

FCC PART 15.231


EMI MEASUREMENT AND TEST REPORT

For

TwinPro International Holdings Limited

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FCC ID: SLCK80800601

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Transmitter, Call Safe
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Report No.: RSZ06091502	
Test Date: 2006-11-01	
Report Date: 2006-11-09	
Reviewed By: EMC Manager: Boni Baniqued 	
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *TwinPro International Holdings Limited* 's product, model K8 or the "EUT" as referred to in this report is a *Call Safe* which measures approximately 6.5 cm L x 3.2 cm W x 2.0 cm H, rated input voltage: DC 12 V battery.

** The test data gathered are from an engineering sample, serial number: 0609025, provided by the manufacturer, we receive the EUT on 2006-9-15.*

Objective

This document is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209 and 15.231 rules.

Related Submittal(s)/Grant(s)

No Related Submittals

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. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratory Corp. (Shenzhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China.

Test site at Bay Area Compliance Laboratory Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

N/A.

Special Accessories

The special accessories were provided by Bay Area Compliance Laboratory Corp. (Shenzhen).

Equipment Modifications

Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

Configuration of Test Setup



Lie

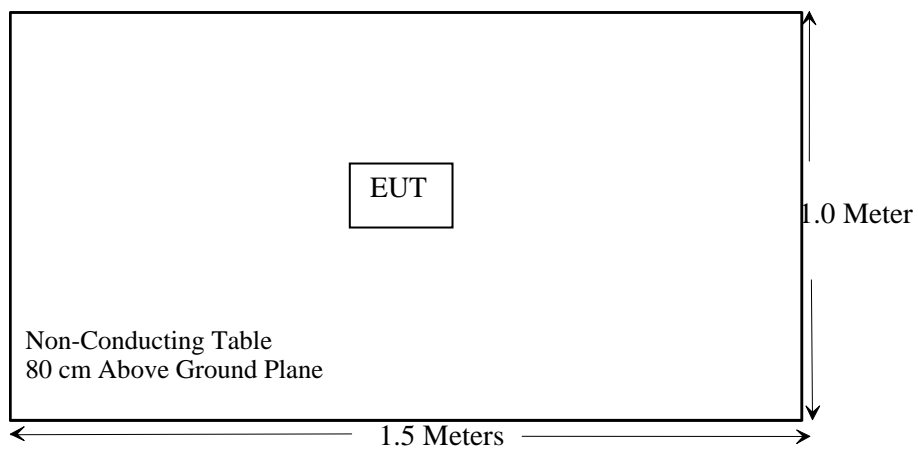


Stand



Side

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band	Compliant
§15.209	General Requirement	Compliant
§15.231 (b)	Radiated Emission	Compliant
§15.231 (c)	20dB Bandwidth Testing	Compliant
§15.231 (a)(1)	Deactivation Testing	Compliant

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

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.

Antenna connected construction

The EUT used a permanently attached antenna, which in accordance to section 15.203 is considered sufficient to comply with the provision of this section.

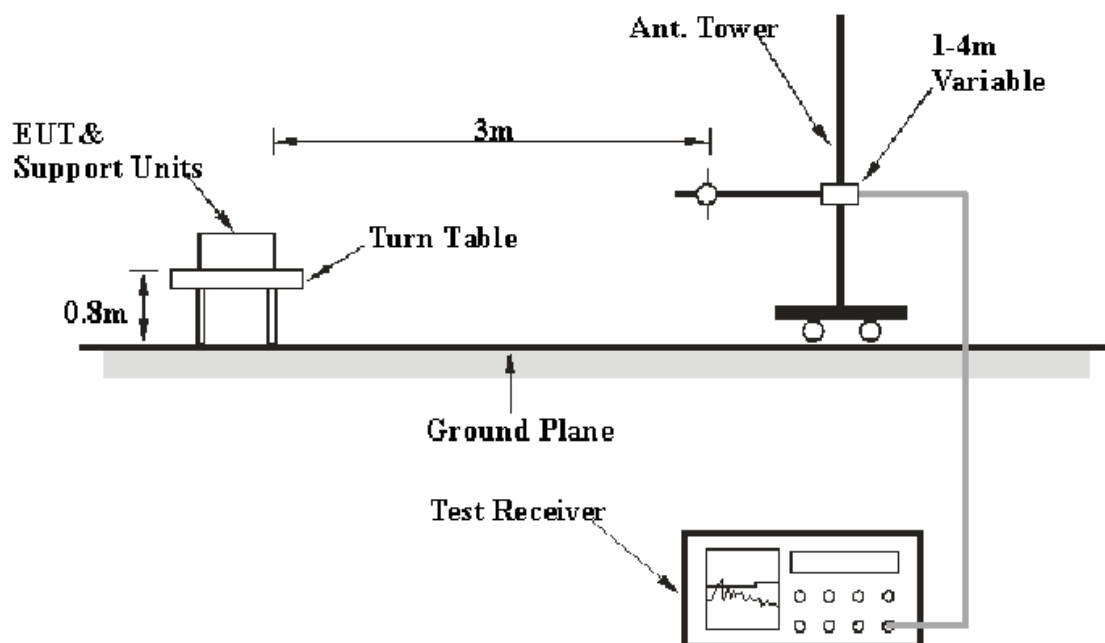
§15.205, §15.209, §15.231 (b) - RADIATED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber A test site, using the setup accordance with the ANSI C63.4 - 2003. The specification used was the FCC 15 § 15.209 and 15.231.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 5 GHz.

