

TEST REPORT

Report No.: HK09071519-2

Sam Ash Music Corporation

Application
For
Certification
(Original Grant)
(FCC ID: CCRAL300)

Wireless Microphone

Prepared and Checked by:



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Date: September 04, 2009

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GENERAL INFORMATION

Sam Ash Music Corporation
BRAND NAME: Samson, MODEL: AL300

FCC ID: CCRAL300

Grantee:	Sam Ash Music Corporation
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Manufacturer:	N/A
Manufacturer Address:	N/A
Brand Name:	Samson
Model:	AL300
Type of EUT:	Transmitter
Description of EUT:	Wireless Beltpack System
Serial Number:	N/A
FCC ID:	CCRAL300
Date of Sample Submitted:	July 30, 2009
Date of Test:	August 10, 2009
Report No.:	HK09071519-2
Report Date:	September 04, 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: AL300

FCC ID: CCRAL300

TEST SPECIFICATION	REFERENCE	RESULTS
Power Output Measurement	74.861(e)(1)	Pass
Occupied Bandwidth	74.861(e)(3), 74.861(e)(5) and 74.861(e)(6)	Pass
Spurious Radiation Measurement	74.861(e)(6)	Pass
Frequency Tolerance	74.861(e)(4)	Pass
Modulation Characteristics Measurement	2.1047(a) and 2.1047(b)	Pass

Note: 1. The EUT uses a permanently attached antenna.

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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a wireless beltpack transmitter for its corresponding receiver. The main function of the EUT is used to transmit the audio signal via the AUX input to the corresponding receiver. And it can transmit signal in 320 difference channels, from 639.025MHz to 647.000MHz with 0.025MHz channel spacing. It's powered by two 1.5VDC "AAA" size batteries, a battery low indicator and a power switch on the top of the EUT's body are used to show the lower battery status and on/off the unit.

Antenna Type : External, Integral

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

1.2 Related Submittal(s) Grants

The Certification procedure of receiver for this transmitter (with FCC ID: CCRAR300) is being processed at the same time of this application.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003) and ANSI/TIA/EIA-603-A-2004. 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 from two 1.5VDC "AAA" size batteries.

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 unit was operated standalone and placed in the center of the turntable.

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 transmits 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.

3.0 RF Power Output

Testing Procedures

1. The EUT shall be placed at 0.8m heights on a turntable vertically.
2. The test antenna shall be oriented initially for vertical polarization location 3m from the EUT to correspond to the frequency of the transmitter.
3. The output of the test antenna shall be connected to measuring receiver and the quasi-peak detector is used for the measurement.
4. The transmitter shall be switch on, if possible, without modulation and the measuring receiver shall be turned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a tuned dipole (substitution antenna).
10. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level note input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
17. The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
18. Repeat above test procedures with the EUT placed horizontally.

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Table 1

**Transmission Power
Pursuant to FCC Part 74.861(e)(1)**

Measured Frequency (MHz)	Measured Power (mW)	Limit (mW)	Margin (mW)
639.025	6.64	250	-243.36
643.000	9.82	250	-240.18
647.000	6.28	250	-243.72

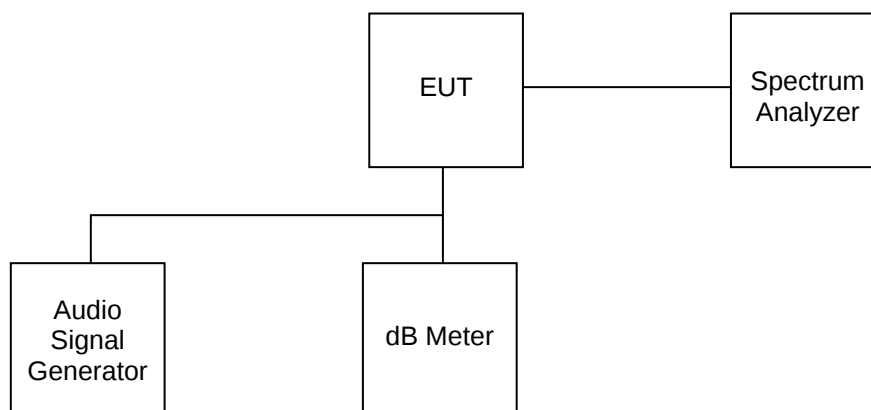
Note: Negative sign in the margin column shows the value below limits.

