TEST REPORT

No.I23Z70243-EMC01

for

Samsung Electronics. Co., Ltd.

Wireless Battery Pack

MODEL NAME: EB-U2510

FCC ID: ZCAEBU2510

with

Hardware Version: V3

Software Version: V02

Issued Date: 2023-11-14

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I23Z70243-EMC01	Rev.0	1st edition	2023-10-25
I23Z70243-EMC01	Rev.1	Changer the product name from" Battery Pack" to "Wireless Battery Pack"	2023-11-14

Note: the latest revision of the test report supersedes all previous version.

CONTENTS

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1: CTTL(Huayuan North Road)

Address: No. 52 Huayuan North Road, Haidian District, Beijing, 100191, P. R. China

1.3. Testing Environment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2023-09-26

Testing End Date: 2023-10-25

1.5. Signature

Zhang Ying

(Prepared this test report)

An Hui

(Reviewed this test report)

Zhang Xia

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	SAMSUNG Electronics Co., Ltd.
Address:	19 Chapin Rd.,Building D Pine Brook, NJ 07058
Contact:	Jenni Chun
E-mail:	j1.chun@samsung.com
Telephone:	+1-201-937-4203

2.2. Manufacturer Information

Company Name:	Samsung Electronics Co., Ltd.
Address:	Samsung R5, Maetan dong 129, Samsung ro Youngtong gu, Suwon city 443 742, Korea
Contact:	Sunghoon Cho
E-mail:	ggobi.cho@samsung.com
Telephone:	+82-10-2722-4159

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Wireless Battery Pack
Model Name	EB-P4520

Note: The EUT functions are described in Annex A of this test report. Specifications of the EUT were provided to fulfil the test. Samples undergoing test were selected by the client. Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL,Telecommunication Technology Labs,CAICT

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT01a	SSW912000030	V3	V02	2023-09-26

*EUT ID: is used to identify the test sample in the lab internally. The HW and SW version information were provided by the applicant.

3.3. Internal Identification of AE

AE ID*	Description	Model	Manufacturer	Note
AE1-1	adapter	EP-TA200(EWE)	---	25W
AE1-2	adapter	EP-TA200(EWE)	---	25W
AE2-1	Mobile phone	---	---	---
AE2-2	Mobile phone	---	---	---
AE2-3	Mobile phone	---	---	---
AE3	Bluetooth headset case	---	---	---
AE4	Bluetooth watch	---	---	---
AE5	USB Cable	SHQ-A175A	Saibao(Jiangxi) Communication Industrial Co.,Ltd	---

*AE ID: is used to identify the test sample in the lab internally.
Note: The USB cables are shielded.

3.4. EUT set-ups

Model No.	Combination of AE		
	Type C port 1(near the power button)	Type C port 2	Wireless
Model 1	adapter	adapter	/

Model 2	adapter	Mobile phone	Mobile phone
Model 3	adapter	Mobile phone	Bluetooth headset case
Model 4	adapter	Mobile phone	Bluetooth watch
Model 5	Mobile phone	adapter	Mobile phone
Model 6	Mobile phone	adapter	Bluetooth headset case
Model 7	Mobile phone	adapter	Bluetooth watch
Model 8	Mobile phone	Mobile phone	Mobile phone
Model 9	Mobile phone	Mobile phone	Bluetooth headset case
Model 10	Mobile phone	Mobile phone	Bluetooth watch

EUT set-up No.	**Combination of EUT and AE**	**Remarks**
Set.1	UT01a + AE1-1 + AE1-2 + AE5	Model 1, EUT+ adapters, charging
Set.2	UT01a + AE1-1 + AE2-1 + AE2-2 + AE5	Model 2/5, EUT+ adapter + mobile phones, charging + discharging
Set.3	UT01a + AE1-1 + AE2-1 + AE3+ AE5	Model 3/6, EUT+ adapter + mobile phone+ Bluetooth headset case, charging + discharging
Set.4	UT01a + AE1-1 + AE2-1 + AE4+ AE5	Model 4/7, EUT+ adapter + mobile phone+ Bluetooth watch, charging + discharging
Set.5	UT01a + AE2-1 + AE2-2 + AE2-3+ AE5	Model 8, EUT+ mobile phones, discharging
Set.6	UT01a + AE2-1 + AE2-2 + AE3+ AE5	Model 9, EUT+ mobile phones+ Bluetooth headset case, discharging
Set.7	UT01a + AE2-1 + AE2-2 + AE4+ AE5	Model 10, EUT+ mobile phones+ Bluetooth watch, discharging

Note: All the set-ups above were tested but only the worst test data of worst set-up showed in this report.

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters, referring to Annex A for detailed information, were supplied by the client or manufacturer, which is the basis of testing. CAICT is not responsible for the accuracy of customer supplied technical information that may affect the test results (for example, antenna gain and loss of customer supplied cable).

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices - Unintentional Radiators	2023
ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

Note: The test methods have no deviation with standards.

