TEST REPORT

Report Number: 3135239MIN-005M
Project Number: 3135239

Testing performed on the
U2 Remote Control

FCC ID: MMURTI1200
IC: 3166A-RTI1200

to
47 CFR Part 15. 231:2007
RSS- 210, Issue 6, 2007
47 CFR, Part 15.109:2006, Class B
ICES 003, Issue 4, 2004

For
Remote Technologies

Test Performed by:	Test Authorized by:
Intertek Testing Services NA, Inc.	Remote Technologies
7250 Hudson Blvd., Suite 100	7651 Anagram Drive
Oakdale, MN 55128	Eden Prairie, MN 55344

Prepared by: _____ Date: May 23, 2008
Uri Spector

Reviewed by: _____ Date: May 23, 2008
Norman Shpilsher

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1.0 DESCRIPTION OF THE SAMPLE (EUT)

Model:	U2
Type of EUT:	Remote Control
Serial Number:	n/a
Company:	Remote Technologies
Customer:	Mr. Paul Weichelt
Address:	7651 Anagram Drive Eden Prairie, MN 55344
Phone:	(952) 253-3113
Fax:	(952) 253-3131
Standards Information:	☒ FCC Part 15. 231 ☒ RSS – 210, Issue 6, 2007 ☒ ICES-003, Issue 4, 2004 ☒ 47 CFR, Part 15:2006, §15.109, Class B
Operating Frequency Range(s):	Range: 433.91MHz
Type of Modulation:	☒ FSK
Type of equipment:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	May 20, 2008
Test Work Started:	May 20, 2008
Test Work Completed:	May 23, 2008
Test Sample Conditions:	☐ Damaged ☐Poor (Usable) ☒ Good ☐ Prototype ☒Production ☐ Used

2.0 TEST SUMMARY

Referring to the performance criteria and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards.

TEST SPECIFICATION	TEST PARAMETERS	RESULT
47 CFR 15.231(a)(1), RSS-Gen Issue 1/RSS-210 Issue 6, A1.1.1	Transmitting Time	Pass
47 CFR 15.231(b), RSS-Gen Issue 1/RSS-210 Issue 6, A1.1.2	Field Strength of Fundamental and Spurious Emissions	Pass
47 CFR 15.231(c), RSS-Gen Issue 1/RSS-210 Issue 6, A1.1.3	Bandwidth of Emissions	Pass
47 CFR 15.109, Class B, ICES003	Radiated Emissions	Pass

Note: The U2 Remote Control Transmitter is battery operated device, therefore Line Conducted Emissions testing is inappropriate and therefore unnecessary.

3.0 EQUIPMENT UNDER TEST

3.1 Power Configuration

Rated voltage:	☐ 120VAC ☐ 230VAC ☐ 400VAC ☒ 6 VDC (4 AAA internal batteries) ☐ Other:
Rated current:	Amp.
Rated frequency:	☐ 50Hz ☐ 60Hz
Power source:	☐ Internal Power supply ☐ External Power supply or AC/DC adapter

3.2 EUT Configuration

The equipment under test was operated during the measurement under the following conditions:

☐ - Standby
☐ - Continuous
☐ - Continuous un-modulated
☐ - Test program (customer specific)
☒ - See below

Operating modes of the EUT:

No.	Description
1	The transmitter was wired to transmit continuously
2	

Cables:

No.	Type	Length	Designation	Note
1	N/A			
2				

Support equipment/Services:

No.	Item	Description
1	N/A	
2		

General notes: Internal USB port. The USB port is only used to download software (by an RTI dealer). Therefore, USB cable was not connected to the U2 remote control during testing.

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

☒ **Normal**

Temperature:	+15 to +35 ° C
Humidity:	20-75 %
Atmospheric pressure:	86-106 kPa

☐ **Extreme**

☐ **Temperature:**	-20 to +50 ° C
☐ **Supply voltage:**	85% to +115%

General notes:

4.0 TEST CONDITIONS AND RESULTS

4.1 Transmitting Time, FCC 15.231(b)

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

The transmitter transmitted continuously while the activation button was pressed. According to FCC Part 15.231(a)(1) a manually operated transmitter should stop transmitting within 5 sec after release the activation button. The transmitter was deactivates automatically less then 1 sec after releasing the activation button.

