



TEST REPORT

No. I19D00071-SAR01

For

Client : Toast, Inc.

Production : Data Processing machine

Model Name : TT200/TK200/TT201/TT202

Brand Name: Toast

FCC ID: 2AMNG-TT200

IC ID: 23177-TT200

Hardware Version: CT541MB80C

Software Version: 1.2.6/121

Issued date: 2019-08-21

NOTE

1. The test results in this test report relate only to the devices specified in this report.
2. This report shall not be reproduced except in full without the written approval of East China Institute of Telecommunications.
3. For the test results, the uncertainty of measurement is not taken into account when judging the compliance with specification, and the results of measurement or the average value of measurement results are taken as the criterion of the compliance with specification directly.
4. It has been confirmed with the customer that the Highest Frame-Averaged Output Power and Antenna gain information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences will be borne by the customer.

Test Laboratory:

East China Institute of Telecommunications

Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

Tel: +86 21 63843300

FAX: +86 21 63843301

E-Mail: welcome@ecit.org.cn

Revision Version

Report Number	Revision	Date	Memo
I19D00071-SAR01	00	2019-08-15	Initial creation of test report
I19D00071-SAR01	01	2019-08-21	Second creation of test report

CONTENTS

1.	TEST LABORATORY	5
1.1.	TESTING LOCATION	5
1.2.	PROJECT DATA	5
1.3.	SIGNATURE	5
2.	CLIENT INFORMATION	6
2.1.	APPLICANT INFORMATION	6
2.2.	MANUFACTURER INFORMATION	6
3.	EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	7
3.1.	ABOUT EUT	7
3.2.	INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	7
3.3.	INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	7
4.	REFERENCE DOCUMENTS FOR FCC	8
4.1.	APPLICABLE STANDARDS	8
4.2.	TEST LIMITS	8
5.	TEST RESULTS	9
5.1.	RF POWER OUTPUT	9
5.2.	CALCULATION INFORMATION	10
5.3.	POWER DENSITY CALCULATIONS	11
6.	REFERENCE DOCUMENTS FOR IC	12
6.1.	APPLICABLE STANDARDS	12
6.2.	TEST LIMITS	12
6.3.	RF POWER OUTPUT	13
6.4.	CALCULATION INFORMATION	14
6.5.	RESULT OF EUT	14

1. Test Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301
FCC Registration NO.:	489729

1.2. Project Data

Project Leader:	Zhou Yan
-----------------	----------

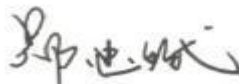
1.3. Signature



Yan Hang
(Prepared this test report)



Fu Erliang
(Reviewed this test report)



Zheng Zhongbin
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: Toast, Inc.
Address: 401 Park Drive, Suite 801, Boston, MA 02215, USA
Telephone: (562) 546-2272
Postal Code: N/A

2.2. Manufacturer Information

Company Name: Toast, Inc.
Address: 401 Park Drive, Suite 801, Boston, MA 02215, USA
Telephone: N/A
Postal Code: N/A

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	Data Processing machine
Model name	TT200/TK200/TT201/TT202
WLAN 2.4G Frequency Band	a/b/g/n/ac
BT Frequency Band	BT;BLE

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N01 (TT200/TK200)	LS01D94D40011	CT541MB80C	1.2.6/121	2019-05-10
N06 (TT201)	LS02D94D40001	CT541MB80C	1.2.6/121	2019-05-10
N06 (TT202)	LS01D94D40028	CT541MB80C	1.2.6/121	2019-05-10

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
--	--	--	--	--

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents For FCC

4.1. Applicable Standards

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.

FCC CFR 47, Part 2, FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

Section 1.1310 Radiofrequency radiation exposure limits

4.2. Test Limits

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

Limits for Occupational / Controlled Exposure

Frequency Range [MHz]	Electric Field Strength (E) [V/m]	Magnetic Field Strength (H) [A/m]	Power Density (S) [mW/cm ²]	Averaging Times E ² , H ² or S [minutes]
0.3 – 3.0	614	1.63	(100)*	6
3.0 – 30	1824/f	4.89/f	(900/f)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	--	--	F/300	6
1500 - 100000	--	--	5	6

Limits for General Population / Uncontrolled Exposure

Frequency Range [MHz]	Electric Field Strength (E) [V/m]	Magnetic Field Strength (H) [A/m]	Power Density (S) [mW/cm ²]	Averaging Times E ² , H ² or S [minutes]
0.3 – 1.34	614	1.63	(100)*	30
1.34 – 30	824/f	2.19/f	(180/f)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	--	--	F/1500	30
1500 - 100000	--	--	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

For the DUT, the limits for General Population / Uncontrolled Exposure are applicable.

5. Test Results

5.1. RF Power Output

Band	Max power(dBm)	Highest Frame-Averaged Output Power (dBm)	Antenna Gain (dBi)
WLAN 2.4G 802.11b	18	18	1.92
WLAN 2.4G 802.11g	18	18	1.92
WLAN 2.4G 802.11 n20	18	18	1.92
WLAN 5G U-NII-1 802.11a	14	14	1.92
WLAN 5G U-NII-1 802.11n20	14	14	1.92
WLAN 5G U-NII-1 802.11n40	17	17	1.92
WLAN 5G U-NII-1 802.11ac20	14	14	1.92
WLAN 5G U-NII-1 802.11ac40	17	17	1.92
WLAN 5G U-NII-1 802.11ac80	12	12	1.92
WLAN 5G U-NII-3 802.11a	14	14	2.04
WLAN 5G U-NII-3 802.11n20	14	14	2.04
WLAN 5G U-NII-3 802.11n40	14	14	2.04
WLAN 5G U-NII-3 802.11ac20	14	14	2.04
WLAN 5G U-NII-3 802.11ac40	14	14	2.04
WLAN 5G U-NII-3 802.11ac80	15	15	2.04
BT	9	9	1.92
BLE	5	5	1.92

