TECHNICAL REPORT

卓時檢測 TIMEWAY TESTING LABORATORY

TESTING CNAS L2292

ISO/IEC17025 Accredited Lab.

Report No:	FCC1009304
File reference No:	2010-11-02
Applicant:	RAYYOUNG ELECTRONIC LTD.
Product:	MICROPHONE
Model No:	PWMA1003T，PWMA2003T， PWMA3003T，P1501ATU，P3201ATU，P1001AT，P2001AT，P3001AT，P1002AI，P3002AI，P2002ABTI，RAY-1000UW， RAY-2000UW， RAY-3000UW， RAY-4000DU，PWMA230， PWMA330， PWMA1050， PWMA1080I，PWMA850，PWMA860I，PWMA930I， PWMA940BTI
Trademark:	N/A
Test Standards:	FCC Part 74H and Part 2
Test result:	The test item passed the test specification(s)

Approved By

Jack Chung

Jack Chung
Manager

Dated: November. 02 .2010

Results appearing herein relate only to the sample tested
The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

Tel (755) 83448688 Fax (755) 83442996

Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The 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 No.:899988.

IC- Registration No.: IC5205A-01

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration No.: IC 5205A-01.

Test Report Conclusion

Content

1.0 **General Details**

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

Telephone: (755) 83448688

Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-01

For 3m & 10 m OATS

1.2 Applicant Details

Applicant: RAYYOUNG ELECTRONIC LTD.

Address: NO. 1ST, SHANGNAN INDUSTRIAL ZONE, TAIHE TOWN, BAIYUN DISTRICT, GZ, CHINA

Telephone: +86-20-87470081

Fax: +86-20-87470081

1.3 Description of EUT

Product:	MICROPHONE
Brand Name:	N/A
Model Number:	PWMA1003T
Additional Model Name	PWMA2003T， PWMA3003T，P1501ATU，P3201ATU，P1001AT，P2001AT，P3001AT，P1002AI，P3002AI，P2002ABTI，RAY-1000UW，RAY-2000UW，RAY-3000UW， RAY-4000DU，PWMA230， PWMA330， PWMA1050，PWMA1080I，PWMA850， PWMA860I，PWMA930I， PWMA940BTI
Rating:	9V DC 1 x 6F22 size Battery
Operation Frequency	189.5MHz, 209.1MHz
Necessary Bandwidth	2M+2DK=2*30kHz+2*20kHz*1.0=100kHz
Antenna Designation	A permanent fixed antenna, which is built-in, designed as an indispensable part of the EUT.

1.4 Submitted Sample: 2 Sample

1.5 Test Duration

2010-09-27 to 2010-11-02

1.6 Test Uncertainty

Conducted Emissions Uncertainty = ± 3.0dB

Radiated Emissions Uncertainty = ± 6.0dB

1.7 Test Engineer

The sample tested by Terry Tang

Print Name: Terry Tang

2.0	**Test Equipments**				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2009-12-05	2010-12-04
Absorbing Clamp	ROHDE&SCHWARZ	MDS-21	100126	2009-12-05	2010-12-04
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2009-12-05	2010-12-04
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2009-12-05	2010-12-04
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2009-12-05	2010-12-04
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2009-03-30	2011-03-29
4-WIRE ISN	ROHDE&SCHWARZ	ENY 41	830663/044	2010-02-25	2011-02-24
GG ENY22 Double 2-Wire ISN	ROHDE&SCHWARZ	ENY22	83066/016	2010-02-25	2011-02-24
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2010-02-25	2011-02-24
System Controller	CT	SC100	-	2010-02-25	2011-02-24
Printer	EPSON	PHOTO EX3	CFNH234850	2010-02-25	2011-02-24
FM-AM Signal Generator	JUNGJIN	SG-150M	389911177	2010-02-25	2011-02-24
Color TV Pattern Generator	PHILIPS	PM5418	LO621747	2010-02-25	2011-02-24

Computer	IBM	8434	1S8434KCE99BLXLO*	-	-
Oscillator	KENWOOD	AG-203D	3070002	2010-02-25	2011-02-24
Spectrum Analyzer	HAMEG	HM5012	-	-	-
Power Supply	LW	APS1502	-	-	-
5K VA AC Power Source	California Instruments	5001iX	56060	2010-02-25	2011-02-24
CDN	EM TEST	CDN M2/M3	-	2010-02-25	2011-02-24
Attenuation	EM TEST	ATT6/75	-	2010-02-25	2011-02-24
Resistance	EM TEST	R100	-	2010-02-25	2011-02-24
Electromagnetic Injection Clamp	LITTHI	EM101	35708	2010-02-25	2011-02-24
Inductive Components	EM TEST	MC2630	-	2010-02-25	2011-02-24
Antenna	EM TEST	MS100	-	2010-02-25	2011-02-24
Signal Generator	ROHDE&SCHWARZ	SMT03	100029	2010-02-25	2011-02-24
Power Amplifier	AR	150W1000	300999	2010-02-25	2011-02-24
Field probe	Holaday	HI-6005	105152	2010-02-25	2011-02-24
Bilog Antenna	Chase	CBL6111C	2576	2010-02-25	2011-02-24
Loop Antenna	EMCO	6502	00042960	2010-02-25	2011-02-24
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2010-02-25	2011-02-24
3m OATS	--	--	N/A	2010-02-25	2011-02-24

3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications:

Test Type	Test Requirement	Standard	Result
Carrier Radiated Power	FCC Part 2.1046	74.861 e) 1) 174M-216M—50mW	Pass
Modulation Deciation	FCC Part 2. 1047	74.861 e) 3) 74.861 e) 3) Within 75kHz	Pass
Frequency Stabolity	FCC Part 2. 1055	74.861 e) 4) <0.005% 50 ppm	Pass
Operating Bandwidth	FCC Part 2. 1049 c	74.861 e) 5) Within 200kHz	Pass
Unwanted Radiation	FCC Part 2. 1049 c	74.861 e) 6) Within the mask	Pass
Radiation Spurious Emission	FCC Part 2. 1053	74.861 e) 3)<43+10lgP(W)dB	Pass

3.2 Test Standards

FCC Part 74H and Part 2

4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co.,Ltd

5 Test Results

5.1 EUT Operation Condition

Operation Environment:

Temperature: 20.0 ℃~25 ℃

Humidity: 50~70% RH

Atmospheric Pressure: 980~1012 mbar

EUT Operation: Test the EUT in transmitting mode

5.2 Test Procedure & Measurement Data

5.2.1 Carrier Radiated Power & Radiated Spurious Emissions

Test Requirement: FCC CFR 47 Part 74.861 e) 1) & d) 3)

Test Method: EIA/TIA 603-C:2004 section 2.2,
FCC CFR 47 Part 2.1047 & 1053

Measurement Distance: 3m (Semi-Anechoic Chamber)

Test Requirement:

(a) For low power auxiliary stations operating in the bands other than those allocated for TV broadcasting, the following technical requirements are imposed.

(b) The occupied bandwidth shall not be greater than that necessary for satisfactory transmission and, in any event, an emission appearing on any discrete frequency outside the authorized band shall be attenuated, at least, $43+10\log_{10}$(mean output power, in watts) dB below the mean output power of the transmitting unit.

