


FCC PART 15.231
MEASUREMENT AND TEST REPORT
FOR

SUZHOU SATE AUTO ELECTRONIC CO., LTD.
377-12, Chenhui Rd, Pudong New Area, Shanghai, 201203, China

FCC ID: TTETPMS1209B

Report Concerns: Original Report	Equipment Type: Tire Pressure Monitoring System
Model:	<u>TPMS1209B</u>
Report No.:	<u>STR061280271</u>
Test/Witness Engineer:	<u>Innaz Lee</u>
Test Date:	<u>2006-12-13</u>
Prepared By:	Shenzhen SEM.Test Compliance Service Co., Ltd Room 609-610, Baotong Building, Baomin 1 st Road, Baoan District, Shenzhen, Guangdong, P.R.C. (518133)
Approved & Authorized By:	 <hr/> PSQ Manager / Jandy So

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)

Client Information

Applicant: Suzhou Sate Auto Electronic Co., Ltd.
 Address of applicant: 377-12, Chenhui Rd, Pudong New Area, Shanghai, 201203, China

Manufacturer: Suzhou Sate Auto Electronic Co., Ltd.
 Address of manufacturer: 377-12, Chenhui Rd, Pudong New Area, Shanghai, 201203, China

General Description of E.U.T

Items	Description
EUT Description:	Tire Pressure Monitoring System
Trade Name:	S&T
Model No.:	TPMS1209B
Rated Voltage:	3.6V Battery
Output Power:	<5 dBm
Frequency Range:	434.10MHz
Antenna Type:	Integral Antenna
Size:	7.5X6.0X2.0 cm
For more information refer to the circuit diagram form and the user's manual.	

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

1.2 Test Standards

The following report of 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.

1.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

United States of American Federal Communications Commission (**FCC**), and the registration number is **274801**(semi anechoic chamber).

Industry Canada (**IC**), and the registration number is **IC4174**.

All measurement required was performed at laboratory of Shenzhen Academy of Metrology and Quality Inspection, Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, 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 is started while the whole system is on.

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 (a)(1) Deactivation Testing	Compliant
§15.231 (c) 20dB Band Width Testing	Compliant
§15.231 (b) 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 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

\1\ Linear interpolations.

According to §15.205 and §15.209 the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

FIELD STRENGTH of Fundamental:	FIELD STRENGTH of Harmonics:	Section 15.209:
902-928MHz		30 - 88 MHz 40 dBuV/m @3M
2.4-2.4835GHz	127.37dBuV/m @3m	88 -216 MHz 43.5 dBuV/m @3M
127.38dBuV/m @3m	54 dBuV/m @3m	216 -960 MHz 46 dBuV/m @3M
		Above 960 MHz 54dBuV/m @3M

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209,WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

4.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	830245/009	2006-1-26	2007-1-25
Multi_Device Controller	ETS	2090	57230	2006-1-26	2007-1-25
Receiver Antenna	ETS	2175	57337	2006-1-26	2007-1-25
Horn Antenna	Rohde & Schwarz	HF906	100013	2006-1-24	2007-1-25
50 ohm Coaxial Cable	ETS	SUCOFLEX 104	25498514	2006-1-26	2007-1-25
3m chamber	Albatross Projects	9X6X6	----	2006-1-24	2008-1-25

