APPLICATION FOR CERTIFICATION
On Behalf of

Linear Electronics Manufactory

GTO TX

Model Number: RB741

Prepared for : Linear Electronics Manufactory
Hourui Second Industrial Zone Hourui Village Xixiang Bao
An County Shenzhen

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
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Report Number	:	ACS-F07115
Date of Test	:	Feb.21~Mar.16, 2007
Date of Report	:	Apr.10, 2007

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TEST REPORT DECLARATION

Applicant	:	Linear Electronics Manufactory
Manufacturer	:	Linear Electronics Manufactory
EUT Description	:	GTO TX
		(A) MODEL NO. : RB741
		(B) SERIAL NO. : N/A
		(C) POWER SUPPLY : Battery 12V

Test Procedure Used:

FCC Rules and Regulations Part 15 Subpart C 2006

The device described above is tested by Audix Technology (Shenzhen) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits for radiated and conducted emissions.
The test results are contained in this test report and Audix Technology (Shenzhen) Co., Ltd. is assumed full responsibility for the accuracy and completeness of tests. Also, this report shows that EUT is technically compliant with FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shenzhen) Co., Ltd.

This report must not be used by the applicant to claim product endorsement by NVLAP or any agency of the U.S. Government.

Date of Test : Feb.21~Mar.16, 2007

Prepared by : YoYo Wang
YoYo Wang / Assistant

Reviewer : Iceman Hu
Iceman Hu / Senior Engineer

Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章
Stamp only for EMC Dept. Report

Approved & Authorized Signer : Signature:
Sean Xing / Assistant Manager

Name of the Representative of the Responsible Party : _____

Signature : _____

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

Description of Test Item	Standard	Results
Radiated Emission Test	FCC Part 15: 15.231	PASS
Stop Transmitting Time Test	FCC Part 15: 15.231	PASS
20 dB Bandwidth Test	FCC Part 15: 15.231	PASS

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description	:	GTO TX
Model Number	:	RB741
Applicant	:	Linear Electronics Manufactory Hourui Second Industrial Zone Hourui Village Xixiang Bao An County Shenzhen
Manufacturer	:	Linear Electronics Manufactory Hourui Second Industrial Zone Hourui Village Xixiang Bao An County Shenzhen
Date of Test	:	Feb.21~Mar.16, 2007

2.2. Test Facility

Site Description

3m Anechoic Chamber : Jun. 13, 2006 File on Federal Communication Commission
Registration Number: 90454

3m & 10m Anechoic Chamber : Jan.31, 2007 File on Federal Communication Commission
Registration Number: 794232

EMC Lab. : Accredited by DATech, German
Registration Number: DAT-P-091/99-01
Feb. 02, 2004

Accredited by NVLAP, USA
NVLAP Code: 200372-0
Apr.01, 2006

2.3. Measurement Uncertainty

No.	Item	Uncertainty	Remark
1.	Uncertainty for Conducted Emission Test	1.22dB	
2.	Uncertainty for Radiated Emission Test	3.14dB	3m Chamber
3.	Uncertainty for Radiated Emission Test	3.18dB	10m Chamber
4.	Uncertainty for Power Clamp Test	1.38dB	

3. POWER LINE CONDUCTED EMISSION TEST

According to Paragraph (f) of FCC Part 15 section 15.231, Tests to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

4. RADIATED EMISSION TEST

4.1. Test Equipment

The following test equipments are used during the radiated emission Test：

4.1.1. For Anechoic Chamber

Frequency rang: 30~1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Spectrum	HP	85422E	3625A00181	May 15, 06	1 Year
2.	Test Receiver	Rohde & Schwarz	ESVS20	830350/005	May 15, 06	1 Year
3.	Amplifier	HP	8447D	2944A07794	Mar.12, 07	1/2 Year
4.	Bilog Antenna	Schaffner	CBL6111C	2598	Feb.22, 07	1 Year
5.	RF Cable	MIYAZAKI	5D-2W	3# Chamber No.1	Jan. 18, 07	1/2 Year
6.	RF Cable	MIYAZAKI	5D-2W	3# Chamber No.2	Jan. 18,07	1/2 Year
7.	RF Cable	FUJIKURAw	RG-55/U	3# Chamber No.3	Jan. 18,07	1/2 Year
8.	RF Cable	FUJIKURA	RG-55/U	3# Chamber No.4	Jan. 18,07	1/2 Year
9.	Coaxial Switch	Anritsu	MP59B	M73989	Jan. 18,07	1/2 Year

Frequency rang: above 1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4407B	MY41440292	May 15, 06	1 Year
2.	Amp	HP	8449B	3008A00863	May 15, 06	1 Year
3.	Horn Antenna	EMCO	3115	9607-4877	Jan.23, 07	1.5 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May 15, 06	1 Year

