



TEST REPORT
FCC ID: 2AG4ZVR-380B

For

Net Tire (BJ) Intelligent Technology Co., Ltd.

Tire Pressure Monitoring System

Model No. : VR-380B, VR-380T

Prepared for : Net Tire (BJ) Intelligent Technology Co., Ltd.
Address : Room1604, Unit1, 1st Building, No.30, Yuzhi Road(East), Changping District,
Beijing City

Prepared by : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building B, East Area of Nanchang Second, Industrial Zone,
Gushu 2nd Road, Bao'an, Shenzhen, China

Report No. : T18518513 01

Date of Receipt : December 01, 2015

Date of Test : December 05-13, 2015

Date of Report : December 14, 2015

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DECLARATION

Applicant : Net Tire (BJ) Intelligent Technology Co., Ltd.

Manufacturer : Vehicle Running(BJ)Technology Development Co., Ltd

Product : Tire Pressure Monitoring System

(A)Model No. : VR-380B, VR-380T

(B)Trade Name : N/A

(C)Power supply : DC 3.6V from battery

Measurement Standard Used:

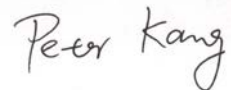
FCC Rules and Regulations Part 15 Subpart C Section 15.231: 2015,

ANSI C63.4:2009

The device described above is tested by Shenzhen Alpha Product Testing 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 both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Peter Kang
 Test Engineer 

Approved by (name + signature).....: Simple Guan
 Project Manager 

Date of issue..... : December 14, 2015

1. General Information

1.1. Description of Device (EUT)

EUT	: Tire Pressure Monitoring System
Model No.	: VR-380B, VR-380T
DIFF.	: All model's the function, software and electric circuit are the same, only different in Model Name VR-380B.
Trade mark	: N/A
Power supply	: DC 3.6V from battery
Operation frequency	: 433.92MHz
Modulation	: FSK
Antenna Type	: Internal antenna, max gain 0dBi.
Software version	: V111
Hardware version	: 2.1
Applicant	: Net Tire (BJ) Intelligent Technology Co., Ltd.
Address	: Room1604, Unit1, 1st Building, No.30, Yuzhi Road(East), Changping District, Beijing City
Manufacturer	: Vehicle Running(BJ)Technology Development Co., Ltd
Address	: RoomA912-143, Building A, No.9, 3rd street of Shangdi, Haidian District, Beijing City

1.2. Accessories of device (EUT)

Accessories	:	N/A
Model		N/A
Input		N/A
Output		N/A
Accessories2	:	N/A
Model		N/A

1.3. Test Lab information

Shenzhen Alpha Product Testing Co., Ltd.

Building B, East Area of Nanchang Second, Industrial Zone, Gushu 2nd Road, Bao'an,
Shenzhen, China

March 25, 2015 File on Federal Communication Commission

Registration Number: 203110

July 18, 2014 Certificated by IC

Registration Number: 12135A

2. Summary of test

2.1. Summary of test result

For Normal mode:

Description of Test Item	Standard	Results
Spurious Emission	Section 15.231(e)&15.209	PASS
Conduction Emission	Section 15.207	N/A
Occupied bandwidth	Section 15.231(c)	PASS
Transmission time	Section 15.231(e)	PASS
Band Edge	Section 15.231	N/A
Antenna Requirement	Section 15.203	PASS
Note : Test according to ANSI C63.4-2009.		

For alarm mode:

Description of Test Item	Standard	Results
Spurious Emission	Section 15.231(a)(2) &15.209	PASS
Conduction Emission	Section 15.207	N/A
Occupied bandwidth	Section 15.231(c)	PASS
Transmission time	Section 15.231(a)(2)	PASS
Band Edge	Section 15.231	N/A
Antenna Requirement	Section 15.203	PASS
Note : Test according to ANSI C63.4-2009.		

2.2. Assistant equipment used for test

Description	:	N/A
Manufacturer	:	N/A
Model No.	:	N/A
Remark: N/A		

2.3. Block Diagram

- For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground. EUT was set into test mode before test. New battery is used during all test



2.4. Test mode

EUT work in Continuous TX mode, and select test channel, wireless mode

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
FSK	CH1	433.92
Note: EUT has normal mode and alarm mode.		

Channel List

Chanel No.	Frequency (MHz)
1	433.92

2.5. Test Conditions

Temperature range	21-25 °C
Humidity range	40-75%
Pressure range	86-106kPa

2.6. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.70dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.90 dB	Polarize: V
	3.92dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.26 dB	Polarize: H
	4.28 dB	Polarize: V
Uncertainty for conducted RF Power	0.16dB	

2.7. Test Equipment

Equipment	Manufacture	Model No.	Serial No.	Last Cal.	Cal Interval
3m Semi-Anechoic	ETS-LINDGREN	N/A	SEL0017	2015.01.19	1 Year
Spectrum analyzer	Agilent	E4407B	MY49510055	2015.01.19	1 Year
Receiver	R&S	ESCI	101165	2015.01.19	1 Year
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-438	2014.01.21	2 Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2014.01.21	2 Year
Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	2015.01.19	1 Year
Cable	Resenberger	SUCOFLEX 104	MY6562/4	2015.01.19	1 Year
Cable	Resenberger	SUCOFLEX 104	309972/4	2015.01.19	1 Year
Cable	Resenberger	SUCOFLEX 104	329112/4	2015.01.19	1 Year
Pre-amplifier	SCHWARZBECK	BBV9743	9743-019	2015.01.19	1 Year
Pre-amplifier	Quietek	AP-180C	CHM-0602012	2015.01.19	1 Year
<p>Note: 1 For the relevant Conducted Measurement, the temporary antenna connector is used during the measurement. Antenna Connector Impedance: 50 Ω , Cable Loss: 1.0 dB 2 The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.</p>					

3. Radiation Emission

3.1. Radiation Emission Limits(15.209&231)

Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66-40.70	1,000	100
70-130	500	50
130-174	500 to 1,500 ¹	50 to 150 ¹
174-260	1,500	150
260-470	1,500 to 5,000 ¹	150 to 500 ¹
Above 470	5,000	500

Note: 1 is Linear interpolations.

Frequency (MHz)	Field Strength Limits at 3 metres (watts, e.i.r.p.)		
	uV/m	dB uV/m	Measurement distance(m)
0.009-0.490	2400/F(kHz)	XX	300
0.490-1.705	24000/F(kHz)	XX	30
1.705-30	30	29.5	30
30~88	100(3nW)	40	3
88~216	150(6.8nW)	43.5	3
216~960	200(12nW)	46	3
Above960	500(75nW)	54	3
Carrier frequency		72.9(AV)	3
Carrier frequency		99.9(PK)	3

For FCC PART 15.231 (b)

Frequency (MHz)	Field Strength Limits at 3 metres (watts, e.i.r.p.)		
	uV/m	dB uV/m	uV/m
Carrier frequency		80.8(AV)	3
Carrier frequency		100.8(PK)	3

For FCC PART 15.231 (e)

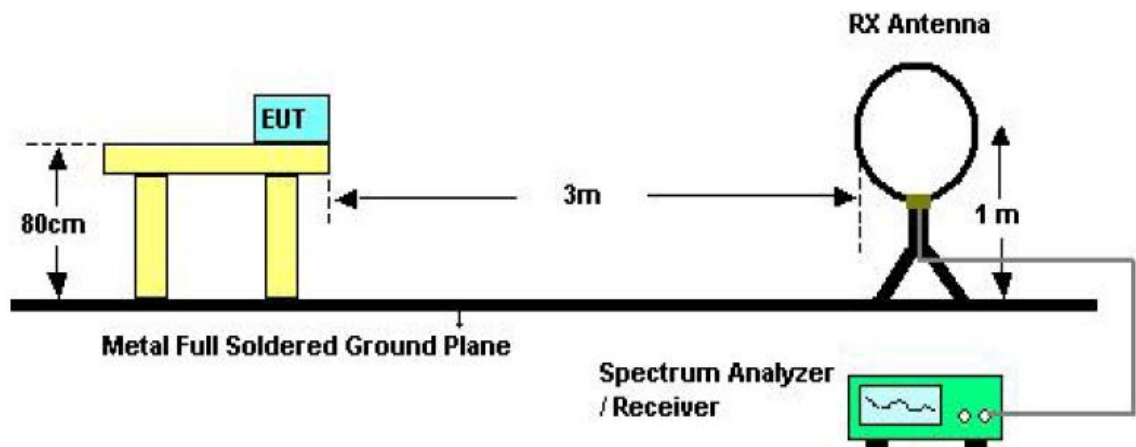
Frequency (MHz)	Field Strength Limits at 3 metres (watts, e.i.r.p.)		
	uV/m	dB uV/m	uV/m
Carrier frequency		72.9(AV)	3
Carrier frequency		99.9(PK)	3

NOTE:

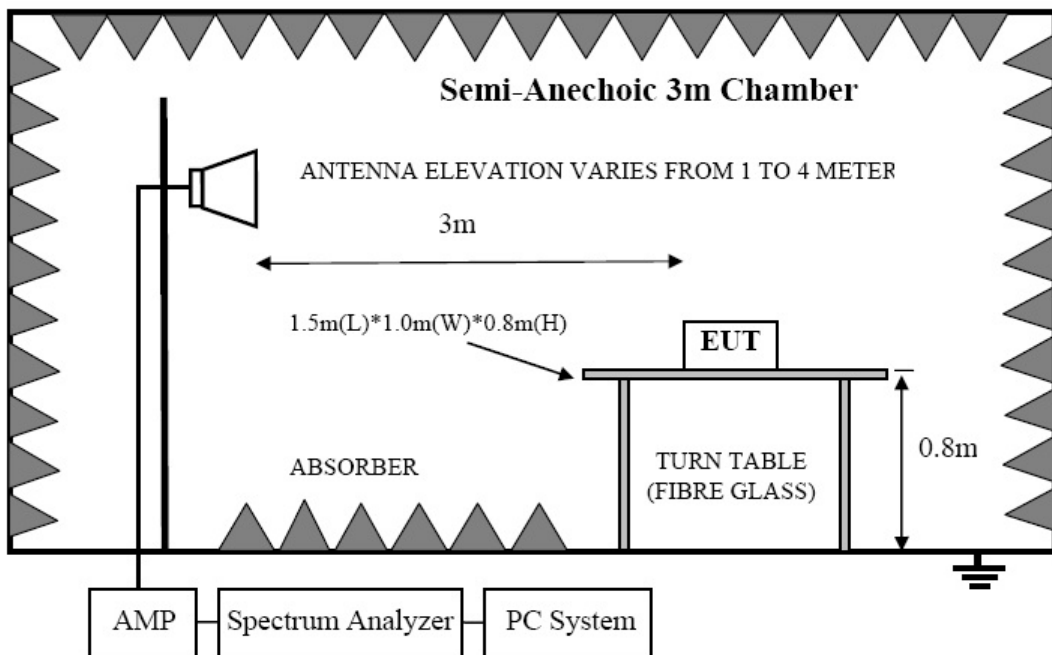
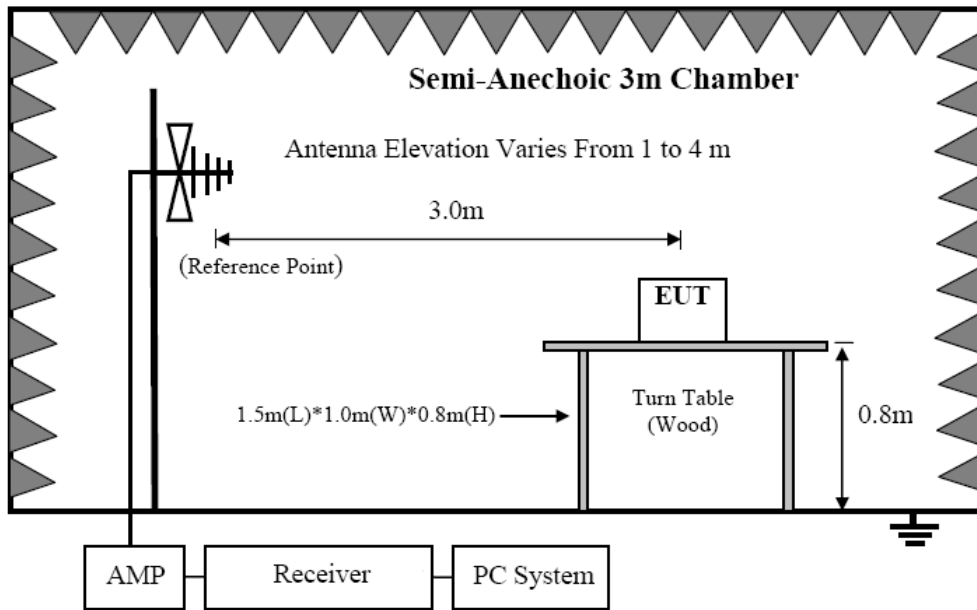
- a) The tighter limit applies at the band edges.
- b) Emission Level(dB uV/m)=20log Emission Level(Uv/m)

3.2. Test Setup

See the next page.



