RF TEST REPORT

Applicant	Quectel Wireless Solutions Co., Ltd
FCC ID	XMR201605EC25A
Product	LTE Module
Brand	Quectel
Model	EC25-A, EC25-A MINIPCIE
Report No.	R1805A0226-R9V3
Issue Date	June 11, 2018

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2017)/ FCC CFR47 Part 27C (2017)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Jiangpeng Lan	*Approved by: Kai Xu*

TA Technology (Shanghai) Co., Ltd.

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000

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Summary of Measurement Results

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	27.50(d)(4)	PASS
3	Radiates Spurious Emission	2.1053/27.53(h) /27.53(g)	PASS
Date of Testing: May 24, 2018~ June 3, 2018			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard.			

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1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

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1.3 Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Xu Kai
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	xukai@ta-shanghai.com

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2 General Description of Equipment under Test

Client Information

Applicant	Quectel Wireless Solutions Co., Ltd
Applicant address	7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District, Shanghai 200233, China
Manufacturer	Quectel Wireless Solutions Co., Ltd
Manufacturer address	7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District, Shanghai 200233, China

General information

EUT Description			
Model	EC25-A, EC25-A MINIPCIE		
IMEI	861107037143642		
Hardware Version	R1.1		
Software Version	EC25AGBR05A05M4G		
Power Supply	External Power Supply		
Antenna Type	External Antenna (The EUT don't have standard Antenna. The Antenna used for testing in this report is the after-market accessory.)		
Test Mode(s)	WCDMA Band IV; LTE Band 4; LTE Band 12;		
Test Modulation	(WCDMA)QPSK; (LTE)QPSK 16QAM;		
HSDPA UE Category	24		
HSUPA UE Category	6		
DC-HSDPA UE Category	24		
HSPA+ Uplink Category	6		
LTE Category	4		
Maximum E.I.R.P. / E.R.P.	WCDMA Band IV:	26.79dBm	
	LTE Band 4	26.77dBm	
	LTE Band 12	18.17dBm	
Rated Power Supply Voltage:	3.8V		
Extreme Voltage	Minimum: 3.3V Maximum: 4.3V		
Extreme Temperature	Lowest: -30°C Highest: +50°C		
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)
	WCDMA Band IV	1710 ~ 1755	2110 ~ 2155
	LTE Band 4	1710 ~ 1755	2110 ~ 2155
	LTE Band 12	699 ~ 716	729 ~ 746
Note：1. The information of the EUT is declared by the manufacturer.			

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EC25-A, EC25-A MINIPCIE (Report No: R1805A0226-R9V3) is a variant model of EC25-A, EC25-A MINIPCIE (Report No: RKS160908001-00A). Only RF Power Output, Effective Isotropic Radiated power and Radiates Spurious Emission are tested for variant in this report. Other test items refer to the original report. The detailed product change description please refers to the ANNEX B.

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3 Applied Standards

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

Test standards

FCC CFR47 Part 2 (2017)

FCC CFR47 Part 27C (2017)

ANSI/TIA-603-E (2016)

KDB 971168 D01 Power Meas License Digital Systems v03r01

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4 Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, horizontal polarization) and the worst case was recorded.

All mode and data rates and positions and RB size and modulations were investigated.
Subsequently, only the worst case emissions are reported.
The following testing in WCDMA/LTE is set based on the maximum RF Output Power.
The following testing in different Bandwidth is set to detailin the following table:

Test modes are chosen to be reported as the worst case configuration below for WCDMA Band IV:

Test items	Modulation
	WCDMA Band IV
RF power output	RMC/HSDPA/HSUPA/DC-HSDPA
Effective Isotropic Radiated power	RMC
Radiates Spurious Emission	RMC

Test modes are chosen to be reported as the worst case configuration below for LTE Band 4/12:

Test items	Modes	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 12	O	O	O	O	-	-	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	LTE 4	O	O	O	O	O	O	O	O	O	-	-	O	O	O
	LTE 12	O	O	O	O	-	-	O	O	O	-	-	O	O	O
Radiates Spurious Emission	LTE 4	O	-	O	-	-	O	O	O	O	O	O	O	O	O
	LTE 12	O	-	O	O	-	-	O	O	O	O	O	O	O	O
Note	1. The mark “O” means that this configuration is chosen for testing. 2. The mark “-” means that this configuration is not testing.														

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5 Test Case Results

5.1 RF Power Output

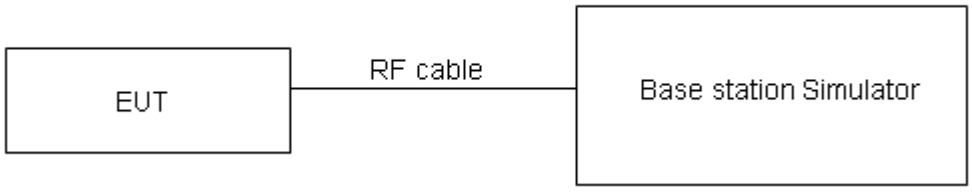
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

Limits

No specific RF power output requirements in part 2.1046.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U=0.4 dB.

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Test Results

WCDMA Band IV		AV Conducted Power(dBm)		
		Channel 1312	Channel 1413	Channel 1513
		1712.4 (MHz)	1732.6 (MHz)	1752.6(MHz)
RMC		23.34	23.32	23.19
HSDPA	Sub - Test 1	22.26	22.40	22.25
	Sub - Test 2	22.40	22.18	22.05
	Sub - Test 3	21.66	21.71	21.64
	Sub - Test 4	21.74	21.77	21.61
HSUPA	Sub - Test 1	22.18	22.13	22.19
	Sub - Test 2	21.55	21.59	21.58
	Sub - Test 3	22.22	22.25	22.28
	Sub - Test 4	22.19	22.16	22.05
	Sub - Test 5	22.23	22.41	22.15
DC-HSDPA	Sub - Test 1	23.21	23.19	23.06
	Sub - Test 2	23.19	23.18	23.05
	Sub - Test 3	22.68	22.67	22.54
	Sub - Test 4	22.67	22.66	22.53

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LTE Band 4				AV Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19957/1710.7	20175/1732.5	20393/1754.3
1.4MHz	QPSK	1	0	22.87	23.06	22.77
		1	2	22.77	23.24	23.10
		1	5	22.86	23.17	22.89
		3	0	22.62	22.90	22.86
		3	2	22.45	22.81	22.79
		3	3	22.36	22.89	22.94
		6	0	21..54	21.84	21.82
	16QAM	1	0	21.86	22.17	21.84
		1	2	21.80	22.32	21.96
		1	5	21.62	22.05	22.03
		3	0	21.04	21.25	21.45
		3	2	21.01	21.65	21.56
		3	3	21.03	21.77	21.45
		6	0	20.75	21.11	21.05
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19965/1711.5	20175/1732.5	20385/1753.5
3MHz	QPSK	1	0	22.66	22.89	22.93
		1	7	22.89	22.71	23.11
		1	14	22.91	22.75	23.01
		8	0	21.80	21.82	21.84
		8	4	21.72	21.98	21.76
		8	7	21.82	21.89	21.69
		15	0	21.66	21.92	21.91
	16QAM	1	0	21.60	22.02	21.83
		1	7	21.83	22.09	21.91
		1	14	21.47	22.24	21.98
		8	0	20.90	20.86	20.82
		8	4	21.04	20.85	20.89
		8	7	20.97	21.02	21.12
		15	0	20.89	20.99	20.89
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	22.63	22.87	22.89
		1	13	22.87	22.67	23.08
		1	24	22.88	22.70	22.97
		12	0	21.77	21.77	21.80
		12	6	21.70	21.94	21.71
		12	13	21.80	21.87	21.65

