

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.

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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

Date:

Jun. 24, 2015

Reviewed By:



Joe Zhou

Date:

Jun. 25, 2015

Approved By:



Tomsin

Date:

Jun. 25, 2015

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

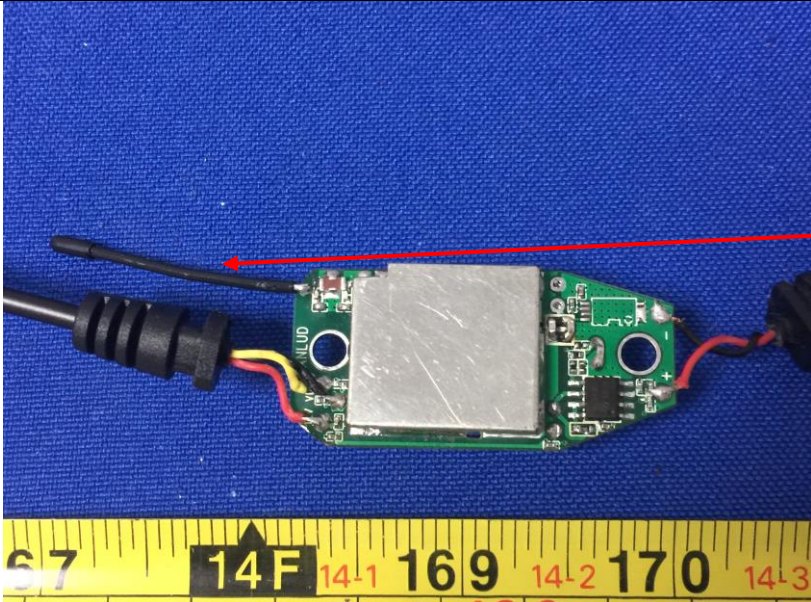
5.3. Measurement Uncertainty

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	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.12\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.92\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^{\circ}\text{C}$
7	Humidity	$\pm 1.0\%$

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	

6.2. Conducted Emission

Test Result:	Not applicable(The power source of EUT is DC only)
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6.3. Radiated Emission Measurement

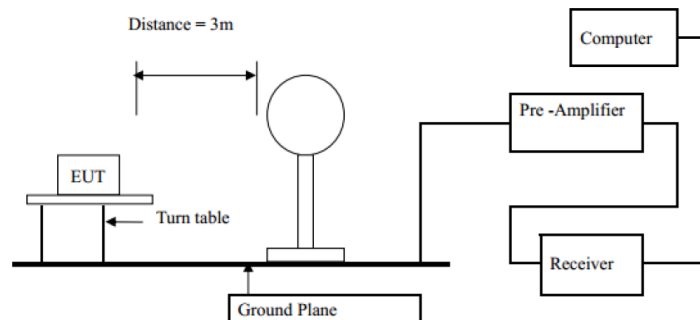
6.3.1. Test Specification

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	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Peak		1MHz	10Hz	Average Value	
Limit(Field strength of the fundamental signal):	Frequency		Limit (dBuV/m @3m)		Remark
	2400MHz-2483.5MHz		94.00		Average Value
			114.00		Peak Value
Limit(Spurious Emissions):	Frequency		Limit (dBuV/m @3m)		Remark
	0.009-0.490		2400/F(KHz)		Quasi-peak Value
	0.490-1.705		24000/F(KHz)		Quasi-peak Value
	1.705-30		30		Quasi-peak Value
	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		Average Value
74.0			Peak Value		
Limit (band edge) :	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at 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:	1. 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. 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.				

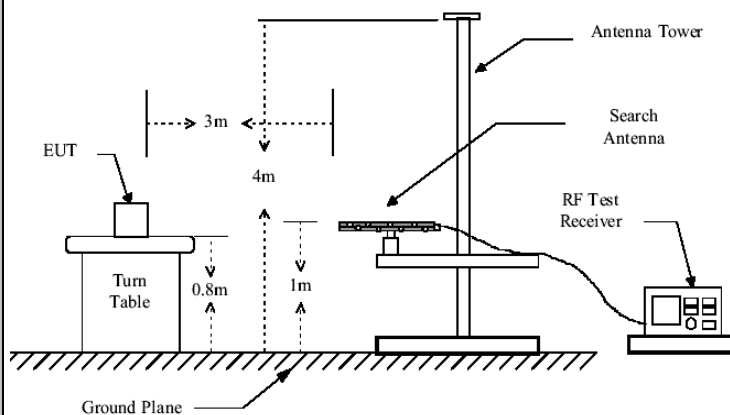
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then 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 setup:

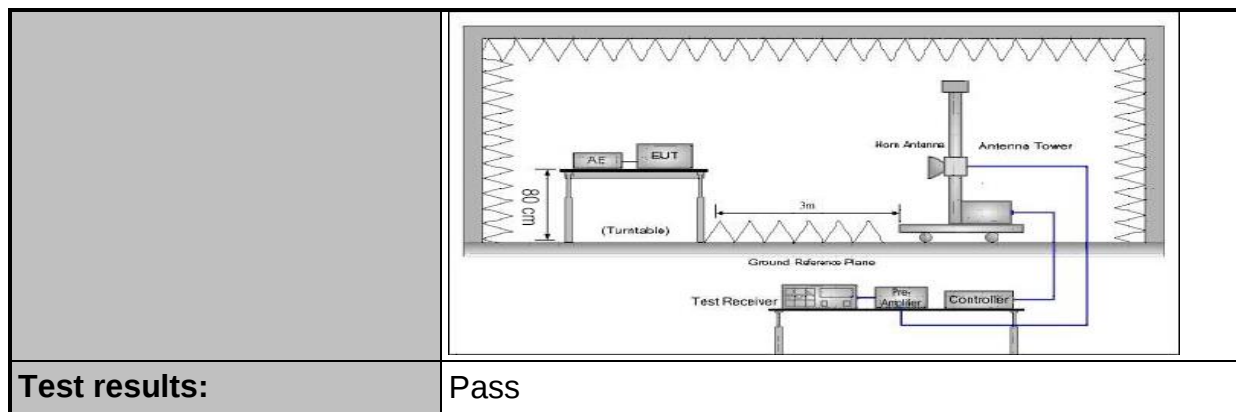
For radiated emissions below 30MHz



30MHz to 1GHz



Above 1GHz



Test results:

Pass

6.3.2. Test Instruments

ESPI Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Sep.16 , 2015
Spectrum Analyzer	ROHDE&SCHW ARZ	FSEM	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)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
2468	H	103.52	---	-7.9	95.62	---	114	---	-18.38
2468	H	---	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)

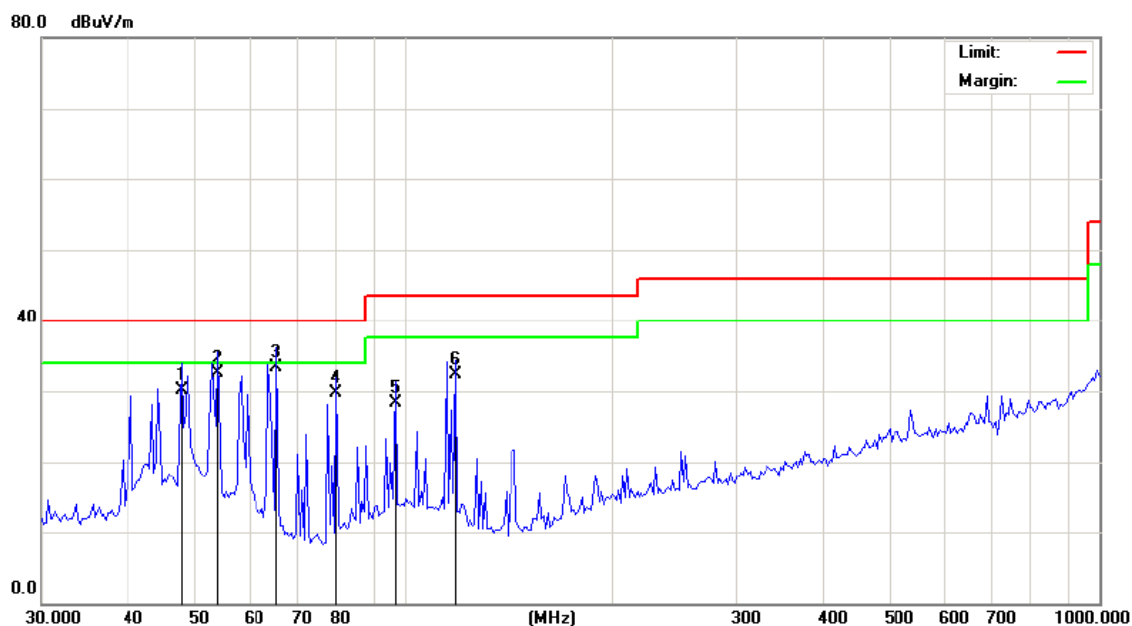
Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
--	--	--
--	--	--
--	--	--
--	--	--

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)