Below 30MHz Test Setup



Above 1GHz Test Setup

3.3. Test Procedure

- The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz, The EUT was placed on a rotating 0.8 m high above ground, The table was rotated 360 degrees to determine the position of the highest radiation
- The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer Peak

detector mode pre-scanning the measurement frequency range. Significant Peaks are then marked. and then Quasia Peak Detector mode remeasured

- d) If Peak value comply with QP limit Below 1GHz.The EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.
- e) For the actual test configuration, please see the test setup photo.
- f) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- g) For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

3.4. Test Equipment Setting For emission test.

9KHz~150KHz	RBW 200Hz	VBW1KHz
150KHz~30MHz	RBW 9KHz	VBW 30KHz
30MHz~1GHz	RBW 120KHz	VBW 300KHz
Above 1GHz	RBW 1MHz	VBW 3MHz

3.5. Test Condition

Continual Transmitting in maximum power(The new battery be used during Test)

3.6. Test Result

Note: The Radiated emissions is showed the maximum power data of TX test mode and showed worst orthogonal axes with X orthogonal axes.

We have scanned the 10th harmonic from 9KHz to the EUT.
Detailed information please see the following page.

From 9KHz to 30MHz:

For normal mode Conclusion: **PASS**

For alarm mode Conclusion: **PASS**

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Notes: 1 --Means other frequency and mode comply with standard requirements and at least have 20dB margin.

Correct Factor = Cable Loss + Antenna Factor-Amplifier Gain

Measurement Result= Reading + Correct Factor

Margin=Measurement Result-Limit

2 –Spectrum setting:

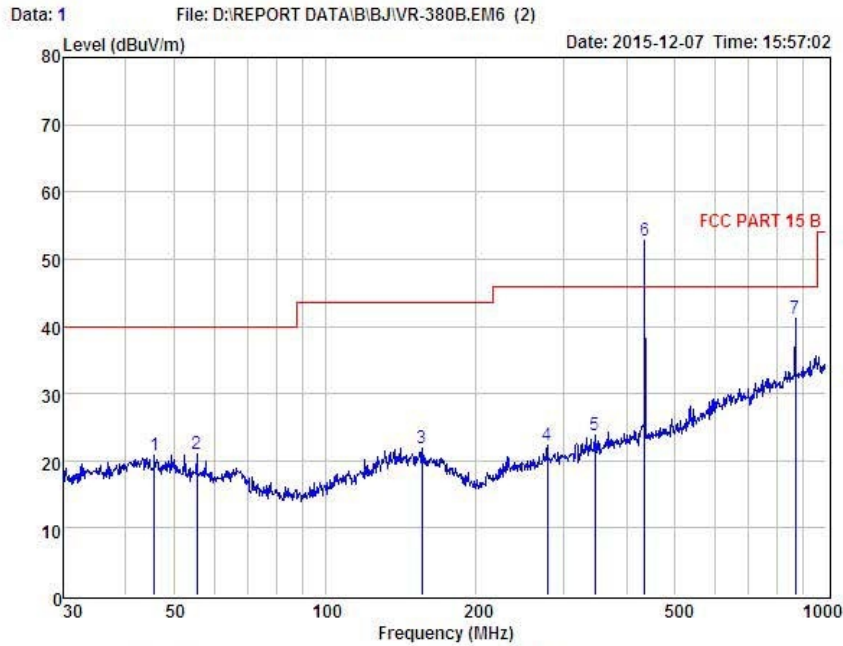
a. Peak setting 30MHz-1GHz, RBW=100KHz, VBW=300KHz.

3- PK measure result values is less than the AVG limit values, so AV measure result values test not applicable.

For normal mode



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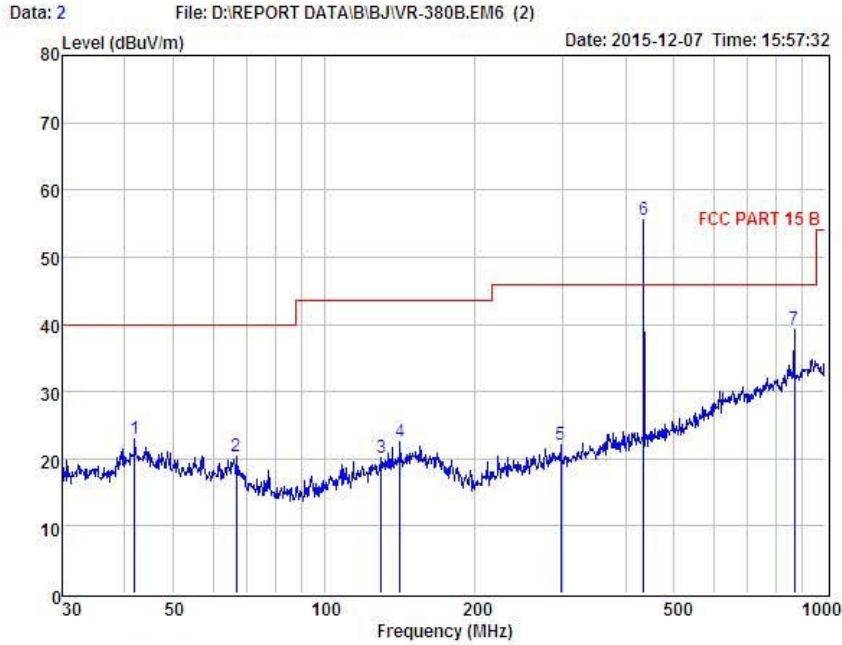
Condition : FCC PART 15 B 3m POL: HORIZONTAL
 EUT : Tire Pressure Monitoring System
 Model No : VR-380B
 Test Mode : TX 433.92MHz
 Power : DC 3.6V from battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	45.69	37.00	13.65	29.96	0.05	20.74	40.00	-19.26	Peak
2	55.41	38.62	13.07	30.87	0.18	21.00	40.00	-19.00	Peak
3	155.91	36.70	14.15	29.31	0.38	21.92	43.50	-21.58	Peak
4	278.07	37.58	12.31	28.09	0.53	22.33	46.00	-23.67	Peak
5	345.60	37.11	13.74	27.81	0.84	23.88	46.00	-22.12	Peak
6	433.92	63.79	15.58	27.22	0.67	52.82	46.00	-4.81	Peak
7	867.84	43.38	21.23	24.89	1.47	41.19	46.00	-4.81	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



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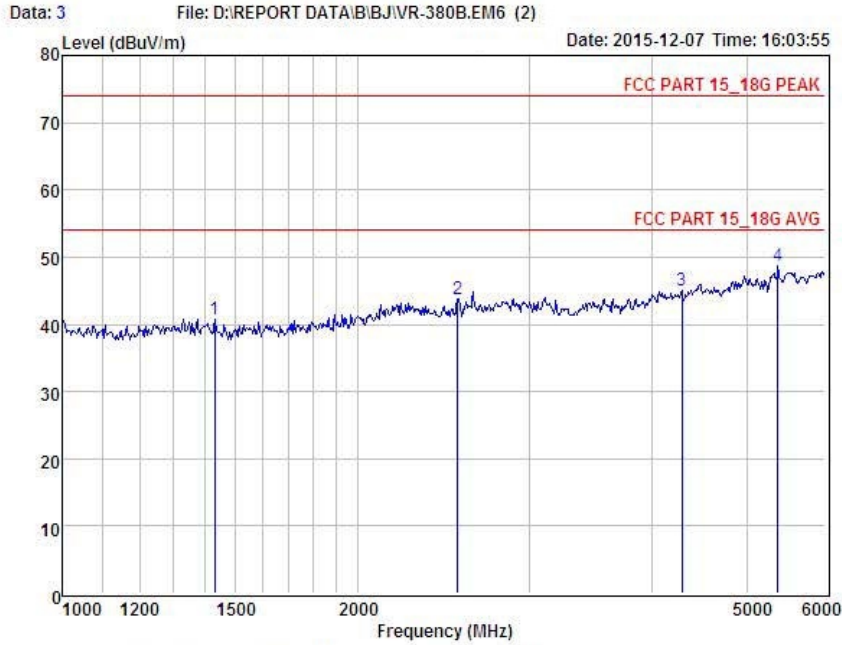
Condition      : FCC PART 15 B      3m      POL: VERTICAL
EUT           : Tire Pressure Monitoring System
Model No      : VR-380B
Test Mode     : TX 433.92MHz
Power         : DC 3.6V from battery
Test Engineer : Peter
Remark        :
Temp          : 24.2°C
Hum           : 54%
    
