

TEST REPORT

FCC ID..... :	2AAS9-L0006	
Test Report No..... :	TCT211208E042	
Date of issue..... :	Jan. 12, 2022	
Testing laboratory	SHENZHEN TONGCE TESTING LAB	
Testing location/ address:	TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China	
Applicant's name..... :	BROWAN COMMUNICATIONS INCORPORATION	
Address..... :	No.15-1, Zhonghua Rd., Hsinchu Industrial Park, Hukou, Hsinchu Hsien, Taiwan, 303	
Manufacturer's name ... :	BROWAN COMMUNICATIONS INCORPORATION	
Address..... :	No.15-1, Zhonghua Rd., Hsinchu Industrial Park, Hukou, Hsinchu Hsien, Taiwan, 303	
Standard(s)	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part24 FCC CFR Title 47 Part27	
Test item description	Pico Next Indoor Gateway	
Trade Mark	BROWAN	
Model/Type reference..... :	L0006, L0006-1, L0006-2, L0006-3, L0006-5, L0006-6, L0006-7, L0006-9, L0006-10, L0006-11, L0006-12, L0006-13	
Rating(s)	Adapter Information: Model: MS-V1500R120-018H0-US Input: AC 100-240V, 50/60Hz, 0.6A max Output: DC 12.0V, 1.5A	
Date of receipt of test item	Dec. 08, 2021	
Date (s) of performance of test..... :	Dec. 08, 2021 ~ Jan. 12, 2022	
Tested by (+signature) ... :	Brews XU	
Check by (+signature).... :	Beryl ZHAO	
Approved by (+signature):	Tomsin	

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1. General Product Information

1.1. EUT description

Test item description	Pico Next Indoor Gateway
Model/Type reference.....	L0006
Sample Number.....	TCT211208E004-0101
Tx Frequency	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 12: 699 MHz ~ 716 MHz
Rx Frequency	LTE Band 2: 1930 MHz ~ 1990 MHz LTE Band 4: 2110 MHz ~ 2155 MHz LTE Band 12: 729 MHz ~ 746 MHz
Bandwidth.....	LTE Band 2: 1.4MHz /3MHz /5MHz /10MHz /15MHz /20MHz LTE Band 4: 1.4MHz /3MHz /5MHz /10MHz /15MHz /20MHz LTE Band 12: 1.4MHz /3MHz /5MHz /10MHz
Maximum Output Power to Antenna.....	LTE Band 2: 22.36dBm LTE Band 4: 22.50dBm LTE Band 12: 24.10dBm
99% Occupied Bandwidth.....	LTE Band 2: 17M9G7D LTE Band 4: 18M0G7D LTE Band 12: 8M97G7D
Type of Modulation.....	QPSK/16QAM
Antenna Type.....	External Antenna
Antenna Gain.....	LTE Band 2: 1.64dBi LTE Band 4: 0.75dBi LTE Band 12: 1.38dBi
Rating(s)	Adapter Information: Model: MS-V1500R120-018H0-US Input: AC 100-240V, 50/60Hz, 0.6A max Output: DC 12.0V, 1.5A

Note: The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

1.2. Model(s) list

No.	Model No.	Tested with
1	L0006	☒
Other models	L0006-1, L0006-2, L0006-3, L0006-5, L0006-6, L0006-7, L0006-9, L0006-10, L0006-11, L0006-12, L0006-13	☐

Note: L0006 is tested model, other models are derivative models. The models are identical in circuit and PCB layout, only different on the model names. So the test data of L0006 can represent the remaining models.

1.3. Emission Designator

LTE Band 2	QPSK		16QAM	
BW(MHz)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)
1.4	1M09G7D	0.251	1M09W7D	0.206
3	2M70G7D	0.247	2M69W7D	0.194
5	4M50G7D	0.241	4M51W7D	0.191
10	8M97G7D	0.250	8M97W7D	0.209
15	13M5G7D	0.236	13M4W7D	0.195
20	17M9G7D	0.240	17M9W7D	0.201
LTE Band 4	QPSK		16QAM	
BW(MHz)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)
1.4	1M09G7D	0.198	1M09W7D	0.163
3	2M70G7D	0.202	2M69W7D	0.167
5	4M50G7D	0.207	4M51W7D	0.158
10	8M98G7D	0.204	8M96W7D	0.178
15	13M5G7D	0.200	13M5W7D	0.179
20	18M0G7D	0.211	18M0W7D	0.180
LTE Band 12	QPSK		16QAM	
BW(MHz)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)
1.4	1M10G7D	0.215	1M09W7D	0.170
3	2M70G7D	0.214	2M70W7D	0.170
5	4M50G7D	0.202	4M51W7D	0.162
10	8M97G7D	0.207	8M96W7D	0.181

