

# 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 : DREFCC2005-0119

2. Customer

• Name : MOTREX CO., LTD.

• Address : Seoyoung Bldg., 25, Hwangsaeul-ro 258beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea

3. Use of Report : Grant of Certification

4. Product Name / Model Name / FCC ID : SMART DISPLAY / MS300ATMFL / BP9-MS300ATMFL

5. Test Method Used : ANSI C63.4:2014

FCC Part 15 Subpart B

(FM Broadcast receiver)

6. Date of Test : Mar. 19. 2020 ~ Apr. 07. 2020

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

8. Testing Environment : Temperature (18 ~ 21) °C , Humidity (39 ~ 42) % 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                     | Technical Manager               |
|             | Name : GiHyun Kim (Signature) | Name : HyungJun Kim (Signature) |

**May. 08. 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-4076,<br>R-4180, R-4496,<br>T-1442,<br>G-10338, G-754,<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                  | MOTREX CO., LTD.<br>Seoyoung Bldg., 25, Hwangsaoul-ro 258beon-gil, Bundang-gu,<br>Seongnam-si, Gyeonggi-do, Korea |
| Manufacturer               | MOTREX CO., LTD.<br>Seoyoung Bldg., 25, Hwangsaoul-ro 258beon-gil, Bundang-gu,<br>Seongnam-si, Gyeonggi-do, Korea |
| Factory                    | MOTREX CO., LTD.<br>62-7,Pungsesandan<br>4-ro,Pungse-myeon,Dongnam-gu,Cheonan-si,Chungcheongnam-do,<br>Korea      |
| Product Name               | SMART DISPLAY                                                                                                     |
| Model Name                 | MS300ATMFL                                                                                                        |
| Add Model Name             | None                                                                                                              |
| Maximum Internal Frequency | 1 000 MHz                                                                                                         |
| Software Version           | TMF.CIS.0000.027.191031                                                                                           |
| Hardware Version           | Rev0.1                                                                                                            |
| Rated Power                | DC 12 V                                                                                                           |
| FCC ID                     | BP9-MS300ATMFL                                                                                                    |
| Remarks                    |                                                                                                                   |

**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   | AM   | The EUT is connected to the SIGNAL GENERATOR and is receiving radio frequency(MF).<br>The EUT is wirelessly connected to the router and continuously sends and receives data.<br>And we have verified the data.(WIFI5G)       |
| 2   | FM   | The EUT is connected to the SIGNAL GENERATOR and is receiving radio frequency(VHF II).<br>The EUT is wirelessly connected to the router and continuously sends and receives data.<br>And we have verified the data.(WIFI2.4G) |
| 3   | USB  | The EUT is connected to USB memory to play the music. (1 kHz tone).<br>The EUT is wirelessly connected to the phone and continuously sends and receives data.(Bluetooth)                                                      |

### 4.3 Test Configuration Mode

| No. | Mode                 | Description                                                                                                           |
|-----|----------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1   | Receiving<br>(AM/FM) | EUT is connected to DC power<br>EUT is connected to the SIGNAL GENERATOR<br>EUT is wirelessly connected to the router |
| 2   | USB                  | EUT is connected to DC power<br>EUT is connected to USB memory<br>The EUT is wirelessly connected to the phone        |

## 4.4 Supported Equipment

| Used*                                                                         | Product Type   | Manufacturer | Model           | Remarks |
|-------------------------------------------------------------------------------|----------------|--------------|-----------------|---------|
| AE                                                                            | MULTI MEDIABOX | N/A          | N/A             | None    |
| AE                                                                            | Speaker        | N/A          | N/A             | None    |
| AE                                                                            | PHONE          | LG           | VS-980          | None    |
| AE                                                                            | USB MEMORY     | Sandisk      | ULTRA FLAIR 3.0 | None    |
| AE                                                                            | ANT.           | N/A          | N/A             | None    |
| AE                                                                            | ROUTER         | RoHS         | NEXT-7004N      | None    |
| *Abbreviations:<br>AE - Auxiliary/Associated Equipment, or<br>SIM - Simulator |                |              |                 |         |

## 4.5 EUT In/Output Port

| Name                                                                                                                                                                                         | Type* | Cable Max. >3m | Cable Shielded | Cable Back shell | Remarks |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------|----------------|------------------|---------|
| DC IN                                                                                                                                                                                        | DC    | 1.8 m          | Non shield     | Plastic          | None    |
| Antenna                                                                                                                                                                                      | I/O   | 3.0 m          | Shield         | Plastic          | None    |
| Multimedia box                                                                                                                                                                               | I/O   | 1.5 m          | Non shield     | Plastic          | None    |
| SPEAKER                                                                                                                                                                                      | I/O   | 1.6 m          | Non shield     | Plastic          | None    |
| *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 (V) | Frequency (Hz) | Phases | Remarks |
|------|-------------|----------------|--------|---------|
| 1    | 12 V        | DC             | -      | None    |

## 5. Test Summary

| Test Items                                                         | Applied Standards | Results         |
|--------------------------------------------------------------------|-------------------|-----------------|
| Conducted Disturbance                                              | ANSI C63.4 : 2014 | N/A<br>(Note 1) |
| Radiated Disturbance                                               | ANSI C63.4 : 2014 | C               |
| Antenna Power Conduction                                           | ANSI C63.4 : 2014 | C               |
| Note 1) The EUT is not a device connected to the AC mains.         |                   |                 |
| C=Comply    N/C=Not Comply    N/T=Not Tested    N/A=Not Applicable |                   |                 |

The data in this test report are traceable to the national or international standards.

-Conducted Disturbance

| Frequency [MHz] | Phase | Result [dB $\mu$ V] | Detector | Limit [dB $\mu$ V] | Margin [dB] |
|-----------------|-------|---------------------|----------|--------------------|-------------|
| -               | -     | -                   | -        | -                  | -           |

-Radiated Disturbance

| Frequency [MHz] | Pol. | Result [dB $\mu$ V/m] | Detector        | Limit [dB $\mu$ V/m] | Margin [dB] |
|-----------------|------|-----------------------|-----------------|----------------------|-------------|
| 39153.040       | V    | 49.76                 | Cispr - Average | 54.00                | 4.25        |

-Antenna Power Conduction

| Frequency [MHz] | Result [dB $\mu$ V/m] | Detector | Limit [dB $\mu$ V/m] | Margin [dB] |
|-----------------|-----------------------|----------|----------------------|-------------|
| -               | -                     | -        | -                    | -           |

## 6. Test Environment

| Test Items               | Test date (YYYY-MM-DD)   | Temp. (°C) | Humidity (% R.H.) | Pressure (kPa) |
|--------------------------|--------------------------|------------|-------------------|----------------|
| Radiated Disturbance     | 2020-03-20<br>2020-04-07 | 18<br>21   | 39<br>42          | -              |
| Antenna Power Conduction | 2020-03-19               | 20         | 40                |                |

## 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. |                                      |                                    |                   |           | Not Applicable |
| 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              |                                    | N/A               |           |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | EUT Operation mode                   |                                    | N/A               |           |                |
| 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 Instrument                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |                                    |                   |           |                |
| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Model                                | Manufacturer                       | Identifier        | Cal. Date | Cal. Due       |
| -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                                    | -                                  | -                 | -         | -              |



| Mains terminal disturbance voltage _ Measurement data |     |                     |     |
|-------------------------------------------------------|-----|---------------------|-----|
| Test configuration mode                               | N/A | EUT Operation mode  | N/A |
| Test voltage (V)                                      | N/A | Test Frequency (Hz) | N/A |

#### Calculation

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

## 7.2 Radiated Disturbance

| ANSI C63.4<br>BETS-7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Radiated disturbance 30 MHz –40 GHz** |                                                                                 |                         | Result  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------|-------------------------|---------|
| <u>Method:</u> 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, 2                    |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EUT Operation mode                    |                                                                                 | 1, 2, 3                 |         |
| 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(CISPR), Pub. 22 shown as below.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                       |                                                                                 |                         |         |
| Frequency range<br>(MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Quasi-peak limit dBµV/m               |                                                                                 |                         |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Class A (10 m distance)               |                                                                                 | Class B (10 m distance) |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30 to 230                             |                                                                                 | 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      |
| 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 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 |
| HORN ANTENNA                                                                                       | EM-6969              | ELECTRO-METRICS | 156        | 2019.02.13 | 2021.02.13 |
| PREAMPLIFIER                                                                                       | MLA-0618-B03-34      | TSJ             | 1785642    | 2019.12.31 | 2020.12.31 |
| HORN ANTENNA WITH                                                                                  | 3116C                | ETS-LINDGREN    | 00213177   | 2019.12.12 | 2021.12.12 |
| PREAMPLIFIER                                                                                       | JS44-18004000-35-8P  | L3 NARDA-MITEQ  | 2046884    | 2019.11.04 | 2020.11.04 |
| (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)                                          | DC 12 V | Test Frequency (Hz) | - |

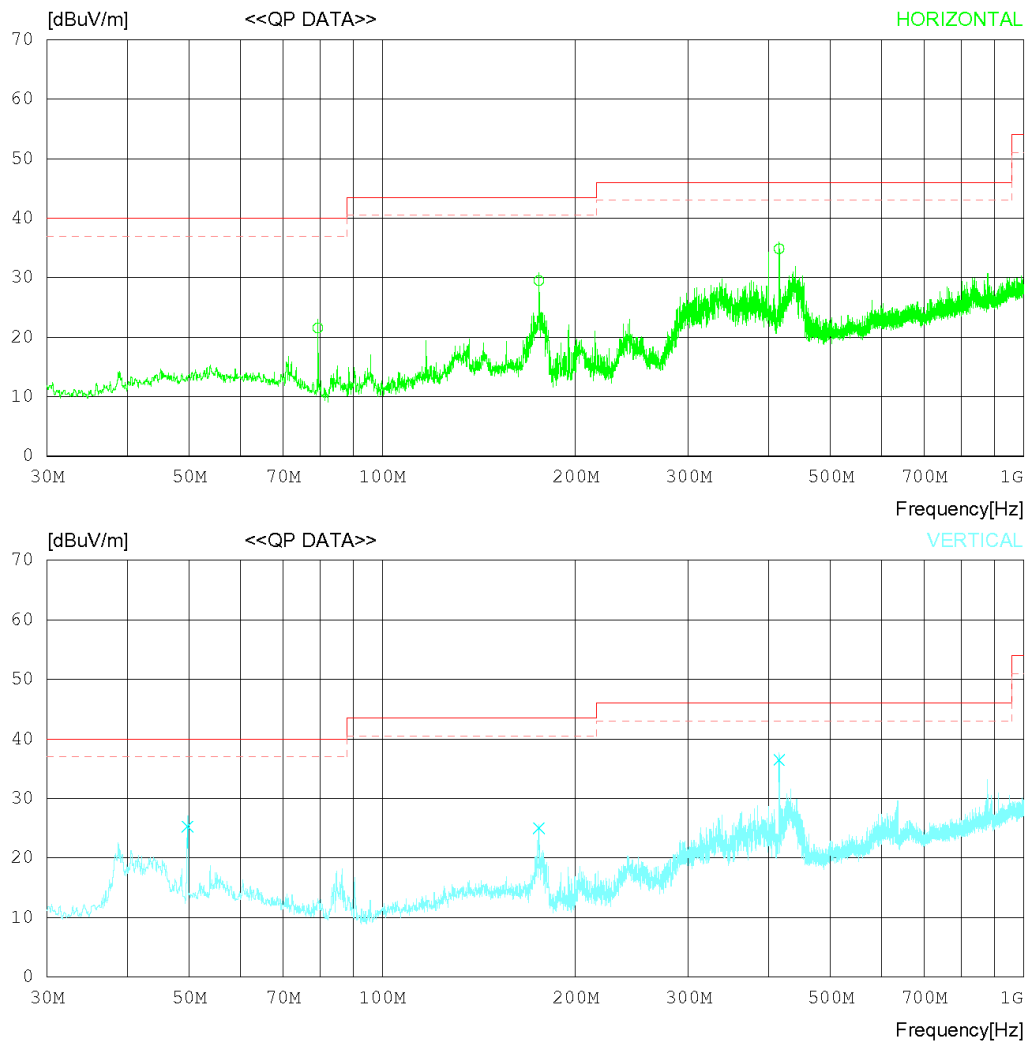
## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 18 'C 39 % R.H.  
Test Condition AM

Memo

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



## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 18 °C 39 % R.H.  
Test Condition AM

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                      | 79.348        | 31.76                   | 14.66                 | 0.90         | 25.74        | 21.58              | 40.00             | 18.42          | 380             | 1              |
| 2                      | 175.497       | 36.34                   | 17.50                 | 1.30         | 25.63        | 29.51              | 43.50             | 13.99          | 126             | 246            |
| 3                      | 415.928       | 36.71                   | 21.90                 | 2.01         | 25.77        | 34.85              | 46.00             | 11.15          | 212             | 208            |
| ----- Vertical -----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 4                      | 49.643        | 32.04                   | 18.26                 | 0.77         | 25.80        | 25.27              | 40.00             | 14.73          | 132             | 54             |
| 5                      | 175.497       | 31.84                   | 17.50                 | 1.30         | 25.63        | 25.01              | 43.50             | 18.49          | 232             | 155            |
| 6                      | 415.928       | 38.32                   | 21.90                 | 2.01         | 25.77        | 36.46              | 46.00             | 9.54           | 147             | 1              |

| Radiated disturbance at (1 ~ 6) GHz _Peak measurement data |         |                     |   |
|------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                    | 1       | EUT Operation mode  | 1 |
| Test voltage (V)                                           | DC 12 V | Test Frequency (Hz) | - |

