FCC PART 15.249

TEST REPORT

For

HHC Changzhou Corp.

No. 61 Xinggang Road, Zhonglou District, Changzhou, Jiangsu, China, 213023

FCC ID: 2AEQWCH10HHC005

Report Type:	**Product Type:**
Original Report	Remote Control

Test Engineer:	Matt Yao
Report Number:	RKS160111001-00A
Report Date:	2016-01-19
Reviewed By:	Jesse Huang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) Chenghu Road,Kunshan Development Zone No.248,Kunshan, Jiangsu, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Kunshan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The HHC Changzhou Corp.' s product, model number: CH10 (FCC ID: 2AEQWCH10HHC005) (the "EUT") in this report was a Remote Control, was measured approximately: 170 mm (L) x65mm (W) x 28mm (H), Weight:150g , rated input voltage: 3*battery AAA 1.5V.

Note: The series product model CH04, CH10 , They have same RF module. The different is the quantity of button. CH10 has 10 buttons. CH04 has 4 buttons ,so the PCB layout have some changes ,but not affect RF performance ,we clarify that both CH10 and CH04 ,the duty cycle of RF signal is the same ,when press any button ,the transmitted spectrum is the same ,they do not affect RF spectrum.

All measurement and test data in this report was gathered from production sample serial number: 20160107002. (Assigned by BACL, Kunshan). The EUT was received on 2016-01-07.

Objective

This type approval report is prepared on behalf of HHC Changzhou Corp. in accordance with Part 2-Subpart J, and 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, and section 15.203, 15.205, 15.209 and 15.249 rules.

Related Submittal(s)/Grant(s)

N/A.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

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

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz.and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the Chenghu Road,Kunshan Development Zone No.248,Kunshan, Jiangsu, China.

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) 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, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. 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

Justification

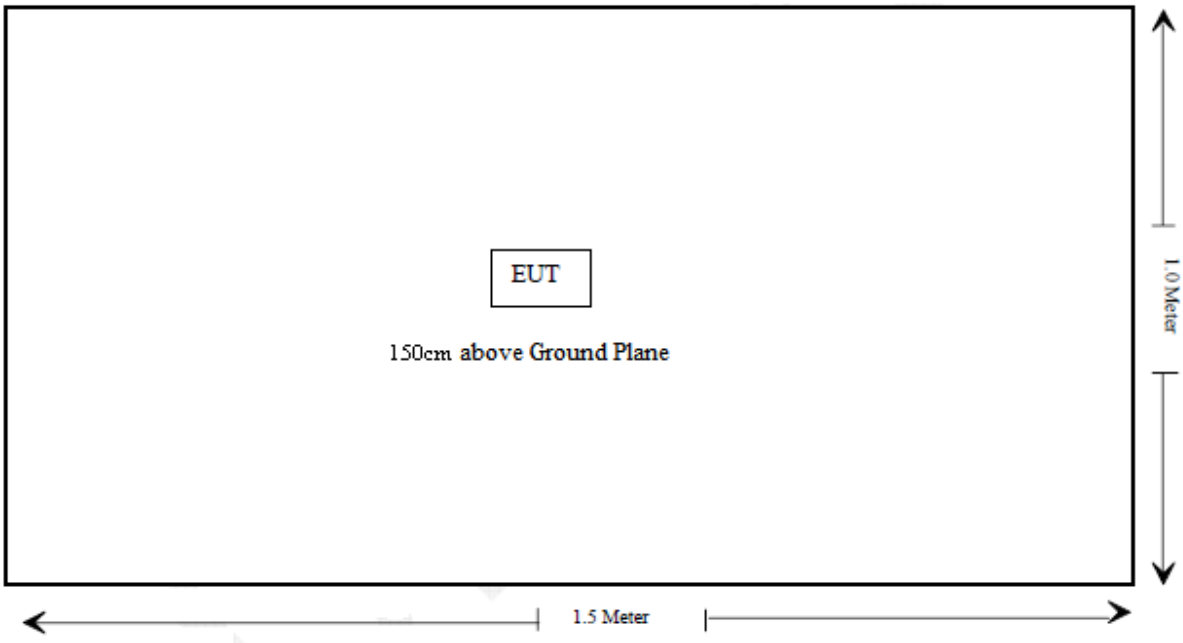
The system was configured in testing mode which was provided by manufacturer.

EUT was tested with Channel 2403MHz, 2412MHz and 2425MHz.

