

FCC PART 15.247

TEST REPORT

For

Lorex Technology Inc

250 Royal Crest Court Markham, Ontario L3R 3S1 Canada

FCC ID: UCZC5410

Report Type: Class II Permissive Change	Product Type: Digital FHSS Device (Camera Unit)
Test Engineer: <u>David Lee</u>	<i>David Lee</i>
Report Number: <u>RSZ150323004-00BA1</u>	
Report Date: <u>2015-03-31</u>	
Reviewed By: <u>Jimmy Xiao</u>	<i>Jimmy Xiao</i>
Test Laboratory: <u>RF Engineer</u>	
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Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Lorex Technology Inc*'s product, model number: *BB2421 (FCC ID: UCZC5410)* (the "EUT") in this report was a camera unit of Digital FHSS Device, named as *2.4G Baby monitor BB2421* by the applicant, which was measured approximately: 8.7 cm (L) x 9.5 cm (W) x 13.5 cm (H), rated input voltage: DC 6V from adapter or 4 x AAA batteries.

KINGS G.Credit adapterInformation:

Model: Y07FF-060-0800U

Input: 100-240V~50/60 Hz 0.25A

Output: DC 6V 800mA

G.Credit G.Credit adapterInformation:

Model: HX-AD060080-U02

Input: 100-240V~50/60 Hz 0.15A

Output: DC 6V 0.8A

5ESP G.Credit adapterInformation:

Model: 5E-AD060080-U

Input: 100-240V~50/60 Hz 0.15A

Output: DC 6V 0.8A

Note: the product, series model MC2411, BB2421, BB2411, BB2411T, LB211, BB2411AC1 and BB2411PK2 are identical schematics, the only difference among them is their model number due to marketing purpose. Model BB2421 was selected for fully testing, which was explained in the attached product similarity declaration letter.

** All measurement and test data in this report was gathered from production sample serial number: 1503203 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2015-03-23.*

Objective

This report is prepared on behalf of *Lorex Technology Inc* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Note: This is the CIIPC application, the details as follow:

1. Adding two adaptors, one's brand is **KINGS**, the other one's brand is **G.Credit**.
2. Changing the product name from 2.4G Baby monitor BB2411 to 2.4G Baby monitor BB2421
3. Changing the model number from "MC2411" to "MC2411, BB2421, BB2411, BB2411T, LB211, BB2411AC1 and BB2411PK2"

The change made to the device will affect the item of "Conducted Emissions" and "Radiated Emissions", so the part of test date and a part of EUT photos have been updated, and all the other test data and photos were referred to the original report RSZ130104003-00 with FCC ID: **UCZC5410**, which was granted on 2013-02-04.

Related Submittal(s)/Grant(s)

Submitted with the part of a system with FCC ID: UCZM5410

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode which was provided by manufacturer.

EUT Exercise Software

No exercise software was used.

