

FCC Test Report

Report No.: RF200710C07-3

FCC ID: L6AITE100-1

Test Model: ITE100-1

Received Date: Jul. 10, 2020

Test Date: Sep. 11 ~ Oct. 28, 2020

Issued Date: Nov. 03, 2020

Applicant: BlackBerry Limited

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

| Issue No. | Description | Date Issued |
|---------------|------------------|---------------|
| RF200710C07-3 | Original Release | Nov. 03, 2020 |

1 Certificate of Conformity

Product: mmwave RF Cargo Sensor with short range RF connectivity

Brand: BlackBerry

Test Model: ITE100-1

Sample Status: Identical Prototype

Applicant: BlackBerry Limited

Test Date: Sep. 11 ~ Oct. 28, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.249)
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 : Gina Liu, **Date:** Nov. 03, 2020
Gina Liu / Specialist

Approved by : Dylan Chiou, **Date:** Nov. 03, 2020
Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart C (Section 15.249) | | | |
|--|---|--------|--|
| FCC Clause | Test Item | Result | Remarks |
| 15.207 | AC Power Conducted Emission | N/A | Without AC Power port of the EUT. |
| 15.215 (c) | 20dB Bandwidth | PASS | Meet the requirement of limit. |
| 15.209 15.249 15.249 (d) | Radiated Emission Test Band Edge Measurement Limit: 50 dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209 | PASS | Meet the requirement of limit. Minimum passing margin is -0.2 dB at 902.00 MHz and 915.00 MHz and 928.00 MHz. |
| 15.203 | Antenna Requirement | PASS | No antenna connector is used. |

N/A: Not Applicable

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) (±) |
|------------------------------------|--------------------|--------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz | 2.79 dB |
| Radiated Emissions up to 1 GHz | 9 kHz ~ 30 MHz | 3.04 dB |
| | 30 MHz ~ 200 MHz | 3.59 dB |
| | 200 MHz ~ 1000 MHz | 3.60 dB |
| Radiated Emissions above 1 GHz | 1 GHz ~ 18 GHz | 2.29 dB |
| | 18 GHz ~ 40 GHz | 2.29 dB |

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

| | |
|----------------------------|---|
| Product | mmwave RF Cargo Sensor with short range RF connectivity |
| Brand | BlackBerry |
| Test Model | ITE100-1 |
| Status of EUT | Identical Prototype |
| Power Supply Rating | 3.6 Vdc (Battery) |
| Modulation Type | 2GFSK, OQPSK |
| Transfer Rate | 32 kbps, 38.4 kbps, 40 kbps, 48 kbps, 50 kbps, 56 kbps, 75 kbps, 80kbps, 100 kbps, 150 kbps, 250 kbps, 500 kbps, 800 kbps |
| Operating Frequency | 903 ~ 927 MHz |
| Number of Channel | 25 |
| Antenna Type | Monopole Antenna with 2.91 dBi gain |
| Antenna Connector | N/A |
| Accessory Device | N/A |
| Data Cable Supplied | N/A |

Note:

1. The EUT contains following accessory devices.

| Product | Brand | Model | Description |
|---------|------------|------------------|---------------|
| Battery | BlackBerry | TLP-93111/A/BB7B | 3.6 Vdc, 19 A |

2. 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.
3. 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.
4. SRD & other technology cannot transmit same time.

3.2 Description of Test Modes

25 channels are provided to this EUT:

| Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|---------|-------------|---------|-------------|---------|-------------|
| 1 | 903 | 10 | 912 | 19 | 921 |
| 2 | 904 | 11 | 913 | 20 | 922 |
| 3 | 905 | 12 | 914 | 21 | 923 |
| 4 | 906 | 13 | 915 | 22 | 924 |
| 5 | 907 | 14 | 916 | 23 | 925 |
| 6 | 908 | 15 | 917 | 24 | 926 |
| 7 | 909 | 16 | 918 | 25 | 927 |
| 8 | 910 | 17 | 919 | | |
| 9 | 911 | 18 | 920 | | |

3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable To | | | | Description |
|--------------------|---------------|-------|-----|------|-------------|
| | RE \geq 1G | RE<1G | PLC | APCM | |
| - | √ | √ | - | √ | - |

Where **RE \geq 1G**: Radiated Emission above 1 GHz **RE<1G**: Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

Note: 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
2. "-" means no effect.
3. For radiated emission test, pre-tested 2GFSK, OQPSK modulation type and found 2GFSK was the worse, therefore chosen for the final test and presented in the test report.

Radiated Emission Test (Above 1 GHz) and Band Edge Measurement:

- ☒ 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 | Available Channel | Tested Channel | Modulation Type | Data Rate (kbps) |
|--------------------|-------------------|----------------|-----------------|------------------|
| - | 1 to 25 | 1, 13, 25 | OQPSK | 160 |

Radiated Emission Test (Below 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 | Available Channel | Tested Channel | Modulation Type | Data Rate (kbps) |
|--------------------|-------------------|----------------|-----------------|------------------|
| - | 1 to 25 | 13 | OQPSK | 160 |

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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 | Available Channel | Tested Channel | Modulation Type | Data Rate (kbps) |
|--------------------|-------------------|----------------|-----------------|------------------|
| - | 1 to 25 | 1, 13, 25 | OQPSK | 160 |

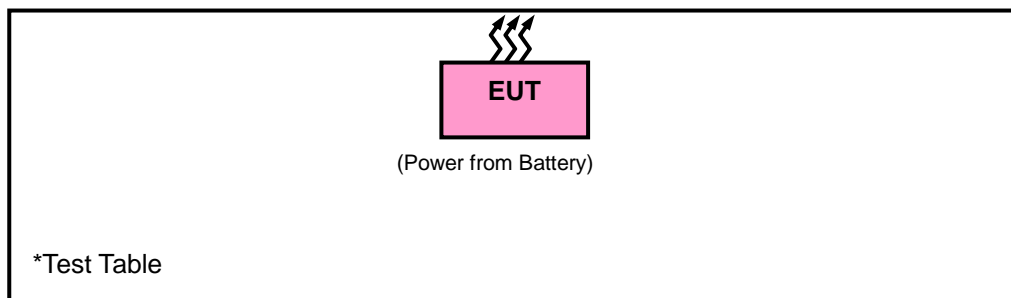
Test Condition:

| Applicable To | Environmental Conditions | Input Power | Tested by |
|---------------|--------------------------|-------------|-----------|
| RE \geq 1G | 22 deg. C, 66 % RH | 3.6 Vdc | Greg Lin |
| RE<1G | 22 deg. C, 66 % RH | 3.6 Vdc | Greg Lin |
| APCM | 25 deg. C, 60 % RH | 3.6 Vdc | Wayne Lin |

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3.1 Configuration of System under Test



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:

FCC Part 15, Subpart C (15.249)

ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

| Fundamental Frequency | Field Strength of Fundamental (millivolts/meter) | Field Strength of Harmonics (microvolts/meter) |
|-----------------------|--|--|
| 902 ~ 928 MHz | 50 | 500 |
| 2400 ~ 2483.5 MHz | 50 | 500 |
| 5725 ~ 5875 MHz | 50 | 500 |
| 24 ~ 24.25 GHz | 250 | 2500 |

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation

| 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 20dB under any condition of modulation.

4.1.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|---|--|---------------------------------|---------------------|-------------------------|
| Test Receiver KEYSIGHT | N9038A | MY55420137 | Apr. 16, 2020 | Apr. 15, 2021 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSV40 | 100979 | Mar. 18, 2020 | Mar. 17, 2021 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100039 | Jun. 12, 2020 | Jun. 11, 2021 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-160 | Nov. 07, 2019 | Nov. 06, 2020 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-1169 | Nov. 24, 2019 | Nov. 23, 2020 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | BBHA9170241 | Nov. 24, 2019 | Nov. 23, 2020 |
| Loop Antenna TESEQ | HLA 6121 | 45745 | Jul. 06, 2020 | Jul. 05, 2021 |
| Preamplifier Agilent (Below 1GHz) | 8447D | 2944A10638 | Jun. 08, 2020 | Jun. 07, 2021 |
| Preamplifier Agilent (Above 1GHz) | 8449B | 3008A02367 | Feb. 18, 2020 | Feb. 17, 2021 |
| RF signal cable HUBER+SUHNER&EMCI | SUCOFLEX 104 & EMC104-SM- SM8000 | CABLE-CH9-02 (248780+171006) | Jan. 18, 2020 | Jan. 17, 2021 |
| RF signal cable HUBER+SUHNER | SUCOFLEX 104 | CABLE-CH9- (250795/4) | Jan. 18, 2020 | Jan. 17, 2021 |
| RF signal cable Woken | 8D-FB | Cable-CH9-01 | Jun. 08, 2020 | Jun. 07, 2021 |
| Software BV ADT | ADT_Radiated_ V7.6.15.9.5 | NA | NA | NA |
| Antenna Tower EMCO | 2070/2080 | 512.835.4684 | NA | NA |
| Turn Table EMCO | 2087-2.03 | NA | NA | NA |
| Antenna Tower & Turn BV ADT | AT100 | AT93021705 | NA | NA |
| Turn Table BV ADT | TT100 | TT93021705 | NA | NA |
| Turn Table Controller BV ADT | SC100 | SC93021705 | NA | NA |
| Boresight Antenna Fixture | FBA-01 | FBA-SIP01 | NA | NA |

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 HwaYa Chamber 9.

4.1.3 Test Procedures

For Radiated emission below 30 MHz

- 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. Both 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 9 kHz at frequency below 30 MHz.

For Radiated emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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 detected 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:

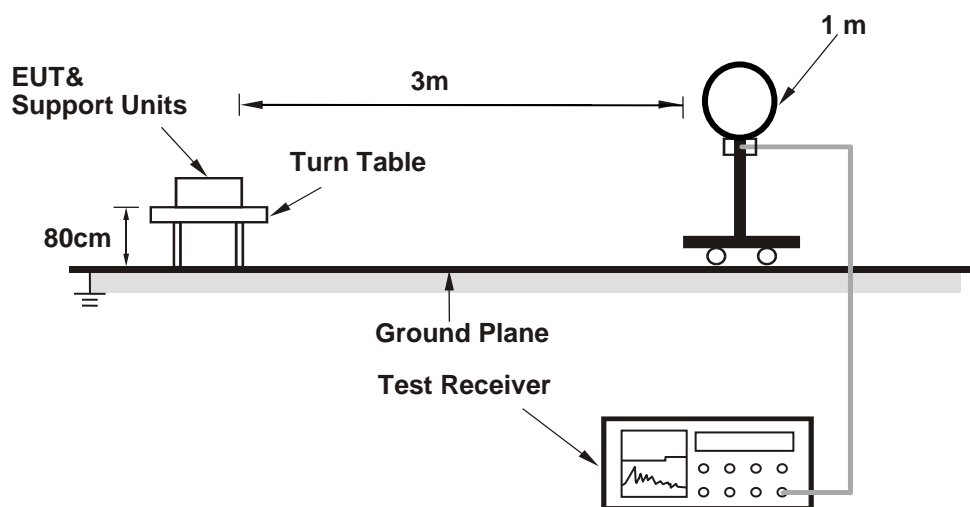
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK)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

4.1.4 Deviation from Test Standard

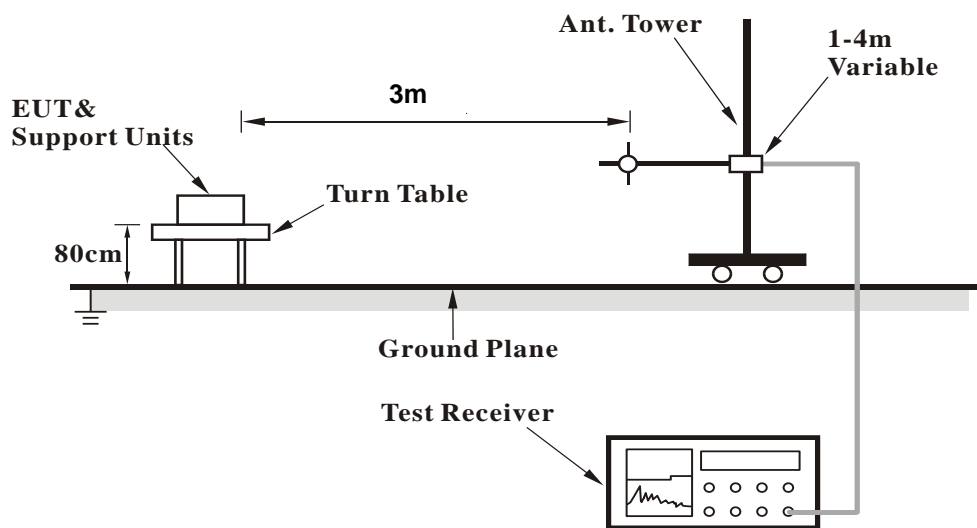
No deviation.

4.1.5 Test Set Up

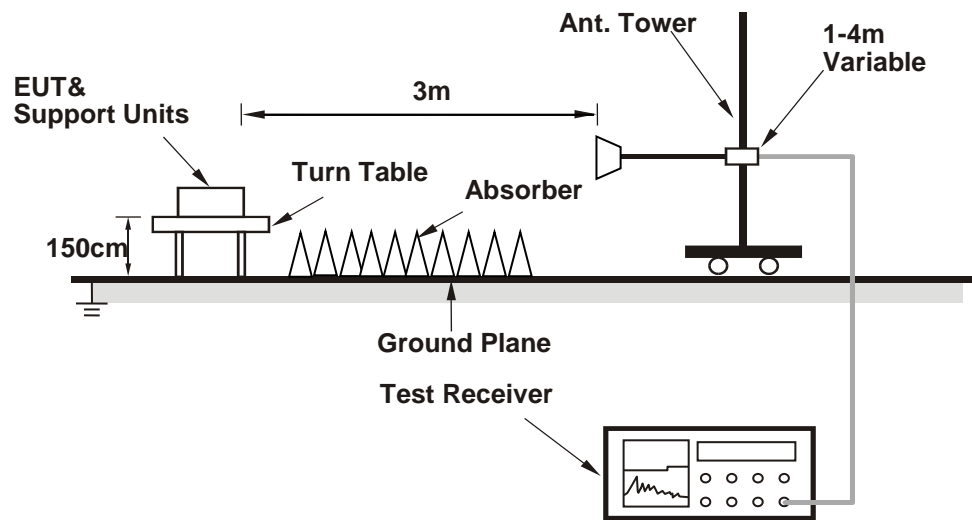
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz WORST-CASE DATA:

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 1 | Frequency Range | 1 GHz ~ 10 GHz |
| Input Power | 3.6 Vdc | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 1806.00 | 54.6 PK | 74.0 | -19.4 | 2.94 H | 209 | 60.2 | -5.6 |
| 2 | 1806.00 | 50.3 AV | 54.0 | -3.7 | 2.94 H | 209 | 55.9 | -5.6 |
| 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 | 1806.00 | 52.5 PK | 74.0 | -21.5 | 1.83 V | 274 | 58.1 | -5.6 |
| 2 | 1806.00 | 47.2 AV | 54.0 | -6.8 | 1.83 V | 274 | 52.8 | -5.6 |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 903 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 13 | Frequency Range | 1 GHz ~ 10 GHz |
| Input Power | 3.6 Vdc | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 1830.00 | 55.3 PK | 74.0 | -18.7 | 2.26 H | 147 | 60.7 | -5.4 |
| 2 | 1830.00 | 51.1 AV | 54.0 | -2.9 | 2.26 H | 147 | 56.5 | -5.4 |
| 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 | 1830.00 | 52.9 PK | 74.0 | -21.1 | 1.49 H | 324 | 58.3 | -5.4 |
| 2 | 1830.00 | 47.7 AV | 54.0 | -6.3 | 1.49 H | 324 | 53.1 | -5.4 |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 915 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 25 | Frequency Range | 1 GHz ~ 10 GHz |
| Input Power | 3.6 Vdc | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 1854.00 | 54.9 PK | 74.0 | -19.1 | 2.29 H | 173 | 60.2 | -5.3 |
| 2 | 1854.00 | 50.3 AV | 54.0 | -3.7 | 2.29 H | 173 | 55.6 | -5.3 |
| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
| 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 | 1854.00 | 52.7 PK | 74.0 | -21.3 | 1.76 V | 323 | 58.0 | -5.3 |
| 2 | 1854.00 | 47.5 AV | 54.0 | -6.5 | 1.76 V | 323 | 52.8 | -5.3 |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 927 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

Below 1 GHz WORST-CASE DATA:

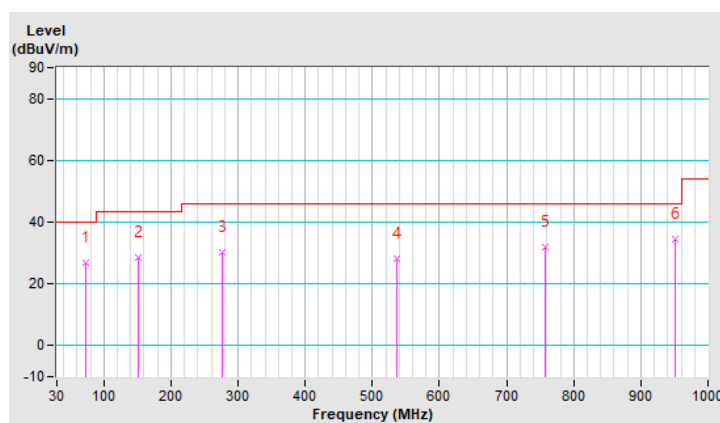
<Spurious Emissions Measurement>

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|-----------------|
| Channel | Channel 13 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 3.6 Vdc | Detector Function | Quasi-peak (QP) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 73.65 | 27.0 QP | 40.0 | -13.0 | 1.25 H | 91 | 38.8 | -11.8 |
| 2 | 150.28 | 28.7 QP | 43.5 | -14.8 | 1.00 H | 110 | 37.4 | -8.7 |
| 3 | 277.35 | 30.3 QP | 46.0 | -15.7 | 1.50 H | 82 | 37.8 | -7.5 |
| 4 | 537.31 | 28.0 QP | 46.0 | -18.0 | 1.25 H | 162 | 30.4 | -2.4 |
| 5 | 756.53 | 31.9 QP | 46.0 | -14.1 | 1.00 H | 237 | 29.7 | 2.2 |
| 6 | 951.50 | 34.5 QP | 46.0 | -11.5 | 1.25 H | 186 | 28.9 | 5.6 |

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.

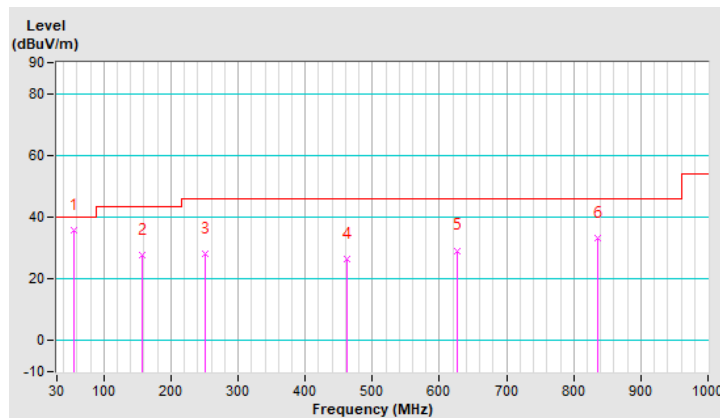


| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|-----------------|
| Channel | Channel 13 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 3.6 Vdc | Detector Function | Quasi-peak (QP) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 56.19 | 35.8 QP | 40.0 | -4.2 | 1.25 V | 48 | 45.0 | -9.2 |
| 2 | 157.07 | 27.9 QP | 43.5 | -15.6 | 1.00 V | 227 | 36.2 | -8.3 |
| 3 | 250.19 | 28.1 QP | 46.0 | -17.9 | 1.50 V | 195 | 37.1 | -9.0 |
| 4 | 461.65 | 26.3 QP | 46.0 | -19.7 | 1.25 V | 103 | 29.8 | -3.5 |
| 5 | 626.55 | 29.2 QP | 46.0 | -16.8 | 1.00 V | 197 | 29.5 | -0.3 |
| 6 | 836.07 | 33.2 QP | 46.0 | -12.8 | 1.25 V | 236 | 29.9 | 3.3 |

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.



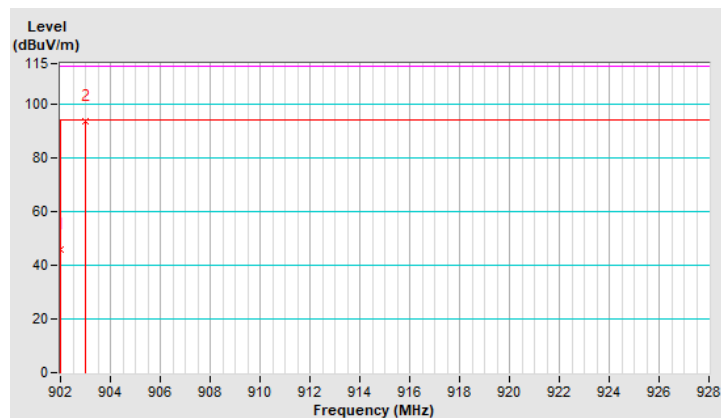
<Band Edge Measurement>

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|-----------------|
| Channel | Channel 1 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 3.6 Vdc | Detector Function | Quasi-peak (QP) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 902.00 | 45.8 QP | 46.0 | -0.2 | 1.53 H | 255 | 13.4 | 32.4 |
| 2 | 903.00 | 93.6 QP | 94.0 | -0.4 | 1.53 H | 255 | 61.1 | 32.5 |

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.

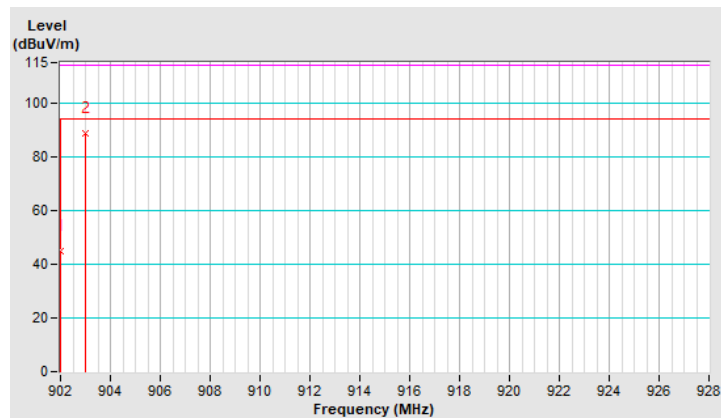


| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|-----------------|
| Channel | Channel 1 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 3.6 Vdc | Detector Function | Quasi-peak (QP) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 902.00 | 45.0 QP | 46.0 | -1.0 | 1.59 V | 166 | 12.6 | 32.4 |
| 2 | 903.00 | 88.8 QP | 94.0 | -5.2 | 1.59 V | 166 | 56.3 | 32.5 |

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.

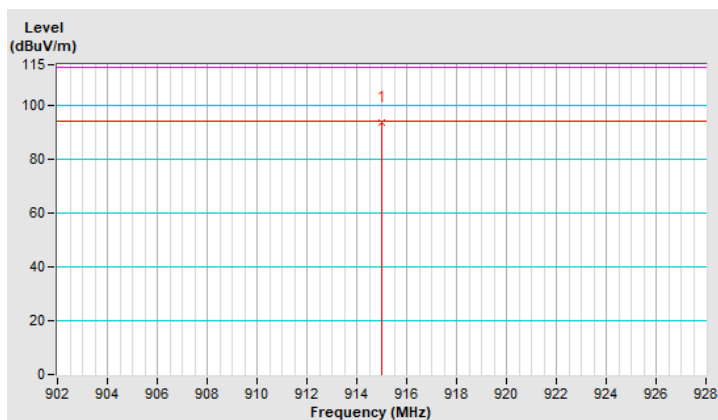


| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|-----------------|
| Channel | Channel 13 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 3.6 Vdc | Detector Function | Quasi-peak (QP) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 915.00 | 93.8 QP | 94.0 | -0.2 | 1.54 H | 258 | 61.0 | 32.8 |

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.

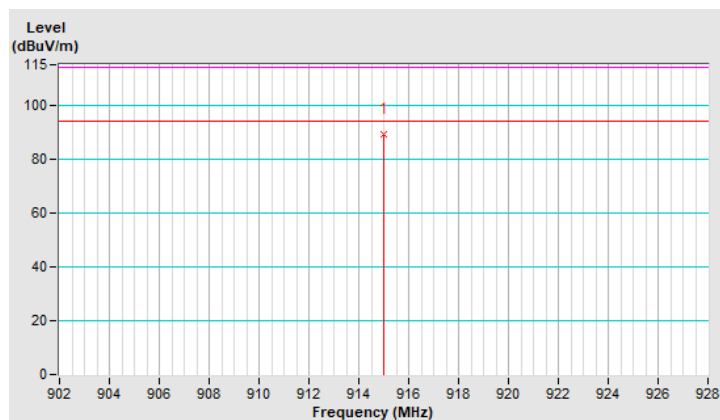


| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|-----------------|
| Channel | Channel 13 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 3.6 Vdc | Detector Function | Quasi-peak (QP) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 915.00 | 89.0 QP | 94.0 | -5.0 | 1.62 V | 157 | 56.2 | 32.8 |

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.

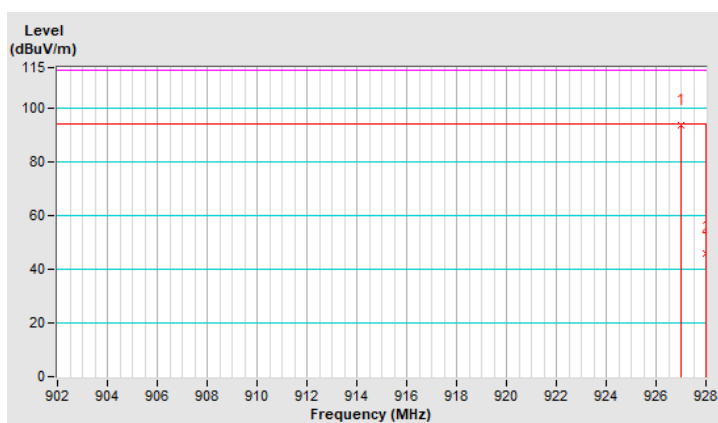


| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|-----------------|
| Channel | Channel 25 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 3.6 Vdc | Detector Function | Quasi-peak (QP) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 927.00 | 93.6 QP | 94.0 | -0.4 | 1.51 H | 256 | 60.7 | 32.9 |
| 2 | 928.00 | 45.8 QP | 46.0 | -0.2 | 1.51 H | 256 | 12.9 | 32.9 |

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.

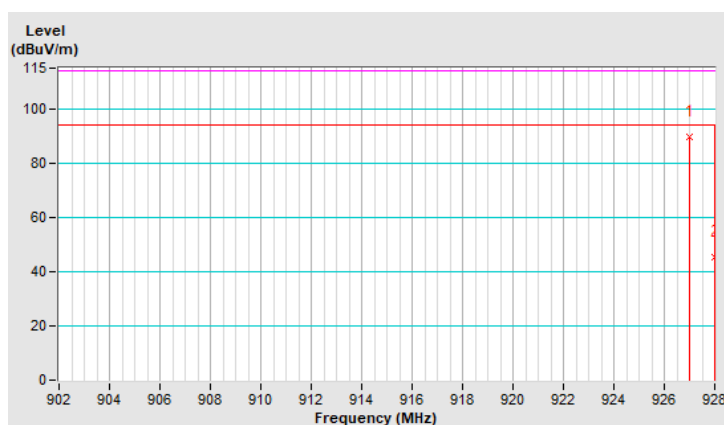


| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|-----------------|
| Channel | Channel 25 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 3.6 Vdc | Detector Function | Quasi-peak (QP) |
| Environmental Conditions | 22 deg. C, 66 % RH | Tested By | Greg Lin |

| 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 | 927.00 | 89.7 QP | 94.0 | -4.3 | 1.63 V | 157 | 56.8 | 32.9 |
| 2 | 928.00 | 45.3 QP | 46.0 | -0.7 | 1.63 V | 157 | 12.4 | 32.9 |

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.



4.2 20 dB Bandwidth Measurement

4.2.1 Limits of 20 dB Bandwidth Measurement

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.

4.2.5 Deviation from Test Standard

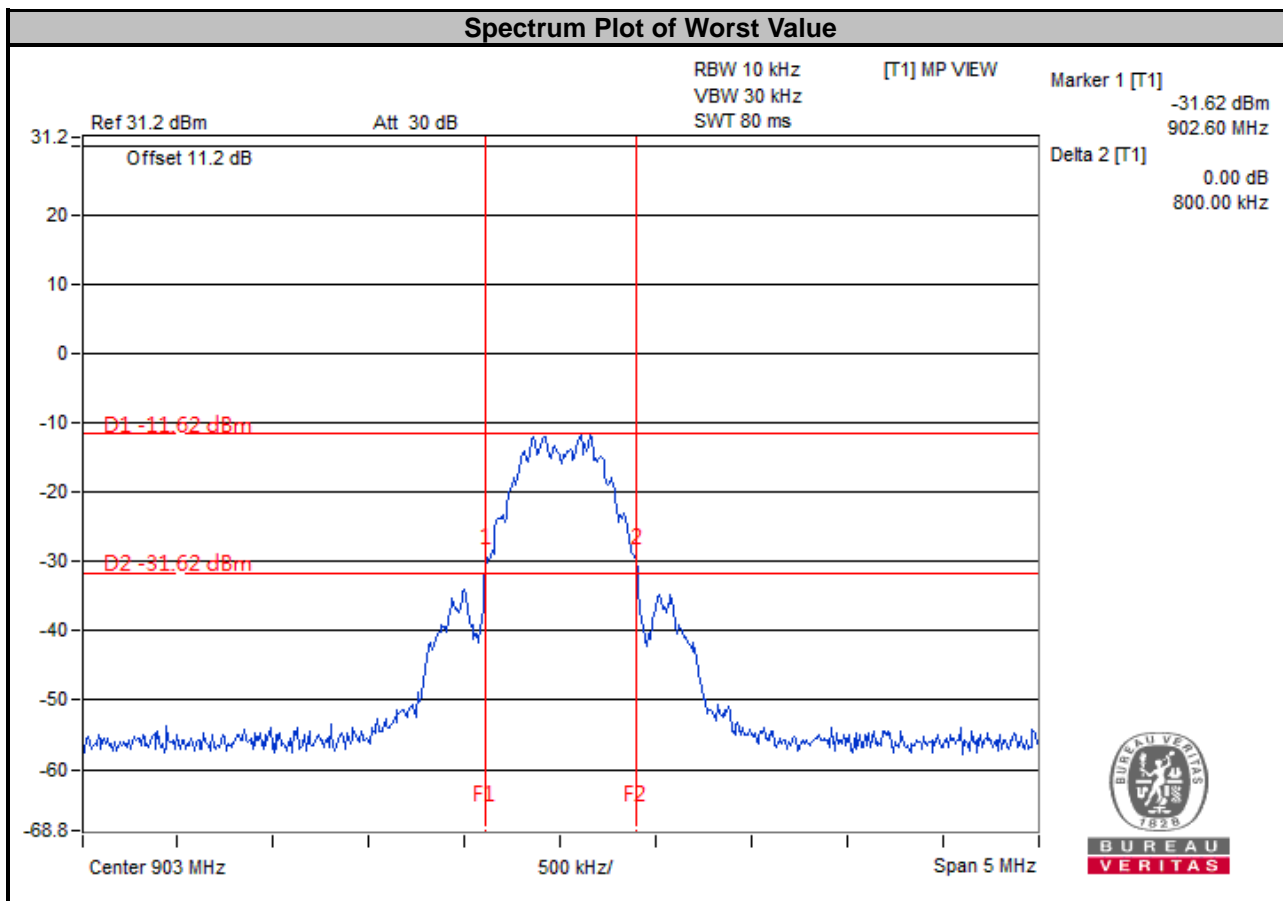
No deviation.

4.2.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at channel frequencies individually.

4.2.7 Test Result

| Channel | Frequency (MHz) | 20 dB Bandwidth (MHz) | Pass / Fail |
|---------|-----------------|-----------------------|-------------|
| 1 | 903 | 0.80 | Pass |
| 13 | 915 | 0.80 | Pass |
| 25 | 927 | 0.80 | Pass |



5 Pictures of Test Arrangements

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

Appendix – Information on 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 according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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