

## VARIANT EMC TEST REPORT

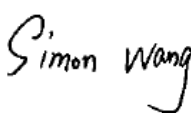
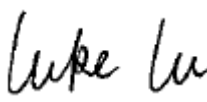
Applicant:	Xiaomi Communications Co., Ltd.
Address:	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

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:	2409BRN2CL
FCC ID:	2AFZZRN2CL
Date of tests:	May. 11, 2024 ~ Jul. 05, 2024 Oct. 16, 2024 ~ Oct. 29, 2024

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: Oct. 29, 2024	 Date: Oct. 29, 2024

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P24050014EM03	Original release	Jul. 05, 2024
W7L-P24100002EM03	Based on the original report product add 2 <sup>nd</sup> materials and 5 <sup>nd</sup> and 6 <sup>nd</sup> screens. This report verify the worst case of RE/CE. So this report only update the RE/CE.	Oct. 29, 2024

## 1 GENERAL INFORMATION

### 1.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Mobile Phone	
<b>BRAND NAME</b>	Redmi	
<b>MODEL NAME</b>	2409BRN2CL	
<b>NOMINAL VOLTAGE</b>	5/3.6~11Vdc(adapter or host equipment) 3.84Vdc (Li-ion, battery)	
<b>MODULATION TYPE</b>	<b>BT_LE</b>	GFSK
	<b>Bluetooth</b>	GFSK, $\pi/4$ -DQPSK, 8DPSK
	<b>WLAN</b>	DSSS, OFDM
	<b>FM</b>	FM
	<b>GPS/GALILEO/GLO NASS/BDS</b>	BPSK
	<b>GSM/GPRS/EDGE</b>	GMSK, 8PSK
	<b>WCDMA</b>	BPSK/QPSK
	<b>LTE</b>	QPSK/16QAM/64QAM
<b>OPERATING FREQUENCY</b>	<b>Bluetooth/BT_LE</b>	2402MHz ~ 2480MHz
	<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>FM</b>	87.5MHz ~ 108MHz
	<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>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) 779.5MHz ~ 784.5MHz (FOR LTE Band13)

		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>	135100C3N	
<b>SW VERSION</b>	Xiaomi HyperOS 1.0	
<b>IMEI</b>	867957070066520	
<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 USB cable3: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable4: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable5: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable6: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable7: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable8: non-shielded cable, with w/o ferrite core, 1.0 meter	
<b>ACCESSORY DEVICES</b>	Refer to note as below	

**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+USB cable 1+Earphone+TF Card+Front Camera On+SIM1+Sample 1
2	GSM1900 Idle+Adapter 1+USB cable 2+Earphone+TF Card+Back Camera On+SIM2+Sample 1
3	WCDMA B2 Idle+Adapter 1+USB cable 3+Earphone+TF Card+Front Camera On+SIM1+Sample 1
4	WCDMA B4 Idle+Adapter 1+USB cable 4+Earphone+TF Card+Back Camera On+SIM2+Sample 1
5	WCDMA B5 Idle+Adapter 1+USB cable 5+Earphone+TF Card+FM RX+SIM1+Sample 1
6	LTE B2 Idle+Adapter 1+USB cable 6+Earphone+TF Card+SIM2+Sample 1
7	LTE B4 Idle+Adapter 1+USB cable 7+Earphone+TF Card+SIM1+Sample 1
8	LTE B5 Idle+Adapter 1+USB cable 8+Earphone+TF Card+SIM2+Sample 1
9	LTE B7 Idle+Adapter 1+USB cable 1+Earphone+TF Card+MPG4+SIM1+Sample 1
10	LTE B13 Idle+Adapter 1+USB cable 2+Earphone+TF Card+Front Camera On+SIM2+Sample 1
11	LTE B26 Idle+Adapter 1+USB cable 3+Earphone+TF Card+Back Camera On+SIM1+Sample 1
12	LTE B66 Idle+Adapter 1+USB cable 4+Earphone+TF Card+SIM2+Sample 1
13	LTE B38 Idle+USB Link +Data Transmission+USB cable 1/2/3/4+TF Card+EUT to Notebook+Earphone+SIM1+Sample 1
14	LTE B41 Idle+USB Link +Data Transmission+USB cable 5/6/7/8+TF Card+Notebook to TF Card+Earphone+SIM2+Sample 1
15	Powered by Battery+TF Card+Reverse charging+Sample 1
16	Worst of 1-12+Adapter 2
17	Worst of 1-16+Sample 2
18	Worst of 1-16+Sample 3
19	Worst of 1-16+Sample 4
20	Worst of 1-16+Sample 5
21	Worst of 1-16+Sample 6

