



FOR THE SCOPE OF ACCREDITATION UNDER NVLAP LAB CODE 500051-0

TEST REPORT #291014

STANDARD: FCC PART 15

SUBPART C--INTENTIONAL RADIATORS

**SECTION 15. 237 OPERATION IN THE BANDS
72.0–73.0 MHz, 74.6–74.8 MHz
AND
75.2–76.0 MHz.**

EQUIPMENT TESTED:

WILLIAMS SOUND, INC.

FCC ID: CNMT46A

MODEL: T46

TEST DATE: 29 OCTOBER 2014

1100 Falcon Avenue
Glencoe, MN 55336



Tele: 320-864-4444
Fax: 320-864-6611

Prepared for:

Williams Sound, Inc.
10300 Valley View Road
Eden Prairie, MN 55344

Test agent:

International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336
Tele: 320-864-4444
Fax: 320-864-6611

Test location:

International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336
Tele: 320-864-4444
Fax: 320-864-6611

Prepared by:

International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336

International Certification Services represents to the client that testing is done in accordance with standard procedures applicable and that reported test results are accurate within generally accepted commercial ranges of accuracy.

This report only applies to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. International Certification Services shall have no liability for any deductions, inferences or generalizations drawn by the client or others from this report.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.

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1.0 TEST SUMMARY

TEST REPORT: #291014

COMPANY: Williams Sound, Inc.

AGENT: International Certification Services, Inc.

PHONE: 320-864-4444

TEST DATE: 29 October, 2014

EQUIPMENT UNDER TEST: Model: T46 FM Portable battery operated auditory assistance transmitter.

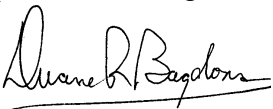
GENERAL TEST SUMMARY: The testing was performed at International Certification Services, Inc. at 1100 Falcon Ave, Glencoe, MN 55336

VERIFICATION / CERTIFICATION STATUS: Williams Sound, Inc. Model: T46 was found to be in compliance with the FCC Part 15 Subpart C, Section 15.237 requirements.

MODIFICATIONS NECESSARY: None

TESTED BY

Duane R. Bagdons



WRITTEN BY

Duane R. Bagdons



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Applicable Standards

47 CFR Ch.1 (54 FR 17714, Apr 25, 1989, as amended at 57 FR 13048, Apr 15, 1992; 78 FR 34927, June 11, 2013)

FCC Part 15 Radio Frequency Devices

Subpart C Intentional Radiators

Section 15.237 Operation in the bands 72.0–73.0 MHz,
74.6–74.8 MHz and 75.2–76.0 MHz

2.1 Referenced Standards

ANSI C63.4-2003 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 Khz to 40 Ghz.

2.2 Equipment Unit Tested

The equipment tested was a battery powered 72 to 76 Mhz transmitter model: T46. This unit transmits on frequencies in the three allowed bands of the FCC Part 15 Subpart C section 15.237. The frequencies are operator selectable by push button switches on the front of the EUT. The 1 meter microphone cable doubles as the transmitting antenna. The EUT is powered by 2 AA (either Alkaline or NiMH) batteries. The RF output of this device is not operator adjustable. This unit is used as an Auditory Assistance Transmitting device.

2.3 Equipment and Cable Configuration

See photo of the EUT test configuration setup in Attachment A

2.4 List of Test Equipment

<u>Test Equipment</u>	<u>Model</u>	<u>S/N</u>	<u>Calibration Date</u>
Spectrum Analyzer	Hewlett-Packard 8566B	2421A00458	01/28/14
Preamp	MiniCircuits ZKL-2R7	N/A	10/17/13
Biconical Antenna	AH Systems Model SAS-200/540	328	08/30/14
Log Periodic Antenna (200-1000 MHz)	EMCO 3146	9111-3280	08/30/14
Horn Antenna (1-18 Ghz)	EMCO 3115	5697	08/30/14
Loop Antenna (10 Khz to 30 Mhz)	EMCO 6512	8912-1074	08/30/14

Measurement cable losses, and antenna correction factors are included in the data sheets. The Resolution BW was set at 1 Mhz and the Video BW was set at 1 Hz with a Span of 0 Hz to perform the correct average detected measurements.

Calibration cycle: 2 years

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2.5 Units of Measurement.

All measurements were taken in dBuV/m with the antenna located at 3 meters distance from the EUT. Frequency measurements are recorded in Mhz.

2.6 Location of Test Site

The open area test site (OATS) measurement facility used to collect the data was International Certification Services, Inc. at 1100 Falcon Ave in Glencoe, MN 55336. This site has been certified to be in spec of the normalized site attenuation per ANSI C63.4-2003.

2.7 Measurement Procedures

The antenna was placed at a distance of 3 meters from the EUT. The EUT was set on a wooden test stand in the OATS site and rotated through 360 degrees to determine the worst case EUT orientation. The transmitting antenna wire of the EUT was extended vertically above the EUT to simulate a worst case condition (Antenna fully extended). The receiving antenna was then positioned vertical and horizontal to determine which antenna polarity orientation was worst case. Then certification data was recorded at all the transmitter frequencies from the fundamental to the 10th harmonic at an antenna height variation of from 1-4 meters. Data was recorded in three orthogonal planes to determine the worst case emissions.

2.8 Reporting Measurement Data

See data sheets and plots in Attachment B.

2.9 Radiated Emissions Data

The frequency and amplitude of the tuned frequency of the EUT along with the frequencies and amplitudes of the harmonics up to the 10th harmonic are reported in the data sheets in Attachment B. This information is plotted against the limit of section 15.237 of FCC Part 15 subpart C. Both Horizontal and Vertical antenna polarities as well as antenna heights of 1 to 4 meters were observed but all maximum signal strengths occurred in the Horizontal antenna polarity and at 1 meter antenna height.

The Final Level, expressed in dBuV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBuV) and adding the antenna correction factor and cable loss factor (Factor dB) and subtracting the preamp gain. This result then has the FCC limit subtracted from it to provide the margin which gives the tabular data as shown in the data sheets in Attachment B.