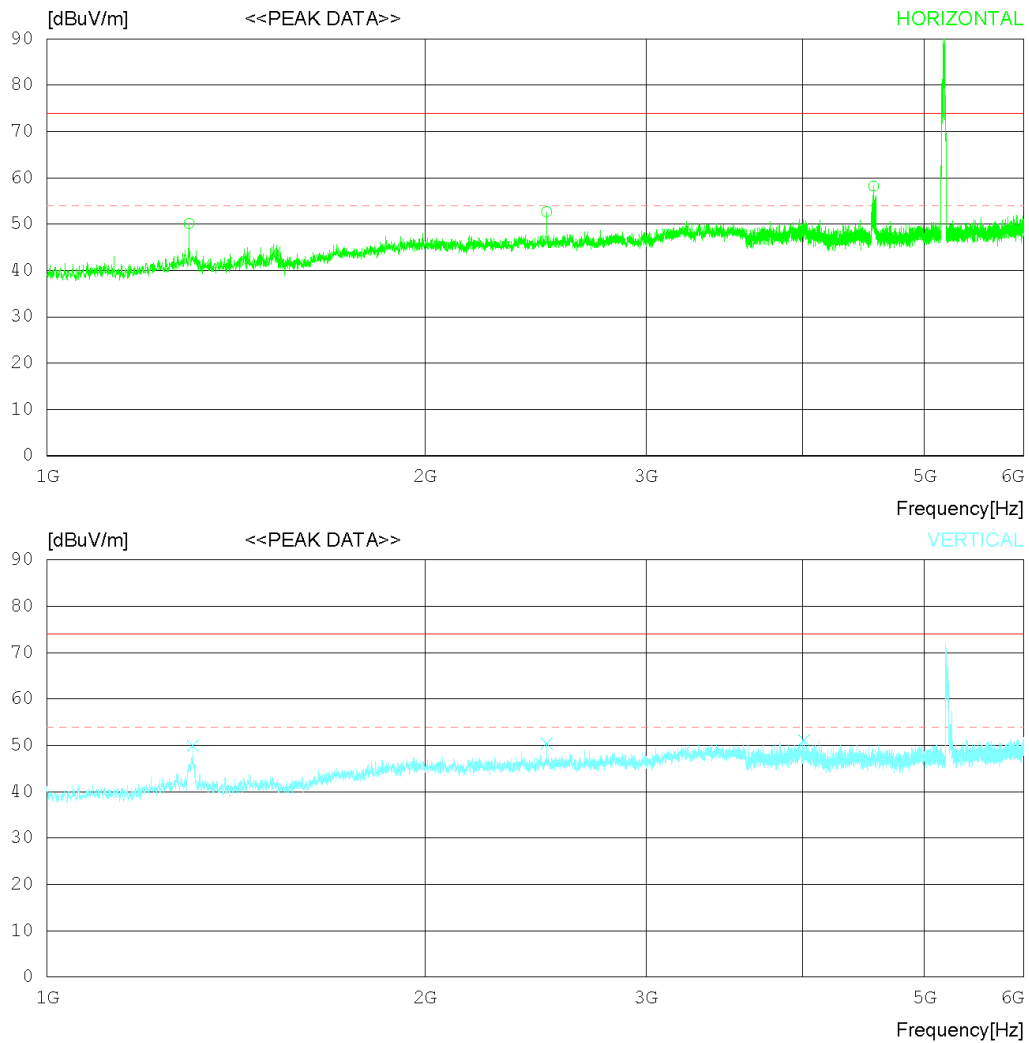
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition AM

Memo

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



\*Remark : (5,150 ~ 5,350) MHz is WIFI 5 G frequency.

## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 °C 42 % R.H.  
Test Condition AM

Memo

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

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<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                      | 1297.500      | 51.00                     | 29.31                 | 5.13         | 35.33        | 50.11              | 74.0              | 23.89          | 325             | 139            |
| 2                      | 2500.000      | 47.90                     | 32.20                 | 7.23         | 34.64        | 52.69              | 74.0              | 21.31          | 157             | 163            |
| 3                      | 4553.750      | 48.90                     | 33.91                 | 9.65         | 34.27        | 58.19              | 74.0              | 15.81          | 251             | 270            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 4                      | 1306.875      | 50.90                     | 29.20                 | 5.17         | 35.32        | 49.95              | 74.0              | 24.05          | 198             | 89             |
| 5                      | 2500.000      | 45.60                     | 32.20                 | 7.23         | 34.64        | 50.39              | 74.0              | 23.61          | 151             | 157            |
| 6                      | 4008.750      | 41.40                     | 33.50                 | 9.71         | 33.55        | 51.06              | 74.0              | 22.94          | 204             | 118            |

| Radiated disturbance at (1 ~ 6) GHz _Average measurement data |         |                     |   |
|---------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                       | 1       | EUT Operation mode  | 1 |
| Test voltage (V)                                              | DC 12 V | Test Frequency (Hz) | - |

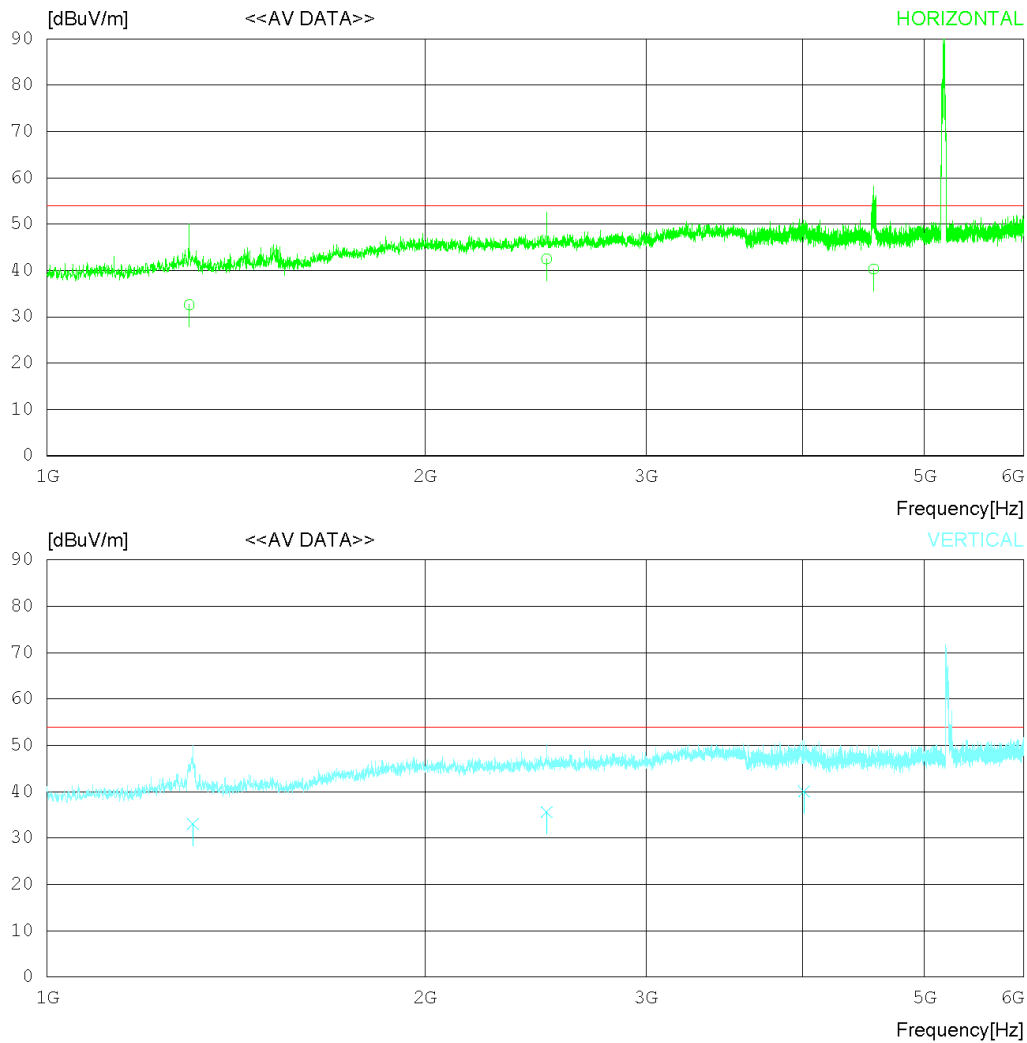
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition AM

Memo

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



\*Remark : (5,150 ~ 5,350) MHz is WIFI 5 G frequency.



## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition AM

### Memo

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

| No.                    | FREQ<br>[MHz] | READING<br>CAV<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                      | 1297.857      | 33.50                    | 29.30                 | 5.13         | 35.33        | 32.60              | 54.00             | 21.40          | 307             | 112            |
| 2                      | 2499.956      | 37.70                    | 32.20                 | 7.22         | 34.63        | 42.49              | 54.00             | 11.51          | 267             | 203            |
| 3                      | 4553.728      | 31.00                    | 33.91                 | 9.65         | 34.27        | 40.29              | 54.00             | 13.71          | 134             | 306            |
| ----- Vertical -----   |               |                          |                       |              |              |                    |                   |                |                 |                |
| 4                      | 1307.080      | 34.00                    | 29.20                 | 5.17         | 35.32        | 33.05              | 54.00             | 20.95          | 305             | 104            |
| 5                      | 2500.380      | 30.80                    | 32.20                 | 7.23         | 34.64        | 35.59              | 54.00             | 18.41          | 277             | 203            |
| 6                      | 4008.342      | 30.40                    | 33.50                 | 9.71         | 33.55        | 40.06              | 54.00             | 13.94          | 105             | 208            |

| Radiated disturbance at (6 ~ 18) GHz _Peak measurement data |         |                     |   |
|-------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                     | 1       | EUT Operation mode  | 1 |
| Test voltage (V)                                            | DC 12 V | Test Frequency (Hz) | - |

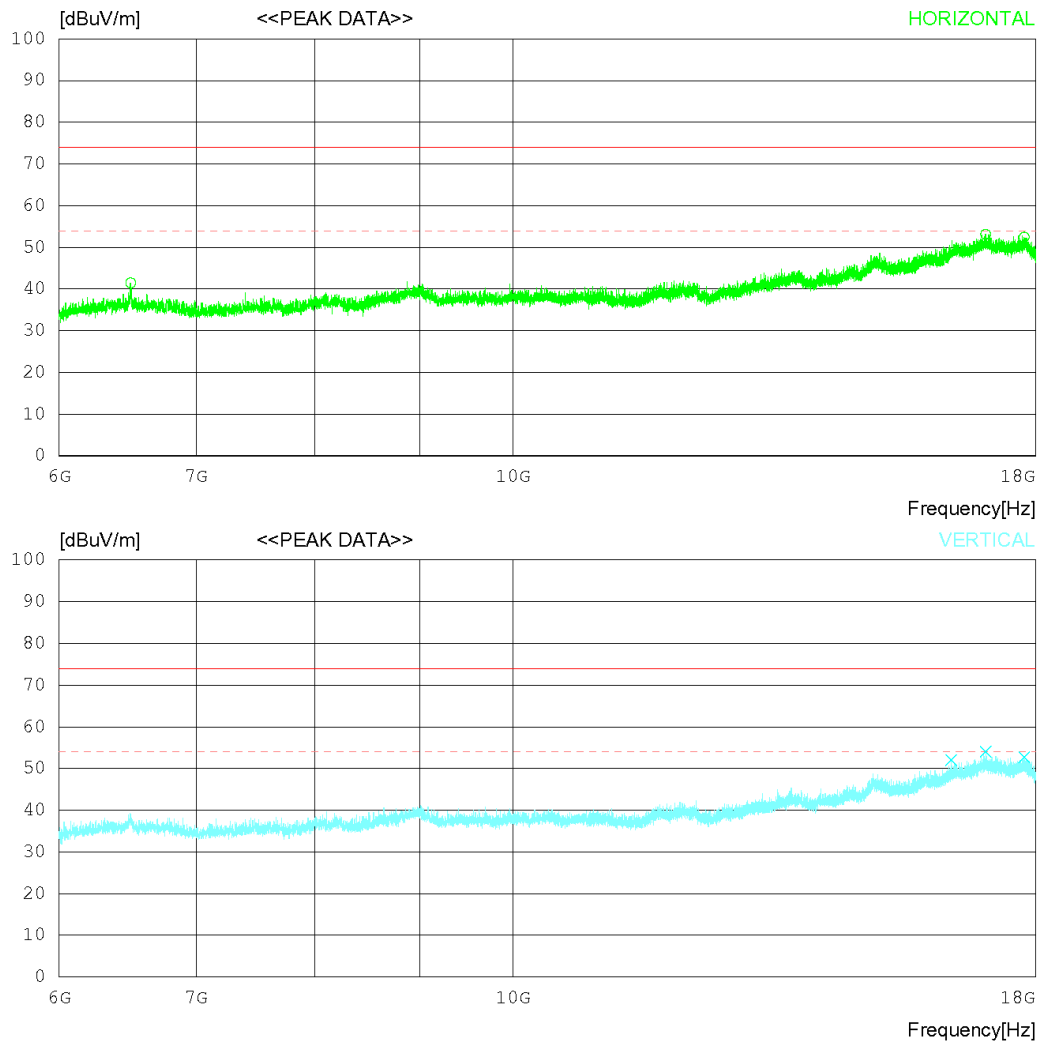
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition AM

Memo

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



## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 °C 42 % R.H.  
Test Condition AM

Memo

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

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<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                      | 6504.000      | 37.30                     | 31.58                 | 11.43        | 38.80        | 41.51              | 74.0              | 32.49          | 265             | 153            |
| 2                      | 17016.750     | 28.30                     | 37.56                 | 23.68        | 36.42        | 53.12              | 74.0              | 20.88          | 165             | 272            |
| 3                      | 17772.000     | 29.00                     | 38.14                 | 22.76        | 37.44        | 52.46              | 74.0              | 21.54          | 100             | 358            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 4                      | 16371.000     | 29.60                     | 36.84                 | 21.74        | 36.18        | 52.00              | 74.0              | 22             | 320             | 358            |
| 5                      | 17016.750     | 29.20                     | 37.56                 | 23.68        | 36.42        | 54.02              | 74.0              | 19.98          | 184             | 241            |
| 6                      | 17770.500     | 29.20                     | 38.14                 | 22.76        | 37.43        | 52.67              | 74.0              | 21.33          | 140             | 280            |

| Radiated disturbance at (6 ~ 18) GHz _Average measurement data |         |                     |   |
|----------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                        | 1       | EUT Operation mode  | 1 |
| Test voltage (V)                                               | DC 12 V | Test Frequency (Hz) | - |

