FCC CERTIFICATION
On Behalf of
Shenzhen Taiyanghui Electronics Co., Ltd.

TPMS
Model No.: TPMS002

FCC ID: UCUTPMS2

Prepared for	:	Shenzhen Taiyanghui Electronics Co., Ltd.
Address	:	Building 6, Hesheng Industrial Area, Heping Village Fuyong, Shenzhen, Guangdong, P.R. China
Prepared by	:	ACCURATE TECHNOLOGY CO. LTD
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Report Number	:	ATE20061118
Date of Test	:	June 20, 2006
Date of Report	:	June 24, 2006

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Test Report Certification

Applicant	:	Shenzhen Taiyanghui Electronics Co., Ltd.
Manufacturer	:	Shenzhen Taiyanghui Electronics Co., Ltd.
EUT Description	:	TPMS

(A) MODEL NO.:TPMS002

(B) SERIAL NO.: N/A

(C) POWER SUPPLY: DC 3.6V(lithium battery ×1)

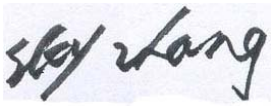
Measurement Procedure Used:

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

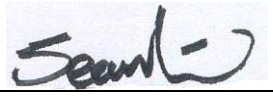
The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.231 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY 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 : June 20, 2006

Prepared by : 

(Engineer)

Reviewer : 

(Quality Manager)

Approved & Authorized Signer : 

(Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	TPMS
Model Number	:	TPMS002
TX Frequency	:	433.9MHz
Power Supply	:	DC 3.6V(lithium battery ×1)
Memo	:	This submittal is transmitter of Tire Pressure Monitoring System, The receiver is compliance with Subpart B is authorized under a DOC procedure.
Applicant	:	Shenzhen Taiyanghui Electronics Co., Ltd.
Address	:	Building 6, Hesheng Industrial Area, Heping Village Fuyong, Shenzhen, Guangdong, P.R. China
Manufacturer	:	Shenzhen Taiyanghui Electronics Co., Ltd.
Address	:	Building 6, Hesheng Industrial Area, Heping Village Fuyong, Shenzhen, Guangdong, P.R. China
Date of sample received	:	June 16, 2006
Date of Test	:	June 20, 2006

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 expanded uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty	=	4.12dB, k=2

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	ESCS30	100307	03.31.2007
EMI Test Receiver	Rohde&Schwarz	ESI26	838786/013	01.02.2007
Bilog Antenna	Schwarzbeck	VULB9163	9163-194	03.31.2007
Bilog Antenna	Chase	CBL6112B	2591	03.31.2007
Horn Antenna	Rohde&Schwarz	HF906	100013	01.02.2007
Spectrum Analyzer	Anritsu	MS2651B	6200238856	03.31.2007
Pre-Amplifier	Agilent	8447D	2944A10619	03.31.2007
Audio Generator	GW	GAG-810	0913317	01.02.2007

3. THE FIELD STRENGTH OF RADIATION EMISSION

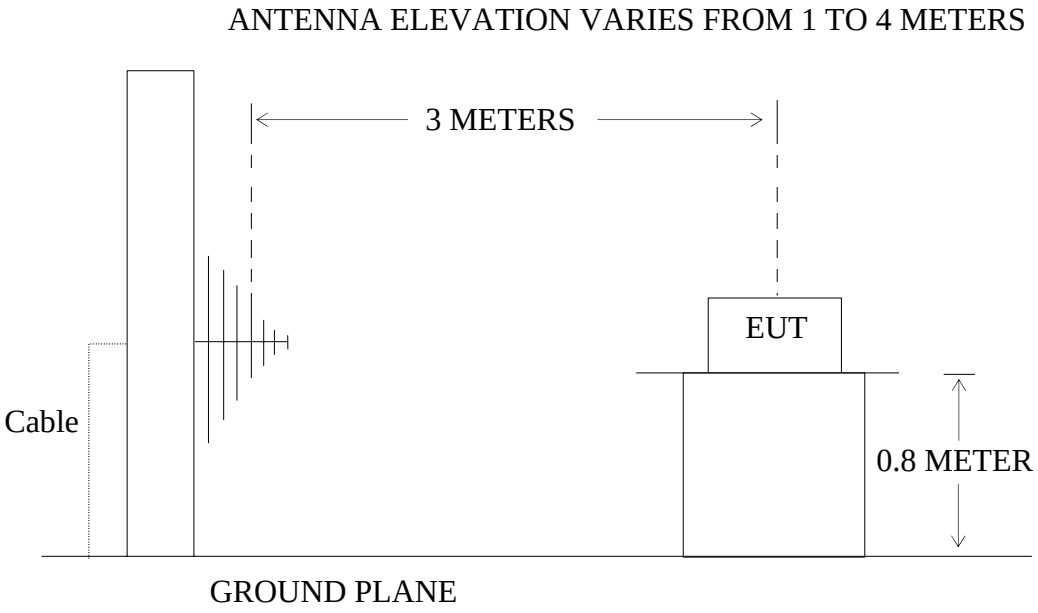
3.1.Block Diagram of Test Setup

3.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: TPMS)

3.1.2.Anechoic Chamber Test Setup Diagram



(EUT: TPMS)

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] [μV/m]	Field Strength of Spurious Emission [Average] [μV/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, μV/m at 3 meters=22.72727(F)-2454.545; For the band 260-470MHz, μV/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 Section15.209

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. TPMS(EUT)

Model Number	**:**	TPMS002
Serial Number	**:**	N/A
Manufacturer	**:**	Shenzhen Taiyanghui Electronics 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:	June 20, 2006	Temperature:	23°C
EUT:	TPMS	Humidity:	54%
Model No.:	TPMS002	Power Supply:	DC 3.6V(lithium battery ×1)
Test Mode:	TX	Test Engineer:	Andy

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	
434.011	80.6	-16.1	-5.9	58.6	64.5	72.9	92.9	14.3	28.4	Horizontal
868.022	56.3	-12.1	-5.9	38.3	44.2	52.9	72.9	14.6	28.7	
*1302.033	49.3	-7.2	-5.9	36.2	42.1	54.0	74.0	17.8	31.9	
1736.044	38.4	-5.7	-5.9	26.8	32.7	52.9	72.9	26.1	40.2	
2170.055	44.3	-4.4	-5.9	34.0	39.9	52.9	72.9	18.9	33.0	
2604.066	38.3	-3.0	-5.9	29.4	35.3	52.9	72.9	23.5	37.6	
3038.077	39.9	-1.9	-5.9	32.1	38.0	52.9	72.9	20.8	34.9	
3472.088	37.5	-0.4	-5.9	31.2	37.1	52.9	72.9	21.7	35.8	
*3906.099	-	-	-	-	-	-	-	-	-	
*4340.114	-	-	-	-	-	-	-	-	-	
434.011	74.8	-16.1	-5.9	52.8	58.7	72.9	92.9	20.1	34.2	Vertical
868.022	47.4	-12.1	-5.9	29.4	35.3	52.9	72.9	23.5	37.6	
*1302.033	47.1	-7.2	-5.9	34.0	39.9	54.0	74.0	20.0	34.1	
1736.044	38.7	-5.7	-5.9	27.1	33.0	52.9	72.9	25.8	39.9	
2170.055	42.5	-4.4	-5.9	32.2	38.1	52.9	72.9	20.7	34.8	
2604.066	39.6	-3.0	-5.9	30.7	36.6	52.9	72.9	22.2	36.3	
3038.077	39.6	-1.9	-5.9	31.8	37.7	52.9	72.9	21.1	35.2	
3472.088	37.4	-0.4	-5.9	31.1	37.0	52.9	72.9	21.8	35.9	
*3906.099	34.8	0.7	-5.9	29.6	35.5	54.0	74.0	24.4	38.5	
*4340.114	-	-	-	-	-	-	-	-	-	

Note:

1. *: 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. Remark "- " means that the emission level is too low to be measured.

