

Partial FCC Test Report

(PART 22)

Report No.: RF180604C04 R1

FCC ID: A4R-WT3

Test Model: L850-GL

Received Date: Jun. 04, 2018

Test Date: Jun. 30, 2018 ~ Jul. 03, 2018

Issued Date: Sep. 03, 2018

Applicant: Google LLC

Address: 1600 Amphitheatre Parkway, Mountain View, California, United States
94043

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

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(R.O.C)

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FCC Registration /
Designation Number: 427177 / TW0011



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Release Control Record

Issue No.	Description	Date Issued
RF180604C04	Original Release	Jul. 23, 2018
RF180604C04 R1	Revised to C2PC.	Sep. 03, 2018

1 Certificate of Conformity

Product: LTE module

Brand: Fibocom

Test Model: L850-GL

Sample Status: Production Unit

Applicant: Google LLC

Test Date: Jun. 30, 2018 ~ Jul. 03, 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:** Sep. 03, 2018
Rona Chen / Specialist

Approved by : Dylan Chiou, **Date:** Sep. 03, 2018
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.
---	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 -31.79 dB at 2539.80 MHz.

Note:

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 BV CPS report no.: RF170106C02 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	Expanded 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	2.0153 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	MY51210203	Mar. 16, 2018	Mar. 15, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 06, 2017	Dec. 05, 2018
HORN Antenna ETS-Lindgren	3117	00143293	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 01, 2017	Nov. 30, 2018
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 24, 2017	Oct. 23, 2018
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
Power Meter Anritsu	ML2495A	1012010	Aug. 15, 2017	Aug. 14, 2018
Power Sensor Anritsu	MA2411B	1315050	Aug. 15, 2017	Aug. 14, 2018
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
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
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	Jun. 29, 2018 Jun. 28, 2019
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 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 IC7450I-1.

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	WCDMA	QPSK
	LTE	QPSK, 16QAM
Frequency Range	WCDMA	826.4 ~ 846.6 MHz
	LTE 5 (Channel Bandwidth: 1.4 MHz)	824.7 ~ 848.3 MHz
	LTE 5 (Channel Bandwidth: 3 MHz)	825.5 ~ 847.5 MHz
	LTE 5 (Channel Bandwidth: 5 MHz)	826.5 ~ 846.5 MHz
	LTE 5 (Channel Bandwidth: 10 MHz)	829 ~ 844 MHz
Max. ERP Power	WCDMA	128.44 mW
	LTE 5 (Channel Bandwidth: 1.4 MHz)	125.83 mW
	LTE 5 (Channel Bandwidth: 3 MHz)	126.71 mW
	LTE 5 (Channel Bandwidth: 5 MHz)	127.59 mW
	LTE 5 (Channel Bandwidth: 10 MHz)	128.77 mW
Antenna Type	Refer to Note as below	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

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

Product	Brand	Model
Study Hub	Verily	WT3

- The antenna information is listed as below.

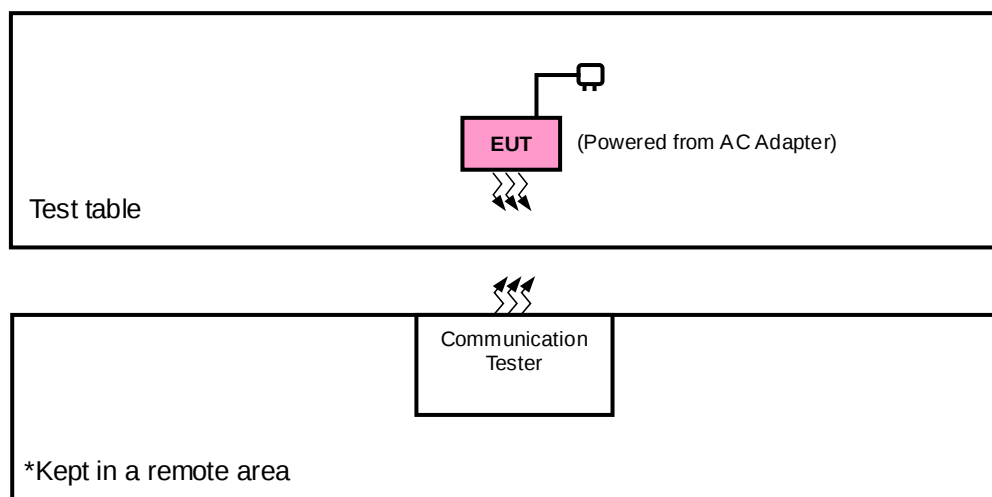
Antenna Type	Fixed Internal	
Band	WCDMA	LTE
	V	5
Gain	1.53	1.53

- The End-product contains following accessory devices.

Product	Brand	Model	Description
Adapter	TPT	MSS050200WI	I/P: 100-240 Vac, 50-60 Hz, 0.3 A O/P: 5 Vdc, 2 A 1.5m shielded cable w/o core
BT/WLAN Module	AzureWave	AW-CM389NF	--
WWAN Module	Fibocom	L850-GL	--

- 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



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
2.	Radio Communication Analyzer	Anritsu	MT8820C	6201300640	N/A

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

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items 1-2 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, 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	Z-plane	X-axis
LTE Band 5	Z-plane	Y-axis

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

LTE Band 5

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Radiated Emission	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK	1 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK	1 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	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	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao

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 1 MHz for GSM, GPRS & EDGE, and 5 MHz for WCDMA and CDMA, 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. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15 \text{ dB}$.

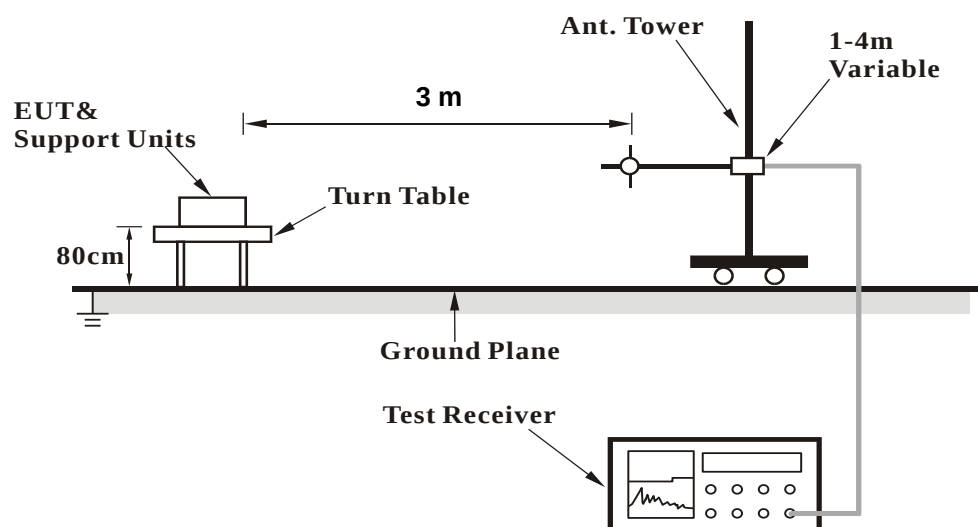
Conducted Power Measurement:

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

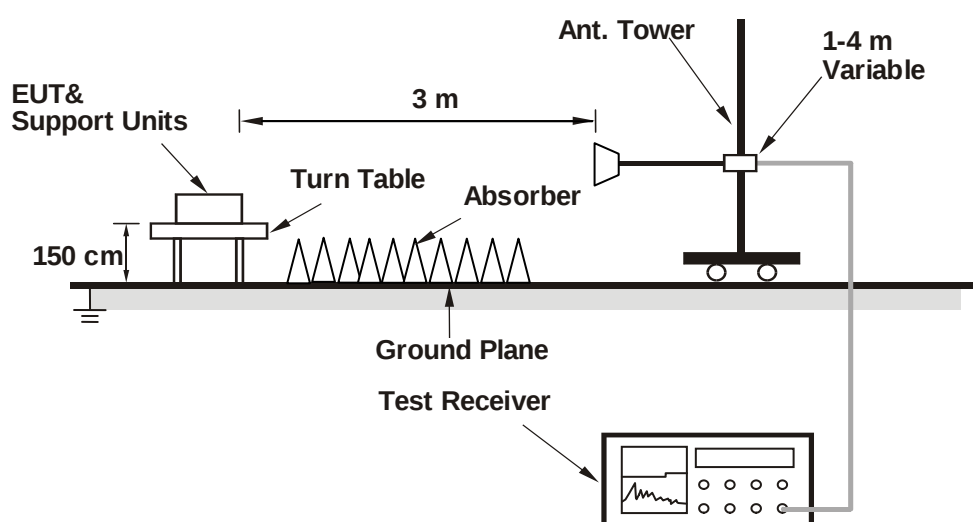
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

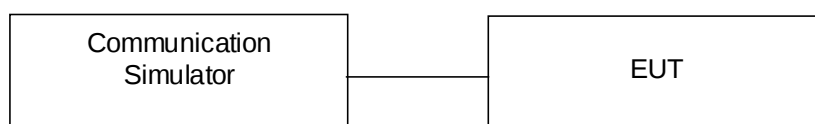


<Radiated Emission above 1 GHz>



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

Conducted Power Measurement:



4.1.4 Test Results

ERP Power (dBm)

WCDMA							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Z	4132	826.4	-11.00	31.208	18.06	63.94	H
	4182	836.4	-11.07	31.3	18.08	64.27	
	4233	846.6	-11.04	31.222	18.03	63.56	
	4132	826.4	-8.31	31.504	21.04	127.17	V
	4182	836.4	-7.88	31.117	21.09	128.44	
	4233	846.6	-8.77	31.922	21.00	125.95	

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

LTE Band 5							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Z	20407	824.7	-8.06	31.208	21.00	125.83	H
	20525	836.5	-8.19	31.3	20.96	124.74	
	20643	848.3	-8.14	31.222	20.93	123.94	
	20407	824.7	-14.38	31.504	14.97	31.43	V
	20525	836.5	-13.98	31.117	14.99	31.53	
	20643	848.3	-14.86	31.922	14.91	30.99	
Channel Bandwidth: 1.4 MHz / 16QAM							
Z	20407	824.7	-9.07	31.208	19.99	99.72	H
	20525	836.5	-9.20	31.3	19.95	98.86	
	20643	848.3	-9.15	31.222	19.92	98.22	
	20407	824.7	-15.38	31.504	13.97	24.97	V
	20525	836.5	-15.01	31.117	13.96	24.87	
	20643	848.3	-15.88	31.922	13.89	24.50	

