

# Wireless Pull Station

**Model No.: NBG-12WL**

**Date: 2020-02-12**

**Report Prepared By:**

**Vinay Gujjar**

**EMC Test Report**



|                                       |                                                                                                                                                                                                |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report Number</b>                  | EMC0421-1                                                                                                                                                                                      |
| <b>EUT Nomenclature</b>               | Wireless Pull Station                                                                                                                                                                          |
| <b>Sample Identification</b>          | Model No : NBG-12WL                                                                                                                                                                            |
|                                       | SL. No : 104                                                                                                                                                                                   |
|                                       | Software Version : 5.88                                                                                                                                                                        |
|                                       | Hardware Version : Rev 3                                                                                                                                                                       |
| <b>Number of Samples</b>              | 1                                                                                                                                                                                              |
| <b>Date of receipt of Sample</b>      | 12-Nov-2019                                                                                                                                                                                    |
| <b>Condition of Sample on receipt</b> | Good                                                                                                                                                                                           |
| <b>Client name</b>                    | Honeywell International Inc                                                                                                                                                                    |
| <b>Client Address</b>                 | System Sensor, 3825, Ohio Ave,<br>St. Charles, IL, USA - 60174                                                                                                                                 |
| <b>Testing Laboratory</b>             | Honeywell Technology Solutions Lab Pvt Ltd                                                                                                                                                     |
| <b>Address</b>                        | RMZ ECOWORLD INFRASTRUCTURE PVT Ltd,<br>(Formerly Adarsh Prime Projects Pvt Ltd., SEZ)<br>Survey # 19/2, Devarabisanahalli Village,<br>Varthur Hobli, Bangalore East Taluk, Bangalore - 560103 |
| <b>Test Dates</b>                     | 14-Dec-2019 to 06-Jan-2020                                                                                                                                                                     |
| <b>Applicable Standard</b>            | FCC Part 15 : 2010, ANSI C63.10:2013                                                                                                                                                           |
| <b>Test Results</b>                   | PASS                                                                                                                                                                                           |

Prepared By: Test Engineer

Name : Vinay Gujjar

Signature:

Date : 12 Feb 2020

Reviewed By: Prasanna Kumar BT

(e-mail approval)

Authorized Signatory:

Name: Prasanna Kumar BT

Signature:

Date of Issue: 14 Feb 2020

*This Report relates to the above-mentioned test sample only. Without the approval of Lab manager, this report shall not be reproduced except in full.*

| TEST SUMMARY                                                                                                                                                                                                                                      |                                    |                                        |                                  |                                     |                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------------------------|----------------------------------|-------------------------------------|--------------------------|
| Test Performed                                                                                                                                                                                                                                    | Name                               | Specification                          | Test Method                      | Pass                                | Fail                     |
| FHSS                                                                                                                                                                                                                                              |                                    |                                        |                                  |                                     |                          |
| <input type="checkbox"/>                                                                                                                                                                                                                          | 20dB Bandwidth                     | FCC Part 15.247 :2010                  | DA 00-705                        | Refer Note 1                        | <input type="checkbox"/> |
| <input type="checkbox"/>                                                                                                                                                                                                                          | Maximum Peak Output Power          | FCC Part 15.247 :2010                  | DA 00-705                        | Refer Note 1                        | <input type="checkbox"/> |
| <input type="checkbox"/>                                                                                                                                                                                                                          | Carrier Frequency Separation       | FCC Part 15.247 :2010                  | DA 00-705                        | Refer Note 1                        | <input type="checkbox"/> |
| <input type="checkbox"/>                                                                                                                                                                                                                          | Number of Hopping Frequencies      | FCC Part 15.247 :2010                  | DA 00-705                        | Refer Note 1                        | <input type="checkbox"/> |
| <input type="checkbox"/>                                                                                                                                                                                                                          | Band Edge compliance               | FCC Part 15.247 :2010                  | DA 00-705                        | Refer Note 1                        | <input type="checkbox"/> |
| <input type="checkbox"/>                                                                                                                                                                                                                          | Time of Occupancy (Dwell Time)     | FCC Part 15.247 :2010                  | DA 00-705                        | Refer Note 1                        | <input type="checkbox"/> |
| <input type="checkbox"/>                                                                                                                                                                                                                          | Spurious RF Conducted Emissions    | FCC Part 15.247 :2010                  | DA 00-705                        | Refer Note 1                        | <input type="checkbox"/> |
| <input checked="" type="checkbox"/>                                                                                                                                                                                                               | Effective Isotropic Radiated Power | FCC Part 15.247: 2010 and 15.209: 2010 | KDB 412172                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/>                                                                                                                                                                                                               | Spurious Radiated Emissions        | FCC Part 15.247: 2010 and 15.209: 2010 | DA 00-705<br>ANSI C63.10 - 2013  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| DTS                                                                                                                                                                                                                                               |                                    |                                        |                                  |                                     |                          |
| <input type="checkbox"/>                                                                                                                                                                                                                          | DTS 6dB Bandwidth                  | FCC Part 15.247: 2010                  | KDB 558074                       | Refer Note 1                        | <input type="checkbox"/> |
| <input type="checkbox"/>                                                                                                                                                                                                                          | Maximum Peak Output Power          | FCC Part 15.247: 2010                  | KDB 558074                       | Refer Note 1                        | <input type="checkbox"/> |
| <input type="checkbox"/>                                                                                                                                                                                                                          | Maximum Power Spectral Density     | FCC Part 15.247: 2010                  | KDB 558074                       | Refer Note 1                        | <input type="checkbox"/> |
| <input type="checkbox"/>                                                                                                                                                                                                                          | Band Edge Conducted Emissions      | FCC Part 15.247: 2010                  | KDB 558074                       | Refer Note 1                        | <input type="checkbox"/> |
| <input checked="" type="checkbox"/>                                                                                                                                                                                                               | Effective Isotropic Radiated Power | FCC Part 15.247: 2010 and 15.209: 2010 | KDB 412172                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/>                                                                                                                                                                                                               | Spurious Radiated Emissions        | FCC Part 15.247: 2010 and 15.209: 2010 | KDB 558074<br>ANSI C63.10 - 2013 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <b>Note 1:</b> - As part of permissive change testing and recommended by TCB, Only Spurious Radiated Emissions and Effective Isotropic Radiated Power for both FHSS and DTS is performed as there is one RF Switch (Drop-in replacement) changed. |                                    |                                        |                                  |                                     |                          |

**MEASUREMENT UNCERTAINTY**

Where relevant, the following measurement uncertainty levels has been estimated for tests performed on the EUT as specified in CISPR 16-4

The Expanded measurement uncertainty (K=2) is provided below

| # | Name                              | Value |
|---|-----------------------------------|-------|
| 1 | Radiated Spurious Emission < 1GHz | 4.3dB |
| 2 | Radiated Spurious Emission > 1GHz | 5.5dB |

**Decision Rule Applied**

|                                     |                                                                                                                                    |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | <i>Measurement Uncertainty is not accounted while reporting statement of conformity to specification / standard. (shared risk)</i> |
| <input type="checkbox"/>            | <i>Measurement uncertainty is accounted and results reported as per ILAC-G8 guidelines</i>                                         |
|                                     |                                                                                                                                    |

# 1 PRODUCT DETAILS

## PRODUCT OPERATION AND INTENDED USE

The Wireless Pull Station is powered by four CR123A batteries. The module has an LED to indicate the activation and trouble status. The Pull Station will occupy one module address.

## RATINGS AND SYSTEM DETAILS

|                                |                                    |
|--------------------------------|------------------------------------|
| Operating Frequency            | 902MHz to 928MHz                   |
| Number of Channels             | DTS :6                             |
|                                | FHSS :55                           |
| Channel Bandwidth (20dB)       | DTS :1MHz                          |
|                                | FHSS :320KHz                       |
| Transmitted Power              | DTS :12dBm                         |
|                                | FHSS :17dBm                        |
| Modulation Type                | FSK                                |
| Data Rate                      | DTS :300Kbps                       |
|                                | FHSS :150Kbps                      |
| Antenna Type                   | Inverted F Patch Antenna           |
| No. of Antenna                 | 3                                  |
| Antenna Gain                   | ANT 1 :1.75dBi                     |
|                                | ANT 2 :0.08dBi                     |
|                                | ANT 3 :1.90dBi                     |
| Supply Voltage and Current     | 3.3V, 5mA                          |
| Dimensions (Diameter x Height) | 10.72cm x 3.66cm x 14.62cm         |
| Environmental Conditions       | Operating Temperature :0°C to 49°C |
|                                | Storage Temperature: -10°C to 60°C |
|                                | Humidity :10% to 93% RH            |

**TEST CONFIGURATION**

| Config #      | Description                                                                                                                                                                                                                                                                  |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Radiated Test | EUT is Powered from Battery. EUT Debug port (UART) is connected to Laptop through USB to UART converter cable. EUT is configured to the respective operating mode through Hyper Terminal. Test is performed at Antenna 3(Transmitting Antenna) as this is high gain antenna. |

**OPERATING MODES**

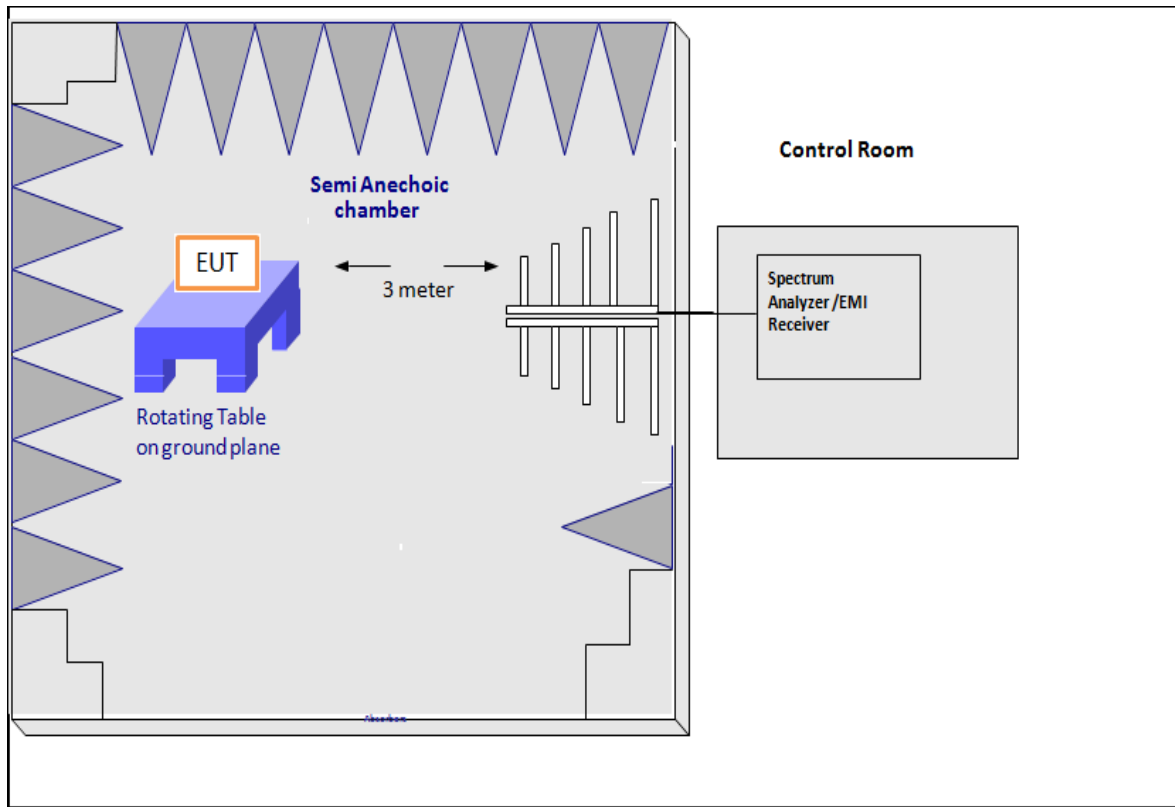
| Mode # | Description                                                                                                                                                                                             |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DTS    | Following DTS channels have been used for Conducted (Continuous Trans mission) and Radiated (Continuous Trans mission) Tests<br>Channel 1: 902.875MHz<br>Channel 4: 915.325MHz<br>Channel 6: 927.125MHz |
| FHSS   | Following FHSS channels have been used for Conducted (Continuous Trans mission) and Radiated (Continuous Trans mission) Tests<br>Channel 1: 903.55MHz<br>Channel 28: 916.00MHz<br>Channel 55: 926.45MHz |

**INPUT AND OUTPUT CABLES**

| Port #                                                                                                                                                                                                  | Name | Port Type | Cable Length | Cable type<br>Shielded/ Unshielded | Comments |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|--------------|------------------------------------|----------|
|                                                                                                                                                                                                         | Nil  |           |              |                                    | Nil      |
|                                                                                                                                                                                                         |      |           |              |                                    |          |
|                                                                                                                                                                                                         |      |           |              |                                    |          |
|                                                                                                                                                                                                         |      |           |              |                                    |          |
|                                                                                                                                                                                                         |      |           |              |                                    |          |
| *Note : AC = AC Power Port      DC = DC Power Port<br>TP = Telecommunication Ports (E.g. Ethernet)      DI / DO = Digital Input / Output<br>N / E = Non Electrical      AI / AO = Analog Input / Output |      |           |              |                                    |          |

**SUPPORT EQUIPMENTS AND ACCESSORIES USED**

| # | Item Description  | Make | Model         | Part No. / Sl. No | Cal Due Date |
|---|-------------------|------|---------------|-------------------|--------------|
| 1 | Laptop            | DELL | Latitude 5490 | 5369273282        | NA           |
| 2 | USB to UART Cable | FTDI | TTL-232R-3V3  | NA                | NA           |

**CONNECTION DIAGRAM AND SETUP DIAGRAM****Radiated Emission Test Setup**

## 2 FHSS CHANNELS

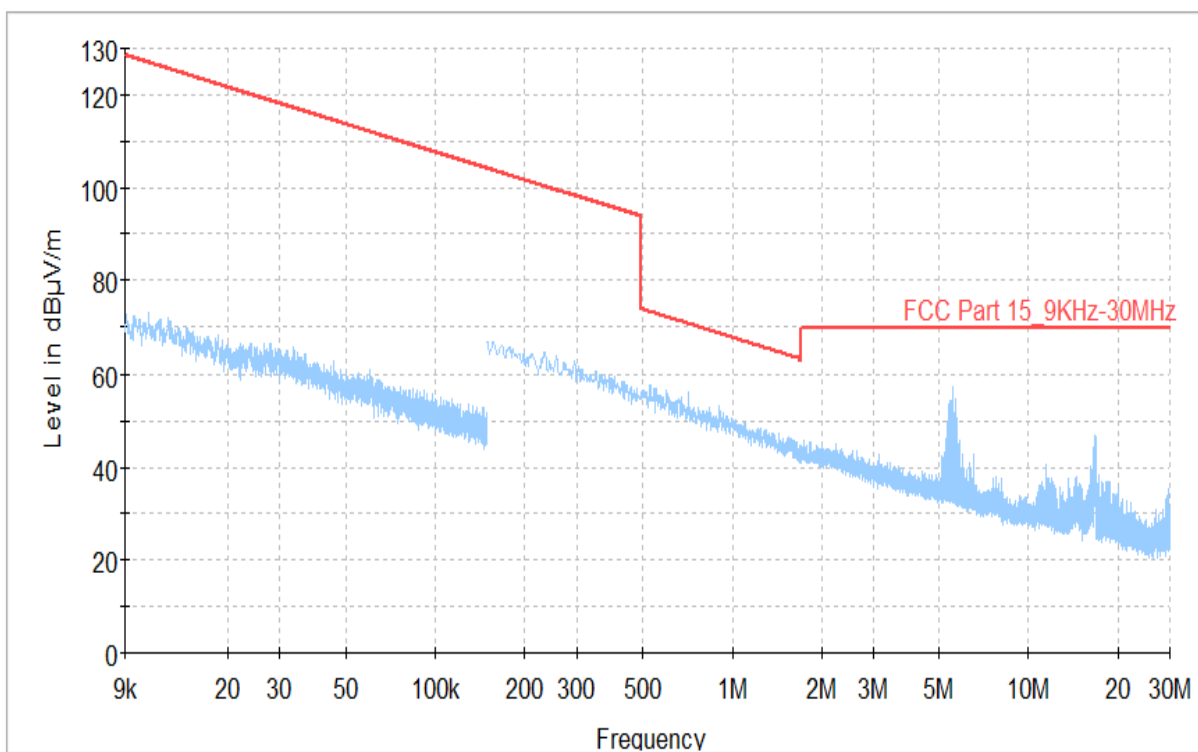
### 2.1 SPURIOUS RADIATED EMISSIONS

|                             |                                       |                      |                                  |
|-----------------------------|---------------------------------------|----------------------|----------------------------------|
| EUT Nomenclature            | Wireless Pull Station                 | Test Report No.      | EMC0421-1                        |
| Model No.                   | NBG-12WL                              | Serial No.           | 104                              |
| Test Start Date             | 14-Dec-2019                           | Temperature (°C)     | 23 ± 2                           |
| Test End Date               | 06-JAN-2020                           | Humidity RH (%)      | 55 ± 3                           |
| Tested By                   | Vinay Gujjar                          | Pressure (mbar)      | NR                               |
| Input Voltage / Freq        | 3.3V, 5mA                             |                      |                                  |
| Operating Mode              | Refer Page 5 Operating Modes Table    |                      |                                  |
| Test configuration          | Refer Page 5 Test Configuration Table |                      |                                  |
| Deviation from Std          | NA                                    |                      |                                  |
| Comment                     | NA                                    |                      |                                  |
| TEST FREQUENCY RANGE        |                                       |                      |                                  |
| Start Frequency             | 9KHz                                  | Stop Frequency       | 10GHz                            |
|                             |                                       |                      |                                  |
| MAXIMUM OPERATING FREQUENCY |                                       |                      |                                  |
| 902MHz to 928MHz            |                                       |                      |                                  |
| TEST PARAMETERS             |                                       |                      |                                  |
| Antenna Height              | 1m to 4m                              | Turntable Rotation   | 0° to 360°                       |
| Applicable standard         | FCC Part 15.247 & 15.209 :2010        | Test Method          | DA 00-705,<br>ANSI C63.10 - 2013 |
| Equipment Class             | NA                                    | Measurement Distance | 3m                               |
|                             |                                       |                      |                                  |

### TEST EQUIPMENT

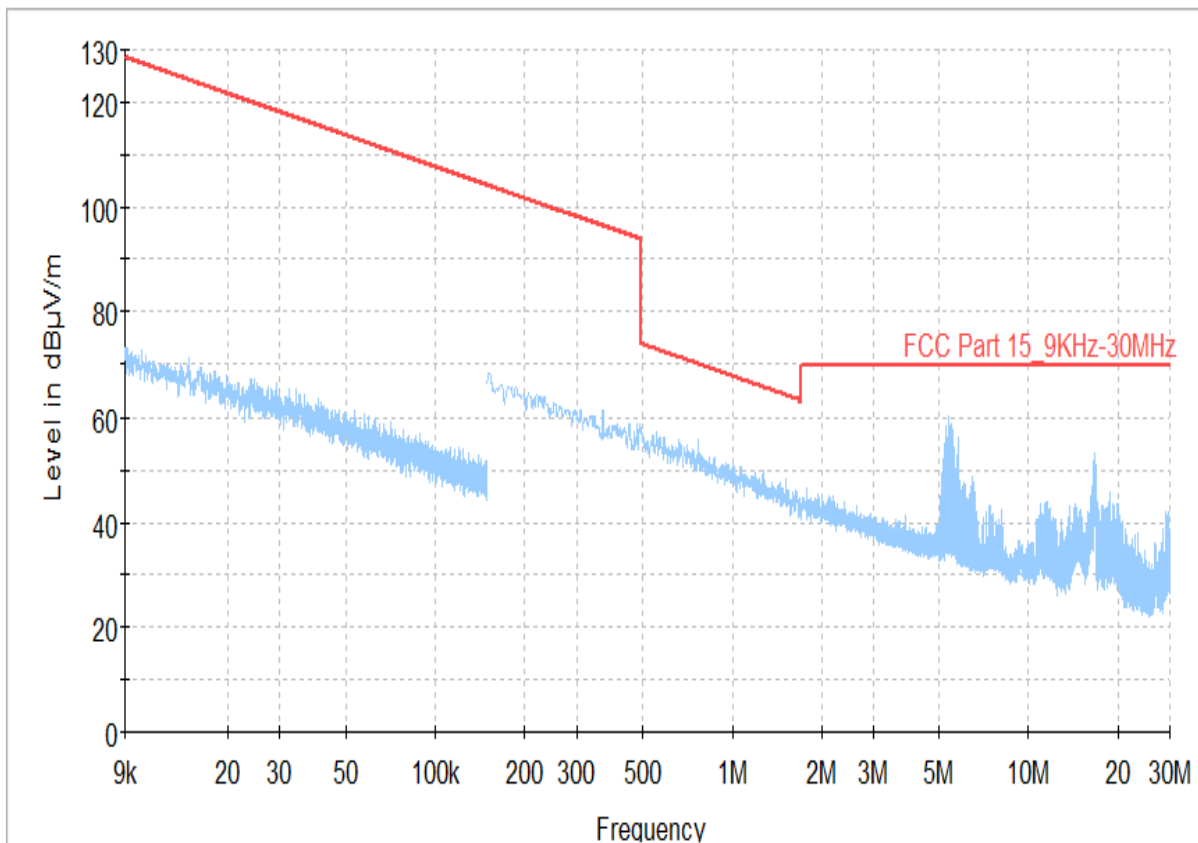
| Y/N                                                                                                                       | Equipment                       | Make         | Model            | Sl. No.      | Cal Due Date |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------|------------------|--------------|--------------|
| Y                                                                                                                         | EMI Test Receiver               | R&S          | ESU26            | 100229       | 7-Aug-20     |
| Y                                                                                                                         | 3m Semi Anechoic Chamber        | ETS Lindgren | DKE 6X7 DBL.DR   | 1625         | 30-Jul-22    |
| Y                                                                                                                         | Double Ridge Guide Horn Antenna | ETS Lindgren | 3117             | 64055        | 1-Nov-21     |
| Y                                                                                                                         | Bilog Antenna                   | ETS Lindgren | HLP3003C         | 130525       | 5-Nov-21     |
| Y                                                                                                                         | Loop Antenna                    | ETS Lindgren | 6507             | 103694       | 15-Nov-21    |
| Y                                                                                                                         | RF cable (9KHz to 18GHz)        | AH Systems   | SAC-18G-06       | RE-03        | 20-Feb-20    |
| Y                                                                                                                         | Signal Conditioning unit        | R&S          | SCU-18           | 10178        | 5-Jun-20     |
| Y                                                                                                                         | High Pass Filter                | Wainwright   | WHKX1.5/15G-12ST | 1            | 24-Feb-20    |
| Y                                                                                                                         | EMC32 Software                  | R&S          | 8.30.0           | 820-OT101248 | NA           |
| Note: Switch ON /OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver |                                 |              |                  |              |              |

