APPLICATION FOR CERTIFICATION
On Behalf of

Measurement Ltd.

Tire Pressure Measuring System

Model Number: MS4908

FCC ID: UUIMS-4908

Prepared for : Measurement Ltd.
Block A,19/F, Prince Industrial Building, 106 King Fuk Street, San Po Kong, Kowloon

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block,
Shenzhen Science & Industrial Park,
Nantou, Shenzhen, Guangdong, China

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Report Number	:	ACS-F09189
Date of Test	:	Aug.29~Sep.03, 2009
Date of Report	:	Sep.08, 2009

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TEST REPORT CERTIFICATION

Applicant	:	Measurement Ltd.
EUT Description	:	Tire Pressure Measuring System
FCC ID	:	UUIMS-4908
		(A) Model No. : MS4908
		(B) Serial No. : N/A
		(C) Power Supply : DC 3V
		(D) Test Voltage : DC 3V

Test Procedure Used:

FCC Rules and Regulations Part 15 Subpart C 2008

The device described above is tested by Audix Technology (Shenzhen) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits for radiated and conducted emissions.

The test results are contained in this test report and Audix Technology (Shenzhen) Co., Ltd. is assumed full responsibility for the accuracy and completeness of tests. Also, this report shows that EUT is technically compliant with FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shenzhen) Co., Ltd.

Date of Test : Aug.29~ Sep.03, 2009

Prepared by : Edie Huang

Edie Huang / Assistant

Reviewer : Jamy Yu

Jamy Yu / Senior Engineer

AUDIX® 信華科技(深圳)有限公司
Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章
Stamp only for EMC Dept. Report
Signature: Ken 09/11/9

Approved & Authorized Signer :

Ken Lu / Manager

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	**Standard**	**Results**
Conducted Emission Test	FCC Part 15C: 15.231 ANSI C63.4: 2003	N/A
Radiated Emission Test	FCC Part 15C: 15.231 ANSI C63.4: 2003	PASS
Stop Transmitting Time Test	FCC Part 15C: 15.231	PASS
20 dB Bandwidth Test	FCC Part 15C: 15.231	PASS
N/A is an abbreviation for Not Applicable.		

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description	:	Tire Pressure Measuring System
Model Number	:	MS4908
Operation frequency	:	433.92MHz
Modulation	:	ASK
Power Supply	:	DC 3V (Note: New batteries were used for all test)
Applicant	:	Measurement Ltd. Block A,19/F, Prince Industrial Building, 106 King Fuk Street, San Po Kong, Kowloon
Date of Test	:	Aug.29~Sep.03, 2009
Date of Receipt	:	Aug.28, 2009
Sample Type	:	Prototype production

2.2. Test Facility

Site Description

Name of Firm	:	Audix Technology (Shenzhen) Co., Ltd. No. 6, Ke Feng Rd., 52 Block, Shenzhen Science & Industrial Park,Nantou, Shenzhen, Guangdong, China
3m Anechoic Chamber	:	Mar.31, 2009 File on Federal Communication Commission Registration Number: 90454
3m & 10m Anechoic Chamber	:	Jan. 31, 2007 File on Federal Communication Commission Registration Number: 794232
EMC Lab.	:	Accredited by DATech, German Registration Number: DAT-P-091/99-01 Feb. 02, 2009 Accredited by NVLAP, USA NVLAP Code: 200372-0 Apr. 01, 2009

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

Test Item	Uncertainty
Uncertainty for Radiation Emission test in 3m chamber	3.78 dB (Polarize: V)
	4.20 dB (Polarize: H)
Uncertainty for Radiated Spurious Emission test in RF chamber	2.70 dB (Bilog antenna 30M~1000MHz)
	2.26 dB (Horn antenna 1000M~25000MHz)
Uncertainty for Conduction Spurious emission test	2.10 dB
Uncertainty for Bandwidth test	$1x10^{-9}$
Uncertainty for DC power test	0.042 %
Uncertainty for test site temperature and humidity	0.6℃
	3%

3. POWER LINE CONDUCTED EMISSION TEST

According to Paragraph (f) of FCC Part 15 section 15.231, Tests to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

4. RADIATED EMISSION TEST

4.1. Test Equipment

Frequency rang: 30~1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	3#Chamber	AUDIX	N/A	N/A	Dec.05,08	1 Year
2	EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 09	1 Year
3	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 09	1 Year
4	Amplifier	HP	8447D	2648A04738	May.08, 09	1 Year
5	Bilog Antenna	Schaffner	CBL6111C	2598	Nov.10, 08	1 Year
6	RF Cable	MIYAZAKI	8D-FB	3# Chamber No.1	May.08, 09	1 Year
7	Coaxial Switch	Anritsu	MP59B	M73989	May.08, 09	1 Year

Frequency rang: above 1000MHz

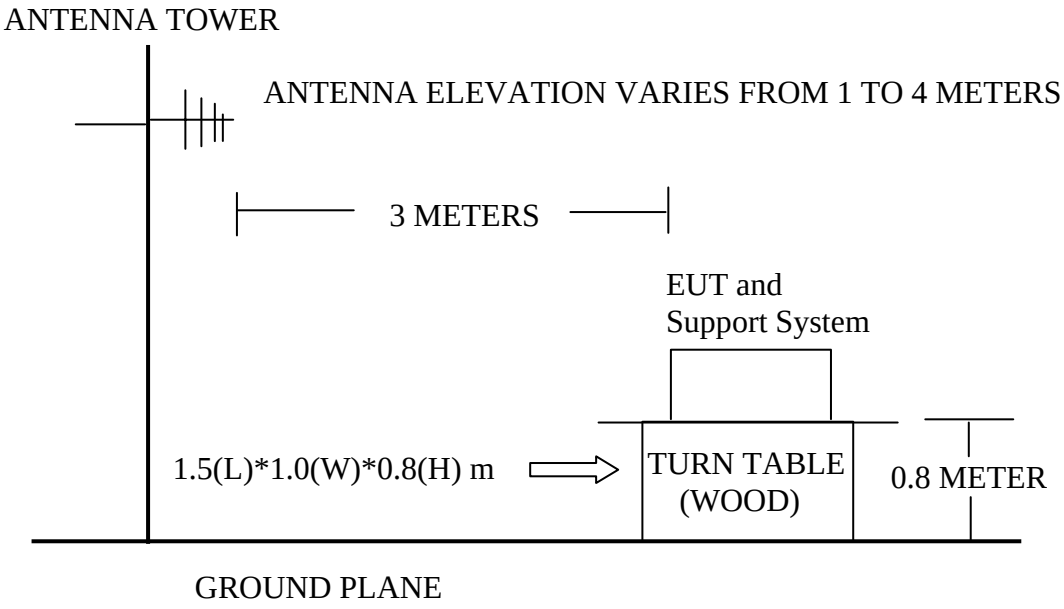
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08, 09	1 Year
2	Horn Antenna	EMCO	3115	9607-4877	May.27, 08	1.5 Year
3	Horn Antenna	EMCO	3116	00060088	May.27, 08	1.5Year
4	Amplifier	Agilent	8449B	3008A02495	Nov.24,08	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	May.08, 09	1 Year
6	RF Cable	Hubersuhner	SUCOFLEX102	271471/4	May.08, 09	1 Year
7	RF Cable	Hubersuhner	SUCOFLEX102	29086/2	May.08, 09	1 Year

