



849 NW STATE ROAD 45
NEWBERRY, FL 32669 USA
PH: 888.472.2424 OR 352.472.5500
FAX: 352.472.2030
EMAIL: INFO@TIMCOENGR.COM
[HTTP://WWW.TIMCOENGR.COM](http://WWW.TIMCOENGR.COM)

TEST REPORT PER FCC PART 90 AND IC RSS-119

APPLICANT	CATTRON-THEIMEG INCORPORATED
	58 W. SHENANGO STREET SHARPSVILLE PA 16150-1198 USA
FCC ID	CN27700H
IC CERTIFICATION	1007A-7700H
MODEL NUMBER	7700H
PRODUCT DESCRIPTION	UHF TRANSCEIVER
DATE SAMPLE RECEIVED	November 6, 2008
DATE TESTED	November 25, 2008
TESTED BY	Nam Nguyen
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	2633AUT8TestReport.pdf
TEST RESULTS	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

**THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**



Certificate # 0955-01

TABLE OF CONTENTS

ATTESTATIONS	3
REPORT SUMMARY	4
TEST ENVIRONMENT AND TEST SETUP	4
TEST EQUIPMENT	5
DUT SPECIFICATION	6
TEST PROCEDURE	7
RF POWER OUTPUT	10
MODULATION CHARACTERISTICS	11
AUDIO FREQUENCY RESPONSE	12
AUDIO LOW PASS FILTER	13
AUDIO INPUT VERSUS MODULATION	14
OCCUPIED BANDWIDTH	15
SPURIOUS EMISSIONS AT ANTENNA TERMINALS CONDUCTED	18
FIELD STRENGTH OF SPURIOUS EMISSIONS	20
RECEIVER RADIATED SPURIOUS EMISSIONS	22
FREQUENCY STABILITY	23
TRANSIENT FREQUENCY BEHAVIOR	24

ATTESTATIONS

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.



Testing Certificate # 0955-01

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669

Authorized Signatory Name:

Mario de Aranzeta C.E.T.
Compliance Engineer/ Lab. Supervisor

Date: December 12, 2008

REPORT SUMMARY

Disclaimer	The test results relate only to the items tested.
Purpose of Test	To demonstrate the DUT in compliance with FCC CFR 47, Part 90 radiated spurious emissions requirements for UHF radios. To demonstrate the DUT in compliance with IC RSS-119 radiated spurious emissions requirements for UHF radios.
Test Standards	ANSI/TIA 603-C: 2004, FCC CFR 47 Part 90 ANSI C63.4: 2003, RSS-119, FCC Pt 15.109
Related Approval	Receiver verified.

TEST ENVIRONMENT AND TEST SETUP

Test Facility	RF output power and radiated emission were conducted by Timco Engineering Inc. located at 849 NW State Road 45, Newberry, FL 32669 USA
Laboratory Test Condition	The temperature was 26°C with a relative humidity of 50%.
Deviation from the standards	No deviation
Modification to the DUT	No modification was made.
Test Exercise (software etc.)	The DUT was placed in continuous transmitting mode of operation.
System Setup	Stand alone device.

TEST EQUIPMENT

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 12/7/07	12/7/09
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 12/7/07	12/7/09
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 12/8/07	12/8/09
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 12/8/07	12/8/09
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 4/29/07	4/29/09
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	CAL 12/29/06	12/29/08
Termaline Wattmeter	Bird Electronic Corporation	611	16405	CAL 7/16/07	7/16/09

DUT SPECIFICATION

DUT Description	UHF TRANSCEIVER
FCC ID	CN27700H
IC Certification	IC: 1007A-7700H
Model Number	7700H
Serial Number	N/A
Operating Frequency	450.00 – 470.00 MHz
Type of Emission	F1D
Modulation	FM
DUT Power Source	<input type="checkbox"/> 110–120Vac/50– 60Hz
	<input checked="" type="checkbox"/> DC Power (5.8V – 16.0V)
	<input type="checkbox"/> Battery Operated Exclusively
Test Item	<input type="checkbox"/> Prototype
	<input checked="" type="checkbox"/> Pre-Production
	<input type="checkbox"/> Production
Type of Equipment	<input checked="" type="checkbox"/> Fixed
	<input type="checkbox"/> Mobile
	<input type="checkbox"/> Portable

