

FCC CERTIFICATION RADIO MEASUREMENT TECHNICAL REPORT

On Model Name: Multi Function Remote Laser Pointer

Model Number : LR4

Trademark : 

FCC ID : S751433LR4

Prepared for Quarton Inc.

According to FCC Part 15 (2006), Subpart C

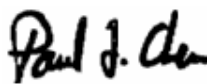
Test Report #: QUA-0608-5597-FCC

Prepared by: Chris Huang

Reviewed by: Harry Zhao

QC Manager: Paul Chen

Test Report Released by:



Paul Chen

2006, October 12

Date

Test Location

Tests performed at EMC Compliance Management Group (China) in a Certified ANSI Semi-Anechoic Chamber and Shielded Room performed testing.

Test Site Location: ADT (Shanghai) Corporation
2F C Building. No.1618 Yi-Shan Rd.
Shanghai, China 201103

Tel: 86-21-64659091
Fax: 86-21-64659092
Registration Number: 245465

Accreditation Bodies

EMC Compliance Management Group is a fully accredited Test Laboratory for ITE, ISM and Telecommunications Products.



In compliance with the site registration requirements of Section 2.948 of the FCC Rules to perform EMI measurements for the general public.



Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code # 200068-0.

Table of Contents

<i>DISCLAIMER NOTICE</i>	<i>1</i>
<i>REPRODUCTION CLAUSE</i>	<i>1</i>
<i>OPINIONS AND INTERPRETATIONS</i>	<i>1</i>
<i>STATEMENT OF MEASUREMENT UNCERTAINTY</i>	<i>1</i>
<i>ADMINISTRATIVE DATA</i>	<i>2</i>
<i>EUT DESCRIPTION</i>	<i>2</i>
<i>TEST SUMMARY</i>	<i>3</i>
<i>TEST MODE JUSTIFICATION</i>	<i>4</i>
<i>EUT EXERCISE SOFTWARE</i>	<i>4</i>
<i>EQUIPMENT MODIFICATION</i>	<i>4</i>
<i>TEST SYSTEM DETAILS</i>	<i>5</i>
<i>CONFIGURATION OF TESTED SYSTEM</i>	<i>6</i>
<i>EUT SAMPLE PHOTOS OF LR4</i>	<i>7</i>
<i>ATTACHMENT 1 - RADIATED EMISSION TEST RESULTS</i>	<i>14</i>
<i>ATTACHMENT 2 - FUNDAMENTAL AND HARMONIC FIELD STRENGTH TEST RESULTS</i>	<i>22</i>
<i>ATTACHMENT 3 - BAND EDGE TEST</i>	<i>30-33</i>

Disclaimer Notice

When government drawing, specification, or other data are used for any purpose other than in connection with a definitely related government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawing, specifications, or other data, is not to be regarded by implication or otherwise in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell patented invention that may in any way be related thereto. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

Reproduction Clause

Any reproduction of this document must be done in full. No single part of this document may be reproduced without permission from EMC Compliance Management Group, 670 National Ave., Mountain View, CA 94043.

Opinions and Interpretations

This test report relates to the abovementioned equipment under test (EUT). Without the permission of EMC Compliance Management Group Test Lab this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products. The manufacturer has sole responsibility of continued compliance of the device.

Statement of Measurement Uncertainty

The data and results referenced in the document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

Administrative Data

Test Sample : Multi Function Remote Laser Pointer

Model Number : LR4

Trade Mark : 

Date Tested : 2006, September 11

Applicant : Quarton Inc.
5F, 175, Sec. 2, Ta-Tung Rd., His-Chih,
Taipei Hsien, Taiwan, R. O. C.

Telephone : 886-2-8692-6000

Fax : 886-2-8692-6100

Manufacturer : Quarton Inc.
5F, 175, Sec. 2, Ta-Tung Rd., His-Chih,
Taipei Hsien, Taiwan, R. O. C.

EUT Description

Quarton Inc. Model numbers LR4 (referred to as the EUT in this test report) is a Multi Function Remote Laser Pointer.

The EUT is consisted of a transmitter and a receiver. The transmitter is powered by one AAA battery and the receiver is powered by USB port of PC. When the receiver is plugged in one USB port of PC, and communicated with the transmitter, we can remote control the PC. EUT has four control functions including keyboard, mouse, media player, timmer.

EUT uses 2.4GHz band frequency, and has 16 channels. When the communication is set, transmitter will choose a channel (pesundo-random number list) to generate signal. Then it will keep working at this channel unless it is reset.

To set EUT to generate signal at specified channel, just insert an 1kohm or 4.7kohm resistor between CE pin of RF module and the ground. Then the EUT will be set into the test mode.

For test mode, it can generate signal in four channels: channel 1, channel 7, Channel 8 and channel 16.

Test Summary

The Electromagnetic Compatibility requirements for this test are stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment Under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up.

EMC Test Items			
<i>Reference FCC Part 15 (2006), Subpart C</i>			
Specification	Description	Test Results	Remark
<i>FCC Part 15.203</i>	<i>Antenna Requirement</i>	<i>Compliance</i>	<i>Integral Antenna</i>
<i>FCC Part 15.205</i>	<i>Restricted Band of Operation</i>	<i>Compliance</i>	<i>Attachment 1</i>
<i>FCC Part 15.107</i>	<i>Conducted Emission Limits for receiver</i>	<i>N/A</i>	<i>See Note #1</i>
<i>FCC Part 15.209</i>	<i>Radiated Emission Limits</i>	<i>Compliance</i>	<i>Attachment 1</i>
<i>FCC Part 15.249 (a)</i>	<i>Fundamental and Harmonics</i>	<i>Compliance</i>	<i>Attachment 2</i>
<i>FCC Part 15.249 (d)</i>	<i>Band Edge</i>	<i>Compliance</i>	<i>Attachment 3</i>

Note #1: The receiver is operating above 960MHz, so test of receiver is omitted.

Test Mode Justification

The test modes (Lie, Side, Stand) were done for testing.

Note: Lie mode means let EUT put flat;

Side mode means let EUT put side;

Stand mode means let EUT stand up.

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

EUT Exercise Software

The EUT doesn't use software during test.