During the radiated emission test, the test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>VBW</i>
30 – 1000 MHz	100 kHz	300 kHz
1000 MHz – 5 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	8564E	3943A01781	2005-12-8	2006-12-8
HP	Amplifier	8449B	3008A00277	2006-8-17	2007-8-17
Sunol Sciences	Horn Antenna	DRH-118	A052604	2006-7-20	2007-7-20
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2005-11-7	2006-11-7
HP	Amplifier	HP8447E	1937A01046	2006-8-17	2007-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2006-4-28	2007-4-28

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Peak and Average detection mode.

Standard Applicable

According to § 15.231(b), In addition to the provisions of §15.205, 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 Harmonic 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.

Corrected Amplitude & Margin Calculation

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

$$\text{Cord. Amp.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Cord. Amp.} - \text{Limit}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 and 15.231, with the worst margin reading of:

30 -1000MHz: **-5.7 dB** at **315 MHz** in the **Horizontal** polarization.
Above 1GHz: **-24.5 dB** at **1575 MHz** in the **Horizontal** polarization.

Test Data

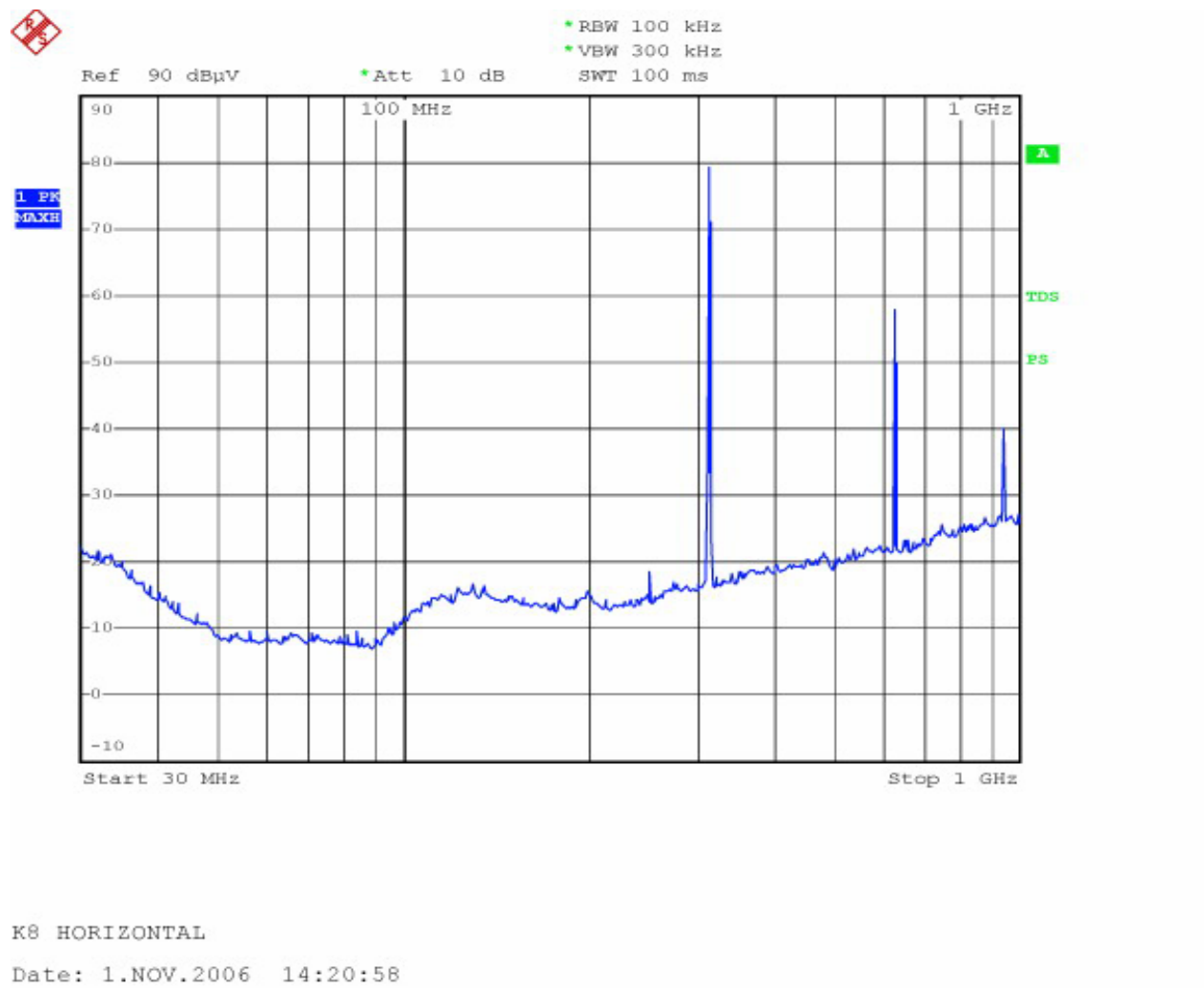
Environmental Conditions

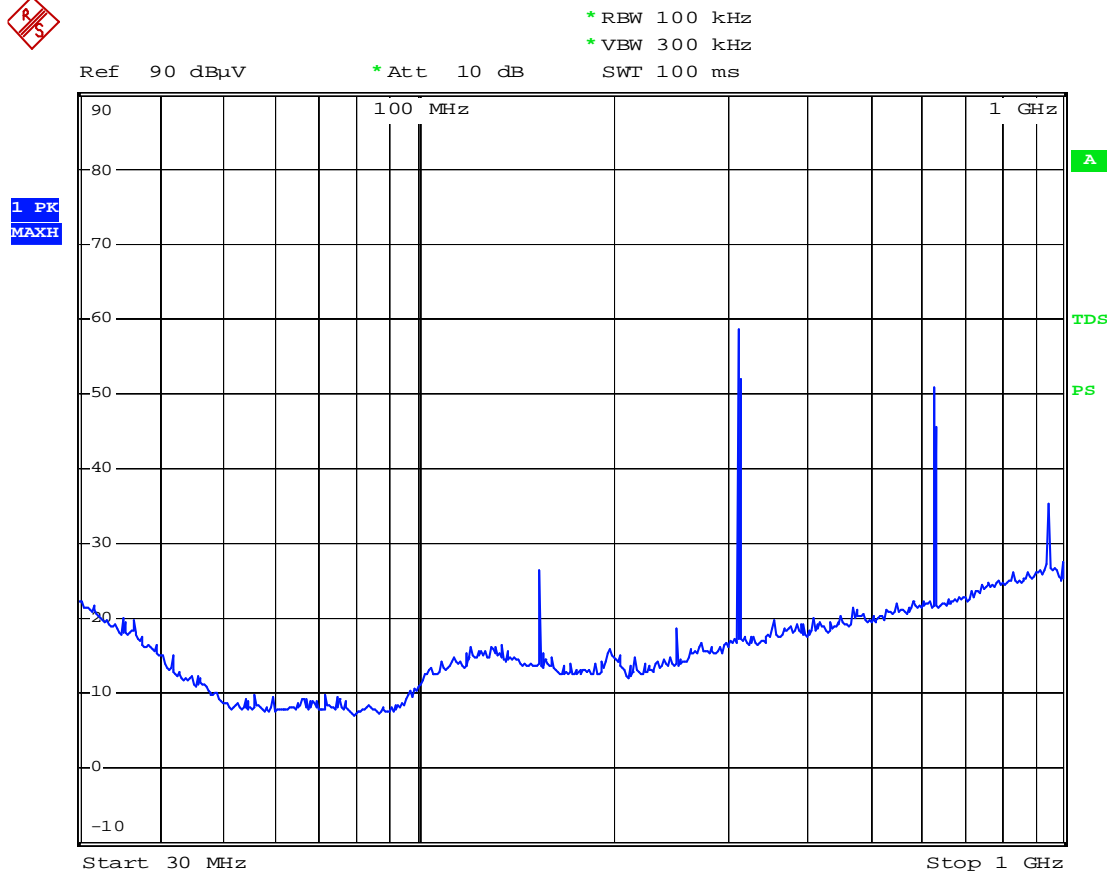
Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	1002mbar

The testing was performed by Lisa Zhu on 2006-11-01.

