Partial FCC Test Report

(PART 27)

Report No.:	RF170822C16D-2
FCC ID:	ZMOL850GL
Test Model:	L850-GL
Received Date:	Apr. 18, 2018
Test Date:	May 25, 2018 ~ May 27, 2018
Issued Date:	Jun. 27, 2018
Applicant:	Fibocom Wireless Inc.
Address:	5/F, Tower A, Technology Building II, 1057#Nanhai Blvd, Shenzhen 518067, 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:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil, Kwei Shan Dist., Taoyuan City 33383, Taiwan (R.O.C)
FCC Registration / Designation Number:	788550 / TW0003

Table of Contents

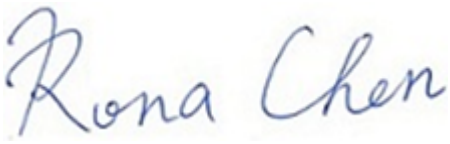
Release Control Record

Issue No.	Description	Date Issued
RF170822C16D-2	Original Release	Jun. 27, 2018

1 Certificate of Conformity

Product:	LTE module
Brand:	Fibocom
Test Model:	L850-GL
Sample Status:	Production Unit
Applicant:	Fibocom Wireless Inc.
Test Date:	May 25, 2018 ~ May 27, 2018
Standards:	FCC Part 27, Subpart C, M

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. 27, 2018

Rona Chen / Specialist

Approved by :  , **Date:** Jun. 27, 2018

Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(h)	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
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
2.1051 27.53(l)	Out-of-Band Emissions Measurements	N/A	Refer to Note
2.1051 27.53(m)	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 27.53(m)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -4.30 dB at 7779.00 MHz.

Note:

This report is a partial report. Therefore, only test item of Effective Isotropic Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to BV CPS report no.: RF170106C02-2 for module (Brand: Fibocom, Model: L850-GL)

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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 16, 2018	Mar. 15, 2019
Spectrum Analyzer Agilent	N9010A	MY52220314	Nov. 24, 2017	Nov. 23, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
Double Ridge Guide Horn Antenna EMCO	3115	5619	Nov. 30, 2017	Nov. 29, 2018
BILOG Antenna SCHWARZBECK	VULB 9168	9168-153	Dec. 06, 2017	Dec. 05, 2018
Fixed Attenuator Mini-Circuits	BW-N10W5+	NA	Jul. 07, 2017	Jul. 06, 2018
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 24, 2017	Oct. 23, 2018
Preamplifier EMCI	EMC 012645	980115	Oct. 20, 2017	Oct. 19, 2018
Preamplifier EMCI	EMC 184045	980116	Oct. 20, 2017	Oct. 19, 2018
Preamplifier EMCI	EMC 330H	980112	Oct. 13, 2017	Oct. 12, 2018
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-8000&3000	140811+170717	Oct. 20, 2017	Oct. 19, 2018
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000(140807)	Oct. 20, 2017	Oct. 19, 2018
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 20, 2017	Oct. 19, 2018
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer Anritsu	MT8820C	6201010284	Dec. 28, 2017	Dec. 27, 2018
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 08, 2017	Sep. 07, 2018
DC Power Supply Topward	33010D	807748	Oct. 25, 2016	Oct. 24, 2018
Digital Multimeter Fluke	87-III	70360742	Jun. 30, 2017	Jun. 29, 2018
HORN Antenna Schwarzbeck	BBHA 9120D	9120D-969	Dec. 12, 2017	Dec. 11, 2018

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 HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The IC Site Registration No. is IC7450F-10.

3 General Information

3.1 General Description of EUT

Product	LTE module	
Brand	Fibocom	
Test Model	L850-GL	
Status of EUT	Production Unit	
Power Supply Rating	5.0 Vdc (Host equipment)	
Modulation Type	QPSK, 16QAM	
Frequency Range	LTE Band 7 (Channel Bandwidth: 5 MHz)	2502.5 ~ 2567.5 MHz
	LTE Band 7 (Channel Bandwidth: 10 MHz)	2505 ~ 2565 MHz
	LTE Band 7 (Channel Bandwidth: 15 MHz)	2507.5 ~ 2562.5 MHz
	LTE Band 7 (Channel Bandwidth: 20 MHz)	2510 ~ 2560 MHz
	LTE Band 41 (Channel Bandwidth: 5 MHz)	2498.5 ~ 2687.5 MHz
	LTE Band 41 (Channel Bandwidth: 10 MHz)	2501.0 ~ 2685.0 MHz
	LTE Band 41 (Channel Bandwidth: 15 MHz)	2503.5 ~ 2682.5 MHz
	LTE Band 41 (Channel Bandwidth: 20 MHz)	2506.0 ~ 2680.0 MHz
Max. EIRP Power	LTE Band 7 (Channel Bandwidth: 5 MHz)	66.85 mW
	LTE Band 7 (Channel Bandwidth: 10 MHz)	70.31 mW
	LTE Band 7 (Channel Bandwidth: 15 MHz)	73.96 mW
	LTE Band 7 (Channel Bandwidth: 20 MHz)	76.74 mW
	LTE Band 41 (Channel Bandwidth: 5 MHz)	73.62 mW
	LTE Band 41 (Channel Bandwidth: 10 MHz)	76.74 mW
	LTE Band 41 (Channel Bandwidth: 15 MHz)	78.34 mW
	LTE Band 41 (Channel Bandwidth: 20 MHz)	81.28 mW
Antenna Type	Refer to Note as below	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

1. The EUT is authorized for use in specific End-product. Please refer to below table for more details.

Product	Brand	Model
Convertible PC	Lenovo	TP00078C

2. The End-product contains following accessory devices.

Product	Brand	Model	Description
Adapter	Lenovo	ADLX65NDC3A	I/P: 100-240 Vac, 50-60 Hz, 1.5 A O/P: 20 Vdc, 3.25 A
Battery	Lenovo	SB10K97589	15.2 Vdc, 3260 mAh

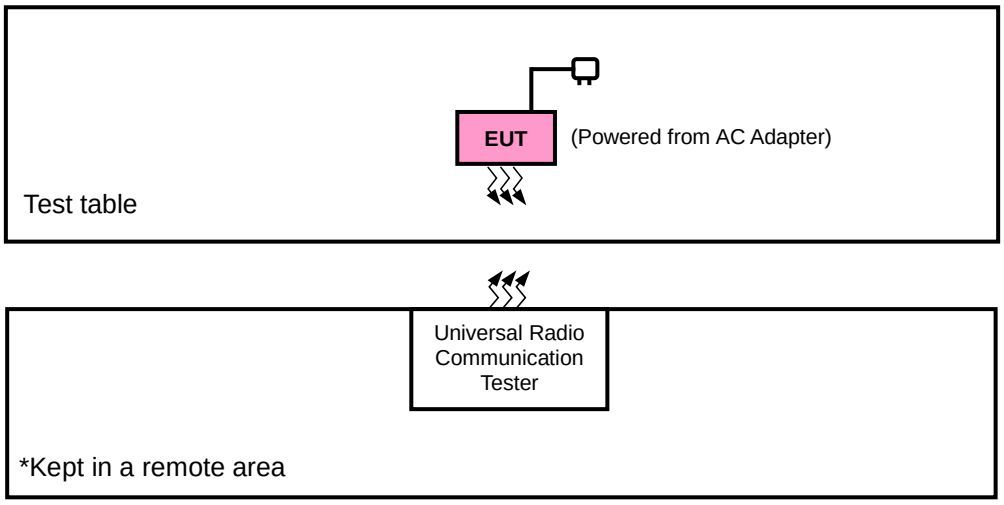
3. The information of antenna of End-product is listed as below.

Antenna Type	Manufacturer	Part No.	Antenna Gain (dBi)
PIFA	HUA CHENG TECHNOLOGY Co., Ltd	Main Antenna: DC33001WM60 Aux. Antenna: DC33001WM10 (Rx only)	-3.19

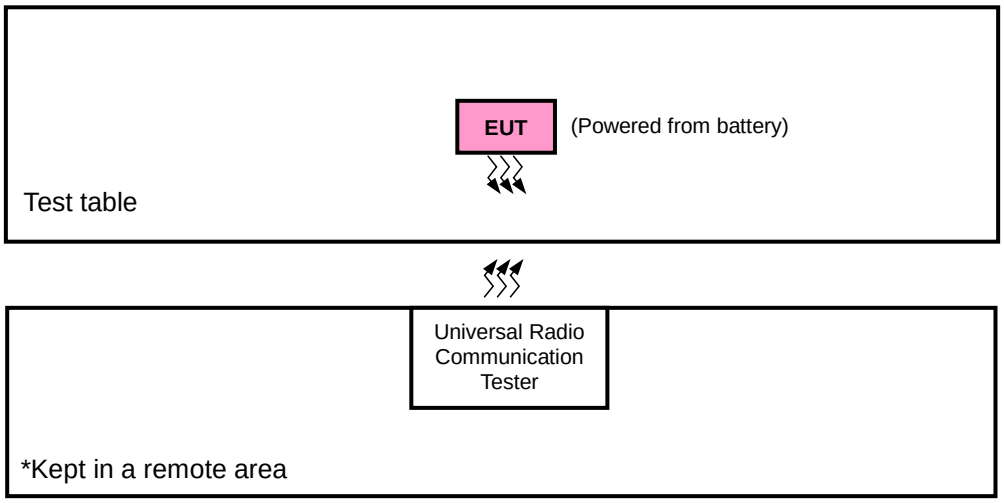
4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.I.R.P. 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. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Communications Tester-Wireless	Agilent	8960 Series 10	MY53201073	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items 1 acted as communication partners to transfer data.

