



SLG Asia Test Labs & Service (HK) Limited

Test Report

According to

FCC PART 15 Subpart C

FCC ID: S29DV05

Test Report Number: H1M21307-1156-P-15



TEST REPORT

Summary | FCC Part 15C

Test Report No.: H1M21307-1156-P-15

Date of issue.....: 15.07.2013

Testing Laboratory name: SLG Asia Test Labs & Service (HK) Limited

Address.....: 26/F., Tamson Plaza, 161 Wai Yip Street,
Kwun Tong, Kowloon, Hong Kong

Applicant's name: Guangzhou Walkera Technology Co., Ltd.

Address.....: Taishi Industrial Park, Dongchong Town, Nansha District, 511475
Guangzhou, China

Manufacturer's name: Guangzhou Walkera Technology Co., Ltd.

Address.....: Taishi Industrial Park, Dongchong Town, Nansha District, 511475
Guangzhou, China

Test specification

Standard(s) applied: FCC Rules 47 CFR Part 15 Subpart C

Test item description: R/C Helicopter with Wifi

Brand Name: devention, WALKERA

Model and/or type reference.....: QR W100S with RX2646H-D module + DV05

Rating(s): DC 3.7V, 600mAh Li-Po battery

Summary of Test Results

Pass

The Summary of Test Results based on a technical opinion belongs to the applied standard(s).

Disclaimer

Further details of testing are provided in particular chapters of this Test Report.

This document base on General Terms and Conditions of SLG Asia Test Labs & Service (HK) Limited, which the applicant accepted with order confirmation.

Emphasized conditions or project related conditions:

Released Test Reports apply only to the specific samples tested under stated test conditions. It is the applicant's responsibility to assure that additional production units of the tested model(s) are manufactured in same construction and with identical electrical and mechanical components to meet the same quality as tested model(s). The applicant/manufacturer/importer is responsible for any modifications made to the production units which result in non-compliance to the applied and/or relevant regulations. SLG Asia Test Labs & Service (HK) Limited shall have no liability for any deductions, inferences or generalizations drawn by the client or others from any kind of issued reports. Reports are confidential property of the client. As a mutual protection to the applicant, the clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.



TABLE OF CONTENTS

1	General Information	3
1.1	Test Report	3
1.2	Test Location	4
1.3	Details of applicant	4
1.4	Manufacturer	4
1.5	Application details	5
1.6	Test item	5
1.7	General Test Conditions	7
2	Test result Summary	8
3	Test results	9
3.1.	6dB Bandwidth	9
3.2.	Output power	11
3.3.	Power Spectral Density	12
3.4.	Out-of-band Emission	13
3.5.	Band edge requirement	17
4	Normative references	19
5	Disclaimer	20
5.1	Revision Notes	20
Annex: A – External Photos of test item	Number of Pages	1
Annex: B – Internal Photos of test item	Number of Pages	2
Annex: C – Photos of test setup	Number of Pages	1



1 General Information

1.1 Test Report

Tested by:

15.07.2013

Mr. Karl Lau

Date

Test Engineer

Signature

Approved by:

15.07.2013

Mr. F. Schulz

Date

Laboratory Manager

Signature



1.2 Test Location

All tests were carrying by personnel from:

Name: SLG Asia Test Labs & Service (HK) Limited
Address: 26/F., Tamson Plaza, 161 Wai Yip Street
Kwun Tong, Kowloon, Hong Kong

Telephone: +852 2389 2200
Fax: +852 2389 3073

The Test facility for radiated measurements is located at:

Name : Hong Kong Productivity Council
Address: EMC Centre, LG1, HKPC Building, 78 Tat Chee Avenue
Kowloon, Hong Kong

The Hong Kong Laboratory Accreditation Scheme (HOKLAS)
Reg. No.082

FCC registered measurement facility
Reg. No.90656

1.3 Details of applicant

Name: GuangZhou Walkera Technology Co., Ltd.
Address: Taishi Industrial Park, Dongchong Town, Nansha District
511475 Guangzhou, China