TEST PROCEDURE

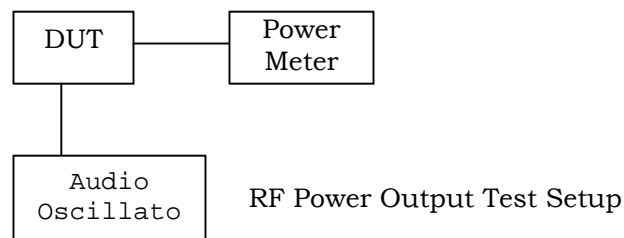
(As applicable)

Power Line Conducted Interference

The procedure used was ANSI 63.4-2003 using a 50uH LISN. Both lines were observed with the DUT transmitting. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

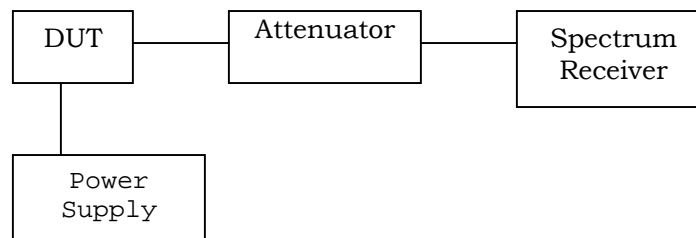
RF Power Output

The RF power output was measured at the antenna feed point using a peak power meter. A 50-ohm, resistive wattmeter was connected to the RF output connector. With a nominal battery voltage, and the transmitter properly adjusted the RF output measures:



Spurious Emissions At Antenna Terminals (Conducted)

The carrier was modulated 100%. The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz. The measurements were made in accordance with standard ANSI/TIA-603-C: 2004



Radiation Interference

The test procedure used was ANSI/TIA-603-C: 2004 and ANSI C63.4-2003 using an Agilent spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a micro volt at the output of the antenna.

Modulation Characteristic

Audio frequency response

The audio frequency response was measured in accordance with ANSI/TIA 603-C: 2004.

Audio Low Pass Filter

The audio low pass filter for voice-modulated equipment was measured in accordance with ANSI/TIA 603-C: 2004.

Audio Input versus modulation

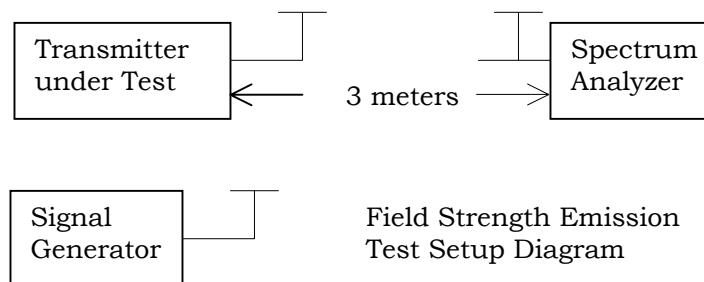
The audio input level needed for a particular percentage of modulation was measured in accordance with ANSI/TIA 603-C: 2004. Curves are provided for audio input frequencies of 300, 1000, and 3000 Hz.

Frequency Stability

The frequency stability was measured per ANSI/TIA 603-C: 2004.

Field Strength of Spurious Emissions

The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. This test was conducted per ANSI/TIA 603-C: 2004 using the substitution method.

