

# TEST REPORT



**DT&C Co., Ltd.**

42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042  
Tel : 031-321-2664, Fax : 031-321-1664

1. Report No. : DREFCC2006-0163(1)

2. Client / Applicant

• Name : LG Electronics Inc.

• Address : 111 Sylvan Avenue Englewood Cliffs, New Jersey, United States 07632

3. Use of Report : Grant of Certification

4. Product Name / Model Name : Mobile Phone / LM-Q730BAW  
(FCC ID : ZNFQ730BAW)

5. Test Standard : ANSI C 63.4 : 2014  
FCC Part 15 Subpart B  
(Other Class B digital devices & peripherals)

6. Date of Test : Jun. 13. 2020 ~ Jun. 14. 2020

7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

8. Testing Environment : Temperature (23 ~ 26) °C , Humidity (42 ~ 44) % R.H.

9. Test Result : Refer to the attached Test Result

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

|             |                                                                                                        |                                                                                                             |
|-------------|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Affirmation | Tested by                                                                                              | Reviewed by                                                                                                 |
|             | Name : JunSeo Park  | Name : KyoungHwan Bae  |

**Jul. 06. 2020**

**DT&C Co., Ltd.**

Not abided by KS Q ISO / IEC 17025 and KOLAS accreditation.

If this report is required to confirmation of authenticity, please contact to [report@dtnc.net](mailto:report@dtnc.net)

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## 1. General Remarks

This report contains the result of tests performed by :

**DT&C Co., Ltd.**

42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042

<http://www.dtnet.net>

Tel: +82-31-321-2664 Fax: +82-31-321-1664

## 2. Test Laboratory

DT&C Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

| Certificate   | Nation       | Agency | Code                                                                                               | Remark                         |
|---------------|--------------|--------|----------------------------------------------------------------------------------------------------|--------------------------------|
| Accreditation | Korea        | KOLAS  | 393                                                                                                | ISO/IEC 17025                  |
|               | South Africa | SABS   | 0006                                                                                               | ISO/IEC 17025                  |
|               | Ghana        | NCA    | NCA agreement<br>23 <sup>rd</sup> , Oct, 2018                                                      | -                              |
| Site Filing   | USA          | FCC    | KR0034<br>101842<br>678747, 596748,<br>804488, 165783                                              | Accredited<br><br>2.948 Listed |
|               | Canada       | IC     | 5740A-3<br>5740A-4                                                                                 | Registered                     |
|               | Japan        | VCCI   | C-1427,<br>R-3385, R-14076,<br>R-4180, R-4496,<br>T-1442,<br>G-10338, G-10754,<br>G-10815, G-20051 | Registered                     |
| Certification | Korea        | KC     | KR0034                                                                                             | Designation                    |
|               | Germany      | TUV    | CARAT 089112<br>0006 Rev.00                                                                        | ISO/IEC 17025                  |
|               | Russia       | RMRS   | 17.10189.296                                                                                       | ISO/IEC 17025                  |

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

### 3. General Information of EUT

|                |                                                                                            |
|----------------|--------------------------------------------------------------------------------------------|
| Applicant      | LG Electronics Inc.<br>111 Sylvan Avenue Englewood Cliffs, New Jersey, United States 07632 |
| Manufacturer   | LG Electronics Inc.<br>111 Sylvan Avenue Englewood Cliffs, New Jersey, United States 07632 |
| Product Name   | Mobile Phone                                                                               |
| Model Name     | LM-Q730BAW                                                                                 |
| Add Model Name | LM-Q730HA, LMQ730BAW, LMQ730HA, Q730BAW, Q730HA                                            |
| Rated Power    | DC 3.87 V                                                                                  |
| FCC ID         | ZNFQ730BAW                                                                                 |
| Remarks        | None                                                                                       |

\* Accessory

| Equipment | No. | Manufacturer | Model Name  | Product Number |
|-----------|-----|--------------|-------------|----------------|
| Earphone  | 1   | CRESYN       | EAB64468444 | N/A            |
| Cable     | 1   | Ningbo       | DC15WB-G    | EAD64746101    |

**Related Submittal(s) / Grant(s)**  
**Original submittal only**

## 4. EUT Operations and Test Configurations

### 4.1 Principle of Configuration Selection

**Emission :**

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use. For each testing mode different configurations were used, Refer to the individual tests.

### 4.2 EUT Operation Mode

| No. | Mode               | Description                                   |
|-----|--------------------|-----------------------------------------------|
| 1   | DATA COMMUNICAITON | The EUT is reading, writing, internal storage |

### 4.3 Test Configuration Mode

| No. | Mode               | Description                                                        |
|-----|--------------------|--------------------------------------------------------------------|
| 1   | DATA COMMUNICAITON | EUT was connected PC by USB cable C type and continuously operated |

## 4.4 Supported Equipment

| Used*                                                                         | Product Type  | Manufacturer  | Model      | Remarks        |
|-------------------------------------------------------------------------------|---------------|---------------|------------|----------------|
| AE                                                                            | PC            | DELL INC      | DCN3       | J51ZBBX        |
| AE                                                                            | PRINTER       | Bixolon       | SRP-770    | N/A            |
| AE                                                                            | SSD           | SAMSUNG       | MU-PT250B  | S2WKNAAH32059X |
| AE                                                                            | KEYBOARD      | DELL INC      | KB212-B    | N/A            |
| AE                                                                            | MOUSE         | LG            | XM-1300    | N/A            |
| AE                                                                            | LED MONITOR   | DELL          | P2417Hb    | N/A            |
| AE                                                                            | Headset       | DONGGUANENMEY | SHS-150V/W | N/A            |
| AE                                                                            | USIM CARD     | N/A           | N/A        | N/A            |
| AE                                                                            | MICRO SD CARD | SANDISK       | N/A        | N/A            |
| *Abbreviations:<br>AE - Auxiliary/Associated Equipment, or<br>SIM - Simulator |               |               |            |                |

## 4.5 EUT In/Output Port

| Name                                                                                                                                                         | Type* | Cable<br>Max. >3 m | Cable<br>Shielded | Cable<br>Back shell | Remarks |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------|-------------------|---------------------|---------|
| AUX                                                                                                                                                          | I/O   | 1.5                | Non shield        | Plastic             | EUT     |
| USB                                                                                                                                                          | I/O   | 1.5                | Shield            | Plastic             | EUT     |
| USB(EUT)                                                                                                                                                     | I/O   | 1.1                | Non shield        | Plastic             | PC      |
| USB(MOUSE)                                                                                                                                                   | I/O   | 1.8                | Non shield        | Plastic             |         |
| USB(KEYBOARD)                                                                                                                                                | I/O   | 1.8                | Non shield        | Plastic             |         |
| USB(SSD)                                                                                                                                                     | I/O   | 1.0                | Non shield        | Plastic             |         |
| VGA(MONITOR)                                                                                                                                                 | I/O   | 1.8                | shield            | Plastic             |         |
| AUX(EAR MIC)                                                                                                                                                 | I/O   | 1.8                | Non shield        | Plastic             |         |
| AC IN(POWER)                                                                                                                                                 | AC    | 1.8                | Non shield        | Plastic             |         |
| RS232(Printer)                                                                                                                                               | I/O   | 1.7                | Non shield        | Plastic             | Monitor |
| Parallel(Printer)                                                                                                                                            | I/O   | 1.9                | Non shield        | Plastic             |         |
| AC IN                                                                                                                                                        | AC    | 1.6                | Non shield        | Plastic             |         |
| *Abbreviations:<br>AC = AC Power Port      DC = DC Power Port      N/E = Non-Electrical<br>I/O = Signal Input or Output Port<br>TP = Telecommunication Ports |       |                    |                   |                     |         |

## 4.6 Test Voltage and Frequency

| Case | Voltage<br>(V) | Frequency<br>(Hz) | Phases | Remarks |
|------|----------------|-------------------|--------|---------|
| 1    | AC 120         | 60                | Single | None    |

