# FCC Test Report

**Brand:**
Agnex Inc.

**Model Name:**
AGN3

**Product Description:**
The AGN3 is a solar-powered tank sensor monitoring device.

**Applied Rules and Standards:**
47 CFR Parts 22, 24, 27, and 90

**FCC ID:** 2BBS4AGN3

**REPORT #:** EMC_TELI2_011_23001_FCC_22_24_27_Rev1

**DATE:** 2024-01-31

**A2LA Accredited**

**IC recognized #**
**3462B-1**


***CETECOM* Inc.**
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Phone: + 1 (408) 586 6200 ◆ Fax: + 1 (408) 586 6299 ◆ E-mail: contact@cetecom.com ◆ http://www.cetecom.com
*CETECOM* Inc. is a Delaware Corporation with Corporation number: 2905571

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## 1 Assessment

The following device as further described in section 3 of this report was evaluated against the applicable criteria specified in the Code of Federal Regulations Title 47 parts 22, 24, 27, and 90.

No deficiencies were ascertained.

| Company Name | Product Description | Model # |
|---|---|---|
| Agnex Inc. | The AGN3 is a solar-powered tank sensor monitoring device. | AGN3 |

**Responsible for Testing Laboratory:**

| Date | Section | Name | Signature |
|---|---|---|---|
| 2024-01-31 | Compliance | Issa Ghanma (EMC Lab Manager) | Digitally signed by: Issa Ghanma DN: CN = Issa Ghanma email = Issa.Ghanma@cetecom.com C = US O = CETECOM, Inc. OU = EMC Date: 2024.01.31 19:15:46 -08'00' |

**Responsible for the Report:**

| Date | Section | Name | Signature |
|---|---|---|---|
| 2024-01-31 | Compliance | Cheng Song (EMC Engineer) | cheng.song@cetecom.com Digitally signed by: cheng.song@cetecom.com DN: CN = cheng.song@cetecom.com Date: 2024.01.31 18:34:45 -08'00' |

# 2 Administrative Data

## 2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

| | |
|---|---|
| **Company Name:** | CETECOM Inc. |
| **Department:** | Compliance |
| **Street Address:** | 411 Dixon Landing Road |
| **City/Zip Code** | Milpitas, CA 95035 |
| **Country** | USA |
| **Telephone:** | +1 (408) 586 6200 |
| **Fax:** | +1 (408) 586 6299 |
| **EMC Lab Manager:** | Issa Ghanma |
| **Responsible Project Leader:** | Rami Saman |

## 2.2 Identification of the Client

| | |
|---|---|
| **Client's Name:** | Agnex Inc. |
| **Street Address:** | 16460 E Annadale Ave, |
| **City/Zip Code** | Sanger CA 93657 |
| **Country** | USA |

## 2.3 Identification of the Manufacturer

| | |
|---|---|
| **Manufacturer's Name:** | Same as Client |
| **Manufacturers Address:** | |
| **City/Zip Code** | |
| **Country** | |

# 3 Equipment Under Test (EUT)

## 3.1 EUT Specifications

| | |
|---|---|
| **Brand:** | Agnex Inc. |
| **Model No** | AGN3 |
| **HW Version** | 0.3 |
| **SW Version** | 1.0.9 |
| **FCC-ID** | 2BBS4AGN3 |
| **Product Description** | The AGN3 is a solar-powered tank sensor monitoring device. |
| **Radio Information as declared** | **Cellular radio:**<br>• LTE CAT-M1 (3GPP Rel.14)<br>• 2G: GSM/GPRS/EGPRS<br>• Refer to the FCC ID: RI7ME910G1WW grant for detailed information on the output power specifications. |
| **Frequency Range** | GSM 850: 824.2 – 848.2 MHz<br>GSM 1900: 1850.2 – 1909.8 MHz<br>LTE Band 2: 1850 – 1910 MHz<br>LTE Band 4: 1710 – 1755 MHz<br>LTE Band 5: 824 – 849 MHz<br>LTE Band 12: 699 – 716 MHz<br>LTE Band 13: 777 – 787 MHz<br>LTE Band 25: 1850– 1915 MHz<br>LTE Band 26: 814 – 849 MHz<br>LTE Band 66: 1710 – 1780 MHz<br>LTE Band 85: 698 – 716 MHz |
| **Antenna Information as declared** | **KYOCERA AVX LTE cellular embedded antenna**<br>• Part No.: 1002289<br>• Peak Gain: 2.9dBi (698 – 960MHz); 4.3dBi (1710 – 2690MHz) |
| **Other Radios included in the device** | **mmWave radio:**<br>• Radar Sensor 57~64 GHz |
| **Power Supply/ Rated Operating Voltage Range** | Nominal Voltage: 3.6V<br>Charge Voltage: 4.2 ± 0.02V |
| **Operating Temperature Range** | -20°C ~ +75°C |
| **EUT Dimensions [mm]** | 106 x 106 x 54.4mm |
| **Weight [g]** | 570 |
| **Sample Revision** | ■Production ☐ Pre-Production |
| **Note:** Details about the Equipment Under Test (EUT) are provided by the client or applicant. | |

## 3.2 EUT Sample details

| EUT # | Model Number | HW Version | SW Version | Comments |
|---|---|---|---|---|
| 1 | AGN3 | 0.3 | 1.0.9 | - |

## 3.3 Accessory Equipment (AE) details

| AE # | Type | Model | Manufacturer | Serial Number |
|---|---|---|---|---|
| 1 | - | - | - | - |

## 3.4 Test Sample Configuration

| Set-up # | EUT / AE used for set-up | Comments |
|---|---|---|
| 1 | EUT#1 | - |

## 3.5 Mode of Operation

| Mode of Operation | Description of Operating modes | Additional Information |
|---|---|---|
| Op. 1 | Cellular | Cellular was tested on LTE CAT-M1 mid Channel at the maximum power. |

## 3.6 Justification for Worst Case Mode of Operation

During the testing process the cellular radio was tested with transmitter sets to mid channel at the maximum power, as it is described in section 3.5 of this document; representing the worst case mode of operation.

For radiated measurements, all data in this report shows the worst case between horizontal and vertical antenna polarizations and for all orientations of the EUT.

# 4 Subject of Investigation

The objective of the measurements done by CETECOM Inc. was to evaluate the compliance of the EUT against the relevant requirements specified in section 1.

# 5 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus, with 95% confidence interval (in dB delta to result), based on a coverage factor k=2.

Radiated measurement

| Measurement System | | EMC 1 | EMC 2 |
|---|---|---|---|
| Conducted emissions (mains port) | | 1.12 dB | 0.46 dB |
| Radiated emissions | (< 30 MHz) | 3.66 dB | 3.88 dB |
| | (30 MHz – 1GHz) | 3.17 dB | 3.34 dB |
| | (1 GHz – 3 GHz) | 5.01 dB | 4.45 dB |
| | (>3 GHz) | 4.0 dB | 4.79 dB |

RF conducted measurement ±0.5 dB

According to TR 102 273 a multiplicative propagation of error is assumed for RF measurement systems. For this reason the RMS method is applied to dB values and not to linear values as appropriate for additive propagation of error. Also used: http://physics.nist.gov/cuu/Uncertainty/typeb.html. The above calculated uncertainties apply to direct application of the Substitution method. The Substitution method is always used when the EUT comes closer than 3dB to the limit.

## 5.1 Environmental Conditions During Testing:

The following environmental conditions were maintained during the course of testing:

- Ambient Temperature: 20-25°C
- Relative humidity: 40-60%

## 5.2 Dates of Testing:

2023-07-24 – 2023-08-01

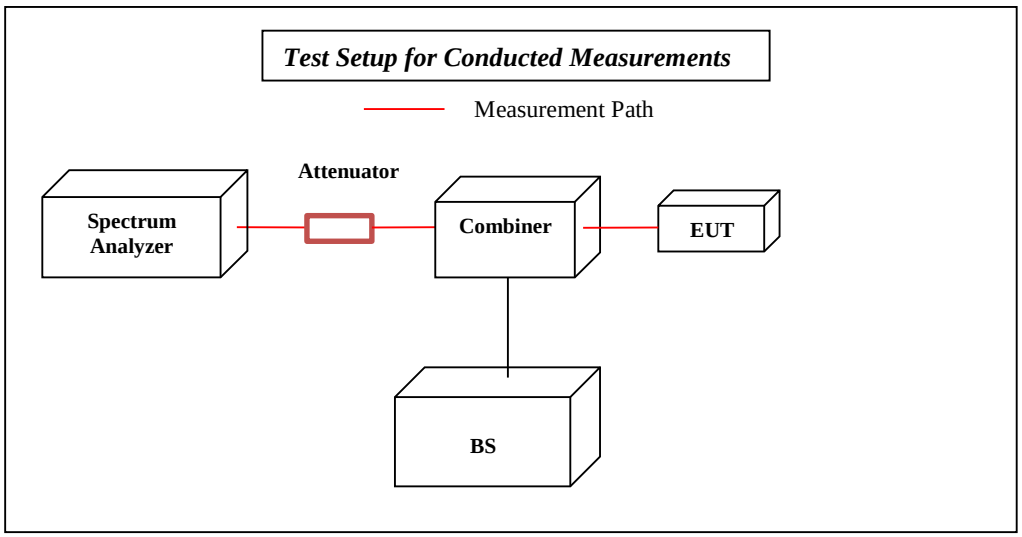
## 5.3 Decision Rule:

Cetecom advanced follows ILAC G8:2019 chapter 4.2.1 (Simple Acceptance Rule).

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3. The measurement uncertainty is mentioned in this test report, See chapter 9, but is not taken into account – neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong.

# 6 Measurement Procedures

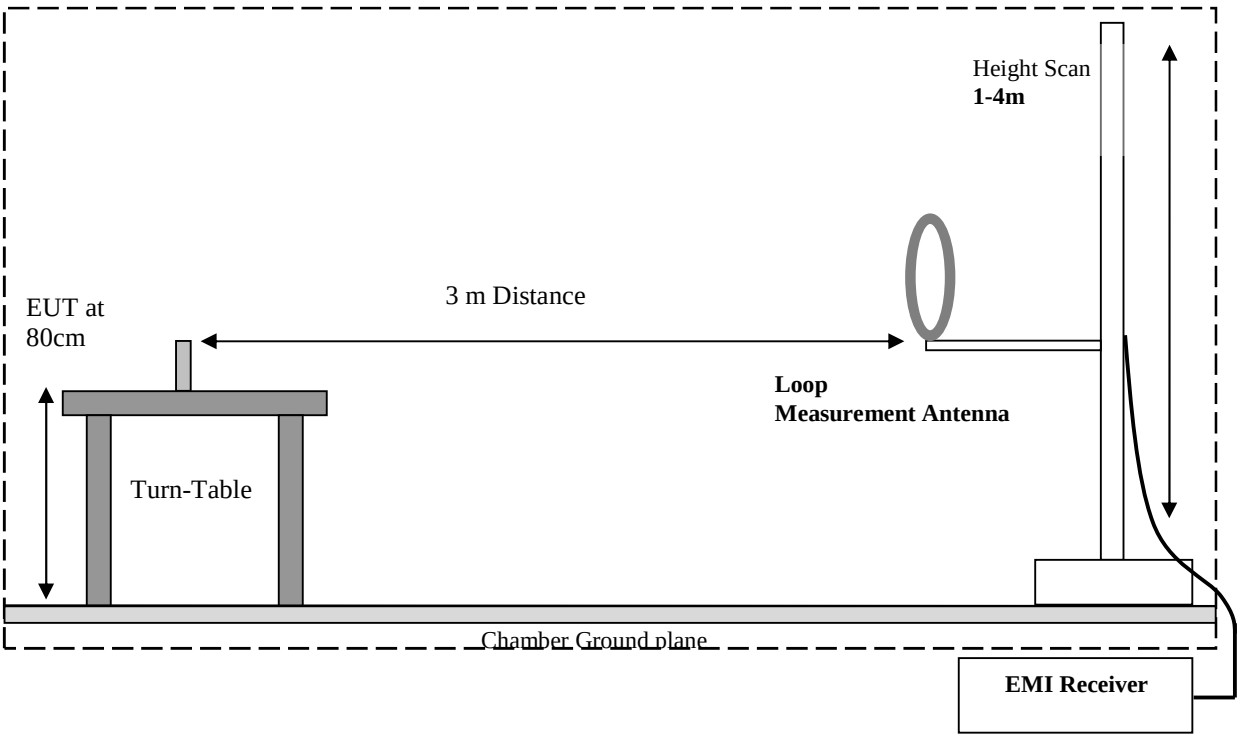
Testing is performed according to the guidelines provided in FCC publication (KDB) 971168 D01 v03r01 – "Measurement Guidance for Certification of Licensed Digital Transmitters" and according to relevant parts of ANSI/TIA-603-D-2010 as detailed below.



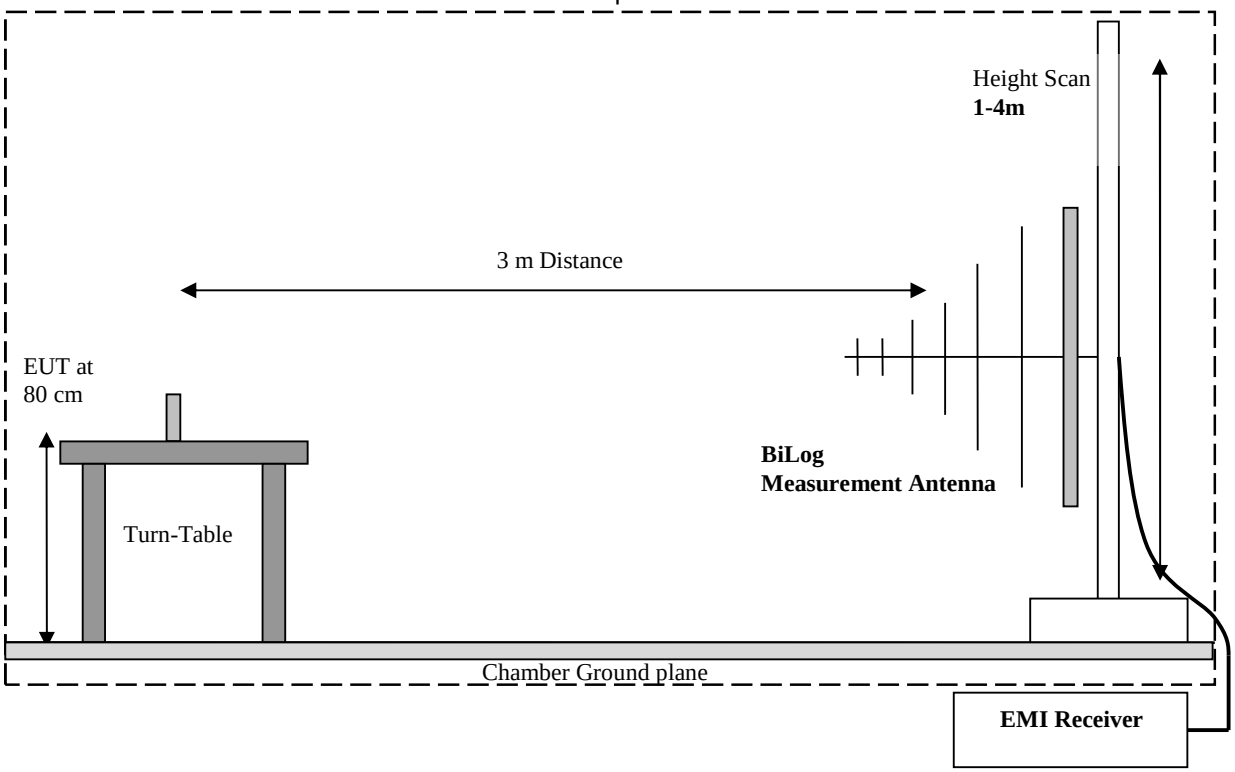

## 6.1 Radiated Measurement

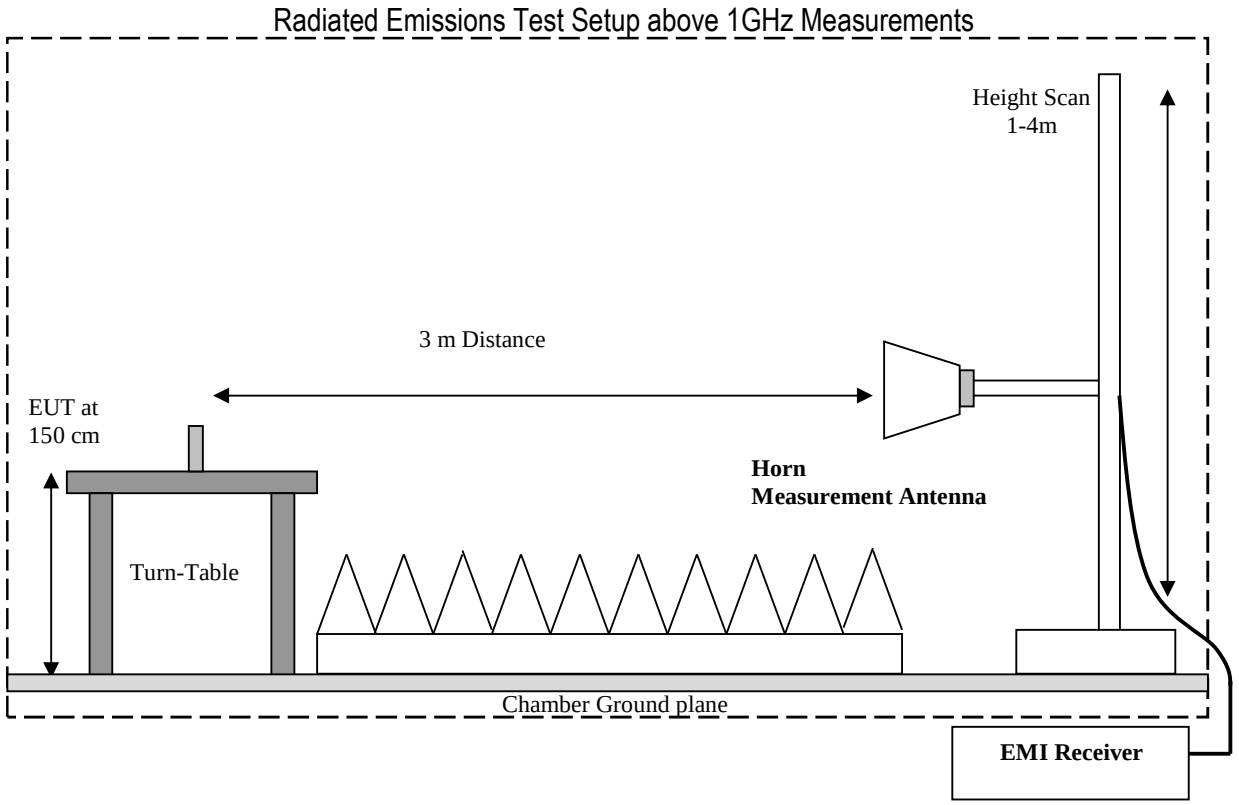
- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The 10 highest emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise floor level only the maximum trace is reported as described above.
- The results are split up into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a Biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.

Radiated Emissions Test Setup below 30MHz Measurements




Radiated Emissions Test Setup 30MHz-1GHz Measurements






## 6.2 Sample Calculations for Field Strength Measurements

Field Strength is calculated from the Spectrum Analyzer/ Receiver readings, taking into account the following parameters:

- Measured reading in dBµV
- Cable Loss between the receiving antenna and SA in dB and
- Antenna Factor in dB/m

All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the following equation:

FS (dBµV/m) = Measured Value on SA (dBµV)+ Cable Loss (dB)+ Antenna Factor (dB/m)

Example:

| Frequency (MHz) | Measured SA (dBµV) | Cable Loss (dB) | Antenna Factor Correction (dB) | Field Strength Result (dBµV/m) |
|---|---|---|---|---|
| 1000 | 80.5 | 3.5 | 14 | 98.0 |

# 7 Measurement Results Summary

## 7.1 FCC 22

| Test Specification | Test Case | Temperature and Voltage Conditions | Mode | Pass | Fail | NA | NP | Result |
|---|---|---|---|---|---|---|---|---|
| §2.1046; §22.913 (a) | RF Output Power | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 Note 3 |
| §2.1055; §22.355 | Frequency Tolerance | Extreme Temperature and Voltage | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 Note 3 |
| §2.1049; §22.917 | Occupied Bandwidth | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 Note 3 |
| §2.1051; §22.917 | Band Edge Compliance | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 Note 3 |
| §2.1051; §22.917 | Conducted Spurious Emissions | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 Note 3 |
| §2.1053; §22.917 | Radiated Spurious Emissions | Nominal | Op. 1 | ■ | ☐ | ☐ | ☐ | Note 4 |

**Note 1**: NA= Not Applicable; NP= Not Performed.
**Note 2**: The LTE CAT-M test results are leveraged from Report #: STS1912245W01, corresponding to FCC ID: RI7ME910G1WW, IC: 5131A-ME910G1WW.
**Note 3**: The GSM 850 test results are leveraged from Report #: STS1912245W03, corresponding to FCC ID: RI7ME910G1WW, IC: 5131A-ME910G1WW.
**Note 4**: The testing for GSM 850 and LTE Band 5 was performed in accordance with the test specifications outlined in FCC Part 22.

## 7.2 FCC 24

| Test Specification | Test Case | Temperature and Voltage Conditions | Mode | Pass | Fail | NA | NP | Result |
|---|---|---|---|---|---|---|---|---|
| §2.1046; §24.232 (a) | RF Output Power | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 Note 3 |
| §2.1055; §24.235 | Frequency Stability | Extreme Temperature and Voltage | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 Note 3 |
| §2.1049; §24.238 | Occupied Bandwidth | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 Note 3 |
| §2.1051; §24.238 | Band Edge Compliance | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 Note 3 |
| §2.1051; §24.238 | Conducted Spurious Emissions | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 Note 3 |
| §2.1053; §24.238 | Radiated Spurious Emissions | Nominal | Op. 1 | ■ | ☐ | ☐ | ☐ | Note 4 |

**Note 1**: NA= Not Applicable; NP= Not Performed.
**Note 2**: The LTE CAT-M test results are leveraged from Report #: STS1912245W01, corresponding to FCC ID: RI7ME910G1WW, IC: 5131A-ME910G1WW.
**Note 3**: The GSM 1900 test results are leveraged from Report #: STS1912245W03, corresponding to FCC ID: RI7ME910G1WW, IC: 5131A-ME910G1WW.
**Note 4**: The testing for GSM 1900, LTE Band 2, and LTE Band 25 was performed in accordance with the test specifications outlined in FCC Part 24.

