FCC REPORT

Applicant: Shenzhen LINGDU Auto Electronics Co., Ltd.

Address of Applicant: 1801-1808 Haiyun Building, No. 468 Minzhi Avenue, Longhua, Shenzhen, China

Equipment Under Test (EUT)

Product Name: CAR DVR

Model No.: LS05D, M550, LS05, V550

FCC ID: 2ASWVLS05D

Applicable standards: FCC CFR Title 47 Part 15 Subpart B

Date of sample receipt: 24 May, 2021

Date of Test: 25 May, to 27 Aug., 2021

Date of report issued: 27 Aug., 2021

Test Result: PASS *

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

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*27 Aug., 2021*	*Original*

Tested by: Carey Chen ***Date:*** *27 Aug., 2021*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *27 Aug., 2021*

Project Engineer

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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:	Shenzhen LINGDU Auto Electronics Co., Ltd.
Address:	1801-1808 Haiyun Building, No. 468 Minzhi Avenue, Longhua, Shenzhen, China
Manufacturer/Factory:	Dongguan Lingdu Electronic Technology Co., Ltd
Address:	1 Longcheng Street, Qingxi Town, Dongguan City, Guangdong Province, China

5.2 General Description of E.U.T.

Product Name:	CAR DVR
Model No.:	LS05D, M550, LS05, V550
Car Adapter:	Model: XHC052501 Input: DC 12-24V Output: DC 5.0V, 2.5A
Test Sample Condition:	The test samples were provided in good working order with no visible defects.
Remarks:	Model No.: LS05D, M550, LS05, V550 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name.

5.3 Test Mode and test samples plans

Operating mode	Detail description
Recording mode	Keep the EUT in Recording mode(Worst case)
Playing mode	Keep the EUT in Playing 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
10M SAC Radiated Emission (30MHz ~ 1000MHz)	4.32 dB (k=2)
3M SAC Radiated Emission (1GHz ~ 18GHz)	5.34 dB (k=2)

5.5 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
VARTA	Lead acid battery	6-QW-60(500)L	7550035197810974	N/A

5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

5.7 Description of Cable Used

N/A

5.8 Additions to, deviations, or exclusions from the method

No

5.9 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 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 17025:2017 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

5.10 Laboratory Location

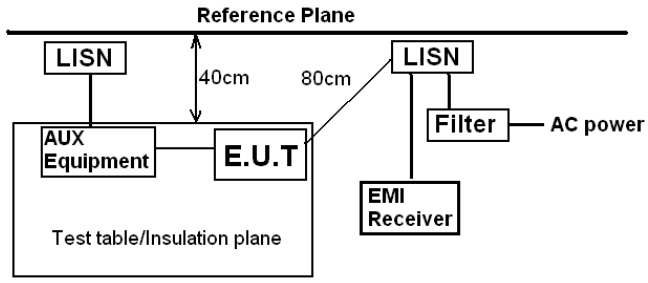
JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://www.ccis-cb.com

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	RFD-100	Q1984	04-14-2021	04-13-2024
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-03-2021	03-02-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-03-2021	03-02-2022
EMI Test Software	Tonscend	TS+	Version:3.0.0.1		
Pre-amplifier	HP	8447D	2944A09358	03-03-2021	03-02-2022
Pre-amplifier	CD	TRLA-010180G50B	20120401	03-03-2021	03-02-2022
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-03-2021	03-02-2022
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-03-2021	03-02-2022
Simulated Station	Anritsu	MT8820C	6201026545	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
10m SAC	ETS	RFSD-100-F/A	Q2005	04-28-2021	04-27-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	1249	04-02-2021	04-01-2022
BiConiLog Antenna	SCHWARZBECK	VULB 9168	1250	04-02-2021	04-01-2022
EMI Test Receiver	R&S	ESR 3	102800	04-08-2021	04-07-2022
EMI Test Receiver	R&S	ESR 3	102802	04-08-2021	04-07-2022
Pre-amplifier	Bost	LNA 0920N	2016	04-06-2021	04-07-2022
Pre-amplifier	Bost	LNA 0920N	2019	04-06-2021	04-07-2022
Test Software	R&S	EMC32	Version: 10.50.40		