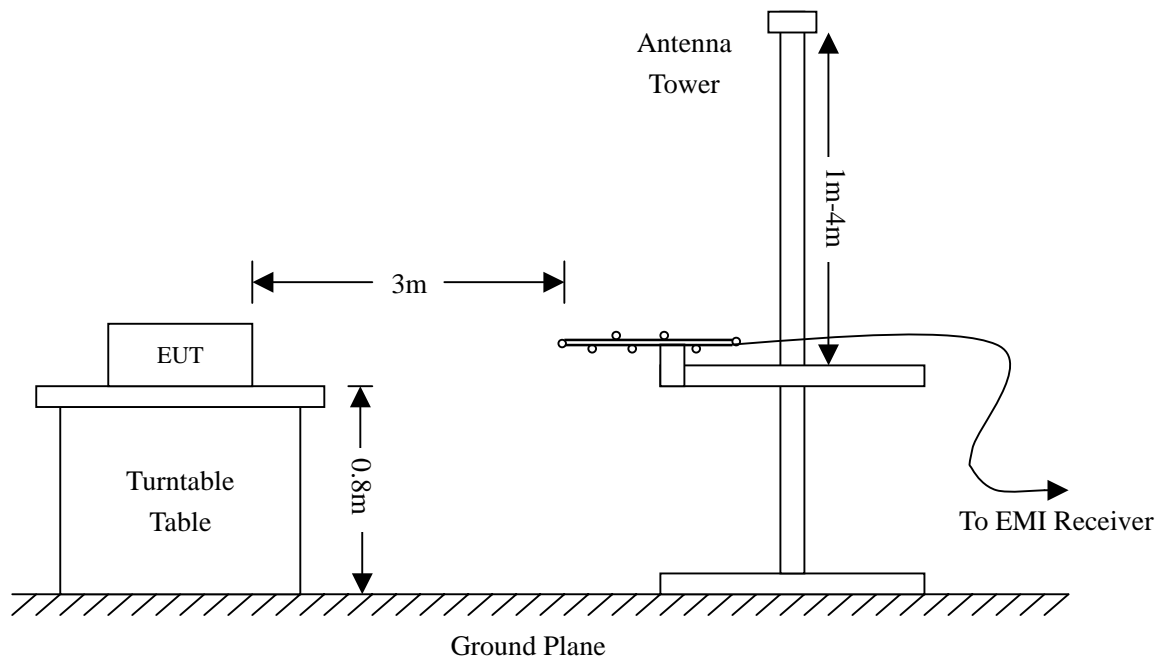
Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

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(e) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



