

## EMC TEST REPORT

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

Manufacturer or Supplier:	Xiaomi Communications Co., Ltd.
Address:	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Product:	Mobile Phone
Brand Name:	Redmi
Model Name:	23053RN02L
FCC ID:	2AFZZRN02L
Date of tests:	Mar. 06, 2023 ~ Mar. 29, 2023

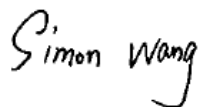
The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

- FCC Part 15, Subpart B, Class A
- FCC Part 15, Subpart B, Class B
- ANSI C63.4:2014

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

Prepared by Simon Wang  
Engineer / Mobile Department

Approved by Luke Lu  
Manager / Mobile Department



Date: Mar. 29, 2023



Date: Mar. 29, 2023

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P23030003EM01	Original release	Mar. 29, 2023



# 1 GENERAL INFORMATION

## 1.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Mobile Phone	
<b>BRAND NAME</b>	Redmi	
<b>MODEL NAME</b>	23053RN02L	
<b>NOMINAL VOLTAGE</b>	5V/9V/10V/12Vdc(adapter or host equipment) 3.8Vdc (Li-ion, battery)	
<b>MODULATION TYPE</b>	<b>BT_LE</b>	GFSK
	<b>Bluetooth</b>	GFSK, $\pi/4$ -DQPSK, 8DPSK
	<b>FM</b>	FM
	<b>WLAN</b>	DSSS, OFDM
	<b>GPS/GALILEO/GLO NASS/BDS</b>	BPSK
	<b>GSM/GPRS/EDGE</b>	GMSK, 8PSK
	<b>WCDMA</b>	QPSK, BPSK
	<b>LTE</b>	QPSK/16QAM/64QAM
<b>OPERATING FREQUENCY</b>	<b>Bluetooth/BT_LE</b>	2402MHz ~ 2480MHz
	<b>FM</b>	87.5MHz ~ 108MHz
	<b>WLAN</b>	2412 ~ 2462MHz for 11b/g/n(HT20) 5180 ~ 5240MHz, 5260 ~ 5320 MHz, 5500 ~ 5720MHz, 5745 ~ 5825 MHz for 11a/ n(HT20)/ n(HT40) / ac(VHT20)/ ac(VHT40) / ac(VHT80)
	<b>GPS/GALILEO/GLO NASS/BDS</b>	1559MHz ~ 1610MHz
	<b>GSM</b>	824.2MHz ~ 848.8MHz (FOR GSM 850) 1850.2MHz ~ 1909.8MHz (FOR GSM 1900)
	<b>WCDMA</b>	1852.4MHz ~ 1907.6MHz(FOR WCDMA Band 2) 1712.4MHz ~ 1752.6MHz(FOR WCDMA Band 4) 826.4MHz ~ 846.6MHz (FOR WCDMA Band 5)



<b>OPERATING FREQUENCY</b>	<b>LTE</b>	1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 824.7MHz ~ 848.3MHz (FOR LTE Band5) 2502.5MHz ~ 2567.5MHz (FOR LTE Band7) 699.7MHz ~ 715.3MHz (FOR LTE Band12) 779.5MHz ~ 784.5MHz (FOR LTE Band13) 706.5MHz ~ 713.5MHz (FOR LTE Band17) 814.7MHz ~ 848.3MHz (FOR LTE Band26) 2572.5MHz ~ 2617.5MHz (FOR LTE Band38) 2498.5MHz ~2687.5MHz (FOR LTE Band41) 1710.7MHz ~ 1779.3MHz (FOR LTE Band66)
<b>HW VERSION</b>	P1.1	
<b>SW VERSION</b>	MIUI14	
<b>IMEI</b>	867866060030240 867866060047483 867866060047491	
<b>I/O PORTS</b>	Refer to user's manual	
<b>CABLE SUPPLIED</b>	USB cable1: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable2: non-shielded cable, with w/o ferrite core, 1.0 meter	

**NOTE:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

## 1.2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart B		
Standard Section	Test Item	Result
FCC Part 15, Subpart B, Class B ANSI C63.4:2014	Conducted Test	Compliance
	Radiated Emission Test (30MHz ~ 1GHz)	Compliance
	Radiated Emission Test (Above 1GHz)	Compliance

## 1.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	±2.70dB
Radiated emissions	30MHz~1GHz	±4.98dB
	1GHz ~6GHz	±4.70dB
	6GHz ~18GHz	±4.60dB
	18GHz ~40GHz	±4.12dB



