COMMUNICATION CERTIFICATION LABORATORY

1940 West Alexander Street
Salt Lake City, UT 84119
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Test Report

Certification

Test Of: SLC5888TXBD

FCC ID: WZC1021473

Test Specification:

FCC PART 15, Subpart C

Test Report Serial No: 1989

Applicant:

Clipsal Australia Pty Ltd
12 Park Terrace
Bowden, Australia 5007
U.S.A.

Date of Test: December 10, 2008

Issue Date: January 7, 2009

Accredited Testing Laboratory By:

NVLAP

NVLAP Lab Code 100272-0

CERTIFICATION OF ENGINEERING REPORT

This report has been prepared by Communication Certification Laboratory to document compliance of the device described below with the requirements of Federal Communications Commission (FCC) Part 15, Subpart C. This report may be reproduced in full. Partial reproduction may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

- Applicant: Clipsal Australia Pty Ltd
- Manufacturer: Clipsal Australia Pty Ltd
- Brand Name: Clipsal
- Model Number: SLC5888TXBD
- FCC ID Number: WZC1021473

On this 7th day of January 2009, I, individually, and for Communication Certification Laboratory, certify that the statements made in this engineering report are true, complete, and correct to the best of my knowledge, and are made in good faith.

Although NVLAP has accredited the Communication Certification Laboratory EMC testing facilities, this report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

COMMUNICATION CERTIFICATION LABORATORY

Tested by: Norman P. Hansen
EMC Technician

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SECTION 1.0 CLIENT INFORMATION

1.1 Applicant:

Company Name: Clipsal Australia Pty Ltd
12 Park Terrace
Bowden, Australia 5007

Contact Name: Tim Fant
Title: UL Approvals Coordinator/QA Analyst

1.2 Manufacturer:

Company Name: Clipsal Australia Pty Ltd
12 Park Terrace
Bowden, Australia 5007

Contact Name: Tim Fant
Title: UL Approvals Coordinator/QA Analyst

SECTION 2.0 EQUIPMENT UNDER TEST (EUT)

2.1 Identification of EUT:

Brand Name: Clipsal
Model Number: SLC5888TXBD
Serial Number: None
Country of Manufacture: Australia

2.2 Description of EUT:

The SLC5888TXBD is a battery powered remote control transmitter operating at 916.7 MHz for Clipsal home automation systems.

This testing and report covers the requirements of FCC Part 15, Subpart C. The EUT is also required to meet the requirements of FCC Part 15, Subpart B which is to be covered in separate testing and report.

2.3 EUT and Support Equipment:

The FCC ID numbers for all the EUT and support equipment used during the test are listed below:

Brand Name Model Number	FCC ID Number	Description	Name of Interface Ports / Interface Cables
BN: Clipsal MN: SLC5888TXBD (Note 1)	WZC1021473	Remote Control	See Section 2.4

Note: (1) EUT.

The support equipment listed above was not modified in order to achieve compliance with this standard.

2.4 Interface Ports on EUT:

There are no interface ports on the EUT.

2.5 Modification Incorporated/Special Accessories on EUT:

There were no modifications or special accessories required to comply with the specification.

Signature: _____

Typed Name: Tim Fant

Title: UL Approvals Coordinator/QA Analyst

SECTION 3.0 TEST SPECIFICATION, METHODS & PROCEDURES

3.1 Test Specification:

Title: FCC PART 15, Subpart C (47 CFR 15)
15.203, 15.249

Limits and methods of measurement of radio interference characteristics of radio frequency devices.

Purpose of Test: The tests were performed to demonstrate initial compliance.

3.2 Methods & Procedures:

3.2.1 §15.203 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.

3.2.2 §15.249 Operation within the bands of 902 -928 MHZ, 2400 – 2483.5 MHz, 5725 -5875 MHz, and 24.0 – 24.25 GHz

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental	Field Strength of	Field Strength of

Frequency	Fundamental (millivolts/meter)	Harmonics (microvolts/meter)
902 – 928 MHz	50	500
2400 – 2483.5 MHz	50	500
5725 – 5875 MHz	50	500
24.0 – 24.25 GHz	250	2500

(b) Fixed, point-to-point operation as referred to in this paragraph shall be limited to systems employing a fixed transmitter transmitting to a fixed remote location. Point-to-multipoint systems, omnidirectional applications, and multiple co-located intentional radiators transmitting the same information are not allowed. Fixed, point-to-point operation is permitted in the 24.05-24.25 GHz band subject to the following conditions:

(1) The field strength of emissions in this band shall not exceed 2500 millivolts/meter.