Contact: Mr. Ya
Telephone: +86 20 8491 5116
Fax: +86 20 8491 5117

1.4 Manufacturer

Name: GuangZhou Walkera Technology Co., Ltd.
Address: Taishi Industrial Park, Dongchong Town, Nansha District
511475 Guangzhou, China

Contact: Mr. Ya
Telephone: +86 20 8491 5116
Fax: +86 20 8491 5117



1.5 Application details

Date of receipt of application: 12.07.2013
Date of receipt of test item: 12.07.2013
Date (s) of performance of tests: 12.07.2013 - 15.07.2013

1.6 Test item

Description of test item: R/C Helicopter with Wifi
Type identification: QR W100S with RX2646H-D module + DV05
Brand Name: devention, WALKERA

Equipment category: 2.4Ghz Wifi Module with Camera
Equipment classification: Portable use
Permitted frequency range: 2400 – 2483.5 MHz
Operation frequency range: IEEE 802.11g: 2412 – 2462 MHz
Lowest Operation frequency: 2412 MHz
Middles Operation frequency: 2437 MHz
Highest Operation frequency: 2462 MHz

Number of channels: 11 (2412MHz, 2417MHz, 2422MHz, 2427MHz, 2432MHz, 2437MHz, 2442MHz, 2447MHz, 2452MHz, 2457MHz, 2462MHz)

Channel Spacing: IEEE 802.11g: 5Mhz
Transmit Data Rate: IEEE 802.11g: 54, 48, 36, 24, 18, 12, 11, 9, 6 Mbps
Type of Modulation: IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)

Emission designator: F7W
Antenna gain: ≤ 3 dBi
Type of modulation: OFDM
Operation mode: simplex
Type of antenna: integral
Power supply: DC 3.7V, 600mAh Li-Po battery

All information was provided by the applicant)



Test configuration

The following equipment was used for supporting the module and for function test only:



Hardware	1. R/C Helicopter QR W100S (with RX2646H-D module) 2. Iphone 4S with WK-REMOTE APP version 1.1
Software	WK-REMOTE APP Version: 1.1



1.7 General Test Conditions

Environmental reference conditions

If not defined otherwise by the Technical Committee responsible for the generic standard and/or the product standard the climatic conditions during the tests are to be within the limits specified by the manufacturer for the operation of the EUT and the test equipment.

The climatic conditions during the tests were within the following limits:

Temperature	Humidity	Atmospheric pressure
15 °C - 35 °C	30 % - 60 %	860 hPa - 1060 hPa

If explicitly required in the test base (basic) the climatic values are recorded and documented separately for the respective test.

Calibration of measurement and test equipment

All measurement and testing equipment that has a significant influence on the accuracy of qualitative measurements and tests is subject to a periodical in-house system of calibration and servicing that is part of the quality management system of the EMC laboratory of SLG Asia Test Labs & Service (HK) Limited.

Measurement uncertainties

All tests are subject to measurement uncertainties. The overall measurement uncertainty of a measurement is defined as the range of which can be supposed that it contains the true value with a specified probability. This probability is 95 % for the generally specified measurement uncertainty (so-called expanded measurement uncertainty).

The limits for emission measurements and the test levels for immunity tests in the applied standards were defined taking into consideration the accuracy limits for measurement and testing equipment required by the basic standards.

All measurement and test results of the EMC laboratory of SLG Asia Test Labs & Service (HK) Limited fulfil the requirements for measurement uncertainties according to the standards applied.