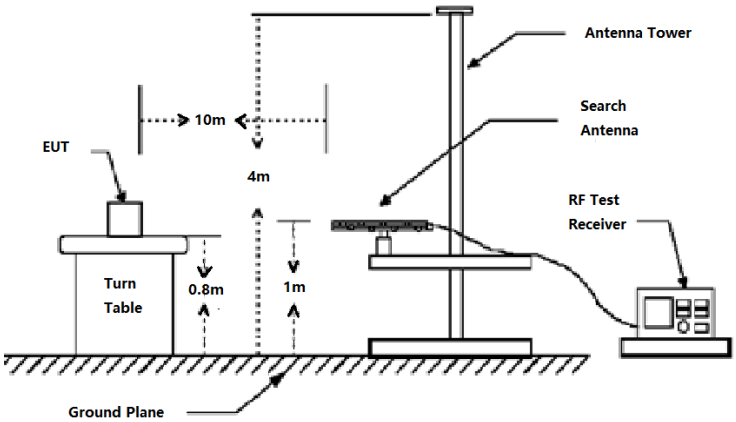
6 Test results and Measurement Data

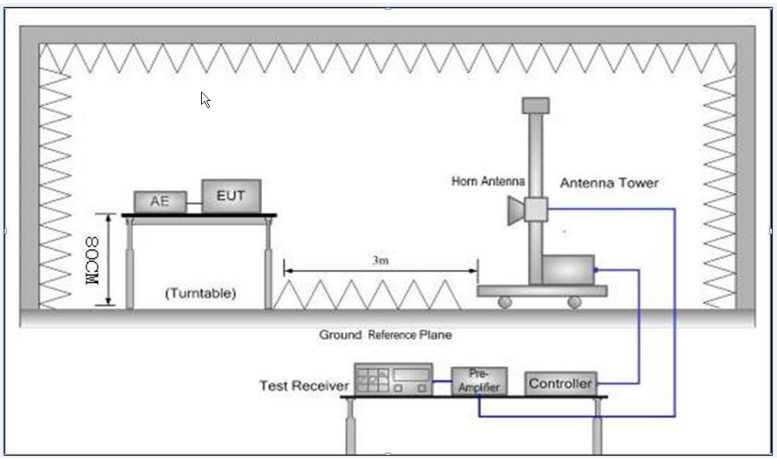
6.1 Conducted Emission

<table>
<tr><td>Test Requirement:</td><td colspan="3">FCC Part 15 B Section 15.107</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="3">150kHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="3">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="3">RBW=9kHz, VBW=30kHz</td></tr>
<tr><td>Limit:</td><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBµV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td></td><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td></td><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td></td><td>0.5-30</td><td>60</td><td>50</td></tr>
<tr><td></td><td colspan="3">* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test setup:</td><td colspan="3"> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test procedure</td><td colspan="3">1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide 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 refers 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(latest version) on conducted measurement.</td></tr>
<tr><td>Test Instruments:</td><td colspan="3">Refer to section 5.11 for details</td></tr>
<tr><td>Test mode:</td><td colspan="3">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="3">Not Applicable</td></tr>
</table>

6.2 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part 15 B Section 15.109</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">30MHz to 6000MHz</td></tr>
<tr><td>Test site:</td><td colspan="5">Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)</td></tr>
<tr><td rowspan="5">Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
<tr><td></td><td colspan="4"></td></tr>
<tr><td rowspan="9">Limit:</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @10m)</td><td>Remark</td></tr>
<tr><td colspan="2">30MHz-88MHz</td><td colspan="2">30.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">88MHz-216MHz</td><td colspan="2">33.5</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">216MHz-960MHz</td><td colspan="2">36.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">960MHz-1GHz</td><td colspan="2">44.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">54.0</td><td>Average Value</td></tr>
<tr><td colspan="2">74.0</td><td>Peak Value</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>Test setup:</td><td colspan="5">Below 1GHz
 

Above 1GHz
 
</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter chamber (below 1GHz)or 3 meter chamber(above 1GHz). The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 10 meters(below 1GHz) or 3 meters(above 1GHz) away from the interference-receiving antenna, which was mounted on</td></tr>
</table>