(2) The frequency tolerance of the carrier signal shall be maintained within + 0.001% of the operating frequency over a temperature variation of –20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

(3) Antenna gain must be at least 33 dBi. Alternatively, the main lobe beamwidth must not exceed 3.5 degrees. The beamwidth limit shall apply to both the azimuth and elevation planes. At antenna gains over 33 dBi or beamwidths narrower than 3.5 degrees, power must be reduced to ensure that the field strength does not exceed 2500 millivolts/meter.

(c) Field strength limits are specified at a distance of 3 meters.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

(e) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field

strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

(f) Parties considering the manufacture, importation, marketing or operation of equipment under this section should also note the requirement in Section 15.37(d).

3.2.3 Test Procedure

The radiated emissions testing was performed according to the procedures in ANSI C63.4 (2003). Testing was performed at CCL's Wanship open area test site #2, located at 29145 Old Lincoln Highway, Wanship, UT. This site has been fully described in a report submitted to the FCC, and was accepted in a letter dated June 6, 2006 (90504).

CCL participates in the National Voluntary Laboratory Accreditation Program (NVLAP) and has been accredited under NVLAP Lab Code: 100272-0, which is effective until September 30, 2009.

For radiated emissions testing at 30 MHz or above that is performed at distances closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

SECTION 4.0 OPERATION OF EUT DURING TESTING

4.1 Operating Environment:

Power Supply: 3 VDC (2 – AAA batteries)

4.2 Operating Modes:

The EUT was tested on 3 orthogonal axes. The EUT was tested while constantly transmitting.

4.3 EUT Exercise Software:

Clipsal software was used to exercise the EUT.

SECTION 5.0 SUMMARY OF TEST RESULTS

5.1 FCC Part 15, Subpart C

5.1.1 Summary of Tests:

Section	Requirement	Frequency Range (MHz)	Result
15.203	Antenna Requirements	N/A	Complied
15.249(a)	Field Strength of Fundamental	902 -928	Complied
15.249(a)	Field Strength of Harmonics	1804 -9280	Complied
15.249(b)	Fixed Point-to-Point Operation	N/A	Not Applicable
15.249(d)	Radiated Spurious Emissions	30 - 9280	Complied

5.2 Result

In the configuration tested, the EUT complied with the requirements of the specification.

SECTION 6.0 MEASUREMENTS, EXAMINATIONS AND DERIVED RESULTS

6.1 General Comments:

This section contains the test results only. Details of the test methods used and a list of the test equipment used during the measurements can be found in Appendix 1 of this report.

6.2 Test Results:

6.2.1 §15.203 Antenna Requirements

The antenna is a trace antenna on the PCB and is not replaceable.

6.2.2 §15.249 Radiated Emissions

The radiated emissions from the fundamental frequency must not exceed 94.0 dBµV/m. Emissions from harmonics and spurious emissions must not exceed 54.0 dBµV/m. The measurement distance specified using these limits is 3 meters. The testing was performed at a 3 meter distance for frequencies below 5000 MHz. For Frequencies above 5000 MHz, a 1 meter measurement distance was used and the measurement adjusted to compensate for the measurement distance. See Section 3.2.3. The tables below show the worst-case emissions from testing. The plots following the data tables show the fundamental frequency residing totally within the specified operating band.

