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Report No.: 1612RSU00201
Report Version: V01
Issue Date: 04-04-2017

MEASUREMENT REPORT
FCC PART 15.231(e) & RSS 210

FCC ID: TTETSB40

IC: 6707A-TSB40

APPLICANT: Suzhou Sate Auto Electronic Co., Ltd.

Application Type:	Certification
Product:	Tire Pressure Monitoring System Sensor
Model No.:	TSB40
Brand Name:	SATE
FCC Classification:	FCC Part 15 Security/Remote Control Transmitter (DSC)
FCC Rule Part(s):	Part 15.231(e)
IC Rule(s):	RSS-210 Issue 9 – Annex A
Test Procedure(s):	ANSI C63.10-2013
Test Date:	December 01, 2016 ~ January 26, 2017

Reviewed By : _____
(Robin Wu)

Approved By : _____
(Marlin Chen)

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1612RSU00201	Rev. 01	Initial report	04-04-2017	Valid

CONTENTS

§2.1033 General Information

Applicant:	Suzhou Sate Auto Electronic Co., Ltd.
Applicant Address:	No.36 Building, Yangtai Road, Suzou Industrial Park, Suzhou, Jiangsu, P.R.China
Manufacturer:	Suzhou Sate Auto Electronic Co., Ltd.
Manufacturer Address:	No.36 Building, Yangtai Road, Suzou Industrial Park, Suzhou, Jiangsu, P.R.China
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT Registration No.:	809388
FCC Rule Part(s):	Part 15.231(e)
IC Rule(s):	RSS-210 Issue 9 – Annex A
Model No.	TSB40
FCC ID:	TTETSB40
IC	6707A-TSB40
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering
FCC Classification:	FCC Part 15 Security/Remote Control Transmitter(DSC)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LACert. No.3628.01) in EMC, Telecommunications and Radio testingfor FCC, Industry Canada, EU and TELEC Rules.**

1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.

2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Tire Pressure Monitoring System Sensor
Model No.	TSB40
Frequency Range	433.92 MHz
Type of modulation	ASK, FSK
Antenna Type	Integral Antenna
Device Category	Fixed Device

2.2. Test Standards

The following report is prepared on behalf of the **Suzhou Sate Auto Electronic Co., Ltd** in accordance with FCC Part 15, Subpart C, and section 15.231, 15.203, 15.205 and 15.209 of the Federal Communication Commission rules, and RSS-210 Issue 9 & RSS-Gen Issue 4 rules of IC rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.231, 15.203, 15.205 and 15.209 of the Federal Communication Commission rules, and RSS-210 Issue 9 & RSS-Gen Issue 4 rules of IC rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

2.3. Test Methodology

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013).
Deviation from measurement procedure…………………………....................................None

2.4. EUT Setup and Test Mode

The EUT was operated at continuous transmitting mode that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
Mode 1	Transmitting	With ASK Modulation
Mode 2	Transmitting	With FSK Modulation

3. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna of the **Tire Pressure Monitoring System Sensor** is permanently attached.
- There are no provisions for connection to an external antenna.

Conclusion:

The Tire Pressure Monitoring System Sensor **FCC ID: TTETSB40** unit complies with the requirement of §15.203.

4. TEST EQUIPMENT CALIBRATION DATA

Radiated Emissions – AC2

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
EMI Test Receiver	R&S	ESR 3.6	102030	1 year	2017/05/08
Preamplifier	Schwarzbeck	BBV 9718	302	1 year	2017/04/16
Preamplifier	Schwarzbeck	BBV9721	9721-008	1 year	2017/04/16
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	1 year	2017/11/21
Bilog Period Antenna	Schwarzbeck	VULB 9168	662	1 year	2017/11/18
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	1457	1 year	2017/11/18
Broadband Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170549	1 year	2018/01/03
Temperature/Humidity Meter	Yuhuaze	ETH529	N/A	1 year	2017/12/24
Anechoic Chamber	RIKEN	Chamber-AC2	N/A	1 year	2017/05/10

20dB Bandwidth

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cal. Due. Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
Bilog Period Antenna	Schwarzbeck	VULB 9168	662	1 year	2017/11/18
Temperature/Humidity Meter	Yuhuaze	ETH529	N/A	1 year	2017/12/24

Transmission Time – AC2

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cal. Due. Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
Bilog Period Antenna	Schwarzbeck	VULB 9168	662	1 year	2017/11/18
Temperature/Humidity Meter	Yuhuaze	ETH529	N/A	1 year	2017/12/24

Duty Cycle – AC2

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cal. Due. Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
Bilog Period Antenna	Schwarzbeck	VULB 9168	662	1 year	2017/11/18
Temperature/Humidity Meter	Yuhuaze	ETH529	N/A	1 year	2017/12/24

Software	Version	Function
e3	V8.3.5	EMI Test Software

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Radiated Emission Measurement – AC2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 3.86dB 1GHz ~ 18GHz: 4.33dB

6. TEST RESULT

6.1. Summary

Company Name: **Suzhou Sate Auto Electronic Co., Ltd.**
FCC ID: **TTETSB40**
IC: **6707A-TSB40**

FCC Part Section(s)	IC Section(s)	Test Description	Test Condition	Test Result
15.205 15.231(e)	RSS-210, A1.4	Radiated Spurious Emissions	Radiated	Pass
15.231(c)	RSS-210, A1.3	20dB Bandwidth / 99% Bandwidth		Pass
15.231(e)	RSS-210, A1.4	Transmission Time		Pass
15.231(e)	RSS-Gen, 6.10	Duty Cycle		Pass

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.

2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

3) The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

6.2. Radiated Emissions

6.2.1. Standard Applicable

According to §15.231(e), the field strength of emissions from intentional radiators operated under this section shall not exceed 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

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements start below or at the lowest crystal frequency.

Compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.
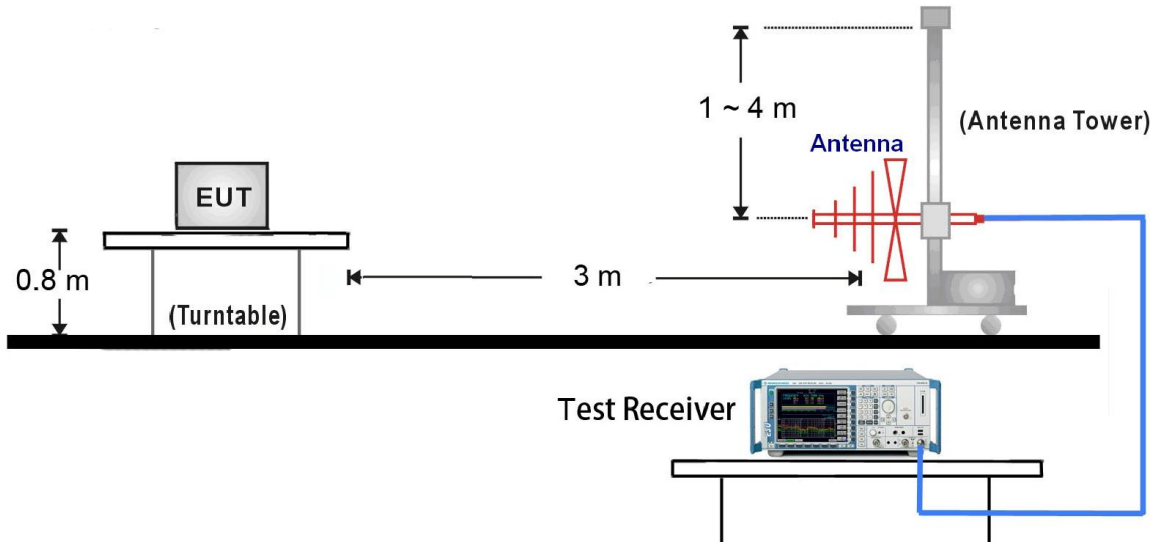
6.2.2. Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.231(e) and FCC Part 15.209 Limit.
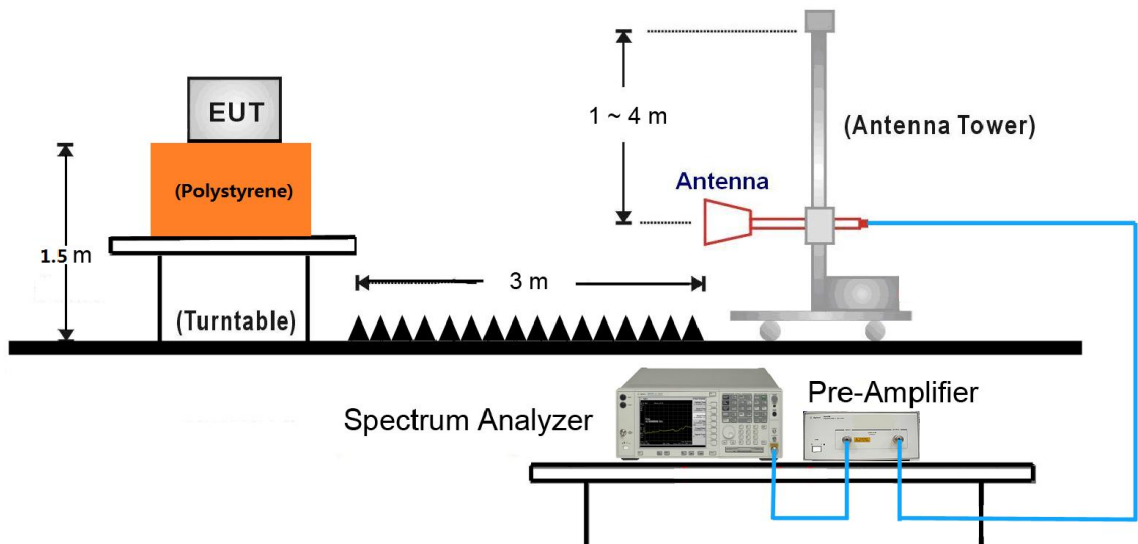
6.2.3. Test Setup

