

## **FCC TEST REPORT**

REPORT NO.: PRA-11DE0161VBTY-A2

MODEL NO.: RG05-1T

**RECEIVED:** Dec. 19, 2011

**ISSUED:** Feb. 02, 2012

**APPLICANT:** ProCom Electric Appliances (Shanghai) Co., Ltd.

ADDRESS: #1118 Huicheng Road, Nanhui Industrial Park, Pudong

New District 201300, Shanghai, China.

ISSUED BY: BUREAU VERITAS ADT (Shanghai) Corporation

ADDRESS: 2F, Building C, No.1618, Yishan rd., 201103,

Shanghai, China

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#### 1 CERTIFICATION

**PRODUCT:** Wireless remote control

MODEL NO.: RG05-1T

APPLICANT: ProCom Electric Appliances (Shanghai) Co., Ltd.

**TESTED:** Dec. 20, 2011~Jan. 12, 2012

**TEST ITEM:** ENGINEERING SAMPLE

STANDARDS: FCC Part 15:2011,

Subpart C (Section 15.209 and 15.231),

ANSI C63.4-2003

We, BUREAU VERITAS ADT (Shanghai) Corporation, declare that the equipment above has been tested in our facility and found compliance with the requirement limits of applicable standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified.

PREPARED BY: John ye , DATE: Feb.02, 2012

Report Engineer

TECHNICAL Joy Zhu

ACCEPTANCE: , DATE: Feb.02, 2012

Joy Zhu Lab Manager

> Zhaoqian YU Director of Operations



## **2 SUMMARY OF TEST RESULTS**

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C					
Standard Paragraph	Test Type	Result	Remarks		
15.207	Conducted Emission Test	N/A	Please refer to 4.1.2.		
15.231(a)	De-activation Time	PASS	Meet the requirement of limit		
15.209	Dadistad Emission Took	PASS	Minimum passing margin is		
15.231(b)	Radiated Emission Test		–3.08 dB at 304.02 MHz		
15.231(c)	20dB Occupied Bandwidth	PASS	Meet the requirement of limit		
10.231(6)	Measurement	FASS	West the requirement of limit		

## 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

Measurement		Value
Conducted emissions		2.55 dB
Conducted emissions at telecom port		2.60 dB
Dadiated emissions	30 MHz ~ 1GHz	3.22 dB
Radiated emissions	Above 1GHz	2.89 dB





#### **3 GENERAL INFORMATION**

## 3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless remote control
MODEL NO.	RG05-1T
POWER SUPPLY	12 Vdc by battery
MODULATION TYPE	FM
CARRIER FREQUENCY OF EACH CHANNEL	303.875 MHz
NUMBER OF CHANNEL	1
ANTENNA TYPE	Soldered on PCB
DATA CABLE SUPPLIED	N/A
I/O PORTS	N/A

**NOTE:** The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

## 3.2 DESCRIPTION OF TEST MODES

Test Mode	Description	
1	Make sure EUT work in the operation mode.	

One channel is provided to this EUT:

Channel	Frequency	
1	303.875 MHz	





#### **TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:**

EUT configure		Applicable to			Description	
mode	PLC	De-a T	RE	20dB OBM		
Α	-		V	V	Continuously transmitting	

Where PLC: Power Line Conducted Emission

RE: Radiated Emission

De-a T: De-activation Time

20dB OBM: 20dB Occupied Bandwidth Measurement

## **Radiated Emission Test:**

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, and X.Y.Z. axis.

Following channel(s) was (were) selected for the final test as listed below.

Available	Tested	Modulation	Axis
Channel	Channel	Type	
1	1	FM	Χ



## 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

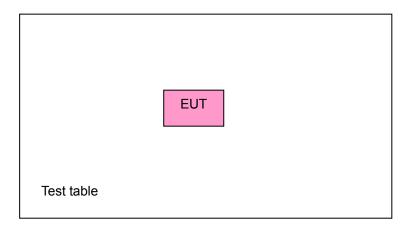
The EUT is a remote switching. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.231) ANSI C63.4- 2003

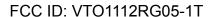
All test items have been performed and recorded as per the above standards.

#### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit.



Note: When doing the test, fresh batteries were used.





#### **4 EMISSION TEST**

## 4.1 CONDUCTED EMISSION MEASUREMENT

## 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

**NOTES**: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

#### **4.1.2 TEST RESULTS**

Since the EUT is powered by battery, the report doesn't require for conduct emission test.