<b>Conducted emission test</b>	
1	GSM850 Idle+Adapter 1+USB cable 1+Earphone+TF Card+Front Camera On+SIM1+Sample 1
2	GSM1900 Idle+Adapter 1+USB cable 2+Earphone+TF Card+Back Camera On+SIM2+Sample 1
3	WCDMA B2 Idle+Adapter 1+USB cable 3+Earphone+TF Card+Front Camera On+SIM1+Sample 1
4	WCDMA B4 Idle+Adapter 1+USB cable 4+Earphone+TF Card+Back Camera On+SIM2+Sample 1

5	WCDMA B5 Idle+Adapter 1+USB cable 5+Earphone+TF Card+FM RX+SIM1+Sample 1
6	LTE B2 Idle+Adapter 1+USB cable 6+Earphone+TF Card+SIM2+Sample 1
7	LTE B4 Idle+Adapter 1+USB cable 7+Earphone+TF Card+SIM1+Sample 1
8	LTE B5 Idle+Adapter 1+USB cable 8+Earphone+TF Card+SIM2+Sample 1
9	LTE B7 Idle+Adapter 1+USB cable 1+Earphone+TF Card+MPG4+SIM1+Sample 1
10	LTE B13 Idle+Adapter 1+USB cable 2+Earphone+TF Card+Front Camera On+SIM2+Sample 1
11	LTE B26 Idle+Adapter 1+USB cable 3+Earphone+TF Card+Back Camera On+SIM1+Sample 1
12	LTE B66 Idle+Adapter 1+USB cable 4+Earphone+TF Card+SIM2+Sample 1
13	LTE B38 Idle+USB Link +Data Transmission+USB cable 1/2/3/4+TF Card+EUT to Notebook+Earphone+SIM1+Sample 1
14	LTE B41 Idle+USB Link +Data Transmission+USB cable 5/6/7/8+TF Card+Notebook to TF Card+Earphone+SIM2+Sample 1
15	Worst of 1-12+Adapter 2
16	Worst of 1-15+Sample 2
17	Worst of 1-15+Sample 3
18	Worst of 1-15+Sample 4
19	Worst of 1-15+Sample 5
20	Worst of 1-15+Sample 6

**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 3 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	Micro SD	SAM SUNG	N/A	N/A	N/A
3	USB Cable	MI	N/A	N/A	N/A
4	FM signal generator	Rohde & Schwarz	SMB100A	109279	N/A
5	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 (dBμV)	
	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 (dBμV)	
	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. 14,24	Feb. 13,25
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Mar. 10,24	Mar. 09,25

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

### 2.1.3 TEST PROCEDURES

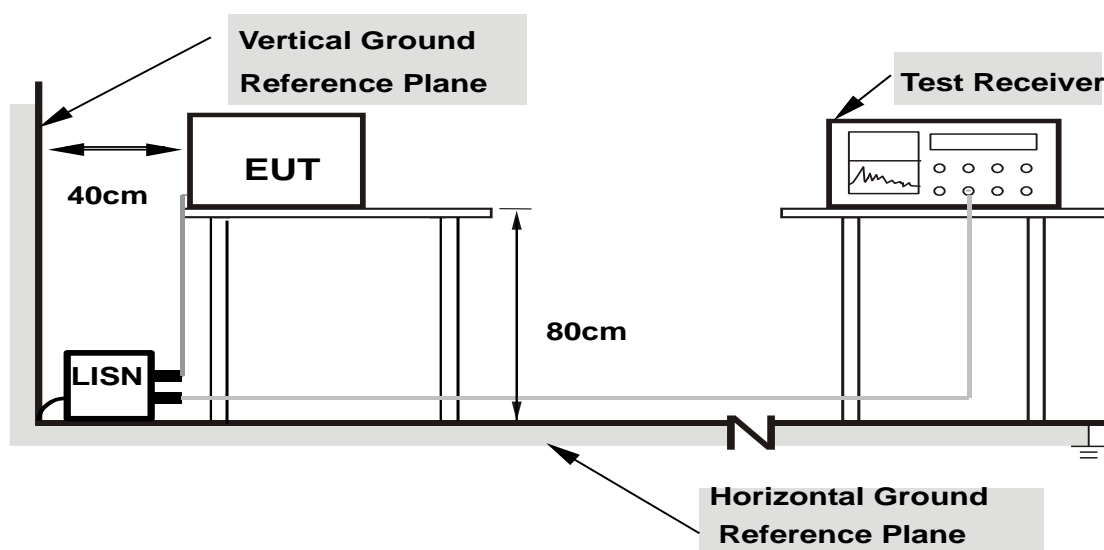
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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.

