

# FCC Test Report

Product Name : Tire Pressure Monitoring System  
Trade Name : ORO  
Model No. : W410  
FCC ID. : W55BRFFM1B2

Applicant : Oro Technology Co., LTD  
Address : 3F, No.29, 21th Road, Industrial Park,  
Taichung 408, Taiwan

Date of Receipt : Jun. 22, 2016  
Issued Date : Aug. 26, 2016  
Report No. : 1670198R-RFUSP14V00  
Report Version : V1.0



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# Test Report Certification

Issued Date : Aug. 26, 2016

Report No. : 1670198R-RFUSP14V00



Product Name : Tire Pressure Monitoring System  
Applicant : Oro Technology Co., LTD  
Address : 3F, No.29, 21th Road, Industrial Park, Taichung 408, Taiwan  
Manufacturer : Oro Technology Co., LTD  
Model No. : W410  
FCC ID. : W55BRFFM1B2  
EUT Voltage : DC 3V (Power by Battery)  
Testing Voltage : DC 3V (Power by Battery)  
Trade Name : ORO  
Applicable Standard : FCC 15 Subpart C Section 15.231(b): 2015  
Test Lab : Quietek Hsin Chu Laboratory  
Test Result : Complied

The test results relate only to the samples tested.  
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**Revision History**

<b>Report No.</b>	<b>Version</b>	<b>Description</b>	<b>Issued Date</b>
1670198R-RFUSP14V00	V1.0	Initial issue of report.	Aug. 26, 2016

## Laboratory Information

We, **Quietek Corporation**, are an independent RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025 specified testing scopes:

**Taiwan R.O.C. : TAF, Accreditation Number: 3024**  
**USA : FCC, Registration Number: 834100**  
**Canada : IC, Submission No: 181665 / IC Registration Number: 4075C-4**

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site:<http://www.quietek.com/english/about/certificates.aspx?bval=5>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site :  
[http://www.quietek.com/index\\_en.aspx](http://www.quietek.com/index_en.aspx)

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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## 1. General Information

### 1.1. EUT Description

Product Name	Tire Pressure Monitoring System
Trade Name	ORO
Model No.	W410
Frequency Range	433.92 MHz
Channel Number	1
Type of Modulation	FSK, ASK

Antenna Information	
Antenna Type	Monopole Antenna
Antenna Gain	0 dBi

Working Frequency of Each Channel	
Channel	Frequency
001	433.92 MHz

**Note:**

1. This device is an Tire Pressure Monitoring System included a 433.92MHz transceiver function.
2. These tests are conducted on a sample for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.231.
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
4. This device is a composite device in accordance with Part 15 regulations. The function receiving was measured and made a test report that the report number is 1670198R-RFUSP01V00 under Declaration of Conformity.

## 1.2. Test Mode

QuieTek verified the construction and function in typical operation. All the test modes are performed in normal operation and are defined as:

Pre-Test Mode	
TX	Mode 1: Transmit
Final Test Mode	
TX	Mode 1: Transmit

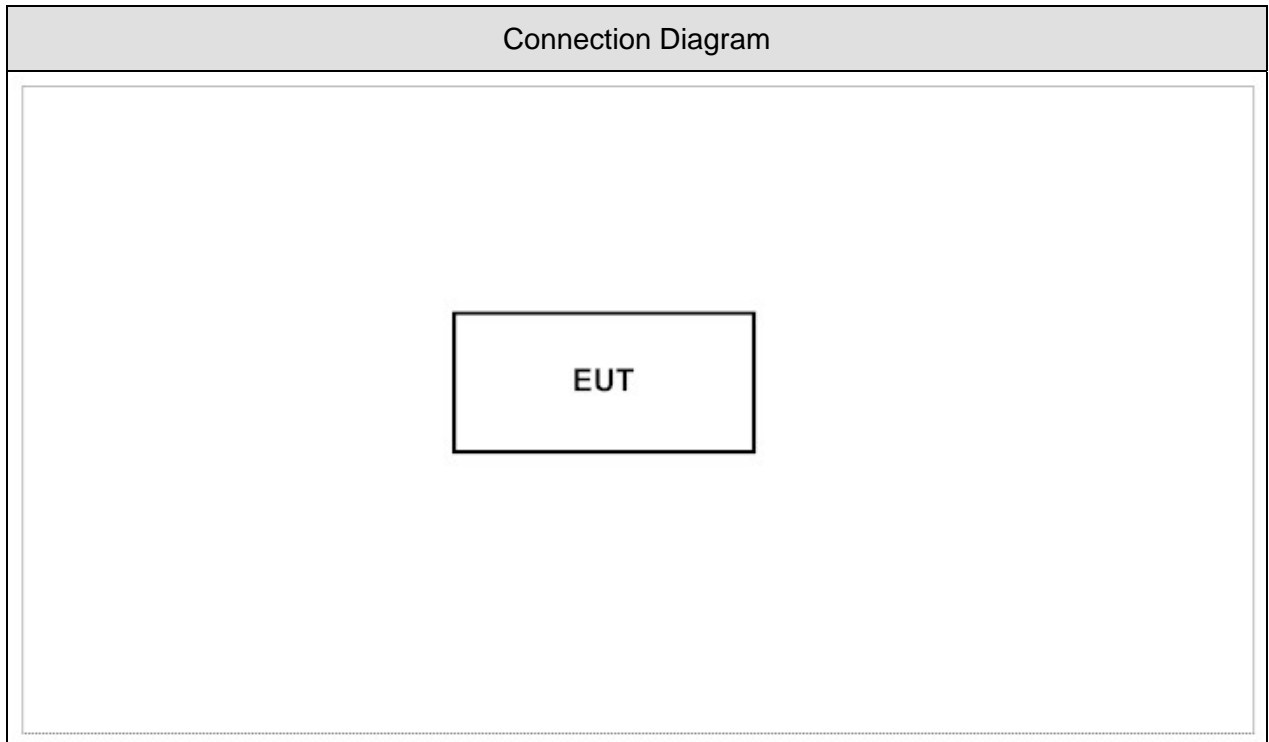
Emission	
Performed Item	Mode 1
Conducted Emission	No
Radiated Emission	Yes
Occupied Bandwidth	Yes
Duty cycle	Yes
Transmitter time	Yes

### 1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
N/A					

### 1.4. Configuration of tested System



### 1.5. EUT Exercise Software

1	Setup the EUT as shown in section 1.4.
2	The EUT will transmit automatically.
3	Verify that the EUT works properly.



## 2. Radiated Emission

### 2.1. Test Equipment

The following test equipments are used during the test:

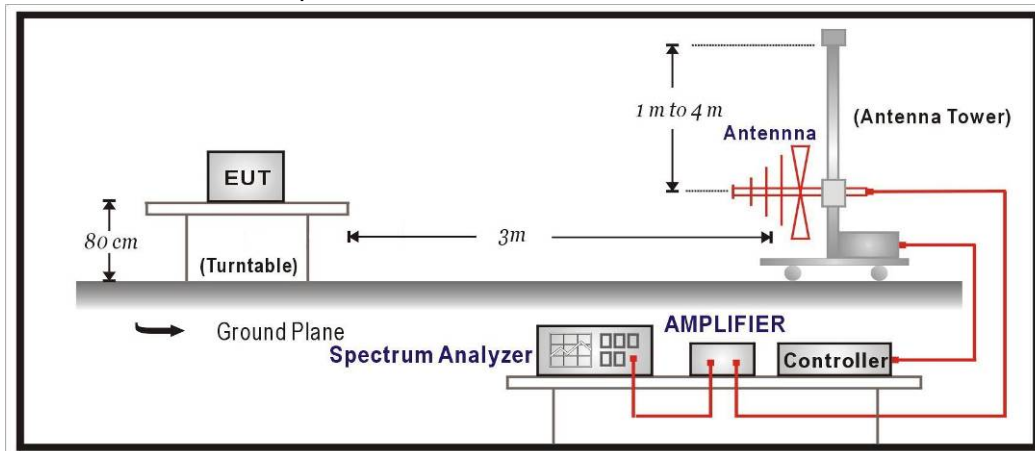
#### Radiated Emission / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	Schaffner	CBL6112B	2895	2017/08/14
Double Ridged Guide Horn Antenna	Schwarzbeck	BBHA 9120	D743	2017/01/14
Pre-Amplifier	EMCI	EMC0031835	4583/10/13	2017/01/26
Pre-Amplifier	Quietek	AP-025C	CHM-0706049	2017/01/03
Spectrum Analyzer	Agilent	E4440A	MY46187335	2016/12/24
k Type Cable	Huber+Suhner	SF 102	25623/2	2017/01/11
Horn Antenna	Schwarzbeck	BBHA 9170	203	2016/09/07
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/05

