

TEST REPORT

Report No.: HK09071518-1

Sam Ash Music Corporation

Application
For
Certification
(Original Grant)
(FCC ID: CCRAR300)

Superheterodyne Receiver

Prepared and Checked by:



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Approved by:



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Date: August 24, 2009

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GENERAL INFORMATION

Sam Ash Music Corporation
BRAND NAME: Samson, MODEL: AR300

FCC ID: CCRAR300

Grantee:	Sam Ash Music Corporation
Grantee Address:	262 Duffy Avenue, Hicksville, NY 11801, USA.
Contact Person:	Mr. Don Albanese
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Manufacturer:	N/A
Manufacturer Address:	N/A
Brand Name:	Samson
Model:	AR300
Type of EUT:	Superheterodyne Receiver
Description of EUT:	Audio Wireless System (Receiver)
Serial Number:	N/A
FCC ID:	CCRAR300
Date of Sample Submitted:	July 30, 2009
Date of Test:	August 10, 2009
Report No.:	HK09071518-1
Report Date:	August 24, 2009
Environmental Conidtions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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SUMMARY OF TEST RESULT

Sam Ash Music Corporation
BRAND NAME: Samson, MODEL: AR300

FCC ID: CCRAR300

TEST SPECIFICATION	REFERENCE	RESULTS
Maximum Peak Output Power	15.247(b), (c) / RSS-210 A8.4	N/A
Hopping Channel Carrier Frequencies Separation	15.247(e) / RSS-210 A8.1	N/A
20dB Bandwidth of the Hopping Channel	15.247(a) / RSS-210 A8.1	N/A
Number of Hopping Frequencies	15.247(e) / RSS-210 A8.1	N/A
Average Time of Occupancy of Hopping Frequency	15.247(e) / RSS-210 A8.1	N/A
Anteann Conducted Spurious Emissions	15.247(d) / RSS-210 A8.5	N/A
Radiated Spurious Emissions	15.247(d) / RSS-210 A8.5	N/A
RF Exposure Compliance	15.247(i) / RSS-Gen 5.5	N/A
Transmitter Power Line Conducted Emissions	15.207 / RSS-Gen 7.2.2	N/A
Transmitter Field Strength	15.227 / RSS-310 3.8	N/A
Transmitter Field Strength	15.229 / RSS-210 A2.7	N/A
Transmitter Field Strength, Bandwidth and Timing Requirement	15.231(a) / RSS-210 A1.1.1	N/A
Transmitter Field Strength, Bandwidth and Timing Requirement	15.231(e) / RSS-210 A1.1.5	N/A
Transmitter Field Strength and Bandwidth Requirement	15.239 / RSS-210 A2.8	N/A
Transmitter Field Strength and Bandwidth Requirement	15.249 / RSS-210 A2.9	N/A
Transmitter Field Strength and Bandwidth Requirement	15.235 / RSS-310 3.9	N/A
Receiver / Digital Device Radiated Eissions	15.109 / ICES-003	Pass
Receiver / Digital Device Conducted Emissions	15.107 / ICES-003	Pass

- Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the pervisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is an audio receiver for it corresponding wireless microphone. The main function of the EUT is used to receive the modulated signal that can be transmitting by its corresponding wireless microphones. And it can receive the transmitting signal in 320 difference channels, from 639.025MHz to 647.000MHz with 0.025MHz channel spacing. It's powered by a AC/DC adaptor (Model: W741-1800200DU), a power on/off switch and three control knobs on the front of the EUT's body are used to control and set several menu functions and parameters displayed in the LCD display and it is also used to channel setting.

Antenna Type: External

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

The Certification procedure of transmitters for this receiver (with FCC ID: CCRAG300, CCRAL300 and CCRA300) are being processed as the same time of this application.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). All radiated measurements were performed in an Open Area Test Site. Preliminary scans were performed in the Open Area Test Site only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the “**Justification Section**” of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been placed on file with the FCC.

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2.0 **System Test Configuration**

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2003).

The device was powered by an AC/DC adaptor (Model: W741-1800200DU, Input: 120VAC, Output: 18VDC 200mA).

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it receives the RF signal continuously.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Equipment Modification

Any modifications installed previous to testing by Sam Ash Music Corporation will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services Hong Kong Ltd.

2.5 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

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2.6 Support Equipment List and Description

N/A.

3.0 **Emission Results**

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG - AV$$

where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB
- AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where

- FS = Field Strength in dB μ V/m
- RR = RA - AG - AV in dB μ V
- LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V/m}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$AV = 5.0 \text{ dB}$$

$$FS = RR + LF$$

$$FS = 18 + 9 = 27 \text{ dB}\mu\text{V/m}$$

$$RR = 18.0 \text{ dB}\mu\text{V}$$

$$LF = 9.0 \text{ dB}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V/m})/20] = 22.4 \mu\text{V/m}$$

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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 143.490 MHz.

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 7.1 dB

3.4 Conducted Emission Configuration Photograph

For electronic filing, the worst case line-conducted configuration photographs are saved with filename: conducted photos.pdf.

3.5 Conducted Emission Data

For electronic filing, the graph and data table of conducted emission is saved with filename: conducted.pdf.

Judgment: Passed by more than 20 dB

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Applicant: Sam Ash Music Corporation
 Model: AR300
 Worst-Case Operating Mode: Receiving

Date of Test: August 10, 2009

Table 1

Radiated Emissions Pursuant to FCC Part 15 Section 15.109 Requirement

639.025MHz

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	111.480	42.9	20	8.6	31.5	43.5	-12.0
V	143.490	48.0	20	8.4	36.4	43.5	-7.1
V	199.750	43.4	20	10.2	33.6	43.5	-9.9

643.000MHz

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	151.250	43.2	20	9.1	32.3	43.5	-11.2
V	159.650	41.1	20	9.6	30.7	43.5	-12.8
V	359.800	41.2	20	15.7	36.9	46.0	-9.1

647.000MHz

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	128.000	38.9	20	7.8	26.7	43.5	-16.8
V	192.004	39.7	20	10.4	30.1	43.5	-13.4
V	200.304	35.2	20	11.4	26.6	43.5	-16.9

- NOTES: 1. Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative sign in the column shows value below limit.
4. Horn antenna is used for the emission over 1000MHz.