6.2.2.1 Radiated Emission Data Transmitting at 916.7 MHz

Frequency (MHz)	Detector	Antenna Polarity	Receiver Reading (dBµV)	Correction Factor (dB/m)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
916.7	Peak	Vertical	58.7	28.6	87.3	94.0	-6.7
916.7	Peak	Horizontal	59.5	28.6	88.1	94.0	-5.9
1833.4	Peak	Vertical	29.2	28.9	58.1	74.0	-15.9
1833.4	Average	Vertical	19.1	28.9	48.0	54.0	-6.0
1833.4	Peak	Horizontal	27.5	28.9	56.4	74.0	-17.6
1833.4	Average	Horizontal	17.4	28.9	46.3	54.0	-7.7
2750.1	Peak	Vertical	22.5	31.8	54.3	74.0	-19.7
2750.1	Average	Vertical	12.4	31.8	44.2	54.0	-9.8
2750.1	Peak	Horizontal	24.2	31.8	56.0	74.0	-18.0

Frequency (MHz)	Detector	Antenna Polarity	Receiver Reading (dBμV)	Correction Factor (dB/m)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2750.1	Average	Horizontal	14.1	31.8	45.9	54.0	-8.1
3666.8	Peak	Vertical	24.2	34.5	58.7	74.0	-15.3
3666.8	Average	Vertical	14.1	34.5	48.6	54.0	-5.4
3666.8	Peak	Horizontal	25.6	34.5	60.1	74.0	-13.9
3666.8	Average	Horizontal	15.5	34.5	50.0	54.0	-4.0
4583.5	Peak	Vertical	12.6	35.5	48.1	54.0	-5.9
4583.5	Peak	Horizontal	12.3	35.5	47.8	54.0	-6.2
5500.2	Peak	Vertical	2.2	37.7	39.9	54.0	-14.1
5500.2	Peak	Horizontal	1.9	37.7	39.6	54.0	-14.4
6416.9	Peak	Vertical	6.5	38.5	45.0	54.0	-9.0
6416.9	Peak	Horizontal	6.0	38.5	44.5	54.0	-9.5
7333.6	Peak	Vertical	6.6	40.6	47.2	54.0	-6.8
7333.6	Peak	Horizontal	6.7	40.6	47.3	54.0	-6.7
8250.3	Peak	Vertical	8.9	41.6	50.5	74.0	-23.5
8250.3	Average	Vertical	-1.2	41.6	40.4	54.0	-13.6
8250.3	Peak	Horizontal	9.3	41.6	50.9	74.0	-23.1
8250.3	Average	Horizontal	-0.8	41.6	40.8	54.0	-13.2
9167.0	Peak	Vertical	8.6	42.5	51.1	74.0	-22.9
9167.0	Average	Vertical	-1.5	42.5	41.0	54.0	-13.0
9167.0	Peak	Horizontal	9.0	42.5	51.5	74.0	-22.5
9167.0	Average	Horizontal	-1.1	42.5	41.4	54.0	-12.6

Note: When only a peak measurement is shown for a frequency, the peak measurement was compared to the average limit. Measurements above 5000 MHz are corrected to 3 meters as the measurements were taken at a 1 meter distance.

6.2.2.2 Pulsed Emission Averaging Factor

The EUT is a pulsed emission device; therefore, the method of §15.35 for averaging a pulsed emission may be used. The characteristics of the pulse train and the average factor calculations are shown below:

The EUT uses Manchester coding which gives a 50% duty cycle for the pulses. The longest duration of pulses (packet) is 30 ms with an inter-packet gap of 18 ms. From this, the actual pulse train duration is 48 ms (30 ms + 18 ms). Using a 50% duty cycle over the 30 ms of the packet, the EUT has an on time of 15 ms (30 ms x 0.5).

The Average Factor is calculated by the equation:

Average Factor = 20 log (on time/pulse train time)
= 20 log (15 ms)/48 ms)
= -10.1 dB

§15.35(b) specifies a 20 dB maximum between the peak and average measurements; therefore, a –10.1 dB averaging factor is allowed by the FCC specification.

6.2.2.3 Sample Field Strength Calculation:

The field strength is calculated by adding the Correction Factor (Antenna Factor + Cable Factor) and the Average Factor to the measured level of the receiver. The receiver amplitude reading is compensated for any amplifier gain.