Test Mode: Transmitting

Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier Gain	Duty Cycle	Corr. Ampl.	FCC Part 15.231		
MHz	dBuV/m	PK/AV	Degree	Meter	H / V	dB	dB	dB	dB	dB uV/m	Limit dBuV/m	Margin dB	Comment
30 -1000MHz													
315	90.4	AV	45	1.0	H	12.2	2.5	25.8	-9.4	69.9	75.6	-5.7	Fundamental
630	60.9	AV	180	1.2	H	17.7	6.5	27.1	-9.4	48.6	55.6	-7.0	Harmonic
630	53.9	AV	90	1.2	V	17.7	6.5	27.1	-9.4	41.5	55.6	-14.1	Harmonic
315	90.4	PK	45	1.0	H	12.2	2.5	25.8	0	79.3	95.6	-16.3	Fundamental
630	60.9	PK	180	1.2	H	17.7	6.5	27.1	0	58.0	75.6	-17.6	Harmonic
630	53.9	PK	90	1.2	V	17.7	6.5	27.1	0	50.9	75.6	-24.7	Harmonic
945	43.8	AV	45	1.2	H	20.8	2.0	26.5	-9.4	30.5	55.6	-25.1	Harmonic
315	69.7	AV	45	1.0	V	12.2	2.5	25.8	-9.4	49.2	75.6	-26.4	Fundamental
945	38.9	AV	180	1.0	V	20.8	2.0	26.5	-9.4	25.8	55.6	-29.8	Harmonic
945	43.8	PK	45	1.2	H	20.8	2.0	26.5	0	40.1	75.6	-35.5	Harmonic
315	69.7	PK	45	1.0	V	12.2	2.5	25.8	0	58.6	95.6	-37.0	Fundamental
945	38.9	PK	180	1.0	V	20.8	2.0	26.5	0	35.2	75.6	-40.4	Harmonic
Above 1GHz													
1575	46.1	AV	180	1.2	V	26.5	2.8	36.5	-9.4	29.5	54.0	-24.5	Harmonic
1890	45.8	AV	180	1.2	H	27.3	3.0	36.1	-9.4	30.6	55.6	-25.0	Harmonic
1890	45.5	AV	90	1.0	V	27.3	3.0	36.1	-9.4	30.5	55.6	-25.1	Harmonic
1575	46.2	AV	90	1.0	H	26.5	2.8	36.5	-9.4	28.6	54.0	-26.4	Harmonic
1260	47.0	AV	180	1.2	H	24.8	2.5	35.8	-9.4	29.1	55.6	-26.5	Harmonic
1260	46.8	AV	90	1.0	V	24.8	2.5	35.8	-9.4	28.9	55.6	-26.7	Harmonic
1575	46.2	PK	90	1.0	H	26.5	2.8	36.5	0	39.0	74.0	-35.0	Harmonic
1575	46.1	PK	180	1.2	V	26.5	2.8	36.5	0	38.9	74.0	-35.1	Harmonic
1890	45.8	PK	180	1.2	H	27.3	3.0	36.1	0	40.0	75.6	-35.6	Harmonic
1890	45.5	PK	90	1.0	V	27.3	3.0	36.1	0	39.7	75.6	-35.9	Harmonic
1260	47.0	PK	180	1.2	H	24.8	2.5	35.8	0	38.5	75.6	-37.1	Harmonic
1260	46.8	PK	90	1.0	V	24.8	2.5	35.8	0	38.3	75.6	-37.3	Harmonic





K8 VERTICAL

Date: 1.NOV.2006 14:18:12

§15.231(c) -20dB BANDWIDTH TESTING

Requirement

Per 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-8-17	2007-8-17
HP	Amplifier	HP8447E	1937A01046	2006-8-17	2007-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2006-4-28	2007-4-28

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

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.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1009mbar

The testing was performed by Lisa Zhu on 2006-11-01.

Test Mode: Transmitting

Frequency (MHz)	Bandwidth Emission (kHz)	Limit (kHz)	Result
315.0	49.2	787.5	Pass

