



RADIO TEST REPORT

ETSI EN 300 220-1 V2.4.1(2012-05)

ETSI EN 300 220-2 V2.4.1(2012-05)

Product : Ajax StreetSiren

Trade Name : АЖАХ

Model Name : Ajax StreetSiren

Serial Model : N/A

Report No. : NTEK-2016NT05256054R

Prepared for

Ajax Systems Inc

910 Foulk Rd., Wilmington, DE 19803, United States

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street

Bao'an District, Shenzhen P.R. China

Tel.: +86-0755-61156588 Fax.: +86-0755-61156599

Website: www.ntek.org.cn

TEST RESULT CERTIFICATION

Applicant's name : Ajax Systems Inc
Address : 910 Foulk Rd., Wilmington, DE 19803, United States
Manufacturer's Name : "Research and Production Enterprise "Ajax" LLC
Address : 5, Sklyarenko, Kyiv04073, Ukraine.

Product description

Product name Ajax StreetSiren
Trademark AJAX
Model and/or type reference : Ajax StreetSiren
Serial Model : N/A
Rating(s) : DC 3.0V*4 Battery or external 12V DC

Standards : EN 300 220-1 V2.4.1: 2012-05
 EN 300 220-2 V2.4.1: 2012-05

This device described above has been tested by Shenzhen NTEK, and the test results show that the equipment under test (EUT) is in compliance with the 1999/5/EC R&TTE Directive Art.3.2 requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of Shenzhen NTEK, this document may be altered or revised by Shenzhen NTEK, personnel only, and shall be noted in the revision of the document.

Date of Test

Date (s) of performance of tests : 26 May. 2016 ~13 June 2016

Date of Issue : 13 June 2016

Test Result..... : **Pass**

Testing Engineer :

Jack Li

(Jack Li)

Technical Manager :

Jason Chen

(Jason Chen)

Authorized Signatory :

Sam Chen

(Sam Chen)



Table of Contents

	Page
1. Summary Of Test Results	4
1.1 Test Facility	5
1.2 Measurement Uncertainty	5
2. General Information	6
2.1 General Description Of EUT	6
2.2 Description Of Test Conditions	7
2.2.1 Test Conditions and Channel	8
2.3 Description Of Support Units	9
2.4 Equipments List For All Test Items	10
3. Blocking	11
3.1 Applied procedures / limit	11
3.2 Method of measurement	11
3.3 Test Procedures	11
3.4 Test Result	12
4. Spurious emissions – Receiver (30-1000MHz)	13
4.1 Applied procedures / limit	13
4.2 Measuring Instruments and Setting	13
4.3 Test Procedures	13
4.4 Test Setup Layout	13
4.5 EUT Operation during Test	13
4.6 TEST RESULTS (25MHz-1000MHz)	14
5. Spurious emissions – Receiver (above 1000MHz)	15
5.1 Applied procedures / limit	15
5.2 Measuring Instruments and Setting	15
5.3 Test Procedures	15
5.4 Test Setup Layout	15
5.5 EUT Operation during Test	15
5.6 TEST RESULTS (Above 1000MHz)	16

APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

1. Summary Of Test Results

Test procedures according to the technical standards:

ETSI EN 300 220-1 V2.4.1 (2012-05)

ETSI EN 300 220-2 V2.4.1 (2012-05)

Clause	Description of Test Item	Results(Pass/Fail)	N.T(Not Test)
Transmitter Parameters			
7.1	Frequency error and frequency drift		N.T
7.2	Average power		N.T
7.3	Effective radiated power		N.T
7.4	Spread spectrum modulation		N.T
7.5	Transient power		N.T
7.6	Adjacent channel power		N.T
7.7	Modulation bandwidth		N.T
7.8	spurious emissions		N.T
7.9	Frequency stability under low-voltage conditions		N.T
7.10	Duty cycle		N.T
7.11	Time-out-timer		N.T
Receiver Parameters			
8.1	Receiver sensitivity		N.T
8.2	Receiver LBT threshold		N.T
8.3	Adjacent channel selectivity		N.T
8.4	Blocking	Pass	
8.5	Spurious response rejection		N.T
8.6	Receiver spurious radiation	Pass	

1.1 Test Facility

NTEK Testing Technology Co., Ltd.

Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China

FCC Registered No.: 791972 IC Registered No.:9270A-1

CNAS Registration No.:L5516

1.2 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded 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	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

2. General Information

2.1 General Description Of EUT

Equipment	Ajax StreetSiren	
Brand Name	AJAX	
Model Name.	Ajax StreetSiren	
Serial Model	N/A	
Model Difference	N/A	
Product Description	The EUT is Ajax StreetSiren	
	Operation Frequency:	868 MHz – 868.5MHz;
	Channel number	3 channels
	Modulation Type:	FM
	Antenna Gain(Peak)	-5dBi
	Antenna Designation:	Built-in helical antenna
	Power Rating	DC 12V
Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.		
Channel List	Refer to below	
Adapter	N/A	
Battery	DC 3.0V*4 Battery or external 12V DC	
Hardware Version (wireless module)	N/A	
Hardware Version	N/A	
Software Version	N/A	

Note:

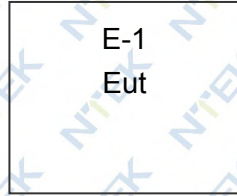
1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel	Frequency (MHz)
00	868.1
01	868.3
02	868.5

2.2 Description Of Test Conditions

1. Block diagram of transmitter



2.2.1 Test Conditions and Channel

	Normal Test Conditions	Extreme Test Conditions
Temperature	15°C - 35°C	-10°C ~ 40°C Note: (1)
Relative Humidity	20% - 75%	N/A
Supply Voltage	DC 12V	DC 10.2-13.8V

Note:

- (1) For tests at extreme temperatures, measurements shall be made in accordance with the procedures specified in clause 5.4.1.2, at the upper and lower temperatures of the range as follow: temperature: -10°C to +40°C;
- (2) For the Leclanché or lithium type battery: 0.85 times the nominal voltage of the battery; for the mercury or nickel-cadmium type of battery: 0.9 times the nominal voltage of the battery. In both cases, the upper extreme test voltage shall be 1.15 times the nominal voltage of the battery.
- (3) The measurements are performed at the highest, middle, lowest available channels.

2.3 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Ajax StreetSiren	АЖАХ	Ajax StreetSiren	N/A	

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.4 Equipments List For All Test Items

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	160400005	2015.07.06	2016.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2015.07.06	2016.07.05	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2015.07.06	2016.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.07.06	2016.07.05	1 year
5	Spectrum Analyzer	ADVANTES T	R3132	150900201	2015.07.06	2016.07.05	1 year
6	Horn Antenna	EM	EM-AH-20180	2011071402	2015.07.06	2016.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.07.06	2016.07.05	1 year
8	Amplifier	EM	EM-30180	060538	2015.07.06	2016.07.05	1 year
9	Loop Antenna	ARA	PLA-2030/B	1029	2015.07.06	2016.07.05	1 year
10	Power Meter	R&S	NRVS	100696	2015.07.06	2016.07.05	1 year
11	Signal Generator	R&S	SMT 06	832080/007	2015.07.06	2016.07.05	1 year
12	Temperature & Humidity Chamber	GIANT FORCE	GTH-056P	GF-94454-1	2015.07.06	2016.07.05	1 year
13	Power Sensor	R&S	URV5-Z4	0395.1619.05	2015.07.06	2016.07.05	1 year

