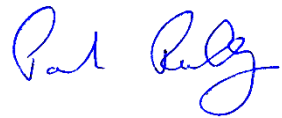


**Confidential Report**

|                                   |   |
|-----------------------------------|---|
| <b>Project No.</b>                | <b>22E10088-1</b>   |
| <b>Quotation</b>                  | <b>Q22-3006-1</b>   |
| <b>Prepared For</b>               | <b>Sensata<br/>Schrader Electronics Ltd</b>   |
| <b>Address</b>                    | <b>Unit 10 Antrim Technology Park<br/>Belfast Road<br/>Antrim<br/>Northern Ireland<br/>BT41 1QS</b> |
| <b>Contact</b>                    | <b>Zoe Gourley</b>  |
| <b>Contact (Phone)</b>            | <b>+44 2894 482536</b>  |
| <b>Contact (Email)</b>            | <b>Gourley, Zoe [zgourley@sensata.com]</b>  |
| <b>Prepared By</b>                | <b>Compliance Engineering Ireland</b>   |
| <b>Test Lab Address</b>           | <b>Clonross Lane<br/>Derrockstown<br/>Dunshaughlin<br/>Co. Meath<br/>Ireland<br/>A85XN59</b>        |
| <b>Tested By</b>                  | <b>Joy Israel Dalayap</b>   |
| <b>Test Report By</b>             | <b>Michael Kirby</b>  |
| <b>FCC Test Firm Registration</b> | <b>409640</b>   |
| <b>ISED CAB identifier</b>        | <b>8517A</b>  |
| <b>Date Received</b>              | <b>22<sup>nd</sup> Aug 2022</b>   |
| <b>Issue Date</b>                 | <b>26<sup>th</sup> Aug 2022</b>   |
| <b>EUT Description</b>            | <b>Sensor 433MHz, Tyre Pressure Monitor</b>   |
| <b>FCC ID</b>                     | <b>MRXFP4</b>   |
| <b>IC ID</b>                      | <b>2546A-FP4</b>  |
| <b>Authorised by</b>              | <b>Paul Reilly</b>  |
| <b>Authorised Signature:</b>      |                |

## TEST SUMMARY

The equipment complies with the requirements according to the following standards.

| FCC Part Section(s) | Industry Canada              | TEST PARAMETERS                 | Test Result |
|---------------------|------------------------------|---------------------------------|-------------|
| 15.231(e)<br>15.35  | RSS-210 A1.4<br>RSS-Gen 6.10 | Duty Cycle                      | PASS        |
| 15.231(e)<br>15.209 | RSS-210 A1.4<br>RSS-210 8.9  | RADIATED EMISSIONS              | PASS        |
| 15.231(c)           | RSS-210 A1.3                 | 20dB BANDWIDTH<br>99% Bandwidth | PASS        |

RSS 210 Issue      10 Dec 2019 (Amd Apr 2020)  
RSS-Gen Issue    5 Apr 2018 (Amd 1 Mar 2019) (Amd 2 Feb 2021)

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**Exhibit A – Technical Report**

**Table of Contents**

**TEST SUMMARY .....2**

**TABLE OF CONTENTS .....3**

**1 EUT DESCRIPTION .....4**

**2 EUT OPERATION .....5**

2.1 Modifications .....5

2.2 Date of Test .....5

2.3 Electromagnetic Emissions Testing .....5

2.4 Special Test Software .....5

**3 EMISSIONS MEASUREMENTS .....6**

3.1 Conducted Emissions Measurements .....6

3.2 Radiated Emissions Measurements .....6

3.3 General .....6

3.3.1 Measurements in Transmit mode .....6

3.3.2 Antenna Requirements .....7

3.3.3 Occupied Bandwidth and Duty Cycle .....8

3.3.3.1 Occupied Bandwidth .....8

3.3.3.1.1 Results for Occupied Bandwidth 20dB Down .....8

3.3.3.1.2 Results for 99% Occupied Bandwidth .....9

3.3.4 Maximum Modulation Percentage (M %) / Duty cycle .....10

**4 FIELD STRENGTH OF RADIATED EMISSIONS .....12**

4.1 Test Specification: FCC 15.231(e) and RSS-210 A1.4 .....12

4.2 Results for Radiated Emissions .....13

4.2.1 Fundamental .....13

4.2.2 Harmonics Spurious Emissions Measurements below 1GHz .....14

4.2.3 Harmonics Spurious Emissions Measurements above 1GHz .....15

4.2.4 Non-Harmonics Spurious Emissions Measurements .....17

**5 MEASUREMENT UNCERTAINTIES .....18**

**6 LIST OF TEST EQUIPMENT USED .....19**

Appendix - A Scans for Spurious Emissions Test Configurations .....20

Appendix - B Test Configurations: .....25

Appendix - C Block Diagrams of Test Setup .....26

## 1 EUT Description

The EUT was monitor using a short range 433.914 MHz band transmitter for reporting of tyre pressure and temperature in cars/trucks.

|   |  |
|---|--|
| <b>Model:</b>                           | FP4  |
| <b>Type:</b>                            | Tyre Pressure Monitor  |
| <b>Type of radio:</b>                   | Stand-alone  |
| <b>Transmitter Type:</b>                | ASK/FSK  |
| <b>Operating Frequency Range(s):</b>    | 433.92 MHz   |
| <b>Number of Channels:</b>              | One  |
| <b>Antenna:</b>                         | Integral peak gain –18.9dBi  |
| <b>Transmitter power configuration:</b> | 3 VDC Internal Battery.  |
| <b>Operating. Temp Range:</b>           | -40° C to +85° C   |
| <b>Classification:</b>                  | DSC  |
| <b>HVIN:</b>                            | FP4  |
| <b>FVIN:</b>                            | Ver 1.0  |
| <b>Test Methodology:</b>                | Measurements performed according to the procedures in ANSI C63.10-2013 |

*Table 1: Detailed Description of EUT*

## 2 EUT Operation

### Operating Conditions during Test:

The equipment under test was operated during the measurement under the following conditions:

A sample (Sample #1) of EUT which was programmed to operate in test mode (CW mode) was used for all tests except duty cycle and bandwidth.

A sample (Sample #2) of EUT which was programmed to operate in test mode (repeated modulated mode) was used for bandwidth test.

A sample (Sample #3) of EUT which was programmed to operate in test mode (modulated mode highest normal duty cycle) was used for duty cycle.

### Environmental conditions:

|                        | <b>Temperature</b> | <b>Relative Humidity</b> |
|------------------------|--------------------|--------------------------|
| <b>Test</b>            | <b>°C</b>          | <b>%</b>                 |
| Radiated Emissions SAR | 23                 | 37                       |
| Radiated Emissions FAR | 26                 | 34                       |
| Duty Cycle             | 27                 | 43                       |

*Table 2: Environmental Conditions During the Tests*

### 2.1 Modifications

No modifications were required in order to pass the test specifications.

### 2.2 Date of Test

The tests were carried out on one sample of the EUT on 15<sup>th</sup>, 16<sup>th</sup>, & 17<sup>th</sup> of August 2022.

### 2.3 Electromagnetic Emissions Testing

The guidelines of CISPR 16-4 were used for all uncertainty calculations, estimates and expressions thereof for EMC testing. A copy of Compliance Engineering Ireland Ltd.'s policy for EMC Measurement Uncertainty is available on request.

### 2.4 Special Test Software

Tests were performed manually, and no special test software was used.

### **3 Emissions Measurements**

#### **3.1 Conducted Emissions Measurements**

Test not performed as EUT is powered from battery.

#### **3.2 Radiated Emissions Measurements**

Radiated Power measurements were made at the Compliance Engineering Ireland Ltd anechoic chamber located in Dunshaughlin, Co. Meath, Ireland to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

#### **3.3 General**

Emissions below 1GHz were measured using resolution bandwidth 100kHz at a measurement distance of 3 metres with EUT on a motorised turntable which allowed 360 degrees rotation.

Emissions above 1GHz were measured with resolution bandwidth of 1MHz at a measurement distance of 3 metres with EUT on a motorised turntable which allowed 360 degrees rotation.

##### **3.3.1 Measurements in Transmit mode**

A Radiated Emission pre-scan was performed which covered the x, y & z orientations in horizontal and vertical polarizations. In each case the emission was maximised. The result of this pre-scan showed that the highest emission for vertical polarization was with the EUT vertical (orientation1 O1)

The EUT in a horizontal orientation (orientation2 O2) gave the highest emissions for horizontal polarization.

A full scan for radiated emission was performed in orientation O1 for vertical polarization and in orientation O2 for horizontal polarization.

The radiated emissions were maximised by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 metres.

Significant peaks from the EUT were then recorded to determine margin to the limits.

Tests were carried out as per Ansi C63.10 -2013.

### 3.3.2 Antenna Requirements

#### **According to FCC 47 CFR 15.203:**

*“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 shall be considered sufficient to comply with the provisions of this section.”*

\*The antenna of this E.U.T is permanently attached.

\*The E.U.T Complies with the requirement of 15.203

### 3.3.3 Occupied Bandwidth and Duty Cycle

#### 3.3.3.1 Occupied Bandwidth

##### Requirement -15.231 (c) & IC RSS-210 A1.3

The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency. Bandwidth is determined at the points 20dB down from the modulated carrier.