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, XYZ axis & NB Mode, 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	EIRP	Radiated Emission
LTE Band 7	NB Mode	NB Mode
LTE Band 41	NB Mode	NB Mode

LTE Band 7

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM	1 RB / 37 RB Offset
		20850 to 21350	20850, 21100 21350	20 MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Radiated Emission	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK	1 RB / 12 RB Offset
		20850 to 21350	20850, 21100 21350	20 MHz	QPSK	1 RB / 50 RB Offset

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

LTE Band 41

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		39700 to 41540	39700, 40620, 41540	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		39725 to 41515	39725, 40620, 41515	15 MHz	QPSK, 16QAM	1 RB / 37 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Radiated Emission	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK	1 RB / 12 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK	1 RB / 50 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
EIRP	25 deg. C, 65 % RH	5 Vdc	Getaz Yang
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang Jisysong Wang

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

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “User stations are limited to 2 watts” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

4.1.2 Test Procedures

EIRP Measurement:

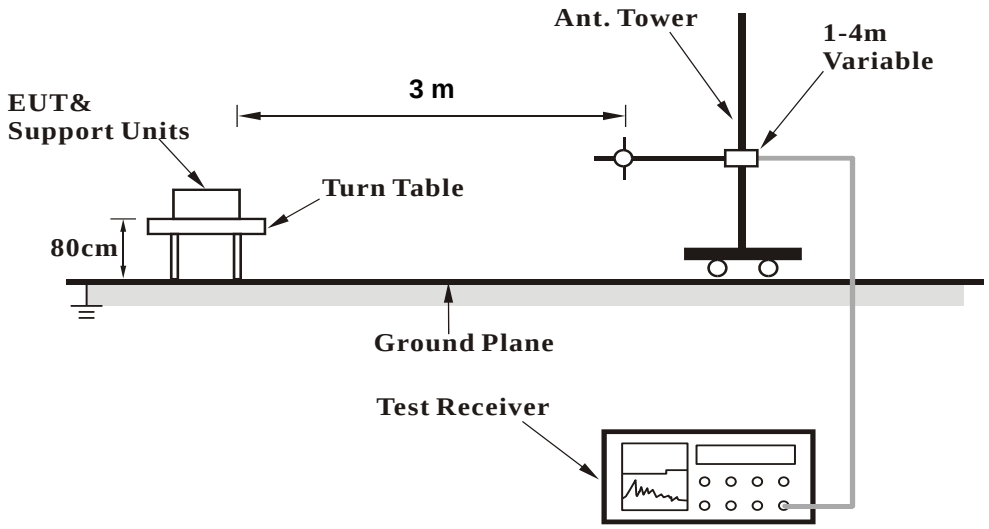
a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 10 MHz for LTE mode.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, 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.

Conducted Power Measurement:

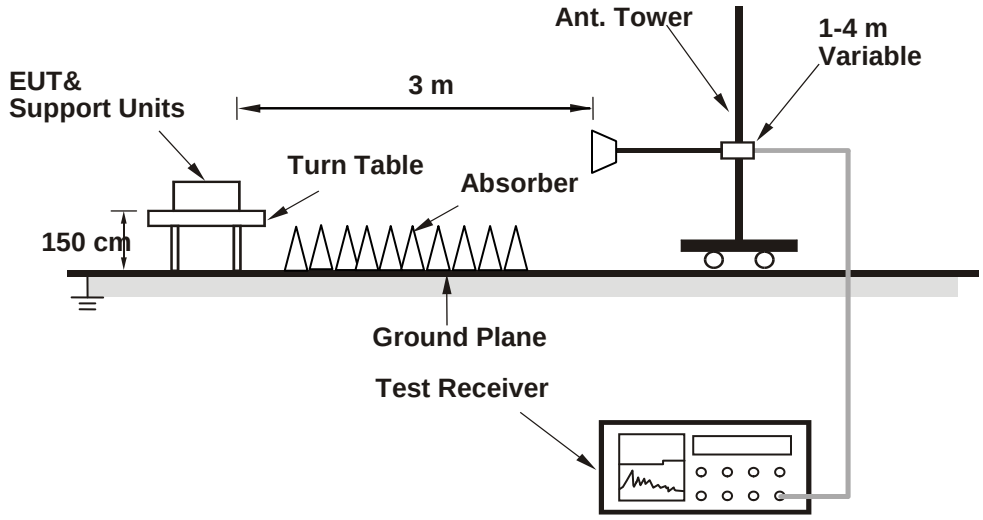
a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

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).

Conducted Power Measurement:

4.1.4 Test Results

EIRP Power (dBm)

LTE Band 7							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
NB Mode	20775	2502.5	-20.45	38.52	18.07	64.09	H
	21100	2535.0	-20.11	38.36	18.25	**66.85**	
	21425	2567.5	-20.35	38.58	18.23	66.57	
	20775	2502.5	-24.90	38.92	14.02	25.23	V
	21100	2535.0	-25.11	39.26	14.15	26.00	
	21425	2567.5	-25.35	39.22	13.87	24.38	
Channel Bandwidth: 5 MHz / 16QAM							
NB Mode	20775	2502.5	-21.37	38.52	17.15	51.88	H
	21100	2535.0	-21.08	38.36	17.28	53.46	
	21425	2567.5	-21.52	38.58	17.06	50.82	
	20775	2502.5	-26.08	38.92	12.84	19.23	V
	21100	2535.0	-26.22	39.26	13.04	20.14	
	21425	2567.5	-26.69	39.22	12.53	17.91	

LTE Band 7							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
NB Mode	20800	2505.0	-20.18	38.65	18.47	**70.31**	H
	21100	2535.0	-19.90	38.36	18.46	70.15	
	21400	2565.0	-20.28	38.49	18.21	66.22	
	20800	2505.0	-24.65	38.84	14.19	26.24	V
	21100	2535.0	-24.99	39.26	14.27	26.73	
	21400	2565.0	-25.18	39.10	13.92	24.66	
Channel Bandwidth: 10 MHz / 16QAM							
NB Mode	20800	2505.0	-21.26	38.65	17.39	54.83	H
	21100	2535.0	-20.93	38.36	17.43	55.34	
	21400	2565.0	-21.37	38.49	17.12	51.52	
	20800	2505.0	-25.74	38.84	13.10	20.42	V
	21100	2535.0	-26.08	39.26	13.18	20.80	
	21400	2565.0	-26.19	39.10	12.91	19.54	

LTE Band 7							
Channel Bandwidth: 15 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
NB Mode	20825	2507.5	-19.86	38.52	18.66	73.45	H
	21100	2535.0	-19.67	38.36	18.69	**73.96**	
	21375	2562.5	-20.16	38.58	18.42	69.50	
	20825	2507.5	-24.60	38.92	14.32	27.04	V
	21100	2535.0	-24.87	39.26	14.39	27.48	
	21375	2562.5	-25.16	39.22	14.06	25.47	
Channel Bandwidth: 15 MHz / 16QAM							
NB Mode	20825	2507.5	-20.89	38.52	17.63	57.94	H
	21100	2535.0	-20.69	38.36	17.67	58.48	
	21375	2562.5	-21.23	38.58	17.35	54.33	
	20825	2507.5	-25.68	38.92	13.24	21.09	V
	21100	2535.0	-25.93	39.26	13.33	21.53	
	21375	2562.5	-26.20	39.22	13.02	20.04	

LTE Band 7							
Channel Bandwidth: 20 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
NB Mode	20850.0	2510.0	-19.76	38.52	18.76	75.16	H
	21100.0	2535.0	-19.51	38.36	18.85	**76.74**	
	21350.0	2560.0	-20.02	38.58	18.56	71.78	
	20850.0	2510.0	-21.55	38.92	17.37	54.58	V
	21100.0	2535.0	-24.77	39.26	14.49	28.12	
	21350.0	2560.0	-25.04	39.22	14.18	26.18	
Channel Bandwidth: 20 MHz / 16QAM							
NB Mode	20850.0	2510.0	-20.83	38.52	17.69	58.75	H
	21100.0	2535.0	-20.57	38.36	17.79	60.12	
	21350.0	2560.0	-21.09	38.58	17.49	56.10	
	20850.0	2510.0	-25.59	38.92	13.33	21.53	V
	21100.0	2535.0	-25.80	39.26	13.46	22.18	
	21350.0	2560.0	-26.06	39.22	13.16	20.70	

LTE Band 41							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
NB Mode	39675	2498.5	-20.45	38.99	18.54	71.45	H
	40620	2593.0	-19.50	38.17	18.67	**73.62**	
	41565	2687.5	-19.96	38.55	18.59	72.28	
	39675	2498.5	-23.94	39.27	15.33	34.12	V
	40620	2593.0	-23.41	38.68	15.27	33.65	
	41565	2687.5	-23.34	38.55	15.21	33.19	
Channel Bandwidth: 5 MHz / 16QAM							
NB Mode	39675	2498.5	-21.41	38.99	17.58	57.28	H
	40620	2593.0	-20.54	38.17	17.63	57.94	
	41565	2687.5	-21.07	38.55	17.48	55.98	
	39675	2498.5	-24.91	39.27	14.36	27.29	V
	40620	2593.0	-24.39	38.68	14.29	26.85	
	41565	2687.5	-24.34	38.55	14.21	26.36	

LTE Band 41							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
NB Mode	39700	2501.0	-20.26	38.98	18.72	74.47	H
	40620	2593.0	-19.32	38.17	18.85	**76.74**	
	41540	2685.0	-19.75	38.45	18.70	74.13	
	39700	2501.0	-23.63	39.04	15.41	34.75	V
	40620	2593.0	-23.29	38.68	15.39	34.59	
	41540	2685.0	-23.24	38.60	15.36	34.36	
Channel Bandwidth: 10 MHz / 16QAM							
NB Mode	39700	2501.0	-21.28	38.98	17.70	58.88	H
	40620	2593.0	-20.41	38.17	17.76	59.70	
	41540	2685.0	-20.82	38.45	17.63	57.97	
	39700	2501.0	-24.64	39.04	14.40	27.54	V
	40620	2593.0	-24.35	38.68	14.33	27.10	
	41540	2685.0	-24.31	38.60	14.29	26.85	

