

**SGS-CSTC Standards
Technical Services Co., Ltd.**

588 West Jindu Road, Songjiang District, Shanghai, China

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Report No.: SHEMO09070079101
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TEST REPORT

Application No. : SHEMO09070079101
Applicant: Ningbo C.F Electronic Tech Co., Ltd
FCC ID: XLVPE23-T
Fundamental Frequency : 315MHz
Equipment Under Test (EUT):
Name: POOL ALARM
Model No.: PE23
Standards: FCC PART 15 SUBPART C, Section 15.231
Date of Receipt: Jul 22, 2009
Date of Test: Jul 25, 2009 to Aug 3, 2009
Date of Issue: Aug 3, 2009
Test Result : **PASS ***

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

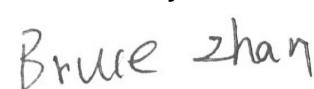
Approved by:



Tino Pan

E&E Section Manager

Tested By:



Bruce Zhan

EMC TEST Engineer

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2 Test Summary

The customer requested FCC tests for a 315MHz transmitter.			
Test	Test Requirement	Standard Paragraph	Result
Radiated Emission	FCC PART 15	Section 15.231(b) Section 15.205	PASS
Occupied Bandwidth	FCC PART 15	Section 15.231(c)	PASS
Dwell Time	FCC PART 15	Section 15.231(a)	PASS

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4 General Information

4.1 Client Information

Applicant Name: Ningbo C.F Electronic Tech Co., ltd
Applicant Address: Gongren village, Gulin Town, Ningbo, China

4.2 Details of E.U.T.

Name: POOLALARM RECEIVER
Model No.: PE23
Power Supply: DC 9V
Power Cord: N/A

4.3 Description of Support Units

The EUT was tested as an independent unit: a 315MHz radio transmitter for transferring control information.

4.4 Test Location

Tests were performed at:

SGS-CSTC EMC Laboratory, No.588 West Jindu Road, Songjiang District, Shanghai, China
Tel: +86 21 6191 5666 Fax: +86 21 6191 5655
No tests were sub-contracted.

4.5 Other Information Requested by the Customer

None.

4.6 Test Facility

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

FCC – Registration No.: 402683

EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 402683. Effective dates: Feb 23, 2009.

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5 Test Results

5.1 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	Spectrum Analyzer	Rohde & Schwarz	FSP-30	100324	2009-4-21	2010-4-20
2	EMI test receiver	Rohde & Schwarz	ESU40	100109	2009-6-4	2010-6-3
3	Bilog Antenna	TESEQ	CBL6112D	23193	2009-5-14	2010-5-14
4	Horn Antenna	EMCO	3115	9100284	2009-4-11	2010-4-10
5	Horn Antenna	EMCO	3115	100285	2008-10-9	2009-10-8
6	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2009-5-29	2010-5-28
7	VHAP PRECISION HALFWAVE DIPOLES	R&S	VHAP	1096+1097	2009-5-18	2010-5-17
8	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY-2003P	--	2008-10-21	2009-10-20
9	CLAMP METER	FLUKE	316	86080010	2009-4-21	2010-4-20
10	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2008-10-21	2009-10-20
11	Digital illuminance meter	TES electrical electronic Corp.	TES-1330A	050602219	2008-10-21	2009-10-20
12	TEMPERATURE& HUMIDITY BOX	KSON	THS-D2C-100	K40723	2008-11-18	2009-11-17
13	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2009-6-18	2010-6-17
14	DC power	KIKUSUI	PMC35-3	NF100260	--	--

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5.2 E.U.T. Operation

Input voltage: DC 9V
Operating Environment:
Temperature: 25.0 °C
Humidity: 56 % RH
Atmospheric Pressure: 1008 mbar
EUT Operation: Test the EUT in transmitting mode.