Notes:

4.2 Field Strength of Fundamental and Spurious Emissions

Date:	May 20, 2008	**Result:** **Pass**
Standard:	FCC Part 15. 231(b)	
Tested by:	Uri Spector	
Operation mode:	See page 6	
Note:	Field Strength of Fundamental and Spurious Emissions measurements were made at Fundamental frequency of 433.91MHz; Spurious Emissions were tested up to 4.5GHz (10^{th} harmonic). The Table 1 shows the Field Strength of Fundamental Radiation. Graphs 1, 2, 3, 4 show calculation of the Average Value Factor. The Table 2 shows Field Strength of Spurious Emissions for U2 Remote Control.	

Table # 1

Frequency	Antenna		Ant. CF	Cable loss	Pre-amp	Reading	Avg Value	Total @ 3m	Limit	Margin	Comments
MHz	Polarity	Hts(cm)	dB1/m	dB	Gain (dB)	dBµV	dB	dBµV/m	dBµV/m	dB	
433.91	V	100	16.6	2.4	0.0	69.3	10.15	78.2	80.8	-2.6	
433.91	H	177	16.6	2.4	0.0	58.9	10.15	67.8	80.8	-13.0	

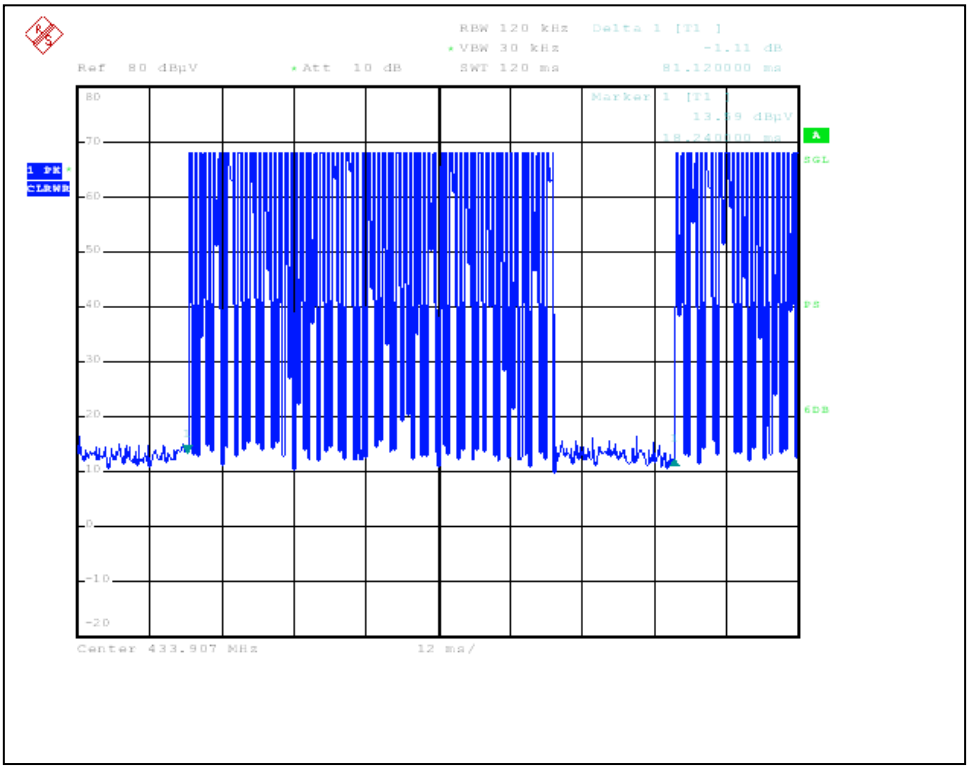
Calculation of the Average Value Factor:

Average Factor= 20Log(On air/Pulse Train)=20Log(4*0.690)+(68*0.330)/81.12=20Log0.3106= -10.15dB