3. Blocking

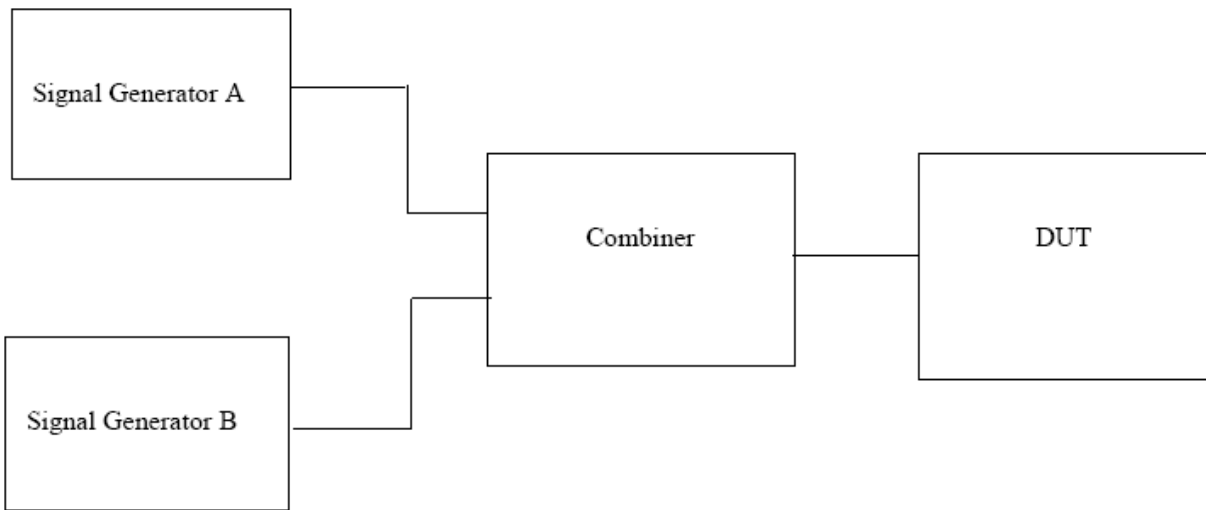
3.1 Applied procedures / limit

Receiver category	Frequency offset	Limit
1	±2 MHz	≥ 84 dB -A (note 2)
2	±2 MHz	≥ 35 dB -A (note 2)
3	±2 MHz	≥ 24 dB -A (note 2)
1	±10 MHz	≥ 84 dB -A (note 2)
2	±10 MHz	≥ 60 dB -A (note 2)
3	±10 MHz	≥ 44 dB -A (note 2)

NOTE 1: The limits apply also for the repeated tests in case of equipment using LBT or category 1 receivers, reduced by 13 dB or 40 dB, respectively, to account for the increased wanted signal level.

NOTE 2: $A = 10 \log (BW_{kHz} / 16 \text{ kHz})$ BW is the receiver bandwidth.

3.2 Method of measurement



3.3 Test Procedures

In clauses EN 300 220-1 8.4.2

3.4 Test Result:

Receiver bandwidth=339.52KHz

EUT :	Ajax StreetSiren	Model Name :	Ajax StreetSiren
Temperature :	26°C	Relative Humidity :	53 %
Pressure :	1012 hPa	Test Voltage :	DC 12V
Test Mode :	RX		

Receiver category	Frequency offset	Receiver BW(kHz)	Measurement Vause(dB)	Limit(dB)
3	-2 MHz	339.52	40.26	10.73
	+2 MHz	339.52	40.24	10.73
	-10 MHz	339.52	39.86	30.73
	-10 MHz	339.52	39.93	30.73

4. Spurious emissions – Receiver (30-1000MHz)

4.1 Applied procedures / limit

Clause	Test Item	Frequency(MHz)	Limit
4.3.5	Spurious emissions	25-1000	-57dBm
	(radiated)	Above 1000	-47dBm

4.2 Measuring Instruments and Setting

The following table is the setting of the Spectrum Analyzer.

Spectrum Analyzer	Setting
Attenuation	Auto
Start Frequency	25 MHz
Stop Frequency	1000 MHz
Detector	Positive Peak
Sweep Time	Auto
RB / VB	100 kHz/100 kHz

4.3 Test Procedures

- a. The EUT was placed on the top of the turntable in open test site area.
- b. The test shall be made in the receiving mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- c. For 30~1000MHz spurious emissions measurement, the broad band bi-log receiving antenna was placed 3 meters far away from the turntable. .
- d. The broadband receiving antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization. Each recorded suspected value is indicated as Read Level (Raw).
- e. Replace the EUT by standard antenna and feed the RF port by signal generator.
- f. Adjust the frequency of the signal generator to the suspected emission and slightly rotate the turntable to locate the position with maximum reading.
- g. Adjust the power level of the signal generator to reach the same reading with Read Level (Raw).
- h. The level of the spurious emission is the power level of (7) plus the gain of the standard antenna in dBi and minus the loss of the cable used between the signal generator and the standard antenna.
- i. The measurement shall be repeated at the lowest and the highest channel of the stated frequency range.

