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FCC TEST REPORT

Under :
FCC 15 Subpart C, Paragraph 15.231

Prepared For :

Long-e Technology(Shenzhen) Co., Ltd.

C-6F, HuaHan Chuangxin Block, KeYuan Road, Hi-Tech Industry Zone, Shenzhen, China.

FCC ID: TUCTA32TA33
EUT: Remote Control
Model: TA33

September 8, 2008

Report Type: Original Report
Test Engineer: <u>Jacky Huang</u>
Test Date: <u>August 26, 2007</u>

Review By: _____ Apollo Liu / Manager

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1. General Information

1. 1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1. 2 Testing Laboratory

SinTek Laboratory Co., Ltd.

No.7, Xinshidai Industrial, Guantian Village, Shiyan Town, Bao'an District, Shenzhen, Guangdong China..

Tel: +86 755 27608353 Fax: +86 755 27608359

Site on File with the Federal Communications Commission – United States

Registration Number: 963441

1. 3 Details of Applicant

Name	:	Long-e Technology(Shenzhen) Co., Ltd.
Address	:	C-6F, HuaHan Chuangxin Block, KeYuan Road, Hi-Tech Industry Zone, Shenzhen, China.
Contact	:	N/A
Tel	:	N/A
Fax	:	N/A

1. 4 Application Details

Date of Receipt of Application	:	August 26, 2008
Date of Receipt of Test Item	:	August 26, 2008
Date of Test	:	August 26~September 8, 2008

1. 5 Test Item

Manufacturer	:	See Applicant
Trade Name	:	N/A
Model No.	:	TA33
Description	:	Remote Control

Additional Information

Frequency	:	433.88MHz
Transmission Range	:	N/A
Number of Channels	:	1
Antenna	:	Internal
Power Supply	:	DC 12V
Extreme Temp. Tolerance	:	N/A

1. 6 Test Standards

Title 47 CFR, FCC Part 15, including: 15.203, 15.205, 15.207, 15.209, 15.231a, 15.231b and 15.231c.

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2. Technical Test

2. 1 Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.203	Antenna Requirement	PASS	Complies
FCC Part 15, Paragraph 15.207	Conducted Test	N/A	Owing to the DC operation of EUT, this test item is not performed.
FCC Part 15 Subpart C Paragraph 15.231(a)	Periodic Operation Characteristics	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.231(b) Limit	Field Strength of Fundamental	PASS	Complies
FCC Part 15, Subpart C Paragraph 15.231(b) Limit & Paragraph 15.209, Paragraph 15.205(b)	Radiated Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.231(c) Limit	Measured 20 dB Bandwidth	PASS	Complies.

3. EUT Modifications

No modification by test lab.

4. Conducted Power Line Test

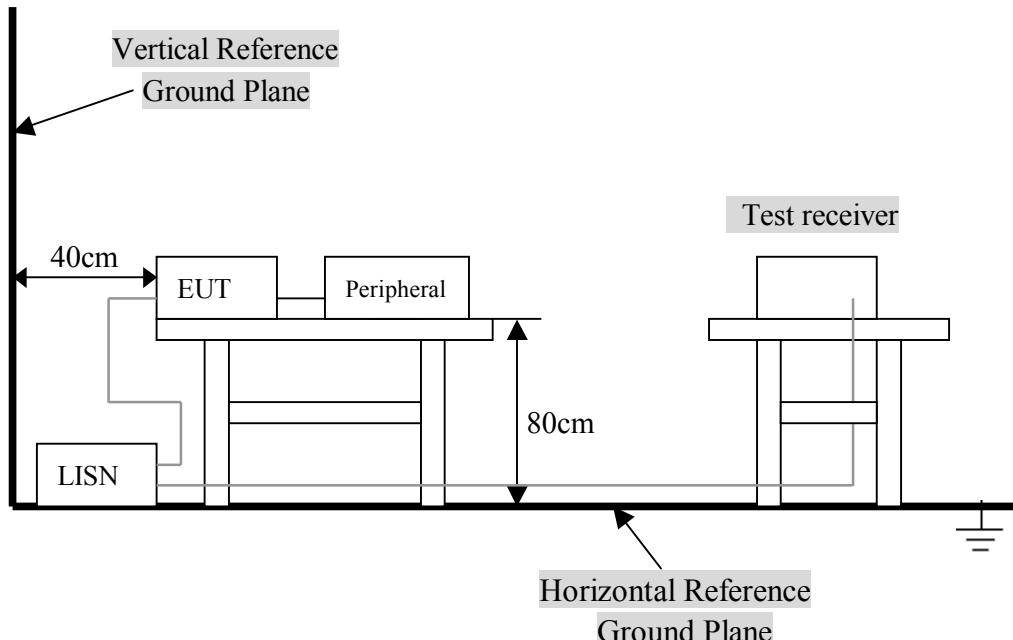
4. 1 Test Equipment

Please refer to Section 9 this report.