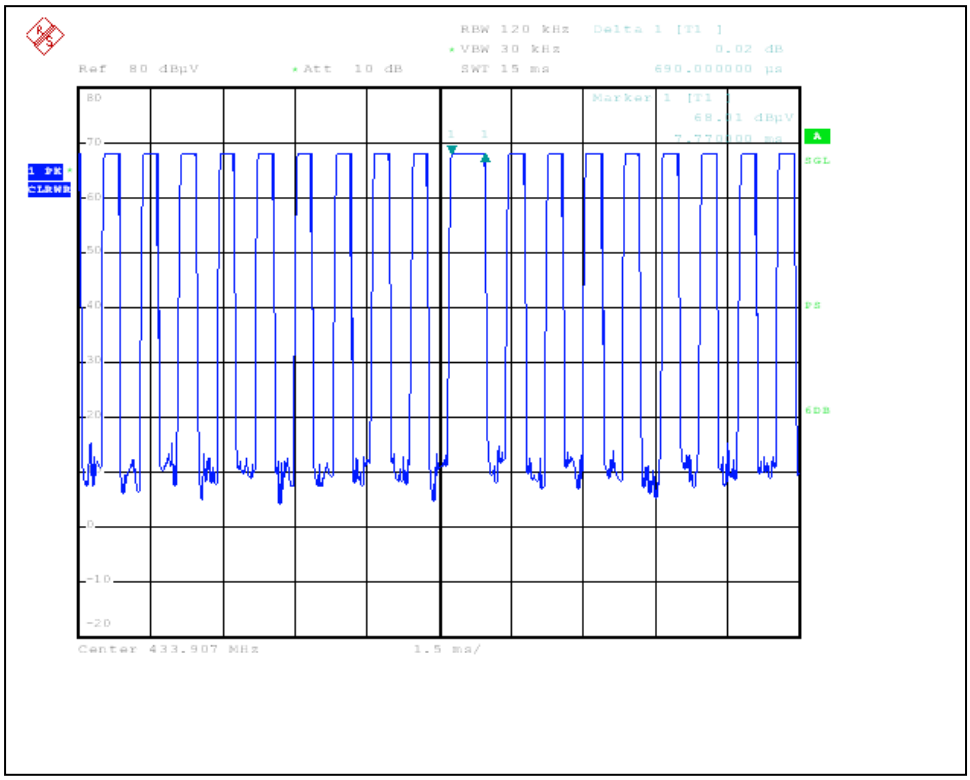
Pulse train=81.12msec (see Graph 1)
"Wide pulses": 4 each of 0.690msec (see Graphs 2, 4)
"Regular pulses": 68 each of 0.330msec (see Graphs 3, 4)

Notes:

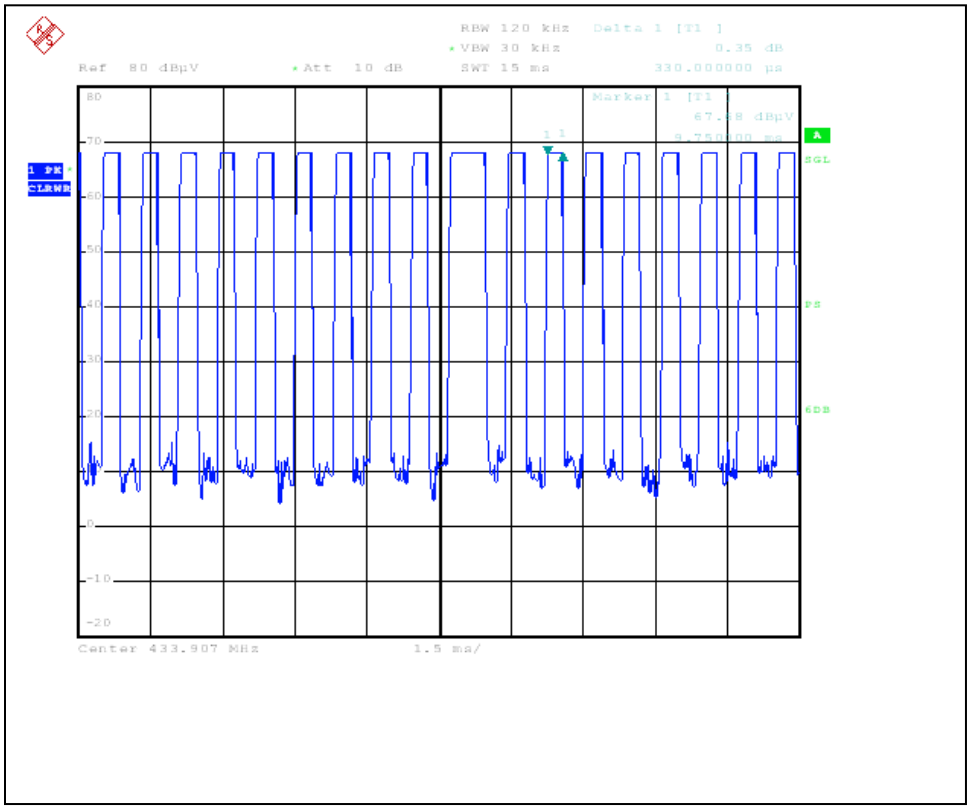
Graph 1



Graph 2



Graph 3



Graph 4

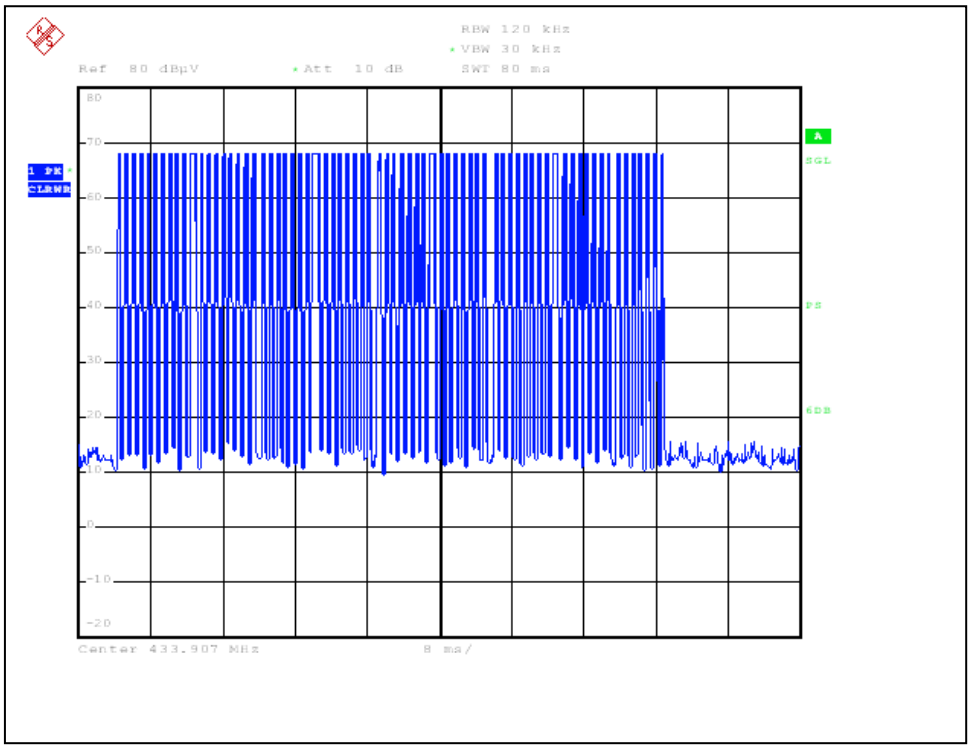


Table # 2

Frequency	Antenna		Ant. CF	Cable loss	Pre-amp	Reading	Total @ 3m	Limit	Margin	Comments
MHz	Polarity	Hts(cm)	dB1/m	dB	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	
867.82	V	140	20.7	3.6	0.0	15.6	39.9	N/A	N/A	1
867.82	H	120	20.7	3.6	0.0	16.7	41.0	N/A	N/A	1
1301.73	V	183	24.3	4.7	39.6	46.1	35.4	60.8	-25.4	
1301.73	H	202	24.3	4.7	39.6	45.3	34.6	60.8	-26.2	
1735.64	V	120	26.6	5.6	39.0	44.2	37.3	N/A	N/A	1
1735.64	H	100	26.6	5.6	39.0	42.4	35.5	N/A	N/A	1
2169.55	V	100	27.9	3.0	38.3	39.3	31.8	N/A	N/A	1
2169.55	H	100	27.9	3.0	38.3	44.2	36.7	N/A	N/A	1
3471.28	V	195	31.0	3.4	37.6	41.4	38.2	N/A	N/A	1
3471.28	H	100	31.0	3.4	37.6	41.6	38.4	N/A	N/A	1
4339.10	V	100	32.5	4.0	37.6	37.7	36.6	60.8	-24.2	
4339.10	H	100	32.5	4.0	37.6	37.1	36.0	60.8	-24.8	