4.2. Block Diagram of Test Setup

4.2.1. Block Diagram of connection between EUT and simulators

(EUT: Tire Pressure Measuring System)

4.2.2. Anechoic Chamber Setup Diagram



4.3. Radiated Emission Limit

4.3.1. Radiated Emission Limit (15.231 section e)

Fundamental Frequency(MHz)	Field Strength of Fundamental	Field Strength of Spurious emissions
433.92	AV:72.84 dBuV/m at 3m distance PK:92.84 dBuV/m at 3m distance	AV:52.84dBuV/m at 3m distance PK:72.84dBuV/m at 3m distance

Note: The spurious emissions appearing within the frequency band listed in 15.205 Shall also comply with limits shown in section 15.209

4.4. EUT Configuration on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.4.1. Tire Pressure Measuring System (EUT)

Model Number : MS4908
Serial Number : N/A

4.5. Operating Condition of EUT

4.5.1. Setup the EUT as shown in Section 4.2.

4.5.2. Turned on the power of all equipment.

4.5.3. Let the EUT worked in test modes (TX) and tested it.

4.6. Test Procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2003 on radiated emission Test.

The bandwidth of the VBW is set at 300kHz and RBW is set at 120kHz for PK measurement below 1GHz and 1MHz RBW, 1MHz VBW for PK measurement for frequency above 1GHz

The duty cycle factor was use to calculate Average Level as below formula

Average level = PK Level – duty cycle factor

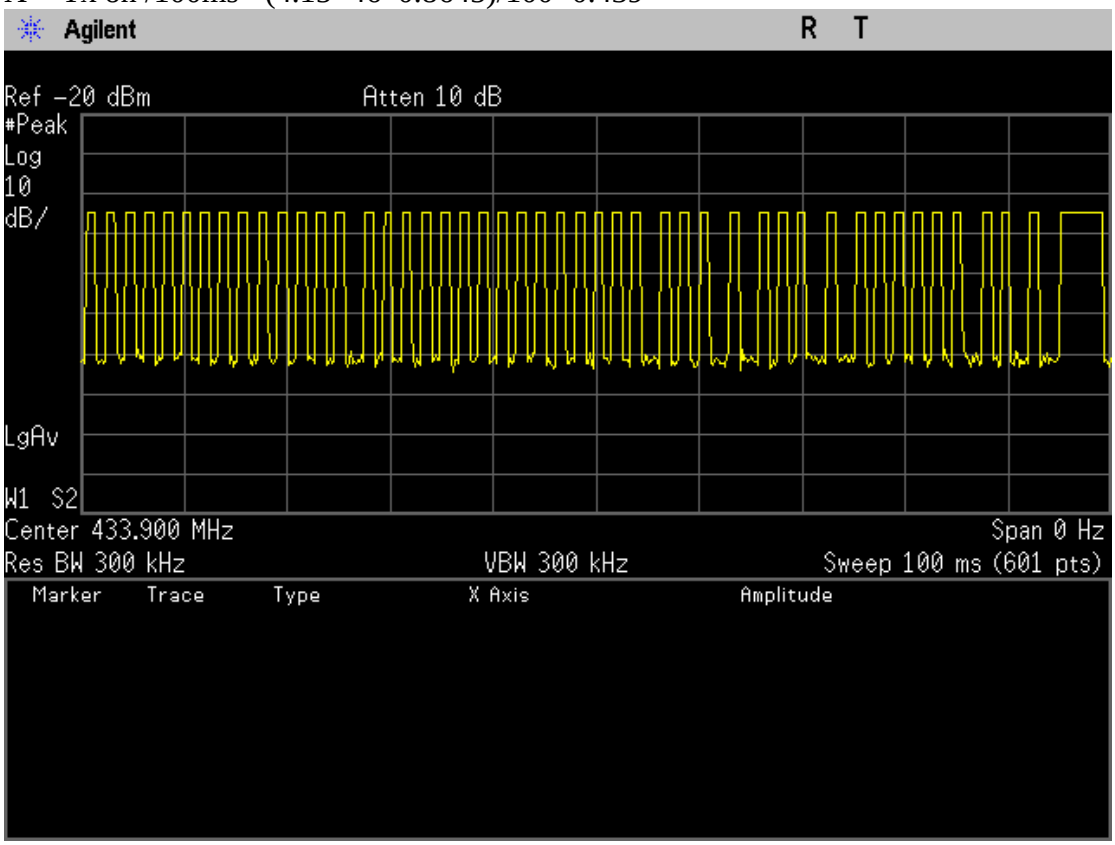
The frequency range from 30MHz to 5000MHz are checked.