Example:

<u>Frequency</u> <u>(MHz)</u>	<u>Level</u> <u>(dBuV)</u>	+	<u>Factor</u> <u>(dB)</u>	=	<u>Corr Data</u> <u>(dBuV/m)</u>	-	<u>FCC Limit</u> <u>(dBuV/m)</u>	=	<u>Margin</u> <u>(dB)</u>
100.0	20.6	+	11.0	=	31.6	-	43.5	=	-11.9

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2.10 Summary of Results

The EUT passed the requirements of FCC Part 15 Subpart C, Section 15.237. The maximum worst case radiated emission was recorded for each of the three bands in the 15.237 section. The data is as follows:

15.237 (b) Band Edge:

Band (Mhz)	Low Band Edge (Mhz) (-20 dB)	Upper Band Edge (Mhz) (-20 dB)	Channel	RESULTS
72-73	72.018		1	PASS
		72.9807	13	PASS
74.6-74.8	74.6152		5	PASS
		74.784	5	PASS
75.2-76	75.222		8	PASS
		75.9778	14	PASS

The T46 complies with the FCC 15.237 requirement (15.237 (b))

15.237 (c) Field Strength (in-band):

Freq Band (Mhz)	Freq (Mhz)	Max Unmod Amp (dBuV/m)	Max Unmod Amp (mV/m)	Max Mod Amp (dBuV/m)	Max Mod Amp (mV/m)	FCC 15.237 Limit (mV/m)	Margin (dB)
72-73	72.5	91.65	38.24			80	-41.76
	72.43			84.85	17.48	80	-62.52
74.6-74.8	74.7	95.59	60.19			80	-19.81
	74.63			86.79	21.85	80	-58.15
75.2-76	75.6	96.10	63.82			80	-16.18
	75.67			89.30	29.18	80	-50.82

Worst case maximum amplitude for this device was measured at a field strength of 63.82 mV/m at the frequency of 75.6 Mhz against a limit of 80 mV/m. No modifications were necessary to accomplish this compliance.

The T46 complies with the FCC 15.237 requirement (15.237 (c))

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15.237 (c) Field Strength (Out-of-band) Spurious Emissions:

Channel 5		Channel 9		Channel 15	
74.7 MHz		72.5 Mhz		75.6 Mhz	
Freq (MHz)	(dBuV)	Freq (MHz)	(dBuV)	Freq (MHz)	(dBuV)
149.4	15	145	13.90	151.2	14.5
224.1	18.3	217.5	17.40	226.8	18.7
298.8	10.2	290.00	10.30	302.4	11.8
373.5	10.5	362.50	9.50	378	11.8
448.2	13	435.00	10.60	453.6	11.2
522.9	10.5	507.50	10.30	529.2	10.8
597.6	12.2	580.00	12.70	604.8	11.8
672.3	10.5	652.50	11.00	680.4	11.8
747	25.9	725.00	11.60	756	11.8
821.7	11.9	797.50	11.50	831.6	11.3
896.4	10.2	870.00	14.60	907.2	11.6
971.1	10.8	942.50	10.30	982.8	12.7

FCC 15.209 Limits

Freq (Mhz)	FCC 15.209 Limit (uV/m)	Dist (m)	FCC 15.209 Limit (dBuV/m)	FCC 15.209 Limit (uV/m)	New FCC Limit (uV/m)	New FCC Limit (dBuV/m)
.009	266.67	300	48.52	1500	1500	63.52
.490	4.9	30	13.8		1500	63.52
.491	48.88	30	33.78	1500	1500	63.52
1.705	14.08	3	22.97		1500	63.52
1.7051	30	3	29.54	1500	1500	63.52
30	30	3	29.54		1500	63.52
30.1	100	3	40	1500	1500	63.52
88	100	3	40	1500	1500	63.52
88.1	150	3	43.52		1500	63.52
216	150	3	43.52	1500	1500	63.52
960	200	3	46.02		1500	63.52
>960	500	3	53.98	1500	1500	63.52

See graphs in Attachment B

The T46 complies with the FCC 15.237 requirement 15.237 (c)