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		25	0	21.64	21.91	21.89
	16QAM	1	0	21.57	21.98	21.80
		1	13	21.80	22.07	21.88
		1	24	21.44	22.22	21.94
		12	0	20.88	20.82	20.79
		12	6	21.01	20.80	20.85
		12	13	20.94	20.97	21.08
		25	0	20.87	20.95	20.84
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	22.65	22.88	22.92
		1	25	22.90	22.72	23.12
		1	49	22.90	22.74	23.00
		25	0	21.80	21.82	21.84
		25	13	21.73	21.99	21.75
		25	25	21.82	21.91	21.70
		50	0	21.72	21.93	21.93
	16QAM	1	0	21.59	22.01	21.82
		1	25	21.83	22.11	21.91
		1	49	21.47	22.24	21.97
		25	0	20.91	20.87	20.83
		25	13	21.03	20.84	20.88
		25	25	20.97	21.02	21.12
		50	0	20.90	21.00	20.88
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	22.64	22.84	22.90
		1	38	22.88	22.71	23.09
		1	74	22.87	22.69	22.96
		36	0	21.78	21.78	21.81
		36	18	21.70	21.94	21.71
		36	39	21.79	21.88	21.66
		75	0	21.70	21.89	21.88
	16QAM	1	0	21.54	21.99	21.80
		1	38	21.81	22.08	21.89
		1	74	21.44	22.20	21.94
		36	0	20.88	20.85	20.80
		36	18	21.00	20.79	20.84
		36	39	20.95	20.98	21.09
		75	0	20.87	20.95	20.84
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20050/1720	20175/1732.5	20300/1745
20MHz	QPSK	1	0	22.61	22.80	22.87

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		1	50	22.87	22.67	23.07
		1	99	22.85	22.68	22.93
		50	0	21.75	21.73	21.77
		50	25	21.68	21.90	21.68
		50	50	21.76	21.83	21.62
		100	0	21.67	21.84	21.84
	16QAM	1	0	21.52	21.95	21.75
		1	50	21.77	22.06	21.85
		1	99	21.42	22.17	21.92
		50	0	20.85	20.81	20.77
		50	25	20.97	20.77	20.81
		50	50	20.92	20.93	21.05
		100	0	20.85	20.91	20.81
Note: 1) The following testing in worst case based on the maximum RF Output Power.						

LTE Band 12				**AV Conducted Power(dBm)**		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23017/699.7	23095/707.5	23173/715.3
1.4MHz	QPSK	1	0	22.98	23.04	22.99
		1	2	23.01	23.31	23.20
		1	5	22.86	23.10	23.24
		3	0	22.81	23.08	22.96
		3	2	22.72	22.94	23.07
		3	3	22.83	22.76	22.91
		6	0	21.90	21.91	22.02
	16QAM	1	0	22.71	22.82	22.87
		1	2	22.90	22.92	23.13
		1	5	22.61	22.76	22.83
		3	0	22.43	22.41	22.27
		3	2	22.29	22.39	22.18
		3	3	22.31	22.34	22.44
		6	0	21.56	21.57	21.67
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23025/700.5	23095/707.5	23165/714.5
3MHz	QPSK	1	0	22.81	22.99	22.98
		1	7	23.21	23.29	23.00
		1	14	22.96	22.89	22.89
		8	0	21.93	22.02	21.98
		8	4	21.97	22.06	21.96
		8	7	22.02	22.01	21.92

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		15	0	21.94	21.94	21.93
	16QAM	1	0	22.53	22.61	22.66
		1	7	22.78	22.88	22.46
		1	14	22.39	22.56	22.16
		8	0	21.43	21.45	21.35
		8	4	21.51	21.64	21.60
		8	7	21.47	21.71	21.30
		15	0	21.40	21.42	21.47
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23035/701.5	23095/707.5	23155/713.5
5MHz	QPSK	1	0	22.80	22.95	22.96
		1	13	23.19	23.28	22.97
		1	24	22.93	22.84	22.85
		12	0	21.91	21.98	21.95
		12	6	21.94	22.01	21.92
		12	13	21.99	21.98	21.88
		25	0	21.92	21.90	21.88
	16QAM	1	0	22.48	22.59	22.64
		1	13	22.76	22.85	22.44
		1	24	22.36	22.52	22.13
		12	0	21.40	21.43	21.32
		12	6	21.48	21.59	21.56
		12	13	21.45	21.67	21.27
		25	0	21.37	21.37	21.43
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23060/704	23095/707.5	23130/711
10MHz	QPSK	1	0	22.77	22.91	22.93
		1	25	23.18	23.24	22.95
		1	49	22.91	22.83	22.82
		25	0	21.88	21.93	21.91
		25	13	21.92	21.97	21.89
		25	25	21.96	21.93	21.84
		50	0	21.89	21.85	21.84
	16QAM	1	0	22.46	22.55	22.59
		1	25	22.72	22.83	22.40
		1	49	22.34	22.49	22.11
		25	0	21.37	21.39	21.29
		25	13	21.45	21.57	21.53
		25	25	21.42	21.62	21.23
		50	0	21.35	21.33	21.40

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5.2 Effective Isotropic Radiated Power

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI/TIA-603-E (2016).

a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.

b) Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).

c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.

d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.LOSS = Generator Output Power (dBm) – Analyzer reading (dBm)

e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:ERP (dBm) = LVL (dBm) + LOSS (dB)

f) The maximum ERP is the maximum value determined in the preceding step.

g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g.transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:

ERP (dBm) = Output Power (dBm) - Losses (dB) + Antenna Gain (dBd)

where:dBd refers to gain relative to an ideal dipole.

EIRP (dBm) = ERP (dBm) + 2.15 (dB.)

The RB allocation refers to section 5.1, using the maximum output power configuration.

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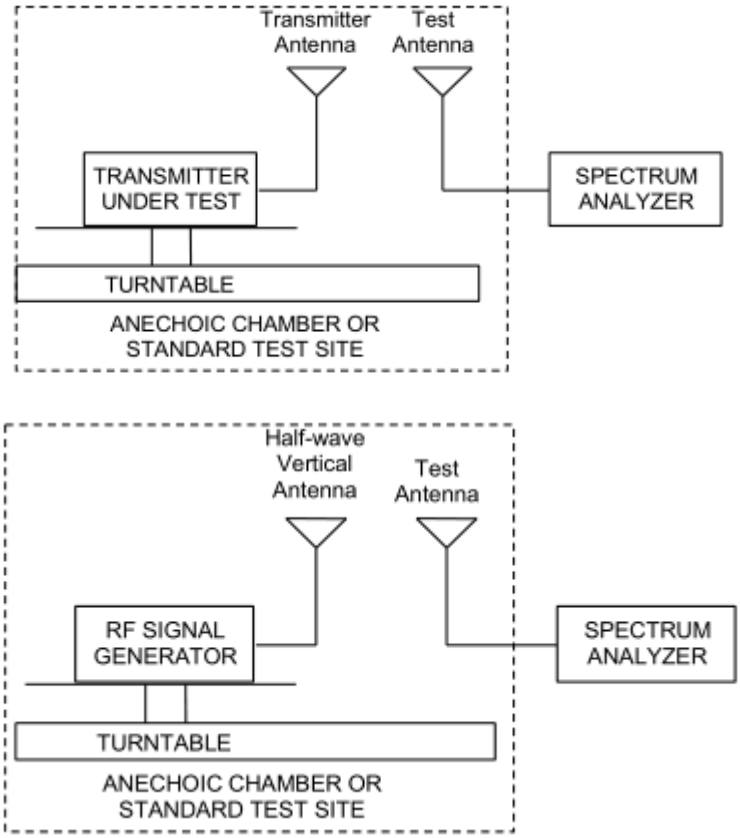
Test setup



Note: Area side:2.4mX3.6m

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

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Limits

Rule Part 27.50(c) (10) specifies that “Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP”

Rule Part 27.50(d) (4) specifies that “Fixed, mobile and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP”

Part 27.50(c)(10)Limit	≤ 3 W (34.77 dBm)
Part 27.50(d)(4)Limit	≤ 1 W (30 dBm)

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 1.19 dB

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Test Results

The measurement is performed for both of horizontal and vertical antenna Polarization, and only the data of worst mode is recorded in this report.