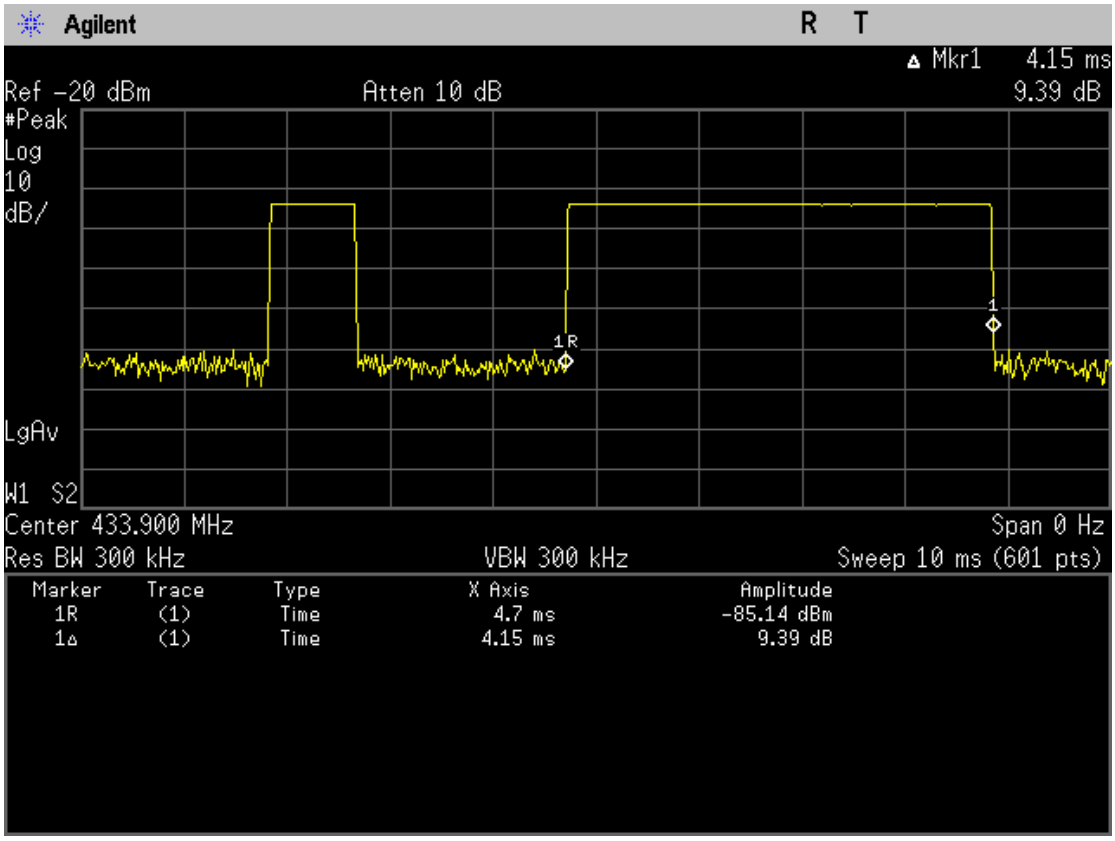
4.7. Radiated Emission Test Results

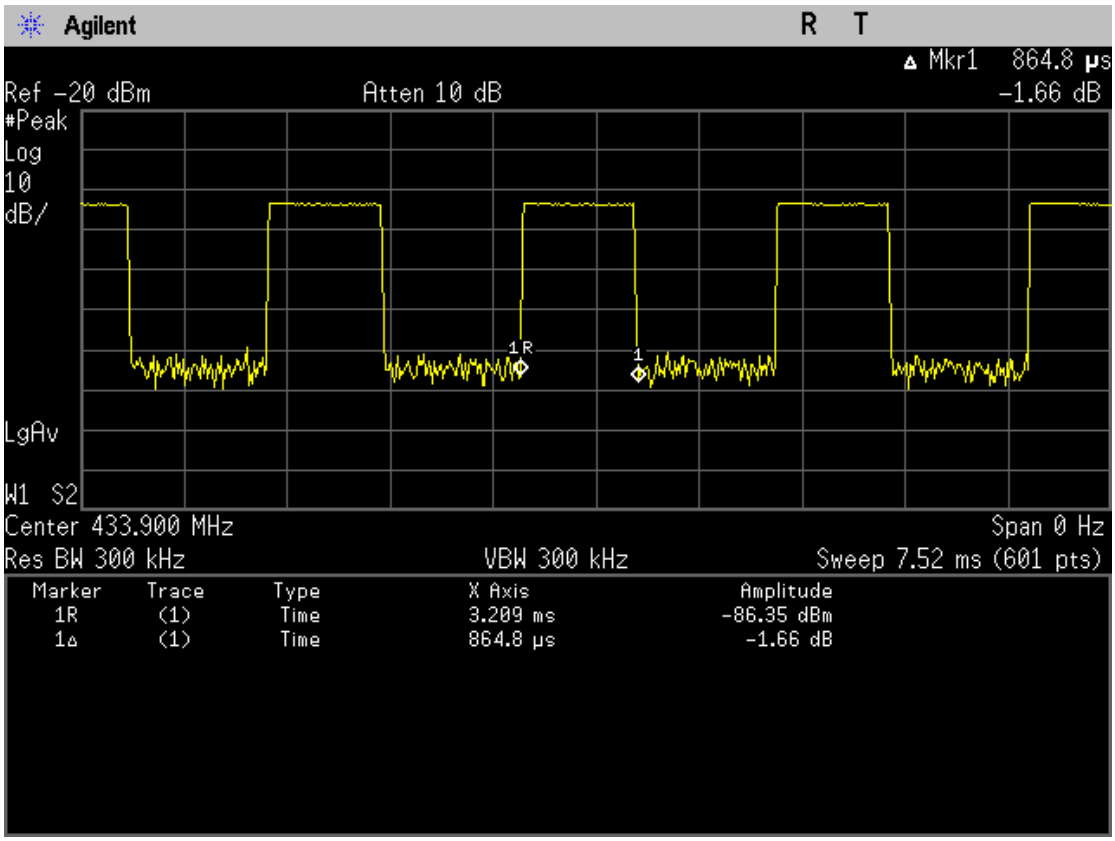
PASS.

The frequency range from 30MHz to 5000MHz was investigated. When PK mesured Levels comply with average limit,then the average levels were deemed to comply with
Average limit.When PK measured levels exceed average limit, then the duty cycle factor of 100ms was used to calculate average level.