## 5. Test Summary

| Test Items                                                         | Applied Standards | Results |
|--------------------------------------------------------------------|-------------------|---------|
| Conducted Disturbance                                              | ANSI C63.4 : 2014 | C       |
| Radiated Disturbance                                               | ANSI C63.4 : 2014 | C       |
| C=Comply    N/C=Not Comply    N/T=Not Tested    N/A=Not Applicable |                   |         |

-Conducted Disturbance

| Frequency [MHz] | Phase | Result [dB $\mu$ V] | Detector        | Limit [dB $\mu$ V] | Margin [dB] |
|-----------------|-------|---------------------|-----------------|--------------------|-------------|
| 0.73781         | L     | 34.48               | Cispr - Average | 46.00              | 11.52       |

-Radiated Disturbance

| Frequency [MHz] | Pol. | Result [dB $\mu$ V/m] | Detector        | Limit [dB $\mu$ V/m] | Margin [dB] |
|-----------------|------|-----------------------|-----------------|----------------------|-------------|
| 17037.720       | H    | 46.40                 | Cispr - Average | 54.00                | 7.60        |

## 6. Test Environment

| Test Items            | Test date (YYYY-MM-DD)   | Temp. (°C) | Humidity (% R.H.) | Pressure (kPa) |
|-----------------------|--------------------------|------------|-------------------|----------------|
| Conducted Disturbance | 2020-06-14               | 23         | 44                | -              |
| Radiated Disturbance  | 2020-06-13<br>2020-06-14 | 23<br>26   | 44<br>42          | -              |

## 7. Test Results : Emission

### 7.1 Conducted Disturbance

| ANSI C63.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Mains terminal disturbance voltage   |                   | Result |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------|--------|
| <u>Method:</u> The AMN placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0,8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN. The measuring port of the LISN for EUT was connected to spectrum analyzer. Using conducted emission test software, the emissions were scanned with peak detector mode. After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and CISPR Average detector. For (0.15 ~ 30) MHz frequency range, Quasi-Peak detector with 10 kHz RBW and 30 kHz VBW was used. By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission. |                                      |                   | Comply |
| Fully configured sample scanned over the following frequency range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Frequency range on each side of line | Measurement Point |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 150 kHz to 30 MHz                    | Mains             |        |
| EUT mode<br>(Refer to clauses 4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Test configuration mode              | 1                 |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | EUT Operation mode                   | 1                 |        |
| Limits – Class A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |                   |        |
| Frequency (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Limit dBµV                           |                   |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Quasi-Peak                           | Average           |        |
| 0.15 to 0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 79                                   | 66                |        |
| 0.50 to 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 73                                   | 60                |        |
| Limits – Class B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |                   |        |
| Frequency (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Limit dBµV                           |                   |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Quasi-Peak                           | Average           |        |
| 0.15 to 0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 66 to 56                             | 56 to 46          |        |
| 0.50 to 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 56                                   | 46                |        |
| 5 to 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 60                                   | 50                |        |

#### Measurement uncertainty

|                                                                                                    |        |
|----------------------------------------------------------------------------------------------------|--------|
| Expended uncertainty $U$<br>(95 %, Confidence level, $k = 2$ )                                     | 3.6 dB |
| The measurement uncertainties were calculated in accordance with requirements of ANSI C 63.4-2014. |        |

#### Measurement Instrument

| Description          | Model                | Manufacturer  | Identifier  | Cal. Date  | Cal. Due   |
|----------------------|----------------------|---------------|-------------|------------|------------|
| MEASUREMENT SOFTWARE | EMI-C VER. 2.00.0170 | TSJ           | N/A         | N/A        | N/A        |
| EMI TEST RECEIVER    | ESU                  | ROHDE&SCHWARZ | 100538      | 2020.01.20 | 2021.01.20 |
| PULSE LIMITER        | ESH3-Z2              | ROHDE&SCHWARZ | 101333      | 2019.09.17 | 2020.09.17 |
| LISN                 | NSLK 8128 RC         | SCHWARZBECK   | 8128 RC-387 | 2019.11.04 | 2020.11.04 |
| LISN                 | KNW-407              | KYORITSU      | 8-317-8     | 2019.12.22 | 2020.12.22 |

| Mains terminal disturbance voltage _Measurement data |     |                     |    |
|------------------------------------------------------|-----|---------------------|----|
| Test configuration mode                              | 1   | EUT Operation mode  | 1  |
| Test voltage (V)                                     | 120 | Test Frequency (Hz) | 60 |

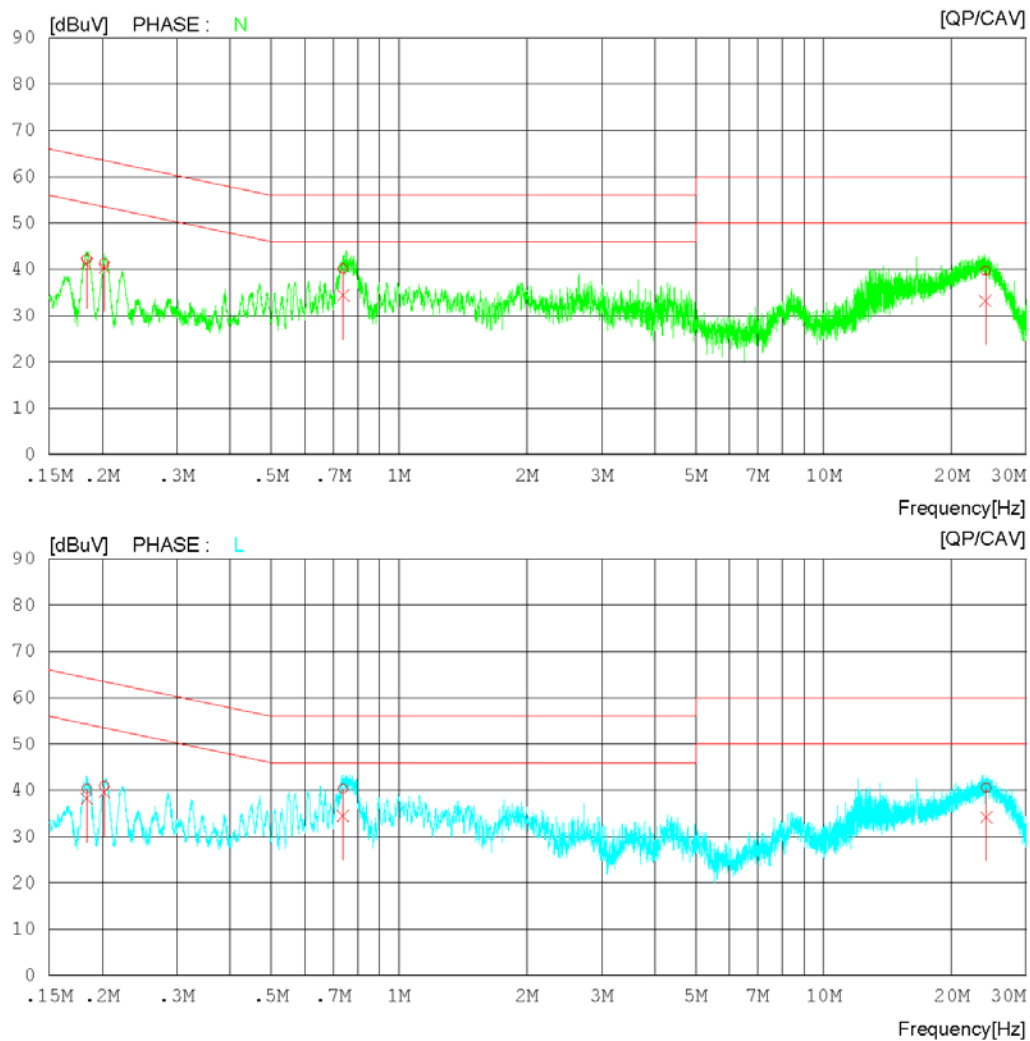
## Results of Conducted Emission

DTNC

Date 2020-06-14

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 'C 44 % R.H.  
Test Condition Data communication

