

*FCC PART 15, SUBPART B and C  
TEST REPORT*

*for*

**RF REMOTE**

**Model: BALBOA**

Prepared for

UNIVERSAL ELECTRONICS, INC.  
6101 GATEWAY DRIVE  
CYPRESS, CALIFORNIA 90630

Prepared by: *James Ross*

JAMES ROSS

Approved by: *Kyle Fujimoto*

KYLE FUJIMOTO

COMPATIBLE ELECTRONICS INC.  
114 OLINDA DRIVE  
BREA, CALIFORNIA 92823  
(714) 579-0500

DATE: JULY 14, 2006

	REPORT BODY	APPENDICES					TOTAL
		<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	
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## GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP, NIST or any other agency of the U.S. Government.

Device Tested: **RF Remote**  
 Model: **Balboa**  
 S/N: **N/A**

Product Description: See Expository Statement.

Modifications: The EUT was not modified in order to meet the specifications.

Manufacturer: Universal Electronics, Inc.  
 6101 Gateway Drive  
 Cypress, California 90630

Test Dates: June 16, 26, and 29, 2006

Test Specifications: EMI requirements  
 CFR Title 47, Part 15 Subpart B; and Subpart C, Sections 15.205, 15.209, and 15.231

Test Procedure: **ANSI C63.4**

Test Deviations: The test procedure was not deviated from during the testing.

## SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz – 30 MHz	This test was not performed because the EUT operates on batteries only and cannot be plugged into the AC public mains.
2	Radiated RF Emissions, 10 kHz – 4340 MHz	Complies with the <b>Class B</b> limits of CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231.
3	-20 dB Bandwidth of the Fundamental	Complies with the limits of Subpart C, sections 15.231 [c].



## 1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the RF Remote, Model: Balboa. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231.



## 2. ADMINISTRATIVE DATA

## 2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

## 2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

## 2.3 Cognizant Personnel

Universal Electronics, Inc.

Jesse Mendez Electrical Engineer

Compatible Electronics, Inc.

Falguni Patel	Test Technician
Benigno Chavez	Test Engineer
James Ross	Test Engineer
Kyle Fujimoto	Test Engineer

## 2.4 Date Test Sample was Received

The test sample was received prior to its qualification testing on June 16, 2006.

## 2.5 Disposition of the Test Sample

The test sample has not been returned to Universal Electronics, Inc. as of the date of this report.

## 2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
PCB	Printed Circuit Board
TX	Transmit
RX	Receive



### **3. APPLICABLE DOCUMENTS**

The following documents are referenced or used in the preparation of this EMI Test Report.

<b>SPEC</b>	<b>TITLE</b>
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4: 2003	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz



## **4. DESCRIPTION OF TEST CONFIGURATION**

### **4.1 Description of Test Configuration - EMI**

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

The RF Remote Model: Balboa (EUT) was tested as a stand-alone unit and tested in three orthogonal axis. The EUT was continuously transmitting.

The antenna is a coil on the PCB of the EUT.

The EUT will only transmit when a button is being pressed down. The EUT will cease operation immediately after the button is released.

The final radiated data was taken in the mode described above. Please see Appendix E for the data sheets.

#### **4.1.1 Cable Construction and Termination**

There were no external cables connected to the EUT.



**5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT****5.1 EUT and Accessory List**

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
RF REMOTE (EUT)	UNIVERSAL ELECTRONICS, INC.	BALBOA	N/A	<b>MG31033-4</b>



## 5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
<b>GENERAL TEST EQUIPMENT USED FOR ALL RF EMISSIONS TESTS</b>					
EMI Receiver	Rohde & Schwarz	ESIB40	100172	October 28, 2004	October 28, 2006
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
<b>RF RADIATED EMISSIONS TEST EQUIPMENT</b>					
Loop Antenna	Com Power	AL-130	17089	September 21, 2005	Sept. 21, 2006
Biconical Antenna	Com Power	AB-900	15227	March 9 2006	March 9 2007
Log Periodic Antenna	Com Power	AL-100	16060	August 22, 2005	August 22, 2007
Horn Antenna	Com Power	AH-118	10067	July 27, 2004	July 27, 2006
Preamplifier	Com Power	PA-102	1017	January 19, 2006	January 19, 2007
Microwave Preamplifier	Com Power	PA-122	181917	January 20, 2006	Jan. 20, 2007
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A



## **6. TEST SITE DESCRIPTION**

### **6.1 Test Facility Description**

Please refer to section 2.1 and 7.1 of this report for EMI test location.