(c) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

(d) The power of the measured unmodulated carrier power at the output of the transmitter power amplifier (antenna input power) may not exceed the following:

(i) 54–72, 76–88, and 174–216 MHz bands—50 mW

(ii) 470–608 and 614–806 MHz bands—250 mW

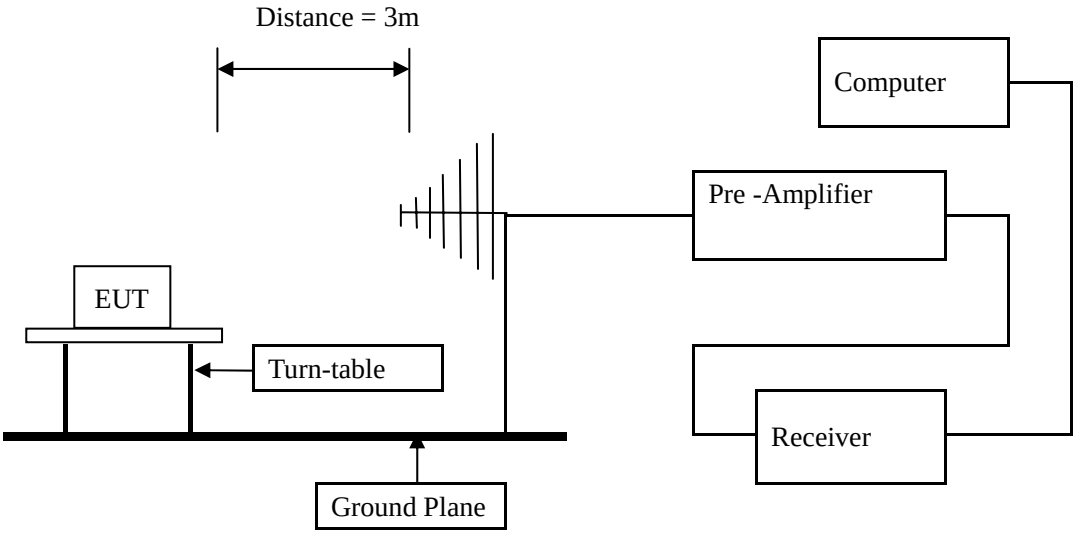
Test Procedure:

The procedure used was EIA/TIA 603-C:2004. The receiver was scanned from 30MHz to 10times carrier frequency. 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:

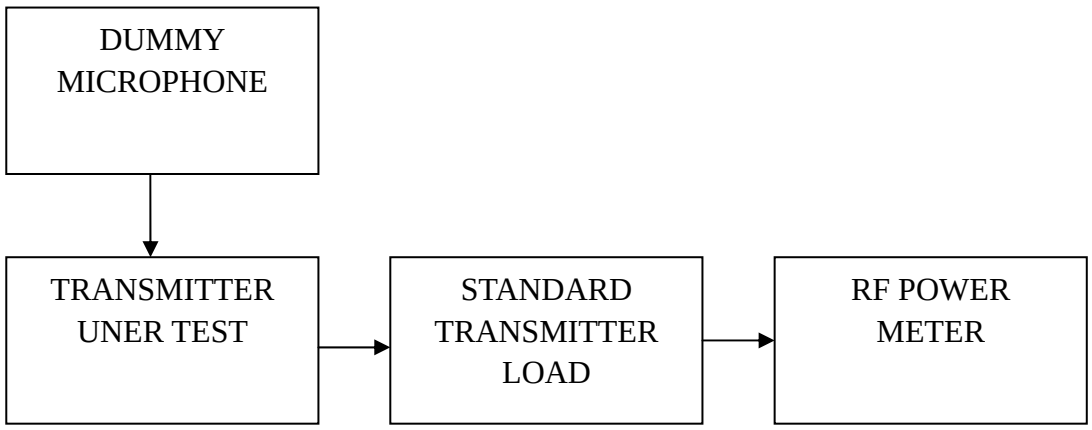
Final Test Level =Receiver Reading+Antenna Factor+Cable Factor–Peramlifer Factor

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bilog antenna with 2 orthogonal polarities. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the Carrier Radiated Power and spurious emissions were measured by the substitution.

Block diagram of Test setup



Carrier Output Power Setup



Test Result:

Carrier Frequency (MHz)	**Factual Level dBm (mW)**	**Limit in** 74.861 e) 1)
189.500	10.02dBm (i.e. 10.05 mW)	17dBm (i.e. 50 mW)
209.100	10.64dBm (i.e. 11.59 mW)	17dBm (i.e. 50 mW)

The Factual Level is conducted value.

Radiated spurious emissions:

Spurious Emission Frequency (MHz)	Factual Level Horizontal (dBm)	Factual Level Vertical (dBm)	Limit (dBm)	Min Margin (dB)
189.500MHz				
284.303	-53.83	-36.54	-13.0	-23.54
379.065	N/A	-46.54	-13.0	-33.54
473.825	N/A	-53.74	-13.0	-40.74
568.586	N/A	-56.54	-13.0	-43.54
852.867	-55.51	-45.04	-13.0	-32.04
209.100MHz				
313.694	-50.61	-44.51	-13.0	-31.51
418.924	-56.66	-43.70	-13.0	-30.70
522.807	-61.91	-44.40	-13.0	-31.40
627.367	N/A	-51.08	-13.0	-38.08
731.913	-52.10	-49.44	-13.0	-36.44
836.472	-51.70	-53.30	-13.0	-38.70
941.030	N/A	-53.33	-13.0	-40.33

The Factual Level is ERP value.

The peak emission of other frequency in rang from 30MHz up to 10 times carrier were 25dB lower than the limit, hence no data was recorded in the report.

TEST RESULTS: The unit does meet the FCC requirements.

5.2.2 Occupied Bandwidth

Test Requirement: FCC CFR 47 Part 74.e) 5) & 6)

Test Method: FCC CFR 47 Part 2.1049

Requirements:

(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

(5) The operating bandwidth shall not exceed 200 kHz.

(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

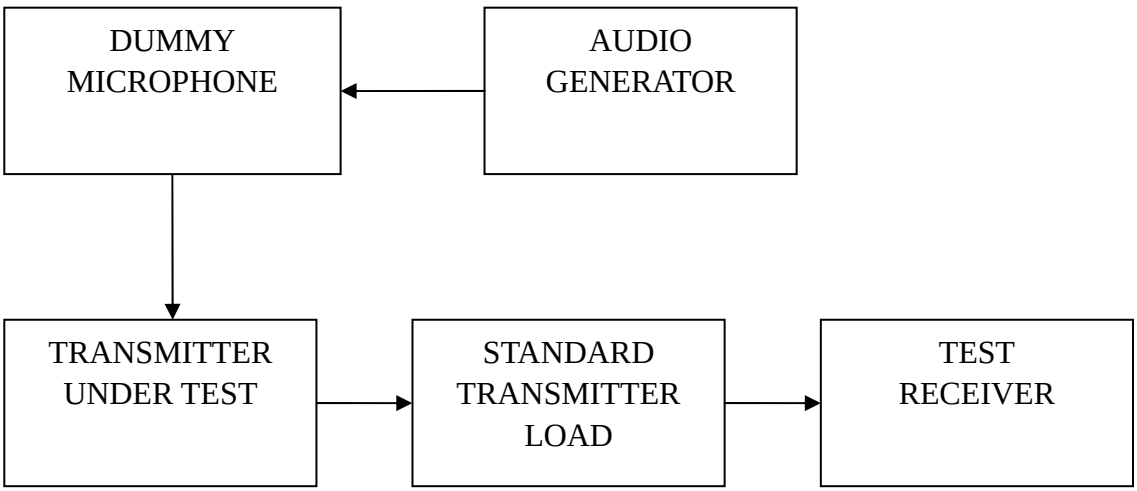
(i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25dB;

(ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35dB;

(iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\log_{10}$ (mean output power in watts) dB.