### 7.3 FCC 27

| Test Specification | Test Case | Temperature and Voltage Conditions | Mode | Pass | Fail | NA | NP | Result |
|---|---|---|---|---|---|---|---|---|
| §2.1046; §27.50 | RF Output Power | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §2.1055; §27.54 | Frequency Stability | Extreme Temperature and Voltage | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §2.1049; §27.53 | Occupied Bandwidth | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §2.1051; §27.53 | Band Edge Compliance | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §2.1051; §27.53 | Conducted Spurious Emissions | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §2.1053; §27.53 | Radiated Spurious Emissions | Nominal | Op. 1 | ■ | ☐ | ☐ | ☐ | Note 3 |

**Note 1**: NA= Not Applicable; NP= Not Performed.
**Note 2**: The LTE CAT-M test results are leveraged from Report #: STS1912245W01, corresponding to FCC ID: RI7ME910G1WW, IC: 5131A-ME910G1WW.
**Note 3**: The testing for LTE Band 4, LTE Band 12, LTE Band 13, LTE Band 66, and LTE Band 85 was performed in accordance with the test specifications outlined in FCC Part 27.

### 7.4 FCC 90

| Test Specification | Test Case | Temperature and Voltage Conditions | Mode | Pass | Fail | NA | NP | Result |
|---|---|---|---|---|---|---|---|---|
| §2.1046; §90.635(b) | RF Output Power | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §90.635(b) | Effective Radiated Power | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §2.1055; §90.213 | Frequency Stability | Extreme Temperature and Voltage | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §2.1049; §90.209 | Occupied Bandwidth | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §2.1051; §90.691 | Emission Masks | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §2.1051; §90.691 | Spurious Emissions at Antenna Terminals | Nominal | - | ☐ | ☐ | ☐ | ■ | Note 1 Note 2 |
| §2.1053; §90.691 | Radiated Spurious Emissions | Nominal | Op. 1 | ■ | ☐ | ☐ | ☐ | Note 3 |

**Note 1**: NA= Not Applicable; NP= Not Performed.
**Note 2**: The LTE CAT-M test results are leveraged from Report #: STS1912245W01, corresponding to FCC ID: RI7ME910G1WW, IC: 5131A-ME910G1WW.
**Note 3**: The testing for LTE Band 26 was performed in accordance with the test specifications outlined in FCC Part 90.

# 8 Test Result Data

## 8.1 Radiated Spurious Emissions

### 8.1.1 Measurement utilizing KDB 971168 D01 Power Meas License Digital Systems v03r01, and according to ANSI/TIA-603-D-2010

**Spectrum Analyzer Settings for FCC 22**

| Frequency Range | 30MHz – 1 GHz | 1 – 1.58 GHz | 1.58 – 9 GHz |
|---|---|---|---|
| Resolution Bandwidth | 100 kHz | 1 MHz | 1 MHz |
| Video Bandwidth | 100 kHz | 1 MHz | 1 MHz |
| Detector | Peak | Peak | Peak |
| Trace Mode | Max Hold | Max Hold | Max Hold |
| Sweep Time | Auto | Auto | Auto |

**Spectrum Analyzer Settings for FCC 24, 27, and 90**

| Frequency Range | 30MHz – 1 GHz | 1 – 2.7 GHz | 2.7 – 18 GHz | 18 – 19.1 GHz |
|---|---|---|---|---|
| Resolution Bandwidth | 100 kHz | 1 MHz | 1 MHz | 1 MHz |
| Video Bandwidth | 100 kHz | 1 MHz | 1 MHz | 1 MHz |
| Detector | Peak | Peak | Peak | Peak |
| Trace Mode | Max Hold | Max Hold | Max Hold | Max Hold |
| Sweep Time | Auto | Auto | Auto | Auto |

### 8.1.2 Limits:

8.1.2.1 FCC Part 22.917 (a); FCC Part 24.238 (a); FCC Part 27.53 (c); FCC Part 27.53 (g); FCC Part 27.53 (h) and FCC Part 90.691 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

### 8.1.3 Test conditions and setup:

| Ambient Temperature (C) | EUT Set-Up # | EUT operating mode | Power Input |
|---|---|---|---|
| 22 | 1 | Op. 1 | 120 VAC |

## 8.2 ERP/EIRP Emission Analysis:

| Rule Part | F Low MHz | F High MHz | PPM | Emission Designator | ERP/EIRP Watts |
|---|---|---|---|---|---|
| 27 | 699.7 | 715.3 | 2.5 PM | 938KW7D | 0.24 |
| 27 | 699.7 | 715.3 | 2.5 PM | 1M10G7D | 0.26 |
| 27 | 700.5 | 713.5 | 2.5 PM | 940KW7D | 0.25 |
| 27 | 700.5 | 713.5 | 2.5 PM | 1M10G7D | 0.25 |
| 27 | 779.5 | 784.5 | 2.5 PM | 1M10G7D | 0.24 |
| 27 | 779.5 | 784.5 | 2.5 PM | 939KW7D | 0.24 |
| 90 | 814.7 | 823.3 | 2.5 PM | 1M10G7D | 0.26 |
| 90 | 814.7 | 823.3 | 2.5 PM | 925KW7D | 0.25 |
| 22H | 824.2 | 848.8 | 2.5 PM | 246KGXW | 2.5 |
| 22H | 824.2 | 848.8 | 2.5 PM | 248KG7W | 0.72 |
| 22H | 824.7 | 848.3 | 2.5 PM | 1M10G7D | 0.26 |
| 22H | 824.7 | 848.3 | 2.5 PM | 1M10W7D | 0.26 |
| 22H | 824.7 | 848.3 | 2.5 PM | 1M10G7D | 0.27 |
| 22H | 824.7 | 848.3 | 2.5 PM | 931KW7D | 0.29 |
| 27 | 1710.7 | 1779.3 | 2.5 PM | 1M11G7D | 0.65 |
| 27 | 1710.7 | 1779.3 | 2.5 PM | 1M10W7D | 0.62 |
| 27 | 1710.7 | 1754.3 | 2.5 PM | 1M10G7D | 0.65 |
| 27 | 1710.7 | 1754.3 | 2.5 PM | 940KW7D | 0.62 |
| 24E | 1850.2 | 1909.8 | 2.5 PM | *246KGXW* | *1.66* |
| 24E | 1850.2 | 1909.8 | 2.5 PM | *247KG7W* | *0.53* |
| 24E | 1850.7 | 1909.3 | 2.5 PM | 1M10G7D | 0.62 |
| 24E | 1850.7 | 1909.3 | 2.5 PM | 926KW7D | 0.62 |
| 24E | 1850.7 | 1914.3 | 2.5 PM | 1M11G7D | 0.62 |
| 24E | 1850.7 | 1914.3 | 2.5 PM | 936KW7D | 0.65 |

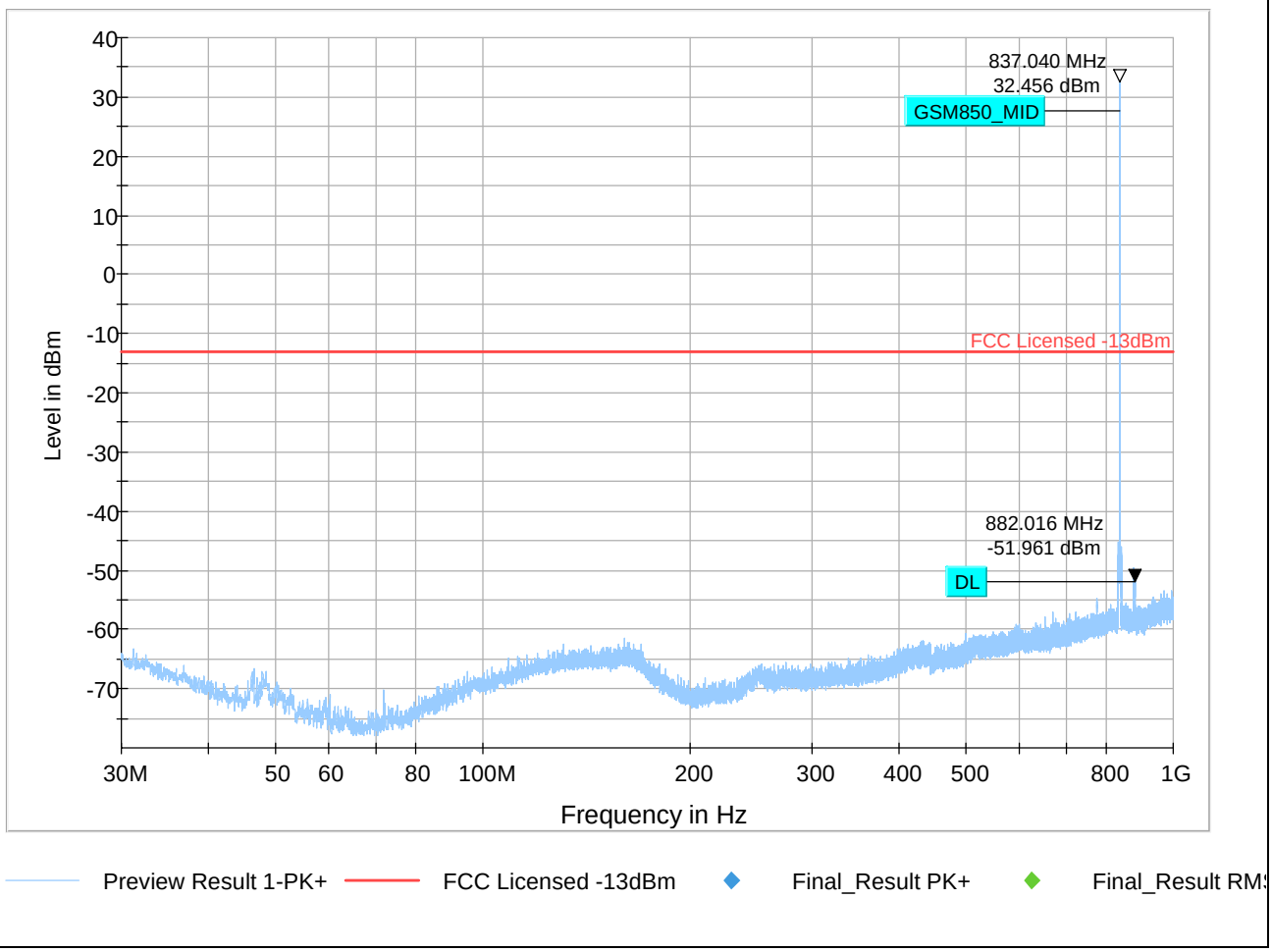
Using the conducted power from the modular report and the declared antenna gain for the device the ERP/EIRP were calculated. The eirp emissions in *italics* were measured in our OTA lab and the values are as outline.

### 8.2.1 Measurement result:

| Plot # | EUT operating band | Scan Frequency | Limit (dBm) | Result |
|---|---|---|---|---|
| 1-3 | GSM 850 | 30 MHz – 9 GHz | -13 | Pass |
| 4-7 | GSM 1900 | 30 MHz – 22 GHz | -13 | Pass |
| 8-11 | LTE B2 | 30 MHz – 22 GHz | -13 | Pass |
| 12-14 | LTE B4 | 30 MHz – 18 GHz | -13 | Pass |
| 15-17 | LTE B5 | 30 MHz – 9 GHz | -13 | Pass |
| 18-20 | LTE B12 | 30 MHz – 18 GHz | -13 | Pass |
| 21-23 | LTE B13 | 30 MHz – 18 GHz | -13 | Pass |
| 24-27 | LTE B25 | 30 MHz – 22 GHz | -13 | Pass |
| 28-30 | LTE B26 | 30 MHz – 18 GHz | -13 | Pass |
| 31-33 | LTE B66 | 30 MHz – 18 GHz | -13 | Pass |
| 34-36 | LTE B85 | 30 MHz – 18 GHz | -13 | Pass |

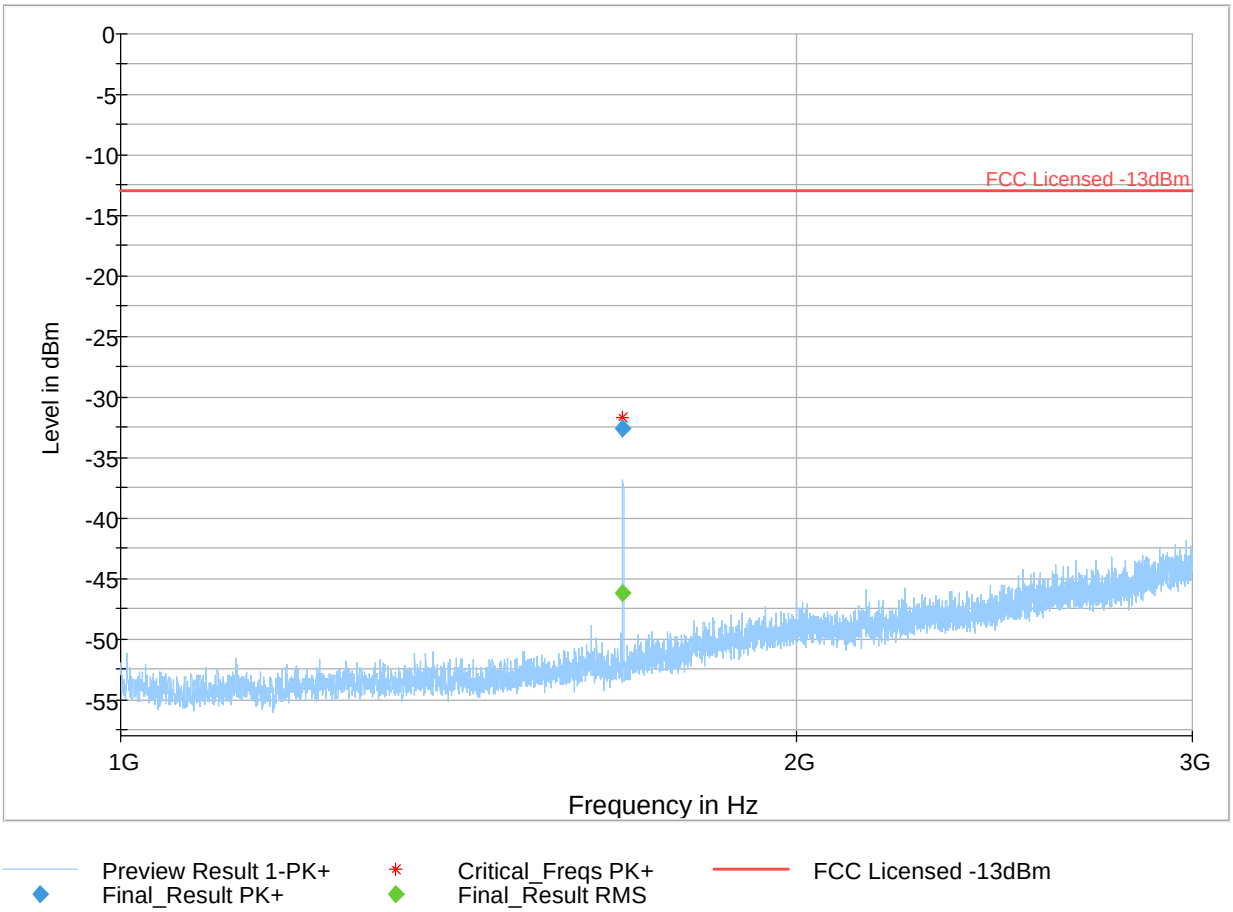
### 8.2.2 Measurement Plots:

**Plot # 1**

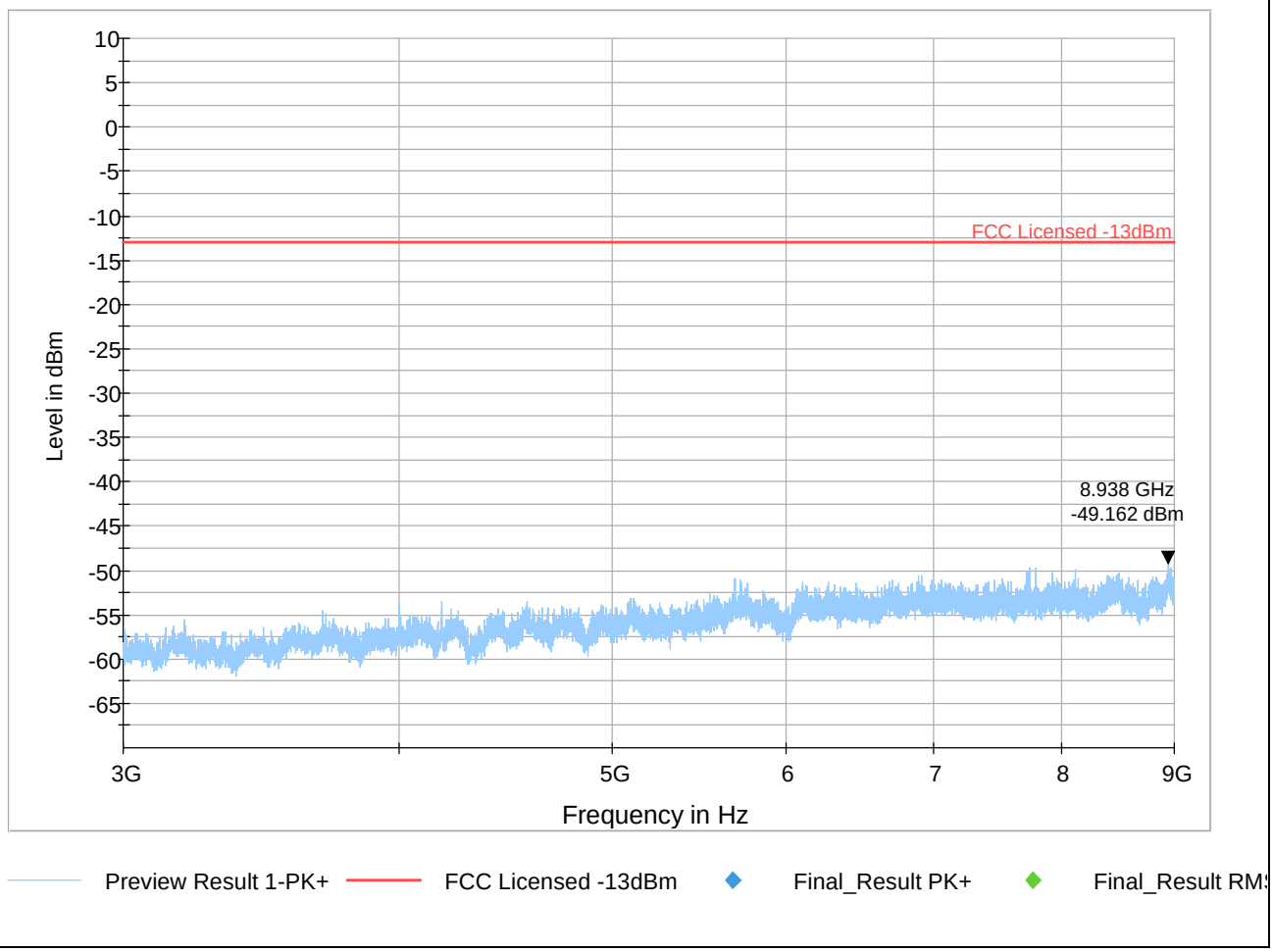


## Plot # 2

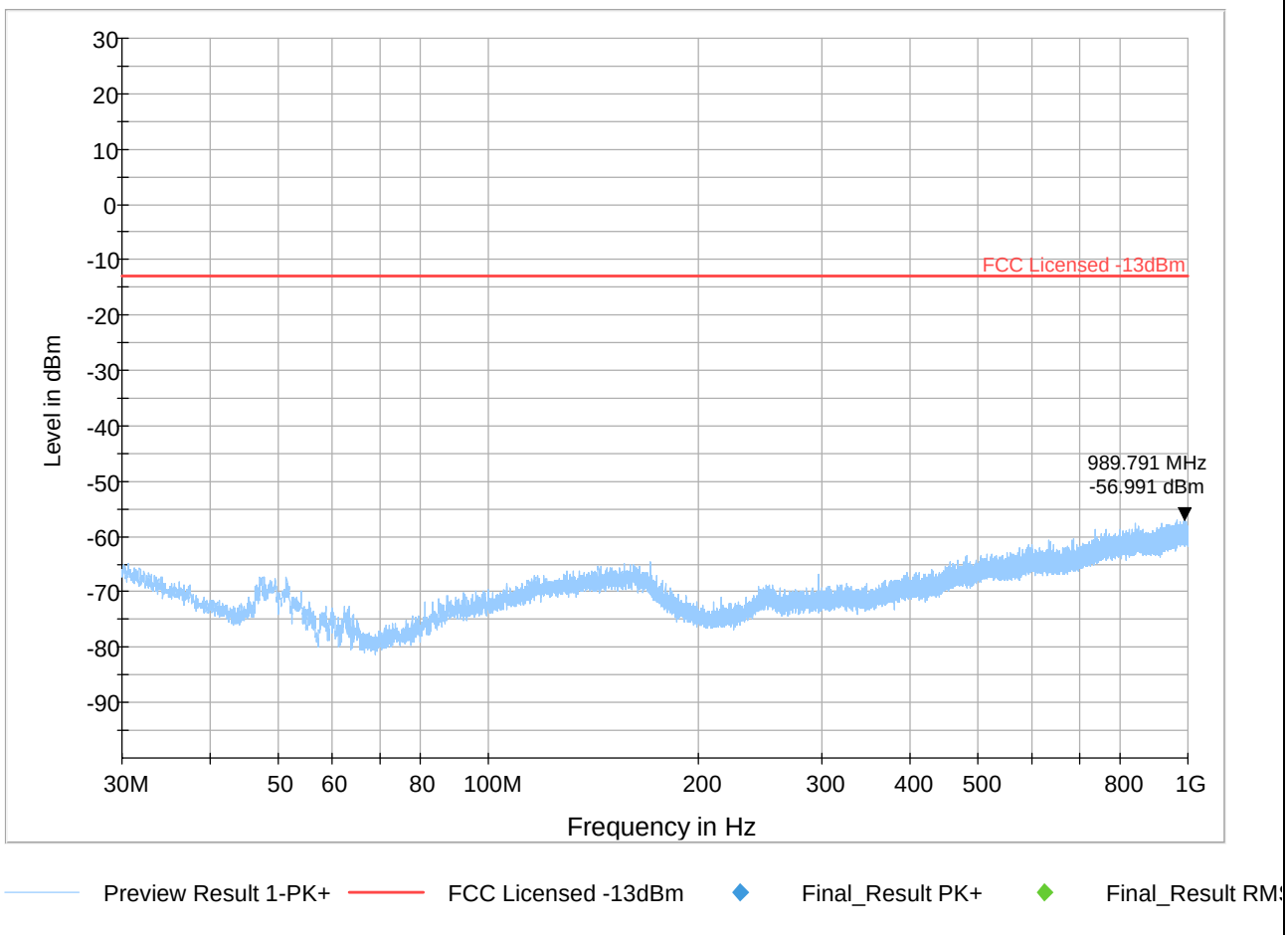
| Frequency (MHz) | MaxPeak (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1673.75 | --- | -46.19 | --- | --- | 500.0 | 1000.0 | 142.0 | V | 34.0 | -64.9 |
| 1673.75 | -32.53 | --- | -13.00 | 19.53 | 500.0 | 1000.0 | 142.0 | V | 34.0 | -64.9 |



