Report No.: DDT-R17Q0524-1E2

Issued Date: Jun. 16, 2017

FCC CERTIFICATION TEST REPORT

FOR

Applicant	**:**	SHENZHEN QIAOHUA INDUSTRIES LIMITED
Address	**:**	301, No.1 Workshop, LongqiaohuaIndustrial Zone, LuotianForest Farm, Songgang Street, BaoanDistrict, Shenzhen City, Guangdong, Province
Equipment under Test	**:**	Remote control
Model No.	**:**	214L-TX-3
Trade Mark	**:**	Quhwa
FCC ID	**:**	2AAV8214L-TX-3
Manufacturer	**:**	SHENZHEN QIAOHUA INDUSTRIES LIMITED
Address	**:**	301, No.1 Workshop, LongqiaohuaIndustrial Zone, LuotianForest Farm, Songgang Street, BaoanDistrict, Shenzhen City, Guangdong, Province

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel: +86-0769-22891499 Http://www.dgddt.com

REPORT

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TEST REPORT DECLARE

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Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.231

Test procedure used:

ANSI C63.10:2013

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC&IC standards.

Report No:	DDT-R17Q0524-1E2		
Date of Receipt	May 24, 2017	**Date of Test:**	Jun. 14, 2017

Prepared By: ***Approved By:***

Leo Liu/Engineer ***Kevin Feng/EMC Manager***

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

1. Summary of test results

Description of Test Item	Standard	Results
Occupied Bandwidth	FCC Part 15: 15.231(c) ANSI C63.10:2013	PASS
Transmission time and silent time	FCC Part 15: 15.231(e)	PASS
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.231(e) ANSI C63.10:2013	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.10:2013	N/A
Antenna requirement	FCC Part 15: 15.203	PASS
Note: N/A is an abbreviation for Not Applicable.		

2. General test information

2.1. Description of EUT

EUT* Name	:	Remote control
Model Number	:	214L-TX-3
EUT function description	:	Please reference user manual of this device
Power supply	:	DC 3V from CR2032 battery
Operation frequency	:	433.92MHz
Modulation	:	FSK
Antenna Type	:	Integrated antenna, maximum PK gain: 0dBi
Sample Type	:	Series production

Note 1: EUT is the ab. of equipment under test.

2.2. Assistant equipment used for test

Assistant equipment	Brand	Model number	Serial No.	Other
N/A	N/A	N/A	N/A	N/A

2.3. Block diagram of EUT configuration for test

EUT

The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode as blow table.

Tested mode, channel, information		
Mode	Channel	Frequency (MHz)
Tx Mode	/	433.92

2.4. Deviations of test standard

No Deviation.

2.5. Test environment conditions

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

Temperature range:	21-25℃
Humidity range:	40-75%
Pressure range:	86-106kPa

2.6. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808 Tel: +86-0769-89201699 http://www.dgddt.com

FCC Registration Number: 270092

Industry Canada site registration number: 10288A-1

CNAS Accreditation No. L6451

A2LA Accreditation No. 3870.01

2.7. Measurement uncertainty

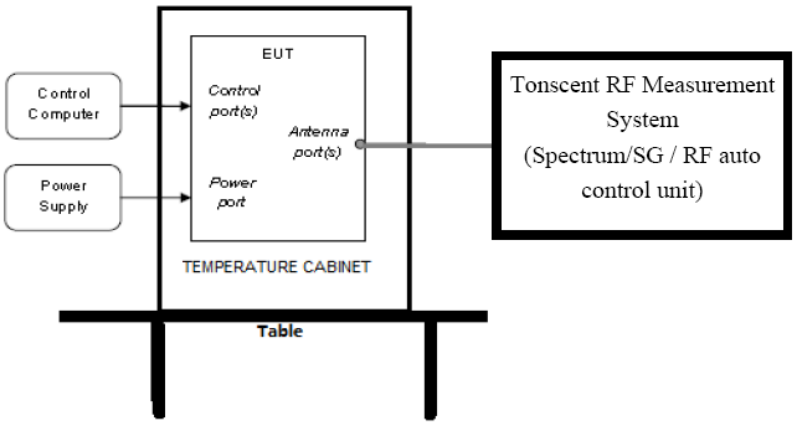
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power(Conducted)(Spectrum analyzer)	0.86dB(10 MHz ≤ f < 3.6GHz);
	1.38dB(3.6GHz≤ f < 8GHz)
Peak Output Power(Conducted)(Power Sensor)	0.74dB
Dwell Time	0.6%
Conducted spurious emissions	0.86dB(10 MHz ≤ f < 3.6GHz);
	1.40dB(3.6GHz≤ f < 8GHz)
	1.66dB(8GHz≤ f < 22GHz)
Uncertainty for radio frequency (RBW<20KHz)	3×10^{-8}
Temperature	0.4℃
Humidity	2%
Uncertainty for Radiation Emission test (30MHz-1GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1GHz-18GHz)	4.10dB(1-6GHz)
	4.40dB (6GHz-18Gz)
Uncertainty for Power line conduction emission test	3.32dB (150KHz-30MHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3. Equipment used during test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
RF Connected Test					
Spectrum analyzer	R&S	FSU26	1166.1660.26	Oct. 16, 2016	1Year
Vector Signal Generator	Agilent	E8267D	MY52098743	Oct. 20, 2016	1Year
Vector Signal Generator	Agilent	N5182A	MY48180737	Jul. 05, 2016	1Year
Power Sensor	Agilent	U2021XA	MY55150010	Apr. 18, 2017	1Year
Power Sensor	Agilent	U2021XA	MY55150011	Apr. 19, 2017	1Year
DC Power Source	MATRIS	MPS-3005L-3	D813058W	Oct. 24, 2016	1Year
Attenuator	Mini-Circuits	BW-S10W2	101109	Aug. 18, 2016	1Year
RF Cable	Micable	C10-01-01-1	100309	Aug. 18, 2016	1Year
Test Software	JS Tonscend	JS1120-2	Ver.2.5	N/A	N/A
USB Data acquisition	Agilent	U2531A	TW55043503	N/A	N/A
Auto control Unit	JS Tonscend	JS0806-2	158060010	N/A	N/A
Radiated Emission Test					
EMI Test Receiver	R&S	ESU8	100316	Oct. 16, 2016	1Year
Spectrum analyzer	R&S	FSU26	1166.1660.26	Oct. 16, 2016	1Year
Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	Oct. 27, 2016	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Oct. 16, 2016	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	Oct. 12, 2016	1 Year
Pre-amplifier	A.H.	PAM-0118	360	Oct. 16, 2016	1 Year
RF Cable	HUBSER	CP-X2	W11.03	Oct. 16, 2016	1Year
RF Cable	HUBSER	CP-X1	W12.02	Oct. 16, 2016	1 Year
MI Cable	HUBSER	C10-01-01-1M	1091629	Oct. 16, 2016	1 Year
Test software	Audix	E3	V 6.11111b	/	/
Power Line Conducted Emissions Test					
Test Receiver	R&S	ESU8	100316	Oct. 16, 2016	1 Year
LISN 1	R&S	ENV216	101109	Oct. 16, 2016	1 Year
LISN 2	R&S	ESH2-Z5	100309	Oct. 16, 2016	1 Year
Pulse Limiter	R&S	ESH3-Z2	101242	Oct. 16, 2016	1 Year
CE Cable 1	HUBSER	ESU8/RF2	W10.01	Oct. 16, 2016	1 Year
Test software	Audix	E3	V 6.11111b	/	/

4. Occupied Bandwidth

4.1. Block diagram of test setup



4.2. Limits

According to 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

4.3. Test Procedure

(1) According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.