Test Procedure

Setup

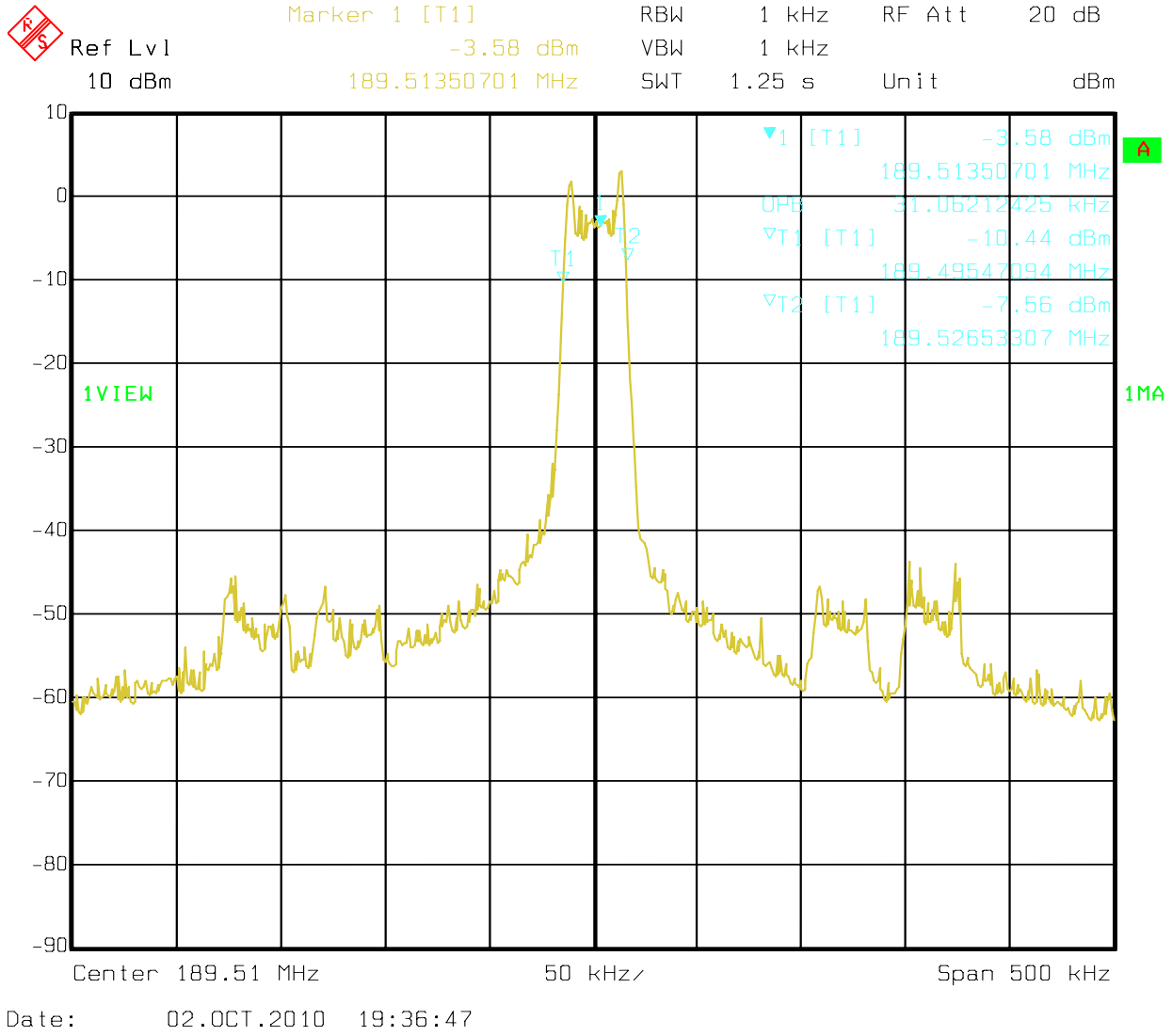


Input 2500Hz signal to the microphone, find the 50% rated deviation, add the level 16dB, test this status the 99% occupied bandwidth and record it.

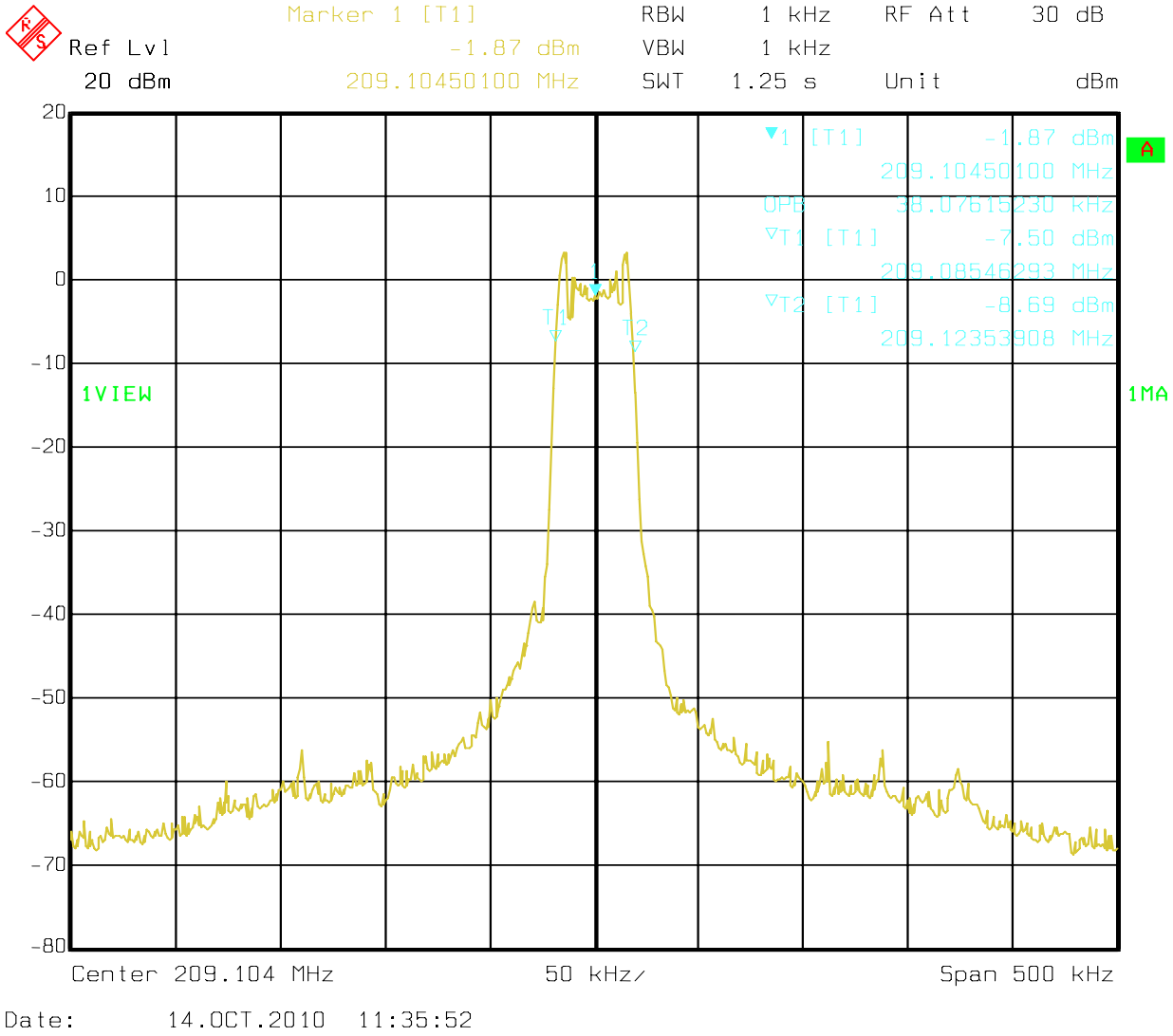
TEST REPORT

Test Result: The graph as below, represents the emissions take for this device. Occupied Bandwidth (99% of total power): 90 kHz.

