

FCC PART 15.231
MEASUREMENT AND TEST REPORT
For

EUT Name: Wireless Flash Trigger
Item No.: PT-04 II
FCC ID: XBYPT0402
Serial No.: Not supplied by client



Prepared for : Shenzhen Fudasi Technology Co.,Ltd.
B Building, Shengde Industrial Park, DaLang,Longhua Town,
Baoan District, Shenzhen City, China
Prepared By : Shenzhen Toby Technology Co., Ltd.
Room 803-805,East DingXin Bldg., Liuxian Road, Xili, Nanshan,
Shenzhen, China 518055
TEL : 0086-18925263335

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TABLE OF CONTENTS

TEST REPORT DECLARATION.....	3
1. GENERAL INFORMATION	4
1.1. Product Description for Equipment Under Test (EUT).....	4
1.2. Test Standards.....	4
1.3. Related Submittal(s)/Grant(s).....	4
1.4. Test Methodology	5
1.5. Accessories Equipment List and Details	5
1.6. EUT Cable List and Details	5
1.7. Test Location	5
2. SUMMARY OF TEST RESULTS	6
3. §15.203 - ANTENNA REQUIREMENT	7
3.1. Standard Applicable.....	7
3.2. Test Result	7
4. §15. 205, §15.209, §15.231 (B) RADIATED EMISSION	8
4.1. Measurement Uncertainty	8
4.2. Standard Applicable.....	8
4.3. Test Equipment List and Details.....	8
4.4. Test Procedure	9
4.5. Corrected Amplitude & Margin Calculation	10
4.6. Environmental Conditions	10
4.7. Summary of Test Results/ Plots.....	10
4.8. Test Receiver Setup	错误！未定义书签。
5. §15. 231(C) 20DB BANDWIDTH TESTING	13
5.1. Standard Applicable.....	13
5.2. Test Equipment List and Details.....	13
5.3. Test Procedure	13
5.4. Environmental Conditions	13
5.5. Summary of Test Results/Plots.....	13
6. §15. 231(A) DEACTIVATION TESTING.....	15
6.1. Standard Applicable.....	15
6.2. Test Equipment List and Details.....	15
6.3. Test Procedure	15
6.4. Environmental Conditions	15
6.5. Summary of Test Results/Plots.....	15
7. §15. 231(B) DUTY CYCLE	17
7.1. Standard Applicable.....	17
7.2. Test Equipment List and Details.....	17
7.3. Test Procedure	17
7.4. Environmental Conditions	17
7.5. Summary of Test Results/Plots.....	17

TEST REPORT DECLARATION

Applicant : Shenzhen Fudasi Technology Co.,Ltd.
Manufacturer : Shenzhen Fudasi Technology Co.,Ltd.
EUT Description : Wireless Flash Trigger
Model No. : PT-04 II

The device described above is tested by SEM. Test Compliance Service 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 both radiation and conduction emissions.

The measurement results are contained in this test report and Shenzhen Toby Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

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

Tested by: Jacky Wang Date: May 08, 2009
(Jacky Wang)

Reviewer: Benny Xu Date: May 11, 2009
(Benny Xu)

Approved by: Justin Zhang Date: May 12, 2009
(Justin Zhang)

1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Shenzhen Fudasi Technology Co.,Ltd.
 Address of applicant : B Building, Shengde Industrial Park, DaLang,Longhua Town, Baoan District, Shenzhen City, China

Manufacturer: Shenzhen Fudasi Technology Co.,Ltd.
 Address of manufacturer: B Building, Shengde Industrial Park, DaLang,Longhua Town, Baoan District, Shenzhen City, China

General Description of E.U.T

Items	Description
EUT Description:	Wireless Flash Trigger
Trade Name:	/
Model No.:	PT-04 II
Rated Voltage:	DC12V Battery
Out Power:	<0 dBm
Frequency Range:	433.9MHz
Tape of Antenna:	Internal Antenna
Size:	6.5cm x 4.2cm x 3.2cm

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 the Shenzhen Fudasi Technology 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 immunity level. Test is carried with playing mode which worst case has been showed. Test setup was adapted accordingly in reference to the Operating Instructions.

