

FCC EMC Test Report

Applicant: Connected Cycle

Address of Applicant: 3 square Desaix - 75015 PARIS - FRANCE

Equipment Under Test (EUT)

Product Name: GPS tracker

Model No.: cc521

Trade Mark: N/A

FCC ID: 2BCLTCC521

Applicable Standards: FCC CFR Title 47 Part 15B

Date of Sample Receipt: 21 Aug., 2023

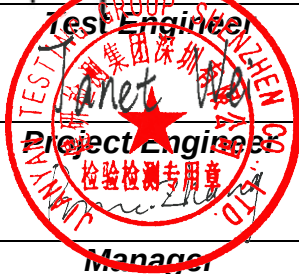
Date of Test: 22 Aug., to 15 Sep., 2023

Date of report Issued: 18 Sep., 2023

Test Result: PASS

Tested by:**Date:**

18 Sep., 2023

Reviewed by:**Date:**

18 Sep., 2023

Approved by:**Date:**

18 Sep., 2023

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

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1 Version

Version No.	Date	Description
00	18 Sep., 2023	Original

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3 General Information

3.1 Client Information

Applicant:	Connected Cycle
Address:	3 square Desaix - 75015 PARIS - FRANCE
Manufacturer:	Connected Cycle
Address:	3 square Desaix - 75015 PARIS - FRANCE
Factory:	KONKA Smart Technology Co., Ltd.
Address:	No.12, West Section of Gangyuan Road, Guoxing Avenue, Lingang Economic Development Zone Yibin, Sicuan, P.R.CHINA

3.2 General Description of E.U.T.

Product Name:	GPS tracker
Model No.:	cc521
Power Supply:	DC 5~55V
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

3.3 Test Mode

Operating Mode	Detail Description
Working mode	Keep the EUT in Downloading mode(Worst case)
GPS mode	Keep the EUT in GPS receiver mode
In the test, the prototype was tested using DC 5V and DC 55V voltages respectively. The test results found that the test data at DC 55V voltage was the worst, and only the worst data was reflected in the report.	
The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

3.4 Description of Test Auxiliary Equipment

Manufacturer	Description	Model	S/N	FCC ID/DoC
Lenovo	Laptop	ThinkPad T14 Gen 1	SL10Z47277	DoC
AINUO	DC power supply	AN50120-12	2010501014A	DoC

3.5 Description of Cable Used

Cable Type	Description	Length	From	To
N/A				

3.6 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Conducted Emission for LISN (9kHz ~ 150kHz)	3.57 dB
Conducted Emission for LISN (10MHz ~ 30MHz)	3.14 dB
Radiated Emission (30MHz ~ 200MHz) (3m SAC)	4.6 dB
Radiated Emission (200MHz ~ 1000MHz) (3m SAC)	5.8 dB
Radiated Emission (1GHz ~ 6GHz) (3m SAC)	4.5 dB
Radiated Emission (6GHz ~ 18GHz) (3m SAC)	4.7 dB
Radiated Emission (30MHz ~ 1GHz) (10m SAC)	4.3 dB

Note: All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

3.7 Additions to, Deviations, or Exclusions from the Method

No

3.8 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

● **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

● **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

3.9 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.

Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info-JYTee@lets.com, Website: <http://jyt.lets.com>

