

## Partial FCC Test Report (PART 22)

**Report No.:** RF181115C24

**FCC ID:** XMR201605EC25A

**Test Model:** EC25-A

**Received Date:** Nov. 15, 2018

**Test Date:** Nov. 28, 2018

**Issued Date:** Feb. 27, 2019

**Applicant:** Quectel Wireless Solutions Co., Ltd

**Address:** 7th Floor, Hongye Building, No. 1801 Hongmei Road, Xuhui District,  
Shanghai 200233, China

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

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan  
( R.O.C )

**Test Location:** B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231,  
Taiwan, R.O.C

**FCC Registration /  
Designation Number:** 427177 / TW0011



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## Table of Contents

<b>Release Control Record .....</b>	<b>3</b>
<b>1 Certificate of Conformity .....</b>	<b>4</b>
<b>2 Summary of Test Results.....</b>	<b>5</b>
2.1 Measurement Uncertainty.....	5
2.2 Test Site and Instruments .....	6
<b>3 General Information .....</b>	<b>7</b>
3.1 General Description of EUT .....	7
3.2 Configuration of System under Test.....	8
3.2.1 Description of Support Units .....	8
3.3 Test Mode Applicability and Tested Channel Detail .....	9
3.4 EUT Operating Conditions .....	9
3.5 General Description of Applied Standards.....	9
<b>4 Test Types and Results .....</b>	<b>10</b>
4.1 Output Power Measurement.....	10
4.1.1 Limits of Output Power Measurement .....	10
4.1.2 Test Procedures.....	10
4.1.3 Test Setup.....	11
4.1.4 Test Results .....	12
4.2 Radiated Emission Measurement.....	13
4.2.1 Limits of Radiated Emission Measurement .....	13
4.2.2 Test Procedure .....	13
4.2.3 Deviation from Test Standard .....	13
4.2.4 Test Setup.....	14
4.2.5 Test Results .....	15
<b>5 Pictures of Test Arrangements.....</b>	<b>21</b>
<b>Appendix – Information of the Testing Laboratories .....</b>	<b>22</b>

### Release Control Record

Issue No.	Description	Date Issued
RF181115C24	Original Release	Feb. 27, 2019

## 1 Certificate of Conformity

**Product:** LTE Module  
**Brand:** Quectel  
**Test Model:** EC25-A  
**Sample Status:** Production Unit  
**Applicant:** Quectel Wireless Solutions Co., Ltd  
**Test Date:** Nov. 28, 2018  
**Standards:** FCC Part 22, Subpart H

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 :** Rona Chen, **Date:** Feb. 27, 2019  
Rona Chen / Specialist

**Approved by :** Dylan Chiou, **Date:** Feb. 27, 2019  
Dylan Chiou / Project Engineer

## 2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 22.913 (a)	Effective Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	N/A	Refer to Note
---	Peak to Average Ratio	N/A	Refer to Note
2.1055 22.355	Frequency Stability	N/A	Refer to Note
2.1049	Occupied Bandwidth	N/A	Refer to Note
22.917	Band Edge Measurements	N/A	Refer to Note
2.1051 22.917	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 22.917	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -29.24 dB at 55.92 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.: RTWK160705001-00 for module (Brand: Quectel, Model: EC25-A)
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) (±)
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
	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	BBHA 9120D	9120D-969	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
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(RFC -SMS-100-SMS-12 0+RFC-SMS-100-S MS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC -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
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jun. 28, 2017	Jun. 27, 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.
4. The IC Site Registration No. is 7450I-1.


### 3 General Information

#### 3.1 General Description of EUT

<b>Product</b>	LTE Module	
<b>Brand</b>	Quectel	
<b>Test Model</b>	EC25-A	
<b>Status of EUT</b>	Production Unit	
<b>Power Supply Rating</b>	3.8 Vdc (Host equipment)	
<b>Modulation Type</b>	WCDMA	QPSK
<b>Frequency Range</b>	WCDMA	826.4 ~ 846.6 MHz
<b>Max. ERP Power</b>	WCDMA	86.54 mW
<b>Antenna Type</b>	Dipole Antenna with 1.6 dBi gain	
<b>Accessory Device</b>	N/A	
<b>Data Cable Supplied</b>	N/A	

Note:

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

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

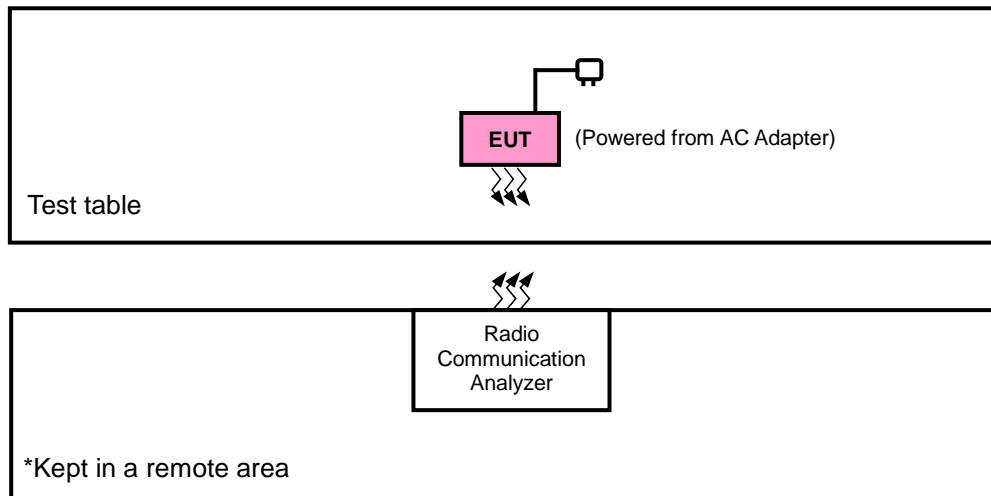
- The End-product contains following accessory devices.

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

- 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. / 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	Radiated Emission
WCDMA	90°	90°

#### WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	4132 to 4233	4132, 4182, 4233	WCDMA
-	Radiated Emission	4132 to 4233	4132, 4182, 4233	WCDMA

#### Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	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 22**

**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

Mobile / Portable station are limited to 7 watts e.r.p.

