

MRT Technology (Suzhou) Co., Ltd Phone: +86-512-66308358 Fax: +86-512-66308368 Web: www.mrt-cert.com Report No.: 1612RSU00201 Report Version: V01 Issue Date: 04-04-2017

MEASUREMENT REPORT FCC PART 15.231(e) & RSS 210

| APPLICANT: | Suzhou Sate Auto Electronic Co., Ltd. |
|------------|---------------------------------------|
| IC: | 6707A-TSB40 |
| | 11E13D40 |

| 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 (Robin Wu) Approved By : Marlinchen (Marlin Chen) TESTING LABORATORY CERTIFICATE #3628.0

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 |
| | | | | |



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|----|------------|----|



§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 Droduction 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 | Туре 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 | Туре 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 | Туре 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 | Туре 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: | <u>6707A-TSB40</u> |

| FCC Part Section(s) | IC Section(s) | Test Description | Test Condition | Test Result | |
|---------------------|---------------|-------------------|----------------|-------------|--|
| 15.205 | RSS-210, A1.4 | Radiated Spurious | | Pass | |
| 15.231(e) | K33-210, A1.4 | Emissions | | Pass | |
| 15.231(c) | RSS-210, A1.3 | 20dB Bandwidth / | | Pass | |
| 15.251(0) | N33-210, A1.3 | 99% Bandwidth | Radiated | F d 5 5 | |
| 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

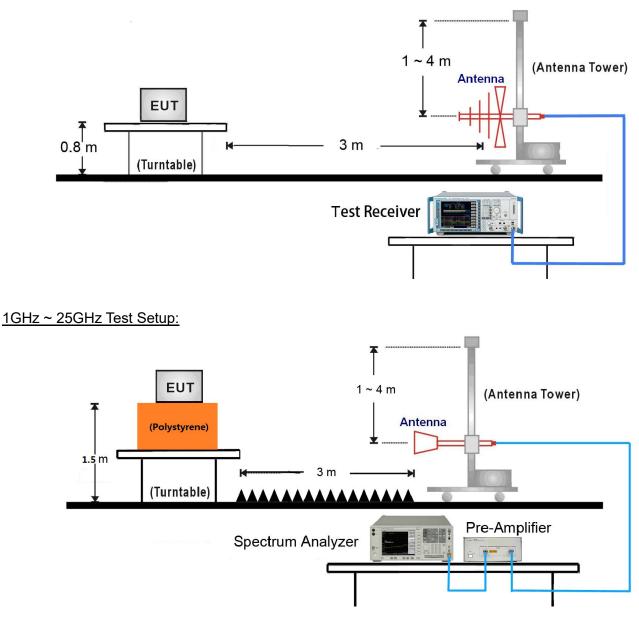
The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.231(e) and FCC Part 15.209 Limit.



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.

<u>30MHz ~ 1GHz Test Setup:</u>





6.2.4. Test Results

| Site: | AC2 | | | Time | e: 2016/12/01 - | 20:11 | | | | |
|---------------|-----------------|----------------|-----------|------------|----------------------|------------------------------|-------------------------|------------------------|--|--|
| Limit | FCC_Part15.2 | 09_RE(3m) | | Eng | ineer: Dandy L | i | | | | |
| Prob | e: VULB9162_0 | .03-8GHz | | Pola | Polarity: Horizontal | | | | | |
| EUT: | Tire Pressure N | Ionitoring Sys | tem Senso | r Pow | Power: By Battery | | | | | |
| Note | Transmit with A | ASK Mode | | I | | | | | | |
| | 90 | N 7 | | | | | | | | |
| | 80 | | | | | 1 | | | | |
| | 70 | | | | | * | | | | |
| | 60 | | | | | | | | | |
| Ê | 50 | | | | | | | P | | |
| Level(dBuV/m) | 40 | | | | | | | | | |
| evel(c | 30 | | | | | | | 2 | | |
| _ | 20 | | | | | | - | with the second second | | |
| | 10 | | m | ~~ × | | whenterteresteresteresterest | star particular and the | | | |
| | | . ~ | ~~~ | | | | | | | |
| | 0 | | | | | | | | | |
| | -10 30 | | 100 | | | da Ab | | 1000 | | |
| 3 | | | | Frequency(| MHz) | | | | | |
| No | Frequency | Reading | Factor | Dutycycle | Measure | Limit | Over Limit | Туре | | |
| | (MHz) | Level | (dB) | Factor | Level | (dBuV/m) | (dB) | | | |
| | | (dBuV) | | (dB) | (dBuV/m) | | | | | |
| 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 \sim 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 ($dB\mu V/m$) = Reading Level ($dB\mu V$) + Factor (dB).