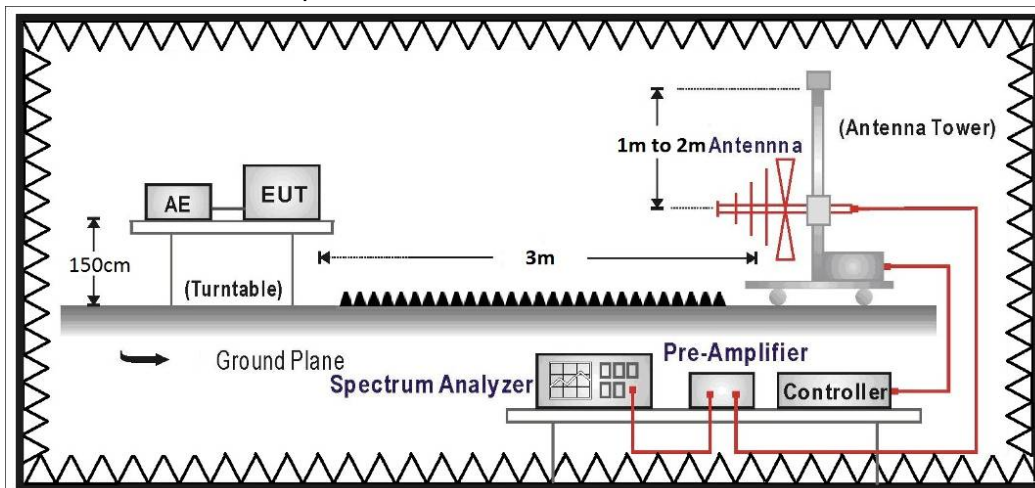
Note: All equipments that need to calibrate are with calibration period of 1 year.

### 2.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



**2.3. Limits**

➤ Fundamental and Harmonics Emission Limits

<b>FCC Part 15 Subpart C Paragraph 15.231(b) Limits</b>				
Fundamental Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	uV/m	dBuV/m	uV/m	dBuV/m
40.66 - 40.70	2250	67.04	225	47.04
70 - 130	1250	61.94	125	41.94
130 - 174	1250 - 3750	61.94 - 71.48	125 - 375	41.94 - 51.48
174 - 260	3750	71.48	375	51.48
260 - 470	3750 - 12500	71.48 - 81.94	375 - 1250	51.48 - 61.94
above 470	12500	81.94	1250	61.94

- Remarks: 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)  
 2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.  
 3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➤ Spurious electric field strength limits

<b>FCC Part 15 Subpart C Paragraph 15.209 Limits</b>			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009 - 0.490	2400/F(kHz)	See Remark <sup>1</sup>	300
0.490 - 1.705	24000/F(kHz)	See Remark <sup>1</sup>	30
1.705 - 30	30	29.5	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

- Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)  
 2. In the Above Table, the tighter limit applies at the band edges.  
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

## 2.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 and 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB beamwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The frequency range from 30MHz to 10th harmonics is checked.

## 2.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231(b): 2015

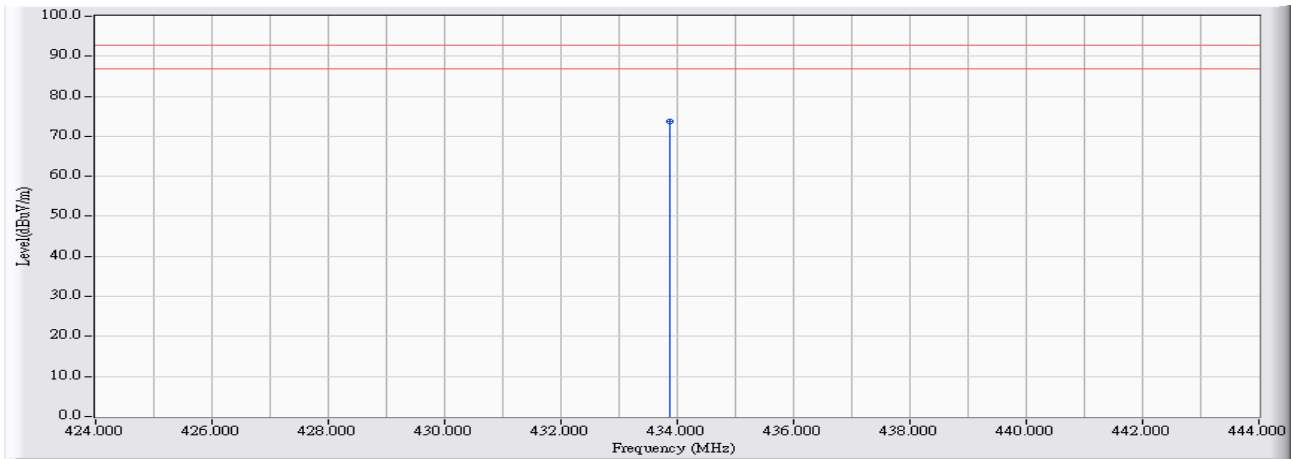
## 2.6. Uncertainty

± 3.8 dB below 1GHz

± 3.9 dB above 1GHz

## 2.7. Test Result

Site : CB1	Time : 2016/06/22 - 11:48
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	Margin : 6
Probe : CB1_FCC_30M-1G-4_9161 - HORIZONTAL	Power : DC 3V (Power by Battery)
EUT : Tire Pressure Monitoring System	Note : Mode 1: Transmit_ X-axis

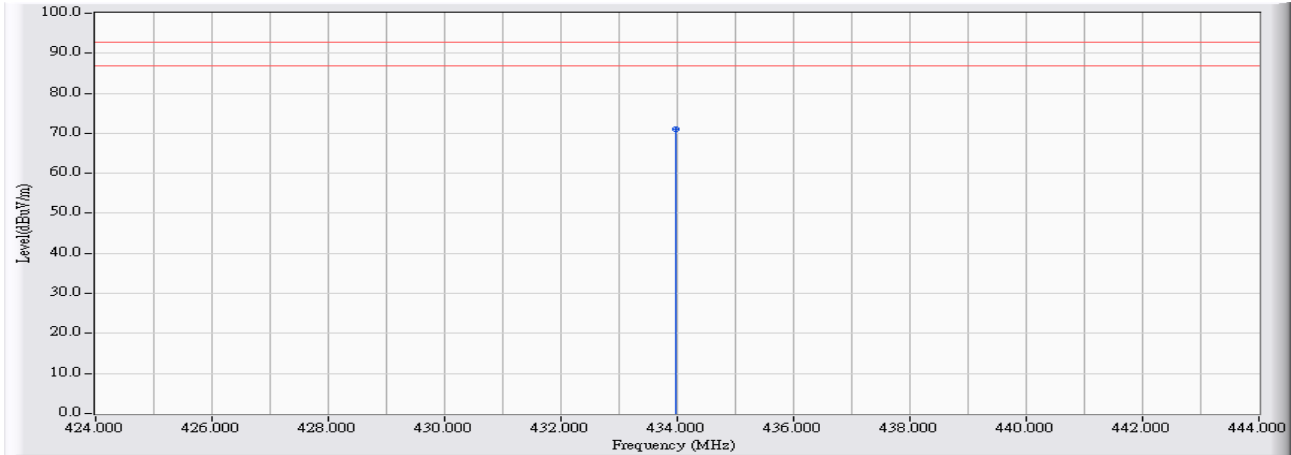


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.880	16.771	56.890	73.660	-19.210	92.870	PEAK

