

TEST REPORT

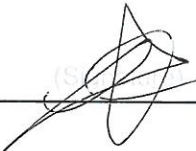



DT&C Co., Ltd.

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

1. Report No. : DREFCC2008-0194
2. Client / Applicant
 - Name : Bluebird Inc.
 - Address : 3F, 115, Irwon-ro, Gangnam-gu, Seoul, Republic of Korea
3. Use of Report : Grant of Certification
4. Product Name / Model Name : Enterprise-Value Full Touch Handheld Computer / VF550
(FCC ID / IC : SS4VF550X / 22515-VF550)
5. Test Standard : ANSI C63.4 : 2014
FCC Part 15 Subpart B
(Communications Rcvr for use w/ licensed Tx and CBs(CXX))
ICES-003 : 2016
CAN/CSA CISPR 22-10
6. Date of Test : Aug. 02. 2020
7. Location of Test : Permanent Testing Lab On Site Testing
8. Testing Environment : Temperature (23) °C , Humidity (54) % R.H.
9. Test Result : Refer to the attached Test Result

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

| | | |
|-------------|---|---|
| Affirmation | Tested by | Reviewed by |
| | Name : ChanGeun Lee  | Name : KyoungHwan Bae  |

Aug. 03. 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

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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.dtnc.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 23rd,Oct,2018 | - |
| Site Filing | USA | FCC | KR0034 101842 678747, 596748, 804488, 165783 | Accredited 2.948 Listed |
| | Canada | IC | 5740A-3 5740A-4 | Registered |
| | Japan | VCCI | C-1427, R-3385, R-14076, R-4180, R-4496, T-1442, G-10338, G-10754, G-10815, G-20051 | Registered |
| Certification | Korea | KC | KR0034 | Designation |
| | Germany | TUV | CARAT 089112 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 | Bluebird Inc. 3F, 115, Irwon-ro, Gangnam-gu, Seoul, Republic of Korea |
| Manufacturer | Bluebird Inc. 3F, 115, Irwon-ro, Gangnam-gu, Seoul, Republic of Korea |
| Factory 1 | Bluebird Inc. (SSang-young IT Twin tower-B 7~8F), 531, Dunchon-daero, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea |
| Factory 2 | TOP INTERCUBE ELECTRONICS VINA CO., LTD (TEV) Lot C1, Ba thien II Industrial park, Thien Ke Ward, Binh Xuyen District, Vinh Phuc Province, Vietnam |
| Product Name | Enterprise-Value Full Touch Handheld Computer |
| Model Name | VF550 |
| Add Model Name | None |
| Add Model Difference | None |
| Maximum Internal Frequency | 1,800 MHz |
| Rated Power | DC 3.85 V |
| FCC ID | SS4VF550X |
| IC | 22515-VF550 |
| Remarks | Wireless Frequency - WCDMA 2 : 1852.4 ~ 1907.6 MHz - WCDMA 4 : 1712.4 ~ 1752.6 MHz - WCDMA 5 : 826.4 ~ 846.6 MHz - LTE Band 2 : 1850.7 ~ 1909.3 MHz - LTE Band 4 : 1710.7 ~ 1799.3 MHz - LTE Band 5 : 824.7 ~ 848.3 MHz - LTE Band 12 : 779.5 ~ 784.5 MHz - LTE Band 13 : 699.7 ~ 715.3 MHz - LTE Band 71 : 665.5 ~ 695.5 MHz - WIFI 2.4 G : 2412 ~ 2462 MHz - WIFI 5 G : 5150 ~ 5850 MHz |

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 | WCDMA 5 | The EUT was tested while operating in WCDMA 5 band Rx mode. |
| 2 | LTE 5 | The EUT was tested while operating in LTE 5 band Rx mode. |
| 3 | LTE 12 | The EUT was tested while operating in LTE 12 band Rx mode. |
| 4 | LTE 13 | The EUT was tested while operating in LTE 13 band Rx mode. |
| 5 | LTE 71 | The EUT was tested while operating in LTE 71 band Rx mode. |
| * WCDMA5, LTE5, LTE12, LTE13, LTE71 bands that tune in the range of 30 MHz - 960 MHz are investigated. Only the worst case(LTE 12 band) emissions are reported. | | |

4.3 Test Configuration Mode

| No. | Mode | Description |
|-----|---------|--|
| 1 | WCDMA 5 | EUT connects to Earphones EUT connects to Micro SD Card |
| 2 | LTE 5 | EUT connects to Earphones EUT connects to Micro SD Card |
| 3 | LTE 12 | EUT connects to Earphones EUT connects to Micro SD Card |
| 4 | LTE 13 | EUT connects to Earphones EUT connects to Micro SD Card |
| 5 | LTE 71 | EUT connects to Earphones EUT connects to Micro SD Card |

4.4 Supported Equipment

| Used* | Product Type | Manufacturer | Model | Remarks |
|---|---------------|--------------|-------|---------------------|
| AE | Micro SD Card | RIDATA | 2GB | Y02GA53M8D3129028TW |
| AE | Earphones | N/A | N/A | SONY |
| *Abbreviations: AE - Auxiliary/Associated Equipment, or SIM - Simulator | | | | |

4.5 EUT In/Output Port

| Name | Type* | Cable Max. >3 m | Cable Shielded | Cable Back shell | Remarks |
|--|-------|--------------------|-------------------|---------------------|---------|
| Micro SD Card Slot | I/O | - | - | - | None |
| AUX | I/O | 1.9 | Non shield | Plastic | None |
| *Abbreviations: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port TP = Telecommunication Ports | | | | | |

4.6 Test Voltage and Frequency

| Case | Voltage (V) | Frequency (Hz) | Phases | Remarks |
|------|----------------|-------------------|--------|---------|
| 1 | DC 3.85 | - | - | Battery |

5. Test Summary

| Test Items | Applied Standards | Results |
|---|--|---------|
| Conducted Disturbance | CAN/CSA CISPR 22-10 ANSI C63.4:2014 | N/A |
| Radiated Disturbance | CAN/CSA CISPR 22-10 ANSI C63.4:2014 | C |
| C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable | | |
| Note 1) These test are not required because EUT is portable equipment. | | |

