
TEST REPORT

Report No.: SRTC2019-9003(F)-0001
Product Name: Fi Smart Collar
Model Name: FC1
Applicant: Barking Labs Corp.
Manufacturer: Barking Labs Corp.
Specification: FCC Part15B (Certification)
(2019 edition)
ANSI C63.4-2014
FCC ID: 2ARXN-FC1

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, Shijingshan District,

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1. General information

1.1 Notes of the test report

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The test results relate only to individual items of the samples which have been tested.

1.2 Information about the testing laboratory

Company: The State Radio_monitoring_center Testing Center (SRTC)
Address: 15th Building, No.30 Shixing Street, Shijingshan District
Testing location: No.80, Zhaojiachang, BeizangCun, Daxing District, Beijing, China.
City: Beijing
Country or Region: China
Contacted person: Liu Jia
Tel: +86 10 57996183
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Email: liujiaf@srtc.org.cn

1.3 Applicant's details

Company: Barking Labs Corp.
Address: 53 Bridge St., Suite 103 USA
City: Brooklyn, NY
Country or Region: USA
Contacted person: Bob Blake
Tel: +1-914-249-9347
Email: bob@tryfi.com

1.4 Manufacturer's details

Company: Barking Labs Corp.
Address: 53 Bridge St., Suite 103 USA
City: Brooklyn, NY
Country or Region: USA
Contacted person: Bob Blake
Tel: +1-914-249-9347
Email: bob@tryfi.com

1.5 Application details

Date of reception of test sample: 29th Jan. 2019

Date of test: 29th Jan. 2019 to 25th Feb. 2019

1.6 Reference specification

FCC Part 15B, 2019 (Certification)

1.7 Information of EUT

1.7.1 General information

Name of EUT	Fi Smart Collar
FCC ID	2ARXN-FC1
Frequency Range	LTE band II(Cat-M1): Tx:1850~1910MHz Rx:1930~1990MHz LTE band IV(Cat-M1): Tx: 1710 MHz – 1755 MHz Rx: 2110 MHz – 2155 MHz LTE band XII(Cat-M1) Tx:699 –716 MHz Rx:729 –746 MHz Bluetooth: 2.4~2.4835GHz
Modulation Type	LTE:QPSK; 16QAM Bluetooth: GFSK (LE)
Duplex Mode	FDD
Equipment Class	Class B
Antenna Type	IFA Antenna
Power Supply	Battery or Charger
Rated Power Supply Voltage	3.85V
Extreme Temperature	Lowest: -20°C Highest: +60°C
Extreme Voltage	Minimum: 3.0V Maximum: 4.35V
HW Version	Rev.A
SW Version	1.0

1.7.2EUT details

Product Name	Model Name	IMEI
Fi Smart Collar	FC1	/

1.7.3 Auxiliary equipment details

AE (Auxiliary Equipment) 1#: USB Cable

Manufacturer	SuZhou KELI TECHNOLOGY DEVELOPMENT CO., LTD.
Model Number	KLC-3103

AE (Auxiliary Equipment) 2#: Battery

Type	Li-Lon
Manufacturer	Jiade Energy Technology(Zhuhai)Co.,Ltd.
Model Number	JKIT
Capacity	520mAh
Nominal Voltage	3.85

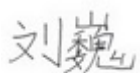
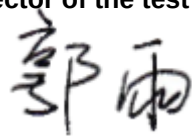
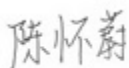
AE (Auxiliary Equipment) 3#: Charger

Manufacturer	DEE VAN ENTERPRISE CO., LTD.
Model Number	DSA-5PF03-05 FUS 050100
Input Voltage	100V-240V AC
Frequency	50/60Hz

2. Test information

2.1 Summary of the test results

No.	Test case	FCC reference	Verdict
1	Conducted emissions	15.107	Pass
2	Radiated emissions	15.109	Pass

Approved By: Mr. Liu Wei Director of the test department 	Checked By: Mr. Guo Yu Vice director of the test department 
Tested By: Mr Chen Huaiwei 	Issued date: 2019.02.26

2.2 Test result

2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
23.4°C	41.2%	101.2kPa

Test Setup with charger:

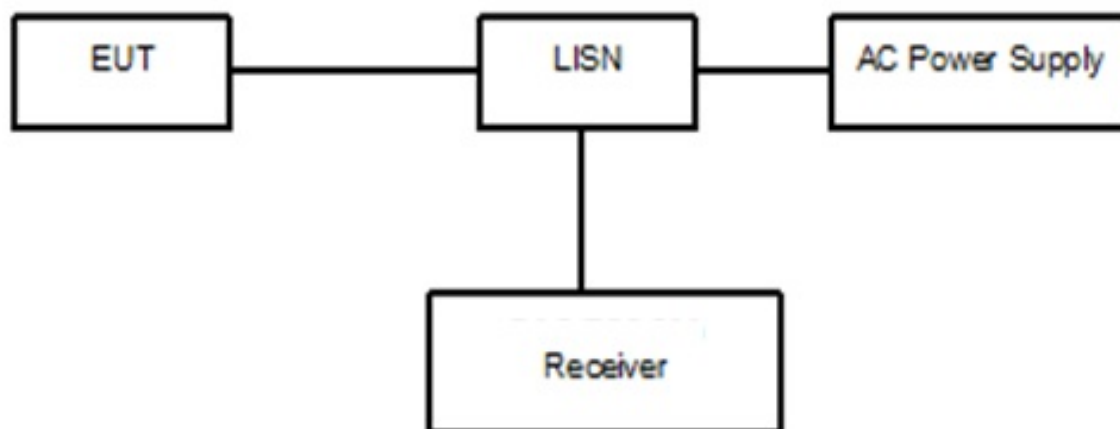


Figure 1

Test Procedure:

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The EUT is connected with LISN via the charger. The LISN is connected to the reference ground.

The test set-up and the test methods are performed according to ANSI C63.4:2014. Then start the test software EMC32. Sweep the whole frequency band through the range from 150 KHz to 30 MHz with RBW 9kHz, VBW 30kHz. The measurement should be done for both L line and N line. During pre-test, the receiver uses both peak detector and average detector. And the final test, the receiver uses both average detector and Quasi-peak detector.

The data of cable loss has been calibrated in full testing frequency range before the testing.

A "reference path loss" Corr.(dB) is established and the $L_{\text{cable}} + \text{ATT} + \text{VDF}$ is the attenuation of "reference path loss", and including the cable loss, the attenuation of the attenuator, the voltage division factor of AMN.

The measurement results are obtained as described below:

$$P_{\text{result}} = P_{\text{mea}} + \text{Corr. (dB)}$$

Sample calculation: (29.64 dBμV) = (-0.06 dBμV) + (29.7 dB), the corresponding frequency is 0.409695MHz.

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Cor. (dB)	Pmea MaxPeak (dBμV)	Pmea Average (dBμV)
0.409695	29.64	---	57.65	28.01	L1	29.7	-0.06	---

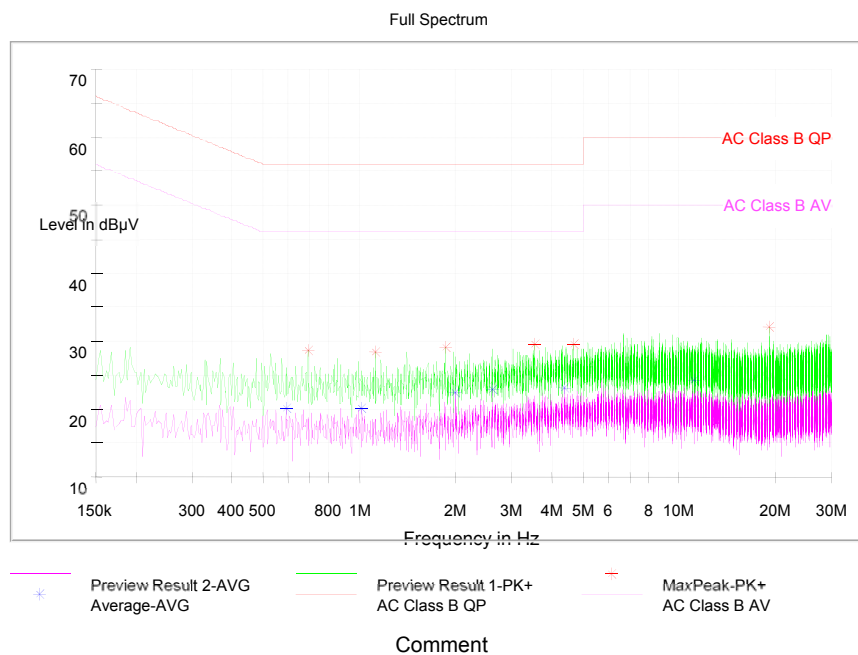
Limit:

Frequency of Emission(MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15~0.5	66 to 56*	56 to 46*
0.5~5	56	46
5~30	60	50