Note:

1. All Reading Levels are Peak value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

<b>Site : CB1</b>	<b>Time : 2016/06/22 - 11:52</b>
<b>Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK</b>	<b>Margin : 6</b>
<b>Probe : CB1_FCC_30M-1G-4_9161 - VERTICAL</b>	<b>Power : DC 3V (Power by Battery)</b>
<b>EUT : Tire Pressure Monitoring System</b>	<b>Note : Mode 1: Transmit_X-axis</b>

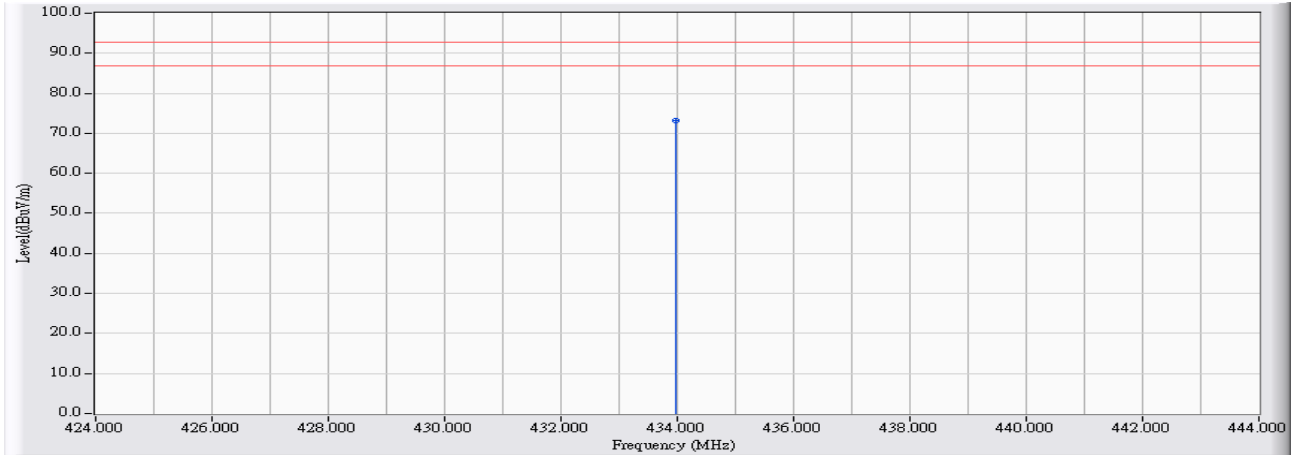


		<b>Frequency (MHz)</b>	<b>Correct Factor (dB)</b>	<b>Reading Level (dBuV)</b>	<b>Measure Level (dBuV/m)</b>	<b>Margin (dB)</b>	<b>Limit (dBuV/m)</b>	<b>Detector Type</b>
1	*	433.970	16.773	54.240	71.012	-21.858	92.870	PEAK

**Note:**

1. All Reading Levels are Peak value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

<b>Site : CB1</b>	<b>Time : 2016/06/22 - 11:35</b>
<b>Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK</b>	<b>Margin : 6</b>
<b>Probe : CB1_FCC_30M-1G-4_9161 - HORIZONTAL</b>	<b>Power : DC 3V (Power by Battery)</b>
<b>EUT : Tire Pressure Monitoring System</b>	<b>Note : Mode 1: Transmit_Y-axis</b>

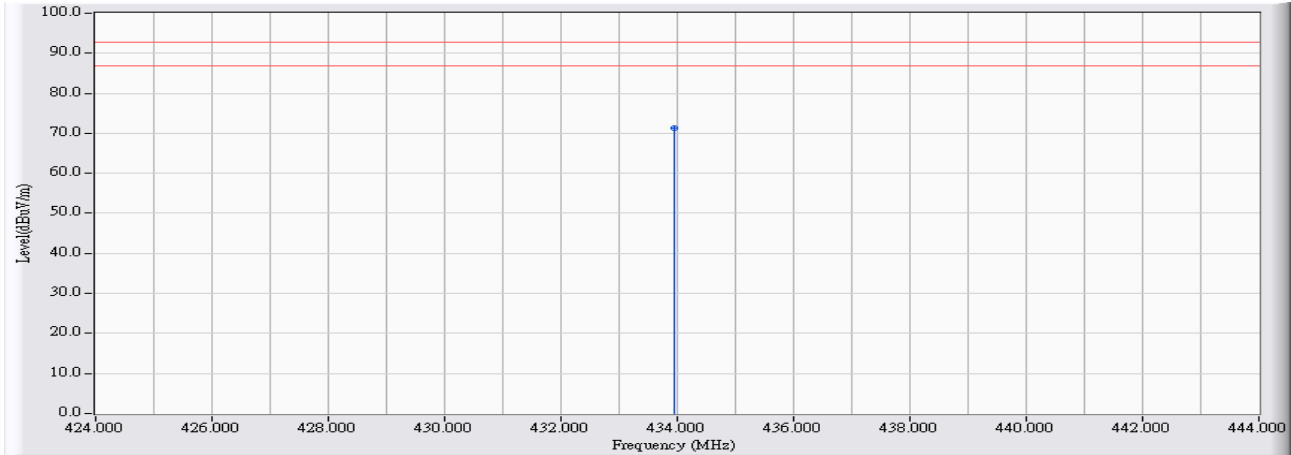


		<b>Frequency (MHz)</b>	<b>Correct Factor (dB)</b>	<b>Reading Level (dBuV)</b>	<b>Measure Level (dBuV/m)</b>	<b>Margin (dB)</b>	<b>Limit (dBuV/m)</b>	<b>Detector Type</b>
1	*	433.975	16.773	56.290	73.063	-19.807	92.870	PEAK

**Note:**

1. All Reading Levels are Peak value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

<b>Site : CB1</b>	<b>Time : 2016/06/22 - 11:42</b>
<b>Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK</b>	<b>Margin : 6</b>
<b>Probe : CB1_FCC_30M-1G-4_9161 - VERTICAL</b>	<b>Power : DC 3V (Power by Battery)</b>
<b>EUT : Tire Pressure Monitoring System</b>	<b>Note : Mode 1: Transmit_Y-axis</b>