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.231(e) and FCC Part 15.209 Limit.
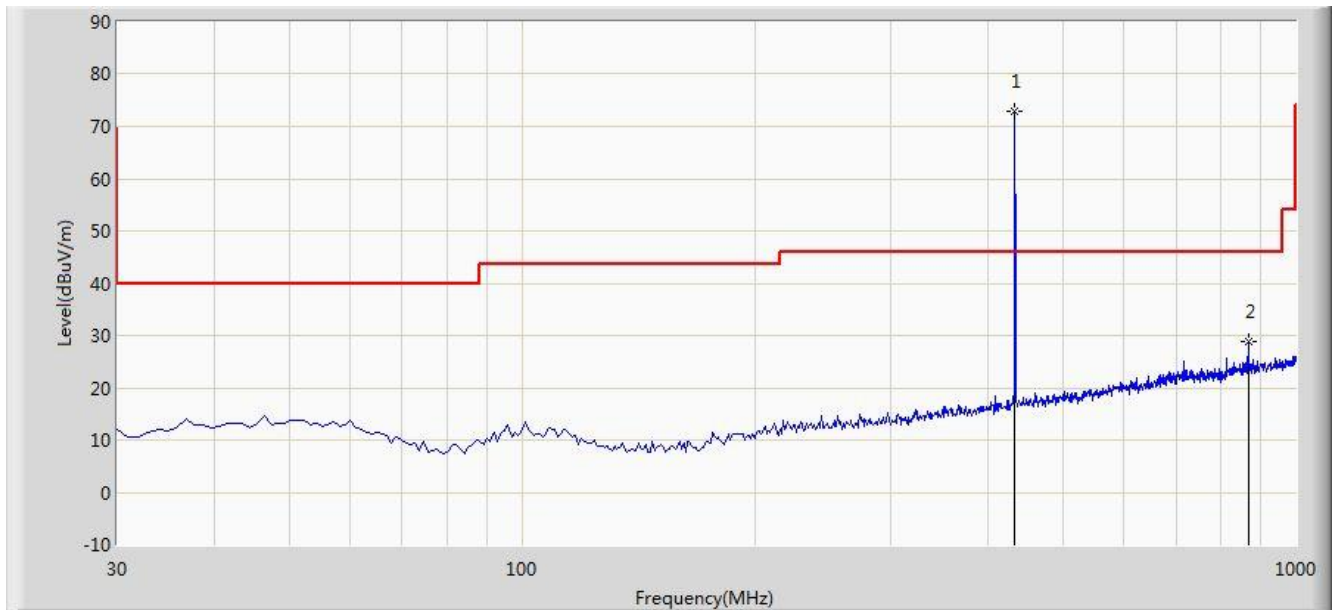
30MHz ~ 1GHz Test Setup:

1GHz ~ 25GHz Test Setup:

6.2.4. Test Results

Site: AC2	Time: 2016/12/01 - 20:11
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Tire Pressure Monitoring System Sensor	Power: By Battery
Note: Transmit with ASK Mode	

No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Dutycycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	433.520	55.680	17.196	N/A	72.876	92.866	-19.990	PK
	433.520	55.680	17.196	19.960	52.916	72.866	-19.950	AV
2	868.080	4.845	23.872	N/A	28.717	72.866	-44.149	PK
	868.080	4.845	23.872	19.960	8.757	52.866	-44.109	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB).

AV Measure Level = Peak Measure Level – Duty Cycle Factor.

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC2	Time: 2016/12/01 - 20:17
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: Tire Pressure Monitoring System Sensor	Power: By Battery
Note: Transmit with ASK Mode	
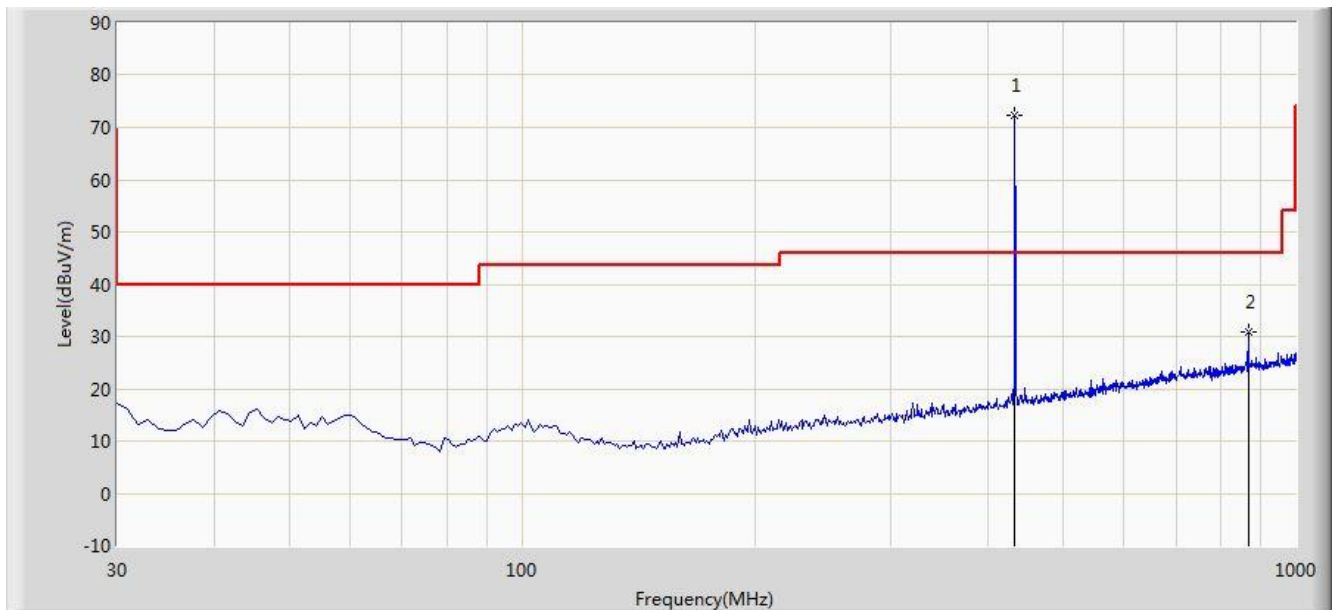
No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Dutycycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	433.520	55.084	17.196	N/A	72.280	92.866	-20.586	PK
	433.520	55.084	17.196	19.960	52.320	72.866	-20.546	AV
2	868.080	6.927	23.872	N/A	30.799	72.866	-42.067	PK
	868.080	6.927	23.872	19.960	10.839	52.866	-42.027	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB).

