

FCC WPT REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
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16677, Rep. of Korea

Date of Issue:
June 17, 2022

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

Report No.: HCT-RF-2206-FC011

FCC ID: A3LSMG990B2

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model: SM-G990B2/DS

Additional Model: SM-G990B2

EUT Type: Mobile Phone

**Frequency of Operation
& Max. Transmit Power:** 110 kHz ~ 148 kHz(Power sharing) : 4.477 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)

Engineering Statement:

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. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

Report No.: HCT-RF-2206-FC011

REVIEWED BY



Report prepared by : Sang Hoon Lee
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
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-2206-FC011	June 17, 2022	- First Approval Report

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1. EUT DESCRIPTION

Model	SM-G990B2/DS
Additional Model	SM-G990B2
EUT Type	Mobile Phone
Power Supply	DC 4.20 V
Frequency of Operation	110 kHz ~ 148 kHz(Power sharing)
Max. Transmit Power	4.477 dBuV/m @300 m
Date(s) of Tests	May 26, 2022 ~ June 21, 2022
Serial number	Radiated: R3CT409L9YB

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 15.205, 15.207 and 15.209 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 30 MHz 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 1 GHz. Above 1 GHz with 1.5 m 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 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 : 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)	2.00 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.40 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.51 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.92 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.48 (Confidence level about 95 %, $k=2$)

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

- S/N : R5CN1003ZRA

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

4. SM-G990B2/DS, SM-G990B2 were tested and the worst case results are reported.

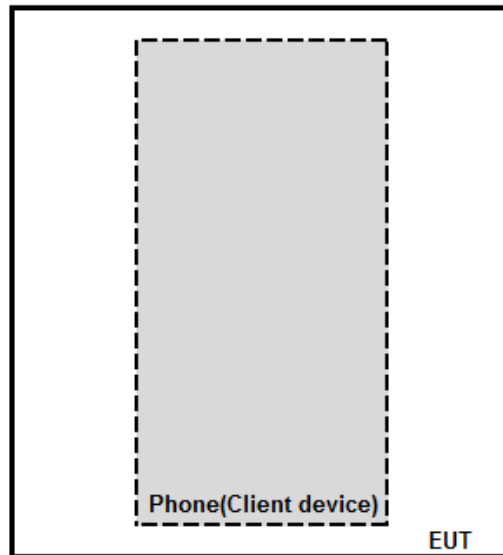
(Worst case : SM-G990B2/DS)

AC Power line Conducted Emissions

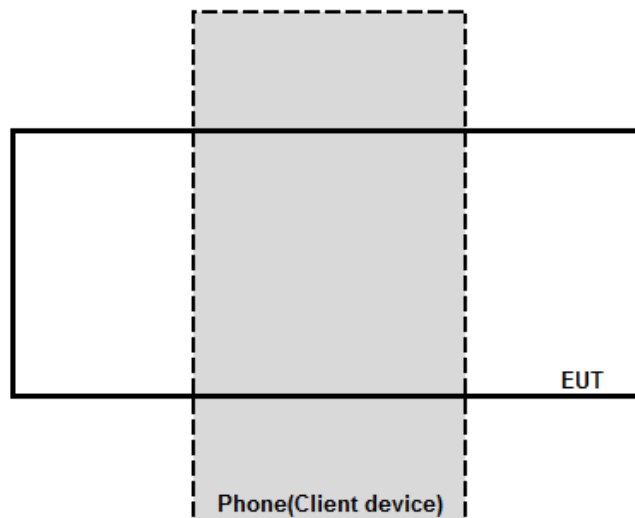
1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : EUT + External accessories(Earphone, etc) + Travel Adapter + Phone(Client device)
 , EUT + Travel Adapter + Phone(Client device)
 - Worst case : EUT + Travel Adapter + Phone(Client device)
2. SM-G990B2/DS, SM-G990B2 were tested and the worst case results are reported.
(Worst case : SM-G990B2/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 :
 - 9 kHz – 150 kHz : 300 Hz
 - 150 kHz – 30 MHz : 10 kHz
 - 30 MHz – 1G Hz : 100 kHz
3. VBW : $\geq 3 \times$ RBW
4. Sweep time : Auto couple
5. Detector : Peak
6. Trace : Maxhold
7. Trace was allowed to stabilize