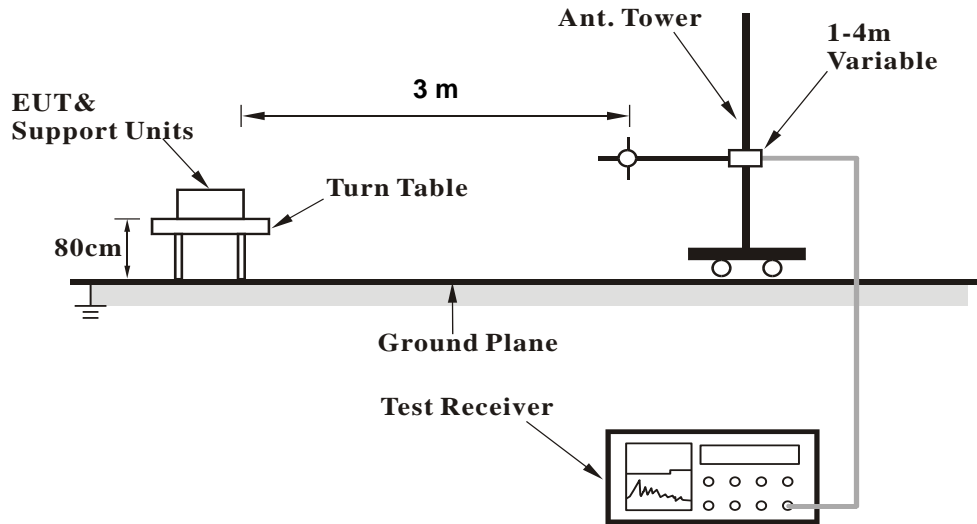
#### 4.1.2 Test Procedures

##### **EIRP / ERP Measurement:**

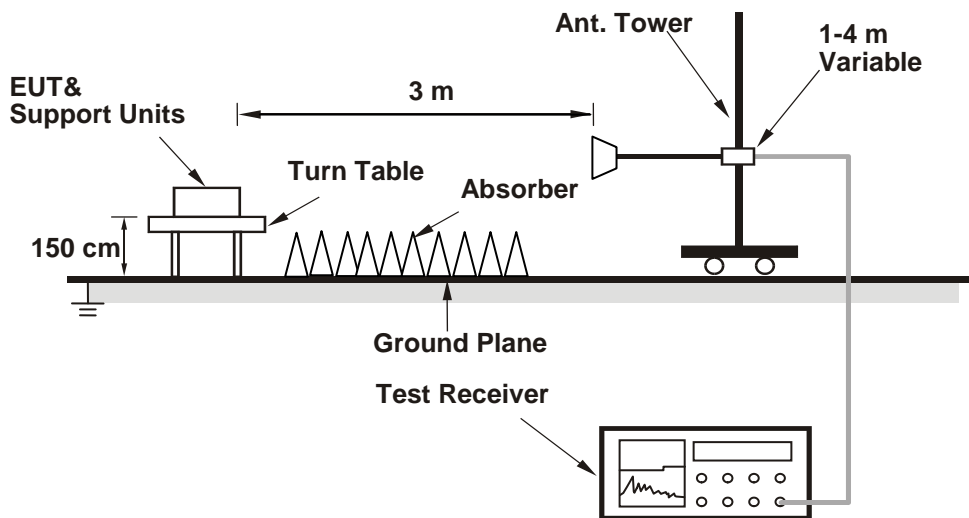
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 5 MHz for WCDMA mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, 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.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$ .

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

## ERP Power (dBm)

WCDMA							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
90°	4132	826.4	-9.72	31.208	19.34	85.86	H
	4182	836.4	-9.85	31.3	19.30	85.11	
	4233	846.6	-9.70	31.222	19.37	<b>86.54</b>	
	4132	826.4	-15.02	31.504	14.33	27.13	V
	4182	836.4	-14.66	31.117	14.31	26.96	
	4233	846.6	-15.41	31.922	14.36	27.30	

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

## 4.2 Radiated Emission Measurement

### 4.2.1 Limits of Radiated Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit is equal to -13 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.

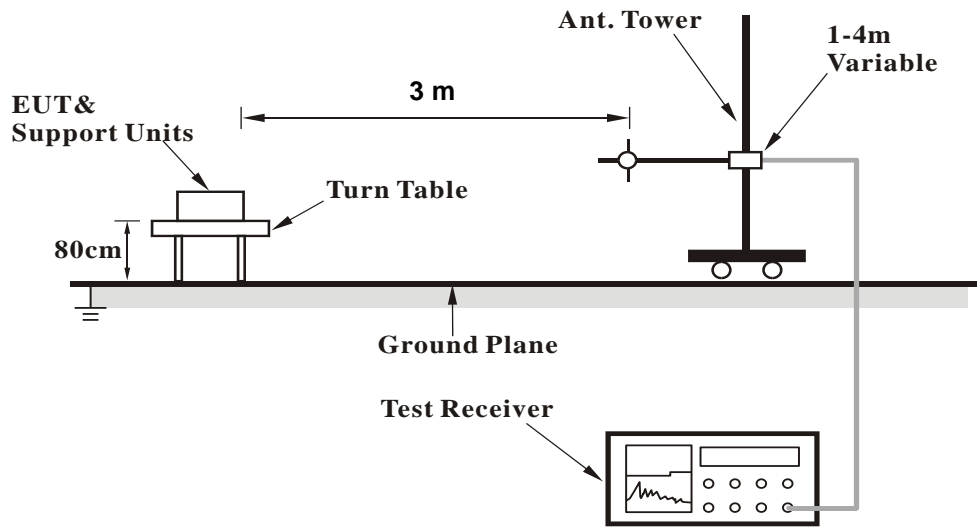
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

### 4.2.3 Deviation from Test Standard

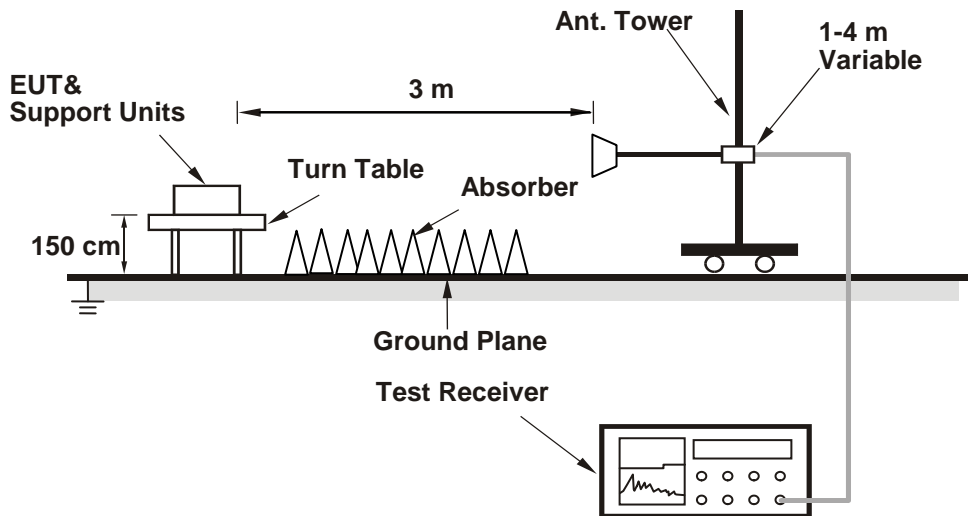
No deviation.

