

# TEST REPORT

**Application No.:** KSEM2008000932CR  
**FCC.:** 2AH25NT312  
**Applicant:** Shanghai Sunmi Technology Co.,Ltd.  
**Address of Applicant:** Room 605,Block 7,KIC Plaza,No.388 Song Hu Road Yang Pu District,Shanghai,China  
**Manufacturer:** Shanghai Sunmi Technology Co.,Ltd.  
**Address of Manufacturer:** Room 605,Block 7,KIC Plaza,No.388 Song Hu Road Yang Pu District,Shanghai,China  
**Factory:** Kang Zhun Electronical Technology(Kunshan)Co.,Ltd.Wu Song Jiang Branch  
**Address of Factory:** No.299,Nansong Road,Yushan Town,Kunshan City,Jiangsu Province,China  
**Equipment Under Test (EUT):**  
**EUT Name:** Cloud POS Printer  
**Model No.:** NT312  
**Standard(s) :** 47 CFR Part 2  
 47 CFR Part 22  
 47 CFR Part 24  
**Date of Receipt:** 2020-08-03  
**Date of Test:** 2020-08-14 to 2020-09-14  
**Date of Issue:** 2020-09-22

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Eric Lin  
EMC Lab Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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Revision Record			
Version	Description	Date	Remark
00	Original	2020-09-22	/

Authorized for issue by:			
		<i>Damon Zhou</i>	
		<b>Damon Zhou / Project Engineer</b>	
		<i>Eric Lin</i>	
		<b>Eric Lin / Reviewer</b>	

## 2 Test Summary

Test Item	FCC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913, §24.232	ERP≤7W(22.913) EIRP≤2W(24.232)	PASS
Peak-Average Ratio	§24.232	≤13dB	PASS
Modulation Characteristics	§2.1047	Digital modulation	PASS
Bandwidth	§2.1049(h)	OBW: No limit EBW: No limit	PASS
Band Edge Compliance	§2.1051, §22.917, §24.238	≤ -13dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	PASS
Spurious emissions at antenna terminals	§2.1051, §22.917, §24.238	≤ -13dBm	PASS
Field strength of spurious radiation	§2.1051, §22.917, §24.238	≤ -13dBm	PASS
Frequency stability	§2.1055, §22.355, §24.235	≤ ±2.5ppm.	PASS

### 3 Contents

	Page
<b>1 COVER PAGE</b> .....	<b>1</b>
<b>2 TEST SUMMARY</b> .....	<b>3</b>
<b>3 CONTENTS</b> .....	<b>4</b>
<b>4 GENERAL INFORMATION</b> .....	<b>6</b>
4.1 DETAILS OF E.U.T. ....	6
4.2 TEST FREQUENCY .....	7
4.3 TEST ENVIRONMENT .....	7
4.4 DESCRIPTION OF SUPPORT UNITS .....	8
4.5 MEASUREMENT UNCERTAINTY .....	8
4.6 TEST LOCATION.....	9
4.7 TEST FACILITY.....	9
4.8 DEVIATION FROM STANDARDS.....	9
4.9 ABNORMALITIES FROM STANDARD CONDITIONS .....	9
<b>5 EQUIPMENT LIST</b> .....	<b>10</b>
<b>6 RADIO SPECTRUM MATTER TEST RESULTS</b> .....	<b>11</b>
6.1 EFFECTIVE (ISOTROPIC) RADIATED POWER OUTPUT DATA .....	11
6.1.1 <i>E.U.T. Operation</i> .....	11
6.1.2 <i>Test Setup Diagram</i> .....	11
6.1.3 <i>Measurement Data</i> .....	11
6.2 PEAK-AVERAGE RATIO .....	12
6.2.1 <i>E.U.T. Operation</i> .....	12
6.2.2 <i>Test Setup Diagram</i> .....	12
6.2.3 <i>Measurement Data</i> .....	12
6.3 BANDWIDTH .....	13
6.3.1 <i>E.U.T. Operation</i> .....	13
6.3.2 <i>Test Setup Diagram</i> .....	13
6.3.3 <i>Measurement Data</i> .....	13
6.4 BAND EDGE COMPLIANCE .....	14
6.4.1 <i>E.U.T. Operation</i> .....	14
6.4.2 <i>Test Setup Diagram</i> .....	14
6.4.3 <i>Measurement Data</i> .....	14
6.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS .....	15
6.5.1 <i>E.U.T. Operation</i> .....	15
6.5.2 <i>Test Setup Diagram</i> .....	15
6.5.3 <i>Measurement Data</i> .....	15
6.6 FIELD STRENGTH OF SPURIOUS RADIATION .....	16
6.6.1 <i>E.U.T. Operation</i> .....	16
6.6.2 <i>Test Setup Diagram</i> .....	16
6.6.3 <i>Measurement Procedure and Data</i> .....	17
6.7 FREQUENCY STABILITY.....	20
6.7.1 <i>E.U.T. Operation</i> .....	20
6.7.2 <i>Test Setup Diagram</i> .....	20
6.7.3 <i>Measurement Data</i> .....	20
6.8 MODULATION CHARACTERISTICS .....	21
6.8.1 <i>E.U.T. Operation</i> .....	21
6.8.2 <i>Test Setup Diagram</i> .....	21
6.8.3 <i>Measurement Data</i> .....	21



