



NVLAP LAB CODE 200707-0



## FCC PART 15.231

### MEASUREMENT AND TEST REPORT

For

### TwinPro International Holdings Limited

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Mongkok, Kowloon, Hong Kong

**FCC ID: SLCTP256BHM**

<b>This Report Concerns:</b>	<b>Equipment Type:</b>
<input checked="" type="checkbox"/> Original Report	Wireless Outdoor/Indoor Rechargeable Speakers (Remote Controller)
<b>Test Engineer:</b>	Andy Yan <i>(Andy) Yan</i>
<b>Report Number:</b>	RSZ07070306
<b>Test Date:</b>	2007-07-14 to 2007-07-27
<b>Report Date:</b>	2007-09-19
<b>Reviewed By:</b>	EMC Manager: Boni Baniquid <i>Boni</i>
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**Note:** This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratory Corp. (Shenzhen) This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

The *TwinPro International Holdings Limited*'s product, model: 256 or the "EUT" as referred to in this report is a remote control unit for Wireless Outdoor/Indoor Rechargeable Speakers which measures approximately 8.9 cm L x 3.3 cm W x 1.0 cm H, rated input voltage: DC 3V battery.

*\* The test data gathered are from production sample, serial number: 0707006 provided by the manufacturer, we receive the EUT on 2007-07-03.*

### 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. (Shenzhen). 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 test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, 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>.

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## SYSTEM TEST CONFIGURATION

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### Justification

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

### EUT Exercise Software

N/A.

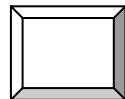
### Special Accessories

The special accessories were supplied by manufacturer.

### Equipment Modifications

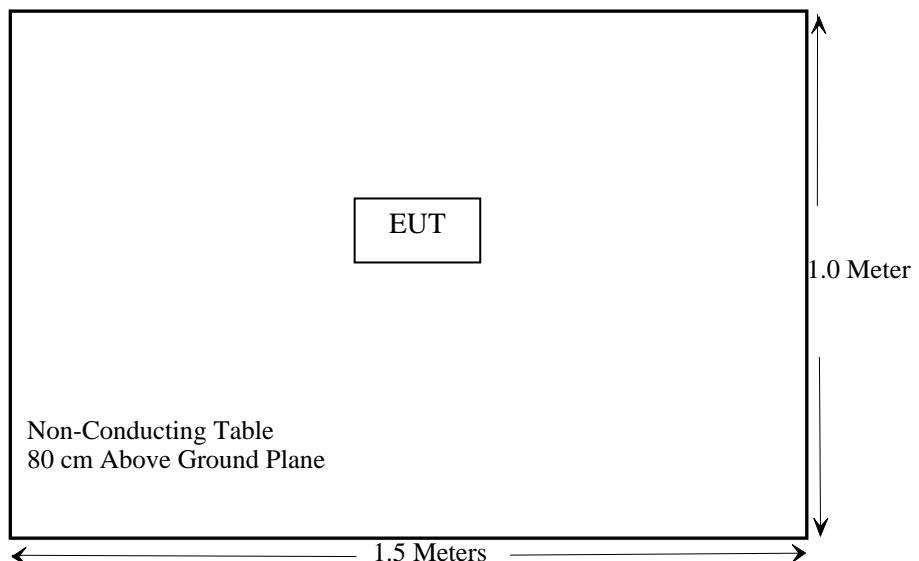
Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

## Configuration of Test Setup



EUT

## 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 Emissions	Compliant
§15.231 (c)	20dB Band Width Testing	Compliant
§15.231 (a)(1)	Deactivation Testing	Compliant
§15.231	Duty Cycle	Compliant

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## §15.203 - ANTENNA REQUIREMENT

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### Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

### Antenna Connector Construction

The EUT antenna is a built-on board antenna, which in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.