AV Measure Level = Peak Measure Level – Duty Cycle Factor.

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC2	Time: 2016/12/01 - 20:06
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Tire Pressure Monitoring System Sensor	Power: By Battery
Note: Transmit with FSK Mode	
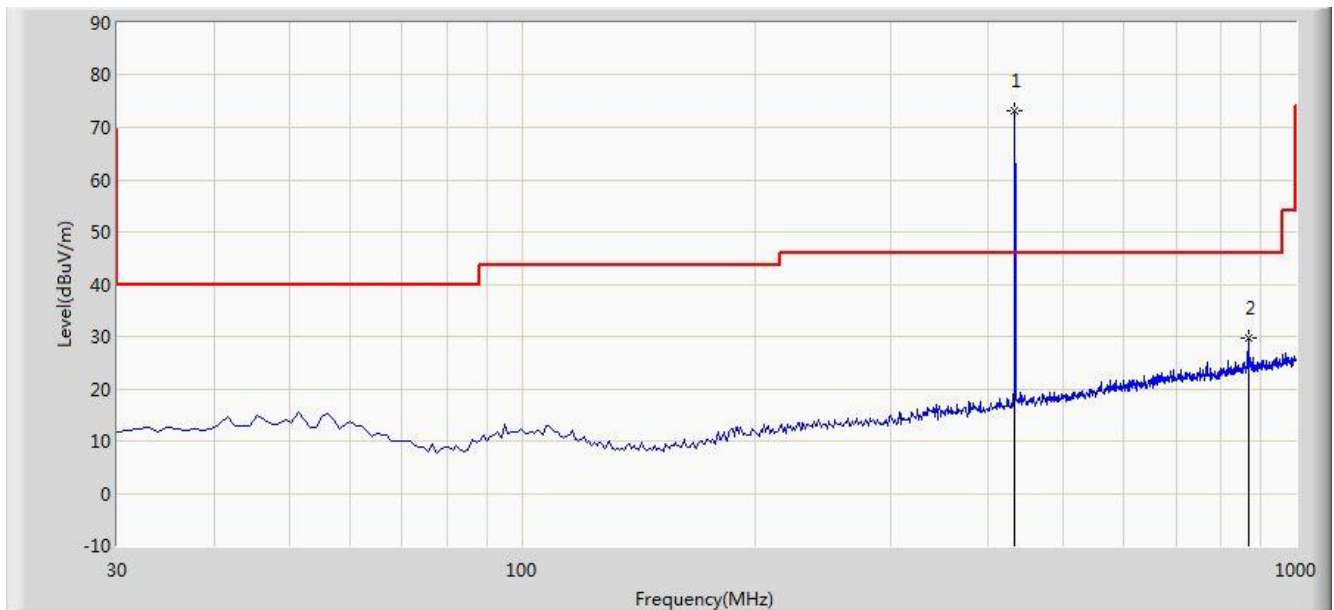
No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Dutycycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	433.520	56.050	17.196	N/A	73.246	92.866	-19.620	PK
	433.520	56.050	17.196	21.460	51.786	72.866	-21.080	AV
2	868.080	5.843	23.872	N/A	29.715	72.866	-43.151	PK
	868.080	5.843	23.872	21.460	8.255	52.866	-44.611	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB).

AV Measure Level = Peak Measure Level – Duty Cycle Factor.

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC2	Time: 2016/12/01 - 20:09
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: Tire Pressure Monitoring System Sensor	Power: By Battery
Note: Transmit with FSK Mode	
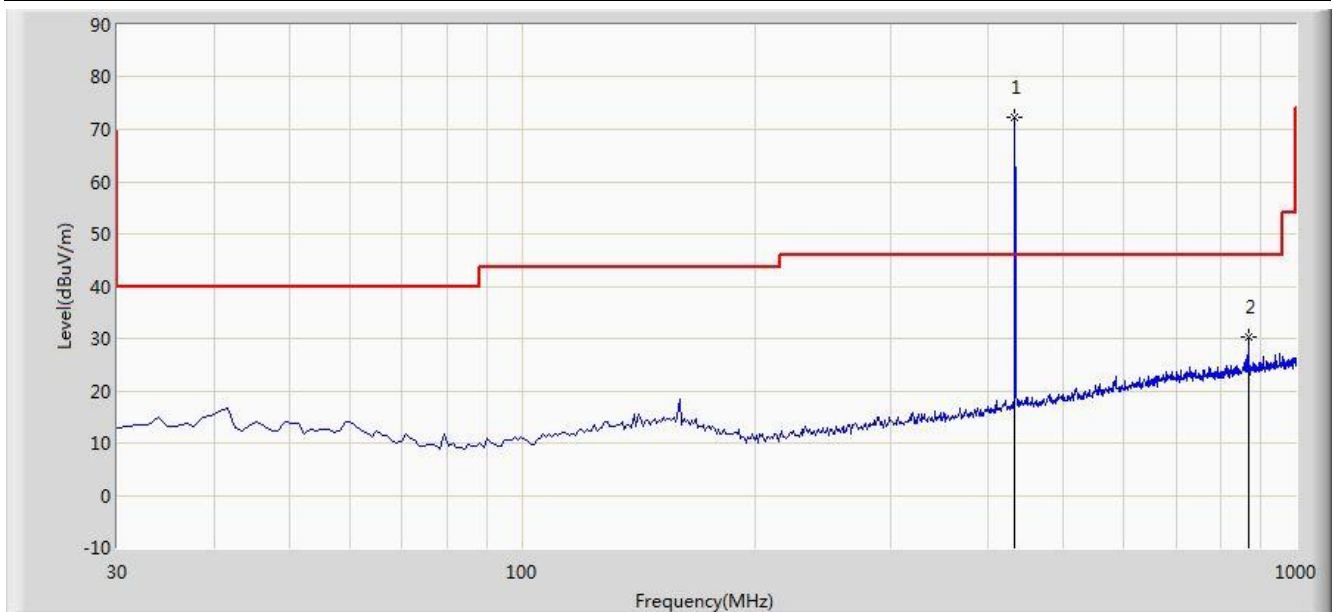
No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Dutycycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	433.520	54.975	17.419	N/A	72.394	92.866	-20.472	PK
	433.520	54.975	17.419	21.460	50.934	72.866	-21.932	AV
2	868.080	6.405	23.886	N/A	30.291	72.866	-42.575	PK
	868.080	6.405	23.886	21.460	8.831	52.866	-44.035	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB).

AV Measure Level = Peak Measure Level – Duty Cycle Factor.

