

FCC Test Report

(PART 24)

Report No.: RF190326C28-1

FCC ID: B94HNC04PD

Test Model: HSN-C04C

Received Date: Mar. 26, 2019

Test Date: Apr. 08, 2019 ~ Apr. 26, 2019

Issued Date: May 07, 2019

Applicant: HP Inc.

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

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(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
RF190326C28-1	Original Release	May 07, 2019

1 Certificate of Conformity

Product: Tablet

Brand: HP

Test Model: HSN-C04C

Sample Status: Engineering Sample

Applicant: HP Inc.

Test Date: Apr. 08, 2019 ~ Apr. 26, 2019

Standards: FCC Part 24, Subpart E

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:** May 07, 2019
Rona Chen / Specialist

Approved by : Dylan Chiou, **Date:** May 07, 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 -32.73 dB at 35.82 MHz.

Note:

1. This report is a partial report. Therefore, only test item of Effective Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to BV CPS report no.: RF170106C02-1 for module (Brand: Fibocom, Model: L850-GL)
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	MY52220314	Dec. 13, 2018	Dec. 12, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Jan. 21, 2019	Jan. 20, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 11, 2018	Oct. 10, 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
Double Ridge Guide Horn Antenna EMCO	3115	5619	Nov. 25, 2018	Nov. 24, 2019
BILOG Antenna SCHWARZBECK	VULB 9168	9168-153	Nov. 23, 2018	Nov. 22, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018 Apr. 15, 2019	Apr. 15, 2019 Apr. 14, 2020
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 19, 2018	Nov. 18, 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-1 000(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
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jun. 28, 2017	Jun. 27, 2019
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 16, 2017	Aug. 15, 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 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The IC Site Registration No. is 7450F-10.

3 General Information

3.1 General Description of EUT

Product	Tablet	
Brand	HP	
Test Model	HSN-C04C	
Status of EUT	Engineering Sample	
Power Supply Rating	7.7 Vdc (Li-ion battery) 20 Vdc (Adapter)	
Modulation Type	WCDMA	QPSK
	LTE	QPSK, 16QAM
Frequency Range	WCDMA	1852.4 ~ 1907.6 MHz
	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	1850.7 ~ 1909.3 MHz
	LTE Band 2 (Channel Bandwidth: 3 MHz)	1851.5 ~ 1908.5 MHz
	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	WCDMA	164.06 mW
	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	100.69 mW
	LTE Band 2 (Channel Bandwidth: 3 MHz)	106.41 mW
	LTE Band 2 (Channel Bandwidth: 5 MHz)	113.24 mW
	LTE Band 2 (Channel Bandwidth: 10 MHz)	121.06 mW
	LTE Band 2 (Channel Bandwidth: 15 MHz)	130.32 mW
	LTE Band 2 (Channel Bandwidth: 20 MHz)	136.77 mW
Antenna Type	PIFA Antenna	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

1. The WWAN module (Brand: Fibocom, Model: L850-GL) was installed in EUT.
2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	AcBel	TPN-AA03	I/P: 100-240 Vac, 50-60 Hz, 1500 mA O/P: 20 Vdc, 3.25 A
Battery	Dynapack	HSTNN-DB9E	7.7 Vdc, 5950 mAh
Keyboard 1	Primax	HSN-P01K	--
Keyboard 2	Cosmo	HSN-C01K	--
BT/WLAN Module	Intel® Wi-Fi 6 AX200	AX200D2WL	--
LTE Module	Fibocom	L850-GL	--

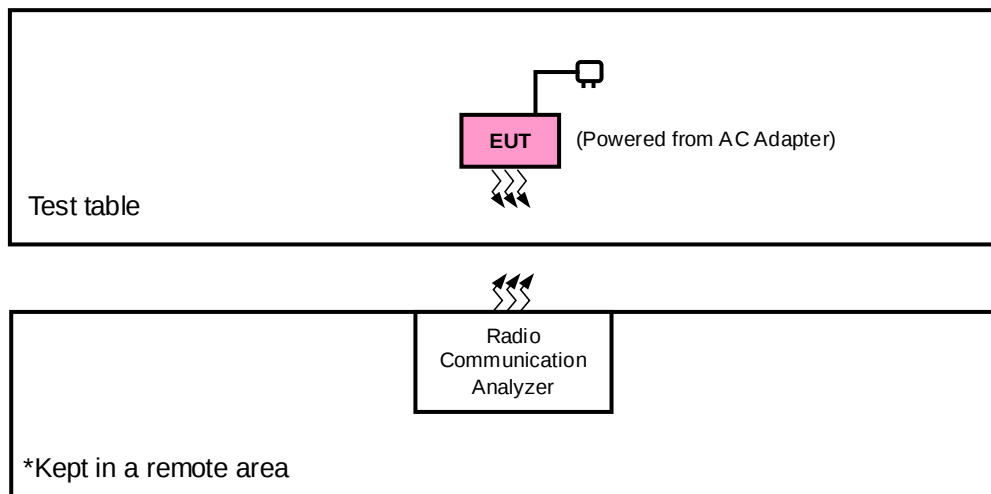
3. The antenna information of EUT is listed as below.

Ant. Type	Manufacturer	Parts Number	WWAN Antenna Gain (dBi)
			WCDMA II / LTE 2
PIFA	INPAQ	Main Antenna: WA-P-LTE15-02-001 (DC330029D20) Aux. Antenna: WA-P-LTE15-02-002 (DC330029D30)	-1.24

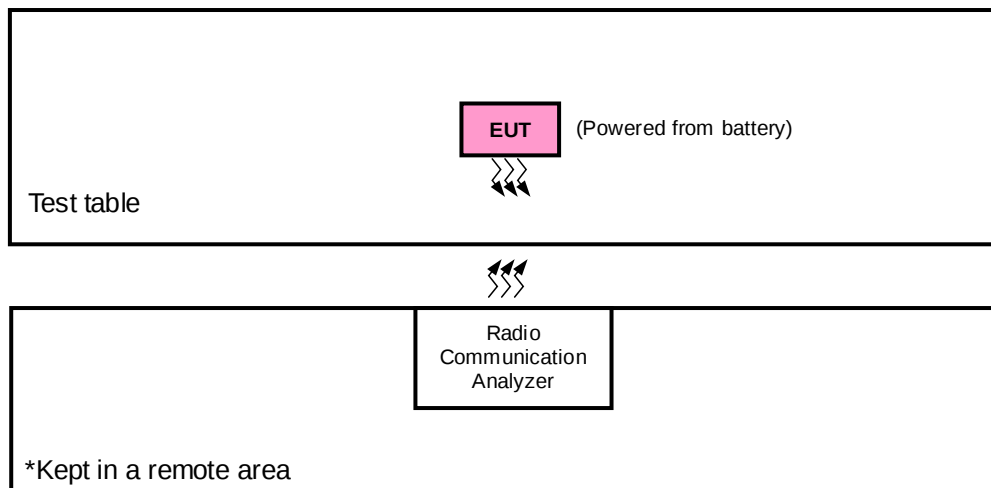
4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.I.R.P. Test>



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis & NB Mode, and antenna ports.

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	EIRP	Radiated Emission
WCDMA	X-plane	NB Mode
LTE Band 2	X-plane	X-axis

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	9262 to 9538	9262, 9400, 9538	WCDMA
-	Radiated Emission	9262 to 9538	9262, 9400, 9538	WCDMA

LTE Band 2

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM	1 RB / 0 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	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK	1 RB / 0 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.
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	3.3 Vdc	Tim Chen Thomas Wei Jisyong Wang
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz (System)	Tim Chen Thomas Wei Jisyong Wang

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 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 5 MHz for WCDMA, 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 from E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

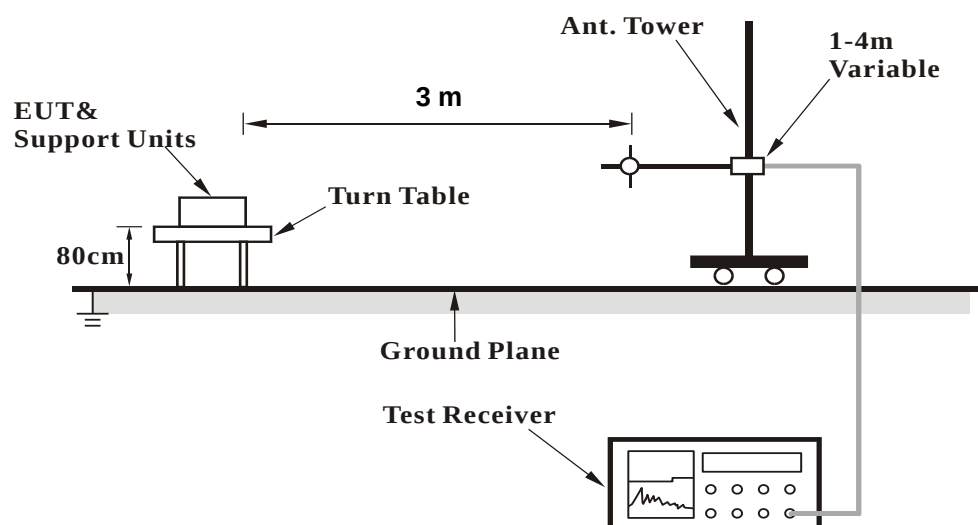
Conducted Power Measurement:

The EUT was set up for the maximum power with WCDMA 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.

