

Universal Electronics Inc.

Application For Certification

NEVO S70 Remote (Z-Wave & WiFi Transceiver)

(FCC ID: MG372400)

07279331 BH/ sl March 07, 2008

The test report only allows to be revised within three years from its original issued date unless further standard or the requirement was noticed.
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MEASUREMENT/TECHNICAL REPORT

Universal Electronics Inc. - MODEL: URC7240

FCC ID: MG372400

This report concerns (check one) Or	iginal Grant <u>X</u> Class II Change
	w Pwr Transceiver, Rx Verified (Z-Wave 15 Digital Transmission Systems (WiFi
transmitter portion)	
Deferred grant requested per 47 CFR 0	0.457(d)(1)(ii)? Yes No <u>X</u>
Company Name agrees to notify the Co	If yes, defer until : date ommission by: date
of the intended date of announcemer issued on that date.	nt of the product so that the grant can be
Transition Rules Request per 15.37?	Yes No _ X
If no, assumed Part 15, Subpart C f [05-04-07 Edition] provision.	or intentional radiator - the new 47 CFR
Report prepared by:	Ho Wai Kin, Ben Intertek Testing Services Hong Kong Ltd. 2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. Phone: 852-2173-8505 Fax: 852-2371-0521

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List of attached file

Exhibit Type	File Description	Filename
Test Report	Test Report	report.pdf
Test Report	6 dB Bandwidth Plot	6dB.pdf
Test Report	Maximum Power Density Plot	maxpd.pdf
Test Report	Out Band Antenna Conducted Emission Plot & Radiated Emission on the Bandedge	obantcon.pdf.pdf
Test Report	Conducted Emission Test Result	conduct.pdf
Test Setup Photo	Radiated Emission	radiated photos.doc
Test Setup Photo	Conducted Emission	conducted photos.doc
External Photo	External Photo	external photos.doc
Internal Photo	Internal Photo	internal photos.doc
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Operation Description	Technical Description	descri.pdf
Cover Letter	Confidentiality Request	request.pdf
RF Exposure info	RF Safety	RF exposure info.pdf

EXHIBIT 1

SUMMARY OF TEST RESULTS

1.0 Summary of Test

Universal Electronics Inc. - MODEL: URC7240

FCC ID: MG372400

WiFi Transmitter Portion		
TEST	REFERENCE	RESULTS
Max. Output power	15.247(b)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d)	Pass
AC Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass (See Notes)

Z-wave Transmitter Portion

TEST	REFERENCE	RESULTS
Radiated Emission	15.249(a)	Pass
Radiated Emission on the Bandedge	15.249(d)	Pass
AC Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses two permanently attached antennae separately for Z-wave and WiFi transceivers, which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

EXHIBIT 2

GENERAL DESCRIPTION

2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a Universal remote control with RF control and WiFi function. The EUT have two the RF control (Z-wave) and WiFi of transceiver. The RF control (Z-wave) is operating at 908.4MHz. The WiFi is operating at 2412 - 2462MHz, 5MHz of channel spacing.

The EUT is powered by 3.7Vdc (1 x 3.7V "1800mAh Li-ion" rechargeable battery, EVE Model: A0356). The AC-DC adaptor 100-240VAC 50-60Hz input, 5VDC 1200mA output, Model: SCP0501200P (HD) is for charging function. During the normal use, the RF control transmits control signal to the corresponding receiver unit (Nevo Connect device) and it to control home theater accordingly and the Z-Wave will receive a acknowledgement from the Nevo Connect device. Besides, the EUT can be up and down data files through WiFi and USB port by application software. The data files can be stored to the memory of EUT.

Antenna Type: Internal, Integral (Z-Wave Transmitter Portion) Internal, Integral (WiFi Transmitter Portion)

The circuit descriptions are saved with filename: descri.pdf.