189.500MHz

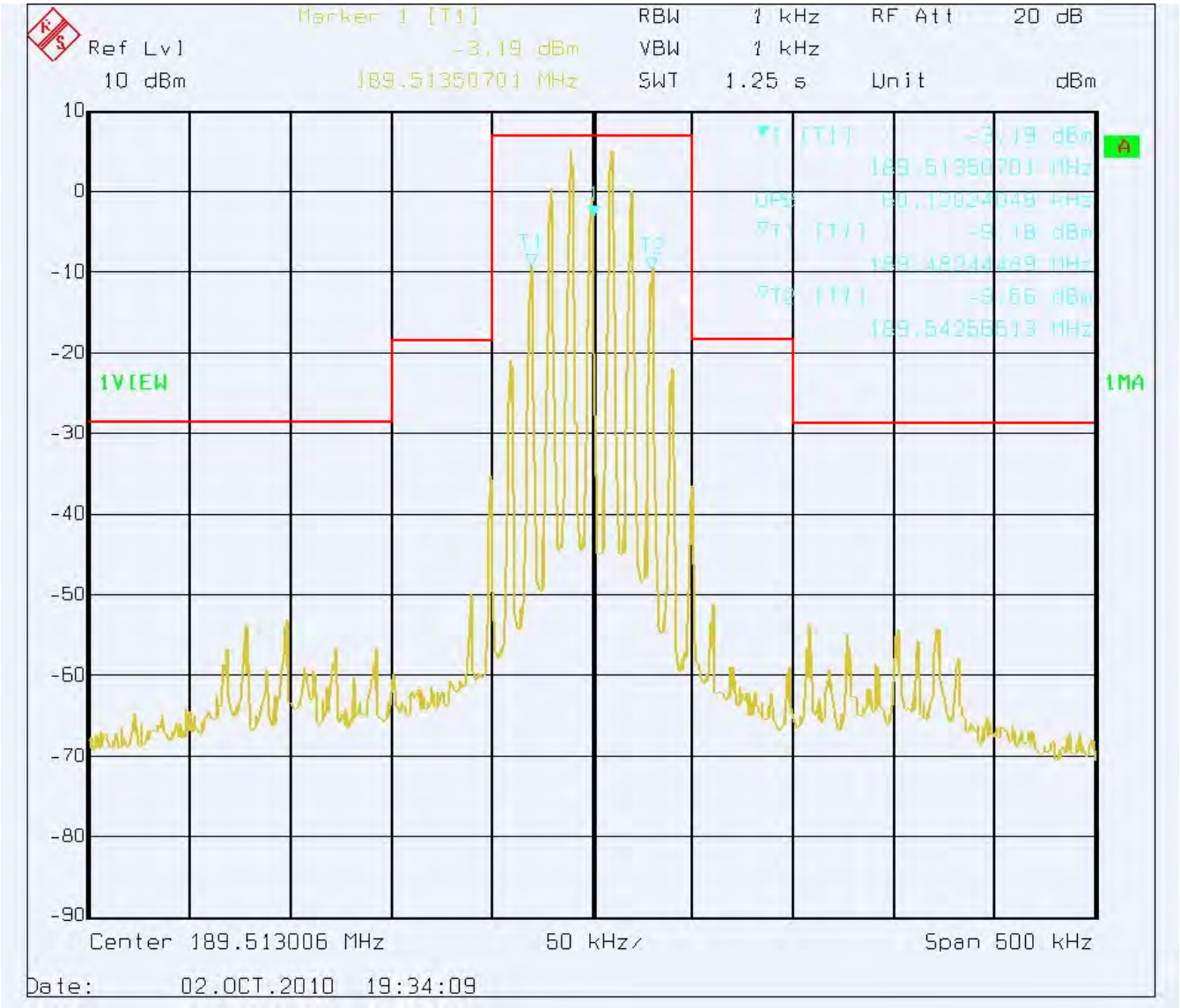


209.100MHz

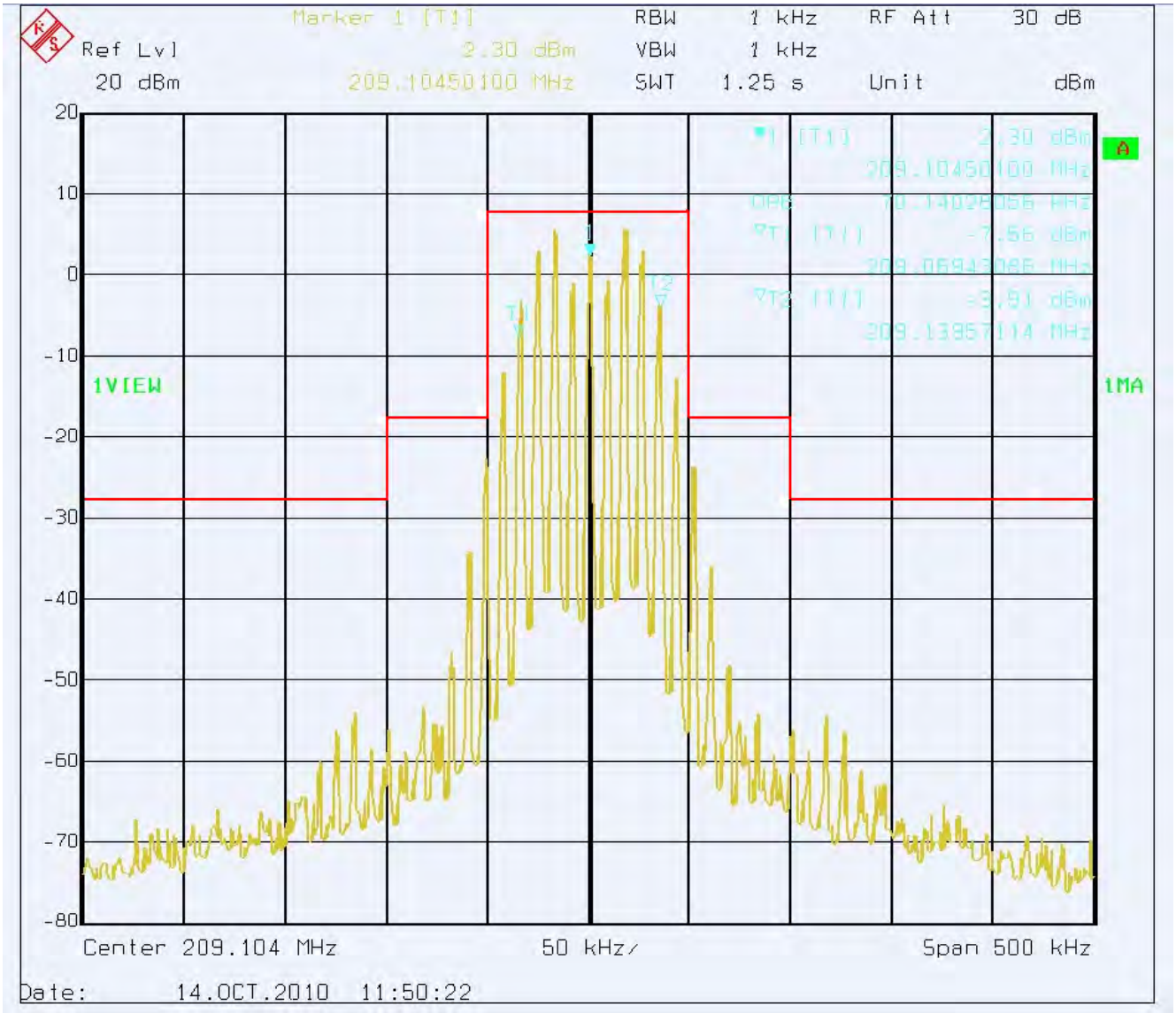


Emission Mask: input with 10 kHz AF, 50% modulation + 16dB.

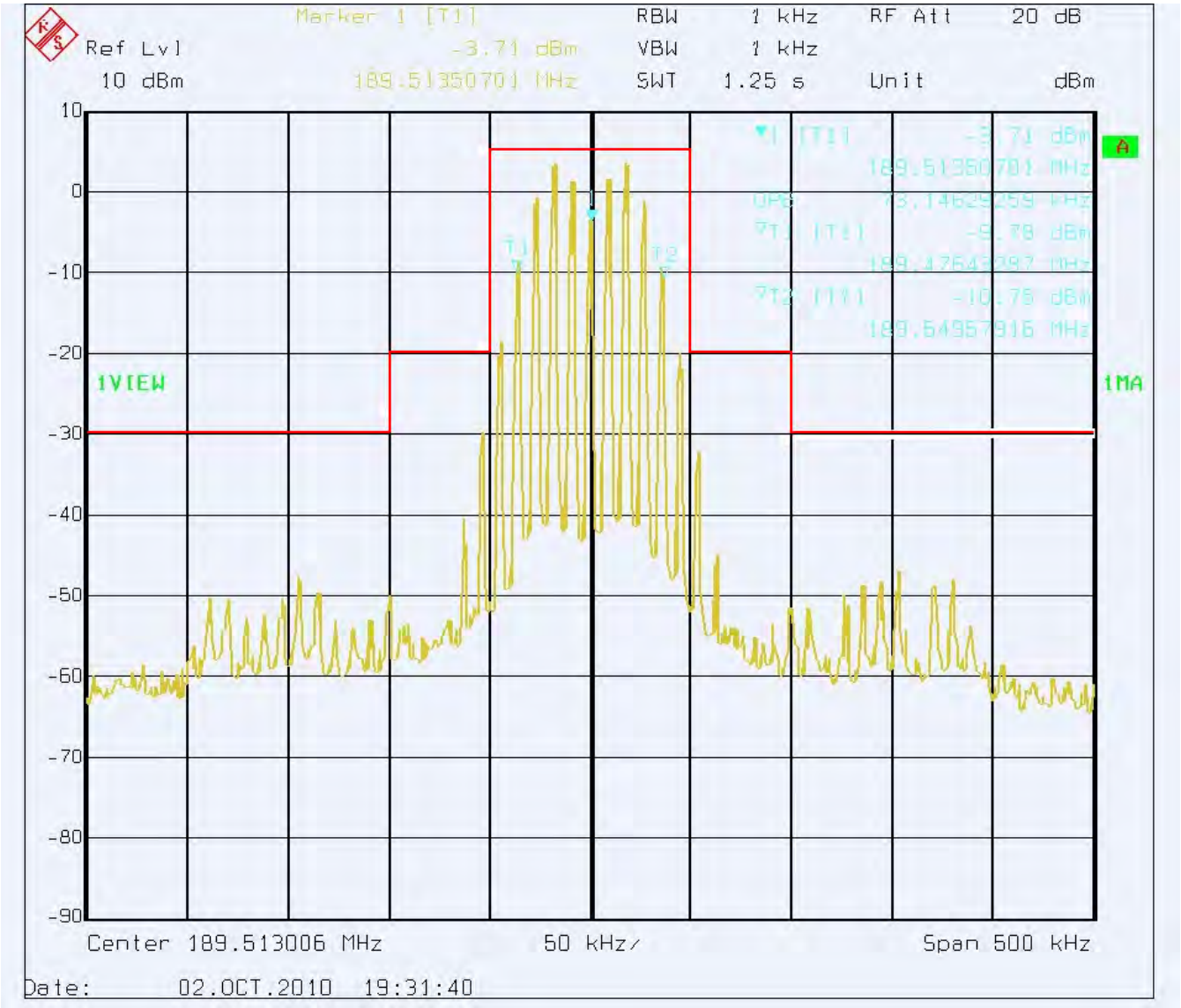
189.500MHz



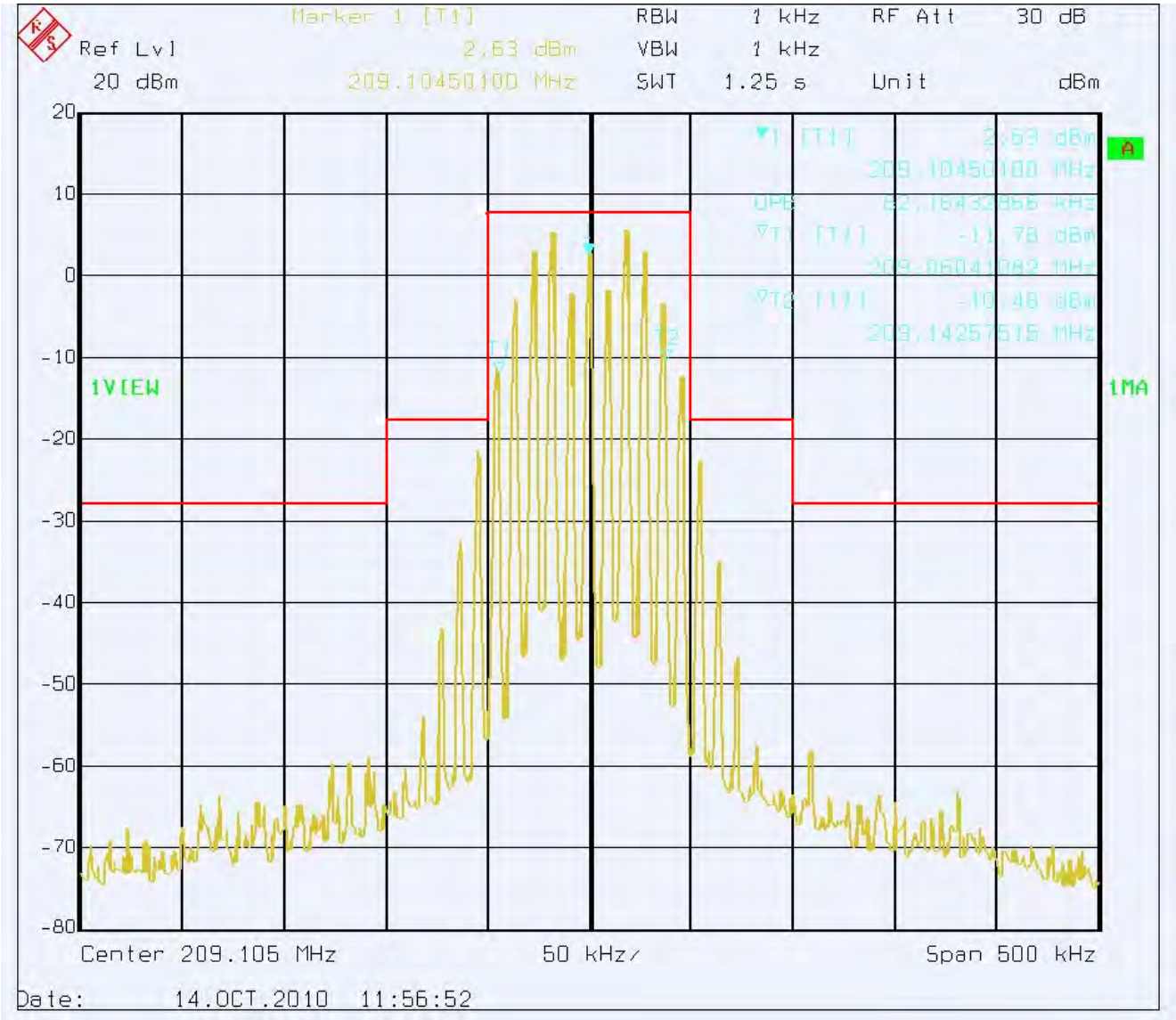
Emission Mask: input with 10 kHz AF, 50% modulation + 16dB.
209.100MHz



Emission Mask: input with 15 kHz AF, 50% modulation + 16dB.
189.500MHz



Emission Mask: input with 15 kHz AF, 50% modulation + 16dB.
209.100MHz



Test results: The unit does meet the FCC requirements.

5.2.3 Frequency Stability

Test Requirement: FCC CFR 47 Part 74.e) 4)

Test Method: FCC CFR 47 Part 2.1055

Requirements: +/-50 ppm

(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

(4) The frequency tolerance of the transmitter shall be 0.005 percent.

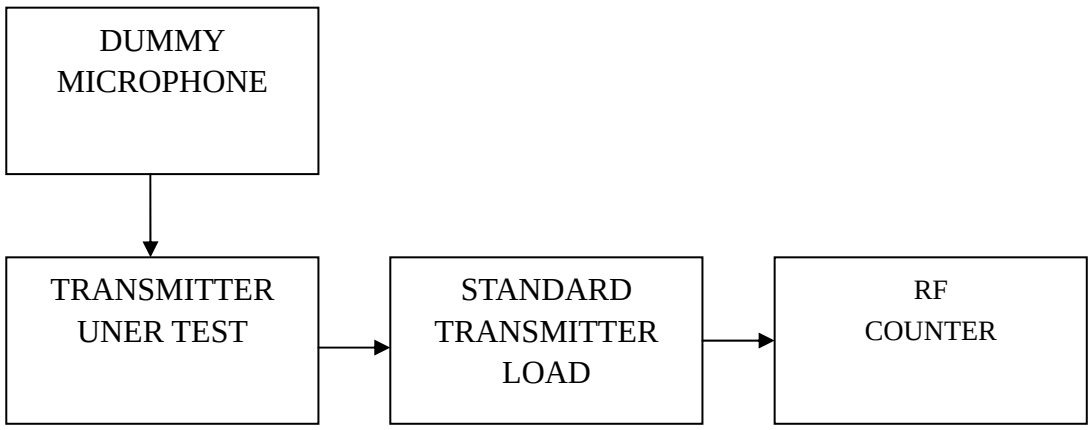
Test Procedure:

Frequency stability versus Environmental Temperature

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

Frequency Stability versus Input Voltage

At room temperature (25 ± 5°C), an external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage. For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Result:

Assigned Frequency: 189.500 MHz,		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 9.5 kHz
50	9.0	+3.5
40	9.0	+3.0
30	9.0	+1.4
20	9.0	+0.6
10	9.0	-0.7
0	9.0	-1.2
-10	9.0	-2.2
-20	9.0	-3.2
-30	9.0	-3.8
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 9.5 kHz
25	9.0	+0.1
25	10.4	+0.9
25	7.7	-1.0
25	6.8	-1.7

Battery end point: 6.8Vdc

The results: The unit does meet the FCC requirements.

5.2.4 Modulation Characteristics

Test Requirement: FCC CFR 47 Part 74.e) 3)

Test Method: FCC CFR 47 Part 2.1047 & TIA/EIA 603 clause 2.2.3, 2.2.6

Requirements:

(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

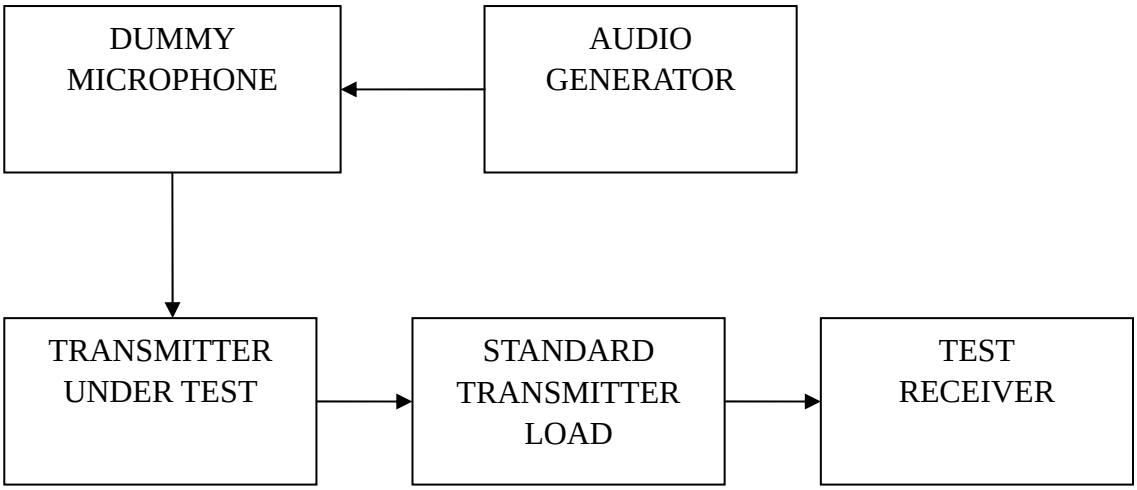
(3) Any form of modulation may be used. A maximum deviation of ±75 kHz is permitted when frequency modulation is employed.

Test Procedure:

Audio Frequency Response

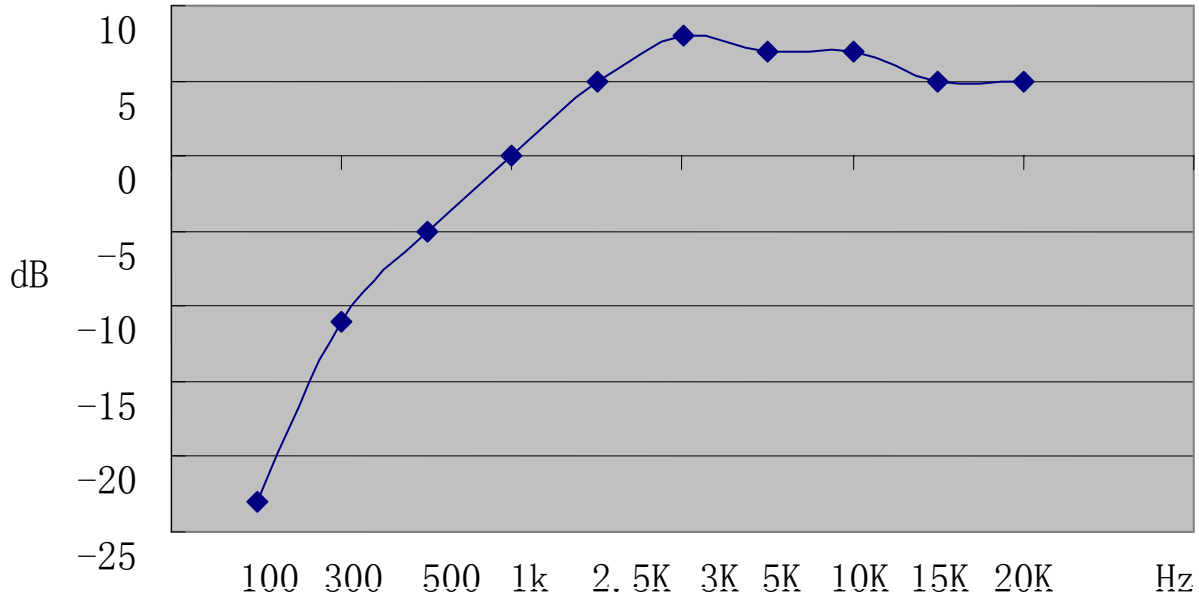
The RF output of the transceiver was connected to the input of FSP 30 with FM deviation module through sufficient attenuation so as not to overload the meter or distort the reading. An audio signal generator was connected to the audio input of microphone.

The audio signal input level was adjusted to obtain **20% of the maximum rated system deviation at 1 kHz**, and recorded as DEV_{REF}. With the audio signal generator level unchanged, set the generator frequency between 100 to 5000 Hz. The transmitter deviations (DEV_{FREQ}) were measured and the audio frequency response was calculated as $20 \log_{10}[DEV_{FREQ} / DEV_{REF}]$



The plot(s) of Audio Frequency Response is presented hereinafter as reference.

0dB=10mV at 1kHz (20% of the maximum rated system deviation).



Modulation Limiting

a) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.

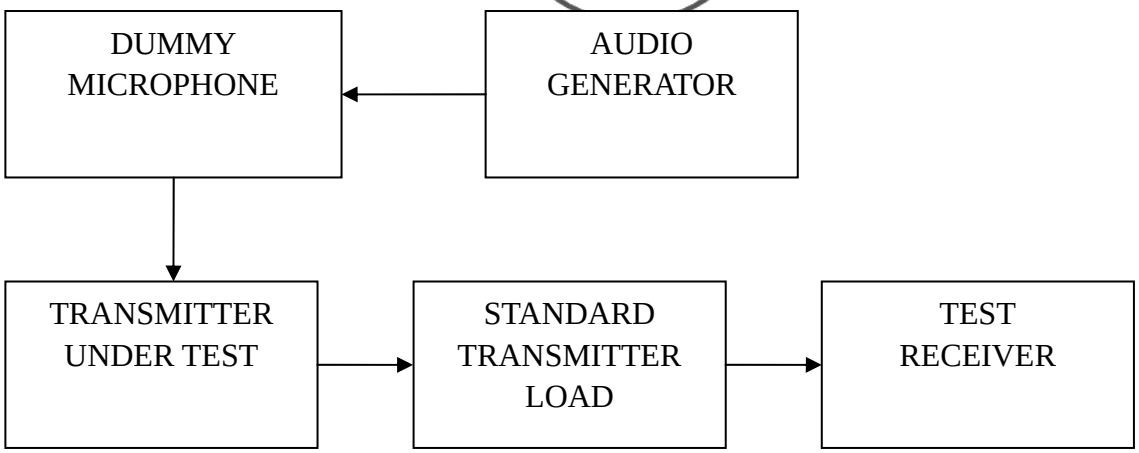
b) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤0.25 Hz to ≥15,000 Hz. Turn the de-emphasis function off.

c) Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation.

d) Increase the level from the audio frequency generator by 20 dB in one step (rise time between the 10% and 90% points shall be 0.1 second maximum).

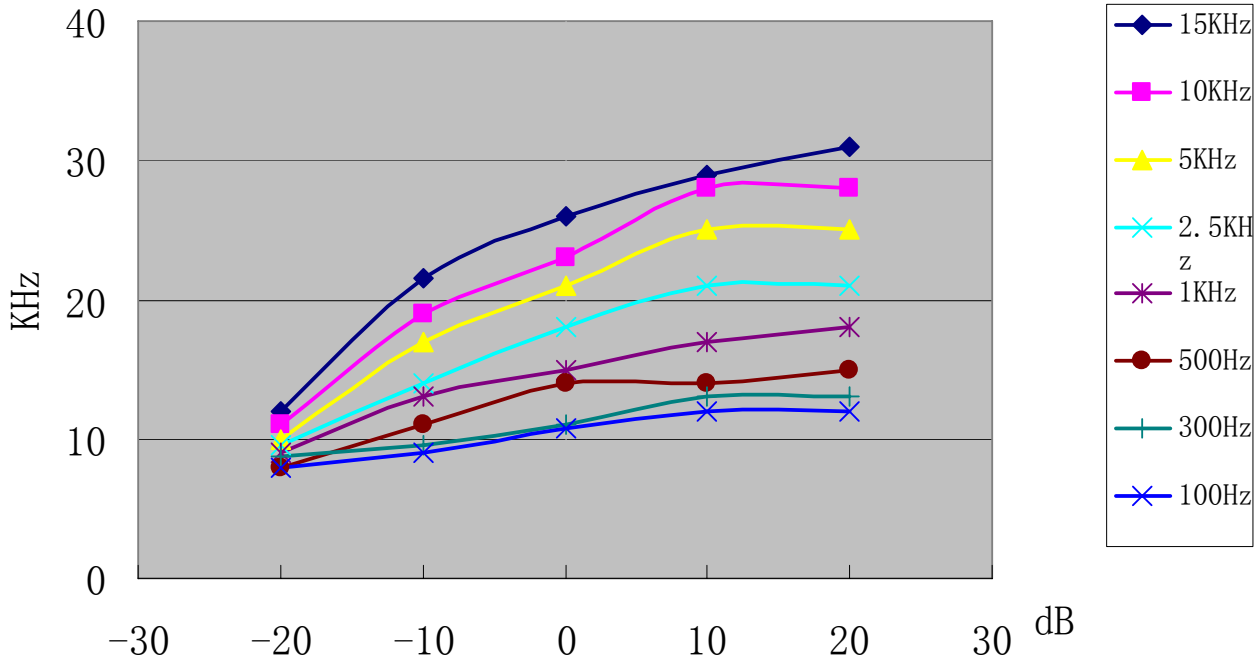
e) Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.

f) With the level from the audio frequency generator held constant at the level obtained in step e), slowly vary the audio frequency from 100 to 15k Hz and observe the steady-state deviation. Record the maximum deviation.



Test at five different modulating frequencies (100Hz ,300Hz, 500Hz, 1KHz, 2.5kHz,5kHz, 10kHz，15kHz), the output level of the audio generator was varied up to 1V and the FM deviation level was recorded.

Positive peak deviation

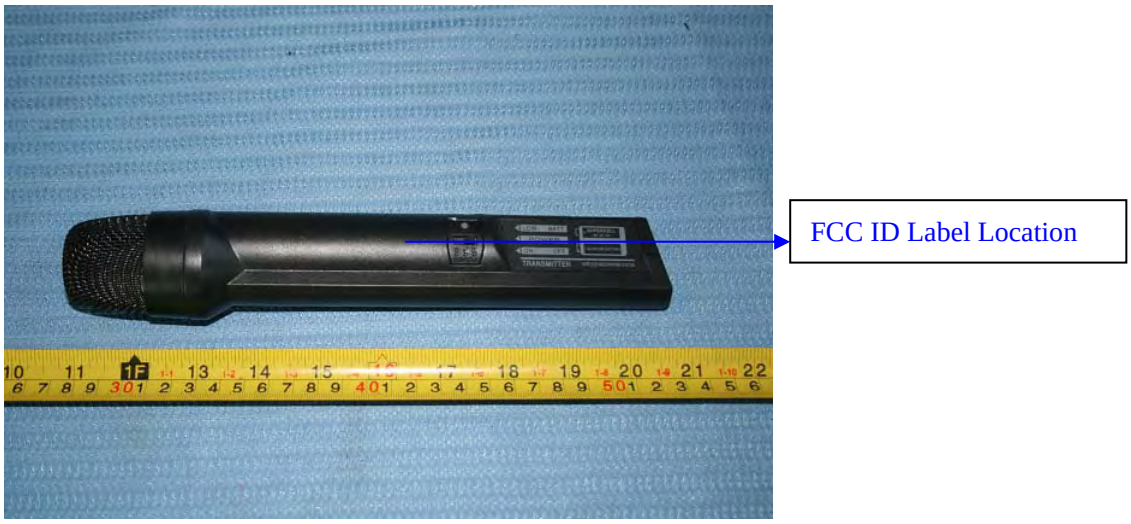


6.0 FCC ID Label

FCC ID: ZDURAYYOUNG011

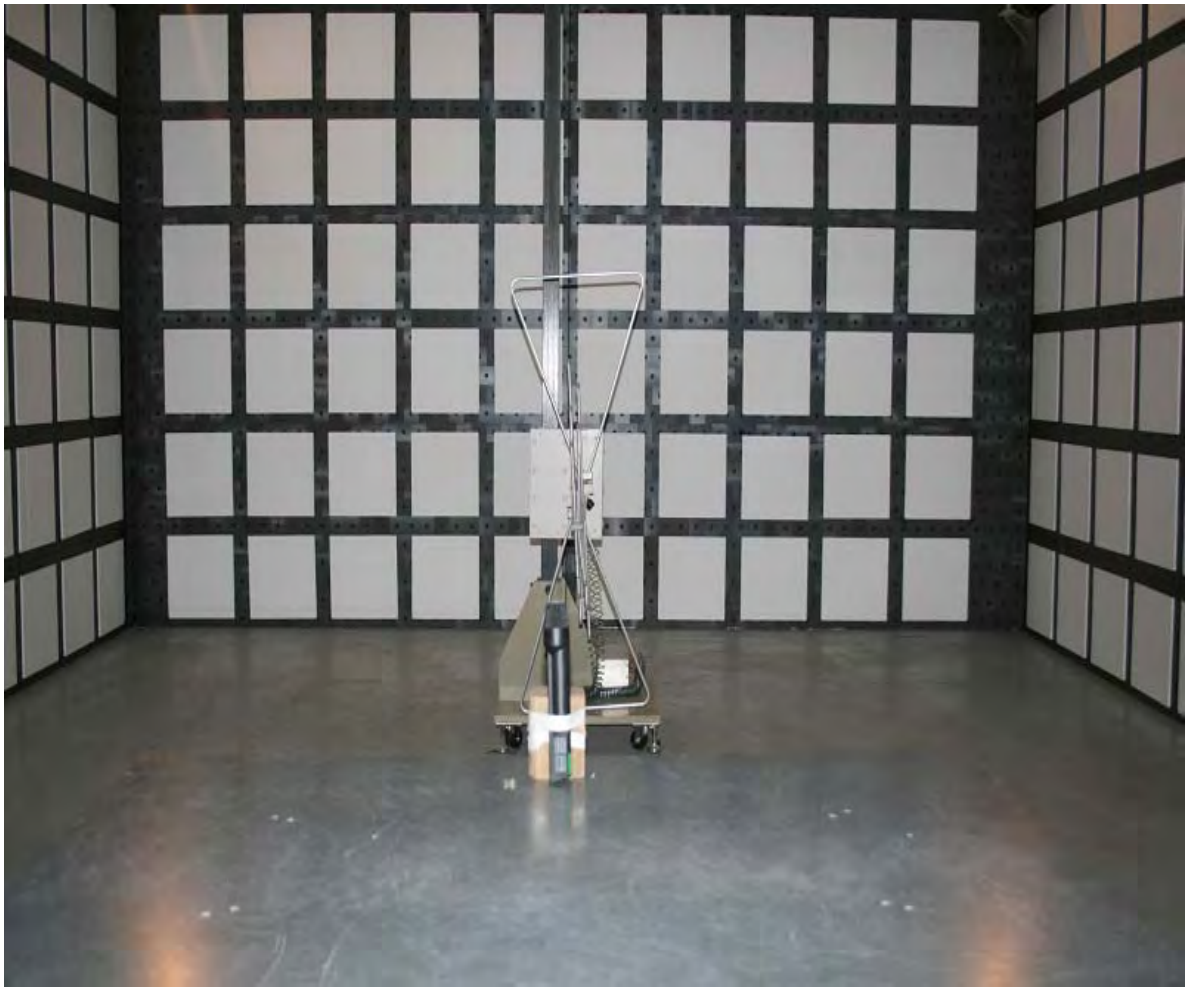
The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