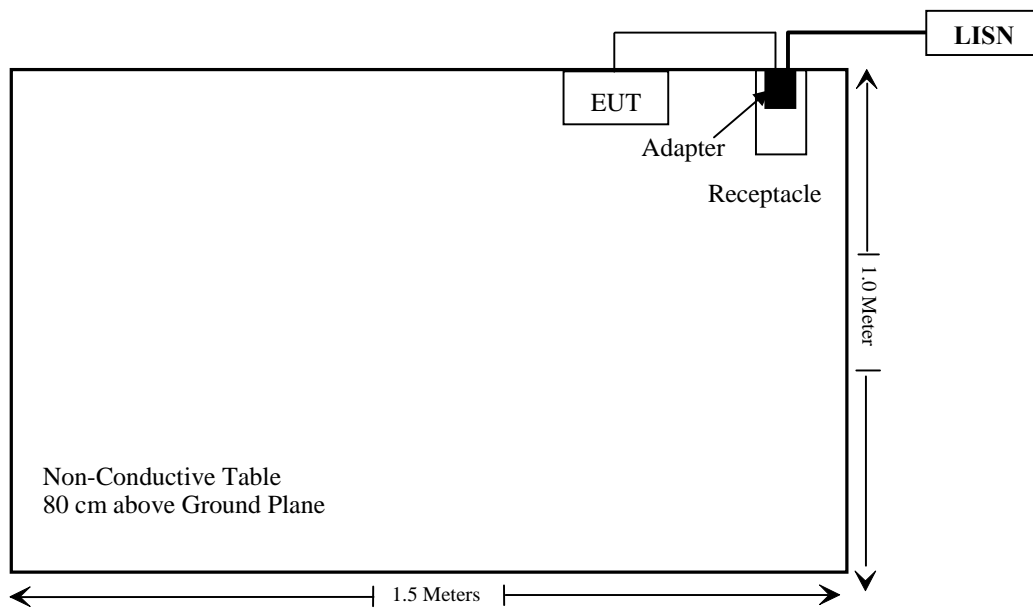
Equipment Modifications

No modification was made to the EUT tested.

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded detachable DC Power Cable	1.83	EUT	Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance*
§15.207 (a)	Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliance
§15.247 (a)(1)	20 dB Bandwidth	Compliance*
§15.247(a)(1)	Channel Separation	Compliance*
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance*
§15.247(a)(1)(iii)	Quantity of hopping channel	Compliance*
§15.247(b)(1)	Peak Output Power Measurement	Compliance*
§15.247(d)	Band Edges	Compliance*

Compliance*: The test data please refer to the original report RSZ130104003-00 that issued on 2013-01-09.

FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Standard Applicable

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

MPE Calculation

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where:

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally *numeric* gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2410.875	2	1.58	13.03	20.09	20	0.00632	1
2441.25	2	1.58	13.40	21.88	20	0.00688	1
2471.625	2	1.58	13.76	23.77	20	0.00748	1

Result: Compliance

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

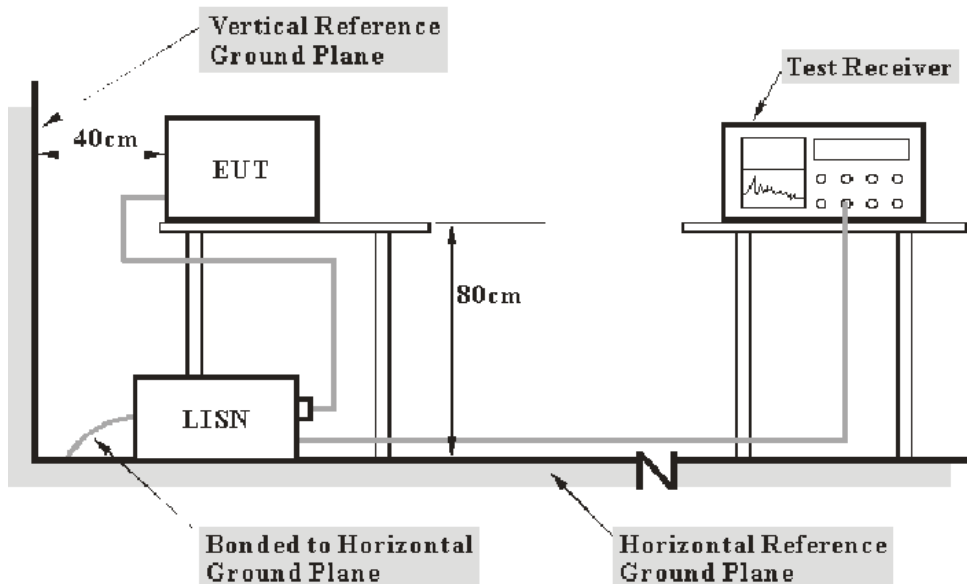
FCC §15.207

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on CISPR-16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is 2.4 dB (k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

EUT Setup



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2014-06-03	2015-06-03
Rohde & Schwarz	LISN 1	ENV216	3560.6650.12-101613-Yb	2014-05-07	2015-05-07
Rohde & Schwarz	LISN 2	ESH2-Z5	892107/021	2014-06-09	2015-06-09
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2014-05-14	2015-05-14
Rohde & Schwarz	CE Test software	EMC 32	V8.53	NCR	NCR

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, the worst margin reading as below:

5.7 dB at 0.485170 MHz in the Line conducted mode for G.Credit adapter

Test Data

Environmental Conditions

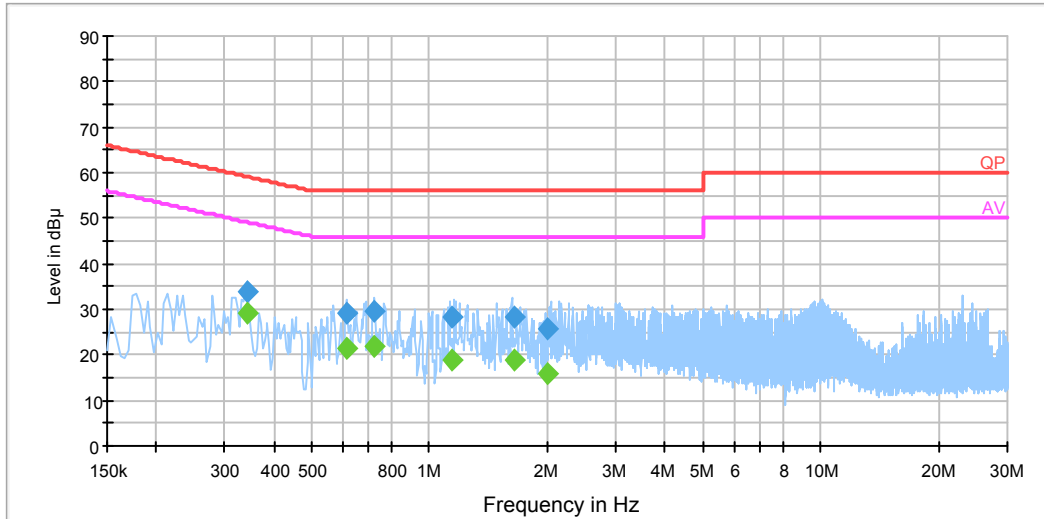
Temperature:	25°C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by David Lee on 2015-03-26.

For KINGS adapter

AC 120 V, 60 Hz, Line:

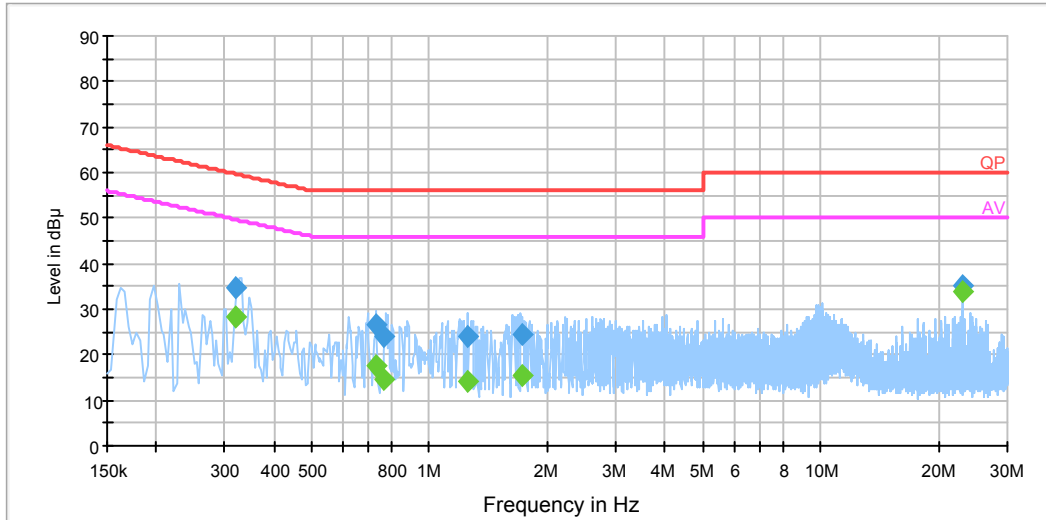
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
0.340870	34.0	19.2	59.2	25.2	QP
0.340870	28.9	19.2	49.2	20.3	Ave.
0.616790	29.3	19.3	56.0	26.7	QP
0.616790	21.4	19.3	46.0	24.6	Ave.
0.723170	29.6	19.3	56.0	26.4	QP
0.723170	21.7	19.3	46.0	24.3	Ave.
1.144630	28.2	19.4	56.0	27.8	QP
1.144630	18.9	19.4	46.0	27.1	Ave.
1.646330	28.1	19.4	56.0	27.9	QP
1.646330	19.1	19.4	46.0	26.9	Ave.
2.007430	25.9	19.4	56.0	30.1	QP
2.007430	16.0	19.4	46.0	30.0	Ave.

