

FCC Test Report

(PART 27)

Report No.: RF190521C20

FCC ID: XMR201607EC25V

Test Model: EC25-V

Received Date: May 21, 2019

Test Date: May 23, 2019 ~ May 29, 2019

Issued Date: Jun. 06, 2019

Applicant: Quectel Wireless Solutions Co., Ltd

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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(R.O.C)

Test Location: B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231,

Taiwan, R.O.C

FCC Registration /

427177 / TW0011

Designation Number:





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The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies



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Release Control Record

Issue No.	Description	Date Issued
RF190521C20	Original Release	Jun. 06, 2019



1 Certificate of Conformity

Product: LTE Module

Brand: Quectel

Test Model: EC25-V

Sample Status: Production Unit

Applicant: Quectel Wireless Solutions Co., Ltd

Test Date: May 23, 2019 ~ May 29, 2019

Standards: FCC Part 27, Subpart F, L

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : , Date: Jun. 06, 2019

Rona Chen / Specialist

Approved by : , **Date:** Jun. 06, 2019

Dylan Chiou / Project Engineer



2 Summary of Test Results

	Applied Standard: FCC Part 27 & Part 2 (LTE 4)							
FCC Clause	Test Item	Result	Remarks					
2.1046 27.50(d)(4)	Maximum Peak Output Power		Meet the requirement of limit.					
2.1047	Modulation Characteristics	N/A	Refer to Note					
2.1055 27.54	Frequency Stability		Refer to Note					
2.1049	Occupied Bandwidth	N/A	Refer to Note					
27.50(d)(5)	Peak to Average Ratio	N/A	Refer to Note					
27.53(h)	Band Edge Measurements	N/A	Refer to Note					
2.1051 27.53(h)	Conducted Spurious Emissions	N/A	Refer to Note					
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -33.69 dB at 34.59 MHz.					

	Applied Standard: FCC Part 27 & Part 2 (LTE 13)						
FCC Clause	Test Item	Result	Remarks				
2.1046 27.50(b)(10) Maximum Peak Output Po		Pass	Meet the requirement of limit.				
2.1047	Modulation Characteristics	N/A	Refer to Note				
2.1055 27.54	Frequency Stability	N/A	Refer to Note				
2.1049	Occupied Bandwidth	N/A	Refer to Note				
	Peak to Average Ratio	N/A	Refer to Note				
27.53(c)(2)(4)	Band Edge Measurements	N/A	Refer to Note				
2.1051 27.53(c)(2)&(f)	Conducted Spurious Emissions	N/A	Refer to Note				
2.1053 27.53(c)(2)&(f)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -17.06 dB at 1564.00 MHz.				

Note:

- 1. This report is a partial report. Therefore, only test item of Effective Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to Bay Area Compliance Laboratories Corp.(Taiwan) report no.: RTWK160705002-00 for module (Brand: Quectel, Model: EC25-V)
- 2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.



2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
	9 kHz ~ 30 MHz	3.0400 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
Radiated Effissions above 1 GHZ	18 GHz ~ 40 GHz	1.1508 dB



2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-616	Nov. 27, 2018	Nov. 26, 2019
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA9170	9170-480	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 19, 2018	Nov. 18, 2019
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RF C-SMS-100-SMS- 120+RFC-SMS-1 00-SMS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RF C-SMS-100-SMS- 24)	Jun. 19, 2018	Jun. 18, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 16, 2017	Aug. 15, 2019

- Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 - 2. The test was performed in HsinTien Chamber 1.
 - 3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.



3 General Information

3.1 General Description of EUT

Product	roduct LTE Module					
Brand	Quectel					
Test Model	EC25-V					
Status of EUT	Production Unit					
Power Supply Rating	3.8 Vdc (Host equipment)					
Modulation Type	LTE	QPSK, 16QAM, 64QAM				
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1710.7 ~ 1754.3 MHz				
	LTE Band 4 (Channel Bandwidth: 3 MHz)	1711.5 ~ 1753.5 MHz				
	LTE Band 4 (Channel Bandwidth: 5 MHz)	1712.5 ~ 1752.5 MHz				
Erogueney Benge	LTE Band 4 (Channel Bandwidth: 10 MHz)	1715.0 ~ 1750.0 MHz				
Frequency Range	LTE Band 4 (Channel Bandwidth: 15 MHz)	1717.5 ~ 1747.5 MHz				
	LTE Band 4 (Channel Bandwidth: 20 MHz)	1720.0 ~ 1745.0 MHz				
	LTE Band 13 (Channel Bandwidth: 5 MHz)	779.5 ~ 784.5 MHz				
	LTE Band 13 (Channel Bandwidth: 10 MHz)	782.0 MHz				
Max. ERP Power	LTE Band 13 (Channel Bandwidth: 5 MHz)	183.70 mW				
IVIAX. ERP POWEI	LTE Band 13 (Channel Bandwidth: 10 MHz)	198.47 mW				
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	240.16 mW				
	LTE Band 4 (Channel Bandwidth: 3 MHz)	241.82 mW				
Max. EIRP Power	LTE Band 4 (Channel Bandwidth: 5 MHz)	228.40 mW				
IVIAX. EIRP POWEI	LTE Band 4 (Channel Bandwidth: 10 MHz)	247.46 mW				
	LTE Band 4 (Channel Bandwidth: 15 MHz)	236.86 mW				
	LTE Band 4 (Channel Bandwidth: 20 MHz)	250.32 mW				
Antenna Type	Dipole Antenna					
Antenna Gain	LTE Band 4	1.5 dBi				
Antenna Gam	LTE Band 13	-1.6 dBi				
Accessory Device	Refer to Note as below					
Data Cable Supplied	Refer to Note as below					

Note:

1. The EUT was installed in a specific End-product.

Product	Brand	Model	FCC ID
veeaHub	veea Hub	VHE09XXX (X=A-Z,0-9, blank or "-")	2ARXKVHE09

2. The End-product contains following accessory devices.

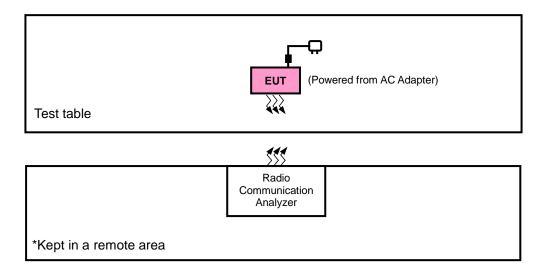
Product	Brand	Model	Description
Adapter	EDACPOWER ELEC.	EA1062SGR-480	I/P: 100-240 Vac, 50-60 Hz, 0.5 A O/P: 48 Vdc, 1.35 A 1.2m cable with 1 core

3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.