LIMIT : FCC Part15 Subpart.B Class B.QP  
FCC Part15 Subpart.B Class B.AV



## Results of Conducted Emission

DTNC

Date 2020-06-14

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 'C 44 % R.H.  
Test Condition Data communication

LIMIT : FCC Part15 Subpart.B Class B.QP  
FCC Part15 Subpart.B Class B.AV

| NO | FREQ<br>[MHz] | READING |        | C.FACTOR<br>[dB] | RESULT |        | LIMIT  |        | MARGIN |        | PHASE |
|----|---------------|---------|--------|------------------|--------|--------|--------|--------|--------|--------|-------|
|    |               | QP      | CAV    |                  | QP     | CAV    | QP     | CAV    | QP     | CAV    |       |
|    |               | [dBuV]  | [dBuV] |                  | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] |       |
| 1  | 0.18420       | 32.13   | 31.13  | 10.07            | 42.20  | 41.20  | 64.29  | 54.29  | 22.09  | 13.09  | N     |
| 2  | 0.20250       | 31.12   | 30.29  | 10.08            | 41.20  | 40.37  | 63.51  | 53.51  | 22.31  | 13.14  | N     |
| 3  | 0.73843       | 29.97   | 24.26  | 10.11            | 40.08  | 34.37  | 56.00  | 46.00  | 15.92  | 11.63  | N     |
| 4  | 24.03874      | 29.07   | 22.57  | 10.61            | 39.68  | 33.18  | 60.00  | 50.00  | 20.32  | 16.82  | N     |
| 5  | 0.18410       | 30.27   | 28.17  | 10.07            | 40.34  | 38.24  | 64.30  | 54.30  | 23.96  | 16.06  | L     |
| 6  | 0.20250       | 30.80   | 29.50  | 10.08            | 40.88  | 39.58  | 63.51  | 53.51  | 22.63  | 13.93  | L     |
| 7  | 0.73781       | 30.17   | 24.37  | 10.11            | 40.28  | 34.48  | 56.00  | 46.00  | 15.72  | 11.52  | L     |
| 8  | 24.15573      | 29.97   | 23.67  | 10.51            | 40.48  | 34.18  | 60.00  | 50.00  | 19.52  | 15.82  | L     |

### Calculation

|                                                                                |
|--------------------------------------------------------------------------------|
| N : Neutral phase, L1 : Live phase                                             |
| C.FACTOR(dB) : Pulse Limiter(dB) + Cable loss(dB) + Insertion loss of LISN(dB) |
| Result(dBuV) : Reading Value(dBuV) + C.FACTOR(dB)                              |
| Margin(dB) : Limit(dBuV) - Result(dBuV)                                        |

## 7.2 Radiated Disturbance

| ANSI C63.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Radiated disturbance 30 MHz – 40 GHz |                                                                                 |                         | Result  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------|-------------------------|---------|
| Method: Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10 or 3 meter below 1GHz and 3 meter above 1GHz. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable. For final measurement below 1 GHz frequency range, Quasi-Peak detector with (RBW = 120 kHz Bandwidth) was used. For final measurement above 1 GHz frequency range, Peak detector with (RBW = 1 MHz Bandwidth) and CISPR Average detector with (RBW = 1 MHz Bandwidth) were used. |                                      |                                                                                 |                         | Comply  |
| EUT mode<br>(Refer to clauses 4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Test configuration mode              |                                                                                 | 1                       |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | EUT Operation mode                   |                                                                                 | 1                       |         |
| Radiated Disturbance below 1 000 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |                                                                                 |                         |         |
| Frequency range<br>(MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quasi-peak limit dBµV/m              |                                                                                 |                         |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Class A                              |                                                                                 | Class B                 |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3 m distance                         | 10 m distance                                                                   | 3 m distance            |         |
| 30 to 88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 49.1                                 | 39.1                                                                            | 40                      |         |
| 88 to 216                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 53.5                                 | 43.5                                                                            | 43.5                    |         |
| 216 to 960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 56.4                                 | 46.4                                                                            | 46                      |         |
| 960 to 1 000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 59.5                                 | 49.5                                                                            | 54                      |         |
| According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22 shown.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |                                                                                 |                         |         |
| Frequency range<br>(MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quasi-peak limit dBµV/m              |                                                                                 |                         |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Class A (10 m distance)              |                                                                                 | Class B (10 m distance) |         |
| 30 to 230                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 40                                   |                                                                                 | 30                      |         |
| 230 to 1 000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 47                                   |                                                                                 | 37                      |         |
| Radiated Disturbance for above 1 000 MHz at a measurement distance of 3 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |                                                                                 |                         |         |
| Frequency range<br>(GHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Peak limit dBµV/m                    |                                                                                 | Average limit dBµV/m    |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Class A                              | Class B                                                                         | Class A                 | Class B |
| 1 to 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 80                                   | 74                                                                              | 60                      | 54      |
| The test frequency range of Radiated Disturbance measurements are listed below.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |                                                                                 |                         |         |
| Highest frequency generated or used in the device or on which the device operates or tunes (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                      | Upper frequency of measurement range (MHz)                                      |                         |         |
| Below 108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      | 1 000                                                                           |                         |         |
| 108 – 500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      | 2 000                                                                           |                         |         |
| 500 – 1 000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      | 5 000                                                                           |                         |         |
| Above 1 000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      | 5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower |                         |         |
| Measurement uncertainty                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                      |                                                                                 |                         |         |
| Expended uncertainty <i>U</i><br>(95 %, Confidence level, <i>k</i> = 2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                      | 6.88 dB, (30 ~ 1 000) MHz<br>6.52 dB, (1 GHz Above)                             |                         |         |
| The measurement uncertainties were calculated in accordance with requirements of ANSI C 63.4-2014.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |                                                                                 |                         |         |

| Measurement Instrument                                                                             |                      |                  |             |            |            |
|----------------------------------------------------------------------------------------------------|----------------------|------------------|-------------|------------|------------|
| Description                                                                                        | Model                | Manufacturer     | Identifier  | Cal. Date  | Cal. Due   |
| MEASUREMENT SOFTWARE                                                                               | EMI-R VER. 2.00.0177 | TSJ              | N/A         | N/A        | N/A        |
| EMI TEST RECEIVER                                                                                  | ESU40                | ROHDE&SCHWARZ    | 100525      | 2019.12.20 | 2020.12.20 |
| TRILOG BROADBAND TEST-ANTENNA WITH 6DB ATT                                                         | VULB9160             | SCHWARZBECK      | 9160-3339   | 2018.10.22 | 2020.10.22 |
|                                                                                                    | 8491B                | HP               | 18403       | 2018.10.22 | 2020.10.22 |
| LOW NOISE PRE AMPLIFIER                                                                            | MLA-100K01-B01-26    | TSJ              | 1252741     | 2020.02.13 | 2021.02.13 |
| HORN ANTENNA                                                                                       | 3117                 | ETS-LINDGREN     | 00152093    | 2020.03.26 | 2021.03.26 |
| PRE AMPLIFIER                                                                                      | 8449B                | H.P              | 3008A00887  | 2019.08.26 | 2020.08.26 |
| HORN ANTENNA WITH PREAMPLIFIER                                                                     | EM-6969              | ELECTRO-METRICS  | 156         | 2019.02.13 | 2021.02.13 |
|                                                                                                    | MLA-0618-B03-34      | TSJ              | 1785642     | 2019.12.31 | 2020.12.31 |
| HORN ANTENNA WITH PREAMPLIFIER                                                                     | SAS-574              | A.H.SYSTEMS INC. | 155         | 2019.07.03 | 2021.07.03 |
|                                                                                                    | MLA-1840-J02-45      | TSJ              | 16966-10728 | 2019.06.27 | 2020.06.27 |
| (NOTE : THE MEASUREMENT ANTENNAS WERE CALIBRATED IN ACCORDANCE TO THE REQUIREMENTS OF C63.5-2017.) |                      |                  |             |            |            |

| Radiated disturbance at (30 ~ 1000) MHz _Measurement data |     |                     |    |
|-----------------------------------------------------------|-----|---------------------|----|
| Test configuration mode                                   | 1   | EUT Operation mode  | 1  |
| Test voltage (V)                                          | 120 | Test Frequency (Hz) | 60 |