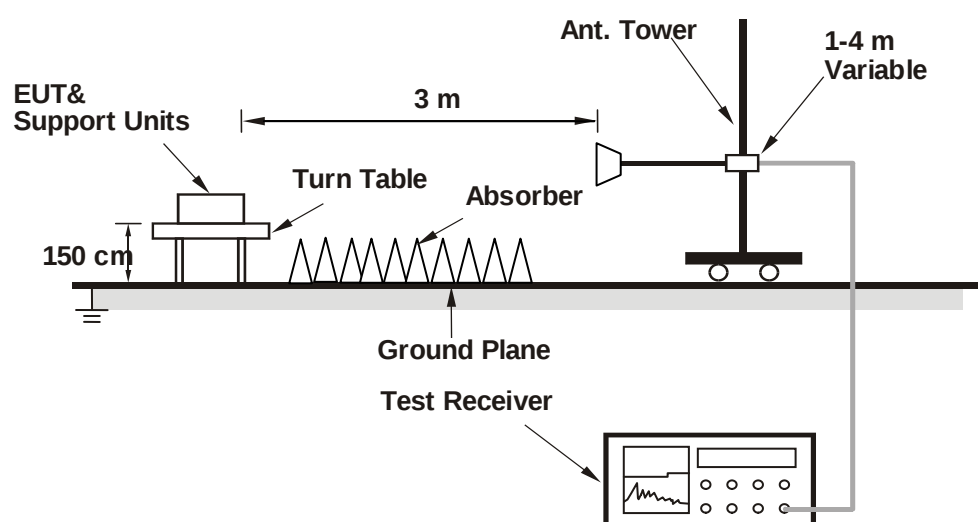
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

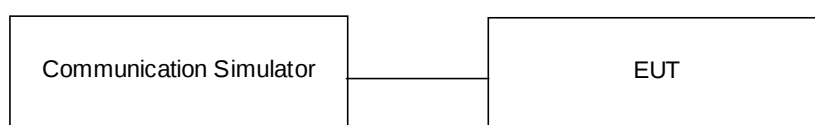


<Radiated Emission above 1 GHz>



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 II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
RMC 12.2K	23.83	23.73	23.78
HSDPA Subtest-1	22.84	22.74	22.79
HSDPA Subtest-2	22.83	22.73	22.78
HSDPA Subtest-3	22.34	22.24	22.29
HSDPA Subtest-4	22.28	22.18	22.23
DC-HSDPA Subtest-1	22.76	22.66	22.71
DC-HSDPA Subtest-2	22.75	22.65	22.70
DC-HSDPA Subtest-3	22.26	22.16	22.21
DC-HSDPA Subtest-4	22.20	22.10	22.15
HSUPA Subtest-1	22.88	22.78	22.83
HSUPA Subtest-2	20.61	20.51	20.56
HSUPA Subtest-3	21.56	21.46	21.51
HSUPA Subtest-4	20.85	20.75	20.80
HSUPA Subtest-5	22.92	22.82	22.87

LTE Band 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		18700	18900	19100				Channel		18675	18900	19125	
		Frequency (MHz)		1860.0	1880.0	1900.0				Frequency (MHz)		1857.5	1880.0	1902.5	
20M	QPSK	1	0	22.93	22.91	22.85	0	15M	QPSK	1	0	22.91	22.81	22.84	0
		1	50	22.89	22.87	22.81	0			1	37	22.86	22.87	22.72	0
		1	99	22.84	22.82	22.76	0			1	74	22.83	22.77	22.73	0
		50	0	21.94	21.92	21.86	1			36	0	21.85	21.87	21.76	1
		50	25	21.91	21.89	21.83	1			36	19	21.88	21.89	21.81	1
		50	50	21.88	21.86	21.80	1			36	39	21.85	21.77	21.77	1
		100	0	21.85	21.83	21.77	1			75	0	21.82	21.76	21.68	1
	16QAM	1	0	21.90	21.88	21.82	1		16QAM	1	0	21.84	21.87	21.81	1
		1	50	21.86	21.84	21.78	1			1	37	21.85	21.83	21.71	1
		1	99	21.81	21.79	21.73	1			1	74	21.72	21.76	21.66	1
		50	0	20.91	20.89	20.83	2			36	0	20.88	20.82	20.76	2
		50	25	20.88	20.86	20.80	2			36	19	20.80	20.81	20.71	2
		50	50	20.85	20.83	20.77	2			36	39	20.85	20.81	20.67	2
		100	0	20.82	20.80	20.74	2			75	0	20.80	20.80	20.70	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		18650	18900	19150				Channel		18625	18900	19175	
		Frequency (MHz)		1855.0	1880.0	1905.0				Frequency (MHz)		1852.5	1880.0	1907.5	
10M	QPSK	1	0	22.77	22.71	22.76	0	5M	QPSK	1	0	22.79	22.72	22.65	0
		1	24	22.87	22.71	22.72	0			1	12	22.66	22.71	22.68	0
		1	49	22.80	22.78	22.65	0			1	24	22.80	22.79	22.52	0
		25	0	21.82	21.87	21.68	1			12	0	21.81	21.76	21.78	1
		25	12	21.73	21.71	21.67	1			12	6	21.85	21.80	21.61	1
		25	25	21.78	21.79	21.64	1			12	13	21.84	21.66	21.54	1
		50	0	21.82	21.62	21.70	1			25	0	21.64	21.74	21.64	1
	16QAM	1	0	21.89	21.72	21.68	1		16QAM	1	0	21.72	21.70	21.65	1
		1	24	21.78	21.74	21.69	1			1	12	21.65	21.69	21.61	1
		1	49	21.67	21.60	21.64	1			1	24	21.69	21.61	21.62	1
		25	0	20.85	20.67	20.81	2			12	0	20.75	20.75	20.65	2
		25	12	20.82	20.73	20.71	2			12	6	20.78	20.86	20.65	2
		25	25	20.83	20.71	20.54	2			12	13	20.75	20.69	20.57	2
		50	0	20.68	20.72	20.66	2			25	0	20.65	20.70	20.71	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		18615	18900	19185				Channel		18607	18900	19193	
		Frequency (MHz)		1851.5	1880.0	1908.5				Frequency (MHz)		1850.7	1880.0	1909.3	
3M	QPSK	1	0	22.85	22.75	22.66	0	1.4M	QPSK	1	0	22.87	22.74	22.75	0
		1	7	22.80	22.70	22.68	0			1	2	22.86	22.71	22.66	0
		1	14	22.76	22.71	22.67	0			1	5	22.76	22.69	22.60	0
		8	0	21.79	21.72	21.76	1			3	0	22.78	22.84	22.81	0
		8	3	21.75	21.80	21.72	1			3	1	22.78	22.74	22.76	0
		8	7	21.83	21.70	21.58	1			3	3	22.75	22.77	22.70	0
		15	0	21.72	21.72	21.70	1			6	0	21.74	21.75	21.63	1
	16QAM	1	0	21.77	21.85	21.66	1		16QAM	1	0	21.87	21.66	21.63	1
		1	7	21.68	21.64	21.74	1			1	2	21.80	21.81	21.59	1
		1	14	21.75	21.75	21.57	1			1	5	21.61	21.58	21.60	1
		8	0	20.77	20.85	20.70	2			3	0	21.83	21.83	21.73	1
		8	3	20.77	20.72	20.57	2			3	1	21.79	21.85	21.62	1
		8	7	20.82	20.71	20.67	2			3	3	21.71	21.81	21.65	1
		15	0	20.73	20.61	20.67	2			6	0	20.72	20.71	20.62	2

EIRP Power (dBm)

WCDMA							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	9262	1852.4	-14.53	36.57	22.04	159.96	H
	9400	1880.0	-15.07	37.22	22.15	164.06	
	9538	1907.6	-15.20	37.18	21.98	157.76	
	9262	1852.4	-20.10	37.65	17.55	56.89	V
	9400	1880.0	-19.95	37.58	17.63	57.94	
	9538	1907.6	-20.01	37.48	17.47	55.85	

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

LTE Band 2							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18607	1850.7	-16.54	36.57	20.03	100.69	H
	18900	1880.0	-17.27	37.22	19.95	98.86	
	19193	1909.3	-17.49	37.18	19.69	93.11	
	18607	1850.7	-21.26	37.65	16.39	43.55	V
	18900	1880.0	-21.25	37.58	16.33	42.95	
	19193	1909.3	-21.32	37.48	16.16	41.30	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	18607	1850.7	-17.43	36.57	19.14	82.04	H
	18900	1880.0	-18.31	37.22	18.91	77.80	
	19193	1909.3	-18.38	37.18	18.80	75.86	
	18607	1850.7	-22.38	37.65	15.27	33.65	V
	18900	1880.0	-22.50	37.58	15.08	32.21	
	19193	1909.3	-22.49	37.48	14.99	31.55	

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

LTE Band 2							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18615	1851.5	-16.30	36.57	20.27	106.41	H
	18900	1880.0	-17.01	37.22	20.21	104.95	
	19185	1908.5	-17.18	37.18	20.00	100.00	
	18615	1851.5	-21.02	37.65	16.63	46.03	V
	18900	1880.0	-21.05	37.58	16.53	44.98	
	19185	1908.5	-21.10	37.48	16.38	43.45	
Channel Bandwidth: 3 MHz / 16QAM							
X	18615	1851.5	-17.13	36.57	19.44	87.90	H
	18900	1880.0	-18.07	37.22	19.15	82.22	
	19185	1908.5	-18.15	37.18	19.03	79.98	
	18615	1851.5	-22.17	37.65	15.48	35.32	V
	18900	1880.0	-22.17	37.58	15.41	34.75	
	19185	1908.5	-22.20	37.48	15.28	33.73	