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

LTE Band 5							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Z	20415	825.5	-8.03	31.208	21.03	126.71	H
	20525	836.5	-8.16	31.3	20.99	125.60	
	20635	847.5	-8.11	31.222	20.96	124.80	
	20415	825.5	-14.35	31.504	15.00	31.65	V
	20525	836.5	-13.99	31.117	14.98	31.46	
	20635	847.5	-14.82	31.922	14.95	31.28	
Channel Bandwidth: 3 MHz / 16QAM							
Z	20415	825.5	-9.03	31.208	20.03	100.65	H
	20525	836.5	-9.18	31.3	19.97	99.31	
	20635	847.5	-9.12	31.222	19.95	98.90	
	20415	825.5	-15.36	31.504	13.99	25.08	V
	20525	836.5	-14.99	31.117	13.98	24.99	
	20635	847.5	-15.83	31.922	13.94	24.79	

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

LTE Band 5							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Z	20425	826.5	-8.00	31.208	21.06	127.59	H
	20525	836.5	-8.12	31.3	21.03	126.77	
	20625	846.5	-8.07	31.222	21.00	125.95	
	20425	826.5	-14.31	31.504	15.04	31.94	V
	20525	836.5	-13.95	31.117	15.02	31.75	
	20625	846.5	-13.77	31.922	16.00	39.83	
Channel Bandwidth: 5 MHz / 16QAM							
Z	20425	826.5	-9.01	31.208	20.05	101.11	H
	20525	836.5	-9.12	31.3	20.03	100.69	
	20625	846.5	-9.08	31.222	19.99	99.82	
	20425	826.5	-15.31	31.504	14.04	25.37	V
	20525	836.5	-14.96	31.117	14.01	25.16	
	20625	846.5	-15.78	31.922	13.99	25.07	

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

LTE Band 5							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Z	20450	829.0	-7.96	31.208	21.10	128.77	H
	20525	836.5	-8.08	31.3	21.07	127.94	
	20600	844.0	-8.03	31.222	21.04	127.12	
	20450	829.0	-14.27	31.504	15.08	32.24	V
	20525	836.5	-13.92	31.117	15.05	31.97	
	20600	844.0	-14.74	31.922	15.03	31.86	
Channel Bandwidth: 10 MHz / 16QAM							
Z	20425	826.5	-8.97	31.208	20.09	102.05	H
	20525	836.5	-9.09	31.3	20.06	101.39	
	20625	846.5	-9.04	31.222	20.03	100.74	
	20425	826.5	-15.27	31.504	14.08	25.61	V
	20525	836.5	-14.93	31.117	14.04	25.33	
	20625	846.5	-15.75	31.922	14.02	25.25	

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

- 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.
- 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
- 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.P.R power - 2.15 dB.

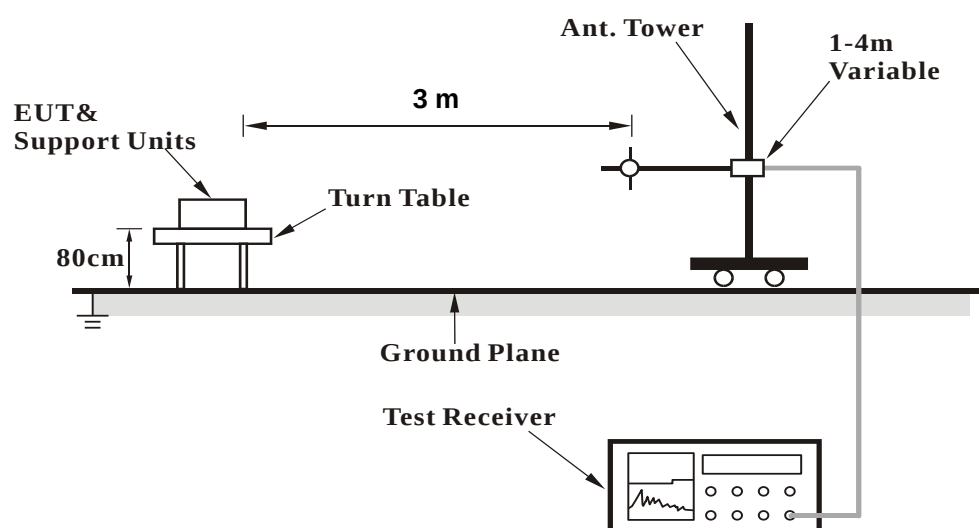
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.2.3 Deviation from Test Standard

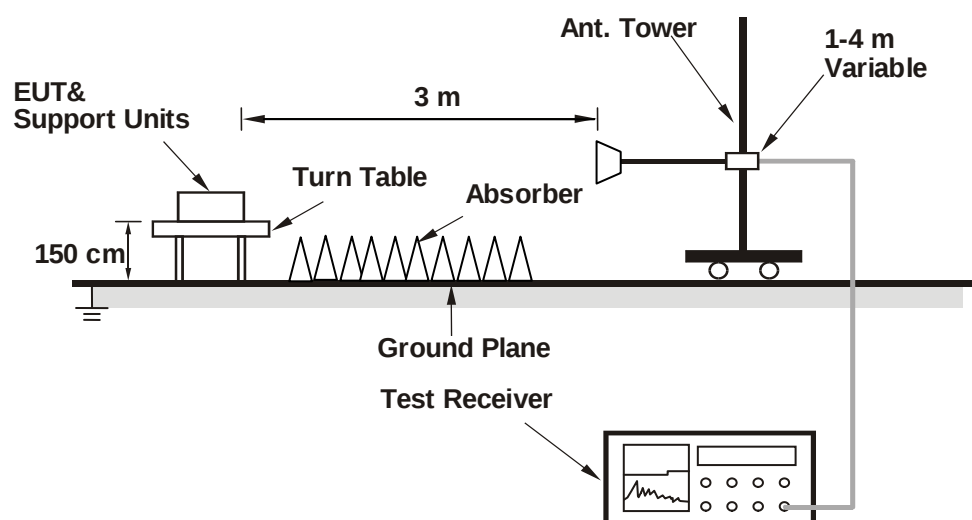
No deviation.

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

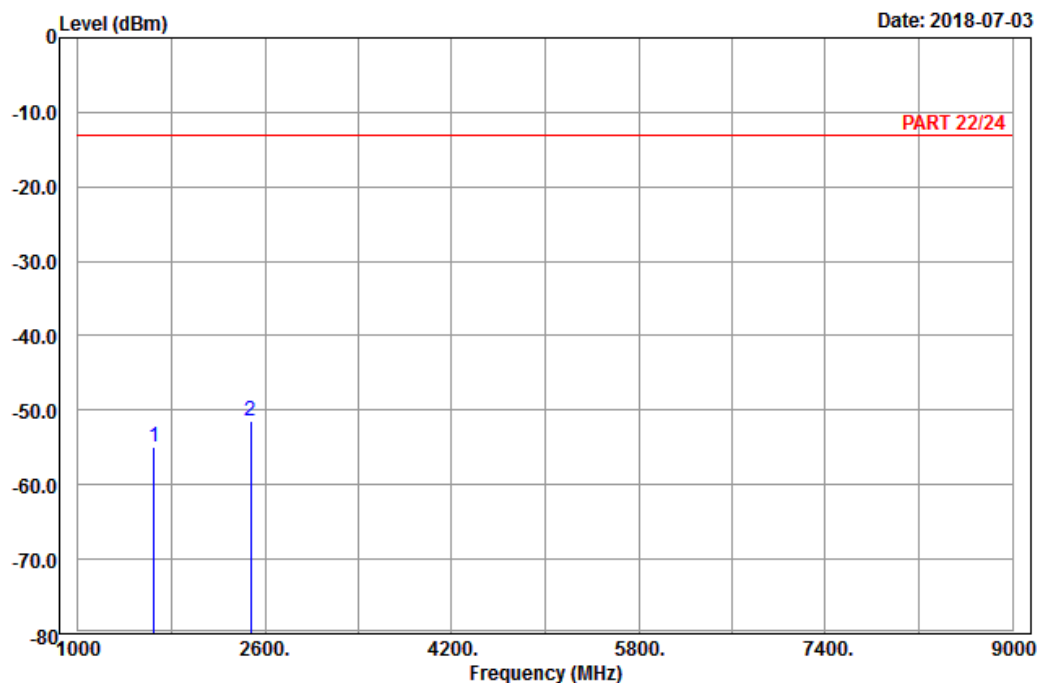


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Data: 5

Date: 2018-07-03



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	1652.80	-54.88	-62.61	-13.00	-41.88	7.73	Peak
2 pp	2479.20	-51.53	-62.56	-13.00	-38.53	11.03	Peak