2 Test result Summary

Digital Transmission system (2400-2483.5MHz)

Requirements according standard:				
FCC Rule	Test description	Results/Notes	Limits/Requirements	Verdict
15.247(a)	Digital modulation	System uses OFDM techniques		P
15.247(a) (2)	6dB Bandwidth	> 15MHz	> 500kHz	P
15.247(b) (3)	Maximum peak E Power	12.90 dBm (EIRP) (19.50 mW)	1W, EIRP limited to 4W	P
15.247(e)	Power Spectral Density	-11.46 dBm/3kHz	< 8dBm/3kHz	P
15.247(d) / 15.209, 15.205	Out-of-band Emission 30MHz – 25GHz	All signals below Limits	15.209, 15.205 restricted bands, all others < -20dBc	P
15.247(d)	Band-edge requirements in 100kHz Bandwidth	All frequencies inside the band	Within range 2400-2483.5MHz	P
15.203	RF Connector	EUT has integral antenna		P
15.247 (b)/ 15.407 (f)	RF Exposure requirements	Exemption of RF Exposure evaluation. Please refer to attached statement	Refer to OET 65	P

Test case verdicts

- P* - Pass *Test item does meet the requirement*
F - Fail *Test item does not meet the requirement*
N.A. - Not Applicable *Test case does not apply to the test object*



3 Test results

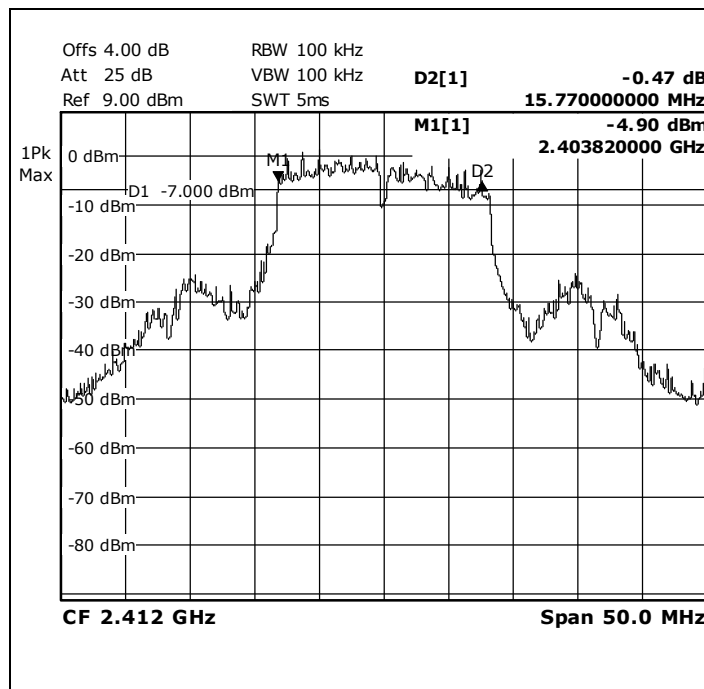
3.1. 6dB Bandwidth

Measurement Results:

FCC part 15.247 (a) (2): Signal Bandwidth

Frequency (MHz)	Resolution bandwidth	6dB bandwidth (MHz)	Limit (kHz)	Results
2412	100kHz	15.770	>500	Pass
2437	100kHz	15.770	>500	Pass
2462	100kHz	16.070	>500	Pass