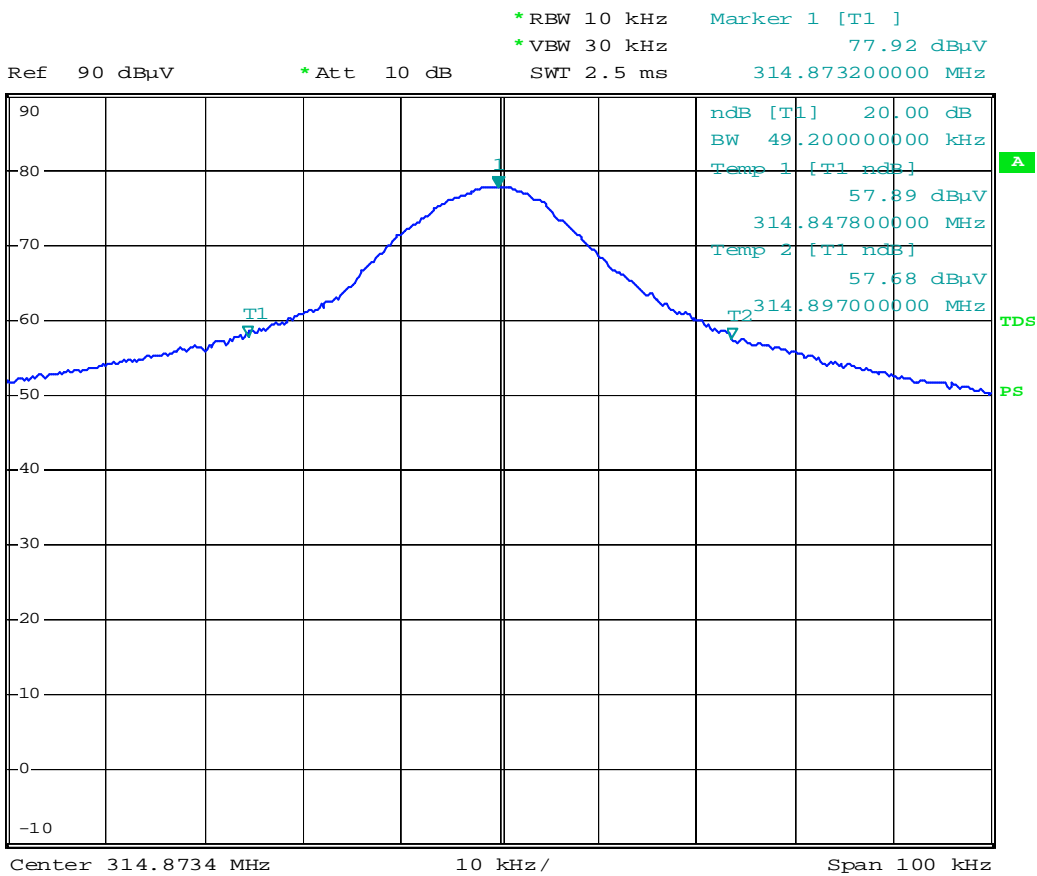
Limit = Frequency×0.25% = 315.0×0.25% = 787.5 kHz

Test Result: Pass

Please refer to the attached plot.



1 PK
MAXH



20 dB Bandwidth

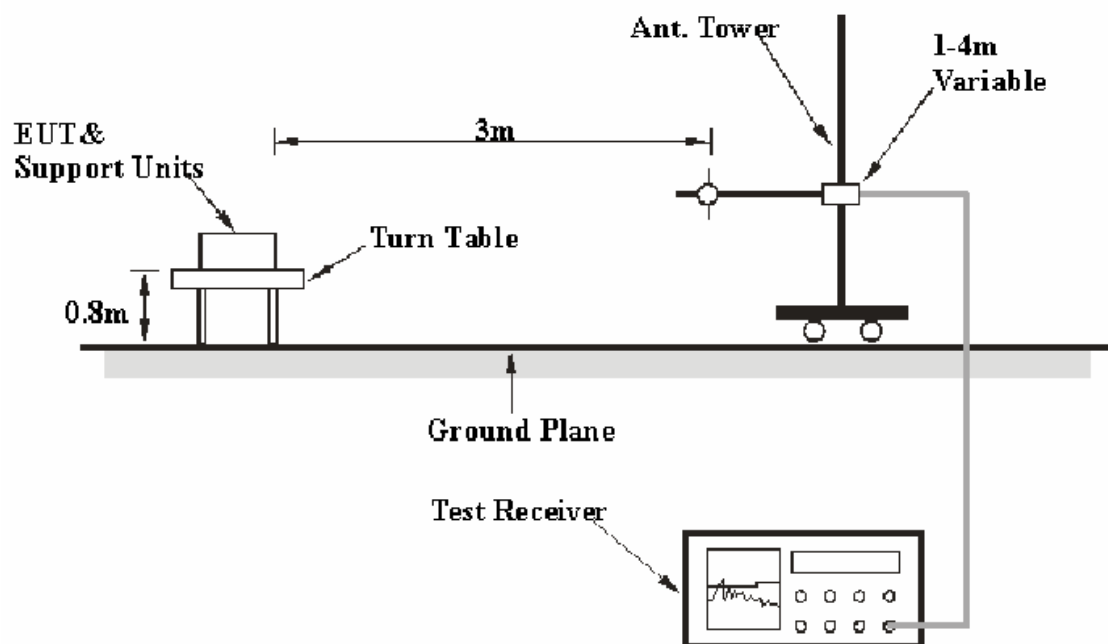
Date: 1.NOV.2006 14:23:26

§15.231(a) (1)-DEACTIVATION TESTING

Requirement

Per 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.