(2) Set to the maximum power setting and enable the EUT transmit continuously.

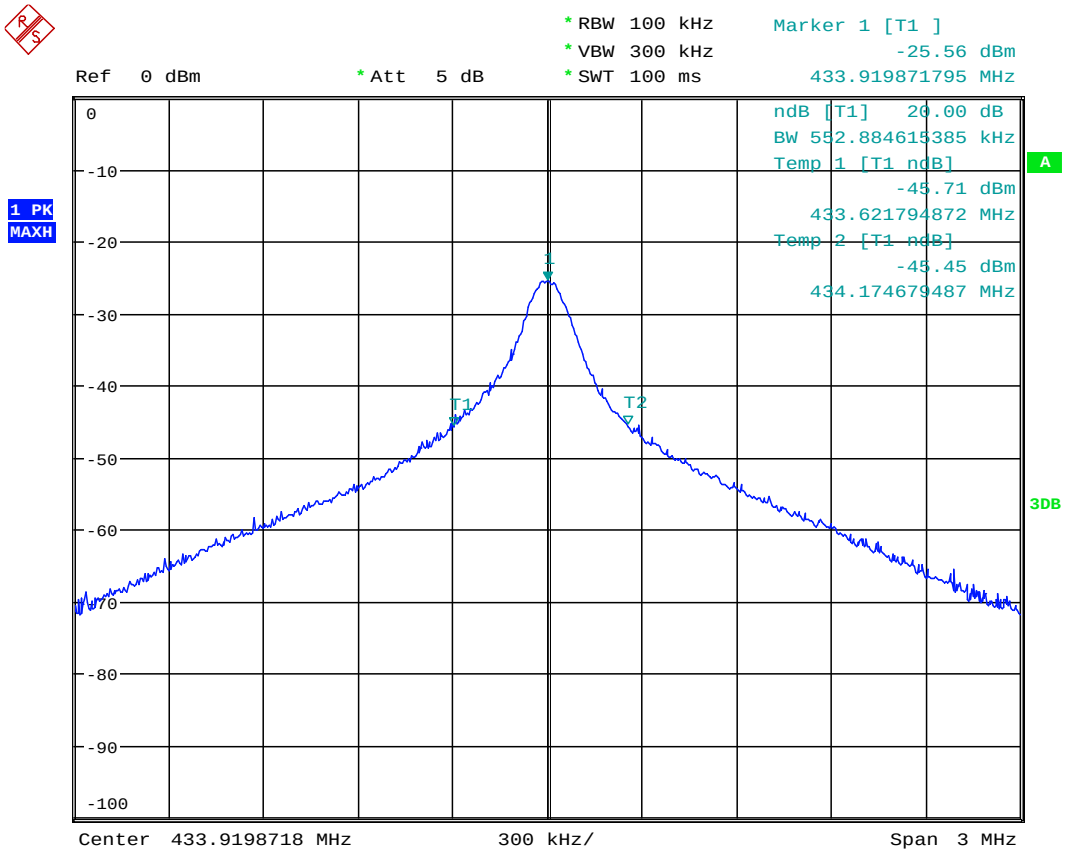
(3) Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW≥ 1% of the 20 dB bandwidth; VBW≥RBW; Sweep = auto; Detector function = peak; Trace = max hold.

(4) Measure and record the results in the test report.

4.4. Test Result

Mode	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
Tx mode	552.9	1084.8	PASS
Note: Limit = 433.92MHz *0.25% = 1084.8 kHz			

Test plots as follows:


RBW 100 kHz
VBW 300 kHz
SWT 100 ms
Marker 1 [T1]
-25.56 dBm
433.919871795 MHz
Ref 0 dBm
Att 5 dB
ndB [T1] 20.00 dB
BW 552.884615385 kHz
Temp 1 [T1 ndB]
-45.71 dBm
433.621794872 MHz
Temp 2 [T1 ndB]
-45.45 dBm
434.174679487 MHz
1 PK
MAXH
A
3DB
T1
T2
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 433.9198718 MHz
300 kHz/
Span 3 MHz

5. Duty Cycle

5.1. Block diagram of test setup

Same as section 4.1

5.2. Test Procedure

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

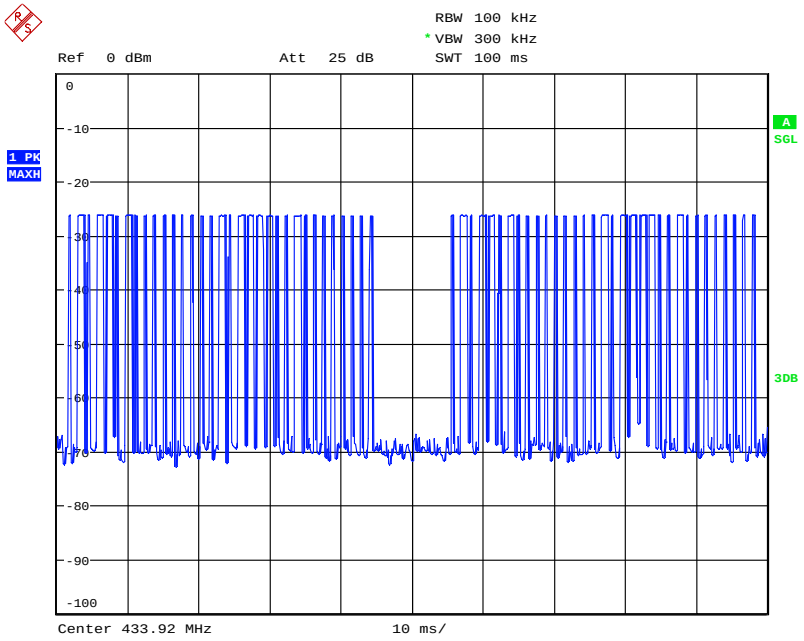
The Duty Cycle Was Determined By the Following Equation: To Calculate The Actual Field Intensity, The Duty Cycle Correction Factor In Decibel is needed for later use and can be obtained from following convwesion

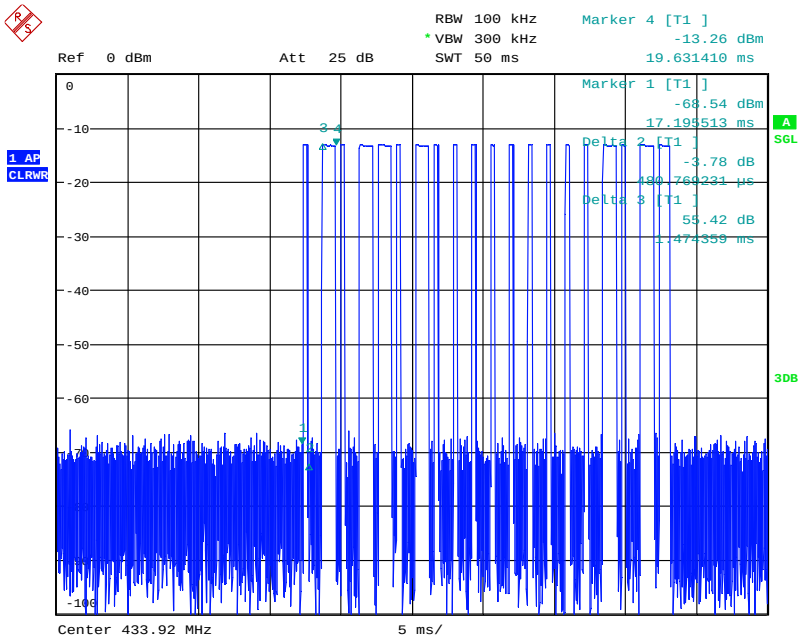
Duty Cycle (%)=Total on interval in A complere pulse train/Length of A complete pulse train*%