4.4 Test Setup Layout

This test setup layout is the same as that shown in section 5.1.3

4.5 EUT Operation during Test

The EUT was programmed to be in continuously receiving mode.

4.6 TEST RESULTS (25MHz-1000MHz)

EUT :	Ajax StreetSiren	Model Name :	Ajax StreetSiren
Temperature :	26°C	Relative Humidity :	53 %
Pressure :	1012 hPa	Test Voltage :	DC 12V
Test Mode :	RX		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	
V	36.92	-98.94	17.47	-81.47	-57.00	-24.47	peak
V	174.76	-97.09	12.58	-84.51	-57.00	-27.51	peak
V	331.20	-88.45	13.76	-74.69	-57.00	-17.69	peak
H	39.45	-95.06	16.33	-78.73	-57.00	-21.73	peak
H	335.85	-89.14	13.91	-75.23	-57.00	-18.23	peak
H	390.15	-91.00	14.97	-76.03	-57.00	-19.03	peak

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit

5. Spurious emissions – Receiver (above 1000MHz)

5.1 Applied procedures / limit

Clause	Test Item	Frequency(MHz)	Limit
4.3.5	Spurious emissions	25-1000	-57dBm
	(narrowband)	Above 1000	-47dBm

5.2 Measuring Instruments and Setting

Please refer to section 9.1.1 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Analyzer	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	12750 MHz
Detector	Positive Peak
Sweep Time	Auto
RB / VB	1MHz / 1MHz

5.3 Test Procedures

- a. The EUT was placed on the top of the turntable in open test site area.
- b. The test shall be made in the receiving mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- c. For 30~1000MHz spurious emissions measurement, the broad band bi-log receiving antenna was placed 3 meters far away from the turntable. .
- d. The broadband receiving antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization. Each recorded suspected value is indicated as Read Level (Raw).
- e. Replace the EUT by standard antenna and feed the RF port by signal generator.
- f. Adjust the frequency of the signal generator to the suspected emission and slightly rotate the turntable to locate the position with maximum reading.
- g. Adjust the power level of the signal generator to reach the same reading with Read Level (Raw).
- h. The level of the spurious emission is the power level of (7) plus the gain of the standard antenna in dBi and minus the loss of the cable used between the signal generator and the standard antenna.
- i. The measurement shall be repeated at the lowest and the highest channel of the stated frequency range.

5.4 Test Setup Layout

This test setup layout is the same as that shown in section 6.1.3

5.5 EUT Operation during Test

The EUT was programmed to be in continuously receiving mode.

5.6 TEST RESULTS (Above 1000MHz)

EUT :	Ajax StreetSiren	Model Name :	Ajax StreetSiren
Temperature :	26°C	Relative Humidity :	53 %
Pressure :	1012 hPa	Test Voltage :	DC 12V
Test Mode :	RX		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	
V	2970.29	-67.81	9.12	-58.69	-47.00	-11.69	peak
V	6436.54	-69.96	13.15	-56.81	-47.00	-9.81	peak
V	8463.41	-71.12	15.85	-55.27	-47.00	-8.27	peak
V	10343.45	-71.82	16.60	-55.22	-47.00	-8.22	peak
H	2823.41	-67.93	8.87	-59.06	-47.00	-12.06	peak
H	6612.79	-70.52	13.00	-57.52	-47.00	-10.52	peak
H	7964.04	-70.94	14.56	-56.38	-47.00	-9.38	peak
H	10784.03	-76.93	22.82	-54.11	-47.00	-7.11	peak

Remark: Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit

Radiated Measurement Photos