EUT Setup



The deactivation test was performed in the 3 meters chamber A test site, using the setup accordance with the ANSI C63.4 - 2003. The specification used was the FCC 15.231(a) limits.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2006-8-17	2007-8-17
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-8-17	2007-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2006-4-28	2007-4-28

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Test Data

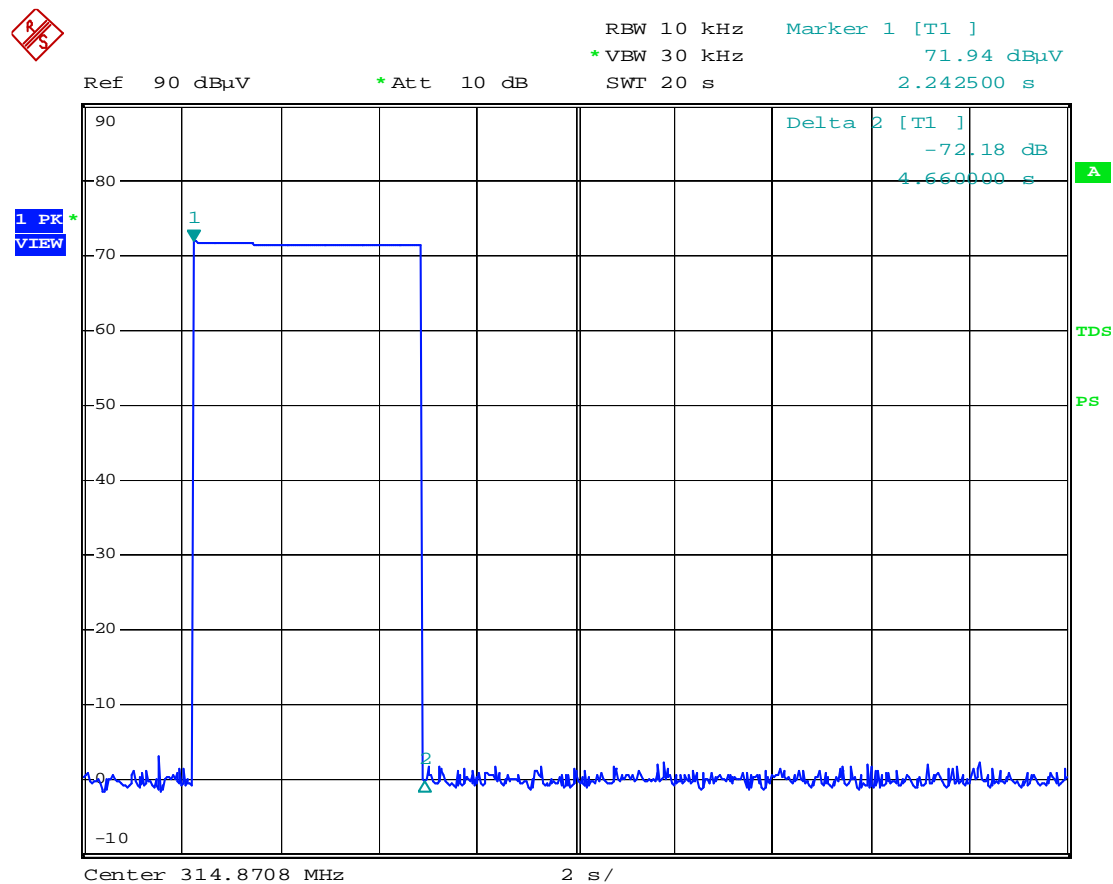
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	1000mbar

The testing was performed by Lisa Zhu on 2006-11-01.

Test Mode: Transmitting

Refer to the attached plots.



Deactivation testing

Date: 1.NOV.2006 15:01:11

§15.231- DUTY CYCLE

Limit

Nil (No dedicated limit specified in the Rules).

