FCC Test Report

Product Name ： Tire Pressure Monitoring System-A Series

Trade Name ： Picolink

Model No. ： A1, A2

FCC ID. ： 2AEJRPA12X

Applicant ： Picolink Technology Co., Ltd

Address ： 5F.-7, No.18, Taiyuan St.Zhubei 302 Taiwan

Date of Receipt ： Jun. 03, 2016

Issued Date ： Mar. 16, 2017

Report No. ： 1660176R-RFUSP14V00

Report Version ： V1.0

Testing Laboratory

3024

The test results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of DEKRA Testing and Certification Co., Ltd.

Test Report Certification

Issued Date : Mar. 16, 2017
Report No. : 1660176R-RFUSP14V00

Product Name	:	Tire Pressure Monitoring System-A Series
Applicant	:	Picolink Technology Co., Ltd
Address	:	5F.-7, No.18, Taiyuan St.Zhubei 302 Taiwan
Manufacturer	:	Picolink Technology Co., Ltd
Model No.	:	A1, A2
FCC ID.	:	2AEJRPA12X
EUT Voltage	:	DC 3V (Power by Battery)
Testing Voltage	:	DC 3V (Power by Battery)
Trade Name	:	Picolink
Applicable Standard	:	FCC 15 Subpart C Section 15.231(b): 2015
Test Lab	:	Hsin Chu Laboratory
Test Result	:	Complied

The test results relate only to the samples tested.
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Approved By : Roy Wang

(Roy Wang / Director)

Revision History

Report No.	Version	Description	Issued Date
1660176R-RFUSP14V00	V1.0	Initial issue of report.	Mar. 16, 2017

Laboratory Information

We, **DEKRA Testing and Certification Co., Ltd.**, 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: 22397-1 / 22397-2 / 22397-3

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:
http://www.dekra.com.tw/english/about/certificates.aspx?bval=5
The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site : http://www.dekra.com.tw/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-A Series
Trade Name	Picolink
Model No.	A1, A2
Frequency Range	433.92 MHz
Channel Number	1
Type of Modulation	FSK

Antenna Information	
Antenna Type	Soldered on PCB Antenna
Antenna Gain	0 dBi

Working Frequency of Each Channel	
Channel	Frequency
001	433.92 MHz

Note:

1. This device is Tire Pressure Monitoring System-A Series included BT4.0 / 433.92MHz transceiver and receiving functions.
2. The different of the each model is shown as below:

Model Number	Description
A1	Tire inside
A2	Tire outside

3. These tests are conducted on a sample for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.231.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
5. This device is a composite device in accordance with Part 15 regulations. The function of the BT4.0 transmitting was tested and its test report number is 1660176R-RFUSP01V00. The function receiving was tested and its test report number is 1660176R-RFUSP01V00-B under Declaration of Conformity.

1.2. Test Mode

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

TX	Mode 1: Transmit Mode_A1 Mode 2: Transmit Mode_A2

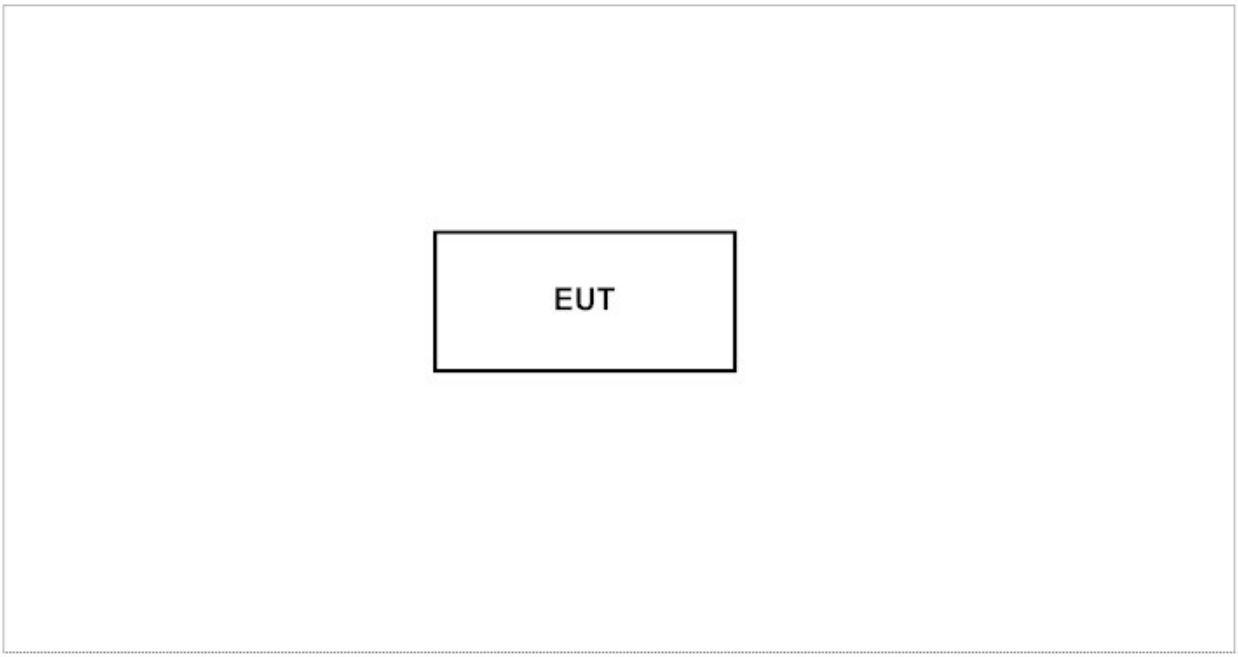
Emission		
Performed Item	Mode 1	Mode 2
Conducted Emission	No	No
Radiated Emission	Yes	Yes
Occupied Bandwidth	Yes	Yes
Duty cycle	No	No
Transmitter time	Yes	Yes

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

Connection Diagram


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:

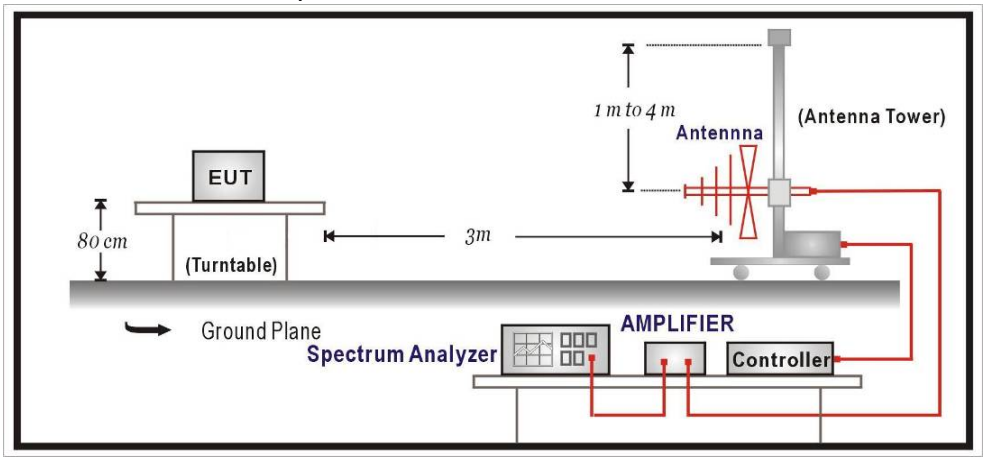
Radiated Emission / CB4-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	Schaffner	CBL6112B	2891	2017/08/14
Horn Antenna	Schwarzbeck	BBHA 9120	D312	2017/10/25
Pre-Amplifier	EMCI	EMC0031835	980233	2018/02/02
Pre-Amplifier	Schwarzbeck	DBL-1840N506	013	2017/09/29
Pre-Amplifier	Miteq	JS41-001040000-58-5P	1573954	2017/10/04
Horn Antenna	Schwarzbeck	BBHA 9170	203	2017/08/28
Signal & Spectrum Analyzer	R&S	FSV40	101049	2018/01/22

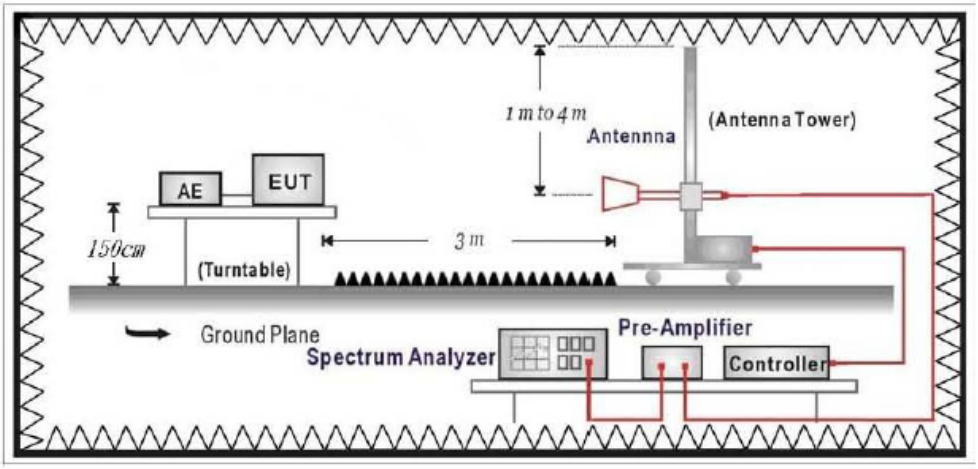
Note: All equipments that need to calibrate are with calibration period of 1 year.