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4.0 Occupied Bandwidth

Testing Procedures

1. Set-up the test equipment in the following configuration:



2. Other than single side band or independent sideband transmitters when modulated by a 2500Hz one at an input level 16dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulation circuit.
3. The occupied bandwidth is measured with the spectrum analyzer set at 50kHz/div scan and 10dB/div.
4. The emission bandwidth shall not exceed the limit 200kHz.
5. The measured occupied bandwidth is 135kHz and 124kHz for carrier frequency of 639.025MHz and 647.000MHz respectively.

For electronic filing, the bandwidth plot is saved with filename: bw.pdf

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Table 2 and Table 3

**Occupied Bandwidth
Pursuant to FCC Section 74.861(e)(3), 74.861(e)(5) and 74.861(e)(6)**

1. Assigned Carrier Frequency: 639.025MHz
2. Measured Occupied Bandwidth in 26dB down: 135kHz

Mask Region	Attenuation from Unmodulated Carrier Emissions		
	Measured Result (dB)	Calculated Limit (dB)	Result
Carrier + 50.0kHz	-0.16	0	Pass
Carrier – 50.0kHz	-0.15	0	Pass
Carrier + 100.0kHz	-62.55	-25	Pass
Carrier – 100.0kHz	-63.44	-25	Pass
Carrier + 200.0kHz	-67.56	-35	Pass
Carrier – 200.0kHz	-65.84	-35	Pass

1. Assigned Carrier Frequency: 647.000MHz
2. Measured Occupied Bandwidth in 26dB down: 124kHz

Mask Region	Attenuation from Unmodulated Carrier Emissions		
	Measured Result (dB)	Calculated Limit (dB)	Result
Carrier + 50.0kHz	-2.25	0	Pass
Carrier – 50.0kHz	-2.76	0	Pass
Carrier + 100.0kHz	-63.40	-25	Pass
Carrier – 100.0kHz	-64.94	-25	Pass
Carrier + 200.0kHz	-67.39	-35	Pass
Carrier – 200.0kHz	-66.80	-35	Pass

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5.0 Field Strength of Spurious Radiation

Testing Procedures

Radiated emission measurements was performed according to the procedures in Wireless Beltpack System. All measurements were performed in Open Area Test Sites located at Roof Top of Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.

For electronic filing, the radiated emission configurations photograph is saved with filename: radiated photos.pdf

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Table 4 and Table 5

**Field Strength of Spurious Radiated
Pursuant to FCC Section 74.861(e)(6)**

Assigned Frequency: 639.025MHz

Polarization	Frequency (MHz)	Net at 3m (dB μ V/m)	Attenuated below the Carrier Power (dB)	Minimum Attenuated below the Carrier Power Limit (dB)	Margin (dB)
V	1278.450	53.80	-53.80	-21.20	-32.60
V	1917.075	45.10	-60.50	-21.20	-39.30
V	2556.100	51.80	-53.80	-21.20	-32.60

Assigned Frequency: 643.000MHz

Polarization	Frequency (MHz)	Net at 3m (dB μ V/m)	Attenuated below the Carrier Power (dB)	Minimum Attenuated below the Carrier Power Limit (dB)	Margin (dB)
V	1286.000	54.60	-52.70	-22.90	-29.80
V	1929.000	48.90	-58.40	-22.90	-35.50
V	2572.000	50.90	-56.40	-22.90	-33.50

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Table 6

**Field Strength of Spurious Radiated
Pursuant to FCC Section 74.861(e)(6)**

Assigned Frequency: 647.000MHz

Polarization	Frequency (MHz)	Net at 3m (dBμV/m)	Attenuated below the Carrier Power (dB)	Minimum Attenuated below the Carrier Power Limited (dB)	Margin (dB)
V	1294.000	55.40	-49.96	-21.00	-28.96
V	1941.000	51.50	-53.86	-21.00	-31.86
V	2588.000	50.70	-54.66	-21.00	-33.66

Notes: 1. Quasi-peak data for emission below 1000MHz.