#### 4.2 DEACTIVATION TIME

### 4.2.1 LIMITS OF DEACTIVATION TIME MEASUREMENT

#### **TEST STANDARD:**

FCC Part 15: 2011, Subpart C (Section: 15.231(a))

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

#### 4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
Spectrum Analyzer ROHDE & SCHWARZ	FSP	E1S1002	May. 16, 2012
BILOG Antenna SCHWARZBECK	VULB9168	E1A1001	Sept. 26, 2012

**NOTE:** The calibration interval of the above test instruments is 12 months.

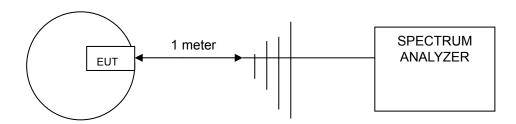
#### 4.2.3 TEST PROCEDURES

- 1 The EUT was placed on the turning table.
- 2 The signal was coupled to the spectrum analyzer through an antenna.
- 3 The transmission duration was measured and recorded.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 TEST SETUP

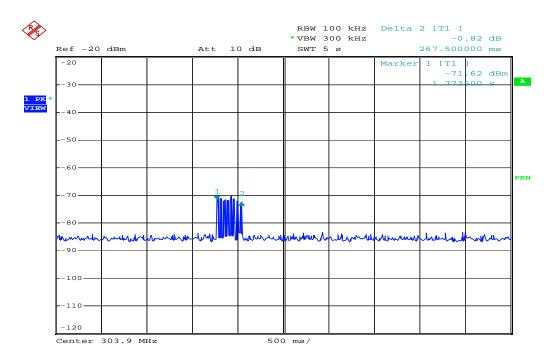






## 4.2.6 TEST RESULTS

	Frequency Transmission duration (MHz) (sec)		1 7		Maximum limit (sec)	Pass / Fail
	303.875	0.2675	5	Pass		



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## 4.3 RADIATED EMISSION MEASUREMENT

#### 4.3.1 LIMITS OF RADIATED EMISSION MEASUREMENT

**TEST STANDARD:** 

FCC Part 15: 2011, Subpart C (Section: 15.205) FCC Part 15: 2011, Subpart C (Section: 15.209) FCC Part 15: 2011, Subpart C (Section: 15.231(b))

According to 15.231 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental	Field Strength	of Fundamental	Field Strength of Spurious	
Frequency (MHz)	uV/meter	dBuV/meter	uV/meter	dBuV/meter
40.66 – 40.70	2250	67.04	225	48.04
70 – 130	1250	61.94	125	41.94
130 – 174	1250 to 3750	61.94 to 71.48	125 to 375	41.94 to 51.48
174 – 260	3750	71.48	75	37.50
260 – 470	3750 to 12500	71.48 to 81.94	375 to 1250	51.48 to 61.94
Above 470	12500	81.94	1250	61.94

#### NOTE:

- (1) Where F is the frequency in MHz, the formula for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F)-6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F)-7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.
- (2) The above field strength limits are specified at a distance of 3meters. The tighter limits apply at the band edges.





Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

# FREQUENCY RANGE OF RADIATED MEASUREMENT

(For intentional radiators)

If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.





#### **4.3.2 TEST INSTRUMENTS**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	Apr. 19, 2012
BILOG Antenna SCHWARZBECK	VULB9168	E1A1001	Sept. 26, 2012
Preamplifier Agilent	8447D	E1A2001	Jan. 27, 2012
Preamplifier Agilent	8449B	E1A2002	Jan. 27, 2012
Double Ridged Broadband Horn Antenna Schwarzbeck	BBHA 9120D	E1A1002	Feb. 15, 2012
*Spectrum Analyzer Agilent	E4403B	E1S1001	Jan. 13, 2012
*Spectrum Analyzer ROHDE & SCHWARZ	FSP	E1S1002	May. 16, 2012
RF signal cable Woken	RG-402	E1CBH01	May. 30, 2012
RF signal cable Woken	RG-402	E1CBH16	May. 30, 2012
RF signal cable Woken	RG-402	E1CBH20	May. 30, 2012
RF signal cable Woken	RG-412	E1CBL02	May. 30, 2012
RF signal cable Woken	RG-412	E1CBL03	May. 30, 2012
RF signal cable Woken	RG-412	E1CBL04	May. 30, 2012
Software ADT	ADT_Radiated_V7.5	N/A	N/A

**NOTE:** 1. The calibration interval of the above test instruments is 12 months.

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<sup>2. &</sup>quot;\*" = These equipment are used for the final measurement.