4. 2 Test Procedure

The EUT was tested according to ANSI C63.4 - 2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 uHenry as specified by section 5.1 of ANSI C63.4 - 2003. cables and peripherals were moved to find the maximum emission levels for each frequency.

4. 3 Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.

4. 4 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. EUT was used DC 12V. Press any key of the EUT. Once the button releasing, the transmission will be stopped within 3 second. The EUT transmitted continuously and the duty cycle of transmitting was set to worst case condition, which provided by manufacturer during all the tests. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model #	FCC ID
Remote Control	Long-e Technology (Shenzhen) Co., Ltd.	TA33	TUCTA32TA33

B. Internal Devices

Device	Manufacturer	Model #	FCCID / DoC
N/A			

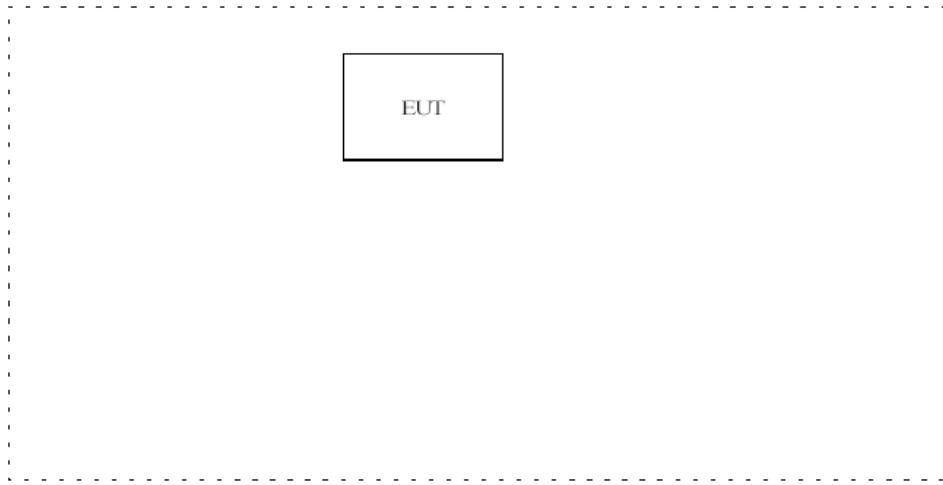
C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
N/A				

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 2003.

- A. Setup the EUT and simulators as shown on follow.
- B. Enable RF signal and confirm EUT active.
- C. Modulate output capacity of EUT up to specification.



4. 6 Conducted Power Line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency Range (MHz)	Class A QP/AV	Class B QP/AV
0.15 – 0.5	79/66	66-56/56-46
0.5 – 5.0	73/60	56/46
5.0 - 30	73/60	60/50

NOTE : In the above table, the tighter limit applies at the band edges.

4. 7 Conducted Power Line Test Result

Owing to the DC operation of EUT, this test item is not performed.