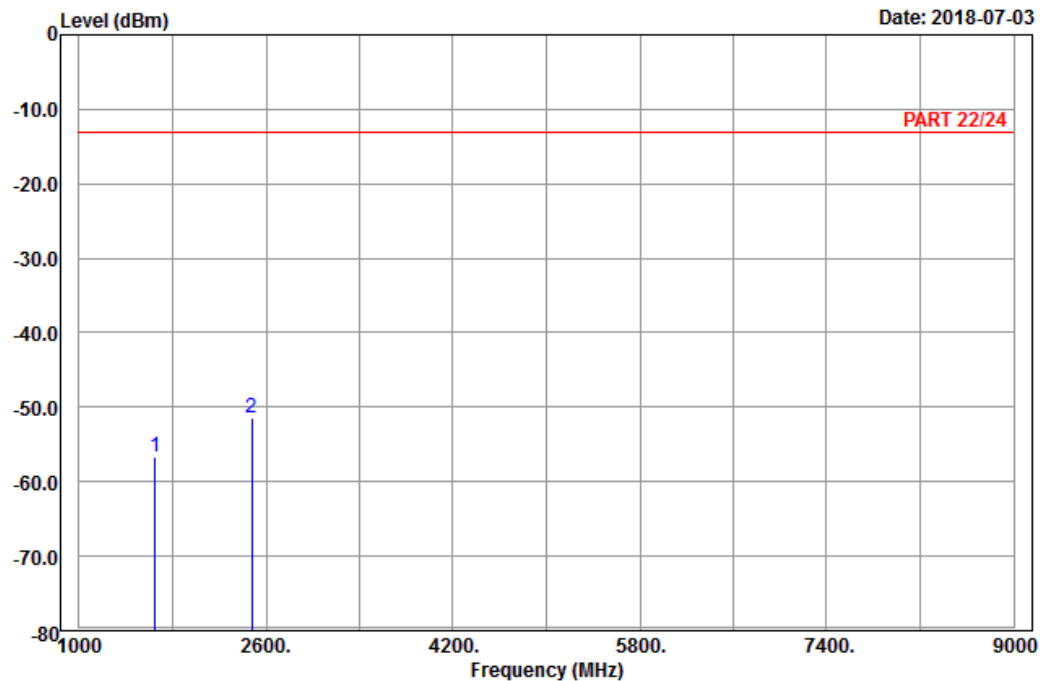


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Data: 6

Date: 2018-07-03



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	1652.80	-56.66	-64.39	-13.00	-43.66	7.73	Peak
2 pp	2479.20	-51.52	-62.55	-13.00	-38.52	11.03	Peak

Middle Channel

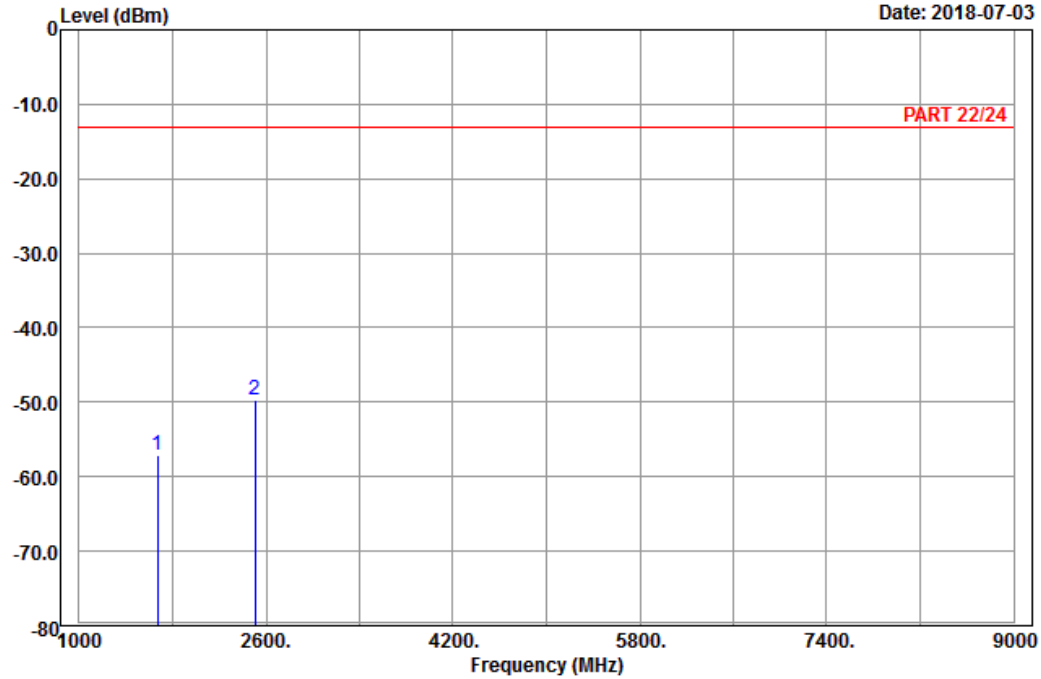


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Data: 5

Date: 2018-07-03



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : Band V_Link_CH4182
Tested by: Karl Lee

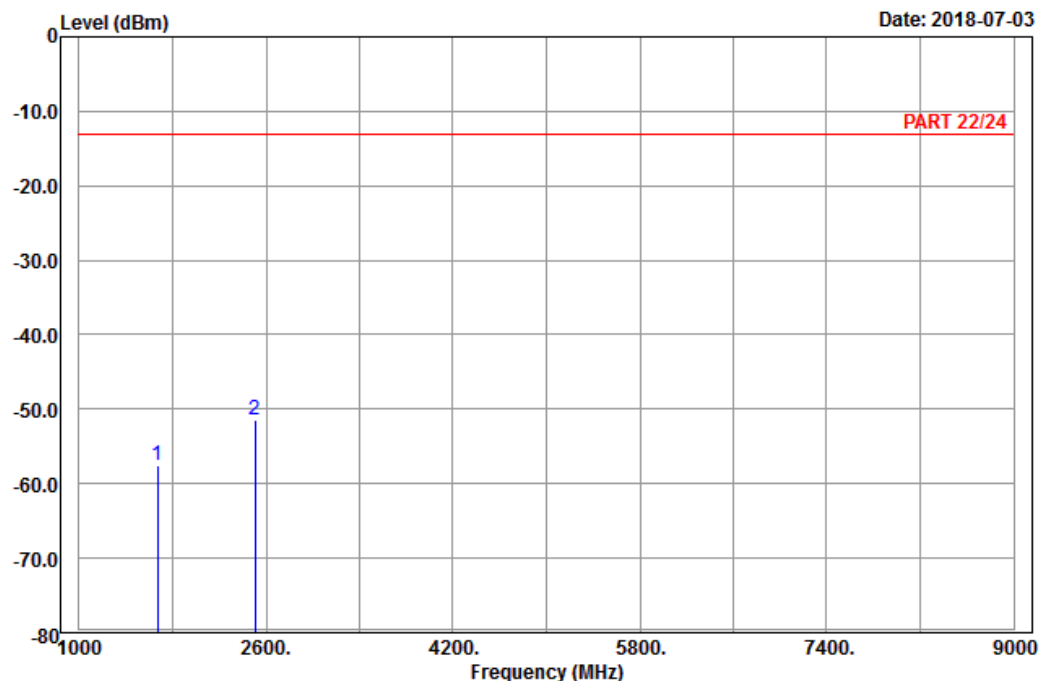
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1672.80	-57.22	-65.13	-13.00	-44.22	7.91	Peak
2	2509.20	-49.66	-60.94	-13.00	-36.66	11.28	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6



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	1672.80	-57.46	-65.37	-13.00	-44.46	7.91	Peak
2 pp	2509.20	-51.52	-62.80	-13.00	-38.52	11.28	Peak

High Channel

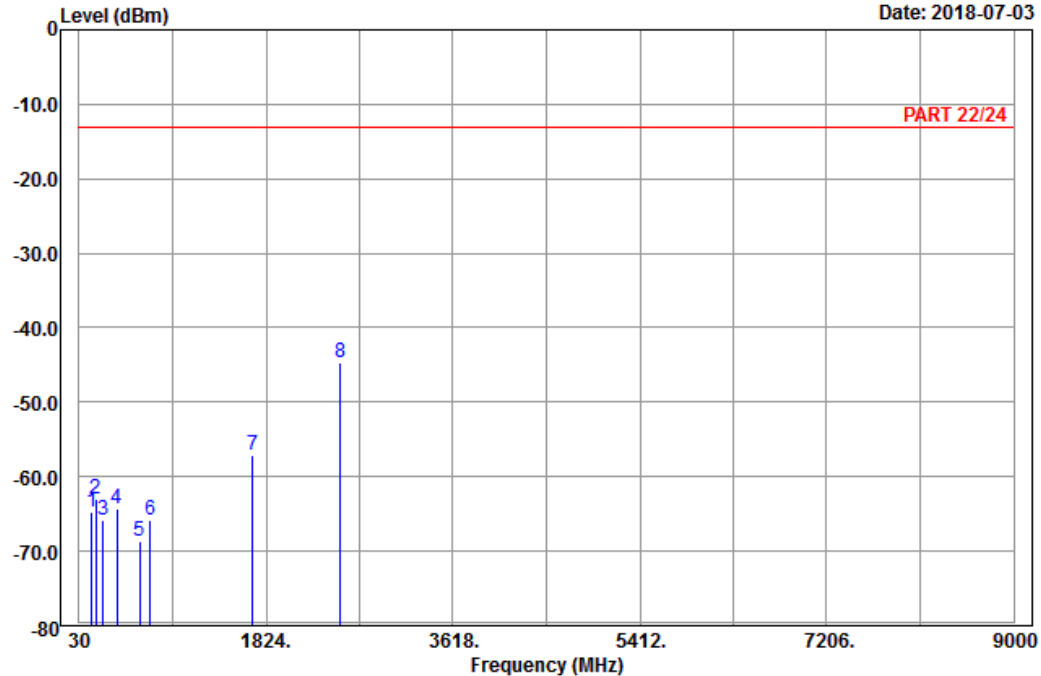


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9

Date: 2018-07-03



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : Band V_Link_CH4233
 Tested by: Karl Lee

		Read	Limit	Over			
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	152.31	-64.65	-56.76	-13.00	-51.65	-7.89	Peak
2	188.49	-62.96	-57.26	-13.00	-49.96	-5.70	Peak
3	263.28	-65.76	-60.14	-13.00	-52.76	-5.62	Peak
4	395.20	-64.35	-61.35	-13.00	-51.35	-3.00	Peak
5	614.30	-68.77	-69.04	-13.00	-55.77	0.27	Peak
6	715.80	-65.75	-65.08	-13.00	-52.75	-0.67	Peak
7	1693.20	-57.07	-65.21	-13.00	-44.07	8.14	Peak
8 pp	2539.80	-44.79	-56.26	-13.00	-31.79	11.47	Peak

