

Variant FCC Test Report (PART 24)

Report No.: RF180521C04C

FCC ID: 2AAGMGM01QA

Test Model: GM01Q

Received Date: Mar. 08, 2019

Test Date: May 21, 2019

Issued Date: Jun. 03, 2019

Applicant: Sequans Communications

Address: 15-55 Boulevard Charles de Gaulle, 92700 Colombes France

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



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Release Control Record

Issue No.	Description	Date Issued
RF180521C04C	Original Release	Jun. 03, 2019

1 Certificate of Conformity

Product: GM01Q-STMOD Cellular Expansion Board

Brand: SEQUANS COMMUNICATIONS

Test Model: GM01Q


Sample Status: Mass Production


Applicant: Sequans Communications

Test Date: May 21, 2019

Standards: FCC Part 24, Subpart E

This report is issued as a supplementary report to BV CPS report no.: RF180521C04B. This report shall be used by combining with its original report.

Prepared by : , **Date:** Jun. 03, 2019
Ivonne Wu / Supervisor

Approved by : , **Date:** Jun. 03, 2019
Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 24 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 24.232	Effective Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	N/A	Refer to Note
2.1046 24.232(d)	Peak to Average Ratio	N/A	Refer to Note
2.1055 24.235	Frequency Stability	N/A	Refer to Note
2.1049	Occupied Bandwidth	N/A	Refer to Note
24.238	Band Edge Measurements	N/A	Refer to Note
2.1051 24.238	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 24.238	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -13.29 dB at 9500.00 MHz.

Note:

1. Only E.I.R.P and Radiated Spurious Emissions test had been performed for this addendum. Refer to original report for other test data.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	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. 18, 2019	Mar. 17, 2020
Spectrum Analyzer Agilent	N9010A	MY56070348	Sep. 06, 2018	Sep. 05, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 11, 2018	Oct. 10, 2019
HORN Antenna SCHWARZBECK	3115	5619	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Nov. 25, 2018	Nov. 24, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Nov. 23, 2018	Nov. 22, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
MXG Vector signal generator Agilent	N5182B	MY53052658	May 24, 2018	May 23, 2019
Preamplifier EMCI	EMC 012645	980115	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 330H	980112	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-800 0&3000	140811+170717	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM- 1000(140807)	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 12, 2018	Oct. 11, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
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
LTE Wireless Communication Test Set Keysight	E7515A	MY57270629	Feb. 22, 2019	Feb. 21, 2020
Wideband Radio Communication Tester R&S	CMW500	151084	Dec. 24, 2018	Dec. 23, 2019
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 05, 2018	Sep. 04, 2019
DC Power Supply Topward	33010D	807748	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 10.

3 General Information

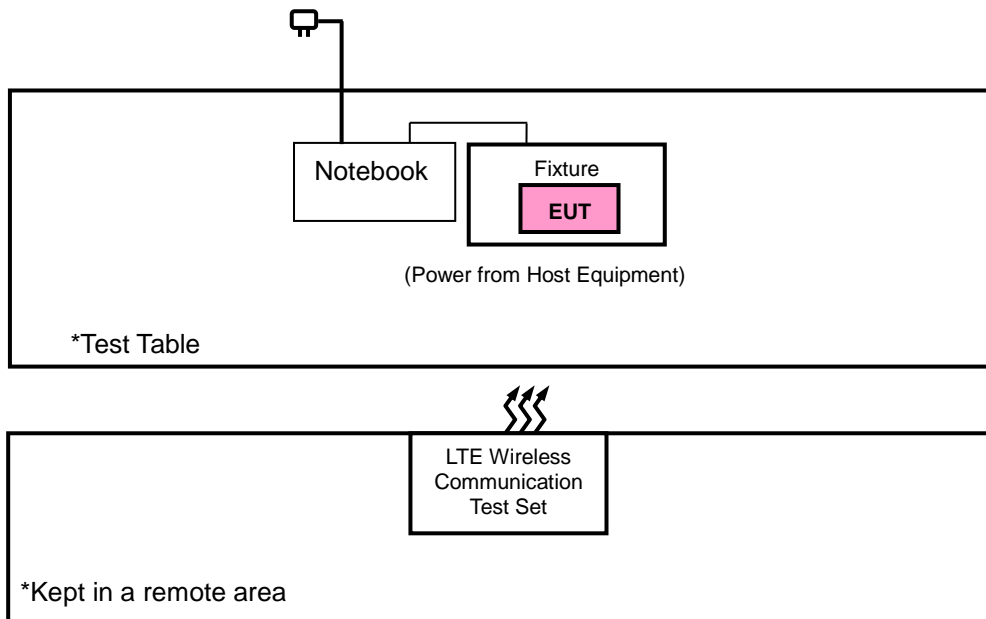
3.1 General Description of EUT

Product	GM01Q-STMOD Cellular Expansion Board	
Brand	SEQUANS COMMUNICATIONS	
Test Model	GM01Q	
Status of EUT	Mass Production	
Power Supply Rating	5.0 Vdc (host equipment) or 3.8 Vdc (form DC power supply)	
Modulation Type	LTE	QPSK, 16QAM
Frequency Range	LTE Band 2 (Channel Bandwidth: 5 MHz)	1852.5 ~ 1907.5 MHz
	LTE Band 2 (Channel Bandwidth: 10 MHz)	1855.0 ~ 1905.0 MHz
	LTE Band 2 (Channel Bandwidth: 15 MHz)	1857.5 ~ 1902.5 MHz
	LTE Band 2 (Channel Bandwidth: 20 MHz)	1860.0 ~ 1900.0 MHz
Max. EIRP Power	LTE Band 2 (Channel Bandwidth: 5 MHz)	246.60 mW
	LTE Band 2 (Channel Bandwidth: 10 MHz)	250.03 mW
	LTE Band 2 (Channel Bandwidth: 15 MHz)	253.51 mW
	LTE Band 2 (Channel Bandwidth: 20 MHz)	257.63 mW
Antenna Type	Dipole Antenna with 2.65 dBi gain	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

1. This report is issued as a supplementary report to BV CPS report no.: RF180521C04B. Change is to add a host: GM01Q-STMOD (Model: GM01Q-STMOD / Brand: Sequans) to certified module which was original granted on 06/21/2019 under FCC ID: 2AAGMGM01QA. RF module is exactly the same chip module (EUT) covered under shielding case with original grant and no RF portion changes. The only change is the antenna traces different. Therefore, only E.I.R.P. and RSE tests had been performed in this report.
2. 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.	Notebook	DELL	E6420	D3T96R1	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).

