

FCC CERTIFICATION
On Behalf of
Matador International Inc.

Wireless Analog Outdoor Temperature/Humidity Transmitter
Model No.: P04483

FCC ID: TJY0720

Prepared for : Matador International Inc.
Address : 5F., No.225, Sec.5, Nan Jing E.Rd., Taipei, 104, Taiwan

Prepared by : ACCURATE TECHNOLOGY CO. LTD
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Report Number : ATE20051396
Date of Test : August 25, 2005
Date of Report : August 31 , 2005

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Test Report Certification

Applicant : Matador International Inc.
 Manufacturer : E-Kai Industrial Co., Ltd.
 EUT Description : Wireless Analog Outdoor Temperature / Humidity Transmitter
 (A) MODEL NO.: P04483
 (B) SERIAL NO.: N/A
 (C) POWER SUPPLY: DC 3.0V("AA" battery Type × 2)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.231: 2004 & ANSI C63.4: 2003

The device described above is tested by ACCURATE TECHNOLOGY 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 Section 15.231 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : August 25 2005

Prepared by : 
 (Engineer)

Reviewer : 
 (Quality Manager)

Approved & Authorized Signer : 
 (Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Wireless Analog Outdoor Temperature / Humidity Transmitter
Model Number	:	P04483
Power Supply	:	DC 3.0V ("AA" battery Type x 2)
Memo	:	This submittal is transmitter of Weather Station, The receiver is compliance with Subpart B is authorized under a DOC procedure.
Applicant	:	Matador International Inc.
Address	:	5F., No.225, Sec.5, Nan Jing E.Rd., Taipei, 104, Taiwan
Manufacturer	:	E-Kai Industrial Co., Ltd.
Address	:	Zhen An Rd., Managing District of Yin Cheng, Xiabian District, Chanan, Dongguan, Guangdong, China
Date of sample received	:	August 20, 2005
Date of Test	:	August 25, 2005

1.2. Description of Test Facility

EMC Lab	:	Accredited by TUV Rheinland Shenzhen, May 10, 2004 Accredited by FCC, May 10, 2004 The Certificate Registration Number is 253065 Accredited by Industry Canada, May 18, 2004 The Certificate Registration Number is IC 5077
Name of Firm	:	ACCURATE TECHNOLOGY CO. LTD
Site Location	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.3. Measurement Uncertainty

Conducted Emission Uncertainty = $\pm 2.66\text{dB}$

Radiated Emission Uncertainty = $\pm 4.26\text{dB}$

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESI26	838786/013	01.02.2006
Bilog Antenna	Schwarzbeck	VULB9163	9163-194	01.02.2006
Bilog Antenna	Chase	CBL6112B	2591	01.02.2006
Horn Antenna	Rohde&Schwarz	HF906	100013	01.02.2006
Spectrum Analyzer	Anritsu	MS2651B	6200238856	01.02.2006
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	01.02.2006
L.I.S.N.	Rohde&Schwarz	ESH3-Z5	100305	01.02.2006
L.I.S.N.	Rohde&Schwarz	ESH3-Z5	100310	01.02.2006
Signal Generator	GW	GAG-810	0913317	01.02.2006

3. THE FIELD STRENGTH OF RADIATION EMISSION

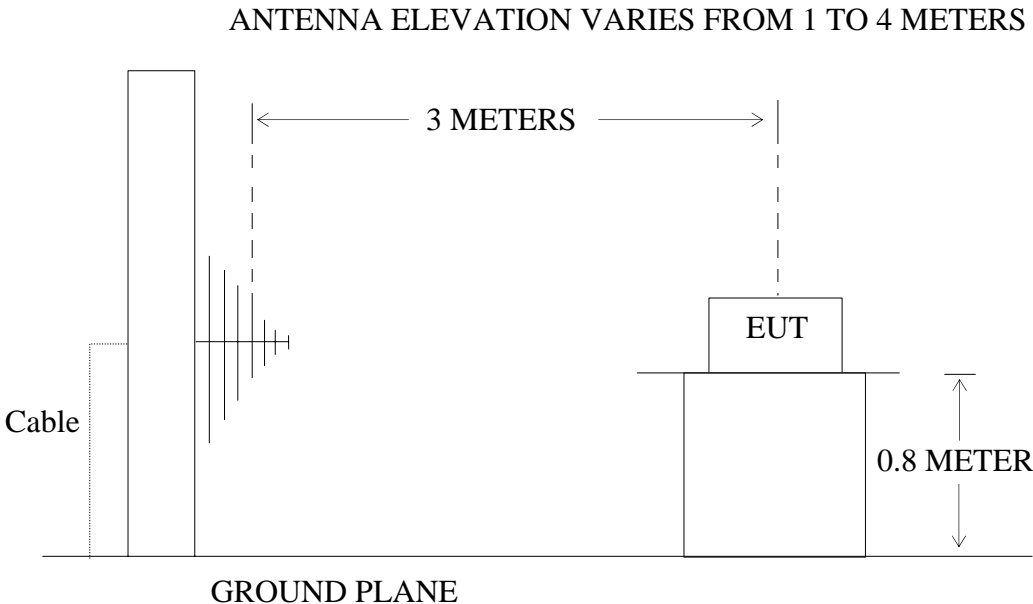
3.1. Block Diagram of Test Setup

3.1.1. Block diagram of connection between the EUT and simulators



(EUT: Wireless Analog Outdoor Temperature / Humidity Transmitter)

3.1.2. Anechoic Chamber Test Setup Diagram



(EUT: Wireless Analog Outdoor Temperature / Humidity Transmitter)

3.2. The Field Strength of Radiation Emission Measurement Limits

3.2.1 Radiation Emission Measurement Limits According to Section 15.231(e)

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Average] [$\mu\text{V/m}$]	Field Strength of Spurious Emission [Average] [$\mu\text{V/m}$]
40.66-40.70	1000	100
70-130	500	50
130-174	500-1500	50-150
174-260	1500	150
260-470	1500-5000	150-500
Above 470	5000	500

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

3.2.2 Restricted Band Radiation Emission Measurement Limits According to Section 15.205 and Section 15.209

3.3. Configuration of EUT on Measurement

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

3.3.1. Wireless Analog Outdoor Temperature / Humidity Transmitter (EUT)

Model Number : P04483
 Serial Number : N/A
 Manufacturer : E-Kai Industrial Co., Ltd.

3.4. Operating Condition of EUT

3.4.1. Setup the EUT and simulator as shown as Section 3.1.

3.4.2. Turn on the power of all equipment.

3.4.3. Let the EUT work in measuring modes (TX) measure it.

3.5. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI 63.4 on radiated emission measurement.

The bandwidth of test receiver (R&S ESI26) is set at 120KHz in 30-1000MHz, and 1MHz in 1000-5000MHz.

The frequency range from 30MHz to 5000MHz is checked.

3.6.The Field Strength of Radiation Emission Measurement Results

PASS.

The frequency range 30MHz to 5000MHz is investigated.

