

# FCC CERTIFICATION REPORT

## Canada ISED ICES-003 TEST REPORT

**Test Report No.** : MH/2018/10036

**Applicant** : Huawei Technologies Co., Ltd.

**Address** : Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, China (For FCC)  
Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, China (Peoples Republic Of) (For IC)

**Manufacturer** : Huawei Technologies Co., Ltd.

**Address** : Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, China (For FCC)  
Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, China (Peoples Republic Of) (For IC)

**Equipment Under Test (EUT) :**

**Product Name** : HUAWEI MateBook

**Brand Name** : HUAWEI; honor

**Model No.** : VLT-W10

**Added Model(s)** : VLT-W50; VLT-W60

**Standards** : FCC Part 15:2017, Subpart B, Class B  
Canada ICES-003 Issue 6(June 2016), Class B

**Date of Receipt** : Jan. 08, 2018

**Date of Test** : Jan. 08 ~ 16, 2018

**Date of Issue** : Mar.08, 2018

|                      |             |
|----------------------|-------------|
| <b>Test Result :</b> | <b>PASS</b> |
|----------------------|-------------|

In the configuration tested, the EUT complied with the standards specified above.

**Remarks :**

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report shall not be reproduced except in full, without the written approval of the laboratory. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

**Tested By:** Bill Cheng  
**Bill Cheng (Engineer)**

**Date:** Mar.08, 2018

**Approved By:** Tony Hsu  
**Tony Hsu (Assistant Supervisor)**

**Date:** Mar.08, 2018



## Revision History

| Report Number | Revision | Description                  | Issue Date   |
|---------------|----------|------------------------------|--------------|
| MH/2018/10036 | Rev.00   | Initial creation of document | Mar.08, 2018 |
|               |          |                              |              |
|               |          |                              |              |
|               |          |                              |              |
|               |          |                              |              |

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# 1. General Information

## 1.1 Applicant & Manufacturer Information

Applicant : Huawei Technologies Co., Ltd.  
Address : Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, China (For FCC)  
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## 1.2 General Description of EUT

Product Name : HUAWEI MateBook  
Brand Name : HUAWEI; honor  
Model No. : VLT-W10  
Added Model(s) : VLT-W50; VLT-W60  
Model Difference : The marketing purposed

### 1.3 Details of EUT

|                             |   |                                   |
|-----------------------------|---|-----------------------------------|
| Power Supply                | AC100~240V  |                                   |
| Highest operate description | 4 GHz   |                                   |
| AC Adapter                  | Huawei  | HW-200325YYY (Y=0-9,A-Z or blank) |
| Adapter Power Rating        | I/P: 100-240VAC, 50/60Hz, 1.8A<br>O/P: 5VDC, 2A; 9VDC, 2A; 12VDC, 2A; 15VDC, 3A; 20VDC, 3.25A |                                   |
| DC Power Cable Type         | Shielded, 1.8m (Detachable) to Power Adapter  |                                   |
| Memory                      | on Board  |                                   |
| CPU                         | Intel   | Up to 4GHz                        |
| Main Board                  | Quanta  | H96A                              |
| Graphics                    | Integrated Graphic<br>NVIDIA N17S   |                                   |
| LCD Panel                   | BOE   | TV14YYY-YYY(Y=0-9,A-Z or blank)   |
|                             | AUO   | B14YYYYYY.Y(Y=0-9,A-Z or blank)   |
|                             | INNOLUX   | N14YYYY-YYY(Y=0-9,A-Z or blank)   |
| WLAN + BT                   | Intel   | 8265HUW                           |
| Storage                     | One PCIE/SATA Storage Device  |                                   |
| Battery                     | One re-chargeable battery pack  |                                   |
| Camera                      | One Camera optional   |                                   |

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Pre-test Mode

| Mode | CPU                 | LCD Panel              | Main Board     | Memory       | SATA SSD / PCIE SSD                          | WLAN + BT         | Battery               | Graphics       | AC Adapter             |
|------|---------------------|------------------------|----------------|--------------|--|-------------------|-----------------------|----------------|------------------------|
| 1    | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | SAMSUNG<br>MZVLB512HAJQ-00000<br>(512GB)     | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 2    | Intel<br>Up to 4GHz | BOE<br>TV14FHM-NH0     | Quanta<br>H96A | DDR4<br>8GB  | LITEON<br>CV8-8E128<br>(128GB)               | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 3    | Intel<br>Up to 4GHz | INNOLUX<br>N140HCA-EAC | Quanta<br>H96A | DDR4<br>16GB | LITEON<br>CV8-8E256<br>(256GB)               | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 4    | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | LITEON<br>CV8-8E512<br>(512GB)               | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 5    | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | MICRON<br>MTFDDAV256TBN-1AR12ABYY<br>(256GB) | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 6    | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | MICRON<br>MTFDDAV512TBN-1AR12ABYY<br>(512GB) | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 7    | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | SAMSUNG<br>MZNLN128HAHQ-00000<br>(128GB)     | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 8    | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | SAMSUNG<br>MZNLN256HAJQ-00000<br>(256GB)     | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 9    | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | SAMSUNG<br>MZNLN512HAJQ-00000<br>(512GB)     | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 10   | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | SANDISK<br>SD9SN8W-128G-1027<br>(128GB)      | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 11   | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | SANDISK<br>SD9SN8W-256G-1027<br>(256GB)      | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 12   | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | SANDISK<br>SD9SN8W-512G-1027<br>(512GB)      | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 13   | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | LITEON<br>CA3-8D256<br>(256GB)               | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 14   | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | LITEON<br>CA3-8D512<br>(512GB)               | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 15   | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | SAMSUNG<br>MZVLW256HEHP-00000<br>(256GB)     | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 16   | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | Toshiba<br>KXG502NV256G<br>(256GB)           | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |
| 17   | Intel<br>Up to 4GHz | AUO<br>B140HAK03.0     | Quanta<br>H96A | DDR4<br>16GB | Toshiba<br>KXG502NV512G<br>(512GB)           | Intel<br>8265HUUW | Huawei<br>HB4593R1ECW | NVIDIA<br>N17S | Huawei<br>HW-200325UP0 |

