

FCC REPORT

Applicant: PS GmbH

Address of Applicant: Melisau 1255, 6863 Egg Austria

Equipment Under Test (EUT)

Product Name: SOLO DUAL

Model No.: DUAL

Trade mark: PS

FCC ID: 2ALMH2

Applicable standards: FCC CFR Title 47 Part 15 Subpart B

Date of sample receipt: 08 Mar., 2021

Date of Test: 08 Mar., to 22 Jun., 2021

Date of report issued: 23 Jun, 2021

Test Result: PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	23 Jun, 2021	Original

Tested by:



Test Engineer

Date:

23 Jun, 2021

Reviewed by:



Project Engineer

Date:

23 Jun, 2021

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4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part 15.107	N/A
Radiated Emission	Part 15.109	Pass
Remark: 1. Pass: The EUT complies with the essential requirements in the standard. 2. N/A: The EUT not applicable of the test item.		
Test Method:	ANSI C63.4:2014	

5 General Information

5.1 Client Information

Applicant:	PS GmbH
Address:	Melisau 1255, 6863 Egg Austria
Manufacturer/ Factory:	PS GmbH
Address:	Melisau 1255, 6863 Egg Austria

5.2 General Description of E.U.T.

Product Name:	SOLO DUAL
Model No.:	DUAL
Power supply:	DC 3.0V
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

5.3 Test Mode and test samples plans

Operating mode	Detail description
Working mode	Keep the EUT in Working mode
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.	

5.4 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.16 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.20 dB (k=2)

5.5 Description of Support Units

Manufacturer	Description	Model	S/N	FCC ID/DoC
Apple	Mobile phone	iPhone 11 Pro	MWDE2CH/A	Doc

5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.
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5.7 Description of Cable Used

N/A

5.8 Additions to, deviations, or exclusions from the method

No

5.9 Laboratory Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> ● 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 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. ● A2LA - Registration No.: 4346.01 This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 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
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5.10 Laboratory Location

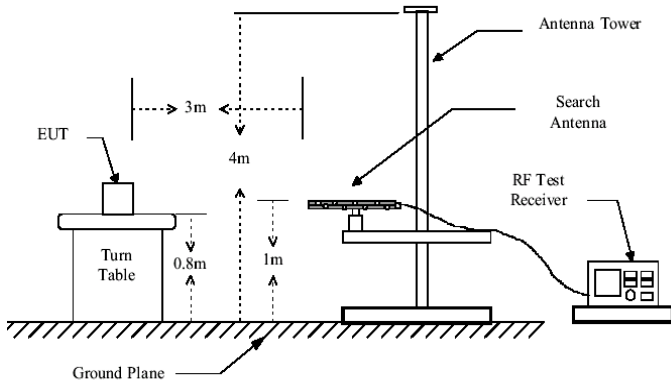
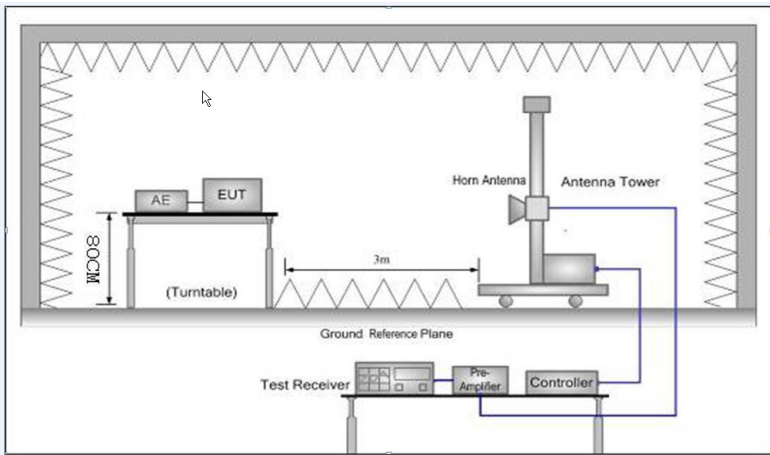
JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: <http://www.ccis-cb.com>

