

FCC Test Report

(Co-Located)

Report No.: RFBDYS-WTW-P21117025-3

FCC ID: 2AWUU6048001

Test Model: AD32-HW

Received Date: Dec. 16, 2021

Test Date: Jan. 05, 2022

Issued Date: Jan. 27, 2022

Applicant: Verkada Inc.

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

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FCC Registration / 788550 / TW0003

Designation Number: 281270 / TW0032



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Release Control Record

| Issue No. | Description | Date Issued |
|------------------------|------------------|---------------|
| RFBDYS-WTW-P21117025-3 | Original Release | Jan. 27, 2022 |

1 Certificate of Conformity

Product: Reader

Brand: Verkada

Test Model: AD32-HW

Sample Status: Engineering Sample

Applicant: Verkada Inc.

Test Date: Jan. 05, 2022

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
47 CFR FCC Part 15, Subpart C (Section 15.225)
47 CFR FCC Part 15, Subpart C (Section 15.215)
47 CFR FCC Part 15, Subpart C (Section 15.209)
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Vera Huang, **Date:** Jan. 27, 2022
Vera Huang / Specialist

Approved by : Jeremy Lin, **Date:** Jan. 27, 2022
Jeremy Lin / Project Engineer

2 Summary of Test Results

| Applied Standard: | 47 CFR FCC Part 15, Subpart C (Section 15.247) 47 CFR FCC Part 15, Subpart C (Section 15.225) 47 CFR FCC Part 15, Subpart C (Section 15.215) 47 CFR FCC Part 15, Subpart C (Section 15.209) | | |
|--------------------------------------|--|--------|---|
| Standard Section | Test Item | Result | Remarks |
| 15.205 & 209 15.225 (d) 15.209 | Radiated Emissions | Pass | Meet the requirement of limit. Minimum passing margin is -9.46dB at 34.22 MHz. |

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement | Frequency | Expanded Uncertainty (k=2) (\pm) |
|--------------------------------|------------------|--------------------------------------|
| Radiated Emissions up to 1 GHz | 9kHz ~ 30MHz | 3.00 dB |
| | 30MHz ~ 200MHz | 2.91 dB |
| | 200MHz ~ 1000MHz | 2.93 dB |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz | 1.76 dB |
| | 18GHz ~ 40GHz | 1.77 dB |

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

| | | |
|--------------------------|---|----------------------|
| Product | Reader | |
| Brand | Verkada | |
| Test Model | AD32-HW | |
| Sample Status | Engineering sample | |
| Power Supply rating | 12.0 Vdc (adapter) | |
| Modulation Type | BT LE | GFSK |
| | NFC | ASK |
| | RFID | FSK |
| Transfer Rate | BT LE | 1 Mbps |
| | NFC | Type A: 106 kbit/s |
| | RFID | 2Kbit/s |
| Operating Frequency | BT LE | 2402 ~ 2480 MHz |
| | NFC | 13.56 MHz |
| | RFID | 128 kHz |
| Output Power | BT LE | 4.519 mW |
| Field Strength (Maximum) | NFC | 26.51 dBuV/m (30m) |
| | RFID | -11.30 dBuV/m (300m) |
| Antenna Type | Refer to Note as below | |
| Antenna Connector | N/A | |
| Accessory Device | N/A | |
| Cable Supplied | 0.4m DC cable non-shielded without core | |

Note:

- The following antennas were provided to the EUT.

| Antenna Spec. | Ant. No. | Model name | Ant. Type | Gain (dBi) |
|---------------|----------|----------------|--------------------|----------------|
| | 1 | RFID (128KHz) | Coil and capacitor | Not applicable |
| | 2 | NFC (13.56MHz) | PCB | Not applicable |
| | 3 | BLE (2.4G) | PCB | 0 |

