FCC RF Test Report

APPLICANT	**: PAX Technology Limited**
EQUIPMENT	**: Mobile Payment Terminal**
BRAND NAME	**: PAX**
MODEL NAME	**: D190**
FCC ID	**: V5PD190**
STANDARD	**: 47 CFR Part 2, and 90(S)**
CLASSIFICATION	**: PCS Licensed Transmitter (PCB)**

The product was received on Oct. 13, 2018 and completely tested on Jan. 07, 2019. We, Sporton International (Shenzhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Shenzhen) Inc., the test report shall not be reproduced except in full.

Eric Shih

Approved by: Eric Shih / Manager

NVLAP®
TESTING
NVLAP LAB CODE 600156-0

Sporton International (Shenzhen) Inc.
1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen City, Guangdong Province 518055, China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FW8D1307	Rev. 01	Initial issue of report	Jan. 18, 2019

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	Reporting only	PASS	-
-	§2.1049 §90.209	Occupied Bandwidth and 26dB Bandwidth	Reporting only	PASS	1
-	§2.1051 §90.691	Emission masks – In-band emissions	< $50+10\log_{10}$(P[Watts])	PASS	1
-	§2.1051 §90.691	Emission masks – Out of band emissions	< $43+10\log_{10}$(P[Watts])	PASS	1
3.2	§2.1053 §90.691	Field Strength of Spurious Radiation	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 47.48 dB at 2443.50 MHz
-	§2.1055 §90.213	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	1

Remark 1: The product was installed a WWAN module (Brand Name: Fibocom Wireless Inc. / FCC ID: ZMOM910GL), the test items are referred to module report “SZEM180400321702”.

1 General Description

1.1 Applicant

PAX Technology Limited
Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour Road, Wanchai, Hong Kong

1.2 Manufacturer

PAX Computer Technology (Shenzhen) Co., Ltd.
4/F, No.3 Building, Software Park, Second Central Science-Tech Road, High-Tech industrial Park, Shenzhen, Guangdong, P.R.C.

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Payment Terminal
Brand Name	PAX
Model Name	D190
FCC ID	V5PD190
EUT supports Radios application	LTE (Cat M1) / NFC WLAN 2.4GHz 802.11b/g/n HT20 Bluetooth BR/EDR/LE
IMEI Code	Conducted: N/A Radiation: N/A
HW Version	D190-xxx-xxx-xxxx
SW Version	V0.0.0.1
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	814.7 ~ 823.3 MHz
Rx Frequency	859.7 ~ 868.3 MHz
Bandwidth	1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz
Maximum Output Power to Antenna	22.81 dBm
Antenna Gain	0.8 dBi
Type of Modulation	QPSK / 16QAM

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum Conducted Power

FCC Rule	System	Type of Modulation	BW	Frequency Tolerance (ppm)	Emission Designator	Maximum Conducted power(W)
Part 90S	LTE Band 26	QPSK	1.4 MHz	-	-	0.1762
Part 90S	LTE Band 26	16QAM	1.4 MHz	-	-	0.1455
Part 90S	LTE Band 26	QPSK	3 MHz	-	-	0.1770
Part 90S	LTE Band 26	16QAM	3 MHz	-	-	0.1455
Part 90S	LTE Band 26	QPSK	5 MHz	-	-	0.1849
Part 90S	LTE Band 26	16QAM	5 MHz	-	-	0.1690
Part 90S	LTE Band 26	QPSK	10 MHz	-	-	0.1849
Part 90S	LTE Band 26	16QAM	10 MHz	-	-	0.1799
Part 90S	LTE Band 26	QPSK	15 MHz	-	-	0.1910
Part 90S	LTE Band 26	16QAM	15 MHz	-	-	0.1901

1.7 Testing Site

Sporton Lab is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0).

Test Site	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen City, Guangdong Province 518055, China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595		
Test Site No.	**Sporton Site No.**	**FCC designation No.**	**FCC Test Firm Registration No.**
	TH01-SZ	CN5018	337463

Test Site	Sporton International (Shenzhen) Inc.		
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District, Shenzhen City, Guangdong Province 518055, China TEL: +86-755- 3320-2398		
Test Site No.	**Sporton Site No.**	**FCC designation No.**	**FCC Test Firm Registration No.**
	03CH02-SZ	CN5019	577730

1.8 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 90(S)
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 971168 D02 Misc Rev Approv License Devices v02r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