3.2 Configuration of System under Test

< E.R.P. / E.I.R.P. / Radiated Emission Test>



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, antenna degree 90° and 180°, and antenna ports.

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	ERP / EIRP	Radiated Emission
LTE Band 4	90°	90°
LTE Band 13	90°	90°



LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
		19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	EIRP	19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
	LIIISSIOII	20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE Band 13

EUT Configure	Test Item	Available	Tested Channel	Channel	Modulation	Mode
Mode		Channel	Channel	Bandwidth		
	ERP	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-		23230	23230	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	Radiated	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK	1 RB / 0 RB Offset
-	Emission	23230	23230	10 MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP / EIRP	25 deg. C, 65 % RH	3.8 Vdc	Karl Lee
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee



3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2 FCC 47 CFR Part 27 KDB 971168 D01 Power Meas License Digital Systems v03r01 ANSI/TIA/EIA-603-E 2016 ANSI 63.26-2015

Note: All test items have been performed and recorded as per the above standards.



4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

Portable stations (hand-held devices) operating in the 746-757 MHz, 776-788 MHz and 805-806 MHz band are limited to 3 watts ERP

Portable stations (hand-held device) operating 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.

4.1.2 Test Procedures

EIRP / ERP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 5 MHz for WCDMA and 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G.
- d. EIRP = Output power level of S.G TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power 2.15 dB.

Conducted Power Measurement:

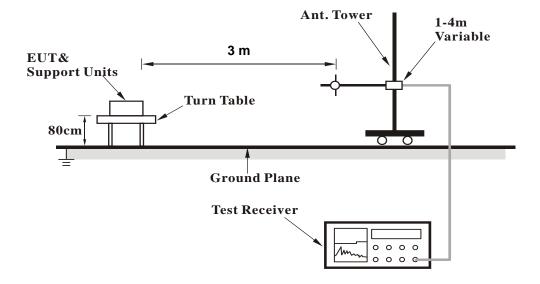
- a. The EUT was set up for the maximum power with WCDMA and LTE link data modulation and link up with simulator.
- b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.



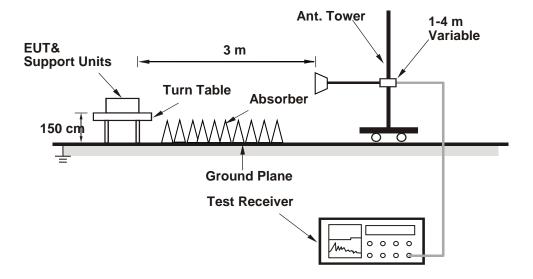
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).



4.1.4 Test Results

LTE Band 13									
Channel Bandwidth: 5 MHz / QPSK									
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)		
	23205	779.5	-7.98	32.771	22.64	183.70			
	23230	782.0	-8.12	32.741	22.47	176.64	Н		
90°	23255	784.5	-8.23	32.854	22.47	176.77			
90°	23205	779.5	-10.56	32.5	19.79	95.28			
	23230	782.0	-10.88	32.52	19.49	88.92	V		
	23255	784.5	-11.21	32.62	19.26	84.33			
			Channel Ba	ndwidth: 5 MHz	/ 16QAM				
	23205	779.5	-8.90	32.771	21.72	148.63			
	23230	782.0	-9.51	32.741	21.08	128.26	Н		
90°	23255	784.5	-9.21	32.854	21.49	141.06			
90°	23205	779.5	-11.85	32.5	18.50	70.79			
	23230	782.0	-11.96	32.52	18.41	69.37	V		
	23255	784.5	-11.77	32.62	18.70	74.13			
			Channel Ba	ndwidth: 5 MHz	/ 64QAM				
	23205	779.5	-10.12	32.771	20.50	112.23			
	23230	782.0	-9.87	32.741	20.72	118.06	Н		
90°	23255	784.5	-10.23	32.854	20.47	111.53			
90°	23205	779.5	-12.66	32.5	17.69	58.75			
	23230	782.0	-12.74	32.52	17.63	57.94	V		
	23255	784.5	-12.48	32.62	17.99	62.95			

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) -2.15

	LTE Band 13									
	Channel Bandwidth: 10 MHz / QPSK									
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)			
90°	23230	782.0	-7.61	32.737	22.98	198.47	Н			
90°	23230	782.0	-10.53	32.52	19.85	96.49	V			
		(Channel Bar	ndwidth: 10 MHz	/ 16QAM					
90°	23230	782.0	-8.75	32.737	21.84	152.65	Н			
90°	23230	782.0	-11.88	32.52	18.49	70.63	V			
Channel Bandwidth: 10 MHz / 64QAM										
90°	23230	782.0	-9.85	32.737	20.74	118.49	Н			
90°	23230	782.0	-12.52	32.52	17.85	60.95	V			



LTE Band 4									
Channel Bandwidth: 1.4 MHz / QPSK									
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)		
	19957	1710.7	-18.68	42.49	23.81	240.16			
	20175	1732.5	-18.55	42.33	23.78	238.62	Н		
90°	20393	1754.3	-18.54	42.10	23.56	226.99			
90°	19957	1710.7	-23.63	42.99	19.37	86.40			
	20175	1732.5	-23.42	42.74	19.32	85.51	V		
	20393	1754.3	-22.84	42.21	19.37	86.50			
		C	hannel Ban	dwidth: 1.4 MHz	: / 16QAM				
	19957	1710.7	-19.95	42.49	22.54	179.27			
	20175	1732.5	-19.81	42.33	22.52	178.53	Н		
90°	20393	1754.3	-19.56	42.10	22.54	179.47			
90°	19957	1710.7	-24.58	42.99	18.41	69.34			
	20175	1732.5	-24.65	42.74	18.09	64.42	V		
	20393	1754.3	-23.84	42.21	18.37	68.71			
		C	hannel Ban	dwidth: 1.4 MHz	/ 64QAM				
	19957	1710.7	-20.88	42.49	21.61	144.71			
	20175	1732.5	-20.56	42.33	21.77	150.21	Н		
000	20393	1754.3	-20.47	42.10	21.63	145.55			
90°	19957	1710.7	-25.51	42.99	17.48	55.98			
	20175	1732.5	-25.52	42.74	17.22	52.72	V		
	20393	1754.3	-24.68	42.21	17.53	56.62			



