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ENUSTECH

Dates of Tests: : Apr 12~20, 2011
Test Report S/N: LR500111104F
Test Site : LTA CO., LTD.

# CERTIFICATION OF COMPLIANCE

FCC ID. TT2KLAT8-RC
IC 6329A-KLAT8RC
APPLICANT ENUSTECH.,INC.

# TEST REPORT

| | | |
|---|---|---|
| **Equipment Class** | **:** | **Part 15 Security/Remote Control Transmitter** |
| **Manufacturing Description** | **:** | **Wireless Remote Controller** |
| **Manufacturer** | **:** | **ENUSTECH.,INC.** |
| **Model name** | **:** | **KlaT8-RC** |
| **Test Device Serial No.:** | **:** | **Identification** |
| **Rule Part(s)** | **:** | **FCC Part 15 Subpart C ; ANSI C-63.4-2003** |
| | | **RSS-210 and ISSUE No.: 8 Date: 2010** |
| **Frequency Range** | **:** | **433.055~434.680 MHz** |
| **Data of issue** | **:** | **Apr 22, 2011** |

This test report is issued under the authority of:

Hyun-Chae You, Manager

The test was supervised by:

Il-Shin kim, Test Engineer

**This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.**

NVLAP LAB Code.: 200723-0

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# 1. General information's

## 1-1 Test Performed

| | | |
|---|---|---|
| Company name | : | LTA Co., Ltd. |
| Address | : | 243, Jubug-ri,Yangji-Myeon,Youngin-Si, Kyunggi-Do, Korea. 449-822 |
| Web site | : | http://www.ltalab.com |
| E-mail | : | chahn@ltalab.com |
| Telephone | : | +82-31-323-6008 |
| Facsimile | | +82-31-323-6010 |

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

## 1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

| Agency | Country | Accreditation No. | Validity | Reference |
|---|---|---|---|---|
| NVLAP | U.S.A | 200723-0 | 2011-09-30 | ECT accredited Lab. |
| RRL | KOREA | KR0049 | 2011-09-01 | EMC accredited Lab. |
| FCC | U.S.A | 610755 | 2011-04-22 | FCC filing |
| FCC | U.S.A | 649054 | 2011-05-26 | FCC CAB |
| VCCI | JAPAN | R2133(10m), C2307 | 2011-06-21 | VCCI registration |
| VCCI | JAPAN | T-2009 | 2013-12-23 | VCCI registration |
| IC | CANADA | IC5799 | 2012-05-14 | IC filing |

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# 2. Information's about test item

## 2-1 Client & Manufacturer

| | | |
|---|---|---|
| Company name | : | ENUSTECH.,INC. |
| Address | : | Dooi Bldg., 5F, 1196-2 Gaepo-4dong, Gangnam-gu, Seoul 135-240, Korea |
| Telephone / Facsimile | : | +82-70-7547-7599 / +82-2-3452-3603 |

## 2-2 Equipment Under Test (EUT)

| | | |
|---|---|---|
| Trade name | : | Wireless Remote Controller |
| Model name | : | KlaT8-RC |
| Serial number | : | Identification |
| Date of receipt | : | Apr 8, 2011 |
| EUT condition | : | Pre-production, not damaged |
| Antenna type | : | Pattern Antenna |
| Frequency Range | : | 433.055~434.680 MHz |
| RF Output Power | : | Below 10 mW |
| Type of Modulation | : | FSK |
| Power Source | : | DC 3.0V By Lithium Battery Power |
| Firmware version | : | V1.0 |

## 2-3 Tested frequency

| Frequency | |
|---|---|
| Low | 433.055MHz |
| Mid | 433.580MHz |
| High | 434.680MHz |

## 2-4 Ancillary Equipment

| Equipment | Model No. | Serial No. | Manufacturer |
|---|---|---|---|
| - | - | - | - |

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# 3. Test Report

## 3.1 Summary of tests

| FCC Part Section(s) | Parameter | Test Condition | Status (note 1) |
|---|---|---|---|
| FCC Part 15.205/209 | Restricted Bands of Operation | Radiated | C |
| FCC Part 15.231 a) | Operation mode | | C [2)] |
| FCC Part 15.231 b) | Radiated emissions | | C |
| FCC Part 15.231 c) | 20dB Bandwidth | | C |
| 15.207 /15.107 | AC Conducted Emissions | Line Conducted | NA[3)] |

*Note 1*: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

*Note 2* The emitting time of fundamental frequency is less than 5seconds.