5. Radiated Emission Test

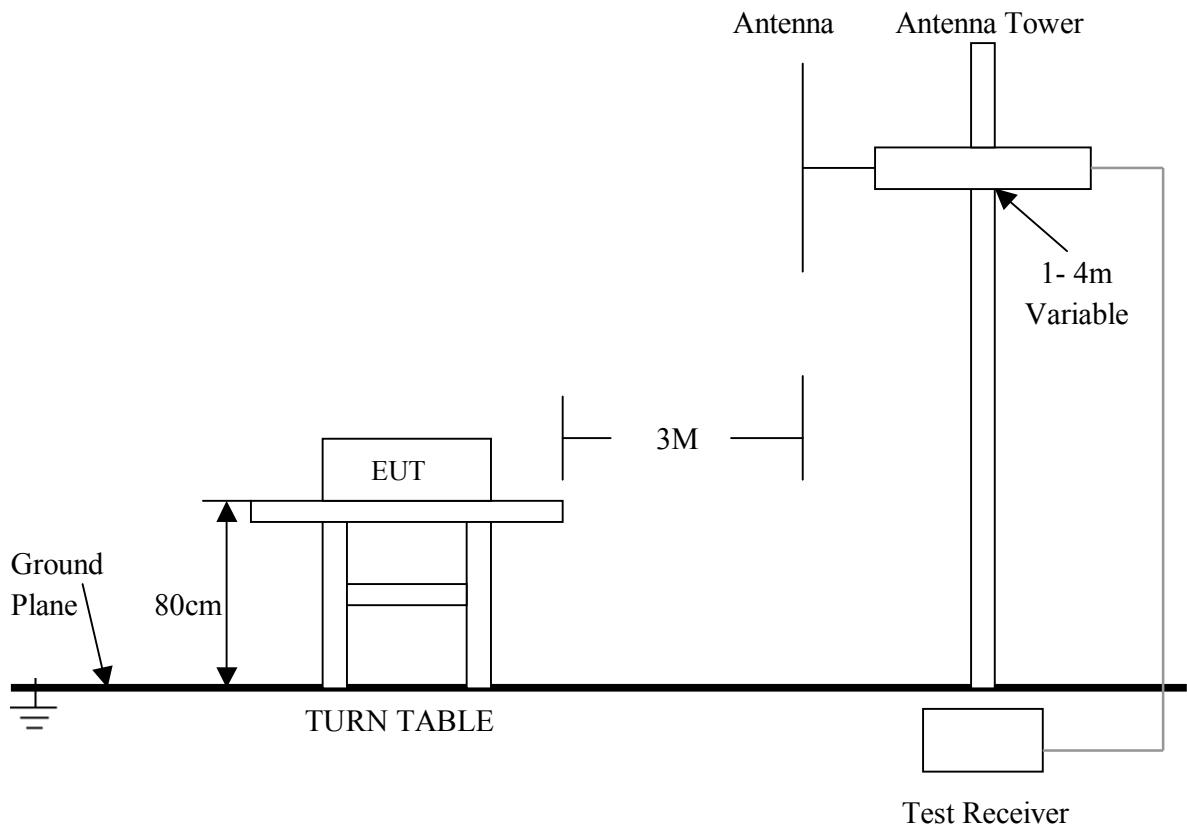
5. 1 Test Equipment

Please refer to Section 9 this report.

5. 2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2003.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
3. The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
6. The antenna polarization : Vertical polarization and Horizontal polarization.

5. 3 Radiated Test Setup



For the actual test configuration , please refer to the related items – Photos of Testing.

5. 4 Configuration of The EUT

Same as section 4 . 4 of this report

5. 5 EUT Operating Condition

Same as section 4 . 5 of this report.

5. 6 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below :

A. FCC Part 15 Subpart C Paragraph 15.231(b) Limit

Calculation of Radiated Emissions limits for FCC Part 15.231b (260-470MHz)

Field Strength of Fundamental / Harmonic Frequencies:

The calculation involves a linear interpolation of 3750 to 12500 uV/m over 260 - 470 MHz, where field strength of the fundamental frequency (f_0) when, $260 \leq f_0 \leq 470$ MHz, can be found by: $41.6667(f_0) - 7083.3333$, where f_0 is in MHz.

Field Strength of Spurious / Harmonic Frequencies:

The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

where $f_0 = 433.88$ MHz

Fundamental: $41.6667(433.88) - 7083.3333 = 10995.0$ uV/m

Fundamental Frequency (MHz)	Field Strength of Fundamental (3m)		Field Strength of Harmonics (3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
433.88	10995.0	80.8	1099.95	60.8

Note:

- (1) RF Voltage (dBuV) = $20 \log_{10}$ RF Voltage (uV)
- (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (3) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

B. Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency (MHz)	Distance (m)	Field Strength (dBuV/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
ABOVE 960	3	54.0

Note:

- (1) RF Voltage (dBuV) = $20 \log_{10}$ RF Voltage (uV)
- (2) In the Above Table, the tighter limit applies at the band edges.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the

5. 7 Radiated Emission Test Result

A. Fundamental Radiated Emission Data

Product	: Remote Control	Test Mode	: Normal
Test Item	: Fundamental Radiated Emission Data	Temperature	: 25 °C
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: PASS		

Freq. (MHz)	Emission Peak (dBuV/m)	Calculated Average Level (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
433.880	76.7	73.8	HORIZ	80.8	-7.0
433.880	63.7	60.8	VERT	80.8	-20.0

Note: (1) Emission Level = Reading Level + Probe Factor + Cable Loss + Duty Cycle.
 (2) The Duty Cycle = 2.9dB, Refer to section 6.2 of this report.

B. General Radiated Emission Data & Harmonics Radiated Emission Data

Product	: Remote Control	Test Mode	: Normal
Test Item	: General Radiated Emission Data & Harmonics Radiated Emission Data	Temperature	: 25 °C
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: PASS		

Freq. (MHz)	Emission Peak (dBuV/m)	Calculated Average Level (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
867.76	56.2	53.2	HORIZ	60.8	-7.62
867.76	47.3	44.4	VERT	60.8	-16.4
1301.64	46.4	43.5	HORIZ	60.8	-17.3
1301.64	40.3	37.4	VERT	60.8	-23.4
4338.80	-	-	HORIZ	-	-
4338.80	-	-	VERT	-	-

Note: (1) Emission Level = Reading Level + Probe Factor + Cable Loss + Duty Cycle.
 (2) The Duty Cycle = 2.9dB, Refer to section 6.2 of this report.

6. Technical Characteristic

6.1 Band Edge

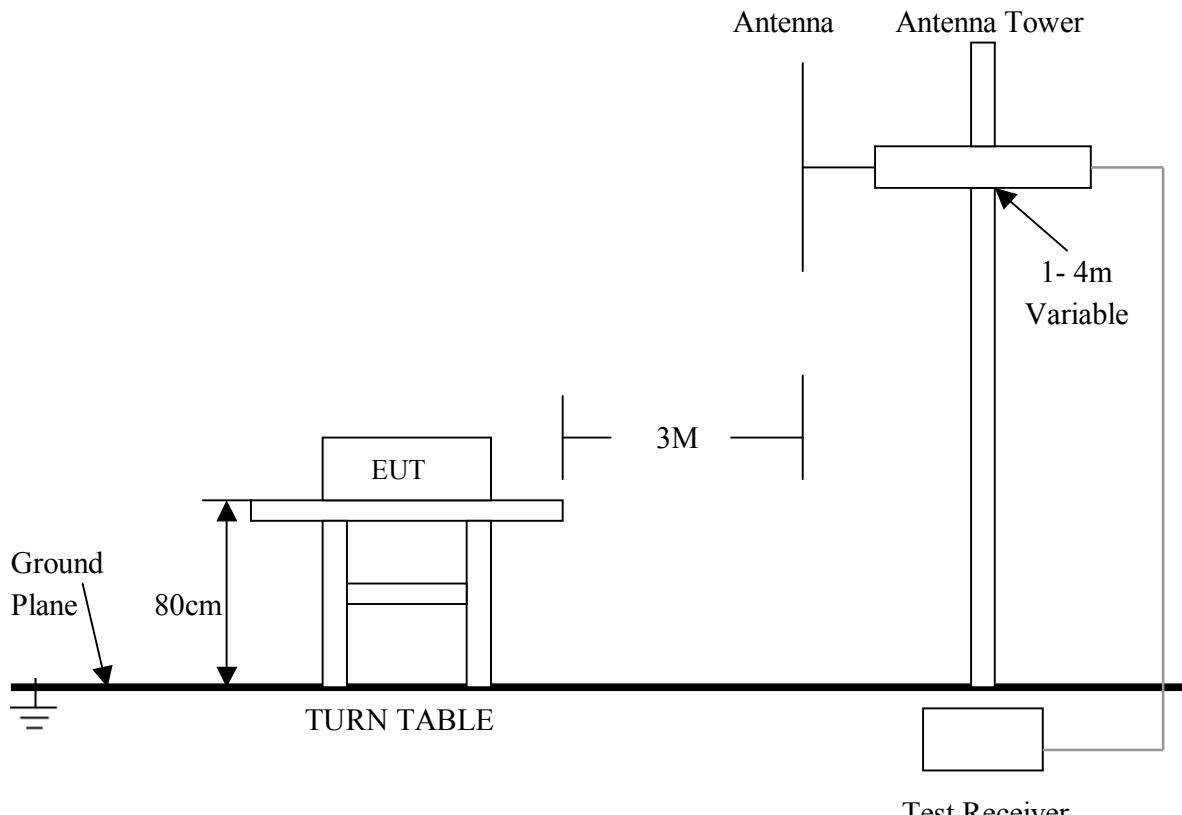
6.1.1 Test Equipment

Please refer to Section 9 this report.

6.1.2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2003.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
3. The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The antenna high were varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement. The bandwidth below 30MHz setting on the field strength meter is 10 kHz, above 1GHz are 1 MHz.
6. Maximizing procedure was performed on the highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
7. The antenna polarization : Vertical polarization and horizontal polarization.

6.1.3 Radiated Test Setup



For the actual test configuration , please refer to the related items – Photos of Testing

6.1.4 Configuration of The EUT

Same as section 4 . 4 of this report

6.1.5 EUT Operating Condition

Same as section 4 . 5 of this report.

6.1.6 Band Edge FCC 15.231 Limit

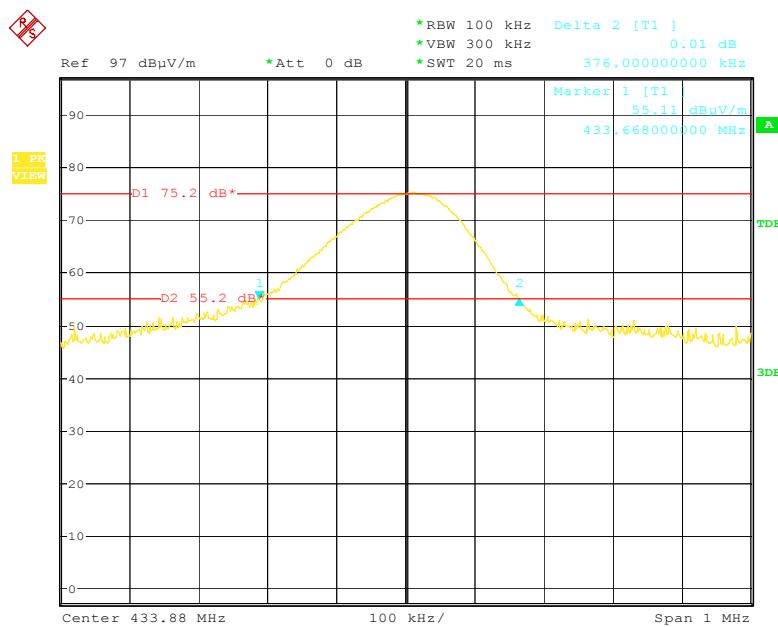
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20dB down from the modulated carrier.

$$B.W(20\text{dBc}) \text{ Limit} = 0.25\% \times f(\text{MHz}) = 0.25\% \times 433.88\text{MHz} = 1.085\text{MHz}$$

From the plot, the bandwidth is observed to be 0.376MHz, at 20dBc where the bandwidth limit is 1.085MHz.

6.1.7 Band Edge Test Result

Product	: Remote Control	Test Mode	: Normal
Test Item	: Band Edge Data	Temperature	: 25 °C
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: PASS		



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Note:

- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.
- (2) The average measurement was not performed when the peak measured data under the limit of average detection.

6.2 Calculation of Average Factor

For a graphical presentation of the data bursts being transmitted from the transmitter, refer to below figures for the amount of time that the transmitter is active. Figures are provided that show the On-time of the transmitter that occurs when a key is held down continuously, and also over a 100 milliseconds (worst case) period. In the 100 millisecond window, with 111.6ms packet length, and 111.6 ms between packets with each packet consisting of 95 bits we will obtain a total of 1 packet transmitted during the 111.6 ms interval. If all bits are high and each bit is 0.846ms long, the On-time for a burst is; 0.846ms x 95 bits = 80.37ms.

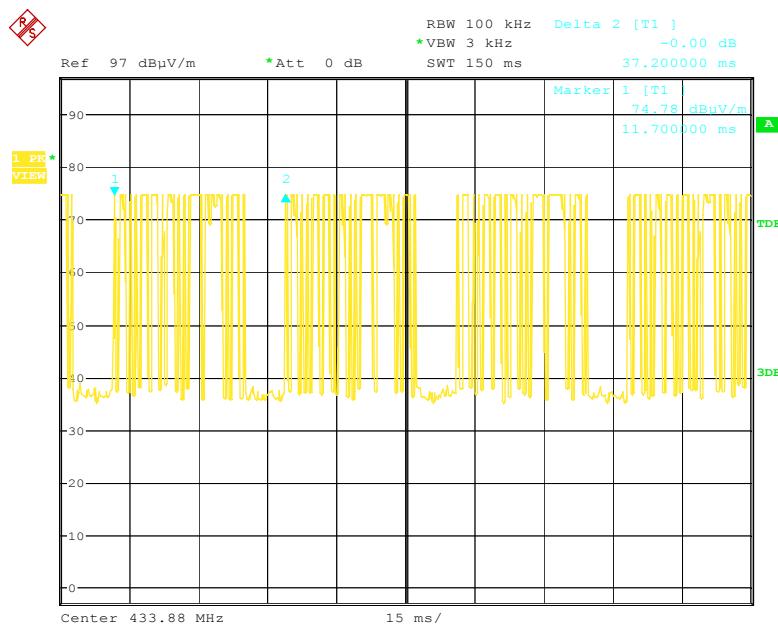
The duration of one cycle = 111.6ms

Effective period of the cycle = 80.37ms

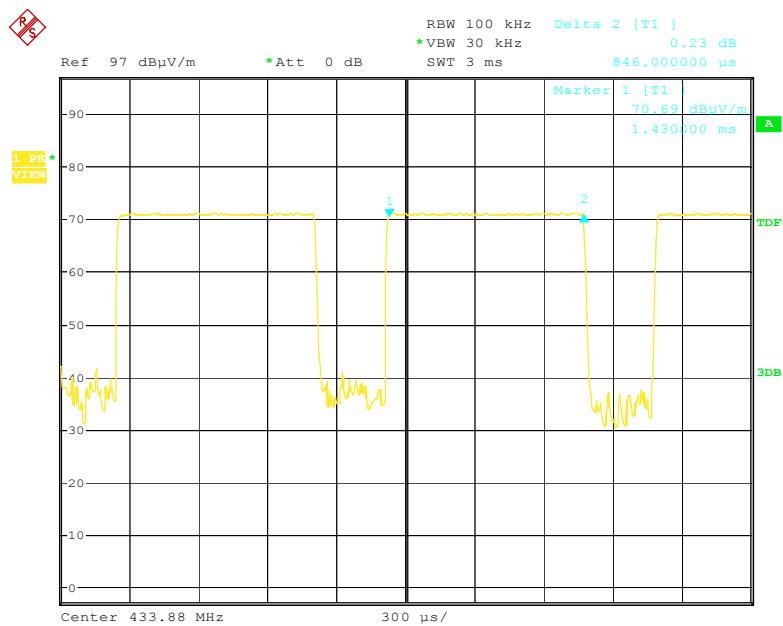
DC = 80.37ms / 111.60ms = 0.72

Averaging Factor = $20 \times \log(0.72) = -2.9\text{dB}$

Duty Cycle Detail, Over a 150 ms Interval

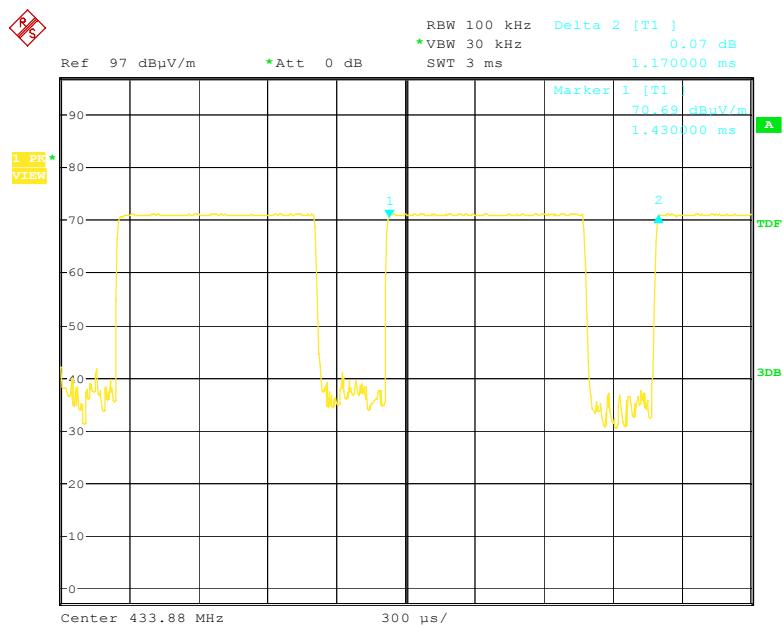


Duty Cycle Detail, Over a 3.0 ms Interval



Date: 8.SEP.2008 15:30:49

Duty Cycle Detail, Over a 3.0 ms Interval

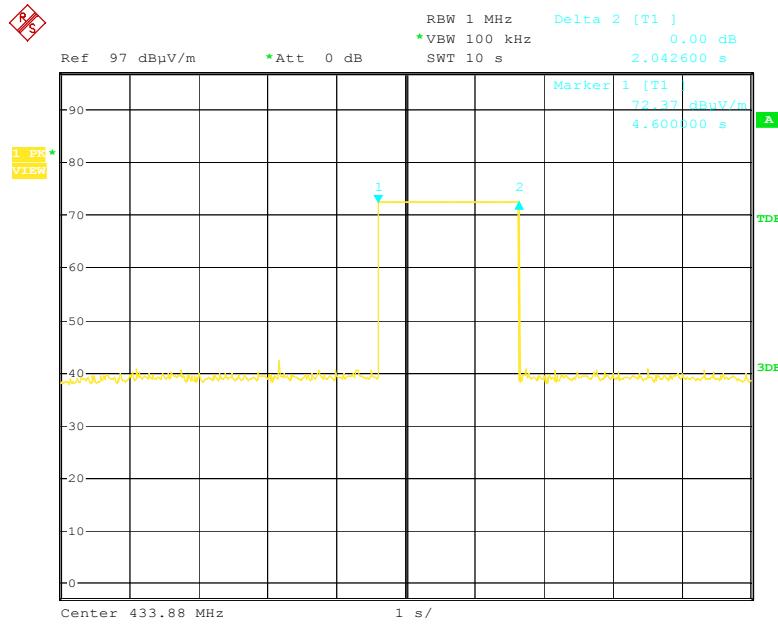


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6.3 Manually Operated Transmitter Deactivation

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

Transmitter Turn-Off Release Time, Upon Momentary Activation of Push Switch (Showing release time less than 3 second)



Date: 8.SEP.2008 15:35:38

6. 4 Antenna Requirement

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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

The EUT's antenna is a trace on the PCB. The EUT meets the requirements of this section.

7. Photos of Testing

7. 1 EUT Test Photographs

Radiated emission test view



7.2 EUT Detailed Photographs

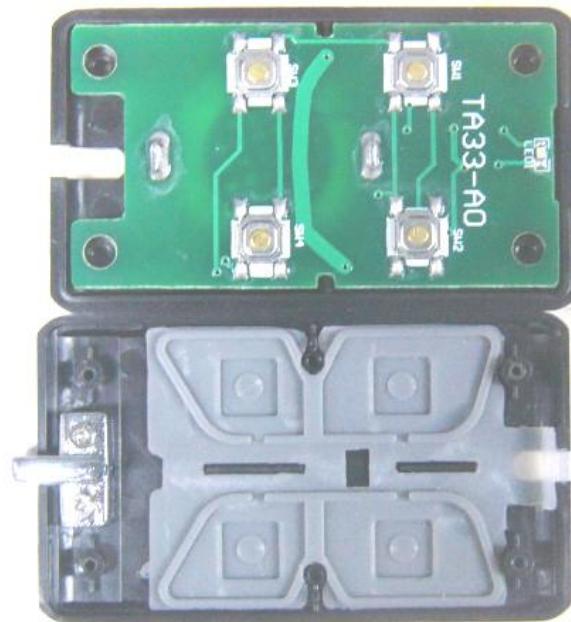
EUT top view



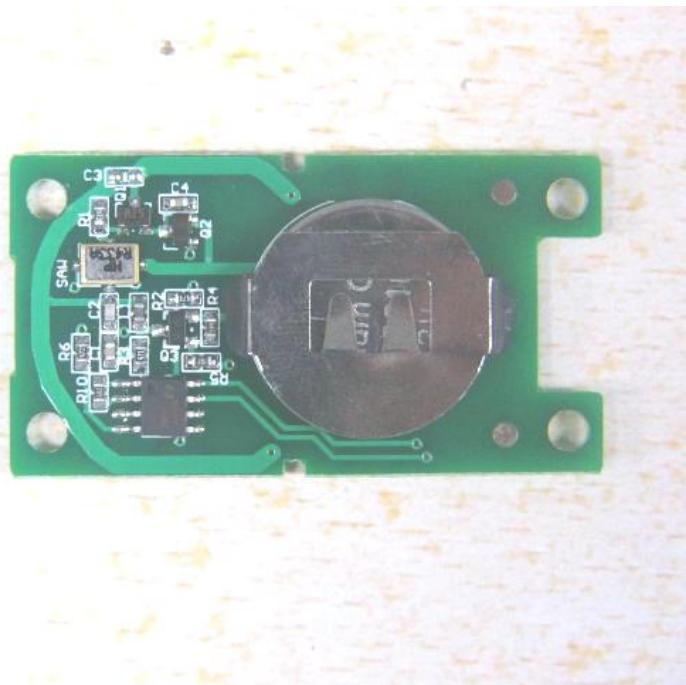
EUT bottom view



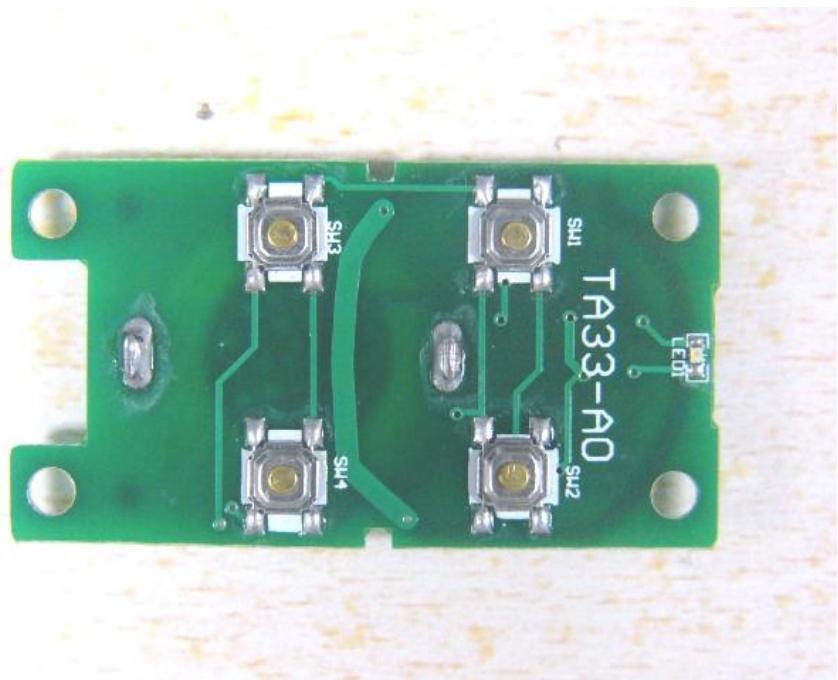
EUT inside whole view



Main board component side



Main board solder side



8. FCC ID Label

FCC ID: TUCTA32TA33

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

EUT Bottom View/Proposed FCC ID Label Location



9. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Date of Cal.	Due Date
Turntable	SinTek	N/A	N/A	NCR	NCR
Antenna Tower	SinTek	N/A	N/A	NCR	NCR
OATS	SinTek	N/A	N/A	Nov. 02, 2004	Nov. 02, 2007
EMI Test Receiver	Rohde & Schwarz	ESPI3	100180	Oct.18, 2006	Oct.18, 2007
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Sep. 18, 2007	Sep. 18, 2008
Signal Generator	FLUKE	PM5418+Y/C	LO747012	Feb.10, 2007	Feb.10, 2008
Signal Generator	FLUKE	PM5418TX	LO738007	Feb.10, 2007	Feb.10, 2008
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan. 30, 2007	Jan. 30, 2008
Loop Antenna	Rohde & Schwarz	HFH2-Z2	872096/16	Jan. 30, 2007	Jan. 30, 2008
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.18, 2007	Sep.18, 2008
