
EMC TEST REPORT

Report Number	BWTR-2210-FCC15B-1
FCC ID	2ATI9-P00107
Applicant	SoftBank Robotics Corp.
Product Name	Virtual Wall Barrier System
Marketing Name	Whiz Screen
Brand Name	SoftBank Robotics
Model Name	P00107101 P00107401
Serial Number	D6TB020006
Test Standard	FCC 47 CFR Part 15 Subpart B
Tested Date	Mar. 02, 2022

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Revision History

Revision	Description	Issued Date
A	Initial issue of report	2022/03/04

1 Summary of Test Result

Report Section	FCC Section	Description	Result
3.1	15.107	Conducted Emission	N/A ^{Note}
3.2	15.109	Radiated Emission	Pass

Note: The test was not performed since the EUT is only powered by the mobile power pack.

We, Beijing Boomwave Test Service Co. Ltd., would like to declare that the tested sample has been evaluated and in compliance with the requirements of applicable standards.

Prepared by:



2022.03.04
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Rationale:

The test results in this report apply exclusively to the tested model / sample.

The electrical copy of test report is invalid without the signatures. The hard copy is invalid without seal.

The test report shall not be modified, republished or copied without the written authorization of the laboratory.

2 General Information

2.1 Applicant

SoftBank Robotics Corp.
7-1, Kaigan 1-chome, Minato-ku, Tokyo 105-7537, Japan

2.2 Manufacturer

SoftBank Robotics Corp.
7-1, Kaigan 1-chome, Minato-ku, Tokyo 105-7537, Japan

2.3 Product Feature of Equipment Under Test

Product Name	Virtual Wall Barrier System
Marketing Name	Whiz Screen
Model Name	P00107101 P00107401
Sample Status	Prototype
Power Supply Rating	DC 5.2V from mobile power pack
Operating Frequency Range	902MHz ~ 928MHz
Type of Wireless Technology	Radio Frequency Identification (RFID)
Number of Antenna	1
Antenna Type	Quadrifilar Helix
Cable	0.2m USB cable
Hardware Version	2.0.0
Software Version	1.1.0
Sample Received Date	2022/02/07

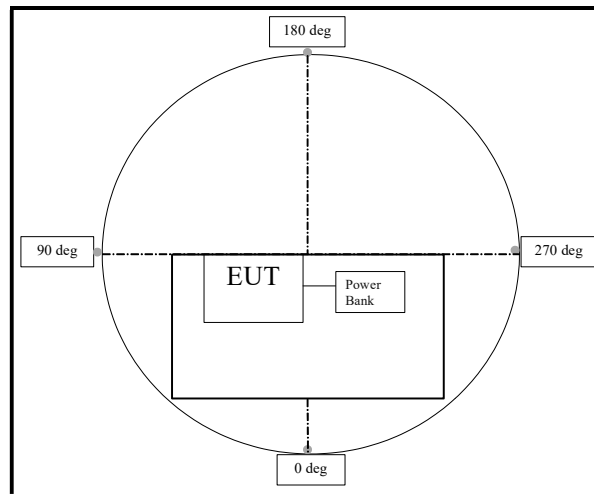
Note: According to the declaration of applicant, the model P00107101 and P00107401 are all the same except for different appearance and color due to its marketing requirement. And the materials for these differences are all the same plastic. Since this case will not affect any wireless performance, all tests of this report were performed only with model P00107101.

2.4 Ancillary Equipment

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following ancillary equipment were used to form a representative test configuration during the tests.

Support Unit	Mobile Power Pack
Manufacturer	Baseus
Model Name	PPXF201-X
Capacity	20000mAh
Nominal Voltage	5V
Serial Number	---

2.5 Configuration and Peripherals



2.6 Applicable Standards

Standard	Version	Title
FCC 47 CFR Part 15 Subpart B	2020	Requirements for Un-intentional Radiators
ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz

2.7 Test Facilities

Company Name: Beijing Boomwave Test Service Co. Ltd

Address: EMC Building, No.1 Wang Jing East Road, Chao Yang District Beijing, P.R. China 100102

FCC Test Firm Registration Number: 613197

ISED Canada Registration No.: 24289 (CAB Identifier: CN0010)