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

- Conducted Disturbance

| Frequency [MHz] | Pol. | Result [dB μ V/m] | Detector | Limit [dB μ V/m] | Margin [dB] |
|-----------------|------|-----------------------|----------|----------------------|-------------|
| - | - | - | - | - | - |

-Radiated Disturbance

| Frequency [MHz] | Pol. | Result [dB μ V/m] | Detector | Limit [dB μ V/m] | Margin [dB] |
|-----------------|------|-----------------------|-----------------|----------------------|-------------|
| 39287.680 | H | 46.21 | Cispr - Average | 54.00 | 7.79 |

6. Test Environment

| Test Items | Test date (YYYY-MM-DD) | Temp. (°C) | Humidity (% R.H.) | Pressure (kPa) |
|----------------------|------------------------|------------|-------------------|----------------|
| Radiated Disturbance | 2020-08-02 | 23 | 54 | - |

7. Test Results : Emission

7.1 Conducted Disturbance

| ANSI C63.4, CAN/CSA-CISPR 22 | Mains terminal disturbance voltage | | Result | | |
|--|--------------------------------------|-------------------|-----------------------|-----------|----------|
| <p>Method: 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.</p> | | | 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 (Refer to clauses 4) | Test configuration mode | N/A | | | |
| | EUT Operation mode | N/A | | | |
| Limits – Class A | | | | | |
| Frequency (MHz) | Limit dB μ V | | | | |
| | Quasi-Peak | Average | | | |
| 0.15 to 0.50 | 79 | 66 | | | |
| 0.50 to 30 | 73 | 60 | | | |
| Limits – Class B | | | | | |
| Frequency (MHz) | Limit dB μ V | | | | |
| | 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, CAN/CSA-CISPR 22 | Radiated disturbance 30 MHz –30 GHz** | | | Result |
|---|---|----------------------|---|----------------|
| Method: Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10 or 3 meter below 1GHz and 3 meter above 1GHz. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable. For final measurement below 1 GHz frequency range, Quasi-Peak detector with (RBW = 120 kHz Bandwidth) was used. For final measurement above 1 GHz frequency range, Peak detector with (RBW = 1 MHz Bandwidth) and CISPR Average detector with (RBW = 1 MHz Bandwidth) were used. | | | | Comply |
| EUT mode (Refer to clauses 4) | Test configuration mode | | 3 | |
| | EUT Operation mode | | 3 | |
| Radiated Disturbance below 1 000 MHz | | | | |
| Frequency range (MHz) | Quasi-peak limit dBμV/m | | | |
| | Class A | | Class B | |
| | 3 m distance | 10 m distance | 3 m distance | |
| 30 to 88 | 49.1 | 39.1 | 40 | |
| 88 to 216 | 53.5 | 43.5 | 43.5 | |
| 216 to 960 | 56.4 | 46.4 | 46 | |
| 960 to 1 000 | 59.5 | 49.5 | 54 | |
| According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22 shown. | | | | |
| Frequency range (MHz) | Quasi-peak limit dBμV/m | | | |
| | Class A (10 m distance) | | Class B (10 m distance) | |
| 30 to 230 | 40 | | 30 | |
| 230 to 1 000 | 47 | | 37 | |
| Radiated Disturbance for above 1 000 MHz at a measurement distance of 3 m | | | | |
| Frequency range (GHz) | Peak limit dBμV/m | | Average limit dBμV/m | |
| | Class A | Class B | Class A | Class B |
| 1 to 40 | 80 | 74 | 60 | 54 |
| The test frequency range of Radiated Disturbance measurements are listed below. | | | | |
| Highest frequency generated or used in the device or on which the device operates or tunes (MHz) | | | Upper frequency of measurement range (MHz) | |
| Below 108 | | | 1 000 | |
| 108 – 500 | | | 2 000 | |
| 500 – 1 000 | | | 5 000 | |
| Above 1 000 | | | 5 th 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 BROAD BAND ANTENNA | VULB9160 | SCHWARZBECK | 9160-3339 | 2018.10.22 | 2020.10.22 |
| 6DB ATTENUATOR | 8491B | HP | 18403 | 2018.10.22 | 2020.10.22 |
| LOW NOISE PRE AMPLIFIER | MLA-100K01-B01-26 | TSJ | 1252741 | 2020.02.13 | 2021.02.13 |
| HORN ANTENNA | 3117 | ETS-LINDGREN | 00152093 | 2020.03.26 | 2021.03.26 |
| PRE AMPLIFIER | 8449B | H.P | 3008A00887 | 2019.08.26 | 2020.08.26 |
| HORN ANTENNA WITH PREAMPLIFIER | EM-6969 | ELECTRO-METRICS | 156 | 2019.02.13 | 2021.02.13 |
| | MLA-0618-B03-34 | TSJ | 1785642 | 2019.12.31 | 2020.12.31 |
| HORN ANTENNA WITH PREAMPLIFIER | 3116C | ETS-LINDGREN | 00213177 | 2019.12.12 | 2020.12.12 |
| | 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 | 3 | EUT Operation mode | 3 |
| Test voltage (V) | Battery | Test Frequency (Hz) | - |