- The EUT consumes power from the following adapter. (For support unit only)

| | |
|--------------|--------------------------------|
| Brand | DVE |
| Model | DSA-12PFT-12 FUS 120100 |
| Input Power | 100-240Vac, 50/60Hz, 0.5A |
| Output Power | 12Vdc, 1A |
| Power Line | 1.47m power cable without core |

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

3.2 Description of Test Modes

BT LE:

40 channels are provided provided to this EUT:

| Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|---------|-------------|---------|-------------|---------|-------------|---------|-------------|
| 0 | 2402 | 10 | 2422 | 20 | 2442 | 30 | 2462 |
| 1 | 2404 | 11 | 2424 | 21 | 2444 | 31 | 2464 |
| 2 | 2406 | 12 | 2426 | 22 | 2446 | 32 | 2466 |
| 3 | 2408 | 13 | 2428 | 23 | 2448 | 33 | 2468 |
| 4 | 2410 | 14 | 2430 | 24 | 2450 | 34 | 2470 |
| 5 | 2412 | 15 | 2432 | 25 | 2452 | 35 | 2472 |
| 6 | 2414 | 16 | 2434 | 26 | 2454 | 36 | 2474 |
| 7 | 2416 | 17 | 2436 | 27 | 2456 | 37 | 2476 |
| 8 | 2418 | 18 | 2438 | 28 | 2458 | 38 | 2478 |
| 9 | 2420 | 19 | 2440 | 29 | 2460 | 39 | 2480 |

NFC:

1 channel was provided to this EUT:

| Channel | Frequency (MHz) |
|---------|-----------------|
| 1 | 13.56 |

RFID:

1 channel is provided to this EUT:

| Channel | Frequency (kHz) |
|---------|-----------------|
| 1 | 128 |

3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable to | | Description |
|--------------------|---------------|-------|-------------|
| | RE \geq 1G | RE<1G | |
| - | √ | √ | - |

Where RE \geq 1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**

Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Mode | Freq. Range | Available Channel | Tested Channel | Modulation Technology |
|--------------------|--------------|-----------------|-------------------|----------------|-----------------------|
| - | BT LE + NFC | 2402 ~ 2480 MHz | 0, 19, 39 | 19 + 1 | GFSK |
| | | 13.56 MHz | 1 | | ASK |
| - | BT LE + RFID | 2402 ~ 2480 MHz | 0, 19, 39 | 19 + 1 | GFSK |
| | | 128 kHz | 1 | | FSK |

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Mode | Freq. Range | Available Channel | Tested Channel | Modulation Technology |
|--------------------|--------------|-----------------|-------------------|----------------|-----------------------|
| - | BT LE + NFC | 2402 ~ 2480 MHz | 0, 19, 39 | 19 + 1 | GFSK |
| | | 13.56 MHz | 1 | | ASK |
| - | BT LE + RFID | 2402 ~ 2480 MHz | 0, 19, 39 | 19 + 1 | GFSK |
| | | 128 kHz | 1 | | FSK |

Test Condition:

| Applicable to | Environmental Conditions | Input Power (System) | Tested by |
|---------------|--------------------------|----------------------|------------|
| RE \geq 1G | 23 deg. C, 67 % RH | 120 Vac, 60 Hz | Edison Lee |
| RE<1G | 23 deg. C, 67 % RH | 120 Vac, 60 Hz | Edison Lee |

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

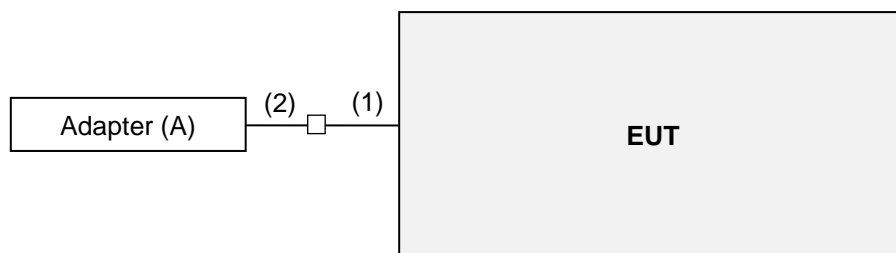
| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks |
|----|----------|-------|-------------------------|------------|--------|--------------------------|
| A | Adapter | DVE | DSA-12PFT-12 FUS 120100 | NA | NA | Provided by manufacturer |
| B | NFC Card | NA | NA | NA | NA | Provided by lab |

Note: All power cords of the above support units are non-shielded (1.8m).