```

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	41.86	39.13	13.93	30.40	0.19	22.85	40.00	-17.15	Peak
2	66.73	39.20	11.21	30.39	0.28	20.30	40.00	-19.70	Peak
3	129.92	36.38	12.79	29.50	0.44	20.11	43.50	-23.39	Peak
4	141.83	38.02	13.64	29.35	0.21	22.52	43.50	-20.98	Peak
5	297.22	36.48	12.76	28.03	0.94	22.15	46.00	-23.85	Peak
6	433.92	66.43	15.58	27.22	0.67	55.46	46.00	9.46	Peak
7	867.84	41.45	21.23	24.89	1.47	39.26	46.00	-6.74	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



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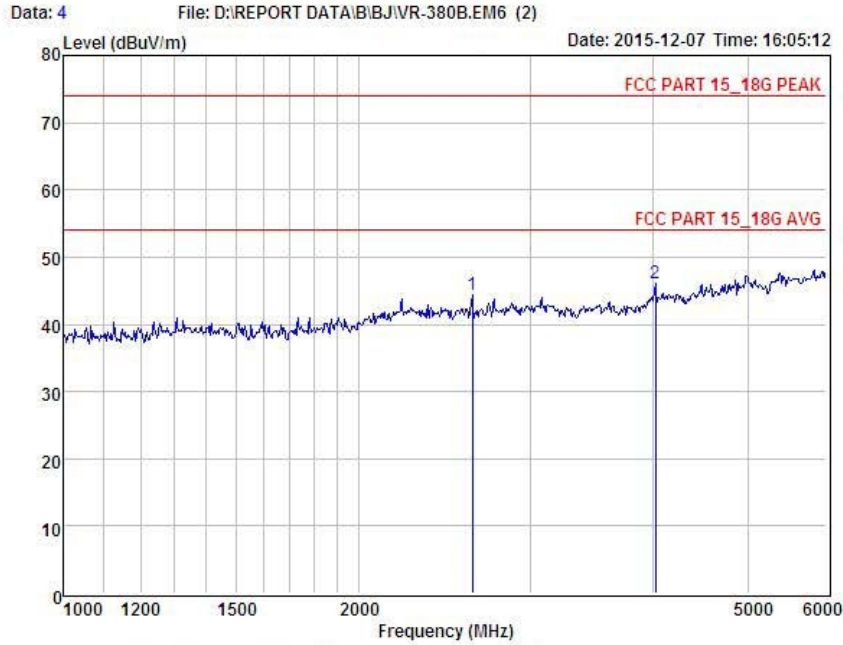
Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
 EUT : Tire Pressure Monitoring System
 Model No : VR-380B
 Test Mode : TX 433.92MHz
 Power : DC 3.6V from battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
	11430.97	47.68	25.09	34.81	2.75	40.71	74.00	-33.29	Peak
	22529.78	47.03	27.64	34.98	4.04	43.73	74.00	-30.27	Peak
	34284.09	44.20	30.13	34.56	5.37	45.14	74.00	-28.86	Peak
	45369.15	44.62	31.73	33.72	6.06	48.69	74.00	-25.31	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



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Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
 EUT : Tire Pressure Monitoring System
 Model No : VR-380B
 Test Mode : TX 433.92MHz
 Power : DC 3.6V from battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
	12612.70	47.47	27.77	34.98	4.12	44.38	74.00	-29.62	Peak
	24016.48	45.96	29.69	34.70	5.19	46.14	74.00	-27.86	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Radiated Emissions Result of Inside band

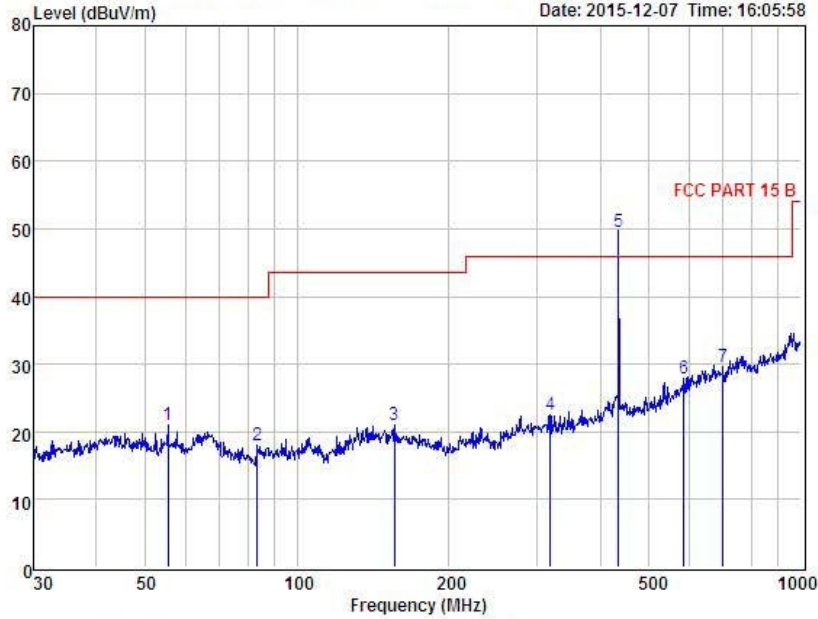
EUT	Tire Pressure Monitoring System		Model Name	VR-380B					
Temperature	25°C		Relative Humidity	56%					
Pressure	960hPa		Test voltage	DC 3.6V from batteries					
Test Mode	TX 433.92MHz		Test by	Peter					
Channel (434MHz Below 1GHz)									
Fre.	Plority	Reading	Antenna	Cable	Amplifier	Correct	Measure	Limit	Margin
MHz	H/V	dBuV	Factor	Loss	Gain	Factor	Result	dBuV/m	dB