Comments: Frequency outside restricted bands of operation per 15.205

4.3 Bandwidth of Emissions

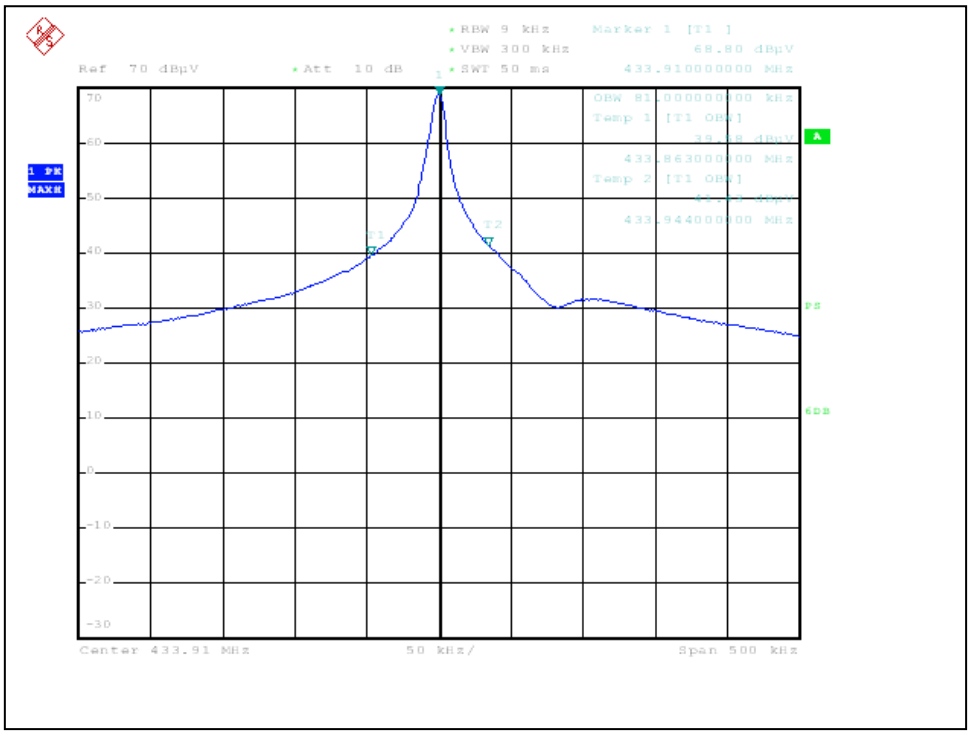
Date:	May 20, 2008	**Result:** **Pass**
Standard:	FCC Part 15.231 (c)	
Tested by:	Uri Spector	
Test Point:	Enclosure	
Operation mode:	See page 6	
Note:		

Notes: Bandwidth of Emissions measurements was made for frequency of 433.91MHz.