<sup>3.</sup> The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

<sup>4.</sup> The Spectrum Analyzer (model: FSP) and RF signal cable (SERIAL: E1CBH05&E1CBH07) are used only for the measurement of emission frequency above 1GHz if tested.





#### 4.3.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its 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.
- d. 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.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

#### NOTE:

- 1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) at frequency above 1GHz.

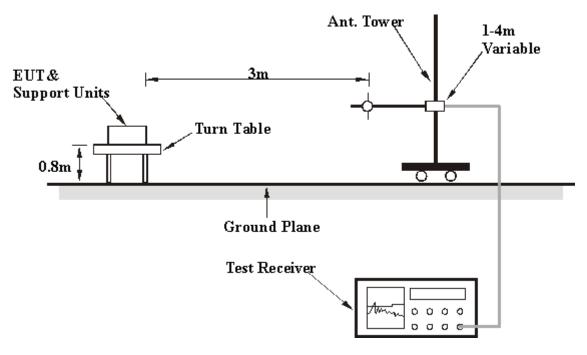
## 4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

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#### 4.3.5 TEST SETUP



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

#### 4.3.6 EUT OPERATING CONDITIONS

Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.



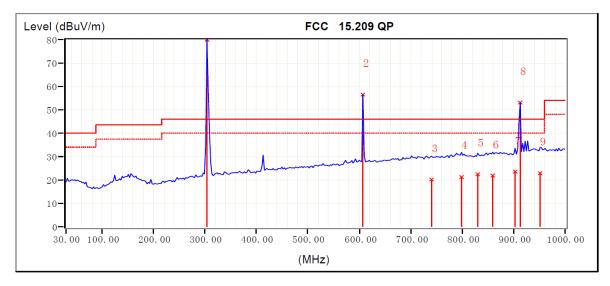


## **4.3.7 TEST RESULTS**

## Below 1GHz Worst-Case Data

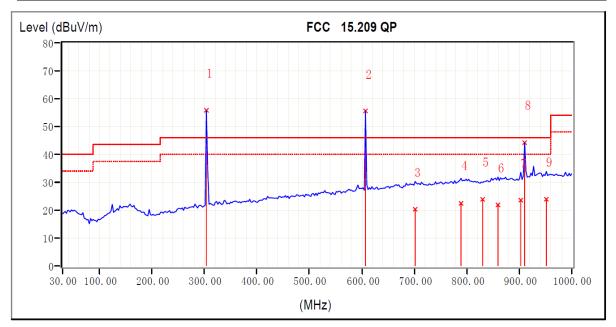
EUT	Wireless remote control	MODEL NO.	RG05-1T
CHANNEL	Channel 1	FREQUENCY RANGE	30 ~ 1000 MHz
MODULATION TYPE	FM	INPUT POWER (SYSTEM)	12 Vdc by battery
ENVIRONMENTAL CONDITIONS	20 deg. C, 50% RH, 101 kPa	DETECTOR FUNCTION	Quasi-Peak / Peak/ Average
TESTED BY	Gray SONG		

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq.	Factor	Reading	Emission	Limit	Margin	Ant. Height	Table Angle
INO.	(MHz)	(dB/M)	(dBuV/M)	(dBuV/M)	(dBuV/M)	(dB)	(cm)	(Deg.)
1	*304.02PK	16.36	63.62	79.98	94.93	-14.95		
1	*304.02AV	16.36	55.49	71.85	74.93	-3.08		
2	607.15PK	23.00	33.51	56.51	74.93	-18.42		
2	607.15AV	23.00	25.38	48.38	54.93	-6.55	-	
3	740.52 QP	24.96	-4.78	20.18	46.00	-25.82	100	0
4	798.73 QP	25.59	-4.35	21.24	46.00	-24.76	100	183
5	830.25 QP	25.94	-3.51	22.43	46.00	-23.57	100	239
6	859.35 QP	25.96	-4.07	21.89	46.00	-24.11	100	90
7	903.00 QP	26.14	-2.56	23.58	46.00	-22.42	100	0
8	912.70PK	26.64	26.47	53.11	74.93	-21.82	ı	
8	912.70AV	26.64	18.34	44.98	54.93	-9.95	-	
9	951.50 QP	27.42	-4.51	22.91	46.00	-23.09	100	222