5. Test Results

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	BR	Re-use test data from basic model report.
	NA	Not applicable
	NM	Not measured

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	**CTTL(Huayuan North Road)**
2	Conducted Emission	15.107(a)	B.2	P	**CTTL(Huayuan North Road)**

6. Test Facilities Utilized

Test instruments list:

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	LISN	ENV216	101200	R&S	1 years	2024-06-04
2	Test Receiver	ESCI 3	100344	R&S	1 years	2024-02-20
3	Test Receiver	ESW44	103144	R&S	1 years	2023-10-25
4	BiLog Antenna	BULB 9163	01223	Schwarzbeck	1 years	2024-03-26

Test software list:

Test Item	Test Software	Software Vendor
Radiated Emission	EMC32 V11.50.00	R&S
Conducted Emission	EMC32 V8.53.0	R&S

Semi-anechoic chamber utilized did not exceed following limits along the testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 10 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 6GHz

Shielded room utilized did not exceed following limits along the testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz－1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

7. Measurement Uncertainty

Where relevant, the following measurement uncertainty(worse case) levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Location 1: CTTL(huayuan North Road)

Test item	Frequency ranges	Measurement uncertainty
Radiated Emission	30MHz-1GHz	4.72dB(*k*=2)
	1GHz-18GHz	4.84dB(*k*=2)
Conducted Emission	150kHz-30MHz	AC Power Line: 3.08dB(*k*=2)

ANNEX A: EUT parameters

Cellular Bands operate between 30MHz-960MHz	╳GSM	Band
	╳CDMA	Band
	╳WCDMA	Band
	╳LTE	Band
	╳5G NR SA	Band
	╳5G NR NSA	Band
Other FCC Part 15B related features	╳FM ╳MP3 ╳MP4 ╳Camera ╳USB data √charging/OTG √wireless	

ANNEX B: Detailed Test Results

B.1. Radiated Emission

Reference: FCC Part 15.109(a).

Method of measurement: The field strength of radiated emissions from the unintentional radiator at distances of 10 meters(for 30MHz-1GHz) and 3 meters (for above 1GHz) were tested. The test was in accordance with the procedures of ANSI C63.4 – 2014, section 8.3.
The EUT was placed on a non-conductive table. The measurement antenna was placed at the specified distance from the EUT. During the test, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

EUT operating mode:
The MS is operating in the mode produced the largest emission consistent with normal application. All the modes in section 3.5weretested.
All equipment is placed on the test table top and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions.

Measurement limit:

Frequency range (MHz)	Field strength limit (μV/m)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

Note: the above limit is for 3 meters test distance.
The limits for 10 meters distance is got by converting: Limit(10m) = Limit(3m) + 20[log(3/10)], which is according to FCC 15.109(g)(2)

Test settings:

Frequency range (MHz)	RBW/VBW	Sweep Time (s)	Detector
30-1000	120kHz (IF Bandwidth)	5	Peak/Quasi-peak
Above 1000	1MHz/3MHz	15	Peak, Average

Measurement results:
A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”. It includes the antenna factor of receive antenna and the path loss.
The measurement results are obtained as described below:
Result = $P_{Mea} + A_{Rpl} = P_{Mea} + G_A + G_{PL}$
Where

G_A: Antenna factor of receive antenna

G_{PL}: Path Loss

P_{Mea}: Measurement result on receiver.

Note:

The measurement results showed as followed are worst cases, and all of the set-ups and each operating mode listed in section 3.5were tested,.

The highest internal source of the EUT is not more than 108MHz, so the measurement above 1000MHz is not applicable.

Set. 3, Model 6, EUT+ adapter + mobile phone+ Bluetooth headset case, charging + discharging

