

TEST REPORT

Applicant : Toast, Incorporated
Address of Applicant : 401 Park Drive, Suite 801, Boston, MA
02215, USA
Product Name : Data Processing Machine
Model No. : TT201/TT204

Standards : FCC CFR47 Part 15, Subpart E
RSS-Gen (Issue 5, March 2019)
RSS-407 (Issue 2, February 2017)

Date of Receipt : 2020-07-24
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1. GENERAL INFORMATION

1.1 Testing Laboratory

Company Name	ICAS Testing Technology Services (Shanghai) Co., Ltd.
Address	1298 Pingan Rd, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

1.2 Product Description for Equipment under Test (EUT)

Product Name	Data Processing machine
Brand Name	Toast
Model No.	TT201/TT204
Class type	Class B
Working Voltage	High 28V, Normal: 24 V, Low 20V
Wireless Description	WIFI 2.4GHz(802.11 B,G,N20) WIFI 5G Band 1/4 802.11a/802.11n (20MHz,40MHz) /802.11ac(20MHz,40MHz,80MHz) Bluetooth4.2 BR/EDR/HS3.0/BLE4.0
Hardware version	CT541MB80C_20191016
Software version	1.2.6/121
FCC ID	2AMNG-TT200
IC number	23177-TT200
Note :	RJ45 LINE is less than 3 meters
<p>General remarks: The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p> <p>Comments: The test results are true for the test sample(s) only.</p>	

1.3 DOCUMENT REVISION HISTORY

Revision Number	Report Number	Standard	Description of Revision
1	SHE19110012-03LE	FCC CFR47 Part 15, Subpart C RSS-Gen (Issue 5, March 2019) RSS-247 (Issue 2, February 2017)	Original Report
2	SHE20070042-02LE	FCC CFR47 Part 15, Subpart E RSS-Gen (Issue 5, March 2019) RSS-247 (Issue 2, February 2017)	Amended Report

Note:

This is an amended report application based on below reports.(issue by ICAS Testing Technology Services (Shanghai) Co., Ltd.) :
SHE19110012-03IE FCC IC BT BDEDR Test Report

Product Description –

The product covered in this report is a Data Processing Machine, intended for used with information technology equipment. Class III equipment.

This equipment consists of following critical parts:

- Data Processing Machine (Main LCD panel Terminal);
- On-Counter Guest Facing Display (Sub LCD panel Terminal)
- Attached base support;
- Adapter (Model: SOY2400400).

Model Differences –

- TT201: Main LCD panel Terminal +Sub LCD panel Terminal + Attached base support;
- TT204: Main LCD panel Terminal(Remove POE module & one speaker)+Sub LCD panel Terminal + Attached base support;

The new model name TT204 were added in this report.

Additional application considerations – (Considerations used to test a component or sub-assembly) –

Only the model name, trade name. The original test results are applicable except radiated spurious emission below 1GHz, conducted emission and continue to be representative of this device. All data please check the Original Report.

1.4 Test Methodology

47 CFR Part 15, Subpart C (10-1-16 Edition)	Miscellaneous Wireless Communications Services
FCC PUBLIC NOTICE DA 00-705 (Mar.30, 2000)	Filling and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
RSS-Gen (Issue 5, March 2019)	General Requirements for Compliance of Radio Apparatus

RSS-247 (Issue 2, February 2017)	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Note(s):

All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

2 Test Condition**2.1 Environmental conditions**

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

2.2 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Due Date
Spectrum Analyzer	Keysight	N9020B	MY59260184	2020-07-28
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2021-06-24
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2021-06-19
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2021-06-19
V-network	SCHWARZBECK	NSLK 8127	8127-902	202102-20
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	100687	2020-08-22
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2021-06-06
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2021-06-06
Loop Antenna	SCHWARZBECK	FMZB 1513	N/A	2021-03-19
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2021-07-26
Test Software	BL	BL410_E	N/A	N/A

2.3 Measurement Uncertainty

Parameter	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	30 MHz – 1 GHz	± 3 dB
	> 1GHz	± 3 dB

3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software was control EUT work in continuous transmitter and receiver mode. Select test channel as below:

For 802.11a/n(HT20), 802.11ac(VHT20)

Band I (5150 – 5250 MHz)		Band IV (5725 – 5850 MHz)	
Channel	Frequency	Channel	Frequency
The lowest channel(CH36)	5180MHz	The lowest channel(CH149)	5745MHz
The middle channel(CH44)	5220MHz	The middle channel(CH157)	5785MHz
The highest channel(CH48)	5240MHz	The highest channel(CH165)	5825MHz

For 802.11n(HT40), 802.11ac(VHT40)

Band I (5150 – 5250 MHz)		Band IV (5725 – 5850 MHz)	
Channel	Frequency	Channel	Frequency
The lowest channel(CH38)	5190MHz	The lowest channel(CH151)	5755MHz
The highest channel(CH46)	5230MHz	The highest channel(CH159)	5795MHz

For 802.11ac(VHT80)

Band I (5150 – 5250 MHz)		Band IV (5725 – 5850 MHz)	
Channel	Frequency	Channel	Frequency
The lowest channel(CH42)	5210MHz	The lowest channel(CH155)	5775MHz

Through Pre-scan under all rate at lowest channel, the data rate as below table described is the worst case, so we choose these data rate for test.