	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq.	Factor	Reading	Emission	Limit	Margin	Ant. Height	Table Angle
NO.	(MHz)	(dB/M)	(dBuV/M)	(dBuV/M)	(dBuV/M)	(dB)	(cm)	(Deg.)
1	*304.02PK	16.36	39.45	55.81	94.93	-39.12		
1	*304.02AV	16.36	31.32	47.68	74.93	-27.25		
2	607.15PK	23.00	32.57	55.57	74.93	-19.36		
2	607.15AV	23.00	24.44	47.44	54.93	-7.49		
3	701.73QP	24.30	-4.00	20.30	46.00	-25.70	100	172
4	789.02QP	25.47	-3.04	22.43	46.00	-23.57	100	119
5	830.25QP	25.94	-2.06	23.88	46.00	-22.12	100	222
6	859.35QP	25.96	-4.07	21.89	46.00	-24.11	100	90
7	903.00QP	26.14	-2.56	23.58	46.00	-22.42	100	323
8	912.70PK	26.51	17.7	44.21	74.93	-30.72		
8	912.70AV	26.51	9.57	36.08	54.93	-18.85		
9	951.50QP	27.42	-3.51	23.91	46.00	-22.09	100	0



NOTE: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB)

- 2. Correction Factor (dB) = Antenna Factor (dB) + Cable Factor (dB)
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.
- 5. "\*" = Fundamental frequency
- 6. The average value of fundamental frequency and spurious emission is: Average = Peak value + 20log(Duty cycle)

Where the duty factor is calculated from following formula:

duty cycle=(1.14\*10+0.56\*3)\*3/100=0.3924

20log(duty cycle)=-8.13

please see page 20 and 21 for plotted duty.



## Above 1GHz Worst-Case Data

EUT	Wireless remote control	MODEL NO.	RG05-1T
CHANNEL	Channel 1	FREQUENCY RANGE	Above 1 GHz
MODULATION TYPE	FM	INPUT POWER (SYSTEM)	12 Vdc by battery
ENVIRONMENTAL CONDITIONS	20 deg. C, 50% RH, 101 kPa	DETECTOR FUNCTION	Peak/ Average
TESTED BY	Gray SONG		

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
Na	Freq.	Factor	Reading	Emission	Limit	Margin	Ant. Height	Table Angle
No.	(MHz)	(dB/M)	(dBuV/M)	(dBuV/M)	(dBuV/M)	(dB)	(cm)	(Deg.)
1	1215.50PK	29.31	26.83	56.14	74	-17.86		
1	1215.50AV	29.31	18.7	48.01	54	-5.99		
2	1519.37PK	29.45	10.87	40.32	74	-33.28		
2	1519.37AV	29.45	2.74	32.59	54	-21.41		
3	1823.25PK	29.72	16.01	45.73	74	-28.27		
3	1823.25AV	29.72	7.88	37.6	54	-16.4		
4	2127.12 PK	32.17	15.18	47.35	74	-26.65		
4	2127.12 AV	32.17	7.05	39.22	54	-14.78		
5	2431.00PK	32.67	22.45	55.12	74	-18.88		
5	2431.00AV	32.67	14.32	46.99	54	-7.01		
6	2734.87PK	32.78	11.62	44.40	74	-29.6		
6	2734.87AV	32.78	3.49	36.27	54	-17.73		
7	3038.75PK	32.63	12.69	46.32	74	-28.68		
7	3038.75AV	32.63	4.56	37.19	54	-16.81		
8	3342.62 PK	32.94	11.14	44.08	74	-29.92		
8	3342.62AV	32.94	3.01	35.95	54	-18.05		
9	3646.50PK	34.06	12.55	46.61	74	-27.39		
9	3646.50AV	34.06	4.42	38.48	54	-15.52		
10	3950.37PK	35.91	11.84	47.75	74	-26.25		
10	3950.37AV	35.91	3.71	39.62	54	-14.38		
11	4254.25PK	37.59	11.95	49.54	74	-24.46		
11	4254.25AV	37.59	3.82	41.41	54	-12.59		
12	4558.12PK	37.71	10.52	48.23	74	-25.77		
12	4558.12AV	37.71	2.39	40.1	54	-13.9		
13	4862.00PK	37.94	11.95	49.89	74	-24.11		
13	4862.00AV	37.94	3.82	41.76	54	-12.24		