LTE Band 41							
Channel Bandwidth: 15 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
NB Mode	39725	2503.5	-20.23	39.09	18.86	76.91	H
	40620	2593.0	-19.23	38.17	18.94	**78.34**	
	41515	2682.5	-19.67	38.52	18.85	76.74	
	39725	2503.5	-23.50	39.04	15.54	35.81	V
	40620	2593.0	-23.03	38.68	15.65	36.73	
	41515	2682.5	-23.06	38.66	15.60	36.31	
Channel Bandwidth: 15 MHz / 16QAM							
NB Mode	39725	2503.5	-21.24	39.09	17.85	60.95	H
	40620	2593.0	-20.30	38.17	17.87	61.24	
	41515	2682.5	-20.70	38.52	17.82	60.53	
	39725	2503.5	-24.55	39.04	14.49	28.12	V
	40620	2593.0	-24.07	38.68	14.61	28.91	
	41515	2682.5	-24.07	38.66	14.59	28.77	

LTE Band 41							
Channel Bandwidth: 20 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
NB Mode	39750	2506.0	-20.28	39.26	18.98	79.07	H
	40620	2593.0	-19.07	38.17	19.10	**81.28**	
	41490	2680.0	-19.74	38.71	18.97	78.89	
	39750	2506.0	-23.65	39.33	15.68	36.98	V
	40620	2593.0	-22.92	38.68	15.76	37.67	
	41490	2680.0	-23.04	38.76	15.72	37.33	
Channel Bandwidth: 20 MHz / 16QAM							
NB Mode	39750	2506.0	-21.31	39.26	17.95	62.37	H
	40620	2593.0	-20.14	38.17	18.03	63.53	
	41490	2680.0	-20.82	38.71	17.89	61.52	
	39750	2506.0	-24.69	39.33	14.64	29.11	V
	40620	2593.0	-23.99	38.68	14.69	29.44	
	41490	2680.0	-24.13	38.76	14.63	29.04	

4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 55 +10 log10(P) dB. The limit of emission is equal to -25 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.P.R power - 2.15 dB.

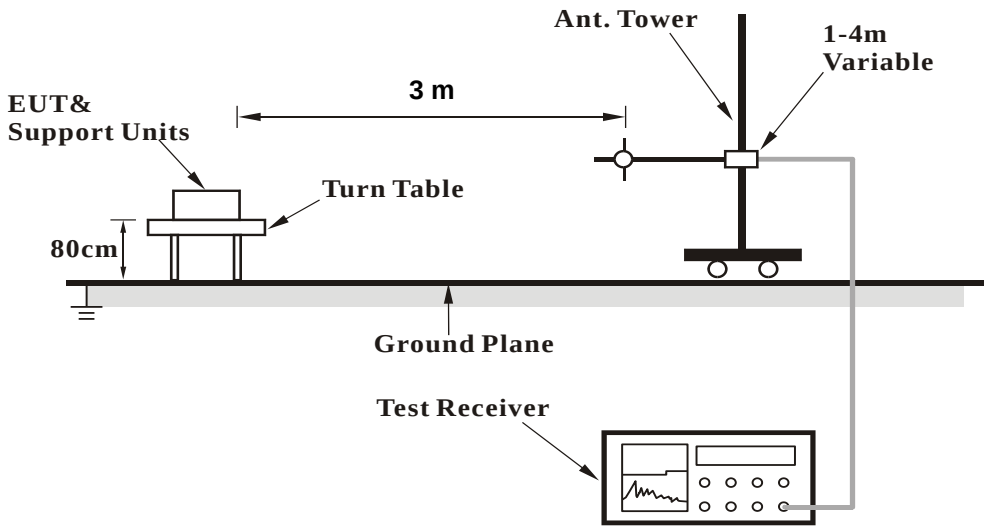
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.2.3 Deviation from Test Standard

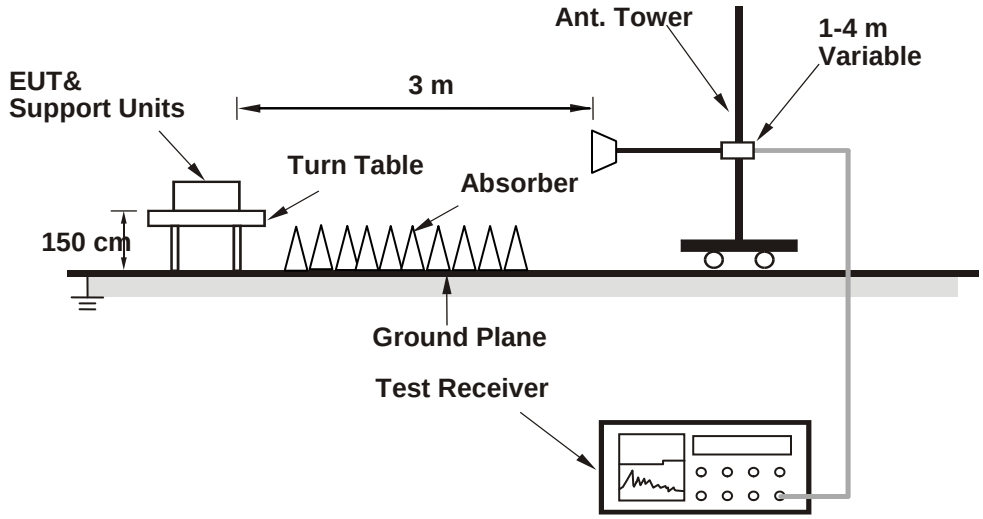
No deviation.

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).

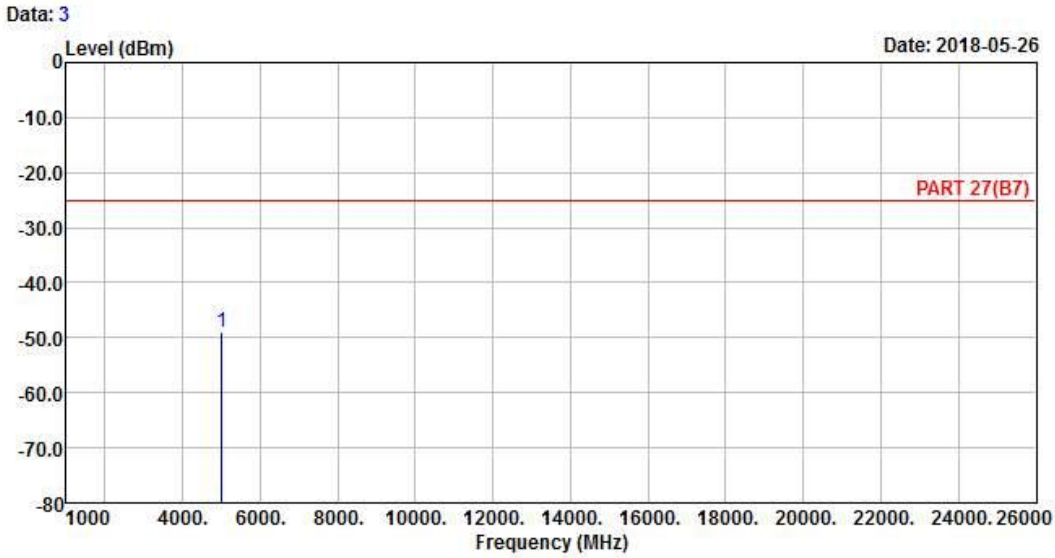
4.2.5 Test Results

LTE Band 7

Channel Bandwidth: 5 MHz / QPSK

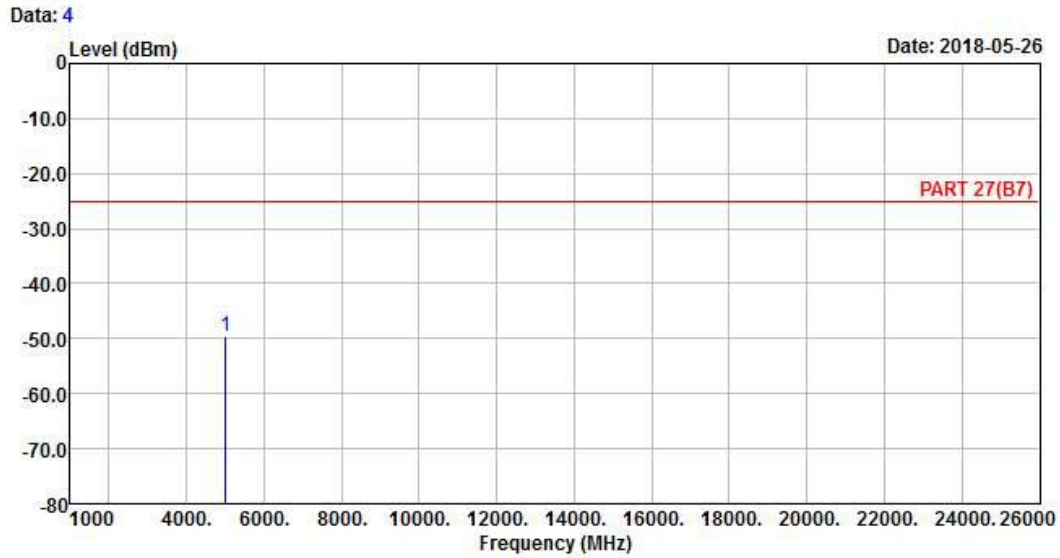
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_5M Link_L-CH
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5005.00	-49.05	-46.59	-25.00	-24.05	-2.46	Peak