1.4 The worst case of the EUT

EUT will be carried out in the worst case as followings:

| Worst Case |                                 |
|------------|---------------------------------|
| CE         | Mode 1 (1920 x 1080 Resolution) |
| RE         | Mode 1 (1920 x 1080 Resolution) |

### 1.5 Description of Support Units

Mode 1:

| PRODUCT            | MANUFACTURER | MODEL NO.         | SERIAL NO.               |
|--------------------|--------------|-------------------|--------------------------|
| Monitor (RE,HRE)   | DELL         | P2415Qb           | CN-0GTTPW-74261-559-0AUL |
| Monitor (CE)       | ASUS         | MX27U             | H5LMRS055345             |
| Mouse (10M,CE,HRE) | Logitech     | M-U0026           | 1738HS05FGU8             |
| Earphone (RE,HRE)  | htc          | N/A               | N/A                      |
| Earphone (CE)      | SONY         | MDR-E9LP          | N/A                      |
| HDD (10M,CE,HRE)   | Transcend    | StoreJet 25M3 1TB | D70559-1523              |
| BT Speaker         | Creative     | MF8090            | YFMF8090245R00855Y       |
| AP                 | ZyXEL        | NBG6503           | S130F23003375            |
| Notebook           | DELL         | Latitude E6440    | 3VGS162                  |

### Support Equipment Used in Tested Cable

Mode 1:

| Cable Type | Core | Length | Shielding/Non-shielding |
|------------|------|--------|-------------------------|
| HDMI       | N/A  | 1.8m   | Shielding               |
| HDD USB    | N/A  | 1m     | Shielding               |
| Mouse USB  | N/A  | 1.8m   | Shielding               |
| Earphone   | N/A  | 2m     | Non-shielding           |

### 1.6 Operation Procedure

Mode 1:

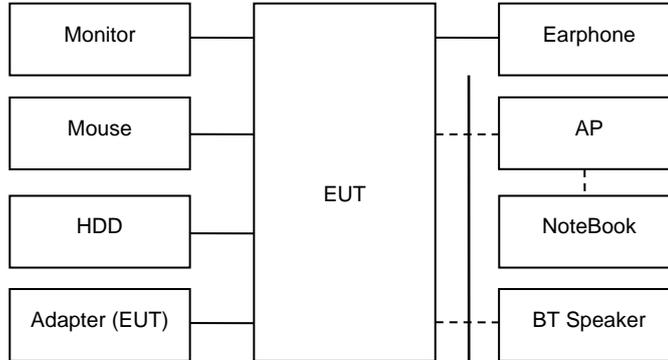
1. Turn on the power of all equipment.
2. The EUT communicates with BT Speaker by Bluetooth radio.
3. The EUT communicates with Wireless AP by WIFI radio.
4. The EUT read(s)/write(s) disk through Win EMC test software.
5. The EUT displays H pattern through Win EMC test software.
6. Executed AMCAP2 software to turn-on the CCD.
7. Setup the condition for test mode, and begin the test.

### 1.7 Modification List

No modification was made by SGS Taiwan Electronics & Communication Laboratory.

### 1.8 Test Set-Up Configuration

Mode 1



### 1.9 Accessories Cable List

See clause 1.3 of this report

### 1.10 Measurement Procedure

Conducted Emission Testing was performed according to ANSI C63.4:2014 in a shielded room with peripherals placed on a table, 0.8m high over a metal floor. It was located more than required distance away from the shielded room wall.

Radiated Emission Testing was performed according to ANSI C63.4:2014 at the 3/10m semi-anechoic chamber. The EUT was placed on a 0.8m high table along with the peripherals. The turn table was placed 10m distance from the antenna. Cables were placed in a position to produce maximum emissions as determined by experimentation, and operation mode was selected for production of maximum emission.

The frequencies and amplitudes of maximum emission were measured at varying azimuths, antenna heights and antenna polarities. Maximum emission levels are then reported.

