

FCC PART 15.231
MEASUREMENT AND TEST REPORT
FOR

Suzhou Sate Auto Electronic Co., Ltd.

6F-138, Qingyun Road, Zhangjiang Hi-Tech Zone, Pudong New Area, Shanghai,

201203, P. R. China

FCC ID: TTETP017

| | |
|--|--|
| Report Concerns: Original Report | Equipment Type: Tire Pressure Monitoring System |
| Model: | <u>M-TPMS</u> |
| Report No.: | <u>STR07128039I</u> |
| Test/Witness Engineer: | <u>Lahm Peng</u> |
| Test Date: | <u>2007-12-20 to 2008-01-05</u> |
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| Approved & Authorized By: |  _____ Jandy So / PSQ Manager |

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant: Suzhou Sate Auto Electronic Co., Ltd.
 Address of applicant: 6F-138, Qingyun Road, Zhangjiang Hi-Tech Zone, Pudong
 New Area, Shanghai, 201203, P. R. China

Manufacturer: Suzhou Sate Auto Electronic Co., Ltd.
 Address of manufacturer: 6F-138, Qingyun Road, Zhangjiang Hi-Tech Zone, Pudong
 New Area, Shanghai, 201203, P. R. China

General Description of E.U.T

| Items | Description |
|---|---------------------------------|
| EUT Description: | Tire Pressure Monitoring System |
| Trade Name: | S&T |
| Model No.: | M-TPMS, TPMS1209W |
| Rated Voltage: | DC 3.0V Battery |
| Output Power: | < 0dBm |
| Frequency Range: | 434.10MHz |
| Antenna Type: | Integral Antenna |
| Size: | 2.7X2.7X3.0 cm |
| Comment: | Periodic Operation Device |
| For more information refer to the circuit diagram form and the user's manual. | |

The test data is gathered from a production sample, provided by the manufacturer,

1.2 Test Standards

The following report is prepared on behalf of 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 Commissions 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 Commissions rules.

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

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions. The EUT was tested in all three orthogonal planes and the worse case was showed.

1.5 Test Facility

The Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files which the Registration No.: **759397**. Measurement required was performed at laboratory of Solid Industrial Co., Ltd. at 333 Bulong Highway Buji Longgang, Shenzhen, Guangdong, China.

1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components. The test software, provided by the customer, is started while the whole system is running.

1.7 Accessories Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|--------------|-------------|-------|---------------|
| / | / | / | / |

1.8 EUT Cable List and Details

| Cable Description | Length (M) | Shielded/Unshielded | With Cord/Without Cord |
|-------------------|------------|---------------------|------------------------|
| / | / | / | / |

2. SUMMARY OF TEST RESULTS

| Description of Test | Result |
|-------------------------------------|---------------|
| §15.203 Antenna Requirement | Compliant |
| §15.205 Restricted Band | Compliant |
| §15.209 General Requirement | Compliant |
| §15.231 (e) Deactivation Testing | Compliant |
| §15.231 (c) 20dB Band Width Testing | Compliant |
| §15.231 (e) Radiated Emission | Compliant |

3. §15.203 - ANTENNA REQUIREMENT

3.1 Standard Applicable

According to FCC 15.203, 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.

3.2 Test Result

This product has a permanent antenna, fulfill the requirement of this section.

4. §15.205, §15.209, §15.231 (b)- RADIATED EMISSION

4.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 3.0 dB.

4.2 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 emissions (microvolts/meter) |
|-----------------------------|--|---|
| 40.66-40.70..... | 1000..... | 100 |
| 70-130..... | 500..... | 50 |
| 130-174..... | \1\ 500 to 1500 | \1\ 50 to 150 |
| 174-260..... | 1500..... | 150 |
| 260-470..... | \1\ 1500 to..... | \1\ 150 to 500 |
| | 5000 | |
| Above 470..... | 5000..... | 500 |

\1\ Linear interpolations.