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



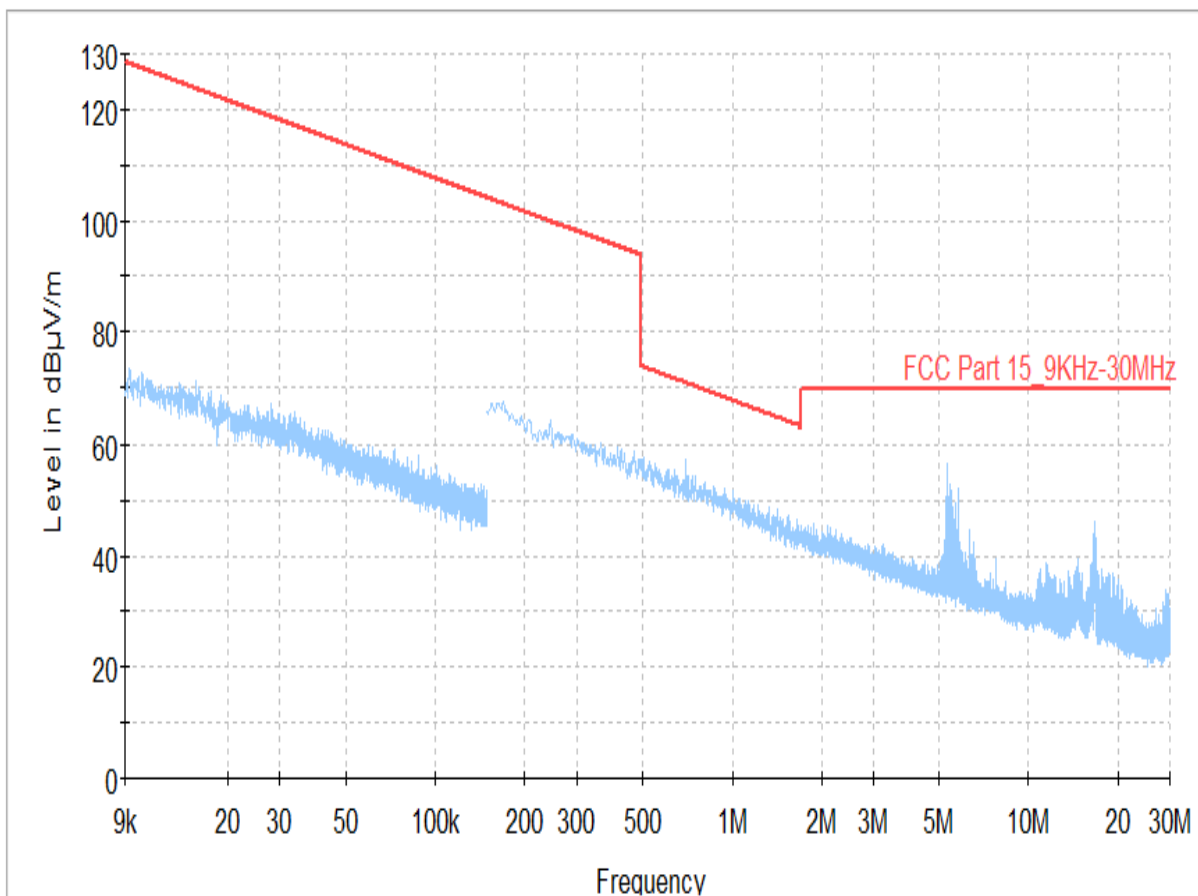
Channel 1 (903.55MHz) – Parallel

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



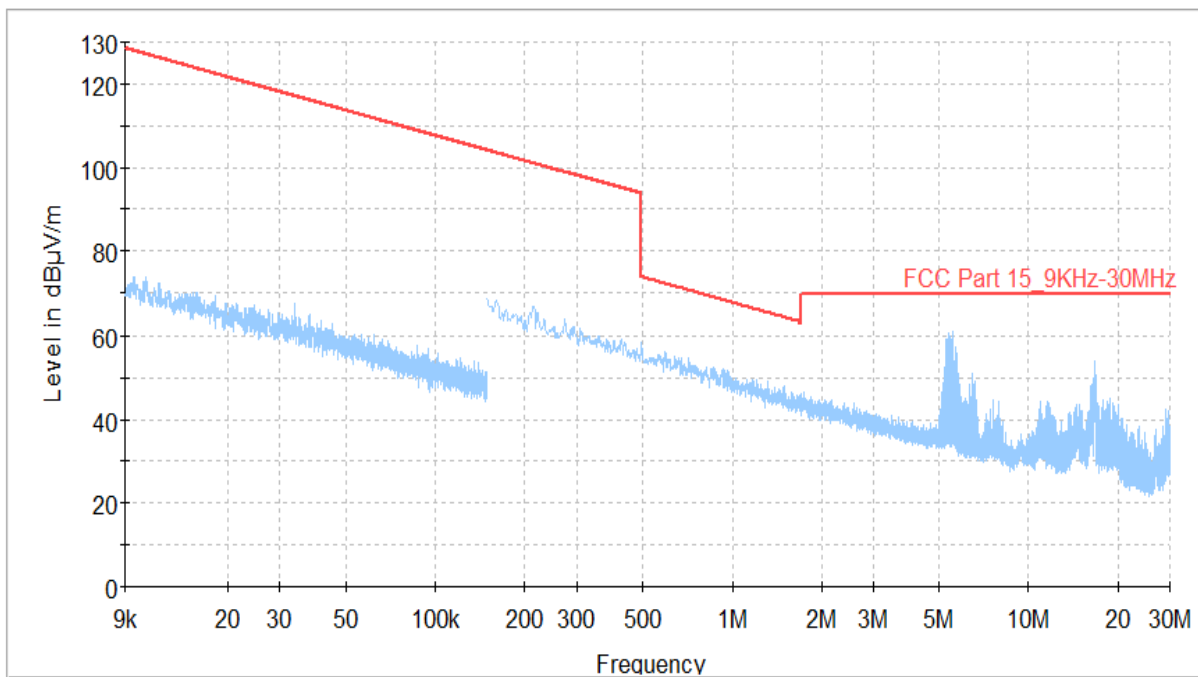
Channel 1 (903.55MHz) – Perpendicular

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



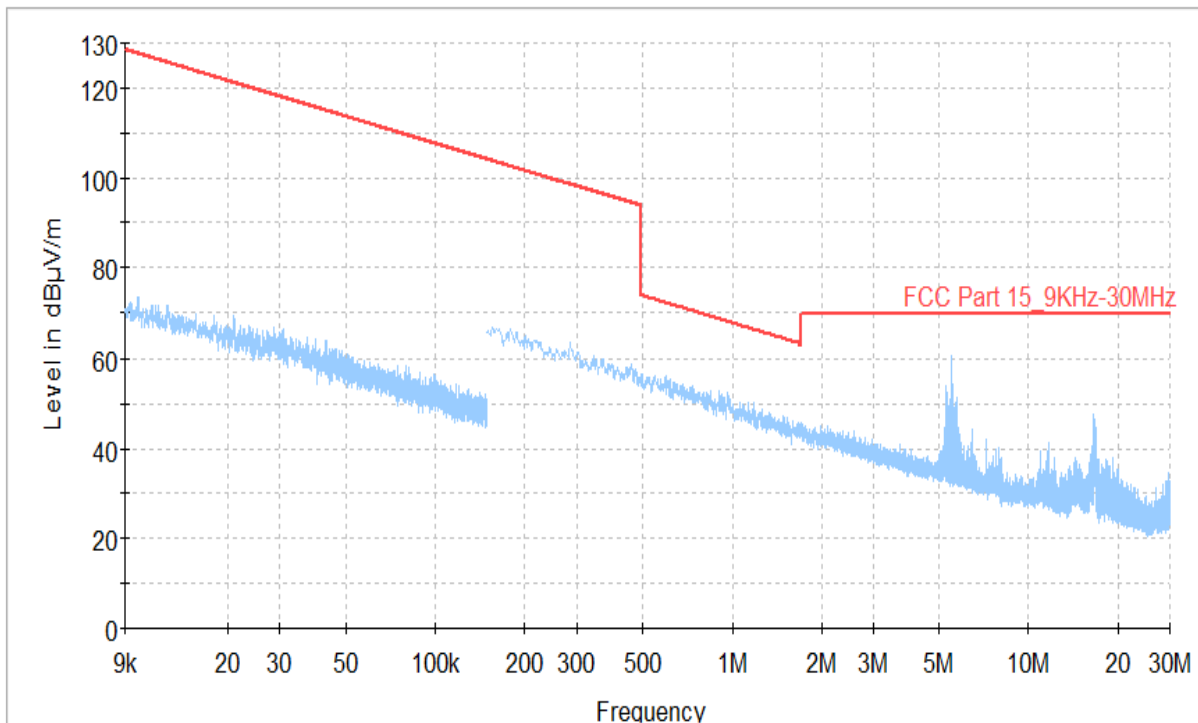
Channel 28 (916 MHz) – Parallel

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



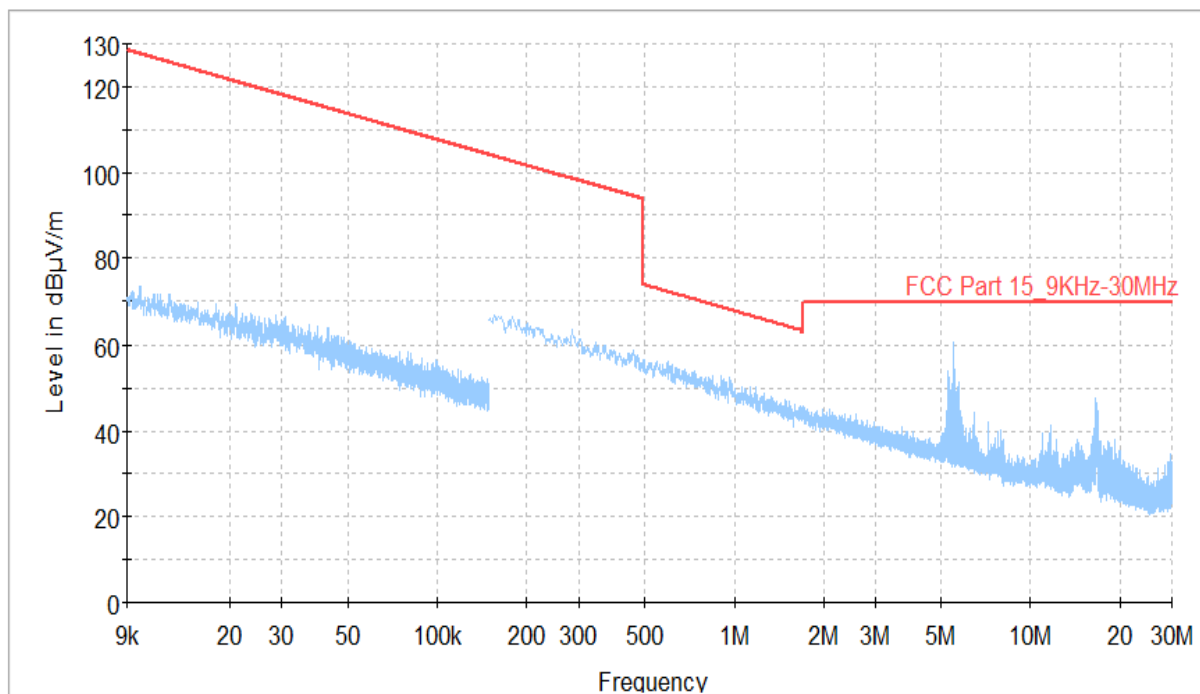
Channel 28 (916 MHz) – Perpendicular

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



Channel 55 (926.45MHz) – Parallel

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)

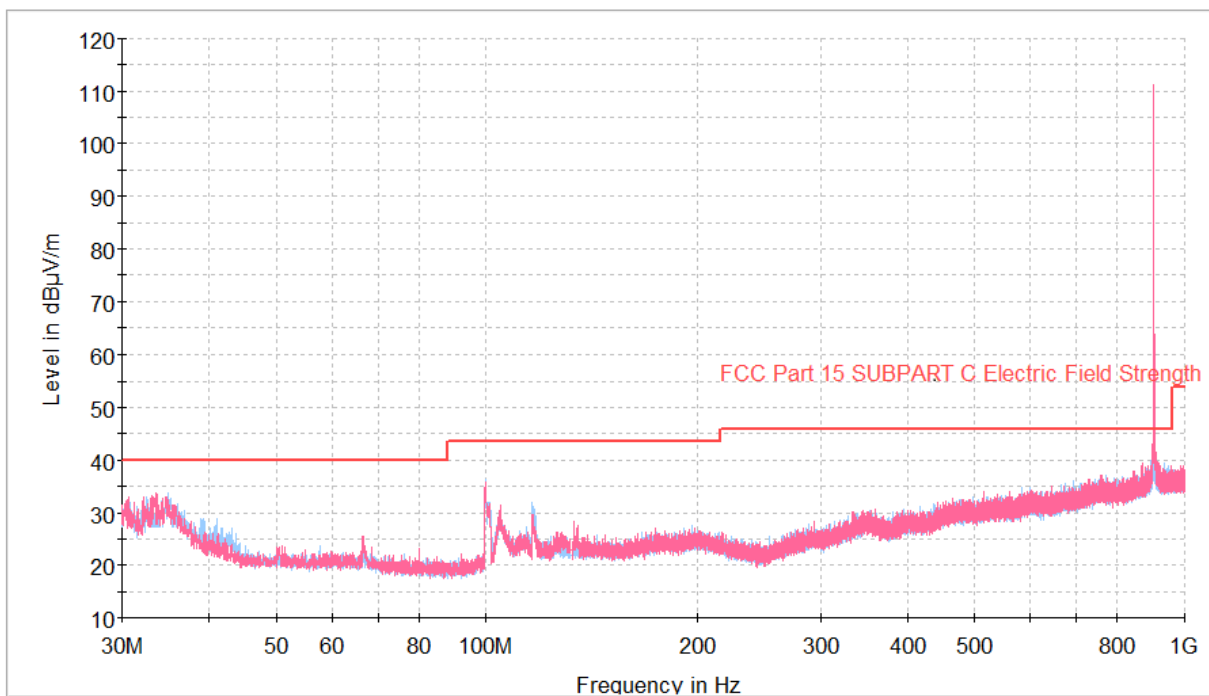


Channel 55 (926.45MHz) – Perpendicular

## TEST RESULT – 9 KHz to 30 MHz

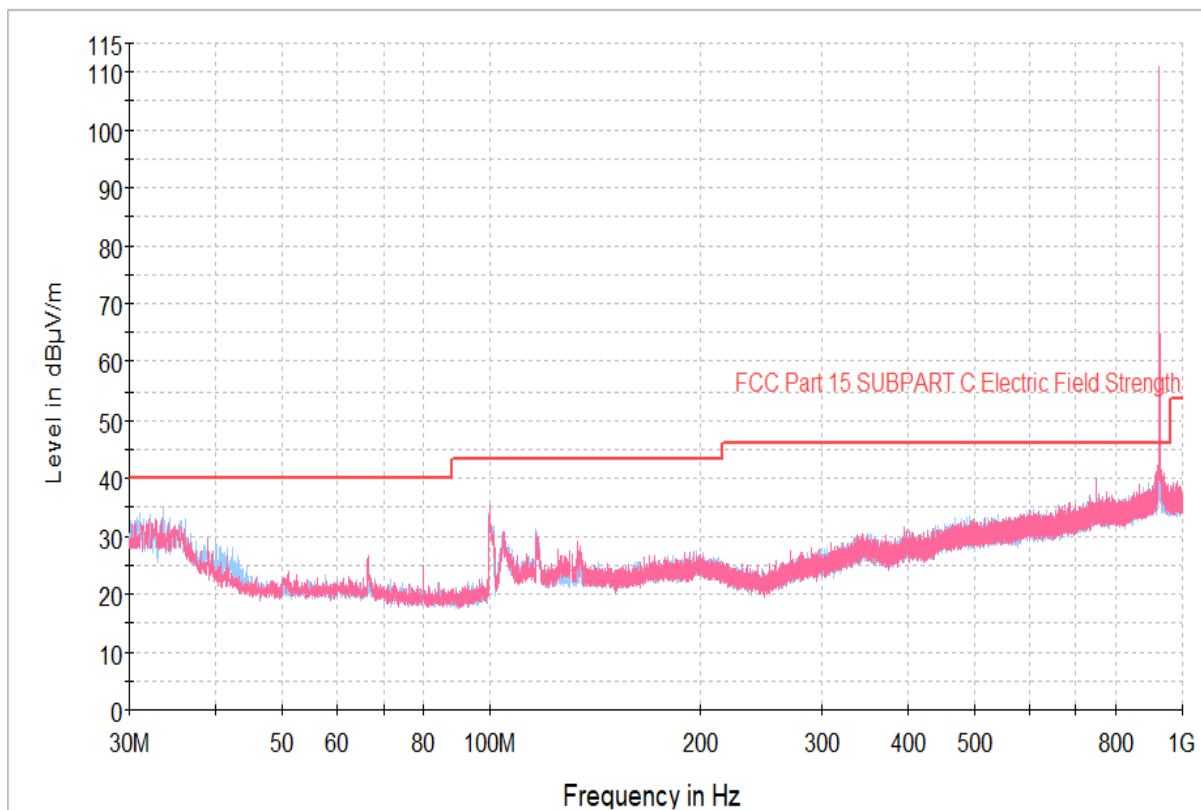
| Channel                                                                                                                     | Channel Frequency | Measured Spurious | Quasi Peak | Height | Ant Pol                  | Azimuth | Margin | Limit @ 3m Distance | Results |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|------------|--------|--------------------------|---------|--------|---------------------|---------|
| #                                                                                                                           | MHz               | MHz               | dBµV/m     | cm     | Parallel / Perpendicular | deg     | dB     | dBµV/m              |         |
| No emissions detected. Emissions shown in the plot are related to the chamber ambient                                       |                   |                   |            |        |                          |         |        |                     |         |
| NOTE: Measured Field Strength –dBuV/m (9 KHz to 1 GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) |                   |                   |            |        |                          |         |        |                     |         |

## TEST GRAPHS – 30MHz to 1GHz (Antenna 3)



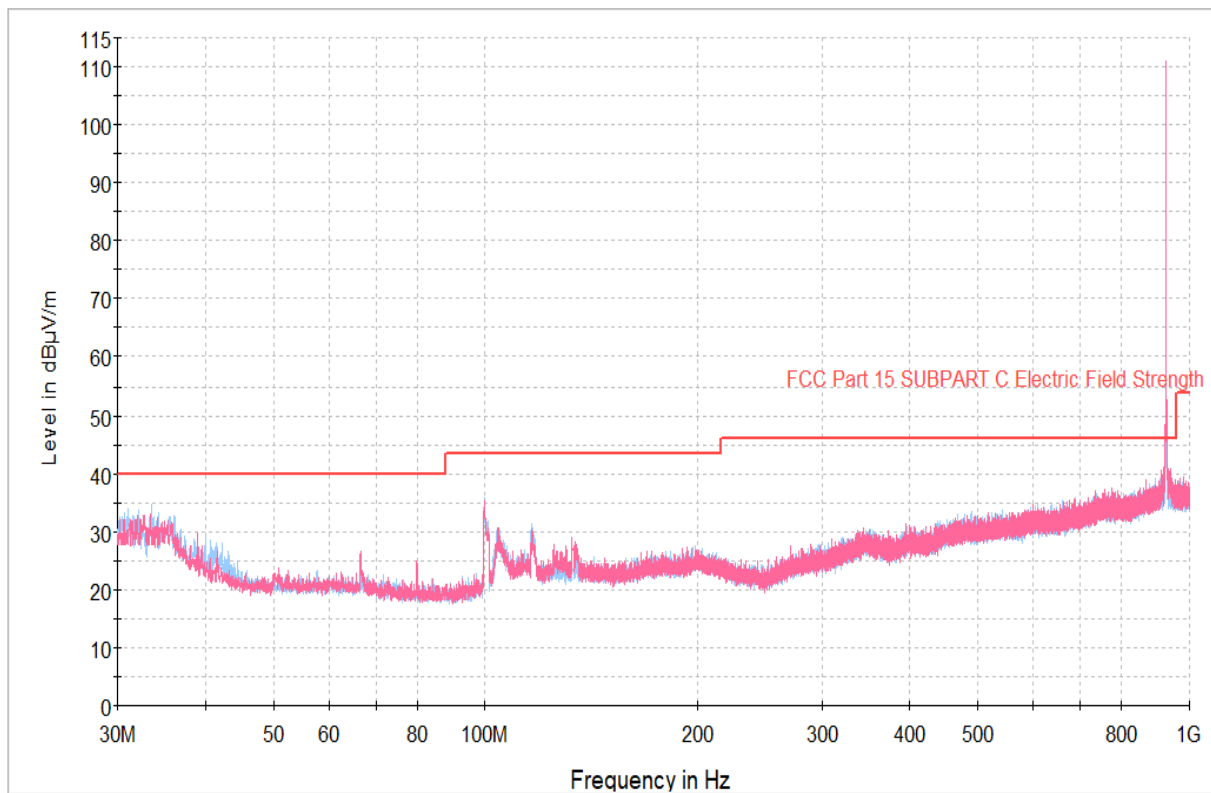
Channel 1 (903.55MHz) – Antenna 3

## TEST GRAPHS – 30MHz to 1GHz (Antenna 3)



Channel 28 (916.0MHz) – Antenna 3

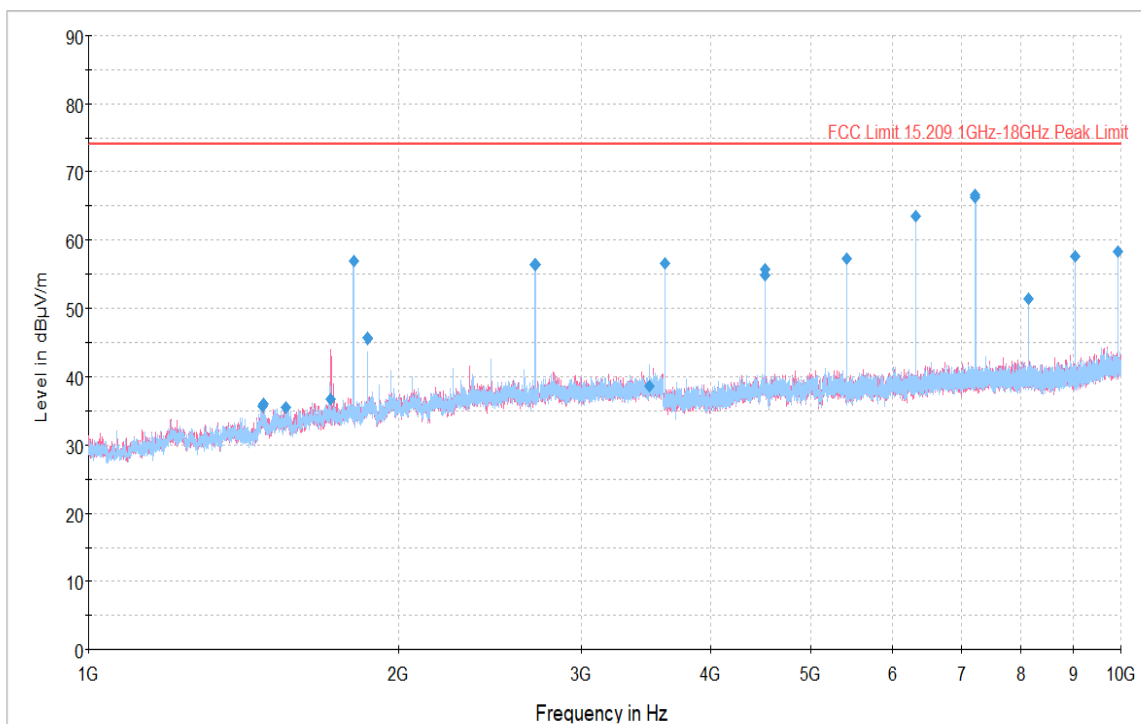
## TEST GRAPHS – 30MHz to 1GHz (Antenna 3)