Mode	Channel	Frequency (MHz)	Polarization	EIRP (dBm)	Limit (dBm)	Conclusion
WCDMA Band IV	Low	1712.4	Horizontal	26.79	30	Pass
	Mid	1732.6	Horizontal	26.23	30	Pass
	High	1752.6	Horizontal	25.54	30	Pass

LTE Band 4						
Bandwidth	Channel	Frequency (MHz)	Polarization	EIRP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	1710.7	Horizontal	26.54	30	Pass
	Mid	1732.5	Horizontal	26.12	30	Pass
	High	1754.3	Horizontal	26.08	30	Pass
3 MHz (QPSK)	Low	1711.5	Horizontal	26.77	30	Pass
	Mid	1732.5	Horizontal	26.31	30	Pass
	High	1753.5	Horizontal	26.04	30	Pass
5 MHz (QPSK)	Low	1712.5	Horizontal	26.53	30	Pass
	Mid	1732.5	Horizontal	26.19	30	Pass
	High	1752.5	Horizontal	26.13	30	Pass
10 MHz (QPSK)	Low	1715	Horizontal	26.69	30	Pass
	Mid	1732.5	Horizontal	26.22	30	Pass
	High	1750	Horizontal	26.10	30	Pass
15 MHz (QPSK)	Low	1717.5	Horizontal	26.32	30	Pass
	Mid	1732.5	Horizontal	26.10	30	Pass
	High	1747.5	Horizontal	25.98	30	Pass
20 MHz (QPSK)	Low	1720	Horizontal	26.32	30	Pass
	Mid	1732.5	Horizontal	26.37	30	Pass
	High	1745	Horizontal	26.23	30	Pass
1.4 MHz (16QAM)	Low	1710.7	Horizontal	26.13	30	Pass
	Mid	1732.5	Horizontal	25.71	30	Pass
	High	1754.3	Horizontal	25.67	30	Pass
3 MHz (16QAM)	Low	1711.5	Horizontal	26.36	30	Pass
	Mid	1732.5	Horizontal	25.85	30	Pass
	High	1753.5	Horizontal	25.58	30	Pass
5 MHz (16QAM)	Low	1712.5	Horizontal	26.07	30	Pass
	Mid	1732.5	Horizontal	25.73	30	Pass
	High	1752.5	Horizontal	25.67	30	Pass
10 MHz (16QAM)	Low	1715	Horizontal	26.30	30	Pass
	Mid	1732.5	Horizontal	25.83	30	Pass
	High	1750	Horizontal	25.71	30	Pass
15 MHz	Low	1717.5	Horizontal	25.93	30	Pass

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(16QAM)	Mid	1732.5	Horizontal	25.71	30	Pass
	High	1747.5	Horizontal	25.59	30	Pass
20 MHz (16QAM)	Low	1720	Horizontal	25.93	30	Pass
	Mid	1732.5	Horizontal	25.98	30	Pass
	High	1745	Horizontal	25.84	30	Pass

LTE Band 12						
Bandwidth	**Channel**	**Frequency (MHz)**	**Polarization**	**ERP (dBm)**	**Limit (dBm)**	**Conclusion**
1.4 MHz (QPSK)	Low	699.7	Horizontal	17.86	34.77	Pass
	Mid	707.5	Horizontal	17.60	34.77	Pass
	High	715.3	Horizontal	17.73	34.77	Pass
3 MHz (QPSK)	Low	700.5	Horizontal	18.04	34.77	Pass
	Mid	707.5	Horizontal	17.88	34.77	Pass
	High	714.5	Horizontal	17.74	34.77	Pass
5 MHz (QPSK)	Low	701.5	Horizontal	18.17	34.77	Pass
	Mid	707.5	Horizontal	18.03	34.77	Pass
	High	713.5	Horizontal	17.86	34.77	Pass
10 MHz (QPSK)	Low	704	Horizontal	18.15	34.77	Pass
	Mid	707.5	Horizontal	17.68	34.77	Pass
	High	711	Horizontal	17.87	34.77	Pass
1.4 MHz (16QAM)	Low	699.7	Horizontal	17.59	34.77	Pass
	Mid	707.5	Horizontal	17.33	34.77	Pass
	High	715.3	Horizontal	17.46	34.77	Pass
3 MHz (16QAM)	Low	700.5	Horizontal	17.77	34.77	Pass
	Mid	707.5	Horizontal	17.61	34.77	Pass
	High	714.5	Horizontal	17.47	34.77	Pass
5 MHz (16QAM)	Low	701.5	Horizontal	17.90	34.77	Pass
	Mid	707.5	Horizontal	17.76	34.77	Pass
	High	713.5	Horizontal	17.59	34.77	Pass
10 MHz (16QAM)	Low	704	Horizontal	17.88	34.77	Pass
	Mid	707.5	Horizontal	17.41	34.77	Pass
	High	711	Horizontal	17.60	34.77	Pass

Note: 1. EIRP= E.R.P+2.15

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5.3 Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI/TIA-603-E (2016).
2. The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAg - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