#### TEST PROCEDURE:

##### 3.3.3.1.1 Results for Occupied Bandwidth 20dB Down

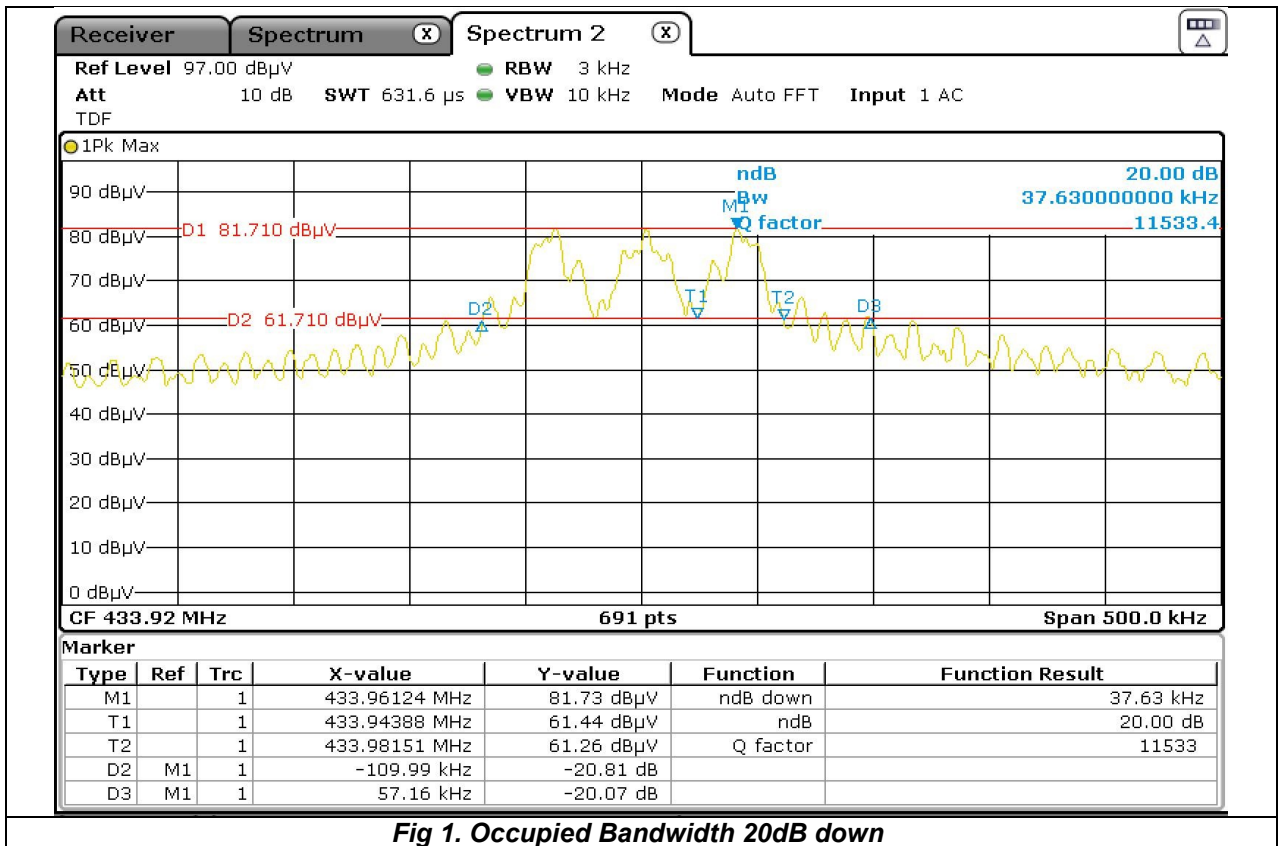


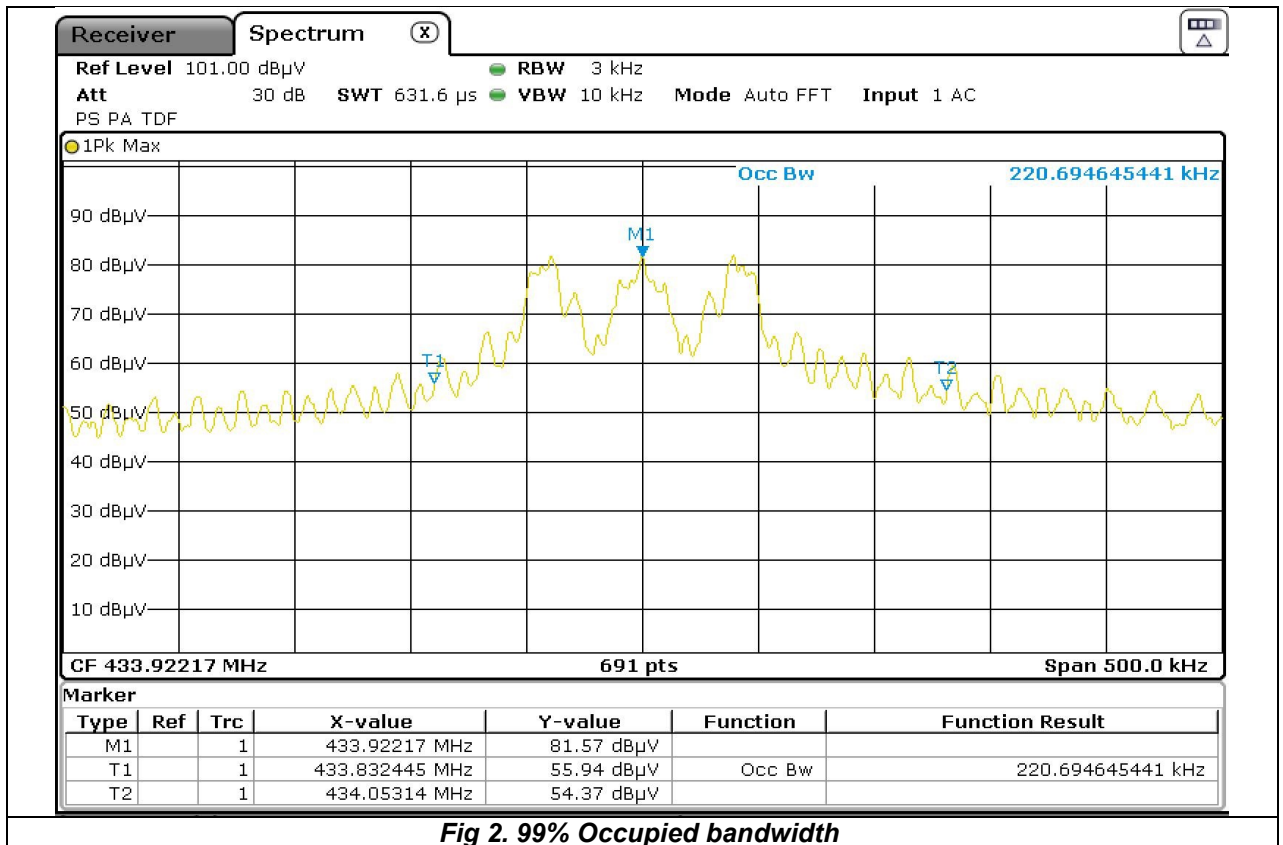
Fig 1. Occupied Bandwidth 20dB down

| Operating Frequency | 20dB Bandwidth | Limit  | Margin  | Result |
|---------------------|----------------|--------|---------|--------|
| MHz                 | KHz            | KHz    | KHz     |        |
| 433.92              | 167.15         | 1084.8 | 1047.46 | Pass   |

Table 3: Occupied Bandwidth 20dB Down Results



### 3.3.3.1.2 Results for 99% Occupied Bandwidth



|                     |                |
|---------------------|----------------|
| Operating Frequency | 99% Bandwidth  |
| <b>MHz</b>          | <b>kHz</b>     |
| <b>433.922</b>      | <b>220.694</b> |

**Table 4: 99% Occupied Bandwidth Results**

### 3.3.4 Maximum Modulation Percentage (M %) / Duty cycle

#### LIMIT

#### Requirement 15.35 (c), 15.231(e), IC RSS210 A1.4 & IC RSS-Gen 6.10

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 seconds interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

#### TEST PROCEDURE:

The transmitter output was connected to a spectrum analyser or radiated field strength. The RBW was set to 100 kHz and the VBW is set to 300KHz. The sweep time was coupled, and the span was set to 0 Hz. The number of pulses was measured and calculated in a 100ms scan.

| One Period(mS) | Pulse Width (mS) | No of Pulses | Duty Cycle | 20 log duty cycle (dB) |
|----------------|------------------|--------------|------------|------------------------|
| 100            | 7.826            | 1            | 0.078      | -22.13                 |

Table 5: Maximum Modulation Percentage/Duty Cycle Result

#### CALCULATION:

Average Reading = Peak Reading dB( $\mu$ V/m) + 20log (Duty Cycle),  
where Duty Cycle is (No of pulses \* pulse width) / 100 or T

Note correction for pulse mode operation is:

|                        |
|------------------------|
| 20 log duty cycle (dB) |
| -22.13                 |

#### 15.231(e) duty cycle limits

The duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

#### Result

|   |                |        |
|---|----------------|--------|
| Duration of each transmission = 417.93ms    | Limit 1sec     | Comply |
| Silent period between transmissions >32Secs | Limit 22.6secs | Comply |