1.5. Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

1.6. EUT Cable List and Details

Cable Description	Length (M)	Shielded/ Unshielded	With Core/ Without Core
/	/	/	/

1.7. Test Location

FCC – Registration No.: 994117

SEM. Test Compliance Service Co., Ltd. EMC 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 our files and the Registration is 994117. SEM. Test Compliance Service Co., Ltd. Lab.

TOBY Tel: +86 0755 2804 5093 Fax: +86 0755 518055

2. SUMMARY OF TEST RESULTS

DESCRIPTION OF TEST	RESULT
§15.203 Antenna Requirement	Compliant
§15.205 Restricted Band	Compliant
§15.207 Conducted Emission	N/A
§15.209 General Requirement	Compliant
§15.231 (a) 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

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is + 3.0 dB.

4.2. Standard Applicable

According to §15.231(b), 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.....	2,250.....	225
70-130.....	1,250.....	125
130-174.....	\1\ 1,250 to 3,750	\1\ 125 to 375
174-260.....	3,750.....	375
260-470.....	\1\ 3,750 to 12,500	\1\ 375 to 1,250
Above 470.....	12,500.....	1,250

\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.

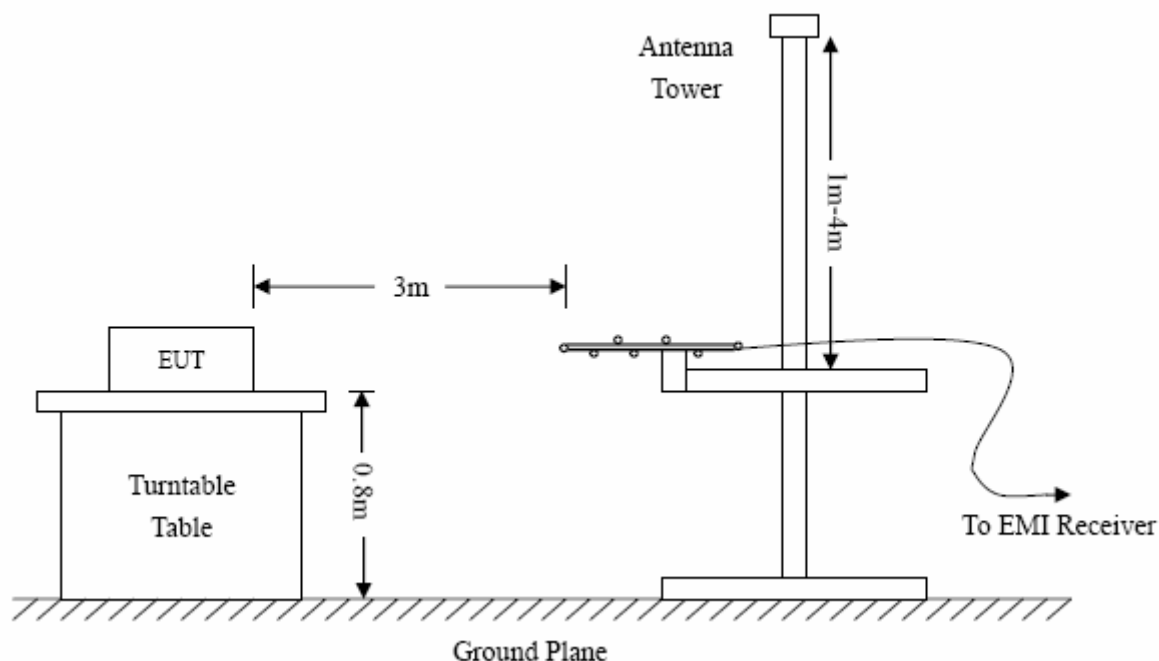
4.3. Test Equipment List and Details

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	2008-07-08	2009-07-07
Positioning Controller	C&C	CC-C-1F	N/A	2008-07-08	2009-07-07
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2008-07-08	2009-07-07
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2008-07-08	2009-07-07
RF Switch	EM	EMSW18	SW060023	2008-07-08	2009-07-07
Amplifier	Agilent	8447F	3113A06717	2008-07-08	2009-07-07
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2008-07-08	2009-07-07
EMI Test Receiver	ROHDE& SCHWARZ	ESPI	25498514	2008-07-08	2009-07-07
EMI Test Receiver	ROHDE& SCHWARZ	ESI26	838786/103	2008-07-08	2009-07-07
Receiver Horn Antenna	ROHDE& SCHWARZ	HF906	100013	2008-07-08	2009-07-07