2.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



2.3. Limits

➢ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.231(b) Limits				
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

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009 - 0.490	2400/F(kHz)	See Remark[1]	300
0.490 - 1.705	24000/F(kHz)	See Remark[1]	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 harminics 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

Product	Tire Pressure Monitoring System-A Series		
Test Item	Fundamental Radiated Emission		
Test Mode	Mode 1: Transmit Mode_A1		
Date of Test	2017/02/08	Test Site	CB4-H

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Peak Measurement Level (dBuV/m)	Average Measurement Level (dBuV/m)	Average Limit (dBuV/m)
Horizontal					
433.920(X-axis)	25.917	58.666	84.582	75.759	80.830
433.920(Y-axis)	25.917	53.792	79.708	70.885	80.830
433.920(Z-axis)	25.917	53.703	79.619	70.796	80.830
Vertical					
433.920(X-axis)	25.917	52.589	78.505	69.682	80.830
433.920(Y-axis)	25.917	56.968	82.884	74.061	80.830
433.920(Z-axis)	25.917	56.986	82.902	74.079	80.830

Note:

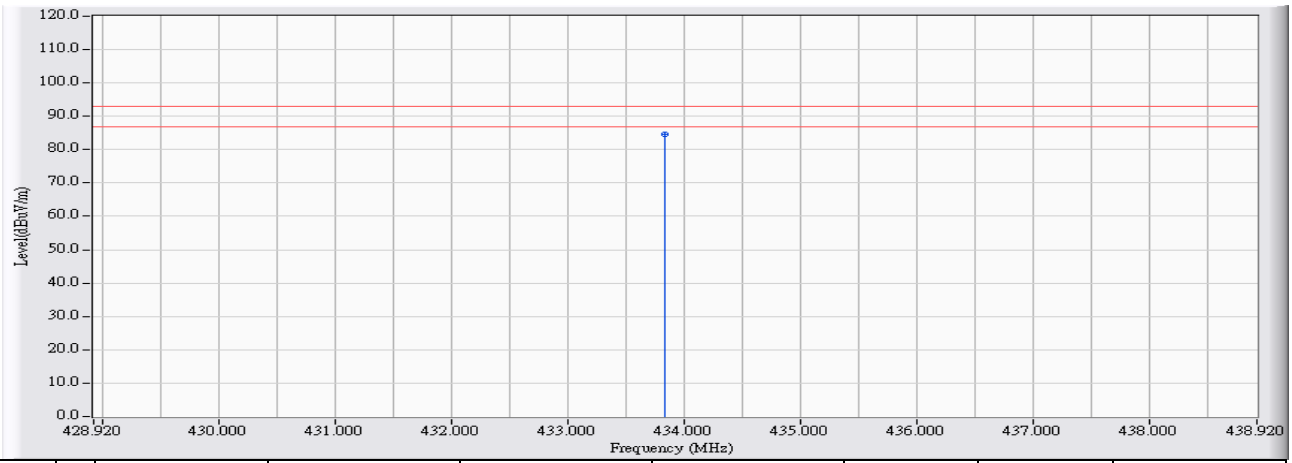
Peak Measurement Level = Reading Level +Correct factor

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

(Duty Cycle)=(Ton/(Ton+Toff)=36.21/100=0.362

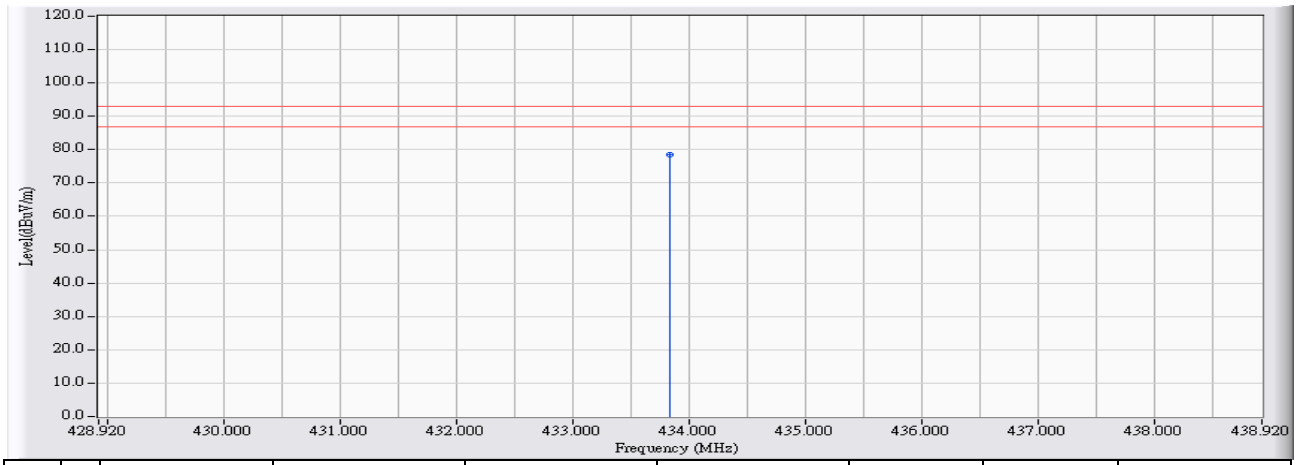
20Log(Duty Cycle)= -8.823

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz_X-axis**



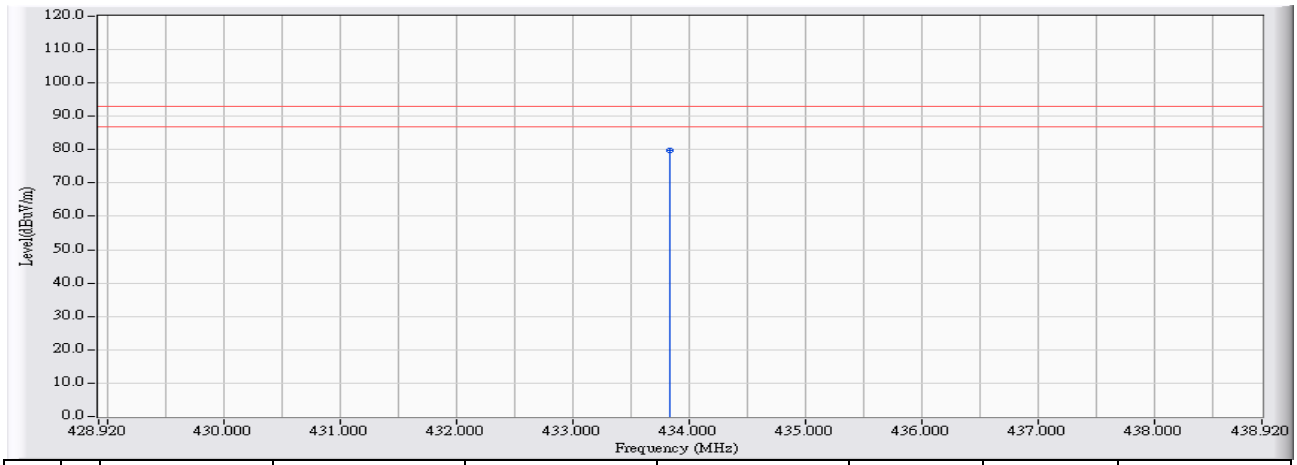
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.834	25.917	58.666	84.582	-8.288	92.870	PEAK

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz_X-axis**



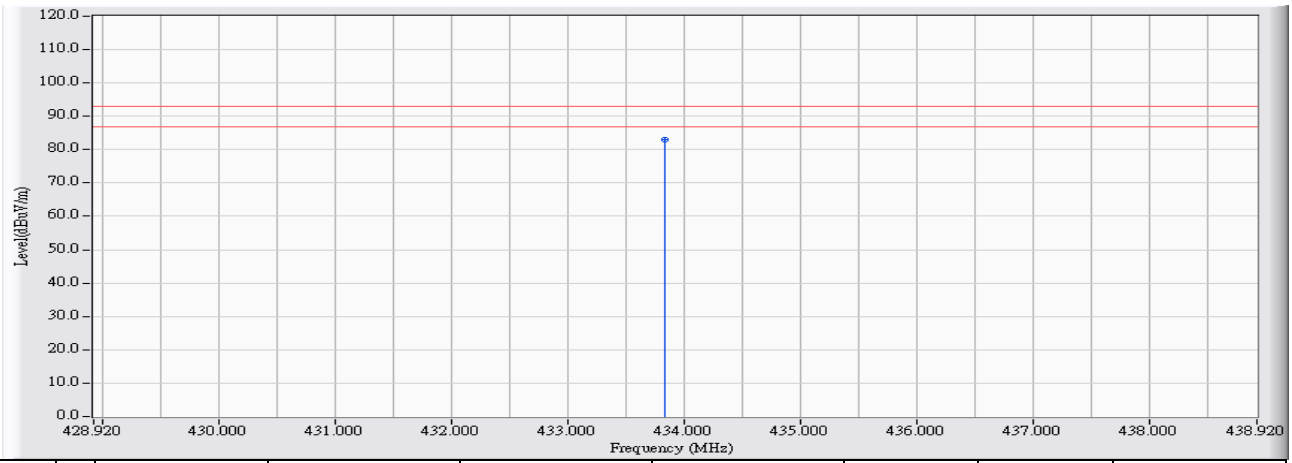
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.835	25.917	52.589	78.505	-14.365	92.870	PEAK

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz_Y-axis**



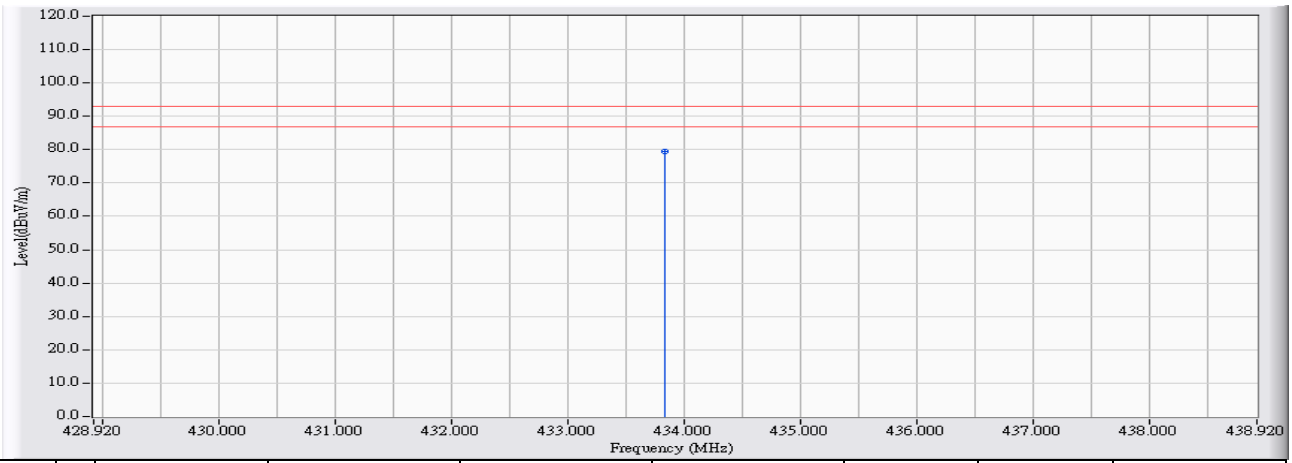
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.834	25.917	53.792	79.708	-13.162	92.870	PEAK