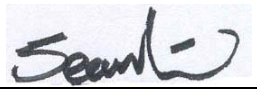
3. The field strength is calculated by adding the average factor, antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

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.

4. FCC Limit for Average Measurement = 16.6667(434.011)-2833.3333 = 4400.1978μV/m=72.9dBμV/m

Reviewer **:** 

4. OCCUPIED BANDWIDTH

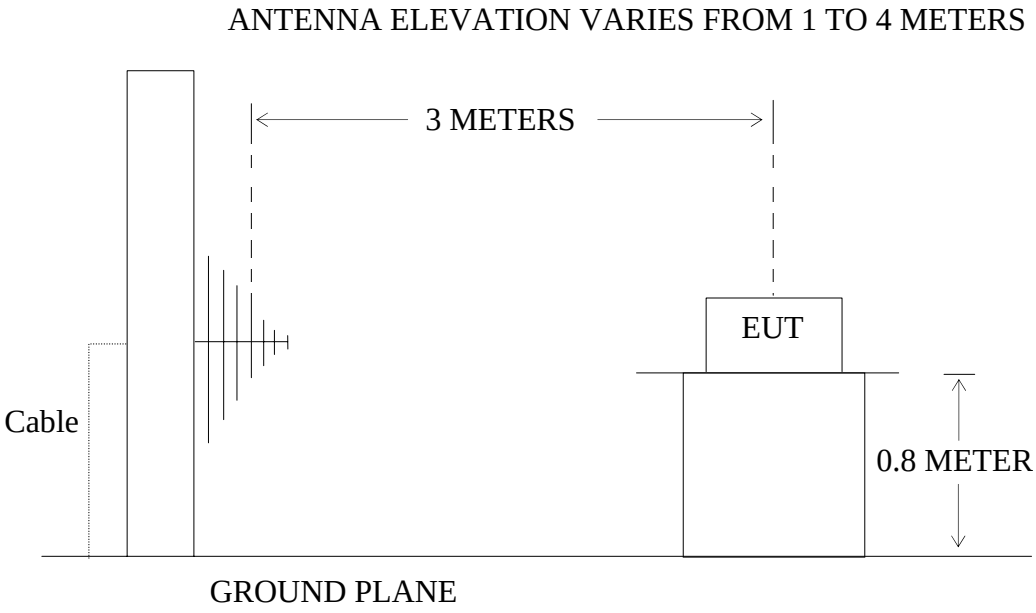
4.1.Block Diagram of Test Setup

4.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: TPMS)

4.1.2.Anechoic Chamber Test Setup Diagram



(EUT: TPMS)

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 434.011MHz×0.25% = 1085.0KHz. 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.TPMS (EUT)

Model Number	**:**	TPMS002
Serial Number	**:**	N/A
Manufacturer	**:**	Shenzhen Taiyanghui Electronics 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 = 10kHz, VBW = 10kHz, Span = 200kHz.

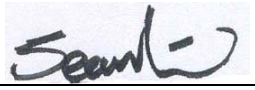
4.5.2. Set SPA Max hold. Mark peak, -20dB

4.6. Measurement Result

The EUT does meet the FCC requirement.

-20dB bandwidth = 27.6KHz < 1085.0KHz

The spectral diagrams in appendix I.

Reviewer **:** 

5. AVERAGE FACTOR MEASUREMENT

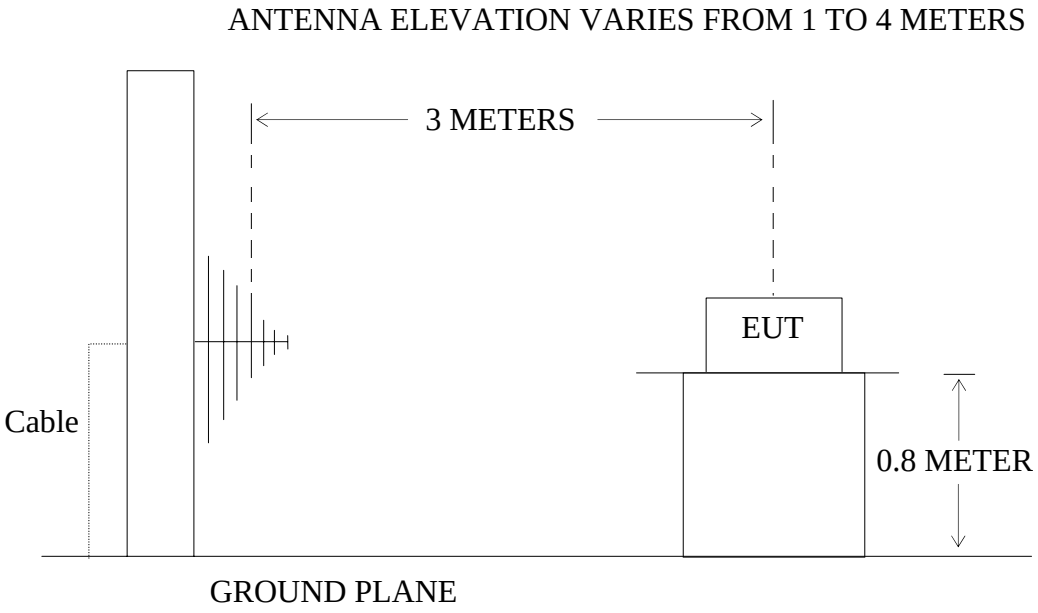
5.1.Block Diagram of Test Setup

5.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: TPMS)

5.1.2.Anechoic Chamber Test Setup Diagram



(EUT: TPMS)

5.2. Average factor Measurement

Average factor in dB = 20 log (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. TPMS(EUT)

Model Number	**:**	TPMS002
Serial Number	**:**	N/A
Manufacturer	**:**	Shenzhen Taiyanghui Electronics 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

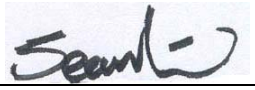
The duty cycle is simply the on time divided by the period:

The duration of one cycle = 10.8ms
Effective period of the cycle = (1.92×1)+(0.098×13)+ (0.042×55) ms= 5.504ms

DC = 5.504ms/10.8ms = 0.5096

Therefore, the average factor is found by 20log0.5096 = -5.9dB

The spectral diagrams in appendix I.