2. Negative sign in margin column shows the value below the limit.

3. Any emissions and any other harmonics which are attenuated more than 20dB below the permissible value need not be recorded.

4. Horn antenna and average detector is used for emission over 1000MHz.

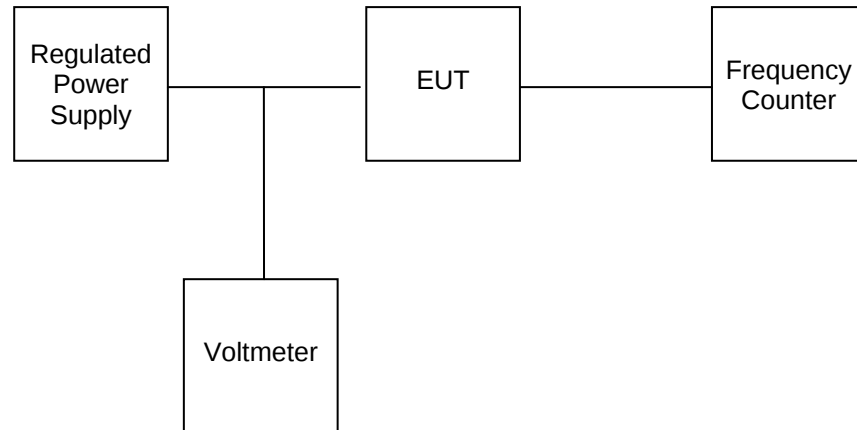
* Calculated limit = $43 + 10 \log_{10}$ (Mean Output Power in Watts) dB

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6.0 Frequency Stability - Voltage

Testing Procedures

1. Set-up the test equipment in the following configuration:



2. For battery powered equipment, reduce primary supply voltage to the battery operating end point voltage which is specified by the manufacturer.

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Table 7

**Power Supply Voltage Stability
Pursuant to FCC Section 2.1055**

Supply Voltage: 3.0VDC

The manufacturer specified battery end point: 1.9VDC

Limit: 0.005% or 50ppm

End Point Voltage (V)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (kHz)	Deviation (ppm)
1.9	639.025	639.0234	-1.6	-2.5
1.9	647.000	647.0000	0	0.0

Note: Measurement were made from the battery operating voltage down to the battery's operating end point.

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7.0 Frequency Stability - Temperature

Testing Procedures

1. Set-up the test equipment in the following configuration:

Temperature Chamber



2. Set the Temperature Chamber to -30°C and stabilize the EUT temperature for one hour. Turn the transmitter ON for two minutes.
3. Turn the EUT OFF.
4. Repeat the above procedure with 10°C intervals from -30°C to 50°C .

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Table 8**Temperature Stability
Pursuant to FCC Section 2.1055**

Assigned Frequency (MHz)	Temperature (°C)	Measured Frequency (MHz)	Deviation (Hz)	Deviation (ppm)
639.025	-30	639.024901	-99	-0.15
	-20	639.024785	-215	-0.34
	-10	639.024692	-308	-0.48
	0	639.024596	-404	-0.63
	10	639.024527	-473	-0.74
	20	639.024453	-547	-8.86
	30	639.024366	-634	-0.99
	40	639.024275	-725	-1.13
	50	639.024125	-875	-1.37
643.025	-30	643.024852	-148	-0.23
	-20	643.024710	-290	-0.45
	-10	643.024627	-373	-0.58
	0	643.024531	-469	-0.73
	10	643.024427	-573	-0.89
	20	643.024363	-637	-0.99
	30	643.024247	-753	-1.17
	40	643.024151	-849	-1.32
	50	643.024091	-909	-1.41
647.000	-30	646.999917	-83	-0.13
	-20	646.999851	-149	-0.23
	-10	646.999717	-283	-0.44
	0	646.999604	-396	-0.61
	10	646.999533	-467	-0.72
	20	646.999412	-588	-0.91
	30	646.999340	-660	-1.02
	40	646.999257	-743	-1.15
	50	646.999201	-799	-1.23

