Partial FCC Test Report

(PART 22)

Report No.:	RF180802C04
FCC ID:	WIYT910
Test Model:	LE910-NA1
Received Date:	Aug. 02, 2018
Test Date:	Aug. 21, 2018
Issued Date:	Sep. 14, 2018
Applicant:	CASTLES TECHNOLOGY CO., LTD.
Address:	6F, NO. 207-5, SEC. 3, BEIXIN RD., XINDIAN DISTRICT, NEW TAIPEI CITY 23143, TAIWAN (R. O. C.)
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 (1):	No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil, Kwei Shan Dist., Taoyuan City 33383, Taiwan (R.O.C)
Test Location (2):	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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Release Control Record

Issue No.	Description	Date Issued
RF180802C04	Original Release	Sep. 14, 2018

1 Certificate of Conformity

Product:	LTE module
Brand:	Telit
Test Model:	LE910-NA1
Sample Status:	Identical Prototype
Applicant:	CASTLES TECHNOLOGY CO., LTD.
Test Date:	Aug. 21, 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 : _____ , **Date:** Sep. 14, 2018

Gina Liu / Specialist

Approved by : _____ , **Date:** Sep. 14, 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.
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 -34.63 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 ATL report no.: 1506FR22-01 and 1506FR21-01 for module (Brand: Telit, Model: LE910-NA V2)

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) (±)
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	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
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-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
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. 29, 2018	Jun. 28, 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 IC7450I-1.

3 General Information

3.1 General Description of EUT

Product	LTE module	
Brand	Telit	
Test Model	LE910-NA1	
Status of EUT	Identical Prototype	
Power Supply Rating	5.0 Vdc (adapter or host equipment) 3.7 Vdc (battery)	
Modulation Type	WCDMA	QPSK
	LTE	QPSK, 16QAM
Max. ERP Power	WCDMA	161.81 mW
	LTE 5 (Channel Bandwidth: 1.4 MHz)	144.88 mW
	LTE 5 (Channel Bandwidth: 3 MHz)	145.88 mW
	LTE 5 (Channel Bandwidth: 5 MHz)	146.89 mW
	LTE 5 (Channel Bandwidth: 10 MHz)	147.91 mW
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
Antenna Type	Dipole Antenna with 1.19 dBi gain	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

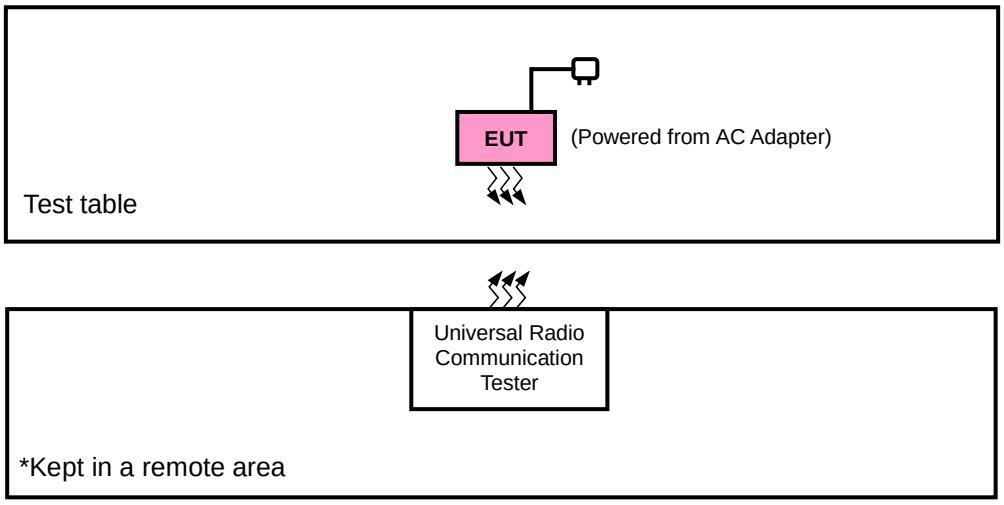
1. The EUT was installed in POS Terminal (Brand: CASTLES TECHNOLOGY, Model: VEGA3000).
2. The EUT contains following accessory devices.

Product	Brand	Model	Description
USB Cable	CHANG YANG ELECTRON CO., LTD.	CY-AS-HK0059	1 m

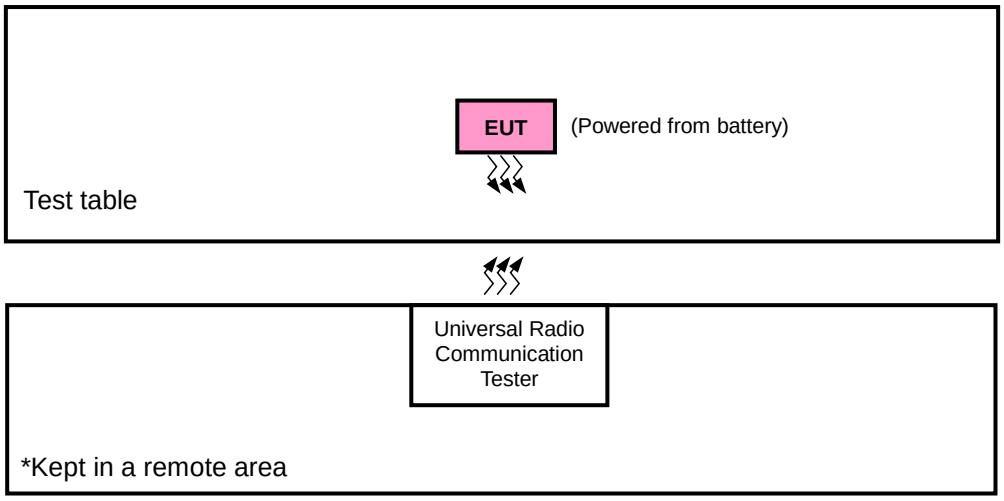
3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.I.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.	Adapter	LUCENT	1A52-UB52A	N/A	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. Item 1 was provided by client.

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	X-plane	Z-axis
LTE Band 5	X-plane	Z-axis

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	4132 to 4233	4132, 4182, 4233	WCDMA
-	Radiated Emission below 1GHz	4132 to 4233	4233	WCDMA
-	Radiated Emission above 1GHz	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 / 2 RB Offset
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK, 16QAM	1 RB / 7 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
-	Radiated Emission below 1GHz	20450 to 20600	20450	10 MHz	QPSK	1 RB / 24 RB Offset
-	Radiated Emission above 1GHz	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK	1 RB / 2 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK	1 RB / 12 RB Offset
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK	1 RB / 24 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	3.7 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:

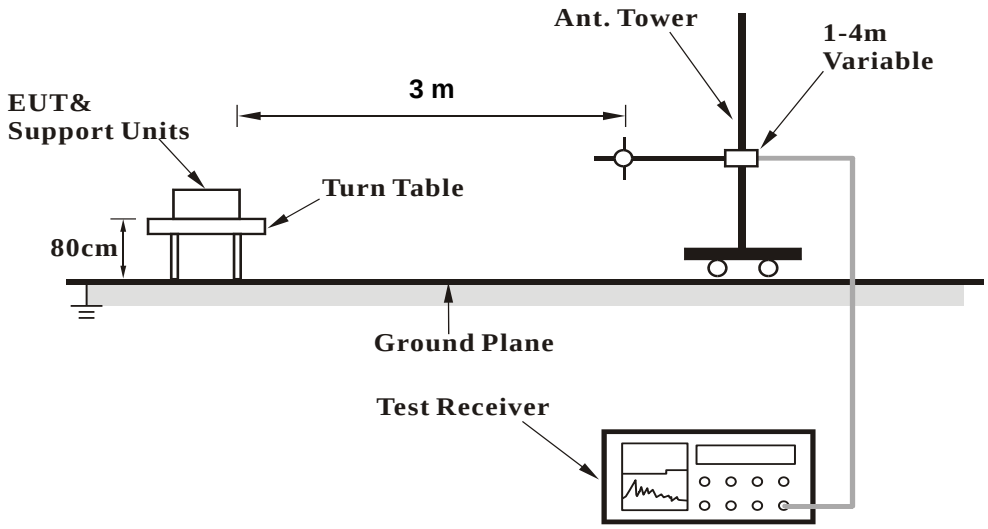
a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1 MHz for GSM, GPRS & EDGE, and 5 MHz for WCDMA and CDMA, and 10 MHz for LTE mode.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or 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 = 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:

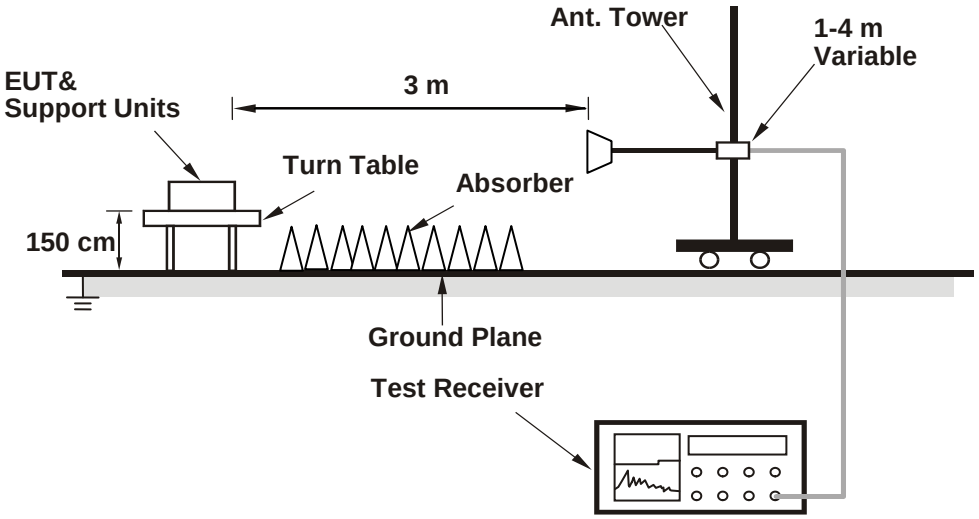
The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA, and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

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

Conducted Output Power (dBm)

Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	22.80	22.89	22.81
HSDPA Subtest-1	22.73	22.74	22.74
HSDPA Subtest-2	22.33	22.34	22.34
HSDPA Subtest-3	21.78	21.79	21.79
HSDPA Subtest-4	21.61	21.62	21.62
DC-HSDPA Subtest-1	22.66	22.67	22.67
DC-HSDPA Subtest-2	22.26	22.27	22.27
DC-HSDPA Subtest-3	21.71	21.72	21.72
DC-HSDPA Subtest-4	21.54	21.55	21.55
HSUPA Subtest-1	22.21	22.30	22.30
HSUPA Subtest-2	20.02	20.11	20.11
HSUPA Subtest-3	21.13	21.22	21.22
HSUPA Subtest-4	20.13	20.22	20.22
HSUPA Subtest-5	22.45	22.41	22.43

LTE Band 5

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20450	20525	20600				Channel		20425	20525	20625	
		Frequency (MHz)		829.0	836.5	844.0				Frequency (MHz)		826.5	836.5	846.5	
10M	QPSK	1	0	22.70	22.79	22.71	0	5M	QPSK	1	0	22.67	22.76	22.68	0
		1	24	22.12	22.21	22.21	0			1	12	22.09	22.18	22.18	0
		1	49	22.00	22.09	22.09	0			1	24	21.97	22.06	22.06	0
		25	0	21.63	21.72	21.72	1			12	0	21.60	21.69	21.69	1
		25	12	21.65	21.74	21.74	1			12	6	21.62	21.71	21.71	1
		25	25	21.63	21.72	21.72	1			12	13	21.60	21.69	21.69	1
		50	0	21.61	21.70	21.70	1			25	0	21.58	21.67	21.67	1
	16QAM	1	0	21.67	21.76	21.68	1		16QAM	1	0	21.64	21.73	21.65	1
		1	24	21.09	21.18	21.18	1			1	12	21.06	21.15	21.15	1
		1	49	20.97	21.06	21.06	1			1	24	20.94	21.03	21.03	1
		25	0	20.60	20.69	20.69	2			12	0	20.57	20.66	20.66	2
		25	12	20.62	20.71	20.71	2			12	6	20.59	20.68	20.68	2
		25	25	20.60	20.69	20.69	2			12	13	20.57	20.66	20.66	2
		50	0	20.58	20.67	20.67	2			25	0	20.55	20.64	20.64	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20415	20525	20635				Channel		20407	20525	20643	
		Frequency (MHz)		825.5	836.5	847.5				Frequency (MHz)		824.7	836.5	848.3	
3M	QPSK	1	0	22.63	22.72	22.64	0	1.4M	QPSK	1	0	22.60	22.69	22.61	0
		1	7	22.05	22.14	22.14	0			1	2	22.02	22.11	22.11	0
		1	14	21.93	22.02	22.02	0			1	5	21.90	21.99	21.99	0
		8	0	21.56	21.65	21.65	1			3	0	21.53	21.62	21.62	0
		8	3	21.58	21.67	21.67	1			3	1	21.55	21.64	21.64	0
		8	7	21.56	21.65	21.65	1			3	3	21.53	21.62	21.62	0
		15	0	21.54	21.63	21.63	1			6	0	21.51	21.60	21.60	1
	16QAM	1	0	21.60	21.69	21.61	1		16QAM	1	0	21.57	21.66	21.58	1
		1	7	21.02	21.11	21.11	1			1	2	20.99	21.08	21.08	1
		1	14	20.90	20.99	20.99	1			1	5	20.87	20.96	20.96	1
		8	0	20.53	20.62	20.62	2			3	0	20.50	20.59	20.59	1
		8	3	20.55	20.64	20.64	2			3	1	20.52	20.61	20.61	1
		8	7	20.53	20.62	20.62	2			3	3	20.50	20.59	20.59	1
		15	0	20.51	20.60	20.60	2			6	0	20.48	20.57	20.57	2

ERP Power (dBm)

WCDMA							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	4132	826.4	-7.02	31.208	22.04	159.88	H
	4182	836.4	-7.06	31.3	22.09	161.81	
	4233	846.6	-7.04	31.222	22.03	159.66	
	4132	826.4	-10.32	31.504	19.03	80.06	V
	4182	836.4	-9.89	31.117	19.08	80.85	
	4233	846.6	-10.73	31.922	19.04	80.20	

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)**
X	20407	824.7	-7.55	31.208	21.51	141.51	H
	20525	836.5	-7.54	31.3	21.61	144.88	
	20643	848.3	-7.53	31.222	21.54	142.63	
	20407	824.7	-10.82	31.504	18.53	71.35	V
	20525	836.5	-10.37	31.117	18.60	72.39	
	20643	848.3	-11.25	31.922	18.52	71.15	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	20407	824.7	-8.56	31.208	20.50	112.15	H
	20525	836.5	-8.55	31.3	20.60	114.82	
	20643	848.3	-8.54	31.222	20.53	113.03	
	20407	824.7	-11.84	31.504	17.51	56.42	V
	20525	836.5	-11.39	31.117	17.58	57.24	
	20643	848.3	-12.28	31.922	17.49	56.13	

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)
X	20415	825.5	-7.51	31.208	21.55	142.82	H
	20525	836.5	-7.51	31.3	21.64	145.88	
	20635	847.5	-7.50	31.222	21.57	143.62	
	20415	825.5	-10.78	31.504	18.57	72.01	V
	20525	836.5	-10.34	31.117	18.63	72.90	
	20635	847.5	-11.20	31.922	18.57	71.98	
Channel Bandwidth: 3 MHz / 16QAM							
X	20415	825.5	-8.52	31.208	20.54	113.19	H
	20525	836.5	-8.52	31.3	20.63	115.61	
	20635	847.5	-8.51	31.222	20.56	113.82	
	20415	825.5	-11.79	31.504	17.56	57.07	V
	20525	836.5	-11.35	31.117	17.62	57.77	
	20635	847.5	-12.22	31.922	17.55	56.91	

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)
X	20425	826.5	-7.48	31.208	21.58	143.81	H
	20525	836.5	-7.48	31.3	21.67	146.89	
	20625	846.5	-7.47	31.222	21.60	144.61	
	20425	826.5	-10.74	31.504	18.61	72.68	V
	20525	836.5	-10.30	31.117	18.67	73.57	
	20625	846.5	-11.16	31.922	18.61	72.64	
Channel Bandwidth: 5 MHz / 16QAM							
X	20425	826.5	-7.50	31.208	21.56	143.15	H
	20525	836.5	-7.49	31.3	21.66	146.55	
	20625	846.5	-7.48	31.222	21.59	144.28	
	20425	826.5	-11.75	31.504	17.60	57.60	V
	20525	836.5	-11.32	31.117	17.65	58.17	
	20625	846.5	-12.17	31.922	17.60	57.57	

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)**
X	20450	829.0	-7.44	31.208	21.62	145.14	H
	20525	836.5	-7.45	31.3	21.70	147.91	
	20600	844.0	-7.43	31.222	21.64	145.95	
	20450	829.0	-10.71	31.504	18.64	73.18	V
	20525	836.5	-10.26	31.117	18.71	74.25	
	20600	844.0	-11.12	31.922	18.65	73.32	
Channel Bandwidth: 10 MHz / 16QAM							
X	20425	826.5	-8.46	31.208	20.60	114.76	H
	20525	836.5	-8.47	31.3	20.68	116.95	
	20625	846.5	-8.45	31.222	20.62	115.40	
	20425	826.5	-11.72	31.504	17.63	58.00	V
	20525	836.5	-11.27	31.117	17.70	58.84	
	20625	846.5	-12.13	31.922	17.64	58.10	

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.

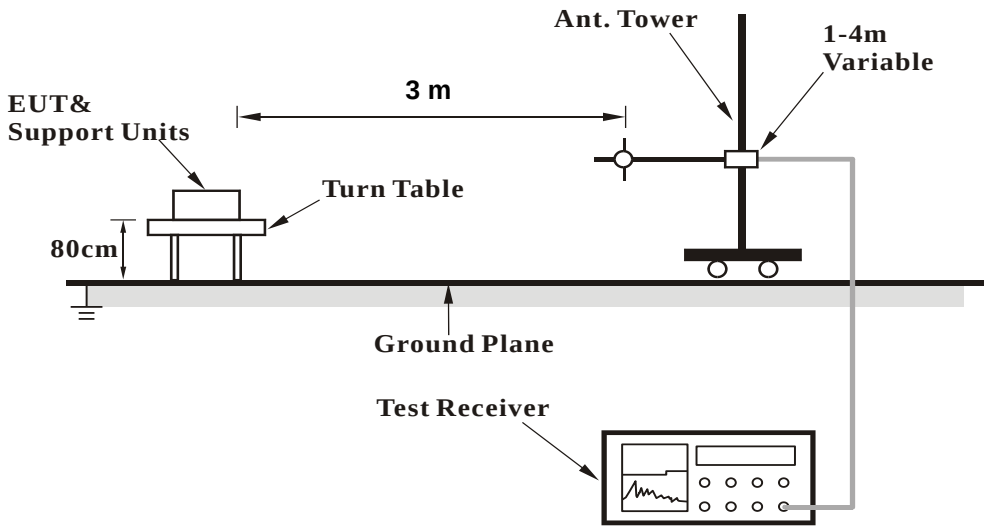
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.2.3 Deviation from Test Standard

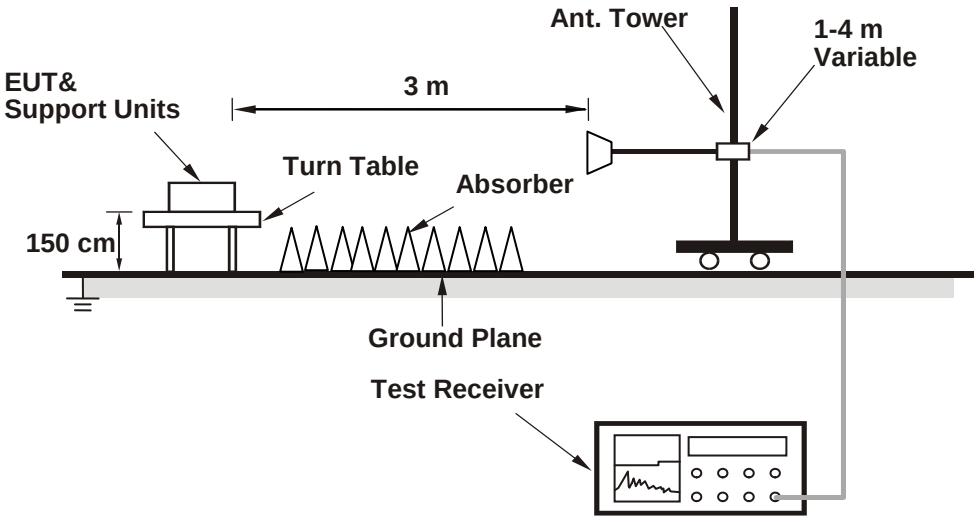
No deviation.