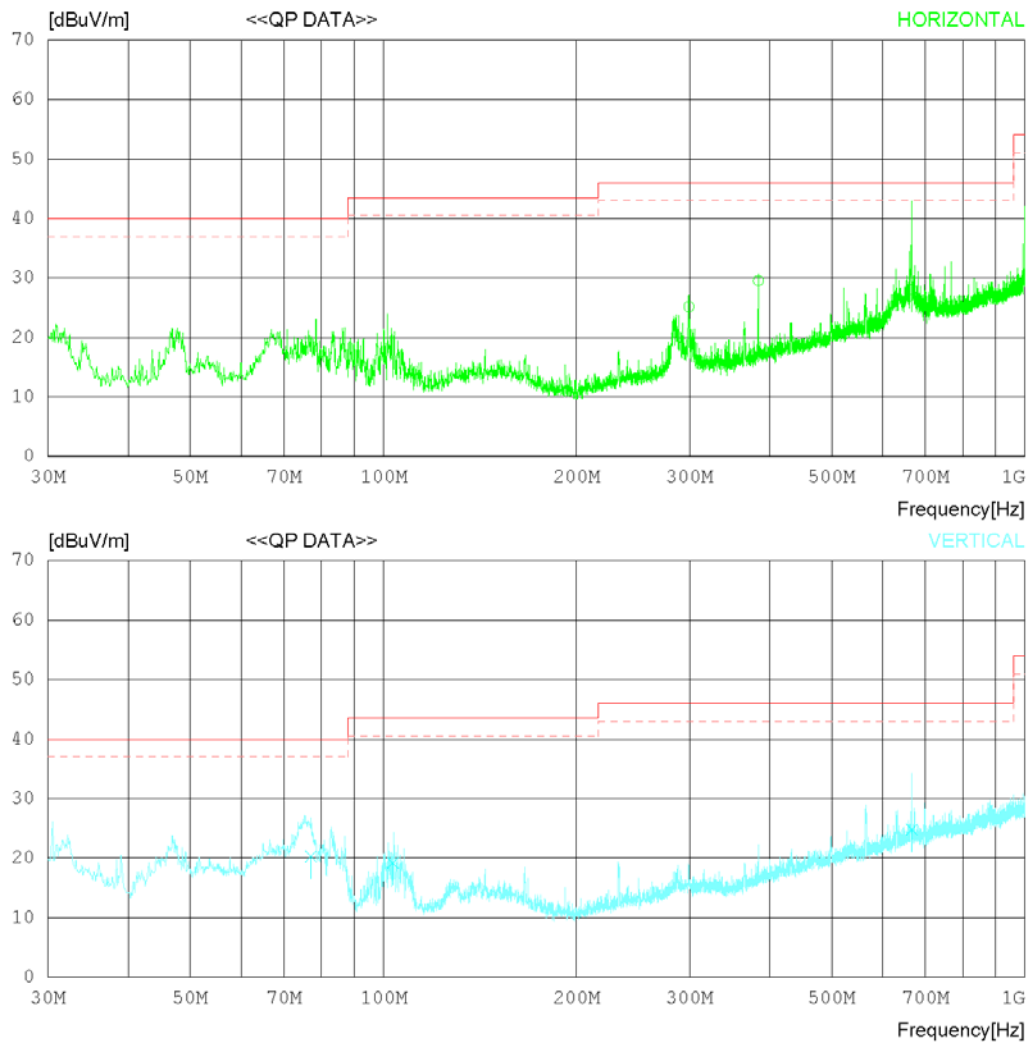
## RADIATED EMISSION

Date 2020-06-13

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 'C 44 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart B Class B (3m)  
MARGIN: 3 dB



## RADIATED EMISSION

Date 2020-06-13

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 °C 44 % R.H.  
Test Condition DATA COMMUNICATION

### Memo

LIMIT : FCC Part15 Subpart.B Class B (3m)  
MARGIN: 3 dB

| No.                    | FREQ<br>[MHz] | READING<br>QP<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- |               |                         |                       |              |              |                    |                   |                |                 |                |
| 1                      | 299.398       | 29.68                   | 19.50                 | 2.53         | 26.56        | 25.15              | 46.00             | 20.85          | 106             | 306            |
| 2                      | 383.998       | 32.52                   | 21.12                 | 2.31         | 26.42        | 29.53              | 46.00             | 16.47          | 104             | 234            |
| 3                      | 666.668       | 24.02                   | 27.37                 | 2.85         | 26.22        | 28.02              | 46.00             | 17.98          | 111             | 348            |
| ----- Vertical -----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 4                      | 77.110        | 30.41                   | 15.37                 | 1.27         | 26.74        | 20.31              | 40.00             | 19.69          | 113             | 222            |
| 5                      | 103.351       | 28.92                   | 15.67                 | 1.43         | 26.83        | 19.19              | 43.50             | 24.31          | 121             | 305            |
| 6                      | 666.668       | 20.84                   | 27.37                 | 2.85         | 26.22        | 24.84              | 46.00             | 21.16          | 185             | 333            |

| Radiated disturbance at (1 ~ 6) GHz _Peak measurement data |     |                     |    |
|------------------------------------------------------------|-----|---------------------|----|
| Test configuration mode                                    | 1   | EUT Operation mode  | 1  |
| Test voltage (V)                                           | 120 | Test Frequency (Hz) | 60 |