	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
Na	Freq.	Factor	Reading	Emission	Limit	Margin	Ant. Height	Table Angle
No.	(MHz)	(dB/M)	(dBuV/M)	(dBuV/M)	(dBuV/M)	(dB)	(cm)	(Deg.)
1	1215.50PK	29.31	17.29	46.60	74	-27.4		
1	1215.50AV	29.31	9.16	38.47	54	-15.53		
2	1519.37PK	29.45	9.47	38.92	74	-35.08		
2	1519.37AV	29.45	1.34	30.79	54	-23.21		
3	1823.25PK	29.72	13.24	42.96	74	-31.04		
3	1823.25AV	29.72	5.11	34.83	54	-19.17		
4	2127.12 PK	32.17	16.30	48.47	74	-25.53		
4	2127.12 AV	32.17	8.17	40.34	54	-13.66		
5	2431.00PK	32.67	21.20	53.77	74	-20.13		
5	2431.00AV	32.67	13.07	45.74	54	-8.26		
6	2734.87PK	32.85	12.16	45.01	74	-28.99		
6	2734.87AV	32.85	4.03	36.88	54	-17.12		
7	3038.75PK	33.57	11.92	45.49	74	-28.51		
7	3038.75AV	33.57	3.79	37.36	54	-16.64		
8	3342.62 PK	32.94	11.21	44.15	74	-29.85		
8	3342.62AV	32.94	3.08	36.02	54	-17.98		
9	3646.50PK	34.01	12.00	46.01	74	-27.99		
9	3646.50AV	34.01	3.87	37.88	54	-16.12		
10	3950.37PK	35.91	12.08	47.99	74	-26.01		
10	3950.37AV	35.91	3.95	39.86	54	-14.14		
11	4254.25PK	37.57	12.54	50.11	74	-23.89		
11	4254.25AV	37.57	4.41	41.98	54	-12.02		
12	4558.12PK	37.75	10.86	48.61	74	-25.39		
12	4558.12AV	37.75	2.73	40.48	54	-13.52		
13	4862.00PK	37.97	10.97	48.94	74	-25.06		
13	4862.00AV	37.97	2.84	40.81	54	-13.19		

#### REMARKS:

- 1. Emission level (dBuV/m) =Raw Value (dBuV) + Correction Factor (dB/m)
- 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.
- 5. The average value of fundamental frequency and spurious emission is: Average = Peak value + 20log(Duty cycle)

Where the duty factor is calculated from following formula:

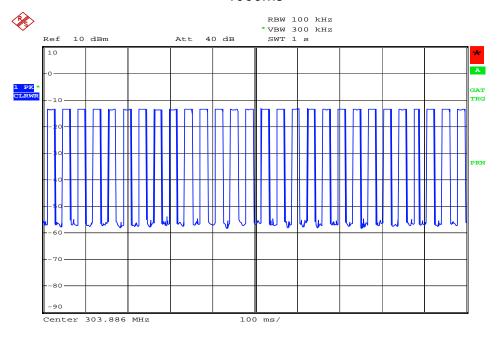
duty cycle=(1.14\*10+0.56\*3)\*3/100=0.3924

20log(duty cycle)=-8.13

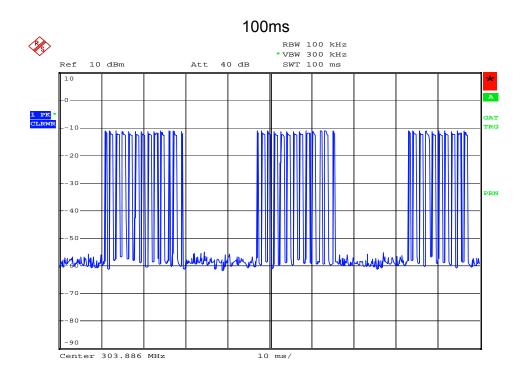
please see page 20 and 21 for plotted duty.