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

WCDMA:  
Low Channel

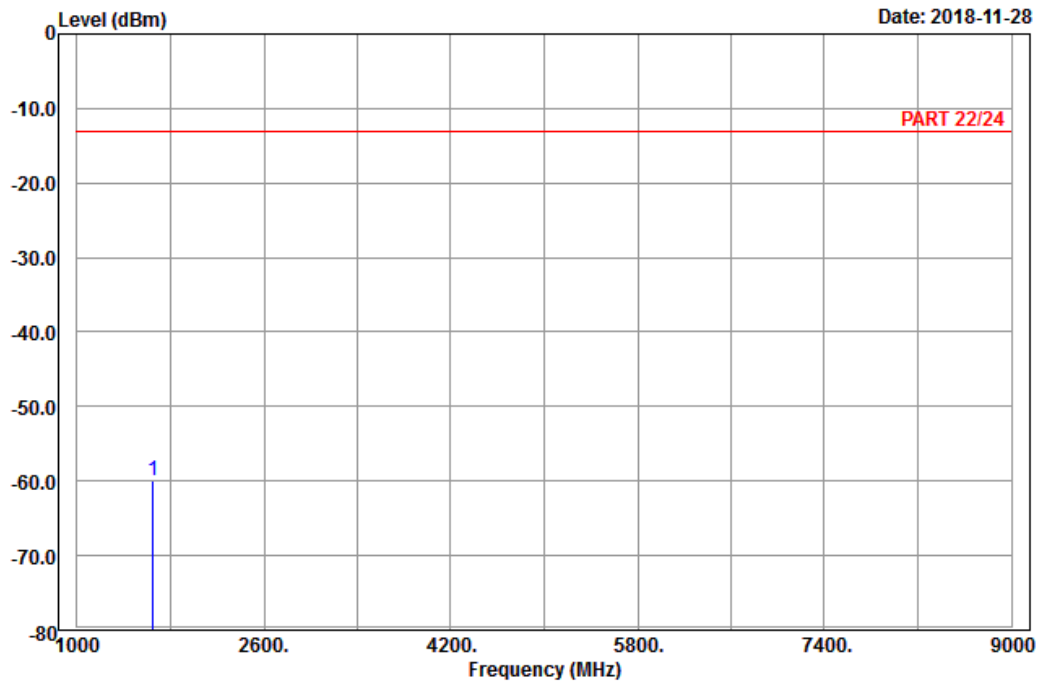


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Data: 5

Date: 2018-11-28



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : Band V\_Link\_CH4132  
Tested by: Karl Lee