5.2. Calculation Information

For conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC KDB 447498 D01 and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

$$\text{Given } S = \frac{P \times G}{4\pi d^2} \qquad \text{Equation 1}$$

Where

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

5.3. Power density calculations

Band	Highest Output Power (dBm)	Antenna Gain (dBi)	Numeric antenna gain	Power density at 20cm	Limit mW/cm ²
WLAN 2.4G 802.11b	18	1.92	1.556	0.020	1.0
WLAN 2.4G 802.11g	18	1.92	1.556	0.020	1.0
WLAN 2.4G 802.11 n20	18	1.92	1.556	0.020	1.0
WLAN 5G U-NII-1 802.11a	14	1.92	1.556	0.008	1.0
WLAN 5G U-NII-1 802.11n20	14	1.92	1.556	0.008	1.0
WLAN 5G U-NII-1 802.11n40	17	1.92	1.556	0.016	1.0
WLAN 5G U-NII-1 802.11ac20	14	1.92	1.556	0.008	1.0
WLAN 5G U-NII-1 802.11ac40	17	1.92	1.556	0.016	1.0
WLAN 5G U-NII-1 802.11ac80	12	1.92	1.556	0.005	1.0
WLAN 5G U-NII-3 802.11a	14	2.04	1.600	0.008	1.0
WLAN 5G U-NII-3 802.11n20	14	2.04	1.600	0.008	1.0
WLAN 5G U-NII-3 802.11n40	14	2.04	1.600	0.008	1.0
WLAN 5G U-NII-3 802.11ac20	14	2.04	1.600	0.008	1.0
WLAN 5G U-NII-3 802.11ac40	14	2.04	1.600	0.008	1.0
WLAN 5G U-NII-3 802.11ac80	15	2.04	1.600	0.010	1.0
BT	9	1.92	1.556	0.002	1.0
BLE	5	1.92	1.556	0.001	1.0

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band

The product is under the MPE limits. All is pass.

6. Reference Documents For IC

6.1. Applicable Standards

RSS 102 Issue 5 :Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)

6.2. Test Limits

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $22.48/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

Note: f=frequency in MHz; *Plane-wave equivalent power density

For the DUT, the limits for General Population / Uncontrolled Exposure are applicable.

6.3. RF Power Output

Band	Max power(dBm)	Highest Frame-Averaged Output Power (dBm)	Antenna Gain (dBi)
WLAN 2.4G 802.11b	18	18	1.92
WLAN 2.4G 802.11g	18	18	1.92
WLAN 2.4G 802.11 n20	18	18	1.92
WLAN 5G U-NII-1 802.11a	14	14	1.92
WLAN 5G U-NII-1 802.11n20	14	14	1.92
WLAN 5G U-NII-1 802.11n40	17	17	1.92
WLAN 5G U-NII-1 802.11ac20	14	14	1.92
WLAN 5G U-NII-1 802.11ac40	17	17	1.92
WLAN 5G U-NII-1 802.11ac80	12	12	1.92
WLAN 5G U-NII-3 802.11a	14	14	2.04
WLAN 5G U-NII-3 802.11n20	14	14	2.04
WLAN 5G U-NII-3 802.11n40	14	14	2.04
WLAN 5G U-NII-3 802.11ac20	14	14	2.04
WLAN 5G U-NII-3 802.11ac40	14	14	2.04
WLAN 5G U-NII-3 802.11ac80	15	15	2.04
BT	9	9	1.92
BLE	5	5	1.92

6.4. Calculation Information

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834} \text{ W}$ (adjusted for tune-up tolerance), where f is in MHz;

6.5. Result of EUT

The MPE limit for Occupational/Controlled Exposure is shown in the RSS 102 issue 5 section 2.5.2, can be calculated as follows:

Frequency Band	Highest Output Power (dBm)	Antenna Gain(dBi)	EIRP/EIP (W)	MPE limit (W)
WLAN 2.4G 802.11b	18	1.92	0.098	2.68
WLAN 2.4G 802.11g	18	1.92	0.098	2.68
WLAN 2.4G 802.11 n20	18	1.92	0.098	2.68
WLAN 5G U-NII-1 802.11a	14	1.92	0.039	4.53
WLAN 5G U-NII-1 802.11n20	14	1.92	0.039	4.53
WLAN 5G U-NII-1 802.11n40	17	1.92	0.078	4.53
WLAN 5G U-NII-1 802.11ac20	14	1.92	0.039	4.53
WLAN 5G U-NII-1 802.11ac40	17	1.92	0.078	4.53
WLAN 5G U-NII-1 802.11ac80	12	1.92	0.025	4.54
WLAN 5G U-NII-3 802.11a	14	2.04	0.040	4.86
WLAN 5G U-NII-3 802.11n20	14	2.04	0.040	4.86
WLAN 5G U-NII-3 802.11n40	14	2.04	0.040	4.86
WLAN 5G U-NII-3 802.11ac20	14	2.04	0.040	4.86
WLAN 5G U-NII-3 802.11ac40	14	2.04	0.040	4.86
WLAN 5G U-NII-3 802.11ac80	15	2.04	0.051	4.87
BT	9	1.92	0.012	2.68
BLE	5	1.92	0.005	2.68

As we can see the resulted EIRP is below the MPE limit, therefore the DUT in this band is compliant with the IC rules on RF exposure.

For the DUT, the WLAN and BT modules sharing a single antenna, and sharing a single module so these can't transmit signal simultaneously.

*****END OF REPORT*****