2.2 Related Submittal(s) Grants

This is an application for Certification of:

- 1. DXT Part 15 Low Pwr Transceiver, Rx Verified (Z-Wave transmitter portion); and
- 2. DTS Part 15 Digital Transmission Systems (WiFi transmitter portion)

Remaining portions are subject to the following procedures

- 1. Computer peripheral (USB portion): 15 DOC
- 2. Receiver portion of Z-wave: 15 Verification
- 3. Receiver portion of WiFi: exempt from technical requirement of this Part.

Other unit, associated with this EUT, has FCC ID: MG310370 and has been granted.

2.3 Test Methodology

Both AC line conducted and Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003) and KDB558074. Radiated measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "Justification **Section**" of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

EXHIBIT 3

SYSTEM TEST CONFIGURATION

3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. It was powered by 1 x 3.7V "1800mAh Li-ion" rechargeable battery (EVE Model: A0356).

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

The parameters of test software setting:

During the test, Channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the applicant and is going to be fixed on the firmware of the end product.

Test software setting of IEEE 802.11b/g			
Channel No. Out power Data rate Data modulation		Data modulation	
1, 6, 11 14 802.11b: 1-11 Mbps 802.11b: DSSS(BPSK, QPSK, CCK)			
	13	802.11g: 6-54 Mbps	802.11g: OFDM(BPSK,QPSK,16/64QAM)

Power Parameters of IEEE 802.11b/g

The tests were performed in 1, 11 Mbps and 6, 54 Mbps data rate (worst case) in standalone mode and shown in this report.

3.3 Details of EUT and Description of Peripherals

Details of EUT:

An AC to DC adaptor is for charging function only and a battery (provided with the unit) is used to power the device. Their description are listed below.

- (1) A "3.7V 1800mAh Li-ion" type rechargeable battery
- (2) A AC-DC adaptor: 100-240VAC 50-60Hz input, 5VDC 1200mA output, Model: SCP0501200P (HD)

There are no special accessories necessary for compliance of this product.

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

3.5 Equipment Modification

Any modifications installed previous to testing by Universal Electronics Inc. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services Hong Kong Ltd.

All the items listed under section 3.0 of this report are confirmed by:

Confirmed by:

Ho Wai Kin, Ben Senior Supervisor Intertek Testing Services Hong Kong Ltd. Agent for Universal Electronics Inc.

Signature

March 07, 2008 Date

EXHIBIT 4

MEASUREMENT RESULTS

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.0 Measurement Results

- 4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):
 - [×] The antenna power of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.
 - [] The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set for RBW> 6dB bandwidth and power was read directly in dBm. External attenuation and cable loss were compensated for using to OFFSET function of the analyzer.

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm).

IEEE 802.11b (Antenna Gain = -1 dBi)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	9.90	9.77
Middle Channel: 2437	10.27	10.64
High Channel: 2462	10.35	10.84

IEEE 802.11g (Antenna Gain = -1 dBi)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	13.45	22.13
Middle Channel: 2437	14.38	27.48
High Channel: 2462	14.28	26.79

Cable loss : 0.5 dB External Attenuation : 10 dB

Cable loss, external attenuation: [] included in OFFSET function [×] added to power meter raw reading

EUT dBm max. output level = 14.38 dBm (+30 dBm or less)

For RF Safety, the information is saved with filename: RF exposure info.pdf.

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

IEEE 802.11b (DSSS, 1, 11Mbps)		
Frequency (MHz) 6 dB Bandwidth (MHz)		
2437	9.92	

IEEE 802.11g (OFDM, 6, 54Mbps)		
Frequency (MHz)6 dB Bandwidth (MHz)		
2437	16.52	

Limit: at least 500kHz

Refer to the following plots for 6 dB bandwidth sharp:

IEEE 802.11b

Plot B2A1 - B2A2: Low Channel 6 dB RF Bandwidth Plot B2B1 - B2B2: Middle Channel 6 dB RF Bandwidth Plot B2C1 - B2C2: High Channel 6 dB RF Bandwidth

IEEE 802.11g Plot G2A1 - G2A2: Low Channel 6 dB RF Bandwidth Plot G2B1 - G2B2: Middle Channel 6 dB RF Bandwidth