Limit

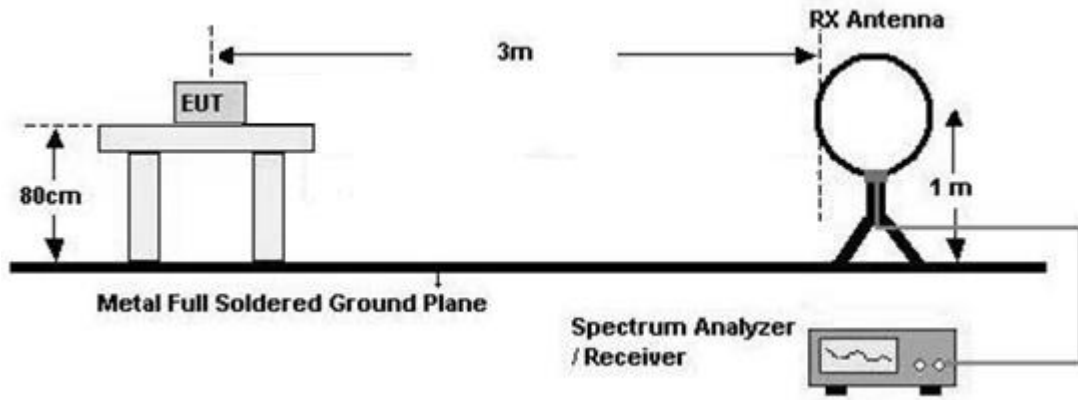
Except as provided elsewhere in this paragraph the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

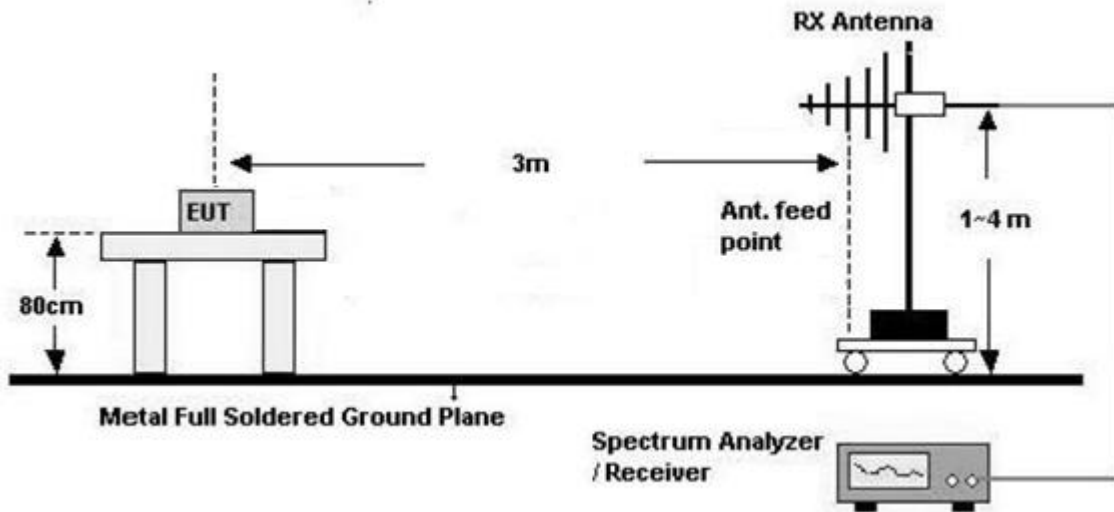
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, 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 0.8 m 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 Value(dBμV/m@30 m)
 - = Measured Value(dBμV/m@3 m) + Ant factor(dB/m) + Cable Loss(dB)
 - Distance Correction Factor(dB)
6. Distance Correction
 - * 0.009 MHz – 0.490 MHz :
 - $40\log(3\text{ m}/300\text{ m}) = - 80\text{ dB}$
 - * 0.490 MHz – 30 MHz :
 - $40\log(3\text{ m}/30\text{ m}) = - 40\text{ dB}$
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 1 GHz)

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 3 m 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 = Measured 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 (dB μ V/m)@3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
9.273	31.808	19.2	0.47	-80.00	-28.522	48.26	76.78
#113.300	61.387	19.6	0.47	-80.00	1.457	26.52	25.06
115.150	29.788	19.6	0.47	-80.00	-30.142	26.38	56.52
340.950	41.008	19.5	0.47	-80.00	-19.022	16.95	35.97
3054.000	12.495	19.6	0.47	-40.00	-7.435	29.54	36.98

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 (dB μ V/m)@3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10.911	32.047	19.2	0.47	-80.00	-28.283	46.85	75.13
#113.250	64.407	19.6	0.47	-80.00	4.477	26.52	22.05
115.250	32.982	19.6	0.47	-80.00	-26.948	26.37	53.32
340.950	40.379	19.5	0.47	-80.00	-19.651	16.95	36.60
3054.000	11.432	19.6	0.47	-40.00	-8.498	29.54	38.04

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 (dB μ V/m)@3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
29.748	36.153	19.6	0.47	-80.00	-23.78	38.14	61.91
#113.350	62.526	19.6	0.47	-80.00	2.60	26.52	23.92
114.400	28.963	19.6	0.47	-80.00	-30.97	26.44	57.40
338.100	41.381	19.5	0.47	-80.00	-18.65	17.02	35.67
3054.000	12.295	19.6	0.47	-40.00	-7.64	29.54	37.18

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 (dB μ V/m)@3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
28.833	36.695	19.6	0.47	-80.00	-23.24	38.41	61.64
#113.350	63.697	19.6	0.47	-80.00	3.77	26.52	22.75
115.350	30.555	19.6	0.47	-80.00	-29.38	26.36	55.74
340.950	42.293	19.5	0.47	-80.00	-17.74	16.95	34.69
3283.500	12.57	19.6	0.47	-40.00	-7.36	29.54	36.90

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.