#### Test Result Pass

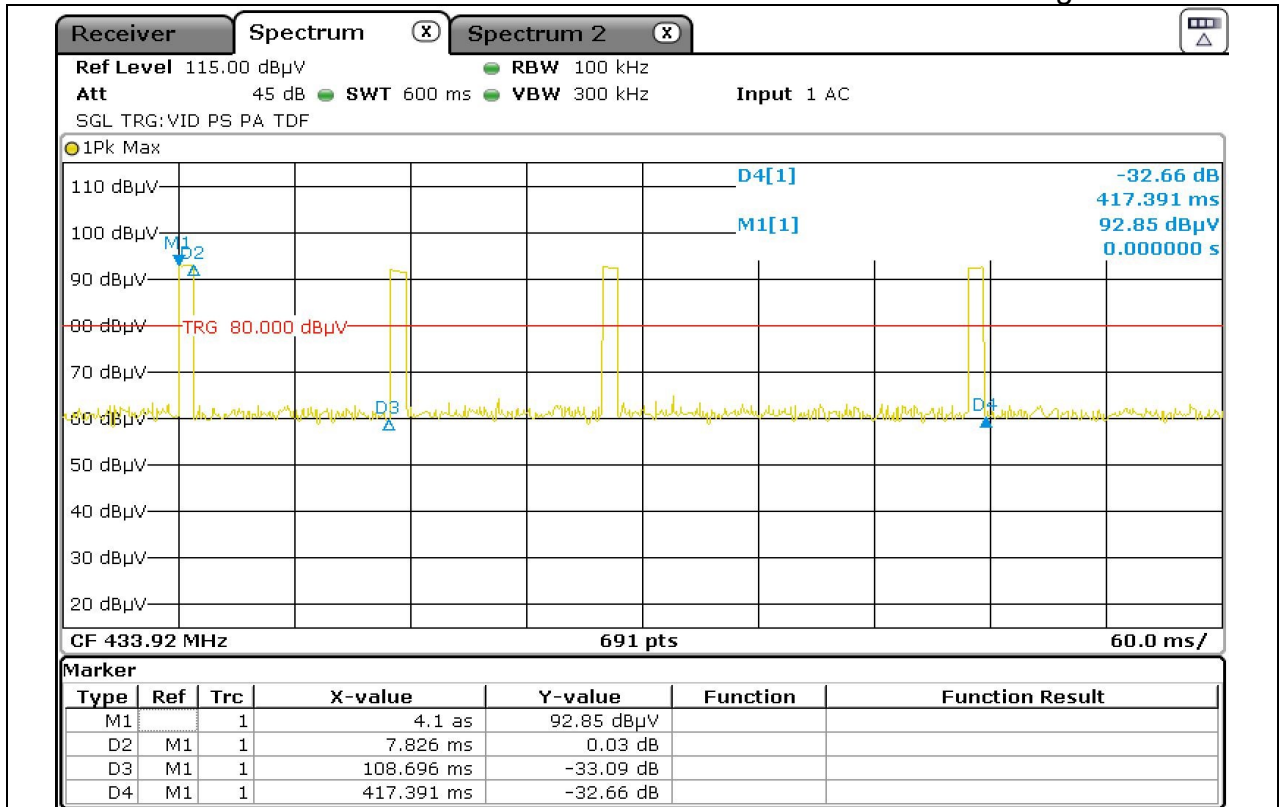


Fig 3. Single Pulse train

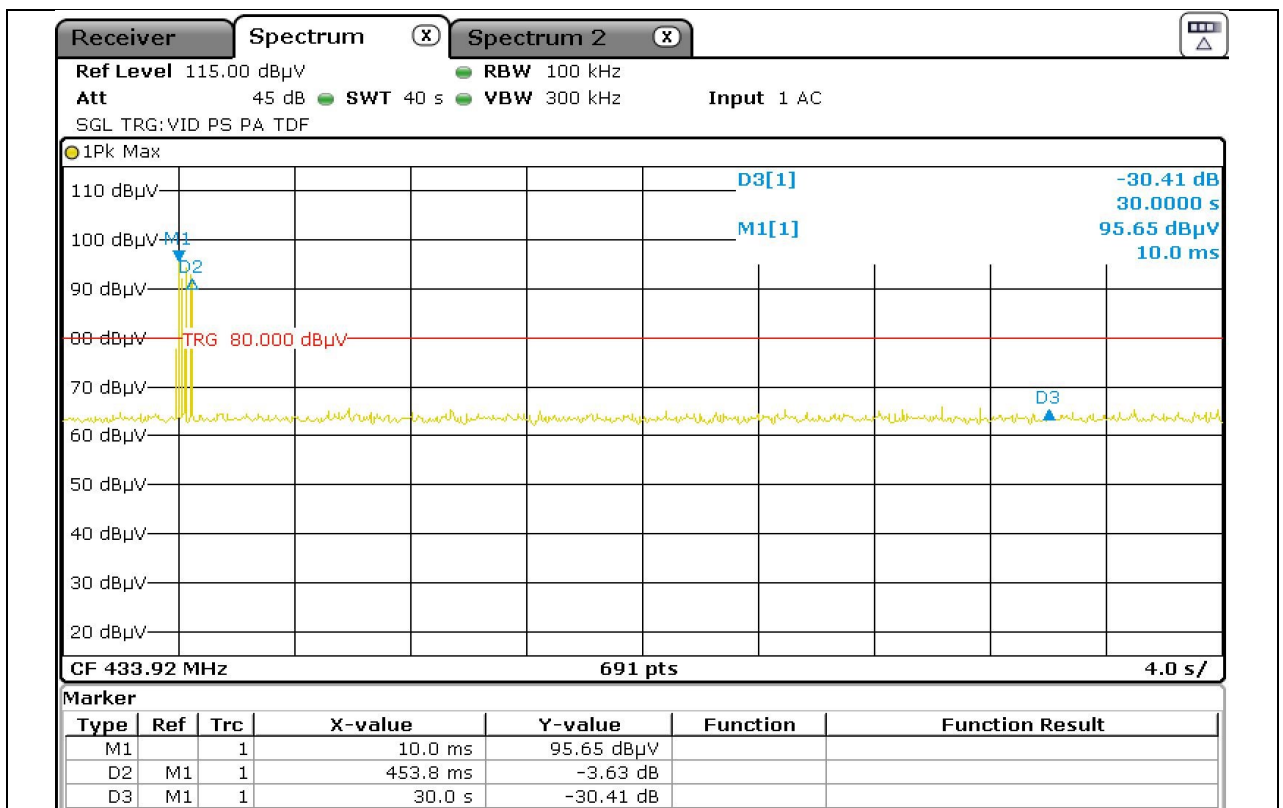


Fig 4. Pulse repetition rate Transmitted Pulses

## 4 Field Strength of Radiated Emissions

### 4.1 Test Specification: FCC 15.231(e) and RSS-210 A1.4

| Fundamental Frequency (MHz) | Field Strength of fundamental ( $\mu\text{V/m}$ ) | Strength of Spurious Emissions ( $\mu\text{V/m}$ ). |
|-----------------------------|---|---|
| 40.66 ~ 40.70               | 22.50   | 225   |
| 70 ~ 130                    | 1250  | 125   |
| 130 ~ 174                   | 1250 to 3750 **                                   | 125 to 375 **                                       |
| 174 ~ 260                   | 3750  | 375   |
| 260 ~ 470                   | 3750 to 12500 **                                  | 375 to 1250 **                                      |
| Above 470                   | 12500   | 1250  |

**Table 6: Reference Frequencies with their Corresponding Levels**

#### \*\* Linear interpolations

**Interpolation Formula =  $16.67 \times \text{Freq MHz} - 2833.33$**

For operating frequency of 433.92 MHz the following limits apply (using interpolation formula above)

| Fundamental Frequency | Field Strength of fundamental | Field Strength of fundamental | Field Strength of Spurious Emissions | Field Strength of Spurious Emissions |
|-----------------------|-------------------------------|-------------------------------|--------------------------------------|--------------------------------------|
| MHz                   | $\mu\text{V/m}$               | $\text{dB}\mu\text{V/m}$      | $\mu\text{V/m}$                      | $\text{dB}\mu\text{V/m}$             |
| 433.950               | 4400.446                      | 72.870                        | 440.045                              | 52.870                               |

**Table 7: Resulting Field Strength when using Interpolation Formula**

### Test Specification: FCC PART 15, SECTION 47 CFR 15.209, RSS Gen 8.9

| Frequency (MHz) | Field Strength ( $\mu\text{V/m}$ ) | Field Strength ( $\text{dB}\mu\text{V/m}$ ) |
|-----------------|------------------------------------|---|
| 30-88           | 100                                | 40.0  |
| 88-216          | 150                                | 43.5  |
| 216-960         | 200                                | 46.0  |
| Above 960       | 500                                | 54.0  |

**Table 8: Reference Frequencies with their Field Strength in Accordance with the Test Specification**

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., Sections 15.231 and 15.241

Duty cycle correction =  $20\text{Log}(\text{duty cycle}) \text{ dB}$

**Duty Cycle correction for Average measurement of pulsed signal = Peak – 22.13**  
as per ANSI C63.10-2013 Section 7.5

## 4.2 Results for Radiated Emissions

### Test Specification: FCC 15.231(e) and RSS-210 A1.4

Appendix A shows the results of the scans in the anechoic chamber.  
Ref Appendix B for EUT orientation

#### 4.2.1 Fundamental

| Frequency | Reading Peak | EUT Orientation | Antenna Polarity | Antenna Factor | Preamp Gain | Cable loss | Final Field Strength Peak | Average Limit | Margin for Peak v Average Limit +20dB |
|-----------|--------------|-----------------|------------------|----------------|-------------|------------|---------------------------|---------------|---------------------------------------|
| MHz       | dBuV/m       |                 | V/H              | dB             | dB          | dB         | dBuV/m                    | dBuV/m        | dB                                    |
| 433.950   | 66.2         | O1              | Vertical         | 16.8           | 0           | 1.7        | 84.7                      | 72.9          | 8.2                                   |
| 433.950   | 65.1         | O2              | Horizontal       | 16.8           | 0           | 1.7        | 83.6                      | 72.9          | 9.3                                   |

**Table 9: Fundamental Result of 433MHz**

| Frequency | Final Field Strength Peak | EUT Orientation | Antenna Polarity | Average Level (Peak plus -22.1dB Duty Cycle factor) | Average Limit | Margin |
|-----------|---------------------------|-----------------|------------------|---|---------------|--------|
| MHz       | dBuV/m                    |                 | V/H              | dBuV/m  | dBuV/m        | dB     |
| 433.950   | 84.7                      | O1              | Vertical         | 62.5  | 72.9          | 10.4   |
| 433.950   | 83.6                      | O2              | Horizontal       | 61.5  | 72.9          | 11.4   |