Refer to the APPENDIX 2.

*Note 3*: This device is only operated by battery.

*Note 4*: The data in this test report are traceable to the national or international standards.

**A sample calculation:**

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

**Note 1:** The sample was tested according to the following specification:
RSS-210 and ISSUE No.: 8 Date: 2010

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## 3.2 Transmitter requirements

### 3.2.1 Conducted Emission

**Procedure:**

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

**Measurement Data: Not applicable**

- The EUT operates by the Battery
- According to the rule of section 15.207(c), The EUT exempt to the power line conducted test.

**LIMIT:**

| Frequency Range | Near-peak | Average |
|---|---|---|
| 0.15 ~ 0.5 MHz | 66 ~ 56 dBuV | 56 ~ 46 dBuV |
| 0.5 ~ 5 MHz | 56 dBuV | 46 dBuV |
| 5 ~ 30 MHz | 60 dBuV | 50 dBuV |

Note: The limits will decrease with the frequency logarithmically within 0.15MHz to 0.5MHz

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## 3.2.2 Radiated Emission-Transmitters

**Definition:**

The field strength of emissions from intentional radiators was measured.

| | | |
|---|---|---|
| Test method | : | FCC Part 15.205 / 209 |
| Transmit Frequency | : | 433.055~434.680MHz |
| Frequency Range | : | 30 MHz ~ 10th harmonic. |
| Bandwidth | : | 120 kHz (F < 1GHz)  1 MHz (F > 1GHz) |
| Distance of antenna | : | 3 meters |
| Test mode | : | Tx mode |
| Result | : | **Complies** |

**Measurement Data:**

- No other emissions were detected at a level greater than 20dB below limit.
- Refer to the next page.

**Field Strength Limit of fundamental and Harmonics:  Part 15.231(b)**

| Frequency (MHz) | Limit @ 3m |
|---|---|
| 433.055~434.680 | 41.6667(433.055) – 7083.3333 = 10961 uV/m = 80.8 dBuV/m (Average)<br>100.8dBuV/m (Peak)<br>41.6667(433.580) – 7083.3333 = 10983 uV/m = 80.8 dBuV/m (Average)<br>100.8dBuV/m (Peak)<br>41.6667(434.680) – 7083.3333 = 11028 uV/m = 80.9 dBuV/m (Average)<br>100.9dBuV/m (Peak) |
| Harmonics | 60.8 dBuV/m<br>(The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.) |

**Part 15.209  LIMIT:**

| Frequency (MHz) | Limit (uV/m) @ 3m |
|---|---|
| 30 ~ 88 | 100** |
| 88 ~ 216 | 150** |
| 216 ~ 960 | 200** |
| Above 960 | 500 |

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz.  However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

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**Measurement Data:**

| Frequency [MHz] | Reading [dBuV/m] AV | Reading [dBuV/m] Peak | Pol. | Correction Factor | Limits [dBuV/m] AV | Limits [dBuV/m] Peak | Result [dBuV/m] AV | Result [dBuV/m] Peak | Margin [dB] AV | Margin [dB] Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| 433.055[3)] | 71.15 | 73.07 | H | -9.08 | 80.8 | 100.8 | 62.07 | 63.99 | 18.73 | 36.81 |
| 866.350 | 33.04 | 35.10 | H | -2.83 | 60.8 | 80.8 | 30.21 | 32.27 | 30.59 | 48.53 |
| **Frequency [MHz]** | **Reading [dBuV/m] AV** | **Reading [dBuV/m] Peak** | **Pol.** | **Correction Factor** | **Limits [dBuV/m] AV** | **Limits [dBuV/m] Peak** | **Result [dBuV/m] AV** | **Result [dBuV/m] Peak** | **Margin [dB] AV** | **Margin [dB] Peak** |
| 433.580[3)] | 70.17 | 72.59 | H | -9.08 | 80.8 | 100.8 | 61.09 | 63.51 | 19.71 | 37.29 |
| **Frequency [MHz]** | **Reading [dBuV/m] AV** | **Reading [dBuV/m] Peak** | **Pol.** | **Correction Factor** | **Limits [dBuV/m] AV** | **Limits [dBuV/m] Peak** | **Result [dBuV/m] AV** | **Result [dBuV/m] Peak** | **Margin [dB] AV** | **Margin [dB] Peak** |
| 434.680[3)] | 70.01 | 72.19 | H | -9.08 | 80.8 | 100.8 | 60.93 | 63.11 | 19.87 | 37.69 |
| 869.500 | 34.33 | 36.51 | H | -2.83 | 60.8 | 80.8 | 31.50 | 33.68 | 29.30 | 47.12 |