1.4. Test Frequency

LTE Band 2(1.4MHz)		LTE Band 2(3MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
18607	1850.7	18615	1851.5
18900	1880	18900	1880
19193	1909.3	19185	1908.5
LTE Band 2(5MHz)		LTE Band 2(10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
18625	1852.5	18650	1855
18900	1880	18900	1880
19175	1907.5	19150	1905
LTE Band 2(15MHz)		LTE Band 2(20MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
18675	1857.5	18700	1860
18900	1880	18900	1880
19125	1902.5	19100	1900

LTE Band 4(1.4MHz)		LTE Band 4(3MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
19957	1710.7	19965	1711.5
20175	1732.5	20175	1732.5
20393	1754.3	20385	1753.5
LTE Band 4(5MHz)		LTE Band 4(10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
19975	1712.5	20000	1715
20175	1732.5	20175	1732.5
20375	1752.5	20350	1750
LTE Band 4(15MHz)		LTE Band 4(20MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
20025	1717.5	20050	1720
20175	1732.5	20175	1732.5
20325	1747.5	20300	1745

LTE Band 12(1.4MHz)		LTE Band 12(3MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
23017	699.7	23025	700.5
23095	707.5	23095	707.5
23173	715.3	23165	714.5
LTE Band 12(5MHz)		LTE Band 12(10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
23035	701.5	23060	704
23095	707.5	23095	707.5
23155	713.5	23130	711

2. Test Result Summary

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

3.1. Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar

Keep the EUT in communication with CMW500 and select channel with modulation 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 12	QPSK Link (1.4MHz / 3MHz / 5MHz / 10MHz)	16QAM Link (1.4MHz / 3MHz / 5MHz / 10MHz)

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03 with maximum output power. Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission. The sample was placed 0.8m/1.5m 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 & 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 polarization. The emissions worst-case are shown in Test Results of the following pages.

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
	12	v	v	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
	12	v	v	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	v	v
	4	v	v	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
Conducted Band Edge	2	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
	12	v	v	v	v	-	-	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
	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v
Frequency Stability	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
	12	v	v	v	v	-	-	v	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
	12	v	v	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
	12	-	-	-	v	-	-	v	v	v	-	-	v	v	v
Note	1. The mark "v" means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported.														

3.2. Description of Support Units

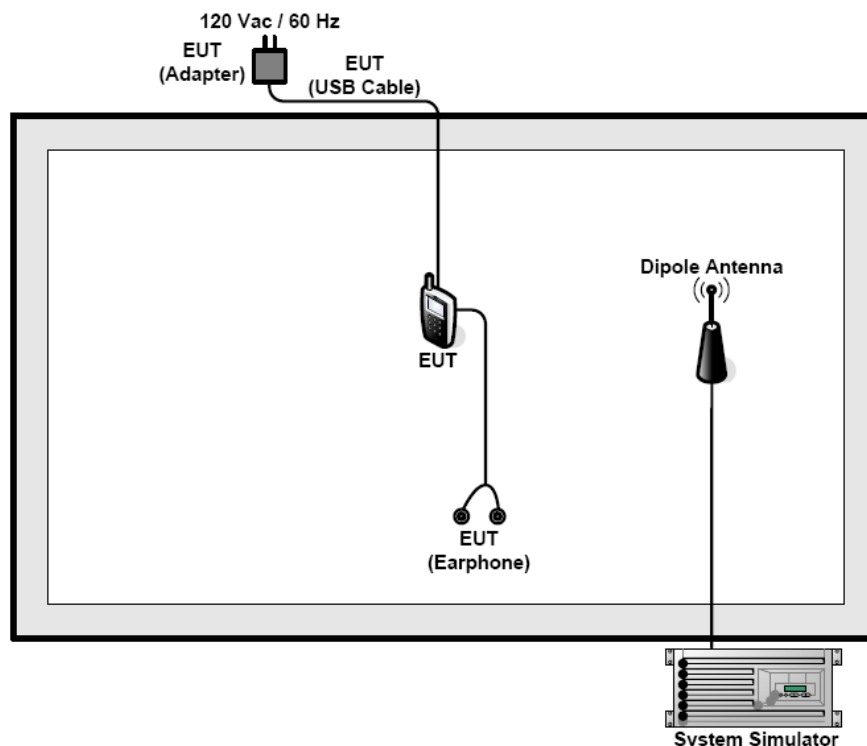
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