4.2.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



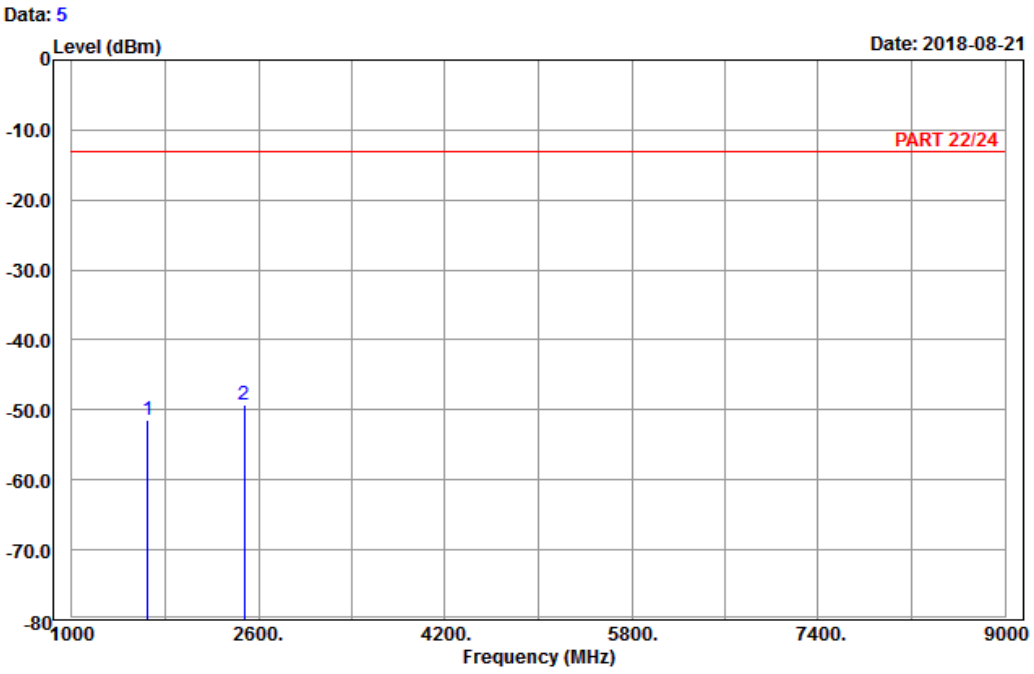
For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.5 Test Results

WCDMA:

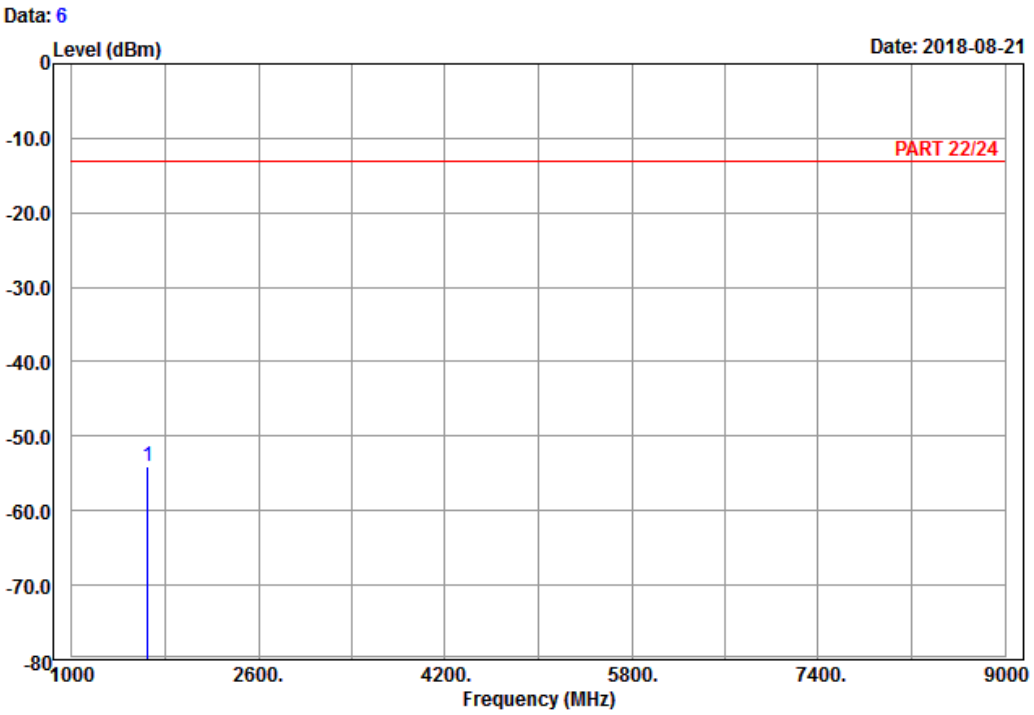
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




```
Site      : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark    : Band V_Link_CH4132
Tested by: Charles Hsiao
                          Read  Limit   Over
           Freq  Level  Level   Line  Limit Factor Remark
          _______ _____ _____ _____ _____ _____ _________
                MHz   dBm   dBm   dBm    dB    dB

  1     1652.80 -51.36 -59.09 -13.00 -38.36  7.73 Peak
  2 pp  2479.20 -49.19 -60.22 -13.00 -36.19 11.03 Peak
```

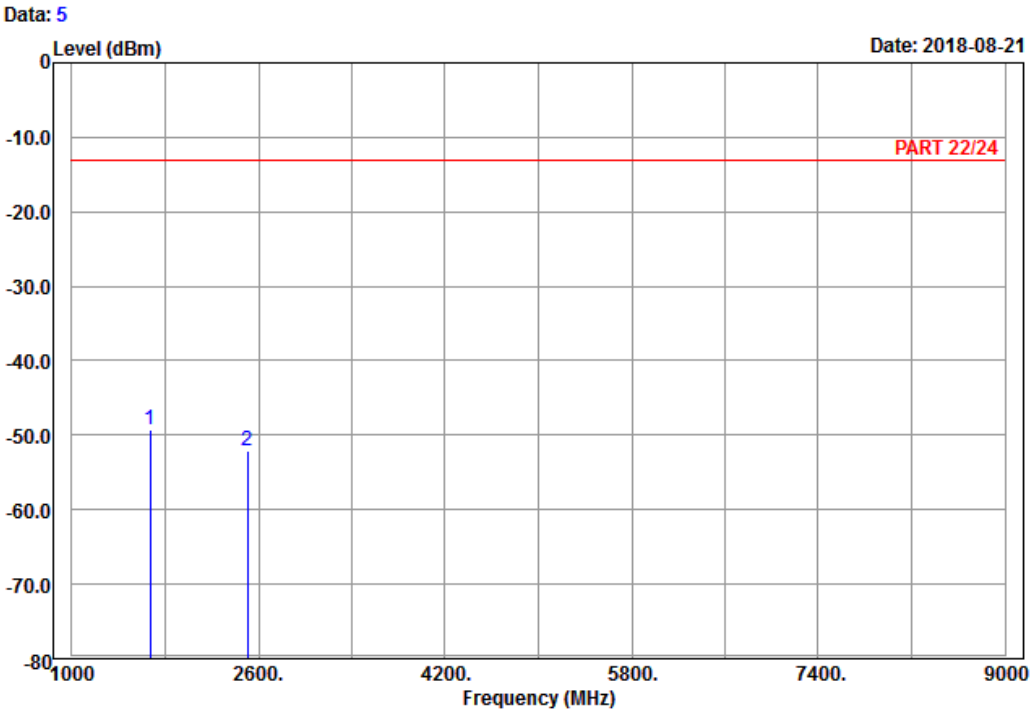


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band V_Link_CH4132
Tested by: Charles Hsiao

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1652.80	-53.97	-61.70	-13.00	-40.97	7.73	Peak

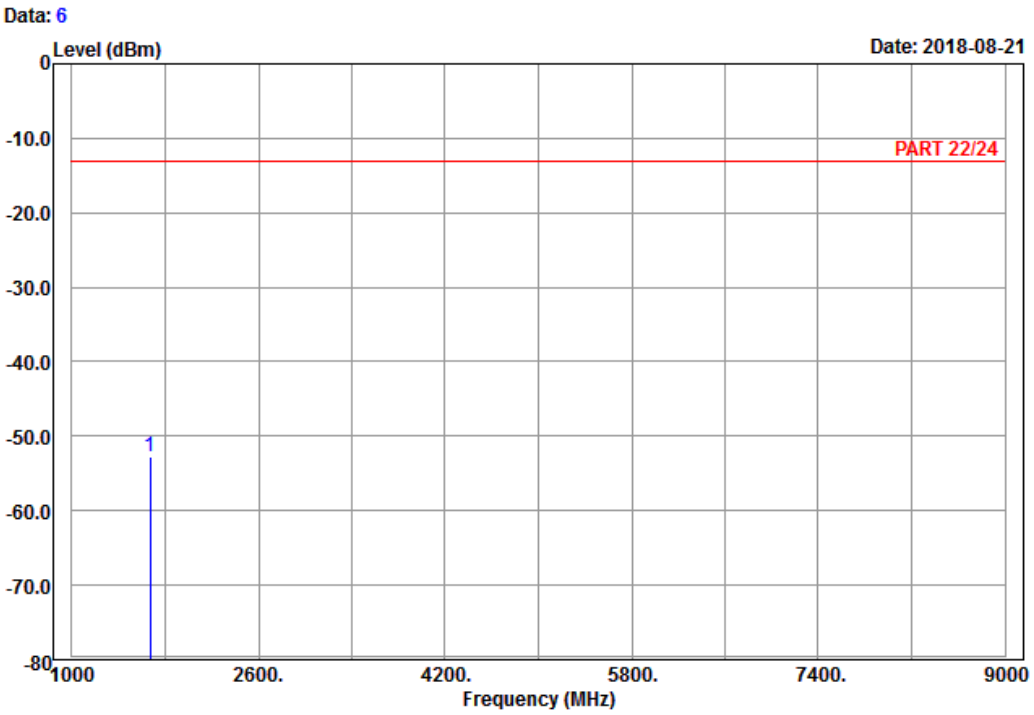
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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 pp	1672.80	-49.33	-57.24	-13.00	-36.33	7.91	Peak
2	2509.20	-52.19	-63.47	-13.00	-39.19	11.28	Peak