EUT Exercise Software

No software was used during the test.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	Conduction Emissions	Not Applicable*
15.205, §15.209, §15.249	Radiated Emissions	Compliance
§15.249(d)	OUT OF BAND EMISSION (50 dB ATTENUATION)	Compliance
§15.215 (c)	20 dB Bandwidth	Compliance

*Not Applicable: The EUT is battery operated equipment.

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT has one integral antenna arrangement and antenna gain is 2dBi, which was permanently attached ,fulfill the requirement of this section, please refer to the EUT photos.

Result: Compliant.

FCC§15.205, §15.209&§15.249- RADIATED EMISSIONS

Applicable Standard

As per FCC§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:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

(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 the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

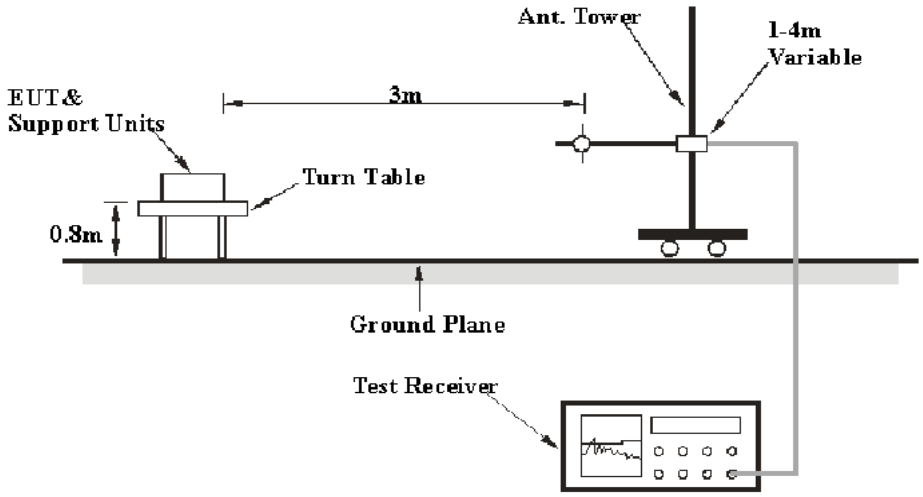
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Kunshan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 1 – Values of U_{cispr}

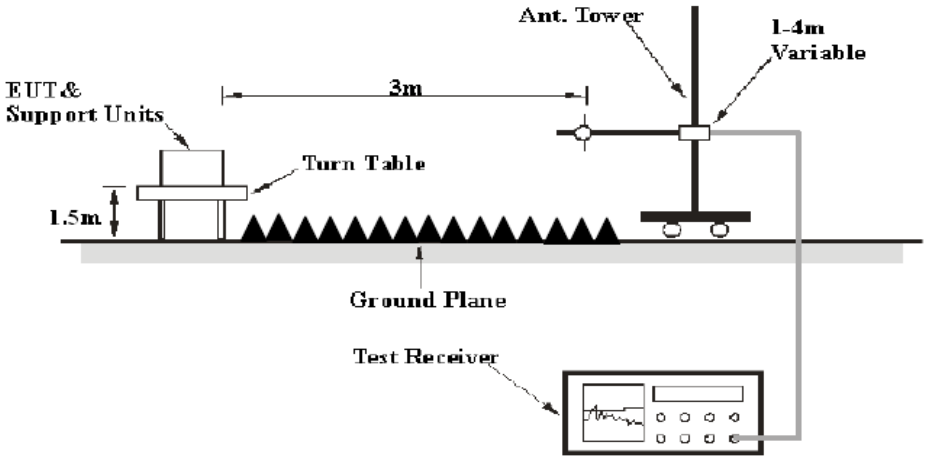
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

Test Equipment 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
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

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

All data was recorded in the Quasi-peak detection mode from 30MHz to 1GHz, Peak and average detection mode above 1 GHz.

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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit –Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrunent	Amplifier	330	171377	2015-9-16	2016-9-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-5-20	2016-5-19
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-7	2016-11-6
ETS	Horn Antenna	3115	6229	2015-11-7	2016-11-6
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-4	2016-11-3
Mini	Pre-amplifier	ZVA-183-S+	857001418	2015-9-16	2016-9-16
R&S	Auto test Software	EMC32	V 09.10.0	-	-
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-6-15

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

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 &15.205 & 15.249, with the worst margin reading of:

4.44 dB at **4806 MHz** in the **Horizontal** polarization for Low Channel

Test Data

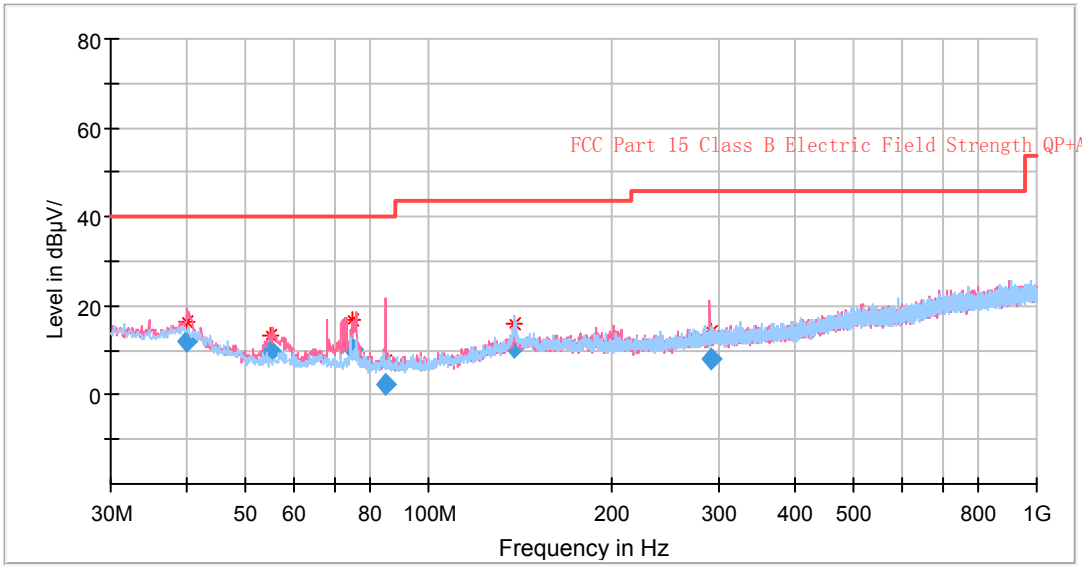
Environmental Conditions

Temperature:	25.6°C
Relative Humidity:	52%
ATM Pressure:	101.2 kPa

The testing was performed by Matt Yao on 2016-1-19.

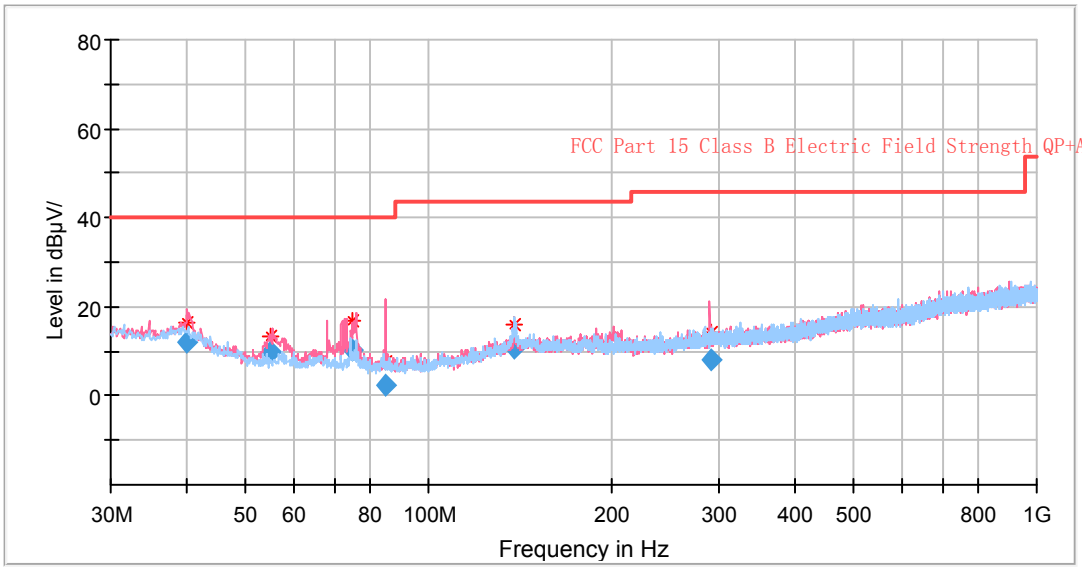
30MHz-1GHz:

For CH10



Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.249/205/209	
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB µ V/m)	Margin (dB)
40.063750	22.22	QP	1.0	100.0	V	-10.3	11.92	40.00	28.08
54.954150	26.42	QP	300.0	100.0	V	-16.6	9.82	40.00	30.18
75.070800	27.17	QP	291.0	100.0	V	-17.1	10.07	40.00	29.93
84.666700	19.27	QP	30.0	100.0	V	-17.1	2.17	40.00	37.83
138.258850	23.02	QP	1.0	100.0	H	-12.1	10.92	43.50	32.58
291.556250	18.45	QP	324.0	100.0	V	-10.4	8.05	46.00	37.95

For CH04



Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.249/205/209	
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB µ V/m)	Margin (dB)
31.778050	25.44	QP	164.0	100.0	V	-10.4	15.04	40.00	24.96
57.414750	26.05	QP	269.0	100.0	V	-16.6	9.45	40.00	30.55
70.032800	28.21	QP	255.0	100.0	V	-17.0	11.21	40.00	28.79
139.137200	22.06	QP	0.0	100.0	H	-12.0	10.06	43.50	33.44
202.404350	22.94	QP	110.0	100.0	H	-12.3	10.64	43.50	32.86
498.054000	18.39	QP	245.0	100.0	H	-5.4	12.99	46.00	33.01

1GHz-25GHz

Test Mode: Transmitting （Scan with X, Y, Z axis, the worst case is X axis ）

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.249/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2403 MHz)									
2403	91.45	PK	160	150	V	3.0	94.45	114	19.55
2403	84.13	Ave	160	150	V	3.0	87.13	94	6.87
2403	91.13	PK	220	200	H	3.0	94.13	114	19.87
2403	83.42	Ave	220	200	H	3.0	86.42	94	7.58
1289	50.62	PK	289	200	H	-2.1	48.52	74	25.48
1289	38.34	Ave	289	200	H	-2.1	36.24	54	17.76
2395	32.53	PK	42	200	H	4.1	36.63	74	37.37
2395	20.81	Ave	42	200	H	4.1	24.91	54	29.09
2400	49.36	PK	107	200	V	3.0	52.36	74	21.64
2400	35.55	Ave	107	200	V	3.0	38.55	54	15.45
4806	35.86	Ave	194	200	H	13.7	49.56	54	4.44
4806	40.61	PK	194	200	H	13.7	54.31	74	19.69
7209	20.84	Ave	358	200	H	20.5	41.34	54	12.66
7209	34.85	PK	358	200	H	20.5	55.35	74	18.65

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.249/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2412MHz)									
2412	91.31	PK	210	150	V	3.0	94.31	114	19.69
2412	84.33	Ave	210	150	V	3.0	87.33	94	6.67
2412	90.24	PK	130	200	H	3.0	93.24	114	20.76
2412	83.65	Ave	130	200	H	3.0	86.65	94	7.35
1280	40.83	Ave	291	200	H	-1.9	38.93	54	15.07
1280	52.46	PK	291	200	H	-1.9	50.56	74	23.44
4824	36.11	PK	184	200	H	13.9	50.01	74	23.99
4824	25.55	Ave	184	200	H	13.9	39.45	54	14.55
6980	33.80	PK	57	200	V	19.8	53.60	74	20.40
6980	20.45	Ave	57	200	V	19.8	40.25	54	13.75
7236	36.20	PK	3	200	H	20.8	57.00	74	17.00
7236	20.65	Ave	3	200	H	20.8	41.45	54	12.55
7890	29.18	PK	227	200	H	22.5	51.68	74	22.32
7890	15.31	Ave	227	200	H	22.5	37.81	54	16.19

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.249/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2425MHz)									
2425	91.54	PK	62	150	V	3.0	94.54	114	19.46
2425	84.12	Ave	62	150	V	3.0	87.12	94	6.88
2425	91.31	PK	230	200	H	3.0	94.31	114	19.69
2425	83.55	Ave	230	200	H	3.0	86.55	94	7.45
2483.5	44.01	PK	67	249	H	4.2	48.21	74	25.79
2483.5	31.47	Ave	67	249	H	4.2	35.67	54	18.33
4850	26.93	Ave	183	200	H	14.1	41.03	54	12.97
4850	40.29	PK	183	200	H	14.1	54.39	74	19.61
6965	33.80	PK	57	200	V	19.8	53.60	74	20.40
6965	20.45	Ave	57	200	V	19.8	40.25	54	13.75
7275	20.22	Ave	0.0	200	H	20.8	41.02	54	12.98
7275	39.44	PK	0.0	200	H	20.8	60.24	74	13.76
7890	29.18	PK	227	200	H	22.5	51.68	74	22.32
7890	15.31	Ave	227	200	H	22.5	37.81	54	16.19