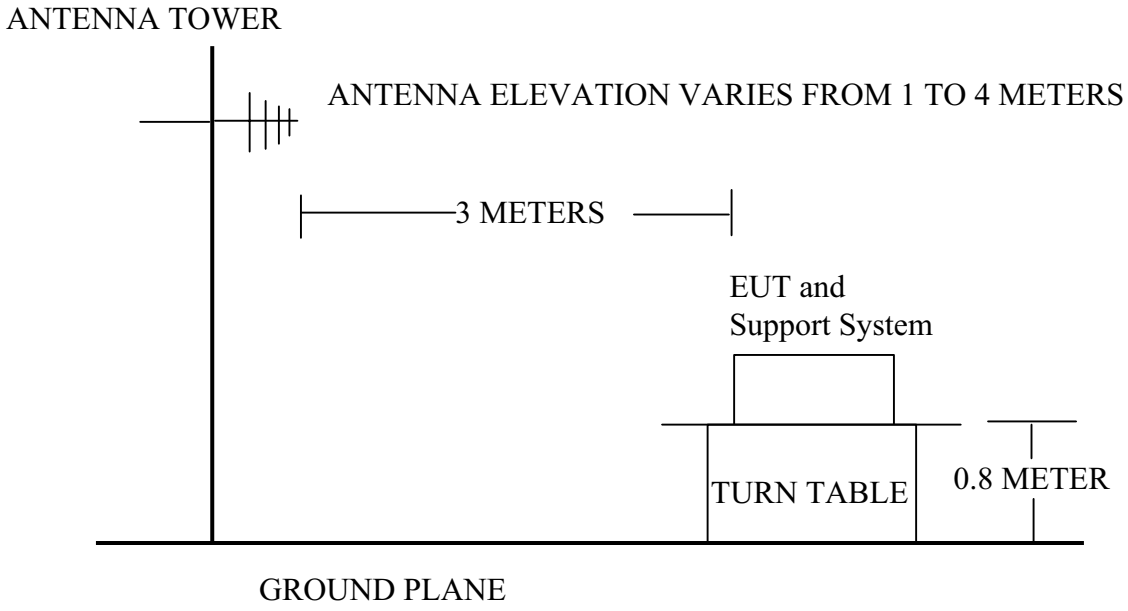
4.2. Block Diagram of Test Setup

4.2.1. Block Diagram of connection between EUT and simulators

EUT

(EUT: GTO TX)

4.2.2. Anechoic Chamber Setup Diagram



4.3. Radiated Emission Limit Standard: FCC Part 15C

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Local Oscillator:	3	95.80 dB(μV)/m (Peak) 75.80 dB(μV)/m (Average)	
Above 1000	3	Other: 74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark： (1) Emission level dBμV = 20 log Emission level μV/m
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

4.4. EUT Configuration on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.4.1. GTO TX (EUT)

Model Number	:	RB741
Serial Number	:	N/A
Manufacturer	:	Linear Electronics Manufactory

4.5. Operating Condition of EUT

4.5.1. Setup the EUT as shown in Section 4.2..

4.5.2. Let the EUT work in test modes (TX) and test it.

4.6. Test Procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to FCC PART 15C on radiated emission Test.

This test was performed with EUT in horizontal position and vertical position, the highest emission levels was found when the EUT in a horizontal position as show in test photo. And this position was made for final emission test.

The bandwidth of the EMI test receiver (R&S ESVS20) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the VBW is set at 300kHz and RBW is set at 120kHz for measurement below 1GHz.

The frequency range from 30MHz to 1000MHz and above 1000MHz are checked.

The test modes (TX Mode) is tested in Anechoic Chamber and all the scanning waveforms are reported on Section 4.7.

4.7. Radiated Emission Test Results

PASS.

The frequency range from 30MHz to 1000MHz and above 1GHz. is investigated. Please see the following pages.

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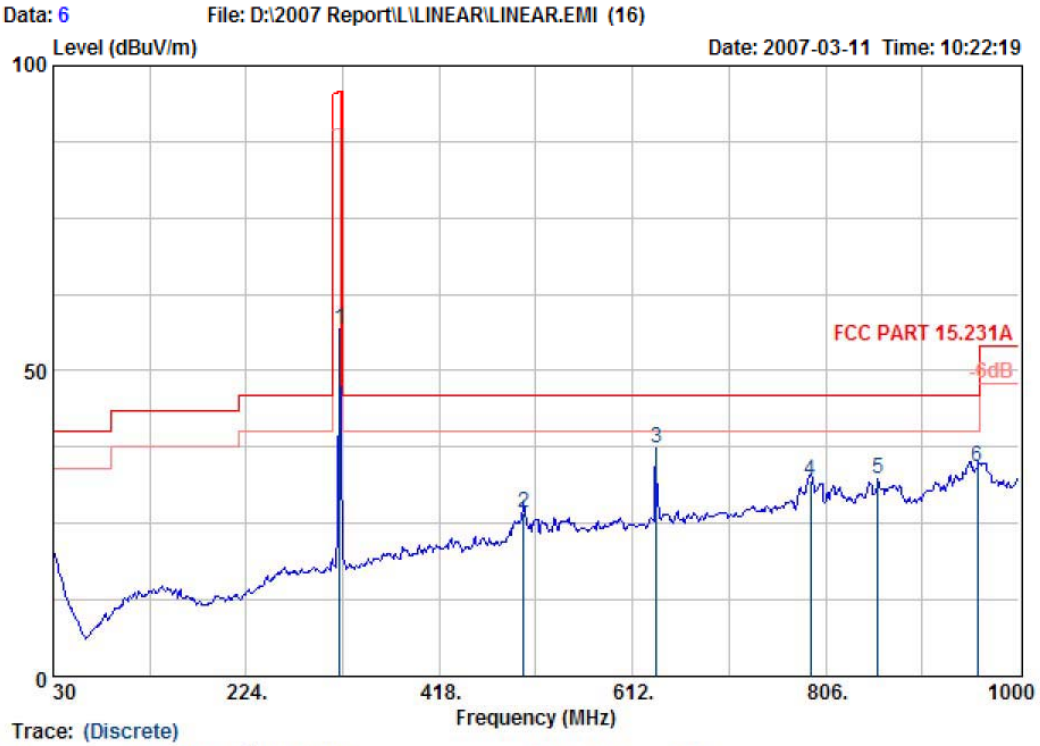