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 -6dB μ V means the emission is 6dB μ V 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:	23° C
Relative Humidity:	57 %
ATM Pressure:	1020 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 is:

-10.09 dB μ V at 1736.80 MHz in the Horizontal, Ave Detector polarization, 30 MHz to 5 GHz, 3Meters

Plot of Radiation Emissions Test Data

Radiated Disturbance

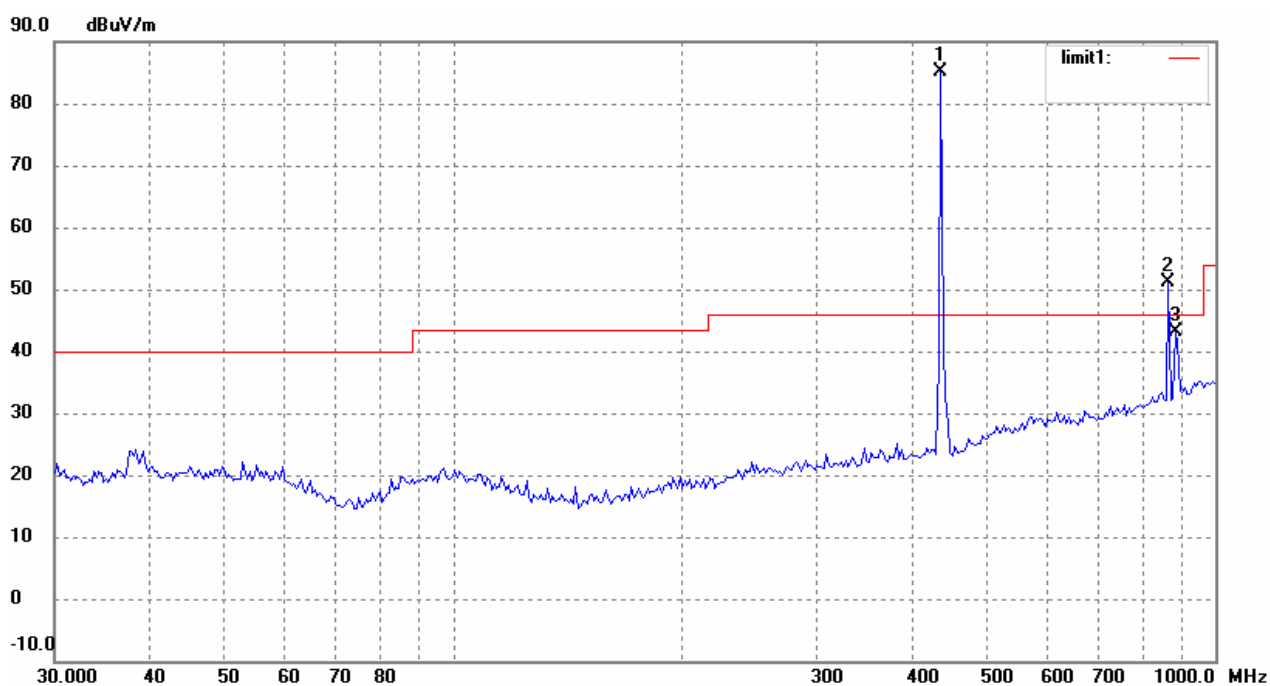
EUT: Wireless Flash Trigger

M/N: PT-04 II

Operating Condition: ON

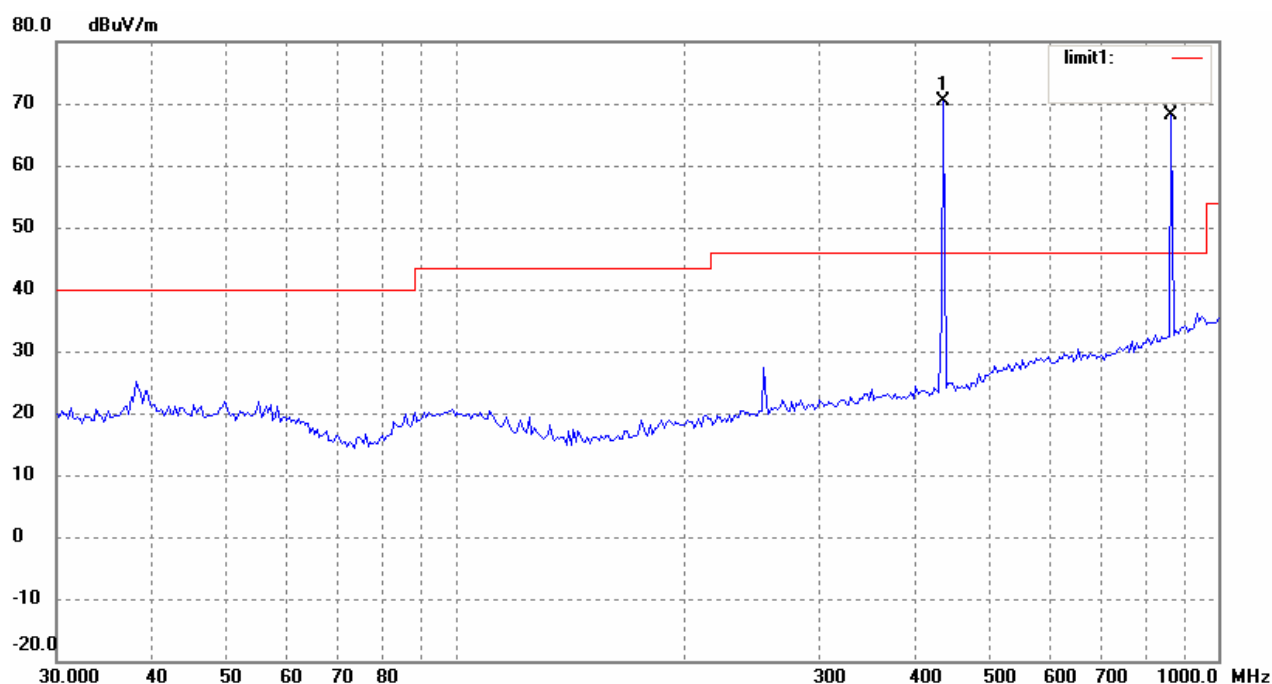
Test Specification: Horizontal & Vertical

Comment: DC12V

Horizontal

No.	Frequency (MHz)	Reading (dBuV/ m)	Correct Factor (dB)	Dutycycle Factor (dB)	Result (dBuV/ m)	Limit (dBuV/ m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	433.9200	74.42	10.65	N/A	85.07	100.80	-15.73	205	100	Peak
2	433.9200	/	/	-12.2	72.87	80.80	-7.93	227	100	Ave
3	867.8400	32.98	18.26	N/A	51.24	80.80	-29.56	218	100	Peak
4	867.8400	/	/	-12.2	39.24	60.80	-21.56	201	100	Ave
5	887.3978	24.61	18.57	N/A	43.18	46.00	-2.82	196	100	Peak

Vertical



No.	Frequency (MHz)	Reading (dBuV/ m)	Correct Factor (dB)	Dutycycle Factor (dB)	Result (dBuV/ m)	Limit (dBuV/ m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	433.9200	59.79	10.65	N/A	70.44	100.80	-30.36	224	100	Peak
2	433.9200	/	/	-12.2	58.24	80.80	-22.56	211	100	Ave
3	867.8400	49.77	18.26	N/A	68.03	80.80	-12.77	207	100	Peak
4	867.8400	/	/	-12.2	55.83	60.80	-4.97	198	100	Ave

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.
The fundamental frequency is 433.9MHz, so the fundamental and spurious emissions radiated limit base on the the operating frequency 433.9MHz.