5.11 Test Instruments list

Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	ETS	9m*6m*6m	966	01-19-2021	01-18-2024
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-07-2020	03-06-2021
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-03-2021	03-02-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-03-2021	03-02-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-18-2020	06-17-2021
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-18-2020	11-17-2021
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-03-2021	03-02-2022
Pre-amplifier	CD	PAP-1G18	11804	03-03-2021	03-02-2022
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-03-2021	03-02-2022
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-18-2020	11-17-2021
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-03-2021	03-02-2022
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-03-2021	03-02-2022
Cable	MICRO-COAX	MFR64639	K10742-5	03-03-2021	03-02-2022
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-03-2021	03-02-2022

6 Test results and Measurement Data

6.1 Radiated Emission

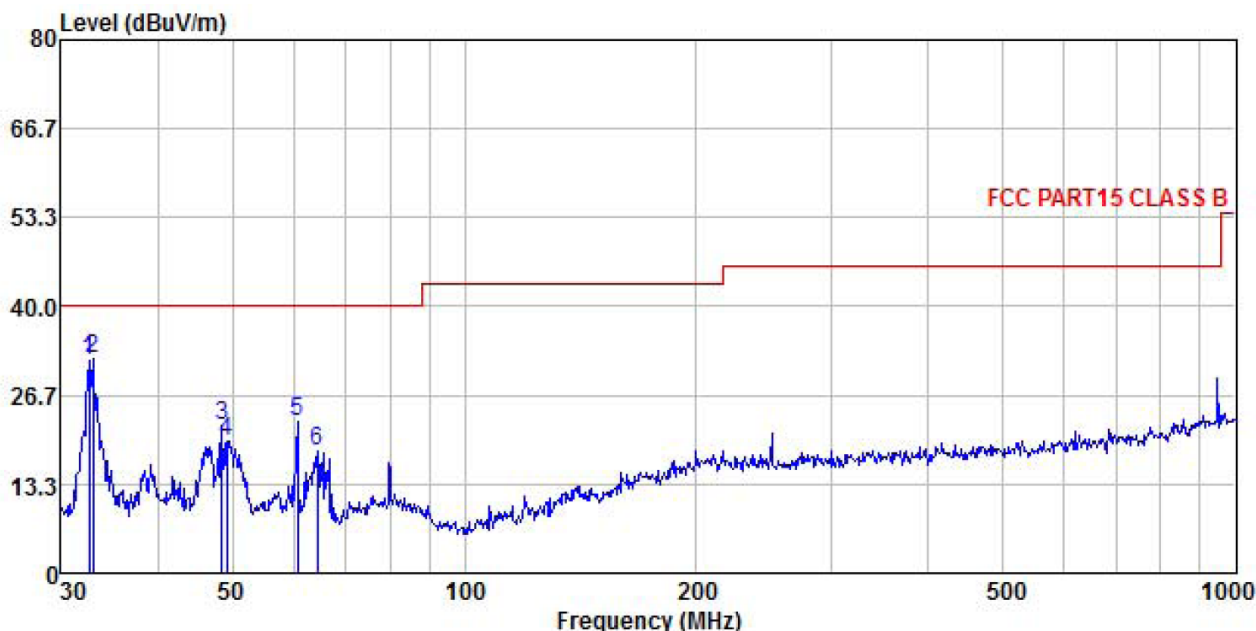
Test Requirement:	FCC Part 15 B Section 15.109				
Test Frequency Range:	30MHz to 6000MHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak RMS	1MHz 1MHz	3MHz 3MHz	Peak Value Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz		54.0 74.0		Average Value Peak Value
Test setup:	Below 1GHz				
					
	Above 1GHz				
					
Test Procedure:	<div>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.</div> <div>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</div> <div>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both</div>				

