Report No: GZ11061535-1

# TEST REPORT

| | | |
|---|---|---|
| Applicant Name & Address | : | Masterbuilt Manufacturing Inc.<br>1 Masterbuilt Court Columbus, Georgia, 31907, USA |
| Manufacturing Site | : | Fudeer Electric Appliance Co.,Ltd.<br>286, Kaifa Avenue, Taizhou Economic Development Zone, Zhejiang Province, China |
| Sample Description | | |
| Product | : | 30" Electric Smoker with RF<br>40" Electric Smoker with RF |
| FCC ID | : | YHXESQ-3040C2 |
| Model No. | : | 20070411, 20071111, 20071011, 20070911, 20070211, 20070311, 20071211, 20071311,20071411 |
| Electrical Rating | : | 40" Electric Smoker with RF: 120VAC, 60Hz, 1200W, 10A<br>30" Electric Smoker with RF: 120VAC, 60Hz, 800W, 6.7A<br>Remote controller: 2*1.5V/AAA battery |
| Frequency | : | 2.440GHz Transceiver |
| Date Received | : | 24 June 2011 |
| Date Test Conducted | : | 06 July 2011 – 13 September 2011 |
| Test standards | : | **FCC Part 15: 2010** |
| Test Result | : | Pass |
| Conclusion | : | The submitted samples complied with the above rules/standards. |
| Remark | : | None. |

**********End of Page**********

***Prepared and Checked By:***

Helen Ma

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***Project Engineer***
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***Signature***

***Carrie Chen***
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***14 September 2011 Date***



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# CONTENT

# 1. General Description

## 1.1 Product Description

The Equipment Under Test (EUT) is a transceiver for Electric Smoker with RF at 2.440GHz. It is powered by AC mains:120V/60Hz.
During normal use, it send temperature information (probe) to remote control, when the “meat probe” button on remote control is pressed and receive control command (temp.and time) from remote control.
Antenna Type: internal integrated antenna.
The model: 20071411,20070311,20071211,20071311 are the same as the test model 20070211 in hardware and software aspect. The only differences are the appearance, and model no.for trading purpose.
The mode:20070411, 20071111, 20071011, 20070911 are the same as the test model 20070211 in hardware and software aspect. The only differences are the appearance and output power.
The power of 20070211,20070311,20071211,20071311,20071411 is 1200W.
The power of 20070411,20071111,20071011,20070911 is 800W
We tested the remote Electric Smoker, model:20070211, to determine if it was in compliance with the relevant FCC standards. We found that the unit met the requirements of FCC part 15.249. The worst case’s test data was presented in this test report.

## 1.2 Related Submittal (s) / Grants

The FCC IC of corresponding transceiver for this transceiver is YHXESQ-3040R2.

## 1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 :2003. Radiated emission measurement was performed in semi-anechoic chamber room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

Conducted emission test was performed according to ANSI C63.4: 2003. The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a 50Ω linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The vertical conducting plane or wall of a screened room shall be located 40 cm to the rear of the EUT. All other surfaces of tabletop EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane(Ground Reference Plane).And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

## 1.4 Test Facility

The Radiated Emission tests is performed at:
Shenzhen Academy of Metrology & Quality Inspection located at Longzhu Road Shenzhen,China. This test facility and site measurement data have been fully placed on file with the FCC, test firm registration number is 97379.

The Conducted Emission, Bandedge and Average factor measurements are performed at:
Interterk Testing Services Shenzhen Ltd. Kejiyuan Branch and located at 6F, Block D, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC, test firm registration number is 242492.

Test Equipment List

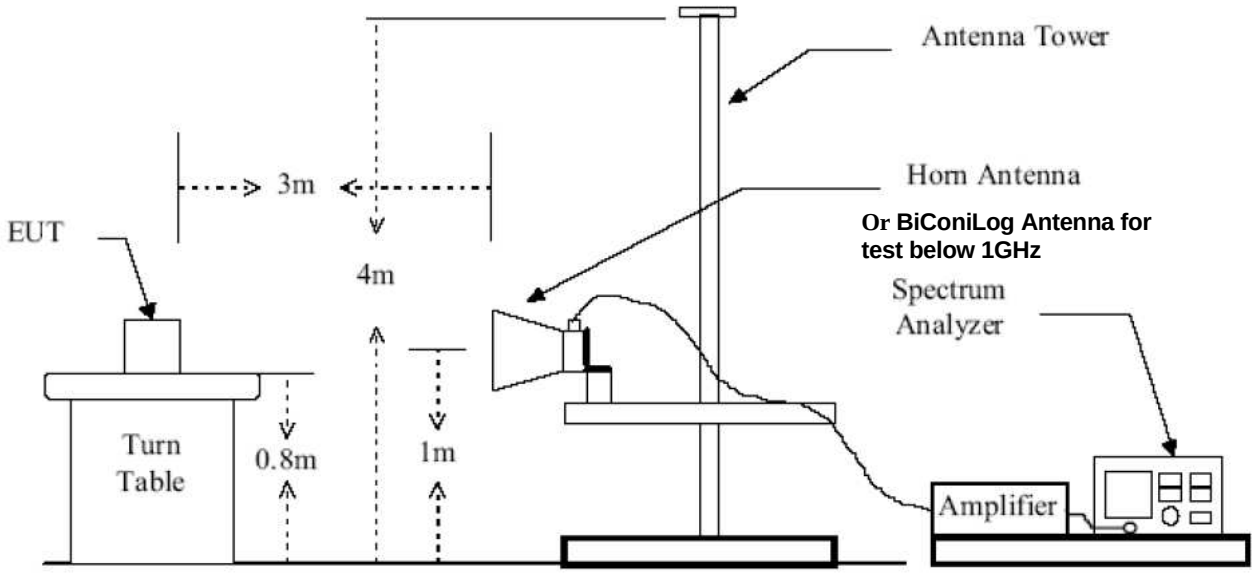
Radiated Emission tests:

| Equipment No. | Equipment | Manufacturer | Model No. | Cal. Date | Due Date |
|---|---|---|---|---|---|
| SB3434 | Horn Antenna | R&S | HF906 | 25-Jan-11 | 25-Jan-12 |
| SB3436 | EMI Test Receiver | R&S | ESI26 | 24-Jan-11 | 24-Jan-12 |
| SB3440 | Bilog Antenna | Chase | CBL6112B | 24-Jan-11 | 24-Jan-12 |
| SB3435/01 | Amplifier | R&S | — | 22-Jan-11 | 22-Jan-12 |
| SB3450 | 3m Semi-anechoic chamber | Albatross Projects | 9X6X6 | 24-Jan-11 | 24-Jan-12 |

Conducted Emission, Bandedge and Average factor measurements:

| Equipment No. | Equipment | Manufacturer | Model No. | Cal. Date | Due Date |
|---|---|---|---|---|---|
| SZ185-02 | EMI Test Receiver | R&S | ESCI | 12-Nov-10 | 12-Nov-11 |
| SZ187-01 | LISN | R&S | ENV216 | 12-Nov-10 | 12-Nov-11 |
| SZ056-03 | Spectrum Analyzer | R&S | FSP 30 | 19-Mar-11 | 19-Mar-12 |

Test setup figure




Test setup figure

## 1.5 Measurement Uncertainty

Conducted Emission: 3.5 dB in the frequency range of 9kHz-30MHz at a level of confidence of 95%.
Radiated Emission: 4.5dB in the frequency range of 30MHz-1000MHz, 4.6dB in the frequency range of 1GHz-25GHZ at a level of confidence of 95%.
When determining the test conclusion, the Measurement Uncertainty of test has been considered.

# 2. System Test Configuration

## 2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2003).

The EUT was powered by 120V/60Hz in the testing.

Type of modulation: GFSK modulation, and only the worst data was reported in this report.

For maximizing emissions, the unit was placed in the center of the turntable, and the turntable was rotated through 360°, the antenna hei ght was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Chapter 3.

## 2.2 EUT Exercising Software

There was no special software to exercise the device.

## 2.3 Special Accessories

No special accessories used.

## 2.4 Equipment Modification

Any modifications installed previous to testing by Masterbuilt Manufacturing Inc will be incorporated in each production model sold/leased in the United States. No modifications were installed by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

## 2.5 Support Equipment List and Description

N/A

# 3. Summary of Test Results

| FCC Rules | Description of Test | Result |
|---|---|---|
| 15.203 | Antenna Requirement | Pass |
| 15.207 | Disturbance Voltage at the Mains Terminals | Pass |
| 15.249 | Radiated Emission | Pass |
| 15.249 | Band Edges Measurement | Pass |

Remark: When determining the test results, measurement uncertainty of tests has been considered.

## 3.1 Antenna Requirement

The EUT Antenna Type: internal integrated antenna.

## 3.2 Conducted Emission

The data on the following page lists the significant emission frequencies, emission level and the limit of compliance. Judgement: Passed by 31.8 dB.at 0.382MHz
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## Conducted Emissions

### Pursuant to FCC 15.107: Conducted Emissions Requirement

| | Frequency | Quasi-Peak | | Average | |
|---|---|---|---|---|---|
| | [MHz] | Disturbance level [dB(uV)] | Permitted limit [dB(uV)] | Disturbance level [dB(uV)] | Permitted limit [dB(uV)] |
| L | 0.238 | 23.3 | 62.2 | 4.9 | 52.2 |
| | 0.254 | 24.0 | 61.6 | 5.1 | 51.6 |
| | 0.338 | 25.1 | 59.3 | 5.2 | 49.3 |
| | 0.366 | 25.9 | 58.6 | 5.3 | 48.6 |
| | 0.402 | 25.9 | 57.8 | 5.3 | 47.8 |
| | 0.666 | 24.0 | 56.0 | 4.7 | 46.0 |
| N | 0.218 | 21.9 | 62.9 | 4.6 | 52.9 |
| | 0.246 | 23.1 | 61.9 | 4.8 | 51.9 |
| | 0.354 | 25.9 | 58.9 | 5.3 | 48.9 |
| | 0.370 | 26.2 | 58.5 | 5.4 | 48.5 |
| | 0.382 | 26.4 | 58.2 | 5.4 | 48.2 |
| | 0.666 | 24.0 | 56.0 | 4.7 | 46.0 |

### Pursuant to FCC 15.207: Conducted Emissions Requirement

| | Frequency | Quasi-Peak | | Average | |
|---|---|---|---|---|---|
| | [MHz] | Disturbance level [dB(uV)] | Permitted limit [dB(uV)] | Disturbance level [dB(uV)] | Permitted limit [dB(uV)] |
| L | 0.246 | 23.2 | 61.9 | 4.6 | 51.9 |
| | 0.262 | 22.5 | 61.4 | 4.3 | 51.4 |
| | 0.310 | 23.5 | 60.0 | 4.6 | 50.0 |
| | 0.350 | 25.2 | 59.0 | 4.9 | 49.0 |
| | 0.390 | 26.0 | 58.1 | 5.1 | 48.1 |
| | 0.670 | 23.7 | 56.0 | 4.4 | 46.0 |
| N | 0.214 | 21.4 | 63.0 | 4.3 | 53.0 |
| | 0.238 | 22.5 | 62.2 | 4.5 | 52.2 |
| | 0.306 | 23.8 | 60.1 | 4.7 | 50.1 |
| | 0.358 | 25.7 | 58.8 | 5.2 | 48.8 |
| | 0.398 | 26.1 | 57.9 | 5.2 | 47.9 |
| | 0.662 | 23.7 | 56.0 | 4.5 | 46.0 |

## 3.3 Radiated Emission

Data is included worst-case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

### 3.3.1 Radiated Emission Limits

According to FCC 15.249, operating within the bands 2400-2483.5 MHz, the field strength of emissions from intentional radiators operated within this frequency bands shall comply with the following:

| Fundamental Frequency (MHz) | Field Strength of Fundamental (millivolts/meter) | Field Strength of Harmonics (microvolts/meter) |
|---|---|---|
| 2400 - 2483.5 | 50 | 500 |

### 3.3.2 Test Setup

Reference 1.4

### 3.3.3 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

Where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD + AV

Assume a receiver reading of 62.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 62.0 dBµV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB

AV = -10 dB

FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 dBµV/m

Level in µV/m = Common Antilogarithm [(32 dBµV/m)/20] = 39.8 µV/m

### 3.3.4 Radiated Emission Test Data

Date of test: 16 July 2011
Operation: EUT on normal operation

**Radiated Emissions**

**Pursuant to FCC 15.109: Emissions Requirement**

| Polarization | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | QP Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Horizontal | 55.158 | 18.5 | 11.2 | 6.3 | 13.6 | 40.0 | -26.4 |
| Horizontal | 109.699 | 13.4 | 11.6 | 12.7 | 14.5 | 43.5 | -29.0 |
| Horizontal | 414.889 | 12.2 | 13.3 | 17.3 | 16.2 | 46.0 | -29.9 |
| Vertical | 31.944 | 16.3 | 10.9 | 18.8 | 24.2 | 40.0 | -15.8 |
| Vertical | 43.607 | 21.4 | 11.2 | 11.7 | 21.9 | 40.0 | -18.1 |
| Vertical | 99.980 | 14.6 | 11.6 | 11.9 | 14.9 | 43.5 | -28.6 |

**Pursuant to FCC 15.249: Emissions Requirement (30MHz-1GHz)**

| Polarization | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Average Factor (-dB) | Net at 3m (dBµV/m) | QP Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| Horizontal | 98.036 | 30.8 | 11.6 | 11.9 | - | 31.1 | 43.5 | -12.4 |
| Horizontal | 282.705 | 27.7 | 12.8 | 13.4 | - | 28.3 | 46.0 | -17.7 |
| Horizontal | 828.938 | 22.9 | 14.9 | 20.4 | - | 28.4 | 46.0 | -17.6 |
| Vertical | 39.719 | 19.4 | 11.2 | 14.1 | - | 22.3 | 40.0 | -17.7 |
| Vertical | 47.940 | 25.0 | 11.2 | 9.4 | - | 23.2 | 40.0 | -16.8 |
| Vertical | 335.190 | 17.3 | 13.2 | 14.7 | - | 18.8 | 46.0 | -27.2 |

**Pursuant to FCC 15.249: Emissions Requirement(1GHz-25GHz)**

| Polarization | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Horizontal | 2440.000 | 88.4 | 32.2 | 28.5 | 84.7 | 114.0 | -29.3 |
| Horizontal | 7320.000 | 50.0 | 29.5 | 36.4 | 56.9 | 74.0 | -17.1 |
| Horizontal | 9760.000 | 48.7 | 28.2 | 37.5 | 58.0 | 74.0 | -16.0 |
| Vertical | 2440.000 | 89.3 | 32.2 | 28.5 | 85.6 | 114.0 | -28.4 |
| Vertical | 4880.000 | 54.6 | 29.5 | 33.3 | 58.4 | 74.0 | -15.6 |
| Vertical | 9760.000 | 48.4 | 28.2 | 37.5 | 57.7 | 74.0 | -16.3 |

| Polarization | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Average Factor (-dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| Horizontal | 2440.000 | 88.4 | 32.2 | 28.5 | 17.0 | 67.7 | 94.0 | -26.3 |
| Horizontal | 7320.000 | 50.0 | 29.5 | 36.4 | 17.0 | 39.9 | 54.0 | -14.1 |
| Horizontal | 9760.000 | 48.7 | 28.2 | 37.5 | 17.0 | 41.0 | 54.0 | -13.0 |
| Vertical | 2440.000 | 89.3 | 32.2 | 28.5 | 17.0 | 68.6 | 94.0 | -25.4 |
| Vertical | 4880.000 | 54.6 | 29.5 | 33.3 | 17.0 | 41.4 | 54.0 | -12.6 |
| Vertical | 9760.000 | 48.4 | 28.2 | 37.5 | 17.0 | 40.7 | 54.0 | -13.3 |

Notes: 1. AT frequencies equal to or less than 1000MHz, quasi-peak detector was used, above 1000MHz, Peak detector was used.

2. All measurements were made at 3 meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna is used for the emission over 1000MHz.

### 3.3.5 Test Result

The data on the above test result table lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

According 15.249, the worst case radiated emission at 98.036 MHz
Judgement: Passed by 12.4dB

## 3.4 Band Edges Measurement

### 3.4.1 Limited of the band edges measurement

Sec15.249:
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

(e) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits in paragraphs (a) and (b) of this section 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 point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

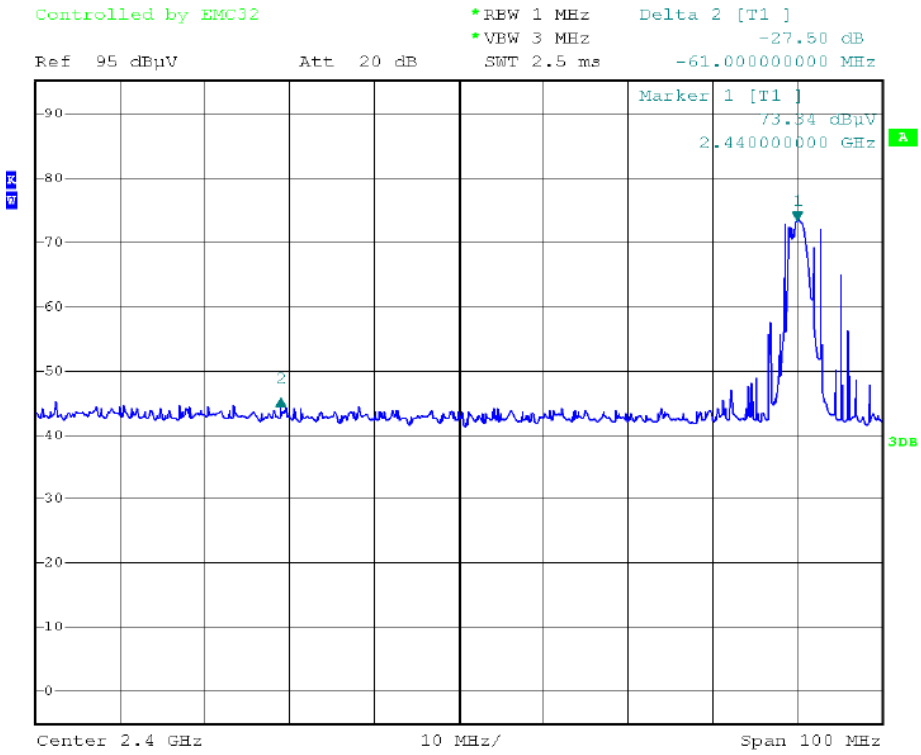
Sec15.215:
(c) Intentional radiators operating under the alternative provisions to the general emission limites, as contained in 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20dB bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

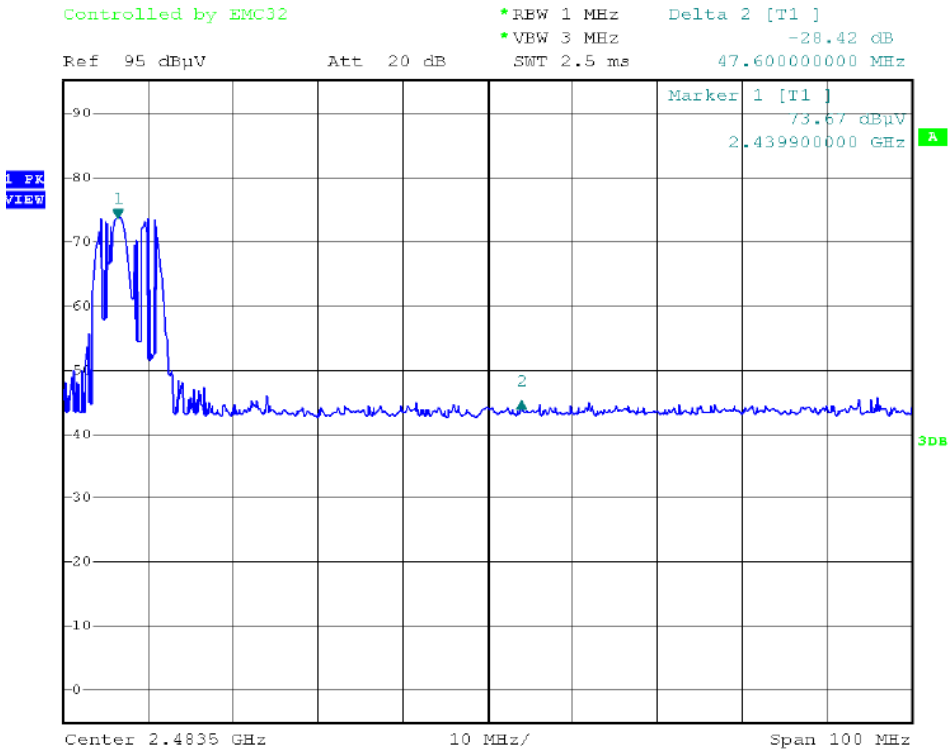
### 3.4.2 Test Setup

Refer to 1.4

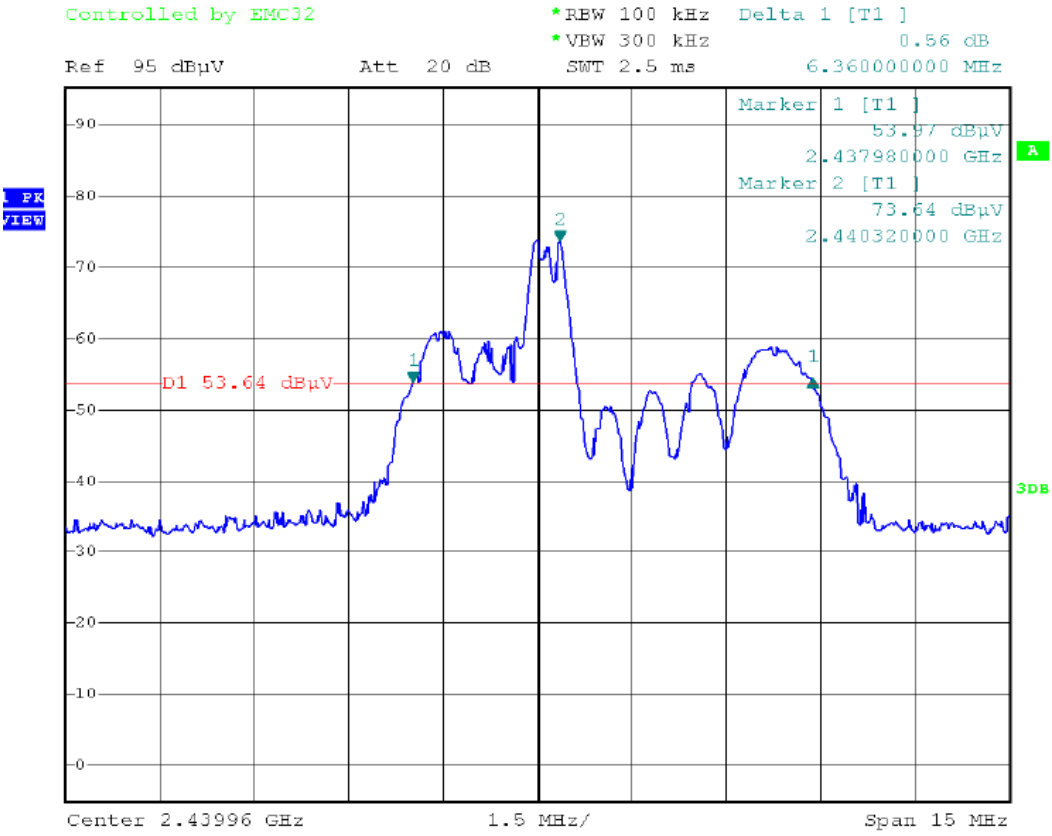
### 3.4.3 Test Plot

Frequency Bands
Operating mode: Transmitting



Modulation Bandwidth
Operating mode: Transmitting



### 3.4.4 Test Result

From the plot, the field strength of any emissions outside of the specified frequency band are attenuated to the general radiated emission limits in section 15.209. It fulfil the requirement of 15.249(d).

Peak Measurement

Bandedge compliance is determined by applying marker-delta method, i.e ( Bandedge Plot).

**(i) Lower bandedge:**

Peak Resultant field strength = Fundamental emissions (peak value) – delta from the bandedge plot

= 85.6dBµv/m – 27.5dB
= 58.1dBµv/m

Average Resultant field strength = Fundamental emissions (peak value) – delta from the bandedge plot

= 68.6dBµv/m – 27.5dB
= 41.1dBµv/m

**(ii) Upper bandedge:**

Peak Resultant field strength = Fundamental emissions (peak value) – delta from the bandedge plot

= 85.6dBµv/m – 28.4dB
= 57.2dBµv/m

Average Resultant field strength = Fundamental emissions (peak value) – delta from the bandedge plot

= 68.6dBµv/m – 28.4dB
= 40.2dBµv/m

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74 dBµv/m (Peak Limit) and 54dBµv/m (Average Limit).

### 3.4.5 Transmitter Duty Cycle Calculation FCC Rule 15.35(b, c)

Averaging factor in dB = 20 log (duty cycle)

The specification for output field strengths in accordance with the FCC rules specify measurements with an average detector. During testing, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The time period over which the duty cycle is measured is 100 milliseconds, or the repetition cycle, whichever is a shorter time frame. The worst case (highest percentage on) duty cycle is used for the calculation. The duty cycle is measured by placing the spectrum analyzer in zero scan (receiver mode) and linear mode at maximum bandwidth (3 MHz at 3 dB down) and viewing the resulting time domain signal output from the analyzer on a Tektronix oscilloscope. The oscilloscope is used because of its superior time base and triggering facilities.

A plot of the worst-case duty cycle as detected in this manner is shown below.

The duty cycle is simply the on-time divided by the period:

The duration of one cycle = 24.72ms
Effective period of the cycle = 3.48ms

DC =3.48/24.72=0.1408 or 14.08%

Thererfor, the averaging factor is found by 20lg0.1408=-17.0dB

## 4. Appendix III - Document List

| Exhibit type | File Description | Filename |
|---|---|---|
| Average factor | Average factor | Average factor.pdf |
| Bandwidth Plot | Bandwidth Plot | Bandwidth Plot.pdf |
| Block Diagram | Block Diagram | Block Diagram.pdf |
| Circuit Diagram | Circuit Diagram:<br>1. main control board<br>2. RF board<br>3. power board | 1. Circuit Diagram-main control board<br>2. Circuit Diagram-RF board<br>3. Circuit Diagram-power board |
| External photos | External photos | External photos.pdf |
| Label and Location | Label and Location | Label and Location.pdf |
| internal photos | internal photos | internal photos.pdf |
| Test Setup Photos(Conducted Emission) | Test Setup Photos(Conducted Emission) | Test Setup Photos(Conducted Emission).pdf |
| Test Setup Photos(Radiated Emission) | Test Setup Photos(Radiated Emission) | Test Setup Photos(Radiated Emission).pdf |
| Test Report | Test Report | Test Report.pdf |
| Letter of Agency | Letter of Agency | Letter of Agency.pdf |
| TCB Agreement | TCB Agreement | TCB Agreement.pdf |
| Technical description | Technical description | Technical description.pdf |
| User Manual | User Manual | User Manual.pdf |
| Form 731 | Form 731 - ITS | Form 731-ITS.word |
| Form 731 | Form 731 - SMQ | Form 731-SMQ.word |

---------- End of Report ----------