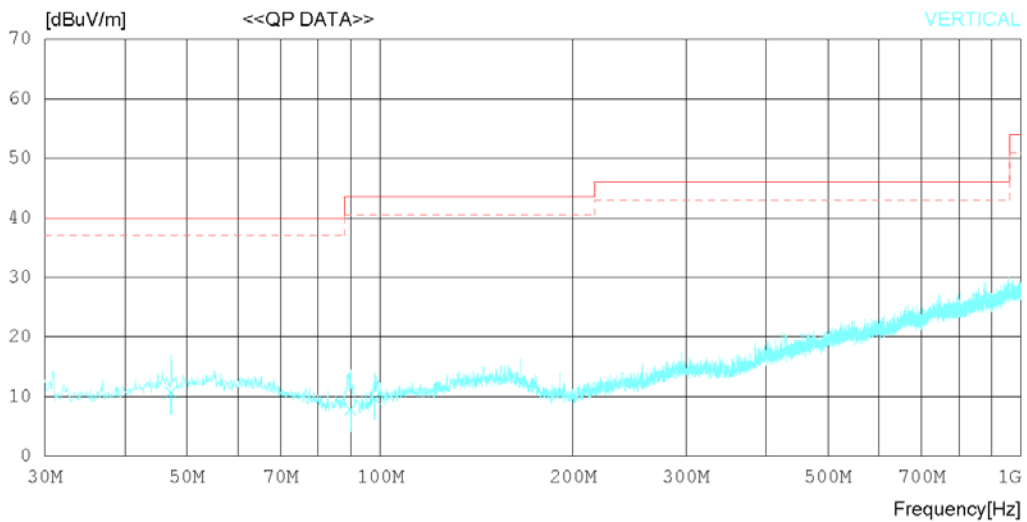
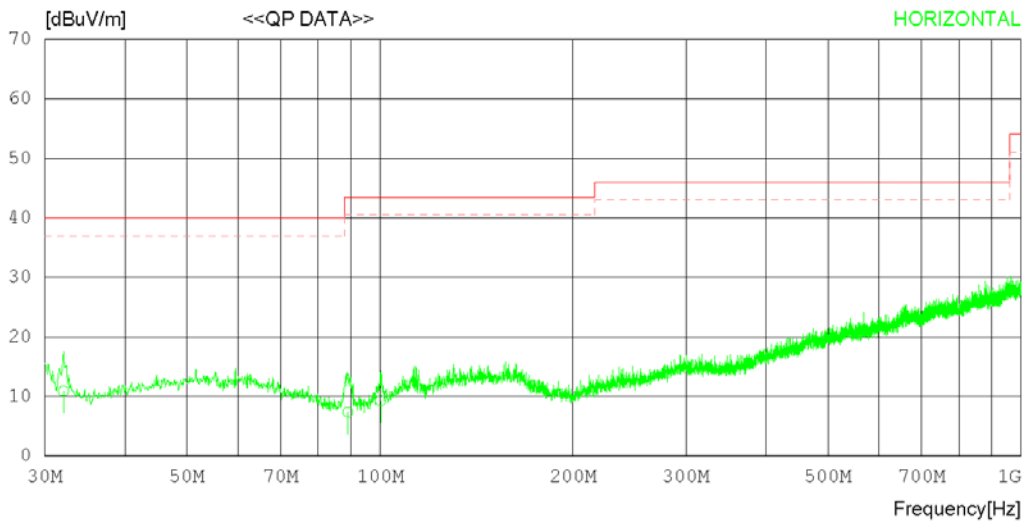
RADIATED EMISSION

Date 2020-08-02

Order No. DTNC2004-03684,2006-04883
 Power Supply Battery
 Temp/Humi 23 'C 54 % R.H.
 Test Condition LTE 12

Memo

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



RADIATED EMISSION

Date 2020-08-02

Order No. DTNC2004-03684,2006-04883
Power Supply Battery
Temp/Humi 23 °C 54 %R.H.
Test Condition LTE 12

Memo

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

| No. | FREQ [MHz] | READING QP [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 32.061 | 21.40 | 15.41 | 0.63 | 26.53 | 10.91 | 40.00 | 29.09 | 105 | 357 |
| 2 | 89.048 | 19.70 | 13.30 | 1.18 | 26.79 | 7.39 | 43.50 | 36.11 | 196 | 334 |
| 3 | 100.203 | 19.50 | 15.32 | 1.31 | 26.84 | 9.29 | 43.50 | 34.21 | 301 | 352 |
| ----- Vertical ----- | | | | | | | | | | |
| 4 | 47.218 | 18.70 | 17.90 | 0.71 | 26.61 | 10.70 | 40.00 | 29.30 | 203 | 0 |
| 5 | 89.897 | 20.20 | 13.30 | 1.14 | 26.80 | 7.84 | 43.50 | 35.66 | 108 | 43 |
| 6 | 98.142 | 20.40 | 14.93 | 1.27 | 26.83 | 9.77 | 43.50 | 33.73 | 105 | 248 |

| Radiated disturbance at (1 ~ 6) GHz _ Peak Measurement data | | | |
|---|---------|---------------------|---|
| Test configuration mode | 3 | EUT Operation mode | 3 |
| Test voltage (V) | Battery | Test Frequency (Hz) | - |