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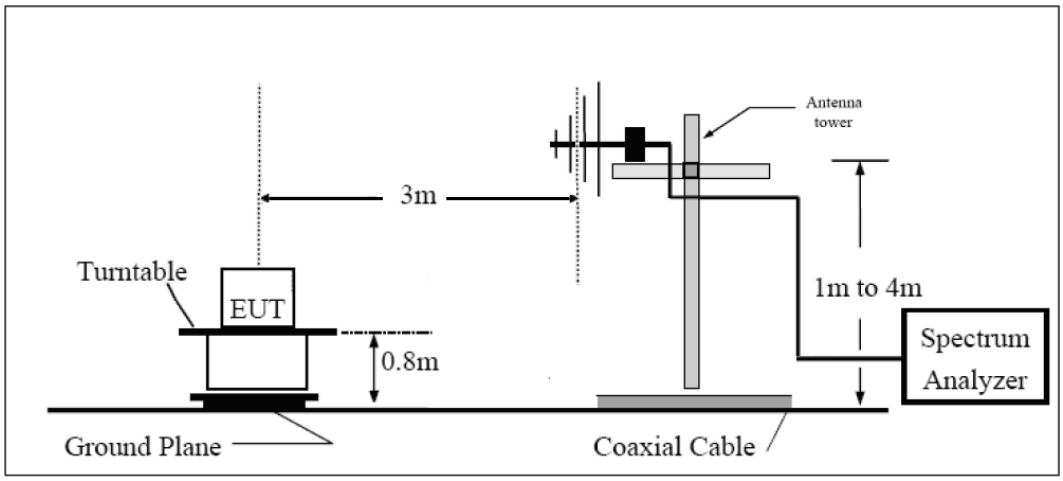
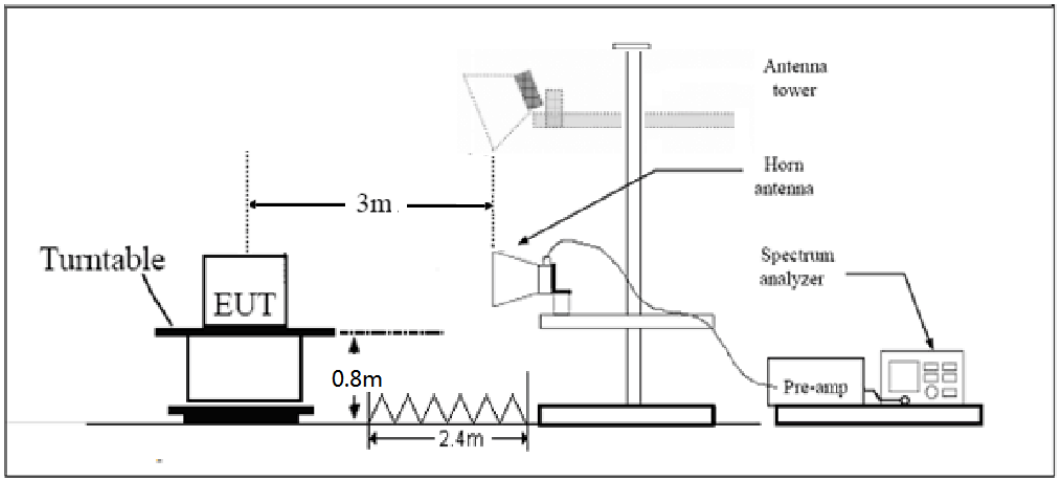
Test setup

30MHz~~~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

Limits

Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB..”

LTE -12 Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands

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immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

LTE B4/12 Limit	-13 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95％ confidence level for the normal distribution is with the coverage factor k = ±1.96, U= ±3.55 dB.

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Test Result

Sweep the whole frequency band through the range from 30MHz to the 10th harmonic of the carrier, from 30MHz to 1GHz are all noise floor will not be recorded in the report.

WCDMA Band IV CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3424.8	-61.78	2.6	10.15	Horizontal	-54.23	-13.00	41.23	90
3	5137.2	-58.30	2.4	11.35	Horizontal	-49.35	-13.00	36.35	225
4	6849.6	-62.61	4.5	10.85	Horizontal	-56.26	-13.00	43.26	0
5	8562.0	-63.38	5.1	11.35	Horizontal	-57.13	-13.00	44.13	180
6	10274.4	-61.78	5.3	11.95	Horizontal	-55.13	-13.00	42.13	45
7	11986.8	-62.72	5.5	13.55	Horizontal	-54.67	-13.00	41.67	45
8	13699.2	-60.00	6.3	13.75	Horizontal	-52.55	-13.00	39.55	225
9	15411.6	-56.95	6.7	13.85	Horizontal	-49.80	-13.00	36.80	180
10	17124.0	-56.08	6.8	14.25	Horizontal	-48.63	-13.00	35.63	90
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