Equipment Modification

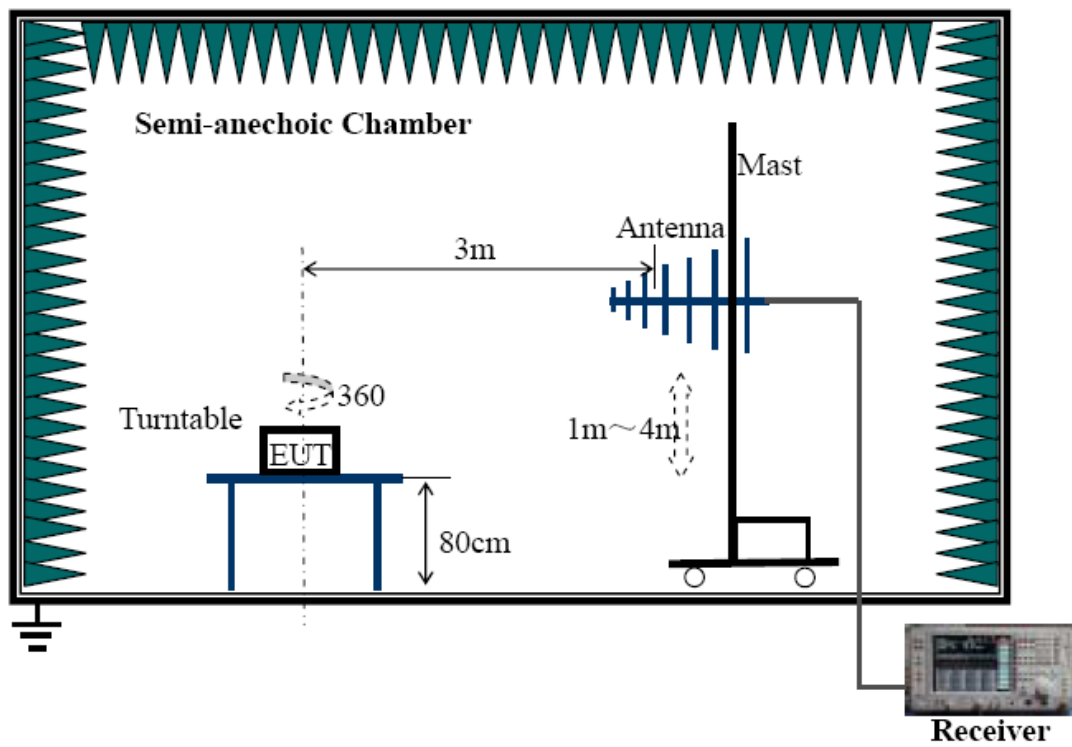
Any modifications installed previous to testing by Quarton Inc. will be incorporated in each production model sold or leased in United States.

There were no modifications installed by EMC Compliance Management Group (China) test personnel.

Test System Details

EUT				
Model Number:	LR4			
Trademark:	INFINITER®			
Serial Number:	Engineering Sample			
Input Voltage:	120V~ 60Hz			
Description:	Multi Function Remote Laser Pointer			
Manufacturer:	Quarton Inc.			
Support Equipment				
Description	Model Number	Serial Number	Manufacturer	Power Cable Description (Meters)
PC	Dimension 2400	292VL1X	Dell	1.5m unshielded
Monitor	170B5	BZ000422427245	Philips	1.5m unshielded
Keyboard	SK8115	E145614	Dell	N/A
Mouse	0517	X08-99491	Microsoft	N/A
Cable Description				
None				