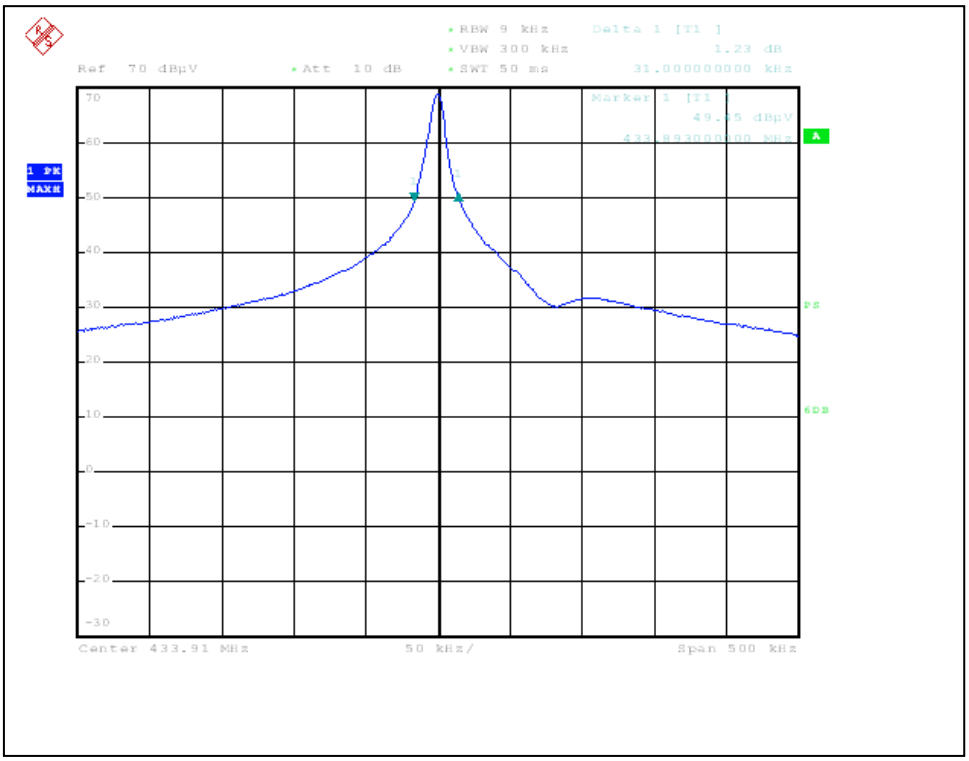
Bandwidth of Emissions at –20dB level was measured at 31kHz.
The maximum allowed level is 433.91MHz x 0.25% = 1084.77kHz
Bandwidth of Emissions for the EUT at 99% power was measured at 81kHz.

The Graph 6 shows the Bandwidth of Emissions at –20dB level.
The Graph 5 shows the Bandwidth of Emissions at 99% power.