### 1.4 DESCRIPTION OF TEST MODES

Test Mode	Test Condition
<b>Radiated emission test</b>	
1	GSM850 Idle + Adapter 1 + GPS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (2.4G) + SIM1 + Front Camera On
2	GSM1900 Idle + Adapter 2 + Glonass RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (5G B1) + SIM2 + Back Camera On
3	WCDMA B2 Idle + Adapter 1 + BDS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (5G B2) + SIM1 + Front Camera On
4	WCDMA B4 Idle + Adapter 2 + Galileo RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (2.4G) + SIM2 + Back Camera On
5	WCDMA B5 Idle + Adapter 1 + GPS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (5G B3) + SIM1 + FM RX
6	LTE B2 Idle + Adapter 2 + Glonass RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (2.4G) + SIM2 + FM RX
7	LTE B4 Idle + Adapter 1 + BDS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (5G B4) + SIM1
8	LTE B5 Idle + Adapter 2 + Galileo RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (5G B1) + SIM2 + MPG4
9	LTE B7 Idle + Adapter 1 + GPS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (2.4G) + SIM1 + Front Camera On
10	LTE B12 Idle + Adapter 2 + Galileo RX + USB cable 2+ Earphone + BT Idle + WIFI Idle (2.4G ) + SIM2 + Back Camera On
11	LTE B13 Idle + Adapter 1 + BDS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (5G B3) + SIM1
12	LTE B17 Idle + Adapter 2 + GPS RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (2.4G) + SIM2 + MPG4
13	LTE B26 Idle + Adapter 1 + Glonass RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (5G B4) + SIM1 + FM RX
14	LTE B66 Idle + Adapter 2 + BDS RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (2.4G) + SIM2 + Front Camera On
15	LTE B38 Idle + USB Link + Data Transmission + BT Idle + WIFI Idle (2.4G) + EUT to Notebook + USB cable 1 + SIM1 + Earphone
16	LTE B41 Idle + USB Link + Data Transmission + Galileo RX + BT Idle + WIFI Idle (5G B1) + Notebook to EUT + USB cable 2 + SIM2 + Earphone
17	Worst case of 1-14 + Sample 2
18	Worst case of 15-16 + Sample 2
19	Worst case of 15-16 + Sample 3
20	Worst case of 15-16 + Sample 4



Conducted emission test	
1	GSM850 Idle + Adapter 1 + GPS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (2.4G) + Sample 1 + SIM1 + Front Camera On
2	GSM1900 Idle + Adapter 2 + Glonass RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (5G B1) + Sample 2 + SIM2 + Back Camera On
3	WCDMA B2 Idle + Adapter 1 + BDS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (5G B2)+ Sample 1 + SIM1 + Front Camera On
4	WCDMA B4 Idle + Adapter 2 + Galileo RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (2.4G) + Sample 2 + SIM2 + Back Camera On
5	WCDMA B5 Idle + Adapter 1 + GPS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (5G B3) + Sample 1 + SIM1 + FM RX
6	LTE B2 Idle + Adapter 2 + Glonass RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (2.4G) + Sample 2 + SIM2 + FM RX
7	LTE B4 Idle + Adapter 1 + BDS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (5G B4) + Sample 1 + SIM1
8	LTE B5 Idle + Adapter + BDS RX + USB cable 1 + BT Idle + WIFI Idle (2.4G) + EUT to Notebook + USB cable 1 + SIM1 + Earphone
9	LTE B7 Idle + Adapter 1 + GPS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (2.4G) + Sample 1 + SIM1 + Front Camera On
10	LTE B12 Idle + Adapter 2 + Galileo RX + USB cable 2+ Earphone + BT Idle + WIFI Idle (2.4G ) + Sample 2 + SIM2 + Back Camera On
11	LTE B13 Idle + Adapter 1 + BDS RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (5G B3) + Sample 1 + SIM1
12	LTE B17 Idle + Adapter 2 + GPS RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (2.4G) + Sample 2 + SIM2 + MPG4
13	LTE B26 Idle + Adapter 1 + Glonass RX + USB cable 1 + Earphone + BT Idle + WIFI Idle (5G B4) + Sample 1 + SIM1 + FM RX
14	LTE B66 Idle + Adapter 2 + BDS RX + USB cable 2 + Earphone + BT Idle + WIFI Idle (2.4G) + Sample 2 + SIM2 + Front Camera On
15	LTE B38 Idle + USB Link + Data Transmission + BT Idle + WIFI Idle (2.4G) + EUT to Notebook+ Sample 1 + USB cable 1 + SIM1 + Earphone
16	LTE B41 Idle + USB Link + Data Transmission + Galileo RX + BT Idle + WIFI Idle (5G B1) + Sample 2 + Notebook to EUT + USB cable 2 + SIM2 + Earphone
17	Worst case of 1-14 + Sample 2
18	Worst case of 15-16 + Sample 2
19	Worst case of 15-16 + Sample 3
20	Worst case of 15-16 + Sample 4

