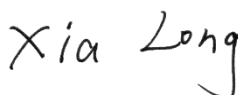


TEST REPORT

Applicant: Ningbo Sunvot Technology Co., Ltd
Address: Building 3, NO 55 Longtan Shan Road, Beilun Daqi, Ningbo, Zhejiang
Equipment Type: LC600 LTE CPE
Model Name: LC600 (refer section 2.4)
Brand Name: Sunvot
FCC ID: 2AZGN-LC600-202302
Test Standard: 47 CFR Part 15 Subpart B
ANSI C63.4-2014
Sample Arrival Date: Feb. 13, 2023
Test Date: Feb. 14, 2023 - Feb. 15, 2023
Date of Issue: Mar. 13, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Zhang Guoxi**Checked by:** Xia Long**Approved by:** Liao Jianming
(Technical Director)

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Mar. 13, 2023</u>	<u>Initial Issue</u>

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☒ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Ningbo Sunvot Technology Co., Ltd
Address	Building 3, NO 55 Longtan Shan Road, Beilun Daqi, Ningbo, Zhejiang

2.2 Manufacturer Information

Manufacturer	N/A
Address	N/A

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	LC600 LTE CPE
Model Name Under Test	LC600
Series Model Name	LC600C, LC600T, LC600L, LC600A, LC600B
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in model name. (this information provided by the customer)
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Note: Not applicable。

2.6 Technical Information

Network and Wireless connectivity	3G Network WCDMA/HSDPA/HSUPA Band 2/4/5 4G Network LTE FDD Band 2/4/5 LTE TDD Band 40/42/43/48 LTE CA Uplink (UL): CA_42C, CA_5B
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The requirement for the following technical information of the EUT was tested in this report:

The Highest Speed of Processor	N/A
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3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15 Subpart B	Unintentional Radiators
2	ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

3.2 Verdict

No.	Description	FCC Rule	Test Verdict	Result
1	Radiated Emission	15.109	Pass	Annex A .1
2	Conducted Emission, AC Ports	15.107	Pass	Annex A .2

3.3 Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions (9 kHz-30 MHz)	3.22 dB
Radiated emissions (30 MHz-1 GHz)-10m	4.80 dB
Radiated emissions (30 MHz-1 GHz)-3m	4.76 dB
Radiated emissions (1 GHz-18 GHz)-3m	4.88 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments, Test Date and Test Engineer

Test items	Voltage	Temperature	Relative Humidity	Ambient Pressure	Test Date	Test Engineer
Radiated Emission	AC 120V/60Hz	23.8℃	42%	101kPa	Feb. 14, 2023	Tian Hengzhao
Conducted Emission	AC 230V/50Hz AC 120V/60Hz	24.3℃	42%		Feb. 15, 2023	Ye Guangqi

4.2 Test Equipment List

Radiated Emission Test For Frequency Below 1 GHz (3m)						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2022.09.09	2023.09.08	☒
Amplifier (30-1GHz)	COM-MV	ZT30-1000M	B2017119081	2022.12.07	2023.12.06	☒
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9168	9168-00867	2022.04.12	2025.04.11	☒
Anechoic Chamber	ChangNing	9m*6m*6m	142	2021.08.19	2024.08.18	☒
Description	Manufacturer	Name		Version		Use
Test Software	BALUN	BL410-E		V22.930		☒

Radiated Emission Test For Frequency Above 1 GHz (3m)						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9038A	MY55330120	2022.09.07	2023.09.08	☒
Spectrum Analyzer	ROHDE & SCHWARZ	FSV40	101544	2022.01.04	2023.12.27	☒
Amplifier (1-12GHz)	Advanced Microwave	WLA652A	1740103	2022.09.07	2023.09.08	☒
Amplifier (0.8-21GHz)	Mini-Circuits	ZVA-213-S+	225321316	2022.09.07	2023.09.08	☒
Amplifier (18-40GHz)	COM-MV	KA_LNA18-40G-01	18050001	2022.09.07	2023.09.08	☒
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	01917	2022.06.09	2025.06.08	☒
Test Antenna-Horn	A-INFOMW	LB-180400KF	J211060273	2021.07.02	2024.07.01	☒
Anechoic Chamber	ChangNing	9m*6m*6m	142	2022.02.19	2024.08.18	☒
Description	Manufacturer	Name		Version		Use
Test Software	BALUN	BL410-E		V22.930		☒

Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2022.09.09	2023.09.08	☒
LISN	SCHWARZBECK	NSLK 8127	8127-687	2022.06.01	2023.05.31	☒
Shielded Room	YiHeng Electronic Co., Ltd	3.5m*3.1m*2.8m	112	2022.02.19	2025.02.18	☒
Description	Manufacturer	Name		Version		Use
Test Software	BALUN	BL410-E		V22.930		☒

4.3 Test Enclosure list

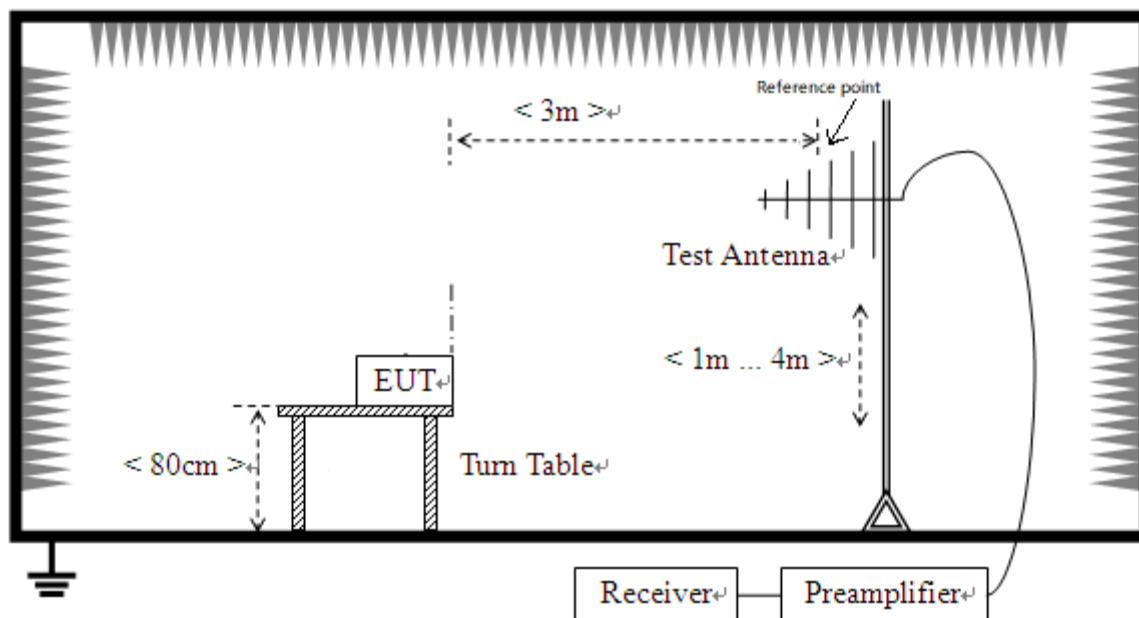
Description	Manufacturer	Model	Serial No.	Length	Description	Use
Wireless Communications Test Set	R&S	CMW500	127801	N/A	Cal. Due 2023.12.27	☒
POE adapter	N/A	N/A	N/A	N/A	N/A	☒
RJ45 Cable	N/A	N/A	N/A	N/A	N/A	☒

4.4 Test Configurations

Test Configurations (TC) No.	Description
Traffic Test Mode	
TC01	<u>The WCDMA Band 5 Test Mode</u> WCDMA Band 5 IDLE+ POE Adapter + RJ45 Cable
TC02	<u>The FDD LTE Band 5 Test Mode</u> LTE Band 5 IDLE + POE Adapter + RJ45 Cable

