

### FCC Report (NFC)

**Applicant:** Magtek Incorporated

**Address of Applicant:** 1710 Apollo Court, Seal Beach, California 90740, United States

**Manufacturer:** Magtek Incorporated

**Address of Manufacturer:** 1710 Apollo Court, Seal Beach, California 90740, United States

**Equipment Under Test (EUT)**

Product Name: tDynamo

Model No.: 21079821

Trade Mark: MagTek

**FCC ID:** U73-21079821

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.225:2016

**Date of sample receipt:** May 18, 2017

**Date of Test:** May 19-25, 2017

**Date of report issued:** May 26, 2017

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

A circular blue ink stamp from GTS Global United Technology Services Co., Ltd. is visible. The stamp contains the text "GTS", "GLOBAL UNITED TECHNOLOGY SERVICES CO., LTD.", and "176019". Overlaid on the stamp is a handwritten signature in black ink, which appears to be "Robinson Lo".

**Robinson Lo**  
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

| Version No. | Date         | Description |
|-------------|--------------|-------------|
| 00          | May 26, 2017 | Original    |
|             |              |             |
|             |              |             |
|             |              |             |
|             |              |             |

Prepared By:

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Date:

May 26, 2017

Project Engineer

Check By:

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Date:

May 26, 2017

Reviewer

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## 4 Test Summary

| Test Item  | Section in CFR 47 | Result |
|--|-------------------|--------|
| Antenna Requirement  | 15.203            | Pass   |
| AC Power Line Conducted Emission                             | 15.207            | Pass   |
| Field Strength of Fundamental Emissions and Mask Measurement | 15.225            | Pass   |
| Radiated Emission  | 15.209            | Pass   |
| 20dB Emission Bandwidth                                      | 15.225            | Pass   |
| Frequency Stability Measurement                              | 15.225            | Pass   |

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.10 2013 and ANSI C63.4: 2014.

### 4.1 Measurement Uncertainty

| Test Item                        | Frequency Range | Measurement Uncertainty | Notes |
|----------------------------------|-----------------|-------------------------|-------|
| Radiated Emission                | 9kHz ~ 30MHz    | $\pm 4.34\text{dB}$     | (1)   |
| Radiated Emission                | 30MHz ~ 1000MHz | $\pm 4.24\text{dB}$     | (1)   |
| Radiated Emission                | 1GHz ~ 26.5GHz  | $\pm 4.68\text{dB}$     | (1)   |
| AC Power Line Conducted Emission | 0.15MHz ~ 30MHz | $\pm 3.45\text{dB}$     | (1)   |

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

## 5 General Information

### 5.1 General Description of EUT

|                      |                  |
|----------------------|------------------|
| Product Name:        | tDynamo          |
| Model No.:           | 21079821         |
| Operation Frequency: | 13.56MHz         |
| Channel Number:      | 1                |
| Modulation:          | ASK              |
| Antenna type:        | Integral Antenna |
| Antenna gain:        | 2.0dBi           |
| Power supply:        | DC 5V            |

## 5.2 Test mode

|                  |  |
|------------------|--|
| Transmitter mode | Keep the EUT in continuously transmitting. |
|------------------|--|

## 5.3 Test Facility

|  |
|--|
| <p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> <li>• <b>FCC —Registration No.: 600491</b><br/>Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016.</li> <li>• <b>Industry Canada (IC) —Registration No.: 9079A-2</b><br/>The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016</li> </ul> |
|--|

## 5.4 Test Location

|  |
|--|
| All tests were performed at:   |
| <p>Global United Technology Services Co., Ltd.<br/>Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102<br/>Tel: 0755-27798480<br/>Fax: 0755-27798960</p> |

## 5.5 Description of Support Units

| Manufacturer          | Description | Model | Serial Number | FCC Approval |
|-----------------------|-------------|-------|---------------|--------------|
| Emerson Network Power | USB Charger | A1299 | N/A           | FCC DoC      |

## 6 Test Instruments list


| Radiated Emission: |                               |                                |                             |               |                     |                         |
|--------------------|-------------------------------|--------------------------------|-----------------------------|---------------|---------------------|-------------------------|
| Item               | Test Equipment                | Manufacturer                   | Model No.                   | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                  | 3m Semi- Anechoic Chamber     | ZhongYu Electron               | 9.2(L)*6.2(W)* 6.4(H)       | GTS250        | July 03 2015        | July 02 2020            |
| 2                  | Control Room                  | ZhongYu Electron               | 6.2(L)*2.5(W)* 2.4(H)       | GTS251        | N/A                 | N/A                     |
| 3                  | Spectrum Analyzer             | Agilent                        | E4440A                      | GTS533        | June 29 2016        | June 28 2017            |
| 4                  | EMI Test Receiver             | Rohde & Schwarz                | ESU26                       | GTS203        | June 29 2016        | June 28 2017            |
| 5                  | BiConiLog Antenna             | SCHWARZBECK<br>MESS-ELEKTRONIK | VULB9163                    | GTS214        | June 29 2016        | June 28 2017            |
| 6                  | Double -ridged waveguide horn | SCHWARZBECK<br>MESS-ELEKTRONIK | 9120D-829                   | GTS208        | June 29 2016        | June 28 2017            |
| 7                  | Horn Antenna                  | ETS-LINDGREN                   | 3160                        | GTS217        | June 29 2016        | June 28 2017            |
| 8                  | EMI Test Software             | AUDIX                          | E3                          | N/A           | N/A                 | N/A                     |
| 9                  | Coaxial Cable                 | GTS                            | N/A                         | GTS213        | June 29 2016        | June 28 2017            |
| 10                 | Coaxial Cable                 | GTS                            | N/A                         | GTS211        | June 29 2016        | June 28 2017            |
| 11                 | Coaxial cable                 | GTS                            | N/A                         | GTS210        | June 29 2016        | June 28 2017            |
| 12                 | Coaxial Cable                 | GTS                            | N/A                         | GTS212        | June 29 2016        | June 28 2017            |
| 13                 | Amplifier(100kHz-3GHz)        | HP                             | 8347A                       | GTS204        | June 29 2016        | June 28 2017            |
| 14                 | Amplifier(2GHz-20GHz)         | HP                             | 8349B                       | GTS206        | June 29 2016        | June 28 2017            |
| 15                 | Amplifier (18-26GHz)          | Rohde & Schwarz                | AFS33-18002<br>650-30-8P-44 | GTS218        | June 29 2016        | June 28 2017            |
| 16                 | Band filter                   | Amindeon                       | 82346                       | GTS219        | June 29 2016        | June 28 2017            |
| 17                 | Power Meter                   | Anritsu                        | ML2495A                     | GTS540        | June 29 2016        | June 28 2017            |
| 18                 | Power Sensor                  | Anritsu                        | MA2411B                     | GTS541        | June 29 2016        | June 28 2017            |

| Conducted Emission: |                          |                     |                      |               |                     |                         |
|---------------------|--------------------------|---------------------|----------------------|---------------|---------------------|-------------------------|
| Item                | Test Equipment           | Manufacturer        | Model No.            | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                   | Shielding Room           | ZhongYu Electron    | 7.3(L)x3.1(W)x2.9(H) | GTS252        | May.16 2014         | May.15 2019             |
| 2                   | EMI Test Receiver        | R&S                 | ESCI 7               | GTS552        | June. 29 2016       | June. 28 2017           |
| 3                   | Coaxial Switch           | ANRITSU CORP        | MP59B                | GTS225        | June. 29 2016       | June. 28 2017           |
| 4                   | Artificial Mains Network | SCHWARZBECK<br>MESS | NSLK8127             | GTS226        | June. 29 2016       | June. 28 2017           |
| 5                   | Coaxial Cable            | GTS                 | N/A                  | GTS227        | N/A                 | N/A                     |
| 6                   | EMI Test Software        | AUDIX               | E3                   | N/A           | N/A                 | N/A                     |
| 7                   | Thermo meter             | KTJ                 | TA328                | GTS233        | June. 29 2016       | June. 28 2017           |

| General used equipment: |                |              |           |               |                     |                         |
|-------------------------|----------------|--------------|-----------|---------------|---------------------|-------------------------|
| Item                    | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                       | Barometer      | ChangChun    | DYM3      | GTS257        | June 29 2016        | June 28 2017            |

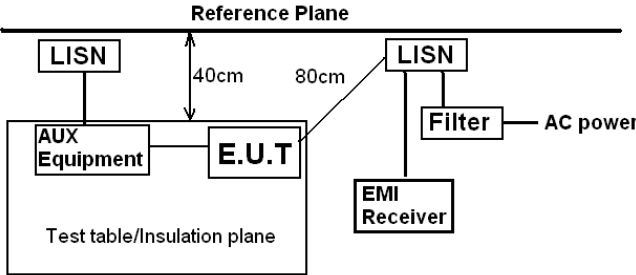
## 7 Test results and Measurement Data

### 7.1 Antenna requirement:

|  |                             |
|--|-----------------------------|
| <b>Standard requirement:</b>   | FCC Part15 C Section 15.203 |
| <b>15.203 requirement:</b><br>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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. |                             |
| <b>E.U.T Antenna:</b><br><i>The antenna is PCB antenna, the best case gain of the antenna is 2.0dBi</i>  |                             |
|   |                             |

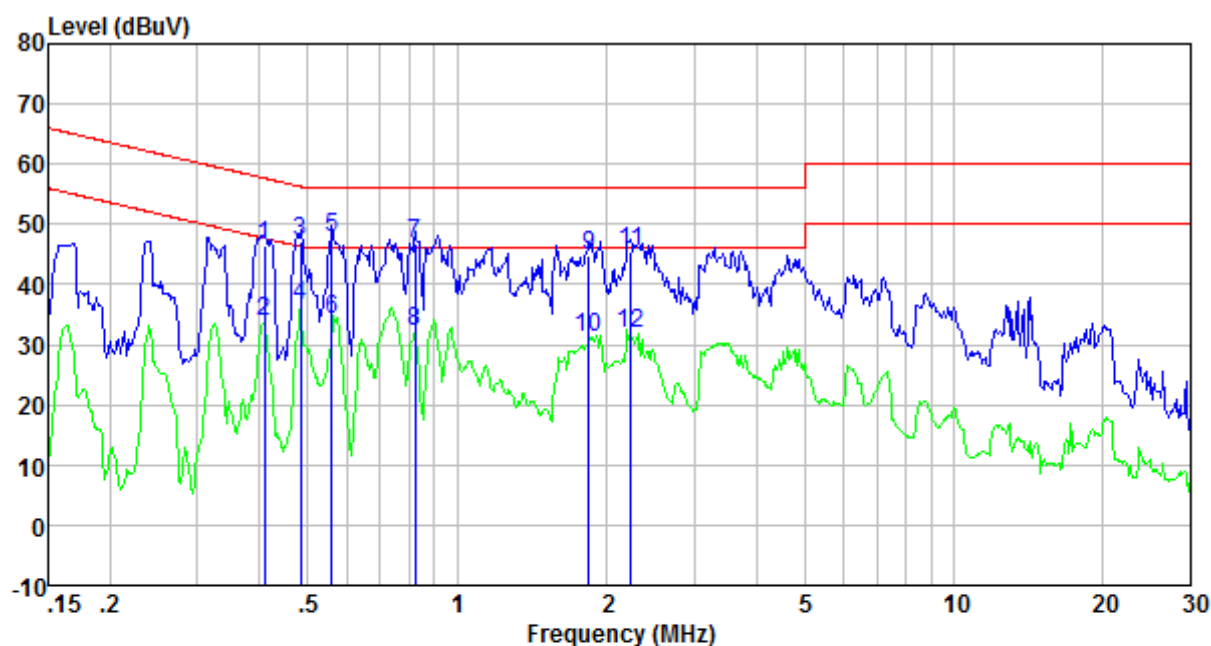


## 7.2 Conducted Emissions

|  |   |              |           |           |
|--|---|--------------|-----------|-----------|
| Test Requirement:                                | FCC Part15 C Section 15.207   |              |           |           |
| Test Method:                                     | ANSI C63.10:2013  |              |           |           |
| Test Frequency Range:                            | 150KHz to 30MHz   |              |           |           |
| Class / Severity:                                | Class B   |              |           |           |
| Receiver setup:                                  | RBW=9KHz, VBW=30KHz, Sweep time=auto  |              |           |           |
| Limit:   | Frequency range (MHz)   | Limit (dBuV) |           |           |
|  |   | Quasi-peak   | Average   |           |
|  |   | 0.15-0.5     | 66 to 56* | 56 to 46* |
|  |   | 0.5-5        | 56        | 46        |
|  |   | 5-30         | 60        | 50        |
| * Decreases with the logarithm of the frequency. |   |              |           |           |
| Test setup:                                      |    |              |           |           |
|  | <p>Remark<br/>E.U.T: Equipment Under Test<br/>LISN: Line Impedance Stabilization Network<br/>Test table height=0.8m</p>   |              |           |           |
| Test procedure:                                  | <div>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</div> <div>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</div> <div>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.</div> |              |           |           |
| Test Instruments:                                | Refer to section 6.0 for details  |              |           |           |
| Test mode:                                       | Refer to section 5.2 for details  |              |           |           |
| Test results:                                    | Pass  |              |           |           |

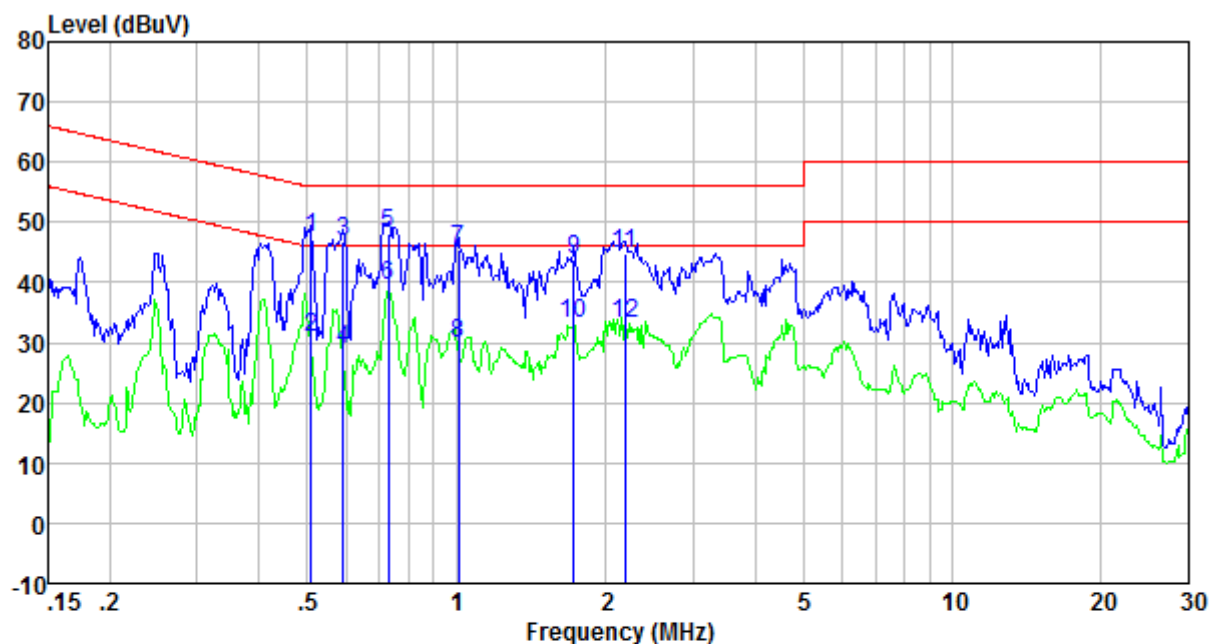
### Measurement data:

Line:



| Freq<br>MHz | Reading<br>level<br>dBuV | LIISN/ISN<br>factor<br>dB | Cable<br>loss<br>dB | level<br>dBuV | Limit<br>level<br>dBuV | Over<br>limit<br>dB | Remark  |
|-------------|--------------------------|---------------------------|---------------------|---------------|------------------------|---------------------|---------|
| 0.41        | 45.81                    | 0.41                      | 0.11                | 46.33         | 57.68                  | -11.35              | QP      |
| 0.41        | 33.33                    | 0.41                      | 0.11                | 33.85         | 47.68                  | -13.83              | Average |
| 0.48        | 46.60                    | 0.39                      | 0.11                | 47.10         | 56.27                  | -9.17               | QP      |
| 0.48        | 36.09                    | 0.39                      | 0.11                | 36.59         | 46.27                  | -9.68               | Average |
| 0.56        | 47.22                    | 0.33                      | 0.12                | 47.67         | 56.00                  | -8.33               | QP      |
| 0.56        | 33.67                    | 0.33                      | 0.12                | 34.12         | 46.00                  | -11.88              | Average |
| 0.82        | 46.36                    | 0.27                      | 0.13                | 46.76         | 56.00                  | -9.24               | QP      |
| 0.82        | 31.75                    | 0.27                      | 0.13                | 32.15         | 46.00                  | -13.85              | Average |
| 1.84        | 44.56                    | 0.20                      | 0.14                | 44.90         | 56.00                  | -11.10              | QP      |
| 1.84        | 30.91                    | 0.20                      | 0.14                | 31.25         | 46.00                  | -14.75              | Average |
| 2.24        | 45.09                    | 0.20                      | 0.15                | 45.44         | 56.00                  | -10.56              | QP      |
| 2.24        | 31.44                    | 0.20                      | 0.15                | 31.79         | 46.00                  | -14.21              | Average |

## Neutral:

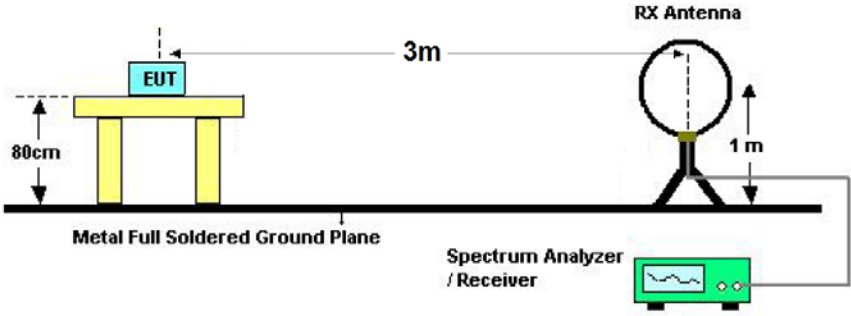


| Freq<br>MHz | Reading<br>level<br>dBuV | LISN/ISN<br>factor<br>dB | Cable<br>loss<br>dB | level<br>dBuV | Limit<br>level<br>dBuV | Over<br>limit<br>dB | Remark  |
|-------------|--------------------------|--------------------------|---------------------|---------------|------------------------|---------------------|---------|
| 0.51        | 46.88                    | 0.34                     | 0.11                | 47.33         | 56.00                  | -8.67               | QP      |
| 0.51        | 30.33                    | 0.34                     | 0.11                | 30.78         | 46.00                  | -15.22              | Average |
| 0.59        | 46.55                    | 0.28                     | 0.12                | 46.95         | 56.00                  | -9.05               | QP      |
| 0.59        | 28.48                    | 0.28                     | 0.12                | 28.88         | 46.00                  | -17.12              | Average |
| 0.73        | 47.76                    | 0.24                     | 0.13                | 48.13         | 56.00                  | -7.87               | QP      |
| 0.73        | 39.13                    | 0.24                     | 0.13                | 39.50         | 46.00                  | -6.50               | Average |
| 1.01        | 45.11                    | 0.21                     | 0.13                | 45.45         | 56.00                  | -10.55              | QP      |
| 1.01        | 29.45                    | 0.21                     | 0.13                | 29.79         | 46.00                  | -16.21              | Average |
| 1.73        | 43.40                    | 0.20                     | 0.14                | 43.74         | 56.00                  | -12.26              | QP      |
| 1.73        | 32.75                    | 0.20                     | 0.14                | 33.09         | 46.00                  | -12.91              | Average |
| 2.19        | 44.52                    | 0.20                     | 0.15                | 44.87         | 56.00                  | -11.13              | QP      |
| 2.19        | 32.87                    | 0.20                     | 0.15                | 33.22         | 46.00                  | -12.78              | Average |

## Notes:

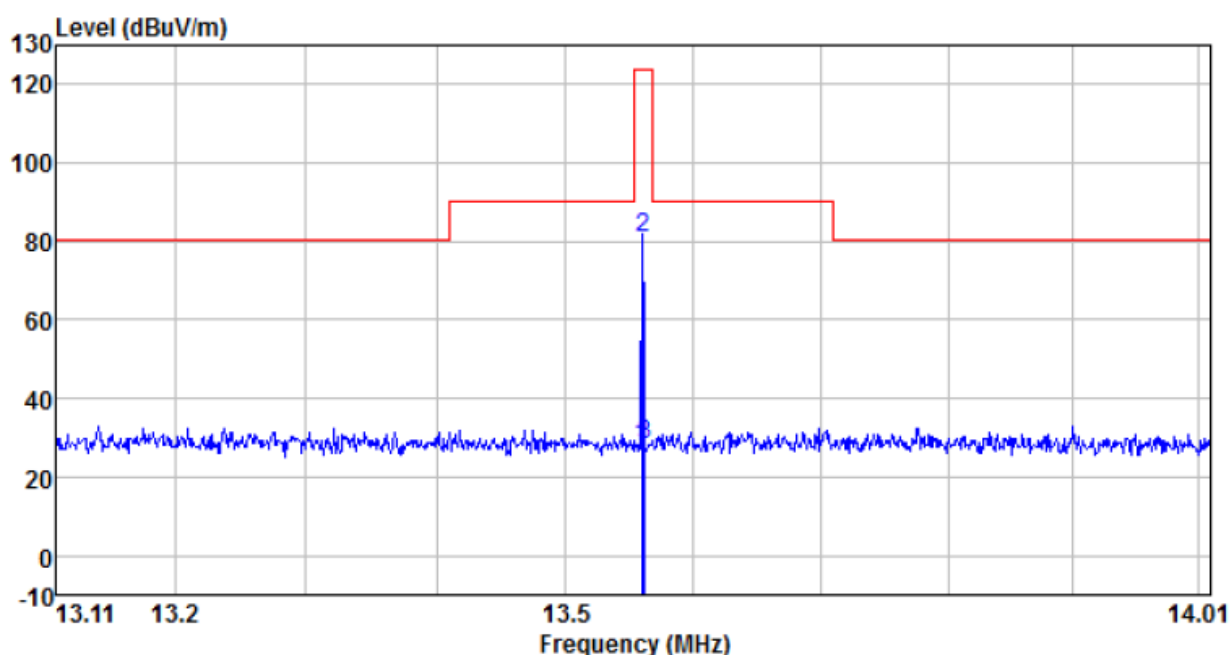
1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss

## 7.3 Field Strength of Fundamental Emissions and Mask Measurement

|                   |  |  |                               |
|-------------------|--|--|-------------------------------|
| Test Requirement: | FCC Part15 C Section 15.225 and 15.209   |  |                               |
| Test Method:      | ANSI C63.10:2013   |  |                               |
| Test site:        | Measurement Distance: 3m   |  |                               |
| Receiver setup:   | RBW=9KHz, VBW=30KHz, Sweep time=Auto   |  |                               |
| Limit:            | Frequency (MHz)  | Field Strength (microvolts/meter) at 30m | Field Strength (dBuV/m) at 3m |
|                   | 13.553~13.567  | 15848                                    | 124 (QP)                      |
| Mark limit:       | Frequency (MHz)  | Field Strength (microvolts/meter) at 30m | Field Strength (dBuV/m) at 3m |
|                   | 1.705~13.110   | 30                                       | 69.5                          |
|                   | 13.110~13.410  | 106                                      | 80.5                          |
|                   | 13.410~13.553  | 334                                      | 90.5                          |
|                   | 13.553~13.567  | 15848                                    | 124.0                         |
|                   | 13.567~13.710  | 334                                      | 90.5                          |
|                   | 13.710~14.010  | 106                                      | 80.5                          |
|                   | 14.010~30.000  | 30                                       | 69.5                          |
| Test setup:       |    |  |                               |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.</li> <li>2. Power on the EUT, the turntable was rotated by 360 degrees to determine the position of the highest radiation.</li> <li>3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.</li> <li>4. For Fundamental emissions, use the receiver to measure QP reading.</li> <li>5. When the radiated emissions limits are expressed in terms of the average value of the emissions and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field</li> </ol> |  |                               |

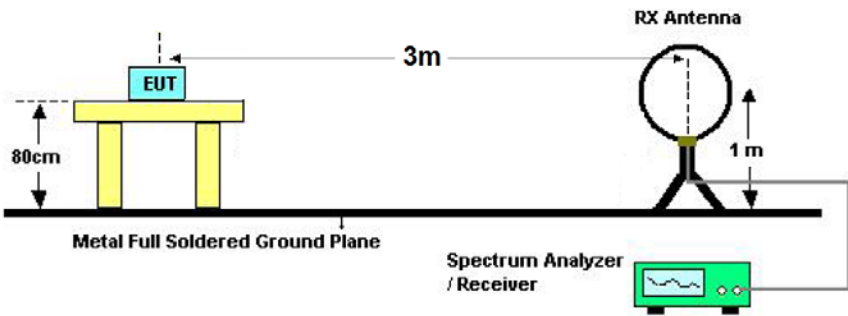
|                   |  |
|-------------------|--|
|                   | <p>strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.</p> <p>6. Compliance with the spectrum mask is tested using a spectrum analyzer with RB set to a 1KHz for the band 13.553~13.567MHz.</p> |
| Test Instruments: | Refer to section 6.0 for details   |
| Test mode:        | Refer to section 5.2 for details   |
| Test results:     | Pass   |

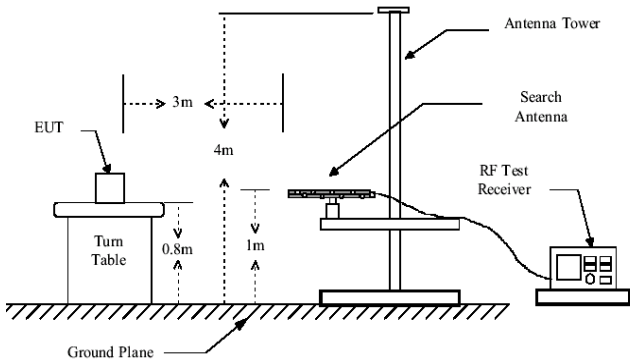
Measurement data:



| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamp<br>factor<br>dB | level<br>dBuV | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------|---------------|--------------------------|---------------------|--------|
| 13.559      | 2.50                     | 24.70                     | 0.51                | 0.00                   | 27.71         | 124.00                   | -96.29              | Peak   |
| 13.560      | 55.85                    | 24.70                     | 0.51                | 0.00                   | 81.06         | 124.00                   | -42.94              | Peak   |
| 13.562      | 3.11                     | 24.70                     | 0.51                | 0.00                   | 28.32         | 124.00                   | -95.68              | Peak   |

## 7.4 Radiated Emission

|                       |  |                                   |                               |
|-----------------------|--|-----------------------------------|-------------------------------|
| Test Requirement:     | FCC Part15 C Section 15.209  |                                   |                               |
| Test Method:          | ANSI C63.10: 2013  |                                   |                               |
| Test Frequency Range: | 9KHz to 1000MHz  |                                   |                               |
| Test site:            | Measurement Distance: 3m   |                                   |                               |
| Receiver setup:       | Frequency (MHz)  | RBW(KHz)                          | Detector                      |
|                       | 0.009~0.15   | 0.2                               | QP                            |
|                       | 0.15~30  | 9                                 | QP                            |
|                       | 30~1000  | 120                               | QP                            |
| Limit:                | The Field strength of any emissions which appear outside of 13.553~13.567MHz band shall not exceed the general radiated emissions limits |                                   |                               |
|                       | Frequency (MHz)  | Field strength (micровolts/meter) | Measurement distance (meters) |
|                       | 0.009~0.490  | 2400/F(KHz)                       | 300                           |
|                       | 0.490~1.705  | 24000/F(KHz)                      | 30                            |
|                       | 1.705~30   | 30                                | 30                            |
|                       | 30~88  | 100                               | 3                             |
|                       | 88~216   | 150                               | 3                             |
|                       | 216~960  | 200                               | 3                             |
|                       | 960~1000   | 500                               | 3                             |
| Test setup:           | Below 30MHz  |                                   |                               |
|                       |  <p>Above 30MHz</p>                                  |                                   |                               |

|                   |   |
|-------------------|---|
|                   |  <p>The diagram illustrates the test setup. An EUT (Equipment Under Test) is placed on a Turn Table at a height of 0.8m from the Ground Plane. The Turn Table is 3m away from the Antenna Tower. The Antenna Tower has a Search Antenna at a height of 4m from the Ground Plane. An RF Test Receiver is connected to the Search Antenna. The Ground Plane is indicated by a hatched line at the bottom.</p>   |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.</li> <li>2. Power on the EUT, the turntable was rotated by 360 degrees to determine the position of the highest radiation.</li> <li>3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.</li> <li>4. For each suspected emissions, the antenna tower was scan (from 1M to 4M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.</li> <li>5. Set the test-receiver system to Peak or CISPR quasi-peak detect function with specified bandwidth under maximum hold mode.</li> <li>6. When the radiated emissions limits are expressed in terms of the average value of the emissions and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.</li> <li>7. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver.</li> </ol> |
| Test Instruments: | Refer to section 6.0 for details  |
| Test mode:        | Refer to section 5.2 for details  |
| Test results:     | Pass  |

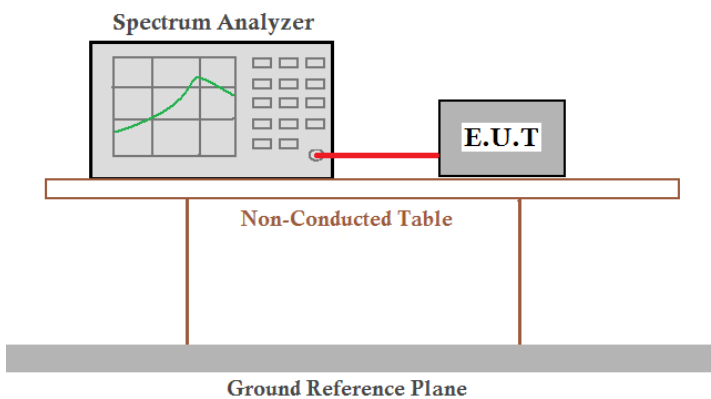
Measurement data:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 41.13           | 25.69             | 12.27                 | 0.67            | 30.04                    | 8.59           | 40.00               | -31.41          | Vertical     |
| 88.65           | 26.34             | 10.60                 | 1.10            | 29.75                    | 8.29           | 43.50               | -35.21          | Vertical     |
| 159.23          | 33.30             | 8.20                  | 1.62            | 29.37                    | 13.75          | 43.50               | -29.75          | Vertical     |
| 199.29          | 30.76             | 10.20                 | 1.84            | 29.20                    | 13.60          | 43.50               | -29.90          | Vertical     |
| 340.78          | 25.39             | 14.32                 | 2.57            | 29.77                    | 12.51          | 46.00               | -33.49          | Vertical     |
| 782.35          | 23.91             | 21.03                 | 4.40            | 29.20                    | 20.14          | 46.00               | -25.86          | Vertical     |
| 32.75           | 27.09             | 11.25                 | 0.58            | 30.08                    | 8.84           | 40.00               | -31.16          | Horizontal   |
| 102.36          | 25.30             | 12.10                 | 1.21            | 29.68                    | 8.93           | 43.50               | -34.57          | Horizontal   |
| 173.81          | 40.28             | 8.50                  | 1.71            | 29.30                    | 21.19          | 43.50               | -22.31          | Horizontal   |
| 191.07          | 37.75             | 9.70                  | 1.80            | 29.23                    | 20.02          | 43.50               | -23.48          | Horizontal   |
| 369.41          | 30.62             | 14.85                 | 2.72            | 29.64                    | 18.55          | 46.00               | -27.45          | Horizontal   |
| 682.35          | 24.65             | 19.71                 | 4.02            | 29.22                    | 19.16          | 46.00               | -26.84          | Horizontal   |

NOTE: Only worse case is reported



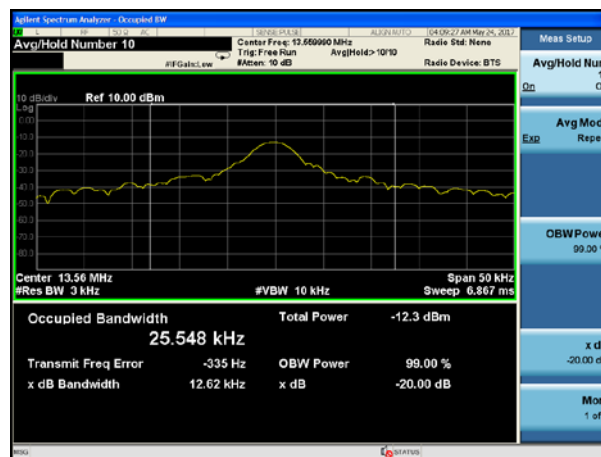
## 7.5 20dB Emission Bandwidth

|                   |  |
|-------------------|--|
| Test Requirement: | FCC Part15 C Section 15.225 and 15.215   |
| Test Method:      | ANSI C63.10:2013   |
| Limit:            | N/A  |
| Test setup:       |  |
| Test Instruments: | Refer to section 6.0 for details   |
| Test mode:        | Refer to section 5.2 for details   |
| Test results:     | Pass   |

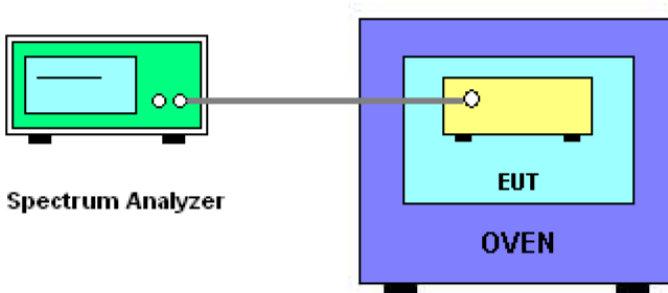
### Measurement Data

| Frequency (MHz) | 20dB Bandwidth (KHz) | 99% OBW (KHz) | Frequency range (MHz)<br>fL>13.553MHz | Frequency range (MHz)<br>fH<13.567MHz | Result |
|-----------------|----------------------|---------------|---------------------------------------|---------------------------------------|--------|
| 13.56MHz        | 12.62                | 25.55         | 13.559                                | 13.562                                | Pass   |

Test plot as follows:



## 7.6 Frequency Stability Measurement

|                   |  |
|-------------------|--|
| Test Requirement: | FCC Part15 C Section 15.225  |
| Test Method:      | ANSI C63.10: 2013  |
| Receiver setup:   | RBW=1KHz, VBW=1KHz, Sweep time=Auto  |
| Limit:            | <p>The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage,</p> <p>for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.</p> <p>For battery operated equipment, the equipment tests shall be performed using a new battery.</p>   |
| Test setup:       |  <p>The diagram illustrates the test setup. On the left is a green box labeled 'Spectrum Analyzer'. A cable connects its antenna port to a yellow box labeled 'EUT' (Equipment Under Test). The 'EUT' is placed inside a blue box labeled 'OVEN'.</p>   |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. The transmitter output (antenna port) was connected to the spectrum analyzer.</li> <li>2. EUT have transmitted absence of modulation signal and fixed channelize</li> <li>3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.</li> <li>4. Set RBW=1KHz, VBW=1KHz with peak detector and maxhold settings.</li> <li>5. <math>f_c</math> is declaring of channel frequency. Then the frequency error formula is <math>(f_c - f)/f_c \times 10^6</math> ppm and the limit is less than <math>\pm 100</math>ppm.</li> <li>6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value</li> <li>7. Extreme temperature rule is -20°C ~50°C</li> </ol> |
| Test Instruments: | Refer to section 6.0 for details   |
| Test mode:        | Refer to section 5.2 for details   |
| Test results:     | Pass   |

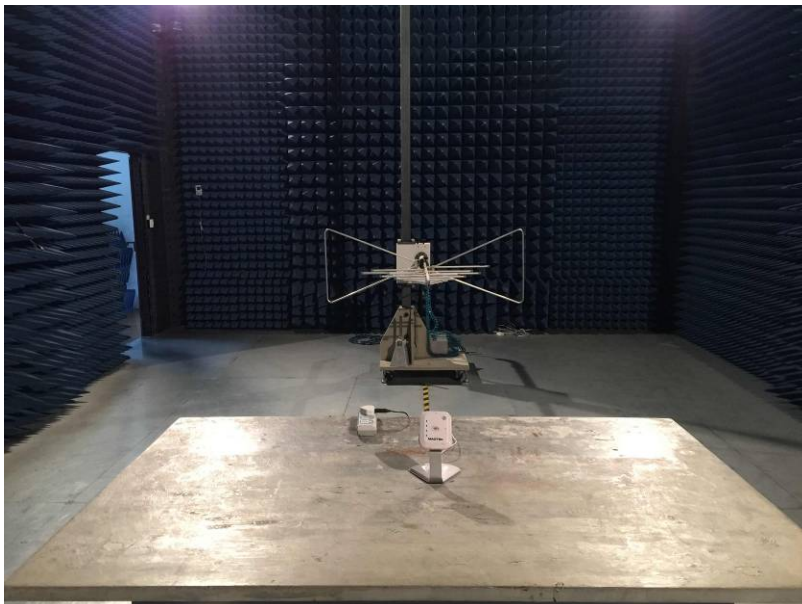
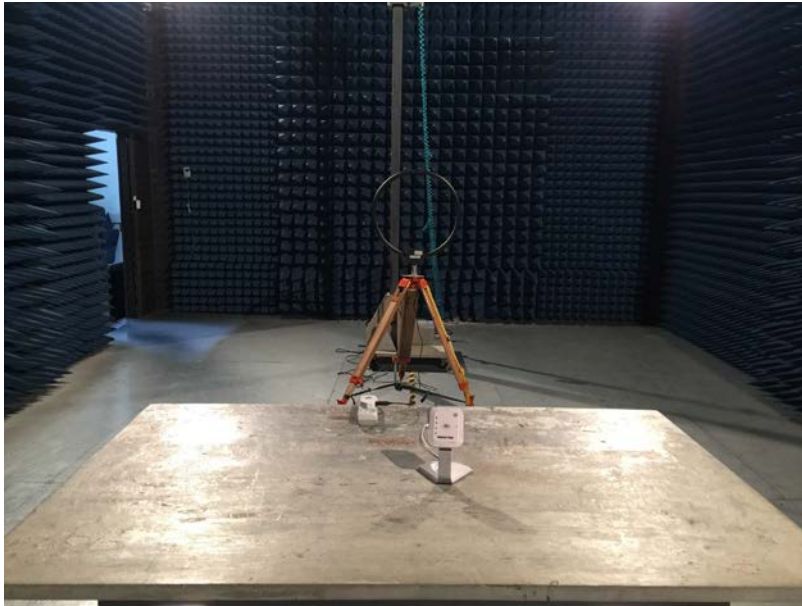
## Measurement data:

| Reference Frequency: 13.56MHz |                  |                 |          |           |        |
|-------------------------------|------------------|-----------------|----------|-----------|--------|
| Power supplied (Vdc)          | Temperature (°C) | Frequency error |          | Limit     | Result |
|                               |                  | Hz              | %        |           |        |
| 5.00                          | -20              | 67              | 0.00044% | +/- 0.01% | Pass   |
|                               | -10              | 58              | 0.00039% |           |        |
|                               | 0                | 54              | 0.00040% |           |        |
|                               | 10               | 50              | 0.00041% |           |        |
|                               | 20               | 53              | 0.00045% |           |        |
|                               | 30               | 59              | 0.00048% |           |        |
|                               | 40               | 66              | 0.00049% |           |        |
|                               | 50               | 75              | 0.00053% |           |        |

| Reference Frequency: 13.56MHz |                      |                 |          |           |        |
|-------------------------------|----------------------|-----------------|----------|-----------|--------|
| Temperature (°C)              | Power supplied (Vdc) | Frequency error |          | Limit     | Result |
|                               |                      | Hz              | ppm      |           |        |
| 20                            | 4.25                 | 57              | 0.00042% | +/- 0.01% | Pass   |
|                               | 5.00                 | 63              | 0.00048% |           |        |
|                               | 5.75                 | 77              | 0.00053% |           |        |

## 8 Test Setup Photo

Radiated Emission



Conducted Emission



## 9 UT Constructional Details

Reference to the test report No. : GTS201705000043F01

----- End -----