### **6.2 EUT Mounting, Bonding and Grounding**

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.



## 7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

### 7.1 Radiated Emissions (Spurious and Harmonics) Test

The EMI Receiver was used as a measuring meter. An amplifier was used to increase the sensitivity of the instrument. The Com Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, and the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies above 1 GHz. The EMI Receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer and EMI Receiver record the highest measured reading over all the sweeps.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
10 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 4.34 GHz	1 MHz	Horn Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results. The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.



## Radiated Emissions (Spurious and Harmonics) Test (continued)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain final test data. The final qualification data sheets are located in Appendix E.

## Test Results:

The EUT complies with the limits of CFR Title 47, Part 15, Subpart B; and Subpart C, section 15.205, 15.209 and 15.231 for radiated emissions.

7.2

## Bandwidth of the Fundamental

The -20 dB bandwidth was checked to see that it was within 0.25% of the fundamental frequency for the EUT. Photographs of the -20 dB bandwidth are located in Appendix E.

## Test Results:

The EUT complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.231 [c].



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**8. CONCLUSIONS**

The RF Remote, Model: Balboa meets all of the **Class B** specification limits defined in CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231.



## **APPENDIX A**

### ***LABORATORY RECOGNITIONS***



## **LABORATORY RECOGNITIONS**

**Compatible Electronics has the following agency accreditations:**

National Voluntary Laboratory Accreditation Program - Lab Code: 200528-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

**Compatible Electronics is recognized or on file with the following agencies:**

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)



**APPENDIX B**

***MODIFICATIONS TO THE EUT***



## MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.231 or FCC Class B specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT.



## APPENDIX C

### ***ADDITIONAL MODELS COVERED UNDER THIS REPORT***



## **ADDITIONAL MODELS COVERED UNDER THIS REPORT**

**USED FOR THE PRIMARY TEST**

RF Remote  
Model: Balboa  
S/N: N/A

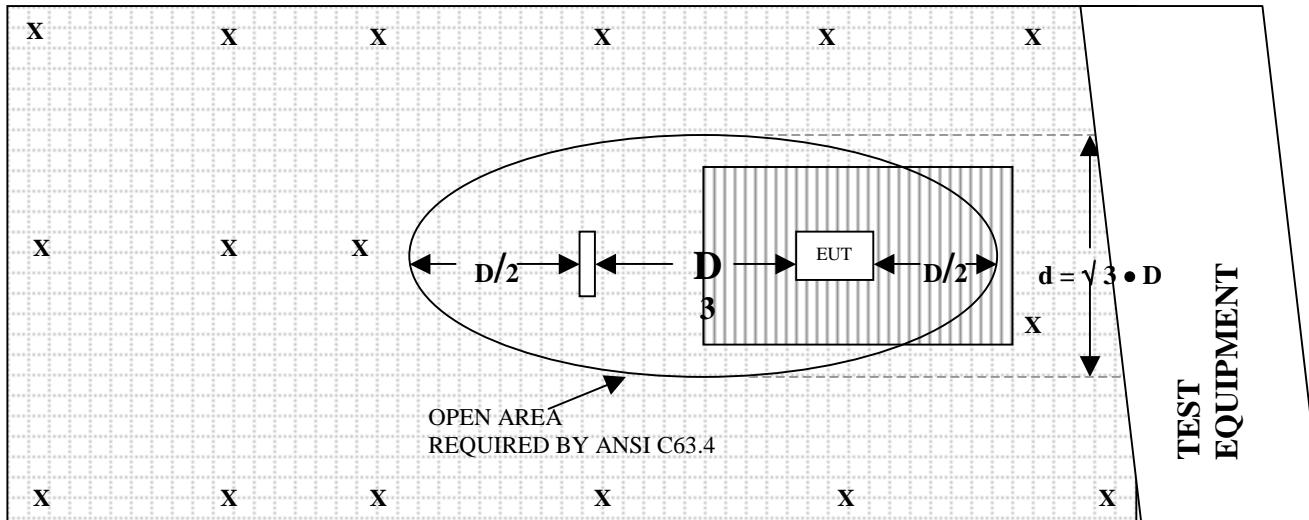
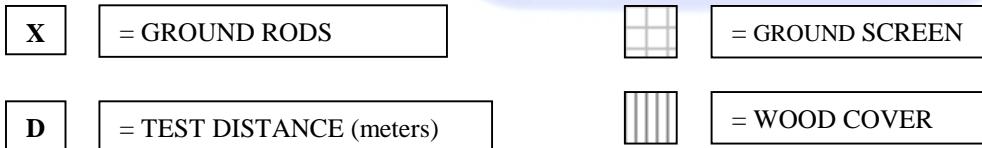
There were no additional models covered under this report.