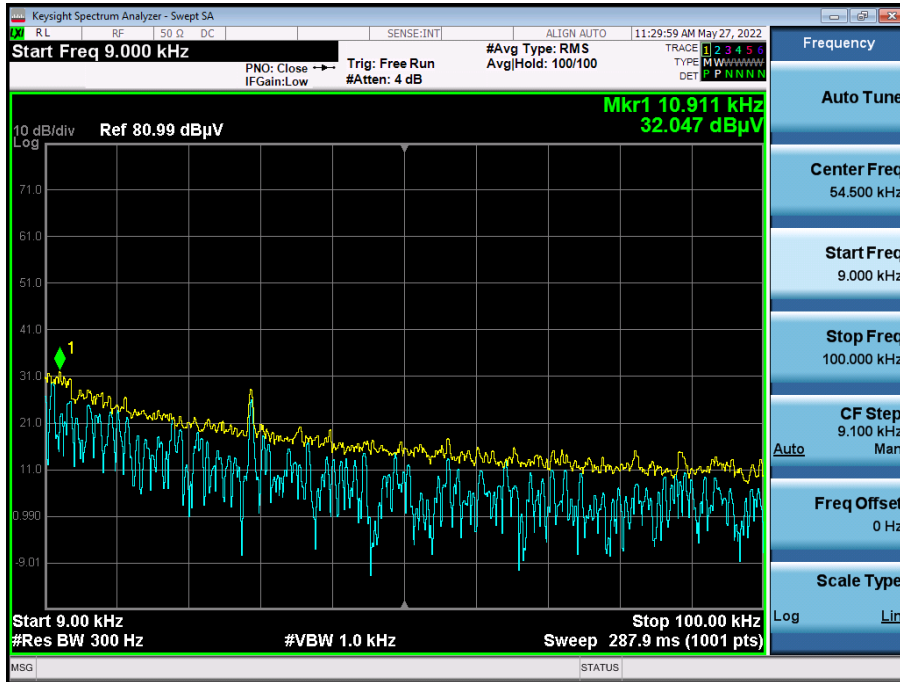
Test Plot

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

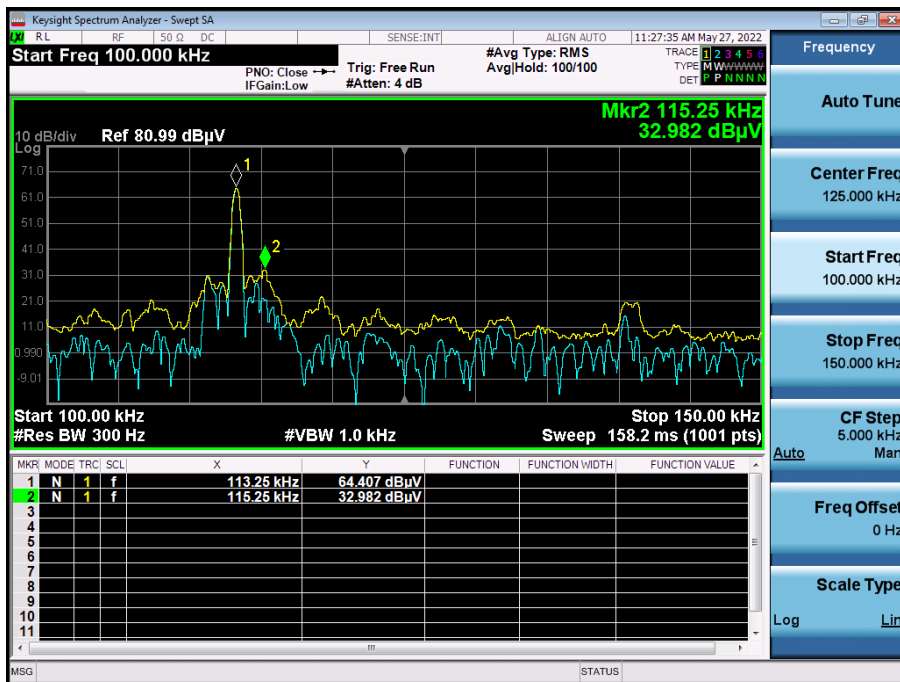
Worst case

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

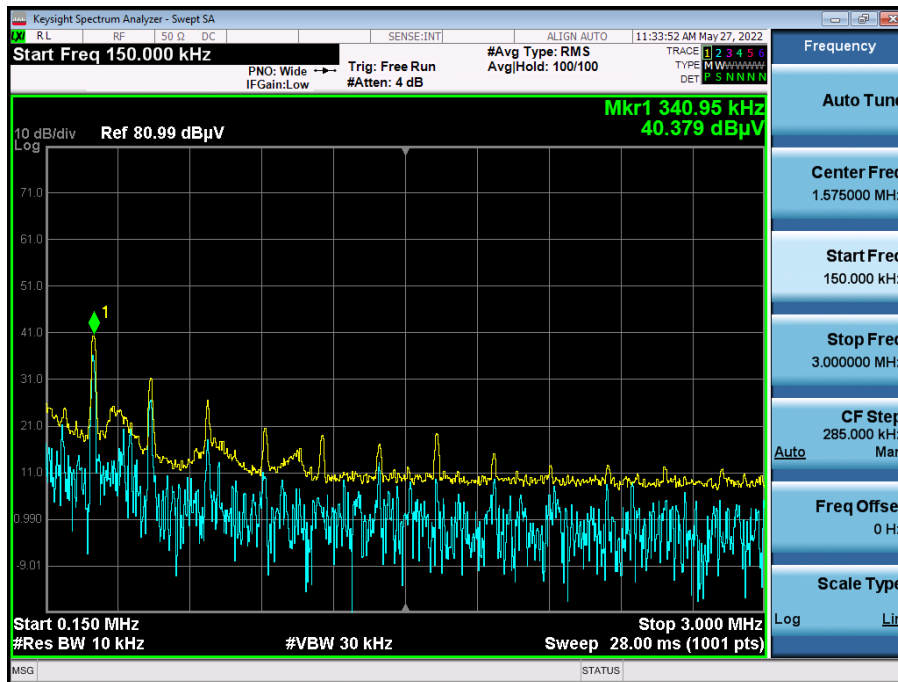
Frequency Range : 9 kHz – 100kHz



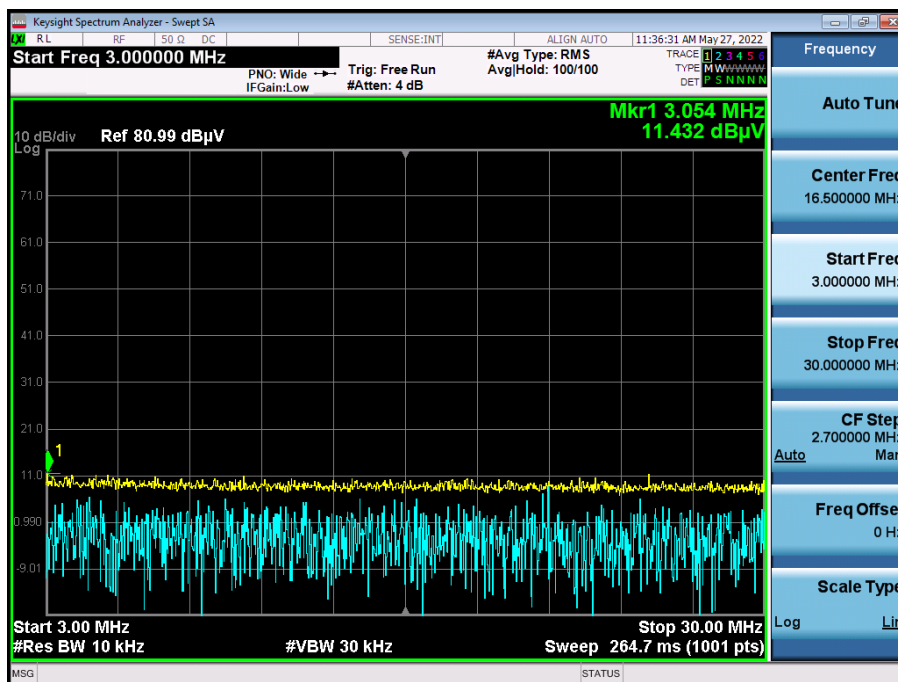
Frequency Range : 100 kHz – 150kHz



Frequency Range : 150 kHz – 3 MHz



Frequency Range : 3 MHz – 30 MHz



Frequency Range : 30 MHz – 1 GHz
 (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) = Measured Value + Correction Factor

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

Test

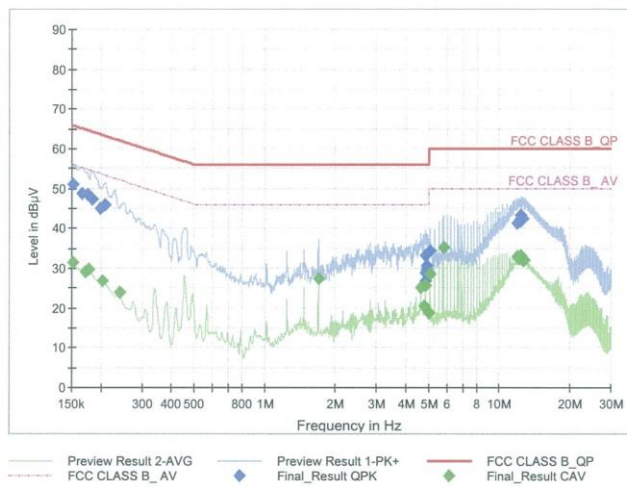
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Test Report