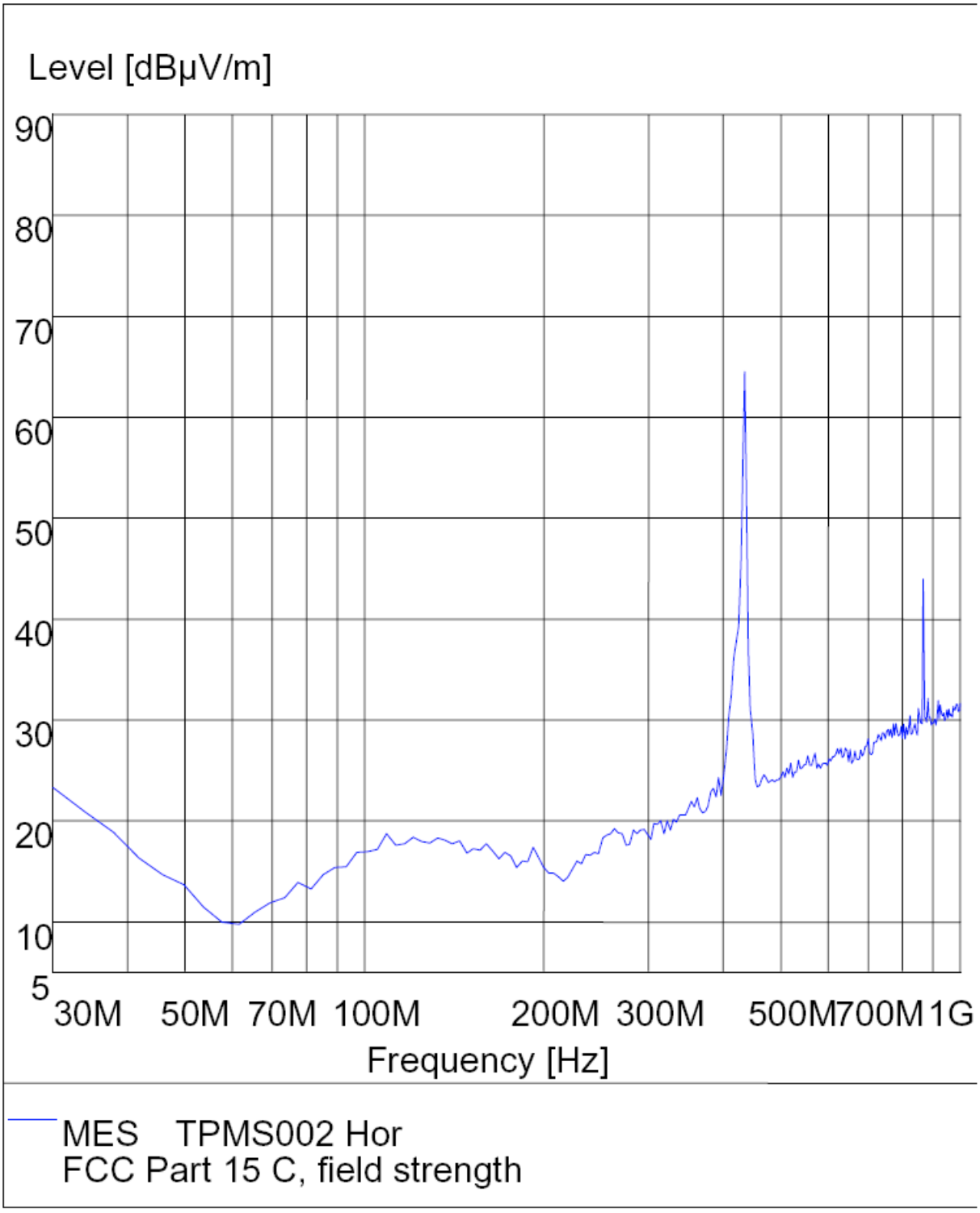
Reviewer **:** 

APPENDIX I
(Test Curves)

Radiated Disturbance

FCC Part 15

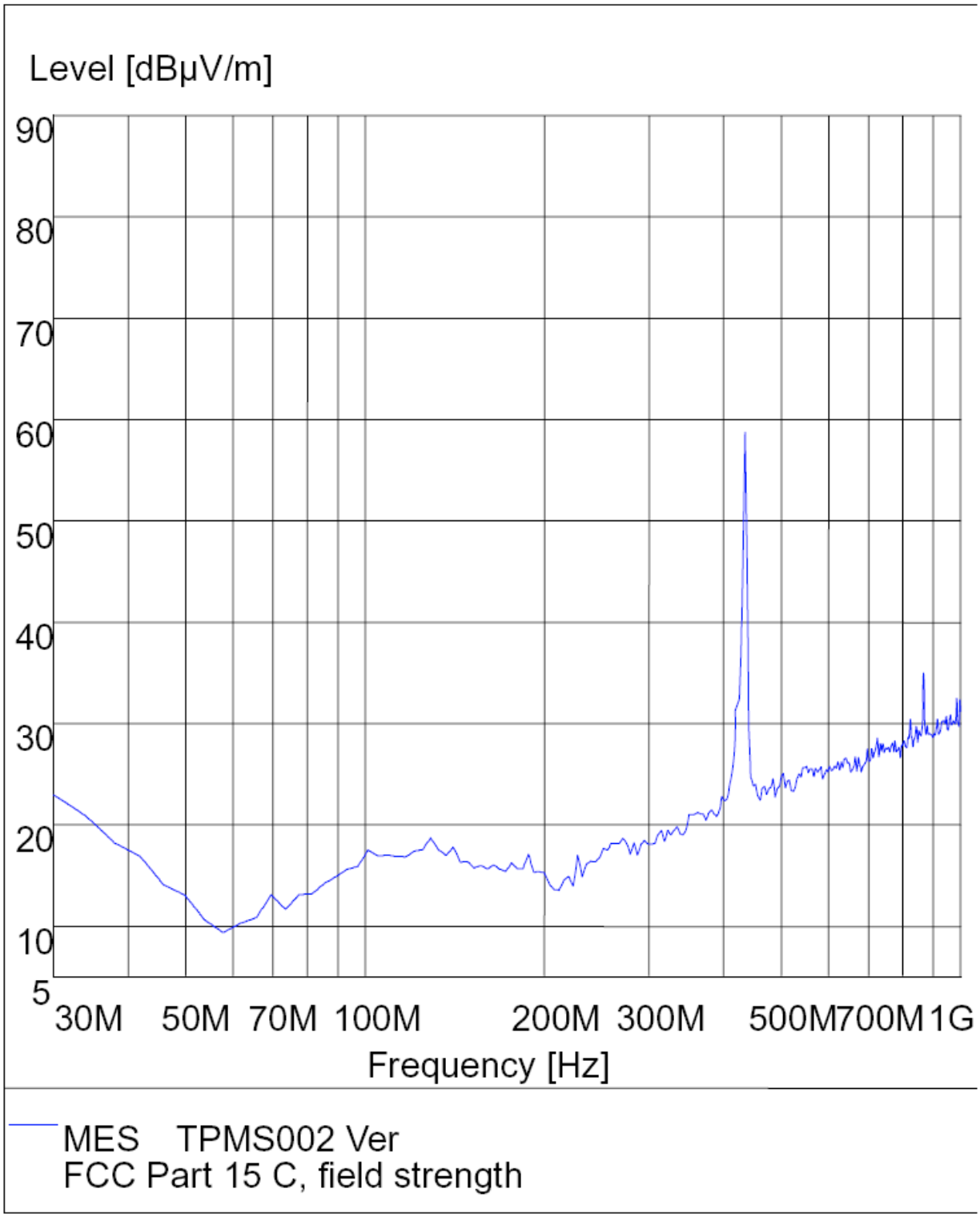
EUT: TPMS M/N:TPMS002
Manufacturer: Shenzhen Taiyanghui Electronics Co., Ltd.
Operating Condition: TX
Test Site: ATC EMC Lab.SAC
Status: Andy
Test Specification: Horizontal
Comment: DC 3.6V