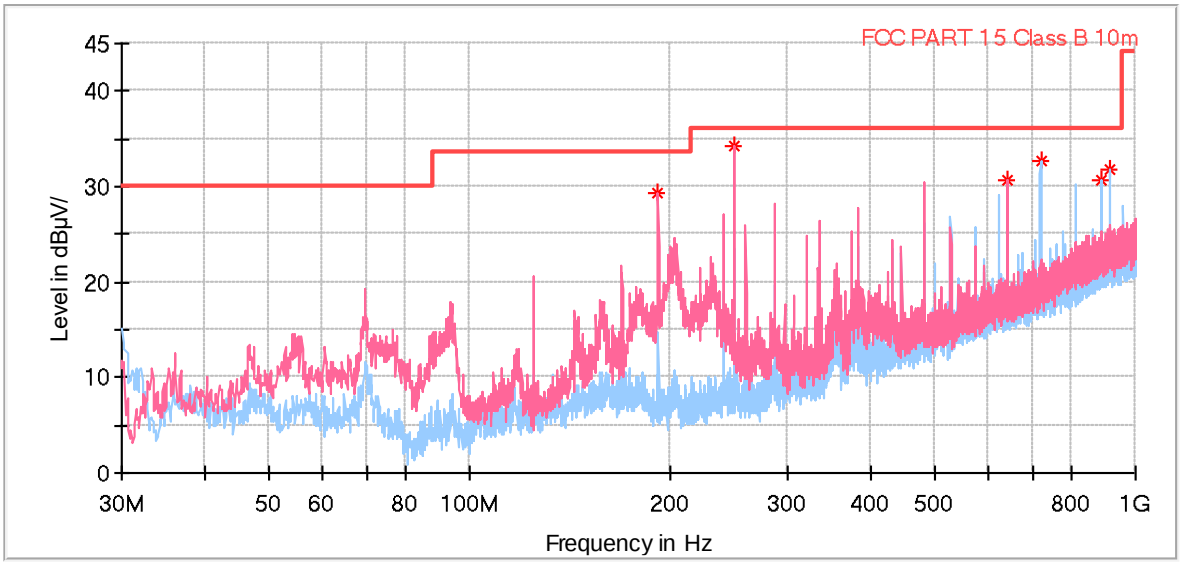
	the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the 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. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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.
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 ware the niose floor , which were no recorded

Measurement Data:

Below 1GHz:

Product Name:	CAR DVR	**Product Model:**	LS05D
Test By:	Carey	**Test mode:**	Recording mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical & Horizontal
Test Voltage:	DC 12V	**Environment:**	Temp: 24℃ Huni: 57%

Full Spectrum



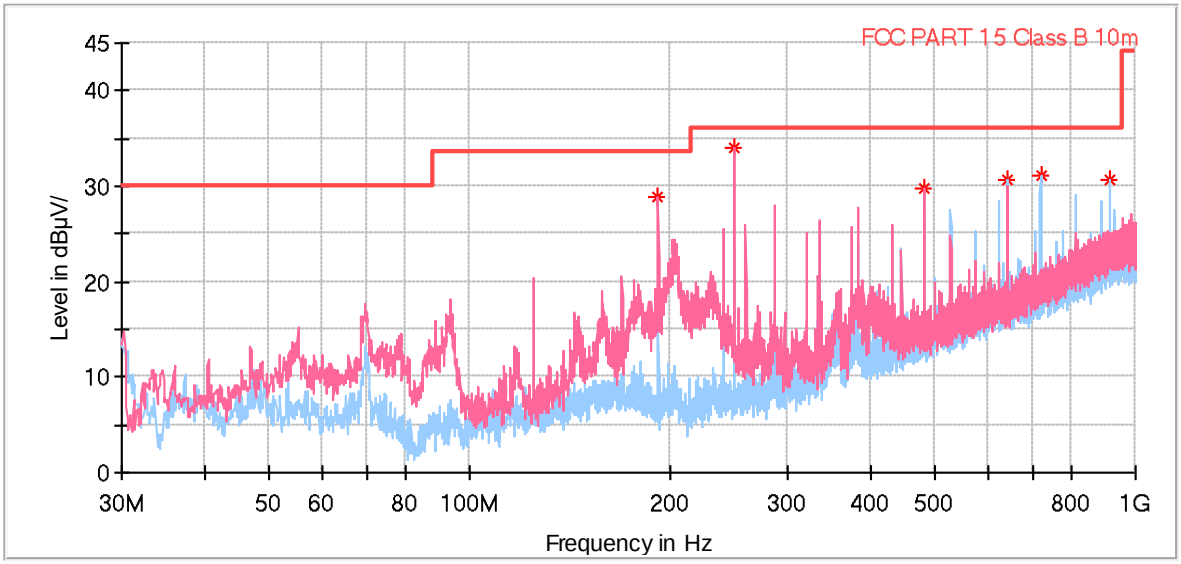
Frequency (MHz)	Max QP (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
191.990000	29.22	33.50	4.28	100.0	V	102.0	-17.9
249.996000	34.28	36.00	1.72	100.0	V	277.0	-15.8
640.033000	30.68	36.00	5.32	100.0	H	73.0	-6.0
720.058000	32.61	36.00	3.39	100.0	H	164.0	-4.7
891.069000	30.57	36.00	5.43	100.0	H	164.0	-1.4
912.021000	31.86	36.00	4.14	100.0	H	210.0	-1.1

