

ISED CABid: ES1909

Test report No:  
NIE: 68649RRF.001

## Partial Test Report

### Reference Standard:

USA FCC Part 22, Part 24, Part 27, Part 90  
CANADA IC RSS-130 RSS-132, RSS-133, RSS-139,  
RSS-Gen

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (*) Identification of item tested         | Continuous Positive Airway Pressure (CPAP) Device                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (*) Trademark                             | ResMed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| (*) Model and /or type reference          | 39001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| (*) Derived model not tested              | USA variants: 39485, 39486, 39487<br>Canada variants: 39488, 39489, 39490                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Other identification of the product       | HW version: 1.0<br>SW version: SW04600<br>FCC ID: 2ACHL-AIR11M1<br>IC: 9103A-AIR11M1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| (*) Features                              | LTE Cat-M1, BLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Applicant                                 | ResMed Pty Ltd<br>1 Elizabeth Macarthur Drive, Bella Vista, NSW, 2153                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Test method requested, standard           | USA FCC Part 22 (10-1-20 Edition): Public Mobile Services.<br>USA FCC Part 24 (10-1-20 Edition): Personal Communications Services.<br>USA FCC Part 27 (10-1-20 Edition): Miscellaneous Wireless Communications Services.<br>USA FCC Part 90 (10-1-20 Edition): Private Land Mobile Radio Services.<br>CANADA IC RSS-130 Issue 2, Feb 2019.<br>CANADA IC RSS-132 Issue 3, Jan. 2013.<br>CANADA IC RSS-133 Issue 6 Amendment 1, Jan. 2018.<br>CANADA IC RSS-139 Issue 3, Jul. 2015.<br>CANADA IC RSS-Gen Issue 5 (March 2019).<br>ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services. |
| Approved by (name / position & signature) | Rafael López Martín<br>EMC Consumer & RF Lab. Manager<br><br>2021.11.09<br>16:54:29<br>+01'00'                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Date of issue                             | 2021-11-0917                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Report template No                        | FDT08_23<br>(*) "Data provided by the client"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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## Competences and guarantees

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DEKRA Testing and Certification S.A.U. is an FCC-recognized accredited testing laboratory with the appropriate scope of accreditation that covers the performed tests in this report.

DEKRA Testing and Certification S.A.U. is an ISED-recognized accredited testing laboratory, CABid: ES1909, with the appropriate scope of accreditation that covers the performed tests in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

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The results presented in this Test Report apply only to the particular item under test established in this document.

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## General conditions

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1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
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## Uncertainty

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Uncertainty (factor  $k=2$ ) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

## Data provided by the client

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The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample of the model 39001 is a CPAP device with integrated cellular and Bluetooth connectivity.
3. Derived models not tested. These models have been declared by the supplier of the sample as being the same as the model under test.



Date: 24 Aug 2021

### DECLARATION OF EQUIVALENCE

This document declares that the following designated products are equivalent to the units under test **39001** and **39002**.

USA Variants:

| Model Name / Product Code | Marketing Name      |
|---------------------------|---------------------|
| 39485                     | AirSense 11 AutoSet |
| 39486                     | AirSense 11 CPAP    |
| 39487                     | AirSense 11 Elite   |

Canada Variants:

| Model Name / Product Code | Marketing Name      |
|---------------------------|---------------------|
| 39488                     | AirSense 11 AutoSet |
| 39489                     | AirSense 11 CPAP    |
| 39490                     | AirSense 11 Elite   |

All the above stated products have the same hardware, cellular firmware and Bluetooth firmware.

**Applicant:**

Company Name: ResMed Pty Ltd  
Address: 1 Elizabeth Macarthur Drive,  
Bella Vista NSW 2153  
Australia

By,



**Christopher Jenkins**  
Title: Associate Manager – Systems Engineering  
Company: ResMed Pty Ltd  
Telephone: +61 2 8884 1517  
e-mail: Christopher.jenkins@resmed.com.au

ResMed Pty Ltd 1 Elizabeth Macarthur Drive, Bella Vista NSW 2153, Australia  
T +61 2 8884 1000 E Christopher.jenkins@ResMed.com.au

ResMed.com

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of result.

## Usage of samples

---

Samples undergoing test have been selected by: The client.

Sample S/01 is composed of the following elements:

| Control N° | Description                                       | Model | Serial N°   | Date of reception |
|------------|---------------------------------------------------|-------|-------------|-------------------|
| 68649/003  | Continuous Positive Airway Pressure (CPAP) Device | 39001 | 22201142551 | 2021/07/29        |
| 68649/007  | AC/DC Adapter                                     | --    | 00003D00    | 2021/07/29        |
| 63467B/015 | Climate Line                                      | --    | --          | 2020/10/14        |

Sample S/01 has undergone the following test(s): The Radiated tests indicated in the Appendixes A, B & C.

## Test sample description

|                                               |                                     |                               |                                     |                          |                                   |                                     |
|-----------------------------------------------|-------------------------------------|-------------------------------|-------------------------------------|--------------------------|-----------------------------------|-------------------------------------|
| Ports..... :                                  | Port name and description           | Cable                         |                                     |                          |                                   |                                     |
|                                               |                                     | Specified max length [m]      | Attached during test                | Shielded                 | Coupled to patient <sup>(3)</sup> |                                     |
|                                               | Power                               |                               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>          |                                     |
| Supplementary information to the ports..... : | --                                  |                               |                                     |                          |                                   |                                     |
| Rated power supply .....                      | Voltage and Frequency               |                               | Reference poles                     |                          |                                   |                                     |
|                                               |                                     |                               | L1                                  | L2                       | L3                                | N                                   |
|                                               | <input checked="" type="checkbox"/> | AC:<br>100-240V~50-60 Hz 2.0A | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>          | <input checked="" type="checkbox"/> |
| Rated Power .....                             | 24 VDC ± 1 VDC, 2.71A               |                               |                                     |                          |                                   |                                     |
| Clock frequencies..... :                      | N/A                                 |                               |                                     |                          |                                   |                                     |
| Other parameters .....                        | 390000 (PSU Model Number)           |                               |                                     |                          |                                   |                                     |
| Software version .....                        | SW04600 (DUT)                       |                               |                                     |                          |                                   |                                     |
| Hardware version .....                        | 1.0 (DUT)                           |                               |                                     |                          |                                   |                                     |
| Dimensions in cm (W x H x D) .....            | 138.5 mm x 259.4 mm x 94.5 mm       |                               |                                     |                          |                                   |                                     |
| Mounting position .....                       | <input checked="" type="checkbox"/> | Table top equipment           |                                     |                          |                                   |                                     |
| Modules/parts..... :                          | Module/parts of test item           |                               | Type                                |                          | Manufacturer                      |                                     |
|                                               | Wireless Module                     |                               | EXS62-W                             |                          | Thales                            |                                     |
|                                               | Bluetooth LE                        |                               | EFR32BG1                            |                          | SiLabs                            |                                     |
| Accessories (not part of the test item) ..... | Description                         |                               | Type                                |                          | Manufacturer                      |                                     |
|                                               | --                                  |                               |                                     |                          |                                   |                                     |
| Documents as provided by the applicant..... : | Description                         |                               | File name                           |                          | Issue date                        |                                     |
|                                               | --                                  |                               |                                     |                          |                                   |                                     |

<sup>(3)</sup> Only for Medical Equipment

## Identification of the client

ResMed Pty Ltd  
1 Elizabeth Macarthur Drive,  
Bella Vista, NSW, 2153

## Testing period and place

|               |                                        |
|---------------|----------------------------------------|
| Test Location | DEKRA Testing and Certification S.A.U. |
| Date (start)  | 2021-08-31                             |
| Date (finish) | 2021-09-02                             |

## Document history

| Report number | Date       | Description   |
|---------------|------------|---------------|
| 68649RRF.001  | 2021-11-09 | First release |

## Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

|                   |                              |
|-------------------|------------------------------|
| Temperature       | Min. = 15 °C<br>Max. = 35 °C |
| Relative humidity | Min. = 20 %<br>Max. = 75 %   |

In the semianechoic chamber, the following limits were not exceeded during the test.

|                   |                              |
|-------------------|------------------------------|
| Temperature       | Min. = 15 °C<br>Max. = 35 °C |
| Relative humidity | Min. = 20 %<br>Max. = 75 %   |

## Remarks and comments

The tests have been performed by the technical personnel: José Manuel Jiménez.

Used instrumentation:

### Radiated Measurements:

|     |                                                                          | Last Calibration | Due Calibration |
|-----|--------------------------------------------------------------------------|------------------|-----------------|
| 1.  | Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP          | N.A.             | N.A.            |
| 2.  | Shielded Room ETS LINDGREN S101                                          | N.A.             | N.A.            |
| 3.  | Hybrid Bilog Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E                   | 2020/10          | 2023/10         |
| 4.  | Pre-amplifier G>40dB 10MHz-6GHz Bonn Elektronik BLNA 0160-01N            | 2021/03          | 2022/03         |
| 5.  | EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7                           | 2019/10          | 2021/10         |
| 6.  | Horn antenna 1-18 GHz SCHWARZBECK BBHA 9120 D                            | 2020/08          | 2023/08         |
| 7.  | Pre-amplifier, G>30 dB ,1-18 GHz BONN ELEKTRONIK BLMA 0118-3A            | 2020/10          | 2021/10         |
| 8.  | Signal and spectrum analyzer 10Hz-40GHz Rhode and Schwarz FSV40          | 2019/10          | 2021/10         |
| 9.  | Broadband Horn antenna 18 - 40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170 | 2020/05          | 2023/05         |
| 10. | Pre-amplifier G>30dB 18-40 GHz BONN ELEKTRONIK BLMA 1840-3G              | 2019/11          | 2021/11         |
| 11. | AC Power Supply 135/270 V, 5/10/20/40 A ELGAR CS-AC35(351SL)             | 2019/09          | 2022/09         |
| 12. | Digital Multimeter FLUKE 175                                             | 2020/11          | 2021/11         |

## Testing verdicts

|                 |     |
|-----------------|-----|
| Not applicable: | N/A |
| Pass:           | P   |
| Fail:           | F   |
| Not measured:   | N/M |

## Summary

### LTE Cat M1 Band FDD 5, LTE Cat M1 Band FDD 26

| FCC PART 22 / IC RSS-132 PARAGRAPH                                |         |        |
|-------------------------------------------------------------------|---------|--------|
| Requirement – Test case                                           | Verdict | Remark |
| FCC 22.913 / RSS-132 5.4: RF output power                         | N/M     | (1)    |
| FCC 2.1047 / RSS-132 5.2: Modulation characteristics              | N/M     | (1)    |
| FCC 22.355 / RSS-132 5.3: Frequency stability                     | N/M     | (1)    |
| FCC 2.1049: Occupied Bandwidth                                    | N/M     | (1)    |
| FCC 22.917 / RSS-132 5.5: Spurious emissions at antenna terminals | N/M     | (1)    |
| FCC 22.917 / RSS-132 5.5: Radiated emissions                      | P       |        |
| <u>Supplementary information and remarks:</u>                     |         |        |
| (1) Test not requested.                                           |         |        |

### LTE Cat M1 Band FDD 2, LTE Cat M1 Band FDD 25

| FCC PART 24 / IC RSS-133 PARAGRAPH                                |         |        |
|-------------------------------------------------------------------|---------|--------|
| Requirement – Test case                                           | Verdict | Remark |
| FCC 24.232 / RSS-133 6.4: RF Output Power                         | N/M     | (1)    |
| FCC 2.1047 / RSS-133 6.2: Modulation Characteristics              | N/M     | (1)    |
| FCC 24.235 / RSS-133 6.3: Frequency Stability                     | N/M     | (1)    |
| FCC 2.1049: Occupied Bandwidth                                    | N/M     | (1)    |
| FCC 24.238 / RSS-133 6.5: Spurious Emissions at Antenna Terminals | N/M     | (1)    |
| FCC 24.238 / RSS-133 6.5: Radiated Emissions                      | P       |        |
| <u>Supplementary information and remarks:</u>                     |         |        |
| (1) Test not requested.                                           |         |        |

LTE Cat M1 Band FDD 4, LTE Cat M1 Band FDD 12, LTE Cat M1 Band FDD 13,  
LTE Cat M1 Band FDD 66

| FCC PART 27 / IC RSS-130, IC RSS-139 PARAGRAPH                                  |         |        |
|---------------------------------------------------------------------------------|---------|--------|
| Requirement – Test case                                                         | Verdict | Remark |
| FCC 27.50 / RSS-130 4.6., RSS-139 6.5.: RF Output Power                         | N/M     | (1)    |
| FCC 2.1047 / RSS-130 4.1., RSS-139 6.2.: Modulation Characteristics             | N/M     | (1)    |
| FCC 27.54 / RSS-130 4.5., RSS-139 6.4.: Frequency Stability                     | N/M     | (1)    |
| FCC 2.1049: Occupied Bandwidth                                                  | N/M     | (1)    |
| FCC 27.53 / RSS-130 4.7., RSS-139 6.6.: Spurious Emissions at Antenna Terminals | N/M     | (1)    |
| FCC 27.53 / RSS-130 4.7., RSS-139 6.6.: Radiated Emissions                      | P       |        |
| <u>Supplementary information and remarks:</u>                                   |         |        |
| (1) Test not requested.                                                         |         |        |

LTE Cat M1 Band FDD 26

| FCC PART 90 PARAGRAPH                                  |         |        |
|--------------------------------------------------------|---------|--------|
| Requirement – Test case                                | Verdict | Remark |
| Clause 90.635 (b): RF output power                     | N/M     | (1)    |
| Clause 2.1047: Modulation characteristics              | N/M     | (1)    |
| Clause 90.213: Frequency stability                     | N/M     | (1)    |
| Clause 2.1049: Occupied Bandwidth                      | N/M     | (1)    |
| Clause 90.691: Spurious emissions at antenna terminals | N/M     | (1)    |
| Clause 90.691: Radiated emissions                      | P       |        |
| <u>Supplementary information and remarks:</u>          |         |        |
| (1) Test not requested.                                |         |        |

## **Appendix A: Test results for FCC Part 22 & 90 / IC RSS-132.**

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## TEST CONDITIONS

### POWER SUPPLY (V):

Vn: 120 Vac

Type of Power Supply: AC Voltage mains.