Plot G2C1 - G2C2: High Channel 6 dB RF Bandwidth

For electronic filing, the above plots are saved with filename: 6dB.pdf

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.3 Maximum Power Density Reading, FCC Rule 15.247(e) :

The spectrum analyzer RES BW was set to 3kHz. In order to look for a peak, the START and STOP frequencies were set to the band edges of the maximum output passband. If there is no clear maximum amplitude in any given portion of the band, it may be necessary to make measurements at a number of bands defined by several START and STOP frequency pairs.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

IEEE 802.11b (DSSS, 1, 11Mbps)							
Frequency (MHz) Power Density (dBm/3kHz)							
2436.308	-12.53						

Frequency Span = 1.5MHz

Sweep Time = Frequency Span/3kHz = 500 seconds

Cable Loss: 0.5 dB

Peak Power Density (at 2436.308MHz) = -12.53 + 0.5 = -12.03dBm/3kHz

Limit: 8dBm/ 3kHz

Refer to the following plots for power density data :

Plot B3A1 - B3A2: Low Channel power density Plot B3B1 - B3B2: Middle Channel power density Plot B3C1 - B3C2: High Channel power density

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.3 Maximum Power Density Reading, FCC Rule 15.247(e) – Continued:

IEEE 802.11g (OFDM, 6, 54Mbps)								
Frequency (MHz)	Power Density (dBm/3kHz)							
2435.158	-17.52							

Frequency Span = 1.5MHz

Sweep Time = Frequency Span/3kHz = 500 seconds

Cable Loss: 0.5 dB

Peak Power Density (at 2435.158MHz) = -17.52 + 0.5 = -17.02dBm/3kHz

Limit: 8dBm/ 3kHz

Refer to the following plots for power density data :

Plot G3A1 - G3A2: Low Channel power density Plot G3B1 - G3B2: Middle Channel power density Plot G3C1 - G3C2: High Channel power density

For electronic filing, the above plots are saved with filename: maxpd.pdf

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.4 Out of Band Conducted Emissions, FCC Rule 15.247(d) & Radiated Emission on the Bandedge, FCC Rule 15.249(d):

Out of Band Conducted Emissions, FCC Rule 15.247(d)

In any 100 kHz bandwidth outside the EUT passband, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20dB below that of the maximum in-band 100 kHz emission, or else shall meet the general limits for radiated emissions at frequencies outside the passband, whichever results in lower attenuation.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

Refer to the following plots for out of band conducted emissions data & bandedge:

Plot B4A1 - B4A2: Low Channel Emissions Plot B4B1 - B4B2: Middle Channel Emissions Plot B4C1 - B4C2: High Channel Emissions Plot G4A1 - G4A2: Low Channel Emissions Plot G4B1 - G4B2: Middle Channel Emissions Plot G4C1 - G4C2: High Channel Emissions

The plots showed all spurious emission and up to the tenth harmonic was measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

Radiated Emission on the Bandedge, FCC Rule 15.249(d)

Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).

Refer to the following plots for out of band conducted emissions data & bandedge:

Plot Z4A1 - Z4A2: Radiated Emissions on the Bandedge

Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 902 and 928MHz.

For the electronic filing, the above plots are saved with filename: obantcon.pdf

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

- [×] Not required, since all emissions are more than 20dB below fundamental
- [] See attached data sheet

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b), (c):

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.7 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

where FS = Field Strength in $dB\mu V/m$ RA = Receiver Amplitude (including preamplifier) in $dB\mu V$ CF = Cable Attenuation Factor in dB AF = Antenna Factor in dB AG = Amplifier Gain in dB PD = Pulse Desensitization in dB AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD + AV

Example

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

 $\begin{array}{l} \mathsf{RA} = 62.0 \; d\mathsf{B}\mu\mathsf{V} \\ \mathsf{AF} = \; 7.4 \; d\mathsf{B} \\ \mathsf{CF} = \; 1.6 \; d\mathsf{B} \\ \mathsf{AG} = 29.0 \; d\mathsf{B} \\ \mathsf{PD} = 0 \; d\mathsf{B} \\ \mathsf{AV} = -10 \; d\mathsf{B} \\ \mathsf{FS} = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \; d\mathsf{B}\mu\mathsf{V/m} \end{array}$

Level in mV/m = Common Antilogarithm [(32 dB μ V/m)/20] = 39.8 μ V/m

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.8 Radiated Emission Configuration Photograph

Worst Case Radiated Emission at 4874.700 MHz

For the electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.doc.

