China

FCC - TEST REPORT

Report Number	:	60.790.19.041.01R02	Date of Issue	: January 31, 2020
Model	:	ST100		
Product Type	:	**Smart bicycle trainer**		
Applicant	:	4iiii Innovations Inc.		
Address	:	141 2nd Ave E, Cochrane AB, Canada		
Production Facility	:	Quasar Innotech		
Address	:	3F, NO 10 JINGKE; 8TH ROAD, TAICHUNG CITY, NANTUN DIST. 40852 TAIWAN		
Test Result	:	■Positive ☐Negative		
Total pages including Appendices	:	18		

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1 Table of Contents

2 Description of Equipment Under Test

Description of the Equipment Under Test

Product:	Smart bicycle trainer
Model no.:	ST100
FCC ID:	ZZN-ST100
Rating:	3.7V DC(Internal rechargeable bettery) 5 VDC (USB Type C input)
Frequency:	2457MHz
Antenna gain:	0 dBi
Number of operated channel:	1
Modulation:	GFSK

Auxiliary Equipment and Software Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	REMARK
Android Smart Phone	Huawei	---	OTA Control

Auxiliary Software Used during Test:

DESCRIPTION	SOFTWARE NAME	VERSION	REMARK
RF Test Mode Software	fouriiii-podcwtest.apk (Android APK)	---	Provided by applicant

3 Summary of Test Standards

Test Standards
FCC Part 15 Subpart C 10-1-18 Edition Federal Communications Commission, PART 15 — Radio Frequency Devices, Subpart C — Unintentional Radiators

All the tests were performed using the procedures from ANSI C63.4(2014) and ANSI C63.10 (2013).

4 Details about the Test Laboratory

Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13 Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2,
Shenzhen 518052, P.R.China
FCC Registration Number: 502708

Emission Tests	
Test Item	Test Site
FCC Part 15 Subpart C	
FCC Title 47 Part 15.205, 15.209 & 15.249 & Radiated Emission	Site 1
FCC Title 47 Part 15.207 Conduct Emission	Site 1
FCC Title 47 Part 15.215 20dB & 99% Bandwidth	Site 1
FCC Title 47 Part 15.203 Antenna Requirement	Site 1

4.1 Test Equipment Site List

Radiated emission Test – Site 1

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2020-6-28
Signal Analyzer	Rohde & Schwarz	FSV40	101031	2020-6-28
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100398	2020-7-7
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2020-7-5
Horn Antenna	Rohde & Schwarz	HF907	102294	2020-6-22
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2020-7-5
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2020-6-28
Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2020-6-28
Attenuator	Agilent	8491A	MY39264334	2020-6-28
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2020-6-28

Conducted Emission Test – Site 1

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2020-6-28
LISN	Rohde & Schwarz	ENV4200	100249	2020-6-28
LISN	Rohde & Schwarz	ENV432	101318	2020-7-19
LISN	Rohde & Schwarz	ENV216	100326	2020-6-28
ISN	Rohde & Schwarz	ENY81	100177	2020-6-28
ISN	Rohde & Schwarz	ENY81-CA6	101664	2020-6-28
High Voltage Probe	Rohde & Schwarz	TK9420(VT9420)	9420-584	2020-6-24
RF Current Probe	Rohde & Schwarz	EZ-17	100816	2020-7-2
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2020-6-28
Test software	Rohde & Schwarz	EMC32	Version9.15.00	N/A

20dB & 99% Bandwidth – Site 1

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2020-6-28
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2020-6-28

4.2 Measurement System Uncertainty

Measurement System Uncertainty Emissions

System Measurement Uncertainty	
Items	**Extended Uncertainty**
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.46dB
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.91dB; Vertical: 4.89dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-25000MHz	Horizontal: 4.80dB; Vertical: 4.79dB;
Uncertainty for Conducted Emission at AC Power Line 150kHz-30MHz	3.21dB
Uncertainty for frequency test	0.6×10-7

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5 Summary of Test Results

Emission Tests				
FCC Part 15 Subpart C				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
FCC Title 47 Part 15.205,15.209 & 15.249 Radiated Emission	12-13	☒	☐	☐
FCC Title 47 Part 15.207 Conduct Emission	14-15	☒	☐	☐
FCC Title 47 Part 15.215 20dB & 99% Bandwidth	16	☒	☐	☐
FCC Title 47 Part 15.203 Antenna Requirement	17	☒	☐	☐

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for **FCC ID: ZZN-ST100**, complies with Section 15.203, 15.205, 15.207, 15.209, 15.249 of the FCC Part 15, Subpart C rules.