The subscript 'n' indicates nominal voltage test conditions.

### ANTENNA:

Declared Gain for antennas:

| Band        | Gain (dBi) | Antenna type |
|-------------|------------|--------------|
| LTE Band 5  | +2.2       | External     |
| LTE Band 26 | +2.2       | External     |

### TEST FREQUENCIES:

#### LTE Band 5. QPSK AND 16QAM MODULATIONS:

|         | Channel per Nominal Bandwidth (Frequency, MHz) |                  |                  |                  |
|---------|------------------------------------------------|------------------|------------------|------------------|
|         | BW = 1.4 MHz                                   | BW = 3 MHz       | BW = 5 MHz       | BW = 10 MHz      |
| Lowest  | 20407<br>(824.7)                               | 20415<br>(825.5) | 20425<br>(826.5) | 20450<br>(829.0) |
| Middle  | 20525<br>(836.5)                               | 20525<br>(836.5) | 20525<br>(836.5) | 20525<br>(836.5) |
| Highest | 20643<br>(848.3)                               | 20635<br>(847.5) | 20625<br>(846.5) | 20600<br>(844.0) |

## LTE Band 26. QPSK AND 16QAM MODULATIONS:

### - 814-824 MHz

|         | Channel per Nominal Bandwidth (Frequency, MHz) |                  |                  |                  |
|---------|------------------------------------------------|------------------|------------------|------------------|
|         | BW = 1.4 MHz                                   | BW = 3 MHz       | BW=5 MHz         | BW=10 MHz        |
| Lowest  | 26697<br>(814.7)                               | 26705<br>(815.5) | 26715<br>(816.5) | N/A              |
| Middle  | 26740<br>(819.0)                               | 26740<br>(819.0) | 26740<br>(819.0) | 26740<br>(819.0) |
| Highest | 26783<br>(823.3)                               | 26775<br>(822.5) | 26765<br>(821.5) | N/A              |

### - 824-849 MHz

|         | Channel per Nominal Bandwidth (Frequency, MHz) |                  |                  |                  |                  |
|---------|------------------------------------------------|------------------|------------------|------------------|------------------|
|         | BW = 1.4 MHz                                   | BW = 3 MHz       | BW=5 MHz         | BW=10 MHz        | BW=15 MHz        |
| Lowest  | 26797<br>(824.7)                               | 26805<br>(825.5) | 26815<br>(826.5) | 26840<br>(829.0) | 26865<br>(831.5) |
| Middle  | 26915<br>(836.5)                               | 26915<br>(836.5) | 26915<br>(836.5) | 26915<br>(836.5) | 26915<br>(836.5) |
| Highest | 27033<br>(848.3)                               | 27025<br>(847.5) | 27015<br>(846.5) | 26990<br>(844.0) | 26965<br>(841.5) |

## Radiated emissions

### SPECIFICATION:

FCC §2.1051 and §22.917. RSS-132 Clause 5.5.

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.

In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz.

At  $P_o$  transmitting power, the specified minimum attenuation becomes  $43+10 \log(P_o)$ , and the level in dBm relative to  $P_o$  becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log(P_o \text{ in mW}) - 30] = -13 \text{ dBm}$$

FCC §90.691:

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \log_{10}(f/6.1)$  decibels or  $50 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section

### METHOD:

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the height and polarization of the measuring antenna. The maximum meter reading was recorded.

A resolution bandwidth / video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

Measurement Limit:

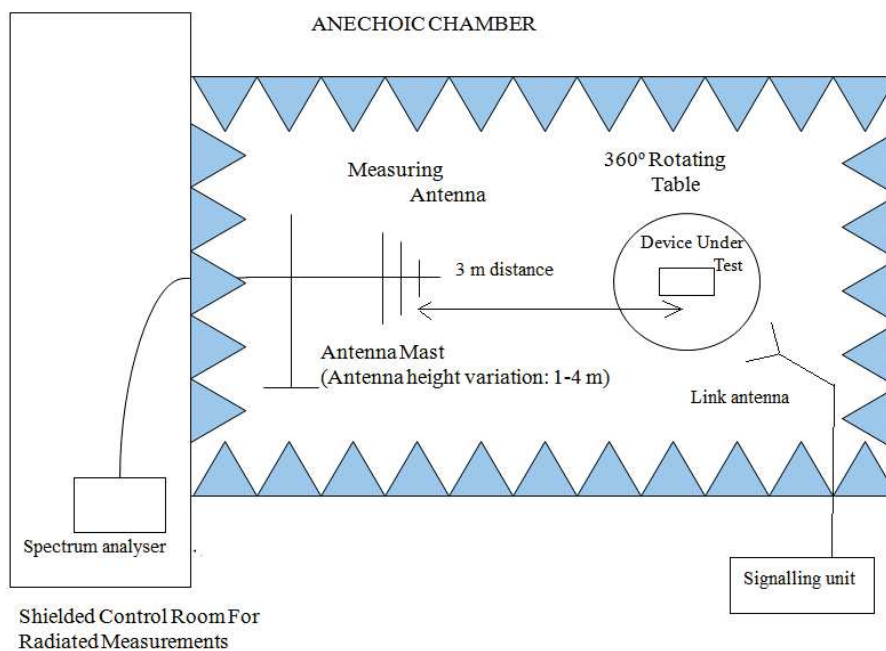
According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log(P)$  dB. P in watts.

At  $P_o$  transmitting power. the specified minimum attenuation becomes  $43+10 \log(P_o)$  and the level in dBm relative  $P_o$  becomes:

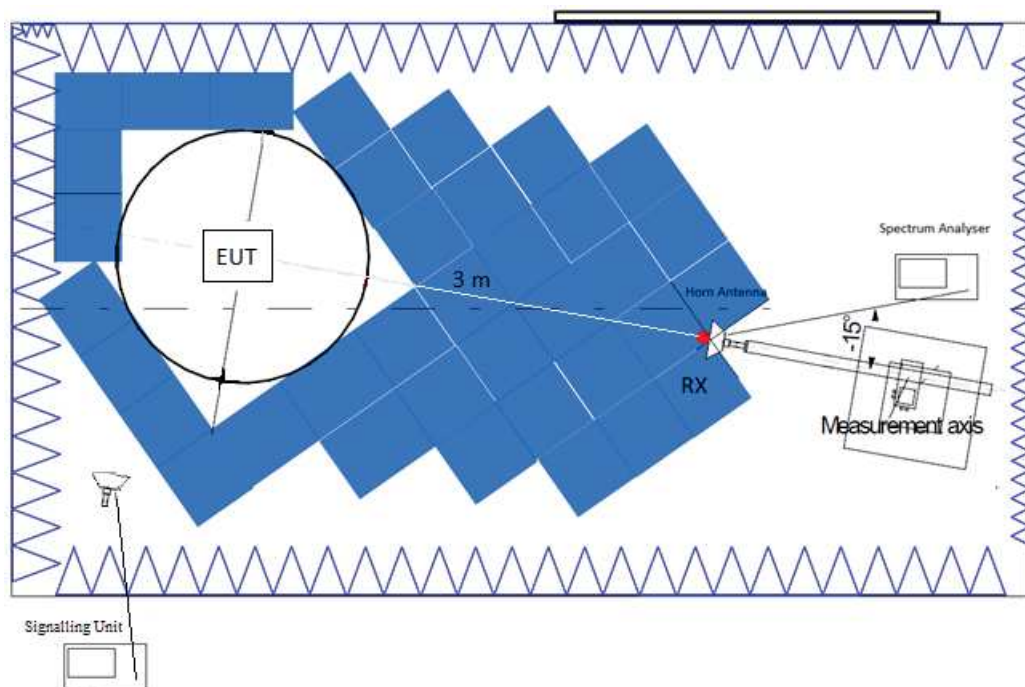
$$P_o \text{ (dBm)} - [43 + 10 \log(P_o \text{ in mwatts}) - 30] = -13 \text{ dBm}$$

## TEST SETUP:

Radiated measurements below 1 GHz.



Radiated measurements above 1 GHz.



## RESULTS:

### LTE Band 5:

QPSK and 16QAM Modulations:

A preliminary scan determined the 16QAM modulation, BW = 10 MHz, RB Size = 5, RB Offset = 0, Narrowband = 0 as the worst case. The following tables and plots show the results for this worst-case configuration.

- Low Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 8.5 GHz:**

No spurious frequencies at less than 20 dB below the limit.

- Middle Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 8.5 GHz:**

No spurious frequencies at less than 20 dB below the limit.

- High Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 8.5 GHz:**

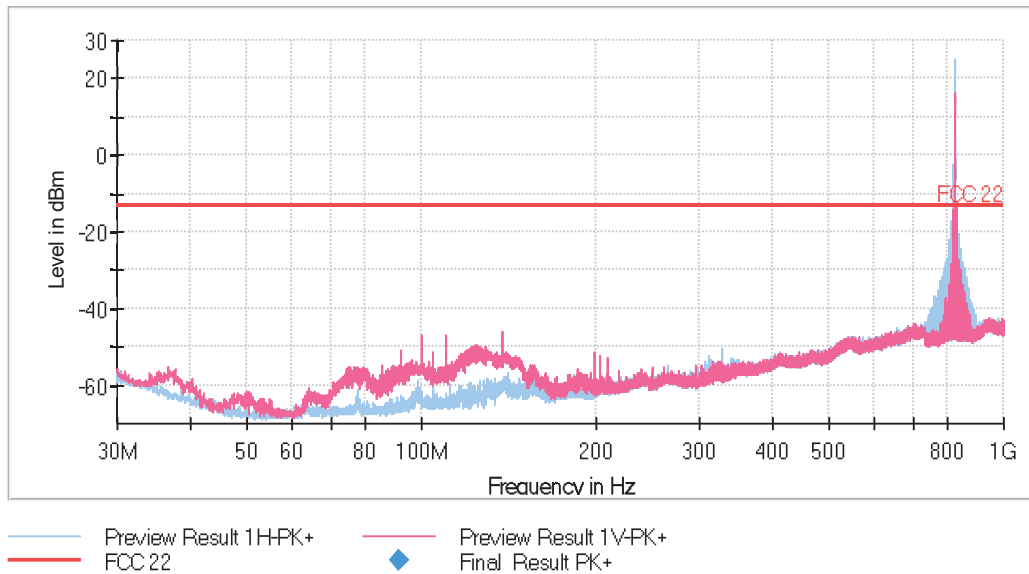
No spurious frequencies at less than 20 dB below the limit.