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	EIRP	Radiated Emission
LTE Band 2	X-plane	X-axis

LTE Band 2

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM	1 RB / 5 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Radiated Emission	18625 to 19175	18625, 18900, 19175	5 MHz	QPSK	1 RB / 5 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK	1 RB / 0 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation and the worst mode reference report to BV CPS report no.: RF180521C04B.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	26 deg. C, 58 % RH	5 Vdc	Getaz Yang
Radiated Emission	25 deg. C, 65 % RH	5 Vdc	Getaz Yang

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 24

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

ANSI 63.2 -1996

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 2 watts e.i.r.p.

4.1.2 Test Procedures

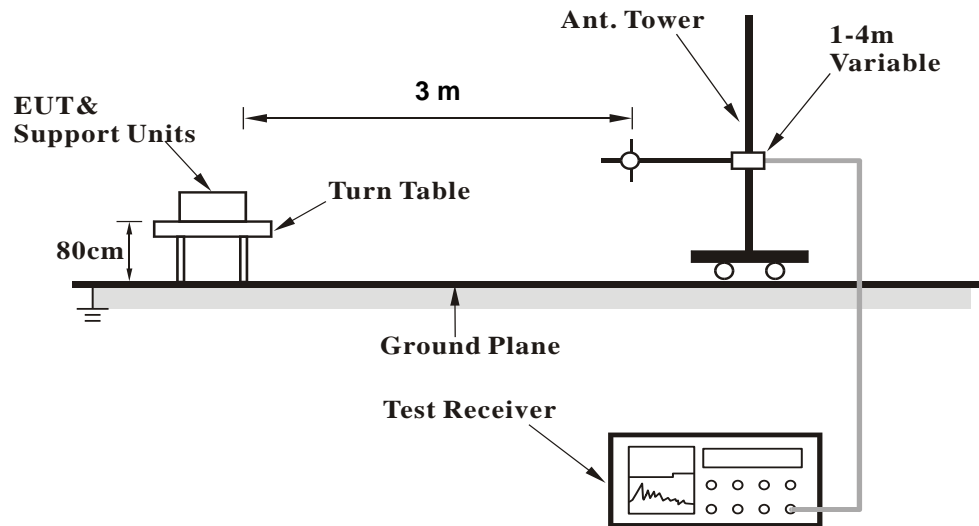
EIRP / ERP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 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, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

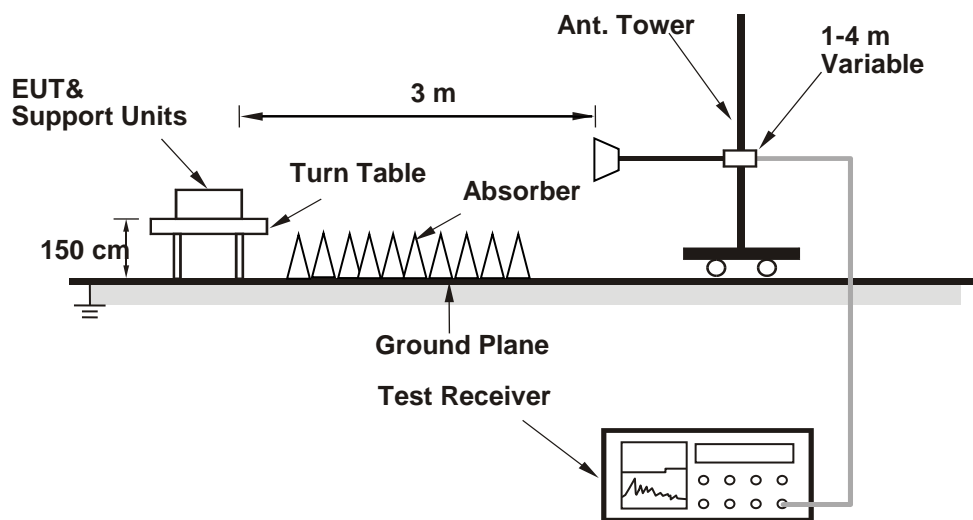
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.4 Test Results

EIRP Power (dBm)