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ATTACHMENT A

RADIATED MEASUREMENT

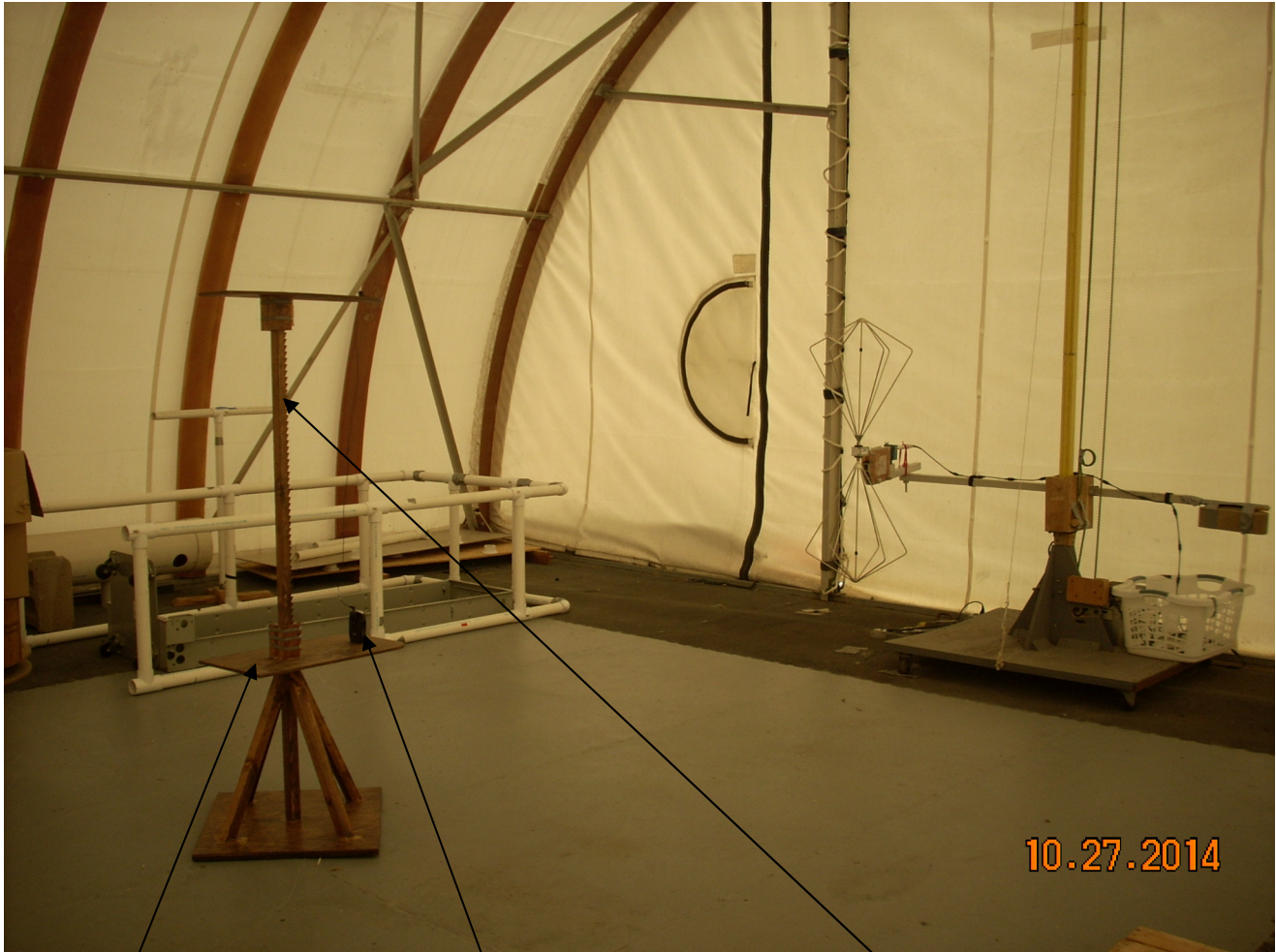
TEST SET UP

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**Williams Sound, Inc.
Model: T46
Radiated Emissions
Test Configuration**



Wooden
EUT Test

EUT

EUT Antenna
Wire Support

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ATTACHMENT B

DETAILED TEST DATA SHEETS

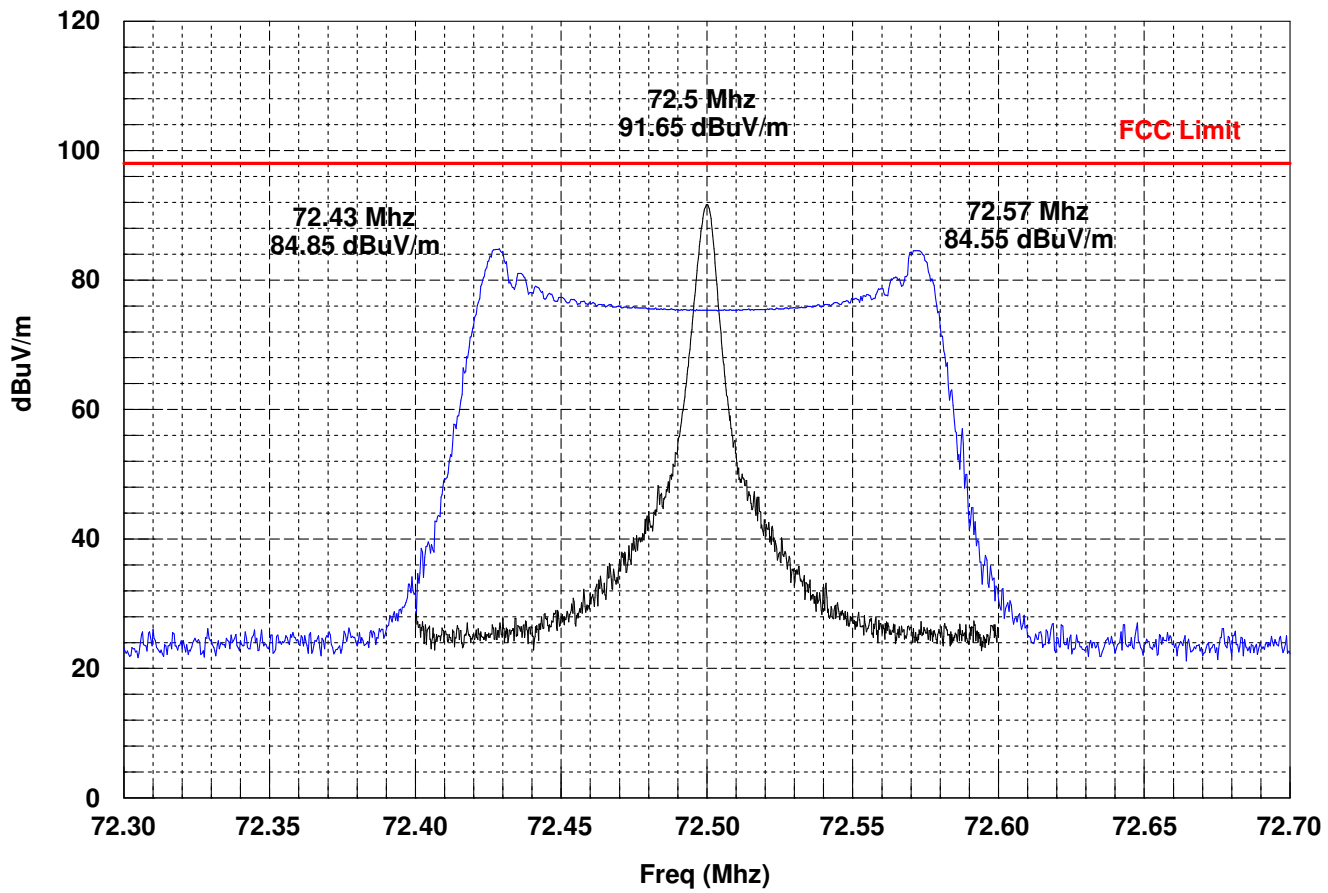
Each radiated emissions plot indicates the receiving antenna measurement distance in meters and the emission amplitudes with respect to their applicable limits. The associated tabulation for each radiated plot lists the emission frequency, the final emission level, and the margin from the limit.

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Williams Sound, Inc.
Model: T46
FCC 15.237 Radiated Emissions
Fundamental Frequency With and Without Modulation
72-73 Mhz Band