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.9 Radiated Emission Data

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 0.7 dB margin

TEST PERSONNEL:

Tester Signature

Mark Cheung, Lead Engineer Typed/Printed Name

March 07, 2008 Date

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11g (TX-Channel 01) Date of Test: January 09, 2008

Table 1

		1			1				- 1
Polari-	Frequency	Reading	Pre-Amp	Antenna	Net at	Average	Calculated	Limit	Margin
zation			Gain	Factor	3m - Peak	Factor	at 3m	at 3m	
	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(-dB)	(dBµV/m)	(dBµV/m)	(dB)
Н	*2310.000	47.9	33	29.4	44.3	0	44.3	54.0	-9.7
Н	*2340.000	49.4	33	29.4	45.8	0	45.8	54.0	-8.2
Н	*2390.000	49.8	33	29.4	46.2	0	46.2	54.0	-7.8
Н	*4824.000	51.1	33	34.9	53.0	0	53.0	54.0	-1.0
V	7236.000	45.9	33	37.9	50.8	0	50.8	54.0	-3.2
V	9648.000	43.7	33	40.4	51.1	0	51.1	54.0	-2.9
V	*12060.000	43.5	33	40.5	51.0	0	51.0	54.0	-3.0

Radiated Emissions

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11g (TX-Channel 06) Date of Test: January 09, 2008

Table 2

Radiated Emissions

Polari-	Frequency	Reading	Pre-Amp	Antenna	Net at	Average	Calculated	Limit	Margin
zation			Gain	Factor	3m - Peak	Factor	at 3m	at 3m	
	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(-dB)	(dBµV/m)	(dBµV/m)	(dB)
Н	*4874.700	51.4	33	34.9	53.3	0	53.3	54.0	-0.7
V	*7312.050	45.2	33	37.9	50.1	0	50.1	54.0	-3.9
V	9749.400	43.6	33	40.4	51.0	0	51.0	54.0	-3.0
V	*12186.750	43.5	33	40.5	51.0	0	51.0	54.0	-3.0

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11g (TX-Channel 11) Date of Test: January 09, 2008

Table 3

Frequency Reading Pre-Amp Antenna Net at Calculated Margin Polari-Average Limit zation Gain Factor 3m - Peak Factor at 3m at 3m (dBµV) (dBµV/m) (dBµV/m) (dB) (dBµV/m) (MHz) (dB) (-dB) (dB) *2483.500 50.1 33 29.4 46.5 46.5 54.0 -7.5 Н 0 н *2491.000 48.7 33 29.4 45.1 0 45.1 54.0 -8.9 н *2500.000 44.7 48.3 33 29.4 44.7 0 54.0 -9.3 53.0 53.0 Н *4923.800 51.1 33 34.9 0 54.0 -1.0 V *7385.700 45.4 33 37.9 50.3 0 50.3 54.0 -3.7 V -3.1 9847.600 43.5 33 40.4 50.9 0 50.9 54.0 V *12309.500 43.3 40.5 50.8 50.8 -3.2 33 0 54.0

Radiated Emissions

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11b (TX-Channel 01) Date of Test: January 09, 2008