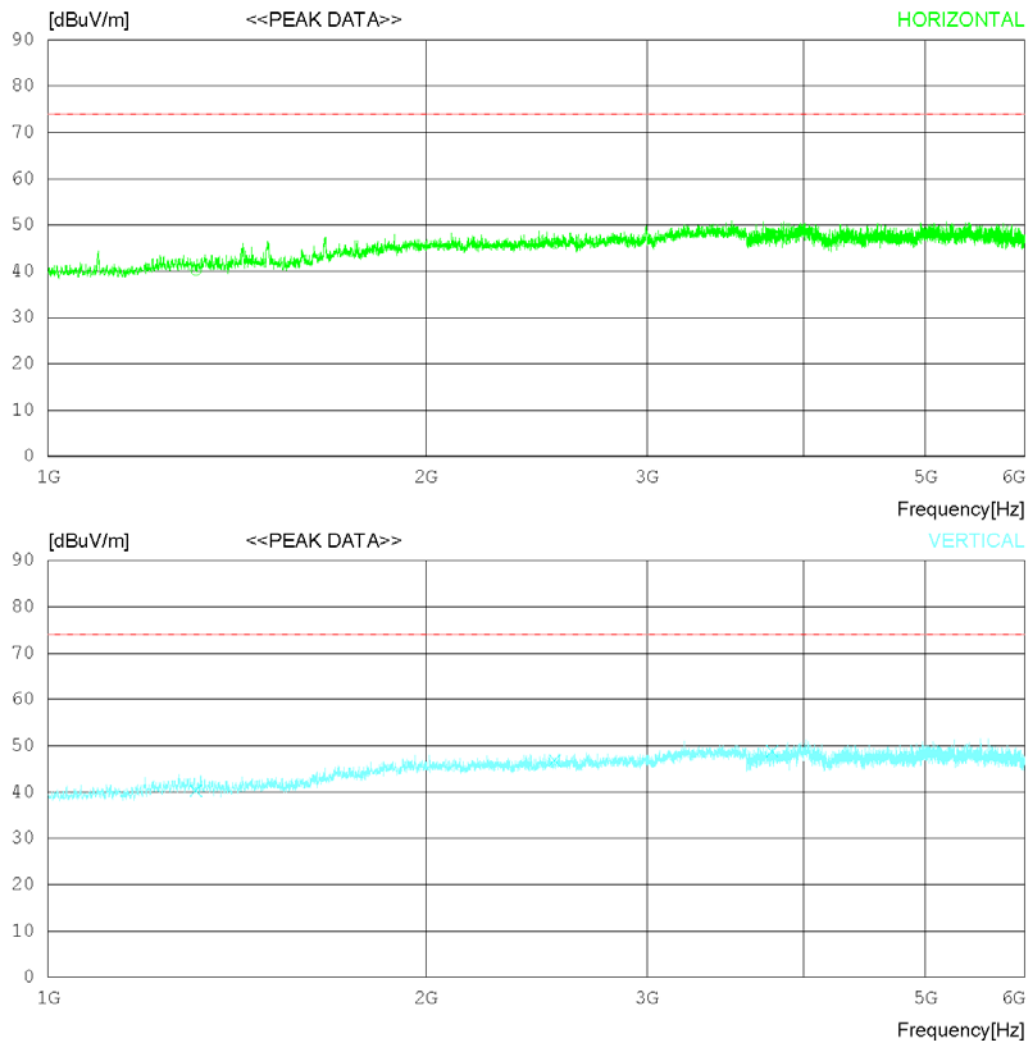
## RADIATED EMISSION

Date 2020-06-13

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 'C 44 % R.H.  
Test Condition DATA COMMUNICATIOM

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Peak)  
FCC Part15 Subpart.B Class B (3m) - GHz(Peak)



## RADIATED EMISSION

Date 2020-06-13

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 °C 44 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Peak)  
FCC Part15 Subpart.B Class B (3m) - GHz(Peak)

| No | Freq     | Reading | Ant.Fac | Loss | Gain  | Site.Fac | Result | Limit | Margin | Pola | Height | Angle |
|----|----------|---------|---------|------|-------|----------|--------|-------|--------|------|--------|-------|
| 1  | 1311.875 | 41.2    | 29.13   | 5.19 | 35.31 | 0        | 40.21  | 74    | 33.79  | Hori | 131    | 58    |
| 2  | 2533.125 | 41.1    | 32.2    | 7.28 | 34.65 | 0        | 45.93  | 74    | 28.07  | Hori | 305    | 1     |
| 3  | 3775     | 39.5    | 33.4    | 8.99 | 33.85 | 0        | 48.04  | 74    | 25.96  | Hori | 305    | 1     |
| 4  | 1311.875 | 41.3    | 29.13   | 5.19 | 35.31 | 0        | 40.31  | 74    | 33.69  | Vert | 223    | 259   |
| 5  | 2533.125 | 42      | 32.2    | 7.28 | 34.65 | 0        | 46.83  | 74    | 27.17  | Vert | 225    | 157   |
| 6  | 3775     | 40.2    | 33.4    | 8.99 | 33.85 | 0        | 48.74  | 74    | 25.26  | Vert | 133    | 358   |

| Radiated disturbance at (1 ~ 6) GHz _Average measurement data |     |                     |    |
|---------------------------------------------------------------|-----|---------------------|----|
| Test configuration mode                                       | 1   | EUT Operation mode  | 1  |
| Test voltage (V)                                              | 120 | Test Frequency (Hz) | 60 |

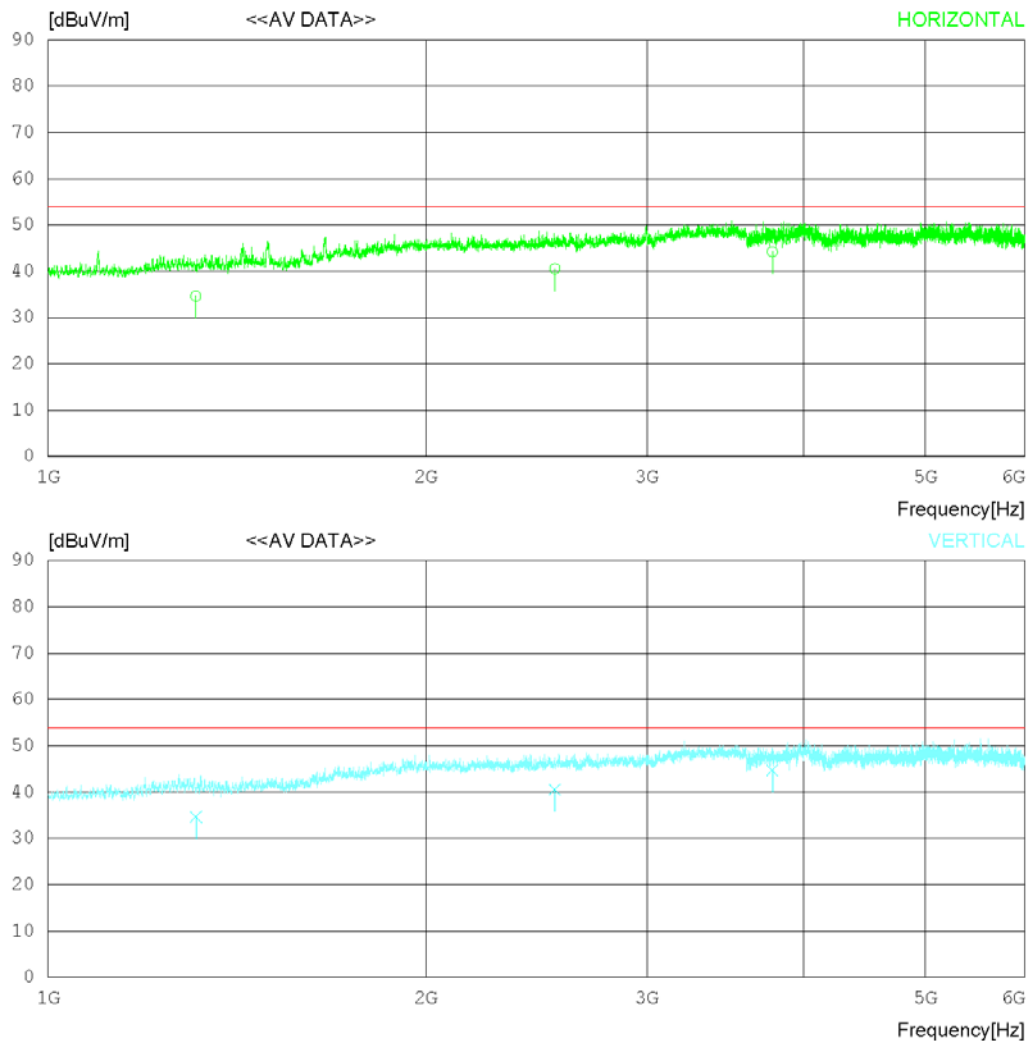
## RADIATED EMISSION

Date 2020-06-13

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 'C 44 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Average)  
FCC Part15 Subpart.B Class B (3m) - GHz(Average)