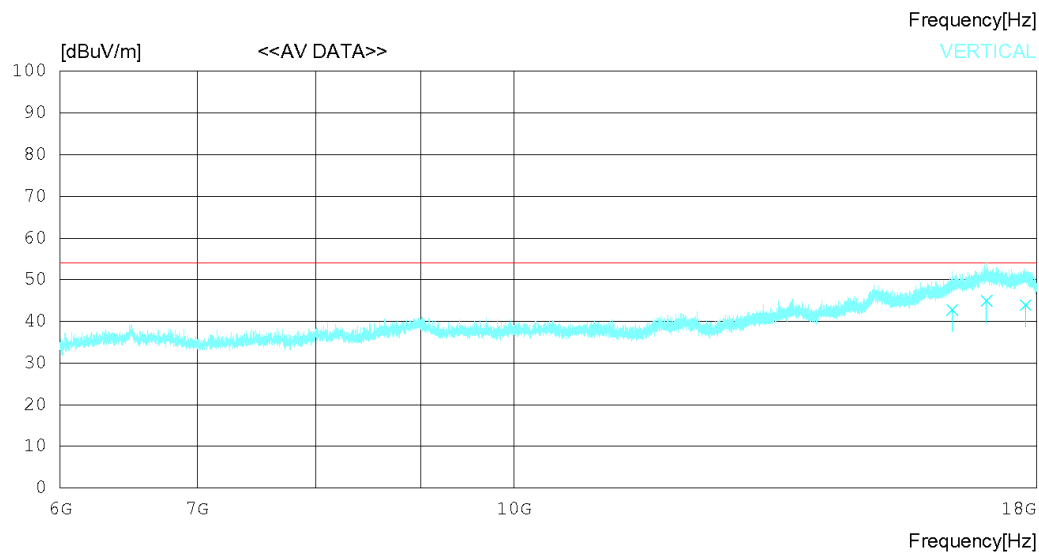
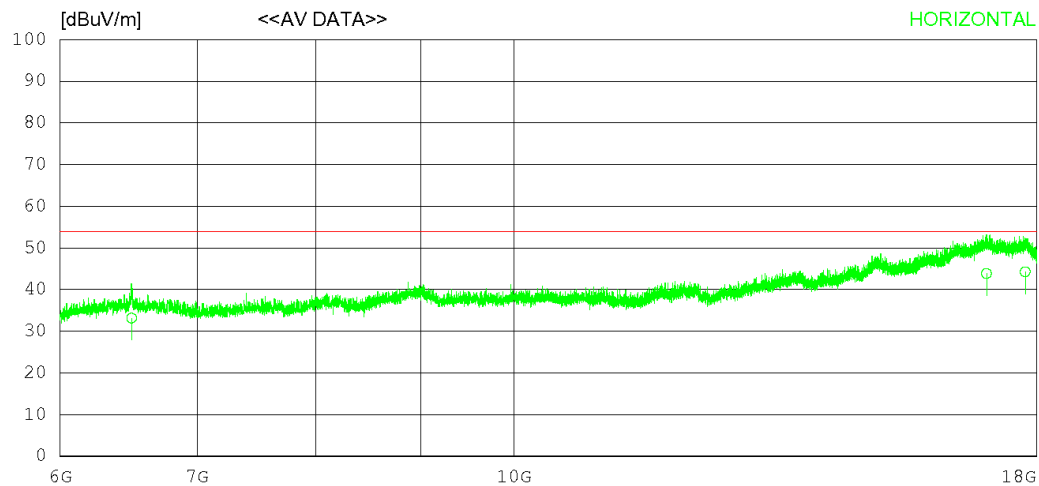
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition AM

Memo

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



## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition AM

Memo

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

| No.                    | FREQ      | READING       | ANT            | LOSS  | GAIN  | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|-----------|---------------|----------------|-------|-------|----------|----------|--------|---------|-------|
|                        | [MHz]     | CAV<br>[dBuV] | FACTOR<br>[dB] | [dB]  | [dB]  | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |           |               |                |       |       |          |          |        |         |       |
| 1                      | 6503.284  | 28.94         | 31.58          | 11.43 | 38.80 | 33.15    | 54.00    | 20.85  | 321     | 142   |
| 2                      | 17015.400 | 19.00         | 37.56          | 23.69 | 36.42 | 43.83    | 54.00    | 10.17  | 274     | 210   |
| 3                      | 17771.610 | 20.78         | 38.14          | 22.77 | 37.43 | 44.26    | 54.00    | 9.74   | 194     | 325   |
| ----- Vertical -----   |           |               |                |       |       |          |          |        |         |       |
| 4                      | 16372.030 | 20.36         | 36.84          | 21.74 | 36.18 | 42.76    | 54.00    | 11.24  | 134     | 320   |
| 5                      | 17016.240 | 20.12         | 37.56          | 23.68 | 36.42 | 44.94    | 54.00    | 9.06   | 158     | 202   |
| 6                      | 17772.010 | 20.46         | 38.14          | 22.76 | 37.44 | 43.92    | 54.00    | 10.08  | 167     | 184   |

| Radiated disturbance at (18 ~ 40) GHz _Peak measurement data |         |                     |   |
|--------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                      | 1       | EUT Operation mode  | 1 |
| Test voltage (V)                                             | DC 12 V | Test Frequency (Hz) | - |

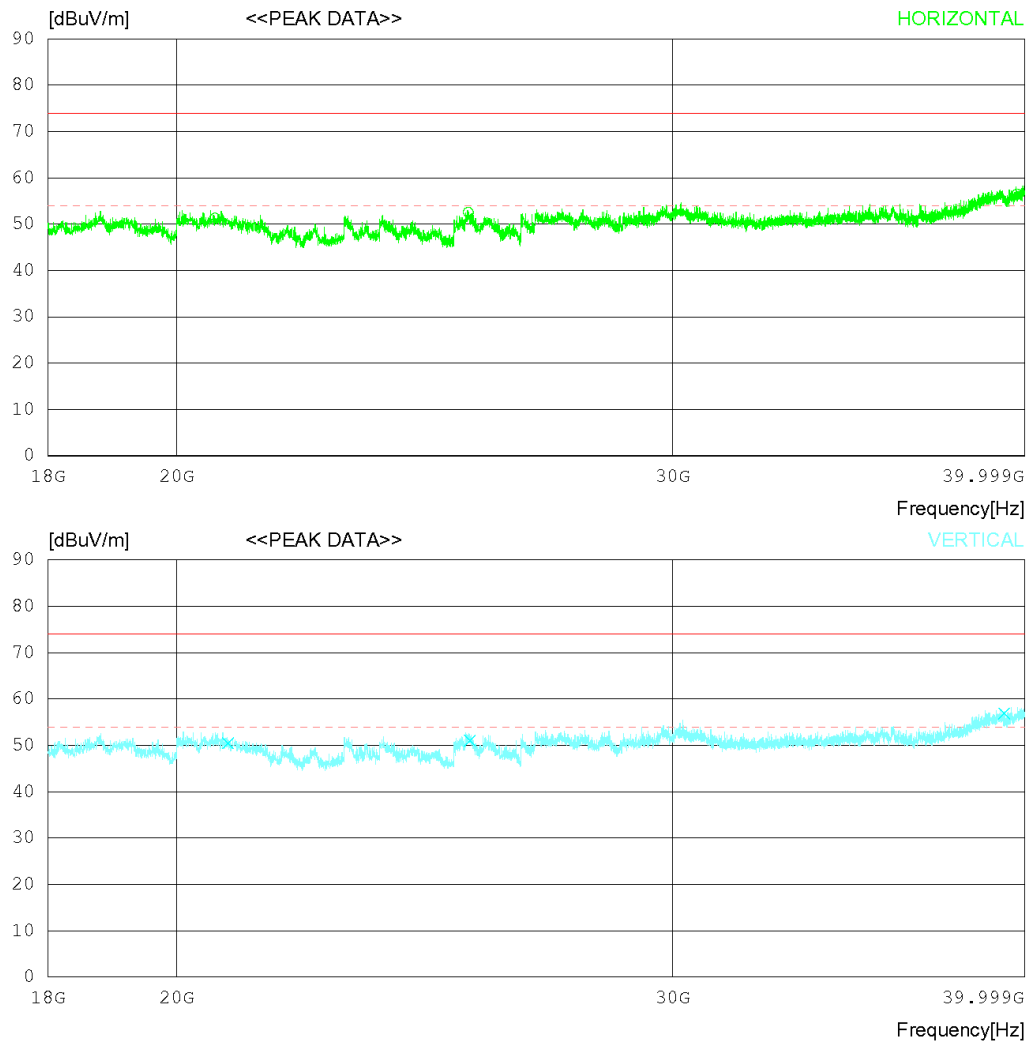
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition AM

Memo

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



## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 °C 42 % R.H.  
Test Condition AM

### Memo

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

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<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                      | 20634.500     | 39.30                     | 45.50                 | 19.81        | 53.29        | 51.32              | 74.0              | 22.68          | 154             | 358            |
| 2                      | 25383.750     | 39.60                     | 45.70                 | 20.90        | 53.68        | 52.52              | 74.0              | 21.48          | 321             | 271            |
| 3                      | 39749.750     | 35.20                     | 48.80                 | 24.68        | 52.21        | 56.47              | 74.0              | 17.53          | 213             | 186            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 4                      | 20849.000     | 38.00                     | 45.60                 | 20.23        | 53.38        | 50.45              | 74.0              | 23.55          | 132             | 0              |
| 5                      | 25411.250     | 38.10                     | 45.71                 | 20.91        | 53.68        | 51.04              | 74.0              | 22.96          | 120             | 138            |
| 6                      | 39329.000     | 35.80                     | 48.03                 | 25.30        | 52.23        | 56.90              | 74.0              | 17.1           | 189             | 0              |

| Radiated disturbance at (18 ~ 40) GHz _Average measurement data |         |                     |   |
|-----------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                         | 1       | EUT Operation mode  | 1 |
| Test voltage (V)                                                | DC 12 V | Test Frequency (Hz) | - |

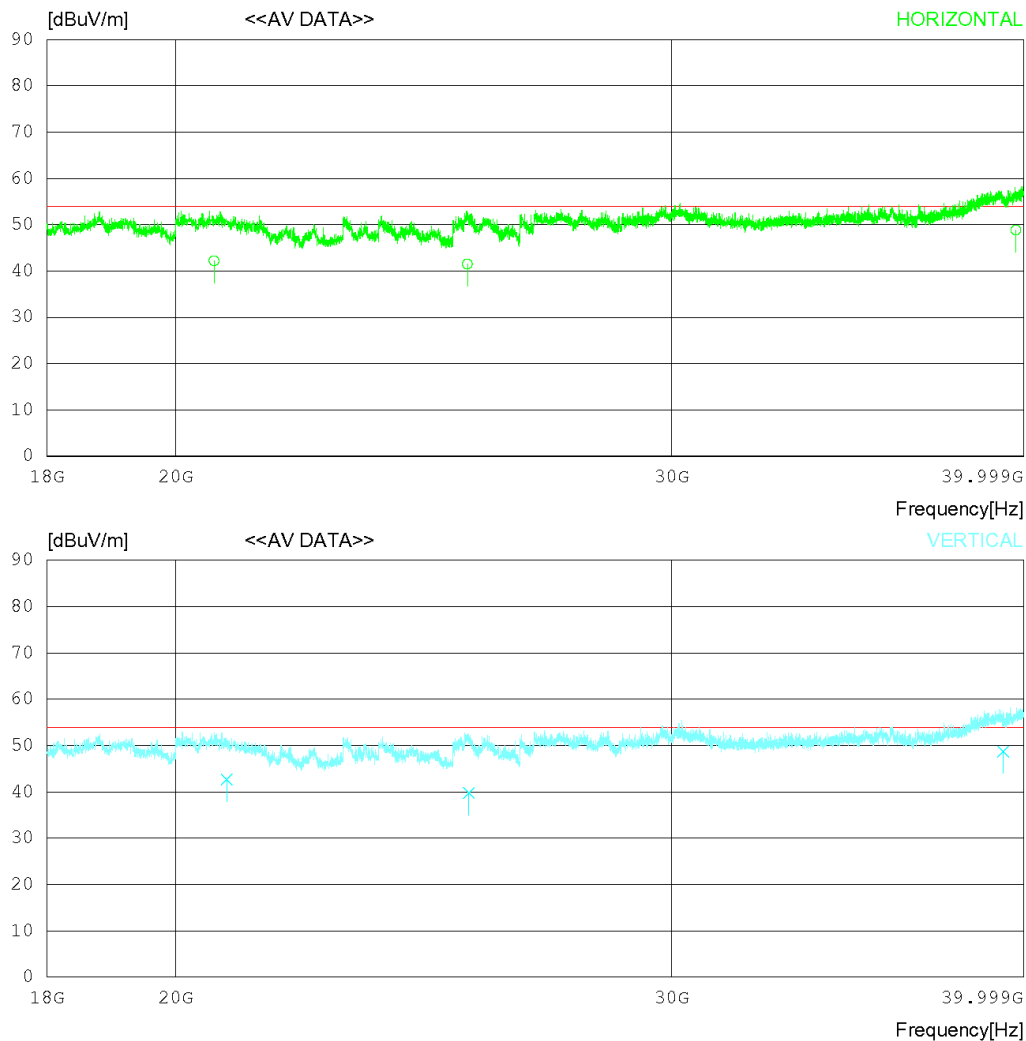
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition AM

Memo

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





## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition AM

Memo

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

| No.                    | FREQ      | READING       | ANT            | LOSS  | GAIN  | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|-----------|---------------|----------------|-------|-------|----------|----------|--------|---------|-------|
|                        | [MHz]     | CAV<br>[dBuV] | FACTOR<br>[dB] | [dB]  | [dB]  | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |           |               |                |       |       |          |          |        |         |       |
| 1                      | 20634.120 | 30.20         | 45.50          | 19.81 | 53.29 | 42.22    | 54.00    | 11.78  | 120     | 233   |
| 2                      | 25383.110 | 28.60         | 45.70          | 20.90 | 53.69 | 41.51    | 54.00    | 12.49  | 334     | 16    |
| 3                      | 39749.730 | 27.62         | 48.80          | 24.68 | 52.21 | 48.89    | 54.00    | 5.11   | 224     | 78    |
| ----- Vertical -----   |           |               |                |       |       |          |          |        |         |       |
| 4                      | 20849.020 | 30.20         | 45.60          | 20.23 | 53.38 | 42.65    | 54.00    | 11.35  | 120     | 124   |
| 5                      | 25411.210 | 26.80         | 45.71          | 20.91 | 53.68 | 39.74    | 54.00    | 14.26  | 243     | 78    |
| 6                      | 39329.070 | 27.62         | 48.03          | 25.30 | 52.23 | 48.72    | 54.00    | 5.28   | 322     | 302   |

| Radiated disturbance at (30 ~ 1000) MHz _Measurement data |         |                     |   |
|-----------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                   | 1       | EUT Operation mode  | 2 |
| Test voltage (V)                                          | DC 12 V | Test Frequency (Hz) | - |