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



| Site: | AC2 | | | Time | Time: 2016/12/01 - 20:17 | | | | | |
|-------|--|--|--|--|--|-----------------------------|-------------------------------|--|--|--|
| Limit | : FCC_Part15.2 | .09_RE(3m) | | Eng | ineer: Dandy L | i | | | | |
| Prob | e: VULB9162_0 |).03-8GHz | | Pola | Polarity: Vertical | | | | | |
| EUT: | Tire Pressure M | Monitoring Sys | tem Senso | r Pow | Power: By Battery | | | | | |
| Note | : Transmit with | ASK Mode | | ł | | | | | | |
| | 90 | | | | | | | | | |
| | 80 | | | | | 1 | | | | |
| | 70 | | | | | * | | | | |
| | 60 | | | | | | | | | |
| Ê | 50 | | | | | | | | | |
| BuV/r | 40 | | | | - | | | | | |
| /el(o | | | | | | | | 2 | | |
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| e1 | 20 | um | | . | will we have the stand and a | Herton and a there and | aus being an under is sure | and the second s | | |
| Lev | 20 | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | manahart | velleposteriorender-openietender | shinder and a starter | anter and a second | * | | |
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| Lev | 20 | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | 100 | | relevelinger of the second and the second second | dentroporand of vitano | austatan anata luun | 1000 | | |
| Le, | 20 10 0 -10 | | 100 | Frequency(| | illestration and a design | | | | |
| No | 20 10 0 -10 | Reading | 100 Factor | | | Limit | Over Limit | | | |
| | 20 10 0 -10 30 | Reading | | Frequency(| MHz) | | | 1000 | | |
| | 20 10 -10 30 Frequency | • | Factor | Frequency(Dutycycle | MHz) Measure | Limit | Over Limit | 1000 | | |
| | 20 10 -10 30 Frequency | Level | Factor | Frequency(Dutycycle Factor | MHz) Measure Level | Limit | Over Limit | 1000 | | |
| No | 20 10 0 -10 30 Frequency (MHz) | Level (dBuV) | Factor (dB) | Frequency(Dutycycle Factor (dB) | MHz) Measure Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | 1000 Type | | |
| No | ²⁰ 10 0 -10 30 Frequency (MHz) 433.520 | Level (dBuV) 55.084 | Factor (dB) 17.196 | Frequency(Dutycycle Factor (dB) N/A | MHz) Measure Level (dBuV/m) 72.280 | Limit (dBuV/m) 92.866 | Over Limit (dB) -20.586 | 1000 Type PK | | |

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 \sim 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 (dB μ V/m) = Reading Level (dB μ V) + Factor (dB).

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



| Site: | AC2 | | | Tim | Time: 2016/12/01 - 20:06 | | | | | |
|------------------------------|---|---------------------------|--------------------------|---|---|--|---|--|--|--|
| Limit | : FCC_Part15.2 | 209_RE(3m) | | Eng | ineer: Dandy L | i | | | | |
| Prob | e: VULB9162_0 |).03-8GHz | | Pola | Polarity: Horizontal | | | | | |
| EUT: | Tire Pressure I | Monitoring Sys | tem Senso | r Pow | Power: By Battery | | | | | |
| Note: Transmit with FSK Mode | | | | | | | | | | |
| | 90 | | | | | | | | | |
| | 80 | | | | | 1 | | <u></u> ; | | |
| | 70 | | | | | * | | | | |
| | 60 | | | | | | | | | |
| Ê | 50 | | | | | | | r | | |
| BuV/r | 40 | | | | | | | | | |
| vel(| 10 | | | | | | | 2 | | |
| eve | 20 | | | | | | | 5 | | |
| Level | 30 | | | | | | A LA LANDARD AND A PARTY | with and all | | |
| Level | 20 | ~~~~_ | | 5.A | Mr. Margan Markana | har har the stand and a stand the second | eren westersterriterenthis | with a start of the start of th | | |
| Level | 20 | ~~~ | mm | Mununan | Martha Martha Martin State State State | hashartforda of the south of the south | manondelinguages and the | with the second se | | |
| Level | 20 10 0 | | mm | Munumana | Martin and a starting of the start of the | had a first and the second | ana and all and a start of the start of | | | |
| Level | 20 | | | Municipation | Mar Martin Martin and San | harden freeder forder and all for any optim | man white and a second second | | | |
| Level | 20 10 0 -10 | | 100 | Frequency(| | har har af each a find a start of the second s | | 1000 | | |
| No | 20 10 0 -10 | Reading | 100 Factor | | | Limit | Over Limit | | | |
| | 20 10 0 -10 30 | Reading | | Frequency | MHz) | | | 1000 | | |
| | 20 10 -10 30 Frequency | - | Factor | Frequency | MHz) Measure | Limit | Over Limit | 1000 | | |
| | 20 10 -10 30 Frequency | Level | Factor | Frequency Dutycycle Factor | MHz) Measure Level | Limit | Over Limit | 1000 | | |
| No | 20 10 -10 30 Frequency (MHz) | Level (dBuV) | Factor (dB) | Frequency(Dutycycle Factor (dB) | MHz) Measure Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | 1000 Type | | |
| No | 20 10 0 -10 30 Frequency (MHz) 433.520 | Level (dBuV) 56.050 | Factor (dB) 17.196 | Frequency Dutycycle Factor (dB) N/A | MHz) Measure Level (dBuV/m) 73.246 | Limit (dBuV/m) 92.866 | Over Limit (dB) -19.620 | 1000 Type PK | | |

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 ($dB\mu V/m$) = Reading Level ($dB\mu V$) + Factor (dB).