Site no. : Audix 3# Chamber
Dis. / Ant. : 3m 2597 3M FACTOR
Limit : FCC PART 15.231A
Env. / Ins. : 25*C/55% ESVS20
EUT : GTO TX M/N:RB741
Power Rating : Battery 12V
Test Mode : TX Mode

Data no. : 6
Ant. pol. : HORIZONTAL
Engineer : Jamy

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	317.96	14.12	4.27	38.47	56.86	95.80	38.94	Peak
2	502.39	17.94	5.33	3.38	26.65	46.00	19.35	QP
3	635.91	20.28	6.03	11.15	37.46	46.00	8.54	Peak
4	790.48	21.90	7.10	3.02	32.02	46.00	13.98	QP
5	858.38	22.96	7.29	2.17	32.42	46.00	13.58	QP
6	958.29	24.30	8.10	1.94	34.34	46.00	11.66	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Fundamental and Harmonics Average Result					
Freq(MHz)	Peak Level (dBμV/m)	PDCF(dBμV/m) (see Section 7)	Average Level (dBμV/m)	Limit(dBμV/m) (average)	Conclusion
317.96	56.86	-3.9	52.96	75.80	PASS
635.91	37.46	-3.9	33.56	55.80	PASS

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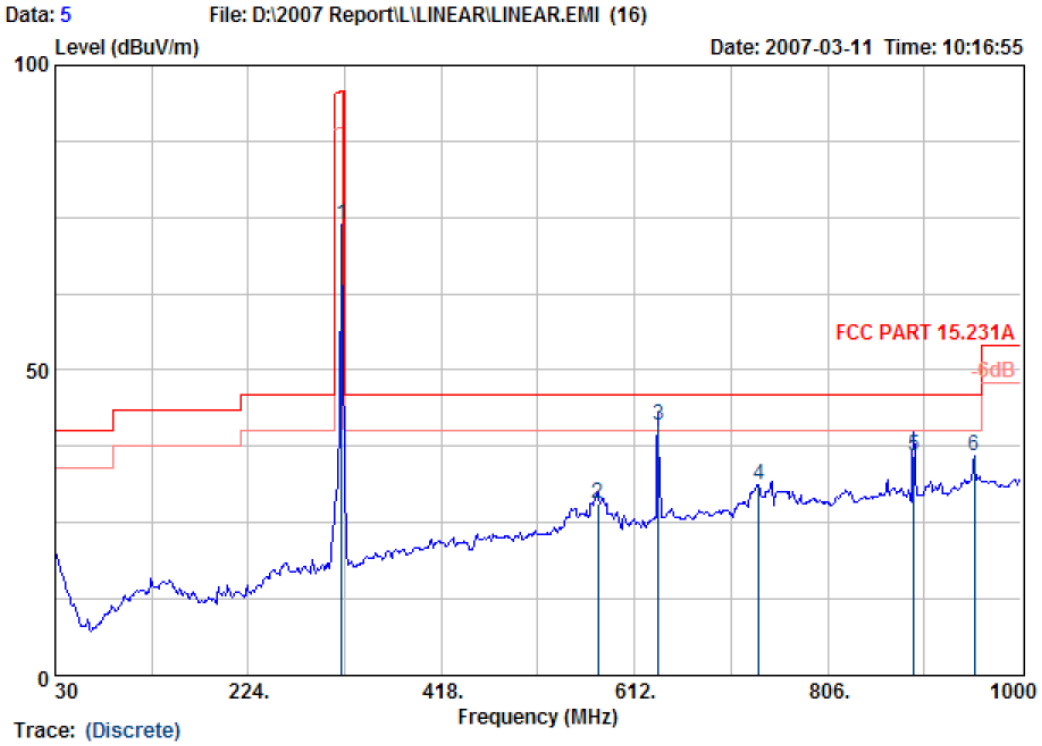

Site no. : Audix 3# Chamber Data no. : 5
Dis. / Ant. : 3m 2597 3M FACTOR Ant. pol. : VERTICAL
Limit : FCC PART 15.231A
Env. / Ins. : 25*C/55% ESVS20 Engineer : Jamy
EUT : GTO TX M/N:RB741
Power Rating : Battery 12V
Test Mode : TX Mode

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	317.95	14.12	4.27	55.50	73.89	95.80	21.91	Peak
2	575.14	19.60	5.97	2.53	28.10	46.00	17.90	QP
3	635.90	20.28	6.03	14.57	40.88	46.00	5.12	Peak
4	737.13	21.48	6.97	2.72	31.17	46.00	14.83	QP
5	892.33	22.74	7.34	5.89	35.97	46.00	10.03	QP
6	953.80	24.27	8.13	3.58	35.98	46.00	10.02	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Fundamental and Harmonics Average Result					
Freq(MHz)	Peak Level (dBμV/m)	PDCF(dBμV/m) (see Section 7)	Average Level (dBμV/m)	Limit(dBμV/m) (average)	Conclusion
317.95	73.89	-3.9	69.99	75.80	PASS
635.90	40.88	-3.9	36.98	55.80	PASS