433.92	H	63.79 (PK)	15.58	0.67	27.22	-10.97	52.82	72.9 (AV)	-20.08
--	H	--	--	--	--	--	--	--	--
433.92	V	66.43 (PK)	15.58	0.67	27.22	-10.97	55.46	72.9 (AV)	-17.44
--	V	--	--	--	--	--	--	--	--

For alarm mode



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Data: 3 File: D:\REPORT DATA\BJ\VR-380B.EM6 (6) Date: 2015-12-07 Time: 16:05:58



Condition : FCC PART 15 B 3m POL: HORIZONTAL
 EUT : Tire Pressure Monitoring System
 Model No : VR-380B
 Test Mode : TX 433.92MHz alarm mode
 Power : DC 3.6V from battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

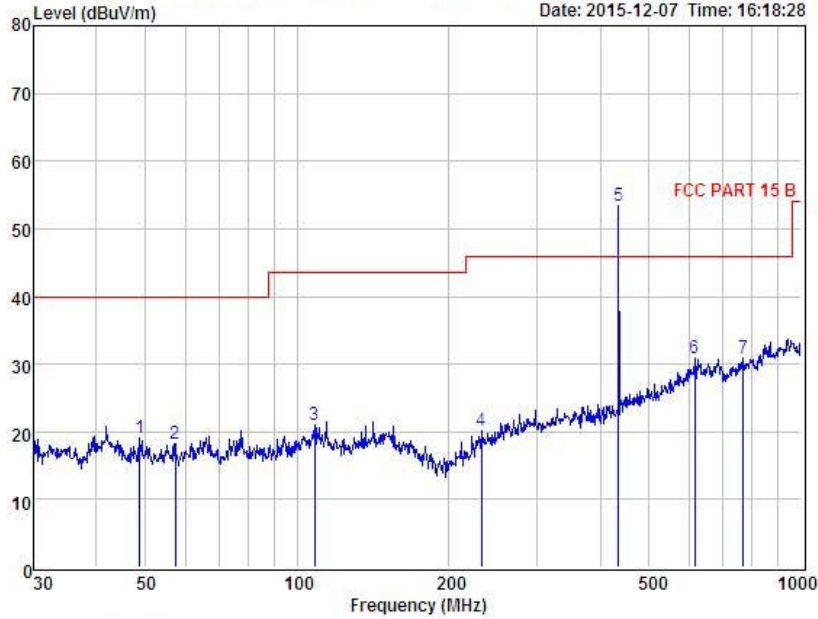
Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	55.41	38.62	13.07	30.87	0.18	21.00	40.00	-19.00	Peak
2	83.52	38.52	9.35	30.09	0.23	18.01	40.00	-21.99	Peak
3	155.91	35.70	14.15	29.31	0.38	20.92	43.50	-22.58	Peak
4	317.70	36.60	13.24	27.91	0.61	22.54	46.00	-23.46	Peak
5	433.92	60.60	15.58	27.22	0.67	49.63	46.00	-18.18	Peak
6	584.79	35.27	18.01	26.39	0.93	27.82	46.00	-18.18	Peak
7	699.30	35.27	19.64	25.96	0.71	29.66	46.00	-16.34	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



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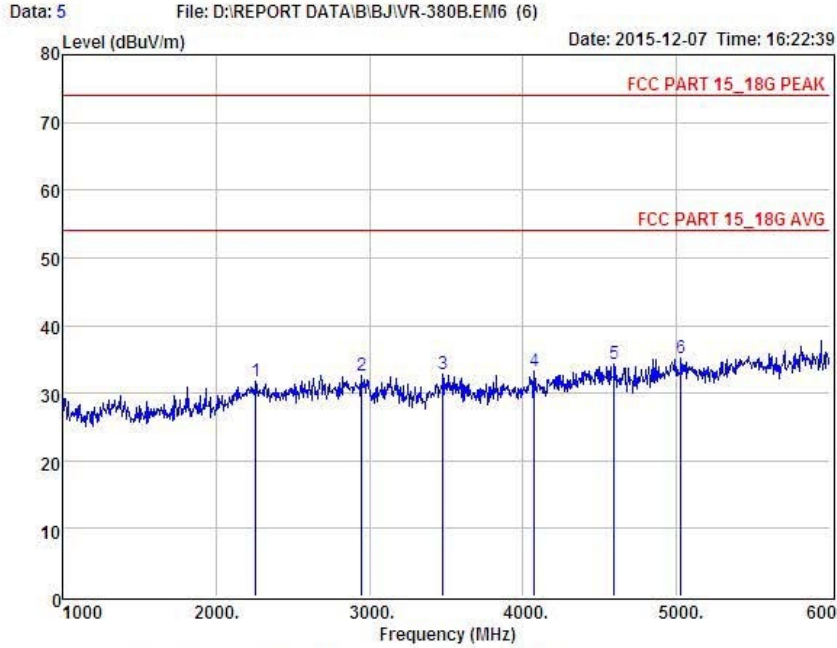
Condition : FCC PART 15 B 3m POL: VERTICAL
 EUT : Tire Pressure Monitoring System
 Model No : VR-380B
 Test Mode : TX 433.92MHz alarm mode
 Power : DC 3.6V from battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	48.67	35.61	13.59	30.25	0.09	19.04	40.00	-20.96	Peak
2	57.39	36.09	12.91	30.88	0.14	18.26	40.00	-21.74	Peak
3	108.27	39.48	11.13	29.96	0.41	21.06	43.50	-22.44	Peak
4	232.53	36.35	11.26	28.10	0.56	20.07	46.00	-25.93	Peak
5	433.92	64.28	15.58	27.22	0.67	53.31	46.00		
6	616.37	36.97	18.62	25.85	1.19	30.93	46.00	-15.07	Peak
7	768.75	34.51	20.47	25.34	1.30	30.94	46.00	-15.06	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



Shenzhen Alpha Product Testing Co., Ltd
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 Website: http://www.a-lab.cn Email: service@a-lab.cn



Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
 EUT : Tire Pressure Monitoring System
 Model No : VR-380B
 Test Mode : TX 433.92MHz alarm mode
 Power : DC 3.6V from battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

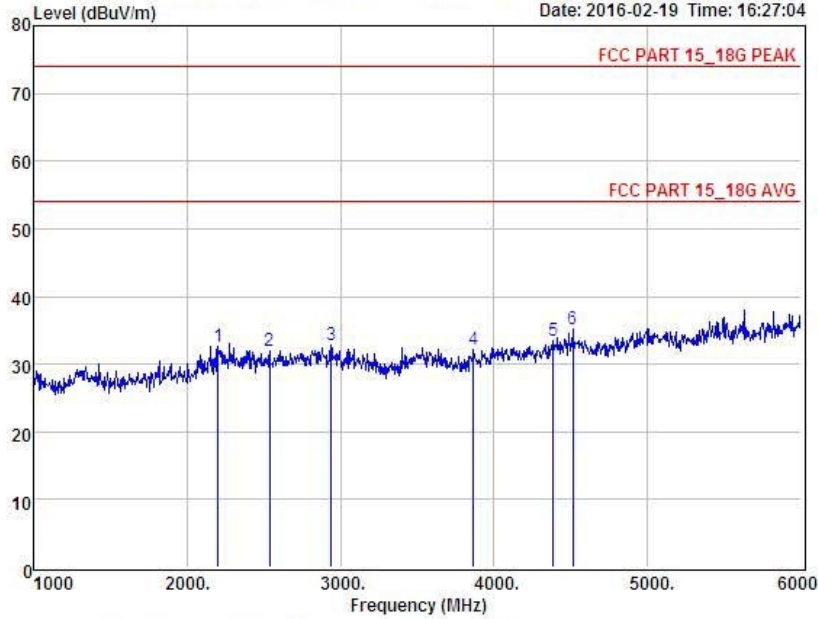
Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
	12260.00	34.97	27.81	34.96	3.82	31.64	74.00	-42.36	Peak
	22950.00	35.13	28.13	34.98	4.38	32.66	74.00	-41.34	Peak
	33480.00	34.49	28.40	34.91	4.83	32.81	74.00	-41.19	Peak
	44075.00	32.78	29.81	34.66	5.23	33.16	74.00	-40.84	Peak
	54595.00	32.38	30.78	34.40	5.56	34.32	74.00	-39.68	Peak
	65030.00	31.74	31.57	34.00	5.84	35.15	74.00	-38.85	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



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 Website: http://www.a-lab.cn Email: service@a-lab.cn

Data: 6 File: D:\REPORT DATA\BJ\VR-380B.EM6 (6) Date: 2016-02-19 Time: 16:27:04



Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
 EUT : Tire Pressure Monitoring System
 Model No : VR-380B
 Test Mode : TX 433.92MHz alarm mode
 Power : DC 3.6V from battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
	12205.00	35.89	27.83	34.95	3.78	32.55	74.00	-41.45	Peak
	22540.00	35.19	27.67	34.98	4.06	31.94	74.00	-42.06	Peak
	32940.00	35.36	28.09	34.98	4.38	32.85	74.00	-41.15	Peak
	43865.00	32.66	29.27	34.76	5.09	32.26	74.00	-41.74	Peak
	54385.00	32.31	30.34	34.51	5.42	33.56	74.00	-40.44	Peak
	64515.00	33.43	30.65	34.43	5.51	35.16	74.00	-38.84	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Radiated Emissions Result of Inside band

EUT	Tire Pressure Monitoring System		Model Name	VR-380B					
Temperature	25°C		Relative Humidity	56%					
Pressure	960hPa		Test voltage	DC 3.6V from batteries					
Test Mode	TX 433.92MHz		Test by	Peter					
Channel (434MHz Below 1GHz)									
Fre.	Plority	Reading	Antenna	Cable	Amplifier	Correct	Measure	Limit	Margin
MHz	H/V	dBuV	Factor	Loss	Gain	Factor	Result	dBuV/m	dB