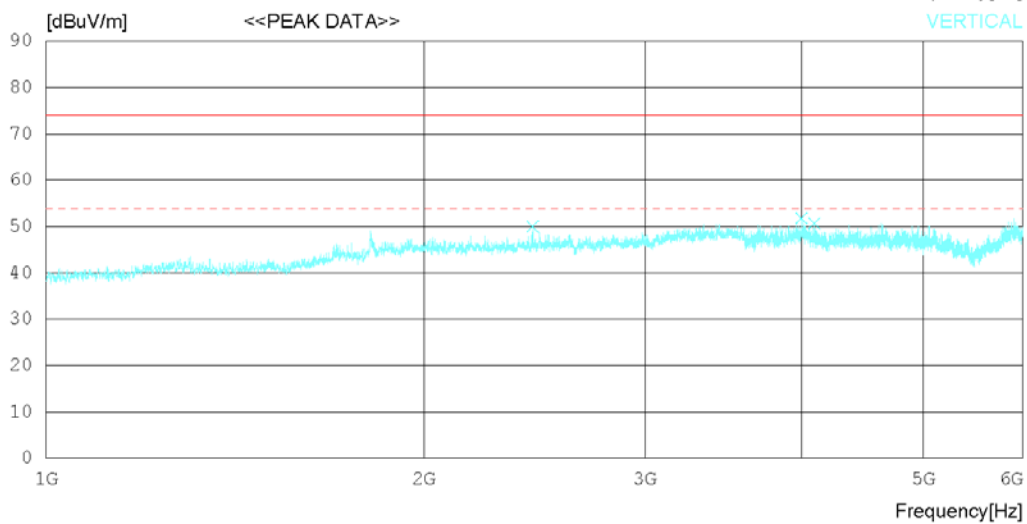
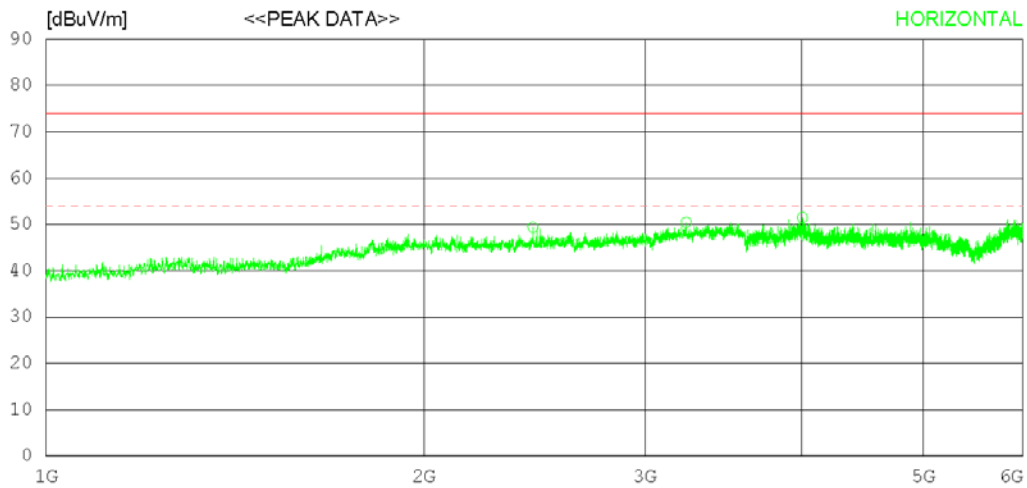
RADIATED EMISSION

Date 2020-08-02

Order No. DTNC2004-03684,2006-04883
 Power Supply Battery
 Temp/Humi 23 'C 54 %.R.H.
 Test Condition LTE 12

Memo

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



RADIATED EMISSION

Date 2020-08-02

Order No. DTNC2004-03684,2006-04883
Power Supply Battery
Temp/Humi 23 °C 54 %R.H.
Test Condition LTE 12

Memo

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

| No. | FREQ [MHz] | READING PEAK [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|---------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 2441.875 | 44.70 | 32.20 | 7.13 | 34.60 | 49.43 | 74.0 | 24.57 | 110 | 169 |
| 2 | 3235.625 | 43.30 | 33.20 | 8.54 | 34.60 | 50.44 | 74.0 | 23.56 | 202 | 1 |
| 3 | 4004.375 | 41.80 | 33.50 | 9.73 | 33.55 | 51.48 | 74.0 | 22.52 | 206 | 250 |
| ----- Vertical ----- | | | | | | | | | | |
| 4 | 2441.875 | 45.30 | 32.20 | 7.13 | 34.60 | 50.03 | 74.0 | 23.97 | 101 | 358 |
| 5 | 3998.125 | 42.10 | 33.50 | 9.74 | 33.54 | 51.80 | 74.0 | 22.2 | 103 | 358 |
| 6 | 4093.125 | 41.50 | 33.41 | 9.43 | 33.66 | 50.68 | 74.0 | 23.32 | 104 | 358 |

| Radiated disturbance at (1 ~ 6) GHz _ Average Measurement data | | | |
|--|---------|---------------------|---|
| Test configuration mode | 3 | EUT Operation mode | 3 |
| Test voltage (V) | Battery | Test Frequency (Hz) | - |

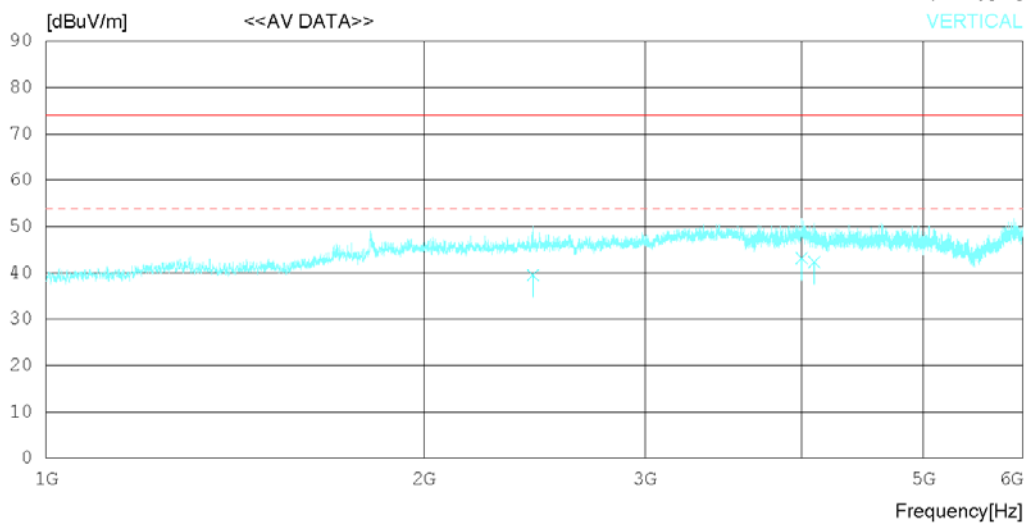
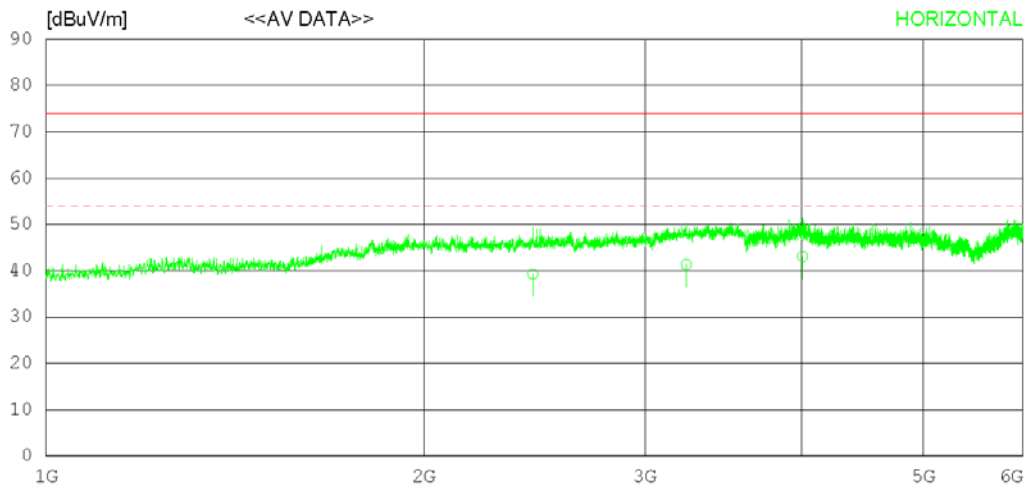
RADIATED EMISSION