Note:

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

3.3. Configuration of Tested System



3.4. 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.

$$\text{Offset} = \text{RF cable loss} + \text{attenuator factor}.$$

4. Facilities and Accreditations

4.1. Facilities

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

- FCC - Registration No.: 645098

SHENZHEN TONGCE TESTING LAB

Designation Number: CN1205

The testing lab 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

SHENZHEN TONGCE TESTING LAB

CAB identifier: CN0031

The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

4.2. Location

SHENZHEN TONGCE TESTING LAB

Address: TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China

TEL: +86-755-27673339

4.3. Measurement Uncertainty

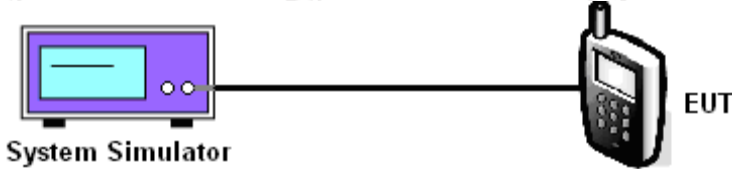
The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	± 3.10 dB
2	RF power, conducted	± 0.12 dB
3	Spurious emissions, conducted	± 0.11 dB
4	All emissions, radiated(<1 GHz)	± 4.56 dB
5	All emissions, radiated(1 GHz - 18 GHz)	± 4.22 dB
6	All emissions, radiated(18 GHz- 40 GHz)	± 4.36 dB

5. Test Results and Measurement Data

5.1. Effective Radiated Power and Effective Isotropic Radiated Power Measurement

5.1.1. Test Specification

Test Requirement:	FCC part 27.50(c), FCC part 27.50(d) and FCC part 27.50(h), FCC part 24.232(c)
Test Method:	FCC part 2.1046
Limit:	LTE Band 2: 2W LTE Band 4: 1W LTE Band 12: 3W
Test Setup:	 The diagram illustrates the test setup. On the left is a 'System Simulator' represented by a purple box with a screen and two buttons. A black cable connects it to a mobile phone on the right, labeled 'EUT' (Equipment Under Test).
Test Procedure:	1. The transmitter output port was connected to the system simulator. 2. Set EUT at maximum power through system simulator. 3. Select lowest, middle, highest channels for each band and different modulation. 4. Measure and record the power level from the system simulator. 5. Calculate the ERP and EIRP The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is: $ERP \text{ or } EIRP = P_{Meas} + G_T - L_C$ where: ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, typically dBW or dBm); P_{Meas} = measured transmitter output power or PSD, in dBm or dBW; G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP); L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB. <i>Note: For personal/portable radios utilizing an integral antenna, the factor L_C is typically negligible. However, in a</i>

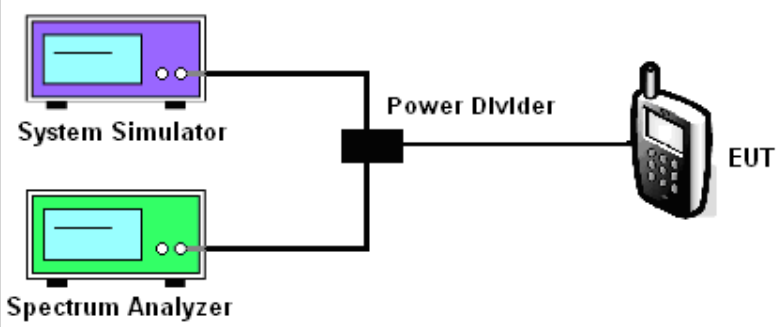
	<i>fixed station transmit system that utilizes a long cable run between the transmitter and the transmitting antenna, this factor can be significant.</i>
Test Result:	PASS