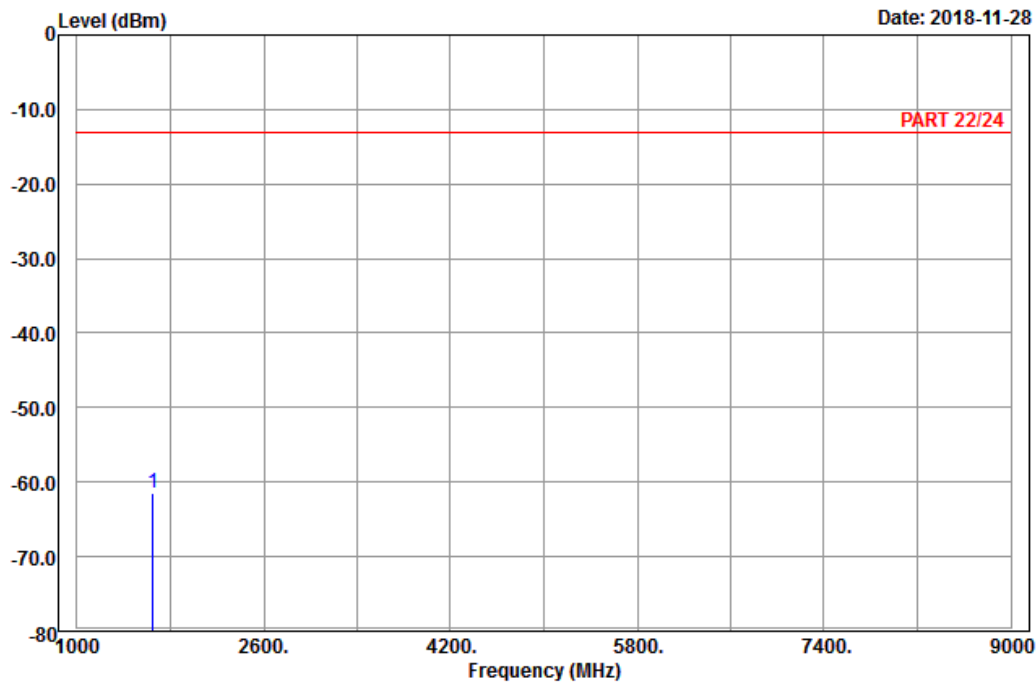
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1652.80	-59.98	-67.71	-13.00	-46.98	7.73	Peak



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Data: 6

Date: 2018-11-28



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : Band V\_Link\_CH4132  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1652.80	-61.47	-69.20	-13.00	-48.47	7.73	Peak



Middle Channel

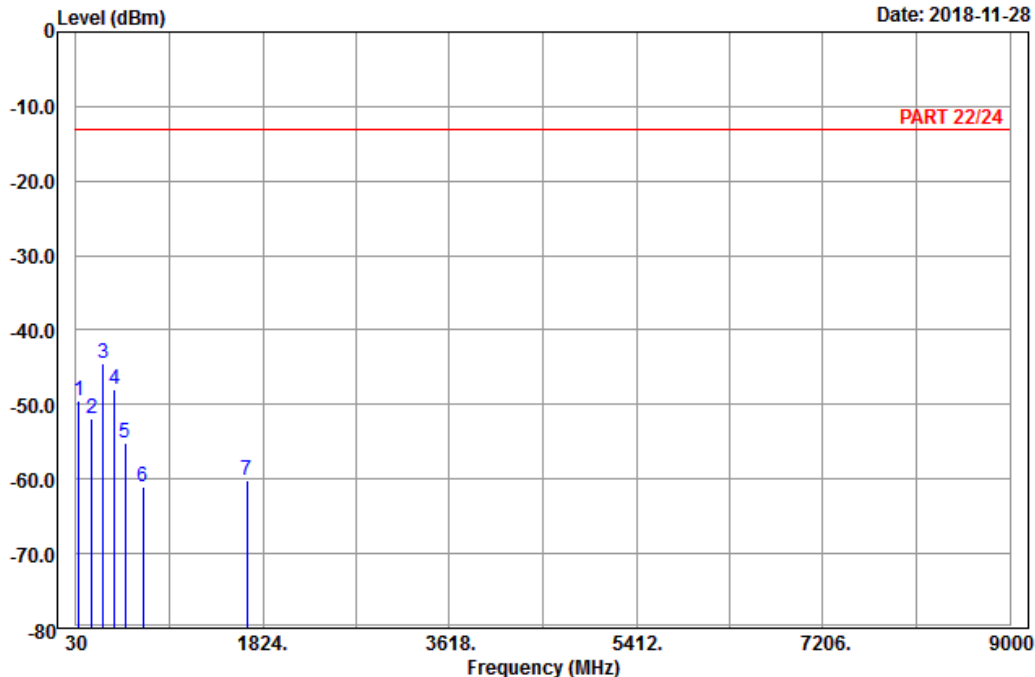


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Data: 9

Date: 2018-11-28



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : Band V\_Link\_CH4182  
 Tested by: Karl Lee