LTE Band 2							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18625	1852.5	-18.73	36.57	17.84	60.81	H
	18900	1880.0	-19.25	37.22	17.97	62.66	
	19175	1907.5	-19.30	37.18	17.88	61.38	
	18625	1852.5	-13.76	37.65	23.89	244.91	V
	18900	1880.0	-13.66	37.58	23.92	246.60	
	19175	1907.5	-13.64	37.48	23.84	242.10	
Channel Bandwidth: 5 MHz / 16QAM							
X	18625	1852.5	-19.98	36.57	16.59	45.60	H
	18900	1880.0	-20.47	37.22	16.75	47.32	
	19175	1907.5	-20.55	37.18	16.63	46.03	
	18625	1852.5	-15.06	37.65	22.59	181.55	V
	18900	1880.0	-14.84	37.58	22.74	187.93	
	19175	1907.5	-14.86	37.48	22.62	182.81	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 2							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18650	1855.0	-18.68	36.57	17.89	61.52	H
	18900	1880.0	-19.13	37.22	18.09	64.42	
	19150	1905.0	-19.24	37.18	17.94	62.23	
	18650	1855.0	-13.70	37.65	23.95	248.31	V
	18900	1880.0	-13.60	37.58	23.98	250.03	
	19150	1905.0	-13.60	37.48	23.88	244.34	
Channel Bandwidth: 10 MHz / 16QAM							
X	18650	1855.0	-19.86	36.57	16.71	46.88	H
	18900	1880.0	-20.36	37.22	16.86	48.53	
	19150	1905.0	-20.41	37.18	16.77	47.53	
	18650	1855.0	-14.93	37.65	22.72	187.07	V
	18900	1880.0	-14.78	37.58	22.80	190.55	
	19150	1905.0	-14.75	37.48	22.73	187.50	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 2							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18675	1857.5	-18.64	36.57	17.93	62.09	H
	18900	1880.0	-19.09	37.22	18.13	65.01	
	19125	1902.5	-19.21	37.18	17.97	62.66	
	18675	1857.5	-13.66	37.65	23.99	250.61	V
	18900	1880.0	-13.54	37.58	24.04	253.51	
	19125	1902.5	-13.52	37.48	23.96	248.89	
Channel Bandwidth: 15 MHz / 16QAM							
X	18675	1857.5	-19.72	36.57	16.85	48.42	H
	18900	1880.0	-20.19	37.22	17.03	50.47	
	19125	1902.5	-20.28	37.18	16.90	48.98	
	18675	1857.5	-14.72	37.65	22.93	196.34	V
	18900	1880.0	-14.70	37.58	22.88	194.09	
	19125	1902.5	-14.69	37.48	22.79	190.11	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 2							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18700	1860.0	-18.56	36.57	18.01	63.24	H
	18900	1880.0	-19.03	37.22	18.19	65.92	
	19100	1900.0	-19.13	37.18	18.05	63.83	
	18700	1860.0	-13.60	37.65	24.05	254.10	V
	18900	1880.0	-13.47	37.58	24.11	257.63	
	19100	1900.0	-13.45	37.48	24.03	252.93	
Channel Bandwidth: 20 MHz / 16QAM							
X	18700	1860.0	-19.59	36.57	16.98	49.89	H
	18900	1880.0	-20.07	37.22	17.15	51.88	
	19100	1900.0	-20.14	37.18	17.04	50.58	
	18700	1860.0	-14.66	37.65	22.99	199.07	V
	18900	1880.0	-14.54	37.58	23.04	201.37	
	19100	1900.0	-14.46	37.48	23.02	200.45	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

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.

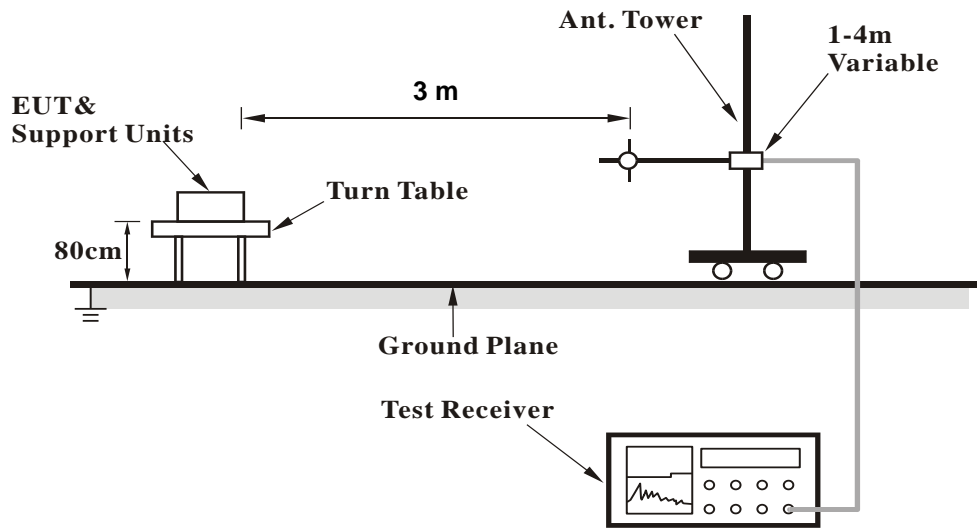
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.2.3 Deviation from Test Standard

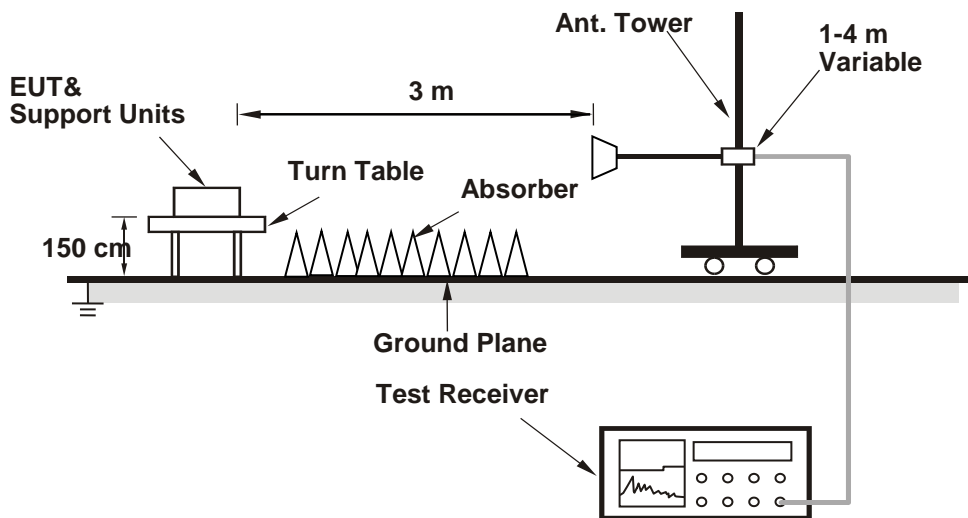
No deviation.