3.10 Test Instruments List

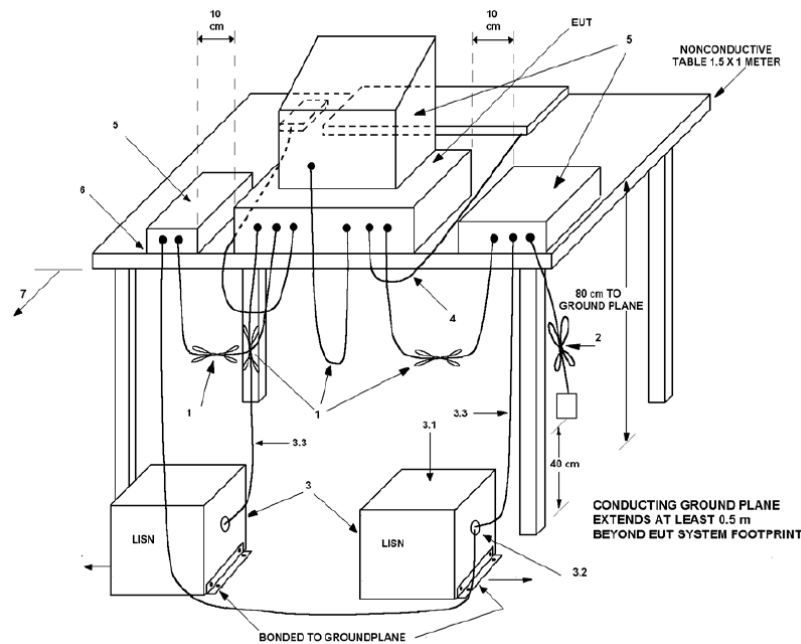
Radiated Emission(3m SAC):					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	ETS	9m*6m*6m	WXJ001-1	04-14-2021	04-13-2024
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	02-09-2023	02-08-2024
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	02-09-2023	02-08-2024
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	01-10-2023	01-09-2024
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXJ001-3	01-10-2023	01-09-2024
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	01-11-2023	01-10-2024
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	01-18-2023	01-17-2024
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG001-5	01-18-2023	01-17-2024
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		

Radiated Emission(10m SAC):					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
10m SAC	ETS	RFSD-100-F/A	WXJ090	04-28-2021	04-27-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-1	01-17-2023	01-16-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-2	01-10-2023	01-09-2024
EMI Test Receiver	R&S	ESR 3	WXJ090-3	01-10-2023	01-09-2024
EMI Test Receiver	R&S	ESR 3	WXJ090-4	01-11-2023	01-09-2024
Low Pre-amplifier	Bost	LNA 0920N	WXJ090-6	01-10-2023	01-09-2024
Low Pre-amplifier	Bost	LNA 0920N	WXJ090-7	01-10-2023	01-09-2024
Cable	Bost	JYT10M-1G-NN-10M	WXG002-7	01-18-2023	01-17-2024
Cable	Bost	JYT10M-1G-NN-10M	WXG002-8	01-18-2023	01-17-2024
Test Software	R&S	EMC32	Version: 10.50.40		

4 Measurement Setup and Procedure

4.1 Test Setup

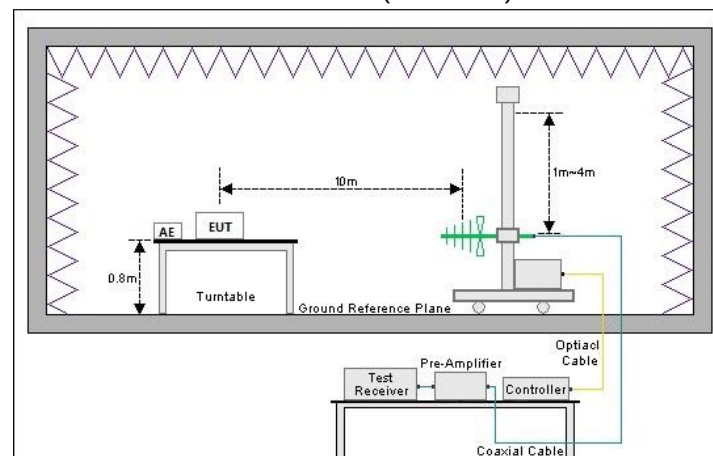
1) Conducted emission measurement:

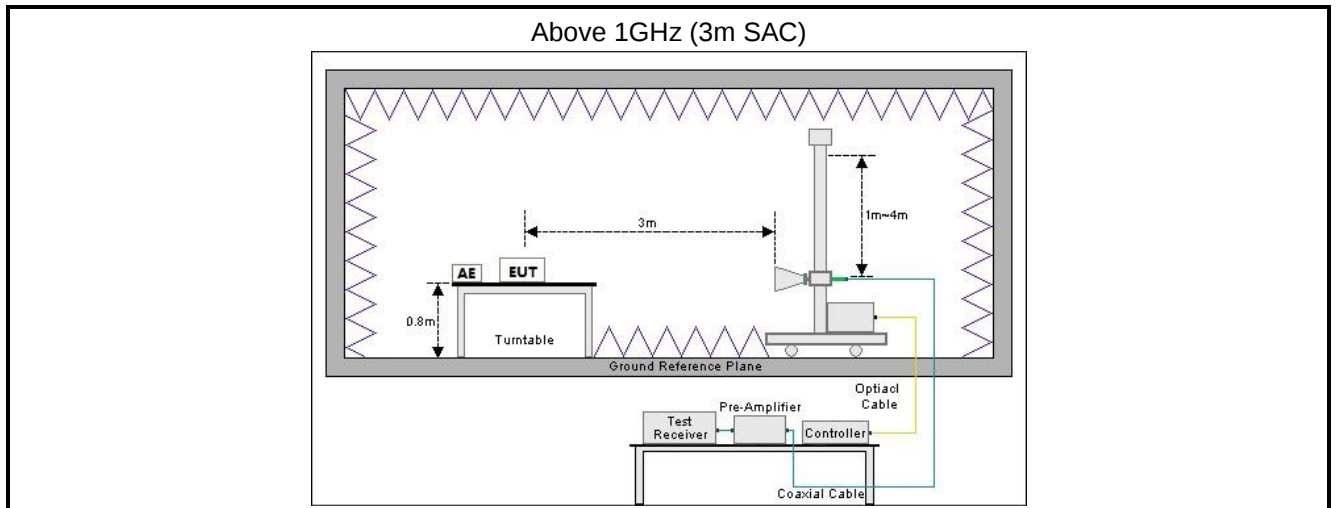


Note: The detailed descriptions please refer to Figure 8 of ANSI C63.4:2014.

2) Radiated emission measurement:

Below 1GHz (10m SAC)





4.2 Test Procedure

Test method	Test step
Conducted emission	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement.
Radiated emission	For below 1GHz: 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 10 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 10 m. 2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data. For above 1GHz: 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.

5 Test Results

5.1 Summary

5.1.1 Clause and data summary

Test items	Standard clause	Test data	Result
Conducted Emission	Part 15.107	See Section 5.2	N/A
Radiated Emission	Part 15.109	See Section 5.3	Pass
Remark: 1. The EUT is a Class B digital device. 2. Pass: The EUT complies with the essential requirements in the standard. 3. N/A: Not Applicable.			
Test Method:	ANSI C63.4:2014		