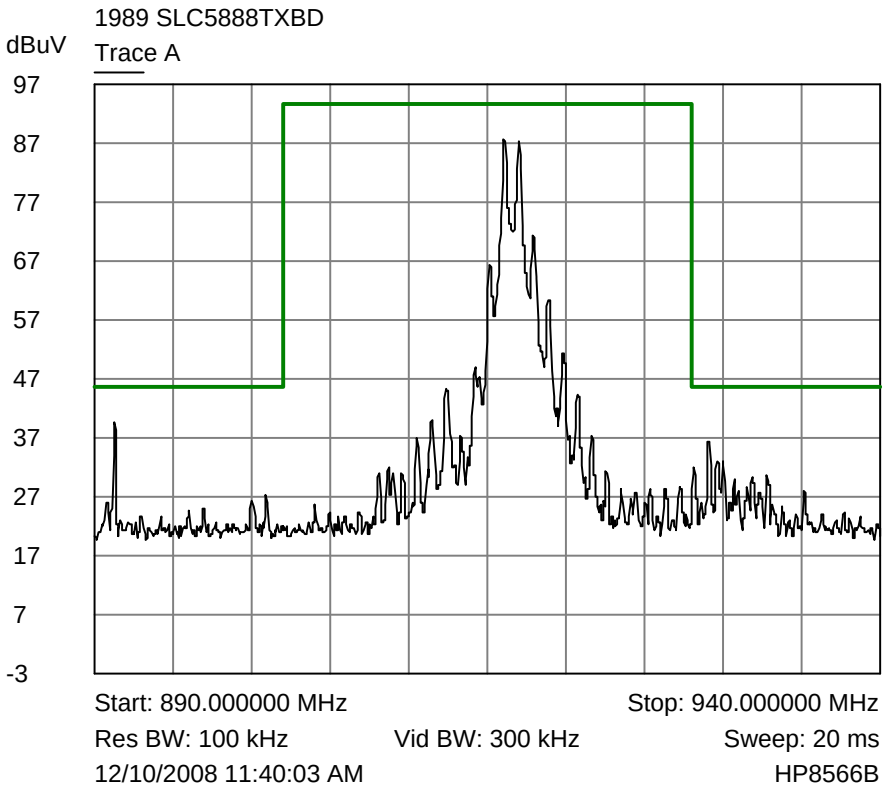
The basic equation with a sample calculation is shown below:

FS = (RA + AV) + CF Where

FS = Field Strength
RA = Receiver Amplitude Reading
CF = Correction Factor (Antenna Factor + Cable Factor)
AV = Averaging Factor

Assume a receiver reading of 44.2 dBμV is obtained from the receiver, with an average factor of –8.6 dB and a correction factor of 17.5 dB. The field strength is calculated by adding the correction factor and the average factor, giving a field strength of 53.1 dBμV/m, FS = (44.2 + (-8.6)) + 17.5 = 53.1 dBμV/m

6.2.2.4 Operating Band Plot



Trace A operating band

APPENDIX 1 TEST PROCEDURES AND TEST EQUIPMENT

A1.1 Radiated Disturbance:

The radiated disturbance from the EUT was measured using a spectrum analyzer with a quasi-peak adapter for peak and quasi-peak readings. A preamplifier with a fixed gain of 26 dB and a power amplifier with a fixed gain of 22 dB were used to increase the sensitivity of the measuring instrumentation. The quasi-peak adapter uses a bandwidth of 120 kHz, with the spectrum analyzer's resolution bandwidth set at 1 MHz, for readings in the 30 to 1000 MHz frequency ranges.

A biconilog antenna was used to measure the frequency range of 30 to 1000 MHz, at a distance of 3 or 10 meters from the EUT. The readings obtained by these antennas are correlated to the levels obtained with a tuned dipole antenna by adding antenna factors. A double-ridged guide antenna was used to measure the emissions at frequencies above 1000 MHz at a distance of 3 and/or 1 meter from the EUT.

The configuration of the EUT was varied to find the maximum radiated emission. The EUT was connected to the peripherals listed in Section 2.3 via the interconnecting cables listed in Section 2.4. A technician manually manipulated these interconnecting cables to obtain worst-case radiated disturbance. The EUT was rotated 360 degrees, and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission. Where there was multiple interface ports all of the same type, cables are either placed on all of the ports or cables added to these ports until the emissions do not increase by more than 2 dB.