VCCI Registration No.: R-20062, G-20063, C-20050, T-20049

Test Site	Description	Dimension	Ground Plane Size
☐ SAC10	10m semi-anechoic chamber	19.5m × 12.9m × 8.6m	4m × 4m
☒ SAC3	3m semi-anechoic chamber	9.6m × 6.4m × 6.0m	9.6m × 6.4m
☐ SR#1	Shielding Room for EMS test	8.1m × 4.05m × 2.755m	8.1m × 4.05m
☐ SR#2	Shielding Room for RF test	8.1m × 4.05m × 2.755m	---

2.8 EUT Operation Mode

Mode No.	Mode	Description
Mode 1	Receiving Mode	---

3 Test Result

3.1 Conducted Emission

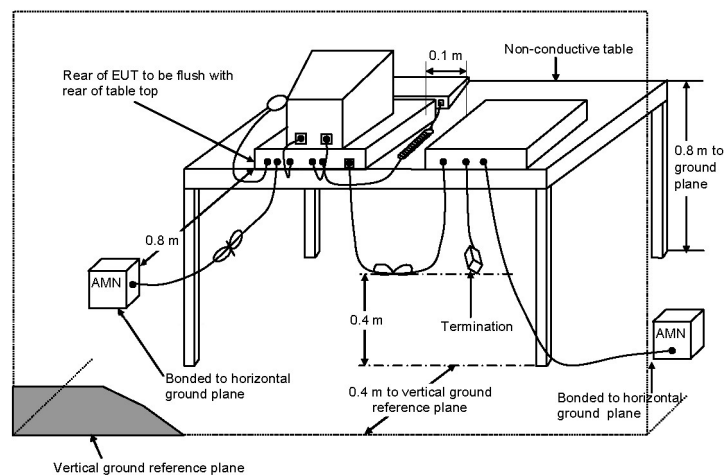
3.1.1. Limits

FCC 47 CFR Part 15 Subpart B - §15.107 (a)

Frequency Range (MHz)	Detector Type / Bandwidth	Class B limits (dBμV)
0.15 to 0.5	Quasi Peak / 9 kHz	66 to 56
0.5 to 5		56
5 to 30		60
0.15 to 0.5	Average / 9 kHz	56 to 46
0.5 to 5		46
5 to 30		50

Note: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

3.1.2. Typical Test Setup Layout



3.1.3. Test Procedures

- 1) The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meter from any other grounded conducting surface.
- 2) Connect EUT to the power mains through a line impedance stabilization network (LISN).
- 3) All the support units are connected to the other LISN.
- 4) The frequency range from 150 kHz to 30 MHz was searched.
- 5) Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6) 6 frequency points closest to the limit of each line shall be performed the final measurement by Quasi Peak detector.

3.1.4. Test Result

N/A

Note: This test was not performed since the EUT is only powered by the mobile power pack.

3.1.5. Uncertainty

$$U_{lab}=3\text{dB} (U_{Cispr}=3.44\text{dB})$$

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of 2 which gives a level of confidence of approximately 95%.

3.2 Radiated Emission

3.2.1. Limit

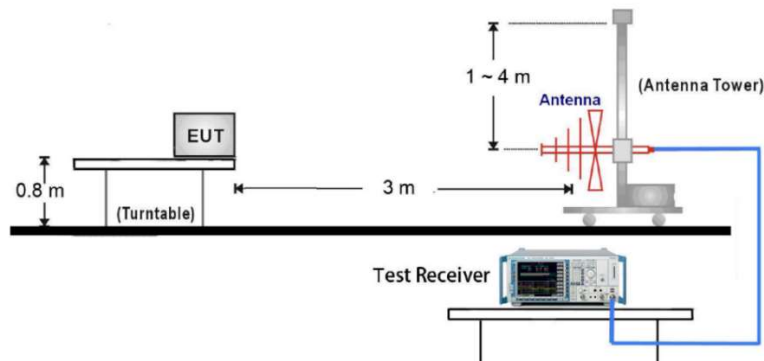
FCC 47 CFR Part 15 Subpart B - §15.109 (a)

Frequency (MHz)	Field Strength		Measurement Distance (meters)
	uV/m	dBuV/m	
30 - 88	100	40.0	3
88 - 216	150	43.5	3
216 - 960	200	46.0	3
Above 960	500	54.0	3