Duty Cycle Correnction Factor (dB)= 20*Log10(Duty Cycle (%))

5.3. Test Result

Total On interval in a complete pulse train(ms)	(13*0.48)*2+(0.96*7)*2
Length of a complete pulse train(ms)	100
Duty Cycle (%)	25.92%
Duty Cycle Correction Factor (dB)	-11.73




RBW 100 kHz
*VBW 300 kHz
SWT 50 ms
Marker 4 [T1]
-13.26 dBm
19.631410 ms
Ref 0 dBm
Att 25 dB
Marker 1 [T1]
-68.54 dBm
17.195513 ms
Delta 2 [T1]
-3.78 dB
180.769231 µs
Delta 3 [T1]
55.42 dB
1.47435 ms
1 AP
CLRWR
A
SGL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-100
Center 433.92 MHz
5 ms/

6. Automatically deactivate

6.1. Block diagram of test setup

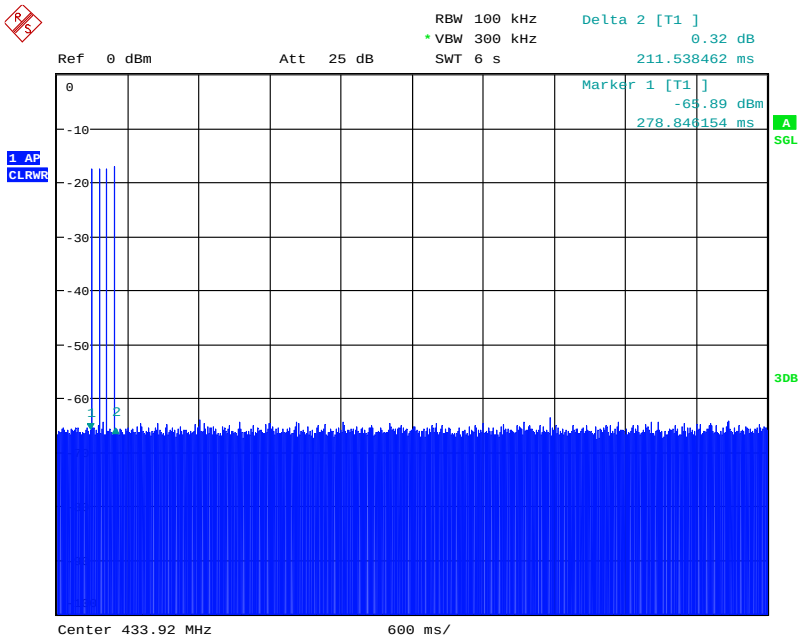
Same as section 4.1

6.2. Test Procedure

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
Spectrum Setting: RBW=100kHz, VBW =300kHz, Sweep time=Auto

6.3. Test Result

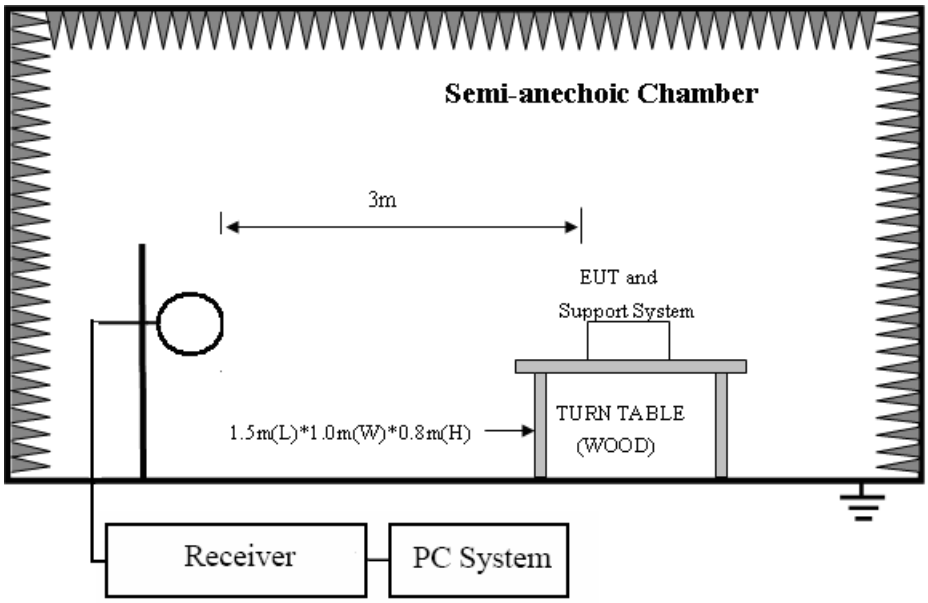
Activation time	Limit (Sec)	Test conclusion
0.211s	5s	Pass