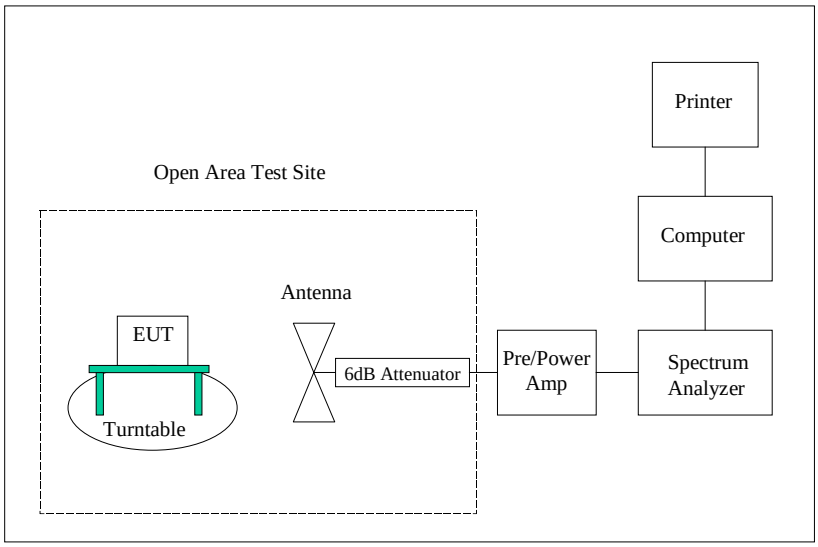
Desktop EUT are measured on a non-conducting table 0.8 meters above the ground plane. The table is placed on a turntable, which is level with the ground plane. For equipment normally placed on floors, the equipment shall be placed directly on the turntable.

Type of Equipment	Manufacturer	Model Number	Serial Number	Date of Last Calibration
Wanship Open Area Test Site #2	CCL	N/A	N/A	10/08/2008
Test Software	CCL	Radiated Emissions	Revision 1.3	N/A
Spectrum Analyzer	Hewlett Packard	8566B	2230A01711	10/31/2008

Type of Equipment	Manufacturer	Model Number	Serial Number	Date of Last Calibration
Quasi-Peak Detector	Hewlett Packard	85650A	2043A00137	11/05/2008
Biconilog Antenna	EMCO	3142	9601-1008	9/26/2008
Double Ridged Guide Antenna	EMCO	3115	9604-4779	03/17/2008
High Frequency Amplifier	Miteq	AFS4-01001800-43-10P-4	1096455	05/29/2007
20’ High Frequency Cable	Utiflex	UFA210A-1-2400-30050U	1175	04/01/2008
3 Meter Radiated Emissions Cable Wanship Site #2	CCL	Cable K	N/A	12/31/2008
Pre/Power-Amplifier	Hewlett Packard	8447F	3113A05161	08/28/2008
6 dB Attenuator	Hewlett Packard	8491A	32835	12/31/2008

An independent calibration laboratory or CCL personnel calibrates all the equipment listed above at intervals defined in ANSI C63.4:2003 Section 4.4 following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to tractability is on file and is available for examination upon request.