Radiated Disturbance

FCC Part 15

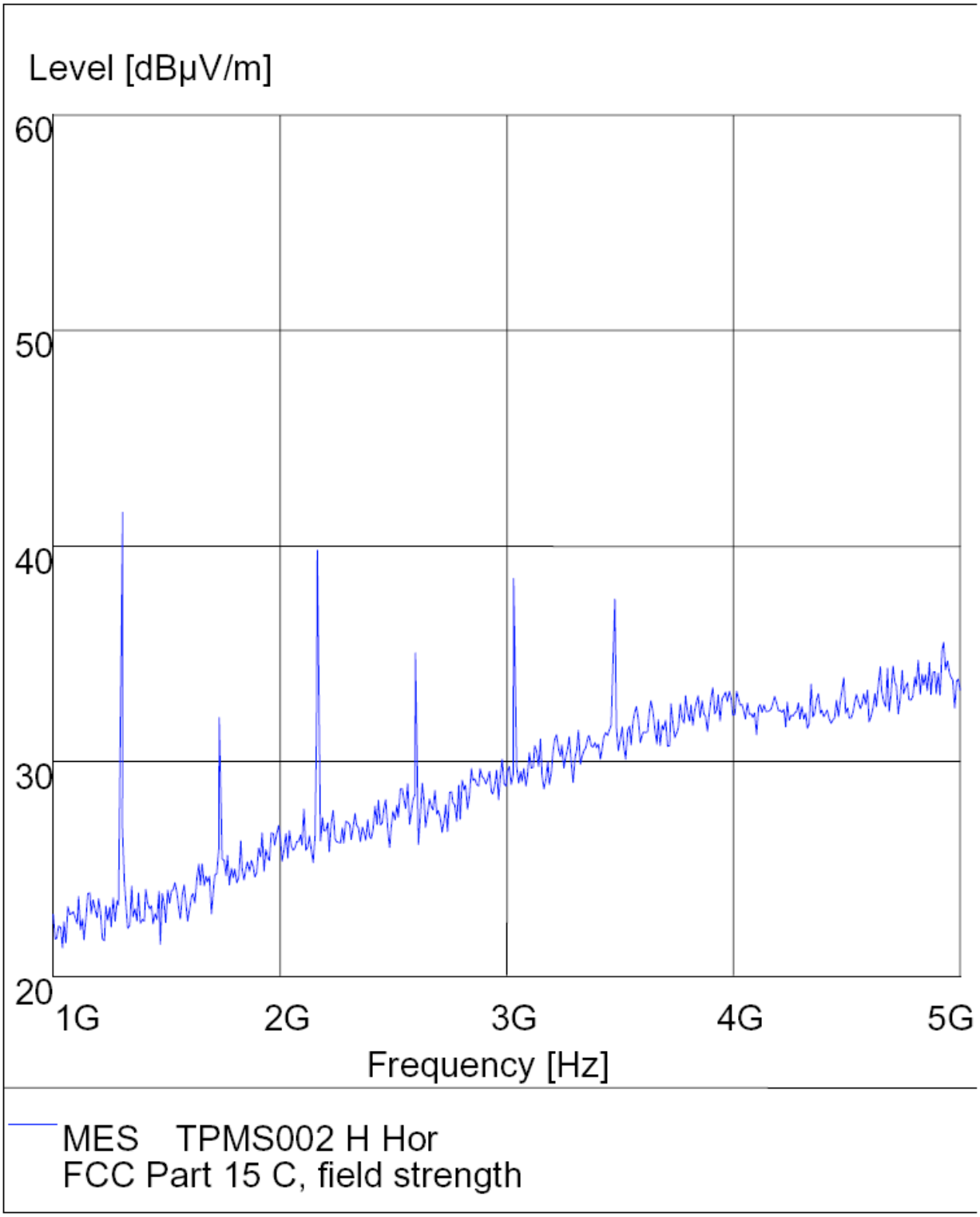
EUT: TPMS M/N:TPMS002
Manufacturer: Shenzhen Taiyanghui Electronics Co., Ltd.
Operating Condition: TX
Test Site: ATC EMC Lab.SAC
Status: Andy
Test Specification: Vertical
Comment: DC 3.6V



Radiated Disturbance

FCC Part 15

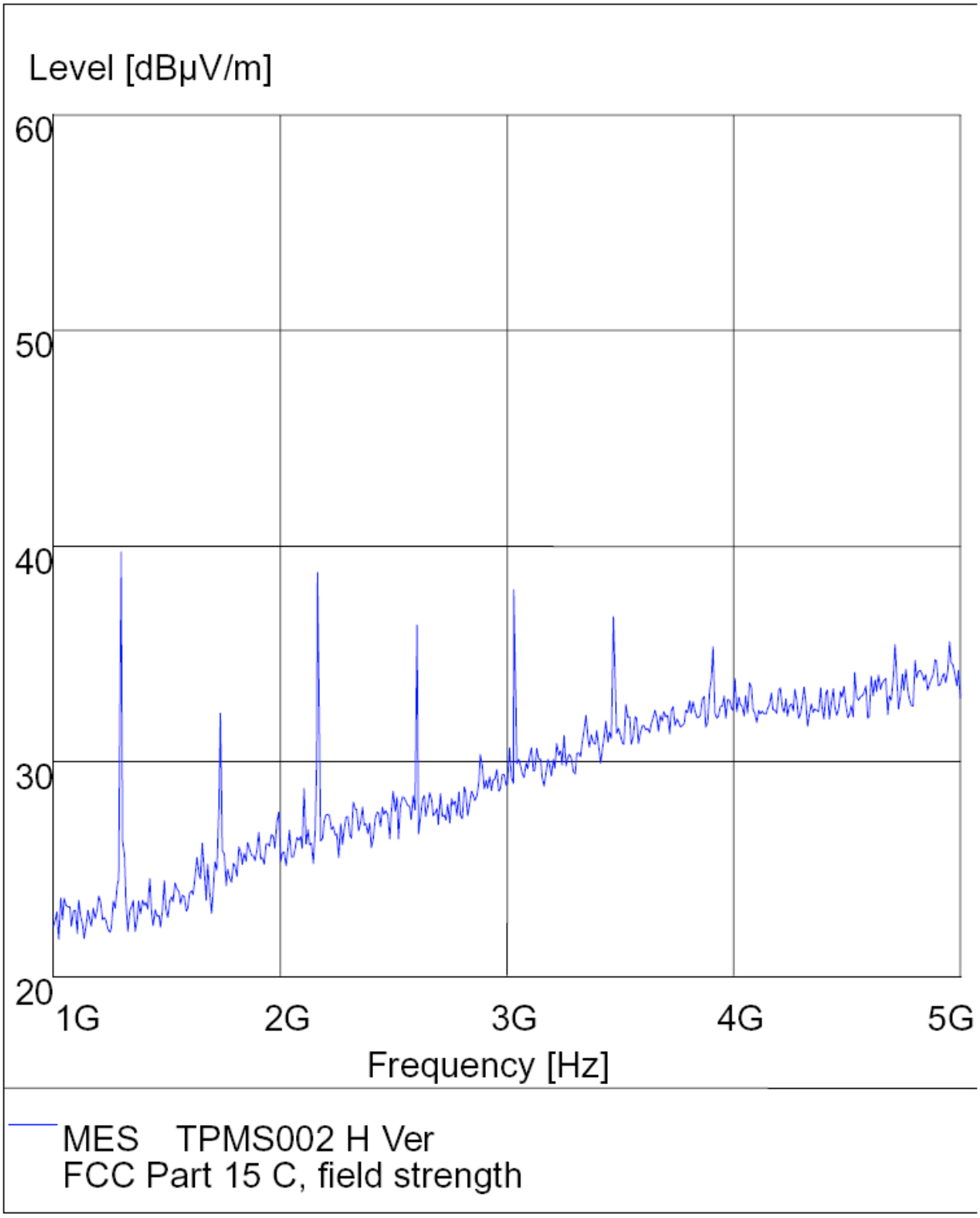
EUT: TPMS M/N:TPMS002
Manufacturer: Shenzhen Taiyanghui Electronics Co., Ltd.
Operating Condition: TX
Test Site: ATC EMC Lab.SAC
Status: Andy
Test Specification: Horizontal
Comment: DC 3.6V