7.0 Photo of testing

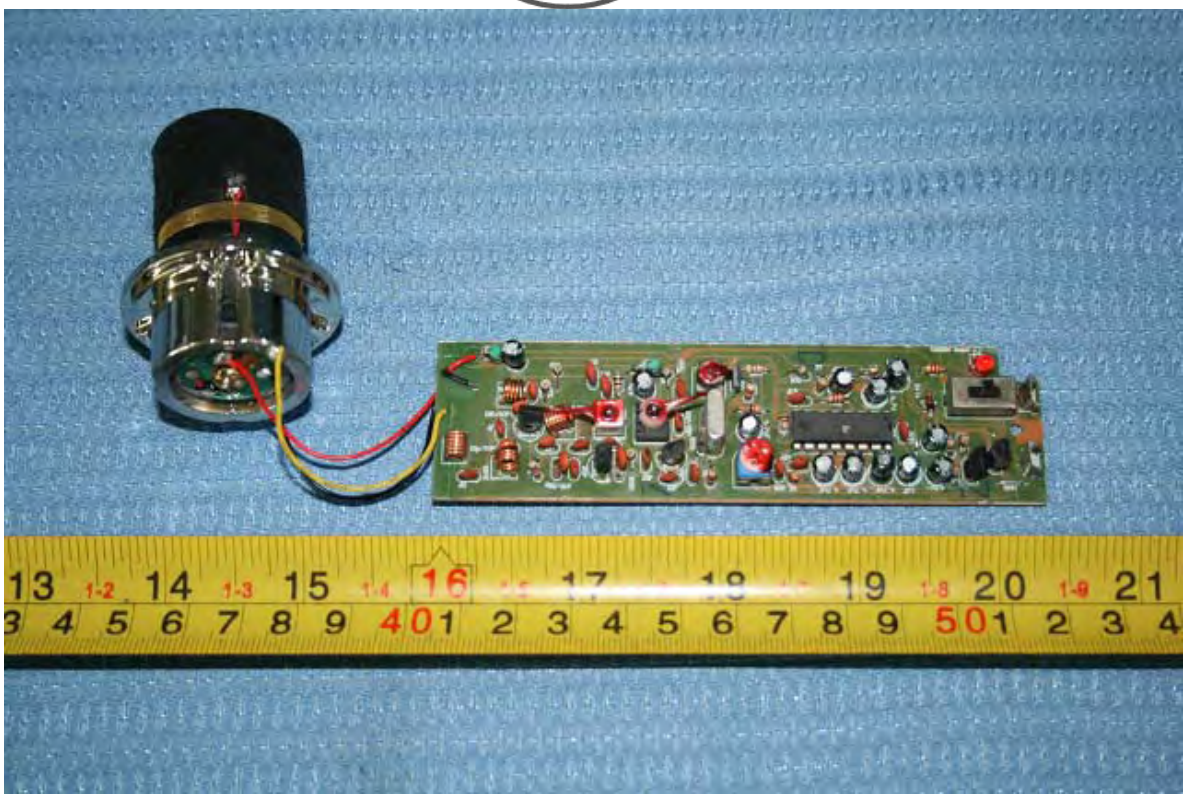
7.1 Radiated emission test view



7.2 Photo for the EUT-TX

Photo for the EUT-TX

Photo for the EUT-TX



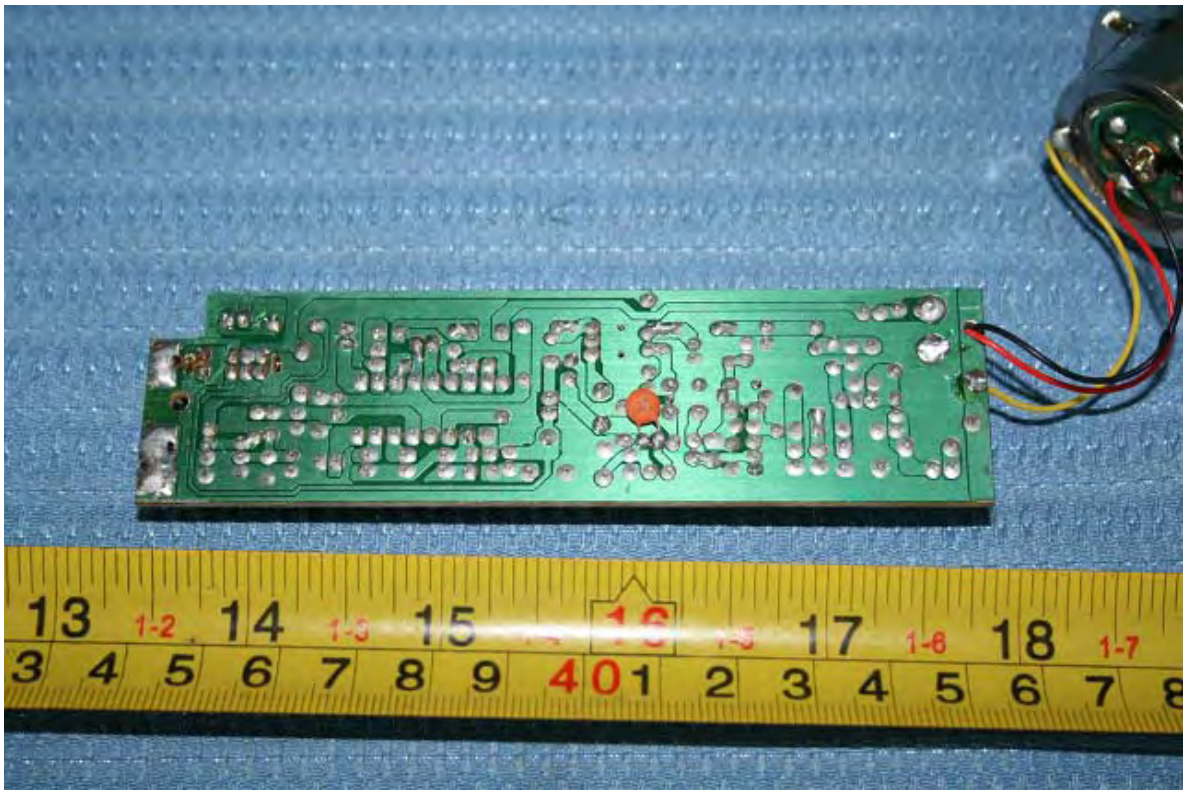
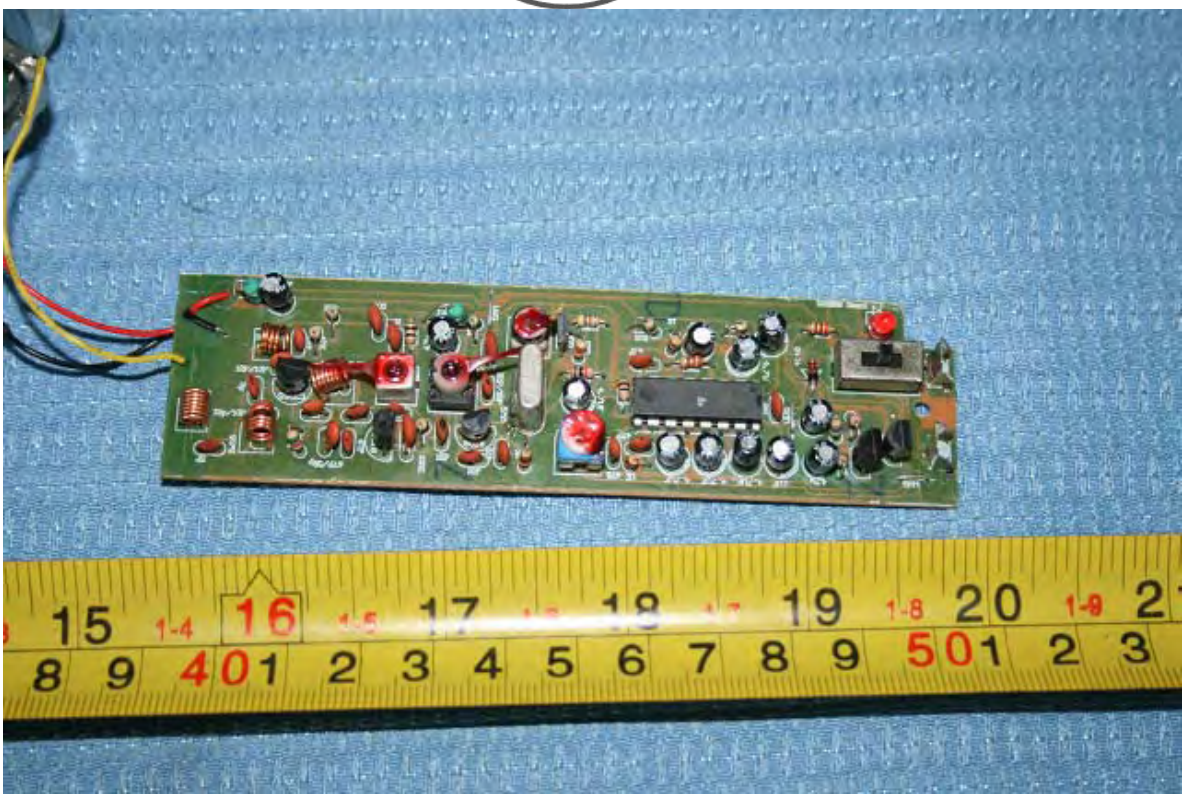


Photo for the EUT-TX



End of the report