Configuration of Tested System



EUT Sample Photos of LR4



Front View



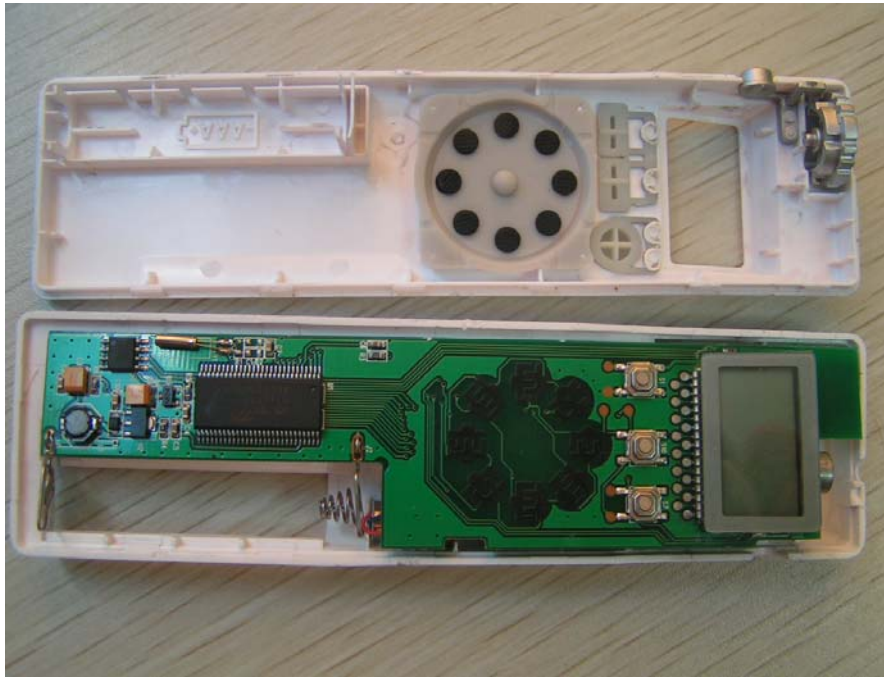
Rear View



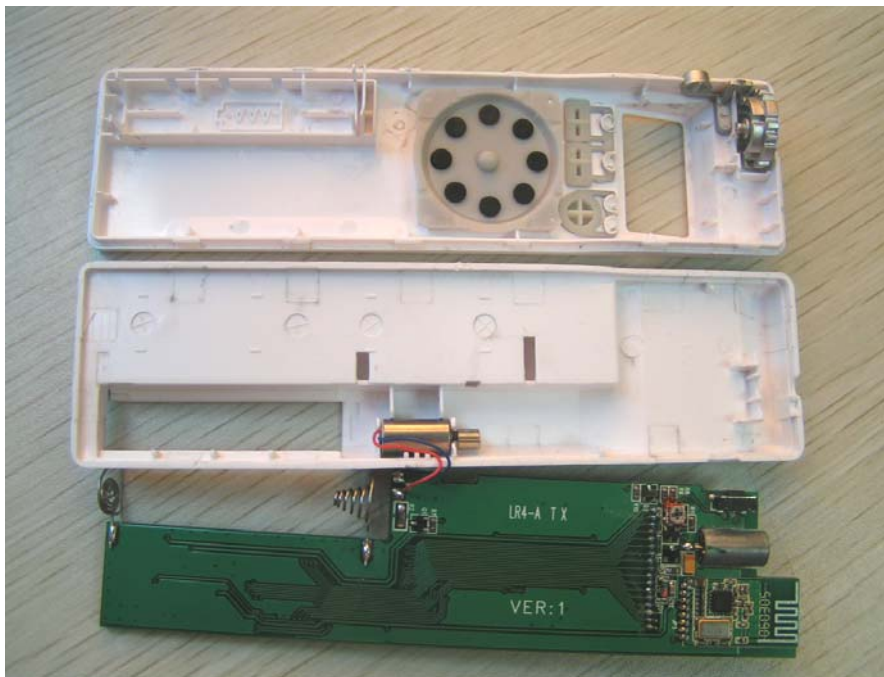
Receiver Taken Out



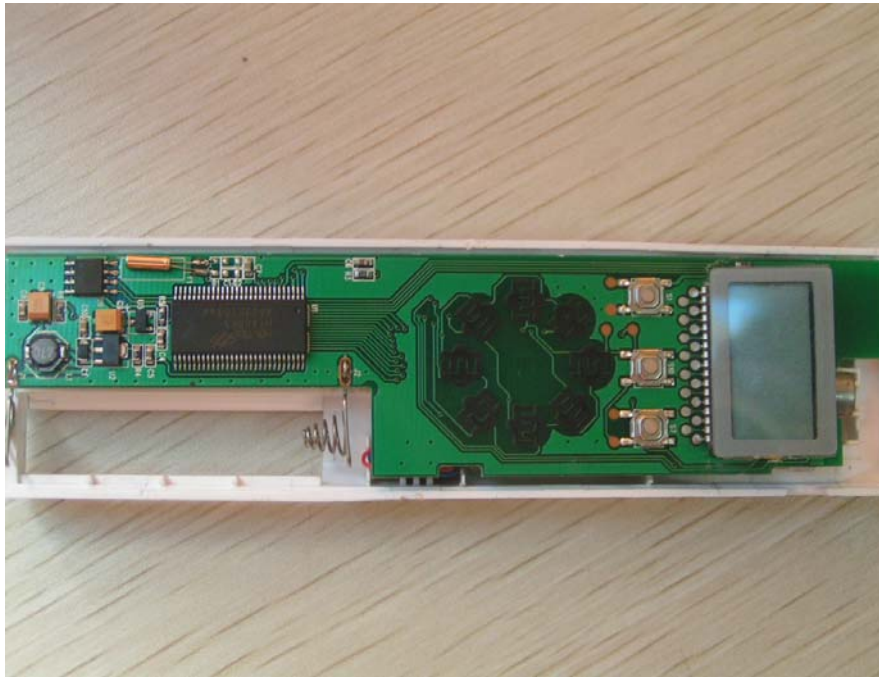
Battery Taken Out



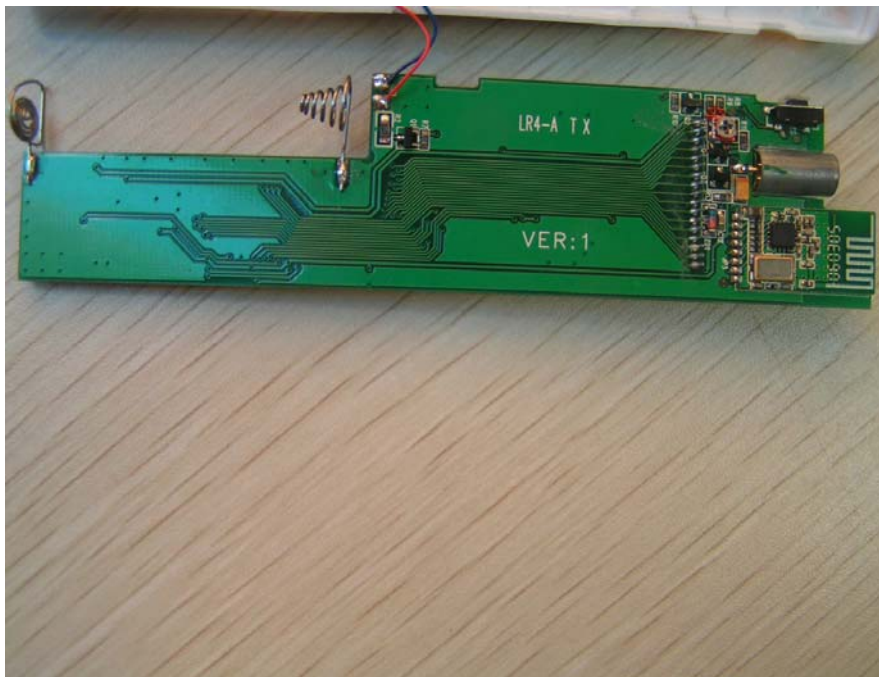
Uncovered View #1



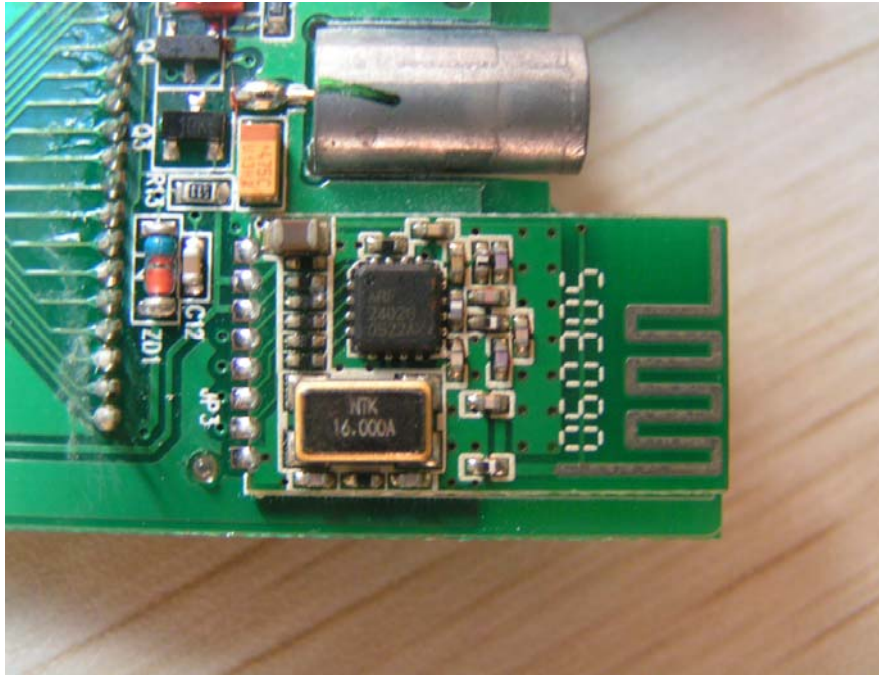
Uncovered View #2



Main Board Front View



Main Board Rear View



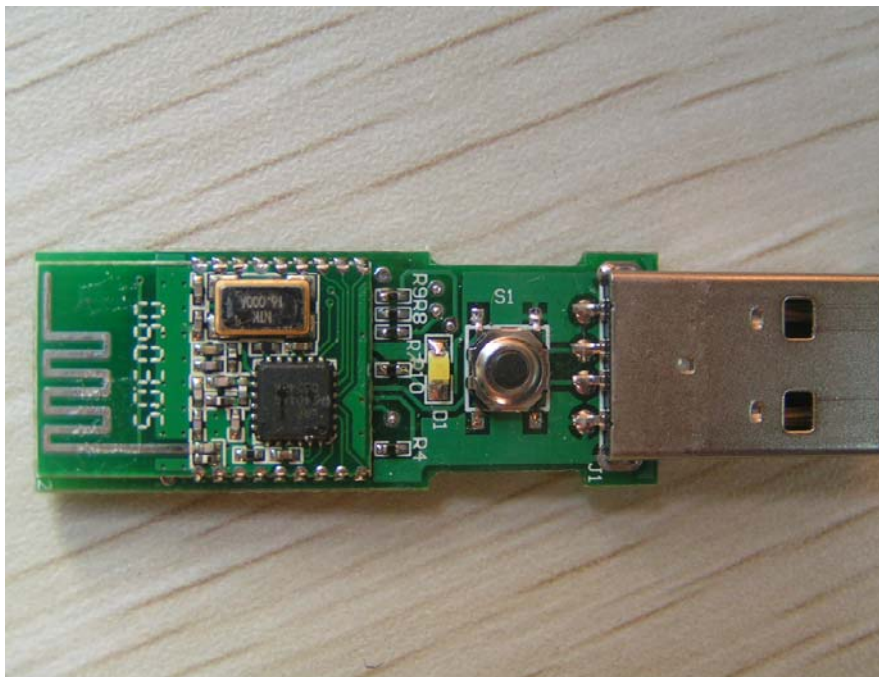
RF Board View



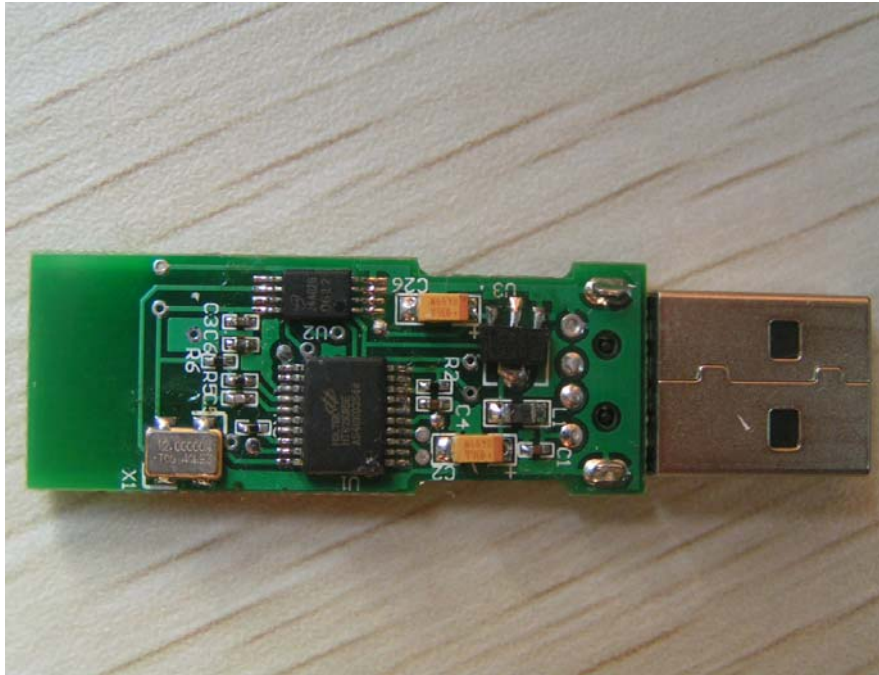
Receiver Uncovered View #1



Receiver Uncovered View #2



Receiver Board Front View



Receiver Board Rear View

ATTACHMENT 1 – RADIATED EMISSION TEST RESULTS

CLIENT:	Quarton Inc.	TEST STANDARD:	FCC Part 15.209 FCC Part 15.205
MODEL NUMBER:	LR4	PRODUCT:	Multi Function Remote Laser Pointer
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	No Grounding
TESTED BY:	Diana Yang	DATE OF TEST:	2006, September 11
SETUP METHOD:	ANSI C63.4 : 2003		
TEST PROCEDURE:	a. The EUT was placed on a rotatable table with 0.8 meters above ground. b. The EUT was set 3 meters from the interference-receiving antenna, which was mounted on the top of a variable height antenna tower. c. The antenna was varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna were set to make measurement. d. For each suspected emission the EUT was arranged to its worst case and then change the antenna tower height (from 1m to 4m) and turn table (from 0 degree to 360 degree) to find the maximum reading. e. If the emission level of the EUT in peak mode was 20 dB lower than the specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be tested using the quasi-peak method in about six maximal points and the results will be reported. f. Broadband antenna (Calibrated antenna) was used as receiving antenna below 1000MHz. Horn antenna were used as receiving antenna above 1000MHz. g. The bandwidth is 120 kHz below 1000 MHz, and 1 MHz above 1000 MHz Explanation of the Correction Factor are given as follows: $FS = RA + AF + CF - AG$ Where: FS = Field Strength RA = Receiver Amplitude AF = Antenna Factor CF = Cable Attenuation Factor AG = Amplifier Gain		
TESTED RANGE:	30MHz to 24000MHz for the transmitter		
TEST VOLTAGE:	1.5V DC for the transmitter and USB 5V for the receiver		

Continue on the next page...