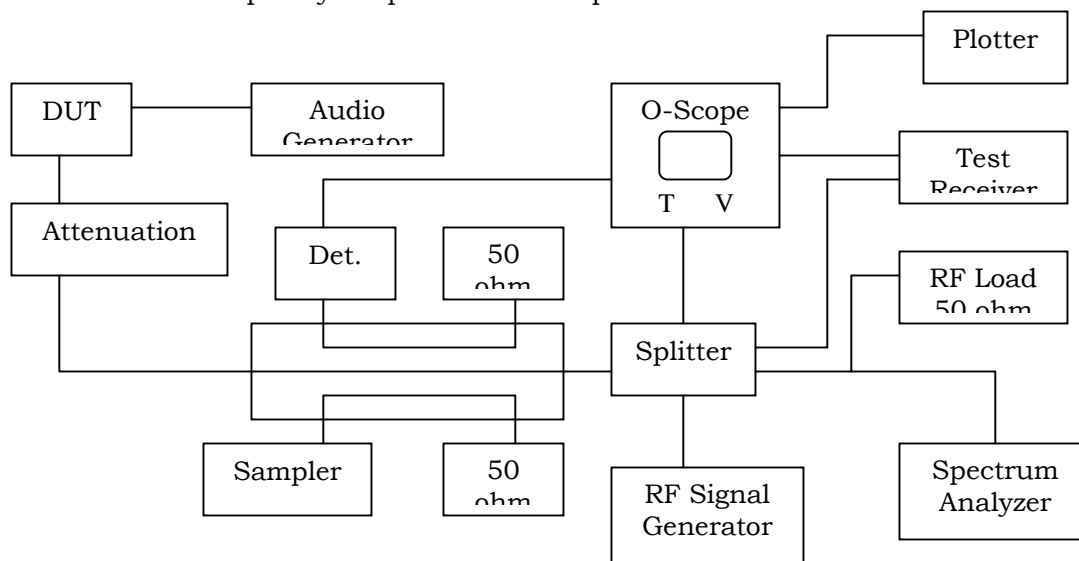


Transient Frequency Behavior

The test procedure was ANSI/TIA 603-C: 2004 Para 2.2.19.

- Using the variable attenuator. The transmitter level was set to 40 dB below the test receivers maximum input level,
- Then the transmitter was turned off.
- With the transmitter off the signal generator was set 20dB below the level of the transmitter in the above step, this level will be maintained with the signal generator through-out the test.
- Reduce the attenuation between the transmitter and the RF detector by 30 dB.
- With the levels set as above the transient frequency behavior was observed & recorded.

Transient Frequency Response Test setup



RF POWER OUTPUT

Rule Part No.: FCC Part 2.1046(a), IC RSS-119 4.1 and 5.4, RSS-GEN 4.8

Test Requirements: FCC Part 2.1046(a), IC RSS-119 4.1 and 5.4, RSS-GEN 4.8

Test Data:

OUTPUT POWER: HIGH – 0.50W
LOW – 0.01W

Part 2.1033 (C)(8) DC Input into the final amplifier

FOR LOW POWER SETTING INPUT POWER: $(12.0V)(0.14A) = 1.68$ Watts

FOR HIGH POWER SETTING INPUT POWER: $(12.0V)(0.52A) = 6.24$ Watts

MODULATION CHARACTERISTICS

Part 2.1033(c)

Part 2.1033(c) (4) Type of Emission: 11K2F1D ,

FCC Part 90.209, IC RSS-119 5.5

FCC Part 90.207

Type of Emission: 11K2F1D

$$B_n = 2M + 2DK$$

$$M = B/2 = 4000/2 = 2000$$

$$D = 3600$$

$$K=1$$

$$B_n = 2(2000) + 2(3600) = 11.2k$$

AUDIO FREQUENCY RESPONSE

Rule Part No.: FCC Part 2.1047(a)(b), IC RSS-119 5.2

Test Requirements: FCC Part 2.1047(a)(b), IC RSS-119 5.2

AUDIO FREQUENCY RESPONSE PLOT

N/A

AUDIO LOW PASS FILTER

VOICE MODULATED COMMUNICATION EQUIPMENT

Part 2.1047(a) Voice modulated communication equipment: For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all the circuitry installed between the modulation limiter and the modulated stage shall be submitted.

AUDIO LOW PASS FILTER

N/A

AUDIO INPUT VERSUS MODULATION

Rule Part No.: FCC Part 2.1047(b) & 90, IC RSS-119 5.2

Test Requirements: FCC Part 2.1047(b) & 90, IC RSS-119 5.2

Test data:

Modulation Limiting Plot

N/A

OCCUPIED BANDWIDTH

Rule Part No.: FCC Part 2.1049(c), RSS-GEN 4.6

Requirements:

FCC Part 90.210(b) RSS-119 4.2 25kHz Channel Spacing

Data in the plots show that on any frequency removed from the assigned frequency by more than 50%, but not more than 100%: At least 25dB. On any frequency removed from the assigned frequency by more than 100%, but not more than 250%: At least 35 dB. On any frequency removed from the assigned frequency by more than 250%, of the authorized bandwidth: At least $43 + 10\log(P)$ dB.