LTE Band 4									
Channel Bandwidth: 3 MHz / QPSK									
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)		
	19965	1711.5	-18.65	42.49	23.84	241.82			
	20175	1732.5	-18.77	42.33	23.56	226.83	Н		
90°	20385	1753.5	-18.85	42.10	23.25	211.35			
90°	19965	1711.5	-23.56	42.99	19.43	87.70			
	20175	1732.5	-23.51	42.74	19.23	83.75	V		
	20385	1753.5	-22.58	42.21	19.63	91.83			
			Channel Ba	ndwidth: 3 MHz	/ 16QAM				
	19965	1711.5	-19.95	42.49	22.54	179.27			
	20175	1732.5	-19.57	42.33	22.76	188.67	Н		
90°	20385	1753.5	-19.68	42.10	22.42	174.58			
90°	19965	1711.5	-24.85	42.99	18.14	65.16			
	20175	1732.5	-24.48	42.74	18.26	66.99	V		
	20385	1753.5	-23.85	42.21	18.36	68.55			
			Channel Ba	ndwidth: 3 MHz	/ 64QAM				
	19965	1711.5	-20.85	42.49	21.64	145.71			
	20175	1732.5	-20.74	42.33	21.59	144.11	Н		
90°	20385	1753.5	-20.65	42.10	21.45	139.64			
90°	19965	1711.5	-25.54	42.99	17.45	55.59			
	20175	1732.5	-25.33	42.74	17.41	55.08	V		
	20385	1753.5	-24.51	42.21	17.70	58.88			



LTE Band 4									
Channel Bandwidth: 5 MHz / QPSK									
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)		
	19975	1712.5	-18.91	42.49	23.58	227.77			
	20175	1732.5	-18.74	42.33	23.59	228.40	Н		
90°	20375	1752.5	-18.66	42.10	23.44	220.80			
90°	19975	1712.5	-23.42	42.99	19.57	90.57			
	20175	1732.5	-23.42	42.74	19.32	85.51	V		
	20375	1752.5	-22.54	42.21	19.67	92.68			
			Channel Ba	ndwidth: 5 MHz	/ 16QAM				
	19975	1712.5	-19.84	42.49	22.65	183.87			
	20175	1732.5	-19.75	42.33	22.58	181.01	Н		
90°	20375	1752.5	-19.68	42.10	22.42	174.58			
90°	19975	1712.5	-24.54	42.99	18.45	69.98			
	20175	1732.5	-24.25	42.74	18.49	70.63	V		
	20375	1752.5	-23.75	42.21	18.46	70.15			
			Channel Ba	ndwidth: 5 MHz	/ 64QAM				
	19975	1712.5	-20.84	42.49	21.65	146.05			
	20175	1732.5	-20.56	42.33	21.77	150.21	Н		
000	20375	1752.5	-20.62	42.10	21.48	140.60			
90°	19975	1712.5	-25.45	42.99	17.54	56.75			
	20175	1732.5	-25.25	42.74	17.49	56.10	V		
	20375	1752.5	-24.71	42.21	17.50	56.23			



LTE Band 4									
Channel Bandwidth: 10 MHz / QPSK									
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)		
	20000	1715.0	-18.55	42.49	23.94	247.46			
	20175	1732.5	-18.45	42.33	23.88	244.17	Н		
90°	20350	1750.0	-18.65	42.10	23.45	221.31			
90°	20000	1715.0	-23.42	42.99	19.57	90.57			
	20175	1732.5	-23.45	42.74	19.29	84.92	V		
	20350	1750.0	-22.65	42.21	19.56	90.36			
		(Channel Bar	ndwidth: 10 MHz	/ 16QAM				
	20000	1715.0	-19.87	42.49	22.62	182.60			
	20175	1732.5	-19.56	42.33	22.77	189.10	Н		
90∘	20350	1750.0	-19.81	42.10	22.29	169.43			
90°	20000	1715.0	-24.55	42.99	18.44	69.82			
	20175	1732.5	-24.42	42.74	18.32	67.92	V		
	20350	1750.0	-23.35	42.21	18.86	76.91			
			Channel Bar	ndwidth: 10 MHz	/ 64QAM				
	20000	1715.0	-20.95	42.49	21.54	142.40			
	20175	1732.5	-20.74	42.33	21.59	144.11	Н		
90∘	20350	1750.0	-20.56	42.10	21.54	142.56			
900	20000	1715.0	-25.25	42.99	17.74	59.43			
	20175	1732.5	-25.35	42.74	17.39	54.83	V		
	20350	1750.0	-24.75	42.21	17.46	55.72			



	LTE Band 4									
Channel Bandwidth: 15 MHz / QPSK										
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)			
	20025	1717.5	-18.74	42.49	23.75	236.86				
	20175	1732.5	-18.63	42.33	23.70	234.26	Н			
90∘	20325	1747.5	-18.54	42.10	23.56	226.99				
90°	20025	1717.5	-23.42	42.99	19.57	90.57				
	20175	1732.5	-22.85	42.74	19.89	97.50	V			
	20325	1747.5	-22.67	42.21	19.54	89.95				
		(Channel Bar	ndwidth: 15 MHz	/ 16QAM					
	20025	1717.5	-19.56	42.49	22.93	196.11				
	20175	1732.5	-19.98	42.33	22.35	171.67	Н			
90∘	20325	1747.5	-19.88	42.10	22.22	166.72				
90°	20025	1717.5	-24.65	42.99	18.34	68.23				
	20175	1732.5	-24.21	42.74	18.53	71.29	V			
	20325	1747.5	-23.85	42.21	18.36	68.55				
		(Channel Bar	ndwidth: 15 MHz	/ 64QAM					
	20025	1717.5	-20.75	42.49	21.74	149.11				
	20175	1732.5	-20.65	42.33	21.68	147.13	Н			
000	20325	1747.5	-20.58	42.10	21.52	141.91				
90°	20025	1717.5	-25.54	42.99	17.45	55.59				
	20175	1732.5	-25.23	42.74	17.51	56.36	V			
	20325	1747.5	-24.85	42.21	17.36	54.45				