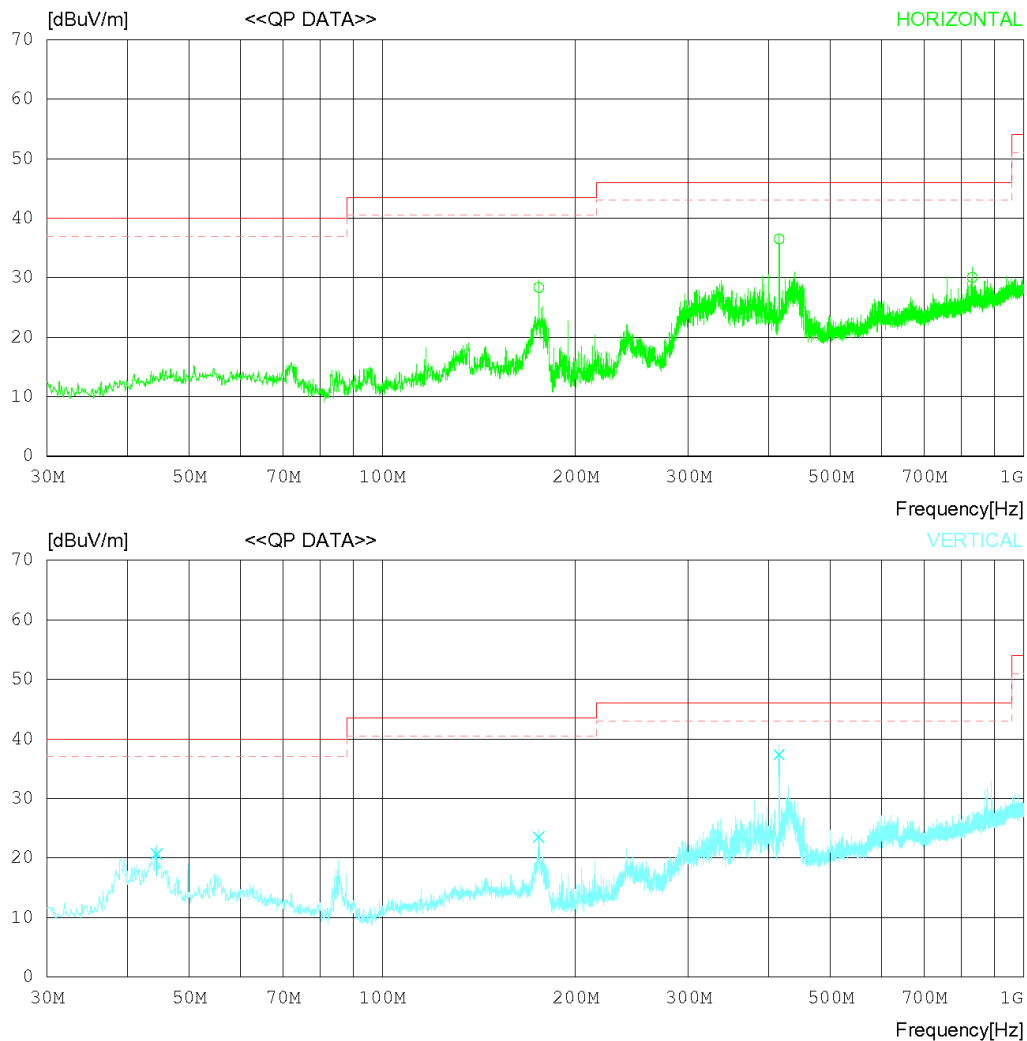
## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 18 'C 39 % R.H.  
Test Condition FM

Memo

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



## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 18 °C 39 % R.H.  
Test Condition FM

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                      | 175.375       | 35.17                   | 17.51                 | 1.30         | 25.63        | 28.35              | 43.50             | 15.15          | 237             | 32             |
| 2                      | 415.928       | 38.36                   | 21.90                 | 2.01         | 25.77        | 36.50              | 46.00             | 9.50           | 184             | 1              |
| 3                      | 831.520       | 24.06                   | 28.76                 | 2.96         | 25.75        | 30.03              | 46.00             | 15.97          | 194             | 359            |
| ----- Vertical -----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 4                      | 44.429        | 28.14                   | 17.64                 | 0.71         | 25.81        | 20.68              | 40.00             | 19.32          | 132             | 262            |
| 5                      | 175.375       | 30.33                   | 17.51                 | 1.30         | 25.63        | 23.51              | 43.50             | 19.99          | 209             | 178            |
| 6                      | 415.928       | 39.24                   | 21.90                 | 2.01         | 25.77        | 37.38              | 46.00             | 8.62           | 111             | 171            |

| Radiated disturbance at (1 ~ 6) GHz _Peak measurement data |         |                     |   |
|------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                    | 1       | EUT Operation mode  | 2 |
| Test voltage (V)                                           | DC 12 V | Test Frequency (Hz) | - |

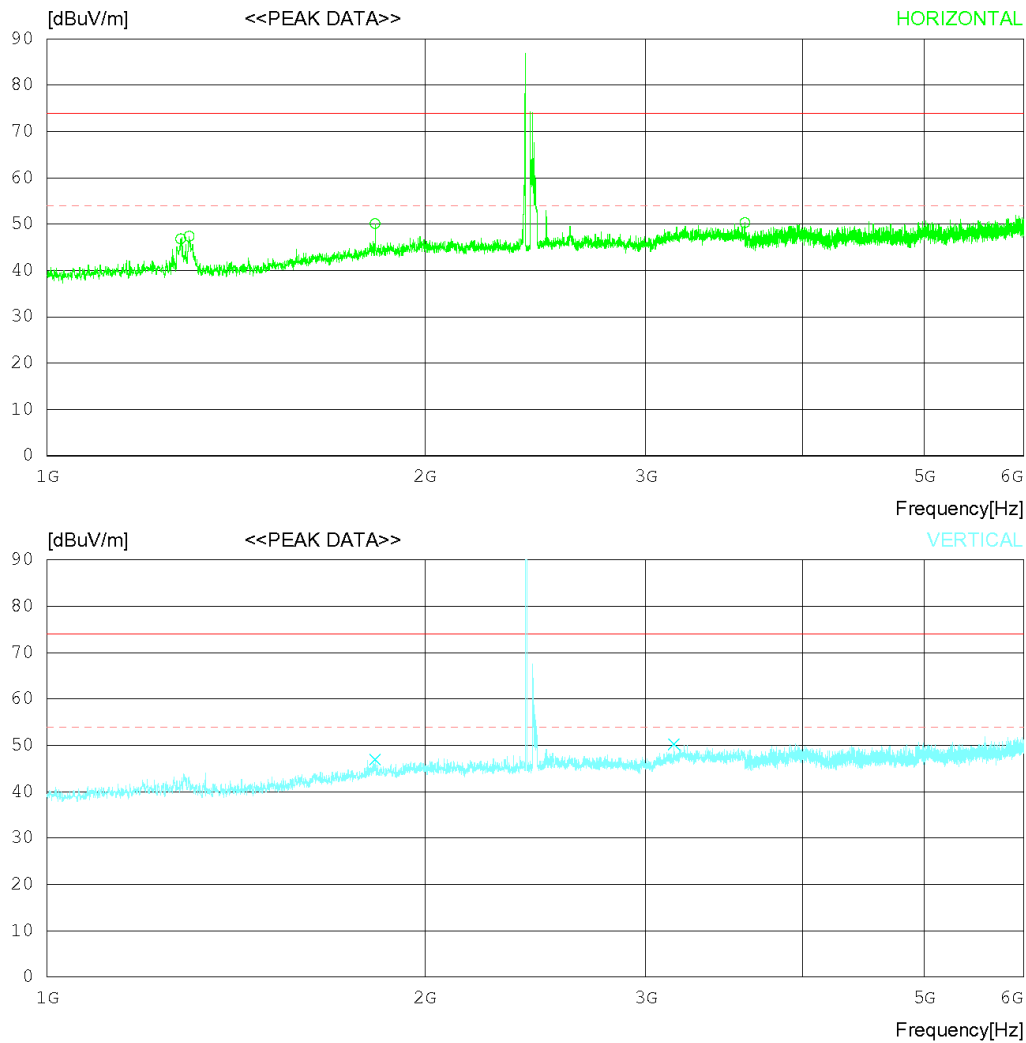
## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 18 'C 39 % R.H.  
Test Condition FM

Memo

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



\*Remark : (2,412 ~ 2,472) MHz is WIFI 2.4 G frequency.

## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 18°C 39 % R.H.  
Test Condition FM

Memo

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

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<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                      | 1278.125      | 48.40                     | 28.76                 | 5.06         | 35.36        | 46.86              | 74.0              | 27.14          | 165             | 1              |
| 2                      | 1298.125      | 48.80                     | 28.80                 | 5.13         | 35.33        | 47.40              | 74.0              | 26.6           | 232             | 216            |
| 3                      | 1825.625      | 47.20                     | 30.50                 | 7.02         | 34.59        | 50.13              | 74.0              | 23.87          | 137             | 359            |
| 4                      | 3598.125      | 42.70                     | 33.48                 | 8.24         | 34.10        | 50.32              | 74.0              | 23.68          | 230             | 211            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 5                      | 1825.625      | 44.00                     | 30.50                 | 7.02         | 34.59        | 46.93              | 74.0              | 27.07          | 201             | 358            |
| 6                      | 3159.375      | 43.60                     | 33.04                 | 8.31         | 34.71        | 50.24              | 74.0              | 23.76          | 164             | 140            |

| Radiated disturbance at (1 ~ 6) GHz _Average measurement data |         |                     |   |
|---------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                       | 1       | EUT Operation mode  | 2 |
| Test voltage (V)                                              | DC 12 V | Test Frequency (Hz) | - |

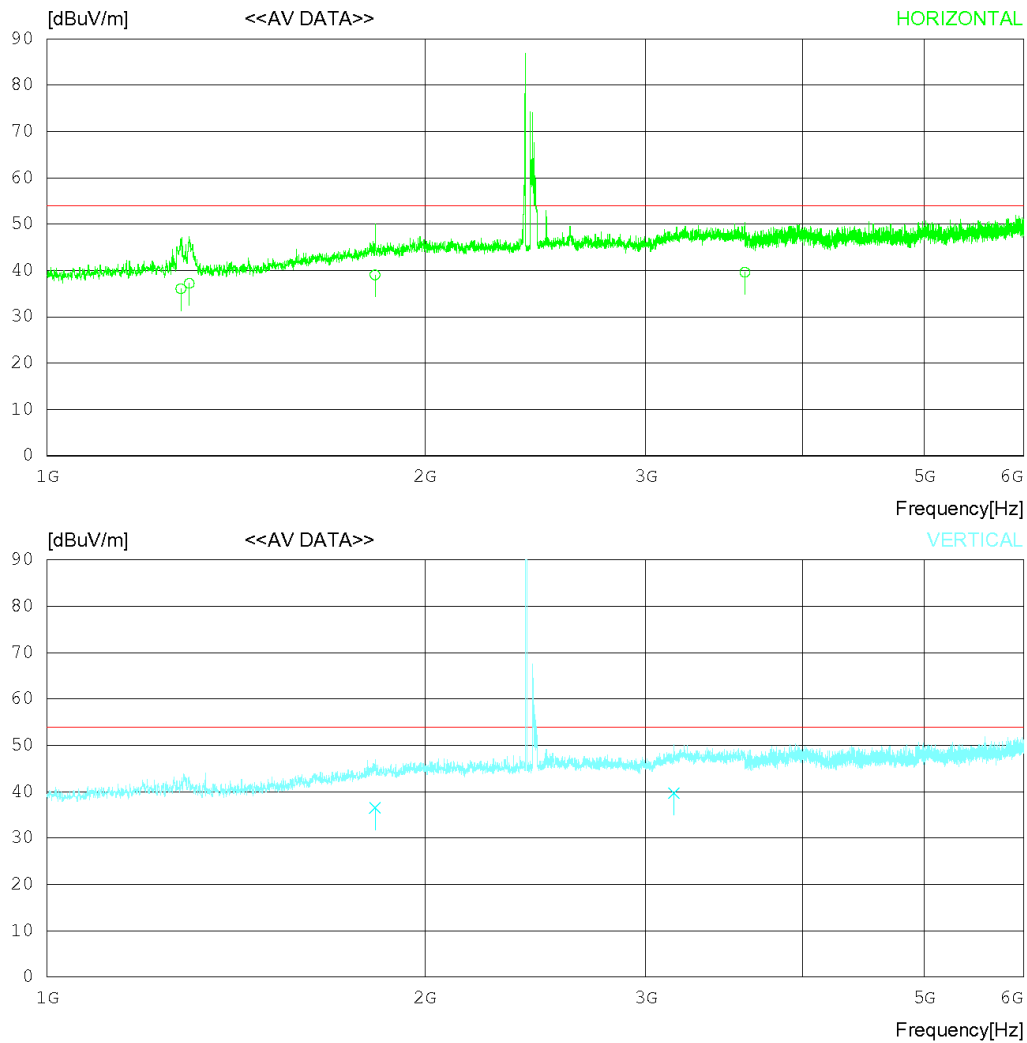
## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 18 'C 39 % R.H.  
Test Condition FM

Memo

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



\*Remark : (2,412 ~ 2,472) MHz is WIFI 2.4 G frequency.

## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 18 °C 39 % R.H.  
Test Condition FM

Memo

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

| No.                    | FREQ     | READING       | ANT            | LOSS | GAIN  | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|----------|---------------|----------------|------|-------|----------|----------|--------|---------|-------|
|                        | [MHz]    | CAV<br>[dBuV] | FACTOR<br>[dB] | [dB] | [dB]  | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |          |               |                |      |       |          |          |        |         |       |
| 1                      | 1278.323 | 37.62         | 28.76          | 5.06 | 35.36 | 36.08    | 54.00    | 17.92  | 132     | 32    |
| 2                      | 1298.324 | 38.64         | 28.80          | 5.13 | 35.33 | 37.24    | 54.00    | 16.76  | 262     | 202   |
| 3                      | 1825.304 | 36.09         | 30.50          | 7.02 | 34.59 | 39.02    | 54.00    | 14.98  | 154     | 340   |
| 4                      | 3598.074 | 32.01         | 33.48          | 8.24 | 34.10 | 39.63    | 54.00    | 14.37  | 280     | 202   |
| ----- Vertical -----   |          |               |                |      |       |          |          |        |         |       |
| 5                      | 1825.323 | 33.65         | 30.50          | 7.02 | 34.59 | 36.58    | 54.00    | 17.42  | 132     | 323   |
| 6                      | 3159.625 | 33.06         | 33.04          | 8.31 | 34.71 | 39.70    | 54.00    | 14.30  | 202     | 132   |

| Radiated disturbance at (6 ~ 18) GHz _Peak measurement data |         |                     |   |
|-------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                     | 1       | EUT Operation mode  | 2 |
| Test voltage (V)                                            | DC 12 V | Test Frequency (Hz) | - |