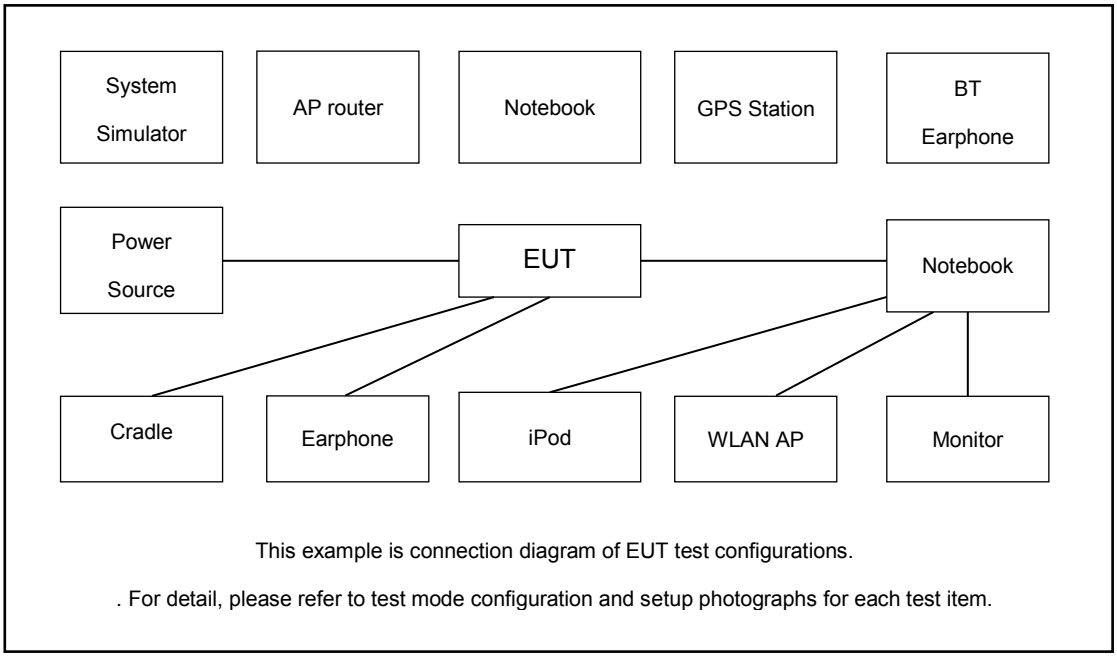
2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is 30 MHz to 9000 MHz.

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	26	v	v	v	v	v	-	v	v	v	v	v	v	v	v
Radiated Spurious Emission	26	v	v	v			-	v		v			v	v	v
	26				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.														

2.2 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

2.4 Frequency List of Low/Middle/High Channels

LTE Band 26 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
15	Channel	26765	-	-
	Frequency	821.5	-	-
10	Channel	-	26740	-
	Frequency	-	819	-
5	Channel	26715	26740	26765
	Frequency	816.5	819	821.5
3	Channel	26705	26740	26775
	Frequency	815.5	819	822.5
1.4	Channel	26697	26740	26783
	Frequency	814.7	819	823.3

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

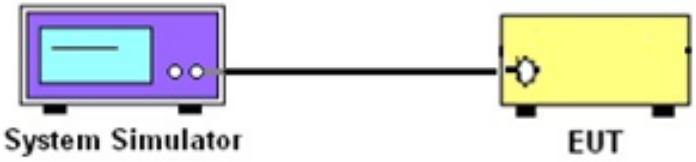
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Please refer to Appendix A.

3.2 Field Strength of Spurious Radiation Measurement

3.2.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI/TIA-603-E. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43+10\log_{10}(P[Watts])$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.2.2 Measuring Instruments