5.1.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Wideband Radio Communication Tester	R&S	CMW500	114220	Jul. 07, 2022
RF cable (9kHz-40GHz)	TCT	RE-05	N/A	Jul. 07, 2022
Antenna Connector	TCT	RFC-02	N/A	Jul. 07, 2022

5.2. Peak to Average Ratio

5.2.1. Test Specification

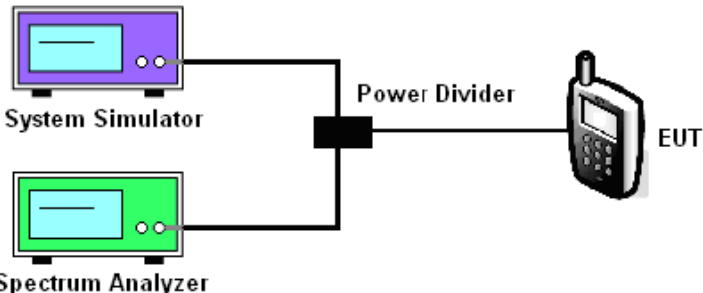
Test Requirement:	FCC part 2.1046; 24.232; 27.50(d); 27.50(c); 27.50(b)
Test Method:	FCC KDB 971168 D01v03
Limit:	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.
Test Setup:	 The diagram illustrates the test setup. A System Simulator (represented by a purple monitor icon) and a Spectrum Analyzer (represented by a green monitor icon) are connected to a central Power Divider (represented by a black square). The Power Divider is then connected to the EUT (Equipment Under Test, represented by a mobile phone icon).
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03 Section 5.7.1. 2. The EUT was connected to spectrum analyzer and system simulator via a power divider. 3. Set EUT to transmit at maximum output power. 4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.
Test Result:	PASS

5.2.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Wideband Radio Communication Tester	R&S	CMW500	114220	Jul. 07, 2022
Spectrum Analyzer	Agilent	N9020A	MY49100619	Jul. 18, 2022
RF cable (9kHz-40GHz)	TCT	RE-05	N/A	Jul. 07, 2022
Antenna Connector	TCT	RFC-02	N/A	Jul. 07, 2022

5.3. 99% Occupied Bandwidth and 26dB Bandwidth Measurement

5.3.1. Test Specification

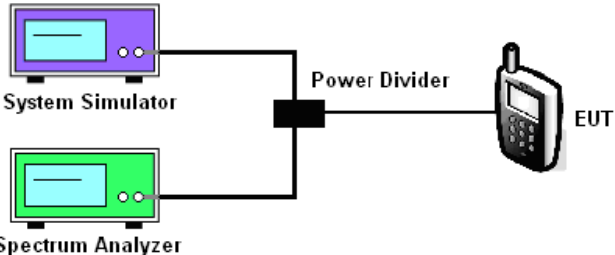
Test Requirement:	FCC part 27.53(h)(3) and FCC part 27.53(m)(6), FCC part 24.238(b)
Test Method:	FCC part 2.1049
Limit:	N/A
Test Setup:	 The diagram shows a System Simulator (purple box) and a Spectrum Analyzer (green box) connected to a Power Divider (black box). The Power Divider is also connected to the EUT (Equipment Under Test, represented by a mobile phone icon).
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03 Section 4.2. 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider. 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. 4. The 99% occupied bandwidth were measured, set RBW= 1% of OBW, VBW= 3*RBW, sample detector, trace maximum hold. 5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.
Test Result:	PASS

5.3.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Wideband Radio Communication Tester	R&S	CMW500	114220	Jul. 07, 2022
Spectrum Analyzer	Agilent	N9020A	MY49100619	Jul. 18, 2022
RF cable (9kHz-40GHz)	TCT	RE-05	N/A	Jul. 07, 2022
Antenna Connector	TCT	RFC-02	N/A	Jul. 07, 2022