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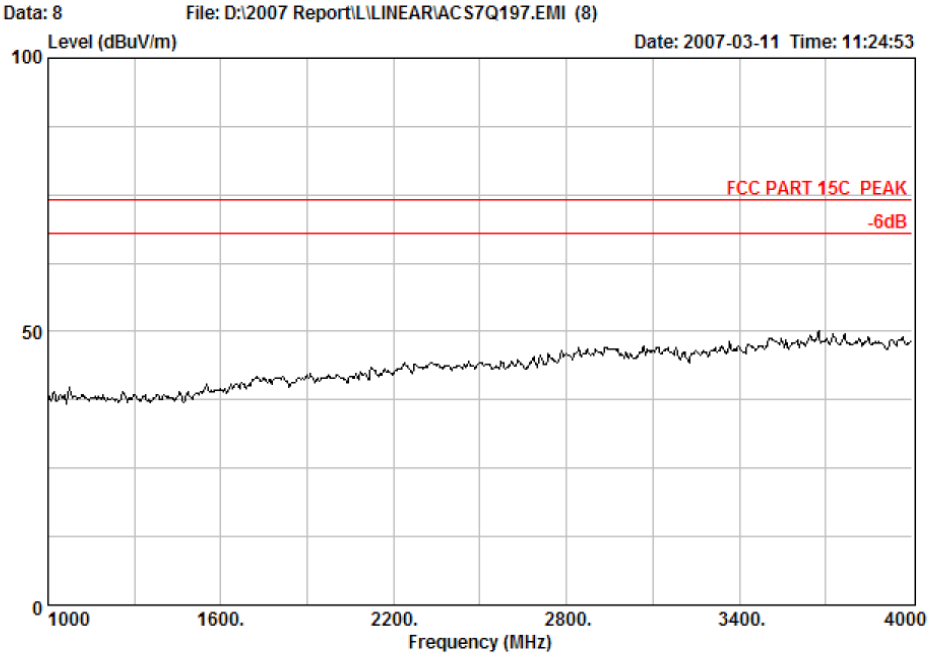
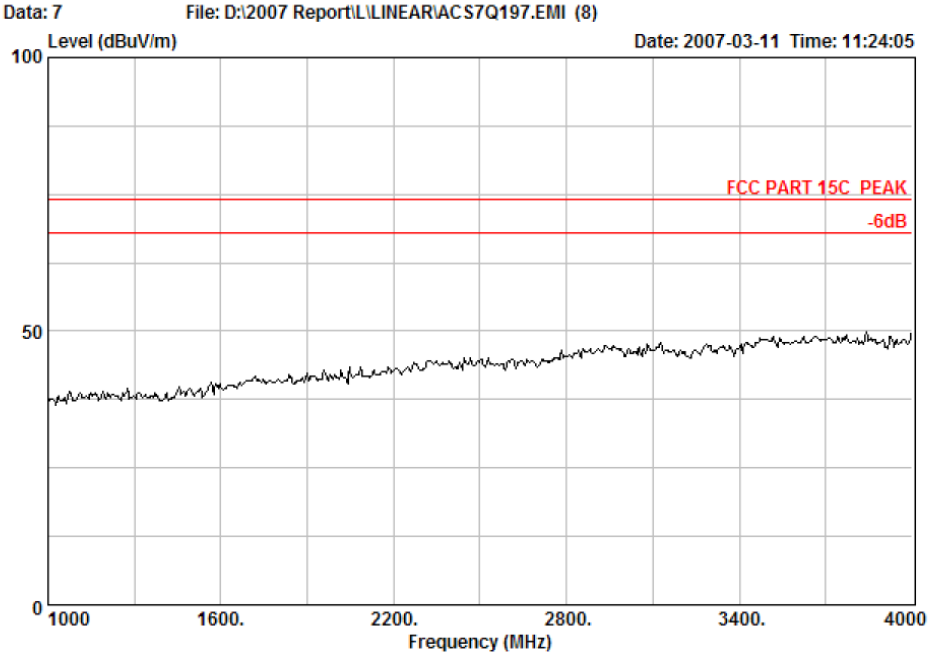


Site no. : Audix No.1 Chamber
Dis. / Ant. : 3m 3115 FACTOR
Limit : FCC PART 15C PEAK
Env. / Ins. : 23*C/54%
EUT : GTO TX M/N:RB741
Power Rating : Battery 12V
Test Mode : TX Mode

Data no. : 8
Ant. pol. : HORIZONTAL
Engineer : Jamy



Site no. : Audix No.1 Chamber
Dis. / Ant. : 3m 3115 FACTOR
Limit : FCC PART 15C PEAK
Env. / Ins. : 23*C/54%
EUT : GTO TX M/N:RB741
Power Rating : Battery 12V
Test Mode : TX Mode

Data no. : 7
Ant. pol. : VERTICAL
Engineer : Jamy

5. STOP TRANSMITTING TIME TEST

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4407B	MY41440292	May 15, 06	1 Year
2.	Amp	HP	8449B	3008A00863	May 15, 06	1 Year
3.	Antenna	EMCO	3115	9607-4877	Jan. 23, 07	1.5 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May 15, 06	1 Year