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:	1019 mbar

4.7 Summary of Test Results/Plots

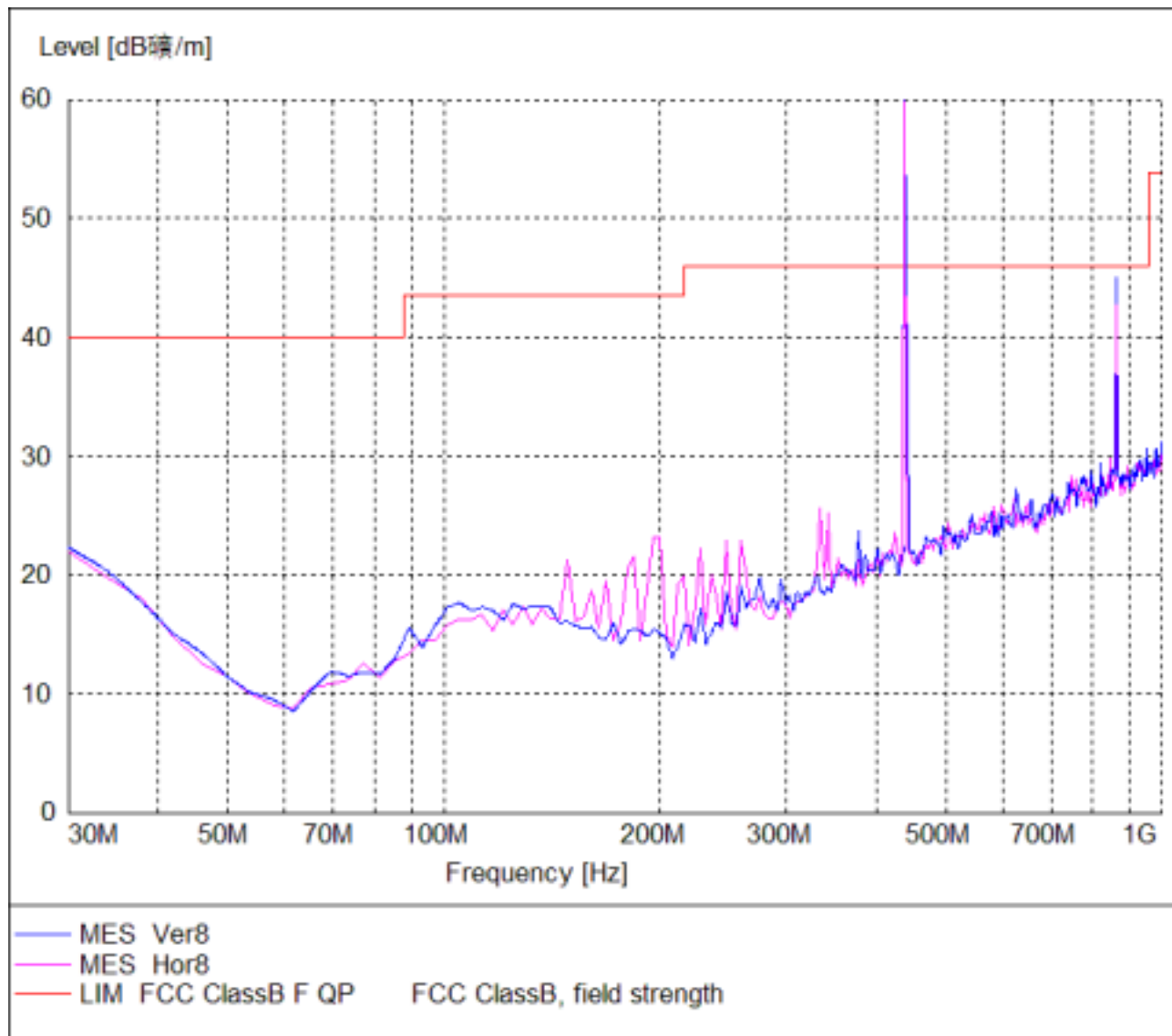
According to the data below, the FCC Part 15.205, 15.209 and 15.231 standards, and had the worst margin of:

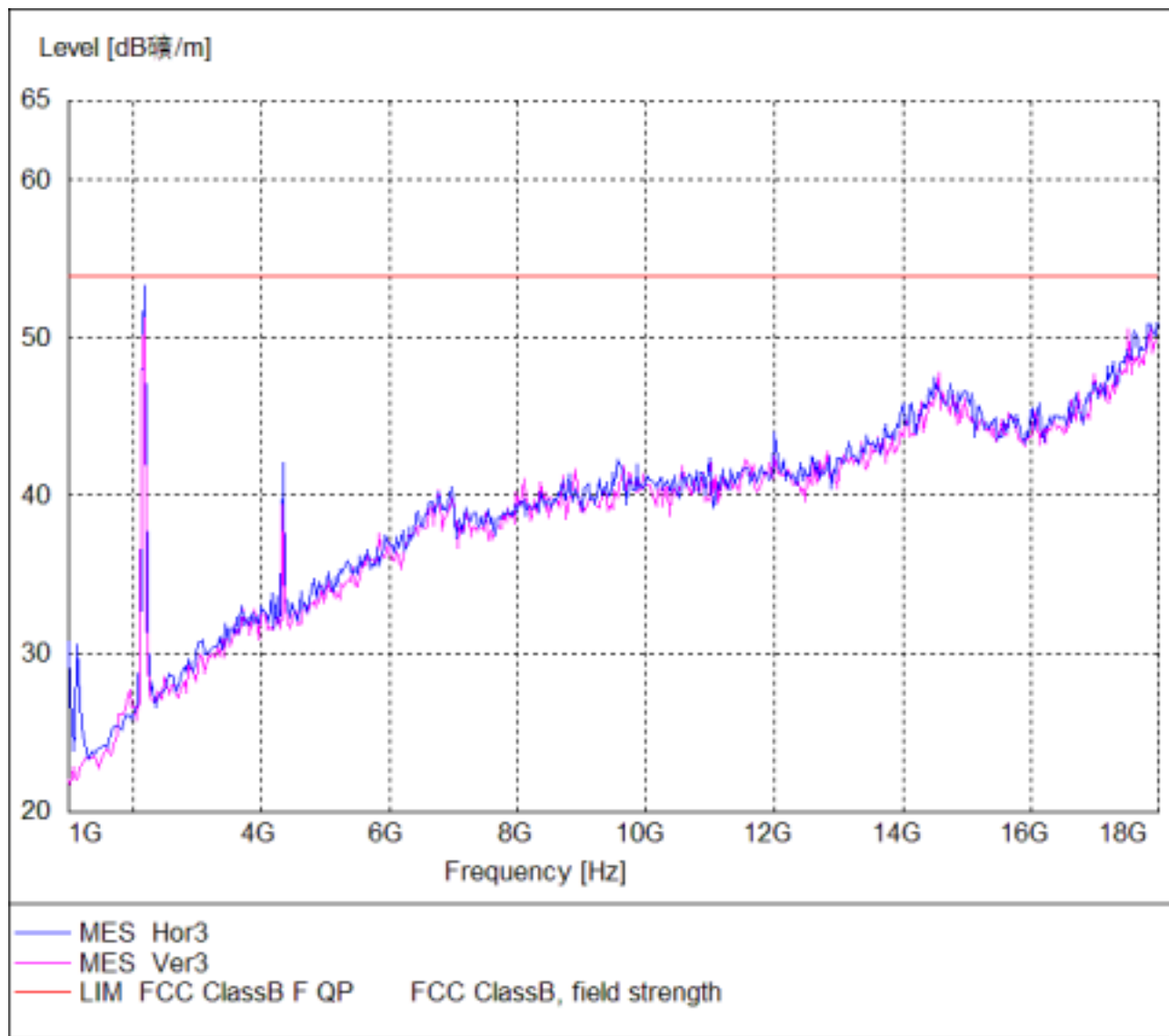
-1.20 dBμV at 1301.31 MHz in the Horizontal polarization, 30 MHz to 18 GHz, 3Meters

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
1301.31	48.0	AV	45	1.2	H	23.8	7.0	26.0	52.8	54.00	-1.2
1301.31	46.9	AV	45	1.2	V	23.8	7.0	26.0	51.65	54.00	-2.4
434.10	71.9	AV	66	1.0	H	16.8	4.1	26.5	66.32	72.87	-6.6
868.22	43.2	AV	45	1.0	V	22.2	6.3	26.7	45.00	54.00	-9.0
868.22	41.9	AV	45	1.0	H	22.2	6.3	26.7	43.71	54.00	-10.3
1735.64	37.4	AV	56	1.4	H	23.8	7.0	26.0	42.17	54.00	-11.8
1735.64	35.1	AV	56	1.4	V	23.8	7.0	26.0	39.92	54.00	-14.1
1301.31	52.8	PK	98	1.2	H	23.8	7.0	26.0	57.60	74.00	-16.4
1301.31	51.5	PK	98	1.2	V	23.8	7.0	26.0	56.33	74.00	-17.7
434.10	59.7	AV	66	1.0	V	16.8	4.1	26.5	54.11	72.87	-18.8
434.10	75.0	PK	135	1.2	H	16.8	4.1	26.5	69.41	92.87	-23.5
868.22	47.6	PK	60	1.3	V	22.2	6.3	26.7	49.35	74.00	-24.7
1735.64	42.7	PK	60	2.0	H	23.8	7.0	26.0	47.50	74.00	-26.5
868.22	44.7	PK	60	1.3	H	22.2	6.3	26.7	46.52	74.00	-27.5
1735.64	39.6	PK	60	2.0	V	23.8	7.0	26.0	44.36	74.00	-29.6
434.10	63.1	PK	135	1.2	V	16.8	4.1	26.5	57.52	92.87	-35.4