WCDMA Band IV CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.2	-66.38	2.6	10.75	Horizontal	-58.23	-13.00	45.23	0
3	5197.8	-63.59	2.4	11.05	Horizontal	-54.94	-13.00	41.94	180
4	6930.4	-61.78	4.5	11.15	Horizontal	-55.13	-13.00	42.13	45
5	8663.0	-62.26	5.1	11.35	Horizontal	-56.01	-13.00	43.01	45
6	10395.6	-62.11	5.3	11.95	Horizontal	-55.46	-13.00	42.46	180
7	12128.2	-62.58	5.5	13.55	Horizontal	-54.53	-13.00	41.53	315
8	13860.8	-59.70	6.3	13.75	Horizontal	-52.25	-13.00	39.25	180
9	15593.4	-57.05	6.7	13.85	Horizontal	-49.90	-13.00	36.90	90
10	17326.0	-56.05	6.8	14.25	Horizontal	-48.60	-13.00	35.60	0
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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WCDMA Band IV CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3505.2	-62.27	2.6	10.15	Horizontal	-54.72	-13.00	41.72	180
3	5254.1	-60.21	2.4	11.05	Horizontal	-51.56	-13.00	38.56	0
4	7010.4	-61.09	4.5	11.15	Horizontal	-54.44	-13.00	41.44	180
5	8763.0	-61.21	5.1	11.35	Horizontal	-54.96	-13.00	41.96	45
6	10515.6	-60.21	5.3	11.95	Horizontal	-53.56	-13.00	40.56	45
7	12268.2	-60.79	5.5	13.55	Horizontal	-52.74	-13.00	39.74	135
8	14020.8	-60.04	6.3	13.75	Horizontal	-52.59	-13.00	39.59	135
9	15773.4	-56.57	6.7	13.85	Horizontal	-49.42	-13.00	36.42	315
10	17526.0	-56.19	6.8	14.25	Horizontal	-48.74	-13.00	35.74	180
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 4 QPSK 1.4MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3421.4	-62.69	2.6	10.15	Horizontal	-55.14	-13.00	42.14	135
3	5131.1	-56.26	2.4	11.35	Horizontal	-47.31	-13.00	34.31	225
4	6842.8	-60.94	4.5	10.85	Horizontal	-54.59	-13.00	41.59	0
5	8553.5	-62.64	5.1	11.35	Horizontal	-56.39	-13.00	43.39	90
6	10264.2	-60.22	5.3	11.95	Horizontal	-53.57	-13.00	40.57	45
7	11974.9	-63.40	5.5	13.55	Horizontal	-55.35	-13.00	42.35	45
8	13685.6	-60.36	6.3	13.75	Horizontal	-52.91	-13.00	39.91	90
9	15396.3	-56.68	6.7	13.85	Horizontal	-49.53	-13.00	36.53	135
10	17107.0	-54.38	6.8	14.25	Horizontal	-46.93	-13.00	33.93	225
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 4 QPSK 1.4MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3464.3	-64.89	2.6	10.75	Horizontal	-56.74	-13.00	43.74	225
3	5197.5	-60.84	2.4	11.05	Horizontal	-52.19	-13.00	39.19	225
4	6930.0	-63.47	4.5	11.15	Horizontal	-56.82	-13.00	43.82	180
5	8662.5	-61.00	5.1	11.35	Horizontal	-54.75	-13.00	41.75	0
6	10395.0	-60.77	5.3	11.95	Horizontal	-54.12	-13.00	41.12	45
7	12127.5	-60.98	5.5	13.55	Horizontal	-52.93	-13.00	39.93	135
8	13860.0	-57.80	6.3	13.75	Horizontal	-50.35	-13.00	37.35	90
9	15592.5	-55.52	6.7	13.85	Horizontal	-48.37	-13.00	35.37	180
10	17325.0	-55.11	6.8	14.25	Horizontal	-47.66	-13.00	34.66	180
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 4 QPSK 1.4MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3507.8	-62.42	2.6	10.15	Horizontal	-54.87	-13.00	41.87	0
3	5261.6	-58.48	2.4	11.05	Horizontal	-49.83	-13.00	36.83	90
4	7017.2	-63.79	4.5	11.15	Horizontal	-57.14	-13.00	44.14	45
5	8771.5	-60.00	5.1	11.35	Horizontal	-53.75	-13.00	40.75	135
6	10525.8	-60.92	5.3	11.95	Horizontal	-54.27	-13.00	41.27	135
7	12280.1	-62.15	5.5	13.55	Horizontal	-54.10	-13.00	41.10	225
8	14034.4	-58.22	6.3	13.75	Horizontal	-50.77	-13.00	37.77	180
9	15788.7	-54.13	6.7	13.85	Horizontal	-46.98	-13.00	33.98	315
10	17543.0	-55.10	6.8	14.25	Horizontal	-47.65	-13.00	34.65	45
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 4 QPSK 5MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3425.0	-62.29	2.6	10.15	Horizontal	-54.74	-13.00	41.74	0
3	5131.1	-56.91	2.4	11.35	Horizontal	-47.96	-13.00	34.96	180
4	6850.0	-61.96	4.5	10.85	Horizontal	-55.61	-13.00	42.61	45
5	8562.5	-62.88	5.1	11.35	Horizontal	-56.63	-13.00	43.63	45
6	10275.0	-59.15	5.3	11.95	Horizontal	-52.50	-13.00	39.50	180
7	11987.5	-62.96	5.5	13.55	Horizontal	-54.91	-13.00	41.91	90
8	13700.0	-59.80	6.3	13.75	Horizontal	-52.35	-13.00	39.35	135
9	15412.5	-55.69	6.7	13.85	Horizontal	-48.54	-13.00	35.54	0
10	17125.0	-55.86	6.8	14.25	Horizontal	-48.41	-13.00	35.41	180
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 4 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3460.5	-62.68	2.6	10.75	Horizontal	-54.53	-13.00	41.53	45
3	5191.5	-60.41	2.4	11.05	Horizontal	-51.76	-13.00	38.76	45
4	6930.0	-63.73	4.5	11.15	Horizontal	-57.08	-13.00	44.08	225
5	8662.5	-61.53	5.1	11.35	Horizontal	-55.28	-13.00	42.28	225
6	10395.0	-62.37	5.3	11.95	Horizontal	-55.72	-13.00	42.72	270
7	12127.5	-59.44	5.5	13.55	Horizontal	-51.39	-13.00	38.39	135
8	13860.0	-59.09	6.3	13.75	Horizontal	-51.64	-13.00	38.64	225
9	15592.5	-56.31	6.7	13.85	Horizontal	-49.16	-13.00	36.16	180
10	17325.0	-55.19	6.8	14.25	Horizontal	-47.74	-13.00	34.74	90
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 4 QPSK 5MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3500.6	-58.63	2.6	10.15	Horizontal	-51.08	-13.00	38.08	135
3	5251.1	-57.13	2.4	11.05	Horizontal	-48.48	-13.00	35.48	225
4	7010.0	-63.99	4.5	11.15	Horizontal	-57.34	-13.00	44.34	225
5	8762.5	-59.97	5.1	11.35	Horizontal	-53.72	-13.00	40.72	270
6	10515.0	-61.51	5.3	11.95	Horizontal	-54.86	-13.00	41.86	135
7	12267.5	-62.05	5.5	13.55	Horizontal	-54.00	-13.00	41.00	180
8	14020.0	-59.77	6.3	13.75	Horizontal	-52.32	-13.00	39.32	45
9	15772.5	-57.02	6.7	13.85	Horizontal	-49.87	-13.00	36.87	45
10	17525.0	-56.53	6.8	14.25	Horizontal	-49.08	-13.00	36.08	225
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 4 QPSK 20MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3440.0	-61.55	2.6	10.15	Horizontal	-54.00	-13.00	41.00	225
3	5133.4	-56.01	2.4	11.35	Horizontal	-47.06	-13.00	34.06	270
4	6880.0	-59.94	4.5	10.85	Horizontal	-53.59	-13.00	40.59	135
5	8600.0	-60.89	5.1	11.35	Horizontal	-54.64	-13.00	41.64	135
6	10320.0	-60.26	5.3	11.95	Horizontal	-53.61	-13.00	40.61	45
7	12040.0	-62.01	5.5	13.55	Horizontal	-53.96	-13.00	40.96	90
8	13760.0	-59.26	6.3	13.75	Horizontal	-51.81	-13.00	38.81	0
9	15480.0	-54.78	6.7	13.85	Horizontal	-47.63	-13.00	34.63	180
10	17200.0	-55.72	6.8	14.25	Horizontal	-48.27	-13.00	35.27	45
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 4 QPSK 20MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.0	-59.26	2.6	10.75	Horizontal	-51.11	-13.00	38.11	45
3	5170.9	-57.83	2.4	11.05	Horizontal	-49.18	-13.00	36.18	180
4	6930.0	-62.15	4.5	11.15	Horizontal	-55.50	-13.00	42.50	90
5	8662.5	-61.06	5.1	11.35	Horizontal	-54.81	-13.00	41.81	135
6	10395.0	-61.62	5.3	11.95	Horizontal	-54.97	-13.00	41.97	225
7	12127.5	-61.75	5.5	13.55	Horizontal	-53.70	-13.00	40.70	90
8	13860.0	-59.52	6.3	13.75	Horizontal	-52.07	-13.00	39.07	225
9	15592.5	-56.26	6.7	13.85	Horizontal	-49.11	-13.00	36.11	135
10	17325.0	-54.64	6.8	14.25	Horizontal	-47.19	-13.00	34.19	225