LTE Band 4									
Channel Bandwidth: 20 MHz / QPSK									
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)		
	20050	1720.0	-18.50	42.49	23.99	250.32			
	20175	1732.5	-18.51	42.33	23.82	240.82	Н		
90°	20300	1745.0	-18.42	42.10	23.68	233.35			
90°	20050	1720.0	-23.33	42.99	19.66	92.47			
	20175	1732.5	-22.88	42.74	19.86	96.83	V		
	20300	1745.0	-22.75	42.21	19.46	88.31			
		(Channel Bar	ndwidth: 20 MHz	/ 16QAM				
	20050	1720.0	-19.51	42.49	22.98	198.38			
	20175	1732.5	-19.45	42.33	22.88	193.95	Н		
90°	20300	1745.0	-19.68	42.10	22.42	174.58			
90°	20050	1720.0	-24.52	42.99	18.47	70.31			
	20175	1732.5	-23.99	42.74	18.75	74.99	V		
	20300	1745.0	-23.65	42.21	18.56	71.78			
		(Channel Bar	ndwidth: 20 MHz	/ 64QAM				
	20050	1720.0	-20.49	42.49	22.00	158.31			
	20175	1732.5	-20.56	42.33	21.77	150.21	Н		
90°	20300	1745.0	-20.57	42.10	21.53	142.23			
90°	20050	1720.0	-25.33	42.99	17.66	58.34			
	20175	1732.5	-24.85	42.74	17.89	61.52	V		
	20300	1745.0	-24.90	42.21	17.31	53.83			



4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

- a. The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB. The limit of emission is equal to -13 dBm.
- b. For operations in the 775-788 MHz, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz. The limit of emissions is equal to -40 dBm.

4.2.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G.
- c. EIRP = Output power level of S.G TX cable loss + Antenna gain of substitution horn.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power 2.15 dB.

Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

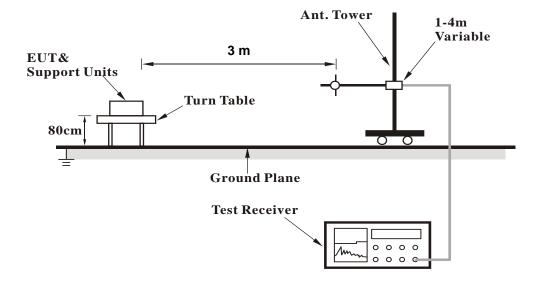
4.2.3 Deviation from Test Standard

No deviation.

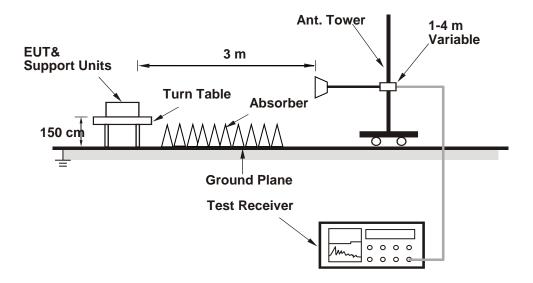


4.2.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).



4.2.5 Test Results

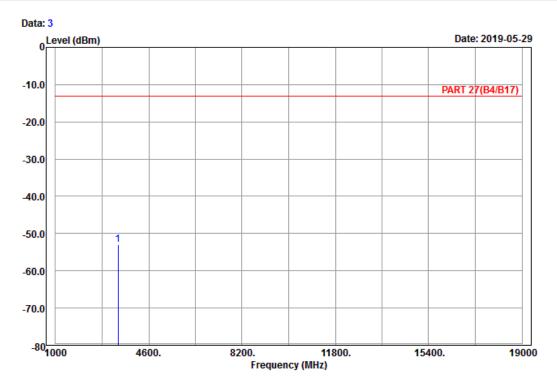
LTE Band 4

Channel Bandwidth: 1.4 MHz / QPSK

Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Horizontal Remark : LTE_Band 4_Link_CH19957

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

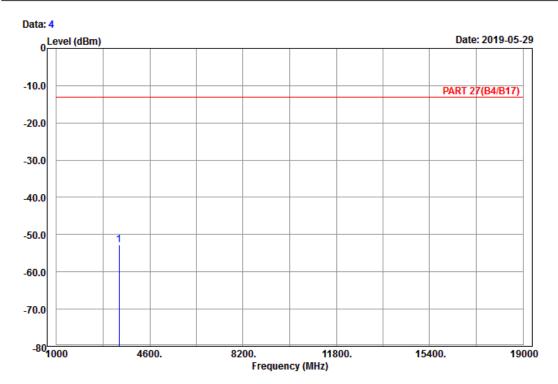
MHz dBm dBm dB dBm dB

1 pp 3421.40 -52.95 -67.32 14.37 -13.00 -39.95 Peak





Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Vertical Remark : LTE_Band 4_Link_CH19957

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

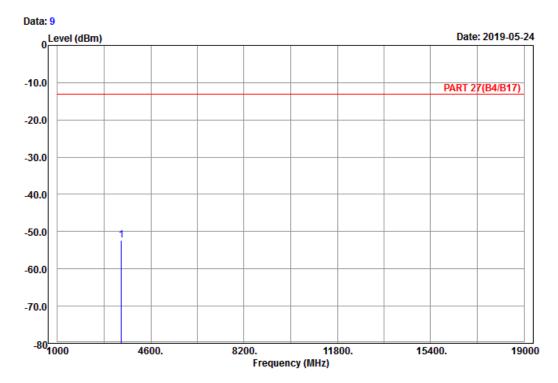
1 pp 3421.40 -52.83 -67.20 14.37 -13.00 -39.83 Peak



Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Horizontal Remark : LTE_Band 4_Link_CH20175

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

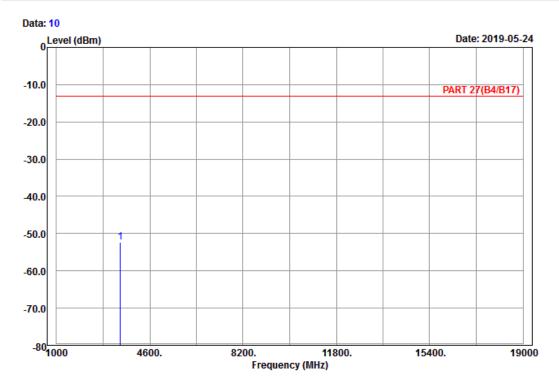
MHz dBm dBm dB dBm dB

1 pp 3465.00 -52.35 -66.69 14.34 -13.00 -39.35 Peak





Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Vertical Remark : LTE_Band 4_Link_CH20175

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

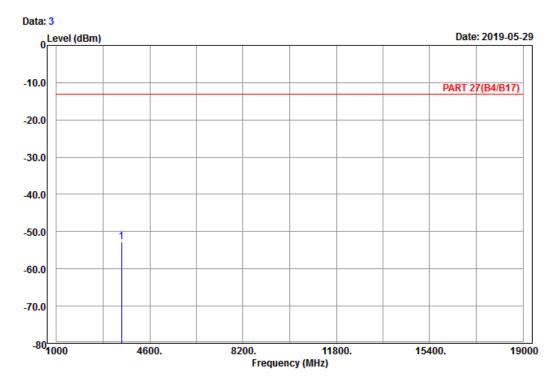
1 pp 3465.00 -52.32 -66.66 14.34 -13.00 -39.32 Peak



High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Horizontal Remark : LTE_Band 4_Link_CH20393

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

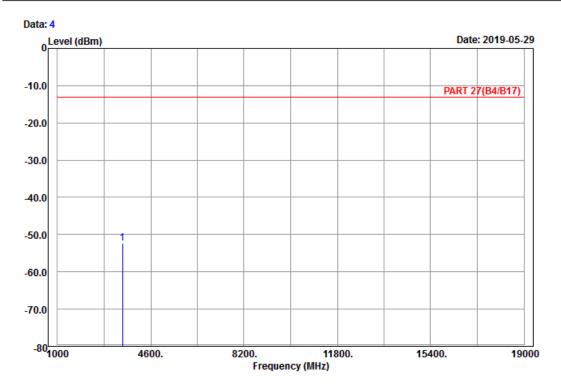
MHz dBm dBm dB dBm dB

1 pp 3508.60 -52.81 -67.09 14.28 -13.00 -39.81 Peak





Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Vertical Remark : LTE_Band 4_Link_CH20393

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

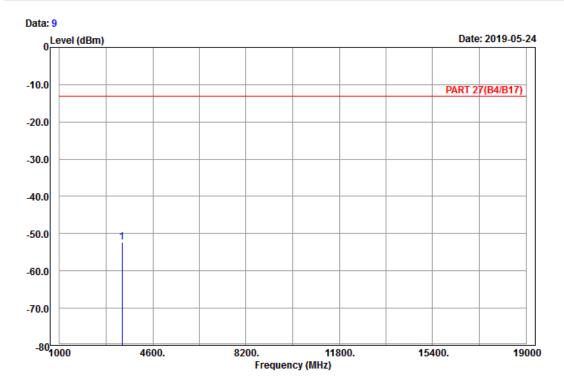
1 pp 3508.60 -52.39 -66.67 14.28 -13.00 -39.39 Peak



Channel Bandwidth: 5 MHz / QPSK Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Horizontal Remark : LTE_Band 4_Link_CH19975

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

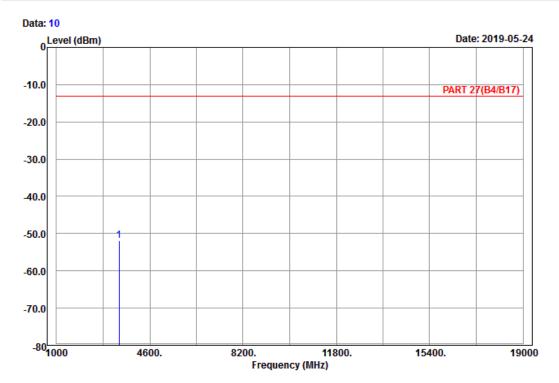
MHz dBm dBm dB dBm dB

1 pp 3425.00 -52.27 -66.64 14.37 -13.00 -39.27 Peak





Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Vertical Remark : LTE_Band 4_Link_CH19975

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

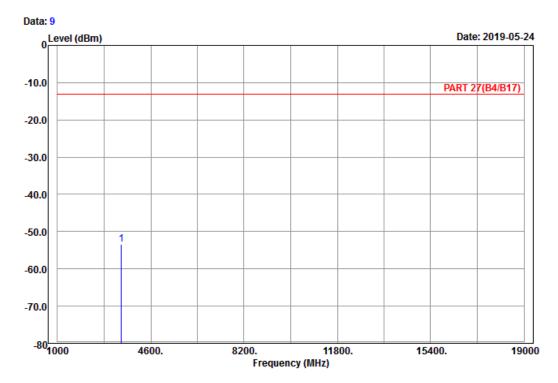
1 pp 3425.00 -51.82 -66.19 14.37 -13.00 -38.82 Peak



Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Horizontal Remark : LTE_Band 4_Link_CH20175

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

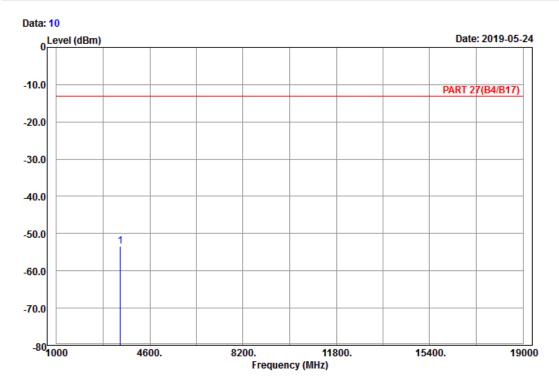
MHz dBm dBm dB dBm dB

1 pp 3465.00 -53.45 -67.79 14.34 -13.00 -40.45 Peak





Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Vertical Remark : LTE_Band 4_Link_CH20175