**NOTE:**

1. For conducted emission test, Pre-scan all mode, mode 1 was the worst case and only this mode was presented in this report.
2. For radiated emission test, Pre-scan all mode, test mode 7 was the worst case and only this mode was presented in this report.



## 1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

### FOR ALL TESTS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	Thinkpad L440	R90FTFKP	N/A
2	Earphone	MI	N/A	N/A	N/A
3	Adapter	MI	MDY-12-EA	N/A	N/A
4	Micro SD	SAM SUNG	N/A	N/A	N/A
5	USB Cable	MI	N/A	N/A	N/A
6	FM signal generator	Rohde&Schwarz	SMB 100A	109279	N/A
7	GPS Simulator+Antenna	TOJOIN	GNSS-5000A	E1-010-010119	N/A
8	Universal radio communication tester	Rohde&Schwarz	CMW500	N/A	N/A
9	Printer	HP	hp LaserJet 1300	CNSJF75989	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	USB Line: Shielded, Detachable 1m;
2	N/A
3	N/A
4	N/A

## 2 EMISSION TEST

### 2.1 CONDUCTED EMISSION MEASUREMENT

#### 2.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC PART 15, SUBPART B (SECTION: 15.107 A CLASS B)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

TEST STANDARD: FCC PART 15, SUBPART B (SECTION: 15.107 B CLASS A)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

**NOTE:** 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 2.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Feb. 14,23	Feb. 13,24
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Mar. 03,23	Mar. 02,24

**NOTE:** 1. The test was performed in CE shielded room.

### 2.1.3 TEST PROCEDURES

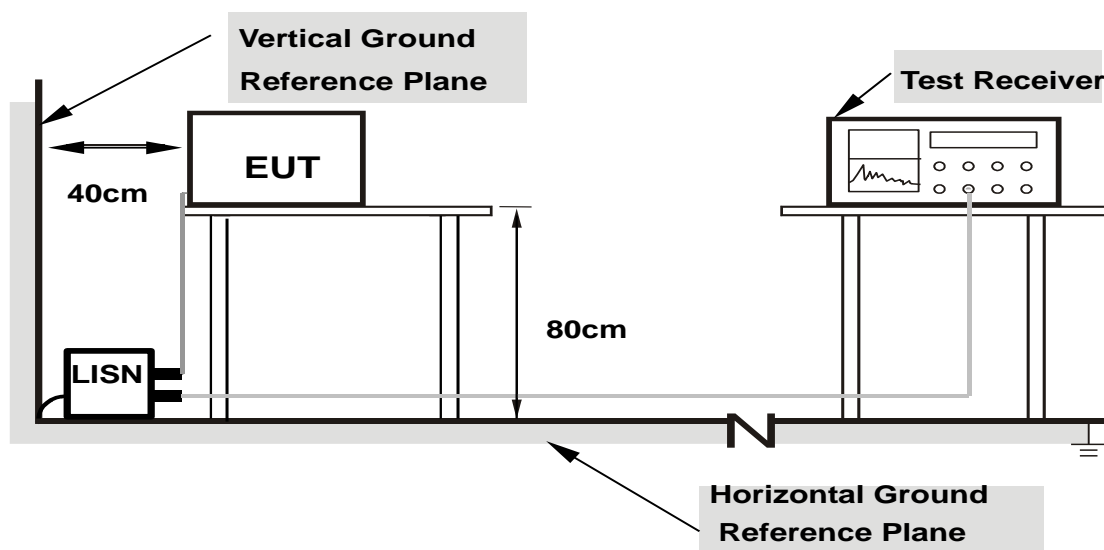
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

### 2.1.4 DEVIATION FROM TEST STANDARD

No deviation.