Note: * Decreases with the logarithm of the frequency

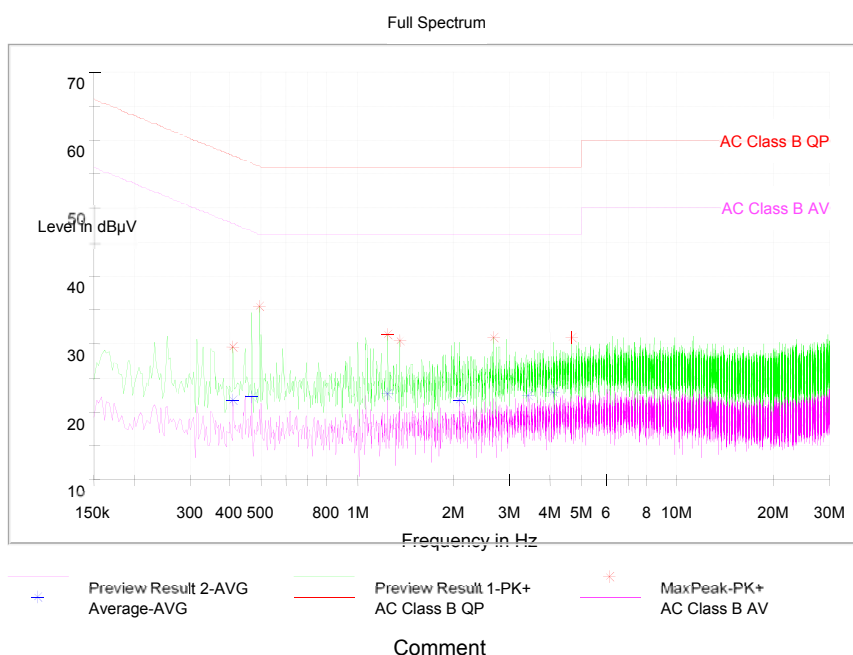
Test result:

Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

EUT + Charger:



Pic2. Conducted emission L&N Line

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)	Pmea MaxPeak (dBµV)	Pmea Average (dBµV)
0.409695	29.64	---	57.65	28.01	L1	29.7	-0.06	---
0.409695	---	21.83	47.65	25.82	L1	29.7	---	-7.87
0.469395	---	22.21	46.53	24.32	L1	29.7	---	-7.49
0.496260	35.61	---	56.06	20.45	L1	29.7	5.91	---
1.242510	31.40	---	56.00	24.60	L1	29.7	1.7	---
1.242510	---	22.64	46.00	23.36	L1	29.7	---	-7.06
1.364895	30.39	---	56.00	25.61	L1	29.8	0.59	---
2.087265	---	21.70	46.00	24.30	L1	29.8	---	-8.1
2.678295	30.91	---	56.00	25.09	L1	29.8	1.11	---
3.418575	---	22.47	46.00	23.53	N	29.8	---	-7.33
4.111095	---	22.85	46.00	23.15	N	29.8	---	-6.95
4.693170	31.00	---	56.00	25.00	L1	29.8	1.2	---

2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
23.4°C	41.2%	101.2kPa

Test Setup:

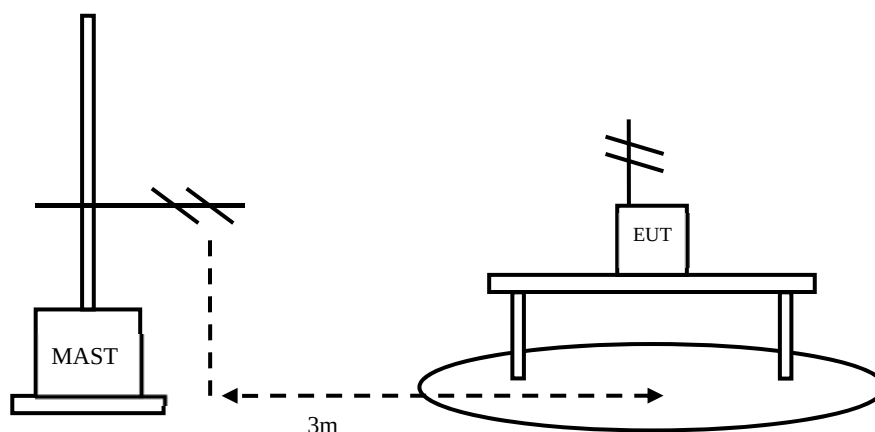


Figure 2

Test Procedure:

EUT+Charger:

The EUT should be placed on a non-metallic table 80cm above the ground plane. The receive antennas shall be moved from 1 to 4 meters. The distance between EUT and receive antenna should be 3 meters.