**APPENDIX D**

***DIAGRAMS, CHARTS, AND PHOTOS***



**FIGURE 1: PLOT MAP AND LAYOUT OF RADIATED TEST SITE**
**OPEN LAND > 15 METERS**
**OPEN LAND > 15 METERS**

**OPEN LAND > 15 METERS**


**COM-POWER AL-130****LOOP ANTENNA****S/N: 17089****CALIBRATION DATE: SEPTEMBER 21, 2005**

<b>FREQUENCY (MHz)</b>	<b>MAGNETIC (dB/m)</b>	<b>ELECTRIC (dB/m)</b>
0.009	-42.84	8.66
0.01	-41.93	9.57
0.02	-41.29	10.21
0.05	-42.37	9.13
0.07	-41.8	9.7
0.1	-41.83	9.67
0.2	-44.13	7.37
0.3	-41.73	9.77
0.5	-41.8	9.7
0.7	-41.53	9.97
1	-41.46	10.04
2	-41.14	10.36
3	-41.26	10.24
4	-41.46	10.04
5	-41.10	10.40
10	-40.83	10.67
15	-41.47	10.03
20	-35.44	16.06
25	-42.37	9.13
30	-42.94	8.56



**COM-POWER AB-900****BICONICAL ANTENNA****S/N: 15227****CALIBRATION DATE: MARCH 9, 2006**

<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>
30	11.12	120	13.50
35	10.17	125	12.63
40	9.75	140	12.20
45	12.22	150	11.85
50	13.28	160	13.25
60	11.36	175	15.74
70	7.95	180	16.23
80	5.95	200	16.79
90	7.62	250	16.47
100	10.89	300	17.49



**COM-POWER AL-100****LOG PERIODIC ANTENNA****S/N: 16060****CALIBRATION DATE: AUGUST 22, 2005**

<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>
300	12.73	700	19.72
400	13.38	800	20.49
500	15.12	900	21.31
600	16.27	1000	24.25



**COM POWER AH-118****HORN ANTENNA****S/N: 10067****CALIBRATION DATE: JULY 27, 2004**

<b>FREQUENCY (GHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (GHz)</b>	<b>FACTOR (dB)</b>
1.0	25.0	10.0	37.8
1.5	27.9	10.5	39.4
2.0	31.5	11.0	39.4
2.5	31.1	11.5	40.6
3.0	30.6	12.0	40.8
3.5	30.5	12.5	40.5
4.0	30.6	13.0	41.2
4.5	31.4	13.5	42.0
5.0	33.7	14.0	43.1
5.5	33.8	14.5	43.4
6.0	34.7	15.0	39.2
6.5	35.0	15.5	38.8
7.0	35.9	16.0	40.1
7.5	38.1	16.5	40.2
8.0	38.2	17.0	43.4
8.5	37.7	17.5	46.6
9.0	37.7	18.0	45.8
9.5	38.4		



**COM-POWER PA-102****PREAMPLIFIER****S/N: 1017****CALIBRATION DATE: JANUARY 19, 2006**

<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>
30	38.3	300	38.4
40	38.4	350	38.4
50	38.3	400	38.0
60	38.4	450	38.1
70	38.5	500	37.5
80	38.4	550	38.0
90	38.4	600	38.0
100	38.4	650	37.6
125	38.1	700	37.7
150	38.5	750	37.7
175	38.4	800	37.0
200	38.3	850	37.2
225	38.3	900	36.6
250	38.1	950	36.3
275	38.3	1000	36.3



## COM-POWER PA-122

### PREAMPLIFIER

S/N: 181917

CALIBRATION DATE: JANUARY 20, 2006

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	34.697	10.0	36.558
1.5	33.817	10.5	35.048
2.0	33.587	11.0	33.258
2.5	33.804	11.5	32.960
3.0	33.850	12.0	33.312
3.5	33.943	12.5	33.836
4.0	34.399	13.0	34.178
4.5	34.847	13.5	34.197
5.0	35.172	14.0	33.769
5.5	35.383	14.5	33.392
6.0	35.539	15.0	33.387
6.5	34.802	15.5	34.038
7.0	33.793	16.0	34.884
7.5	33.511	16.5	35.740
8.0	33.910	17.0	35.341
8.5	34.907	17.5	34.729
9.0	36.036	18.0	33.760
9.5	36.661		





#### **FRONT VIEW**

Universal Electronics, Inc.