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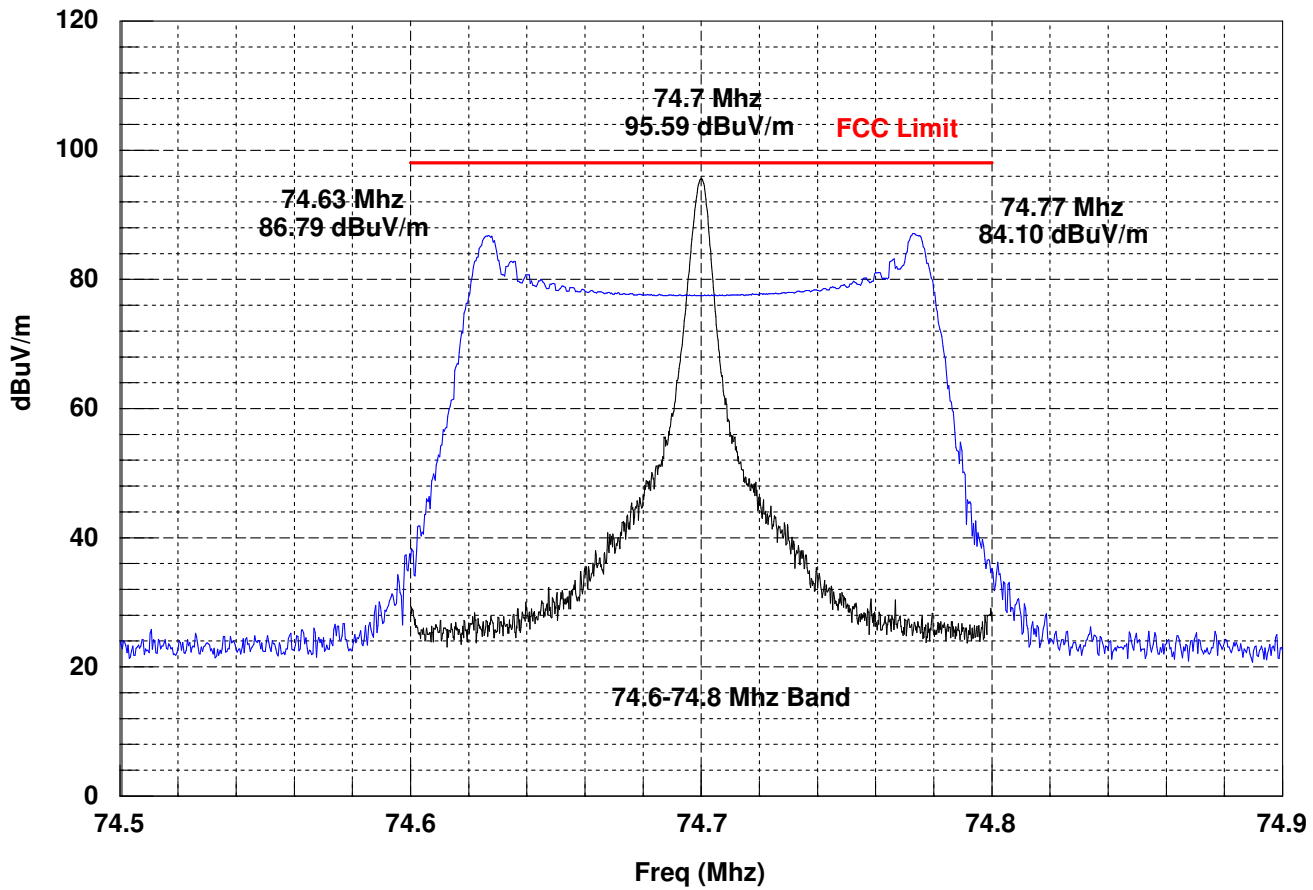
October 27, 2014

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CERTIFICATION SERVICES, INC.

Williams Sound, Inc.
Model: T46
FCC 15.237 Radiated Emissions
Fundamental Frequency with and without modulation
74.6 - 74.8 Mhz



International Certification Services, Inc.

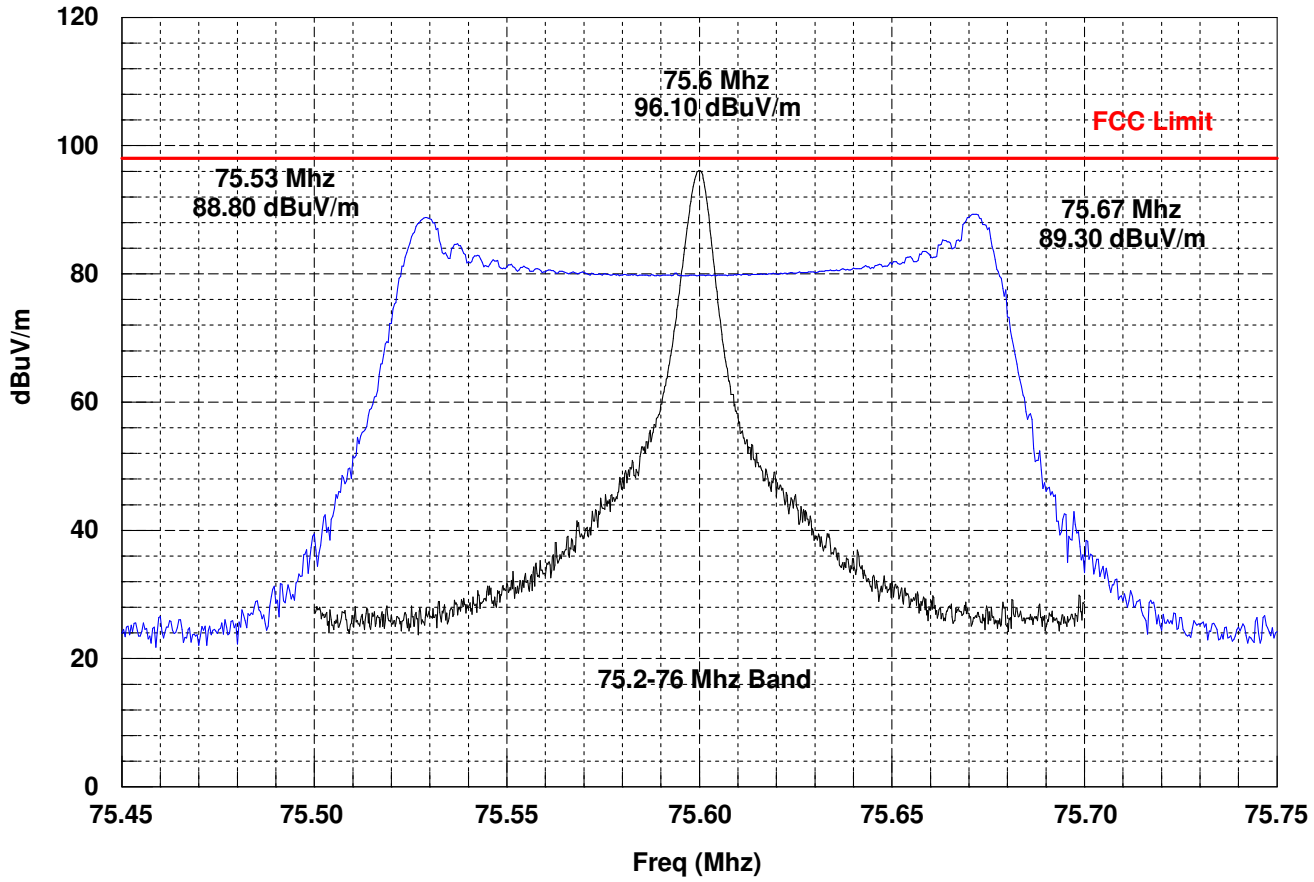
October 27, 2014

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Williams Sound, Inc.
Model: T46
FCC 15.237 Radiated Emissions
Fundamental Frequency with and without modulation
75.2 - 76 Mhz Band