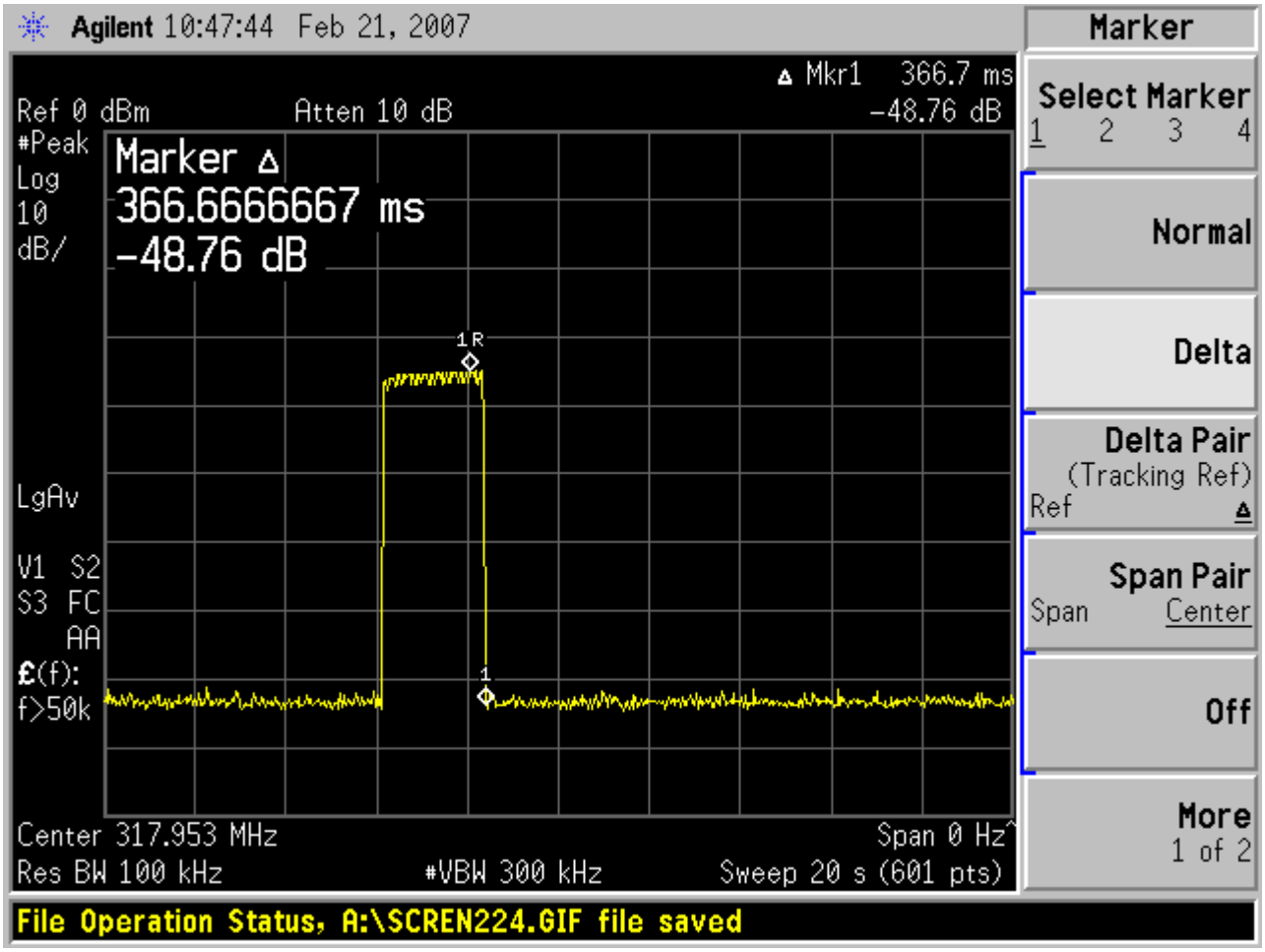
5.2. Test Information

EUT:	GTO TX
M/N:	RB741
Test Date:	Feb.21, 2007
Ambient Temperature:	23℃
Relative Humidity:	50%
Test standard:	FCC PART 15C: 15.231
Test mode:	Transmitting
Test Frequency:	318MHz
Test By:	Jamy

5.3. Test Results

Set the spectrum to zero span, activated the EUT by manually, And then, we could see the transmitting wave in the spectrum, when the time marker went to “1R”, released the EUT, After 316.7ms, we could see the EUT stop transmitting.

Frequency (MHz)	Stop Transmitting Time	Limit: not more than 5 seconds of being released	Conclusion
318	366.7ms	5s	PASS


Agilent 10:47:44 Feb 21, 2007
Marker
Mkr1 366.7 ms
-48.76 dB
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
Marker Δ
366.6666667 ms
-48.76 dB
1R
LgAv
V1 S2
S3 FC
AA
£(f):
f>50k
Center 317.953 MHz
Span 0 Hz
Res BW 100 kHz
#VBW 300 kHz
Sweep 20 s (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, A:\SCREN224.GIF file saved