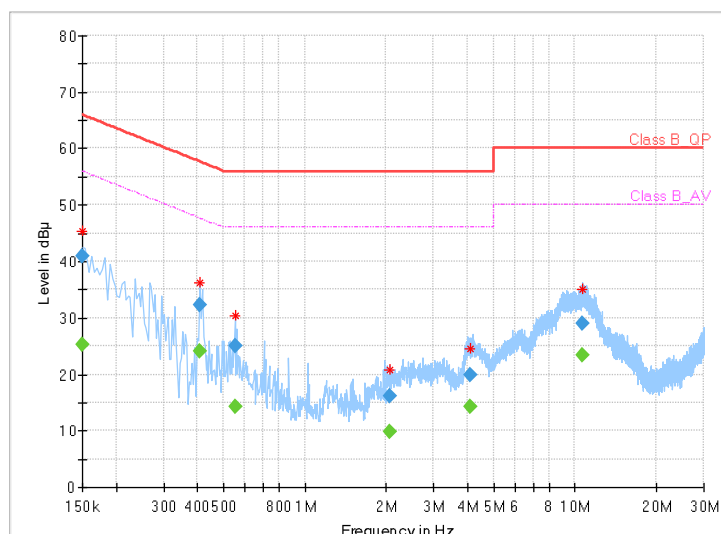
## 2.1.7 TEST RESULTS

<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)
0.150000	---	25.34	56.00	30.66	L1	ON	9.8
0.150000	41.00	---	66.00	25.00	L1	ON	9.8
0.408000	---	24.20	47.69	23.49	L1	ON	9.8
0.408000	32.30	---	57.69	25.39	L1	ON	9.8
0.552000	---	14.29	46.00	31.71	L1	ON	9.8
0.552000	24.94	---	56.00	31.06	L1	ON	9.8
2.052000	---	9.86	46.00	36.14	L1	ON	9.8
2.052000	16.14	---	56.00	39.86	L1	ON	9.8
4.104000	---	14.33	46.00	31.67	L1	ON	9.8
4.104000	19.91	---	56.00	36.09	L1	ON	9.8
10.696000	---	23.45	50.00	26.55	L1	ON	10.5
10.696000	29.09	---	60.00	30.91	L1	ON	10.5