RF REMOTE

MODEL: BALBOA

FCC SUBPART B AND C – RADIATED EMISSIONS – 10 kHz to 1 GHz

#### **PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS**



**REAR VIEW**

Universal Electronics, Inc.  
RF REMOTE  
MODEL: BALBOA  
FCC SUBPART B AND C – RADIATED EMISSIONS – 10 kHz to 1 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**

**FRONT VIEW**

Universal Electronics, Inc.

**RF REMOTE**

**MODEL: BALBOA**

FCC SUBPART B AND C – RADIATED EMISSIONS – 1 GHz to 4.34 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



**REAR VIEW**

Universal Electronics, Inc.  
**RF REMOTE**  
**MODEL: BALBOA**

FCC SUBPART B AND C – RADIATED EMISSIONS – 1 GHz to 4.34 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



**APPENDIX E**

***DATA SHEETS***



***RADIATED EMISSIONS***

***DATA SHEETS***



**FCC 15.231**

 Universal Electronics, Inc.  
 RF Remote  
 Model: Balboa

 Date: 06/16/06  
 Lab: D  
 Tested By: Benigno Chavez

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
433.92	69.38	H	100.8	-14.8	Peak	1	90	X-Axis
433.92	54.15	H	80.8	-10.03	Avg	1	90	X-Axis
433.92	54.55	V	100.8	-29.63	Peak	2	180	X-Axis
433.92	39.32	V	80.8	-24.86	Avg	2	180	X-Axis
433.92	54.54	H	100.8	-29.64	Peak	0	2	Y-Axis
433.92	39.31	H	80.8	-24.87	Avg	0	2	Y-Axis
433.92	65.02	V	100.8	-19.16	Peak	1.25	135	Y-Axis
433.92	49.79	V	80.8	-14.39	Avg	1.25	135	Y-Axis
433.92	67.61	H	100.8	-16.57	Peak	1	90	Z-Axis
433.92	52.38	H	80.8	-11.8	Avg	1	90	Z-Axis
433.92	57.86	V	100.8	-26.32	Peak	1.5	180	Z-Axis
433.92	42.63	V	80.8	-21.55	Avg	1.5	180	Z-Axis



**FCC 15.231**

 Universal Electronics, Inc.  
 RF Remote  
 Model: Balboa

 Date: 06/16/06  
 Lab: D  
 Tested By: Benigno Chavez

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
867.84	84.69	H	80.8	-8.02	Peak	1	225	X-Axis
867.84	69.46	H	60.8	-3.25	Avg	1	225	X-Axis
867.84	72.13	V	80.8	-20.58	Peak	1.5	0	X-Axis
867.84	56.9	V	60.8	-15.81	Avg	1.5	0	X-Axis
867.84	71.81	H	80.8	-20.9	Peak	1	180	Y-Axis
867.84	56.58	H	60.8	-16.13	Avg	1	180	Y-Axis
867.84	82.48	V	80.8	-10.23	Peak	1	0	Y-Axis
867.84	67.25	V	60.8	-5.46	Avg	1	0	Y-Axis
867.84	82.99	H	80.8	-9.72	Peak	1	90	Z-Axis
867.84	67.76	H	60.8	-4.95	Avg	1	90	Z-Axis
867.84	76.32	V	80.8	-16.39	Peak	1.5	180	Z-Axis
867.84	61.09	V	60.8	-11.62	Avg	1.5	180	Z-Axis



