

## Variant FCC Test Report

### (PART 24)

**Report No.:** RFBEIH-WTW-P21070244-1

**FCC ID:** P27-IG515

**Test Model:** IG515-4G

**Received Date:** Jul. 08, 2021

**Test Date:** Sep. 30, 2021

**Issued Date:** Dec. 03, 2021

**Applicant:** Sercomm Corp.

**Address:** 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

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

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location :** No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**FCC Registration /**  
**Designation Number:** 788550 / TW0003



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### Release Control Record

| Issue No.              | Description      | Date Issued   |
|------------------------|------------------|---------------|
| RFBEIH-WTW-P21070244-1 | Original Release | Dec. 03, 2021 |

## 1 Certificate of Conformity

**Product:** Gateway

**Brand:** Sercomm

**Test Model:** IG515-4G

**Sample Status:** Engineering Sample

**Applicant:** Sercomm Corp.

**Test Date:** Sep. 30, 2021

**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 :**

*Lena Wang*

**Date:**

Dec. 03, 2021

Lena Wang / Specialist

**Approved by :**

*Jeremy Lin*

**Date:**

Dec. 03, 2021

Jeremy Lin / Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 24 & Part 2 |                                    |        |                                                                                     |
|----------------------------------------|------------------------------------|--------|-------------------------------------------------------------------------------------|
| FCC Clause                             | Test Item                          | Result | Remarks                                                                             |
| 2.1046<br>24.232                       | Effective Isotropic Radiated Power | N/A    | Refer to note                                                                       |
| 2.1047                                 | Modulation Characteristics         | N/A    | Refer to note                                                                       |
| 24.232(d)                              | Peak to Average Ratio              | N/A    | Refer to note                                                                       |
| 2.1055<br>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<br>24.238                       | Conducted Spurious Emissions       | N/A    | Refer to note                                                                       |
| 2.1053<br>24.238                       | Radiated Spurious Emissions        | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -33.14 dB at 61.04 MHz. |

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. Only Radiated Spurious Emissions (below 1GHz) tests was performed for this addendum. Refer to original report for other test data.

### 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                        |

## 2.2 Test Site and Instruments

| Description & Manufacturer                     | Model No.         | Serial No.                | Date of Calibration | Due Date of Calibration |
|------------------------------------------------|-------------------|---------------------------|---------------------|-------------------------|
| Spectrum Analyzer<br>Agilent                   | N9010A            | MY52220314                | Dec. 07, 2020       | Dec. 06, 2021           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43             | 101261                    | Apr. 12, 2021       | Apr. 11, 2022           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9120D        | 9120D-969                 | Nov. 22, 2020       | Nov. 21, 2021           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB 9168         | 9168-472                  | Nov. 06, 2020       | Nov. 05, 2021           |
| Fixed Attenuator<br>WOKEN                      | MDCS18N-10        | MDCS18N-10-01             | Apr. 13, 2021       | Apr. 12, 2022           |
| Preamplifier<br>EMCI                           | EMC 012645        | 980115                    | Oct. 07, 2020       | Oct. 06, 2021           |
| Preamplifier<br>EMCI                           | EMC 184045        | 980116                    | Oct. 07, 2020       | Oct. 06, 2021           |
| Preamplifier<br>EMCI                           | EMC001340         | 980201                    | Oct. 21, 2020       | Oct. 20, 2021           |
| Preamplifier<br>EMCI                           | EMC 330H          | 980112                    | Oct. 07, 2020       | Oct. 06, 2021           |
| RF Coaxial Cable<br>EMCI                       | EMC104-SM-SM-8000 | 171005                    | Oct. 07, 2020       | Oct. 06, 2021           |
| RF Coaxial Cable<br>HUBER+SUHNNER              | SUCOFLEX 104      | EMC104-SM-SM-1000(140807) | Oct. 07, 2020       | Oct. 06, 2021           |
| RF Coaxial Cable<br>WOKEN                      | 8D-FB             | Cable-Ch10-01             | Oct. 07, 2020       | Oct. 06, 2021           |
| Boresight Antenna Fixture                      | FBA-01            | FBA-SIP01                 | NA                  | NA                      |
| Software<br>BV ADT                             | E3<br>6.120103    | NA                        | NA                  | NA                      |
| Antenna Tower<br>MF                            | MFA-440H          | NA                        | NA                  | NA                      |
| Turn Table<br>MF                               | MFT-201SS         | NA                        | NA                  | NA                      |
| Antenna Tower & Turn<br>Table Controller<br>MF | MF-7802           | NA                        | NA                  | NA                      |
| Radio Communication<br>Analyzer<br>Anritsu     | MT8821C           | 6201240431                | NA                  | NA                      |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSW43             | 101582                    | Apr. 01, 2021       | Mar. 31, 2022           |