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC2	Time: 2016/12/01 - 23:28
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Tire Pressure Monitoring System Sensor	Power: By Battery
Note: Transmit with ASK Mode	
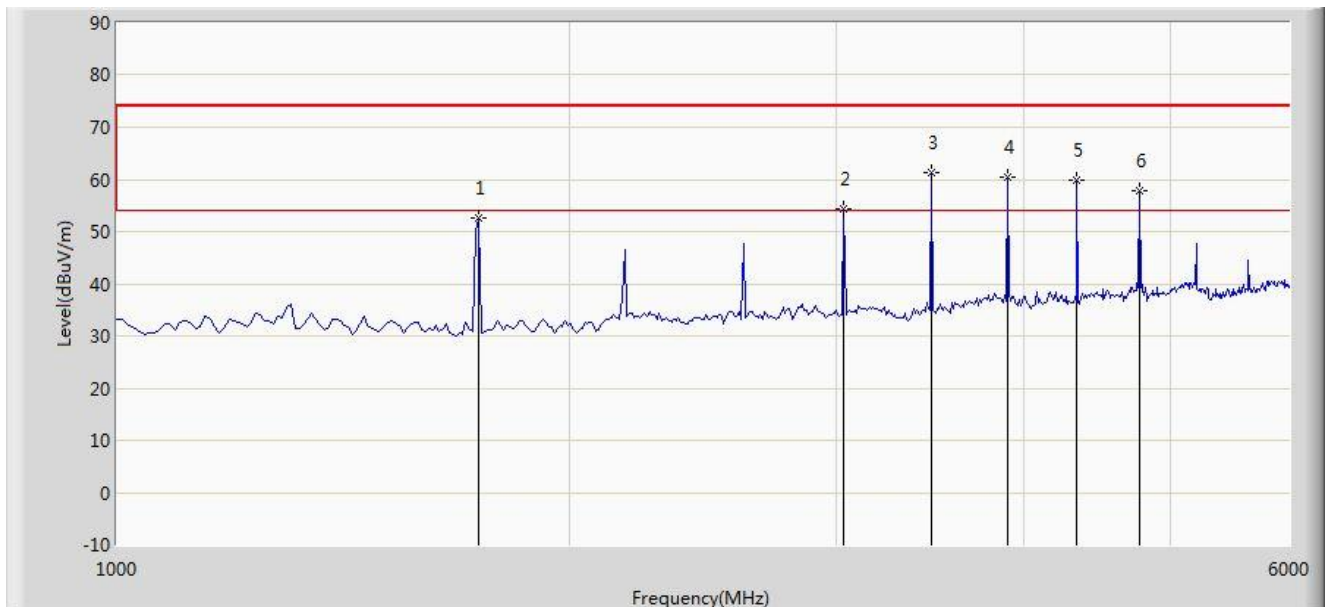
No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Dutycycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	1739.500	58.786	-6.074	N/A	52.713	72.866	-20.153	PK
	1739.500	58.786	-6.074	19.960	32.753	52.866	-20.113	AV
2	3040.000	57.158	-2.895	N/A	54.262	72.866	-18.604	PK
	3040.000	57.158	-2.895	19.960	34.302	52.866	-18.564	AV
3	3473.500	62.762	-1.555	N/A	61.207	72.866	-11.659	PK
	3473.500	62.762	-1.555	19.960	41.247	52.866	-11.619	AV
4	3907.000	60.895	-0.592	N/A	60.304	72.866	-12.562	PK
	3907.000	60.895	-0.592	19.960	40.344	52.866	-12.522	AV
5	4340.500	58.842	1.081	N/A	59.923	72.866	-12.943	PK
	4340.500	58.842	1.081	19.960	39.963	52.866	-12.903	AV
6	4774.000	54.942	2.857	N/A	57.799	72.866	-15.067	PK
	4774.000	54.942	2.857	19.960	37.839	52.866	-15.027	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB).

AV Measure Level = Peak Measure Level – Duty Cycle Factor.

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB).

Site: AC2	Time: 2016/12/01 - 23:31
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Tire Pressure Monitoring System Sensor	Power: By Battery
Note: Transmit with ASK Mode	
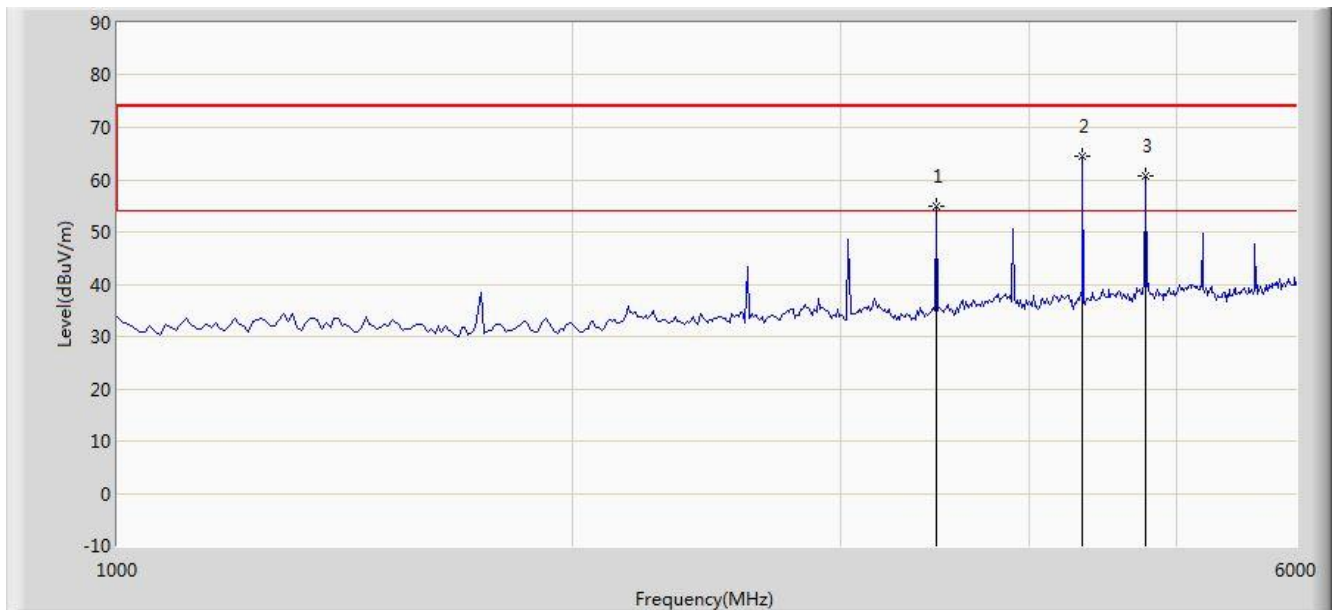
No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Dutycycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	3473.500	56.345	-1.555	N/A	54.790	72.866	-18.076	PK
	3473.500	56.345	-1.555	19.960	34.830	52.866	-18.036	AV
2	4340.500	63.491	1.081	N/A	64.572	72.866	-8.294	PK
	4340.500	63.491	1.081	19.960	44.612	52.866	-8.254	AV
3	4774.000	57.899	2.857	N/A	60.756	72.866	-12.110	PK
	4774.000	57.899	2.857	19.960	40.796	52.866	-12.070	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB).

AV Measure Level = Peak Measure Level – Duty Cycle Factor.

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB).

Site: AC2	Time: 2016/12/01 - 23:22
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Tire Pressure Monitoring System Sensor	Power: By Battery
Note: Transmit with FSK Mode	
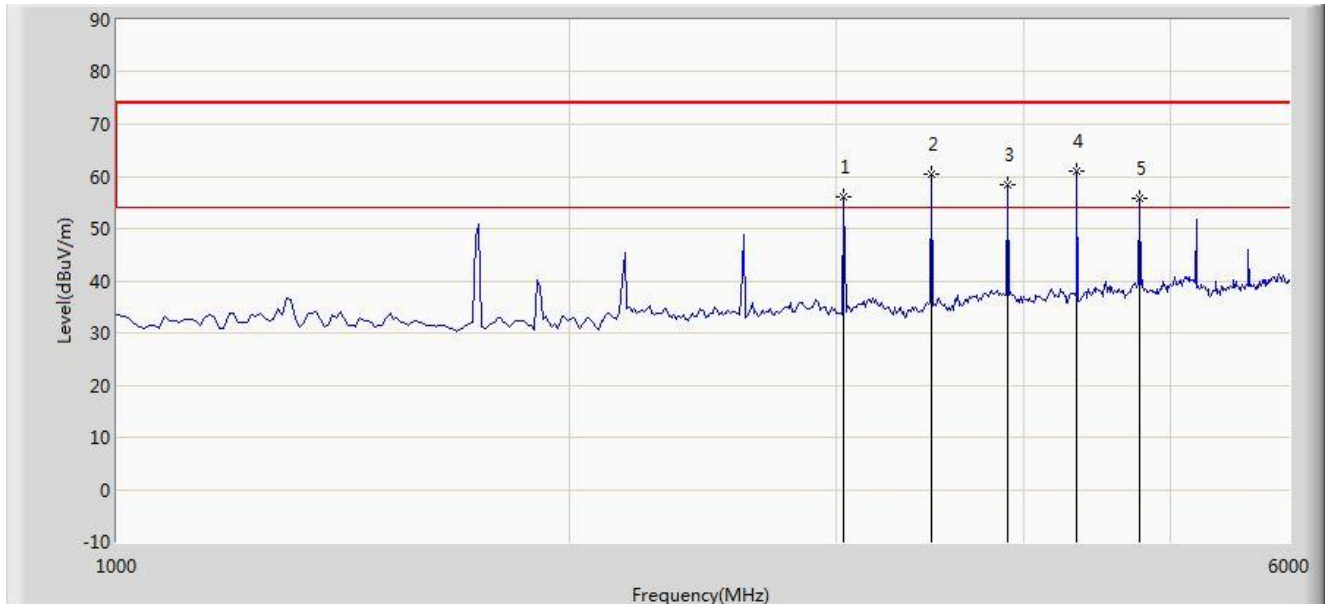
No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Dutycycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	3040.000	59.001	-2.895	N/A	56.105	72.866	-16.761	PK
	3040.000	59.001	-2.895	21.460	34.645	52.866	-18.221	AV
2	3473.500	62.053	-1.555	N/A	60.498	72.866	-12.368	PK
	3473.500	62.053	-1.555	21.460	39.038	52.866	-13.828	AV
3	3907.000	59.059	-0.592	N/A	58.468	72.866	-14.398	PK
	3907.000	59.059	-0.592	21.460	37.008	52.866	-15.858	AV
4	4340.500	59.877	1.081	N/A	60.958	72.866	-11.908	PK
	4340.500	59.877	1.081	21.460	39.498	52.866	-13.368	AV
5	4774.000	52.972	2.857	N/A	55.829	72.866	-17.037	PK
	4774.000	52.972	2.857	21.460	34.369	52.866	-18.497	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB).