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.

compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

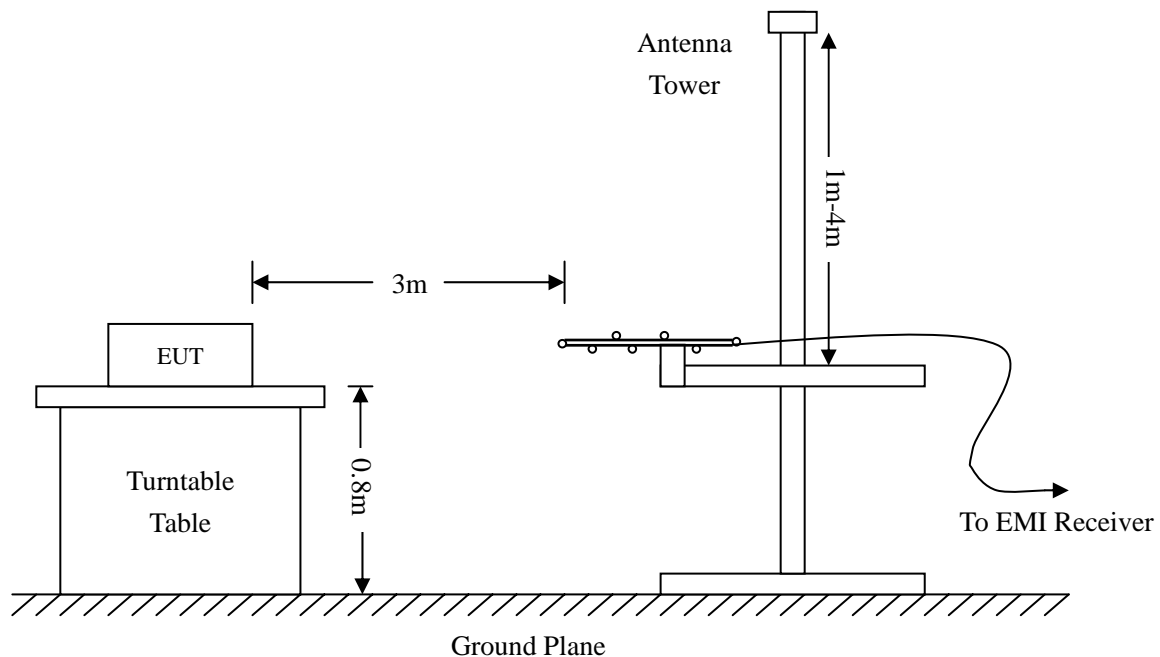
4.3 Test Equipment List and Details

| Description | Manufacturer | Model | Serial Number | Cal. Date | Due. Date |
|-------------------------|--------------------|--------------|---------------|------------|------------|
| EMI Test Receiver | Rohde & Schwarz | ESCS30 | 830245/009 | 2007-06-30 | 2008-06-29 |
| Multi_Device Controller | ETS | 2090 | 57230 | 2007-06-30 | 2008-06-29 |
| Receiver Antenna | ETS | 2175 | 57337 | 2007-06-30 | 2008-06-29 |
| Horn Antenna | Rohde & Schwarz | HF906 | 100013 | 2007-06-30 | 2008-06-29 |
| 50 ohm Coaxial Cable | ETS | SUCOFLEX 104 | 25498514 | 2007-06-30 | 2008-06-29 |
| 3m chamber | Albatross Projects | 9X6X6 | ---- | 2007-06-30 | 2008-06-29 |

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.231(b) and FCC Part 15.209 Limit.



4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Loss} + \text{Cab. Loss} - \text{Ampl. Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.231 Limit}$$

4.6 Environmental Conditions

| | |
|--------------------|-----------|
| Temperature: | 21° C |
| Relative Humidity: | 50% |
| ATM Pressure: | 1011 mbar |

