

TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID: WHBUTR2

1. Equipment Under Test : UTR 2.0
2. Model Name : UTR 2.0
3. Variant Model Name(s) : Refer to page 3
4. Applicant : Mobile Appliance, Inc.
5. Manufacturer : Mobile Appliance, Inc.
6. Date of Receipt : 2020.06.16
7. Date of Test(s) : 2020.07.15 ~ 2020.07.23
8. Date of Issue : 2020.07.24

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

- 1) The results of this test report are effective only to the items tested.
- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.

Tested by:



Jinhyoung Cho

Technical
Manager:



Jungmin Yang

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Report Number: F690501-RF-RTL001013

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

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1.2. Details of Applicant

Applicant : Mobile Appliance, Inc.

Address : 401, Simin-daero, Dongan-gu, #1701-1706, Daerung Techno Town 15,
Gwangyang-dong, Anyang-si, Gyeonggi-do, Korea, 14057

Contact Person : Choi, Jin-oh

Phone No. : +82 31 421 8071

1.3. Details of Manufacturer

Company : Same as applicant

Address : Same as applicant

1.4. Description of EUT

Kind of Product	UTR 2.0
Model Name	UTR 2.0
Power Supply	DC 12 V
Variant Model Name(s)	Porsche Dashcam, Universal Traffic Recorder 2
Frequency Range	2 402 MHz ~ 2 480 MHz (Bluetooth Low Energy) 2 412 MHz ~ 2 462 MHz (11b/g/n_HT20) 5 755 MHz (Band 3: 11n_HT40) 5 775 MHz (Band 3: 11ac_VHT80) 24.22 GHz (24 GHz Radar)
Modulation Technique	DSSS, OFDM, GFSK, FMCW
Number of Channels	40 channels (Bluetooth Low Energy) 11 channels (11b/g/n_HT20) 1 channel (Band 3: 11n_HT40) 1 channel (Band 3: 11ac_VHT80) 1 channel (24 GHz Radar)
Antenna Type	Chip antenna Patch antenna
Antenna Gain	2 400 MHz ~ 2 483.5 MHz: 1.99 dBi (Bluetooth Low Energy) 2 400 MHz ~ 2 483.5 MHz: 2.24 dBi (WLAN 2.4G) 5 725 MHz ~ 5 850 MHz: 1.52 dBi (WLAN 5G) 24 GHz: 7 dBi (24 GHz Radar)
H/W Version	V1.0
S/W Version	V1.0

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1.5. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL001013	2020.07.24	Initial

2. RF Exposure Evaluation

2.1. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1 500	-	-	f/300	6
1 500-100 000	-	-	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1 500	-	-	f/1500	30
<u>1 500-100 000</u>	-	-	<u>1.0</u>	<u>30</u>

2.1.1. Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

2.1.2. Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data

Test Mode : Normal Operation

2.1.3. Output Power into Antenna & RF Exposure Evaluation Distance

Bluetooth Low Energy

- Maximum tune up tolerance

Frequency Range (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
2 400 ~ 2 483.5	-4	1.99	0.000 125	1

WLAN (2.4G)

- Maximum tune up tolerance

Frequency Range (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
2 400 ~ 2 483.5	15	2.24	0.010 537	1

WLAN (5G)

- Maximum tune up tolerance

Frequency Range (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
5 725 ~ 5 850	1	1.52	0.000 355	1

24 GHz Radar

- Maximum tune up tolerance

Frequency (GHz)	Radiated Filed Strength (dBμV/m)	Convert Field Strength to E.I.R.P. (dB m)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
24.22	102.11	6.88	0.000 970	1

Note;

- According to KDB 412172, E.I.R.P. = (Filed Strength (V/m) x d (m))² / 30,
d = measurement distance in meters (m)
- The power density Pd (5th column) at a distance of 20 cm calculated from the friis transmission formula is far below the limit of 1 mW/cm².
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum 20 cm between the radiator and your body.
- The antenna gain of this transmitter is less than 6 dB i and must not be collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC.
- According to KDB 447498 D01 RF Exposure Guidance 4.1.

Simultaneous transmission of RF Exposure test exclusion for worst case configuration.

Bluetooth Low Energy: the ratio is 0.000 125 / 1

WLAN: the ratio is 0.010 537 / 1

Confirm the sum result of individual MPEs ratio is ≤ 1.0 ;

Bluetooth Low Eenergy + WLAN: $(0.000\ 125 / 1) + (0.010\ 537 / 1) = 0.010\ 662 \leq 1.0$

- EUT can transmit simultaneously only Bluetooth Low Energy and WLAN.

- End of the Test Report -