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Registration number: 282399

Report No.: GZEM110400126801
Page: 1 of 15
FCC ID: XHT10011-12-T27M

TEST REPORT

Application No.:	GZEM1104001268RF
Applicant:	GUANGDONG YINRUN INDUSTRY CO., LTD.
FCC ID:	XHT10011-12-T27M
Product Name:	Tornado Tumbler
Product Description:	Radio control toys with 27.145MHz as a carrier
Model No.:	10011, 10012 ♣
♣	Please refer to section 3 of this report for details
Standards:	FCC PART 15 SUBPART C:2010 section 15.227 ANSI C63.10:2010
Date of Receipt:	2011-05-04
Date of Test:	2011-05-06 to 2011-05-16
Date of Issue:	2011-05-20
Test Result :	PASS *

* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 3 of this report for further details.

Strong Yao
2011 May

Strong Yao
Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2011-05-20		Original

Authorized for issue by:			
Tested By			2011-05-06 to 2011-05-16 Date
	(Storm Shu) /Project Engineer		
Prepared By			2011-05-19 Date
	(Millie Li) /Clerk		
Checked By			2011-05-20 Date
	(Strong Yao)/Reviewer		



3 Test Summary

Test	Test Requirement	Test method	Result
Radiated Emission	FCC PART 15 Section 15.227	ANSI C 63.10 Clasue 6.4, 6.5	PASS **
Occupied Bandwidth	FCC PART 15 Section 15.215	ANSI C 63.10 Clasue 6.9	PASS
Label Requirement	FCC PART 15 Section 15.19	N/A	N/A

Remark:

N/A: not applicable. Refer to the relative section for the details.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radio Frequency.

♣ Model No.: 10011, 10012

According to the confirmation from the applicant, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, except for the Model No. for marketing requirement.

Therefore only one model 10012 was tested in this report.

** The EUT passed Radiated Emission test after retest.



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5 General Information

5.1 Client Information

Applicant: GUANGDONG YINRUN INDUSTRY CO., LTD.
Address of Applicant: YINRUN IND GARDEN, LAIMEI ZONE, CHENGHAI, SHANTOU CITY, GUANGDONG, CHINA

5.2 General Description of E.U.T.

Product Name: Tornado Tumbler
Model No.: 10011, 10012

5.3 Details of E.U.T.

Modulation and Antenna Type: The Tx is a ASK modulation by internal signal with an integral antenna.
Power Supply: DC 9 V (1 x 9V size 6F22" battery)
Power cord: N/A

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

The EUT passed Radiated Emission test after retest.

5.7 Other Information Requested by the Customer

None.

5.8 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,
198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.



5.9 Test Facility

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

- **NVLAP – Lab Code: 200611-0**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **FCC – Registration No.: 282399**

SGS-CSTC Standards Technical Services Co., Ltd., 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 282399, May 31, 2002.



6 Equipment Used during Test

RE in Chamber					
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date
					(YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2011-09-06
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2012-01-17
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	10036	2011-06-02
N/A	EMI Test Software	Audix	E3	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	2011-12-08
EMC2025	Trilog Broadband Antenna 30-3000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9163	9163-450	2011-10-28
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2011-12-20
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2011-12-20
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2011-09-11
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2012-01-17
EMC0049	Amplifier	Agilent	8447D	2944A10862	2012-04-21
EMC0075	310N Amplifier	Sonama	310N	272683	2011-10-25
EMC0523	Active Loop Antenna	EMCO	6502	42963	2011-11-17
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	2012-05-10

General used equipment					
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date
					(YYYY-MM-DD)
EMC0006	DMM	Fluke	73	70681569	2011-12-16
EMC0007	DMM	Fluke	73	70671122	2011-12-16



7 Test Results

7.1 E.U.T. test conditions

- Power supply: DC 9 V (new battery)
- Requirements: **15.31(e):** For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.
- Type of antenna: Integral
- Operating Environment:
 Temperature: 22-25.0 °C
 Humidity: 48-55% RH
 Atmospheric Pressure: 1001-1010 mbar
- Test frequencies and frequency range: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:
- According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

Remark: Test frequency is 27.145 MHz.



7.2 Radiated Emissions

- Test Requirement:** FCC Part 15 C section 15.227
- Test Method:** ANSI C63.10: clause 6.4, 6.5 and 6.6
- Measurement Distance:** 3 m (Semi-Anechoic Chamber)
- Test Status:** Test in transmitting mode.