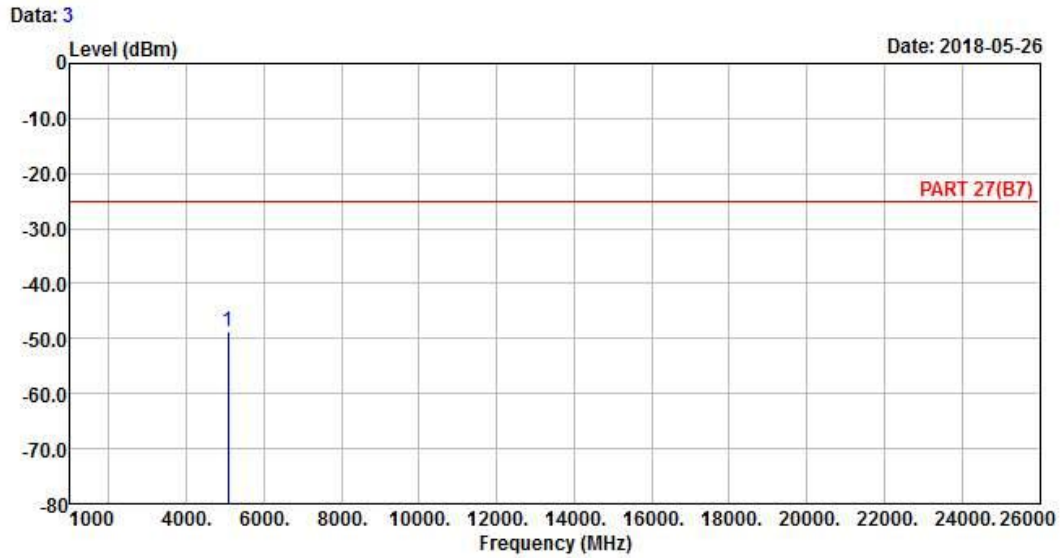


Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_5M Link_L-CH
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5005.00	-49.73	-47.27	-25.00	-24.73	-2.46	Peak

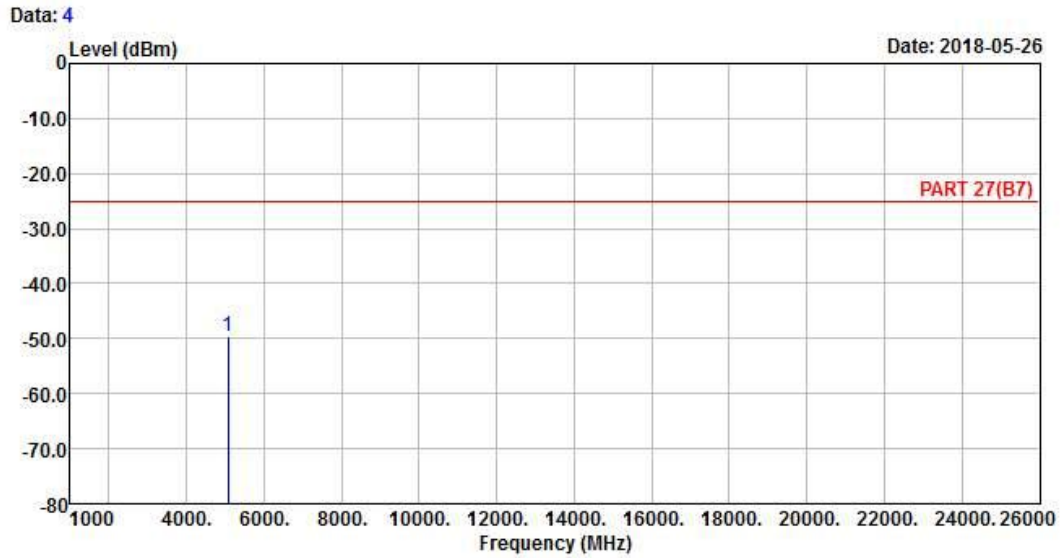
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_5M Link_M-CH
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5070.00	-48.66	-46.79	-25.00	-23.66	-1.87	Peak

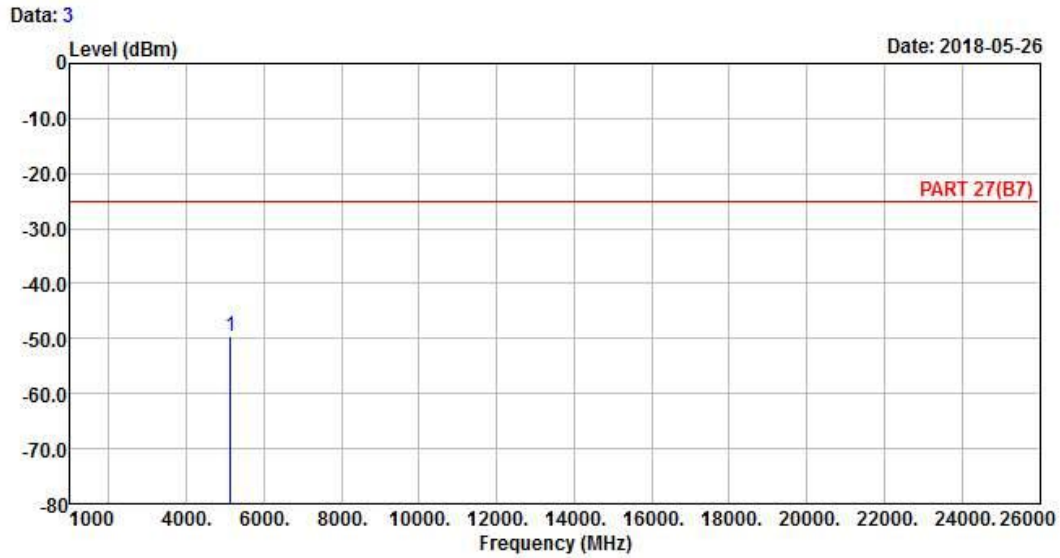


Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_5M Link_M-CH
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5070.00	-49.50	-47.63	-25.00	-24.50	-1.87	Peak

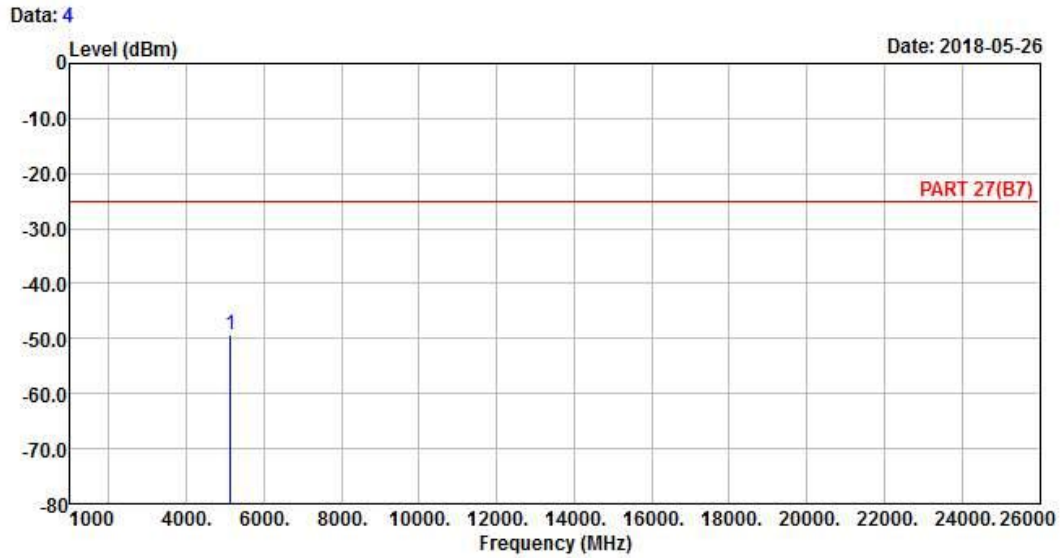
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_5M Link_H-CH
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5135.00	-49.65	-47.91	-25.00	-24.65	-1.74	Peak



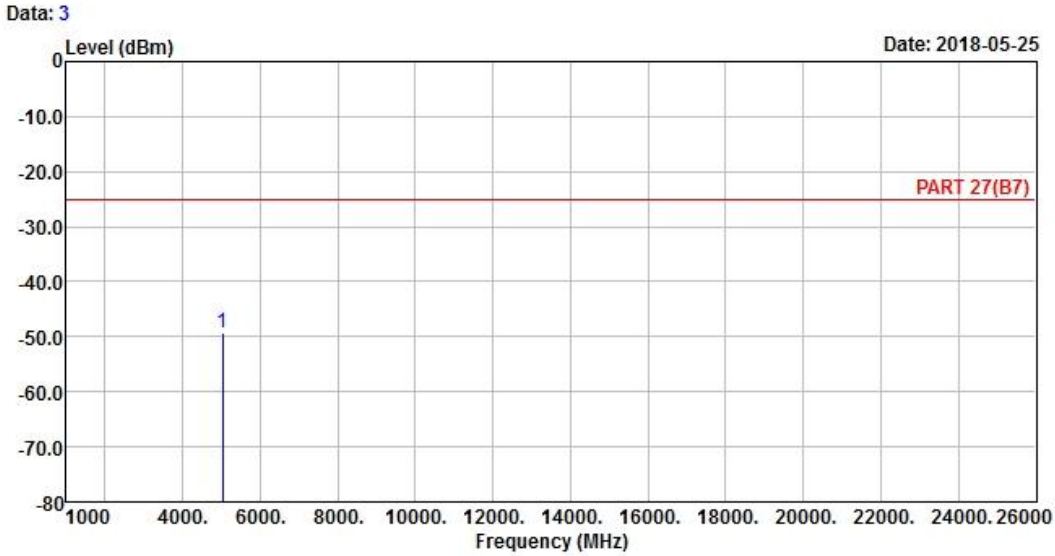
Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_5M Link_H-CH
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5135.00	-49.26	-47.52	-25.00	-24.26	-1.74	Peak