5.3 Test Procedure & Measurement Data

5.3.1 Radiated Emissions

5.3.1.1 Harmonic and other spurious emissions

Test Requirement: FCC Part15 C 15.231(b)
Test Method: ANSI C63.4 section 8 & 13
Test Date: Aug 3, 2009
Measurement Distance: 3m (Semi-Anechoic Chamber)
Requirements: the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency MHz	Field Strength of Fundamental (dB μ V/m @ 3m)	Field Strength of Harmonics and Spurious Emissions (dB μ V/m @ 3m)
40.66 to 40.70	67.04	47.04
70 to 130	61.94	41.94
130 to 174	61.94 to 71.48	41.94 to 51.48
174 to 260	71.48	51.48
260 to 470	71.48 to 81.94	51.48 to 61.94
Above 470	81.94	61.94
Detector:	Peak for pre-scan Peak and Average: 30-1000MHz: 120kHz resolution bandwidth 1GHz-5GHz: 1MHz resolution bandwidth	

** linear interpolations

[Where F is the frequency in MHz, the formulas 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.]

The fundamental frequency of the EUT is 315MHz

The limit for average field strength dB μ V/m for the fundamental emission = 75.6 dB μ V/m

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No fundamental is allowed in the restricted bands.

The limit for average field strength dB_{BuV/m} for the spurious emission=55.6 dB_{BuV/m}. Spurious in the restricted bands must be less than 55.6 dB_{BuV/m} or 15.209, Whichever limit permits a higher field strength.

Test Procedure: The procedure used was ANSI Standard C63.4-2003. The receive was scanned from 30MHz to 5.0GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Peramplifier . The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Peramplifier Factor

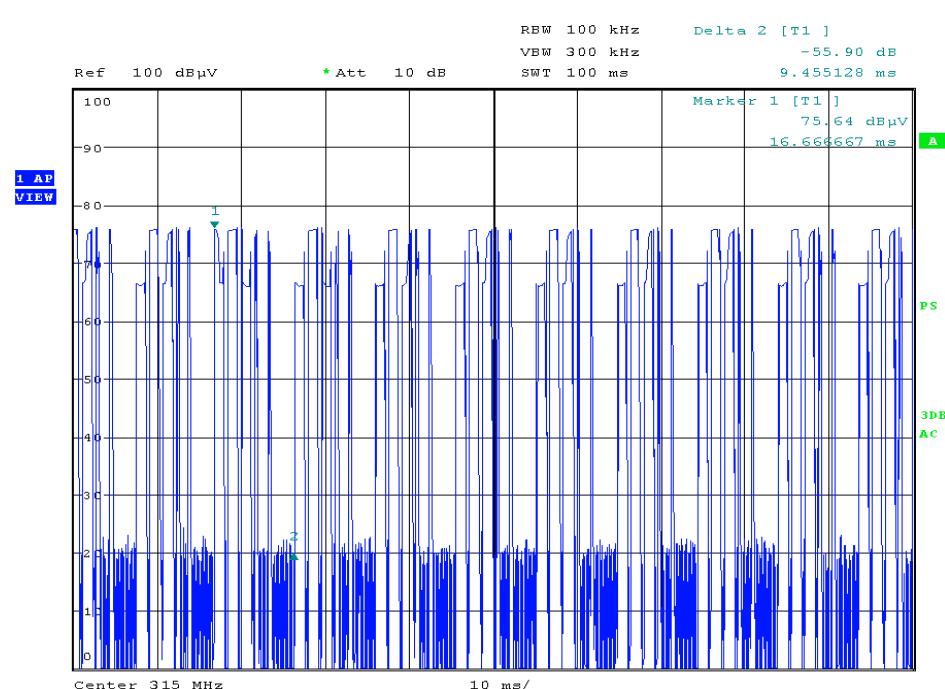
An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. Peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bilog antenna with 2 orthogonal polarities and Horn antenna.

The following test results were performed on the EUT :

1. Sweep time: 100ms

RBW=100kHz

VBW=300kHz



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2.