Measurement uncertainty (dB)  $< \pm 4.89$  for  $f < 1$  GHz  
 $< \pm 5.13$  for  $f \geq 1$  GHz up to 8.5 GHz

Verdict: PASS

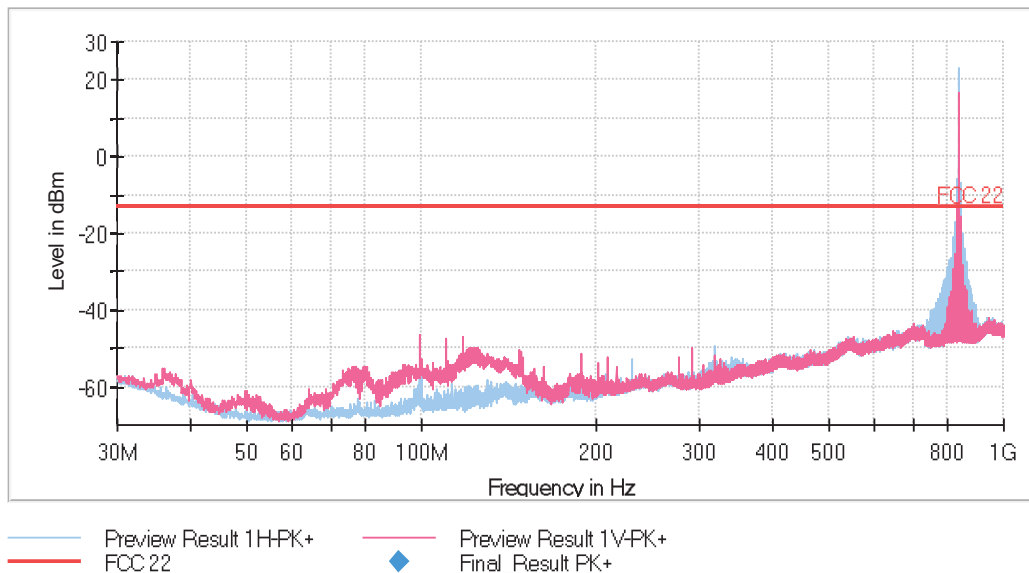
## FREQUENCY RANGE 30 MHz - 1 GHz (worst case):

- Low Channel:



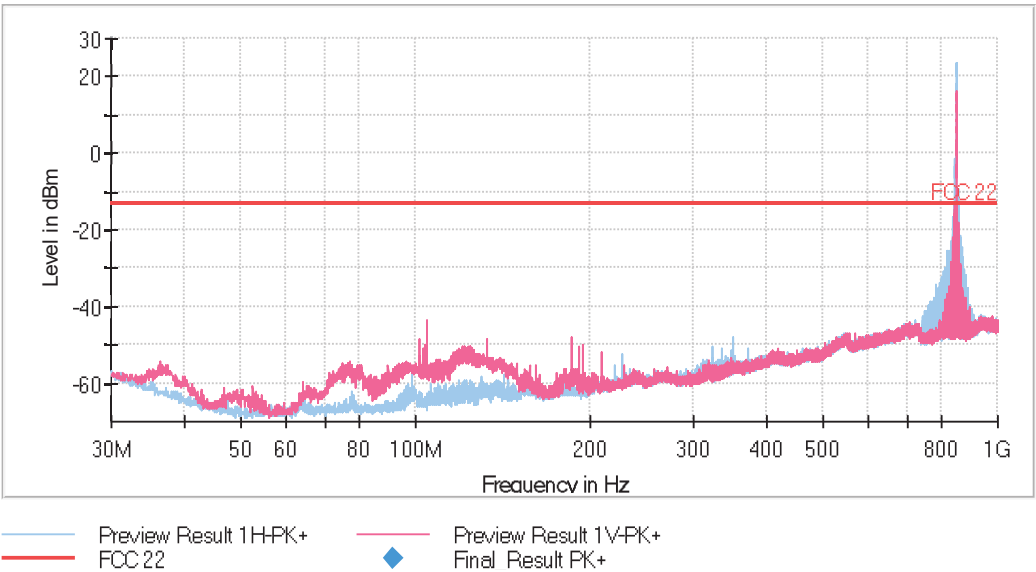
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

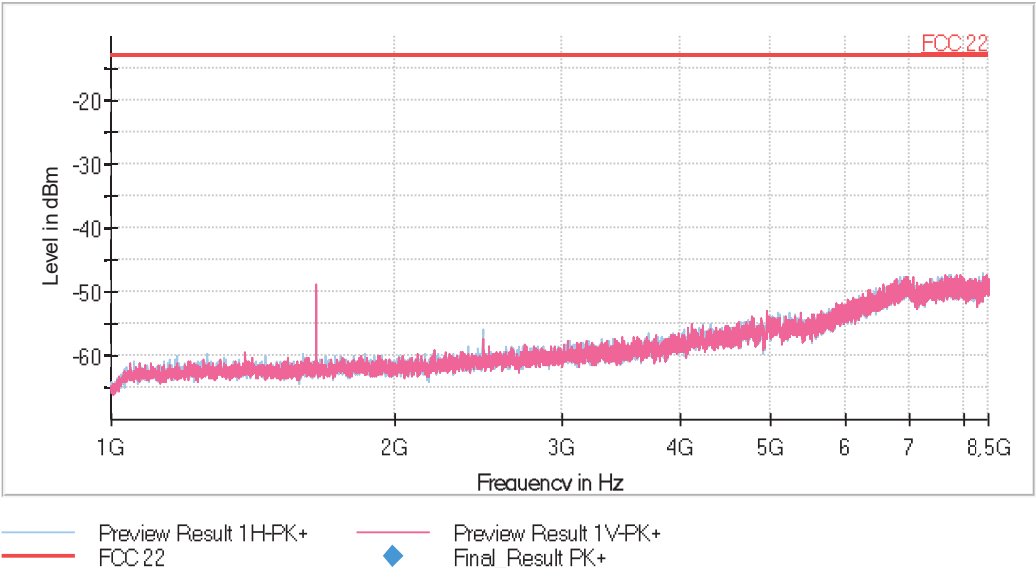
- High Channel:



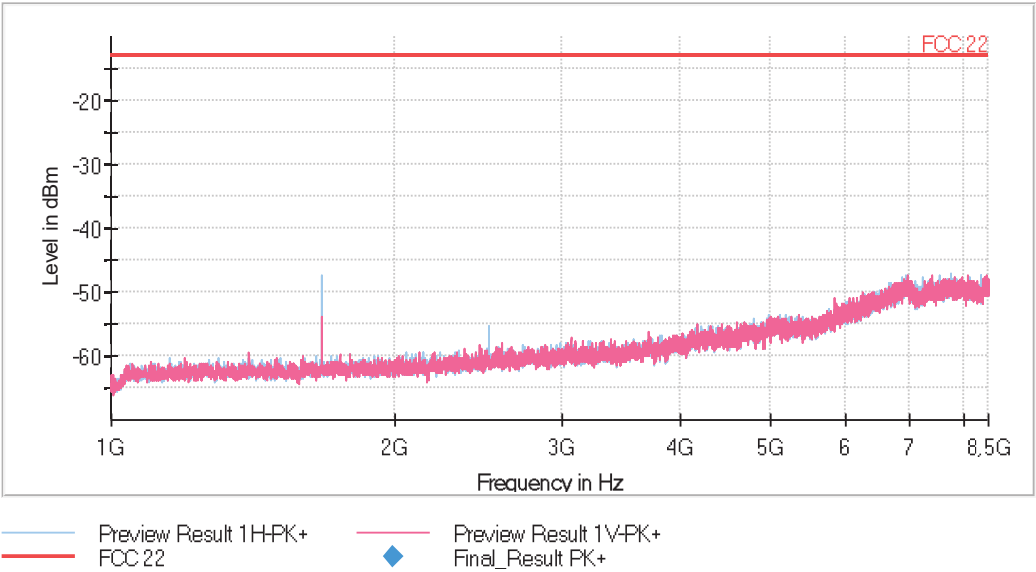
The peak above the limit is the carrier frequency.

**FREQUENCY RANGE 1 - 8.5 GHz (worst case):**

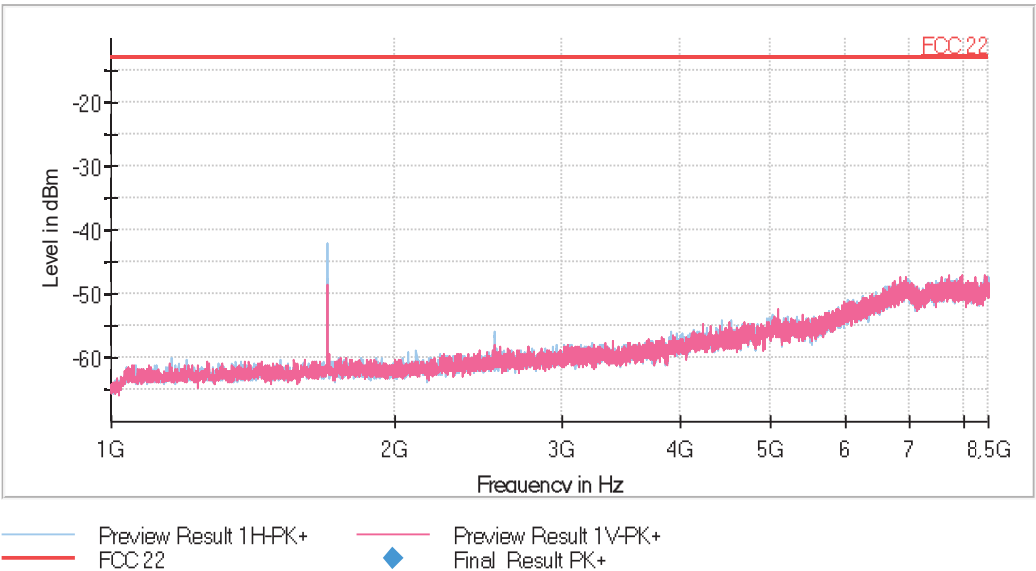
- Low Channel:



- Middle Channel:



- High Channel:



## **LTE Band 26:**

### **814-824 MHz**

QPSK and 16QAM Modulations:

A preliminary scan determined the 16QAM modulation, BW = 10 MHz, RB Size = 1, RB Offset = 0, Narrowband = 0 as the worst case. The following tables and plots show the results for this worst-case configuration.

- Low Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 10 GHz:**

No spurious frequencies at less than 20 dB below the limit.

- Middle Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 10 GHz:**

No spurious frequencies at less than 20 dB below the limit.

- High Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 10 GHz:**

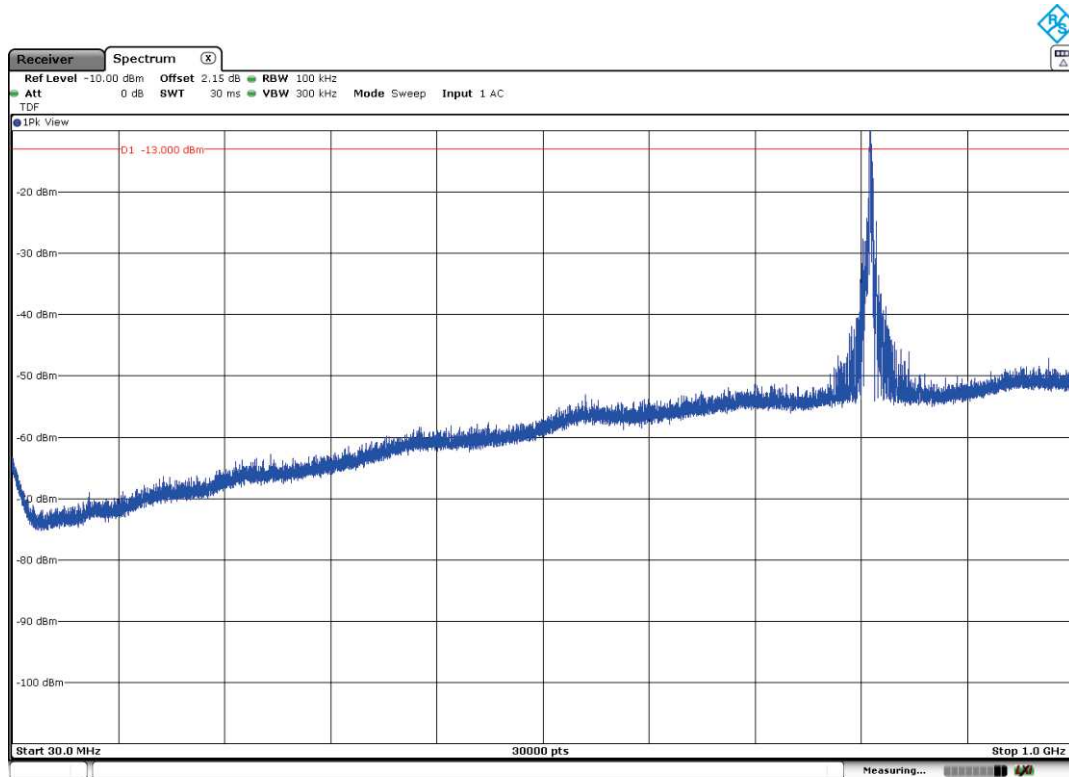
No spurious frequencies at less than 20 dB below the limit.