Common Information

EUT : SM-G990B2/DS
 Manufacturer : SAMSUNG Electronics Co., Ltd.
 Test Site : SHIELD ROOM
 Operating Conditions : WPT_Aligned_L1 mode
 Operator Name :
 Comment :

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	51.17	65.88	14.71	9.000	L1	OFF	9.6
0.1658	48.89	65.17	16.28	9.000	L1	OFF	9.6
0.1748	48.55	64.73	16.18	9.000	L1	OFF	9.6
0.1838	47.20	64.31	17.11	9.000	L1	OFF	9.6
0.1995	45.14	63.63	18.49	9.000	L1	OFF	9.6
0.2085	45.88	63.27	17.38	9.000	L1	OFF	9.6
4.8268	28.97	56.00	27.03	9.000	L1	OFF	9.8
4.8335	26.78	56.00	29.22	9.000	L1	OFF	9.8
4.8695	33.15	56.00	22.85	9.000	L1	OFF	9.8
4.8808	29.57	56.00	26.43	9.000	L1	OFF	9.8
4.8920	30.52	56.00	25.48	9.000	L1	OFF	9.8
5.0968	34.20	60.00	25.80	9.000	L1	OFF	9.9
11.8895	41.20	60.00	18.80	9.000	L1	OFF	10.1
12.3373	41.74	60.00	18.26	9.000	L1	OFF	10.1
12.3418	42.53	60.00	17.47	9.000	L1	OFF	10.1
12.3800	42.19	60.00	17.81	9.000	L1	OFF	10.1
12.3868	43.22	60.00	16.78	9.000	L1	OFF	10.1
12.6298	42.29	60.00	17.71	9.000	L1	OFF	10.1

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	31.49	55.88	24.38	9.000	L1	OFF	9.6
0.1725	29.28	54.84	25.56	9.000	L1	OFF	9.6
0.1770	29.60	54.63	25.03	9.000	L1	OFF	9.6
0.2040	26.93	53.45	26.51	9.000	L1	OFF	9.6
0.2400	24.00	52.10	28.10	9.000	L1	OFF	9.6
1.6993	27.35	46.00	18.65	9.000	L1	OFF	9.7
4.6423	25.15	46.00	20.85	9.000	L1	OFF	9.8
4.7795	20.49	46.00	25.51	9.000	L1	OFF	9.8
4.8673	25.71	46.00	20.29	9.000	L1	OFF	9.8
4.9910	18.87	46.00	27.13	9.000	L1	OFF	9.8
5.0945	28.66	50.00	21.34	9.000	L1	OFF	9.9
5.7740	35.24	50.00	14.76	9.000	L1	OFF	9.9
11.8873	32.79	50.00	17.21	9.000	L1	OFF	10.1
12.1303	32.36	50.00	17.64	9.000	L1	OFF	10.1
12.3418	33.05	50.00	16.95	9.000	L1	OFF	10.1
12.3845	33.13	50.00	16.87	9.000	L1	OFF	10.1
12.6298	32.14	50.00	17.86	9.000	L1	OFF	10.1
12.7783	32.03	50.00	17.97	9.000	L1	OFF	10.1

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Conducted Emissions (Line 2)

Test

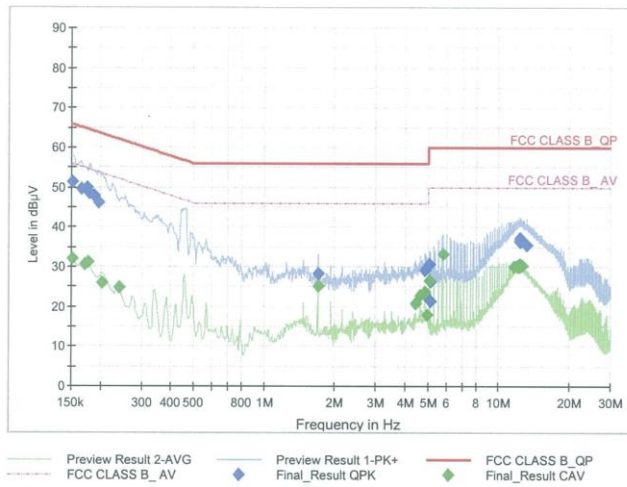
1 / 2

Test Report

Common Information

EUT : SM-G990B2/DS
 Manufacturer : SAMSUNG Electronics Co., Ltd.
 Test Site: SHIELD ROOM
 Operating Conditions : WPT_Aligned_N mode
 Operator Name:
 Comment:

Full Spectrum



Final Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	51.47	65.88	14.41	9.000	N	OFF	9.6
0.1658	49.56	65.17	15.61	9.000	N	OFF	9.6
0.1748	49.97	64.73	14.76	9.000	N	OFF	9.6
0.1793	48.55	64.52	15.97	9.000	N	OFF	9.6
0.1883	47.76	64.11	16.36	9.000	N	OFF	9.6
0.1973	46.28	63.73	17.44	9.000	N	OFF	9.6
1.6993	28.24	56.00	27.76	9.000	N	OFF	9.7
4.8673	29.07	56.00	26.93	9.000	N	OFF	9.8
4.8763	22.98	56.00	33.02	9.000	N	OFF	9.8
5.0945	30.53	60.00	29.47	9.000	N	OFF	9.9
5.1035	26.35	60.00	33.65	9.000	N	OFF	9.9
5.1148	21.36	60.00	38.64	9.000	N	OFF	9.9
12.3395	37.10	60.00	22.90	9.000	N	OFF	10.2
12.3845	36.76	60.00	23.24	9.000	N	OFF	10.2
12.3913	36.75	60.00	23.25	9.000	N	OFF	10.2
12.4003	36.34	60.00	23.66	9.000	N	OFF	10.2
12.4250	36.41	60.00	23.59	9.000	N	OFF	10.2
13.2215	35.44	60.00	24.56	9.000	N	OFF	10.2

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	31.95	55.88	23.92	9.000	N	OFF	9.6
0.1725	30.52	54.84	24.32	9.000	N	OFF	9.6
0.1770	31.21	54.63	23.42	9.000	N	OFF	9.6
0.2040	25.87	53.45	27.58	9.000	N	OFF	9.6
0.2400	24.75	52.10	27.35	9.000	N	OFF	9.6
1.6993	25.20	46.00	20.80	9.000	N	OFF	9.7
4.4150	20.88	46.00	25.12	9.000	N	OFF	9.8
4.6423	22.79	46.00	23.21	9.000	N	OFF	9.8
4.8673	23.75	46.00	22.25	9.000	N	OFF	9.8
4.9550	17.85	46.00	28.15	9.000	N	OFF	9.8
5.0945	26.42	50.00	23.58	9.000	N	OFF	9.9
5.7740	33.22	50.00	16.78	9.000	N	OFF	9.9
11.6600	30.11	50.00	19.89	9.000	N	OFF	10.1
12.0853	29.88	50.00	20.12	9.000	N	OFF	10.1
12.1145	30.40	50.00	19.60	9.000	N	OFF	10.1
12.3373	30.52	50.00	19.48	9.000	N	OFF	10.2
12.3868	30.12	50.00	19.88	9.000	N	OFF	10.2
12.5668	30.35	50.00	19.65	9.000	N	OFF	10.2

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

Test

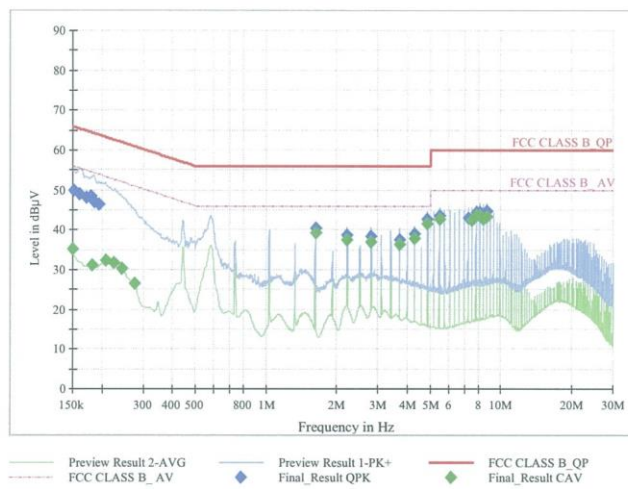
1 / 2

Test Report

Common Information

EUT : SM-G990B2/DS
 Manufacturer : SAMSUNG Electronics Co., Ltd.
 Test Site: SHIELD ROOM
 Operating Conditions : WPT_Cross_L1 mode
 Operator Name:
 Comment:

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	49.80	65.88	16.08	9.000	L1	OFF	9.6
0.1613	49.06	65.40	16.34	9.000	L1	OFF	9.6
0.1725	48.23	64.84	16.61	9.000	L1	OFF	9.6
0.1793	48.37	64.52	16.15	9.000	L1	OFF	9.6
0.1860	47.06	64.21	17.15	9.000	L1	OFF	9.6
0.1950	46.35	63.82	17.48	9.000	L1	OFF	9.6
1.6250	40.37	56.00	15.63	9.000	L1	OFF	9.7
2.2168	38.76	56.00	17.24	9.000	L1	OFF	9.8
2.8063	38.35	56.00	17.65	9.000	L1	OFF	9.8
3.6928	37.47	56.00	18.53	9.000	L1	OFF	9.8
4.2845	38.96	56.00	17.04	9.000	L1	OFF	9.8
4.8763	42.80	56.00	13.20	9.000	L1	OFF	9.8
5.4658	43.49	60.00	16.51	9.000	L1	OFF	9.9
7.2410	43.07	60.00	16.93	9.000	L1	OFF	9.9
7.8305	44.44	60.00	15.56	9.000	L1	OFF	10.0
8.1275	44.54	60.00	15.46	9.000	L1	OFF	10.0
8.4223	43.80	60.00	16.20	9.000	L1	OFF	10.0
8.7170	44.66	60.00	15.34	9.000	L1	OFF	10.0