### 1.11 Standards Applicable for Testing

Tests to be carried out under FCC Part 15, Subpart B/CISPR 22

| Test Standards          | Status       |
|-------------------------|--------------|
| FCC Part 15, Subpart B  | Applicable   |
| Deviation from Standard | No deviation |

### 1.12 Summary of Results

| Highest Emission                               |                    |        |            |                |              |
|--|--------------------|--------|------------|----------------|--------------|
| Standard                                       | Test Type          | Result | Phase/Pol. | Frequency(MHz) | Margin(dB)   |
| FCC Part 15 Subpart B<br>Class B               | Conducted Emission | PASS   | Line       | 0.1660         | -21.62 (QP)  |
|  |                    |        | Neutral    | 0.1700         | -21.34 (QP)  |
| Canada ICES-003<br>Issue 6 (June 2016),Class B | Radiated Emission  | PASS   | Ver.       | 17983.000      | -5.04 (peak) |

## 2. EMISSION

### 2.1 Test Results

|                    | Results     |
|--------------------|-------------|
| Conducted Emission | <b>Pass</b> |
| Radiated Emission  | <b>Pass</b> |

### 2.2 Frequency Range

#### FCC Part 15, Subpart B:

Conducted Emission : 150 kHz - 30 MHz

Radiated Emission : See below table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)      Upper frequency of measurement range (MHz)

---

|             |   |
|-------------|---|
| Below 1.705 | 30  |
| 1.705 - 108 | 1000  |
| 108 - 500   | 2000  |
| 500 - 1000  | 5000  |
| Above 1000  | 5th harmonic of the highest frequency or 40 GHz, whichever is lower |

## 2.3 Limits of Conducted and Radiated Emission

### 2.3.1 Limits of Conducted Emission

#### FCC Part 15, Subpart B/CISPR 22:

| FREQUENCY<br>(MHz) | Class A (dBuV) |         | Class B (dBuV) |         |
|--------------------|----------------|---------|----------------|---------|
|                    | Quasi - peak   | Average | Quasi - peak   | Average |
| 0.15 - 0.5         | 79             | 66      | 66 - 56        | 56 - 46 |
| 0.50 - 5.0         | 73             | 60      | 56             | 46      |
| 5.0 - 30.0         | 73             | 60      | 60             | 50      |

Note : (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected there to, shall not exceed the level of field strengths specified above.

### 2.3.2 Limits of Radiated Emissions

#### FCC Part 15, Subpart B Limit:

- Detector Function : Quasi – Peak

| FREQUENCY<br>(MHz) | Class A (at 10m) | Class B (at 3m) |
|--------------------|------------------|-----------------|
|                    | dBuV/m           | dBuV/m          |
| 30~88              | 39               | 40              |
| 88~216             | 43.5             | 43.5            |
| 216~960            | 46.44            | 46              |
| Above 960          | 49.54            | 54              |

- Detector Function : Peak , Average

| FREQUENCY<br>(MHz)  | Class A (dBuV/m) (at 3m) |         | Class B (dBuV/m) (at 3m) |         |
|---------------------|--------------------------|---------|--------------------------|---------|
|                     | Peak                     | Average | Peak                     | Average |
| Above<br>1000-18000 | 79.3                     | 59.3    | 73.9                     | 53.9    |

**CISPR 22 Limit:**

- Detector Function : Quasi – Peak

| FREQUENCY<br>(MHz) | Class A (at 10m) |  | Class B (at 10m) |  |
|--------------------|------------------|--|------------------|--|
|                    | dBuV/m           |  | dBuV/m           |  |
| 30-230             | 40               |  | 30               |  |
| 230-1000           | 47               |  | 37               |  |

NOTE 1 The lower limit shall apply at the transition frequency.

NOTE 2 Additional provisions may be required for cases where interference occurs.

| FREQUENCY<br>(GHz) | Class A (dBuV/m) (at 3m) |      | Class B (dBuV/m) (at 3m) |      |
|--------------------|--------------------------|------|--------------------------|------|
|                    | Average                  | Peak | Average                  | Peak |
| 1~3                | 56                       | 76   | 50                       | 70   |
| 3~6                | 60                       | 80   | 54                       | 74   |

NOTE The lower limit applies at the transition frequency.

## 2.4. Test of Conducted Emission

### 2.4.1 Test Equipments

| SGS Conducted_Emission HWAYA Conducted Room No.A EMC |                      |                    |               |                  |                 |
|--|----------------------|--------------------|---------------|------------------|-----------------|
| EQUIPMENT TYPE                                       | Manufacturer         | Model Number       | Serial Number | Calibration Date | Calibration Due |
| EMI Test Receiver                                    | R&S                  | ESCI 3             | 101311        | 2017/6/23        | 2018/6/22       |
| Coaxial Cables                                       | EMC Instruments Corp | EMCRG58-BM-BM-3000 | 160812        | 2017/8/12        | 2018/8/11       |
| LISN   | SCHWARZBECK          | NSLK 8127          | 8127-648      | 2017/6/18        | 2018/6/17       |
| Pulse Limiter  | Narda S.T.S.         | PMM PL01           | 1110X30602    | 2017/8/12        | 2018/8/11       |
| LISN   | Schwarzbeck          | NSLK 8128          | NSLK8128-300  | 2017/9/4         | 2018/9/3        |
| ISN  | TESEQ                | ISN T800           | 34384         | 2017/3/23        | 2018/3/22       |
| ISN  | TESEQ                | ISN ST08           | 36271         | 2017/9/30        | 2018/9/29       |
| RF Current Probe                                     | SCHWARZBECK          | SW 9605            | SW 9605-138   | 2017/10/13       | 2018/10/12      |
| Capacitive Voltage Probe                             | SCHWARZBECK          | CVP 9222           | 9222-031      | 2017/10/13       | 2018/10/12      |
| DC LISN  | SCHWARZBECK          | NNBM 8124          | 8124-564      | 2017/12/6        | 2018/12/5       |
| DC LISN  | SCHWARZBECK          | NNBM 8124          | 8124-565      | 2017/12/6        | 2018/12/5       |
| High Voltage Probe                                   | SCHWARZBECK          | TK 9420            | TK 9420-5223  | 2017/3/8         | 2018/3/7        |
| Universal Digital Radio Communication Tester         | R&S                  | CMU 200            | 119988        | 2017/3/7         | 2018/3/6        |
| Wideband Radio Communication Tester                  | R&S                  | CMW 500            | 152303        | 2017/2/23        | 2018/2/22       |
| Radio Communication Analyzer                         | Anritsu              | MT8820C            | 6201465315    | 2017/12/29       | 2018/12/28      |
| Test S/W   | Farad                | EZ-EMC             | Ver. SGS-03A2 | N.C.R.           | N.C.R.          |