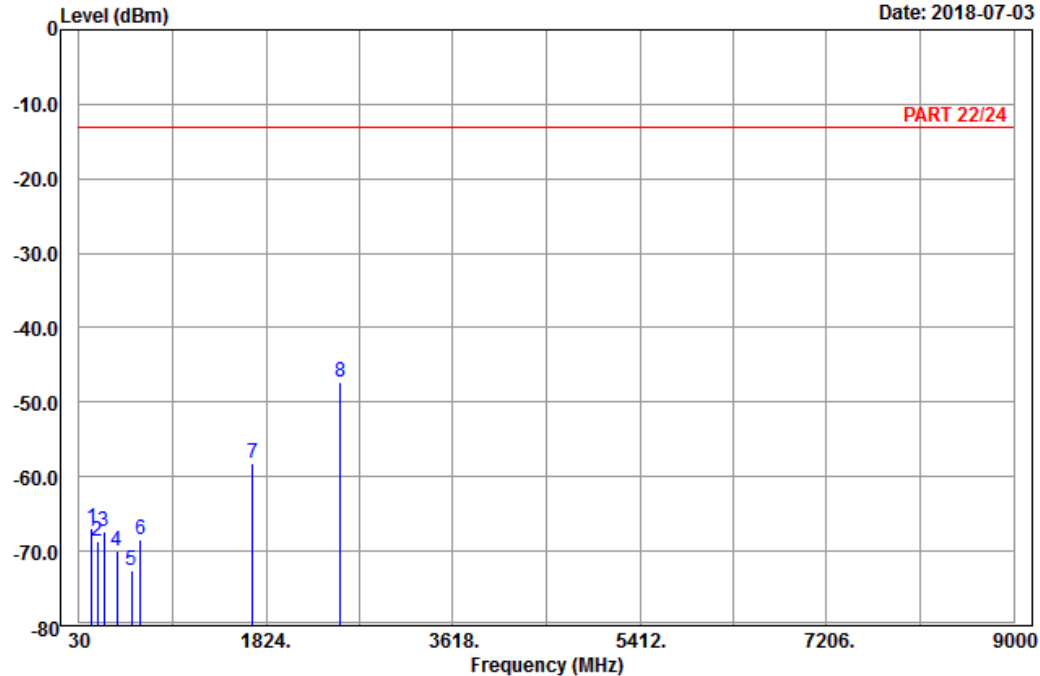


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2018-07-03



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	152.85	-66.88	-59.02	-13.00	-53.88	-7.86	Peak
2	202.80	-68.72	-62.58	-13.00	-55.72	-6.14	Peak
3	271.11	-67.46	-61.76	-13.00	-54.46	-5.70	Peak
4	393.80	-69.96	-66.91	-13.00	-56.96	-3.05	Peak
5	533.80	-72.60	-69.73	-13.00	-59.60	-2.87	Peak
6	620.60	-68.55	-68.75	-13.00	-55.55	0.20	Peak
7	1693.20	-58.14	-66.28	-13.00	-45.14	8.14	Peak
8 pp	2539.80	-47.39	-58.86	-13.00	-34.39	11.47	Peak

LTE Band 5
Channel Bandwidth: 1.4 MHz / QPSK
Low Channel

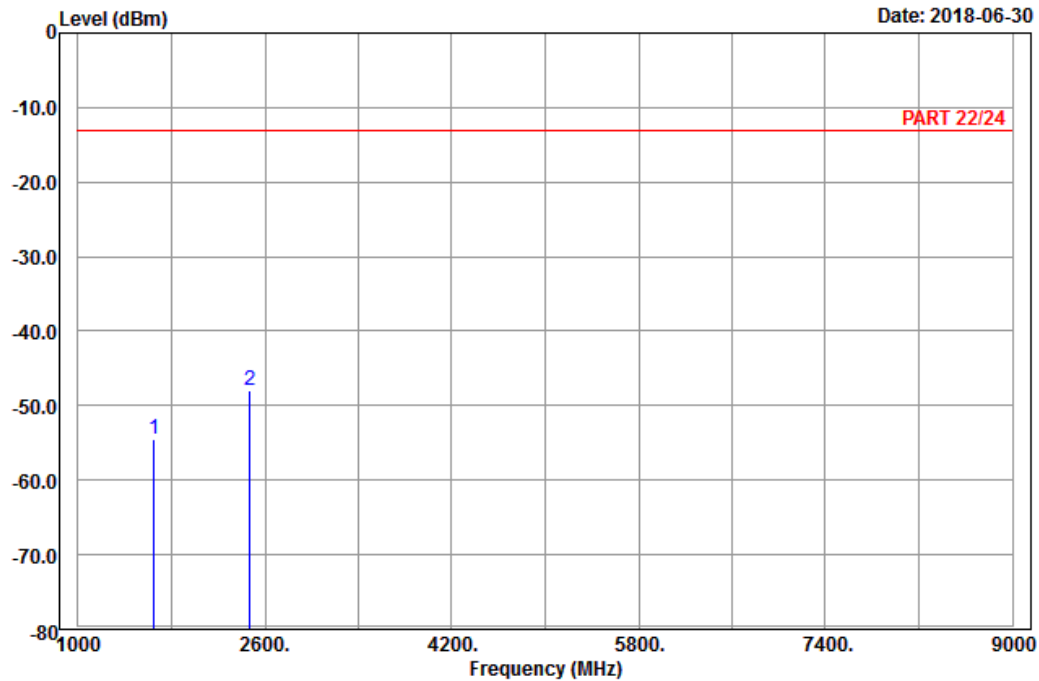


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-06-30



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20407
Tested by: Charles Hsiao

		Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor Remark
	MHz	dBm	dBm	dBm	dB	dB
1	1649.40	-54.55	-62.28	-13.00	-41.55	7.73 Peak
2 pp	2474.10	-48.01	-59.04	-13.00	-35.01	11.03 Peak

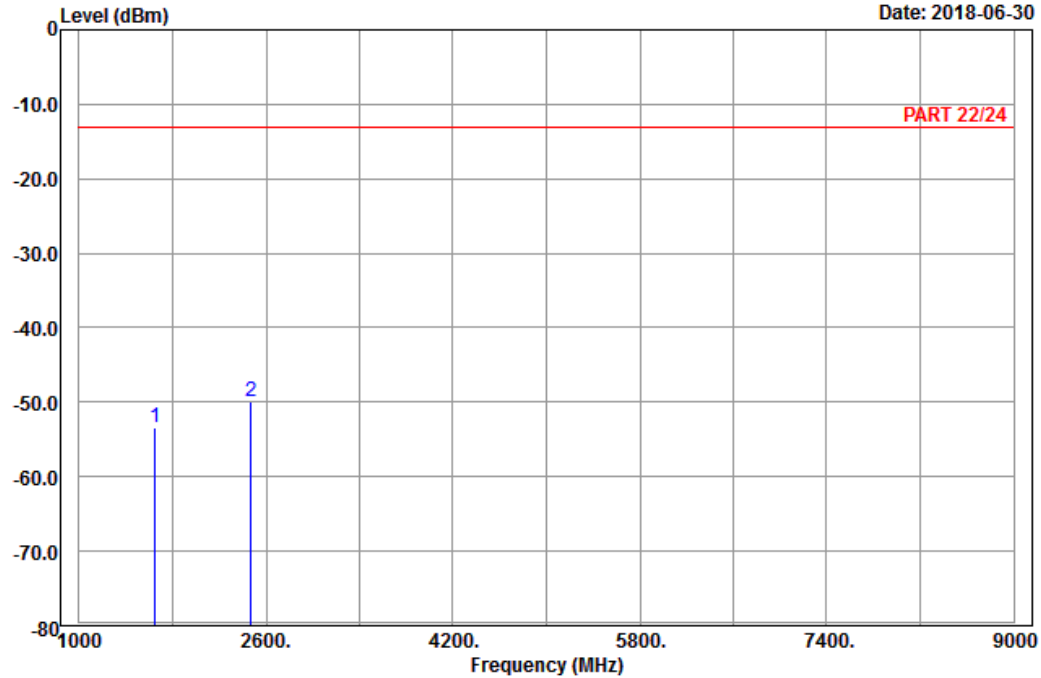


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-06-30



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20407
Tested by: Charles Hsiao

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1649.40	-53.32	-61.05	-13.00	-40.32	7.73	Peak
2 pp	2474.10	-49.90	-60.93	-13.00	-36.90	11.03	Peak

Middle Channel

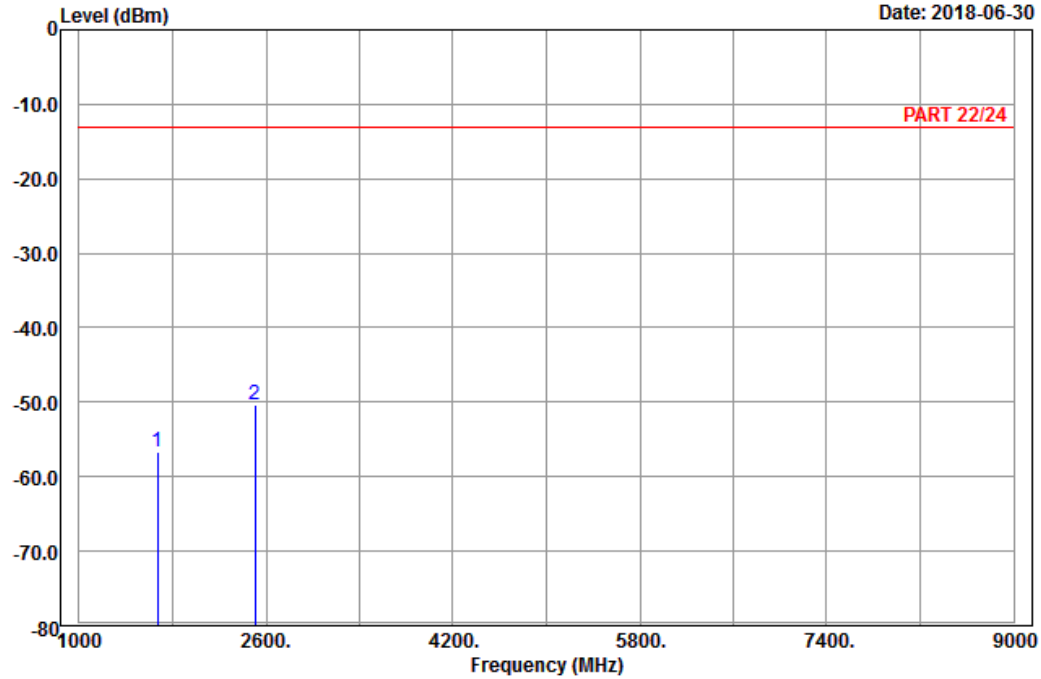


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-06-30



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20525
Tested by: Charles Hsiao