7 TEST SETUP PHOTOGRAPHS .....22

8 EUT CONSTRUCTIONAL DETAILS .....22

## 4 General Information

### 4.1 Details of E.U.T.

Power Supply:	DC 24V by Adapter Adapter Model:CYSE65-240250 INPUT:100-240V,50/60Hz 1.7A OUTPUT:24V,2.5A
Sample Type:	Portable production
Support Network:	UMTS B2,B5
Operation Frequency Band:	UMTS B2,B5
Modulation Type:	QPSK
Antenna Type:	PIFA
Antenna Gain:	UMTS Band 2: 0.96dBi UMTS B5: -0.63dBi
Extreme temp. Tolerance:	0°C to +45°C
Extreme vol. Limits:	102VAC to 138VAC (nominal: 120V AC)
HSDPA UE Category:	14
HSUPA UE Category:	6
IMEI:	P4K41005010050

### 4.2 Test Frequency

Test mode:	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
WCDMA B2	TX	Channel 9262	Channel 9400	Channel 9538
		1852.4 MHz	1880.0 MHz	1907.6 MHz
	RX	Channel 9662	Channel 9800	Channel 9938
		1932.4 MHz	1960 MHz	1987.6 MHz
Test mode:	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
WCDMA B5	TX	Channel 4132	Channel 4182	Channel 4233
		826.4 MHz	836.4 MHz	846.4 MHz
	RX	Channel 4357	Channel 4407	Channel 4458
		871.4 MHz	881.4 MHz	891.6 MHz

### 4.3 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1015Pa	
Temperature:	TN	25 °C
Voltage:	VL	102 V
	VN	120 V
	VH	138 V

NOTE: VL= lower extreme test voltage  
 VN= nominal voltage  
 VH= upper extreme test voltage  
 TN= normal temperature

#### 4.4 Description of Support Units

The EUT has been tested independent unit.

#### 4.5 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4 x 10 <sup>-8</sup>
2	Timeout	2s
3	Duty cycle	0.37%
4	Occupied Bandwidth	3%
5	RF conducted power	0.6dB
6	RF power density	2.84dB
7	Conducted Spurious emissions	0.75dB
8	RF Radiated power	4.6dB (Below 1GHz)
		4.1dB (Above 1GHz)
9	Radiated Spurious emission test	4.2dB (Below 30MHz)
		4.4dB (30MHz-1GHz)
		4.8dB (1GHz-18GHz)
		5.2dB (Above 18GHz)
10	Temperature test	1°C
11	Humidity test	3%
12	Supply voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



#### 4.6 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

#### 4.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC (Designation Number: CN1172)**

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

- **ISED (CAB Identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development (ISED) Canada as an accredited testing laboratory.

CAB Identifier: CN0072.

- **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1600, C-1707, T-1499, G-10216 respectively.