The TX and RX range is 2457MHz.

SUMMARY:

- All tests according to the regulations cited on page 8 were

■ - Performed

☐ - **Not** Performed

- The Equipment Under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: November 25, 2019

Testing Start Date: November 27, 2019

Testing End Date: December 17, 2019

Reviewed by:

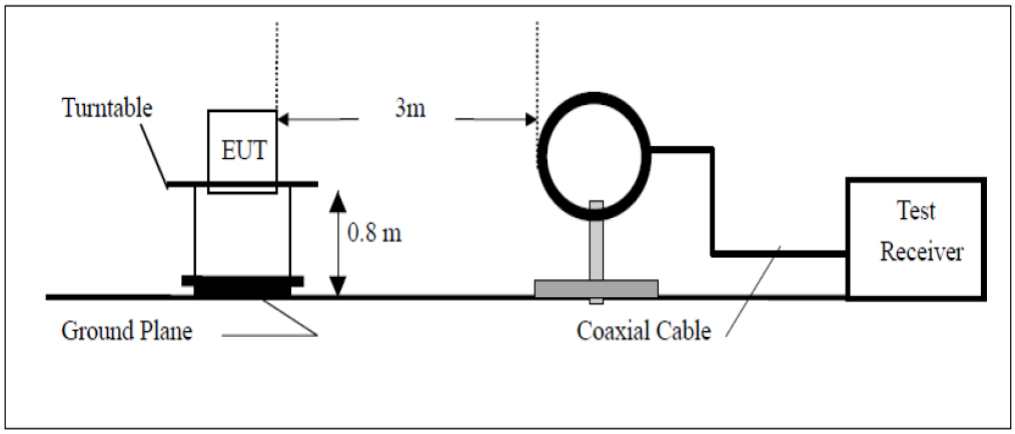
Hosea CHAN
EMC Project Engineer

Prepared by:

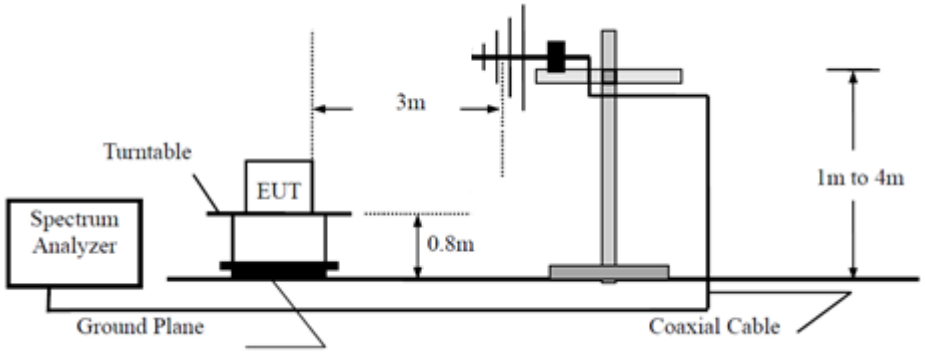
Eric LI
EMC Senior Project Engineer

7 Test Setups

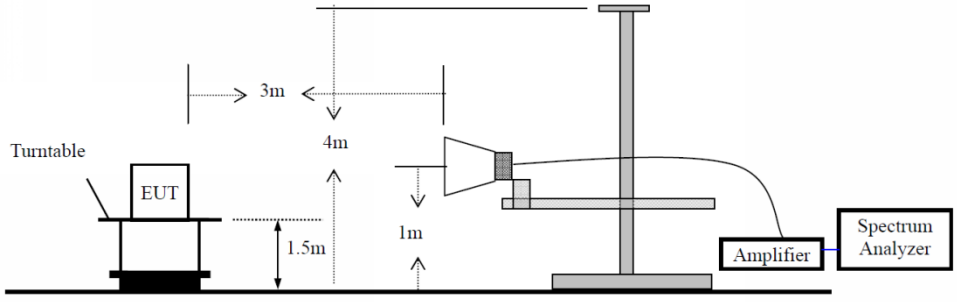
7.1 Radiated test setups 9kHz-30MHz



7.2 Radiated test setups Below 1GHz



7.3 Radiated test setups Above 1GHz



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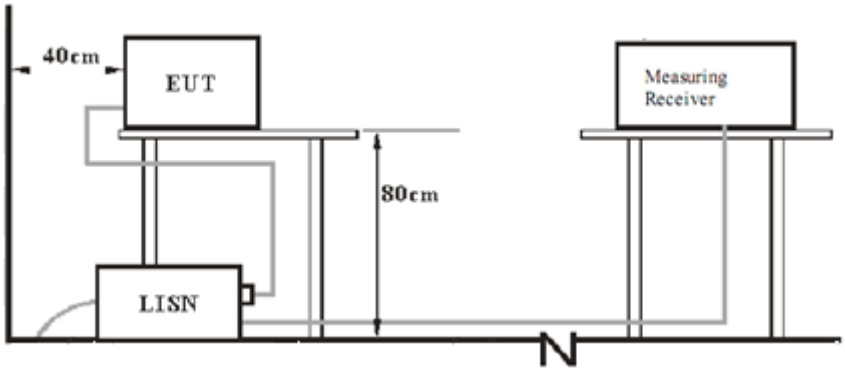
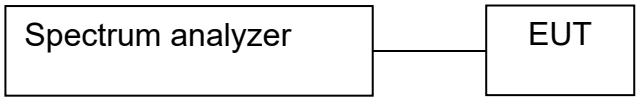
7.4 AC Power Line Conducted Emission test setups



7.5 Conducted RF test setups



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8 Emission Test Results

8.1 Radiated Emission

EUT: ST100
Op Condition: Operated, TX Mode (2457MHz)
Test Specification: FCC15.249 & 15.209, Antenna: Horizontal
Comment: 3.7V DC
Remark: 9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector	Corr. (dB)
44.280556	21.72	40.00	-18.28	Quasi Peak	-24.2
55.435556	20.69	40.00	-19.31	Quasi Peak	-24.7
879.073333	32.51	46.00	-13.49	Quasi Peak	-16.4
1779.687500	26.92	54.00	-27.08	Peak	-9.4
2457.000000	83.57	114.00	-30.43	Peak	-6.5
2457.000000	64.34	94.00	-29.66	Average	-6.5
4913.906250	44.10	54.00	-9.90	Peak	1.7
7373.437500	34.90	54.00	-19.10	Peak	2.8
15955.781250	48.84	54.00	-5.16	Peak	20.7

Remark: As the peak value were below the average limit, so average value no need to be measured.

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Radiated Emission

EUT: ST100
Op Condition: Operated, TX Mode (2457MHz)
Test Specification: FCC15.249 & 15.209, Antenna: Vertical
Comment: 3.7V DC
Remark: 9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector	Corr. (dB)
48.430000	22.06	40.00	-17.94	Quasi Peak	-24.0
62.548889	20.44	40.00	-19.56	Quasi Peak	-26.1
943.255000	33.26	46.00	-12.74	Quasi Peak	-15.8
1852.000000	26.64	54.00	-27.36	Peak	-8.9
2457.000000	86.56	114.00	-27.44	Peak	-6.5
2457.000000	73.18	94.00	-20.82	Average	-6.5
4913.928560	41.61	54.00	-12.39	Peak	1.7
9713.437500	39.17	54.00	-14.83	Peak	8.6
15918.750000	48.07	54.00	-5.93	Peak	20.2

Remark*: As the peak value were below the average limit, so average value no need to be measured.