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|----|---------------|------|------------|--------------------|--------------|--------------------------|
| 1. | DC cable | 1 | 0.4 | N | 0 | Attached on EUT |
| 2. | Adapter cable | 1 | 1.47 | Y | 0 | Provided by manufacturer |

3.3.1 Configuration of System under Test

For BT LE & RFID



For NFC



3.4 General Description of Applied Standards

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

Test Standard:

FCC Part 15, Subpart C (15.247)

FCC Part 15, Subpart C (15.225)

FCC Part 15, Subpart C (15.215)

FCC Part 15, Subpart C (15.209)

ANSI C63.10-2013

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

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

KDB 414788 D01 Radiated Test Site v01r01

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

| Frequencies (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009 ~ 0.490 | 2400/F (kHz) | 300 |
| 0.490 ~ 1.705 | 24000/F (kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.1.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due |
|--|--|---|---------------|---------------|
| Test Receiver Rohde & Schwarz | N9038A | MY55420137 | Apr. 09, 2021 | Apr. 08, 2022 |
| Spectrum Analyzer KEYSIGHT | N9020B | MY60110440 | Dec. 09, 2021 | Dec. 08, 2022 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 1213 | Oct. 27, 2021 | Oct. 26, 2022 |
| HORN Antenna RF SPIN | DRH18-E | 210103A18E | Nov. 14, 2021 | Nov. 13, 2022 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | 9170 | Dec. 10, 2021 | Dec. 09, 2022 |
| Loop Antenna EMCI | EM-6879 | 269 | Sep. 16, 2021 | Sep. 15, 2022 |
| Loop Antenna TESEQ | HLA 6121 | 45745 | Jul. 21, 2021 | Jul. 20, 2022 |
| Preamplifier EMCI | EMC330N | 980782 | Jan. 12, 2021 | Jan. 11, 2022 |
| Preamplifier EMCI | EMC118A45SE | 980808 | Jan. 12, 2021 | Jan. 11, 2022 |
| Preamplifier EMCI | EMC184045SE | 980788 | Jan. 12, 2021 | Jan. 11, 2022 |
| RF signal cable EMCI | EMC104-SM-SM- (9000+2000+1000) | 201243+ 201231+ 210102 | Jan. 12, 2021 | Jan. 11, 2022 |
| RF signal cable EMCI | EMCCFD400-NM- NM- (9000+300+500) | 201236+ 201235+ 201233 | Jan. 12, 2021 | Jan. 11, 2022 |
| RF signal cable EMCI | EMC101G-KM-KM- (5000+3000+2000) | 201260+201257+201254 | Jan. 12, 2021 | Jan. 11, 2022 |
| Software BV ADT | ADT_Radiated_V7. 6.15.9.5 | NA | NA | NA |
| Antenna Tower Max-Full | MFT-151SS-0.5T | NA | NA | NA |
| Turn Table Max-Full | MF-7802BS | NA | NA | NA |
| Turn Table Controller Max-Full | MF-7802BS | MF780208674 | NA | NA |
| USB Wideband Power Sensor KEYSIGHT | U2021XA | MY55050005/MY55190004/ MY55190007/MY55210005 | Jul. 12, 2021 | Jul. 11, 2022 |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in WM Chamber 8.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

