

# TEST REPORT

**FCC ID: 2ADINN5001TL**

**Product: LTE mobile phone**

**Model No.: N5001L**

**Additional Model No.: N5001TL, A4L, A3L**

**Trade Mark: NUU**

**Report No.: TCT171020E012**

**Issued Date: Oct. 20, 2017**

Issued for:

**Sun Cupid Technology (HK) Ltd.**

**16/F, CEO Tower, 77 Wing Hong St, Cheung Sha Wan, Kowloon, Hong Kong.**

Issued By:

**Shenzhen Tongce Testing Lab.**

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**Appendix A: Photographs of Test Setup**

**Appendix B: Photographs of EUT**

**Test Data: Refer to Appendix For LTE Band Part1 Power&OBW, Appendix For LTE Band Part2 Bandedge, Appendix For LTE Band Part3 CS**

## 1. Test Certification

<b>Product:</b>	LTE mobile phone
<b>Model No.:</b>	N5001L
<b>Additional Model:</b>	N5001TL, A4L, A3L
<b>Trade Mark:</b>	<b>NUU</b>
<b>Applicant:</b>	Sun Cupid Technology (HK) Ltd.
<b>Address:</b>	16/F, CEO Tower, 77 Wing Hong St, Cheung Sha Wan, Kowloon, Hong Kong.
<b>Manufacturer:</b>	SUNCUPID (ShenZhen) Electronic Ltd
<b>Address:</b>	Baolong Industrial City, Longgang District, Shenzhen Hi-Tech Road, Building 1, A 7, China.
<b>Date of Test:</b>	Apr. 24, 2017 – Sep. 30, 2017
<b>Applicable Standards:</b>	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part22 FCC CFR Title 47 Part24 FCC CFR Title 47 Part27

*The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.*

**Tested By:**

*Garen*

Garen

**Date:**

Sep. 30, 2017

**Reviewed By:**

*Tomsin*



Tomsin

**Date:**

Oct. 20, 2017

**Approved By:**

**Date:**

Oct. 20, 2017

## 2. Test Result Summary

Requirement	CFR 47 Section	Result
Conducted Output Power	§2.1046; §24.232(c); §27.50(h); §27.50(c); §27.50(d); §22.913	PASS
Peak-to-Average Ratio	§24.232(d); §22.913; §27.50	PASS
Effective (Isotropic) Radiated Power	§2.1046; §24.232(c); §27.50(h); §27.50(c); §27.50(d); §22.913	PASS
Occupied Bandwidth	§2.1049; §24.238(b); §27.53(h)(3); §27.53(m)(6);	PASS
Band Edge	§2.1051; §27.53(g); §27.53(h); §24.238(a); §22.917(a); §27.53(m);	PASS
Conducted Spurious Emission	§2.1051; §27.53(g); §27.53(h); §24.238(a); §22.917(a); §27.53(m);	PASS
Field Strength of Spurious Radiation	§2.1053; §27.53(g); §27.53(h); §24.238(b); §22.917(a); §27.53(m);	PASS
Frequency Stability for Temperature & Voltage	§2.1055; §27.54; §24.235; §22.355	PASS