Channel 55 (926.45MHz) – Antenna 3

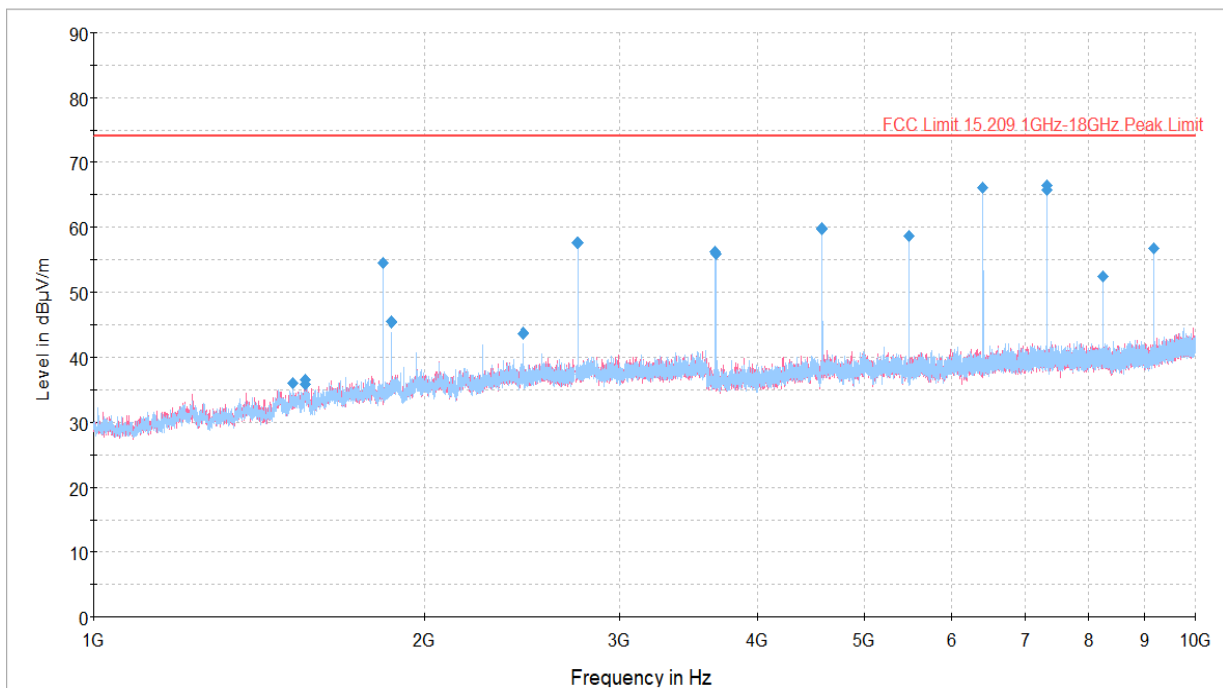
| TEST RESULT – 30MHz to 1GHz                                                                                                 |                   |            |        |         |         |        |                     |                    |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------|------------|--------|---------|---------|--------|---------------------|--------------------|
| Channel                                                                                                                     | Measured Spurious | Quasi Peak | Height | Ant Pol | Azimuth | Margin | Limit @ 3m Distance | Results            |
| #                                                                                                                           | MHz               | dBµV/m     | cm     | H / V   | deg     | dB     | dBµV/m              |                    |
| Antenna – 3                                                                                                                 |                   |            |        |         |         |        |                     |                    |
| CH-1                                                                                                                        | 507.24            | 31.33      | 100    | V       | 33      | 14.67  | 46                  | Pass               |
| CH-1                                                                                                                        | 520.43            | 31.69      | 300    | V       | 347     | 14.31  | 46                  | Pass               |
| CH-1                                                                                                                        | 520.82            | 31.74      | 100    | H       | 19      | 14.26  | 46                  | Pass               |
| CH-1                                                                                                                        | 679.32            | 34.91      | 100    | V       | 57      | 11.09  | 46                  | Pass               |
| CH-1                                                                                                                        | 682.23            | 35.01      | 200    | V       | 69      | 10.99  | 46                  | Pass               |
| CH-1                                                                                                                        | 696.39            | 35.29      | 200    | V       | 321     | 10.71  | 46                  | Pass               |
| CH-1                                                                                                                        | 736.16            | 36.31      | 200    | H       | 192     | 9.69   | 46                  | Pass               |
| CH-1                                                                                                                        | 826.18            | 37.1       | 300    | H       | 236     | 8.9    | 46                  | Pass               |
| CH-1                                                                                                                        | 903.55            | 111.11     | 100    | V       | 94      | -      | -                   | Intended Frequency |
| CH-28                                                                                                                       | 623.83            | 34.42      | 400    | H       | 186     | 11.58  | 46                  | Pass               |
| CH-28                                                                                                                       | 687.27            | 35.24      | 400    | H       | 110     | 10.76  | 46                  | Pass               |
| CH-28                                                                                                                       | 696.58            | 35.42      | 400    | V       | 123     | 10.58  | 46                  | Pass               |
| CH-28                                                                                                                       | 750.13            | 40.06      | 300    | V       | 71      | 5.94   | 46                  | Pass               |
| CH-28                                                                                                                       | 838.01            | 37.48      | 200    | H       | 180     | 8.52   | 46                  | Pass               |
| CH-28                                                                                                                       | 838.59            | 37.46      | 200    | H       | 236     | 8.54   | 46                  | Pass               |
| CH-28                                                                                                                       | 916.39            | 109.74     | 100    | V       | 38      | -      | -                   | Intended Frequency |
| CH-55                                                                                                                       | 685.53            | 35.11      | 400    | H       | 226     | 10.89  | 46                  | Pass               |
| CH-55                                                                                                                       | 696.97            | 35.38      | 400    | V       | 14      | 10.62  | 46                  | Pass               |
| CH-55                                                                                                                       | 699.49            | 35.57      | 200    | H       | 290     | 10.43  | 46                  | Pass               |
| CH-55                                                                                                                       | 837.82            | 37.67      | 300    | H       | 116     | 8.33   | 46                  | Pass               |
| CH-55                                                                                                                       | 838.59            | 37.64      | 100    | V       | 19      | 8.36   | 46                  | Pass               |
| CH-55                                                                                                                       | 845.96            | 37.74      | 100    | V       | 149     | 8.26   | 46                  | Pass               |
| CH-55                                                                                                                       | 926.45            | 110.93     | 100    | V       | 116     | -      | -                   | Intended Frequency |
| NOTE: Measured Field Strength –dBµV/m (9 KHz to 1 GHz) = Receiver Readings (dBµV) + Antenna Factor (dB/m) + Cable loss (dB) |                   |            |        |         |         |        |                     |                    |

## TEST GRAPHS – 1GHz to 10GHz (Antenna 3)



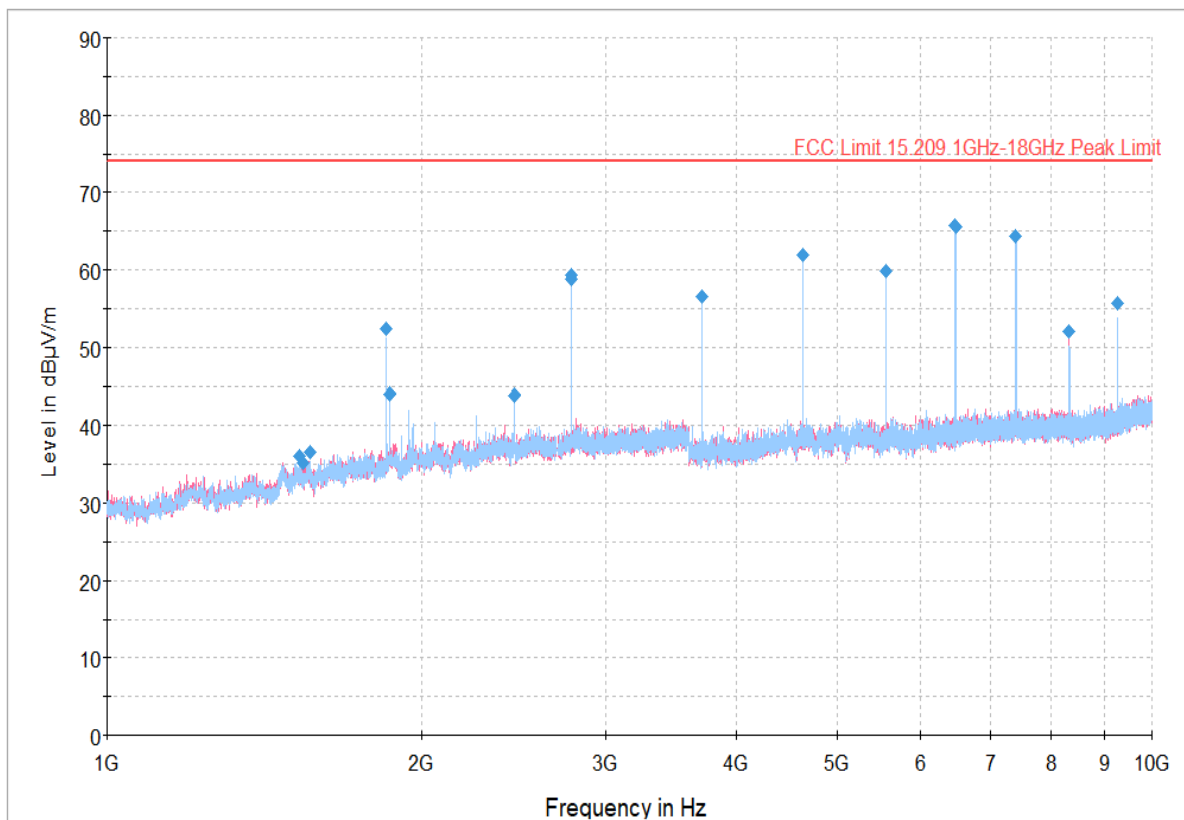
Channel 1 (903.55MHz) – Antenna 3

## TEST GRAPHS – 1GHz to 10GHz (Antenna 3)



Channel 28 (916.0MHz) – Antenna 3

## TEST GRAPHS – 1GHz to 10GHz (Antenna 3)



Channel 55 (926.45MHz) – Antenna 3

| TEST RESULT – 1 GHz to 10 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |                              |        |         |         | RESTRICTED BAND – PEAK & AVERAGE |        |                            |               |                |        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------|--------|---------|---------|----------------------------------|--------|----------------------------|---------------|----------------|--------|
| Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Frequency | Measured Field Strength Peak | Height | Ant Pol | Azimuth | Peak                             | Peak   | Calculated Average Reading | Average Limit | Average Margin | Result |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                              |        |         |         | Margin                           | Limit  | [Peak – Duty cycle]        |               |                |        |
| #                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MHz       | dBμV/m                       | cm     | H / V   | deg     | dB                               | dBμV/m | dBμV/m                     | dBμV/m        | dBμV/m         |        |
| Antenna – 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                              |        |         |         |                                  |        |                            |               |                |        |
| CH-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2710.32   | 56.32                        | 100    | H       | 187     | 17.68                            | 74     | 38.25                      | 54            | 15.75          | PASS   |
| CH-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3614.50   | 56.47                        | 200    | H       | 201     | 17.53                            | 74     | 38.4                       | 54            | 15.6           | PASS   |
| CH-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4517.07   | 54.84                        | 300    | H       | 144     | 19.16                            | 74     | 36.77                      | 54            | 17.23          | PASS   |
| CH-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4517.71   | 55.68                        | 300    | H       | 144     | 18.32                            | 74     | 37.61                      | 54            | 16.39          | PASS   |
| CH-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5421.25   | 57.23                        | 200    | H       | 133     | 16.77                            | 74     | 39.16                      | 54            | 14.84          | PASS   |
| CH-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 8132.82   | 51.33                        | 300    | H       | 272     | 22.67                            | 74     | 33.26                      | 54            | 20.74          | PASS   |
| CH-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 9035.39   | 57.57                        | 300    | H       | 266     | 16.43                            | 74     | 39.5                       | 54            | 14.5           | PASS   |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2748.89   | 57.57                        | 100    | H       | 198     | 16.43                            | 74     | 39.5                       | 54            | 14.5           | PASS   |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3664.96   | 56.26                        | 200    | H       | 198     | 17.74                            | 74     | 38.19                      | 54            | 15.81          | PASS   |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3665.61   | 55.77                        | 200    | H       | 175     | 18.23                            | 74     | 37.7                       | 54            | 16.3           | PASS   |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4581.36   | 59.74                        | 300    | H       | 124     | 14.26                            | 74     | 41.67                      | 54            | 12.33          | PASS   |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4582.00   | 59.66                        | 400    | H       | 112     | 14.34                            | 74     | 41.59                      | 54            | 12.41          | PASS   |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 7330.21   | 66.45                        | 200    | H       | 136     | 7.55                             | 74     | 48.38                      | 54            | 5.62           | PASS   |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 7331.18   | 65.66                        | 200    | H       | 131     | 8.34                             | 74     | 47.59                      | 54            | 6.41           | PASS   |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 8247.25   | 52.31                        | 300    | H       | 281     | 21.69                            | 74     | 34.24                      | 54            | 19.76          | PASS   |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 9163.96   | 56.71                        | 300    | H       | 260     | 17.29                            | 74     | 38.64                      | 54            | 15.36          | PASS   |
| CH-55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2777.82   | 58.77                        | 300    | H       | 176     | 15.23                            | 74     | 40.7                       | 54            | 13.3           | PASS   |
| CH-55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2778.46   | 59.3                         | 300    | H       | 193     | 14.7                             | 74     | 41.23                      | 54            | 12.77          | PASS   |
| CH-55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3704.18   | 56.47                        | 200    | H       | 201     | 17.53                            | 74     | 38.4                       | 54            | 15.6           | PASS   |
| CH-55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4630.21   | 61.83                        | 200    | H       | 154     | 12.17                            | 74     | 43.76                      | 54            | 10.24          | PASS   |
| CH-55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4630.86   | 61.87                        | 300    | H       | 150     | 12.13                            | 74     | 43.8                       | 54            | 10.2           | PASS   |
| CH-55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 7408.00   | 64.3                         | 200    | H       | 138     | 9.7                              | 74     | 46.23                      | 55            | 8.77           | PASS   |
| CH-55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 8335.00   | 51.94                        | 300    | H       | 277     | 22.06                            | 74     | 33.87                      | 56            | 22.13          | PASS   |
| CH-55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 9262.00   | 55.6                         | 300    | H       | 261     | 18.4                             | 74     | 37.53                      | 57            | 19.47          | PASS   |
| <p>Note :</p> <p>Measured Field Strength –Peak dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss – Ext. Pre amplifier Gain (dB)</p> <p>Cal. Average Readings(dBuV/m) =Measured Peak(dBuV/m)-Duty Cycle Correction Factor(dB)</p> <p>Duty Cycle Correction Factor is calculated using the guidelines provided in DA 00-705</p> <p>Duty Cycle Factor =20*log (Dwell time /100msec) , Number of Transmission for 100msec: 8, Dwell time per Transmission: 1.55msec</p> <p>Duty Cycle correction Factor =20 log (1.55*8/100) = -18.07dB</p> |           |                              |        |         |         |                                  |        |                            |               |                |        |

| TEST RESULT – 1 GHz to 10 GHz                                                                                                                                    |                      |                   |                   |        |         |         | NON- RESTRICTED BAND - PEAK |        |         |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|-------------------|--------|---------|---------|-----------------------------|--------|---------|------|
| Channel                                                                                                                                                          | Measured Fundamental | Spurious Emission | Measured Harmonic | Height | Ant Pol | Azimuth | Limit                       | Margin | Results |      |
|                                                                                                                                                                  |                      |                   |                   |        |         |         | [Fundamental – 20 dB]       |        |         |      |
| #                                                                                                                                                                | dBµV/m               | MHz               | dBµV/m            | cm     | H / V   | deg     | dBuV/m                      | dB     |         |      |
| Antenna – 3                                                                                                                                                      |                      |                   |                   |        |         |         |                             |        |         |      |
| CH-1                                                                                                                                                             | 111.11               | 1806.79           | 56.81             | 100    | H       | 208     | 91.11                       | 34.3   |         | PASS |
| CH-1                                                                                                                                                             | 111.11               | 1865.29           | 45.55             | 400    | H       | 223     | 91.11                       | 45.56  | PASS    |      |
| CH-1                                                                                                                                                             | 111.11               | 3488.82           | 38.6              | 400    | H       | 8       | 91.11                       | 52.51  | PASS    |      |
| CH-1                                                                                                                                                             | 111.11               | 6325.43           | 63.55             | 200    | H       | 117     | 91.11                       | 27.56  | PASS    |      |
| CH-1                                                                                                                                                             | 111.11               | 7227.68           | 66.66             | 200    | H       | 127     | 91.11                       | 24.45  | PASS    |      |
| CH-1                                                                                                                                                             | 111.11               | 7228.32           | 66.29             | 300    | H       | 113     | 91.11                       | 24.82  | PASS    |      |
| CH-1                                                                                                                                                             | 111.11               | 9939.89           | 58.33             | 400    | H       | 266     | 91.11                       | 32.78  | PASS    |      |
| CH-28                                                                                                                                                            | 109.74               | 1832.50           | 54.5              | 200    | H       | 190     | 89.74                       | 35.24  | PASS    |      |
| CH-28                                                                                                                                                            | 109.74               | 1865.61           | 45.39             | 400    | H       | 122     | 89.74                       | 44.35  | PASS    |      |
| CH-28                                                                                                                                                            | 109.74               | 2454.14           | 43.74             | 400    | H       | 224     | 89.74                       | 46     | PASS    |      |
| CH-28                                                                                                                                                            | 109.74               | 5498.07           | 58.6              | 200    | H       | 141     | 89.74                       | 31.14  | PASS    |      |
| CH-28                                                                                                                                                            | 109.74               | 6415.11           | 65.99             | 200    | H       | 126     | 89.74                       | 23.75  | PASS    |      |
| CH-55                                                                                                                                                            | 110.93               | 1852.11           | 52.29             | 200    | H       | 201     | 90.93                       | 38.64  | PASS    |      |
| CH-55                                                                                                                                                            | 110.93               | 1864.96           | 44.06             | 400    | H       | 255     | 90.93                       | 46.87  | PASS    |      |
| CH-55                                                                                                                                                            | 110.93               | 2454.79           | 43.83             | 400    | H       | 180     | 90.93                       | 47.1   | PASS    |      |
| CH-55                                                                                                                                                            | 110.93               | 5556.89           | 59.86             | 200    | H       | 150     | 90.93                       | 31.07  | PASS    |      |
| CH-55                                                                                                                                                            | 110.93               | 6481.96           | 65.72             | 200    | H       | 133     | 90.93                       | 25.21  | PASS    |      |
| CH-55                                                                                                                                                            | 110.93               | 6482.93           | 65.62             | 200    | H       | 117     | 90.93                       | 25.31  | PASS    |      |
| <u>Note :</u>                                                                                                                                                    |                      |                   |                   |        |         |         |                             |        |         |      |
| Measured Harmonic Field Strength (dBuV/m) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB) |                      |                   |                   |        |         |         |                             |        |         |      |

## 2.2 EFFECTIVE ISOTROPIC RADIATED POWER

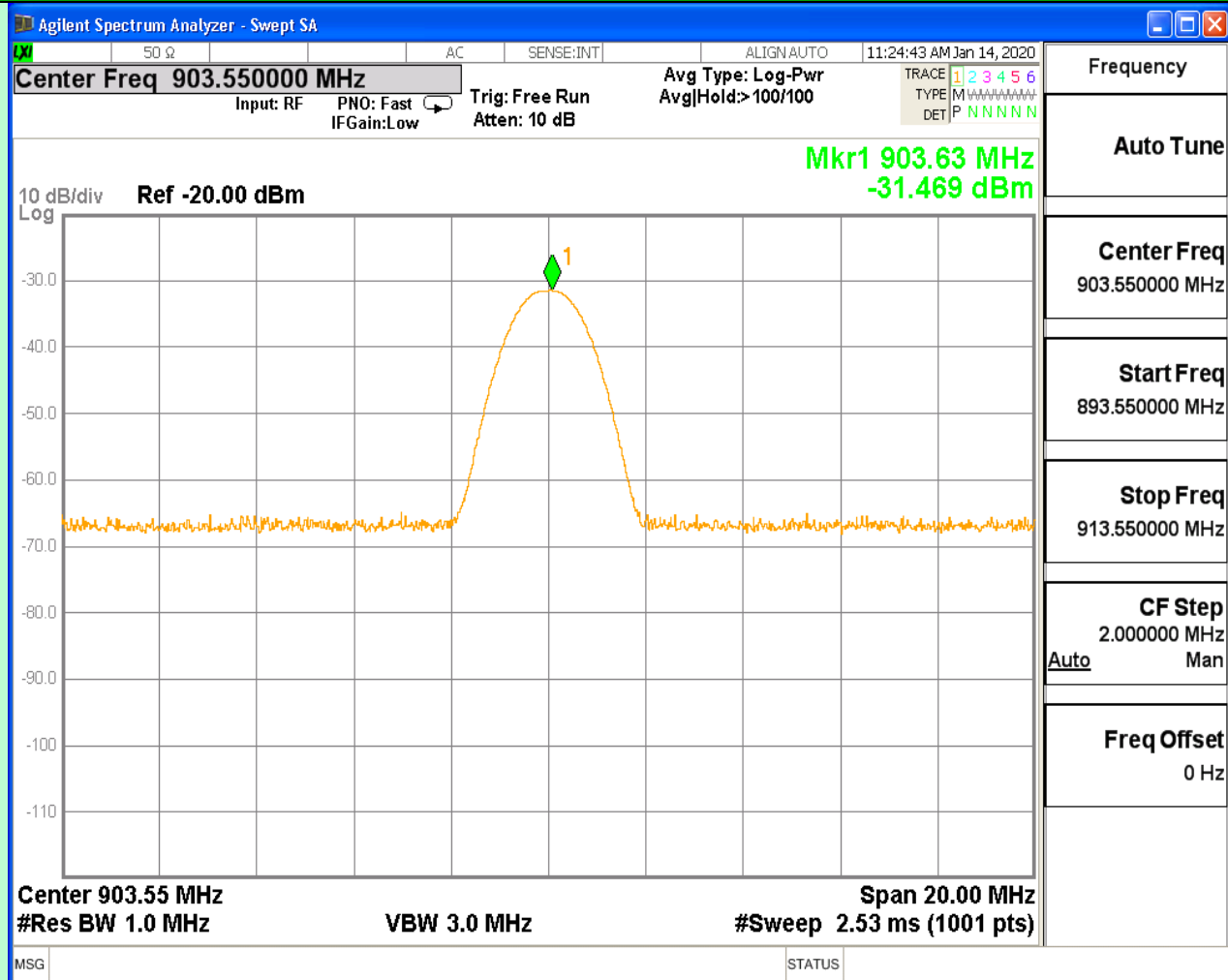
|                             |                                                                                 |                             |            |
|-----------------------------|---------------------------------------------------------------------------------|-----------------------------|------------|
| <b>EUT Nomenclature</b>     | Wireless Pull Station                                                           | <b>Test Request No.</b>     | EMC0421-1  |
| <b>Model No.</b>            | NBG-12WL                                                                        | <b>Serial No.</b>           | 104        |
| <b>Test Start Date</b>      | 14-Dec-2019                                                                     | <b>Temperature (°C)</b>     | 23 ± 2     |
| <b>Test End Date</b>        | 06-Jan-2020                                                                     | <b>Humidity RH (%)</b>      | 55 ± 3     |
| <b>Tested By</b>            | Vinay Gujjar                                                                    | <b>Pressure (mbar)</b>      | NR         |
| <b>Input Voltage / Freq</b> | 3.3V, 5mA                                                                       |                             |            |
| <b>Operating Mode</b>       | Refer Page 5 for Operating Mode Table                                           |                             |            |
| <b>Test configuration</b>   | Refer Page 5 for Test Configuration Table                                       |                             |            |
| <b>Deviation from Std</b>   | NA                                                                              |                             |            |
| <b>Applicable standard</b>  | FCC Part 15.247: 2010 & 15.209 :2010                                            |                             |            |
| <b>Test Method</b>          | KDB 412172                                                                      |                             |            |
| <b>Comment</b>              | NA                                                                              |                             |            |
| <b>TEST DETAILS</b>         |                                                                                 |                             |            |
| <b>Method</b>               | <input checked="" type="checkbox"/> Radiated <input type="checkbox"/> Conducted |                             |            |
| <b>TEST PARAMETERS</b>      |                                                                                 |                             |            |
| <b>Antenna Height</b>       | 1m to 4m                                                                        | <b>Turntable Rotation</b>   | 0° to 360° |
| <b>Equipment Class</b>      | NA                                                                              | <b>Measurement Distance</b> | 3m         |