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



| Site: | AC2 | | | Tim | e: 2016/12/01 - | 20:09 | | | | |
|---------------|---------------------|-----------|-----------|--|---|------------------------|---|------|--|--|
| Limit | FCC_Part15.2 | 09_RE(3m) | | Eng | Engineer: Dandy Li | | | | | |
| Prob | e: VULB9162_0 | .03-8GHz | | Pola | Polarity: Vertical | | | | | |
| | Tire Pressure N | | tem Senso | | Power: By Battery | | | | | |
| | : Transmit with F | | | | | | | | | |
| | 90 | | T 01 01 | | - 11 T | 1 | 1 1 | | | |
| | 80 | | | | | | | | | |
| | 70 | | | | | 1 | | | | |
| | 60 | | | | | | | | | |
| ~ | | | | | | | | 4 | | |
| Level(dBuV/m) | 50 | | | | | | | | | |
| vel(dB | 40 | | | | | | | 2 | | |
| ē | 30 | | | | | | الم بلد (ب | | | |
| | 20 | | | - mindre | - man an a | Avenue Marcade a value | sent has been been die beginnen werten wer | | | |
| | 10 | - mon | mm | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | - Hugenstrations and the second | | | | | |
| | 0 | | | | | | | | | |
| | -10 | | 100 | | | | | | | |
| 3 | 30 | | 100 | Frequency(| MHz) | | | 1000 | | |
| No | Frequency | Reading | Factor | Dutycycle | Measure | Limit | Over Limit | Туре | | |
| | (MHz) | Level | (dB) | Factor | Level | (dBuV/m) | (dB) | | | |
| | | (dBuV) | | (dB) | (dBuV/m) | | | | | |
| 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 (dB μ V/m) = Reading Level (dB μ V) + Factor (dB).

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



| Site: | AC2 | | | | Time: 2016/12/01 - 23:28 | | | | |
|---------------|--|-------------------------------------|--------------------------|--|--|---------------------------------------|--|------------------|--|
| Limit | :: FCC_Part15.2 | 209_RE(3m) | | | Engineer: Dandy Li | | | | |
| Prob | e: BBHA9120D | _1-18GHz | | | Polarity: Horizontal Power: By Battery | | | | |
| EUT: | Tire Pressure | Monitoring Sys | stem Senso | or | | | | | |
| Note | : Transmit with | ASK Mode | | | | | | | |
| | 90 | | | | | | | | |
| | 80 | | | | | | | | |
| | 70 | | | | | | | | |
| | | | | | 2 | 3 4 * * | 5 6 | | |
| _ | 60 | | 1 | | | | * * | | |
| Level(dBuV/m) | 50 | | | 1 | | | | 1 | |
| dBi | 40 | | | | | | in momental starting | wanter | |
| 1 | 20 | | | | | | | | |
| Level | 30 ~~~~~ | m | molen | multim | million | and when a start of the | | | |
| Level | 30 ~~~~~ | -Ann | mlm | with | line | manne and | | | |
| Level | 20 | ~~~~ | million | m Marin | h | | | | |
| Level | 20 | ~~~~~ | mdh | m Ihm | | under and the | | | |
| Level | 20 10 0 | ~~~~ | mlm | m dhannan an a | h | | | | |
| Level | 20 | ~~~~~ | | m dhanna | | | | 600 | |
| Level | 20 10 0 -10 | ~~~~~ | | Frequ | ency(MHz) | | | 6004 | |
| | 20 10 0 -10 | Reading | Factor | Frequ | | Limit | Over Limit | 600 Type | |
| | 20 10 0 -10 1000 | Reading | Factor (dB) | | | | | 1 | |
| No | 20 10 -10 1000 Frequency | - | | Dutycycle | e Measure | Limit | Over Limit | 1 | |
| | 20 10 -10 1000 Frequency | Level | | Dutycycle Factor | e Measure Level | Limit | Over Limit | 1 | |
| No | 20 10 0 -10 1000 Frequency (MHz) | Level (dBuV) | (dB) | Dutycycle Factor (dB) | e Measure Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Туре | |
| No | 20 10 0 -10 1000 Frequency (MHz) 1739.500 | Level (dBuV) 58.786 | (dB) -6.074 | Dutycycle Factor (dB) N/A | e Measure Level (dBuV/m) 52.713 | Limit (dBuV/m) 72.866 | Over Limit (dB) -20.153 | Type PK | |
| No 1 | 20 10 0 -10 1000 Frequency (MHz) 1739.500 1739.500 | Level (dBuV) 58.786 58.786 | (dB) -6.074 -6.074 | Dutycycle Factor (dB) N/A 19.960 | e Measure Level (dBuV/m) 52.713 32.753 | Limit (dBuV/m) 72.866 52.866 | Over Limit (dB) -20.153 -20.113 | Type PK 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 \sim 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 ($dB\mu V/m$) = Reading Level ($dB\mu V$) + Factor (dB).