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz_Y-axis**



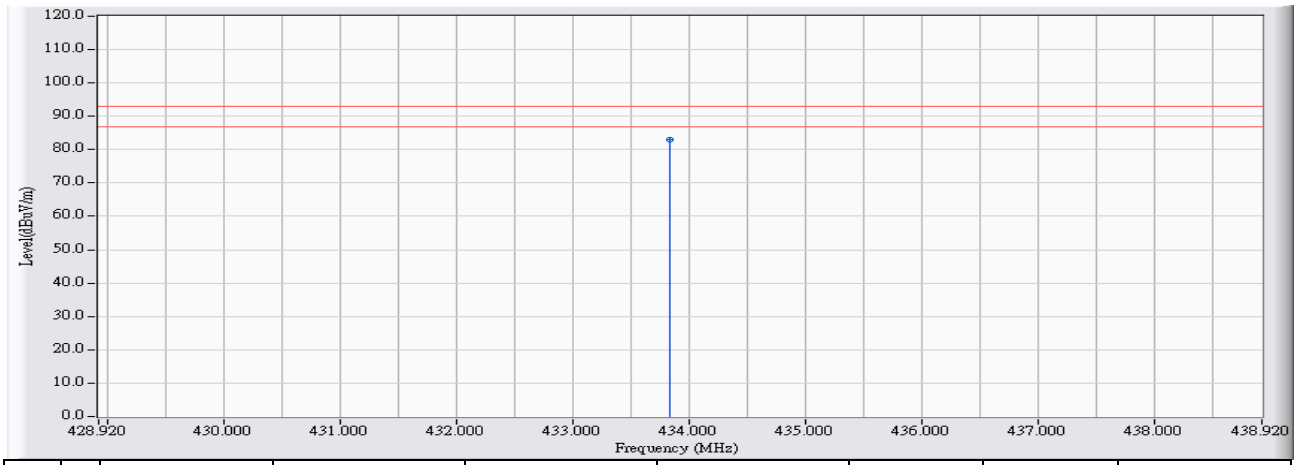
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.835	25.917	56.968	82.884	-9.986	92.870	PEAK

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz_Z-axis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.834	25.917	53.703	79.619	-13.251	92.870	PEAK

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz_Z-axis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.834	25.917	56.986	82.902	-9.968	92.870	PEAK

Product	Tire Pressure Monitoring System-A Series		
Test Item	Fundamental Radiated Emission		
Test Mode	Mode 2: Transmit Mode_A2		
Date of Test	2017/02/08	Test Site	CB4-H

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Peak Measurement Level (dBuV/m)	Average Measurement Level (dBuV/m)	Average Limit (dBuV/m)
Horizontal					
433.920(X-axis)	25.918	35.730	61.648	52.825	80.830
433.920(Y-axis)	25.917	50.240	76.156	67.333	80.830
Vertical					
433.920(X-axis)	25.918	49.286	75.204	66.381	80.830
433.920(Y-axis)	25.917	40.250	66.166	57.343	80.830

Note1:

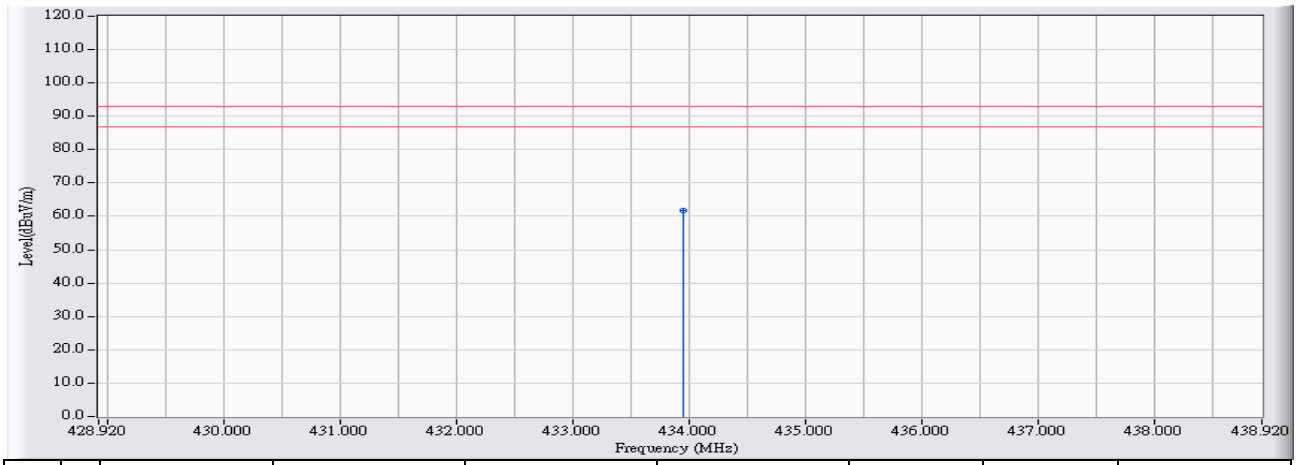
Peak Measurement Level = Reading Level +Correct factor

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

(Duty Cycle)=(Ton/(Ton+Toff)=36.21/100=0.362

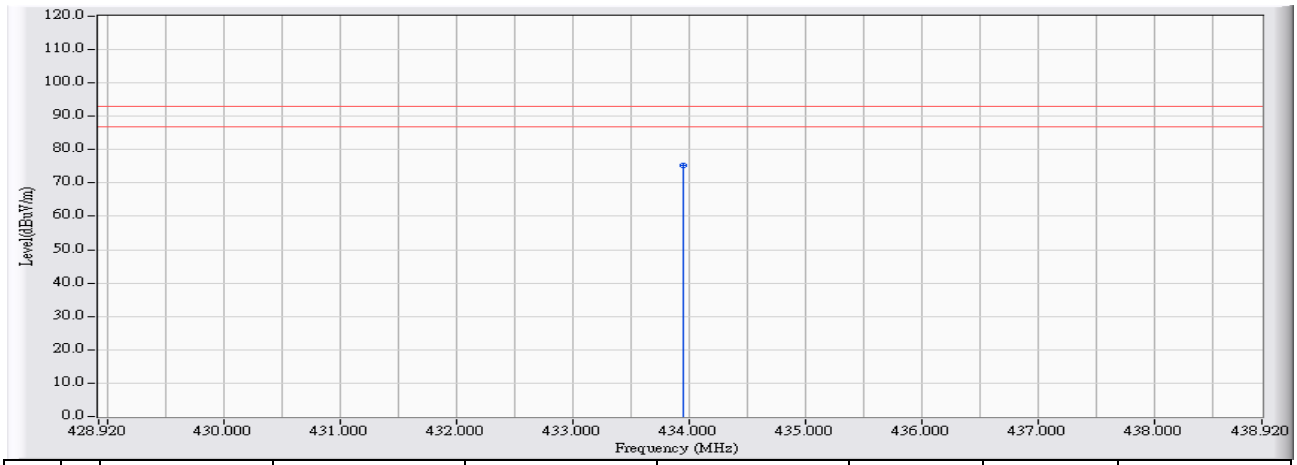
20Log(Duty Cycle)= -8.823

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 2: Transmit Mode_A2 _433.92MHz_X-axis**



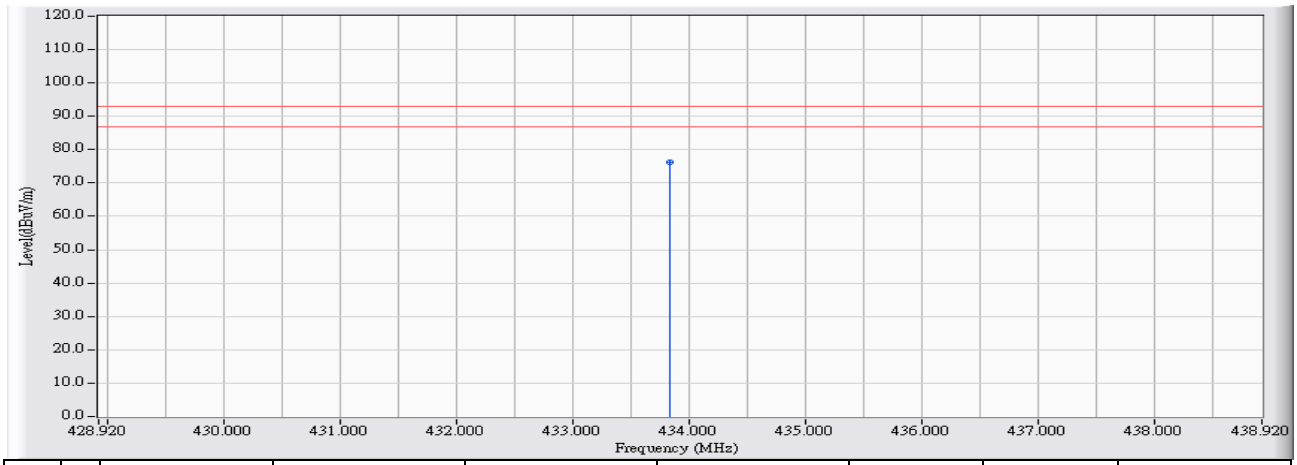
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.949	25.918	35.730	61.648	-31.222	92.870	PEAK

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 2: Transmit Mode_A2 _433.92MHz_X-axis**



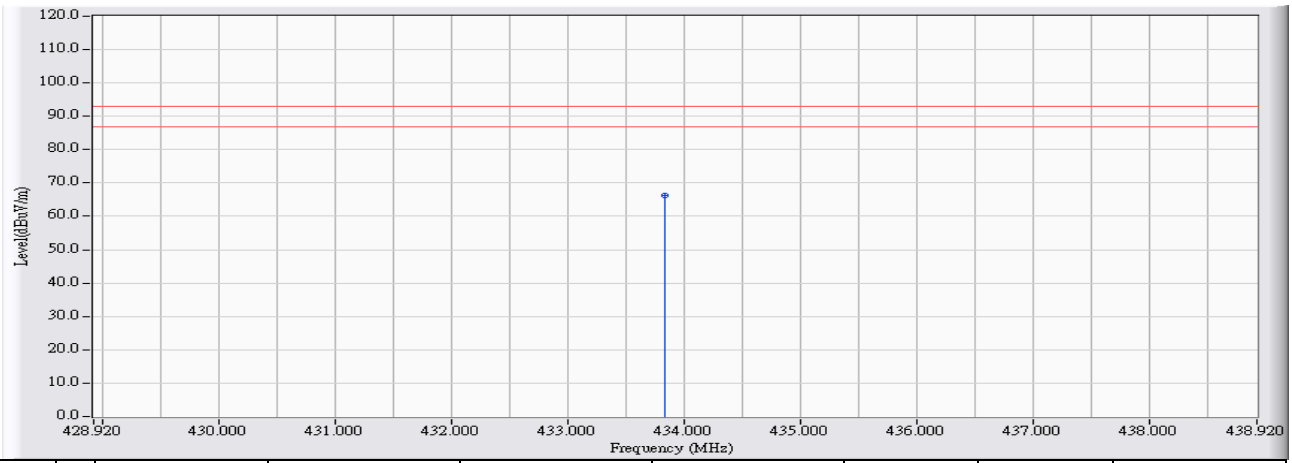
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.950	25.918	49.286	75.204	-17.666	92.870	PEAK