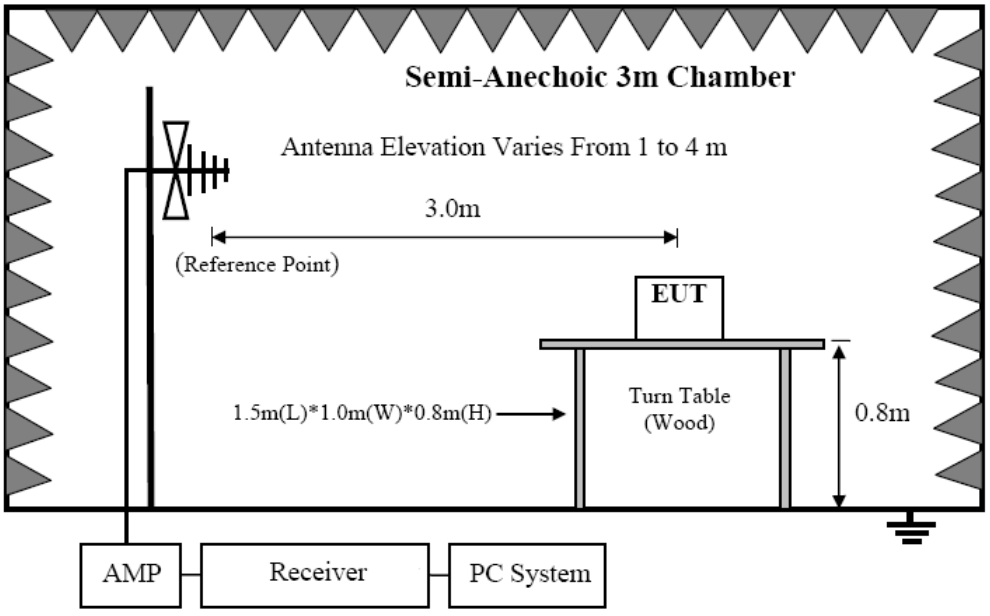
7. Radiated emission

7.1. Block diagram of test setup

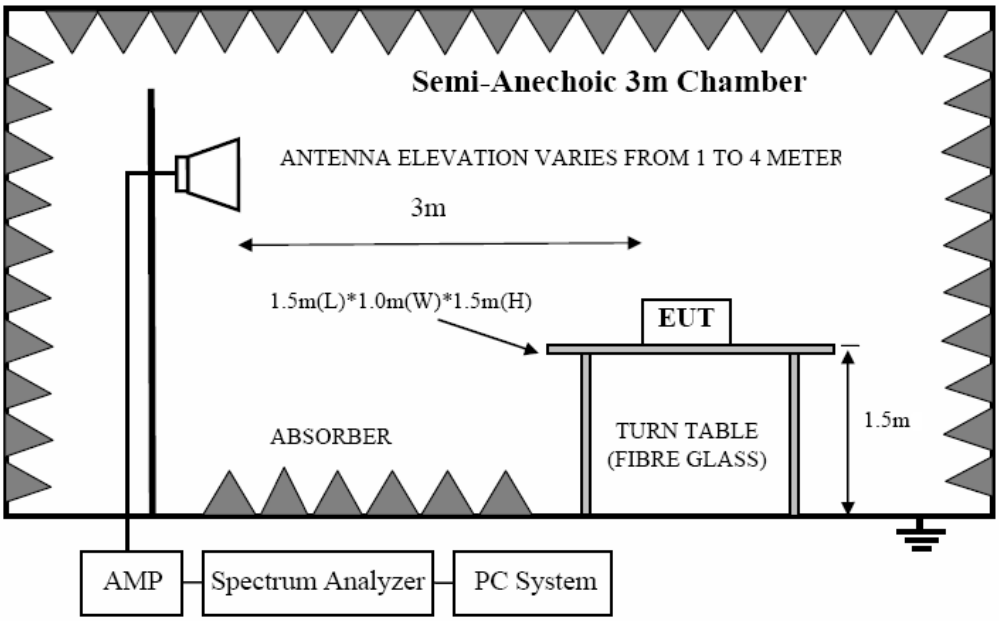
In 3m Anechoic Chamber Test Setup Diagram for 9KHz-30MHz



In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

7.2. Limit

(1) FCC 15.205 Restricted frequency band

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])

(2) FCC 15.209 Limit.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(KHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(KHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0

Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)

Note: (1)The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz.Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer then that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$Limit_{3m}(dBuV/m) = Limit_{30m}(dBuV/m) + 40Log(30m/3m)$$

(3) Limit for this EUT

Fundamental Frequency (MHz)	Filed Strength of Fundamental (microvolts/meter)	Filed Strength of Spurious Emission(dBμV/m)
433.92	80.83	60.83
Note: 1. Intentional radiators operating under the provisions of this Section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. 2.According to 15.35, on any frequency or frequencies below or equal to 1000 MHz, the limits Shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. 3. According to 15.231(b), The limits on the field strength of the spurious emissions in the above table is based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to thegeneral limits shown in Section 15.209, whichever limit permits one higher field strength.		

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

7.3. Test Procedure

(1) EUT was placed on a non-metallic table, 150 cm above the ground plane inside a semi-anechoic chamber.

(2) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
9KHz-30MHz	Active Loop antenna
30MHz-1GHz	Trilog Broadband Antenna
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)
18GHz-40GHz	Horn Antenna(18GHz-40GHz)

According ANSI C63.10:2013 clause 6.4.4.2 and 6,5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of

Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9KHz to 25GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m(Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18GHz to 25GHz, so below final test was performed with frequency range from 9KHz to 18GHz.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.

(5) The emissions from 9KHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz, for emissions from 9KHz-90KHz,110KHz-490KHz and above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9KHz to 1GHz, QP or average values were measured with EMI receiver with below RBW.

Frequency band	RBW
9KHz-150KHz	200Hz
150KHz-30MHz	9KHz
30MHz-1GHz	120KHz

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RMS detector RBW 1MHz VBW 3MHz for Average measure(according ANSI C63.10:2013 clause 4.2.3.2.3 procedure for average measure).

(8) X axis, Y axis, Z axis are tested, and worse setup X axis is reported.

7.4. Test result

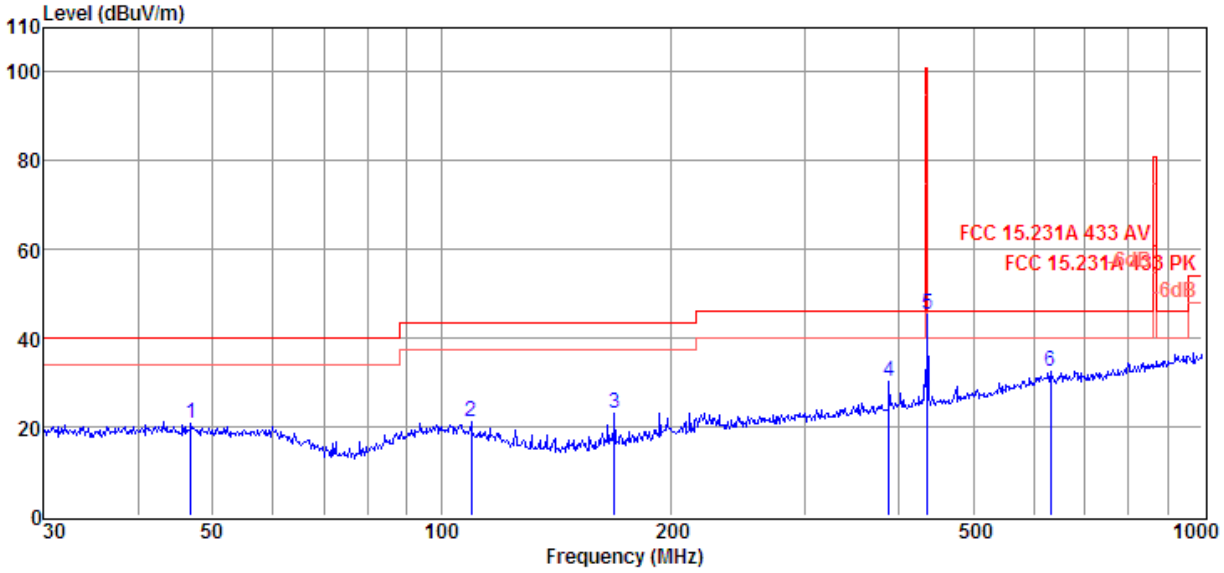
PASS. (See below detailed test result)

Radiated Emission test (below 1GHz)

TR-4-E-009 Radiated Emission Test Result

Test Site	:	DDT 3m Chamber 1#	D:\2017 RE1# Report Data\17Q0524-1\RE.EM6		
Test Date	:	2017-06-14	**Tested By**	:	Jerry
EUT	:	Remote control	**Model Number**	:	214L-TX-3
Power Supply	:	DC 3V	**Test Mode**	:	Tx mode
Condition	:	Temp:24.5'C,Humi:55%, Press:100.1kPa	**Antenna/Distance**	:	2016 VULB9163 1#/3m/VERTICAL
Memo	:				