**Table 10: Average Level and Limit of the Fundamental**

**Result: Pass**

**4.2.2 Harmonics Spurious Emissions Measurements below 1GHz  
(30MHz - 1GHz)**

**Test Specification: FCC 15.231(e) and RSS-210 A1.1.5**

| Frequency | Reading Peak | EUT Orientation | Antenna Polarity | Antenna Factor | Preamp Gain | Cable loss | Final Field Strength Peak | Average Limit | Margin for Peak v Average Limit +20dB |
|-----------|--------------|-----------------|------------------|----------------|-------------|------------|---------------------------|---------------|---------------------------------------|
| MHz       | dBuV/m       |                 | V/H              | dB             | dB          | dB         | dBuV/m                    | dBuV/m        | dB                                    |
| 867.900   | 22.4         | O1              | Vertical         | 23.3           | 0           | 2.2        | 47.9                      | 52.9          | 25.0                                  |
| 867.900   | 22.9         | O2              | Horizontal       | 23.3           | 0           | 2.2        | 48.4                      | 52.9          | 24.5                                  |

**Table 11: Result of Harmonics Below 1GHz**

| Frequency | Final Field Strength Peak | EUT Orientation | Antenna Polarity | Average Level (Peak plus -22.1dB Duty Cycle factor) | Average Limit | Margin |
|-----------|---------------------------|-----------------|------------------|---|---------------|--------|
| MHz       | dBuV/m                    |                 | V/H              | dBuV/m  | dBuV/m        | dB     |
| 867.900   | 47.9                      | O1              | Vertical         | 25.8  | 52.9          | 27.1   |
| 867.900   | 48.4                      | O2              | Horizontal       | 26.3  | 52.9          | 26.6   |

**Table 12: Average Level and Limit of the Harmonics below 1GHz**

**Result: Pass**

### 4.2.3 Harmonics Spurious Emissions Measurements above 1GHz (1GHz - 6 GHz)

#### Test Specification: FCC 15.231(e) and RSS-210 A1.4

| Frequency | Reading Peak | EUT Orientation | Antenna Polarity | Antenna Factor | Preamp Gain | Cable loss | Final Field Strength Peak | Average Limit | Margin for Peak v Average Limit +20dB |
|-----------|--------------|-----------------|------------------|----------------|-------------|------------|---------------------------|---------------|---------------------------------------|
| GHz       | dBuV/m       |                 | V/H              | dB             | dB          | dB         | dBuV/m                    | dBuV/m        | dB                                    |
| 1.302     | 54.3         | O1              | Vertical         | 24.2           | 39.8        | 3.8        | 42.5                      | 52.9          | 30.4                                  |
| 1.736     | 60.5         | O1              | Vertical         | 25.4           | 39.3        | 2.8        | 49.4                      | 52.9          | 23.5                                  |
| 2.170     | 57.4         | O1              | Vertical         | 27.4           | 39.5        | 3.4        | 48.7                      | 52.9          | 24.2                                  |
| 2.604     | 59.3         | O1              | Vertical         | 28.7           | 38.9        | 3.6        | 52.7                      | 52.9          | 20.2                                  |
| 3.037     | 69.2         | O1              | Vertical         | 30.4           | 38.9        | 3.8        | 64.5                      | 52.9          | 8.4                                   |
| 3.471     | 50.4         | O1              | Vertical         | 31.3           | 37.8        | 4.5        | 48.4                      | 52.9          | 24.5                                  |
| 3.906     | 46.5         | O1              | Vertical         | 31.3           | 37.7        | 4.8        | 44.9                      | 52.9          | 28.0                                  |
| 4.340     | 44.7         | O1              | Vertical         | 32.6           | 37.3        | 5          | 45.0                      | 52.9          | 27.9                                  |
| 4.773     | 45.1         | O1              | Vertical         | 32.4           | 37.1        | 5.2        | 45.6                      | 52.9          | 27.3                                  |
| 5.207     | 44.6         | O1              | Vertical         | 33.5           | 37          | 5.3        | 46.4                      | 52.9          | 26.5                                  |
| 5.641     | 43.4         | O1              | Vertical         | 34.3           | 37.6        | 6.4        | 46.5                      | 52.9          | 26.4                                  |
| 1.302     | 53.5         | O3              | Horizontal       | 24.2           | 39.8        | 3.8        | 41.7                      | 52.9          | 31.2                                  |
| 1.736     | 60.5         | O2              | Horizontal       | 25.4           | 39.3        | 2.8        | 49.4                      | 52.9          | 23.5                                  |
| 2.217     | 57.0         | O2              | Horizontal       | 27.4           | 39.5        | 3.4        | 48.3                      | 52.9          | 24.6                                  |
| 2.604     | 59.3         | O2              | Horizontal       | 28.7           | 38.9        | 3.6        | 52.7                      | 52.9          | 20.2                                  |
| 3.038     | 61.7         | O2              | Horizontal       | 30.4           | 38.9        | 3.8        | 57.0                      | 52.9          | 15.9                                  |
| 3.472     | 50.5         | O2              | Horizontal       | 31.3           | 37.8        | 4.5        | 48.5                      | 52.9          | 24.4                                  |
| 3.906     | 45.8         | O3              | Horizontal       | 31.3           | 37.7        | 4.8        | 44.2                      | 52.9          | 28.7                                  |
| 4.340     | 43.9         | O2              | Horizontal       | 32.6           | 37.3        | 5          | 44.2                      | 52.9          | 28.7                                  |
| 4.773     | 44.9         | O2              | Horizontal       | 32.4           | 37.1        | 5.2        | 45.4                      | 52.9          | 27.5                                  |
| 5.207     | 44.6         | O2              | Horizontal       | 33.5           | 37          | 5.3        | 46.4                      | 52.9          | 26.5                                  |
| 5.641     | 43.9         | O2              | Horizontal       | 34.3           | 37.6        | 6.4        | 47.0                      | 52.9          | 25.9                                  |

**Table 13: Result of Harmonics Above 1GHz**

| Frequency | Final Field Strength Peak | EUT Orientation | Antenna Polarity | Average Level (Peak plus -22.1dB Duty Cycle factor) | Average Limit | Margin |
|-----------|---------------------------|-----------------|------------------|---|---------------|--------|
| GHz       | dBuV/m                    |                 | V/H              | dBuV/m  | dBuV/m        | dB     |
| 1.302     | 42.5                      | O1              | Vertical         | 20.4  | 52.9          | 32.5   |
| 1.736     | 49.4                      | O1              | Vertical         | 27.3  | 52.9          | 25.6   |
| 2.170     | 48.7                      | O1              | Vertical         | 26.6  | 52.9          | 26.3   |
| 2.604     | 52.7                      | O1              | Vertical         | 30.6  | 52.9          | 22.3   |
| 3.037     | 64.5                      | O1              | Vertical         | 42.4  | 52.9          | 10.5   |
| 3.471     | 48.4                      | O1              | Vertical         | 26.3  | 52.9          | 26.6   |
| 3.906     | 44.9                      | O1              | Vertical         | 22.8  | 52.9          | 30.1   |
| 4.340     | 45.0                      | O1              | Vertical         | 22.9  | 52.9          | 30     |
| 4.773     | 45.6                      | O1              | Vertical         | 23.4  | 52.9          | 29.5   |
| 5.207     | 46.4                      | O1              | Vertical         | 24.3  | 52.9          | 28.6   |
| 5.641     | 46.5                      | O1              | Vertical         | 24.4  | 52.9          | 28.5   |
| 1.302     | 41.7                      | O3              | Horizontal       | 19.6  | 52.9          | 33.3   |
| 1.736     | 49.4                      | O2              | Horizontal       | 27.3  | 52.9          | 25.6   |
| 2.217     | 48.3                      | O2              | Horizontal       | 26.2  | 52.9          | 26.7   |
| 2.604     | 52.7                      | O2              | Horizontal       | 30.6  | 52.9          | 22.3   |
| 3.038     | 57.0                      | O2              | Horizontal       | 34.9  | 52.9          | 18     |
| 3.472     | 48.5                      | O2              | Horizontal       | 26.4  | 52.9          | 26.5   |
| 3.906     | 44.2                      | O3              | Horizontal       | 22.1  | 52.9          | 30.8   |
| 4.340     | 44.2                      | O2              | Horizontal       | 22.1  | 52.9          | 30.8   |
| 4.773     | 45.4                      | O2              | Horizontal       | 23.3  | 52.9          | 29.6   |
| 5.207     | 46.4                      | O2              | Horizontal       | 24.2  | 52.9          | 28.7   |
| 5.641     | 47.0                      | O2              | Horizontal       | 24.8  | 52.9          | 28.1   |

**Table 14: Average Level and Limit of the Harmonics Above 1GHz**

Duty cycle correction =  $20\text{Log}(\text{duty cycle}) \text{ dB} = -10.76\text{dB}$

**Duty Cycle correction for Average measurement of pulsed signal = Peak – 10.76dB**  
as per ANSI C63.10-2013 Section 7.5