**FCC 15.231**

 Universal Electronics, Inc.  
 RF Remote  
 Model: Balboa

 Date: 06/26/06  
 Labs: B  
 Tested By: Falguni Patel

**X-Axis**

 Duty Cycle: 17.3 %  
**-15.23**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1301.76	65.43	V	74	-8.57	Peak	2.99	180	
1301.76	50.2	V	54	-3.8	Avg	2.99	180	
1735.7	58.15	V	80.8	-22.65	Peak	3.26	270	
1735.7	42.92	V	60.8	-17.88	Avg	3.26	270	
2169.6	63.07	V	80.8	-17.73	Peak	2.97	270	
2169.6	47.84	V	60.8	-12.96	Avg	2.97	270	
2603.52	51.22	V	80.8	-29.58	Peak	2.75	45	
2603.52	35.99	V	60.8	-24.81	Avg	2.75	45	
3037.44	60.03	V	80.8	-20.77	Peak	2.31	180	
3037.44	44.8	V	60.8	-16	Avg	2.31	180	
3471.36	63.73	V	80.8	-17.07	Peak	2.77	45	
3471.36	48.5	V	60.8	-12.3	Avg	2.77	45	
3905.28	50.1	V	74	-23.9	Peak	2.77	0	
3905.28	34.87	V	54	-19.13	Avg	2.77	0	
4339.2	59.34	V	74	-14.66	Peak	1.18	180	
4339.2	44.11	V	54	-9.89	Avg	1.18	180	



**FCC 15.231**

 Universal Electronics, Inc.  
 RF Remote  
 Model: Balboa

 Date: 06/16/06  
 Labs: B  
 Tested By: Benigno Chavez

**X-Axis**

 Duty Cycle: 17.3 %  
**-15.23**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1301.76	58.19	H	74	-15.81	Peak	1.2	0	
1301.76	42.96	H	54	-11.04	Avg	1.2	0	
1735.7	61.95	H	80.8	-18.85	Peak	2.6	0	
1735.7	46.72	H	60.8	-14.08	Avg	2.6	0	
2169.6	67.76	H	80.8	-13.04	Peak	1.85	0	
2169.6	52.53	H	60.8	-8.27	Avg	1.85	0	
2603.52	54.33	H	80.8	-26.47	Peak	1.38	45	
2603.52	39.1	H	60.8	-21.7	Avg	1.38	45	
3037.44	61.33	H	80.8	-19.47	Peak	3.04	45	
3037.44	46.1	H	60.8	-14.7	Avg	3.04	45	
3471.36	63.26	H	80.8	-17.54	Peak	2.81	45	
3471.36	48.03	H	60.8	-12.77	Avg	2.81	45	
3905.28	49.78	H	74	-24.22	Peak	2.55	45	
3905.28	34.55	H	54	-19.45	Avg	2.55	45	
4339.2	60.04	H	74	-13.96	Peak	2.97	90	
4339.2	44.81	H	54	-9.19	Avg	2.97	90	



**FCC 15.231**

 Universal Electronics, Inc.  
 RF Remote  
 Model: Balboa

 Date: 06/16/06  
 Labs: B  
 Tested By: Benigno Chavez

**Y-Axis**

 Duty Cycle: 17.3 %  
**-15.23**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1301.76	63.11	V	74	-10.89	Peak	3.59	270	
1301.76	47.88	V	54	-6.12	Avg			
1735.7	59.4	V	80.8	-21.4	Peak	1.38	0	
1735.7	44.17	V	60.8	-16.63	Avg			
2169.6	59.31	V	80.8	-21.49	Peak	1.44	90	
2169.6	44.08	V	60.8	-16.72	Avg			
2603.52	47.82	V	80.8	-32.98	Peak	3.28	180	
2603.52	32.59	V	60.8	-28.21	Avg			
3037.44	61.08	V	80.8	-19.72	Peak	3.26	90	
3037.44	45.85	V	60.8	-14.95	Avg			
3471.36	65.3	V	80.8	-15.5	Peak	2.34	0	
3471.36	50.07	V	60.8	-10.73	Avg			
3905.28	54.6	V	74	-19.4	Peak	2.07	0	
3905.28	39.37	V	54	-14.63	Avg			
4339.2	61.82	V	74	-12.18	Peak	2.07	0	
4339.2	46.59	V	54	-7.41	Avg			