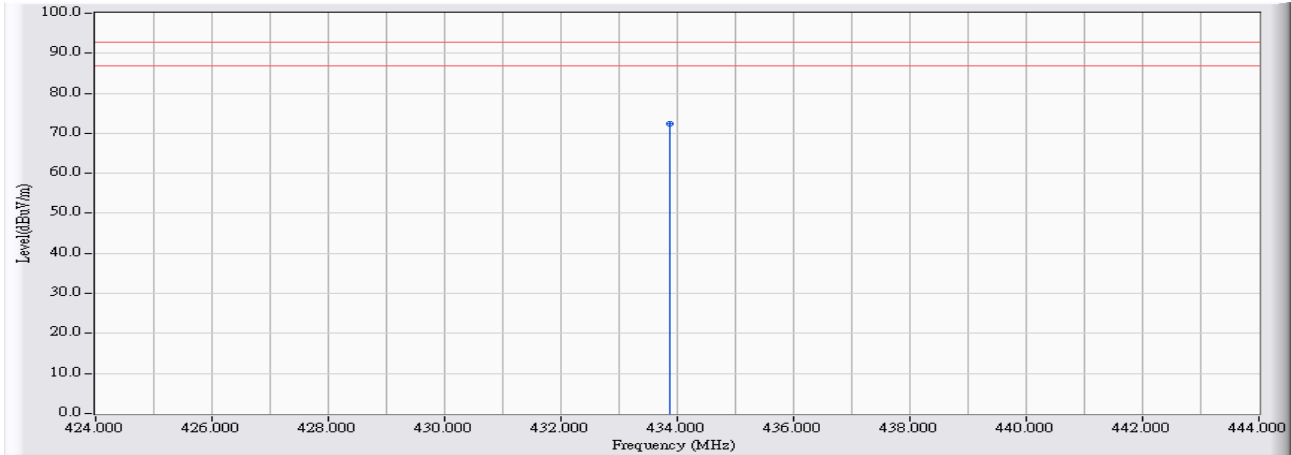


		<b>Frequency (MHz)</b>	<b>Correct Factor (dB)</b>	<b>Reading Level (dBuV)</b>	<b>Measure Level (dBuV/m)</b>	<b>Margin (dB)</b>	<b>Limit (dBuV/m)</b>	<b>Detector Type</b>
1	*	433.960	16.773	54.650	71.422	-21.448	92.870	PEAK

**Note:**

1. All Reading Levels are Peak value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

<b>Site : CB1</b>	<b>Time : 2016/06/22 - 11:10</b>
<b>Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK</b>	<b>Margin : 6</b>
<b>Probe : CB1_FCC_30M-1G-4_9161 - HORIZONTAL</b>	<b>Power : DC 3V (Power by Battery)</b>
<b>EUT : Tire Pressure Monitoring System</b>	<b>Note : Mode 1: Transmit_Z-axis</b>



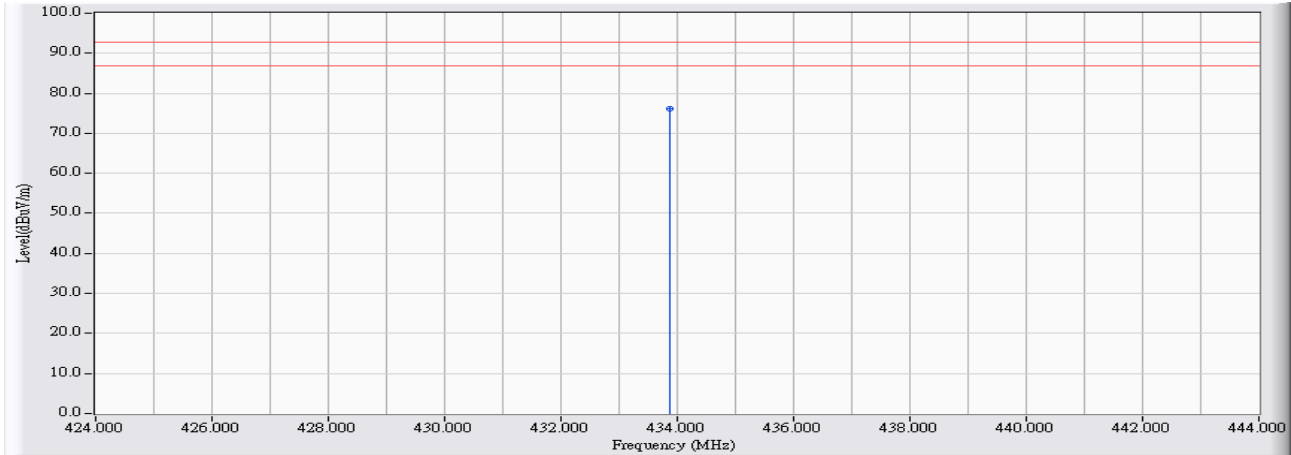
		<b>Frequency (MHz)</b>	<b>Correct Factor (dB)</b>	<b>Reading Level (dBuV)</b>	<b>Measure Level (dBuV/m)</b>	<b>Margin (dB)</b>	<b>Limit (dBuV/m)</b>	<b>Detector Type</b>
1	*	433.880	16.771	55.700	72.470	-20.400	92.870	PEAK

**Note:**

1. All Reading Levels are Peak value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.



<b>Site : CB1</b>	<b>Time : 2016/06/22 - 11:28</b>
<b>Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK</b>	<b>Margin : 6</b>
<b>Probe : CB1_FCC_30M-1G-4_9161 - VERTICAL</b>	<b>Power : DC 3V (Power by Battery)</b>
<b>EUT : Tire Pressure Monitoring System</b>	<b>Note : Mode 1: Transmit_Z-axis</b>



		<b>Frequency (MHz)</b>	<b>Correct Factor (dB)</b>	<b>Reading Level (dBuV)</b>	<b>Measure Level (dBuV/m)</b>	<b>Margin (dB)</b>	<b>Limit (dBuV/m)</b>	<b>Detector Type</b>
1	*	433.880	16.771	59.310	76.080	-16.790	92.870	PEAK

**Note:**

1. All Reading Levels are Peak value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product	Tire Pressure Monitoring System		
Test Item	Fundamental Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2016/06/22	Test Site	CB1

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Peak Measurement Level (dBuV/m)	Average Measurement Level (dBuV/m)	Average Limit (dBuV/m)
<b>Horizontal</b>					
433.920(X-axis)	16.771	56.890	73.660	53.660	72.870
433.920(Y-axis)	16.773	56.290	73.063	53.063	72.870
433.920(Z-axis)	16.773	55.700	72.470	52.470	72.870
<b>Vertical</b>					
433.920(X-axis)	16.773	54.240	71.012	51.422	72.870
433.920(Y-axis)	16.773	54.650	71.422	51.422	72.870
433.920(Z-axis)	16.771	59.310	76.080	56.080	72.870

Note1:

Peak Measurement Level = Reading Level +Correct factor

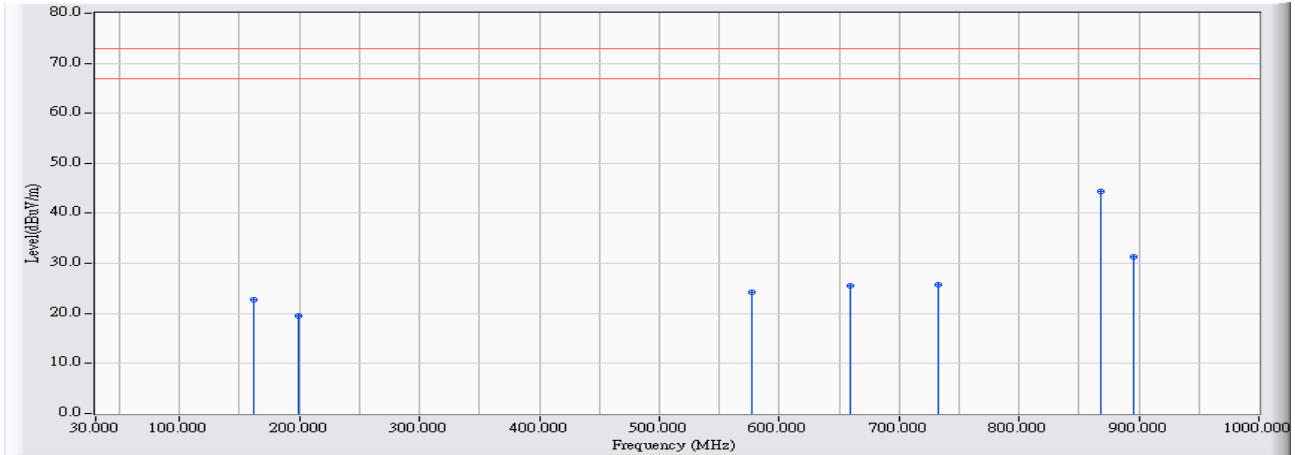
Average Measurement Level = Peak Measurement Level +20Log(Duty Cycle)

(Duty Cycle)=(Ton/(Ton+Toff)=8.45/100=0.0845

20Log(Duty Cycle)= -21.463

**30MHz-1GHz Spurious :**

<b>Site : CB1</b>	<b>Time : 2016/07/01 - 10:24</b>
<b>Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK</b>	<b>Margin : 6</b>
<b>Probe : CB1_FCC_30M-1G-4_9161 - HORIZONTAL</b>	<b>Power : DC 3V (Power by Battery)</b>
<b>EUT : Tire Pressure Monitoring System</b>	<b>Note : Mode 1: Transmit</b>

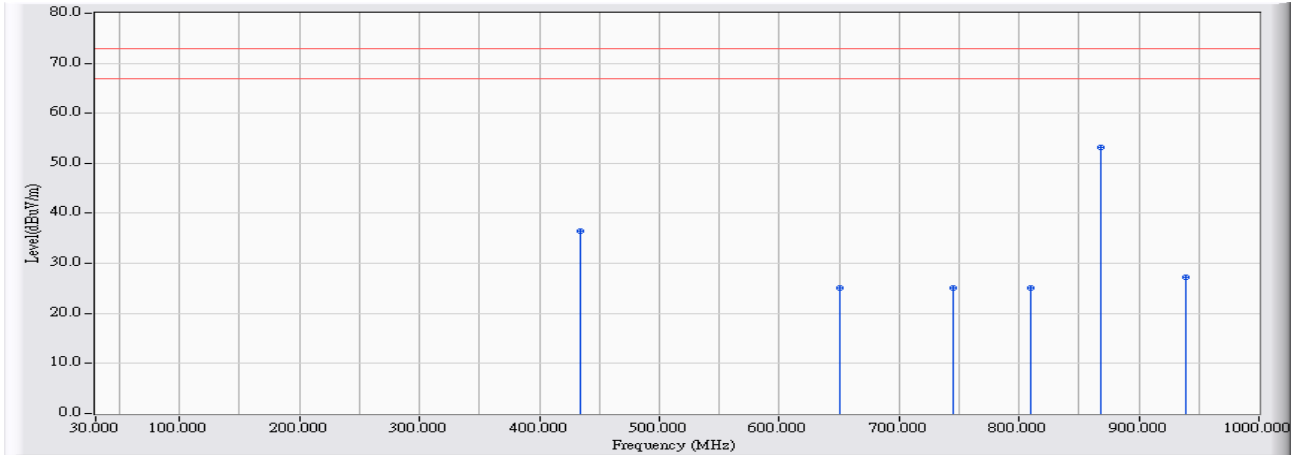


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	162.339	17.526	5.139	22.665	-50.205	72.870	QUASPEAK
2	198.696	12.555	6.927	19.481	-53.389	72.870	QUASPEAK
3	577.776	19.270	4.914	24.184	-48.686	72.870	QUASPEAK
4	658.731	20.502	5.059	25.561	-47.309	72.870	QUASPEAK
5	732.899	21.478	4.279	25.756	-47.114	72.870	QUASPEAK
6	* 867.661	23.088	21.283	44.370	-28.500	72.870	QUASPEAK
7	895.292	23.399	7.993	31.392	-41.478	72.870	QUASPEAK

**Note:**

1. All Reading Levels are Quasi-Peak value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

<b>Site : CB1</b>	<b>Time : 2016/07/01 - 10:25</b>
<b>Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK</b>	<b>Margin : 6</b>
<b>Probe : CB1_FCC_30M-1G-4_9161 - VERTICAL</b>	<b>Power : DC 3V (Power by Battery)</b>
<b>EUT : Tire Pressure Monitoring System</b>	<b>Note : Mode 1: Transmit</b>



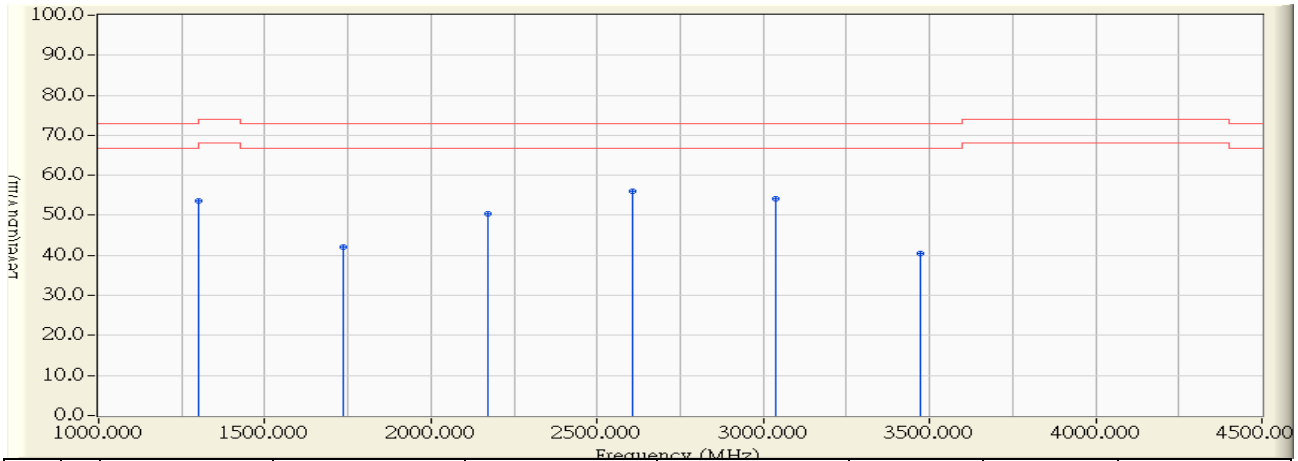
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	433.803	16.768	19.654	36.422	-36.448	72.870	QUASPEAK
2	650.490	20.389	4.786	25.176	-47.694	72.870	QUASPEAK
3	744.533	21.625	3.552	25.176	-47.694	72.870	QUASPEAK
4	809.490	22.431	2.598	25.029	-47.841	72.870	QUASPEAK
5	* 867.661	23.088	30.171	53.258	-19.612	72.870	QUASPEAK
6	938.921	23.824	3.388	27.213	-45.657	72.870	QUASPEAK

**Note:**

1. All Reading Levels are Quasi-Peak value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

**Above 1GHz Spurious:**

<b>Site : CB1</b>	<b>Time : 2016/06/27 - 17:13</b>
<b>Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK</b>	<b>Margin : 6</b>
<b>Probe : CB1_FCC_EFS_1-18G_H2_Ant3 - HORIZONTAL</b>	<b>Power : DC 3V (Power by Battery)</b>
<b>EUT : Tire Pressure Monitoring System</b>	<b>Note : Mode 1: Transmit</b>