-1.555

-1.555

-0.592

-0.592

1.081

1.081

2.857

2.857

N/A

N/A

N/A

N/A

19.960

19.960

19.960

19.960

61.207

41.247

60.304

40.344

59.923

39.963

57.799

37.839

72.866

52.866

72.866

52.866

72.866

52.866

72.866

52.866

-11.659

-11.619

-12.562

-12.522

-12.943

-12.903

-15.067

-15.027

ΡK

AV

ΡK

AV PK

AV

ΡK

AV

3

4

5

6

3473.500

3473.500

3907.000

3907.000

4340.500

4340.500

4774.000

4774.000

62.762

62.762

60.895

60.895

58.842

58.842

54.942

54.942



AV Measure Level = Peak Measure Level – Duty Cycle Factor. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB).



| 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 Power: By Battery | | |
|--|---------------------------------|-------------|
| EUT: Tire Pressure Monitoring System Sensor Power: By Battery Note: Transmit with ASK Mode | | |
| Note: Transmit with ASK Mode | | |
| 90 | | |
| | | |
| 80 | | |
| | | |
| 70 | 2 | |
| 60 1 | * * | |
| ξ 50 ··································· | | |
| ₩ 50 HO BD 30 Martin 30 Martin | man and the more thank when the | Mourinamine |
| 30 30 30 | | |
| 20 | | |
| 10 | | |
| 0 | | |
| -10 | | |
| 1000 Frequency(MHz) | | 6000 |
| No Frequency Reading Factor Dutycycle Measure Limit | Over Limit | Туре |
| (MHz) Level (dB) Factor Level (dBuV/m) | (dB) | Type |
| (dBuV) (dB) (dBuV/m) | (42) | |
| | -18.076 | PK |
| 1 3473.500 56.345 -1.555 N/A 54.790 72.866 | - | |
| 1 3473.500 56.345 -1.555 N/A 54.790 72.866 3473.500 56.345 -1.555 19.960 34.830 52.866 | -18.036 | AV |
| | -18.036 -8.294 | AV PK |
| 3473.500 56.345 -1.555 19.960 34.830 52.866 | | |
| 3473.500 56.345 -1.555 19.960 34.830 52.866 2 4340.500 63.491 1.081 N/A 64.572 72.866 | -8.294 | PK |

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 \sim 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 (dB μ V/m) = Reading Level (dB μ V) + Factor (dB).

