RF Exposure Evaluation Declaration

Product Name	:	Xiaomi Router HD
Model No.	:	R3D
FCC ID	:	2AIMRMIWIFIR3D

Applicant	:	Beijing Xiaomi Electronics Co., Ltd.
Address	:	No.58 Yard, Fifth Jinghai Road, Beijing Economic-Technological Development Area, Beijing, China.

Date of Receipt	:	Apr. 26, 2017
Test Date		Apr. 26, 2017~ Sep. 21, 2017
Issued Date	:	Oct. 23, 2017
Report No.	:	1742142R-RF-US-P20V01
Report Version	:	V1.0

Test Report Certification

Issued Date : Oct. 23, 2017
Report No. : 1742142R-RF-US-P20V01

Product Name	:	Xiaomi Router HD
Applicant	:	Beijing Xiaomi Electronics Co., Ltd.
Address	:	No.58 Yard, Fifth Jinghai Road, Beijing Economic-Technological Development Area, Beijing, China.
Manufacturer	:	Beijing Xiaomi Electronics Co., Ltd.
Address	:	No.58 Yard, Fifth Jinghai Road, Beijing Economic-Technological Development Area, Beijing, China.
Model No.	:	R3D
FCC ID	:	2AIMRMIWIFIR3D
Brand Name	:	MI
EUT Voltage	:	AC 100-240V/50-60Hz
Applicable Standard	:	KDB 447498D01V06 FCC Part1.1310
Test Result	:	Complied
Performed Location	:	DEKRA Testing and Certification (Suzhou) Co., Ltd. No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Registration Number: 800392

Documented By : Kitty Li

(Adm. Specialist: Kitty Li)

Reviewed By : Frank he

(Senior Engineer: Frank He)

Approved By : Harry Zhao

(Engineering Manager : Harry Zhao)

1. RF Exposure Evaluation

1.1. 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/cm2)	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: Pd = (Pout*G)/(4*pi*r2)

Where

Pd = power density in mW/cm2

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

Pd is the limit of MPE, 1 mW/cm2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18℃and 78% RH.

1.3. Test Result of RF Exposure Evaluation

Product	:	Xiaomi Router HD
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

Antenna Information:

2.4G:

Antenna manufacturer	N/A			
Antenna Delivery	☐	1*TX+1*RX	☐ 2*TX+2*RX ☐ 3*TX+3*RX ☒ 4*TX+4*RX	
Antenna technology	☐	SISO		
	☒	MIMO	☐	Basic
			☐	Sectorized antenna systems
			☐	Cross-polarized antennas
			☐	Unequal antenna gains, with equal transmit powers
			☐	Spatial Multiplexing
			☒	CDD
			☒	Beam-forming
Antenna Type	☒	External	☒	Dipole
	☐	Internal	☐	PIFA
			☐	PCB
			☐	Ceramic Chip Antenna
			☐	Metal plate type F antenna
			☐	Cross-polarize Antenna
			☐	Samrt antenna
Antenna Gain #1	2dBi			
Antenna Gain #2	2dBi			
Antenna Gain #3	2dBi			
Antenna Gain #4	2dBi			
Antenna Gain with Beamforming	8.02dBi			

5G:

Antenna Model No.	N/A							
Antenna manufacturer	N/A							
Antenna Delivery	☐	1*TX+1*RX	☐	2*TX+2*RX	☐	3*TX+3*RX	☒	4*TX+4*RX
Antenna technology	☐	SISO						
	☒	MIMO	☐	Basic				
			☐	Sectorized antenna systems				
			☐	Cross-polarized antennas				
			☐	Unequal antenna gains, with equal transmit powers				
			☐	Spatial Multiplexing				
			☒	CDD				
			☒	Beam-forming				
Antenna Type	☒	External	☒	Dipole				
	☐	Internal	☐	PIFA				
			☐	PCB				
			☐	Ceramic Chip Antenna				
			☐	Metal plate type F antenna				
			☐	Cross-polarize Antenna				
			☐	Samrt antenna				
Antenna Gain #1	2dBi							
Antenna Gain #2	2dBi							
Antenna Gain #3	2dBi							
Antenna Gain #4	2dBi							
Beamforming Gain	8.02dBi							

- Output Power into Antenna & RF Exposure Evaluation Distance:

Standlone modes

Test Mode	Frequency Band (MHz)	Maximum Output Power to Antenna (dBm)	Directional Gain (dBi)	Power Density at R = 20 cm (mW/cm2)	Power Density Limit at R = 20 cm (mW/cm2)
802.11b/g/n/ac(20MHz) with CDD	2412 ~ 2462 MHz	26.45	2	0.1392	1.0
802.11n/ac(40MHz) with CDD	2422 ~ 2452 MHz	24.26	2	0.0841	1.0
802.11n/ac(20MHz) with Beamforming	2412 ~ 2462 MHz	24.92	8.02	0.3915	1.0
802.11n/ac(40MHz) with Beamforming	2422 ~ 2452 MHz	24.26	8.02	0.3363	1.0
802.11a/n/ac (20MHz) with CDD	5180-5240MHz 5745-5825 MHz	26.08	2	0.1279	1.0
802.11n/ac (40MHz) with CDD	5190-5230MHz 5755-5795 MHz	24.29	2	0.0847	1.0
802.11ac(80MHz) with CDD	5210MHz 5775MHz	20.70	2	0.0370	1.0
802.11 a/n/ac (20MHz) with Beamforing	5180-5240MHz 5745-5825 MHz	26.07	8.02	0.5102	1.0
802.11n/ac (40MHz) with Beamforing	5190-5230MHz 5755-5795 MHz	24.29	8.02	0.3386	1.0
802.11ac(80MHz) with Beamforing	5210MHz 5775MHz	20.76	8.02	0.1502	1.0

Simultaneous transmission:

Frequency Band (MHz)	Maximum Output Power to Antenna (dBm)	Directional Gain (dBi)	Power Density at R = 20 cm (mW/cm2)	Power Density Limit at R = 20 cm (mW/cm2)
2412 ~ 2462	24.92	8.02	0.3915	1.0
5180-5240 5745-5825	25.90	8.02	0.5102	1.0
Simultaneous transmission power density			0.9017	1.0

Note: The simultaneous transmission power density is 0.9017mW/cm2 for Xiaomi Router HD without any other radio equipment.

The End