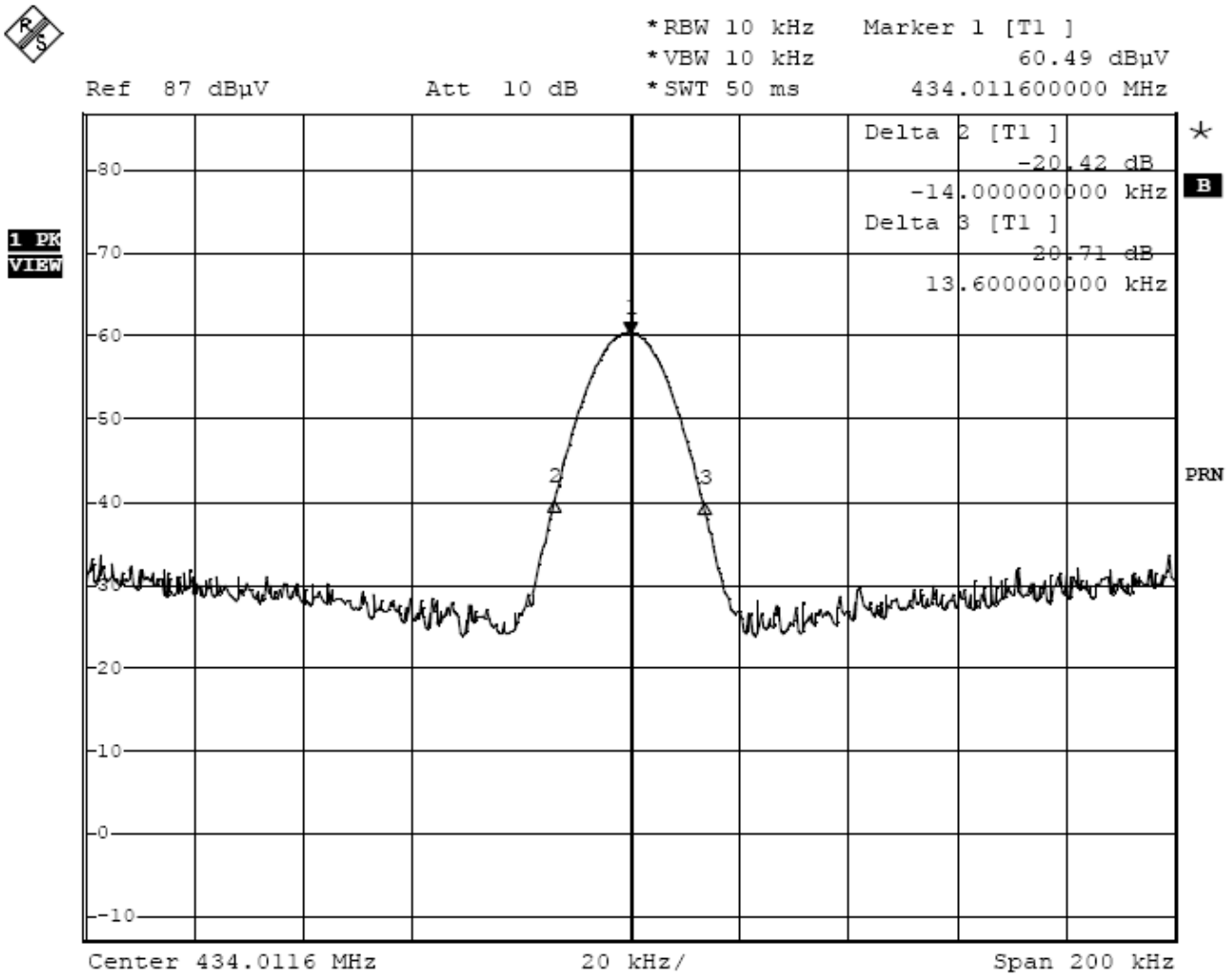


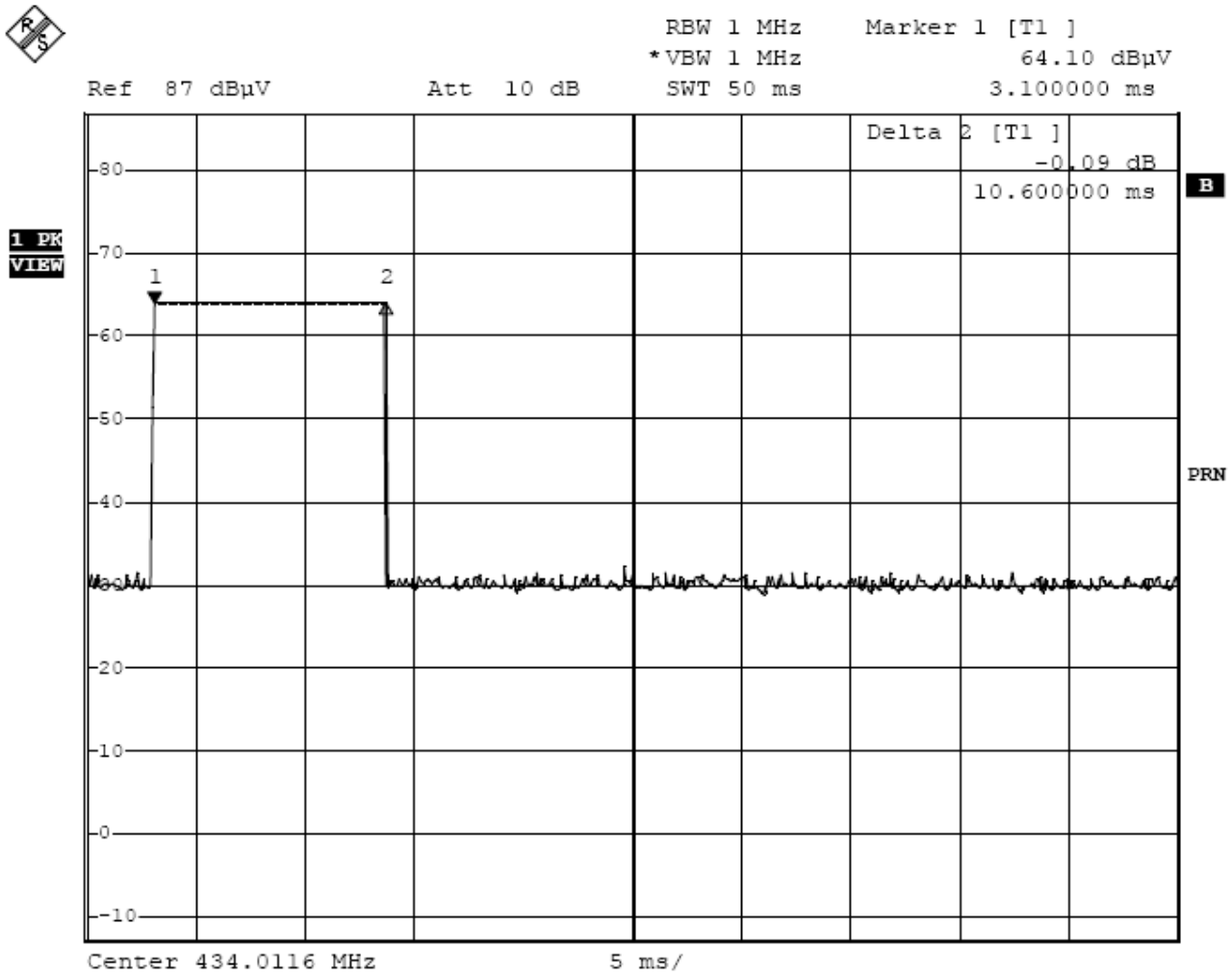
Radiated Disturbance

FCC Part 15

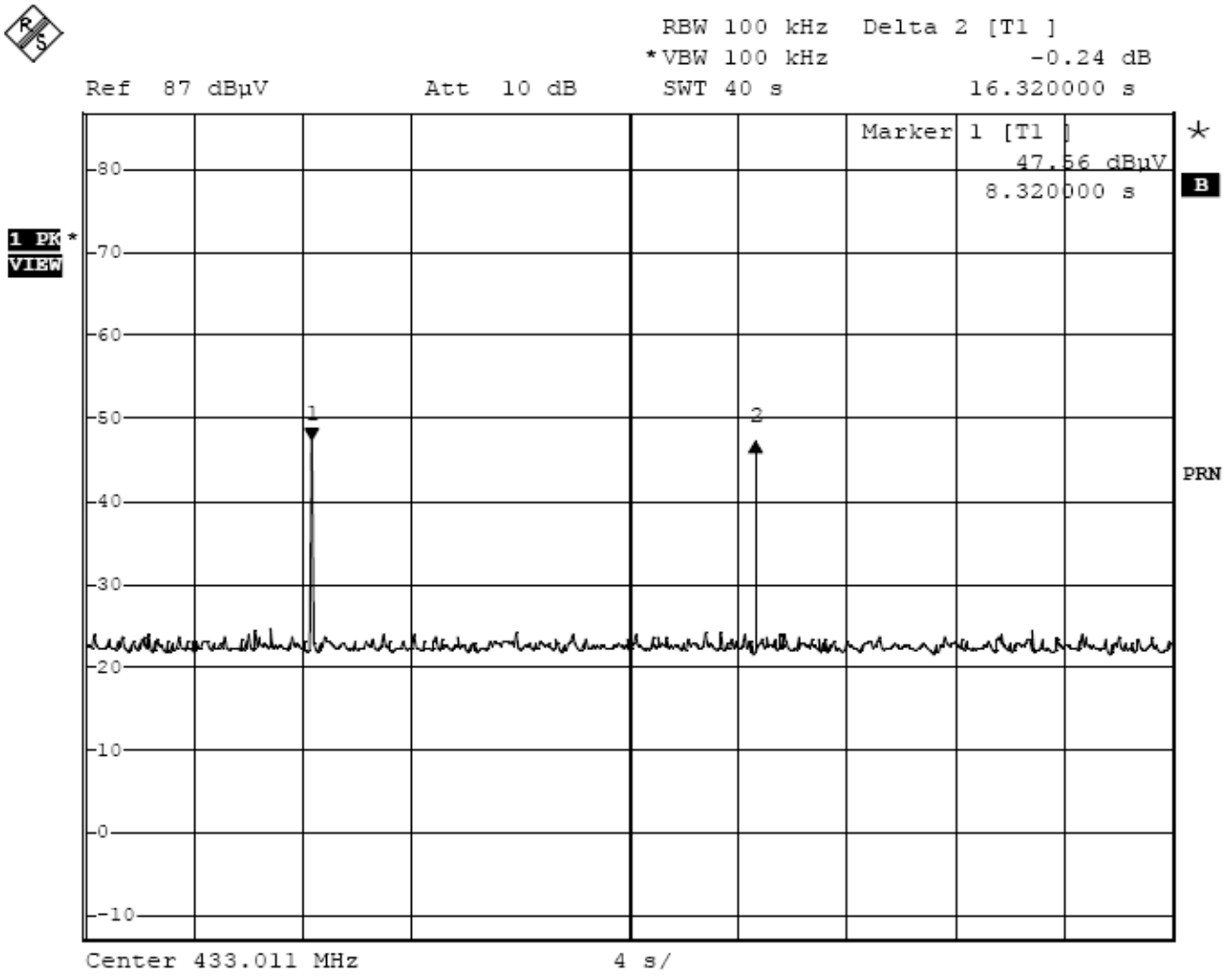
EUT: TPMS M/N:TPMS002
Manufacturer: Shenzhen Taiyanghui Electronics Co., Ltd.
Operating Condition: TX
Test Site: ATC EMC Lab.SAC
Status: Andy
Test Specification: Vertical
Comment: DC 3.6V