#### 4.8 Deviation from Standards

None

#### 4.9 Abnormalities from Standard Conditions

None

## 5 Equipment List

Item	Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal. Due Date
<b>Conducted Emission at Mains Terminals (150kHz-30MHz)</b>						
1	EMI Test Receive	R&S	ESCI	100781	02/24/2020	02/23/2021
2	LISN	R&S	ENV216	101604	10/24/2019	10/23/2020
3	LISN	Schwarzbeck	NNLK 8129	8129-143	10/24/2019	10/23/2020
4	Pulse Limiter	R&S	ESH3-Z2	100609	02/24/2020	02/23/2021
5	CE test Cable	Thermax	/	14	02/24/2020	02/23/2021
<b>RF Conducted Test</b>						
1	Spectrum Analyzer	Agilent	E4446A	MY44020154	04/22/2020	04/21/2021
2	Spectrum Analyzer	Keysight	N9020A	MY55370209	12/19/2019	12/18/2020
3	Signal Generator	Agilent	E8257C	MY43321570	10/24/2019	10/23/2020
4	Vector Signal Generator	R&S	SMU 200A	102744	02/24/2020	02/23/2021
5	Universal Radio Communication Tester	R&S	CMU200	109525	12/19/2019	12/18/2020
6	Universal Radio Communication Tester	R&S	CMW500	159275	12/19/2019	12/18/2020
7	Power Meter	Anritsu	ML2495A	1445010	04/21/2020	04/20/2021
8	Switcher	CCSRF	FY562	KS301219	12/20/2019	12/19/2020
9	AC Power Source	EXTECH	6605	1570106	N.C.R	N.C.R
10	DC Power Supply	Agilent	E3632A	MY50340053	N.C.R	N.C.R
11	6dB Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R	N.C.R
12	Power Divider	AISI	IOWOPE2068	PE2068	N.C.R	N.C.R
13	Filter	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
14	Conducted test cable	/	RF01-RF04	/	04/21/2020	04/22/2021
15	Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	04/21/2020	04/20/2021
<b>RF Radiated Test</b>						
1	Spectrum Analyzer	R&S	FSV40	101493	01/08/2020	01/07/2021
2	Signal Generator	Agilent	E8257C	MY43321570	10/24/2019	10/23/2020
3	Loop Antenna	Schwarzbeck	HXYZ9170	9170-108	02/24/2020	02/23/2021
4	Bilog Antenna	TESEQ	CBL 6112D	35403	06/22/2019	06/21/2021
5	Bilog Antenna	SCHWARZBECK	VULB9160	9160-3342	04/29/2019	04/28/2021
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	267	11/04/2018	11/03/2020
7	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	00143290	02/25/2019	02/24/2021
8	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	BBHA9170171	02/27/2018	02/26/2021
9	Pre-Amplifier(30MHz~18GHz)	CCSRF	AMP1277	1	12/19/2019	12/18/2020
10	Pre-Amplifier(0.1~26.5GHz)	EMCI	EMC012645	980060	04/21/2020	04/20/2021
11	Low Pass Filter	MICRO-TRONICS	VLFX-950	RV142900829	N.C.R	N.C.R
12	High Pass Filter	Mini-Circuits	VHF-1200	15542	N.C.R	N.C.R
13	Filter (5450MHz~5770 MHz)	MICRO-TRONICS	BRC50704-01	2	N.C.R	N.C.R
14	Filter (5690 MHz~5930 MHz)	MICRO-TRONICS	BRC50705-01	4	N.C.R	N.C.R
15	Filter (5150 MHz~5350 MHz)	MICRO-TRONICS	BRC50703-01	2	N.C.R	N.C.R
16	Filter (885 MHz~915 MHz)	MICRO-TRONICS	BRM14698	1	N.C.R	N.C.R
17	Filter (815 MHz~860 MHz)	MICRO-TRONICS	BRM14697	1	N.C.R	N.C.R
18	Filter (1745 MHz~1910 MHz)	MICRO-TRONICS	BRM14700	1	N.C.R	N.C.R
19	Filter (1922 MHz~1977 MHz)	MICRO-TRONICS	BRM50715	1	N.C.R	N.C.R
20	Filter (2550 MHz)	MICRO-TRONICS	HPM13362	5	N.C.R	N.C.R
21	Filter (1532 MHz~1845 MHz)	MICRO-TRONICS	BRM50713	1	N.C.R	N.C.R
22	Filter (2.4GHz)	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
23	RE test cable	/	RE01-RE04	/	04/21/2020	04/22/2021

## 6 Radio Spectrum Matter Test Results

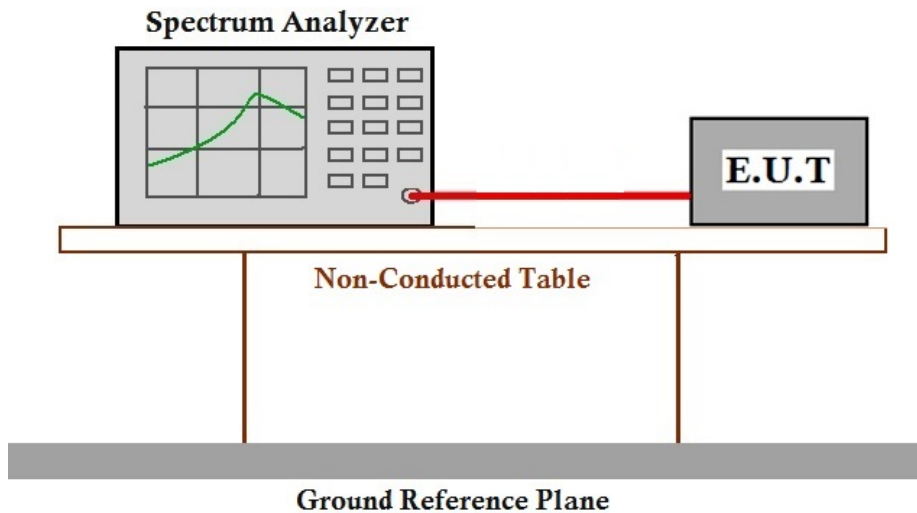
### 6.1 Effective (Isotropic) Radiated Power Output Data

Test Requirement: §2.1046, §22.913, §24.232  
 Test Method: ANSI C63.26, KDB 971168 D01 v03  
 Limit:  $ERP \leq 7W$

#### 6.1.1 E.U.T. Operation

Operating Environment:  
 Temperature: 22.7 °C      Humidity: 68.2 % RH      Atmospheric Pressure: 1030 mbar  
 Test mode: b: Tx mode, Keep the EUT in transmitting mode.