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

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	-16.03	36.57	20.54	113.24	H
	18900	1880.0	-16.76	37.22	20.46	111.17	
	19175	1907.5	-16.89	37.18	20.29	106.91	
	18625	1852.5	-20.77	37.65	16.88	48.75	V
	18900	1880.0	-20.84	37.58	16.74	47.21	
	19175	1907.5	-20.89	37.48	16.59	45.60	
Channel Bandwidth: 5 MHz / 16QAM							
X	18625	1852.5	-16.83	36.57	19.74	94.19	H
	18900	1880.0	-17.82	37.22	19.40	87.10	
	19175	1907.5	-17.82	37.18	19.36	86.30	
	18625	1852.5	-21.86	37.65	15.79	37.93	V
	18900	1880.0	-21.84	37.58	15.74	37.50	
	19175	1907.5	-21.98	37.48	15.50	35.48	

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	-15.74	36.57	20.83	121.06	H
	18900	1880.0	-16.43	37.22	20.79	119.95	
	19150	1905.0	-16.54	37.18	20.64	115.88	
	18650	1855.0	-20.55	37.65	17.10	51.29	V
	18900	1880.0	-20.51	37.58	17.07	50.93	
	19150	1905.0	-20.67	37.48	16.81	47.97	
Channel Bandwidth: 10 MHz / 16QAM							
X	18650	1855.0	-16.64	36.57	19.93	98.40	H
	18900	1880.0	-17.54	37.22	19.68	92.90	
	19150	1905.0	-17.53	37.18	19.65	92.26	
	18650	1855.0	-21.66	37.65	15.99	39.72	V
	18900	1880.0	-21.61	37.58	15.97	39.54	
	19150	1905.0	-21.70	37.48	15.78	37.84	

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	-15.42	36.57	21.15	130.32	H
	18900	1880.0	-16.20	37.22	21.02	126.47	
	19125	1902.5	-16.19	37.18	20.99	125.60	
	18675	1857.5	-20.22	37.65	17.43	55.34	V
	18900	1880.0	-20.25	37.58	17.33	54.08	
	19125	1902.5	-20.35	37.48	17.13	51.64	
Channel Bandwidth: 15 MHz / 16QAM							
X	18675	1857.5	-16.39	36.57	20.18	104.23	H
	18900	1880.0	-17.34	37.22	19.88	97.27	
	19125	1902.5	-17.32	37.18	19.86	96.83	
	18675	1857.5	-21.35	37.65	16.30	42.66	V
	18900	1880.0	-21.34	37.58	16.24	42.07	
	19125	1902.5	-21.39	37.48	16.09	40.64	

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	-15.21	36.57	21.36	136.77	H
	18900	1880.0	-15.94	37.22	21.28	134.28	
	19100	1900.0	-15.99	37.18	21.19	131.52	
	18700	1860.0	-20.02	37.65	17.63	57.94	V
	18900	1880.0	-20.03	37.58	17.55	56.89	
	19100	1900.0	-20.04	37.48	17.44	55.46	
Channel Bandwidth: 20 MHz / 16QAM							
X	18700	1860.0	-16.15	36.57	20.42	110.15	H
	18900	1880.0	-17.06	37.22	20.16	103.75	
	19100	1900.0	-17.06	37.18	20.12	102.80	
	18700	1860.0	-21.02	37.65	16.63	46.03	V
	18900	1880.0	-21.08	37.58	16.50	44.67	
	19100	1900.0	-21.09	37.48	16.39	43.55	

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

- 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.
- $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.
- E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

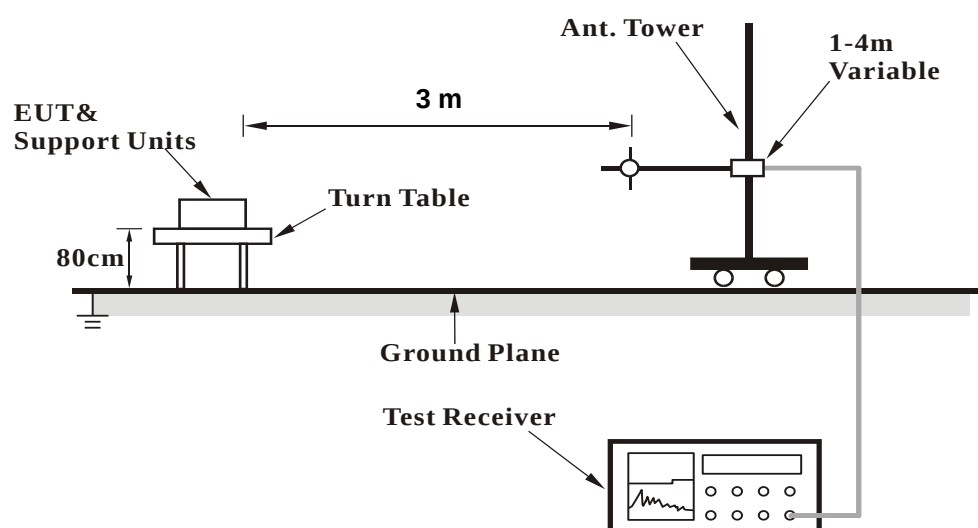
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.2.3 Deviation from Test Standard

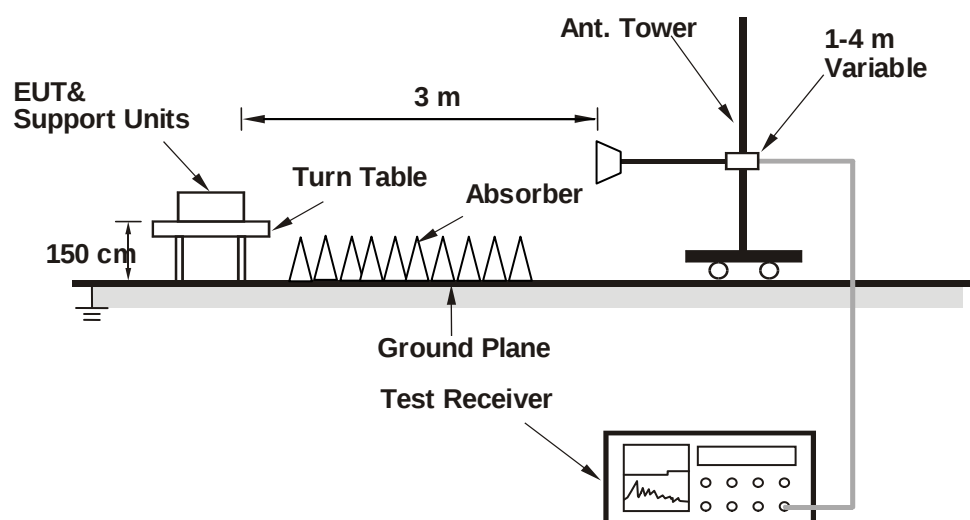
No deviation.

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:

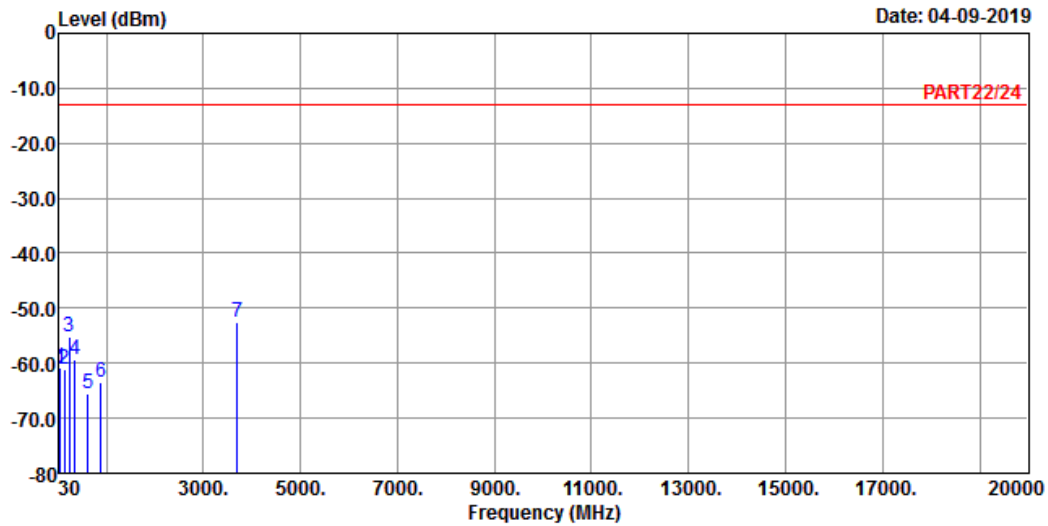
Low Channel

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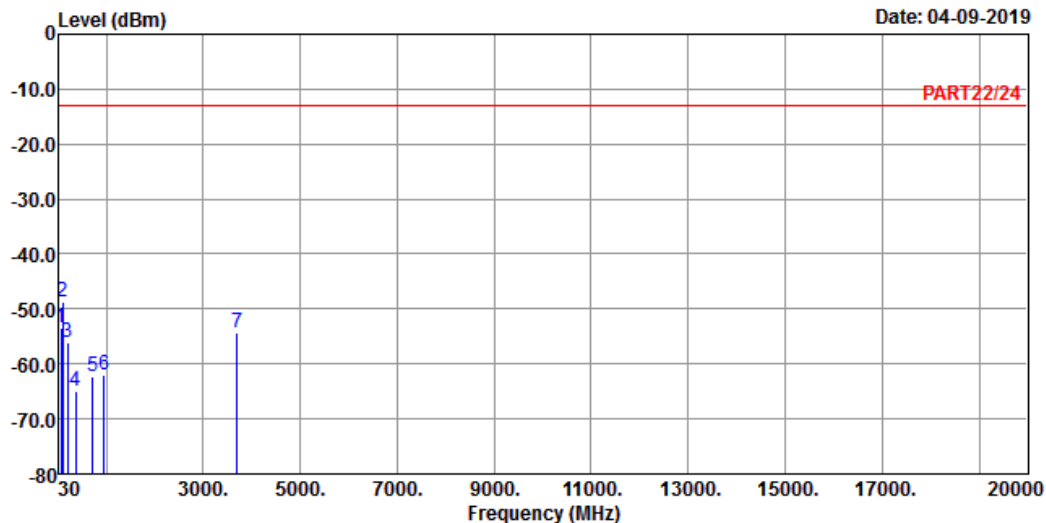
Data: 5