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:	CAR DVR	Product Model:	LS05D
Test By:	Carey	Test mode:	Recording mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical & Horizontal
Test Voltage:	DC 24V	Environment:	Temp: 24℃ Huni: 57%

Full Spectrum



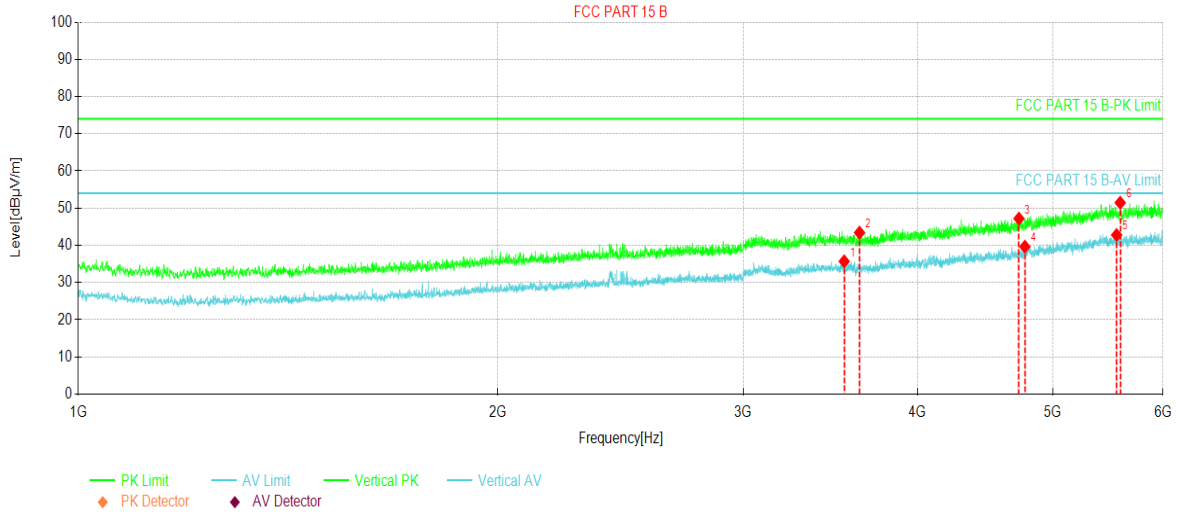
Frequency (MHz)	Max QP (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
191.990000	28.99	33.50	4.51	100.0	V	72.0	-17.9
249.996000	34.06	36.00	1.94	100.0	V	303.0	-15.8
479.983000	29.74	36.00	6.26	100.0	V	205.0	-9.3
640.033000	30.67	36.00	5.33	100.0	H	86.0	-6.0
720.058000	31.03	36.00	4.97	100.0	H	0.0	-4.7
912.021000	30.70	36.00	5.30	100.0	H	72.0	-1.1

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:	CAR DVR	**Product Model:**	LS05D
Test By:	Carey	**Test mode:**	Recording mode
Test Frequency:	1 GHz ~ 6 GHz	**Polarization:**	Vertical
Test Voltage:	DC 12V	**Environment:**	Temp: 24℃ Huni: 57%