433.92	H	60.60 (PK)	15.58	0.67	27.22	-10.97	49.63	80.8 (AV)	-31.17
--	H	--	--	--	--	--	--	--	--
433.92	V	64.28 (PK)	15.58	0.67	27.22	-10.97	53.31	100.8 (AV)	-47.49
--	V	--	--	--	--	--	--	--	--

4. POWER LINE CONDUCTED EMISSION

4.1. Conducted Emission Limits(15.209)

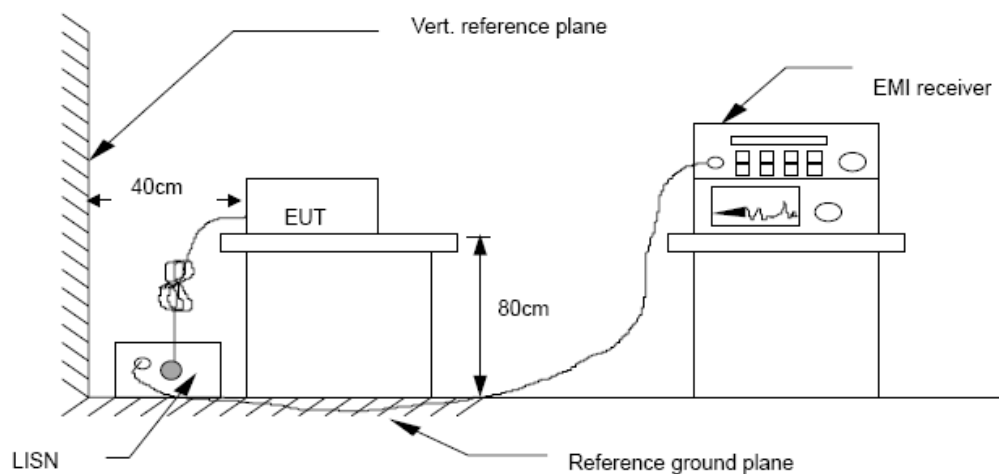
Frequency MHz	Limits dB(μ V)	
	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

3. The limit decreases in line with the logarithm of the frequency in the rang of 0.15 to 0.50 MHz.

4.2. Test Setup



4.3. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4-2009 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9 kHz.

4.4. Test Results

EUT power supply by battery, so the test not applicable.

5. Occupied bandwidth

5.1. Test limit

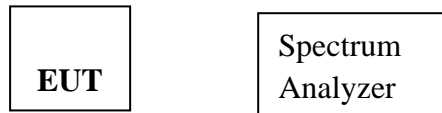
Please refer section 15.231

According to §15.231(C), 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.

5.2. Method of measurement

- a) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.
- b) The test receiver RBW set 30KHz, VBW set 30KHz, Sweep time set auto.

5.3. Test Setup

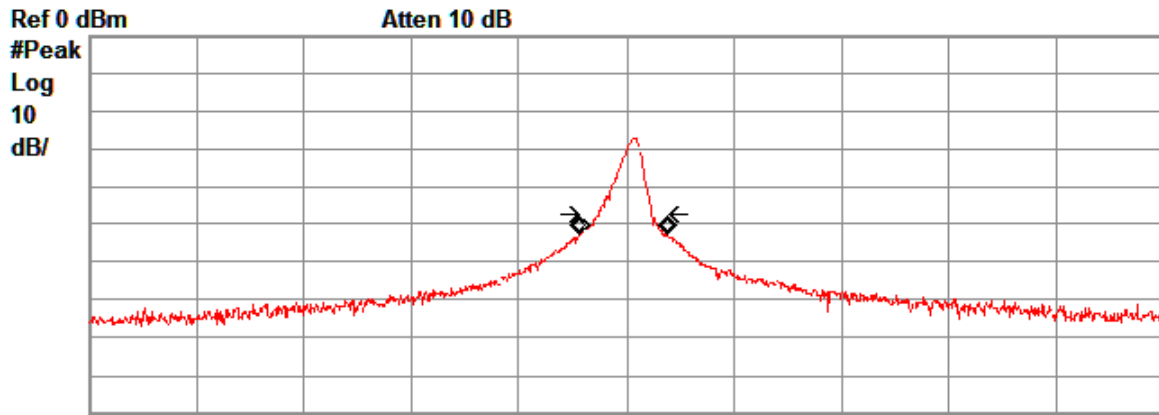


5.4. Test Results

For normal mode

EUT: Tire Pressure Monitoring System				
M/N: VR-380B				
Test Mode: Keeping TX mode				
Test date: 2015-12-07		Test site: RF site		Tested by: Eric
Mode	Freq (MHz)	20dB Bandwidth (KHz)	Limit (kHz)	Conclusion
FSK	433.92	150.271	1084.8	PASS
Note: Limit=433.92*0.25%=1.0848MHz				

Agilent R T



Center 433.9 MHz Span 3 MHz
 #Res BW 30 kHz #VBW 30 kHz Sweep 9.99 ms (1000 pts)

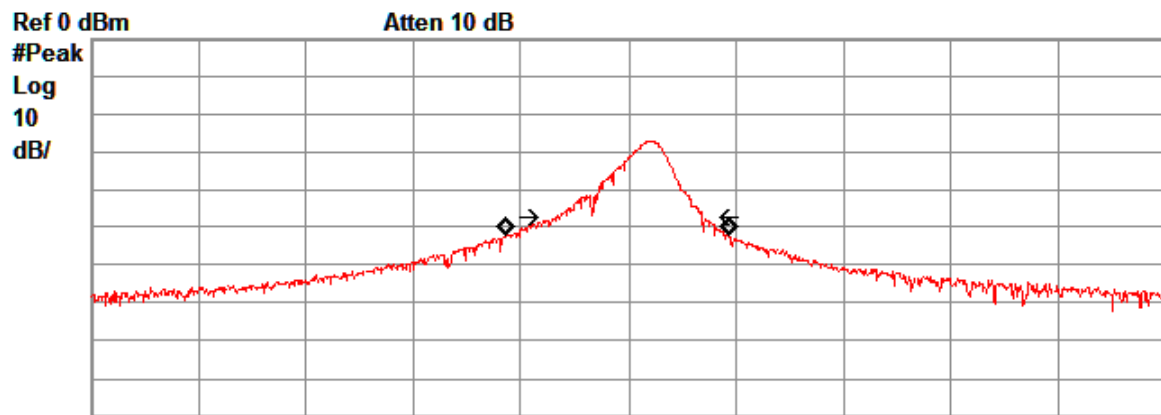
Occupied Bandwidth
 246.6612 kHz

Occ BW % Pwr 99.00 %
 x dB -20.00 dB

Transmit Freq Error -7.359 kHz
 x dB Bandwidth 150.271 kHz

For alarm mode

EUT: Tire Pressure Monitoring System				
M/N: VR-380B				
Test Mode: Keeping TX mode				
Test date: 2015-12-07		Test site: RF site		Tested by: Eric
Mode	Freq (MHz)	20dB Bandwidth (KHz)	Limit (kHz)	Conclusion
FSK	433.92	134.231	1084.8	PASS
Note: Limit=433.92*0.25%=1.0848MHz				