4.7 Summary of Test Results/Plots

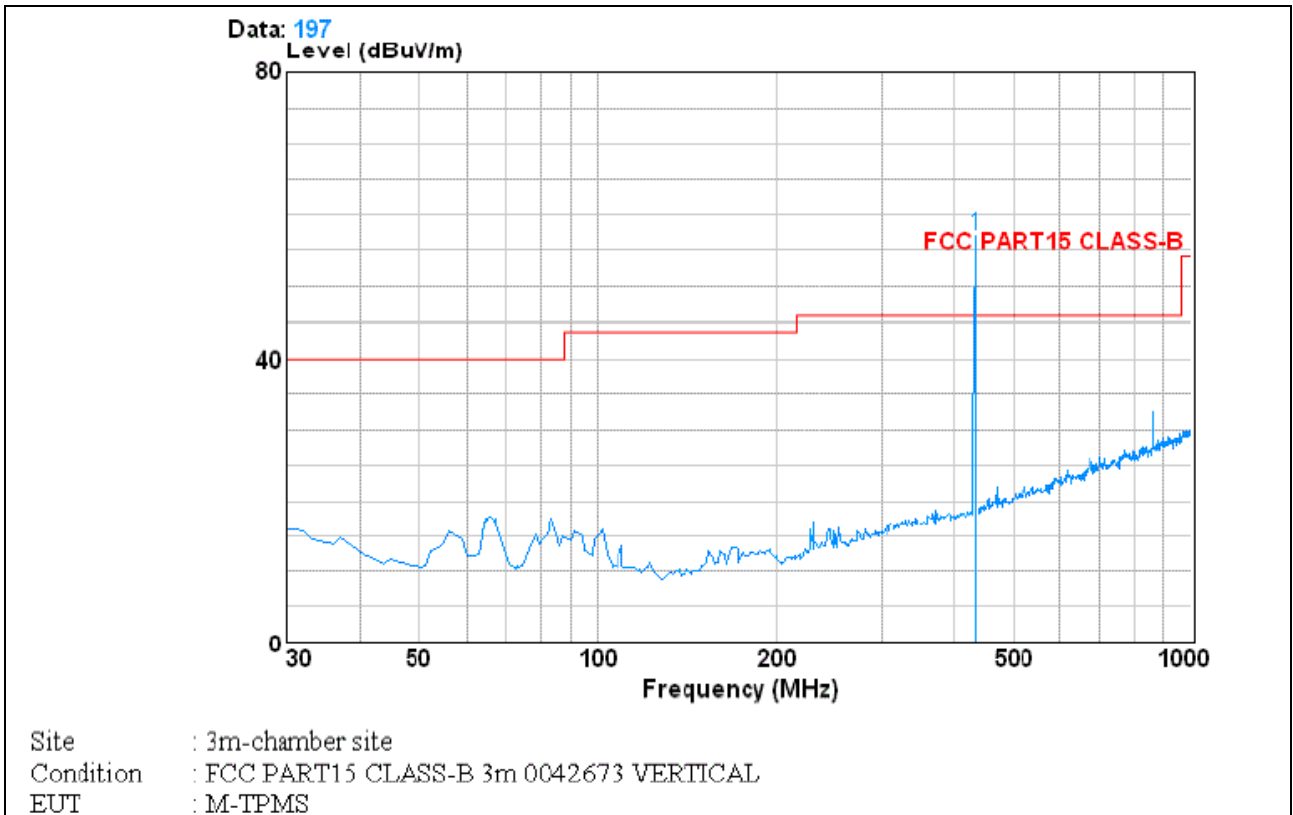
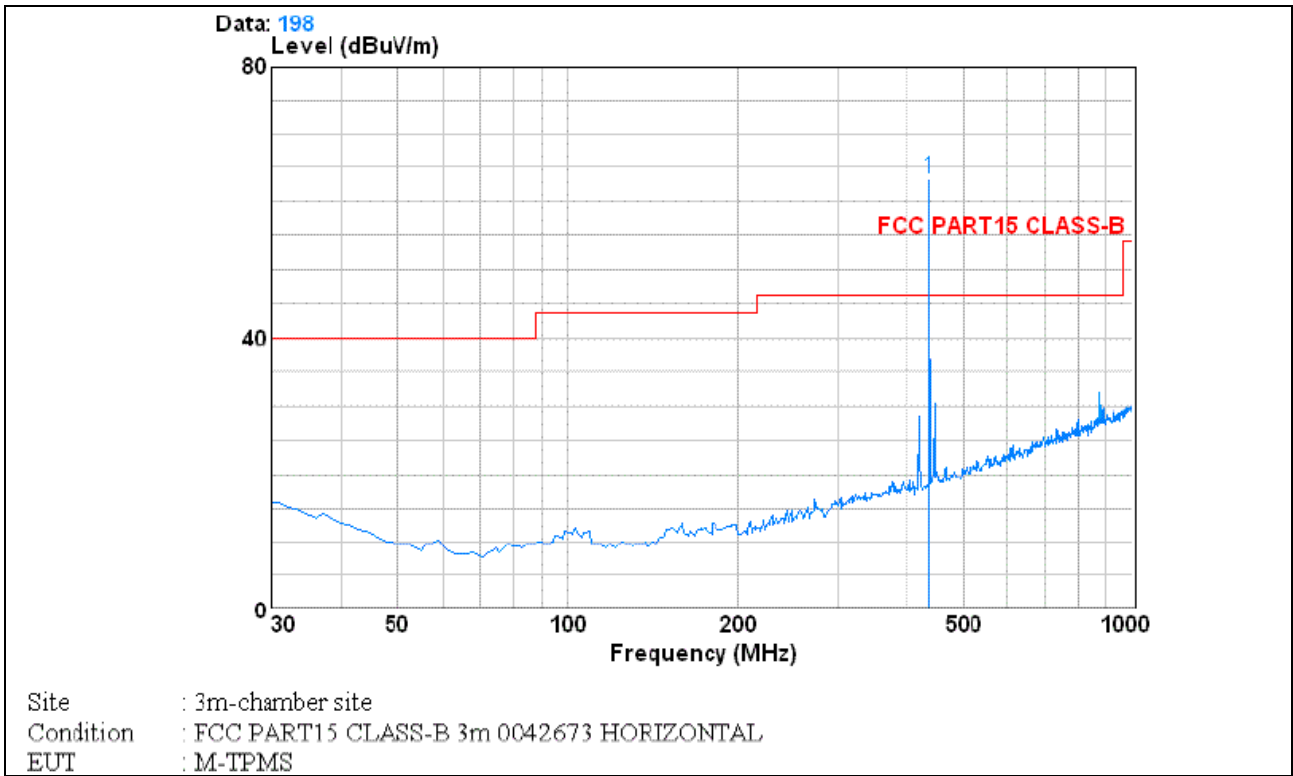
According to the data below, the FCC Part 15.205, 15.209 and 15.231 standards, and had the worst margin of:

-16.6 dBμV at 434.10 MHz in the Horizontal polarization, 30 MHz to 5 GHz, 3Meters

| Frequency MHz | Meter Reading dBuV | Detector PK/ AV | Direction Degree | Height Meter | Polar H / V | Antenna Loss dB | Cable loss dB | Amplifier Gain dB | Corr. Ampl. dBuV/m | FCC Part 15.231 & 15.209 | |
|------------------|--------------------------|--------------------|---------------------|-----------------|----------------|-----------------------|---------------------|-------------------------|-----------------------|-----------------------------|--------------|
| | | | | | | | | | | Limit dBuV/m | Margin dB |
| 434.10 | 62.8 | AV(Fun.) | 45 | 1.0 | H | 16.8 | 2.2 | 25.51 | 56.25 | 72.8 | -16.6 |
| 1736.4 | 37.8 | AV | 0 | 1.0 | H | 29.8 | 1.6 | 36.00 | 33.20 | 54.0 | -20.8 |
| 1736.4 | 37.7 | AV | 120 | 1.0 | V | 29.8 | 1.6 | 36.00 | 33.13 | 54.0 | -20.9 |
| 434.10 | 58.4 | AV(Fun.) | 135 | 1.2 | V | 16.8 | 2.2 | 25.51 | 51.86 | 72.8 | -20.9 |
| 1302.3 | 37.6 | AV | 45 | 1.0 | H | 27.6 | 1.3 | 35.50 | 31.01 | 54.0 | -23.0 |
| 1302.3 | 37.3 | AV | 135 | 1.2 | V | 27.6 | 1.3 | 35.50 | 30.67 | 54.0 | -23.3 |
| 868.20 | 26.6 | AV | 66 | 1.2 | H | 22.2 | 3.4 | 24.62 | 27.55 | 52.8 | -25.3 |
| 868.20 | 25.8 | AV | 66 | 1.2 | V | 22.2 | 3.4 | 24.62 | 26.76 | 52.8 | -26.0 |
| 434.10 | 69.8 | PK(Fun.) | 135 | 1.0 | H | 16.8 | 2.2 | 25.51 | 63.28 | 92.8 | -29.5 |
| 434.10 | 65.2 | PK(Fun.) | 90 | 1.3 | V | 16.8 | 2.2 | 25.51 | 58.67 | 92.8 | -34.1 |
| 1736.4 | 44.3 | PK | 45 | 1.2 | H | 29.8 | 1.6 | 36.00 | 39.67 | 74.0 | -34.3 |
| 1736.4 | 43.9 | PK | 0 | 1.0 | V | 29.8 | 1.6 | 36.00 | 39.33 | 74.0 | -34.7 |
| 1302.3 | 45.3 | PK | 90 | 1.3 | V | 27.6 | 1.3 | 35.50 | 38.67 | 74.0 | -35.3 |
| 1302.3 | 44.9 | PK | 135 | 1.0 | H | 27.6 | 1.3 | 35.50 | 38.33 | 74.0 | -35.7 |
| 868.20 | 31.7 | PK | 43 | 2.0 | H | 22.2 | 3.4 | 24.62 | 32.68 | 72.8 | -40.1 |
| 868.20 | 31.4 | PK | 43 | 2.0 | V | 22.2 | 3.4 | 24.62 | 32.34 | 72.8 | -40.5 |