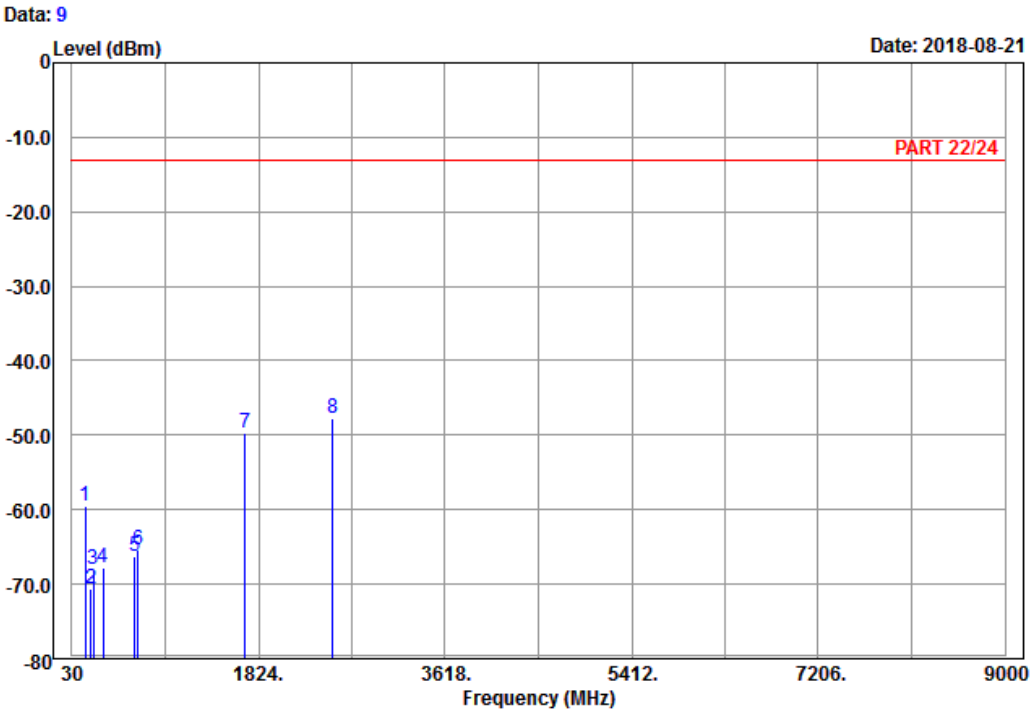


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band V_Link_CH4182
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1672.80	-52.86	-60.77	-13.00	-39.86	7.91	Peak

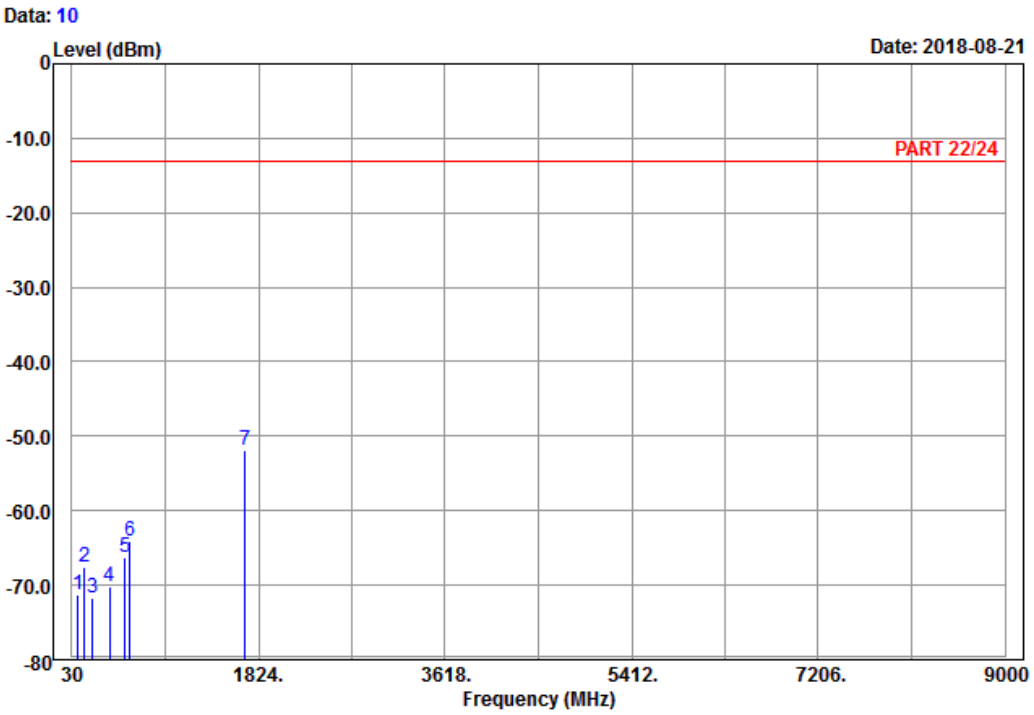
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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	158.52	-59.56	-51.84	-13.00	-46.56	-7.72	Peak
2	213.06	-70.65	-64.65	-13.00	-57.65	-6.00	Peak
3	237.90	-67.99	-62.31	-13.00	-54.99	-5.68	Peak
4	332.90	-67.86	-62.28	-13.00	-54.86	-5.58	Peak
5	636.00	-66.26	-66.28	-13.00	-53.26	0.02	Peak
6	661.90	-65.43	-65.24	-13.00	-52.43	-0.19	Peak
7	1693.20	-49.78	-57.92	-13.00	-36.78	8.14	Peak
8 pp	2539.80	-47.63	-59.10	-13.00	-34.63	11.47	Peak

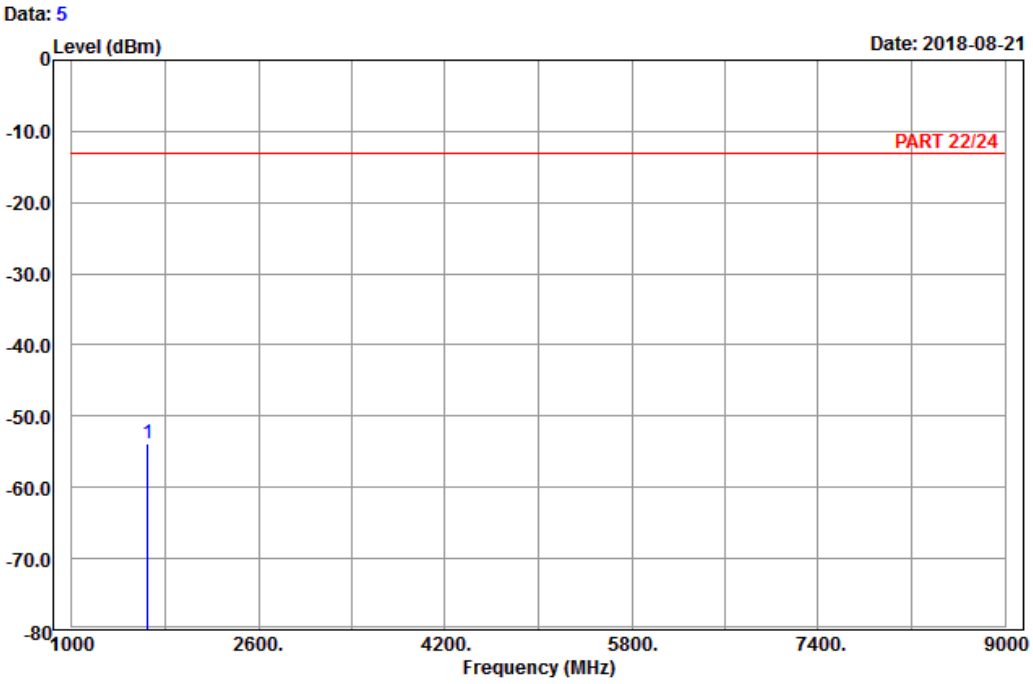


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band V_Link_CH4233
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	88.86	-71.39	-60.61	-13.00	-58.39	-10.78	Peak
2	154.20	-67.60	-59.76	-13.00	-54.60	-7.84	Peak
3	227.37	-71.61	-65.79	-13.00	-58.61	-5.82	Peak
4	393.10	-70.09	-66.99	-13.00	-57.09	-3.10	Peak
5	538.70	-66.17	-63.66	-13.00	-53.17	-2.51	Peak
6	588.40	-63.98	-63.93	-13.00	-50.98	-0.05	Peak
7 pp	1693.20	-51.98	-60.12	-13.00	-38.98	8.14	Peak

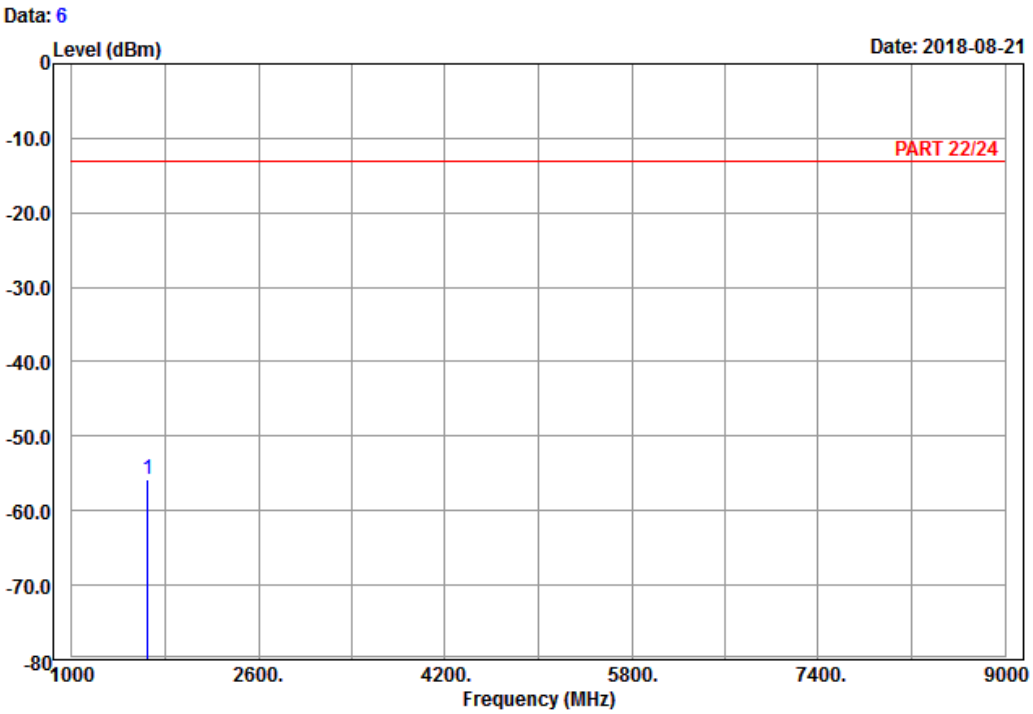
LTE Band 5
Channel Bandwidth: 1.4 MHz / QPSK
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1649.40	-53.91	-61.64	-13.00	-40.91	7.73	Peak