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

LTE Band 2

Channel Bandwidth: 5 MHz / QPSK

Low Channel

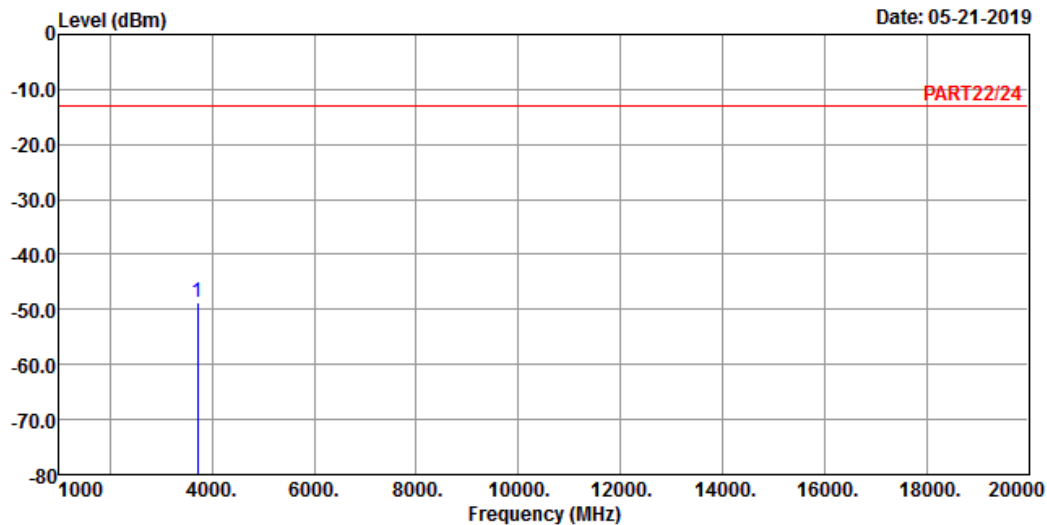


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A D T

Data: 3

Date: 05-21-2019



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remark : Cat-M1 Band 2 QPSK_5M Link_L-CH

Tested by: Getaz Yang

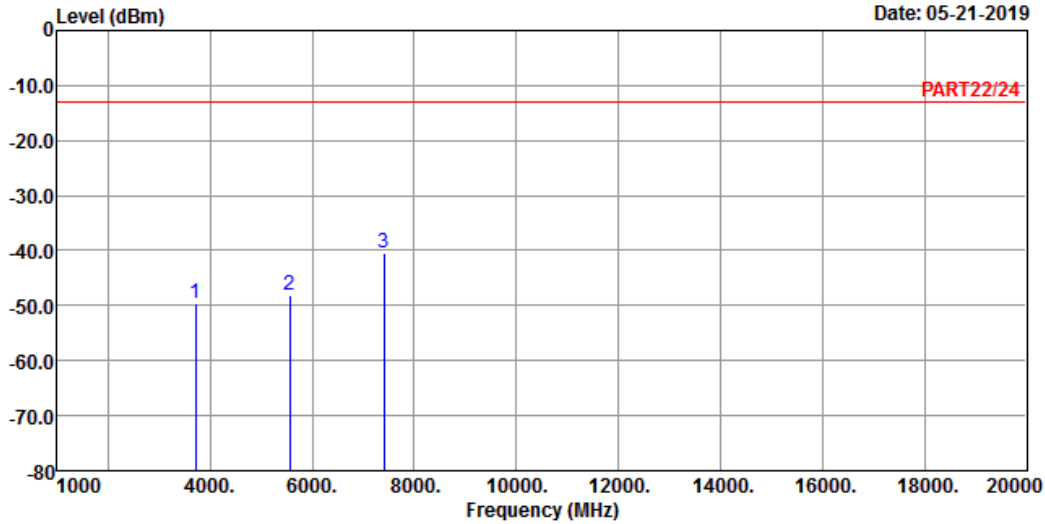
Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3705.00	-48.74	-41.81	-13.00	-6.93	-35.74	Peak



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A D T

Data: 4



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remark : Cat-M1 Band 2 QPSK_5M Link_L-CH
 Tested by: Getaz Yang

	Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3705.00	-49.60	-42.67	-13.00	-6.93	-36.60	Peak
2	5557.50	-48.08	-46.17	-13.00	-1.91	-35.08	Peak
3	7410.00	-40.34	-44.47	-13.00	4.13	-27.34	Peak