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	35.16	56.00	20.84	9.000	L1	OFF	9.6
0.1815	31.03	54.42	23.38	9.000	L1	OFF	9.6
0.2085	32.31	53.27	20.95	9.000	L1	OFF	9.6
0.2243	31.72	52.66	20.94	9.000	L1	OFF	9.6
0.2423	30.27	52.02	21.74	9.000	L1	OFF	9.6
0.2760	26.65	50.94	24.29	9.000	L1	OFF	9.6
1.6250	39.37	46.00	6.63	9.000	L1	OFF	9.7
2.2168	37.43	46.00	8.57	9.000	L1	OFF	9.8
2.8063	37.04	46.00	8.96	9.000	L1	OFF	9.8
3.6928	36.28	46.00	9.72	9.000	L1	OFF	9.8
4.2845	37.84	46.00	8.16	9.000	L1	OFF	9.8
4.8763	41.67	46.00	4.33	9.000	L1	OFF	9.8
5.4658	42.75	50.00	7.25	9.000	L1	OFF	9.9
7.5358	42.26	50.00	7.74	9.000	L1	OFF	10.0
7.8305	43.63	50.00	6.37	9.000	L1	OFF	10.0
8.1253	43.58	50.00	6.42	9.000	L1	OFF	10.0
8.4223	42.60	50.00	7.40	9.000	L1	OFF	10.0
8.7170	43.17	50.00	6.83	9.000	L1	OFF	10.0

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Conducted Emissions (Line 2)

Test

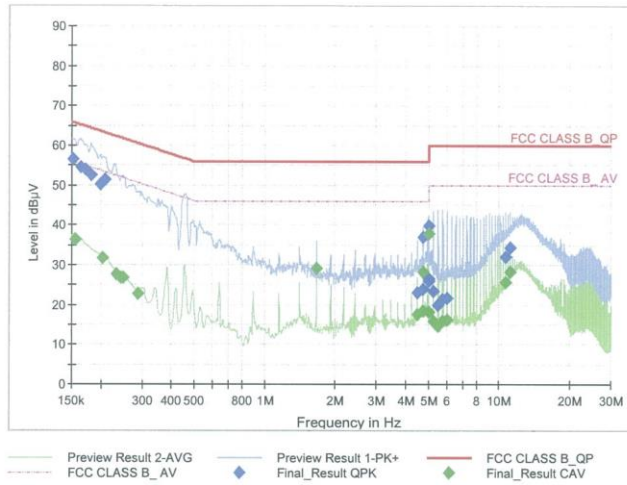
1 / 2

Test Report

Common Information

EUT : SM-G990B2/DS
 Manufacturer : SAMSUNG Electronics Co., Ltd.
 Test Site: SHIELD ROOM
 Operating Conditions : WPT_Cross_N mode
 Operator Name:
 Comment:

Full Spectrum



Final Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	56.47	65.88	9.40	9.000	N	OFF	9.6
0.1635	54.65	65.28	10.64	9.000	N	OFF	9.6
0.1725	53.97	64.84	10.87	9.000	N	OFF	9.6
0.1815	52.49	64.42	11.92	9.000	N	OFF	9.6
0.1995	50.15	63.63	13.48	9.000	N	OFF	9.6
0.2085	51.32	63.27	11.94	9.000	N	OFF	9.6
4.4870	22.97	56.00	33.03	9.000	N	OFF	9.8
4.7323	36.78	56.00	19.22	9.000	N	OFF	9.8
4.7435	24.01	56.00	31.99	9.000	N	OFF	9.8
4.9888	39.80	56.00	16.20	9.000	N	OFF	9.8
4.9978	26.53	56.00	29.47	9.000	N	OFF	9.8
5.0000	26.02	56.00	29.98	9.000	N	OFF	9.9
5.2565	23.24	60.00	36.76	9.000	N	OFF	9.9
5.5130	19.78	60.00	40.22	9.000	N	OFF	9.9
5.7695	21.38	60.00	38.62	9.000	N	OFF	9.9
6.0260	21.75	60.00	38.25	9.000	N	OFF	9.9
10.6408	31.98	60.00	28.02	9.000	N	OFF	10.1
11.1538	34.38	60.00	25.62	9.000	N	OFF	10.1