Date 2020-08-02

| | |
|----------------|---------------------------|
| Order No. | DTNC2004-03684,2006-04883 |
| Power Supply | Battery |
| Temp/Humi | 23 'C 54 %.R.H. |
| Test Condition | LTE 12 |

Memo

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



RADIATED EMISSION

Date 2020-08-02

Order No. DTNC2004-03684,2006-04883
Power Supply Battery
Temp/Humi 23 °C 54 %R.H.
Test Condition LTE 12

Memo

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

| No. | FREQ [MHz] | READING CAV [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|--------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 2441.825 | 34.60 | 32.20 | 7.13 | 34.60 | 39.33 | 54.00 | 14.67 | 109 | 177 |
| 2 | 3235.615 | 34.20 | 33.20 | 8.54 | 34.60 | 41.34 | 54.00 | 12.66 | 201 | 0 |
| 3 | 4004.465 | 33.40 | 33.50 | 9.73 | 33.55 | 43.08 | 54.00 | 10.92 | 205 | 259 |
| ----- Vertical ----- | | | | | | | | | | |
| 4 | 2441.895 | 34.80 | 32.20 | 7.13 | 34.60 | 39.53 | 54.00 | 14.47 | 100 | 357 |
| 5 | 3998.275 | 33.50 | 33.50 | 9.74 | 33.54 | 43.20 | 54.00 | 10.80 | 101 | 355 |
| 6 | 4093.365 | 33.10 | 33.41 | 9.43 | 33.66 | 42.28 | 54.00 | 11.72 | 105 | 352 |

| Radiated disturbance at (6 ~ 18) GHz _ Peak Measurement data | | | |
|--|---------|---------------------|---|
| Test configuration mode | 3 | EUT Operation mode | 3 |
| Test voltage (V) | Battery | Test Frequency (Hz) | - |

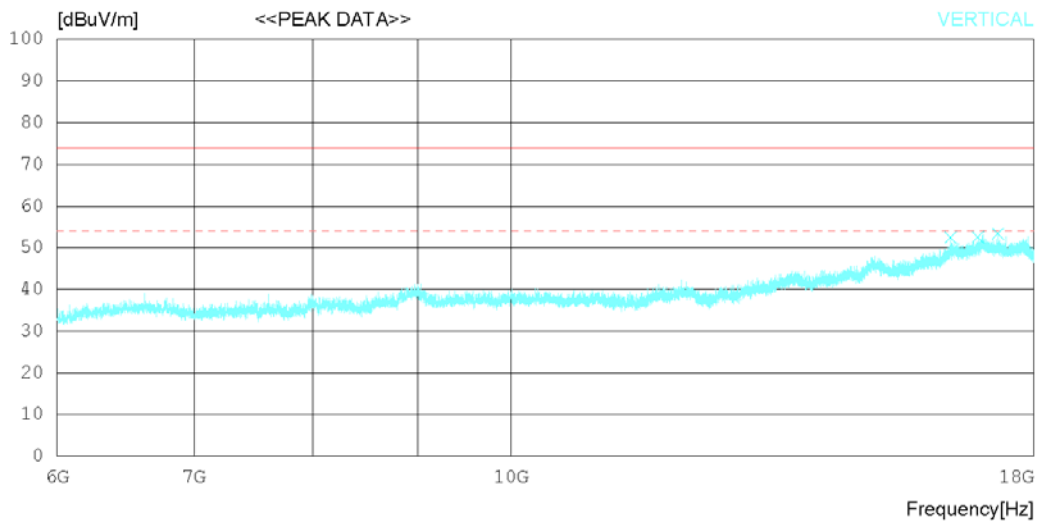
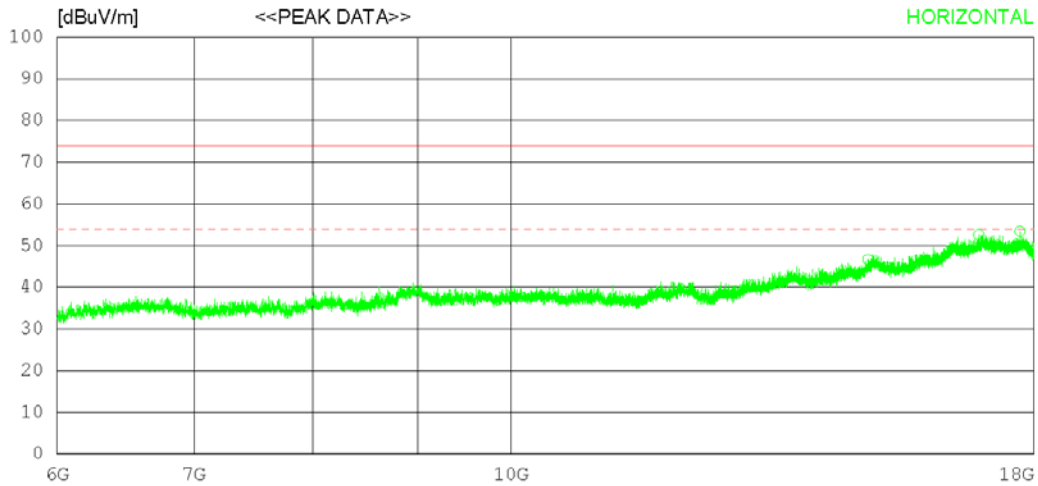
RADIATED EMISSION