## TEST EQUIPMENT

| Y/N | Equipment                | Make         | Model          | Sl. No. | Cal Due Date |
|-----|--------------------------|--------------|----------------|---------|--------------|
| Y   | EMI Test Receiver        | R&S          | ESU26          | 100525  | 7-Aug-20     |
| Y   | 3m Semi Anechoic Chamber | ETS Lindgren | DKE 6X7 DBL.DR | 1625    | 30-Jul-22    |
| Y   | Bilog Antenna            | ETS Lindgren | HLP3003C       | 130525  | 5-Nov-21     |
| Y   | RF cable (9KHz to 1GHz)  | AH System    | SAC-18G-06     | RE-03   | 20-Feb-20    |

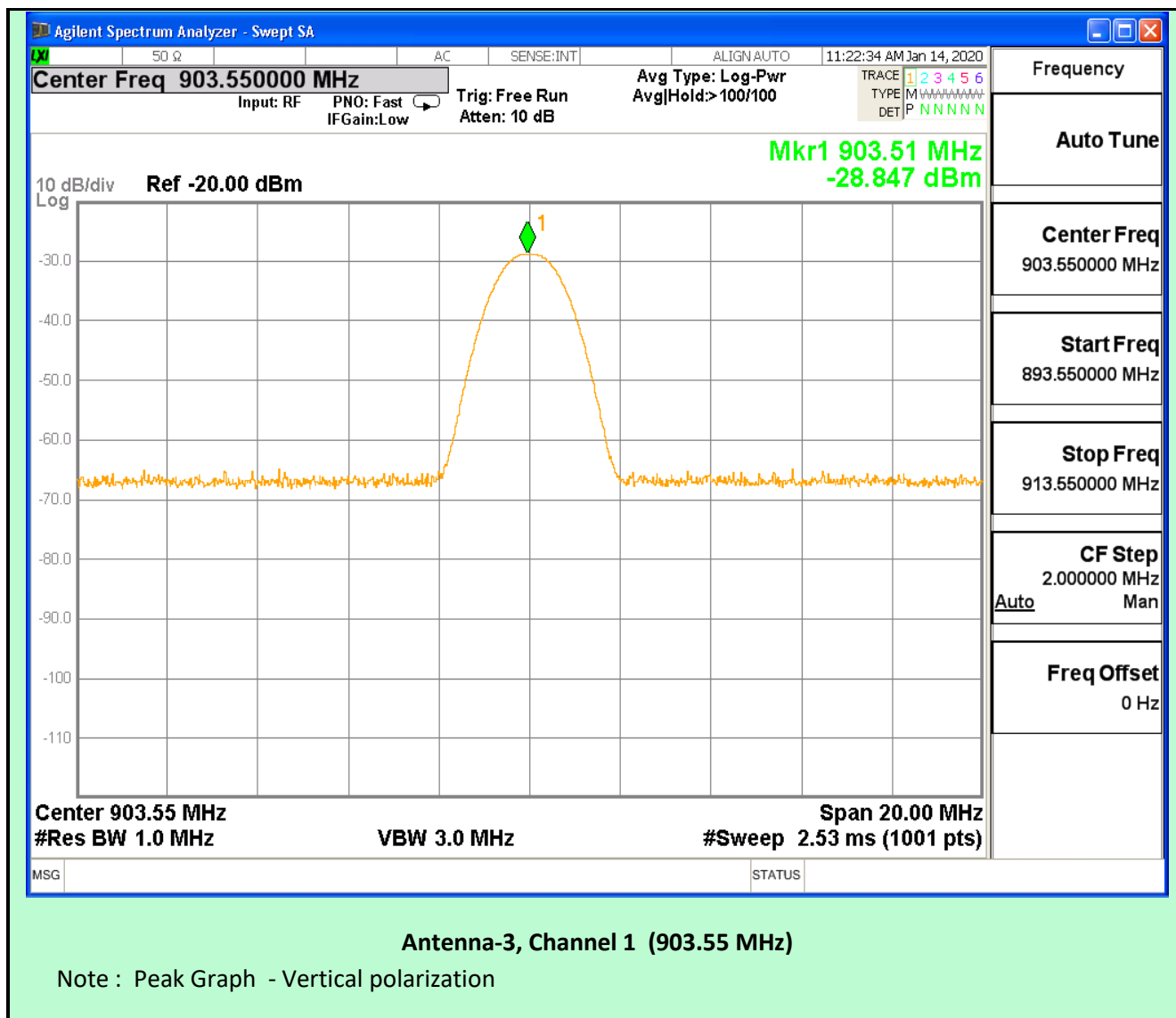
Note: Switch ON /OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

## TEST GRAPHS – EIRP

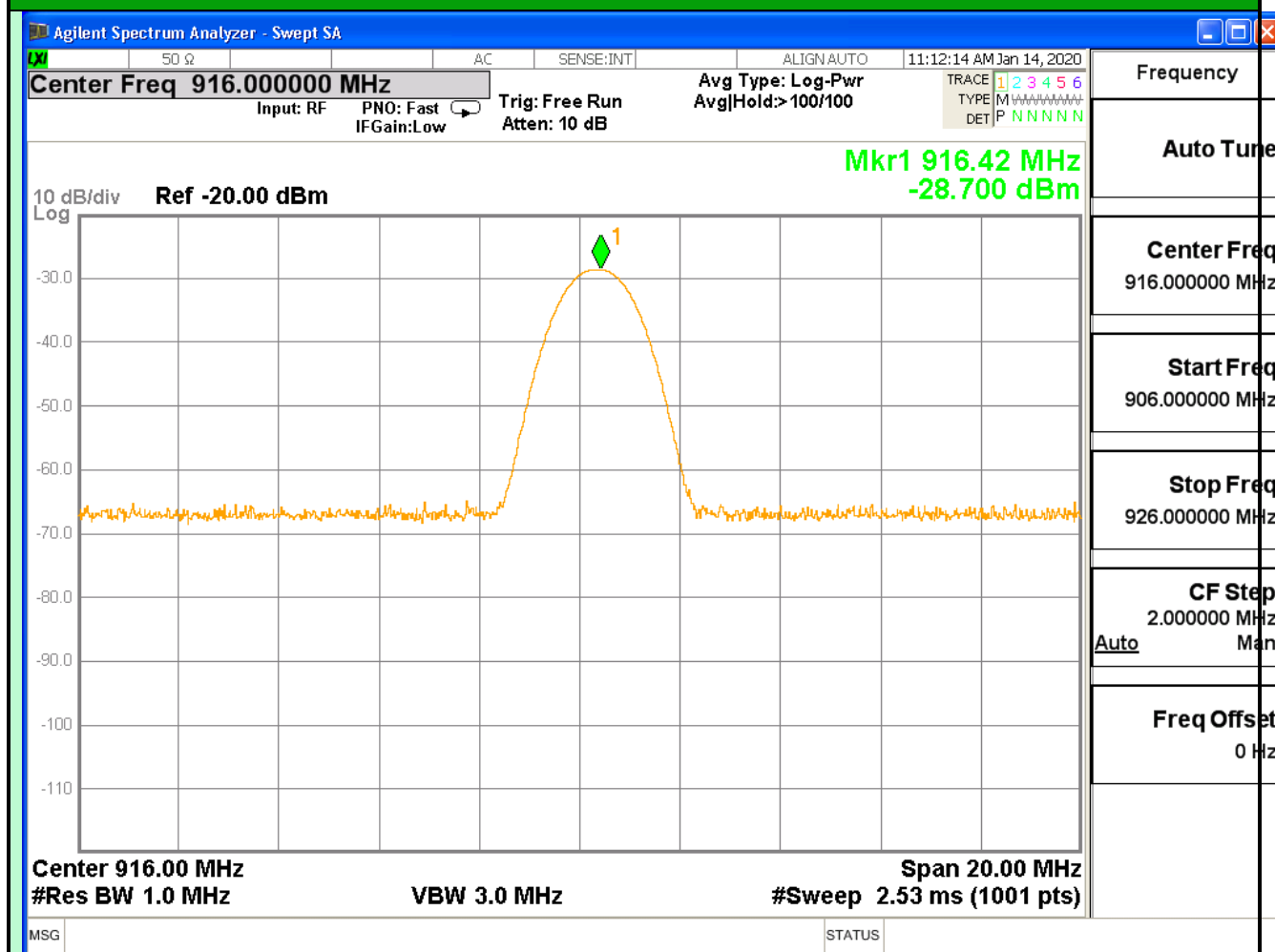


Antenna-3, Channel 1 (903.55 MHz)

Note : Peak Graph - Horizontal polarization

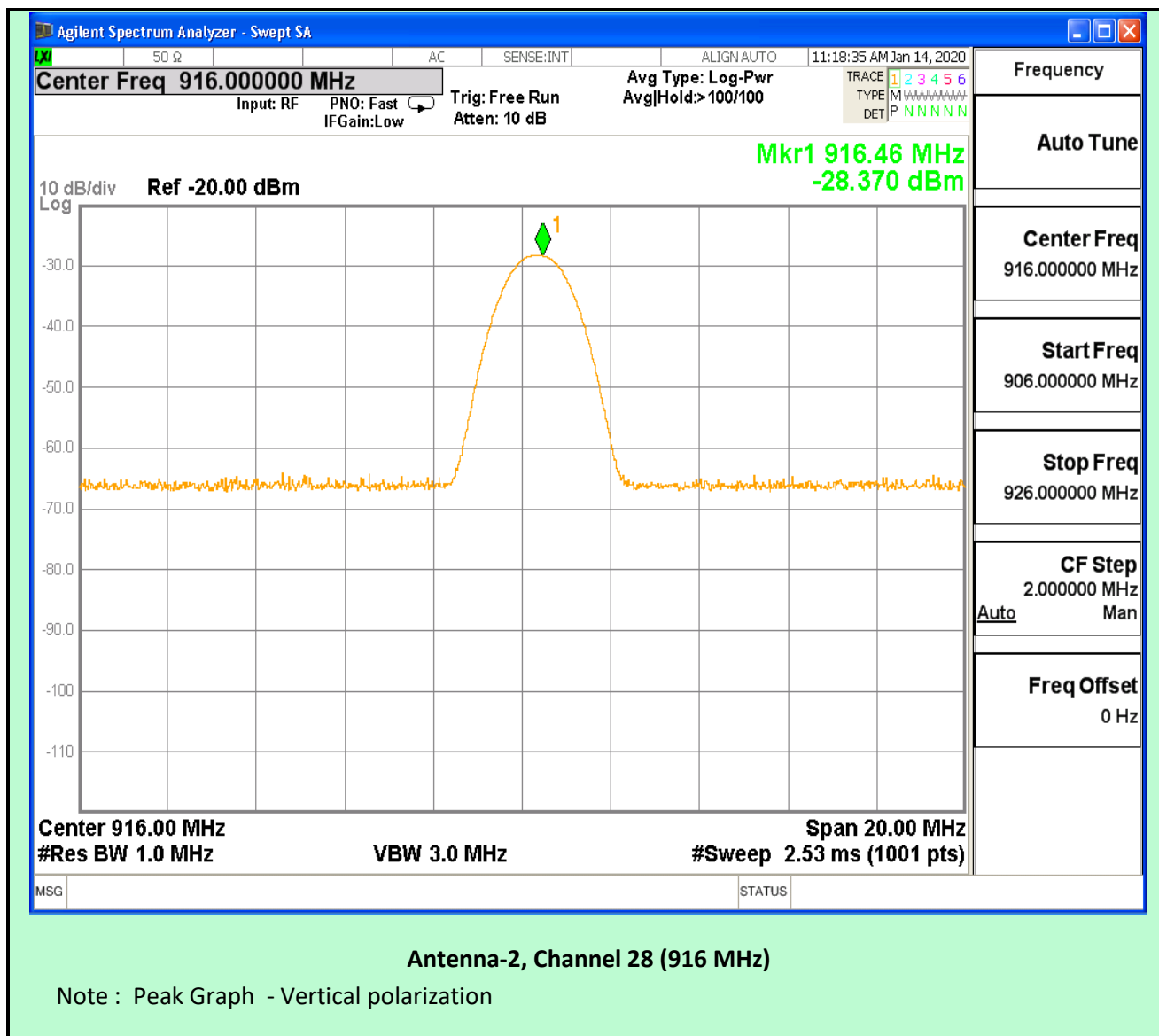


## TEST GRAPHS – EIRP

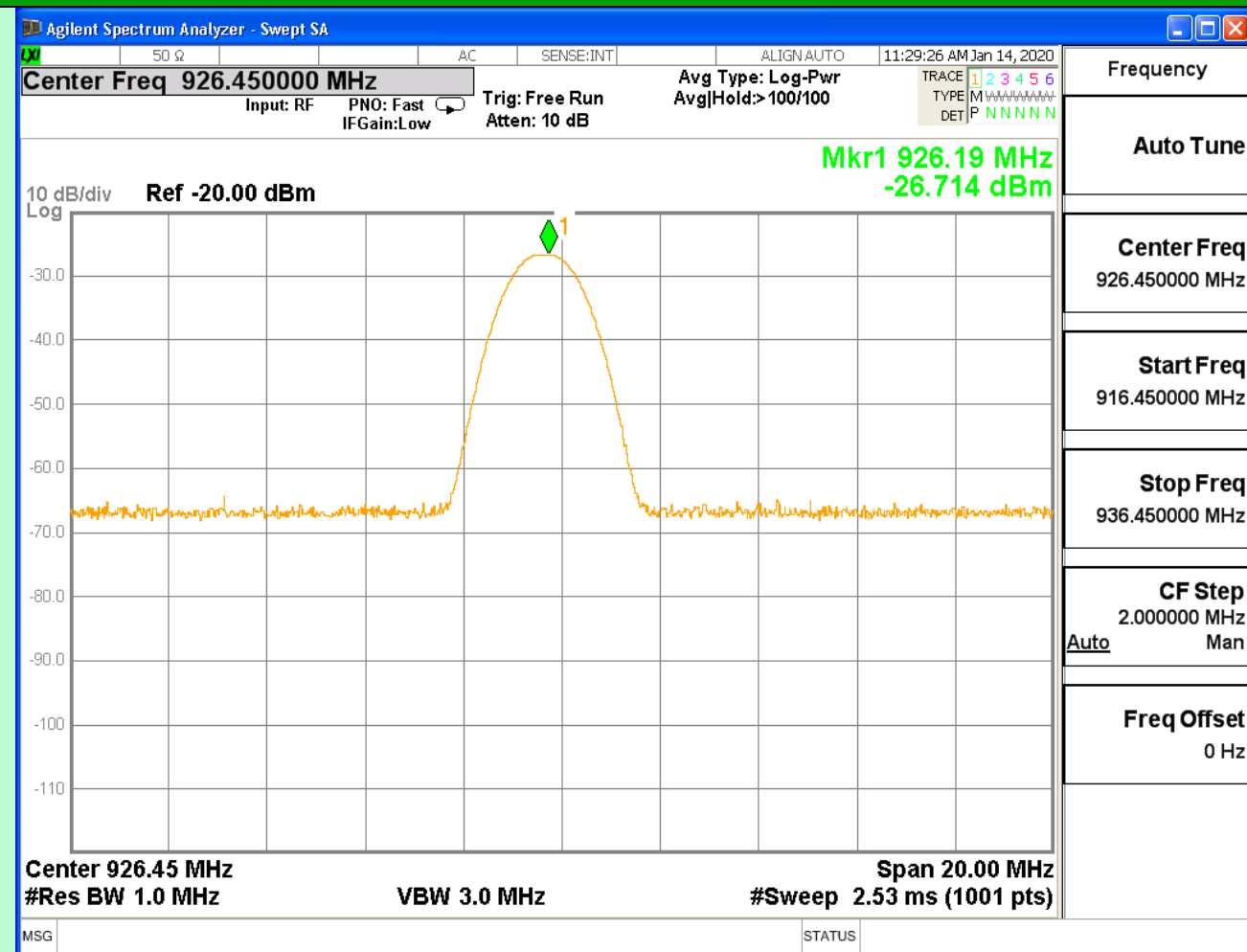


Antenna-3, Channel 28 (916 MHz)

Note : Peak Graph - Horizontal polarization

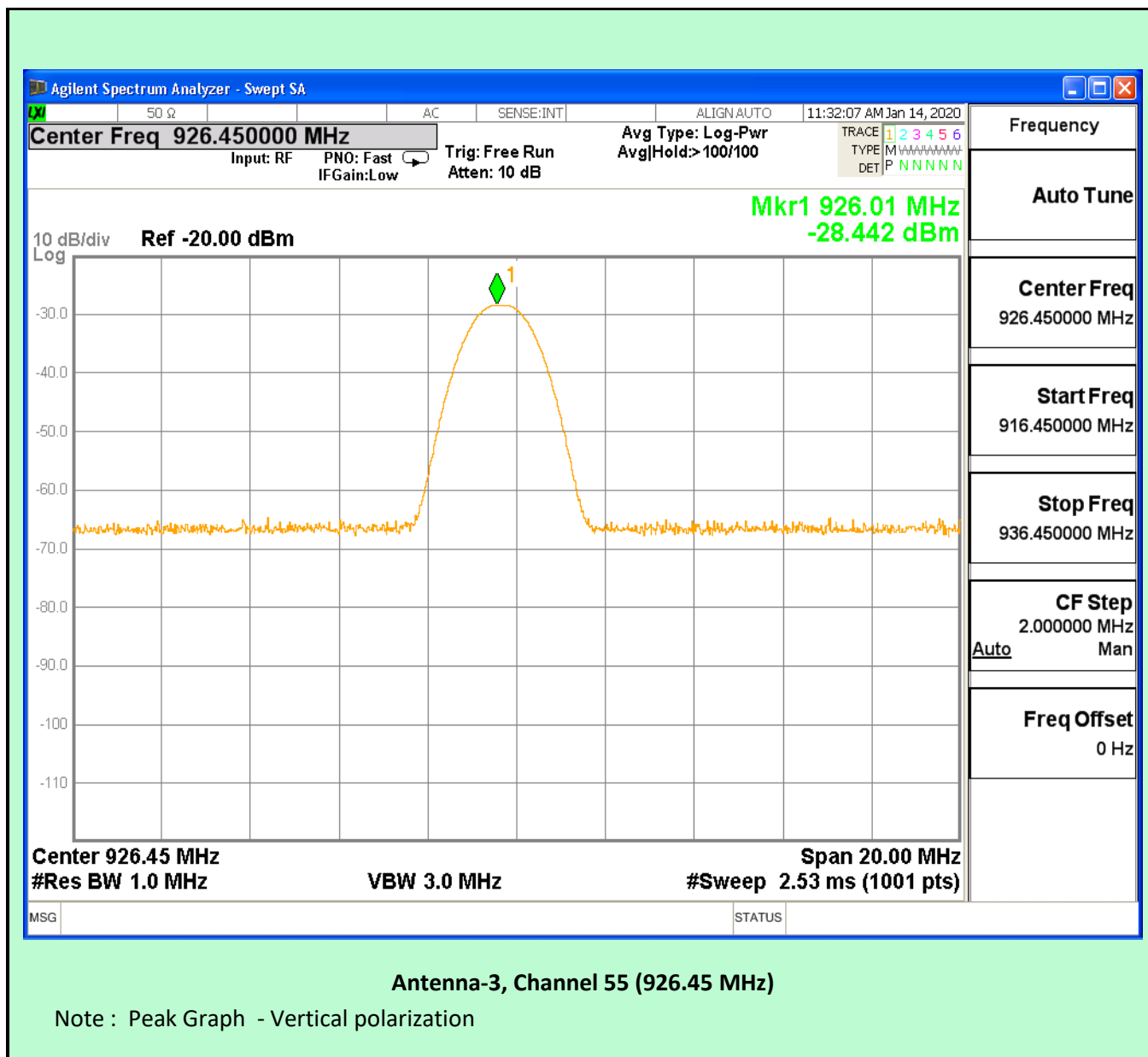


## TEST GRAPHS – EIRP



Antenna-3, Channel 55 (926.45 MHz)

Note : Peak Graph - Horizontal polarization



| TEST RESULT – EIRP                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |                   |            |                |            |              |                |                 |                     |                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------|------------|----------------|------------|--------------|----------------|-----------------|---------------------|-----------------|
| Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Channel Freq | Rx Antenna Height | Rx Ant Pol | Measured Level | Cable Loss | External Att | Path loss @ 3m | Rx Antenna Gain | Calculated Rx Power | Calculated EIRP |
| #                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MHz          | cm                | H/V        | dBm            | dB         | dB           | dB             | dBi             | dBm                 | dBm             |
| Antenna – 3 (FHSS Mode)                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |                   |            |                |            |              |                |                 |                     |                 |
| CH-1                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 903.55       | 206               | H          | -31.46         | 2.91       | 6            | 41.21          | 6.3             | -28.85              | 12.36           |
| CH-1                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 903.55       | 221               | V          | -28.84         | 2.91       | 6            | 41.21          | 6.3             | -26.23              | 14.98           |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 916          | 200               | H          | -28.7          | 2.91       | 6            | 41.21          | 6.3             | -25.99              | 15.22           |
| CH-28                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 916          | 360               | V          | -28.37         | 2.91       | 6            | 41.21          | 6.3             | -25.76              | 15.45           |
| CH-55                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 926.45       | 207               | H          | -26.71         | 2.91       | 6            | 41.21          | 6.3             | -24.16              | 17.05           |
| CH-55                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 926.45       | 214               | V          | -28.44         | 2.91       | 6            | 41.21          | 6.3             | -25.83              | 15.38           |
| <p><b>Note :</b> Effective Isotropic Radiated Power (dBm)= Pr(dBm) +Lp(dB)</p> <p>Pr = Pmeas(dBm)-Gr(dBi)+Lc(dB)+Latt(dB)</p> <p>Lp =20Log F+20LogD-27.5</p> <p>Where:</p> <p>Pr =Calculated Received Power Level(dBm)</p> <p>Lp= Free Space Path Loss(dB)</p> <p>Pmeas= Measured Power Level(dBm)</p> <p>Gr = Receiver Antenna Gain(dBi)</p> <p>Lc = Cable Loss (dB)</p> <p>Latt= External Attenuator(dB)</p> <p>F = Frequency (MHz)</p> <p>D= Distance (m)</p> |              |                   |            |                |            |              |                |                 |                     |                 |