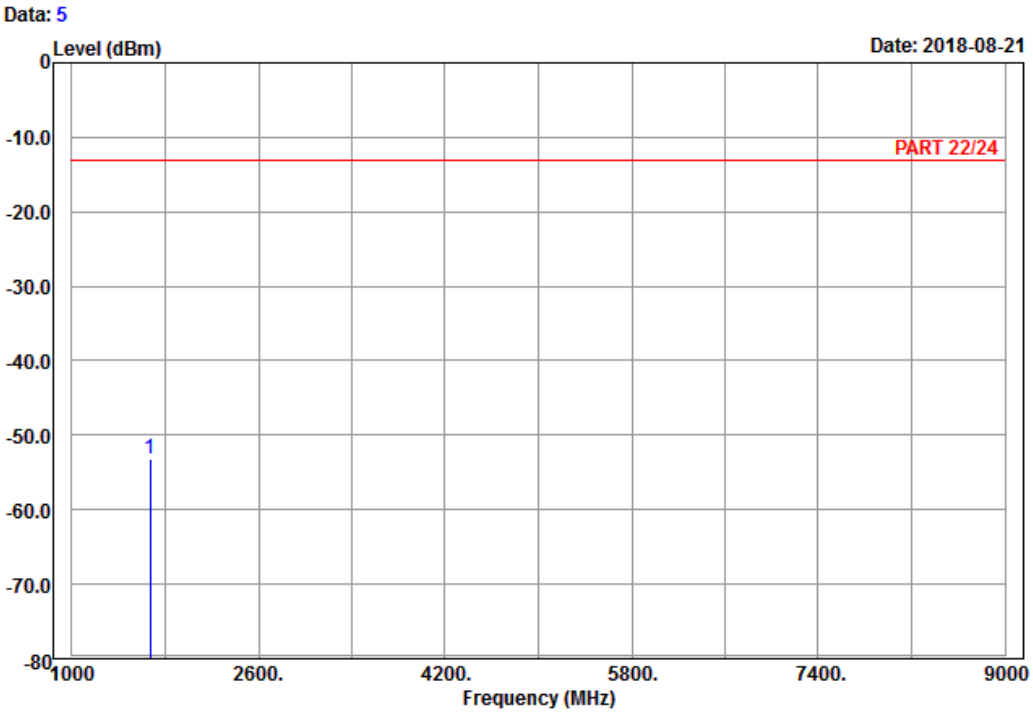


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20407
Tested by: Harry Hsueh

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1649.40	-55.70	-63.43	-13.00	-42.70	7.73	Peak

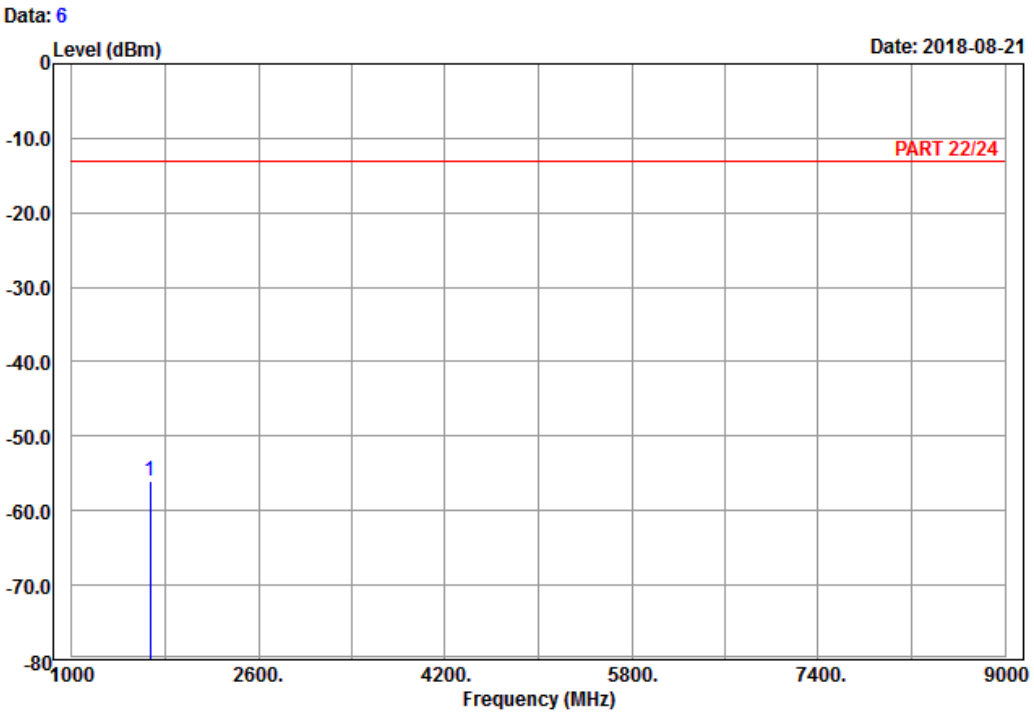
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1673.00	-53.16	-61.07	-13.00	-40.16	7.91	Peak

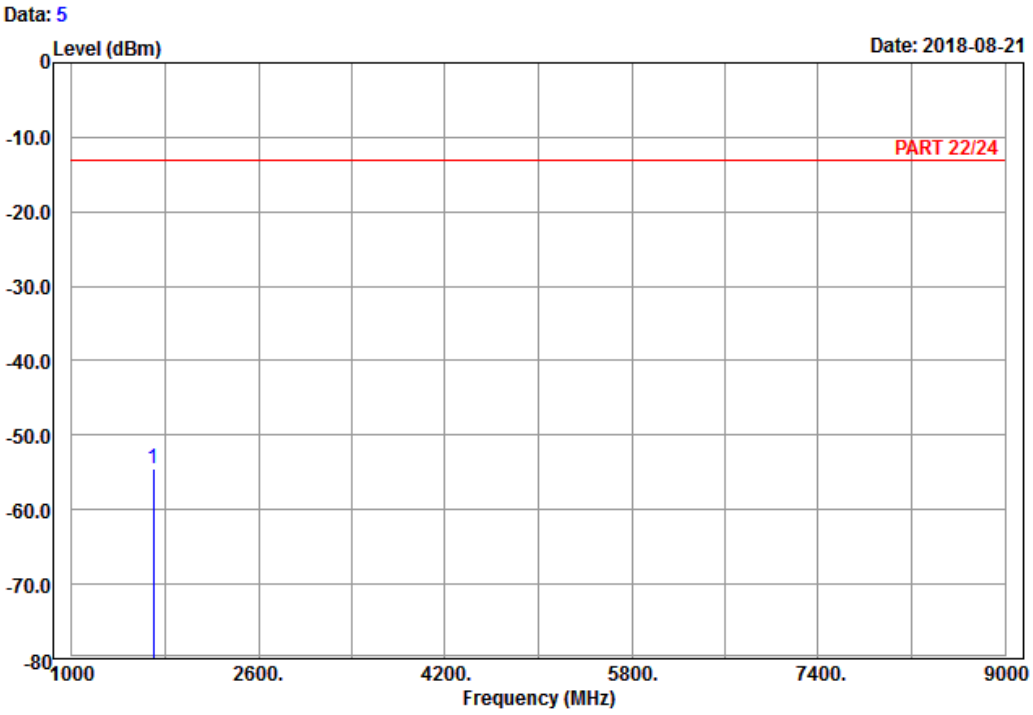


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20525
Tested by: Harry Hsueh

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1673.00	-55.97	-63.88	-13.00	-42.97	7.91	Peak

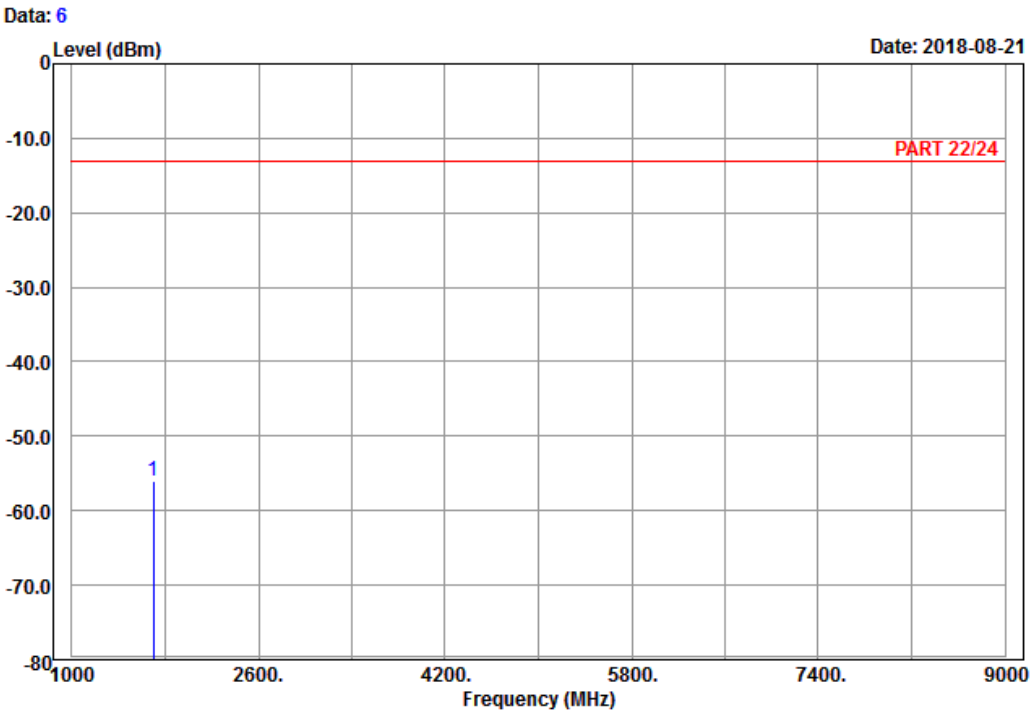
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1696.60	-54.51	-62.65	-13.00	-41.51	8.14	Peak