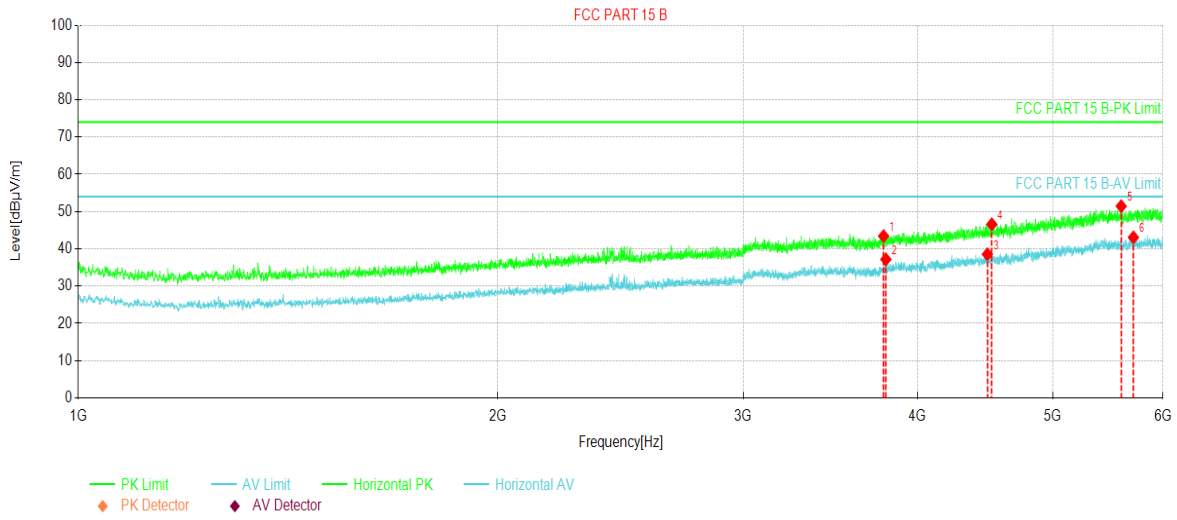


NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	3543.75	50.57	35.70	-14.87	54.00	18.30	AV	Vertical
2	3634.37	58.17	43.41	-14.76	74.00	30.59	PK	Vertical
3	4729.37	56.78	47.21	-9.57	74.00	26.79	PK	Vertical
4	4776.25	48.98	39.64	-9.34	54.00	14.36	AV	Vertical
5	5557.50	48.85	42.78	-6.07	54.00	11.22	AV	Vertical
6	5590.62	57.54	51.47	-6.07	74.00	22.53	PK	Vertical

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:	CAR DVR	Product Model:	LS05D
Test By:	Carey	Test mode:	Recording mode
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test Voltage:	DC 12V	Environment:	Temp: 24℃ Huni: 57%