***restricted band of operation §15.205**

*** Result level = Reading value + Antenna factor – Amp Gain + Cable Loss**

*** This EUT was tested in 3 orthogonal positions and the worst-case data was presented.**

***Note 1:*** No other emission were detected at a level greater than 20 dB below limit.

***Note 2:*** All readings above 1GHz were taken using a peak detector function at a distance of 3 meters.

***Note 3:*** Fundamental Frequency

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# Radiated Emissions

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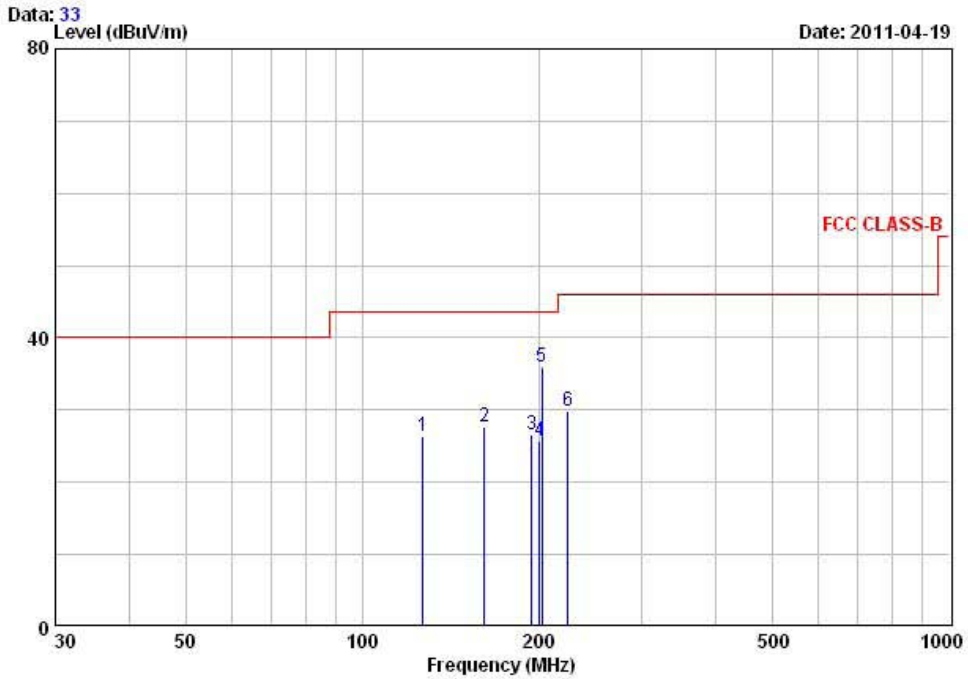
EUT/Model No.: KlaT8-RC  TEST MODE: Wireless mode

Temp Humi : 18 / 22  Tested by: PARK.H.W




| | Freq | Reading | C.F | Result | Limit QP | Margin | Height | Angle | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB/m | dBuV/m | dBuV/m | dB | cm | deg | |
| 1 | 126.75 | 36.90 | -10.45 | 26.45 | 43.50 | 17.05 | 198 | 75 | HORIZONTAL |
| 2 | 161.72 | 36.80 | -9.12 | 27.68 | 43.50 | 15.82 | 247 | 159 | HORIZONTAL |
| 3 | 194.63 | 38.00 | -11.51 | 26.49 | 43.50 | 17.01 | 214 | 73 | HORIZONTAL |
| 4 | 200.58 | 37.60 | -11.82 | 25.78 | 43.50 | 17.72 | 149 | 57 | HORIZONTAL |
| 5 | 202.61 | 47.70 | -11.71 | 35.99 | 43.50 | 7.51 | 183 | 47 | HORIZONTAL |
| 6 | 224.13 | 40.60 | -10.67 | 29.93 | 46.00 | 16.07 | 124 | 148 | HORIZONTAL |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



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## 3.2.3 Radiated Emission-Receivers

**Definition:**

The field strength of emissions from intentional radiators was measured.

| | | |
|---|---|---|
| Test method | : | FCC Part 15.209 |
| Transmit Frequency | : | 433.055~434.680MHz |
| Frequency Range | : | 30 MHz ~ 10$^{th}$ harmonic. |
| Bandwidth | : | 120 kHz (F < 1GHz)  1 MHz (F > 1GHz) |
| Distance of antenna | : | 3 meters |
| Test mode | : | Rx mode |
| Result | : | **Complies** |

**Measurement Data:**

- No other emissions were detected at a level greater than 20dB below limit.
- Refer to the next page.