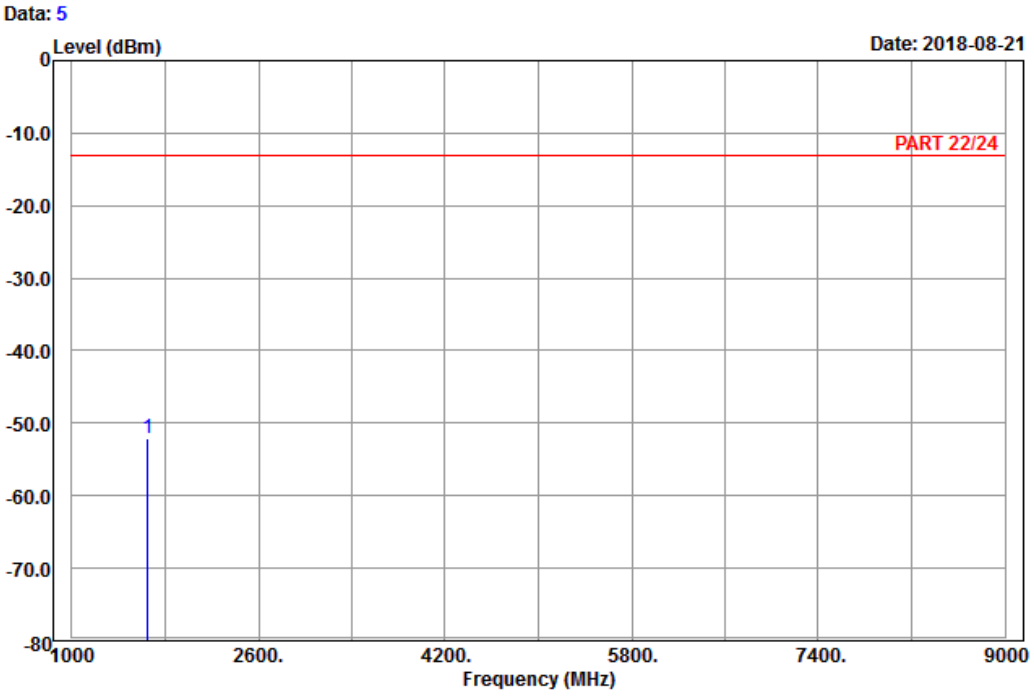


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20643
Tested by: Harry Hsueh

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1696.60	-56.07	-64.21	-13.00	-43.07	8.14	Peak

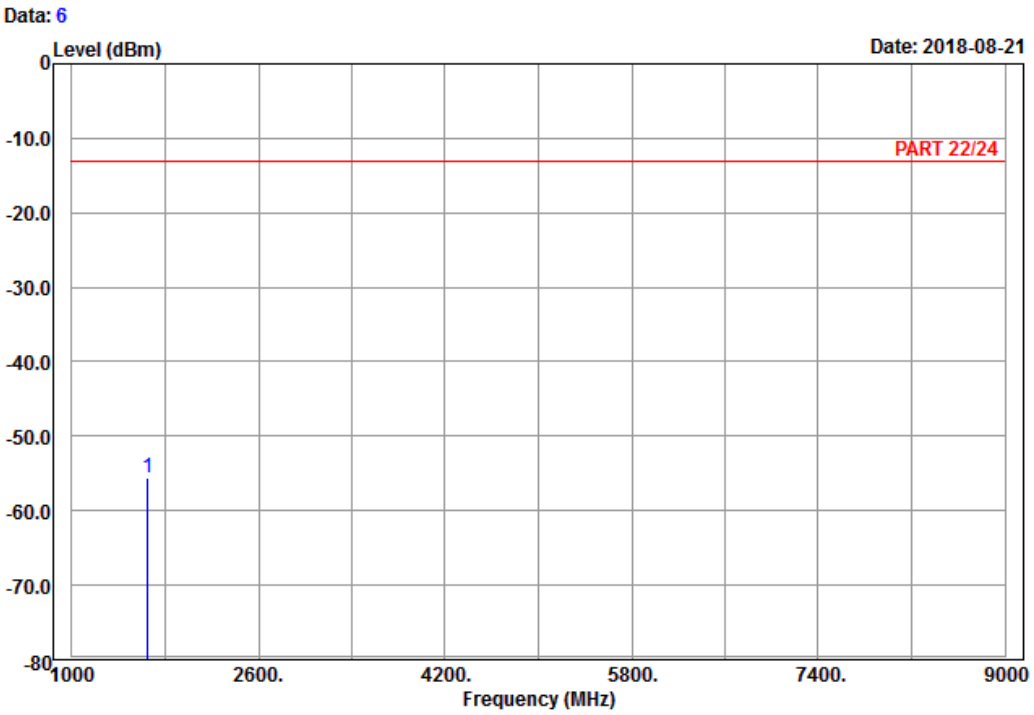
Channel Bandwidth: 5 MHz / QPSK
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1653.00	-52.12	-59.85	-13.00	-39.12	7.73	Peak

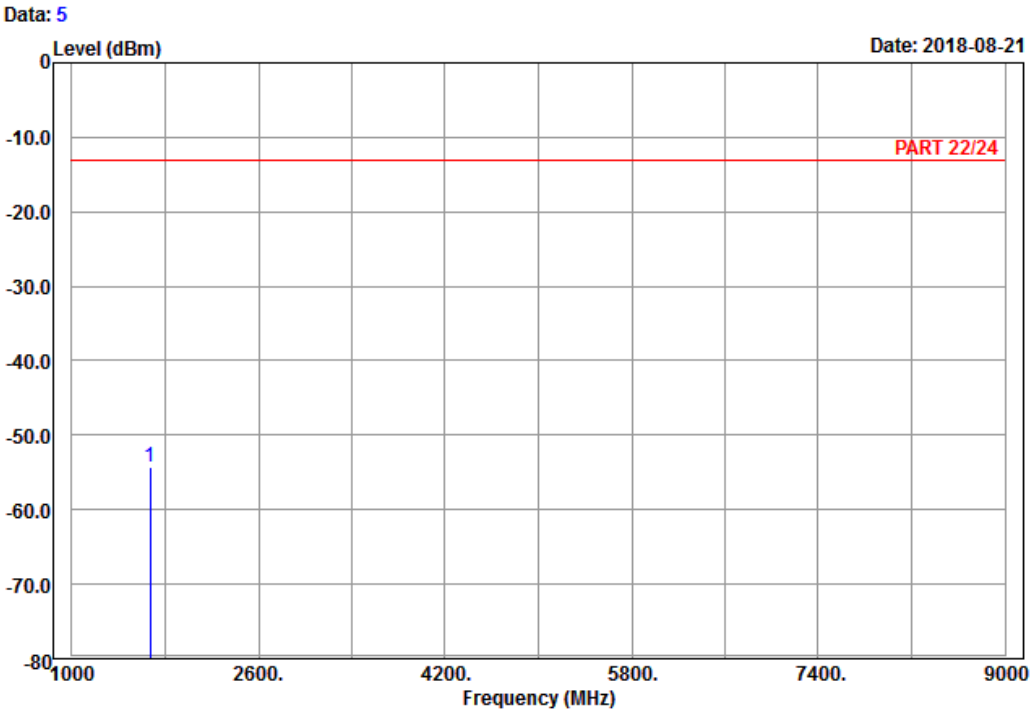


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20425
Tested by: Harry Hsueh

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1653.00	-55.50	-63.23	-13.00	-42.50	7.73	Peak

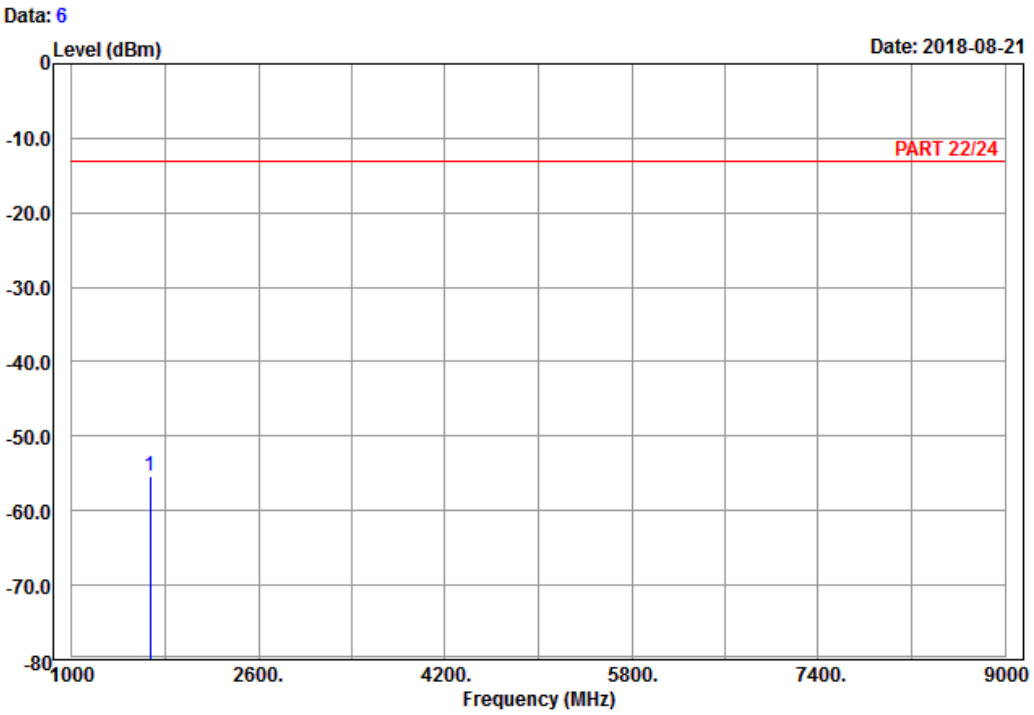
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1673.00	-54.25	-62.16	-13.00	-41.25	7.91	Peak