Requirements:

the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

15.227(a):The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

15.227(b) :The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

Out of band emissions shall not exceed:

Frequency range(MHz)	Quasi-peak limits dB (µV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960	54

At transitional frequencies the lower limit applies.

Test Procedure:

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna. The center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specied distance from the EUT.During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30 MHz to 1 GHz emissions:

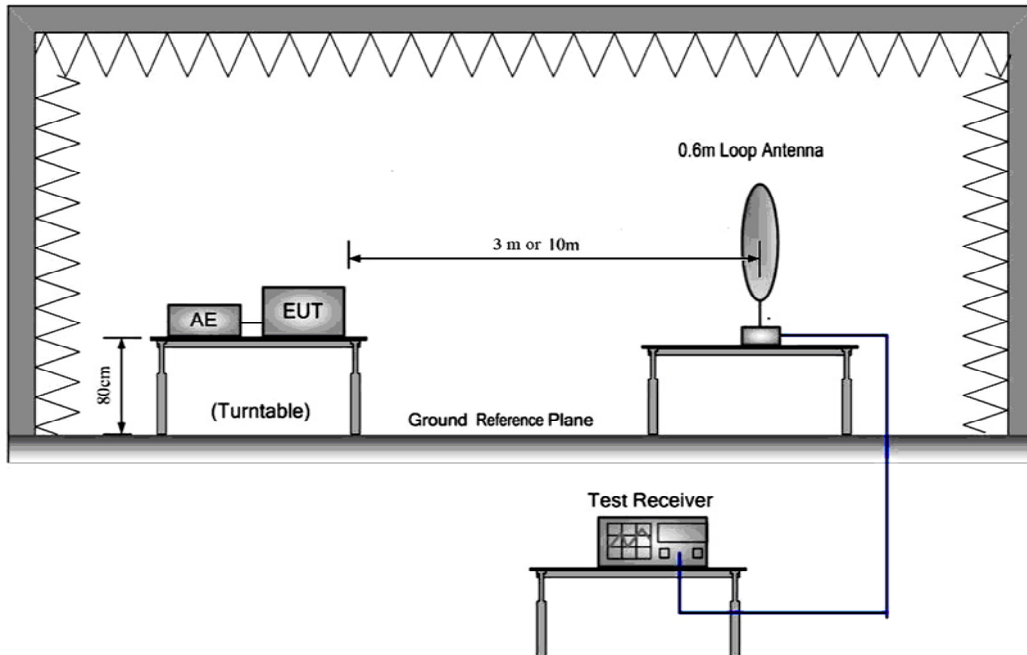
For testing performed with the bi-log type antenna. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

Detector:

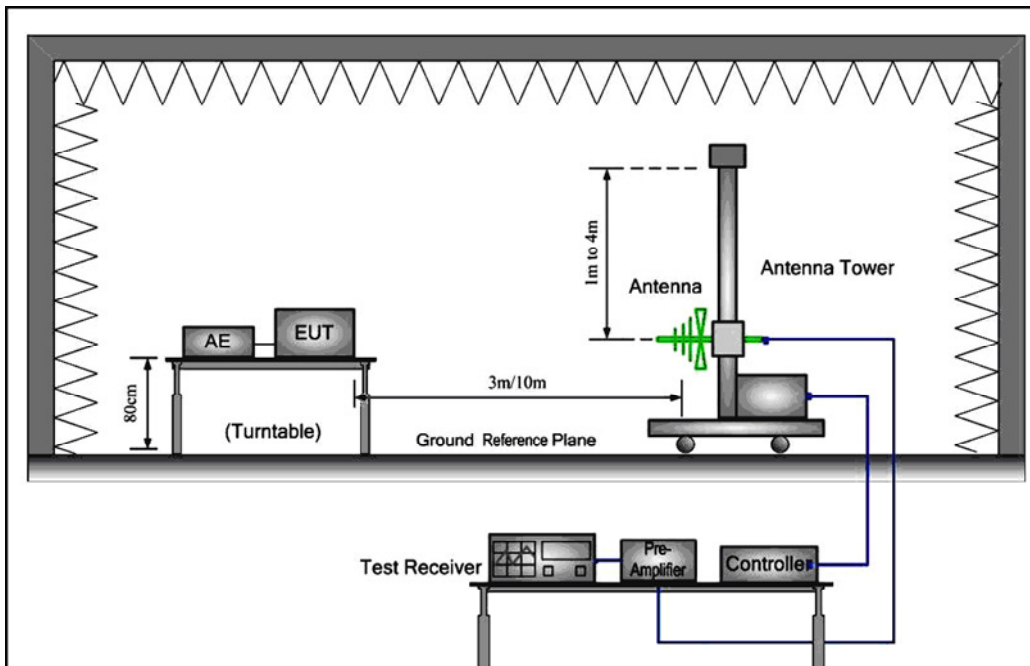
Test Receiver/ Spectrum Analyzer test setup	Detector	
	Peak	Average
RBW	100 kHz for f < 1 GHz	100 kHz for f < 1 GHz
VBW	≥ RBW	10Hz
Sweep	auto	auto
Detector function	peak	peak
Trace	max hold	max hold