### 2.1.5 TEST SETUP



- Note:**
- 1.Support units were connected to second LISN.
  - 2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

## 2.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the use type described in the manufacturer's specifications or the user's manual.



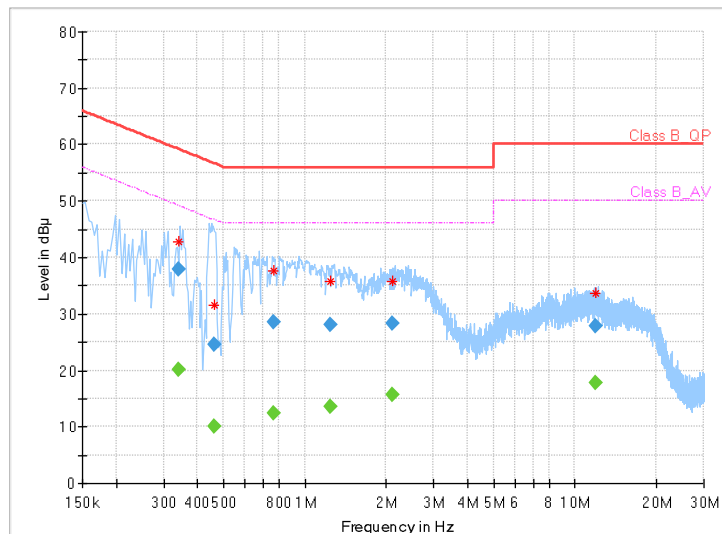
## 2.1.7 TEST RESULTS

<b>TEST VOLTAGE</b>	Input 120 Vac, 60 Hz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9 kHz
<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 51%RH	<b>TESTED BY</b>	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.340000	---	20.17	49.20	29.03	L1	ON	9.7
0.340000	37.95	---	59.20	21.25	L1	ON	9.7
0.464000	---	10.15	46.62	36.47	L1	ON	9.7
0.464000	24.48	---	56.62	32.14	L1	ON	9.7
0.768000	---	12.46	46.00	33.54	L1	ON	9.7
0.768000	28.59	---	56.00	27.41	L1	ON	9.7
1.248000	---	13.53	46.00	32.47	L1	ON	9.7
1.248000	28.01	---	56.00	27.99	L1	ON	9.7
2.100000	---	15.67	46.00	30.33	L1	ON	9.7
2.100000	28.32	---	56.00	27.68	L1	ON	9.7
11.984000	---	17.88	50.00	32.12	L1	ON	9.8
11.984000	27.89	---	60.00	32.11	L1	ON	9.8

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Limit value - Emission level
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

Full Spectrum

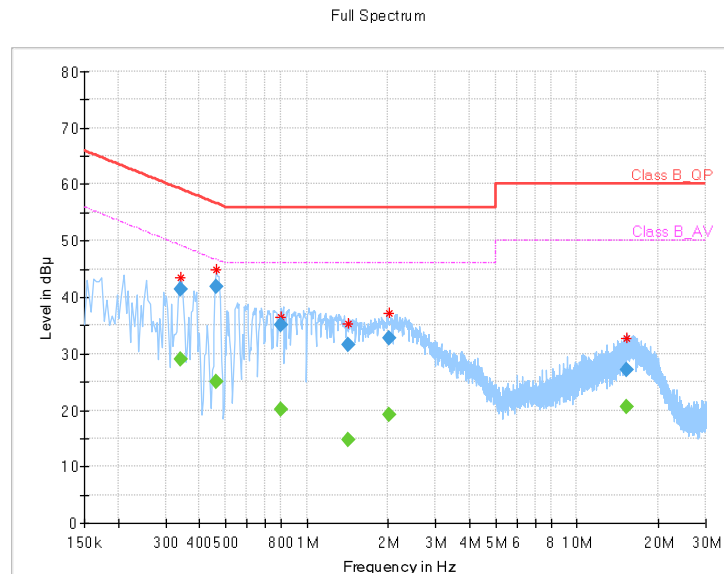




<b>TEST VOLTAGE</b>	Input 120 Vac, 60 Hz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9 kHz
<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 51%RH	<b>TESTED BY</b>	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.340000	---	28.89	49.20	20.31	N	ON	9.7
0.340000	41.33	---	59.20	17.87	N	ON	9.7
0.460000	---	25.10	46.69	21.59	N	ON	9.7
0.460000	41.97	---	56.69	14.72	N	ON	9.7
0.800000	---	20.22	46.00	25.78	N	ON	9.7
0.800000	35.14	---	56.00	20.86	N	ON	9.7
1.424000	---	14.67	46.00	31.33	N	ON	9.8
1.424000	31.62	---	56.00	24.38	N	ON	9.8
2.024000	---	19.15	46.00	26.85	N	ON	9.8
2.024000	32.67	---	56.00	23.33	N	ON	9.8
15.336000	---	20.60	50.00	29.40	N	ON	9.8
15.336000	27.09	---	60.00	32.91	N	ON	9.8