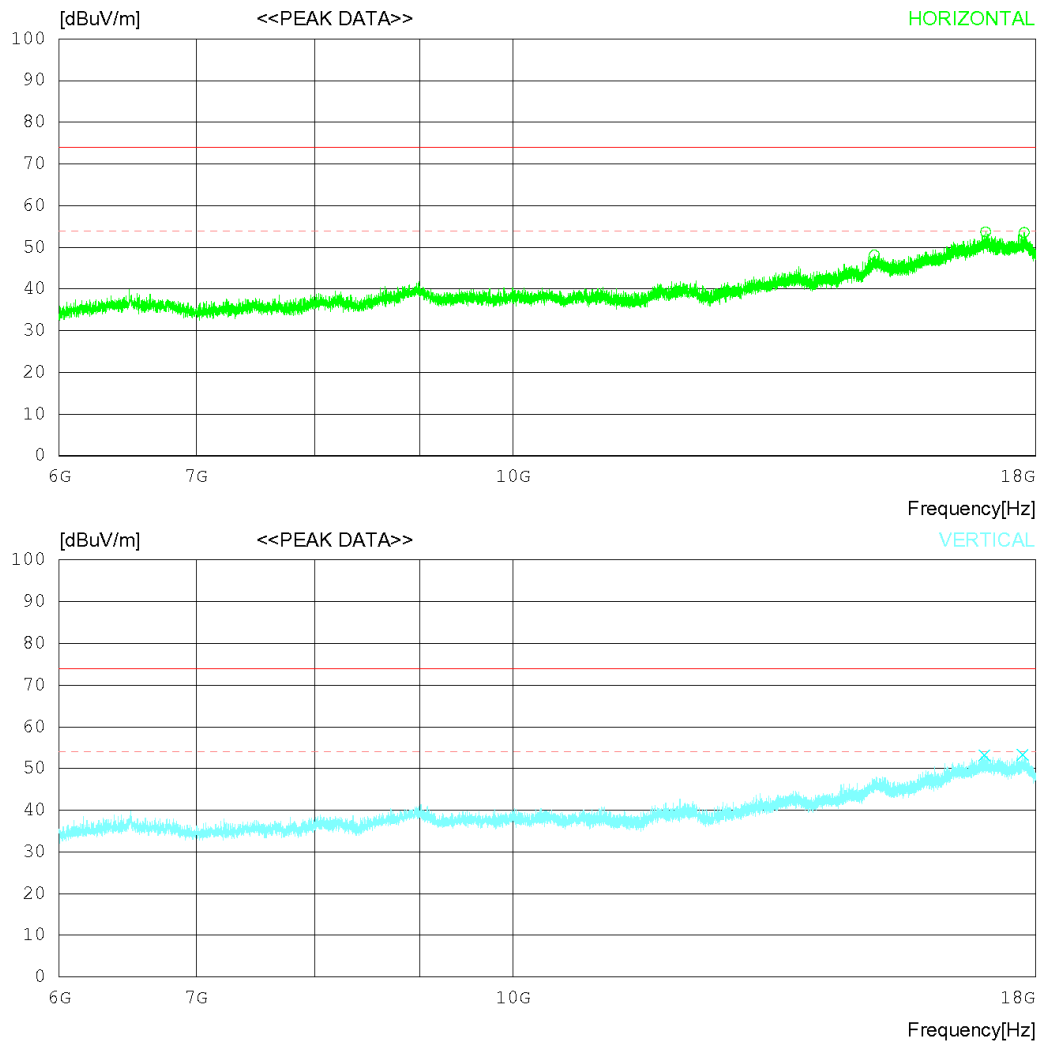
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition FM

Memo

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





## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 °C 42 % R.H.  
Test Condition FM

Memo

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

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<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                      | 15014.250     | 29.00                     | 35.46                 | 20.68        | 36.99        | 48.15              | 74.0              | 25.85          | 312             | 353            |
| 2                      | 17018.250     | 28.90                     | 37.56                 | 23.67        | 36.42        | 53.71              | 74.0              | 20.29          | 220             | 358            |
| 3                      | 17773.500     | 30.10                     | 38.15                 | 22.76        | 37.44        | 53.57              | 74.0              | 20.43          | 121             | 358            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 4                      | 16992.000     | 28.30                     | 37.54                 | 23.74        | 36.40        | 53.18              | 74.0              | 20.82          | 267             | 358            |
| 5                      | 17738.250     | 29.80                     | 38.12                 | 22.71        | 37.38        | 53.25              | 74.0              | 20.75          | 156             | 358            |

| Radiated disturbance at (6 ~ 18) GHz _Average measurement data |         |                     |   |
|----------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                        | 1       | EUT Operation mode  | 2 |
| Test voltage (V)                                               | DC 12 V | Test Frequency (Hz) | - |

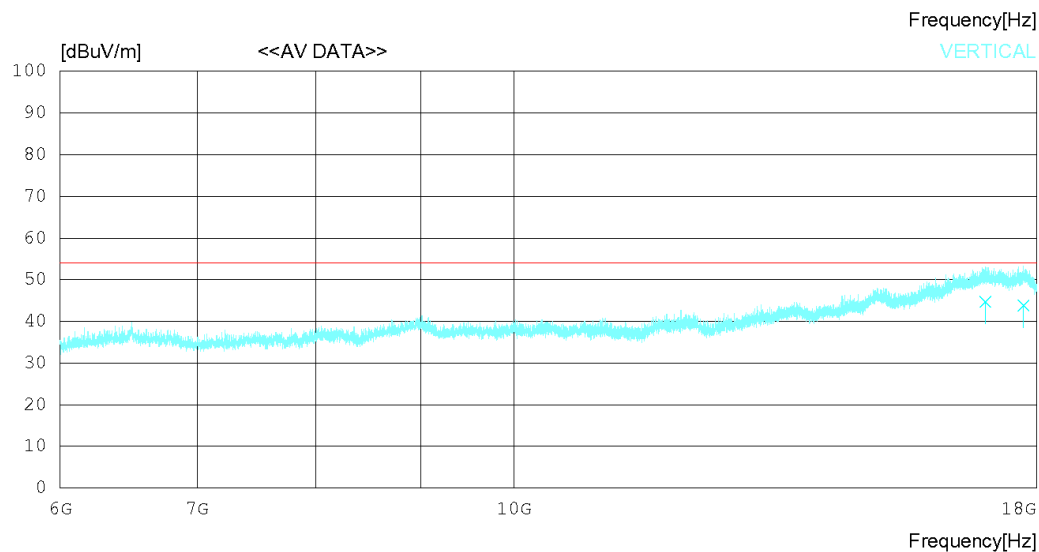
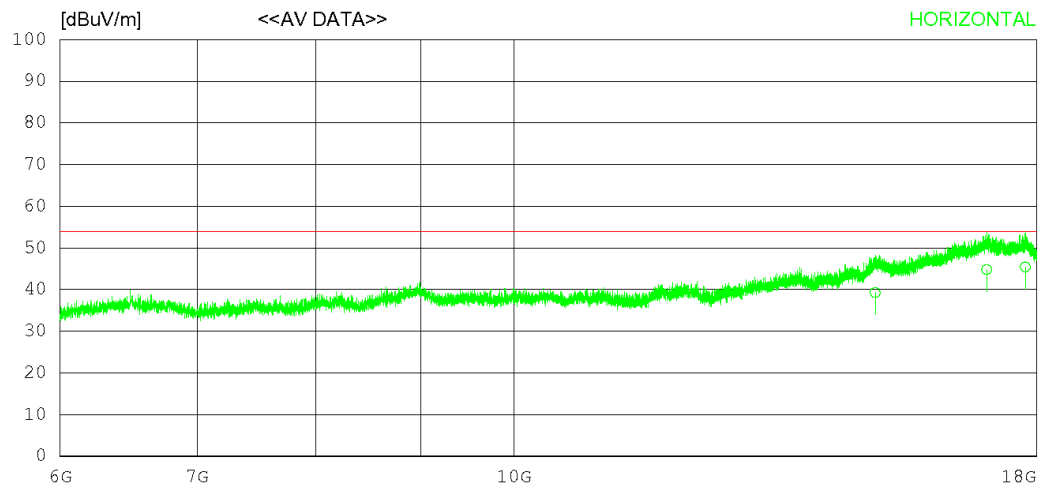
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition FM

Memo

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



## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition FM

Memo

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

| No.                    | FREQ      | READING       | ANT            | LOSS  | GAIN  | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|-----------|---------------|----------------|-------|-------|----------|----------|--------|---------|-------|
|                        | [MHz]     | CAV<br>[dBuV] | FACTOR<br>[dB] | [dB]  | [dB]  | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |           |               |                |       |       |          |          |        |         |       |
| 1                      | 15013.250 | 20.14         | 35.46          | 20.68 | 36.99 | 39.29    | 54.00    | 14.71  | 235     | 135   |
| 2                      | 17018.370 | 20.02         | 37.56          | 23.66 | 36.42 | 44.82    | 54.00    | 9.18   | 184     | 248   |
| 3                      | 17773.950 | 21.95         | 38.15          | 22.76 | 37.44 | 45.42    | 54.00    | 8.58   | 167     | 329   |
| ----- Vertical -----   |           |               |                |       |       |          |          |        |         |       |
| 4                      | 16992.350 | 19.84         | 37.54          | 23.74 | 36.40 | 44.72    | 54.00    | 9.28   | 134     | 251   |
| 5                      | 17737.360 | 20.36         | 38.12          | 22.70 | 37.38 | 43.80    | 54.00    | 10.20  | 169     | 320   |

| Radiated disturbance at (18 ~ 40) GHz _Peak measurement data |         |                     |   |
|--------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                      | 1       | EUT Operation mode  | 2 |
| Test voltage (V)                                             | DC 12 V | Test Frequency (Hz) | - |

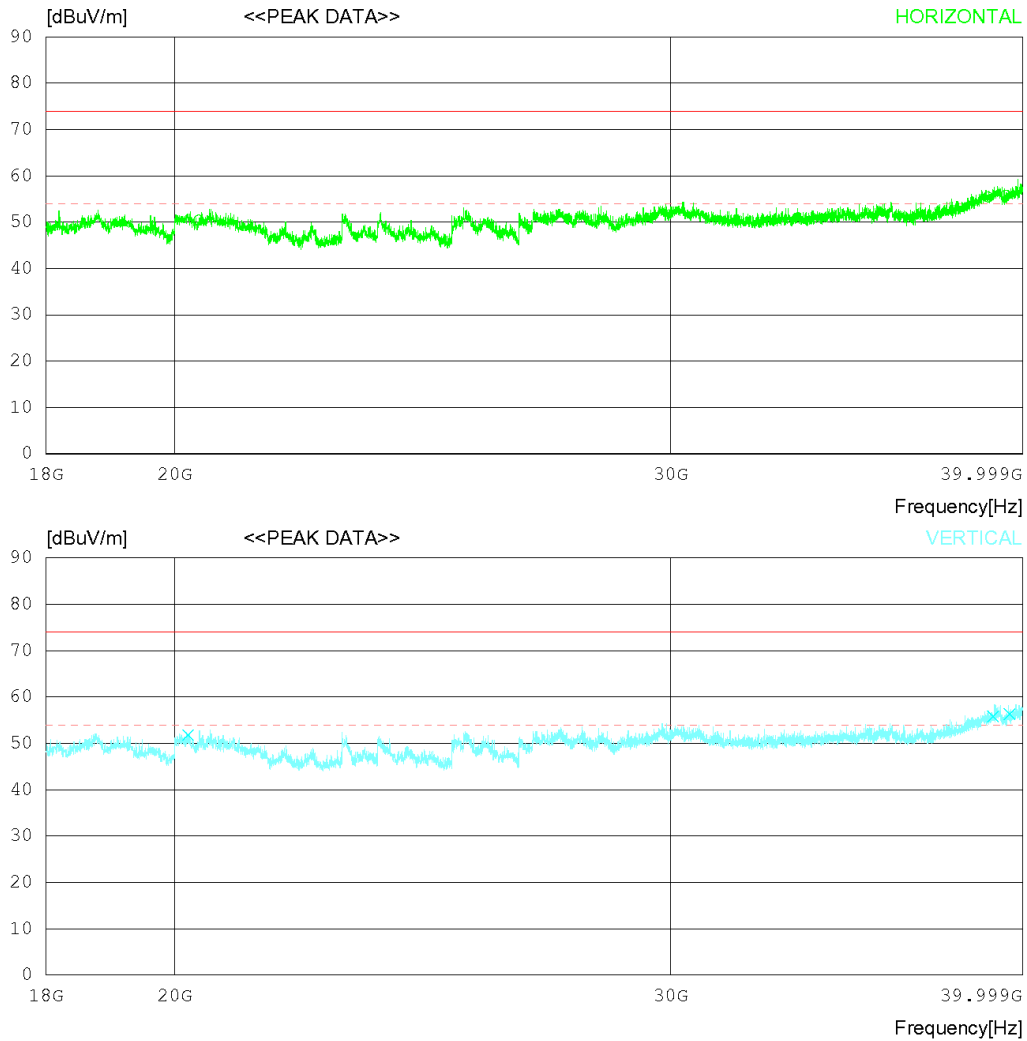
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition FM

Memo

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



## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 21°C 42% R.H.  
Test Condition FM

Memo

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

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<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                      | 20395.250     | 38.90                     | 45.40                 | 19.35        | 53.18        | 50.47              | 74.0              | 23.53          | 320             | 359            |
| 2                      | 38886.250     | 34.60                     | 47.47                 | 25.64        | 52.26        | 55.45              | 74.0              | 18.55          | 147             | 9              |
| 3                      | 39455.500     | 34.70                     | 48.21                 | 25.11        | 52.23        | 55.79              | 74.0              | 18.21          | 220             | 292            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 4                      | 20216.500     | 40.60                     | 45.30                 | 19.00        | 53.10        | 51.80              | 74.0              | 22.2           | 154             | 85             |
| 5                      | 39034.750     | 34.70                     | 47.63                 | 25.73        | 52.25        | 55.81              | 74.0              | 18.19          | 165             | 349            |
| 6                      | 39576.500     | 35.20                     | 48.45                 | 24.93        | 52.22        | 56.36              | 74.0              | 17.64          | 167             | 0              |

| Radiated disturbance at (18 ~ 40) GHz _Average measurement data |         |                     |   |
|-----------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                         | 1       | EUT Operation mode  | 2 |
| Test voltage (V)                                                | DC 12 V | Test Frequency (Hz) | - |

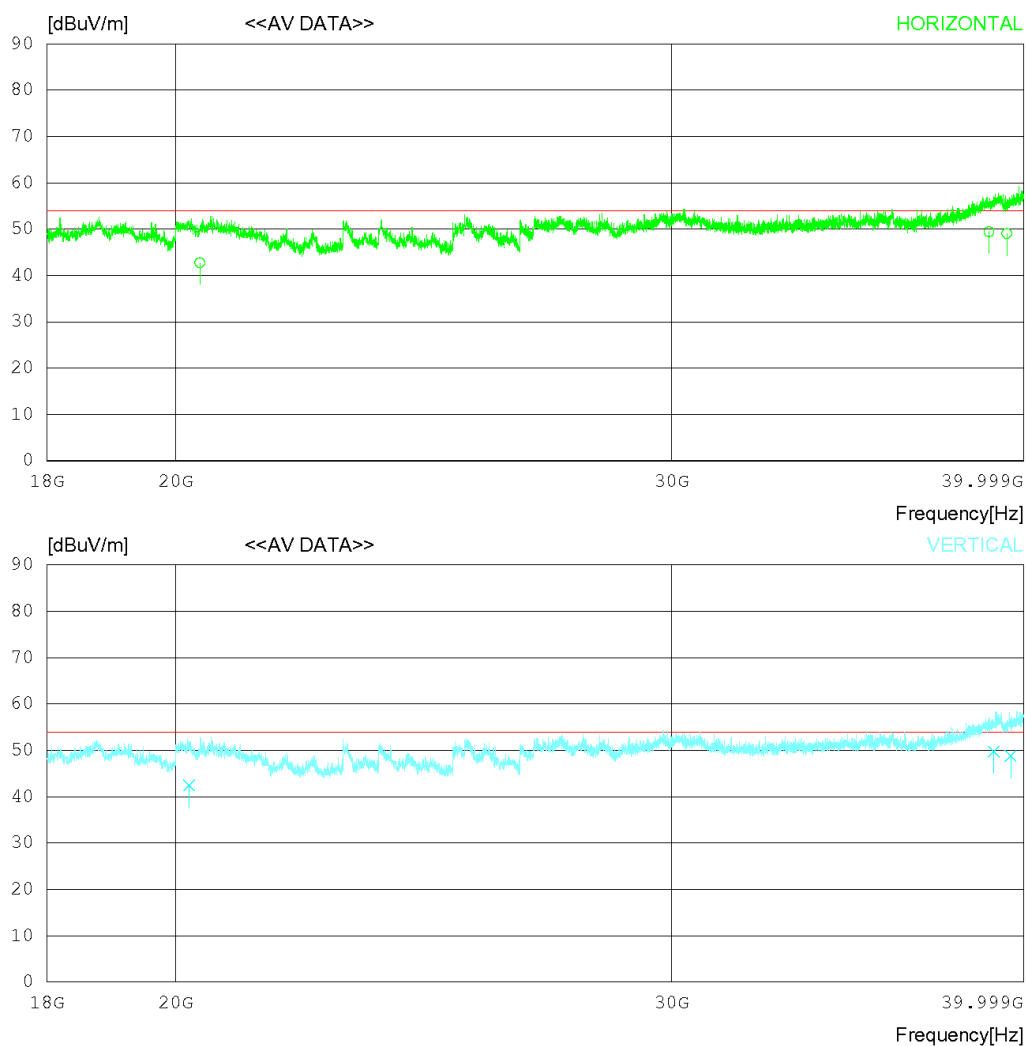
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition FM

