

TEST REPORT

FCC ID: Z5CRC-200

Product: Wireless Rear View Mirror with Back Up Camera

Model No.: RC-200

Additional Model: N/A

Trade Mark: AutoXS

Report No.: TCT150527E008

Issued Date: Jun. 25, 2015

Issued for:

SUPRA Foto Elektronik Vertriebs GmbH
Denisstrasse 28a 67663 Kaiserslautern Germany

Issued By:

Shenzhen Tongce Testing Lab.

1F, Leinuo Watch Building, Fuyong Town, Baoan Dist, Shenzhen, China

TEL: +86-755-27673339

FAX: +86-755-27673332

Note: This report shall not be reproduced except in full, without the written approval of Shenzhen Tongce Testing Lab.

This document may be altered or revised by Shenzhen Tongce Testing Lab. personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

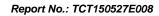




TABLE OF CONTENTS

1.	Test Certification	. 3
2.	Test Result Summary	. 4
3.	EUT Description	. 5
4.	Genera Information	. 6
	4.1. Test Environment and Mode	6
	4.2. Description of Support Units	6
5.	Facilities and Accreditations	. 7
	5.1. Facilities	7
	5.2. Location	7
	5.3. Measurement Uncertainty	7
6.	Test Results and Measurement Data	. 8
	6.1. Antenna Requirement	8
	6.2. Conducted Emission	9
	6.3. Radiated Emission Measurement	9
	6.4. 20dB Occupied Bandwidth	.16
Ap	pendix A: Photographs of Test Setup	
Δn	nendix B. Photographs of FUT	



1. Test Certification

Product:	Wireless Rear View Mirror with Back Up Camera			
Model No.:	RC-200			
Additional Model:	N/A			
Applicant:	SUPRA Foto Elektronik Vertriebs GmbH			
Address:	Denisstrasse 28a 67663 Kaiserslautern Germany			
Manufacturer:	Shenzhen Anlud Science And Technology Development Co.,Ltd.			
Address:	Building A, Bole Industrial Zone, Bantian Avenue, Longgang District, Shenzhen City, Guangdong Province, P.R. China			
Date of Test:	May 28 – Jun. 24, 2015			
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249			

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:

Leon Chen

Reviewed By:

Joe Zhou

Approved By:

Date: Jun. 24, 2015

Date: Jun. 25, 2015

Date: Jun. 25, 2015

Page 3 of 17

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com



2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna Requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	N/A
Field Strength of Fundamental	§15.249 (a)	PASS
Spurious Emissions	§15.249 (a) (d)/ §15.209	PASS
Band Edge	§15.249 (d)/ §15.205	PASS
20dB Occupied Bandwidth	§15.215 (c)	PASS

Note:

- 1. Pass: Test item meets the requirement.
- 2. Fail: Test item does not meet the requirement.
- 3. N/A: Test case does not apply to the test object.
- 4. The test result judgment is decided by the limit of test standard.



3. EUT Description

Product Name:	Wireless Rear View Mirror with Back Up Camera
Model :	RC-200
Additional Model:	N/A
Trade Mark:	AutoXS
Operation Frequency:	2468MHz
Modulation Type:	FM
Antenna Type:	Internal Antenna
Antenna Gain:	1dBi
Power Supply:	DC10~24V



4. Genera Information

4.1. Test Environment and Mode

Operating Environment:						
Temperature:	25.0 °C					
Humidity:	54 % RH					
Atmospheric Pressure: 1010 mbar						
Test Mode:						
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations					

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.

4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
lead-acid battery	95D31R	/	/	REMARKABLE

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.



5. Facilities and Accreditations

5.1. Facilities

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

• FCC - Registration No.: 572331

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

• IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

CNAS - Registration No.: CNAS L6165
 Shenzhen TCT Testing Technology Co., Ltd. is accredited to ISO/IEC 17025:2005
 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6165.

5.2.Location

Shenzhen Tongce Testing Lab

Address: 1F, Leinuo Watch Building, Fuyong Town, Baoan Dist, Shenzhen, China

Tel: 86-755-36638142

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	±2.56dB
2	RF power, conducted	±0.12dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.92dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

Report No.: TCT150527E008



6. Test Results and Measurement Data

6.1.Antenna Requirement

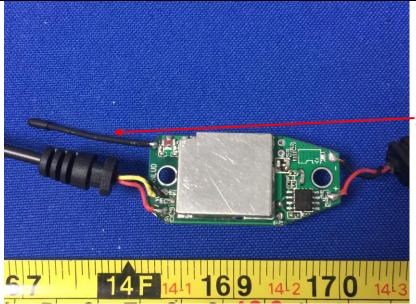
Standard requirement: FCC Part15 C Section 15.203

15.203 requirement:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

E.U.T Antenna:

The Bluetooth antenna is an internal PCB antenna which permanently attached, and the best case gain of the antenna is 1dBi.



