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Report No.: GLEMR080100010RFT
Page: 1 of 17
FCC ID: VX5268NC

TEST REPORT

Application No. : GLEMR080100010RF

Applicant: Thermor Ltd.

FCC ID: VX5268NC

**Fundamental
Frequency :** 433.920MHz

Equipment Under Test (EUT):

Name: 433MHz Wireless Wind Chill and Humidex Thermometer

Model No.: 266BC, 266NC, 268BC, 268NC♣

Serial No.: Not supplied by client.

♣ Please refer to section 2 of this report which indicates which item was actually tested and which were electrically identical.

Standards: FCC PART 15, SUBPART C : 2007
Section 15.231(e)

Date of Receipt: 03 January 2008

Date of Test: 03 January to 27 February 2008

Date of Issue: 28 February 2008

| | |
|----------------------|---------------|
| Test Result : | PASS * |
|----------------------|---------------|

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Stephen Guo
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 Test Summary

| The customer requested FCC tests for a 433MHz Wireless Wind Chill and Humidex Thermometer | | | |
|---|-------------------|--------------------|--------|
| Test | Test Requirement | Standard Paragraph | Result |
| Radiated Emission (30MHz to 1000MHz) | FCC PART 15 :2007 | Section 15.231(e) | PASS ① |
| Occupied Bandwidth | FCC PART 15 :2007 | Section 15.231(c) | PASS |
| Dwell Time | FCC PART 15 :2007 | Section 15.231(e) | PASS |

Remark:

♣Item No.: 266BC, 266NC, 268BC, 268NC

Only the Item **266BC** was tested, since the electrical circuit design, PCB layout, components used and internal wiring were identical for the above items, only the logo imprinted on the plastic casing ,the color of the plastic casing and item numbers were different acrodding to the conformation from the applicant (manufacturer).



3 Contents

| | Page |
|--|------|
| 1 COVER PAGE | 1 |
| 2 TEST SUMMARY | 2 |
| 3 CONTENTS | 3 |
| 4 GENERAL INFORMATION..... | 4 |
| 4.1 CLIENT INFORMATION | 4 |
| 4.2 DETAILS OF E.U.T. | 4 |
| 4.3 DESCRIPTION OF SUPPORT UNITS | 4 |
| 4.4 TEST LOCATION | 4 |
| 4.5 OTHER INFORMATION REQUESTED BY THE CUSTOMER..... | 4 |
| 4.6 TEST FACILITY | 5 |
| 5 TEST RESULTS | 6 |
| 5.1 TEST INSTRUMENTS..... | 6 |
| 5.2 E.U.T. OPERATION..... | 7 |
| 5.3 TEST PROCEDURE & MEASUREMENT DATA | 7 |
| 5.3.1 <i>Radiated Emissions</i> | 7 |
| 5.3.2 <i>Occupied Bandwidth</i> | 11 |
| 5.3.3 <i>Dwell Time</i> | 12 |
| 6 PHOTOGRAPHS - TEST SETUP | 14 |
| 7 PHOTOGRAPHS - EUT CONSTRUCTIONAL DETAILS | 15 |



4 General Information

4.1 Client Information

Applicant Name: Thermor Ltd.
Applicant Address: 16975 Leslie Street, Newmarket, Ontario, L3Y 9A1, Canada.

4.2 Details of E.U.T.

Name: 433MHz Wireless Wind Chill and Humidex Thermometer
Model No.: 266BC, 266NC, 268BC, 268NC♣
Power Supply: DC3V (2×1.5V“AA”size battery)
Power Cord: N/A-

4.3 Description of Support Units

The EUT was tested as an independent unit: a 433.950MHz radio transmitter.

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory, No.198 Kezhu Road, Science Town Economic& Technology Development District Guangzhou, China 510663

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

No tests were sub-contracted.

4.5 Other Information Requested by the Customer

None.



4.6 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. With the above and NVLAP's accreditation, SGS-CSTC is an authorized test laboratory for the DoC process.