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 2: Transmit Mode_A2 _433.92MHz_Y-axis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.835	25.917	50.240	76.156	-16.714	92.870	PEAK

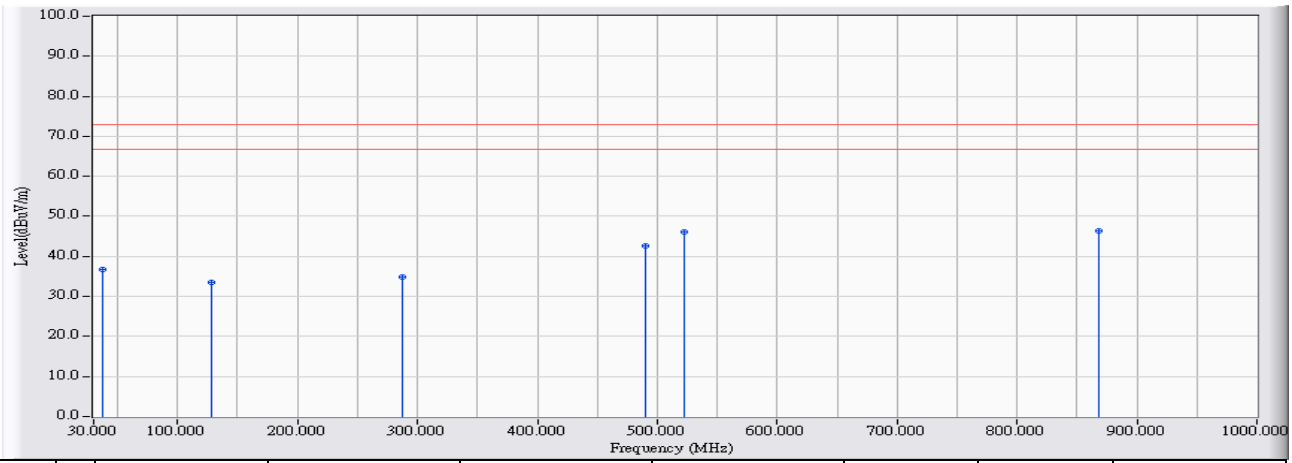
Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_F_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 2: Transmit Mode_A2 _433.92MHz_Y-axis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	433.834	25.917	40.250	66.166	-26.704	92.870	PEAK

30MHz-1GHz Spurious :

Site : CB4-H	**Time : 2017/02/16**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz**

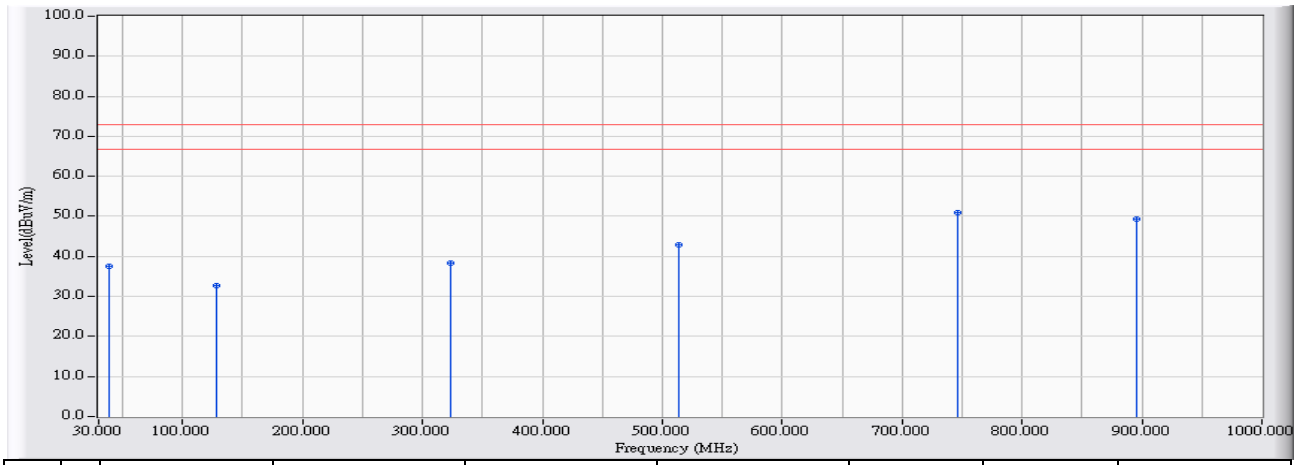


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		37.662	-14.215	50.991	36.776	-36.094	72.870	QUASIPEAK
2		128.445	-14.215	47.742	33.527	-39.343	72.870	QUASIPEAK
3		287.994	-14.215	49.110	34.895	-37.975	72.870	QUASIPEAK
4		490.025	-14.215	56.769	42.554	-30.316	72.870	QUASIPEAK
5		522.905	-14.215	60.343	46.128	-26.742	72.870	QUASIPEAK
6	*	867.608	-14.215	60.468	46.253	-26.617	72.870	QUASIPEAK

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.

Site : CB4-H	**Time : 2017/02/16**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz**

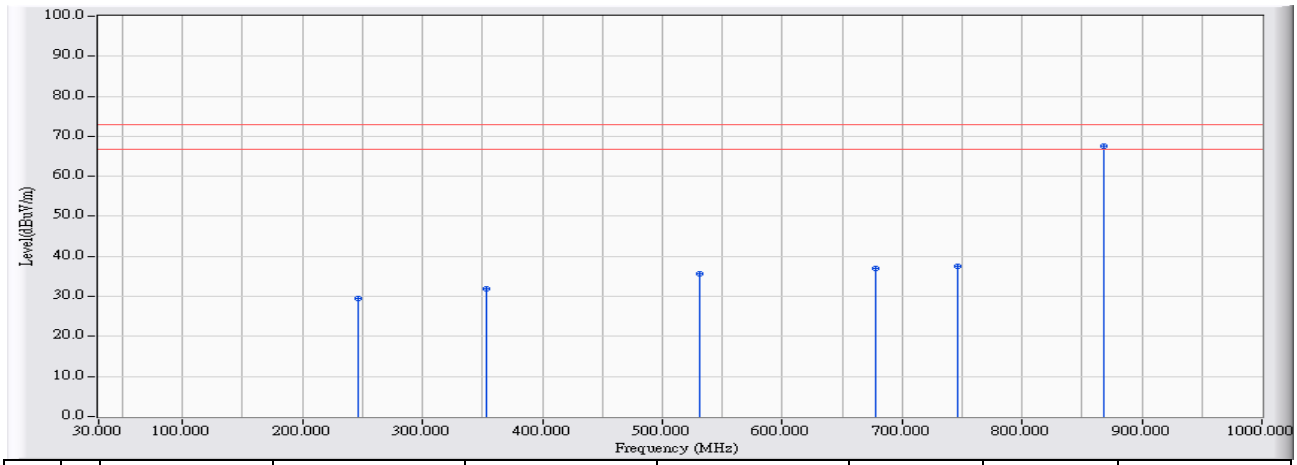


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		38.147	25.644	11.813	37.457	-35.413	72.870	QUASIPEAK
2		128.251	20.652	12.150	32.803	-40.067	72.870	QUASIPEAK
3		323.978	22.976	15.355	38.331	-34.539	72.870	QUASIPEAK
4		513.982	27.173	15.647	42.820	-30.050	72.870	QUASIPEAK
5	*	746.855	29.537	21.314	50.851	-22.019	72.870	QUASIPEAK
6		895.929	31.288	18.030	49.318	-23.552	72.870	QUASIPEAK

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.

Site : CB4-H	**Time : 2017/02/10**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 2: Transmit Mode_A2 _433.92MHz**

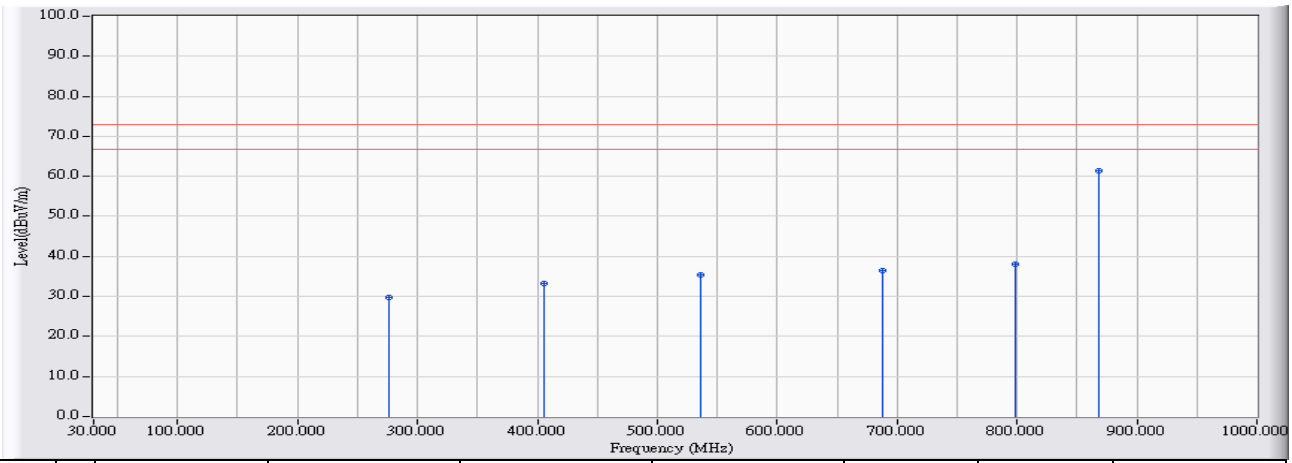


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		246.967	21.170	8.408	29.578	-43.292	72.870	QUASIPEAK
2		352.881	23.868	8.099	31.967	-40.903	72.870	QUASIPEAK
3		531.343	27.366	8.189	35.555	-37.315	72.870	QUASIPEAK
4		678.477	28.864	8.203	37.067	-35.803	72.870	QUASIPEAK
5		745.982	29.524	8.094	37.617	-35.253	72.870	QUASIPEAK
6	*	867.608	30.886	36.718	67.604	-5.266	72.870	QUASIPEAK

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.

Site : CB4-H	**Time : 2017/02/10**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 2: Transmit Mode_A2 _433.92MHz**



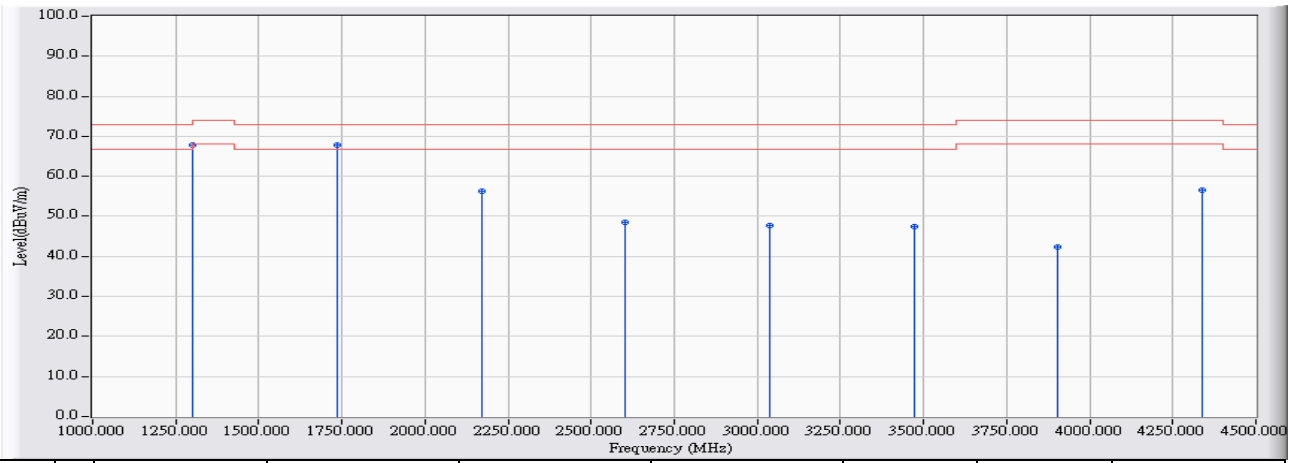
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		276.549	21.804	8.030	29.833	-43.037	72.870	QUASIPEAK
2		405.352	25.436	7.714	33.150	-39.720	72.870	QUASIPEAK
3		536.095	27.431	7.876	35.307	-37.563	72.870	QUASIPEAK
4		687.982	28.856	7.713	36.568	-36.302	72.870	QUASIPEAK
5		798.745	30.175	7.784	37.958	-34.912	72.870	QUASIPEAK
6	*	867.899	30.885	30.581	61.466	-11.404	72.870	QUASIPEAK

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:

Site : CB4-H	**Time : 2017/02/16**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz**

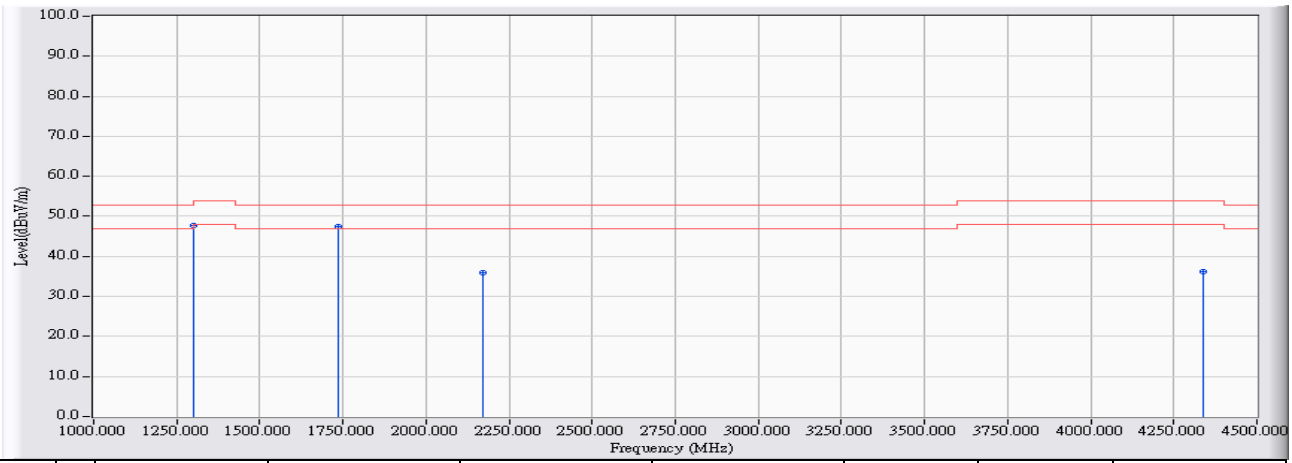


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1301.670	-13.150	81.103	67.954	-6.046	74.000	PEAK
2	*	1735.626	-11.557	79.442	67.885	-4.985	72.870	PEAK
3		2169.233	-9.820	66.040	56.220	-16.650	72.870	PEAK
4		2603.190	-7.962	56.579	48.617	-24.253	72.870	PEAK
5		3037.846	-6.828	54.460	47.632	-25.238	72.870	PEAK
6		3470.403	-6.151	53.539	47.388	-25.482	72.870	PEAK
7		3904.359	-4.591	46.943	42.351	-31.649	74.000	PEAK
8		4338.316	-2.723	59.363	56.640	-17.360	74.000	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.

Site : CB4-H	**Time : 2017/02/16**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_AV	**Margin : 6**
Probe : CB4-H_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz**

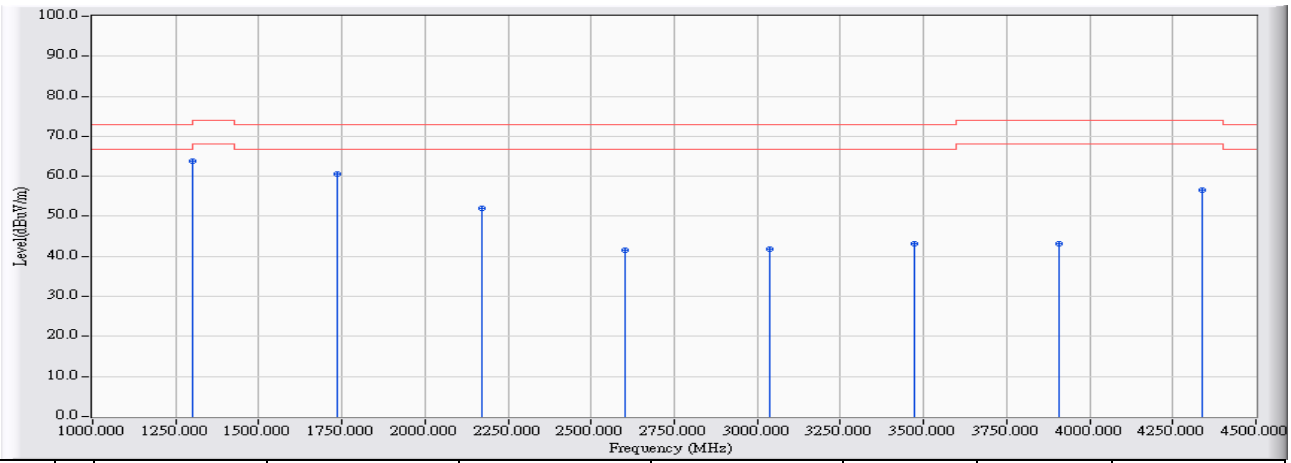


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1301.670	-13.150	60.763	47.614	-6.386	54.000	AVERAGE
2	*	1735.626	-11.557	59.102	47.545	-5.325	52.870	AVERAGE
3		2169.233	-9.820	45.700	35.880	-16.990	52.870	AVERAGE
4		4338.316	-2.723	39.023	36.300	-17.700	54.000	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.

Site : CB4-H	**Time : 2017/02/16**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz**

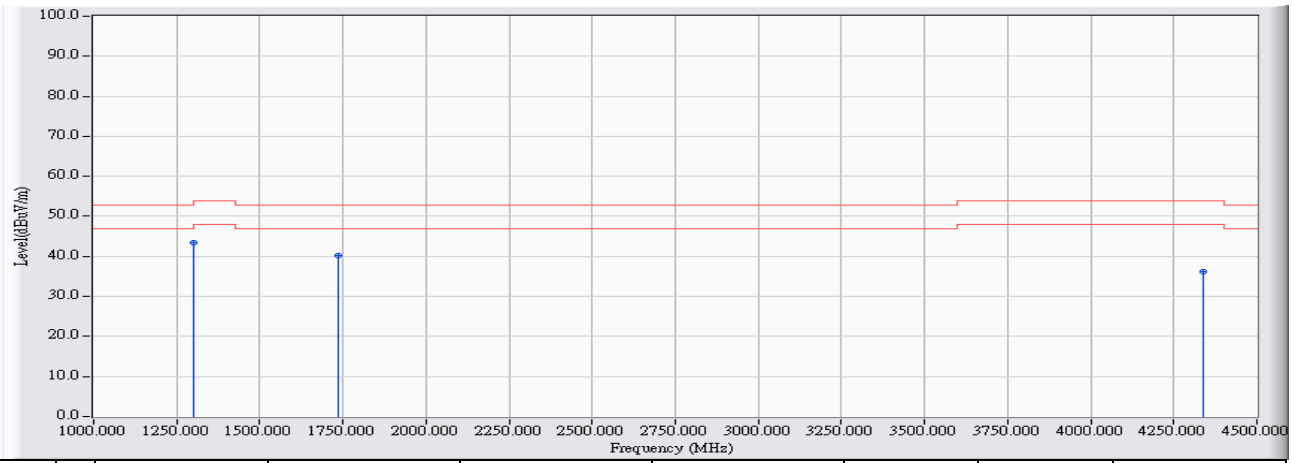


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	1301.670	-13.150	76.852	63.703	-10.297	74.000	PEAK
2		1735.976	-11.556	72.195	60.639	-12.231	72.870	PEAK
3		2169.233	-9.820	61.781	51.961	-20.909	72.870	PEAK
4		2602.840	-7.962	49.464	41.501	-31.369	72.870	PEAK
5		3037.496	-6.828	48.704	41.876	-30.994	72.870	PEAK
6		3470.403	-6.151	49.386	43.235	-29.635	72.870	PEAK
7		3905.759	-4.585	47.734	43.148	-30.852	74.000	PEAK
8		4337.966	-2.724	59.389	56.664	-17.336	74.000	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.

Site : CB4-H	**Time : 2017/02/16**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_AV	**Margin : 6**
Probe : CB4-H_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 1: Transmit Mode_A1 _433.92MHz**

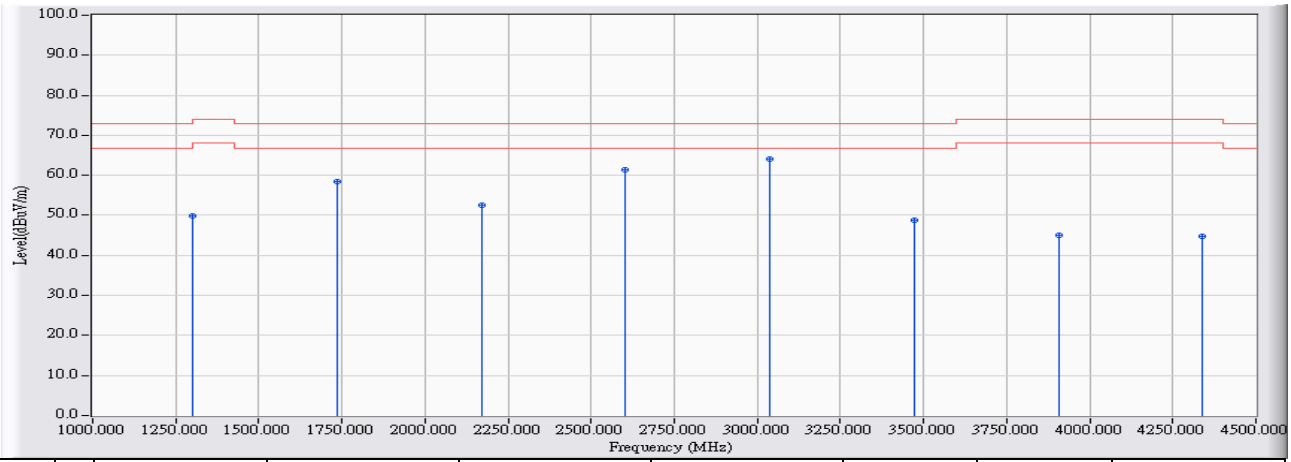


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	1301.670	-13.150	56.512	43.363	-10.637	54.000	AVERAGE
2		1735.976	-11.556	51.855	40.299	-12.571	52.870	AVERAGE
3		4337.966	-2.724	39.049	36.324	-17.676	54.000	AVERAGE

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.

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 2: Transmit Mode_A2 _433.92MHz**

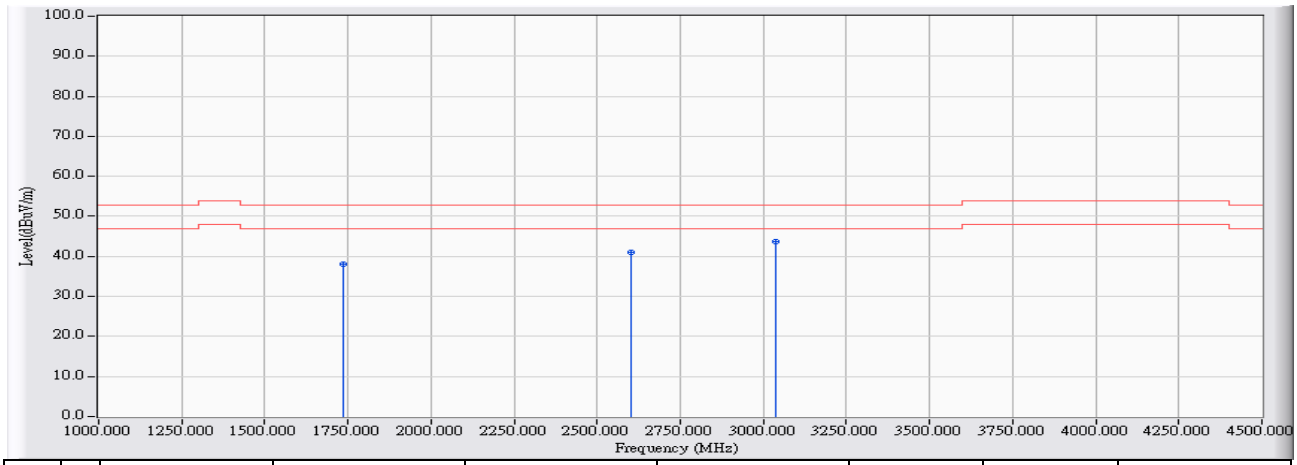


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1301.320	-6.121	56.104	49.983	-24.017	74.000	PEAK
2		1735.276	-4.511	62.965	58.454	-14.416	72.870	PEAK
3		2169.233	-2.744	55.255	52.511	-20.359	72.870	PEAK
4		2602.840	-0.922	62.237	61.315	-11.555	72.870	PEAK
5	*	3036.796	0.243	63.851	64.094	-8.776	72.870	PEAK
6		3471.103	1.054	47.764	48.818	-24.052	72.870	PEAK
7		3905.759	2.707	42.254	44.960	-29.040	74.000	PEAK
8		4339.200	4.463	40.420	44.882	-29.118	74.000	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.

Site : CB4-H	**Time : 2017/02/14**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_AV	**Margin : 6**
Probe : CB4-H_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 2: Transmit Mode_A2 _433.92MHz**

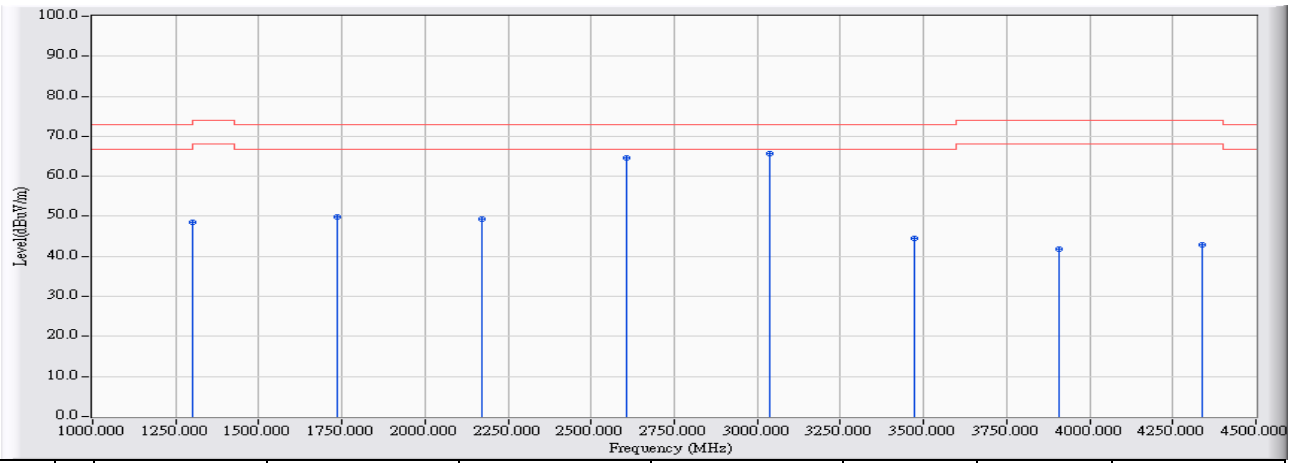


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1735.276	-4.511	42.702	38.191	-14.679	52.870	AVERAGE
2		2602.840	-0.922	41.974	41.052	-11.818	52.870	AVERAGE
3	*	3036.796	0.243	43.588	43.831	-9.039	52.870	AVERAGE

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.

Site : CB4-H	**Time : 2017/02/08**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_PK	**Margin : 6**
Probe : CB4-H_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 2: Transmit Mode_A2 _433.92MHz**

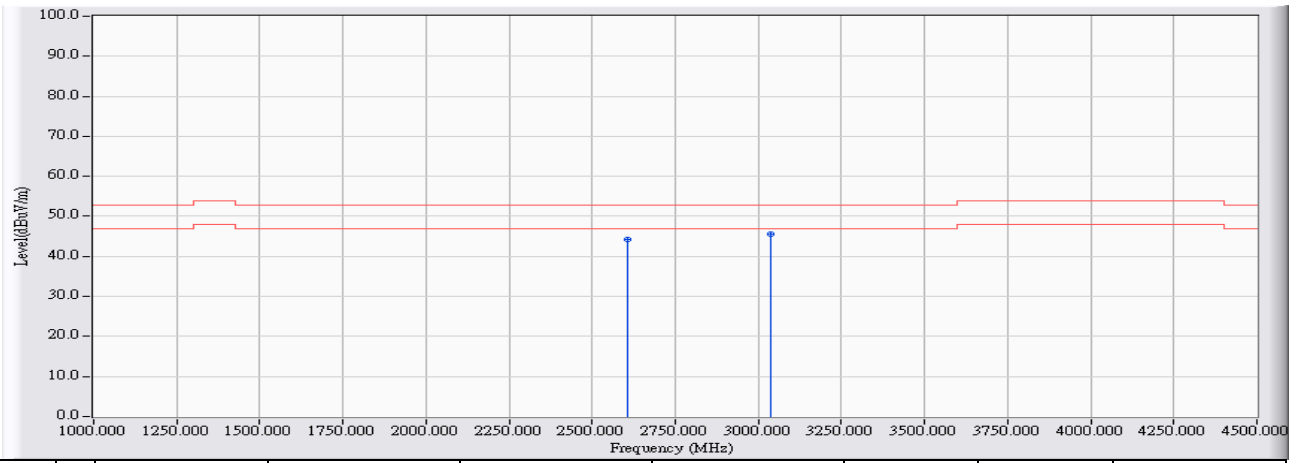


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1301.320	-6.121	54.579	48.458	-25.542	74.000	PEAK
2		1735.276	-4.511	54.290	49.779	-23.091	72.870	PEAK
3		2169.583	-2.743	52.091	49.348	-23.522	72.870	PEAK
4		2604.589	-0.918	65.407	64.490	-8.380	72.870	PEAK
5	*	3037.496	0.244	65.499	65.743	-7.127	72.870	PEAK
6		3471.453	1.056	43.514	44.569	-28.301	72.870	PEAK
7		3905.759	2.707	39.219	41.925	-32.075	74.000	PEAK
8		4339.200	4.463	38.520	42.982	-31.018	74.000	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.

Site : CB4-H	**Time : 2017/02/14**
Limit : FCC_SpartC_15.231(e)_H_433.92MHz_03M_AV	**Margin : 6**
Probe : CB4-H_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 3V (Power by Battery)**
EUT : Tire Pressure Monitoring System-A Series	**Note : Mode 2: Transmit Mode_A2 _433.92MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2604.589	-0.918	45.144	44.227	-8.643	52.870	AVERAGE
2	*	3037.496	0.244	45.236	45.480	-7.390	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.

3. Occupied Bandwidth

3.1. Test Equipment

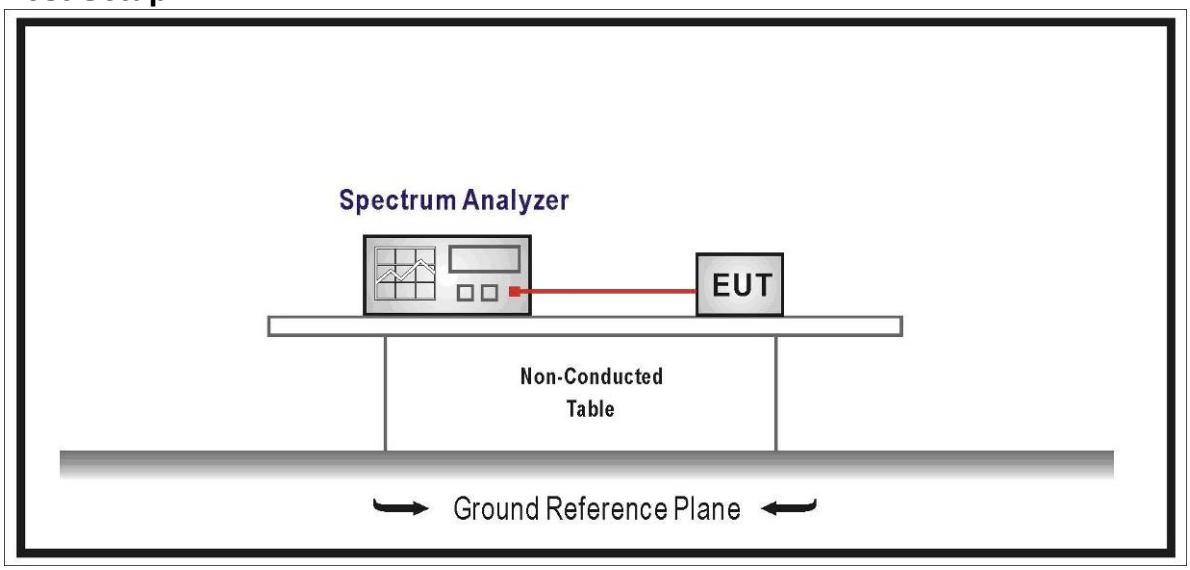
The following test equipments are used during the radiated emission tests:

Occupied Bandwidth / SR10-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/08/08

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

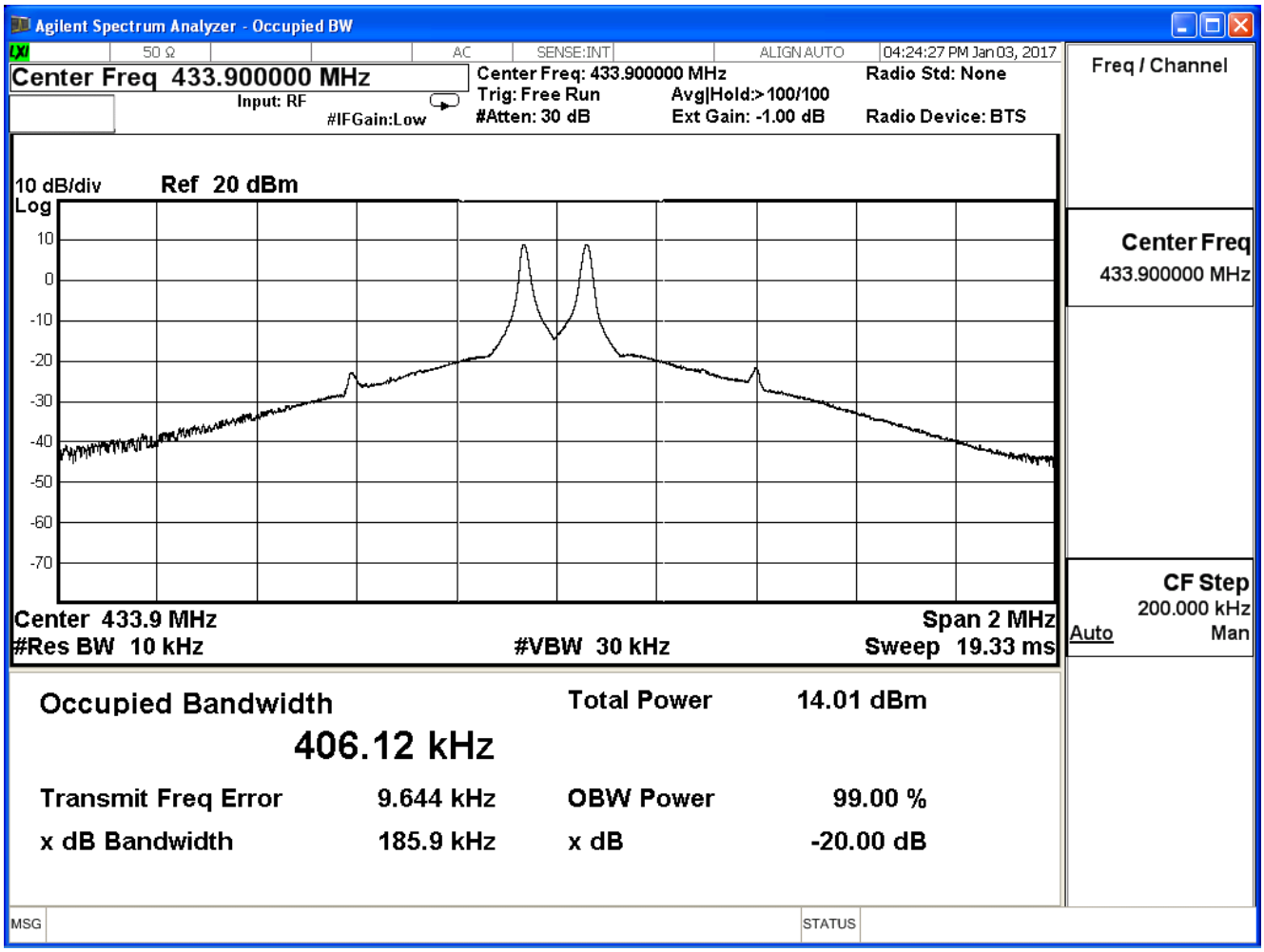
3.5. Uncertainty

± 150Hz

3.6. Test Result

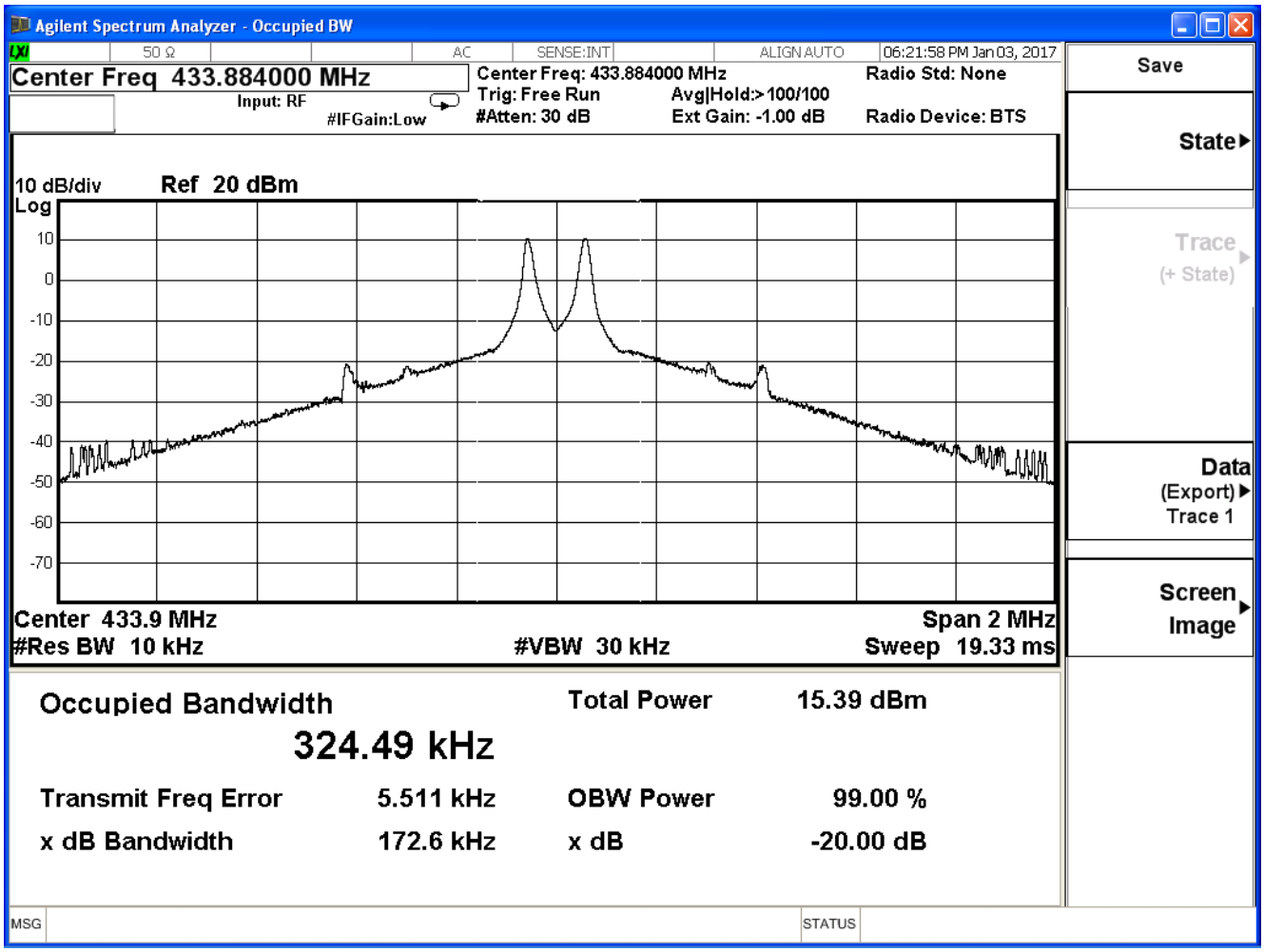
Product	Tire Pressure Monitoring System-A Series		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit Mode_A1		
Date of Test	2017/02/21	Test Site	SR10-H

Center Frequency	433.92 MHz
Allowable Bandwidth (70-900 MHz: 0.25%, Above 900MHz: 0.5%)	1.0848MHz
Bandwidth at 20dB down (Max)	185.9KHz
Result	PASS



Product	Tire Pressure Monitoring System-A Series		
Test Item	Occupied Bandwidth		
Test Mode	Mode 2: Transmit Mode_A2		
Date of Test	2017/02/21	Test Site	SR10-H

Center Frequency	433.92 MHz
Allowable Bandwidth (70-900 MHz: 0.25%, Above 900MHz: 0.5%)	1.0848MHz
Bandwidth at 20dB down (Max)	172.6KHz
Result	PASS



4. Transmitter time

4.1. Test Equipment

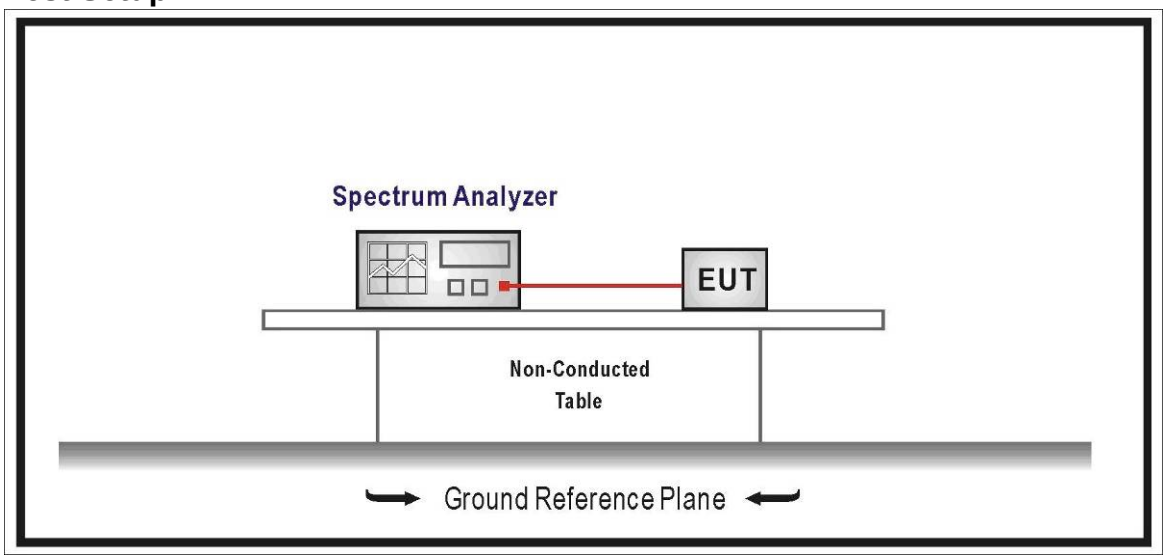
The following test equipments are used during the radiated emission tests:

Transmitter time / SR10-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/08/08

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

4.2. Test Setup



4.3. 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.

4.4. Test Specification

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

4.5. Uncertainty

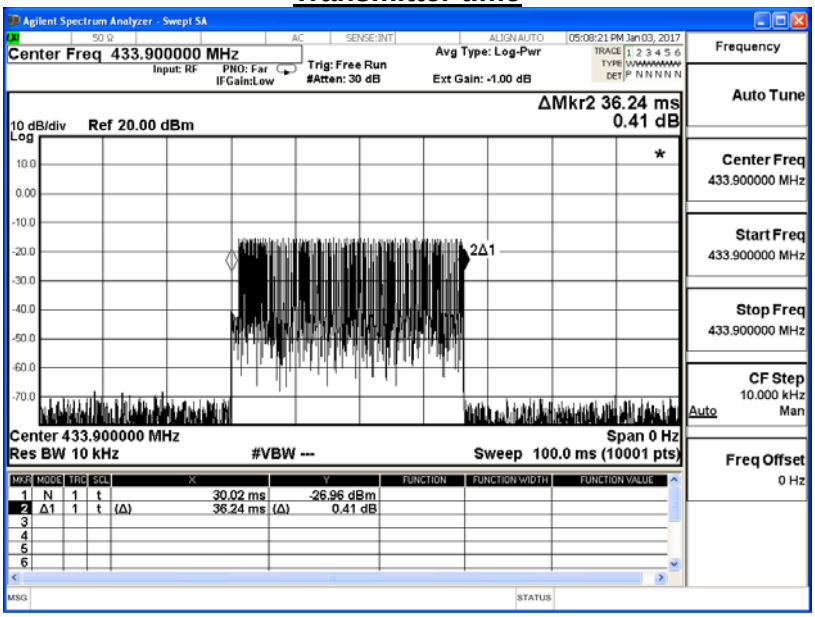
± 25msec

4.6. Test Result

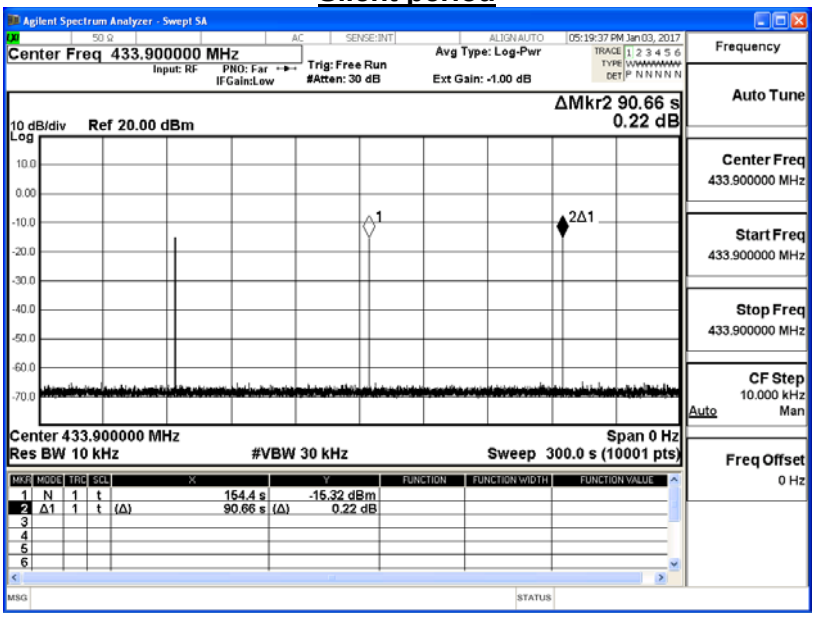
Product	Tire Pressure Monitoring System-A Series		
Test Item	Transmitter time		
Test Mode	Mode 1: Transmit Mode_A1		
Date of Test	2017/01/03	Test Site	SR10-H

Frequency (MHz)	Transmitter time (ms.)		Silent period (sec.)	
	Measure value	Limit	Measure value	Limit
433.92	36.24	1000	90.66	10

Transmitter time



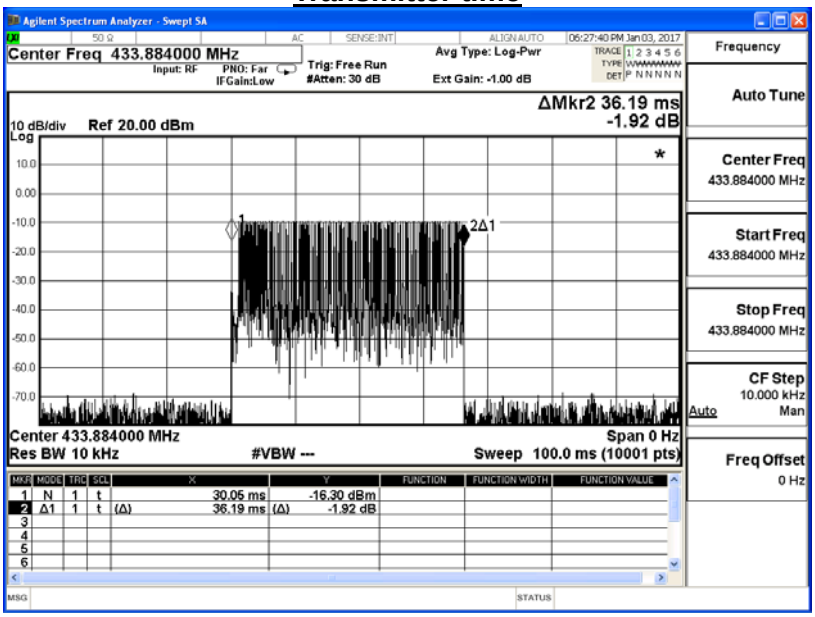
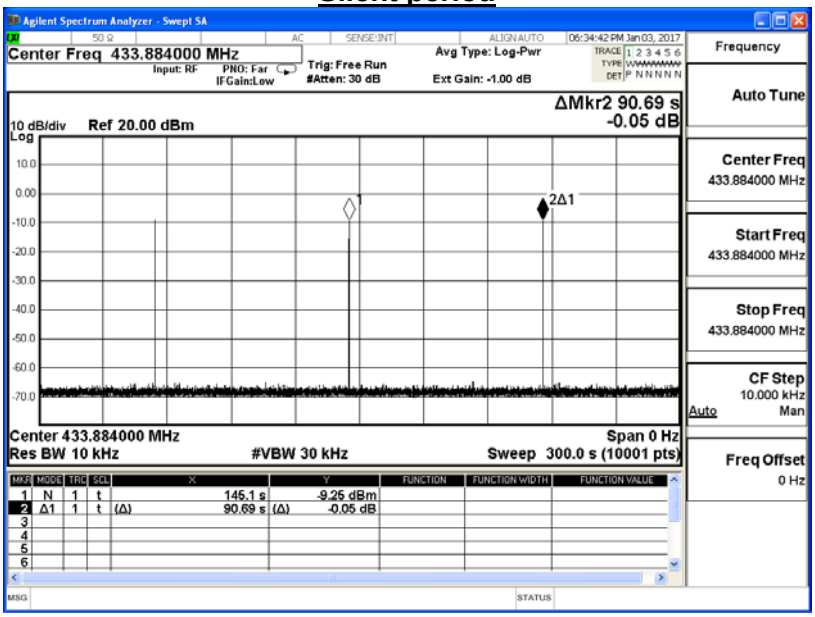
Silent period



Product	Tire Pressure Monitoring System-A Series		
Test Item	Transmitter time		
Test Mode	Mode 2: Transmit Mode_A2		
Date of Test	2017/01/03	Test Site	SR10-H

Frequency (MHz)	Transmitter time (ms.)		Silent period (sec.)	
	Measure value	Limit	Measure value	Limit
433.92	36.19	1000	90.69	10

Transmitter time



Silent period