TEST STATUS:	For transmitter, keep Tx in normal continuous transmission mode, modulated
RESULTS:	The EUT meets the requirements of field strength test. The test results relate only to the equipment under test provided by client.
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB

For transmitter of LR4
Test Results (30MHz~1GHz)

<i>Horizontal</i>								
Signal	Frequency (MHz)	Antenna Factor (dB/m)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	168.22	9.4	1.3	9.20	43.5	-34.30	176	106
2	238.55	10.9	1.5	7.31	46.0	-38.69	66	356
3	427.70	15.9	2.0	12.39	46.0	-33.61	127	286
4	558.65	18.6	2.3	15.07	46.0	-30.93	48	262
5	706.58	18.8	3.0	17.62	46.0	-28.38	195	206
6	801.15	19.8	3.6	18.66	46.0	-27.34	117	178
<i>Vertical</i>								
Signal	Frequency (MHz)	Antenna Factor (dB/m)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	117.30	11.5	0.8	6.76	43.5	-36.74	341	101
2	321.11	13.6	1.6	9.61	46.0	-36.39	94	101
3	427.70	15.9	2.0	12.27	46.0	-33.73	33	101
4	565.92	18.6	2.3	14.82	46.0	-31.18	155	101
5	682.33	18.7	2.9	16.60	46.0	-29.40	277	101
6	825.40	20.0	3.6	17.91	46.0	-28.09	216	101
Note: All readings are quasi-peak unless stated otherwise, using a QP bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.								

Test Results (1GHz~24GHz)

<i>Horizontal</i>									
Signal	Frequency (MHz)	Antenna Factor (dB/m)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1456.37	26.7	4.1	31.5	54.0	-22.5	41.2	74.0	-32.8
2	2904.65	29.4	6.0	32.8	54.0	-21.2	43.7	74.0	-30.3
3	12089.11	38.4	9.9	36.7	54.0	-17.3	44.7	74.0	-29.3
<i>Vertical</i>									
Signal	Frequency (MHz)	Antenna Factor (dB/m)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1454.85	26.6	4.1	33.8	54.0	-20.2	42.5	74.0	-31.5
2	2904.65	29.4	6.0	40.1	54.0	-13.9	47.9	74.0	-26.1
3	12089.11	26.7	4.1	40.8	54.0	-13.2	48.7	74.0	-25.3
Note: All readings are average and peak unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.									

Restricted bands:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

Antenna Horizontal								
Signal	Frequency (MHz)	Corrected PK Level (dBuV)	Limits PK (dBuV)	Margin PK (dB)	Frequency (MHz)	Corrected AVE Level (dBuV)	Limits AVE (dBuV)	Margin AVE (dB)
1	2390	33.5	74.0	-40.5	2390	30.6	54.0	-23.4
2	2483.5	35.7	74.0	-38.3	2483.5	31.1	54.0	-22.9
Antenna Vertical								
Signal	Frequency (MHz)	Corrected QP Level (dBuV)	Limits PK (dBuV)	Margin AV (dB)	Frequency (MHz)	Corrected AVE Level (dBuV)	Limits AVE (dBuV)	Margin AVE (dB)
1	2390	34.2	74.0	-39.8	2390	31.2	54.0	-22.8
2	2483.5	35.7	74.0	-38.3	2483.5	31.5	54.0	-22.5
Note: The peak readings are using a resolution bandwidth of 1MHz and video bandwidth of 1MHz; the average readings are using a resolution bandwidth of 1MHz and video bandwidth of 10Hz.								

Test Equipment	Model	Manufacturer	Serial No.	Last Cal.	Cal. Due Date
Trilog Broadband Antenna	VULB 9168	Schwarzbeck	9168-159	09/26/05	09/25/06
Double Ridged Broadband Horn Antenna	BBHA9120D	Schwarzbeck	9120D-398	02/19/06	02/18/07
Spectrum Analyzer	E4403B	Agilent	MY41440678	01/12/06	01/13/07
Spectrum Analyzer	E4440A	Agilent	US45303119	03/20/06	03/19/07
Preamplifier	HP 8447D-CFG001	Agilent	2944A10643	01/25/06	01/26/07
Preamplifier	HP8449B-FG	Agilent	3008A01966	01/25/06	01/26/07
Receiver	ESCS30	R&S	100296	06/18/06	06/19/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST)					

SIGNED BY:

Diana Yang

ENGINEER

REVIEWED BY:

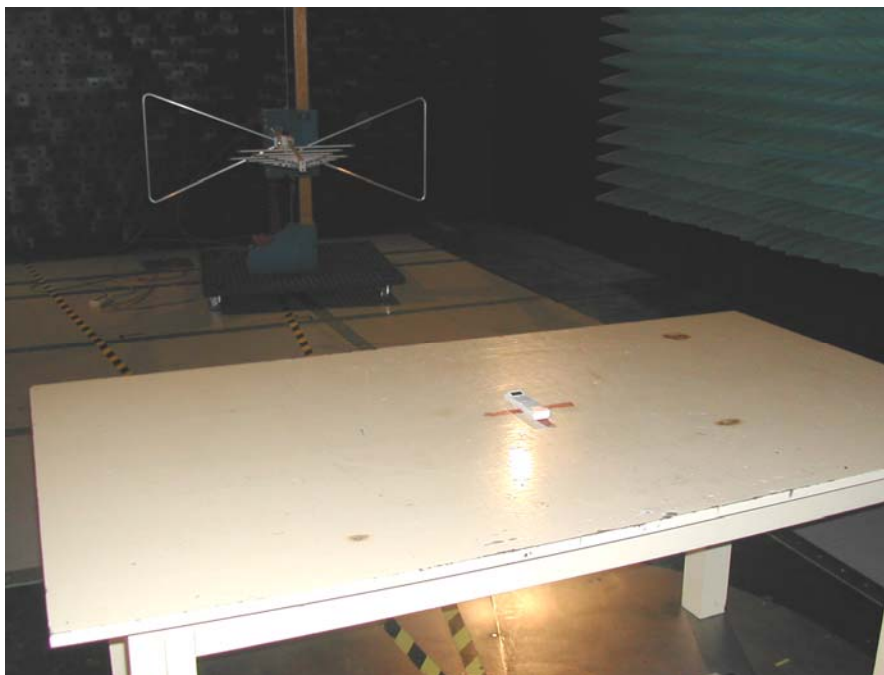
Hayden

SENIOR ENGINEER

For transmitter of LR4



Radiated Emissions Test Set-up Front View



Radiated Emissions Test Set-up Rear View

ATTACHMENT 2 – FUNDAMENTAL AND HARMONIC FIELD STRENGTH TEST RESULTS

CLIENT:	Quarton Inc.	TEST STANDARD:	FCC Part 15.249 (a)
MODEL NUMBER:	LR4	PRODUCT:	Multi Function Remote Laser Pointer
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	No Grounding
TESTED BY:	Diana Yang	DATE OF TEST:	2006, September 11
SETUP METHOD:	ANSI C63.4 : 2003		
TEST PROCEDURE:	a. The EUT was placed on a rotatable table with 0.8 meters above ground. b. The EUT was set 3 meters from the interference-receiving antenna, which was mounted on the top of a variable height antenna tower. c. The antenna was varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna were set to make measurement. d. For each suspected emission the EUT was arranged to its worst case and then change the antenna tower height (from 1m to 4m) and turn table (from 0 degree to 360 degree) to find the maximum reading. e. If the emission level of the EUT in peak mode was 20 dB lower than the specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be tested using the quasi-peak method in about six maximal points and the results will be reported. f. Broadband antenna (Calibrated antenna) was used as receiving antenna below 1000MHz. Horn antenna were used as receiving antenna above 1000MHz. g. The bandwidth is 120 kHz below 1000 MHz, and 1 MHz above 1000 MHz Explanation of the Correction Factor are given as follows: $FS = RA + AF + CF - AG$ Where: FS = Field Strength RA = Receiver Amplitude AF = Antenna Factor CF = Cable Attenuation Factor AG = Amplifier Gain FCC 15.249 limit 15.249 (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:		

Continue on to next page...

EMC Test Report #: QUA-0608-5597-FCC

Prepared for Quarton Inc.

Prepared by EMC Compliance Management Group

Page 22 of 33

	Fundamental Frequency	Field Strength of Fundamental (milivolts/meter)	Field Strength of Harmonics (microvolts/meter)
	902-928MHz	50	500
	2400-2483.5MHz	50	500
	5725-5875MHz	50	500
	24.0-24.25GHz	250	2500
TESTED RANGE:	2400MHz to 24000MHz for the transmitter		
TEST VOLTAGE:	1.5V DC for the transmitter		
TEST STATUS:	Set transmitter to generate signal at low, middle and high channels continually, and set transmitter in lying, side and standing mode		
RESULTS:	The EUT meets the requirements of the fundamental and harmonic field strength. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

Peak Field Strength=Peak Read Level + Factor - Duty Cycle Correction Factor
Factor = Antenna Factor + Cable Loss - Preamp Factor
Average Field Strength=Peak Field Strength - Duty Cycle Correction Factor
Duty Cycle Correction Factor is calculated by averaging the sum of the pulse train. Correction factor is measured as follows:
Keep the EUT in continuous transmission mode (modulated), and set the spectrum to the fundamental frequency and set the span width to 0 Hz. Then connect a storage oscilloscope to the video output of the spectrum that is used to detect the pulse train. Adjust the oscilloscope settings to observe the pulse train and determine the number and width of the pulses, as well as the period of the train.

$$\text{Duty cycle} = 440\mu\text{S} \times 18 / 100\text{mS} = 7.9\%$$

$$\text{So the Duty Cycle Correction Factor} = 20|\log 7.9\%| = 22.05\text{dB}$$

(See the plot in next page)