**Field Strength Limit**

**Part 15.209 LIMIT:**

| Frequency (MHz) | Limit (uV/m) @ 3m |
|---|---|
| 30 ~ 88 | 100** |
| 88 ~ 216 | 150** |
| 216 ~ 960 | 200** |
| Above 960 | 500 |

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

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**Measurement Data:**

| Frequency [MHz] | Reading [dBuV/m] AV | Reading [dBuV/m] Peak | Pol. | Correction Factor | Limits [dBuV/m] AV | Limits [dBuV/m] Peak | Result [dBuV/m] AV | Result [dBuV/m] Peak | Margin [dB] AV | Margin [dB] Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| 339.6 | 42.65 | 44.60 | H | -10.73 | 46 | 66 | 31.92 | 33.87 | 14.08 | 32.13 |

| Frequency [MHz] | Reading [dBuV/m] AV | Reading [dBuV/m] Peak | Pol. | Correction Factor | Limits [dBuV/m] AV | Limits [dBuV/m] Peak | Result [dBuV/m] AV | Result [dBuV/m] Peak | Margin [dB] AV | Margin [dB] Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| 339.6 | 41.38 | 43.54 | H | -10.73 | 46 | 66 | 30.65 | 32.81 | 15.35 | 33.19 |

| Frequency [MHz] | Reading [dBuV/m] AV | Reading [dBuV/m] Peak | Pol. | Correction Factor | Limits [dBuV/m] AV | Limits [dBuV/m] Peak | Result [dBuV/m] AV | Result [dBuV/m] Peak | Margin [dB] AV | Margin [dB] Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| 339.6 | 42.09 | 44.17 | H | -10.73 | 46 | 66 | 31.36 | 33.44 | 14.64 | 32.56 |

*** Result level = Reading value + Antenna factor – Amp Gain + Cable Loss**

***Note 1:*** No other emission were detected at a level greater than 20 dB below limit.

***Note 2:*** All readings above 1GHz were taken using a peak detector function at a distance of 3 meters.

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APPENDIX 1

# BANDWIDTH OF EMISSION

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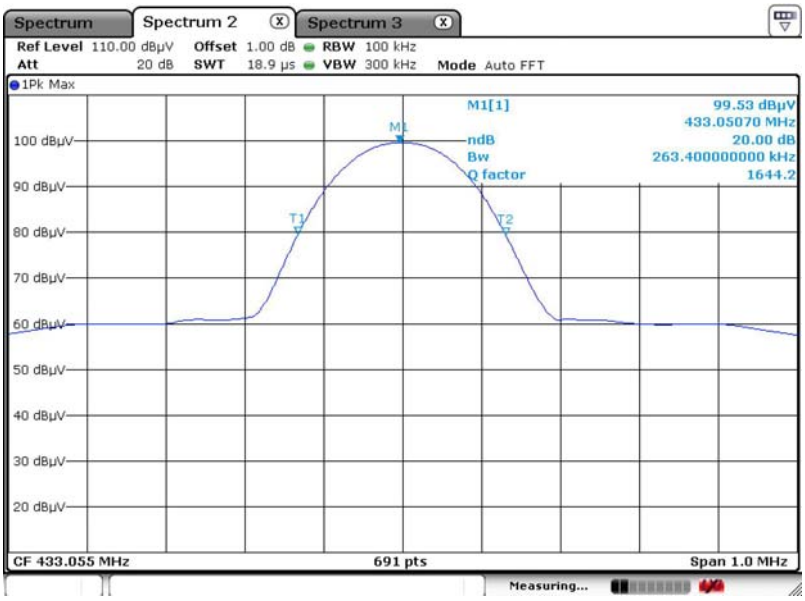