Channel Bandwidth: 20 MHz / QPSK

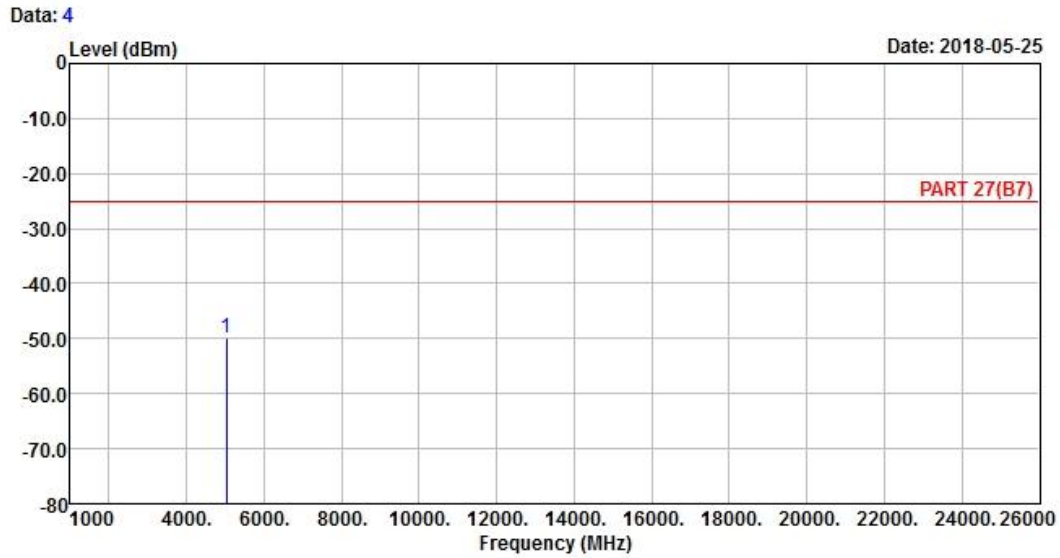
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_20M Link_L-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5020.00	-49.19	-46.87	-25.00	-24.19	-2.32	Peak

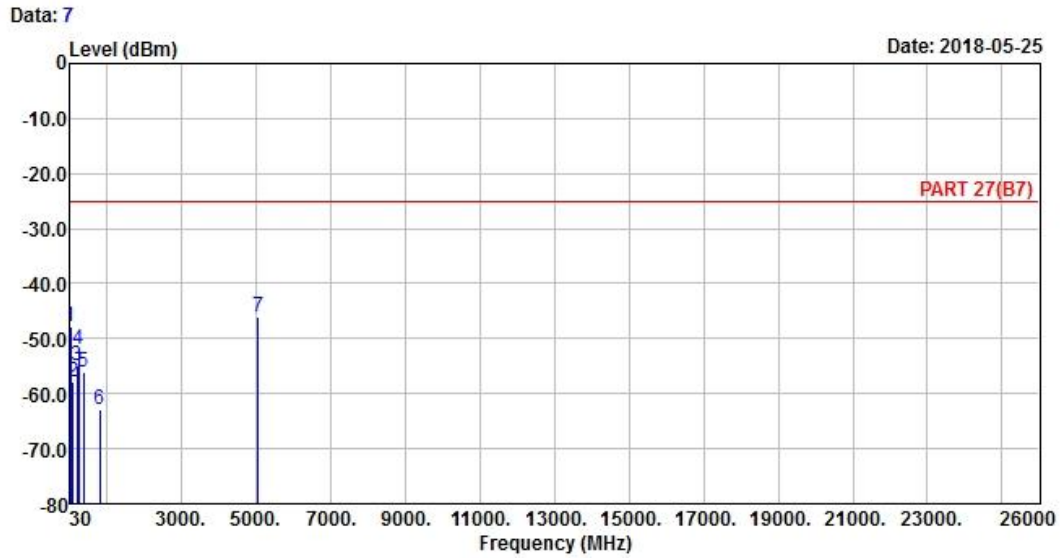


Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_20M Link_L-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5020.00	-49.92	-47.60	-25.00	-24.92	-2.32	Peak

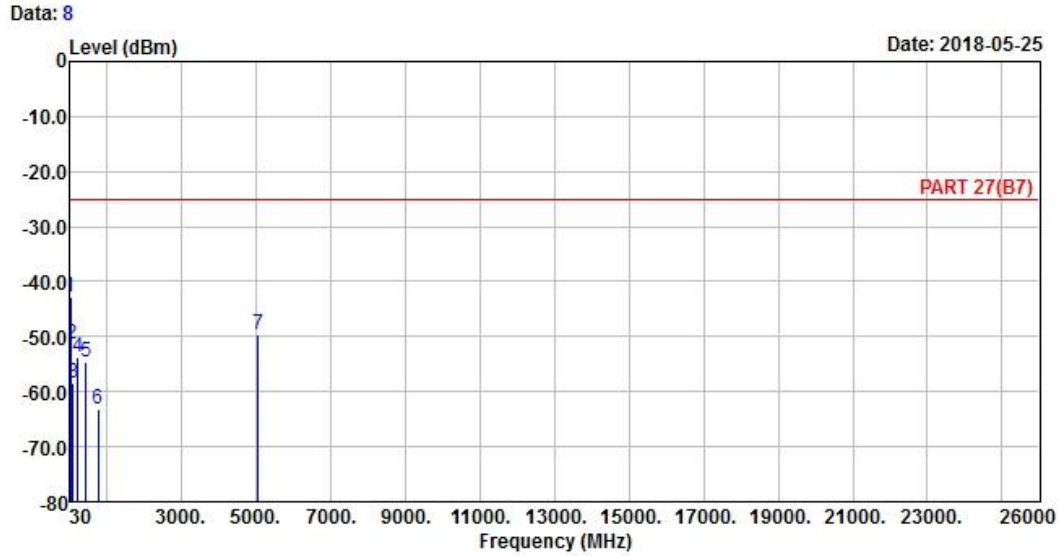
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_20M Link_M-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	39.45	-47.83	-48.47	-25.00	-22.83	0.64	Peak
2	96.42	-57.94	-47.16	-25.00	-32.94	-10.78	Peak
3	205.50	-54.92	-47.13	-25.00	-29.92	-7.79	Peak
4	263.55	-52.06	-45.79	-25.00	-27.06	-6.27	Peak
5	375.60	-56.10	-50.01	-25.00	-31.10	-6.09	Peak
6	819.40	-62.87	-63.43	-25.00	-37.87	0.56	Peak
7 pp	5070.00	-46.12	-44.25	-25.00	-21.12	-1.87	Peak

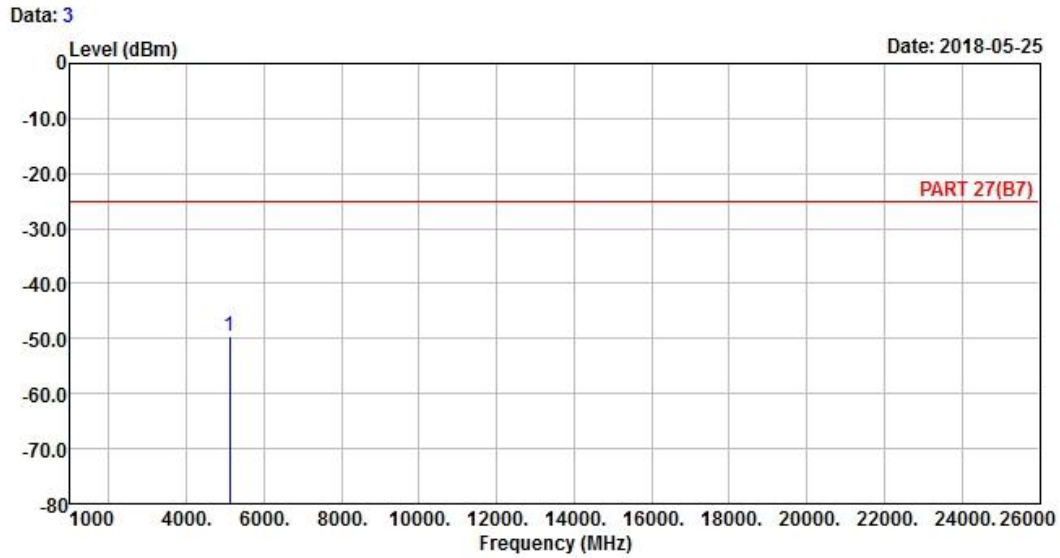


Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_20M Link_M-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	39.18	-42.75	-42.85	-25.00	-17.75	0.10	Peak
2	67.80	-51.25	-43.00	-25.00	-26.25	-8.25	Peak
3	97.50	-58.50	-47.83	-25.00	-33.50	-10.67	Peak
4	223.32	-53.85	-46.77	-25.00	-28.85	-7.08	Peak
5	453.30	-54.76	-49.26	-25.00	-29.76	-5.50	Peak
6	787.20	-63.28	-64.05	-25.00	-38.28	0.77	Peak
7	5070.00	-49.56	-47.69	-25.00	-24.56	-1.87	Peak