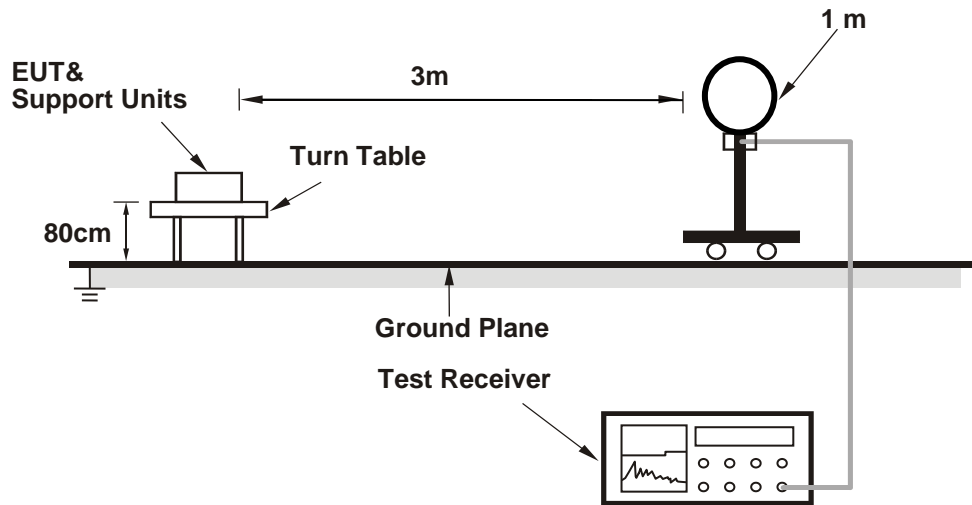
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

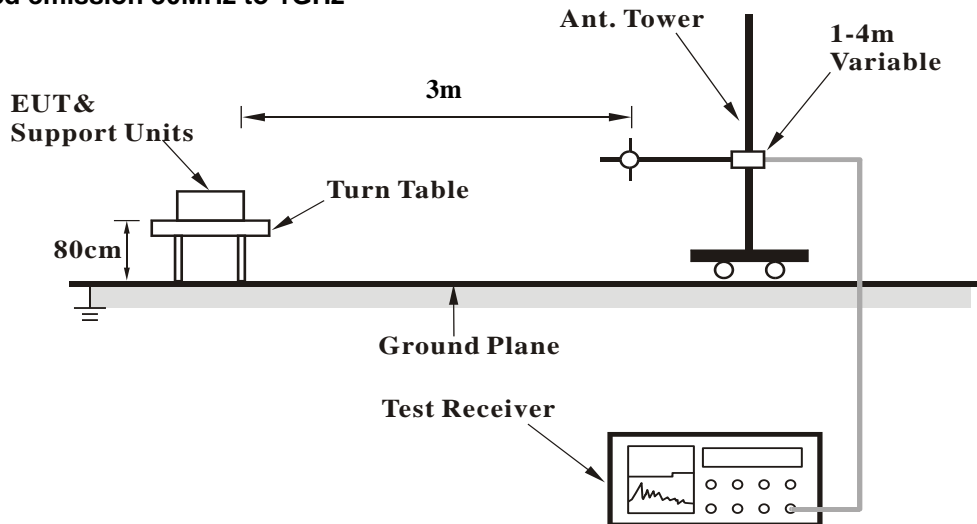
No deviation.