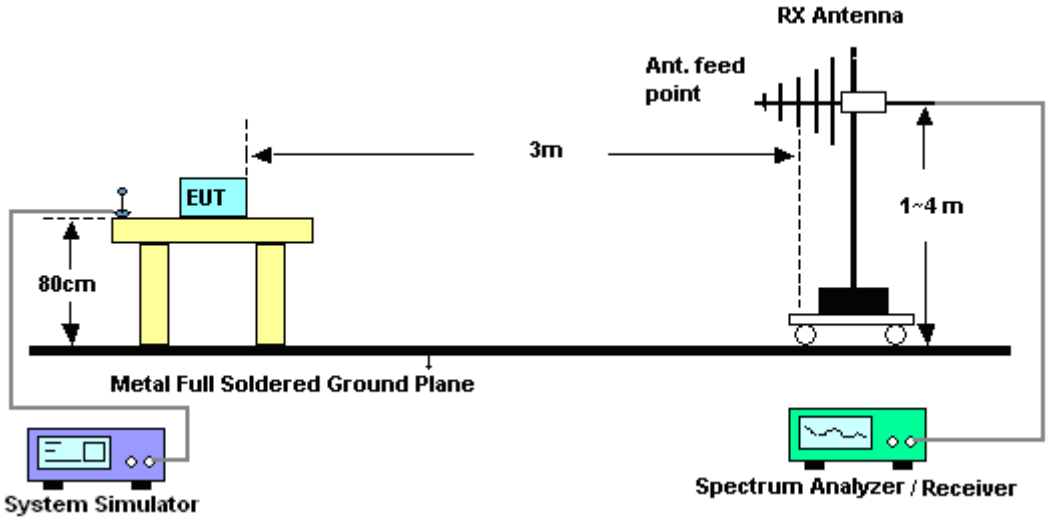
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

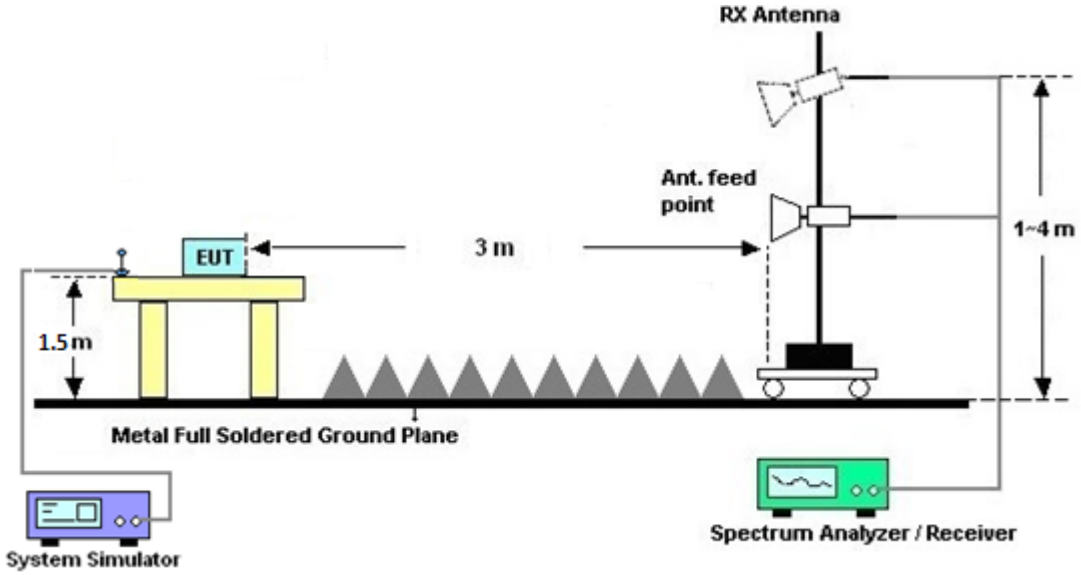
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
13. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

3.2.4 Test Setup

For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



3.2.5 Test Result of Field Strength of Spurious Radiated

Please refer to Appendix B.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Base Station	R&S	CMW500	132727	2G/3G/4G	Dec. 25, 2018	Jan. 06, 2019	Dec. 24, 2019	Conducted (TH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 19, 2018	Jan. 07, 2019	Apr. 18, 2019	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	May. 10, 2018	Jan. 07, 2019	May. 09, 2019	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA	9120D-1285	1GHz~18GHz	Mar.29, 2018	Jan. 07, 2019	Mar.28, 2019	Radiation (03CH02-SZ)
LF Amplifier	Burgeon	BPA-530	102211	0.01~3000Mhz	Oct.20, 2018	Jan. 07, 2019	Oct 19, 2019	Radiation (03CH02-SZ
HF Amplifier	Agilent	8449B	3008A01023	1GHz~26.5GHz	Oct.20, 2018	Jan. 07, 2019	Oct 19, 2019	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002470	N/A	NCR	Jan. 07, 2019	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Jan. 07, 2019	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Jan. 07, 2019	NCR	Radiation (03CH02-SZ)

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.5dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.3dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.7dB**

Appendix A. Test Results of Conducted Test

Conducted Output Power (Average power)