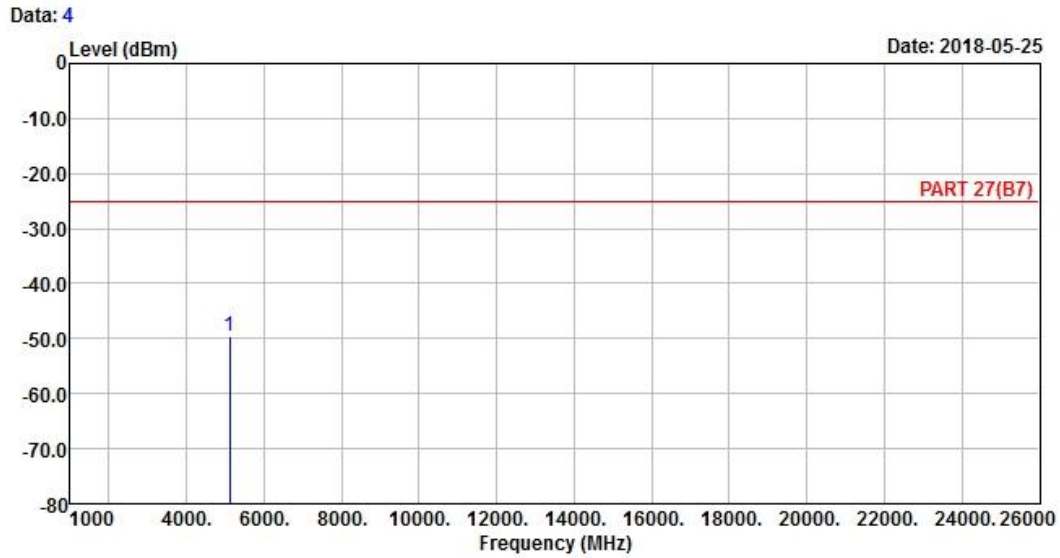
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_20M Link_H-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5120.00	-49.54	-47.88	-25.00	-24.54	-1.66	Peak

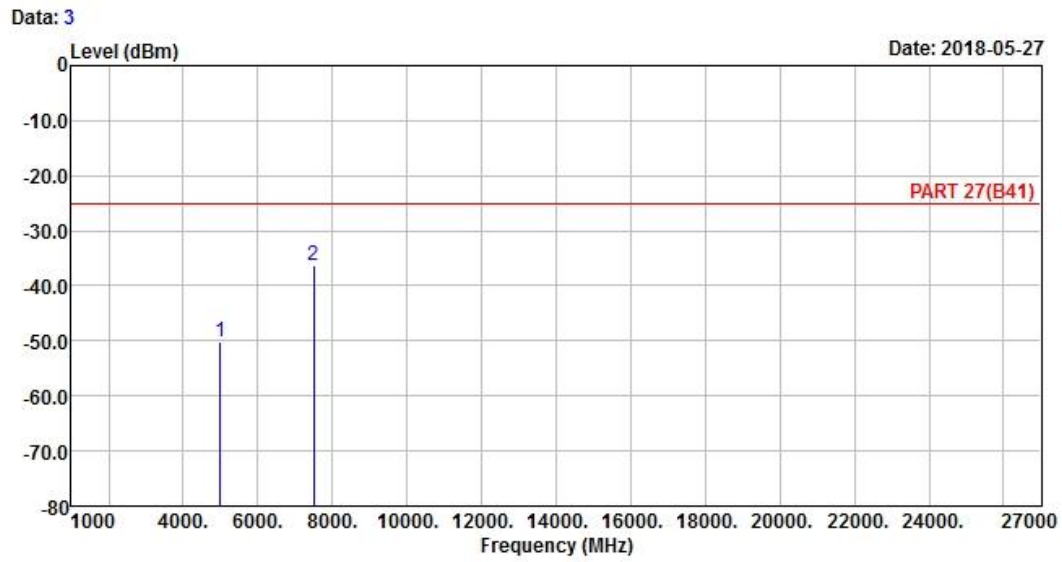


Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_20M Link_H-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	5120.00	-49.62	-47.96	-25.00	-24.62	-1.66	Peak

LTE Band 41
Channel Bandwidth: 5 MHz / QPSK
Low Channel

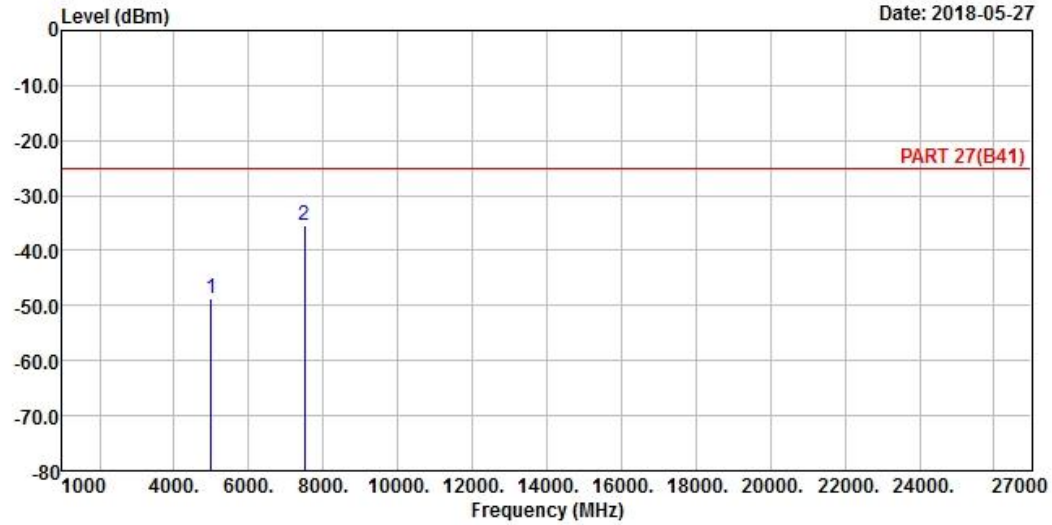
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B41) HORIZONTAL
Remak : LTE Band 41 QPSK_5M Link _L-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	4997.00	-50.30	-47.69	-25.00	-25.30	-2.61	Peak
2 pp	7495.50	-36.25	-40.44	-25.00	-11.25	4.19	Peak

Data: 4

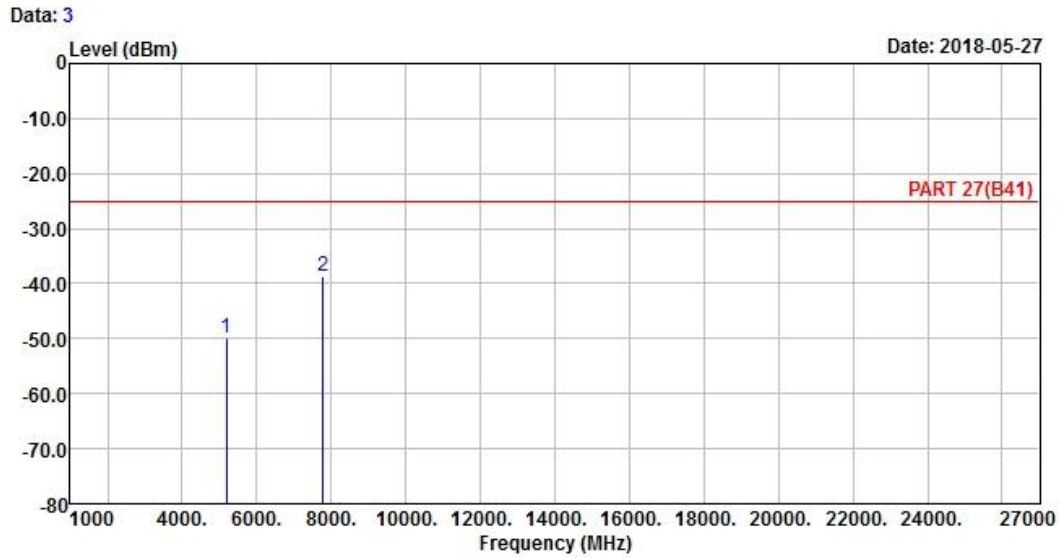


Site : 966 Chamber 5
Condition: PART 27(B41) VERTICAL
Remak : LTE Band 41 QPSK_5M Link _L-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	4997.00	-48.82	-46.21	-25.00	-23.82	-2.61	Peak
2 pp	7495.50	-35.52	-39.71	-25.00	-10.52	4.19	Peak

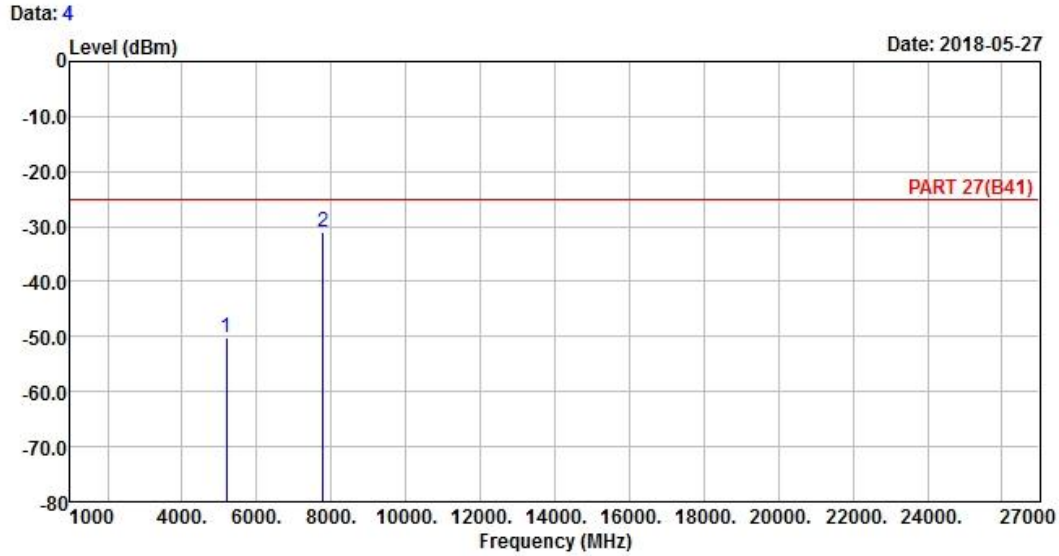
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B41) HORIZONTAL
Remak : LTE Band 41 QPSK_5M Link _M-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	5186.00	-49.85	-47.86	-25.00	-24.85	-1.99	Peak
2 pp	7779.00	-38.62	-43.36	-25.00	-13.62	4.74	Peak