#### 6.1.2 Test Setup Diagram



#### 6.1.3 Measurement Data

Please refer to Appendix A for Effective (Isotropic) Radiated Power Output Data-WCDMA

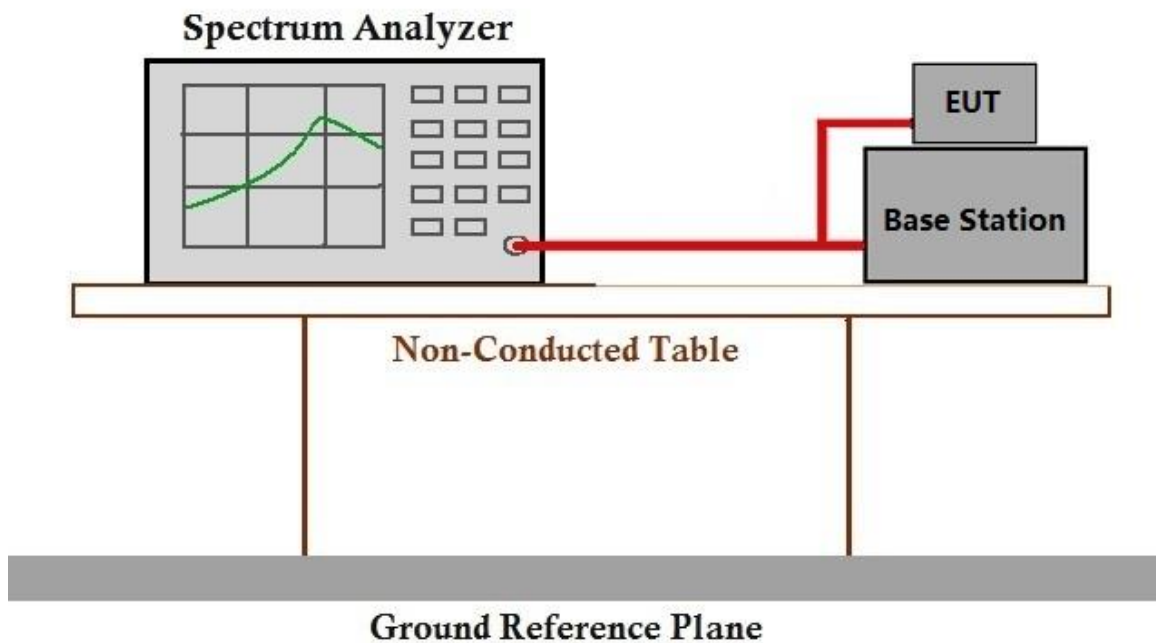
## 6.2 Peak-Average Ratio

Test Requirement: §24.232  
 Test Method: ANSI C63.26, KDB 971168 D01 v03  
 Limit: ≤13dB

### 6.2.1 E.U.T. Operation

Operating Environment:  
 Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar  
 Test mode: b: Tx mode, Keep the EUT in transmitting mode.

### 6.2.2 Test Setup Diagram



### 6.2.3 Measurement Data

Please refer to Appendix B for Peak-Average Ratio-WCDMA

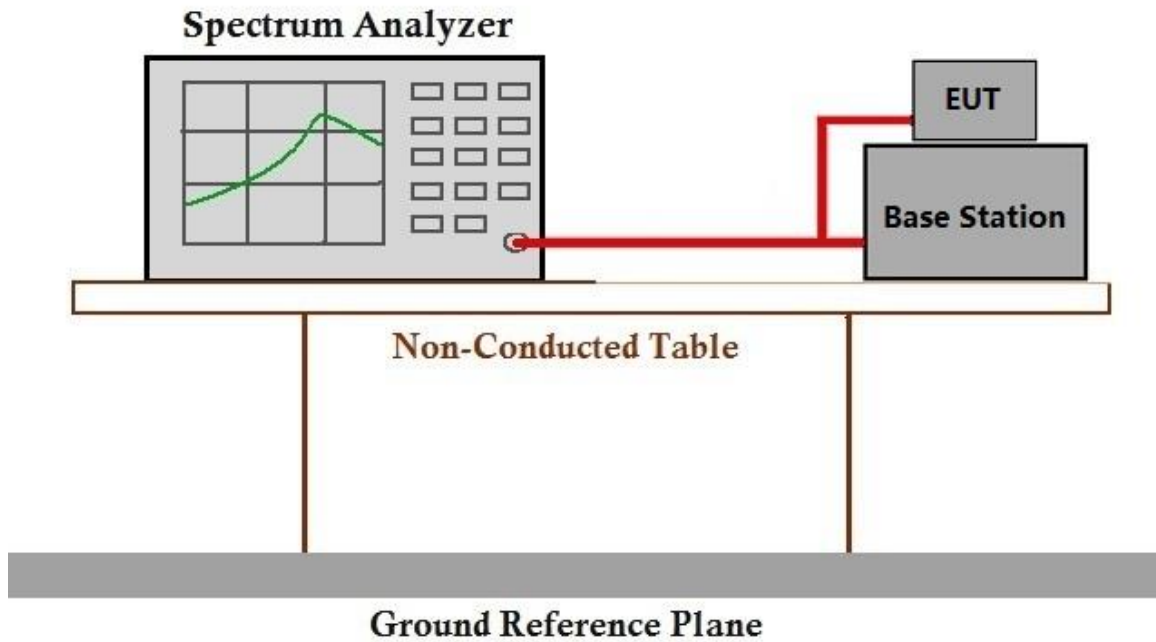
### 6.3 Bandwidth

Test Requirement: §2.1049(h), §22.917, §24.238  
 Test Method: ANSI C63.26, KDB 971168 D01 v03  
 Limit: OBW: No limit  
 EBW: No limit