Average level = Peak level – Duty factor
Duty factor = 20 log (1/x) = 7.15
X = Tx on /100ms =(4.15+46*0.8645)/100=0.439






Agilent
R T
Mkr1 864.8 µs
-1.66 dB
Ref -20 dBm
Atten 10 dB
#Peak
Log
10
dB/
LgAv
W1 S2
1R
1
Center 433.900 MHz
Span 0 Hz
Res BW 300 kHz
VBW 300 kHz
Sweep 7.52 ms (601 pts)
Marker Trace Type X Axis Amplitude
1R (1) Time 3.209 ms -86.35 dBm
1Δ (1) Time 864.8 µs -1.66 dB

Frequency: 30MHz~1GHz

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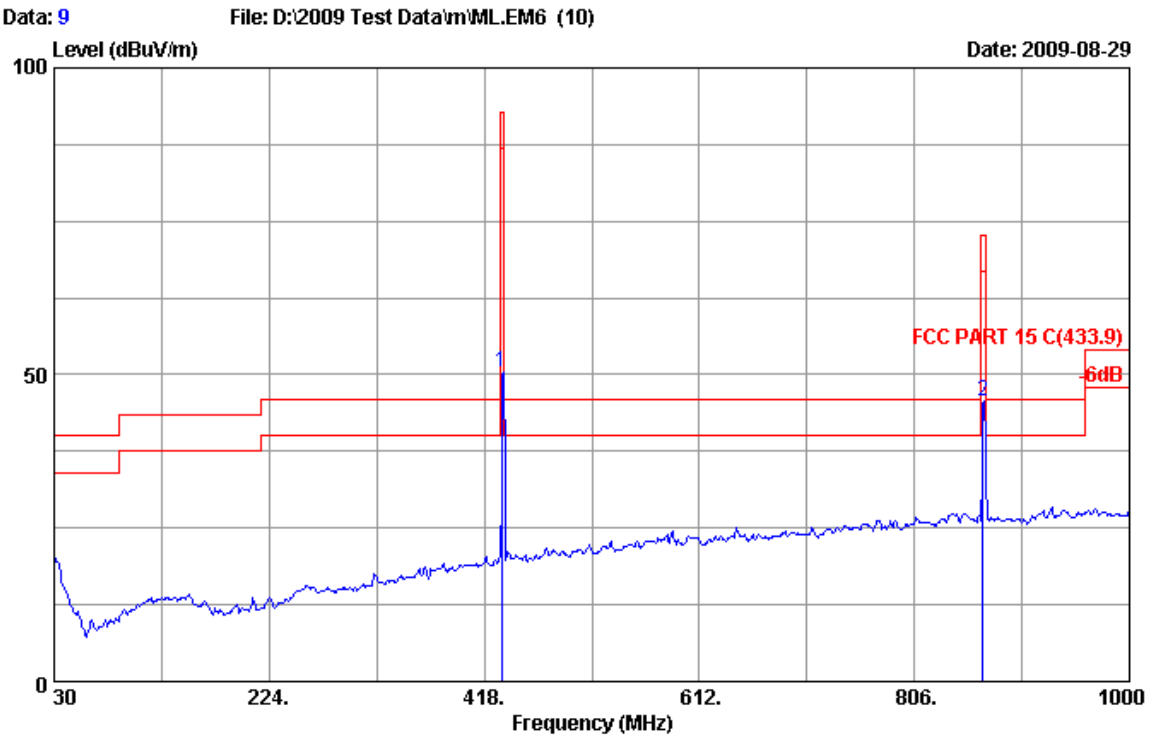

Site no. : 3m Chamber Data no. : 9
Dis. / Ant. : 3m CBL6111C Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C(433.9)
Env. / Ins. : 24*C/56% Engineer : Victory CAO
EUT : Tire Pressure Measuring System
Power Rating : DC 3V
Test Mode : Tx mode
M/N:MS4908

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	433.900	16.90	2.04	31.53	50.47	92.84	42.37	Peak
2	867.800	22.56	3.14	20.08	45.78	72.84	27.06	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

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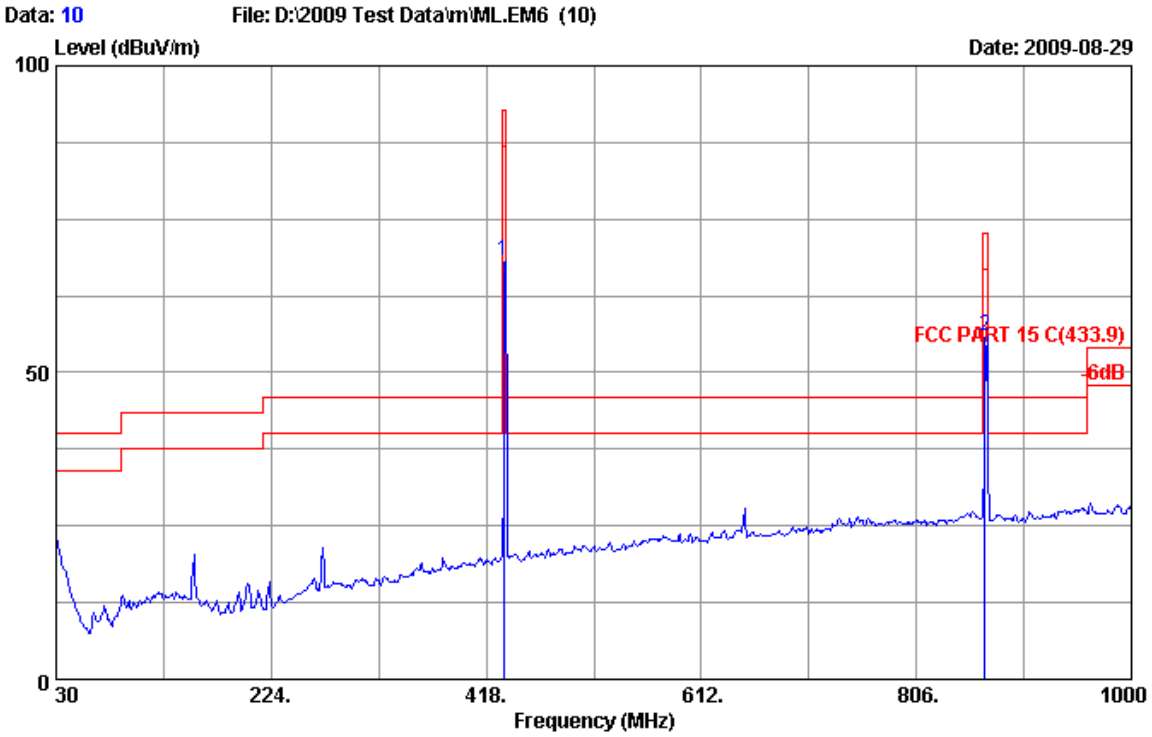