5.4. Band Edge and Conducted Spurious Emission Measurement

5.4.1. Test Specification

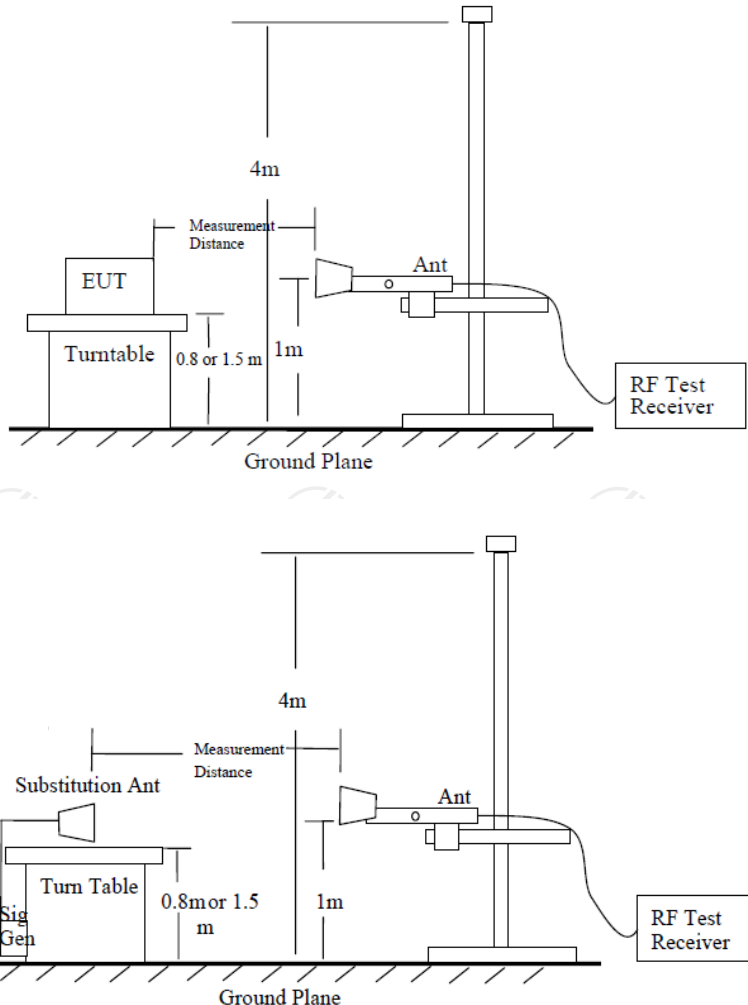
Test Requirement:	FCC part 27.53(h), FCC part 27.53(g) , FCC part 27.53(m)(4), FCC part 24.238(a)
Test Method:	FCC part2.1051
Limit:	-13dBm
Test Setup:	 The diagram shows a System Simulator (top) and a Spectrum Analyzer (bottom) connected to a central Power Divider. The Power Divider is also connected to the EUT (Equipment Under Test) on the right.
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03 Section 6.0. 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider. 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. 4. The band edges of low and high channels for the highest RF powers were measured. 5. The conducted spurious emission for the whole frequency range was taken. 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band. 7. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power $P(\text{Watts}) = P(\text{W}) - [43 + 10\log(P)] (\text{dB}) = [30 + 10\log(P)] (\text{dBm}) - [43 + 10\log(P)] (\text{dB}) = -13\text{dBm}.$ For Band 17, the limit line is derived from $55 + 10\log(P)$ dB below the transmitter power
Test Result:	PASS

5.4.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Wideband Radio Communication Tester	R&S	CMW500	114220	Jul. 07, 2022
Spectrum Analyzer	Agilent	N9020A	MY49100619	Jul. 18, 2022
RF cable (9kHz-40GHz)	TCT	RE-05	N/A	Jul. 07, 2022
Antenna Connector	TCT	RFC-02	N/A	Jul. 07, 2022