**FCC 15.231**

 Universal Electronics, Inc.  
 RF Remote  
 Model: Balboa

 Date: 06/16/06  
 Labs: B  
 Tested By: Benigno Chavez

**Y-Axis**

 Duty Cycle: 17.3 %  
**-15.23**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1301.76	59.16	H	74	-14.84	Peak	1	180	
1301.76	43.93	H	54	-10.07	Avg			
1735.7	59.13	H	80.8	-21.67	Peak	1.45	180	
1735.7	43.9	H	60.8	-16.9	Avg			
2169.6	68.06	H	80.8	-12.74	Peak	2.26	0	
2169.6	52.83	H	60.8	-7.97	Avg			
2603.52	59.23	H	80.8	-21.57	Peak	3.08	180	
2603.52	44	H	60.8	-16.8	Avg			
3037.44	59.45	H	80.8	-21.35	Peak	3.08	90	
3037.44	44.22	H	60.8	-16.58	Avg			
3471.36	66.06	H	80.8	-14.74	Peak	3.71	0	
3471.36	50.83	H	60.8	-9.97	Avg			
3905.28	48.4	H	74	-25.6	Peak	3.8	275	
3905.28	33.17	H	54	-20.83	Avg			
4339.2	56.95	H	74	-17.05	Peak	3.35	90	
4339.2	41.72	H	54	-12.28	Avg			



**FCC 15.231**

 Universal Electronics, Inc.  
 RF Remote  
 Model: Balboa

 Date: 06/16/06  
 Labs: B  
 Tested By: Benigno Chavez

**Z-Axis**

 Duty Cycle: 17.3 %  
**-15.23**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1301.76	65.37	V	74	-8.63	Peak	1	0	
1301.76	50.14	V	54	-3.86	Avg			
1735.7	58.25	V	80.8	-22.55	Peak	2.07	90	
1735.7	43.02	V	60.8	-17.78	Avg			
2169.6	67.53	V	80.8	-13.27	Peak	2.2	45	
2169.6	52.3	V	60.8	-8.5	Avg			
2603.52	56.77	V	80.8	-24.03	Peak	3.45	45	
2603.52	41.54	V	60.8	-19.26	Avg			
3037.44	63.06	V	80.8	-17.74	Peak	1.85	180	
3037.44	47.83	V	60.8	-12.97	Avg			
3471.36	65.58	V	80.8	-15.22	Peak	1.62	45	
3471.36	50.35	V	60.8	-10.45	Avg			
3905.28	48.72	V	74	-25.28	Peak	1.3	45	
3905.28	33.49	V	54	-20.51	Avg			
4339.2	58.16	V	74	-15.84	Peak	2.2	270	
4339.2	42.93	V	54	-11.07	Avg			



**FCC 15.231**

 Universal Electronics, Inc.  
 RF Remote  
 Model: Balboa

 Date: 06/16/06  
 Labs: B  
 Tested By: Benigno Chavez

**Z-Axis**

 Duty Cycle: 17.3 %  
**-15.23**

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1301.76	62.55	H	74	-11.45	Peak	3.5	190	
1301.76	47.32	H	54	-6.68	Avg			
1735.7	58.09	H	80.8	-22.71	Peak	3.53	90	
1735.7	42.86	H	60.8	-17.94	Avg			
2169.6	60.65	H	80.8	-20.15	Peak	3.69	265	
2169.6	45.42	H	60.8	-15.38	Avg			
2603.52	52.49	H	80.8	-28.31	Peak	3.23	15	
2603.52	37.26	H	60.8	-23.54	Avg			
3037.44	64.18	H	80.8	-16.62	Peak	2.43	270	
3037.44	48.95	H	60.8	-11.85	Avg			
3471.36	66.77	H	80.8	-14.03	Peak	2.44	90	
3471.36	51.54	H	60.8	-9.26	Avg			
3905.28	66.72	H	74	-7.28	Peak	2.4		
3905.28	51.49	H	54	-2.51	Avg		90	
4339.2	55.67	H	74	-18.33	Peak	2	90	
4339.2	40.44	H	54	-13.56	Avg			



<b>Test Location</b>	: Compatible Electronics	<b>Page</b>	: 11
<b>Customer</b>	: Uni verval Electronics, Inc.	<b>Date</b>	: 6/26/2006
<b>Manufacturer</b>	: Uni verval Electronics, Inc.	<b>Time</b>	: 2: 15: 26
<b>Eut name</b>	: RF Remote	<b>Lab</b>	: B & D
<b>Model</b>	: Balboa	<b>Test Distance</b>	: 3 & 10
<b>Serial #</b>	: N/A		
<b>Specification</b>	: FCC Class B		
<b>Distance correction factor (20 * log(test/spec))</b>			: 0.00
<b>Test Mode</b>	: Test Engineer: Falguni Patel		