	<p>horizontal and vertical polarizations of the antenna are set to make the measurement.</p> <p>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p>
Test Instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	All of the observed value above 6GHz were the noise floor , which were no recorded

Measurement Data:

Below 1GHz:

Product Name:	SOLO DUAL	Product Model:	DUAL
Test By:	Yaro	Test mode:	Working mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	DC 3.0V	Environment:	Temp: 24℃ Humi: 57%

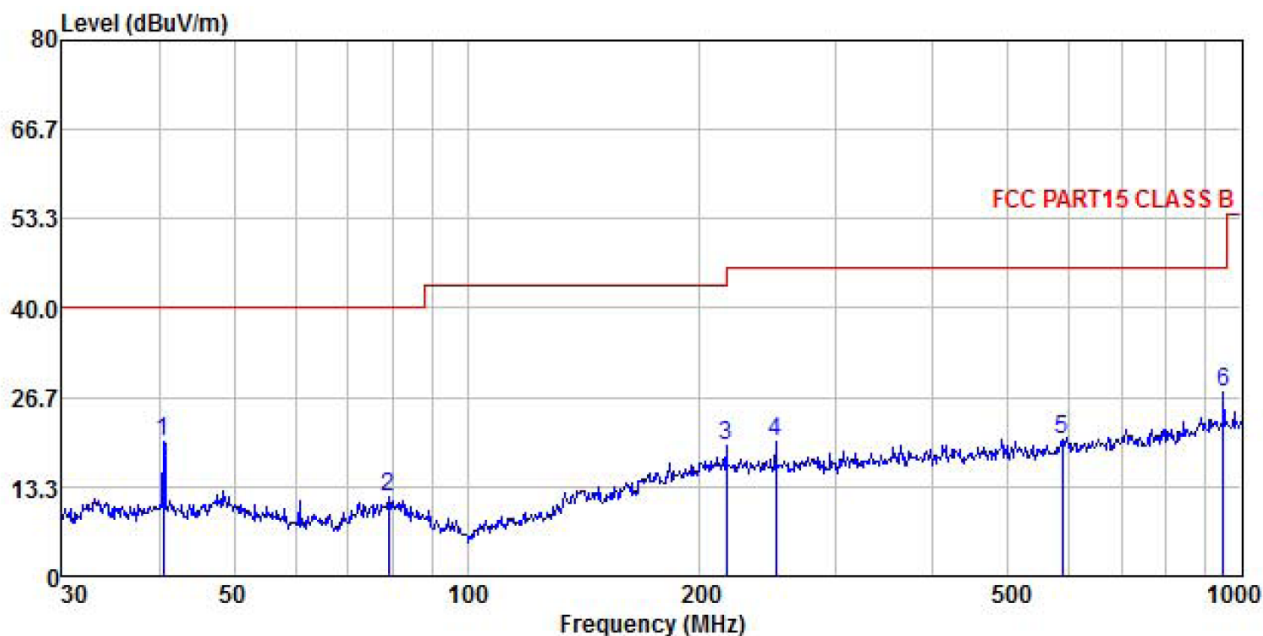


	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	Remark
	MHz	Level	Factor	Loss	Factor	Line	Limit	
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	32.634	49.71	12.24	0.00	29.96	31.99	40.00	-8.01 QP
2	32.979	49.73	12.29	0.00	29.96	32.06	40.00	-7.94 QP
3	48.502	38.88	13.11	0.00	29.83	22.16	40.00	-17.84 QP
4	49.187	36.54	13.15	0.00	29.83	19.86	40.00	-20.14 QP
5	60.704	41.86	10.66	0.00	29.77	22.75	40.00	-17.25 QP
6	64.433	38.15	9.89	0.00	29.76	18.28	40.00	-21.72 QP

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The Aux Factor is a notch filter switch box loss, this item is not used.