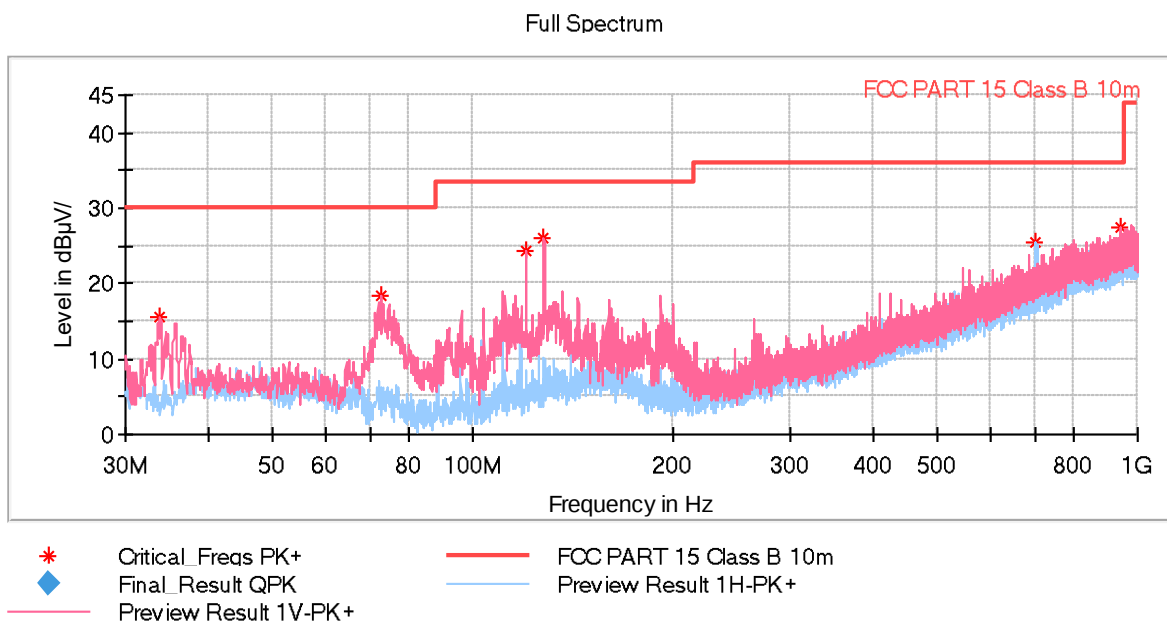
5.1.2 Test Limit

Test items	Limit																													
Conducted Emission	<table> <tr> <th rowspan="2">Frequency (MHz)</th><th colspan="2">Class A Limit (dBμV)</th><th colspan="2">Class B Limit (dBμV)</th></tr> <tr> <th>Quasi-Peak</th><th>Average</th><th>Quasi-Peak</th><th>Average</th></tr> <tr> <td>0.15 – 0.5</td><td>79</td><td>66</td><td>66 to 56 Note 1</td><td>56 to 46 Note 1</td></tr> <tr> <td>0.5 – 5</td><td>73</td><td>60</td><td>56</td><td>46</td></tr> <tr> <td>5 – 30</td><td>73</td><td>60</td><td>60</td><td>50</td></tr> </table>	Frequency (MHz)	Class A Limit (dBμV)		Class B Limit (dBμV)		Quasi-Peak	Average	Quasi-Peak	Average	0.15 – 0.5	79	66	66 to 56 Note 1	56 to 46 Note 1	0.5 – 5	73	60	56	46	5 – 30	73	60	60	50					
Frequency (MHz)	Class A Limit (dBμV)		Class B Limit (dBμV)																											
	Quasi-Peak	Average	Quasi-Peak	Average																										
0.15 – 0.5	79	66	66 to 56 Note 1	56 to 46 Note 1																										
0.5 – 5	73	60	56	46																										
5 – 30	73	60	60	50																										
Note 1: The limit level in dBμV decreases linearly with the logarithm of frequency. Note 2: The more stringent limit applies at transition frequencies.																														
Radiated Emission	<table> <tr> <th rowspan="2">Frequency (MHz)</th><th colspan="2">Class A Limit (dBμV/m)</th><th colspan="2">Class B Limit (dBμV/m)</th></tr> <tr> <th>Quasi-Peak @ 3m</th><th>Quasi-Peak @ 10m</th><th>Quasi-Peak @ 3m</th><th>Quasi-Peak @ 10m</th></tr> <tr> <td>30 – 88</td><td>49.0</td><td>39.0</td><td>40.0</td><td>30.0</td></tr> <tr> <td>88 – 216</td><td>53.5</td><td>43.5</td><td>43.5</td><td>33.5</td></tr> <tr> <td>216 – 960</td><td>56.0</td><td>46.0</td><td>46.0</td><td>36.0</td></tr> <tr> <td>960 – 1000</td><td>60.0</td><td>50.0</td><td>54.0</td><td>44.0</td></tr> </table>	Frequency (MHz)	Class A Limit (dBμV/m)		Class B Limit (dBμV/m)		Quasi-Peak @ 3m	Quasi-Peak @ 10m	Quasi-Peak @ 3m	Quasi-Peak @ 10m	30 – 88	49.0	39.0	40.0	30.0	88 – 216	53.5	43.5	43.5	33.5	216 – 960	56.0	46.0	46.0	36.0	960 – 1000	60.0	50.0	54.0	44.0
Frequency (MHz)	Class A Limit (dBμV/m)		Class B Limit (dBμV/m)																											
	Quasi-Peak @ 3m	Quasi-Peak @ 10m	Quasi-Peak @ 3m	Quasi-Peak @ 10m																										
30 – 88	49.0	39.0	40.0	30.0																										
88 – 216	53.5	43.5	43.5	33.5																										
216 – 960	56.0	46.0	46.0	36.0																										
960 – 1000	60.0	50.0	54.0	44.0																										
Note: The more stringent limit applies at transition frequencies.																														
<table> <tr> <th rowspan="2">Frequency</th><th colspan="2">Class A Limit (dBμV/m) @ 3m</th><th colspan="2">Class B Limit (dBμV/m) @ 3m</th></tr> <tr> <th>Average</th><th>Peake</th><th>Average</th><th>Peake</th></tr> <tr> <td>Above 1 GHz</td><td>60.0</td><td>80.0</td><td>54.0</td><td>74.0</td></tr> </table>	Frequency	Class A Limit (dBμV/m) @ 3m		Class B Limit (dBμV/m) @ 3m		Average	Peake	Average	Peake	Above 1 GHz	60.0	80.0	54.0	74.0																
Frequency		Class A Limit (dBμV/m) @ 3m		Class B Limit (dBμV/m) @ 3m																										
	Average	Peake	Average	Peake																										
Above 1 GHz	60.0	80.0	54.0	74.0																										
Note: The measurement bandwidth shall be 1 MHz or greater.																														