LTE Band 26 Maximum Average Power [dBm]									
15	QPSK	1	0	0	6	11	22.66	-	-
15		1	5	0	6	11	22.81	-	-
15		3	0	0	6	11	22.76	-	-
15		3	3	0	6	11	22.63	-	-
15		6	0	0	6	11	22.66	-	-
15	16-QAM	1	0	0	6	11	21.80	-	-
15		1	5	0	6	11	21.79	-	-
15		3	0	0	6	11	22.76	-	-
15		3	3	0	6	11	22.79	-	-
15		6	0	0	6	11	22.49	-	-
10	QPSK	1	0	0	4	7	-	22.63	-
10		1	5	0	4	7	-	22.67	-
10		3	0	0	4	7	-	22.65	-
10		3	3	0	4	7	-	22.66	-
10		6	0	0	4	7	-	22.18	-
10	16-QAM	1	0	0	4	7	-	22.54	-
10		1	5	0	4	7	-	22.55	-
10		3	0	0	4	7	-	22.40	-
10		3	3	0	4	7	-	22.42	-
10		6	0	0	4	7	-	21.72	-
5	QPSK	1	0	0	2	3	21.62	22.64	22.52
5		1	5	0	2	3	21.65	22.67	22.48
5		3	0	0	2	3	21.15	22.16	21.98
5		3	3	0	2	3	21.17	22.06	21.96
5		6	0	0	2	3	21.08	21.98	21.79
5	16-QAM	1	0	0	2	3	21.83	21.77	21.57
5		1	5	0	2	3	21.87	21.71	21.52
5		3	0	0	2	3	21.22	22.26	22.19
5		3	3	0	2	3	21.23	22.27	22.28
5		6	0	0	2	3	21.04	21.39	21.17

LTE Band 26 Maximum Average Power [dBm]									
3	QPSK	1	0	0	0	1	21.41	22.44	22.47
3		1	5	0	0	1	21.43	22.46	22.48
3		3	0	0	0	1	21.28	22.34	22.21
3		3	3	0	0	1	21.16	22.21	22.19
3		6	0	0	0	1	21.02	21.21	21.18
3	16-QAM	1	0	0	0	1	21.23	21.59	21.35
3		1	5	0	0	1	21.15	21.61	21.32
3		3	0	0	0	1	21.17	21.63	21.39
3		3	3	0	0	1	21.04	21.50	21.28
3		6	0	0	0	1	21.03	21.25	21.13
1.4	QPSK	1	0	0	0	0	21.43	22.46	22.38
1.4		1	5	0	0	0	21.42	22.41	22.39
1.4		3	0	0	0	0	21.33	22.27	22.25
1.4		3	3	0	0	0	21.25	22.32	22.24
1.4		6	0	0	0	0	21.03	21.21	21.10
1.4	16-QAM	1	0	0	0	0	21.20	21.38	21.29
1.4		1	5	0	0	0	21.03	21.45	21.30
1.4		3	0	0	0	0	21.17	21.63	21.42
1.4		3	3	0	0	0	21.11	21.41	21.32
1.4		6	0	0	0	0	21.01	21.15	21.05

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

LTE Band 26 / 1.4MHz / QPSK									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1628.14	-68.68	-13	-55.68	-79.38	-71.91	3.98	9.36	H
	2442.21	-64.95	-13	-51.95	-79.97	-68.50	4.85	10.55	H
	3256.28	-63.14	-13	-50.14	-80.29	-68.07	5.50	12.58	H
	1628.14	-69.07	-13	-56.07	-79.32	-72.30	3.98	9.36	V
	2442.21	-64.92	-13	-51.92	-79.95	-68.47	4.85	10.55	V
	3256.28	-62.90	-13	-49.90	-80.18	-67.83	5.50	12.58	V
Middle	1636.74	-68.16	-13	-55.16	-78.88	-71.41	4.00	9.40	H
	2455.11	-65.29	-13	-52.29	-80.29	-68.86	4.88	10.60	H
	3273.48	-63.46	-13	-50.46	-80.58	-68.39	5.52	12.60	H
	1636.74	-68.55	-13	-55.55	-78.82	-71.80	4.00	9.40	V
	2455.11	-64.90	-13	-51.90	-79.87	-68.47	4.88	10.60	V
	3273.48	-63.15	-13	-50.15	-80.37	-68.08	5.52	12.60	V
Highest	1645.34	-67.07	-13	-54.07	-77.66	-70.24	4.10	9.42	H
	2468.01	-65.25	-13	-52.25	-80.27	-68.83	4.90	10.63	H
	3290.68	-63.35	-13	-50.35	-80.43	-68.27	5.55	12.62	H
	1645.34	-68.20	-13	-55.20	-78.42	-71.37	4.10	9.42	V
	2468.01	-65.19	-13	-52.19	-80.18	-68.77	4.90	10.63	V
	3290.68	-63.67	-13	-50.67	-80.82	-68.59	5.55	12.62	V