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

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



| | AC2 | | | Т | Time: 2016/12/01 - 23:22 | | | | |
|---------------|--|---|---|---|--|--|---|--|--|
| Limit | : FCC_Part15.2 | 209_RE(3m) | | E | Engineer: Dandy l | Li | | | |
| Prob | e: BBHA9120D | _1-18GHz | | F | Polarity: Horizontal | | | | |
| EUT: | Tire Pressure | Monitoring Sys | stem Senso | r F | Power: By Battery | | | | |
| Note | : Transmit with | FSK Mode | | i | L | | | | |
| | 90 | | | | | | 1 | | |
| | 80 | | | | | | | | |
| | 70 | | | | | - | 4 | | |
| | 60 | | | | 1 | 2 3 | * 5 | | |
| Ē | 50 | | 1 | | * | | | | |
| Level(dBuV/m) | 40 | | | 1 | | | 1 antone Mutation | Lunentran | |
| Level(| 30 | mm | Inh | mound | munning | munition | Martin - | | |
| | 20 | | | | | | | | |
| | 10 | | | | | | | | |
| | 0 | | | | | | | | |
| | -10 | | | | | | | | |
| | | | | | | | | | |
| | 1000 | | | F | - 440-> | | | 6000 | |
| | 1000 | Deading | Fastar | 1 | ncy(MHz) | | Overlimit | | |
| No | 1000 Frequency | Reading | Factor | Dutycycle | Measure | Limit | Over Limit | 6000 Type | |
| No | 1000 | Level | Factor (dB) | Dutycycle Factor | Measure Level | Limit (dBuV/m) | Over Limit (dB) | | |
| | 1000 Frequency (MHz) | Level (dBuV) | (dB) | Dutycycle Factor (dB) | Measure Level (dBuV/m) | (dBuV/m) | (dB) | Туре | |
| No 1 | 1000 Frequency (MHz) 3040.000 | Level (dBuV) 59.001 | (dB) -2.895 | Dutycycle Factor (dB) N/A | Measure Level (dBuV/m) 56.105 | (dBuV/m) 72.866 | (dB) -16.761 | Type PK | |
| 1 | 1000 Frequency (MHz) 3040.000 3040.000 | Level (dBuV) 59.001 59.001 | (dB) -2.895 -2.895 | Dutycycle Factor (dB) N/A 21.460 | Measure Level (dBuV/m) 56.105 34.645 | (dBuV/m) 72.866 52.866 | (dB) -16.761 -18.221 | Type PK AV | |
| | 1000 Frequency (MHz) 3040.000 3040.000 30473.500 | Level (dBuV) 59.001 59.001 62.053 | (dB) -2.895 -2.895 -1.555 | Dutycycle Factor (dB) N/A 21.460 N/A | Measure Level (dBuV/m) 56.105 34.645 60.498 | (dBuV/m) 72.866 52.866 72.866 | (dB) -16.761 -18.221 -12.368 | Type PK AV PK | |
| 1 | 1000 Frequency (MHz) 3040.000 3040.000 30473.500 | Level (dBuV) 59.001 59.001 62.053 62.053 | (dB) -2.895 -2.895 -1.555 -1.555 | Dutycycle Factor (dB) N/A 21.460 N/A 21.460 | Measure Level (dBuV/m) 56.105 34.645 60.498 39.038 | (dBuV/m) 72.866 52.866 72.866 52.866 | (dB) -16.761 -18.221 -12.368 -13.828 | Type PK AV PK AV | |
| 1 | 1000 Frequency (MHz) 3040.000 3040.000 30473.500 3473.500 3907.000 | Level (dBuV) 59.001 59.001 62.053 62.053 59.059 | (dB) -2.895 -2.895 -1.555 -1.555 -0.592 | Dutycycle Factor (dB) N/A 21.460 N/A 21.460 N/A | Measure Level (dBuV/m) 56.105 34.645 60.498 39.038 58.468 | (dBuV/m) 72.866 52.866 72.866 52.866 72.866 | (dB) -16.761 -18.221 -12.368 -13.828 -14.398 | PK AV PK AV PK | |
| 1 2 3 | 1000 Frequency (MHz) 3040.000 3040.000 3473.500 3473.500 3907.000 | Level (dBuV) 59.001 59.001 62.053 62.053 59.059 59.059 | (dB) -2.895 -2.895 -1.555 -1.555 -0.592 -0.592 | Dutycycle Factor (dB) N/A 21.460 N/A 21.460 N/A 21.460 | Measure Level (dBuV/m) 56.105 34.645 60.498 39.038 58.468 37.008 | (dBuV/m) 72.866 52.866 72.866 52.866 72.866 52.866 | (dB) -16.761 -18.221 -12.368 -13.828 -14.398 -15.858 | Type PK AV PK AV PK AV | |
| 1 | 1000 Frequency (MHz) 3040.000 3040.000 3473.500 3473.500 3907.000 3907.000 4340.500 | Level (dBuV) 59.001 59.001 62.053 62.053 59.059 59.059 59.059 59.877 | (dB) -2.895 -2.895 -1.555 -1.555 -0.592 -0.592 1.081 | Dutycycle Factor (dB) N/A 21.460 N/A 21.460 N/A 21.460 N/A | Measure Level (dBuV/m) 56.105 34.645 60.498 39.038 58.468 37.008 60.958 | (dBuV/m) 72.866 52.866 72.866 52.866 72.866 52.866 52.866 72.866 | (dB) -16.761 -18.221 -12.368 -13.828 -14.398 -15.858 -11.908 | Type PK AV PK AV PK AV PK | |
| 1 2 3 | 1000 Frequency (MHz) 3040.000 3040.000 3473.500 3473.500 3907.000 | Level (dBuV) 59.001 59.001 62.053 62.053 59.059 59.059 | (dB) -2.895 -2.895 -1.555 -1.555 -0.592 -0.592 | Dutycycle Factor (dB) N/A 21.460 N/A 21.460 N/A 21.460 | Measure Level (dBuV/m) 56.105 34.645 60.498 39.038 58.468 37.008 | (dBuV/m) 72.866 52.866 72.866 52.866 72.866 52.866 | (dB) -16.761 -18.221 -12.368 -13.828 -14.398 -15.858 | Type PK AV PK AV PK 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 \sim 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 ($dB\mu V/m$) = Reading Level ($dB\mu V$) + 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_Part15.2 | 209_RE(3m) | | | Engi | neer: Dandy l | i | | |
| Prob | e: BBHA9120D | _1-18GHz | | | Polarity: Vertical | | | | |
| EUT: | Tire Pressure | Monitoring Sys | stem Senso | r | Power: By Battery | | | | |
| Note | : Transmit with | FSK Mode | | | | | | | |
| | 90 | | | | | Ń | | | |
| | 80 | | | | | | | | |
| | 70 | | | | | | | 3 | |
| | 60 | | | | | | 1 2 | * 4 | |
| Ê | 50 | | | | | | * * | * | |
| BuV/h | 40 | | | | | | | مند ا | |
| Level(dBuV/m) | 30 | m | mm | mm | ~~~ | homeling | mannen | and the second of the second o | have a second |
| _ | 20 | | | | | | | | |
| | | | | | | | | | |
| | 10 | | | | | | | | |
| | 0 | | | | | | | | |
| | -10 1000 | | | | | | al dad | | 6000 |
| 3 | | | 1 | Frec | quency(N | /Hz) | | 1 | |
| No | Frequency | Reading | Factor | Dutycyc | le | Measure | Limit | Over Limit | Туре |
| | (MHz) | Level | (dB) | Factor | | Level | (dBuV/m) | (dB) | |
| | | (dBuV) | | (dB) | | (dBuV/m) | | | |
| 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 |

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.