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remark : WCDMA Band 2 Link_L-CH
 Tested by: Thomas Wei

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	53.28	-60.67	-54.86	-13.00	-5.81	-47.67	Peak
2	129.91	-61.01	-52.32	-13.00	-8.69	-48.01	Peak
3	227.88	-55.23	-48.34	-13.00	-6.89	-42.23	Peak
4	347.19	-59.33	-53.05	-13.00	-6.28	-46.33	Peak
5	614.91	-65.47	-64.68	-13.00	-0.79	-52.47	Peak
6	892.33	-63.43	-63.96	-13.00	0.53	-50.43	Peak
7 pp	3704.80	-52.60	-45.67	-13.00	-6.93	-39.60	Peak

Data: 6



Site : 966 Chamber 5
Condition: PART22/24 VERTICAL
Remark : WCDMA Band 2 Link_L-CH
Tested by: Thomas Wei

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	66.86	-53.53	-45.35	-13.00	-8.18	-40.53	Peak
2 pp	104.69	-48.61	-38.17	-13.00	-10.44	-35.61	Peak
3	205.57	-56.09	-48.30	-13.00	-7.79	-43.09	Peak
4	371.44	-65.08	-58.97	-13.00	-6.11	-52.08	Peak
5	721.61	-62.23	-62.55	-13.00	0.32	-49.23	Peak
6	957.32	-61.91	-63.98	-13.00	2.07	-48.91	Peak
7	3704.80	-54.23	-47.30	-13.00	-6.93	-41.23	Peak

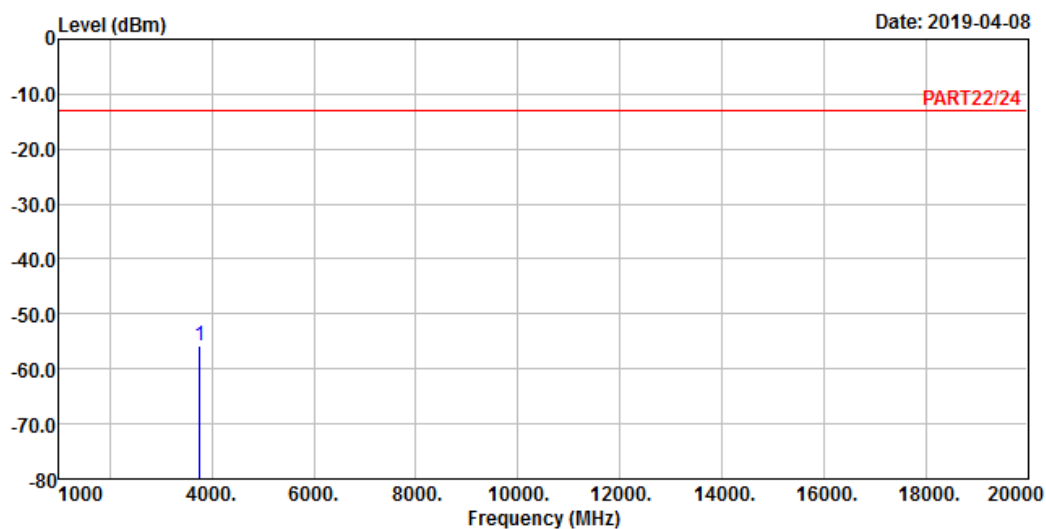
Middle Channel

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Data: 3

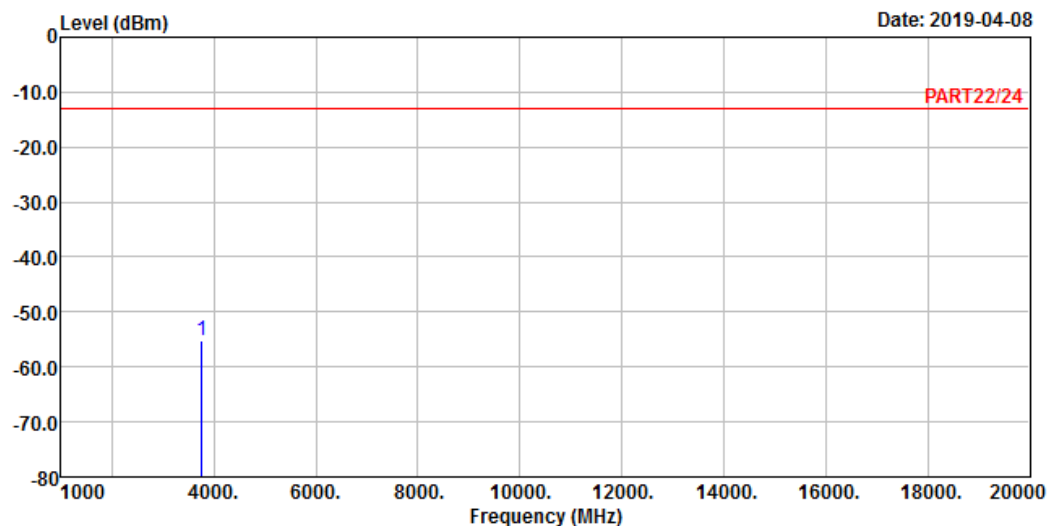


Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remark : WCDMA Band 2 Link_M-CH
Tested by: tim-chen

Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3760.00	-55.77	-49.12	-13.00	-6.65	-42.77	Peak



Data: 4



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remark : WCDMA Band 2 Link_M-CH
 Tested by: tim-chen

Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3760.00	-55.33	-48.68	-13.00	-6.65	-42.33	Peak

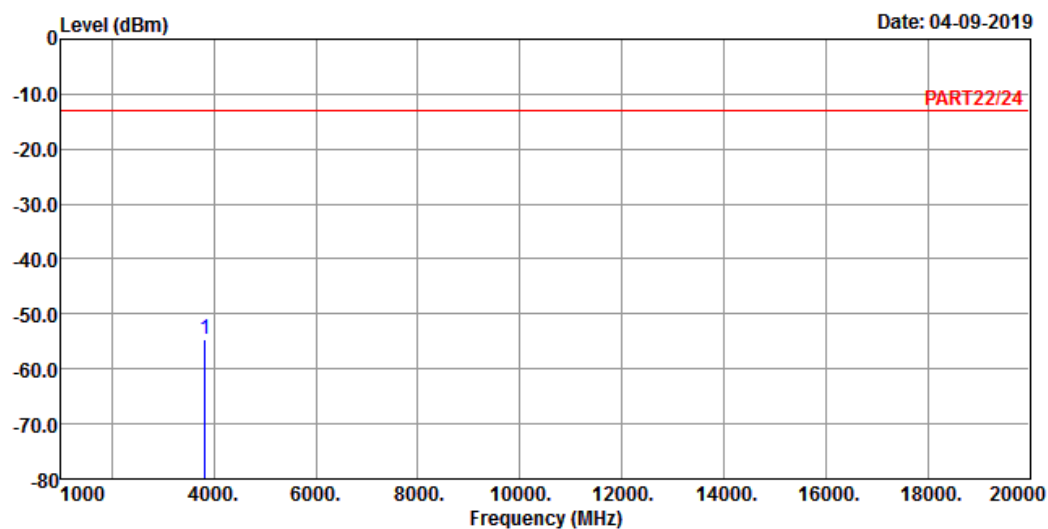
High Channel

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A D T

Data: 3

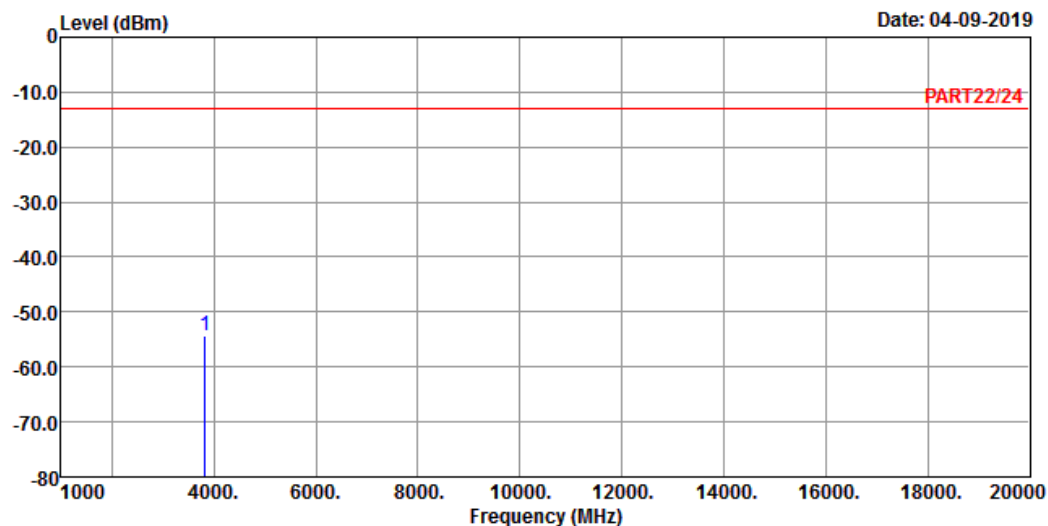


Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remark : WCDMA Band 2 Link_H-CH
Tested by: Thomas Wei

Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3815.20	-54.49	-48.09	-13.00	-6.40	-41.49	Peak



Data: 4



Site : 966 Chamber 5
Condition: PART22/24 VERTICAL
Remark : WCDMA Band 2 Link_H-CH
Tested by: Thomas Wei

Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3815.20	-54.30	-47.90	-13.00	-6.40	-41.30	Peak

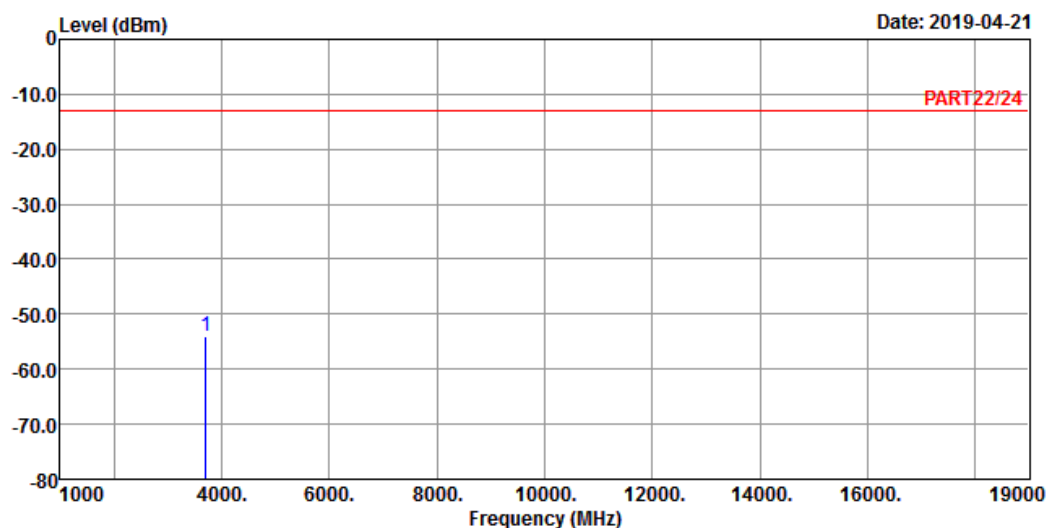
LTE Band 2
Channel Bandwidth: 1.4 MHz / QPSK
Low Channel

Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



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Data: 3

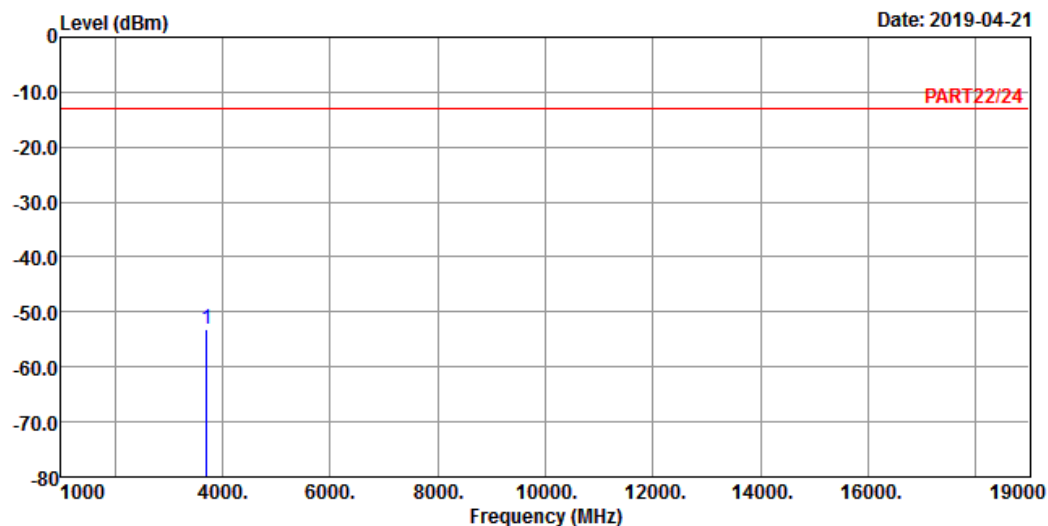


Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : LTE Band 2 QPSK_1.4M Link_L-CH
Tested by: Jisyong Wang

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3701.40	-53.97	-45.80	-13.00	-8.17	-40.97	Peak



Data: 4



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : LTE Band 2 QPSK_1.4M Link_L-CH
 Tested by: Jisyong Wang

Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3704.00	-53.11	-44.94	-13.00	-8.17	-40.11	Peak

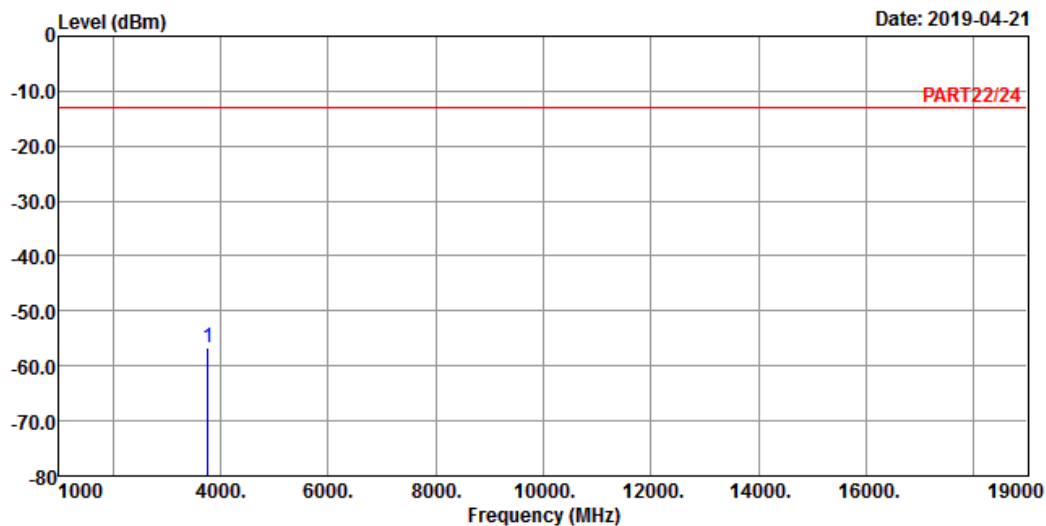
Middle Channel

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A D T

Data: 3

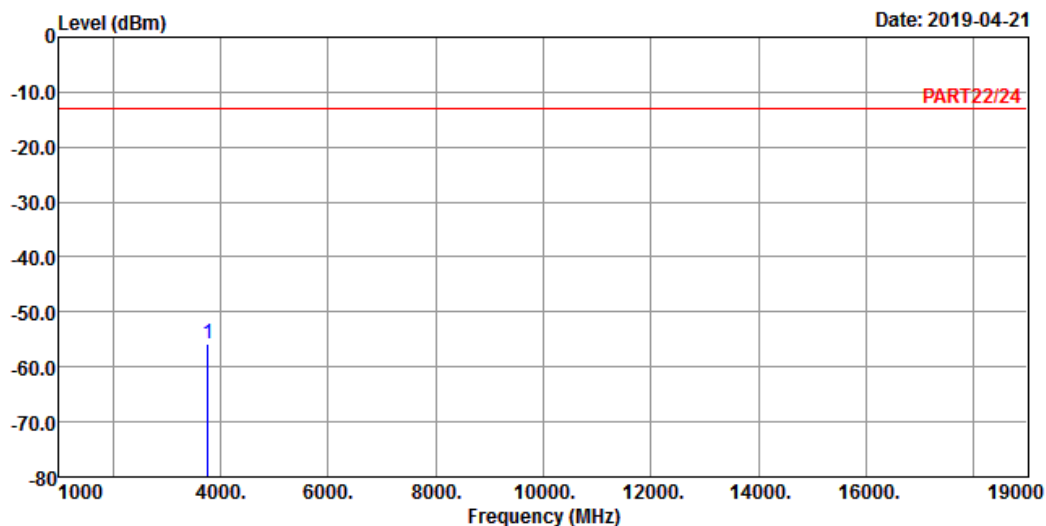


Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : LTE Band 2 QPSK_1.4M Link_M-CH
Tested by: Jisyong Wang

Freq	Level	Read Level	Limit Line	Over Factor	Limit Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 3760.00	-56.56	-48.50	-13.00	-8.06	-43.56 Peak



Data: 4



Site : 966 Chamber 5
Condition: PART22/24 VERTICAL
Remak : LTE Band 2 QPSK_1.4M Link_M-CH
Tested by: Jisyong Wang

Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3760.00	-55.90	-47.84	-13.00	-8.06	-42.90	Peak