Type	Data rate
802.11a	6Mbps
802.11n(HT20), 802.11ac(VHT20)	MCS0
802.11n(HT40), 802.11ac(VHT40)	MCS0
802.11ac(VHT80)	MCS0

The basic operation modes are:

- A. On
 1. BR/EDR mode
 - a. Transmitting
 - i. Low Channel
 - ii. Middle Channel
 - iii. High Channel
 - iv. Hopping mode
 - b. Receiving
 2. Normal working with Bluetooth on
- B. Standby
- C. Off

3.2 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	TP00083A	N/A

3.3 Support Software

Description	Manufacturer	Software Name
Software	/	RF Test Tool

3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

4 Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Spurious Emission

RESULT:

PASS

Test standard : FCC Part 15.407(b)
 RSS-247 6.2
 Requirement : ANSI C63.10-2013
 Kind of test site : 3m Semi-Anechoic Chamber

Test setup

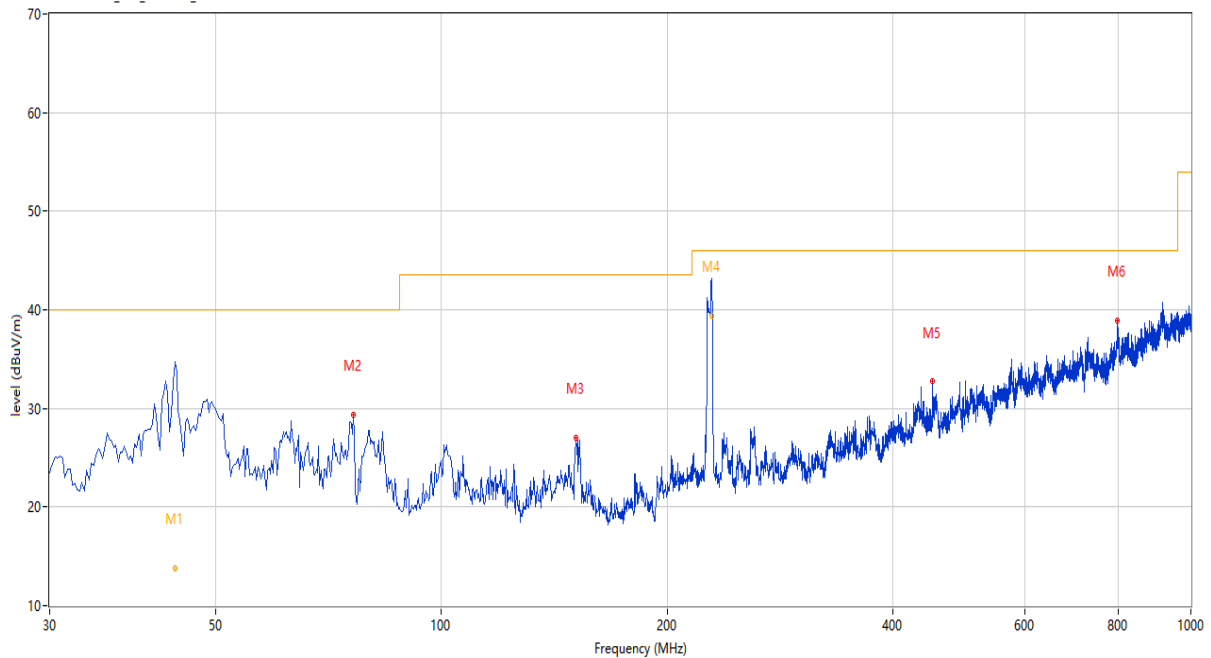
Test Channel : Low/Middle/High
 Operation Mode : A
 Ambient temperature : 26°C
 Relative humidity : 52%

4.1.2 Test record

TT204

AC port 110V:

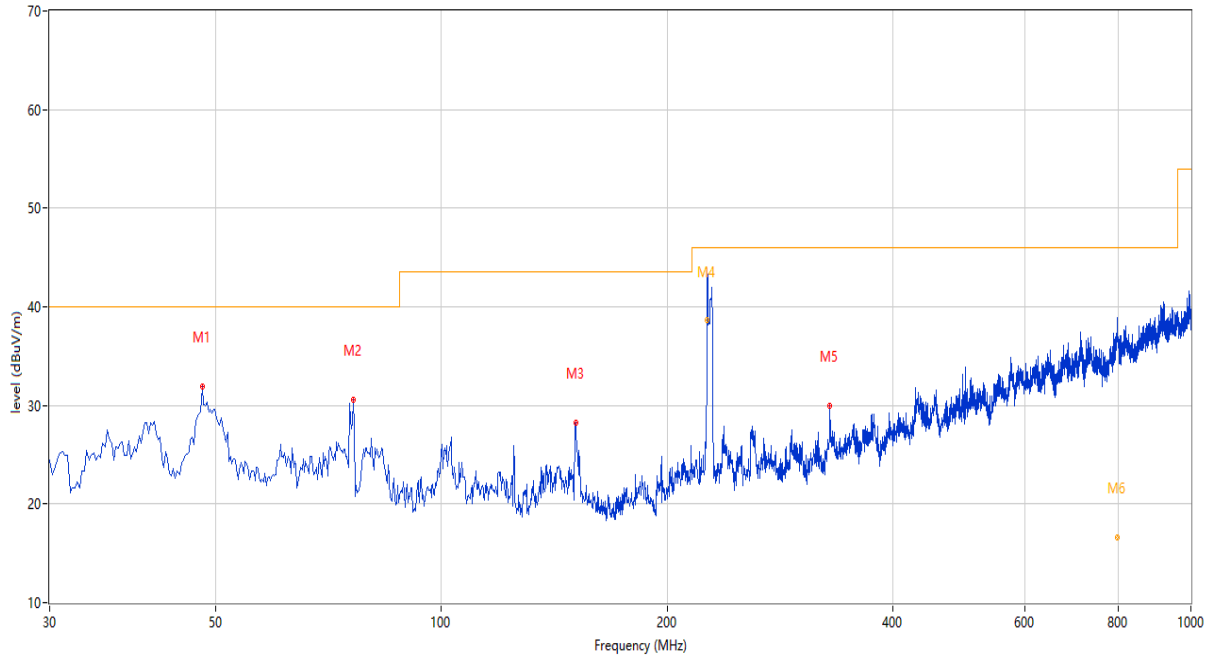
R Emission Test case_FCC_Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	44.142	18.60	-25.40	40.0	-21.40	Peak	0.00	100	Horizontal	Pass
1*	44.142	13.74	-25.40	40.0	-26.26	QP	0.00	100	Horizontal	Pass
2	76.306	29.31	-30.56	40.0	-10.69	Peak	353.60	100	Horizontal	Pass
3	151.220	27.05	-28.38	43.5	-16.45	Peak	0.00	200	Horizontal	Pass
4	229.278	43.60	-25.70	46.0	-2.40	Peak	0.00	114	Horizontal	Pass
4*	229.278	39.44	-25.70	46.0	-6.56	QP	0.00	114	Horizontal	Pass
5	452.572	32.73	-19.76	46.0	-13.27	Peak	226.80	100	Horizontal	Pass

6	798.048	38.87	-11.45	46.0	-7.13	Peak	0.00	200	Horizontal	Pass
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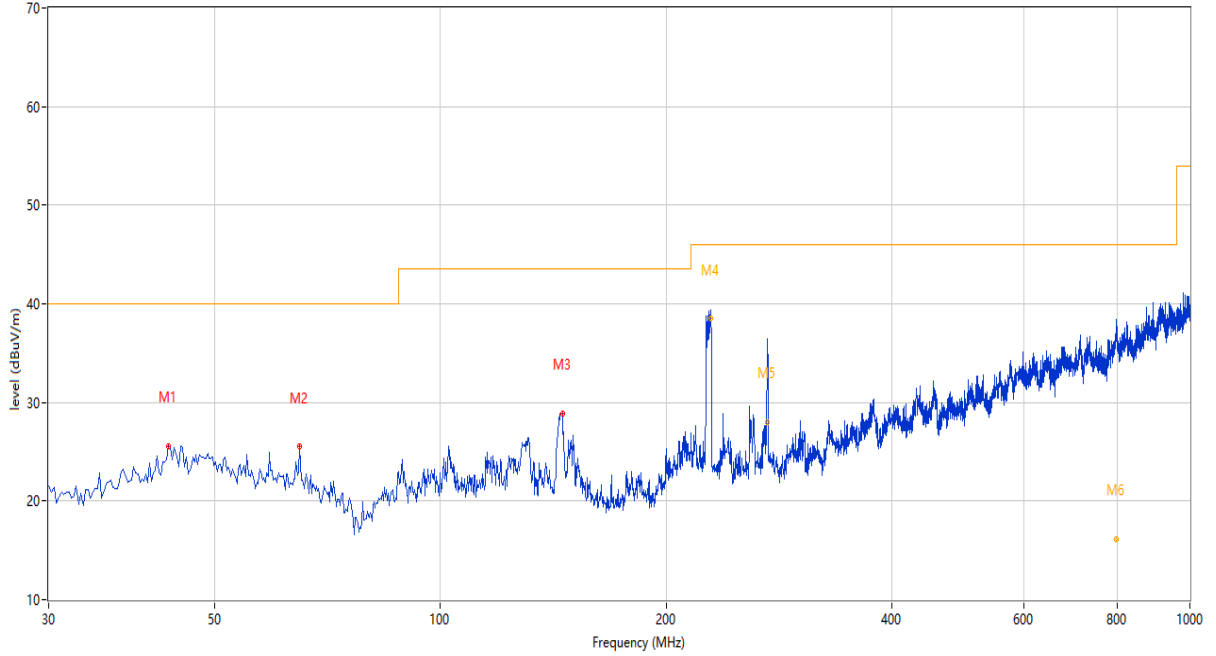
REmission Test case_FCC_Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	47.941	31.95	-23.67	40.0	-8.05	Peak	0.00	200	Vertical	Pass
2	76.306	30.57	-30.56	40.0	-9.43	Peak	195.90	100	Vertical	Pass
3	150.977	28.21	-28.42	43.5	-15.29	Peak	1.00	100	Vertical	Pass
4	226.431	43.02	-25.79	46.0	-2.98	Peak	0.00	108	Vertical	Pass
4*	226.431	38.65	-25.79	46.0	-7.35	QP	0.00	108	Vertical	Pass
5	329.898	29.94	-21.50	46.0	-16.06	Peak	178.80	100	Vertical	Pass
6	797.971	22.58	-11.45	46.0	-23.42	Peak	359.70	349	Vertical	Pass
6*	797.971	16.58	-11.45	46.0	-29.42	QP	359.70	349	Vertical	Pass