Product Name:	SOLO DUAL	Product Model:	DUAL
Test By:	Yaro	Test mode:	Working mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	DC 3.0V	Environment:	Temp: 24℃ Humi: 57%



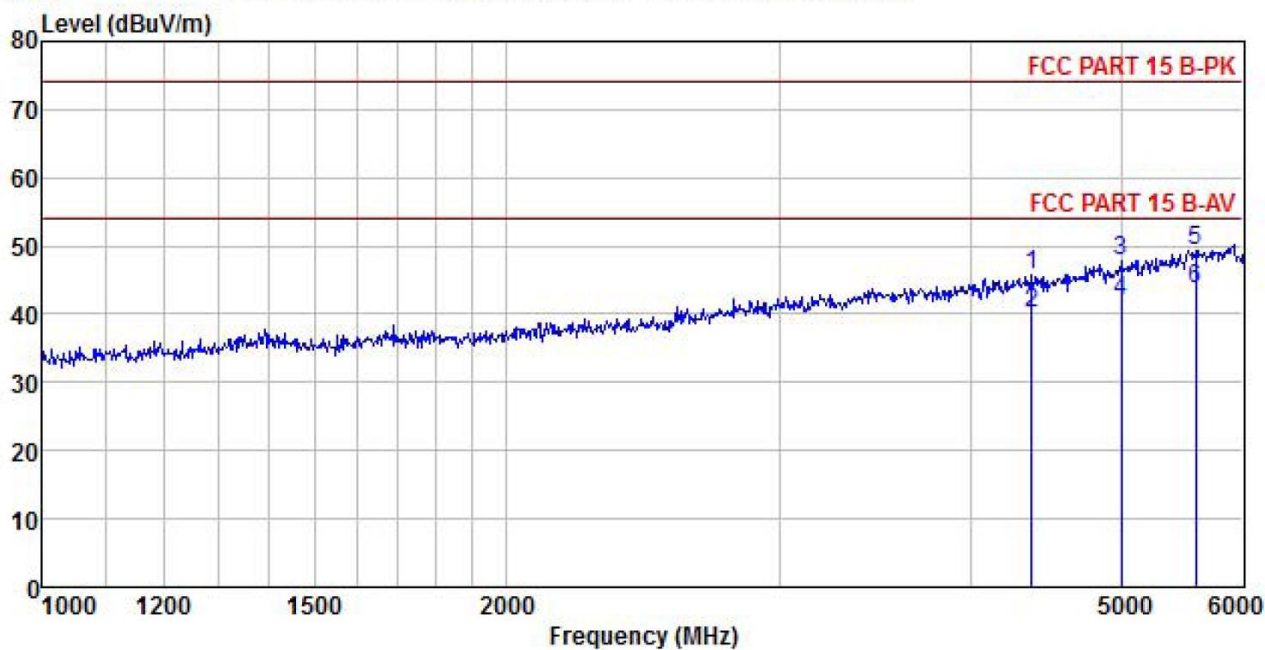
	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	40.559	37.29	12.81	0.00	29.90	20.20	40.00	-19.80 QP
2	79.243	28.93	12.59	0.00	29.65	11.87	40.00	-28.13 QP
3	216.024	29.73	18.37	0.00	28.73	19.37	46.00	-26.63 QP
4	250.301	30.09	18.50	0.00	28.54	20.05	46.00	-25.95 QP
5	586.844	29.62	19.83	0.00	28.98	20.47	46.00	-25.53 QP
6	948.761	32.50	22.80	0.00	27.73	27.57	46.00	-18.43 QP

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The Aux Factor is a notch filter switch box loss, this item is not used.