**Result: Pass**



#### 4.2.4 Non-Harmonics Spurious Emissions Measurements

##### Test Specification: FCC Part 15.209, RSS Gen

| Frequency | Quasi peak Level | Antenna Factor | Preamp Gain | Cable Loss | Antenna Polarity | EUT Orientation | Final Field Strength Quasi Peak | Average Limit | Margin |
|-----------|------------------|----------------|-------------|------------|------------------|-----------------|---------------------------------|---------------|--------|
| MHz       | dBuV/m           | dB             | dB          | dB         | V/H              |                 | dBuV/m                          | dBuV/m        | dB     |
| 51.18     | -4.5             | 8.9            | 0           | 0.2        | Vertical         | O1              | 4.6                             | 40.0          | 35.4   |
| 157.08    | -5.5             | 11.2           | 0           | 0.2        | Vertical         | O1              | 5.9                             | 43.5          | 37.6   |
| 397.95    | 15.5             | 15.2           | 0           | 1.2        | Vertical         | O1              | 31.9                            | 46.0          | 14.1   |
| 421.95    | 21.8             | 16.2           | 0           | 1.2        | Vertical         | O1              | 39.2                            | 46.0          | 6.8    |
| 445.96    | 24.9             | 16.1           | 0           | 1.2        | Vertical         | O1              | 42.2                            | 46.0          | 3.8    |
| 469.96    | 24.7             | 17.1           | 0           | 1.2        | Vertical         | O1              | 43.0                            | 46.0          | 3.0    |
| 481.96    | 21.0             | 17.1           | 0           | 1.2        | Vertical         | O1              | 39.3                            | 46.0          | 6.7    |
| 493.96    | 20.8             | 17.4           | 0           | 1.2        | Vertical         | O1              | 39.4                            | 46.0          | 6.6    |
| 505.96    | 19.7             | 17.5           | 0           | 1.2        | Vertical         | O1              | 38.4                            | 46.0          | 7.6    |
| 529.96    | 19.9             | 17.9           | 0           | 1.2        | Vertical         | O1              | 39.0                            | 46.0          | 7.0    |
| 47.28     | -7.1             | 11             | 0           | 0.2        | Horizontal       | O2              | 4.1                             | 40.0          | 35.9   |
| 297.21    | -4.6             | 12.8           | 0           | 1.2        | Horizontal       | O2              | 9.4                             | 46.0          | 36.6   |
| 397.95    | 15.4             | 15.2           | 0           | 1.2        | Horizontal       | O2              | 31.8                            | 46.0          | 14.2   |
| 421.95    | 22.1             | 16.2           | 0           | 1.2        | Horizontal       | O2              | 39.5                            | 46.0          | 6.5    |
| 445.95    | 24.8             | 16.1           | 0           | 1.2        | Horizontal       | O2              | 42.1                            | 46.0          | 3.9    |
| 469.96    | 25.4             | 17.1           | 0           | 1.2        | Horizontal       | O2              | 43.7                            | 46.0          | 2.3    |
| 481.96    | 21.8             | 17.1           | 0           | 1.2        | Horizontal       | O2              | 40.1                            | 46.0          | 5.9    |
| 493.96    | 21.7             | 17.4           | 0           | 1.2        | Horizontal       | O2              | 40.3                            | 46.0          | 5.7    |
| 505.96    | 21.3             | 17.5           | 0           | 1.2        | Horizontal       | O2              | 40.0                            | 46.0          | 6.0    |

**Table 15: Results for Non-Harmonics Radiated Spurious Emissions**

as per ANSI C63.10-2013 Section 7.5

**Result: Pass**

## 5 Measurement Uncertainties

| Measurement                                | Uncertainty            |
|--|------------------------|
| Radio Frequency                            | +/- $5 \times 10^{-7}$ |
| Maximum Frequency Deviation                | +/- 1.7 %              |
| Radiated Emission 30MHz-100MHz             | +/- 5.3 dB             |
| Radiated Emission 100MHz-300MHz            | +/- 4.7 dB             |
| Radiated Emission 300MHz-1GHz              | +/- 3.9 dB             |
| Radiated Emission 1GHz-40GHz               | +/- 3.8 dB             |
| Occupied Bandwidth                         | ± 5%                   |
| Conducted RF power                         | ± 1.23 dB              |
| Conducted Spurious Emission of transmitter | ± 2.14 dB              |
| Conducted Emissions of Receivers           | ± 2.14 dB              |
| RF level of uncertainty for a given BER    | ± 1.23 dB              |
| Temperature                                | ± 0.2 °C               |
| Humidity                                   | ± 4% RH                |
| Frequency                                  | ±0.01 ppm              |
| Duty Cycle                                 | +/- 5 %                |

**Table 16: Measurement Uncertainties**

The measurement uncertainties stated were calculated with a k=2 for a confidence level of 95.45%.

The test data can be compared directly to the specification limit to determine compliance, as the calculated measurement uncertainty meets the requirements of the applicable specification.

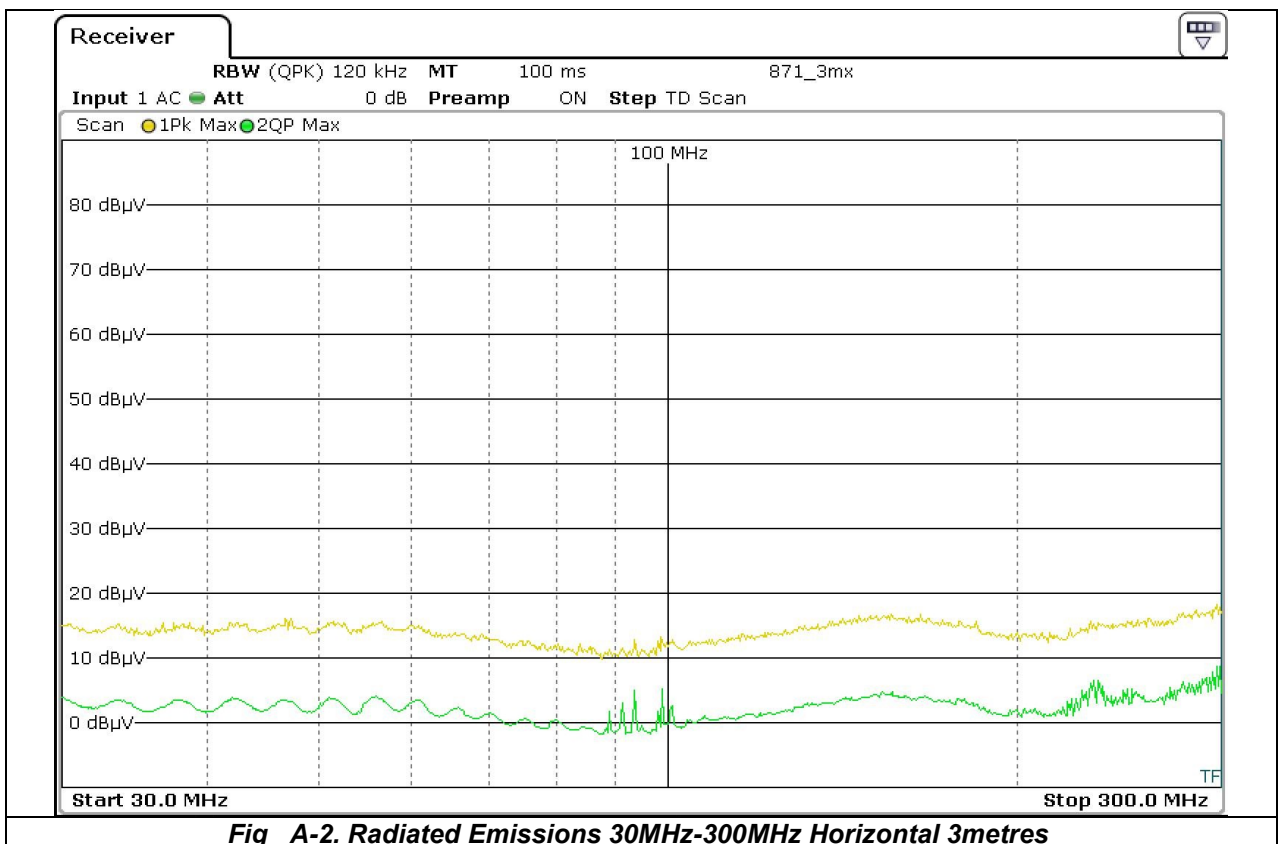
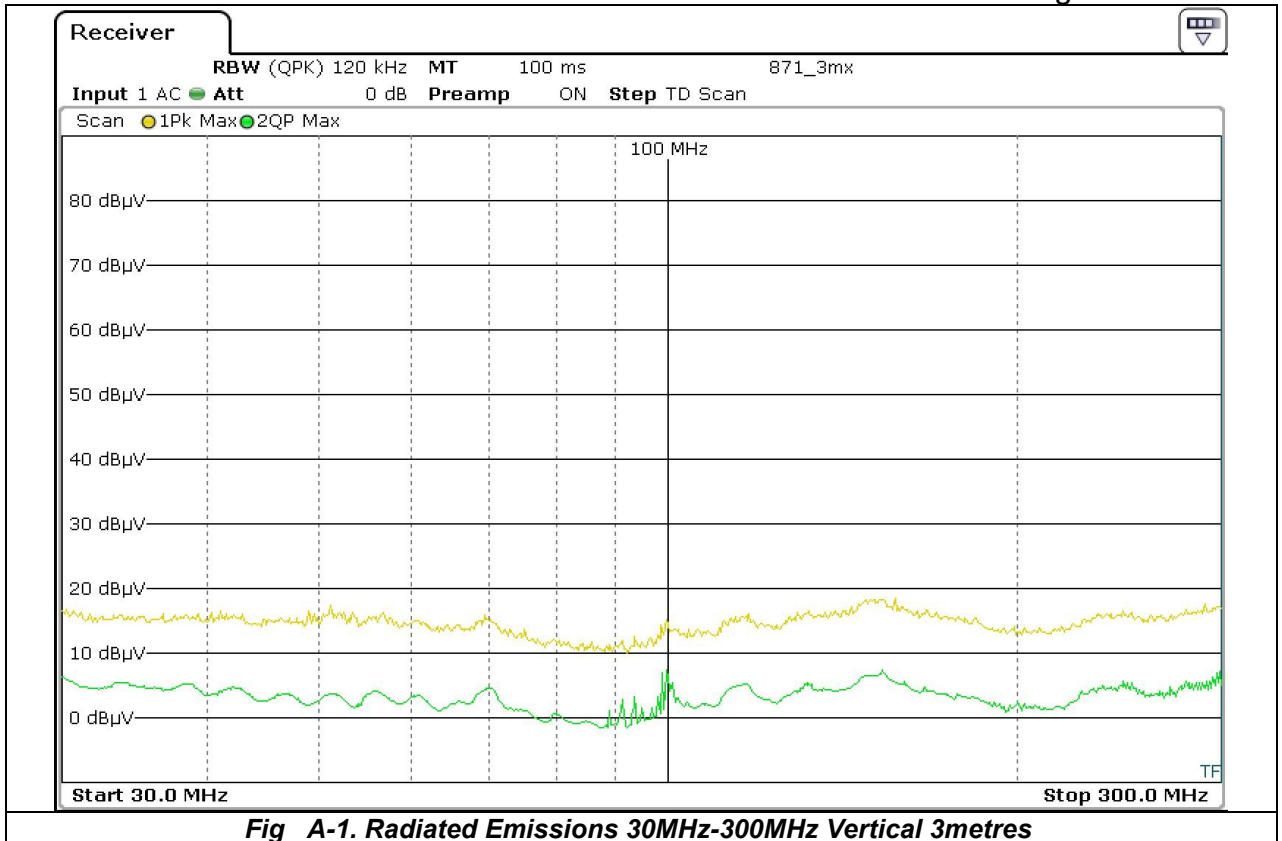
## 6 List of Test Equipment Used