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Limit value - Emission level
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



## 2.2 RADIATED EMISSION MEASUREMENT

### 2.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

#### TEST STANDARD: FCC PART 15, SUBPART B (SECTION: 15.109)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 3 meters (dB $\mu$ V/m)		
Frequencies (MHz)	FCC 15B, Class A	FCC 15B, Class B
30-88	49	40
88-216	53.5	43.5
216-960	56	46
960-1000	59.5	54
Above 1000	Avg: 59.5 Peak: 79.5	Avg: 54 Peak: 74

#### Frequency Range (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40GHz, whichever is lower

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
  2. Emission level (dBuV/m) = 20 log Emission level ( $\mu$ V/m).
  3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
  4. QP detector shall be applied if not specified.

## 2.2.2 TEST INSTRUMENTS

### Frequency range below1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 05,23	Mar. 04,24
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 17,23	Feb. 16,24
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May.12,22	May.11,23
E3 Test Software	E3	V 9.160323	N/A	N/A	N/A

### Frequency range above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Horn Antenna	ETS-LINDGREN	3117	00168728	Mar. 05,23	Mar. 04,24
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Sep.04, 22	Sep.03, 23
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 17,23	Feb. 16,24
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.12,22	May.11,23
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 17,23	Feb. 16,24
E3 Test Software	E3	V 9.160323	N/A	N/A	N/A

- NOTE:** 1. The test was performed in 3m chamber.  
2. The FCC Site Registration No. is 525120; The Designation No. is CN1171.



## 2.2.3 TEST PROCEDURE

### <Frequency Range below 1GHz>

The basic test procedure was in accordance with ANSI C63.4:2014 (section 12).

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

#### NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
5. Margin value = Emission level – Limit value.

### <Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter fully-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. The bore sight should be used during the test above 1GHz.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz

#### NOTE:

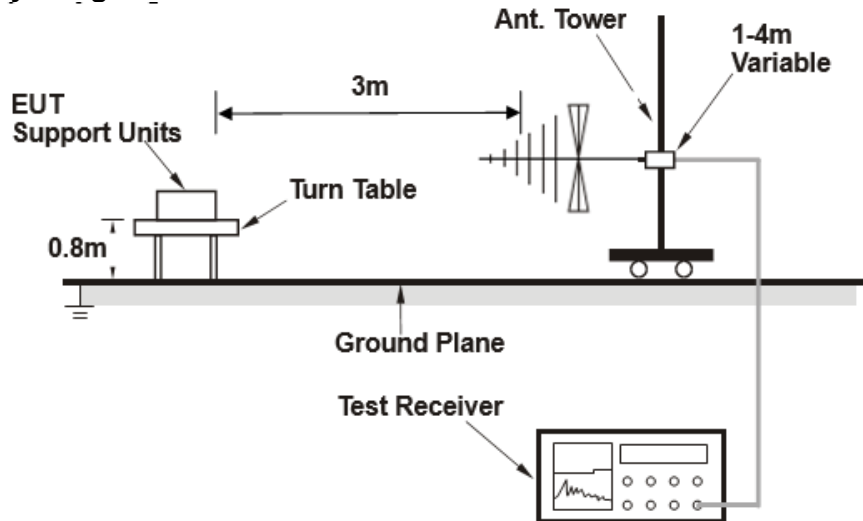
- . The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- . The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth of test receiver/spectrum analyzer is 1Hz for Average detection (AV) at frequency above 1GHz.
- . For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
- . Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
- . Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
- . Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier)
- . Margin value = Emission level – Limit value.