4.1.5 Test Setup

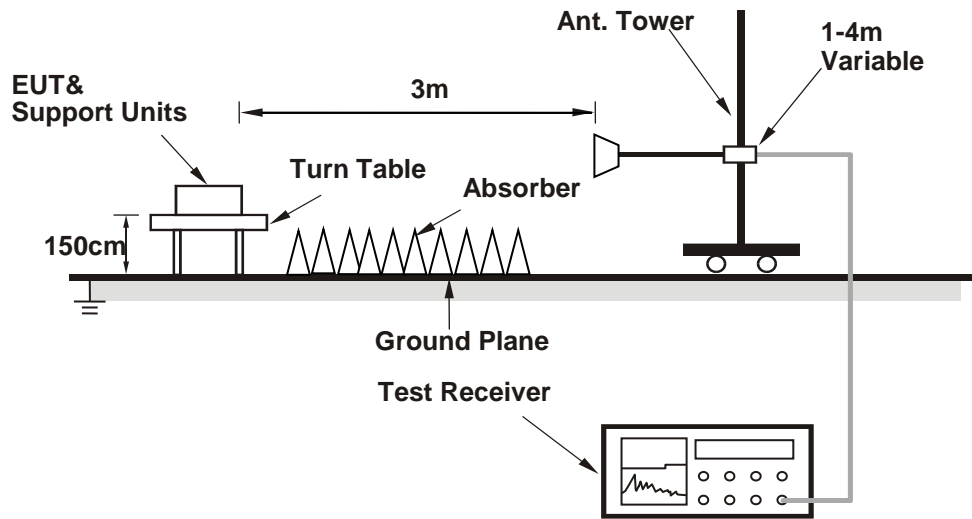
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

BT LE CH19 + NFC CH 1

| | | | |
|-----------------|--------------|-------------------|---------------------------|
| Frequency Range | 1GHz ~ 25GHz | Detector Function | Peak (PK) Average (AV) |
|-----------------|--------------|-------------------|---------------------------|

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 2440.00 | 100.07 PK | | | 1.35 H | 145 | 68.35 | 31.72 |
| 2 | 2440.00 | 99.27 AV | | | 1.35 H | 145 | 67.55 | 31.72 |
| 3 | 4880.00 | 48.67 PK | 74.00 | -25.33 | 1.66 H | 217 | 46.08 | 2.59 |
| 4 | 4880.00 | 35.17 AV | 54.00 | -18.83 | 1.66 H | 217 | 32.58 | 2.59 |
| Antenna Polarity & Test Distance : Vertical at 3 m | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 2440.00 | 97.27 PK | | | 1.20 V | 217 | 65.55 | 31.72 |
| 2 | 2440.00 | 96.07 AV | | | 1.20 V | 217 | 64.35 | 31.72 |
| 3 | 4880.00 | 48.07 PK | 74.00 | -25.93 | 1.93 V | 98 | 45.48 | 2.59 |
| 4 | 4880.00 | 34.97 AV | 54.00 | -19.03 | 1.93 V | 98 | 32.38 | 2.59 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

BT LE CH19 + RFID CH 1

| | | | |
|-----------------|--------------|-------------------|---------------------------|
| Frequency Range | 1GHz ~ 25GHz | Detector Function | Peak (PK) Average (AV) |
|-----------------|--------------|-------------------|---------------------------|

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 2440.00 | 98.97 PK | | | 1.35 H | 154 | 67.25 | 31.72 |
| 2 | 2440.00 | 98.17 AV | | | 1.35 H | 154 | 66.45 | 31.72 |
| 3 | 4880.00 | 48.47 PK | 74.00 | -25.53 | 1.59 H | 219 | 45.88 | 2.59 |
| 4 | 4880.00 | 34.97 AV | 54.00 | -19.03 | 1.59 H | 219 | 32.38 | 2.59 |
| Antenna Polarity & Test Distance : Vertical at 3 m | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 2440.00 | 96.47 PK | | | 1.11 V | 219 | 64.75 | 31.72 |
| 2 | 2440.00 | 95.17 AV | | | 1.11 V | 219 | 63.45 | 31.72 |
| 3 | 4880.00 | 47.97 PK | 74.00 | -26.03 | 2.01 V | 106 | 45.38 | 2.59 |
| 4 | 4880.00 | 34.77 AV | 54.00 | -19.23 | 2.01 V | 106 | 32.18 | 2.59 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