Measurement uncertainty (dB)  $< \pm 4.89$  for  $f < 1$  GHz  
 $< \pm 5.13$  for  $f \geq 1$  GHz up to 10 GHz

Verdict: PASS

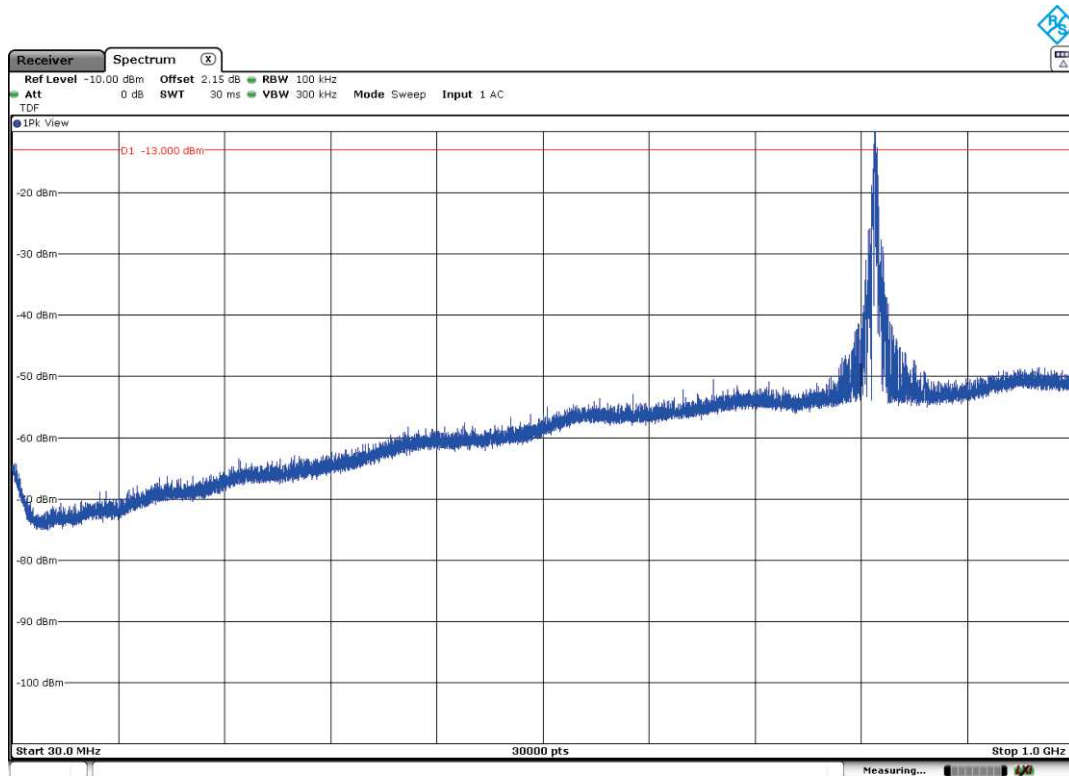
## FREQUENCY RANGE 30 MHz - 1 GHz (worst case):

- Low Channel:



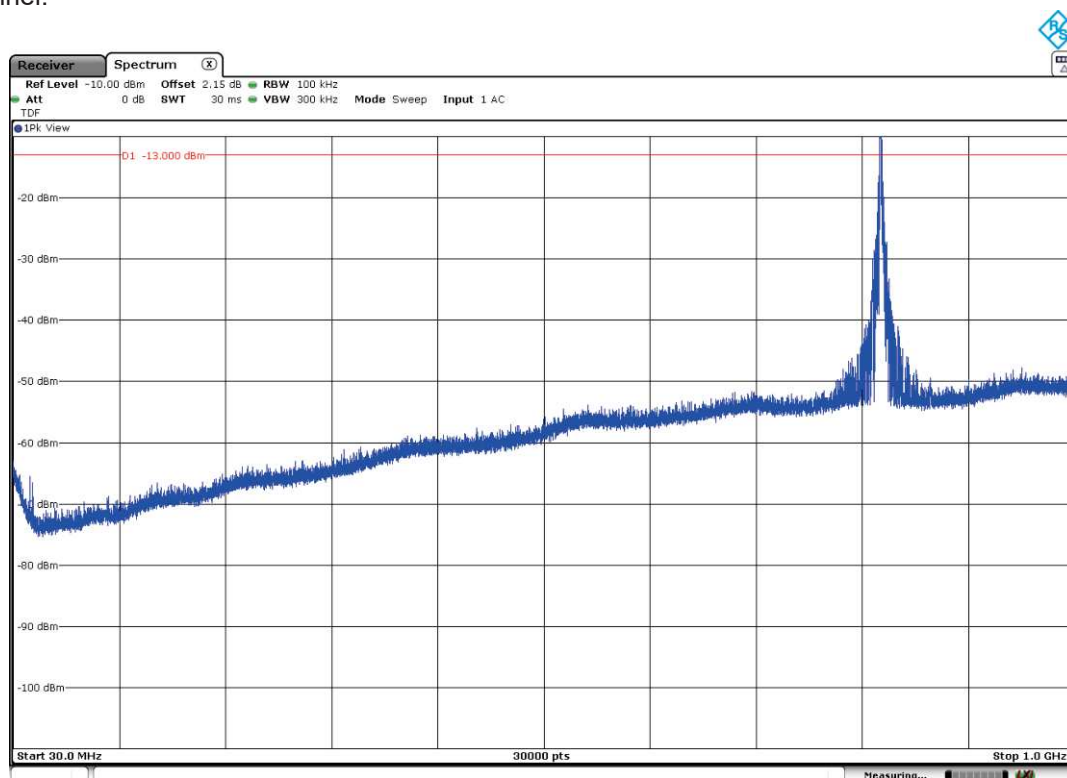
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

- High Channel:

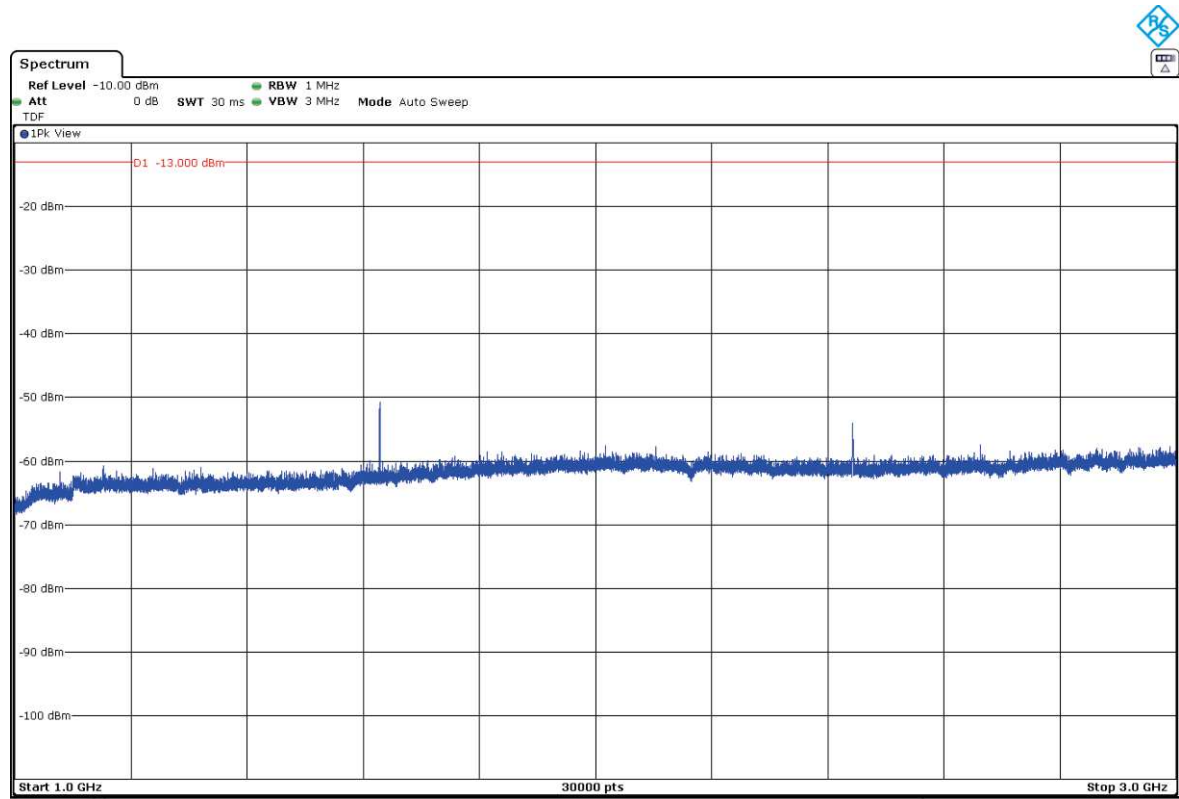


The peak above the limit is the carrier frequency.

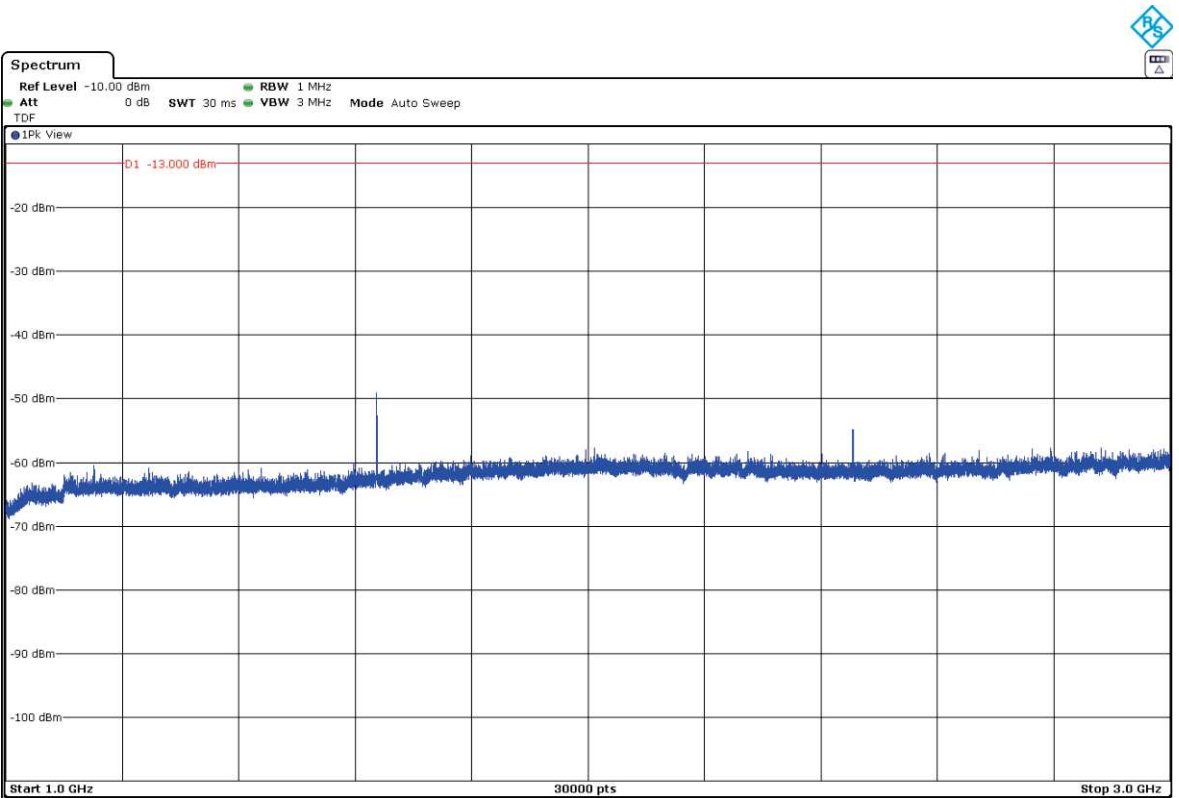
FREQUENCY RANGE 1 - 10 GHz (worst case):

FREQUENCY RANGE 1 - 3 GHz

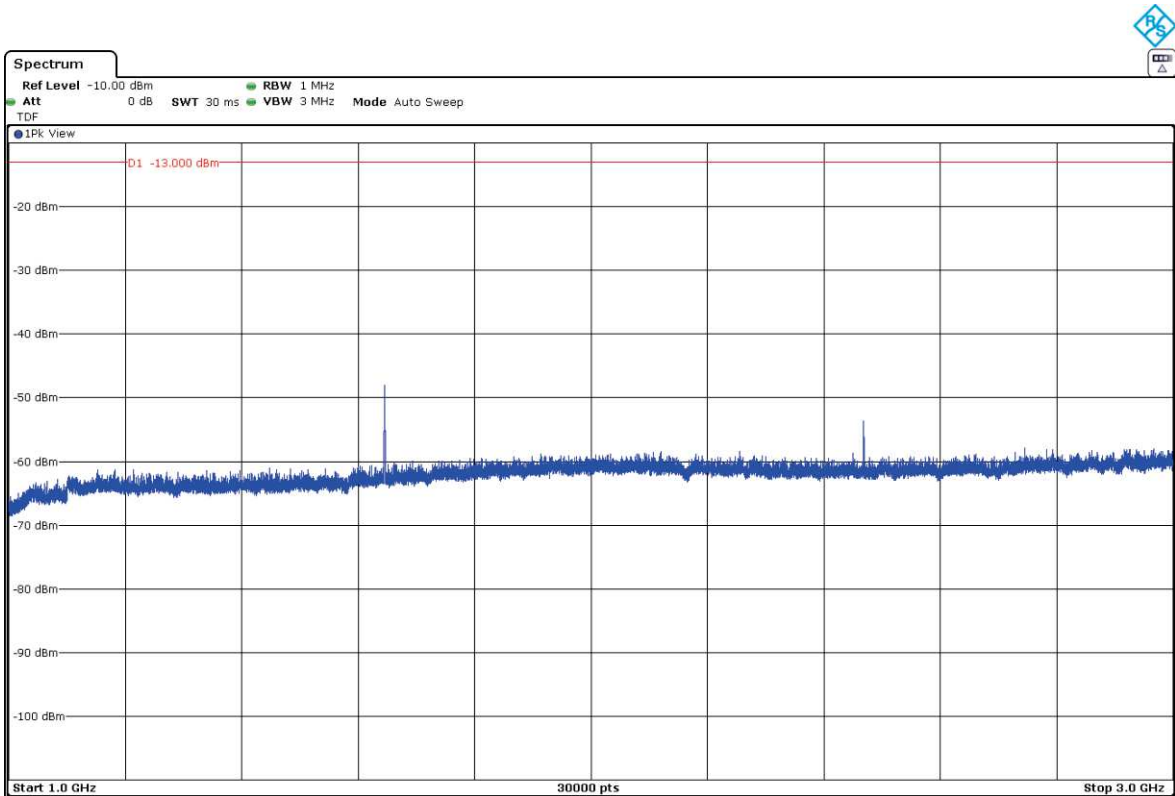
- Low Channel:



- Middle Channel:

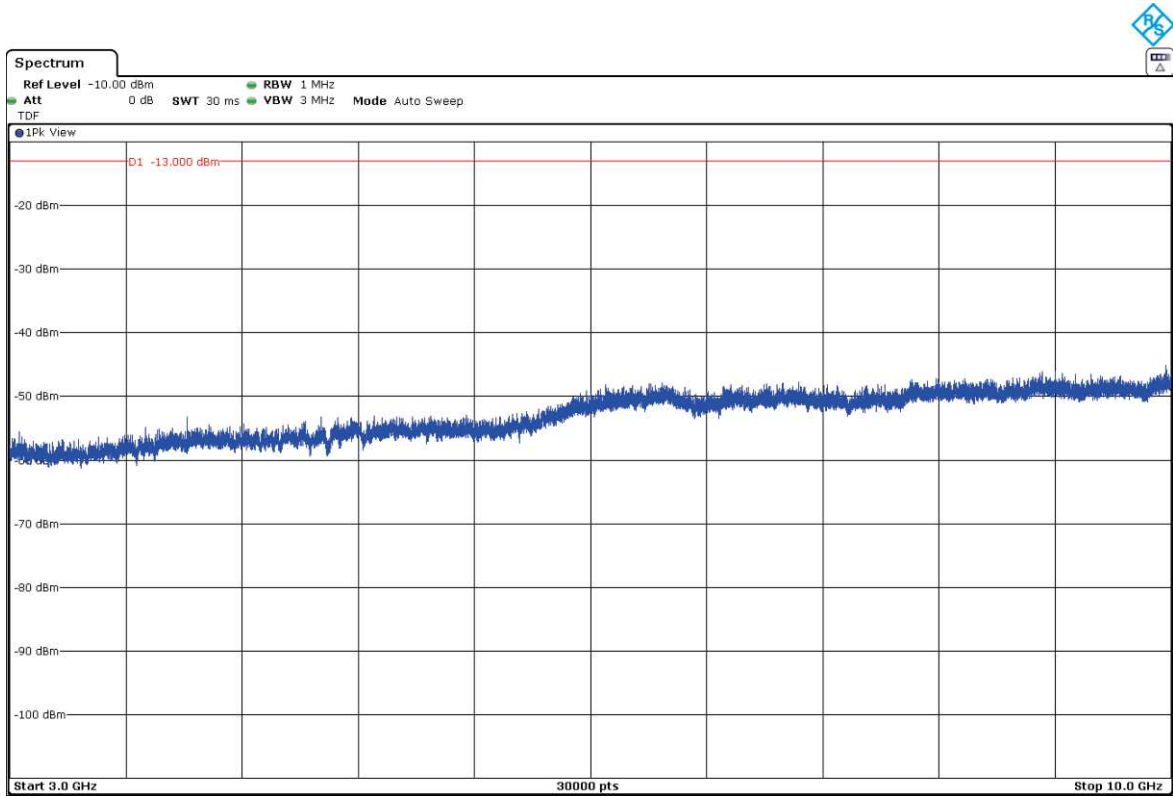


- High Channel:

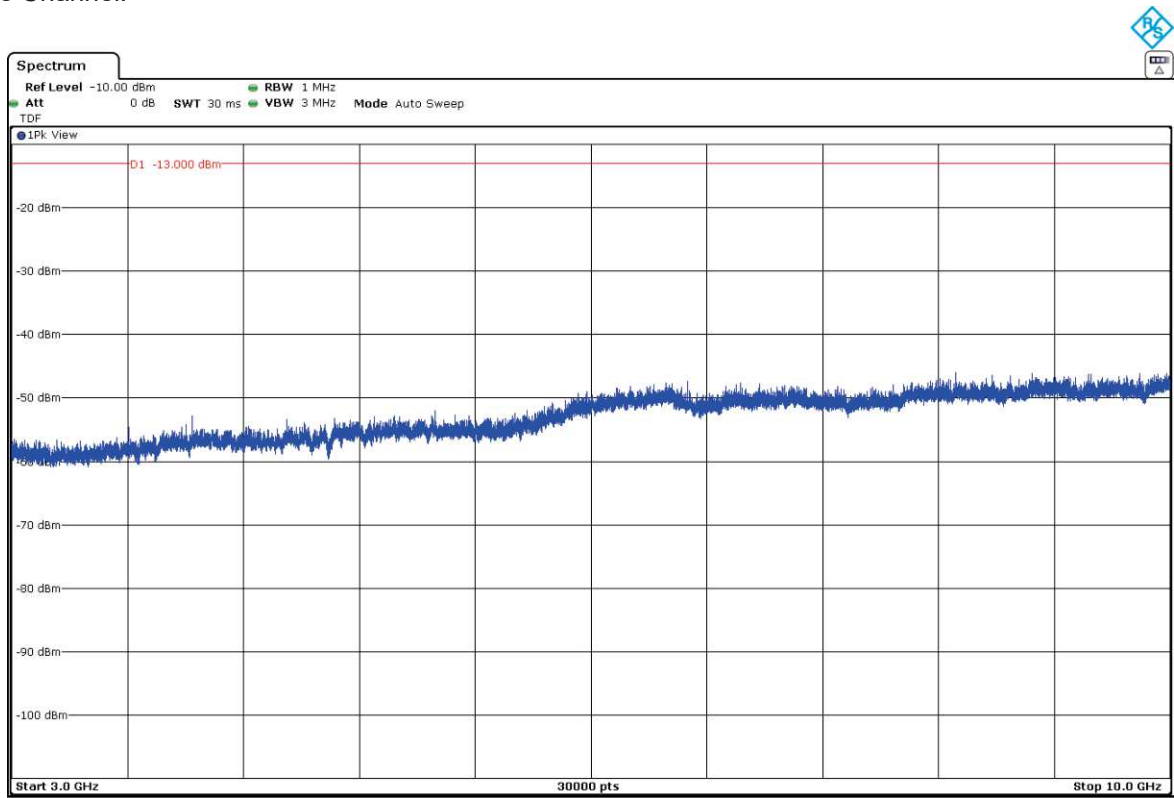


FRECUENCY RANGE 3 - 10 GHz

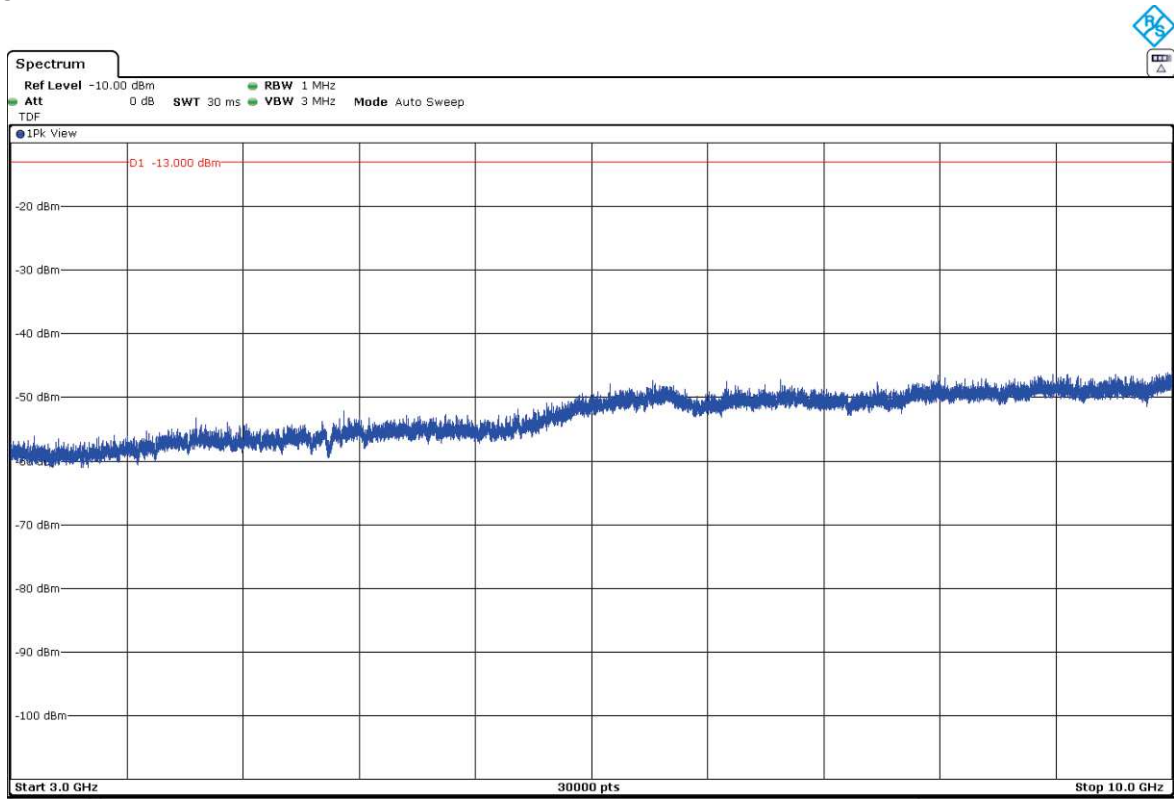
- Low Channel:



- Middle Channel:



- High Channel:



## **LTE Band 26:**

### **824-849 MHz**

QPSK and 16QAM Modulations:

A preliminary scan determined the 16QAM modulation, BW = 15 MHz, RB Size = 6, RB Offset = 0, Narrowband = 0 as the worst case. The following tables and plots show the results for this worst-case configuration.

- Low Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 8.5 GHz:**

No spurious frequencies at less than 20 dB below the limit.

- Middle Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 8.5 GHz:**

No spurious frequencies at less than 20 dB below the limit.

- High Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 8.5 GHz:**

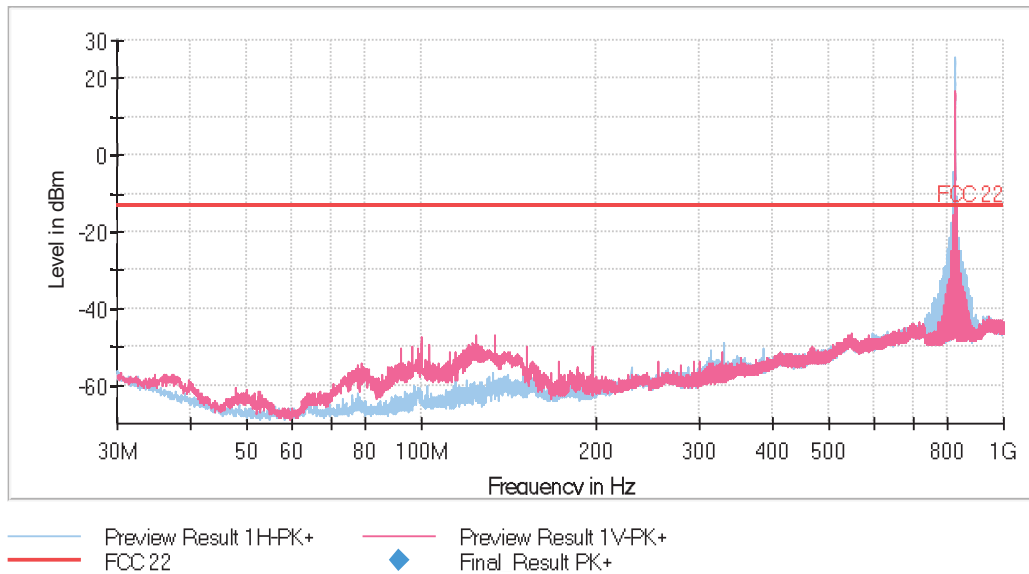
No spurious frequencies at less than 20 dB below the limit.

Measurement uncertainty (dB)  $< \pm 4.89$  for  $f < 1$  GHz  
 $< \pm 5.13$  for  $f \geq 1$  GHz up to 8.5 GHz

Verdict: PASS

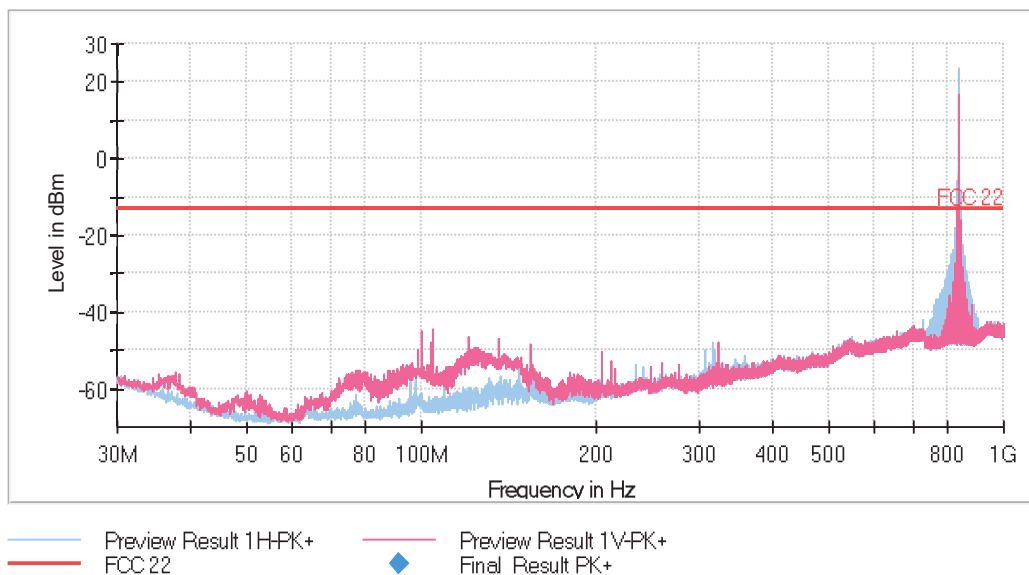
## FREQUENCY RANGE 30 MHz - 1 GHz (worst case):