## 2.2.4 DEVIATION FROM TEST STANDARD

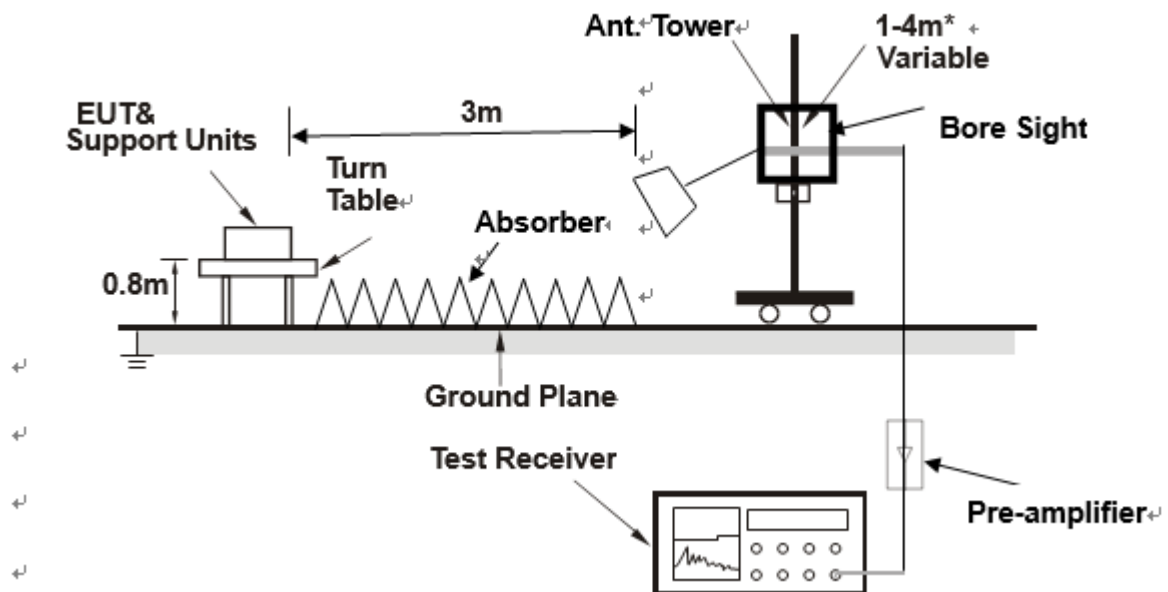
No deviation.

## 2.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



**Note:** Above 1G is a directional antenna

depends on the EUT height and the antenna 3dB bandwidth both, refer to section 7.3 of CISPR 16-2-3.

## 2.2.6 EUT OPERATING CONDITIONS

Same as item 2.1.6.

## 2.2.7 TEST RESULTS

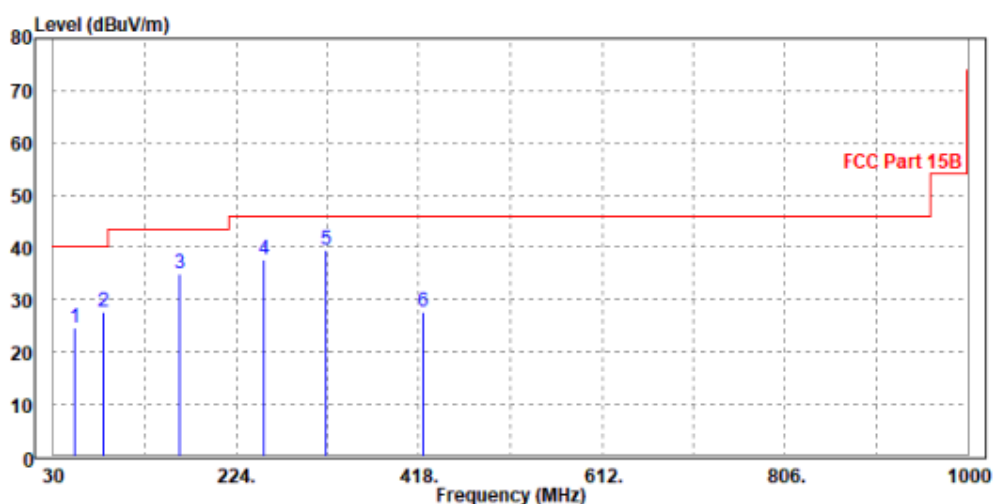
Acceleromete alternative worst case:

<b>TEST VOLTAGE</b>	Input 120 Vac, 60 Hz	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70 %RH	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	Quasi-Peak, 120 kHz
<b>TESTED BY</b>	Jace Hu		

### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	52.310	24.50	51.11	40.00	-15.50	-26.61	Peak	Horizontal
2	83.350	27.83	56.19	40.00	-12.17	-28.36	Peak	Horizontal
3	163.860	34.94	59.75	43.50	-8.56	-24.81	Peak	Horizontal
4	253.100	37.64	59.54	46.00	-8.36	-21.90	Peak	Horizontal
5 PP	320.030	39.50	60.41	46.00	-6.50	-20.91	Peak	Horizontal
6	422.850	27.71	46.44	46.00	-18.29	-18.73	Peak	Horizontal

- REMARKS:**
1. Emission level(dBuV/m)=Read Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)- Amplifier Gain
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.