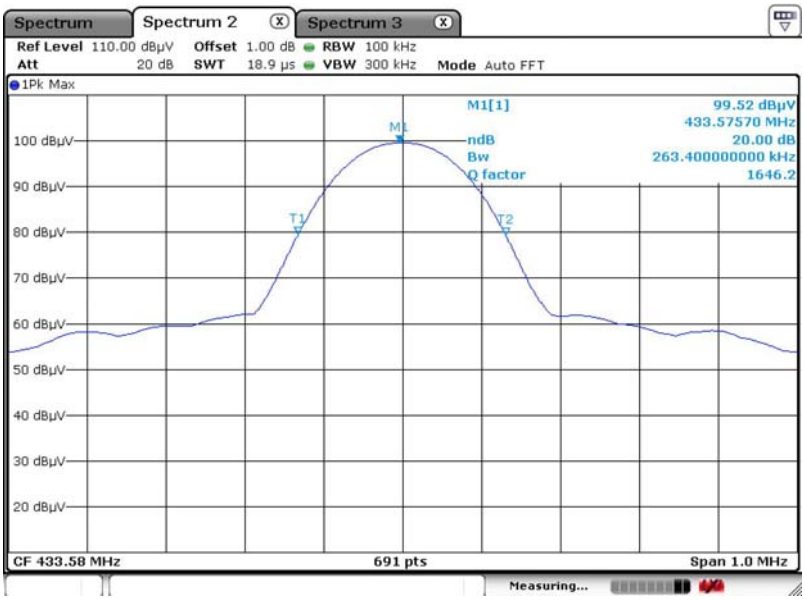


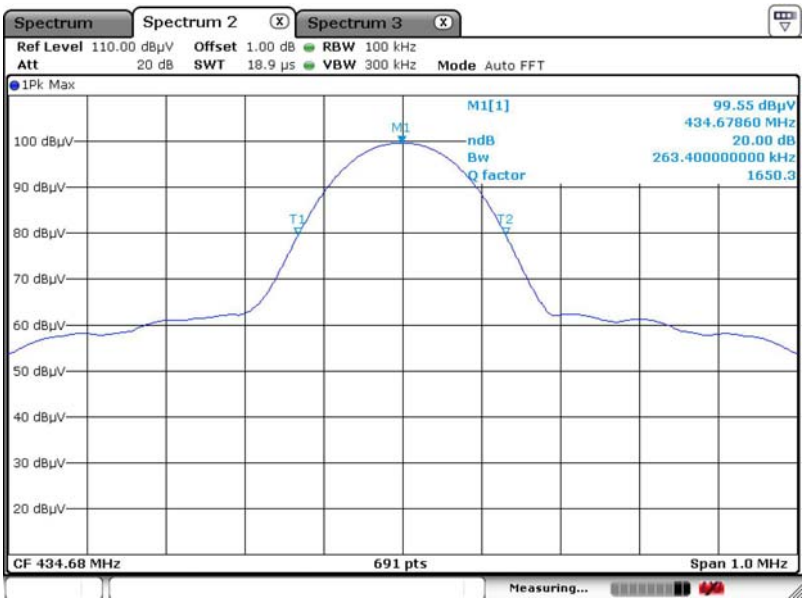


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APPENDIX 2

# THE EMITTING TIME OF FUNDAMENTAL FREQUENCY

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