Date of Test:	<u>August 25, 2005</u>	Temperature:	<u>22°C</u>
	<u>Wireless Analog Outdoor</u>		
	<u>Temperature / Humidity</u>		
EUT:	<u>Transmitter</u>	Humidity:	<u>50%</u>
Model No.:	<u>P04483</u>	Power Supply:	<u>DC3.0V ("AA" batteryx2)</u>
Test Mode:	<u>TX</u>	Test Engineer:	<u>Andy</u>

Frequency (MHz)	Reading (dBμV/m)	Factor Corr.	Average Factor	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	PEAK	(dB)	(dB)	AV	PEAK	AV	PEAK	AV	PEAK	
433.833	51.9	16.6	-6.7	61.8	68.5	72.8	92.8	11.0	24.3	Horizontal
867.666	37.0	24.4	-6.7	48.7	55.4	52.8	72.8	4.1	17.4	
*1301.499	38.3	12.4	-6.7	44.0	50.7	54.0	74.0	10.0	23.3	
1735.332	23.2	14.1	-6.7	30.6	37.3	52.8	72.8	22.2	35.5	
2169.165	27.8	16.1	-6.7	37.2	43.9	52.8	72.8	15.6	28.9	
2402.806	18.4	17.5	-6.7	29.2	35.9	52.8	72.8	23.6	36.9	
2602.998	19.8	18.1	-6.7	31.2	37.9	52.8	72.8	21.6	34.9	
3036.831	25.7	19.5	-6.7	38.5	45.2	52.8	72.8	14.3	27.6	
3470.664	17.2	21.1	-6.7	31.6	38.3	52.8	72.8	21.2	34.5	
433.833	67.5	16.6	-6.7	69.4	76.1	72.8	92.8	3.4	16.7	Vertical
867.666	37.1	24.4	-6.7	50.8	57.5	52.8	72.8	2.0	15.3	
*1301.499	44.9	12.4	-6.7	50.6	57.3	54.0	74.0	3.4	16.7	
1735.332	36.3	14.1	-6.7	43.7	50.4	52.8	72.8	9.1	22.4	
2169.165	35.4	16.1	-6.7	44.8	51.5	52.8	72.8	8.0	21.3	
2602.998	20.3	18.1	-6.7	31.7	38.4	52.8	72.8	21.1	34.4	
3036.831	21.0	19.5	-6.7	33.8	40.5	52.8	72.8	19.0	32.3	
3470.664	16.0	21.1	-6.7	30.4	37.1	52.8	72.8	22.4	35.7	

Note:

- *: Denotes restricted band of operation.

Measurements were made using a peak detector and average detector. Any emission Above 1000MHz and falling within the restricted bands of FCC Part 15 Section 15.205 were compliance with the emission limit of FCC Part 15 Section 15.209.

2. The field strength is calculated by adding the average factor, antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

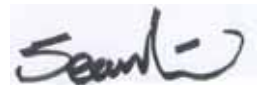
Result = Reading + Corrected Factor + Average Factor

Where Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss – Amplifier Gain

Average factor is calculated see Section 5.

3. FCC Limit for Average Measurement = $16.6667(433.833)-2833.3333 = 4397.2312\mu\text{V/m}=72.8\text{dB}\mu\text{V/m}$

Reviewer :



4. OCCUPIED BANDWIDTH

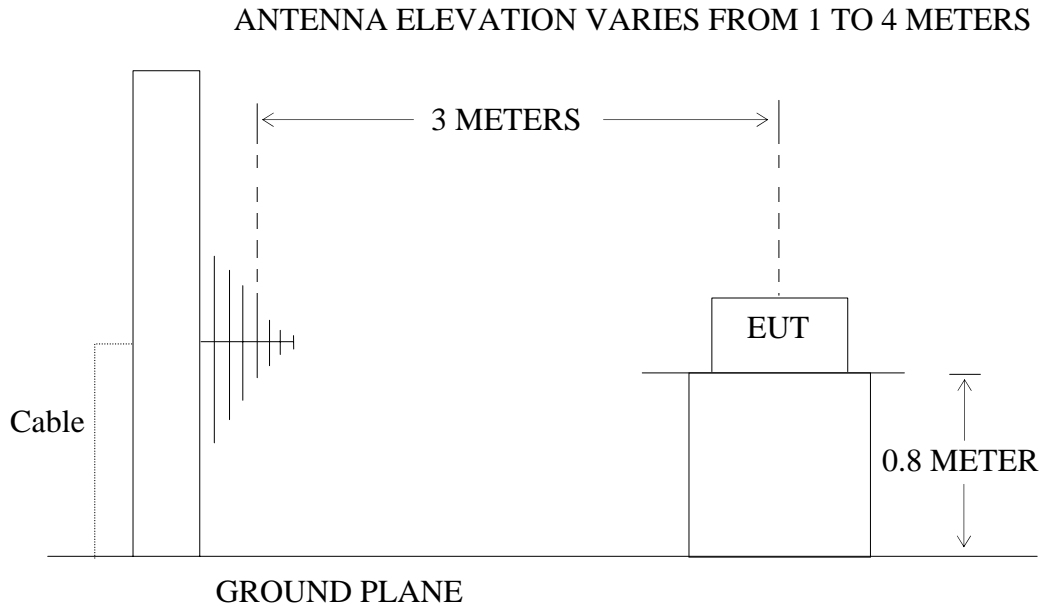
4.1. Block Diagram of Test Setup

4.1.1. Block diagram of connection between the EUT and simulators



(EUT: Wireless Analog Outdoor Temperature / Humidity Transmitter)

4.1.2. Anechoic Chamber Test Setup Diagram



(EUT: Wireless Analog Outdoor Temperature / Humidity Transmitter)

4.2. The Bandwidth of Emission Limit According To Section 15.231(c)

The bandwidth of emission shall be no wider than 0.25% of the center frequency. Therefore, the bandwidth of the emission limit is $433.833\text{MHz} \times 0.25\% = 1084.6\text{KHz}$. Bandwidth is determined at the two points 20 dB down from the top of modulated carrier.

4.3.EUT Configuration on Measurement

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

4.3.1.Wireless Analog Outdoor Temperature / Humidity Transmitter (EUT)

Model Number : P04483
Serial Number : N/A
Manufacturer : E-Kai Industrial Co., Ltd.

4.4.Operating Condition of EUT

4.4.1.Setup the EUT and simulator as shown as Section 4.1.

4.4.2.Turn on the power of all equipment.

4.4.3.Let the EUT work in measuring mode (TX) measure it.

4.5.Test Procedure

4.5.1. Set SPA Center Frequency = Fundamental frequency, RBW = 3kHz, VBW = 10kHz, Span = 200kHz.

4.5.2. Set SPA Max hold. Mark peak, -20dB

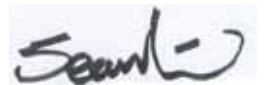
4.6. Measurement Result

The EUT does meet the FCC requirement.

-20dB bandwidth = 15.2KHz < 1084.6KHz.

The spectral diagrams in appendix I.

Reviewer :

A handwritten signature in black ink, appearing to read "Sean", is written over a light blue rectangular background. The signature is stylized with a large 'S' and a trailing flourish.

5. AVERAGE FACTOR MEASUREMENT

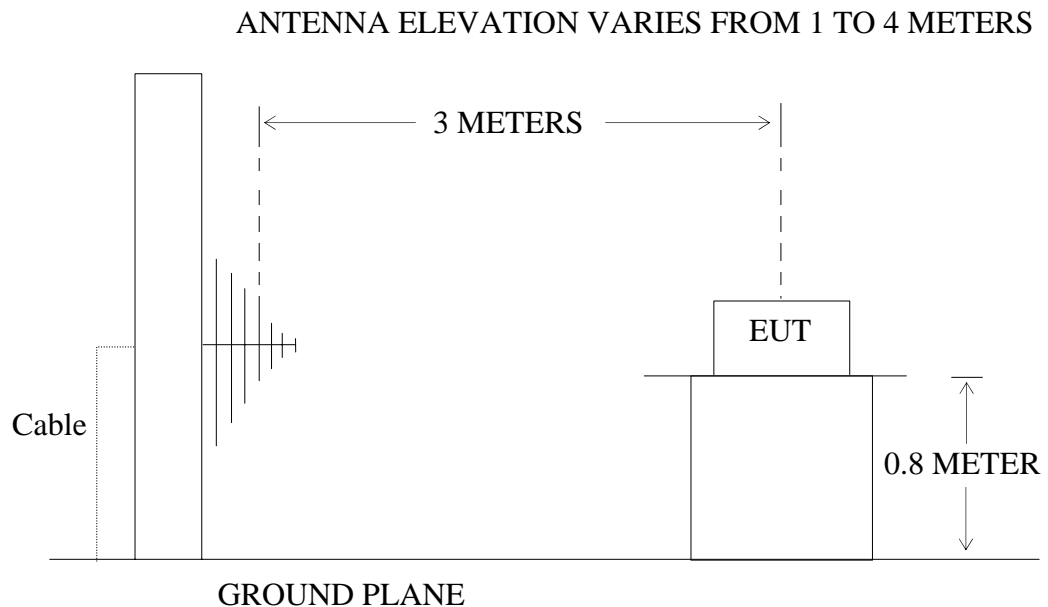
5.1. Block Diagram of Test Setup

5.1.1. Block diagram of connection between the EUT and simulators



(EUT: Wireless Analog Outdoor Temperature / Humidity Transmitter)

