

TEST REPORT

Reference No..... : WTS20S04015152W
FCC ID : 2AG32MBS31001
Applicant..... : Baicells Technologies Co., Ltd.
Address..... : 3F, Hui Yuan Development Building, No.1 Shangdi Information
Industry Base, Haidian Dist., Beijing, China
Manufacturer : The same as above
Address..... : The same as above
Product..... : LTE TDD Base Station
Model(s) : mBS31001
Brand Name..... : BaiCells
Standards..... : FCC 1.1307
Date of Receipt sample : 2020-04-01
Date of Test : 2020-04-02 to 2020-04-07
Date of Issue..... : 2020-04-07
Test Result..... : **Pass**
Note : This report is based on the FCC ID 2AG32MBS31001 update
antenna gain value.,EIRP and PSD have been recalculated.

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS20S04015 152W	2020-04-01	2020-04-02 to 2020-04- 06	2020-04-07	original	-	Valid

4 General Information

4.1 General Description of E.U.T.

Product:	LTE TDD Base Station
Model(s):	mBS31001
Model Description:	N/A
Note:	N/A

4.2 Details of E.U.T.

Operation Frequency:	3555MHz~3695MHz
Type of Modulation:	QPSK, 16QAM, 64QAM
Antenna installation:	External antenna
Antenna Gain:	11.0dBi
Ratings:	DC 48V, 1.5A

5 Test Summary

Test Items	Test Requirement	Result
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

6 RF Exposure

Test Requirement: FCC Part 1.1307

Test Mode: The EUT work in test mode(Tx).

6.1 Requirements

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 levels 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.

6.2 The procedures / limit

FCC Part 1.1307:

(A) 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 Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	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

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time 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
1500-100,000			1.0	30

Note: f = frequency in MHz ;

*Plane-wave equivalent power density

6.3 MPE Calculation Method

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

From the peak EUT RF output power, the minimum mobile separation distance, d=70cm, as well as the gain of the used antenna, the RF power density can be obtained

Remark:

FCC Part 1.1307:

Mode	Antenna Gain (dBi)	Antenna Gain (numeric)	Max.Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
LTE	11.00	12.589	35.83	3828.25	0.782679	1

7 MAXIMUM EFFECTIVE ISOTROPIC RADIATED POWER (EIRP)

LIMITS:

The maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the following table.

Device	Maximum EIRP (dBm/10 MHz)	Maximum PSD (dBm/MHz)
End User Device	23	n/a
Category A CBSD	30	20
Category B CBSD	47	37

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (Band 48)
TEST RESULTS:	PASS

2X2 MIMO
10MHz BW
Port 1 and 2
QPSK

	Lowest frequency 3555MHz	Middle frequency 3625MHz	Lowest frequency 3695MHz
Power at Port 1(dBm/10MHz)	29.51	29.62	29.65
Power at Port 2(dBm/10MHz)	29.89	29.65	29.84
Summed Power (dBm/10MHz)	32.71	32.65	32.91
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	43.71	43.65	43.91
Measurement uncertainty(dB)	<±0.95		

64QAM

	Lowest frequency 3555MHz	Middle frequency 3625MHz	Lowest frequency 3695MHz
Power at Port 1(dBm/10MHz)	26.89	27.98	26.75
Power at Port 2(dBm/10MHz)	25.77	27.52	26.01
Summed Power (dBm/10MHz)	29.38	30.77	29.41
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	40.38	41.77	40.41
Measurement uncertainty(dB)	<±0.95		

Port 3 and 4

QPSK

	Lowest frequency 3555MHz	Middle frequency 3625MHz	Lowest frequency 3695MHz
Power at Port 3(dBm/10MHz)	29.72	29.98	29.30
Power at Port 4(dBm/10MHz)	29.49	29.97	29.76
Summed Power (dBm/10MHz)	32.62	32.99	32.55
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	43.62	43.99	43.55
Measurement uncertainty(dB)	<±0.95		

64QAM

	Lowest frequency 3555MHz	Middle frequency 3625MHz	Lowest frequency 3695MHz
Power at Port 1(dBm/10MHz)	27.67	29.14	28.11
Power at Port 2(dBm/10MHz)	27.12	28.55	26.89
Summed Power (dBm/10MHz)	30.41	31.87	30.55
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	41.41	42.87	41.55
Measurement uncertainty(dB)	<±0.95		