Date 2020-08-02

| | |
|----------------|---------------------------|
| Order No. | DTNC2004-03684,2006-04883 |
| Power Supply | Battery |
| Temp/Humi | 23 'C 54 %.R.H. |
| Test Condition | LTE 12 |

Memo

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



RADIATED EMISSION

Date 2020-08-02

Order No. DTNC2004-03684,2006-04883
Power Supply Battery
Temp/Humi 23 °C 54 %R.H.
Test Condition LTE 12

Memo

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

| No. | FREQ [MHz] | READING PEAK [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|---------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 14935.500 | 28.20 | 35.35 | 20.17 | 37.08 | 46.64 | 74.0 | 27.36 | 106 | 317 |
| 2 | 16917.750 | 28.40 | 37.46 | 23.11 | 36.35 | 52.62 | 74.0 | 21.38 | 202 | 358 |
| 3 | 17720.250 | 30.00 | 38.10 | 22.68 | 37.35 | 53.43 | 74.0 | 20.57 | 206 | 177 |
| ----- Vertical ----- | | | | | | | | | | |
| 4 | 16388.250 | 29.90 | 36.86 | 21.88 | 36.17 | 52.47 | 74.0 | 21.53 | 101 | 0 |
| 5 | 16903.500 | 28.50 | 37.44 | 22.99 | 36.34 | 52.59 | 74.0 | 21.41 | 102 | 358 |
| 6 | 17285.250 | 30.20 | 37.77 | 22.13 | 36.74 | 53.36 | 74.0 | 20.64 | 101 | 358 |

| Radiated disturbance at (6 ~ 18) GHz _ Average Measurement data | | | |
|---|---------|---------------------|---|
| Test configuration mode | 3 | EUT Operation mode | 3 |
| Test voltage (V) | Battery | Test Frequency (Hz) | - |

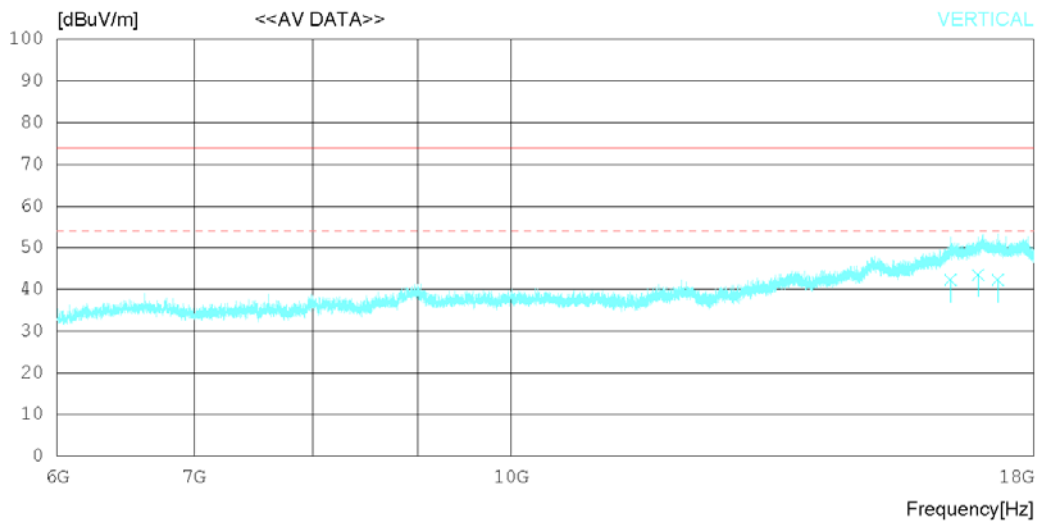
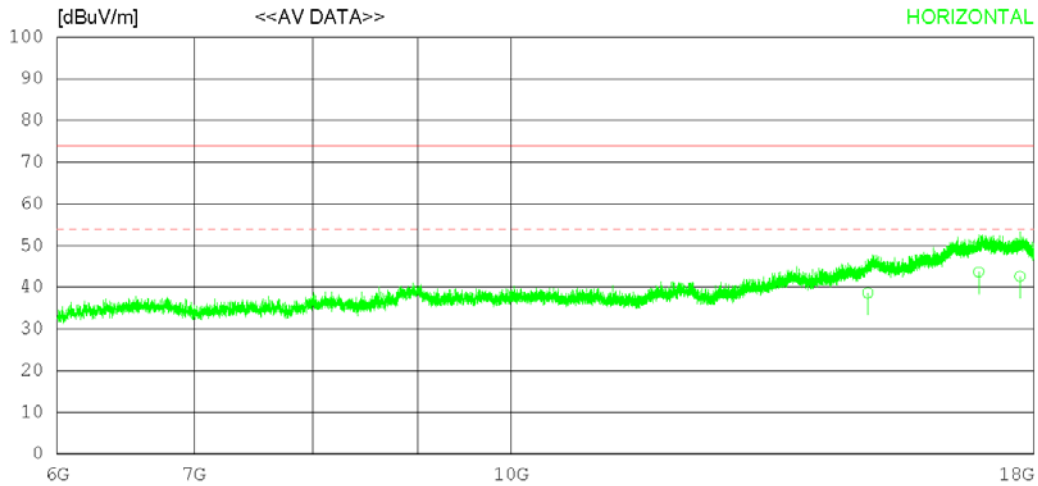
RADIATED EMISSION

Date 2020-08-02

| | |
|----------------|---------------------------|
| Order No. | DTNC2004-03684,2006-04883 |
| Power Supply | Battery |
| Temp/Humi | 23 'C 54 %.R.H. |
| Test Condition | LTE 12 |