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	ESCI	100224	2006-11-07	2007-11-07

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (ShenZhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

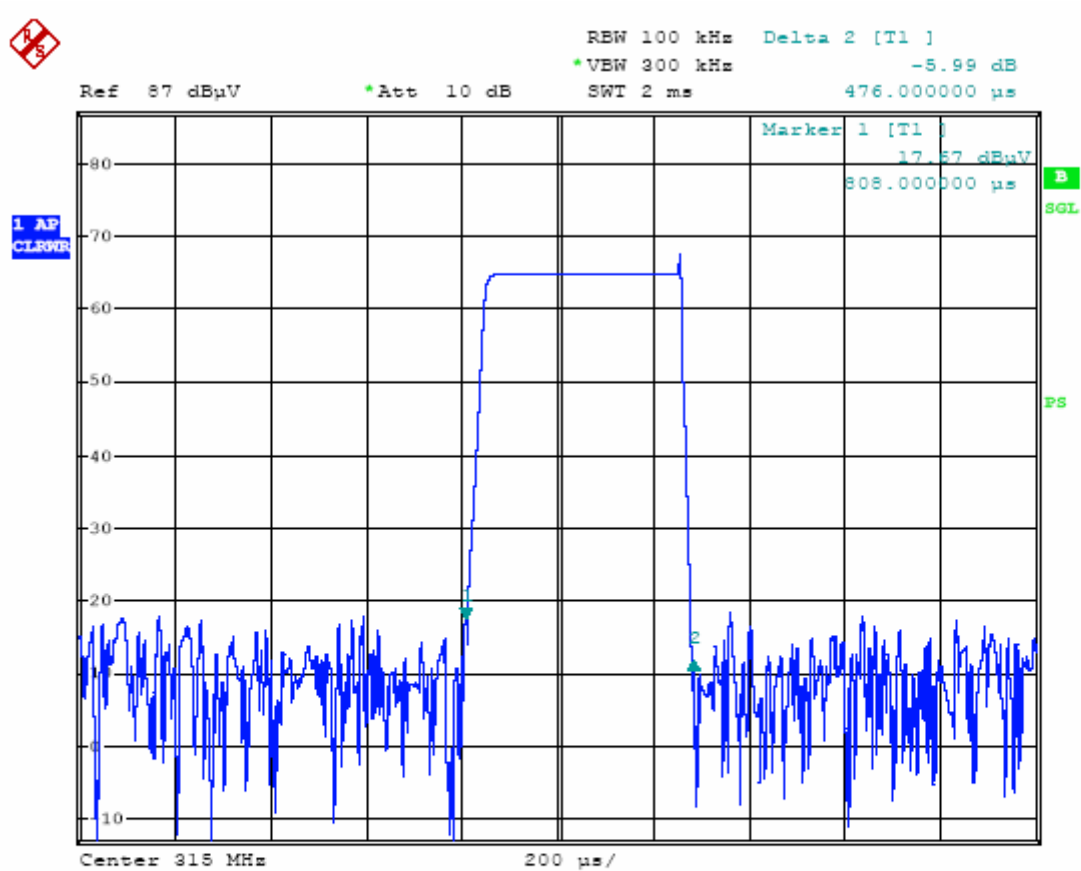
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer=operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=0Hz, Adjust Sweep=110ms.
5. Repeat above procedures until all frequency measured were complete.

Test Data

$T_p = 100 \text{ ms}$

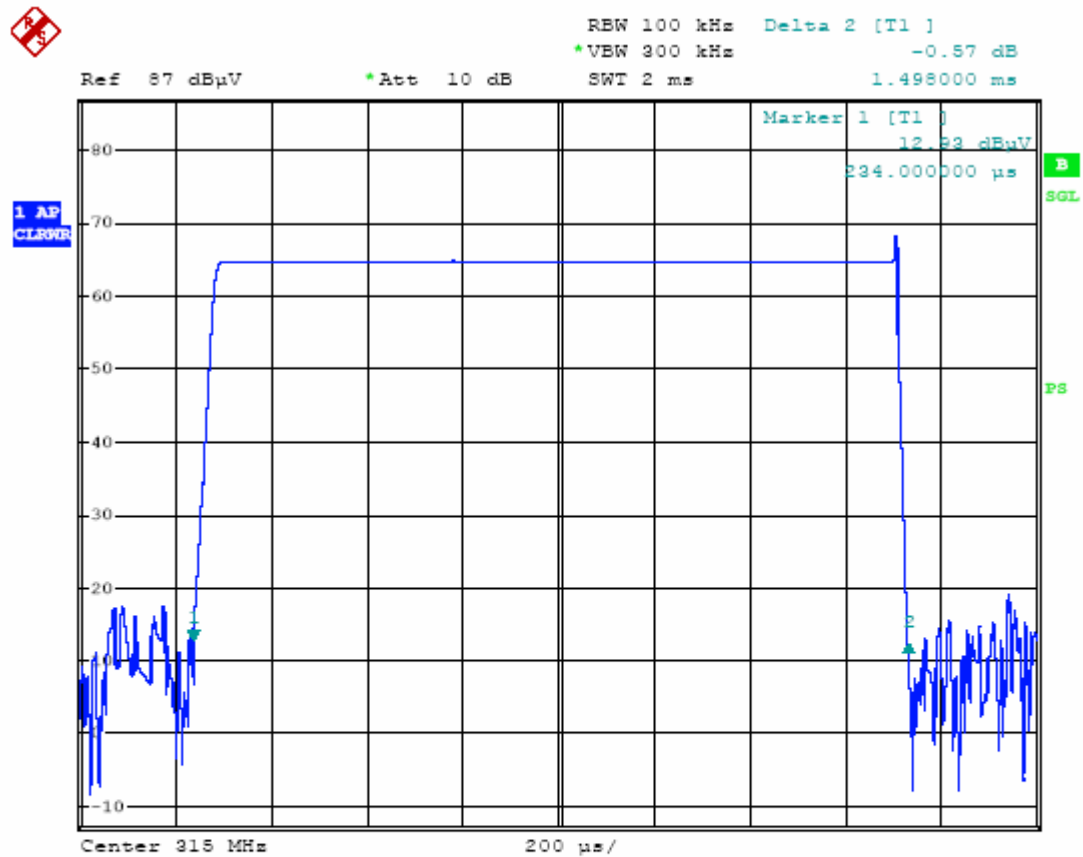
$T_{on} = 0.476 * 30 + 1.498 * 13 = 33.754 \text{ (ms)}$