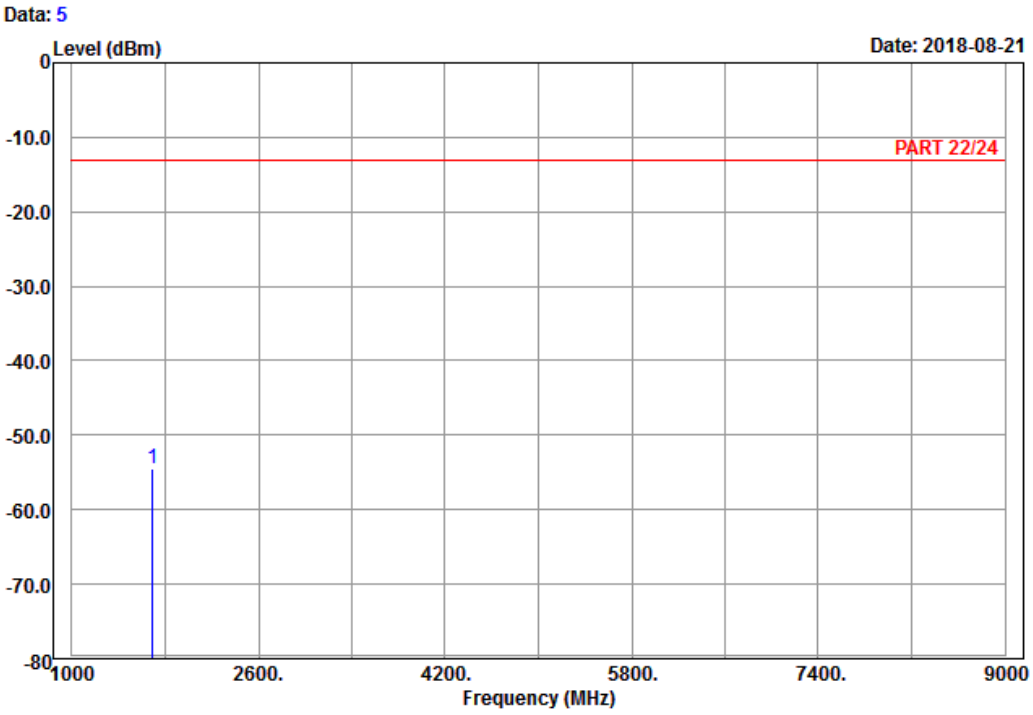


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20525
Tested by: Harry Hsueh

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1673.00	-55.26	-63.17	-13.00	-42.26	7.91	Peak

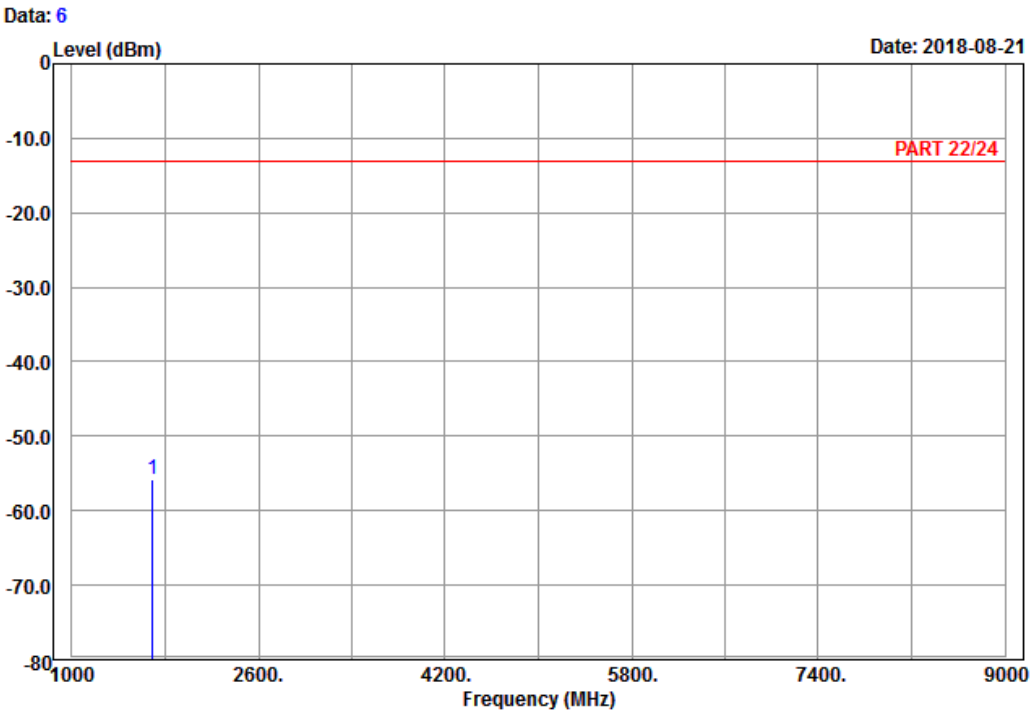
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1693.00	-54.46	-62.48	-13.00	-41.46	8.02	Peak

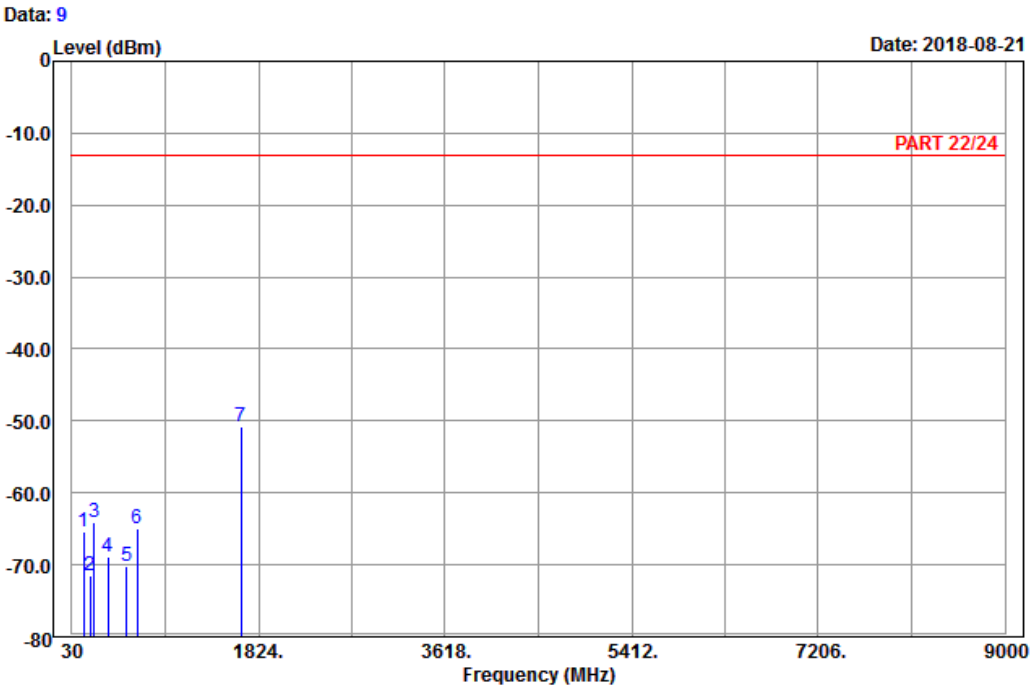


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20625
Tested by: Harry Hsueh

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1693.00	-55.71	-63.73	-13.00	-42.71	8.02	Peak

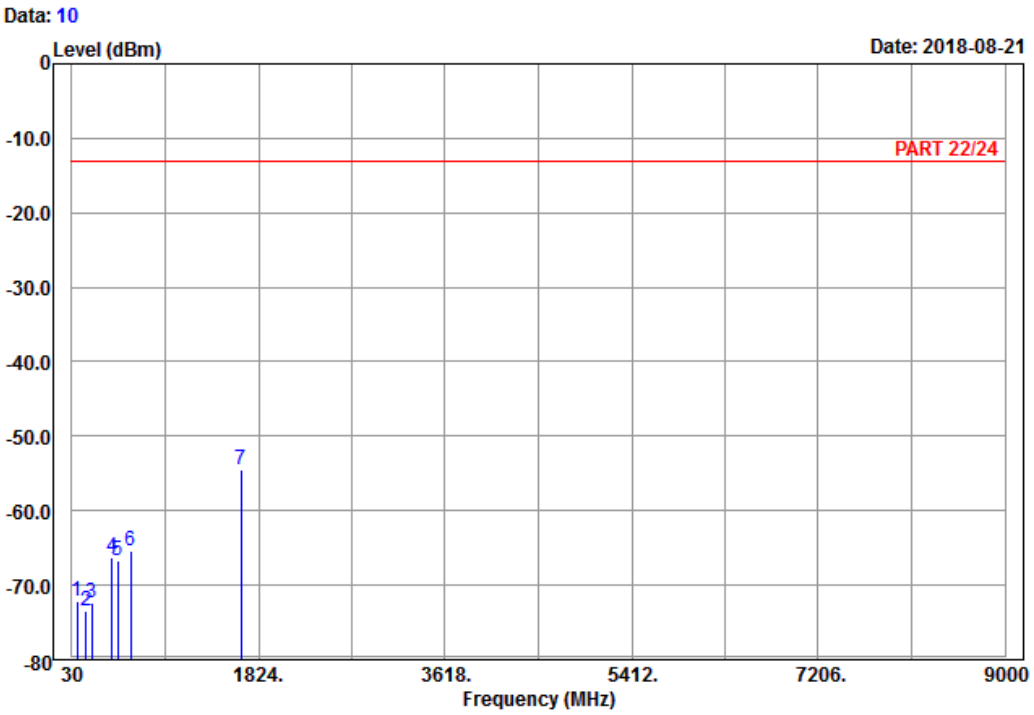
Channel Bandwidth: 10 MHz / QPSK
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	142.59	-65.40	-57.64	-13.00	-52.40	-7.76	Peak
2	207.39	-71.54	-65.46	-13.00	-58.54	-6.08	Peak
3	240.87	-64.07	-58.43	-13.00	-51.07	-5.64	Peak
4	374.90	-68.85	-64.82	-13.00	-55.85	-4.03	Peak
5	560.40	-70.19	-68.97	-13.00	-57.19	-1.22	Peak
6	659.80	-65.04	-64.86	-13.00	-52.04	-0.18	Peak
7 pp	1658.00	-50.87	-58.78	-13.00	-37.87	7.91	Peak