Memo

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



RADIATED EMISSION

Date 2020-08-02

Order No. DTNC2004-03684,2006-04883
Power Supply Battery
Temp/Humi 23 °C 54 %R.H.
Test Condition LTE 12

Memo

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

| No. | FREQ [MHz] | READING CAV [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|--------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 14935.510 | 20.20 | 35.35 | 20.17 | 37.08 | 38.64 | 54.00 | 15.36 | 105 | 328 |
| 2 | 16917.730 | 19.50 | 37.46 | 23.11 | 36.35 | 43.72 | 54.00 | 10.28 | 201 | 352 |
| 3 | 17720.190 | 19.20 | 38.10 | 22.68 | 37.35 | 42.63 | 54.00 | 11.37 | 205 | 188 |
| ----- Vertical ----- | | | | | | | | | | |
| 4 | 16388.170 | 19.70 | 36.86 | 21.88 | 36.17 | 42.27 | 54.00 | 11.73 | 100 | 0 |
| 5 | 16903.520 | 19.40 | 37.44 | 22.99 | 36.34 | 43.49 | 54.00 | 10.51 | 101 | 355 |
| 6 | 17285.390 | 19.10 | 37.77 | 22.13 | 36.74 | 42.26 | 54.00 | 11.74 | 102 | 351 |

| Radiated disturbance at (18 ~ 40) GHz _ Peak Measurement data | | | |
|---|---------|---------------------|---|
| Test configuration mode | 3 | EUT Operation mode | 3 |
| Test voltage (V) | Battery | Test Frequency (Hz) | - |

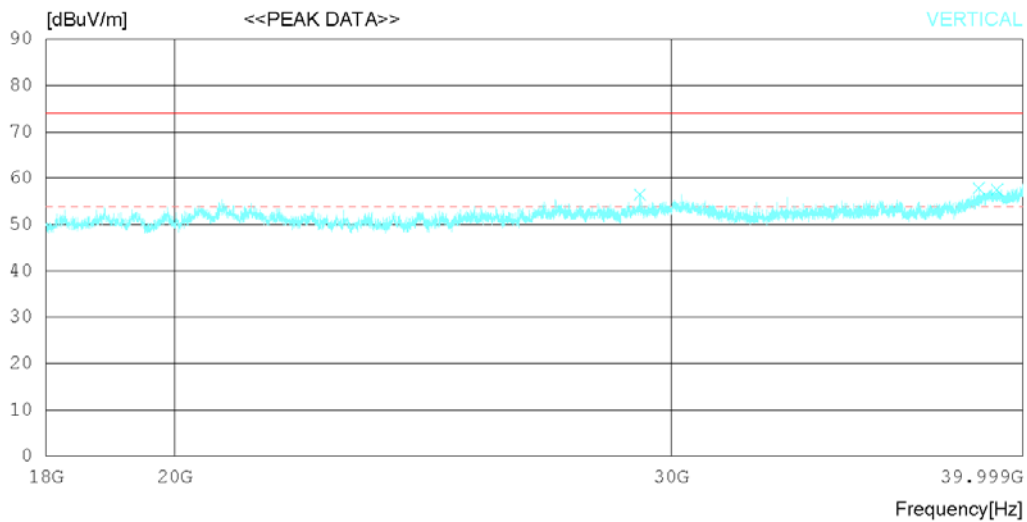
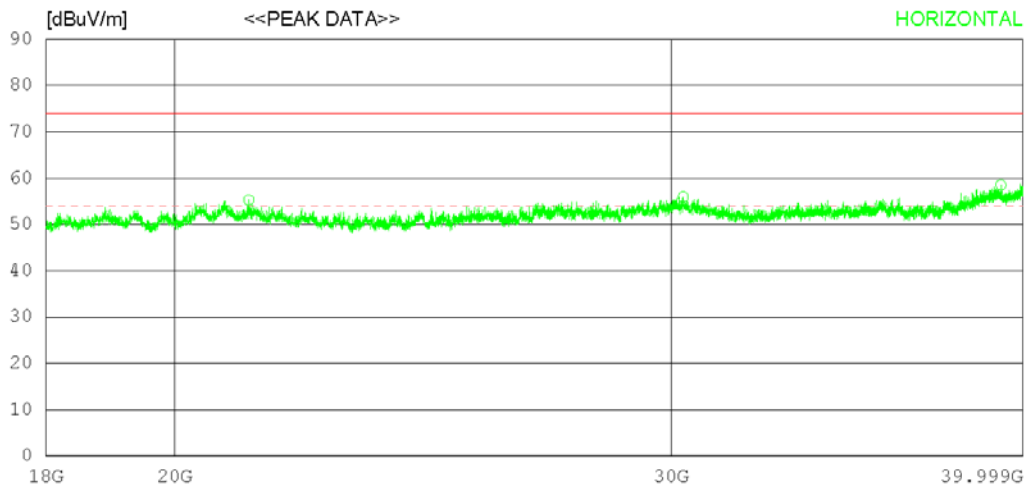
RADIATED EMISSION

Date 2020-08-02

| | |
|----------------|---------------------------|
| Order No. | DTNC2004-03684,2006-04883 |
| Power Supply | Battery |
| Temp/Humi | 23 'C 54 %.R.H. |
| Test Condition | LTE 12 |

Memo

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



RADIATED EMISSION

Date 2020-08-02

Order No. DTNC2004-03684,2006-04883
Power Supply Battery
Temp/Humi 23 °C 54 %R.H.
Test Condition LTE 12