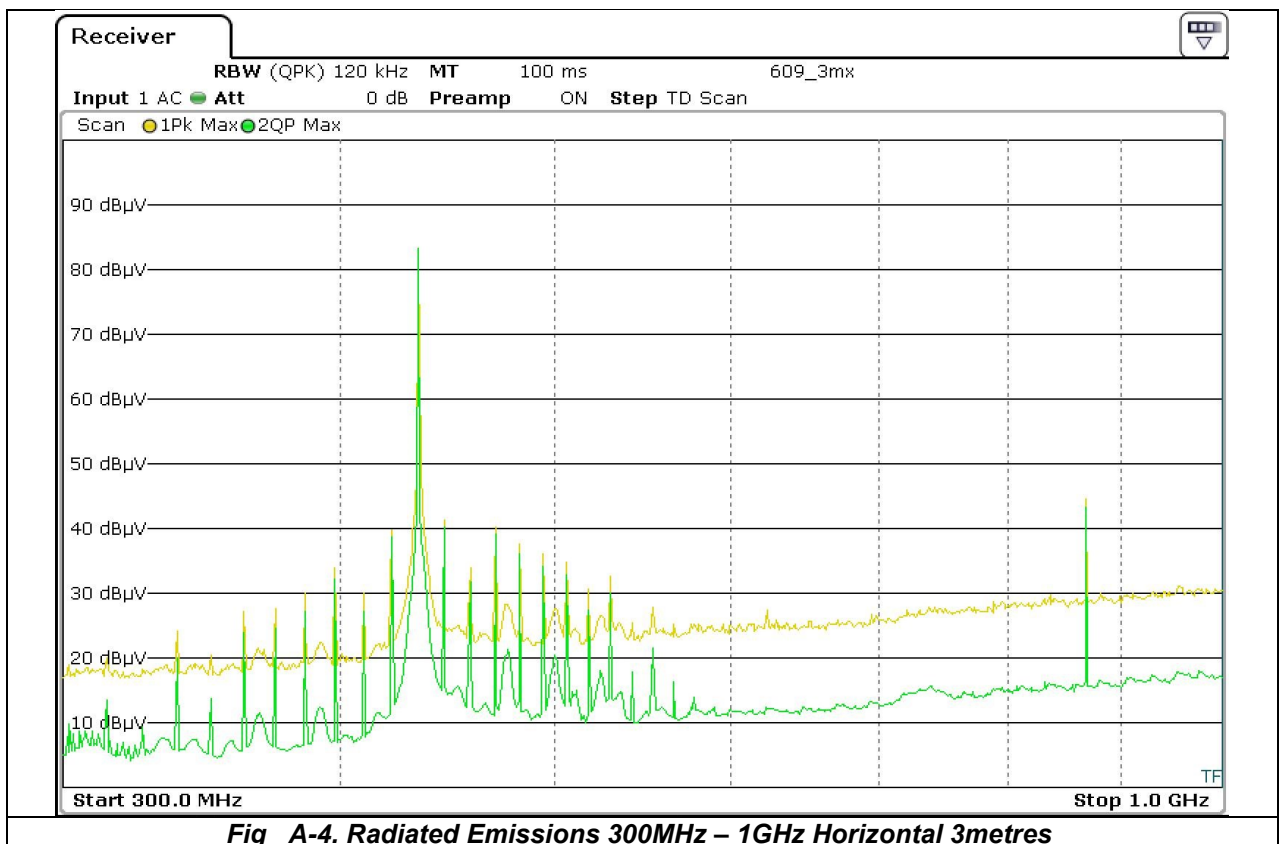
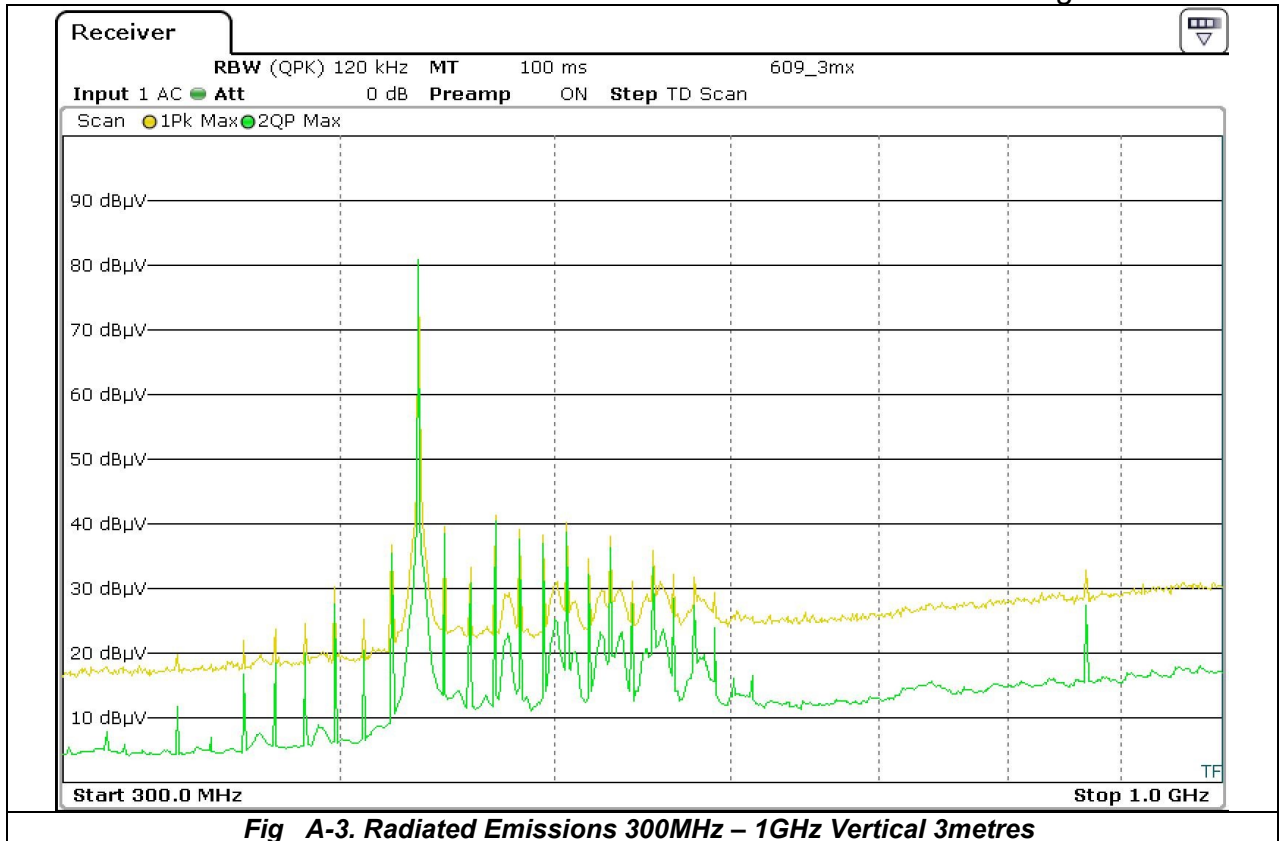
| Instrument                   | Manufacturer    | Model     | Serial Num            | CEI Ref | Cal Due Date | Cal Interval Months |
|------------------------------|-----------------|-----------|-----------------------|---------|--------------|---------------------|
| Microwave Preamplifier       | Hewlett Packard | 83017A    | 3123A00175            | 805     | 30-Sep-22    | 12                  |
| Spectrum Analyser 30Hz-40GHz | Rohde& Schwarz  | FSP40     | 100053                | 850     | 10-Dec-24    | 36                  |
| Test Receiver 3.6GHz         | Rohde& Schwarz  | ESR       | 1316.3003k03-101625-s | 869     | 28-May-23    | 36                  |
| LISN                         | Rohde & Schwarz | ESH3-Z5   | 825460/003            | 604     | 16-Feb-23    | 36                  |
| Antenna Horn                 | EMCO            | 3115      | 9905-5809             | 655     | 21-Jan-24    | 24                  |
| Fully Anechoic Chamber       | CEI             | FAR 3M    | 906                   | 906     | 23-Jul-25    | 36                  |
| Anechoic Chamber             | CEI             | SAR 10M   | 845                   | 845     | 17-May-25    | 36                  |
| Antenna Biconical            | Schwarzbeck     | VHBB 9124 | 9124 667              | 871     | 06-Oct-24    | 36                  |
| Antenna Log Periodic         | Chase           | UPA6108   | 1072                  | 609     | 09-Sep-24    | 36                  |
| Cable Ntype 10m              |                 |           |                       | 963     | 29-Jul-23    | 12                  |
| Cable Ntype 2m               |                 |           |                       | 828     | 29-Jul-23    | 12                  |
| Cable purple Ktype 1.8m      |                 |           |                       | 917     | 29-Jul-23    | 12                  |
| Cable Ntype 10m              |                 |           |                       | 914     | 29-Jul-23    | 12                  |
| Cable HF Ktype 1.5m          |                 |           |                       | 705     | 29-Jul-23    | 12                  |