#### 6.3.1 E.U.T. Operation

Operating Environment:  
 Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar  
 Test mode: b: Tx mode, Keep the EUT in transmitting mode.

#### 6.3.2 Test Setup Diagram



#### 6.3.3 Measurement Data

Please refer to Appendix C for 99% & 26dB Bandwidth-WCDMA

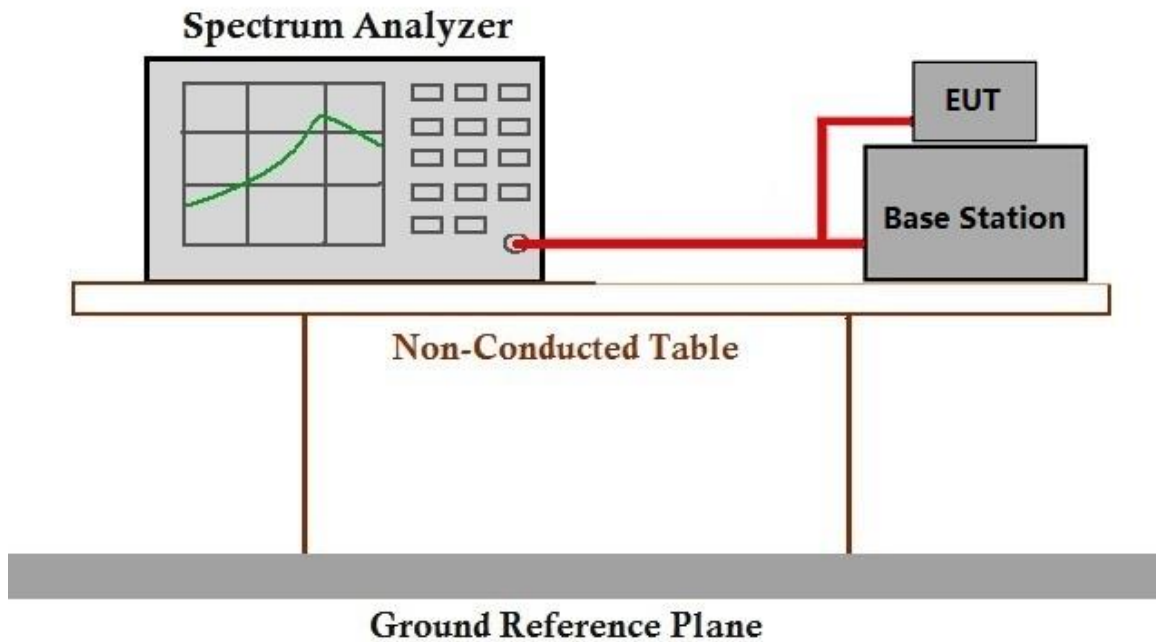
### 6.4 Band Edge Compliance

Test Requirement: §2.1051, §22.917, §24.238  
 Test Method: ANSI C63.26, KDB 971168 D01 v03  
 Limit:  $\leq -13\text{dBm}/1\% \cdot \text{EBW}$ , in 1 MHz bands immediately outside and adjacent to the frequency block.

#### 6.4.1 E.U.T. Operation

Operating Environment:  
 Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar  
 Test mode: b: Tx mode, Keep the EUT in transmitting mode.