AV Measure Level = Peak Measure Level – Duty Cycle Factor.

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB).

Site: AC2	Time: 2016/12/01 - 23:26
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Tire Pressure Monitoring System Sensor	Power: By Battery
Note: Transmit with FSK Mode	

No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Dutycycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	3473.500	53.417	-1.555	N/A	51.862	72.866	-21.004	PK
	3473.500	53.417	-1.555	21.460	30.402	52.866	-22.464	AV
2	3907.000	53.571	-0.592	N/A	52.980	72.866	-19.886	PK
	3907.000	53.571	-0.592	21.460	31.520	52.866	-21.346	AV
3	4340.500	62.306	1.081	N/A	63.387	72.866	-9.479	PK
	4340.500	62.306	1.081	21.460	41.927	52.866	-10.939	AV
4	4774.000	56.701	2.857	N/A	59.558	72.866	-13.308	PK
	4774.000	56.701	2.857	21.460	38.098	52.866	-14.768	AV
5	5207.500	49.795	2.791	N/A	52.586	72.866	-20.280	PK
	5207.500	49.795	2.791	21.460	31.126	52.866	-21.740	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB).

AV Measure Level = Peak Measure Level – Duty Cycle Factor.

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB).
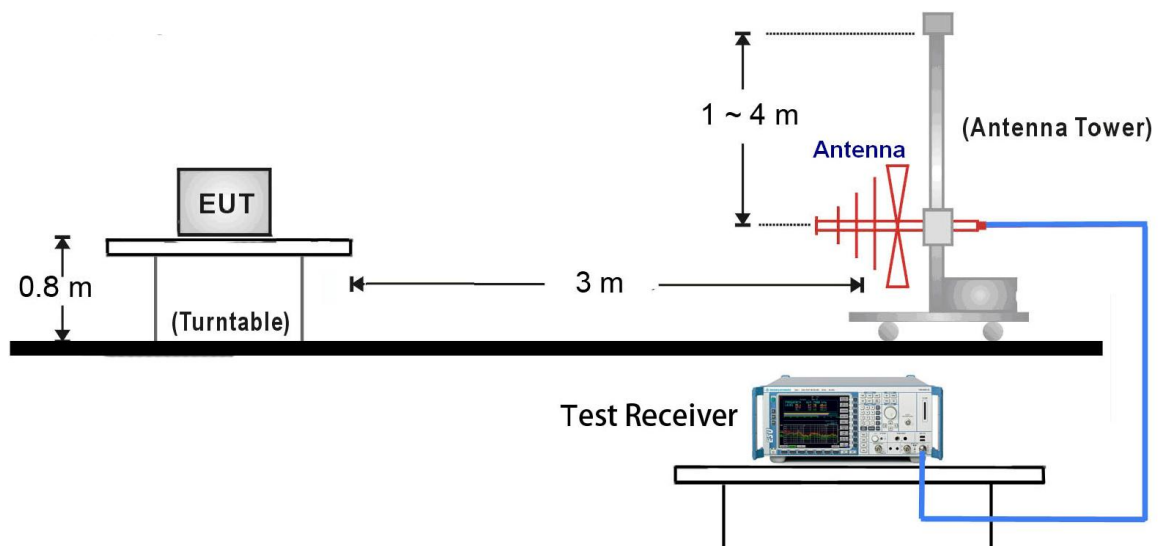
6.3. 20dB Bandwidth / 99% Bandwidth

6.3.1. Standard Applicable

According to FCC Part 15.231(c), the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

6.3.2. Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna, which was connected to the spectrum analyzer with the START, and STOP frequencies set to the EUT's operation band.

6.3.3. Test Setup

6.3.4. Test Result

Test Frequency (MHz)	Modulation Type	20dB Bandwidth (KHz)	99% Bandwidth (KHz)	Limit (KHz)	Result
433.92	ASK	82.24	109.41	≤ 1084.8	Pass
	FSK	167.90	131.70	≤ 1084.8	Pass

Limit = Fundamental Frequency * 0.25% = 433.92 MHz * 0.25% = 1084.8 kHz

20dB Bandwidth Test Plot for ASK
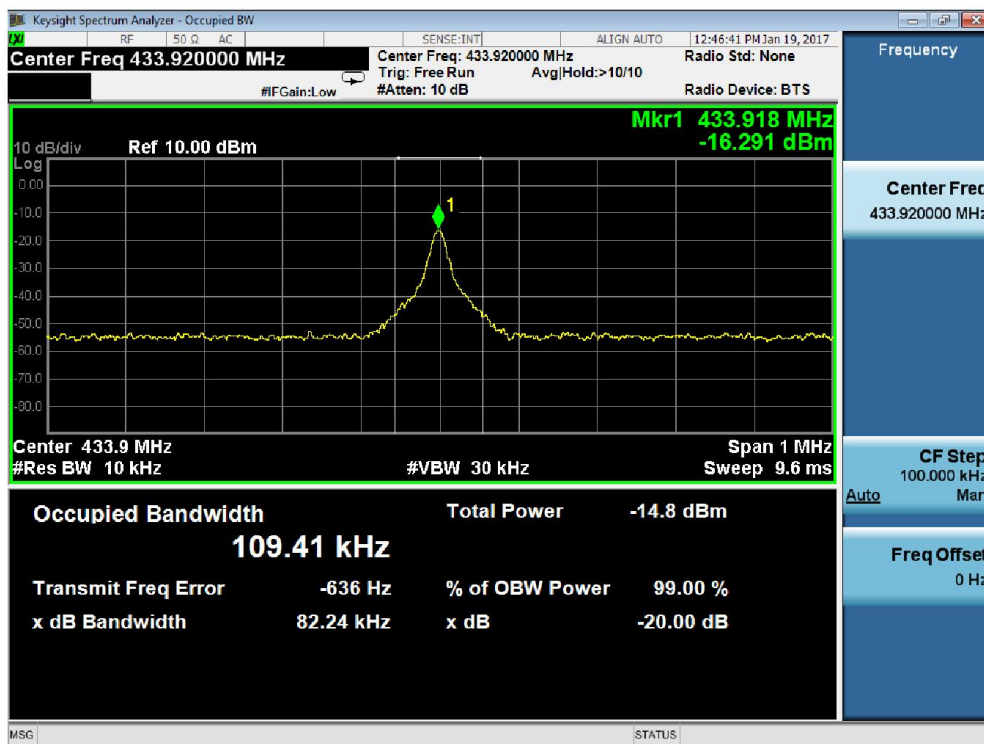
20dB Bandwidth Test Plot for FSK

6.4. Transmission Time

6.4.1. Standard Applicable

According to FCC 15.231(e), 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.