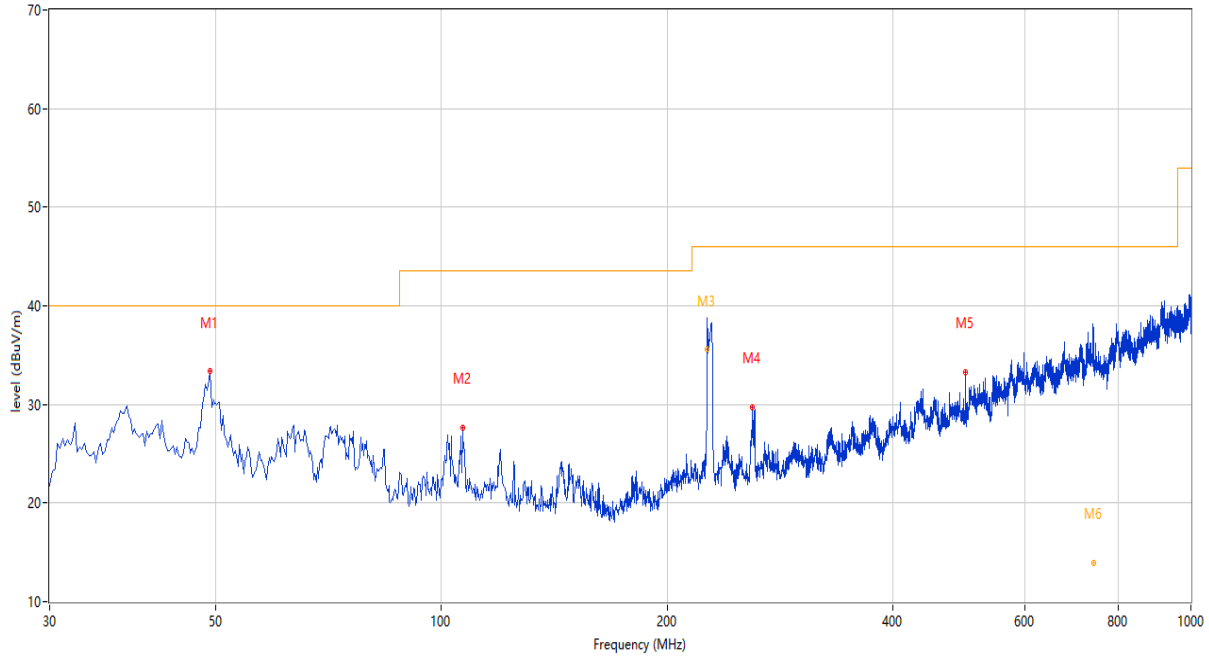
AC port 230V:

REmission Test case_FCC_Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.334	25.61	-25.76	40.0	-14.39	Peak	309.20	200	Horizontal	Pass
2	64.911	25.50	-26.05	40.0	-14.50	Peak	192.40	100	Horizontal	Pass
3	145.401	28.91	-29.40	43.5	-14.59	Peak	317.40	200	Horizontal	Pass
4	229.278	42.43	-25.70	46.0	-3.57	Peak	86.30	130	Horizontal	Pass
4*	229.278	38.52	-25.70	46.0	-7.48	QP	86.30	130	Horizontal	Pass
5	272.969	35.50	-24.58	46.0	-10.50	Peak	95.30	113	Horizontal	Pass
5*	272.969	27.99	-24.58	46.0	-18.01	QP	95.30	113	Horizontal	Pass
6	797.310	22.51	-11.80	46.0	-23.49	Peak	232.20	301	Horizontal	Pass
6*	797.310	16.16	-11.80	46.0	-29.84	QP	232.20	301	Horizontal	Pass

REmission Test case_FCC_Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	49.153	33.35	-23.97	40.0	-6.65	Peak	346.30	100	Vertical	Pass
2	106.611	27.67	-27.16	43.5	-15.83	Peak	178.50	100	Vertical	Pass
3	226.431	40.26	-25.79	46.0	-5.74	Peak	0.50	109	Vertical	Pass
3*	226.431	35.59	-25.79	46.0	-10.41	QP	0.50	109	Vertical	Pass
4	260.075	29.68	-25.31	46.0	-16.32	Peak	0.00	200	Vertical	Pass
5	499.848	33.31	-20.12	46.0	-12.69	Peak	40.40	100	Vertical	Pass
6	741.079	19.85	-14.68	46.0	-26.15	Peak	42.20	113	Vertical	Pass
6*	741.079	13.96	-14.68	46.0	-32.04	QP	42.20	113	Vertical	Pass

Notes:

1. All the frequency is tested, the report only show the main difference test data.
2. Above 1GHz test data please refer to the original test report : "SHE19110012-03LE FCC IC WLAN 5G Test Report"
3. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.
4. The EUT is working in the Normal link mode below 1 GHz.

4.2 Mains Emissions

4.2.1 Conducted Emission on AC

RESULT:

PASS

Test standard : FCC Part 15.207(a)
 RSS-Gen 8.8
 Requirement : ANSI C63.10-2013
 Kind of test site : Shielded room

Test setup

Input Voltage : AC 120V, 60Hz; AC 240V, 50Hz Operation
 Operation Mode : A
 Earthing : Not Connected
 Ambient temperature : 25°C
 Relative humidity : 50%

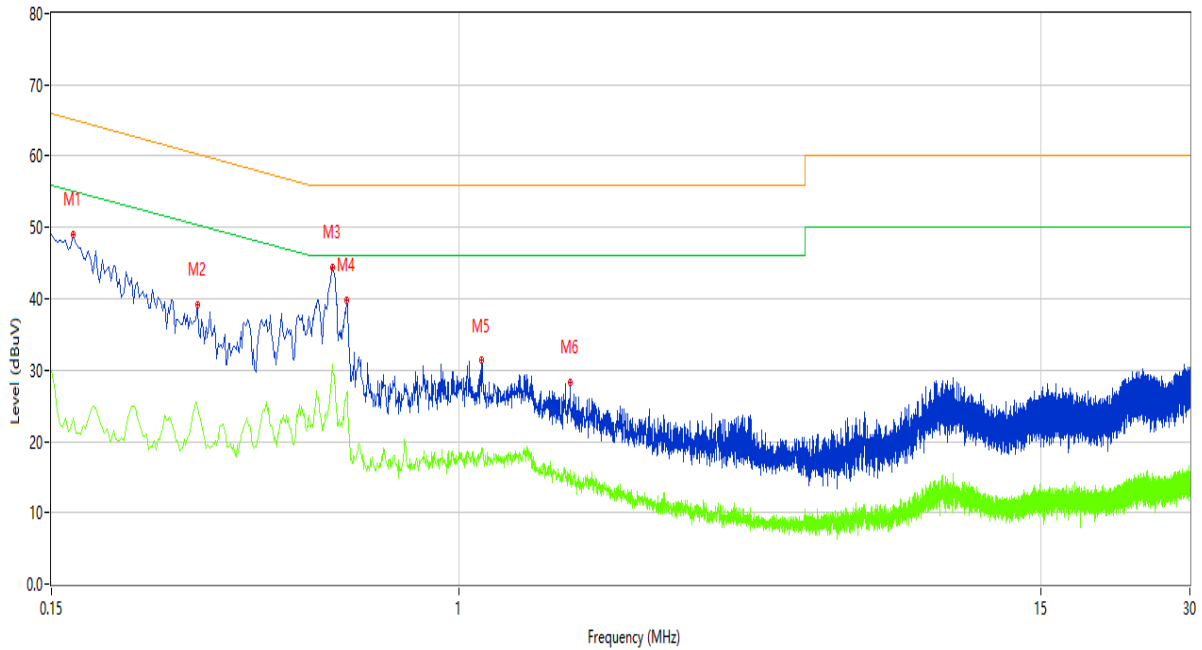
For details refer to following test plot.