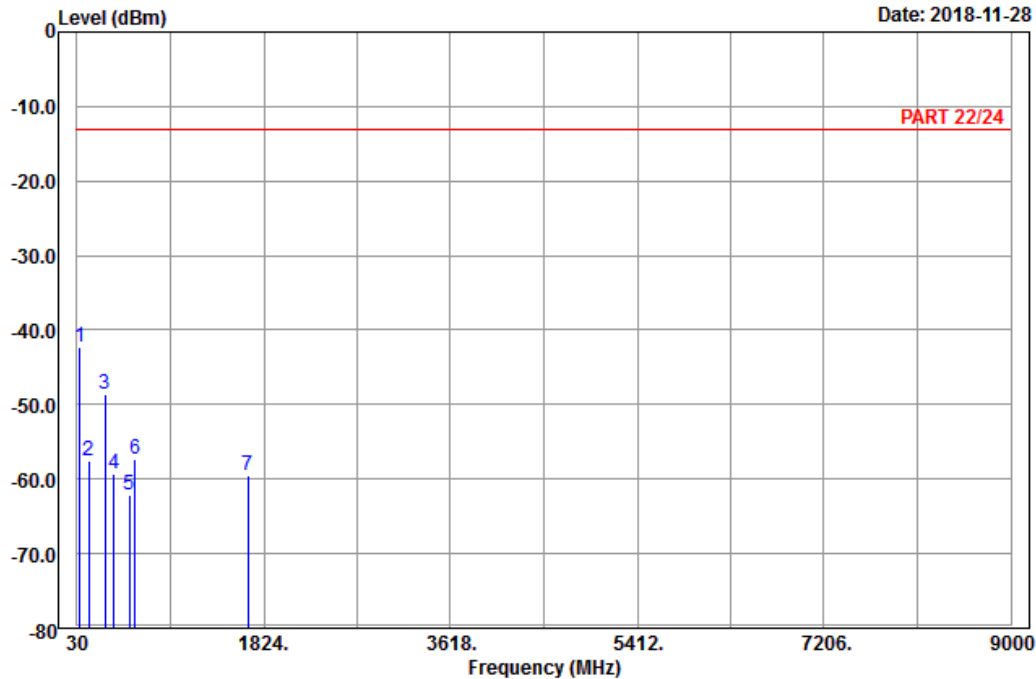
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	57.81	-49.41	-35.35	-13.00	-36.41	-14.06	Peak
2	178.23	-51.98	-46.20	-13.00	-38.98	-5.78	Peak
3 pp	293.25	-44.57	-38.67	-13.00	-31.57	-5.90	Peak
4	403.60	-47.88	-45.05	-13.00	-34.88	-2.83	Peak
5	500.20	-55.21	-49.93	-13.00	-42.21	-5.28	Peak
6	673.10	-61.12	-60.87	-13.00	-48.12	-0.25	Peak
7	1672.80	-60.08	-67.99	-13.00	-47.08	7.91	Peak



A D T

Data: 10

Date: 2018-11-28



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : Band V\_Link\_CH4182  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	55.92	-42.24	-28.18	-13.00	-29.24	-14.06	Peak
2	142.59	-57.46	-49.70	-13.00	-44.46	-7.76	Peak
3	295.41	-48.54	-42.62	-13.00	-35.54	-5.92	Peak
4	382.60	-59.29	-55.67	-13.00	-46.29	-3.62	Peak
5	529.60	-62.11	-58.96	-13.00	-49.11	-3.15	Peak
6	586.30	-57.42	-57.28	-13.00	-44.42	-0.14	Peak
7	1672.80	-59.41	-67.32	-13.00	-46.41	7.91	Peak