**Note:**

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

### 3. EUT Description

<b>Product:</b>	LTE mobile phone
<b>Model No.:</b>	N5001L
<b>Additional Model:</b>	N5001TL, A4L, A3L
<b>Trade Mark:</b>	<b>NUU</b>
<b>Hardware version:</b>	110SFM788P0A2V0
<b>Software version:</b>	N5001L-AM-01
<b>Tx Frequency:</b>	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 17: 704 MHz ~ 716 MHz
<b>Rx Frequency:</b>	LTE Band 2: 1930 MHz ~ 1990 MHz LTE Band 4: 2110 MHz ~ 2155 MHz LTE Band 5: 869 MHz ~ 894 MHz LTE Band 7: 2620 MHz ~ 2690 MHz LTE Band 12: 729 MHz ~ 746 MHz LTE Band 17: 734 MHz ~ 746 MHz
<b>Bandwidth:</b>	LTE Band 2: 1.4MHz /3MHz /5MHz /10MHz /15MHz / 20MHz LTE Band 4: 1.4MHz /3MHz /5MHz /10MHz /15MHz / 20MHz LTE Band 5: 1.4MHz /3MHz /5MHz /10MHz LTE Band 7: 5MHz /10MHz /15MHz / 20MHz LTE Band 12: 1.4MHz /3MHz /5MHz /10MHz LTE Band 17: 5MHz /10MHz
<b>Maximum Output Power to Antenna:</b>	LTE Band 2: 21.60dBm LTE Band 4: 21.27dBm LTE Band 5: 21.80dBm LTE Band 7: 21.54dBm LTE Band 12: 21.98dBm LTE Band 17: 21.99dBm
<b>99% Occupied Bandwidth:</b>	LTE Band 2: 18M2G7D LTE Band 4: 18M2G7D LTE Band 5: 9M12G7D LTE Band 7: 18M2W7D; 18M2G7D LTE Band 12: 9M12W7D LTE Band 17: 9M04W7D; 9M04G7D
<b>Type of Modulation:</b>	QPSK / 16QAM
<b>Antenna Type:</b>	Internal Antenna

<b>Antenna Gain:</b>	LTE Band 2: 0.49dBi LTE Band 4: 0.48dBi LTE Band 5: -0.52dBi LTE Band 7: 0.50dBi LTE Band 12: 0.58dBi LTE Band 17: 0.57dBi
<b>Power Supply:</b>	Rechargeable Li-ion Battery DC3.8V / 2000mAh
<b>Adapter:</b>	Adapter Information: Model name: HJ-0501000E1-US Input: AC 100-240V 50/60Hz 0.2A Output: DC 5.0V 1000mA
<b>Remark:</b>	All models above are identical in interior structure, electrical circuits and components, and just model names and color are different for the marketing requirement.

Note: The report LTE band2/4/5/7 data is used in 2ADINN5001L reported test data.

## 4. Genera Information

### 4.1. Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation
<p>The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y &amp; Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.</p>	

**Description Operation Frequency**

**Test channels:**

LTE BAND 2			
Test Channel	BW(MHz)	UL Channel	Frequency(MHz)
Low Range	1.4	18607	1850.7
	3	18615	1851.5
	5	18625	1852.5
	10	18650	1855
	15	18675	1857.5
	20	18700	1860
Mid Range	1.4/3/5/10 15 /20	18900	1880
High Range	1.4	19193	1909.3
	3	19185	1908.5
	5	19175	1907.5
	10	19150	1905
	15	19125	1902.5
	20	19100	1900

LTE BAND 4			
Test Channel	BW(MHz)	UL Channel	Frequency(MHz)
Low Range	1.4	19957	1710.7
	3	19965	1711.5
	5	19975	1712.5
	10	20000	1715
	15	20025	1717.5
	20	20050	1720
Mid Range	1.4/3/5/10/15/20	20175	1732.5
High Range	1.4	20393	1754.3
	3	20385	1753.5
	5	20375	1752.5
	10	20350	1750
	15	20325	1747.5
	20	20300	1745



LTE BAND 5			
Test Channel	BW(MHz)	UL Channel	Frequency(MHz)
Low Range	1.4	20470	824.7
	3	20415	825.5
	5	20425	826.5
	10	20450	829
Mid Range	1.4/3/5/10	20525	836.5
High Range	1.4	20643	848.3
	3	20635	847.5
	5	20625	846.5
	10	20600	844

LTE BAND 7			
Test Channel	BW(MHz)	UL Channel	Frequency(MHz)
Low Range	5	20775	2502.5
	10	20800	2505
	15	20825	2507.5
	20	20850	2510
Mid Range	5/10/15/20	21100	2535
High Range	5	21425	2567.5
	10	21400	2565
	15	21375	2562.5
	20	21350	2560

LTE BAND 12			
Test Channel	BW(MHz)	UL Channel	Frequency(MHz)
Low Range	1.4	23017	699.7
	3	23025	700.5
	5	23035	701.5
	10	23060	704
Mid Range	1.4/3/5/10	23095	707.5
High Range	1.4	23173	715.3
	3	23165	714.5
	5	23155	713.5
	10	23130	711

LTE BAND 17			
Test Channel	BW(MHz)	UL Channel	Frequency(MHz)
Low Range	5	23755	706.5
	10	23780	709
Mid Range	5/10	23790	710
High Range	5	23825	713.5
	10	23800	711

Note 1: both QPSK&16QAM modulation has been measured;

Note 2: The worst condition was recorded in the test report if no other modes test data.