Duty Cycle Test

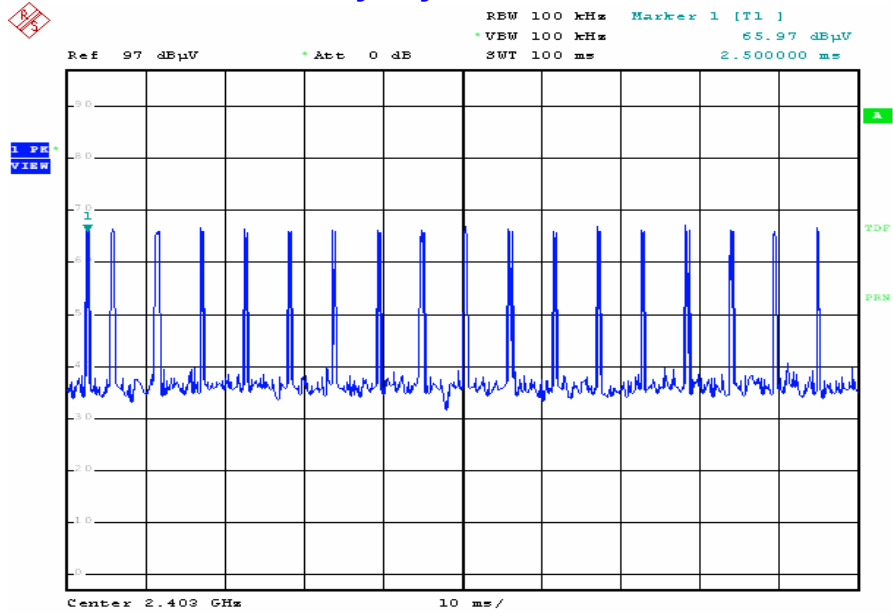


Figure #1

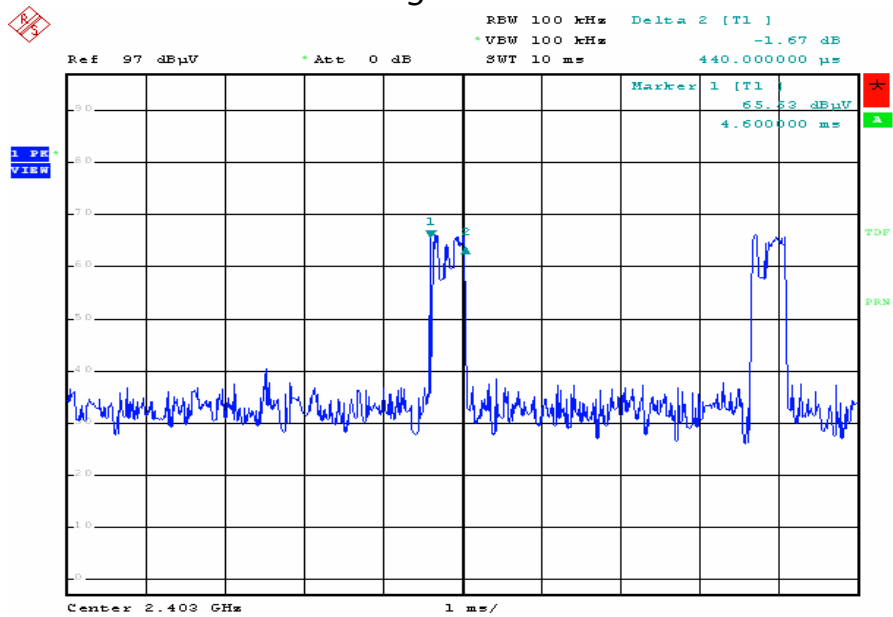


Figure #2

*For transmitter of LR4
For Channel 1 (2403MHz) Lie mode
Test Results (2.4GHz~24GHz)*

<i>Horizontal</i>								
Signal	Frequen cy (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2403	35.22	85.61	114.00	-28.39	63.56	94.00	-30.44
2	4806	41.14	55.90	74.00	-18.10	33.85	54.00	-20.15
3	7209	48.79	58.30	74.00	-15.70	36.25	54.00	-17.75
4	9612	52.28	60.85	74.00	-13.15	38.80	54.00	-15.20
5	12015	53.61	64.35	74.00	-9.65	42.30	54.00	-11.70
HIGHER HARMONICS		--	<60	74.00	>14.00	<38	54.00	>16.00
<i>Vertical</i>								
Signal	Frequen cy (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2403	35.22	89.50	114.00	-24.50	67.45	94.00	-26.55
2	4806	41.14	55.07	74.00	-18.93	33.02	54.00	-20.98
3	7209	48.79	57.64	74.00	-16.36	35.59	54.00	-18.41
4	9612	52.28	59.56	74.00	-14.44	37.51	54.00	-16.49
5	12015	53.61	62.05	74.00	-11.95	40.00	54.00	-14.00
HIGHER HARMONICS		--	<60	74.00	>14.00	<38	54.00	>16.00
Note: All readings are peak and average unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.								

*For transmitter of LR4
For Channel 7 (2434MHz) Side mode
Test Results (2.4GHz~24GHz)*

<i>Horizontal</i>								
Signal	Frequen cy (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2434	35.26	92.37	114.00	-21.63	70.32	94.00	-23.68
2	4868	41.36	52.57	74.00	-21.43	30.52	54.00	-23.48
3	7302	48.98	57.98	74.00	-16.02	35.93	54.00	-18.07
4	9736	52.43	58.82	74.00	-15.18	36.77	54.00	-17.23
5	12170	53.54	61.65	74.00	-12.35	39.6	54.00	-14.4
HIGHER HARMONICS		--	<60	74.00	>14.00	<38	54.00	>16.00
<i>Vertical</i>								
Signal	Frequen cy (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2434	35.26	89.46	114.00	-24.54	67.41	94.00	-26.59
2	4868	41.36	57.53	74.00	-16.47	35.48	54.00	-18.52
3	7302	48.98	58.87	74.00	-15.13	36.82	54.00	-17.18
4	9736	52.43	58.31	74.00	-15.69	36.26	54.00	-17.74
5	12170	53.54	61.56	74.00	-12.44	39.51	54.00	-14.49
HIGHER HARMONICS		--	<60	74.00	>14.00	<38	54.00	>16.00
Note: All readings are peak and average unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.								

*For transmitter of LR4
For Channel 16 (2474MHz) Standing mode
Test Results (2.4GHz~24GHz)*

<i>Horizontal</i>								
Signal	Frequen cy (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2474	35.30	91.50	114.00	-22.50	77.04	94.00	-16.96
2	4938	41.60	54.71	74.00	-19.29	40.65	54.00	-13.35
3	7422	49.23	56.91	74.00	-17.09	42.95	54.00	-11.05
4	9896	52.47	59.89	74.00	-14.11	44.17	54.00	-9.83
5	12370	53.45	61.79	74.00	-12.21	44.79	54.00	-9.21
HIGHER HARMONICS		--	<60	74.00	>14.00	<38	54.00	>16.00
<i>Vertical</i>								
Signal	Frequen cy (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2474	35.30	90.96	114.00	-23.04	68.91	94.00	-25.09
2	4938	41.60	56.96	74.00	-17.04	34.91	54.00	-19.09
3	7422	49.23	57.77	74.00	-16.23	35.72	54.00	-18.28
4	9896	52.47	60.22	74.00	-13.78	38.17	54.00	-15.83
5	12370	53.45	62.29	74.00	-11.71	40.24	54.00	-13.76
HIGHER HARMONICS		--	<60	74.00	>14.00	<38	54.00	>16.00
Note: All readings are peak and average unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.								