AC 120V, 60 Hz, Neutral:

EMI Auto Test N

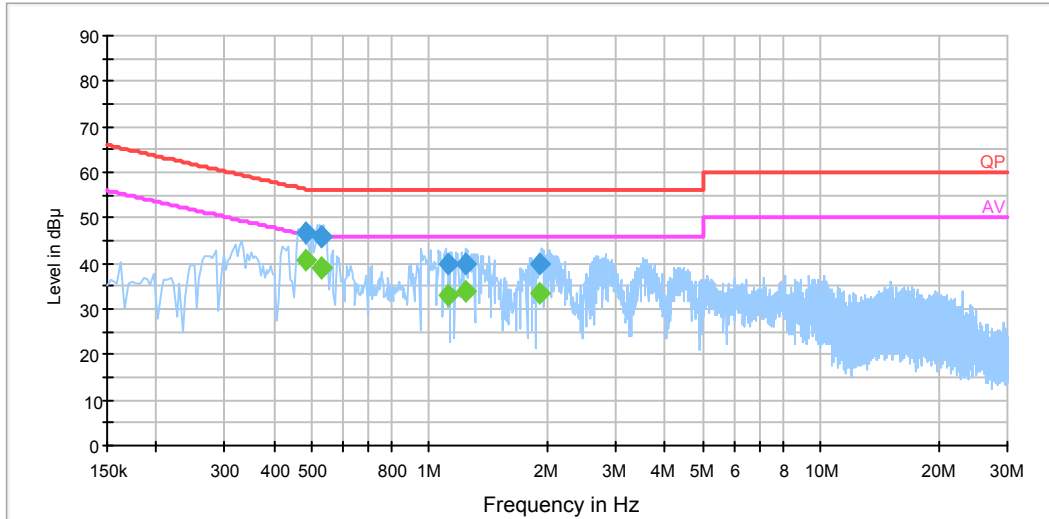


Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
0.321110	34.7	19.2	59.7	25.0	QP
0.321110	28.5	19.2	49.7	21.2	Ave.
0.727050	26.6	19.3	56.0	29.4	QP
0.727050	17.8	19.3	46.0	28.2	Ave.
0.762390	23.9	19.3	56.0	32.1	QP
0.762390	14.7	19.3	46.0	31.3	Ave.
1.251190	24.0	19.4	56.0	32.0	QP
1.251190	14.1	19.4	46.0	31.9	Ave.
1.720290	24.5	19.4	56.0	31.5	QP
1.720290	15.3	19.4	46.0	30.7	Ave.
23.127050	34.9	19.7	60.0	25.1	QP
23.127050	33.8	19.7	50.0	16.2	Ave.

For G.Credit adapter

AC 120 V, 60 Hz, Line:

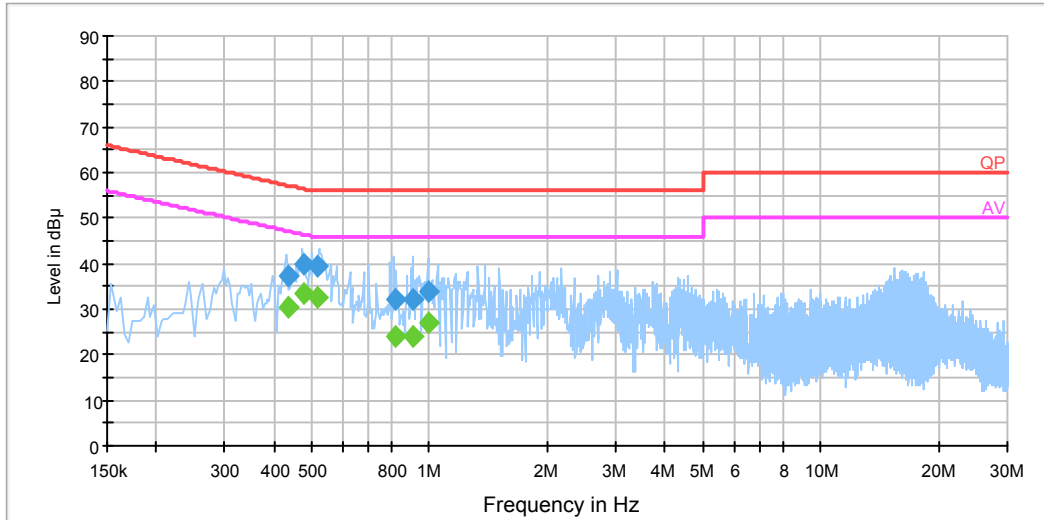
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
0.485170	46.8	19.3	56.3	9.5	QP
0.485170	40.6	19.3	46.3	5.7	Ave.
0.529930	45.7	19.3	56.0	10.3	QP
0.529930	38.9	19.3	46.0	7.1	Ave.
0.530110	45.8	19.3	56.0	10.2	QP
0.530110	38.9	19.3	46.0	7.1	Ave.
1.114470	40.0	19.4	56.0	16.0	QP
1.114470	33.1	19.4	46.0	12.9	Ave.
1.239370	39.8	19.4	56.0	16.2	QP
1.239370	33.7	19.4	46.0	12.3	Ave.
1.920870	39.7	19.4	56.0	16.3	QP
1.920870	33.3	19.4	46.0	12.7	Ave.

AC 120V, 60 Hz, Neutral:

EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
0.436450	37.3	19.2	57.1	19.8	QP
0.436450	30.4	19.2	47.1	16.7	Ave.
0.478890	40.0	19.2	56.4	16.4	QP
0.478890	33.2	19.2	46.4	13.2	Ave.
0.518170	39.5	19.2	56.0	16.5	QP
0.518170	32.8	19.2	46.0	13.2	Ave.
0.821790	32.2	19.3	56.0	23.8	QP
0.821790	24.1	19.3	46.0	21.9	Ave.
0.904410	32.3	19.3	56.0	23.7	QP
0.904410	23.9	19.3	46.0	22.1	Ave.
0.999150	33.7	19.4	56.0	22.3	QP
0.999150	27.2	19.4	46.0	18.8	Ave.

Note 1:

For the test data of 5ESP adapter, please refer to the original report RSZ130104003-00 with FCC ID: **UCZC5410**, which was granted on 2013-02-04.

Note 2:

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN/ISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
- 3) Margin = Limit - Corrected Amplitude

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

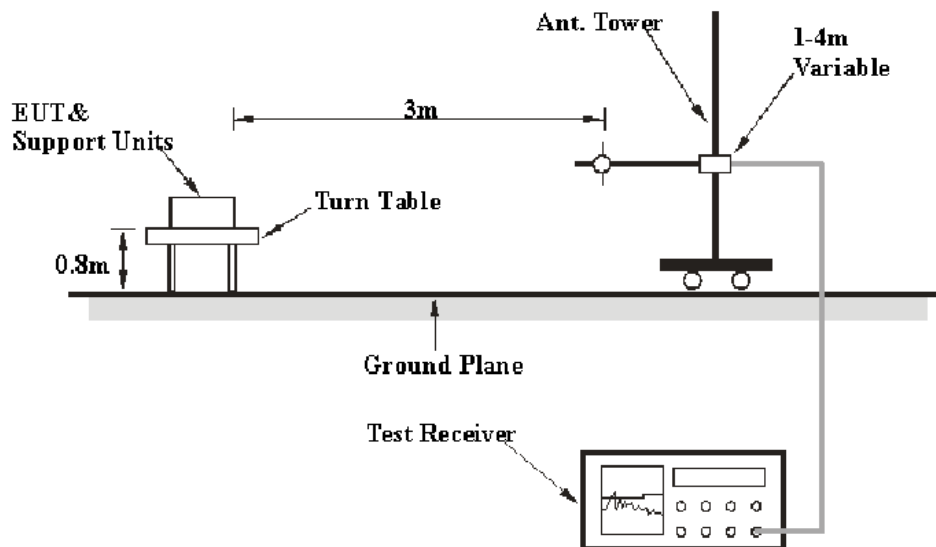
FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB (k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209 and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	100 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