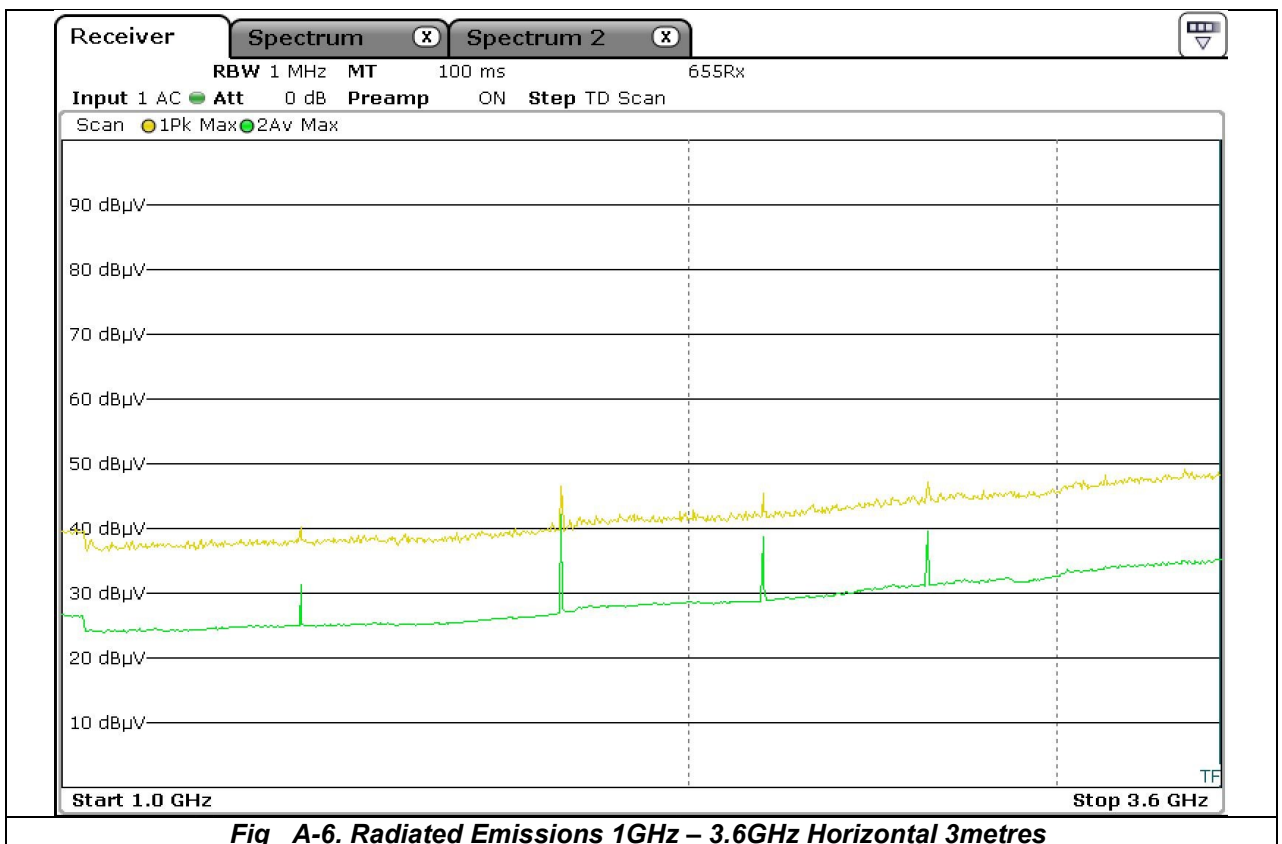
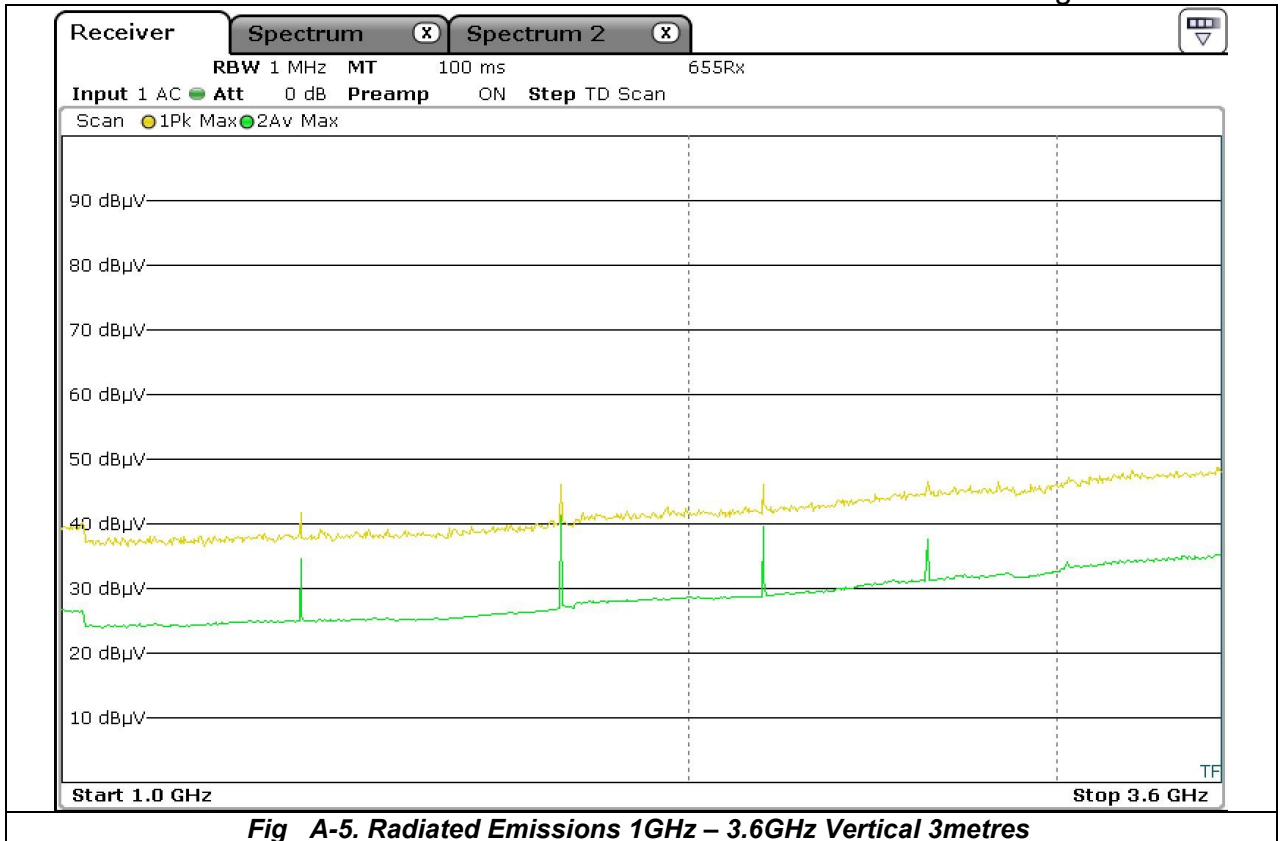
**Table 17: Equipment Used During Testing**