Test Configuration:

- 1) 9 kHz to 30 MHz emissions:



- 2) 30 MHz to 1 GHz emissions:





1) Fundamental emission:

Antenna polarization: Horizontal:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
27.145	79.72	9.50	0.60	69.62	100.0	-30.38	Peak
27.145	79.13	9.50	0.60	69.03	80.0	-10.97	Average

Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
27.145	82.44	9.50	0.60	72.34	100.0	-27.66	Peak
27.145	82.15	9.50	0.60	72.05	80.0	-7.95	Average

Y: rotate EUT by 90° vertically.

X: rotate EUT by 90° clockwise.

Z: EUT as Radiated Emission test setup photograph in section 6 of this report.

Remark: Radiated Emission test setup photograph in section 6 of this report is the worst case and reported.

2) other emissions:

The receive was scanned from 30 MHz to 1 GHz. 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 worst case emissions were reported.

An initial pre-scan was performed in the 3 m chamber using the spectrum analyzer 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.

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 –Peramplifier Factor.



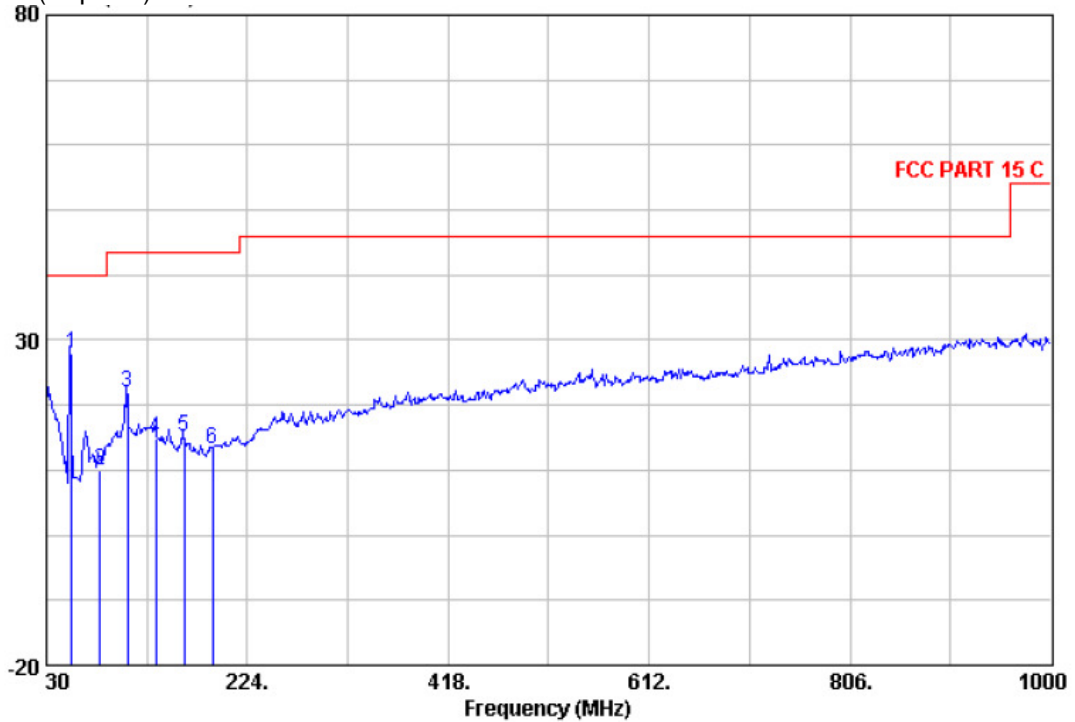
The following test results were performed on the EUT.