5.2 Radiated Emission

Below 1GHz:

Product Name:	GPS tracker	Product Model:	cc521
Test By:	Harper	Test mode:	Working mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical & Horizontal
Test Voltage:	DC 55V		



Critical Freqs

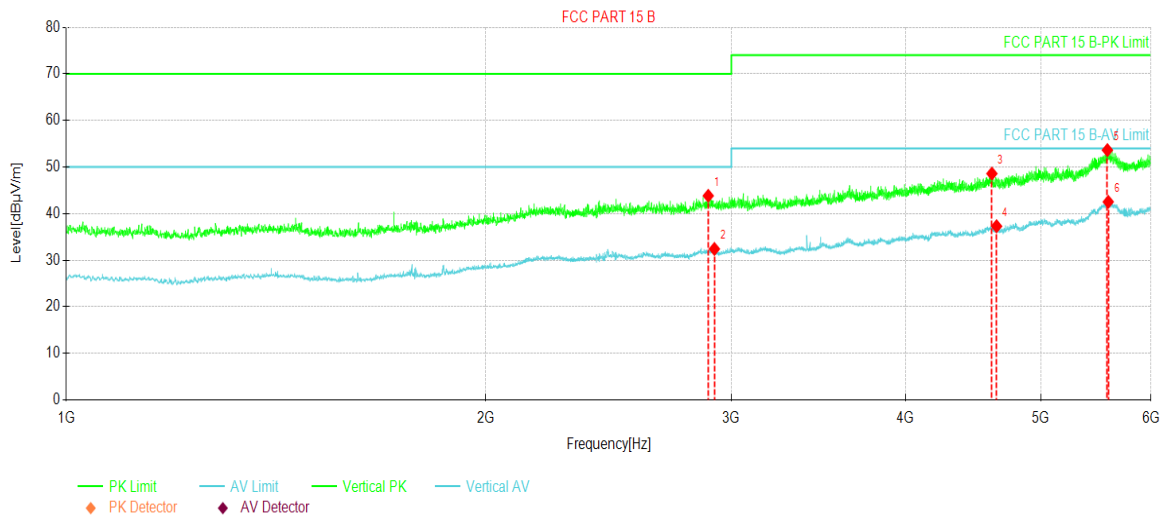
Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
33.880000	15.56	30.00	14.44	100.0	V	199.0	-16.9
72.728500	18.38	30.00	11.62	100.0	V	306.0	-18.9
119.967500	24.29	33.50	9.21	100.0	V	176.0	-17.5
127.970000	25.98	33.50	7.52	100.0	V	240.0	-17.0
704.101500	25.57	36.00	10.43	100.0	H	60.0	-4.6
942.673000	27.39	36.00	8.61	100.0	V	188.0	0.0