## RADIATED EMISSION

Date 2020-06-13

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 °C 44 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Average)  
FCC Part15 Subpart.B Class B (3m) - GHz(Average)

| No | Freq     | Reading | Ant.Fac | Loss | Gain  | Site.Fac | Result | Limit | Margin | Pola | Height | Angle |
|----|----------|---------|---------|------|-------|----------|--------|-------|--------|------|--------|-------|
| 1  | 1311.164 | 35.63   | 29.14   | 5.18 | 35.31 | 0        | 34.64  | 54    | 19.36  | Hori | 121    | 58    |
| 2  | 1311.811 | 35.67   | 29.13   | 5.19 | 35.31 | 0        | 34.68  | 54    | 19.32  | Vert | 121    | 120   |
| 3  | 2533.51  | 35.72   | 32.2    | 7.28 | 34.65 | 0        | 40.55  | 54    | 13.45  | Hori | 305    | 78    |
| 4  | 2533.162 | 35.72   | 32.2    | 7.28 | 34.65 | 0        | 40.55  | 54    | 13.45  | Vert | 353    | 230   |
| 5  | 3775.622 | 35.66   | 33.4    | 8.99 | 33.85 | 0        | 44.2   | 54    | 9.8    | Hori | 112    | 305   |
| 6  | 3775.42  | 36.12   | 33.4    | 8.99 | 33.85 | 0        | 44.66  | 54    | 9.34   | Vert | 121    | 113   |

| Radiated disturbance at (6 ~ 18) GHz _Peak measurement data |     |                     |    |
|-------------------------------------------------------------|-----|---------------------|----|
| Test configuration mode                                     | 1   | EUT Operation mode  | 1  |
| Test voltage (V)                                            | 120 | Test Frequency (Hz) | 60 |

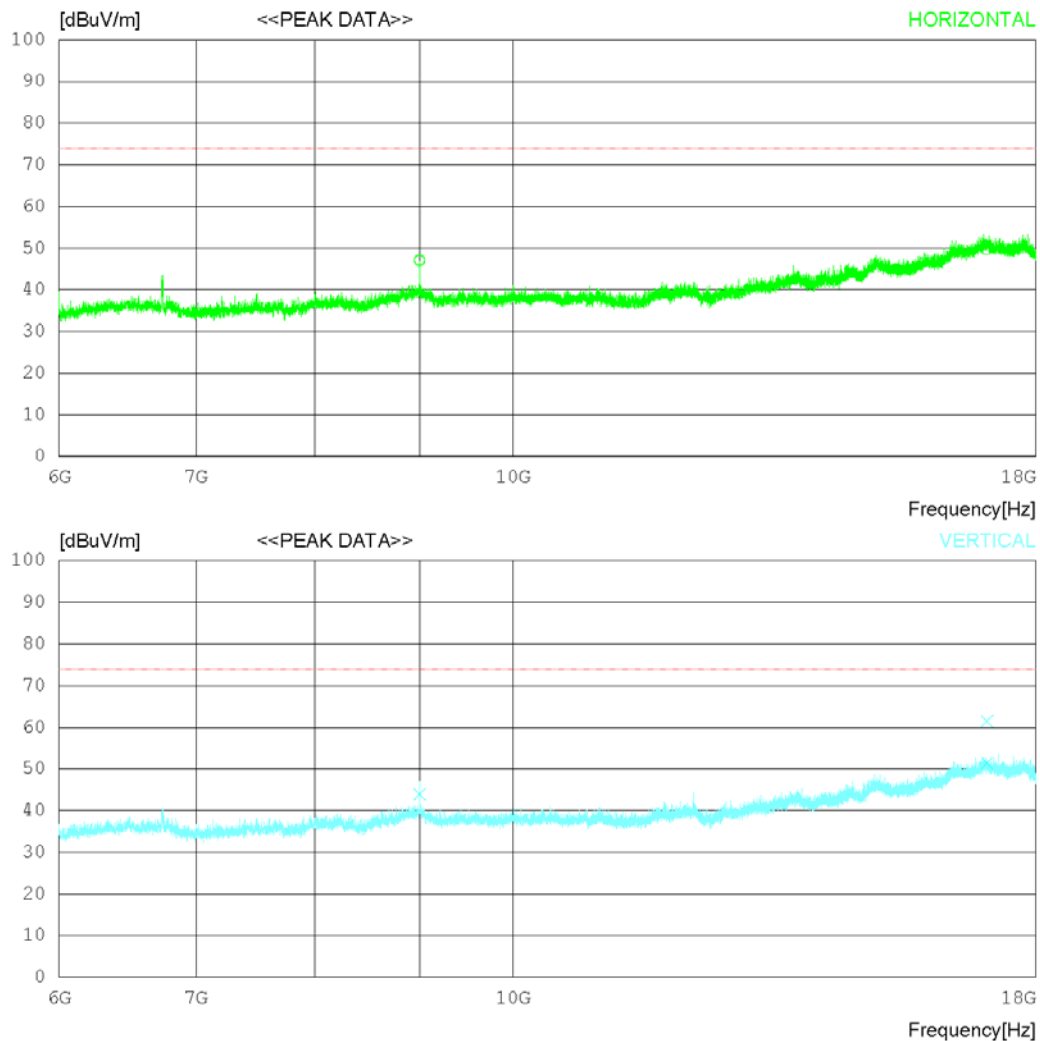
## RADIATED EMISSION

Date 2020-06-13

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 °C 44 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Peak)  
FCC Part15 Subpart.B Class B (3m) - GHz(Peak)



## RADIATED EMISSION

Date 2020-06-13

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 °C 44 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Peak)  
FCC Part15 Subpart.B Class B (3m) - GHz(Peak)

| No | Freq     | Reading | Ant.Fac | Loss  | Gain  | Site.Fac | Result | Limit | Margin | Pola | Height | Angle |
|----|----------|---------|---------|-------|-------|----------|--------|-------|--------|------|--------|-------|
| 1  | 9000     | 36.8    | 32.1    | 15.54 | 37.5  | 0        | 46.94  | 74    | 27.06  | Hori | 322    | 130   |
| 2  | 9000.053 | 37.1    | 32.1    | 15.54 | 37.5  | 0        | 47.24  | 74    | 26.76  | Hori | 246    | 78    |
| 3  | 17037    | 25      | 37.58   | 23.52 | 36.44 | 0        | 49.66  | 74    | 24.34  | Hori | 305    | 351   |
| 4  | 9000.065 | 33.8    | 32.1    | 15.54 | 37.5  | 0        | 43.94  | 74    | 30.06  | Vert | 221    | 113   |
| 5  | 17037    | 26.8    | 37.58   | 23.52 | 36.44 | 0        | 51.46  | 74    | 22.54  | Vert | 325    | 293   |
| 6  | 17037.41 | 36.8    | 37.58   | 23.52 | 36.44 | 0        | 61.46  | 74    | 12.54  | Vert | 113    | 255   |

| Radiated disturbance at (6 ~ 18) GHz _Average measurement data |     |                     |    |
|----------------------------------------------------------------|-----|---------------------|----|
| Test configuration mode                                        | 1   | EUT Operation mode  | 1  |
| Test voltage (V)                                               | 120 | Test Frequency (Hz) | 60 |