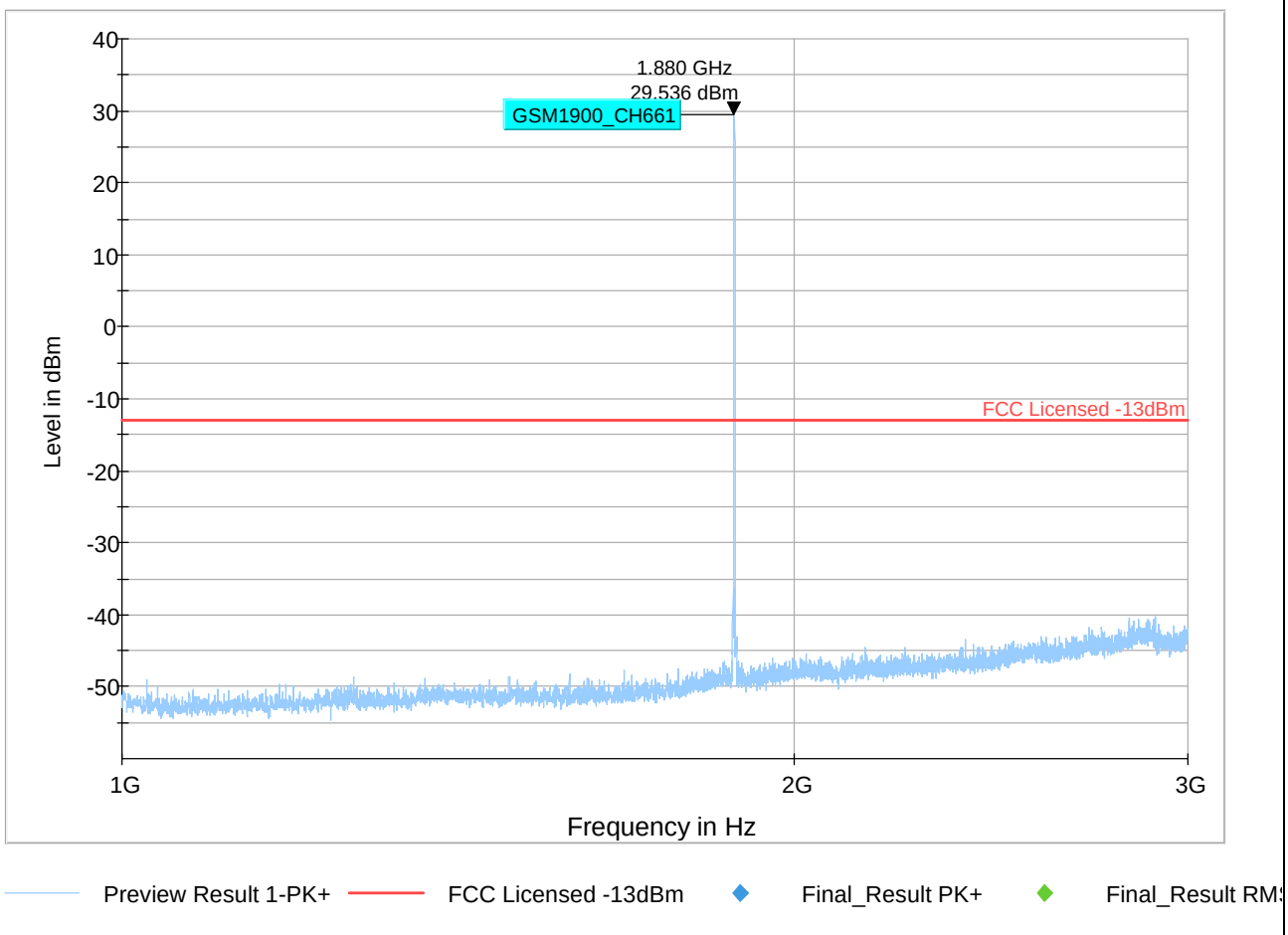
**Plot # 3**


10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
Level in dBm
FCC Licensed -13dBm
8.938 GHz
-49.162 dBm
3G
5G
6
7
8
9G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

**Plot # 4**


30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Level in dBm
FCC Licensed -13dBm
989.791 MHz
-56.991 dBm
30M
50
60
80
100M
200
300
400
500
800
1G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

## Plot # 5

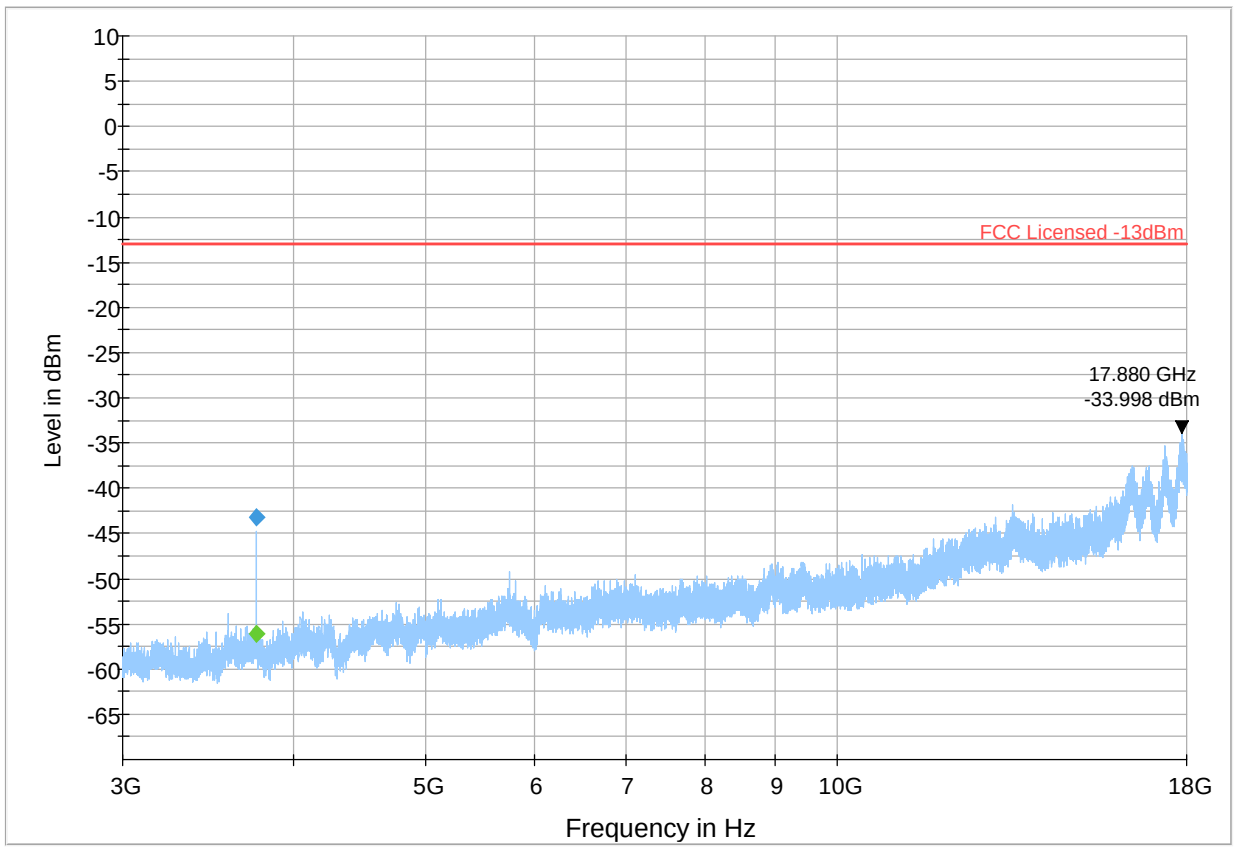

1.880 GHz
29.536 dBm
GSM1900_CH661
FCC Licensed -13dBm
Level in dBm
40
30
20
10
0
-10
-20
-30
-40
-50
1G
2G
3G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

## Plot # 6

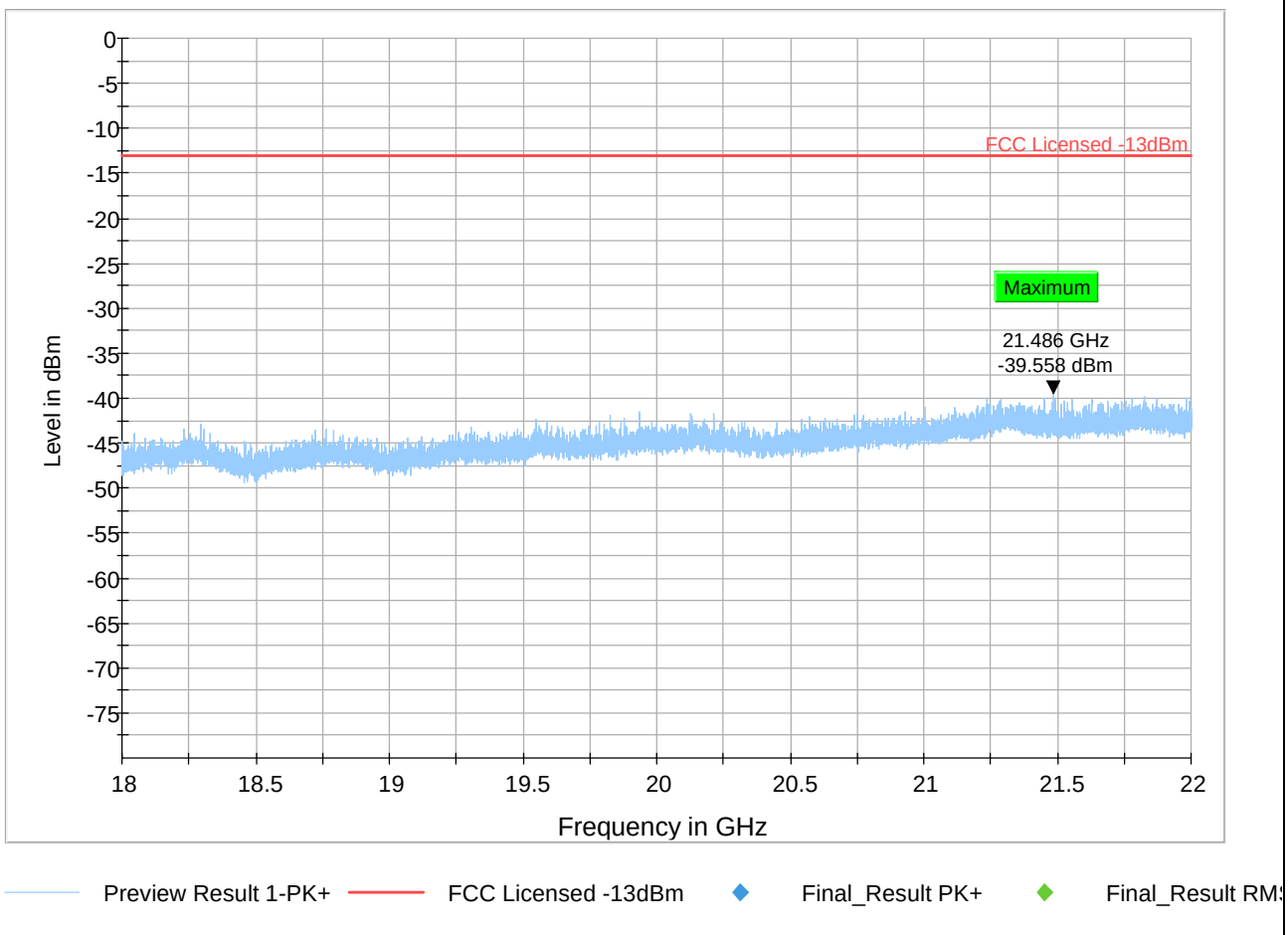
| Frequency (MHz) | MaxPeak (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3759.75 | --- | -56.05 | --- | --- | 500.0 | 1000.0 | 116.0 | V | 191.0 | -100.9 | 7.2 | 0.0 | -108.0 |
| 3759.75 | -43.25 | --- | -13.00 | 30.25 | 500.0 | 1000.0 | 116.0 | V | 191.0 | -100.9 | 7.2 | 0.0 | -108.0 |

(continuation of the "Final_Result" table from column 19 ...)

| Frequency (MHz) | Raw Rec (dBµV) |
|---|---|
| 3759.75 | 44.8 |
| 3759.75 | 57.6 |



## Plot # 7

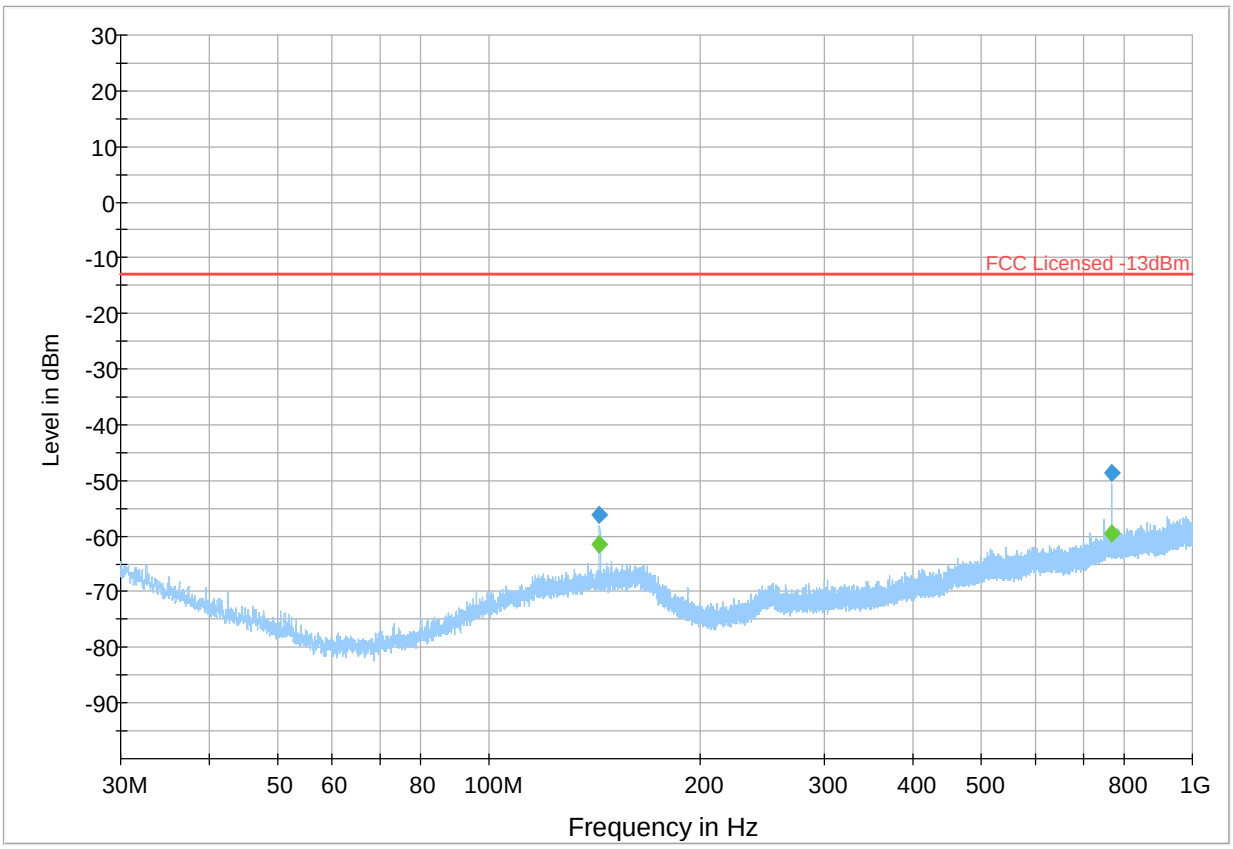

FCC Licensed -13dBm
Maximum
21.486 GHz
-39.558 dBm
Level in dBm
Frequency in GHz
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
-70
-75
18
18.5
19
19.5
20
20.5
21
21.5
22
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

## Plot # 8

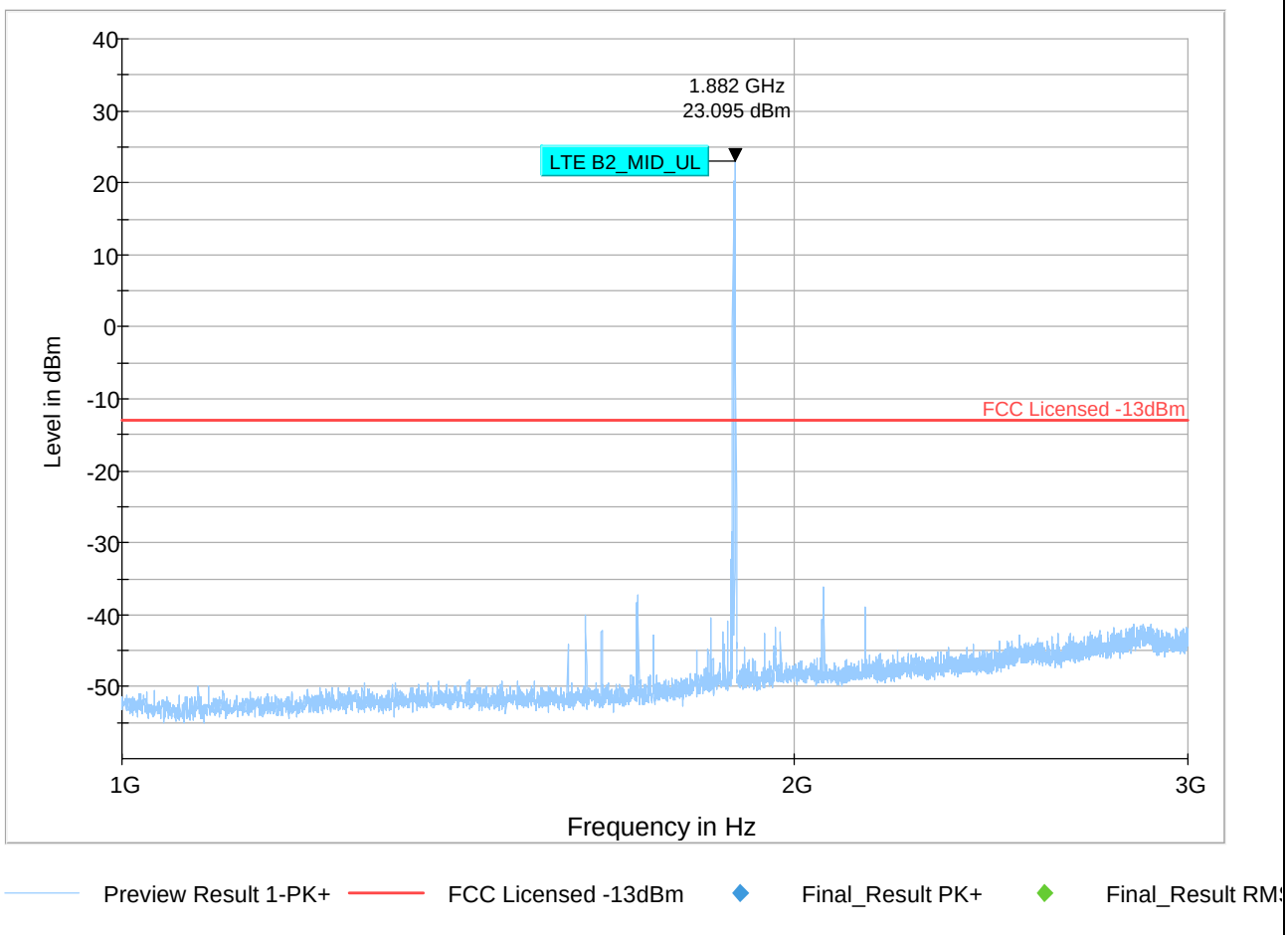
| Frequency (MHz) | MaxPeak (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 143.88 | --- | -61.45 | --- | --- | 500.0 | 120.0 | 166.0 | H | 104.0 | -70.2 | 0.8 | 0.0 | -70.9 |
| 143.88 | -56.17 | --- | -13.00 | 43.17 | 500.0 | 120.0 | 166.0 | H | 104.0 | -70.2 | 0.8 | 0.0 | -70.9 |
| 768.00 | --- | -59.58 | --- | --- | 500.0 | 120.0 | 107.0 | H | 338.0 | -64.8 | 2.3 | 0.0 | -67.1 |
| 768.00 | -48.63 | --- | -13.00 | 35.63 | 500.0 | 120.0 | 107.0 | H | 338.0 | -64.8 | 2.3 | 0.0 | -67.1 |

(continuation of the "Final_Result" table from column 19 ...)