**Result:** Compliant. Please refer to EUT internal photos.

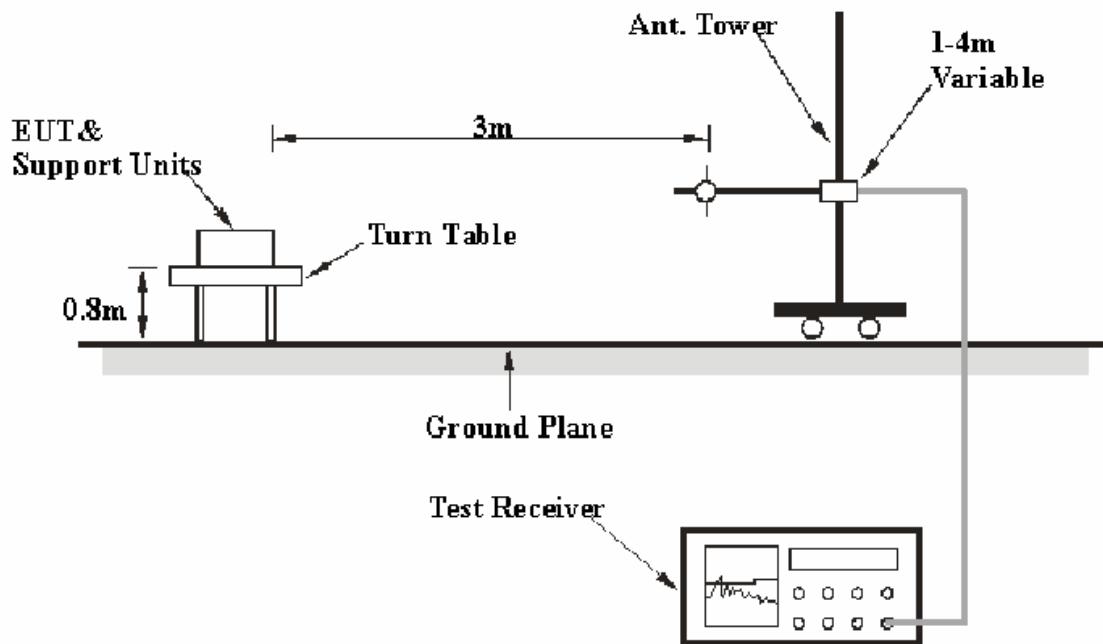
## §15.205, §15.209, §15.231 (b) - RADIATED EMISSIONS

### 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  $\pm 4.0$  dB.

### EUT Setup



The radiated emission tests were performed in the 3 meters chamber B 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:

<b>Frequency Range</b>	<b>RBW</b>	<b>VBW</b>
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
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22
HP	Pre-Amplifier	8449B	3008A00277	2006-09-29	2007-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2006-09-25	2007-09-25
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
HP	Pre-Amplifier	8447E	1937A01046	2006-11-15	2007-11-15
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2006-08-14	2007-08-14

\* **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), 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	1,250 to 3,370	125 to 375
174-260	3,750	375
260-470	3,750 to 12,500	375 to 1,250
Above 470	12,500	1,250

Linear interpolations for frequency ranges 130 - 174 MHz and 260 - 470 MHz.

The above field strength limits are specified at a distance of 3-meters the tighter limits apply at the band edges.

## 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 5.8dB means the emission is 5.8dB below the limit. The equation for margin calculation is as follows:

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

## Test Data

### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.2 kPa

The testing was performed by Andy Yan on 2007-07-14.

Test Mode: Transmitting

### Field strength of radiated emission (Peak):

Freq. (MHz)	Meter Reading (dBuV)	Detector PK/AV	Direction Degree	Ant.		Antenna Factor (dB/m)	Cable Loss (dB)	Pre- Amp Gain (dB)	Corr. Amp. (dB uV/m)	FCC Part 15.231/209		
				Height (m)	Polar (H/V)					Limit (dBuV/m)	Margin (dB)	Result
433.92	79.78	PK	180	1.0	H	16.80	3.12	27.36	72.34	100.8	28.46	Compliant
433.92	70.55	PK	180	1.0	V	16.80	3.12	27.36	63.11	100.8	37.69	Compliant
867.84	48.07	PK	45	1.0	H	22.20	3.93	26.67	47.53	80.8	33.27	Compliant
867.84	40.80	PK	45	1.0	V	22.20	3.93	26.67	40.26	80.8	40.54	Compliant
1301.76	57.00	PK	90	1.0	H	25.4	2.79	36	49.19	80.8	31.61	Compliant
1301.76	58.66	PK	180	1.2	V	25.4	2.79	36	50.85	80.8	29.95	Compliant
1735.68	57.05	PK	180	1.2	H	27.1	2.82	35	51.97	80.8	28.83	Compliant
1735.68	60.96	PK	45	1.2	V	27.1	2.82	35	55.88	80.8	24.92	Compliant

### Field strength of radiated emission (Average):

Freq. (MHz)	Peak measurement @3m (dB $\mu$ V/m)	Ant. Polar (H/V)	Duty Cycle Correction (dB)	Corrected Amp. (dB $\mu$ V/m)	FCC 15.231 Limit (dB $\mu$ V/m)	Result
433.92	72.34	H	-5.52	66.82	80.8	Compliant
433.92	63.11	V	-5.52	57.59	80.8	Compliant
867.84	47.53	H	-5.52	42.01	60.8	Compliant
867.84	40.26	V	-5.52	34.74	60.8	Compliant
1301.76	49.19	H	-5.52	43.67	60.8	Compliant
1301.76	50.85	V	-5.52	45.33	60.8	Compliant
1735.68	51.97	H	-5.52	46.45	60.8	Compliant
1735.68	55.88	V	-5.52	50.36	60.8	Compliant