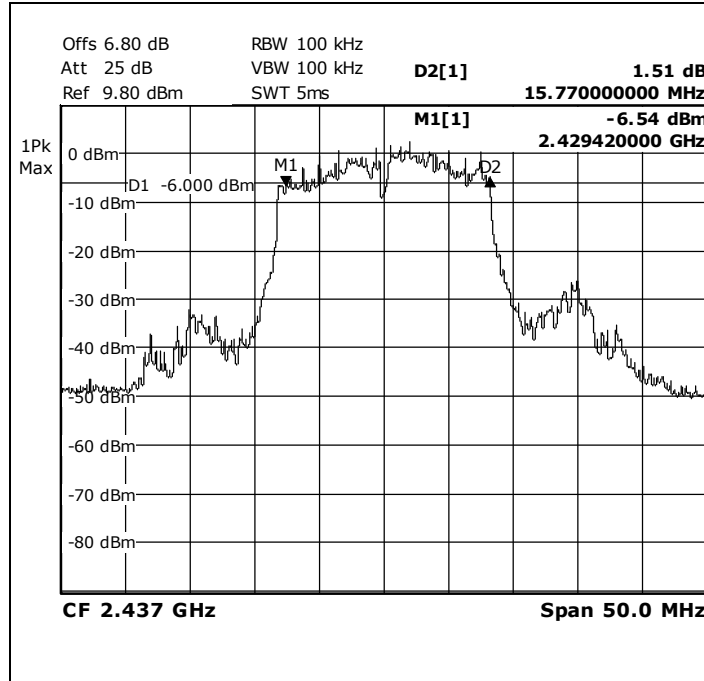
Lowest Operation frequency: 2412 MHz



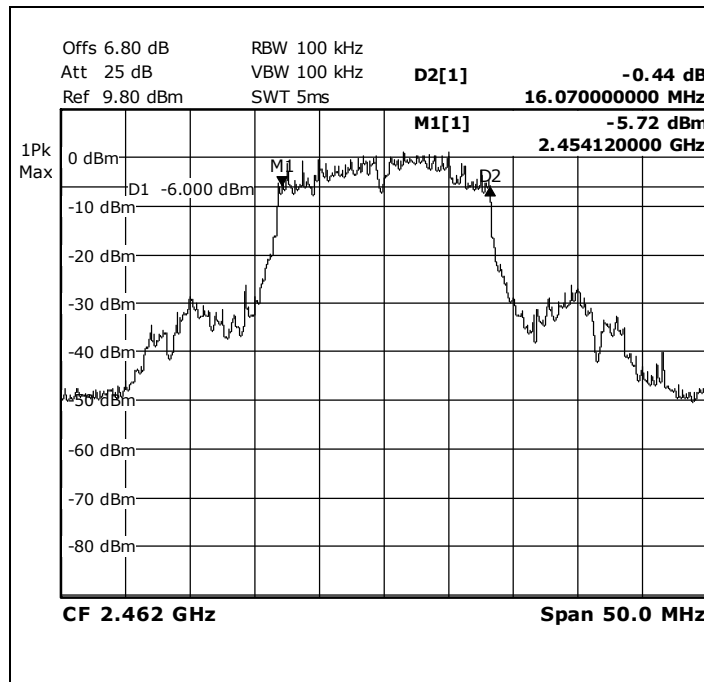


SLG Asia Test Labs & Service (HK) Limited

Middles Operation frequency: 2437 MHz



Highest Operation frequency: 2462 MHz



Test Report No.: H1M21307-1156-P-15



3.2. Output power

Measurement Results:

FCC part 15.247 (b) (3): Output Power

Frequency MHz	Output Power		Antenna Gain dBi	Results	EIRP	
	dBm	mW			dBm	mW
2412	6.94	4.94	3	Pass	9.94	9.86
2437	9.90	9.77	3	Pass	12.90	19.50
2462	7.24	5.30	3	Pass	10.24	10.57

All results were measured with peak power meter.

Measurement Equipment Used:

Test equipment	Type	S/N	Manufacturer	Cal Due Date
Spectrum Analyzer	FSEK 20	836043/003	Rohde & Schwarz	Sep 13



3.3. Power Spectral Density

Measurement Results:

FCC part 15.247 (e): Power spectral Density

Frequency MHz	PSD dBm/3kHz	Limit dBm/3kHz	Results
2412	-11.46	8	Pass
2437	-12.36	8	Pass
2462	-12.14	8	Pass

Note 1:	Power spectral density measured using RBW=3kHz, VBW=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using
---------	---