5.5. Field Strength of Spurious Radiation Measurement

5.5.1. Test Specification

Test Requirement:	FCC part 27.53(g) ,FCC part 27.53(h), FCC part 27.53(m)(4), FCC part 24.238(b)
Test Method:	FCC part 2.1053
Limit:	30MHz~20GHz -13dBm
Test setup:	 The test setup consists of two diagrams. The top diagram shows the EUT (Equipment Under Test) placed on a turntable. The turntable is positioned at a height of 0.8 or 1.5 m above the ground plane. The measurement distance between the EUT and the receiving antenna (Ant) is 4 m. The receiving antenna is mounted on a tower. The bottom diagram shows a substitution antenna (Substitution Ant) placed on a turntable. The turntable is positioned at a height of 0.8 or 1.5 m above the ground plane. The measurement distance between the substitution antenna and the receiving antenna (Ant) is 4 m. The receiving antenna is mounted on a tower. Both setups include a ground plane and an RF test receiver.
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12. 2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground. 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower. 4. The table was rotated 360 degrees to determine the position of the highest spurious emission. 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 polarizations. 6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission. 7. A horn antenna was substituted in place of the EUT and was driven by a signal generator. 8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission. 9. Taking the record of output power at antenna port. 10. Repeat step 7 to step 8 for another polarization. 11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain 12. ERP (dBm) = EIRP - 2.15 13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band. 14. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts) = P(W) - [43 + 10log(P)] (dB) = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.
Test results:	PASS
Remark:	All modulations have been tested, but only the worst modulation show in this test item.

5.5.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Universal Radio Communication Tester	R&S	CMU200	110188	Jul. 07, 2022
Spectrum Analyzer	R&S	FSQ40	200061	Jul. 07, 2022
Signal Generator	HP	83623B	3614A00396	Jul. 18, 2022
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 04, 2022
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 04, 2022
Broadband Antenna	Schwarzbeck	VULB9163	412	Sep. 04, 2022
Horn Antenna	Schwarzbeck	BBHA 9120D	1201	Sep. 04, 2022
Horn Antenna	Schwarzbeck	BBHA 9170	00956	Apr. 10, 2023
Coaxial cable	SKET	RC_DC18G-N	N/A	Apr. 08, 2022
Coaxial cable	SKET	RC-DC18G-N	N/A	Apr. 08, 2022
Coaxial cable	SKET	RC-DC40G-N	N/A	Jul. 07, 2022
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

5.5.3. Test Data

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
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Note: 1. Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Band	Band 2(QPSK, 1.4MHz)	Test channel:	Lowest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3720.00	Vertical	-58.56	23.54	-35.02	-13.00	PASS
5580.00	V	-63.43	23.81	-39.62		
7440.00	V	-78.88	23.96	-54.92		
3720.00	Horizontal	-55.67	23.54	-32.13		
5580.00	H	-63.40	23.81	-39.59		
7440.00	H	-76.04	23.96	-52.08		

Band	Band 2(QPSK, 1.4MHz)	Test channel:	Middle
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3760.00	Vertical	-57.73	23.58	-34.15	-13.00	PASS
5640.00	V	-69.35	23.85	-45.50		
7520.00	V	-77.48	23.99	-53.49		
3760.00	Horizontal	-57.30	23.58	-33.72		
5640.00	H	-63.95	23.85	-40.10		
7520.00	H	-78.37	23.99	-54.38		

Band	Band 2(QPSK, 1.4MHz)	Test channel:	Highest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3800.00	Vertical	-60.88	23.60	-37.28	-13.00	PASS
5700.00	V	-69.22	23.88	-45.34		
7600.00	V	-77.93	24.02	-53.91		
3800.00	Horizontal	-56.23	23.60	-32.63		
5700.00	H	-65.47	23.88	-41.59		
7600.00	H	-79.58	24.02	-55.56		

Band	Band 2(16QAM, 1.4MHz)	Test channel:	Lowest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3720.00	Vertical	-58.24	23.54	-34.70	-13.00	PASS
5580.00	V	-64.52	23.81	-40.71		
7440.00	V	-77.76	23.96	-53.80		
3720.00	Horizontal	-56.37	23.54	-32.83		
5580.00	H	-63.88	23.81	-40.07		
7440.00	H	-75.66	23.96	-51.70		

Band	Band 2(16QAM, 1.4MHz)	Test channel:	Middle
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3760.00	Vertical	-58.58	23.58	-35.00	-13.00	PASS
5640.00	V	-69.19	23.85	-45.34		
7520.00	V	-77.01	23.99	-53.02		
3760.00	Horizontal	-56.65	23.58	-33.07		
5640.00	H	-64.61	23.85	-40.76		
7520.00	H	-78.17	23.99	-54.18		