5.1.2. Anechoic Chamber Test Setup Diagram



(EUT: Wireless Analog Outdoor Temperature / Humidity Transmitter)

5.2. Average factor Measurement

Average factor in dB = $20 \log (\text{duty cycle})$

5.2.1. The specification for output field strengths in accordance with the FCC rules specify measurements with an average detector. During testing, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

5.3.EUT Configuration on Measurement

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

5.3.1. Wireless Analog Outdoor Temperature / Humidity Transmitter (EUT)

Model Number : P04483
Serial Number : N/A
Manufacturer : E-Kai Industrial Co., Ltd.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in measuring mode (TX) measure it.

5.5.Test Procedure

5.5.1. The time period over which the duty cycle is measured is 100 milliseconds, or the repetition cycle, whichever is a shorter time frame. The worst case (highest percentage on) duty cycle is used for the calculation.

5.5.2. Set EUT as normal operation.

5.5.3. Set SPA View. Delta Mark time.

5.6. Measurement Result

The duty cycle is simply the on time divided by the period:

The duration of one cycle = 135.6ms

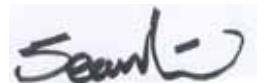
Effective period of the cycle = $(1 \times 9.58) + (14 \times 2.62) + (16 \times 1.02)$ ms = 62.58ms

DC = $62.58\text{ms} / 135.6\text{ms} = 0.4615$

Therefore, the average factor is found by $20\log 0.4615 = -6.7\text{dB}$

The spectral diagrams in appendix I.

Reviewer :



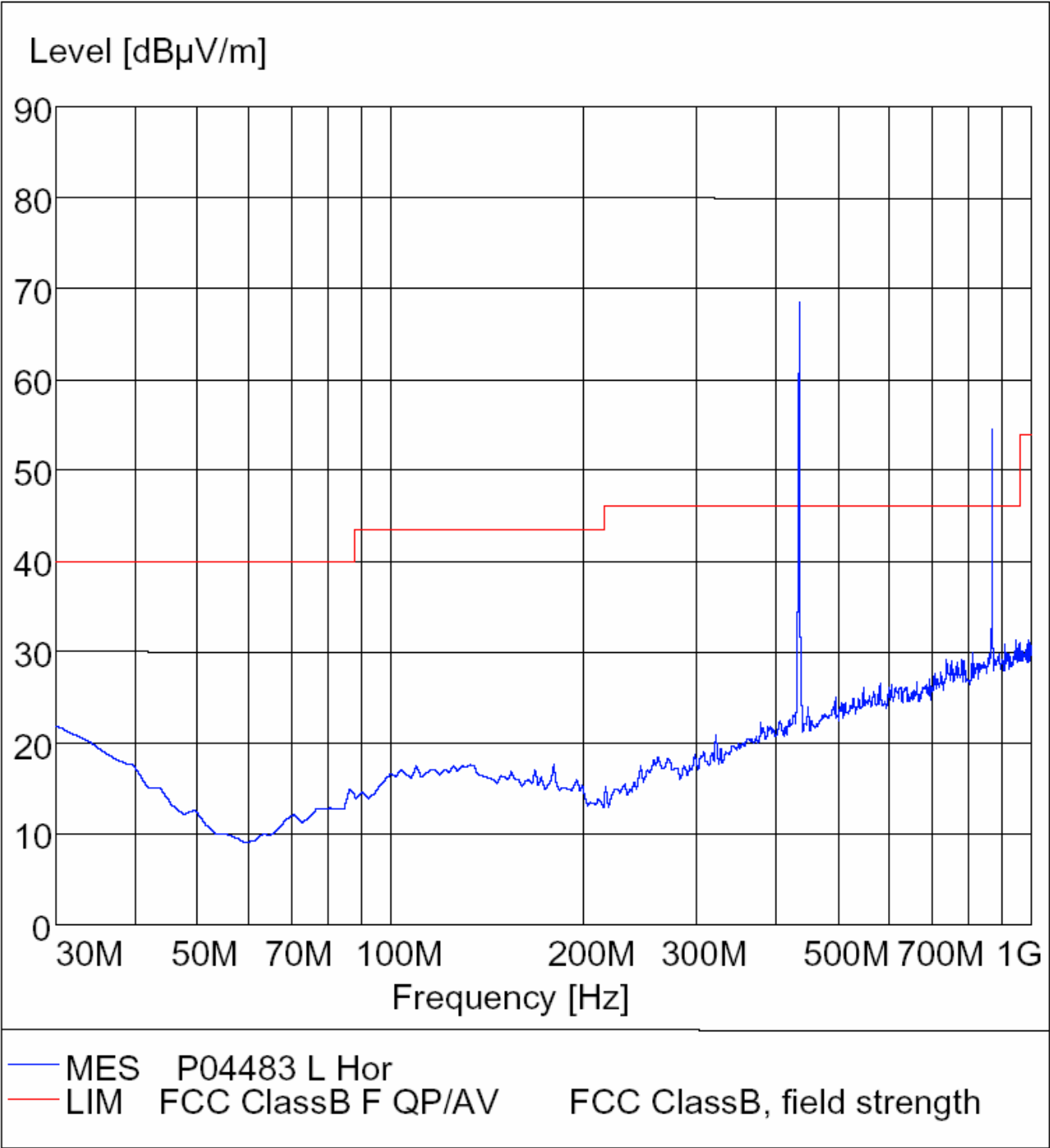
APPENDIX I (Test Curves)

Radiated Disturbance

FCCPart15

EUT: Wireless Analog Outdoor Temperature/Humidity Transmitter
Manufacturer: Matador International Inc.
Operating Condition: TX
Test Site: ATC Lab.SAC
Operator: Andy
Test Specification: Horizontal
Commend: DC 3.0V Power By Battery