Test the EUT in transmitting mode:

Vertical:

Peak scan

Level (dB μ V/m)



Quasi-peak measurement

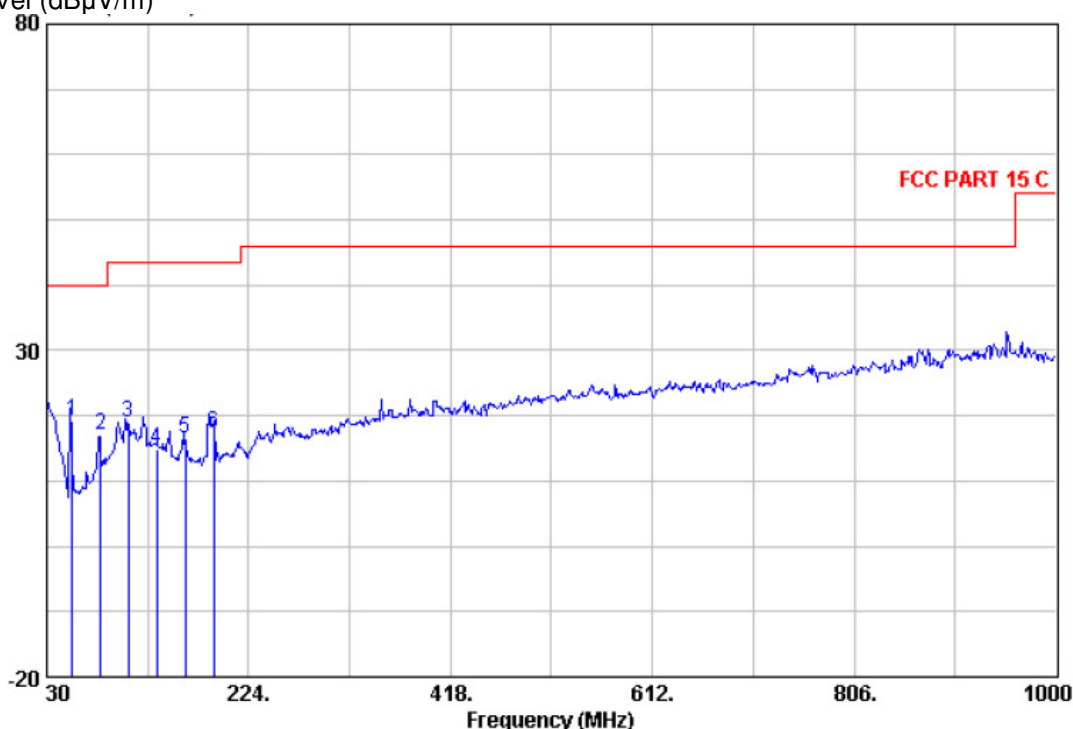
Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dB μ V	dB/m	dB	dB	dB μ V/m	dB μ V/m	dB	
54.290	50.89	4.40	0.60	27.86	28.02	40.00	-11.98	QP
81.435	30.11	6.73	0.80	27.74	9.90	40.00	-30.10	QP
108.580	36.85	11.80	0.90	27.63	21.92	43.50	-21.58	QP
135.725	30.07	11.43	1.00	27.49	15.01	43.50	-28.49	QP
162.870	32.41	8.90	1.10	27.37	15.04	43.50	-28.46	QP
190.015	30.89	8.40	1.20	27.27	13.22	43.50	-30.28	QP



Horizontal:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	Remark
MHz	Level	Factor	Loss	Factor	dBµV/m	Line	Limit	
	dBµV	dB/m	dB	dB		dBµV/m	dB	
54.290	42.02	4.40	0.60	27.86	19.16	40.00	-20.84	QP
81.435	37.18	6.73	0.80	27.74	16.97	40.00	-23.03	QP
108.580	33.79	11.80	0.90	27.63	18.86	43.50	-24.64	QP
135.725	29.92	11.43	1.00	27.49	14.87	43.50	-28.63	QP
162.870	33.93	8.90	1.10	27.37	16.56	43.50	-26.94	QP
190.015	35.08	8.40	1.20	27.27	17.40	43.50	-26.10	QP

Remark:

According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.