Site no. : 3m Chamber Data no. : 10
Dis. / Ant. : 3m CBL6111C Ant. pol. : VERTICAL
Limit : FCC PART 15 C(433.9)
Env. / Ins. : 24*C/56% Engineer : Victory CAO
EUT : Tire Pressure Measuring System
Power Rating : DC 3V
Test Mode : Tx mode
M/N:MS4908

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	433.900	16.90	2.04	49.35	68.29	92.84	24.55	Peak
2	867.800	22.56	3.14	30.23	55.93	72.84	16.91	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Frequency (MHz)	PK Level (dBuV/m)	Duty cycle factor (dB)	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
867.80	55.93	7.15	48.78	52.84	4.06

Frequency: 1GHz~5GHz

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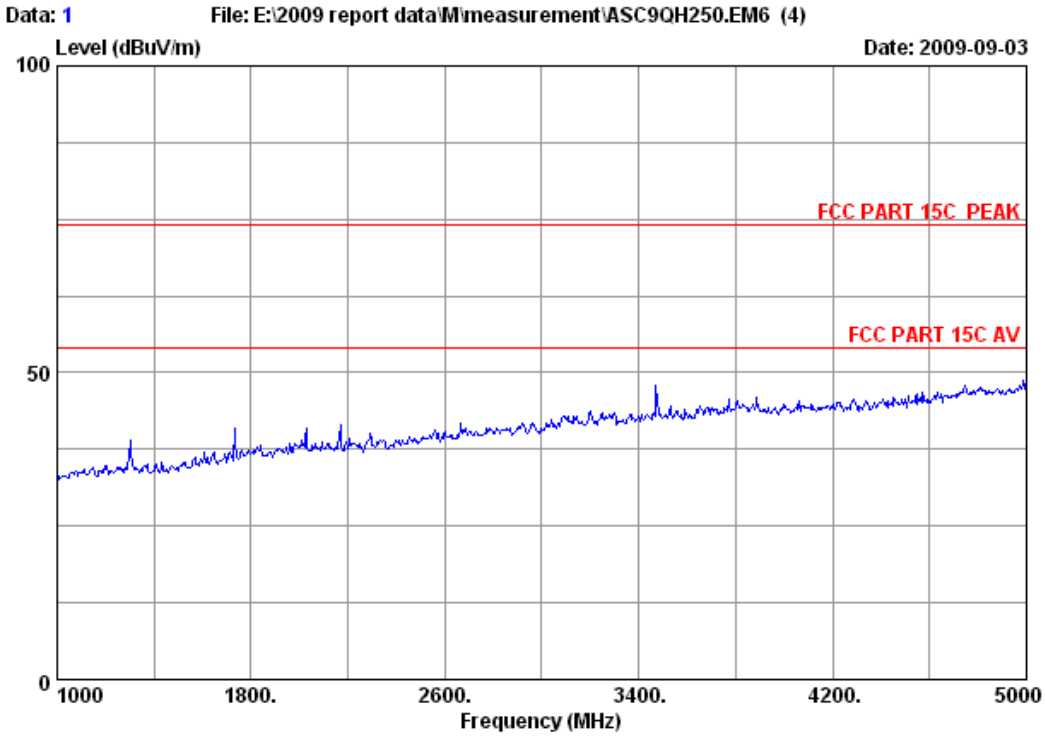

Site no.	: 3m Chamber	Data no.	: 1
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23*C/54%	Engineer	: Power Feng
EUT	: Tire Pressure Measuring System		
Power	: DC 3V		
Test mode	: Tx mode		
M/N	: M/N:MS4908		

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Postcode:518057

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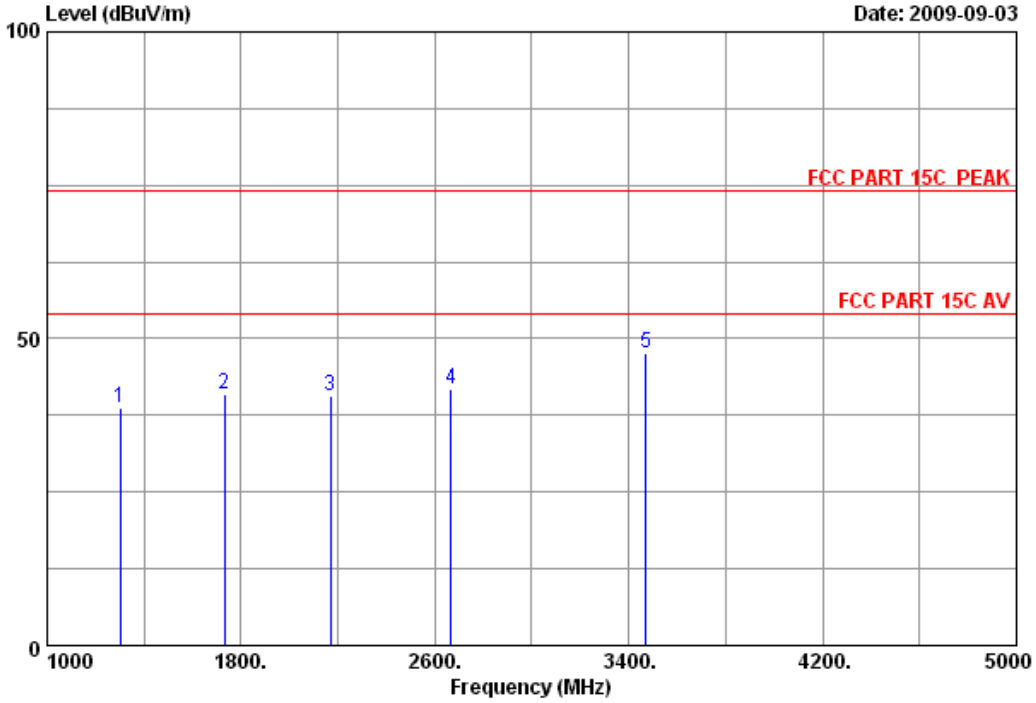

Site no. : 3m Chamber Data no. : 2
Dis. / Ant. : 3m 3115(0905) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23*C/54% Engineer : Power Feng
EUT : Tire Pressure Measuring System
Power : DC 3V
Test mode : Tx mode
M/N : M/N:MS4908