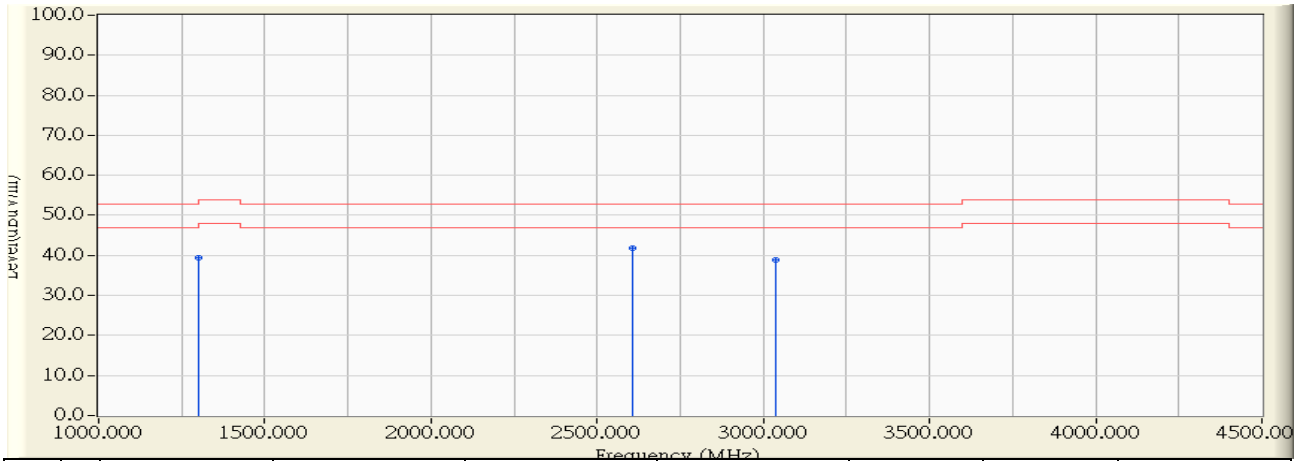


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	1301.000	-10.204	63.710	53.506	-20.494	74.000	PEAK
2	1736.750	-10.987	53.010	42.023	-30.847	72.870	PEAK
3	2169.000	-9.827	60.240	50.412	-22.458	72.870	PEAK
4	* 2604.750	-6.104	62.030	55.926	-16.944	72.870	PEAK
5	3037.000	-7.306	61.480	54.174	-18.696	72.870	PEAK
6	3471.000	-7.707	48.180	40.473	-32.397	72.870	PEAK

**Note:**

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. “ \* ”, means this data is the worst emission level.
4. Measurement Level = Reading Level + Correct Factor.
5. Average Measurement Level = Peak Measurement Level + 20Log (Duty Cycle)  
 Duty Cycle(Only Ton)= Ton/ (Ton+off)=8.45/100=0.0845  
 20\*Log(Duty Cycle) = -21.463
6. The average measurement was not performed when the peak measured data under the limit of peak detection.

<b>Site : CB1</b>	<b>Time : 2016/06/27 - 17:24</b>
<b>Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_AV</b>	<b>Margin : 6</b>
<b>Probe : CB1_FCC_EFS_1-18G_H2_Ant3 - HORIZONTAL</b>	<b>Power : DC 3V (Power by Battery)</b>
<b>EUT : Tire Pressure Monitoring System</b>	<b>Note : Mode 1: Transmit</b>

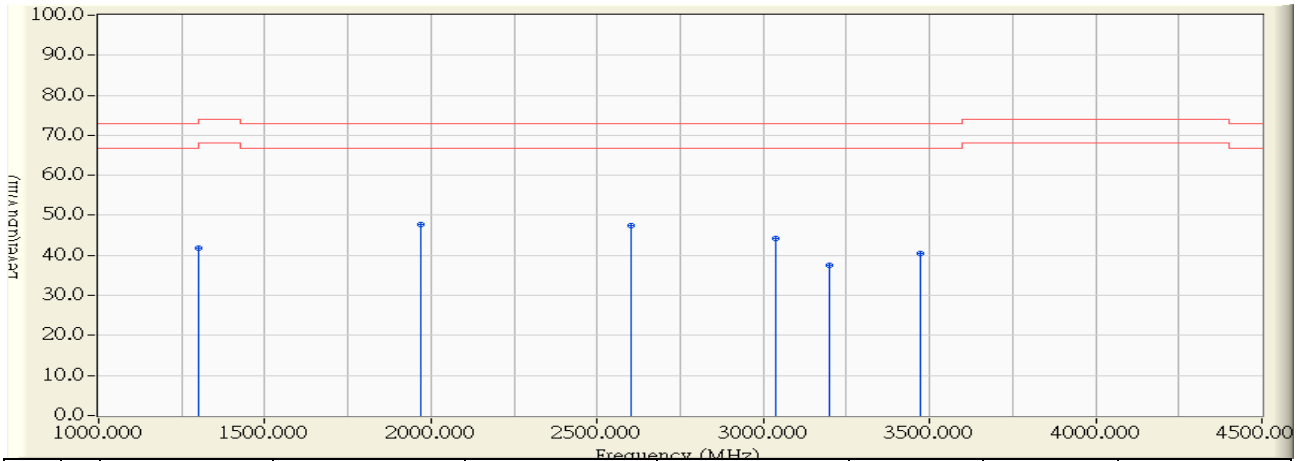


	<b>Frequency (MHz)</b>	<b>Correct Factor (dB)</b>	<b>Reading Level (dBuV)</b>	<b>Measure Level (dBuV/m)</b>	<b>Margin (dB)</b>	<b>Limit (dBuV/m)</b>	<b>Detector Type</b>
1	1302.030	-10.201	49.670	39.469	-14.531	54.000	AVERAGE
2	* 2604.305	-6.102	47.820	41.717	-11.153	52.870	AVERAGE
3	3037.530	-7.306	46.170	38.864	-14.006	52.870	AVERAGE

**Note:**

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. “ \* ”, means this data is the worst emission level.
4. Measurement Level = Reading Level + Correct Factor.
5. Average Measurement Level = Peak Measurement Level + 20Log (Duty Cycle)  
 Duty Cycle(Only Ton)= Ton/ (Ton+off)=8.45/100=0.0845  
 20\*Log(Duty Cycle) = -21.463
6. The average measurement was not performed when the peak measured data under the limit of peak detection.

<b>Site : CB1</b>	<b>Time : 2016/06/27 - 17:37</b>
<b>Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK</b>	<b>Margin : 6</b>
<b>Probe : CB1_FCC_EFS_1-18G_H2_Ant3 - VERTICAL</b>	<b>Power : DC 3V (Power by Battery)</b>
<b>EUT : Tire Pressure Monitoring System</b>	<b>Note : Mode 1: Transmit</b>



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	1302.750	-9.518	51.468	41.950	-32.050	74.000	PEAK
2	* 1967.750	-12.161	59.977	47.817	-25.053	72.870	PEAK
3	2603.000	-4.859	52.392	47.533	-25.337	72.870	PEAK
4	3037.000	-5.252	49.405	44.153	-28.717	72.870	PEAK
5	3199.750	-5.240	42.880	37.641	-35.229	72.870	PEAK
6	3471.000	-5.219	45.738	40.519	-32.351	72.870	PEAK

**Note:**

- All readings above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- " \* ", means this data is the worst emission level.
- Measurement Level = Reading Level + Correct Factor.
- Average Measurement Level = Peak Measurement Level + 20Log (Duty Cycle)  
 $Duty\ Cycle(Only\ Ton) = \frac{Ton}{(Ton+off)} = \frac{8.45}{100} = 0.0845$   
 $20 * \log(Duty\ Cycle) = -21.463$
- The average measurement was not performed when the peak measured data under the limit of peak detection.

### 3. Occupied Bandwidth

#### 3.1. Test Equipment

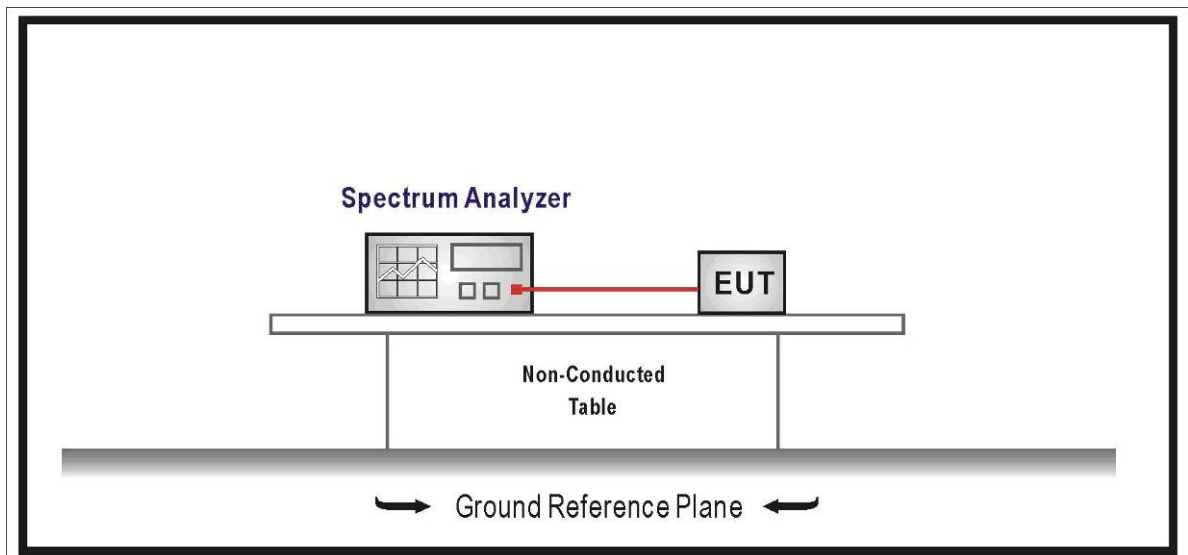
The following test equipments are used during the radiated emission tests:

Occupied Bandwidth / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/08/08
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/05
Signal Analyzer	R&S	FSV7	101650	2016/11/30

Note: All equipments that need to calibrate are with calibration period of 1 year.

#### 3.2. Test Setup



#### 3.3. Limits

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. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

#### 3.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231(b): 2015

#### 3.5. Uncertainty

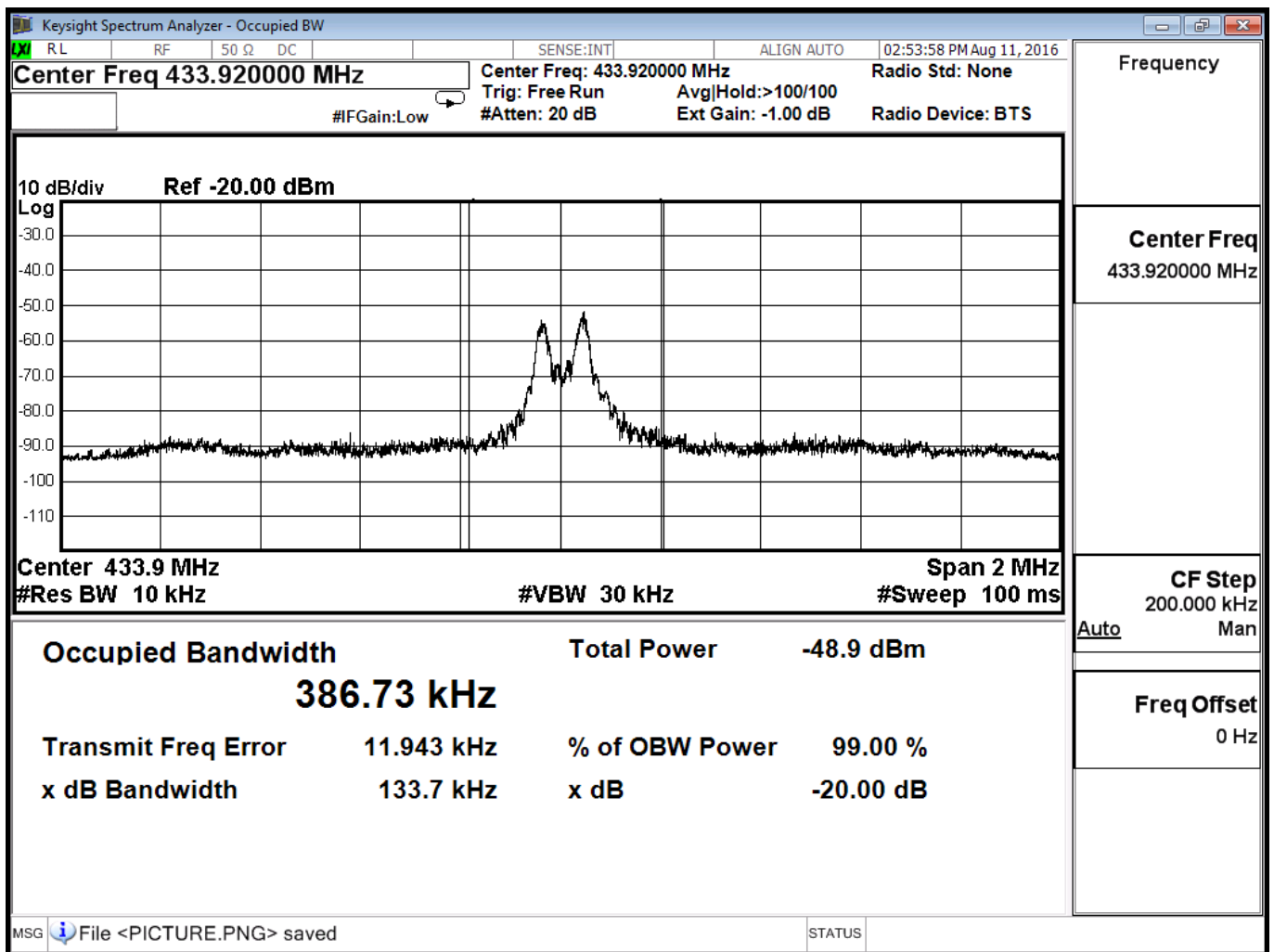
± 150Hz



### 3.6. Test Result

Product	Tire Pressure Monitoring System		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2016/08/11	Test Site	SR7

Center Frequency	433.92 MHz
Allowable Bandwidth (70-900 MHz: 0.25%, Above 900MHz: 0.5%)	1084.8 KHz
Bandwidth at 20dB down (Max)	133.7KHz
Result	PASS



**4. Duty cycle**

**4.1. Test Equipment**

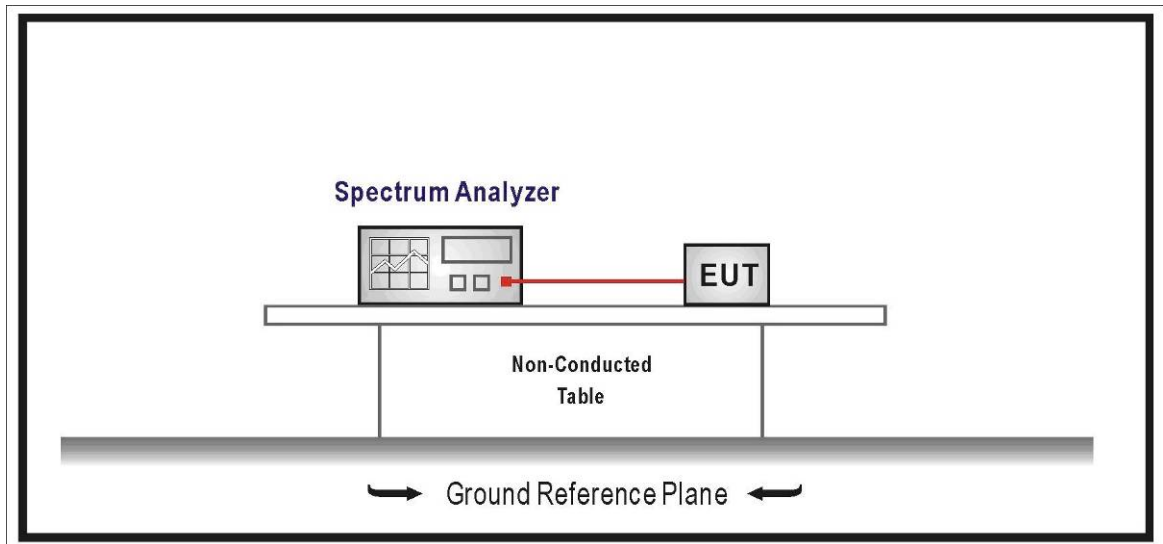
The following test equipments are used during the radiated emission tests:

Duty cycle / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/08/08
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/05
Signal Analyzer	R&S	FSV7	101650	2016/11/30

Note: All equipments that need to calibrate are with calibration period of 1 year.