Port 1,2,3 and 4

QPSK

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1&2(dBm/10MHz)	32.71	32.65	32.91
Power at Port 3&4(dBm/10MHz)	32.62	32.99	32.55
Summed Power (dBm/10MHz)	35.68	35.83	35.74
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	46.68	46.83	46.74
Measurement uncertainty(dB)	<±0.95		

64QAM

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1&2 (dBm/10MHz)	29.38	30.77	29.41
Power at Port 3&4 (dBm/10MHz)	30.41	31.87	30.55
Summed Power (dBm/10MHz)	32.94	34.36	33.03
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	43.94	45.36	44.03
Measurement uncertainty(dB)	<±0.95		

20MHz BW

Port 1 and 2

QPSK

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1(dBm/10MHz)	27.02	27.10	27.05
Power at Port 2(dBm/10MHz)	26.76	26.55	27.01
Summed Power (dBm/10MHz)	29.90	29.84	30.04
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	40.90	40.84	41.04
Measurement uncertainty(dB)	<±0.95		

64QAM

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1(dBm/10MHz)	23.04	25.48	23.69
Power at Port 2(dBm/10MHz)	22.93	24.69	23.37
Summed Power (dBm/10MHz)	26.00	28.11	26.54
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	37.00	39.11	37.54
Measurement uncertainty(dB)	<±0.95		

Port 3 and 4

QPSK

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 3(dBm/10MHz)	27.27	28.68	28.40
Power at Port 4(dBm/10MHz)	27.05	27.25	27.00
Summed Power (dBm/10MHz)	30.17	31.03	30.77
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	41.17	42.03	41.77
Measurement uncertainty(dB)	<±0.95		

64QAM

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1(dBm/10MHz)	24.02	26.47	25.23
Power at Port 2(dBm/10MHz)	23.59	25.67	23.80
Summed Power (dBm/10MHz)	26.82	29.10	27.58
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	37.82	40.10	38.58
Measurement uncertainty(dB)	<±0.95		

Port 1,2,3 and 4

QPSK

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1&2(dBm/10MHz)	29.90	29.84	30.04
Power at Port 3&4(dBm/10MHz)	30.17	31.03	30.77
Summed Power (dBm/10MHz)	33.05	33.49	33.43
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	44.05	44.49	44.43
Measurement uncertainty(dB)	<±0.95		

64QAM

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1&2 (dBm/10MHz)	26.00	28.11	26.54
Power at Port 3&4 (dBm/10MHz)	26.82	29.10	27.58
Summed Power (dBm/10MHz)	29.44	31.64	30.10
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/10MHz)	40.44	42.64	41.10
Measurement uncertainty(dB)	<±0.95		

20MHz BW Reference only

Port 1 and 2

QPSK

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1 (dBm/20MHz)	29.69	29.80	29.66
Power at Port 2(dBm/20MHz)	29.36	29.24	29.57
Summed Power (dBm/20MHz)	32.54	32.54	32.63
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/20MHz)	43.54	43.54	41.63
Measurement uncertainty(dB)	<±0.95		

64QAM

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1 (dBm/20MHz)	25.54	28.12	26.30
Power at Port 2 (dBm/20MHz)	25.53	27.35	25.94
Summed Power (dBm/20MHz)	28.55	30.76	29.13
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/20MHz)	39.55	41.76	40.13
Measurement uncertainty(dB)	<±0.95		

Port 3 and 4

QPSK

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 3 (dBm/20MHz)	29.87	29.81	29.03
Power at Port 4(dBm/20MHz)	29.75	29.95	29.65
Summed Power (dBm/20MHz)	32.82	32.89	32.36
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/20MHz)	43.82	43.89	43.36
Measurement uncertainty(dB)	<±0.95		

64QAM

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1 (dBm/20MHz)	26.56	29.09	27.78
Power at Port 2 (dBm/20MHz)	26.34	28.33	26.45
Summed Power (dBm/20MHz)	29.46	31.74	30.18
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/20MHz)	40.46	42.74	41.18
Measurement uncertainty(dB)	<±0.95		