FCC § 15.249(d) - OUT OF BAND EMISSION (50 dB ATTENUATION)

Applicable Standard

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 the general radiated emission limits in § 15.209, whichever is the lesser attenuation

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-4	2016-11-3
Dressler	Attenuator	ATT 6/75	510020010004	2015-11-12	2016-11-12

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

Test Data

Environmental Conditions

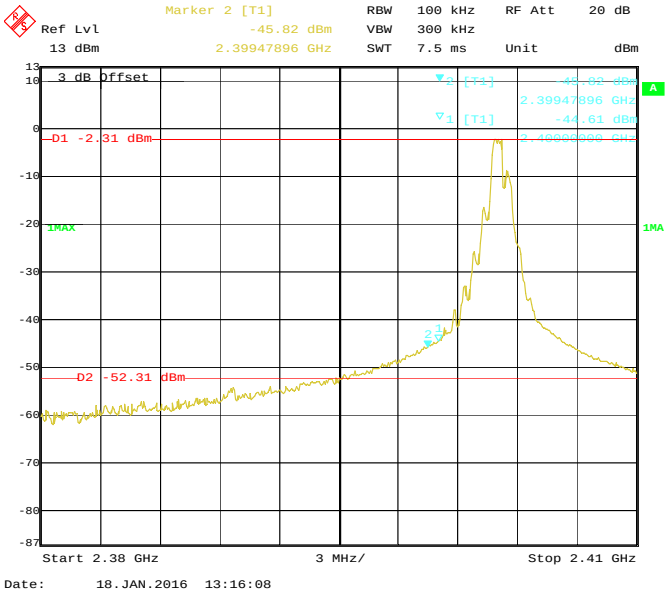
Temperature:	25.6°C
Relative Humidity:	51 %
ATM Pressure:	101.2kPa

** The testing was performed by Matt Yao on 2016-1-18.*

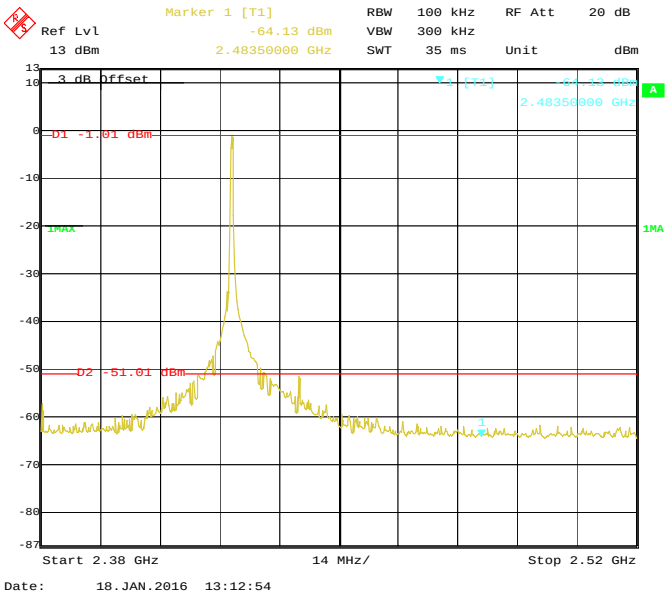
Test Result: Compliant.

Please refer to following plots

Band Edge, Left Side



Band Edge, Right Side



Note：The band emission compliant with the general radiated emission limits in § 15.209. Please refer to radiated emissions test section.

FCC §15.215(c) – 20 dB BANDWIDTH TESTING

Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-4	2016-11-3
Dressler	Attenuator	ATT 6/75	510020010004	2015-11-12	2016-11-12