6. 20 DB BANDWITH TEST

6.1. Test Equipment

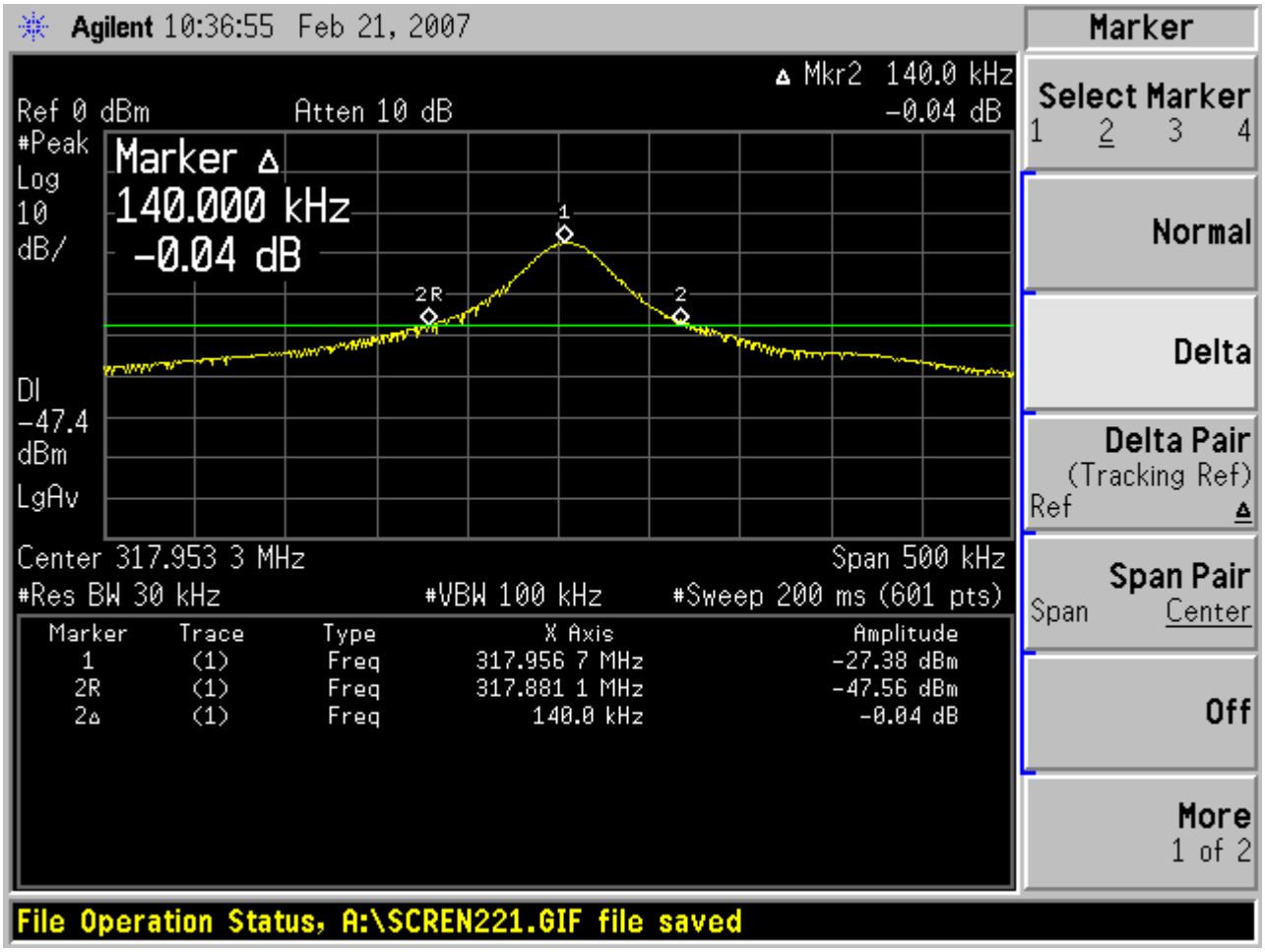
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4407B	MY41440292	May 15, 06	1 Year
2.	Amp	HP	8449B	3008A00863	May 15, 06	1 Year
3.	Antenna	EMCO	3115	9607-4877	Jan. 23, 07	1.5 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May 15, 06	1 Year

6.2. Test Information

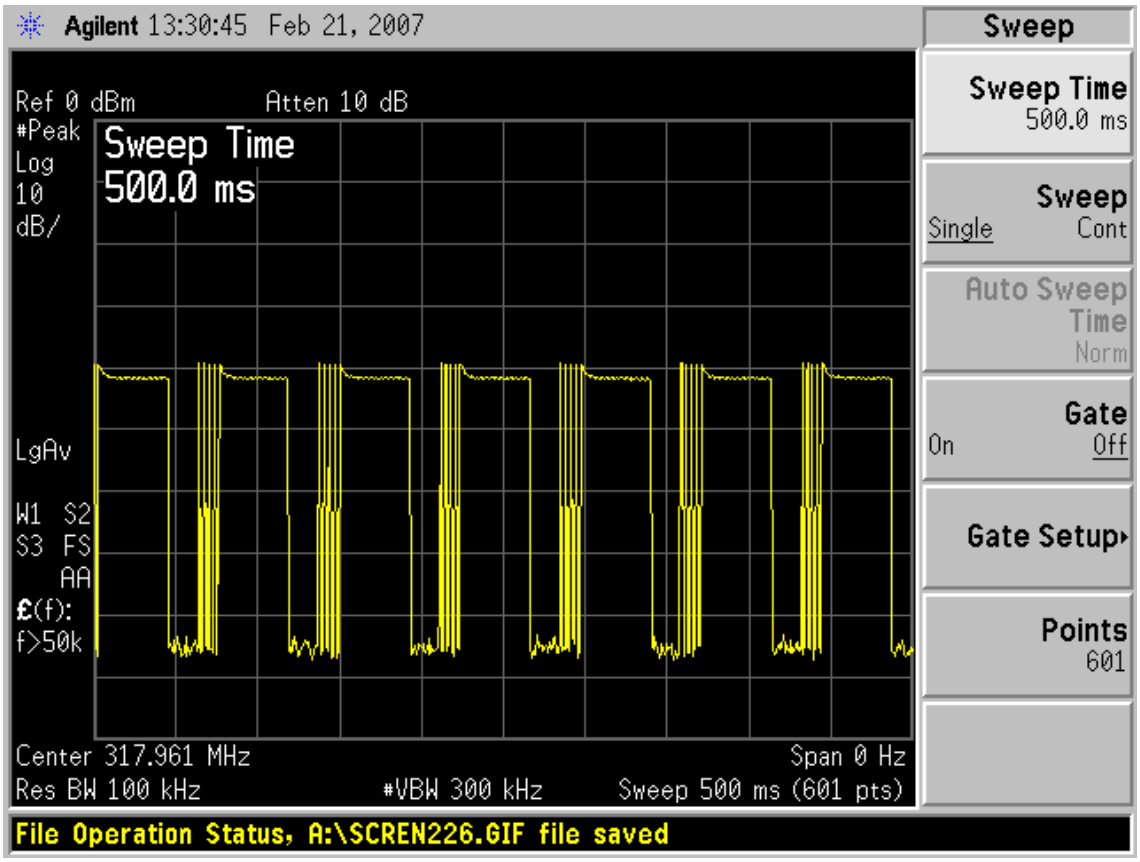
EUT:	GTO TX
M/N:	RB741
Test Date:	Feb.21, 2007
Ambient Temperature:	23℃
Relative Humidity:	50%
Test standard:	FCC PART 15C: 15.231
Test mode:	Transmitting
Test Frequency:	318MHz
Test By:	Jamy