## §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	2006-09-29	2007-09-29
HP	Pre-Amplifier	8447E	1937A01046	2006-11-15	2007-11-15
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2006-08-14	2007-08-14

\* **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:	100.9 kPa

The testing was performed by Andy Yan on 2007-07-25

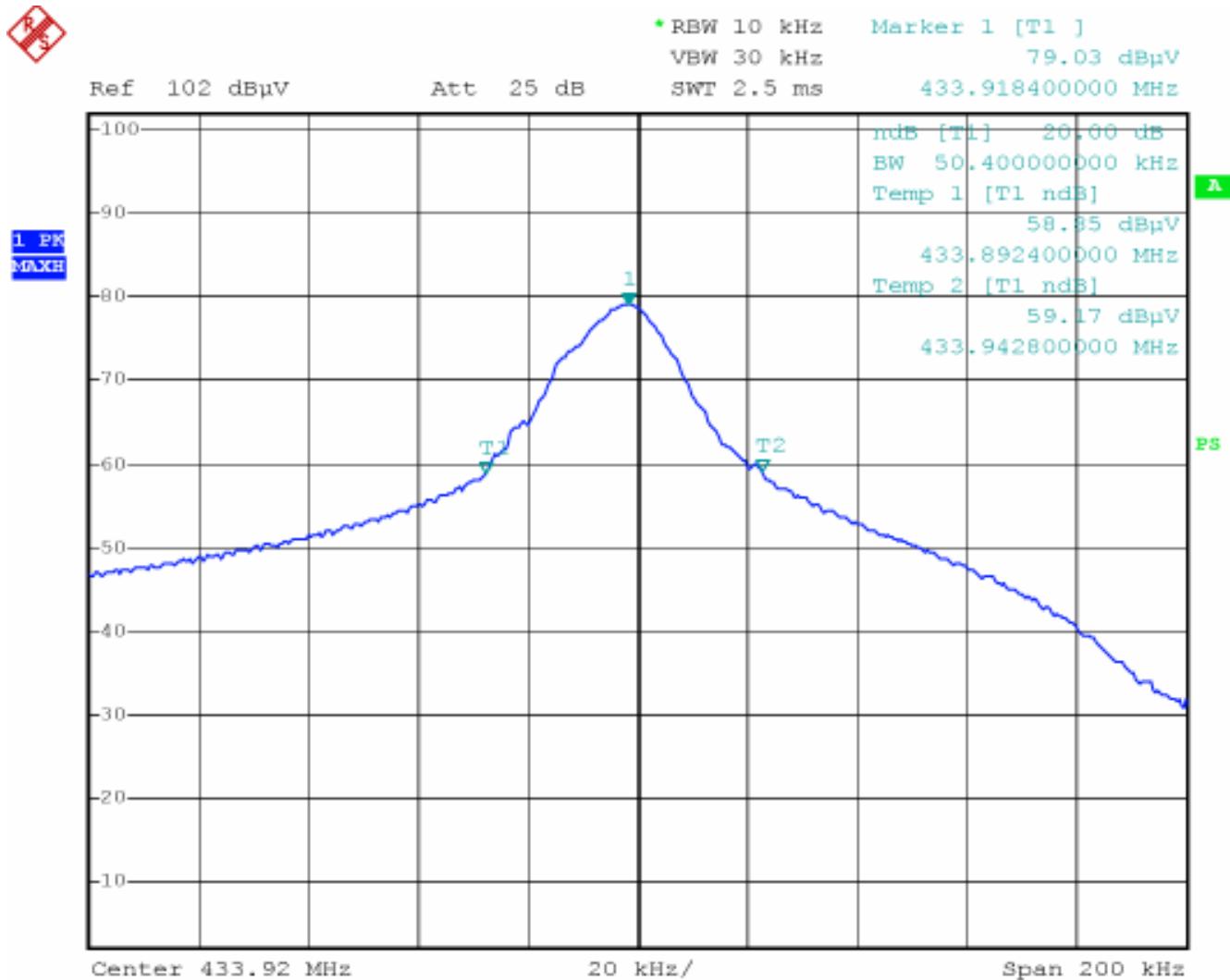
Test Mode: Transmitting

20 dB Bandwidth Limit = Fundamental \* 0.25% = 433.92 MHz \*0.25% =1084.8 kHz

Channel Frequency (MHz)	Measured 20dB Bandwidth (kHz)	Limit (kHz)
433.92	50.4	1084.8

Refer to the following plot:

## 20 dB Bandwidth



TWINPRO Wireless Outdoor/Indoor Rechargeable Speakers M/N:256

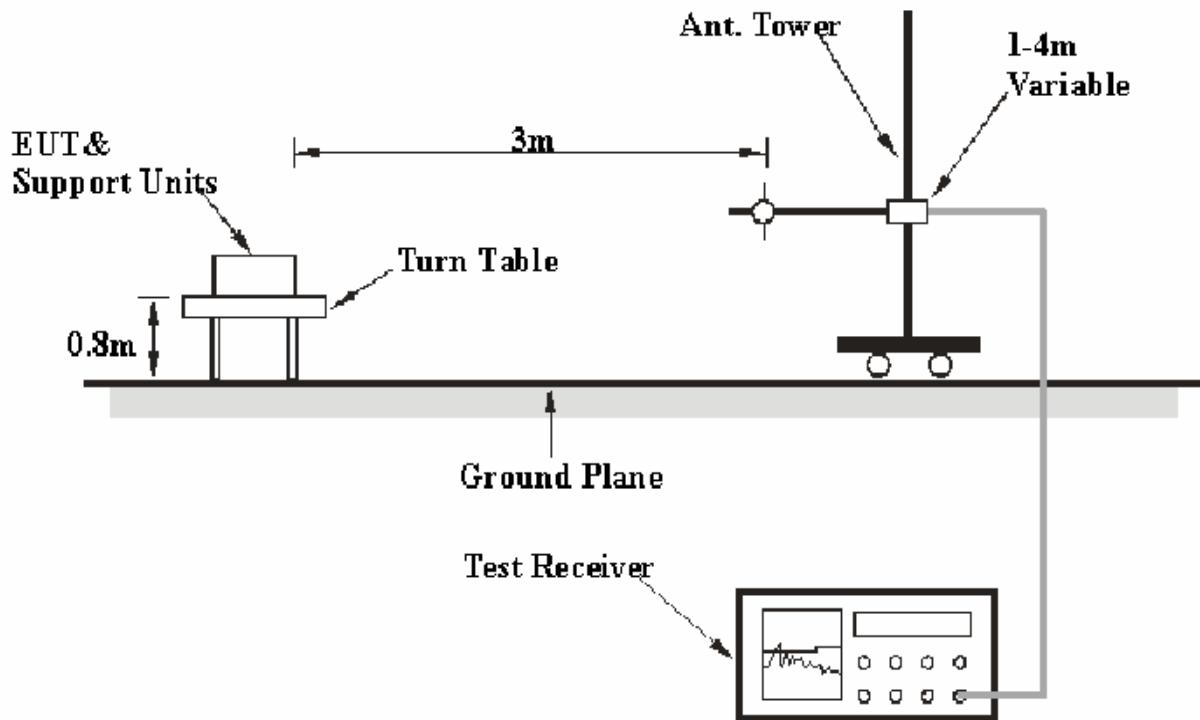
Date: 25.JUL.2007 10:44:04

## §15.231(a) - 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.

### Test Setup



The deactivation test was performed in the 3 meters chamber B 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
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
HP	Pre-Amplifier	8447E	1937A01046	2006-11-15	2007-11-15
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2006-08-14	2007-08-14

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

## Test Data

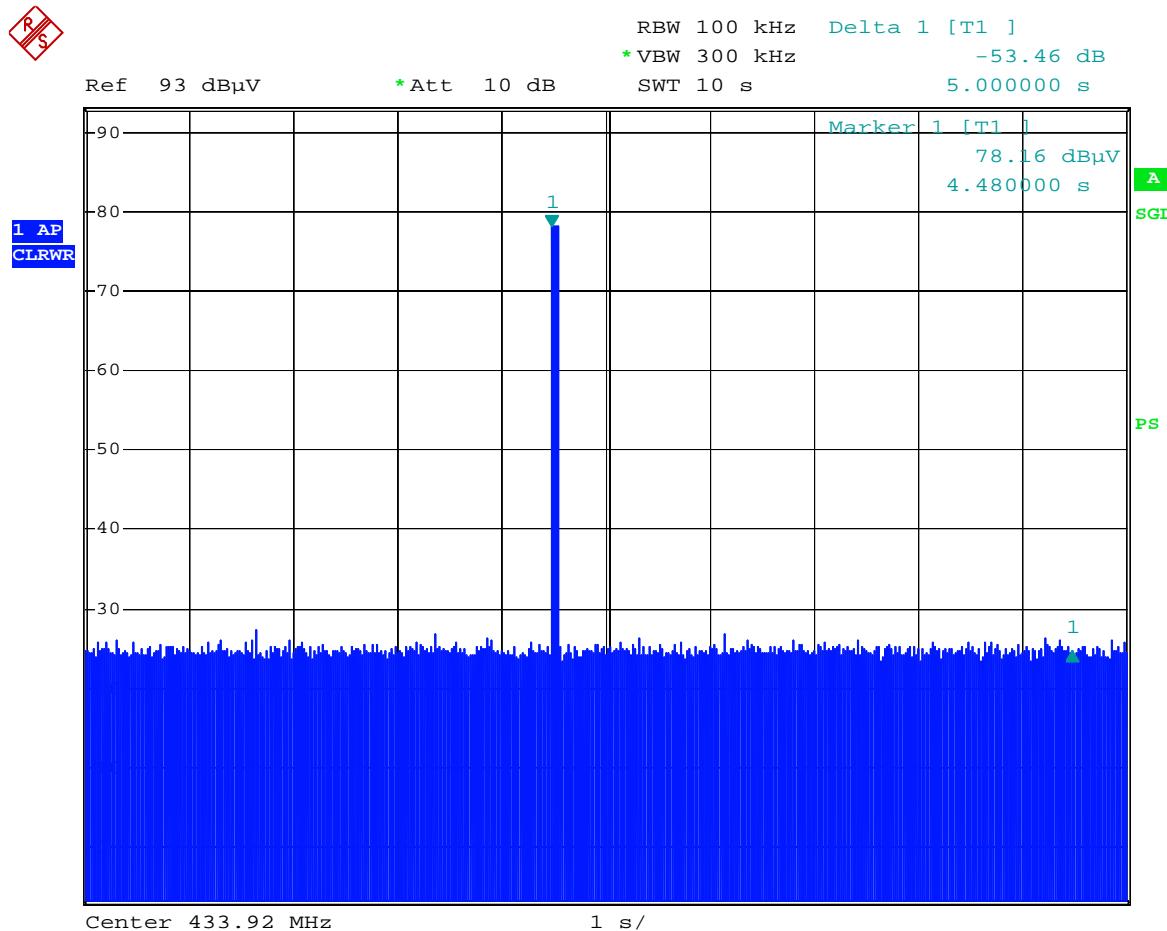
### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	103.2 kPa