Band	Band 2(16QAM, 1.4MHz)	Test channel:	Highest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3800.00	Vertical	-60.10	23.60	-36.50	-13.00	PASS
5700.00	V	-69.79	23.88	-45.91		
7600.00	V	-77.70	24.02	-53.68		
3800.00	Horizontal	-55.41	23.60	-31.81		
5700.00	H	-65.24	23.88	-41.36		
7600.00	H	-79.82	24.02	-55.80		

Band	Band 4(QPSK, 1.4MHz)	Test channel:	Lowest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3440.00	Vertical	-57.75	23.40	-34.35	-13.00	PASS
5160.00	V	-63.27	23.69	-39.58		
6880.00	V	-77.67	23.75	-53.92		
3440.00	Horizontal	-56.93	23.40	-33.53		
5160.00	H	-64.12	23.69	-40.43		
6880.00	H	-76.69	23.75	-52.94		

Band	Band 4(QPSK, 1.4MHz)	Test channel:	Middle
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3465.00	Vertical	-57.79	23.42	-34.37	-13.00	PASS
5197.50	V	-68.73	23.73	-45.00		
6930.00	V	-77.62	23.79	-53.83		
3465.00	Horizontal	-55.50	23.42	-32.08		
5197.50	H	-64.28	23.73	-40.55		
6930.00	H	-76.99	23.79	-53.20		

Band	Band 4(QPSK, 1.4MHz)	Test channel:	Highest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3490.00	Vertical	-59.75	23.46	-36.29	-13.00	PASS
5235.00	V	-69.18	23.77	-45.41		
6980.00	V	-76.93	23.81	-53.12		
3490.00	Horizontal	-55.76	23.46	-32.30		
5235.00	H	-65.91	23.77	-42.14		
6980.00	H	-79.62	23.81	-55.81		

Band	Band 4(16QAM, 1.4MHz)	Test channel:	Lowest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3440.00	Vertical	-59.65	23.40	-36.25	-13.00	PASS
5160.00	V	-64.61	23.69	-40.92		
6880.00	V	-78.57	23.75	-54.82		
3440.00	Horizontal	-57.30	23.40	-33.90		
5160.00	H	-64.83	23.69	-41.14		
6880.00	H	-76.90	23.75	-53.15		

Band	Band 4(16QAM, 1.4MHz)	Test channel:	Middle
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3465.00	Vertical	-58.32	23.42	-34.90	-13.00	PASS
5197.50	V	-69.82	23.73	-46.09		
6930.00	V	-78.21	23.79	-54.42		
3465.00	Horizontal	-56.76	23.42	-33.34		
5197.50	H	-65.22	23.73	-41.49		
6930.00	H	-78.02	23.79	-54.23		

Band	Band 4(16QAM, 1.4MHz)	Test channel:	Highest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
3490.00	Vertical	-60.97	23.46	-37.51	-13.00	PASS
5235.00	V	-69.36	23.77	-45.59		
6980.00	V	-78.02	23.81	-54.21		
3490.00	Horizontal	-56.83	23.46	-33.37		
5235.00	H	-66.88	23.77	-43.11		
6980.00	H	-79.99	23.81	-56.18		

Band	Band 12(QPSK, 1.4MHz)	Test channel:	Lowest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
1408.00	Vertical	-58.98	23.03	-35.95	-13.00	PASS
2112.00	V	-64.42	23.16	-41.26		
2816.00	V	-79.69	23.25	-56.44		
1408.00	Horizontal	-59.48	23.03	-36.45		
2112.00	H	-62.07	23.16	-38.91		
2816.00	H	-77.31	23.25	-54.06		

Band	Band 12(QPSK, 1.4MHz)	Test channel:	Middle
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
1415.00	Vertical	-58.08	23.05	-35.03	-13.00	PASS
2122.50	V	-68.18	23.18	-45.00		
2830.00	V	-77.58	23.28	-54.3		
1415.00	Horizontal	-55.36	23.05	-32.31		
2122.50	H	-62.61	23.18	-39.43		
2830.00	H	-77.21	23.28	-53.93		