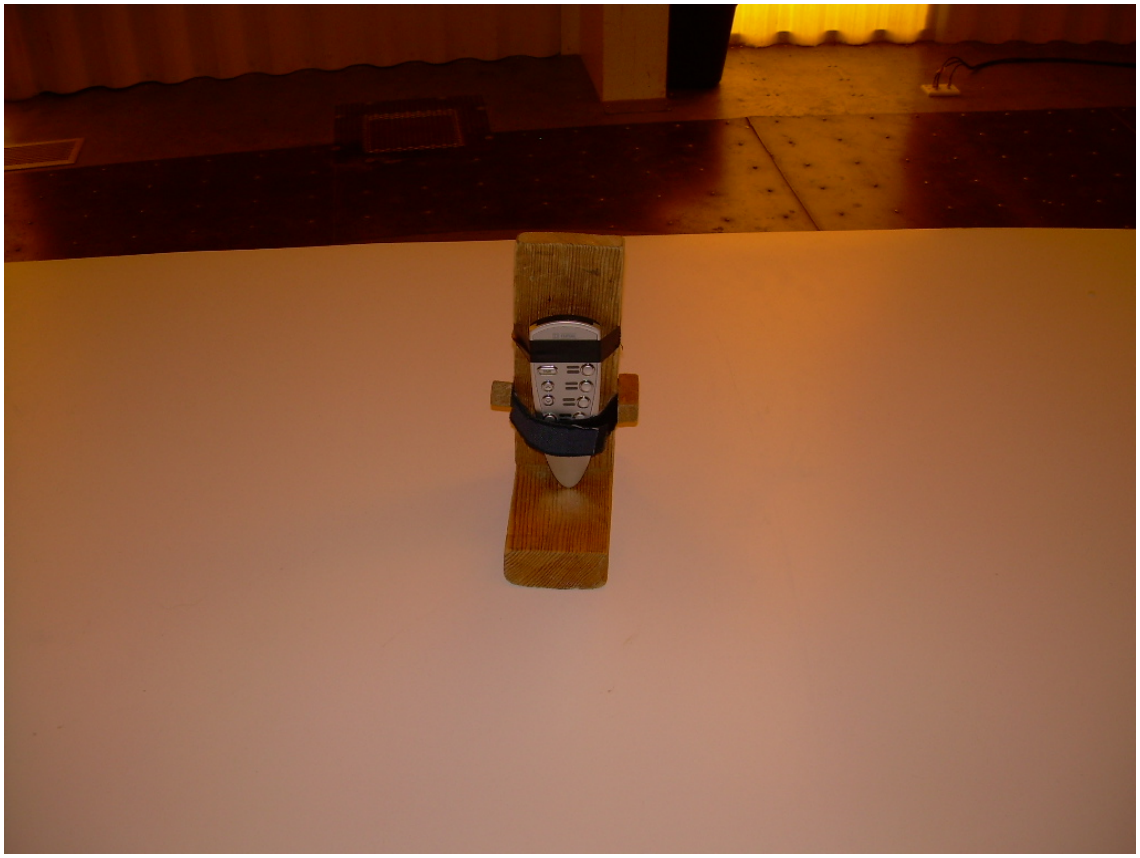
Radiated Emissions Test Setup



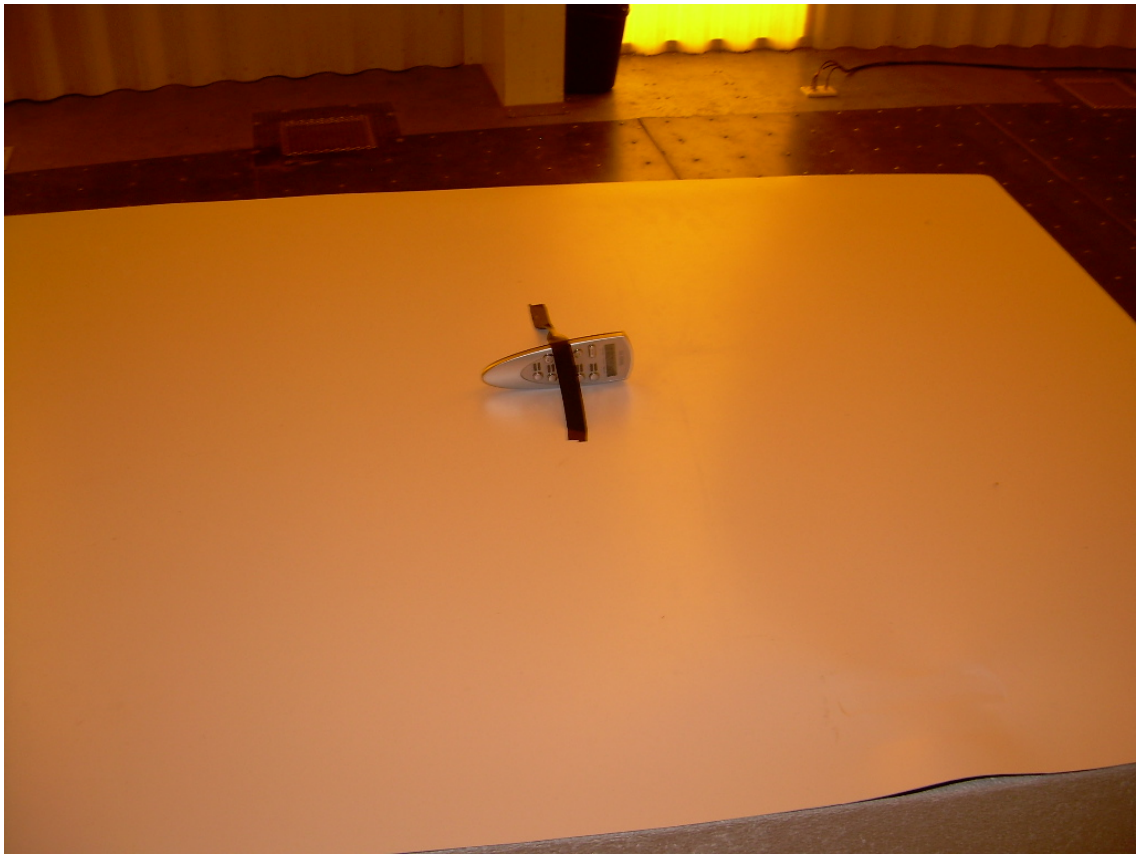
APPENDIX 2 PHOTOGRAPHS

Photograph 1 – View of Test Setup – Horizontal Placement

Photograph 2 – View of Test Setup – Vertical Placement