Data: 3



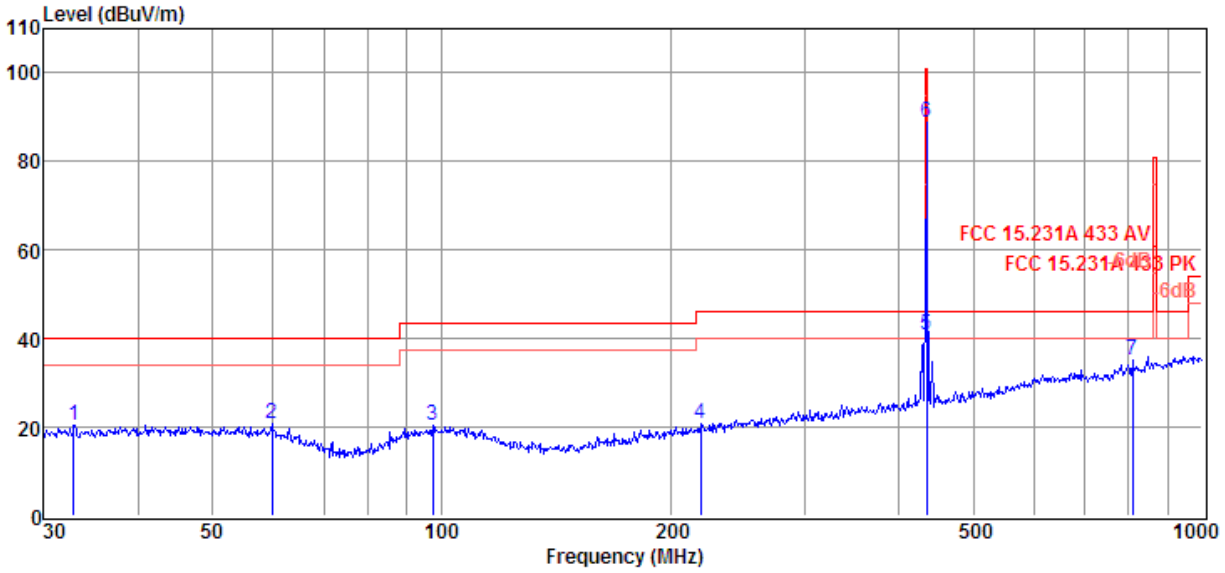
Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	46.83	4.55	12.24	3.86	20.65	40.00	-19.35	Peak	VERTICAL
2	109.41	5.61	11.07	4.35	21.03	43.50	-22.47	Peak	VERTICAL
3	169.01	10.12	8.36	4.71	23.19	43.50	-20.31	Peak	VERTICAL
4	387.99	8.87	15.44	5.75	30.06	46.00	-15.94	Peak	VERTICAL
5	433.92	22.93	16.37	5.93	45.23	100.83	-55.60	Peak	VERTICAL
6	631.69	6.35	19.38	6.61	32.34	46.00	-13.66	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2017 RE1# Report Data\17Q0524-1\RE.EM6	
Test Date	: 2017-06-14	**Tested By**	: Jerry
EUT	: Remote control	**Model Number**	: 214L-TX-3
Power Supply	: DC 3V	**Test Mode**	: Tx mode
Condition	: Temp:24.5'C,Humi:55%, Press:100.1kPa	**Antenna/Distance**	: 2016 VULB9163 1#/3m/HORIZONTAL
Memo	:		

Data: 4



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	32.86	5.24	11.49	3.71	20.44	40.00	-19.56	Peak	HORIZONTAL
2	59.86	5.17	11.70	3.98	20.85	40.00	-19.15	Peak	HORIZONTAL
3	97.46	4.17	11.80	4.28	20.25	43.50	-23.25	Peak	HORIZONTAL
4	219.08	4.71	11.25	4.99	20.95	46.00	-25.05	Peak	HORIZONTAL
5	433.92	/	/	/	77.20	80.83	-4.23	Average	HORIZONTAL
6	433.92	66.68	16.32	5.93	88.93	100.83	-11.90	Peak	HORIZONTAL
7	810.27	6.68	21.21	7.15	35.04	46.00	-10.96	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

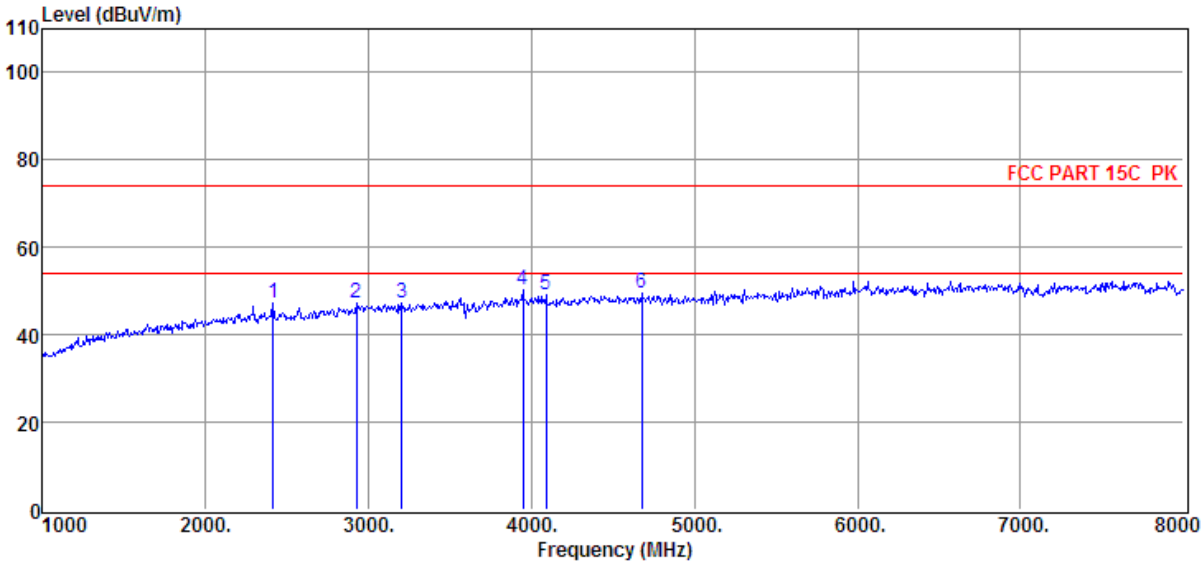
Note： AV of 433.92MHZ=PK-dutycycle factor=88.93-11.73=77.2dB μ V/m

Radiated Emission test (above 1GHz)

TR-4-E-009 Radiated Emission Test Result

Test Site	:	DDT 3m Chamber 1#	D:\2017 RE1# Report Data\17Q0524-1\RE.EM6		
Test Date	:	2017-06-14	**Tested By**	:	Jerry
EUT	:	Remote control	**Model Number**	:	214L-TX-3
Power Supply	:	DC 3V	**Test Mode**	:	Tx mode
Condition	:	Temp:24.5'C,Humi:55%, Press:100.1kPa	**Antenna/Distance**	:	2016 HF907/3m/VERTICAL
Memo	:				