Note: The all configurations were tested respectively, but only the worst configuration shown here.
 Figure 1: Conducted Emission on AC Mains, L Phase

TT204

AC port 110V:

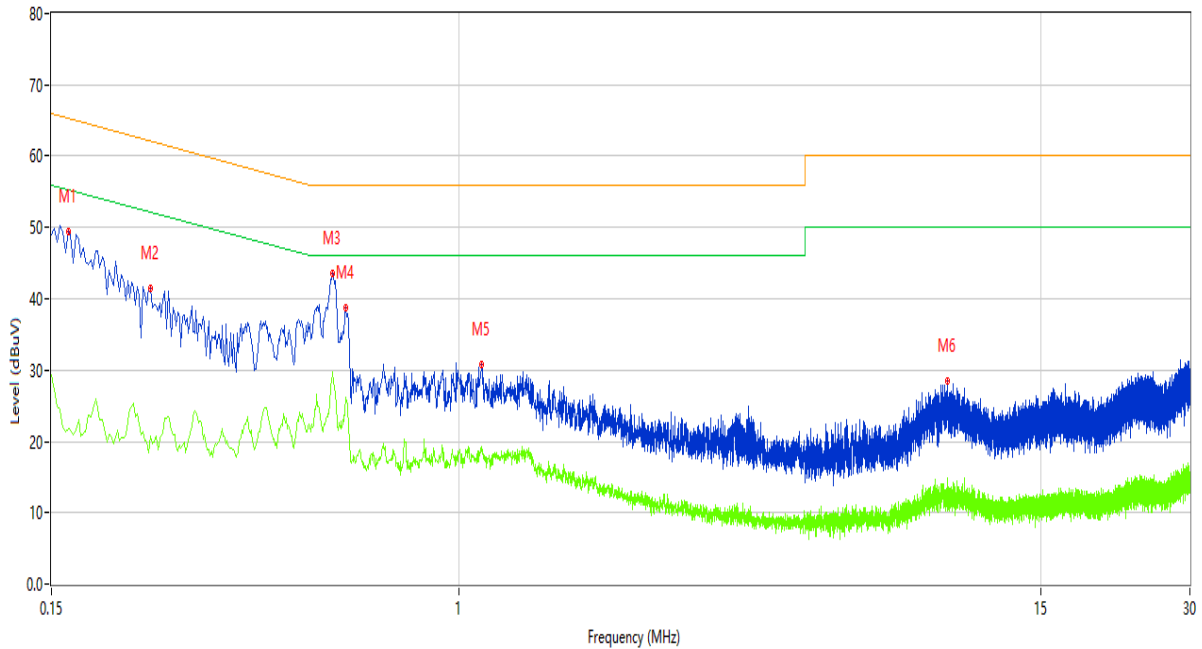
CEmission Test case_FCC_CE_FCC PART 15B_Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.166	49.20	10.15	65.16	-15.96	Peak	L	Pass
1*	0.166	41.32	10.15	65.16	-23.84	QP	L	Pass
1**	0.166	23.21	10.15	55.16	-31.95	AV	L	Pass
2	0.296	41.65	10.14	60.35	-18.70	Peak	L	Pass
2*	0.296	33.02	10.14	60.35	-27.33	QP	L	Pass

2**	0.296	24.82	10.14	50.35	-25.53	AV	L	Pass
3	0.554	45.24	10.15	56.00	-10.76	Peak	L	Pass
3*	0.554	42.30	10.15	56.00	-13.70	QP	L	Pass
3**	0.554	30.74	10.15	46.00	-15.26	AV	L	Pass
4	0.592	40.55	10.15	56.00	-15.45	Peak	L	Pass
4*	0.592	37.40	10.15	56.00	-18.60	QP	L	Pass
4**	0.592	26.59	10.15	46.00	-19.41	AV	L	Pass
5	1.108	31.64	10.16	56.00	-24.36	Peak	L	Pass
5*	1.108	25.03	10.16	56.00	-30.97	QP	L	Pass
5**	1.108	18.21	10.16	46.00	-27.79	AV	L	Pass
6	1.676	28.49	10.17	56.00	-27.51	Peak	L	Pass
6*	1.676	20.74	10.17	56.00	-35.26	QP	L	Pass
6**	1.676	15.87	10.17	46.00	-30.13	AV	L	Pass