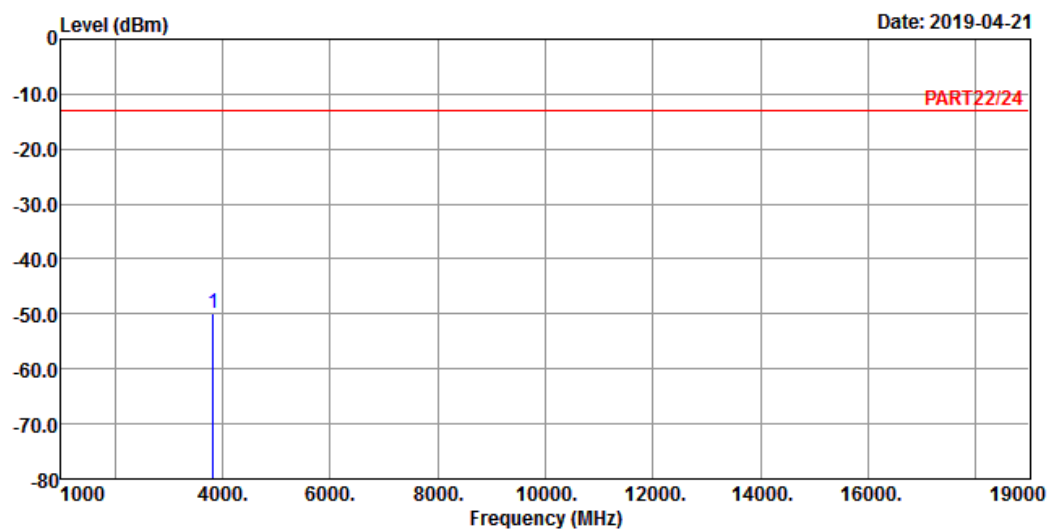
High Channel

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A D T

Data: 3

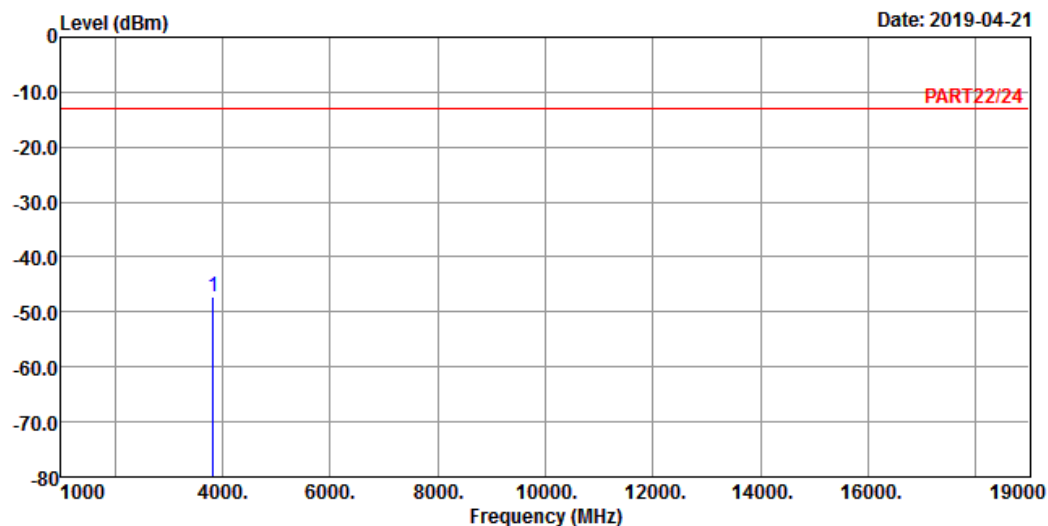


Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : LTE Band 2 QPSK_1.4M Link_H-CH
Tested by: Jisyong Wang

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3818.60	-50.00	-42.32	-13.00	-7.68	-37.00	Peak



Data: 4



Site : 966 Chamber 5
Condition: PART22/24 VERTICAL
Remak : LTE Band 2 QPSK_1.4M Link_H-CH
Tested by: Jisyong Wang

Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3818.60	-47.19	-39.51	-13.00	-7.68	-34.19	Peak

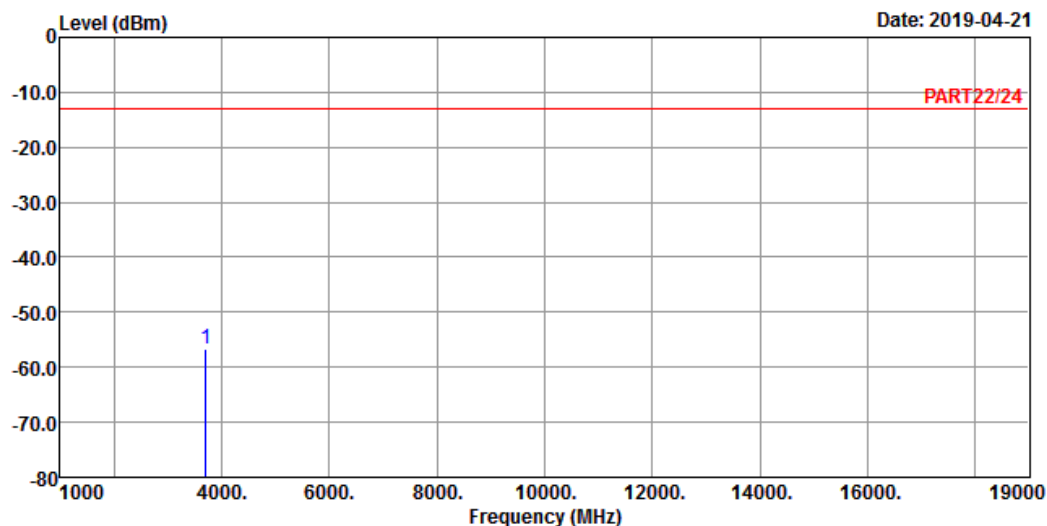
Channel Bandwidth: 5 MHz / QPSK
Low Channel

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Data: 3



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : LTE Band 2 QPSK_5M Link_L-CH

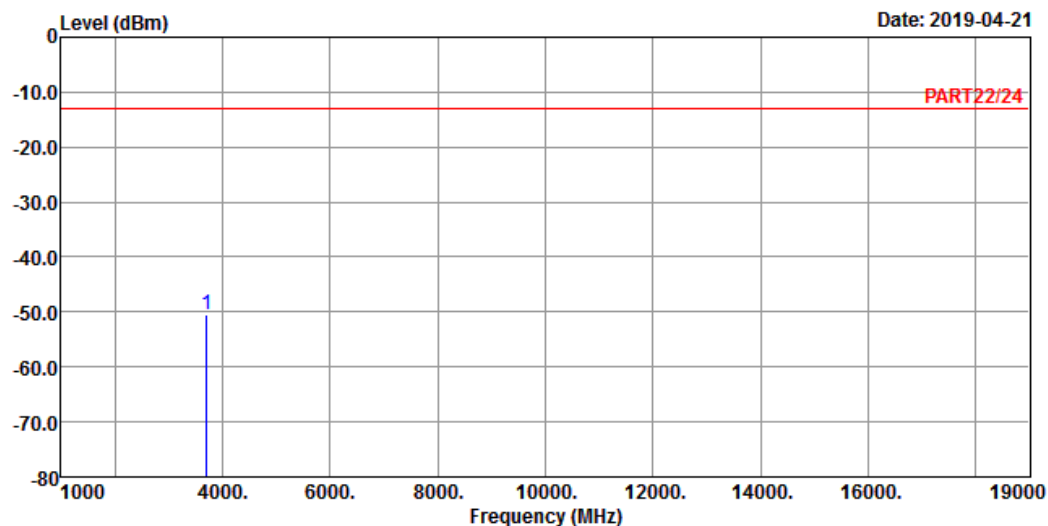
Tested by: Jisyong Wang

Freq	Level	Read Level	Limit	Over	Remark
MHz	dBm	dBm	dBm	dB	

1 pp 3705.00 -56.70 -48.53 -13.00 -8.17 -43.70 Peak



Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 2 QPSK_5M Link_L-CH

Tested by: Jisyong Wang

Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3705.00	-50.41	-42.24	-13.00	-8.17	-37.41	Peak

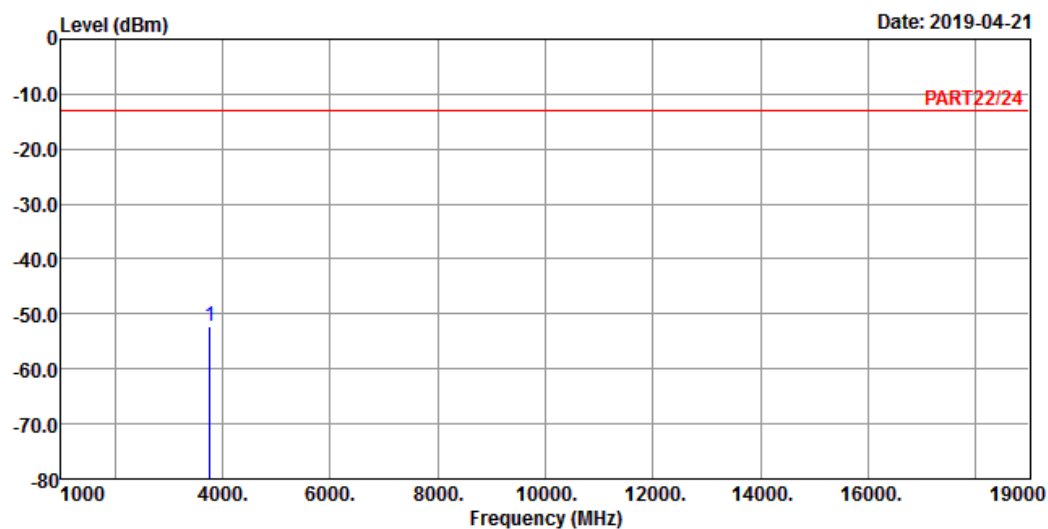
Middle Channel

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A D T

Data: 3

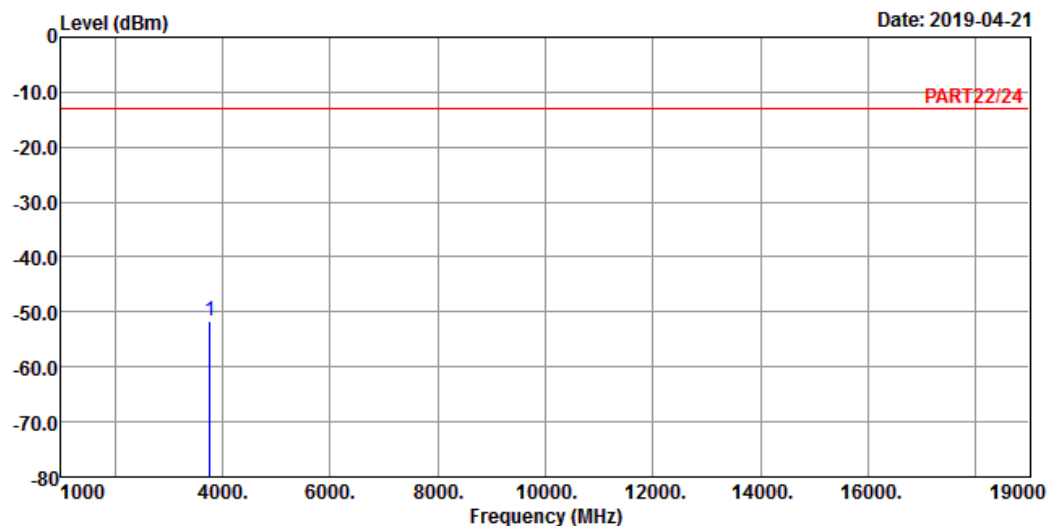


Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : LTE Band 2 QPSK_5M Link_M-CH
Tested by: Jisyong Wang

