

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

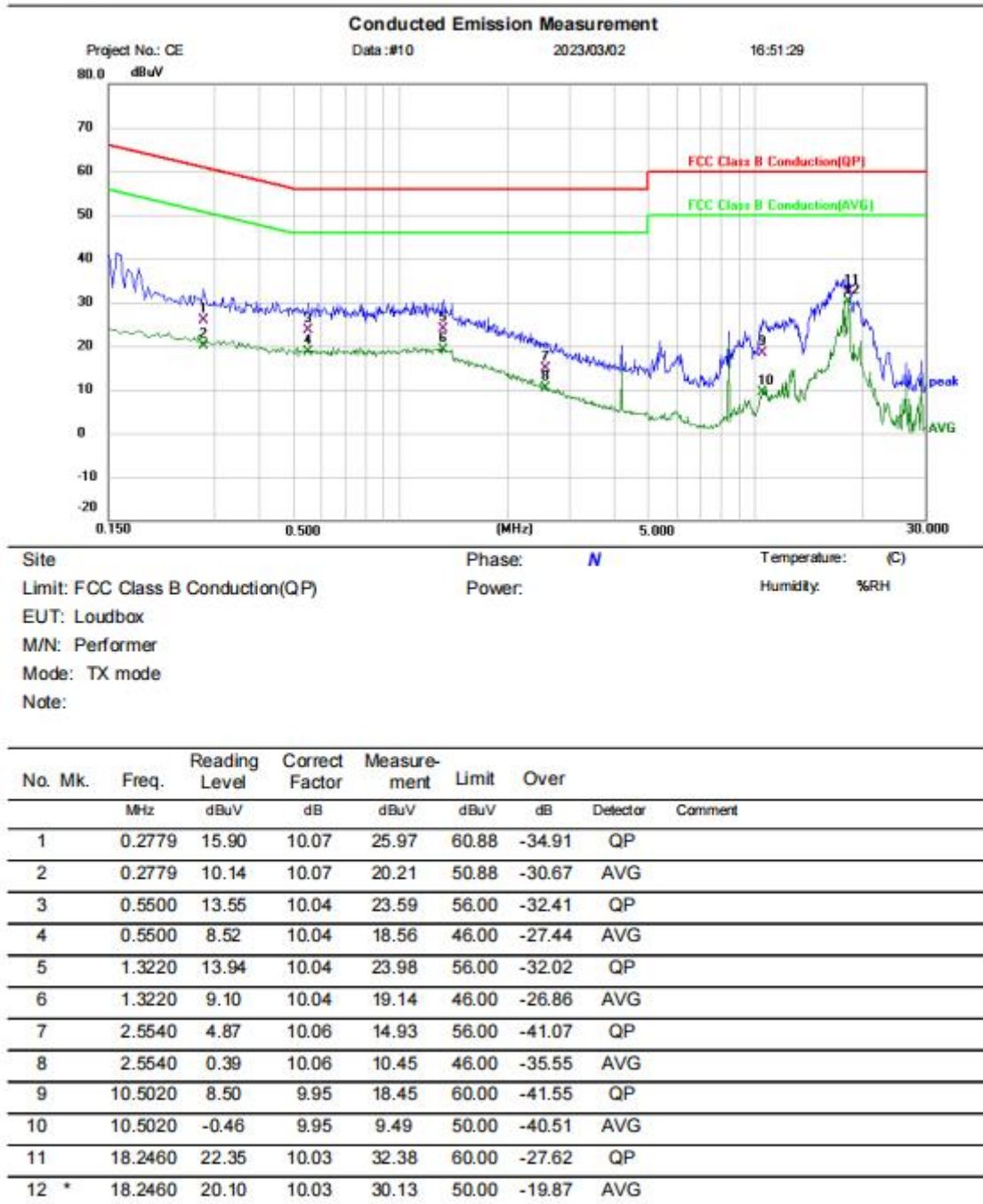
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark:  $\text{LISN} = \text{Read Level} + \text{Cable Loss} + \text{LISN Factor}$

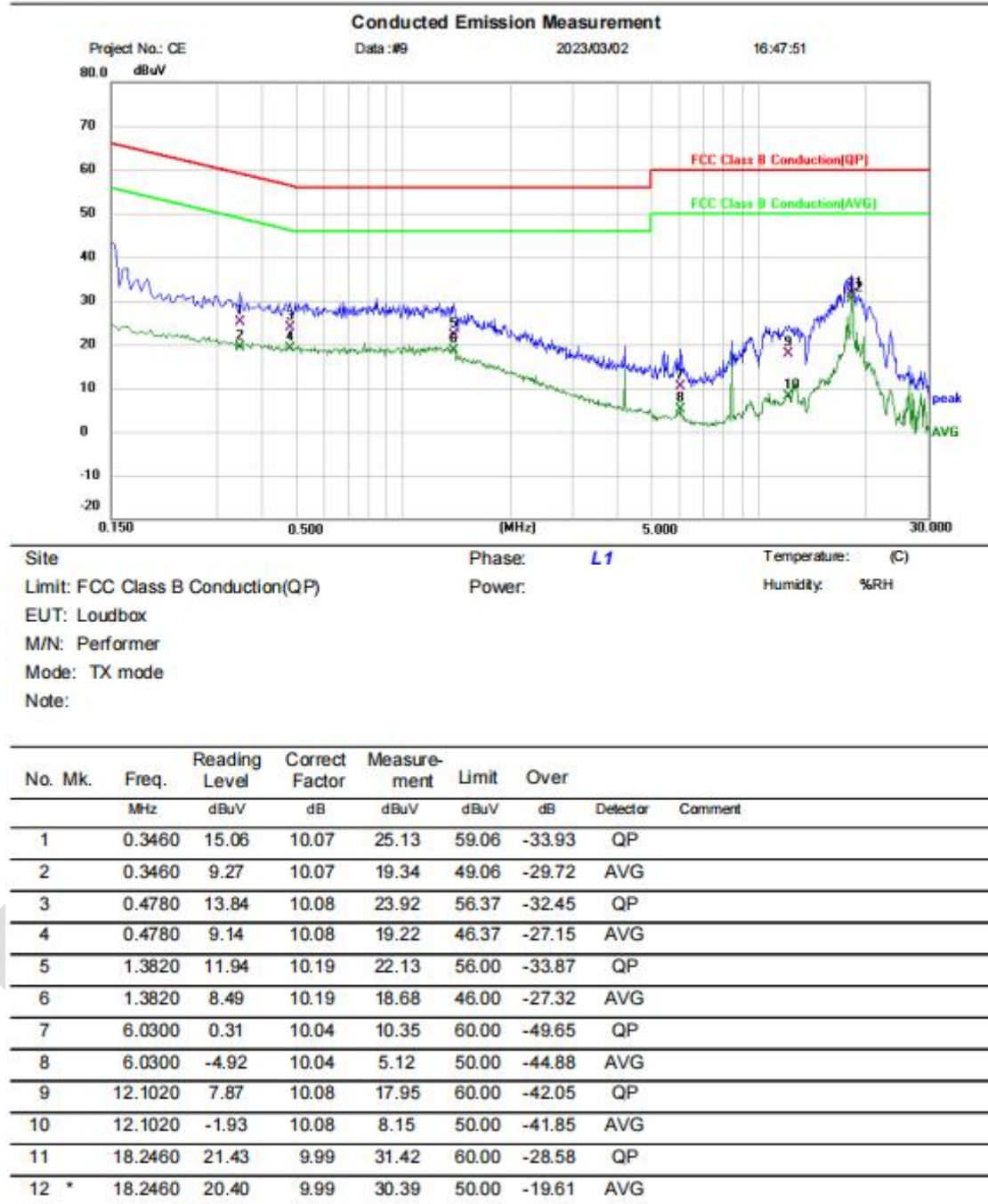
## 16.4 TEST DATA

[TestMode: TX mode]; [Line: Nutral]; [Power:120V/60Hz]



**Test Result: Pass**

[TestMode: TX mode]; [Line: Line]; [Power:120V/60Hz]



**Test Result: Pass**

## 17 RADIATED SPURIOUS EMISSIONS

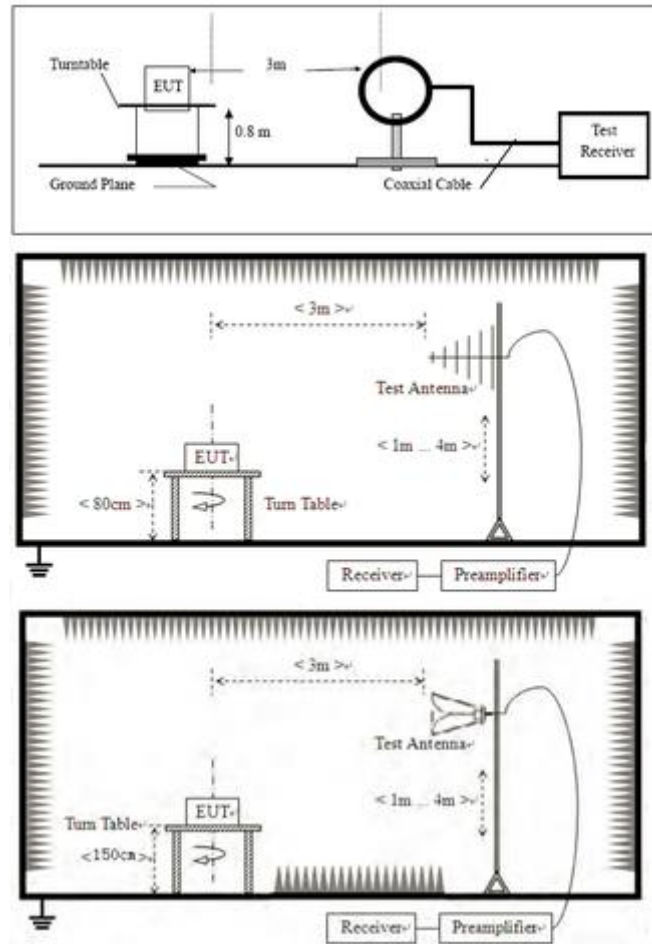
|                               |                                        |
|-------------------------------|----------------------------------------|
| <b>Test Standard</b>          | 47 CFR Part 15, Subpart C 15.247       |
| <b>Test Method</b>            | ANSI C63.10 (2013) Section 6.4,6.5,6.6 |
| <b>Test Mode (Pre-Scan)</b>   | TX                                     |
| <b>Test Mode (Final Test)</b> | TX                                     |
| <b>Tester</b>                 | Charlie                                |
| <b>Temperature</b>            | 25℃                                    |
| <b>Humidity</b>               | 60%                                    |

### 17.1 LIMITS

| <b>Frequency(MHz)</b> | <b>Field strength(microvolts/meter)</b> | <b>Measurement distance(meters)</b> |
|-----------------------|-----------------------------------------|-------------------------------------|
| 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                                   |

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

## 17.2 BLOCK DIAGRAM OF TEST SETUP



## 17.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height 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.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

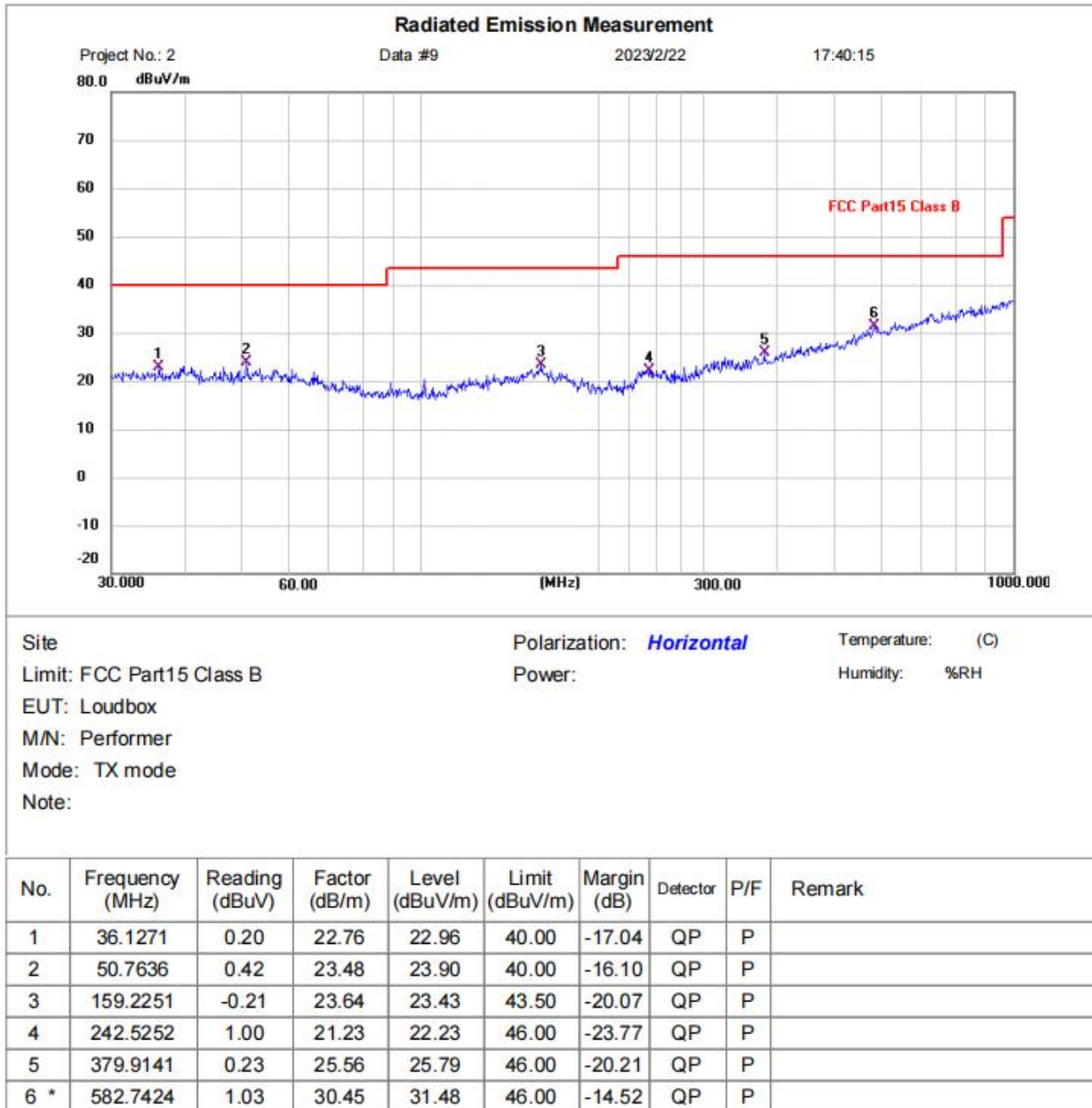
Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. fundamental frequency is blocked by filter, and only spurious emission is shown.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

## 17.4 TEST DATA

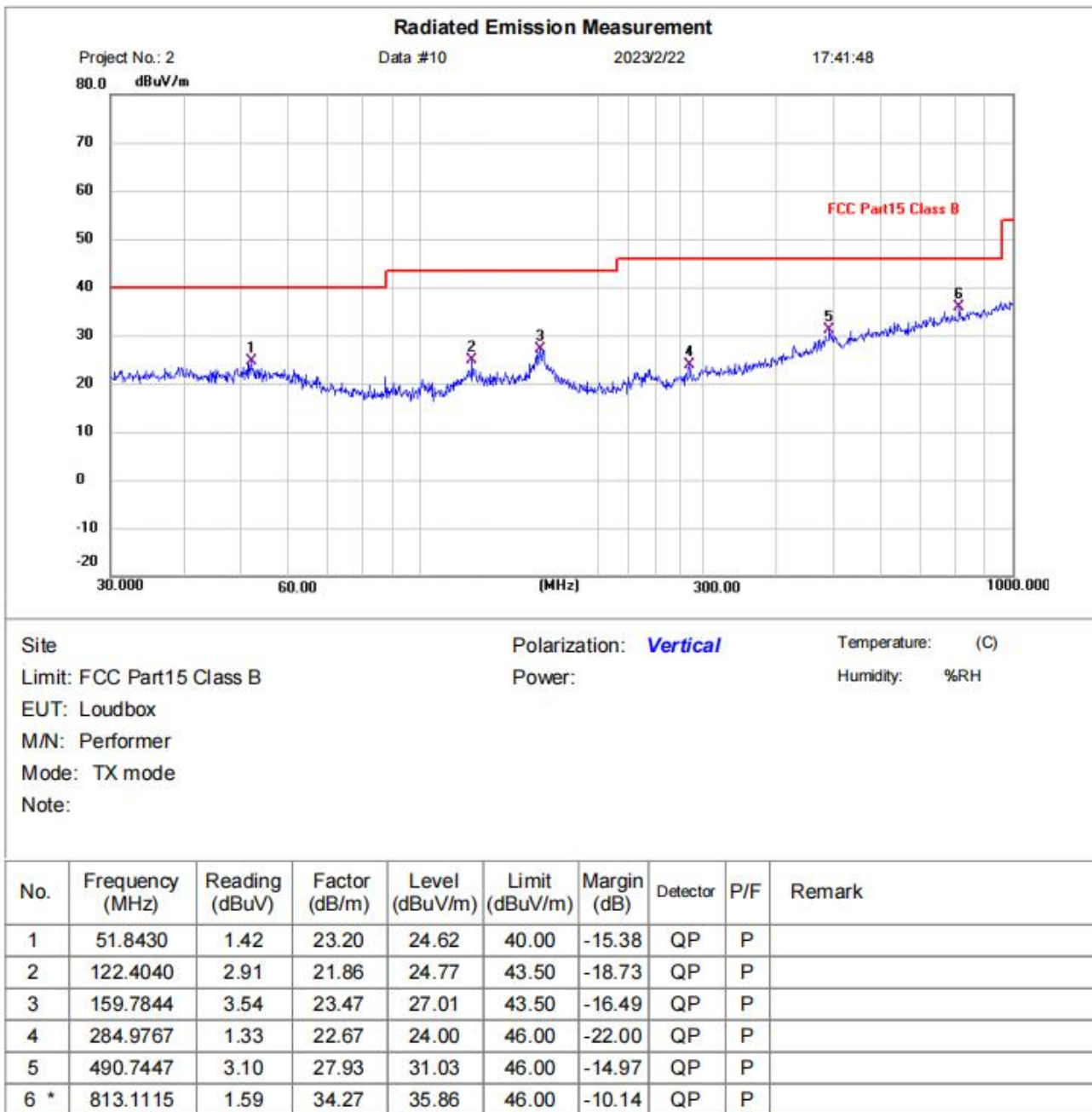
Below 1GHz

[TestMode: TX]; [Polarity: Horizontal]



**Test Result: Pass**

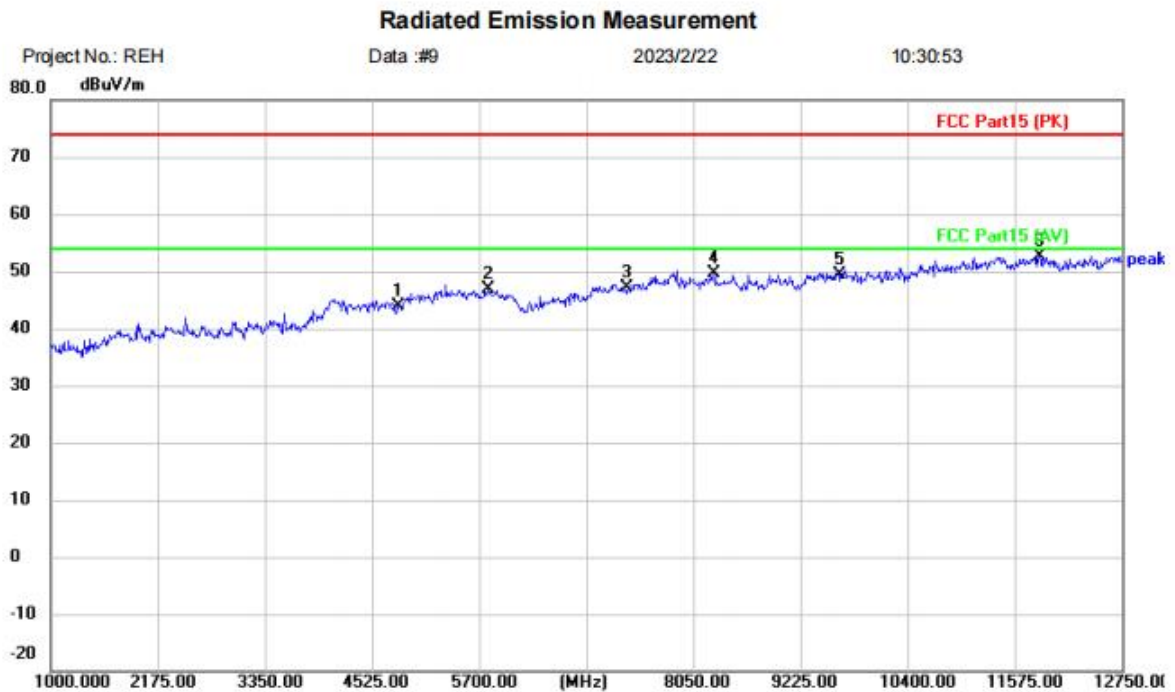
[TestMode: TX]; [Polarity: Vertical]



**Test Result: Pass**

Above 1GHz

[TestMode: TX lowest channel]; [Polarity: Horizontal]



Site      Polarization: **Horizontal**      Temperature: (C)

Limit: FCC Part15 (PK)      Power:      Humidity: %RH

EUT: Loudbox

M/N: Performe

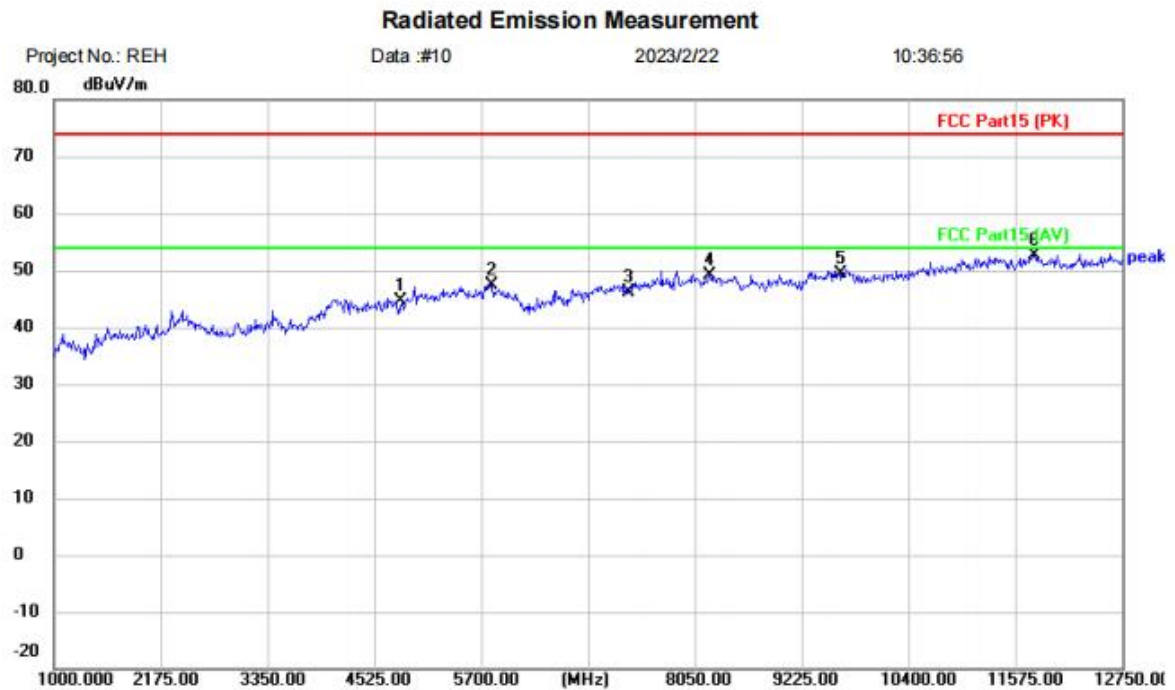
Mode: TX-L

Note:

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|------------|----------|---------|
| 1   |     | 4824.000     | 39.75                    | 4.13                      | 43.88                      | 74.00           | -30.12     | peak     |         |
| 2   |     | 5805.750     | 40.10                    | 6.76                      | 46.86                      | 74.00           | -27.14     | peak     |         |
| 3   |     | 7326.000     | 38.90                    | 8.21                      | 47.11                      | 74.00           | -26.89     | peak     |         |
| 4   |     | 8273.250     | 40.58                    | 9.03                      | 49.61                      | 74.00           | -24.39     | peak     |         |
| 5   |     | 9648.000     | 38.44                    | 11.01                     | 49.45                      | 74.00           | -24.55     | peak     |         |
| 6   | *   | 11845.250    | 38.83                    | 13.83                     | 52.66                      | 74.00           | -21.34     | peak     |         |

**Test Result: Pass**

[TestMode:TX lowest channel]; [Polarity: Vertical]



Site      Polarization: **Vertical**      Temperature: (C)

Limit: FCC Part15 (PK)      Power:      Humidity: %RH

EUT: Loudbox

M/N: Performe

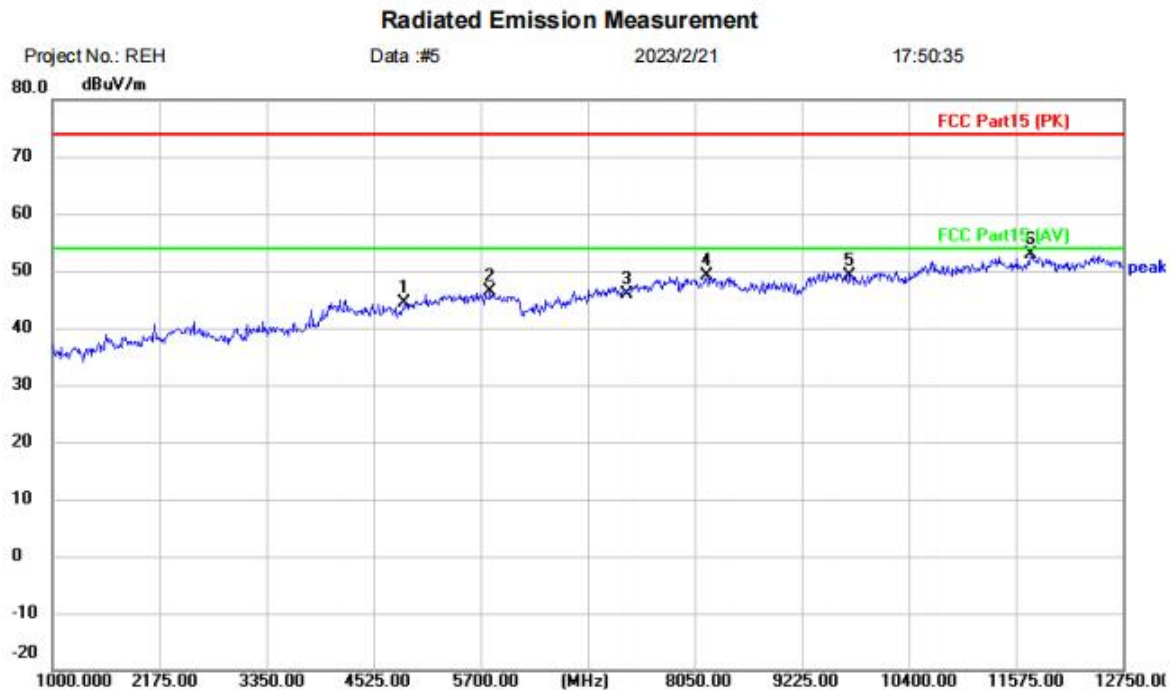
Mode: TX-L

Note:

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|------------|----------|---------|
| 1   |     | 4824.000     | 40.44                    | 4.13                      | 44.57                      | 74.00           | -29.43     | peak     |         |
| 2   |     | 5817.500     | 40.69                    | 6.78                      | 47.47                      | 74.00           | -26.53     | peak     |         |
| 3   |     | 7326.000     | 37.91                    | 8.21                      | 46.12                      | 74.00           | -27.88     | peak     |         |
| 4   |     | 8214.500     | 40.11                    | 9.00                      | 49.11                      | 74.00           | -24.89     | peak     |         |
| 5   |     | 9648.000     | 38.40                    | 11.01                     | 49.41                      | 74.00           | -24.59     | peak     |         |
| 6   | *   | 11786.500    | 38.78                    | 13.81                     | 52.59                      | 74.00           | -21.41     | peak     |         |

**Test Result: Pass**

[TestMode: TX middle channel]; [Polarity: Horizontal]



Site:      Polarization: **Horizontal**      Temperature: (C)

Limit: FCC Part15 (PK)      Power:      Humidity: %RH

EUT: Loudbox

M/N: Performe

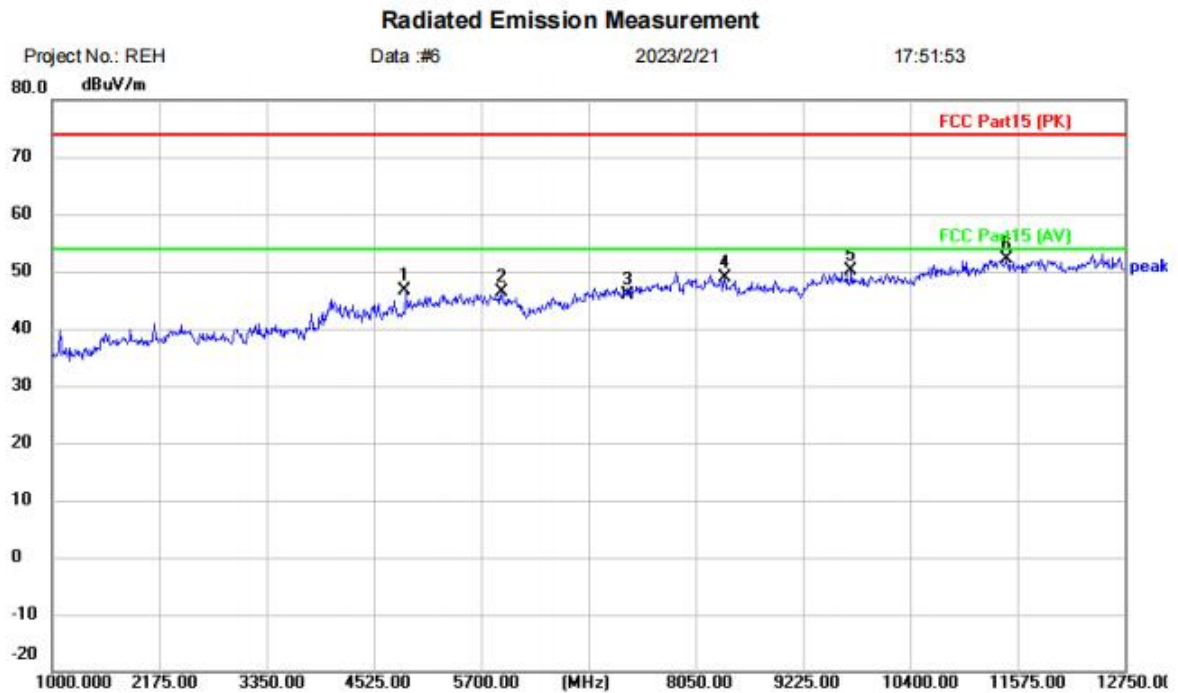
Mode: TX-M

Note:

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|------------|----------|---------|
| 1   |     | 4874.000     | 39.95                    | 4.32                      | 44.27                      | 74.00           | -29.73     | peak     |         |
| 2   |     | 5805.750     | 39.73                    | 6.76                      | 46.49                      | 74.00           | -27.51     | peak     |         |
| 3   |     | 7311.000     | 37.73                    | 8.18                      | 45.91                      | 74.00           | -28.09     | peak     |         |
| 4   |     | 8179.250     | 40.14                    | 8.98                      | 49.12                      | 74.00           | -24.88     | peak     |         |
| 5   |     | 9748.000     | 37.95                    | 11.26                     | 49.21                      | 74.00           | -24.79     | peak     |         |
| 6   | *   | 11739.500    | 39.08                    | 13.78                     | 52.86                      | 74.00           | -21.14     | peak     |         |

**Test Result: Pass**

[TestMode: TX middle channel]; [Polarity: Vertical]



Site:      Polarization: **Vertical**      Temperature: (C)

Limit: FCC Part15 (PK)      Power:      Humidity: %RH

EUT: Loudbox

M/N: Performe

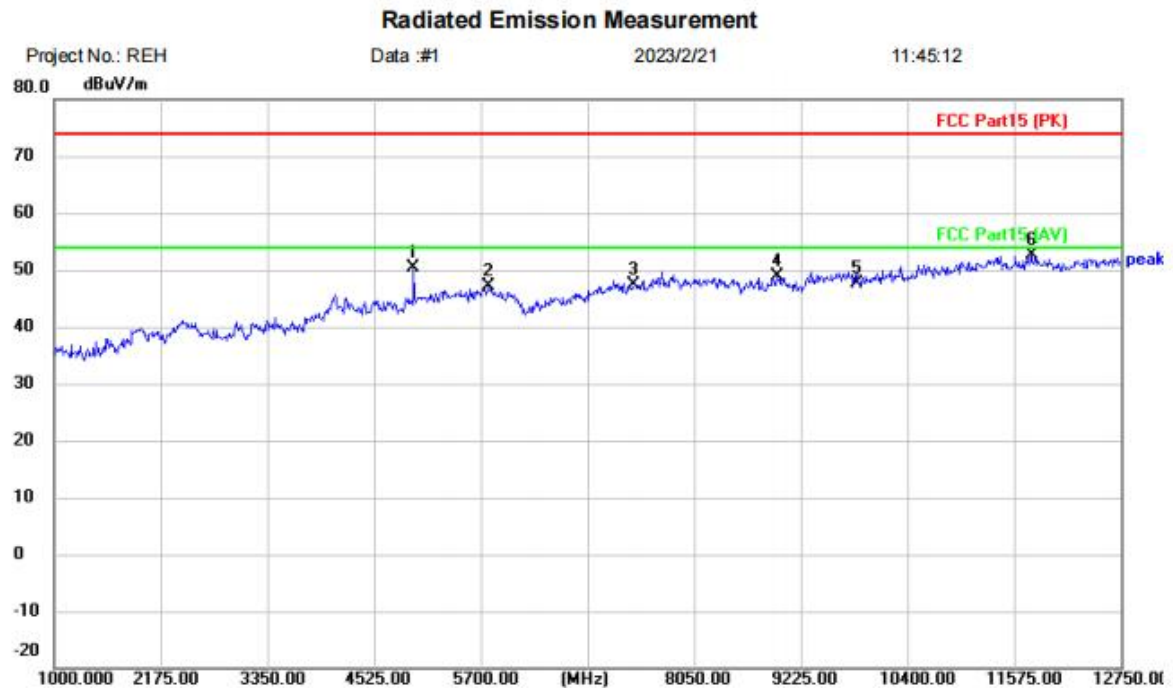
Mode: TX-M

Note:

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|------------|----------|---------|
| 1   |     | 4874.000     | 42.20                    | 4.32                      | 46.52                      | 74.00           | -27.48     | peak     |         |
| 2   |     | 5923.250     | 39.44                    | 6.87                      | 46.31                      | 74.00           | -27.69     | peak     |         |
| 3   |     | 7311.000     | 37.59                    | 8.18                      | 45.77                      | 74.00           | -28.23     | peak     |         |
| 4   |     | 8367.250     | 39.76                    | 9.07                      | 48.83                      | 74.00           | -25.17     | peak     |         |
| 5   |     | 9748.000     | 38.75                    | 11.26                     | 50.01                      | 74.00           | -23.99     | peak     |         |
| 6   | *   | 11457.500    | 38.40                    | 13.66                     | 52.06                      | 74.00           | -21.94     | peak     |         |

**Test Result: Pass**

[TestMode: TX highest channel]; [Polarity: Horizontal]



Site      Polarization: **Horizontal**      Temperature: (C)

Limit: FCC Part15 (PK)      Power:      Humidity: %RH

EUT: Loudbox

M/N: Performe

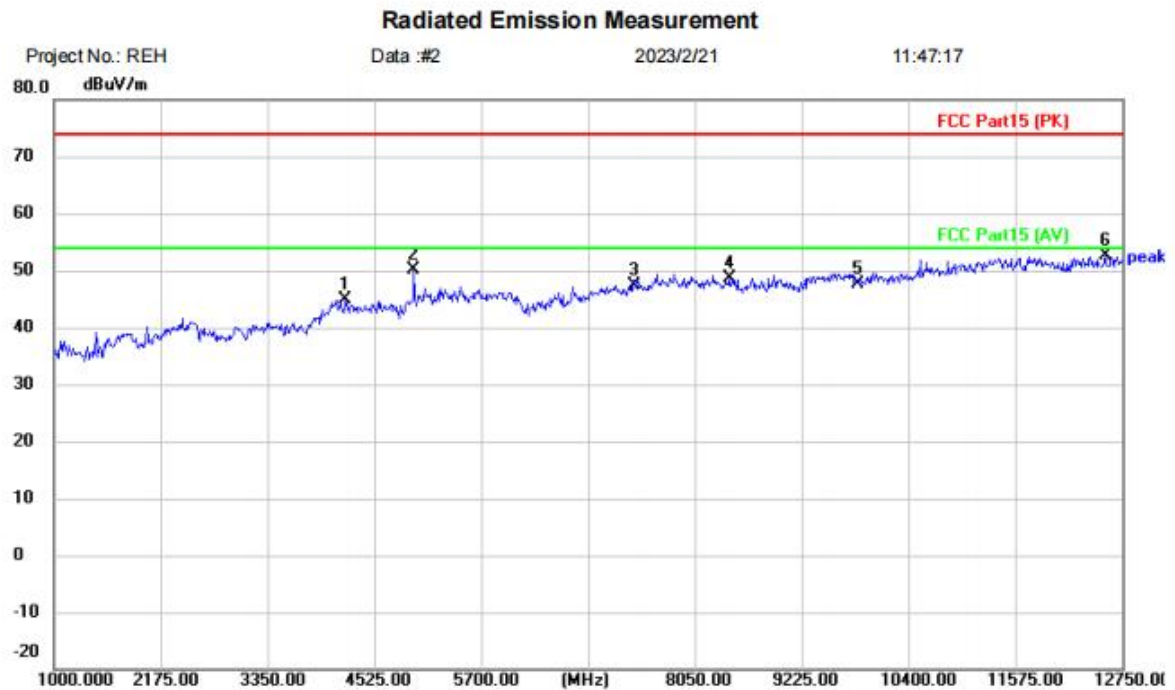
Mode: TX-H

Note:

| No. | Mk. | Freq.     | Reading Level | Correct Factor | Measurement | Limit  | Over   |          |         |
|-----|-----|-----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz       | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     | Detector | Comment |
| 1   |     | 4959.750  | 44.84         | 5.42           | 50.26       | 74.00  | -23.74 | peak     |         |
| 2   |     | 5782.250  | 40.44         | 6.77           | 47.21       | 74.00  | -26.79 | peak     |         |
| 3   |     | 7386.000  | 39.05         | 8.36           | 47.41       | 74.00  | -26.59 | peak     |         |
| 4   |     | 8966.500  | 39.64         | 9.34           | 48.98       | 74.00  | -25.02 | peak     |         |
| 5   |     | 9848.000  | 36.09         | 11.52          | 47.61       | 74.00  | -26.39 | peak     |         |
| 6   | *   | 11763.000 | 38.94         | 13.80          | 52.74       | 74.00  | -21.26 | peak     |         |

**Test Result: Pass**

[TestMode: TX highest channel]; [Polarity: Vertical]



Site:      Polarization: **Vertical**      Temperature: (C)  
Limit: FCC Part15 (PK)      Power:      Humidity: %RH  
EUT: Loudbox  
M/N: Performe  
Mode: TX-H  
Note:

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|------------|----------|---------|
| 1   |     | 4207.750     | 39.77                    | 5.07                      | 44.84                      | 74.00           | -29.16     | peak     |         |
| 2   |     | 4959.750     | 44.78                    | 5.42                      | 50.20                      | 74.00           | -23.80     | peak     |         |
| 3   |     | 7386.000     | 39.01                    | 8.36                      | 47.37                      | 74.00           | -26.63     | peak     |         |
| 4   |     | 8426.000     | 39.57                    | 9.09                      | 48.66                      | 74.00           | -25.34     | peak     |         |
| 5   |     | 9848.000     | 36.10                    | 11.52                     | 47.62                      | 74.00           | -26.38     | peak     |         |
| 6   | *   | 12562.000    | 38.80                    | 13.88                     | 52.68                      | 74.00           | -21.32     | peak     |         |

**Test Result: Pass**

## 18 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

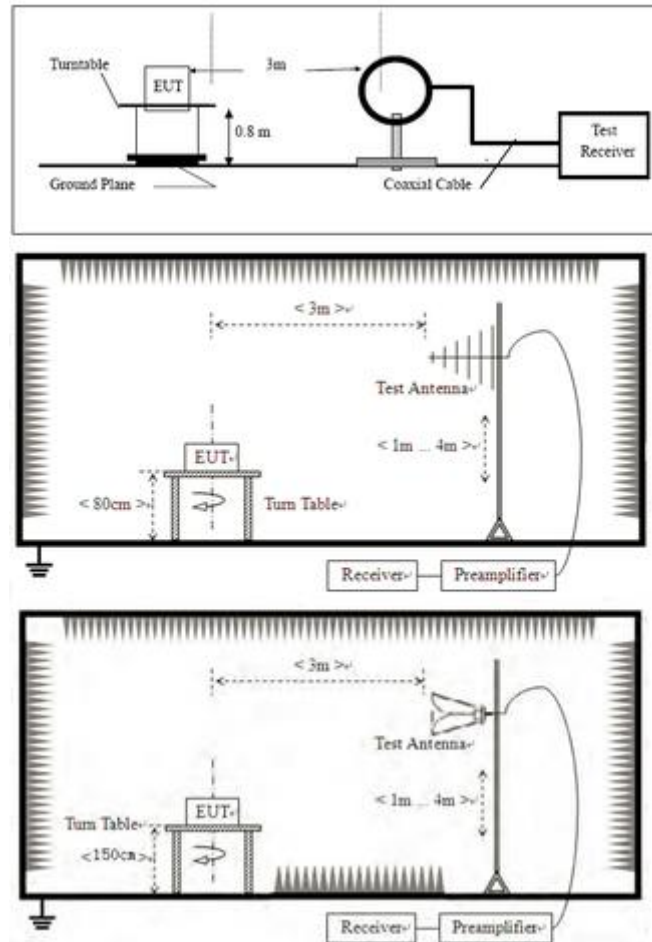
|                               |                                   |
|-------------------------------|-----------------------------------|
| <b>Test Standard</b>          | 47 CFR Part 15, Subpart C 15.247  |
| <b>Test Method</b>            | ANSI C63.10 (2013) Section 6.10.5 |
| <b>Test Mode (Pre-Scan)</b>   | TX                                |
| <b>Test Mode (Final Test)</b> | TX                                |
| <b>Tester</b>                 | Charlie                           |
| <b>Temperature</b>            | 25°C                              |
| <b>Humidity</b>               | 60%                               |

### 18.1 LIMITS

| <b>Frequency(MHz)</b> | <b>Field strength(microvolts/meter)</b> | <b>Measurement distance(meters)</b> |
|-----------------------|-----------------------------------------|-------------------------------------|
| 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                                   |

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

## 18.2 BLOCK DIAGRAM OF TEST SETUP



## 18.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height 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.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

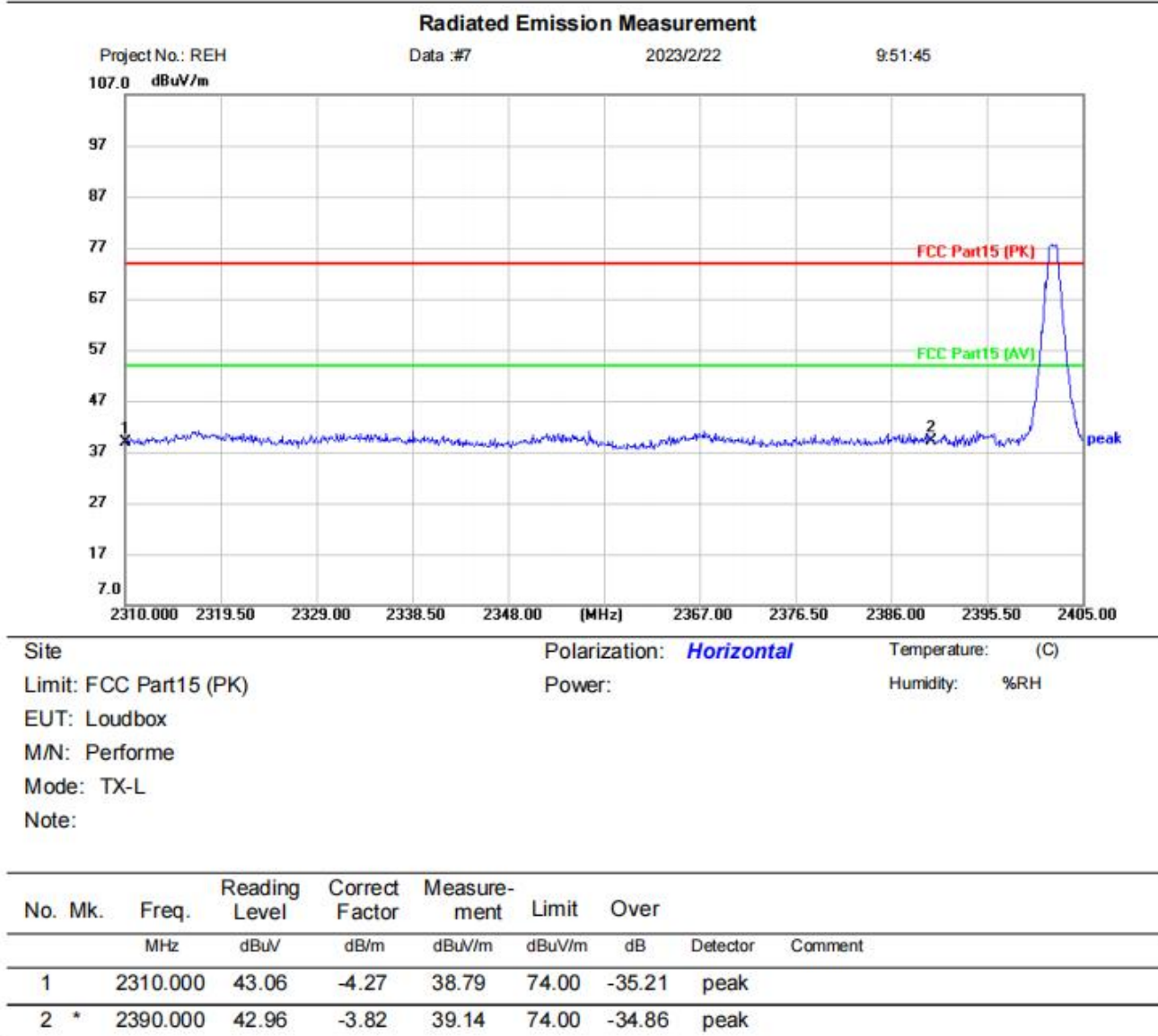
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1:  $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

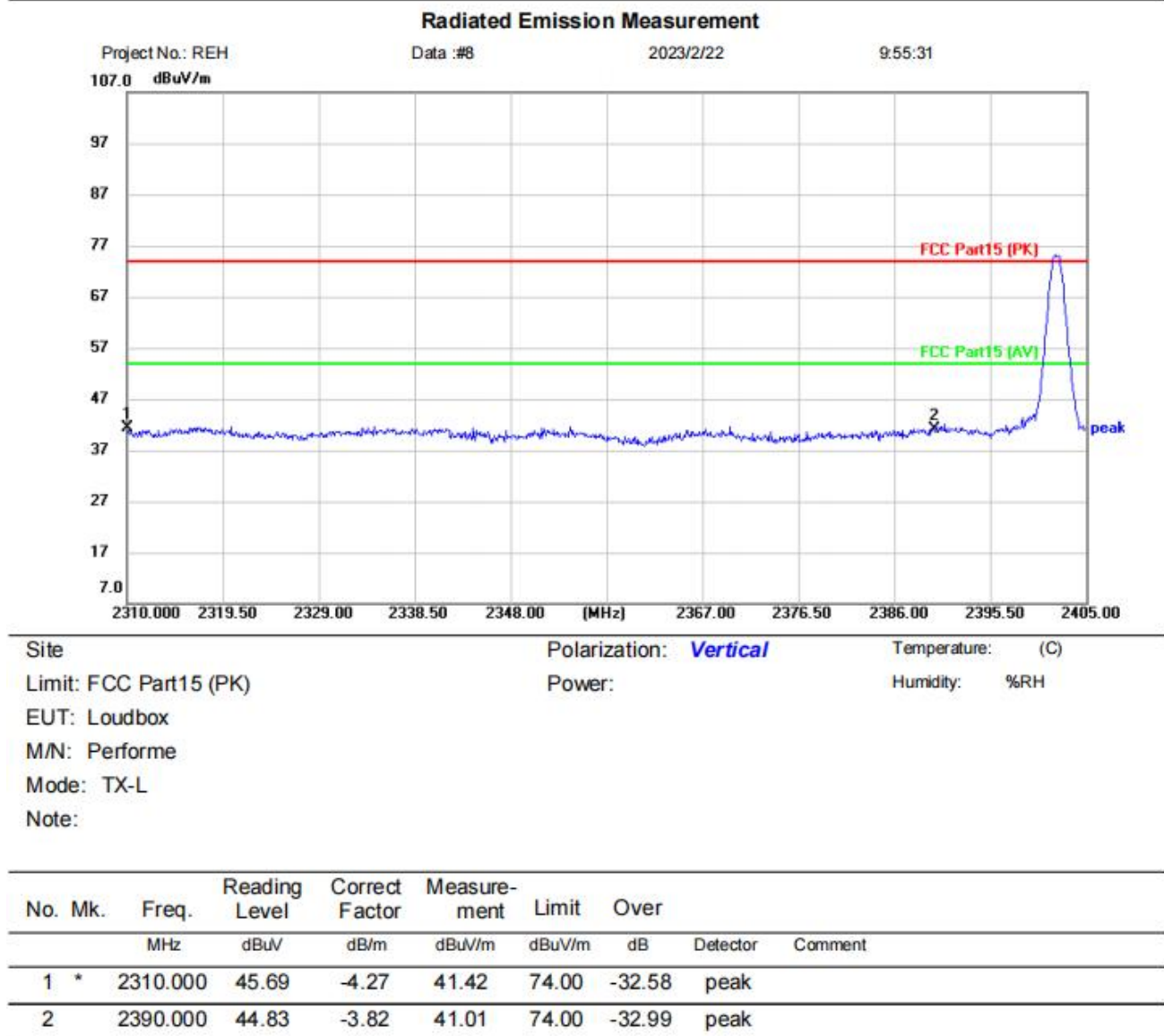
## 18.4 TEST DATA

[TestMode: TX lowest channel]; [Polarity: Horizontal]



**Test Result: Pass**

[TestMode: TX lowest channel]; [Polarity: Vertical]



**Test Result: Pass**

[TestMode: TX highest channel]; [Polarity: Horizontal]

### Radiated Emission Measurement



Site Polarization: **Horizontal** Temperature: (C)  
Limit: FCC Part15 (PK) Power: Humidity: %RH  
EUT: Loudbox  
M/N: Performe  
Mode: TX-H  
Note:

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|------------|----------|---------|
| 1   |     | 2483.500     | 43.53                    | -3.96                     | 39.57                      | 74.00           | -34.43     | peak     |         |
| 2   | *   | 2500.000     | 44.31                    | -4.00                     | 40.31                      | 74.00           | -33.69     | peak     |         |

**Test Result: Pass**