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Applicant: Sam Ash Music Corporation
 Model: AR300
 Worst-Case Operating Mode: Rx (ANT A)

Date of Test: August 10, 2009

Table 2

Antenna Power Conduction Measurements Pursuant to FCC Part 15 Section 15.111 Requirement

639.025MHz

Measured Frequency (MHz)	Reading (dB μ V)	Limit (dB μ V)	Margin (dB)
312.008	42.36	50.0	-7.64
328.002	46.42	50.0	-3.58
336.010	40.97	50.0	-9.03
344.010	44.93	50.0	-5.07
360.010	40.98	50.0	-9.02
392.010	39.17	50.0	-10.83
400.026	38.96	50.0	-11.04
416.008	38.92	50.0	-11.08
431.998	36.84	50.0	-13.16
649.720	42.61	50.0	-7.39

643.000MHz

Measured Frequency (MHz)	Reading (dB μ V)	Limit (dB μ V)	Margin (dB)
312.008	40.28	50.0	-9.72
328.008	45.50	50.0	-4.50
336.008	41.07	50.0	-8.93
344.002	45.07	50.0	-4.93
360.016	39.71	50.0	-10.29
392.000	37.61	50.0	-12.39
400.019	37.85	50.0	-12.15
416.022	37.66	50.0	-12.34
432.020	36.14	50.0	-13.86
653.700	41.59	50.0	-8.41

647.000MHz

Measured Frequency (MHz)	Reading (dB μ V)	Limit (dB μ V)	Margin (dB)
312.006	39.59	50.0	-10.41
328.016	45.04	50.0	-4.96
344.010	45.14	50.0	-4.86
360.012	39.31	50.0	-10.69
392.012	37.67	50.0	-12.33
400.016	37.96	50.0	-12.04
416.020	37.76	50.0	-12.24
657.698	38.40	50.0	-11.60

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Applicant: Sam Ash Music Corporation
 Model: AR300
 Worst-Case Operating Mode: Rx (ANT B)

Date of Test: August 10, 2009

Table 3

Antenna Power Conduction Measurements Pursuant to FCC Part 15 Section 15.111 Requirement

639.025MHz

Measured Frequency	Reading	Limit	Margin
312.018	38.13	50.0	-11.87
328.012	42.51	50.0	-7.49
344.012	42.26	50.0	-7.74
360.014	36.86	50.0	-13.14
376.026	33.58	50.0	-16.42
392.012	34.81	50.0	-15.19
400.026	34.90	50.0	-15.10
416.016	34.42	50.0	-15.58
649.722	41.91	50.0	-8.09

643.000MHz

Measured Frequency (MHz)	Reading (dB μ V)	Limit (dB μ V)	Margin (dB)
312.024	39.33	50.0	-10.67
328.012	44.03	50.0	-5.97
344.005	42.77	50.0	-7.23
359.998	36.15	50.0	-13.85
392.020	34.78	50.0	-15.22
400.018	34.06	50.0	-15.94
416.024	33.43	50.0	-16.57
653.692	39.25	50.0	-10.75

647.000MHz

Measured Frequency (MHz)	Reading (dB μ V)	Limit (dB μ V)	Margin (dB)
312.009	39.26	50.0	-10.74
328.012	43.53	50.0	-6.47
344.014	42.65	50.0	-7.35
360.013	36.50	50.0	-13.50
392.010	34.45	50.0	-15.55
400.024	34.22	50.0	-15.78
416.019	33.42	50.0	-16.58
657.704	33.68	50.0	-16.32

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4.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

5.0 **Product Labelling**

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

6.0 **Technical Specifications**

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

7.0 **Instruction Manual**

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

8.0 **Miscellaneous Information**

The miscellaneous information includes details of the test procedure.

8.1 Discussion Pulse Desensitivity

This device is a superheterodyne receiver. No desensitization of the measurement equipment is required as the received signals are continuously.

8.2 Calculation of Average Factor

This device is a superheterodyne receiver. It is not necessary to apply average factor to the measurement result.

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8.3 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of superheterodyne receivers operating under the Part 15, Subpart B rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003. A typical or an unmodulated CW signal at the operating frequency of the EUT has been supplied to the EUT for all measurements. Such a signal is supplied by a signal generator and an antenna in close proximity to the EUT. The signal level is sufficient to stabilize the local oscillator of the EUT.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to 5000 MHz. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

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8.3 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.4 - 2003.

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

9.0 Equipment List

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Log Periodic Antenna
Registration No.	EW-0014	EW-0954	EW-0446
Manufacturer	R&S	EMCO	EMCO
Model No.	ESVS30	3104C	3146
Calibration Date	Jun. 01, 2009	Sep. 30, 2008	Oct. 02, 2008
Calibration Due Date	Jun. 01, 2010	Mar. 30, 2010	Apr. 02, 2010

2) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN	Pulse Limiter
Registration No.	EW-2251	EW-0192	EW-0698
Manufacturer	R&S	R&S	R&S
Model No.	ESCI	ESH3-Z5	ESH3-Z2
Calibration Date	Oct. 28, 2008	Nov. 12, 2008	Feb 03, 2009
Calibration Due Date	Oct. 28, 2009	Nov. 12, 2009	Feb 03, 2010