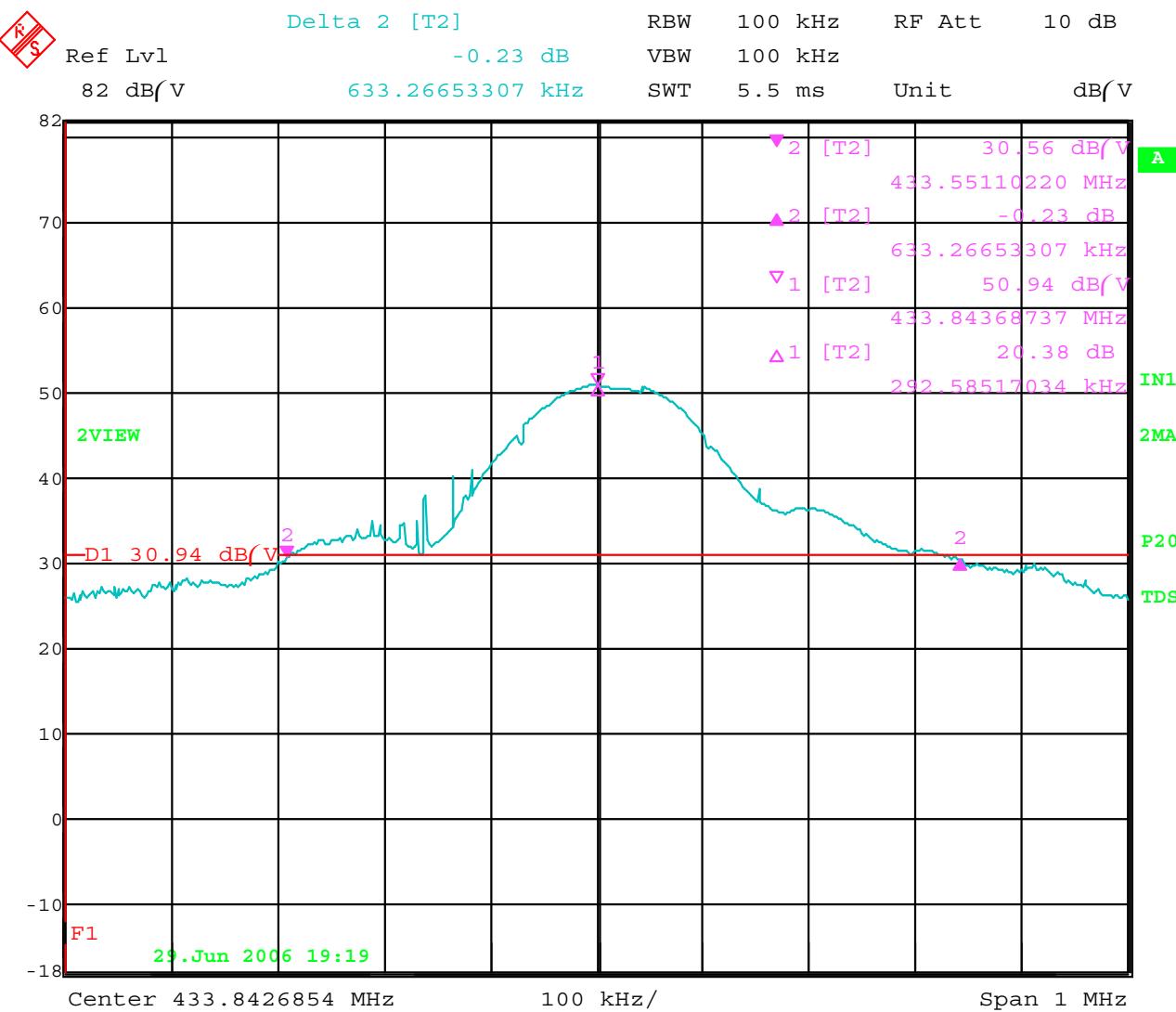
Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor' d rdg = R dBuV	Li mit = L dBuV/m	Delta R-L dB
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**-20 dB BANDWIDTH**

**DATA SHEET**





Date: 29.JUN.2006 19:19:54

20 dB Bandwidth for the Fundamental