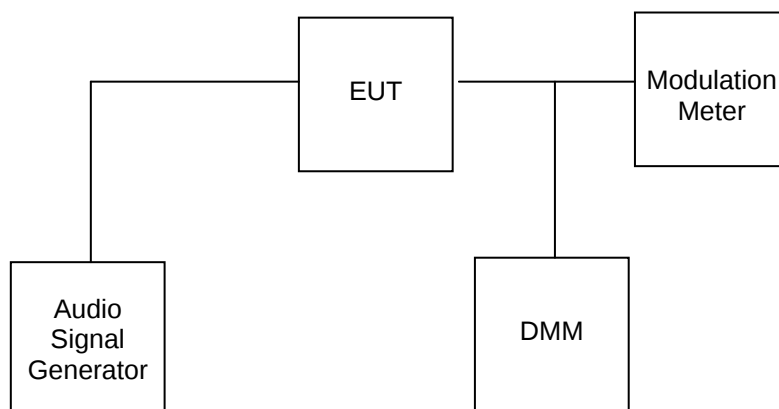
Note: Measurements are made between -30°C and +50°C at intervals not greater than 10°C. Sufficient time is allowed for temperature stabilization.
Limit: 0.005% or 50ppm.

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8.0 Modulation Characteristics - Audio Frequency Response

Testing Procedures

1. Set-up the test equipment in the following configuration:



2. Apply a 1000Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
3. Set the meter to measure the deviation and record the deviation reading.
4. Record the DMM reading as V_{REF} .
5. Set the audio frequency generator to the desired test frequency between 100Hz to 5000Hz.
6. Vary the audio frequency generator output level until the deviation reading that was recorded in step 3 is obtained.
7. Record the DMM reading as V_{FREQ} .
8. Calculate the audio frequency response at the present frequency as:
audio frequency response = $20\log_{10} (V_{FREQ}/V_{REF})$
9. Repeat steps 5 through 9 for all the desired test frequencies.

For electronic filing, the plot is saved with filename: afr.pdf

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Table 9 and Table 10

**Audio Frequency Response
Pursuant to FCC Section 2.1047(a)**

Assigned Frequency: 643.025MHz

Modulation Frequency (Hz)	Input Level (mV)	Audio Frequency Response
100	18.00	2.55
200	20.00	3.01
300	22.00	3.42
400	18.00	2.55
500	18.00	2.55
600	15.00	1.76
700	15.00	1.76
800	15.00	1.76
900	15.00	1.76
1000	10.00	0.00
1500	8.00	-0.97
2000	7.00	-1.55
2500	5.00	-3.01
3000	4.00	-3.98
3500	5.00	-3.01
4000	3.50	-4.56
4500	3.50	-4.56
5000	3.50	-4.56

Assigned Frequency: 647.000MHz

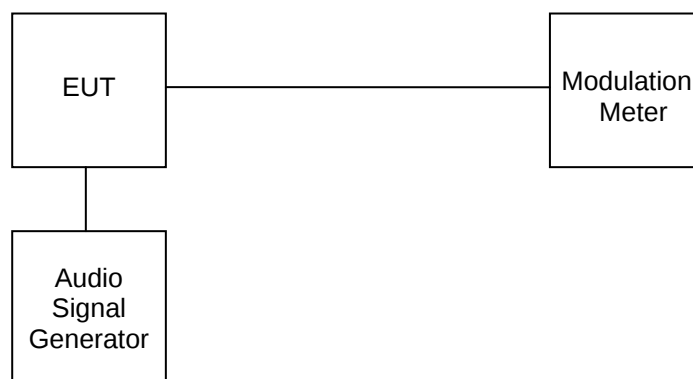
Modulation Frequency (Hz)	Input Level (mV)	Audio Frequency Response
100	22.00	3.33
200	25.60	4.64
300	24.20	4.15
400	17.80	1.49
500	17.70	1.44
600	17.90	1.54
700	18.10	1.63
800	17.50	1.34
900	18.00	1.58
1000	15.00	0.00
1500	12.50	-1.58
2000	11.80	-2.08
2500	9.80	-3.70
3000	8.80	-4.63
3500	9.50	-3.97
4000	7.50	-6.02
4500	7.54	-5.97
5000	7.00	-6.62

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9.0 Modulation Characteristics - Modulation Limiting

Testing Procedures

1. Set-up the test equipment in the following configuration:



2. Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
3. Apply a 1000Hz modulating signal to the transmitter from the audio signal generator, and adjust the level to obtain 60% of full rated system deviation.
4. Increase the level from the audio frequency generator from 5.0mV to 160.0mV.
5. Recording the maximum deviation.
6. Repeat the above procedures with frequency 500Hz, 1000Hz, 2500Hz and 5000Hz.