Port 1,2,3 and 4

QPSK

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
Power at Port 1&2 (dBm/20MHz)	32.54	32.54	32.63
Power at Port 3&4 (dBm/20MHz)	32.82	32.89	32.36
Summed Power (dBm/20MHz)	35.69	35.73	35.51
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/20MHz)	46.69	46.73	46.51
Measurement uncertainty(dB)	<±0.95		

64QAM

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3695MHz
Power at Port 1&2 (dBm/20MHz)	28.55	30.76	29.13
Power at Port 3&4 (dBm/20MHz)	29.46	31.74	30.18
Summed Power (dBm/20MHz)	32.04	34.29	32.70
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum EIRP (dBm/20MHz)	43.04	45.29	43.70
Measurement uncertainty(dB)	<±0.95		

8 MAXIMUM POWER SPECTRAL DENSITY(PSD)

LIMITS

The procedure in Section 5.2 of ANSI C63.26-2015 is acceptable for performing power measurements. Measurements can be made using either a peak or average (RMS) detector, if the appropriate procedure is followed. The RMS detector was used for the measurement at each frequency with following the procedure stated in the Section 5.2.4.4.2 of ANSI C63.26-2015.

The maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the following table.

Device	Maximum EIRP (dBm/10 MHz)	Maximum PSD (dBm/MHz)
End User Device	23	n/a
Category A CBSD	30	20
Category B CBSD	47	37

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (Band 48)
TEST RESULTS:	PASS

10MHz BW
Port 1 and 2

	Lowest frequency 3555MHz	Middle frequency 3625MHz	Lowest frequency 3695MHz
PSD at Port 1(dBm/MHz)	15.83	16.01	16.31
PSD at Port 2(dBm/MHz)	16.55	15.74	16.29
Summed PSD (dBm/MHz)	19.22	18.89	19.31
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum PSD (dBm/MHz)	30.22	29.89	30.31
Measurement uncertainty	<±0.95		

Port 3 and 4

	Lowest frequency 3555MHz	Middle frequency 3625MHz	Lowest frequency 3695MHz
PSD at Port 1(dBm/MHz)	15.95	16.06	15.77
PSD at Port 2(dBm/MHz)	16.31	16.52	16.77
Summed PSD (dBm/MHz)	19.14	19.31	19.31
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum PSD (dBm/MHz)	30.14	30.31	30.31
Measurement uncertainty	<±0.95		

20MHz BW
Port 1 and 2

	Lowest frequency 3555MHz	Middle frequency 3625MHz	Lowest frequency 3695MHz
PSD at Port 1(dBm/MHz)	15.56	15.57	15.07
PSD at Port 2(dBm/MHz)	15.58	16.09	15.71
Summed PSD (dBm/MHz)	18.58	18.85	18.41
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum PSD (dBm/MHz)	29.58	29.85	29.41
Measurement uncertainty	<±0.95		

Port 3 and 4

	Lowest frequency 3555MHz	Middle frequency 3625MHz	Lowest frequency 3695MHz
PSD at Port 1(dBm/MHz)	16.01	15.94	15.56
PSD at Port 2(dBm/MHz)	15.20	15.66	16.01
Summed PSD (dBm/MHz)	18.63	18.81	18.80
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum PSD (dBm/MHz)	29.63	29.81	29.80
Measurement uncertainty	<±0.95		

10MHz BW Summed PSD
Port 1,2,3 and 4

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
PSD at Port 1&2(dBm/MHz)	19.22	18.89	19.31
PSD at Port 3&4(dBm/MHz)	19.14	19.31	19.31
Summed PSD (dBm/MHz)	22.19	22.11	22.32
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum PSD (dBm/MHz)	33.19	33.11	33.32
Measurement uncertainty	<±0.95		

20MHz BW Summed PSD
Port 1,2,3 and 4

	Lowest frequency 3560MHz	Middle frequency 3625MHz	Lowest frequency 3690MHz
PSD at Port 1&2(dBm/MHz)	18.58	18.85	18.41
PSD at Port 3&4(dBm/MHz)	18.63	18.81	18.80
Summed PSD (dBm/MHz)	21.62	21.84	21.62
Maximum declared antenna gain (dBi)	11.00	11.00	11.00
Maximum PSD (dBm/MHz)	32.62	32.84	32.62
Measurement uncertainty	<±0.95		

====End of Report=====