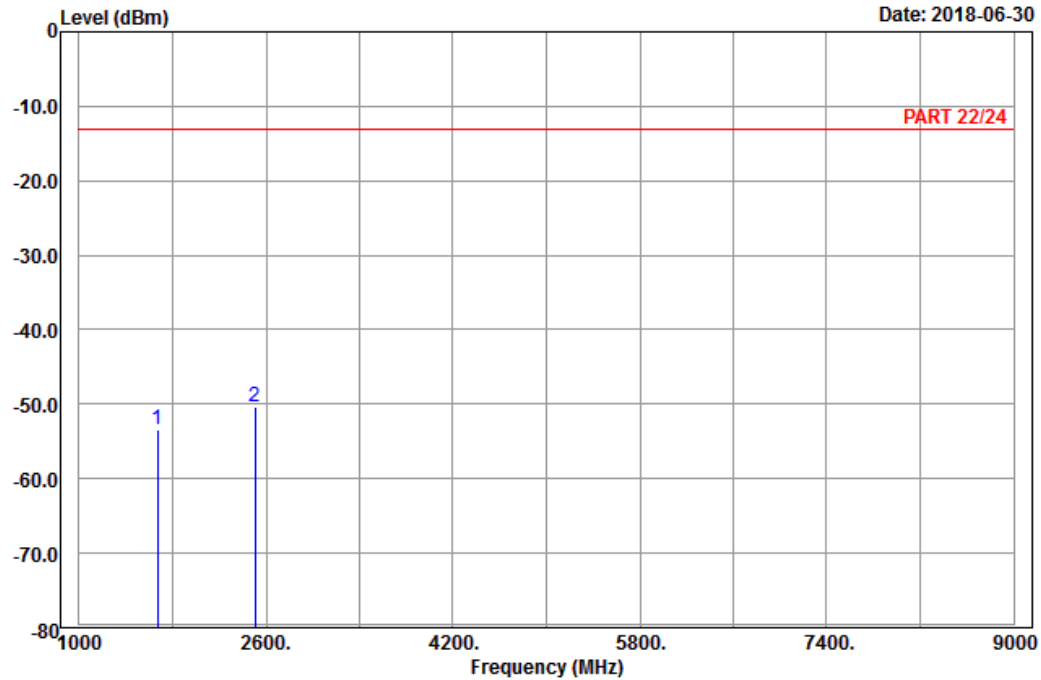
		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1673.00	-56.60	-64.51	-13.00	-43.60	7.91 Peak
2	2509.50	-50.31	-61.59	-13.00	-37.31	11.28 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6



Site : 966 chamber 1
 Condition: PART 22/24 Vertical
 Remark : LTE_Band 5_Link_CH20525
 Tested by: Charles Hsiao

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1673.00	-53.40	-61.31	-13.00	-40.40	7.91	Peak
2 pp	2509.50	-50.40	-61.68	-13.00	-37.40	11.28	Peak

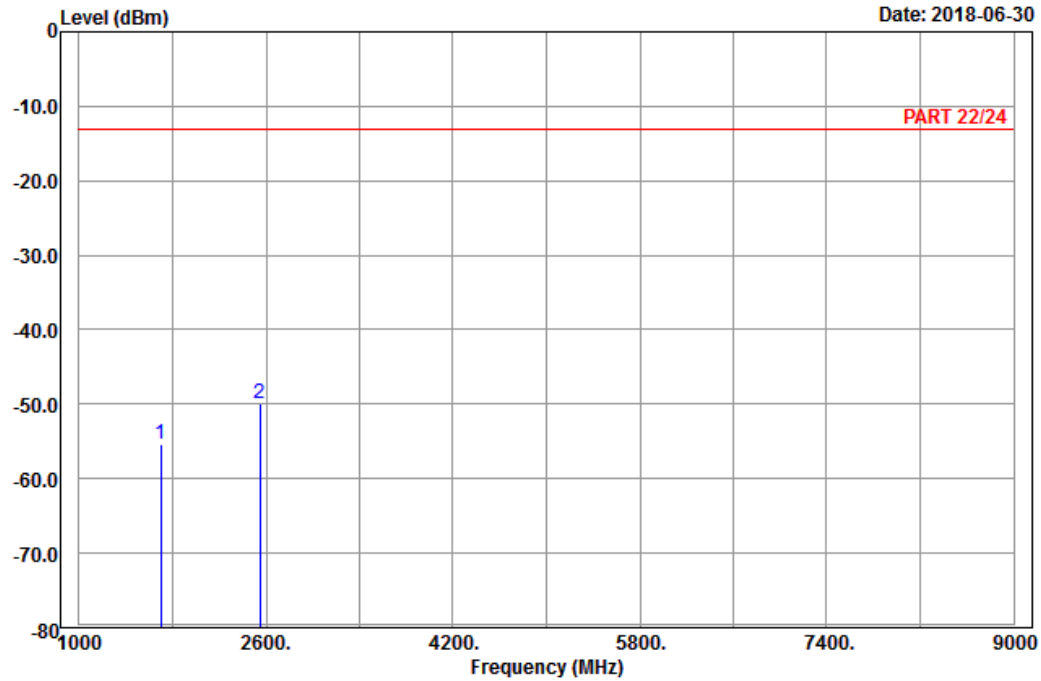
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20643
Tested by: Charles Hsiao

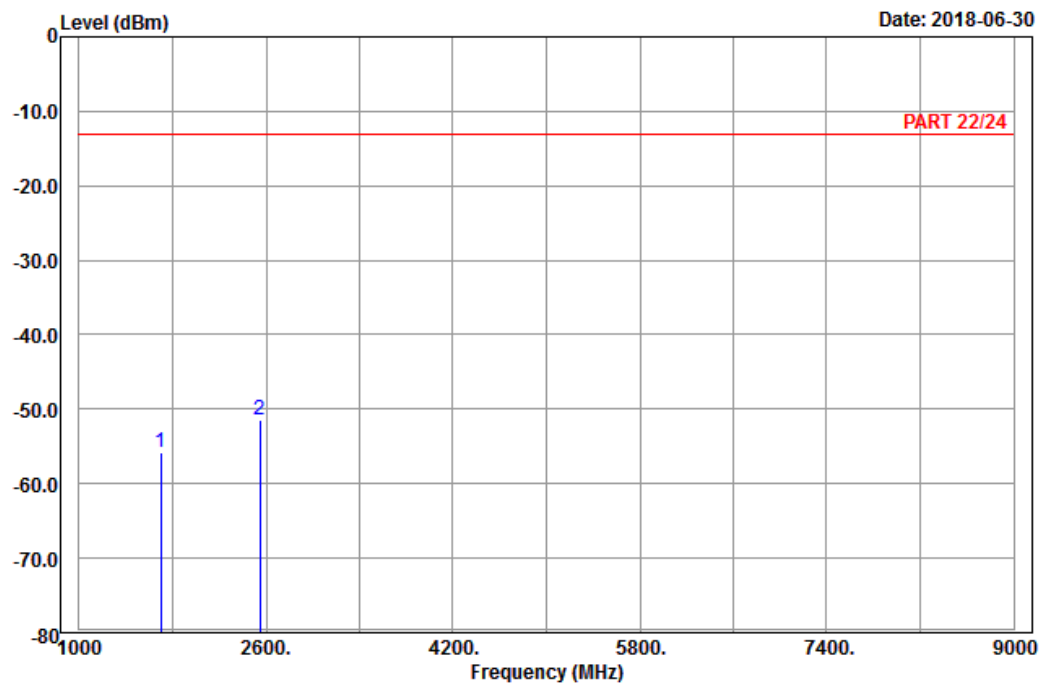
		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1696.60	-55.37	-63.51	-13.00	-42.37	8.14 Peak
2 pp	2544.90	-50.02	-61.49	-13.00	-37.02	11.47 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6



Site : 966 chamber 1
 Condition: PART 22/24 Vertical
 Remark : LTE_Band 5_Link_CH20643
 Tested by: Charles Hsiao

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1696.60	-55.74	-63.88	-13.00	-42.74	8.14	Peak
2 pp	2544.90	-51.49	-62.96	-13.00	-38.49	11.47	Peak

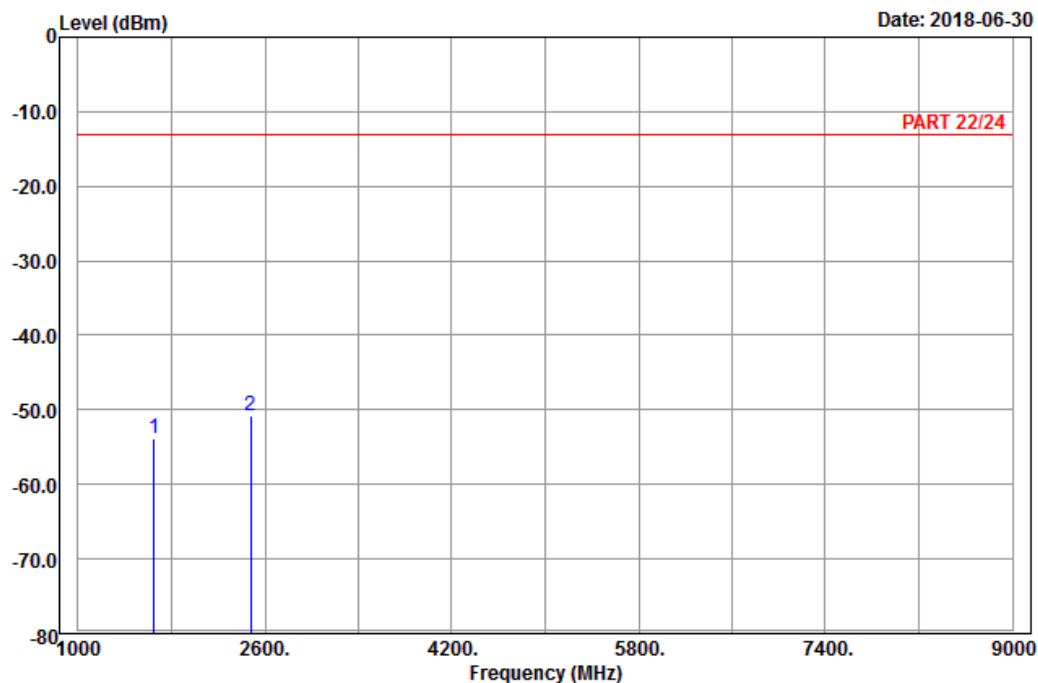
Channel Bandwidth: 5 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20425
Tested by: Charles Hsiao