Table 4

Frequency Reading Pre-Amp Antenna Net at Calculated Margin Polari-Average Limit zation Gain Factor 3m - Peak Factor at 3m at 3m (dBµV) (dBµV/m) (dBµV/m) (dB) (dBµV/m) (MHz) (dB) (-dB) (dB) *2310.000 45.9 33 29.4 42.3 42.3 54.0 -11.7 Н 0 -10.2 47.4 н *2340.000 33 29.4 43.8 0 43.8 54.0 н *2390.000 44.2 -9.8 47.8 33 29.4 44.2 0 54.0 53.0 53.0 Н *4824.000 51.1 33 34.9 0 54.0 -1.0 V 7236.000 45.2 33 37.9 50.1 0 50.1 54.0 -3.9 V -3.7 9648.000 42.9 33 40.4 50.3 0 50.3 54.0 V *12060.000 43.6 33 40.5 51.1 51.1 -2.9 0 54.0

Radiated Emissions

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11b (TX-Channel 06) Date of Test: January 09, 2008

Table 5

Radiated Emissions

Polari-	Frequency	Reading	Pre-Amp	Antenna	Net at	Average	Calculated	Limit	Margin
zation			Gain	Factor	3m - Peak	Factor	at 3m	at 3m	
	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(-dB)	(dBµV/m)	(dBµV/m)	(dB)
Н	*4874.700	51.1	33	34.9	53.0	0	53.0	54.0	-1.0
V	*7312.050	45.6	33	37.9	50.5	0	50.5	54.0	-3.5
V	9749.400	43.2	33	40.4	50.6	0	50.6	54.0	-3.4
V	*12186.750	43.6	33	40.5	51.1	0	51.1	54.0	-2.9

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11b (TX-Channel 11) Date of Test: January 09, 2008

Table 6

Radiated Emissions

Frequency Reading Pre-Amp Antenna Net at Calculated Margin Polari-Average Limit zation Gain Factor 3m - Peak Factor at 3m at 3m (dBµV) (dBµV/m) (dBµV/m) (dBµV/m) (MHz) (dB) (dB) (-dB) (dB) *2483.500 48.1 33 29.4 44.5 44.5 54.0 -9.5 Н 0 *2491.000 46.7 -10.9 Н 33 29.4 43.1 0 43.1 54.0 *2500.000 29.4 42.7 42.7 54.0 -11.3 н 46.3 33 0 *4923.800 51.4 34.9 53.3 53.3 54.0 -0.7 Н 33 0 V *7385.700 45.3 33 37.9 50.2 0 50.2 54.0 -3.8 V 9847.600 43.4 33 40.4 50.8 0 50.8 54.0 -3.2 V *12309.500 44.1 33 40.5 51.6 0 51.6 54.0 -2.4

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: TX (Z-wave) Date of Test: January 09, 2008

Table 7

Radiated Emissions

	Frequency	Reading	Pre-Amp	Antenna	Average	Net	Limit	Margin
Polarization			Gain	Factor	Factor	at 3m	at 3m	
	(MHz)	(dBµV)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
V	908.390	74.0	16	32.0	0	90.0	94.0	-4.0
V	1816.780	51.6	33	27.2	0	45.8	54.0	-8.2
V	*2725.170	50.6	33	30.4	0	48.0	54.0	-6.0
V	*3633.560	45.1	33	33.3	0	45.4	54.0	-8.6
V	*4541.950	44.4	33	34.9	0	46.3	54.0	-7.7
V	*5450.340	43.3	33	35.7	0	46.0	54.0	-8.0

NOTES: 1. Quasi-peak detector is used for the emission below or equal to 1000 MHz.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11g (TX-Channel 01, WiFi & Z-wave On) Date of Test: January 09, 2008

Table 8

1									
Polari-	Frequency	Reading	Pre-Amp	Antenna	Net at	Average	Calculated	Limit	Margin
zation			Gain	Factor	3m - Peak	Factor	at 3m	at 3m	
	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(-dB)	(dBµV/m)	(dBµV/m)	(dB)
Н	*2310.000	47.1	33	29.4	43.5	0	43.5	54.0	-10.5
Н	*2340.000	48.4	33	29.4	44.8	0	44.8	54.0	-9.2
Н	*2390.000	48.8	33	29.4	45.2	0	45.2	54.0	-8.8
Н	*4824.000	50.1	33	34.9	52.0	0	52.0	54.0	-2.0
V	7236.000	44.9	33	37.9	49.8	0	49.8	54.0	-4.2
V	9648.000	42.6	33	40.4	50.0	0	50.0	54.0	-4.0
V	*12060.000	41.5	33	40.5	49.0	0	49.0	54.0	-5.0