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





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	2006-06-30	2007-06-29
ETS	Receiver Antenna	2175	57337	2006-1-26	2007-1-25
ETS	50 ohm Coaxial Cable	SUCOFLEX 104	25498514	2006-1-26	2007-1-25

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:	1018 mbar

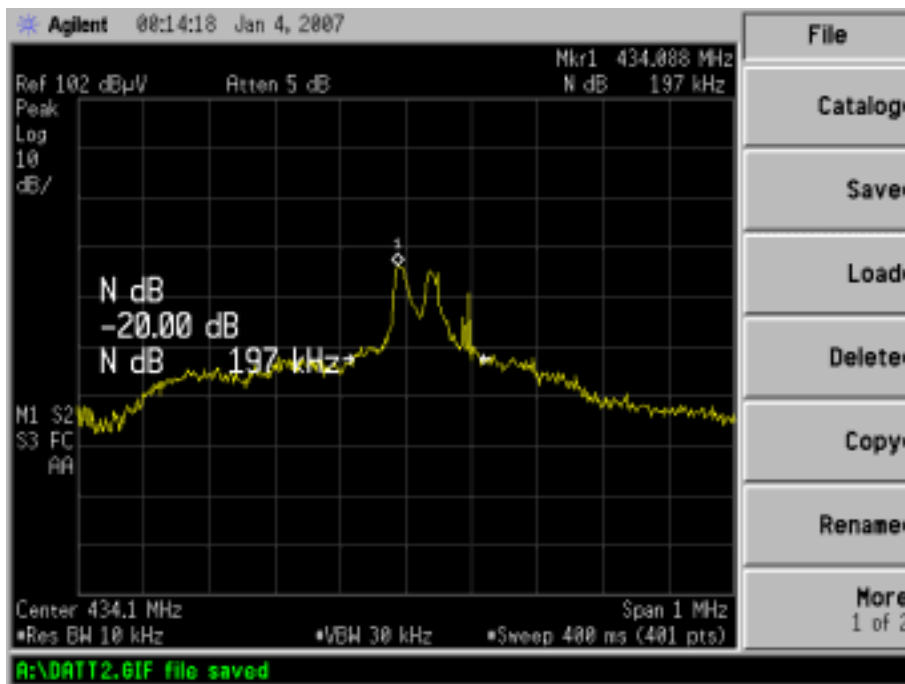
5.5 Summary of Test Results/Plots

Frequency MHz	20dB Bandwidth KHz	Limit KHz
434.10	197.00	1085.25

$$\text{Limit} = \text{Frequency} \times 0.25\% = 434.10 \times 0.25\% = 1085.25 \text{KHz}$$

Test Result Pass

Refer to the attached plots.



6. §15.231(a)-DEACTIVATION TESTING

6.1 Standard Applicable

According to FCC 15.231 for Periodic operation 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	2006-06-30	2007-06-29
Receiver Antenna	ETS	2175	57337	2006-1-26	2007-1-25
50 ohm Coaxial Cable	ETS	SUCOFLEX 104	25498514	2006-1-26	2007-1-25

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.