31.126

52.866

21.460

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 $(dB\mu V/m)$ = Reading Level $(dB\mu V)$ + Factor (dB).

2.791

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

49.795

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

5207.500

-21.740

AV



6.3. 20dB Bandwidth / 99% Bandwidth

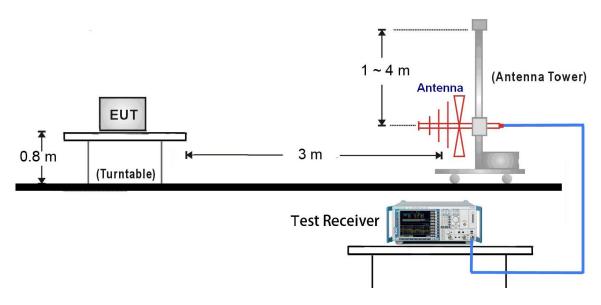
6.3.1. Standard Applicable

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 |
|-------------------------|-----------------|-------------------------|------------------------|----------------|--------|
| 100.00 | ASK | 82.24 | 109.41 | ≤ 1084.8 | Pass |
| 433.92 | FSK | 167.90 | 131.70 | ≤ 1084.8 | Pass |

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

ight Spectrum Analyzer - Occupied B SENSE:INT ALIGN AUTO Center Freq: 433,920000 MHz Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB 12:46:41 PM Jan 19, 2017 Radio Std: None Frequency Center Freg 433.920000 MHz #IFGain:Low Radio Device: BTS Mkr1 433.918 MHz -16.291 dBm 10 dB/div Ref 10.00 dBm _og **Center Freq** 433.920000 MHz Center 433.9 MHz #Res BW 10 kHz Span 1 MHz Sweep 9.6 ms CF Step 100.000 kHz #VBW 30 kHz Auto Man -14.8 dBm **Total Power** Occupied Bandwidth 109.41 kHz Freq Offset 0 Hz Transmit Freq Error -636 Hz % of OBW Power 99.00 % x dB Bandwidth 82.24 kHz x dB -20.00 dB MSG

20dB Bandwidth Test Plot for ASK



20dB Bandwidth Test Plot for FSK

| 📕 Keysight Spectrum Analyzer - Occupied BW | | | | | |
|---|----------------|--|------------------------------------|--|-------------------------------|
| RF 50 Ω AC Center Freq 433.920000 M | Trig | SENSE:INT ter Freq: 433.920000 M :: Free Run Av :en: 0 dB | ALIGN AUTO IHz g Hold:>10/10 | 01:19:10 PM Jan 19, Radio Std: None Radio Device: BT | Frequency |
| 15 dB/div Ref -10.00 dBn | n | 1 | Mkr | 1 433.959 N -31.702 d | IHz Bm |
| -25.0 | | | | | Center Freq 433.920000 MHz |
| -00.0 -70.0 -85.0 | man | مرمد ا | way www. | Manna | |
| -100 | | | | | |
| Center 433.9 MHz | | | | Enon 1 | |
| #Res BW 10 kHz | | #VBW 30 kHz | | Span 1 F Sweep 9.6 | |
| Occupied Bandwidt | י 31.70 kHz | Total Powe | er -27.1 | dBm | Freg Offset |
| Transmit Freq Error | -1.212 kHz | % of OBW | Power 99 | 0.00 % | 0 Hz |
| x dB Bandwidth | 167.9 kHz | x dB | -20. | 00 dB | |
| MSG | | | STATUS | 3 | |