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

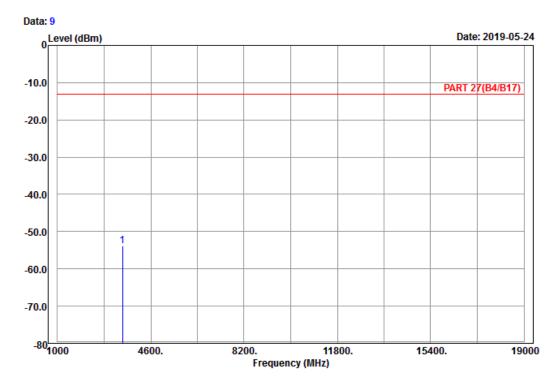
1 pp 3465.00 -53.51 -67.85 14.34 -13.00 -40.51 Peak



High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Horizontal Remark : LTE_Band 4_Link_CH20375

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

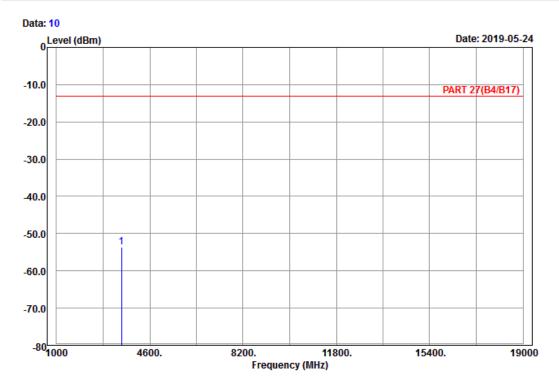
MHz dBm dBm dB dBm dB

1 pp 3505.00 -53.74 -68.02 14.28 -13.00 -40.74 Peak





Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Vertical Remark : LTE_Band 4_Link_CH20375

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

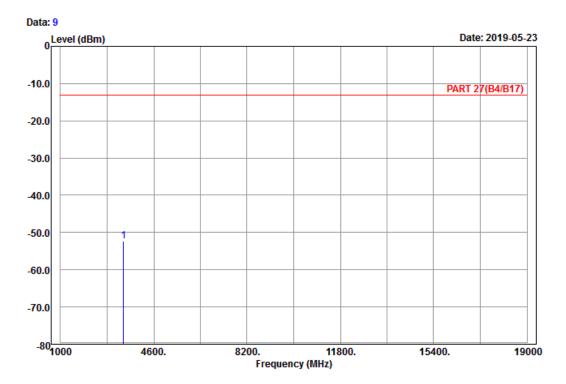
1 pp 3505.00 -53.62 -67.90 14.28 -13.00 -40.62 Peak



Channel Bandwidth: 20 MHz / QPSK Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Horizontal Remark : LTE_Band 4_Link_CH20050

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

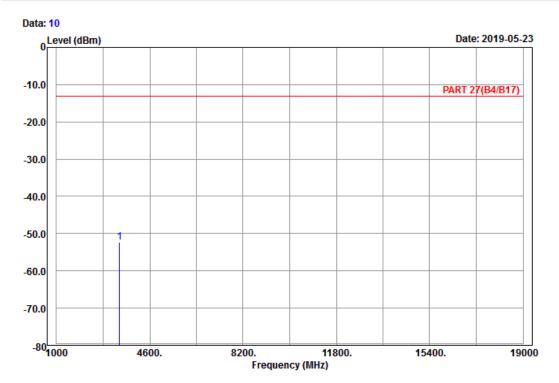
MHz dBm dBm dB dBm dB

1 pp 3440.00 -52.33 -66.68 14.35 -13.00 -39.33 Peak





Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Vertical Remark : LTE_Band 4_Link_CH20050

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

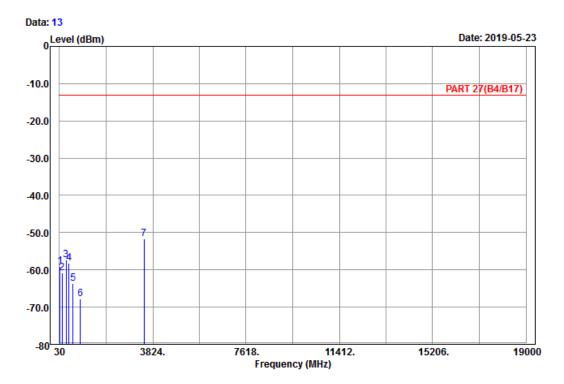
1 pp 3440.00 -52.36 -66.71 14.35 -13.00 -39.36 Peak



Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



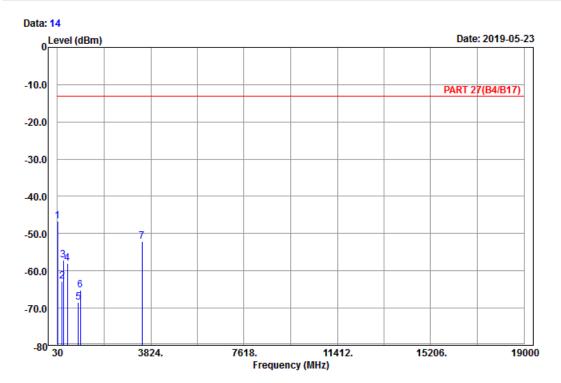
Site : 966 chamber 1

Condition: PART 27(B4/B17) Horizontal Remark : LTE_Band 4_Link_CH20175

			Read		Limit	Over	
	Freq	Level	Level	Factor	Line	Limit	Remark
_	MHz	dBm	dBm	dB	dBm	dB	
1	53 76	-59 05	-11 99	-14.06	-13 00	-46 05	Poak
_							
2	136.65	-60.90	-53.22	-7.68	-13.00	-47.90	Peak
3	296.49	-57.33	-51.40	-5.93	-13.00	-44.33	Peak
4	414.10	-58.30	-55.24	-3.06	-13.00	-45.30	Peak
5	584.90	-63.59	-63.37	-0.22	-13.00	-50.59	Peak
6	876.10	-67.86	-70.06	2.20	-13.00	-54.86	Peak
7 pp	3465.00	-51.63	-65.97	14.34	-13.00	-38.63	Peak