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dbuv)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1300.000	25.63	6.33	36.49	43.12	38.59	74.00	35.41	Peak
2	1732.000	26.83	7.31	36.36	43.10	40.88	74.00	33.12	Peak
3	2168.000	28.14	8.12	35.95	40.33	40.64	74.00	33.36	Peak
4	2668.000	29.13	9.17	35.88	39.38	41.80	74.00	32.20	Peak
5	3472.000	31.50	10.47	35.63	41.30	47.64	74.00	26.36	Peak

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

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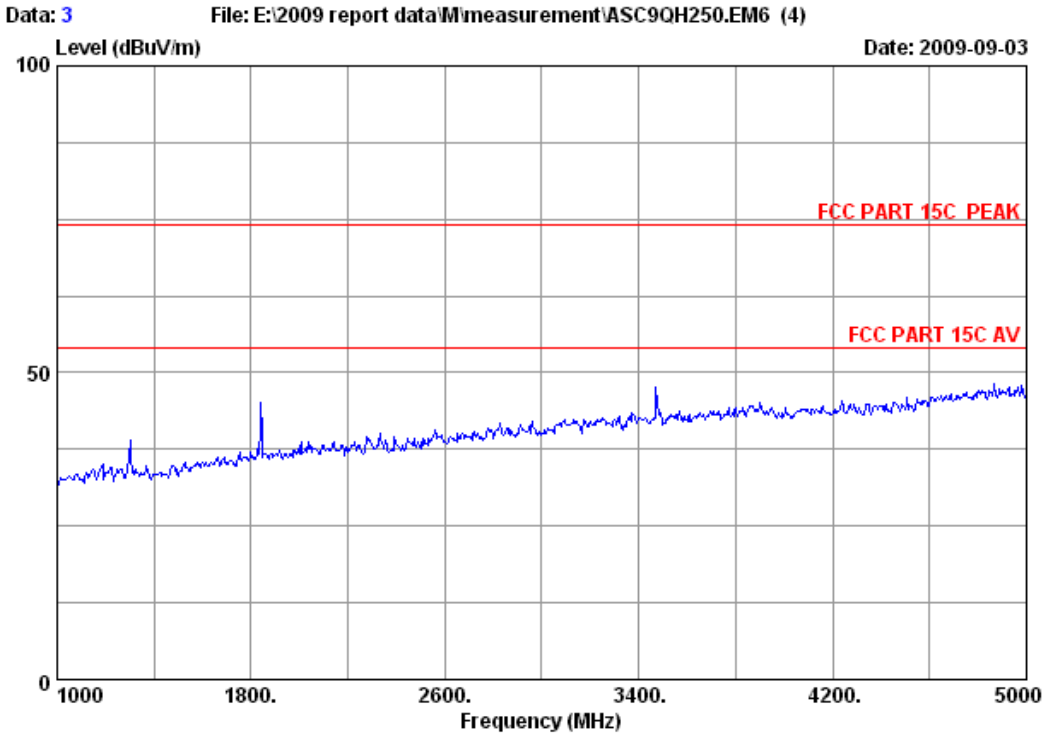

Site no.	: 3m Chamber	Data no.	: 3
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23*C/54%	Engineer	: Power Feng
EUT	: Tire Pressure Measuring System		
Power	: DC 3V		
Test mode	: Tx Mode		
M/N	: M/N:MS4908		

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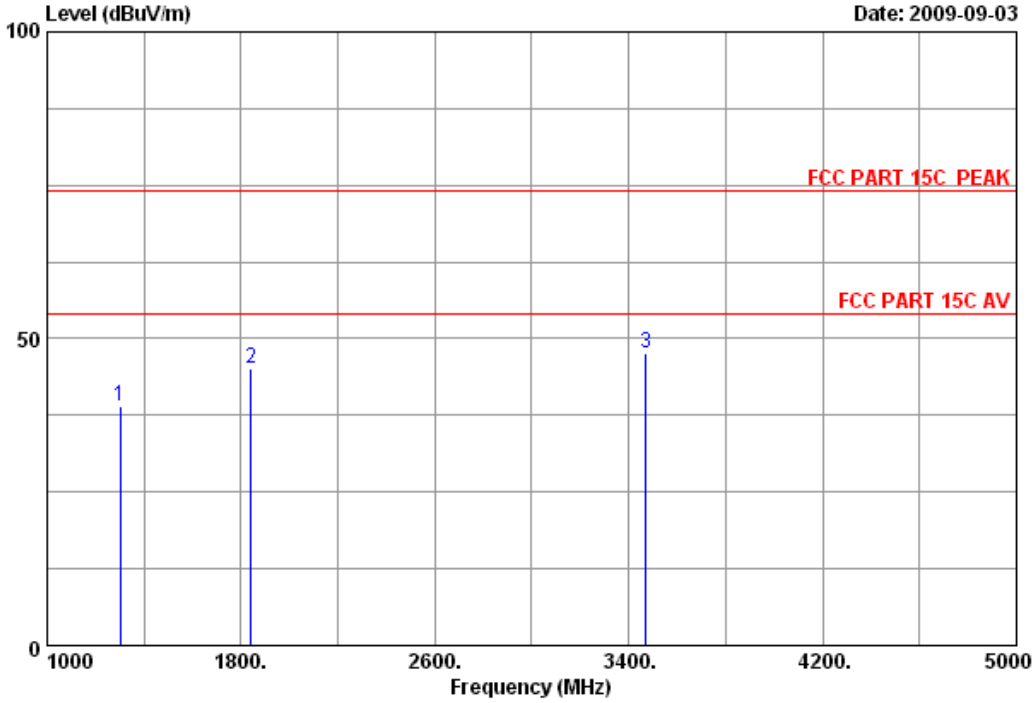


Site no. : 3m Chamber Data no. : 4
Dis. / Ant. : 3m 3115(0905) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23*C/54% Engineer : Power Feng
EUT : Tire Pressure Measuring System
Power : DC 3V
Test mode : Tx mode
M/N : M/N:MS4908

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dbuv)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1300.000	25.63	6.33	36.49	43.46	38.93	74.00	35.07	Peak
2	1840.000	27.23	7.52	36.28	46.53	45.00	74.00	29.00	Peak
3	3472.000	31.50	10.47	35.63	41.27	47.61	74.00	26.39	Peak

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

5. STOP TRANSMITTING TIME TEST

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08, 09	1 Year

5.2. Limit

The operation duration time 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.