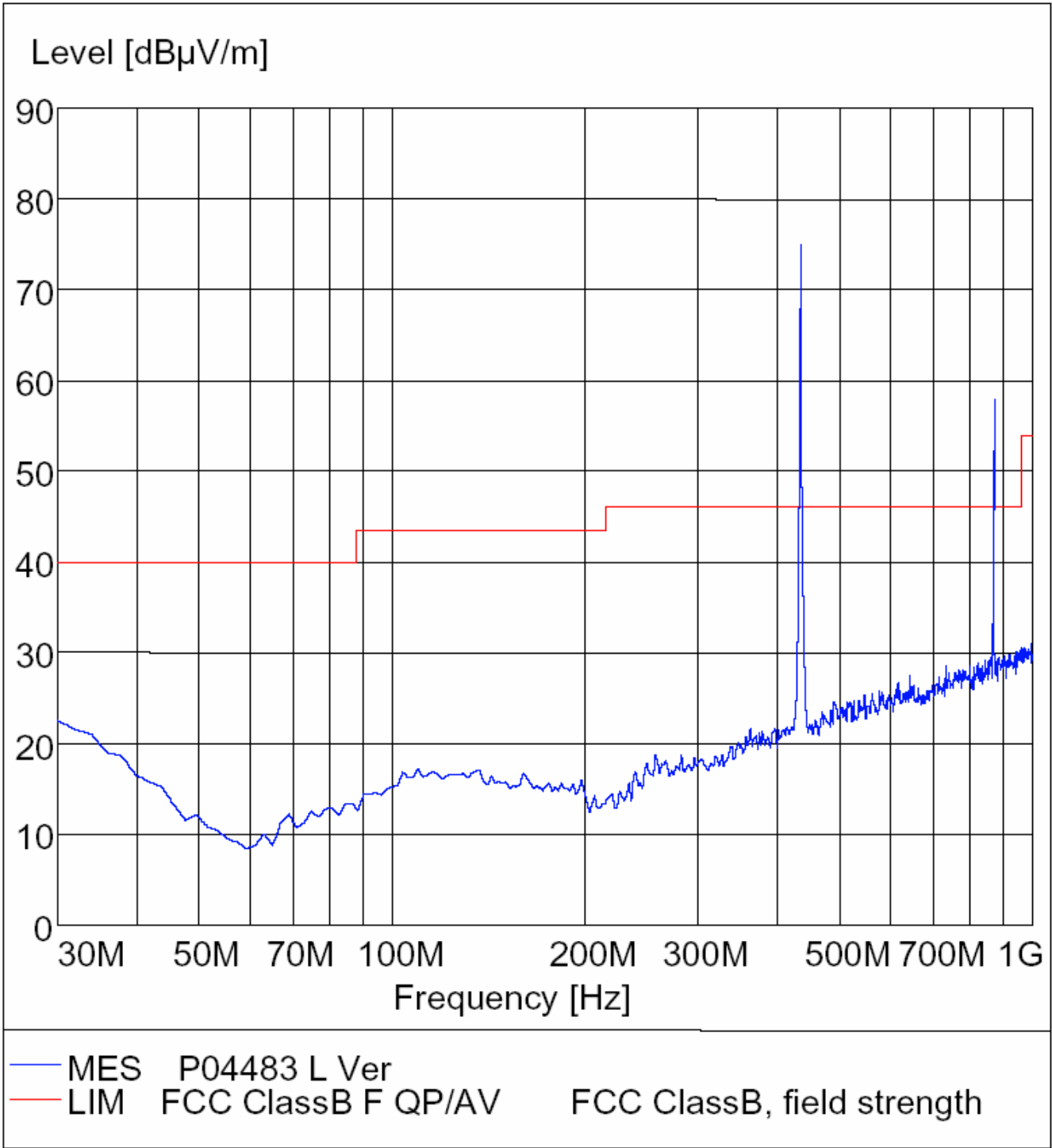
M/N:P04483



Radiated Disturbance

FCCPart15

EUT: Wireless Analog Outdoor Temperature/Humidity Transmitter M/N:P04483
Manufacturer: Matador International Inc.
Operating Condition: TX
Test Site: ATC Lab.SAC
Operator: Andy
Test Specification: Vertical
Commend: DC 3.0V Power By Battery



Radiated Disturbance

FCCPart15

EUT: Wireless Analog Outdoor Temerature/Humidity TransmitterM/N:P04483

Manufacturer:Matador International Inc.

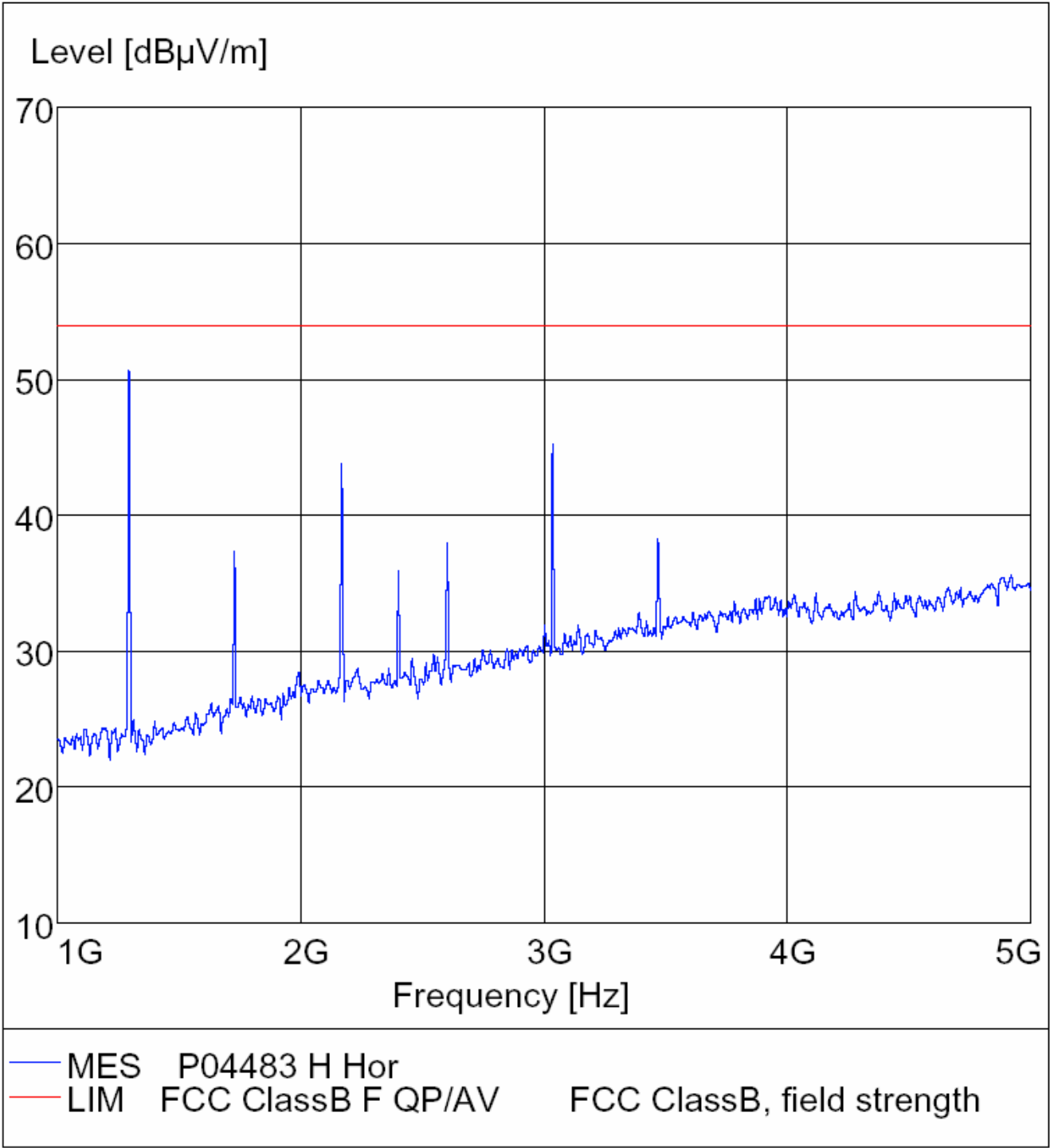
Operating Condition: TX

Test Site:ATC Lab.SAC

Operator:Andy

Test Specification: Horizontal

Commend:DC 3.0V Power By Battery



Radiated Disturbance

FCCPart15

EUT: Wireless Analog Outdoor Temerature/Humidity TransmitterM/N:P04483

Manufacturer:Matador International Inc.