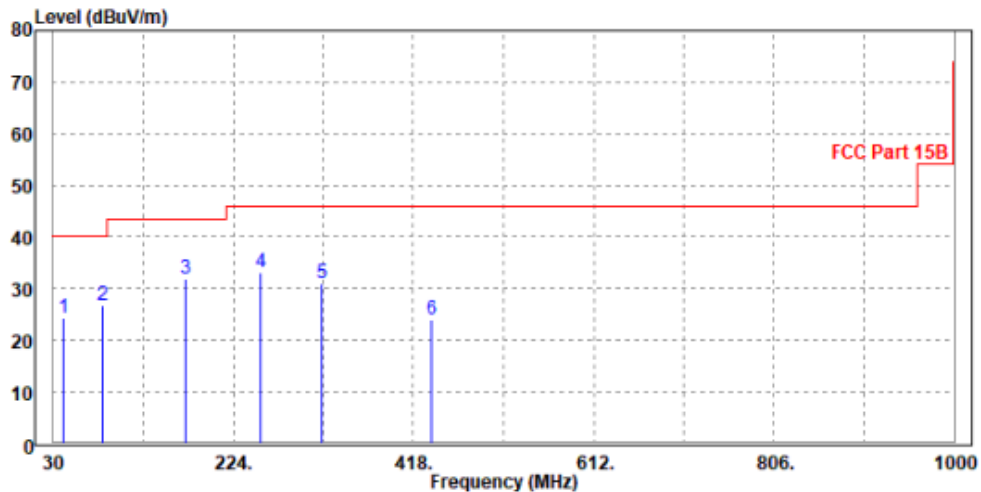


<b>TEST VOLTAGE</b>	Input 120 Vac, 60 Hz	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70% RH	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	Quasi-Peak , 120 kHz
<b>TESTED BY</b>	Jace Hu		

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	41.640	24.27	49.11	40.00	-15.73	-24.84	Peak	Vertical
2	83.350	26.72	55.25	40.00	-13.28	-28.53	Peak	Vertical
3 PP	172.590	31.91	56.57	43.50	-11.59	-24.66	Peak	Vertical
4	253.100	33.05	55.79	46.00	-12.95	-22.74	Peak	Vertical
5	320.030	30.90	51.79	46.00	-15.10	-20.89	Peak	Vertical
6	437.400	24.03	42.60	46.00	-21.97	-18.57	Peak	Vertical

- REMARKS:**
1. Emission level(dBuV/m)=Read Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) -Amplifier Gain
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.