Photograph 3 – View of Test Setup – On-Edge Placement

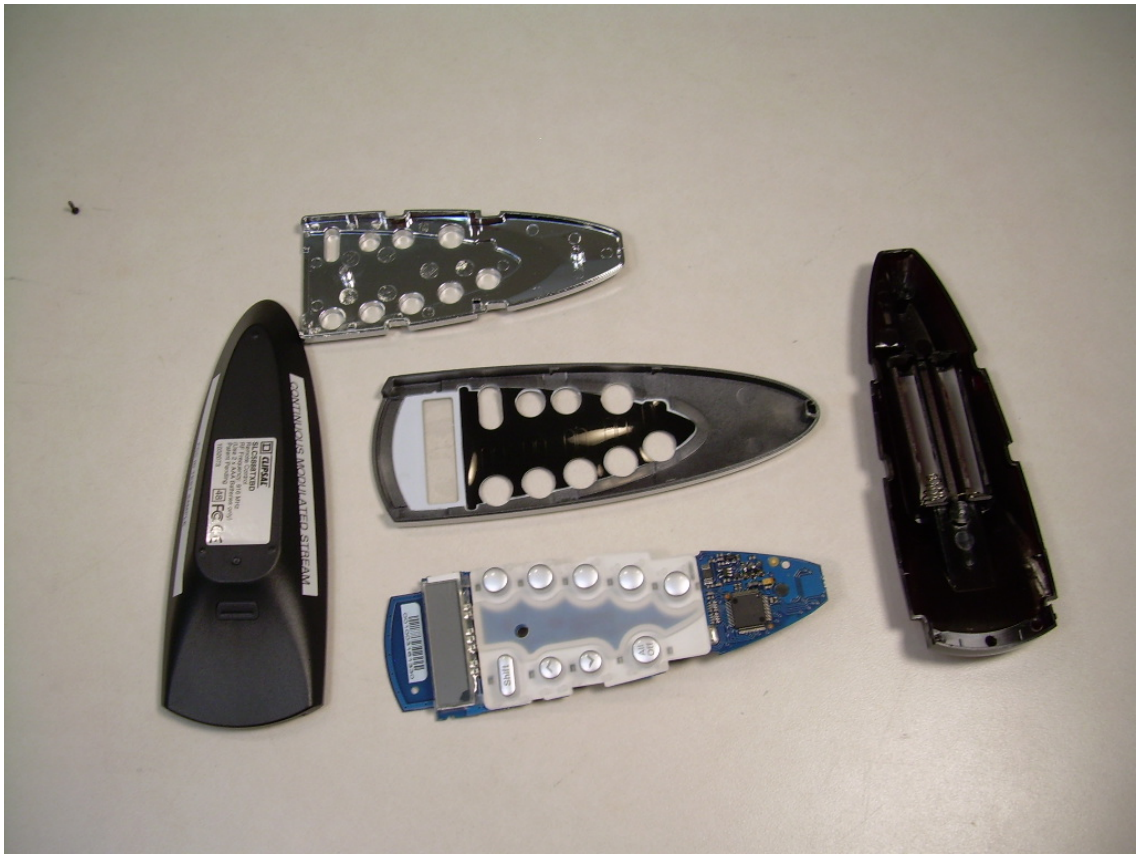


Photograph 4 – Top View of the EUT

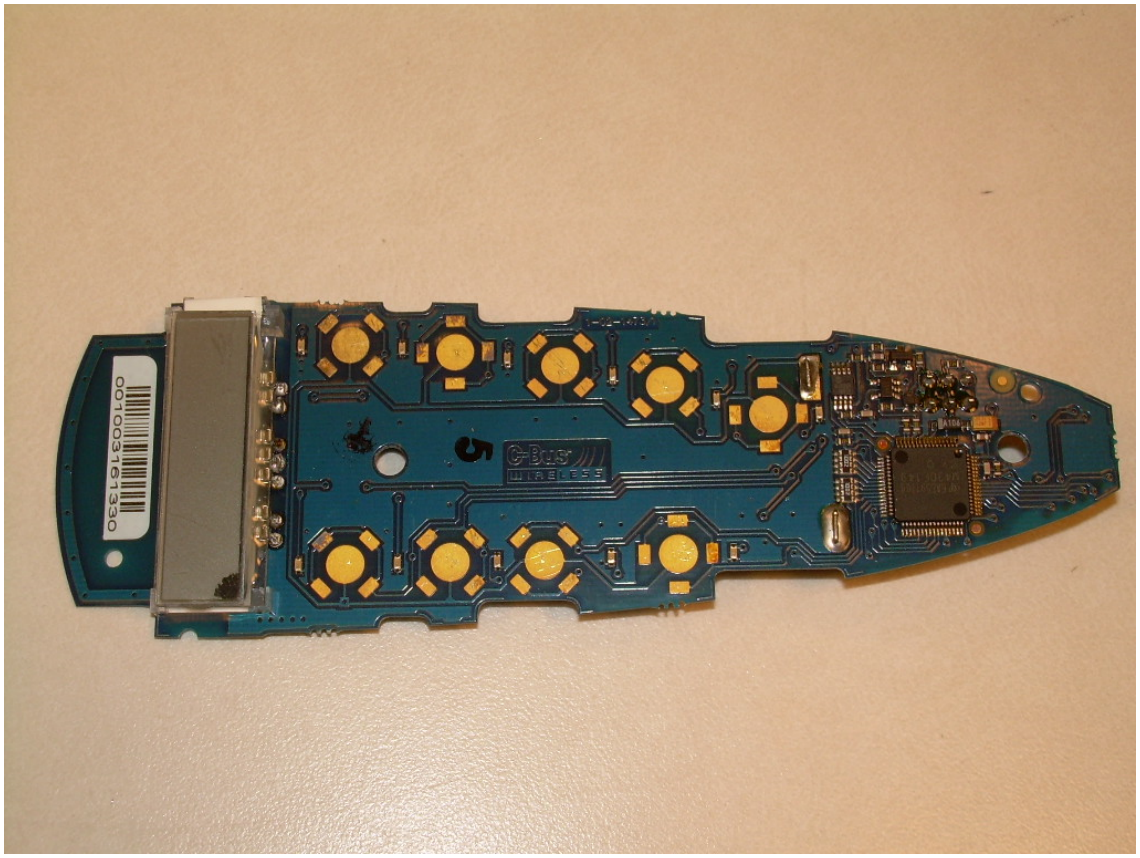
Photograph 5 – Bottom View of the EUT

Photograph 6 – Bottom View of the EUT with Battery Cover Removed

Photograph 7 – EUT with Covers and Housing Removed



Photograph 8 – View of the Top Side of the PCB



Photograph 9 – View of the Bottom Side of the PCB