Band	Band 12(QPSK, 1.4MHz)	Test channel:	Highest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
1422.00	Vertical	-61.07	23.08	-37.99	-13.00	PASS
2133.00	V	-70.33	23.20	-47.13		
2844.00	V	-81.42	23.31	-58.11		
1422.00	Horizontal	-56.61	23.08	-33.53		
2133.00	H	-64.91	23.20	-41.71		
2844.00	H	-80.37	23.31	-57.06		

Band	Band 12(16QAM, 1.4MHz)	Test channel:	Lowest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
1408.00	Vertical	-58.17	23.03	-35.14	-13.00	PASS
2112.00	V	-61.86	23.16	-38.70		
2816.00	V	-79.37	23.25	-56.12		
1408.00	Horizontal	-57.38	23.03	-34.35		
2112.00	H	-63.66	23.16	-40.50		
2816.00	H	-77.32	23.25	-54.07		

Band	Band 12(16QAM, 1.4MHz)	Test channel:	Middle
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
1415.00	Vertical	-58.16	23.05	-35.11	-13.00	PASS
2122.50	V	-68.56	23.18	-45.38		
2830.00	V	-77.62	23.28	-54.34		
1415.00	Horizontal	-56.81	23.05	-33.76		
2122.50	H	-64.56	23.18	-41.38		
2830.00	H	-77.33	23.28	-54.05		

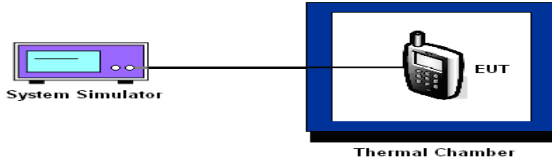
Band	Band 12(16QAM, 1.4MHz)	Test channel:	Highest
Test mode:		Temperature :	25°C
		Relative Humidity:	56%

Note: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
	Polarization	Level (dBm)	Correction Factor (dB)	Spurious emissions (dBm)		
1422.00	Vertical	-60.19	23.08	-37.11	-13.00	PASS
2133.00	V	-68.96	23.20	-45.76		
2844.00	V	-76.54	23.31	-53.23		
1422.00	Horizontal	-55.74	23.08	-32.66		
2133.00	H	-65.20	23.20	-42.00		
2844.00	H	-78.98	23.31	-55.67		

5.6. Frequency Stability Measurement

5.6.1. Test Specification

Test Requirement:	FCC part 27.54, FCC part 24.235
Test Method:	FCC Part 2.1055
Limit:	±2.5 ppm
Test Setup:	 The diagram illustrates the test setup. On the left, a 'System Simulator' is connected via a cable to an 'EUT' (Equipment Under Test) which is placed inside a 'Thermal Chamber'.
Test Procedure:	Test Procedures for Temperature Variation 1. The testing follows FCC KDB 971168 D01v03 Section 9.0. 2. The EUT was set up in the thermal chamber and connected with the system simulator. 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. 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. Test Procedures for Voltage Variation 1. The testing follows FCC KDB 971168 D01v03 Section 9.0. 2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator. 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. 4. The variation in frequency was measured for the worst case. 5. The worst case(worst bandwidth) for frequency stability reported in the Test Data. The worst bandwidth is as follow: 1.4M is for LTE Band 2, 1.4M is for LTE Band 4, 1.4M is for LTE Band 12
Test Result:	PASS

5.6.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Wideband Radio Communication Tester	R&S	CMW500	114220	Jul. 07, 2022
Programable tempratuce and humidity chamber	JQ	MHU-80L	N/A	Jul. 18, 2022
DC power supply	Kingrang	KR3005K	N/A	Jul. 18, 2022
RF cable (9kHz-40GHz)	TCT	RE-04	N/A	Jul. 18, 2022
Antenna Connector	TCT	RFC-03	N/A	Jul. 18, 2022

Appendix A: Photographs of Test Setup

Refer to the test report No. TCT211208E004

Appendix B: Photographs of EUT

Refer to the test report No. TCT211208E004

**Test Data for Appendix For LTE Band 2, Appendix For LTE Band 4,
Appendix For LTE Band 12**

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