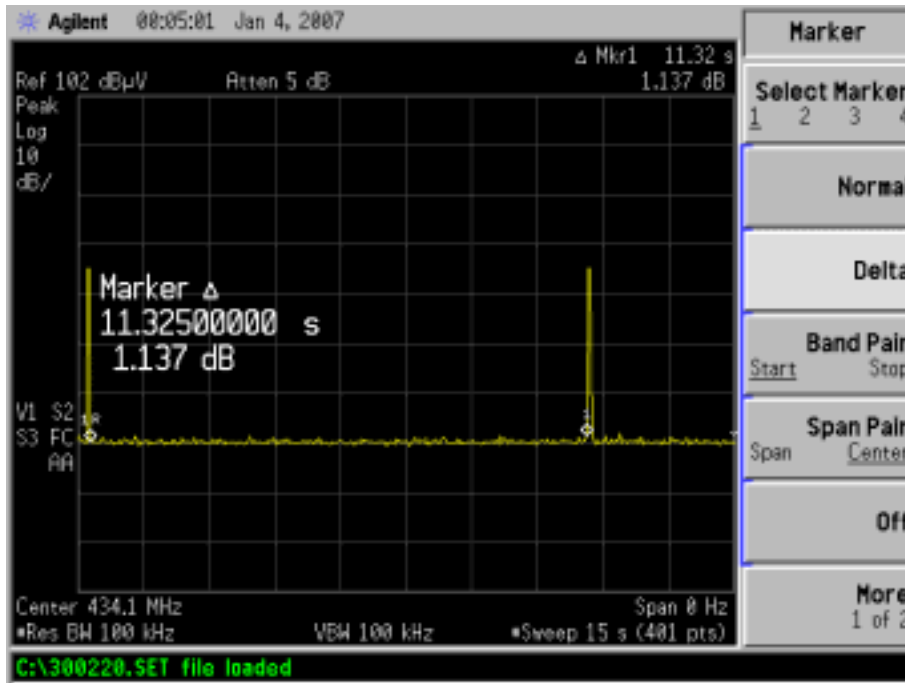
6.4 Environmental Conditions

Temperature:	26° C
Relative Humidity:	52%
ATM Pressure:	1022 mbar

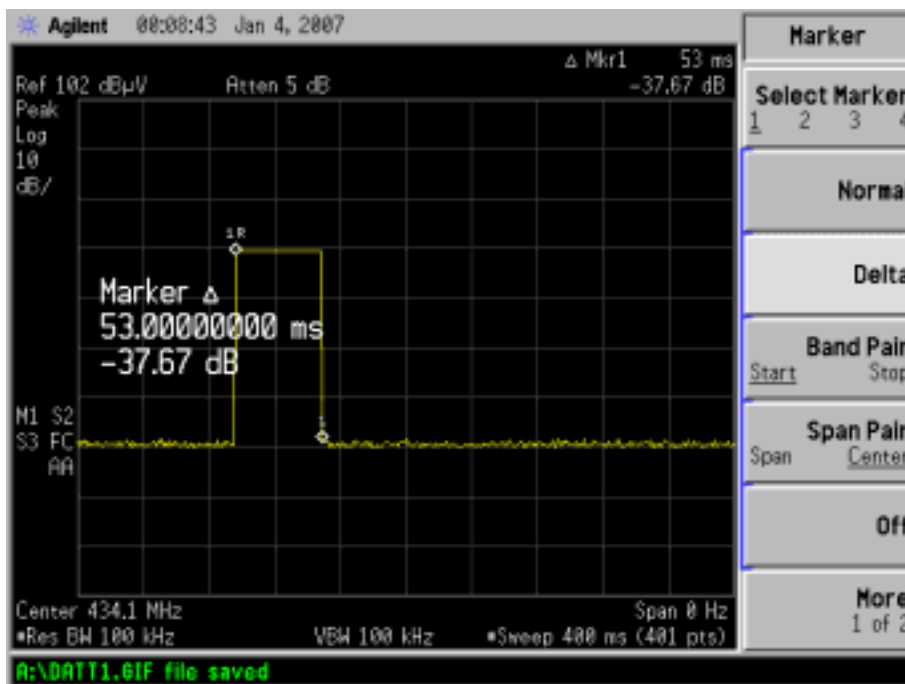
6.5 Summary of Test Results/Plots

Refer to the attached plots.

Deactive Time=11.325s



Transmitting Time=53ms



Deactive Time=11.325s >10s

Deactive Time > 30* (Transmitting Time)

Result: Pass