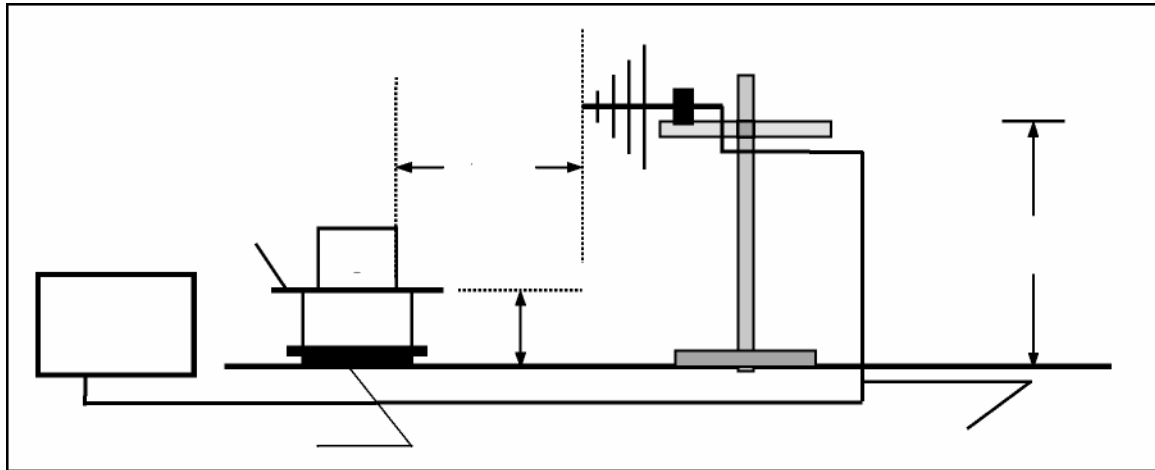
Measurement Equipment Used:

Test equipment	Type	S/N	Manufacturer	Cal Due Date
Spectrum Analyzer	FSEK 20	836043/003	Rohde & Schwarz	Sep 13



3.4. Out-of-band Emission

Measurement Procedure



The equipment under test is placed on a non metallic table with 0.8 m height. The power supply and the RF connection points are close to the equipment under test at the floor inside a connection box. The cables to this connection box are shielded and below the double floor. The receiving antenna is placed in a height at 1.0 m to 4.0 m and in a distance of 3 m.

Measurement Equipment Used:

Test equipment	Type	S/N	Manufacturer	Cal Due Date
Semi-anechoic Chamber	Nil	Nil	Frankonia	May 13
Test Receiver	ESU 26	100050	Rohde & Schwarz	Aug 13
Bi-conical Antenna	HK116	841489/016	Rohde & Schwarz	Mar 13
Log.-Periodic Antenna	HL223	841516/020	Rohde & Schwarz	Feb 13
Horn Antenna	3115	9002-3351	EMCO	Feb 13
Active Loop Antenna	6502	9107-2651	EMCO	Dec 13

SLG Asia Test Labs & Service (HK) Limited



Measurement Results:

Low Frequency @ 2412 MHz

Fundamental emission level @3m in 100khz RBV				105.17	dB μ V/m	
Limit for emission outside of restricted bands:				85.17	dB μ V/m	
Frequency	Level	Pol	15.209/15.247		Detector	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	
85.531	29.53	V	85.17	55.64	Pk	RB/VB 100kHz
89.279	29.43	H	85.17	55.74	Pk	RB/VB 100kHz
360.321	38.49	V	85.17	46.68	Pk	RB/VB 100kHz
539.880	45.73	H	85.17	39.44	Pk	RB/VB 100kHz
4826	35.03	V	54	18.97	Avg	RB/VB 1MHz
4826	34.18	H	54	19.82	Avg	RB/VB 1MHz
7238	33.12	V	85.17	52.05	Avg	RB/VB 1MHz
7238	34.02	H	85.17	51.15	Avg	RB/VB 1MHz
12731	48.88	V	85.17	36.29	Pk	RB/VB 1MHz
12141	46.97	H	85.17	38.20	Pk	RB/VB 1MHz
For emission in restricted band, the limit of 15,209 was used. For all other emission, the limit was set 20dB below the level of fundamental and measured in 100kHz						