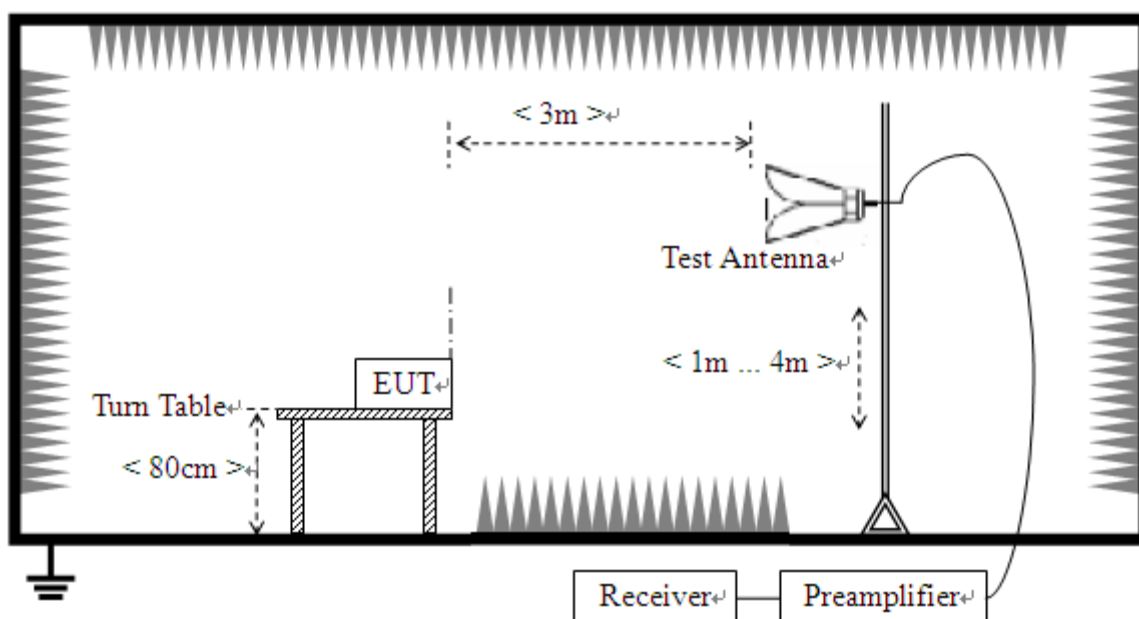
4.5 Test Setups

Test Setup 1

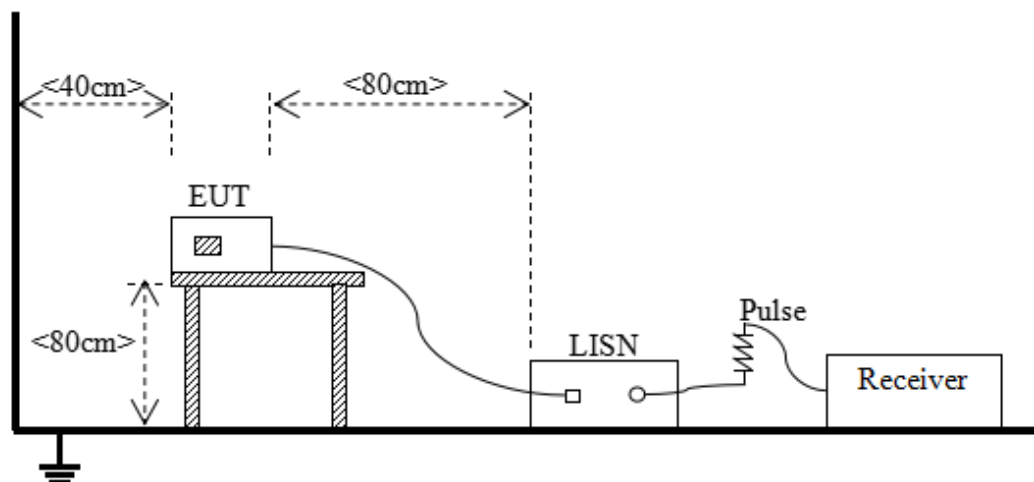


(For Radiated Emission Test (30 MHz-1 GHz))

Test Setup 2



(For Radiated Emission Test (above 1 GHz))

Test Setup 3

(For Conducted Emission, AC Ports Test)

4.6 Test Conditions

Test Case	Test Conditions	
Radiated Emission	Test Setup	Test Setup 1&2
	Test Configuration	TC01~TC02 ^{Note}
Conducted Emission, AC Ports	Test Setup	Test Setup 3
	Test Configuration	TC01~TC02 ^{Note}
Note: Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report. The WCDMA Band 5 Test Mode is the worst mode in this report.		

5 TEST ITEMS

5.1 Emission Tests

5.1.1 Radiated Emission

5.1.1.1 Limit

Frequency range (MHz)	Class B (at 3 m)		Class B (at 10 m)	Class A (at 10 m)	
	Field Strength ($\mu\text{V/m}$)	Field Strength (dB $\mu\text{V/m}$)	Field Strength (dB $\mu\text{V/m}$)	Field Strength ($\mu\text{V/m}$)	Field Strength (dB $\mu\text{V/m}$)
30 - 88	100	40	30	90	39
88 - 216	150	43.5	33.5	150	43.5
216 - 960	200	46	36	210	46.4
Above 960	500	54	44	300	49.5

NOTE:

- 1) Field Strength (dB $\mu\text{V/m}$) = $20 \cdot \log [\text{Field Strength } (\mu\text{V/m})]$.
- 2) In the emission tables above, the tighter limit applies at the band edges.

5.1.1.2 Test Setup

Refer to 4.5 section (test setup 1 to test setup 2) for radiated emission test, the photo of test setup please refer to ANNEX B.