Site : 966 chamber 1

Condition: PART 27(B4/B17) Vertical Remark : LTE_Band 4_Link_CH20175

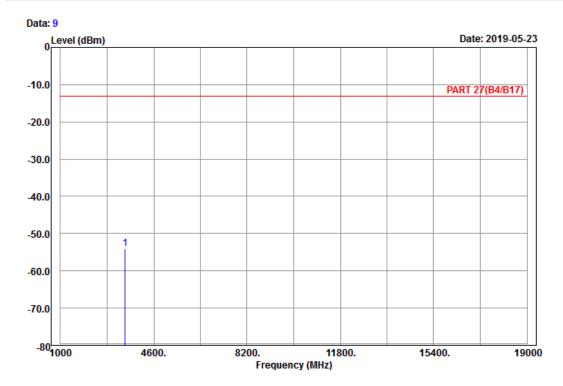
	Freq	Level	Read Level			Over Limit	Remark
_	MHz	dBm	dBm	dB	dBm	dB	
1 pp	34.59	-46.69	-35.59	-11.10	-13.00	-33.69	Peak
2	215.76	-62.75	-56.79	-5.96	-13.00	-49.75	Peak
3	276.78	-57.05	-51.30	-5.75	-13.00	-44.05	Peak
4	431.60	-57.90	-54.46	-3.44	-13.00	-44.90	Peak
5	873.30	-68.53	-70.64	2.11	-13.00	-55.53	Peak
6	958.70	-65.10	-70.23	5.13	-13.00	-52.10	Peak
7	3465.00	-52.03	-66.37	14.34	-13.00	-39.03	Peak



High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B4/B17) Horizontal Remark : LTE_Band 4_Link_CH20300

Tested by: Karl Lee

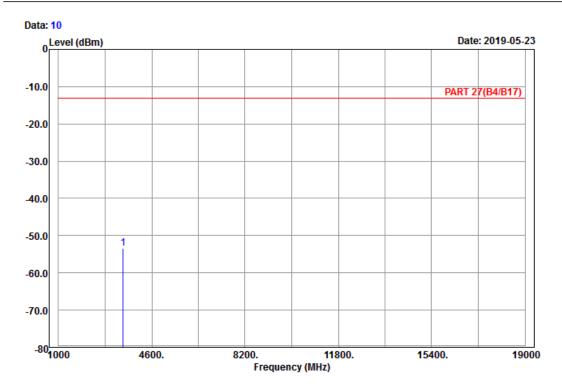
Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

1 pp 3490.00 -53.98 -68.29 14.31 -13.00 -40.98 Peak







Site : 966 chamber 1

Condition: PART 27(B4/B17) Vertical Remark : LTE_Band 4_Link_CH20300

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

1 pp 3490.00 -53.43 -67.74 14.31 -13.00 -40.43 Peak



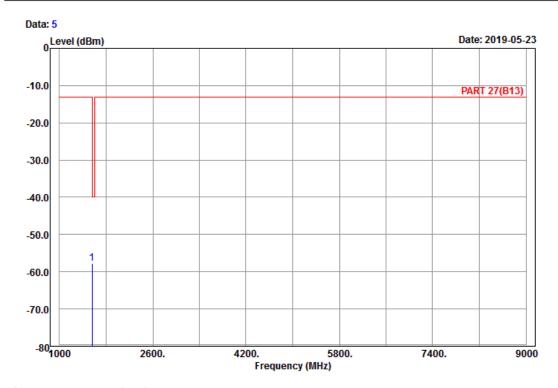
LTE Band 13

Channel Bandwidth: 5 MHz / QPSK

Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B13) Horizontal Remark : LTE_Band 13_Link_CH23205

Tested by: Karl Lee

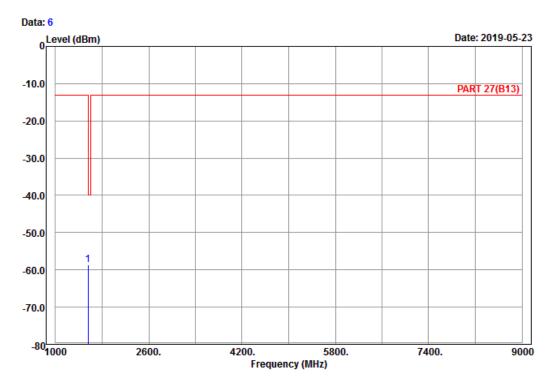
Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

1 pp 1559.00 -57.76 -64.62 6.86 -40.00 -17.76 Peak







Site : 966 chamber 1

Condition: PART 27(B13) Vertical Remark : LTE_Band 13_Link_CH23205

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

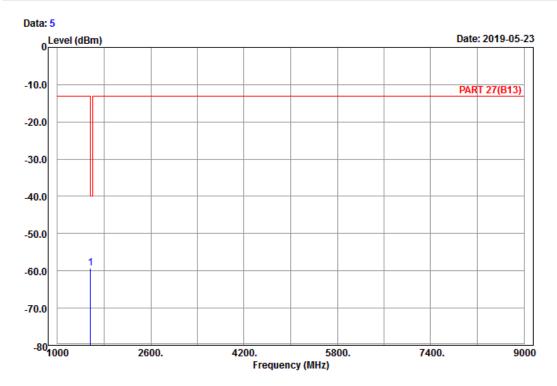
1 pp 1559.00 -58.57 -65.43 6.86 -40.00 -18.57 Peak



Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B13) Horizontal Remark : LTE_Band 13_Link_CH23230

Tested by: Karl Lee

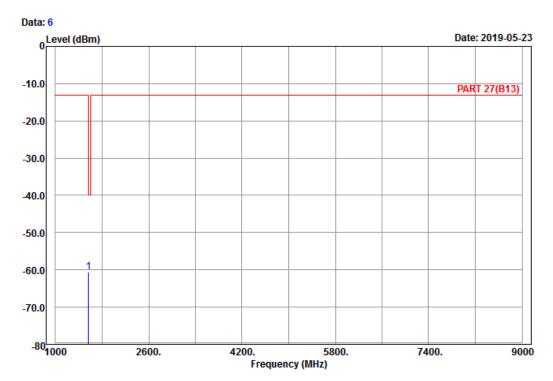
Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