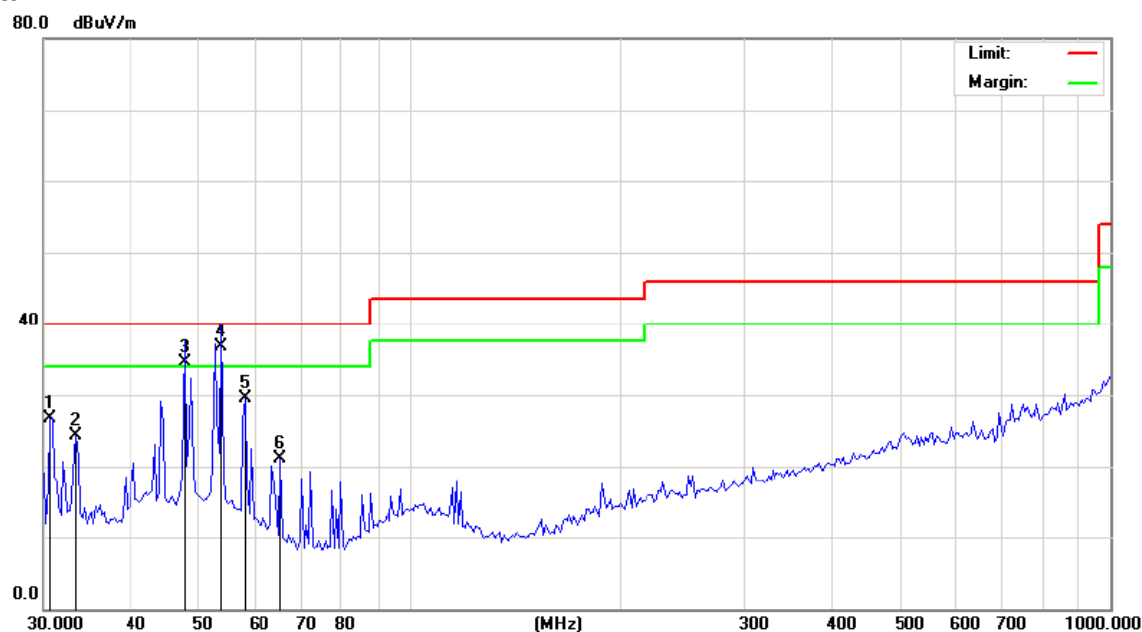
Horizontal:



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	Measurement	Limit	Over	Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	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	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
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	I	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 (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4936	H	59.61	---	1.24	60.85	---	74	---	-13.15
4936	H	---	48.82	1.24	---	50.06	---	54	-3.94
7404	H	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) (dBμV/m)-Average limit (dBμV/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

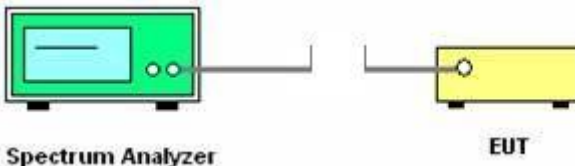
Test channel: 2468 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
2388.16	H	54.99	---	-8.23	46.76	---	74	54	-7.24
2484.22	H	55.03	---	-7.52	47.51	---	74	54	-6.49
---	---	---	---	---	---	---	---	---	---
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) (dBμV/m)-Average limit (dBμV/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
	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. 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$\geq$1% of the 20 dB bandwidth; VBW$\geq$RBW; Sweep = auto; Detector function = peak; Trace = max hold. 4. Measure and record the results in the test report.
Test setup:	 The diagram illustrates the test setup. On the left is a green Spectrum Analyzer with a screen and two knobs. A cable connects it to a yellow rectangular box on the right, which is labeled 'EUT'.
Test Mode:	Transmitting mode with modulation
Test results:	Pass

6.4.2. Test Instruments

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

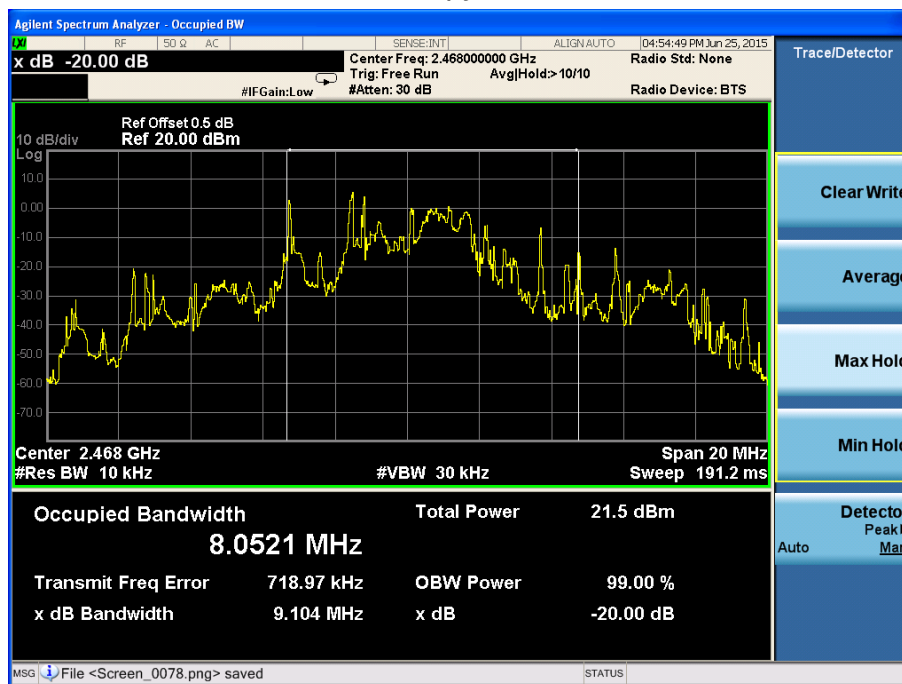
Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

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*****