Data: 1



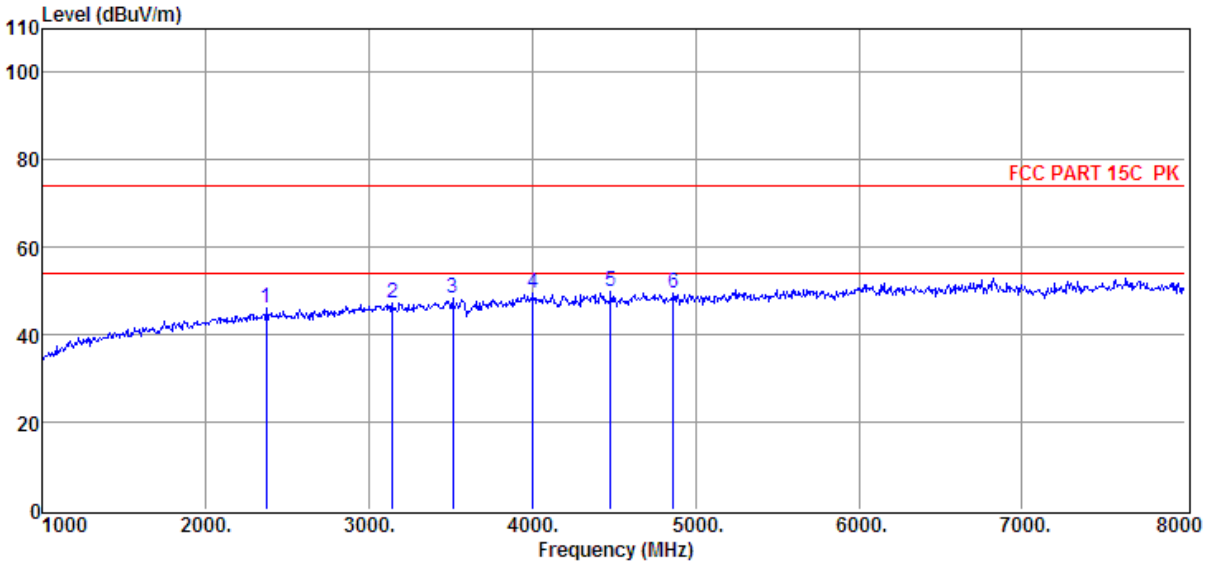
Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2414.00	40.87	29.87	29.48	6.03	47.29	74.00	-26.71	Peak	VERTICAL
2	2925.00	39.08	31.49	30.17	6.68	47.08	74.00	-26.92	Peak	VERTICAL
3	3205.00	38.68	31.79	30.04	6.98	47.41	74.00	-26.59	Peak	VERTICAL
4	3947.00	38.38	33.25	29.07	7.58	50.14	74.00	-23.86	Peak	VERTICAL
5	4087.00	37.14	33.47	29.06	7.69	49.24	74.00	-24.76	Peak	VERTICAL
6	4675.00	36.80	33.76	29.28	8.33	49.61	74.00	-24.39	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	:	DDT 3m Chamber 1#	D:\2017 RE1# Report Data\17Q0524-1\RE.EM6		
Test Date	:	2017-06-14	**Tested By**	:	Jerry
EUT	:	Remote control	**Model Number**	:	214L-TX-3
Power Supply	:	DC 3V	**Test Mode**	:	Tx mode
Condition	:	Temp:24.5'C,Humi:55%, Press:100.1kPa	**Antenna/Distance**	:	2016 HF907/3m/HORIZONTAL
Memo	:				

Data: 2

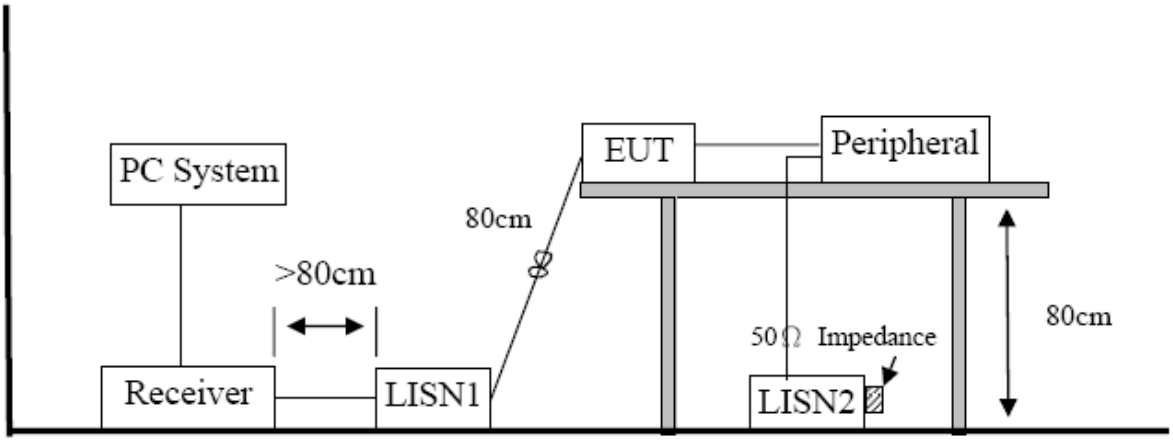


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2372.00	39.67	29.71	29.37	6.01	46.02	74.00	-27.98	Peak	HORIZONTAL
2	3142.00	38.84	31.76	30.10	6.94	47.44	74.00	-26.56	Peak	HORIZONTAL
3	3513.00	38.49	31.94	29.51	7.30	48.22	74.00	-25.78	Peak	HORIZONTAL
4	4003.00	37.54	33.40	29.04	7.61	49.51	74.00	-24.49	Peak	HORIZONTAL
5	4479.00	37.21	33.78	29.20	8.12	49.91	74.00	-24.09	Peak	HORIZONTAL
6	4864.00	36.62	33.73	29.33	8.56	49.58	74.00	-24.42	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

8. Power Line Conducted Emission

8.1. Block diagram of test setup



8.2. Power Line Conducted Emission Limits

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

8.3. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

8.4. Test Result

Not Applicable

9. Antenna Requirements

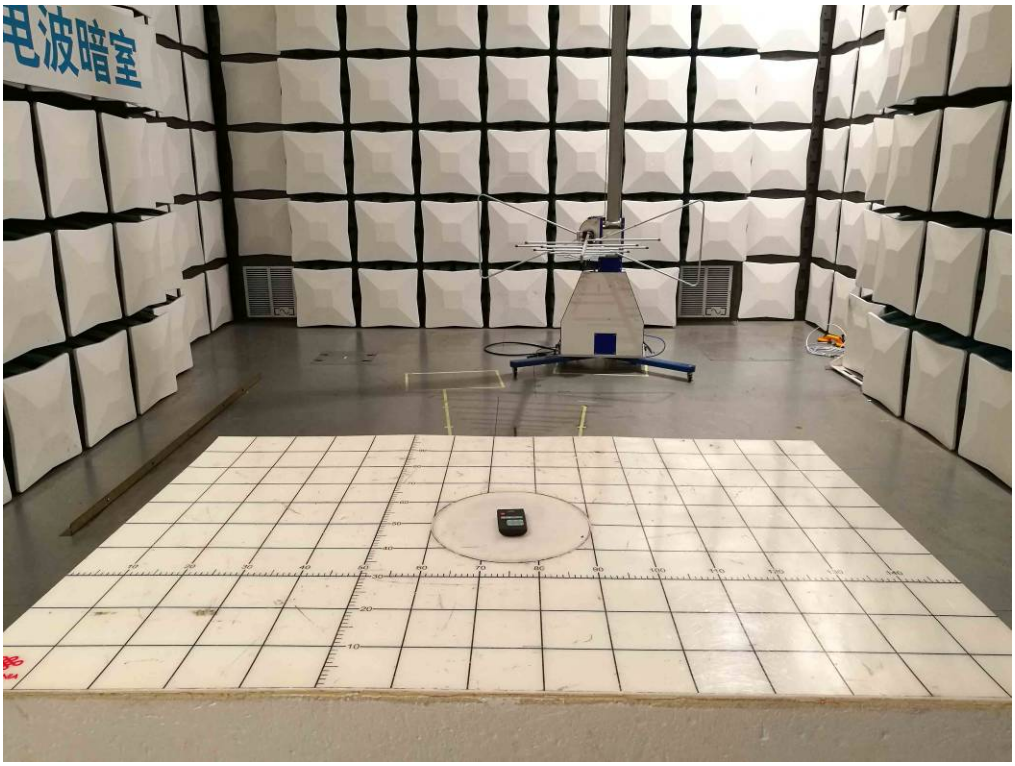
9.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2. Result