## 1000ms

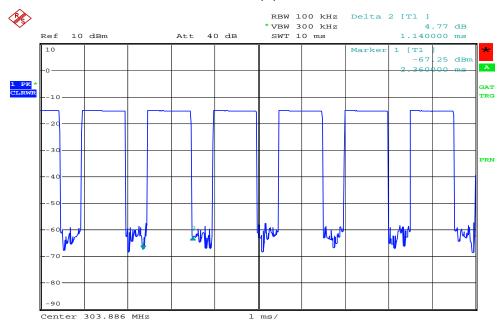


Date: 21.DEC.2011 22:03:31

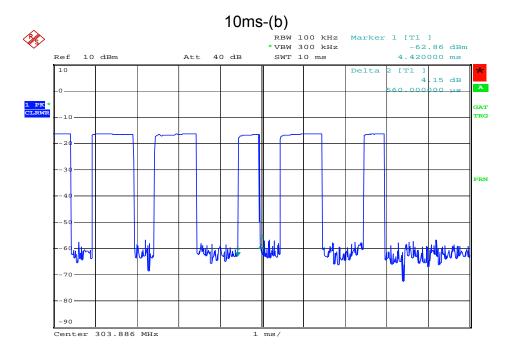




## 10ms-(a)



Date: 21.DEC.2011 21:53:50



Date: 21.DEC.2011 21:54:42





## 4.4 20DB OCCUPIED BANDWIDTH MEASUREMENT

## 4.4.1 LIMITS OF BAND EDGES MEASUREMENT

**TEST STANDARD:** 

FCC Part 15: 2011, Subpart C (Section: 15.231(C))

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for device operating above 70 MHz and below 900 MHz.

Fundamental Frequency (MHz)	Limit of 20 dB Bandwidth(kHz)	
303.875	759.69	

#### **4.4.2 TEST INSTRUMENTS**

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SIGNAL ANALYZER Rohde & Schwarz	FSP	E1S1002	Mar. 16, 2012
BILOG Antenna SCHWARZBECK	VULB9168	E1A1001	Sept. 26, 2012

**NOTE:** The calibration interval of the above test instruments is 12 months.



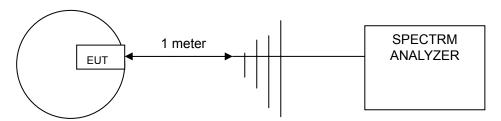
#### 4.4.3 TEST PROCEDURES

- 1. The EUT was placed on the turning table.
- 2. The signal was coupled to the spectrum analyzer through an antenna.
- 3. Set the resolution bandwidth to 100 kHz and video bandwidth to 300 kHz then select Peak function to scan the channel frequency.
- 4. The 20dB bandwidth was measured and recorded.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.4.5 TEST SETUP

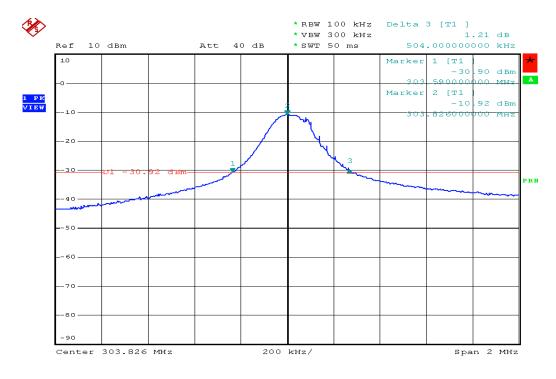




## **4.4.6 TEST RESULTS**

Frequency (MHz)	20 dB bandwidth (kHz)	Maximum limit (kHz)	Pass / Fail
303.875	504	759.69	Pass

The plot of test result is attached as below.



Date: 21 DEC 2011 21-15-51

Report No.: PRA-11DE0161VBTY-A2





#### 5 APPENDIX - INFORMATION ON THE TESTING LABORATORY

We, BUREAU VERITAS ADT (Shanghai) Corporation, were founded in 2004 to provide our best service in EMC, Radio and Vehicle consultation. Our laboratories are accredited by the following accreditation bodies according to ISO/IEC 17025 (2005).

USA A2LA

Certificate No.: 2343.01

China CNAS

Certificate No.: L2810

Copies of accreditation certificates could be inquired from our office. If you have any comments, please feel free to contact us at the following:

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#### EMC / RF / Vehicle Lab:

Tel: +86 21 6465 9091 Fax:+86 21 6465 9092

Email: <u>bvadtshmail@cn.bureauveritas.com</u>