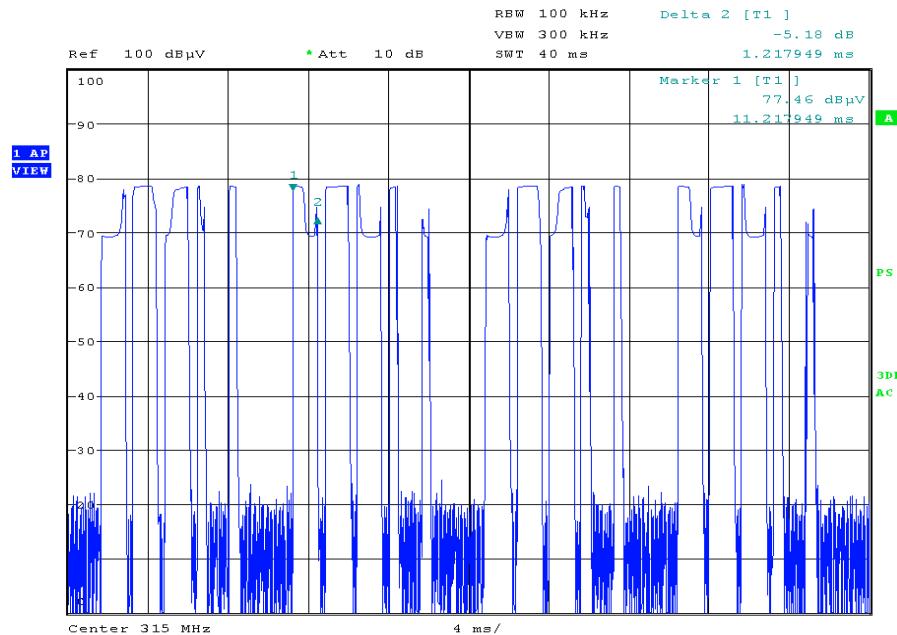
Sweep time: 40ms

RBW=100kHz

VBW=300kHz

Graph 1:

On time=1.2179ms



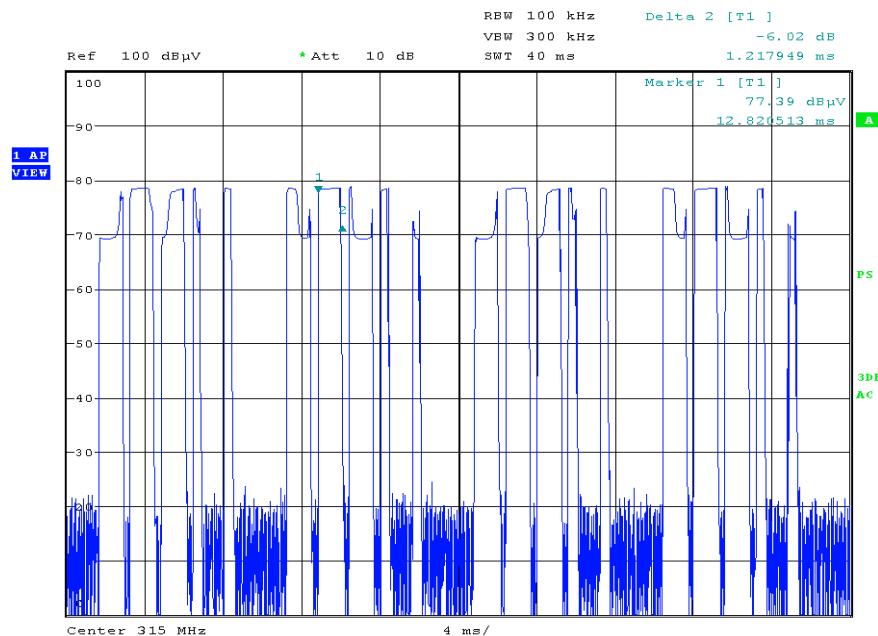
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Graph 2:
On time=1.2179ms