·Antenna



ECHNOLOGY Report No.: TCT150527E008

6.2.Conducted Emission

Test Result: Not applicable(The power source	ce of EUT is DC only)
--	-----------------------

6.3. Radiated Emission Measurement

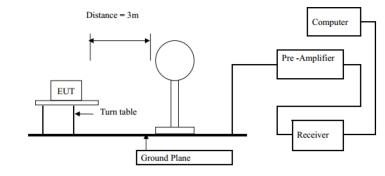
6.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209					
Test Method:	ANSI C63.4: 2009 and ANSI C63.10:2009					
Frequency Range:	9 kHz to 25 GHz					
Measurement Distance:	3 m					
Antenna Polarization:	Horizontal & Vertical					
Receiver Setup:	Frequency 9kHz- 150kHz 150kHz- 30MHz	Detector Quasi-peak Quasi-peak	9kHz	VBW 1kHz 30kHz	Remark Quasi-peak Value Quasi-peak Value	
	30MHz-1GHz Above 1GHz	Quasi-peak Peak Peak	120kHz 1MHz 1MHz	300kHz 3MHz 10Hz	Quasi-peak Value Peak Value Average Value	
Limit(Field strength of the fundamental signal):	Frequency 2400MHz-2483.5MHz		Limit (dBuV/m @3m) 94.00 114.00		Remark Average Value Peak Value	
Limit(Spurious Emissions):	Frequency 0.009-0.490 0.490-1.705 1.705-30 30MHz-88MHz 88MHz-216MHz 216MHz-960MHz 960MHz-1GHz Above 1GHz		Limit (dBuV/m @3m) 2400/F(KHz) 24000/F(KHz) 30 40.0 43.5 46.0 54.0		Remark Quasi-peak Value Average Value Peak Value	
Limit (band edge) :	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by a least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.					
Test Procedure:	 The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber in below 1GHz, 80cm above the ground in above 1GHz. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 					



- 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.

For radiated emissions below 30MHz



30MHz to 1GHz

Antenna Tower

Search
Antenna

RF Test
Receiver

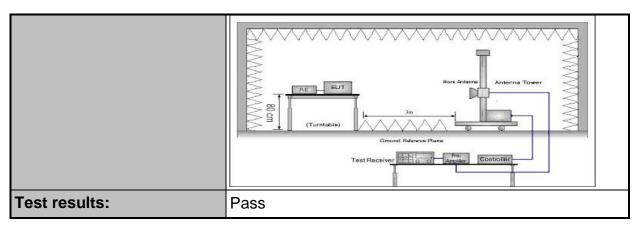
Ground Plane

Above 1GHz

Test setup:







6.3.2. Test Instruments

ESPI Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Sep.16 , 2015	
Spectrum Analyzer	Spectrum Analyzer ROHDE&SCHW ARZ		848597/001	Sep.16 , 2015	
Spectrum Analyzer	Agilent	N9020A	MY49100060	Oct. 21, 2015	
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep.16 , 2015	
Pre-amplifier	HP	8447D	2727A05017	Sep.16 , 2015	
Loop antenna	ZHINAN	ZN30900A	12024	Dec.14, 2015	
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep.16 , 2015	
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep.16 , 2015	
Horn Antenna	Schwarzbeck	BBHA 9170	373	Sep.16 , 2015	
Coax cable	TCT	RE-low-01	N/A	Sep.15 , 2015	
Coax cable	TCT	RE-high-02	N/A	Sep.15 , 2015	
Coax cable	TCT	RE-low-03	N/A	Sep.15 , 2015	
Coax cable	TCT	RE-high-04	N/A	Sep.15 , 2015	
Antenna Mast	ccs	CC-A-4M	N/A	N/A	
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A	

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



6.3.3. Test Data

Field Strength of Fundamental

Test channel: 2468 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Emissic Peak (dBµV/m)	AV	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
2468	Н	103.52		-7.9	95.62		114		-18.38
2468	Н		95.38	-7.9		87.48		94	-6.52
2468	V	107.9		-7.9	100		114		-14
2468	V		99.65	-7.9		91.75		94	-2.25

Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBµV/m)	Limit@3m (dBµV/m)

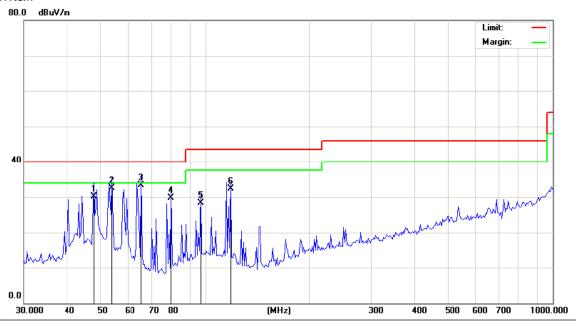
Note: 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