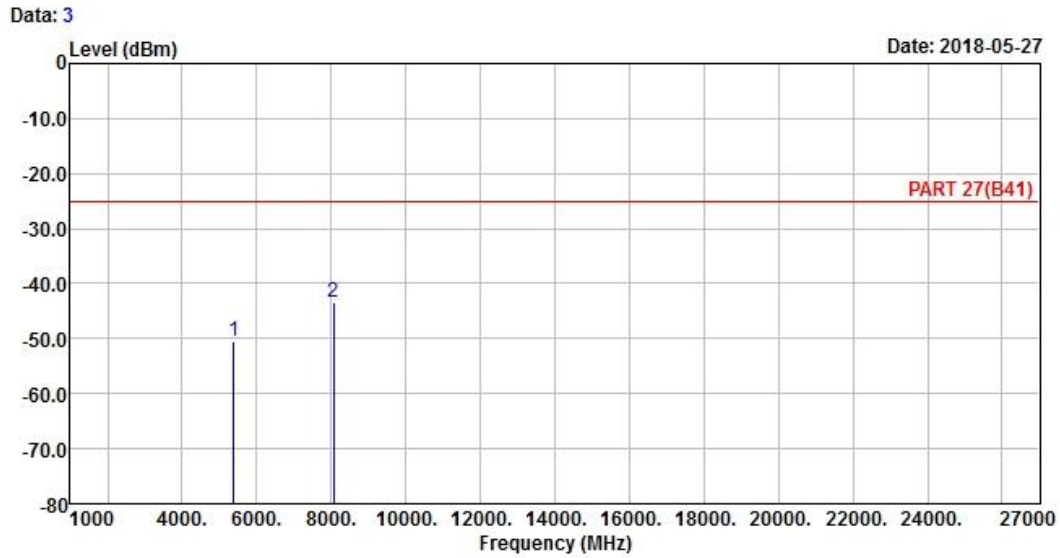


Site : 966 Chamber 5
Condition: PART 27(B41) VERTICAL
Remak : LTE Band 41 QPSK_5M Link _M-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	5186.00	-50.23	-48.24	-25.00	-25.23	-1.99	Peak
2 pp	7779.00	-31.02	-35.76	-25.00	-6.02	4.74	Peak

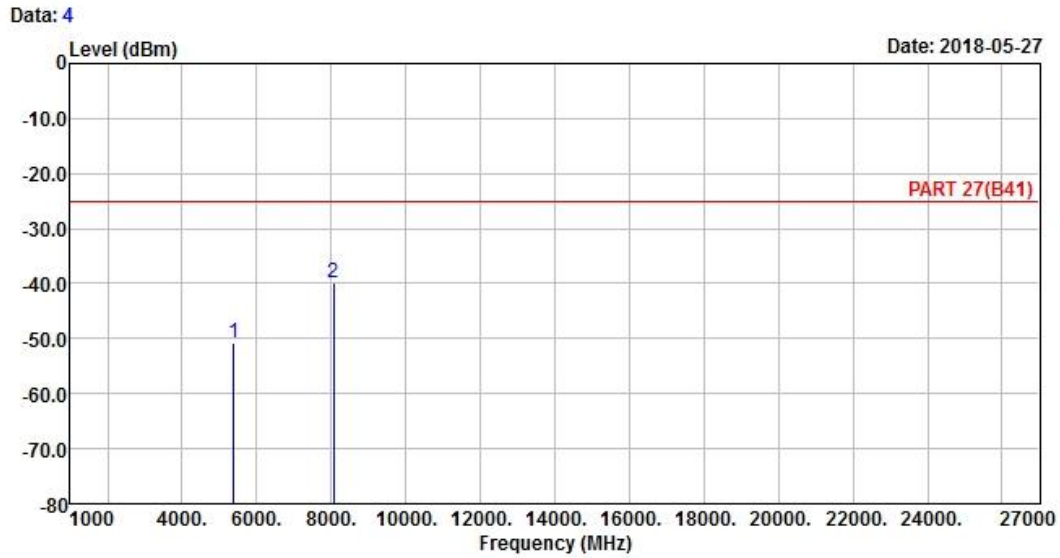
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B41) HORIZONTAL
Remak : LTE Band 41 QPSK_5M Link _H-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	5375.00	-50.45	-48.05	-25.00	-25.45	-2.40	Peak
2 pp	8062.50	-43.36	-48.46	-25.00	-18.36	5.10	Peak

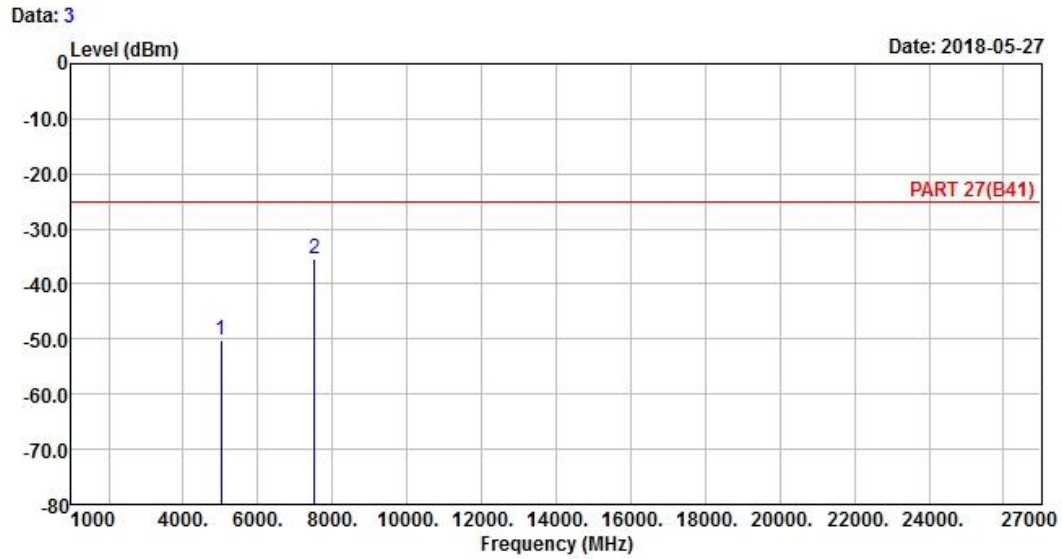


Site : 966 Chamber 5
Condition: PART 27(B41) VERTICAL
Remak : LTE Band 41 QPSK_5M Link _H-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	5375.00	-50.85	-48.45	-25.00	-25.85	-2.40	Peak
2 pp	8062.50	-39.99	-45.09	-25.00	-14.99	5.10	Peak

Channel Bandwidth: 20 MHz / QPSK
Low Channel

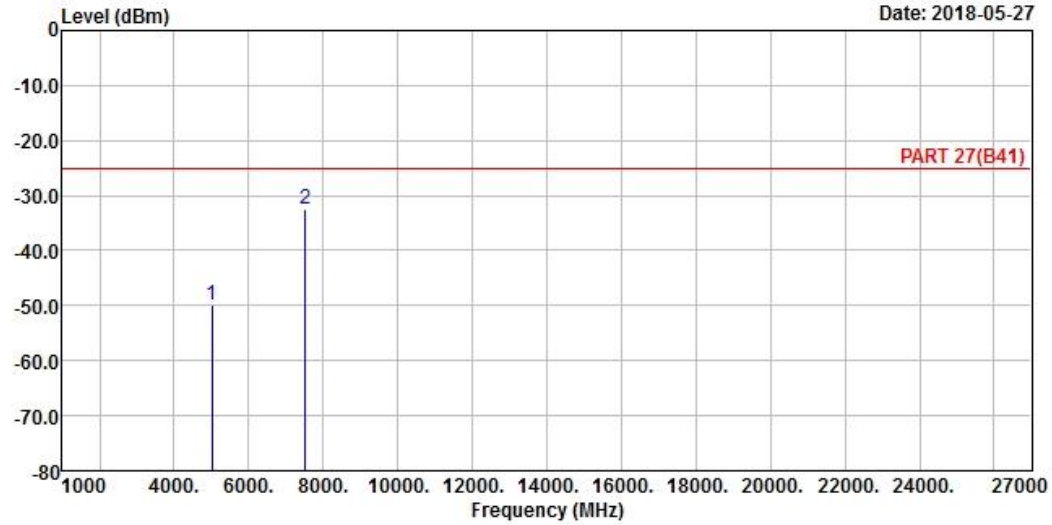
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B41) HORIZONTAL
Remak : LTE Band 41 QPSK_20M Link _L-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	5012.00	-50.30	-47.84	-25.00	-25.30	-2.46	Peak
2 pp	7518.00	-35.51	-39.72	-25.00	-10.51	4.21	Peak