Part 90.210(c) 12.5kHz Channel Spacing Not Equipped with a Low Pass Filter

For transmitters that are not equipped with an audio low pass filter pursuant to S90.211 (b), the power of any emission must be attenuated below the un-modulated carrier output power as follows; (1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5 kHz but not more than 10 kHz: At least $83 \log(f_d/5)$ dB; (2) ON any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 10 kHz, but not more than 250% of the authorized bandwidth: At least $29 \log(f_d^2/11)$ dB or 50 dB, whichever is the lesser attenuation; (3) On any frequency removed from the center of the authorized bandwidth by more than 250% of the authorized bandwidth: At least $43+10 \log(P_o)$ dB.

Part 90.210(d) Emission Mask D - 12.5 kHz channel BW equipment

For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- (1) On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 : Zero dB.
- (2) On any frequency from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least $7.27 (f_d - 2.88 \text{ kHz})$ dB.
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10\log(P)$ dB or 70 dB, whichever is the lesser attenuation.

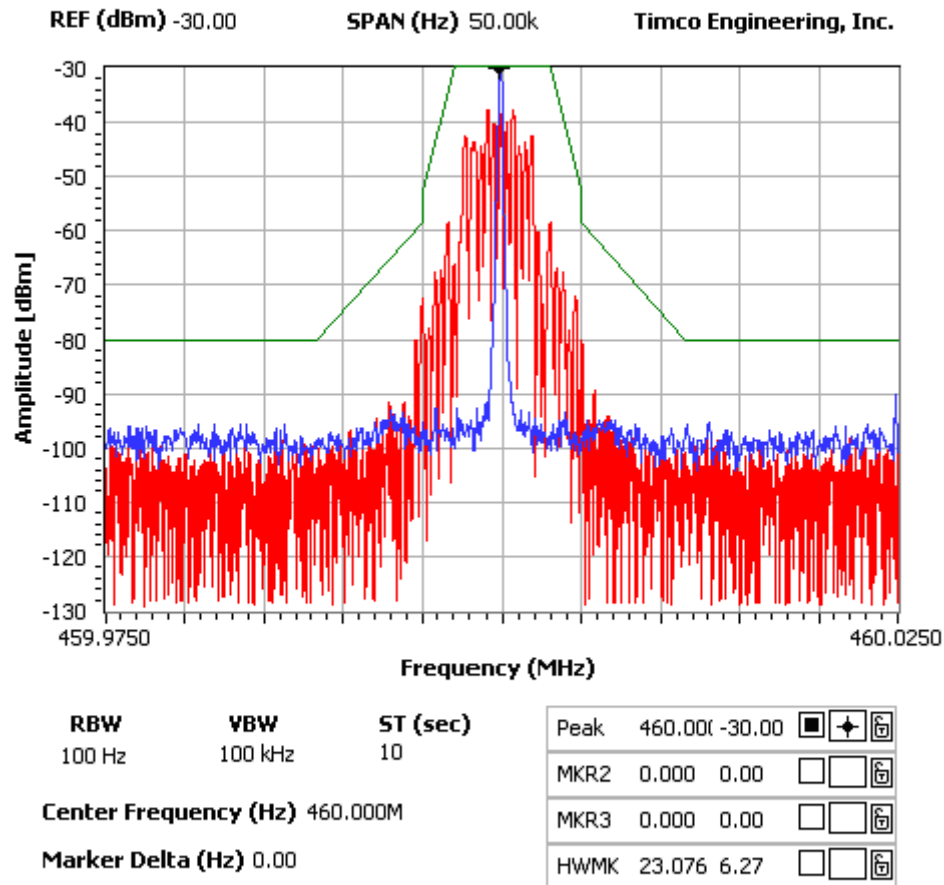
Test Data: See the plots below

Mask C

NOTES:

CATTRON-THEIMEG INCORPORATED - FCC ID: CN27700H
OCCUPIED BANDWIDTH PLOT

FCC 90.210 Mask C

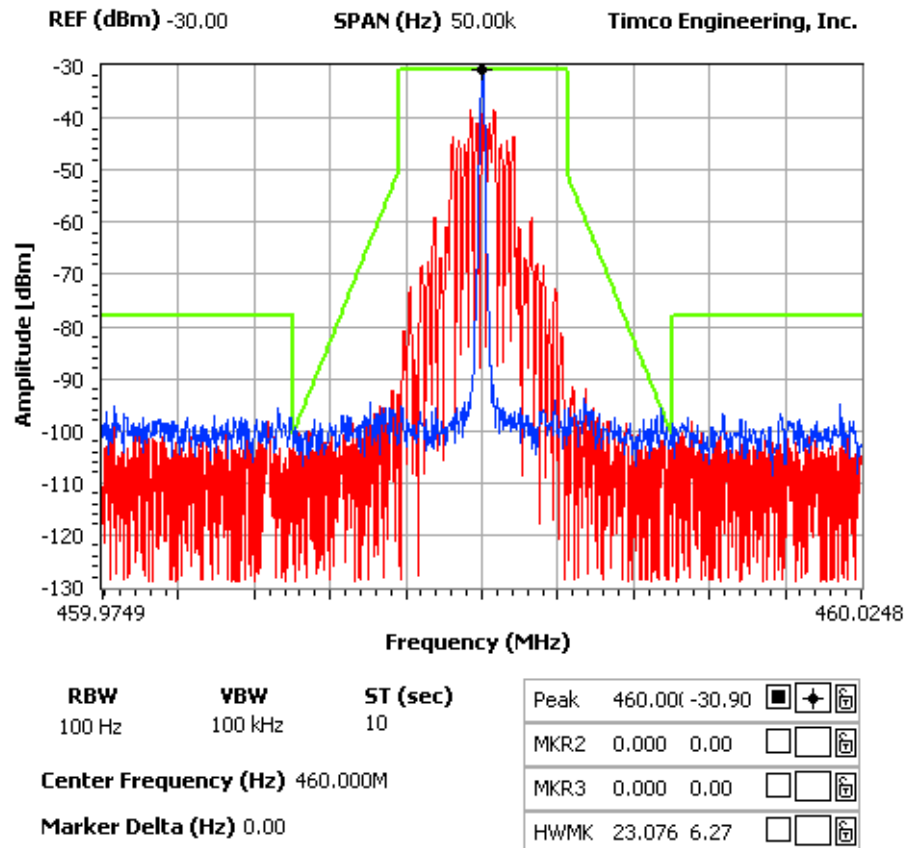


Applicant: CATTRON-THEIMEG INCORPORATED
FCC ID: CN27700H
IC CERT #: 1007A-7700H
Report: C\CATTRON\2633AUT8\2633AUT8TestReport.doc

Mask D

NOTES:

CATTRON-THEIMEG INCORPORATED - FCC ID: CN27700H
OCCUPIED BANDWIDTH PLOT



SPURIOUS EMISSIONS AT ANTENNA TERMINALS CONDUCTED

Rule Part No.: FCC Part 2.1051(a), RSS-GEN 7.1.4

Requirements: 12.5kHz Channel Spacing = $50 + 10\log(P_o) = 47\text{dBc}$ (for 0.5 Watts)

Test Data:

TF HIGH POWER	EF	dB below carrier		TF LOW POWER	EF	dB below carrier
450.00	900.00	83.6		450.00	900.00	86.5
	1350.00	100.5			1350.00	NF
	1800.00	101.2			1800.00	NF
	2250.00	98.3			2250.00	NF
	2700.00	95.8			2700.00	NF
	3150.00	92.5			3150.00	NF
	3600.00	NF			3600.00	NF
	4050.00	NF			4050.00	NF
	4500.00	NF			4500.00	NF

TF HIGH POWER	EF	dB below carrier		TF LOW POWER	EF	dB below carrier
460.00	920.00	78.1		460.00	920.00	87.9
	1380.00	99.2			1380.00	NF
	1840.00	100.3			1840.00	NF
	2300.00	98.4			2300.00	NF
	2760.00	94.9			2760.00	NF
	3220.00	95.3			3220.00	NF
	3680.00	NF			3680.00	NF
	4140.00	NF			4140.00	NF
	4600.00	NF			4600.00	NF

TF HIGH POWER	EF	dB below carrier		TF LOW POWER	EF	dB below carrier
470.00	940.00	76.1		470.00	940.00	90
	1410.00	99.2			1410.00	NF
	1880.00	99.5			1880.00	NF
	2350.00	99.4			2350.00	NF
	2820.00	101.5			2820.00	NF
	3290.00	101.4			3290.00	NF
	3760.00	NF			3760.00	NF
	4230.00	NF			4230.00	NF
	4700.00	NF			4700.00	NF

FIELD STRENGTH OF SPURIOUS EMISSIONS

Rule Parts. No.: FCC Part 2.1053, RSS-GEN 4.9

Requirements: The FCC limits for radiated emissions are the same as previously stated the conducted emissions.