### 3 DTS CHANNELS

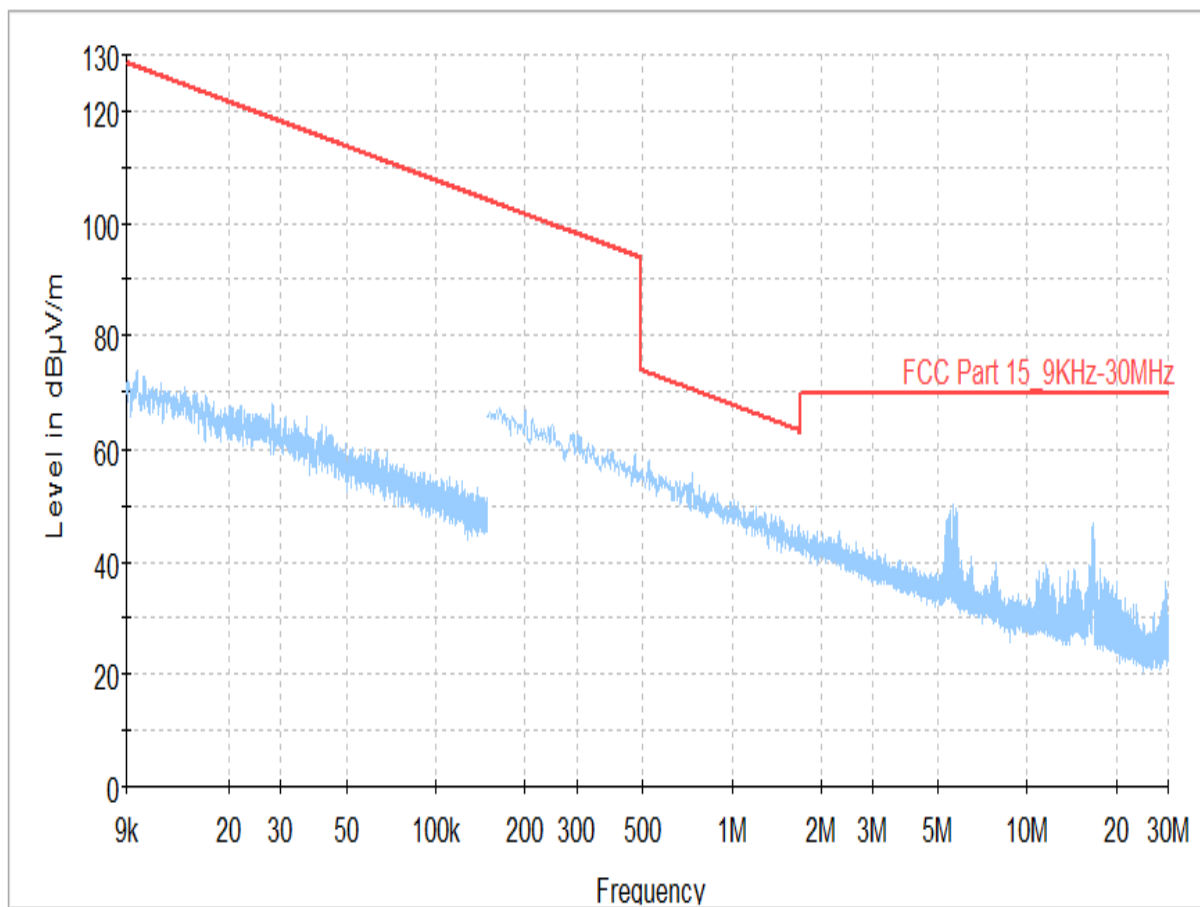
#### 3.1 SPURIOUS RADIATED EMISSIONS

|                             |                                       |                      |            |
|-----------------------------|---------------------------------------|----------------------|------------|
| EUT Nomenclature            | Wireless Pull Station                 | Test Report No.      | EMC0421-1  |
| Model No.                   | NBG-12WL                              | Serial No.           | 104        |
| Test Start Date             | 14-Dec-2019                           | Temperature (°C)     | 23 ± 2     |
| Test End Date               | 06-Jan-2020                           | Humidity RH (%)      | 55 ± 3     |
| Tested By                   | Vinay Gujjar                          | Pressure (mbar)      | NR         |
| Input Voltage / Freq        | 3.3V, 5mA                             |                      |            |
| Operating Mode              | Refer Page 5 Operating Modes Table    |                      |            |
| Test configuration          | Refer Page 5 Test Configuration Table |                      |            |
| Deviation from Std          | NA                                    |                      |            |
| Comment                     |                                       |                      |            |
| TEST FREQUENCY RANGE        |                                       |                      |            |
| Start Frequency             | 9KHz                                  | Stop Frequency       | 10GHz      |
|                             |                                       |                      |            |
| MAXIMUM OPERATING FREQUENCY |                                       |                      |            |
| 902MHz to 928MHz            |                                       |                      |            |
| TEST PARAMETERS             |                                       |                      |            |
| Antenna Height              | 1m to 4m                              | Turntable Rotation   | 0° to 360° |
| Applicable standard         | FCC Part 15.209                       | Test Method          | KDB 558074 |
| Equipment Class             | NA                                    | Measurement Distance | 3m         |
|                             |                                       |                      |            |

#### TEST EQUIPMENT

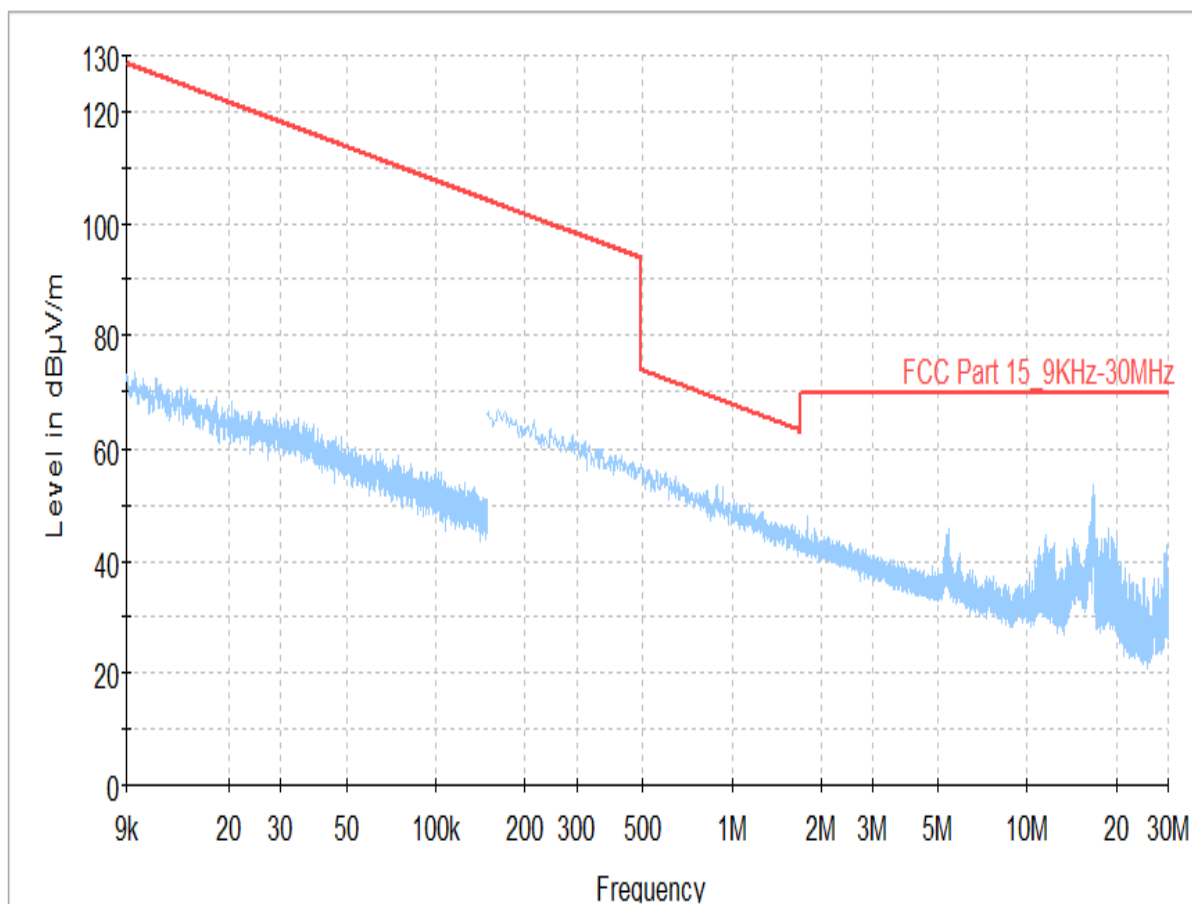
| Y/N                                                                                                                       | Equipment                       | Make         | Model            | Sl. No.      | Cal Due Date |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------|------------------|--------------|--------------|
| Y                                                                                                                         | EMI Test Receiver               | R&S          | ESU26            | 100229       | 7-Aug-20     |
| Y                                                                                                                         | 3m Semi Anechoic Chamber        | ETS Lindgren | DKE 6X7 DBL.DR   | 1625         | 30-Jul-22    |
| Y                                                                                                                         | Double Ridge Guide Horn Antenna | ETS Lindgren | 3117             | 64055        | 1-Nov-21     |
| Y                                                                                                                         | Bilog Antenna                   | ETS Lindgren | HLP3003C         | 130525       | 5-Nov-21     |
| Y                                                                                                                         | Loop Antenna                    | ETS Lindgren | 6507             | 103694       | 15-Nov-21    |
| Y                                                                                                                         | RF cable (9KHz to 18GHz)        | AH Systems   | SAC-18G-06       | RE-03        | 20-Feb-20    |
| Y                                                                                                                         | Signal Conditioning unit        | R&S          | SCU-18           | 10178        | 5-Jun-20     |
| Y                                                                                                                         | High Pass Filter                | Wainwright   | WHKX1.5/15G-12ST | 1            | 24-Feb-20    |
| Y                                                                                                                         | EMC32 Software                  | R&S          | 8.30.0           | 820-OT101248 | NA           |
| Note: Switch ON /OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver |                                 |              |                  |              |              |