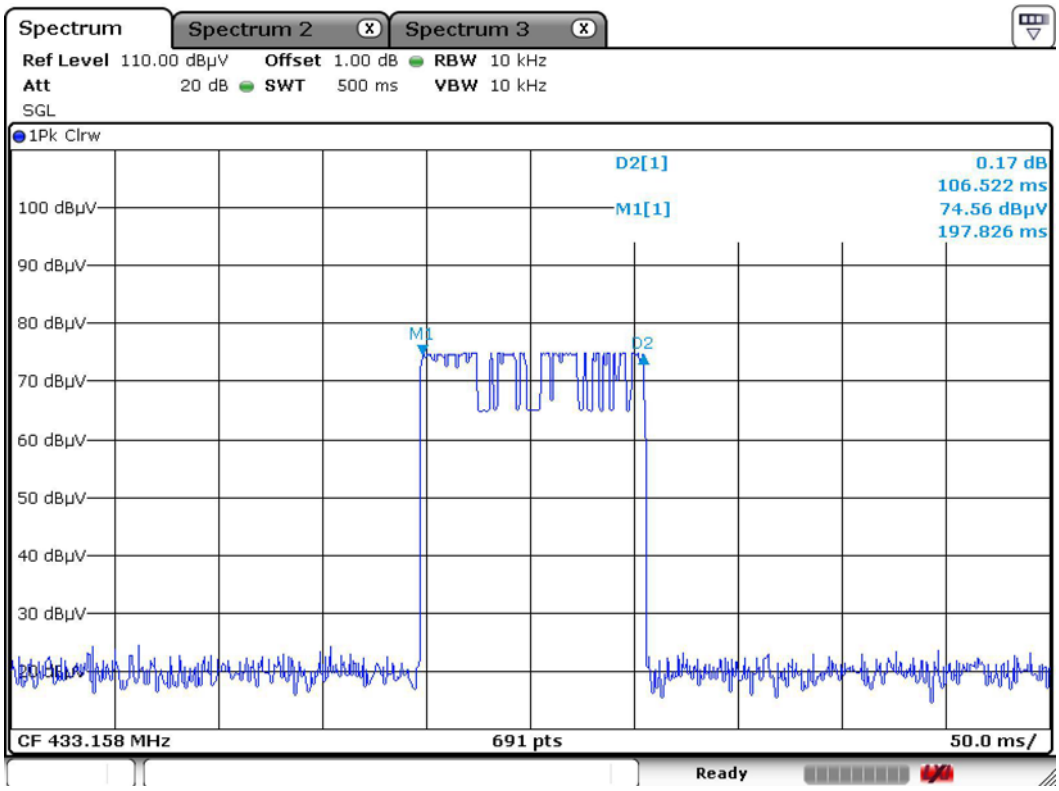
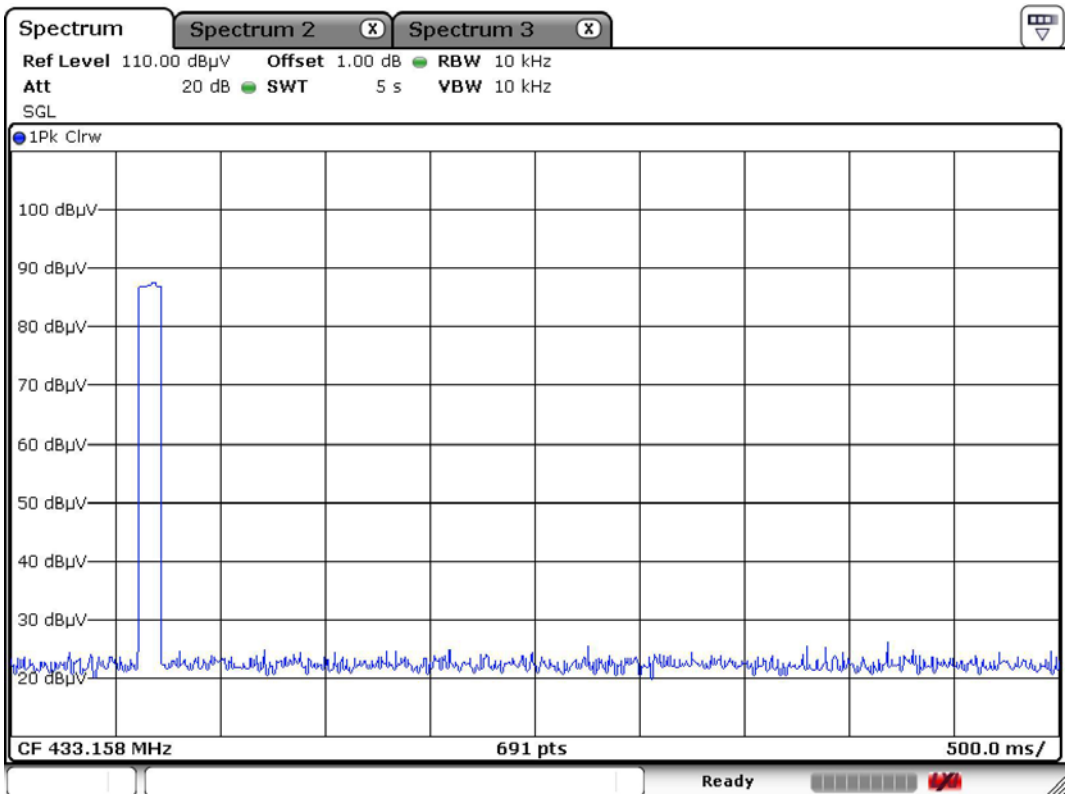
# The Emitting time of Fundamental Frequency




Note . The above plots is the worst case plots generated with the full data rate.