Middle Channel

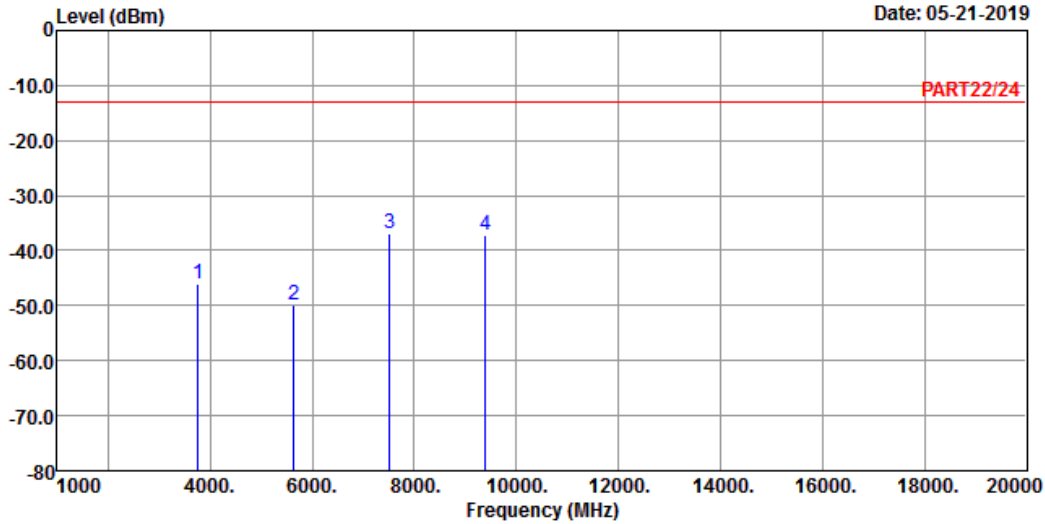


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Data: 3

Date: 05-21-2019



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remark : Cat-M1 Band 2 QPSK_5M Link_M-CH
 Tested by: Getaz Yang

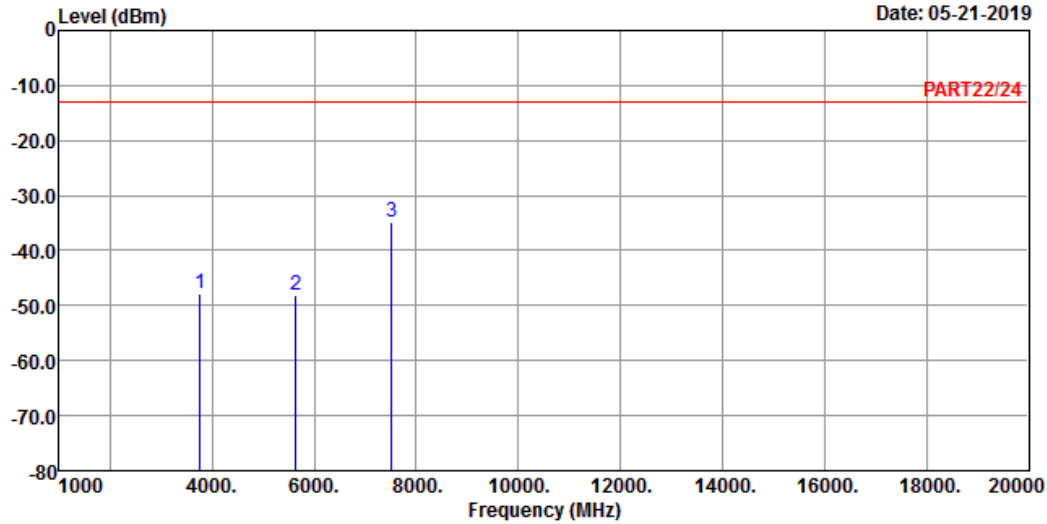
	Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3760.00	-45.98	-39.33	-13.00	-6.65	-32.98	Peak
2	5640.00	-49.78	-47.92	-13.00	-1.86	-36.78	Peak
3 pp	7520.00	-36.78	-40.99	-13.00	4.21	-23.78	Peak
4	9400.00	-37.19	-42.26	-13.00	5.07	-24.19	Peak



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A D T

Data: 4



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remark : Cat-M1 Band 2 QPSK_5M Link_M-CH
 Tested by: Getaz Yang

	Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3760.00	-47.91	-41.26	-13.00	-6.65	-34.91	Peak
2	5640.00	-48.18	-46.32	-13.00	-1.86	-35.18	Peak
3 pp	7520.00	-34.93	-39.14	-13.00	4.21	-21.93	Peak

High Channel

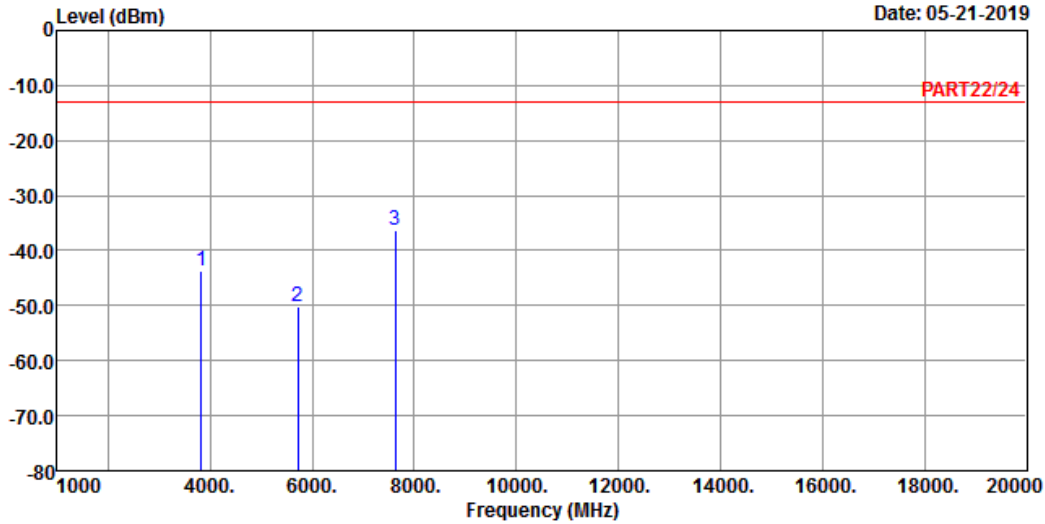


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A D T

Data: 3

Date: 05-21-2019



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remark : Cat-M1 Band 2 QPSK_5M Link_H-CH
 Tested by: Getaz Yang

	Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3815.00	-43.75	-37.35	-13.00	-6.40	-30.75	Peak
2	5722.50	-50.07	-48.38	-13.00	-1.69	-37.07	Peak
3 pp	7630.00	-36.40	-40.91	-13.00	4.51	-23.40	Peak

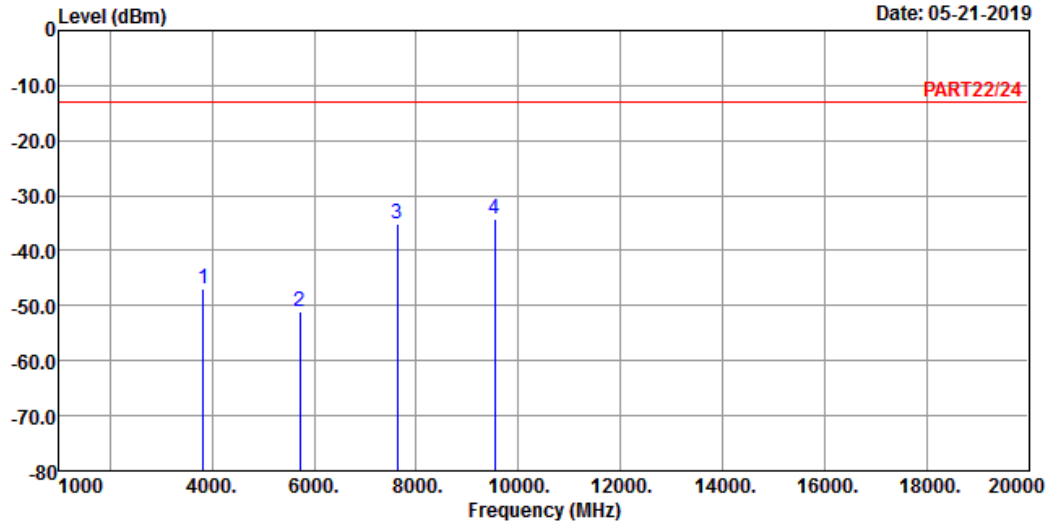


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remark : Cat-M1 Band 2 QPSK_5M Link_H-CH
 Tested by: Getaz Yang

	Freq	Level	Read Level	Limit	Over	Factor	Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	dB	
1	3815.00	-46.80	-40.40	-13.00	-6.40	-33.80	Peak	
2	5722.50	-51.19	-49.50	-13.00	-1.69	-38.19	Peak	
3	7630.00	-35.06	-39.57	-13.00	4.51	-22.06	Peak	
4 pp	9537.50	-34.39	-39.78	-13.00	5.39	-21.39	Peak	

Channel Bandwidth: 20 MHz / QPSK
Low Channel

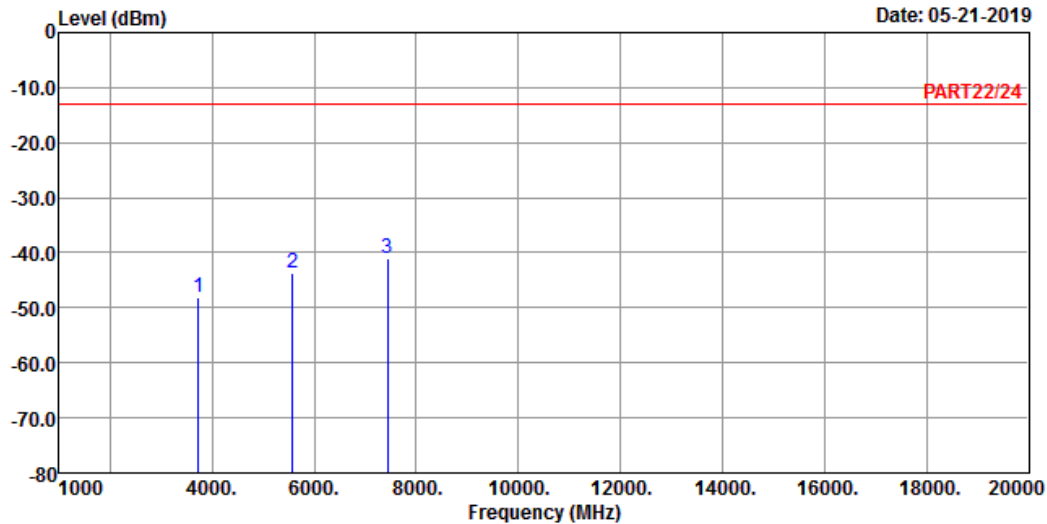


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 05-21-2019



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remark : Cat-M1 Band 2 QPSK_20M Link_L-CH
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3720.00	-48.01	-41.19	-13.00	-6.82	-35.01	Peak
2	5580.00	-43.73	-41.81	-13.00	-1.92	-30.73	Peak
3 pp	7440.00	-40.90	-45.05	-13.00	4.15	-27.90	Peak