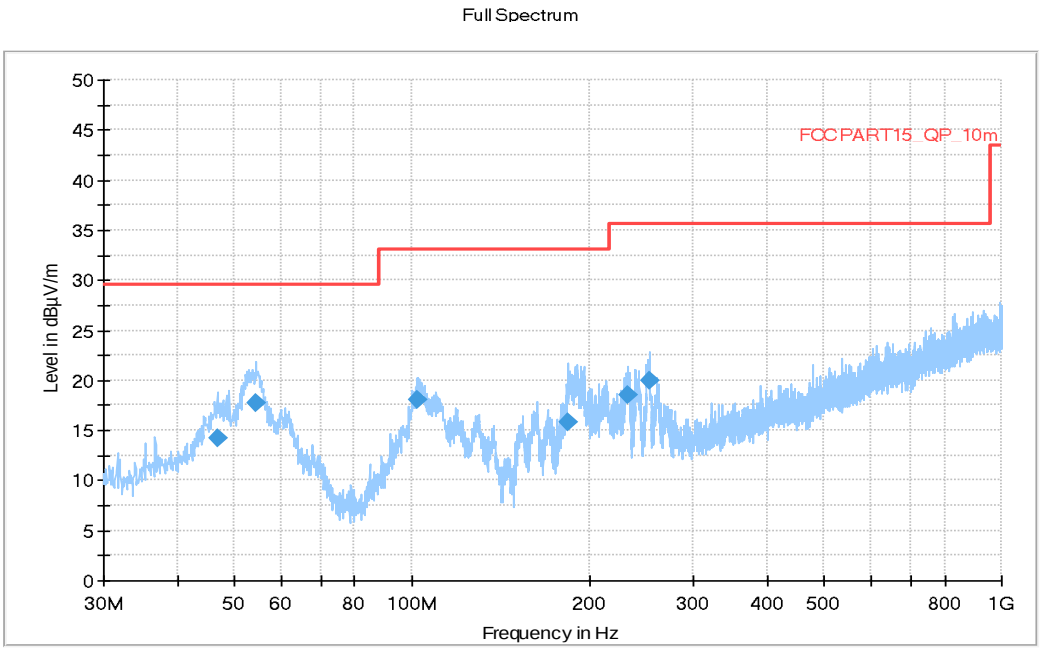

Figure A.1 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency	QuasiPeak	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
46.781000	14.28	29.54	15.26	120.000	322.0	V	45.0	-10.6
54.347000	17.75	29.54	11.79	120.000	125.0	V	-43.0	-11.0
102.168000	18.12	33.06	14.94	120.000	125.0	V	-31.0	-12.1
183.745000	15.85	33.06	17.21	120.000	283.0	H	8.0	-13.5
231.954000	18.60	35.56	16.96	120.000	175.0	V	252.0	-10.7
252.324000	19.94	35.56	15.62	120.000	125.0	V	266.0	-9.8

B.2. Conducted Emission

Reference: FCC: Part 15.107(a).

Method of measurement: For equipment 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. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 7.3.

EUT operating mode: The EUT is operating in the mode produced the largest emission consistent with normal application. All the modes in section 3.5 were tested.

Measurement limit:

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency		

Test Settings:

Voltage(V)	Frequency(Hz)
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1

Measurement results:

Note: All of the set-ups and each operating model listed in section 3.5 were tested, only the worst test data are showed in this section.

Set.2, Model 2: EUT+ adapter + mobile phones, charging + discharging

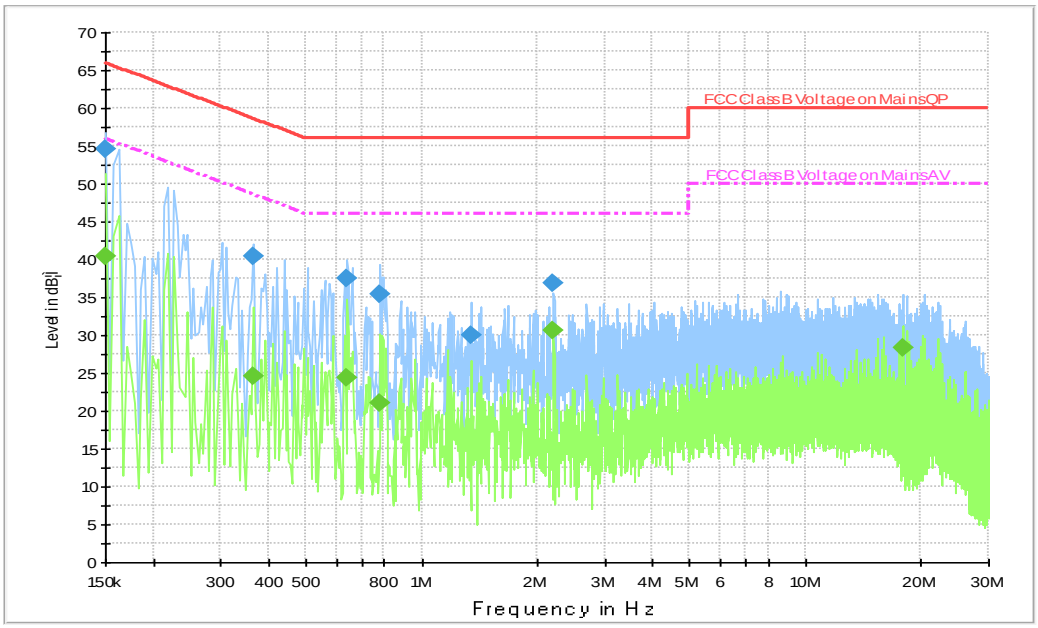

Figure A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	54.5	N	20.0	11.5	66.0
0.366000	40.5	N	19.7	18.1	58.6
0.638000	37.4	N	19.6	18.6	56.0
0.782000	35.5	L1	19.7	20.5	56.0
1.346000	30.0	L1	19.6	26.0	56.0
2.206000	36.8	N	19.6	19.2	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	40.5	N	20.0	15.5	56.0
0.366000	24.7	N	19.7	23.9	48.6
0.638000	24.4	N	19.6	21.6	46.0
0.782000	21.1	L1	19.7	24.9	46.0
2.206000	30.6	N	19.6	15.4	46.0
18.038000	28.4	N	19.7	21.6	50.0

ANNEX C: Persons involved in this testing

Test Item	Tester
Radiated Emission	Li Pengfei
Conducted Emission	Yan Hanchen

*****END OF REPORT*****