The antennas used for this product are integrated antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0dBi.

10. Test setup photograph



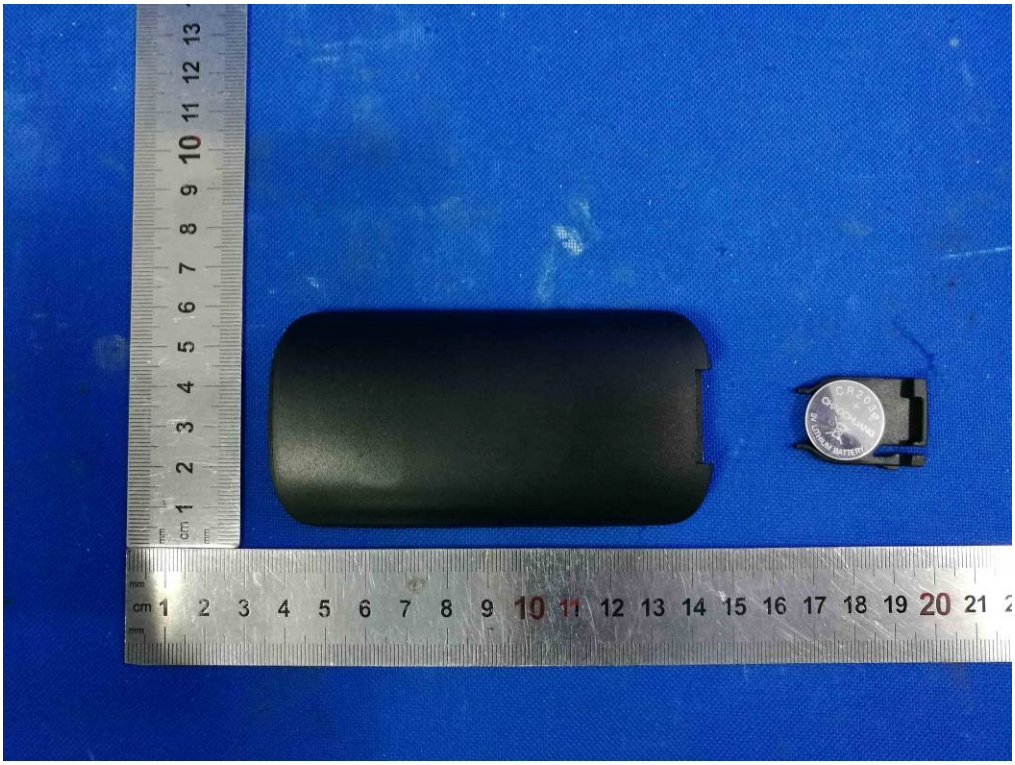
11. Photos of the EUT

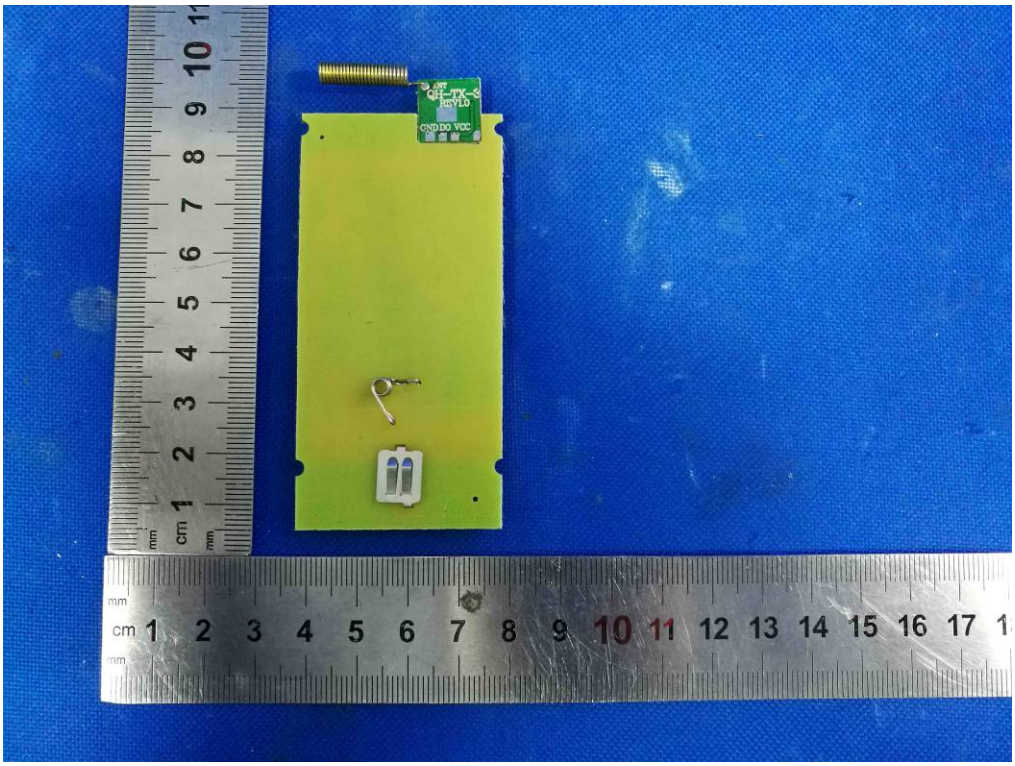

Quhwa
1
2
3
4
G
B
R
W