Memo

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



## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition FM

### Memo

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

| No.                    | FREQ      | READING       | ANT            | LOSS  | GAIN  | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|-----------|---------------|----------------|-------|-------|----------|----------|--------|---------|-------|
|                        | [MHz]     | CAV<br>[dBuV] | FACTOR<br>[dB] | [dB]  | [dB]  | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |           |               |                |       |       |          |          |        |         |       |
| 1                      | 20395.210 | 31.20         | 45.40          | 19.35 | 53.18 | 42.77    | 54.00    | 11.23  | 120     | 124   |
| 2                      | 38886.420 | 28.62         | 47.47          | 25.65 | 52.26 | 49.48    | 54.00    | 4.52   | 223     | 232   |
| 3                      | 39455.580 | 27.99         | 48.21          | 25.11 | 52.23 | 49.08    | 54.00    | 4.92   | 371     | 214   |
| ----- Vertical -----   |           |               |                |       |       |          |          |        |         |       |
| 4                      | 20216.420 | 31.26         | 45.30          | 19.00 | 53.10 | 42.46    | 54.00    | 11.54  | 120     | 158   |
| 5                      | 39034.710 | 28.62         | 47.63          | 25.73 | 52.25 | 49.73    | 54.00    | 4.27   | 235     | 166   |
| 6                      | 39576.240 | 27.66         | 48.45          | 24.93 | 52.22 | 48.82    | 54.00    | 5.18   | 178     | 263   |

| Radiated disturbance at (30 ~ 1000) MHz _Measurement data |         |                     |   |
|-----------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                   | 2       | EUT Operation mode  | 3 |
| Test voltage (V)                                          | DC 12 V | Test Frequency (Hz) | - |

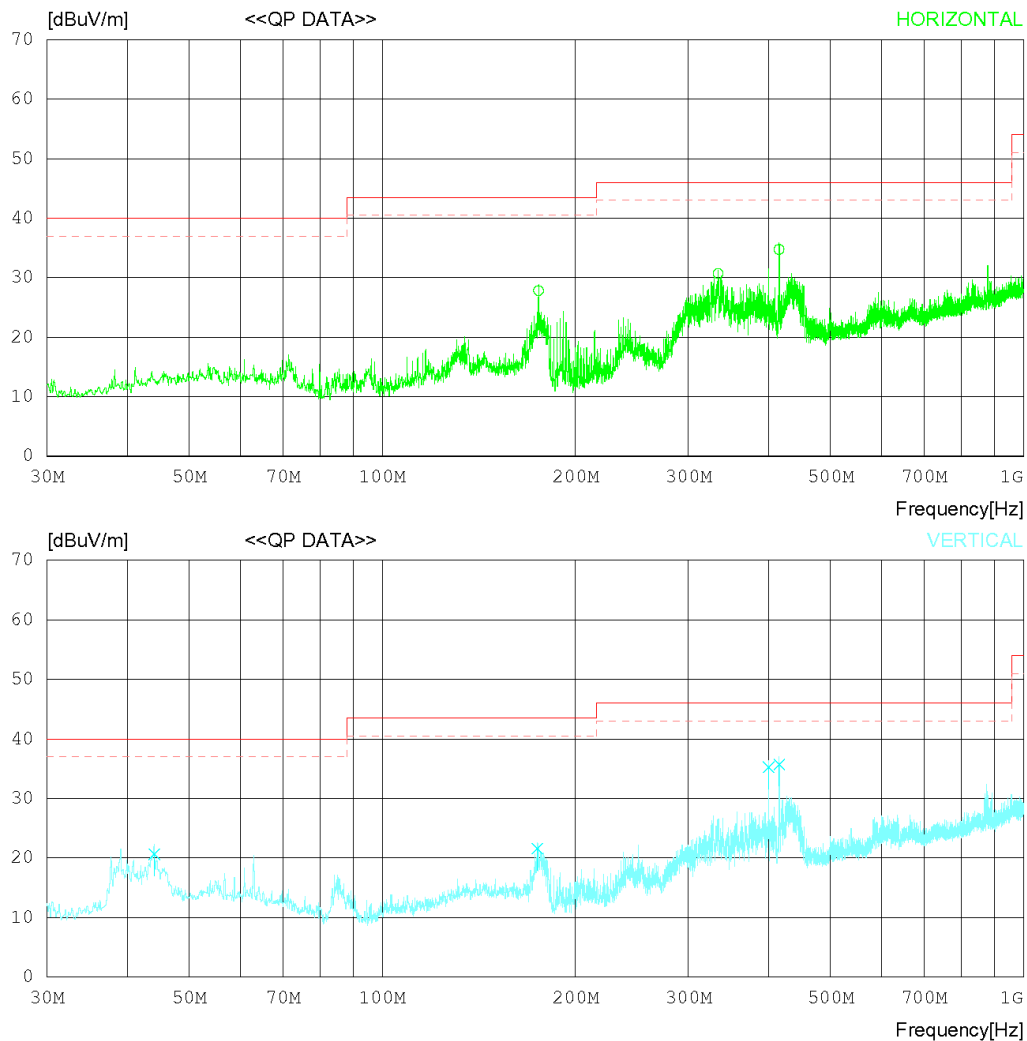
## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 18 'C 39 % R.H.  
Test Condition USB

Memo

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





## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 18 °C 39 % R.H.  
Test Condition USB

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                      | 175.254       | 34.62                   | 17.52                 | 1.30         | 25.63        | 27.81              | 43.50             | 15.69          | 236             | 257            |
| 2                      | 334.087       | 34.92                   | 19.88                 | 1.79         | 25.88        | 30.71              | 46.00             | 15.29          | 201             | 251            |
| 3                      | 415.928       | 36.61                   | 21.90                 | 2.01         | 25.77        | 34.75              | 46.00             | 11.25          | 154             | 358            |
| ----- Vertical -----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 4                      | 44.065        | 28.12                   | 17.61                 | 0.71         | 25.81        | 20.63              | 40.00             | 19.37          | 134             | 1              |
| 5                      | 174.527       | 28.33                   | 17.60                 | 1.30         | 25.64        | 21.59              | 43.50             | 21.91          | 237             | 358            |
| 6                      | 399.924       | 37.61                   | 21.50                 | 1.98         | 25.84        | 35.25              | 46.00             | 10.75          | 124             | 54             |
| 7                      | 415.928       | 37.62                   | 21.90                 | 2.01         | 25.77        | 35.76              | 46.00             | 10.24          | 106             | 18             |

| Radiated disturbance at (1 ~ 6) GHz _Peak measurement data |         |                     |   |
|------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                    | 2       | EUT Operation mode  | 3 |
| Test voltage (V)                                           | DC 12 V | Test Frequency (Hz) | - |

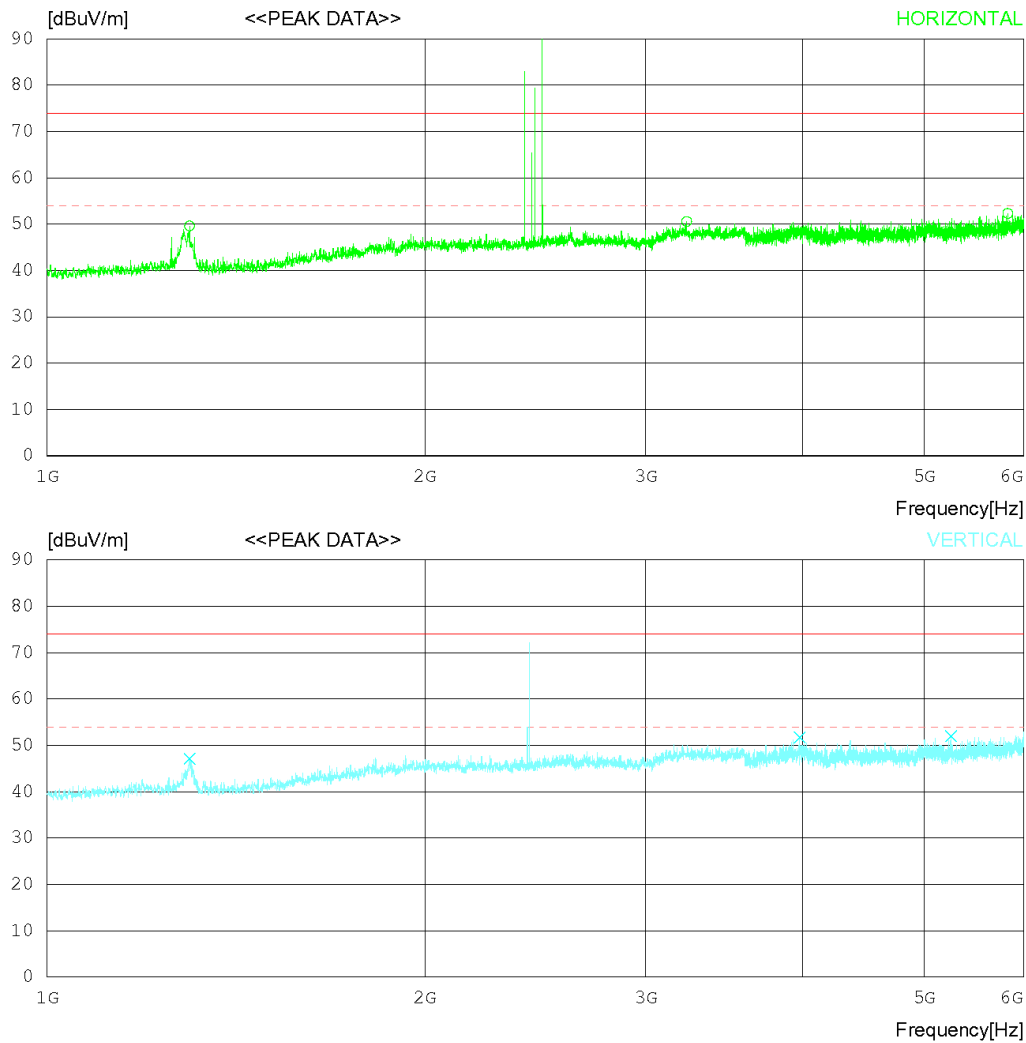
## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 18 'C 39 % R.H.  
Test Condition USB

Memo

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



\*Remark : (2,402 ~ 2,480) MHz is BT frequency.

## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 18°C 39 % R.H.  
Test Condition USB

Memo

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

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<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                      | 1298.750      | 51.00                     | 28.80                 | 5.14         | 35.33        | 49.61              | 74.0              | 24.39          | 107             | 358            |
| 2                      | 3234.375      | 43.60                     | 33.06                 | 8.54         | 34.60        | 50.60              | 74.0              | 23.4           | 224             | 96             |
| 3                      | 5830.000      | 41.30                     | 34.82                 | 11.19        | 34.98        | 52.33              | 74.0              | 21.67          | 197             | 267            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 4                      | 1299.375      | 48.50                     | 28.80                 | 5.14         | 35.33        | 47.11              | 74.0              | 26.89          | 267             | 1              |
| 5                      | 3978.125      | 42.30                     | 33.30                 | 9.67         | 33.57        | 51.70              | 74.0              | 22.3           | 304             | 1              |
| 6                      | 5254.375      | 42.20                     | 34.31                 | 10.37        | 34.90        | 51.98              | 74.0              | 22.02          | 107             | 1              |

| Radiated disturbance at (1 ~ 6) GHz _Average measurement data |         |                     |   |
|---------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                       | 2       | EUT Operation mode  | 3 |
| Test voltage (V)                                              | DC 12 V | Test Frequency (Hz) | - |

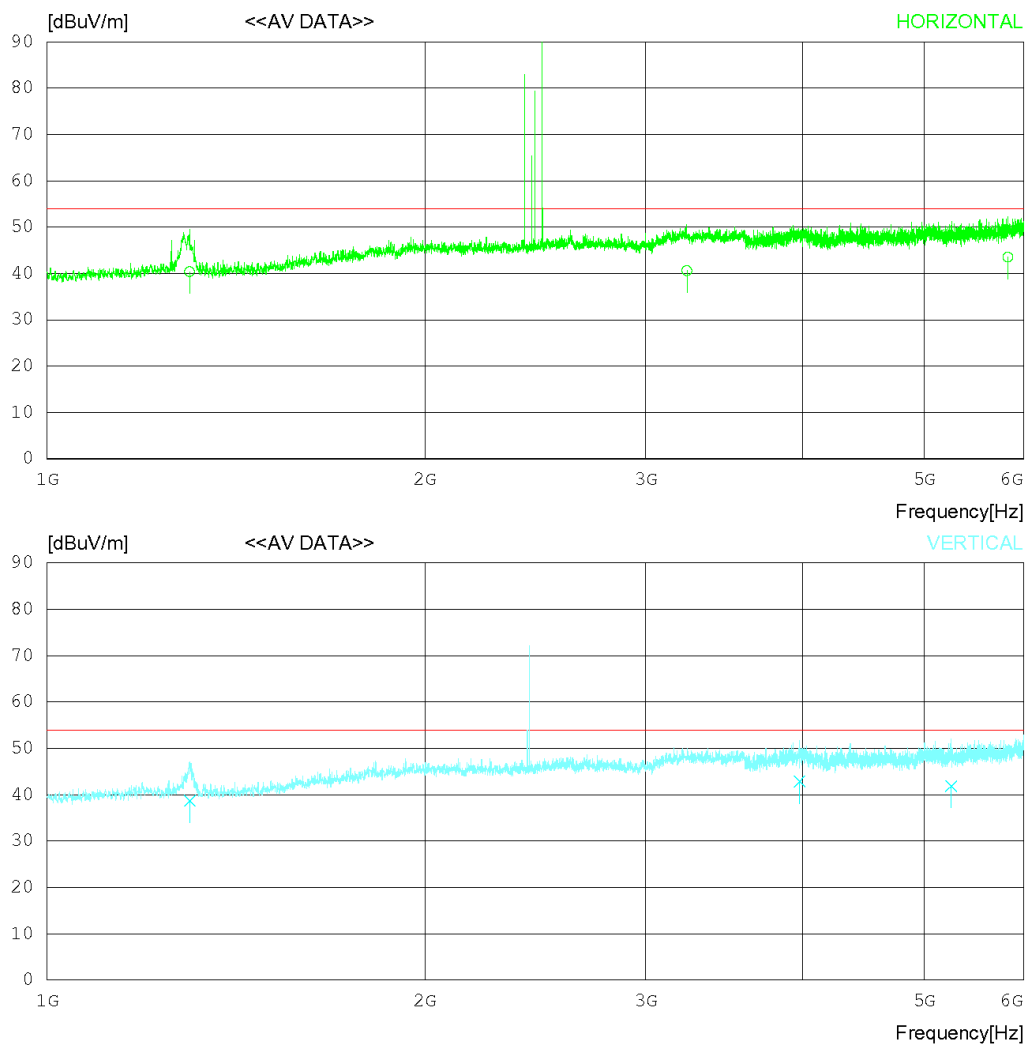
## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 18 'C 39 % R.H.  
Test Condition USB

Memo

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



\*Remark : (2,402 ~ 2,480) MHz is BT frequency.