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

|                            |                                         |                     |
|----------------------------|-----------------------------------------|---------------------|
| <b>Product</b>             | Gateway                                 |                     |
| <b>Brand</b>               | Sercomm                                 |                     |
| <b>Test Model</b>          | IG515-4G                                |                     |
| <b>Status of EUT</b>       | Engineering Sample                      |                     |
| <b>Power Supply Rating</b> | 12.0 Vdc (adapter)                      |                     |
| <b>Modulation Type</b>     | WCDMA                                   | BPSK, QPSK          |
|                            | HSDPA                                   | BPSK                |
|                            | HSUPA                                   | QPSK                |
|                            | LTE                                     | QPSK, 16QAM         |
| <b>Frequency Range</b>     | 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 |
| <b>Antenna Type</b>        | Refer to Note as below                  |                     |
| <b>Accessory Device</b>    | Refer to Note as below                  |                     |
| <b>Data Cable Supplied</b> | N/A                                     |                     |

Note:

- This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to BV CPS report no. FD200709D02-1. The difference compared with original report is listed as below, therefore only Radiated Spurious Emissions (below 1GHz) tests was performed for this addendum.

- ◆ Adding new HW, Buzzer, Tamper & Pairing button
- ◆ Adding new battery source (Main source : Simpo : Model : Sercomm NA50X\_NA502S, 2nd source : FUJI : Model : IG55)
- ◆ Cancel the large shell of the original report.

- The EUT contains following accessory devices.

| Product | Brand | Model      | Description                                           |
|---------|-------|------------|-------------------------------------------------------|
| Adapter | APD   | WB-24J12FU | I/P: 100-240 Vac, 50/60 Hz, 0.7 A<br>O/P: 12 Vdc, 2 A |
| Battery | FUJI  | IG55       | 7.2V, 3100mAh, 22.32Wh                                |

- The antenna information is listed as below.

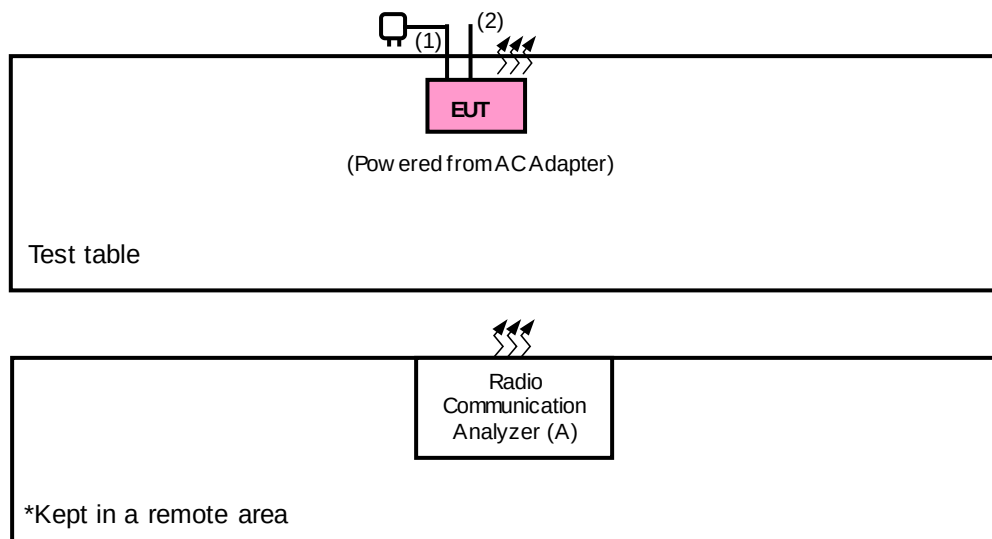
| Antenna Type |               | PIFA  |     |     |     |     |     |     |
|--------------|---------------|-------|-----|-----|-----|-----|-----|-----|
| Band         |               | WCDMA |     | LTE |     |     |     |     |
|              |               | 2     | 5   | 2   | 4   | 5   | 12  | 13  |
| Gain         | Ant. 1 (Main) | 2.3   | 1.3 | 2.3 | 2.8 | 1.3 | 1.1 | 1.1 |
|              | Ant. 2 (Div)  | 2.6   | 2.5 | 2.6 | 2.8 | 2.5 | 2.8 | 2.8 |

- The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

5. 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>



#### 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 |
|-----|------------------------------|---------|-----------|------------|--------|
| A   | Radio Communication Analyzer | ANRITSU | MT8820C   | 6201240431 | N/A    |

| No. | Signal Cable Description Of The Above Support Units |
|-----|-----------------------------------------------------|
| 1.  | Power Cable: 1.5m                                   |
| 2.  | LAN Cable: 2m                                       |

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       | Radiated Emission |
|------------|-------------------|
| WCDMA      | X-plane           |
| LTE Band 2 | X-plane           |

## WCDMA

| EUT Configure Mode | Test Item         | Available Channel | Tested Channel | Mode  |
|--------------------|-------------------|-------------------|----------------|-------|
| -                  | Radiated Emission | 9262 to 9538      | 9538           | WCDMA |

## LTE Band 2

| EUT Configure Mode | Test Item         | Available Channel | Tested Channel | Channel Bandwidth | Modulation | Mode               |
|--------------------|-------------------|-------------------|----------------|-------------------|------------|--------------------|
| -                  | Radiated Emission | 18700 to 19100    | 18900          | 20 MHz            | QPSK       | 1 RB / 0 RB Offset |

**Note:** For radiated emissions below 1 GHz, select the worst radiated emission channel for final testing.

### Test Condition:

| Test Item         | Environmental Conditions | Input Power    | Tested By |
|-------------------|--------------------------|----------------|-----------|
| Radiated Emission | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Cookie Ku |

### 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 and references

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

#### Test Standard:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 24**

**ANSI 63.26-2015**

**NOTE:** All test items have been performed and recorded as per the above standards.

#### References Test Guidance:

**KDB 971168 D01 Power Meas License Digital Systems v03r01**

**ANSI/TIA/EIA-603-E 2016**

**NOTE:** All test items have been performed as a reference to the above KDB test guidance.

## 4 Test Types and Results

### 4.1 Radiated Emission Measurement

#### 4.1.1 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.

#### 4.1.2 Test Procedure

- a. 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.  $EIRP = \text{Output power level} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . Correction Factor (includes EIRP and ERP unit conversion factor) = Antenna gain of substitution horn. - Tx cable loss. Measurement method refers to ANSI C63.26 section 5.2.7 & 5.5.
- c. E.R.P power can be calculated from E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$ .

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

**NOTE:** The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:

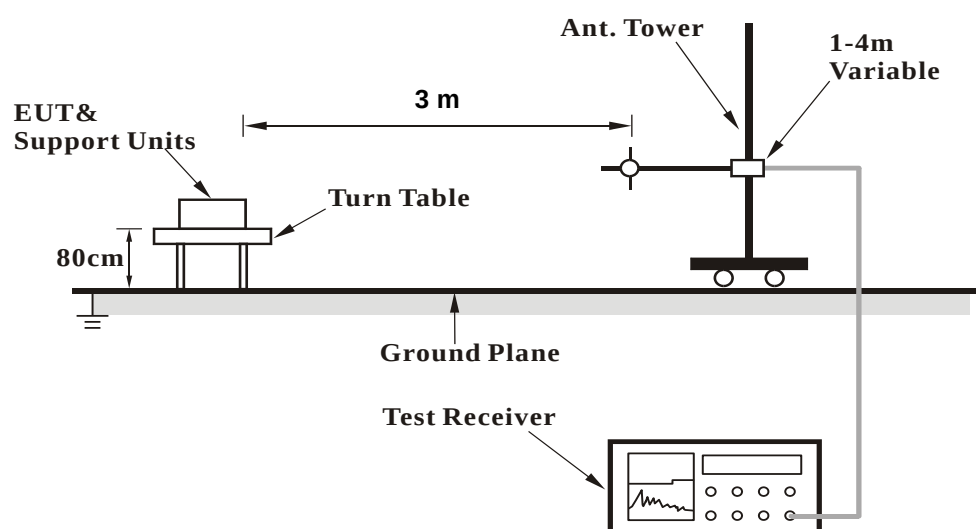
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

#### 4.1.3 Deviation from Test Standard

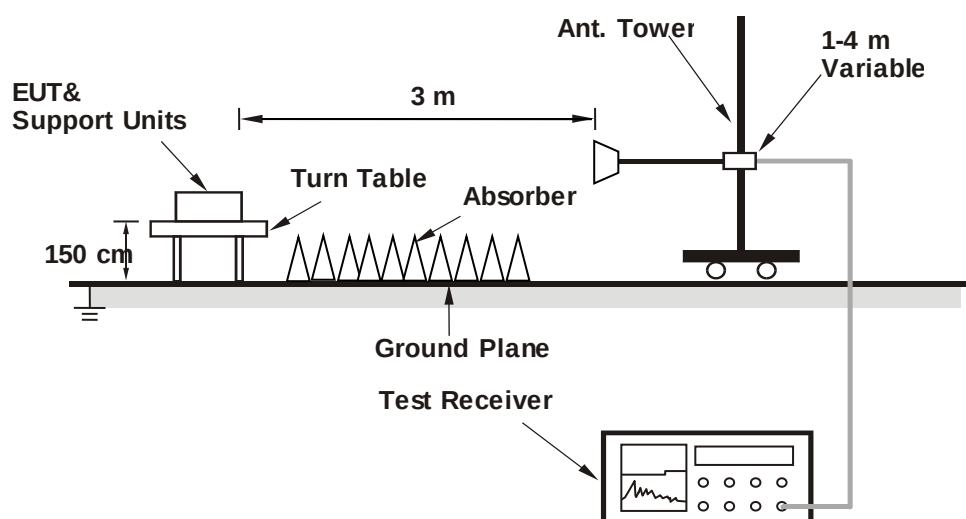
No deviation.

#### 4.1.4 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).

#### 4.1.5 Test Results

WCDMA:

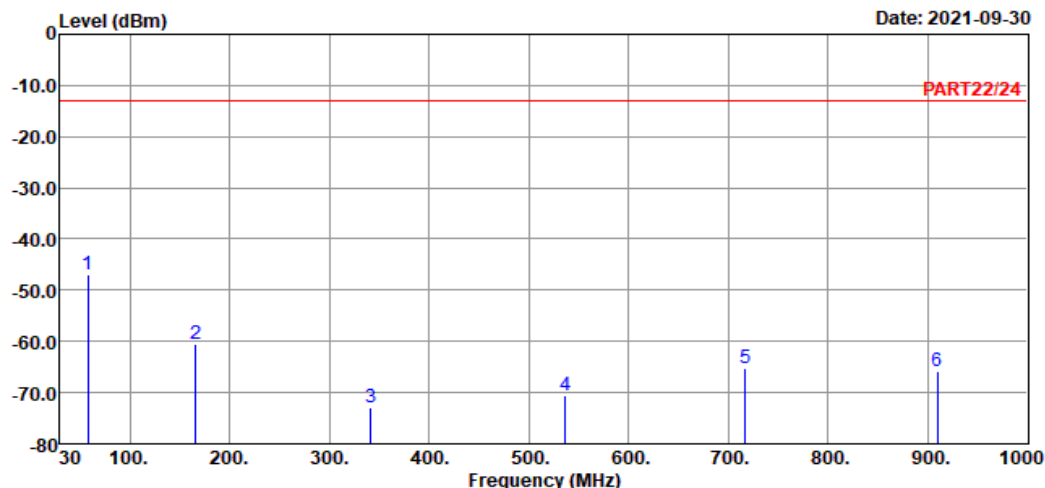
High Channel



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Data: 3



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : WCDMA B2 Link\_H-CH

Tested by: Cookie Ku

|      | Freq   | Level  | Read Level | Limit  | Line Factor | Over Limit | Remark |
|------|--------|--------|------------|--------|-------------|------------|--------|
|      | MHz    | dBm    | dBm        | dBm    | dB          | dB         |        |
| 1 pp | 58.13  | -46.99 | -39.86     | -13.00 | -7.13       | -33.99     | Peak   |
| 2    | 165.80 | -60.59 | -55.34     | -13.00 | -5.25       | -47.59     | Peak   |
| 3    | 341.37 | -72.95 | -66.58     | -13.00 | -6.37       | -59.95     | Peak   |
| 4    | 536.34 | -70.51 | -67.18     | -13.00 | -3.33       | -57.51     | Peak   |
| 5    | 716.76 | -65.16 | -65.39     | -13.00 | 0.23        | -52.16     | Peak   |
| 6    | 909.79 | -65.76 | -66.57     | -13.00 | 0.81        | -52.76     | Peak   |

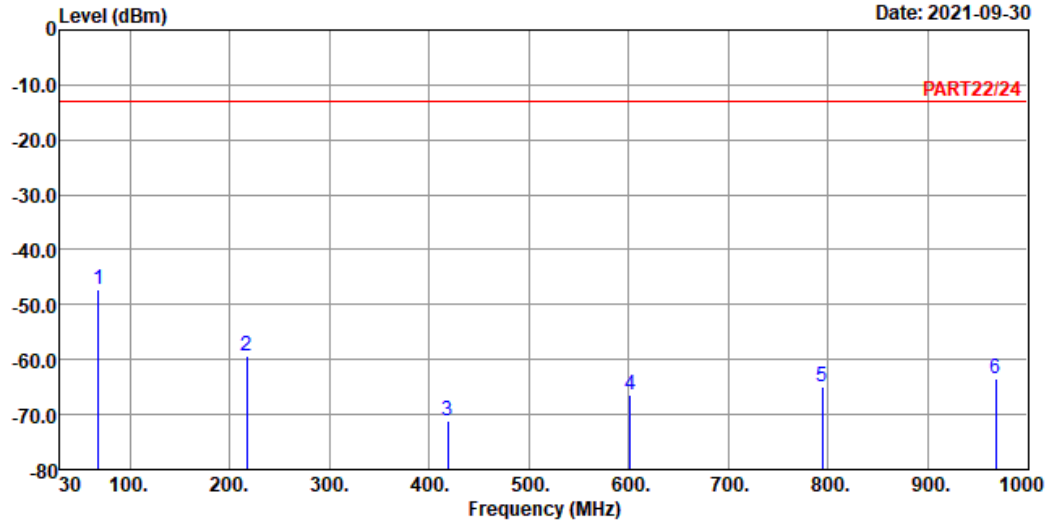


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A D T

Data: 4

Date: 2021-09-30



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : WCDMA B2 Link\_H-CH

Tested by: Cookie Ku

|      | Freq   | Level  | Read Level | Limit  | Line  | Factor | Over Limit | Remark |
|------|--------|--------|------------|--------|-------|--------|------------|--------|
|      | MHz    | dBm    | dBm        | dBm    |       | dB     | dB         |        |
| 1 pp | 68.80  | -47.32 | -39.00     | -13.00 | -8.32 | -34.32 | Peak       |        |
| 2    | 217.21 | -59.25 | -51.93     | -13.00 | -7.32 | -46.25 | Peak       |        |
| 3    | 418.97 | -71.06 | -65.27     | -13.00 | -5.79 | -58.06 | Peak       |        |
| 4    | 601.33 | -66.30 | -65.54     | -13.00 | -0.76 | -53.30 | Peak       |        |
| 5    | 794.36 | -65.03 | -65.78     | -13.00 | 0.75  | -52.03 | Peak       |        |
| 6    | 967.99 | -63.54 | -65.99     | -13.00 | 2.45  | -50.54 | Peak       |        |

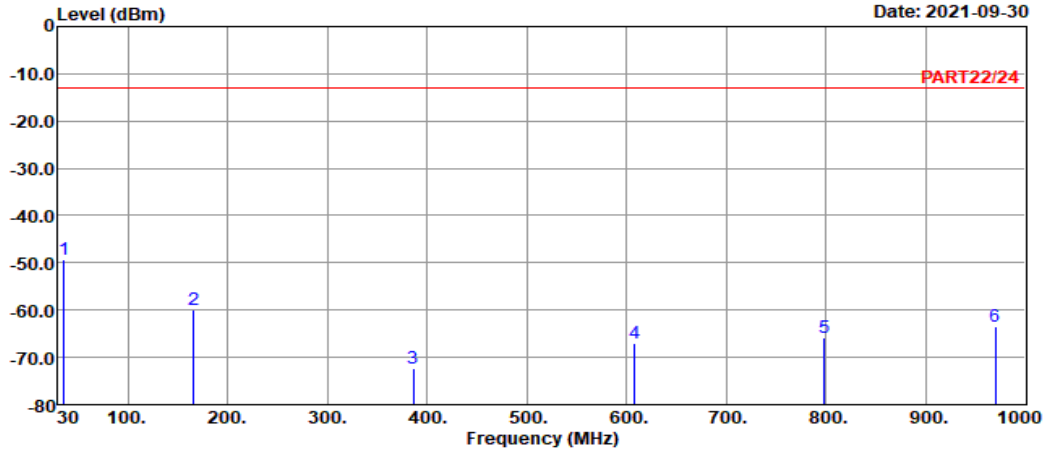
LTE Band 2  
Channel Bandwidth: 20 MHz / QPSK  
Middle Channel



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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: Cookie Ku

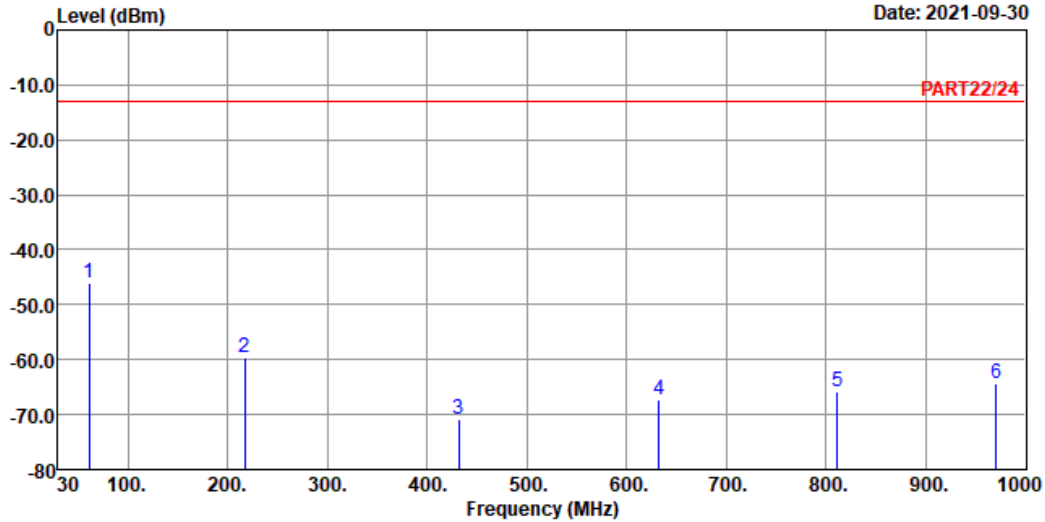
|      | Freq   | Level  | Read Level | Limit Line | Factor | Over Limit | Remark |
|------|--------|--------|------------|------------|--------|------------|--------|
|      | MHz    | dBm    | dBm        | dBm        | dB     | dB         |        |
| 1 pp | 35.82  | -49.32 | -47.79     | -13.00     | -1.53  | -36.32     | Peak   |
| 2    | 165.80 | -60.03 | -54.78     | -13.00     | -5.25  | -47.03     | Peak   |
| 3    | 385.99 | -72.43 | -66.40     | -13.00     | -6.03  | -59.43     | Peak   |
| 4    | 608.12 | -66.93 | -66.16     | -13.00     | -0.77  | -53.93     | Peak   |
| 5    | 798.24 | -65.82 | -66.56     | -13.00     | 0.74   | -52.82     | Peak   |
| 6    | 969.93 | -63.34 | -65.86     | -13.00     | 2.52   | -50.34     | Peak   |



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A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 2 QPSK\_20M Link\_M-CH

Tested by: Cookie Ku

|      | Freq   | Level  | Read Level | Limit  | Line Factor | Over Limit | Remark |
|------|--------|--------|------------|--------|-------------|------------|--------|
|      | MHz    | dBm    | dBm        | dBm    | dB          | dB         |        |
| 1 pp | 61.04  | -46.14 | -38.40     | -13.00 | -7.74       | -33.14     | Peak   |
| 2    | 217.21 | -59.77 | -52.45     | -13.00 | -7.32       | -46.77     | Peak   |
| 3    | 431.58 | -70.88 | -65.18     | -13.00 | -5.70       | -57.88     | Peak   |
| 4    | 632.37 | -67.19 | -66.35     | -13.00 | -0.84       | -54.19     | Peak   |
| 5    | 810.85 | -65.72 | -66.36     | -13.00 | 0.64        | -52.72     | Peak   |
| 6    | 970.90 | -64.43 | -66.98     | -13.00 | 2.55        | -51.43     | 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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**Hsin Chu EMC/RF/Telecom Lab**

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**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

--- END ---