Freq	Level	Read Level	Limit Line	Over Factor	Limit Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 3760.00	-52.35	-44.29	-13.00	-8.06	-39.35 Peak



Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 2 QPSK_5M Link_M-CH

Tested by: Jisyong Wang

Freq	Level	Read Level	Limit	Over	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	dB	
1 pp 3760.00	-51.67	-43.61	-13.00	-8.06	-38.67		Peak

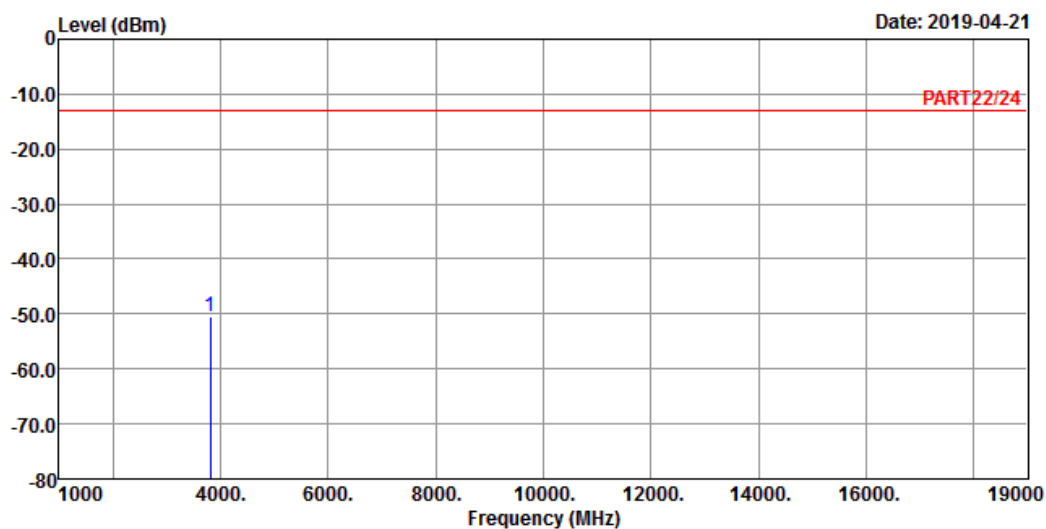
High Channel

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A D T

Data: 3

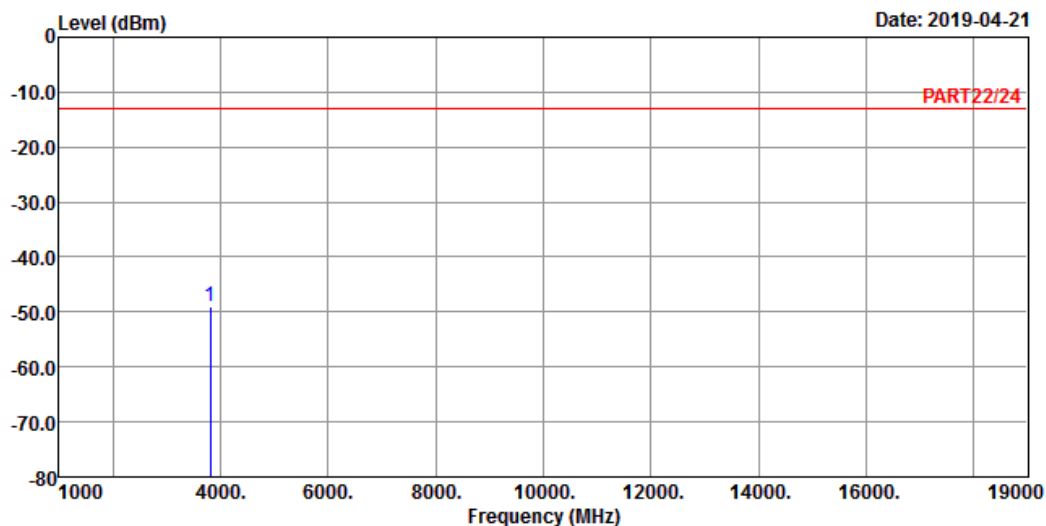


Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : LTE Band 2 QPSK_5M Link_H-CH
Tested by: Jisyong Wang

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3815.00	-50.60	-42.82	-13.00	-7.78	-37.60	Peak



Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 2 QPSK_5M Link_H-CH

Tested by: Jisyong Wang

Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3815.00	-48.93	-41.15	-13.00	-7.78	-35.93	Peak

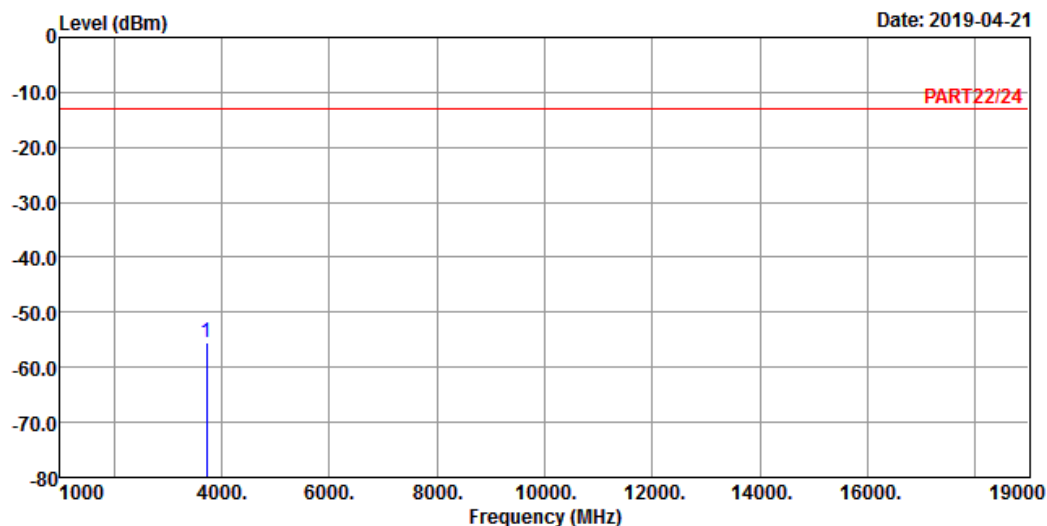
Channel Bandwidth: 20 MHz / QPSK
Low Channel

Bureau Veritas Consumer Products Services Ltd., Taoyuan 31063



A D T

Data: 3

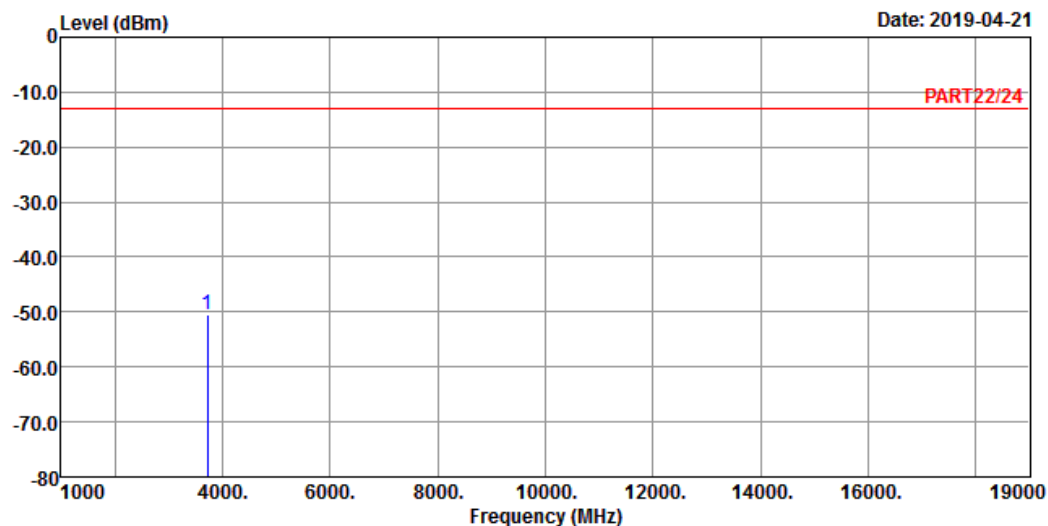


Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : LTE Band 2 QPSK_20M Link_L-CH
Tested by: Jisyong Wang

Freq	Level	Read Level	Limit	Over	Remark
MHz	dBm	dBm	dBm	dB	
1 pp 3720.00	-55.53	-47.40	-13.00	-8.13	-42.53 Peak