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



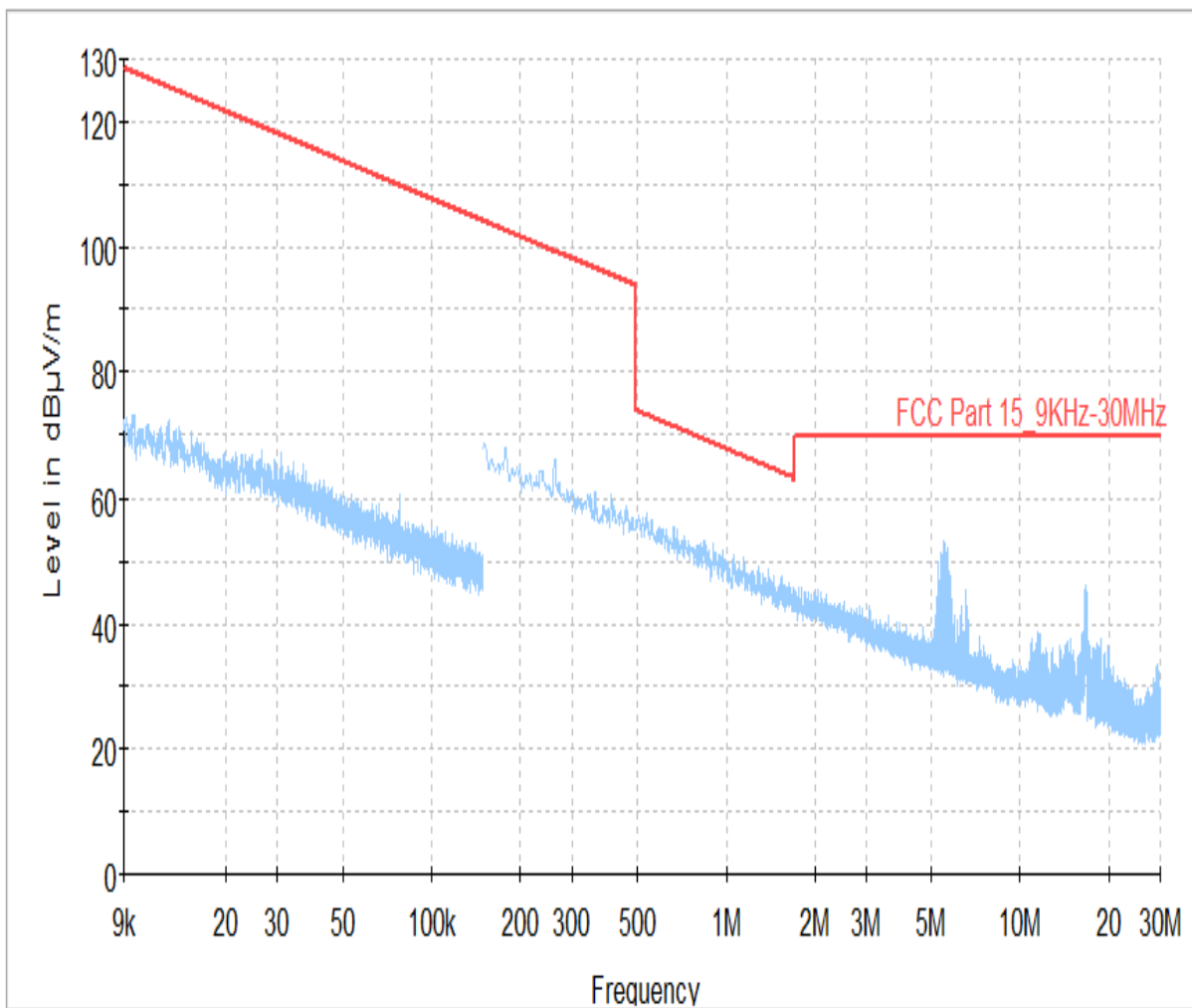
Channel 1 (902.875MHz) – Parallel

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



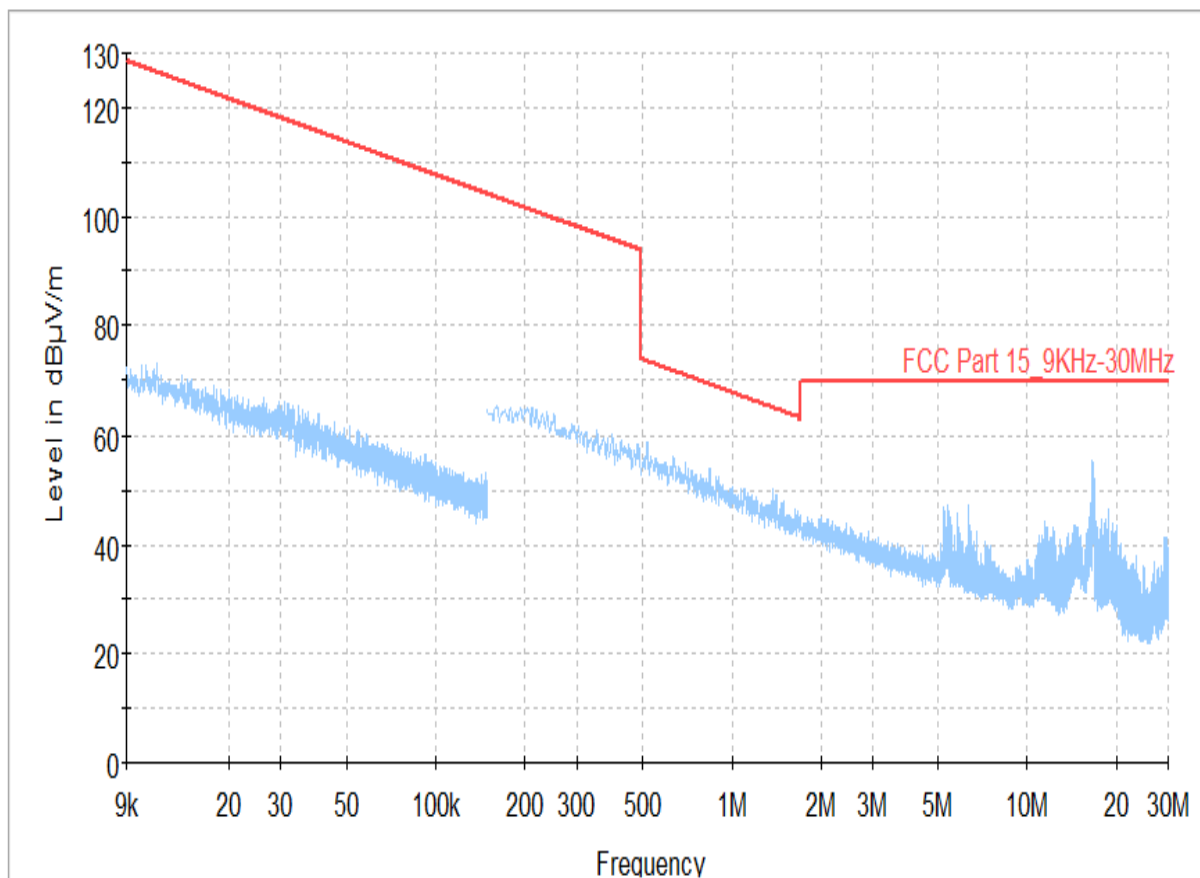
Channel 1 (902.875MHz) – Perpendicular

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



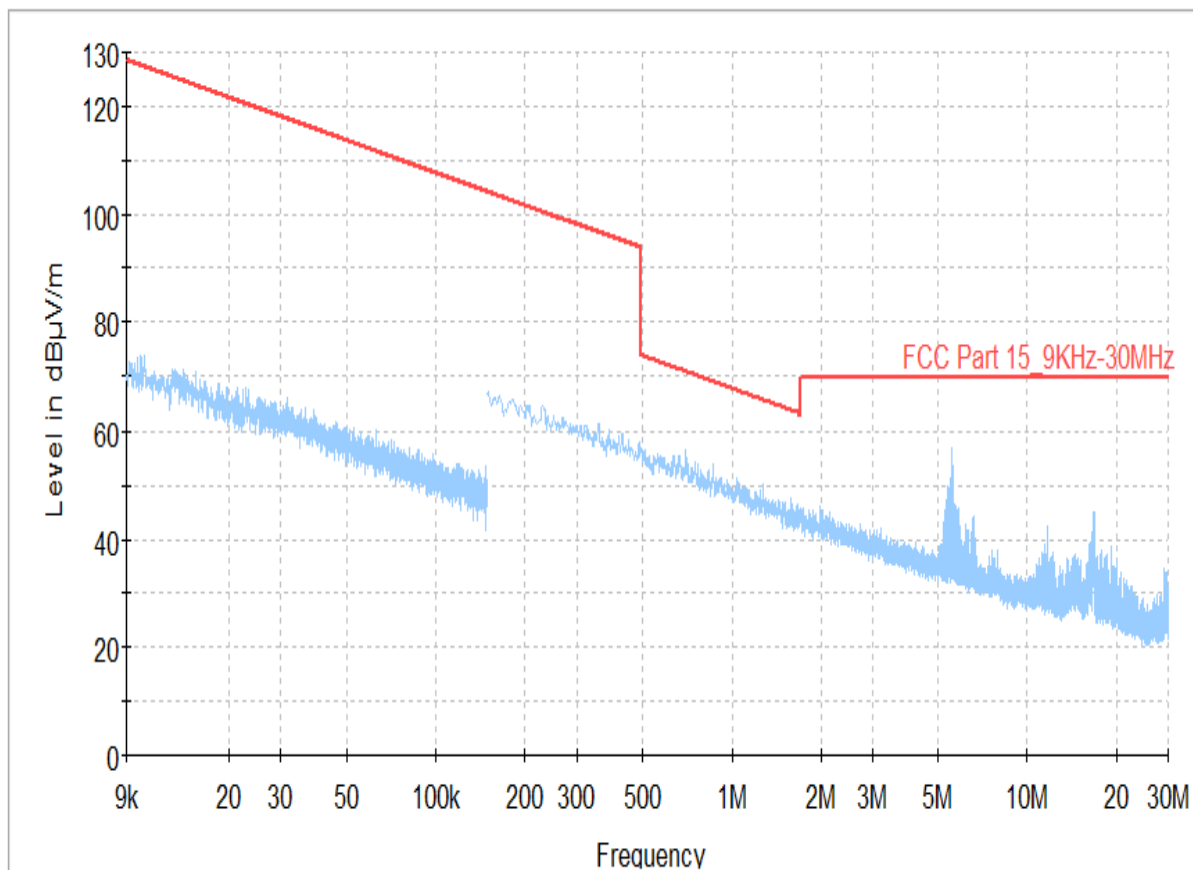
Channel 4 (915.325MHz) – Parallel

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



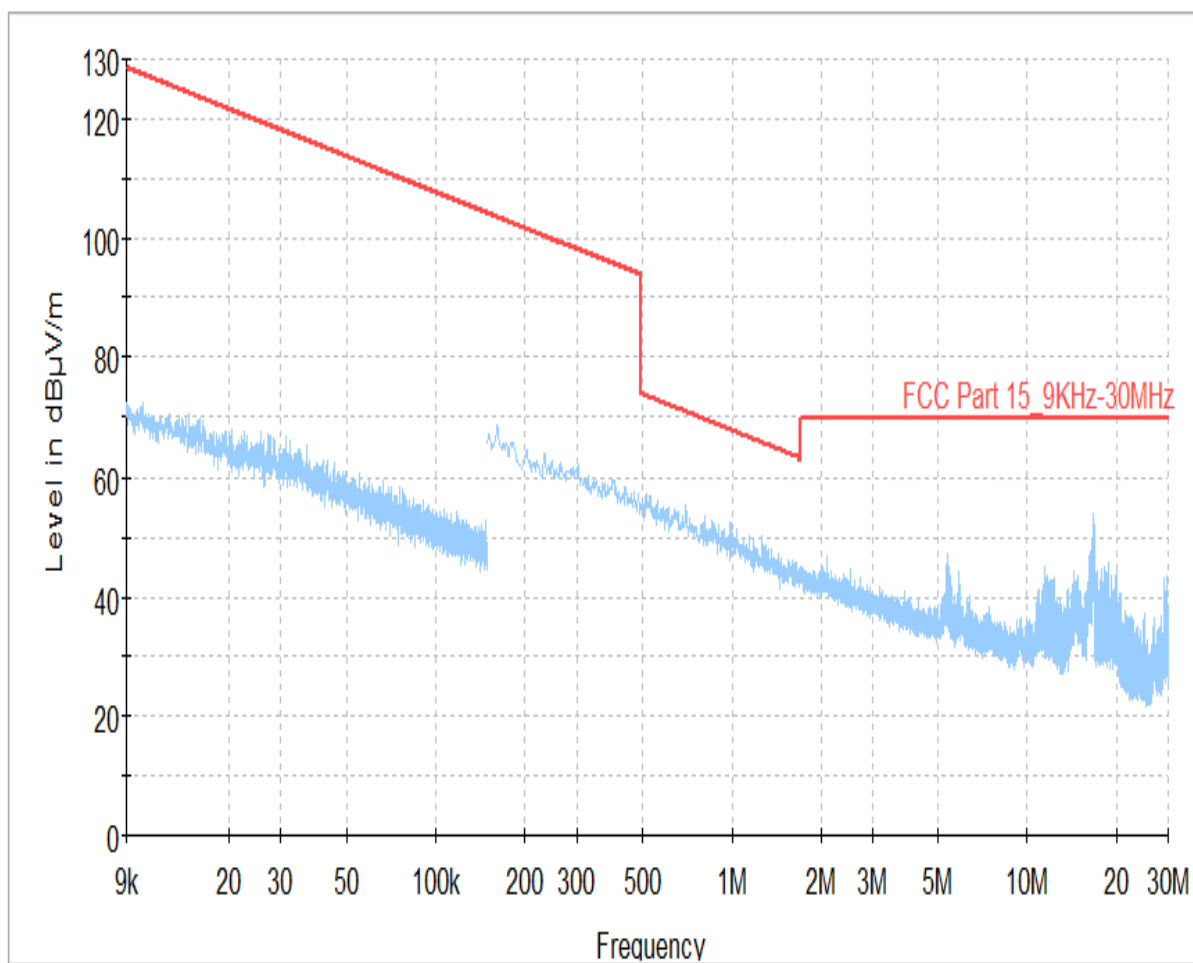
Channel 4 (915.325MHz) – Perpendicular

## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



Channel 6 (927.125MHz) – Parallel

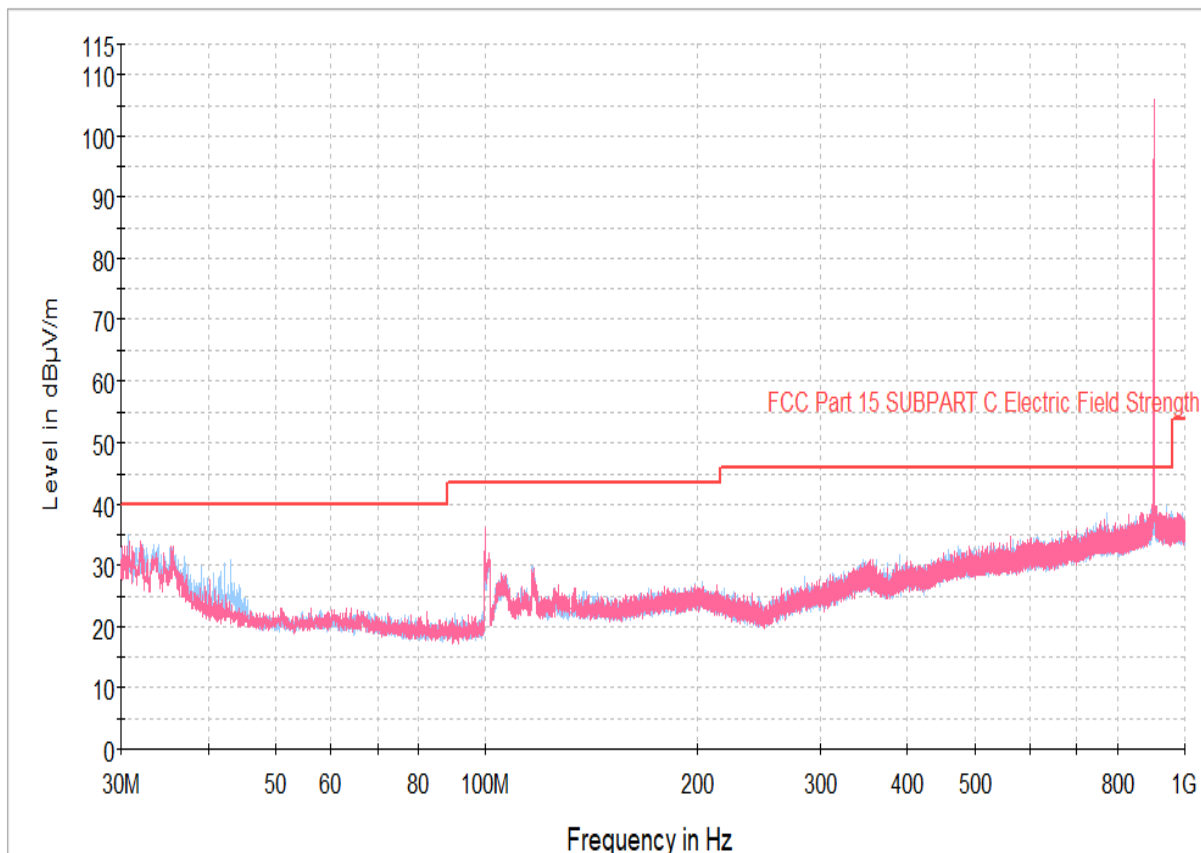
## TEST GRAPHS – 9 KHz to 30 MHz (Antenna 3)



Channel 6 (927.125MHz) – Perpendicular

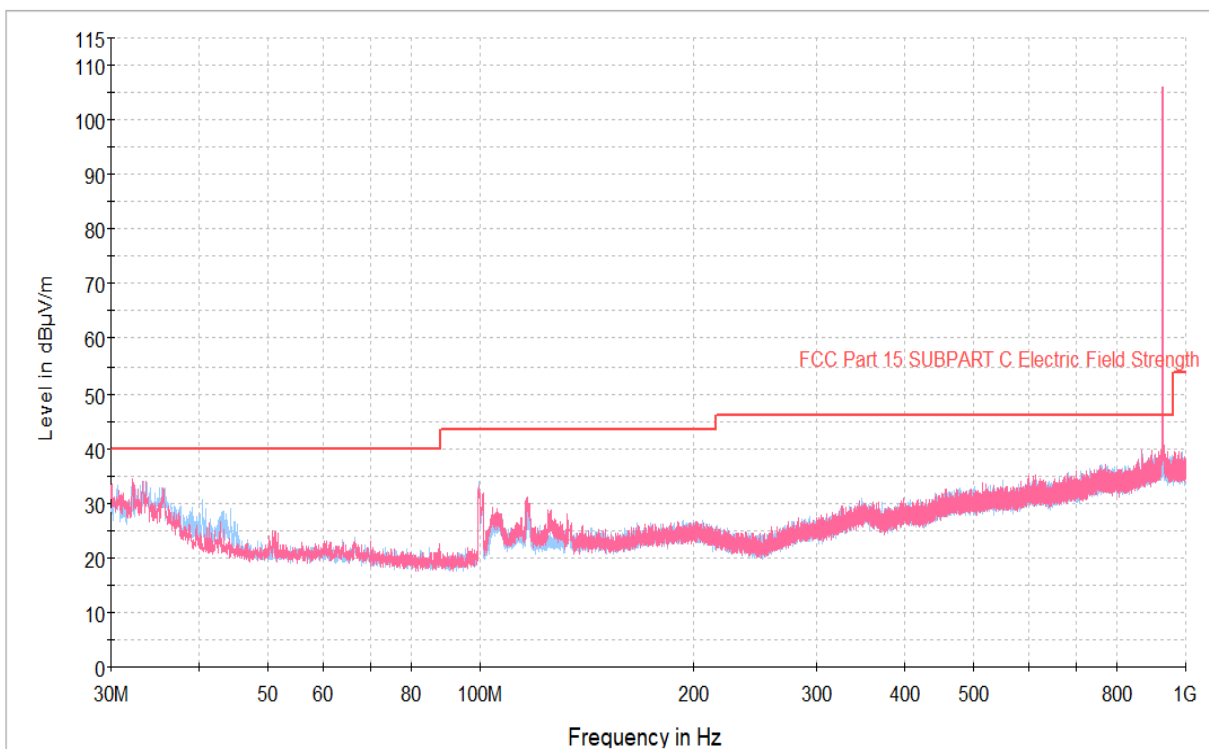
| TEST RESULT – 9 KHz to 30 MHz                                                                                               |                   |                   |            |        |                          |         |        |                     |         |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|------------|--------|--------------------------|---------|--------|---------------------|---------|
| Channel                                                                                                                     | Channel Frequency | Measured Spurious | Quasi Peak | Height | Ant Pol                  | Azimuth | Margin | Limit @ 3m Distance | Results |
| #                                                                                                                           | MHz               | MHz               | dBµV/m     | cm     | Parallel / Perpendicular | deg     | dB     | dBµV/m              |         |
| No emissions detected. Emissions shown in the plot are related to the chamber ambient                                       |                   |                   |            |        |                          |         |        |                     |         |
| NOTE: Measured Field Strength –dBuV/m (9 KHz to 1 GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) |                   |                   |            |        |                          |         |        |                     |         |

## TEST GRAPHS – 30MHz to 1GHz (Antenna 3)



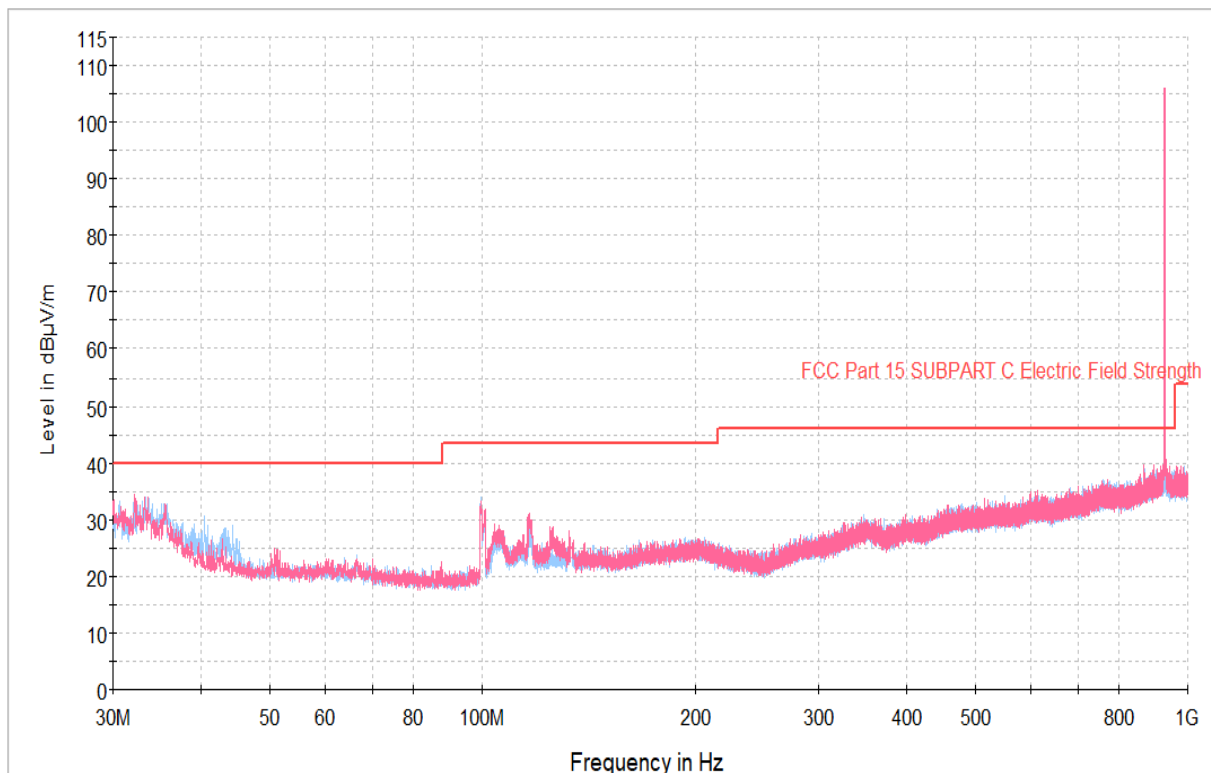
Channel 1 (902.875MHz) – Antenna 3

## TEST GRAPHS – 30MHz to 1GHz (Antenna 3)



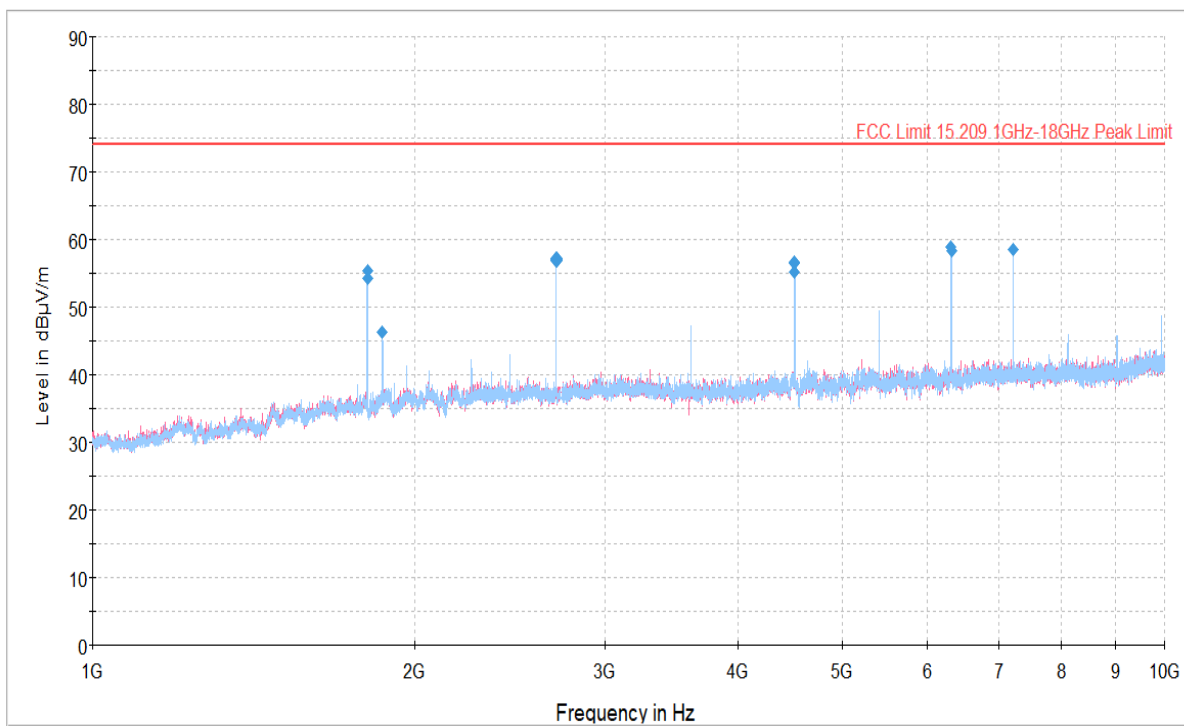
Channel 4 (915.325MHz) – Antenna 3

## TEST GRAPHS – 30MHz to 1GHz (Antenna 3)

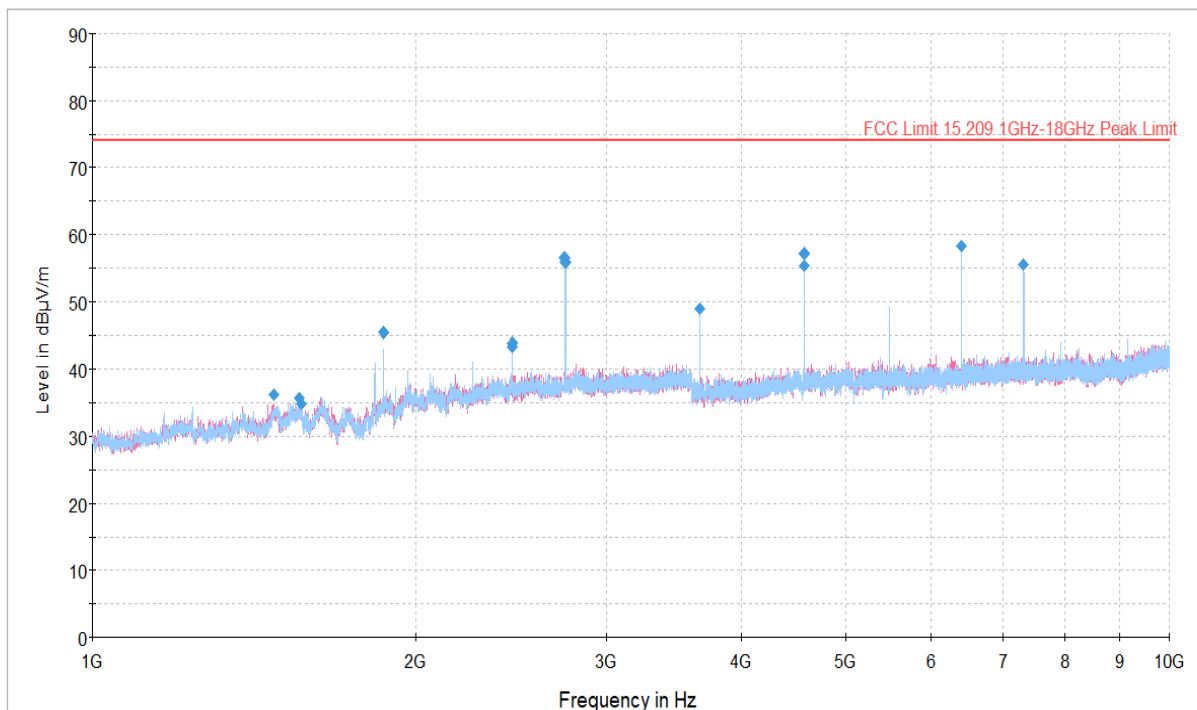


Channel 6 (927.125MHz) – Antenna 3

| TEST RESULT – 30 MHz to 1 GHz                                                                                               |                   |            |        |         |         |        |                     |                    |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------|------------|--------|---------|---------|--------|---------------------|--------------------|
| Channel                                                                                                                     | Measured Spurious | Quasi Peak | Height | Ant Pol | Azimuth | Margin | Limit @ 3m Distance | Results            |
| #                                                                                                                           | MHz               | dBµV/m     | Cm     | H / V   | deg     | dB     | dBµV/m              |                    |
| Antenna – 3                                                                                                                 |                   |            |        |         |         |        |                     |                    |
| CH-1                                                                                                                        | 679.12            | 25.93      | 200    | H       | 214     | 20.07  | 46                  | Pass               |
| CH-1                                                                                                                        | 688.24            | 26.15      | 300    | H       | 312     | 19.85  | 46                  | Pass               |
| CH-1                                                                                                                        | 695.61            | 26.38      | 100    | H       | 85      | 19.62  | 46                  | Pass               |
| CH-1                                                                                                                        | 823.07            | 27.88      | 400    | V       | 130     | 18.12  | 46                  | Pass               |
| CH-1                                                                                                                        | 836.07            | 28.22      | 200    | V       | 355     | 17.78  | 46                  | Pass               |
| CH-1                                                                                                                        | 838.20            | 28.33      | 100    | V       | 334     | 17.67  | 46                  | Pass               |
| CH-1                                                                                                                        | 902.74            | 106.06     | 100    | V       | 61      | -      | -                   | Intended Frequency |
| CH-4                                                                                                                        | 663.41            | 25.48      | 300    | H       | 148     | 20.52  | 46                  | Pass               |
| CH-4                                                                                                                        | 682.62            | 26.06      | 100    | H       | 359     | 19.94  | 46                  | Pass               |
| CH-4                                                                                                                        | 691.35            | 26.24      | 300    | V       | 272     | 19.76  | 46                  | Pass               |
| CH-4                                                                                                                        | 818.42            | 27.77      | 400    | H       | 294     | 18.23  | 46                  | Pass               |
| CH-4                                                                                                                        | 824.82            | 27.9       | 300    | H       | 278     | 18.1   | 46                  | Pass               |
| CH-4                                                                                                                        | 843.64            | 28.37      | 200    | V       | 262     | 17.63  | 46                  | Pass               |
| CH-4                                                                                                                        | 915.22            | 102.45     | 100    | V       | 39      | -      | -                   | Intended Frequency |
| CH-6                                                                                                                        | 678.74            | 31.49      | 200    | H       | 225     | 14.51  | 46                  | Pass               |
| CH-6                                                                                                                        | 689.02            | 31.82      | 100    | H       | 198     | 14.18  | 46                  | Pass               |
| CH-6                                                                                                                        | 794.75            | 33.31      | 200    | H       | 225     | 12.69  | 46                  | Pass               |
| CH-6                                                                                                                        | 836.07            | 34.03      | 400    | V       | 63      | 11.97  | 46                  | Pass               |
| CH-6                                                                                                                        | 847.13            | 34.34      | 200    | V       | 332     | 11.66  | 46                  | Pass               |
| CH-6                                                                                                                        | 926.99            | 106.06     | 100    | V       | 41      | -      | -                   | Intended Frequency |
| NOTE: Measured Field Strength –dBuV/m (9 KHz to 1 GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) |                   |            |        |         |         |        |                     |                    |

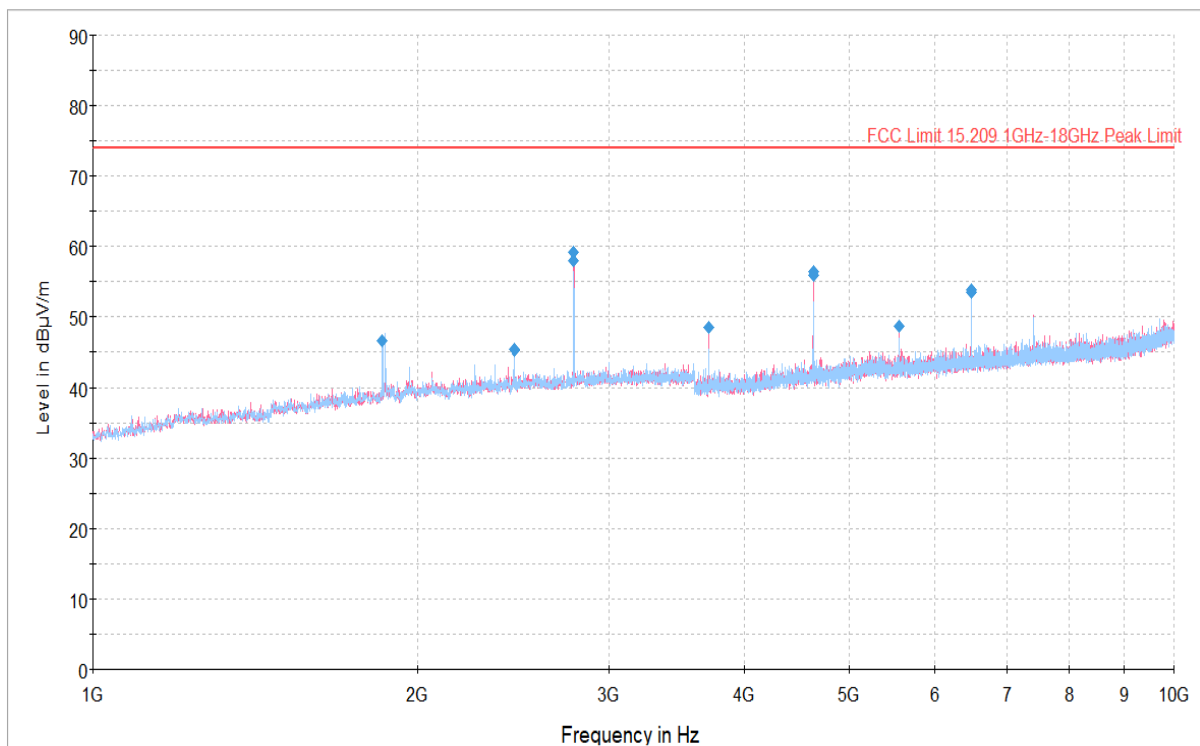
**TEST GRAPHS – 1GHz to 10GHz (Antenna 3)**