The testing was performed by Leon Zhou on 2007-07-26.

Test Mode: Transmitting

**Result:** The transmitter will stop transmission within 5 seconds of being released.



TWINPRO Wireless Outdoor/Indoor Rechargeable Speakers M/N:25

6 Deactive time

Date: 26.JUL.2007 09:06:42

## §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	EMI Test Receiver	ESCI	100224	2006-09-29	2007-09-29

\* **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=100 kHz, Span=0Hz, Adjust Sweep=100ms.
5. Repeat above procedures until all frequency measured was complete.

### Test Data

#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	103.2 kPa

The testing was performed by Leon Zhou on 2007-07-26.

Test Mode: Transmitting

#### Result:

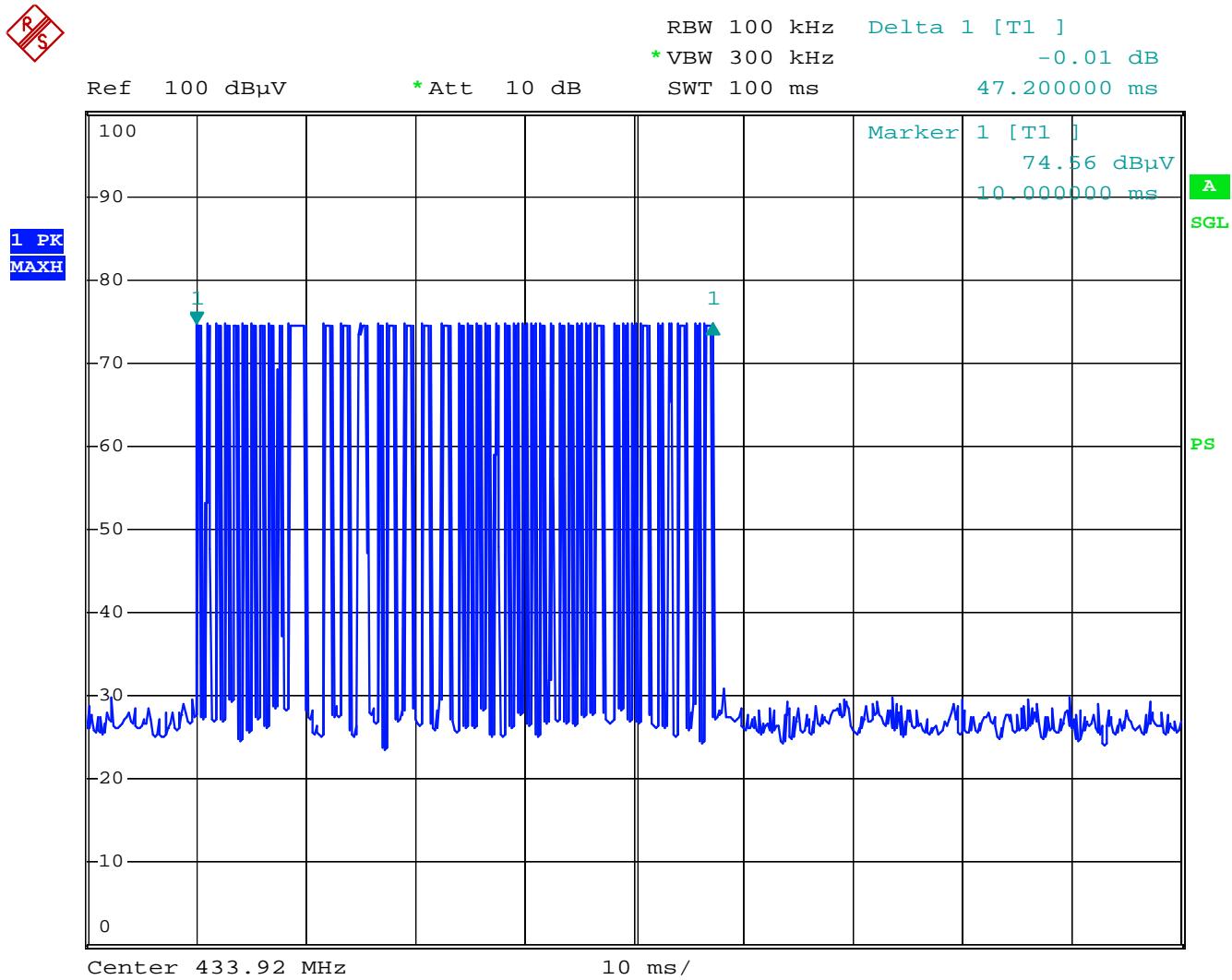
Tp = 47.2 ms

$$Ton = 0.440 * 32 + 0.840 * 11 + 1.680 * 1 = 14.08 + 9.24 + 1.68 = 25 \text{ (ms)}$$

$$\text{Duty Cycle Factor} = 20 * \log(Ton / Tp) = 20 * \log(25 / 47.2) = -5.52 \text{ dB}$$

Please refer to the following plots.

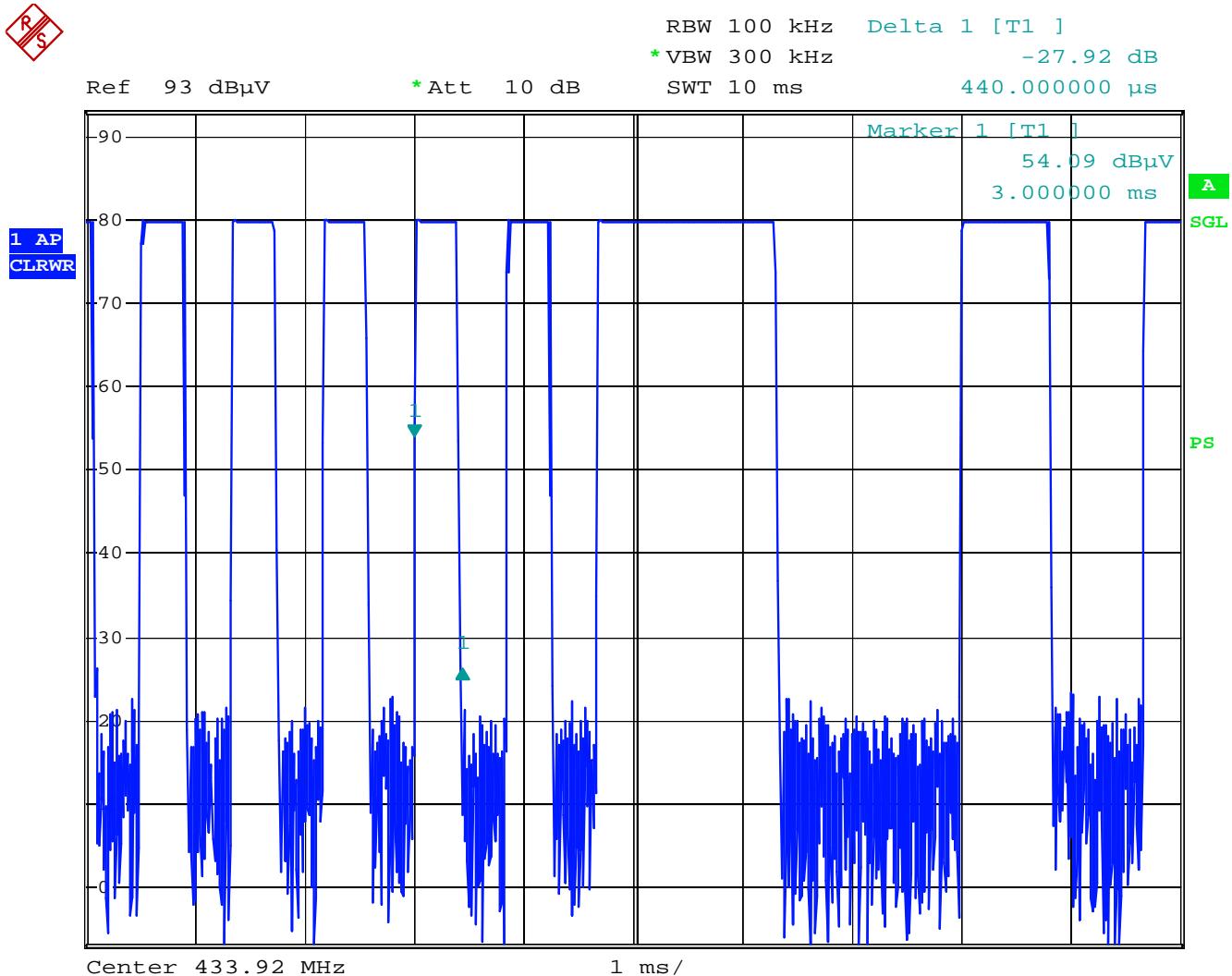
Plot-1



Duty cycle(Tp)

Date: 27.JUL.2007 16:12:43

## Plot-2

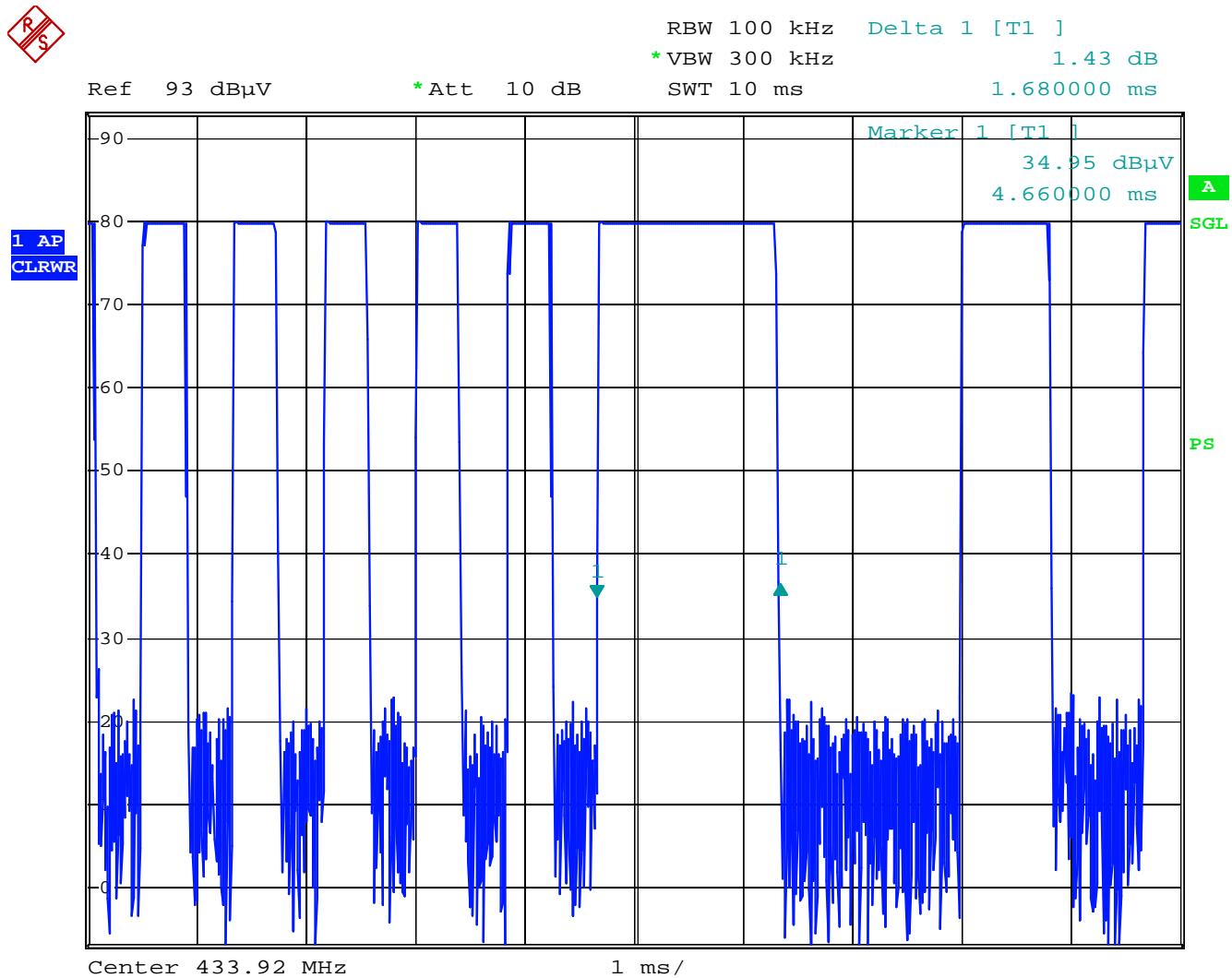


TWINPRO Wireless Outdoor/Indoor Rechargeable Speakers M/N:25

6 Duty cycle Ton1

Date: 26.JUL.2007 09:10:53

Plot-3

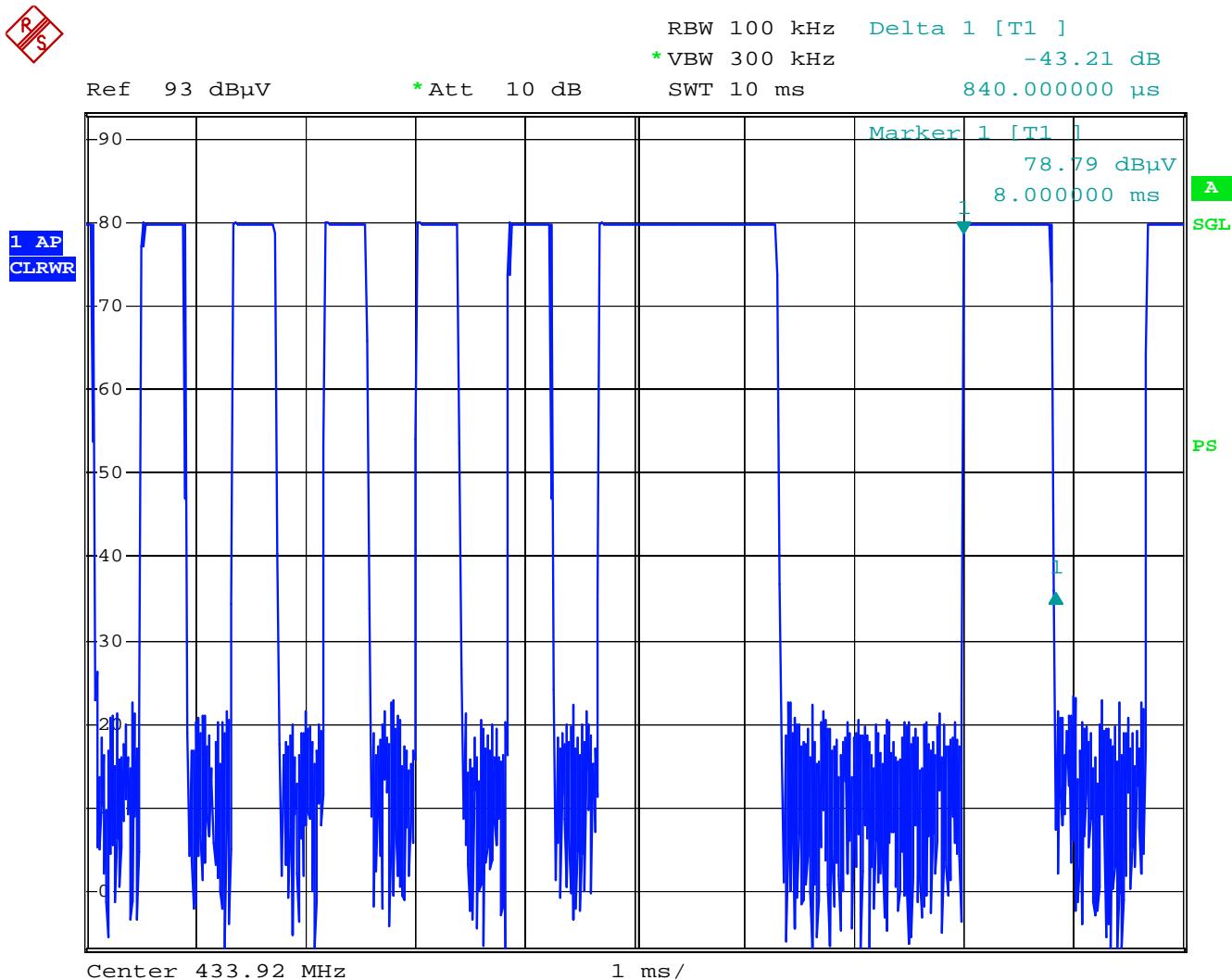


TWINPRO Wireless Outdoor/Indoor Rechargeable Speakers M/N:25

6 Duty cycle Ton2

Date: 26.JUL.2007 09:11:45

Plot-4



TWINPRO Wireless Outdoor/Indoor Rechargeable Speakers M/N:25

6 Duty cycle Ton3

Date: 26.JUL.2007 09:12:21

\*\*\*\*\*END OF REPORT\*\*\*\*\*