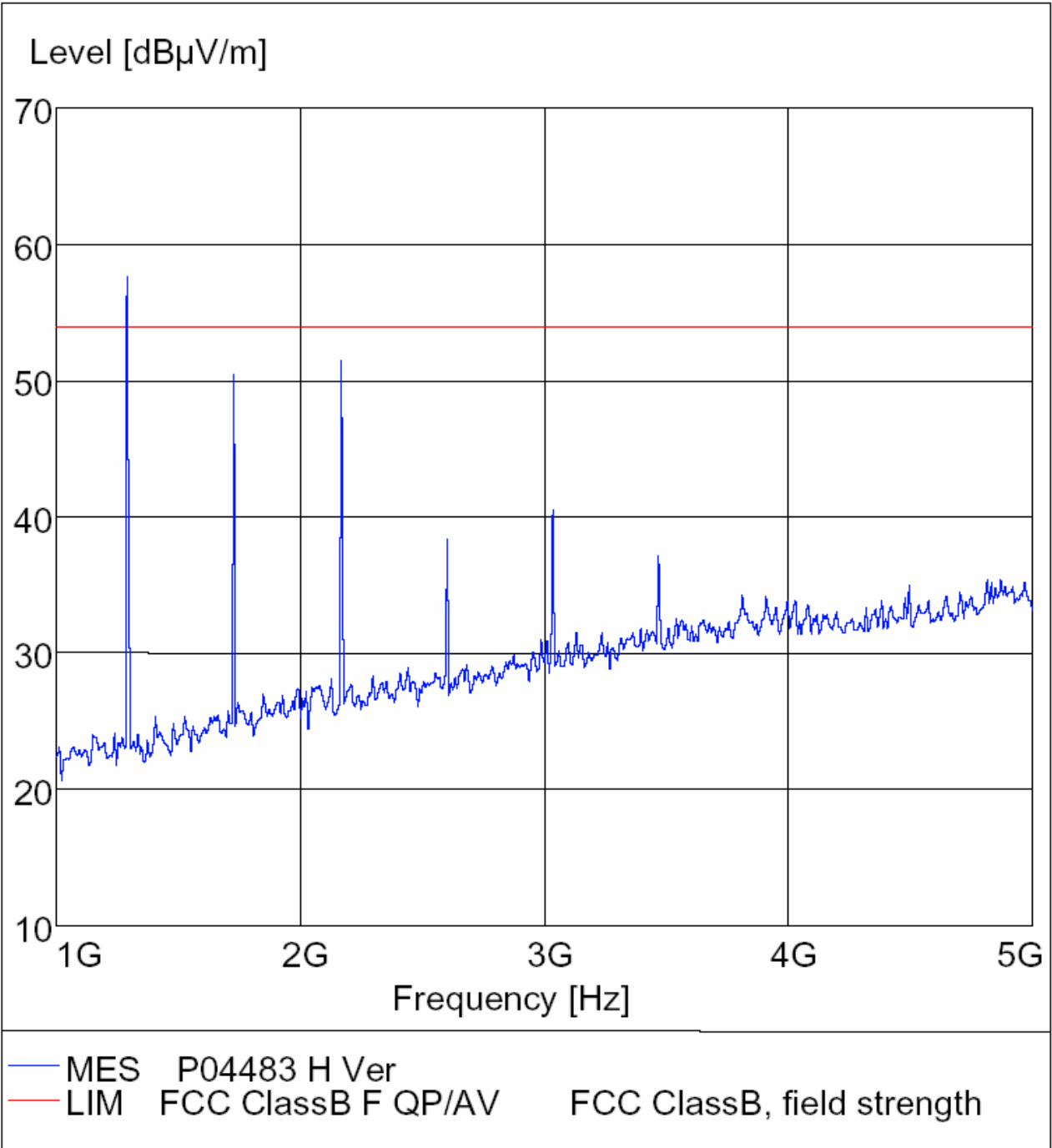
Operating Condition: TX

Test Site:ATC Lab.SAC

Operator:Andy

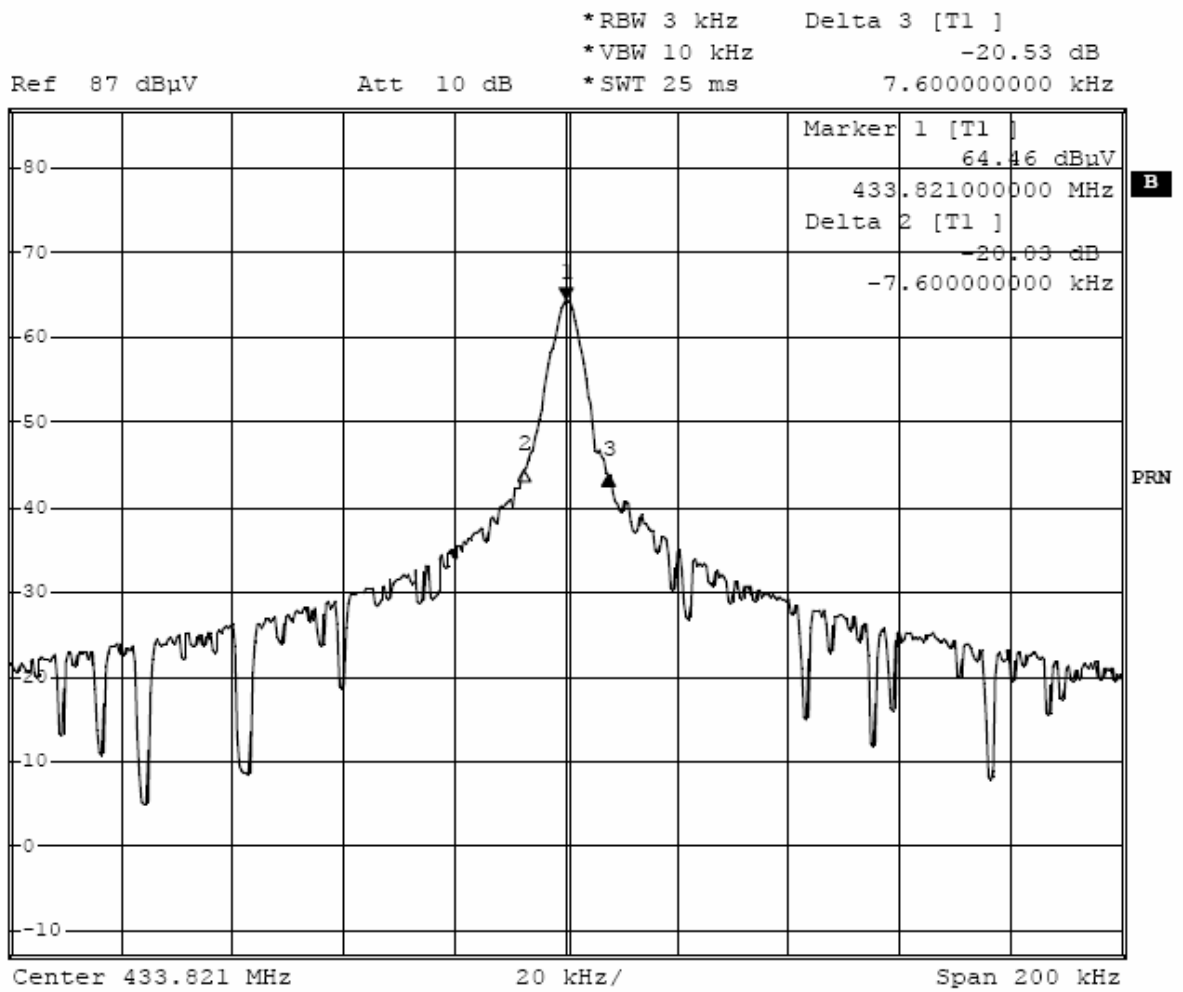
Test Specification: Vertical