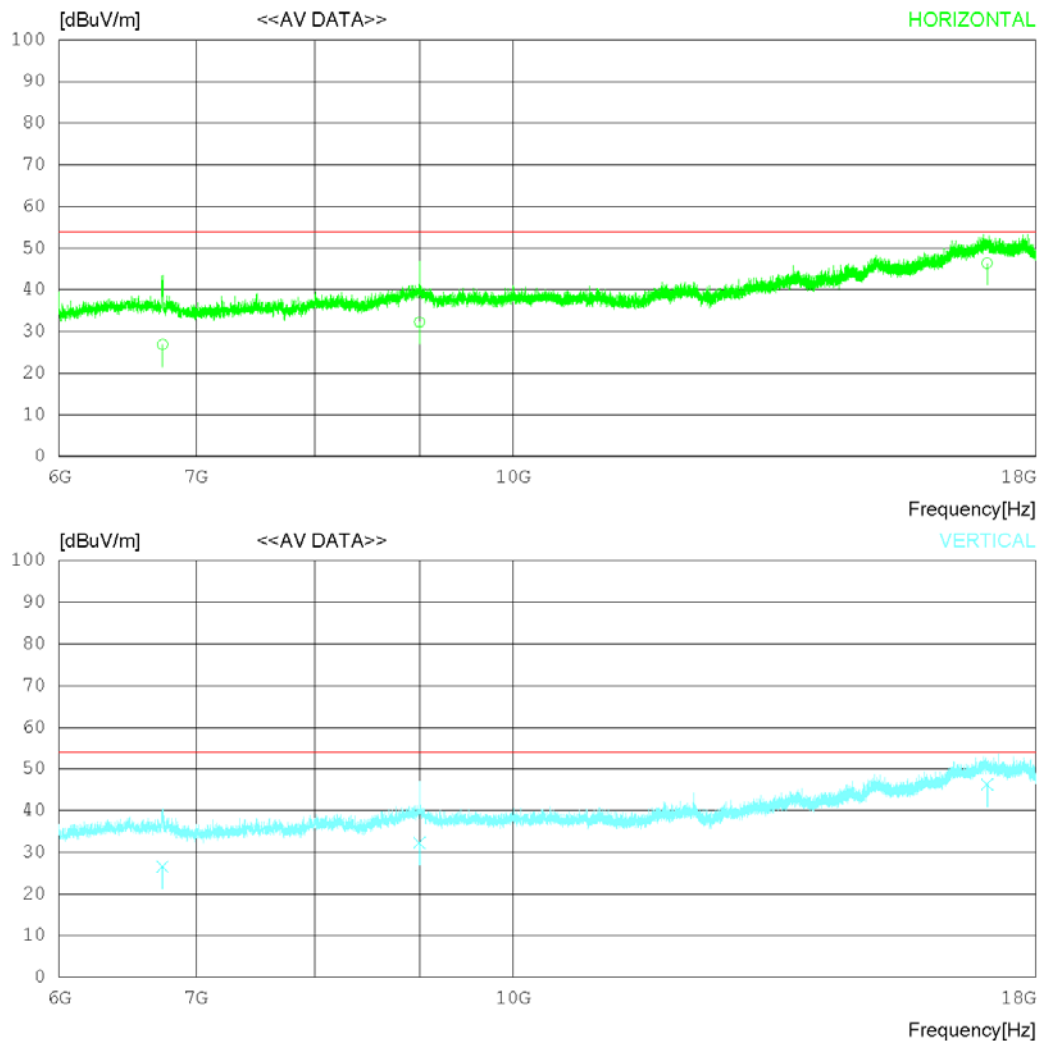
## RADIATED EMISSION

Date 2020-06-13

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 °C 44 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Average)  
FCC Part15 Subpart.B Class B (3m) - GHz(Average)



## RADIATED EMISSION

Date 2020-06-13

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 23 °C 44 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Average)  
FCC Part15 Subpart.B Class B (3m) - GHz(Average)

| No | Freq     | Reading | Ant.Fac | Loss  | Gain  | Site.Fac | Result | Limit | Margin | Pola | Height | Angle |
|----|----------|---------|---------|-------|-------|----------|--------|-------|--------|------|--------|-------|
| 1  | 6741.412 | 21.62   | 31.52   | 12.43 | 38.7  | 0        | 26.87  | 54    | 27.13  | Hori | 131    | 0     |
| 2  | 6741.012 | 21.35   | 31.52   | 12.43 | 38.7  | 0        | 26.6   | 54    | 27.4   | Vert | 177    | 120   |
| 3  | 9000.044 | 22.12   | 32.1    | 15.54 | 37.5  | 0        | 32.26  | 54    | 21.74  | Hori | 350    | 240   |
| 4  | 9000.065 | 22.12   | 32.1    | 15.54 | 37.5  | 0        | 32.26  | 54    | 21.74  | Vert | 243    | 223   |
| 5  | 17037.72 | 21.76   | 37.58   | 23.51 | 36.45 | 0        | 46.4   | 54    | 7.6    | Hori | 112    | 351   |
| 6  | 17037.42 | 21.63   | 37.58   | 23.52 | 36.44 | 0        | 46.29  | 54    | 7.71   | Vert | 113    | 350   |

| Radiated disturbance at (18 ~ 40) GHz _Peak measurement data |     |                     |    |
|--------------------------------------------------------------|-----|---------------------|----|
| Test configuration mode                                      | 1   | EUT Operation mode  | 1  |
| Test voltage (V)                                             | 120 | Test Frequency (Hz) | 60 |

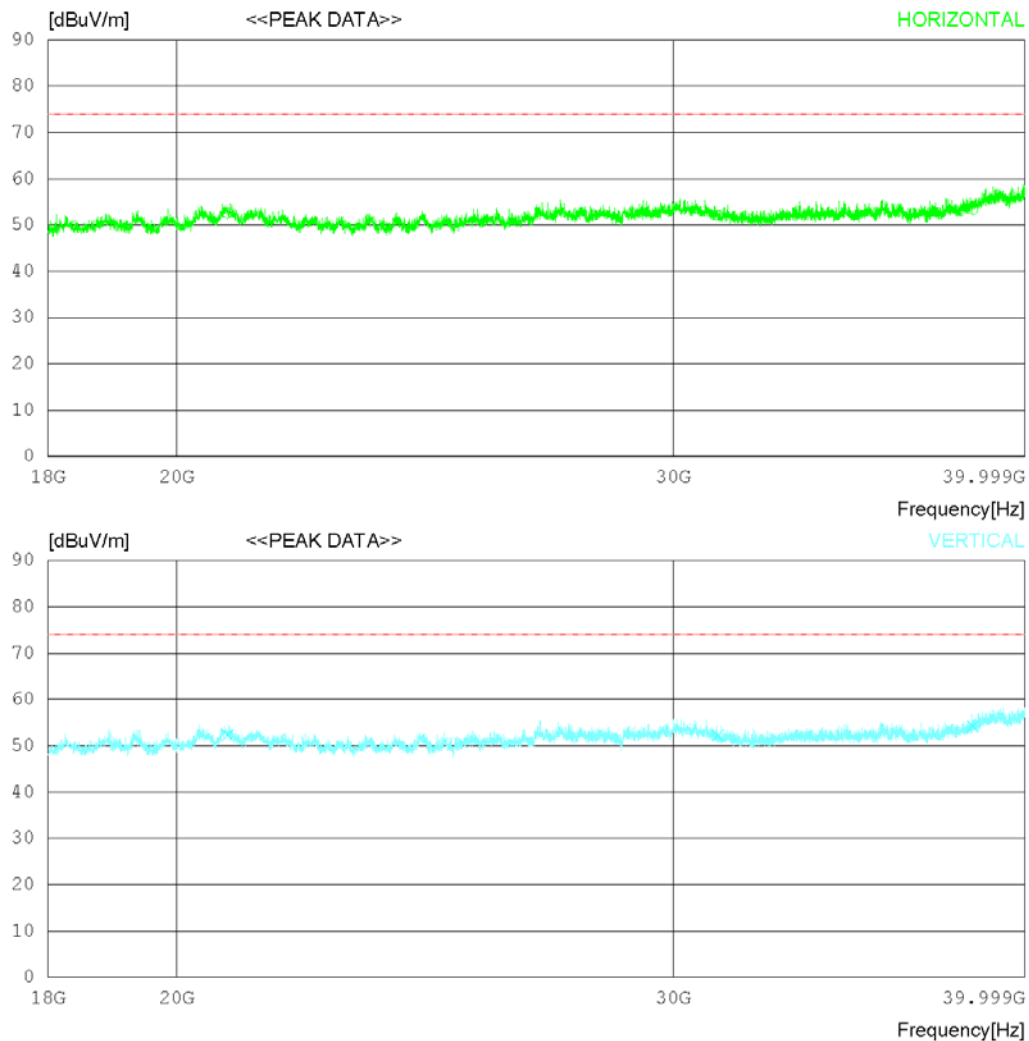
## RADIATED EMISSION

Date 2020-06-14

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 26 °C 42 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Peak)  
FCC Part15 Subpart.B Class B (3m) - GHz(Peak)