Memo

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

| No. | FREQ [MHz] | READING PEAK [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|---------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 21245.000 | 42.90 | 45.56 | 20.37 | 53.56 | 55.27 | 74.0 | 18.73 | 207 | 108 |
| 2 | 30300.750 | 38.60 | 47.50 | 22.05 | 52.22 | 55.93 | 74.0 | 18.07 | 106 | 167 |
| 3 | 39287.750 | 37.40 | 47.99 | 25.36 | 52.24 | 58.51 | 74.0 | 15.49 | 102 | 158 |
| ----- Vertical ----- | | | | | | | | | | |
| 4 | 29250.250 | 40.00 | 47.10 | 21.85 | 52.44 | 56.51 | 74.0 | 17.49 | 200 | 259 |
| 5 | 38583.750 | 37.90 | 46.90 | 25.28 | 52.27 | 57.81 | 74.0 | 16.19 | 102 | 358 |
| 6 | 39164.000 | 36.40 | 47.83 | 25.54 | 52.24 | 57.53 | 74.0 | 16.47 | 106 | 358 |

| Radiated disturbance at (18 ~ 40) GHz _ Average Measurement data | | | |
|--|---------|---------------------|---|
| Test configuration mode | 3 | EUT Operation mode | 3 |
| Test voltage (V) | Battery | Test Frequency (Hz) | - |

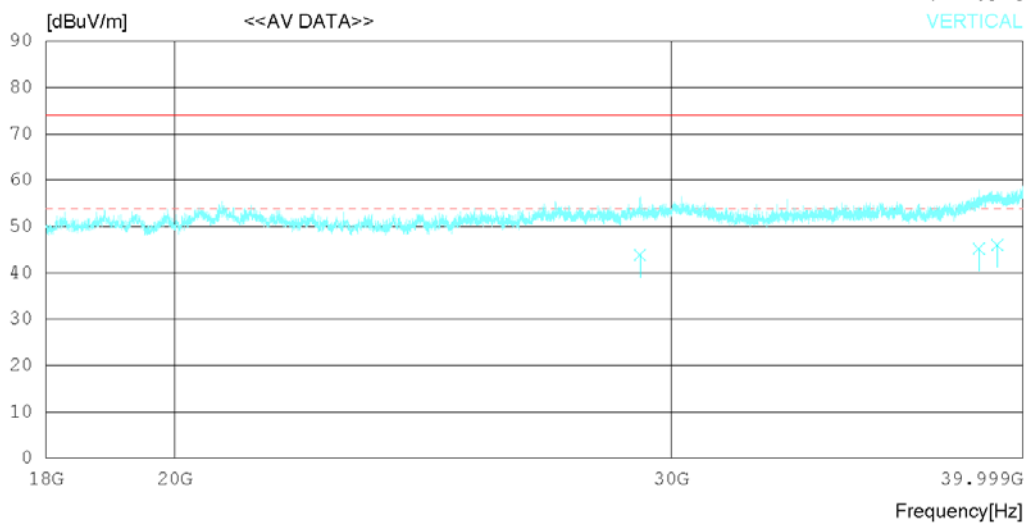
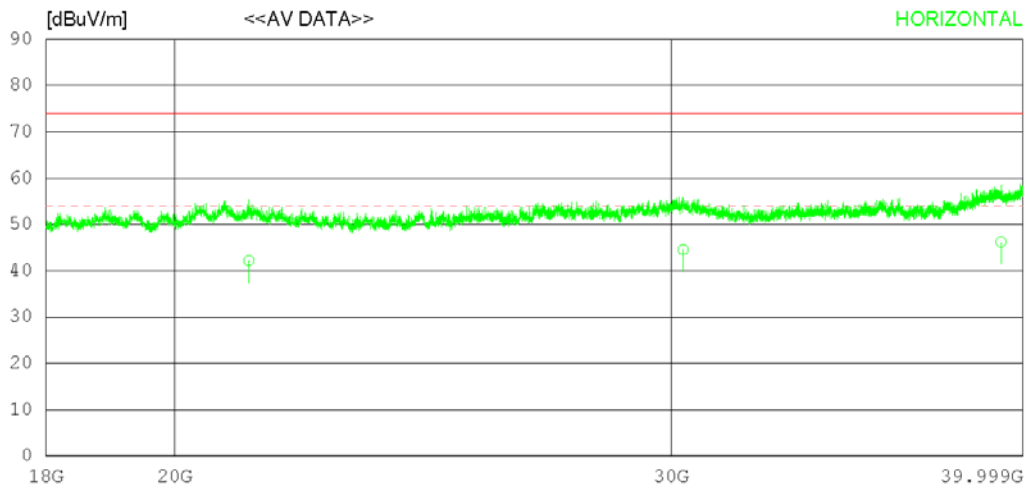
RADIATED EMISSION

Date 2020-08-02

Order No. DTNC2004-03684,2006-04883
 Power Supply Battery
 Temp/Humi 23 'C 54 %.R.H.
 Test Condition LTE 12

Memo

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



RADIATED EMISSION

Date 2020-08-02

| | |
|----------------|---------------------------|
| Order No. | DTNC2004-03684,2006-04883 |
| Power Supply | Battery |
| Temp/Humi | 23 °C 54 %R.H. |
| Test Condition | LTE 12 |

Memo

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

| No. | FREQ [MHz] | READING CAV [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|--------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 21245.090 | 29.80 | 45.55 | 20.37 | 53.56 | 42.16 | 54.00 | 11.84 | 206 | 115 |
| 2 | 30300.720 | 27.20 | 47.50 | 22.05 | 52.22 | 44.53 | 54.00 | 9.47 | 105 | 172 |
| 3 | 39287.680 | 25.10 | 47.99 | 25.36 | 52.24 | 46.21 | 54.00 | 7.79 | 101 | 168 |
| ----- Vertical ----- | | | | | | | | | | |
| 4 | 29250.210 | 27.30 | 47.10 | 21.85 | 52.44 | 43.81 | 54.00 | 10.19 | 198 | 266 |
| 5 | 38583.790 | 25.30 | 46.90 | 25.28 | 52.27 | 45.21 | 54.00 | 8.79 | 101 | 352 |
| 6 | 39164.160 | 24.90 | 47.83 | 25.54 | 52.24 | 46.03 | 54.00 | 7.97 | 105 | 346 |

Calculation

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

| |
|---|
| Margin : Limit(dBuV/m) - Result(dBuV/m) |
|---|

8. Revision History

| Date | Description | Revised By | Reviewed By |
|---------------|----------------|--------------|----------------|
| Aug. 03. 2020 | Initial report | ChanGeun Lee | KyoungHwan Bae |
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-End of test report-