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

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2008-07-08	2009-07-07
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2008-07-08	2009-07-07
Receiver Antenna	ETS	2175	57337	2008-07-08	2009-07-07
50 ohm Coaxial Cable	ETS	SUCOFLEX 104	25498514	2008-07-08	2009-07-07

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:	23° C
Relative Humidity:	55 %
ATM Pressure:	1017 mbar

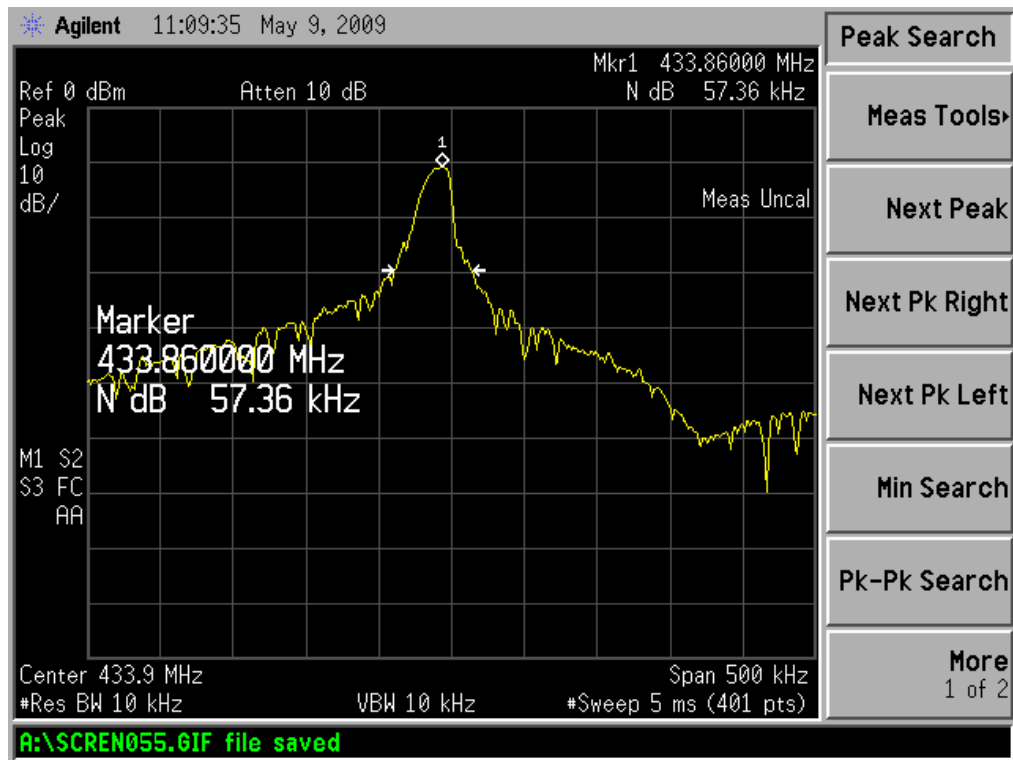
5.5. Summary of Test Results/Plots

Frequency 20dB MHz	Bandwidth KHz	Limit KHz	Result
433.9	57.36	1084.8	Pass

Limit=Fundamental Frequency×0.25%=433.9×0.25%=1084.8kHz

Test Result Pass

Refer to the attached plots.