5.1.1.3 Test Procedure

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

An initial pre-scan was performed in the chamber using the EMI Receiver in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bi-Log antenna with 2 orthogonal polarities.

The measurement frequency range is from 30 MHz to the 5th harmonic of the maximum frequency of the EUT internal source. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1 \text{ GHz}$, 100 kHz for $f < 1 \text{ GHz}$

VBW $\geq$ RBW

Sweep = auto

Detector function = peak for $f < 1 \text{ GHz}$, peak & RMS Average for $f \geq 1 \text{ GHz}$

Trace = max hold

5.1.1.4 Test Result

Please refer to ANNEX A.1.

NOTE:

1. Results (dB μ V/m) = Reading (dB μ V/m) + Factor (dB/m)

The reading level is calculated by software which is not shown in the sheet

2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain (dB)

3. Over limit = Results – Limit.

5.1.2 Conducted Emission

5.1.2.1 Test Limit

Frequency range (MHz)	Class A	
	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	79	66
0.50 - 30	73	60

Frequency range (MHz)	Class B	
	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50 MHz.

5.1.2.2 Test Setup

Refer to 4.5 section test (test setup 3) for conducted emission, the photo of test setup please refer to ANNEX B.

5.1.2.3 Test Procedure

The EUT is connected to the power mains through a LISN which provides 50 Ω /50 μ H of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30 MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

Use the following spectrum analyzer settings:

RBW = 9 kHz

VBW $\geq$ RBW

Sweep = 10ms

Detector function = peak & Average

Trace = max hold

5.1.2.4 Test Result

Please refer to ANNEX A.2.

NOTE:

1. Results (dBμV) = Reading (dBμV) + Factor (dB)

The reading level is calculated by software which is not shown in the sheet

2. Factor = Insertion loss + Cable loss

3. Over limit = Results – Limit.

ANNEX A TEST RESULTS

A.1 Radiated Emission

Note 1: The symbol of “--” in the table which means not application.

Note 2: For the test data above 1 GHz, according the ANSI C63.4-2014, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

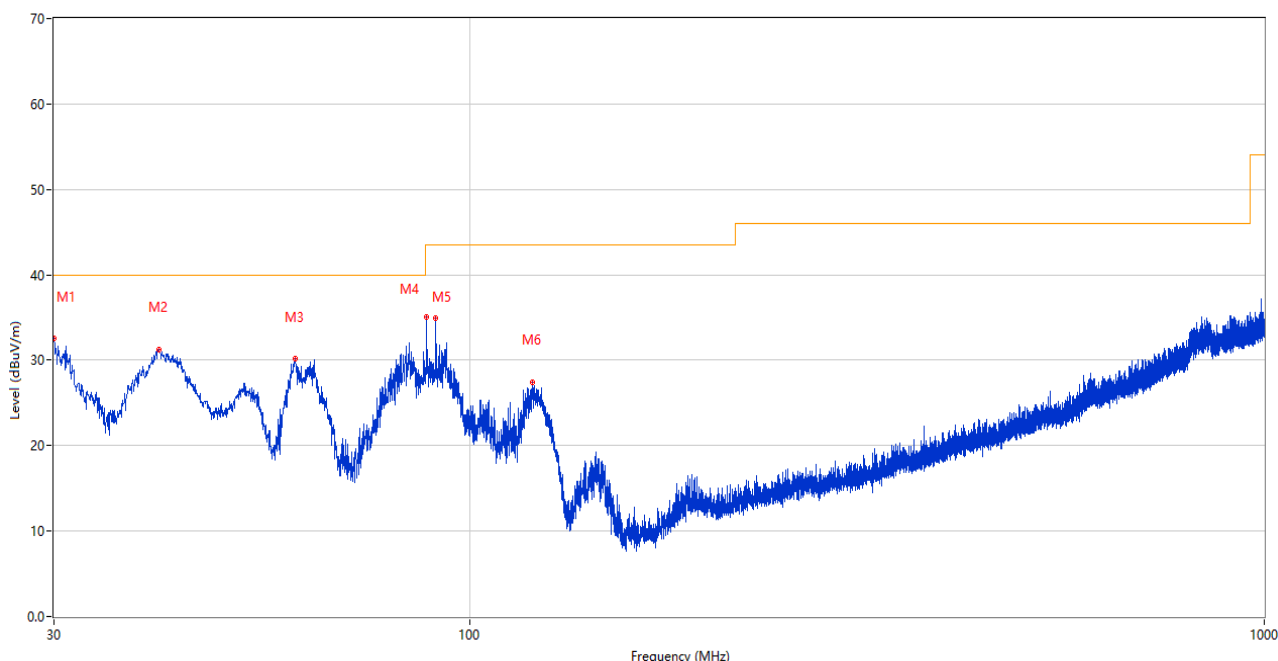
Note 3: The Radiated Emission from 18G-40G is noise only, do not show on the report.