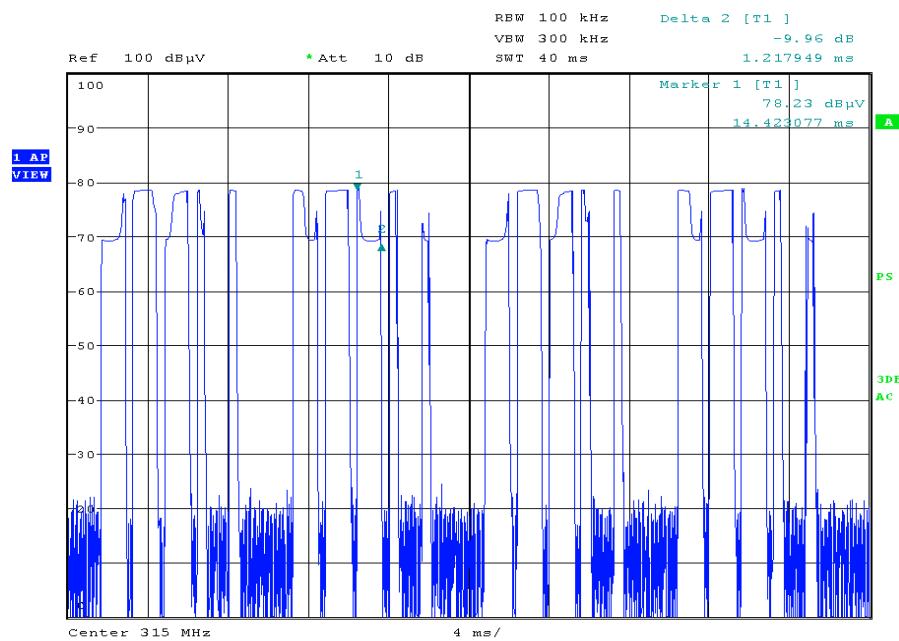
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Graph 3:
On time=1.2179ms



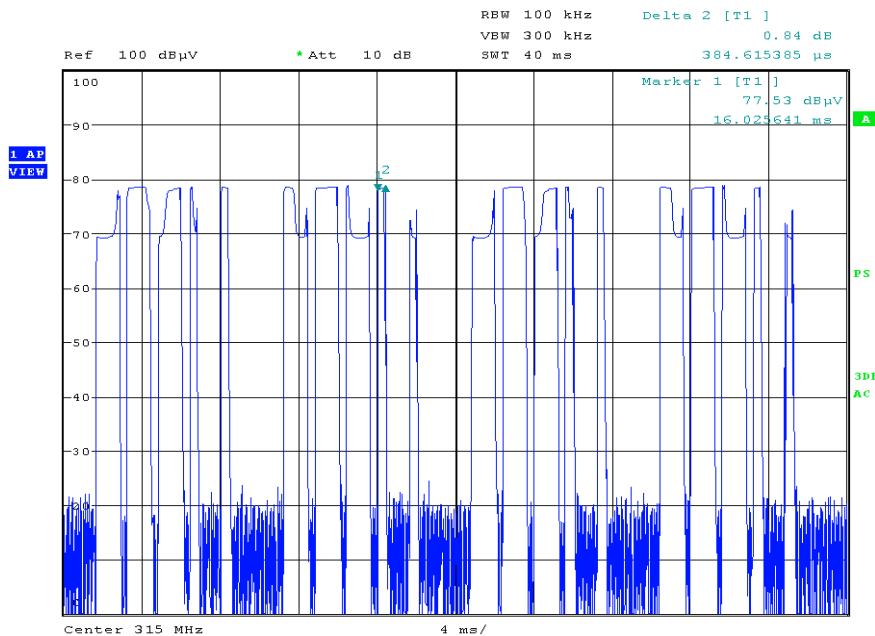
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Graph 4:
On time=0.3846ms



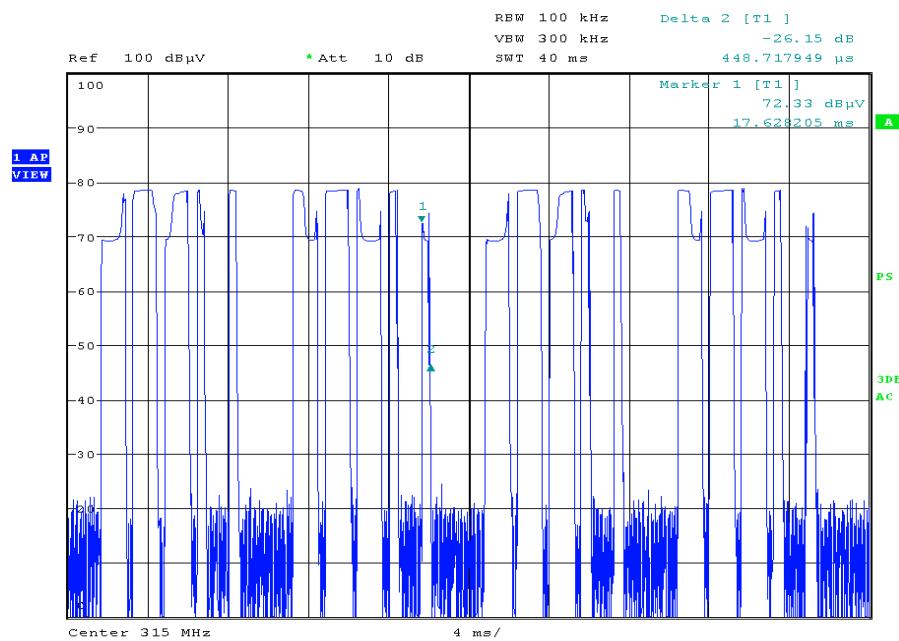
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Graph 5:
On time=0.4487ms