^{2.} The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement



Frequency Range (30MHz-1GHz)

Horizontal:

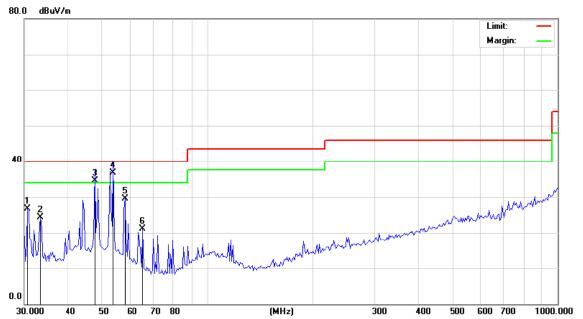


Site Polarization: Horizontal Temperature: 25
Limit: FCC Part 15B Class B RE_3 m Power: DC 12V Humidity: 56 %

No. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	47.7028	42.20	-12.13	30.07	40.00	-9.93	QP		0	
2	53.7560	44.90	-12.33	32.57	40.00	-7.43	QP		0	
3 *	65.4452	48.20	-14.82	33.38	40.00	-6.62	QP		0	
4	79.6764	46.10	-16.35	29.75	40.00	-10.25	QP		0	
5	97.0023	40.20	-11.90	28.30	43.50	-15.20	QP		0	
6	118.0957	45.70	-13.35	32.35	43.50	-11.15	QP		0	



Vertical:



Site Polarization: Vertical Temperature: 25
Limit: FCC Part 15B Class B RE_3 m Power: DC 12V Humidity: 56 %

No. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	30.6392	40.36	-13.64	26.72	40.00	-13.28	QP		0	
2	33.3350	37.63	-13.30	24.33	40.00	-15.67	QP		0	
3 !	47.7028	46.60	-12.13	34.47	40.00	-5.53	QP		0	
4 *	53.7560	49.10	-12.33	36.77	40.00	-3.23	QP		0	
5	58.0760	42.17	-12.67	29.50	40.00	-10.50	QP		0	
6	65.4452	35.89	-14.82	21.07	40.00	-18.93	QP		0	



Above 1GHz

	Test channel: 2468 MHz								
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	AV	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
4936	Н	59.61		1.24	60.85		74		-13.15
4936	Н		48.82	1.24		50.06		54	-3.94
7404	Н	41		10.12	51.12		74	54	-2.88
4936	V	62.59		1.24	63.83		74		-10.17
4936	V		50.42	1.24		51.66		54	-2.34
7404	V	42.53		10.12	52.65		74	54	-1.35

Note:

- 1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss Pre-amplifier
- 2. Margin (dB) = Emission Level (Peak) (dB μ V/m)-Average limit (dB μ V/m)
- 3. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 5. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

Band Edge Requirement

	Test channel: 2468 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)	
2388.16	Η	54.99		-8.23	46.76	-	74	54	-7.24	
2484.22	Η	55.03		-7.52	47.51	-	74	54	-6.49	
	-	-		-	-	ł	1	-		
2388.16	V	60.82		-8.23	52.59		74	54	-1.41	
2484.22	V	54.87		-7.52	47.35		74	54	-6.65	

Note:

- 1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss Pre-amplifier
- 2. Margin (dB) = Emission Level (Peak) (dB μ V/m)-Average limit (dB μ V/m)
- 3. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 5. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.



6.4.20dB Occupied Bandwidth

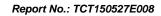
6.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.215(c)					
Test Method:	ANSI C63.4: 2009					
Limit:	N/A					
	 According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. Set to the maximum power setting and enable the EUT transmit continuously. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW≥1% of the 20 dB bandwidth; VBW≥RBW; Sweep = auto; Detector function = peak; Trace = max hold. Measure and record the results in the test report. 					
Test setup:	Spectrum Analyzer EUT					
Test Mode:	Transmitting mode with modulation					
Test results:	Pass					

6.4.2. Test Instruments

RF Test Room								
Equipment Manufacturer Model Serial Number Calibration Duc								
Spectrum Analyzer	Agilent	N9020A	MY49100060	Oct. 21, 2015				

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).





6.4.3. Test data

Test Channel	20dB Occupy Bandwidth (MHz)	Limit	Conclusion	
2468 MHz	9.104		PASS	

Test plots as follows:

20dB Occupy Bandwidth



*****END OF REPORT****