Test Data:

High Power			Low Power		
Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)	Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)
450.00	0	0.00	460.00	0	0.00
925.40	H	59.75	920.00	H	69.89
1388.20	H	62.57	1380.00	H	70.96
1850.90	H	67.91	1840.00	H	69.49
2313.60	H	61.43	2300.00	H	NF
2776.40	H	57.34	2760.00	H	NF
3239.00	H	59.86	3220.00	H	65.81
3701.80	H	76.03	3680.00	H	NF
4164.50	H	70.97	4140.00	H	63.97
4627.20	H	72.70	4600.00	H	NF

High Power			Low Power		
Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)	Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)
460.00	0	0.00	460.00	0	0.00
920.00	H	58.29	920.00	H	69.89
1380.00	H	69.56	1380.00	H	70.96
1840.00	H	71.09	1840.00	H	69.49
2300.00	H	68.09	2300.00	H	NF
2760.00	H	64.50	2760.00	H	NF
3220.00	H	66.61	3220.00	H	65.81
3680.00	H	75.23	3680.00	H	NF
4140.00	H	68.07	4140.00	H	63.97
4600.00	H	78.94	4600.00	H	NF

High Power			Low Power		
Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)	Emission Frequency MHz	Ant. Polarity V/H	dB Below Carrier (dBc)
470.00	0	0.00	470.00	0	0.00
940.00	H	61.03	940.00	H	71.33
1410.00	H	69.74	1410.00	H	72.24
1880.00	H	67.66	1880.00	H	68.56
2350.00	H	62.06	2350.00	H	72.36
2820.00	H	63.76	2820.00	H	70.56
3290.00	H	67.37	3290.00	H	67.37
3760.00	H	75.93	3760.00	H	NF
4230.00	H	68.78	4230.00	H	65.18
4700.00	H	70.48	4700.00	H	NF

RECEIVER RADIATED SPURIOUS EMISSIONS

This section is reserved for IC submission.

Rule Parts. No.: FCC Part 15.109, RSS-GEN 4.10, 6

Requirements:	30-88 MHz	40.0 dB μ V/m measured at 3 meters
	88-216 MHz	43.5 dB μ V/m
	216-960 MHz	46.0 dB μ V/m
	ABOVE 960 MHz	54.0 dB μ V/m

Test Data: THERE IS NO EMISSION FOUND IN RECEIVER MODE.

FREQUENCY STABILITY

Rule Parts. No.: FCC Part 2.1055, Part 90.213, RSS-119 5.3, RSS-GEN 7.2.4

Requirements: Temperature range requirements: -30 to +50° C.
Voltage Variation +, -15%
±1.5 PPM

Test Data:

Assigned Frequency (Ref. Frequency) (MHz)		459.999932
Temperature (°C)	Frequency (MHz)	Frequency Stability (PPM)
-30	460.000551	1.35
-20	460.000176	0.53
-10	459.999896	-0.08
0	459.999796	-0.30
+10	459.999694	-0.52
+20	459.999811	-0.26
+30	459.999756	-0.38
+40	459.999735	-0.43
+50	459.999731	-0.44

Assigned Frequency (Ref. Frequency) (MHz)		459.999932
% Battery (%)	Frequency (MHz)	Frequency Stability (PPM)
-15%	459.999815	-0.25
	459.999932	0
+15%	459.999803	-0.28

TRANSIENT FREQUENCY BEHAVIOR

Rule Part No.: FCC Part 2.1055(a)(1) FCC Part 90.214, IC RSS-119 5.8

Test Requirements: Transmitters designed to operate in the 150-174 MHz and 421-512 MHz frequency bands must maintain transient frequencies within the maximum transient frequencies within the maximum frequency difference limits during the time intervals indicated:

Time Intervals	Maximum frequency difference	All Equipment	
		150-174 MHz	421-512 MHz

Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels

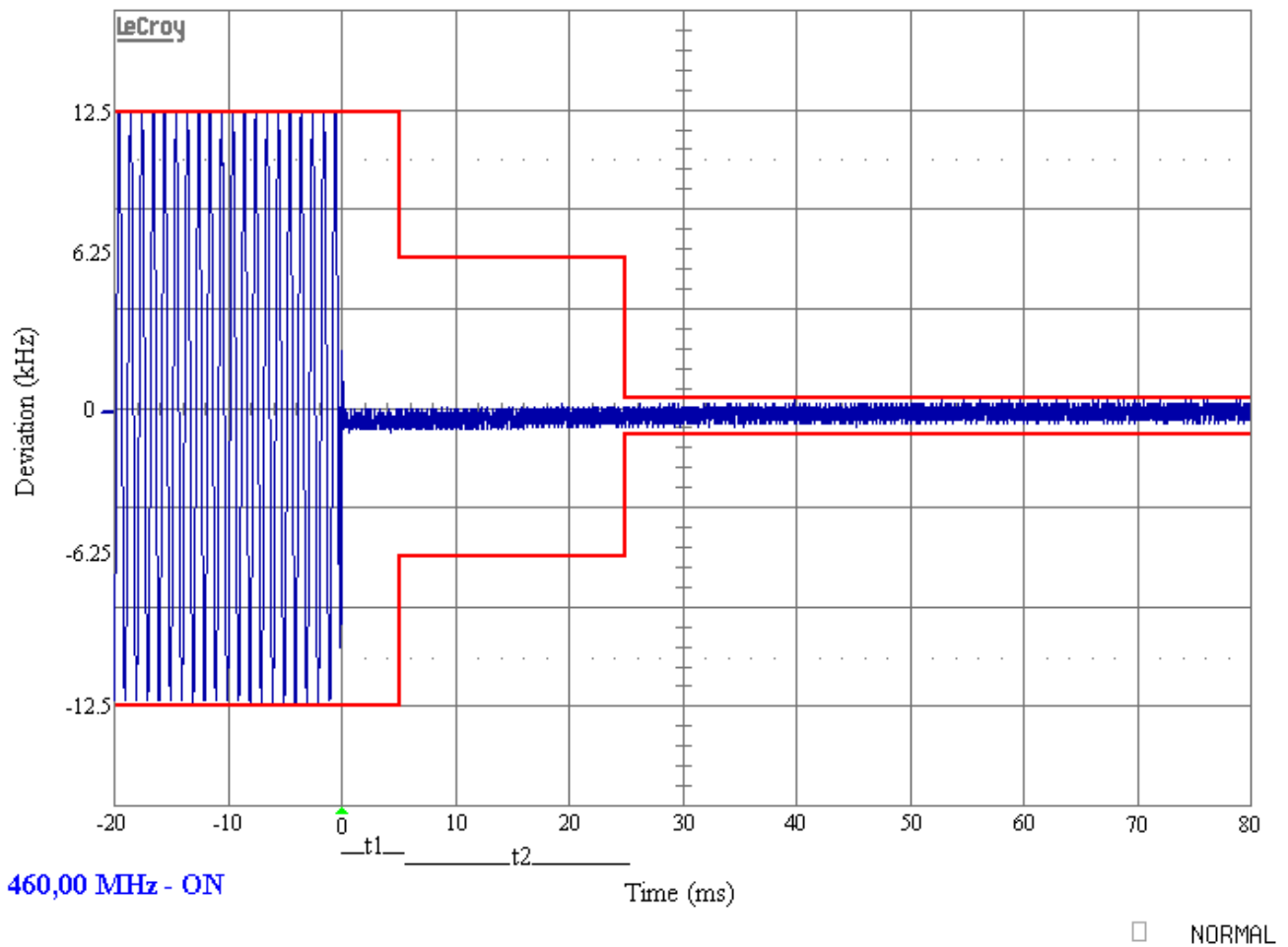
t_1^4	± 25.0 kHz	5.0 ms	10.0 ms
t_2	± 12.5 kHz	20.0 ms	25.0 ms
t_3^4	± 25.0 kHz	5.0 ms	10.0 ms