7.3 Occupied Bandwidth

Test Requirement: FCC Part 15 C Section 15.215

Test Method: ANSI C63.10 clause 6.9

Test Status: Test in transmitting mode.

Requirements:

15.215(c), Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Procedure:

The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector. Record the 20 dB bandwidth of the carrier.

The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector. The vertical Scale is set to 10dB per division. The horizontal scale is set to 20KHz per division. Read the down 20dB bandwidth of the carrier.

Set the spectrum analyzer: start at 26.96MHz and stop at 27.28MHz

Set the spectrum analyzer: RBW = 1 kHz, VBW = 3 kHz

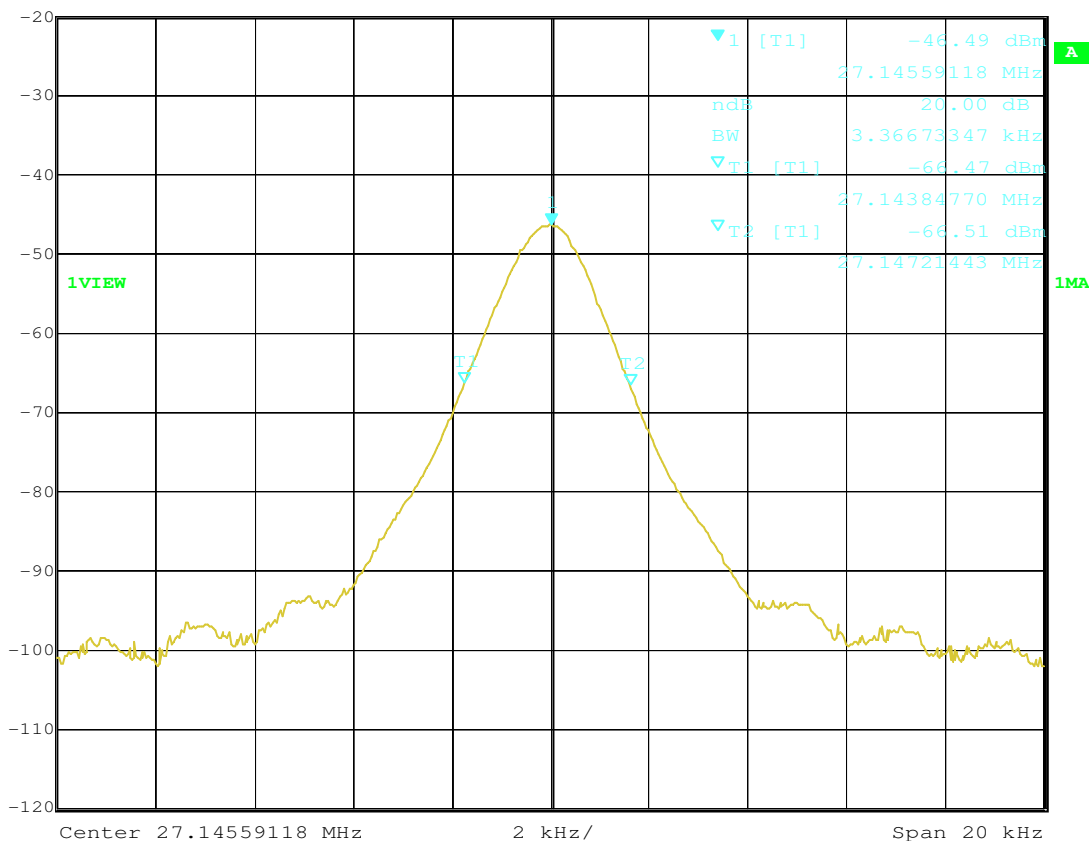
Sweep = auto; Detector Function = Peak. Trace = Max Hold.

Mark the peak frequency and -20dB points bandwidth.



Test plot as below:

	Marker 1 [T1 ndB]	RBW	1 kHz	RF Att	10 dB
	Ref Lvl	ndB	20.00 dB	VBW	3 kHz
	-20 dBm	BW	3.36673347 kHz	SWT	150 ms
				Unit	dBm



Date: 18.MAY.2011 10:13:10

20dB bandwidth lower frequency : 27.14384770MHz

20dB bandwidth upper frequency : 27.14721443MHz

--The End of Report--