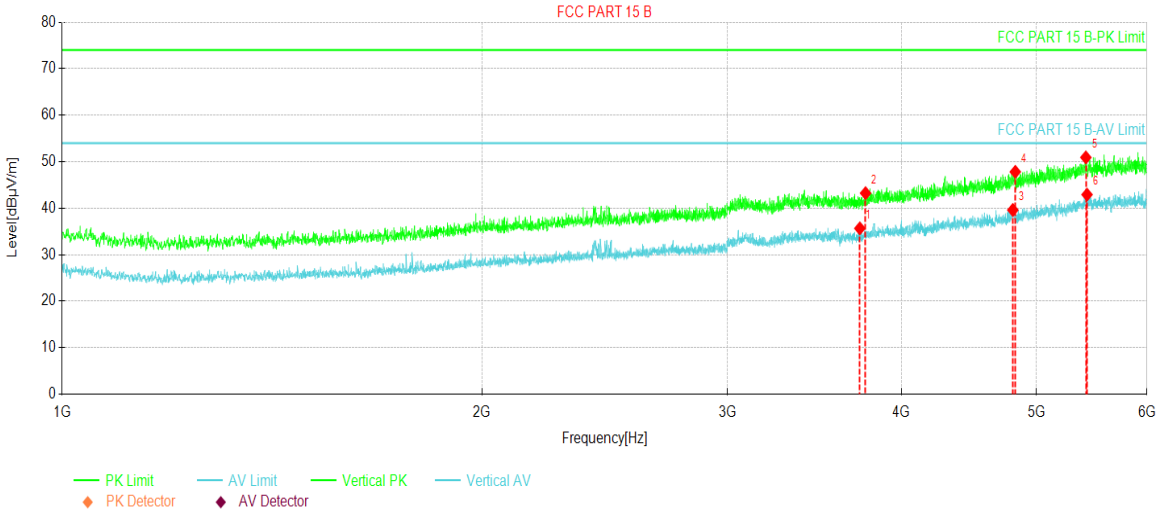


NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	3781.87	57.40	43.41	-13.99	74.00	30.59	PK	Horizontal
2	3796.25	51.07	37.17	-13.90	54.00	16.83	AV	Horizontal
3	4488.75	49.40	38.55	-10.85	54.00	15.45	AV	Horizontal
4	4521.87	57.28	46.57	-10.71	74.00	27.43	PK	Horizontal
5	5600.00	57.51	51.44	-6.07	74.00	22.56	PK	Horizontal
6	5714.37	48.30	43.07	-5.23	54.00	10.93	AV	Horizontal

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:	CAR DVR	Product Model:	LS05D
Test By:	Carey	Test mode:	Recording mode
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Vertical
Test Voltage:	DC 24V	Environment:	Temp: 24℃ Huni: 57%

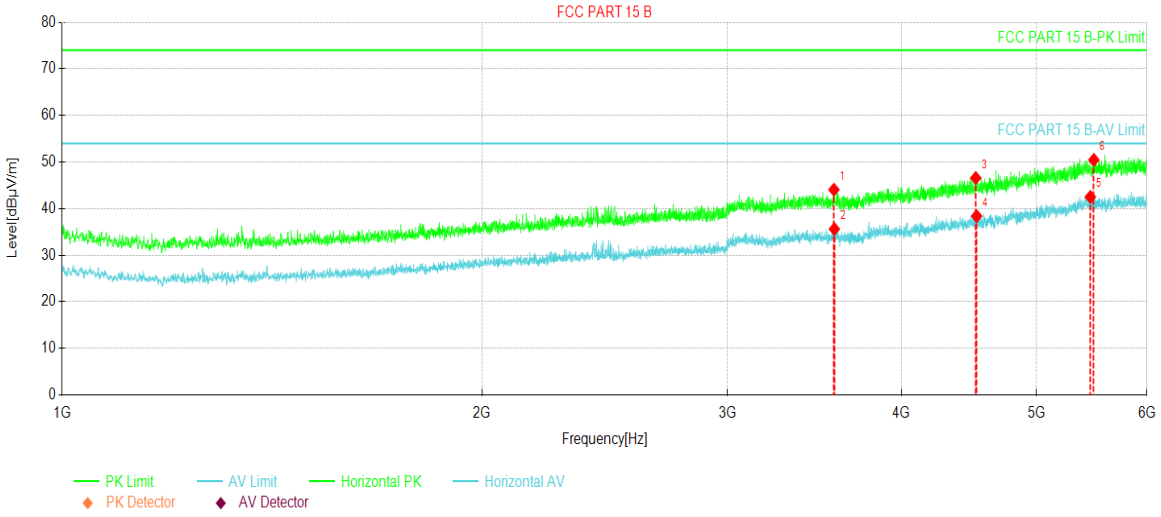


NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	3733.75	49.93	35.65	-14.28	54.00	18.35	AV	Vertical
2	3769.37	57.28	43.22	-14.06	74.00	30.78	PK	Vertical
3	4807.50	48.79	39.60	-9.19	54.00	14.40	AV	Vertical
4	4826.87	56.92	47.81	-9.11	74.00	26.19	PK	Vertical
5	5423.75	56.88	50.91	-5.97	74.00	23.09	PK	Vertical
6	5434.37	48.90	42.92	-5.98	54.00	11.08	AV	Vertical

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:	CAR DVR	Product Model:	LS05D
Test By:	Carey	Test mode:	Recording mode
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test Voltage:	DC 24V	Environment:	Temp: 24℃ Huni: 57%



NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	3577.50	58.94	44.05	-14.89	74.00	29.95	PK	Horizontal
2	3580.00	50.51	35.61	-14.90	54.00	18.39	AV	Horizontal
3	4521.87	57.28	46.57	-10.71	74.00	27.43	PK	Horizontal
4	4528.75	49.06	38.38	-10.68	54.00	15.62	AV	Horizontal
5	5463.75	48.53	42.50	-6.03	54.00	11.50	AV	Horizontal
6	5495.62	56.52	50.45	-6.07	74.00	23.55	PK	Horizontal

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.