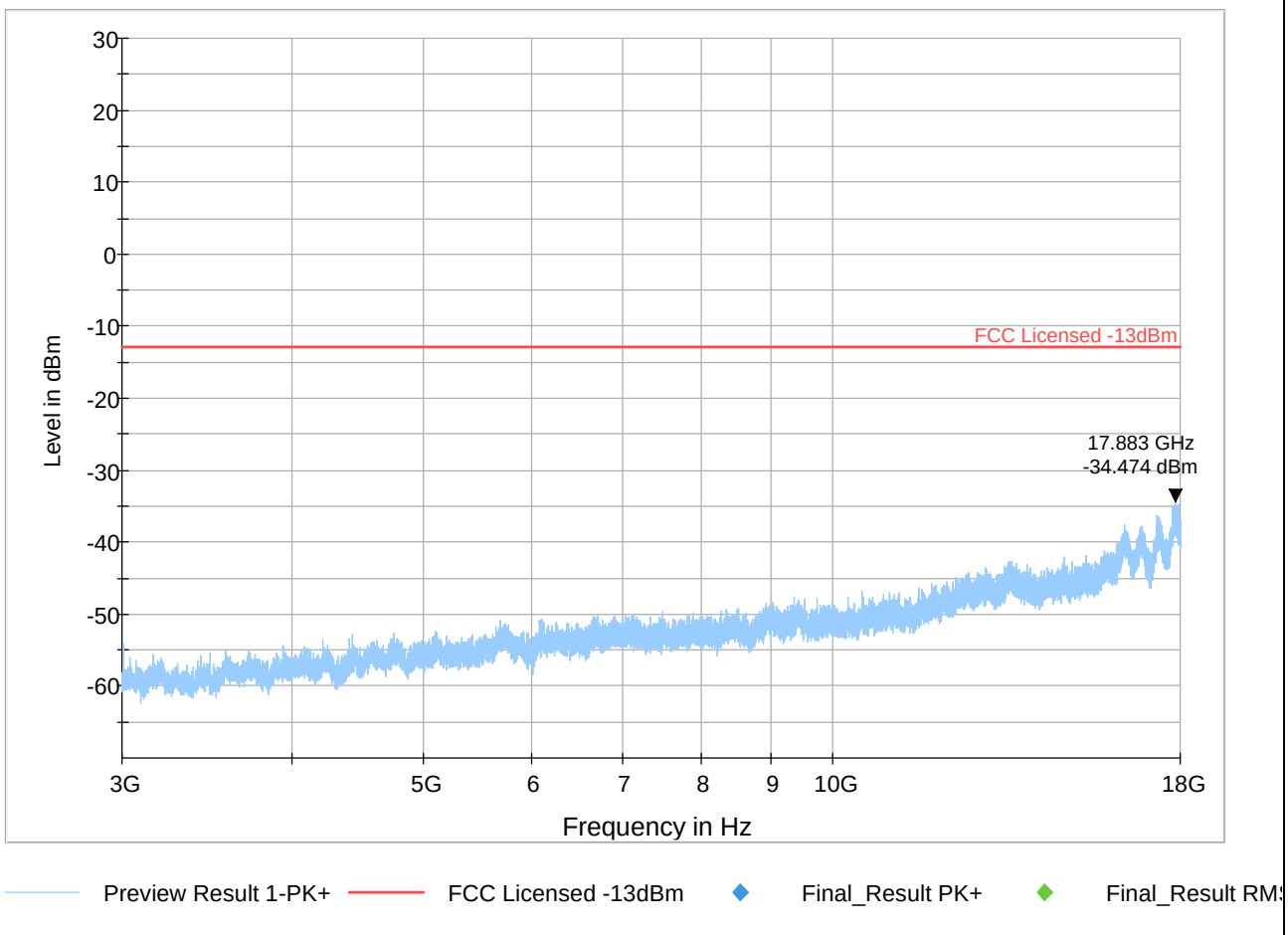
| Frequency (MHz) | Raw Rec (dBµV) |
|---|---|
| 143.88 | 8.7 |
| 143.88 | 14.0 |
| 768.00 | 5.2 |
| 768.00 | 16.2 |



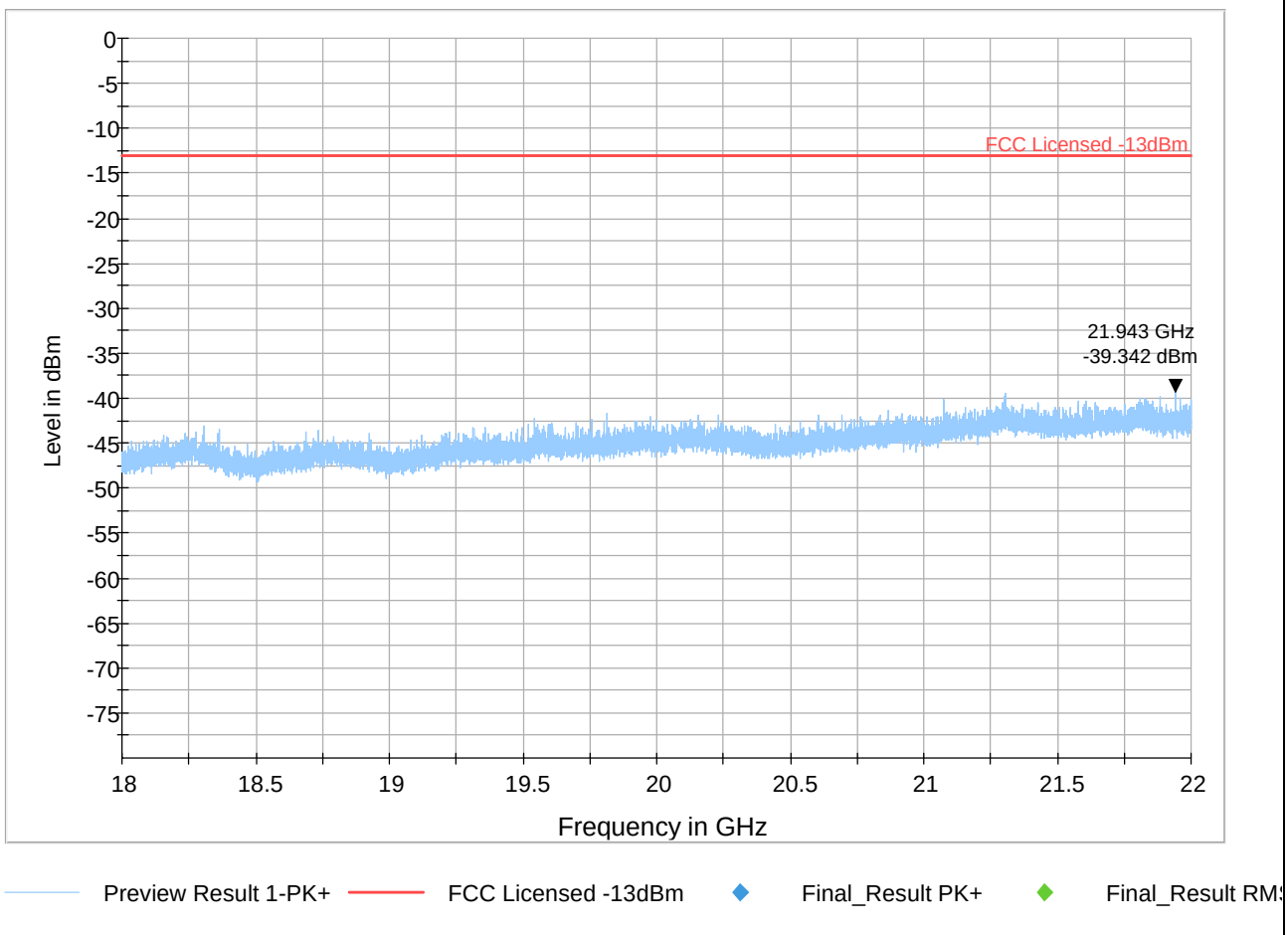
**Plot # 9**


1.882 GHz
23.095 dBm
LTE B2_MID_UL
FCC Licensed -13dBm
Level in dBm
40
30
20
10
0
-10
-20
-30
-40
-50
1G
2G
3G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

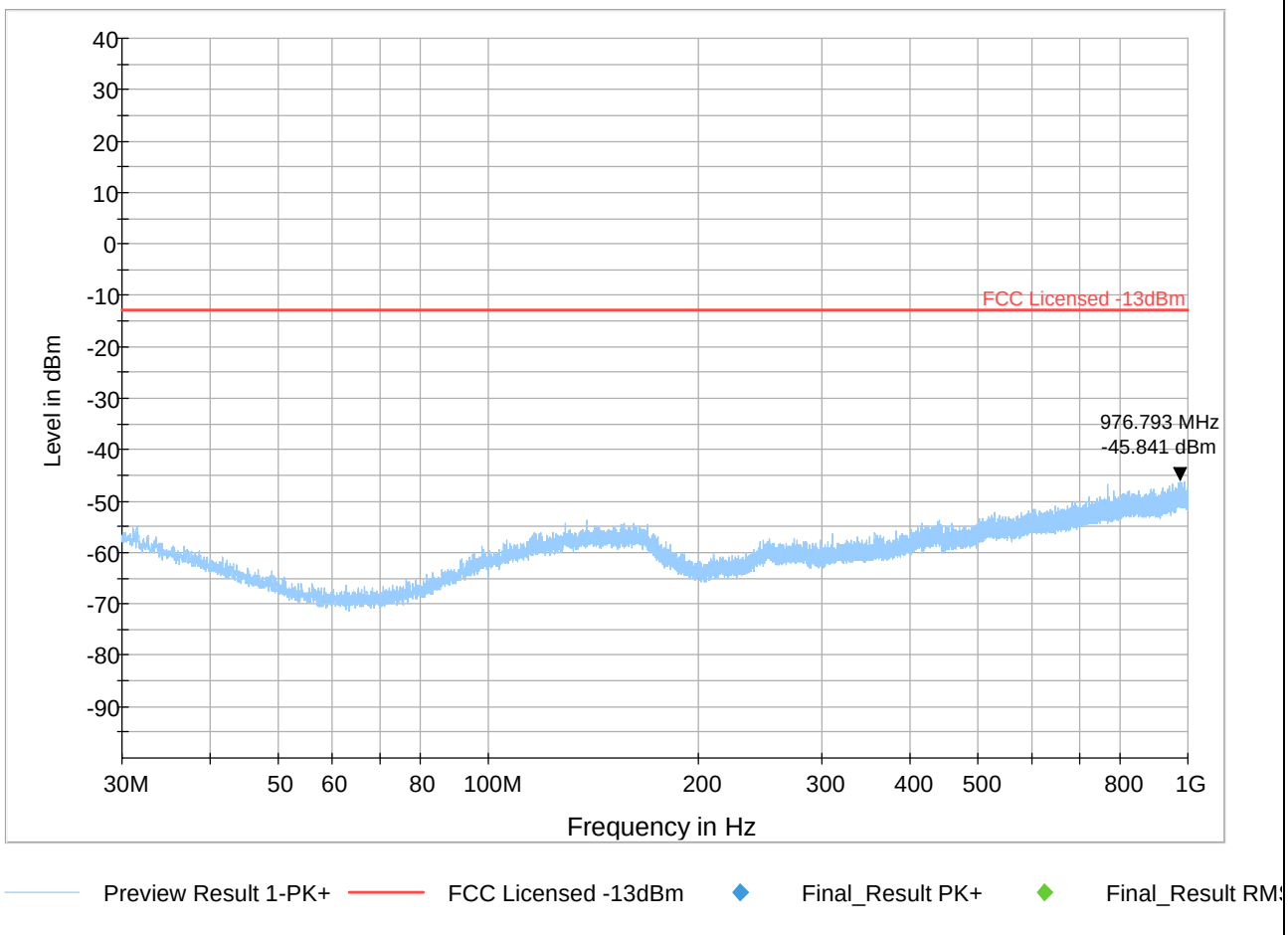
**Plot # 10**


30
20
10
0
-10
-20
-30
-40
-50
-60
Level in dBm
FCC Licensed -13dBm
17.883 GHz
-34.474 dBm
3G
5G
6
7
8
9
10G
18G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

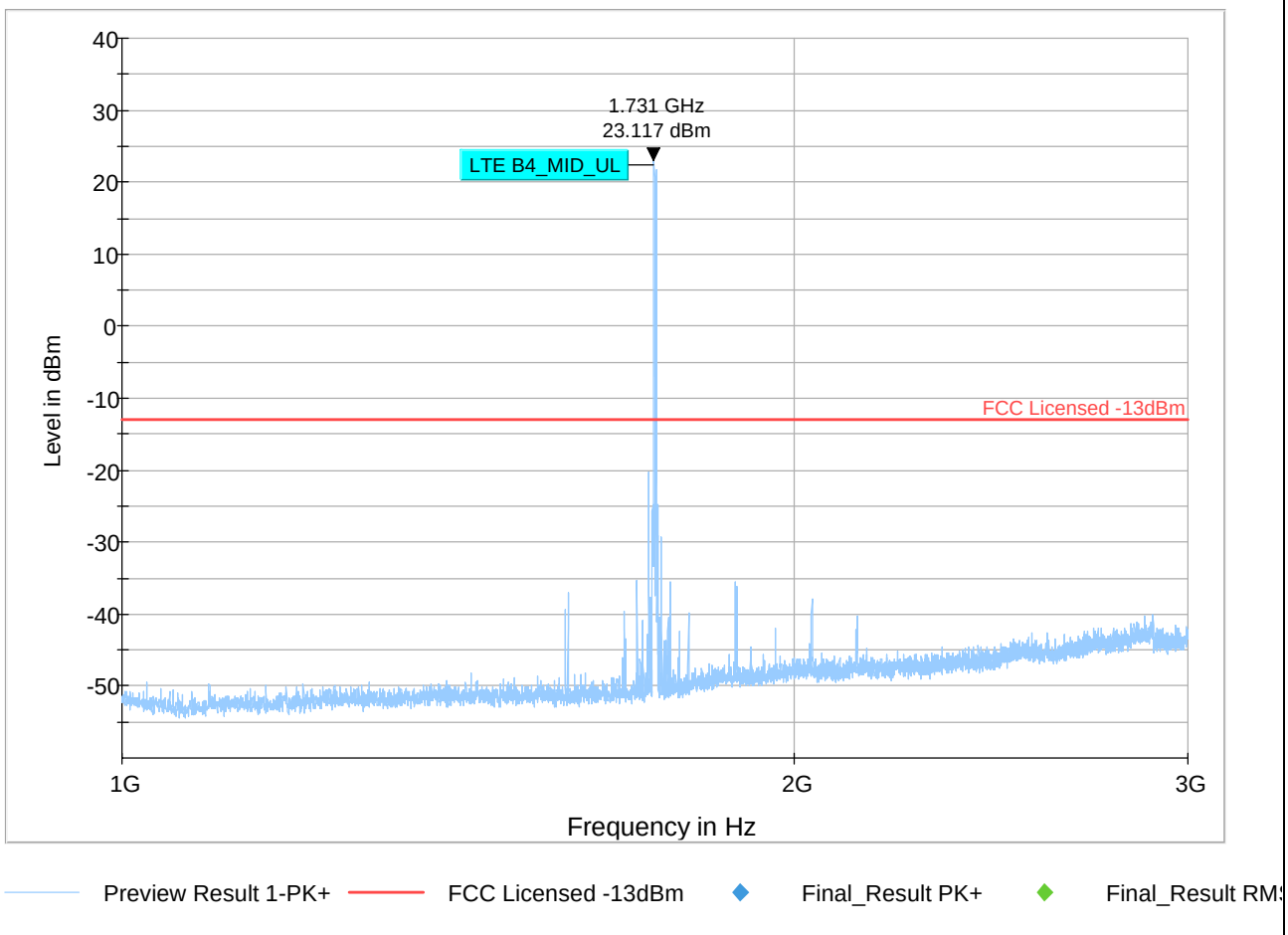
## Plot # 11


FCC Licensed -13dBm
21.943 GHz
-39.342 dBm
Level in dBm
Frequency in GHz
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
-70
-75
18
18.5
19
19.5
20
20.5
21
21.5
22
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

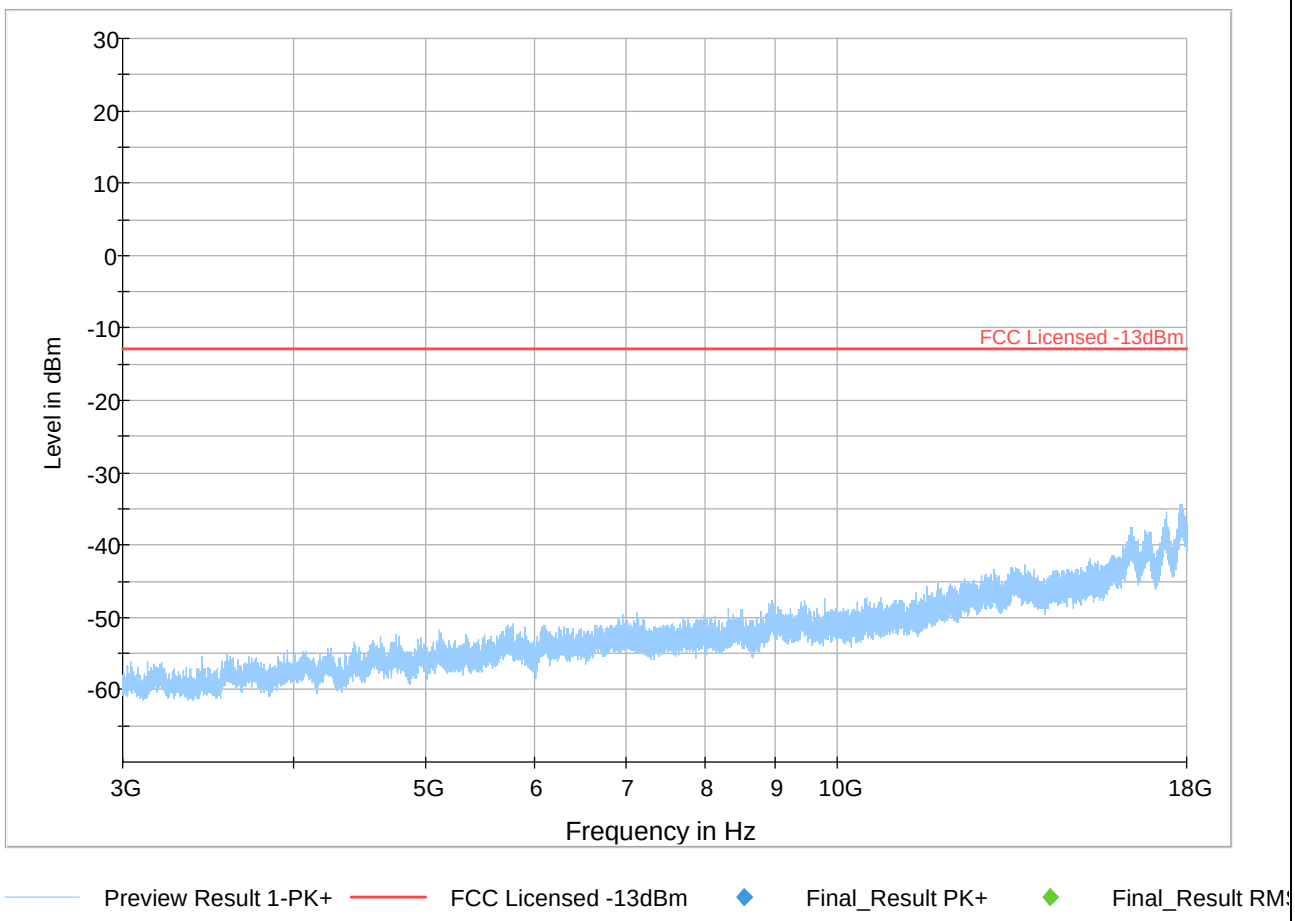
## Plot # 12


40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Level in dBm
FCC Licensed -13dBm
976.793 MHz
-45.841 dBm
30M
50
60
80
100M
200
300
400
500
800
1G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

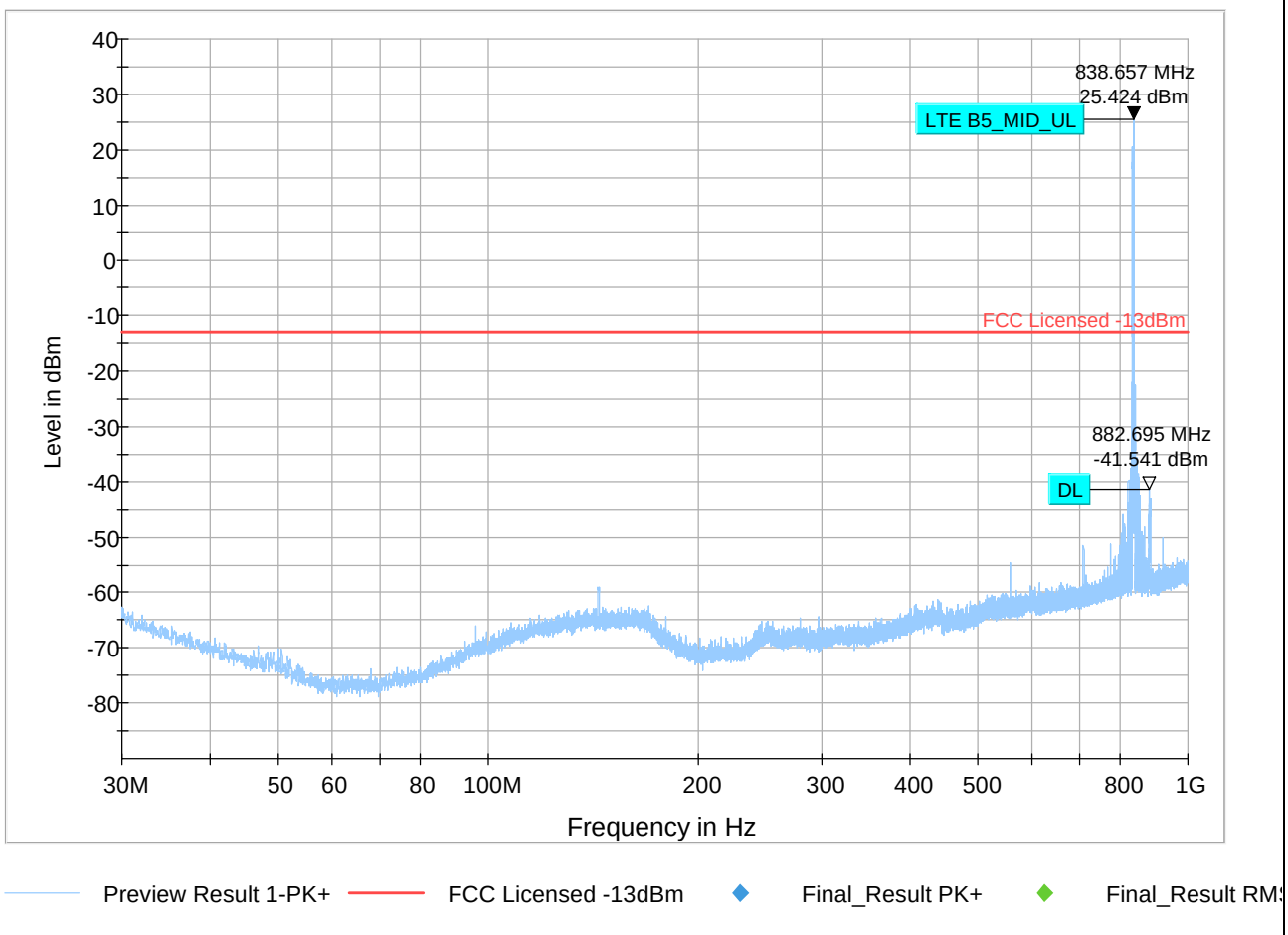
## Plot # 13


1.731 GHz
23.117 dBm
LTE B4_MID_UL
FCC Licensed -13dBm
Level in dBm
40
30
20
10
0
-10
-20
-30
-40
-50
1G
2G
3G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