6.4.2. Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

6.4.3. Test Setup
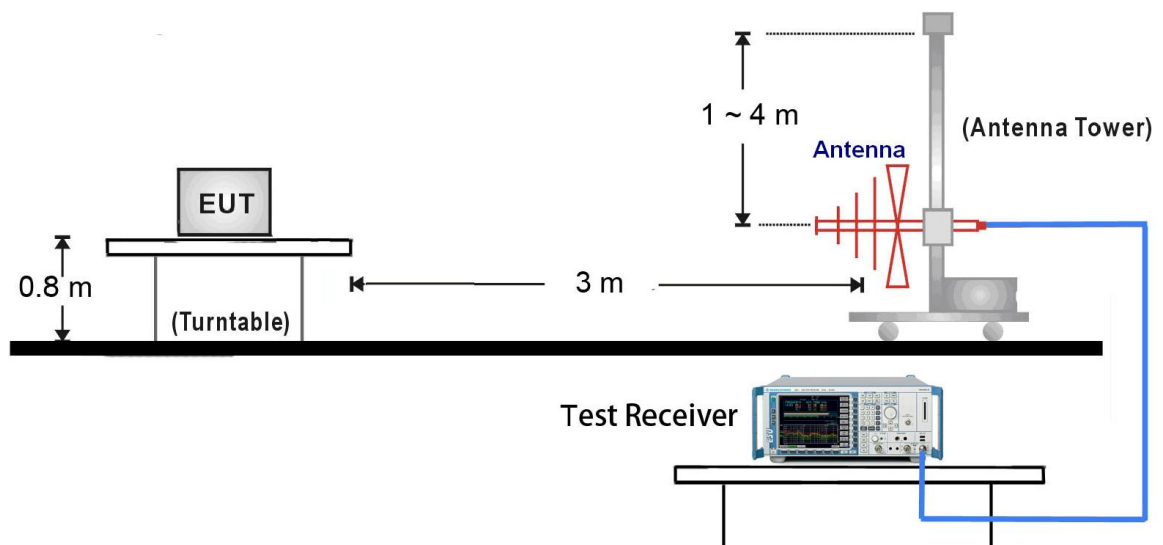
6.4.4. Test Result

Modulation Type	Item	Measured Value	Limit	Result
ASK	Transmission Time(T_{on})	0.010 s	≤ 1 s	Pass
	Silent Time	12.03 s	≥ 10 s	Pass
	Silent Time/Transmission Time	1203	≥ 30 times	Pass
FSK	Transmission Time(T_{on})	0.008 s	≤ 1 s	Pass
	Silent Time	12.08 s	≥ 10 s	Pass
	Silent Time/Transmission Time	1510	≥ 30 times	Pass

Note:

For ASK Modulation, Transmission time (T_{on}) (ms) = 56 * 0.120 (ms) + 13 * 0.256(ms) = 10.05 (ms)