- 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

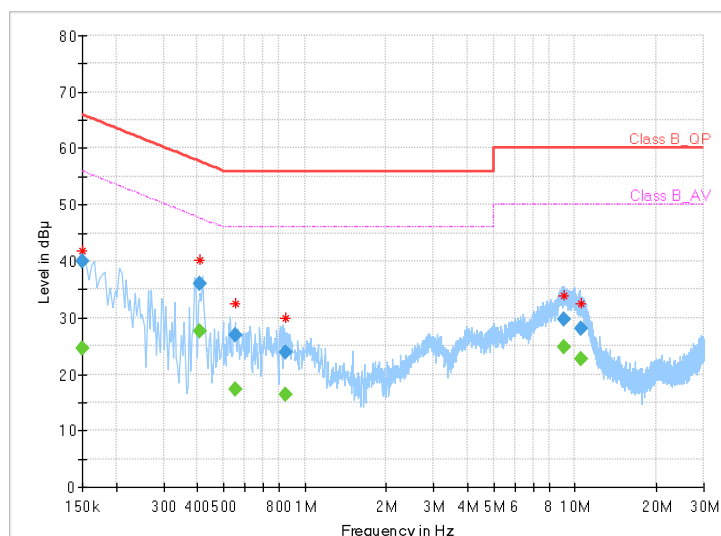


<b>TEST VOLTAGE</b>	Input 120 Vac, 60 Hz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9 kHz
<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 51%RH	<b>TESTED BY</b>	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	24.68	56.00	31.32	N	ON	9.7
0.150000	39.92	---	66.00	26.08	N	ON	9.7
0.408000	---	27.58	47.69	20.11	N	ON	9.6
0.408000	36.07	---	57.69	21.62	N	ON	9.6
0.552000	---	17.20	46.00	28.80	N	ON	9.7
0.552000	26.95	---	56.00	29.05	N	ON	9.7
0.848000	---	16.38	46.00	29.62	N	ON	9.7
0.848000	23.82	---	56.00	32.18	N	ON	9.7
9.128000	---	24.85	50.00	25.15	N	ON	10.3
9.128000	29.80	---	60.00	30.20	N	ON	10.3
10.520000	---	22.73	50.00	27.27	N	ON	10.4
10.520000	28.04	---	60.00	31.96	N	ON	10.4

- 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



## 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 (dB $\mu$ V/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

### #1

#### Frequency range below 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Nov. 14,23	Nov. 13,26
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 18,24	Feb. 17,25
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 28,24	Mar. 27,25
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May. 06,24	May. 05,25
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	Nov. 14,23	Nov. 13,26
Horn Antenna	ETS-LINDGREN	3117	00168728	Nov. 30,23	Nov. 29,24
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-003 61	15433	Sep.04, 23	Sep.03, 24
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 28,24	Mar. 27,25
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.10,24	May.09,25
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 17,24	Feb. 16,25
E3 Test Software	E3	V 9.160323	N/A	N/A	N/A

### #2

#### Frequency range below 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Nov. 14,23	Nov. 13,26
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 18,24	Feb. 17,25
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 28,24	Mar. 27,25
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May. 06,24	May. 05,25
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	Nov. 14,23	Nov. 13,26
Horn Antenna	ETS-LINDGREN	3117	00168728	Nov. 30,23	Nov. 29,24
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-003 61	15433	Sep.04, 24	Sep.03, 25
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 28,24	Mar. 27,25
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.10,24	May.09,25
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 17,24	Feb. 16,25
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.  $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
3.  $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$  (if the raw value not contains the amplifier);
4.  $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$  (if the raw value contains the amplifier).
5.  $\text{Margin value} = \text{Emission level} - \text{Limit value}$ .

### <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:

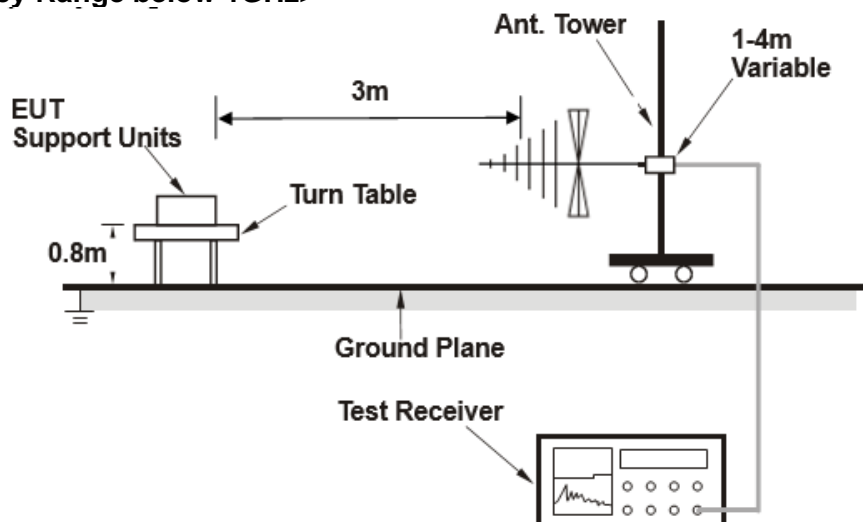
- . The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- . The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of 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.
- .  $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
- .  $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$  (if the raw value not contains the amplifier);
- .  $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$  (if the raw value contains the amplifier)
- .  $\text{Margin value} = \text{Emission level} - \text{Limit value}.$