6.4. Transmission Time

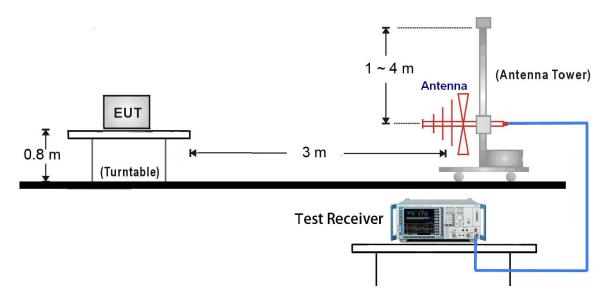
6.4.1. Standard Applicable

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



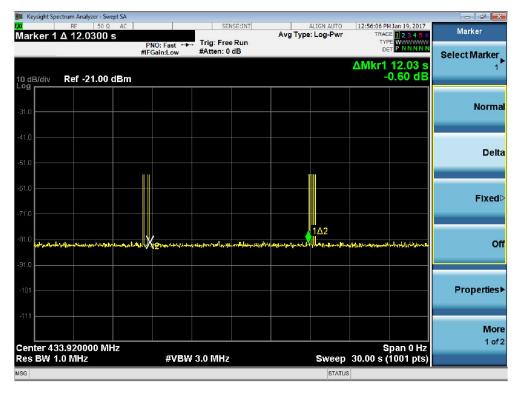


6.4.4. Test Result

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



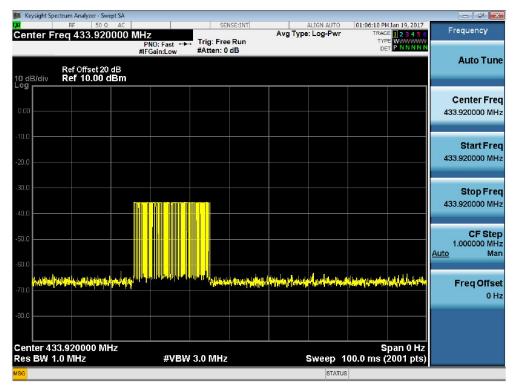
Silent Time for ASK



Silent Time for FSK

| | | | | | | | | ctrum Analyzer - S | 鱦 Keysight Sp |
|---------------|---|-------------------------|----------------------------|---------------------|------------------|--|--------|-------------------------|---|
| Marker | 01:21:15 PM Jan 19, 2017 TRACE 1 2 3 4 5 6 | ALIGN AUTO | | NSE:INT | SEN | | | Δ 12.0750 | <mark>X</mark> Morkov (|
| | | . Log-r wi | AAB I NH | | Trig: Free | PNO: Fast ++ | | Δ 12.0750 | Marker |
| Select Marker | | | | dB | #Atten: 0 | #FGain:Low | | | |
| | Mkr1 12.08 s | | | | | | | Ref Offset 2 | |
| | 0.27 dB | | | | | | lBm | Ref 10.00 | 10 dB/div Log |
| | | | | | | | | | |
| Normal | | | | | | | | | .0.00 |
| | | | | | | | | | 0.00 |
| | | | | | | | | | 10.0 |
| | | | | | | | | | -10.0 |
| Delta | | | | | | | | | |
| | | | | | | | | | -20.0 |
| | | | | | | | | | |
| Eine alb | | | | | | | II | | -30.0 |
| Fixed⊳ | | | | | | | | | |
| | | | ╈ | | | | | | -40.0 |
| | | | | | | | | | |
| Off | | | ╞╋ | | | | | | -50.0 |
| 01 | | | | | | | | | |
| | | | 142 | | | | | | -60.0 |
| | for the has a second of the second | مروريتها وسلوا فيحونونه | and a falled prosentile de | in a second distant | niniantalipulini | the product of the state of the | X2-141 | under the second second | en en falser og som en falser og som en s |
| Properties ► | | | | | | | | | -70.0 |
| | | | | | | | | | |
| | | | | | | | | | -80.0 |
| More | | | | | | | | | |
| 1 of 2 | | | | | | | | | |
| 1072 | Span 0 Hz | | | | | | Hz | 3.920000 N | |
| | 0.00 s (2001 pts) | Sweep | | | 3.0 MHz | #VBW | | .0 MHz | Res BW 1 |
| | | STATUS | | | | | | | MSG |

Transmission Time for ASK





| 📕 Keysight Spectrum Analyzer - Swept SA | | | | | - J × |
|---|--|-------------------|-------------------------------|--|----------------|
| Marker 3 Δ 256.133 μs | | SENSE:INT | ALIGN AUTO g Type: Log-Pwr | 01:14:57 PM Jan 19, 2017 TRACE 1 2 3 4 5 6 | Marker |
| | PNO: Fast Trig: F #IFGain:Low #Atten | ree Run : 0 dB | | DET P N N N N | Select Marker |
| Ref Offset 20 dB 10 dB/div Ref 10.00 dBm | | | | ∆Mkr3 256.1 µs -0.65 dB | 3 |
| -10.0 | | | | | Normal |
| -20.0 -30.0 -40.0 -50.0 | 1 <u>62</u> | | | | Delta |
| -60.0 .70.0 4/00/00/00/00/00/00/00/00/00/00/00/00/00 | insignation of a constraint of | | UICH VAUUUUUUUUUUUUUUU | AL PARTY AND AN AND AN AND AND AND AND AND AND A | Fixed⊳ |
| Center 433.920000 MHz Res BW 1.0 MHz | #VBW 3.0 MH | | | Span 0 Hz 0.13 ms (2001 pts) | Ofi |
| MKR MODE TRC SCL X 1 Δ2 1 t (Δ) 2 F 1 t 3 Δ4 1 t (Δ) 4 F 1 t 5 6 6 6 6 | 10.32 ms -35.82 | i5 dB | FUNCTION WIDTH | FUNCTION VALUE | Properties► |
| 7 8 9 10 11 11 | " | | | - | More 1 of 2 |
| MSG | | | STATUS | 1 | |

