

**TEST REPORT**

Applicant Name & Address : Masterbuilt Manufacturing Inc.  
1 Masterbuilt Court Columbus, Georgia, 31907, USA

Sample Description

Product : 30" Black Electric Smoker  
40" Black Electric Smoker

FCC ID : YHXESQ-3040C6

Model No. : 20070312, 20072112, 20072212, 20072312, 20072412, 20072912  
20070512, 20072512, 20072612, 20072712, 20072812, 20073012

Electrical Rating : 30" Black Electric Smoker: 120VAC, 60Hz, 800W, 6.7A  
40" Black Electric Smoker : 120VAC, 60Hz, 1200W, 10A  
Remote controller: 2\*1.5V/AAA battery

Frequency : 2.440GHz Transceiver

Date Received : 14 April 2014

Date Test Conducted : 15 April 2014 – 08 May 2014

Test standards : FCC Part 15: 2013

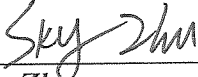
Test Result : Pass

Conclusion : The submitted samples complied with the above rules/standards.

Remark : None.

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

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**16 June 2014** **Date**

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## 1. General Description

### 1.1 Product Description

The Equipment Under Test (EUT) is a transceiver for Black Electric Smoker with RF at 2.440GHz. It is powered by AC mains:120V/60Hz.

During normal use, it sends 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: 20070312, 20072112, 20072212, 20072312, 20072412, 20072912, 20070512, 20072512, 20072612, 20072712, 20072812, 20073012 are the same in hardware and software aspect. The only differences are the appearance, and model no.for trading purpose.

The power of 20070512, 20072512, 20072612, 20072712, 20072812, 20073012 is 1200W.

The power of 20070312, 20072112, 20072212, 20072312, 20072412, 20072912 is 800W

We tested the Black Electric Smoker, model:20070312, 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 ID of corresponding transceiver for this transceiver is YHXESQ-3040R6.

### 1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.10:2009. 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 C63.10: 2009. 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.



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

#### **1.4 Test Facility**

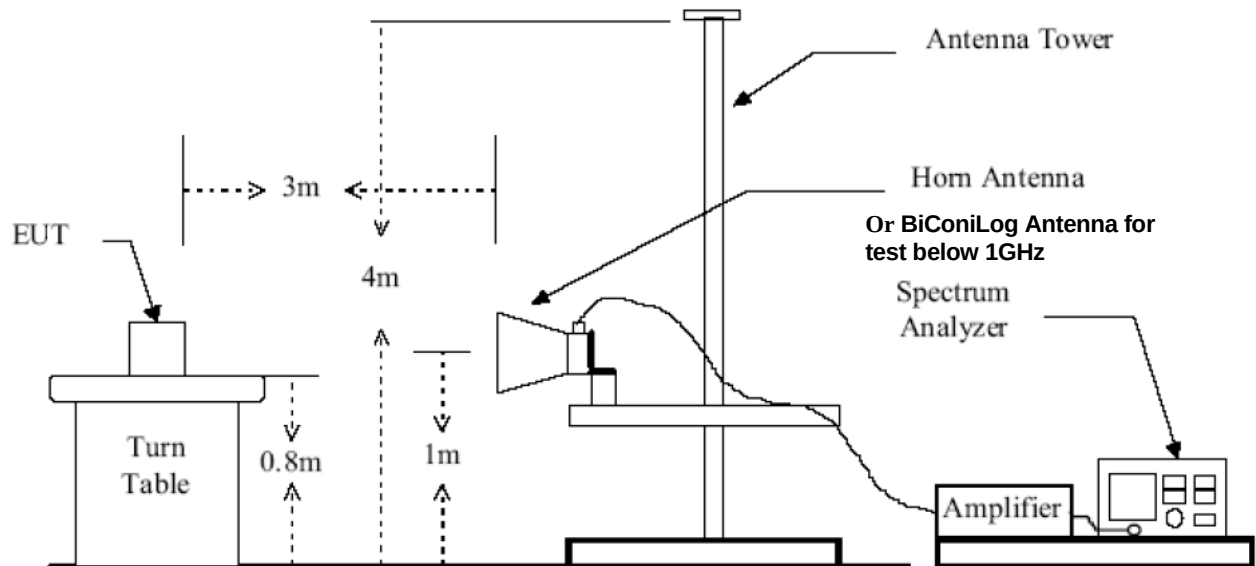
All of the tests are performed at:

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China 510663.

This test facility and site measurement data have been fully placed on file with the FCC, test firm registration number is 549654.

Test setup figure



Test setup figure

## 1.5 Measurement Uncertainty

Radiated Emission: 3.79dB in the frequency range of 30MHz-200MHz, 3.62dB in the frequency range of 200MHz-1000MHz, 5.04dB in the frequency above 1GHz 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 C63.10:2009

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 height 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

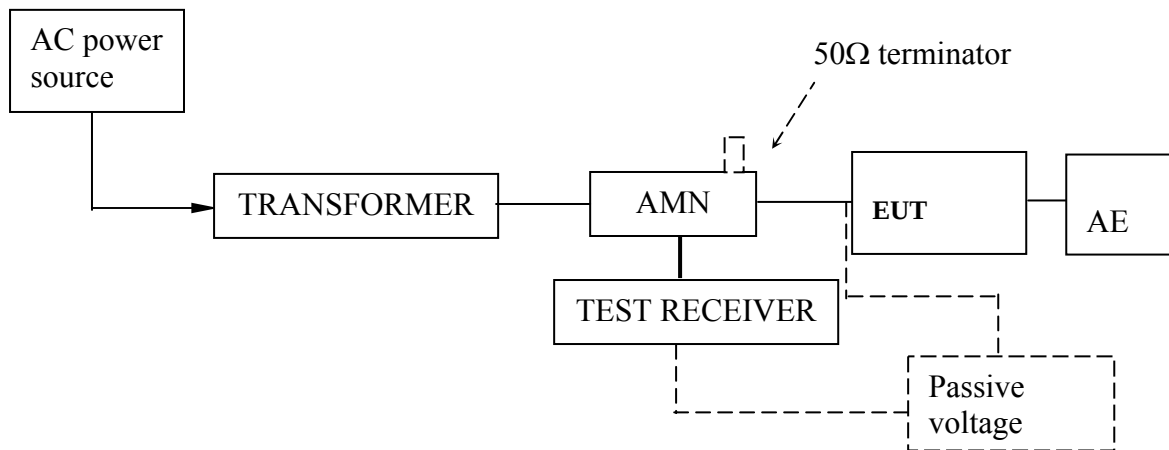
##### 3.2.1 Conducted Emission Limits

According to FCC 15.207, for an intentional radiator that is designed to be connected to the public utility(AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150kHz to 30MHz, shall not exceed the limits in the following table:

| Frequency of emission(MHz) | Conducted 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

### 3.2.2 Block Diagram of Test Setup



### 3.2.3 Conducted Emission Test Data

**Tested Wire: Live**

**Operation Mode: EUT on transmitting operation**

| Frequency<br>[MHz] | Quasi-Peak                    |                             | Average                       |                             |
|--------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------------|
|                    | Disturbance level<br>[dB(μV)] | Permitted limit<br>[dB(μV)] | Disturbance level<br>[dB(μV)] | Permitted limit<br>[dB(μV)] |
| 0.160              | <55                           | 65.5                        | <48                           | 58.3                        |
| 0.240              | <52                           | 62.1                        | <43                           | 53.9                        |
| 0.550              | <46                           | 56.0                        | <36                           | 46.0                        |
| 1.000              | <46                           | 56.0                        | <36                           | 46.0                        |
| 1.400              | <46                           | 56.0                        | <36                           | 46.0                        |
| 2.000              | <46                           | 56.0                        | <36                           | 46.0                        |
| 6.000              | <50                           | 60.0                        | <40                           | 50.0                        |
| 10.000             | <50                           | 60.0                        | <40                           | 50.0                        |
| 22.000             | <50                           | 60.0                        | <40                           | 50.0                        |
| 30.000             | <50                           | 60.0                        | <40                           | 50.0                        |

**Tested Wire: Neutral**

**Operation Mode: EUT on transmitting operation**

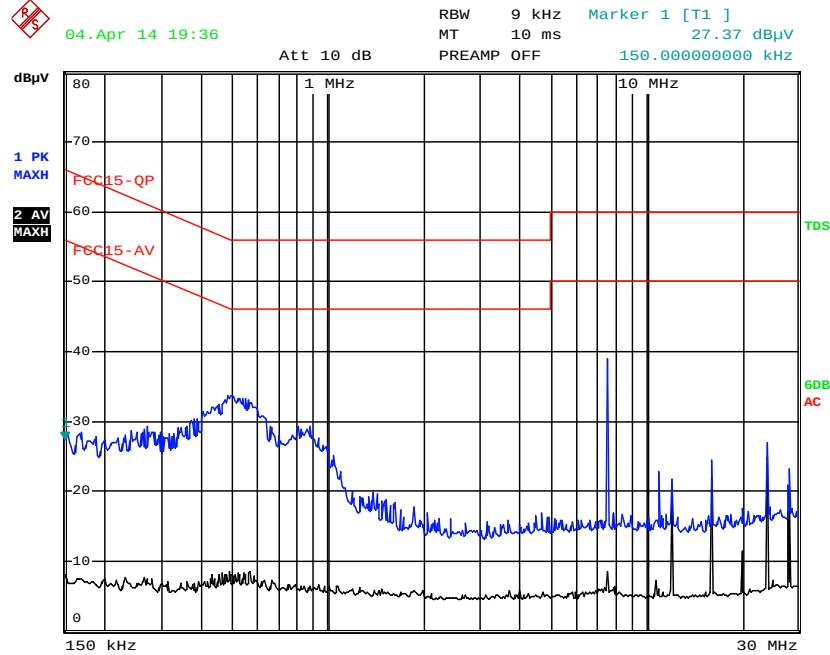
| Frequency<br>[MHz] | Quasi-Peak                    |                             | Average                       |                             |
|--------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------------|
|                    | Disturbance level<br>[dB(μV)] | Permitted limit<br>[dB(μV)] | Disturbance level<br>[dB(μV)] | Permitted limit<br>[dB(μV)] |
| 0.160              | <55                           | 65.5                        | <48                           | 58.3                        |
| 0.240              | <52                           | 62.1                        | <43                           | 53.9                        |
| 0.550              | <46                           | 56.0                        | <36                           | 46.0                        |
| 1.000              | <46                           | 56.0                        | <36                           | 46.0                        |
| 1.400              | <46                           | 56.0                        | <36                           | 46.0                        |
| 2.000              | <46                           | 56.0                        | <36                           | 46.0                        |
| 6.000              | <50                           | 60.0                        | <40                           | 50.0                        |
| 10.000             | <50                           | 60.0                        | <40                           | 50.0                        |
| 22.000             | <50                           | 60.0                        | <40                           | 50.0                        |
| 30.000             | <50                           | 60.0                        | <40                           | 50.0                        |

### 3.2.4 Emission Curve

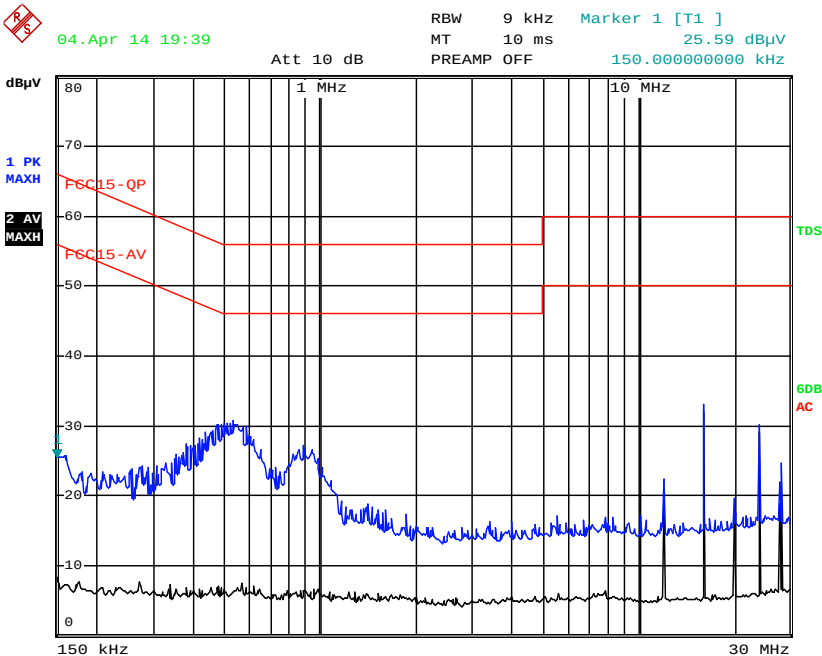
At mains terminal:

Operation Mode: EUT on transmitting operation

Tested Wire: Live



Tested Wire: Neutral



### 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.

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

→  $FS = RA + \text{Correct Factor}$

Where

- FS = Peak Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB
- PD = Pulse Desensitization in dB
- Correct Factor = AF + CF – AG + PD

Unless otherwise specified, e.g. § 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the average value of field strength shall be determined by:

$$\text{Average value} = \text{Peak value} + \text{Average factor}$$

### 3.3.4 Radiated Emission Test Data

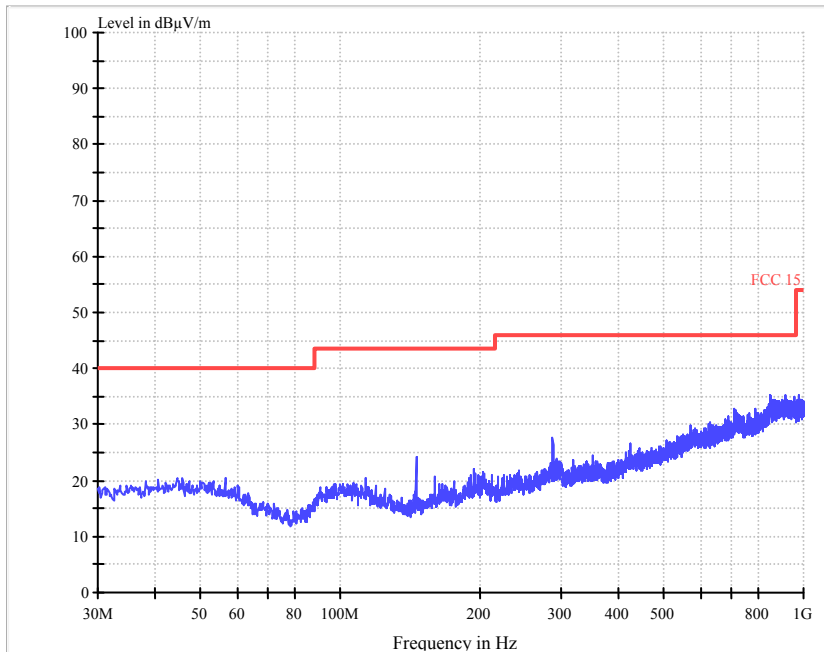
#### Radiated Emissions (Below 1GHz)

Operation: EUT on transmitting operation

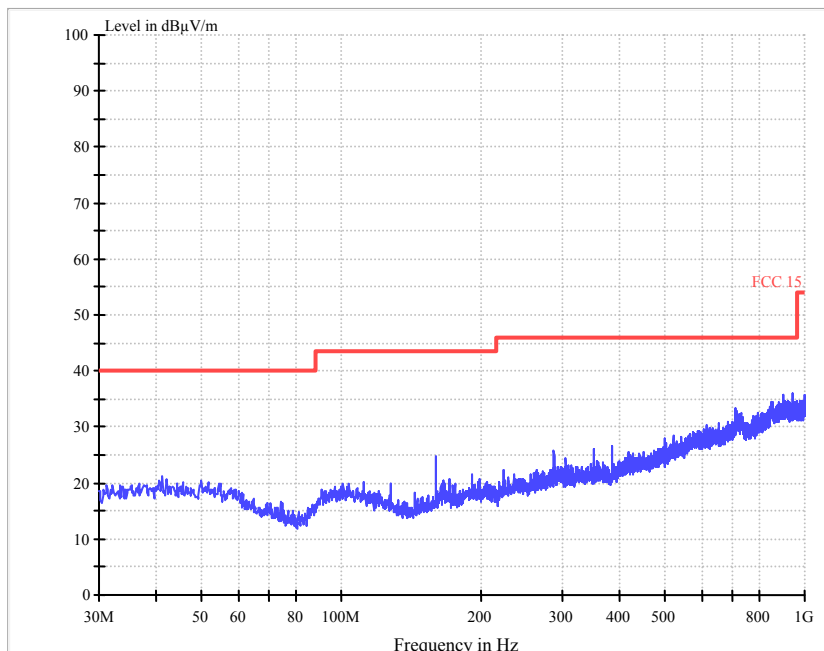
#### Pursuant to FCC 15.209: Emissions Requirement (30MHz-1GHz)

| Antenna Polarization | Frequency [MHz] | Measured Net at 3m [dB(μV/m)] | Limit at 3m [dB(μV/m)] |
|----------------------|-----------------|-------------------------------|------------------------|
| Horizontal           | 40.0            | <30                           | 40.0                   |
| Horizontal           | 400.0           | <36                           | 46.0                   |
| Horizontal           | 961.0           | <44                           | 54.0                   |
| Vertical             | 200.0           | <33.5                         | 43.5                   |
| Vertical             | 400.0           | <36                           | 46.0                   |
| Vertical             | 980.0           | <44                           | 54.0                   |

**Test Curve**  
 EUT on transmitting operation  
 Horizontal



**Vertical**



**Radiated Emissions (Above 1GHz)**  
**EUT on transmitting operation**

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

| Polarization | Frequency (MHz) | Reading (dBμV) | Correction Factor (dB) | Net at 3m (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|------------------------|--------------------|---------------------------|-------------|
| Horizontal   | 2440.400        | 98.5           | -7.7                   | 90.8               | 114.0                     | -23.2       |
| Horizontal   | 4880.800        | 64.8           | -0.7                   | 64.1               | 74.0                      | -9.9        |
| Horizontal   | 9762.400        | 53.4           | 7.4                    | 60.8               | 74.0                      | -13.2       |
| Vertical     | 2440.800        | 102.8          | -7.7                   | 95.1               | 114.0                     | -18.9       |
| Vertical     | 4880.400        | 66.0           | -0.7                   | 65.3               | 74.0                      | -8.7        |
| Vertical     | 7320.800        | 52.1           | 4.7                    | 56.8               | 74.0                      | -17.2       |
| Vertical     | 9762.800        | 52.8           | 7.4                    | 60.2               | 74.0                      | -13.8       |

| Polarization | Frequency (MHz) | Peak Value (dBμV) | Average Factor (-dB) | Net at 3m (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|-------------------|----------------------|--------------------|------------------------------|-------------|
| Horizontal   | 2440.400        | 90.8              | -13.4                | 77.4               | 94.0                         | -16.6       |
| Horizontal   | 4880.800        | 64.1              | -13.4                | 50.7               | 54.0                         | -3.3        |
| Horizontal   | 9762.400        | 60.8              | -13.4                | 47.4               | 54.0                         | -6.6        |
| Vertical     | 2440.800        | 95.1              | -13.4                | 81.7               | 94.0                         | -12.3       |
| Vertical     | 4880.400        | 65.3              | -13.4                | 51.9               | 54.0                         | -2.1        |
| Vertical     | 7320.800        | 56.8              | -13.4                | 43.4               | 54.0                         | -10.6       |
| Vertical     | 9762.800        | 60.2              | -13.4                | 46.8               | 54.0                         | -7.2        |

- 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.

### **3.4 Bandedges Measurement**

#### **3.4.1 Limited of the bandedges 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 limits, 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.

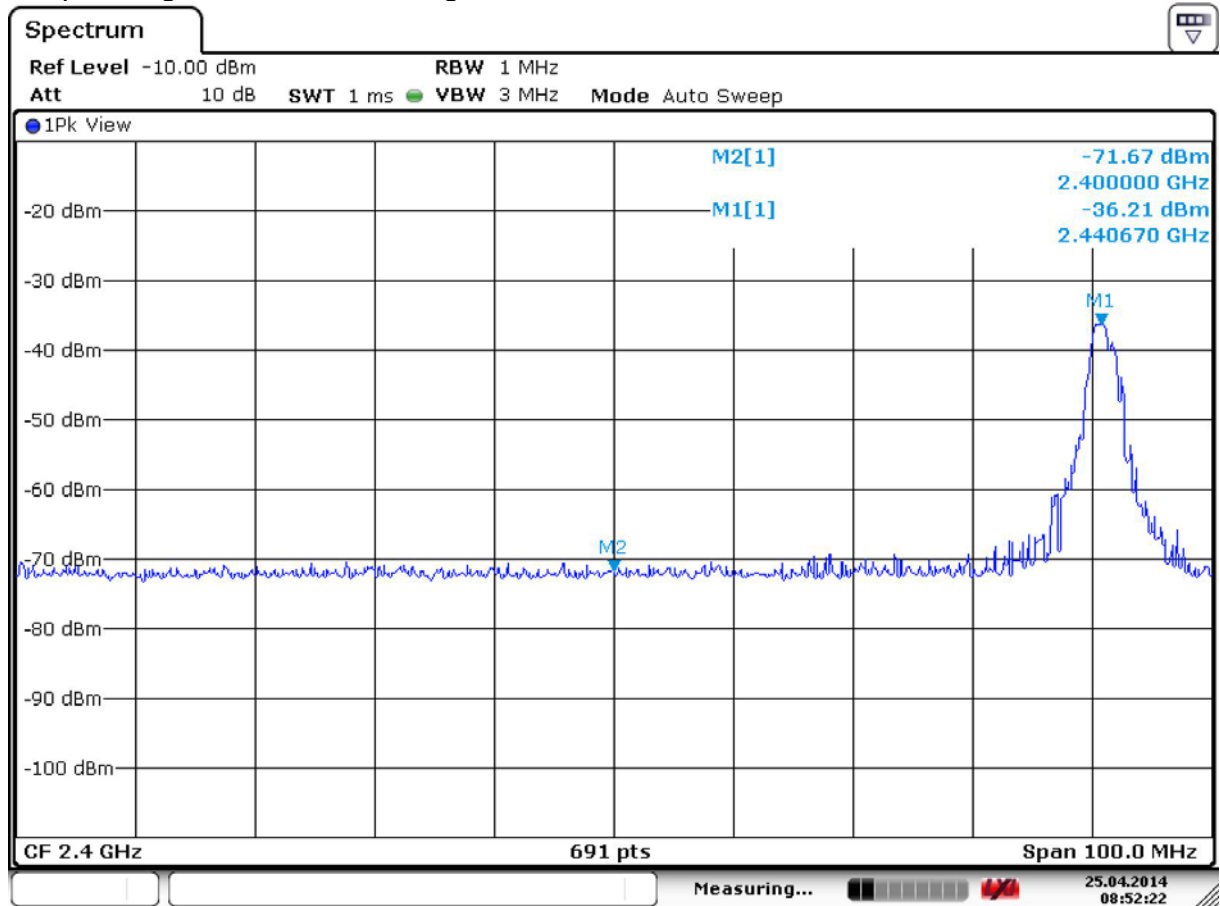
#### **3.4.2 Test Setup**

Refer to 1.4

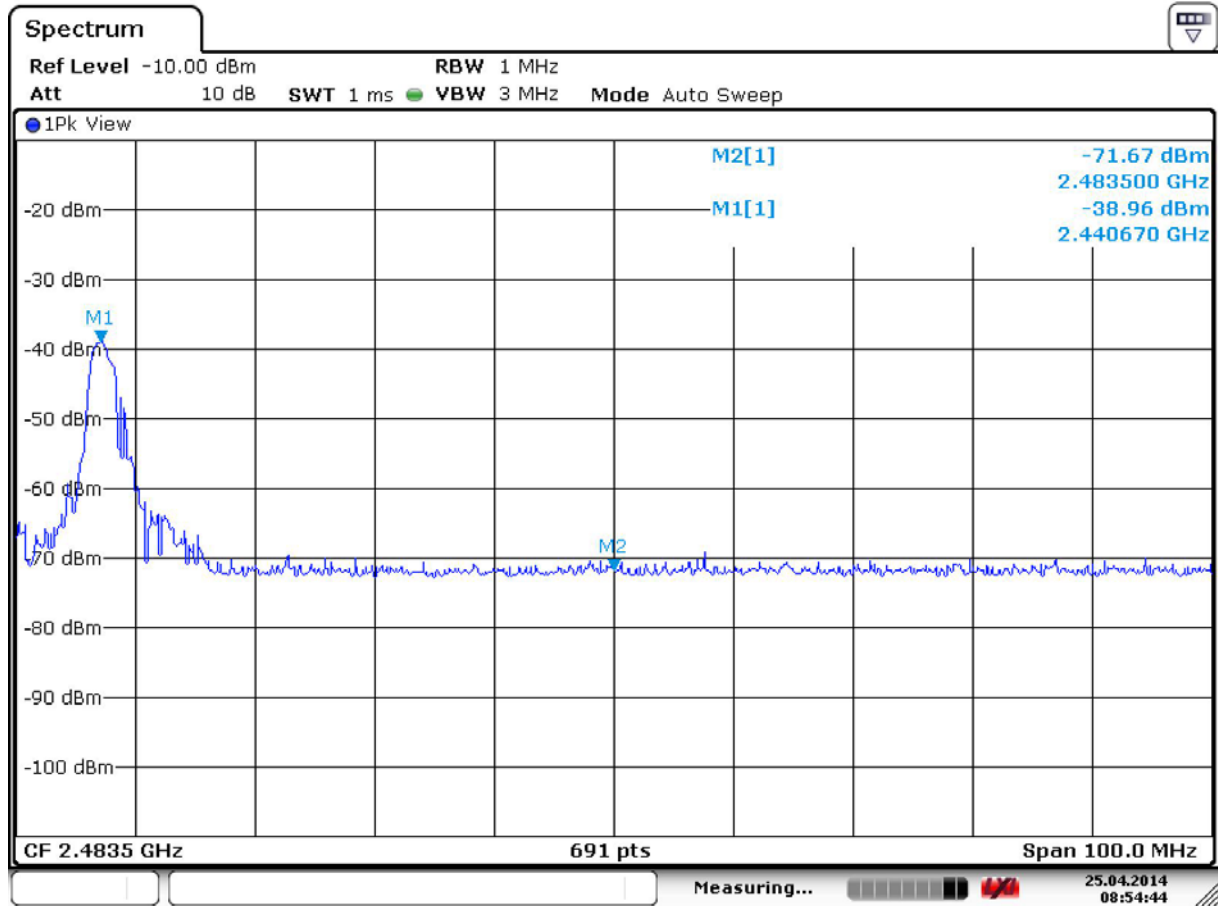
### 3.4.3 Test Plot

Frequency Bands

Operating mode: Transmitting

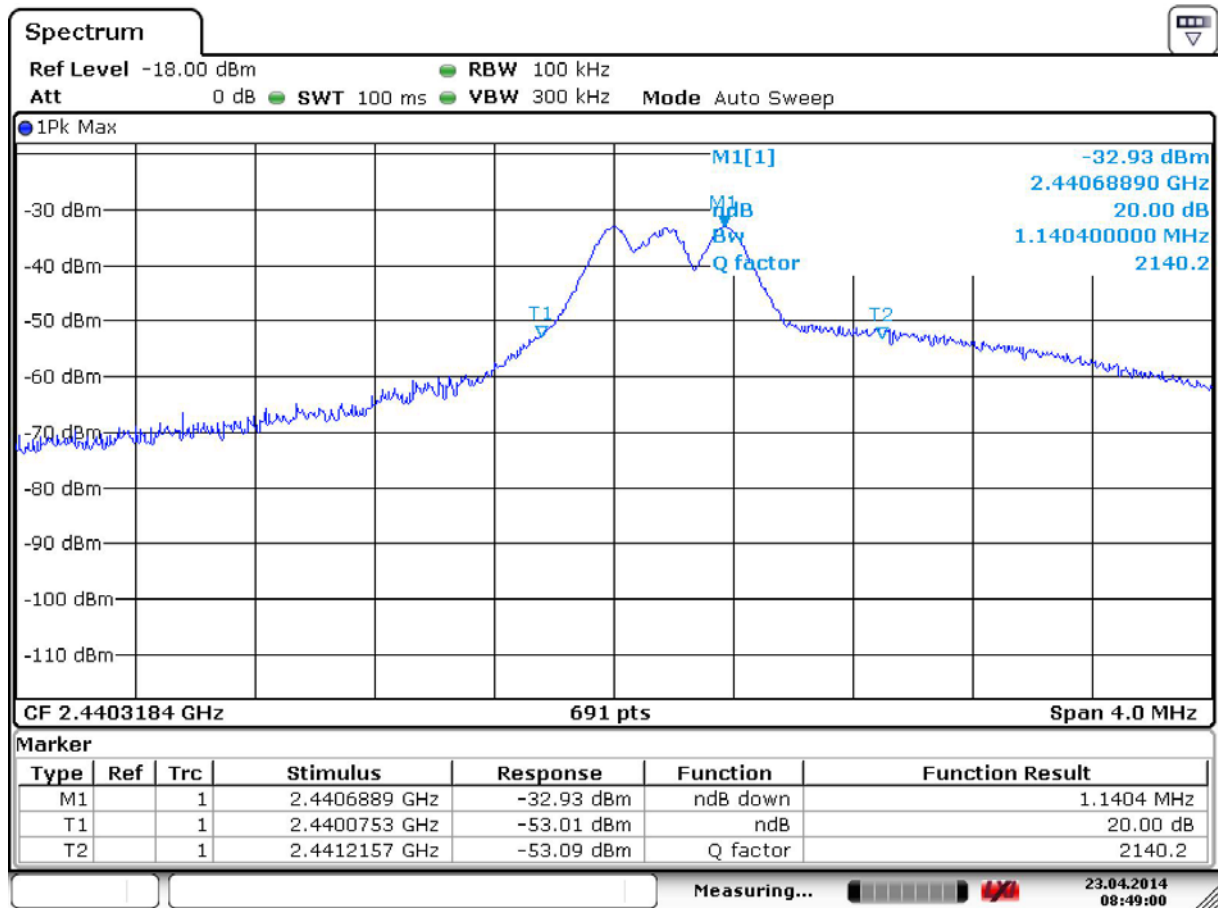


Date: 25.APR.2014 08:52:22



Date: 25.APR.2014 08:54:44

Modulation Bandwidth  
 Operating mode: Transmitting



Date: 23.APR.2014 08:49:00

### 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 fulfils 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

$$\begin{aligned} &= 95.1\text{dB}\mu\text{v/m} - 35.5\text{dB} \\ &= 59.6\text{dB}\mu\text{v/m} \end{aligned}$$

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

$$\begin{aligned} &= 81.7\text{dB}\mu\text{v/m} - 35.5\text{dB} \\ &= 46.2\text{dB}\mu\text{v/m} \end{aligned}$$

##### **(ii) Upper bandedge:**

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

$$\begin{aligned} &= 95.1\text{dB}\mu\text{v/m} - 32.7\text{dB} \\ &= 62.4\text{dB}\mu\text{v/m} \end{aligned}$$

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

$$\begin{aligned} &= 81.7\text{dB}\mu\text{v/m} - 32.7\text{dB} \\ &= 49.0\text{dB}\mu\text{v/m} \end{aligned}$$

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).

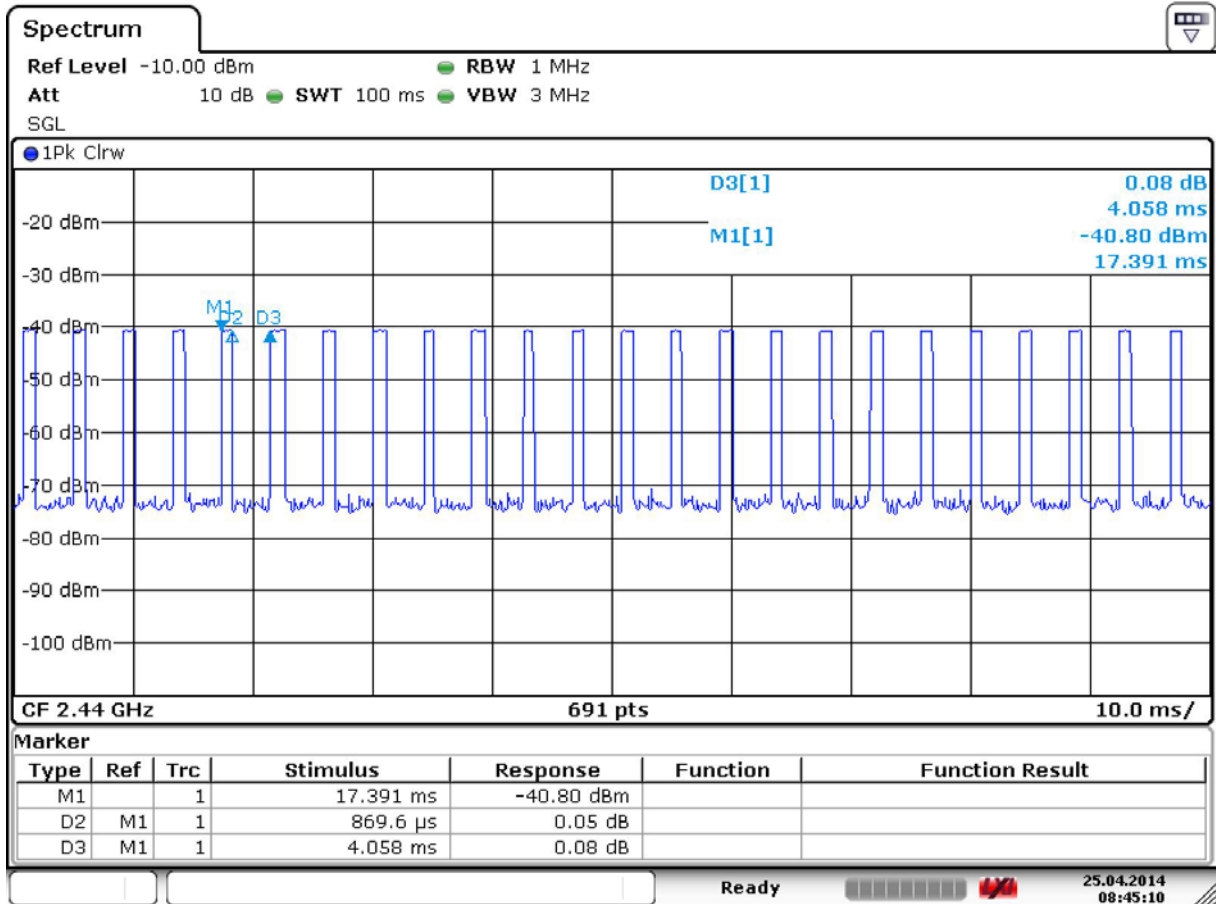
**3.4.5 Transmitter Duty Cycle Calculation FCC Rule 15.35(b, c)**

Averaging factor in dB =  $20 \log (\text{duty cycle})$

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 (1 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.



Date: 25.APR.2014 08:45:09

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

The duration of one cycle = 4.058ms  
 Effective period of the cycle = 0.869ms

DC = 0.869/4.058 = 0.2141 or 21.41%

Therefore, the averaging factor is found by  $20\lg 0.2141 = -13.4\text{dB}$

#### 4. Equipment List

| Equipment No. | Equipment                                                | Model                | Manufacturer  | Cal. Due date<br>(YYYY-MM-DD) | Calibration Interval |
|---------------|----------------------------------------------------------|----------------------|---------------|-------------------------------|----------------------|
| EM030-01      | 3m Semi-Anechoic Chamber                                 | 9×6×6 m <sup>3</sup> | ETS•LINDGR EN | 2015-04-02                    | 1Y                   |
| EM030-02      | Control room for 3m Semi-Anechoic Chamber                | 4×4×3 m <sup>3</sup> | ETS•LINDGR EN |                               |                      |
| EM031-02      | EMI Test Receiver<br>(9 kHz~7 GHz)                       | R&S<br>ESR7          | R&S           | 2015-06-03                    | 1Y                   |
| EM031-03      | Signal and Spectrum Analyzer<br>(10 Hz~40 GHz)           | R&S<br>FSV40         | R&S           | 2015-06-03                    | 1Y                   |
| EM011-04      | Loop antenna<br>(9 kHz-30 MHz)                           | HFH2-Z2              | R&S           | 2015-05-25                    | 1Y                   |
| EM061-03      | TRILOG Super Broadband test Antenna<br>(30 MHz-1.5 GHz)  | VULB<br>9161         | SCHWARZBECK   | 2015-05-25                    | 1Y                   |
| EM033-02      | Bouble-Ridged Waveguide Horn Antenna<br>(800 MHz-18 GHz) | R&S<br>HF907         | R&S           | 2015-05-25                    | 1Y                   |
| EM031-02-01   | Coaxial cable                                            | /                    | R&S           | 2015-06-03                    | 1Y                   |

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