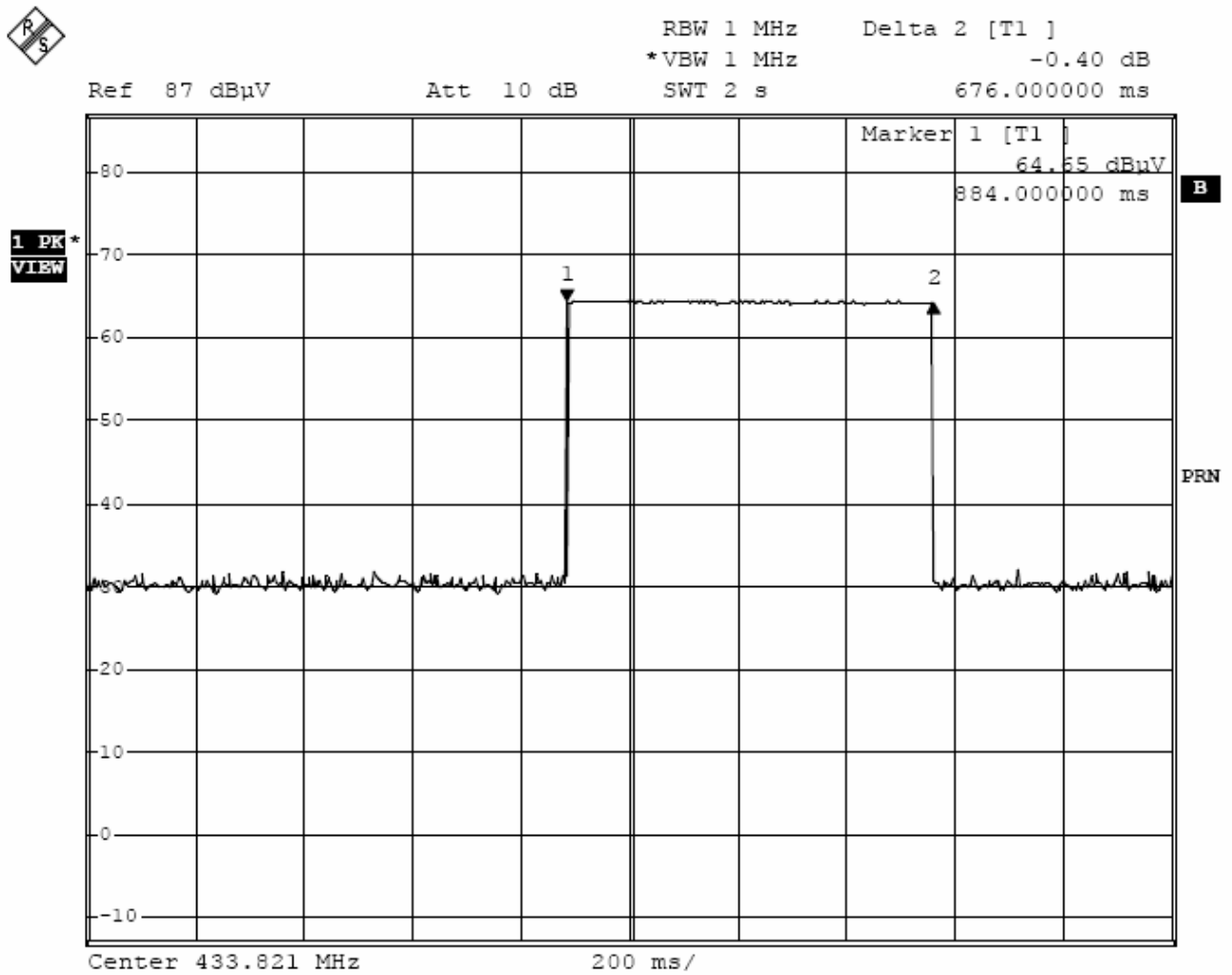
Commend:DC 3.0V Power By Battery





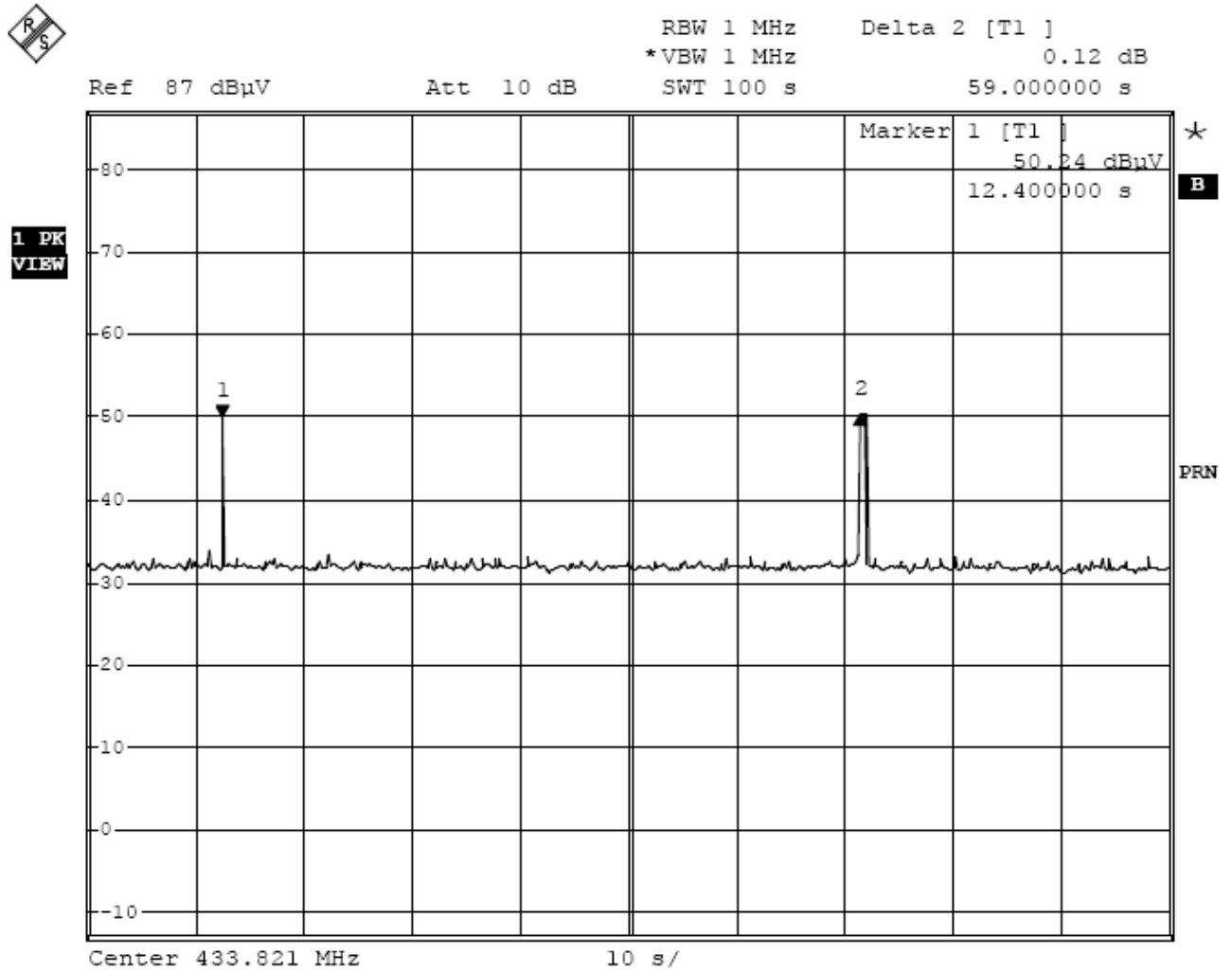
1 PK
VIEW



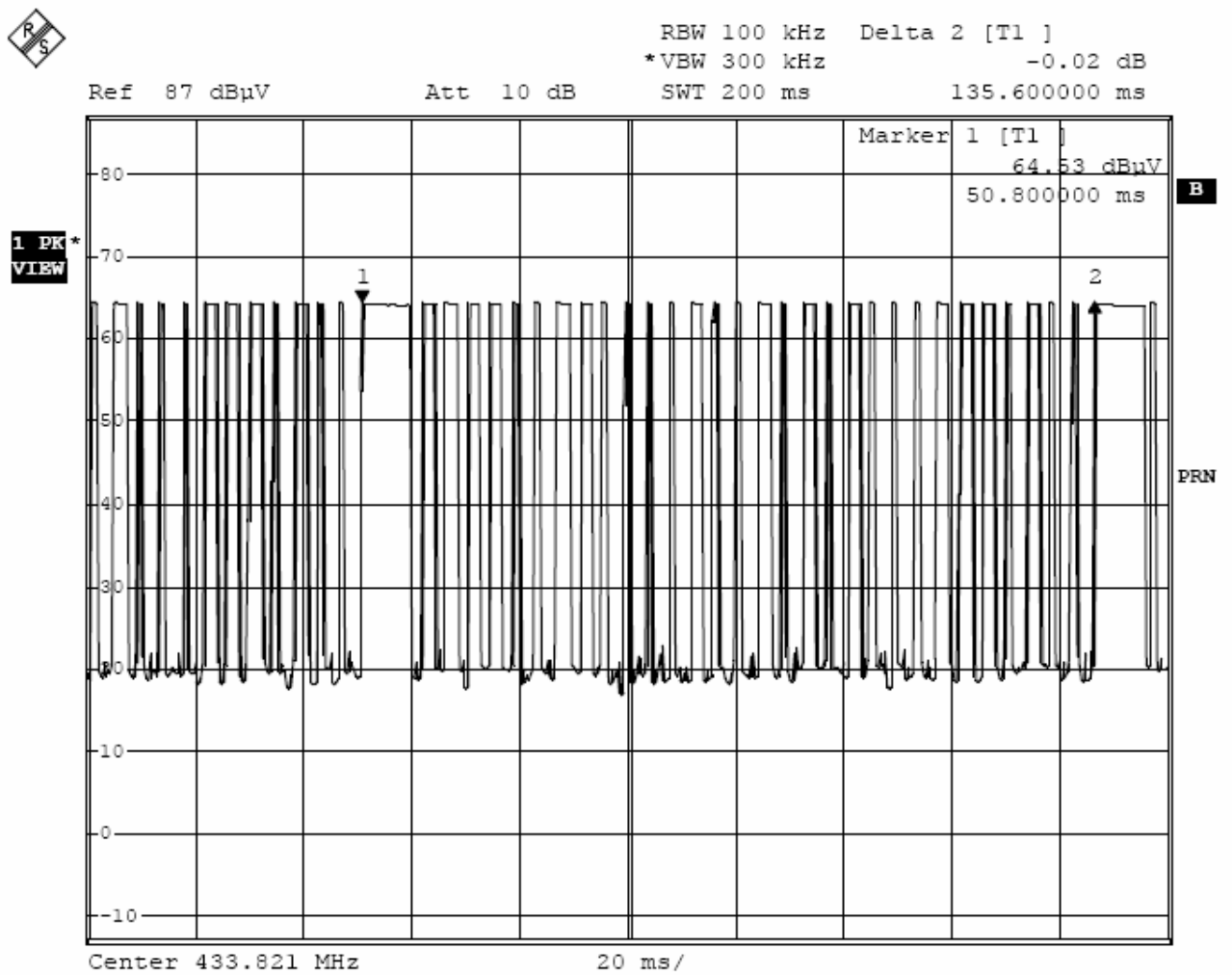


From marker 1 to marker 2, The total “on” time is 676.0ms.