Transmission Time for FSK





6.5. Duty Cycle

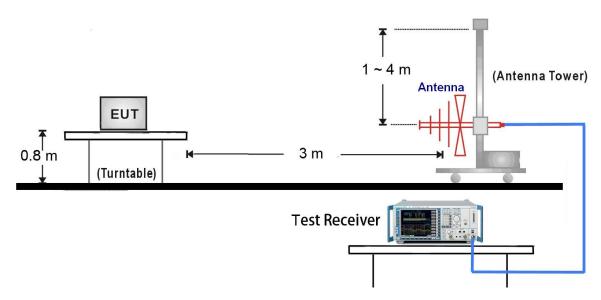
6.5.1. Standard Applicable

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

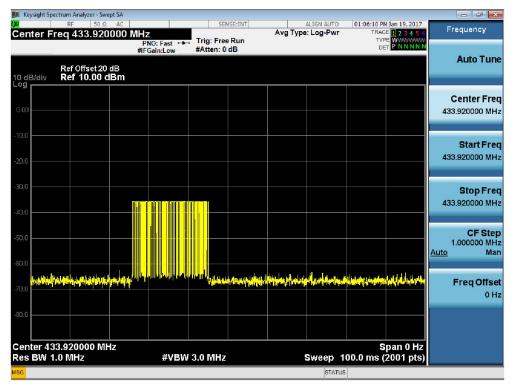


6.5.4. Test Result

| Modulation Type | Total Time (T _{on}) | The duration of one | Duty Cycle | Duty Cycle Factor |
|-----------------|-------------------------------|---------------------|------------|-------------------|
| | (ms) | cycle | (%) | (dB) |
| | | (ms) | | |
| 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



| Keysight Spectrum Analyzer - Swept | | | | | | |
|---|--|---|----------|-----------------------------|---|---------------|
| RF 50 Ω larker 3 Δ 256.133 μ | PNO: Fast -> | Trig: Free Rut #Atten: 0 dB | Avg | ALIGN AUTO Type: Log-Pwr | 01:14:57 PM Jan 19, 201 TRACE 1 2 3 4 TYPE WWWWW DET P NNN | Marker |
| Ref Offset 20 d 0 dB/div Ref 10.00 dB | | #Atten: 0 dB | | Ĺ | ΔMkr3 256.1 μ -0.65 d | Select Marker |
| | | | | | | Norma |
| 40.0 | 1Δ: X2 | | | 14 | | Delt |
| 60.0 70.0 <mark>htt:///////////////////////////////////</mark> | upontypedf-righting to the state of the stat | |) [| KAR MAYAKAN MALAN | , , | Fixed |
| center 433.920000 MH; ces BW 1.0 MHz | | V 3.0 MHz | FUNCTION | Sweep 3 | Span 0 H 0.13 ms (2001 pt FUNCTION VALUE | |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | 120.5 μs (Δ) 10.32 ms 256.1 μs (Δ) 18.64 ms | 0.11 dB -35.82 dBm -0.65 dB -35.88 dBm | FORCHON | PORCION WIDTH | FORCHOR VALUE | Properties |
| 7 8 9 9 10 11 1 | | | | | | Mor 1 of |
| s <mark>G</mark> | | | | STATUS | | |

Width of Pulse for FSK

| | | 1 | | | | | | | rum Analyzer - Sw | Keysight Sp |
|---------------|-----------------------------|---|--------------------|-----|---|---|------------------------|-------------|--|----------------------|
| Marker | RACE 1 2 3 4 5 6 | ALIGN AUTO 01:23:25 PM Jan 19, 2017 Avg Type: Log-Pwr TRACE 1 2 3 4 5 Type: U 01:00 1:23:25 PM Jan 19, 2017 | | | | RF 50 Ω AC SENSE: 8.45000 ms | | | | larker 1 |
| Select Marker | | [] [] | | | | Trig: Free #Atten: 0 | NO: Fast ↔ Gain:Low | P #IF | | |
| 1 | 8.450 ms 0.01 dB | Mkr1 8 | Δ | | | | | dB IBm | Ref Offset 20 Ref 10.00 (| 0 dB/div og |
| Norma | | | | | | | | | | |
| | | | | | | | | | | |
| Delt | | | | | | | | | | 10.0 |
| | | | ▲ 1Δ2 | | | | | | | 20.0 |
| Fixed | | | | X2- | | | | | | 30.0 |
| | | | | | | | | | | 40.0 |
| o | | | | | | | | | | 50.0 |
| | | | | | | | | | | 50.0 |
| Properties | Alupo balluni se palente da | in provident | White works from a | ih. | e in the second seco | and the state of the | an di di di sa sa sa | neweek with | y for the state of | 70.0 |
| | | | | | | | | | | 30.0 |
| Mor 1 of | | | | | | | | | | |
| | Span 0 Hz s (2001 pts) | | Sweep_1 | | | 3.0 MHz | #VBW | lz | .920000 MI) MHz | enter 43 les BW 1 |
| | | | STATUS | | | | | | | sg |



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