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Measurement Uncertainty of Conducted Emission  
Expanded uncertainty U<sub>lab</sub>(K=2) of conducted emission is 2.25 dB  
Expanded uncertainty U<sub>lab</sub>(K=2) of ISN conducted emission is 2.57 dB  
Theory Valuse uncertainty U<sub>cispr 16-4-2 :2011+A1\_2014</sub> (K=2) of AC mains Conduciton Essission is 3.44dB  
Theory Valuse uncertainty U<sub>cispr 16-4-2 :2011+A1\_2014</sub> (K=2) of ISN Conduciton Essission is 4.59dB



## 2.4.2 Operating Environment

Temperature : 18 degree C

Humidity : 41 %RH

Atmospheric Pressure : 992 mBar

## 2.4.3 Measurement Level Calculation

Factor = LISN insertion loss + Cable loss+ Pulse Limiter Insertion Loss

Measurement Level = Reading Level + Factor

Over (Margin) = Measurement Level – Limit

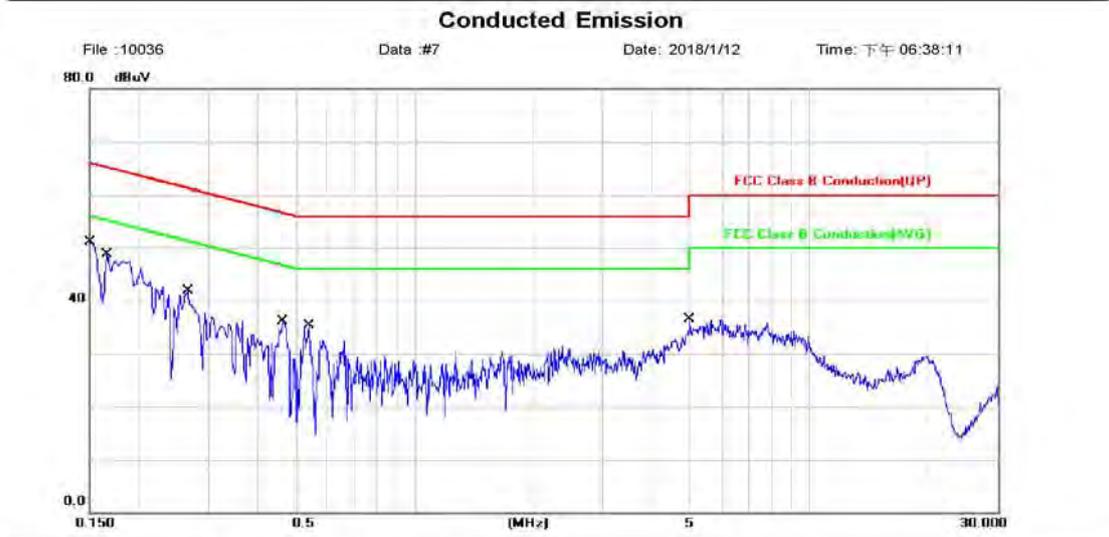
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2.4.4 Measurement Data:

Model No.: VLT-W10  
Mode\_1\_L

Site: Conduction Room Phase: L1 Temperature: 18 °C  
Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 41 %  
Mode: Mode 1  
Note:



| No. | Mk. | Freq.  | Reading Level | Correct Factor | Measurement | Limit | Over   | Detector | Comment |
|-----|-----|--------|---------------|----------------|-------------|-------|--------|----------|---------|
|     |     | MHz    | dBuV          | dB             | dBuV        | dBuV  | dB     |          |         |
| 1   |     | 0.1500 | 44.20         | 0.04           | 44.24       | 66.00 | -21.76 | QP       |         |
| 2   |     | 0.1500 | 28.50         | 0.04           | 28.54       | 56.00 | -27.46 | AVG      |         |
| 3   | *   | 0.1660 | 43.50         | 0.04           | 43.54       | 65.16 | -21.62 | QP       |         |
| 4   |     | 0.1660 | 26.20         | 0.04           | 26.24       | 55.16 | -28.92 | AVG      |         |
| 5   |     | 0.2660 | 36.30         | 0.03           | 36.33       | 61.24 | -24.91 | QP       |         |
| 6   |     | 0.2660 | 23.40         | 0.03           | 23.43       | 51.24 | -27.81 | AVG      |         |
| 7   |     | 0.4660 | 32.80         | 0.04           | 32.84       | 56.58 | -23.74 | QP       |         |
| 8   |     | 0.4660 | 24.30         | 0.04           | 24.34       | 46.58 | -22.24 | AVG      |         |
| 9   |     | 0.5420 | 31.60         | 0.05           | 31.65       | 56.00 | -24.35 | QP       |         |
| 10  |     | 0.5420 | 16.00         | 0.05           | 16.05       | 46.00 | -29.95 | AVG      |         |
| 11  |     | 4.9940 | 30.30         | 0.41           | 30.71       | 56.00 | -25.29 | QP       |         |
| 12  |     | 4.9940 | 20.50         | 0.41           | 20.91       | 46.00 | -25.09 | AVG      |         |