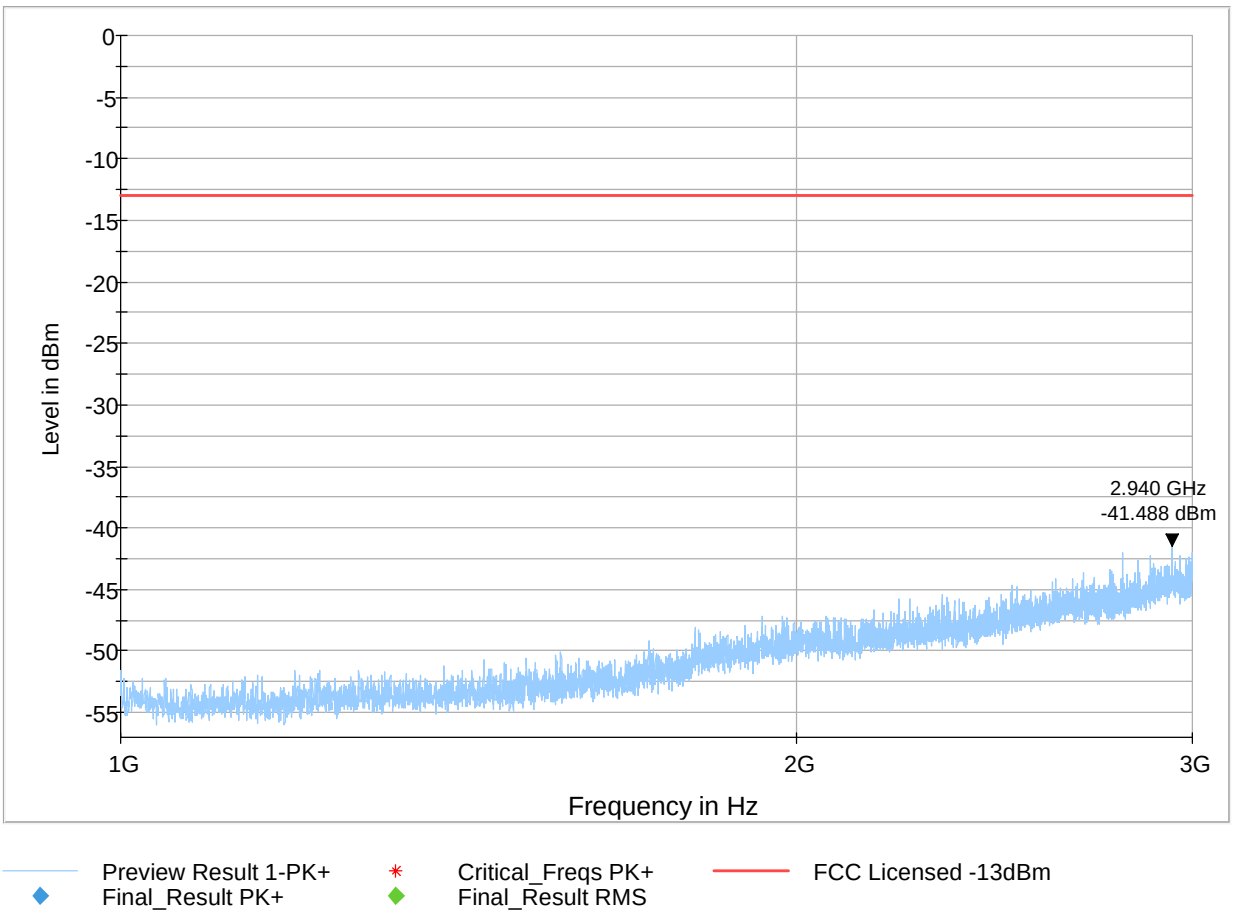
**Plot # 14**


30
20
10
0
-10
-20
-30
-40
-50
-60
Level in dBm
FCC Licensed -13dBm
3G
5G
6
7
8
9
10G
18G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

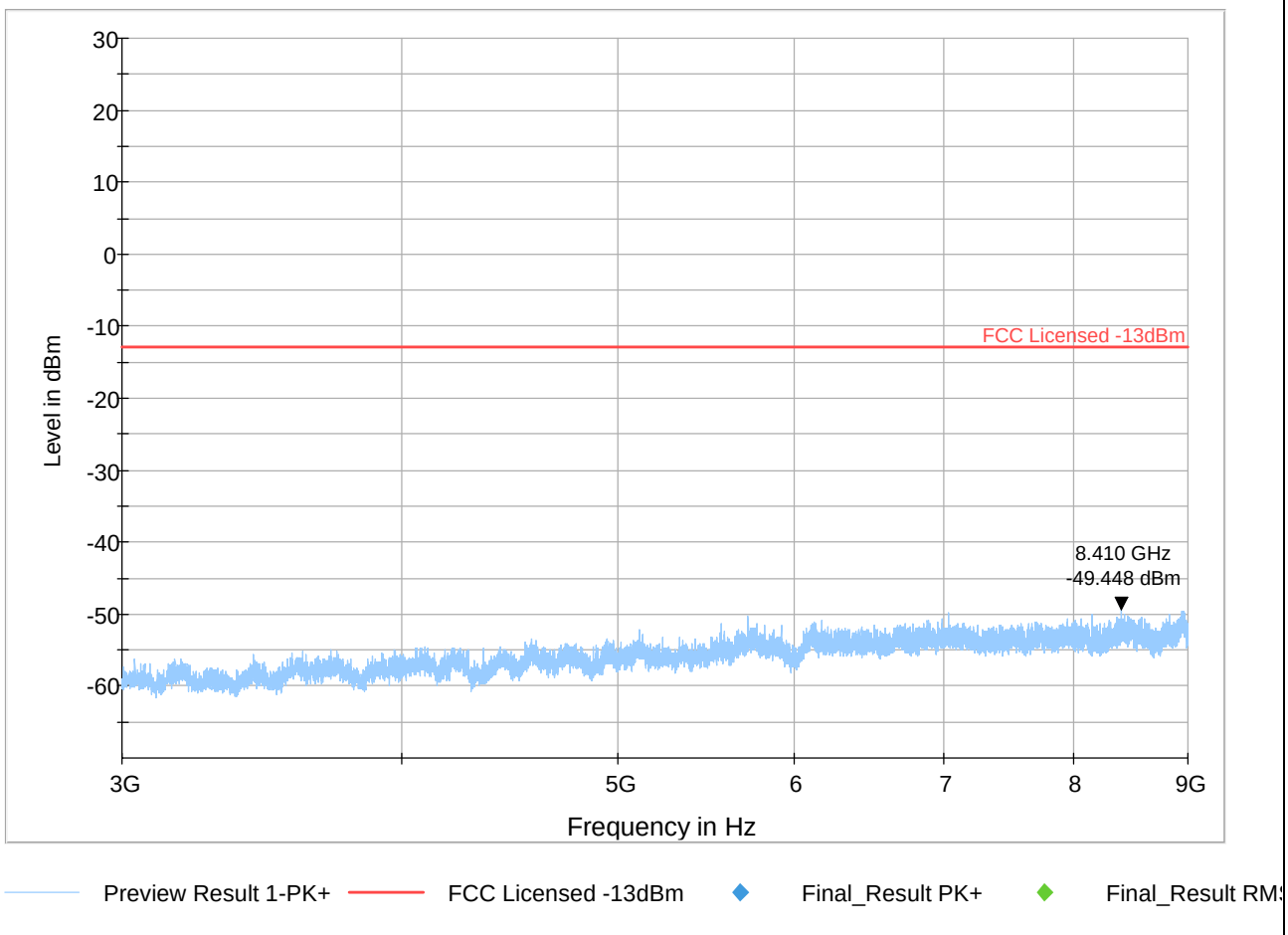
## Plot # 15


838.657 MHz
25.424 dBm
LTE B5_MID_UL
FCC Licensed -13dBm
882.695 MHz
-41.541 dBm
DL
Level in dBm
Frequency in Hz
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
30M
50
60
80
100M
200
300
400
500
800
1G
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

## Plot # 16


0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
Level in dBm
2.940 GHz
-41.488 dBm
1G
2G
3G
Frequency in Hz
Preview Result 1-PK+
Final_Result PK+
Critical_Freqs PK+
Final_Result RMS
FCC Licensed -13dBm

**Plot # 17**

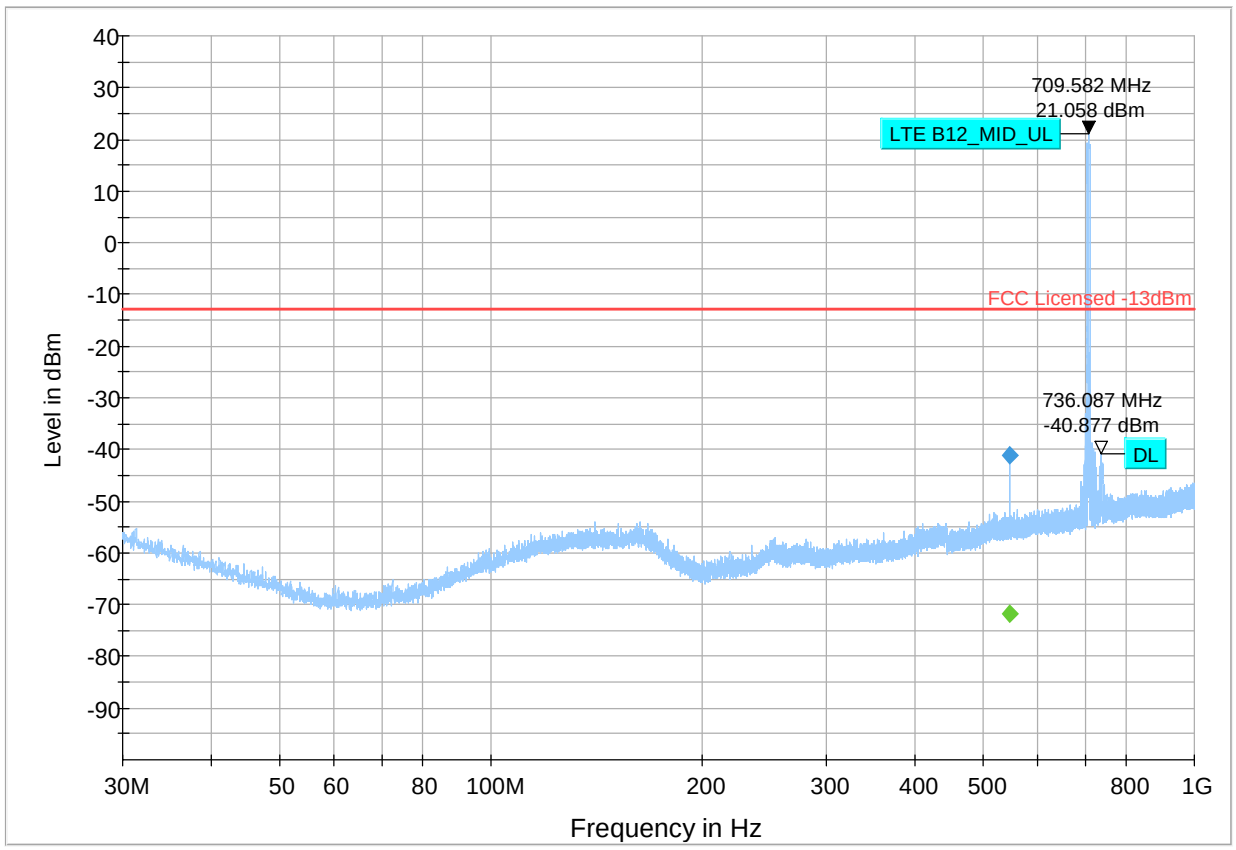

30
20
10
0
-10
-20
-30
-40
-50
-60
Level in dBm
FCC Licensed -13dBm
8.410 GHz
-49.448 dBm
3G
5G
6
7
8
9G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

## Plot # 18

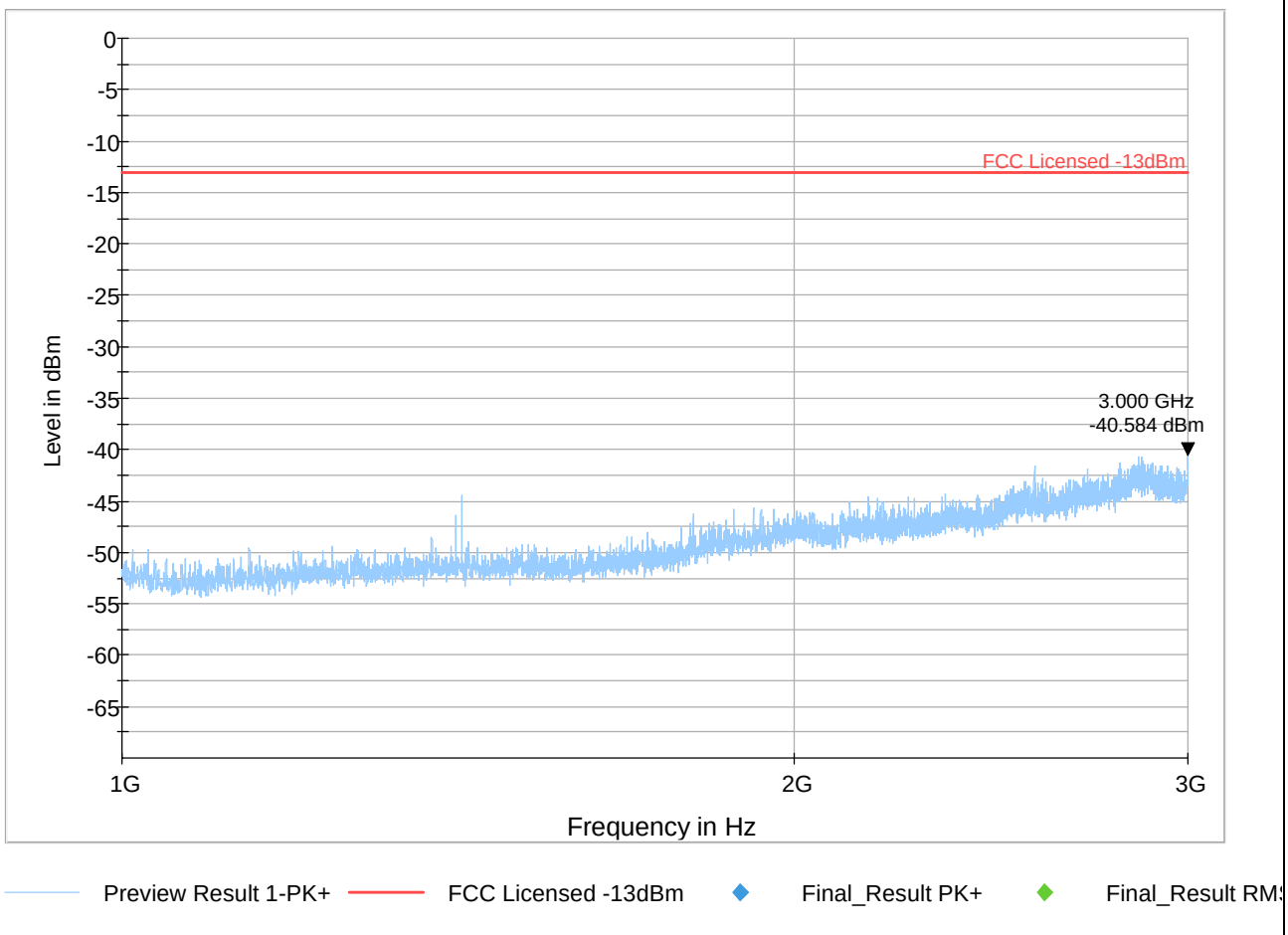
| Frequency (MHz) | MaxPeak (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 545.53 | --- | -71.74 | -13.00 | 58.74 | 500.0 | 100.0 | 107.0 | V | 45.0 | -69.0 | 2.1 | 0.0 | -71.2 |
| 545.53 | -41.19 | --- | -13.00 | 28.19 | 500.0 | 100.0 | 107.0 | V | 45.0 | -69.0 | 2.1 | 0.0 | -71.2 |

(continuation of the "Final_Result" table from column 19 ...)

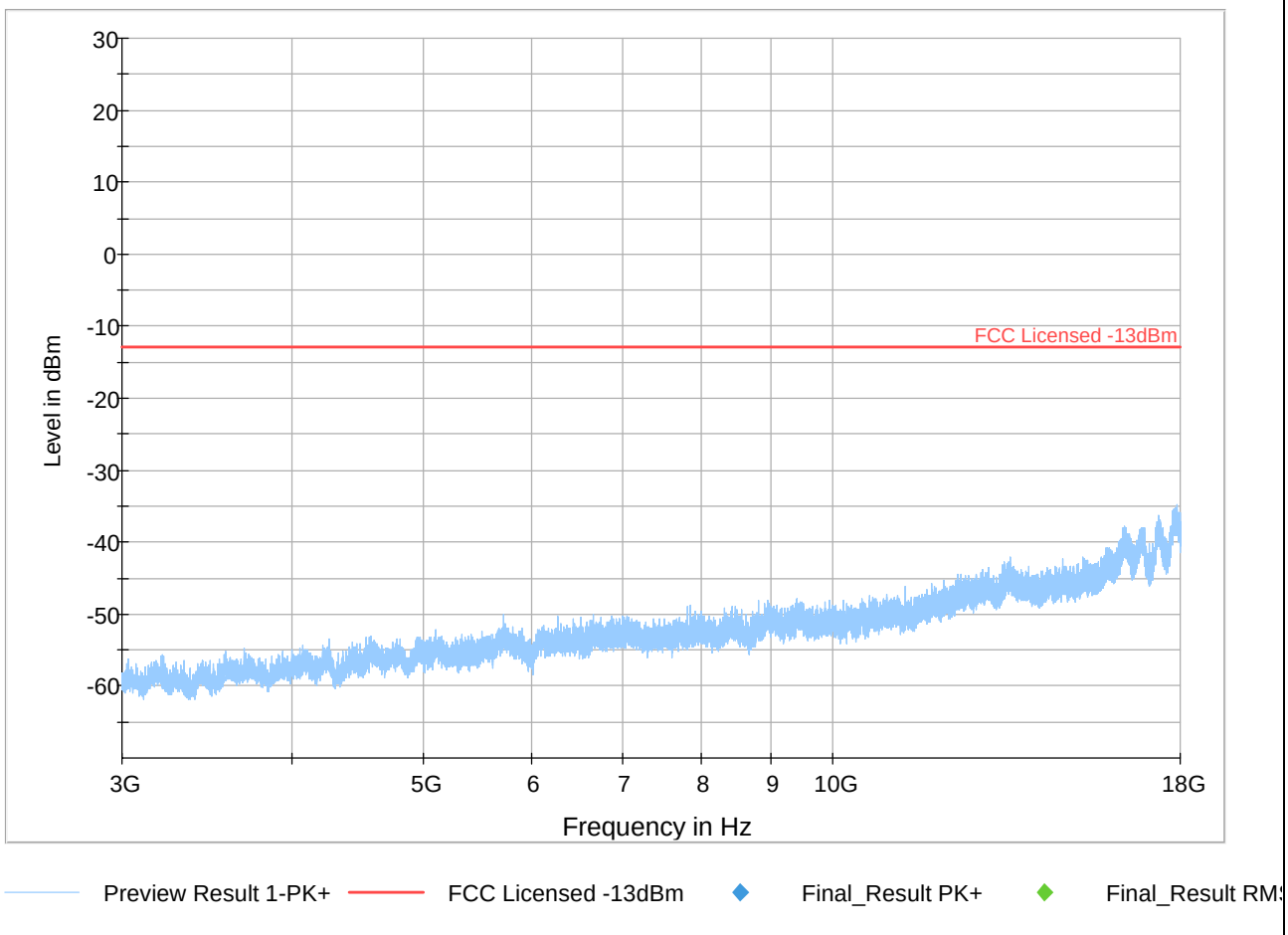
| Frequency (MHz) | Raw Rec (dBµV) |
|---|---|
| 545.53 | -2.7 |
| 545.53 | 27.9 |



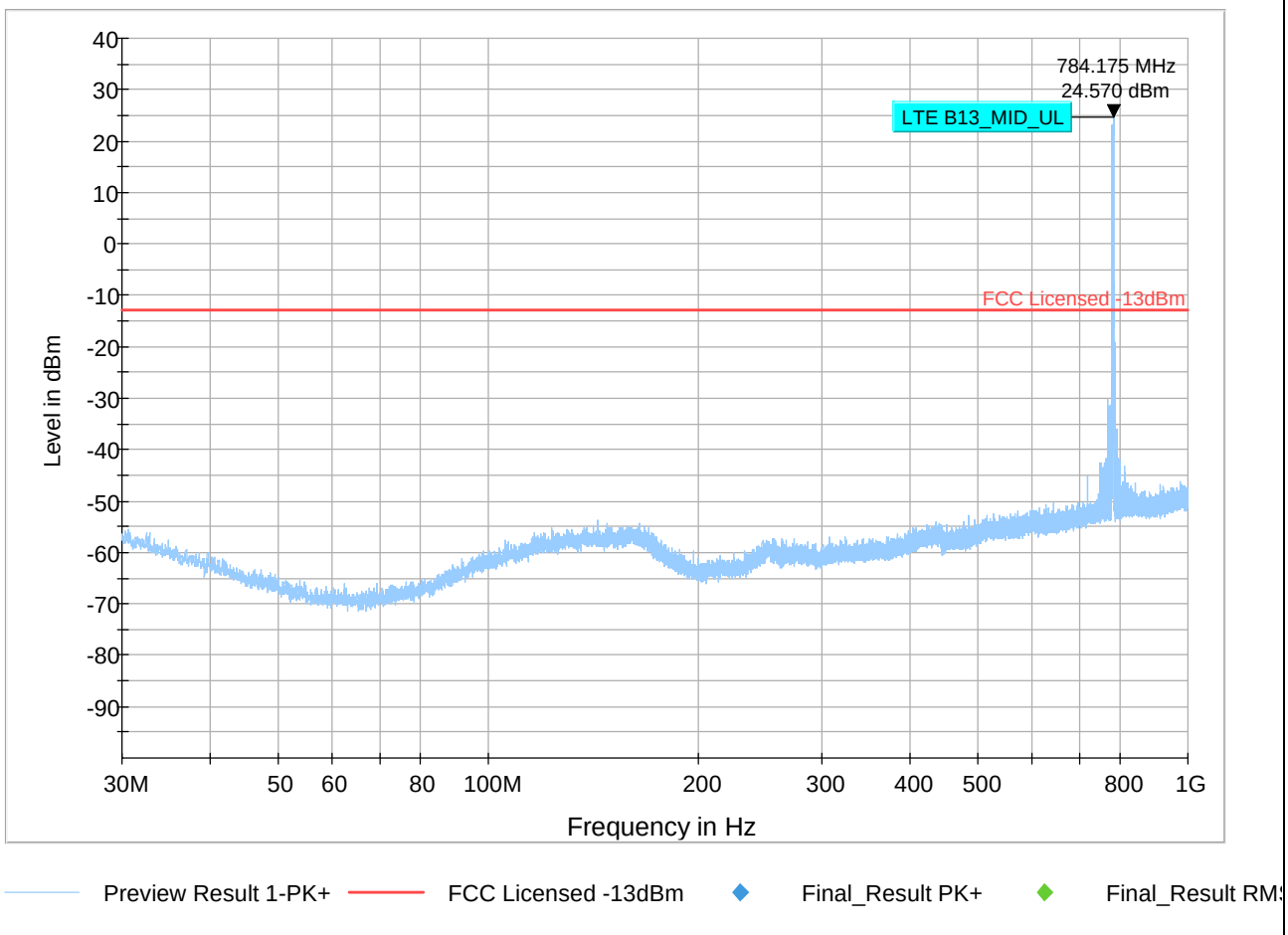
**Plot # 19**


0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
Level in dBm
FCC Licensed -13dBm
3.000 GHz
-40.584 dBm
1G
2G
3G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RMS