Middle Frequency @ 2437 MHz

Fundamental emission level @3m in 100khz RBV				108.13	dB μ V/m	
Limit for emission outside of restricted bands:				88.13	dB μ V/m	
Frequency	Level	Pol	15.209/15.247		Detector	Comments
MHz	dBmV/m	V/H	Limit	Margin	Pk/QP/Avg	
186.713	29.51	V	88.13	58.62	Pk	RB/VB 100kHz
149.238	30.59	H	88.13	57.54	Pk	RB/VB 100kHz
360.321	38.36	V	88.13	49.77	Pk	RB/VB 100kHz
539.880	43.03	H	88.13	45.10	Pk	RB/VB 100kHz
4874	34.67	V	54	19.33	Avg	RB/VB 1MHz
4874	34.25	H	54	19.75	Avg	RB/VB 1MHz
7311	43.12	V	88.13	45.01	Pk	RB/VB 1MHz
7311	35.65	H	88.13	52.48	Pk	RB/VB 1MHz
12731	48.43	V	88.13	39.70	Pk	RB/VB 1MHz
12740	48.62	H	88.13	39.51	Pk	RB/VB 1MHz
For emission in restricted band. the limit of 15.209 was used. For all other emission. the limit was set 20dB below the level of fundamental and measured in 100kHz						

Test Report No.: H1M21307-1156-P-15

SLG Asia Test Labs & Service (HK) Limited



High Frequency @ 2462 MHz

Fundamental emission level @3m in 100kHz RBV	105.47	dB μ V/m
Limit for emission outside of restricted bands:	85.47	dB μ V/m

Frequency MHz	Level dBmV/m	Pol V/H	15.209/15.247		Detector Pk/QP/Avg	Comments
			Limit	Margin		
30.341	29.90	V	85.47	55.57	Pk	RB/VB 100kHz
85.531	30.28	H	85.47	55.19	Pk	RB/VB 100kHz
360.321	38.44	V	85.47	47.03	Pk	RB/VB 100kHz
539.880	43.92	H	85.47	41.55	Pk	RB/VB 100kHz
4922	50.56	V	54	3.44	Pk	RB/VB 1MHz
4922	48.02	H	54	5.98	Pk	RB/VB 1MHz
7385	39.88	V	85.47	45.59	Pk	RB/VB 1MHz
7385	40.70	H	85.47	44.77	Pk	RB/VB 1MHz
12750	48.47	V	85.47	37.00	Pk	RB/VB 1MHz
12740	48.75	H	85.47	36.72	Pk	RB/VB 1MHz

For emission in restricted band the limit of 15.209 was used. For all other emission. the limit was set 20dB below the level of fundamental and measured in 100kHz

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4. Emissions 20dB lower than the limit are not reported.

SLG Asia Test Labs & Service (HK) Limited



FCC Part 15. Subpart C. §15.209. Radiated Emission Limits

Frequency of Emission [MHz]	Field strength [$\mu\text{V}/\text{m}$]	Field Strength [$\text{dB}\mu\text{V}/\text{m}$]
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

FCC Part 15. Subpart C. §15.205. Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
10.495 - 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	
13.36-13.41			