5 Test Results

5.1 Test Instruments

| RE in Chamber/OATS | | | | | | |
|--------------------|-------------------------------|-------------------|---------------|------------|----------------------|--------------------------|
| No: | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date (dd-mm-yy) | Cal. Due date (dd-mm-yy) |
| EMC0525 | Compact Semi-Anechoic Chamber | ChangZhou ZhongYu | N/A | N/A | 06-03-2007 | 06-03-2008 |
| EMC0522 | EMI Test Receiver | Rohde & Schwarz | ESIB26 | 100249 | 05-12-2007 | 05-12-2008 |
| N/A | EMI Test Software | Audix | E3 | N/A | N/A | N/A |
| EMC0514 | Coaxial cable | SGS | N/A | N/A | 04-12-2007 | 04-12-2008 |
| EMC0524 | Bi-log Type Antenna | Schaffner -Chase | CBL6112B | 2966 | 12-08-2007 | 12-08-2008 |
| EMC0519 | Bilog Type Antenna | Schaffner -Chase | CBL6143 | 5070 | 12-08-2007 | 12-08-2008 |
| EMC0517 | Horn Antenna | Rohde & Schwarz | HF906 | 100095 | 12-08-2007 | 12-08-2008 |
| EMC0040 | Spectrum Analyzer | Rohde & Schwarz | FSP30 | 100324 | 05-12-2007 | 05-12-2008 |
| EMC0520 | 0.1-1300 MHz Pre-Amplifier | HP | 8447D OPT 010 | 2944A06252 | 28-03-2007 | 28-03-2008 |
| EMC0521 | 1-26.5 GHz Pre-Amplifier | Agilent | 8449B | 3008A01649 | 28-03-2007 | 28-03-2008 |
| EMC0523 | Active Loop Antenna | EMCO | 6502 | 00042963 | 09-08-2006 | 09-08-2008 |
| EMC0530 | 10m Semi- Anechoic Chamber | ETS | N/A | N/A | 10-08-2007 | 10-08-2008 |

| General used equipment | | | | | | |
|------------------------|-------------------------|-------------------|-----------|------------|----------------------|--------------------------|
| No: | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date (dd-mm-yy) | Cal. Due date (dd-mm-yy) |
| EMC0050-EMC0053 | Temperature, & Humidity | ZHENGZHOU BO YANG | WSB | N/A | 05-12-2007 | 05-12-2008 |
| EMC0006 | DMM | Fluke | 73 | 70681569 | 27-09-2007 | 27-09-2008 |
| EMC0007 | DMM | Fluke | 73 | 70671122 | 27-09-2007 | 27-09-2008 |



5.2 E.U.T. Operation

Input voltage: DC3V (2x1.5V"AA"size battery)
Operating Environment:
Temperature: 25.0 °C
Humidity: 56 % RH
Atmospheric Pressure: 1011 mbar
EUT Operation: Test the EUT in transmitting mode.

5.3 Test Procedure & Measurement Data

5.3.1 Radiated Emissions

Test Requirement: FCC Part15 C 15.231(e)
Test Method: ANSI C63.4 section 8 & 13
Test Date: January 18 2008(Initial test)
February 27 2008(Final test)
Measurement Distance: 3m (Semi-Anechoic Chamber)
Requirements: the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Table with 3 columns: Fundamental Frequency (MHz), Field Strength of Fundamental (dBµV/m @ 3m), and Field Strength of Harmonics and Spurious Emissions (dBµV/m @ 3m). Rows include frequency ranges like 40.66 to 40.70, 70 to 130, 130 to 174, 174 to 260, 260 to 470, and 470 and above.

Detector: Peak for pre-scan
Peak and Average:
30-1000MHz:120kHz resolution bandwidth
1GHz-5GHz: 1MHz resolution bandwidth

** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 22.72727(F) - 2454.545; for the band 260-470 MHz, uV/m at 3 meters = 16.6667(F) - 2833.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

Since the device is a pulsed transmission with a periodic rate less than 20 pulses per second (20Hz).

The fundamental frequency of the EUT is 433.920MHz.

The limit for average field strength dBuV/m for the fundamental emission= 72.9 dBµV/m

No fundamental is allowed in the restricted bands.The limit for average field strength dBuV/m for the spurious emission=52.9 dBuV/m.Spurious in the restricted bands must be less than 52.9dBuV/m or 15.209.Whichever limit permits a higher field strength.