Radiated Emissions

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11g (TX-Channel 06, WiFi & Z-wave On) Date of Test: January 09, 2008

Table 9

Radiated Emissions

Polari-	Frequency	Reading	Pre-Amp	Antenna	Net at	Average	Calculated	Limit	Margin
zation			Gain	Factor	3m - Peak	Factor	at 3m	at 3m	
	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(-dB)	(dBµV/m)	(dBµV/m)	(dB)
Н	*4874.700	50.4	33	34.9	52.3	0	52.3	54.0	-1.7
V	*7312.050	44.2	33	37.9	49.1	0	49.1	54.0	-4.9
V	9749.400	42.6	33	40.4	50.0	0	50.0	54.0	-4.0
V	*12186.750	42.5	33	40.5	50.0	0	50.0	54.0	-4.0

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11g (TX-Channel 11, WiFi & Z-wave On) Date of Test: January 09, 2008

Table 10

Radiated Emissions

Polari-	Frequency	Reading	Pre-Amp	Antenna	Net at	Average	Calculated	Limit	Margin
zation			Gain	Factor	3m - Peak	Factor	at 3m	at 3m	
	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(-dB)	(dBµV/m)	(dBµV/m)	(dB)
Н	*2483.500	49.1	33	29.4	45.5	0	45.5	54.0	-8.5
Н	*2491.000	47.7	33	29.4	44.1	0	44.1	54.0	-9.9
Н	*2500.000	47.3	33	29.4	43.7	0	43.7	54.0	-10.3
Н	*4923.800	50.6	33	34.9	52.5	0	52.5	54.0	-1.5
V	*7385.700	44.4	33	37.9	49.3	0	49.3	54.0	-4.7
V	9847.600	42.5	33	40.4	49.9	0	49.9	54.0	-4.1
V	*12309.500	42.0	33	40.5	49.5	0	49.5	54.0	-4.5

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11b (TX-Channel 01, WiFi & Z-wave On) Date of Test: January 09, 2008

Table 11

Frequency Reading Pre-Amp Antenna Net at Calculated Margin Polari-Average Limit zation Gain Factor 3m - Peak Factor at 3m at 3m (dBµV) (dBµV/m) (dBµV/m) (dB) (dBµV/m) (MHz) (dB) (-dB) (dB) *2310.000 46.1 33 29.4 42.5 42.5 54.0 -11.5 Н 0 н *2340.000 47.8 33 29.4 44.2 0 44.2 54.0 -9.8 н *2390.000 47.7 44.1 33 29.4 44.1 0 54.0 -9.9 52.3 52.3 Н *4824.000 50.4 33 34.9 0 54.0 -1.7 -4.7 V 7236.000 44.4 33 37.9 49.3 0 49.3 54.0 V 9648.000 41.9 33 40.4 49.3 0 49.3 54.0 -4.7 V *12060.000 42.6 40.5 50.1 50.1 -3.9 33 0 54.0

Radiated Emissions

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11b (TX-Channel 06, WiFi & Z-wave On) Date of Test: January 09, 2008

Table 12

Radiated Emissions

Polari-	Frequency	Reading	Pre-Amp	Antenna	Net at	Average	Calculated	Limit	Margin
zation			Gain	Factor	3m - Peak	Factor	at 3m	at 3m	
	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(-dB)	(dBµV/m)	(dBµV/m)	(dB)
Н	*4874.700	50.4	33	34.9	52.3	0	52.3	54.0	-1.7
V	*7312.050	44.3	33	37.9	49.2	0	49.2	54.0	-4.8
V	9749.400	42.2	33	40.4	49.6	0	49.6	54.0	-4.4
V	*12186.750	42.6	33	40.5	50.1	0	50.1	54.0	-3.9