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Above 1GHz:

Product Name:	GPS tracker	Product Model:	cc521
Test By:	Harper	Test mode:	Working mode
Test Frequency:	1000 MHz ~ 6000 MHz	Polarization:	Vertical
Test Voltage:	DC 55V		



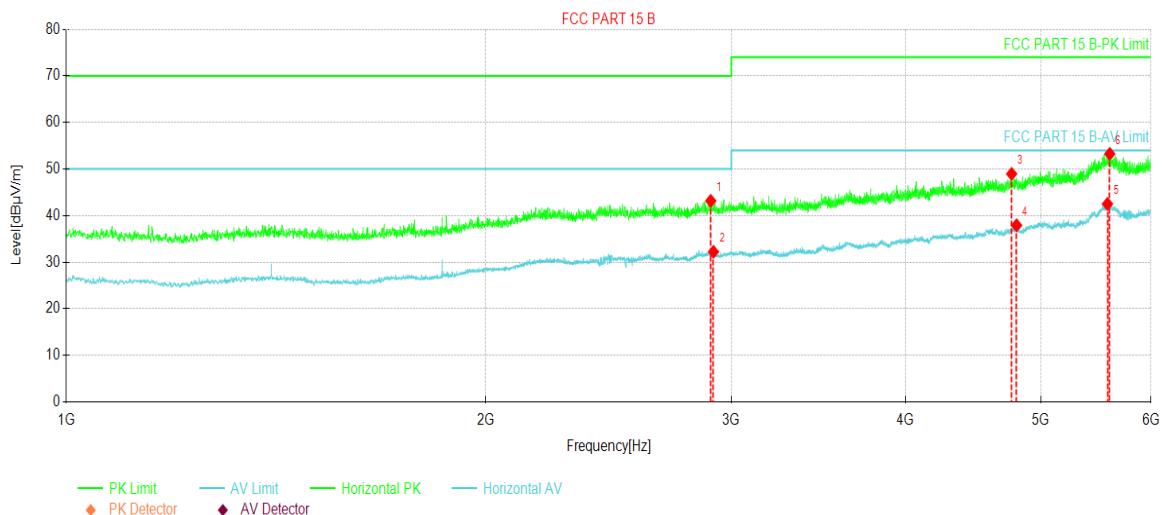
Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2887.73	43.82	-17.41	70.00	26.18	100	152	Vertical
2	2917.11	32.40	-17.50	50.00	17.60	100	132	Vertical
3	4613.57	48.57	-11.35	74.00	25.43	100	88	Vertical
4	4649.20	37.28	-11.36	54.00	16.72	100	352	Vertical
5	5583.07	53.63	-5.06	74.00	20.37	100	88	Vertical
6	5591.19	42.52	-4.95	54.00	11.48	100	214	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	GPS tracker	Product Model:	cc521
Test By:	Harper	Test mode:	Working mode
Test Frequency:	1000 MHz ~ 6000 MHz	Polarization:	Horizontal
Test Voltage:	DC 55V		



Suspected Data List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2899.61	43.15	-17.35	70.00	26.85	100	46	Horizontal
2	2912.73	32.22	-17.46	50.00	17.78	100	4	Horizontal
3	4766.72	48.95	-11.13	74.00	25.05	100	27	Horizontal
4	4805.47	37.91	-11.18	54.00	16.09	100	4	Horizontal
5	5583.69	42.50	-5.05	54.00	11.50	100	100	Horizontal
6	5604.95	53.24	-4.88	74.00	20.76	100	89	Horizontal

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

-----End of report-----