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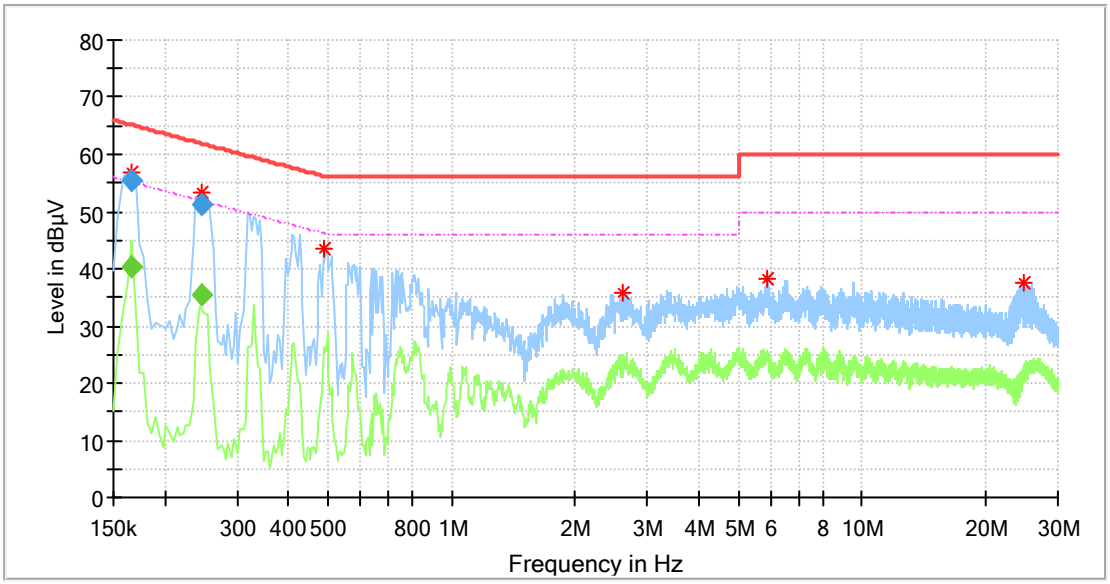
8.2 Conducted Emission at AC Power line

EUT: ST100
Op Condition: Operated, TX Mode
Test Specification: FCC15.107
Comment: 120V AC, L Line

Test Result
☒ Passed
☐ Not Passed



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)
0.165500	56.81	---	64.96	-8.15
0.245500	53.20	---	61.76	-8.56
0.486000	43.43	---	56.24	-12.80
2.598000	35.89	---	56.00	-20.11
5.902000	38.14	---	60.00	-21.86
24.914000	37.63	---	60.00	-22.37

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)
0.165500	---	40.21	55.18	-14.97
0.165500	55.55	---	65.18	-9.63
0.245500	---	35.28	51.91	-16.63
0.245500	51.31	---	61.91	-10.60

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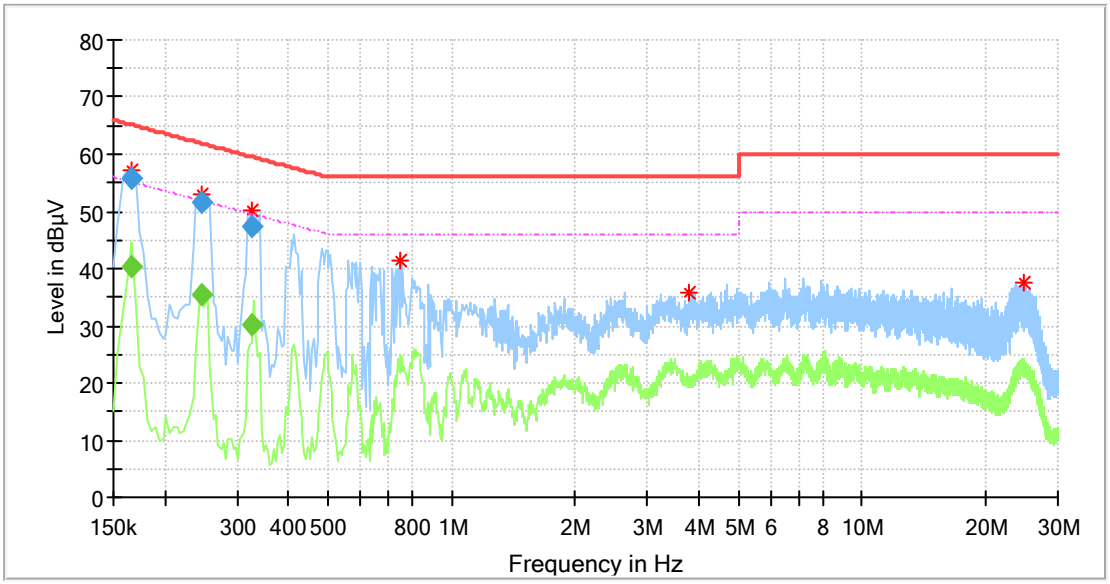
Conducted Emission at AC Power Line