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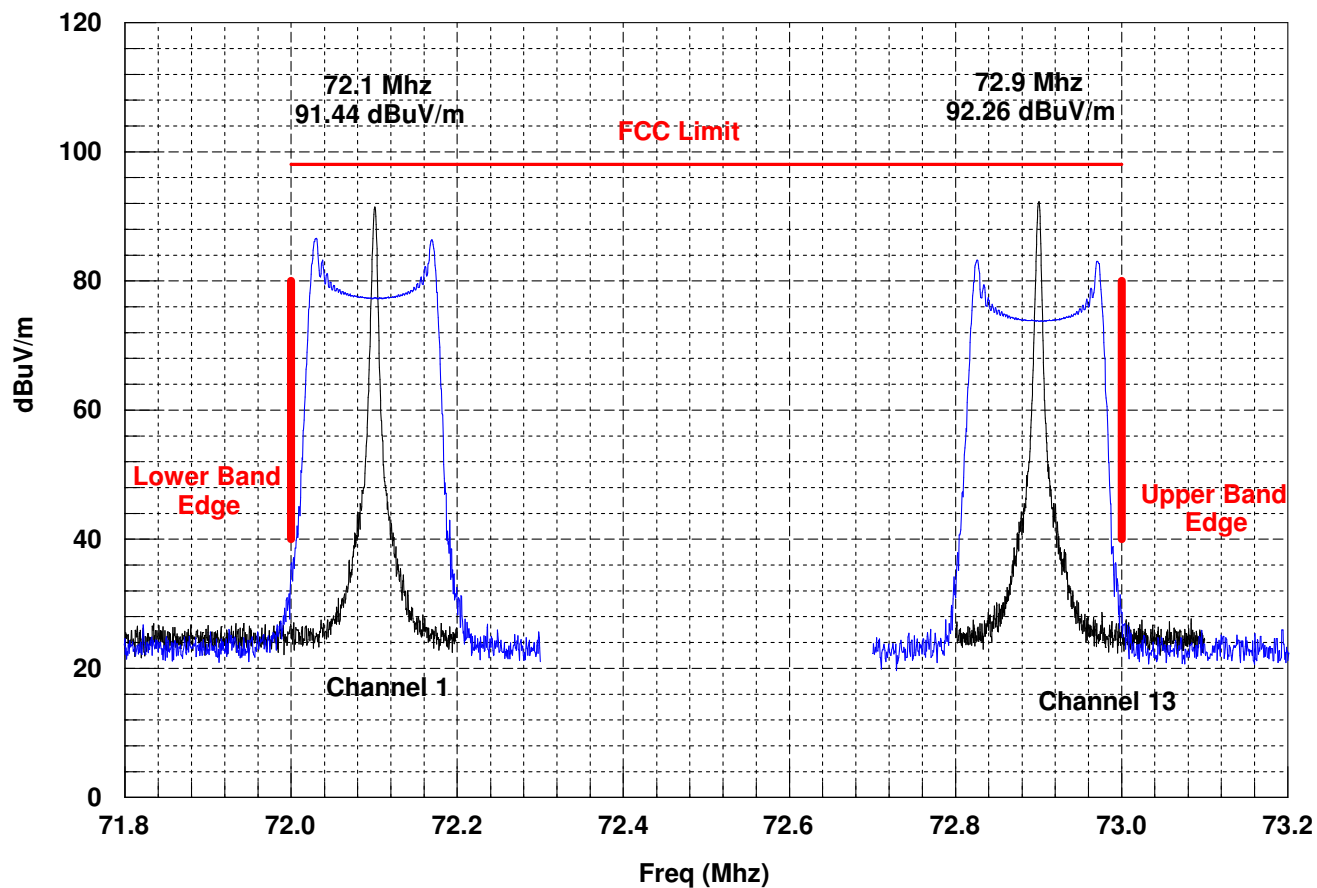
October 27, 2014

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Williams Sound, Inc.
Model: T46
FCC 15.237 Radiated Emissions
Band Edge (72-73 Mhz Band)
with and without modulation