The EUT should work in idle mode. The test set-up and the test methods are performed according to ANSI C63.4:2014.

Then start the test software EMC32. Sweep the whole frequency band through the range from 30MHz to 1GHz, using receive log period antenna HL562.

During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The EUT is laid in two modes as follow: 1. put the EUT in horizontal direction; 2. put the EUT in vertical direction.

The data of cable loss and antenna factor have been calibrated in full testing frequency range before the testing. All test results are performed with max hold at

the horizontal and vertical polarity.

RBW=120kHz, VBW=300kHz, when the test frequency: $30\text{MHz} < f < 1\text{GHz}$

RBW=1MHz, VBW=3MHz, when the test frequency: $f > 1\text{GHz}$

A “reference path loss” is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{mea}} + A_{Rpl}$$

Sample calculation: $(24.65 \text{ dB}\mu\text{V/m}) = (36.95 \text{ dB}\mu\text{V/m}) + (-12.3 \text{ dB})$, the corresponding frequency is 31.697500MHz.

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity
31.697500	24.65	-12.3	36.95	V

Limit:

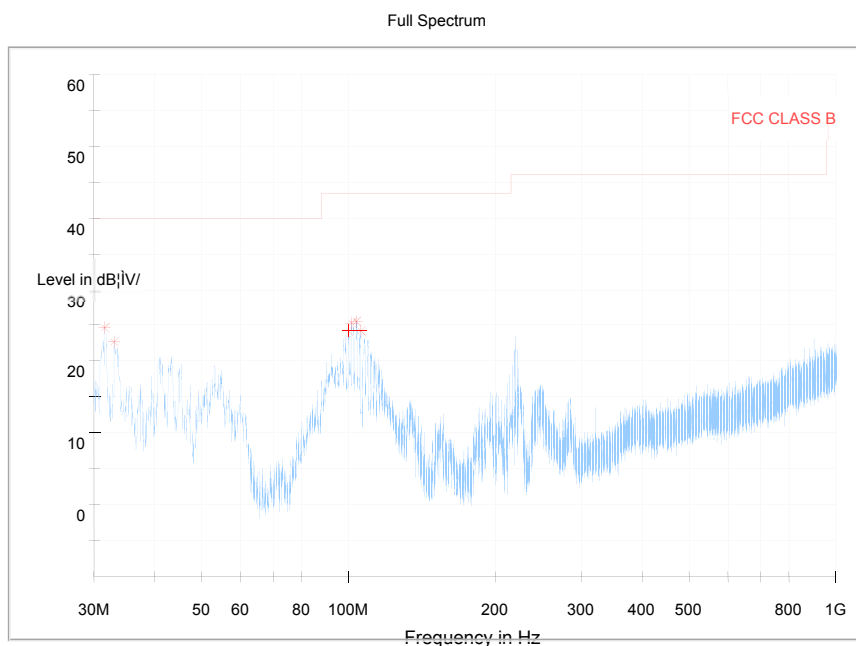
Frequency of Emission(MHz)	Limits	
	Detector	Unit (dB μ V/m)
30~88	Quasi-peak	40
88~216	Quasi-peak	43.5
216~960	Quasi-peak	46
960~1000	Quasi-peak	54
1000~5th harmonic of the highest frequency or 40GHz, whichever is lower	Average Peak	54 74

Test result:

EUT + Charger

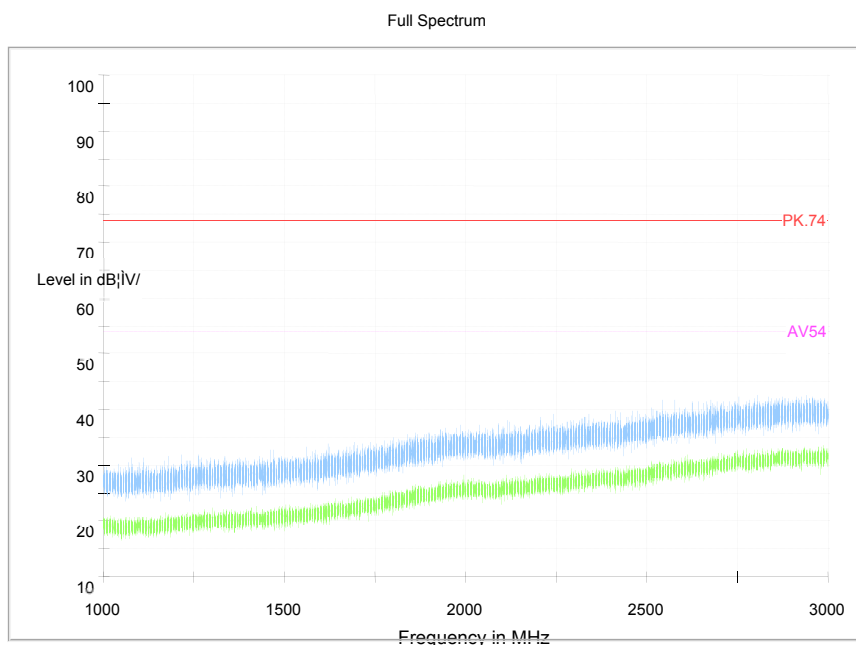
Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity
31.697500	24.65	-12.3	36.95	V
33.071667	22.69	-11.1	33.79	V
99.961250	24.34	-10.6	34.94	V
101.497083	25.24	-11.0	36.24	V
103.962500	25.54	-10.8	36.34	H
105.781250	24.17	-10.8	34.97	V

EUT + Charger: refer to Pic3, Pic4 and Pic5



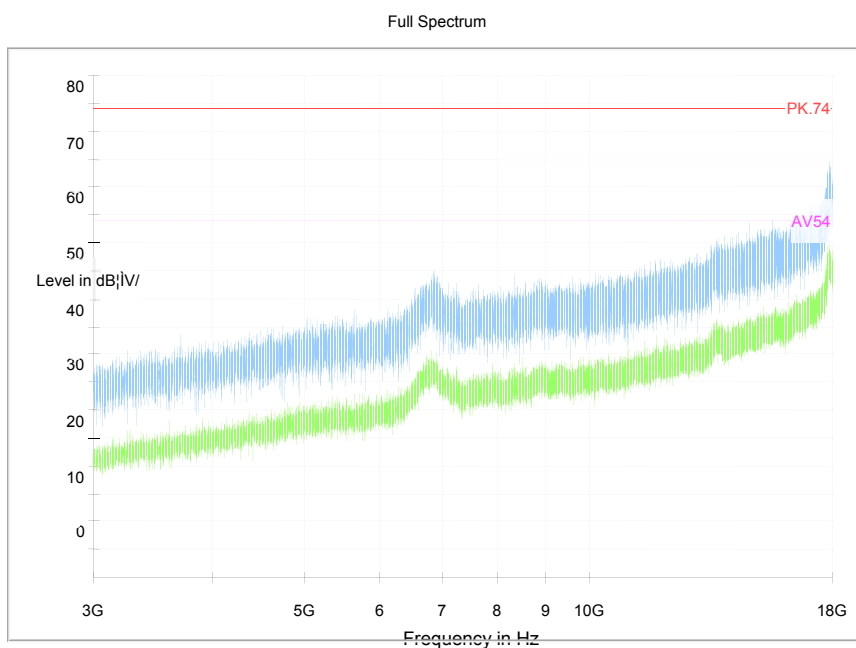
Pic3. Radiated emission(30MHz – 1GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical



Pic4. Radiated emission (1GHz –3GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical



Pic5. Radiated emission (3GHz –18GHz)

Note: The test data in the graph includes two polarizations: horizontal and vertical

2.3. List of test equipments

No.	Name/Model	Manufacturer	S/N	Calibration Due Date	Calibration Date
1	23.18m×16.88m×9.60mS emi-AnechoicChamber	FRANKONIA	-----	5th Sep. 2021	6th Sep. 2016
2	ESW EMI test receiver	R&S	101574	20th Aug. 2019	20th Aug. 2018
3	CMW500 Mobile Station Tester	R&S	160132	20th Aug. 2019	20th Aug. 2018
4	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	5th Sep. 2021	6th Sep. 2016
5	ESIB7 EMI test receiver	R&S	100280	20th Aug. 2019	20th Aug. 2018
6	HL562Ultra log test antenna	R&S	100167	20th Aug. 2019	20th Aug. 2018
7	ENV216 AMN	R&S	3560.6550. 12	20th Aug. 2019	20th Aug. 2018
8	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	20th Aug. 2019	20th Aug. 2018
9	PS2000 Turn Table	FRANKONIA	-----	-----	-----
10	MA260 Antenna Master	FRANKONIA	-----	-----	-----
11	EMC32EMI test software	R&S	-----	-----	-----