And according 15.35(a)

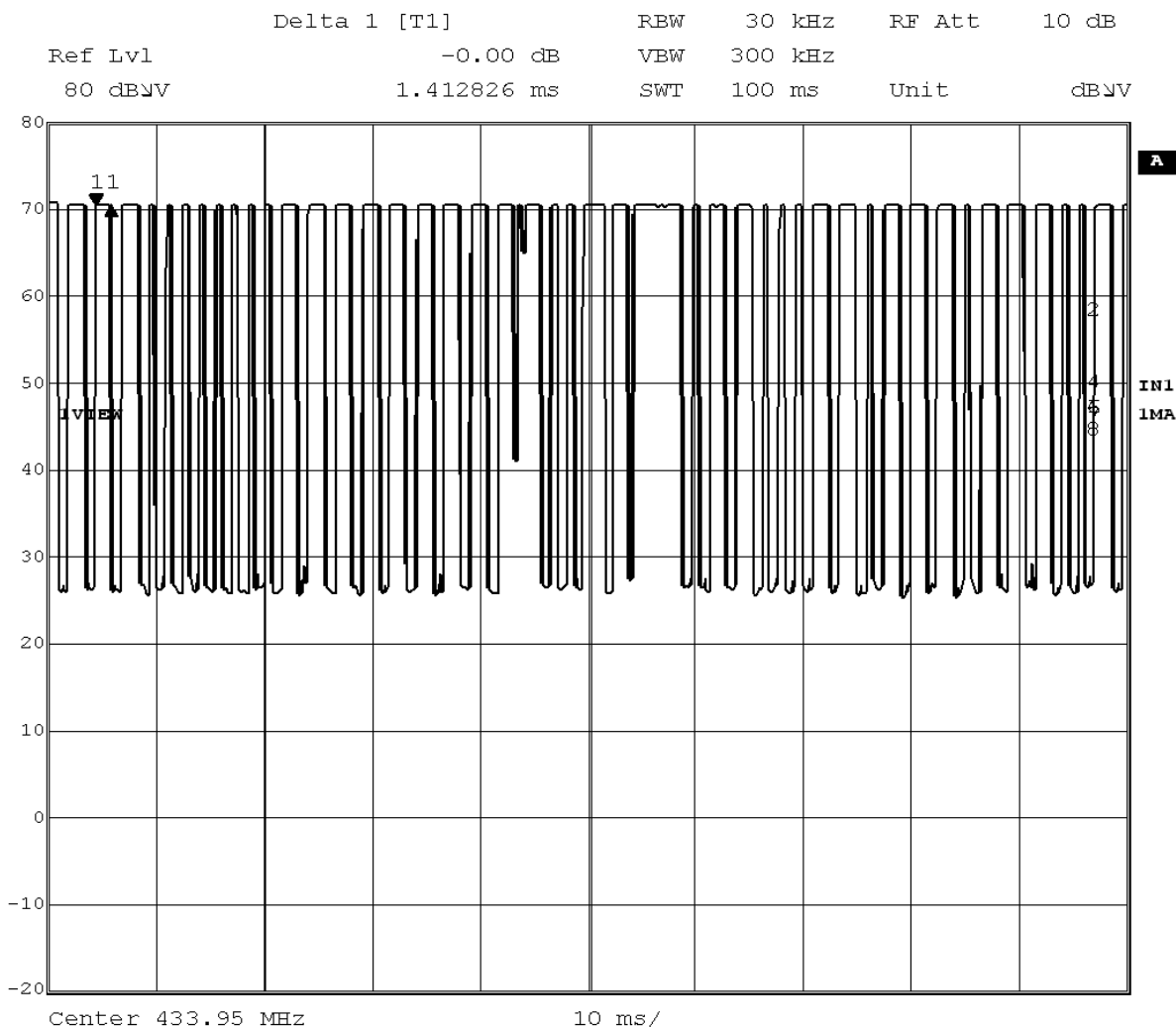
15.35(a) On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified. The specifications for the measuring instrument using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Interference (CISPR) of the International Electrotechnical Commission. As an alternative to CISPR quasi-peak measurements, the responsible party, at its option, may demonstrate compliance with the emission limits using measuring equipment employing a peak detector function, properly adjusted for such factors as pulse desensitization, as long as the same bandwidths as indicated for CISPR quasi-peak measurements are employed.

