FCC WLAN 6GHz RF Exposure

Applicant	:	**Xiaomi Communications Co., Ltd.**
Equipment	:	**Mobile Phone**
Brand Name	:	**Xiaomi**
Model Name	:	**23078PND5G**
FCC ID	:	**2AFZZND5G**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Si Zhang

Approved by: Si Zhang

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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History of this test report

Report No.	Version	Description	Issued Date
FA351205-03	01	Initial issue of report	Aug. 04, 2023

1. Statement of Compliance

This permissive change is to enable the following features via SW only:

- **Additional** WLAN 6GHz **320M** bandwidth

As there is no change in HW, and maximum output power is same as what reported in the original report, for the additional WLAN 6GHz 320M bandwidth which is enabled by software, the compliance for the following aspects can be covered by the testing performed in the original filing, only added measured the conducted power of WLAN 6GHz 320MHz, the maximum power tune-up limit of 320M bandwidth is less than maximum power tune-up limit of 160M bandwidth.

- **RF exposure:** WLAN 6GHz RF Exposure Evaluation report (Sporton Report Number: FA351205B), SAR test report (Sporton Report Number: FA351205 and FA351205A).

Date of Testing: (Power measure)	2023/6/5

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

2. Administration Data

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR04-KS	CN1257	314309

Applicant	
Company Name	Xiaomi Communications Co., Ltd.
Address	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

Manufacturer	
Company Name	Xiaomi Communications Co., Ltd.
Address	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Mobile Phone
Brand Name	Xiaomi
Model Name	23078PND5G
FCC ID	2AFZZND5G
IMEI Code	IMEI 1: 861585060041561 IMEI 2: 861585060041579
Wireless Technology and Frequency Range	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850MHz ~ 1910MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV : 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 7 : 2500 MHz ~ 2570 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 17 : 704 MHz ~ 716 MHz LTE Band 25 : 1850 MHz ~ 1915 MHz LTE Band 26 : 814 MHz ~ 849 MHz LTE Band 38 : 2570 MHz ~ 2620 MHz LTE Band 41 : 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~3550 MHz LTE Band 48 : 3550 MHz ~ 3700 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n77 : 3450 MHz ~ 3550 MHz; 3700 MHz ~ 3980 MHz 5G NR n78 : 3450 MHz ~ 3550 MHz; 3700 MHz ~ 3800 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz WLAN 6GHz U-NII-5: 5925 MHz ~ 6425 MHz WLAN 6GHz U-NII-6: 6425 MHz ~ 6525 MHz WLAN 6GHz U-NII-7: 6525 MHz ~ 6875 MHz WLAN 6GHz U-NII-8: 6875 MHz ~ 7125 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC: 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+(16QAM uplink is supported) LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR : CP-OFDM / DFT-s-OFDM, PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ax/be HE20/HE40/EHT20/EHT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/VHT160 WLAN 5GHz 802.11ax HE20/HE40/HE80/HE160 WLAN 5GHz 802.11be EHT20/EHT40/EHT80/EHT160

	WLAN 6GHz 802.11ax HE20/HE40/HE80/HE160 WLAN 6GHz 802.11be EHT20/EHT40/EHT80/EHT160/EHT320 Bluetooth BR/EDR/LE NFC: ASK
HW Version	P2.0
SW Version	MIUI 14
EUT Stage	Identical Prototype

Remark:
1. The 2.4GHz/5GHz/6GHz WLAN can transmit in MIMO antenna mode and SISO antenna mode.
2. For WLAN when transmit simultaneous with WWAN, power reduction will be activated to head.
3. The device support DBS (Dual Band Simultaneous) function, when the device WLAN 2.4GHz and WLAN 5GHz or WLAN 6GHz transmit at the same time the module will limit different output power for simultaneous transmission compliance.

3.2 Maximum Tune-up Limit

General Note:
The following table shows maximum output power configurations for various exposure conditions (output power index) with tune-up tolerance accounted