During 100ms period:

On time = $1.2179 \times 10 + 1.2179 \times 11 + 1.2179 \times 11 + 0.3846 \times 11 + 0.4487 \times 11 = 48.1391$ (ms)

Duty cycle=on time/100ms = $48.1391 / 100 = 0.481391$

Duty Cycle Factor = $20 \log(\text{Duty cycle}) = -6.35$

Average Level=Peak Level +Average Factor

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1. Fundamental emission & Spurious Emissions

(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Remark
315	63.33	15.1	0.35	--	78.78	95.6	16.82	PEAK
315	56.98	15.1	0.35	--	72.43	75.6	3.17	AVERAG
630	38.17	20.81	0.48	--	59.46	75.6	16.14	PEAK
630	31.82	20.81	0.48	--	53.11	55.6	2.49	AVERAG
945	32.1	23.3	0.52	--	55.92	75.6	19.68	PEAK
945	25.75	23.3	0.52	--	49.57	55.6	6.03	AVERAG
1260	41.23	24.86	0.61	42.1	24.6	75.6	51	PEAK
1260	34.88	24.86	0.61	42.1	18.25	55.6	37.35	AVERAG
1575	38.42	24.9	0.73	42.2	21.85	74.0	52.15	PEAK
1575	32.07	24.9	0.73	42.2	15.5	54.0	38.5	AVERAG
1890	38.6	25.54	0.78	42.2	22.72	75.6	52.88	PEAK
1890	32.25	25.54	0.78	42.2	16.37	55.6	39.23	AVERAG
2205	40.72	26.3	0.82	42.3	25.54	74.0	48.46	PEAK
2205	34.37	26.3	0.82	42.3	19.19	54.0	34.81	AVERAG
2520	42.53	27.6	0.89	42.5	28.52	75.6	47.08	PEAK
2520	36.18	27.6	0.89	42.5	22.17	55.6	33.43	AVERAG
2835	43.73	28.15	10.7	42.6	39.98	74.0	34.02	PEAK
2835	37.38	28.15	1.07	42.6	24.00	54.0	30.00	AVERAG
3150	42.83	28.25	1.16	42.7	29.54	75.6	46.06	PEAK
3150	36.48	28.25	1.16	42.7	23.19	55.6	32.41	AVERAG

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(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Remark
315	64.72	15.1	0.35	--	80.17	95.6	15.43	PEAK
315	58.37	15.1	0.35	--	73.82	75.6	1.78	AVERAG
630	39.12	20.81	0.48	--	60.41	75.6	15.19	PEAK
630	32.77	20.81	0.48	--	54.06	55.6	1.54	AVERAG
945	31.22	23.3	0.52	--	55.04	75.6	20.56	PEAK
945	24.87	23.3	0.52	--	48.69	55.6	6.91	AVERAG
1260	40.11	24.86	0.61	42.1	23.48	75.6	52.12	PEAK
1260	33.76	24.86	0.61	42.1	17.13	55.6	38.47	AVERAG
1575	37.14	24.9	0.73	42.2	20.57	74.0	53.43	PEAK
1575	30.79	24.9	0.73	42.2	14.22	54.0	39.78	AVERAG
1890	38.62	25.54	0.78	42.2	22.74	75.6	52.86	PEAK
1890	32.27	25.54	0.78	42.2	16.39	55.6	39.21	AVERAG
2205	41.53	26.3	0.82	42.3	26.35	74.0	47.65	PEAK
2205	35.18	26.3	0.82	42.3	20.00	54.0	34.00	AVERAG
2520	43.52	27.6	0.89	42.5	29.51	75.6	46.09	PEAK
2520	37.17	27.6	0.89	42.5	23.16	55.6	32.44	AVERAG
2835	45.37	28.15	10.7	42.6	41.62	74.0	32.38	PEAK
2835	39.02	28.15	1.07	42.6	25.64	54.0	28.36	AVERAG
3150	44.48	28.25	1.16	42.7	31.19	75.6	44.41	PEAK
3150	38.13	28.25	1.16	42.7	24.84	55.6	30.76	AVERAG

Remark: According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.