## 4.2. Test Mode

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Mode		
Band	Radiated TCs	Conducted TCs
LTE Band 2	QPSK Link (1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz)	16QAM Link (1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz)
LTE Band 4	QPSK Link (1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz)	16QAM Link (1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz)
LTE Band 5	QPSK Link (1.4MHz / 3MHz / 5MHz / 10MHz)	16QAM Link (1.4MHz / 3MHz / 5MHz / 10MHz)
LTE Band 7	QPSK Link (5MHz / 10MHz / 15MHz / 20MHz)	16QAM Link (5MHz / 10MHz / 15MHz / 20MHz)
LTE Band 12	QPSK Link (1.4MHz / 3MHz / 5MHz / 10MHz)	16QAM Link (1.4MHz / 3MHz / 5MHz / 10MHz)
LTE Band 17	QPSK Link (5MHz / 10MHz)	16QAM Link (5MHz / 10MHz)

Antenna port conducted and radiated test items were performed according to KDB 971168 D02 Power Meas. License Digital Systems v02r02 with maximum output power. Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v			v	v	v	v	v	v	v	v
	7			v	v	v	v	v	v	v	v	v	v	v	v
	12	v	v	v	v			v	v	v	v	v	v	v	v
	17			v	v			v	v	v	v	v	v	v	v
Peak-to-Average Ratio	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v			v	v	v	v	v	v	v	v
	7			v	v	v	v	v	v	v	v	v	v	v	v

	12	v	v	v	v			v	v	v	v	v	v	v	v
	17			v	v			v	v	v	v	v	v	v	v
26dB and 99% Bandwidth	2	v	v	v	v	v	v	v	v			v	v	v	v
	4	v	v	v	v	v	v	v	v			v	v	v	v
	5	v	v	v	v			v	v			v	v	v	v
	7			v	v	v	v	v	v			v	v	v	v
	12	v	v	v	v			v	v			v	v	v	v
	17			v	v			v	v			v	v	v	v

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Conducted Band Edge	2	v	v	v	v	v	v	v	v	v			v	v	v
	4	v	v	v	v	v	v	v	v	v			v	v	v
	5	v	v	v	v			v	v	v			v	v	v
	7			v	v	v	v	v	v	v			v	v	v
	12	v	v	v	v			v	v	v			v	v	v
	17			v	v			v	v	v			v	v	v
Conducted Spurious Emission	2	v	v	v	v	v	v	v	v	v			v	v	v
	4	v	v	v	v	v	v	v	v	v			v	v	v
	5	v	v	v	v			v	v	v			v	v	v
	7			v	v	v	v	v	v	v			v	v	v
	12	v	v	v	v			v	v	v			v	v	v
	17			v	v			v	v	v			v	v	v
Frequency Stability	2				v			v	v				v	v	
	4				v			v	v				v	v	
	5				v			v	v				v	v	
	7				v			v	v				v	v	
	12				v			v	v				v	v	
	17				v			v	v				v	v	
E.R.P./E.I.R.P.	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v			v	v	v	v	v	v	v	v
	7			v	v	v	v	v	v	v	v	v	v	v	v
	12	v	v	v	v			v	v	v	v	v	v	v	v
	17			v	v			v	v	v	v	v	v	v	v

Radiated Spurious Emission	2	v						v	v	v			v	v	v
	4	v						v	v	v			v	v	v
	5	v						v	v	v			v	v	v
	7			v				v	v	v			v	v	v
	12	v						v	v	v			v	v	v
	17			v				v	v	v			v	v	v
Note	<ol style="list-style-type: none"> <li>The mark "v" means that this configuration is chosen for testing</li> <li>The mark "-" means that this bandwidth is not supported.</li> </ol>														