CEmission Test case_FCC_CE_FCC PART 15B_Class B

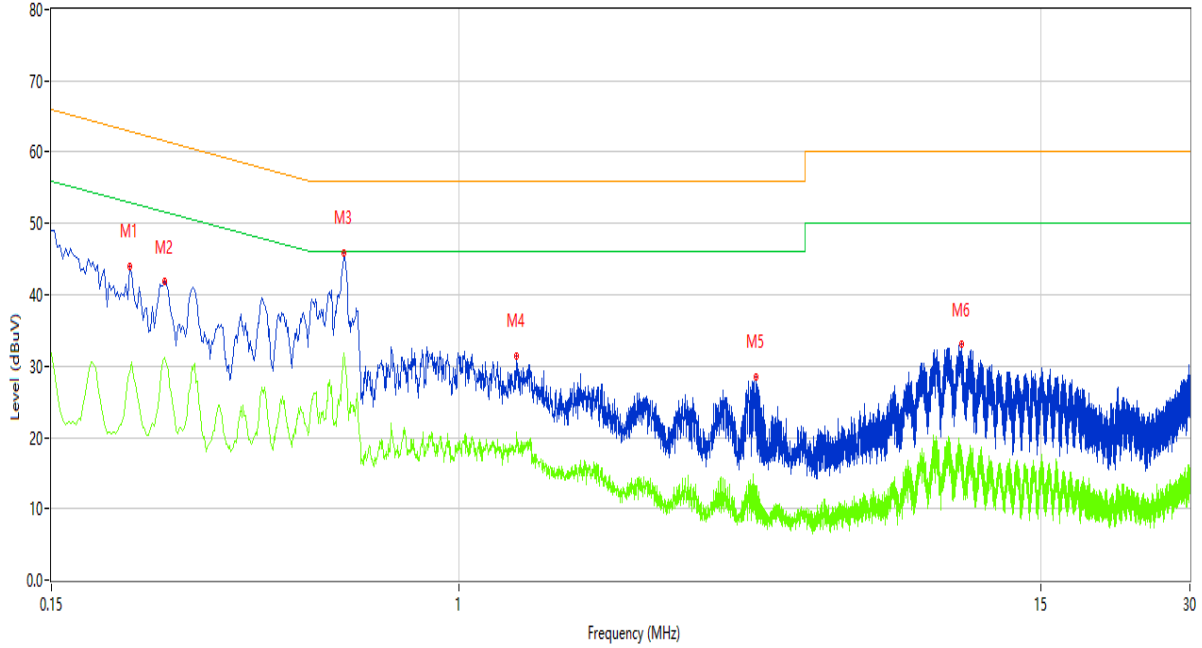


No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.162	51.34	10.15	65.36	-14.02	Peak	N	Pass
1*	0.162	42.50	10.15	65.36	-22.86	QP	N	Pass
1**	0.162	21.85	10.15	55.36	-33.51	AV	N	Pass
2	0.238	43.35	10.14	62.17	-18.82	Peak	N	Pass
2*	0.238	34.70	10.14	62.17	-27.47	QP	N	Pass
2**	0.238	20.77	10.14	52.17	-31.40	AV	N	Pass
3	0.554	44.42	10.15	56.00	-11.58	Peak	N	Pass
3*	0.554	41.52	10.15	56.00	-14.48	QP	N	Pass
3**	0.554	29.75	10.15	46.00	-16.25	AV	N	Pass
4	0.590	39.86	10.15	56.00	-16.14	Peak	N	Pass
4*	0.590	35.95	10.15	56.00	-20.05	QP	N	Pass
4**	0.590	26.21	10.15	46.00	-19.79	AV	N	Pass
5	1.110	32.75	10.16	56.00	-23.25	Peak	N	Pass
5*	1.110	26.39	10.16	56.00	-29.61	QP	N	Pass

5**	1.110	19.29	10.16	46.00	-26.71	AV	N	Pass
6	9.726	29.33	10.38	60.00	-30.67	Peak	N	Pass
6*	9.726	24.27	10.38	60.00	-35.73	QP	N	Pass
6**	9.726	12.58	10.38	50.00	-37.42	AV	N	Pass