Note 4: All the configurations were pre tested, only the worst configuration has been reported in this report.

Test Data and Plots

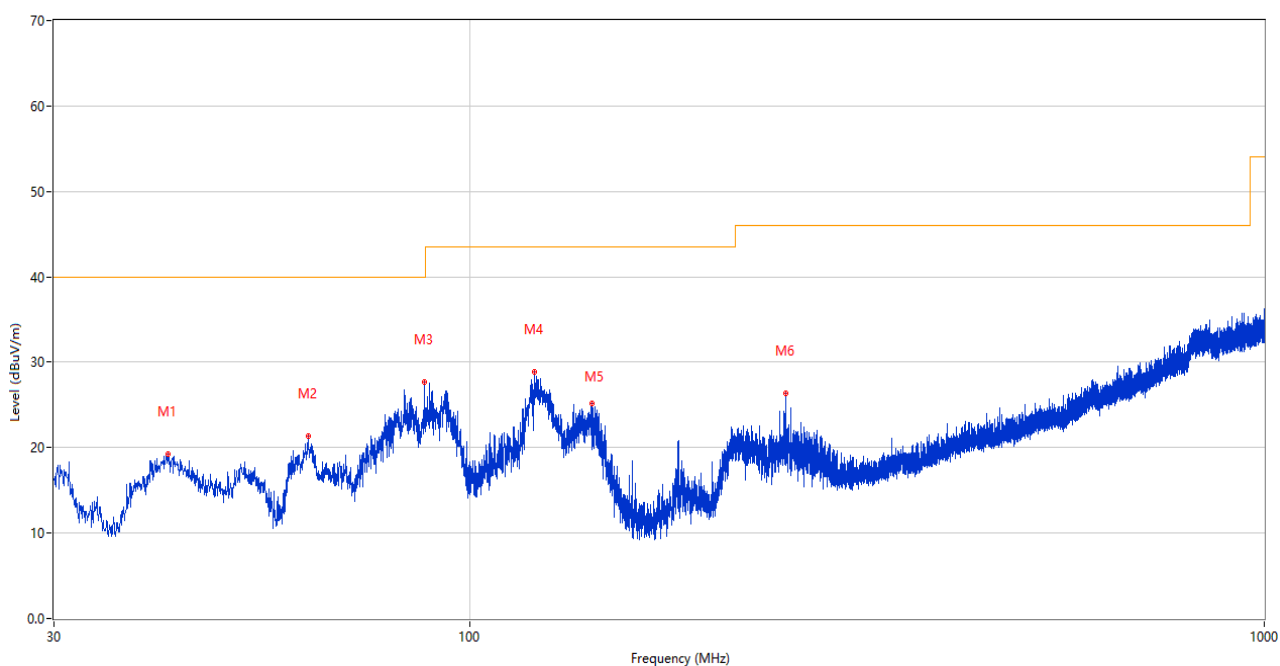
The WCDMA Band 5 Test Mode

A.1.1 Test Antenna Vertical, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	30.000	32.59	-27.87	40.0	7.41	Peak	23.00	100	Vertical	Pass
2	40.718	31.27	-25.51	40.0	8.73	Peak	54.00	100	Vertical	Pass
3	60.361	30.13	-25.77	40.0	9.87	Peak	125.00	100	Vertical	Pass
4	88.297	35.02	-27.42	43.5	8.48	Peak	225.00	100	Vertical	Pass
5	90.722	34.99	-26.86	43.5	8.51	Peak	210.00	100	Vertical	Pass
6	120.113	27.37	-26.74	43.5	16.13	Peak	208.00	100	Vertical	Pass