### 4.3. Description of Support Units

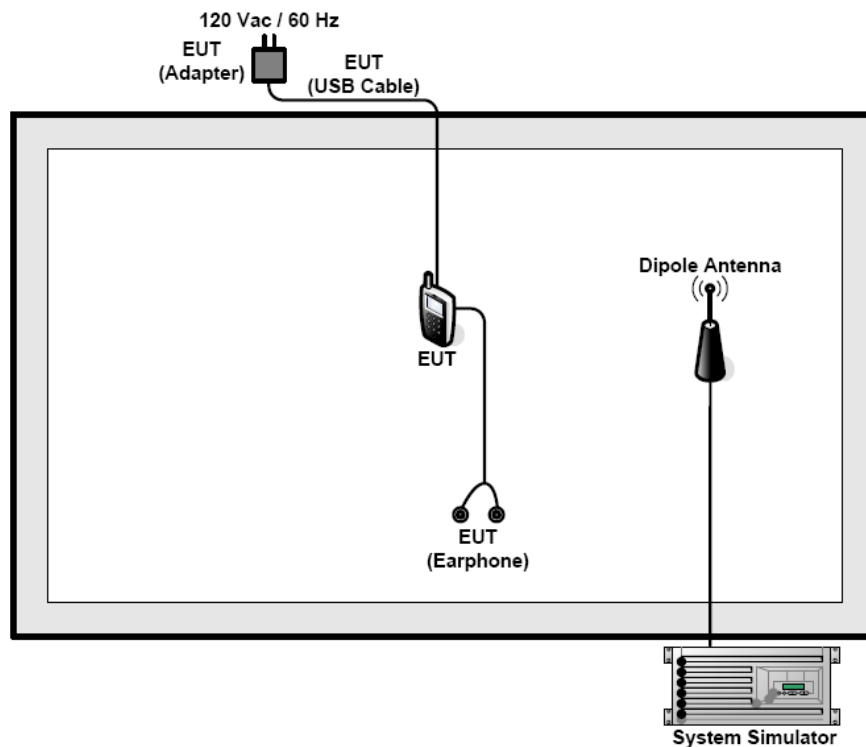
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name

**Note:**

- All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

#### 4.4. Configuration of Tested System



#### 4.5. Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level. The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

## 5. Facilities and Accreditations

### 5.1. Facilities

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

- FCC - Registration No.: 645098

#### **Shenzhen Tongce Testing Lab.**

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

### 5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

### 5.3. Measurement Uncertainty

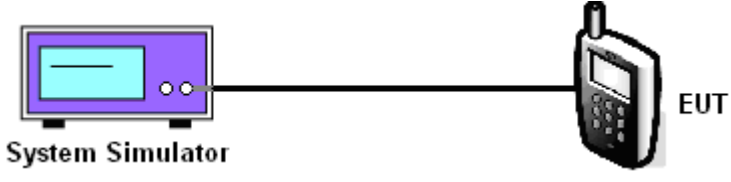
The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.12\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.92\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^\circ\text{C}$
7	Humidity	$\pm 1.0\%$

## 6. Test Results and Measurement Data

### 6.1. Conducted Output Power Measurement

#### 6.1.1. Test Specification

<b>Test Requirement:</b>	FCC part 27.50(c), FCC part 27.50(d) and FCC part 27.50(h), FCC part 24.232(c), FCC part 22.913
<b>Test Method:</b>	FCC part 2.1046
<b>Limits:</b>	LTE Band 2: 2W LTE Band 4: 1W LTE Band 5: 7W LTE Band 7: 2W LTE Band 12: 1W LTE Band 17: 1W
<b>Test Setup:</b>	 <p>The diagram illustrates the test setup. On the left is a purple 'System Simulator' with a screen and two ports. A black cable connects it to a black mobile phone labeled 'EUT' on the right.</p>
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>1. The transmitter output port was connected to the system simulator.</li> <li>2. Set EUT at maximum power through system simulator.</li> <li>3. Select lowest, middle, highest channels for each band and different modulation.</li> <li>4. Measure and record the power level from the system simulator.</li> </ol>
<b>Test Result:</b>	PASS