Graph 5



Graph 6



4.4 Radiated Emissions

Description of the test location

Test location: ☐ OATS ☒ Anechoric Chamber

Test distance: ☐ 10 meters ☒ 3 meters

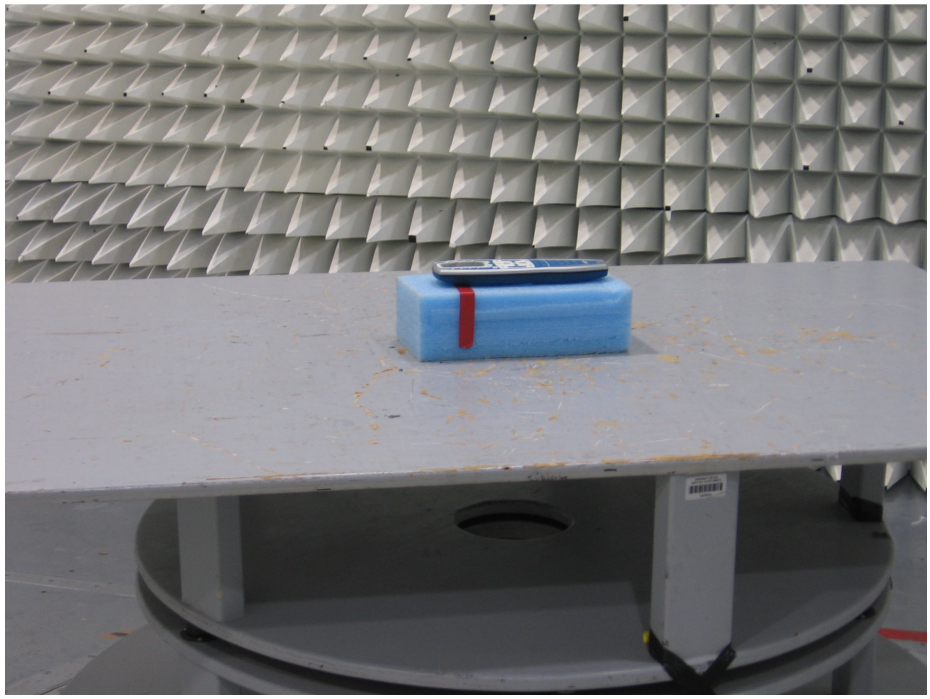
Test result: **Pass**

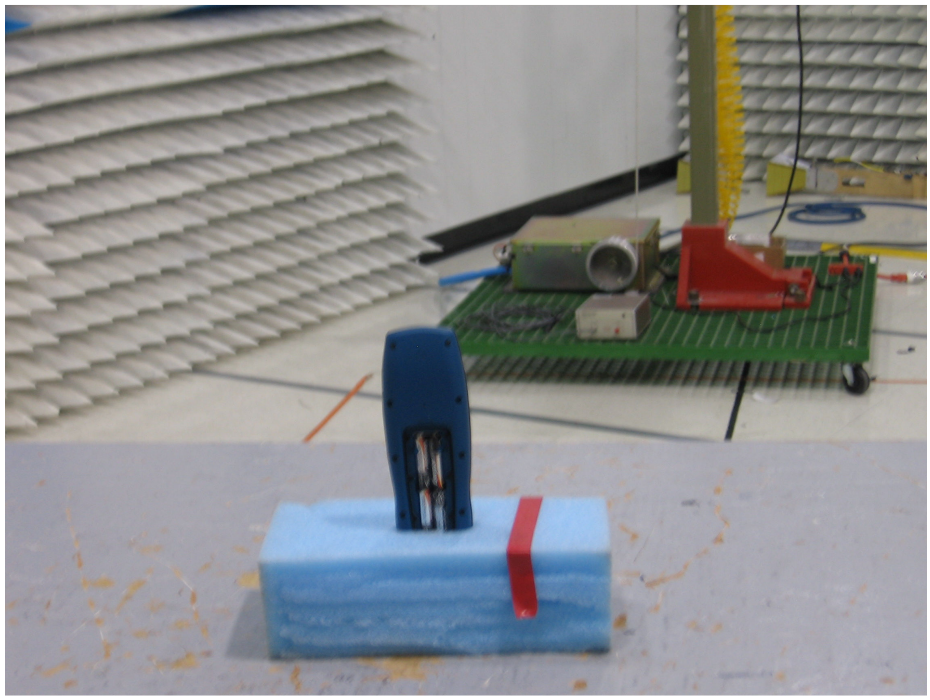
Frequency range: 30MHz-2000MHz

Max. Emissions margin: 14.9 dB below the limit

Notes: The EUT (U2 Remote Control) as a digital device was tested according to FCC Part 15.109, Class B in frequency range from 30MHz to 2GHz; emissions at transmitter fundamental frequency and 2nd harmonic were excluded from the Table.

The U2 Remote Control is battery operated device, therefore Line Conducted Emissions testing is inappropriate and therefore unnecessary.





Test Setup Photos

Date:	May 22, 2008	**Result:** **Pass**
Standard:	FCC Part 15.109, Class B	
Tested by:	Uri Spector	
Test Point:	Enclosure	
Operation mode:	See Page 6	
Note:		

Table # 3

Frequency	Antenna		Ant. CF	Cable loss	Pre-amp	Reading	Total @ 3m	Limit	Margin	Comments
MHz	Polarity	Hts(cm)	dB1/m	dB	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	
108.08	H	100	11.7	1.1	0.0	14.9	27.8	43.5	-15.7	
180.02	H	100	9.5	1.5	0.0	16.1	27.1	43.5	-16.4	
216.24	H	100	9.9	1.7	0.0	13.1	24.6	46.0	-21.4	
252.08	H	100	12.8	1.8	0.0	14.8	29.4	46.0	-16.6	
324.00	H	100	14.2	2.1	0.0	14.9	31.1	46.0	-14.9	
148.82	V	100	11.4	1.3	0.0	11.3	24.0	43.5	-19.5	
180.02	V	100	9.5	1.5	0.0	12.3	23.3	43.5	-20.2	
1092.75	V	100	24.7	2.2	39.8	43.3	30.4	54.0	-23.5	
1500.00	V	100	25.6	2.5	39.4	42.3	31.0	54.0	-23.0	
1185.00	H	100	24.8	2.3	39.6	42.8	30.3	54.0	-23.7	
1599.00	H	100	26.0	2.6	39.3	41.9	31.2	54.0	-22.8	

5.0 TEST EQUIPMENT

Emissions Equipment

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	CAL DUE	USED
Spectrum Analyzer	R & S	FSP 40	100024	08/23/2008	☒
Spectrum Analyzer	R & S	ESCI	100358	04/27/2009	☒
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	07/30/2008	☒
Horn Antenna	EMCO	3115	6579	03/06/2009	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	04/24/2009	☒
System	TILE! Instrument Control		Ver. 3.4.K.29	VBU	☒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