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APPENDIX 3

# TEST EQUIPMENT USED FOR TESTS

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| | Description | Model No. | Serial No. | Manufacturer | Interval | Last Cal. Date |
|---|---|---|---|---|---|---|
| 1 | Spectrum Analyzer | FSV-30 | 100757 | R&S | 1 year | 2011-01-24 |
| 2 | Spectrum Analyzer | 8563E | 3425A02505 | HP | 2 year | 2010-03-29 |
| 3 | Spectrum Analyzer | 8594E | 3710A04074 | HP | 2 year | 2009-10-12 |
| 4 | Signal Generator | 8648C | 3623A02597 | HP | 1 year | 2011-03-30 |
| 5 | Signal Generator | 83711B | US34490456 | HP | 1 year | 2011-03-30 |
| 6 | Attenuator (3dB) | 8491A | 37822 | HP | 2 year | 2010-10-08 |
| 7 | Attenuator (10dB) | 8491A | 63196 | HP | 2 year | 2010-10-08 |
| 8 | EMI Test Receiver | ESCI7 | 100722 | R&S | 1 year | 2010-10-08 |
| 9 | Horn Antenna(18 ~ 40GHz) | SAS-574 | 154 | Schwarzbeck | 2 year | 2010-11-25 |
| 10 | Horn Antenna(18 ~ 40GHz) | SAS-574 | 155 | Schwarzbeck | 2 year | 2010-11-25 |
| 11 | RF Amplifier | 8447D | 2439A09058 | HP | 2 year | 2010-10-08 |
| 12 | RF Amplifier | 8449B | 3008A02126 | HP | 2 year | 2010-03-29 |
| 13 | Test Receiver | ESHS10 | 828404/009 | R&S | 1 year | 2011-03-30 |
| 14 | TRILOG Antenna | VULB 9160 | 9160-3172 | SCHWARZBECK | 2 year | 2010-10-07 |
| 15 | Horn Antenna | BBHA 9120D | 9120D122 | SCHWARZBECK | 2 year | 2010-12-24 |
| 16 | Dipole Antenna | VHA9103 | 2116 | SCHWARZBECK | 2 year | 2010-11-25 |
| 17 | Dipole Antenna | VHA9103 | 2117 | SCHWARZBECK | 2 year | 2010-11-25 |
| 18 | Dipole Antenna | VHA9105 | 2261 | SCHWARZBECK | 2 year | 2010-11-25 |
| 19 | Dipole Antenna | VHA9105 | 2262 | SCHWARZBECK | 2 year | 2010-11-25 |
| 20 | Hygro-Thermograph | THB-36 | 0041557-01 | ISUZU | 2 year | 2010-04-12 |
| 21 | Splitter (SMA) | ZFSC-2-2500 | SF617800326 | Mini-Circuits | - | - |
| 22 | Power Divider | 11636A | 6243 | HP | 2 year | 2010-10-08 |
| 23 | DC Power Supply | 6622A | 3448A03079 | HP | - | - |
| 24 | Frequency Counter | 5342A | 2826A12411 | HP | 1 year | 2011-03-30 |
| 25 | Power Meter | EPM-441A | GB32481702 | HP | 1 year | 2011-03-30 |
| 26 | Power Sensor | 8481A | US41030291 | HP | 1 year | 2010-10-08 |
| 27 | Audio Analyzer | 8903B | 3729A18901 | HP | 1 year | 2010-10-08 |
| 28 | Modulation Analyzer | 8901B | 3749A05878 | HP | 1 year | 2010-10-08 |
| 29 | TEMP & HUMIDITY Chamber | YJ-500 | LTAS06041 | JinYoung Tech | 1 year | 2010-10-08 |
| 30 | Stop Watch | HS-3 | 601Q09R | CASIO | 2 year | 2010-03-31 |
| 31 | LISN | ENV216 | 100408 | R&S | 1 year | 2010-10-08 |
| 32 | UNIVERSAL RADIO COMMUNICATION TESTER | CMU200 | 106243 | R&S | 2 year | 2010-05-13 |
| 33 | Attenuator (30dB) | 8498A | 3318A10929 | HP | 2 year | 2011-01-05 |

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