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 4 QPSK 20MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3490.0	-65.59	2.6	10.15	Horizontal	-58.04	-13.00	45.04	90
3	5208.4	-61.10	2.4	11.05	Horizontal	-52.45	-13.00	39.45	135
4	6980.0	-61.91	4.5	11.15	Horizontal	-55.26	-13.00	42.26	135
5	8725.0	-62.31	5.1	11.35	Horizontal	-56.06	-13.00	43.06	0
6	10470.0	-62.11	5.3	11.95	Horizontal	-55.46	-13.00	42.46	225
7	12215.0	-62.15	5.5	13.55	Horizontal	-54.10	-13.00	41.10	270
8	13960.0	-58.35	6.3	13.75	Horizontal	-50.90	-13.00	37.90	135
9	15705.0	-57.35	6.7	13.85	Horizontal	-50.20	-13.00	37.20	135
10	17450.0	-56.44	6.8	14.25	Horizontal	-48.99	-13.00	35.99	0
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 12 QPSK 1.4MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1399.4	-69.49	2.00	10.15	Horizontal	-61.34	-13.00	48.34	45
3	2099.1	-68.22	2.50	11.35	Horizontal	-59.37	-13.00	46.37	225
4	2798.8	-61.08	4.20	10.85	Horizontal	-54.43	-13.00	41.43	180
5	3498.5	-64.62	5.20	11.35	Horizontal	-58.47	-13.00	45.47	135
6	4198.2	-67.52	5.50	11.95	Horizontal	-61.07	-13.00	48.07	90
7	4897.9	-66.91	5.70	13.55	Horizontal	-59.06	-13.00	46.06	135
8	5597.6	-65.97	6.30	13.75	Horizontal	-58.52	-13.00	45.52	225
9	6297.3	-64.04	6.80	13.85	Horizontal	-56.99	-13.00	43.99	180
10	6997.0	-62.99	6.90	14.25	Horizontal	-55.64	-13.00	42.64	90
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 12 QPSK 1.4MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.0	-71.31	2.00	10.75	Horizontal	-62.56	-13.00	49.56	90
3	2122.5	-68.65	2.51	11.05	Horizontal	-60.11	-13.00	47.11	135
4	2830.0	-62.13	4.20	11.15	Horizontal	-55.18	-13.00	42.18	90
5	3537.5	-67.74	5.20	11.15	Horizontal	-61.79	-13.00	48.79	135
6	4245.0	-67.33	5.50	11.95	Horizontal	-60.88	-13.00	47.88	45
7	4952.5	-65.57	5.70	13.55	Horizontal	-57.72	-13.00	44.72	0
8	5660.0	-66.24	6.30	13.75	Horizontal	-58.79	-13.00	45.79	180
9	6367.5	-64.12	6.80	13.85	Horizontal	-57.07	-13.00	44.07	45
10	7075.0	-65.74	6.90	14.25	Horizontal	-58.39	-13.00	45.39	45
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 12 QPSK 1.4MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1430.6	-67.42	2.00	10.15	Horizontal	-59.27	-13.00	46.27	135
3	2145.9	-68.89	2.51	11.05	Horizontal	-60.35	-13.00	47.35	225
4	2861.2	-62.92	4.20	11.15	Horizontal	-55.97	-13.00	42.97	225
5	3576.5	-67.38	5.20	11.15	Horizontal	-61.43	-13.00	48.43	90
6	4291.8	-64.88	5.50	11.95	Horizontal	-58.43	-13.00	45.43	135
7	5007.1	-67.26	5.70	13.55	Horizontal	-59.41	-13.00	46.41	225
8	5722.4	-65.21	6.30	13.75	Horizontal	-57.76	-13.00	44.76	180
9	6437.7	-64.23	6.80	13.85	Horizontal	-57.18	-13.00	44.18	135
10	7153.0	-62.68	6.90	14.25	Horizontal	-55.33	-13.00	42.33	0
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 12 QPSK 5MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1403.0	-67.34	2.00	10.15	Horizontal	-59.19	-13.00	46.19	135
3	2104.5	-69.45	2.50	11.35	Horizontal	-60.60	-13.00	47.60	0
4	2806.0	-63.33	4.20	10.85	Horizontal	-56.68	-13.00	43.68	180
5	3507.5	-65.51	5.20	11.35	Horizontal	-59.36	-13.00	46.36	180
6	4209.0	-66.93	5.50	11.95	Horizontal	-60.48	-13.00	47.48	45
7	4910.5	-66.52	5.70	13.55	Horizontal	-58.67	-13.00	45.67	45
8	5612.0	-66.57	6.30	13.75	Horizontal	-59.12	-13.00	46.12	225
9	6313.5	-64.34	6.80	13.85	Horizontal	-57.29	-13.00	44.29	180
10	7015.0	-64.95	6.90	14.25	Horizontal	-57.60	-13.00	44.60	90
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 12 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.0	-68.35	2.00	10.75	Horizontal	-59.60	-13.00	46.60	45
3	2122.5	-68.83	2.51	11.05	Horizontal	-60.29	-13.00	47.29	45
4	2830.0	-61.45	4.20	11.15	Horizontal	-54.50	-13.00	41.50	135
5	3537.5	-68.30	5.20	11.15	Horizontal	-62.35	-13.00	49.35	135
6	4245.0	-66.96	5.50	11.95	Horizontal	-60.51	-13.00	47.51	90
7	4952.5	-67.69	5.70	13.55	Horizontal	-59.84	-13.00	46.84	0
8	5660.0	-63.88	6.30	13.75	Horizontal	-56.43	-13.00	43.43	45
9	6367.5	-62.91	6.80	13.85	Horizontal	-55.86	-13.00	42.86	180
10	7075.0	-63.72	6.90	14.25	Horizontal	-56.37	-13.00	43.37	0
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 12 QPSK 5MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1427.0	-69.25	2.00	10.15	Horizontal	-61.10	-13.00	48.10	225
3	2140.5	-67.56	2.51	11.05	Horizontal	-59.02	-13.00	46.02	180
4	2854.0	-63.41	4.20	11.15	Horizontal	-56.46	-13.00	43.46	90
5	3567.5	-67.58	5.20	11.15	Horizontal	-61.63	-13.00	48.63	180
6	4281.0	-66.73	5.50	11.95	Horizontal	-60.28	-13.00	47.28	45
7	4994.5	-67.07	5.70	13.55	Horizontal	-59.22	-13.00	46.22	45
8	5708.0	-65.81	6.30	13.75	Horizontal	-58.36	-13.00	45.36	180
9	6421.5	-64.59	6.80	13.85	Horizontal	-57.54	-13.00	44.54	90
10	7135.0	-65.75	6.90	14.25	Horizontal	-58.40	-13.00	45.40	135
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 12 QPSK 10MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1408.0	-66.90	2.00	10.15	Horizontal	-58.75	-13.00	45.75	135
3	2112.0	-68.44	2.51	11.35	Horizontal	-59.60	-13.00	46.60	0
4	2816.0	-61.49	4.20	10.85	Horizontal	-54.84	-13.00	41.84	225
5	3520.0	-64.84	5.20	11.35	Horizontal	-58.69	-13.00	45.69	225
6	4224.0	-66.28	5.50	11.95	Horizontal	-59.83	-13.00	46.83	180
7	4928.0	-66.29	5.70	13.55	Horizontal	-58.44	-13.00	45.44	90
8	5632.0	-65.71	6.30	13.75	Horizontal	-58.26	-13.00	45.26	135
9	6336.0	-63.16	6.80	13.85	Horizontal	-56.11	-13.00	43.11	0
10	7040.0	-64.39	6.90	14.25	Horizontal	-57.04	-13.00	44.04	180
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 12 QPSK 10MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.0	-67.43	2.00	10.75	Horizontal	-58.68	-13.00	45.68	90
3	2122.5	-69.05	2.51	11.05	Horizontal	-60.51	-13.00	47.51	0
4	2830.0	-61.97	4.20	11.15	Horizontal	-55.02	-13.00	42.02	180
5	3537.5	-68.12	5.20	11.15	Horizontal	-62.17	-13.00	49.17	45
6	4245.0	-64.93	5.50	11.95	Horizontal	-58.48	-13.00	45.48	45
7	4952.5	-66.93	5.70	13.55	Horizontal	-59.08	-13.00	46.08	45
8	5660.0	-64.95	6.30	13.75	Horizontal	-57.50	-13.00	44.50	45
9	6367.5	-63.11	6.80	13.85	Horizontal	-56.06	-13.00	43.06	225
10	7075.0	-64.36	6.90	14.25	Horizontal	-57.01	-13.00	44.01	180
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 12 QPSK 10MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1422.0	-70.54	2.00	10.15	Horizontal	-62.39	-13.00	49.39	45
3	2133.0	-68.80	2.51	11.05	Horizontal	-60.26	-13.00	47.26	45
4	2844.0	-63.66	4.20	11.15	Horizontal	-56.71	-13.00	43.71	90
5	3555.0	-68.42	5.20	11.15	Horizontal	-62.47	-13.00	49.47	90
6	4266.0	-66.21	5.50	11.95	Horizontal	-59.76	-13.00	46.76	135
7	4977.0	-66.08	5.70	13.55	Horizontal	-58.23	-13.00	45.23	0
8	5688.0	-64.94	6.30	13.75	Horizontal	-57.49	-13.00	44.49	180
9	6399.0	-63.61	6.80	13.85	Horizontal	-56.56	-13.00	43.56	45
10	7110.0	-65.09	6.90	14.25	Horizontal	-57.74	-13.00	44.74	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