Center 433.9 MHz Span 1 MHz
 #Res BW 30 kHz #VBW 30 kHz Sweep 9.99 ms (1000 pts)

Occupied Bandwidth Occ BW % Pwr 99.00 %
 205.2204 kHz x dB -20.00 dB

Transmit Freq Error -10.279 kHz
 x dB Bandwidth 134.231 kHz

6. Transmission time

6.1. Test limit

Please refer section 15.231

According to §15.231(a)(1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

According to §15.231(a)(2), A transmitter activated automatically shall cease transmission within 5 seconds after activation.

According to §15.231(e), In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

6.2. Method of measurement

6.2.1. Place the EUT on the table and set it in transmitting mode.

6.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3. Set spectrum analyzer Center=433.92MHz, Span = 0MHz, Sweep = 200ms.

6.2.4. Set the spectrum analyzer as RBW, VBW=1MHz,

6.2.5. Max hold, view and count how many channel in the band.

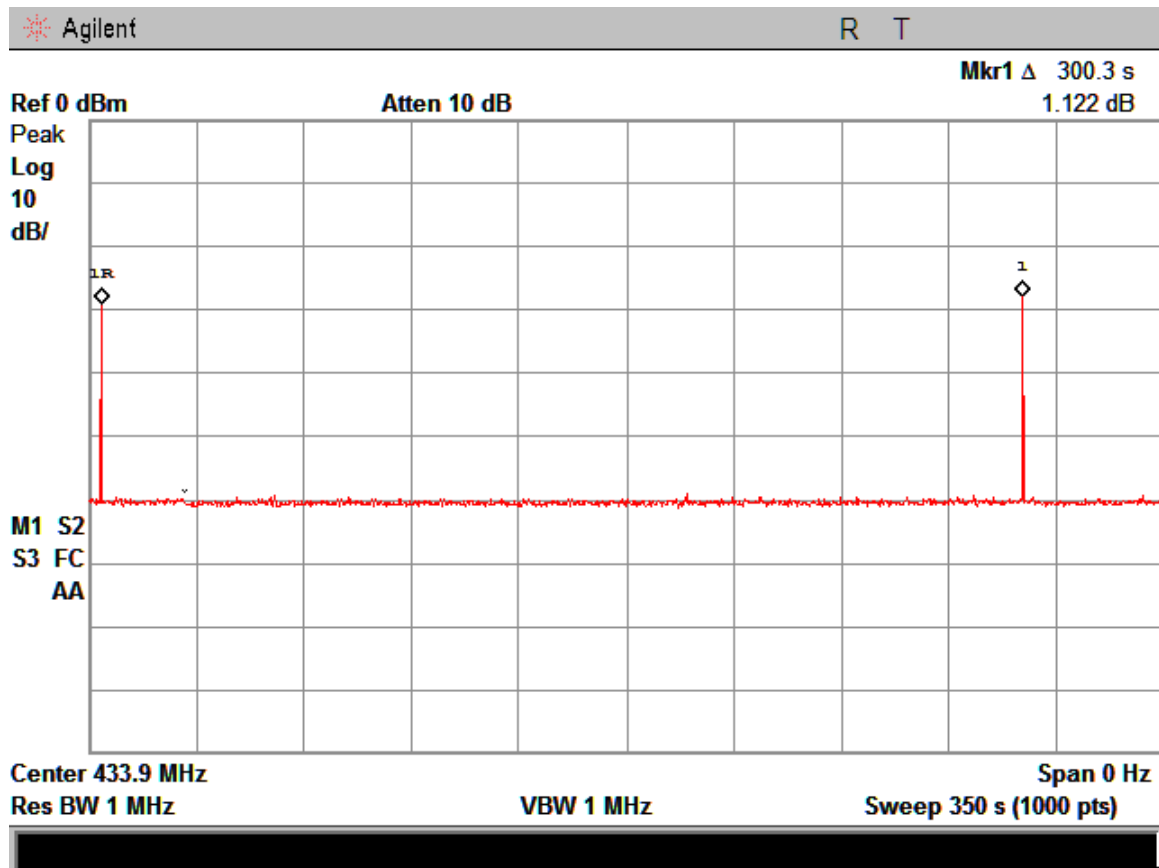
6.3. Test Setup

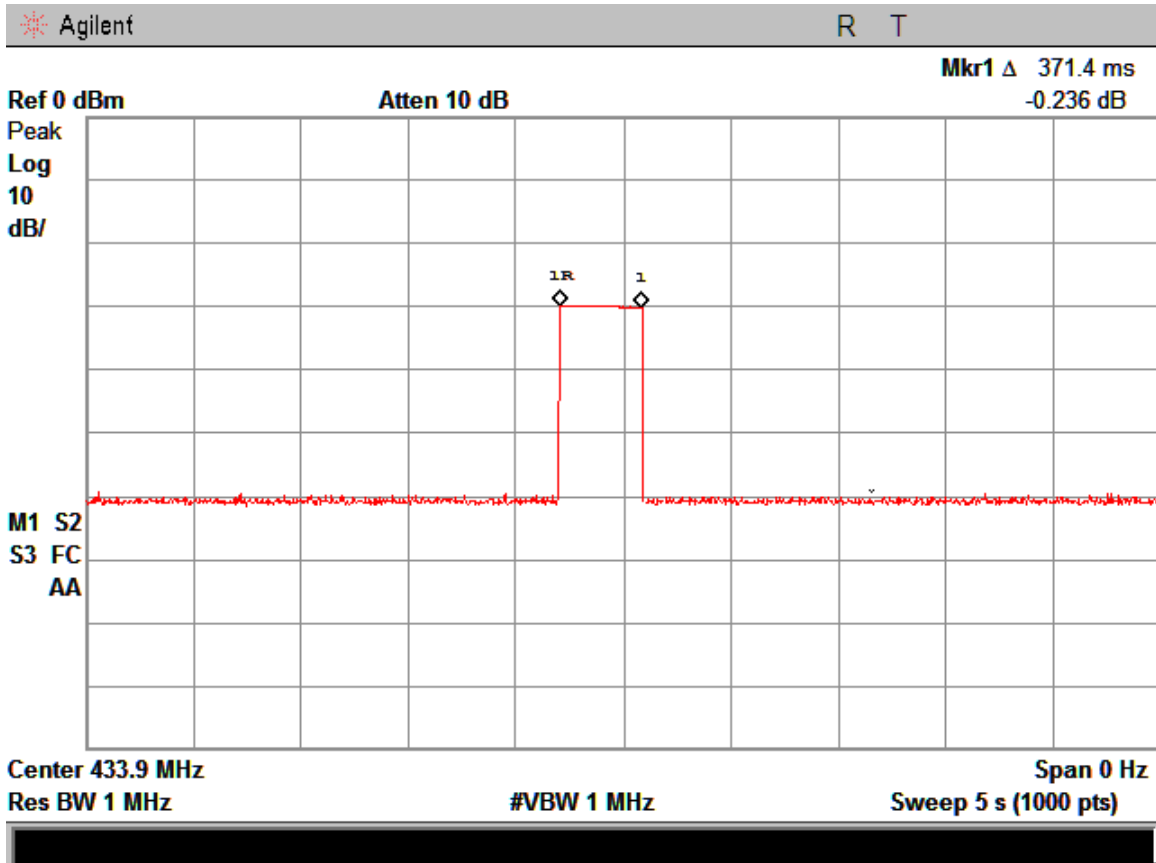


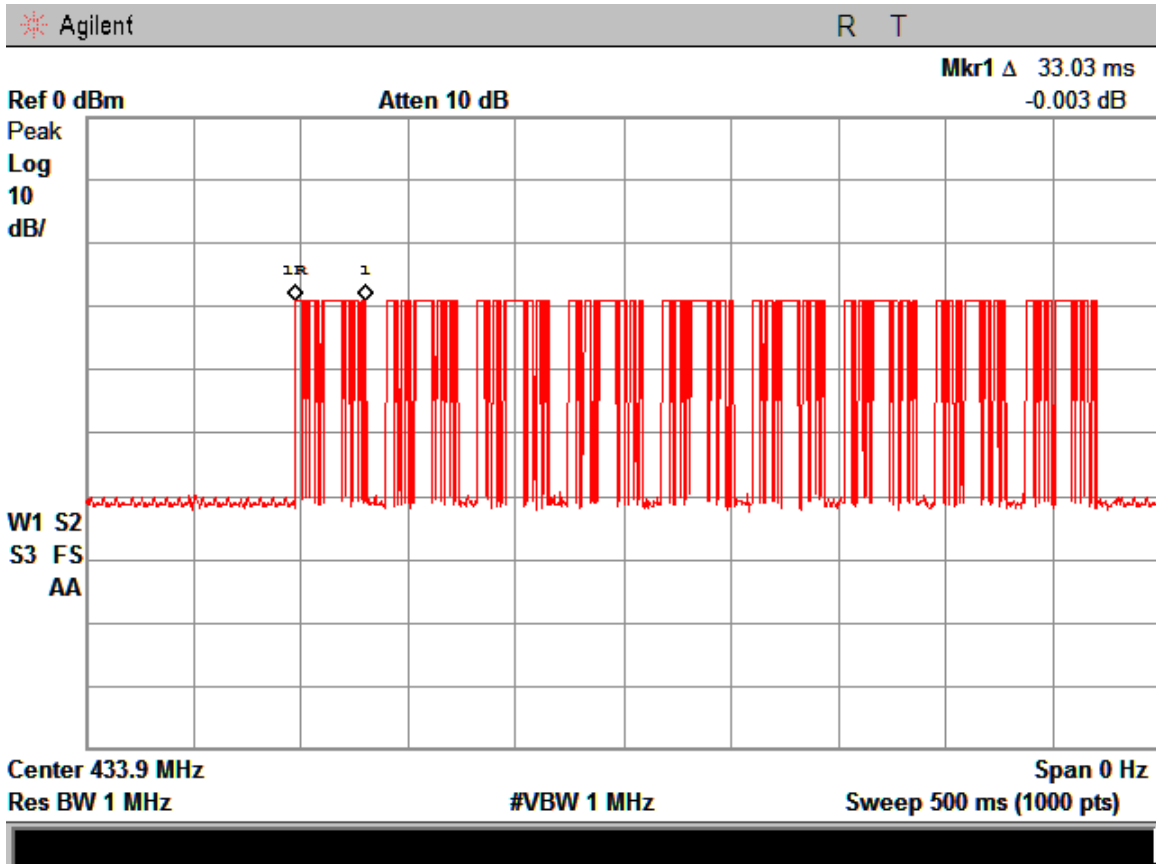
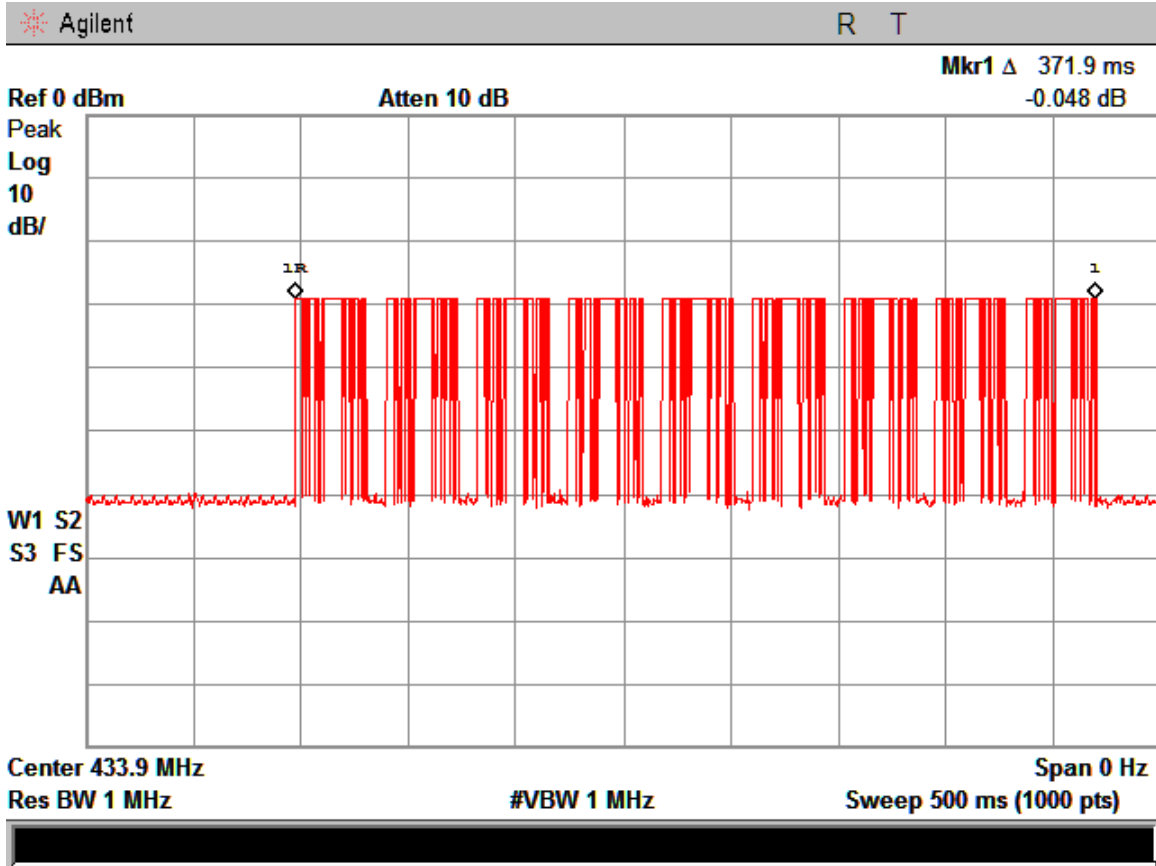
6.4. Test Results

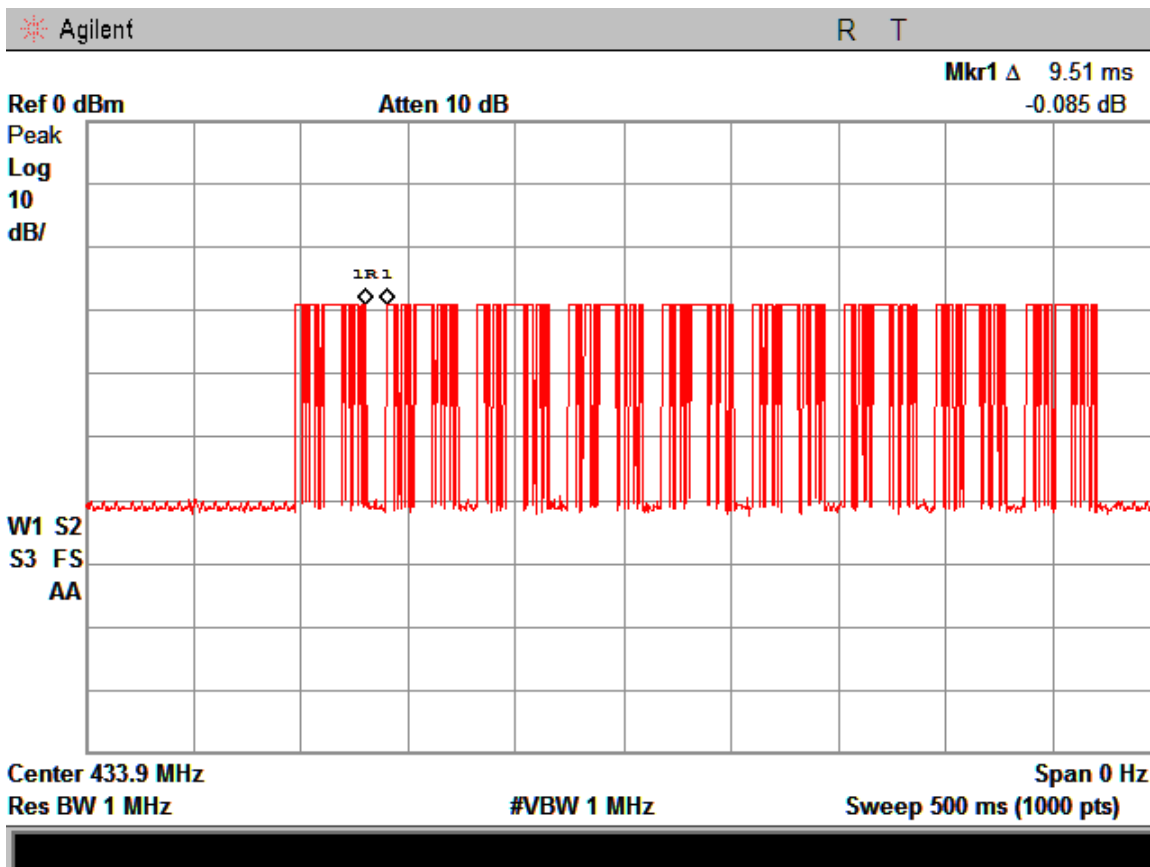
For normal mode

EUT: Tire Pressure Monitoring System				
M/N: VR-380B				
Test Mode: Keeping TX mode				
Test date: 2015-12-07		Test site: RF site		Tested by: peter
Mode	Freq (MHz)	Test Result(s)	Limit (s)	Conclusion
FSK	433.92	0.3714	< 5s	PASS
Note: EUT transmitter activated automatically only 0.3714s, Compliance with 15.231 a(2) section.				



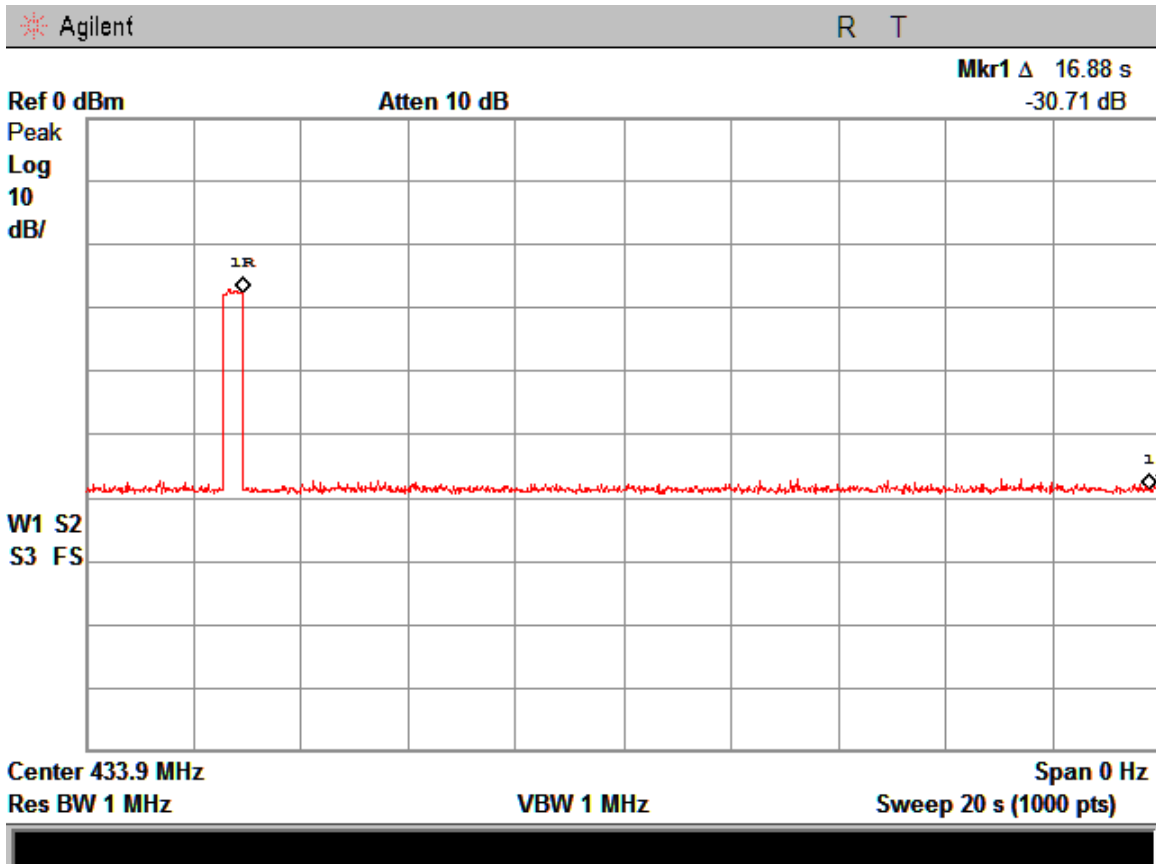
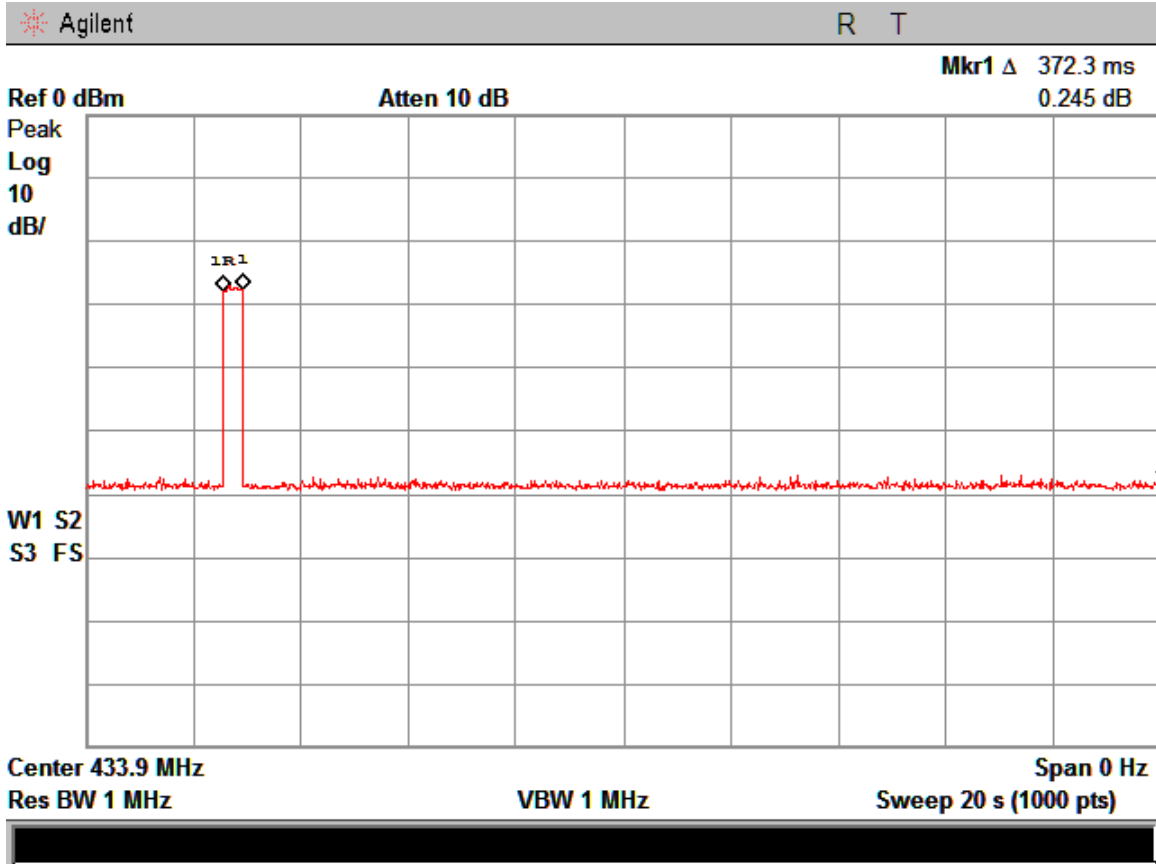






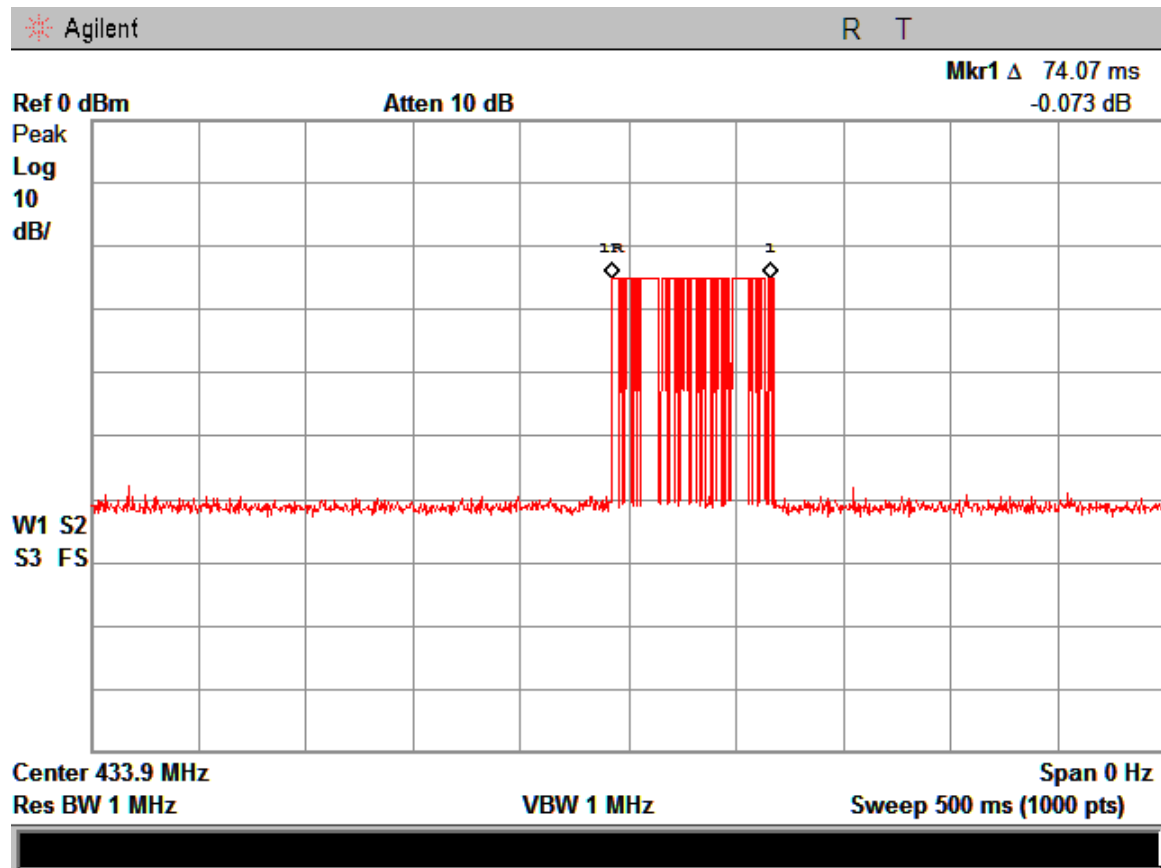
EUT: Tire Pressure Monitoring System				
M/N: VR-380B				
Test Mode: Keeping TX mode				
Test date: 2015-12-07		Test site: RF site		Tested by: peter
Mode	Freq (MHz)	duration of each transmission (s)	Limit (s)	Conclusion
FSK	433.92	0.3723	1	PASS

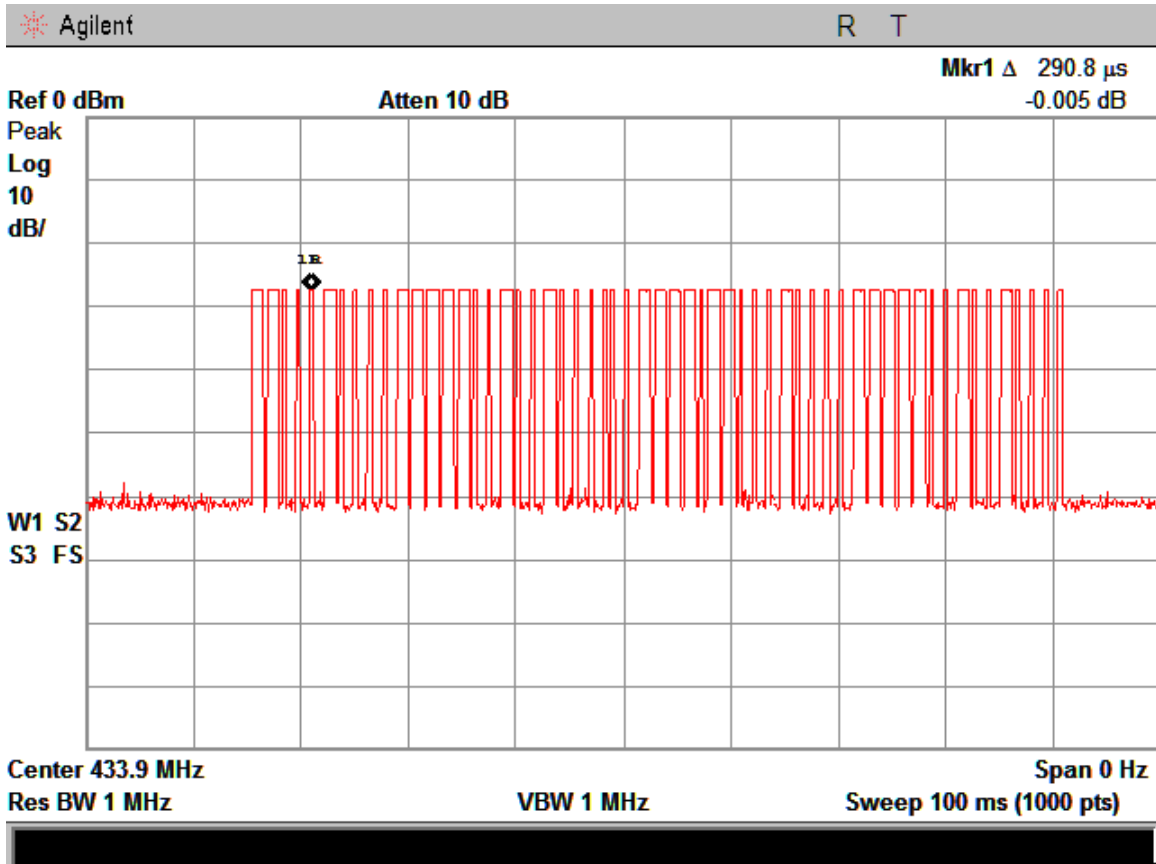
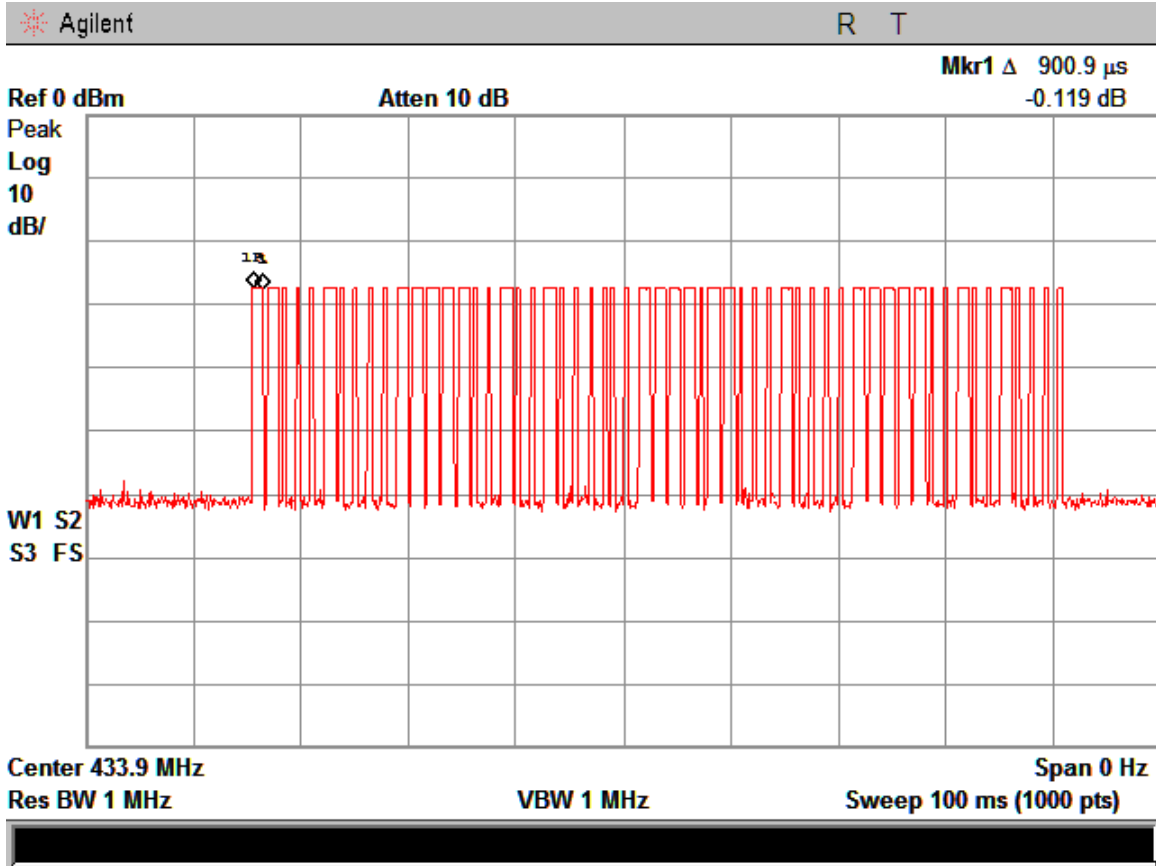