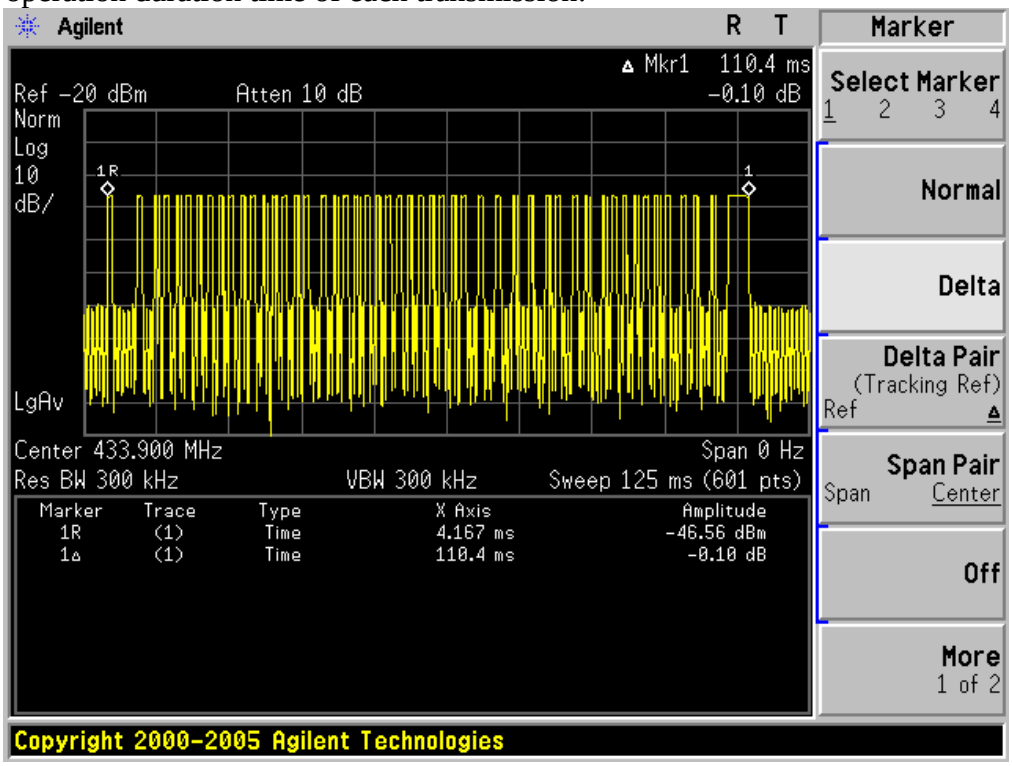
5.3. Test Results

Set the spectrum to zero span, activated the EUT by manually after 110.4ms, the EUT stop transmitting.

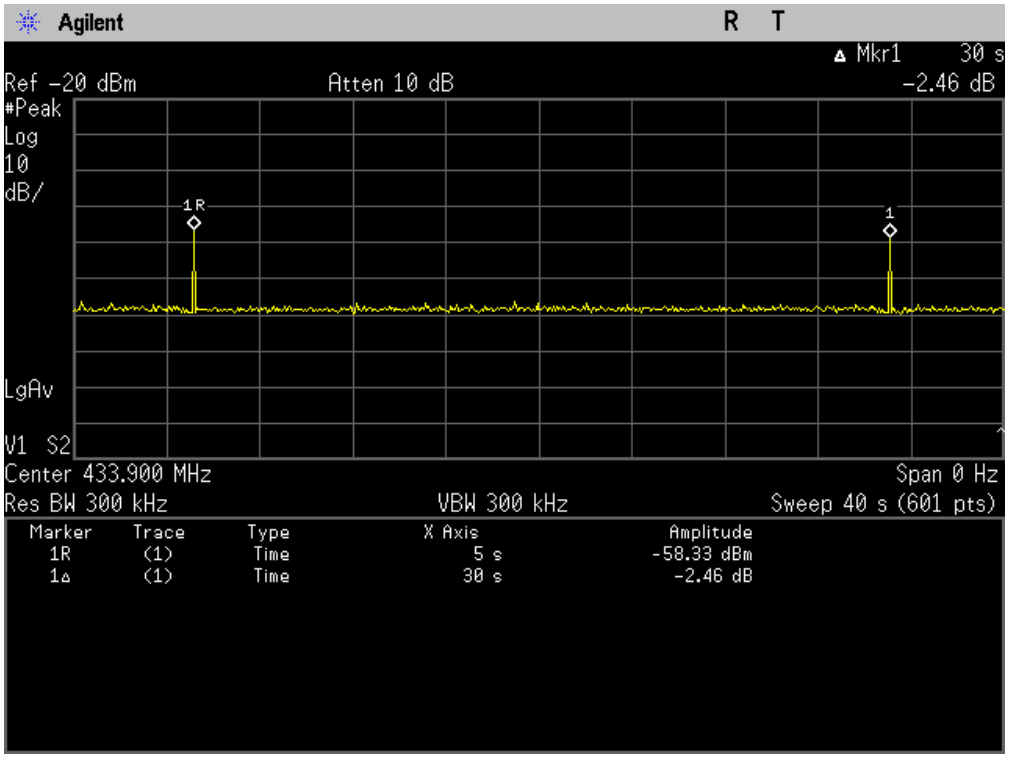
Frequency (MHz)	Stop Transmitting Time	Limit	Conclusion
433.900	110.4ms	1s	PASS

As declared by applicant, in two consecutive reading if the difference between the last reading and the current reading is not more than 1PSI then data will be transmitted in 30 minutes intervals. If in two consecutive readings if the valve cap detects a pressure drop of over 1PSI then it will transmit the data within next 30 seconds. This will continue until the valve cap detects the pressure is back to stable.