A.1.2 Test Antenna Horizontal, 30 MHz – 1 GHz



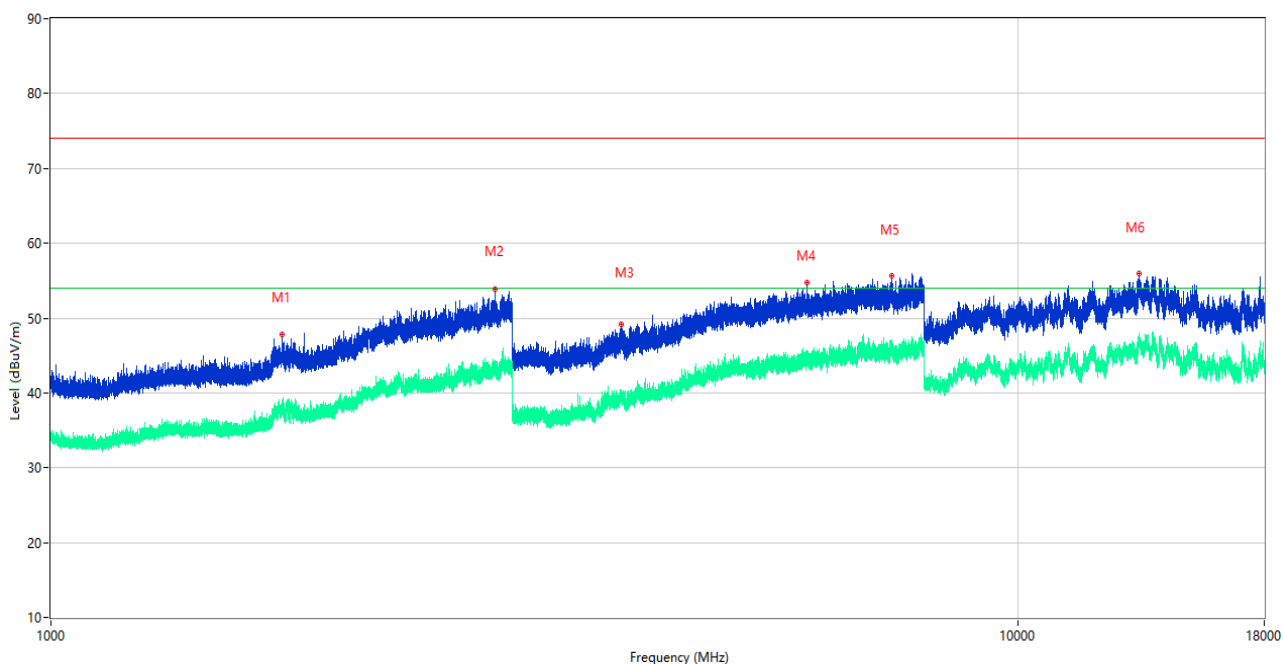
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	41.737	19.25	-25.18	40.0	20.75	Peak	41.00	100	Horizontal	Pass
2	62.689	21.35	-25.89	40.0	18.65	Peak	320.00	100	Horizontal	Pass
3	87.715	27.74	-27.57	40.0	12.26	Peak	141.00	100	Horizontal	Pass
4	120.598	28.93	-26.80	43.5	14.57	Peak	331.00	200	Horizontal	Pass
5	142.714	25.21	-28.30	43.5	18.29	Peak	291.00	200	Horizontal	Pass
6	249.996	26.34	-22.20	46.0	19.66	Peak	252.00	100	Horizontal	Pass

A.1.3 Test Antenna Vertical, 1 GHz – 18 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1412.900	45.52	-10.38	74.0	28.48	Peak	10.00	100	Vertical	Pass
1**	1412.900	34.83	-10.38	54.0	19.17	AV	10.00	100	Vertical	Pass
2	1720.800	47.40	-7.93	74.0	26.60	Peak	34.00	100	Vertical	Pass
2**	1720.800	39.91	-7.93	54.0	14.09	AV	34.00	100	Vertical	Pass
3	2831.500	52.61	-1.12	74.0	21.39	Peak	187.00	100	Vertical	Pass
3**	2831.500	42.99	-1.12	54.0	11.01	AV	187.00	100	Vertical	Pass
4	4936.000	53.46	0.29	74.0	20.54	Peak	311.00	100	Vertical	Pass
4**	4936.000	42.77	0.29	54.0	11.23	AV	311.00	100	Vertical	Pass
5	7813.000	56.45	2.52	74.0	17.55	Peak	122.00	100	Vertical	Pass
5**	7813.000	45.23	2.52	54.0	8.77	AV	122.00	100	Vertical	Pass
6	11313.500	55.64	2.01	74.0	18.36	Peak	308.00	100	Vertical	Pass
6**	11313.500	45.74	2.01	54.0	8.26	AV	308.00	100	Vertical	Pass