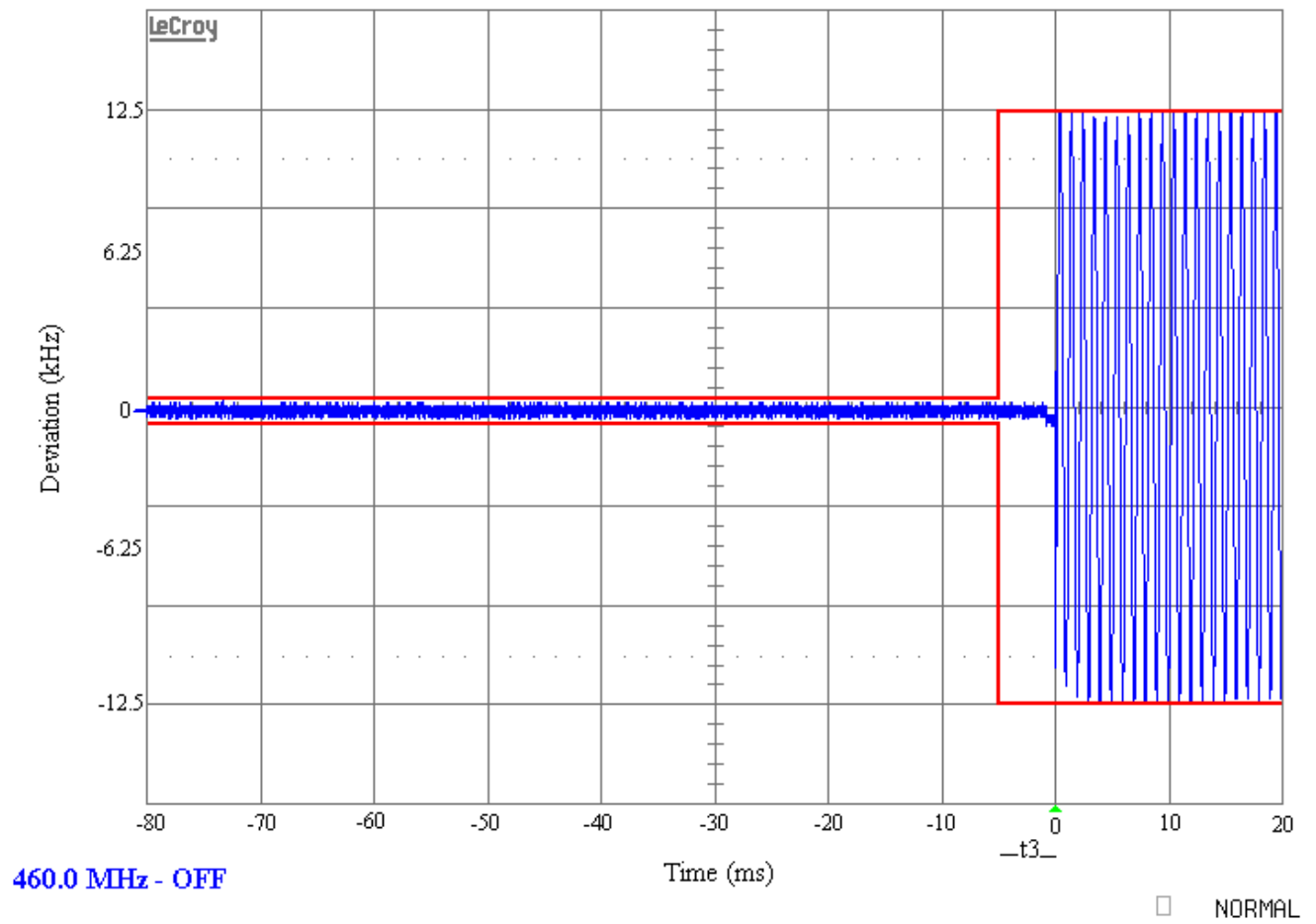
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels

t_1^4	± 12.5 kHz	5.0 ms	10.0 ms
t_2	± 6.25 kHz	20.0 ms	25.0 ms
t_3^4	± 12.5 kHz	5.0 ms	10.0 ms

Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels

t_1^4	± 6.25 kHz	5.0 ms	10.0 ms
t_2	± 3.125 kHz	20.0 ms	25.0 ms
t_3^4	± 6.25 kHz	5.0 ms	10.0 ms





TEST PROCEDURE: ANSI/TIA 603-C:2004 PARA 2.2.19

1. Using the variable attenuator the transmitter level was set to 40 dB below the test receivers maximum input level, then the transmitter was turned off.
2. With the transmitter off the signal generator was set 20dB below the level of the transmitter in the above step, this level will be maintained with the signal generator through-out the test.
3. Reduce the attenuation between the transmitter and the RF detector by 30 dB. With the levels set as above the transient frequency behavior was observed & recorded.