For electronic filing, the plot is saved with filename: ml.pdf

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Table 11

**Modulation Limiting Characteristics
Pursuant to FCC Section 2.1047(b)**

Assigned Frequency: 643.025MHz

Modulation Input (mV)	Peak Frequency Deviation (kHz)			
	at 500Hz	at 1000Hz	at 2500Hz	at 5000Hz
5.0	30.00	40.00	40.00	15.00
10.0	30.00	40.00	52.00	17.00
20.0	43.00	49.00	60.00	18.00
30.0	51.00	56.00	62.00	18.30
40.0	57.00	59.00	61.00	18.50
50.0	59.00	53.00	54.00	18.50
60.0	62.00	54.00	53.00	18.40
70.0	65.00	52.00	52.00	18.00
80.0	70.00	51.00	51.00	18.00
90.0	73.00	51.00	51.00	18.00
100.0	75.00	51.00	50.00	18.00
110.0	75.00	51.00	50.00	18.00
120.0	74.00	51.00	50.00	18.00
130.0	74.00	51.00	50.00	18.00
140.0	74.00	51.00	50.00	18.00
150.0	74.00	51.00	50.00	18.00
160.0	74.00	51.00	50.00	18.00

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Table 12

**Modulation Limiting Characteristics
Pursuant to FCC Section 2.1047(b)**

Assigned Frequency: 647.000MHz

Modulation Input (mV)	Peak Frequency Deviation (kHz)			
	at 500Hz	at 1000Hz	at 2500Hz	at 5000Hz
5.0	36.00	40.00	50.00	15.00
15.0	36.00	40.00	50.00	15.00
20.0	38.00	43.00	52.00	15.00
30.0	45.00	49.00	56.00	15.00
40.0	49.00	52.00	53.00	15.80
50.0	52.00	46.00	47.00	15.70
60.0	54.00	47.00	46.00	15.90
70.0	57.00	46.00	45.00	15.90
80.0	61.00	45.00	44.00	15.80
90.0	64.00	44.00	44.00	15.80
100.0	65.00	44.00	44.00	15.70
110.0	65.00	44.00	43.00	15.70
120.0	65.00	44.00	43.00	15.70
130.0	65.00	44.00	43.00	15.70
140.0	65.00	44.00	43.00	15.70
150.0	65.00	44.00	43.00	15.70
160.0	65.00	44.00	43.00	15.70

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10.0 Input Current and Voltage

Input Current & Voltage Pursuant to FCC Section 2.1033(c)(8)

The D.C. input current and voltage to final R.F. stage.

Assigned Frequency : 639.025MHz to 647.000MHz

Input DC Voltage : 1.2VDC

Input DC current : 120mA

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11.0 **Equipment Photographs**

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

12.0 **Product Labelling**

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

13.0 **Technical Specifications**

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

14.0 **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.

15.0 **Tune Up Procedure**

In order to satisfy the FCC Section 2.1033(c)(9) requirement, a preliminary copy of the tune up procedure is saved with filename: tuneup.pdf.

16.0 **Miscellaneous Information**

The miscellaneous information includes details of the test procedure.

16.1 Discussion Pulse Desensitivity

Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

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16.2 Calculation of Average Factor

The average factor is not applicable for this device as the transmitted signal is a continuously signal.

17.0 **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) Stability, Bandwidth and Modulation Testing

Equipment	Communication Service Monitor	Temperature & Humidity Chamber	Spectrum Analyzer
Registration No.	EW-1775	EW-2044	EW-2249
Manufacturer	R&S	YOUNGCHENN	R&S
Model No.	CMS54	LP-60H	FSP30
Calibration Date	Sep. 12, 2008	Jan. 14, 2009	Jun. 25, 2009
Calibration Due Date	Sep. 12, 2009	Jan. 18, 2010	Jun. 25, 2010