$\text{Factor} = 20 * \log (T_{on} / T_p) = 20 * \log (33.754/100) = -9.4\text{dB}$



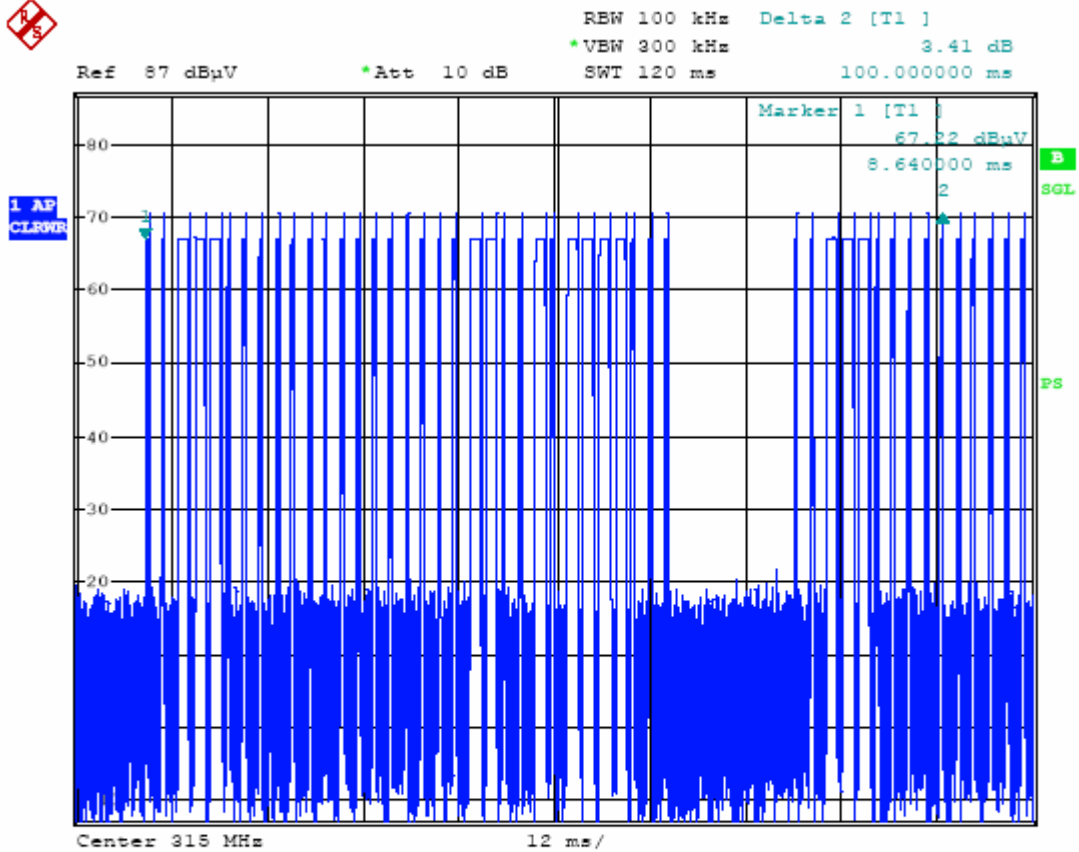
K8 Ton1

Date: 23.NOV.2006 09:01:21



K8 Ton2

Date: 23.NOV.2006 09:05:05



K8 Tp

Date: 23.NOV.2006 08:56:01