TEST RESULTS: The unit does meet the FCC Part 15 C Section 15.231 requirements.

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5.3.1.2 Radiated Emissions which fall in the restricted bands

Test Requirement: Section 15.231(b) Further, compliance with the provisions of Section 15.205 shall be demonstrated using the measurement instrumentation specified in that section. must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(b)).

Test Method: Base on ANSI 63.4

Test Date: Jul 25, 2009

Measurement Distance: 3m (Semi-Anechoic Chamber)

Limit: 40.0 dB μ V/m between 30MHz & 88MHz;
43.5 dB μ V/m between 88MHz & 216MHz;
46.0 dB μ V/m between 216MHz & 960MHz;
54.0 dB μ V/m above 960MHz.

Detector: Peak for pre-scan:
100kHz resolution bandwidth and 100kHz video bandwidth within 1GHz.
1MHz resolution bandwidth and 1MHz video bandwidth above 1GHz

Restricted bands

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

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Antenna polarization:

Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Remark
1400	38.42	25.1	0.65	42.2	21.97	74.0	52.03	PEAK
1400	32.07	25.1	0.65	42.2	15.62	54.0	38.38	AVERAG
2483.5	40.72	27.6	0.8	42.4	26.72	74.0	47.28	PEAK
2483.5	34.37	27.6	0.8	42.4	20.37	54.0	33.63	AVERAG
2800	43.73	28.0	0.92	42.6	30.05	74.0	43.95	PEAK
2800	37.38	28.0	0.92	42.6	23.7	54.0	30.3	AVERAG

(b) Antenna polarization:

Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Remark
1400	37.14	25.1	0.65	42.2	20.69	74.0	53.31	PEAK
1400	30.79	25.1	0.65	42.2	14.34	54.0	39.66	AVERAG
2483.5	41.53	27.6	0.8	42.4	27.53	74.0	46.47	PEAK
2483.5	35.18	27.6	0.8	42.4	21.18	54.0	32.82	AVERAG
2800	45.37	28.0	0.92	42.6	31.69	74.0	42.31	PEAK
2800	39.02	28.0	0.92	42.6	25.34	54.0	28.66	AVERAG

Remark: No any other emission which fall in restricted bands can be detected and be reported.

The unit does meet the FCC requirements.

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5.3.2 Occupied Bandwidth

Test Requirement: FCC Part 15 C Section 15.231(c)