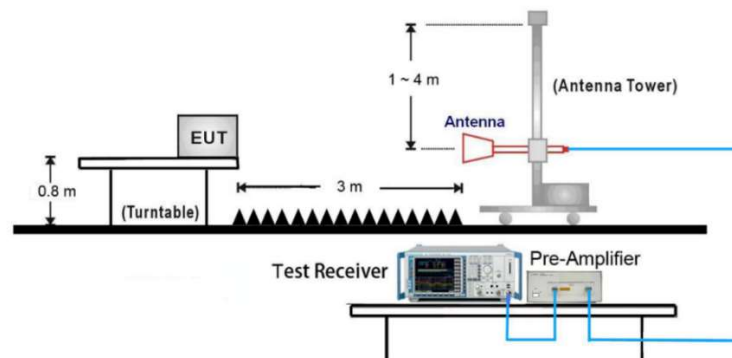
Frequency (MHz)	Class B Limits dBuV/m		Measurement Distance (meters)
	Peak	Average	
Above 1000	74	54	3

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705~108	1000
108~500	2000
500~1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

3.2.2. Typical Test Setup Layout and Connection



30MHz- 1GHz Test Setup



Above 1GHz Test Setup

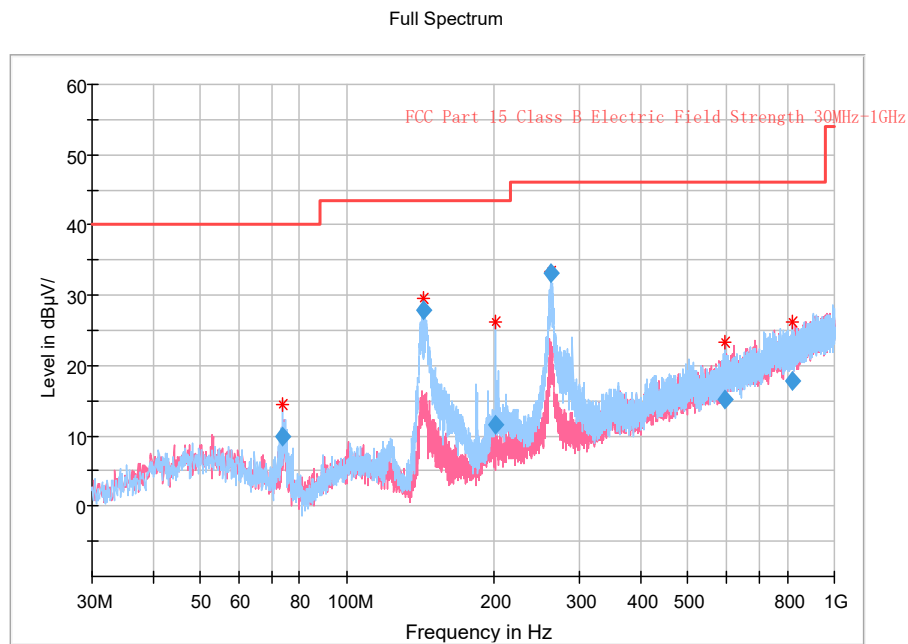
3.2.3. Test Procedures

30MHz - 1GHz & Above 1GHz:

- 1) The EUT was placed on a rotatable table top 0.8 meter above ground.
- 2) The EUT was set 3 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- 3) The table was rotated 360 degrees to determine the position of the highest radiation.
- 4) The elevation of the antenna varies from 1 m to 4 m above the ground to find the maximum field strength. The horizontal polarization and vertical polarization of the antenna are set for measurement.
- 5) For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 to 4 meters) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- 6) Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode; Then the quasi-peak or average scan is carried out at points with relatively high peak value.
- 7) Reading(dBuV/m) = QuasiPeak(dBuV/m) or MaxPeak(dBuV/m) or Average(dBuV/m) - Corr.(dB)