**Plot # 20**


30
20
10
0
-10
-20
-30
-40
-50
-60
Level in dBm
FCC Licensed -13dBm
3G
5G
6
7
8
9
10G
18G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

## Plot # 21

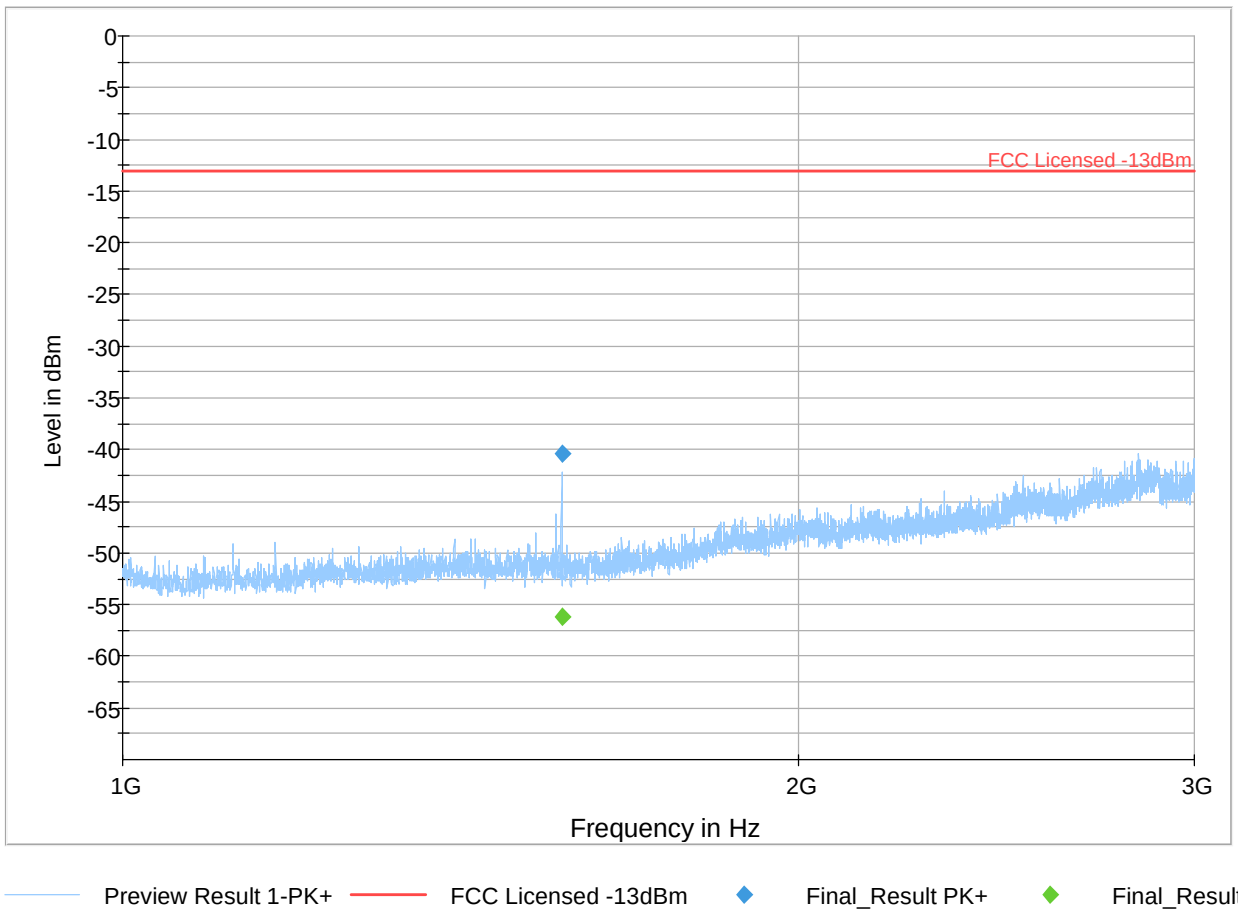

784.175 MHz
24.570 dBm
LTE B13_MID_UL
FCC Licensed -13dBm
Level in dBm
Frequency in Hz
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
30M
50
60
80
100M
200
300
400
500
800
1G
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

## Plot # 22

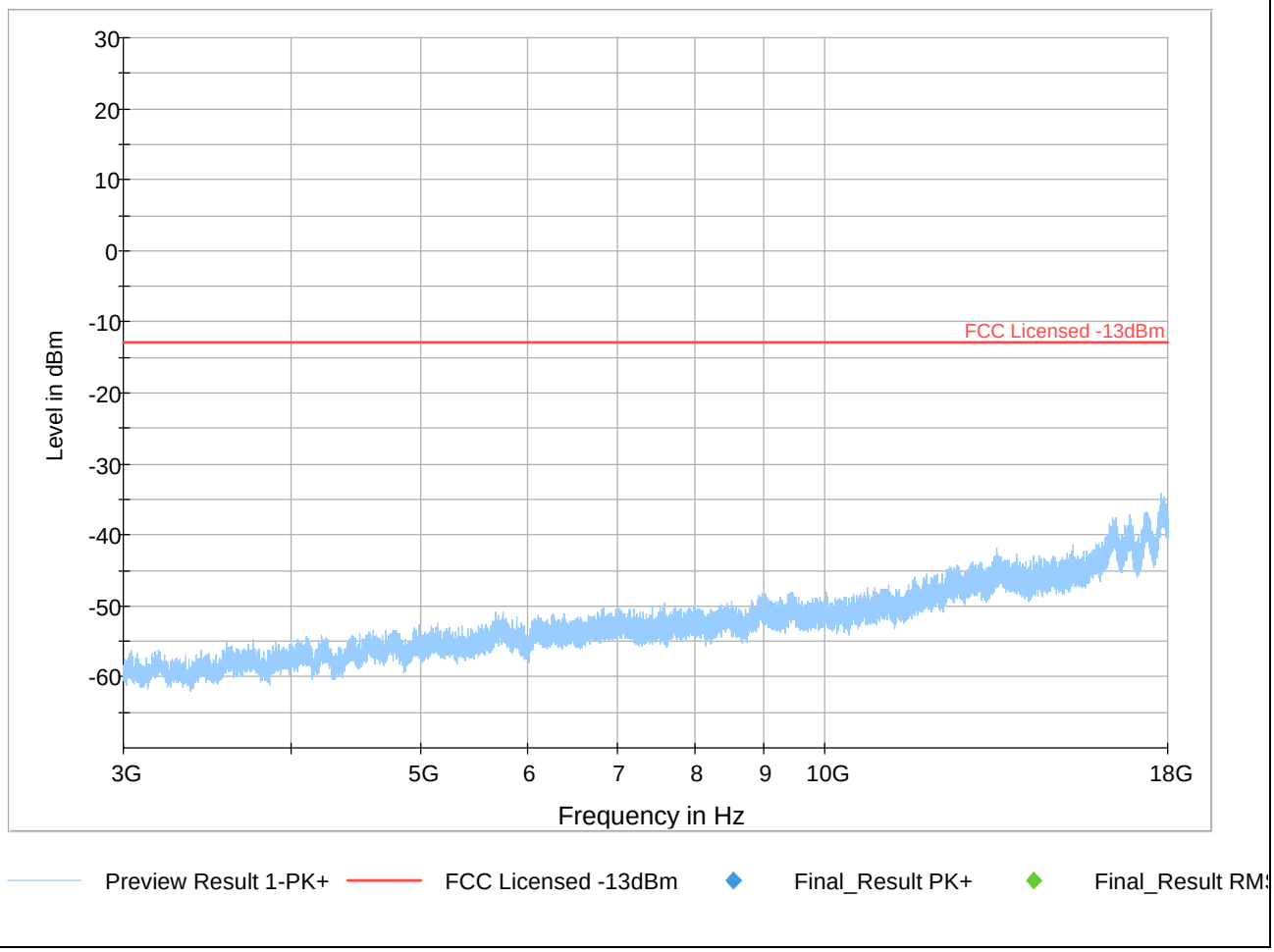
| Frequency (MHz) | MaxPeak (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1568.25 | --- | -56.13 | --- | --- | 500.0 | 1000.0 | 292.0 | H | 52.0 | -65.9 | 3.7 | 0.0 | -69.5 |
| 1568.25 | -40.35 | --- | -13.00 | 27.35 | 500.0 | 1000.0 | 292.0 | H | 52.0 | -65.9 | 3.7 | 0.0 | -69.5 |

(continuation of the "Final_Result" table from column 19 ...)

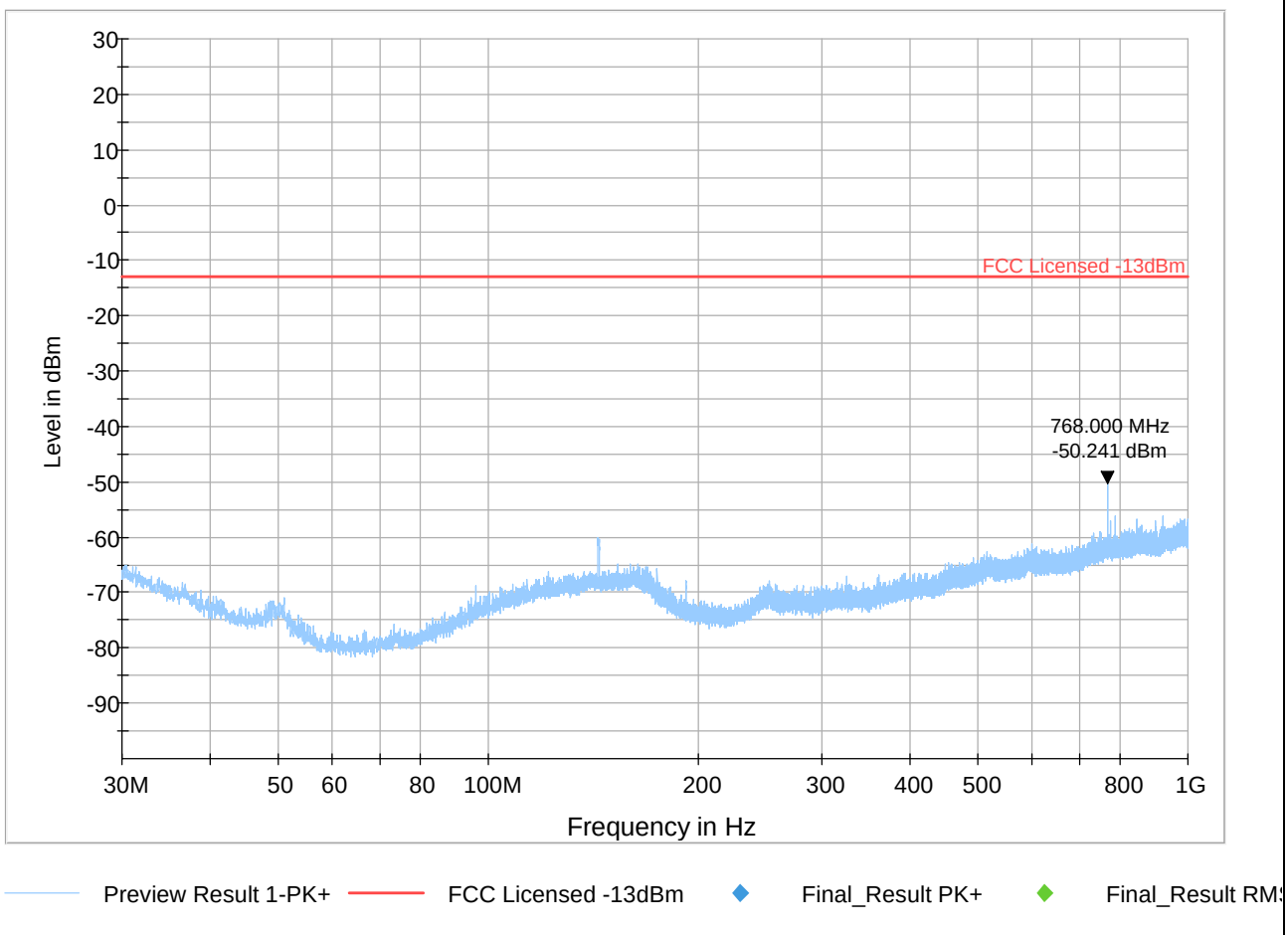
| Frequency (MHz) | Raw Rec (dBµV) |
|---|---|
| 1568.25 | 9.7 |
| 1568.25 | 25.5 |



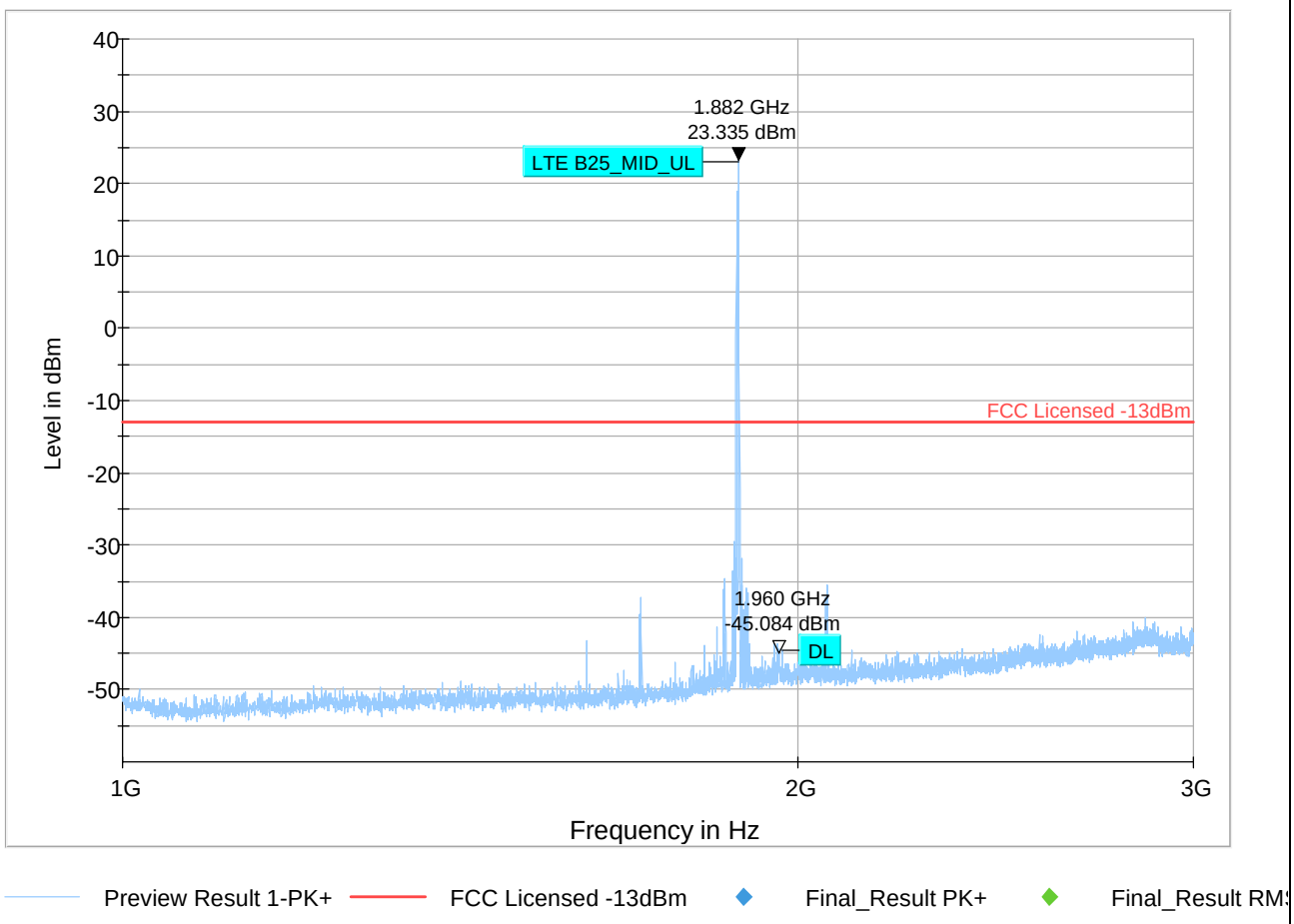
**Plot # 23**


30
20
10
0
-10
-20
-30
-40
-50
-60
Level in dBm
FCC Licensed -13dBm
3G
5G
6
7
8
9
10G
18G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

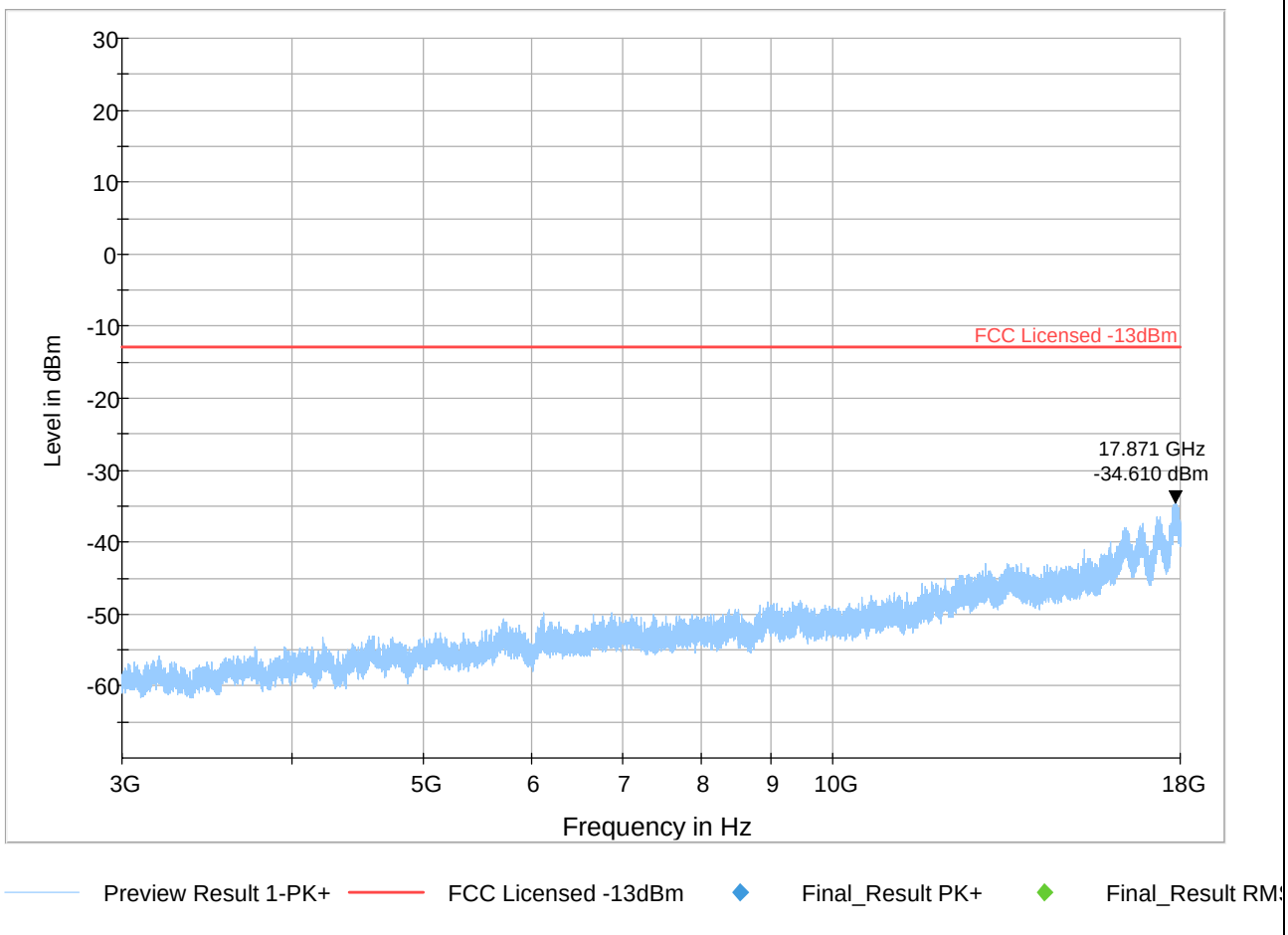
**Plot # 24**


30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Level in dBm
FCC Licensed -13dBm
768.000 MHz
-50.241 dBm
30M
50
60
80
100M
200
300
400
500
800
1G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

