



FCC TEST REPORT

According to

FCC CFR Title 47 Part 15 Subpart C

| | |
|-----------|--|
| Applicant | : BQT Solutions (Australia) Pty Ltd. |
| Address | : Unit 29,1 Talavera Road,North Ryde,NSW2113, Australia |
| Equipment | : 13.56MHz/125KHz Dual Frequency Contactless Smart Card Reader |
| Model No. | : BT950-DT |
| FCC ID | : QVL-BT950-2 |

- The test result refers exclusively to the test presented test model / sample.,
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- The test report must not be used by the clients to claim product certification approval by **NVLAP** or any agency of the Government.



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| Address | : Unit 29,1 Talavera Road,North Ryde,NSW2113, Australia |
| Equipment | : 13.56MHz/125KHz Dual Frequency Contactless Smart Card Reader |
| Model No. | : BT950-DT |
| Trade Name | : BQT Solutions |
| FCC ID | : QVL-BT950-2 |

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 – 2009** and the energy emitted by this equipment was **passed** **CISPR PUB. 22 and FCC Part 15** in radiated emission class B limits.

Testing was carried out on Apr. 23, 2015 at **Cerpass Technology (Suzhou) Co., Ltd.**

Signature

Miro Chueh
EMC/RF B.U. Manager



1. Report of Measurements and Examinations

| FCC Rule | Description of Test | Result |
|----------------------|----------------------------------|--------|
| 15.203 | Antenna Requirement | Pass |
| 15.207 | AC Power Line Conducted Emission | N/A |
| 15.225 (a) | In-band Emission | Pass |
| 15.225 (d) 15.209 | Out-of –band Emission | Pass |
| 15.225(e) | Frequency Stability Tolerance | Pass |

Note: (1) "N/A" denotes test is not applicable in this test report.



2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

| | |
|-------------------|--|
| Equipment | 13.56MHz/125KHz Dual Frequency Contactless Smart Card Reader |
| Model No. | BT950-DT |
| Frequency | 13.56MHz |
| Number of Channel | 1 channel |
| Modulation type | ASK |
| Transmit Power | 34.19dBuV/m at 3m (Peak) |
| Antenna type | N/A |
| Power Supply | 12V DC |

2.2. Carrier Frequency of Channels

| Channel | Frequency(MHz) | Channel | Frequency(MHz) |
|---------|----------------|---------|----------------|
| 01 | 13.56 | --- | --- |
| --- | --- | --- | --- |
| --- | --- | --- | --- |



2.3. Test Mode & Test Software

- A. Test Mode & Test Software
- B. During testing, the interface cables and equipment positions were varied according to ANSI C63.4
- C. The complete test system included EUT for RF test.
- D. The test mode was performed for radiation test.

2.4. Description of Test System

| No | Device | Manufacturer | Model No. | FCC ID | Series No. | Data Cable | Power Cord |
|----|-----------------|--------------|-----------|--------|------------|------------|------------|
| 1 | DC Power Supply | TOPWARD | 3303D | N/A | N/A | Unshielded | Unshielded |

2.5. General Information of Test

| | |
|----------------------------|---|
| Test Site: | Cerpass Technology (Suzhou) Co., Ltd. |
| Performand Location : | No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China |
| NVLAP LAB Code : | 200814-0 |
| FCC Registration Number : | 916572, 331395 |
| IC Registration Number : | 7290A-1, 7290A-2 |
| VCCI Registration Number : | T-343 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test below 1GHz G-227 for Radiated emission test above 1GHz |



2.6. Measurement Uncertainty

Test results and Measurement uncertainty without any relationship in the test report.

| Measurement | Polarity | Frequency | Uncertainty |
|------------------------------------|----------|-----------------|--------------|
| Radiated emissions (below 1GHz) | H | 30MHz ~ 200MHz | +/- 4.0677dB |
| | | 200MHz ~1000MHz | +/- 3.9131dB |
| | V | 30MHz ~ 200MHz | +/- 4.0678dB |
| | | 200MHz ~1000MHz | +/- 3.9142dB |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22: 2008, clause 11, Measurement Uncertainty) determining compliance with the limits shall be based on the results of the compliance measurement. Consequently the measured emissions being less than the maximum allowed emission result in this being a compliant test or passing test.



3. Antenna Requirements

3.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

3.2. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.3. Antenna Construction

N/A



4. Test of Spurious Emission (Radiated)

4.1. Test Limit

Radiated emissions from 13.553 MHz to 13.567 MHz were measured according to the 15.225(a), the field strength of any emissions within the band 13.553 – 13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

The filed strength of any emissions which appear outside of the 13.110 – 14.010 MHz band shall not exceed the general radiated emission limits in Section 15.209.

| Frequency (MHz) | Distance Meters | Radiated (μ V / M) | Radiated (dB μ V/ M) |
|--------------------------------|-----------------|-------------------------|--------------------------|
| 13.553-13.567 | 30 | 15848 | 84.0 |
| 13.410-13.553 13.567-13.710 | 30 | 334 | 50.5 |
| 13.110-13.410 13.710-14.010 | 30 | 106 | 40.5 |

| Frequency (MHz) | Distance Meters | Radiated (μ V / M) | Radiated (dB μ V/ M) |
|-----------------|-----------------|-------------------------|--------------------------|
| 1.705 to 30 | 30 | 30 | 29.5 |
| 30-88 | 3 | 100 | 40.0 |
| 88-216 | 3 | 150 | 43.5 |
| 216-960 | 3 | 200 | 46.0 |
| Above 960 | 3 | 500 | 54.0 |

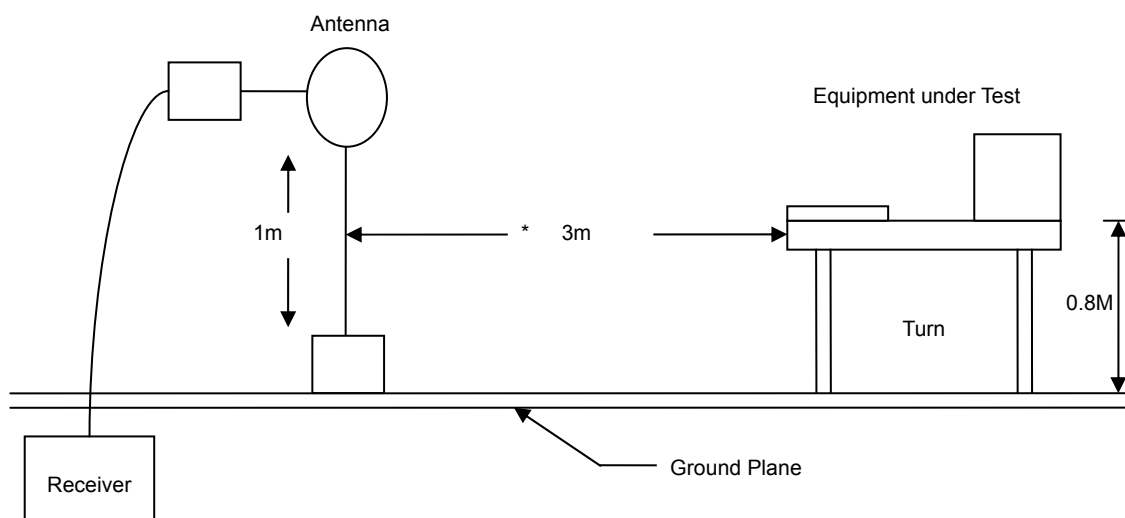
4.2. Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 30 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

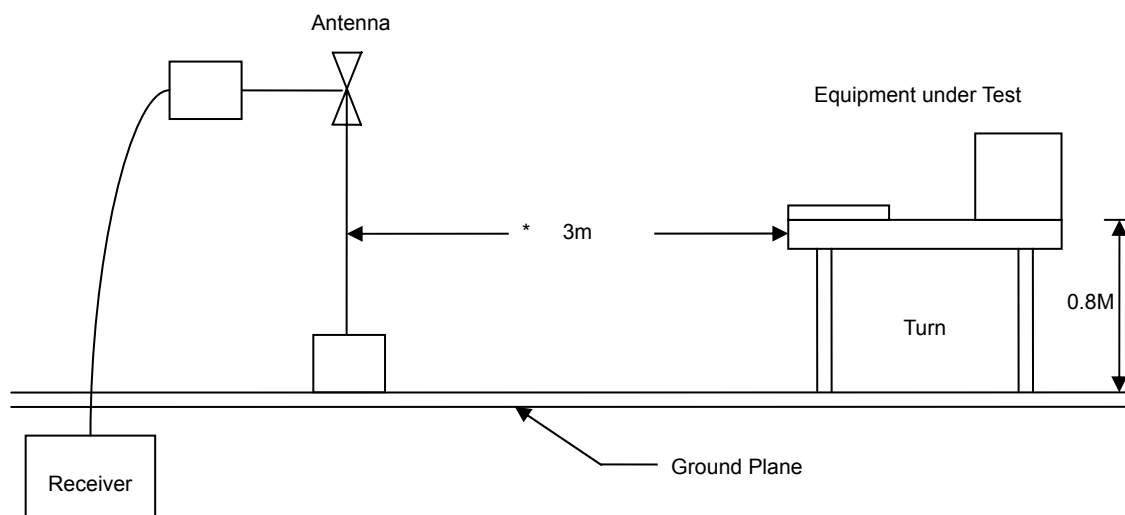


4.3. Typical Test Setup

Below 30MHz test setup



30MHz- 1GHz Test Setup



**4.4. Measurement Equipment**

| Instrument/Ancillary | Manufacturer | Model No. | Serial No. | Calibration Date | Valid Date. |
|-----------------------------|---------------|-----------|------------|------------------|-------------|
| EMI Test Receiver | R&S | ESCI | 100563 | 2015.03.29 | 2016.03.28 |
| Preamplifier | Agilent | 87405B | My39500554 | 2015.03.29 | 2016.03.28 |
| Preamplifier | Agilent | 8449B | 3008A02342 | 2015.03.29 | 2016.03.28 |
| Bilog Antenna | Sunol Science | JB1 | A072414-3 | 2014.08.05 | 2015.08.04 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-619 | 2014.05.24 | 2015.05.23 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA9170 | 9170-348 | 2014.11.04 | 2015.11.03 |
| Spectrum Analyzer | R&S | FSP40 | 100324 | 2015.03.29 | 2016.03.28 |
| Loop Antenna | R&S | HFH2-Z2 | 100150 | 2014.08.30 | 2015.08.29 |
| Temperature/ Humidity Meter | Zhicheng | ZC1-11 | CEP-TH-001 | 2015.04.02 | 2016.04.01 |



4.5. Test Result and Data

4.5.1 Test Result of Fundamental Emission

| | | | | | |
|-----------|---|-------------------|----------------------|---|----------|
| Power | : | DC 12V | Temperature | : | 24 °C |
| Test Mode | : | Transmit/ Receive | Humidity | : | 54 % |
| Test Date | : | Apr. 23, 2015 | Atmospheric Pressure | : | 1010 hpa |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1 | 13.5503 | -23.19 | 57.38 | 34.19 | 124.00 | -89.81 | peak | 105 | 178 |

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor

**4.5.2 Test Result of Spurious emission**

| | | | |
|-------------------|--------|------------------|----------|
| Test Mode : | Normal | Frequency Range: | 9K-30MHz |
| Temp : | 23℃ | Humidity : | 52% |
| Measured Distance | 3m | Test Result: | Pass |

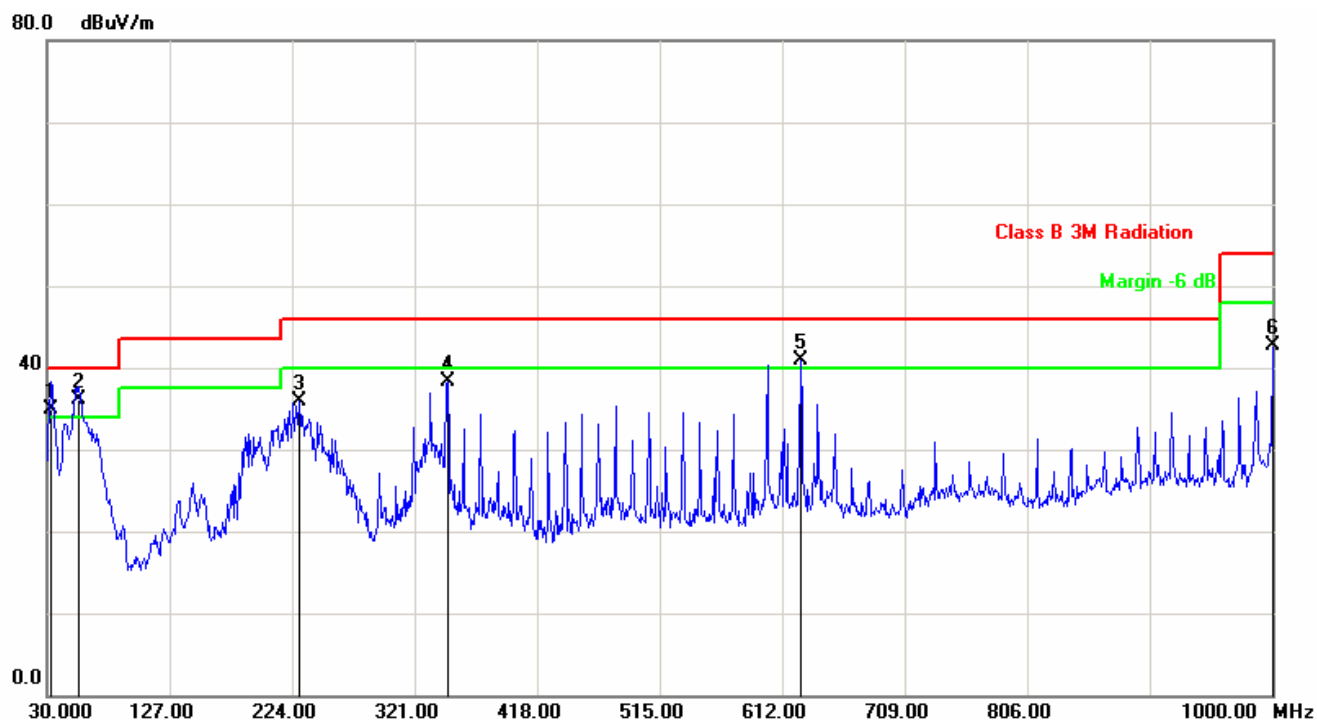
| Frequency (MHz) | Ant. Polarization H/V | Emission Level (dBuV/m) | Limit 3m (dBuV/m) | Over (dB) |
|--------------------|--------------------------|----------------------------|----------------------|--------------|
| --- | --- | --- | --- | --- |

Note: The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported



30M-1000MHz

| | |
|----------------------------|----------------------|
| Engineer :Amos | |
| Site : EMC Lab AC 102 | Time : Apr. 23, 2015 |
| Limit : FCC_CLASS_B_03M_QP | Margin : 6 |
| EUT : BT950-DT | Probe : HORIZONTAL |
| Power : DC12V | Note : Normal Link |



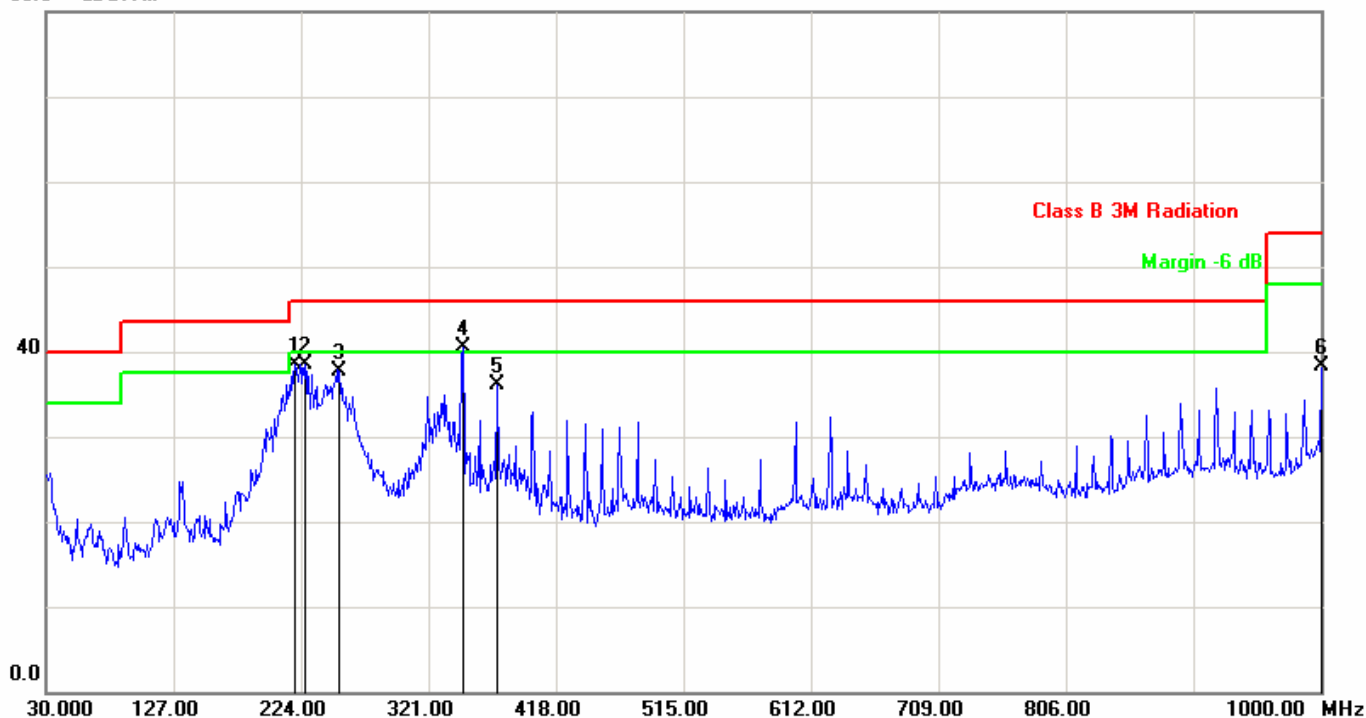
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|
| 1 | 32.9100 | -4.78 | 39.67 | 34.89 | 40.00 | -5.11 | QP | 100 | 311 |
| 2 | 55.2200 | -15.19 | 51.37 | 36.18 | 40.00 | -3.82 | QP | 100 | 153 |
| 3 | 229.8200 | -9.55 | 45.49 | 35.94 | 46.00 | -10.06 | QP | 100 | 344 |
| 4 | 347.1900 | -4.26 | 42.55 | 38.29 | 46.00 | -7.71 | QP | 100 | 359 |
| 5 | 626.5500 | -1.42 | 42.42 | 41.00 | 46.00 | -5.00 | QP | 100 | 123 |
| 6 | 1000.0000 | 5.95 | 36.81 | 42.76 | 54.00 | -11.24 | QP | 100 | 357 |

Note: Measurement Level = Reading Level + Correct Factor



| | |
|----------------------------|----------------------|
| Engineer :Amos | |
| Site : EMC Lab AC 102 | Time : Apr. 23, 2015 |
| Limit : FCC_CLASS_B_03M_QP | Margin : 6 |
| EUT : BT950-DT | Probe : VERTICAL |
| Power : DC12V | Note : Normal Link |

80.0 dBuV/m



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|
| 1 | 219.1500 | -9.58 | 48.18 | 38.60 | 46.00 | -7.40 | QP | 200 | 245 |
| 2 | 226.9100 | -9.56 | 48.11 | 38.55 | 46.00 | -7.45 | QP | 300 | 106 |
| 3 | 253.1000 | -8.25 | 45.89 | 37.64 | 46.00 | -8.36 | QP | 100 | 102 |
| 4 | 347.1900 | -4.26 | 44.68 | 40.42 | 46.00 | -5.58 | QP | 200 | 80 |
| 5 | 373.3800 | -4.85 | 40.88 | 36.03 | 46.00 | -9.97 | QP | 100 | 61 |
| 6 | 1000.0000 | 5.95 | 32.39 | 38.34 | 54.00 | -15.66 | QP | 100 | 101 |

Note: Measurement Level = Reading Level + Correct Factor



5. Frequency tolerance (15.225 (e))

5.1. Regulation

15.225 (e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.2. Test Result

| Operating frequency: 13.56 MHz | | | | | |
|--------------------------------|------------------|--------------|----------------------|---------------|--------------|
| Temperature (°C) | Power supply (V) | Observe Time | Read Frequency (MHz) | Tolerance (%) | Limit |
| 50 | 120 | Start | 13.560110 | 0.001% | $\pm 0.01\%$ |
| | | 2 minute | 13.560110 | 0.001% | $\pm 0.01\%$ |
| | | 5 minute | 13.560200 | 0.001% | $\pm 0.01\%$ |
| | | 10 minute | 13.560400 | 0.003% | $\pm 0.01\%$ |
| 40 | 120 | Start | 13.560050 | 0.000% | $\pm 0.01\%$ |
| | | 2 minute | 13.560050 | 0.000% | $\pm 0.01\%$ |
| | | 5 minute | 13.560100 | 0.001% | $\pm 0.01\%$ |
| | | 10 minute | 13.560200 | 0.001% | $\pm 0.01\%$ |
| 30 | 120 | Start | 13.560030 | 0.000% | $\pm 0.01\%$ |
| | | 2 minute | 13.560030 | 0.000% | $\pm 0.01\%$ |
| | | 5 minute | 13.560030 | 0.000% | $\pm 0.01\%$ |
| | | 10 minute | 13.560100 | 0.001% | $\pm 0.01\%$ |
| 20 | 120 | Start | 13.560000 | 0.000% | $\pm 0.01\%$ |
| | | 2 minute | 13.560000 | 0.000% | $\pm 0.01\%$ |
| | | 5 minute | 13.560000 | 0.000% | $\pm 0.01\%$ |
| | | 10 minute | 13.560010 | 0.000% | $\pm 0.01\%$ |
| 20 | 108 | Start | 13.560100 | 0.001% | $\pm 0.01\%$ |
| | | 2 minute | 13.560100 | 0.001% | $\pm 0.01\%$ |
| | | 5 minute | 13.560120 | 0.001% | $\pm 0.01\%$ |
| | | 10 minute | 13.560200 | 0.001% | $\pm 0.01\%$ |
| 20 | 132 | Start | 13.560050 | 0.000% | $\pm 0.01\%$ |
| | | 2 minute | 13.560100 | 0.001% | $\pm 0.01\%$ |
| | | 5 minute | 13.560100 | 0.001% | $\pm 0.01\%$ |
| | | 10 minute | 13.560100 | 0.001% | $\pm 0.01\%$ |
| 10 | 120 | Start | 13.560120 | 0.001% | $\pm 0.01\%$ |
| | | 2 minute | 13.560120 | 0.001% | $\pm 0.01\%$ |
| | | 5 minute | 13.560200 | 0.001% | $\pm 0.01\%$ |
| | | 10 minute | 13.560200 | 0.001% | $\pm 0.01\%$ |
| 0 | 120 | Start | 13.560150 | 0.001% | $\pm 0.01\%$ |
| | | 2 minute | 13.560150 | 0.001% | $\pm 0.01\%$ |
| | | 5 minute | 13.560200 | 0.001% | $\pm 0.01\%$ |
| | | 10 minute | 13.560300 | 0.002% | $\pm 0.01\%$ |
| -10 | 120 | Start | 13.560250 | 0.002% | $\pm 0.01\%$ |
| | | 2 minute | 13.560400 | 0.003% | $\pm 0.01\%$ |
| | | 5 minute | 13.560400 | 0.003% | $\pm 0.01\%$ |
| | | 10 minute | 13.560600 | 0.004% | $\pm 0.01\%$ |
| -20 | 120 | Start | 13.560600 | 0.004% | $\pm 0.01\%$ |
| | | 2 minute | 13.560600 | 0.004% | $\pm 0.01\%$ |
| | | 5 minute | 13.560800 | 0.006% | $\pm 0.01\%$ |
| | | 10 minute | 13.561000 | 0.007% | $\pm 0.01\%$ |