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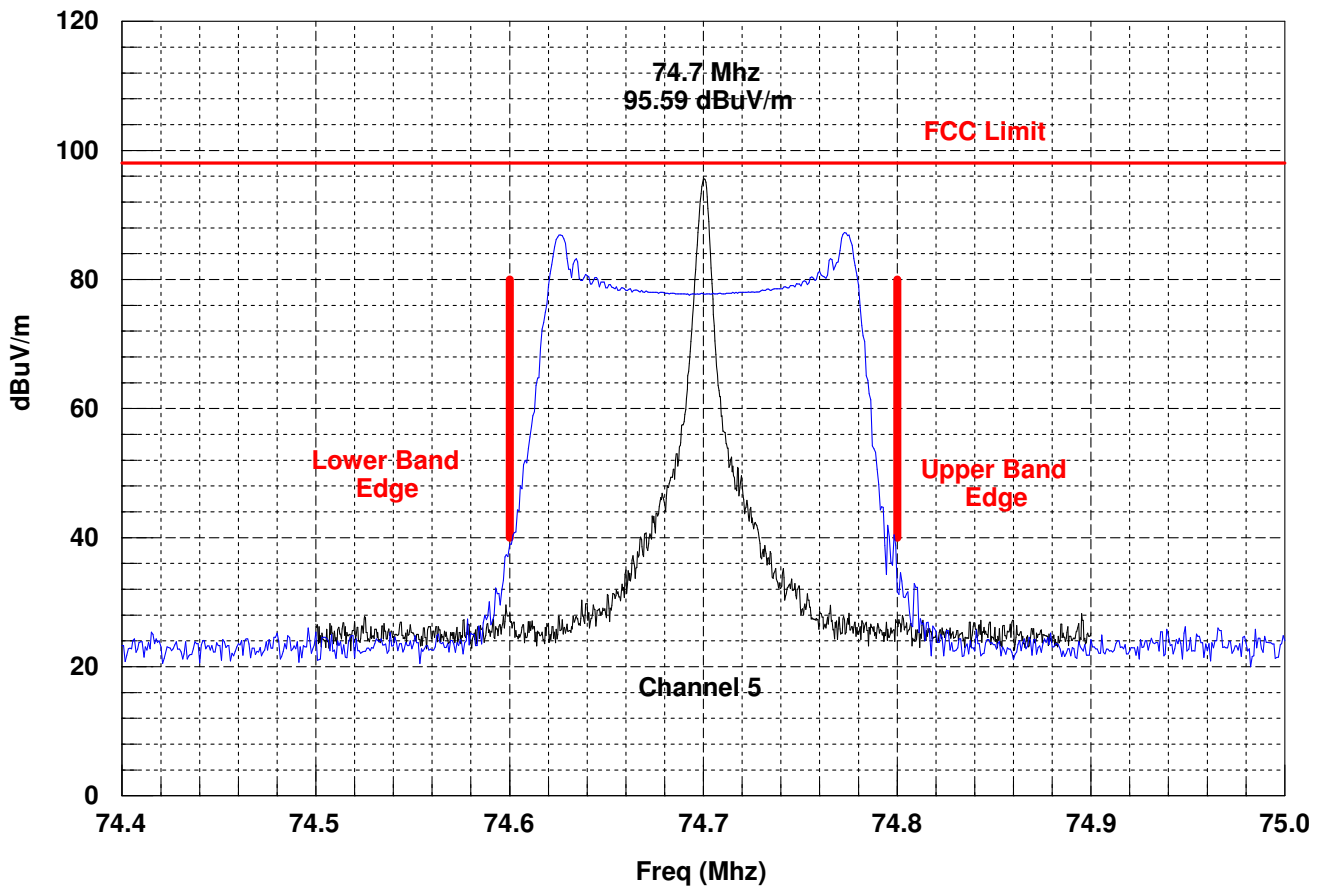
October 27, 2014

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CERTIFICATION SERVICES, INC.

Williams Sound, Inc.
Model: T46
FCC 15.237 Radiated Emissions
Band Edge (74.6-74.8 Mhz Band)
with and without modulation



International Certification Services, Inc.

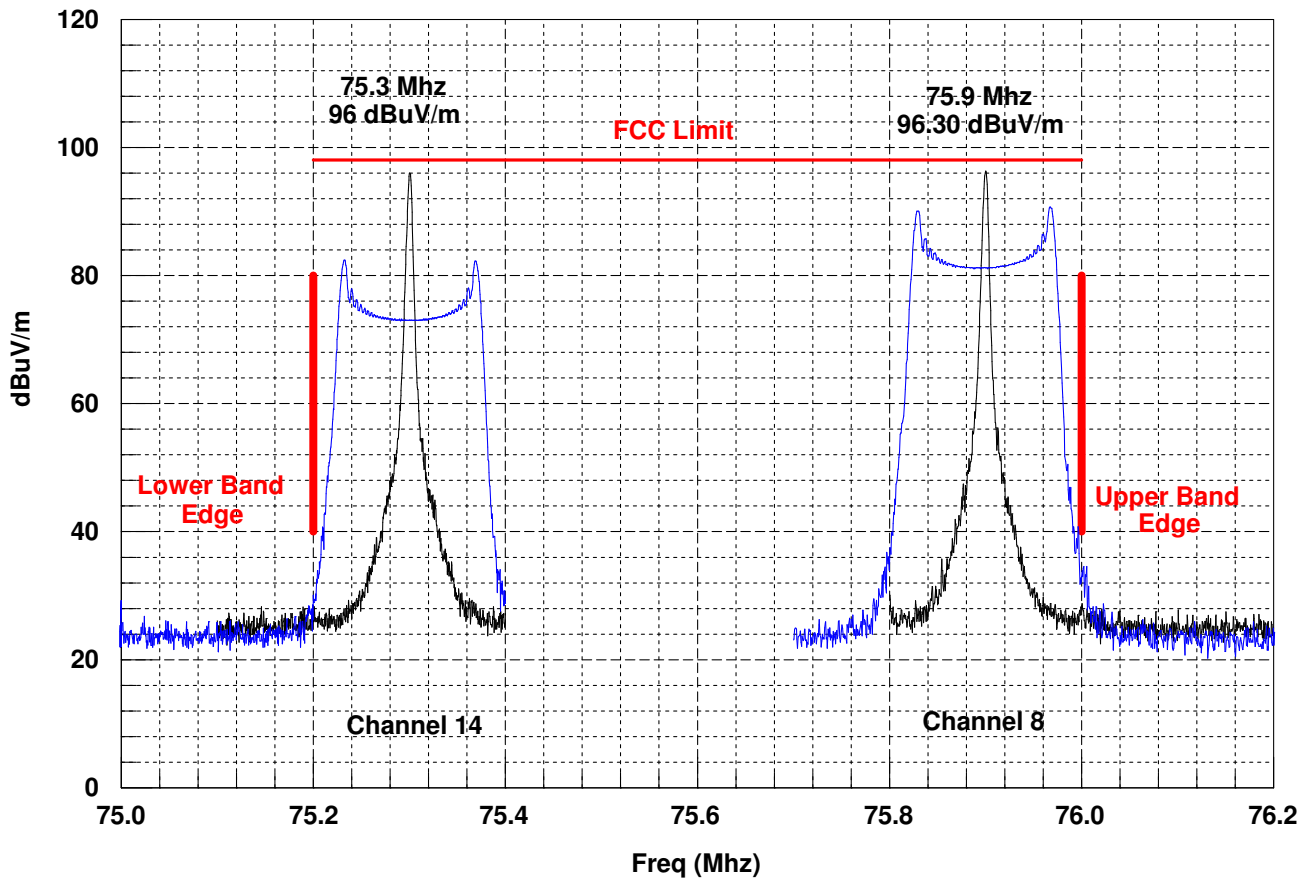
October 27, 2014

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Williams Sound, Inc.
Model: T46
FCC 15.237 Radiated Emissions
Band Edge (75.2-76 Mhz Band)



International Certification Services, Inc.