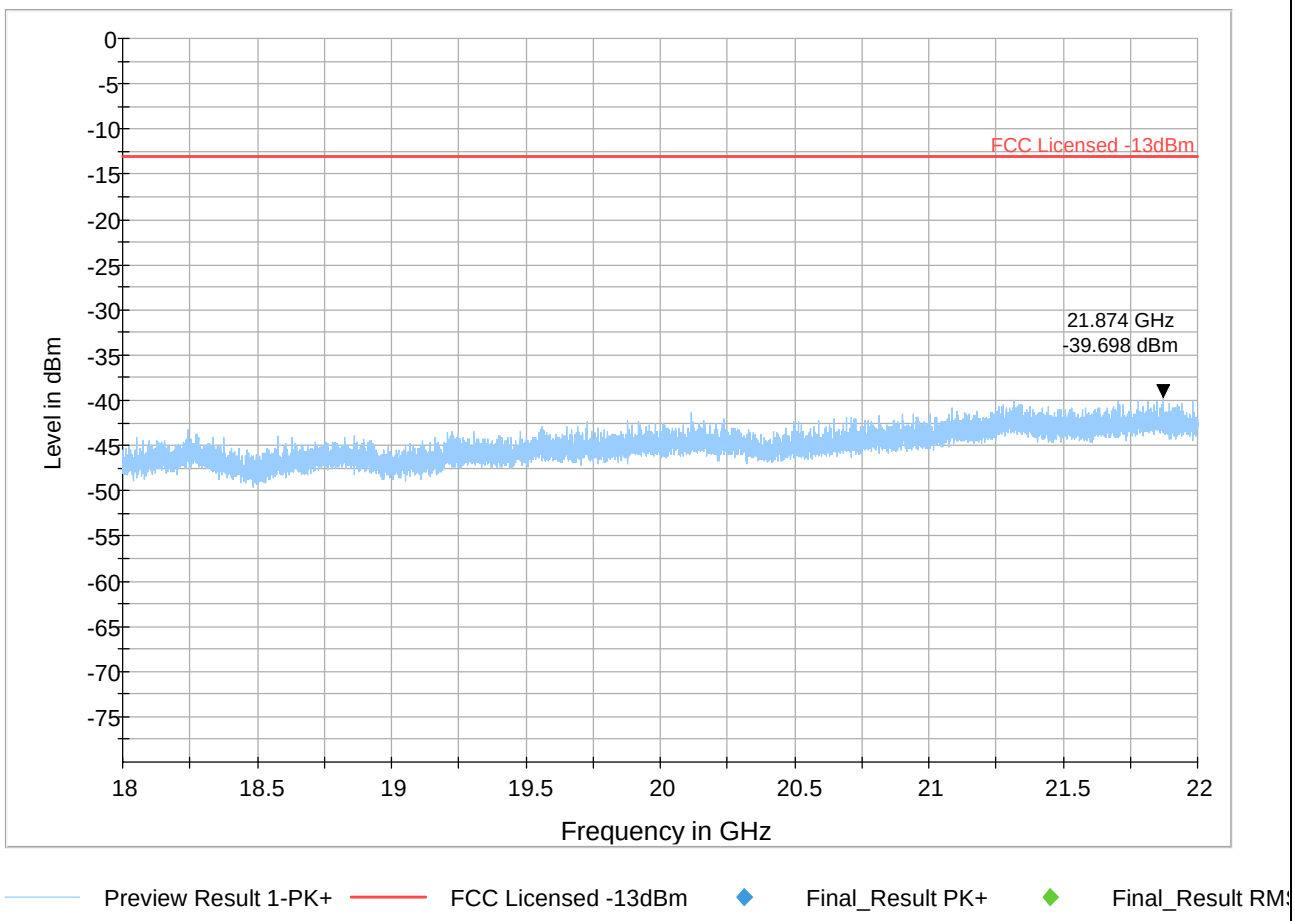
## Plot # 25


40
30
20
10
0
-10
-20
-30
-40
-50
Level in dBm
1.882 GHz
23.335 dBm
LTE B25_MID_UL
FCC Licensed -13dBm
1.960 GHz
-45.084 dBm
DL
1G
2G
3G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

**Plot # 26**


30
20
10
0
-10
-20
-30
-40
-50
-60
Level in dBm
FCC Licensed -13dBm
17.871 GHz
-34.610 dBm
3G
5G
6
7
8
9
10G
18G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

**Plot # 27**

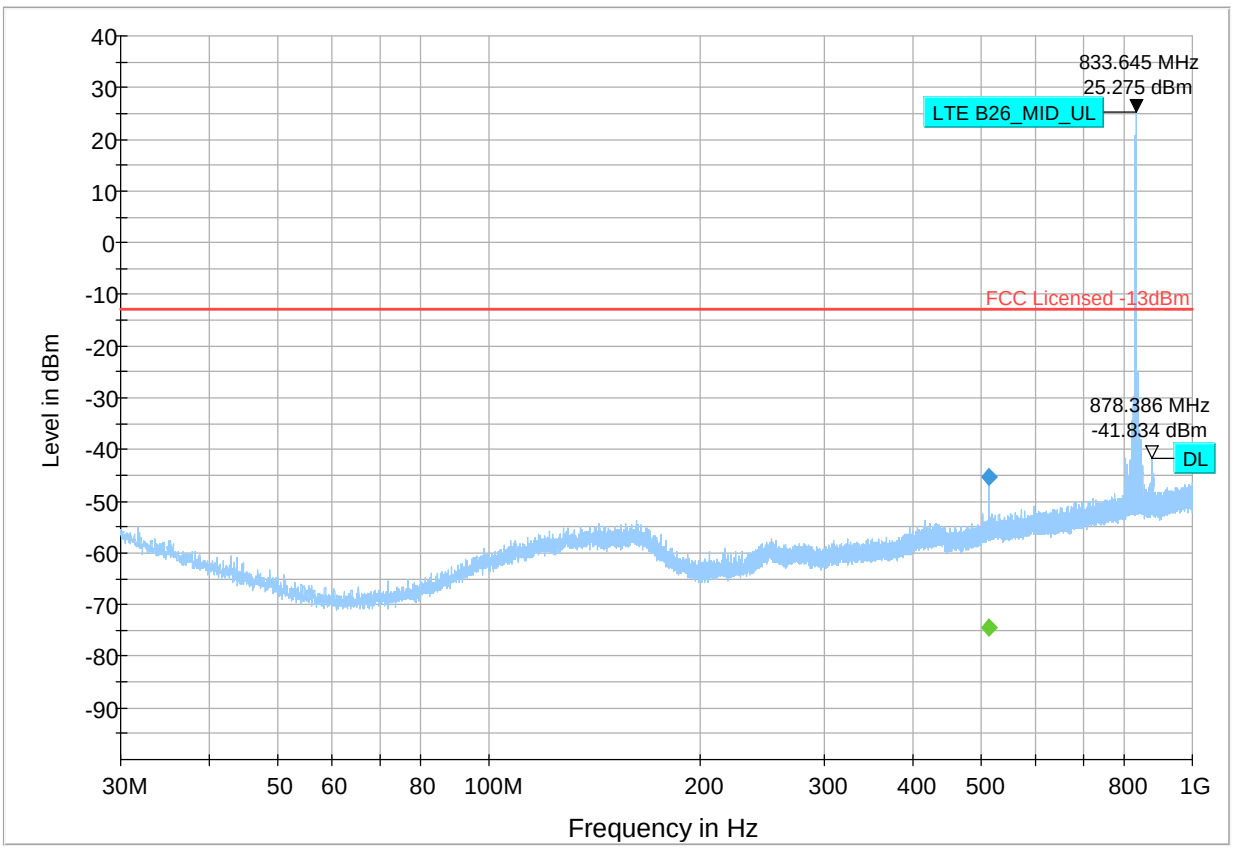

FCC Licensed -13dBm
21.874 GHz
-39.698 dBm
Level in dBm
Frequency in GHz
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
-70
-75
18
18.5
19
19.5
20
20.5
21
21.5
22
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

## Plot # 28

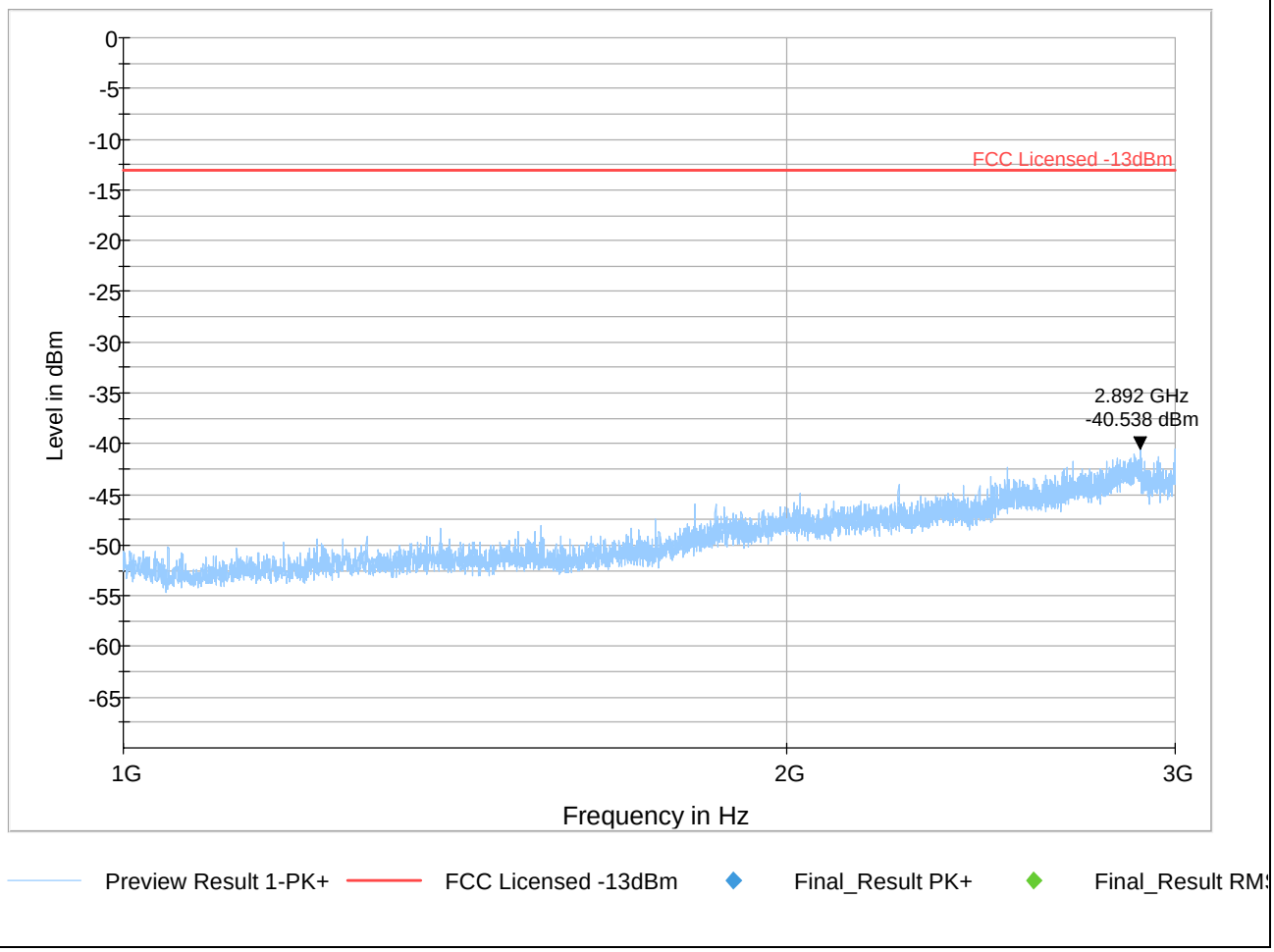
| Frequency (MHz) | MaxPeak (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 512.72 | --- | -74.40 | -13.00 | 61.40 | 500.0 | 100.0 | 158.0 | H | 181.0 | -68.8 | 1.9 | 0.0 | -70.7 |
| 512.72 | -45.23 | --- | -13.00 | 32.23 | 500.0 | 100.0 | 158.0 | H | 181.0 | -68.8 | 1.9 | 0.0 | -70.7 |

(continuation of the "Final_Result" table from column 19 ...)

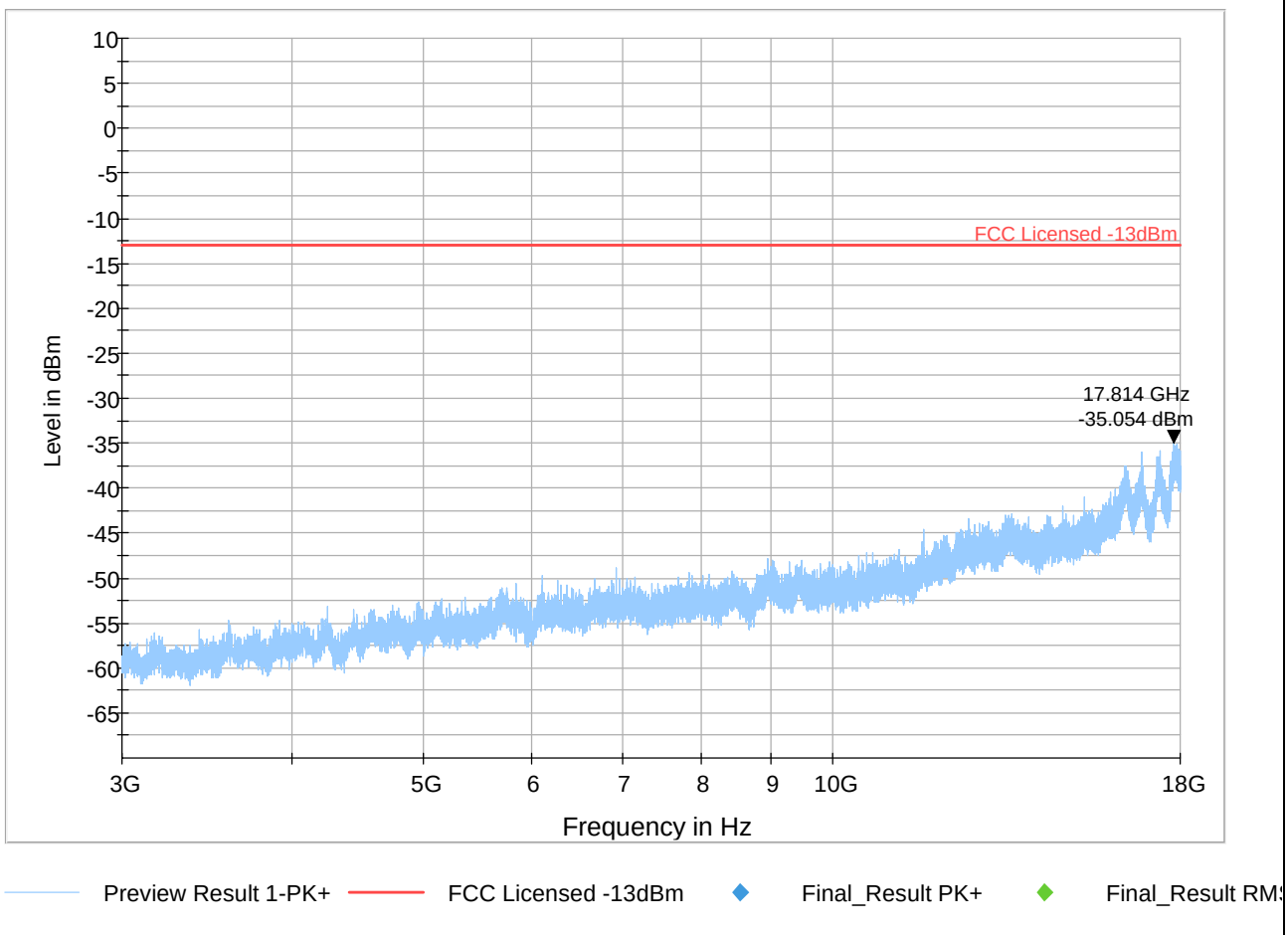
| Frequency (MHz) | Raw Rec (dBµV) |
|---|---|
| 512.72 | -5.6 |
| 512.72 | 23.6 |



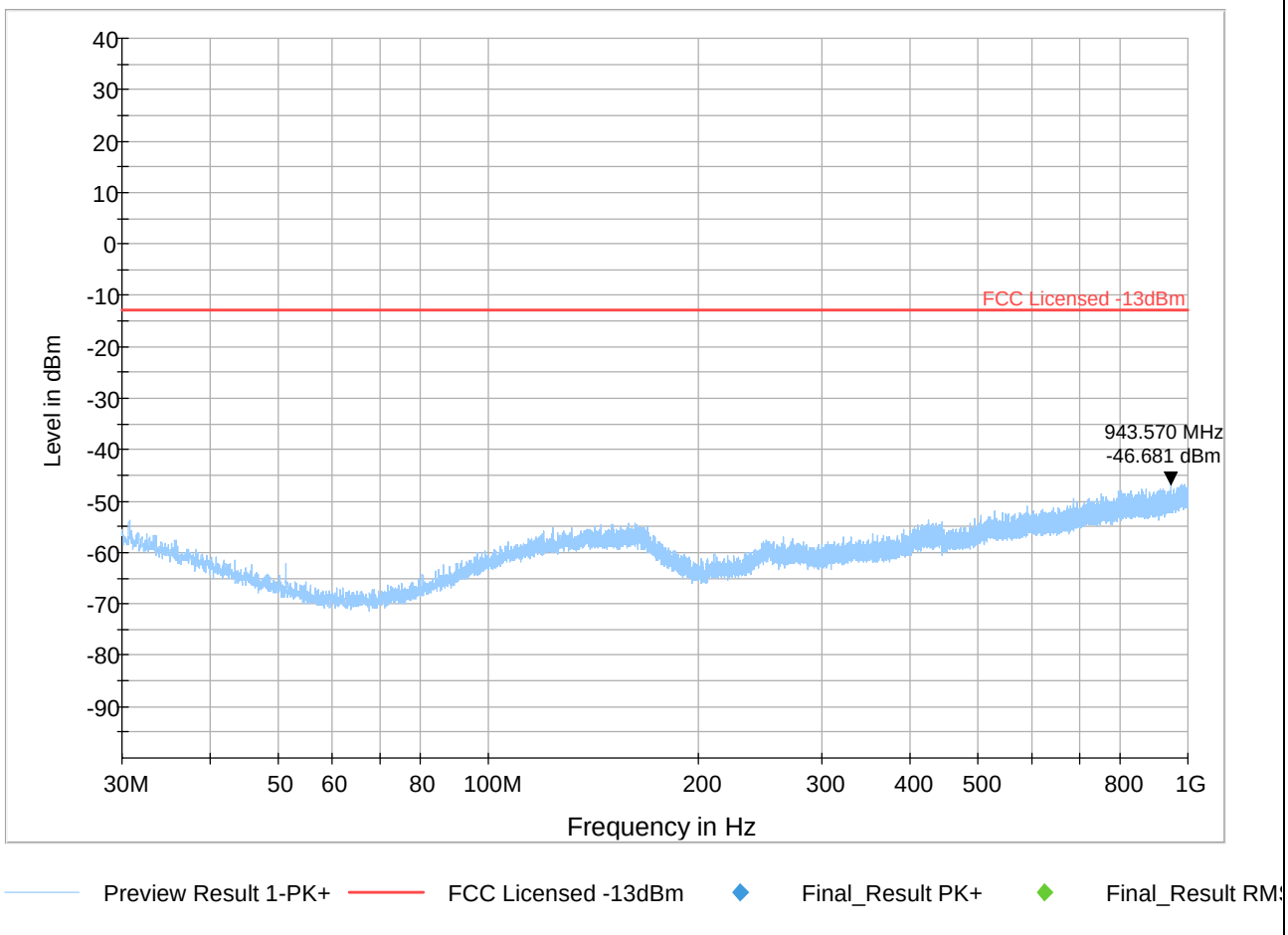
**Plot # 29**


0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
Level in dBm
FCC Licensed -13dBm
2.892 GHz
-40.538 dBm
1G
2G
3G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

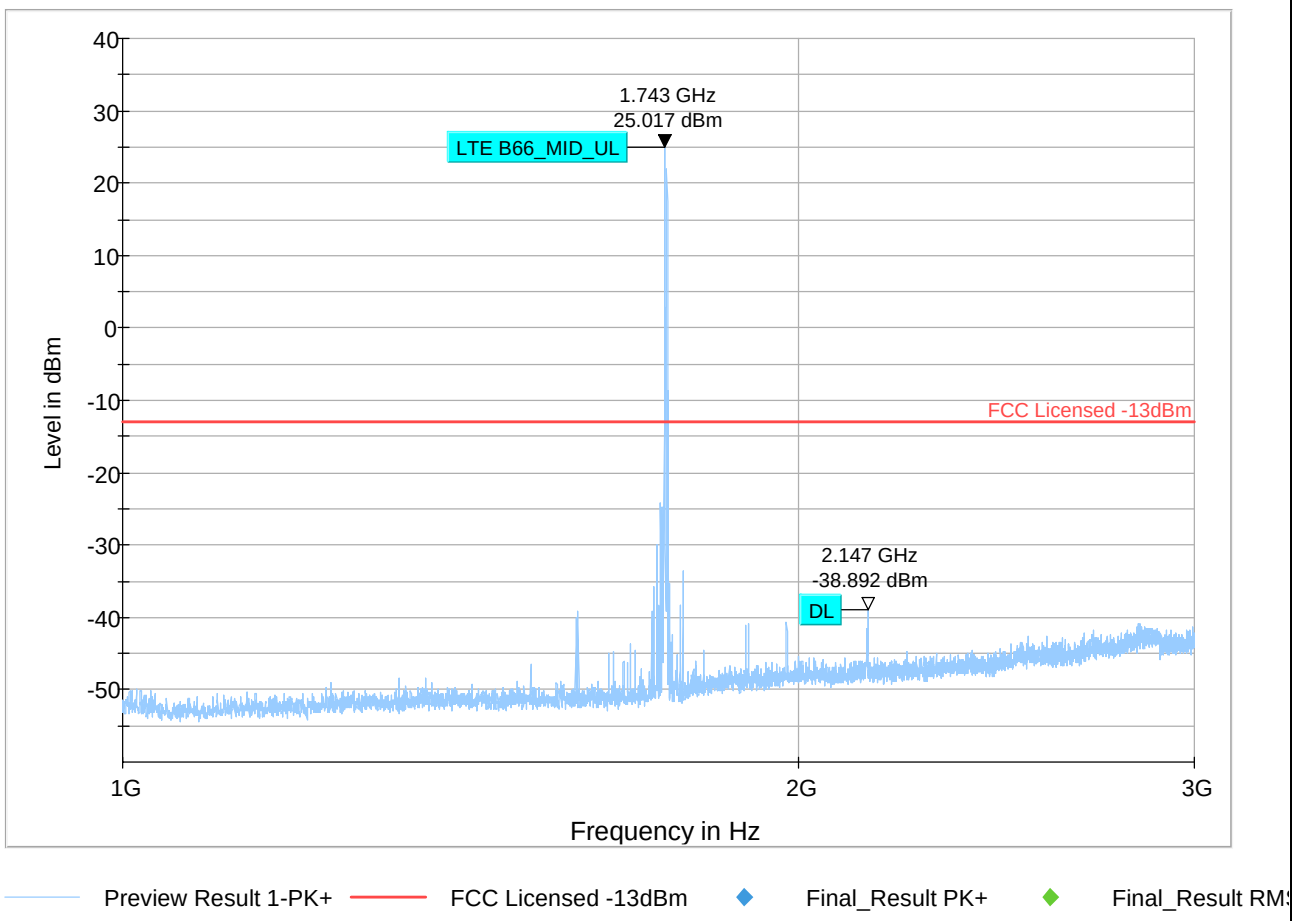
**Plot # 30**


10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
Level in dBm
FCC Licensed -13dBm
17.814 GHz
-35.054 dBm
3G
5G
6
7
8
9
10G
18G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

