RF Exposure Report

Report No.:	SA150709C20E
FCC ID:	RSL-TQ4400E
Test Model:	AT-TQ4400e
Received Date:	Jul. 09, 2015
Test Date:	Aug. 01 ~ Oct. 17, 2016
Issued Date:	Nov. 21, 2016
Applicant:	Allied Telesis K.K.
Address:	2nd. TOC Bldg. 7-21-11 Nishi-Gotanda, Shinagawa-ku, Tokyo Japan, 141-0031
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
SA150709C20E	Original release.	Nov. 21, 2016

1 Certificate of Conformity

Product:	Outdoor Wireless Access Point
Brand:	Allied Telesis™
Test Model:	AT-TQ4400e
Sample Status:	Engineering sample
Applicant:	Allied Telesis K.K.
Test Date:	Aug. 01 ~ Oct. 17, 2016
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D03 (January 17, 2014) IEEE C95.1

The above equipment 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. 21, 2016

Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Nov. 21, 2016

Ken Liu / Senior Manager

2 RF Exposure

2.1 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

2.2 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

2.3 Classification

The antenna of this product, under normal use condition, is at least 34cm away from the body of the user. So, this device is classified as **Mobile Device**.

3 Calculation Result of Maximum Conducted Power

The following antennas are provided to the EUT

Item	Model Number	Description	Band	Type	Gain (dBi)	Connector	Supplier's model name
1	AT-AN5158-19DP	5GHz, 19dBi gain, dual polarity, panel antenna	5GHz	Panel	19	N type, 2 feed	HG4958-19DP
2	AT-AN5158-16DP	5GHz, 16dBi gain, dual polarity, 120° sector antenna	5GHz	Sector	16	N type, 2 feed	HG5158-16DP-120
3	AT-AN2458-10DP	2.4/5GHz, 10dBi gain, dual polarity, panel antenna	2.4GHz/ 5GHz	Panel	8dBi/ 10dBi	N type, 2 feed	HG2458-10DP
4	98615MNXX003	Outdoor 2.4GHz dipole	2.4GHz	Dipole	5	N type	N/A
5	98615UNXX005	Outdoor 5GHz dipole	5GHz	Dipole	7	N type	N/A

The following antenna cables are provided to the EUT.

Item	Model Number	Description	Cable Dia.	Length	Cable loss(dBi)		Supplier's model name
					2.4G	5G	
1	AT-AN0001	RF coaxial cable, 1.2m, N-male to N-male connector	0.240 in. (6.1mm)	4.0ft (1.2m)	-1.62	-3.18	CA-NMNMT004
2	AT-AN0002	RF coaxial cable, 3.0m, N-male to N-male connector	0.405 in. (10.3mm)	10.0ft (3.0m)	-1.82	-2.96	CA3N010
3	AT-AN0003	RF coaxial cable, 6.1m, N-male to N-male connector	0.405 in. (10.3mm)	20.0ft (6.1m)	-2.35	-3.56	CA3N020

*For 2.4GHz Band: Model: AT-AN0001 was the worst for the final test.
*For 5GHz Band: Model: AT-AN0002 was the worst for the final test.

The simultaneous operation mode was determined by client as below:

Ant. 3: WLAN 2.4G + Ant. 3: WLAN 5.0G

Ant. 3: WLAN 2.4G + Ant. 2: WLAN 5.0G

Ant. 4: WLAN 2.4G + Ant. 1: WLAN 5.0G

Ant. 3: WLAN 2.4G + Ant. 1: WLAN 5.0G

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
EUT with Antenna 1					
5260-5320	10.89	19.05	34	0.068	1
5500-5700	10.91	19.05	34	0.068	1
5745-5825	19.59	19.05	34	0.503	1
EUT with Antenna 2					
5180-5240	19.07	16.05	34	0.224	1
5260-5320	13.63	16.05	34	0.064	1
5500-5700	13.83	16.05	34	0.067	1
5745-5825	22.59	16.05	34	0.503	1
EUT with Antenna 3					
2412-2462	29.02	9.39	34	0.477	1
5180-5240	21.00	10.05	34	0.088	1
5260-5320	19.41	10.05	34	0.061	1
5500-5700	19.93	10.05	34	0.069	1
5745-5825	27.85	10.05	34	0.424	1
EUT with Antenna 4					
2412-2462	29.02	8.01	34	0.347	1
EUT with Antenna 5					
5180-5240	21.13	10.01	34	0.090	1
5260-5320	20.01	10.01	34	0.069	1
5500-5700	20.54	10.01	34	0.078	1
5745-5825	22.79	10.01	34	0.131	1

Note:
Ant. 1: Directional gain = 19dBi +Cable loss(-2.96) + 10log(2)=19.05dBi
Ant. 2: Directional gain = 16dBi +Cable loss(-2.96) + 10log(2)=16.05dBi
Ant. 3: For 2.4GHz Band: Directional gain = 8dBi +Cable loss(-1.62)+10log(2) = 9.39dBi
For 5.0GHz Band: Directional gain = 10dBi+Cable loss(-2.96)+10log(2)=10.05dBi
Ant. 4: For 2.4GHz: Directional gain = 5dBi + 10log(2) = 8.01dBi
Ant. 5: For 5GHz: Directional gain = 7.00dBi + 10log(2) = 10.01dBi

CONCULSION:

Both of the WLAN 2.4G & WLAN 5G can transmit simultaneously, the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

The simultaneous operation mode was determined by client.

Ant. 3: WLAN 2.4G + Ant. 3: WLAN 5.0G = 0.477 + 0.424 = 0.901

Ant. 3: WLAN 2.4G + Ant. 2: WLAN 5.0G = 0.477 + 0.503 = 0.980

Ant. 4: WLAN 2.4G + Ant. 1: WLAN 5.0G = 0.347 + 0.503 = 0.850

Ant. 3: WLAN 2.4G + Ant. 1: WLAN 5.0G = 0.477 + 0.503 = 0.980

Therefore, the maximum calculation of this situation is 0.980, which is less than the “1” limit.

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