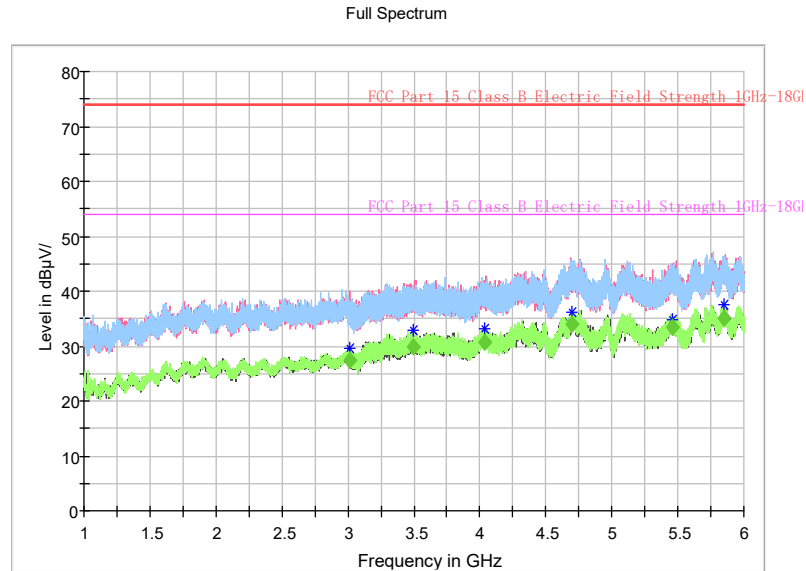
3.2.4. Test Result

Test Mode	Mode 1	Test Date	2022.03.02
Test Frequency	30 MHz ~ 1000 MHz	Test Engineer	Gao Shuang
Serial Number	D6TB020006	Temp, Humidity	24.2°C, 53.4%



Frequency (MHz)	Reading (dBuV/m)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
73.844000	34.79	9.89	40.00	30.11	1000.0	120.000	218.7	H	295.0	-24.9
143.102000	51.67	27.77	43.50	15.73	1000.0	120.000	224.3	H	10.0	-23.9
201.787000	31.79	11.69	43.50	31.81	1000.0	120.000	124.7	H	-24.0	-20.1
262.412000	51.28	33.18	46.00	12.82	1000.0	120.000	99.8	H	65.0	-18.1
597.644000	23.19	15.09	46.00	30.91	1000.0	120.000	175.6	H	115.0	-8.1
821.811000	22.59	17.89	46.00	28.11	1000.0	120.000	113.1	H	115.0	-4.7

Test Mode	Mode 1	Test Date	2022.03.02
Test Frequency	1000 MHz ~ 6000 MHz	Test Engineer	Gao Shuang
Serial Number	D6TB020006	Temp, Humidity	24.2°C, 53.4%



Frequency (MHz)	Reading MaxPeak (dBμV/m)	Reading Average (dBμV/m)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
3011.000000	---	55.06	---	27.46	54.00	26.54	1000.0	1000.000	112.2	V	25.0	-27.6
3493.400000	---	55.20	---	29.80	54.00	24.20	1000.0	1000.000	217.4	V	-24.0	-25.4
4038.400000	---	55.31	---	30.61	54.00	23.39	1000.0	1000.000	112.2	V	-3.0	-24.7
4702.100000	---	55.55	---	33.95	54.00	20.05	1000.0	1000.000	224.8	H	205.0	-21.6
5462.900000	---	55.40	---	33.30	54.00	20.70	1000.0	1000.000	187.0	V	-1.0	-22.1
5845.100000	---	55.25	---	35.15	54.00	18.85	1000.0	1000.000	206.9	V	190.0	-20.1

3.2.5. Uncertainty

Radiated Test				
Frequency	Antenna Polarization	Distance	U_{lab}	k
30MHz-200MHz	Horizontal	3m	4.58 dB	2
	Vertical	3m	4.73 dB	2
200MHz-1GHz	Horizontal	3m	4.90 dB	2
	Vertical	3m	4.93 dB	2
1GHz-6GHz	---	3m	4.66 dB	2
6GHz-18GHz	---	3m	5.14dB	2

Determining compliance with the limits shall be based on the results of the compliance measurements, taking into account the considerations on measurement instrumentation uncertainty.

Because U_{lab} is equal to U_{CISPR} (as specified in CISPR16-4-2), then:

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

4 Test Instruments

Test Item	Description	Model Name	S / N	Manufacture	Next Cal Date
Radiated Emission	EMI TEST RECERVER	ESR26	101320	R&S	2023/01/11
	Pre-amplifier	PE15A1009	V00140120181115E825	Pasternack Enterprises	2023/01/11
	Hybrid antenna	VULB9163	01266	SCHAFFNER	2022/07/03
	Pre-amplifier	TAP-011858	AP19L806047	TONSCEND	2022/04/01
	Horn Antenna	HF907	100096	R&S	2022/04/01
Other	Digital display temperature and humidity recorder	TM320	15082	DICKSON	2022/05/11
	Aneroid barometer	DYM3	00868	Shanghai Boji	2022/05/05

--- End of Test Report ---