

RF Exposure Evaluation Report

Product Name : Intelligent Robot

Model No. : Zenbo-K

FCC ID : MSQ-ZENBO-K

Applicant : ASUSTeK COMPUTER INC.

Address : 4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan

Date of Receipt : Jun. 05, 2019

Date of Declaration : Jul. 11, 2019

Report No. : 1960050R-SAUSP03V00

Report Version : V1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Issued Date: Jul. 11, 2019

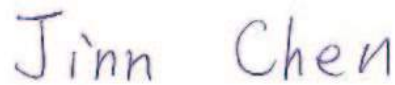
Report No.: 1960050R-SAUSP03V00



Product Name	Intelligent Robot
Applicant	ASUSTeK COMPUTER INC.
Address	4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan
Manufacturer	ASUSTeK COMPUTER INC.
Model No.	Zenbo-K
FCC ID.	MSQ-ZENBO-K
Trade Name	ASUS
Applicable Standard	FCC 47 CFR 1.1307
Test Result	Complied

Documented By

:



(Senior Adm. Specialist / Jinn Chen)

Tested By

:



(Senior Engineer / Wen Lee)

Approved By

:



(Director / Vincent Lin)

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Intelligent Robot
Trade Name	ASUS
Model No.	Zenbo-K
FCC ID.	MSQ-ZENBO-K
Frequency Range	802.11b/g/n-20MHz: 2412-2462MHz 802.11a/n-20MHz: 5180-5320MHz, 5500-5700MHz, 5745-5825MHz 802.11n-40MHz: 5190-5310, 5510-5670MHz, 5755-5795MHz 802.11ac-20MHz: 5720, 802.11ac-40MHz: 5710 802.11ac-80MHz: 5210-5290MHz, 5530-5690MHz, 5775MHz Bluetooth: 2402 – 2480MHz
Channel Number	802.11b/g/n-20MHz: 11 802.11a/n-20MHz: 24; 802.11n-40MHz: 11 802.11ac-20MHz: 1, 802.11ac-40MHz: 1, 802.11ac-80MHz: 6 Bluetooth: V2.1+EDR: 79CH, V4.0: 40CH
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11a/g/n/ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) Bluetooth: V2.1+EDR: GFSK(1Mbps) / π /4DQPSK(2Mbps) / 8DPSK(3Mbps), V4.0: GFSK(1Mbps)
Antenna Type	PIFA Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	ASUS No.	Antenna Type	Peak Gain
1	INPAQ	WA-F-LB-02-165	14008-02060100	PIFA	1.3dBi for 2.4GHz 0.4dBi For 5.15~5.25GHz 1.1dBi For 5.25~5.35GHz 1.6dBi For 5.47~5.725GHz 0.1dBi For 5.725~5.825GHz

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission 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

2.2. Test Result of RF Exposure Evaluation

Product : Intelligent Robot
Test Item : RF Exposure Evaluation

WLAN 2.4G Peak Gain: 1.3dBi

Band	Frequency (MHz)	Conducted maximum Peak Power (dBm)	Worst case Duty Cycle (%)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Pass/Fail
2.4G	2437	21.71	93.75	158.135	0.0424	1	Pass

WLAN 5G Peak Gain: 1.6dBi

Band	Frequency (MHz)	Conducted maximum Average Power (dBm)	Worst case Duty Cycle (%)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Pass/Fail
5G	5310	14.93	78.75	39.514	0.0114	1	Pass

Note: The Maximum conducted output power is refer to report No.: 1960050R-RFUSP01V00, 1960050R-RFUSP01V00-B, 1960050R-RFUSP26V00, 1960050R-RFUSP52V00 from the DEKRA.