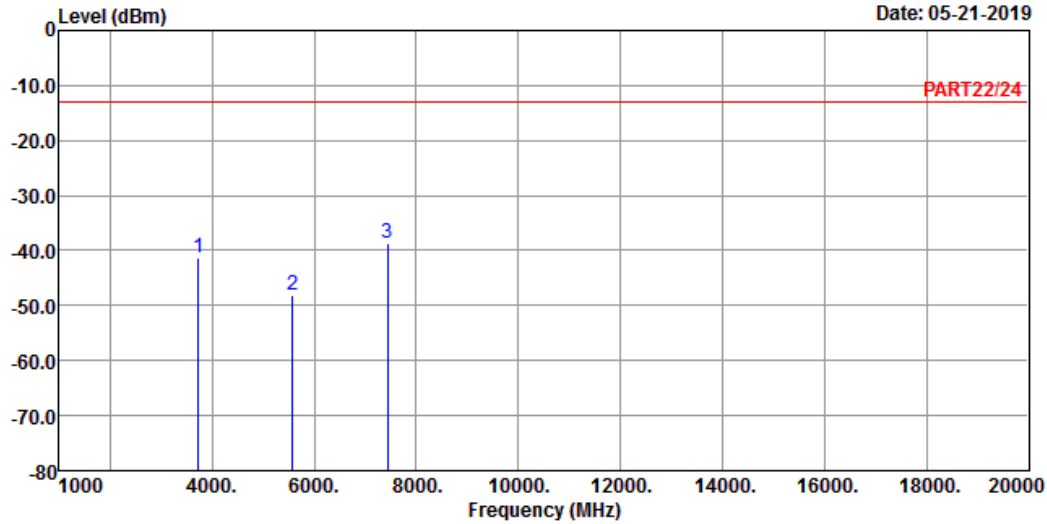


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remark : Cat-M1 Band 2 QPSK_20M Link_L-CH
 Tested by: Getaz Yang

	Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3720.00	-41.34	-34.52	-13.00	-6.82	-28.34	Peak
2	5580.00	-47.98	-46.06	-13.00	-1.92	-34.98	Peak
3 pp	7440.00	-38.59	-42.74	-13.00	4.15	-25.59	Peak

Middle Channel

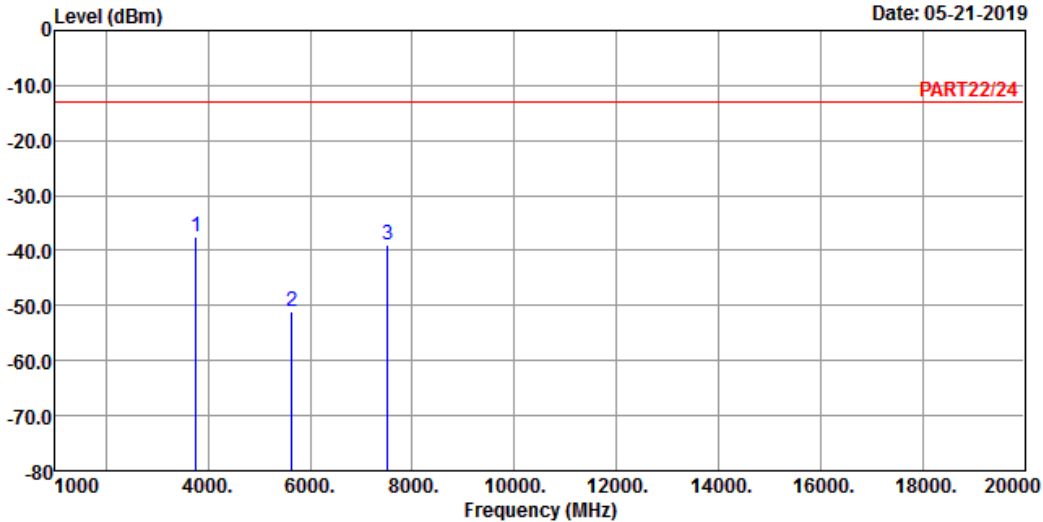


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 05-21-2019



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remark : Cat-M1 Band 2 QPSK_20M Link_M-CH
 Tested by: Getaz Yang

	Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3760.00	-37.42	-30.77	-13.00	-6.65	-24.42	Peak
2	5635.00	-51.10	-49.24	-13.00	-1.86	-38.10	Peak
3	7520.00	-38.91	-43.12	-13.00	4.21	-25.91	Peak

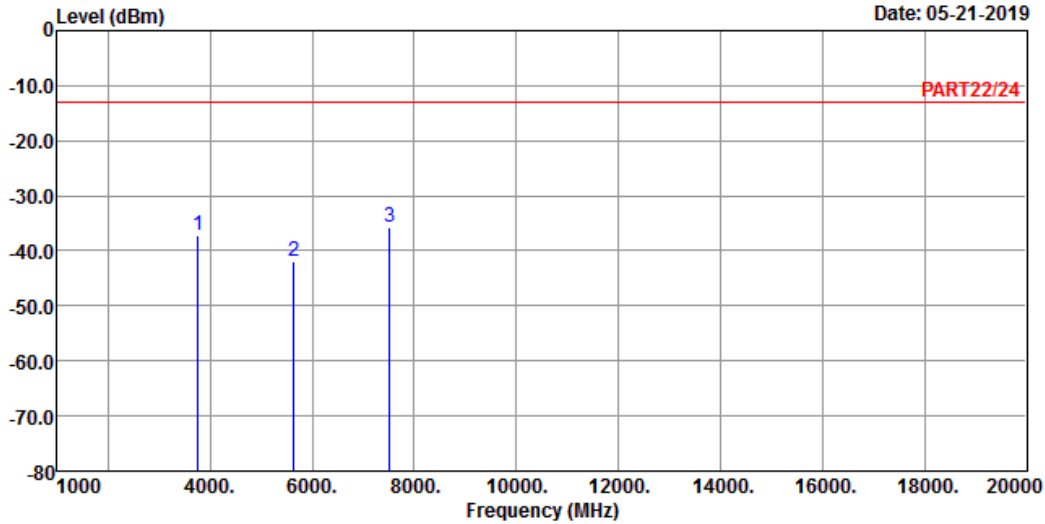


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 05-21-2019



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remark : Cat-M1 Band 2 QPSK_20M Link_M-CH
 Tested by: Getaz Yang

	Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3760.00	-37.26	-30.61	-13.00	-6.65	-24.26	Peak
2	5640.00	-42.06	-40.20	-13.00	-1.86	-29.06	Peak
3 pp	7520.00	-35.85	-40.06	-13.00	4.21	-22.85	Peak