#### 6.4.2 Test Setup Diagram



#### 6.4.3 Measurement Data

Please refer to Appendix D for Spurious Emission-WCDMA

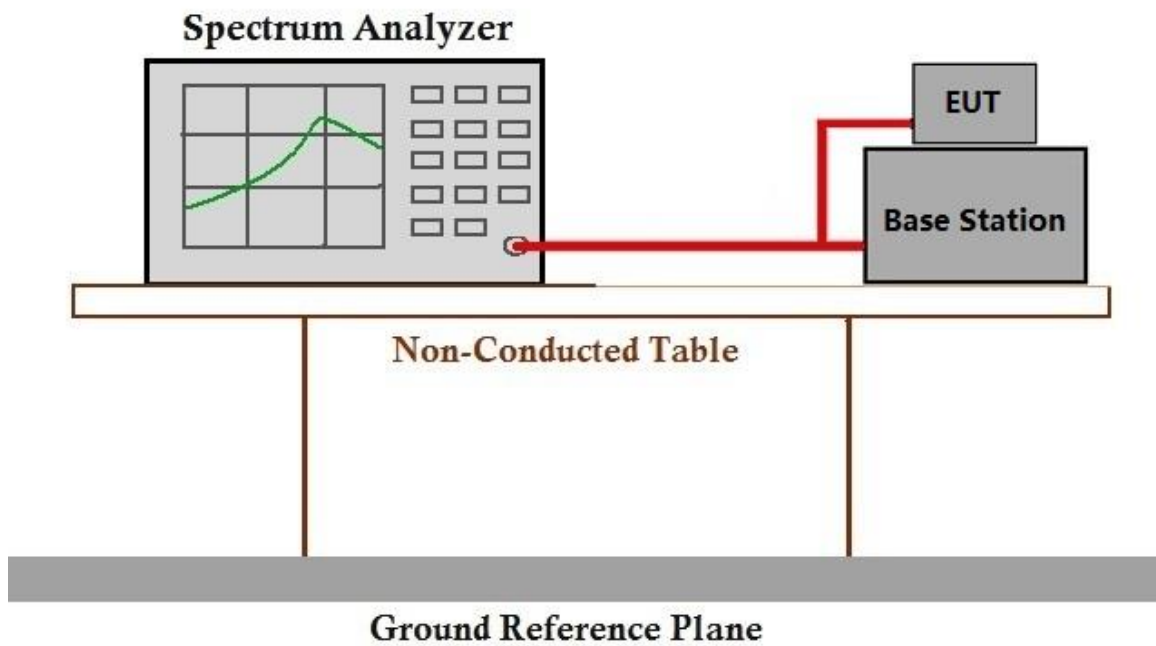
### 6.5 Spurious emissions at antenna terminals

Test Requirement: §2.1051, §22.917, §24.238  
 Test Method: ANSI C63.26, KDB 971168 D01 v03  
 Limit: ≤ -13dBm

#### 6.5.1 E.U.T. Operation

Operating Environment:  
 Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar  
 Test mode: b: Tx mode, Keep the EUT in transmitting mode.

#### 6.5.2 Test Setup Diagram



#### 6.5.3 Measurement Data

Please refer to Appendix D for Spurious Emission-WCDMA



## 6.6 Field strength of spurious radiation

Test Requirement: §2.1051, §22.917, §24.238,  
Test Method: ANSI C63.26, KDB 971168 D01 v03  
Limit:  $\leq -13\text{dBm}$

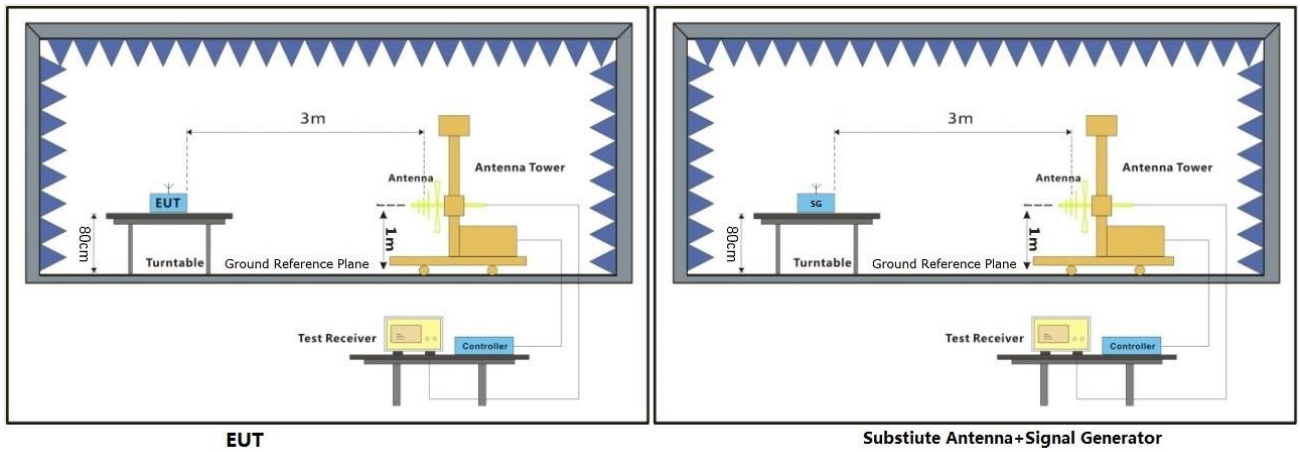
### 6.6.1 E.U.T. Operation

Operating Environment:

Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar

Test mode: b: Tx mode, Keep the EUT in transmitting mode.