Above 1GHz:

Product Name:	SOLO DUAL	Product Model:	DUAL
Test By:	Yaro	Test mode:	Working mode
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Vertical
Test Voltage:	DC 3.0V	Environment:	Temp: 24℃ Humi: 57%

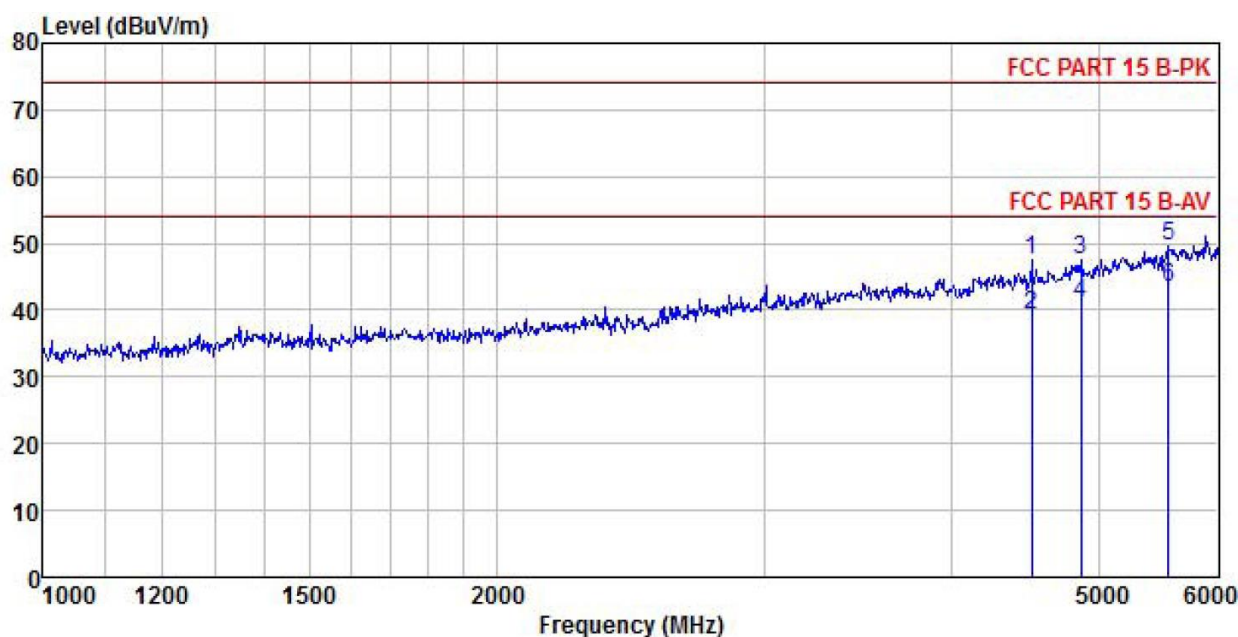


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	4377.203	49.53	29.92	6.05	2.32	41.95	45.87	74.00	-28.13	Peak
2	4377.203	43.95	29.92	6.05	2.32	41.95	40.29	54.00	-13.71	Average
3	4997.811	49.44	31.20	6.56	2.50	41.88	47.82	74.00	-26.18	Peak
4	4997.811	43.45	31.20	6.56	2.50	41.88	41.83	54.00	-12.17	Average
5	5585.026	49.18	32.33	7.04	2.68	41.80	49.43	74.00	-24.57	Peak
6	5585.026	43.58	32.33	7.04	2.68	41.80	43.83	54.00	-10.17	Average

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Name:	SOLO DUAL	Product Model:	DUAL
Test By:	Yaro	Test mode:	Working mode
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test Voltage:	DC 3.0V	Environment:	Temp: 24℃ Humi: 57%



	ReadAntenna	Cable	Aux Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Factor	Level
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dB	dBuV/m
1	4512.583	50.96	30.13	6.14	2.37	42.06
2	4512.583	42.59	30.13	6.14	2.37	42.06
3	4865.277	49.48	30.90	6.44	2.47	41.83
4	4865.277	43.05	30.90	6.44	2.47	41.83
5	5565.048	49.28	32.33	7.03	2.68	41.80
6	5565.048	43.01	32.33	7.03	2.68	41.80

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.