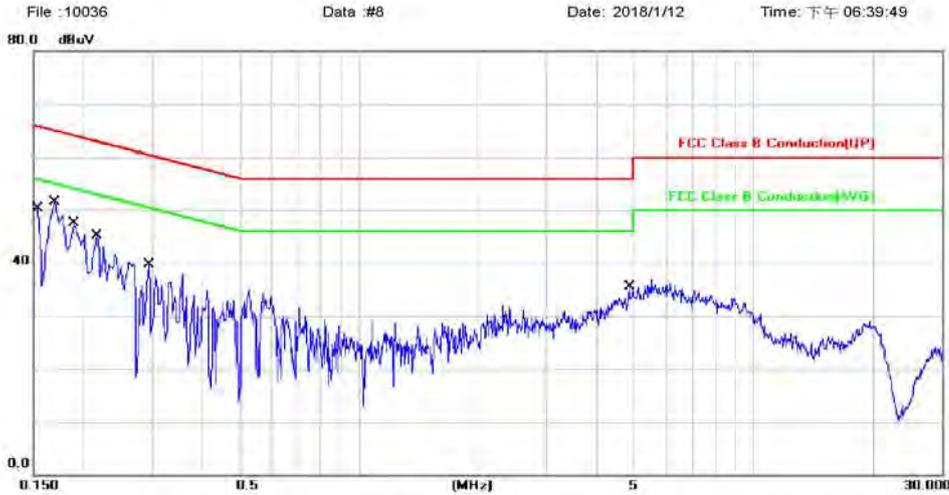
\*:Maximum data x:Over limit l:over margin

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### Mode\_1\_N

Site: Conduction Room      Phase: **N**      Temperature: 18 °C  
 Limit: FCC Class B Conduction(QP)      Power: AC 120V/60Hz      Humidity: 41 %  
 Mode: Mode 1  
 Note:

#### Conducted Emission



| No. | Mk. | Freq.  | Reading Level | Correct Factor | Measurement | Limit | Over   | Detector | Comment |
|-----|-----|--------|---------------|----------------|-------------|-------|--------|----------|---------|
|     |     | MHz    | dBuV          | dB             | dBuV        | dBuV  | dB     |          |         |
| 1   |     | 0.1540 | 43.80         | 0.12           | 43.92       | 65.78 | -21.86 | QP       |         |
| 2   |     | 0.1540 | 27.20         | 0.12           | 27.32       | 55.78 | -28.46 | AVG      |         |
| 3   | *   | 0.1700 | 43.50         | 0.12           | 43.62       | 64.96 | -21.34 | QP       |         |
| 4   |     | 0.1700 | 26.30         | 0.12           | 26.42       | 54.96 | -28.54 | AVG      |         |
| 5   |     | 0.1900 | 41.30         | 0.11           | 41.41       | 64.04 | -22.63 | QP       |         |
| 6   |     | 0.1900 | 27.00         | 0.11           | 27.11       | 54.04 | -26.93 | AVG      |         |
| 7   |     | 0.2180 | 36.90         | 0.11           | 37.01       | 62.89 | -25.88 | QP       |         |
| 8   |     | 0.2180 | 19.00         | 0.11           | 19.11       | 52.89 | -33.78 | AVG      |         |
| 9   |     | 0.2940 | 31.80         | 0.11           | 31.91       | 60.41 | -28.50 | QP       |         |
| 10  |     | 0.2940 | 15.60         | 0.11           | 15.71       | 50.41 | -34.70 | AVG      |         |
| 11  |     | 4.8500 | 29.20         | 0.28           | 29.48       | 56.00 | -26.52 | QP       |         |
| 12  |     | 4.8500 | 20.20         | 0.28           | 20.48       | 46.00 | -25.52 | AVG      |         |

\*:Maximum data    x:Over limit    !:over margin

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## 2.5 Test of Radiated Emission

