RF EXPOSURE REPORT

REPORT NO.:	SA140527E05
MODEL NO.:	QLivebox
FCC ID:	2ACFN-QLIVEBOX
RECEIVED:	May 27, 2014
TESTED:	June 19, 2014
ISSUED:	Nov. 17, 2014
APPLICANT:	QNAP Systems, Inc.
ADDRESS:	2F., No. 22, Zhongxing Rd., Xizhi Dist., New Taipei City, 221 Taiwan
ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
LAB ADDRESS:	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by any government agencies.

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA140527E05	Original release	Nov. 17, 2014

1. CERTIFICATION

PRODUCT:	QLivebox
BRAND NAME:	QNAP
MODEL NO.:	QLivebox
TEST SAMPLE:	MASS-PRODUCTION
APPLICANT:	QNAP Systems, Inc.
TESTED DATE:	June 19, 2014
STANDARDS:	FCC Part 2 (Section 2.1091)
	KDB 447498 D03
	IEEE C95.1

The above equipment (Model: QLivebox) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared By : _____ , **Date:** Nov. 17, 2014
(Lori Chung, Specialist)

Approved By : _____ , **Date:** Nov. 17, 2014
(May Chen, Manager)

2. RF EXPOSURE LIMIT

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

FREQUENCY RANGE (MHz)	ELECTRIC FIELD STRENGTH (V/m)	MAGNETIC FIELD STRENGTH (A/m)	POWER DENSITY (mW/cm^2)	AVERAGE TIME (minutes)
LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

3. MPE CALCULATION FORMULA

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

pi = 3.1416

r = distance between observation point and center of the radiator in cm

4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

5. ANTENNA GAIN

The antennas provided to the EUT, please refer to the following table:

For WLAN							
Ant. No.	Transmitter Circuit	Brand	Model	Antenna Type	Antenna Gain (dBi)	Connector type	Frequency range (GHz to GHz)
1	CHAIN (0)	Unictron	AA077	CHIP	1.4	NA	2.4~2.5
	CHAIN (1)						
2	CHAIN (0)				2.3		5.15~5.85
	CHAIN (1)						

For Zigbee						
Ant. No.	Brand	Model	Antenna Type	Antenna Gain (dBi)	Connector type	Frequency range (GHz to GHz)
3	Unictron	AA055	CHIP	2.5	NA	2.4~2.5

6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For WLAN (2.4GHz)

802.11b

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
2412 - 2462	132.05	4.41	20	0.07252	1.00

NOTE: Directional gain = 1.4dBi + 10log(2) = 4.41dBi.

802.11g

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
2412 - 2462	496.964	4.41	20	0.27293	1.00

NOTE: Directional gain = 1.4dBi + 10log(2) = 4.41dBi.

802.11n (HT20)

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
2412 - 2462	462.538	4.41	20	0.25403	1.00

NOTE: Directional gain = 1.4dBi + 10log(2) = 4.41dBi.

802.11n (HT40)

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
2422-2452	150.356	4.41	20	0.08258	1.00

NOTE: Directional gain = 1.4dBi + 10log(2) = 4.41dBi.

For WLAN (5GHz)

802.11a

FREQUENCY BAND (MHz)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
5180 - 5240	44.486	5.31	20	0.03006	1.00

NOTE: Directional gain = 2.3dBi + 10log(2) = 5.31dBi.

802.11n (HT20)

FREQUENCY BAND (MHz)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
5180 - 5240	44.674	5.31	20	0.03018	1.00

NOTE: Directional gain = 2.3dBi + 10log(2) = 5.31dBi.

802.11n (HT40)

FREQUENCY BAND (MHz)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
5190-5230	42.125	5.31	20	0.02846	1.00

NOTE: Directional gain = 2.3dBi + 10log(2) = 5.31dBi.

For Zigbee

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
2425 - 2475	0.6109	2.5	20	0.00022	1.00

CONCLUSION:

Both of the WLAN and Zigbee can transmit simultaneously, the formula of calculated the MPE is:

$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \ldots\ldots etc. < 1$

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is 0.27293 / 1 + 0.00022 / 1= 0.273, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

--- END ---