Note: The EUT was tested in all three orthogonal planes and frequency rang 30MHz to the tenth harmonics. Emissions attenuated closely to the noise base are not reported.

Plot of Radiation Emissions Test



Emissions above 1GHz is closing to the base.

5. §15.231(c) 20dB BANDWIDTH TESTING

5.1 Standard Applicable

According to FCC 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. Bandwidth is determined at the points 20 dB down from the modulated carrier.

5.2 Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Cal. Date | Due. Date |
|--------------|----------------------|-----------------|---------------|------------|------------|
| Agilent | Spectrum Analyzer | E4402B | US41192821 | 2007-06-30 | 2008-06-29 |
| ETS | Receiver Antenna | 2175 | 57337 | 2007-06-30 | 2008-06-29 |
| ETS | 50 ohm Coaxial Cable | SUCOFLEX 104 | 25498514 | 2007-06-30 | 2008-06-29 |

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3 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.

5.4 Environmental Conditions

| | |
|--------------------|-----------|
| Temperature: | 21° C |
| Relative Humidity: | 52% |
| ATM Pressure: | 1011 mbar |

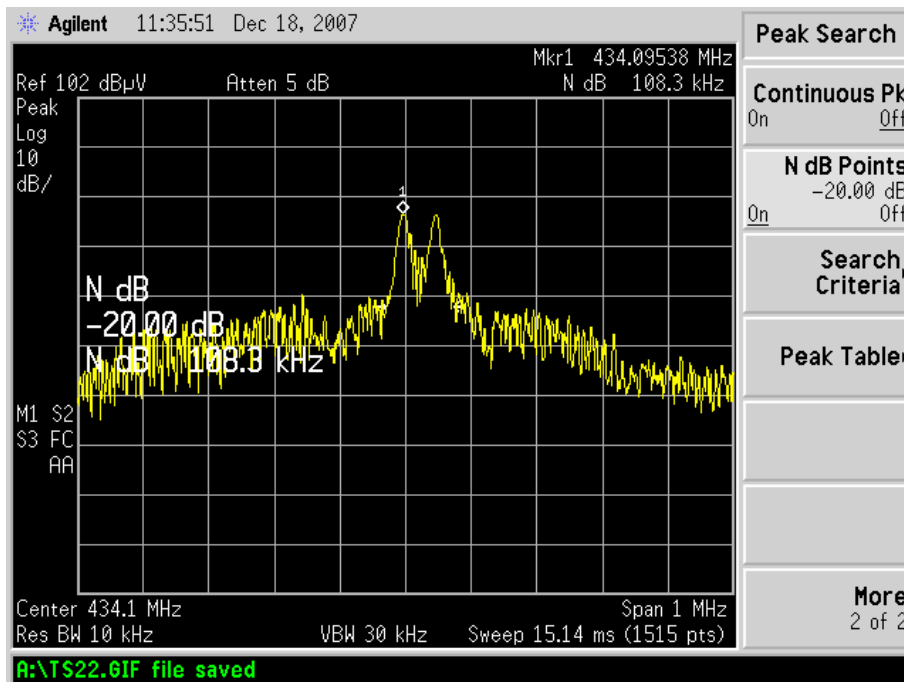
5.5 Summary of Test Results/Plots

| Frequency MHz | 20dB Bandwidth KHz | Limit kHz |
|------------------|-----------------------|--------------|
| 434.10 | 108.8 | 1085 |

Limit=Frequency×0.25%=434.10×0.25%=1085 kHz

Test Result Pass

Refer to the attached plots.



6. §15.231(a)-DEACTIVATION TESTING

6.1 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.

6.2 Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Cal. Date | Due. Date |
|----------------------|-------------------|--------------|---------------|------------|------------|
| Agilent | Spectrum Analyzer | E4402B | US41192821 | 2007-06-30 | 2008-06-29 |
| Receiver Antenna | ETS | 2175 | 57337 | 2007-06-30 | 2008-06-29 |
| 50 ohm Coaxial Cable | ETS | SUCOFLEX 104 | 25498514 | 2007-06-30 | 2008-06-29 |

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3 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 434.10MHz, than set the spectrum analyzer to Zero Span for the release time reading.

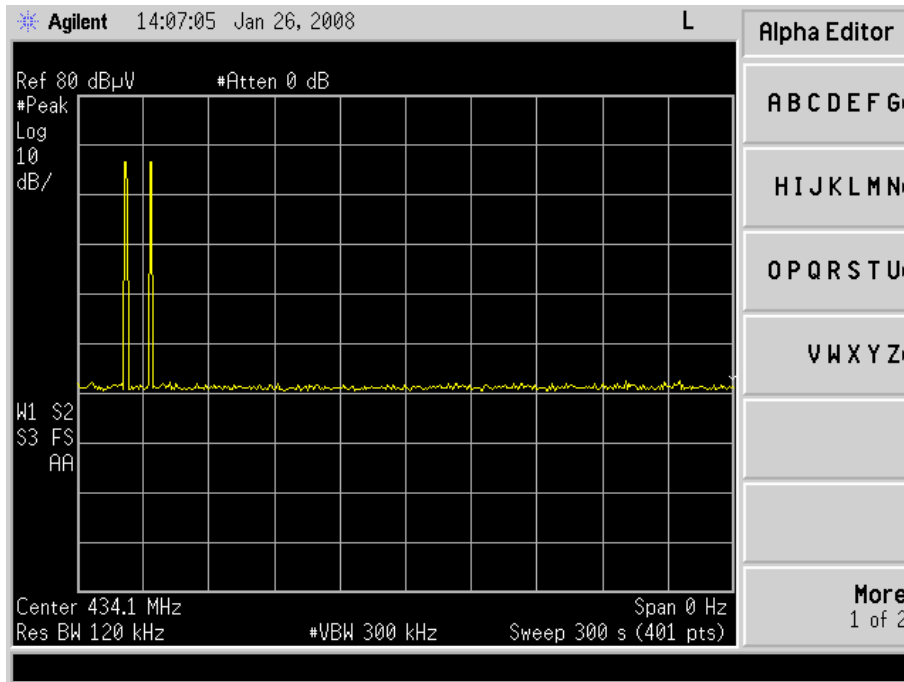
6.4 Environmental Conditions

| | |
|--------------------|-----------|
| Temperature: | 20° C |
| Relative Humidity: | 52% |
| ATM Pressure: | 1011 mbar |