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6 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113645	2018-05-20	2019-05-19
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	2018-05-20	2019-05-19
Spectrum Analyzer	Key sight	N9010A	MY50210259	2018-05-20	2019-05-19
Signal Analyzer	R&S	FSV30	100815	2017-12-17	2018-12-16
Signal generator	R&S	SMB 100A	102594	2018-05-20	2019-05-19
EMI Test Receiver	R&S	ESCI	100948	2018-05-20	2019-05-19
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2014-12-06	2019-12-05
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	100126	2014-12-06	2019-12-05
Horn Antenna	ETS-Lindgren	3160-09	00102643	2015-01-30	2020-01-29
Climatic Chamber	Re Ce	PT-30B	20101891	2015-07-18	2018-07-17
RF Cable	Agilent	SMA 15cm	0001	NA	NA
Preampflier	R&S	SCU18	102327	2017-06-18	2018-06-17
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2018-05-20	2019-05-19
Software	R&S	EMC32	V 8.52.0	NA	NA

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

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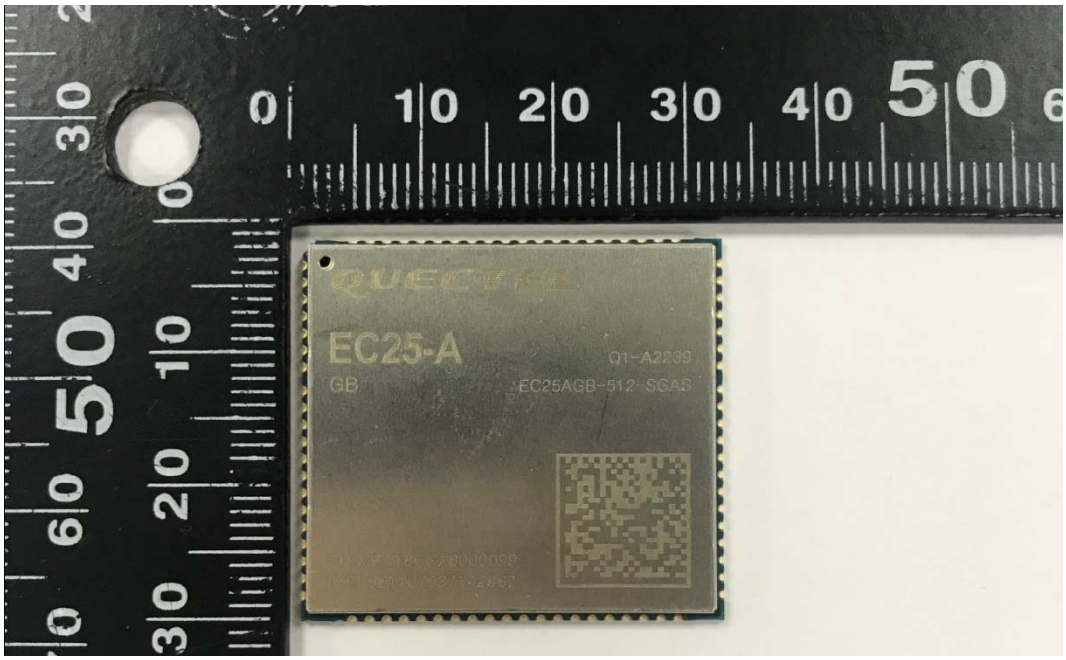
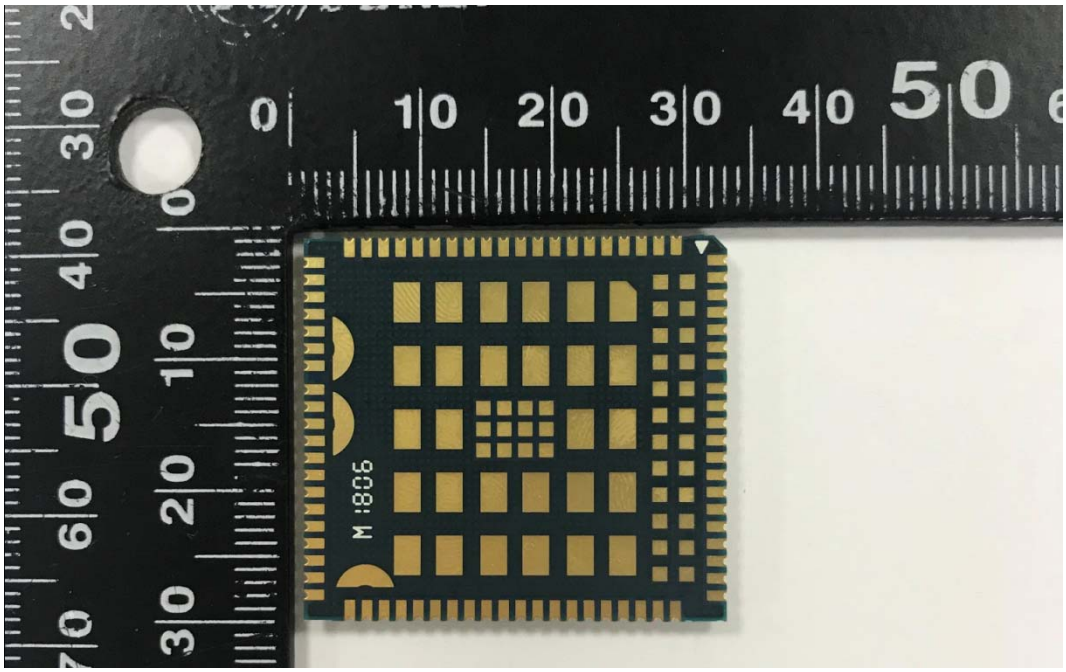
ANNEX A: EUT Appearance and Test Setup

A.1 EUT Appearance



Front Side



Back Side

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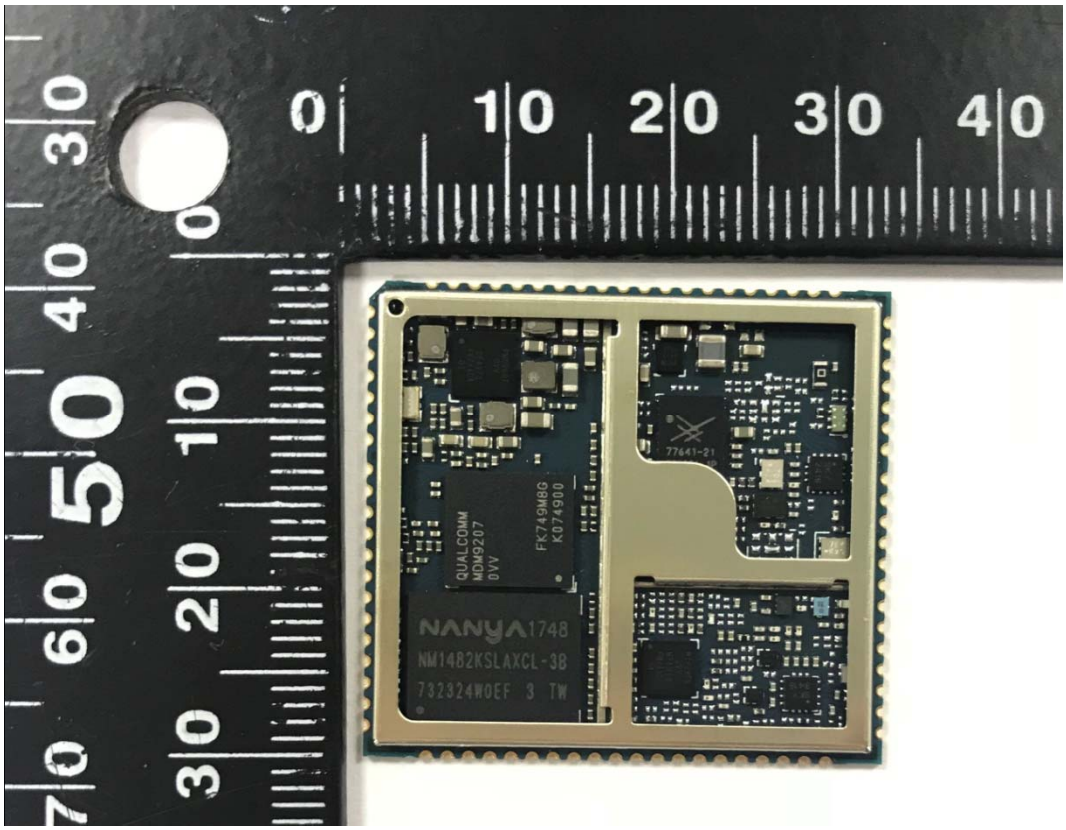