Note: For pulse modulated devices with a pulse-repetition frequency of 20 Hz or less and for which CISPR quasi-peak measurements are specified, compliance with the regulations shall be demonstrated using measuring equipment employing a peak detector function, properly adjusted for such factors as pulse desensitization, using the same measurement bandwidths that are indicated for CISPR quasi-peak measurements.

According to 15.35 (b) Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, *e.g.*, see §§ 15.250, 15.252, 15.255, and 15.509-15.519 of this part, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device, *e.g.*, the total peak power level. Note that the use of a pulse desensitization correction factor may be needed to determine the total peak emission level. The instruction manual or application note for the measurement instrument should be consulted for determining pulse desensitization factors, as necessary.

The average correction factor is computed by analyzing the "worst case" on time in any 100 msec time period . Analysis of the remote transmitter worst case on time in any 100 msec time period is an on time of 100 msec, therefore the average value of fundamental frequency is: Average = Peak value + 20log (Duty cycle), where the duty factor is calculated from following formula:

Number of 0 pulses is $(100-4.6)/2.5 = 38$
On time in 100 ms = $38 \times 1.5 + 4.6 = 61.6$ ms
Duty cycle in 100 ms = $20 \text{ Log } (61.6/100) = -4.2$ dB
Please refer to below pictures for more details.



Test Procedure: The procedure used was ANSI Standard C63.4-2003. The receiver was scanned from 30MHz to 5.0GHz. 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 with two new batteries.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Peramplifier . The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Peramplifier Factor}$$

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. Peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bilog antenna with 2 orthogonal polarities and Horn antenna.

The following test results were performed on the EUT on February 27 2008.



1. Fundamental emission& Spurious Emissions

(a) Antenna polarization: Horizontal

Table with 9 columns: Frequency (MHz), Read Level (dBuV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Level (dBuV/m), Limit Line (dBuV/m), Over Limit (dB), Remark. Rows include frequencies like 433.759, 867.518, 1301.360, and 1728.000 with remarks PEAK and AVERAG.

(b) Antenna polarization: Vertical

Table with 9 columns: Frequency (MHz), Read Level (dBuV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Level (dBuV/m), Limit Line (dBuV/m), Over Limit (dB), Remark. Rows include frequencies like 433.759, 867.518, 1301.450, and 1728.000 with remarks PEAK and AVERAG.

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.

TEST RESULTS: The unit does meet the FCC Part 15 C Section 15.231 requirements.