<WLAN 6GHz Tune-up Limit>

				Ant5		Ant18		Ant5+18	
				Full Power	Simultaneous non DBS&DBS for Head	Full Power	Simultaneous non DBS&DBS for Head	Full Power	Simultaneous non DBS&DBS for Head
	Mode	Channel	Frequency (MHz)	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
WLAN 6GHz	802.11ax-HE20 MCS0	1	5955	4.00	4.00	4.00	4.00	7.00	7.00
		57	6235	4.50	4.50	4.50	4.50	7.50	7.50
		113	6515	5.50	5.00	5.50	5.00	8.50	8.00
		173	6815	5.00	5.00	6.00	5.00	9.00	8.00
		229	7095	7.50	5.00	6.50	5.00	10.00	8.00
	802.11ax-HE40 MCS0	3	5965	7.00	5.00	7.00	5.00	10.00	8.00
		59	6245	7.50	5.00	7.50	5.00	10.50	8.00
		107	6485	8.00	5.00	9.00	5.00	11.50	8.00
		171	6805	8.00	5.00	9.00	5.00	11.50	8.00
		227	7085	10.50	5.00	9.50	5.00	13.00	8.00
	802.11ax-HE80 MCS0	7	5985	9.50	5.00	10.50	5.00	13.00	8.00
		71	6305	9.00	5.00	9.50	5.00	12.50	8.00
		119	6545	11.00	5.00	11.00	5.00	14.00	8.00
		167	6785	11.50	5.00	12.50	5.00	15.00	8.00
		215	7025	12.00	5.00	12.00	5.00	15.00	8.00
	802.11ax-HE160 MCS0	15	6025	10.00	5.00	11.00	6.00	14.00	9.00
		47	6185	10.00	5.00	10.00	5.00	13.00	8.00
		111	6505	12.50	7.50	13.00	8.00	16.00	11.00
		143	6665	12.00	7.00	12.00	7.00	15.00	10.00
		207	6985	11.50	6.50	11.50	6.50	14.50	9.50
WLAN 6GHz	Mode	Channel	Frequency (MHz)	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
	802.11be-EHT20 MCS0	1	5955	4.00	4.00	4.00	4.00	7.00	7.00
		57	6235	4.50	4.50	4.50	4.50	7.50	7.50
		113	6515	5.50	5.00	5.50	5.00	8.50	8.00
		173	6815	5.50	5.00	6.00	5.00	9.00	8.00
		229	7095	7.50	5.00	6.50	5.00	10.00	8.00
	802.11be-EHT40 MCS0	3	5965	7.00	5.00	7.00	5.00	10.00	8.00
		59	6245	7.50	5.00	8.00	5.00	11.00	8.00
		107	6485	8.00	5.00	9.00	5.00	11.50	8.00
		171	6805	8.50	5.00	9.00	5.00	12.00	8.00
		227	7085	10.50	5.00	10.00	5.00	13.50	8.00
	802.11be-EHT80 MCS0	7	5985	10.00	5.00	10.50	5.00	13.50	8.00
		71	6305	9.50	5.00	10.00	5.00	13.00	8.00
		119	6545	11.00	5.00	11.50	5.00	14.50	8.00
		167	6785	11.50	5.00	12.50	5.00	15.00	8.00
		215	7025	12.00	5.00	12.50	5.00	15.00	8.00
	802.11be-EHT160 MCS0	15	6025	10.00	5.00	11.00	6.00	14.00	9.00
		47	6185	10.00	5.00	10.00	5.00	13.00	8.00
		111	6505	12.50	7.50	13.00	8.00	16.00	11.00
		143	6665	12.00	7.00	12.00	7.00	15.00	10.00
		207	6985	11.50	6.50	11.50	6.50	14.50	9.50
	802.11be EHT320 MCS0	31	6105	9.90	5.00	10.90	5.00	13.90	8.00
		95	6425	10.00	5.00	10.50	5.00	13.50	8.00
		127	6585	11.50	5.00	12.00	5.00	15.00	8.00
		159	6745	11.90	5.00	11.90	5.00	14.90	8.00
		191	6905	10.90	5.00	11.90	5.00	14.40	8.00

4. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
CHIGO	Thermo-Hygrometer	HTC-1	55012	2023/1/8	2024/1/7
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Rohde & Schwarz	Power Meter	NRVD	102081	2022/7/14	2023/7/13
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	2022/7/14	2023/7/13
Rohde & Schwarz	Power Sensor	NRV-Z5	100539	2022/7/14	2023/7/13
Rohde & Schwarz	Power Sensor	NRP50S	101385	2022/10/12	2023/10/11
Rohde & Schwarz	Spectrum Analyzer	FSV7	101631	2022/10/12	2023/10/11
MCL	Attenuation1	BW-S10W5+	N/A	Note 1	
MCL	Attenuation2	BW-S10W5+	N/A	Note 1	
MCL	Attenuation3	BW-S10W5+	N/A	Note 1	

5. WLAN 6GHz Output Power (Unit: dBm)

General Note:

1. The 6GHz WLAN can transmit in SISO/MIMO antenna mode, for SISO mode power is less than per chain power of MIMO mode. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power, SAR and PD for MIMO was evaluated by making a measurement with both antennas transmitting simultaneously.
2. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
3. Per 201904 TCBC workshops, General principles of FCC KDB Publication 248227 D01 can be applied to determine the SAR Initial Test Configurations and test reduction for 802.11ax SAR testing. For the table below the 802.11ax maximum power is SU (non-OFDMA), and the SU maximum power also higher than RU (OFDMA)
4. In applying the test guidance, the IEEE 802.11 mode with the maximum output power (out of all modes) should be considered for testing
5. For modes with the same maximum output power, the guidance from section 5.3.2 a) of FCC KDB Publication 248227 D01 should be applied, with 802.11ax being considered as the highest 802.11 mode for the appropriate frequency bands
6. When multiple transmission modes (802.11a/g/n/ac/ax/be) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac then 802.11ax then 802.11be or 802.11g is chosen over 802.11n.
7. 802.11 ax/be supports both full tone size mode and partial tone size mode, after verification on partial tone size mode that partial size tone mode power will not be higher than full tone size mode, therefore, full tone mode power was chosen to be measured in this report.

Ant5				Full Power		Simultaneous non DBS&DBS for Head		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WLAN 6GHz	802.11be EHT320 MCS0	31	6105	9.13	9.90	Not Required	5.00	66.67
		95	6425	9.48	10.00		5.00	
		127	6585	10.89	11.50		5.00	
		159	6745	11.18	11.90		5.00	
		191	6905	10.10	10.90		5.00	

Ant18				Full Power		Simultaneous non DBS&DBS for Head		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WLAN 6GHz	802.11be EHT320 MCS0	31	6105	10.12	10.90	Not Required	5.00	66.67
		95	6425	9.81	10.50		5.00	
		127	6585	11.48	12.00		5.00	
		159	6745	11.39	11.90		5.00	
		191	6905	11.12	11.90		5.00	

Ant5+18				Full Power		Simultaneous non DBS&DBS for Head		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WLAN 6GHz	802.11be EHT320 MCS0	31	6105	12.66	13.90	Not Required	8.00	66.67
		95	6425	12.66	13.50		8.00	
		127	6585	14.21	15.00		8.00	
		159	6745	14.30	14.90		8.00	
		191	6905	13.65	14.40		8.00	

Test Engineer : Martin Li, Varus Wang

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