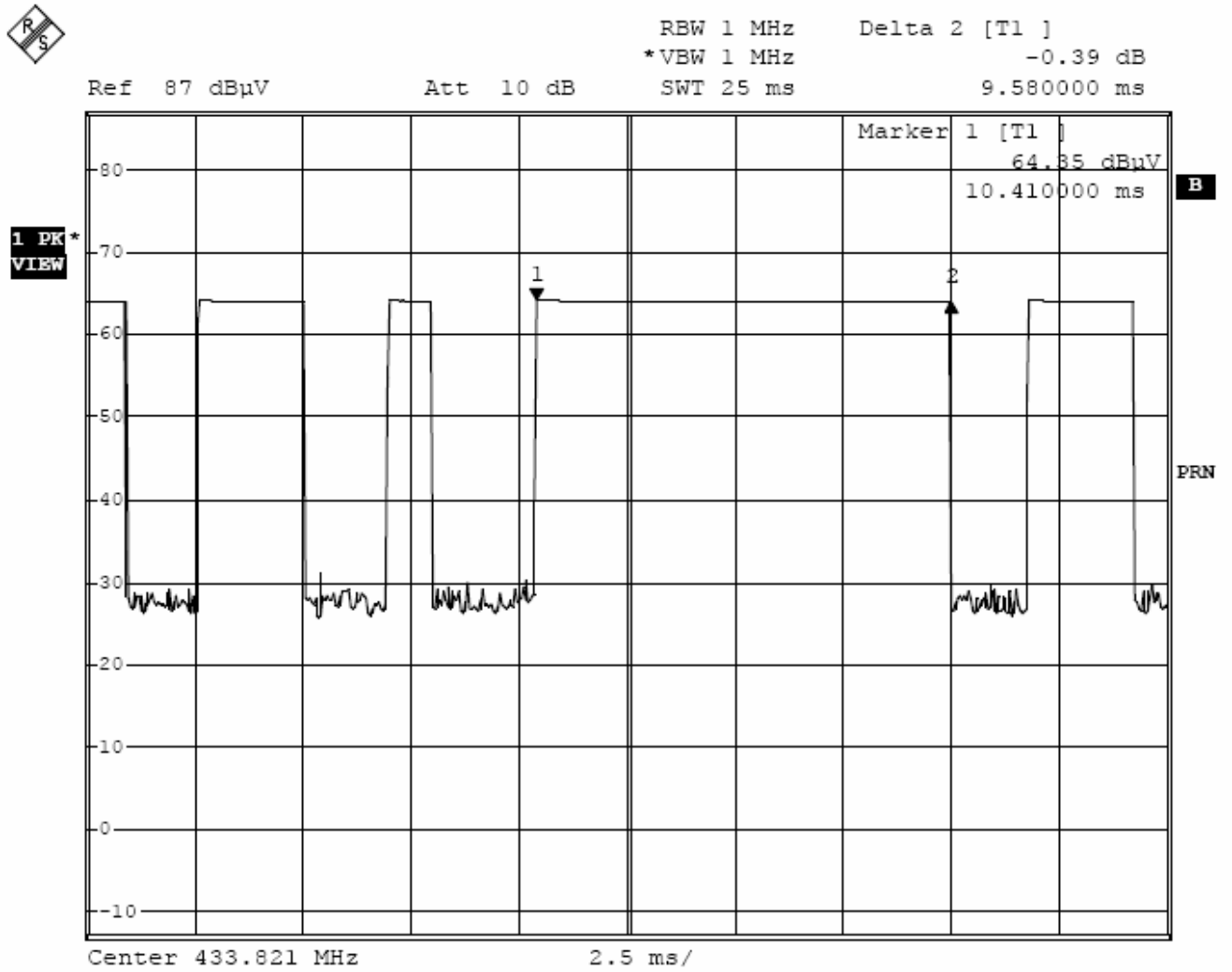
The time does meet FCC PART15 SECTION 231(e)-“the duration of each transmission shall not be greater than one second.”



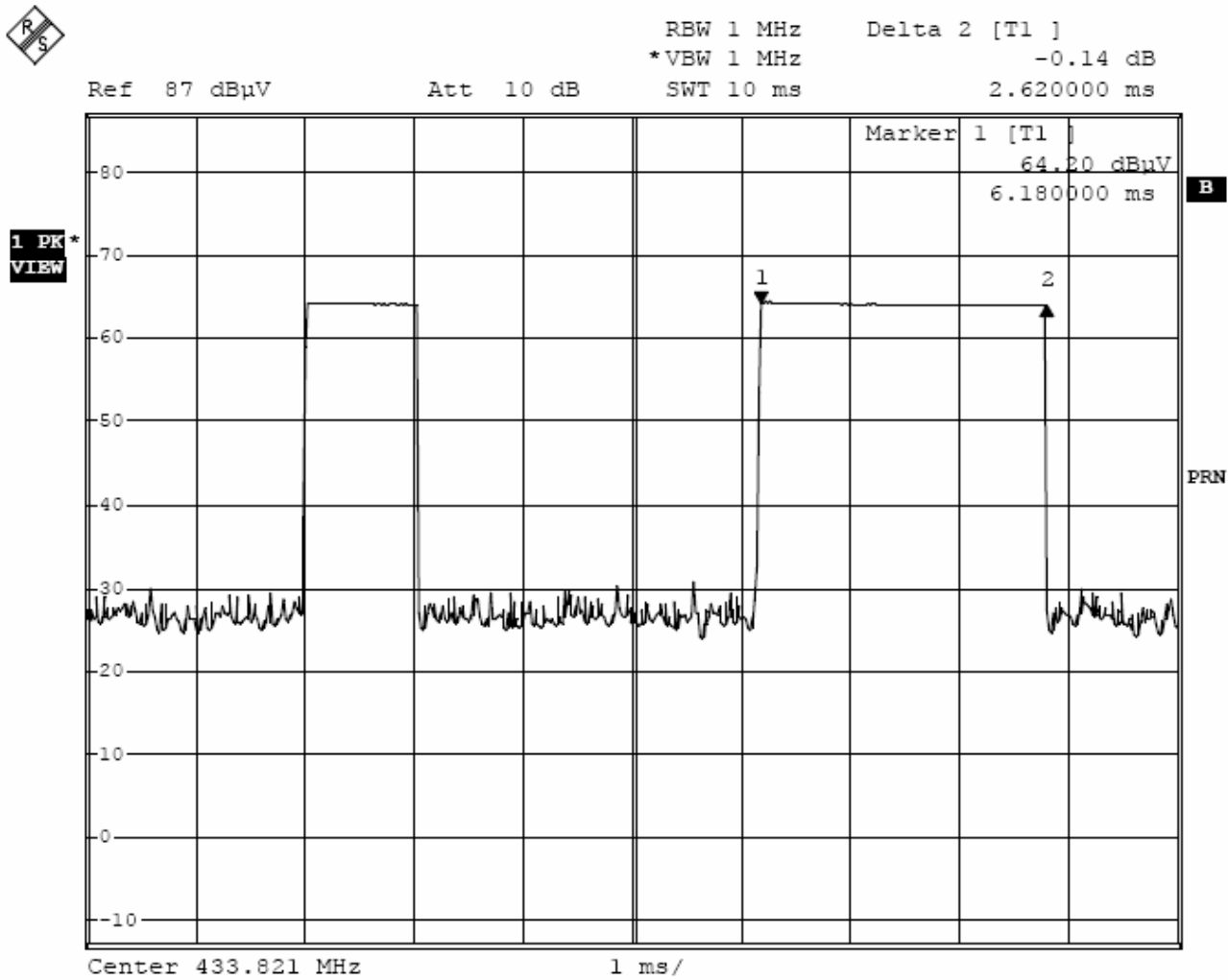
The silent period between transmissions is 59.0seconds.
The time does meet FCC PART15 SECTION 231(e)-“ the silent period between transmission shall be at least 30 times the duration of the transmission but in no case less than 10 seconds”



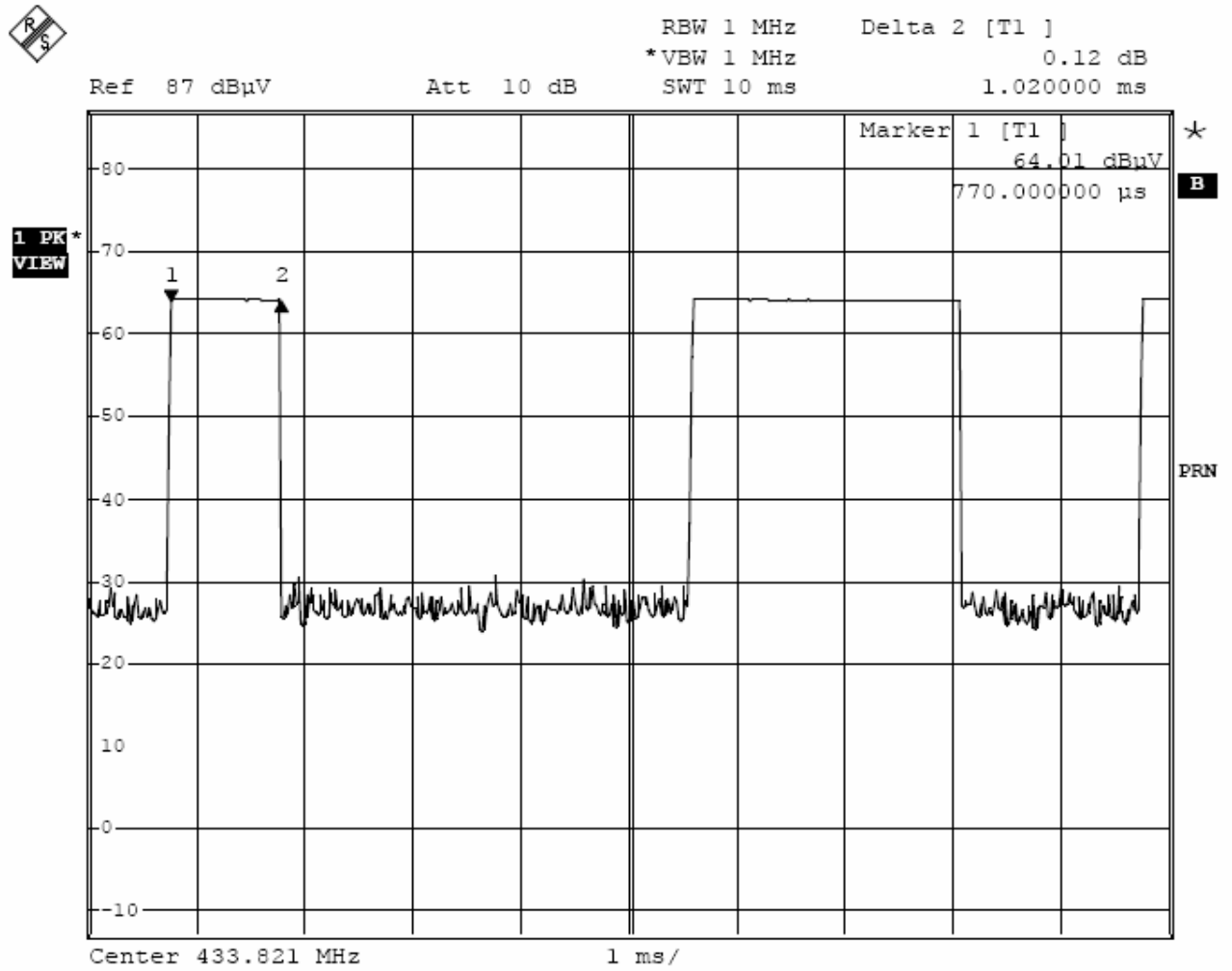
The graph shows the pattern of coding during the signal transmission.
The time interval of one coding period starts from marker 1 to marker 2,
Hence the total time of one period is 135.6ms.
It sums of 1 long 'on' signals and 14 middle 'on' signals and 16 short 'on' signals.



The graph show the duration of long 'on' signal. From marker 1 to marker 2, duration is 9.58ms.



The graph show the duration of middle 'on' signal. From marker 1 to marker 2, duration is 2.62ms.



The graph show the duration of short 'on' signal. From marker 1 to marker 2, duration is 1.02ms.