Silent Time for ASK
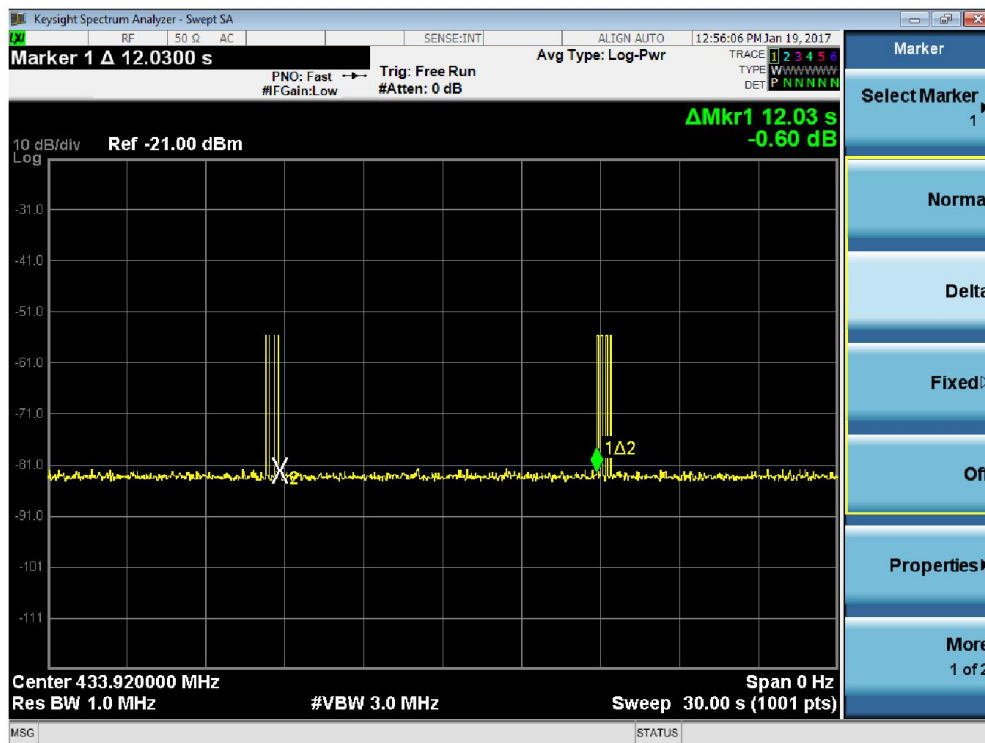
Silent Time for FSK
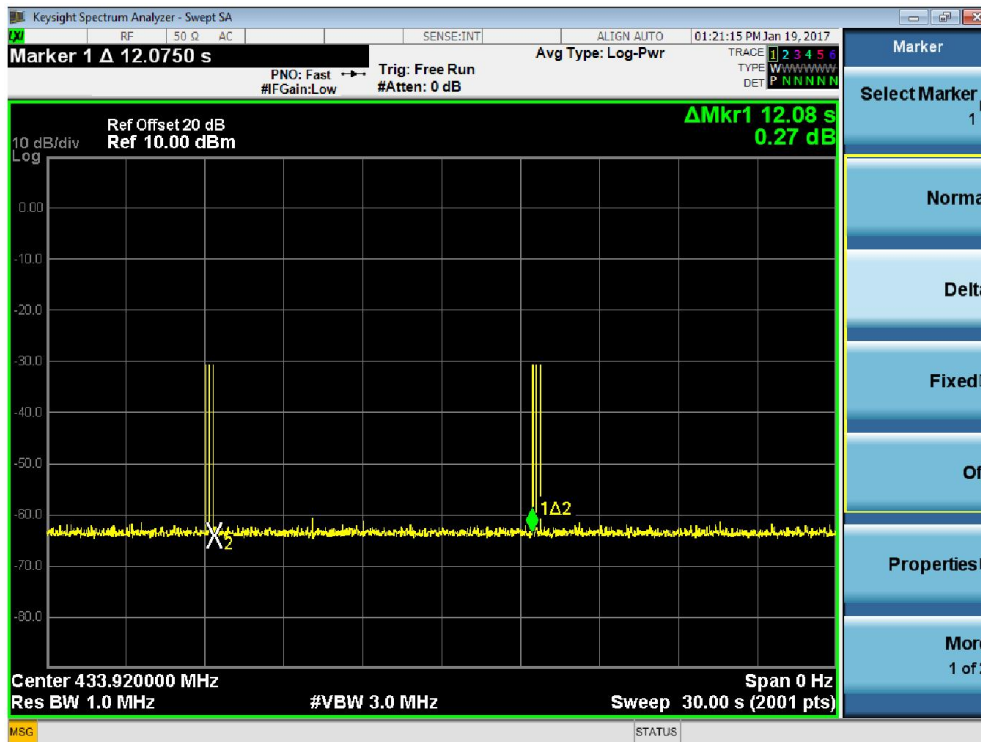
Transmission Time for ASK
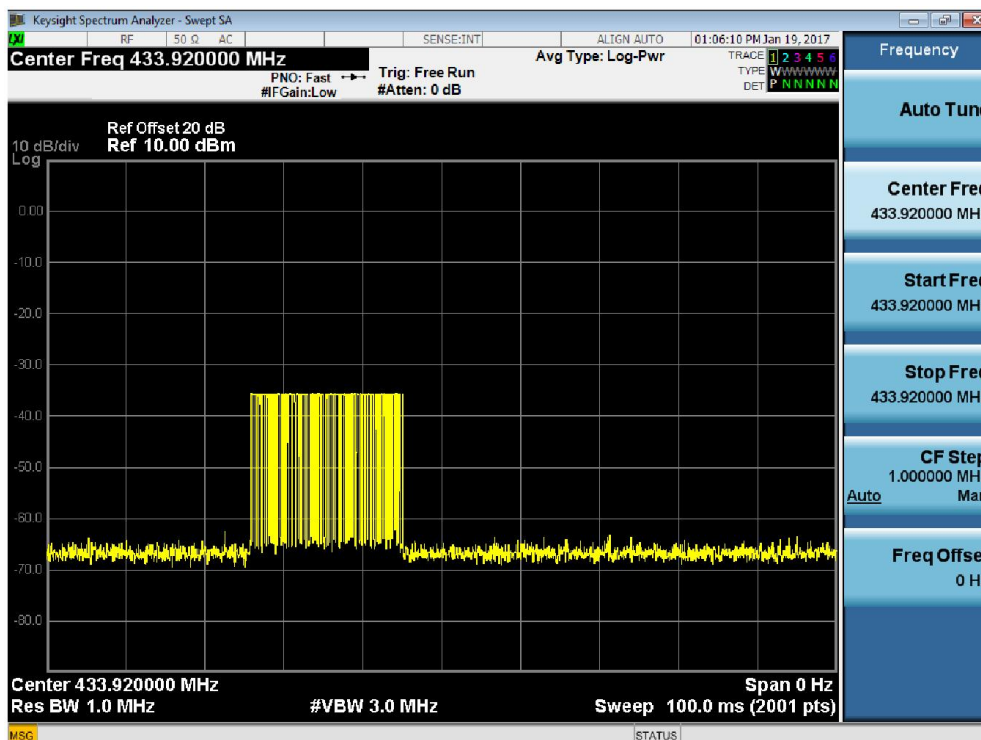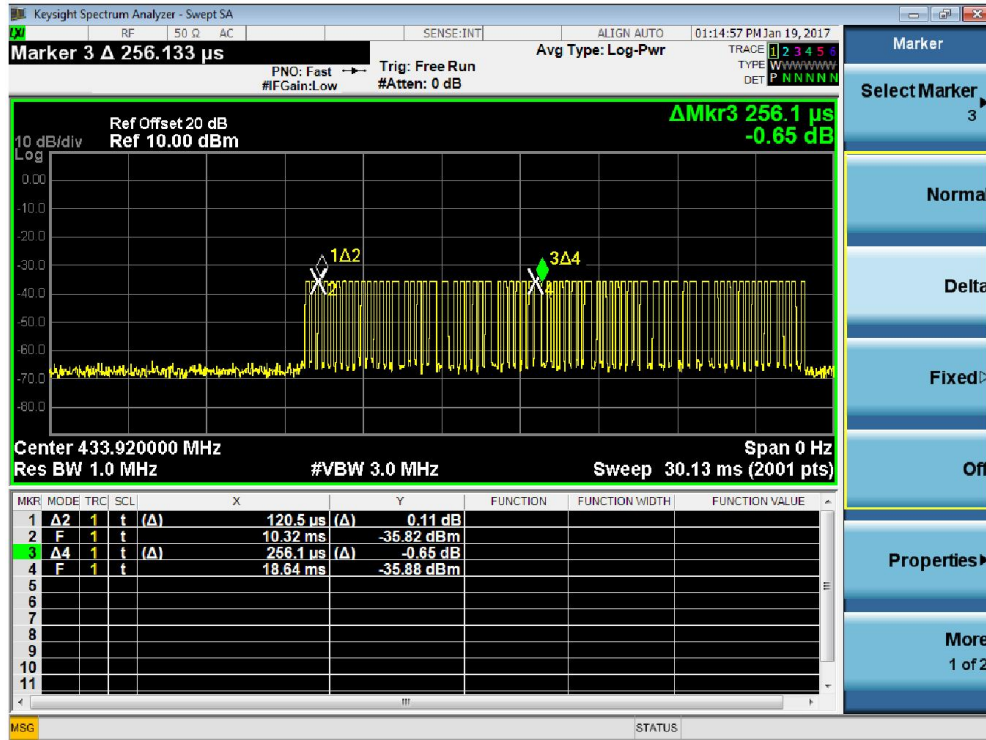
Transmission Time for FSK
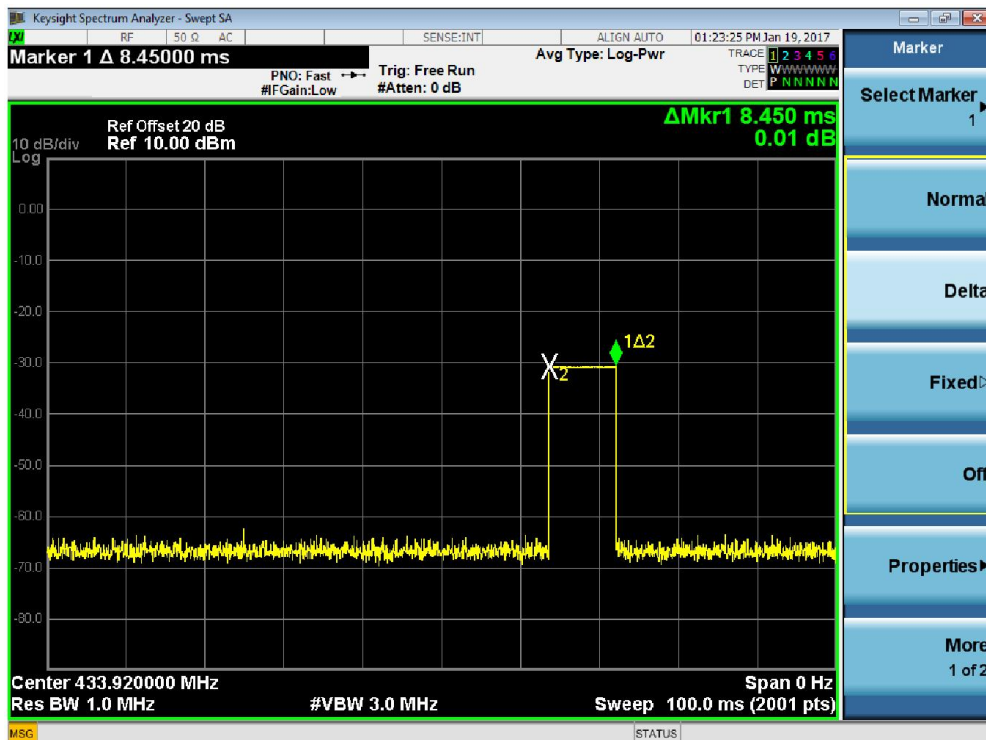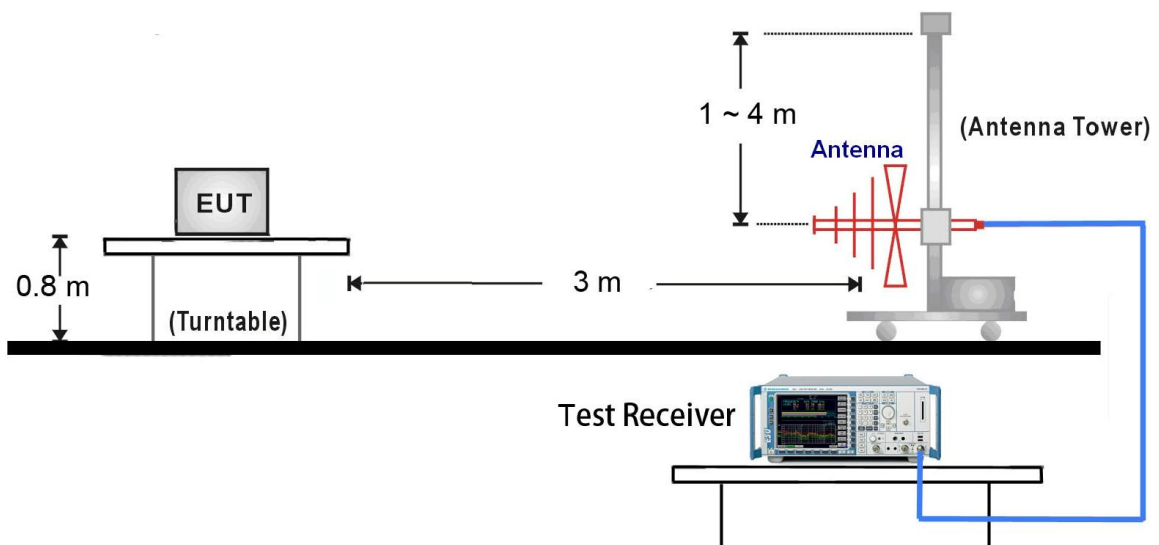
6.5. Duty Cycle