## RADIATED EMISSION

Date 2020-03-20

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 18 °C 39 % R.H.  
Test Condition USB

Memo

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

| No.                    | FREQ     | READING       | ANT            | LOSS  | GAIN  | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|----------|---------------|----------------|-------|-------|----------|----------|--------|---------|-------|
|                        | [MHz]    | CAV<br>[dBuV] | FACTOR<br>[dB] | [dB]  | [dB]  | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |          |               |                |       |       |          |          |        |         |       |
| 1                      | 1298.657 | 41.80         | 28.80          | 5.14  | 35.33 | 40.41    | 54.00    | 13.59  | 104     | 358   |
| 2                      | 3234.787 | 33.60         | 33.06          | 8.54  | 34.60 | 40.60    | 54.00    | 13.40  | 207     | 137   |
| 3                      | 5830.278 | 32.50         | 34.82          | 11.19 | 34.98 | 43.53    | 54.00    | 10.47  | 102     | 299   |
| ----- Vertical -----   |          |               |                |       |       |          |          |        |         |       |
| 4                      | 1299.663 | 40.10         | 28.80          | 5.14  | 35.33 | 38.71    | 54.00    | 15.29  | 169     | 56    |
| 5                      | 3978.368 | 33.50         | 33.30          | 9.67  | 33.57 | 42.90    | 54.00    | 11.10  | 187     | 37    |
| 6                      | 5254.678 | 32.10         | 34.31          | 10.37 | 34.90 | 41.88    | 54.00    | 12.12  | 335     | 56    |

| Radiated disturbance at (6 ~ 18) GHz _Peak measurement data |         |                     |   |
|-------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                     | 2       | EUT Operation mode  | 3 |
| Test voltage (V)                                            | DC 12 V | Test Frequency (Hz) | - |

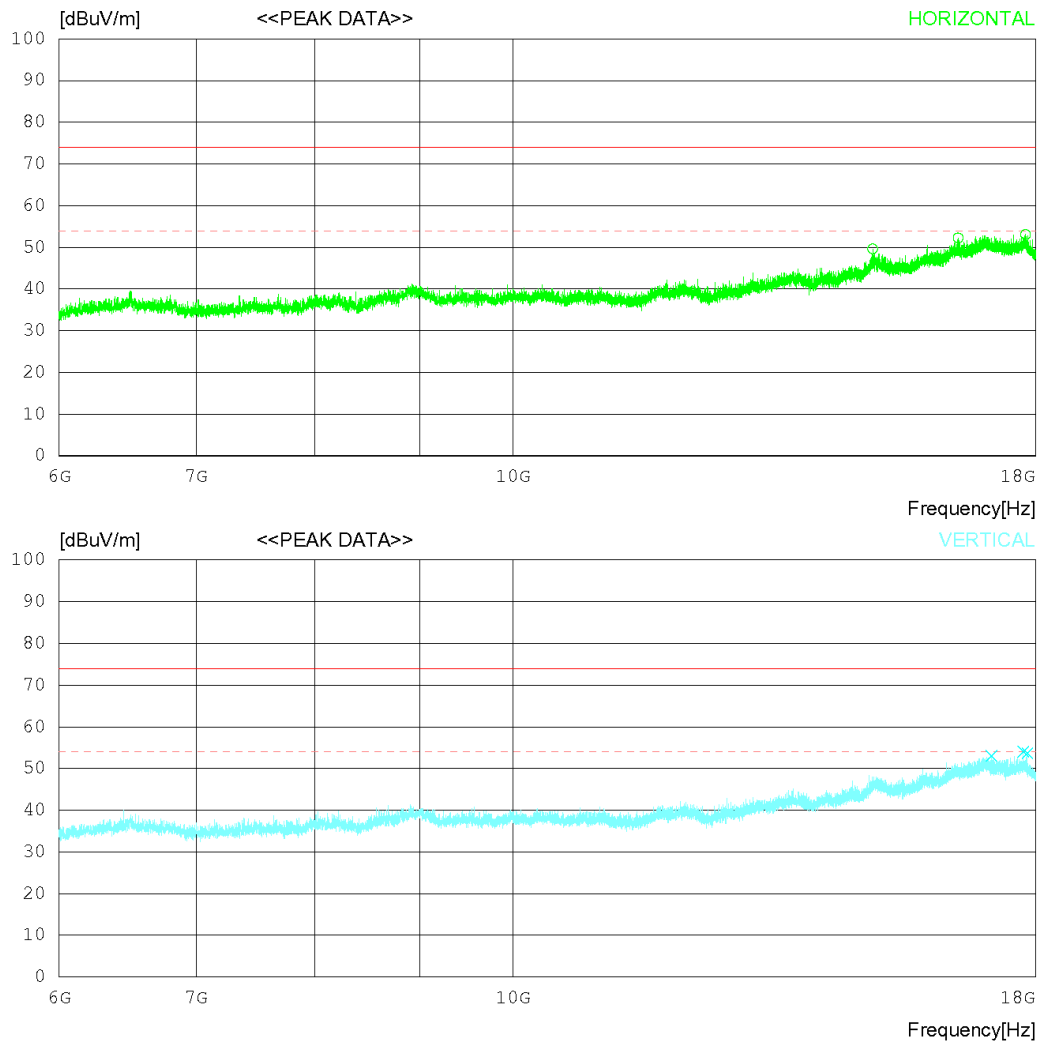
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition USB

Memo

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



## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 21°C 42% R.H.  
Test Condition USB

Memo

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

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<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                      | 14987.250     | 30.60                     | 35.43                 | 20.61        | 37.02        | 49.62              | 74.0              | 24.38          | 256             | 358            |
| 2                      | 16501.500     | 29.50                     | 36.99                 | 21.86        | 36.10        | 52.25              | 74.0              | 21.75          | 340             | 358            |
| 3                      | 17802.000     | 29.60                     | 38.17                 | 22.80        | 37.48        | 53.09              | 74.0              | 20.91          | 103             | 358            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 4                      | 17130.000     | 29.20                     | 37.65                 | 22.78        | 36.56        | 53.07              | 74.0              | 20.93          | 358             | 39             |
| 5                      | 17751.000     | 30.60                     | 38.13                 | 22.73        | 37.40        | 54.06              | 74.0              | 19.94          | 124             | 229            |
| 6                      | 17836.500     | 30.40                     | 38.19                 | 22.62        | 37.54        | 53.67              | 74.0              | 20.33          | 168             | 358            |

| Radiated disturbance at (6 ~ 18) GHz _Average measurement data |         |                     |   |
|----------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                        | 2       | EUT Operation mode  | 3 |
| Test voltage (V)                                               | DC 12 V | Test Frequency (Hz) | - |

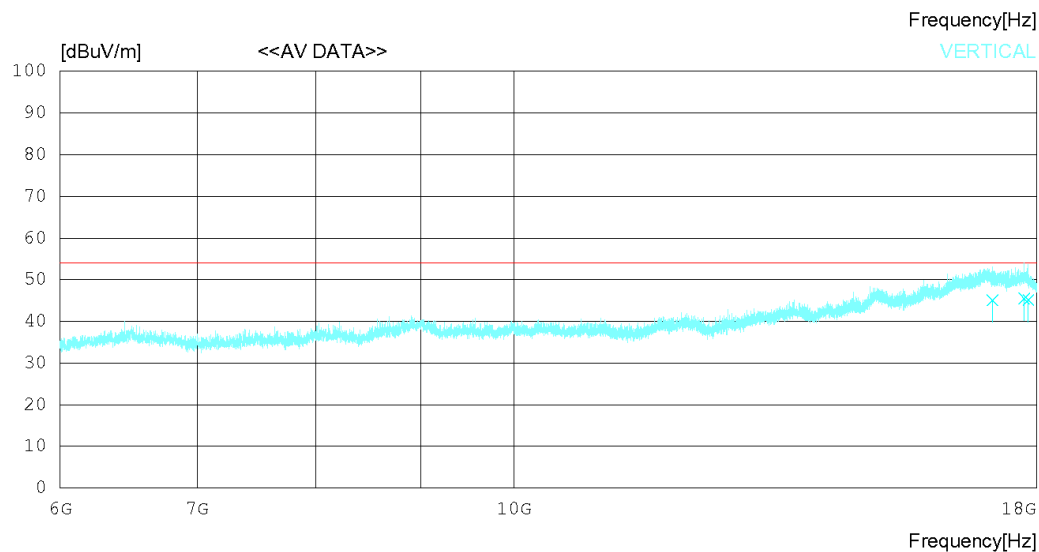
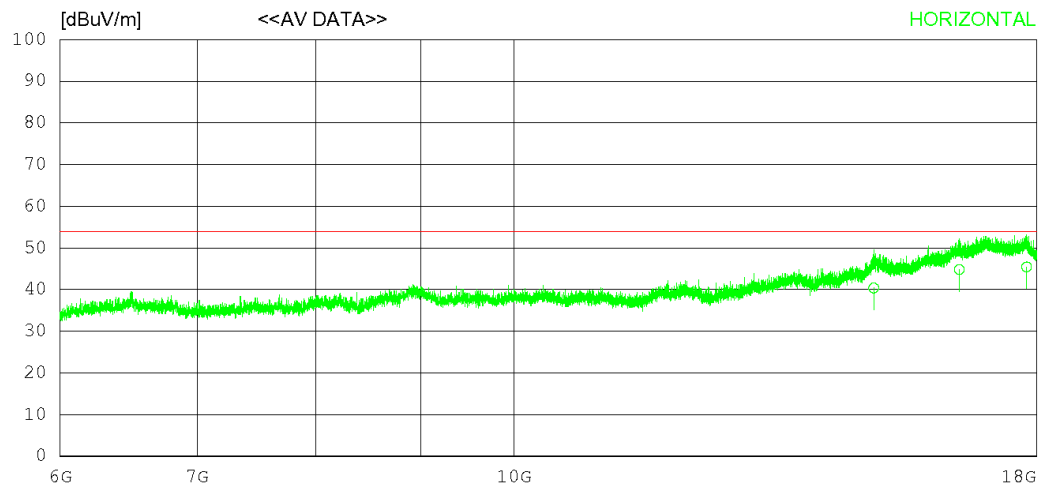
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition USB

Memo

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





## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition USB

Memo

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

| No.                    | FREQ      | READING       | ANT            | LOSS  | GAIN  | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|-----------|---------------|----------------|-------|-------|----------|----------|--------|---------|-------|
|                        | [MHz]     | CAV<br>[dBuV] | FACTOR<br>[dB] | [dB]  | [dB]  | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |           |               |                |       |       |          |          |        |         |       |
| 1                      | 14987.330 | 21.37         | 35.43          | 20.61 | 37.02 | 40.39    | 54.00    | 13.61  | 236     | 321   |
| 2                      | 16501.270 | 22.07         | 36.99          | 21.86 | 36.10 | 44.82    | 54.00    | 9.18   | 341     | 245   |
| 3                      | 17801.340 | 21.95         | 38.17          | 22.80 | 37.48 | 45.44    | 54.00    | 8.56   | 320     | 303   |
| ----- Vertical -----   |           |               |                |       |       |          |          |        |         |       |
| 4                      | 17131.010 | 21.21         | 37.65          | 22.77 | 36.56 | 45.07    | 54.00    | 8.93   | 154     | 84    |
| 5                      | 17752.020 | 22.01         | 38.13          | 22.73 | 37.40 | 45.47    | 54.00    | 8.53   | 203     | 194   |
| 6                      | 17835.320 | 21.84         | 38.19          | 22.62 | 37.54 | 45.11    | 54.00    | 8.89   | 121     | 360   |

| Radiated disturbance at (18 ~ 40) GHz _Peak measurement data |         |                     |   |
|--------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                      | 2       | EUT Operation mode  | 3 |
| Test voltage (V)                                             | DC 12 V | Test Frequency (Hz) | - |