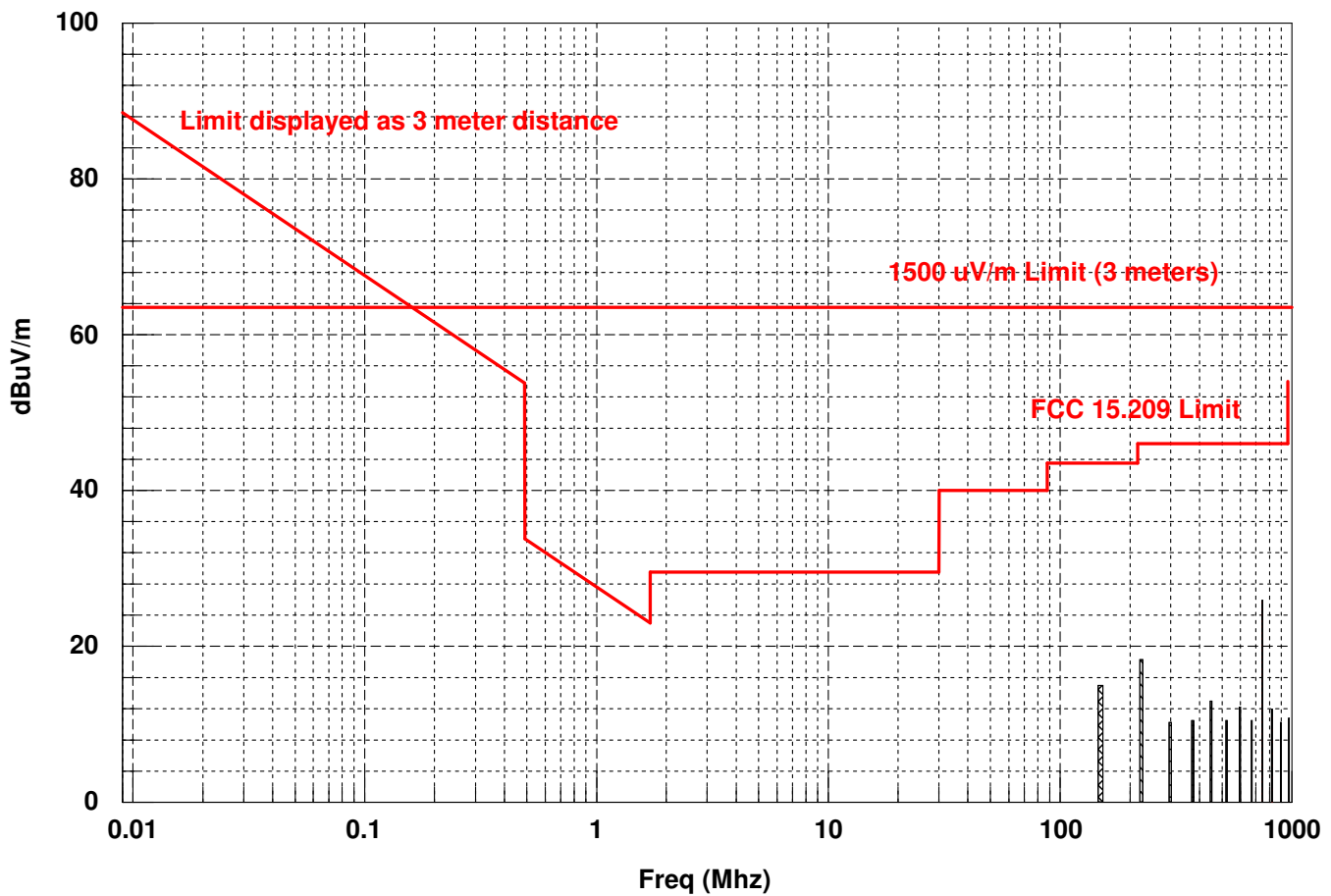
October 27, 2014

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Williams Sound, Inc.
Model: T46
FCC 15.209 Radiated Emissions
Spurious Emissions
74.7 Mhz (Channel 5)



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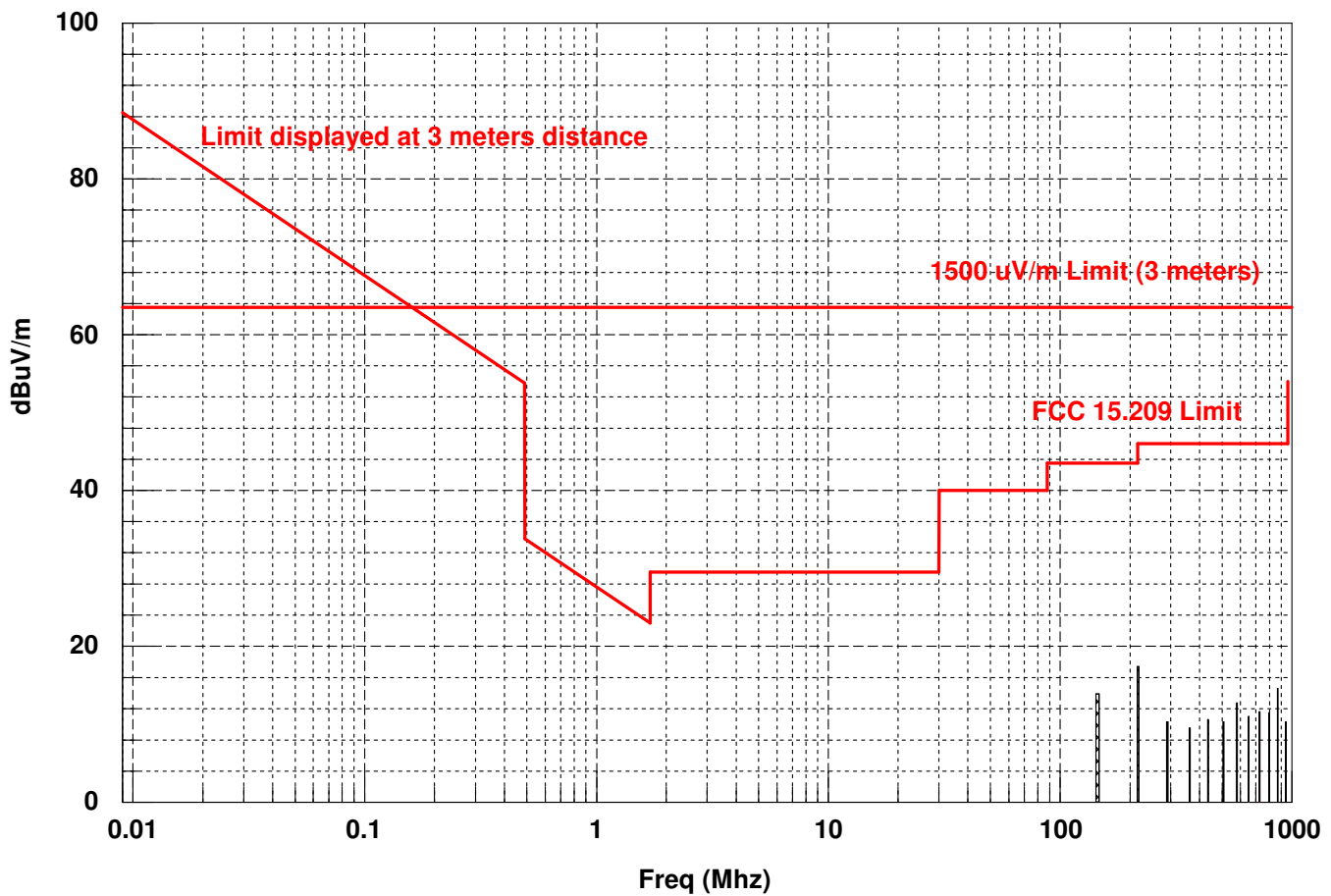
October 29, 2014