Data: 4

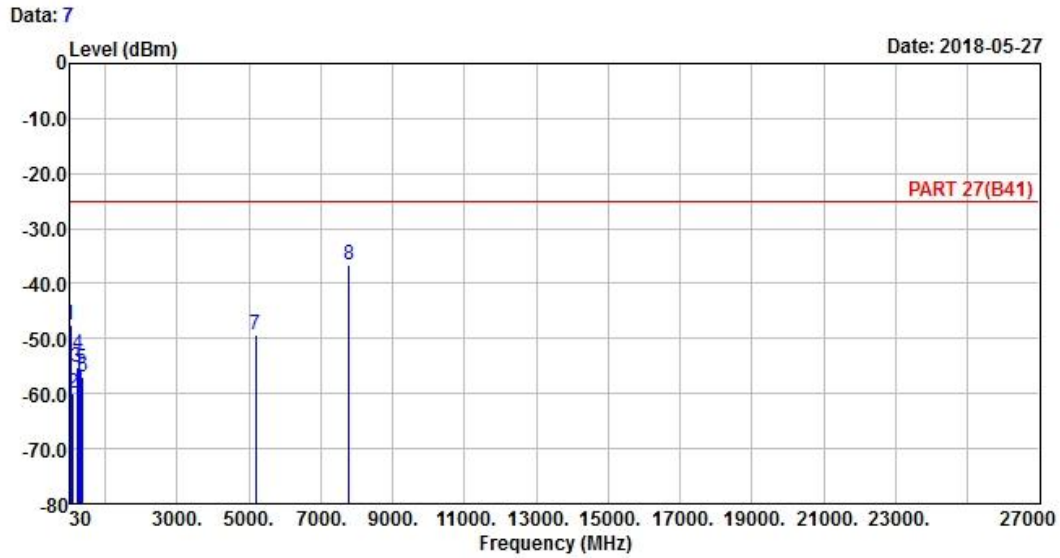


Site : 966 Chamber 5
Condition: PART 27(B41) VERTICAL
Remak : LTE Band 41 QPSK_20M Link _L-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	5012.00	-49.84	-47.38	-25.00	-24.84	-2.46	Peak
2 pp	7518.00	-32.62	-36.83	-25.00	-7.62	4.21	Peak

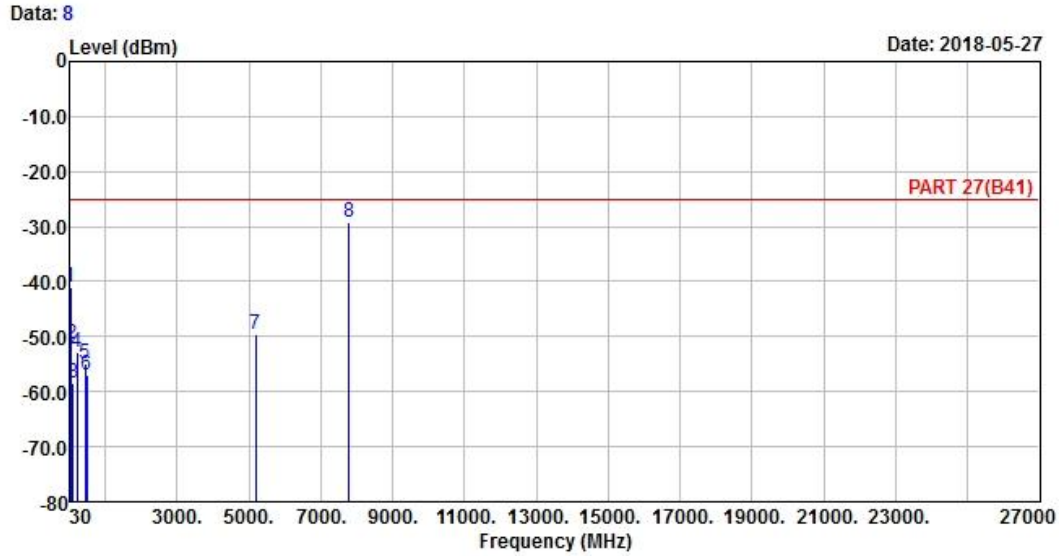
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B41) HORIZONTAL
Remak : LTE Band 41 QPSK_20M Link _M-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	39.45	-47.63	-48.27	-25.00	-22.63	0.64	Peak
2	103.98	-59.90	-49.43	-25.00	-34.90	-10.47	Peak
3	211.44	-55.34	-47.79	-25.00	-30.34	-7.55	Peak
4	261.12	-52.81	-46.60	-25.00	-27.81	-6.21	Peak
5	324.50	-55.55	-48.92	-25.00	-30.55	-6.63	Peak
6	377.00	-56.97	-50.89	-25.00	-31.97	-6.08	Peak
7	5186.00	-49.35	-47.36	-25.00	-24.35	-1.99	Peak
8 pp	7779.00	-36.71	-41.45	-25.00	-11.71	4.74	Peak

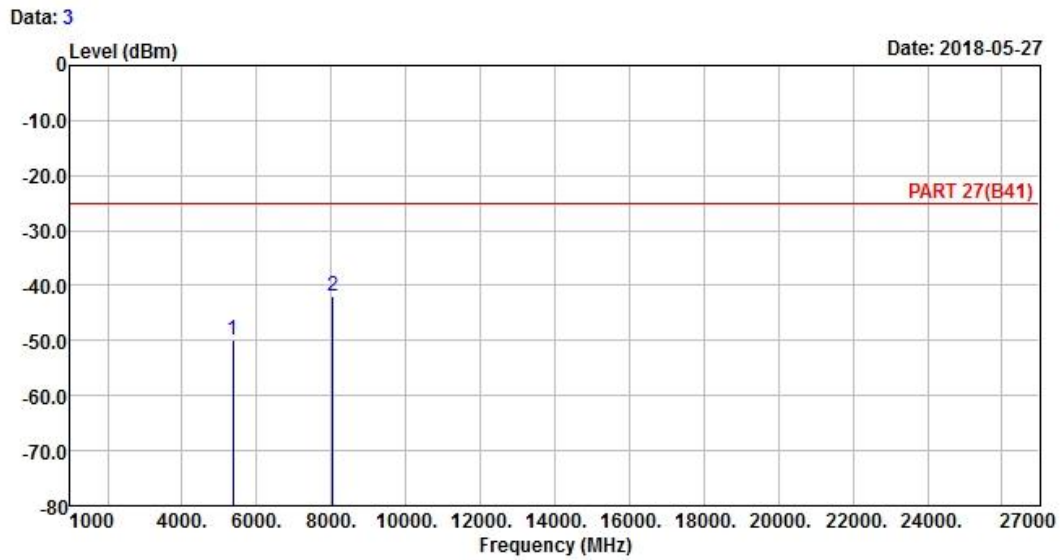


Site : 966 Chamber 5
Condition: PART 27(B41) VERTICAL
Remak : LTE Band 41 QPSK_20M Link _M-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	38.91	-40.99	-41.09	-25.00	-15.99	0.10	Peak
2	68.61	-51.25	-42.93	-25.00	-26.25	-8.32	Peak
3	99.66	-58.34	-47.78	-25.00	-33.34	-10.56	Peak
4	217.92	-52.73	-45.45	-25.00	-27.73	-7.28	Peak
5	438.60	-54.82	-49.18	-25.00	-29.82	-5.64	Peak
6	486.90	-57.08	-52.22	-25.00	-32.08	-4.86	Peak
7	5186.00	-49.69	-47.70	-25.00	-24.69	-1.99	Peak
8 pp	7779.00	-29.30	-34.04	-25.00	-4.30	4.74	Peak

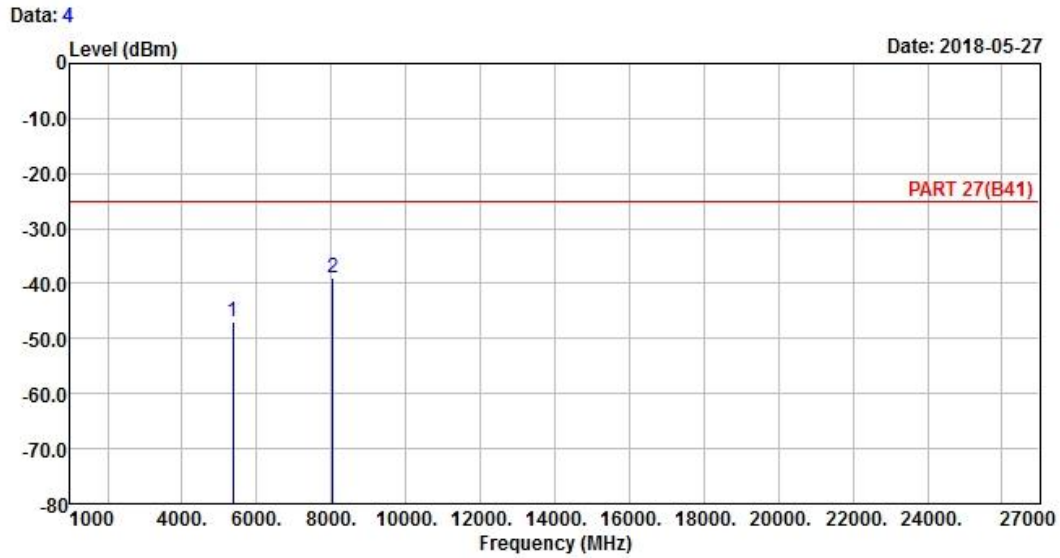
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B41) HORIZONTAL
Remak : LTE Band 41 QPSK_20M Link _H-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	5360.00	-49.94	-47.43	-25.00	-24.94	-2.51	Peak
2 pp	8040.00	-42.05	-47.33	-25.00	-17.05	5.28	Peak



Site : 966 Chamber 5
Condition: PART 27(B41) VERTICAL
Remak : LTE Band 41 QPSK_20M Link _H-CH
Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	5360.00	-47.02	-44.51	-25.00	-22.02	-2.51	Peak
2 pp	8040.00	-39.08	-44.36	-25.00	-14.08	5.28	Peak

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on 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:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

--- END ---