Test Report No.: H1M21307-1156-P-15



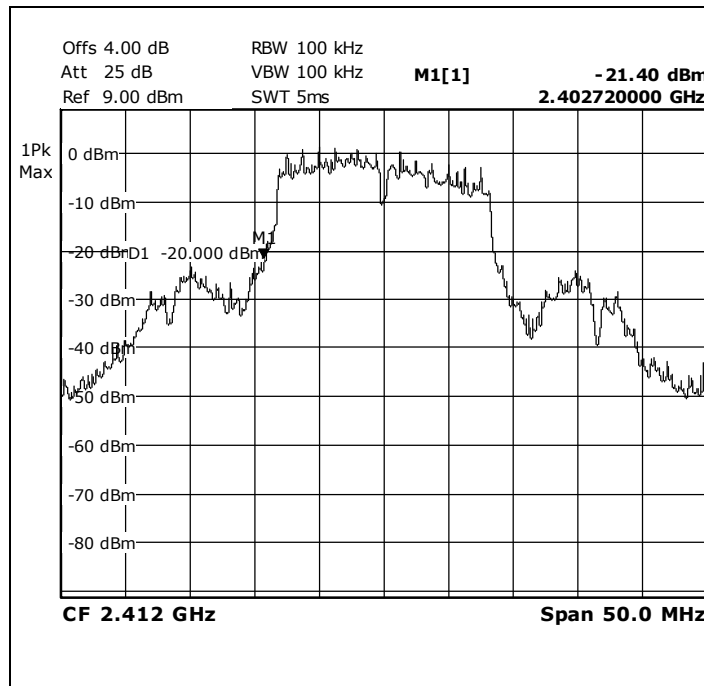
3.5. Band edge requirement

Measurement Results:

FCC part 15.247 (d): Band edge requirements

Frequency (MHz)	Resolution bandwidth	20 dB band edge (MHz)	Limit (MHz)	Results
2412	100kHz	2402.7	> 2400.0	Pass
2462	100kHz	2471.0	< 2483.5	Pass

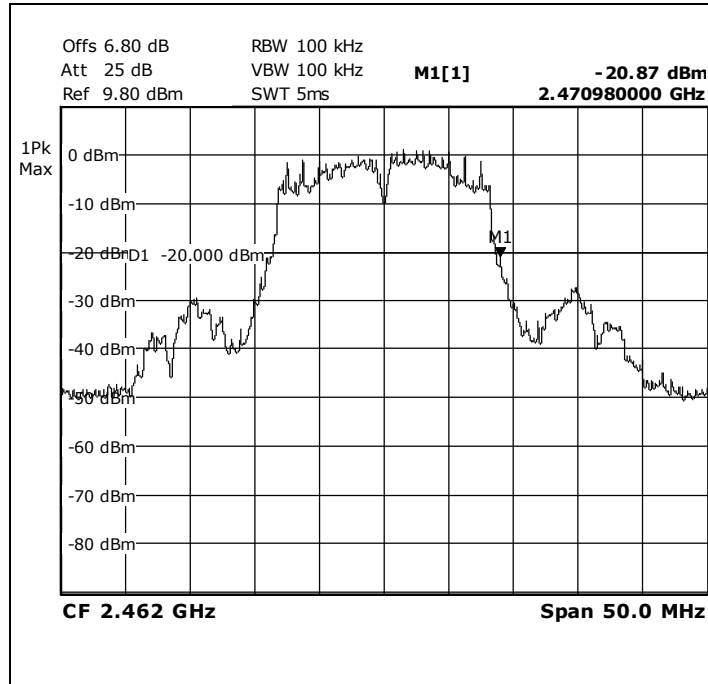
Lowest Operation frequency: 2412 MHz



SLG Asia Test Labs & Service (HK) Limited



Highest Operation frequency: 2462 MHz



Test Report No.: H1M21307-1156-P-15

SLG Asia Test Labs & Service (HK) Limited
26/F., Tamson Plaza, 161 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong

Page 18 of 20



4 Normative references

- /1/ FCC Rules 47 CFR PART 15 Subpart: 2012
Radio Frequency Devices
- /2/ ANSI C63.4-2009
Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and
Electronic Equipment in the Range of 9 kHz to 40 GHz



5 Disclaimer

This document based on General Terms and Conditions of SLG Asia Test Labs & Service (HK) Limited which the applicant accepted with order confirmation.