A.1.4 Test Antenna Horizontal, 1 GHz – 18 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1734.800	47.87	-7.89	74.0	26.13	Peak	360.00	100	Horizontal	Pass
1**	1734.800	38.25	-7.89	54.0	15.75	AV	360.00	100	Horizontal	Pass
2	2883.500	53.90	-0.23	74.0	20.10	Peak	45.00	100	Horizontal	Pass
2**	2883.500	43.72	-0.23	54.0	10.28	AV	45.00	100	Horizontal	Pass
3	3891.000	49.24	-2.50	74.0	24.76	Peak	212.00	100	Horizontal	Pass
3**	3891.000	39.49	-2.50	54.0	14.51	AV	212.00	100	Horizontal	Pass
4	6063.000	54.68	0.82	74.0	19.32	Peak	300.00	100	Horizontal	Pass
4**	6063.000	44.20	0.82	54.0	9.80	AV	300.00	100	Horizontal	Pass
5	7406.250	55.60	2.67	74.0	18.40	Peak	237.00	100	Horizontal	Pass
5**	7406.250	45.93	2.67	54.0	8.07	AV	237.00	100	Horizontal	Pass
6	13370.500	56.02	5.10	74.0	17.98	Peak	15.00	100	Horizontal	Pass
6**	13370.500	46.26	5.10	54.0	7.74	AV	15.00	100	Horizontal	Pass