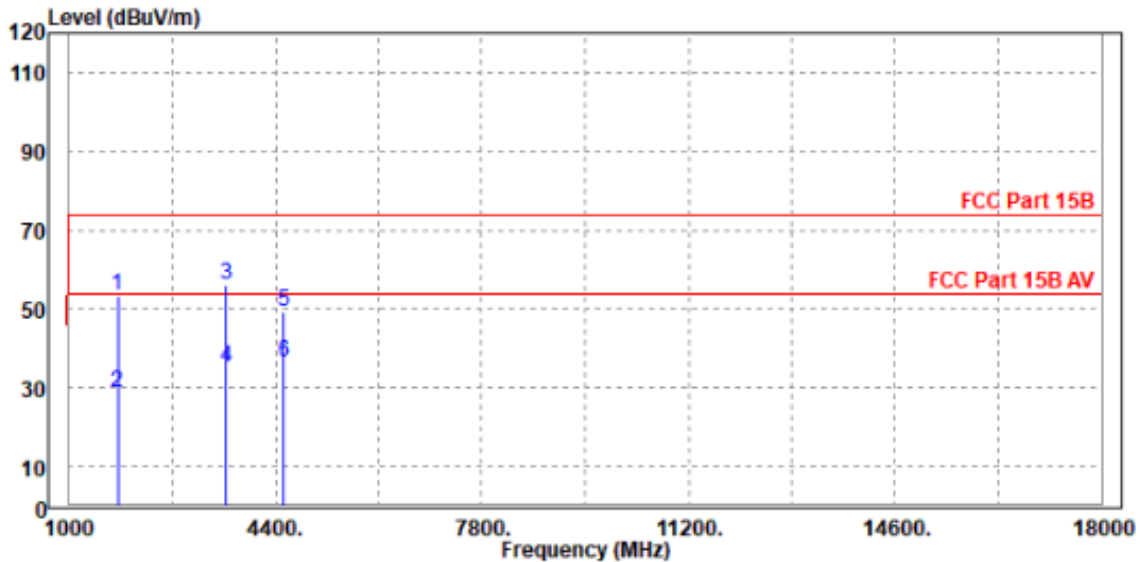




TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Jace Hu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
1799	53.2	61.79	74	-20.8	32.19	5.35	46.13	100	65	Peak
1799	29.66	38.25	54	-24.34	32.19	5.35	46.13	100	65	Average
3669	57.95	59.59	74	-16.05	35.93	7.91	45.48	100	120	Peak
3669	37.39	39.03	54	-16.61	35.93	7.91	45.48	100	120	Average
5692	52.61	50.45	74	-21.39	37.79	9.87	45.5	100	95	Peak
5692	39.84	37.68	54	-14.16	37.79	9.87	45.5	100	95	Average

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 1GHz to 5th harmonic of the highest frequency or 40GHz, whichever is lower .For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.
  4. Only emissions significantly above equipment noise floor are reported.

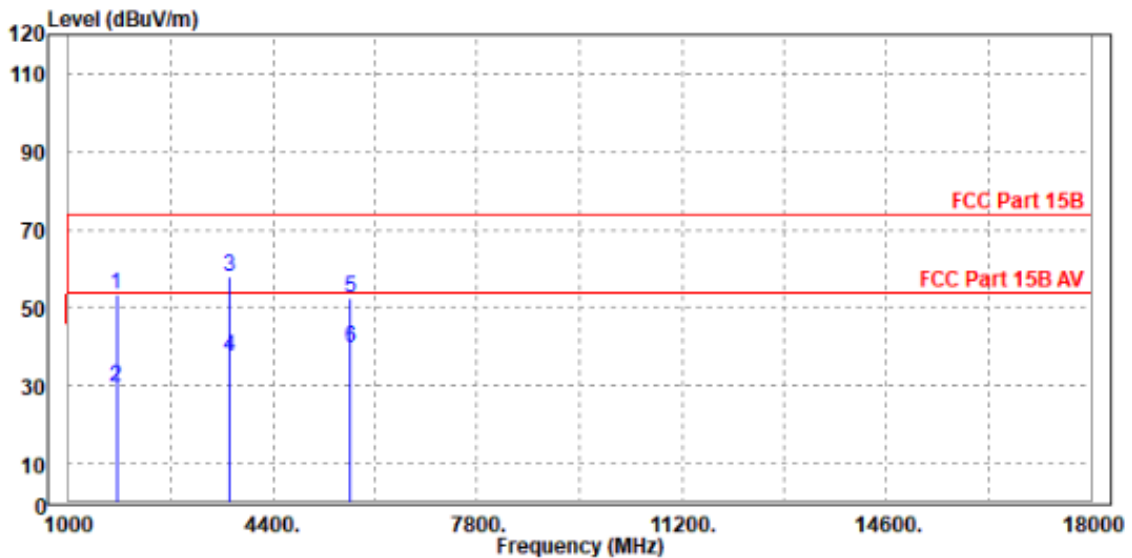




TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Jace Hu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
1799	53.57	63.19	74	-20.43	31.16	5.35	46.13	100	121	Peak
1799	28.88	38.5	54	-25.12	31.16	5.35	46.13	100	121	Average
3601	56	59.38	74	-18	34.2	7.93	45.51	100	84	Peak
3601	34.91	38.29	54	-19.09	34.2	7.93	45.51	100	84	Average
4536	49.19	49.6	74	-24.81	35.11	9.93	45.45	100	36	Peak
4536	36.49	36.9	54	-17.51	35.11	9.93	45.45	100	36	Average

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 1GHz to 5th harmonic of the highest frequency or 40GHz, whichever is lower .For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.
  4. Only emissions significantly above equipment noise floor are reported.





### **3 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications were made to the EUT by the lab during the test.

**---END---**