6.3. Test Results

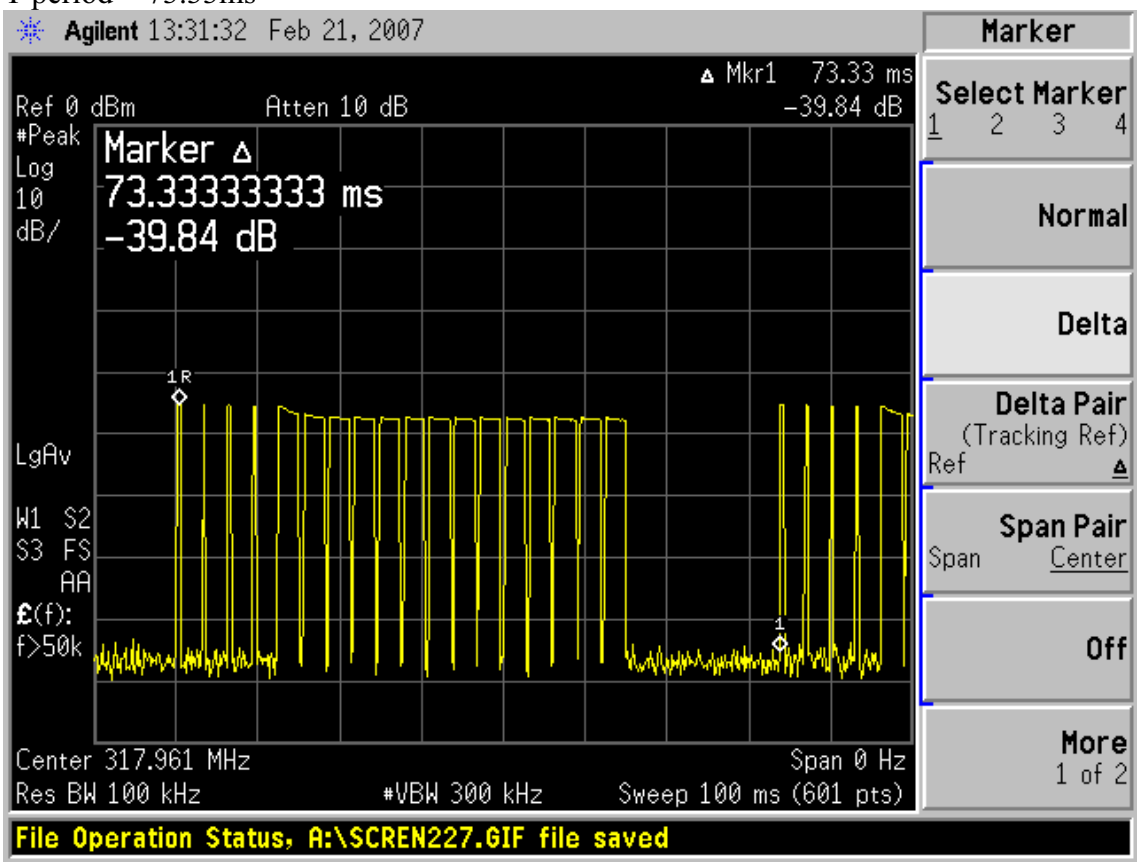
Frequency (MHz)	20 dB Bandwidth (kHz)	Limit(kHz): No wider than 0.25% of the center frequency	Conclusion
318	140.0	318*0.25%=795kHz	PASS