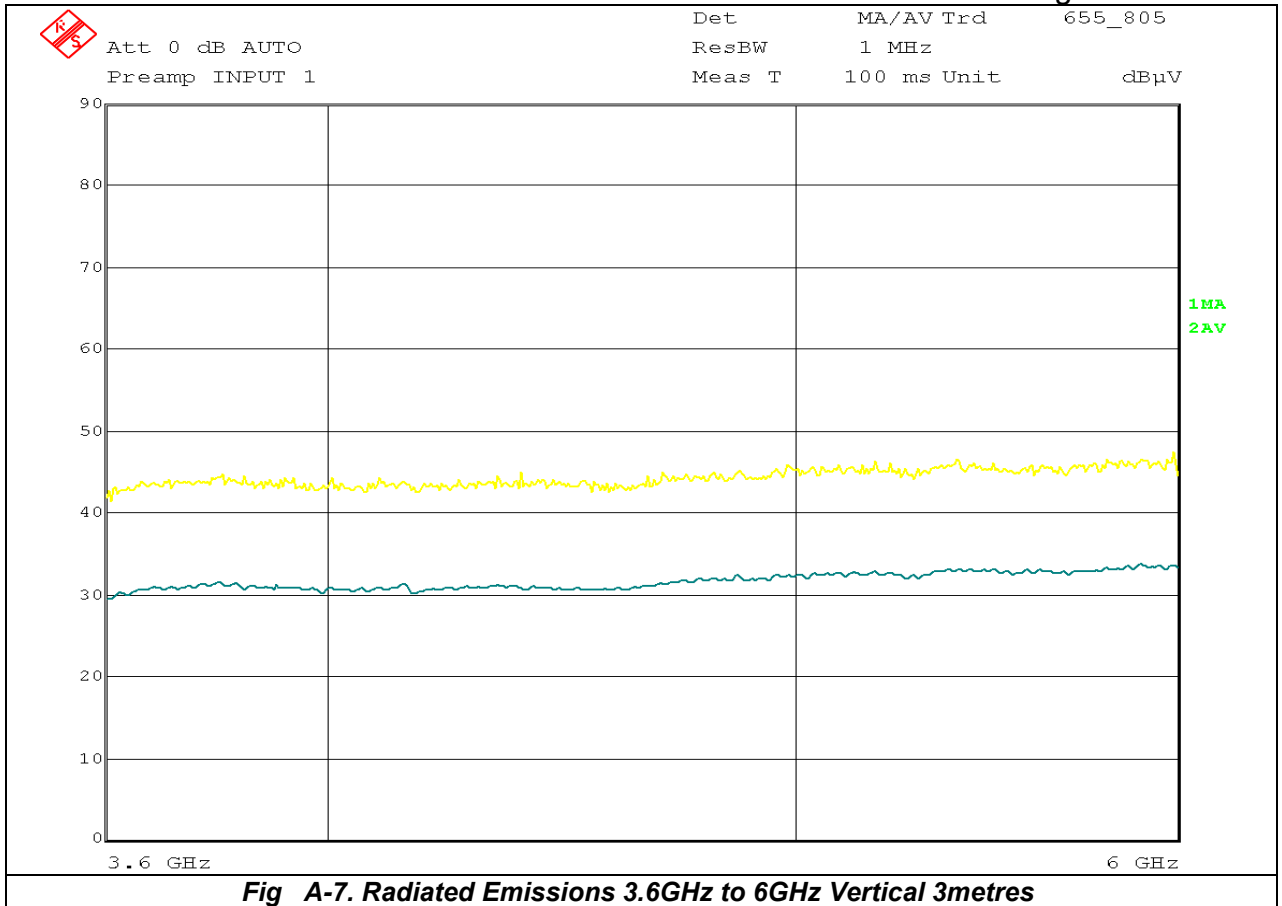
**Appendix - A**

**Scans for Spurious Emissions Test Configurations**

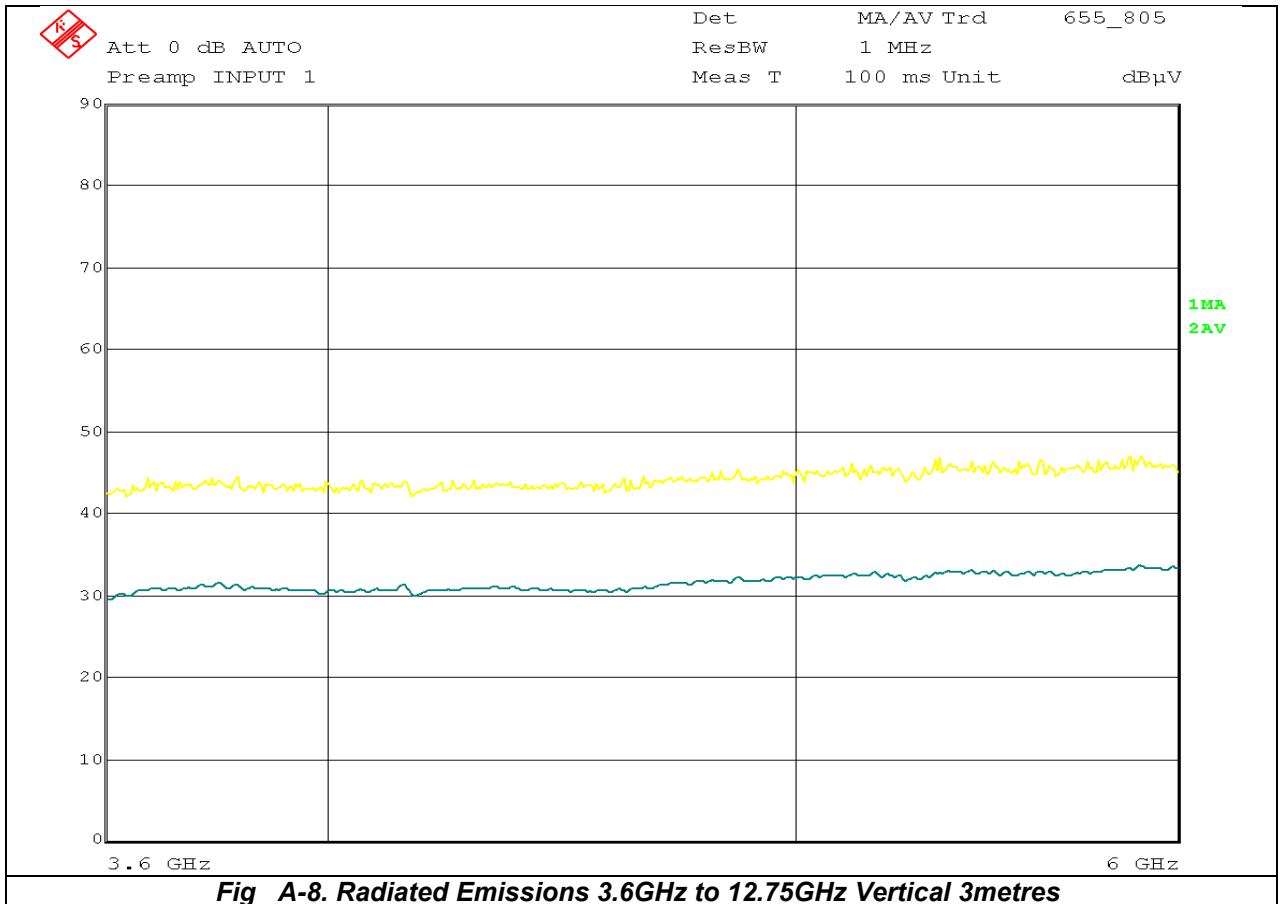








**Fig A-7. Radiated Emissions 3.6GHz to 6GHz Vertical 3metres**

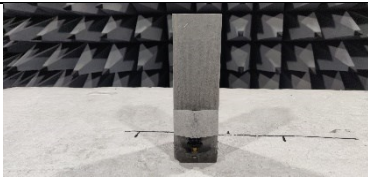
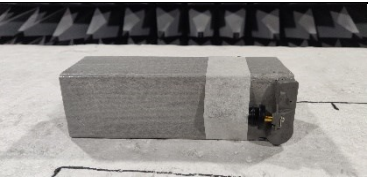



**Fig A-8. Radiated Emissions 3.6GHz to 12.75GHz Vertical 3metres**



**Appendix - B      Test Configurations:**

**Orientations for Radiated Emissions**

|   |  |   |
|---|--|---|
|  |  |  |
| <p>Fig B1: EUT orientation "O1"</p>   | <p>Fig B2: EUT orientation "O2"</p>  | <p>Fig B3: EUT orientation "O3"</p>   |

**Appendix - C      Block Diagrams of Test Setup**

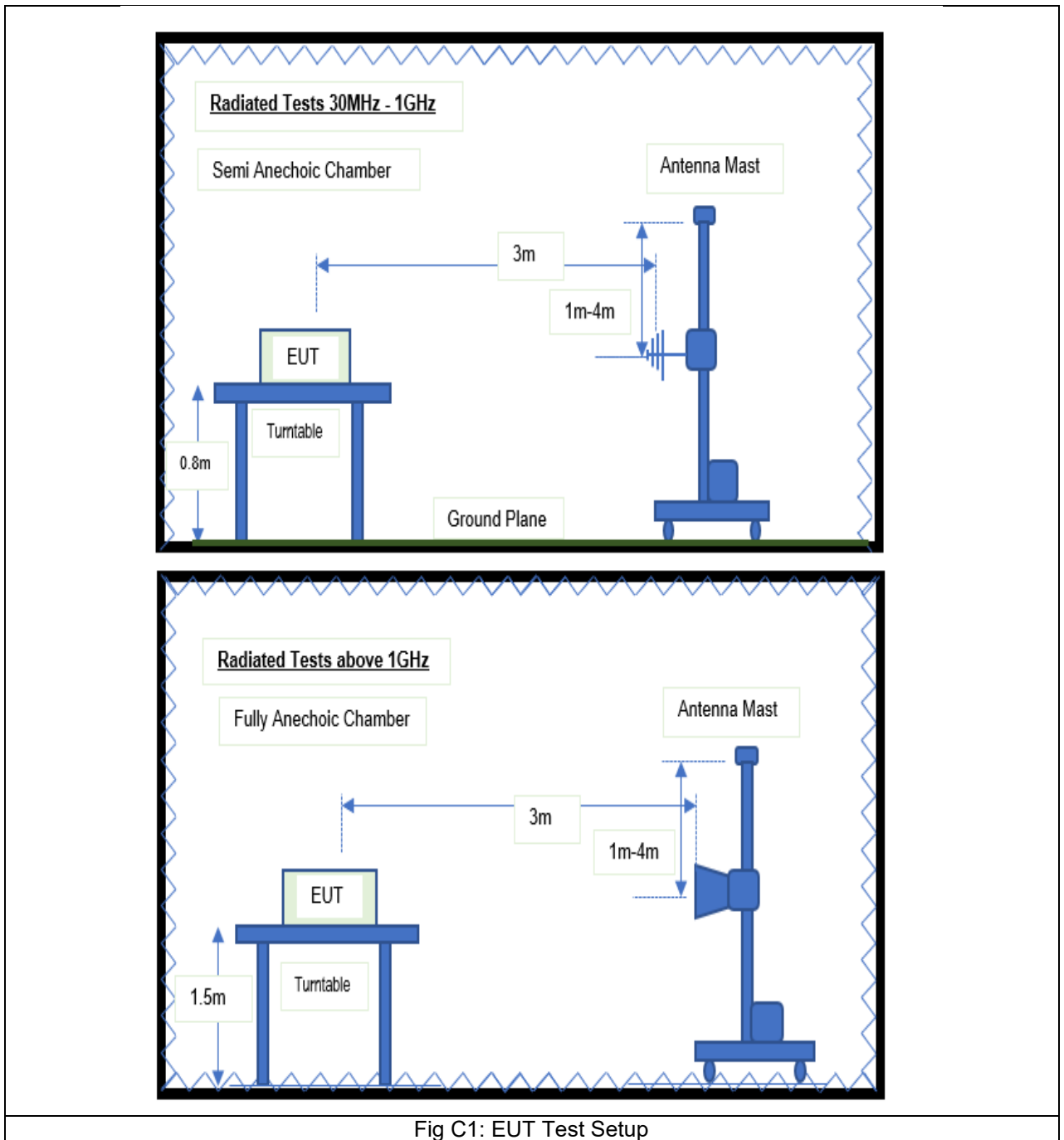


Fig C1: EUT Test Setup

**End of Report**