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

LTE Band 26 / 3MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1628.3	-68.77	-13	-55.77	-79.47	-72.00	3.98	9.36	H
	2442.45	-64.84	-13	-51.84	-79.86	-68.39	4.85	10.55	H
	3256.6	-62.92	-13	-49.92	-80.07	-67.85	5.50	12.58	H
	1628.3	-69.01	-13	-56.01	-79.26	-72.24	3.98	9.36	V
	2442.45	-64.89	-13	-51.89	-79.92	-68.44	4.85	10.55	V
	3256.6	-62.80	-13	-49.80	-80.08	-67.73	5.50	12.58	V
Middle	1635.3	-67.99	-13	-54.99	-78.71	-71.24	4.00	9.40	H
	2452.95	-64.97	-13	-51.97	-79.99	-68.54	4.88	10.60	H
	3270.6	-63.63	-13	-50.63	-80.75	-68.56	5.52	12.60	H
	1635.3	-68.46	-13	-55.46	-78.73	-71.71	4.00	9.40	V
	2452.95	-64.40	-13	-51.40	-79.43	-67.97	4.88	10.60	V
	3270.6	-63.32	-13	-50.32	-80.54	-68.25	5.52	12.60	V
Highest	1642.3	-67.38	-13	-54.38	-77.97	-70.55	4.10	9.42	H
	2463.45	-65.17	-13	-52.17	-80.19	-68.75	4.90	10.63	H
	3284.6	-63.14	-13	-50.14	-80.26	-68.06	5.55	12.62	H
	1642.3	-66.66	-13	-53.66	-76.88	-69.83	4.10	9.42	V
	2463.45	-64.72	-13	-51.72	-79.71	-68.30	4.90	10.63	V
	3284.6	-63.30	-13	-50.30	-80.52	-68.22	5.55	12.62	V

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

LTE Band 26 / 5MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1628.5	-67.59	-13	-54.59	-78.29	-70.82	3.98	9.36	H
	2442.75	-64.81	-13	-51.81	-79.83	-68.36	4.85	10.55	H
	3257	-63.23	-13	-50.23	-80.38	-68.16	5.50	12.58	H
	1628.5	-67.90	-13	-54.90	-78.15	-71.13	3.98	9.36	V
	2442.75	-65.03	-13	-52.03	-80.06	-68.58	4.85	10.55	V
	3257	-63.29	-13	-50.29	-80.57	-68.22	5.50	12.58	V
Middle	1633.5	-67.40	-13	-54.40	-78.12	-70.65	4.00	9.40	H
	2450.25	-64.48	-13	-51.48	-79.50	-68.05	4.88	10.60	H
	3267	-63.08	-13	-50.08	-80.23	-68.01	5.52	12.60	H
	1633.5	-65.74	-13	-52.74	-76.01	-68.99	4.00	9.40	V
	2450.25	-62.78	-13	-49.78	-77.81	-66.35	4.88	10.60	V
	3267	-63.23	-13	-50.23	-80.51	-68.16	5.52	12.60	V
Highest	1638.5	-64.50	-13	-51.50	-75.09	-67.67	4.10	9.42	H
	2457.75	-63.40	-13	-50.40	-78.40	-66.98	4.90	10.63	H
	3277	-63.42	-13	-50.42	-80.54	-68.34	5.55	12.62	H
	1638.5	-68.10	-13	-55.10	-78.32	-71.27	4.10	9.42	V
	2457.75	-63.74	-13	-50.74	-78.71	-67.32	4.90	10.63	V
	3277	-62.90	-13	-49.90	-80.12	-67.82	5.55	12.62	V

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

LTE Band 26 / 10MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1629	-63.89	-13	-50.89	-74.59	-67.14	4.00	9.40	H
	2443.5	-64.30	-13	-51.30	-79.32	-67.87	4.88	10.60	H
	3258	-62.31	-13	-49.31	-79.46	-67.24	5.52	12.60	H
	1629	-61.50	-13	-48.50	-71.75	-64.75	4.00	9.40	V
	2443.5	-60.48	-13	-47.48	-75.51	-64.05	4.88	10.60	V
	3258	-63.14	-13	-50.14	-80.42	-68.07	5.52	12.60	V

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