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RF Exposure Evaluation Report

Report No. : CQASZ20181000044E-03
Applicant: MOC Co.,Ltd.
Address of Applicant: Room 10802-8657, 8th Floor, Rui Ji Building, No.15 Gaoxin 2 Road, High-Tech Zone, Xi'an, China
Manufacturer: GUANGZHOU BOSMA TECHNOLOGY CO.,LTD
Address of Manufacturer: FL.2, BuildingA5, NO.11 Kai-Yuan AVE., Guangzhou, China
Factory: GUANGZHOU BOSMA TECHNOLOGY CO.,LTD
Address of Factory: FL.2, BuildingA5, NO.11 Kai-Yuan AVE., Guangzhou, China
Equipment Under Test (EUT):
Product: MoC Sharing On-Board-Unit
Model No.: MOC-CS
Brand Name: MoC
FCC ID: 2ARKTMOC-CS
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06
Date of Test: 2018-10-18 to 2018-12-04
Date of Issue: 2018-12-04
Test Result : PASS*

Tested By:

Martin Lee

(Martin Lee)

Reviewed By:

Aaron Ma

(Aaron Ma)

Approved By:

Jack Ai
(Jack Ai)



* In the configuration tested, the EUT complied with the standards specified above.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20181000044E-03	Rev.01	Initial report	2018-12-04

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3 General Information

3.1 Client Information

Applicant:	MOC Co.,Ltd.
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Address of Factory:	FL.2, BuildingA5, NO.11 Kai-Yuan AVE., Guangzhou, China

3.2 General Description of EUT

Product Name:	MoC Sharing On-Board-Unit
Model No.:	MOC-CS
Trade Mark:	MoC
Hardware Version:	V2.0
Software Version:	0x510204DC
Sample Type:	☒ Mobile ☐ Portable ☐ Fix Location
Power Supply:	DC12V

3.3 General Description of BLE

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V4.0
Modulation Type:	GFSK
Number of Channel:	40
Test Software of EUT:	SmartRF_Studio_7(manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	0dBi

3.4 General Description of 2G/3G

Antenna Type:	Integral antenna
Antenna Gain:	GSM 850: 1.0dBi, GSM 1900: 1.0dBi, WCDMA 850: 1.0dBi, WCDMA 1900: 1.0dBi.

4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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
300–1500			f/300	6
1500–100,000			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
300–1500			f/1500	30
1500–100,000			1.0	30

F= Frequency in MHz

Friis Formula

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

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 is 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 r where the MPE limit is reached.

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.2 1.1.3 EUT RF Exposure Evaluation

To meet MPE requirement, the allowed maximal gain for each band is below:

Mode	Frequency Range (MHz)	Antenna Gain		Max Turn-up Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(Numeric)	(dBm)	(mW)			
BLE	2402~2480	0	1.0	-4.2	0.38	20	0.00008	1.0
GSM850	824.2-848.8	1.0	1.26	31	1258.925	20	0.315	0.549
GSM1900	1850.2-1909.8	1.0	1.26	28	630.957	20	0.158	1.0
WCDMA (Band 2)	1852.4-1907.6	1.0	1.26	23.0	199.53	20	0.05	1.0
WCDMA (Band 5)	826.4-846.6	1.0	1.26	22.0	158.49	20	0.04	0.551

Note:

1. The device meets FCC MPE at 20 cm distance.
2. Target Power =the max power including Tune-up tolerance, the tune up power declared by manufacture as:

BLE: -4.2 dBm;
GSM850: 31 dBm;
GSM1900: 28.0 dBm;
WCDMA Band 2: 23 dBm;
WCDMA Band 5: 22 dBm;