## 2.2.4 DEVIATION FROM TEST STANDARD

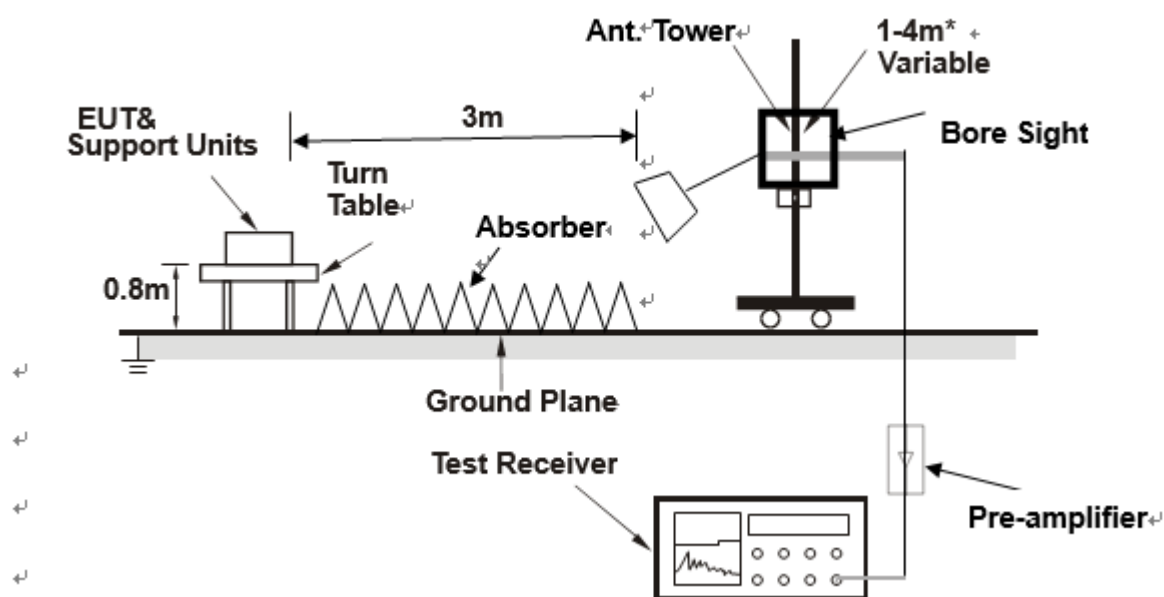
No deviation.

## 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

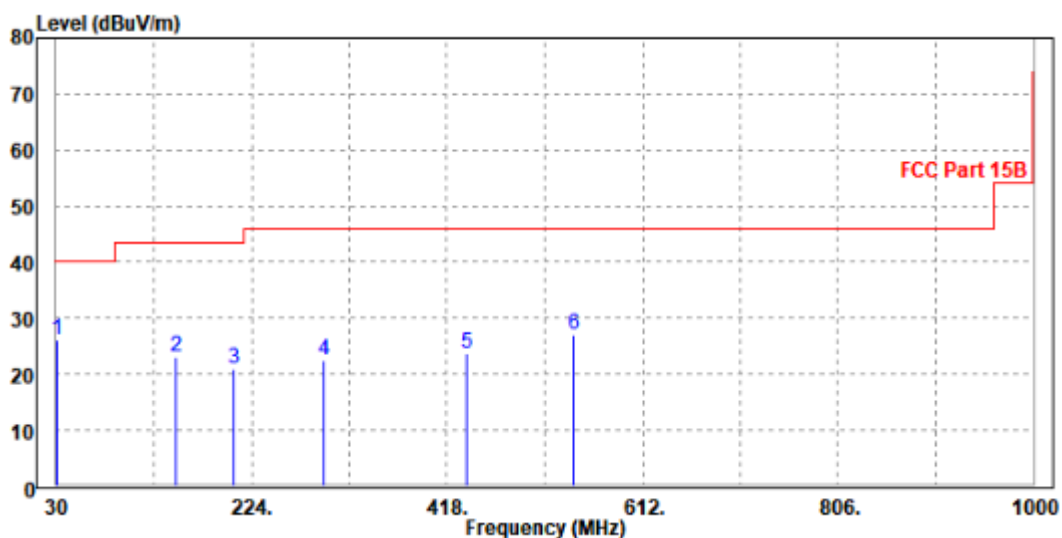
Acceleromete alternative worst case:

TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	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 PP	30.970	26.27	32.95	40.00	-13.73	-6.68	Peak	Horizontal
2	148.340	23.26	38.20	43.50	-20.24	-14.94	Peak	Horizontal
3	206.540	21.12	34.10	43.50	-22.38	-12.98	Peak	Horizontal
4	295.780	22.41	33.05	46.00	-23.59	-10.64	Peak	Horizontal
5	437.400	23.68	29.86	46.00	-22.32	-6.18	Peak	Horizontal
6	544.100	26.99	28.91	46.00	-19.01	-1.92	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.

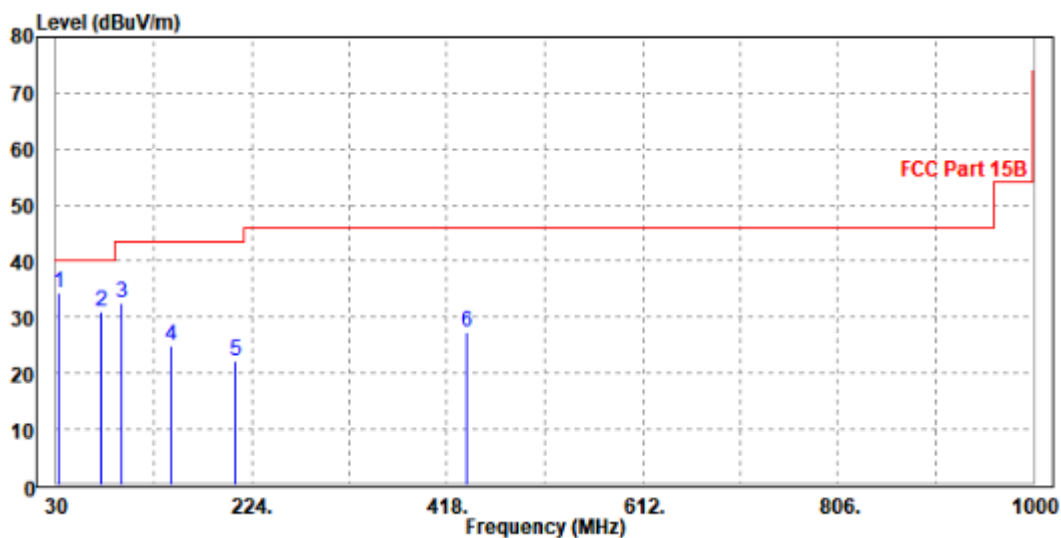


TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70% RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak , 120 kHz
TESTED BY	Jace Hu		

**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 PP	32.910	34.42	41.93	40.00	-5.58	-7.51	Peak	Vertical
2	74.620	31.00	48.86	40.00	-9.00	-17.86	Peak	Vertical
3	94.990	32.56	49.42	43.50	-10.94	-16.86	Peak	Vertical
4	143.490	25.04	40.75	43.50	-18.46	-15.71	Peak	Vertical
5	208.480	22.32	35.21	43.50	-21.18	-12.89	Peak	Vertical
6	437.400	27.51	33.69	46.00	-18.49	-6.18	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.