### 6.6.2 Test Setup Diagram





### 6.6.3 Measurement Procedure and Data

#### Test Procedure:

- (1) On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
- (2) The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
- (3) The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- (4) The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- (5) The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
- (6) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- (7) The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
- (8) The maximum signal level detected by the measuring receiver shall be noted.
- (9) The measurement shall be repeated with the test antenna set to horizontal polarization.
- (10) Replace the antenna with a proper Antenna (substitution antenna).
- (11) The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
- (12) The substitution antenna shall be connected to a calibrated signal generator.
- (13) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- (14) The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- (15) The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- (16) The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- (17) The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

WCDMA BAND II-Low channel				
Frequency (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization
3704.800	-53.68	-13	-40.68	Horizontal
5557.200	-55.91	-13	-42.91	Horizontal
7409.600	-55.46	-13	-42.46	Horizontal
3704.800	-52.60	-13	-39.60	Vertical
5557.200	-59.67	-13	-46.67	Vertical
7409.600	-55.12	-13	-42.12	Vertical

WCDMA BAND II-Middle channel				
Frequency (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization
3760.000	-55.84	-13	-42.84	Horizontal
5640.000	-61.47	-13	-48.47	Horizontal
7520.000	-55.41	-13	-42.41	Horizontal
3760.000	-52.81	-13	-39.81	Vertical
5640.000	-59.18	-13	-46.18	Vertical
7520.000	-59.72	-13	-46.72	Vertical

WCDMA BAND II-High channel				
Frequency (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization
3815.200	-56.28	-13	-43.28	Horizontal
5722.800	-59.40	-13	-46.40	Horizontal
7630.400	-54.70	-13	-41.70	Horizontal
3815.200	-56.19	-13	-43.19	Vertical
5722.800	-59.39	-13	-46.39	Vertical
7630.400	-55.62	-13	-42.62	Vertical

WCDMA BAND V-Low channel				
Frequency (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization
1652.800	-52.03	-13	-39.03	Horizontal
2479.200	-47.67	-13	-34.67	Horizontal
3305.600	-48.89	-13	-35.89	Horizontal
1652.800	-44.75	-13	-31.75	Vertical
2479.200	-50.19	-13	-37.19	Vertical
3305.600	-44.86	-13	-31.86	Vertical

WCDMA BAND V-Middle channel				
Frequency (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization
1672.800	-41.36	-13	-28.36	Horizontal
2509.200	-52.13	-13	-39.13	Horizontal
3345.600	-44.29	-13	-31.29	Horizontal
1672.800	-40.48	-13	-27.48	Vertical
2509.200	-51.48	-13	-38.48	Vertical
3345.600	-44.15	-13	-31.15	Vertical

WCDMA BAND V-High channel				
Frequency (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization
1692.800	-46.47	-13	-33.47	Horizontal
2539.200	-49.28	-13	-36.28	Horizontal
3385.600	-42.52	-13	-29.52	Horizontal
1692.800	-45.85	-13	-32.85	Vertical
2539.200	-51.59	-13	-38.59	Vertical
3385.600	-42.85	-13	-29.85	Vertical

**Remark:**

We have tested all modulation and all Bandwidth , but only the worst case data presented in this report.