		Read	Limit	Over			
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1653.00	-53.77	-61.50	-13.00	-40.77	7.73	Peak
2 pp	2479.50	-50.87	-61.90	-13.00	-37.87	11.03	Peak

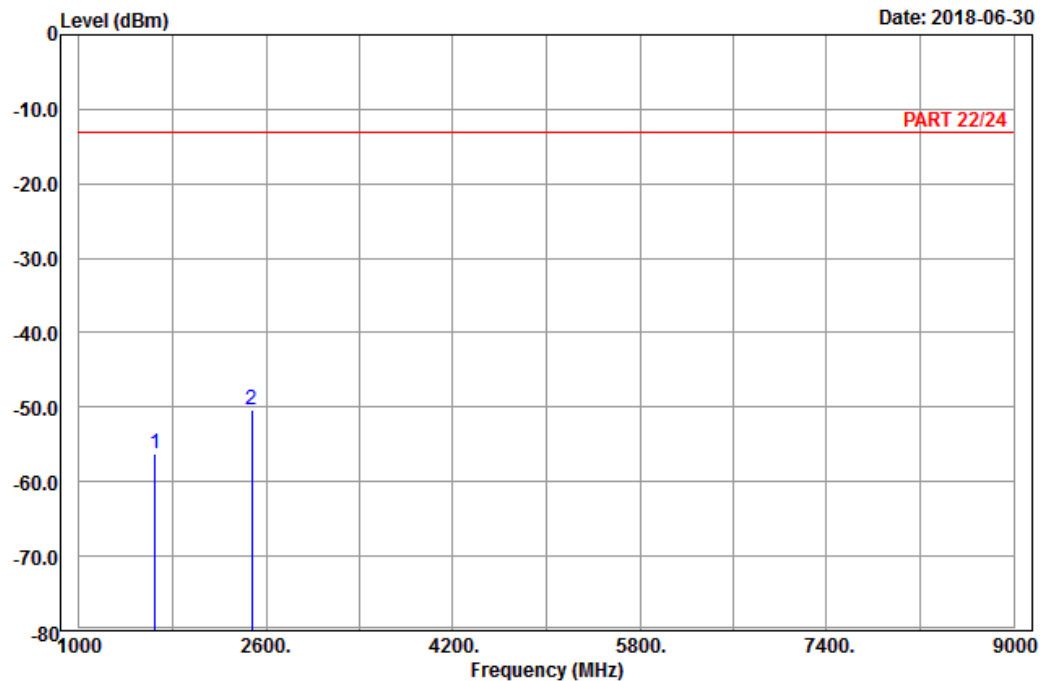


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-06-30



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20425
Tested by: Charles Hsiao

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1653.00	-56.14	-63.87	-13.00	-43.14	7.73	Peak
2 pp	2479.50	-50.31	-61.34	-13.00	-37.31	11.03	Peak

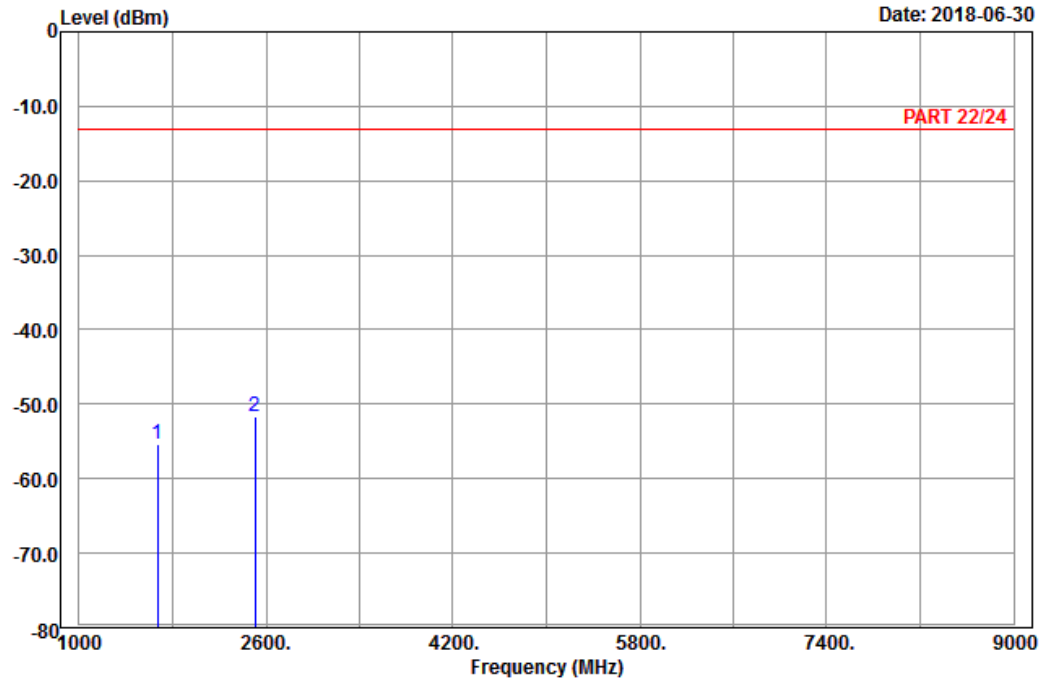
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20525
Tested by: Charles Hsiao

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1673.00	-55.47	-63.38	-13.00	-42.47	7.91 Peak
2	2509.50	-51.57	-62.85	-13.00	-38.57	11.28 Peak

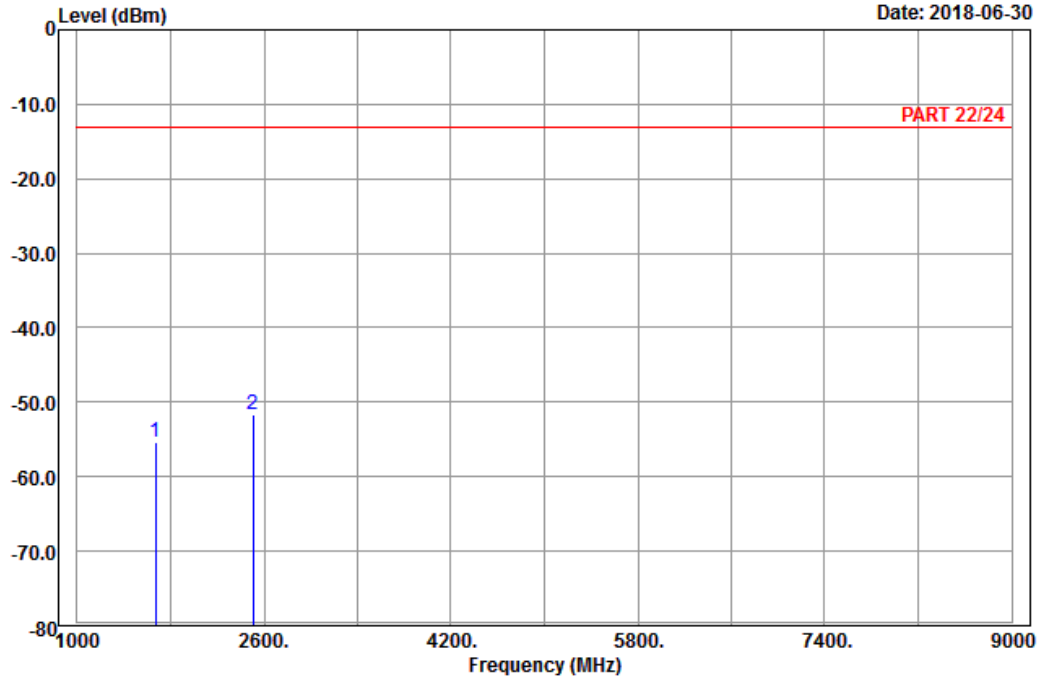


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-06-30



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20525
Tested by: Charles Hsiao

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1673.00	-55.30	-63.21	-13.00	-42.30	7.91	Peak
2 pp	2509.50	-51.77	-63.05	-13.00	-38.77	11.28	Peak

High Channel

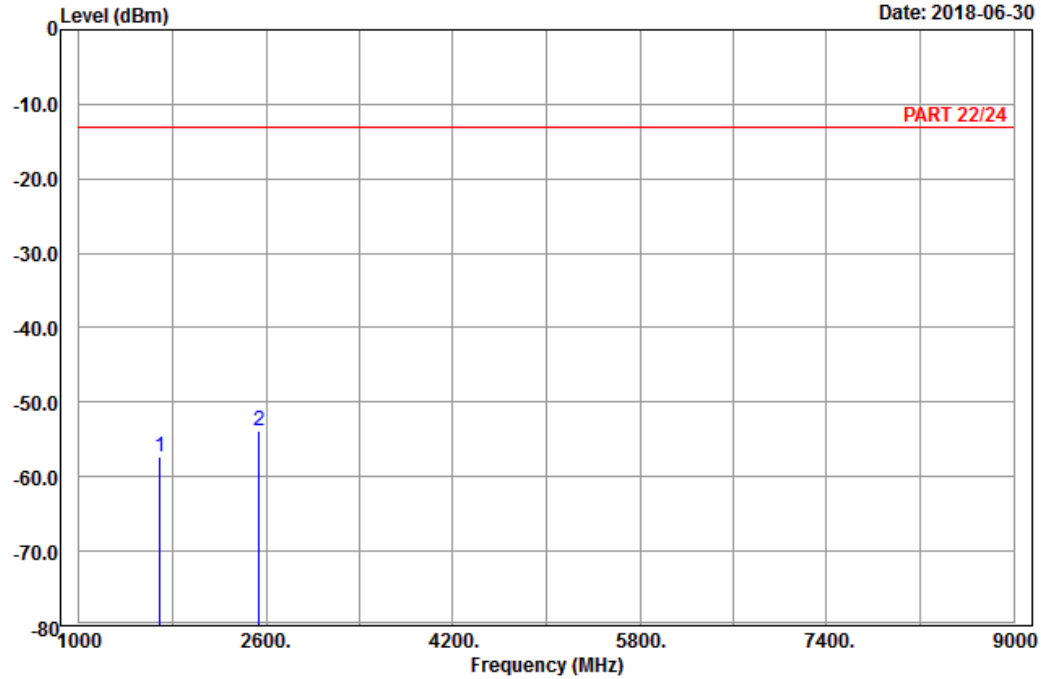


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-06-30



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20625
Tested by: Charles Hsiao

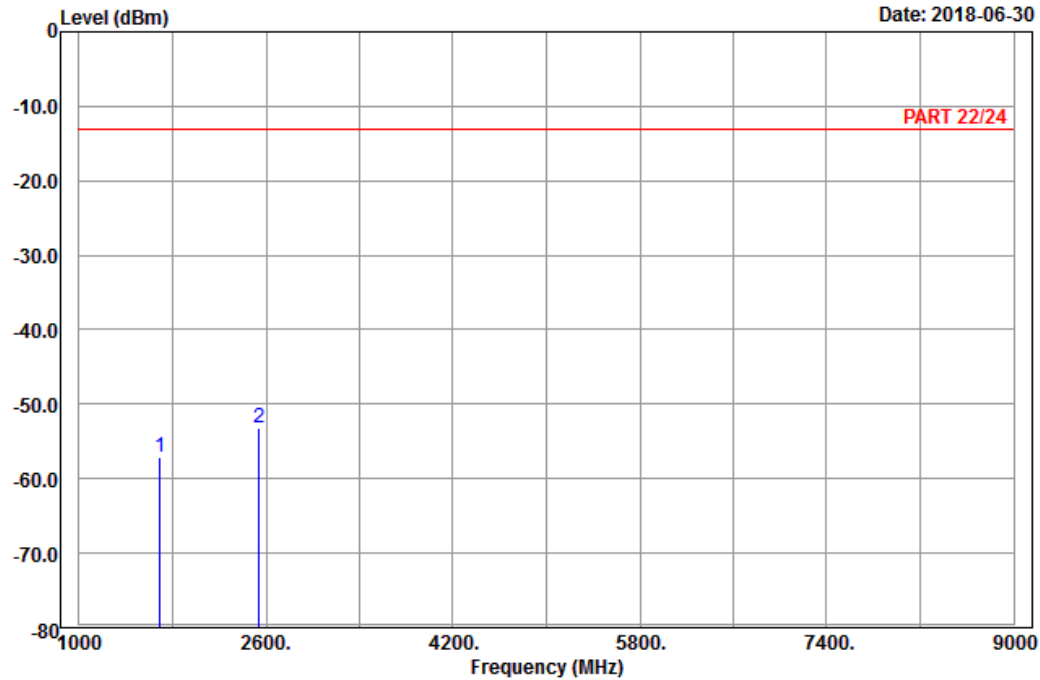
		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1693.00	-57.40	-65.42	-13.00	-44.40	8.02 Peak
2	2539.50	-53.85	-65.32	-13.00	-40.85	11.47 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20625
Tested by: Charles Hsiao

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1693.00	-57.10	-65.12	-13.00	-44.10	8.02	Peak
2 pp	2539.50	-53.11	-64.58	-13.00	-40.11	11.47	Peak

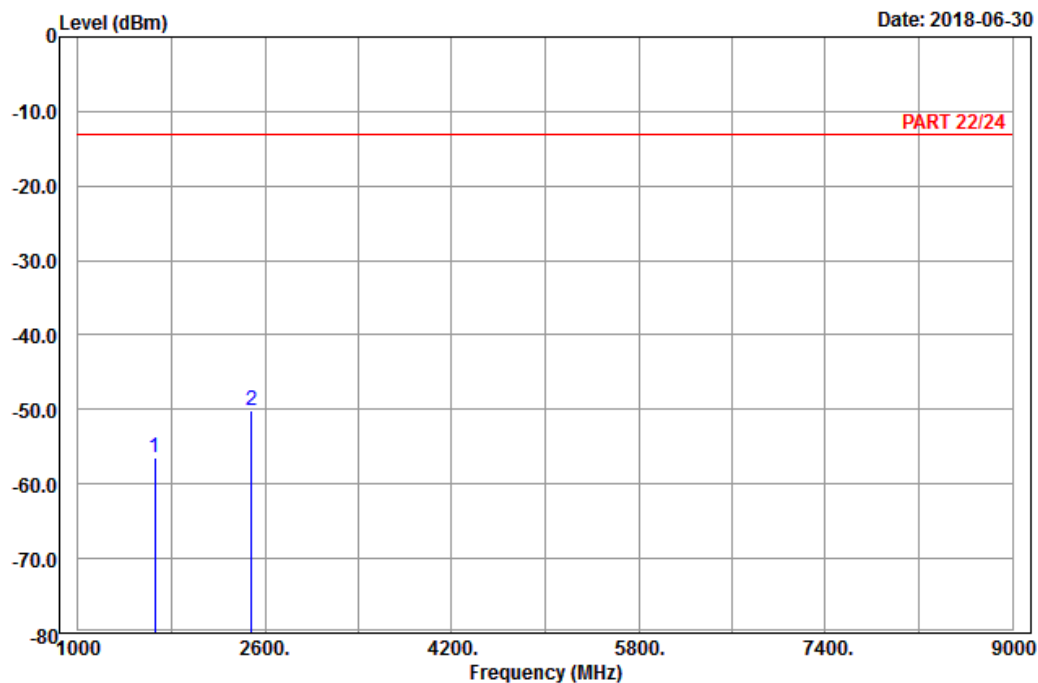
Channel Bandwidth: 10 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20450
Tested by: Charles Hsiao

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1658.00	-56.37	-64.28	-13.00	-43.37	7.91 Peak
2 pp	2487.00	-50.12	-61.16	-13.00	-37.12	11.04 Peak

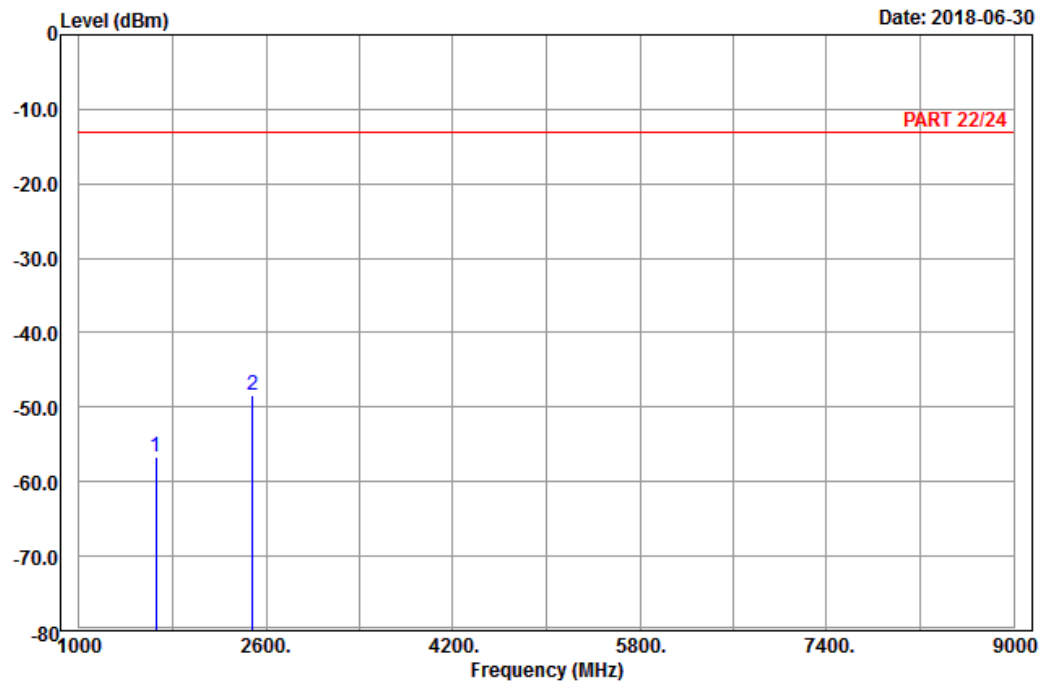


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-06-30



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20450
Tested by: Charles Hsiao

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1658.00	-56.66	-64.57	-13.00	-43.66	7.91	Peak
2 pp	2487.00	-48.42	-59.46	-13.00	-35.42	11.04	Peak

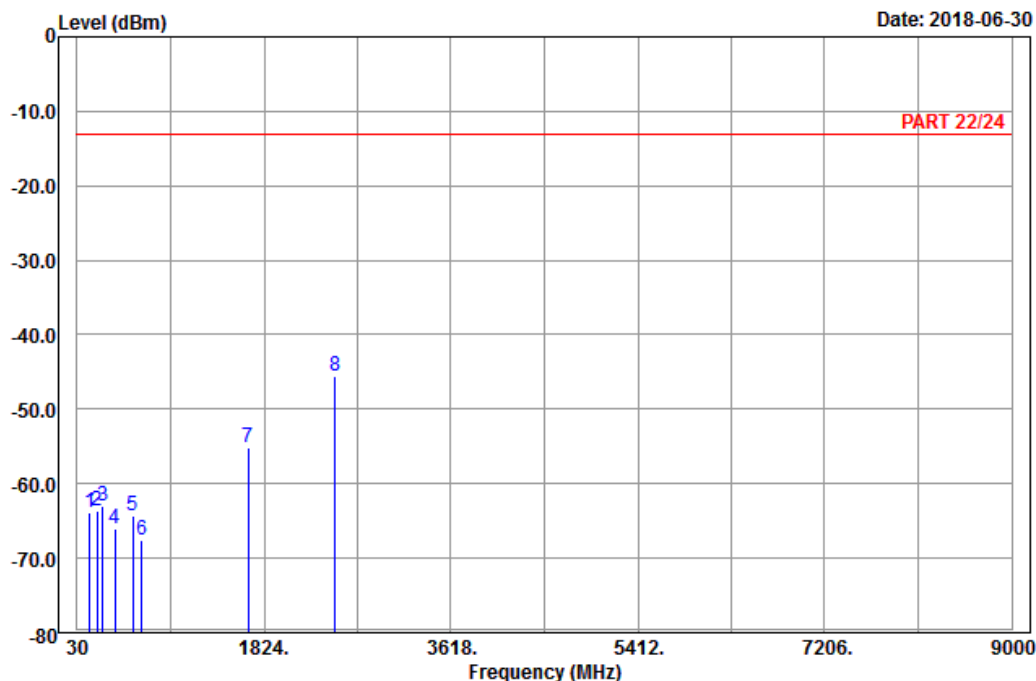
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20525
Tested by: Charles Hsiao

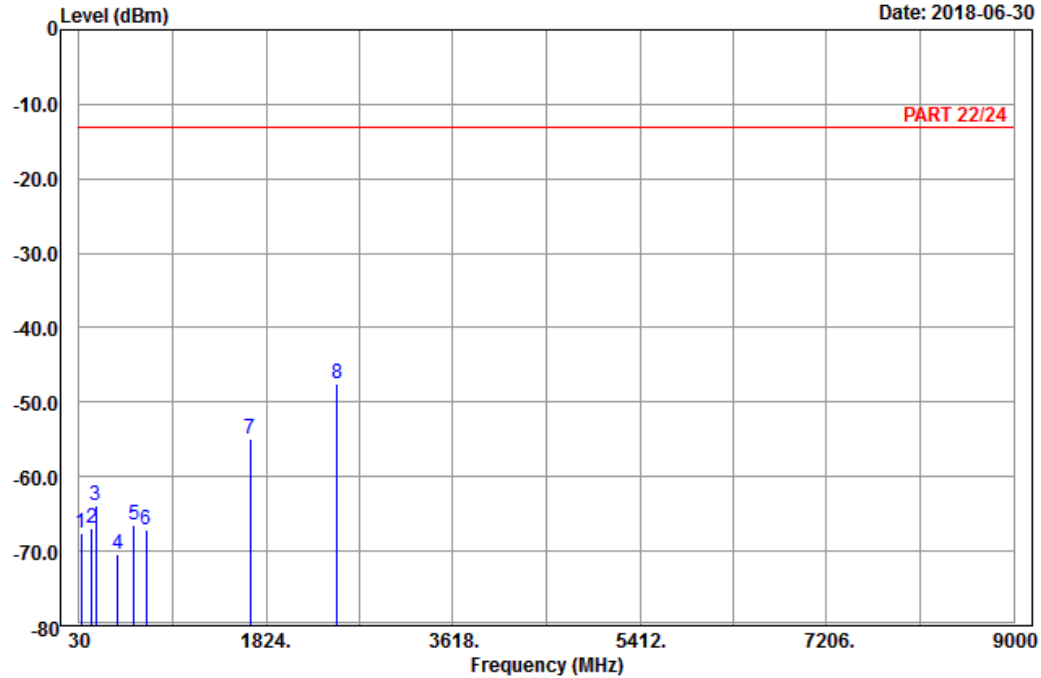
			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	150.96	-63.86	-55.94	-13.00	-50.86	-7.92	Peak
2	218.46	-63.58	-57.64	-13.00	-50.58	-5.94	Peak
3	275.97	-63.05	-57.30	-13.00	-50.05	-5.75	Peak
4	394.50	-66.08	-63.08	-13.00	-53.08	-3.00	Peak
5	567.40	-64.36	-63.42	-13.00	-51.36	-0.94	Peak
6	652.10	-67.66	-67.52	-13.00	-54.66	-0.14	Peak
7	1673.00	-55.17	-63.08	-13.00	-42.17	7.91	Peak
8 pp	2509.50	-45.62	-56.90	-13.00	-32.62	11.28	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20525
Tested by: Charles Hsiao

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	51.60	-67.56	-53.51	-13.00	-54.56	-14.05	Peak
2	152.58	-66.91	-59.02	-13.00	-53.91	-7.89	Peak
3	188.49	-63.89	-58.19	-13.00	-50.89	-5.70	Peak
4	402.90	-70.35	-67.55	-13.00	-57.35	-2.80	Peak
5	554.80	-66.59	-65.13	-13.00	-53.59	-1.46	Peak
6	675.20	-67.19	-66.93	-13.00	-54.19	-0.26	Peak
7	1673.00	-54.99	-62.90	-13.00	-41.99	7.91	Peak
8 pp	2509.50	-47.57	-58.85	-13.00	-34.57	11.28	Peak

High Channel

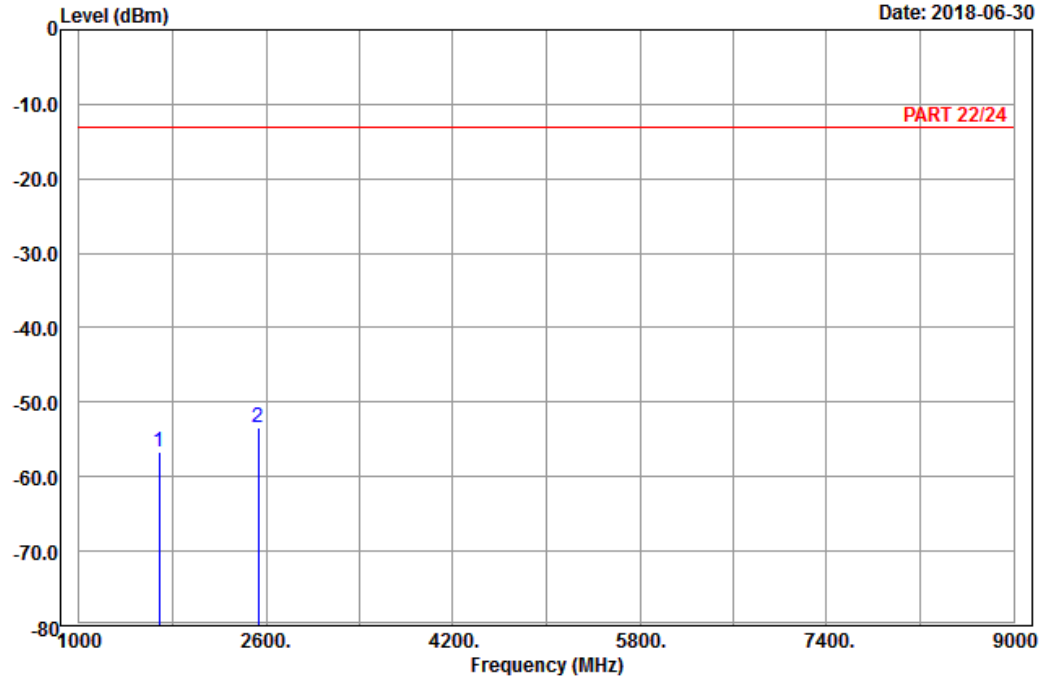


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-06-30



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 5_Link_CH20600
Tested by: Charles Hsiao

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	1688.00	-56.64	-64.66	-13.00	-43.64	8.02 Peak
2	2532.00	-53.32	-64.70	-13.00	-40.32	11.38 Peak

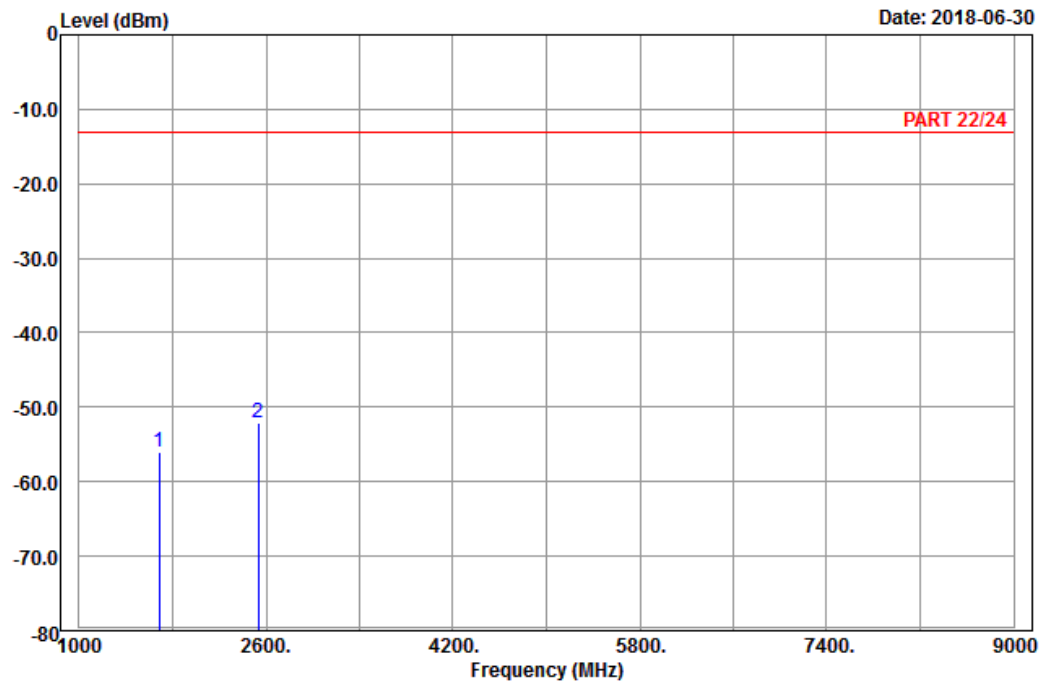


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-06-30



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20600
Tested by: Charles Hsiao

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1688.00	-55.99	-64.01	-13.00	-42.99	8.02	Peak
2 pp	2532.00	-52.12	-63.50	-13.00	-39.12	11.38	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

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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 ---