**4.2. Test Setup**



**4.3. Limits**

N/A

**4.4. Test Specification**

According to FCC Part 15 Subpart C Paragraph 15.231(b): 2015

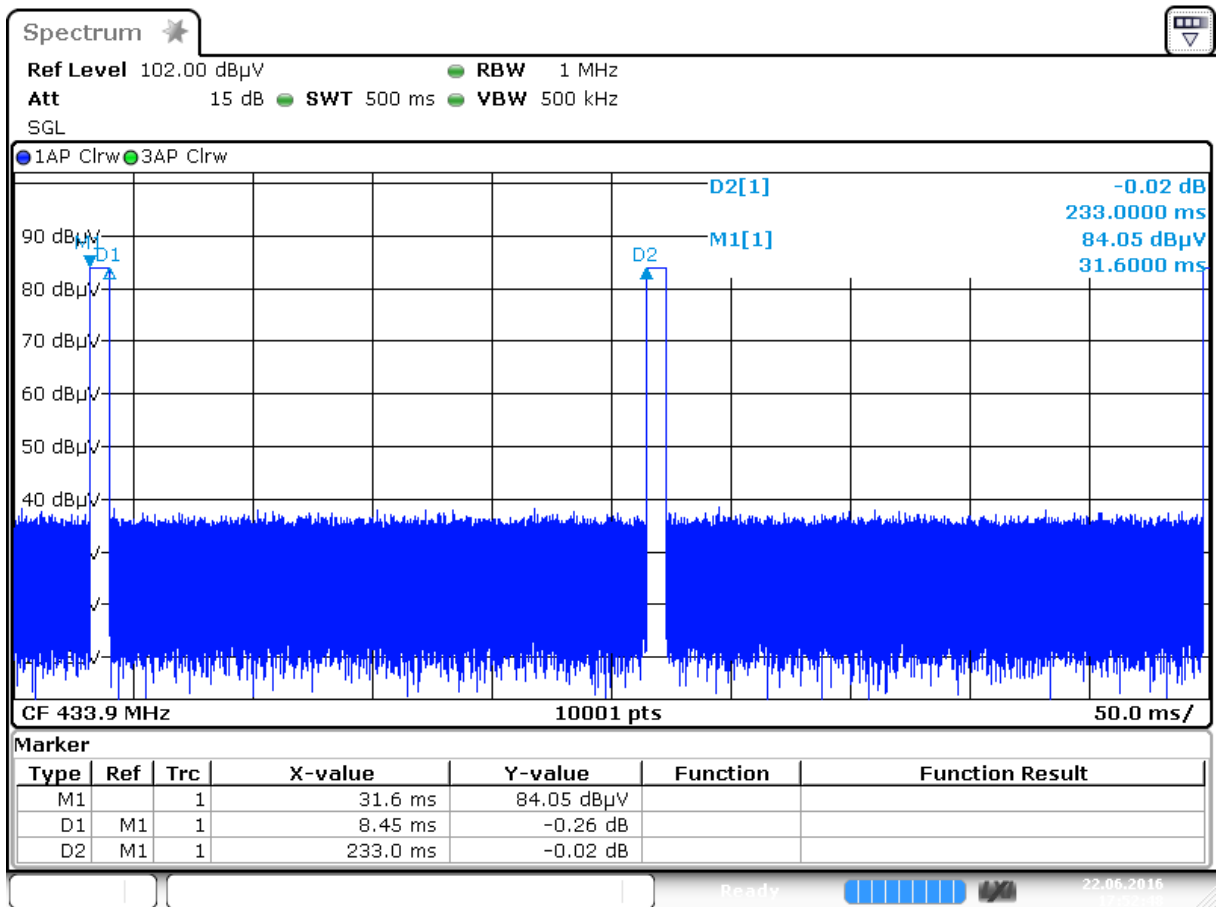
**4.5. Uncertainty**

± 25msec

### 4.6. Test Result

Product	Tire Pressure Monitoring System		
Test Item	Duty Cycle		
Test Mode	Mode 1: Transmit		
Date of Test	2016/06/22	Test Site	SR7

Center Frequency	433.92 MHz
$T_{ON} = 8.45ms$	
$T_{ON} + T_{Off} = 100ms$	
Duty Cycle = $8.45msec / 100msec = 0.0845$	0.415%
Duty Cycle correction factor = $20 \text{ LOG } 0.0845 = -21.463$	



Date: 22 JUN 2016 17:52:48

**5. Transmitter time**

**5.1. Test Equipment**

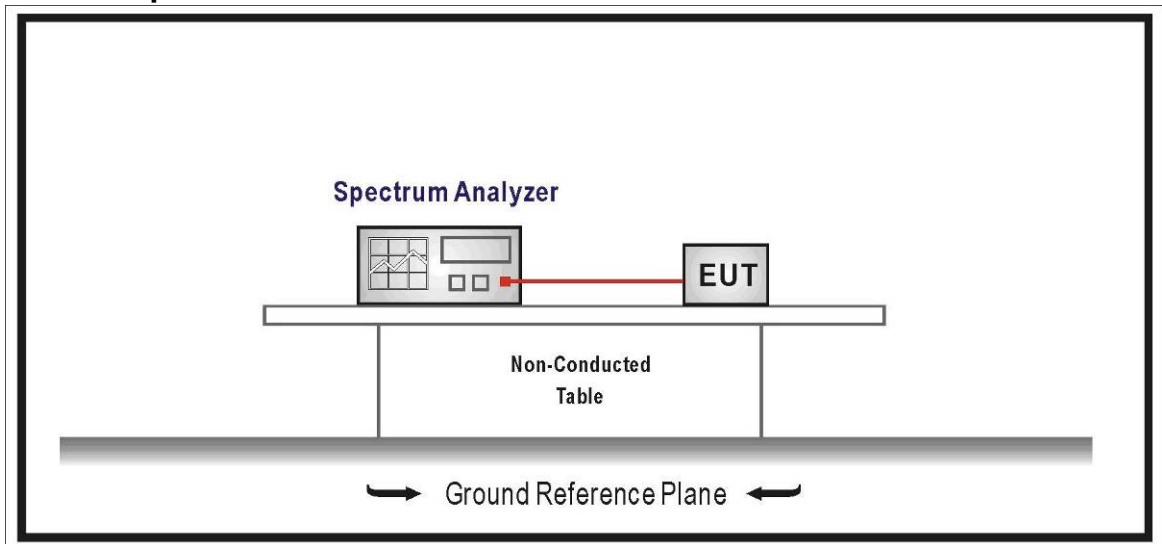
The following test equipments are used during the radiated emission tests:

Transmitter time / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/08/08
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/05
Signal Analyzer	R&S	FSV7	101650	2016/11/30

Note: All equipments that need to calibrate are with calibration period of 1 year.

**5.2. Test Setup**



**5.3. Limits**

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. A transmitter activated automatically shall cease transmission within 5 seconds after activation.

**5.4. Test Specification**

According to FCC Part 15 Subpart C Paragraph 15.231(b): 2015

**5.5. Uncertainty**

± 25msec

**5.6. Test Result**

Product	Tire Pressure Monitoring System		
Test Item	Transmitter time		
Test Mode	Mode 1: Transmit		
Date of Test	2016/08/11	Test Site	SR7

Center Frequency	433.92 MHz
Transmitter time =9.5ms < 5 sec.	Below 5 sec.
Result	PASS

**Transmitter time**