High Channel

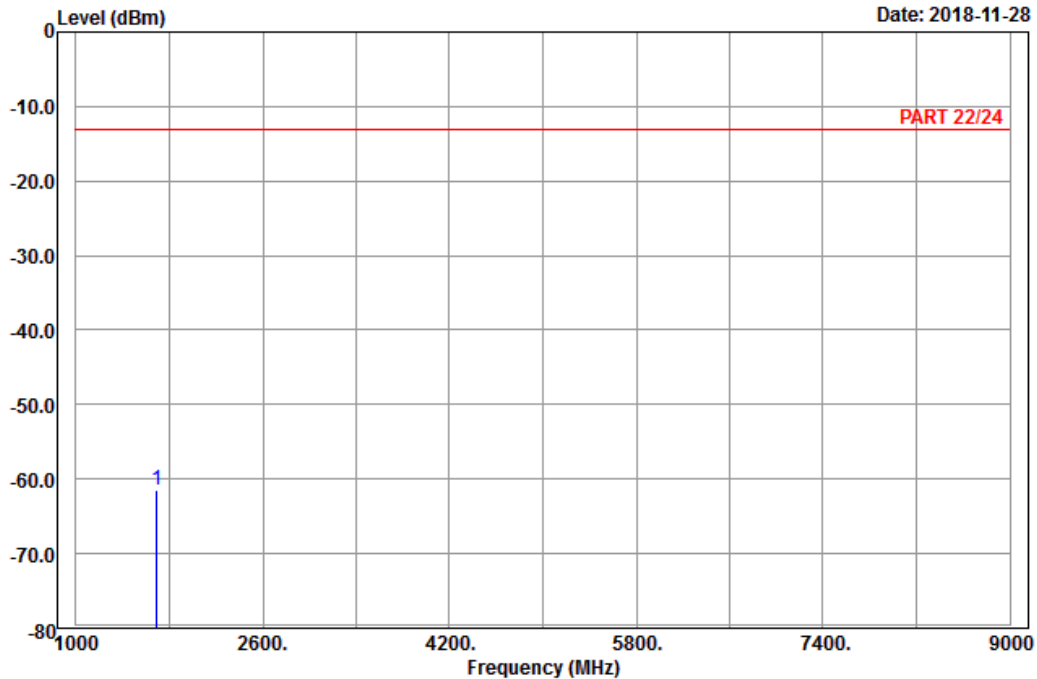


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A D T

Data: 5

Date: 2018-11-28



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : Band V\_Link\_CH4233  
 Tested by: Karl Lee

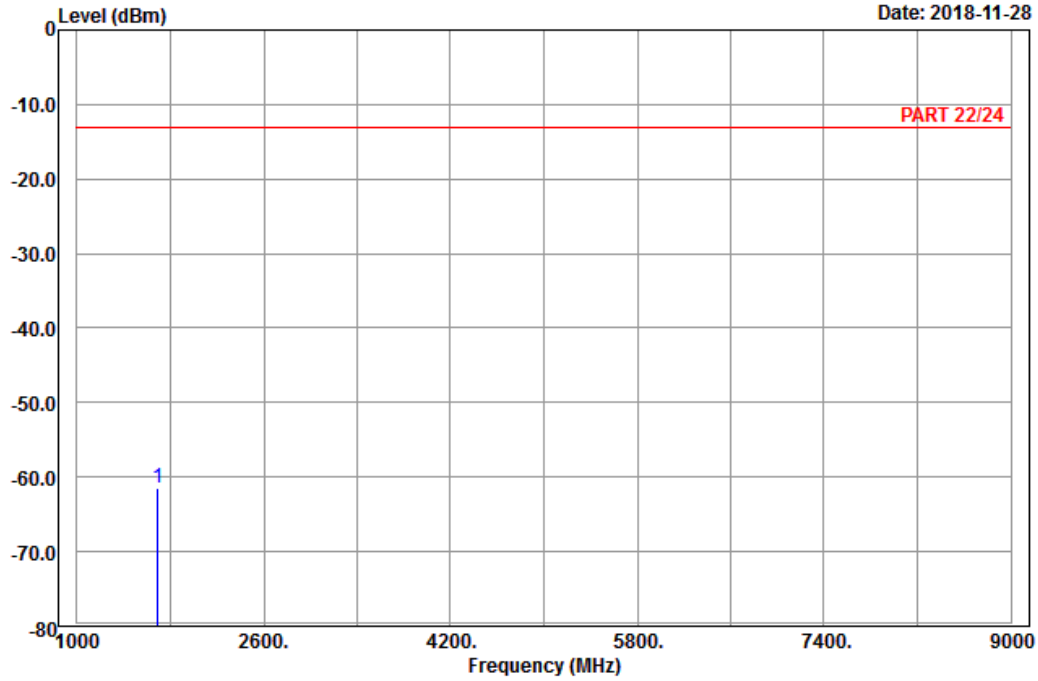
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1693.20	-61.51	-69.65	-13.00	-48.51	8.14	Peak



A D T

Data: 6

Date: 2018-11-28



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : Band V\_Link\_CH4233  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1693.20	-61.58	-69.72	-13.00	-48.58	8.14	Peak

## 5 Pictures 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.

If you have any comments, please feel free to contact us at the following:

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Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

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Fax: 886-3-6668323

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**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

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