6.5.1. Standard Applicable

According to FCC Part 15.231(e) and 15.35(c), for pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

6.5.2. Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.
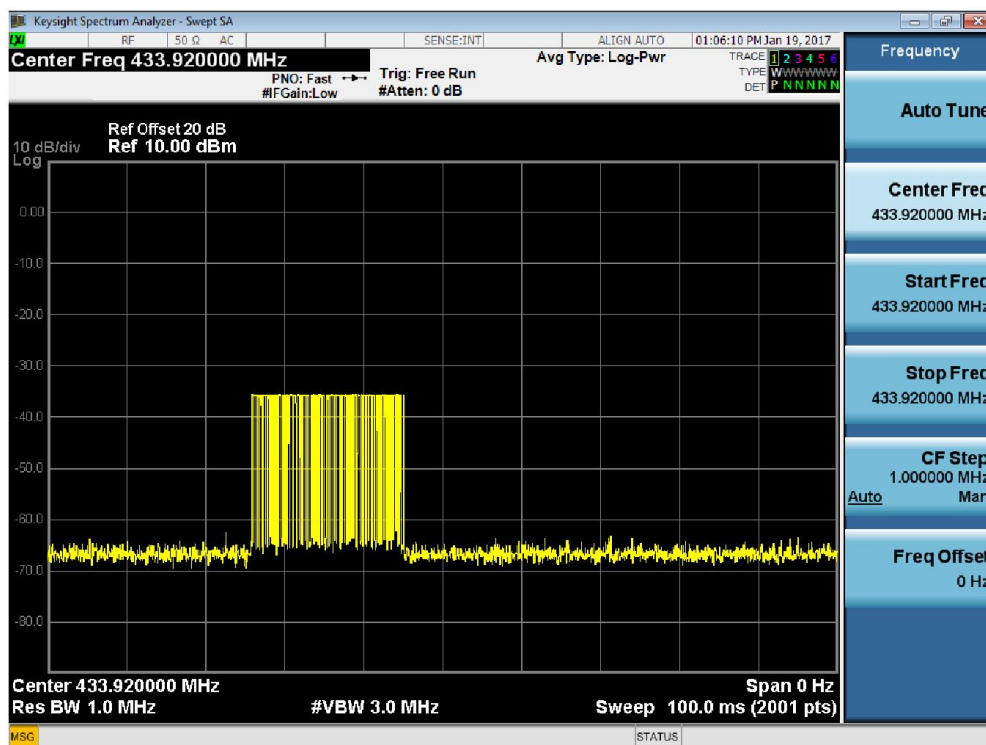
6.5.3. Test Setup

6.5.4. Test Result

Modulation Type	Total Time (T_{on}) (ms)	The duration of one cycle (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
ASK	10.05	100	10.05	19.96
FSK	8.45	100	8.45	21.46

Note 1: Duty Cycle Factor = 20*Log*(1/Duty Cycle).

Note 2: For ASK Modulation, Total time (T_{on}) (ms) =56 * 0.120 (ms) + 13 * 0.256(ms) = 10.05 (ms)
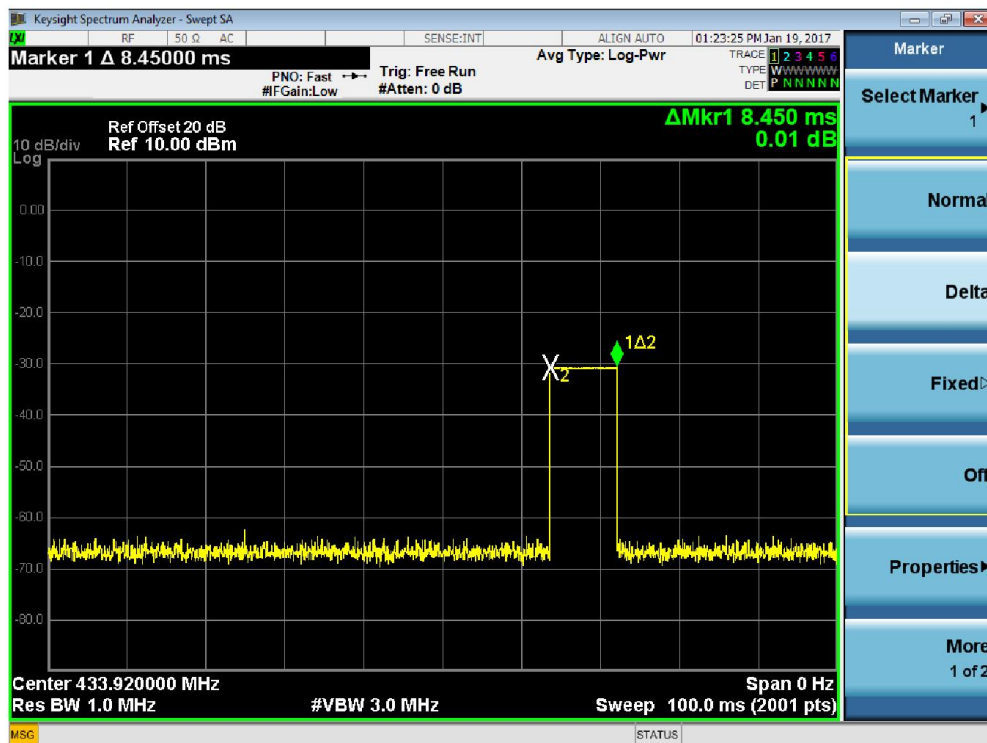
Width of Pulse for ASK
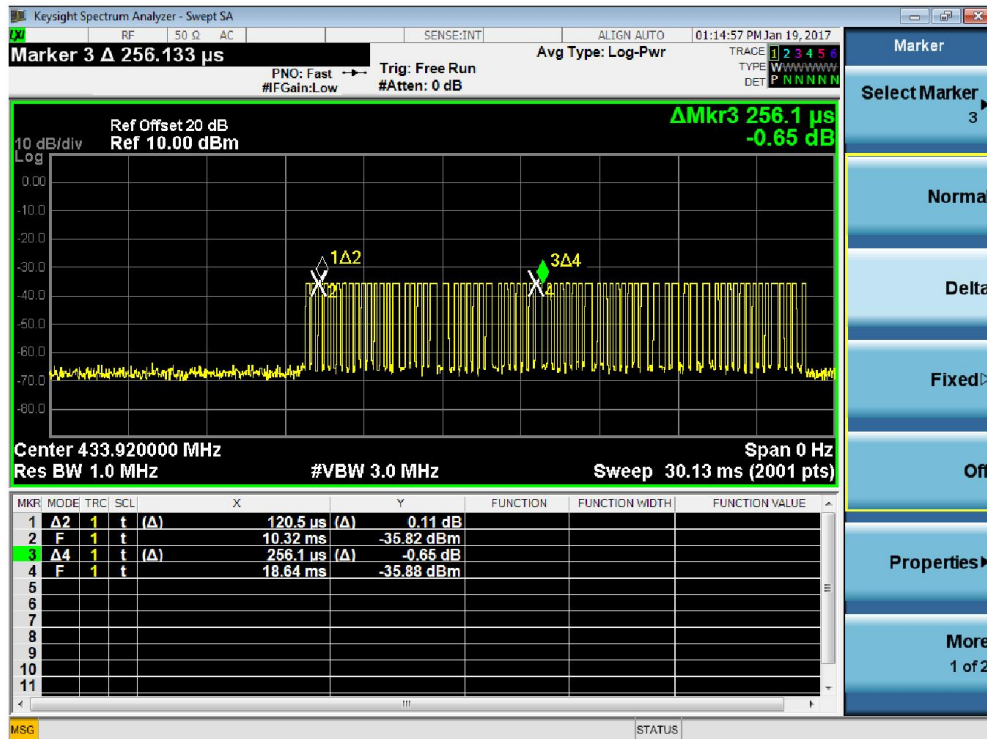
Width of Pulse for FSK

7. CONCLUSION

The data collected relate only the item(s) tested and show that the **Tire Pressure Monitoring**

System Sensor FCC ID: TTETSB40 & IC: 6707A-TSB40 is in compliance with FCC Part 15.231(e)

of the FCC Rules and RSS 210 Issue 9 – Annex A of IC Rules.

———————————— The End ————————————