EUT: ST100
Op Condition: Operated, TX Mode
Test Specification: FCC15.107
Comment: 120V AC, N Line

Test Result
☒ Passed
☐ Not Passed



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)
0.165500	57.10	---	64.96	-7.86
0.245500	53.06	---	61.76	-8.70
0.326500	50.04	---	59.66	-9.61
0.750000	41.35	---	56.00	-14.65
3.806000	35.80	---	56.00	-20.20
24.650000	37.72	---	60.00	-22.28

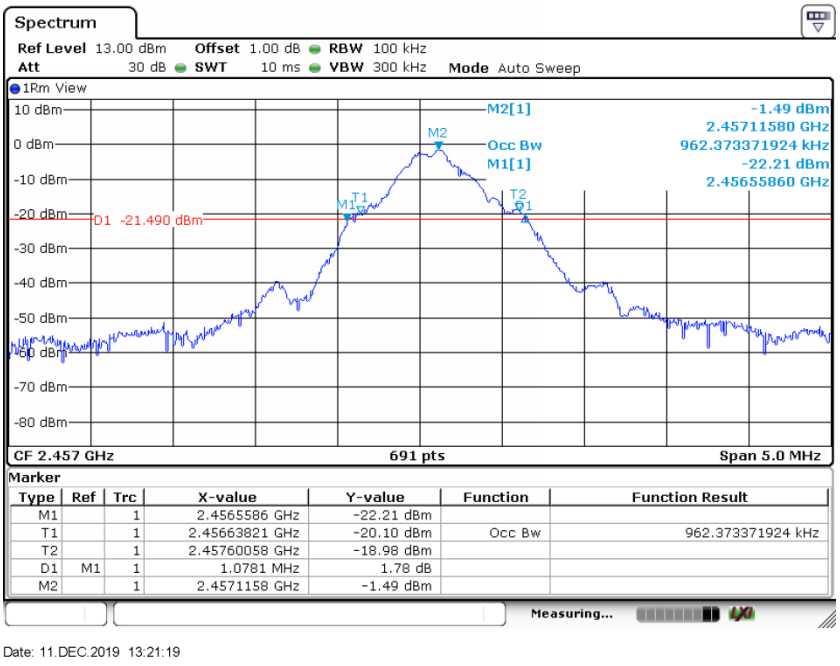
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)
0.165500	---	40.50	55.18	-14.68
0.165500	55.84	---	65.18	-9.34
0.245500	---	35.44	51.91	-16.47
0.245500	51.58	---	61.91	-10.33
0.326500	---	30.12	49.54	-19.42
0.326500	47.47	---	59.54	-12.07

8.3 20dB & 99% Bandwidth

EUT: ST100
Op Condition: Operated, TX Mode (2457MHz)
Test Specification: FCC15.215
Comment: 3.7V DC

Test Result
☒ Passed
☐ Not Passed



Bandwidth	Measured Value
20dB bandwidth	1.078 MHz
99% OCB	0.962 MHz

8.4 Antenna Requirement

EUT:	ST100
Op Condition:	Operated, TX Mode
Test Specification:	FCC15.203 (b)
Comment:	3.7V DC

Test Result
☒ Passed
☐ Not Passed

Limit

For intentional device, according to FCC Title 47 Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Connector Construction

The antenna used in this product is integrated antenna on PCB, which in accordance to section 15.203, is considered sufficient to comply with the antenna requirement.

9 Appendix A - General Product Information

Radiofrequency radiation exposure evaluation

This exposure evaluation is intended for **FCC ID: ZZN-ST100**

According to KDB 447498 D01v06 section 4.3.1, For frequencies between 100 MHz to 6GHz and test separation distances ≤ 50 mm, the Numeric threshold is determined as:

Step a)
[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR

>> The fundamental frequency of the EUT is 2402-2480MHz,
the test separation distance is ≤ 50mm.
(Manufacturer specified the separation distance is: 5mm)

Step b)
>> Numeric threshold (2457MHz), mW / 5mm * √2.457GHz ≤ 3.0
Numeric threshold (2457MHz) ≤ 9.569mW

>>The power of EUT measured (2457MHz) is: -1.26dBm = 0.748mW

Which is smaller than the Numeric threshold.
Therefore, the device is exempt from stand-alone SAR test requirements.

Power Plot