Emphasized conditions or project related conditions:

Released Test Reports apply only to the specific samples tested under stated test conditions. It is the applicant's responsibility to assure that additional production units of the tested model(s) are manufactured in same construction and with identical electrical and mechanical components to meet the same quality as tested model(s). The applicant/manufacturer/importer is responsible for any modifications made to the production units which result in non-compliance to the applied and/or relevant regulations.

SLG Asia Test Labs & Service (HK) Limited shall have no liability for any deductions inferences or generalizations drawn by the client or others from any kind of issued reports. Reports are confidential property of the client as a mutual protection to the applicant the clients. The public and ourselves extracts from the test report shall not be reproduced except in full without our written approval.

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications as appropriate. The complexity of the technical specifications means that full and thorough testing is impractical for both technical and economic reasons. Furthermore there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification. Neither is there any guarantee that such a test sample will interact with other genuinely open systems. The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in clause 1.6 of this report. The test report may only be reproduced or published in full.

Reproducing or publishing extracts of the report requires the prior written approval of SLG Asia Test Labs & Service (HK) Limited.

5.1 Revision Notes

This revised Report replaces the all former Test Reports based on number H1M21307-1156-P-15. These former Test Reports are not longer valid. Every Revision of the original report is recorded below and identified by the || symbol beside the text.

Revision No.	Revision
H1M21307-1156-P-15	Original Test Report

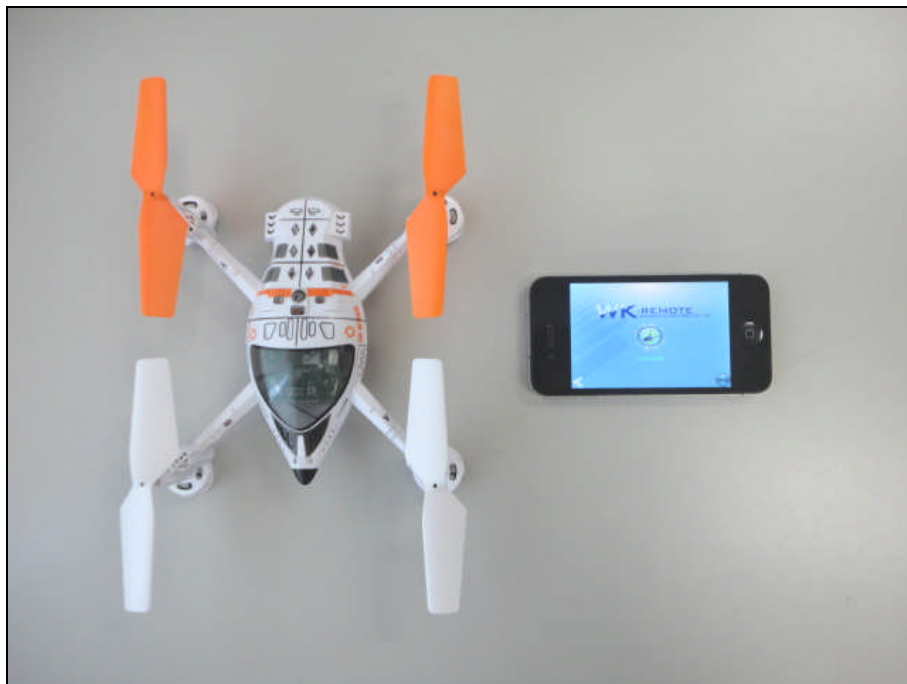


Annex C: Photos of test setup

**Radiated emission Test-setup in
3m measurement distance in semi anechoic chamber**



EUT on the turn table which rotate 360° during the testing to find the maximum field-strength readings



Test configuration: 1. R/C Helicopter QR W100S (with RX2646H-D module)
 2. Iphone 4S with WK-REMOTE APP version 1.1