High Channel

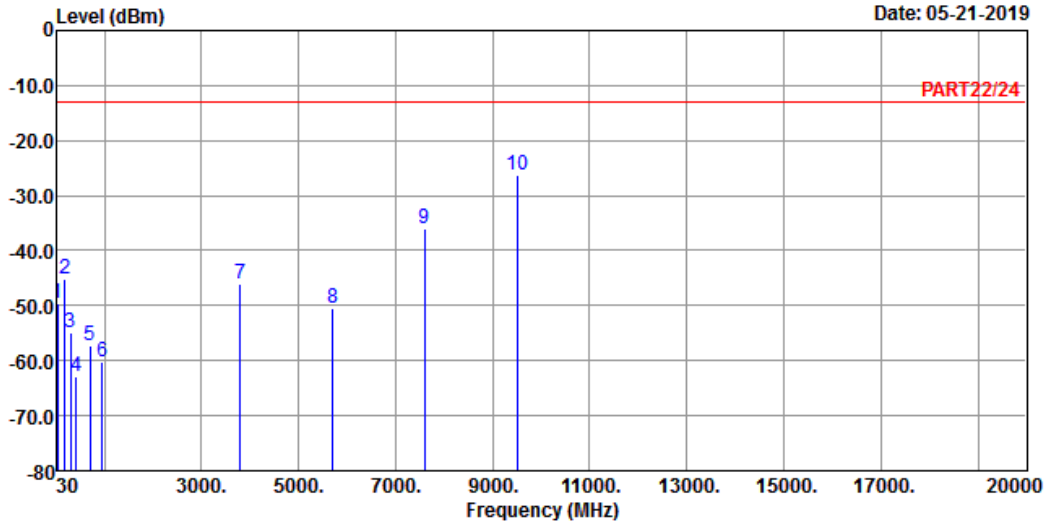


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 05-21-2019



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remark : Cat-M1 Band 2 QPSK_20M Link_H-CH
 Tested by: Getaz Yang

	Freq	Level	Read Level	Limit	Line	Factor	Over	Remark
	MHz	dBm	dBm	dBm		dB	dB	
1	30.00	-49.54	-49.92	-13.00		0.38	-36.54	Peak
2	193.93	-45.23	-37.77	-13.00		-7.46	-32.23	Peak
3	304.51	-55.02	-48.08	-13.00		-6.94	-42.02	Peak
4	412.18	-62.82	-56.97	-13.00		-5.85	-49.82	Peak
5	699.30	-57.33	-57.22	-13.00		-0.11	-44.33	Peak
6	952.47	-60.34	-62.24	-13.00		1.90	-47.34	Peak
7	3800.00	-46.10	-39.67	-13.00		-6.43	-33.10	Peak
8	5700.00	-50.61	-48.88	-13.00		-1.73	-37.61	Peak
9	7600.00	-35.97	-40.44	-13.00		4.47	-22.97	Peak
10 pp	9500.00	-26.29	-31.60	-13.00		5.31	-13.29	Peak

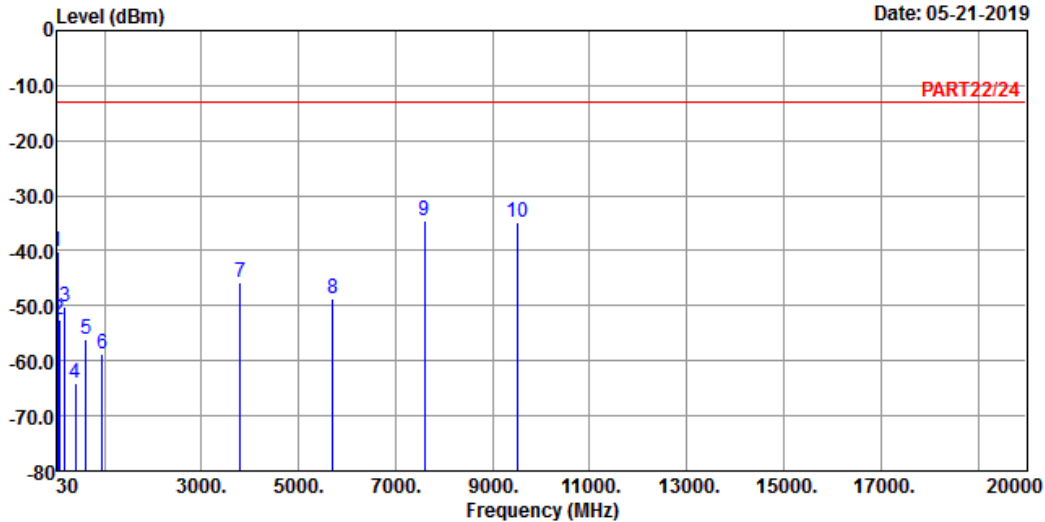


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 05-21-2019



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remark : Cat-M1 Band 2 QPSK_20M Link_H-CH
 Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	30.97	-40.11	-40.00	-13.00	-0.11	-27.11	Peak
2	65.89	-52.56	-44.46	-13.00	-8.10	-39.56	Peak
3	193.93	-50.14	-42.68	-13.00	-7.46	-37.14	Peak
4	407.33	-64.03	-58.14	-13.00	-5.89	-51.03	Peak
5	621.70	-56.06	-55.25	-13.00	-0.81	-43.06	Peak
6	954.41	-58.88	-60.85	-13.00	1.97	-45.88	Peak
7	3800.00	-45.61	-39.18	-13.00	-6.43	-32.61	Peak
8	5700.00	-48.64	-46.91	-13.00	-1.73	-35.64	Peak
9 pp	7600.00	-34.65	-39.12	-13.00	4.47	-21.65	Peak
10	9500.00	-34.73	-40.04	-13.00	5.31	-21.73	Peak

5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

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

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

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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.

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