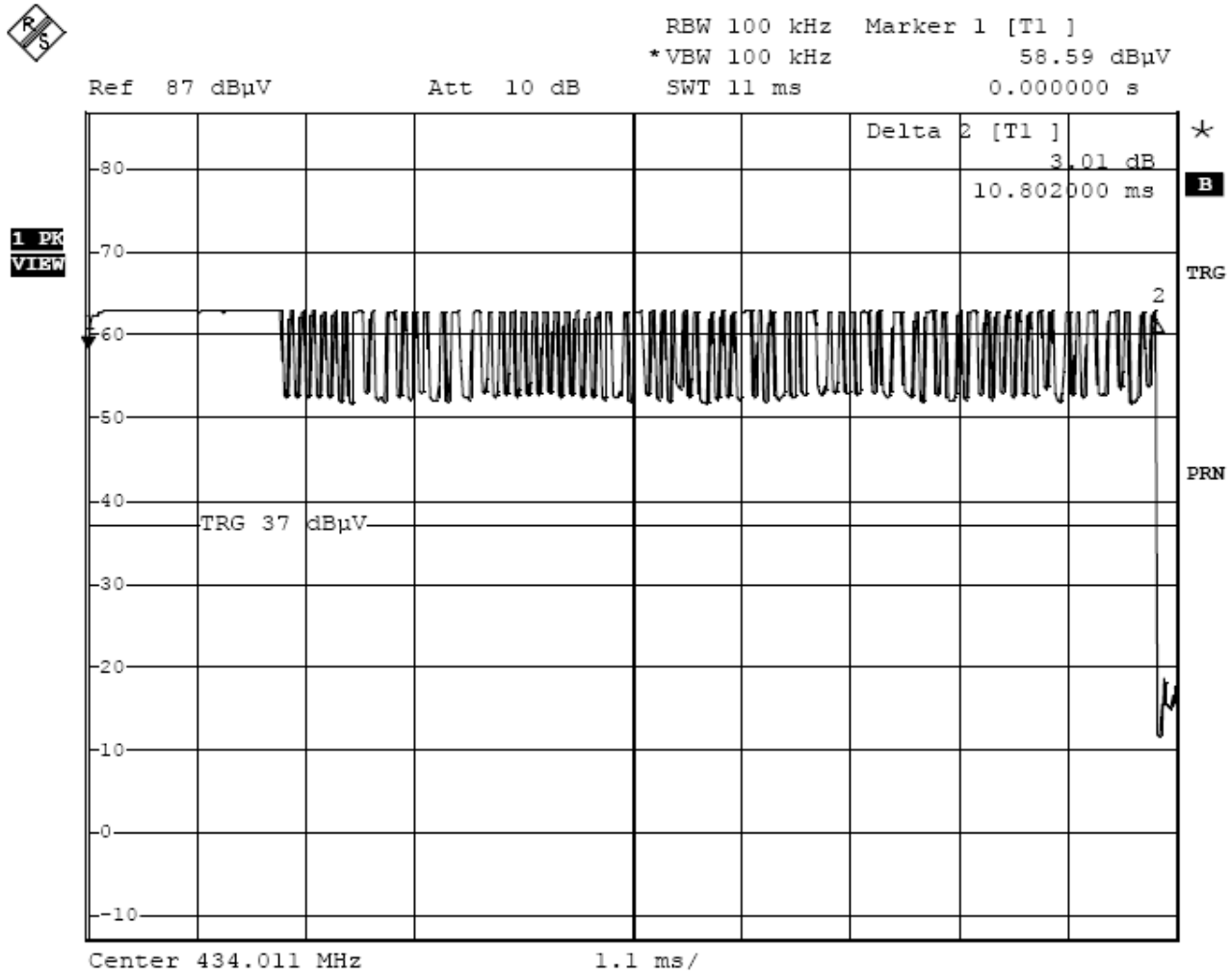

*RBW 10 kHz
*VBW 10 kHz
*SWT 50 ms
Marker 1 [T1]
60.49 dBµV
434.011600000 MHz
Ref 87 dBµV
Att 10 dB
Delta 2 [T1]
-20.42 dB
-14.000000000 kHz
Delta 3 [T1]
20.71 dB
13.600000000 kHz
1 PK
VIEW
B
PRN
80
70
60
50
40
30
20
10
0
-10
Center 434.0116 MHz
20 kHz/
Span 200 kHz



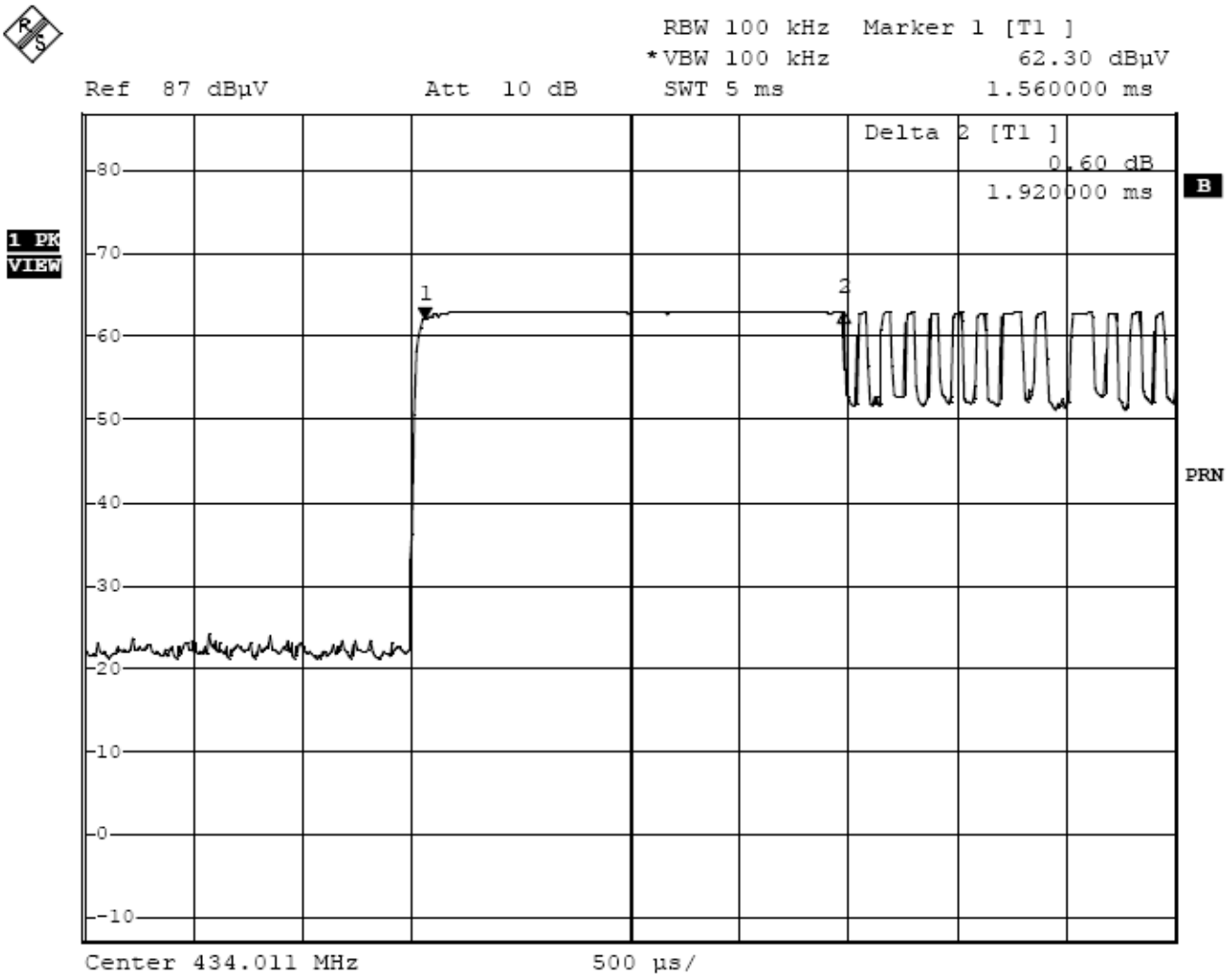
From marker 1 to marker 2, The total “on” time is 10.6ms.
The time does meet FCC PART15 SECTION 231(e)-“the duration of each transmission shall not be greater than one second.”



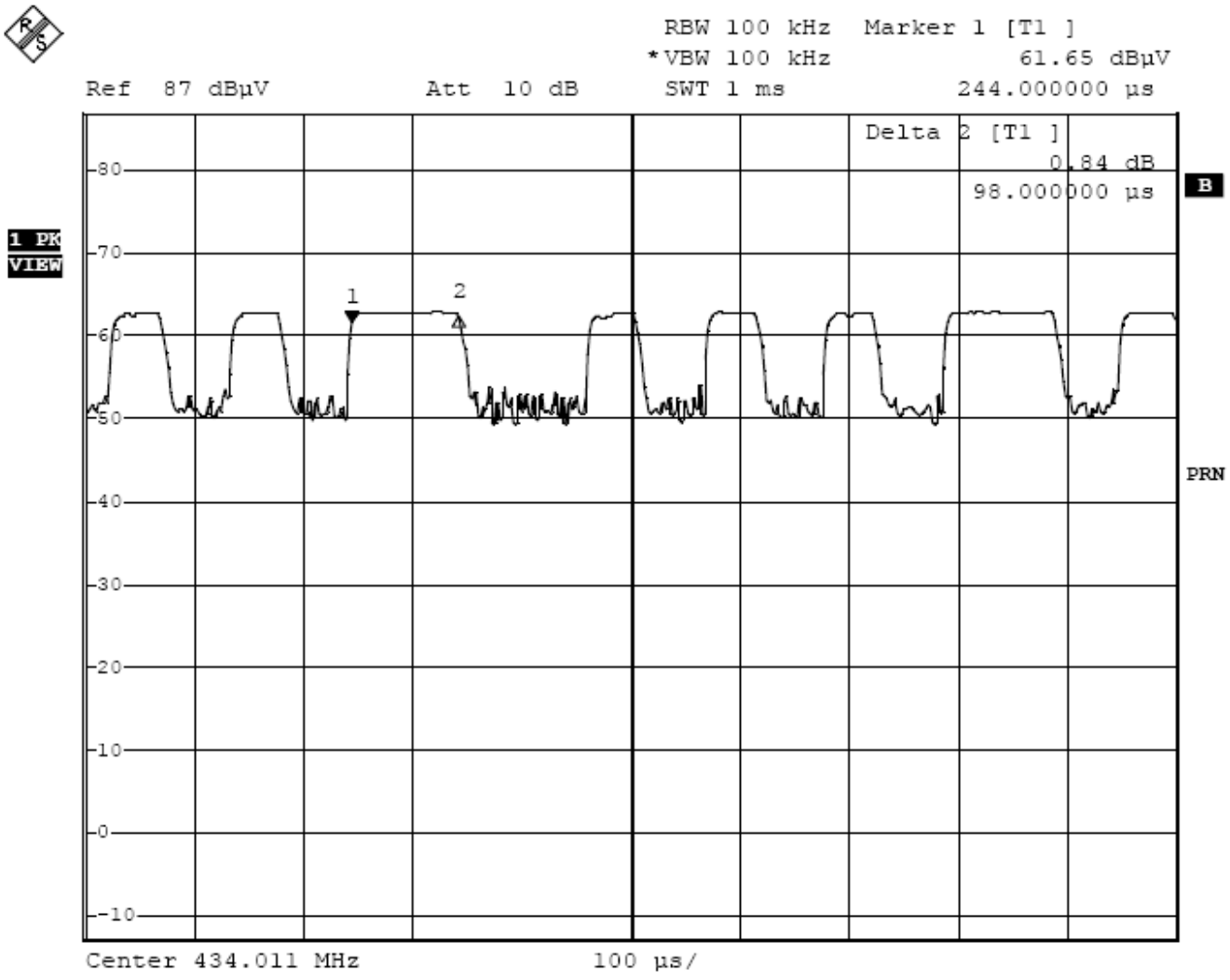
The silent period between transmissions is 16.3seconds.
The time does meet FCC PART15 SECTION 231(e)-“ the silent period between transmission shall be at least 30 times the duration of the transmission but in no case less than 10 seconds”



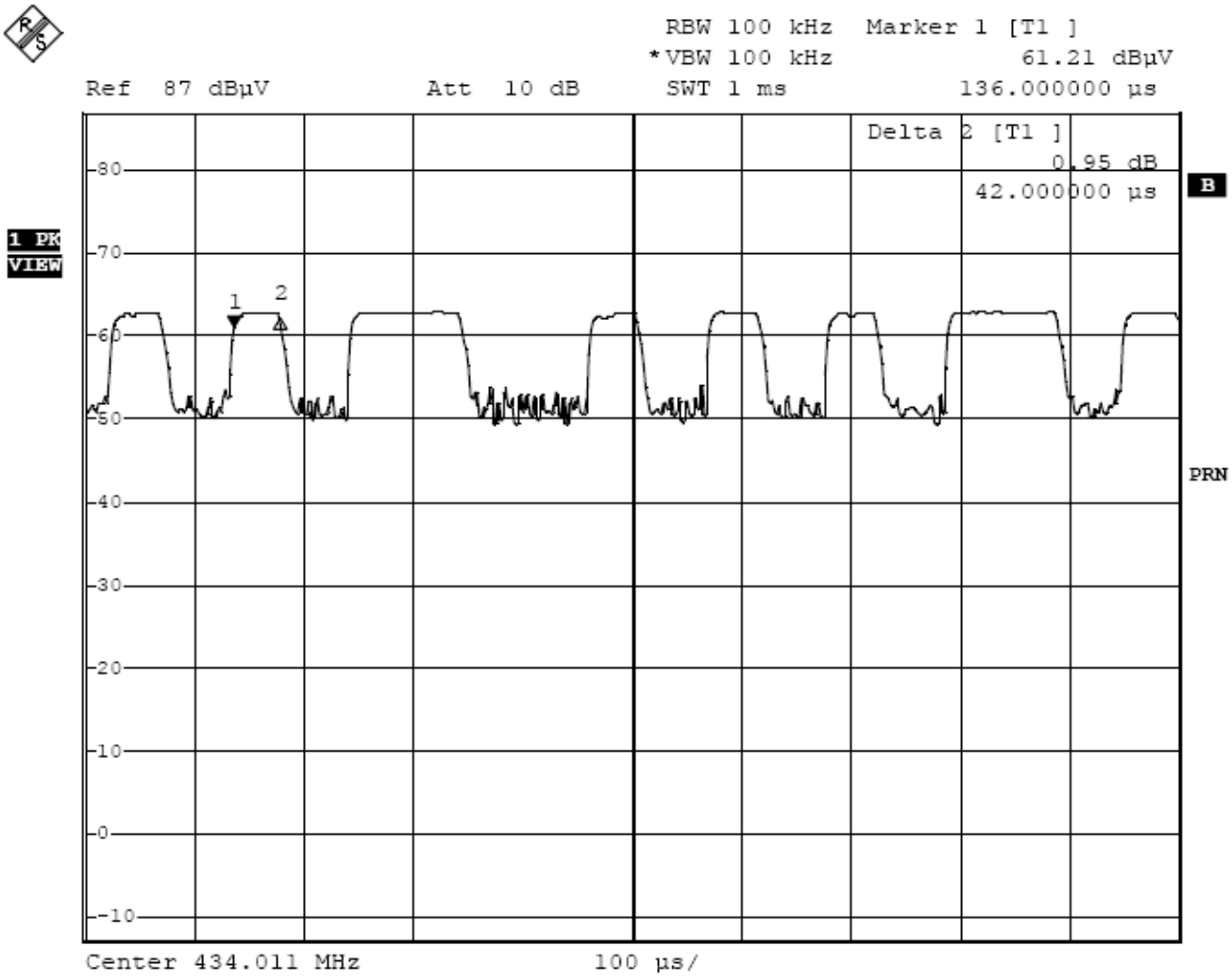
The graph shows the pattern of coding during the signal transmission.
Hence the total time of one period is 10.8ms.
It sums of 1 long ‘on’ signals and 13 middle ‘on’ signals and 55 short ‘on’ signals.



The graph show the duration of long ‘on’ signal. From marker 1 to marker 2, duration is 1.92ms.



The graph show the duration of middle ‘on’ signal. From marker 1 to marker 2, duration is 0.098ms.



The graph show the duration of short ‘on’ signal. From marker 1 to marker 2, duration is 0.042ms.