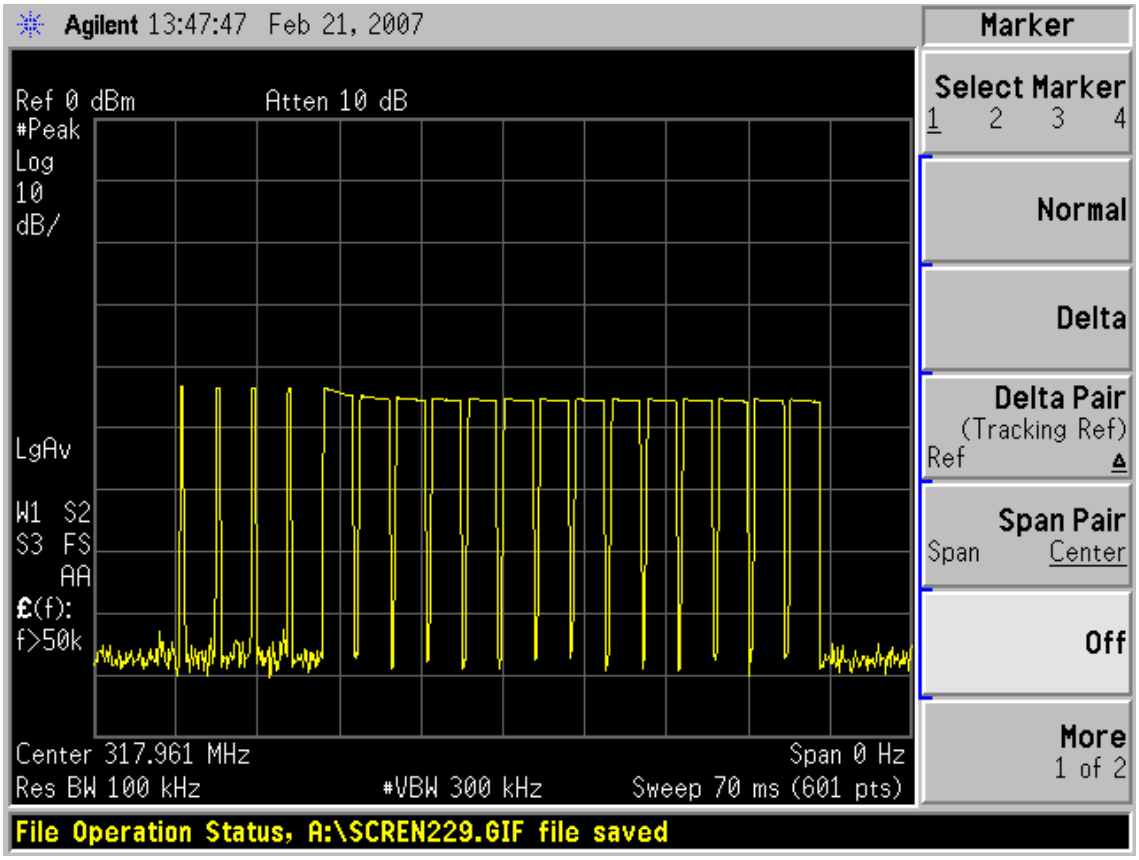

Agilent 10:36:55 Feb 21, 2007
Marker
Mkr2 140.0 kHz
-0.04 dB
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
Marker Δ
140.000 kHz
-0.04 dB
1
2R
2
DI
-47.4
dBm
LgAv
Center 317.953 3 MHz
Span 500 kHz
#Res BW 30 kHz
#VBW 100 kHz
#Sweep 200 ms (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 317.956 7 MHz -27.38 dBm
2R (1) Freq 317.881 1 MHz -47.56 dBm
2Δ (1) Freq 140.0 kHz -0.04 dB
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, A:\SCREN221.GIF file saved

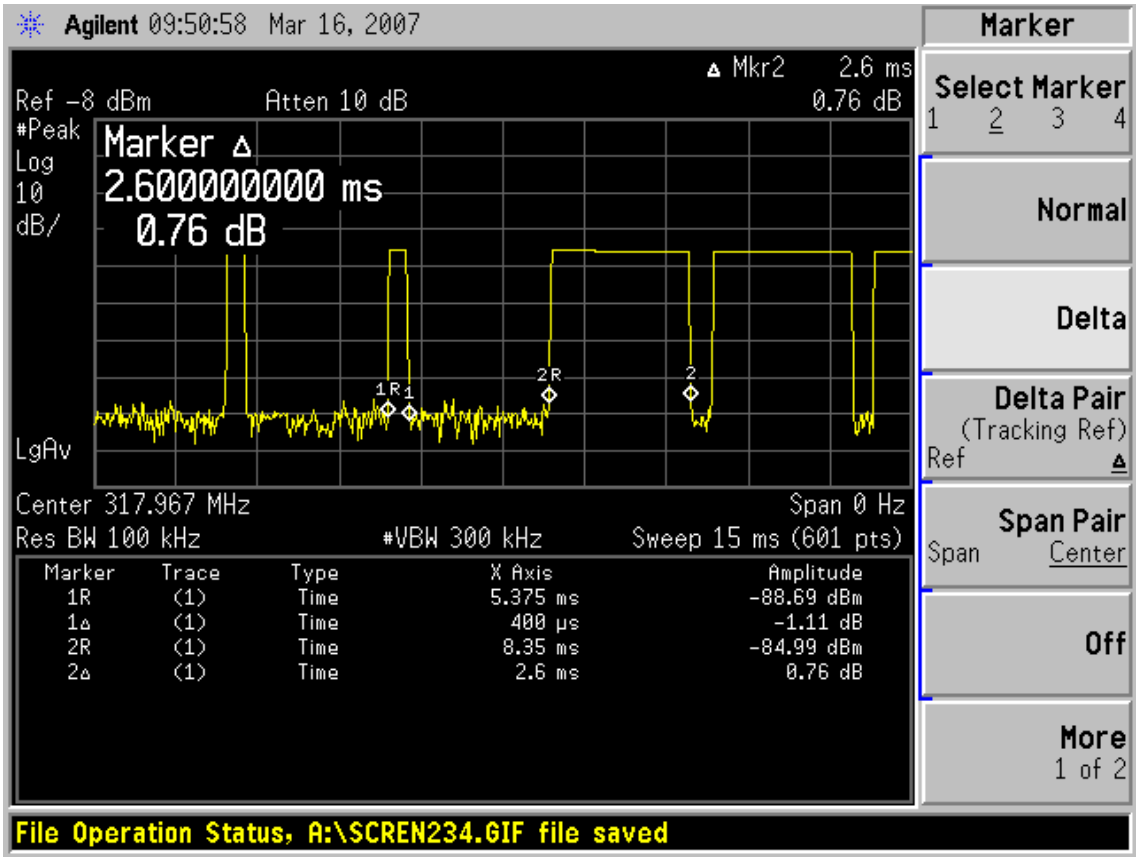
7. PULSE DESENSITIZATION CORRECTION FACTOR



T period = 73.33ms







T ontime(assumed worse case)=18*2.6ms=46.8ms
Duty cycle= T ontime / T period=46.8ms / 73.33ms=0.638
PDCF=20*log(Duty cycle)=20*log(0.638)=-3.9

8. DEVIATION TO TEST SPECIFICATIONS

[NONE]