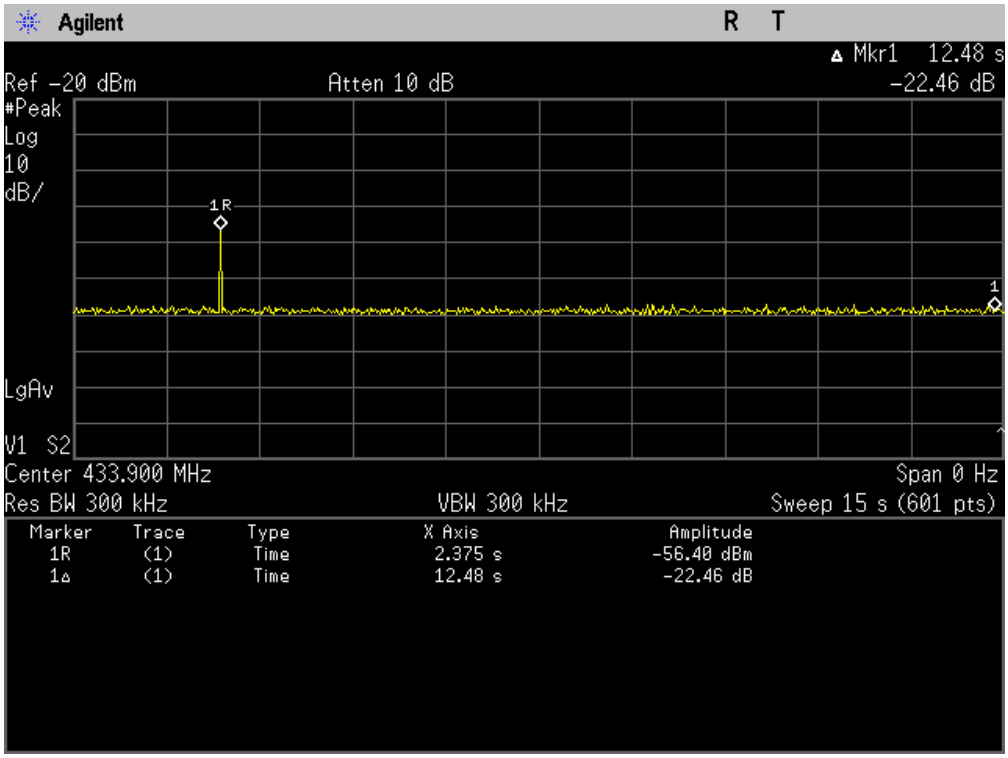
operation duration time of each transmission:



Transmittion intervals when two consecutive readings pressure changed more than 1PSI:



Transmittion intervals when two consecutive readings pressure changed no more than 1PSI:



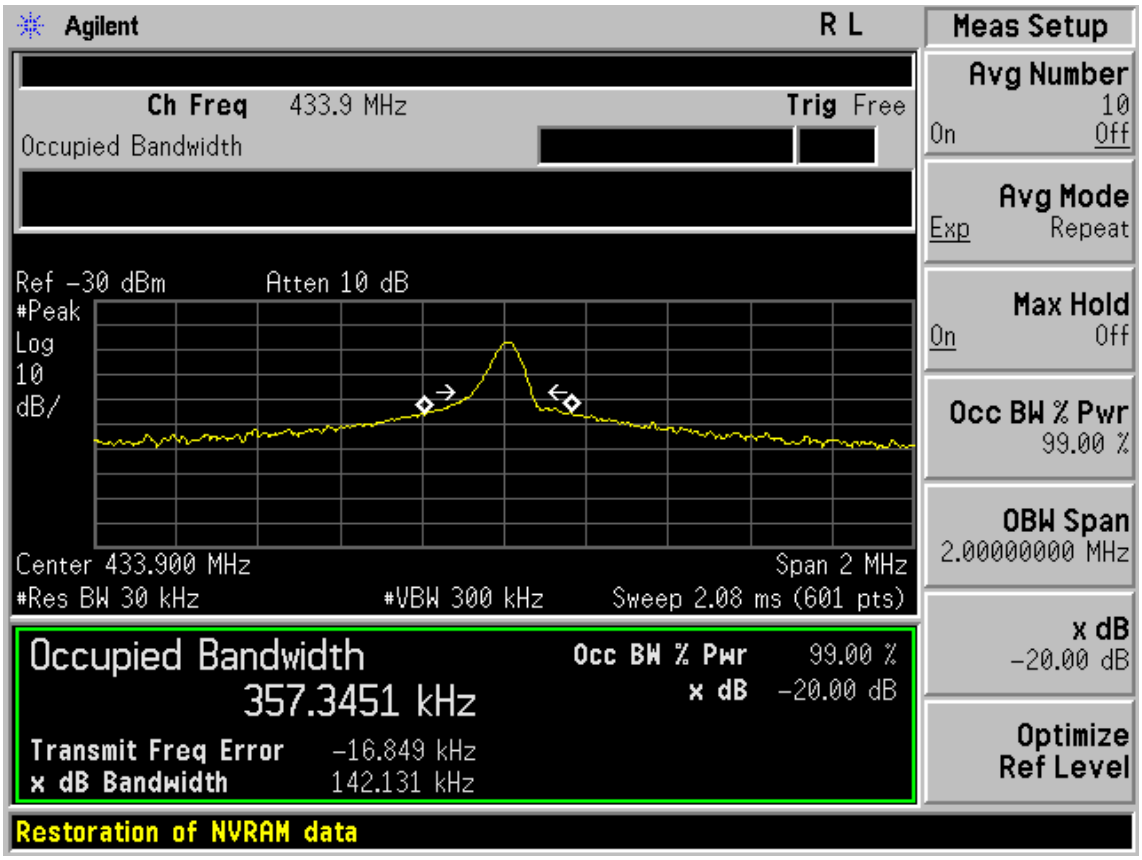
6. 20 DB BANDWITH TEST

6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08, 09	1 Year

6.2. Test Results

Frequency (MHz)	20 dB Bandwidth (kHz)	Limit(kHz): No wider than 0.25% of the center frequency	Conclusion
433.900	142.131	433.9*0.25%=1.08MHz	PASS


Agilent
R L
Meas Setup
Ch Freq 433.9 MHz
Trig Free
Occupied Bandwidth
Avg Number
10
On Off
Avg Mode
Exp Repeat
Ref -30 dBm
Atten 10 dB
#Peak
Log
10
dB/
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
2.00000000 MHz
Center 433.900 MHz
Span 2 MHz
#Res BW 30 kHz
#VBW 300 kHz
Sweep 2.08 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
357.3451 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -16.849 kHz
x dB Bandwidth 142.131 kHz
Optimize Ref Level
Restoration of NVRAM data

7. DEVIATION TO TEST SPECIFICATIONS

[NONE]