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Williams Sound, Inc.
Model: T46
FCC 15.209 Radiated Emissions
Spurious Emissions
72.5 Mhz (Channel 9)



International Certification Services, Inc.

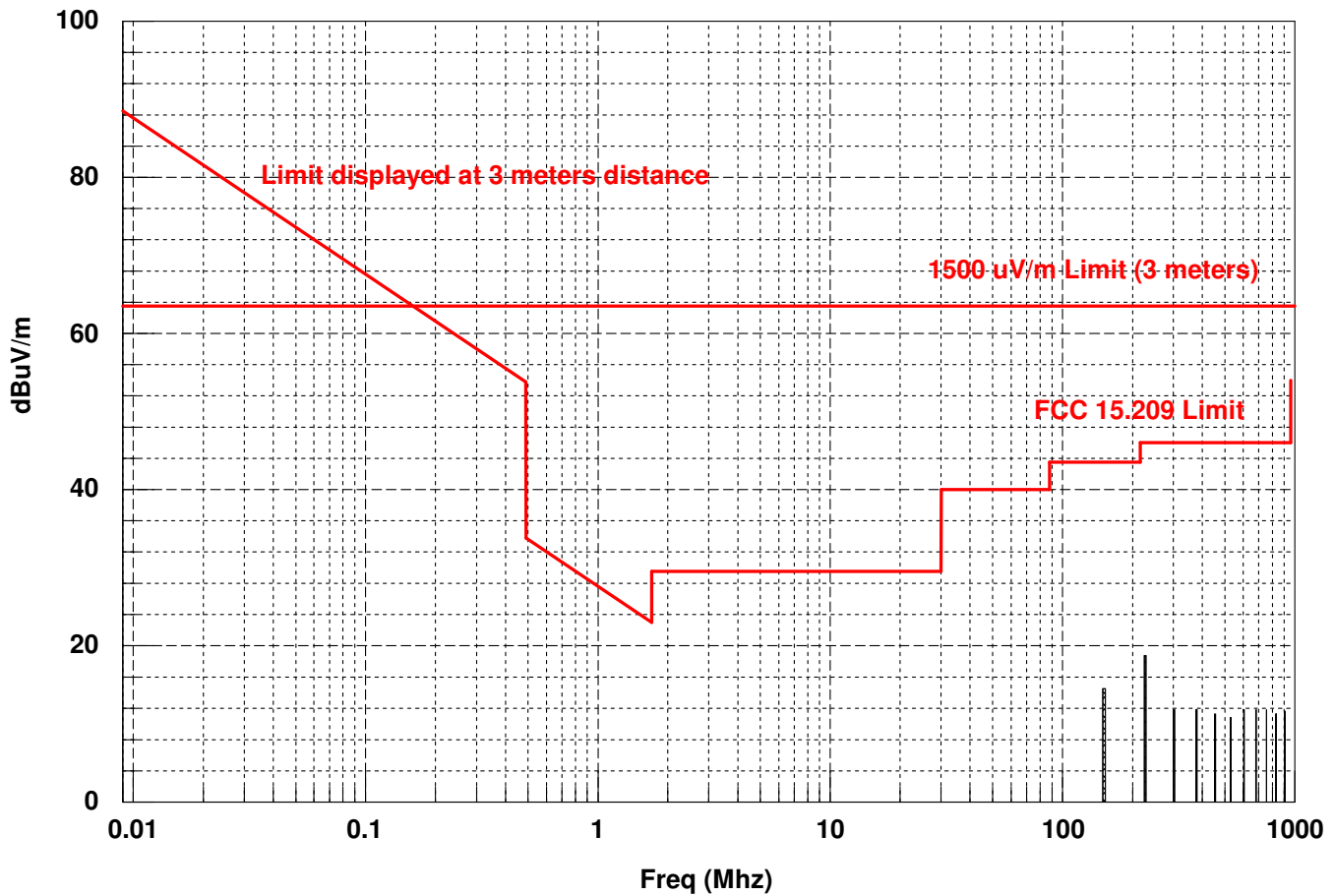
October 29, 2014

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CERTIFICATION SERVICES, INC.

Williams Sound, Inc.
Model: T46
FCC 15.209 Radiated Emissions
Spurious Emissions
75.6 Mhz (Channel 15)



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October 29, 2014

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ATTACHMENT C

**PRODUCT DATA SHEET OR PRODUCT INFORMATION FORM AS SUPPLIED
BY THE CUSTOMER**

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CERTIFICATION SERVICES, INC.

COMPANY NAME: Williams Sound, Inc.

CUSTOMER REPRESENTATIVE: International Certification Services, Inc.

EQUIPMENT DESCRIPTION: 72 to 76 Mhz Transmitter

MODEL NUMBER: T46

SERIAL NUMBER: N/A

TYPE OF TEST: ☐ Development
☐ Initial Design Verification
☐ Design Change (Please describe exact changes below)
☒ Production Sample (Audit Test)
Changes made: NONE

OSCILLATOR FREQUENCIES:

10.000 Mhz

PRODUCT SHIELDING PROVISION:

Plastic enclosure

SOFTWARE AND / OR OPERATING MODES:

Company proprietary software

I/O CABLES: NONE

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