6. §15. 231(A) DEACTIVATION TESTING

6.1. Standard Applicable

According to FCC 15.231 (a)(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

6.2. Test Equipment List and Details

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2008-07-08	2009-07-07
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2008-07-08	2009-07-07
Receiver Antenna	ETS	2175	57337	2008-07-08	2009-07-07
50 ohm Coaxial Cable	ETS	SUCOFLEX 104	25498514	2008-07-08	2009-07-07

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 433.92MHz, then 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. Environmental Conditions

Temperature:	23° C
Relative Humidity:	55 %
ATM Pressure:	1019 mbar

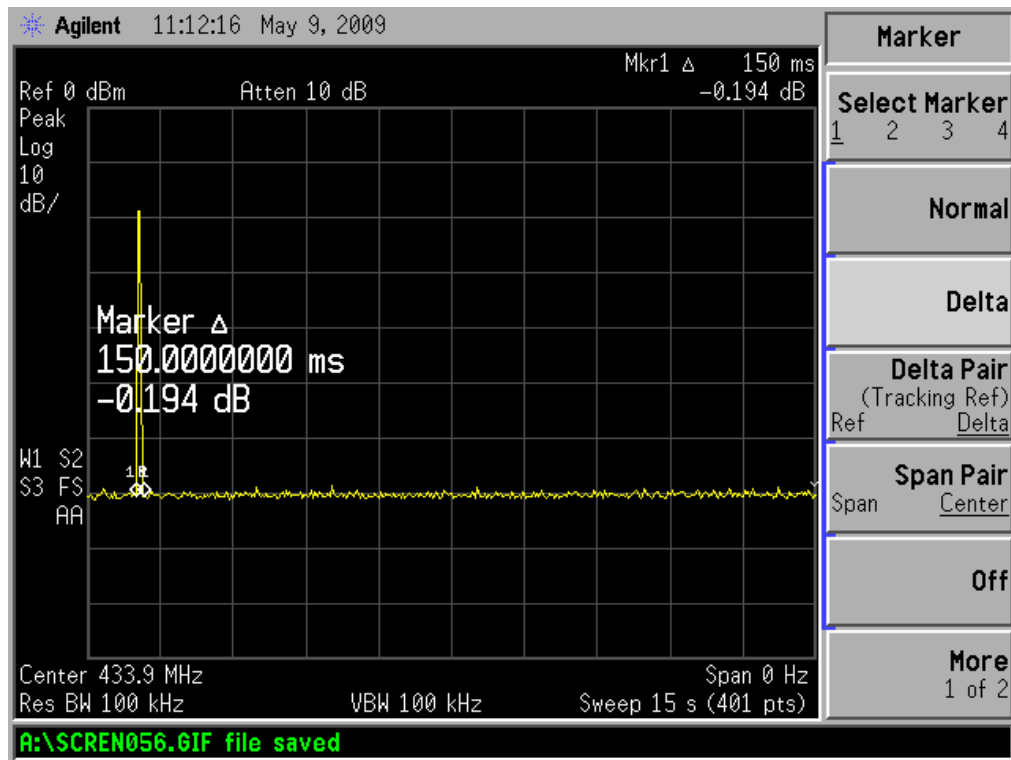
6.5. Summary of Test Results/Plots

Refer to the attached plots.

The transmission time <5s

Test Result Pass

Refer to the attached plots.



7. §15. 231(B) DUTY CYCLE

7.1. Standard Applicable

According to FCC 15.231 (b)(2) and 15.35 (c), For pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

7.2. Test Equipment List and Details

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2008-07-08	2009-07-07
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2008-07-08	2009-07-07
Receiver Antenna	ETS	2175	57337	2008-07-08	2009-07-07
50 ohm Coaxial Cable	ETS	SUCOFLEX 104	25498514	2008-07-08	2009-07-07

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

7.3. 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 433.9MHz, 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.

7.4. Environmental Conditions

Temperature:	22° C
Relative Humidity:	56 %
ATM Pressure:	1018 mbar

7.5. Summary of Test Results/Plots

16 long pulses—0.2875ms and 8 short pulses—0.08ms

$Ton = 16 * 0.2875 + 8 * 0.08 = 5.24ms$

Duty Cycle = $Ton / (Period) = 5.24ms / 8.54ms = 0.6136 (61.36\%)$

Duty Cycle Correction Factor = $20 * \text{Log} (\text{duty cycle}) = 20 * \text{Log} 0.6136 = -4.24dB$

Test Result Pass

Duty Cycle plots.

