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**FCC PART 15.231(e)**  
**INDUSTRY CANADA RSS 210 (i8) ANNEX 1 A1.1.5**  
**MOMENTARILY OPERATED DEVICES TEST REPORT**

|                                         |                                                                        |
|-----------------------------------------|------------------------------------------------------------------------|
| <b>Applicant</b>                        | <b>MATRIX PRODUCT DEVELOPMENT, INC.</b>                                |
| <b>Address</b>                          | <b>13 N. BIRD STREET<br/>SUN PRAIRIE WI 53590 USA</b>                  |
| <b>FCC ID</b>                           | VGC-WYZEPLUSBSE                                                        |
| <b>IC Certification Number</b>          | 12661A-WYZEPLUSBSE                                                     |
| <b>FCC Standard Applied</b>             | 47 CFR §15.231 (a)(c)(e), 15.209                                       |
| <b>Industry Canada Standard Applied</b> | RSS-210 Issue 8 Annex (A1.1.1)(A1.1.3)(A1.1.5)                         |
| <b>Product Description</b>              | WYZE TEMPERATURE BASE                                                  |
| <b>Date Sample Received</b>             | 1/8/2015                                                               |
| <b>Date Tested</b>                      | 1/13/2015                                                              |
| <b>Tested By</b>                        | Cory Leverett                                                          |
| <b>Approved By</b>                      | Sid Sanders                                                            |
| <b>Timco Report No.</b>                 | 63AUT15TestReport.docx                                                 |
| <b>Test Results</b>                     | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

**THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL  
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**

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## GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

## Summary

The device under test does:

- ☒ fulfill the general approval requirements as identified in this test report  
☐ not fulfill the general approval requirements as identified in this test report

## Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made, under my signature, at:

Timco Engineering Inc.  
849 NW State Road 45  
Newberry, FL 32669

## Authorized Signatory Name:

Cory Leverett  
**Project Manager**

**Date:** 1/15/2015

A handwritten signature in black ink is written over a circular purple stamp. The stamp contains the text 'TIMCO ENGINEERING, INC.' around the perimeter.

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## REPORT SUMMARY

|                                  |                                                       |
|----------------------------------|-------------------------------------------------------|
| Disclaimer                       | The test results only relate to the item tested.      |
| Applicable FCC Rule(s)           | FCC Pt 15.231(a)(c)(e), Pt 15.209                     |
| Applicable IC Rule (s)           | RSS 210 Annex 1(A1.1.1)(A1.1.3)(A1.1.5), RSS GEN (i4) |
| Measurement Standard             | ANSI C63.4:2003                                       |
| Related Report(s) or Approval(s) | NA                                                    |

### Receiver

The receiver portion of this system has been tested and meets all of the FCC requirements per FCC rules Part 15.109. A report was issued and a copy of this report is available upon request.

## TEST ENVIRONMENT

|                 |                                                                            |
|-----------------|----------------------------------------------------------------------------|
| Test Facility   | The test sites are located at 849 NW State Road 45 Newberry, FL 32669 USA. |
| Test Condition: | Temperature: 24-26°C<br>Relative humidity: 50-65%                          |

## TEST SETUP

|                                                              |                                                                                                                                                        |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Exercise (e.g software description, test signal, etc.): | The EUT was operated in a normal mode to determine the duty cycle and then placed in continuous transmit mode of operation for the radiated emissions. |
| Deviation from the standard(s)                               | No deviation from the standard(s)                                                                                                                      |
| Modification to the EUT:                                     | No modification was made to the EUT.                                                                                                                   |
| Supporting Peripheral Equipment                              | Not applicable. The device is a stand-alone remote control radio.                                                                                      |

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## EUT SPECIFICATION

|                             |                                                       |                                                    |                                     |
|-----------------------------|-------------------------------------------------------|----------------------------------------------------|-------------------------------------|
| <b>Applicant</b>            | MATRIX PRODUCT DEVELOPMENT, INC.                      |                                                    |                                     |
| <b>Description</b>          | WYZE TEMPERATURE BASE                                 |                                                    |                                     |
| <b>FCC ID</b>               | VGC-WYZEPLUSBSE                                       |                                                    |                                     |
| <b>IC</b>                   | 12661A-WYZEPLUSBSE                                    |                                                    |                                     |
| <b>Model Number</b>         | TP1113                                                |                                                    |                                     |
| <b>Power Setting Tested</b> | -6.8                                                  |                                                    |                                     |
| <b>Frequency Range</b>      | 433.47 – 433.47                                       |                                                    |                                     |
| <b>EUT Power Source</b>     | <input type="checkbox"/> 110–120Vac/50– 60Hz          |                                                    |                                     |
|                             | <input checked="" type="checkbox"/> DC Power          |                                                    |                                     |
|                             | <input type="checkbox"/> Battery Operated Exclusively |                                                    |                                     |
| <b>Test Item</b>            | <input type="checkbox"/> Prototype                    | <input checked="" type="checkbox"/> Pre-Production | <input type="checkbox"/> Production |
| <b>Type of Equipment</b>    | <input checked="" type="checkbox"/> Fixed             | <input type="checkbox"/> Mobile                    | <input type="checkbox"/> Portable   |

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## DECLARATION OF COMPLIANCE PART 15.231(a) & RSS210 ANNEX 1 A1.1.1

The following information is declared by the radio equipment manufacturer.

| Item | Description                                                                                                               | Yes | No |
|------|---------------------------------------------------------------------------------------------------------------------------|-----|----|
| 1    | Does this device transmit a signal that is only used to control another device?                                           |     | x  |
| 2    | Does this device send data with this control signal?                                                                      | x   |    |
| 3    | Does this device send data? Data is, things like: temperature, wind direction, fluid amount, rate of flow, etc.           | x   |    |
| 4    | Does this device transmit continuously or automatically?                                                                  | x   |    |
| 5    | If manually operated does this device stop transmitting within 5 seconds of releasing the button?                         | n/a |    |
| 6    | If automatically operated does it deactivate 5 seconds after activation?                                                  | x   |    |
| 7    | Does it transmit at regular predetermined intervals?                                                                      | x   |    |
| 8    | Does it poll or send supervisory information?                                                                             | x   |    |
|      | If yes does it do a system integrity check? How often?                                                                    |     | x  |
| 9    | Is this a fire, security or safety of life device?                                                                        |     | x  |
|      | If YES does the device stop transmitting after the alarm condition is satisfied?                                          | n/a |    |
| 10   | Duty cycle: Maximum on-time?                                                                                              | 7mS |    |
|      | On-time in 100 ms? If Other, please specify here                                                                          | 7mS |    |
| 11   | Modulation technique: Please specify the modulation of the test sample, FM, or AFSK, or FSK, or on-off keying, or others? | FSK |    |

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## TEST PROCEDURES

**Power line conducted Emissions:** The test procedure used was ANSI C63.4-2009.

**Spurious Emissions:** The test procedure used was ANSI C63.4-2009 using a spectrum analyzer with a preselector. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz and the video bandwidth was always greater than the RBW.

**Occupied Bandwidth:** A small sample of the transmitter output was fed into the spectrum analyzer and a was generated. The vertical scale is set to 10 dB per division.

**Formula Of Conversion Factors:** The field strength at 3m was established by adding the meter reading of the spectrum analyzer to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. The antenna correction factors are stated in terms of dB/m. The gain of the preselector was accounted for in the spectrum analyzer reading.

Example:

| Freq<br>MHz | Meter Reading<br>dB $\mu$ V | ACF<br>dB/m | Cable Loss<br>dB | Field Strength<br>dB $\mu$ V/m @ 3 m |
|-------------|-----------------------------|-------------|------------------|--------------------------------------|
| 33          | 20                          | +10.36      | +1.2             | = 31.56                              |

**ANSI C63.4-2003 Measurement:** The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the 10th harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes when necessary and the highest readings were converted to average readings based on the duty cycle.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

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## RADIATION INTERFERENCE

**Rules Part No.:** 15.231(e), RSS 210 Annex 1 A1.1.5

### Requirements:

| Fundamental Frequency (MHz), excluding restricted band frequencies of FCC PT 15.205 /RSS-Gen | Field Strength of Fundamental (dBμV/m @ 3m) | Field Strength of Harmonics and Spurious Emissions (dBμV/m @ 3m) |
|----------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------|
| 40.66 to 40.70                                                                               | 60.0(1000uV)                                | 40(100uV)                                                        |
| 70 to 130                                                                                    | 54(500uV)                                   | 34(50uV)                                                         |
| *130 to 174                                                                                  | 54.0 to 63.5(500-1500uV)                    | 34 to 43.5(50-150uV)                                             |
| 174 to 260                                                                                   | 63.5(1500uV)                                | 43.5(150uV)                                                      |
| *260 to 470                                                                                  | 63.5 to 74(1500-5000uV)                     | 43.5 to 54(150-500uV)                                            |
| 470 and above                                                                                | 74.0(5000uV)                                | 54.0(500uV)                                                      |

\*Linear interpolations with frequency F in MHz

For 130–174 MHz: FS (microvolts/m) =  $(22.73 \times F) - 2454.55$

For 260–470 MHz: FS (microvolts/m) =  $(16.67 \times F) - 2833.33$

No fundamental frequency is allowed in the restricted bands.

Spurious emissions in the restricted bands must be less than 54 dBμV/m or to the limits of 15.209, & RSS Gen (i8)

### Linear Interpolation Limit for Fundamental of used in this EUT

calculation of limit @ 433.47 MHz:

$16.666 (433.47) - 2833.3333 = 4390.87772 \text{ uV/m}$

$20\log(4390.87772) = \mathbf{72.8 \text{ dBuV/m}}$  limit @ 433.47 MHz

The limit for average field strength in dBuV/m @ 3 m for the fundamental frequency is **72.8 dBμV/m**.

The limit for average field strength in dBuV/m for the harmonics and other spurious frequencies is **52.8 dBμV/m**, unless it is in a restricted band.

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APPLICANT: MATRIX PRODUCT DEVELOPMENT, INC.

FCC ID: VGC-WYZEPLUSBSE

IC Cert: 12661A-WYZEPLUSBSE

REPORT: M\MATRIX\_VGC\63AUT15\63AUT15TestReport.docx



## RADIATION INTERFERENCE

**Test Data:** Field Strength table of emissions

| Tuned Frequency MHz | Emission Frequency MHz | Meter Reading dBuV | Ant. Polarity | Coax Loss dB | Correction Factor dB / m | Duty Cycle Factor dB | Field Strength dBuV / m | Margin dB |
|---------------------|------------------------|--------------------|---------------|--------------|--------------------------|----------------------|-------------------------|-----------|
| 433.5               | 433.47                 | 66.7               | H             | 1.44         | 15.83                    | 20                   | 63.99                   | 8.81      |
| 433.5               | 433.47                 | 74.7               | V             | 1.44         | 15.83                    | 20                   | 71.97                   | 0.83      |
| 433.5               | 866.94                 | 26.3               | H             | 2.2          | 23.04                    | 20                   | 31.49                   | 21.31     |
| 433.5               | 866.94                 | 34.6               | V             | 2.2          | 23.04                    | 20                   | 39.82                   | 12.98     |
| 433.5               | 1,300.41               | 16.8               | H             | 3.26         | 27.61                    | 20                   | 27.66                   | 25.14     |
| 433.5               | 1,733.88               | 12.8               | H             | 2.91         | 29.58                    | 20                   | 25.31                   | 27.49     |
| 433.5               | 1,733.88               | 17.9               | V             | 2.91         | 29.58                    | 20                   | 30.37                   | 22.43     |
| 433.5               | 2,600.82               | 14.5               | V             | 3.32         | 32.41                    | 20                   | 30.27                   | 22.53     |
| 433.5               | 2,600.82               | 15.6               | H             | 3.32         | 32.41                    | 20                   | 31.34                   | 21.46     |

Note: Emissions that are 20 dB below the limit are not required to be reported.

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## CALCULATION OF DUTY CYCLE

The period of the pulse train is determined by observing it on an oscilloscope or a spectrum analyzer with zero (0) frequency span. A plot is then made of the pulse train with a sweep time of 100 milliseconds. This sweep determines the duration of the pulse train. This sweep allows the determination of the number of and type of pulses, i.e. long & short. Plots are then made showing the duration of each type of pulse and its duration. From the 100-millisecond plot, the number of a given type of pulse is then multiplied by the duration of that type pulse. This allows the calculation of the amount of time the EUT is on within 100 ms.

|                    |        |
|--------------------|--------|
| Number of Pulse    | 1      |
| Pulse Length       | 2.6 ms |
| Worst Case On Time | 7 ms   |
| Measured On Time   | 2 ms   |
| Period             | 100    |
| Duty Cycle         | 2 %    |
| Correction         | 20 dB  |

$$\text{dB} = 20 * \log(\text{ON TIME}) / \text{PERIOD}$$

$$\text{dB} = 20 * \log(2/100)$$

$$\text{dB} = 20 * \log(0.02)$$

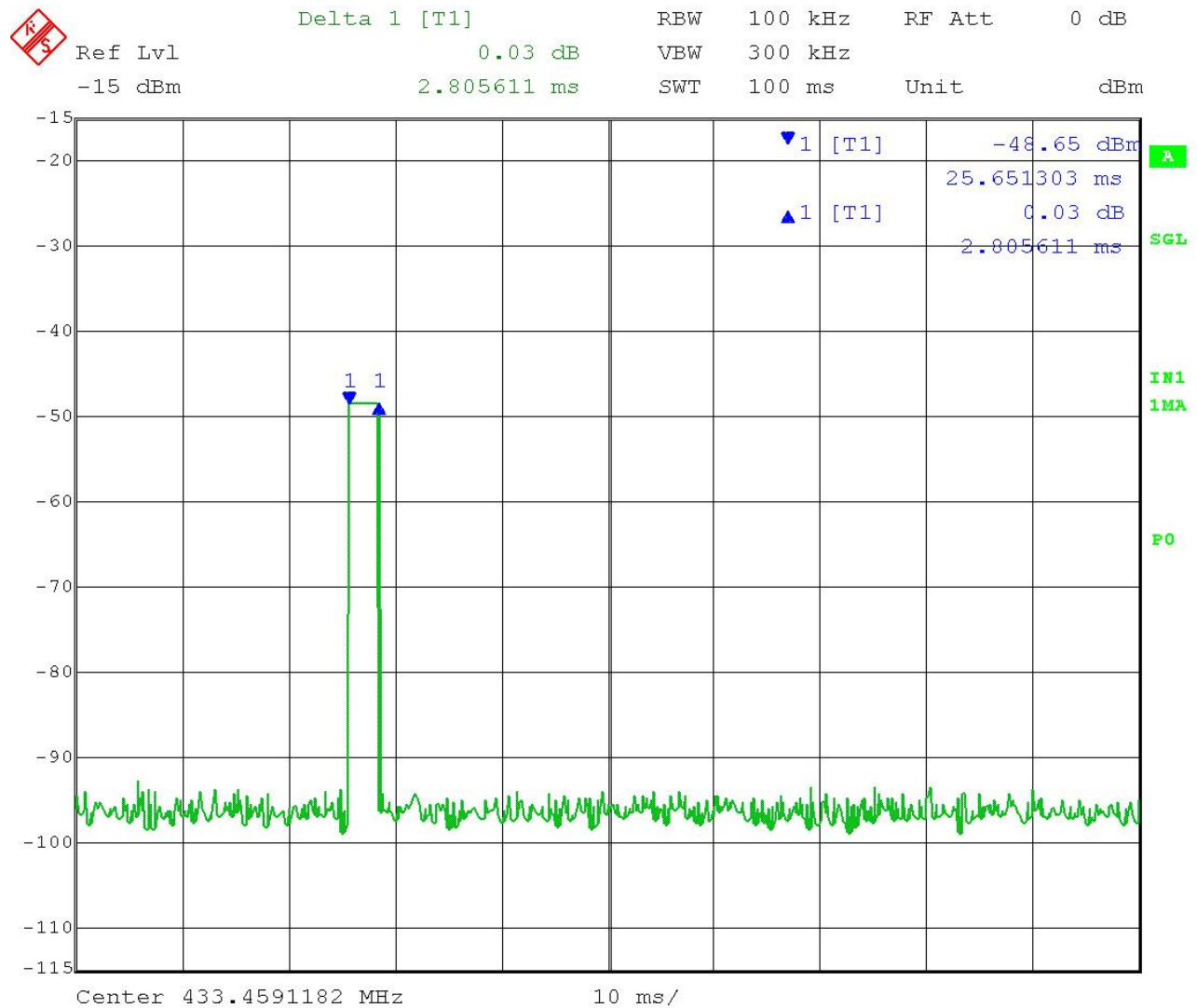
$$\text{dB} = -33.98$$

See the following plots.

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## CALCULATION OF DUTY CYCLE

### TEST DATA: Plot of pulse



Date: 13.JAN.2015 14:21:43

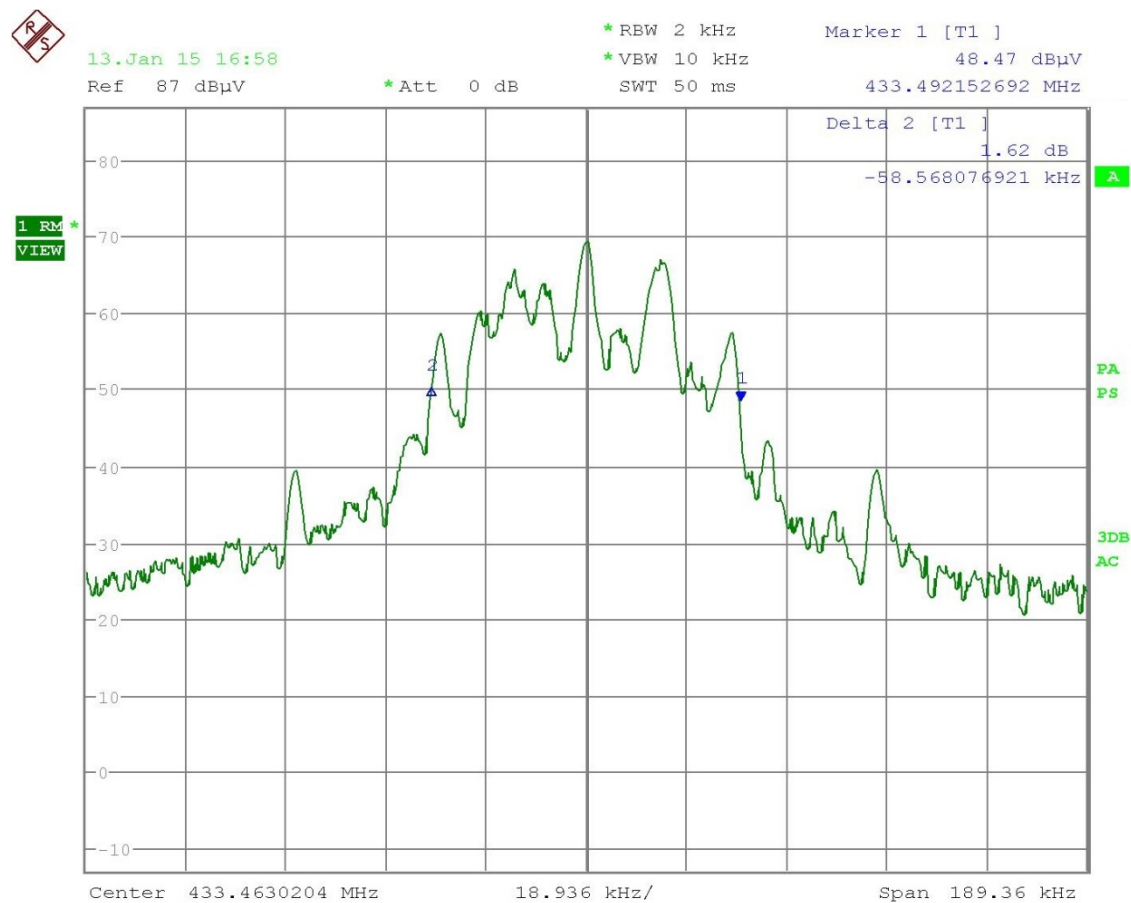
## OCCUPIED BANDWIDTH 20dB

**Rules Part No.:** 15.231(C)

**Requirements:** The bandwidth of the emission shall be no wider than .25% of the center frequency for devices operating between 70 and 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

### Test Data:

| 20 dB Measured Bandwidth | Authorized 20 dB BW Limit | Margin      |
|--------------------------|---------------------------|-------------|
| 58.56 KHz                | 1083 KHz                  | 1024.44 KHz |



Date: 13.JAN.2015 16:58:01

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 REPORT: M\MATRIX\_VGC\63AUT15\63AUT15TestReport.docx

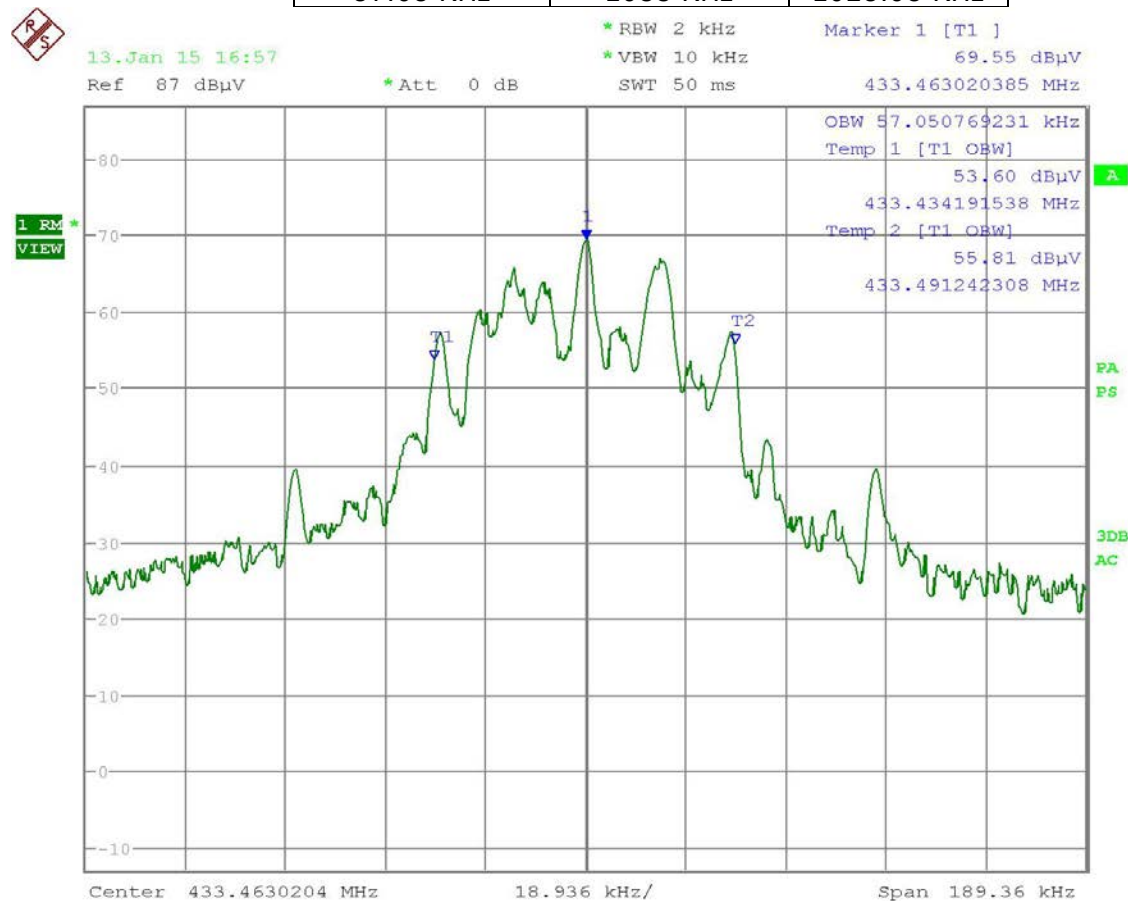
## OCCUPIED BANDWIDTH 99 %

**Rules Part No.:** RSS 210 Annex 1 A1.1.3

**Requirements:** The 99% bandwidth shall be no wider than 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency

### Test Data:

| 99 % Measured Bandwidth | Authorized 99 % BW Limit | Margin      |
|-------------------------|--------------------------|-------------|
| 57.05 KHz               | 1083 KHz                 | 1025.95 KHz |



Date: 13.JAN.2015 16:57:07

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IC Cert: 12661A-WYZEPLUSBSE  
REPORT: M\MATRIX\_VGC\63AUT15\63AUT15TestReport.docx

## TEST EQUIPMENT LIST

| Device                                   | Manufacturer         | Model   | Serial Number  | Cal/Char Date | Due Date |
|------------------------------------------|----------------------|---------|----------------|---------------|----------|
| Antenna:<br>Biconnical Chamber           | Eaton Chamber        | 94455-1 | 1057           | 06/14/13      | 06/14/15 |
| Antenna:<br>Log-Periodic Chamber         | Eaton                | 96005   | 1243           | 05/31/13      | 05/31/15 |
| LISN (Primary)                           | Electro-Metrics      | EM-7820 | 2682           | 02/26/13      | 02/26/15 |
| 3-Meter Semi-Anechoic Chamber            | Panashield           | N/A     | N/A            | 12/31/13      | 12/31/15 |
| Ant:<br>Double-Ridged Horn/ETS Horn 1 Ch | ETS-Lindgren Chamber | 3117    | 00035923       | 06/13/14      | 06/13/16 |
| Software:<br>EMI Test Receiver           | Rohde & Schwarz      | EMC 32  | Version 4.30.0 | N/A           | N/A      |
| EMI Test Receiver R & S ESU 40 Chamber   | Rohde & Schwarz      | ESU 40  | 100320         | 03/11/14      | 03/11/16 |

### \*EMI RECEIVER SOFTWARE VERSION

The receiver firmware used was version 4.43 Service Pack 3

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