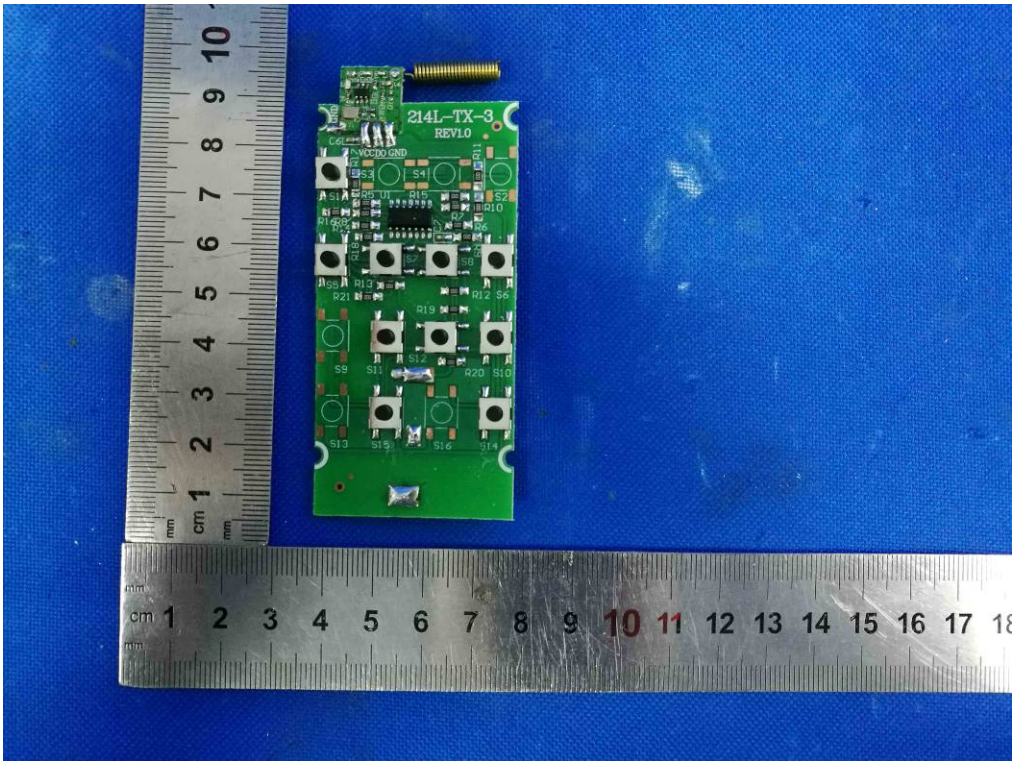

Quhwa
R
ON/OFF
G
ON/OFF
The remote control-02

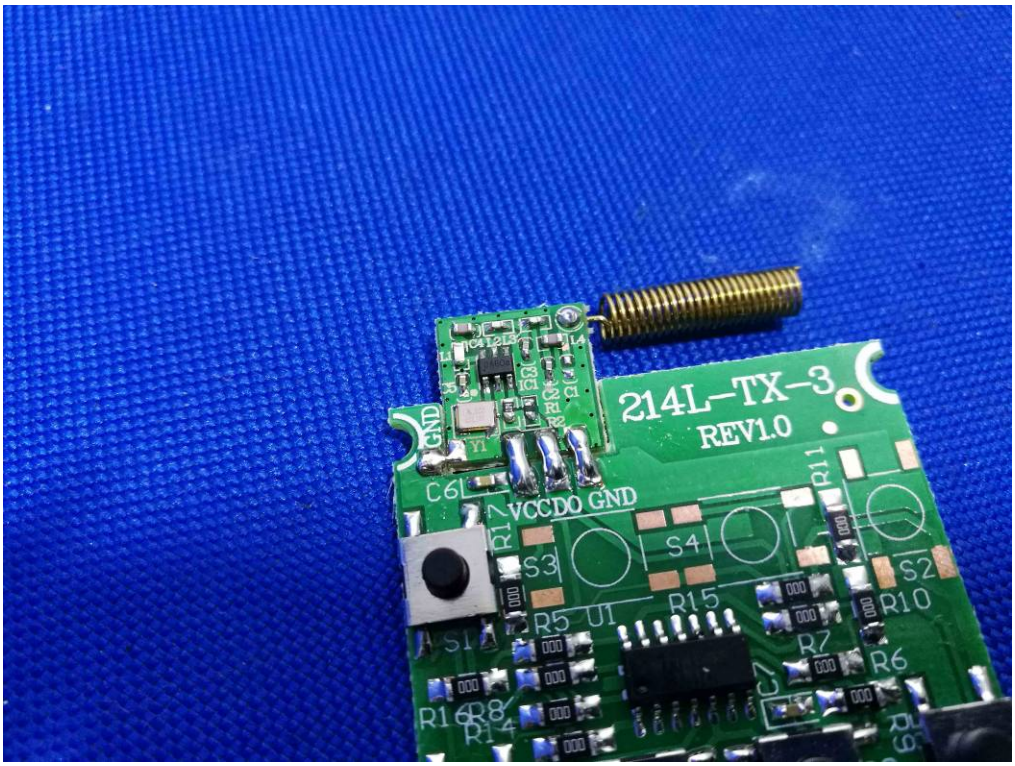

Quhwa
R
ON/OFF
B
ON/OFF
G
ON/OFF
The remote control-05

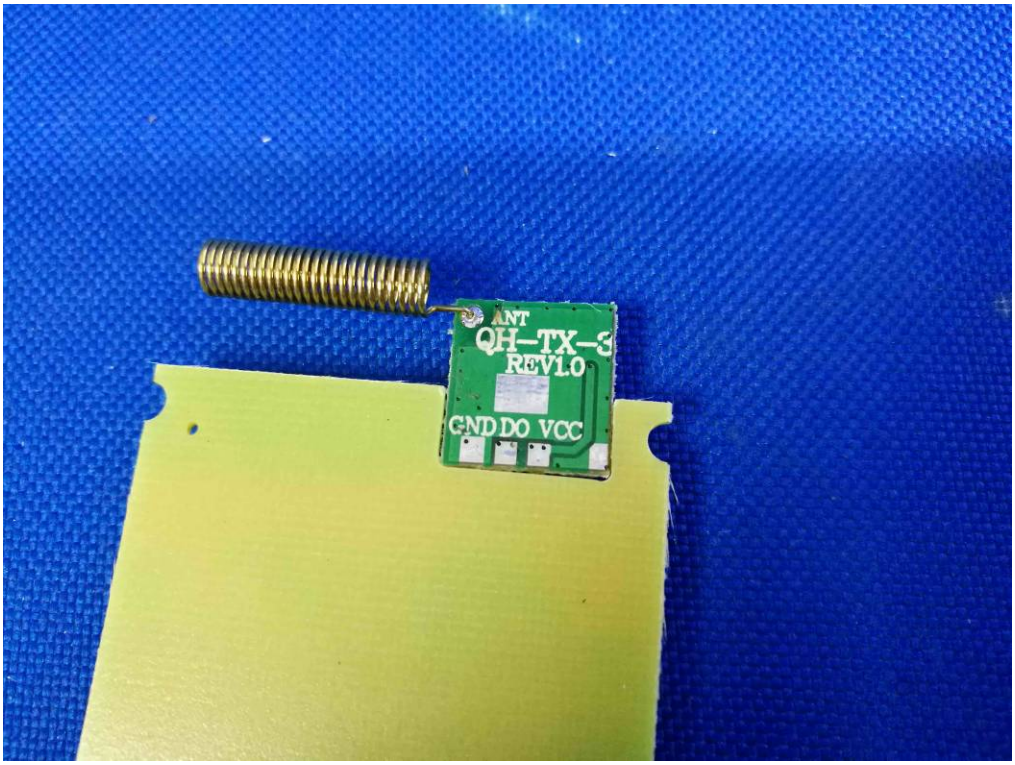

Quhwa






214L-TX-3
REV1.0
VCCDO GND


214L-TX-3
REV1.0
VCCDO GND



END OF REPORT