For the radiated emissions test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz to 1GHz and peak and Average detection modes for frequencies above 1GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2014-05-06	2015-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2014-11-03	2015-11-03
Sunol Sciences	Broadband Antenna	JB3	A111513	2014-06-18	2017-06-17
A.H. System	Horn Antenna	SAS-200/571	135	2013-02-11	2016-02-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2014-08-22	2015-08-22
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2014-04-03	2015-04-03
TDK	Chamber	Chamber A	2#	2012-10-15	2015-10-15
TDK	Chamber	Chamber B	1#	2012-07-23	2015-07-22
R&S	Auto test Software	EMC32	V9.10	NCR	NCR

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI)

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, the worst margin reading as below:

0.57 dB at 2483.5 MHz in the Horizontal polarization

Test Data

Environmental Conditions

Temperature:	25°C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

For KINGS adapter and G.Credit adapter the testing was performed by David Lee on 2015-03-26.

Test mode: Transmitting

30 MHz -25 GHz:**For KINGS adapter**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15B	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
264.0	51.52	QP	180	2.2	H	-13.5	38.02	46	7.98
408.0	48.30	QP	217	1.6	H	-10.0	38.30	46	7.70
456.0	42.57	QP	287	1.2	V	-9.4	33.17	46	12.83
552.0	51.60	QP	162	2.1	V	-8.0	43.60	46	2.40
600.0	51.81	QP	235	1.6	V	-8.4	43.41	46	2.59
828.1	41.09	QP	137	1.9	V	-3.3	37.79	46	8.21

For G.Credit adapter

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15B	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
264.0	50.98	QP	86	2.5	H	-13.5	37.48	46	8.52
408.0	49.25	QP	143	1.7	H	-10.0	39.25	46	6.75
456.0	46.42	QP	111	1.9	V	-9.4	37.02	46	8.98
552.0	50.36	QP	36	1.9	V	-8.0	42.36	46	3.64
600.0	52.91	QP	241	2	V	-8.4	44.51	46	1.49
828.1	21.94	QP	349	1.3	V	-4.1	17.84	46	28.16

Note 1:

For the test data of 5ESP adapter, please refer to the original report RSZ130104003-00 with FCC ID: UCZC5410, which was granted on 2013-02-04.

Note 2: We had tested the above 1GHz radiated emission of the EUT, and the result shows that it will not affect the test data compared with the original device (Model: MC2411, FCC ID: UCZC5410). So the above 1GHz test data please refer to the original report RSZ130104003-00 with FCC ID: UCZC5410, which was granted on 2013-02-04.

Note 3:

1. Corrected Factor=Antenna factor (RX) +cable loss – amplifier factor
2. Corrected Amplitude = Corrected Factor + Receiver Reading
3. Margin = Limit- Corrected Amplitude
4. *Within measurement uncertainty

PRODUCT SIMILARITY DECLARATION LETTER



Lorex Technology Inc.
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Tel: 905 946 8589 Fax: 905 947 0138

2015-4-14

Product Similarity Declaration

To Whom It May Concern,

We, Lorex Technology Inc., hereby declare that we have a product named as 2.4G Baby monitor BB2421, (Model number: BB2421) were tested by BACL, meanwhile, for our marketing purpose, we would like to list a series models (BB2421, BB2411, BB2411T, LB211, BB2411AC1, BB2411PK2, MC2411) on reports and certificate, all the models are identical schematics. Only named differently due to different combination, for details as below:

Model No	Model description
BB2421	1 camera+1 monitor+1 charger
BB2411	1 camera+1 monitor
BB2411T	1 camera+1 monitor+Window Box
LB211	1 camera+1 monitor+Other Gift Box
BB2411AC1	Accessory Camera
BB2411PK2	2 camera+1 monitor
MC2411	1 camera

No other changes are made to them.

We confirm that all information above is true, and we'll be responsible for all the consequences. Please contact me if you have any question.

Signature:

Niles Kanapathipillai

Director Quality Assurance

***** END OF REPORT *****