RF EXPOSURE REPORT

REPORT NO.:	SA140714E01A R1
MODEL NO.:	AT-TQ4600
FCC ID:	RSL-TQ4600
RECEIVED:	July 24, 2014
TESTED:	Aug. 05 to Sep. 11, 2014
ISSUED:	Dec. 19, 2014

APPLICANT:	Allied Telesis R&D Center K.K.
ADDRESS:	2nd TOC Bldg. 7-21-11 Nishi-Gotanda, Shinagawa-ku, Tokyo 141-0031, Japan

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.
TEST LOCATION (1):	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
TEST LOCATION (2):	No. 49, Ln. 206, Wende Rd., Shangshan 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.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA140714E01A	Original release	Nov. 06, 2014
SA140714E01A R1	Removed 5.26 ~ 5.32GHz, 5.50 ~ 5.58GHz & 5.66GHz ~ 5.70GHz data.	Dec. 19, 2014

1. CERTIFICATION

PRODUCT:	Access Point
BRAND NAME:	Allied Telesis
MODEL NO.:	AT-TQ4600
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	Allied Telesis R&D Center K.K.
TESTED DATE:	Aug. 05 to Sep. 11, 2014
STANDARDS:	FCC Part 2 (Section 2.1091)
	KDB 447498 D03
	IEEE C95.1

The above equipment (Model: AT-TQ4600) 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:** Dec. 19, 2014
(Elsie Hsu, Specialist)

APPROVED BY : _____ , **DATE:** Dec. 19, 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

There are antennas provided to the EUT, please refer to the following table:

For 2.4GHz used						
No.	Transmitter Circuit	Brand	Model	Antenna Type	Antenna Gain(dBi) Including cable loss	Connector type
1	CHAIN (0)	ARISTOTLE	RFA-02-G133-70B-110R	PIFA	3.1	I-PEX(MHF)
2	CHAIN (1)		RFA-02-G133-70B-58		3.17	
3	CHAIN (2)		RFA-02-G133-70B-180		1.75	
For 5GHz used						
No.	Transmitter Circuit	Brand	Model	Antenna Type	Antenna Gain(dBi) Including cable loss	Connector type
1	CHAIN (0)	ARISTOTLE	RFA-05-G134-70-230C	PIFA	2.65	I-PEX(MHF)
2	CHAIN (1)		RFA-05-G134-70-105C		4.15	
3	CHAIN (2)		RFA-05-G134-70-75C		4.04	

6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For 15.247(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	126.474	3.1	20	0.05137	1.00

802.11g

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
2412 - 2462	362.092	7.47	20	0.40230	1.00

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3]
Effective Legacy Gain (dBi) = 7.47

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	275.13	7.47	20	0.30568	1.00

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3]
Effective Legacy Gain (dBi) = 7.47

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	118.624	7.47	20	0.13180	1.00

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3]
Effective Legacy Gain (dBi) = 7.47

For 15.407(5GHz)

802.11a

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
5180 - 5240	204.225	8.41	20	0.28173	1.00
5745 - 5825	220.019	8.41	20	0.30352	1.00

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3]
Effective Legacy Gain (dBi) = 8.41

802.11n (HT20)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
5180 - 5240	164.651	8.41	20	0.22714	1.00
5745 - 5825	175.42	8.41	20	0.24200	1.00

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3]
Effective Legacy Gain (dBi) = 8.41

802.11n (HT40)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
5190 - 5230	130.591	8.41	20	0.18015	1.00
5755 - 5795	132.953	8.41	20	0.18341	1.00

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3]
Effective Legacy Gain (dBi) = 8.41

802.11ac (VHT80)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)
5210	41.371	8.41	20	0.05707	1.00
5775	58.791	8.41	20	0.08110	1.00

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3]
Effective Legacy Gain (dBi) = 8.41

CONCLUSION:

Both of the 2.4GH and 5GHz can transmit simultaneously, the formula of calculated the MPE is:

$CPD_1 / LPD_1 + CPD_2 / LPD_2$ + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is 0.40230 / 1 + 0.30352 / 1 = 0.706, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

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