## RADIATED EMISSION

Date 2020-06-14

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 26 °C 42 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Peak)  
FCC Part15 Subpart.B Class B (3m) - GHz(Peak)

| No | Freq     | Reading | Ant.Fac | Loss  | Gain  | Site.Fac | Result | Limit | Margin | Pola | Height | Angle |
|----|----------|---------|---------|-------|-------|----------|--------|-------|--------|------|--------|-------|
| 1  | 20851.75 | 40.1    | 45.6    | 20.23 | 53.38 | 0        | 52.55  | 74    | 21.45  | Hori | 120    | 110   |
| 2  | 31123    | 34.8    | 47.14   | 22.44 | 52.26 | 0        | 52.12  | 74    | 21.88  | Hori | 307    | 0     |
| 3  | 38330.75 | 34.1    | 46.6    | 24.98 | 52.28 | 0        | 53.4   | 74    | 20.6   | Hori | 222    | 315   |
| 4  | 20851.75 | 39.8    | 45.6    | 20.23 | 53.38 | 0        | 52.25  | 74    | 21.75  | Vert | 223    | 358   |
| 5  | 31123    | 34.9    | 47.14   | 22.44 | 52.26 | 0        | 52.22  | 74    | 21.78  | Vert | 120    | 288   |
| 6  | 38330.75 | 35      | 46.6    | 24.98 | 52.28 | 0        | 54.3   | 74    | 19.7   | Vert | 305    | 358   |

| Radiated disturbance at (18 ~ 40) GHz _Average measurement data |     |                     |    |
|-----------------------------------------------------------------|-----|---------------------|----|
| Test configuration mode                                         | 1   | EUT Operation mode  | 1  |
| Test voltage (V)                                                | 120 | Test Frequency (Hz) | 60 |

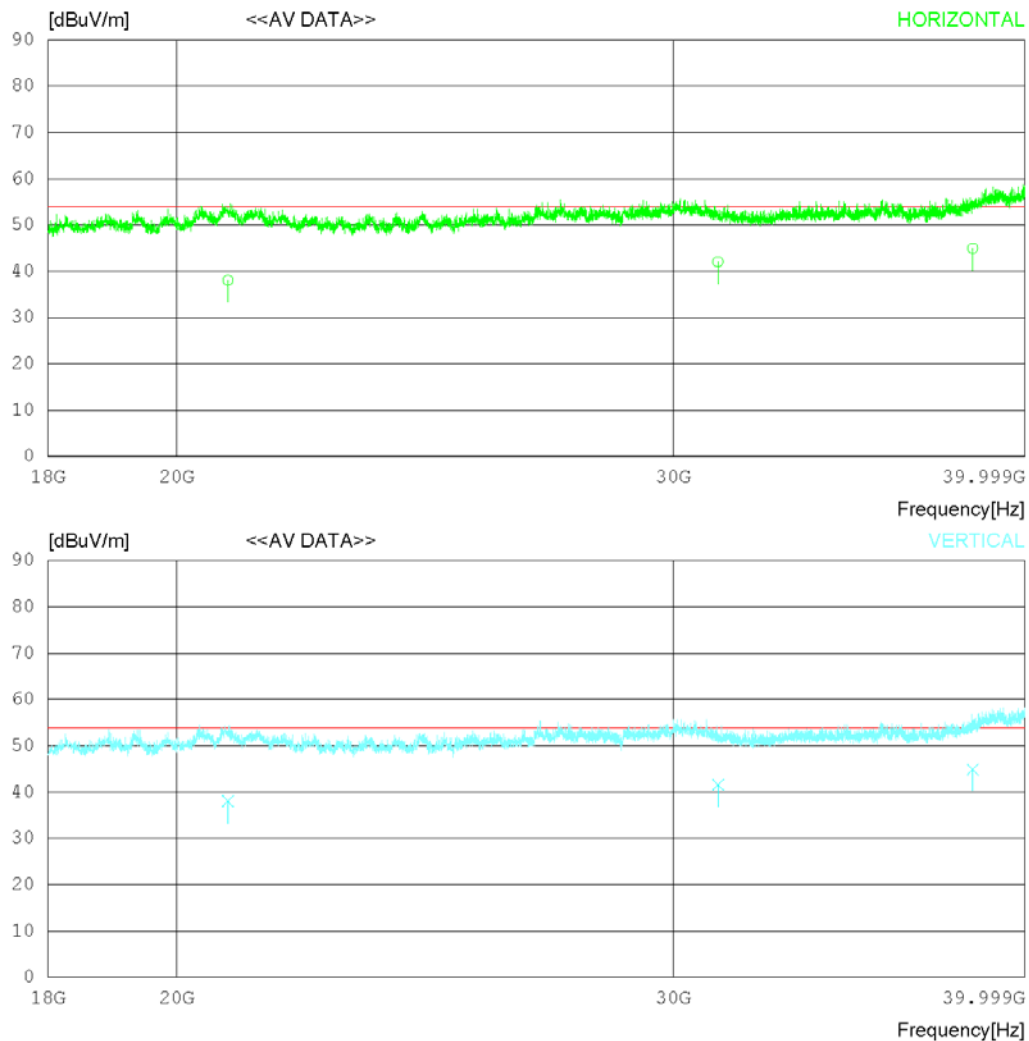
## RADIATED EMISSION

Date 2020-06-14

Order No. DTNC2005-04380  
Power Supply 120 V 60 Hz  
Temp/Humi 26 °C 42 % R.H.  
Test Condition DATA COMMUNICATION

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Average)  
FCC Part15 Subpart.B Class B (3m) - GHz(Average)



## RADIATED EMISSION

Date 2020-06-14

|                |                    |
|----------------|--------------------|
| Order No.      | DTNC2005-04380     |
| Power Supply   | 120 V 60 Hz        |
| Temp/Humi      | 26 °C 42 % R.H.    |
| Test Condition | DATA COMMUNICATION |

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Average)  
FCC Part15 Subpart.B Class B (3m) - GHz(Average)

| No | Freq     | Reading | Ant.Fac | Loss  | Gain  | Site.Fac | Result | Limit | Margin | Pola | Height | Angle |
|----|----------|---------|---------|-------|-------|----------|--------|-------|--------|------|--------|-------|
| 1  | 20851.12 | 25.62   | 45.6    | 20.23 | 53.38 | 0        | 38.07  | 54    | 15.93  | Hori | 233    | 78    |
| 2  | 20851.12 | 25.62   | 45.6    | 20.23 | 53.38 | 0        | 38.07  | 54    | 15.93  | Vert | 232    | 122   |
| 3  | 31123.06 | 24.75   | 47.14   | 22.44 | 52.26 | 0        | 42.07  | 54    | 11.93  | Hori | 131    | 113   |
| 4  | 31123.42 | 24.25   | 47.14   | 22.44 | 52.26 | 0        | 41.57  | 54    | 12.43  | Vert | 111    | 305   |
| 5  | 38330.11 | 25.66   | 46.6    | 24.98 | 52.28 | 0        | 44.96  | 54    | 9.04   | Hori | 224    | 231   |
| 6  | 38330.11 | 25.66   | 46.6    | 24.98 | 52.28 | 0        | 44.96  | 54    | 9.04   | Vert | 305    | 113   |

### Calculation

|                                                                                                  |
|--------------------------------------------------------------------------------------------------|
| Result(dBuV/m) : Reading Value(dBuV) + Cable loss(dB) - Pre amplifier gain(dB) + Ant. Factor(dB) |
| Margin : Limit(dBuV/m) - Result(dBuV/m)                                                          |

## 8. Revision History

| Date          | Description                                         | Revised By  | Reviewed By    |
|---------------|-----------------------------------------------------|-------------|----------------|
| Jun. 19. 2020 | Initial report                                      | JunSeo Park | KyoungHwan Bae |
| Jul. 06. 2020 | Correction due to miswriting accessory information. | JunSeo Park | KyoungHwan Bae |
|               |                                                     |             |                |
|               |                                                     |             |                |
|               |                                                     |             |                |
|               |                                                     |             |                |
|               |                                                     |             |                |
|               |                                                     |             |                |

-End of test report-