Channel 1 (902.875MHz) – Antenna 3

**TEST GRAPHS – 1GHz to 10GHz (Antenna 3)**

Channel 4 (915.325MHz) – Antenna 3

## TEST GRAPHS – 1GHz to 10GHz (Antenna 3)



Channel 6 (927.125MHz) – Antenna 3

| TEST RESULT – 1 GHz to 10 GHz                                                                                                                           |           |                  |        |         | RESTRICTED BAND – PEAK |        |          |        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------|--------|---------|------------------------|--------|----------|--------|
| Channel                                                                                                                                                 | Frequency | Measured MaxPeak | Height | Ant Pol | Azimuth                | Margin | Limit    | Result |
| #                                                                                                                                                       | (MHz)     | (dBμV/m)         | (cm)   | H / V   | (deg)                  | (dB)   | (dBμV/m) |        |
| Antenna – 3                                                                                                                                             |           |                  |        |         |                        |        |          |        |
| CH-1                                                                                                                                                    | 2707.60   | 56.76            | 400    | H       | 179                    | 17.24  | 74       | PASS   |
| CH-1                                                                                                                                                    | 2708.20   | 56.89            | 400    | H       | 179                    | 17.11  | 74       | PASS   |
| CH-1                                                                                                                                                    | 2709.40   | 57.2             | 100    | H       | 193                    | 16.8   | 74       | PASS   |
| CH-1                                                                                                                                                    | 4513.00   | 56.54            | 200    | H       | 147                    | 17.46  | 74       | PASS   |
| CH-1                                                                                                                                                    | 4514.80   | 55.04            | 200    | H       | 136                    | 18.96  | 74       | PASS   |
| CH-1                                                                                                                                                    | 4515.70   | 56.49            | 300    | H       | 147                    | 17.51  | 74       | PASS   |
| CH-4                                                                                                                                                    | 2745.04   | 56.5             | 100    | H       | 193                    | 17.5   | 74       | PASS   |
| CH-4                                                                                                                                                    | 2746.64   | 55.89            | 100    | H       | 203                    | 18.11  | 74       | PASS   |
| CH-4                                                                                                                                                    | 3662.39   | 48.89            | 300    | H       | 131                    | 25.11  | 74       | PASS   |
| CH-4                                                                                                                                                    | 4575.25   | 57.11            | 200    | H       | 151                    | 16.89  | 74       | PASS   |
| CH-4                                                                                                                                                    | 4576.54   | 55.34            | 200    | H       | 121                    | 18.66  | 74       | PASS   |
| CH-4                                                                                                                                                    | 4578.14   | 57.15            | 400    | H       | 111                    | 16.85  | 74       | PASS   |
| CH-4                                                                                                                                                    | 7320.25   | 55.45            | 200    | H       | 131                    | 18.55  | 74       | PASS   |
| CH-6                                                                                                                                                    | 2780.39   | 58.3             | 300    | H       | 164                    | 15.7   | 74       | PASS   |
| CH-6                                                                                                                                                    | 2782.00   | 58.47            | 300    | H       | 190                    | 15.53  | 74       | PASS   |
| CH-6                                                                                                                                                    | 3709.32   | 49.18            | 200    | H       | 139                    | 24.82  | 74       | PASS   |
| CH-6                                                                                                                                                    | 4634.07   | 58.45            | 200    | H       | 155                    | 15.55  | 74       | PASS   |
| CH-6                                                                                                                                                    | 4635.68   | 56.35            | 200    | H       | 144                    | 17.65  | 74       | PASS   |
| CH-6                                                                                                                                                    | 4637.29   | 58.38            | 200    | H       | 150                    | 15.62  | 74       | PASS   |
| CH-6                                                                                                                                                    | 7419.57   | 52.26            | 300    | H       | 127                    | 21.74  | 74       | PASS   |
| Note :                                                                                                                                                  |           |                  |        |         |                        |        |          |        |
| Measured Field Strength (dBuV/m) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB) |           |                  |        |         |                        |        |          |        |

| TEST RESULT – 1 GHz to 10 GHz                                                                                                                           |           |                  |        |         | RESTRICTED BAND – AVERAGE |        |          |        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------|--------|---------|---------------------------|--------|----------|--------|
| Channel                                                                                                                                                 | Frequency | Measured Average | Height | Ant Pol | Azimuth                   | Margin | Limit    | Result |
| #                                                                                                                                                       | (MHz)     | (dBµV/m)         | (cm)   | H / V   | (deg)                     | (dB)   | (dBµV/m) |        |
| Antenna – 3                                                                                                                                             |           |                  |        |         |                           |        |          |        |
| CH-1                                                                                                                                                    | 2708.20   | 50.14            | 400    | H       | 179                       | 3.86   | 54       | PASS   |
| CH-1                                                                                                                                                    | 2709.10   | 49.87            | 100    | H       | 193                       | 4.13   | 54       | PASS   |
| CH-1                                                                                                                                                    | 4513.30   | 46.9             | 300    | H       | 150                       | 7.1    | 54       | PASS   |
| CH-1                                                                                                                                                    | 4515.40   | 46.51            | 200    | H       | 136                       | 7.49   | 54       | PASS   |
| CH-4                                                                                                                                                    | 2258.07   | 36.27            | 400    | H       | 146                       | 17.73  | 54       | PASS   |
| CH-4                                                                                                                                                    | 2745.36   | 49.23            | 100    | H       | 198                       | 4.77   | 54       | PASS   |
| CH-4                                                                                                                                                    | 2746.64   | 48.61            | 100    | H       | 203                       | 5.39   | 54       | PASS   |
| CH-4                                                                                                                                                    | 3662.39   | 38.73            | 300    | H       | 131                       | 15.27  | 54       | PASS   |
| CH-4                                                                                                                                                    | 4575.57   | 47.3             | 200    | H       | 131                       | 6.7    | 54       | PASS   |
| CH-4                                                                                                                                                    | 4577.82   | 47.22            | 300    | H       | 121                       | 6.78   | 54       | PASS   |
| CH-6                                                                                                                                                    | 2781.68   | 50.47            | 300    | H       | 179                       | 3.53   | 54       | PASS   |
| CH-6                                                                                                                                                    | 3709.64   | 38.64            | 300    | H       | 116                       | 15.36  | 54       | PASS   |
| CH-6                                                                                                                                                    | 4634.39   | 48.76            | 300    | H       | 143                       | 5.24   | 54       | PASS   |
| CH-6                                                                                                                                                    | 4635.36   | 46.67            | 300    | H       | 153                       | 7.33   | 54       | PASS   |
| CH-6                                                                                                                                                    | 4636.96   | 48.75            | 300    | H       | 153                       | 5.25   | 54       | PASS   |
| CH-6                                                                                                                                                    | 7419.57   | 40.03            | 200    | H       | 139                       | 13.97  | 54       | PASS   |
| Note :                                                                                                                                                  |           |                  |        |         |                           |        |          |        |
| Measured Field Strength (dBuV/m) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB) |           |                  |        |         |                           |        |          |        |

| TEST RESULT – 1 GHz to 10 GHz                                                                                                                                    |                      |           |                              |        |         | NON RESTRICTED BAND - PEAK |                                  |        |         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------|------------------------------|--------|---------|----------------------------|----------------------------------|--------|---------|
| Channel                                                                                                                                                          | Measured Fundamental | Frequency | Measured Peak field Strength | Height | Ant Pol | Azimuth                    | Peak Limit [Fundamental – 20 dB] | Margin | Results |
| #                                                                                                                                                                | dBµV/m               | MHz       | dBµV/m                       | cm     | H / V   | deg                        | dBuV/m                           | dB     |         |
| Antenna – 3                                                                                                                                                      |                      |           |                              |        |         |                            |                                  |        |         |
| CH-1                                                                                                                                                             | 106.06               | 1804.9    | 54.26                        | 100    | H       | 204                        | 86.06                            | 31.8   | PASS    |
| CH-1                                                                                                                                                             | 106.06               | 1806.1    | 55.38                        | 100    | H       | 204                        | 86.06                            | 30.68  | PASS    |
| CH-1                                                                                                                                                             | 106.06               | 1865.2    | 46.17                        | 400    | H       | 326                        | 86.06                            | 39.89  | PASS    |
| CH-1                                                                                                                                                             | 106.06               | 6318.1    | 58.88                        | 200    | H       | 114                        | 86.06                            | 27.18  | PASS    |
| CH-1                                                                                                                                                             | 106.06               | 6322.3    | 58.28                        | 200    | H       | 114                        | 86.06                            | 27.78  | PASS    |
| CH-1                                                                                                                                                             | 106.06               | 7225.3    | 58.44                        | 300    | H       | 118                        | 86.06                            | 27.62  | PASS    |
| CH-4                                                                                                                                                             | 106.45               | 1865.2857 | 45.38                        | 400    | H       | 157                        | 86.45                            | 41.07  | PASS    |
| CH-4                                                                                                                                                             | 106.45               | 2454.1429 | 43.34                        | 400    | H       | 292                        | 86.45                            | 43.11  | PASS    |
| CH-4                                                                                                                                                             | 106.45               | 2454.7857 | 43.91                        | 400    | H       | 121                        | 86.45                            | 42.54  | PASS    |
| CH-4                                                                                                                                                             | 106.45               | 6405.1429 | 58.29                        | 200    | H       | 121                        | 86.45                            | 28.16  | PASS    |
| CH-4                                                                                                                                                             | 106.45               | 6409.3214 | 58.33                        | 200    | H       | 126                        | 86.45                            | 28.12  | PASS    |
| CH-6                                                                                                                                                             | 106.06               | 1853.3929 | 49                           | 200    | H       | 202                        | 86.06                            | 37.06  | PASS    |
| CH-6                                                                                                                                                             | 106.06               | 1854.0357 | 50.04                        | 200    | H       | 202                        | 86.06                            | 36.02  | PASS    |
| CH-6                                                                                                                                                             | 106.06               | 1854.6786 | 50.36                        | 200    | H       | 202                        | 86.06                            | 35.7   | PASS    |
| CH-6                                                                                                                                                             | 106.06               | 5560.75   | 50.89                        | 200    | H       | 144                        | 86.06                            | 35.17  | PASS    |
| CH-6                                                                                                                                                             | 106.06               | 5561.3929 | 48.24                        | 300    | V       | 278                        | 86.06                            | 37.82  | PASS    |
| CH-6                                                                                                                                                             | 106.06               | 6487.75   | 56.98                        | 200    | H       | 118                        | 86.06                            | 29.08  | PASS    |
| CH-6                                                                                                                                                             | 106.06               | 6489.6786 | 53.48                        | 200    | H       | 144                        | 86.06                            | 32.58  | PASS    |
| CH-6                                                                                                                                                             | 106.06               | 6491.9286 | 57.14                        | 200    | H       | 118                        | 86.06                            | 28.92  | PASS    |
| Note :                                                                                                                                                           |                      |           |                              |        |         |                            |                                  |        |         |
| Measured Harmonic Field Strength (dBuV/m) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB) |                      |           |                              |        |         |                            |                                  |        |         |

**3.2 EFFECTIVE ISOTROPIC RADIATED POWER**

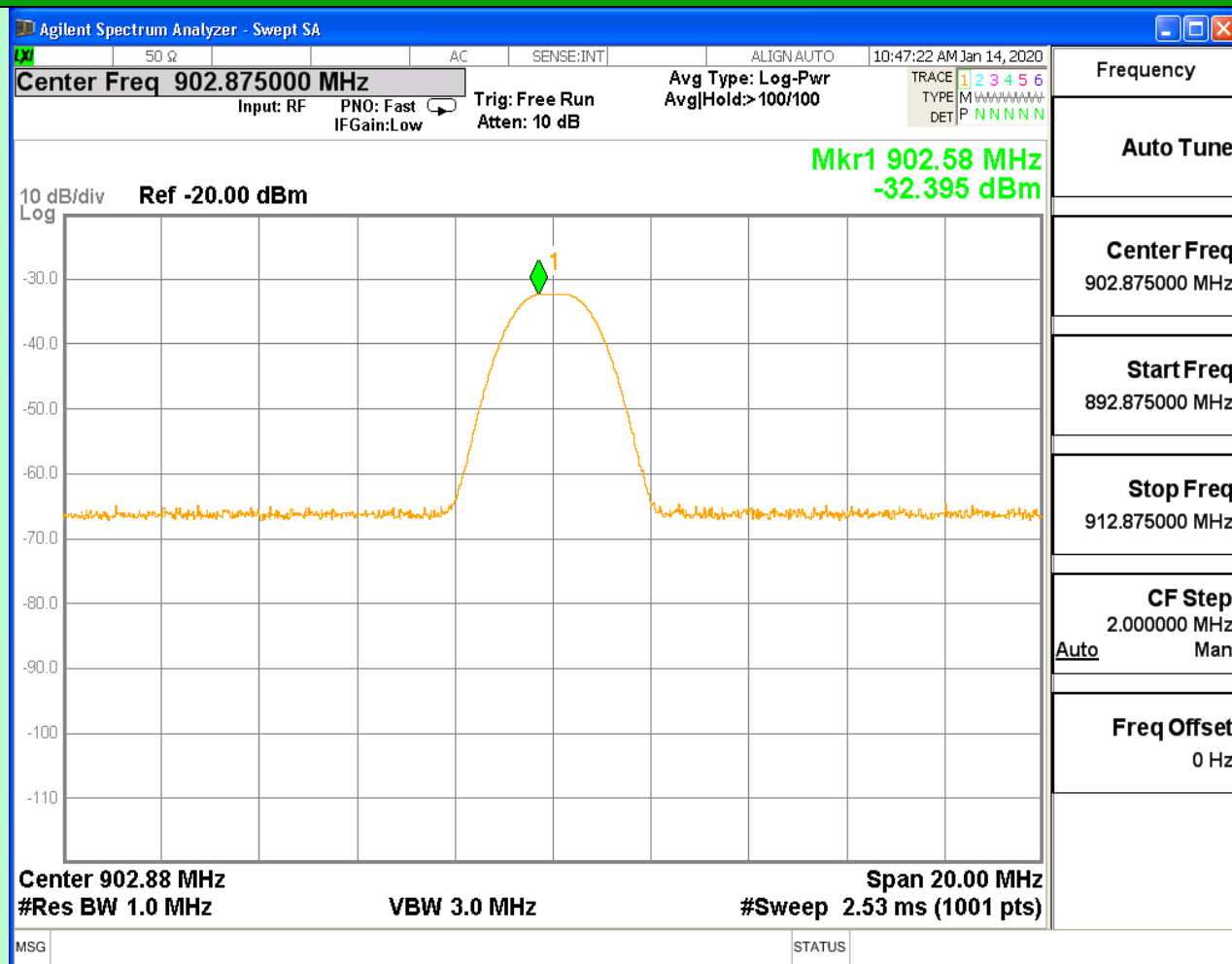
|                             |                                                                                 |                             |            |
|-----------------------------|---------------------------------------------------------------------------------|-----------------------------|------------|
| <b>EUT Nomenclature</b>     | Wireless Pull Station                                                           | <b>Test Request No.</b>     | EMC0421-1  |
| <b>Model No.</b>            | NBG-12WL                                                                        | <b>Serial No.</b>           | 104        |
| <b>Test Start Date</b>      | 14-Dec-2019                                                                     | <b>Temperature (°C)</b>     | 23 ± 2     |
| <b>Test End Date</b>        | 06-Jan-2020                                                                     | <b>Humidity RH (%)</b>      | 55 ± 3     |
| <b>Tested By</b>            | Vinay Gujjar                                                                    | <b>Pressure (mbar)</b>      | NR         |
| <b>Input Voltage / Freq</b> | 3.3V, 5mA                                                                       |                             |            |
| <b>Operating Mode</b>       | Refer Page 5 for Operating Mode Table                                           |                             |            |
| <b>Test configuration</b>   | Refer Page 5 for Test Configuration Table                                       |                             |            |
| <b>Deviation from Std</b>   | NA                                                                              |                             |            |
| <b>Applicable standard</b>  | FCC Part 15.247: 2010 & 15.209 :2010                                            |                             |            |
| <b>Test Method</b>          | KDB 412172                                                                      |                             |            |
| <b>Comment</b>              | NA                                                                              |                             |            |
| <b>TEST DETAILS</b>         |                                                                                 |                             |            |
| <b>Method</b>               | <input checked="" type="checkbox"/> Radiated <input type="checkbox"/> Conducted |                             |            |
| <b>TEST PARAMETERS</b>      |                                                                                 |                             |            |
| <b>Antenna Height</b>       | 1m to 4m                                                                        | <b>Turntable Rotation</b>   | 0° to 360° |
| <b>Equipment Class</b>      | NA                                                                              | <b>Measurement Distance</b> | 3m         |

**TEST EQUIPMENT**

| Y/N | Equipment                | Make         | Model          | Sl. No. | Cal Due Date |
|-----|--------------------------|--------------|----------------|---------|--------------|
| Y   | EMI Test Receiver        | R&S          | ESU26          | 100525  | 7-Aug-20     |
| Y   | 3m Semi Anechoic Chamber | ETS Lindgren | DKE 6X7 DBL.DR | 1625    | 30-Jul-22    |
| Y   | Bilog Antenna            | ETS Lindgren | HLP3003C       | 130525  | 5-Nov-21     |
| Y   | RF cable (9KHz to 1GHz)  | AH System    | SAC-18G-06     | RE-03   | 20-Feb-20    |

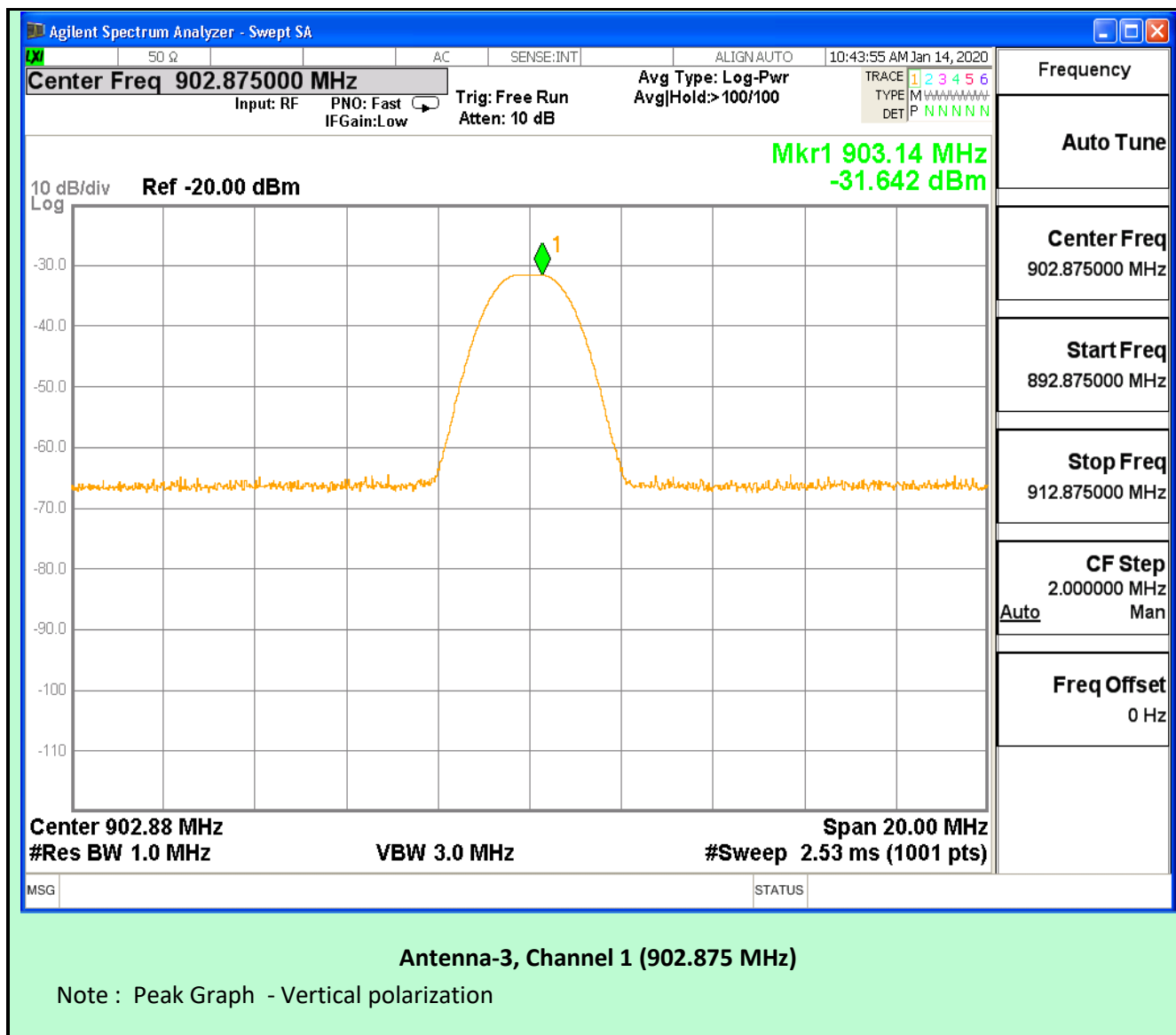
Note: Switch ON /OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

## TEST GRAPHS – EIRP

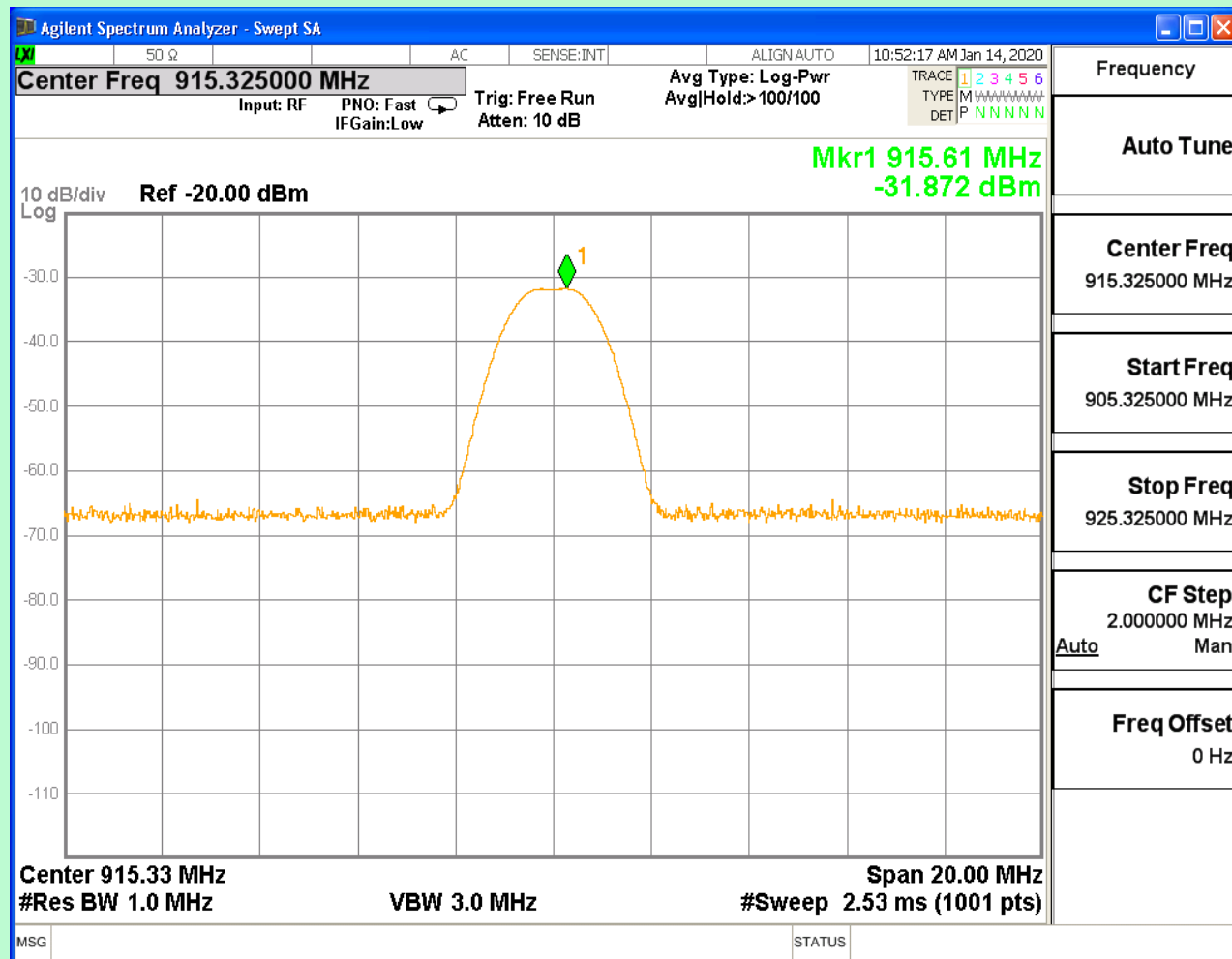


Antenna-3, Channel 1 (902.875 MHz)