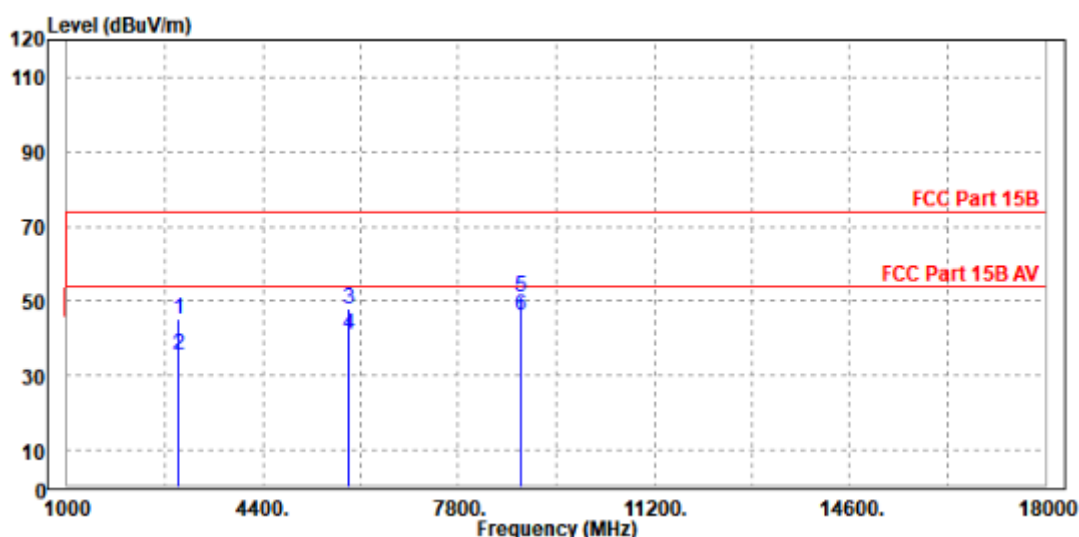


TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Jace Hu		

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
2938	45.18	49.28	74	-28.82	33.39	8.5	45.99	100	50	Peak
2938	35.72	39.82	54	-18.28	33.39	8.5	45.99	100	50	Average
5896	47.76	47.47	74	-26.24	34.99	11.71	46.41	100	150	Peak
5896	40.86	40.57	54	-13.14	34.99	11.71	46.41	100	150	Average
8888	51.17	45.89	74	-22.83	36.18	14.51	45.41	100	200	Peak
8888	46.13	40.85	54	-7.87	36.18	14.51	45.41	100	200	Average

**REMARKS:**

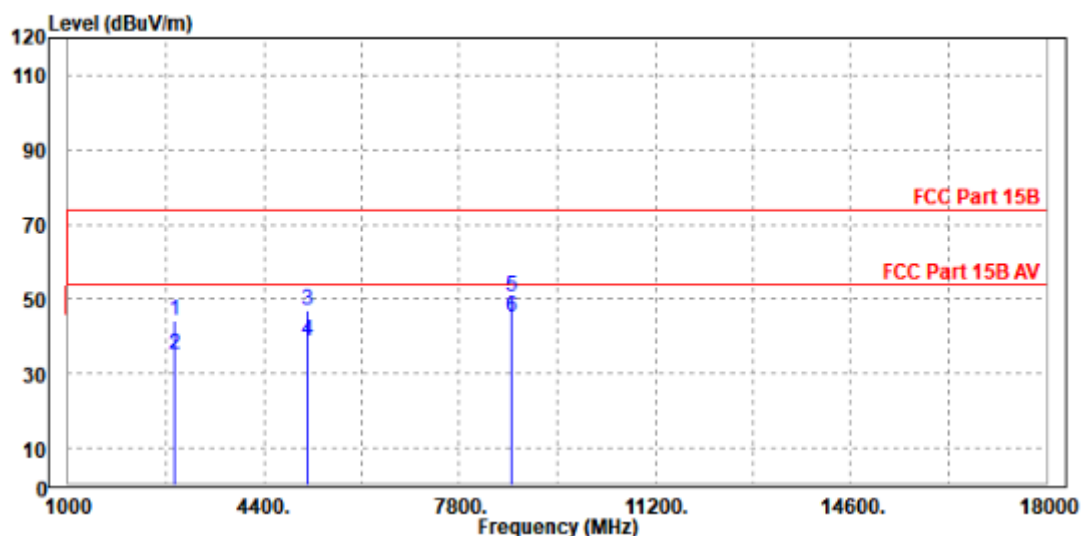
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 1GHz to 5th harmonic of the highest frequency 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
2853	44.47	49.2	74	-29.53	32.89	8.39	46.01	100	300	Peak
2853	35.08	39.81	54	-18.92	32.89	8.39	46.01	100	300	Average
5165	47.02	48.46	74	-26.98	33.97	11.18	46.59	100	250	Peak
5165	38.9	40.34	54	-15.1	33.97	11.18	46.59	100	250	Average
8701	50.76	46.28	74	-23.24	35.7	14.25	45.47	100	200	Peak
8701	45.23	40.75	54	-8.77	35.7	14.25	45.47	100	200	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---