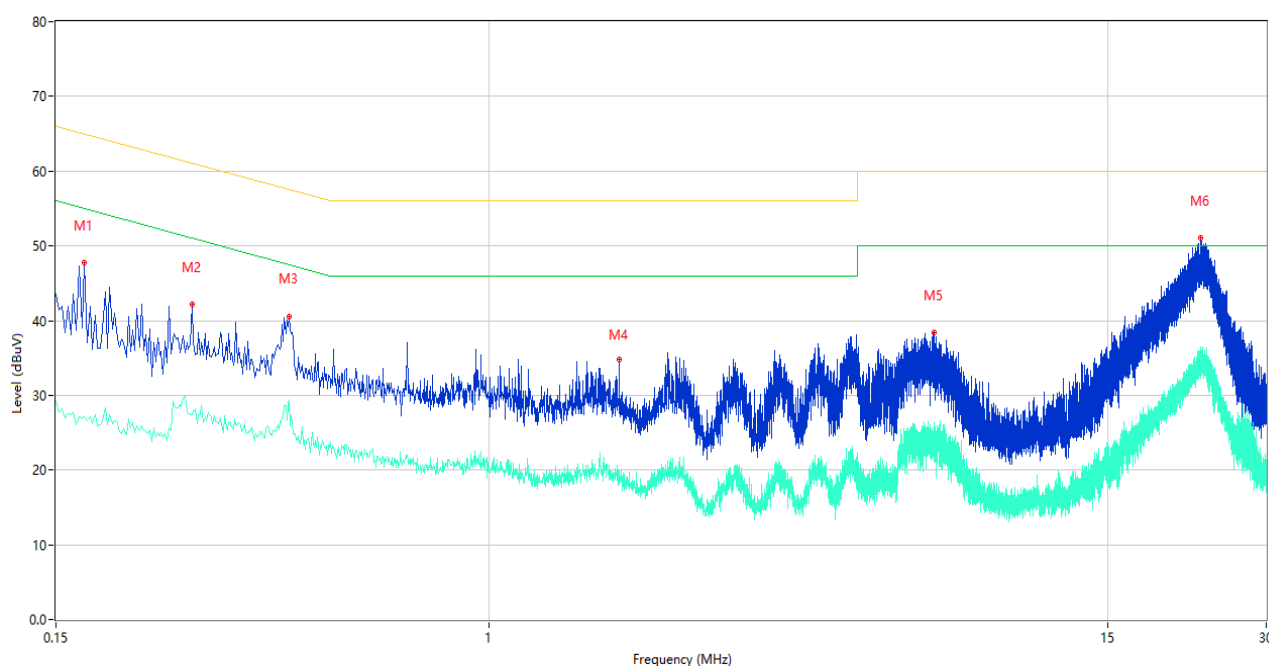
A.2 Conducted Emission

Note: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

Test Data and Plots

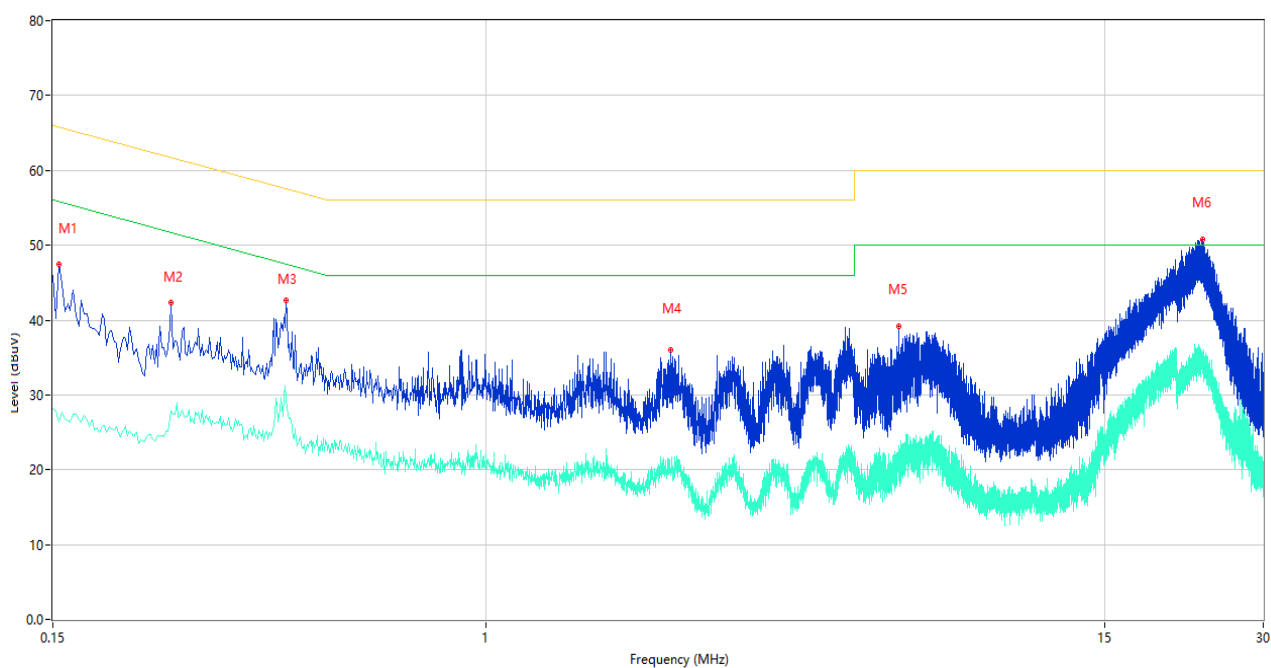
The WCDMA Band 5 Test Mode

A.2.1 L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.170	47.70	10.15	64.96	17.26	Peak	L	Pass
1**	0.170	27.07	10.15	54.96	27.89	AV	L	Pass
2	0.272	42.13	10.06	61.06	18.93	Peak	L	Pass
2**	0.272	27.36	10.06	51.06	23.70	AV	L	Pass
3	0.416	40.60	10.59	57.53	16.93	Peak	L	Pass
3**	0.416	29.31	10.59	47.53	18.22	AV	L	Pass
4	1.764	34.82	10.29	56.00	21.18	Peak	L	Pass
4**	1.764	19.03	10.29	46.00	26.97	AV	L	Pass
5	7.016	38.42	10.44	60.00	21.58	Peak	L	Pass
5**	7.016	25.34	10.44	50.00	24.66	AV	L	Pass
6	22.472	51.11	10.52	60.00	8.89	Peak	L	Pass
6**	22.472	35.00	10.52	50.00	15.00	AV	L	Pass

A.2.2 N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.154	47.53	10.18	65.78	18.25	Peak	N	Pass
1**	0.154	26.30	10.18	55.78	29.48	AV	N	Pass
2	0.252	42.33	10.07	61.69	19.36	Peak	N	Pass
2**	0.252	27.92	10.07	51.69	23.77	AV	N	Pass
3	0.416	42.62	10.59	57.53	14.91	Peak	N	Pass
3**	0.416	29.45	10.59	47.53	18.08	AV	N	Pass
4	2.238	36.02	10.29	56.00	19.98	Peak	N	Pass
4**	2.238	19.28	10.29	46.00	26.72	AV	N	Pass
5	6.094	39.13	10.17	60.00	20.87	Peak	N	Pass
5**	6.094	22.52	10.17	50.00	27.48	AV	N	Pass
6	23.012	50.74	10.61	60.00	9.26	Peak	N	Pass
6**	23.012	34.11	10.61	50.00	15.89	AV	N	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2320202-AE.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2320202-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2320202-AI.PDF”.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
3. For the report with CNAS mark or A2LA mark, the items marked with "☆" are not within the accredited scope.
4. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the "inspection and testing dedicated stamp" or test report stamp.
5. The test data and results are only valid for the tested samples provided by the customer.
6. This report shall not be partially reproduced without the written permission of the laboratory.
7. Any objection shall be raised to the laboratory within 30 days after receiving the report.

--END OF REPORT--