Test Method: ANSI C63.4 section 13 & FCC Part 2.1049

Test Date: Jul 28, 2009

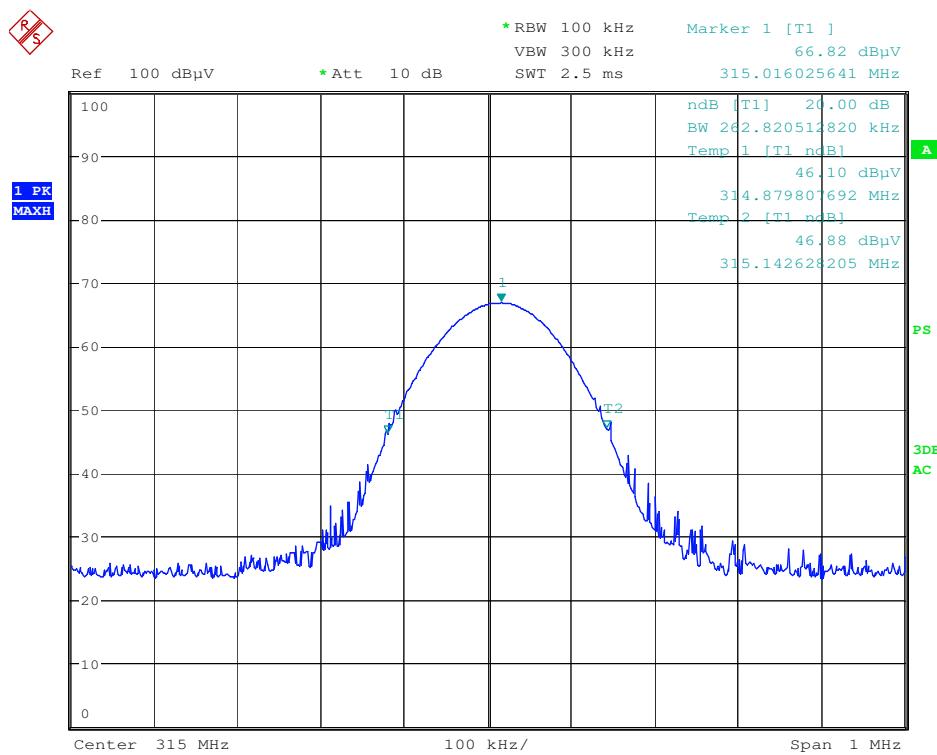
Requirements: 15.231 (c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Limit: 787.5kHz

Method of measurement: The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector. RBW set 100kHz, VBW set 300kHz.

Measurement Result: 315.016KHz

The graph as below, represents the emissions take for this device.



Date: 28.JUL.2009 04:40:49

The results: The unit does meet the FCC Part 15 C Section 15.231 requirements.

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5.3.3 Dwell Time:

Test Requirement: FCC Part 15 C Section 15.231(a)

Test Method: FCC Part 15 C Section 15.231(a)

Test Date: Jul 28, 2009

Requirements:

1. Regulation 15.231 (a) The provisions of this Section are restricted to periodic operation within the band 40.66-40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this Section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Radio control of toys is not permitted. Continuous transmissions, such as voice or video, and data transmissions are not permitted. The prohibition against data transmissions does not preclude the use of recognition codes. Those codes are used to identify the sensor that is activated or to identify the particular component as being part of the system.

Result:

The EUT is a remote switch without audio or video transmitted.

The EUT meets the requirements of this section.

2. Regulation 15.231 (a1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Result:

The EUT does not employ manually operated transmission.

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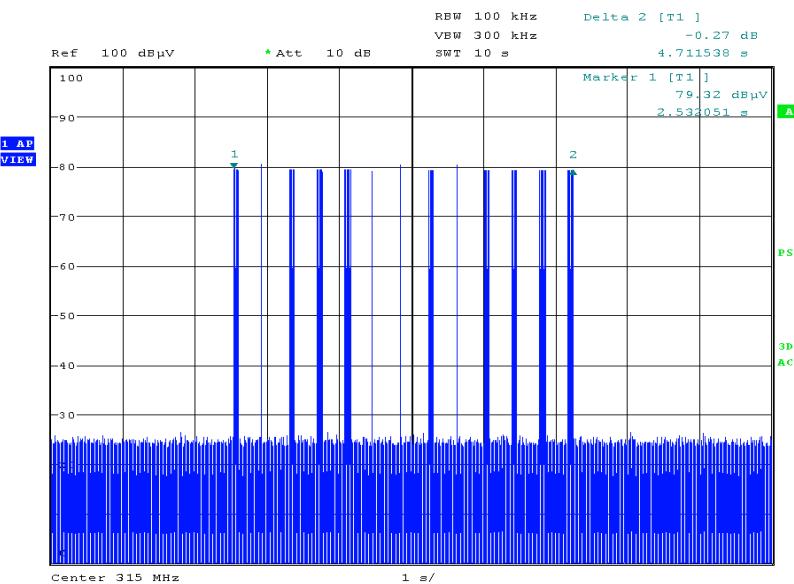
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3. Regulation 15.231 (a2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Result: Dwell Time = 4.71s

The graph as below.



Result:

The EUT does not have automatic transmission.

4. Regulation 15.231 (a3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.

Result:

The EUT does not employ periodic transmission.

5. Regulation 15.231 (a4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

Result:

This section is not applicable to the EUT.

The results: The unit does meet the FCC Part 15 C Section 15.231 requirements.