1 pp 1564.00 -59.22 -66.08 6.86 -40.00 -19.22 Peak







Site : 966 chamber 1

Condition: PART 27(B13) Vertical Remark : LTE_Band 13_Link_CH23230

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

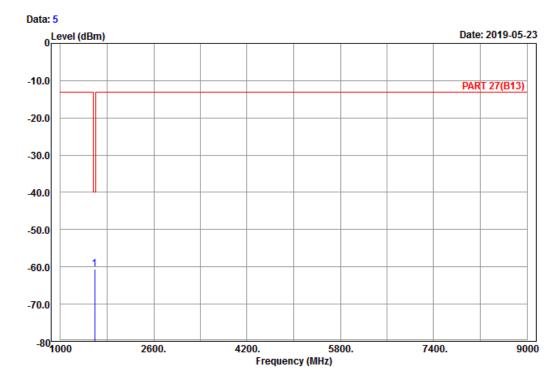
1 pp 1564.00 -60.67 -67.53 6.86 -40.00 -20.67 Peak



High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 chamber 1

Condition: PART 27(B13) Horizontal Remark : LTE_Band 13_Link_CH23255

Tested by: Karl Lee

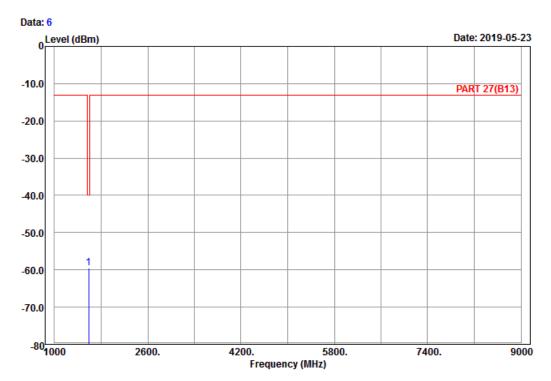
Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

1 pp 1591.00 -60.63 -67.84 7.21 -40.00 -20.63 Peak







Site : 966 chamber 1

Condition: PART 27(B13) Vertical Remark : LTE_Band 13_Link_CH23255

Tested by: Karl Lee

Read Limit Over
Freq Level Level Factor Line Limit Remark

MHz dBm dBm dB dBm dB

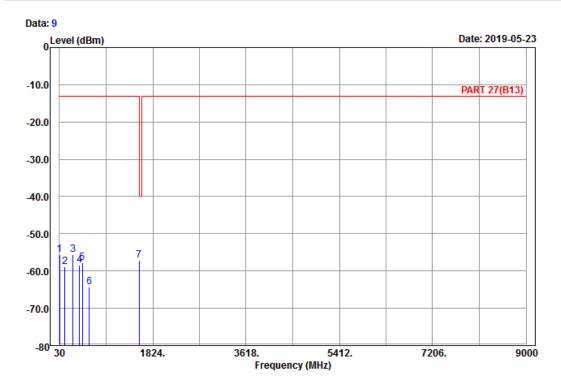
1 pp 1591.00 -59.57 -66.78 7.21 -40.00 -19.57 Peak



Channel Bandwidth: 10 MHz / QPSK Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



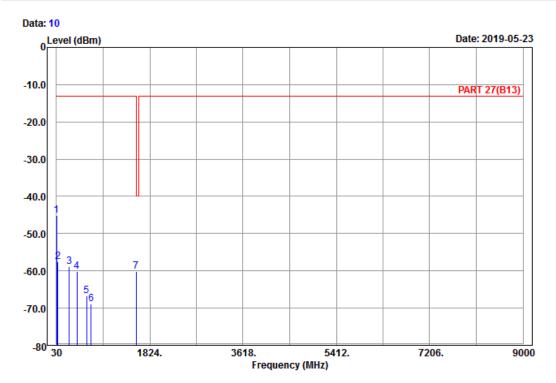
Site : 966 chamber 1

Condition: PART 27(B13) Horizontal Remark : LTE_Band 13_Link_CH23230

	Fred	Level	Read	Factor		Over	Remark	
							KCIIIGI K	
	MHz	dBm	dBm	dB	dBm	dB		
1	30.54	-55.66	-45.01	-10.65	-13.00	-42.66	Peak	
2	135.03	-58.78	-51.11	-7.67	-13.00	-45.78	Peak	
3	293.25	-55.48	-49.58	-5.90	-13.00	-42.48	Peak	
4	414.10	-58.50	-55.44	-3.06	-13.00	-45.50	Peak	
5	468.70	-57.71	-53.34	-4.37	-13.00	-44.71	Peak	
6	603.80	-64.28	-64.66	0.38	-13.00	-51.28	Peak	
7 pp	1564.00	-57.06	-63.92	6.86	-40.00	-17.06	Peak	







Site : 966 chamber 1

Condition: PART 27(B13) Vertical Remark : LTE_Band 13_Link_CH23230

	Freq	Level	Read Level	Factor	Limit Line		Remark
_	MHz	dBm	dBm	dB	dBm	dB	
1	34.05	-45.21	-34.23	-10.98	-13.00	-32.21	Peak
2	54.30	-57.50	-43.44	-14.06	-13.00	-44.50	Peak
3	278.40	-58.78	-53.02	-5.76	-13.00	-45.78	Peak
4	423.90	-60.26	-56.99	-3.27	-13.00	-47.26	Peak
5	612.20	-66.68	-66.97	0.29	-13.00	-53.68	Peak
6	696.20	-68.78	-68.42	-0.36	-13.00	-55.78	Peak
7 pp	1564.00	-60.13	-66.99	6.86	-40.00	-20.13	Peak



5 Pi	ctures of Test Arrangements						
	Please refer to the attached file (Test Setup Photo).						



Appendix - Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

Hsin Chu EMC/RF/Telecom Lab

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The address and road map of all our labs can be found in our web site also.

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