Data: 4



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : LTE Band 2 QPSK_20M Link_L-CH
 Tested by: Jisyong Wang

Freq	Level	Read Level	Limit	Line Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3720.00	-50.34	-42.21	-13.00	-8.13	-37.34	Peak

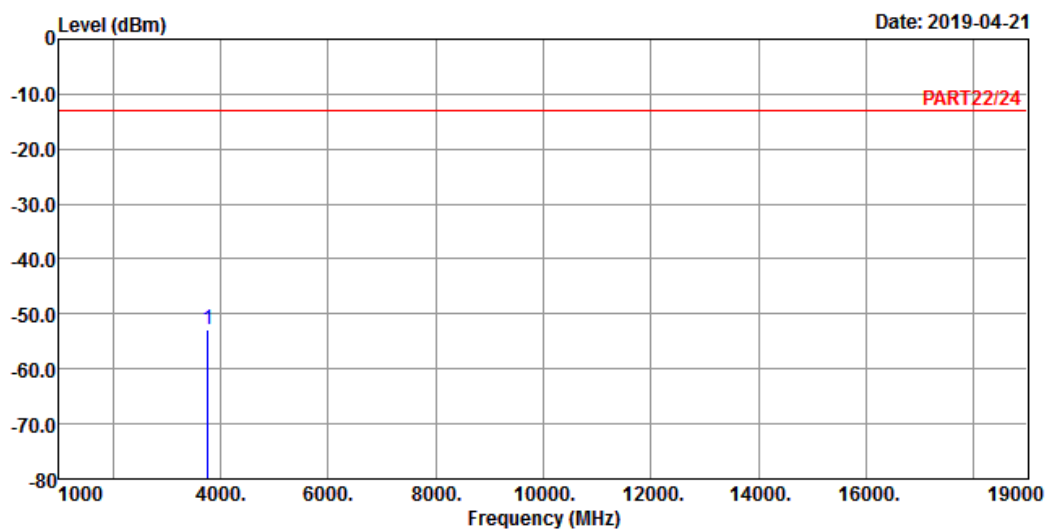
Middle Channel

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A D T

Data: 3

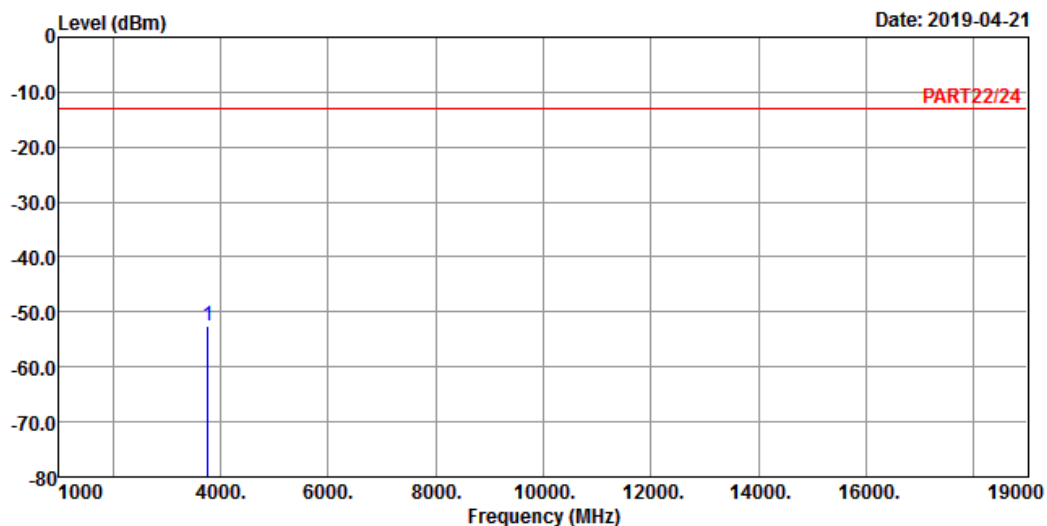


Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : LTE Band 2 QPSK_20M Link_M-CH
Tested by: Jisyong Wang

Freq	Level	Read Level	Limit Line	Over Factor	Limit Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 3760.00	-52.93	-44.87	-13.00	-8.06	-39.93 Peak



Data: 4



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : LTE Band 2 QPSK_20M Link_M-CH
 Tested by: Jisyong Wang

Freq	Level	Read Level	Limit	Over	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	dB	
1 pp 3760.00	-52.44	-44.38	-13.00	-8.06	-39.44		Peak

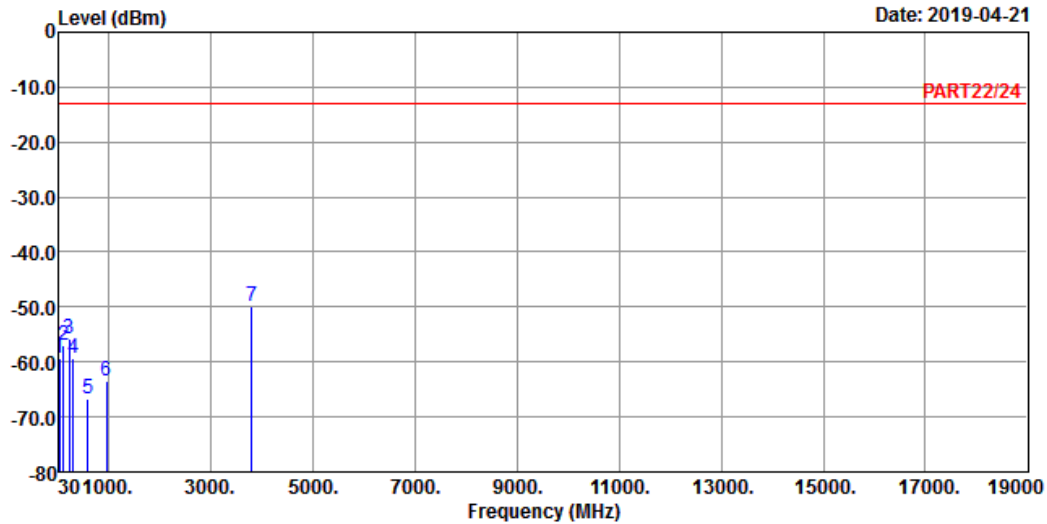
High Channel

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A D T

Data: 5



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : LTE Band 2 QPSK_20M Link_H-CH
Tested by: Jisyong Wang

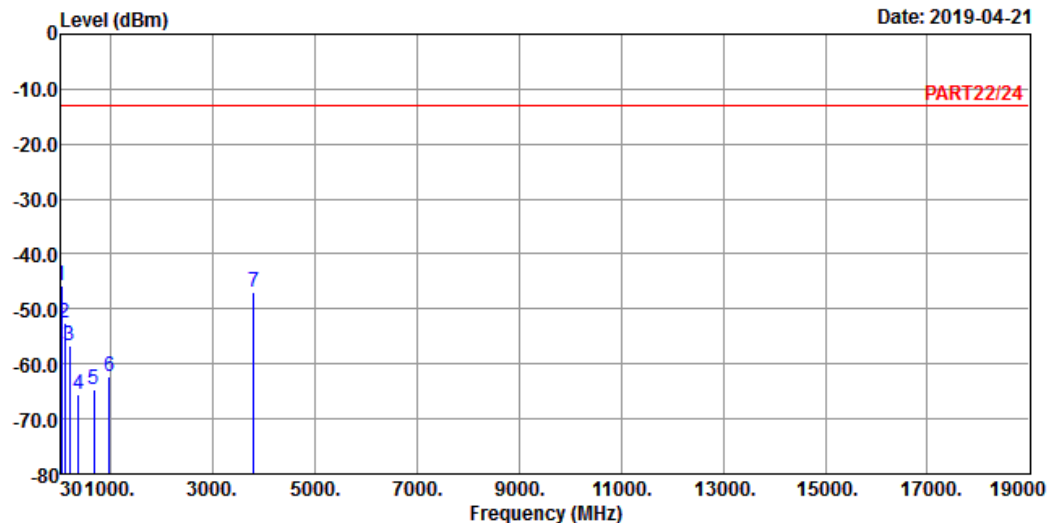
	Freq	Level	Read Level	Limit	Over	
	MHz	dBm	dBm	dBm	Factor	Limit Remark
					dB	dB
1	32.91	-59.40	-58.31	-13.00	-1.09	-46.40 Peak
2	108.57	-56.84	-46.49	-13.00	-10.35	-43.84 Peak
3	224.97	-55.84	-48.83	-13.00	-7.01	-42.84 Peak
4	299.66	-59.44	-52.43	-13.00	-7.01	-46.44 Peak
5	583.87	-66.60	-65.16	-13.00	-1.44	-53.60 Peak
6	953.44	-63.33	-65.27	-13.00	1.94	-50.33 Peak
7 pp	3800.00	-49.98	-42.20	-13.00	-7.78	-36.98 Peak

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A D T

Data: 6



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : LTE Band 2 QPSK_20M Link_H-CH
 Tested by: Jisyong Wang

	Freq	Level	Read Level	Limit Line	Over Factor	Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	35.82	-45.73	-44.20	-13.00	-1.53	-32.73	Peak
2	94.02	-52.53	-41.64	-13.00	-10.89	-39.53	Peak
3	195.87	-56.69	-49.04	-13.00	-7.65	-43.69	Peak
4	365.62	-65.49	-59.34	-13.00	-6.15	-52.49	Peak
5	669.23	-64.73	-64.15	-13.00	-0.58	-51.73	Peak
6	974.78	-62.26	-64.95	-13.00	2.69	-49.26	Peak
7	3800.00	-46.95	-39.17	-13.00	-7.78	-33.95	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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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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