

RF Exposure Report

Report No.: SA150407E02

Compliance ID : ADBA-SX14015A

Product Name* : ADB-1761WF

**For any other product variant refer to above Compliance ID*

FCC ID: MCLADB1761WF

Received Date: Feb. 11, 2015

Test Date: Apr. 24 to May 09, 2015

Issued Date: May 28, 2015

Applicant: HON HAI PRECISION IND. CO., LTD.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

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Test Location (1): No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin
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A D T

Release Control Record

Issue No.	Description	Date Issued
SA150407E02	Original release.	May 28, 2015



A D T

1 Certificate of Conformity

Compliance ID: ADBA-SX14015A

Product Name*: ADB-1761WF

Product Description: IP Set-Top Box with Wi-Fi 11ac

**For any other product variant refer to above Compliance ID*

Brand: ADB

Sample Status: ENGINEERING SAMPLE

Applicant: HON HAI PRECISION IND. CO., LTD.

Test Date: Apr. 24 to May 09, 2015


Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D03

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:** May 28, 2015
Elsie Hsu / Specialist

Approved by : , **Date:** May 28, 2015
May Chen / 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

$$P_d = (P_{out} * G) / (4 * \pi * r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

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

Zigbee							
Antenna No.	Transmitter Circuit	Brand	Model	Ant. Gain(dBi) <Including cable loss>	Frequency range (GHz to GHz)	Antenna Type	Connector Type
1	Chain (0)	INPAQ	NA	2.78	2.4~2.5	PIFA	NA
2	Chain (1)		NA	2.45	2.4~2.5		
5GHz Band							
Antenna No.	Transmitter Circuit	Brand	Model	Ant. Gain(dBi) <Including cable loss>	Frequency range (GHz to GHz)	Antenna Type	Connector Type
1	Chain (0)	TONGDA COMMUNICAT ION CO., LTD.	NA	3.49	5.15~5.25	PCB	i-pex(MHF)
			NA	3.99	5.725~5.85	PCB	i-pex(MHF)
2	Chain (1)		NA	3.47	5.15~5.25	PCB	i-pex(MHF)
			NA	4.57	5.725~5.85	PCB	i-pex(MHF)
3	Chain (2)		NA	4.11	5.15~5.25	PCB	i-pex(MHF)
			NA	3.7	5.725~5.85	PCB	i-pex(MHF)
4	Chain (3)		NA	3.45	5.15~5.25	PCB	i-pex(MHF)
			NA	3.46	5.725~5.85	PCB	i-pex(MHF)

3 Calculation Result Of Maximum Conducted Power

For WLAN
CDD MODE
802.11a

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
5180-5240	274.648	9.66	20	0.50525	1
5745-5825	217.062	9.96	20	0.42787	1

NOTE:

5150~5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.66\text{dBi}$

5725~5825MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.96\text{dBi}$

802.11ac (VHT20)

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
5180-5240	264.91	9.66	20	0.48733	1
5745-5825	203.756	9.96	20	0.40164	1

NOTE:

5150~5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.66\text{dBi}$

5725~5825MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.96\text{dBi}$

802.11ac (VHT40)

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
5190-5230	156.576	9.66	20	0.28804	1
5755-5795	231.77	9.96	20	0.45686	1

NOTE:

5150~5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.66\text{dBi}$

5725~5825MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.96\text{dBi}$

802.11ac (VHT80)

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
5210	115.914	9.66	20	0.21324	1
5775	116.519	9.96	20	0.22968	1

NOTE:

5150~5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.66\text{dBi}$

5725~5825MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.96\text{dBi}$

Beamforming MODE

802.11ac (VHT20)

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
5180-5240	224.64	9.66	20	0.41325	1
5745-5825	203.756	9.96	20	0.40164	1

NOTE:

5150~5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.66\text{dBi}$

5725~5825MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.96\text{dBi}$

802.11ac (VHT40)

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
5190-5230	303.827	9.66	20	0.55893	1
5755-5795	302.577	9.96	20	0.59644	1

NOTE:

5150~5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.66\text{dBi}$

5725~5825MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.96\text{dBi}$

802.11ac (VHT80)

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
5210	115.914	9.66	20	0.21324	1
5775	94.864	9.96	20	0.18700	1

NOTE:

5150~5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.66\text{dBi}$

5725~5825MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.96\text{dBi}$

For Zigbee

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2405-2480	1.959	2.78	20	0.00074	1

CONCLUSION:

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

$$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

$$\text{WLAN} + \text{Zigbee} = 0.59644 + 0.00074 = 0.597$$

Therefore the maximum calculations of above situations are less than the “1” limit.

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