No sheilding

a: EUT

Picture 1 EUT and Accessory

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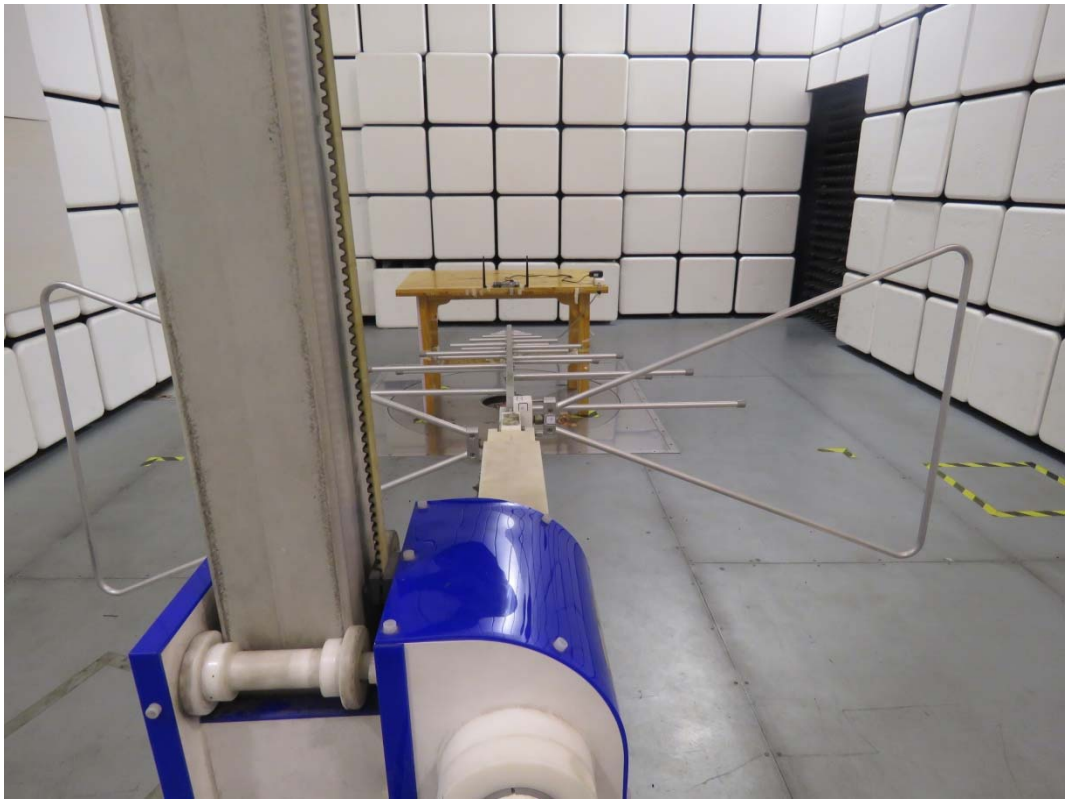
A.2 Test Setup



Picture 2: Radiated Spurious Emissions Test setup

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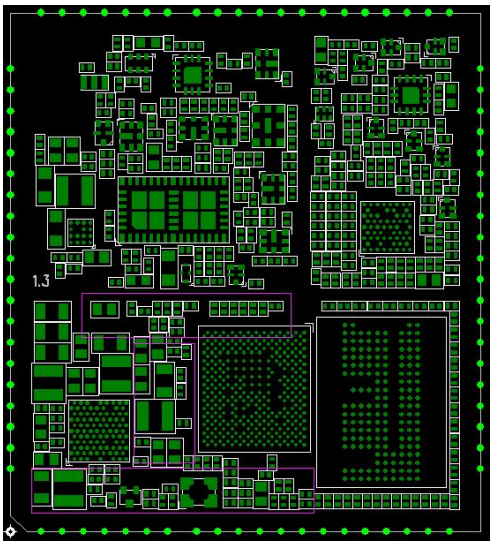
ANNEX B: Product Change Description

We **Quectel Wireless Solutions Co., Ltd** declare the following models.

Product Name: LTE Module
Model Number: EC25-A, EC25-A MINIPCIE,
EC25-V, EC25-V MINIPCIE,
Hardware version: Refer to below table

Model	Certified HW Version A	New HW Version B
EC25-A, EC25-A MINIPCIE	R1.0	R1.1
EC25-V, EC25-V MINIPCIE	R1.0	R1.1

All above series models share the same hardware and software design. Here we need to update the hardware to improve power supply. There are some differences between **Certified HW Version A** and **New HW Version B** on PCB design which are some capacitors and resistors' location which used for BB. The details are shown as following pictures and table.



Designator	R1.0 Position (mm, mm)	R1.1 Position (mm, mm)
C0301	(5.8, 13.7)	(9.7,6.89)
C0306	(7.475, 13.75)	(10.84,7.81)
C0310	-	(8.707, 13.847)
C0307	(10.85, 11.1)	-
C0328	(8.85, 12.78)	-
C0227	(8.085, 11.15)	-
R0501	(16.35, 13.9)	(19.08, 13.91)
C0340	-	(9.23, 1.7)

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C0402	**-**	**(12.37, 4.25)**
C0227	**(8.085, 11.15)**	**(4.45, 13.58)**
C0330	**(9.1, 11.375)**	**(9.66, 5.12)**
C0211	**(2.575, 11.03)**	**(2.42, 12.35)**
L0201	**(2.35, 9.15)**	**(2.32, 10.45)**
L0202	**(8.925, 7.1)**	**(8.15, 7.94)**
C0214	**(1.91, 2.73)**	**(1.89, 4.05)**
L0204	**(3.62, 2.64)**	**(3.78, 3.97)**
Y0101	**(11.61, 2.45)**	**(7.45, 2.39)**
Q0101	**(7.36, 2.125)**	**(3.32, 2.12)**
C0317	**(15.46, 2.3)**	**(17.01, 1.87)**

We hereby state that there is no any other internal difference between them and the change is layout part of power supply BB which won't affect the RF portions and the original RF data can be re-used.

Your assistance on this matter is highly appreciated.

Sincerely,
Name: Jean Hu
Title: Certification Section

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