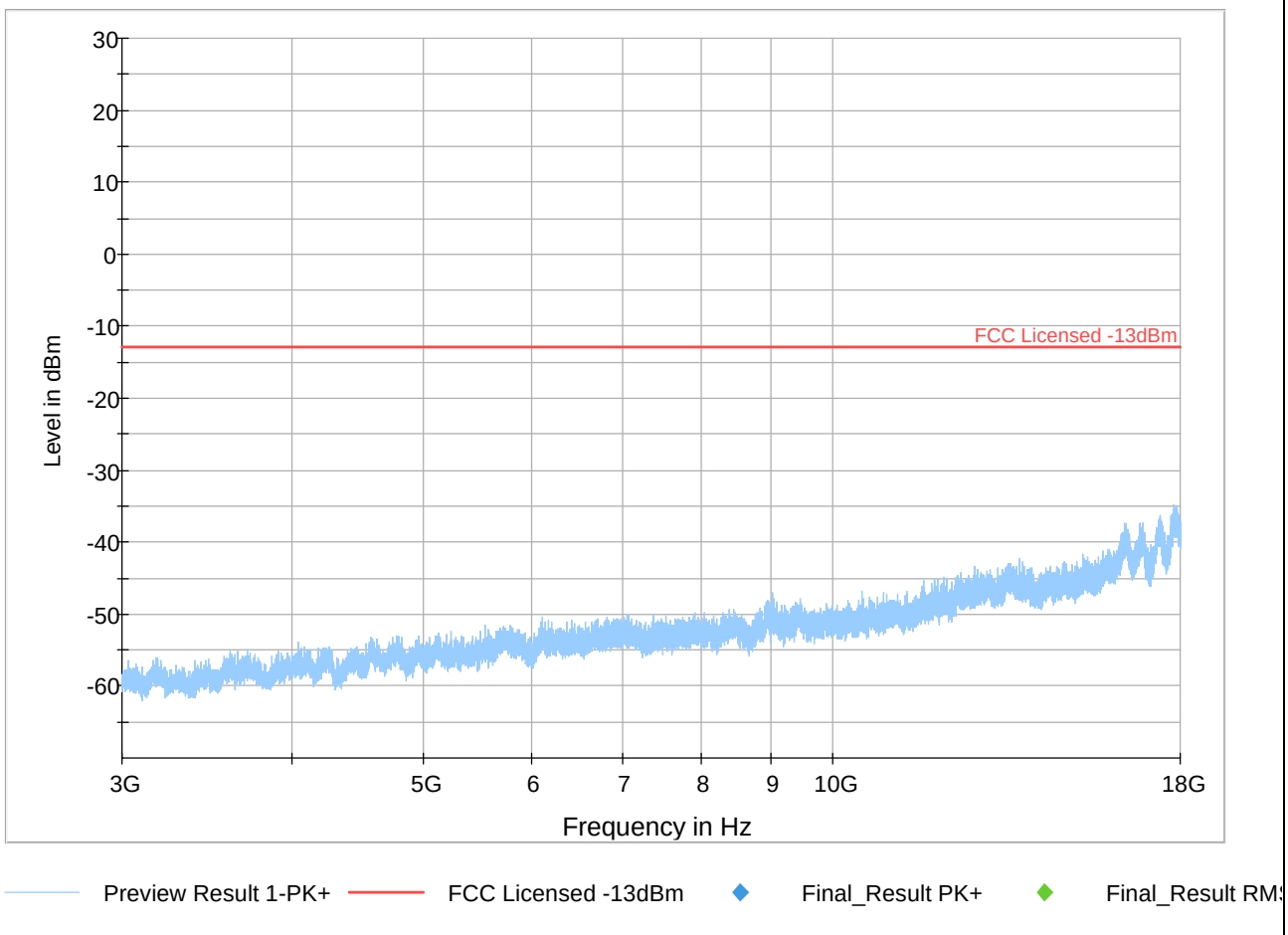
**Plot # 31**


40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Level in dBm
FCC Licensed -13dBm
943.570 MHz
-46.681 dBm
30M
50
60
80
100M
200
300
400
500
800
1G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

## Plot # 32


40
30
20
10
0
-10
-20
-30
-40
-50
Level in dBm
1.743 GHz
25.017 dBm
LTE B66_MID_UL
FCC Licensed -13dBm
2.147 GHz
-38.892 dBm
DL
1G
2G
3G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

**Plot # 33**

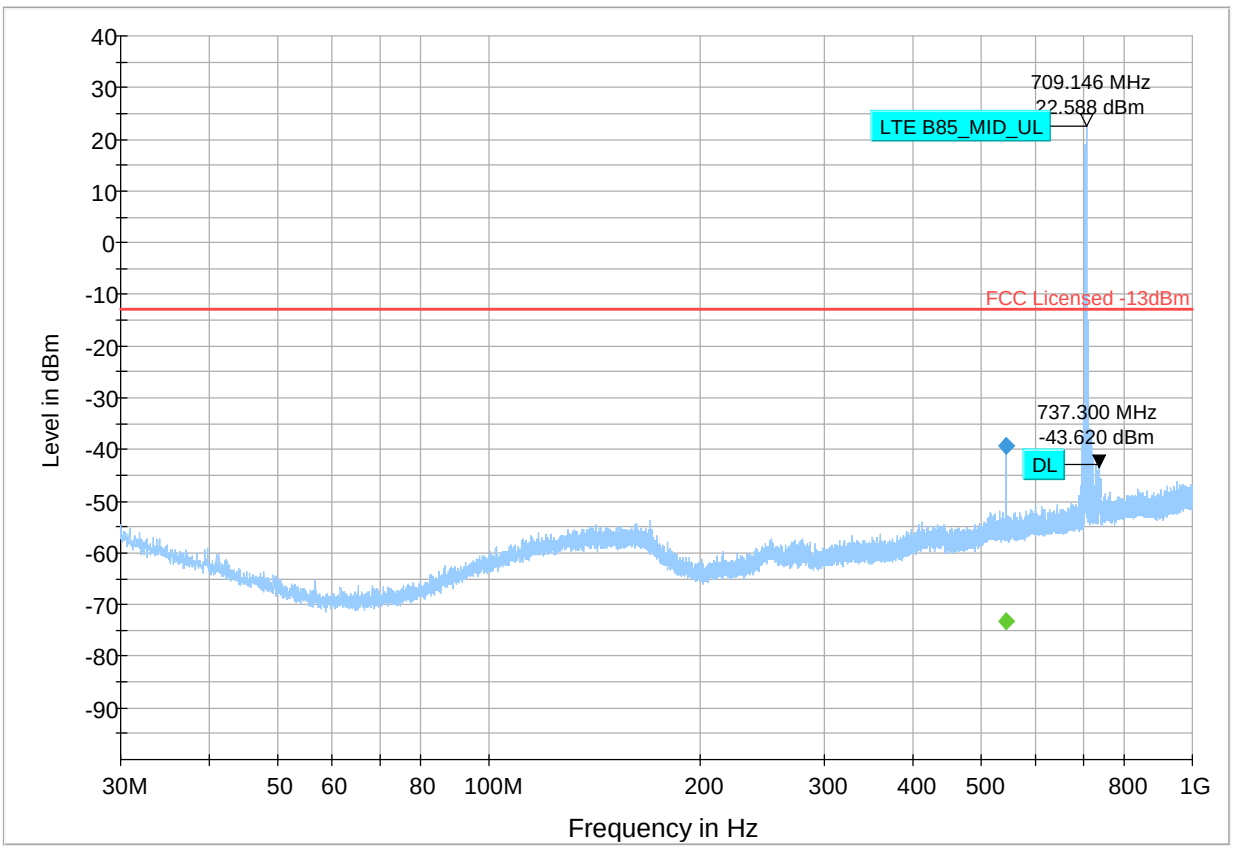

30
20
10
0
-10
-20
-30
-40
-50
-60
Level in dBm
FCC Licensed -13dBm
3G
5G
6
7
8
9
10G
18G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

## Plot # 34

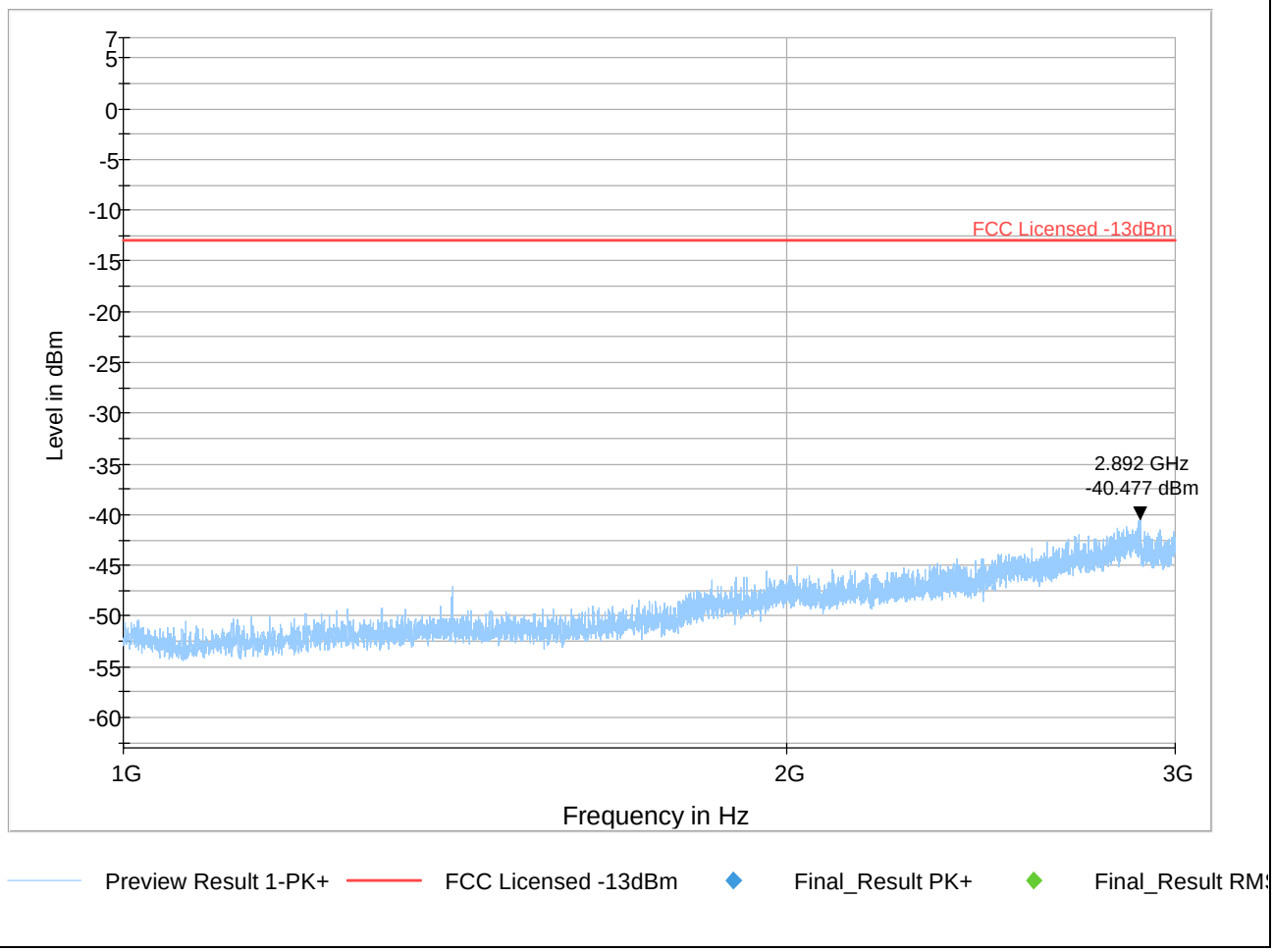
| Frequency (MHz) | MaxPeak (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 542.52 | --- | -73.35 | -13.00 | 60.35 | 500.0 | 100.0 | 100.0 | V | 169.0 | -69.0 | 2.1 | 0.0 | -71.1 |
| 542.52 | -39.17 | --- | -13.00 | 26.17 | 500.0 | 100.0 | 100.0 | V | 169.0 | -69.0 | 2.1 | 0.0 | -71.1 |

(continuation of the "Final_Result" table from column 19 ...)

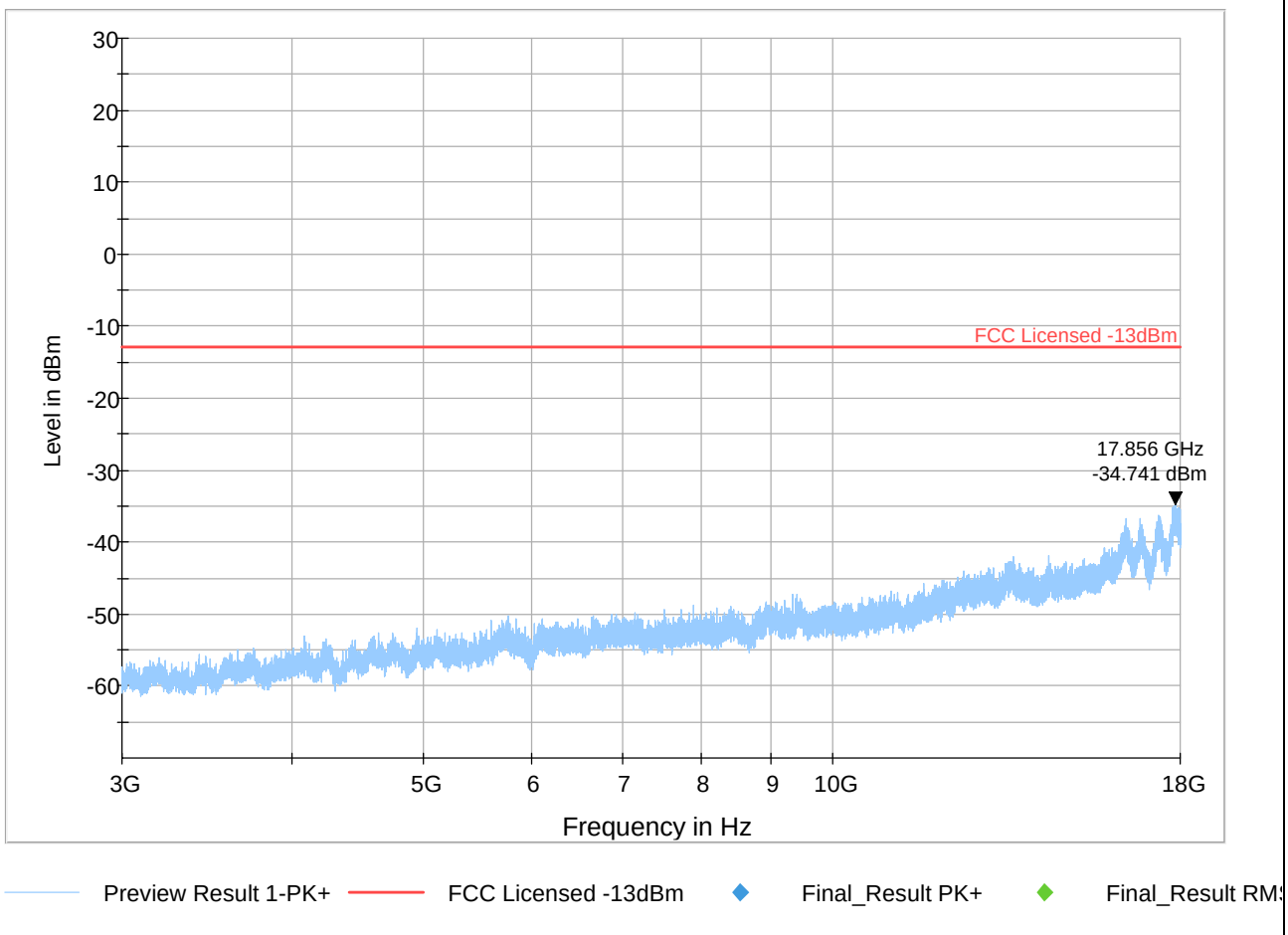
| Frequency (MHz) | Raw Rec (dBµV) |
|---|---|
| 542.52 | -4.3 |
| 542.52 | 29.8 |



**Plot # 35**


7
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
Level in dBm
FCC Licensed -13dBm
2.892 GHz
-40.477 dBm
1G
2G
3G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

**Plot # 36**


30
20
10
0
-10
-20
-30
-40
-50
-60
Level in dBm
FCC Licensed -13dBm
17.856 GHz
-34.741 dBm
3G
5G
6
7
8
9
10G
18G
Frequency in Hz
Preview Result 1-PK+
FCC Licensed -13dBm
Final_Result PK+
Final_Result RM

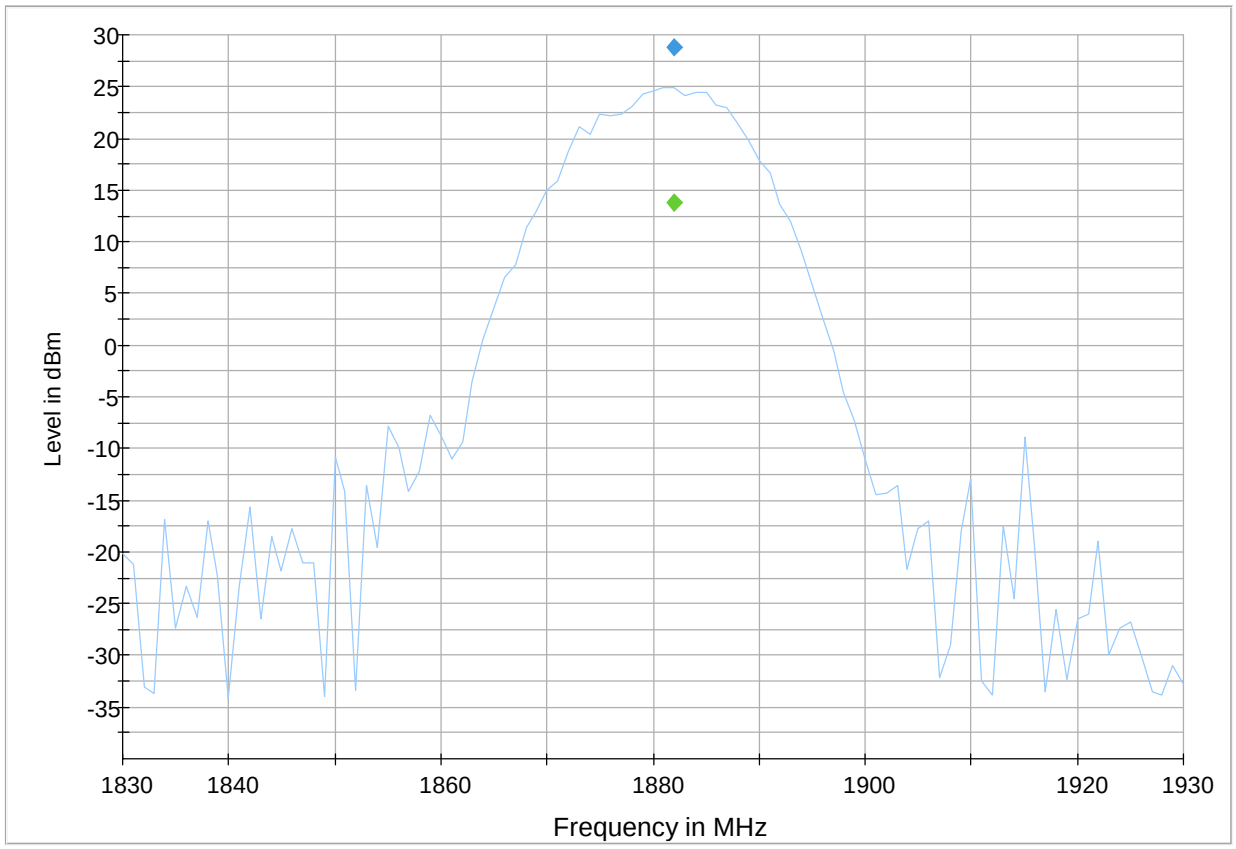
## 8.3 Power Verification

### EIRP LTE B2

| Frequency (MHz) | MaxPeak (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1882.00 | --- | 13.75 | --- | --- | 500.0 | 50000.0 | 167.0 | H | 90.0 | -64.1 | 4.1 | 0.0 | -68.2 |
| 1882.00 | 28.81 | --- | --- | --- | 500.0 | 50000.0 | 167.0 | H | 90.0 | -64.1 | 4.1 | 0.0 | -68.2 |

(continuation of the "Final_Result" table from column 19 ...)

| Frequency (MHz) | Raw Rec (dBµV) |
|---|---|
| 1882.00 | 77.9 |
| 1882.00 | 92.9 |



## 9 Test setup photos

Setup photos are included in supporting file name: “EMC_TELI2_011_23001_FCC_Setup_Photos”

## 10 Test Equipment And Ancillaries Used For Testing

| Equipment Type | Manufacturer | Model | Serial # | Calibration Cycle | Last Calibration Date |
|---|---|---|---|---|---|
| BILOG ANTENNA | A.H. SYSTEMS | BiLA2G | 569 | 3 YEARS | 11/16/2021 |
| HORN ANTENNA | EMCO | 3115 | 00035111 | 3 YEARS | 9/30/2021 |
| HORN ANTENNA | ETS LINDGREN | 3117-PA | 00169547 | 3 YEARS | 9/1/2020 |
| HORN ANTENNA | ETS LINDGREN | 3116C-PA | 00169535 | 3 YEARS | 9/23/2020 |
| ESW.EMI TEST RECEIVER | ROHDE & SCHWARZ | ESW44 | 101715 | 3 YEARS | 9/14/2021 |

**Note:** Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.
Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated “N/A” for cal status either do not specifically require calibration or is internally characterized before use.

## 11 Revision History

| Date | Report Name | Changes to report | Prepared by |
|---|---|---|---|
| 2023-11-27 | EMC_TELI2_011_23001_FCC_22_24_27 | Initial Version | Cheng Song |
| 2024-01-31 | EMC_TELI2_011_23001_FCC_22_24_27_Rev1 | Deleted the test results for LTE Bands 8 and 71. Added the erp / eirp emission analysis table to Section 8.2 | Cheng Song |

<<< The End >>>