### 2.5.1 Test Equipments

#### Below 1GHz

| SGS Radiated_Below_1GHz HWAYA 966A EMC |                       |                  |               |                  |                 |
|--|-----------------------|------------------|---------------|------------------|-----------------|
| EQUIPMENT TYPE                         | Manufacturer          | Model Number     | Serial Number | Calibration Date | Calibration Due |
| EMI Test Receiver                      | R&S                   | ESR 7            | 101459        | 2017/2/17        | 2018/2/16       |
| Biconical Antenna                      | SCHWARZBECK           | VULB 9168        | 9168-297      | 2017/5/26        | 2018/5/25       |
| Pre Amplifier                          | EMC Instruments Corp. | EMC330           | 980180        | 2017/5/19        | 2018/5/18       |
| Coaxial Cable                          | Huber+Suhner          | RG 214/U         | 539808        | 2017/4/23        | 2018/4/22       |
| Coaxial Cable                          | EMC Instruments       | EMC8D-NM-NM-6000 | 140922        | 2017/4/23        | 2018/4/22       |
| Coaxial Cable                          | NA                    | 8D               | SAC-A-0.5M    | 2017/4/23        | 2018/4/22       |
| Communication Tester                   | SCHWARZBECK           | CMW500           | 152303        | 2017/2/23        | 2018/2/22       |
| Communication Tester                   | Anritsu               | MT8820C          | 6201465315    | 2017/12/29       | 2018/12/28      |
| Communication Tester                   | R&S                   | CMU200           | 119988        | 2017/3/7         | 2018/3/6        |
| Coaxial Cable                          | MF                    | MF-7802          | N/A           | N.C.R.           | N.C.R.          |
| Antenna Master                         | MF                    | N/A              | N/A           | N.C.R.           | N.C.R.          |
| Turn Table                             | MF                    | N/A              | N/A           | N.C.R.           | N.C.R.          |
| Site NSA                               | SGS                   | 966 Chamber A    | SAC-A         | 2018/1/12        | 2019/1/11       |
| Test Software                          | Farad                 | EZ-EMC           | Ver. SGS-03A2 | N.C.R.           | N.C.R.          |

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Measurement Uncertainty of Radiated Emission  
Expanded uncertainty Ulab (k=2) of radiated emission measurement is 4.71 dB. (30-1000MHz)  
Theory values uncertainty Ucispr 16-4-2:2011+A1:2014 (K=2) of radiated emission is 5.26 dB. (30MHz ~ 1000MHz)

**Above 1GHz**

| SGS Radiated_Above_1GHz HWAYA 966A EMC       |                       |                  |               |                  |                 |
|--|-----------------------|------------------|---------------|------------------|-----------------|
| EQUIPMENT TYPE                               | Manufacturer          | Model Number     | Serial Number | Calibration Date | Calibration Due |
| Spectrum Analyzer                            | R&S                   | FSV 40           | 101419        | 2017/3/1         | 2018/2/28       |
| EMI Test Receiver                            | R&S                   | ESR 7            | 101459        | 2017/2/17        | 2018/2/16       |
| Horn Antenna                                 | SCHWARZBECK           | BBHA9120D        | BBHA9120D673  | 2017/10/16       | 2018/10/15      |
| Pre Amplifier                                | EMC Instruments Corp. | EMC012645B       | 980216        | 2017/4/25        | 2018/4/24       |
| Pre Amplifier                                | EMC Instruments Corp. | EMC184045B       | 980135        | 2017/10/27       | 2018/10/26      |
| Coaxial Cable                                | JUNFLOW               | MWX221-NMSNMS    | J0778929      | 2017/4/23        | 2018/4/22       |
| Coaxial Cable                                | Huber+Suhner          | SUCCOFLEX 104PEA | 30255/4PEA    | 2017/4/23        | 2018/4/22       |
| Coaxial Cable                                | EMC Instruments       | EMC104-SM-SM     | 140927        | 2017/4/23        | 2018/4/22       |
| Coaxial Cable                                | Huber+Suhner          | SUCOFLEX 102     | MY 2152/2     | 2017/6/5         | 2018/6/4        |
| Coaxial Cable                                | Huber+Suhner          | SUCOFLEX 102     | MY 2153/2     | 2017/6/5         | 2018/6/4        |
| Universal Digital Radio Communication Tester | R&S                   | CMU 200          | 119988        | 2017/3/7         | 2018/3/6        |
| Wideband Radio Communication Tester          | R&S                   | CMW 500          | 152303        | 2017/2/23        | 2018/2/22       |
| Radio Communication Analyzer                 | Anritsu               | MT8820C          | 6201465315    | 2017/12/29       | 2018/12/28      |
| Controller                                   | MF                    | MF-7802          | N.C.R.        | N.C.R.           | N.C.R.          |
| Antenna Master                               | MF                    | N/A              | N/A           | N.C.R.           | N.C.R.          |
| Turn Table                                   | MF                    | N/A              | N/A           | N.C.R.           | N.C.R.          |
| Site VSWR                                    | SGS                   | 966 Chamber A    | SAC-A         | 2018/1/12        | 2019/1/11       |
| Test S/W                                     | Farad                 | EZ-EMC           | Ver. SGS-03A2 | N.C.R.           | N.C.R.          |

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Measurement Uncertainty of Radiated Emission

Expanded uncertainty (k=2) of radiated emission measurement is 5.05 dB. (1-6GHz)

Expanded uncertainty (k=2) of radiated emission measurement is 5.07 dB. (6-18GHz)

Expanded uncertainty U<sub>lab</sub> (k=2) of radiated emission measurement is 5.19 dB. (18-26GHz)

Expanded uncertainty U<sub>lab</sub> (k=2) of radiated emission measurement is 5.14 dB. (26-40GHz)

Theory values uncertainty U<sub>cispr 16-4-2:2011+A1:2014</sub> (K=2) of Irradiated emission measurement is 5.18 dB.(1-6GHz)

Theory values uncertainty U<sub>cispr 16-4-2:2011+A1:2014</sub> (K=2) of Irradiated emission measurement is 5.48 dB.(6-18GHz)

Theory values uncertainty U<sub>cispr 16-4-2:2011+A1:2014</sub> (K=2) of Irradiated emission measurement is ---- dB.(18-26GHz)

Theory values uncertainty U<sub>cispr 16-4-2:2011+A1:2014</sub> (K=2) of Irradiated emission measurement is ---- dB.(26-40GHz)



### 2.5.2 Operating Environment

Temperature : 19 degree C

Humidity : 70 %RH

Atmospheric Pressure : 996 mBar

### 2.5.3 Measurement Level Calculation

Correction Factor = Antenna Factor + Cable loss- Amplifier Gain

Measurement Level = Reading Level + Correction Factor

Over (Margin) = Measurement Level – Limit

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## 2.5.4 Measurement Data

Below 1GHz

Model No.: VLT-W10

Mode\_1\_H

|                                 |                                 |                    |
|---------------------------------|---------------------------------|--------------------|
| Site: SGS 966 Chamber A         | Polarization: <b>Horizontal</b> | Temperature: 19 °C |
| Limit: FCC Class B 3M Radiation | Power: AC 120V/60Hz             | Humidity: 70 %     |
| Mode: Mode 1                    | Distance:                       |                    |
| Note:                           |                                 |                    |

### Radiated Emission



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|------------|----------|---------|
| 1   |     | 30.9700      | 34.88                    | -12.58                    | 22.30                      | 40.00           | -17.70     | QP       |         |
| 2   |     | 116.3300     | 36.20                    | -14.70                    | 21.50                      | 43.50           | -22.00     | QP       |         |
| 3   |     | 228.8500     | 41.35                    | -13.95                    | 27.40                      | 46.00           | -18.60     | QP       |         |
| 4 * |     | 262.8000     | 48.04                    | -12.24                    | 35.80                      | 46.00           | -10.20     | QP       |         |
| 5   |     | 704.1500     | 29.02                    | -2.72                     | 26.30                      | 46.00           | -19.70     | QP       |         |
| 6   |     | 788.5400     | 29.66                    | -1.26                     | 28.40                      | 46.00           | -17.60     | QP       |         |

\*:Maximum data    x:Over limit    l:over margin

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### Mode\_1\_V

Site: SGS 966 Chamber A      Polarization: **Vertical**      Temperature: 19 °C  
 Limit: FCC Class B 3M Radiation      Power: AC 120V/60Hz      Humidity: 70 %  
 Mode: Mode 1      Distance:  
 Note:

### Radiated Emission



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   | Detector | Comment |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     |          |         |
| 1   | *   | 30.9700  | 41.68         | -12.58         | 29.10       | 40.00  | -10.90 | QP       |         |
| 2   |     | 115.3600 | 41.17         | -14.77         | 26.40       | 43.50  | -17.10 | QP       |         |
| 3   |     | 132.8200 | 43.28         | -13.48         | 29.80       | 43.50  | -13.70 | QP       |         |
| 4   |     | 229.8200 | 39.21         | -13.91         | 25.30       | 46.00  | -20.70 | QP       |         |
| 5   |     | 262.8000 | 45.34         | -12.24         | 33.10       | 46.00  | -12.90 | QP       |         |
| 6   |     | 788.5400 | 35.46         | -1.26          | 34.20       | 46.00  | -11.80 | QP       |         |

\*:Maximum data    x:Over limit    !:over margin

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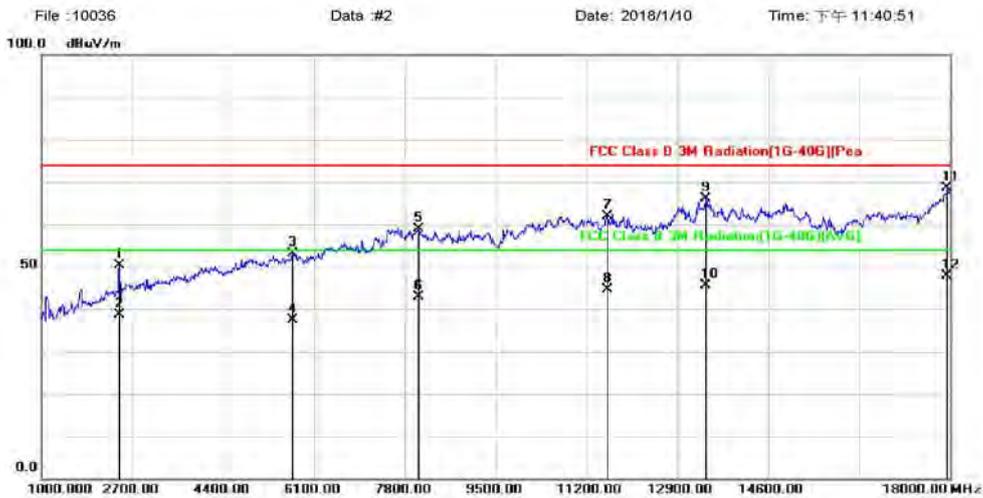
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Above 1GHz

Model No.: VLT-W10  
Mode\_1\_H

Site: SGS 966 Chamber A      Polarization: **Horizontal**      Temperature: 18 °C  
Limit: FCC Class B 3M Radiation(1G-40G)(Pea      Power: AC 120V/60Hz      Humidity: 63 %  
Mode: Mode 1      Distance:  
Note:

Radiated Emission



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|------------|----------|---------|
| 1   |     | 2462.000     | 64.85                    | -14.59                    | 50.26                      | 74.00           | -23.74     | peak     |         |
| 2   |     | 2462.000     | 53.30                    | -14.59                    | 38.71                      | 54.00           | -15.29     | AVG      |         |
| 3   |     | 5692.000     | 59.42                    | -6.34                     | 53.08                      | 74.00           | -20.92     | peak     |         |
| 4   |     | 5692.000     | 43.79                    | -6.34                     | 37.45                      | 54.00           | -16.55     | AVG      |         |
| 5   |     | 8055.000     | 57.44                    | 1.49                      | 58.93                      | 74.00           | -15.07     | peak     |         |
| 6   |     | 8055.000     | 41.44                    | 1.49                      | 42.93                      | 54.00           | -11.07     | AVG      |         |
| 7   |     | 11591.000    | 55.75                    | 6.18                      | 61.93                      | 74.00           | -12.07     | peak     |         |
| 8   |     | 11591.000    | 38.36                    | 6.18                      | 44.54                      | 54.00           | -9.46      | AVG      |         |
| 9   |     | 13427.000    | 56.92                    | 9.30                      | 66.22                      | 74.00           | -7.78      | peak     |         |
| 10  |     | 13427.000    | 36.38                    | 9.30                      | 45.68                      | 54.00           | -8.32      | AVG      |         |
| 11  | *   | 17949.000    | 49.30                    | 19.32                     | 68.62                      | 74.00           | -5.38      | peak     |         |
| 12  |     | 17949.000    | 28.53                    | 19.32                     | 47.85                      | 54.00           | -6.15      | AVG      |         |

\*:Maximum data    x:Over limit    l:over margin

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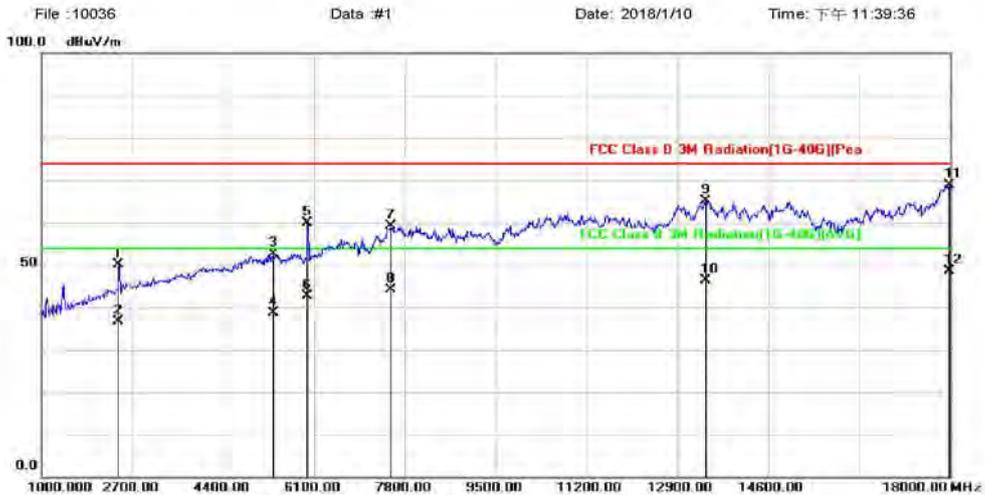
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### Mode\_1\_V

Site: SGS 966 Chamber A      Polarization: **Vertical**      Temperature: 18 °C  
 Limit: FCC Class B 3M Radiation(1G-40G)(Pea)      Power: AC 120V/60Hz      Humidity: 63 %  
 Mode: Mode 1      Distance:  
 Note:

### Radiated Emission



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB/m | Measurement dBuV/m | Limit dBuV/m | Over dB | Detector | Comment |
|-----|-----|-----------|--------------------|---------------------|--------------------|--------------|---------|----------|---------|
| 1   |     | 2445.000  | 65.10              | -14.93              | 50.17              | 74.00        | -23.83  | peak     |         |
| 2   |     | 2445.000  | 51.52              | -14.93              | 36.59              | 54.00        | -17.41  | AVG      |         |
| 3   |     | 5335.000  | 59.60              | -6.93               | 52.67              | 74.00        | -21.33  | peak     |         |
| 4   |     | 5335.000  | 45.66              | -6.93               | 38.73              | 54.00        | -15.27  | AVG      |         |
| 5   |     | 5981.000  | 65.47              | -5.65               | 59.82              | 74.00        | -14.18  | peak     |         |
| 6   |     | 5981.000  | 48.21              | -5.65               | 42.56              | 54.00        | -11.44  | AVG      |         |
| 7   |     | 7528.000  | 58.22              | 0.93                | 59.15              | 74.00        | -14.85  | peak     |         |
| 8   |     | 7528.000  | 43.26              | 0.93                | 44.19              | 54.00        | -9.81   | AVG      |         |
| 9   |     | 13427.000 | 55.91              | 9.30                | 65.21              | 74.00        | -8.79   | peak     |         |
| 10  |     | 13427.000 | 36.98              | 9.30                | 46.28              | 54.00        | -7.72   | AVG      |         |
| 11  | *   | 17983.000 | 49.06              | 19.90               | 68.96              | 74.00        | -5.04   | peak     |         |
| 12  |     | 17983.000 | 28.63              | 19.90               | 48.53              | 54.00        | -5.47   | AVG      |         |

\*:Maximum data    x:Over limit    l:over margin

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Page: 1

**\*\* End of Report \*\***