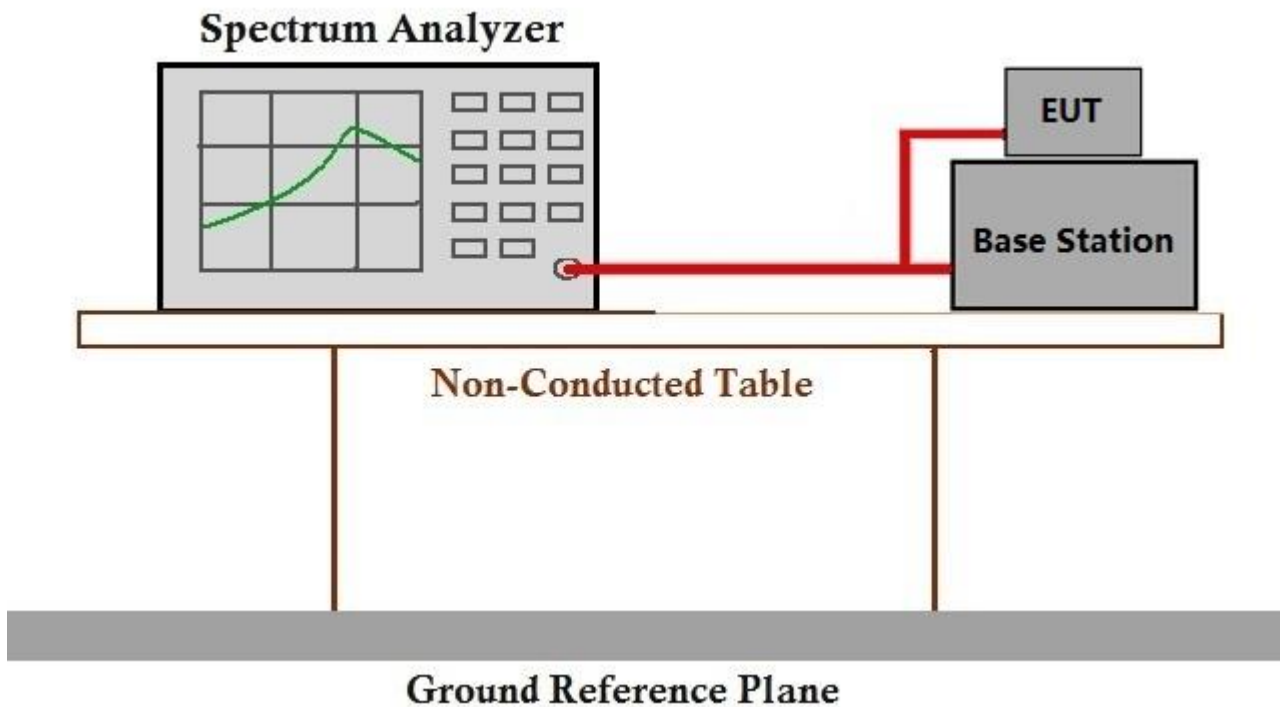
### 6.7 Frequency stability

Test Requirement: §2.1055, §22.355, §24.235  
 Test Method: ANSI C63.26, KDB 971168 D01 v03  
 Limit:  $\leq \pm 2.5\text{ppm}$ .

#### 6.7.1 E.U.T. Operation

Operating Environment:  
 Temperature: 22.7 °C      Humidity: 68.2 % RH      Atmospheric Pressure: 1030 mbar  
 Test mode: b: Tx mode, Keep the EUT in transmitting mode.

#### 6.7.2 Test Setup Diagram



#### 6.7.3 Measurement Data

Please refer to Appendix E for Frequency stability-WCDMA

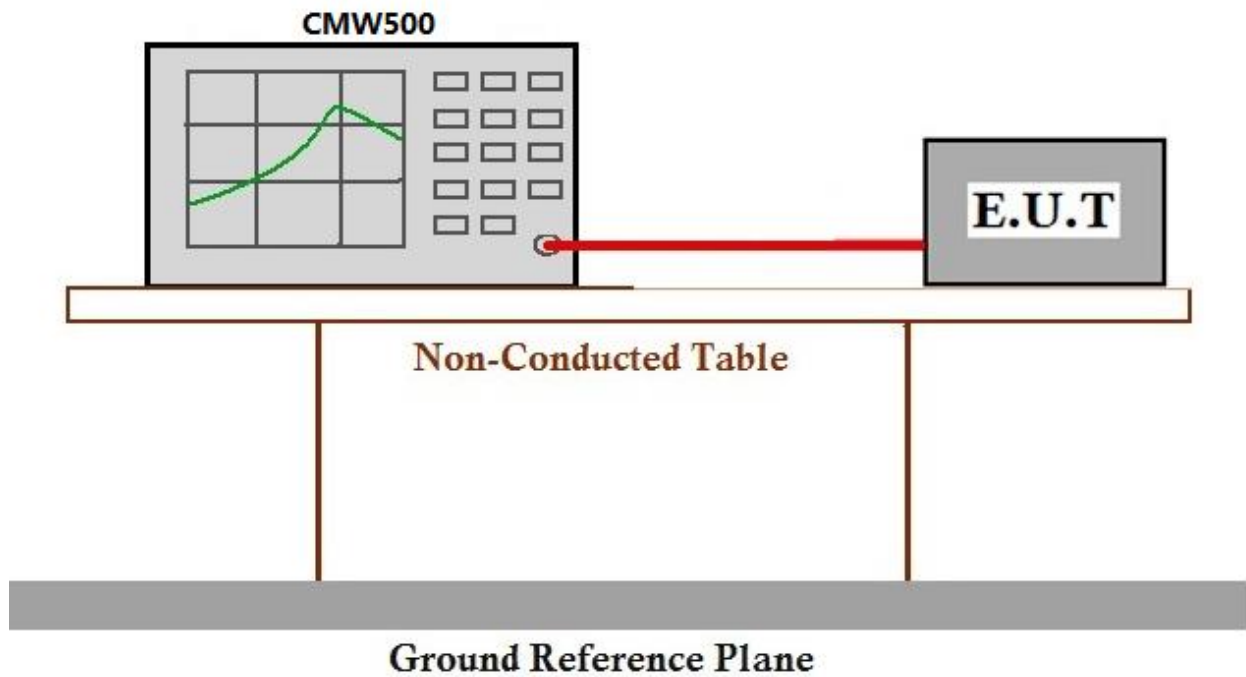
**6.8 Modulation Characteristics**

Test Requirement: §2.1047  
 Test Method: ANSI C63.26, KDB 971168 D01 v03  
 Limit: Digital modulation

**6.8.1 E.U.T. Operation**

Operating Environment:  
 Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar  
 Test mode: b: Tx mode, Keep the EUT in transmitting mode.

**6.8.2 Test Setup Diagram**



**6.8.3 Measurement Data**

Please refer to Appendix F for Modulation Characteristics-WCDMA

## 7 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

## 8 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -