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## FCC PART 15.249

### UNLICENSED INTENTIONAL RADIATOR

### TEST REPORT

|                             |                                                   |
|-----------------------------|---------------------------------------------------|
| <b>Applicant</b>            | KP ELECTRONIC SYSTEMS LTD.                        |
| <b>Address</b>              | P.O. BOX 42<br>TEFEN INDUSTRIAL PARK 24959 ISRAEL |
| <b>FCC ID</b>               | H78KPWERII                                        |
| <b>Model Number</b>         | WERII                                             |
| <b>Product Description</b>  | WIRELESS ELECTRICAL REGISTER                      |
| <b>Date Sample Received</b> | 03/28/2019                                        |
| <b>Final Test Date</b>      | 04/18/2019                                        |
| <b>Tested By</b>            | Tim Royer                                         |
| <b>Approved By</b>          | Franklin Rose                                     |

| <b>Report Number</b> | <b>Version Number</b> | <b>Description</b>                   | <b>Issue Date</b> |
|----------------------|-----------------------|--------------------------------------|-------------------|
| 690CUT19TestReport   | Rev1                  | Initial Issue                        | 04/18/2019        |
| 690CUT19TestReport   | Rev2                  | Updated operating frequency – Page 4 | 04/30/2019        |

**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 and was selected by the customer.
- ☐ 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 at:

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



Sr. EMC Engineer  
EMC-003838-NE



### Tested by:

Name and Title: Tim Royer, Project Manager/Testing Engineer

**Date: 04/18/2019**

### Reviewed and approved by:



Name and Title: Franklin Rose, Project Manager/EMC Specialist

**Date: 04/19/2019**

## GENERAL INFORMATION

### EUT Specification

|                             |                                                                                                                                                  |                                                    |                                              |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------|
| <b>Regulatory Standards</b> | FCC Title 47 CFR Part 15.249<br>IC RSS-210 Issue 8 A2.9 & RSS-GEN Issue 4                                                                        |                                                    |                                              |
| <b>FCC ID</b>               | H78KPWERII                                                                                                                                       |                                                    |                                              |
| <b>Model</b>                | WER II                                                                                                                                           |                                                    |                                              |
| <b>EUT Description</b>      | WIRELESS ELECTRICAL REGISTER                                                                                                                     |                                                    |                                              |
| <b>Operating Frequency</b>  | TX: 2433 MHz                                                                                                                                     |                                                    |                                              |
| <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 type="checkbox"/> Fixed                                                                                                                   | <input type="checkbox"/> Mobile                    | <input checked="" type="checkbox"/> Portable |
| <b>Antenna Connector</b>    | None                                                                                                                                             |                                                    |                                              |
| <b>Antenna</b>              | Integral                                                                                                                                         |                                                    |                                              |
| <b>Test Conditions</b>      | Temperature: 24-26°C<br>Relative humidity: 50-65%                                                                                                |                                                    |                                              |
| <b>Test Facility</b>        | Timco Engineering Inc. located at 849 NW State Road 45<br>Newberry, FL 32669 USA.<br>Designation #: US1070<br>IC Test Site Registration #: 2056A |                                                    |                                              |
| <b>Measurement Standard</b> | ANSI C63.10-2013<br>ANSI C63.4-2014 (Radiated Site Validation)                                                                                   |                                                    |                                              |

### Test Supporting Equipment

| Device | Manufacturer | Model | S/N | Supplied By | Used For |
|--------|--------------|-------|-----|-------------|----------|
| N/A    |              |       |     |             |          |

## RESULTS SUMMARY

| FCC Rule Part No. | IC Standard Ref.  | Requirement               | Test Item                   | Result |
|-------------------|-------------------|---------------------------|-----------------------------|--------|
| 2.1049            | RSS-GEN 6.6       | Occupied Bandwidth        | 99% Bandwidth               | Pass   |
| 15.249(a)(c)      | RSS-210 § A2.9(a) | Fundamental and Harmonics | Radiated Spurious Emissions | Pass   |
| 15.249(d)(e)      | RSS-247 § 5.5     | Spurious Emissions        | Bandedge                    | Pass   |
|                   |                   |                           | Radiated Spurious Emissions | Pass   |

## OCCUPIED BANDWIDTH

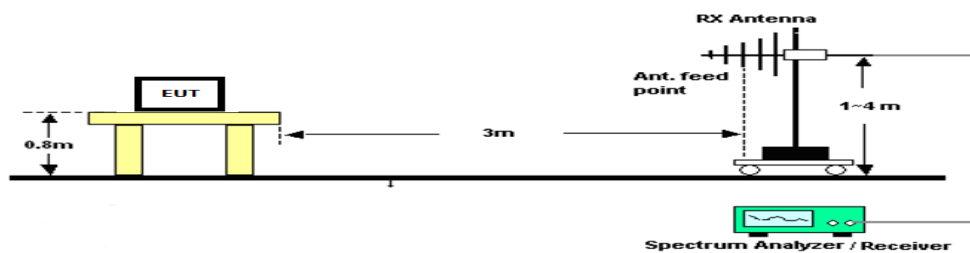
**Rules Part No.:** FCC 2.1049, FCC 15.215(c), IC RSS GEN § 6.6

**FCC Requirements:** FCC requires that the 20 dB bandwidth of the emission shall be contained within the frequency band designated under which the equipment is operated.

**IC Requirements:** Reporting Only

**Test Method:** THE TEST PROCEDURES USED ARE DETAILED IN THE STANDARD LISTED ABOVE.

### Setup:



### Test Data: 99 % Occupied Bandwidth Measurement Table

| Tuned Frequency (MHz) | 99 % BW (kHz) | 20dB BW (kHz) |
|-----------------------|---------------|---------------|
| 2433.11               | 753.12        | 765.22        |

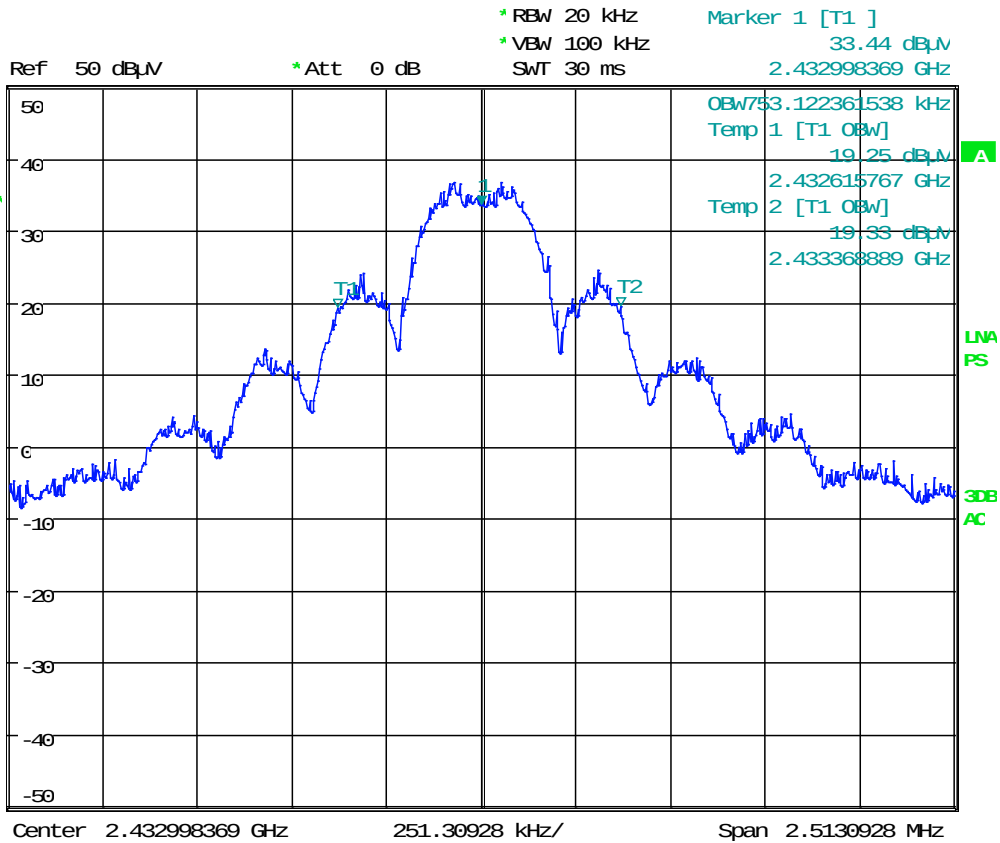
**Note:** The receiver's automatic 99% Occupied Bandwidth function was used. The function is identical in operation to ANSI C63.26, 5.4.4, Step e).

## OCCUPIED BANDWIDTH

Test Data: 99 % OBW



LRV  
VIBW



Date: 17.APR.2019 17:43:10

**RESULTS: Meets Requirements**

## OCCUPIED BANDWIDTH

Test Data: 20dB OBW



\* RBW 20 kHz

Delta 2 [T1 ]

\* VBW 3 MHz

0.17 dB

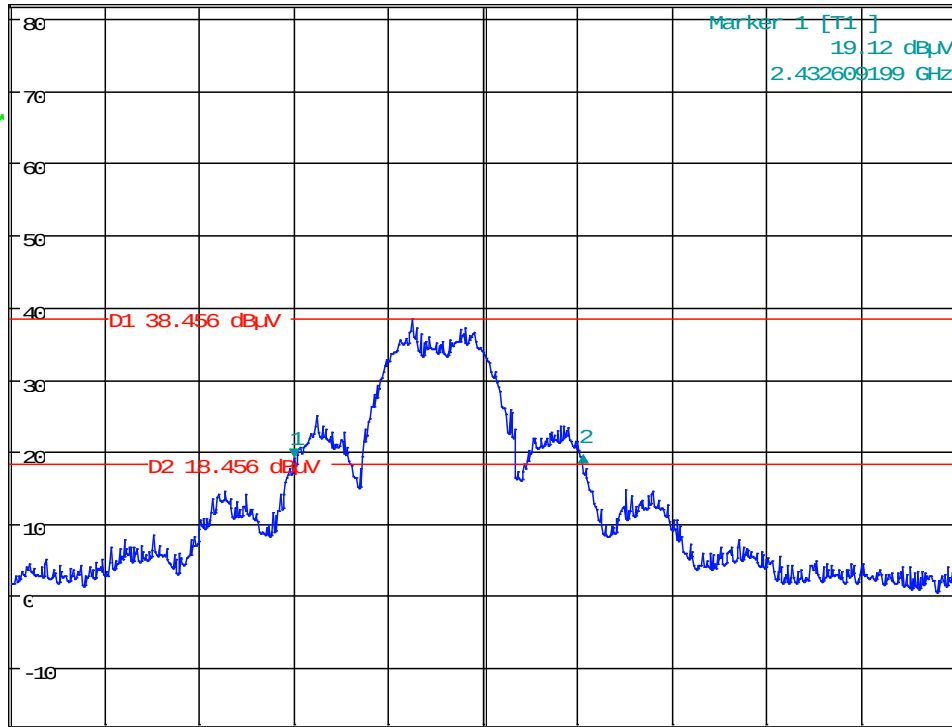
SWT 25 ms

765.224358970 kHz

Ref 82 dBμV

\* Att 10 dB

1.0V  
VIEW



Center 2.43311 GHz

250 kHz/

Span 2.5 MHz

Date: 18.APR.2019 14:34:36

**RESULTS: Meets Requirements**



## OCCUPIED BANDWIDTH

### BANDEDGE

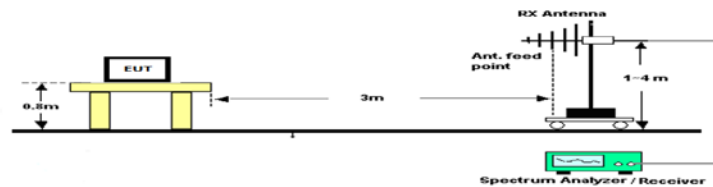
**Rule Part No.:** FCC 15.249(d), IC RSS 210 § A2.9(b)

**Requirements:** Emissions must be at least 50 dB down from the highest emission level Within the authorized band as measured with a 100 kHz RBW, or to the limits of 15.209.

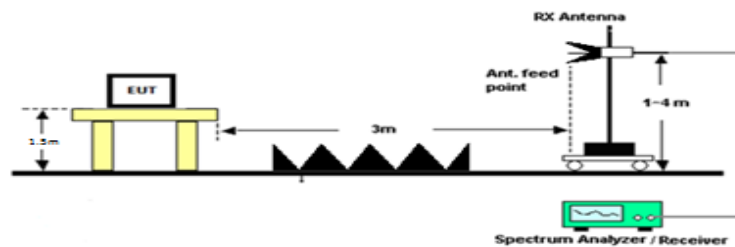
**Test Method:** THE TEST PROCEDURES USED ARE DETAILED IN THE STANDARD LISTED ABOVE.

#### Setup:

#### Emissions 30 – 1000 MHz



#### Emissions above 1 GHz

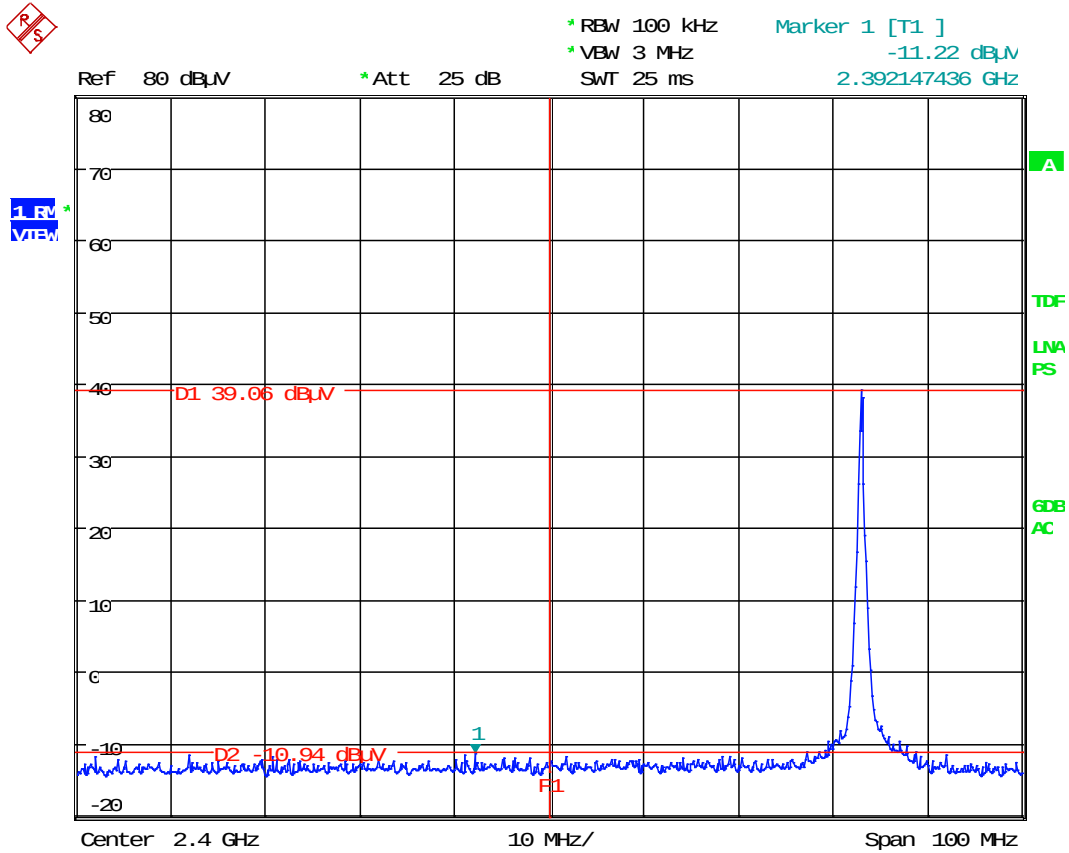


#### Test Data: Bandedge Measurement Table

| Bandedge | Tuned Frequency (MHz) | Measured Level (dBc) | Limit (dBc) | Margin (dB) |
|----------|-----------------------|----------------------|-------------|-------------|
| Lower    | 2433.11               | 50.26                | 50          | 0.26        |
| Upper    | 2433.11               | 50.51                | 50          | 0.51        |

#### Results Meet Requirements

**Test Data: Lower Band Edge Plot**

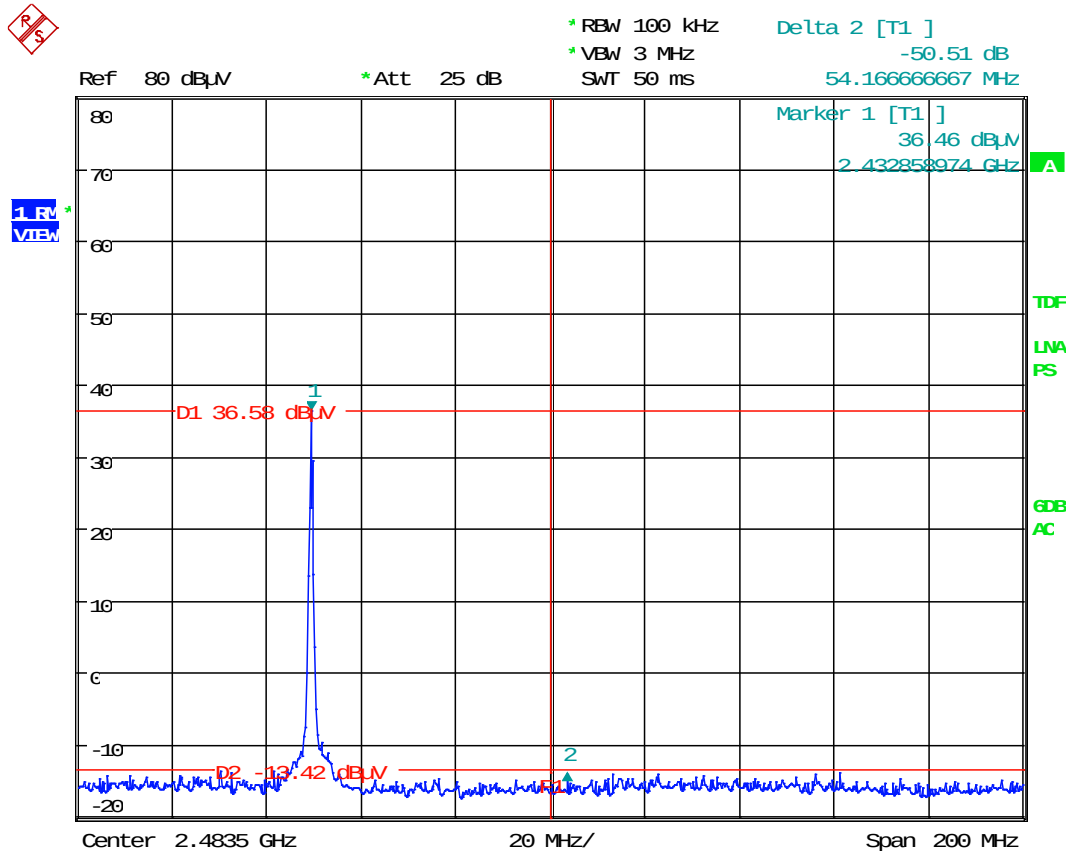


Date: 17.APR.2019 17:55:16

**RESULTS: Meets Requirements**

## BANDEDGE

Test Data: Upper Band Edge Plot



Date: 17.APR.2019 17:58:05

**RESULTS: Meets Requirements**

## RADIATED SPURIOUS EMISSIONS

**Rules Part No.:** FCC part 15.249 (a)(c)(d)(e)

**Requirements:** the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits 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

Field strength limits are specified at a distance of 3 meters

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 §15.209, whichever is the lesser attenuation.

| Frequency                    | Limits                              |
|------------------------------|-------------------------------------|
| Part 15.209                  |                                     |
| 9 to 490 kHz                 | 2400/F (kHz) $\mu$ V/m @ 300 meters |
| 490 to 1705 kHz              | 24000/F (kHz) $\mu$ V/m @ 30 meters |
| 1705 kHz to 30 MHz           | 29.54 dB $\mu$ V/m @ 30 meters      |
| 30 – 88                      | 40.0 dB $\mu$ V/m @ 3 meters        |
| 80 – 216                     | 43.5 dB $\mu$ V/m @ 3 meters        |
| 216 – 960                    | 46.0 dB $\mu$ V/m @ 3 meters        |
| Above 960                    | 54.0 dB $\mu$ V/m @ 3 meters        |
| Part 15.249                  |                                     |
| Fundamental 902 – 928 MHz    | 94.0 dB $\mu$ V/m @ 3 meters        |
| Fundamental 2.4 – 2.4835 GHz | 94.0 dB $\mu$ V/m @ 3 meters        |
| Harmonics                    | 54.0 dB $\mu$ V/m @ 3 meters        |

**Test Method:** ANSI C63.4 § Annex D Validation of radiated emissions standard test sites  
 ANSI C63.10 § 6.3 Common requirements radiated emissions  
 ANSI C63.10 § 6.4 Emissions below 30 MHz  
 ANSI C63.10 § 6.5 Emissions between 30 & 1000 MHz  
 ANSI C63.10 § 6.6 Emissions above 1 GHz

### Field Strength Calculation:

The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB $\mu$ V) to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

Example:

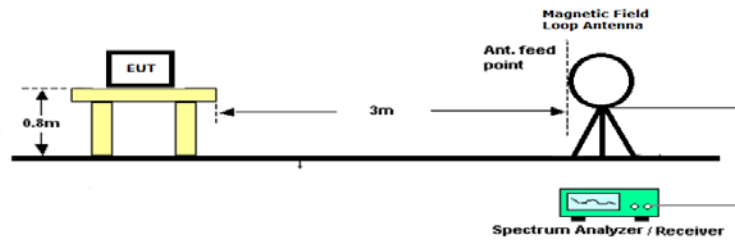
|            |               |            |                                 |
|------------|---------------|------------|---------------------------------|
| Freq (MHz) | Meter Reading | + ACF      | + CL = FS                       |
| 33         | 20 dB $\mu$ V | + 10.36 dB | + 0.5 = 30.86 dB $\mu$ V/m @ 3m |

Applicant: KP ELECTRONIC SYSTEMS LTD.  
 FCC ID: H78KPWERII  
 Report: 690CUT19TestReport\_Rev1

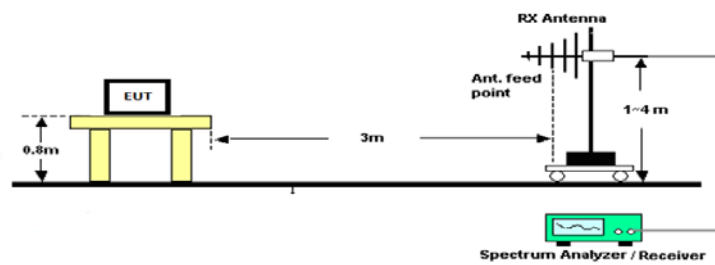
## RADIATED SPURIOUS EMISSIONS

Setup:

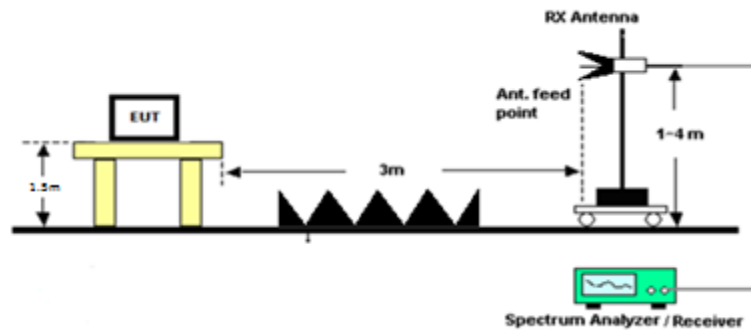
### Emissions below 30 MHz



### Emissions 30 – 1000 MHz



### Emissions above 1 GHz



## RADIATED SPURIOUS EMISSIONS

**Notes:** The EUT was checked in three orthogonal planes as required, a setup photo is provided to show the orientation of the worst case position.

Only emissions within 20dB of the limit are reported.

The spectrum was measured from 9 KHz to 10 GHz

### Test Data: Field Strength at 3 Meters Measurement Table

| Tuned Freq MHz | Emission Frequency MHz | Meter Reading dBu V | Antenna Polarity | Coax Loss Db | Correction Factor dB/M | Field Strength dBu V/M | Margin |
|----------------|------------------------|---------------------|------------------|--------------|------------------------|------------------------|--------|
| 2433.11        | 2433.11                | 42.48               | H                | 5.62         | 32.39                  | 80.49                  | 13.51  |
| 2433.11        | 2433.11                | 34.30               | H                | 5.62         | 32.39                  | 72.31                  | 21.69  |
| 2433.11        | 2433.11                | 35.10               | V                | 5.62         | 32.39                  | 73.11                  | 20.89  |
| 2433.11        | 2433.11                | 40.07               | V                | 5.62         | 32.39                  | 78.08                  | 15.92  |

| Tuned Freq MHz | Emission Frequency MHz | Meter Reading dBu V | Antenna Polarity | Coax Loss Db | Correction Factor dB/M | Field Strength dBu V/M | Margin |
|----------------|------------------------|---------------------|------------------|--------------|------------------------|------------------------|--------|
| 2433.11        | 103.55                 | 4.60                | V                | 1.17         | 10.65                  | 16.42                  | 27.08  |
| 2433.11        | 103.55                 | 2.64                | V                | 1.17         | 10.65                  | 14.46                  | 29.04  |
| 2433.11        | 106.82                 | 3.29                | V                | 1.19         | 10.40                  | 14.88                  | 28.62  |
| 2433.11        | 140.80                 | 3.43                | V                | 1.34         | 15.36                  | 20.13                  | 23.37  |
| 2433.11        | 235.89                 | 3.19                | V                | 1.76         | 10.99                  | 15.94                  | 30.06  |
| 2433.11        | 551.28                 | 3.75                | H                | 2.84         | 18.26                  | 24.85                  | 21.15  |
| 2433.11        | 3449.15                | -14.09              | V                | 6.84         | 32.93                  | 25.68                  | 28.32  |
| 2433.11        | 7363.20                | -12.14              | V                | 9.45         | 35.67                  | 32.98                  | 21.02  |
| 2433.11        | 4348.80                | -14.78              | H                | 7.28         | 33.58                  | 26.08                  | 27.92  |

## EMC EQUIPMENT LIST

| Device                                        | Manufacturer    | Model                         | Serial Number                                  | Cal/Char Date | Due Date |
|-----------------------------------------------|-----------------|-------------------------------|------------------------------------------------|---------------|----------|
| Antenna: Biconical 1057                       | Eaton           | 94455-1                       | 1057                                           | N/A           | N/A      |
| Antenna: Log-Periodic 1243                    | Eaton           | 96005                         | 1243                                           | 04/20/18      | 04/20/21 |
| CHAMBER                                       | Panashield      | 3M                            | N/A                                            | 12/31/17      | 12/31/19 |
| Antenna: Double-Ridged Horn/ETS Horn 2        | ETS-Lindgren    | 3117                          | 00041534                                       | 03/01/17      | 03/01/20 |
| Software: Field Strength Program              | Timco           | N/A                           | Version 4.10.7.0                               | N/A           | N/A      |
| Antenna: Active Loop                          | ETS-Lindgren    | 6502                          | 00062529                                       | 12/11/17      | 12/11/19 |
| EMI Test Receiver R & S ESU 40 Chamber        | Rohde & Schwarz | ESU 40                        | 100320                                         | 08/28/18      | 08/28/21 |
| Coaxial Cable - Chamber 3 cable set (Primary) | Micro-Coax      | Chamber 3 cable set (Primary) | KMKM-0244-01;<br>KMKM-0670-00;<br>KFKF-0198-01 | 08/09/16      | 08/09/19 |
| Bore-sight Antenna Positioning Tower          | Sunol Sciences  | TLT2                          | N/A                                            | N/A           | N/A      |
| Pre-amp                                       | RF-LAMBDA       | RLNA00M45GA                   | N/A                                            | 01/04/16      | 01/04/20 |

### \*EMI RECEIVER SOFTWARE VERSION

The receiver firmware used was version 4.43 Service Pack 3

### END OF TEST REPORT