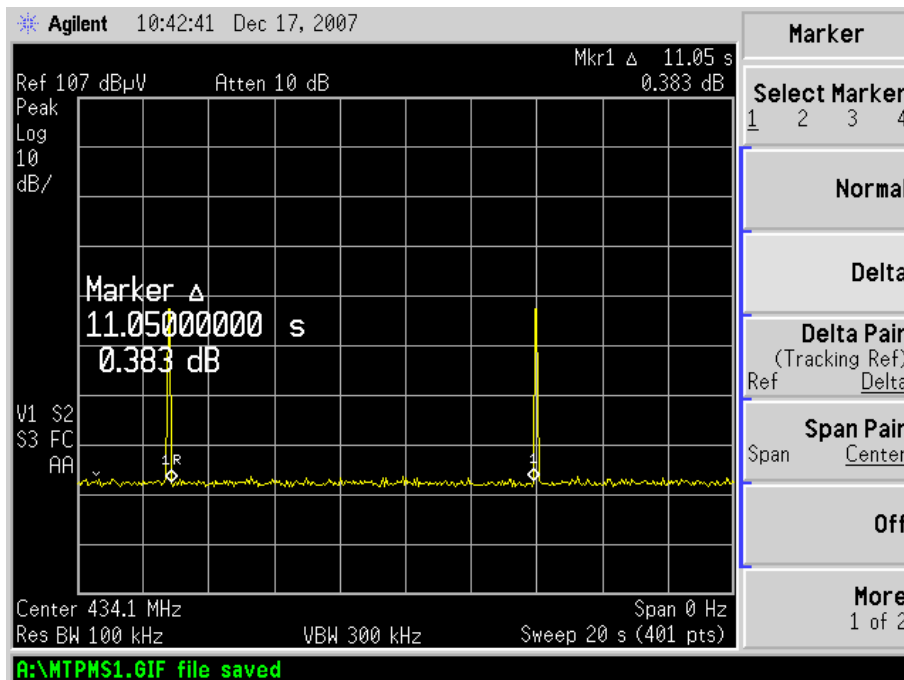
6.5 Summary of Test Results/Plots

Refer to the attached plots.

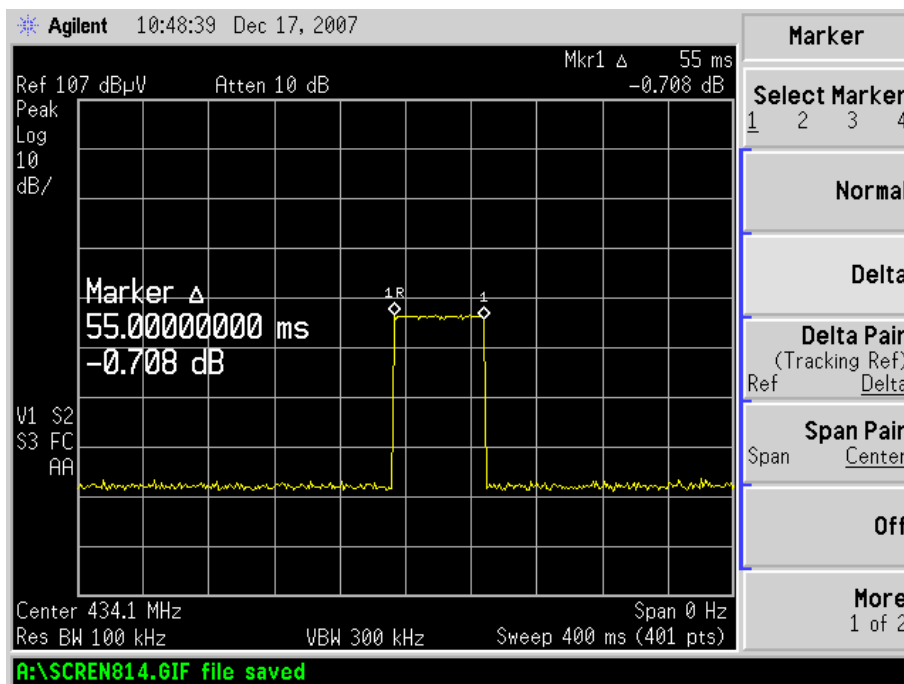
Transmission is active and the total active time <2s within tow hours.



Silent Time = 11.05s > 10s



Transmission Time=0.055s <1s



Result: Pass