#### 6.1.2. Test Instruments

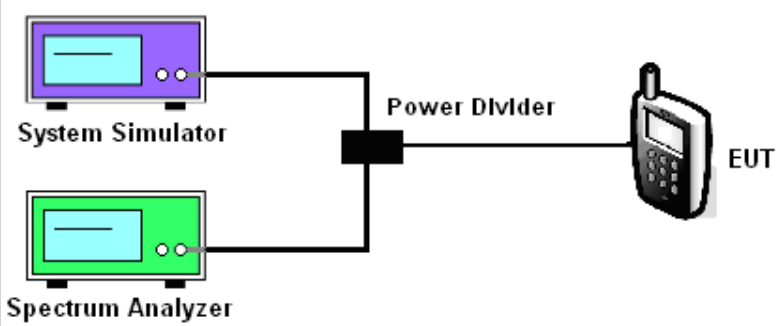
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Wideband Radio Communication Tester	R&S	CMW500	114220	Jun. 12, 2018
RF cable (9kHz-40GHz)	TCT	RE-05	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-02	N/A	Sep. 27, 2018

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



## 6.2. Peak to Average Ratio

### 6.2.1. Test Specification

<b>Test Requirement:</b>	FCC part 27.50, FCC part 24.232(d), FCC part 22.913
<b>Test Method:</b>	FCC KDB 971168 v02r02
<b>Limit:</b>	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.
<b>Test Setup:</b>	 <p>The diagram illustrates the test setup. A System Simulator (purple box) and a Spectrum Analyzer (green box) are connected to a central Power Divider (black box). The Power Divider is then connected to the EUT (Equipment Under Test, represented by a mobile phone icon).</p>
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.</li> <li>2. The EUT was connected to spectrum analyzer and system simulator via a power divider.</li> <li>3. Set EUT to transmit at maximum output power.</li> <li>4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer.</li> </ol> <p>Record the maximum PAPR level associated with a probability of 0.1%.</p>
<b>Test Result:</b>	PASS

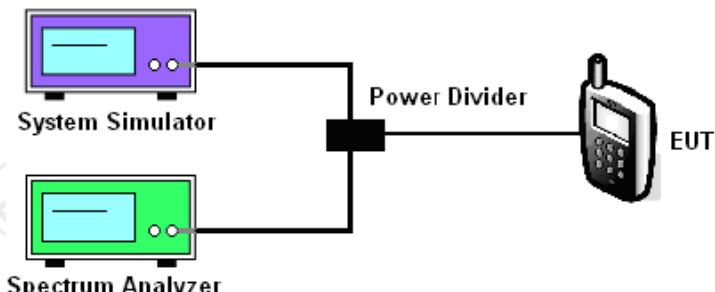
### 6.2.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Wideband Radio Communication Tester	R&S	CMW500	114220	Jun. 12, 2018
Spectrum Analyzer	ROHDE&SCH WARZ	FSQ	200061	Sep. 27, 2018
RF cable (9kHz-40GHz)	TCT	RE-05	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-02	N/A	Sep. 27, 2018

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

### 6.3. 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 6.3.1. Test Specification

<b>Test Requirement:</b>	FCC part 27.53(h)(3) and FCC part 27.53(m)(6), FCC part 24.238(b), FCC part 2.1049
<b>Test Method:</b>	FCC part 2.1049
<b>Limit:</b>	N/A
<b>Test Setup:</b>	 <p>The diagram illustrates the test setup. On the left, there are two pieces of equipment: a System Simulator (top) and a Spectrum Analyzer (bottom). Both are connected to a central Power Divider. The Power Divider is then connected to the EUT (Equipment Under Test), which is represented by a mobile phone icon on the right.</p>
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 4.2.</li> <li>2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.</li> <li>3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>4. The 99% occupied bandwidth were measured, set RBW= 1% of OBW, VBW= 3*RBW, sample detector, trace maximum hold.</li> <li>5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.</li> </ol>
<b>Test Result:</b>	PASS

#### 6.3.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Wideband Radio Communication Tester	R&S	CMW500	114220	Jun. 12, 2018
Spectrum Analyzer	ROHDE&SCH WARZ	FSQ	200061	Sep. 27, 2018
RF cable (9kHz-40GHz)	TCT	RE-05	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-02	N/A	Sep. 27, 2018