Note : Peak Graph - Horizontal polarization

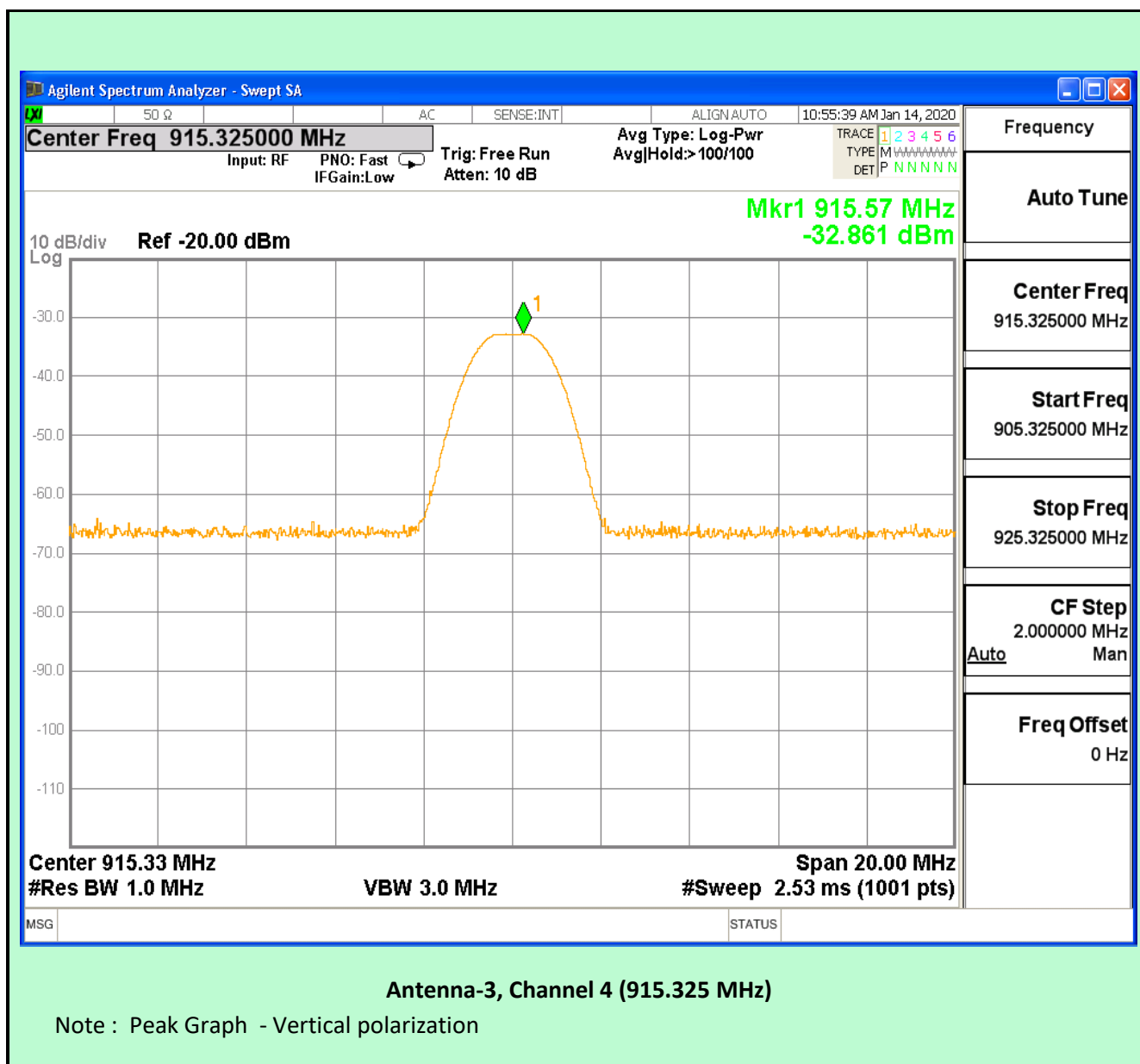


## TEST GRAPHS – EIRP

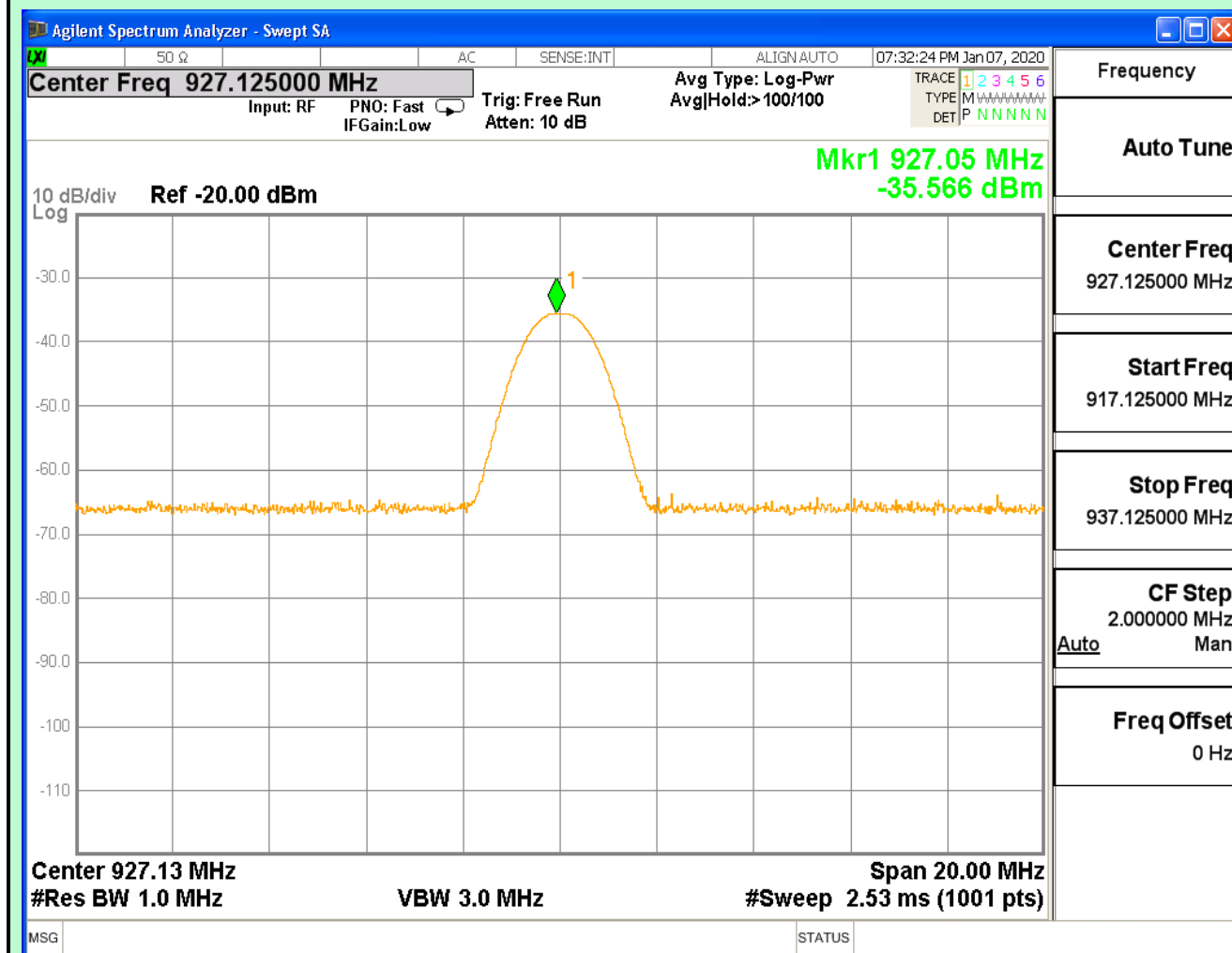


Antenna-3, Channel 4 (915.325 MHz)

Note : Peak Graph - Horizontal polarization

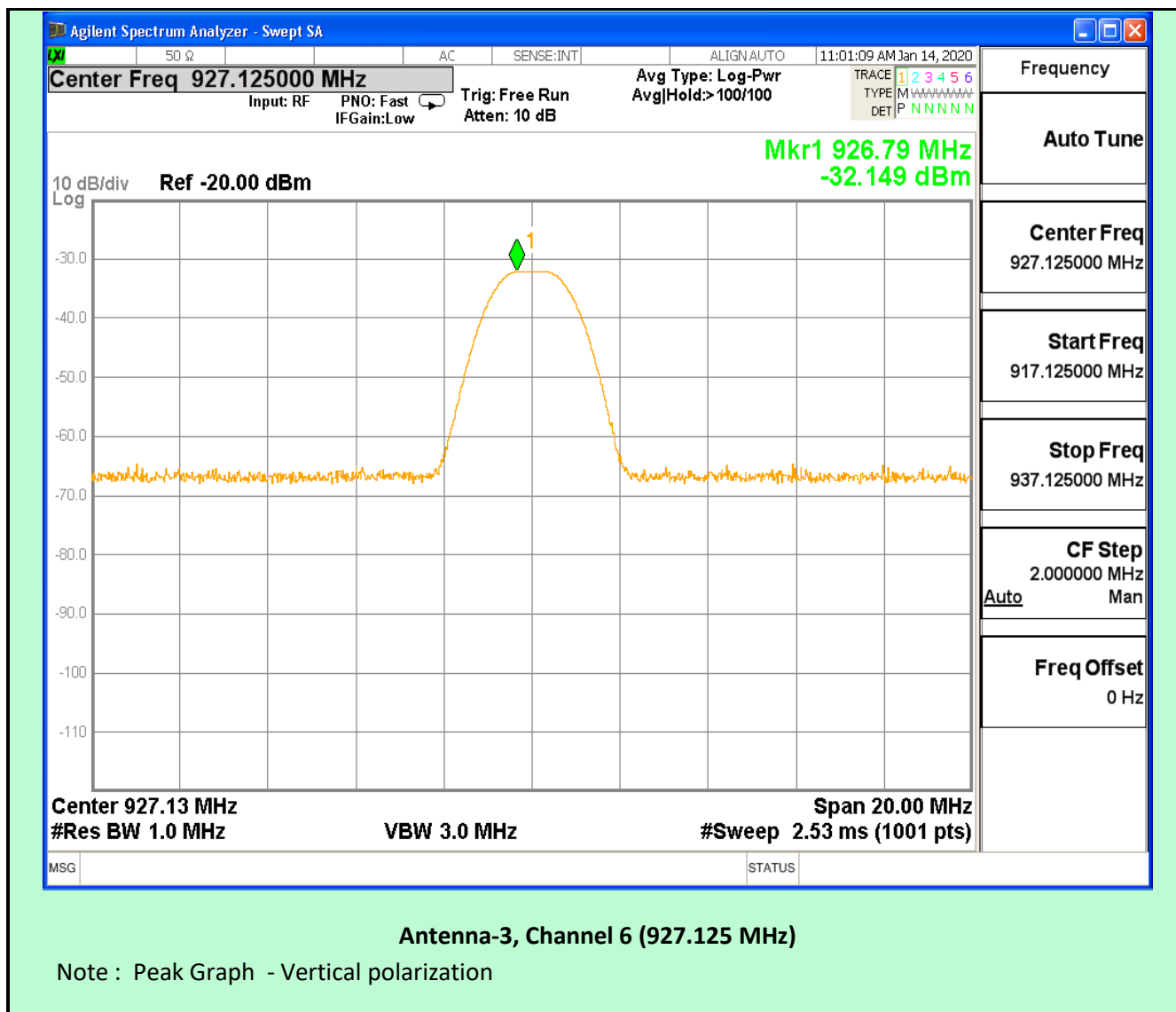


## TEST GRAPHS – EIRP



Antenna-3, Channel 6 (927.125 MHz)

Note : Peak Graph - Horizontal polarization



**TEST RESULT – EIRP**

| Channel                | Channel Freq | Rx Antenna Height | Rx Ant Pol | Measured Level | Cable Loss | External Att | Path loss @ 3m | Rx Antenna Gain | Calculated Rx Power | Calculated EIRP |
|------------------------|--------------|-------------------|------------|----------------|------------|--------------|----------------|-----------------|---------------------|-----------------|
| #                      | MHz          | cm                | H/V        | dBm            | dB         | dB           | dB             | dB              | dBm                 | dBm             |
| Antenna – 3 (DTS Mode) |              |                   |            |                |            |              |                |                 |                     |                 |
| CH-1                   | 902.875      | 274               | H          | -32.39         | 2.91       | 6            | 41.21          | 6.3             | -29.78              | 11.43           |
| CH-1                   | 902.875      | 220               | V          | -31.64         | 2.91       | 6            | 41.21          | 6.3             | -29.03              | 12.18           |
| CH-4                   | 915.325      | 382               | H          | -31.87         | 2.91       | 6            | 41.21          | 6.3             | -29.26              | 11.95           |
| CH-4                   | 915.325      | 210               | V          | -32.86         | 2.91       | 6            | 41.21          | 6.3             | -30.25              | 10.96           |
| CH-6                   | 927.125      | 156               | H          | -35.56         | 2.91       | 6            | 41.21          | 6.3             | -32.95              | 8.26            |
| CH-6                   | 927.125      | 371               | V          | -32.14         | 2.91       | 6            | 41.21          | 6.3             | -29.52              | 11.69           |

**Note :** Effective Isotropic Radiated Power (dBm)= Pr(dBm) +Lp(dB)

$$Pr = P_{meas}(dBm) - Gr(dBi) + Lc(dB) + Latt(dB)$$

$$Lp = 20 \log F + 20 \log D - 27.5$$

Where:

Pr = Calculated Received Power Level(dBm)

Lp= Free Space Path Loss(dB)

Pmeas= Measured Power Level(dBm)

Gr = Receiver Antenna Gain(dBi)

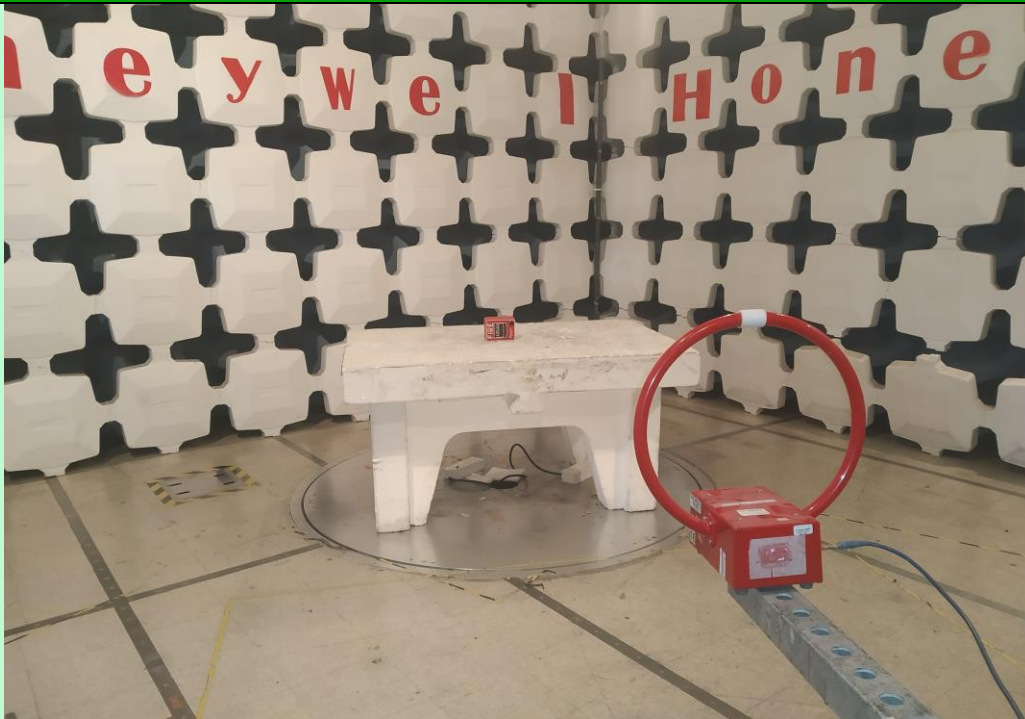
Lc = Cable Loss (dB)

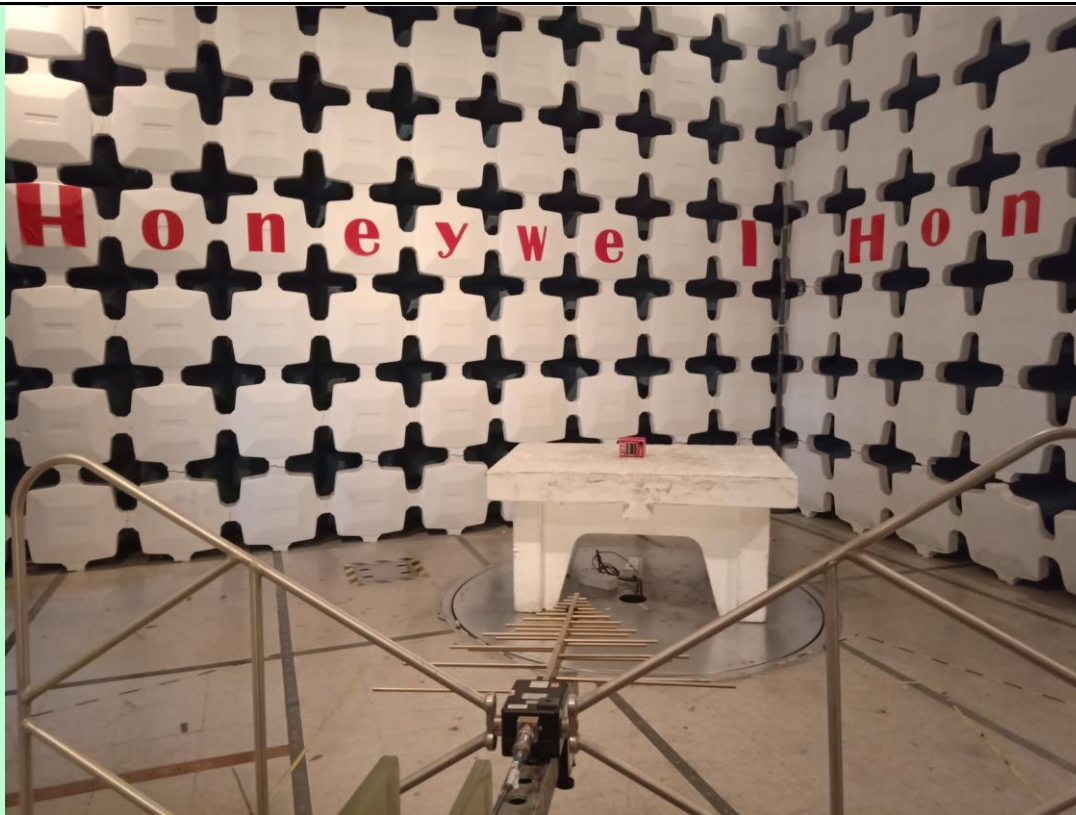
Latt= External Attenuator(dB)

F = Frequency (MHz)

D= Distance (m)

# Annexure – 1

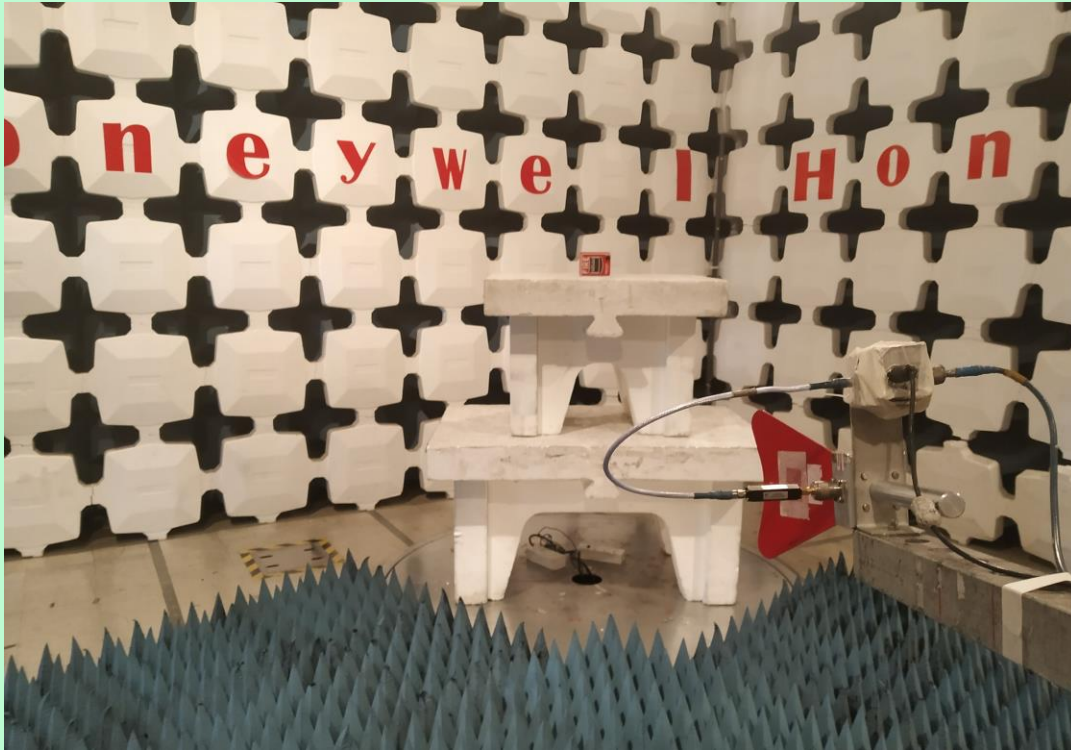
**RADIATED EMISSION SETUP****Radiated Emission Setup – 9 KHz to 30 MHz [ Parallel ]****Radiated Emission Setup – 9 KHz to 30 MHz [ Perpendicular ]**



**Radiated Emission Setup –30 MHz to 1 GHz [ Horizontal Polarization]**



**Radiated Emission Setup –30 MHz to 1 GHz [ Vertical Polarization]**



**Radiated Emission Setup –1 GHz to 10 GHz [Horizontal Polarization ]**



**Radiated Emission Setup –1 GHz to 10 GHz [Vertical Polarization ]**