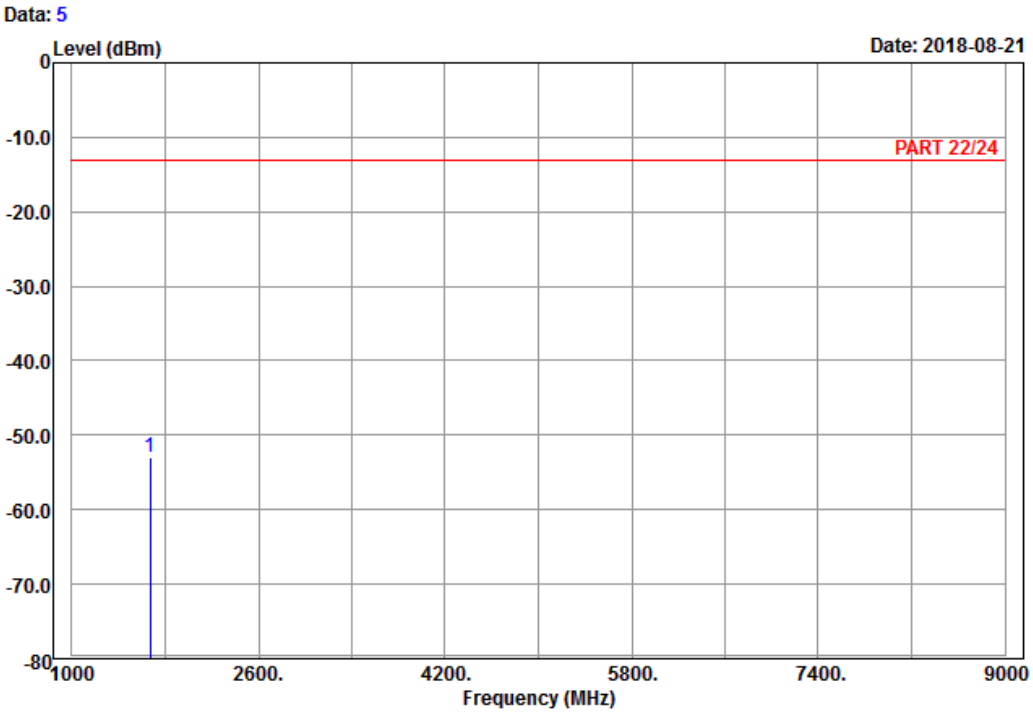


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20450
Tested by: Harry Hsueh

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	82.38	-72.08	-60.53	-13.00	-59.08	-11.55	Peak
2	164.73	-73.56	-66.37	-13.00	-60.56	-7.19	Peak
3	219.54	-72.35	-66.43	-13.00	-59.35	-5.92	Peak
4	414.80	-66.28	-63.20	-13.00	-53.28	-3.08	Peak
5	469.40	-66.64	-62.24	-13.00	-53.64	-4.40	Peak
6	596.80	-65.42	-65.69	-13.00	-52.42	0.27	Peak
7 pp	1658.00	-54.53	-62.44	-13.00	-41.53	7.91	Peak

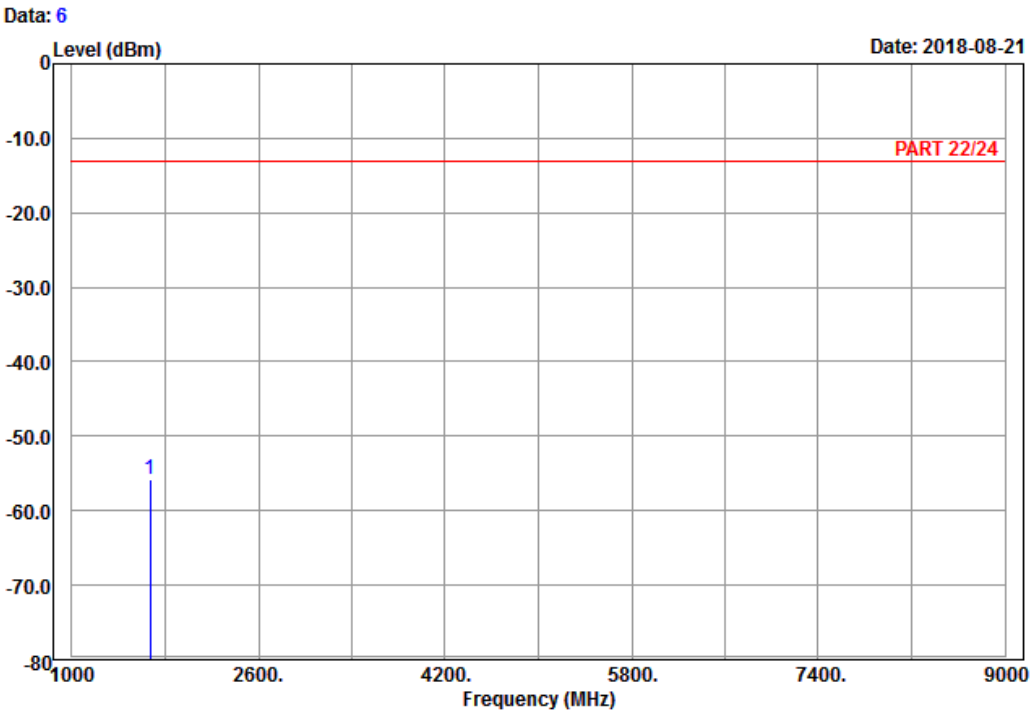
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1673.00	-53.07	-60.98	-13.00	-40.07	7.91	Peak

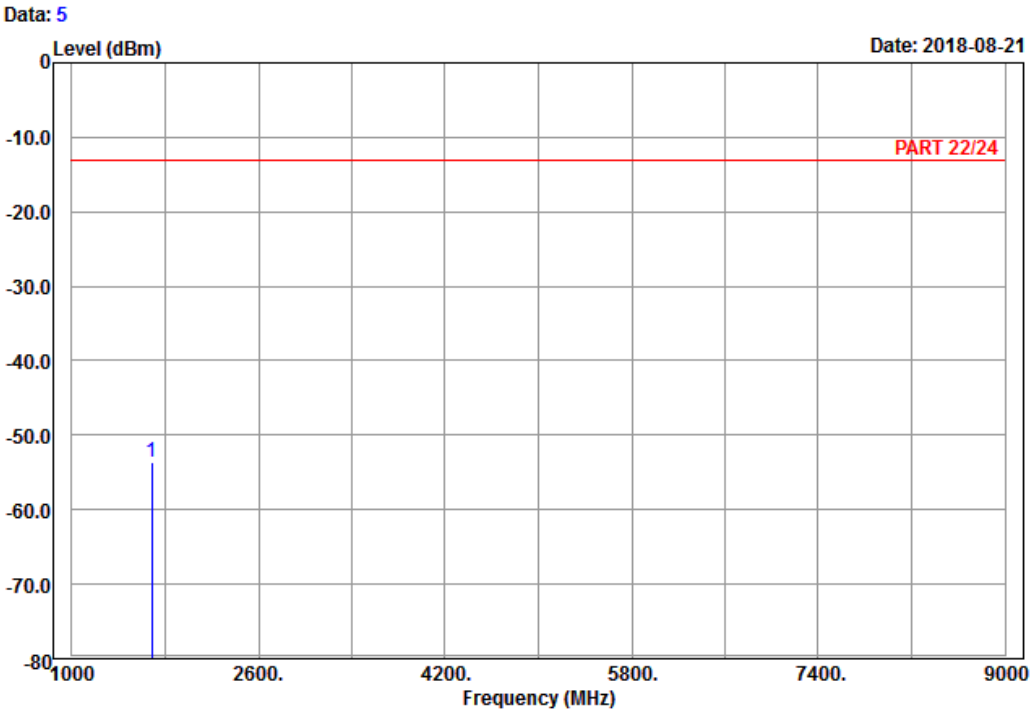


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 5_Link_CH20525
Tested by: Harry Hsueh

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1673.00	-55.82	-63.73	-13.00	-42.82	7.91	Peak

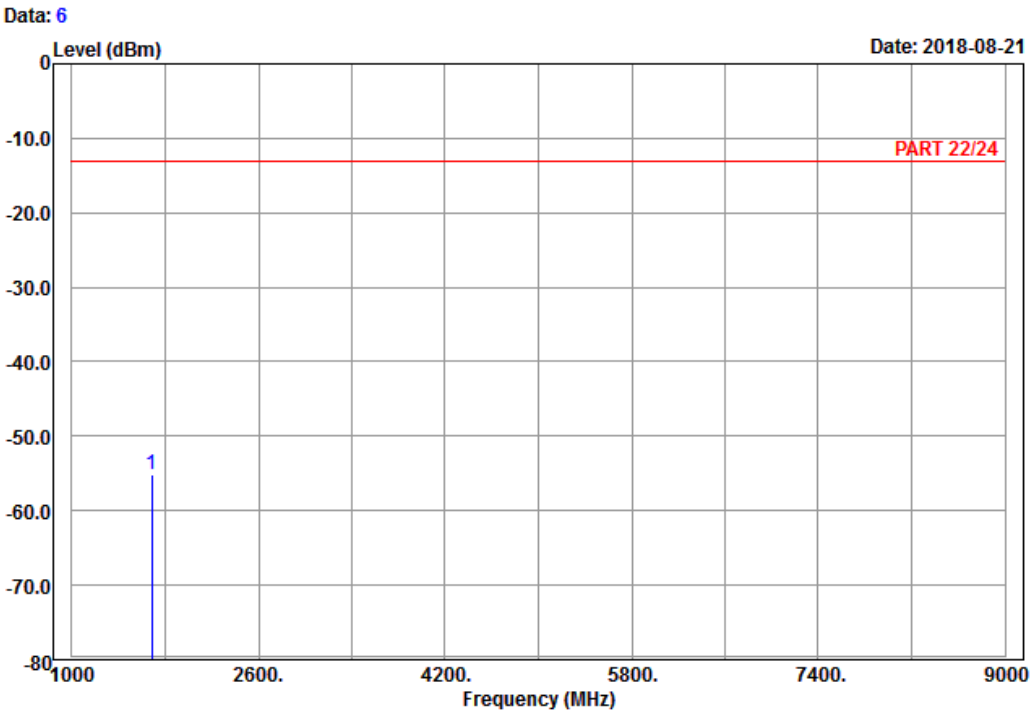
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1688.00	-53.54	-61.56	-13.00	-40.54	8.02	Peak



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1688.00	-55.22	-63.24	-13.00	-42.22	8.02	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

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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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