- Low Channel:



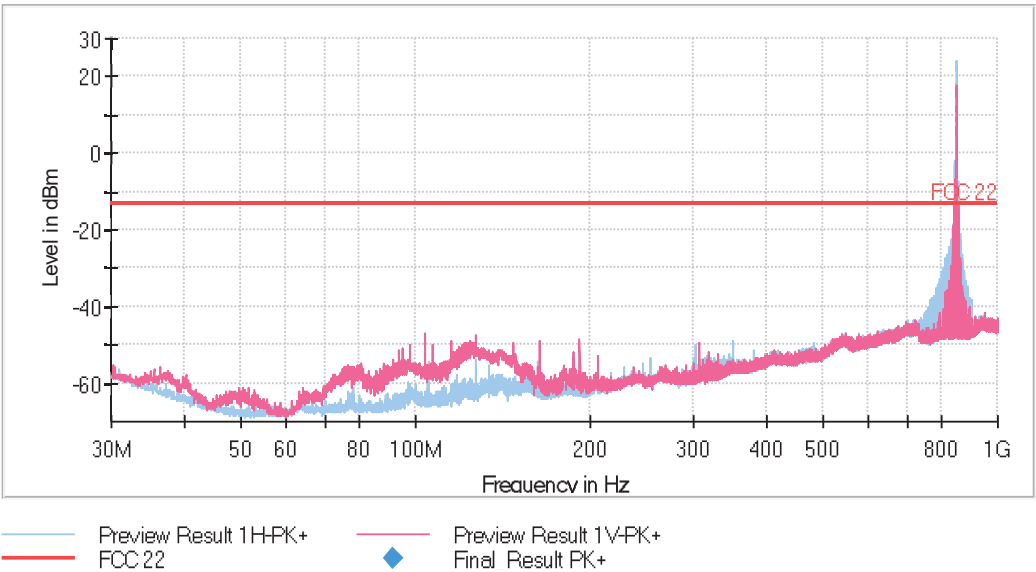
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

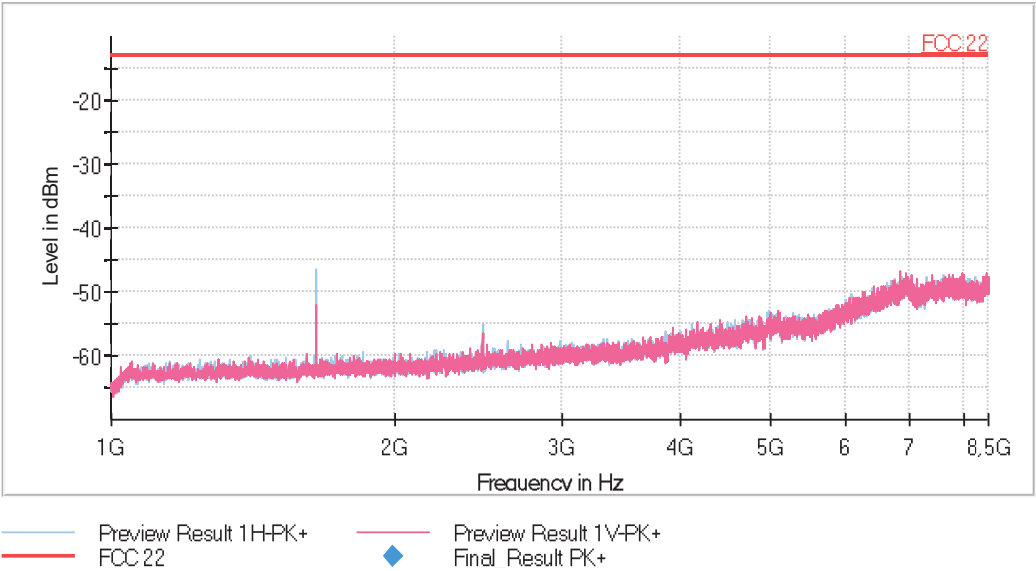
- High Channel:



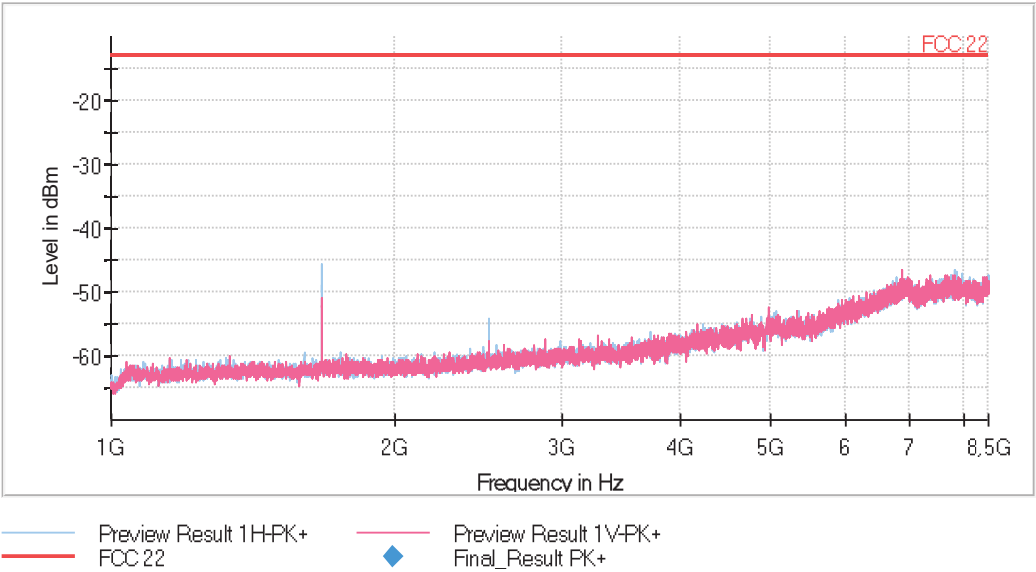
The peak above the limit is the carrier frequency.

**FREQUENCY RANGE 1 - 8.5 GHz (worst case):**

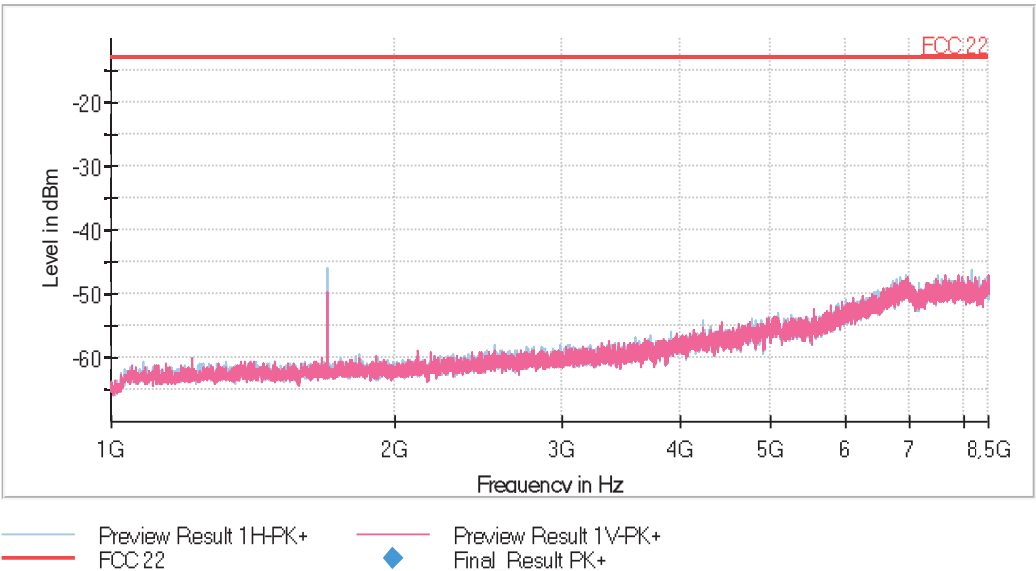
- Low Channel:



- Middle Channel:



- High Channel:



## **Appendix B: Test results for FCC Part 24 / IC RSS-133.**

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## TEST CONDITIONS

### POWER SUPPLY (V):

Vn: 120 Vac

Type of Power Supply: AC Voltage mains.

The subscript 'n' indicates nominal voltage test conditions.

### ANTENNA:

Declared Gain for antennas:

| Band        | Gain (dBi) | Antenna type |
|-------------|------------|--------------|
| LTE Band 2  | +2.5       | External     |
| LTE Band 25 | +2.5       | External     |

### TEST FREQUENCIES:

#### LTE Band 2. QPSK AND 16QAM MODULATIONS:

| Channel per Nominal Bandwidth (Frequency, MHz) |                |                |                |              |                |              |
|------------------------------------------------|----------------|----------------|----------------|--------------|----------------|--------------|
|                                                | BW = 1.4 MHz   | BW = 3 MHz     | BW = 5 MHz     | BW = 10 MHz  | BW = 15 MHz    | BW = 20 MHz  |
| Lowest                                         | 18607 (1850.7) | 18615 (1851.5) | 18625 (1852.5) | 18650 (1855) | 18675 (1857.5) | 18700 (1860) |
| Middle                                         | 18900 (1880)   | 18900 (1880)   | 18900 (1880)   | 18900 (1880) | 18900 (1880)   | 18900 (1880) |
| Highest                                        | 19193 (1909.3) | 19185 (1908.5) | 19175 (1907.5) | 19150 (1905) | 19125 (1902.5) | 19100 (1900) |

#### LTE Band 25. QPSK AND 16QAM MODULATIONS:

| Channel per Nominal Bandwidth (Frequency, MHz) |                |                |                |                |                |                |
|------------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                                                | BW = 1.4 MHz   | BW = 3 MHz     | BW = 5 MHz     | BW = 10 MHz    | BW = 15 MHz    | BW = 20 MHz    |
| Lowest                                         | 26047 (1850.7) | 26055 (1851.5) | 26065 (1852.5) | 26090 (1855)   | 26115 (1857.5) | 26140 (1860)   |
| Middle                                         | 26365 (1882.5) | 26365 (1882.5) | 26365 (1882.5) | 26365 (1882.5) | 26365 (1882.5) | 26365 (1882.5) |
| Highest                                        | 26683 (1914.3) | 26675 (1913.5) | 26665 (1912.5) | 26640 (1910)   | 26615 (1907.5) | 26590 (1905)   |

## Radiated Emissions

### SPECIFICATION:

FCC §24.238. RSS-133 Clause 6.5.

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.

At  $P_o$  transmitting power, the specified minimum attenuation becomes  $43 + 10 \log(P_o)$ , and the level in dBm relative to  $P_o$  becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log(P_o \text{ in mW}) - 30] = -13 \text{ dBm}$$

### METHOD:

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the height and polarization of the measuring antenna. The maximum meter reading was recorded.

A resolution bandwidth / video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

Measurement Limit:

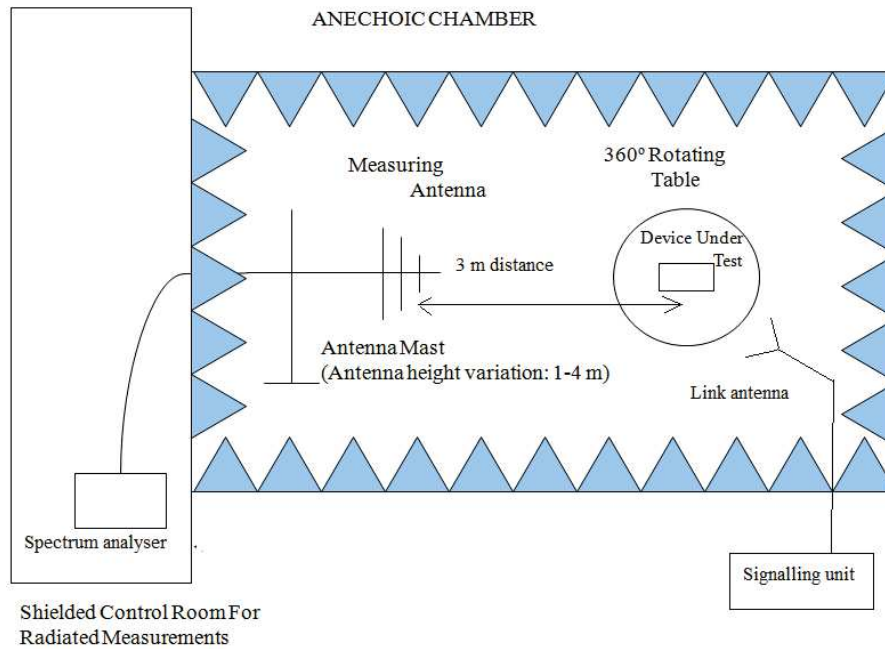
According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log(P)$  dB. P in watts.

