

# FCC TEST REPORT

**FCC ID: 2AUAR900MAX**

**Report No.** : SSP24030146-1E

**Applicant** : THINKCAR TECH CO., LTD.

**Product Name** : Professional diagnostic Tool

**Model Name** : DS300

**Test Standard** : FCC Part 15.247

**Date of Issue** : 2024-04-01



**Shenzhen CCUT Quality Technology Co., Ltd.**

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This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen CCUT Quality Technology Co., Ltd.

**Test Report Basic Information**

|                                    |                                                                                                                                                                     |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b> .....:            | THINKCAR TECH CO., LTD.<br>2606, building 4, phase II, TiananYungu, Gangtou community, Bantian,<br>Address of Applicant.....: Longgang District, Shenzhen, China    |
| <b>Manufacturer</b> .....:         | THINKCAR TECH CO., LTD.<br>2606, building 4, phase II, TiananYungu, Gangtou community, Bantian,<br>Address of Manufacturer.....: Longgang District, Shenzhen, China |
| <b>Product Name</b> .....:         | Professional diagnostic Tool                                                                                                                                        |
| <b>Brand Name</b> .....:           | ANCEL                                                                                                                                                               |
| <b>Main Model</b> .....:           | DS300                                                                                                                                                               |
| <b>Series Models</b> .....:        | -                                                                                                                                                                   |
| <b>Test Standard</b> .....:        | FCC Part 15 Subpart C<br>ANSI C63.4-2014<br>ANSI C63.10-2013                                                                                                        |
| <b>Date of Test</b> .....          | 2024-03-22 to 2024-03-30                                                                                                                                            |
| <b>Test Result</b> .....:          | PASS                                                                                                                                                                |
| <b>Tested By</b> .....             | <u>Lorzix Luo</u> (Lorzix Luo)                                                                                                                                      |
| <b>Reviewed By</b> .....:          | <u>Lieber Ouyang</u> (Lieber Ouyang)                                                                                                                                |
| <b>Authorized Signatory</b> .....: | <u>Lahm Peng</u> (Lahm Peng)                                                                                                                                        |



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Revision History

| Revision | Issue Date | Description     | Revised By |
|----------|------------|-----------------|------------|
| V1.0     | 2024-04-01 | Initial Release | Lahm Peng  |
|          |            |                 |            |
|          |            |                 |            |
|          |            |                 |            |
|          |            |                 |            |

## 1. General Information

### 1.1 Product Information

|                                                                                           |                                     |
|-------------------------------------------------------------------------------------------|-------------------------------------|
| Product Name:                                                                             | Professional diagnostic Tool        |
| Trade Name:                                                                               | ANCEL                               |
| Main Model:                                                                               | DS300                               |
| Series Models:                                                                            | -                                   |
| Rated Voltage:                                                                            | DC 3.8V by battery, USB 5V Charging |
| Battery:                                                                                  | DC 3.8V/23.94Wh                     |
| Hardware Version:                                                                         | V1.0                                |
| Software Version:                                                                         | V1.0                                |
| Note 1: The test data is gathered from a production sample, provided by the manufacturer. |                                     |

| Wireless Specification |                                                                                                                                    |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Wireless Standard:     | Bluetooth BLE, Bluetooth BR/EDR, 802.11b/g/n                                                                                       |
| Operating Frequency:   | BT: 2402MHz ~ 2480MHz ,2.4G WiFi: 2412MHz ~ 2462MHz for 802.11b/g/n(HT20) 2422MHz ~ 2452MHz for 802.11n(HT40)                      |
| Number of Channel:     | Bluetooth BLE: 40, Bluetooth BR+EDR: 79, 2.4G WiFi:11/7                                                                            |
| Channel Separation:    | Bluetooth BLE: 2MHz, Bluetooth BR+EDR: 1MHz, 2.4G WiFi:5MHz                                                                        |
| Modulation:            | BT: GFSK, Pi/4 DQPSK, 8DPSK, 2.4G WiFi: CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM                                                        |
| Antenna Gain:          | 0dBi                                                                                                                               |
| Type of Antenna:       | FPCB Antenna                                                                                                                       |
| Type of Device:        | <input checked="" type="checkbox"/> Portable Device <input type="checkbox"/> Mobile Device <input type="checkbox"/> Modular Device |

## 1.2 Test Setup Information

| List of Test Modes                      |              |                         |                     |                      |
|-----------------------------------------|--------------|-------------------------|---------------------|----------------------|
| Test Mode                               | Description  | Remark                  |                     |                      |
| TM1                                     | BLE_1Mbps    | 2402/2440/2480MHz       |                     |                      |
| TM2                                     | BR_DH5       | 2402/2441/2480MHz       |                     |                      |
| TM3                                     | EDR_2DH5     | 2402/2441/2480MHz       |                     |                      |
| TM4                                     | EDR_3DH5     | 2402/2441/2480MHz       |                     |                      |
| TM5                                     | 802.11b      | 2412MHz/2437MHz/2462MHz |                     |                      |
| TM6                                     | 802.11g      | 2412MHz/2437MHz/2462MHz |                     |                      |
| TM7                                     | 802.11n(H20) | 2412MHz/2437MHz/2462MHz |                     |                      |
| TM8                                     | 802.11n(H40) | 2422MHz/2437MHz/2452MHz |                     |                      |
| List and Details of Auxiliary Cable     |              |                         |                     |                      |
| Description                             |              | Length (cm)             | Shielded/Unshielded | With/Without Ferrite |
| USB Cable                               |              | 100                     | Unshielded          | Without Ferrite      |
| -                                       |              | -                       | -                   | -                    |
| List and Details of Auxiliary Equipment |              |                         |                     |                      |
| Description                             |              | Manufacturer            | Model               | Serial Number        |
| Adapter                                 |              | Huawei                  | HW-100225C00        | HC78E2N6A23645       |
| -                                       |              | -                       | -                   | -                    |

| List of Channels (Bluetooth BLE) |                 |                |                 |                |                 |                |                 |
|----------------------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
| No. of Channel                   | Frequency (MHz) | No. of Channel | Frequency (MHz) | No. of Channel | Frequency (MHz) | No. of Channel | Frequency (MHz) |
| 01                               | 2402            | 11             | 2422            | 21             | 2442            | 31             | 2462            |
| 02                               | 2404            | 12             | 2424            | 22             | 2444            | 32             | 2464            |
| 03                               | 2406            | 13             | 2426            | 23             | 2446            | 33             | 2466            |
| 04                               | 2408            | 14             | 2428            | 24             | 2448            | 34             | 2468            |
| 05                               | 2410            | 15             | 2430            | 25             | 2450            | 35             | 2470            |
| 06                               | 2412            | 16             | 2432            | 26             | 2452            | 36             | 2472            |
| 07                               | 2414            | 17             | 2434            | 27             | 2454            | 37             | 2474            |
| 08                               | 2416            | 18             | 2436            | 28             | 2456            | 38             | 2476            |
| 09                               | 2418            | 19             | 2438            | 29             | 2458            | 39             | 2478            |
| 10                               | 2420            | 20             | 2440            | 30             | 2460            | 40             | 2480            |

| List of Channels (Bluetooth BR/EDR) |                 |                |                 |                |                 |                |                 |
|-------------------------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
| No. of Channel                      | Frequency (MHz) | No. of Channel | Frequency (MHz) | No. of Channel | Frequency (MHz) | No. of Channel | Frequency (MHz) |
| 01                                  | 2402            | 21             | 2422            | 41             | 2442            | 61             | 2462            |
| 02                                  | 2403            | 22             | 2423            | 42             | 2443            | 62             | 2463            |
| 03                                  | 2404            | 23             | 2424            | 43             | 2444            | 63             | 2464            |
| 04                                  | 2405            | 24             | 2425            | 44             | 2445            | 64             | 2465            |
| 05                                  | 2406            | 25             | 2426            | 45             | 2446            | 65             | 2466            |
| ~                                   | ~               | ~              | ~               | ~              | ~               | ~              | ~               |
| 16                                  | 2417            | 36             | 2437            | 56             | 2457            | 76             | 2477            |
| 17                                  | 2418            | 37             | 2438            | 57             | 2458            | 77             | 2478            |
| 18                                  | 2419            | 38             | 2439            | 58             | 2459            | 78             | 2479            |
| 19                                  | 2420            | 39             | 2440            | 59             | 2460            | 79             | 2480            |
| 20                                  | 2421            | 40             | 2441            | 60             | 2461            |                |                 |

| List of Channels (802.11b/g/n) |                 |                |                 |                |                 |                |                 |
|--------------------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
| No. of Channel                 | Frequency (MHz) | No. of Channel | Frequency (MHz) | No. of Channel | Frequency (MHz) | No. of Channel | Frequency (MHz) |
| 01                             | 2412            | 05             | 2432            | 09             | 2452            | 13             | --              |
| 02                             | 2417            | 06             | 2437            | 10             | 2457            | 14             | --              |
| 03                             | 2422            | 07             | 2442            | 11             | 2462            | 15             | --              |
| 04                             | 2427            | 08             | 2447            | 12             | --              | 16             | --              |

### 1.3 Compliance Standards

| Compliance Standards                                                                                                                                                                                                  |                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC Part 15 Subpart C                                                                                                                                                                                                 | FEDERAL COMMUNICATIONS COMMISSION, RADIO FREQUENCY DEVICES, Intentional Radiators                                                                                    |
| All measurements contained in this report were conducted with all above standards                                                                                                                                     |                                                                                                                                                                      |
| According to standards for test methodology                                                                                                                                                                           |                                                                                                                                                                      |
| FCC Part 15 Subpart C                                                                                                                                                                                                 | FEDERAL COMMUNICATIONS COMMISSION, RADIO FREQUENCY DEVICES, Intentional Radiators                                                                                    |
| ANSI C63.4-2014                                                                                                                                                                                                       | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. |
| ANSI C63.10-2013                                                                                                                                                                                                      | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices                                                                       |
| Maintenance of compliance is the responsibility of the manufacturer or applicant. Any modification of the product, which result is lowering the emission, should be checked to ensure compliance has been maintained. |                                                                                                                                                                      |

### 1.4 Test Facilities

|                                                                                                                                                                                                      |                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Laboratory Name:                                                                                                                                                                                     | <b>Shenzhen CCUT Quality Technology Co., Ltd.</b><br>1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China |
| CNAS Laboratory No.:                                                                                                                                                                                 | L18863                                                                                                                                                                    |
| A2LA Certificate No.:                                                                                                                                                                                | 6893.01                                                                                                                                                                   |
| FCC Registration No:                                                                                                                                                                                 | 583813                                                                                                                                                                    |
| ISED Registration No.:                                                                                                                                                                               | CN0164                                                                                                                                                                    |
| All measurement facilities used to collect the measurement data are located at 1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China. |                                                                                                                                                                           |

## 1.5 List of Measurement Instruments

| Description                 | Manufacturer  | Model           | Serial Number | Cal. Date  | Due. Date  |
|-----------------------------|---------------|-----------------|---------------|------------|------------|
| <b>Conducted Emissions</b>  |               |                 |               |            |            |
| AMN                         | ROHDE&SCHWARZ | ENV216          | 101097        | 2023-10-21 | 2024-10-20 |
| EMI Test Receiver           | ROHDE&SCHWARZ | ESPI            | 100242        | 2023-07-31 | 2024-07-30 |
| <b>Radiated Emissions</b>   |               |                 |               |            |            |
| EMI Test Receiver           | ROHDE&SCHWARZ | ESPI            | 100154        | 2023-07-31 | 2024-07-30 |
| Spectrum Analyzer           | KEYSIGHT      | N9020A          | MY48030972    | 2023-07-31 | 2024-07-30 |
| Spectrum Analyzer           | ROHDE&SCHWARZ | FSV40-N         | 101692        | 2023-07-31 | 2024-07-30 |
| Amplifier                   | SCHWARZBECK   | BBV 9743B       | 00251         | 2023-07-31 | 2024-07-30 |
| Amplifier                   | HUABO         | YXL0518-2.5-45  | --            | 2023-07-31 | 2024-07-30 |
| Amplifier                   | COM-MW        | DLAN-18G-4G-02  | 10229104      | 2023-07-31 | 2024-07-30 |
| Loop Antenna                | DAZE          | ZN30900C        | 21104         | 2023-08-07 | 2024-08-06 |
| Broadband Antenna           | SCHWARZBECK   | VULB 9168       | 01320         | 2023-08-07 | 2024-08-06 |
| Horn Antenna                | SCHWARZBECK   | BBHA 9120D      | 02553         | 2023-08-07 | 2024-08-06 |
| Horn Antenna                | COM-MW        | ZLB7-18-40G-950 | 12221225      | 2023-08-07 | 2024-08-06 |
| <b>Conducted RF Testing</b> |               |                 |               |            |            |
| RF Test System              | MWRFTTest     | MW100-RFCB      | 220418SQS-37  | 2023-07-31 | 2024-07-30 |
| Spectrum Analyzer           | KEYSIGHT      | N9020A          | ATO-90521     | 2023-07-31 | 2024-07-30 |

## 1.6 Measurement Uncertainty

| Test Item                   | Conditions    | Uncertainty |
|-----------------------------|---------------|-------------|
| Conducted Emissions         | 9kHz ~ 30MHz  | ±1.64 dB    |
| Radiated Emissions          | 9kHz ~ 30MHz  | ±2.88 dB    |
|                             | 30MHz ~ 1GHz  | ±3.32 dB    |
|                             | 1GHz ~ 18GHz  | ±3.50 dB    |
|                             | 18GHz ~ 40GHz | ±3.66 dB    |
| Conducted Output Power      | 9kHz ~ 26GHz  | ±0.50 dB    |
| Occupied Bandwidth          | 9kHz ~ 26GHz  | ±4.0 %      |
| Conducted Spurious Emission | 9kHz ~ 26GHz  | ±1.32 dB    |
| Power Spectrum Density      | 9kHz ~ 26GHz  | ±0.62 dB    |

## 2. Summary of Test Results

| FCC Rule                                                                                                                                                                           | Description of Test Item | Result |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------|
| FCC Part 15.207                                                                                                                                                                    | Conducted Emissions      | Passed |
| FCC Part 15.209, 15.247(d)                                                                                                                                                         | Radiated Emissions       | Passed |
| Passed: The EUT complies with the essential requirements in the standard<br>Failed: The EUT does not comply with the essential requirements in the standard<br>N/A: Not applicable |                          |        |

### 3. Conducted Emissions

#### 3.1 Standard and Limit

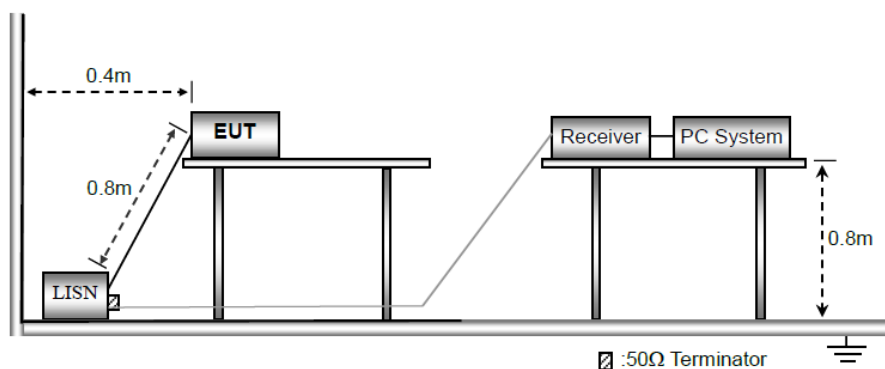
According to the rule FCC Part 15.207, Conducted emissions limit, the limit for a wireless device as below:

| Frequency of Emission<br>(MHz) | Conducted emissions (dBuV) |          |
|--------------------------------|----------------------------|----------|
|                                | Quasi-peak                 | Average  |
| 0.15-0.5                       | 66 to 56                   | 56 to 46 |
| 0.5-5                          | 56                         | 46       |
| 5-30                           | 60                         | 50       |

Note 1: Decreases with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz  
 Note 2: The lower limit applies at the band edges

#### 3.2 Test Procedure

Test is conducting under the description of ANSI C63.10 - 2013 section 6.2.



Test Setup Block Diagram

a) The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

b) The following is the setting of the receiver

Attenuation: 10dB

Start Frequency: 0.15MHz

Stop Frequency: 30MHz

IF Bandwidth: 9kHz

c) The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

d) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

e) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

f) LISN is at least 80 cm from nearest part of EUT chassis.

g) For the actual test configuration, please refer to the related Item - photographs of the test setup.

### **3.3 Test Data and Results**

Based on all tested data, the EUT complied with the FCC Part 15.207 standard limit for a wireless device, and with the worst case as below:

Remark: Level = Reading + Factor, Margin = Level - Limit

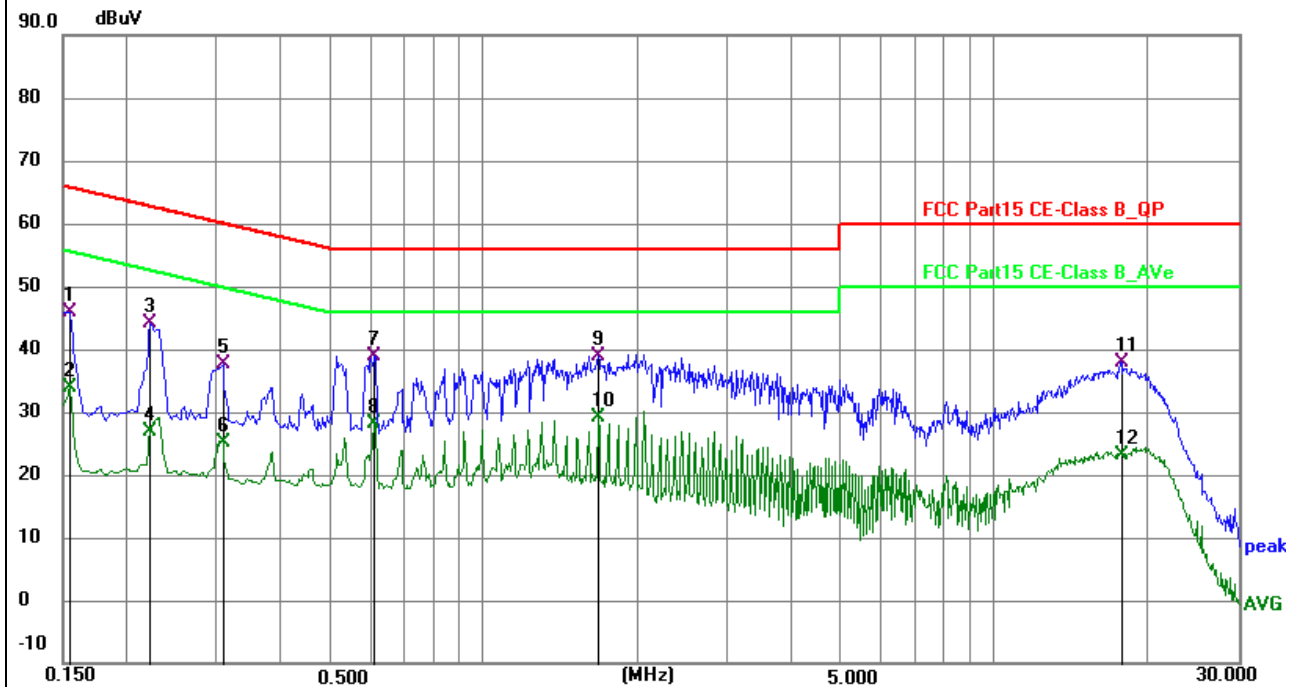
## Test Plots and Data of Conducted Emissions

Tested Mode: TM1(2402MHz)

Test Voltage: AC 120V/60Hz

Test Power Line: Neutral

Remark:



| No.  | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|------|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1    | 0.1545          | 36.47          | 9.42        | 45.89        | 65.75        | -19.86      | QP       | P   |        |
| 2    | 0.1545          | 24.41          | 9.42        | 33.83        | 55.75        | -21.92      | AVG      | P   |        |
| 3    | 0.2220          | 34.50          | 9.63        | 44.13        | 62.74        | -18.61      | QP       | P   |        |
| 4    | 0.2220          | 17.20          | 9.63        | 26.83        | 52.74        | -25.91      | AVG      | P   |        |
| 5    | 0.3075          | 27.87          | 9.64        | 37.51        | 60.04        | -22.53      | QP       | P   |        |
| 6    | 0.3075          | 15.58          | 9.64        | 25.22        | 50.04        | -24.82      | AVG      | P   |        |
| 7    | 0.6134          | 29.27          | 9.70        | 38.97        | 56.00        | -17.03      | QP       | P   |        |
| 8    | 0.6134          | 18.39          | 9.70        | 28.09        | 46.00        | -17.91      | AVG      | P   |        |
| 9    | 1.6800          | 28.77          | 10.04       | 38.81        | 56.00        | -17.19      | QP       | P   |        |
| 10 * | 1.6800          | 19.11          | 10.04       | 29.15        | 46.00        | -16.85      | AVG      | P   |        |
| 11   | 17.7270         | 27.61          | 10.22       | 37.83        | 60.00        | -22.17      | QP       | P   |        |
| 12   | 17.7270         | 12.93          | 10.22       | 23.15        | 50.00        | -26.85      | AVG      | P   |        |

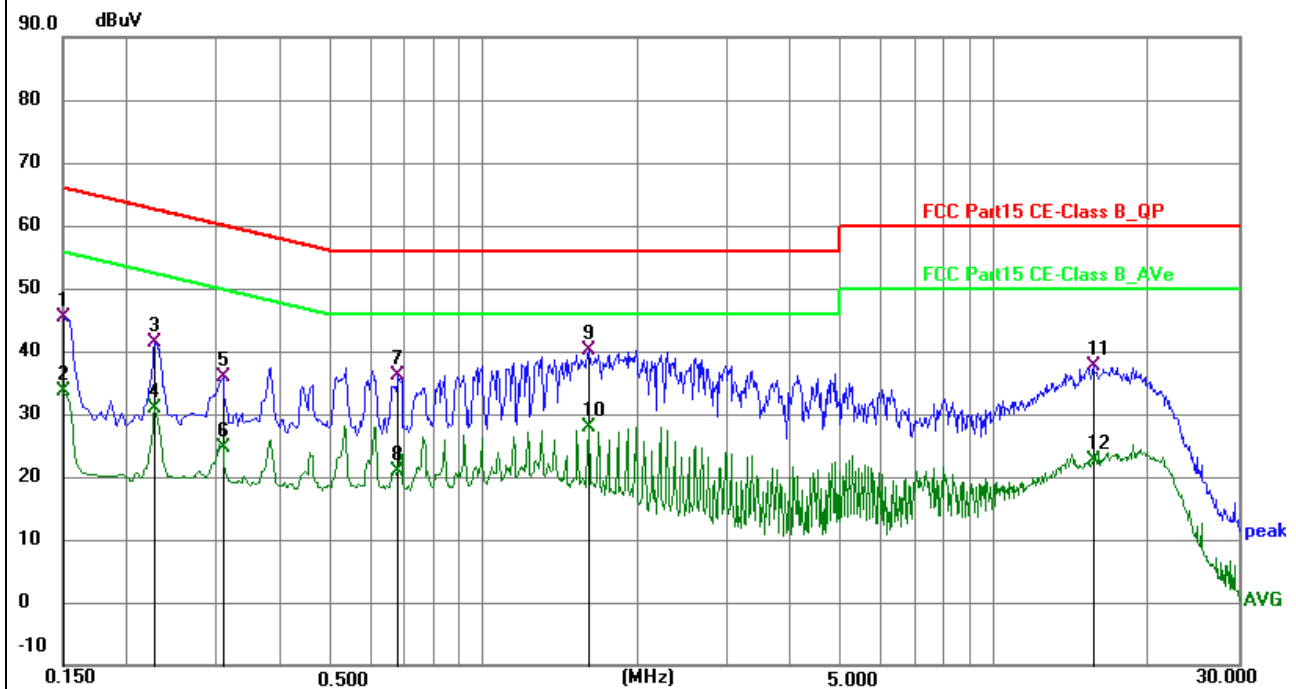
## Test Plots and Data of Conducted Emissions

Tested Mode: TM1(2402MHz)

Test Voltage: AC 120V/60Hz

Test Power Line: Live

Remark:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1   | 0.1500          | 36.19          | 9.27        | 45.46        | 66.00        | -20.54      | QP       | P   |        |
| 2   | 0.1500          | 24.43          | 9.27        | 33.70        | 56.00        | -22.30      | AVG      | P   |        |
| 3   | 0.2265          | 32.20          | 9.25        | 41.45        | 62.58        | -21.13      | QP       | P   |        |
| 4   | 0.2265          | 21.57          | 9.25        | 30.82        | 52.58        | -21.76      | AVG      | P   |        |
| 5   | 0.3075          | 26.00          | 9.78        | 35.78        | 60.04        | -24.26      | QP       | P   |        |
| 6   | 0.3075          | 14.97          | 9.78        | 24.75        | 50.04        | -25.29      | AVG      | P   |        |
| 7   | 0.6809          | 26.18          | 9.86        | 36.04        | 56.00        | -19.96      | QP       | P   |        |
| 8   | 0.6809          | 11.06          | 9.86        | 20.92        | 46.00        | -25.08      | AVG      | P   |        |
| 9 * | 1.6035          | 30.05          | 10.04       | 40.09        | 56.00        | -15.91      | QP       | P   |        |
| 10  | 1.6035          | 17.74          | 10.04       | 27.78        | 46.00        | -18.22      | AVG      | P   |        |
| 11  | 15.5715         | 27.23          | 10.28       | 37.51        | 60.00        | -22.49      | QP       | P   |        |
| 12  | 15.5715         | 12.30          | 10.28       | 22.58        | 50.00        | -27.42      | AVG      | P   |        |

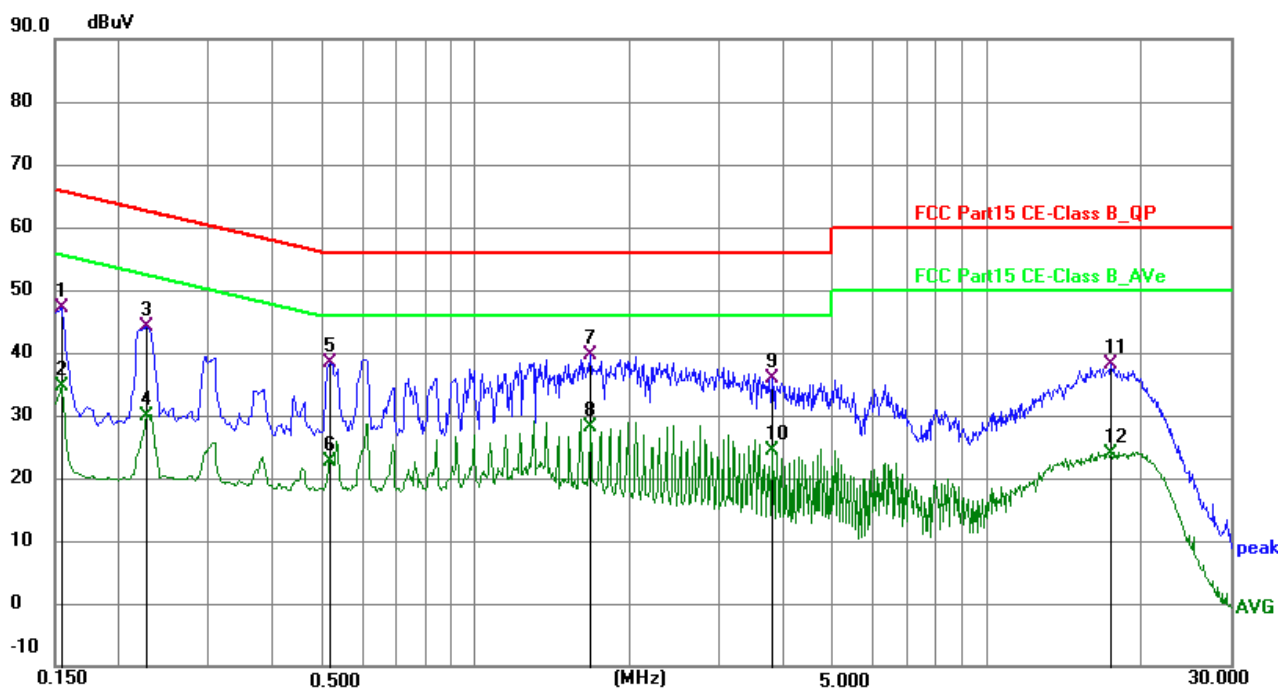
## Test Plots and Data of Conducted Emissions

Tested Mode: TM2(2402MHz)

Test Voltage: AC 120V/60Hz

Test Power Line: Neutral

Remark:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1   | 0.1544          | 37.67          | 9.42        | 47.09        | 65.76        | -18.67      | QP       | P   |        |
| 2   | 0.1544          | 25.17          | 9.42        | 34.59        | 55.76        | -21.17      | AVG      | P   |        |
| 3   | 0.2265          | 34.53          | 9.63        | 44.16        | 62.58        | -18.42      | QP       | P   |        |
| 4   | 0.2265          | 20.20          | 9.63        | 29.83        | 52.58        | -22.75      | AVG      | P   |        |
| 5   | 0.5190          | 28.39          | 9.91        | 38.30        | 56.00        | -17.70      | QP       | P   |        |
| 6   | 0.5190          | 12.67          | 9.91        | 22.58        | 46.00        | -23.42      | AVG      | P   |        |
| 7 * | 1.6800          | 29.56          | 10.04       | 39.60        | 56.00        | -16.40      | QP       | P   |        |
| 8   | 1.6800          | 18.13          | 10.04       | 28.17        | 46.00        | -17.83      | AVG      | P   |        |
| 9   | 3.8174          | 25.78          | 10.14       | 35.92        | 56.00        | -20.08      | QP       | P   |        |
| 10  | 3.8174          | 14.32          | 10.14       | 24.46        | 46.00        | -21.54      | AVG      | P   |        |
| 11  | 17.5515         | 27.85          | 10.21       | 38.06        | 60.00        | -21.94      | QP       | P   |        |
| 12  | 17.5515         | 13.76          | 10.21       | 23.97        | 50.00        | -26.03      | AVG      | P   |        |

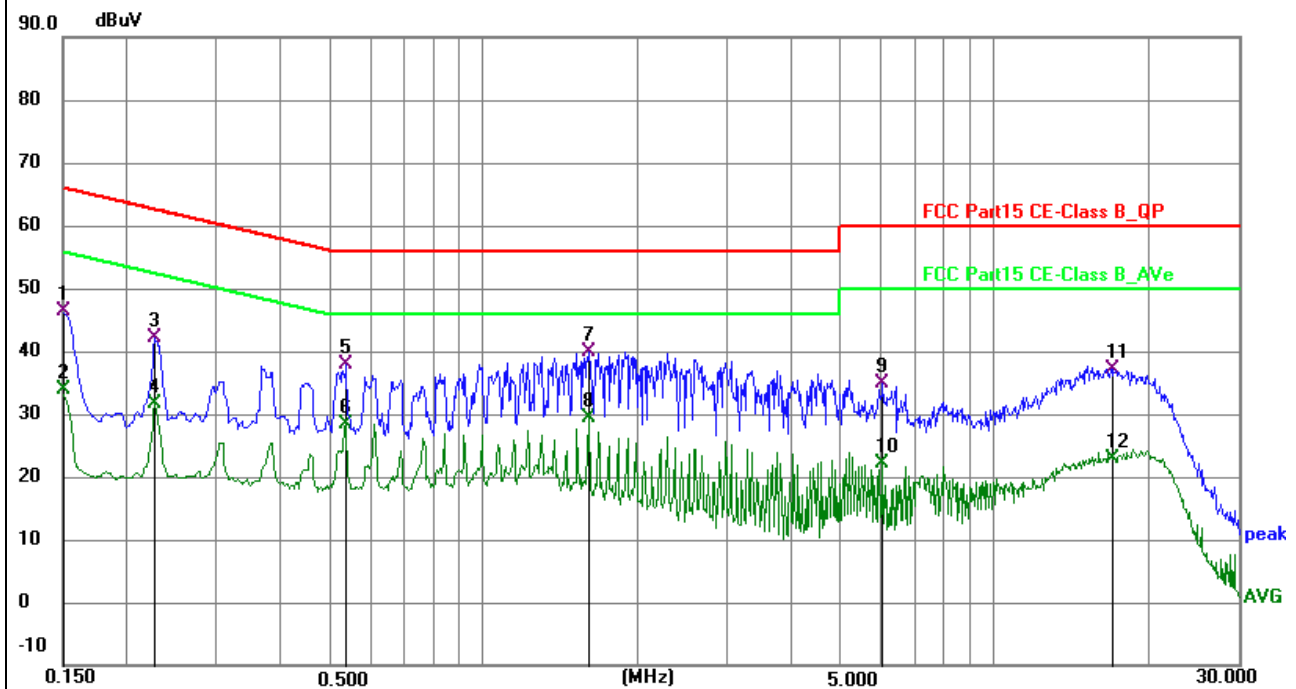
## Test Plots and Data of Conducted Emissions

Tested Mode: TM2(2402MHz)

Test Voltage: AC 120V/60Hz

Test Power Line: Live

Remark:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1   | 0.1500          | 37.09          | 9.27        | 46.36        | 66.00        | -19.64      | QP       | P   |        |
| 2   | 0.1500          | 24.60          | 9.27        | 33.87        | 56.00        | -22.13      | AVG      | P   |        |
| 3   | 0.2265          | 32.94          | 9.25        | 42.19        | 62.58        | -20.39      | QP       | P   |        |
| 4   | 0.2265          | 22.38          | 9.25        | 31.63        | 52.58        | -20.95      | AVG      | P   |        |
| 5   | 0.5370          | 27.92          | 9.94        | 37.86        | 56.00        | -18.14      | QP       | P   |        |
| 6   | 0.5370          | 18.39          | 9.94        | 28.33        | 46.00        | -17.67      | AVG      | P   |        |
| 7 * | 1.6035          | 29.79          | 10.04       | 39.83        | 56.00        | -16.17      | QP       | P   |        |
| 8   | 1.6035          | 19.24          | 10.04       | 29.28        | 46.00        | -16.72      | AVG      | P   |        |
| 9   | 6.0314          | 24.58          | 10.25       | 34.83        | 60.00        | -25.17      | QP       | P   |        |
| 10  | 6.0314          | 11.96          | 10.25       | 22.21        | 50.00        | -27.79      | AVG      | P   |        |
| 11  | 17.0970         | 26.70          | 10.37       | 37.07        | 60.00        | -22.93      | QP       | P   |        |
| 12  | 17.0970         | 12.39          | 10.37       | 22.76        | 50.00        | -27.24      | AVG      | P   |        |

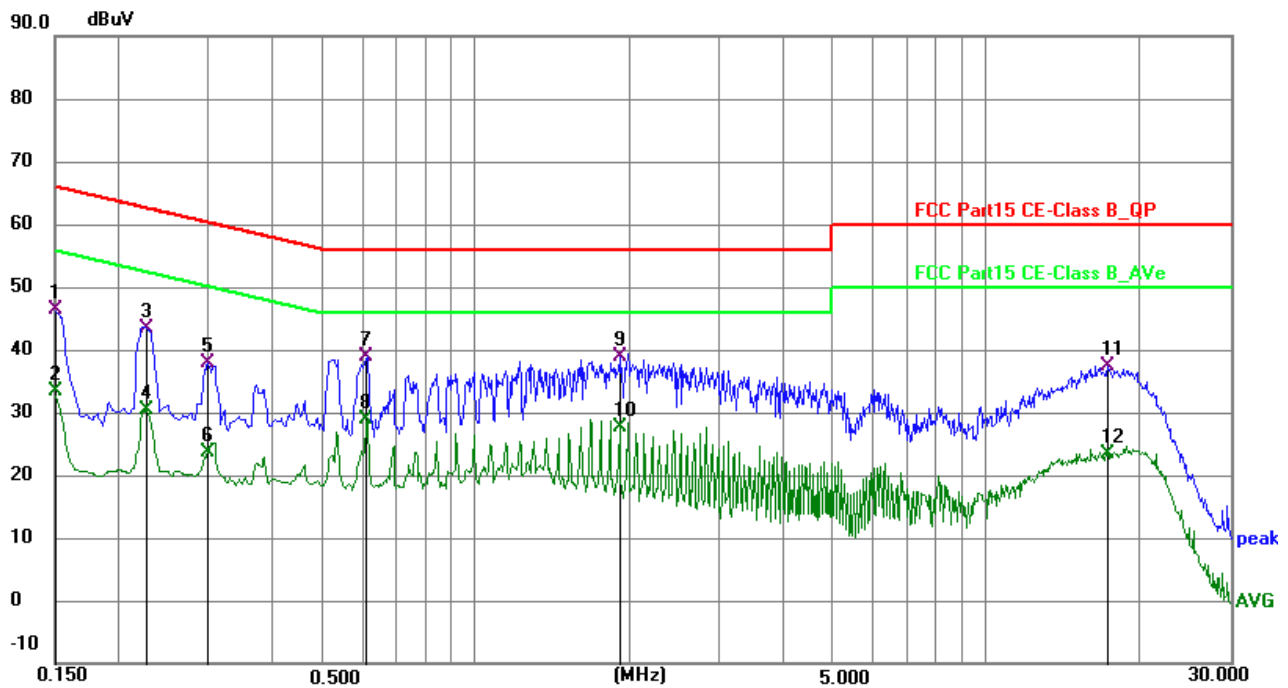
## Test Plots and Data of Conducted Emissions

Tested Mode: TM5(2412MHz)

Test Voltage: AC 120V/60Hz

Test Power Line: Neutral

Remark:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1   | 0.1500          | 36.85          | 9.51        | 46.36        | 66.00        | -19.64      | QP       | P   |        |
| 2   | 0.1500          | 23.95          | 9.51        | 33.46        | 56.00        | -22.54      | AVG      | P   |        |
| 3   | 0.2265          | 33.86          | 9.63        | 43.49        | 62.58        | -19.09      | QP       | P   |        |
| 4   | 0.2265          | 20.77          | 9.63        | 30.40        | 52.58        | -22.18      | AVG      | P   |        |
| 5   | 0.2985          | 28.27          | 9.69        | 37.96        | 60.28        | -22.32      | QP       | P   |        |
| 6   | 0.2985          | 13.89          | 9.69        | 23.58        | 50.28        | -26.70      | AVG      | P   |        |
| 7 * | 0.6134          | 29.12          | 9.70        | 38.82        | 56.00        | -17.18      | QP       | P   |        |
| 8   | 0.6134          | 19.06          | 9.70        | 28.76        | 46.00        | -17.24      | AVG      | P   |        |
| 9   | 1.9095          | 28.76          | 10.04       | 38.80        | 56.00        | -17.20      | QP       | P   |        |
| 10  | 1.9095          | 17.59          | 10.04       | 27.63        | 46.00        | -18.37      | AVG      | P   |        |
| 11  | 17.2770         | 27.29          | 10.18       | 37.47        | 60.00        | -22.53      | QP       | P   |        |
| 12  | 17.2770         | 13.13          | 10.18       | 23.31        | 50.00        | -26.69      | AVG      | P   |        |

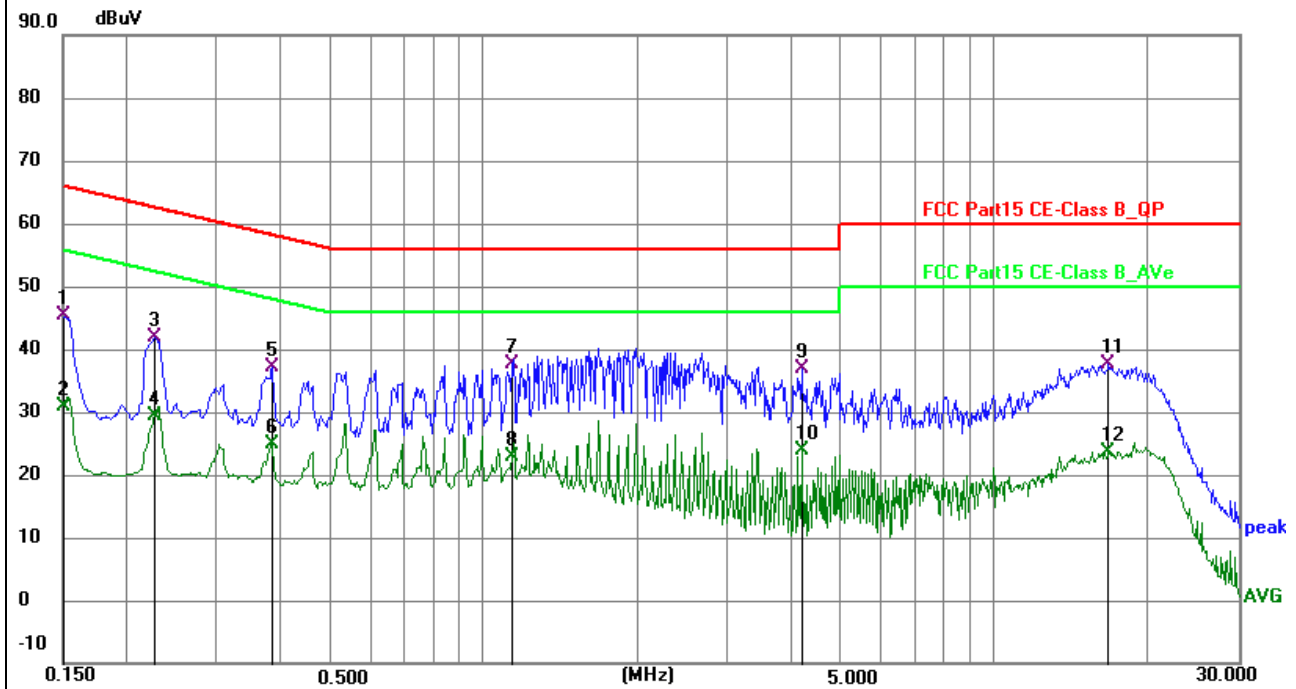
## Test Plots and Data of Conducted Emissions

Tested Mode: TM5(2412MHz)

Test Voltage: AC 120V/60Hz

Test Power Line: Live

Remark:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1   | 0.1500          | 36.12          | 9.27        | 45.39        | 66.00        | -20.61      | QP       | P   |        |
| 2   | 0.1500          | 21.63          | 9.27        | 30.90        | 56.00        | -25.10      | AVG      | P   |        |
| 3   | 0.2265          | 32.57          | 9.25        | 41.82        | 62.58        | -20.76      | QP       | P   |        |
| 4   | 0.2265          | 20.19          | 9.25        | 29.44        | 52.58        | -23.14      | AVG      | P   |        |
| 5   | 0.3840          | 27.30          | 9.89        | 37.19        | 58.19        | -21.00      | QP       | P   |        |
| 6   | 0.3840          | 15.10          | 9.89        | 24.99        | 48.19        | -23.20      | AVG      | P   |        |
| 7 * | 1.1400          | 27.71          | 10.00       | 37.71        | 56.00        | -18.29      | QP       | P   |        |
| 8   | 1.1400          | 12.91          | 10.00       | 22.91        | 46.00        | -23.09      | AVG      | P   |        |
| 9   | 4.2000          | 26.67          | 10.15       | 36.82        | 56.00        | -19.18      | QP       | P   |        |
| 10  | 4.2000          | 13.85          | 10.15       | 24.00        | 46.00        | -22.00      | AVG      | P   |        |
| 11  | 16.7280         | 27.33          | 10.34       | 37.67        | 60.00        | -22.33      | QP       | P   |        |
| 12  | 16.7280         | 13.23          | 10.34       | 23.57        | 50.00        | -26.43      | AVG      | P   |        |

## 4. Radiated Emissions

### 4.1 Standard and Limit

According to §15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

According to the rule FCC Part 15.209, Radiated emission limit for a wireless device as below:

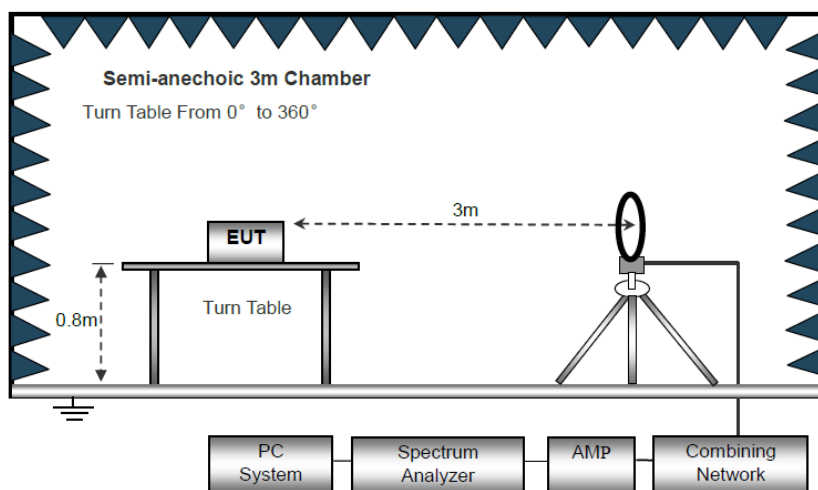
| Frequency of Emission<br>(MHz)                                    | Field Strength<br>(micorvolts/meter) | Measurement Distance<br>(meters) |
|-------------------------------------------------------------------|--------------------------------------|----------------------------------|
| 0.009~0.490                                                       | 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: The more stringent limit applies at transition frequencies. |                                      |                                  |

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

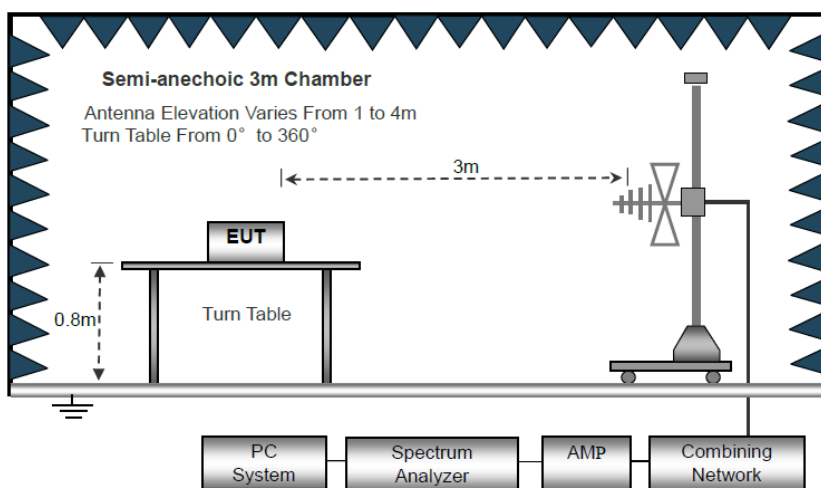
*Note: Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.*

### 4.2 Test Procedure

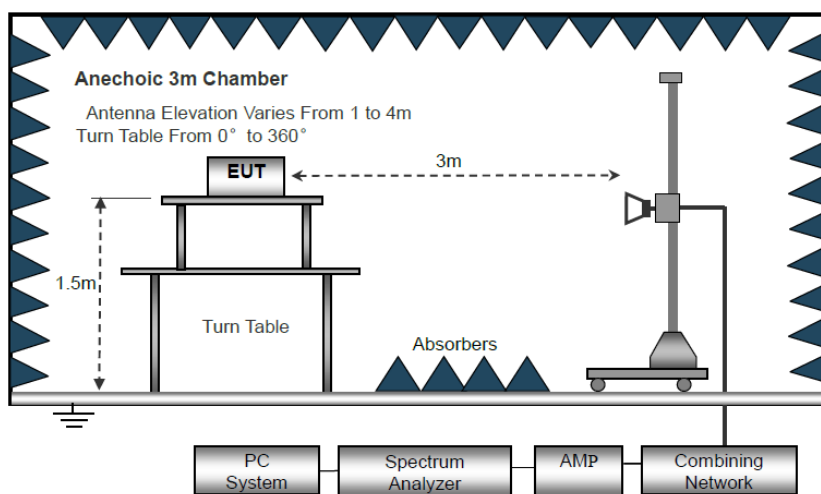
Test is conducting under the description of ANSI C63.10 - 2013 section 6.3 to 6.6.



Block Diagram of Radiated Emission Below 30MHz



Block Diagram of Radiated Emission From 30MHz to 1GHz



Block Diagram of Radiated Emission Above 1GHz

- a) The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range below 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.
- b) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- c) Use the following spectrum analyzer settings:  
Span = wide enough to fully capture the emission being measured  
RBW = 1 MHz for  $f \geq 1\text{GHz}$ , 100 kHz for  $f < 1\text{GHz}$ , 10kHz for  $f < 30\text{MHz}$   
VBW  $\geq$  RBW, Sweep = auto  
Detector function = peak  
Trace = max hold
- d) Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- e) The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.
- f) For the actual test configuration, please refer to the related item - EUT test photos.

### 4.3 Test Data and Results

Based on all tested data, the EUT complied with the FCC Part 15.247 standard limit for a wireless device, and with the worst case as below:

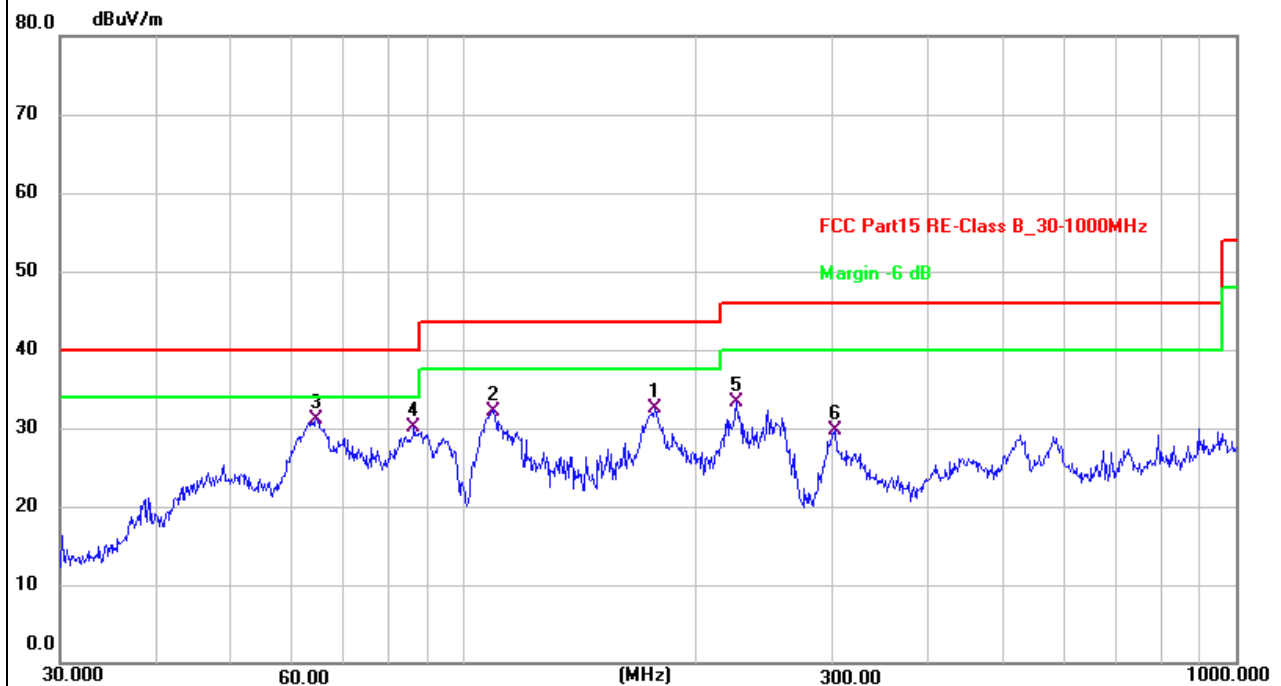
Remark: Level = Reading + Factor, Margin = Level - Limit

## Radiated Emission Test Data (30MHz to 1GHz)

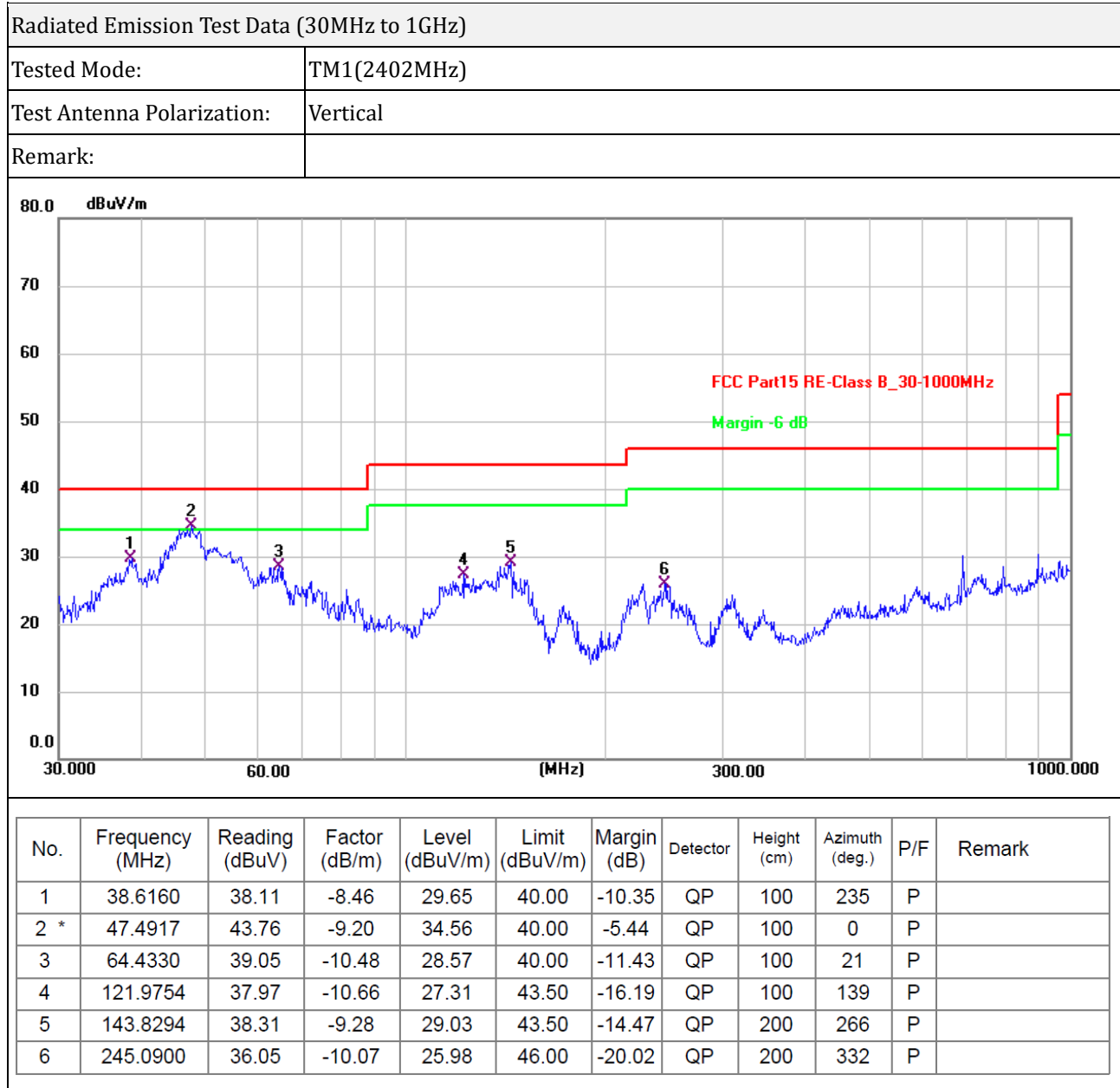
Tested Mode: TM1(2402MHz)

Test Antenna Polarization: Horizontal

Remark:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 176.8877        | 43.05          | -10.53        | 32.52          | 43.50          | -10.98      | QP       | 100         | 246            | P   |        |
| 2   | 109.0285        | 44.27          | -12.07        | 32.20          | 43.50          | -11.30      | QP       | 100         | 235            | P   |        |
| 3 * | 64.4330         | 41.54          | -10.48        | 31.06          | 40.00          | -8.94       | QP       | 200         | 110            | P   |        |
| 4   | 86.2000         | 43.59          | -13.56        | 30.03          | 40.00          | -9.97       | QP       | 200         | 0              | P   |        |
| 5   | 225.3080        | 44.46          | -11.10        | 33.36          | 46.00          | -12.64      | QP       | 200         | 332            | P   |        |
| 6   | 302.4811        | 38.11          | -8.45         | 29.66          | 46.00          | -16.34      | QP       | 100         | 356            | P   |        |

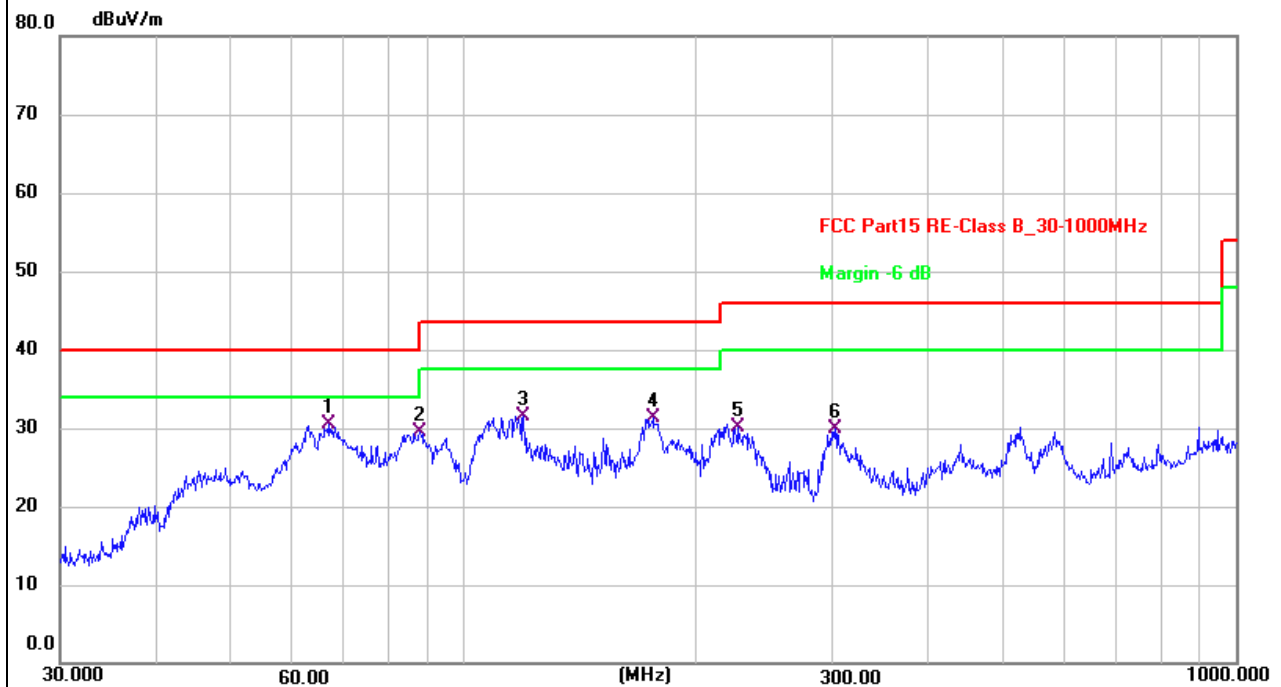


## Radiated Emission Test Data (30MHz to 1GHz)

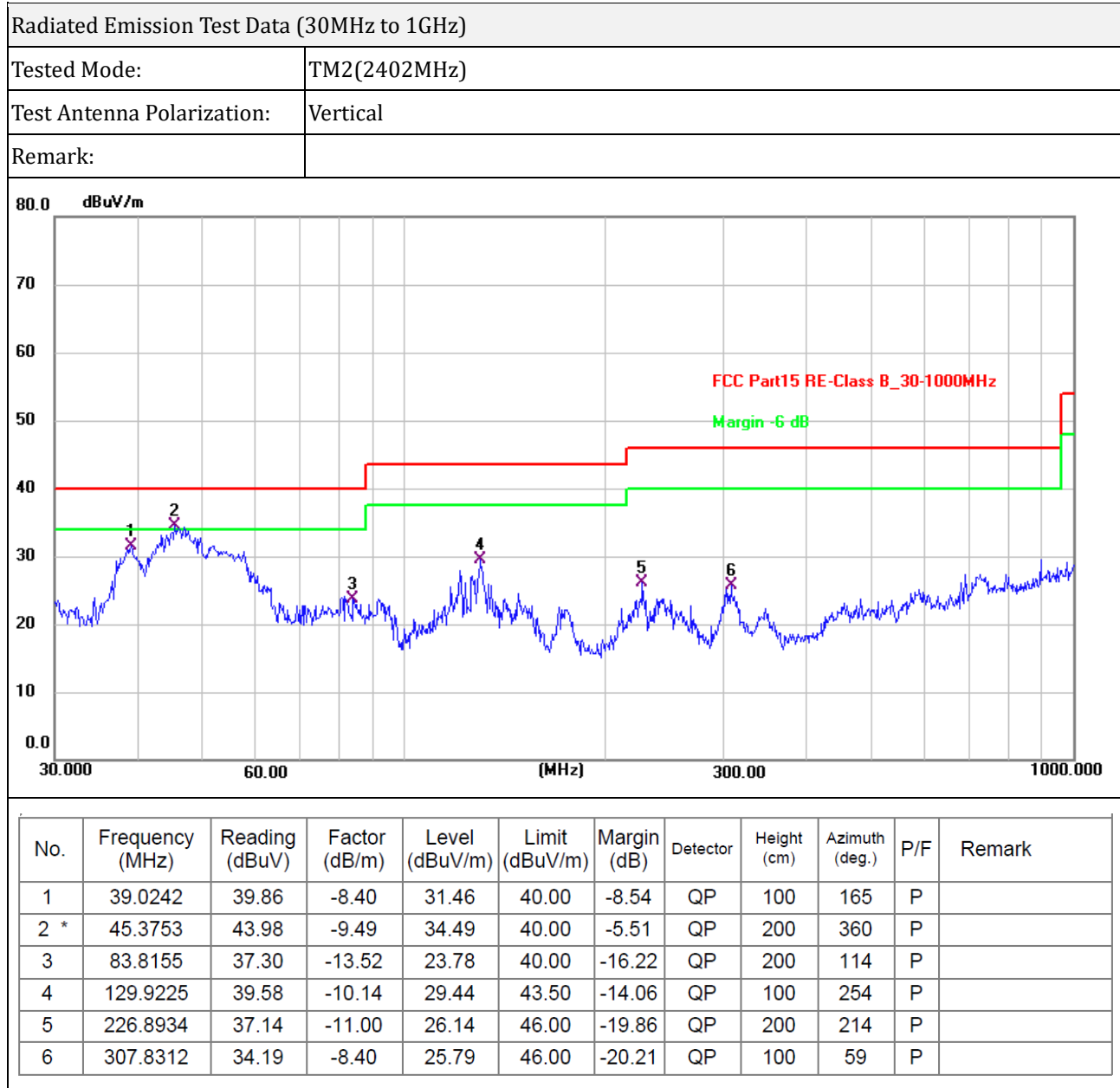
Tested Mode: TM2(2402MHz)

Test Antenna Polarization: Horizontal

Remark:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1 * | 66.9670         | 41.26          | -10.74        | 30.52          | 40.00          | -9.48       | QP       | 100         | 196            | P   |        |
| 2   | 87.7246         | 43.09          | -13.56        | 29.53          | 40.00          | -10.47      | QP       | 200         | 360            | P   |        |
| 3   | 119.4360        | 42.39          | -10.86        | 31.53          | 43.50          | -11.97      | QP       | 200         | 56             | P   |        |
| 4   | 175.6516        | 41.70          | -10.40        | 31.30          | 43.50          | -12.20      | QP       | 100         | 222            | P   |        |
| 5   | 226.8935        | 41.03          | -11.00        | 30.03          | 46.00          | -15.97      | QP       | 100         | 11             | P   |        |
| 6   | 302.4811        | 38.34          | -8.45         | 29.89          | 46.00          | -16.11      | QP       | 100         | 0              | P   |        |

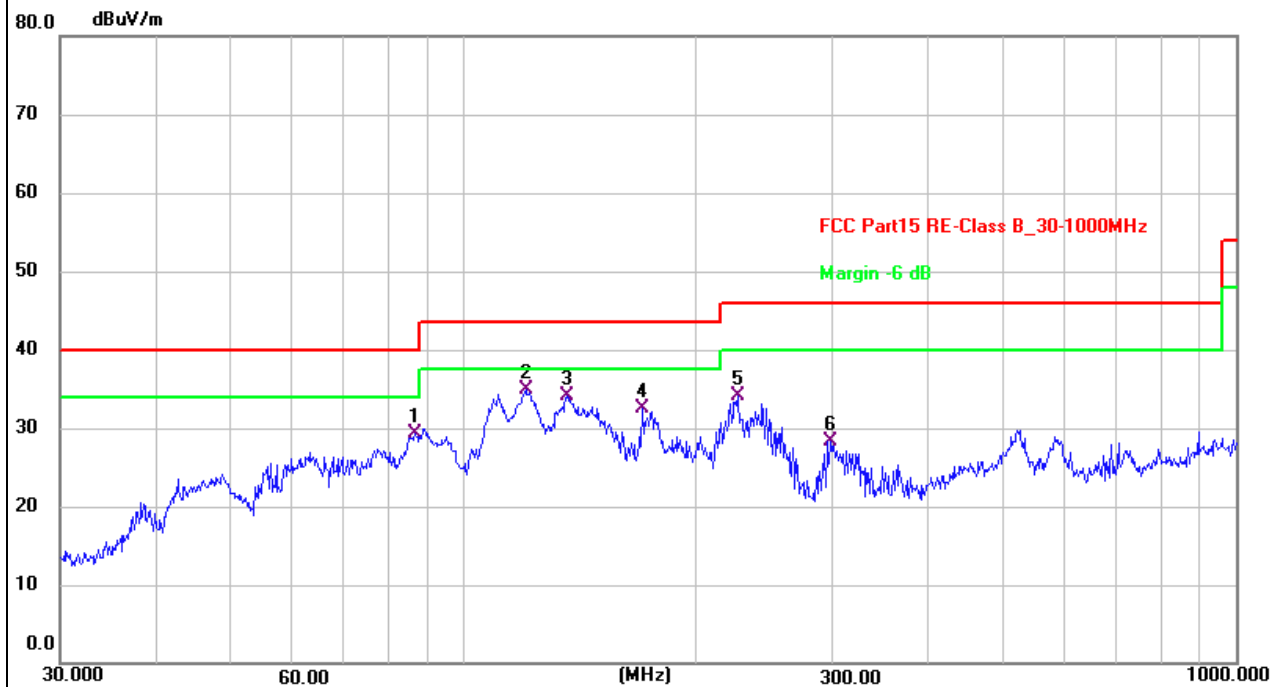


## Radiated Emission Test Data (30MHz to 1GHz)

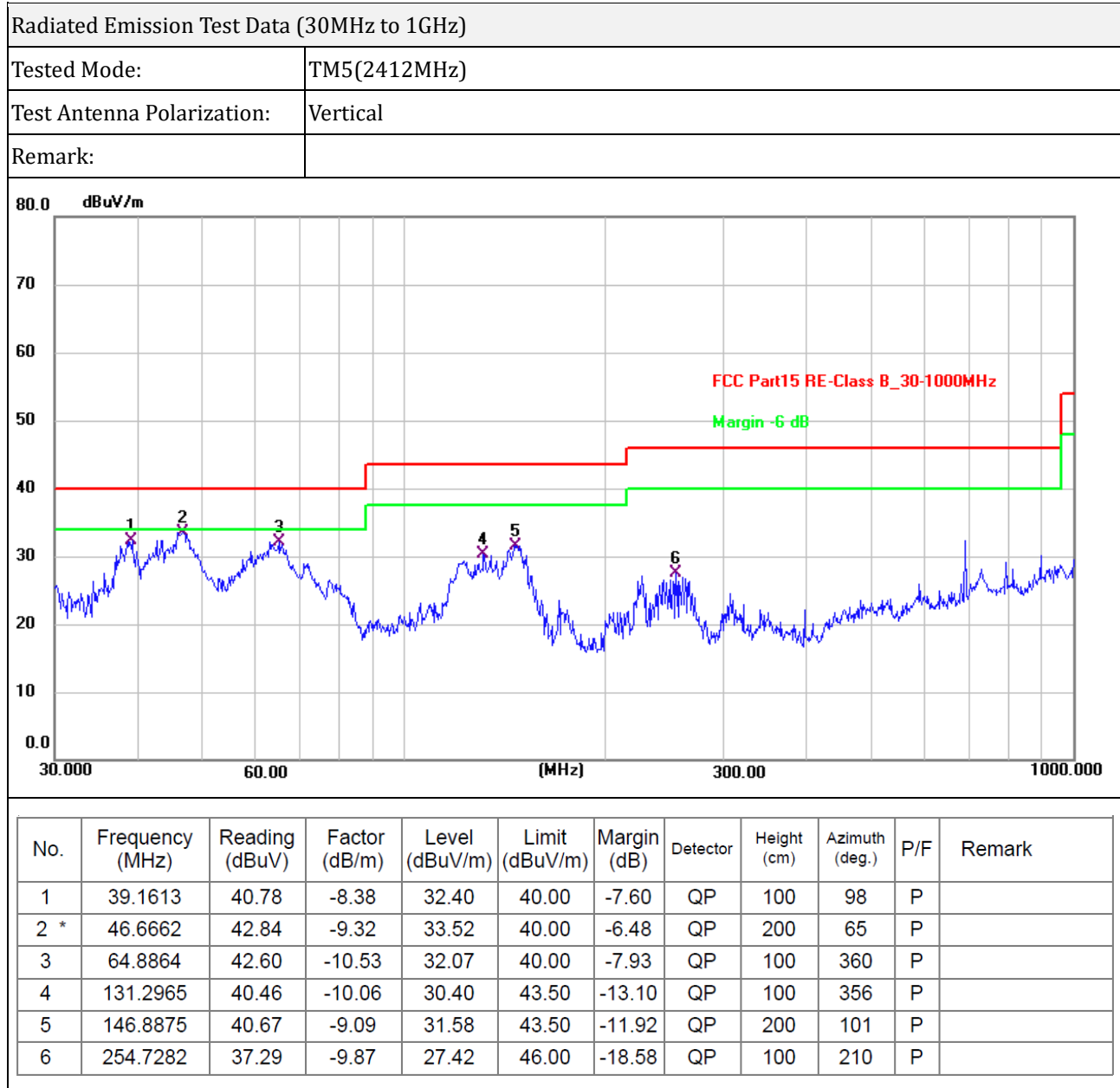
Tested Mode: TM5(2412MHz)

Test Antenna Polarization: Horizontal

Remark:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 86.5027         | 42.79          | -13.55        | 29.24          | 40.00          | -10.76      | QP       | 100         | 255            | P   |        |
| 2 * | 120.2766        | 45.71          | -10.77        | 34.94          | 43.50          | -8.56       | QP       | 200         | 173            | P   |        |
| 3   | 135.9821        | 43.79          | -9.77         | 34.02          | 43.50          | -9.48       | QP       | 200         | 11             | P   |        |
| 4   | 170.1947        | 42.35          | -9.81         | 32.54          | 43.50          | -10.96      | QP       | 100         | 269            | P   |        |
| 5   | 226.0994        | 45.21          | -11.05        | 34.16          | 46.00          | -11.84      | QP       | 100         | 141            | P   |        |
| 6   | 298.2681        | 36.86          | -8.50         | 28.36          | 46.00          | -17.64      | QP       | 200         | 231            | P   |        |



\*\*\*\*\* END OF REPORT \*\*\*\*\*