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## 6.4. Band Edge and Conducted Spurious Emission Measurement

### 6.4.1. Test Specification

<b>Test Requirement:</b>	FCC part 27.53(h), FCC part 27.53(g) , FCC part 27.53(m)(4), FCC part 24.238(a), FCC part 22.917(a)
<b>Test Method:</b>	FCC part 2.1051
<b>Limit:</b>	-13dBm
<b>Test Setup:</b>	<p>The diagram illustrates the test setup. A System Simulator (purple box) and a Spectrum Analyzer (green box) are connected to a Power Divider (black box). The Power Divider is also connected to the EUT (a mobile phone).</p>
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 6.0.</li> <li>2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.</li> <li>3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>4. The band edges of low and high channels for the highest RF powers were measured.</li> <li>5. The conducted spurious emission for the whole frequency range was taken.</li> <li>6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</li> <li>7. The limit line is derived from <math>43 + 10\log(P)</math> dB below the transmitter power  <math>P(\text{Watts}) = P(W) - [43 + 10\log(P)] (\text{dB}) = [30 + 10\log(P)] (\text{dBm}) - [43 + 10\log(P)] (\text{dB}) = -13\text{dBm}</math>.                      For Band 17, the limit line is derived from <math>55 + 10\log(P)</math> dB below the transmitter power</li> </ol>
<b>Test Result:</b>	PASS

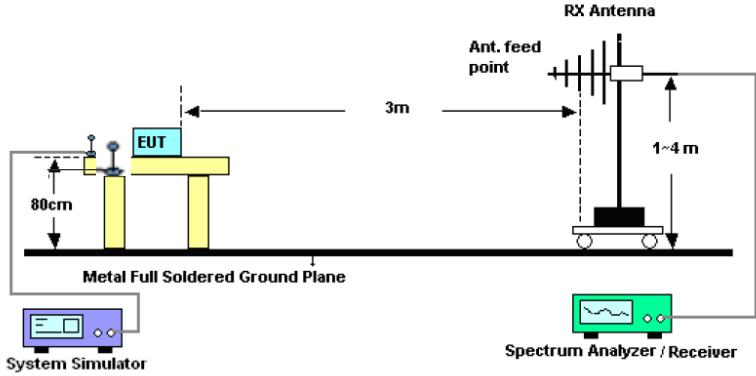
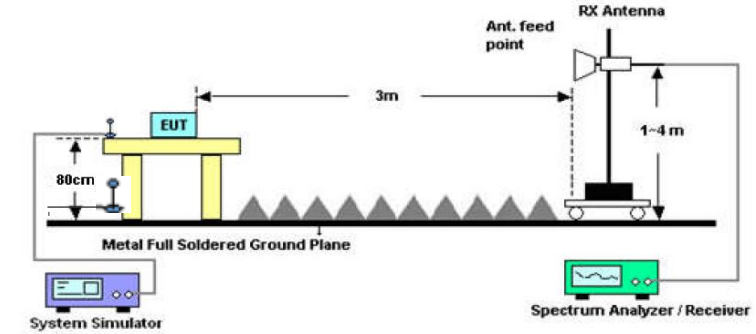
#### 6.4.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Wideband Radio Communication Tester	R&S	CMW500	114220	Jun. 12, 2018
Spectrum Analyzer	ROHDE&SCHWARZ	FSQ	200061	Sep. 27, 2018
RF cable (9kHz-40GHz)	TCT	RE-05	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-02	N/A	Sep. 27, 2018

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## 6.5. Field Strength of Spurious Radiation Measurement

### 6.5.1. Test Specification

<p><b>Test Requirement:</b></p>	<p>FCC part 27.53(g) ,FCC part 27.53(h), FCC part 27.53(m)(4), FCC part 24.238(b) FCC part 22.917(a)</p>
<p><b>Test Method:</b></p>	<p>FCC part 2.1053</p>
<p><b>Limit:</b></p>	<p>30MHz~20GHz -13dBm</p>
<p><b>Test setup:</b></p>	<p>From 30MHz to 1GHz</p>  <p>Above 1GHz</p> 
<p><b>Test Procedure:</b></p>	<ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-D-2010Section 2.2.12.</li> <li>2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.</li> <li>3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.</li> <li>4. The table was rotated 360 degrees to determine the position of the highest spurious emission.</li> <li>5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical</li> </ol>