EUT: Tire Pressure Monitoring System				
M/N: VR-380B				
Test Mode: Keeping TX mode				
Test date: 2015-12-07		Test site: RF site		Tested by: peter
Mode	Freq (MHz)	Silent Period (s)	Limit (s)	Conclusion
FSK	433.92	>16.88	10	PASS
Note: According OP, EUT interval 5min transmitter a time, Compliance with 15.231e section.				



For alarm mode

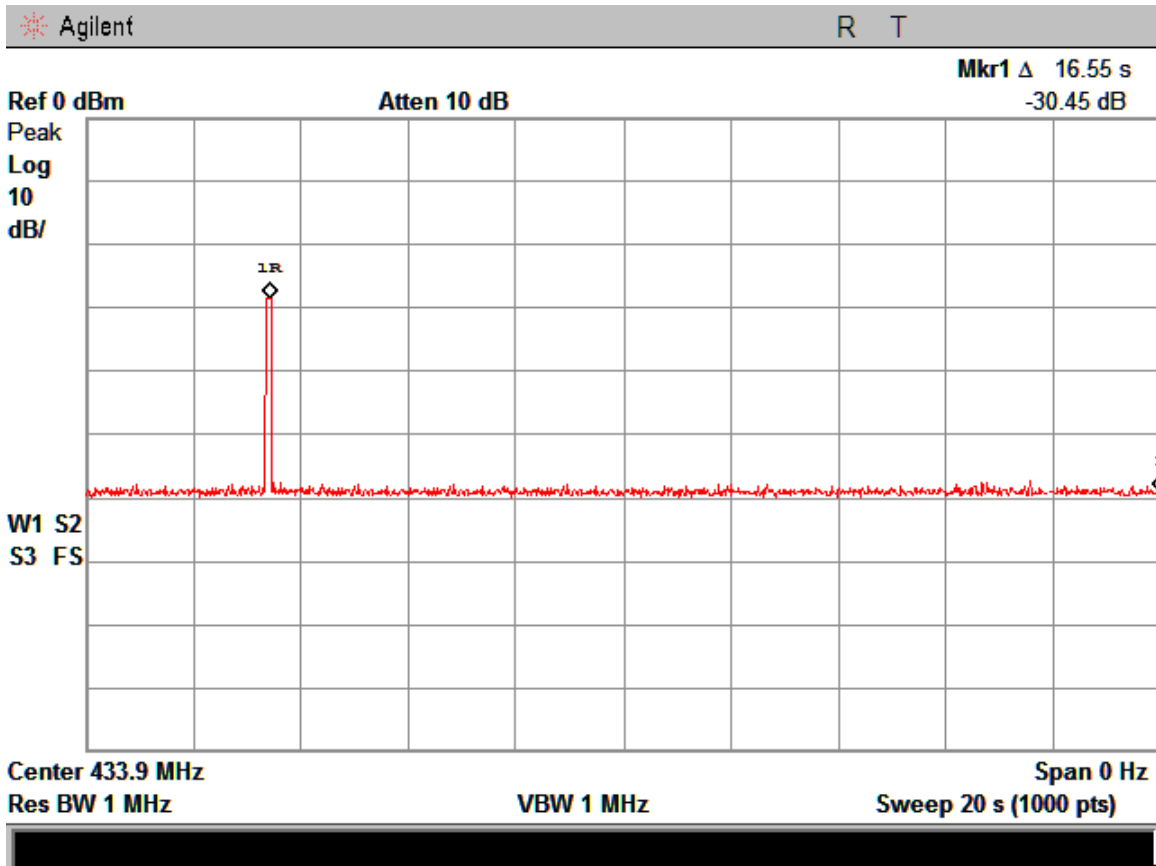
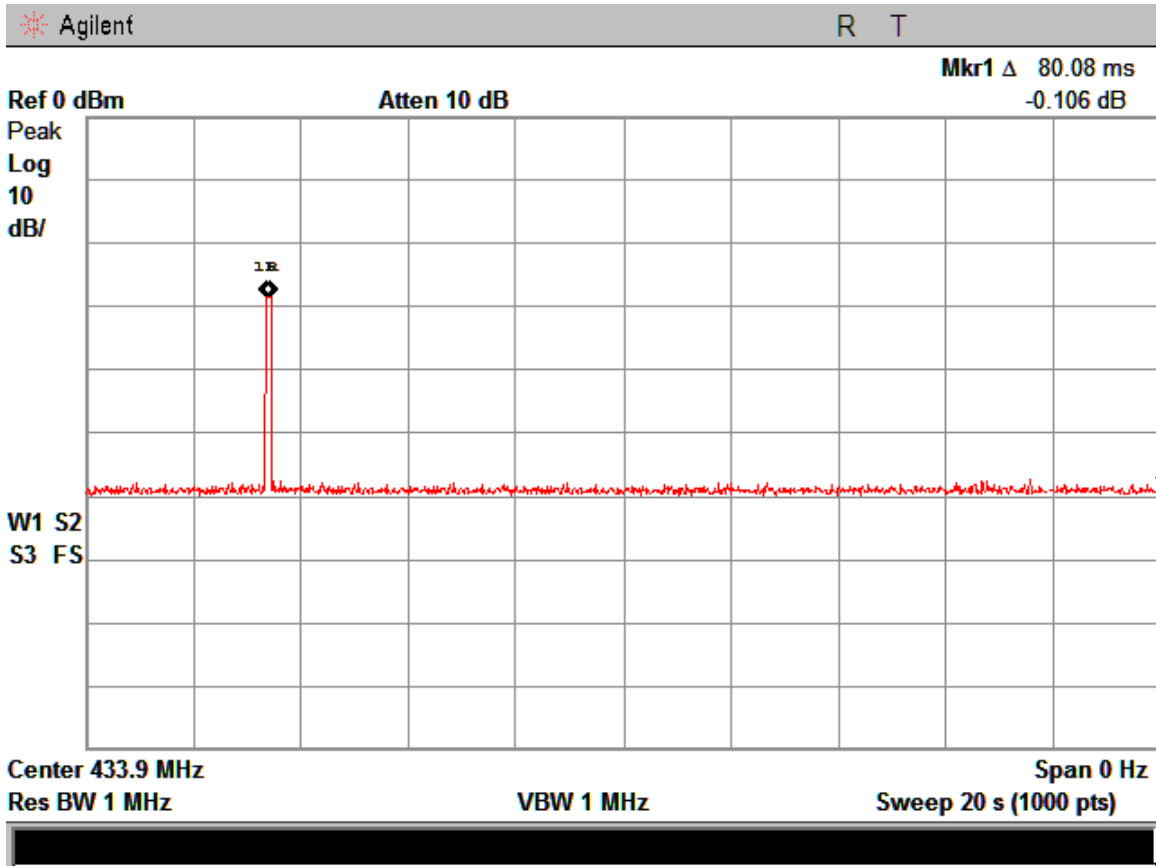
EUT: Tire Pressure Monitoring System				
M/N: VR-380B				
Test Mode: Keeping TX mode				
Test date: 2015-12-07		Test site: RF site		Tested by: peter
Mode	Freq (MHz)	Test Result(s)	Limit (s)	Conclusion
FSK	433.92	0.07407	< 5s	PASS
Note: EUT transmitter activated automatically only 0.07407s, Compliance with 15.231 a(2) section.				





EUT: Tire Pressure Monitoring System				
M/N: VR-380B				
Test Mode: Keeping TX mode				
Test date: 2015-12-07		Test site: RF site		Tested by: peter
Mode	Freq (MHz)	duration of each transmission (s)	Limit (s)	Conclusion
FSK	433.92	0.0808	1	PASS

EUT: Tire Pressure Monitoring System				
M/N: VR-380B				
Test Mode: Keeping TX mode				
Test date: 2015-12-07		Test site: RF site		Tested by: peter
Mode	Freq (MHz)	Silent Period (s)	Limit (s)	Conclusion
FSK	433.92	>16.55	10	PASS



7. Antenna Requirement

7.1. Standard Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

7.2. Antenna Connected Construction

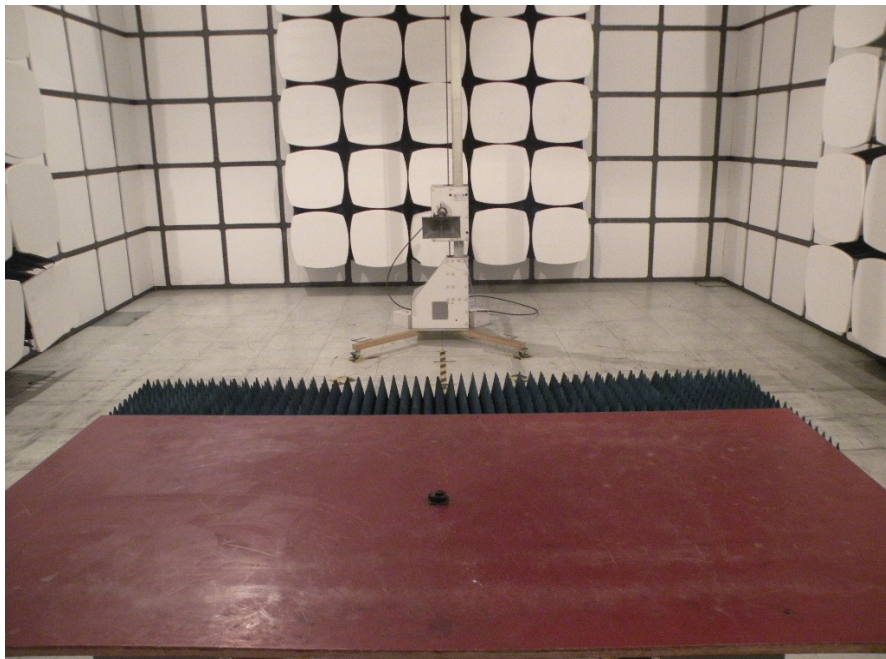
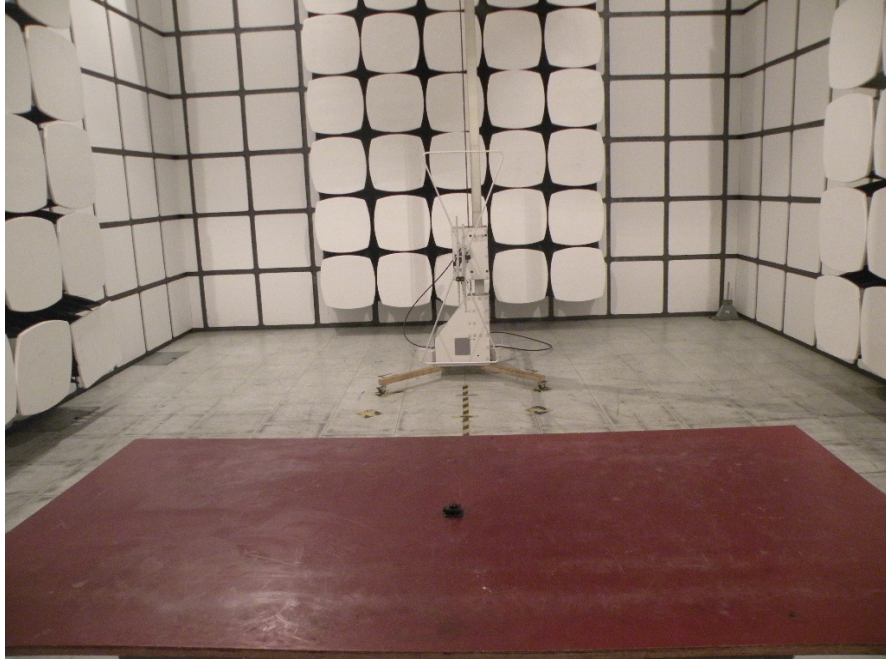
The directional gains of antenna used for transmitting is 0 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

7.3. Result

The EUT antenna is internal antenna. It complies with the standard requirement.

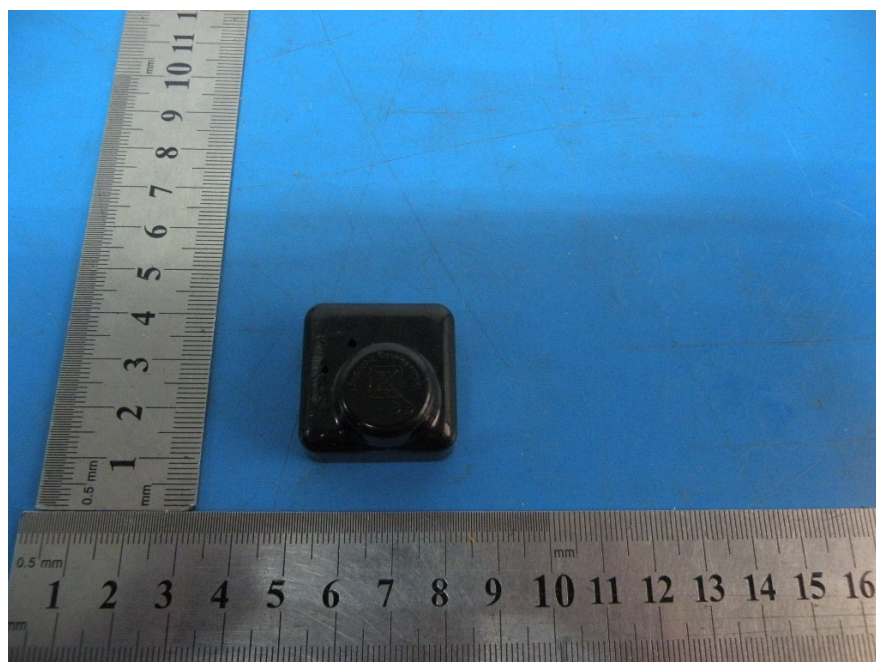
8. Test setup photo

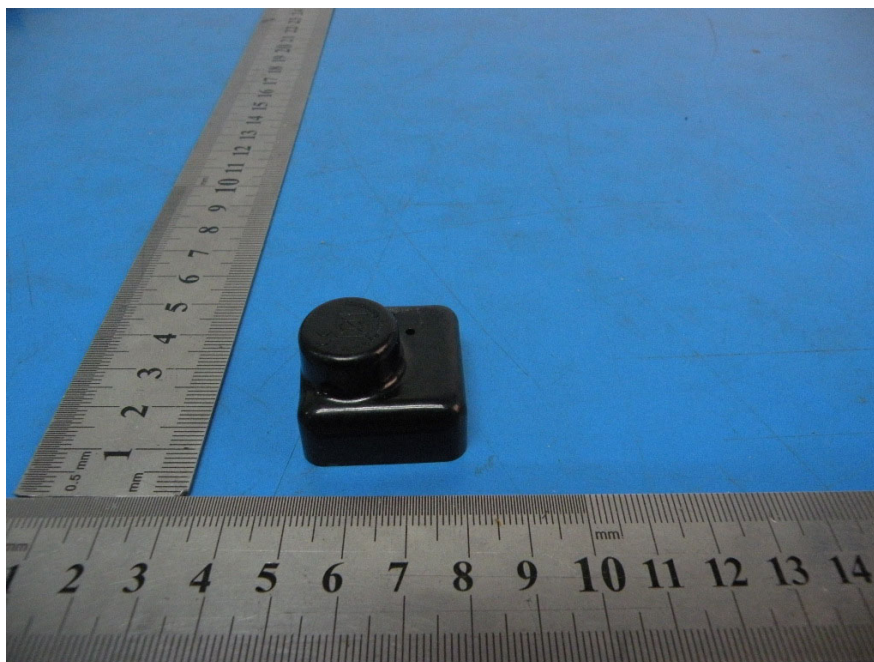
Photos of Radiated emission



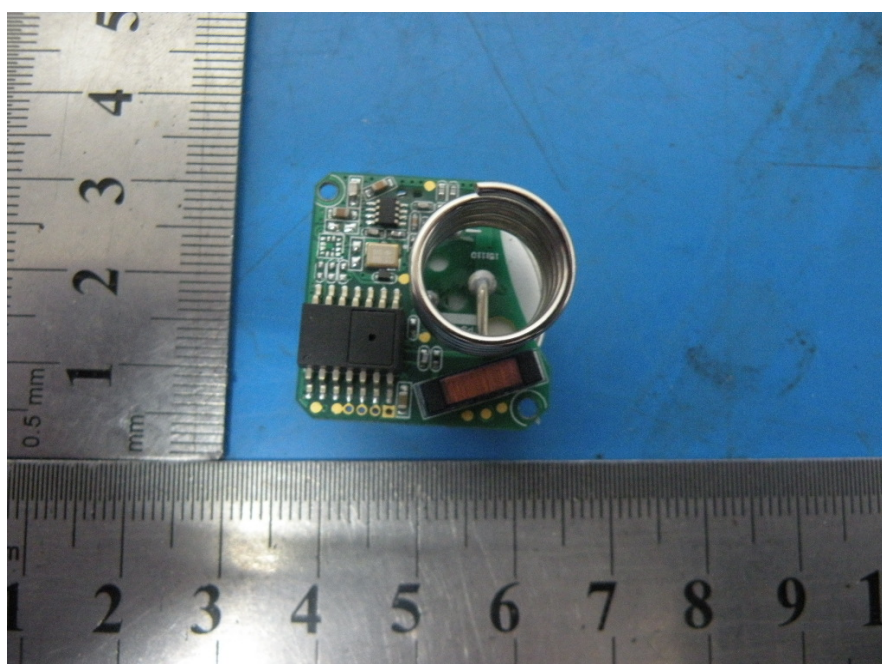
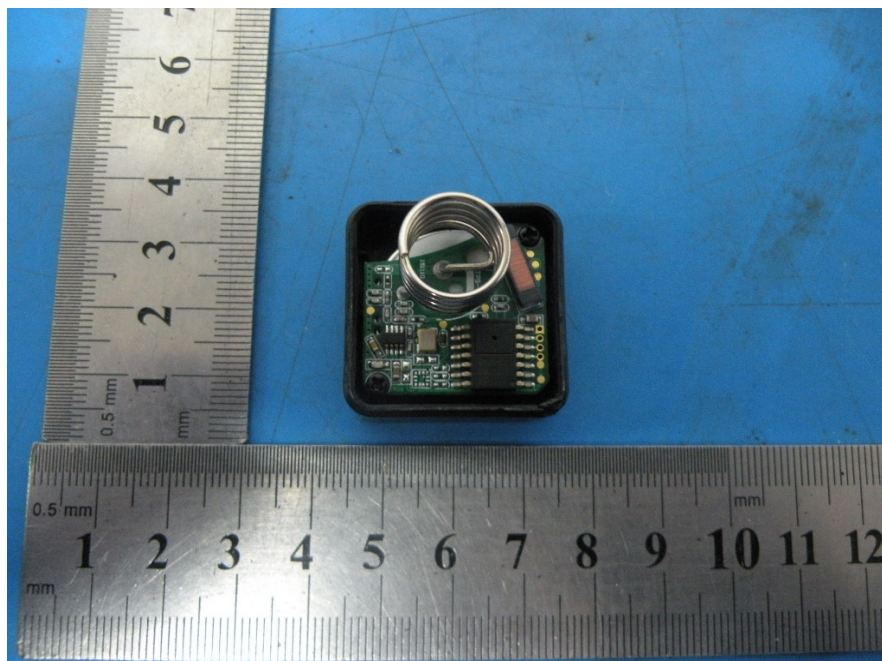
9. Photos of EUT

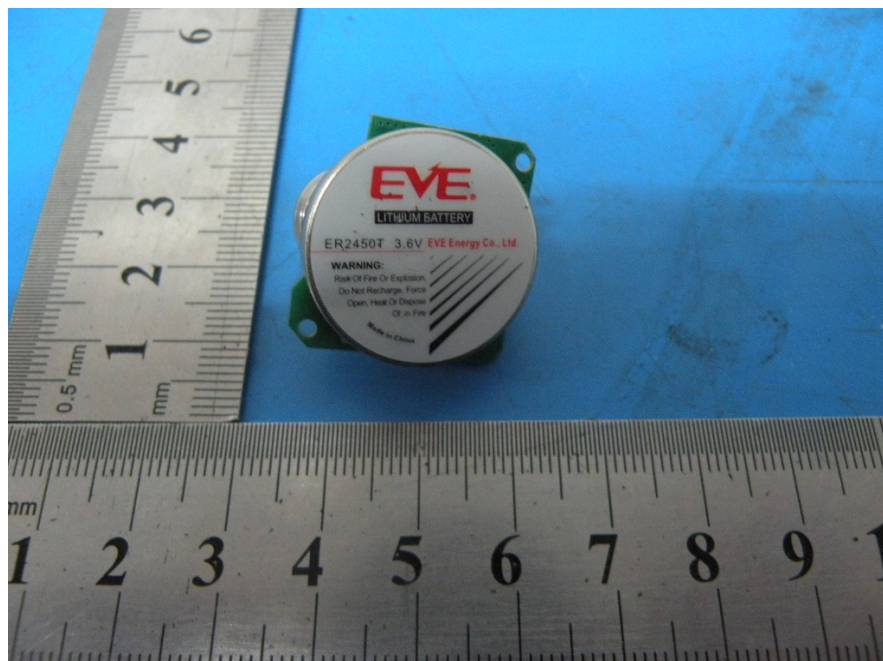












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