Below 1GHz data

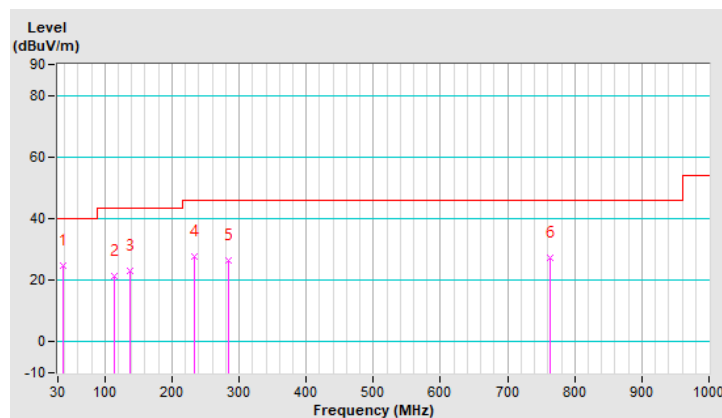
BT LE CH19 + NFC CH 1

| | | | |
|-----------------|--------------|-------------------|-----------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |
|-----------------|--------------|-------------------|-----------------|

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 38.43 | 24.88 QP | 40.00 | -15.12 | 2.00 H | 18 | 43.58 | -18.70 |
| 2 | 114.35 | 21.52 QP | 43.50 | -21.98 | 1.51 H | 51 | 42.41 | -20.89 |
| 3 | 138.25 | 23.10 QP | 43.50 | -20.40 | 1.51 H | 51 | 41.78 | -18.68 |
| 4 | 232.43 | 27.53 QP | 46.00 | -18.47 | 1.51 H | 270 | 47.89 | -20.36 |
| 5 | 284.45 | 26.49 QP | 46.00 | -19.51 | 1.01 H | 195 | 44.39 | -17.90 |
| 6 | 762.42 | 27.23 QP | 46.00 | -18.77 | 1.51 H | 2 | 35.16 | -7.93 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

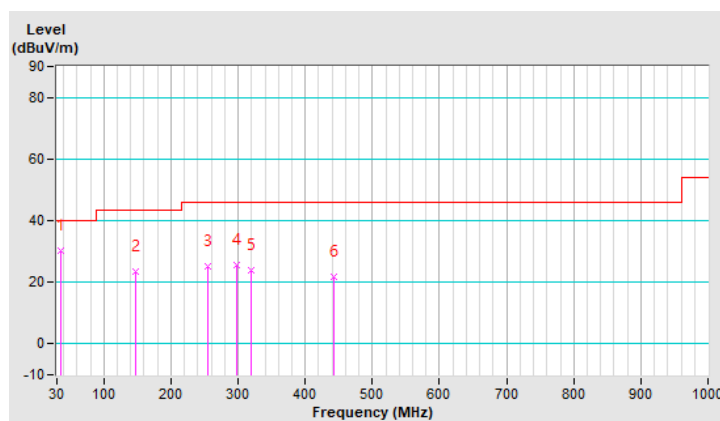


| | | | |
|-----------------|--------------|-------------------|-----------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |
|-----------------|--------------|-------------------|-----------------|

| Antenna Polarity & Test Distance : Vertical at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 35.62 | 30.22 QP | 40.00 | -9.78 | 2.00 V | 263 | 49.33 | -19.11 |
| 2 | 148.09 | 23.31 QP | 43.50 | -20.19 | 1.00 V | 70 | 41.45 | -18.14 |
| 3 | 254.93 | 25.05 QP | 46.00 | -20.95 | 1.00 V | 109 | 44.30 | -19.25 |
| 4 | 297.10 | 25.63 QP | 46.00 | -20.37 | 1.00 V | 122 | 43.31 | -17.68 |
| 5 | 319.59 | 24.04 QP | 46.00 | -21.96 | 1.49 V | 72 | 41.05 | -17.01 |
| 6 | 441.90 | 21.63 QP | 46.00 | -24.37 | 1.00 V | 294 | 35.36 | -13.73 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