	<p>polarizations.</p> <ol style="list-style-type: none"> <li>6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.</li> <li>7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.</li> <li>8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.</li> <li>9. Taking the record of output power at antenna port.</li> <li>10. Repeat step 7 to step 8 for another polarization.</li> <li>11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain</li> <li>12. ERP (dBm) = EIRP - 2.15</li> <li>13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</li> <li>14. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)  <math>= P(W) - [43 + 10\log(P)] \text{ (dB)}</math>  <math>= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}</math>  <math>= -13\text{dBm}.</math>                      For Band 17, the limit line is derived from 55 + 10log(P) dB below the transmitter power</li> </ol>
<b>Test results:</b>	PASS

**6.5.2. Test Instruments**

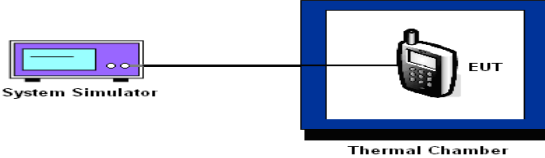
Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
System simulator	R&S	CMU200	111382	Sep. 27, 2018
Spectrum Analyzer	ROHDE&SCHWARZ	R&S	FSQ	Sep. 27, 2018
Signal Generator	HP	83623B	3614A00396	Sep. 27, 2018
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 27, 2018
Broadband Antenna	Schwarzbeck	VULB9163	412	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBHA 9120D	1201	Mar. 05, 2018
Horn Antenna	Schwarzbeck	BBH 9170	582	Jun. 07, 2018
Dipole Antenna	TCT	TCT-RF	N/A	Sep. 27, 2018
Coax cable (9kHz-1GHz)	TCT	RE-low-01	N/A	Sep. 27, 2018

Coax cable (9kHz-40GHz)	TCT	RE-high-02	N/A	Sep. 27, 2018
Coax cable (9kHz-1GHz)	TCT	RE-low-03	N/A	Sep. 27, 2018
Coax cable (9kHz-40GHz)	TCT	RE-High-04	N/A	Sep. 27, 2018
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## 6.6. Frequency Stability Measurement

### 6.6.1. Test Specification

<b>Test Requirement:</b>	FCC part 27.54, FCC part 24.235, FCC Part 22.355
<b>Test Method:</b>	FCC Part 2.1055
<b>Limit:</b>	±2.5 ppm
<b>Test Setup:</b>	 <p>The diagram illustrates the test setup. On the left, a 'System Simulator' is connected via a cable to a 'Thermal Chamber'. Inside the thermal chamber, the 'EUT' (Equipment Under Test) is shown.</p>
<b>Test Procedure:</b>	<p><b>Test Procedures for Temperature Variation</b></p> <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 9.0.</li> <li>2. The EUT was set up in the thermal chamber and connected with the system simulator.</li> <li>3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.</li> <li>4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.</li> </ol> <p><b>Test Procedures for Voltage Variation</b></p> <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 9.0.</li> <li>2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.</li> <li>3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.</li> <li>4. The variation in frequency was measured for the worst case.</li> </ol>
<b>Test Result:</b>	PASS



**6.6.2. Test Instruments**

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Wideband Radio Communication Tester	R&S	CMW500	114220	Jun. 12, 2018
Programable tempratuce and humidity chamber	JQ	JQ-2000	N/A	Sep. 27, 2018
DC power supply	Kingrang	KR3005K 30V/5A	N/A	Sep. 27, 2018
RF cable (9kHz-40GHz)	TCT	RE-04	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-03	N/A	Sep. 27, 2018

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## Appendix A: Photographs of Test Setup

Refer to test report TCT171020E013

## Appendix B: Photographs of EUT

Refer to test report TCT171020E013

**\*\*\*\*\*END OF REPORT\*\*\*\*\***