Test Equipment	Model	Manufacturer	Serial No.	Last Cal.	Cal. Due Date
Double Ridged Broadband Horn Antenna	BBHA9120D	Schwarzbeck	9120D-398	02/19/06	02/18/07
Spectrum Analyzer	E4403B	Agilent	MY41440678	01/12/06	01/13/07
Spectrum Analyzer	FSP30	R&S	1093.4495.30	03/20/06	03/19/07
Preamplifier	HP8449B-FG	Agilent	3008A01966	01/25/06	01/26/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST)					

SIGNED BY: Diana Yang
ENGINEER

REVIEWED BY: Hangzhou
SENIOR ENGINEER

For transmitter of LR4

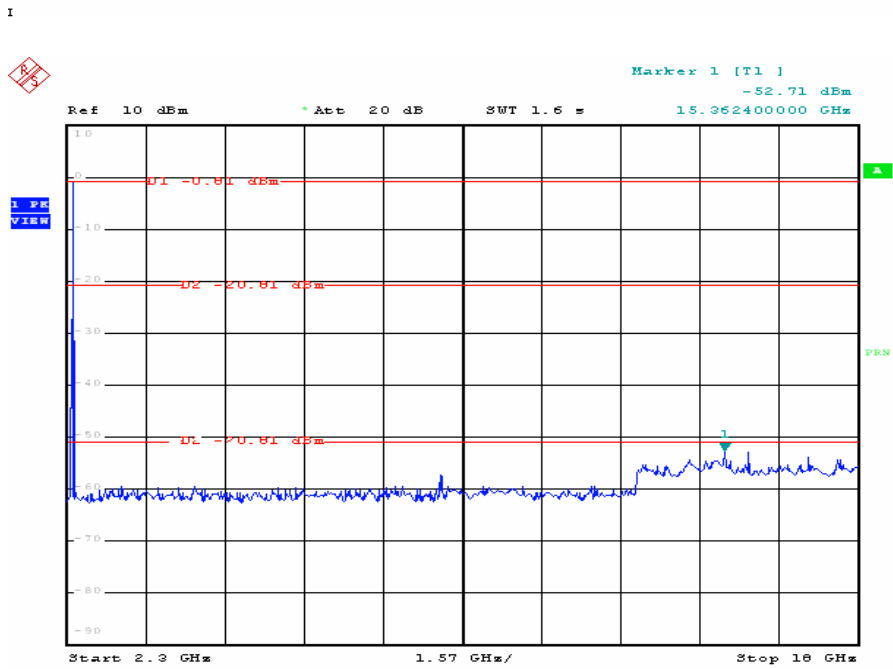
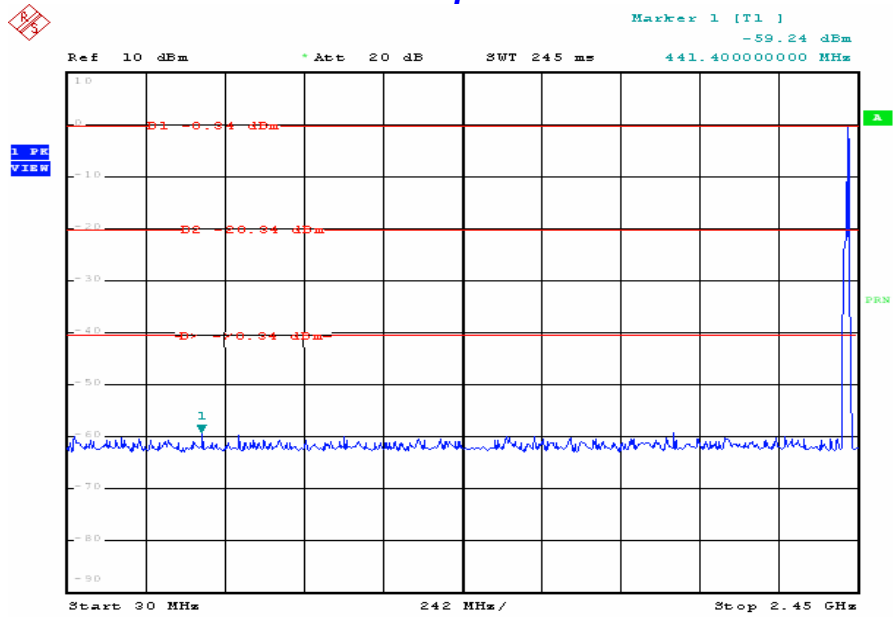


Fundamental & Harmonics Strength Test Set-up Front View

ATTACHMENT 3 – Band Edge Test

CLIENT:	Quarton Inc.	TEST STANDARD:	FCC Part 15.247 (d)
MODEL NUMBER:	LR4	PRODUCT:	Multi Function Remote Laser Pointer
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21 °C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	No Grounding
TESTED BY:	Shi Xiting	DATE OF TEST:	2006, September 11
SETUP METHOD:	ANSI C63.4 - 2003		
BANDEDGE REQUIREMENT:	FCC 15.249 (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 general radiated emission limits in Section 15.209, which is the lesser attenuation.		
TEST PROCEDURE:	Set the spectrum as follow: Span=wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation. RBW=100kHz; VBW$\geq$RBW; Sweep=Auto; Detector=Peak; Trace=Maxhold; Allow the trace to stabilize and use the search peak function to set the marker to the peak of the useful emission, then use delta-mark function to mark the maximum emission outside of the band, record the delta level to see if it's more than 50dB.		
TEST VOLTAGE:	1.5V DC for the transmitter		
TEST STATUS:	Channel 1 for low and Channel 16 for high		
RESULTS:	The EUT meets band edge requirement. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

Test data of Model LR4



Band edge test data

Test Equipment	Model	Manufacturer	Serial No.	Last Cal.	Cal. Due Date
Double Ridged Broadband Horn Antenna	BBHA9120D	Schwarzbeck	9120D-398	02/19/06	02/18/07
Spectrum Analyzer	E4403B	Agilent	MY41440678	01/12/06	01/13/07
Spectrum Analyzer	FSP30	R&S	1093.4495.30	03/20/06	03/19/07
Preamplifier	HP8449B-FG	Agilent	3008A01966	01/25/06	01/26/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST)					

SIGNED BY: Diana Yang
ENGINEER

REVIEWED BY: Hangzhan
SENIOR ENGINEER

Model LR4



Band Edge Test Set-up Front View