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

Test Data

Environmental Conditions

Temperature:	25.6°C
Relative Humidity:	51 %
ATM Pressure:	101.2kPa

** The testing was performed by Matt Yao on 2016-1-18.*

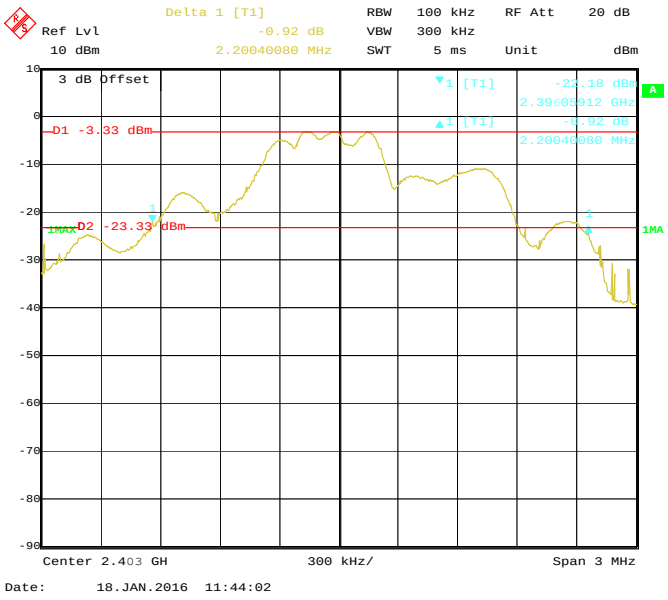
Test Result: Compliant.

Please refer to following tables and plots

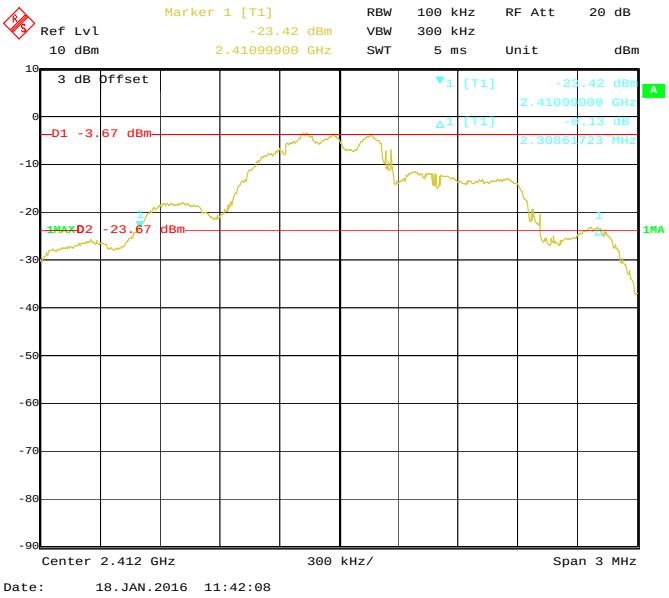
Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2403	2.2004
Middle	2412	2.3086
High	2425	2.2545

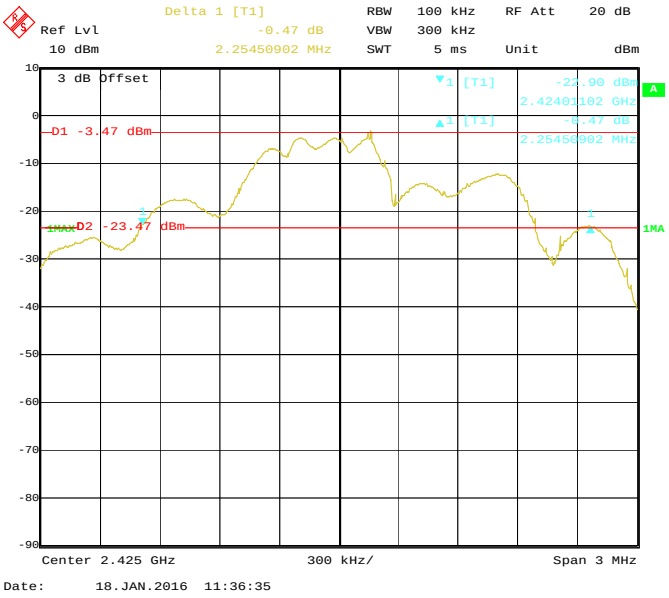
Low Channel



Middle Channel



High Channel



DECLARATION

DECLARATION

Date:2016-1-14

To:
Bay Area Compliance Laboratories Corp. (Kunshan)
No.248 Chenghu Road Kunshan,Jiangsu,China
http://www.baclcorp.com

Dear Sir or Madam:

We,（ company name： HHC Changzhou Corp.）hereby declare that product: Remote Control, model: CH10, serial model:CH04, which has been tested by BACL.

CH10 and CH04 have same RF module. The different is the quantity of button. CH10 has 10 buttons. CH04 has 4 buttons ,so the PCB layout have some changes ,but not affect RF performance ,we clarify that both CH10 and CH04 ,the duty cycle of RF signal is the same ,when press any button ,the transmitted spectrum is the same ,they do not affect RF spectrum.

Please contact me if there is need for any additional clarification or information.
Best Regards

Signature:

Printed name： Jack Chen Jack Chen
Title： Project Manager

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