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4080	Sep.18, 2007	Sep.18, 2008
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-564	Sep.18, 2007	Sep.18, 2008
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-565	Sep.18, 2007	Sep.18, 2008
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct. 23, 2006	Oct. 23, 2007
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct. 23, 2006	Oct. 23, 2007
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS-21	N/A	Oct. 29, 2006	Oct. 29, 2007
KMO Shielded Room	KMO	KMO-001	N/A	N/A	N/A
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	95549	Sep.18, 2007	Sep.18, 2008
Power Meter	Rohde & Schwarz	NRVD	100041	Feb.10, 2007	Feb.10, 2008
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb.10, 2007	Feb.10, 2008
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.10, 2007	Feb.10, 2008
Communication Analyzer	Wavetek Stabilock	4032	N/A	Feb. 01, 2007	Feb.01, 2008
Storage Oscilloscope	Tektronix	TDS3052	N/A	Feb. 01, 2007	Feb.01, 2008
Attenuator	Schwarzbeck	20dB	N/A	Feb. 01, 2007	Feb.01, 2008
Attenuator	Rohde & Schwarz	10dB	N/A	Feb. 01, 2007	Feb.01, 2008
SOHO Telephone Switching System	IKE	2000-108C	N/A	Feb.10, 2007	Feb.10, 2008
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb.10, 2007	Feb.10, 2008