5.3.2 Occupied Bandwidth

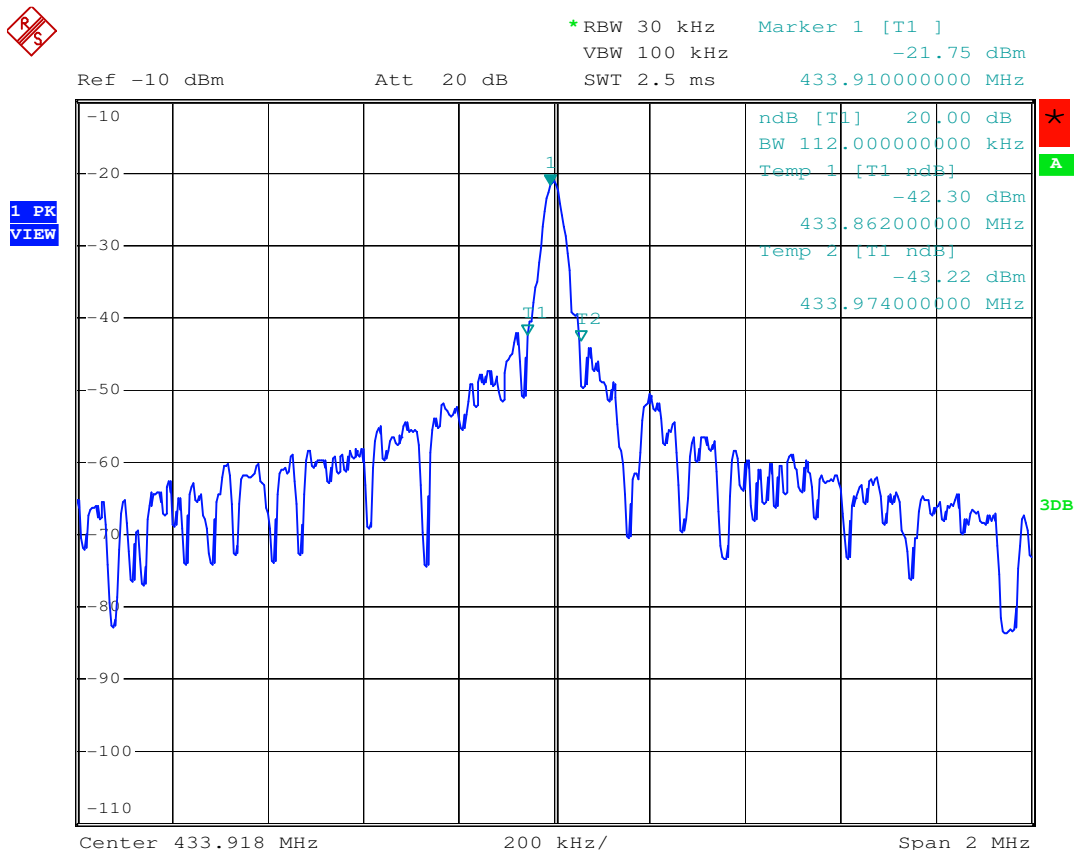
Test Requirement: FCC Part 15 C Section 15.231(c)
Test Method: ANSI C63.4 section 13.
Test Date: 18 January 2008
Requirements: 15.231 (c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.

The fundamental frequency is 433.950MHz, so the limit for 20dB bandwidth is 1.08MHz.

Method of measurement: 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 200KHz per division.

20dB Bandwidth: 112KHz

The graph as below, represents the emissions take for this device.



The results: The unit does meet the FCC Part 15 C Section 15.231 requirements.



5.3.3 Dwell Time

Test Requirement: FCC Part 15 C Section 15.231(e)
Test Method: FCC Part15 C Section 15.231(e)
Test Date: 26 February 2008

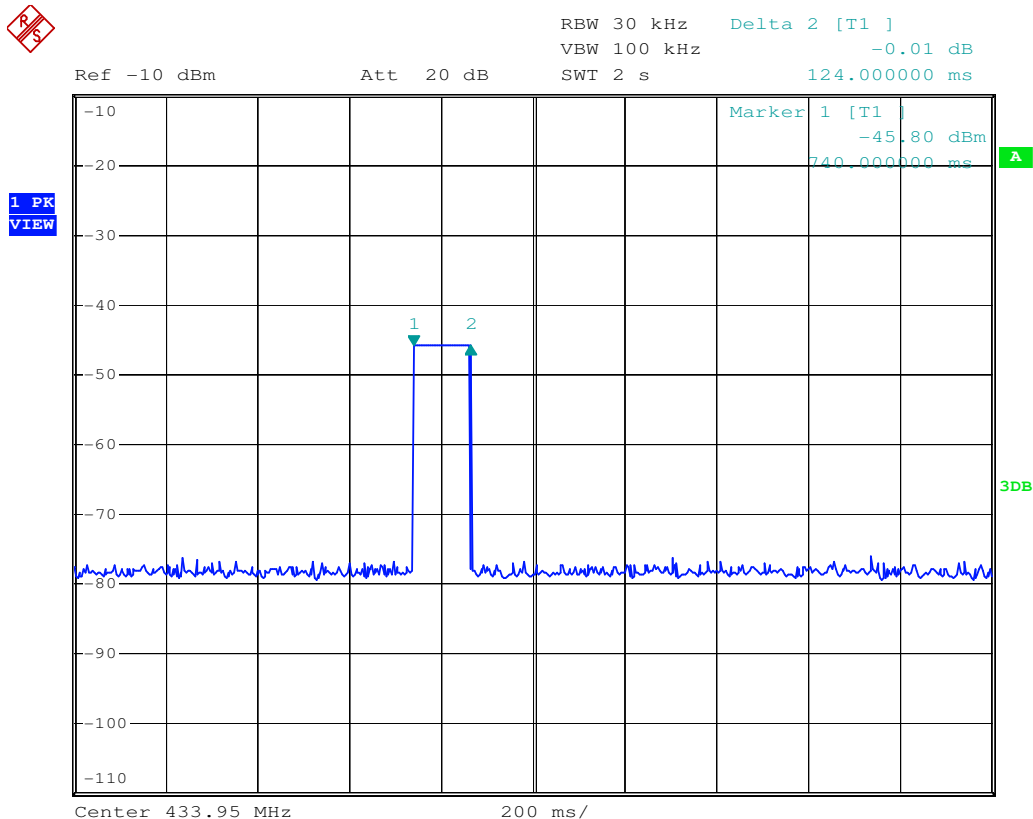
Requirements:

1. Regulation 15.231 (e) In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

Result:

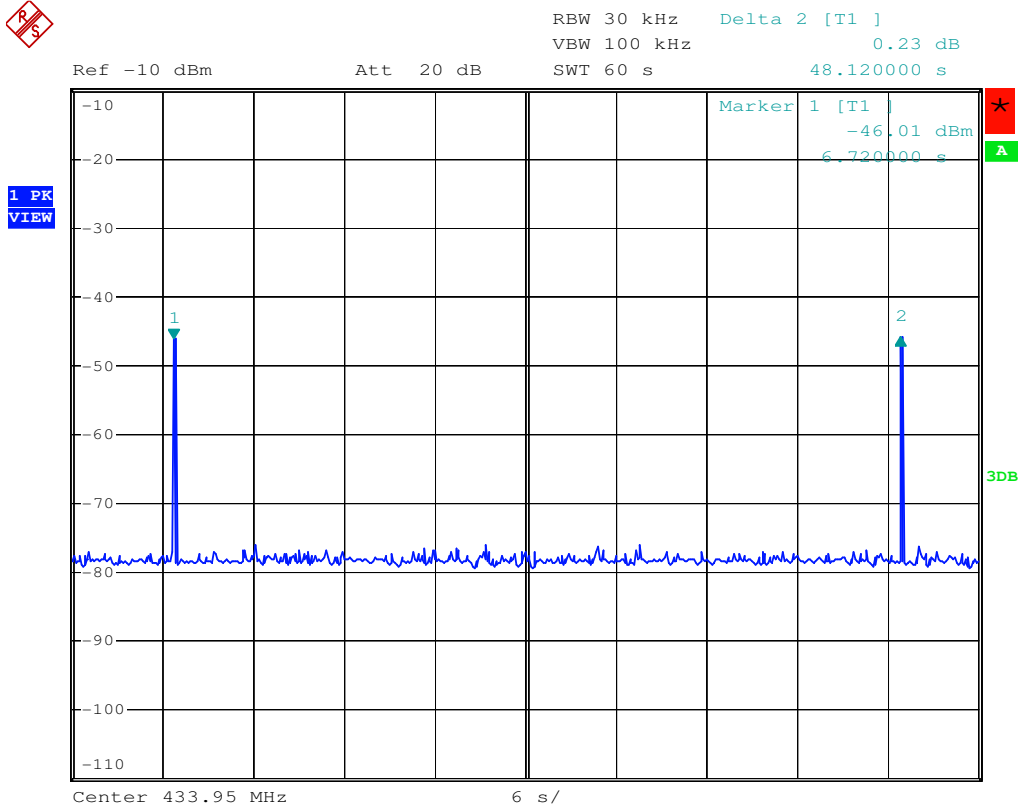
The duration of the EUT transmission is 124ms, and the silent period between transmissions is about 48.1s greater than 30 times the duration of the transmission and greater than 10 seconds.

Duration time of transmissions



Date: 26.FEB.2008 06:04:25

Silent period between transmissions



Date: 26.FEB.2008 06:08:37

The results: The unit does meet the FCC Part 15 C Section 15.231 requirements.

6 Photographs - Test Setup

Radiated Emission



7 Photographs - EUT Constructional Details