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	36.24	55.75	19.52	9.000	N	OFF	9.6
0.2040	31.61	53.45	21.84	9.000	N	OFF	9.6
0.2333	27.71	52.33	24.62	9.000	N	OFF	9.6
0.2423	26.94	52.02	25.08	9.000	N	OFF	9.6
0.2490	26.86	51.79	24.93	9.000	N	OFF	9.6
0.2873	22.83	50.60	27.78	9.000	N	OFF	9.6
1.6655	29.12	46.00	16.88	9.000	N	OFF	9.7
4.4870	17.67	46.00	28.33	9.000	N	OFF	9.8
4.7323	28.40	46.00	17.60	9.000	N	OFF	9.8
4.7435	18.47	46.00	27.53	9.000	N	OFF	9.8
4.9888	37.72	46.00	8.28	9.000	N	OFF	9.8
5.0000	18.30	46.00	27.70	9.000	N	OFF	9.9
5.2565	15.72	50.00	34.28	9.000	N	OFF	9.9
5.5130	14.73	50.00	35.27	9.000	N	OFF	9.9
5.7695	15.99	50.00	34.01	9.000	N	OFF	9.9
6.0260	16.18	50.00	33.82	9.000	N	OFF	9.9
10.6408	25.65	50.00	24.35	9.000	N	OFF	10.1
11.1538	28.41	50.00	21.59	9.000	N	OFF	10.1

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11. EMISSION BANDWIDTH PLOT

Test Settings

1. Analyzer frequency set to the frequency of the radiated spurious emissipn of interst
2. RBW : 300 Hz
(Becasue 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

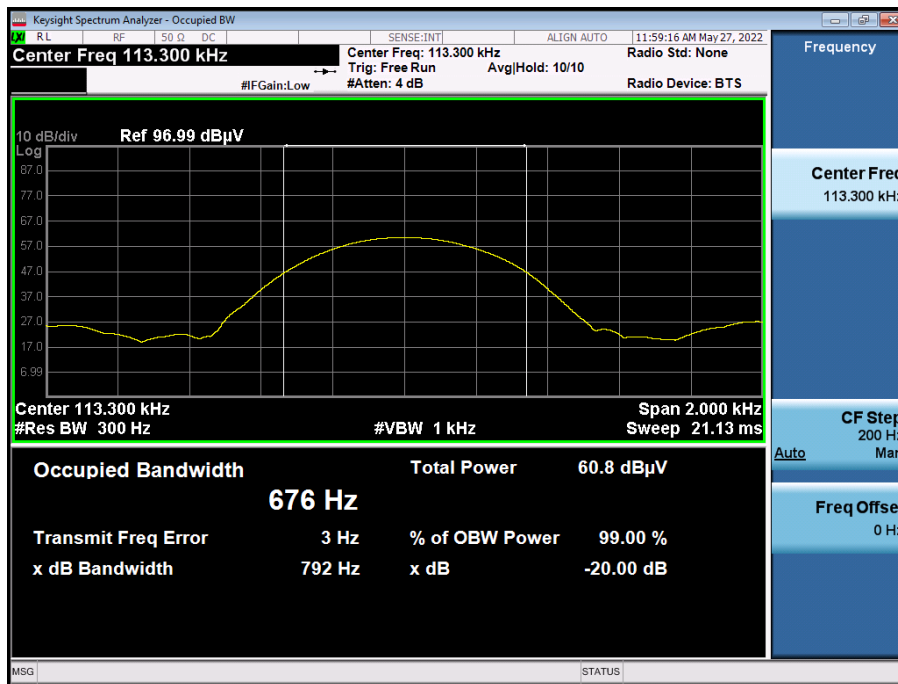
(for reporting purposes only.)

■ Test Result

EUT Mode	Position	Test Frequency (kHz)	20dB Bandwidth (kHz)	Occupied Bandwidth (Hz)
Charging from EUT to Phone	Aligned	113.300	0.792	0.676
Charging from EUT(Charging from TA) to Phone	Aligned	113.350	0.775	0.657
Charging from EUT to Phone	Cross	113.250	0.781	0.671
Charging from EUT(Charging from TA) to Phone	Cross	113.350	0.780	0.665

■ Test Plot

Charging from EUT to Phone Position : Aligned



12. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/23/2022	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/07/2023	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	03/04/2023	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	09/07/2022	Annual
Power Meter	N1911A	Agilent	MY45100523	03/24/2023	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/24/2023	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2022	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/03/2023	Annual
DC Power Supply	E3646A	Agilent	MY40002937	12/14/2022	Annual
Attenuator(10 dB)(DC-26.5 GHz)	5910-N-50-010	H+S	00801	10/29/2022	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	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

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	EM2090	Emco	060520	N/A	N/A
Turn Table	N/A	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	09/04/2022	Biennial
Spectrum Analyzer	FSP(9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/13/2022	Annual
Spectrum Analyzer	FSV40-N(9 kHz ~ 30 GHz)	Rohde & Schwarz	101068-SZ	09/15/2022	Annual
ATT(3 dB) + LNA2(6~18 GHz)	18B-03, CBL06185030	WEINSCHEL CERNEX	N/A	12/22/2022	Annual
ATT(10 dB) + LNA1(0.1~18 GHz)	56-10, CBLU1183540B-01	Api tech, CERNEX	N/A	12/22/2022	Annual

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

13. Annex A_TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2206-FC011-P