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Test Engineer: Mark Cheung

Applicant: Universal Electronics Inc. Model: URC7240 Mode: 802.11b (TX-Channel 11, WiFi & Z-wave On) Date of Test: January 09, 2008

Table 13

Radiated Emissions

Polari-	Frequency	Reading	Pre-Amp	Antenna	Net at	Average	Calculated	Limit	Margin
zation			Gain	Factor	3m - Peak	Factor	at 3m	at 3m	
	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(-dB)	(dBµV/m)	(dBµV/m)	(dB)
Н	*2483.500	48.4	33	29.4	44.8	0	44.8	54.0	-9.2
Н	*2491.000	47.2	33	29.4	43.6	0	43.6	54.0	-10.4
Н	*2500.000	47.1	33	29.4	43.5	0	43.5	54.0	-10.5
Н	*4923.800	50.2	33	34.9	52.1	0	52.1	54.0	-1.9
V	*7385.700	44.4	33	37.9	49.3	0	49.3	54.0	-4.7
V	9847.600	42.4	33	40.4	49.8	0	49.8	54.0	-4.2
V	*12309.500	43.1	33	40.5	50.6	0	50.6	54.0	-3.4

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Test Engineer: Mark Cheung

Applicant: Universal Electronics Inc. Model: URC7240 Mode: TX (Z-wave & WiFi On) Date of Test: January 09, 2008

Table 14

Radiated Emissions

	Frequency	Reading	Pre-Amp	Antenna	Average	Net	Limit	Margin
Polarization			Gain	Factor	Factor	at 3m	at 3m	
	(MHz)	(dBµV)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
V	908.390	73.6	16	32.0	0	89.6	94.0	-4.4
V	1816.780	51.1	33	27.2	0	45.3	54.0	-8.7
V	*2725.170	50.1	33	30.4	0	47.5	54.0	-6.5
V	*3633.560	44.7	33	33.3	0	45.0	54.0	-9.0
V	*4541.950	44.2	33	34.9	0	46.1	54.0	-7.9
V	*5450.340	42.8	33	35.7	0	45.5	54.0	-8.5

NOTES: 1. Quasi-peak detector is used for the emission below or equal to 1000 MHz.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Test Engineer: Mark Cheung

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

- 4.10 AC Line Conducted Emission, FCC Rule 15.207:
- [] Not required; battery operation only
- [×] Test data attached

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.11 Line Conducted Configuration Photograph

Worst Case Line-Conducted Configuration at 0.300 MHz

For electronic filing, the worst case line conducted configuration photographs are saved with filename: conducted photos.doc.

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.12 Line Conducted Emission Configuration Data

The data on the following pages list the significant emission frequencies, the limit, and the margin of compliance.

Judgement : Passed by 13.4 dB margin

For electronic filing, the conducted emission test result is saved with filename: conducted.pdf

TEST PERSONNEL:

Tester Signature

Mark Cheung, Lead Engineer Typed/Printed Name

March 07, 2008 Date

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

- 4.13 Radiated Emissions from Digital Section of Transceiver, FCC Ref: 15.109
- [] Not required No digital part
- [] Test results are attached
- [x] Included in the separated DOC report.

Applicant: Universal Electronics Inc. Model: URC7240 Date of Test: January 09, 2008

4.14 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The transmitter ON time was determined from the resultant time-amplitude display:

		See attached spectrum analyzer chart (s) for transmitter timing
		See transmitter timing diagram provided by manufacturer
>	<	Not applicable, duty cycle was not used.

EQUIPMENT PHOTOGRAPHS

5.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.doc & internal photos.doc.

PRODUCT LABELLING

6.0 Product Labelling

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf.

TECHNICAL SPECIFICATIONS

7.0 **Technical Specifications**

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

INSTRUCTION MANUAL

8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

CONFIDENTIALITY REQUEST

9.0 Confidentiality Request

The applicant would like to have confidential protection of the following documents:

- Block Diagram
- Circuit Diagram
- Operational Description

For electronic filing, the request letter is saved with filename: request.pdf.

MISCELLANEOUS INFORMATION

10.0 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF.*

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.