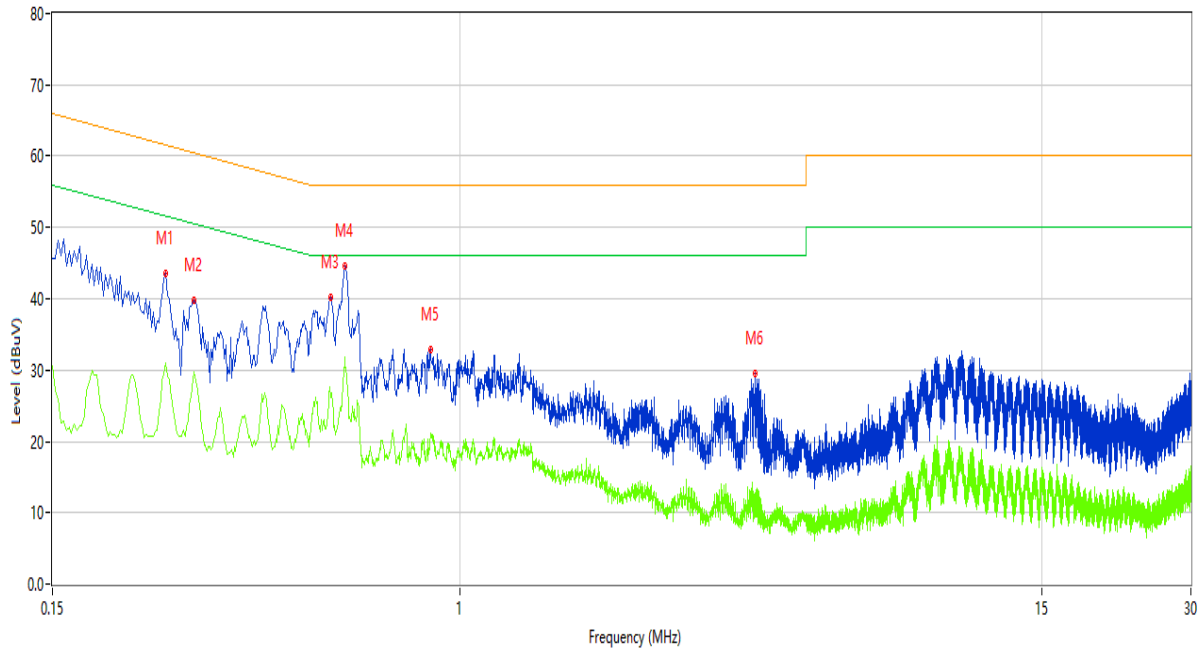
AC port 230V:

CEmission Test case_FCC_CE_FCC PART 15B_Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.216	46.44	10.14	62.97	-16.53	Peak	L	Pass
1*	0.216	39.10	10.14	62.97	-23.87	QP	L	Pass
1**	0.216	29.09	10.14	52.97	-23.88	AV	L	Pass
2	0.254	45.72	10.14	61.63	-15.91	Peak	L	Pass
2*	0.254	40.55	10.14	61.63	-21.08	QP	L	Pass
2**	0.254	31.18	10.14	51.63	-20.45	AV	L	Pass
3	0.586	46.50	10.15	56.00	-9.50	Peak	L	Pass
3*	0.586	43.78	10.15	56.00	-12.22	QP	L	Pass
3**	0.586	31.55	10.15	46.00	-14.45	AV	L	Pass
4	1.308	33.86	10.16	56.00	-22.14	Peak	L	Pass
4*	1.308	25.28	10.16	56.00	-30.72	QP	L	Pass
4**	1.308	20.64	10.16	46.00	-25.36	AV	L	Pass
5	3.984	29.57	10.25	56.00	-26.43	Peak	L	Pass
5*	3.984	23.91	10.25	56.00	-32.09	QP	L	Pass
5**	3.984	13.18	10.25	46.00	-32.82	AV	L	Pass
6	10.350	34.04	10.41	60.00	-25.96	Peak	L	Pass
6*	10.350	29.80	10.41	60.00	-30.20	QP	L	Pass
6**	10.350	16.52	10.41	50.00	-33.48	AV	L	Pass

CEmission Test case_FCC_CE_FCC PART 15B_Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.254	45.07	10.14	61.63	-16.56	Peak	N	Pass
1*	0.254	39.68	10.14	61.63	-21.95	QP	N	Pass
1**	0.254	30.94	10.14	51.63	-20.69	AV	N	Pass
2	0.290	43.46	10.14	60.52	-17.06	Peak	N	Pass
2*	0.290	38.36	10.14	60.52	-22.16	QP	N	Pass
2**	0.290	29.80	10.14	50.52	-20.72	AV	N	Pass
3	0.548	41.46	10.15	56.00	-14.54	Peak	N	Pass
3*	0.548	38.24	10.15	56.00	-17.76	QP	N	Pass
3**	0.548	26.18	10.15	46.00	-19.82	AV	N	Pass
4	0.584	45.21	10.15	56.00	-10.79	Peak	N	Pass
4*	0.584	42.54	10.15	56.00	-13.46	QP	N	Pass
4**	0.584	31.90	10.15	46.00	-14.10	AV	N	Pass
5	0.872	34.05	10.15	56.00	-21.95	Peak	N	Pass
5*	0.872	29.14	10.15	56.00	-26.86	QP	N	Pass
5**	0.872	21.10	10.15	46.00	-24.90	AV	N	Pass
6	3.948	29.95	10.25	56.00	-26.05	Peak	N	Pass
6*	3.948	24.16	10.25	56.00	-31.84	QP	N	Pass
6**	3.948	11.95	10.25	46.00	-34.05	AV	N	Pass

END OF REPORT