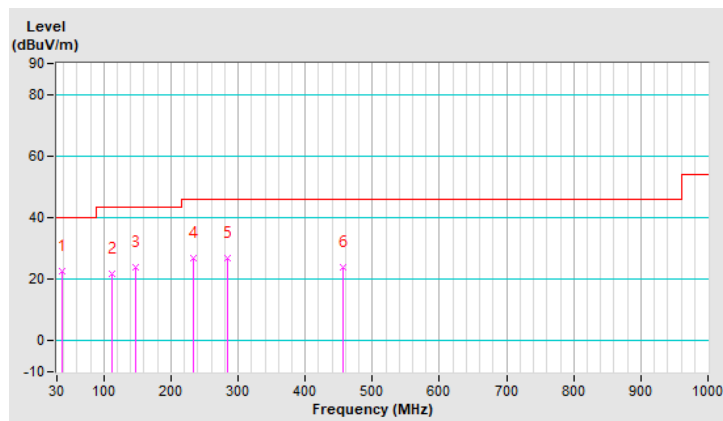
BT LE CH19 + RFID CH 1

| | | | |
|-----------------|--------------|-------------------|-----------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |
|-----------------|--------------|-------------------|-----------------|

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 37.03 | 22.63 QP | 40.00 | -17.37 | 1.01 H | 18 | 41.48 | -18.85 |
| 2 | 111.54 | 21.67 QP | 43.50 | -21.83 | 1.50 H | 2 | 42.87 | -21.20 |
| 3 | 148.09 | 23.69 QP | 43.50 | -19.81 | 1.01 H | 118 | 41.83 | -18.14 |
| 4 | 232.43 | 26.96 QP | 46.00 | -19.04 | 1.50 H | 248 | 47.32 | -20.36 |
| 5 | 284.45 | 26.85 QP | 46.00 | -19.15 | 1.01 H | 194 | 44.75 | -17.90 |
| 6 | 455.96 | 23.78 QP | 46.00 | -22.22 | 1.01 H | 244 | 37.13 | -13.35 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

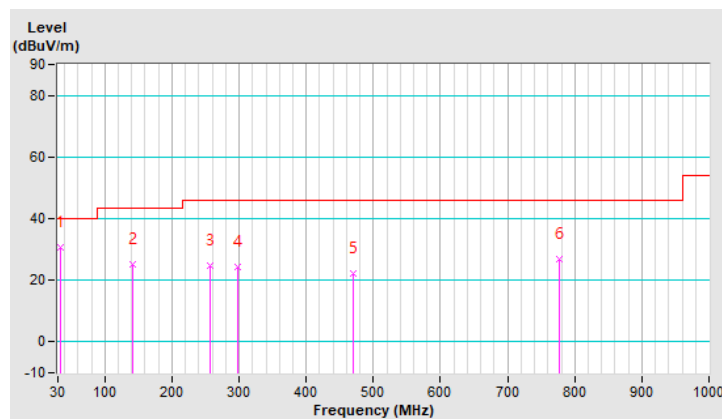


| | | | |
|-----------------|--------------|-------------------|-----------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |
|-----------------|--------------|-------------------|-----------------|

| Antenna Polarity & Test Distance : Vertical at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 34.22 | 30.54 QP | 40.00 | -9.46 | 1.49 V | 5 | 49.73 | -19.19 |
| 2 | 141.06 | 25.13 QP | 43.50 | -18.37 | 1.00 V | 65 | 43.64 | -18.51 |
| 3 | 256.33 | 24.60 QP | 46.00 | -21.40 | 1.00 V | 274 | 43.80 | -19.20 |
| 4 | 297.10 | 24.47 QP | 46.00 | -21.53 | 1.00 V | 106 | 42.15 | -17.68 |
| 5 | 470.01 | 22.40 QP | 46.00 | -23.60 | 1.00 V | 190 | 35.60 | -13.20 |
| 6 | 777.88 | 26.80 QP | 46.00 | -19.20 | 1.00 V | 113 | 34.56 | -7.76 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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

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