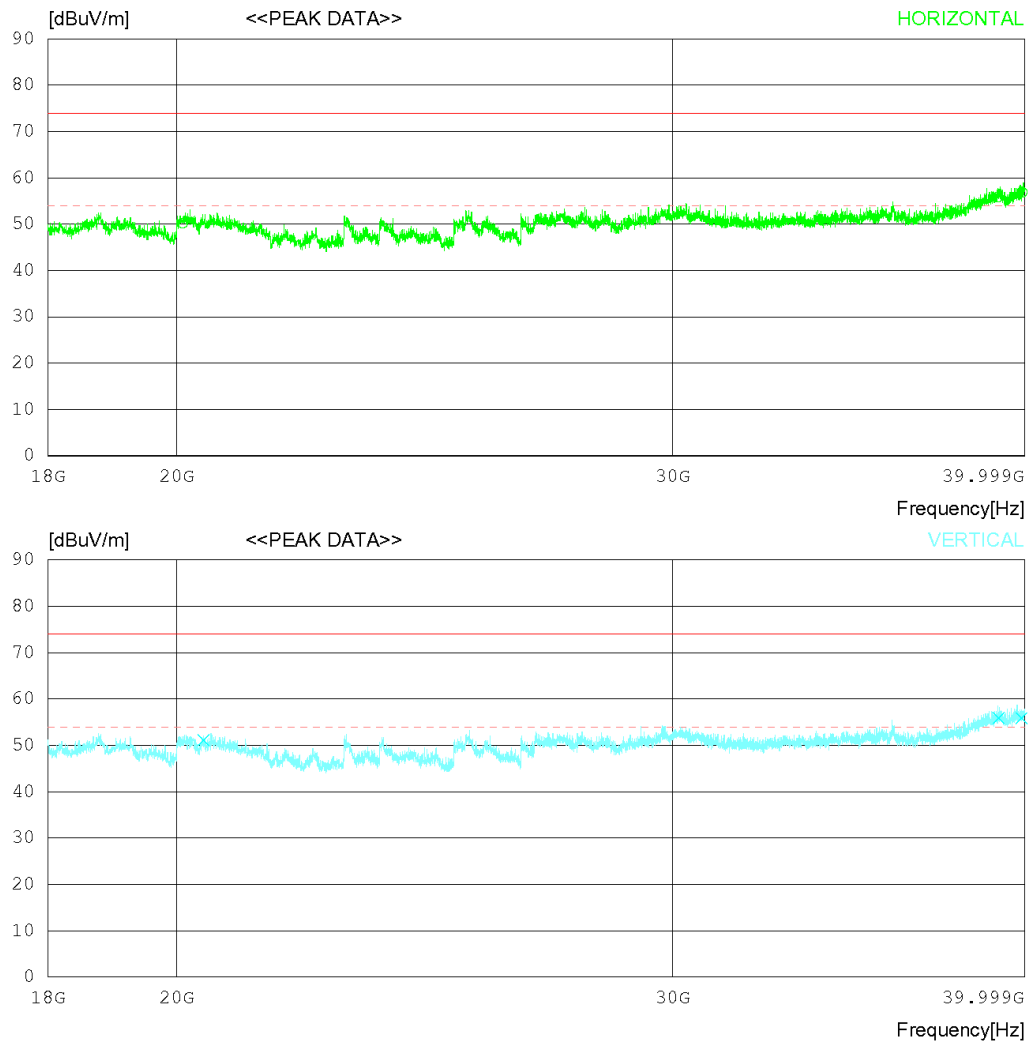
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition USB

Memo

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



## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 °C 42 % R.H.  
Test Condition USB

Memo

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

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<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                      | 20095.500     | 39.20                     | 45.30                 | 18.77        | 53.04        | 50.23              | 74.0              | 23.77          | 154             | 358            |
| 2                      | 39131.000     | 34.70                     | 47.76                 | 25.59        | 52.24        | 55.81              | 74.0              | 18.19          | 287             | 191            |
| 3                      | 39920.250     | 35.50                     | 49.14                 | 24.42        | 52.20        | 56.86              | 74.0              | 17.14          | 184             | 32             |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 4                      | 20442.000     | 39.50                     | 45.40                 | 19.44        | 53.20        | 51.14              | 74.0              | 22.86          | 320             | 335            |
| 5                      | 39153.000     | 34.80                     | 47.81                 | 25.56        | 52.24        | 55.93              | 74.0              | 18.07          | 121             | 0              |
| 6                      | 39898.250     | 34.50                     | 49.10                 | 24.46        | 52.21        | 55.85              | 74.0              | 18.15          | 198             | 0              |

| Radiated disturbance at (18 ~ 40) GHz _Average measurement data |         |                     |   |
|-----------------------------------------------------------------|---------|---------------------|---|
| Test configuration mode                                         | 2       | EUT Operation mode  | 3 |
| Test voltage (V)                                                | DC 12 V | Test Frequency (Hz) | - |

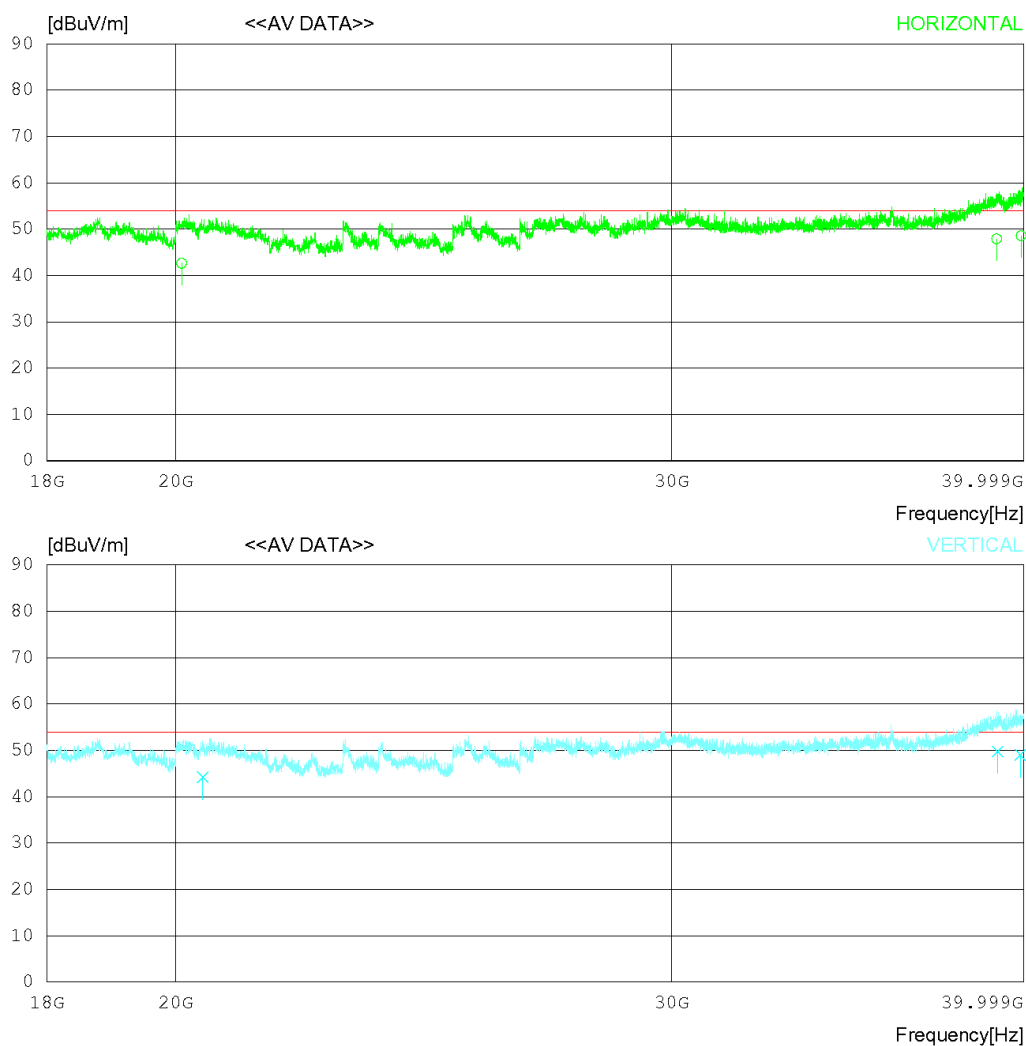
## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12 V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition USB

Memo

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



## RADIATED EMISSION

Date 2020-04-07

Order No. DTNC2003-02055  
Power Supply DC 12V  
Temp/Humi 21 'C 42 % R.H.  
Test Condition USB

Memo

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

| No.                    | FREQ      | READING       | ANT            | LOSS  | GAIN  | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|-----------|---------------|----------------|-------|-------|----------|----------|--------|---------|-------|
|                        | [MHz]     | CAV<br>[dBuV] | FACTOR<br>[dB] | [dB]  | [dB]  | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |           |               |                |       |       |          |          |        |         |       |
| 1                      | 20095.540 | 31.62         | 45.30          | 18.77 | 53.04 | 42.65    | 54.00    | 11.35  | 120     | 134   |
| 2                      | 39131.040 | 26.80         | 47.76          | 25.59 | 52.24 | 47.91    | 54.00    | 6.09   | 335     | 32    |
| 3                      | 39920.270 | 27.23         | 49.14          | 24.42 | 52.20 | 48.59    | 54.00    | 5.41   | 277     | 117   |
| ----- Vertical -----   |           |               |                |       |       |          |          |        |         |       |
| 4                      | 20442.270 | 32.60         | 45.40          | 19.44 | 53.20 | 44.24    | 54.00    | 9.76   | 120     | 223   |
| 5                      | 39153.040 | 28.63         | 47.81          | 25.56 | 52.24 | 49.76    | 54.00    | 4.25   | 234     | 305   |
| 6                      | 39898.210 | 27.66         | 49.10          | 24.46 | 52.21 | 49.01    | 54.00    | 4.99   | 127     | 278   |

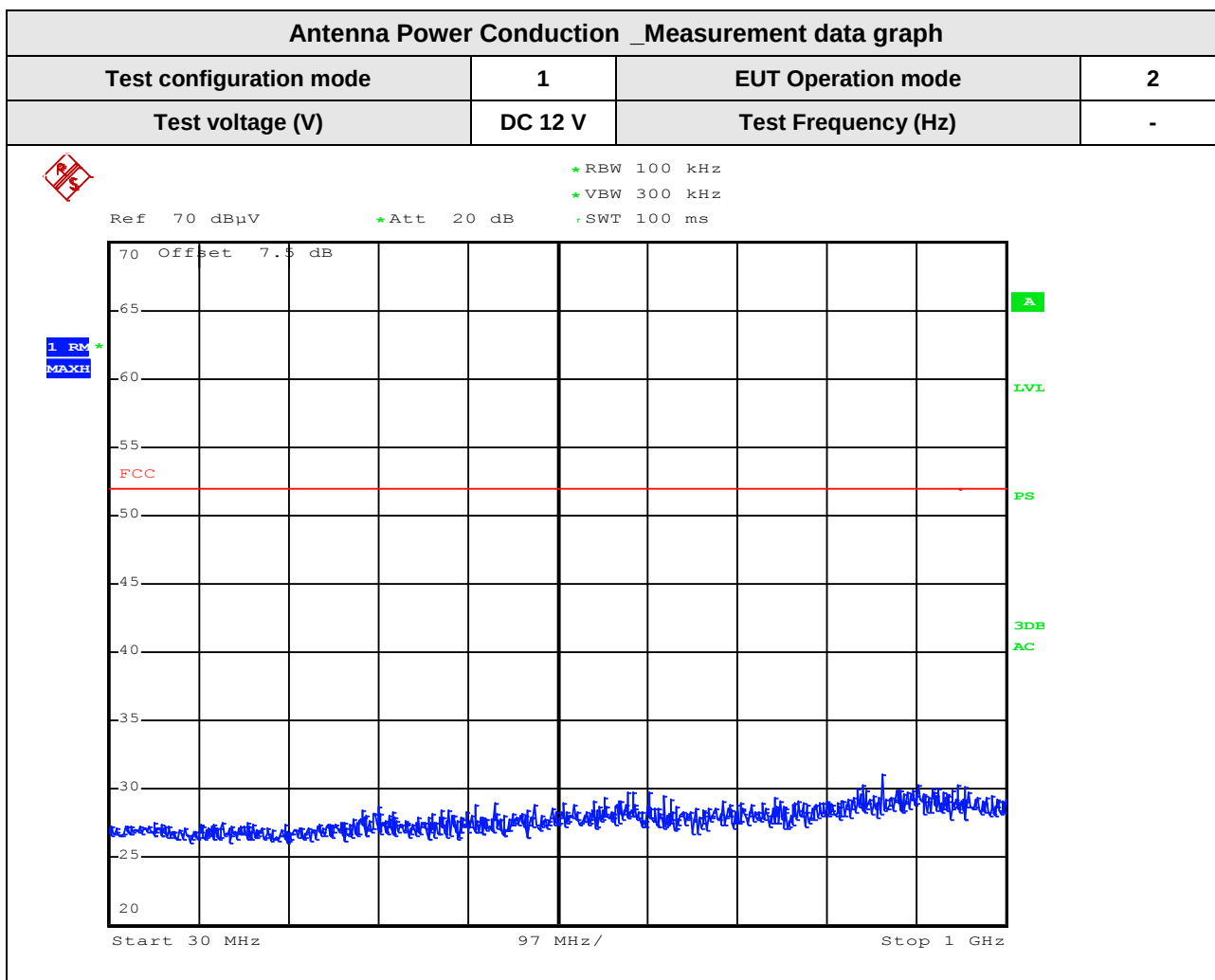
### Calculation

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

### 7.3 Antenna Power Conduction

| ANSI C63.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Antenna power conduction                                      |                                                                | Result |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|--------|
| <u>Method:</u> Power on the receive antenna terminals was to be determined by measurement of the voltage present at these terminals. Antenna conducted power measurements was performed with the EUT antenna terminals connected directly to measuring instrument using a impedance-Matching network to connect the measurement Instrument to the antenna terminals of the EUT. The losses in decibels in impedance-matching network and cables was added to the measured values in dBµV. The measurements were repeated with the receiver tuned to a frequency until all of frequencies had been successively measured. Power in the receive antenna terminals in the ratio of V <sup>2</sup> /R, where V is the loss-corrected voltage measured at the antenna terminals, and R is the impedance of the measuring instrument |                                                               |                                                                | Comply |
| Fully configured sample scanned over the following frequency range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Frequency range on each side of line                          | Limit                                                          |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 30 MHz to 2 150 MHz                                           | 2 nW (51.7 dBµV)                                               |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 54 MHz to 300 MHz<br>300 MHz to 450 MHz<br>450 MHz to 804 MHz | -26 dBmV (34 dBµV)<br>-20 dBmV (40 dBµV)<br>-15 dBmV (45 dBµV) |        |
| Measurement Point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Tuner port                                                    |                                                                |        |
| EUT mode<br>(Refer to clauses 4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Test configuration mode                                       | 1                                                              |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | EUT Operation mode                                            | 2                                                              |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                               |                                                                |        |

| Measurement Instrument |              |                              |             |            |            |
|------------------------|--------------|------------------------------|-------------|------------|------------|
| Description            | Model        | Manufacturer                 | Identifier  | Cal. Date  | Cal. Due   |
| EMI TEST RECEIVER      | ESCI         | ROHDE & SCHWARZ              | 100364      | 2020.02.25 | 2021.02.25 |
| IMPEDANCE MATCHING PAD | 8AP50NM75NF  | COPPER MOUNTAIN TECHNOLOGIES | 16012       | 2019.12.10 | 2020.12.10 |
| SPLITTER               | ZFRSC-123-S+ | MINI CIRCUITS                | SF139801142 | 2019.07.15 | 2020.07.15 |



## 8. Revision History

| Date          | Description    | Revised By | Reviewed By  |
|---------------|----------------|------------|--------------|
| May. 08. 2020 | Initial report | GiHyun Kim | HyungJun Kim |
|               |                |            |              |
|               |                |            |              |
|               |                |            |              |
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|               |                |            |              |
|               |                |            |              |

-End of test report-