At  $P_o$  transmitting power. the specified minimum attenuation becomes  $43 + 10 \log(P_o)$ . and the level in dBm relative  $P_o$  becomes:

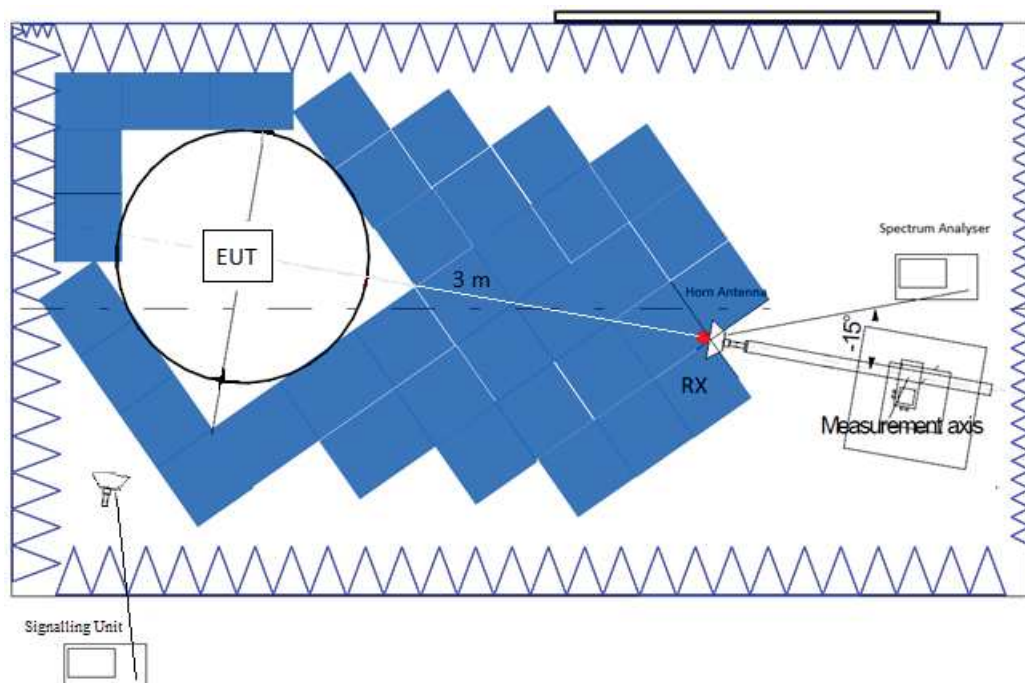
$$P_o \text{ (dBm)} - [43 + 10 \log(P_o \text{ in mwatts}) - 30] = -13 \text{ dBm}$$

## TEST SETUP:

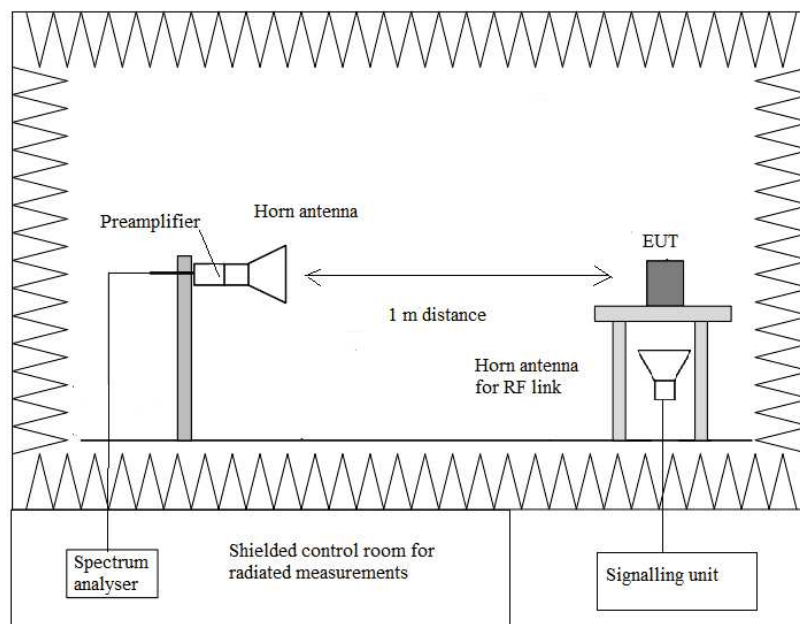
Radiated measurements below 1 GHz:



Radiated measurements in the range 1 to 18 GHz:



## Radiated measurements above 18 GHz:



## RESULTS:

### LTE Band 2:

QPSK and 16QAM Modulations:

A preliminary scan determined the 16QAM modulation, BW = 5 MHz, RB Size = 1, RB Offset = 0, Narrowband = 0 as the worst case. The following tables and plots show the results for this worst-case configuration.

- Low Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 20 GHz:**

No spurious frequencies at less than 20 dB below the limit.

- Middle Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 20 GHz:**

No spurious frequencies at less than 20 dB below the limit.

- High Channel:

#### **Frequency range 30 MHz - 1 GHz:**

No spurious frequencies at less than 20 dB below the limit.

#### **Frequency range 1 - 20 GHz:**

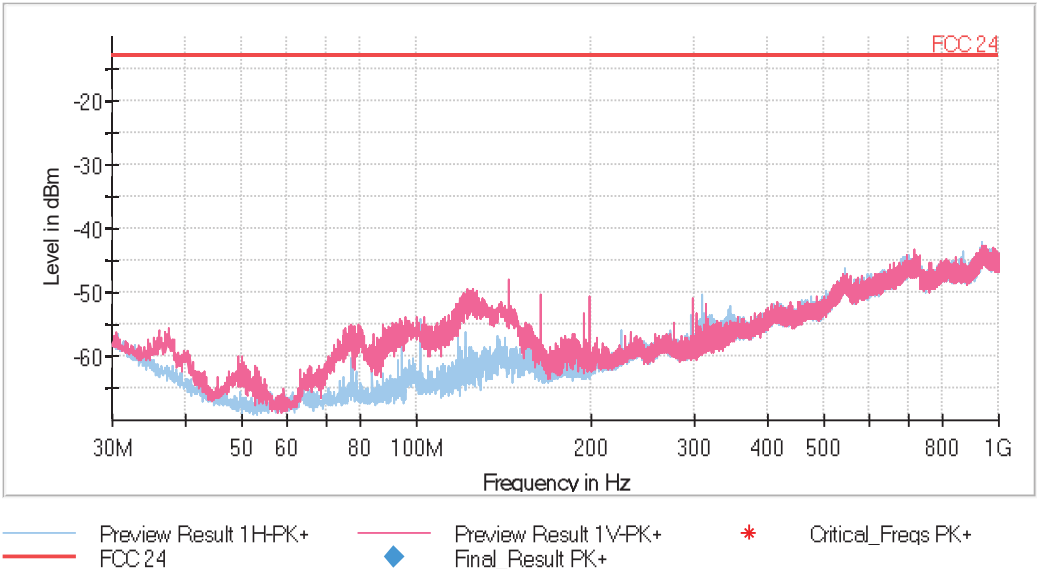
No spurious frequencies at less than 20 dB below the limit.

|                               |                                     |
|-------------------------------|-------------------------------------|
| Measurement Uncertainty (dB): | <± 4.89 for f ≥ 30 MHz up to 1 GHz  |
|                               | <± 4.11 for f ≥ 1 GHz up to 3 GHz   |
|                               | <± 5.13 for f ≥ 3 GHz up to 18 GHz  |
|                               | <± 4.81 for f ≥ 18 GHz up to 20 GHz |

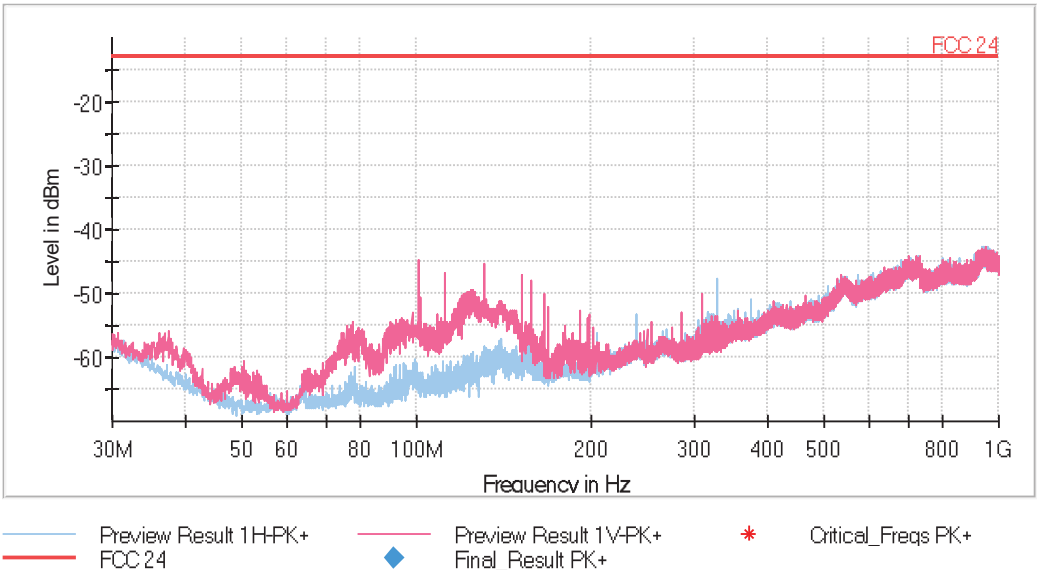
Verdict: PASS

FREQUENCY RANGE 30 MHz - 1 GHz (worst case):

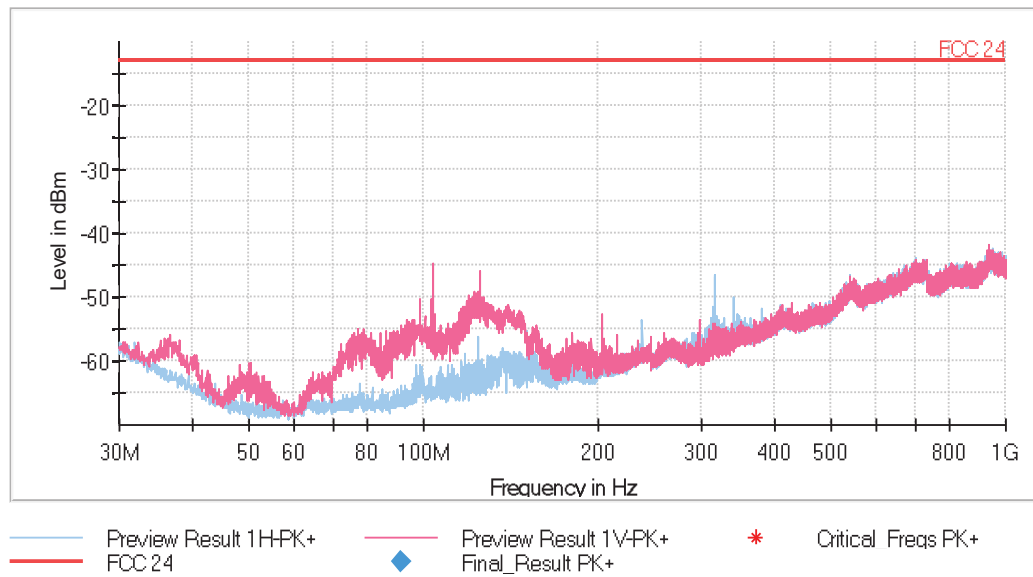
- Low Channel:



- Middle Channel:

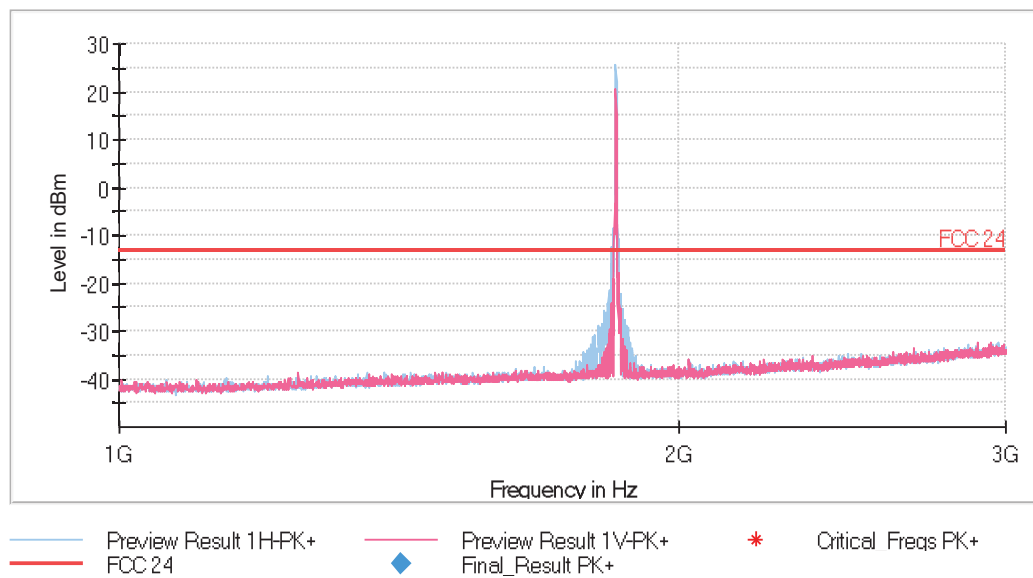


- High Channel:



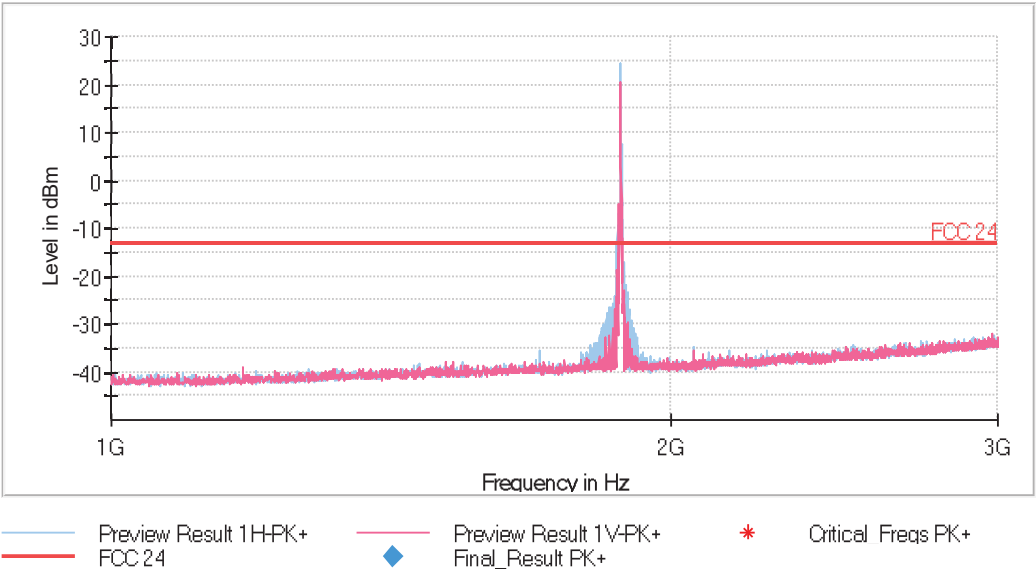
#### FREQUENCY RANGE 1 - 3 GHz (worst case):

- Low Channel:



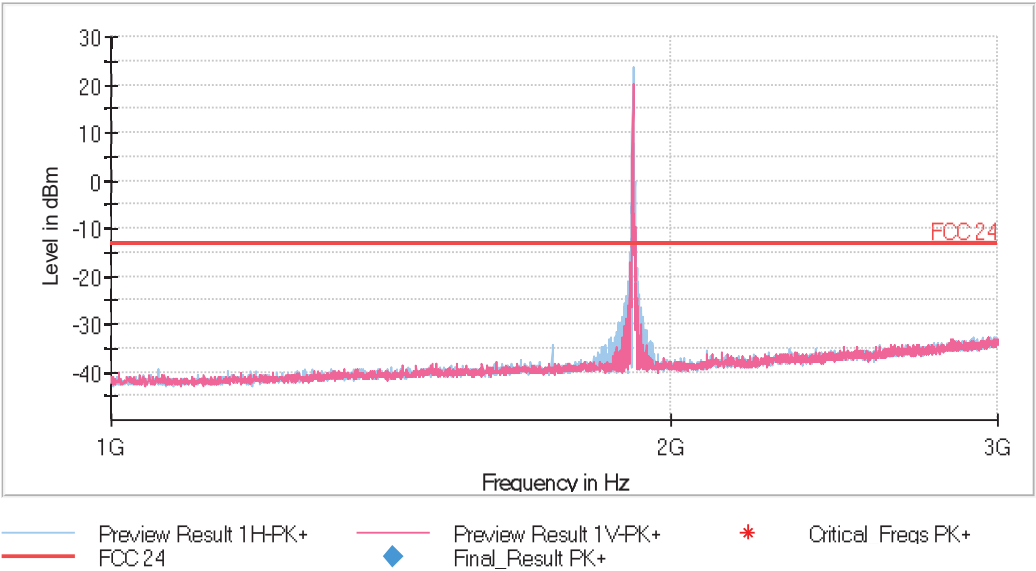
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

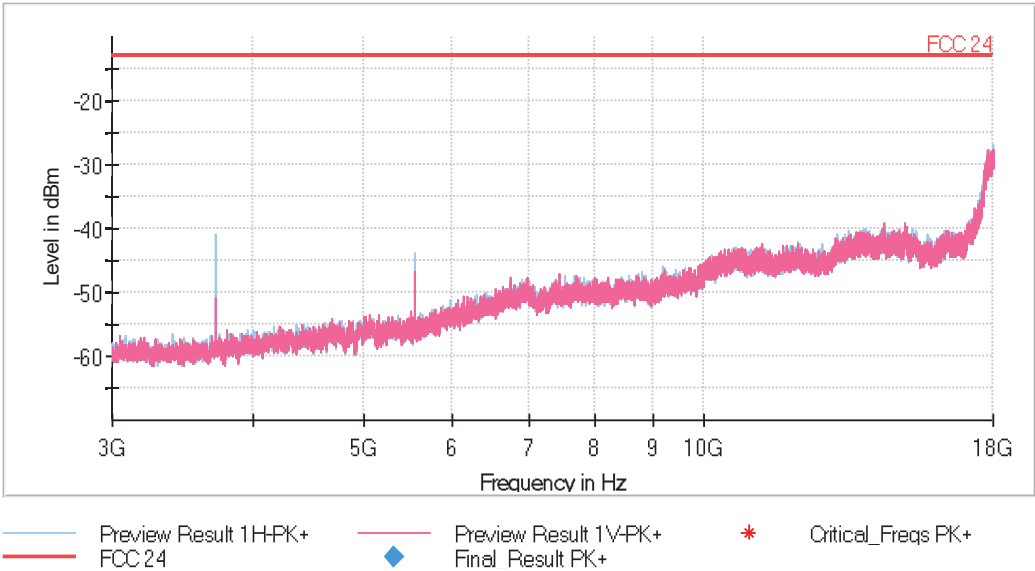
- High Channel:



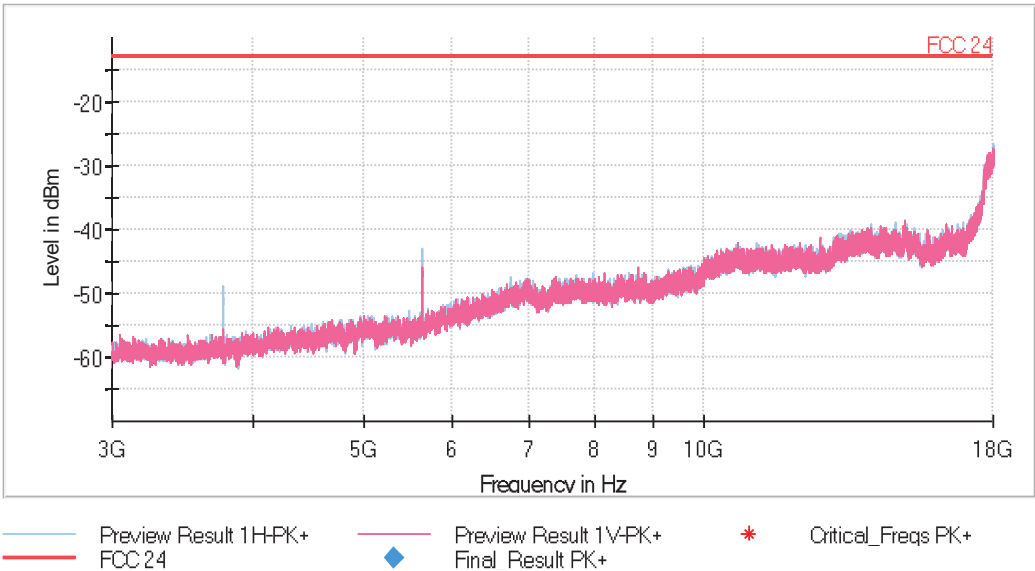
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 - 18 GHz (worst case):

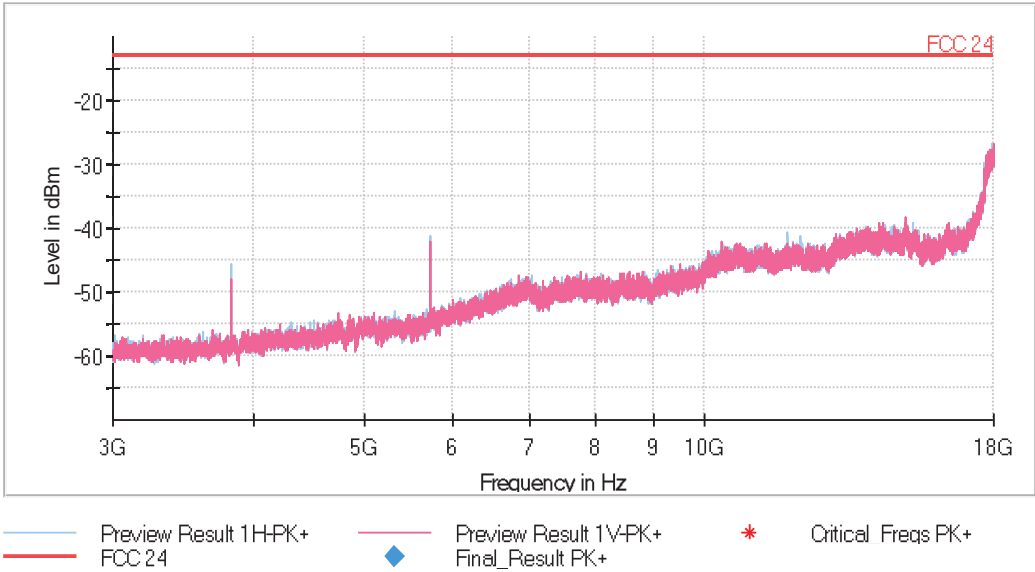
- Low Channel:



- Middle Channel:

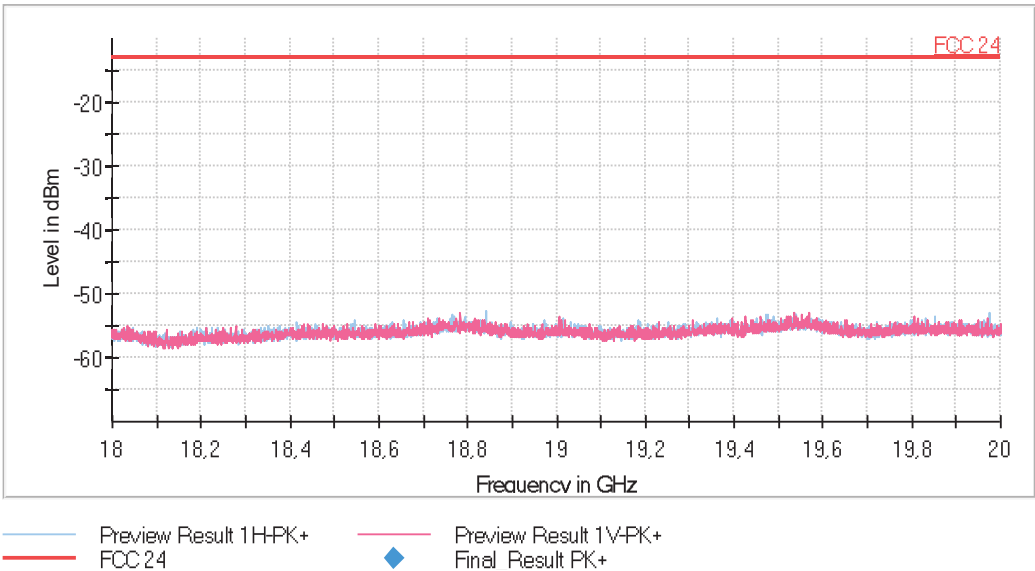


- High Channel:

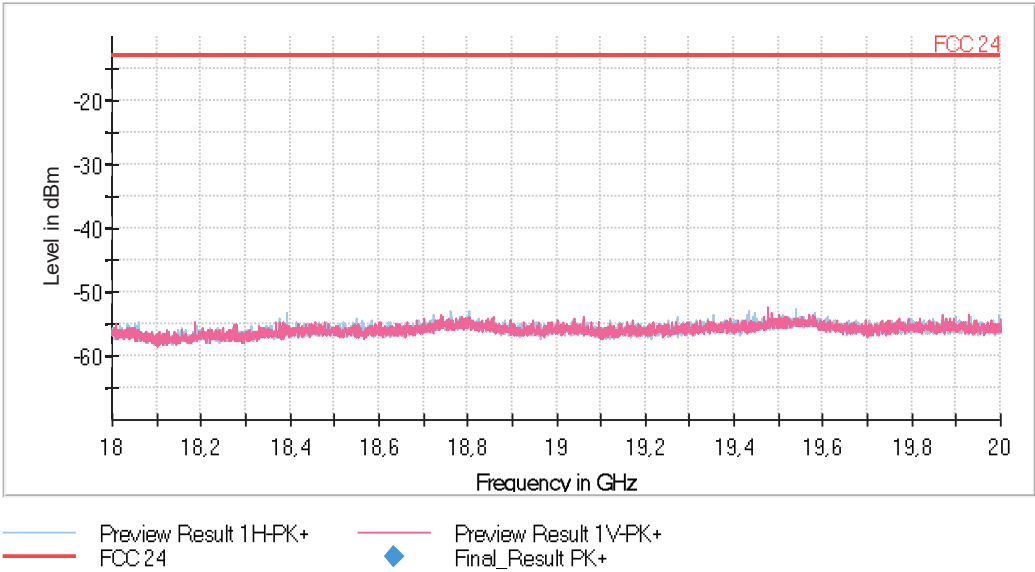


**FREQUENCY RANGE 18 - 20 GHz (worst case):**

- Low Channel:



- Middle Channel:



- High Channel:

