



Sverige



Accred. no. 10363  
Testing  
ISO/IEC 17025

# Report On

FCC Testing of the  
Ericsson Remote Radio Unit LTE and NB-IoT IB and NB-IoT GB KRC  
161 707/2, Radio 8843 B2 B66A (1900 MHz), with compatible Main  
Unit in a Base Station configuration in accordance with FCC CFR 47  
Part 2, FCC CFR 47 Part 24

COMMERCIAL-IN-CONFIDENCE

FCC: TA8AKRC161707-2

PREPARED BY

APPROVED BY

DATED

A handwritten signature in black ink, appearing to read 'Maggie Whiting'.

Maggie Whiting  
Key Account Manager

A handwritten signature in black ink, appearing to read 'Steve Scarfe'.

Steve Scarfe  
Authorised Signatory

09 July 2020

**Document 75949355 Report 01 Issue 2**

**July 2020**



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## **SECTION 1**

### **REPORT INFORMATION**



## 1.1 REPORT DETAILS

|                               |   |
|-------------------------------|---|
| Manufacturer                  | Ericsson  |
| Address                       | Torshamnsgatan 23<br>Kista<br>SE-16480<br>Stockholm<br>Sweden |
| Product Name & Product Number | Radio 8843 B2 B66A & KRC 161 707/2                            |
| Serial Number(s)              | E238267455  |
| Software Version              | CXP9013268/15 Rec R81KM                                       |
| Hardware Version              | R1H   |
| Non-tested Variant            | Radio 8843 B2 B66A & KRC 161 707/1                            |
| Test Specification/Issue/Date | FCC CFR 47 Part 2: 2019<br>FCC CFR 47 Part 24: 2019           |
| Test Plan                     | test plan for IoT for 8843 B2 B66A rev 5                      |
| Start of Test                 | 15 June 2020  |
| Finish of Test                | 02 July 2020  |
| Name of Engineer(s)           | Raj Kumar Kallem<br>Hector Trujillo                           |
| Related Document(s)           | KDB 971168 D01 v02r02<br>KDB 662911 D01 v02r01                |

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### ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate compliance with FCC CFR 47 Part 24. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

Raj Kumar Kallem

Hector Trujillo

**This Report has been up issued to Issue 2 and should be read in place of Issue 1. This Report has been up issued to issue 2 to replace the Declaration of Build Status.**



## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 24 is shown below.

| Section | Specification Clause |                    | Test Description  | Result |
|---------|----------------------|--------------------|---|--------|
|         | FCC CFR 47 Part 2    | FCC CFR 47 Part 24 |   |        |
| 2.1     | 2.1046               | 24.232             | Maximum Peak Output Power and Peak to Average Ratio - Conducted | Pass   |
| 2.2     | 2.1049               | 24.238 (b)         | Occupied Bandwidth  | Pass   |
| 2.3     | 2.1051               | 24.238 (b)         | Band Edge   | Pass   |
| 2.4     | 2.1051               | 24.238 (a)         | Transmitter Spurious Emissions                                  | Pass   |
| 2.5     | 2.1053               | -                  | Radiated Emissions  | Pass   |

Testing in this Report covers only B2 (1900 MHz).

For additional configurations and test cases not contained within this test report, refer to the following reports:

75949355 Report 02 – Radio 8843 B2 B66A (2100 MHz, B66A)

### Measurement Uncertainty Decision Statement

Determination of conformity with the specification limits is based on the results of the compliance measurement and does not take into account measurement instrumentation uncertainty as defined in ANSI C63.26:2015 Clause 1.3.



### 1.3 CONFIGURATION DESCRIPTION

| Configuration | RAT             | No. Of carriers | Carrier Bandwidth           | Carrier Frequency Configuration (MHz) |             |        |
|---------------|-----------------|-----------------|-----------------------------|---------------------------------------|-------------|--------|
|               |                 |                 |                             | Bottom                                | Middle      | Top    |
| 1             | LTE + NB-IoT GB | 1               | LTE 10 MHz + 2xNB IoT GB    | 1935                                  | -           | 1985   |
|               |                 |                 | LTE 15 MHz + 2xNB IoT GB    | 1937.5                                | -           | 1982.5 |
|               |                 |                 | LTE 20 MHz + 2xNB IoT GB    | 1940                                  | -           | 1980   |
| 2             | LTE             | 2               | LTE 20+20 MHz + 4xNB IoT GB | -                                     | 1950 + 1970 | -      |
| 3             | LTE             | 1               | LTE 5 MHz + NB IoT IB       | 1932.5                                | -           | 1987.5 |
|               |                 |                 | LTE 20 MHz + NB IoT IB      | 1940                                  | -           | 1980   |



#### 1.4 DECLARATION OF BUILD STATUS

|  |   |
|--|---|
| <b>MAIN EUT</b>  |   |
| MANUFACTURING DESCRIPTION  | Radio Unit  |
| MANUFACTURER   | Ericsson AB   |
| PRODUCT NAME   | Radio 8843 B2 B66A                                      |
| PART NUMBER  | KRC 161 707/2   |
| IC Model Name  | N/A   |
| SERIAL NUMBER  | E238267455  |
| HARDWARE VERSION   | R1H   |
| SOFTWARE VERSION   | CXP9013268/15   |
| TRANSMITTER OPERATING RANGE  | B2: 1930-1990 MHz<br>B66A: 2110-2180 MHz                |
| MODULATIONS  | NR & LTE: QPSK, 16QAM, 64QAM, 256QAM                    |
| ITU DESIGNATION OF EMISSION  | B2 LTE 5 MHz BW channel <sup>1</sup> : 4M51W7D          |
|  | B2 LTE 10 MHz BW channel <sup>1</sup> : 9M4W7D          |
|  | B2 LTE 15 MHz BW channel <sup>1</sup> : 14M1W7D         |
|  | B2 LTE 20 MHz BW channel <sup>1</sup> : 18M5W7D         |
|  | B2 LTE 20+20 MHz BW channel CA <sup>1</sup> : 38M5W7D   |
|  | B66A LTE 5 MHz BW channel: 4M51W7D                      |
|  | B66A LTE 10 MHz BW channel <sup>1</sup> : 9M5W7D        |
|  | B66A LTE 15 MHz BW channel <sup>1</sup> : 14M1W7D       |
|  | B66A LTE 20 MHz BW channel <sup>1</sup> : 18M5W7D       |
|  | B66A LTE 20+20 MHz BW channel CA <sup>1</sup> : 38M4W7D |
|  | B2 NR 5 MHz BW channel: 4M47W7D                         |
|  | B2 NR 10 MHz BW channel: 9M29W7D                        |
|  | B2 NR 15 MHz BW channel: 14M1W7D                        |
|  | B2 NR 20 MHz BW channel: 17M3W7D                        |
|  | B2 NR 20+20 MHz BW channel CA: 38M8W7D                  |
|  | B66A NR 5 MHz BW channel: 4M47W7D                       |
|  | B66A NR 10 MHz BW channel: 9M29W7D                      |
| B66A NR 15 MHz BW channel: 14M1W7D   |   |
| B66A NR 20 MHz BW channel: 17M3W7D   |   |
| B66A NR 20+20 MHz BW channel: 38M8W7D  |   |
| OUTPUT POWER (RMS) (W or dBm)  | B2: 4x40W or 2x60W<br>B66A: 4x60W or 2x80W              |
| FCC ID   | TA8AKRC161707-2   |
| IC ID  | N/A   |
| TECHNICAL DESCRIPTION<br>(a brief description of the intended use and operation) | Base Station Radio                                      |

<sup>1</sup> Including 2 NB-IoT GB carriers (4 with CA)

Signature   
Niklas Roos

Date 2020-07-08

No responsibility will be accepted by TÜV SÜD as to the accuracy of the information declared in this document by the manufacturer.

## 1.5 PRODUCT INFORMATION

### 1.5.1 Technical Description

The Equipment Under Test (EUT) Radio 8843 B2 B66A is an Ericsson AB Radio Unit working in the public mobile service 1900 MHz band which provides communication connections to 1900MHz network. The Radio 8843 B2 B66A operates from a -48V DC supply.

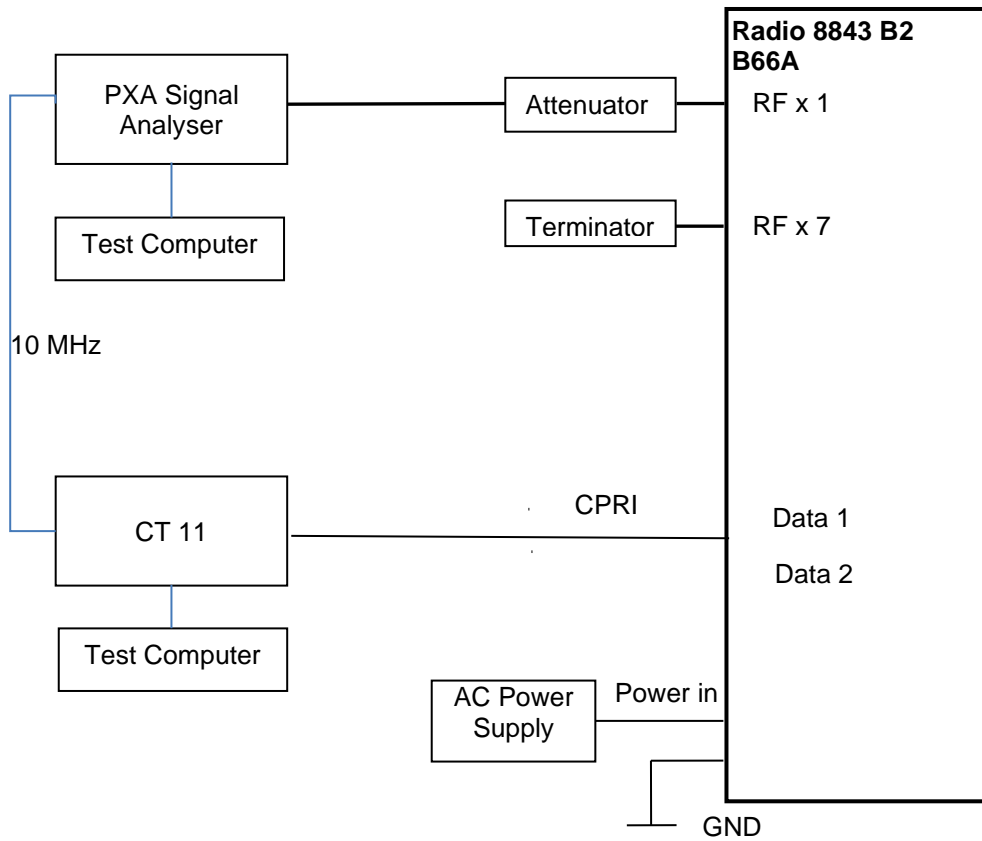
The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.



Equipment Under Test



## 1.6 TEST SETUP





## 1.7 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated as described in the Test Method for each Test.

The EUT was powered from a -48V DC supply.

FCC Measurement Facility Registration Number  
563983 Delta Test Laboratory, Vasteras  
563983 Ericsson Test Laboratory, Kista

Under our group Swedac Accreditation, TÜV SÜD Sverige conducted the following tests Delta Test Lab, Vasteras.

| Test Name          | Name of Engineer(s) |
|--------------------|---------------------|
| Radiated Emissions | Hector Trujillo     |

Under our group Swedac Accreditation, TÜV SÜD Sverige conducted the following tests Ericsson Test Lab, Kista.

| Test Name   | Name of Engineer(s) |
|---|---------------------|
| Maximum Peak Output Power and Peak to Average Ratio - Conducted | Rajkumar Kallem     |
| Occupied Bandwidth  | Rajkumar Kallem     |
| Band Edge   | Rajkumar Kallem     |
| Transmitter Spurious Emissions                                  | Rajkumar Kallem     |

## 1.8 DEVIATION FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

## 1.9 MODIFICATION RECORD

No modifications were made to the EUT during testing.

## 1.10 ADDITIONAL INFORMATION

Testing was performed in the presence of Tomas Johansson at Ericsson AB, Kista, Sweden.



## **SECTION 2**

### **TEST DETAILS**



**2.1 MAXIMUM PEAK OUTPUT POWER AND PEAK TO AVERAGE RATIO - CONDUCTED**

**2.1.1 Specification Reference**

FCC CFR 47 Part 2, Clause 2.1046  
 FCC CFR 47 Part 24, Clause 24.232

**2.1.2 Date of Test and Modification State**

04 June 2020 - Modification State 0

**2.1.3 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

**2.1.4 Environmental Conditions**

Ambient Temperature 22.9°C  
 Relative Humidity 38.2%

**2.1.5 Test Method**

All measurements were made in accordance with FCC KDB 971168 D01, clause 5.2.1 and summed in accordance with FCC KDB 662911 D01.

**2.1.6 Test Results**

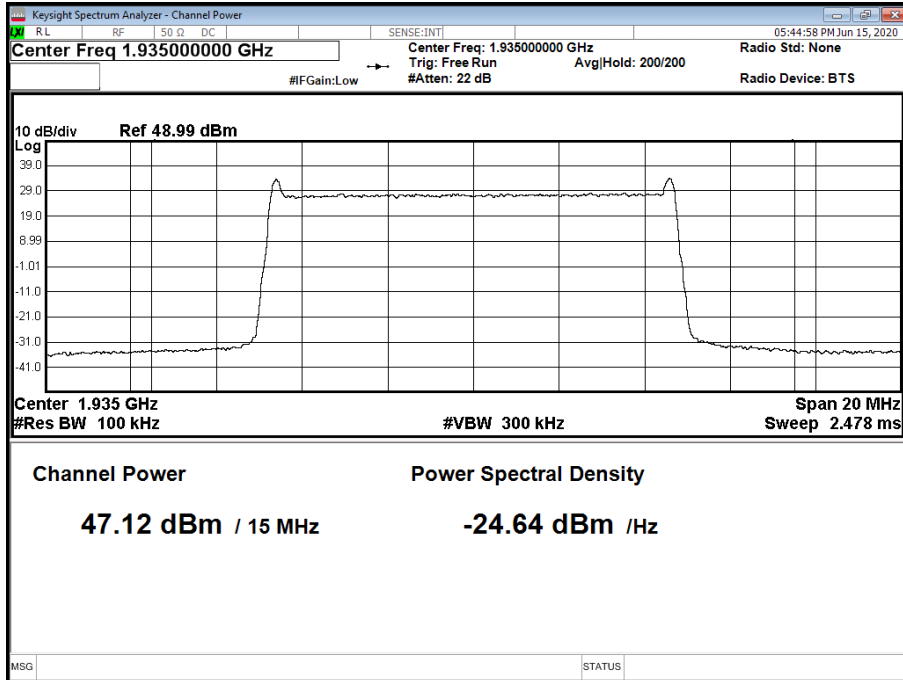
Configuration 1

Maximum Output Power 47.8 dBm

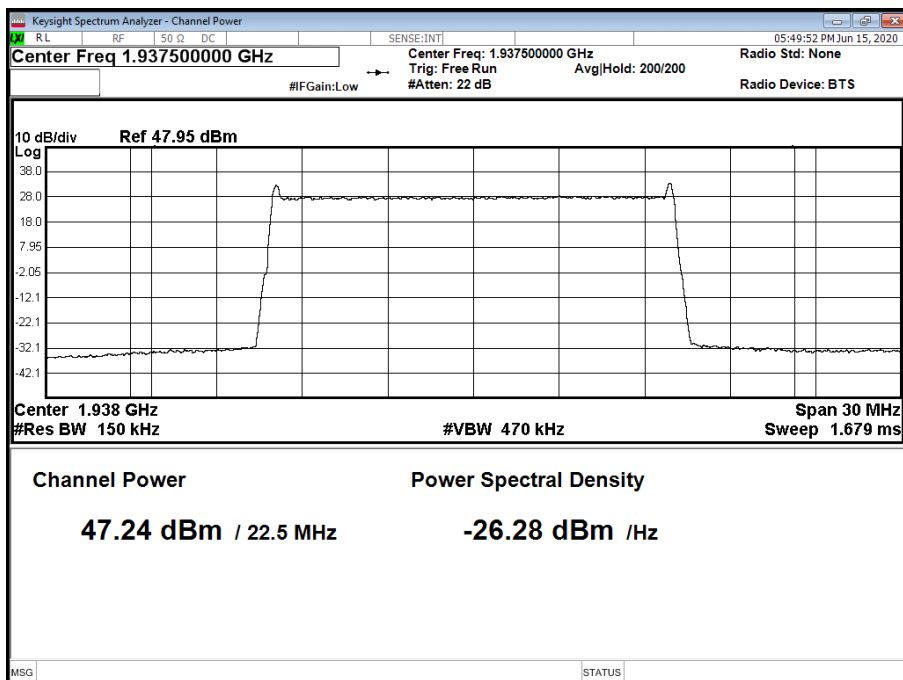
| Antenna | LTE / NB-IoT GB Modulation | LTE / NB-IoT GB Carrier Bandwidth | Peak to Average Ratio (PAR) / Output Power |                             |         |
|---------|----------------------------|-----------------------------------|--|-----------------------------|---------|
|         |                            |                                   | PAR (dB)                                   | Channel Position $B_{RFBW}$ |         |
|         |                            |                                   |  | Average Power               |         |
|         |                            |                                   |  | dBm                         | dBm/MHz |
| A       | 64QAM / N:QPSK / N:QPSK    | 10.0 MHz +2xNB IoT GB             | 7.31                                       | 47.12                       | -       |
| A       | 64QAM / N:QPSK / N:QPSK    | 15.0 MHz +2xNB IoT GB             | 7.32                                       | 47.24                       | -       |
| A       | 64QAM / N:QPSK / N:QPSK    | 20.0 MHz +2xNB IoT GB             | 7.42                                       | 47.16                       | -       |



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW

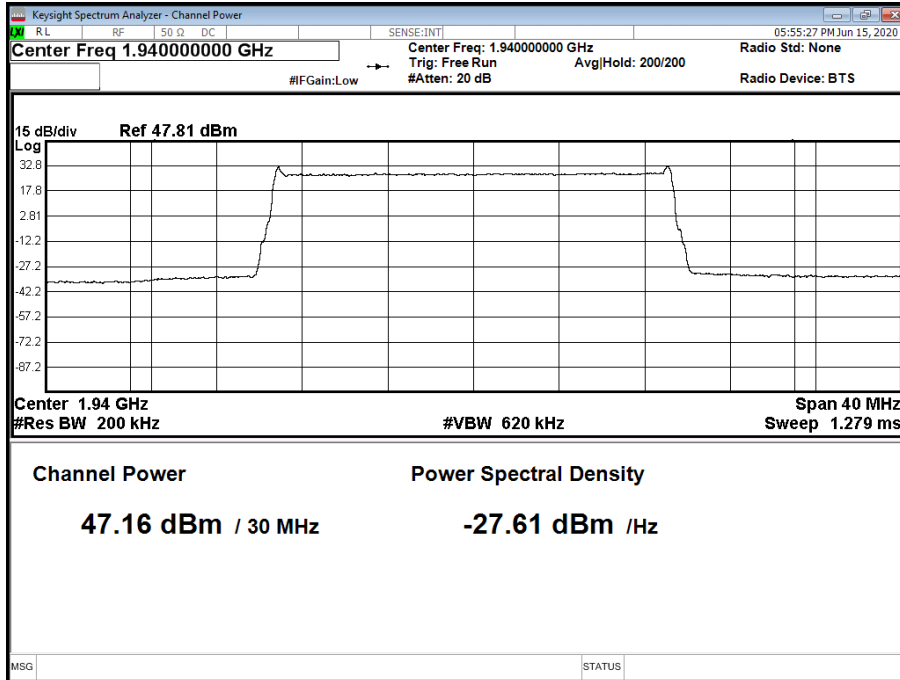


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW





Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW



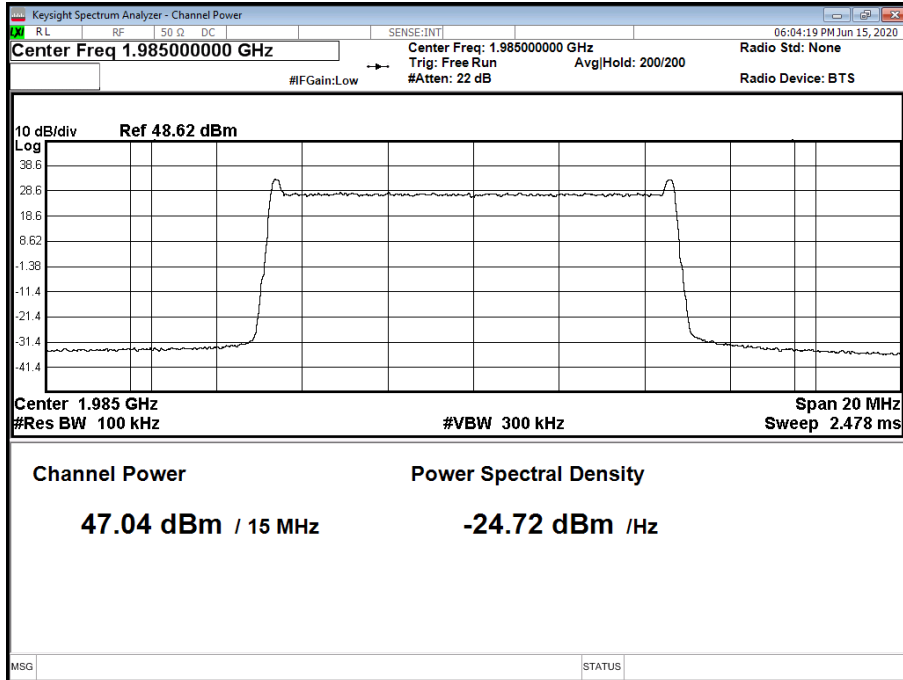
Configuration 1

Maximum Output Power 47.8 dBm

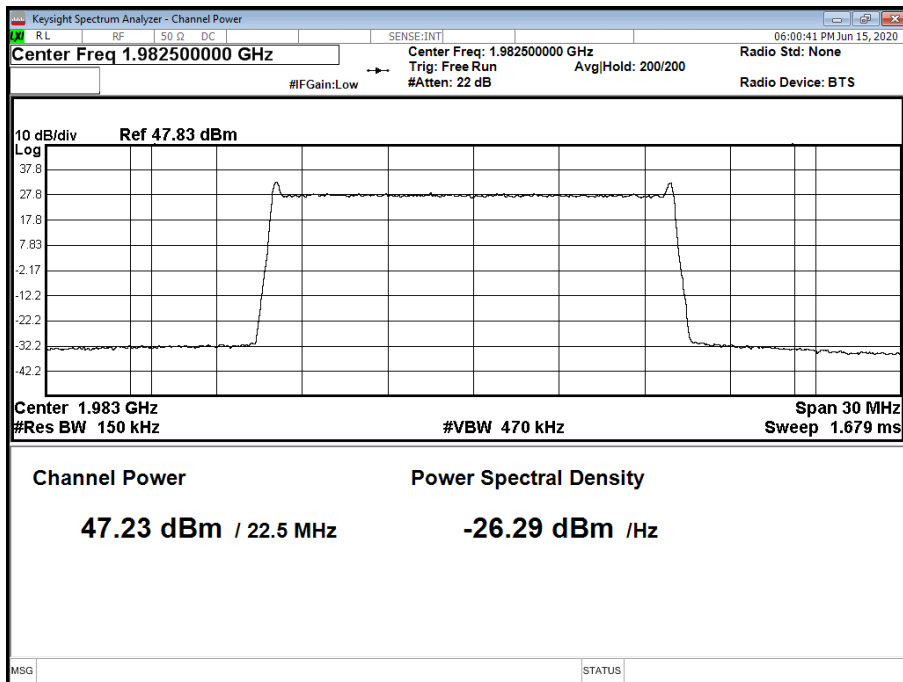
| Antenna | LTE / NB-IoT GB Modulation | LTE / NB-IoT GB Carrier Bandwidth | Peak to Average Ratio (PAR) / Output Power |               |   |
|---------|----------------------------|-----------------------------------|--|---------------|---|
|         |                            |                                   | Channel Position T <sub>RFBW</sub>         |               |   |
|         |                            |                                   | PAR (dB)                                   | Average Power |   |
| dBm     | dBm/MHz                    |                                   |  |               |   |
| A       | 64QAM / N:QPSK / N:QPSK    | 10.0 MHz +2xNB IoT GB             | 7.25                                       | 47.04         | - |
| A       | 64QAM / N:QPSK / N:QPSK    | 15.0 MHz +2xNB IoT GB             | 7.25                                       | 47.23         | - |
| A       | 64QAM / N:QPSK / N:QPSK    | 20.0 MHz +2xNB IoT GB             | 7.28                                       | 47.23         | - |



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW

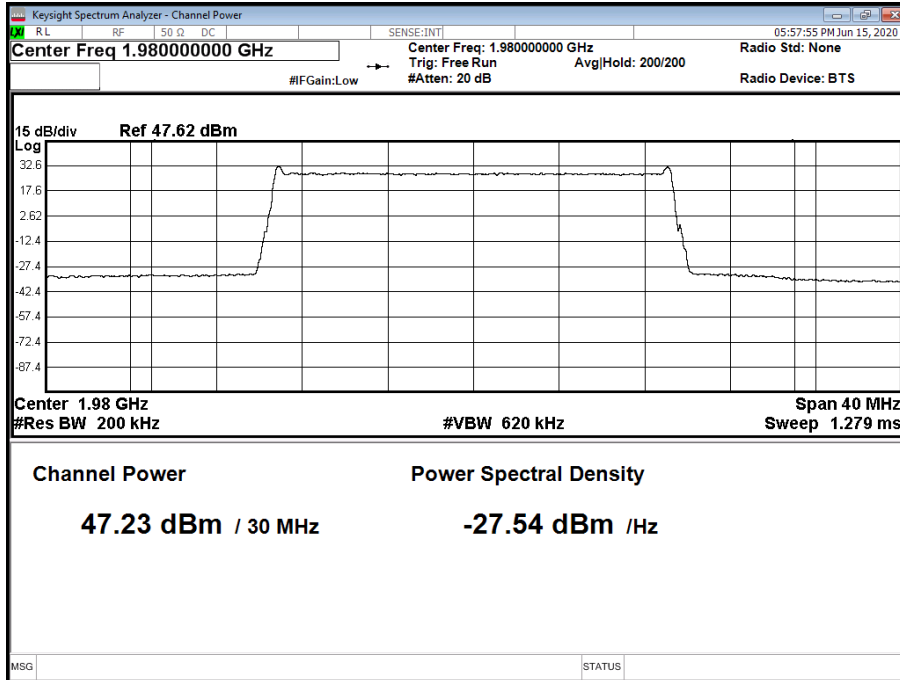


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW





Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW



Configuration 2

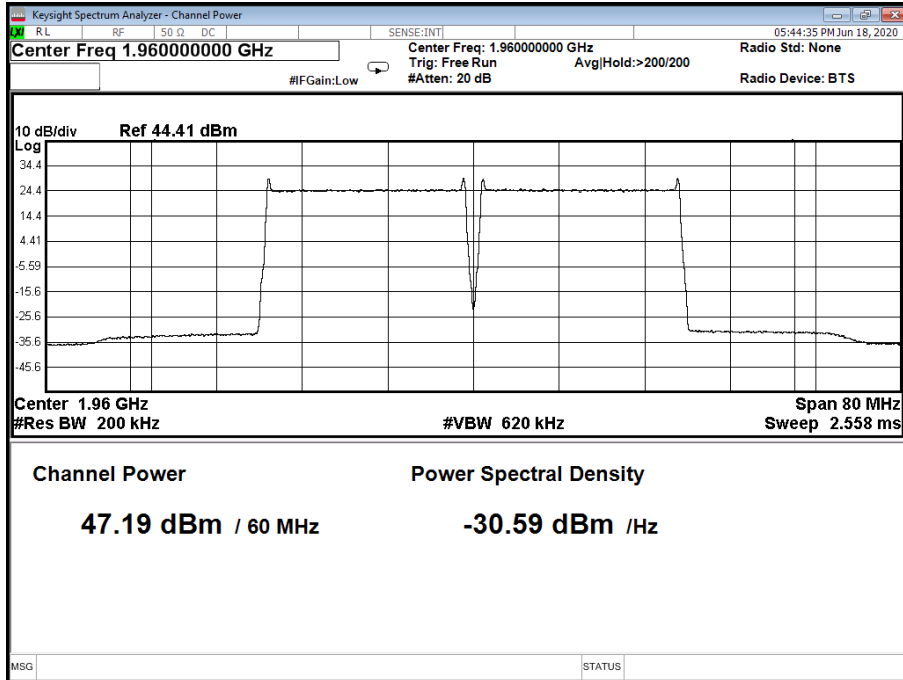
Maximum Output Power 47.8 dBm

| Antenna | LTE / NB-IoT GB Modulation                        | LTE / NB-IoT GB Carrier Bandwidth | Peak to Average Ratio (PAR) / Output Power |               |   |
|---------|---|-----------------------------------|--|---------------|---|
|         |   |                                   | Channel Position M <sub>RFBW</sub>         |               |   |
|         |   |                                   | PAR (dB)                                   | Average Power |   |
| dBm     | dBm/MHz   |                                   |  |               |   |
| A       | 64QAM / 64QAM / N:QPSK / N:QPSK / N:QPSK / N:QPSK | 20.0 + 20.0 MHz +4xNB IoT GB      | -  | 47.19         | - |





**Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position MRFBW**



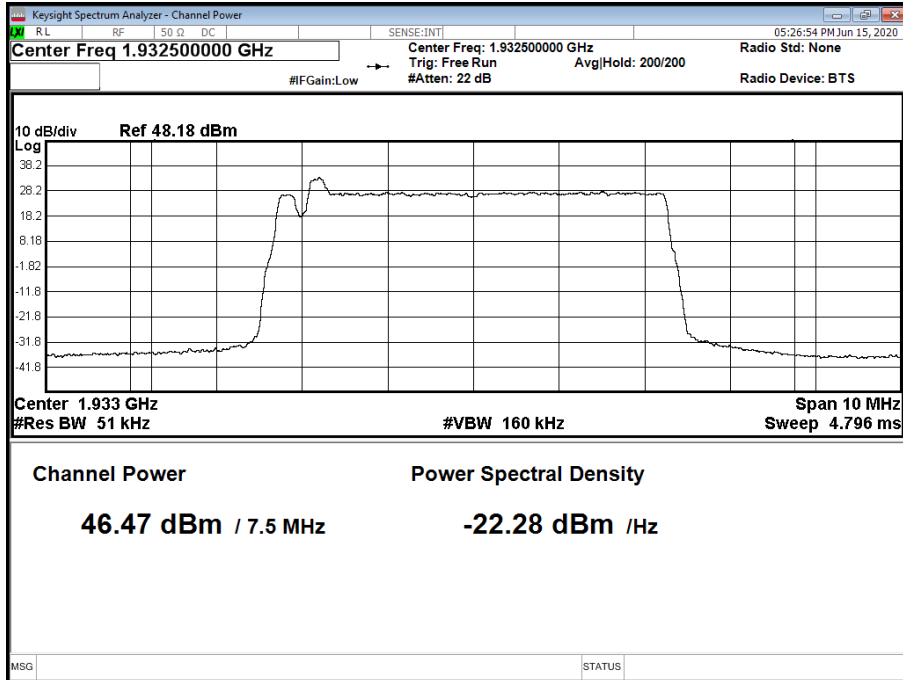
**Configuration 3**

Maximum Output Power 47.8 dBm

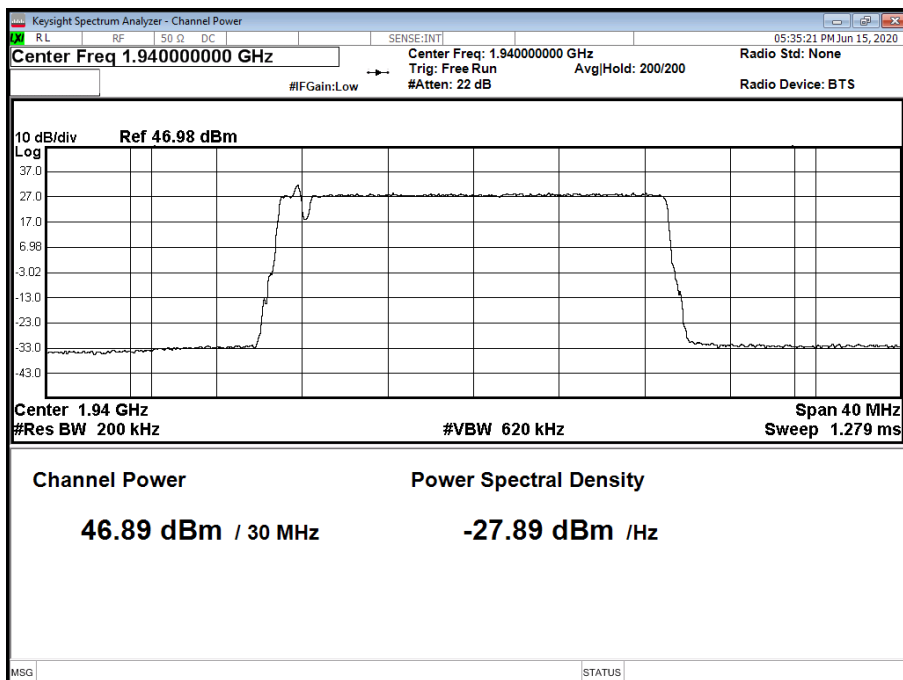
| Antenna | LTE / NB-IoT IB Modulation | LTE / NB-IoT IB Carrier Bandwidth | Peak to Average Ratio (PAR) / Output Power |               |   |
|---------|----------------------------|-----------------------------------|--|---------------|---|
|         |                            |                                   | Channel Position $B_{RFBW}$                |               |   |
|         |                            |                                   | PAR (dB)                                   | Average Power |   |
| dBm     | dBm/MHz                    |                                   |  |               |   |
| A       | 64QAM / N:QPSK             | 5.0 MHz + NB-IoT IB               | 7.54                                       | 46.47         | - |
| A       | 64QAM / N:QPSK             | 20.0 MHz + NB IoT IB              | 7.59                                       | 46.89         | - |



Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 5.0 MHz +NB-IoT IB - Channel Position BRFBW



Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 20.0 MHz + IoT IB - Channel Position BRFBW



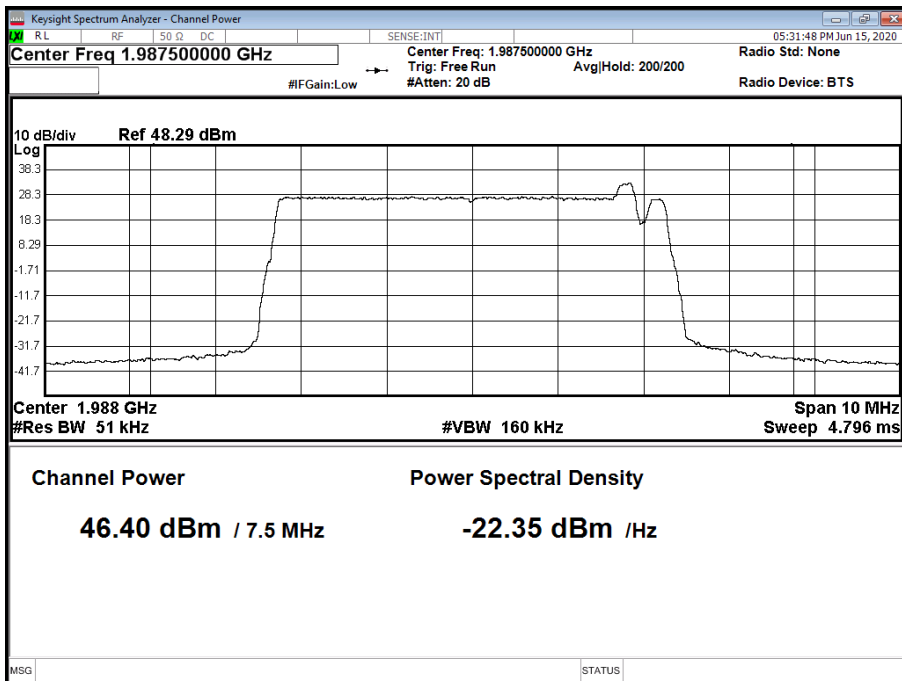


Configuration 3

Maximum Output Power 47.8 dBm

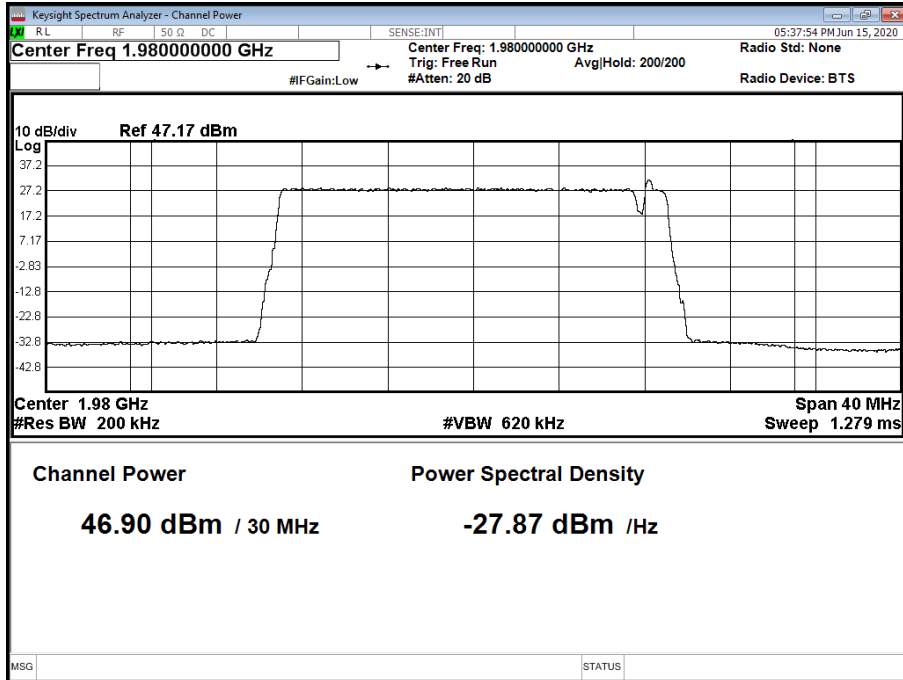
| Antenna | LTE / NB-IoT IB Modulation | LTE / NB-IoT IB Carrier Bandwidth | Peak to Average Ratio (PAR) / Output Power |               |   |
|---------|----------------------------|-----------------------------------|--|---------------|---|
|         |                            |                                   | Channel Position T <sub>RFBW</sub>         |               |   |
|         |                            |                                   | PAR (dB)                                   | Average Power |   |
| dBm     | dBm/MHz                    |                                   |  |               |   |
| A       | 64QAM / N:QPSK             | 5.0 MHz + NB-IoT IB               | 7.52                                       | 46.40         | - |
| A       | 64QAM / N:QPSK             | 20.0 MHz + NB-IoT IB              | 7.52                                       | 46.90         | - |

Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 5.0 MHz +NB-IoT IB - Channel Position TRFBW





Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 20.0 MHz +NB IoT IB - Channel Position TRFBW



|                       |                             |
|-----------------------|-----------------------------|
| Limit                 |                             |
| Peak Power            | ≤ 1640 W/MHz or ≤+62.15 dBm |
| Peak to Average Ratio | 13 dB                       |



## 2.2 OCCUPIED BANDWIDTH

### 2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049  
 FCC CFR 47 Part 24, Clause 24.238 (b)

### 2.2.2 Date of Test and Modification State

04 June 2020 - Modification State 0

### 2.2.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.2.4 Environmental Conditions

Ambient Temperature 22.9°C  
 Relative Humidity 38.2%

### 2.2.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01.

### 2.2.6 Test Results

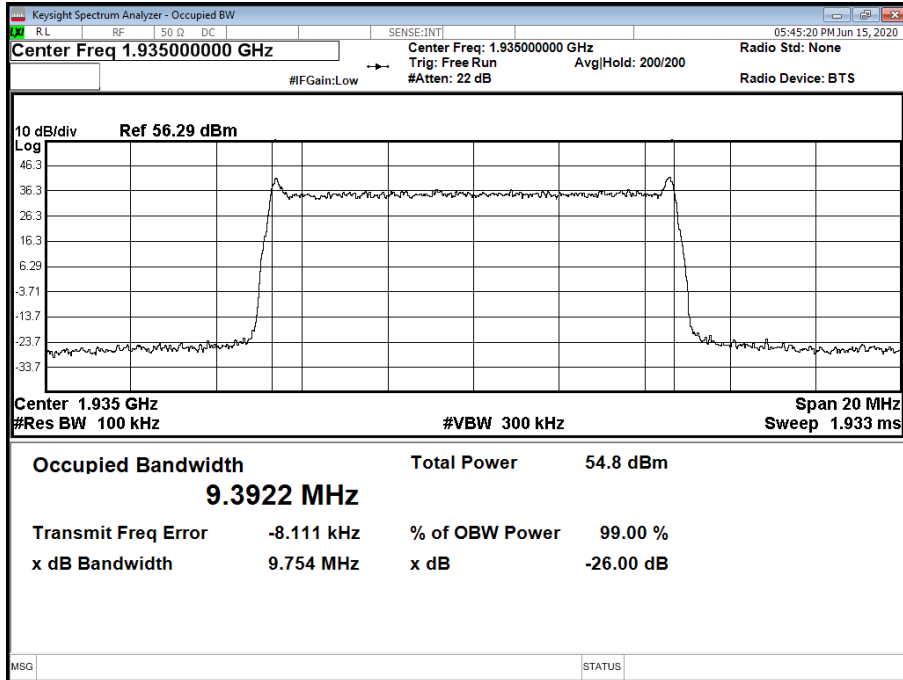
Configuration 1

Maximum Output Power 47.8 dBm

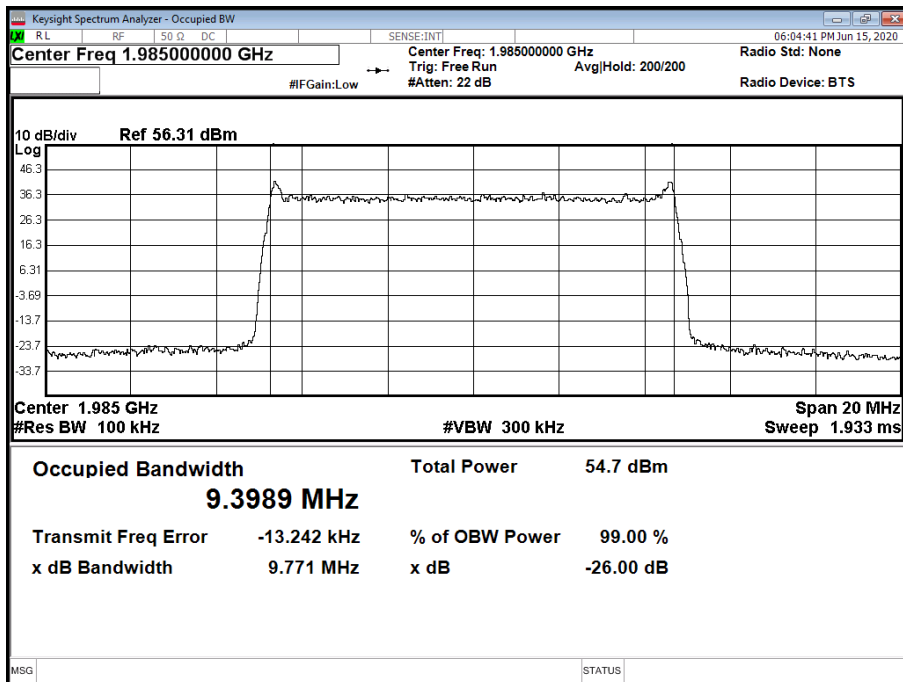
| Antenna | LTE / NB-<br>IoT GB<br>Modulation | LTE / NB-<br>IoT GB<br>Carrier<br>Bandwidth | Result (MHz)              |                     |                           |                     |                        |                     |
|---------|-----------------------------------|---|---------------------------|---------------------|---------------------------|---------------------|------------------------|---------------------|
|         |                                   |   | Channel Position<br>BRFBW |                     | Channel Position<br>MRFBW |                     | Channel Position TRFBW |                     |
|         |                                   |   | Occupied<br>Bandwidth     | -26 dB<br>Bandwidth | Occupied<br>Bandwidth     | -26 dB<br>Bandwidth | Occupied<br>Bandwidth  | -26 dB<br>Bandwidth |
| A       | 64QAM /<br>N:QPSK /<br>N:QPSK     | 10.0 MHz<br>+2xNB IoT<br>GB                 | 9.392                     | 9.754               | -                         | -                   | 9.398                  | 9.770               |
| A       | 64QAM /<br>N:QPSK /<br>N:QPSK     | 15.0 MHz<br>+2xNB IoT<br>GB                 | 14.026                    | 14.565              | -                         | -                   | 14.018                 | 14.632              |
| A       | 64QAM /<br>N:QPSK /<br>N:QPSK     | 20.0 MHz<br>+2xNB IoT<br>GB                 | 18.460                    | 19.342              | -                         | -                   | 18.458                 | 19.213              |



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW

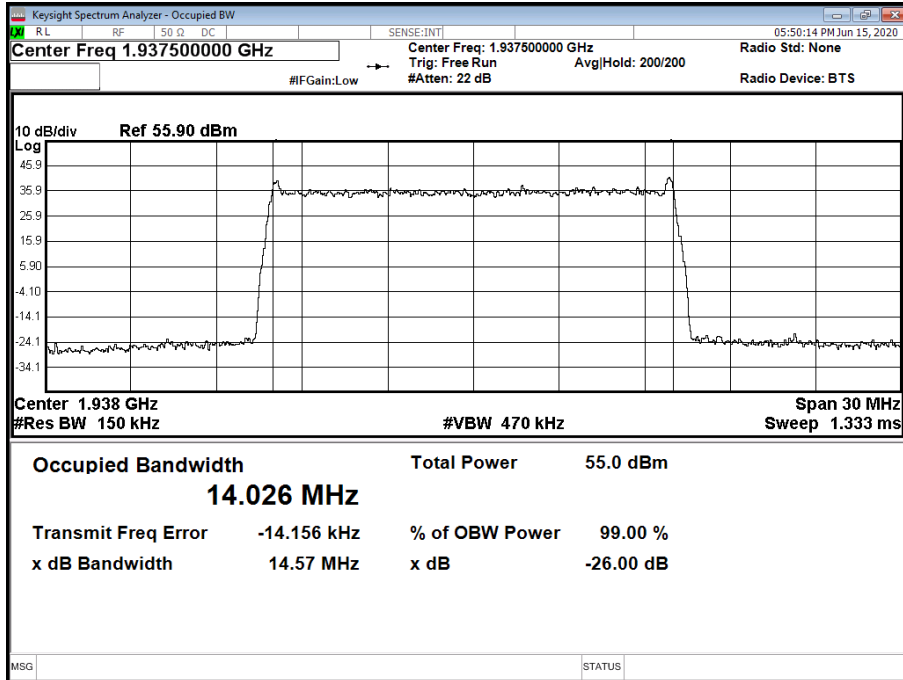


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW

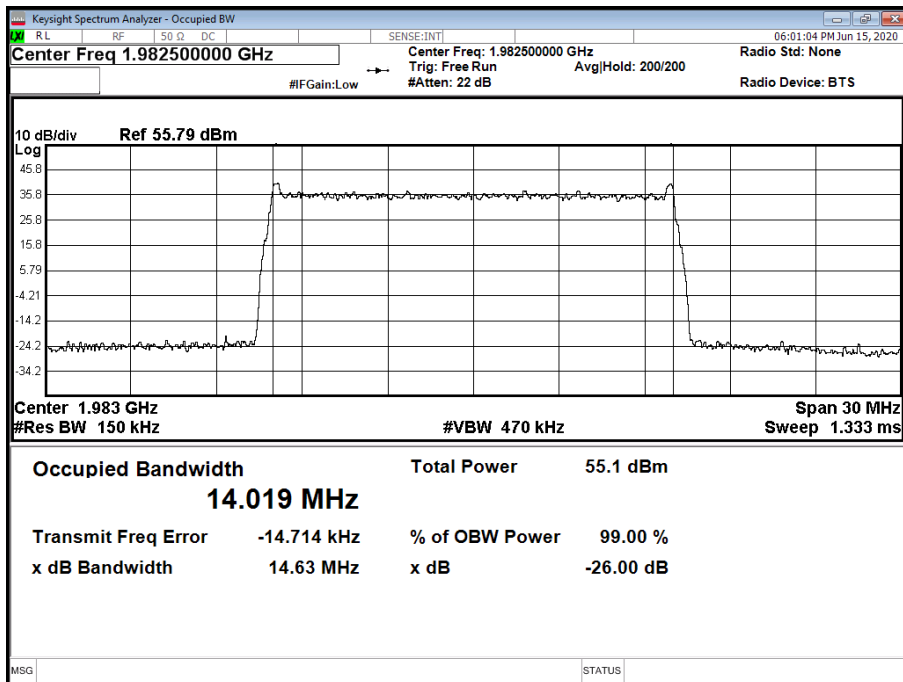




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW

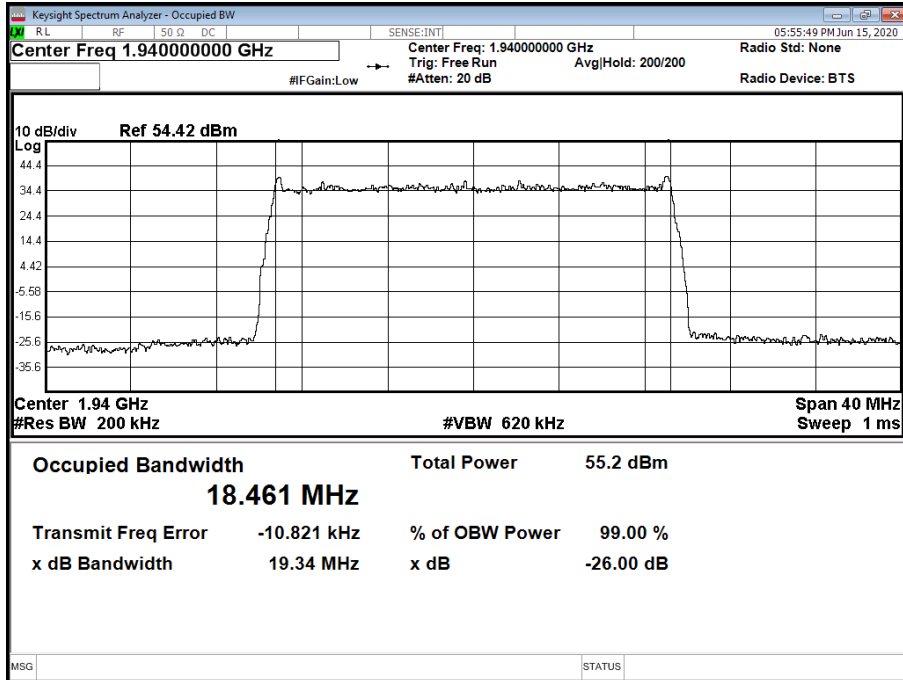


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW

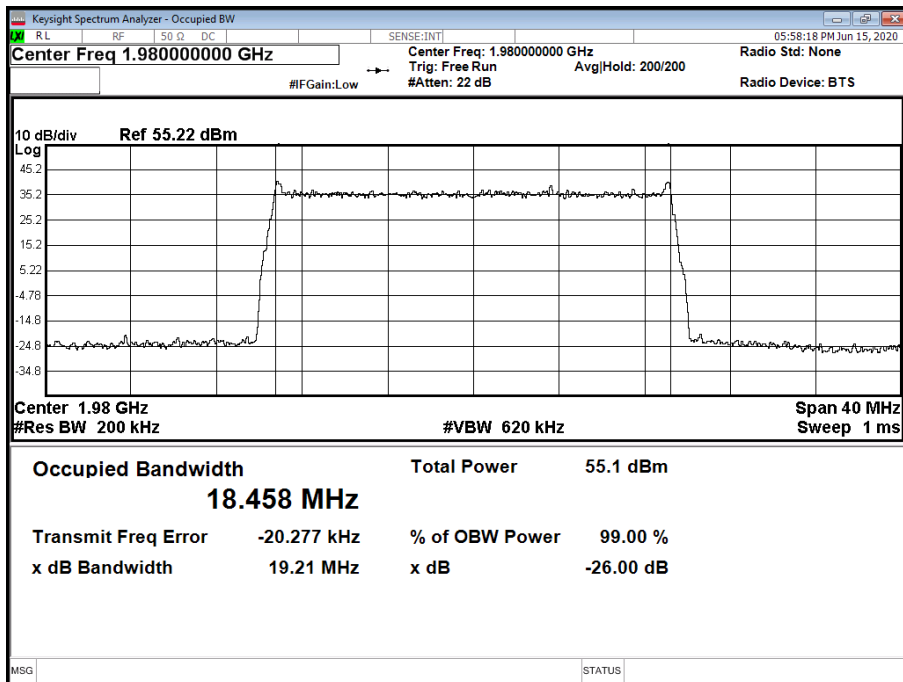




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW





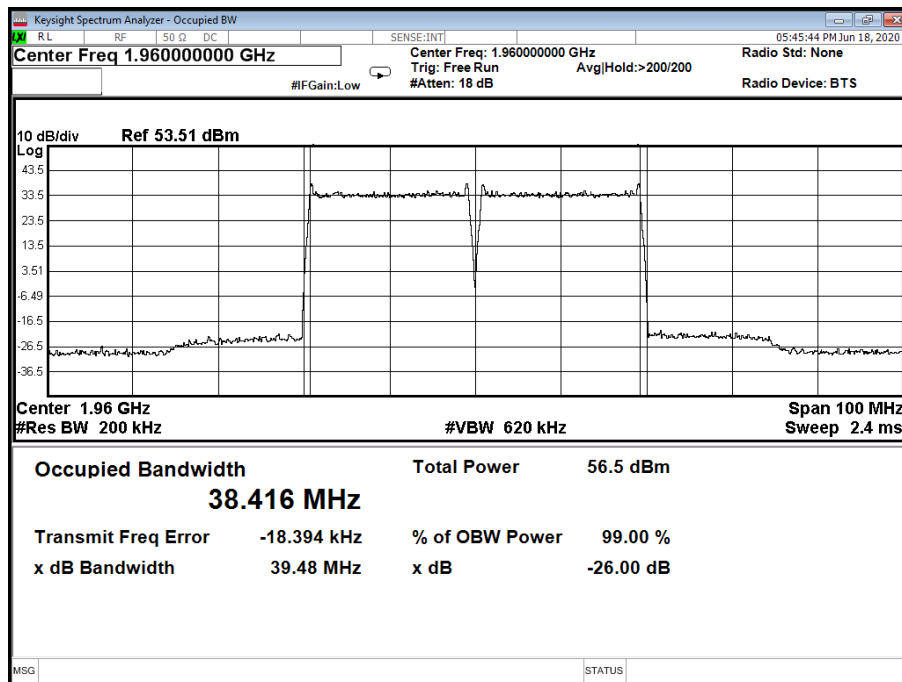


Configuration 2

Maximum Output Power 47.8 dBm

| Antenna | LTE / NB-IoT GB Modulation                        | LTE / NB-IoT GB Carrier Bandwidth | Result (MHz)           |                  |                        |                  |                        |                  |
|---------|---|-----------------------------------|------------------------|------------------|------------------------|------------------|------------------------|------------------|
|         |   |                                   | Channel Position BRFBW |                  | Channel Position MRFBW |                  | Channel Position TRFBW |                  |
|         |   |                                   | Occupied Bandwidth     | -26 dB Bandwidth | Occupied Bandwidth     | -26 dB Bandwidth | Occupied Bandwidth     | -26 dB Bandwidth |
| A       | 64QAM / 64QAM / N:QPSK / N:QPSK / N:QPSK / N:QPSK | 20.0 + 20.0 MHz +4xNB IoT GB      | -                      | -                | 38.39                  | 39.30            | -                      | -                |

Antenna A - LTE / NB-IoT GB Modulation 64QAM / 64QAM / N:QPSK / N:QPSK / N:QPSK / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth 20.0 + 20.0 MHz +4xNB IoT GB - Channel Position MRFBW





## 2.3 BAND EDGE

### 2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051  
 FCC CFR 47 Part 24, Clause 24.238 (b)

### 2.3.2 Date of Test and Modification State

04 June 2020 - Modification State 0

### 2.3.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.3.4 Environmental Conditions

Ambient Temperature 22.9°C  
 Relative Humidity 38.2%

### 2.3.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01.

Each antenna port has been declared as being equivalent, therefore measurements were made on one antenna port only. To account for this, the limit was tightened by  $10 * \text{Log}(N)$ , where N is equal to the number of MIMO antenna ports.

For single port, the limit was calculated as being  $-13 \text{ dBm} - 10 * \text{Log}(1) = -13 \text{ dBm}$ .

For dual port, the limit was calculated as being  $-13 \text{ dBm} - 10 * \text{Log}(4) = -19 \text{ dBm}$ .

### 2.3.6 Test Results

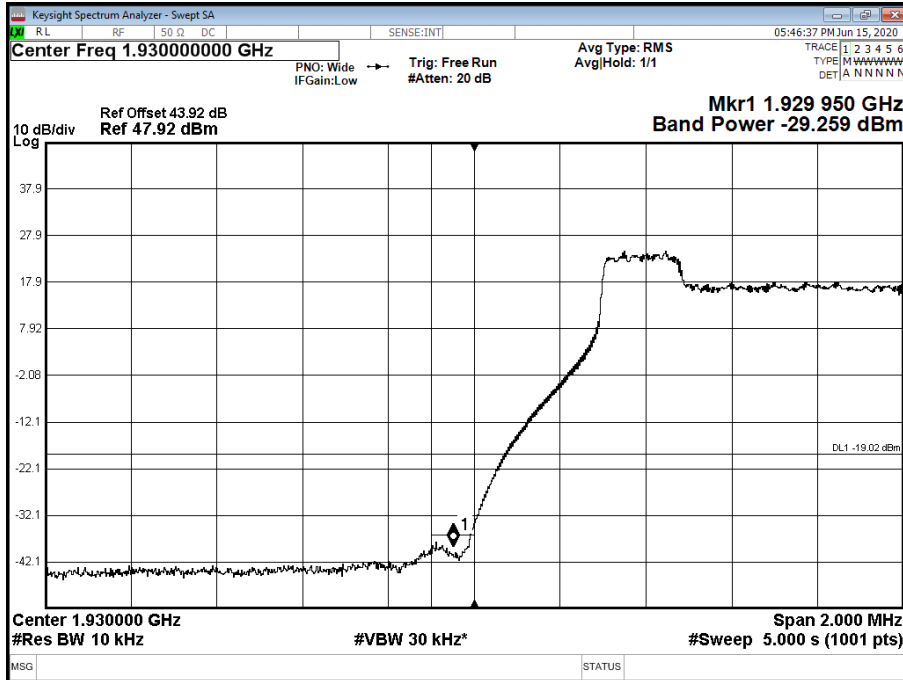
Configuration 1

Maximum Output Power 47.8 dBm

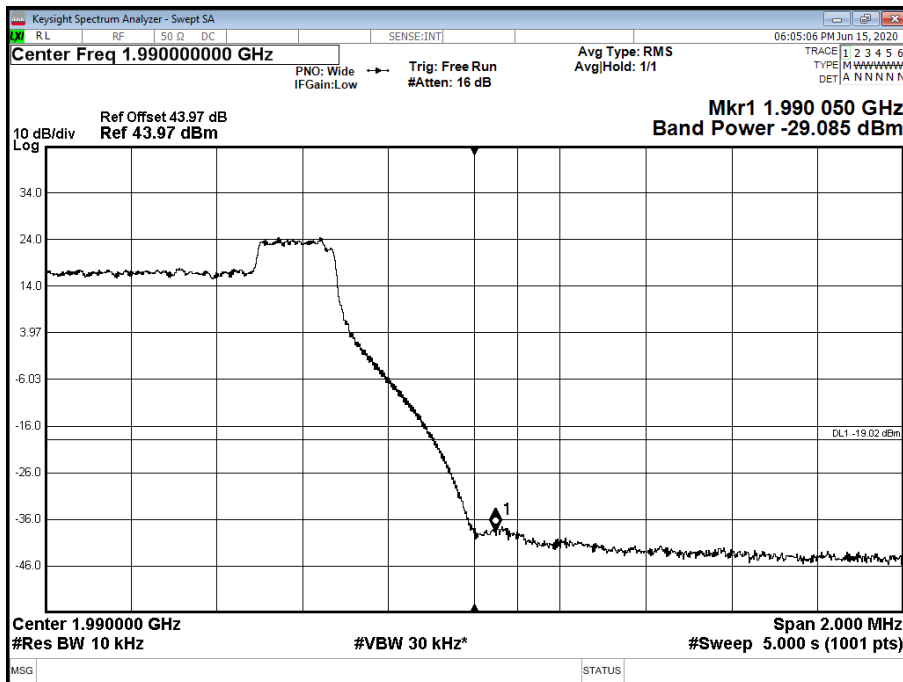
| Antenna | LTE / NB-IoT GB Modulation | LTE / NB-IoT GB Carrier Bandwidth | Band Edge (MHz)        |                        |
|---------|----------------------------|-----------------------------------|------------------------|------------------------|
|         |                            |                                   | Channel Position BRFBW | Channel Position TRFBW |
| A       | 64QAM / N:QPSK / N:QPSK    | 10.0 MHz +2xNB IoT GB             | 1935                   | 1985                   |
| A       | 64QAM / N:QPSK / N:QPSK    | 15.0 MHz +2xNB IoT GB             | 1937.5                 | 1982.5                 |
| A       | 64QAM / N:QPSK / N:QPSK    | 20.0 MHz +2xNB IoT GB             | 1940                   | 1980                   |



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW

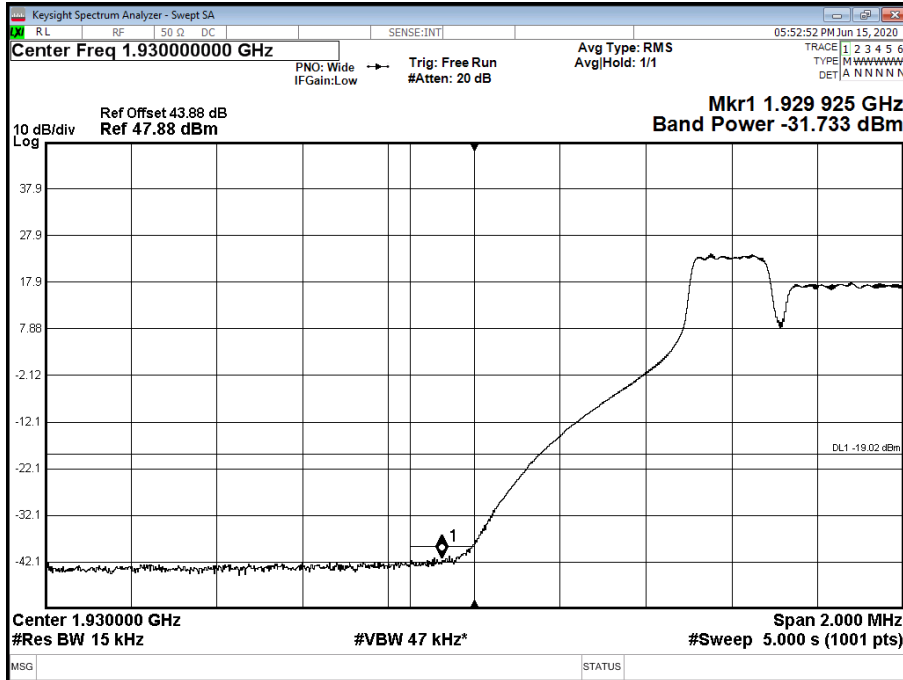


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW

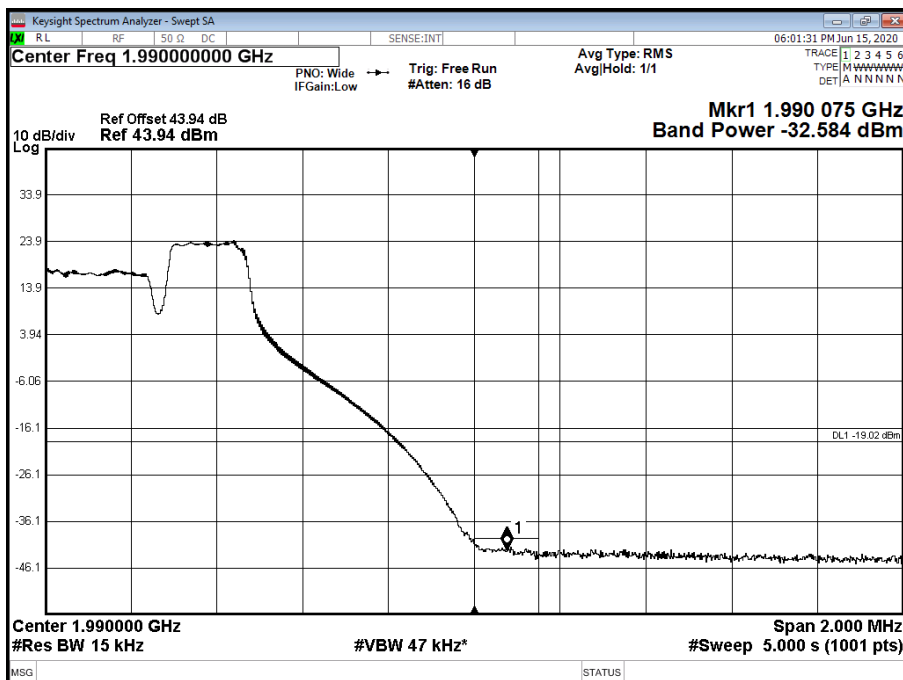




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW

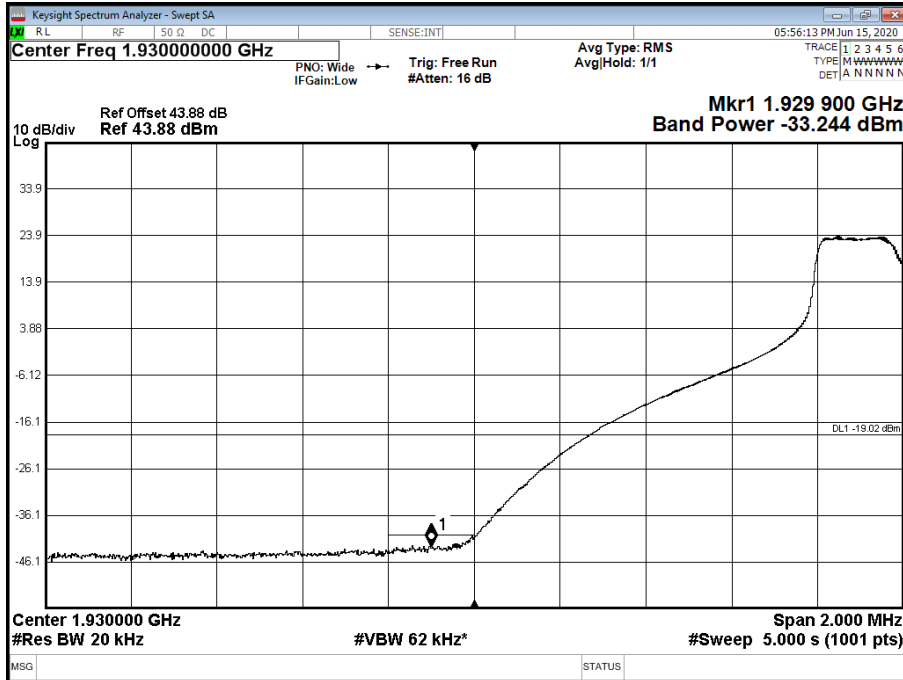


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW

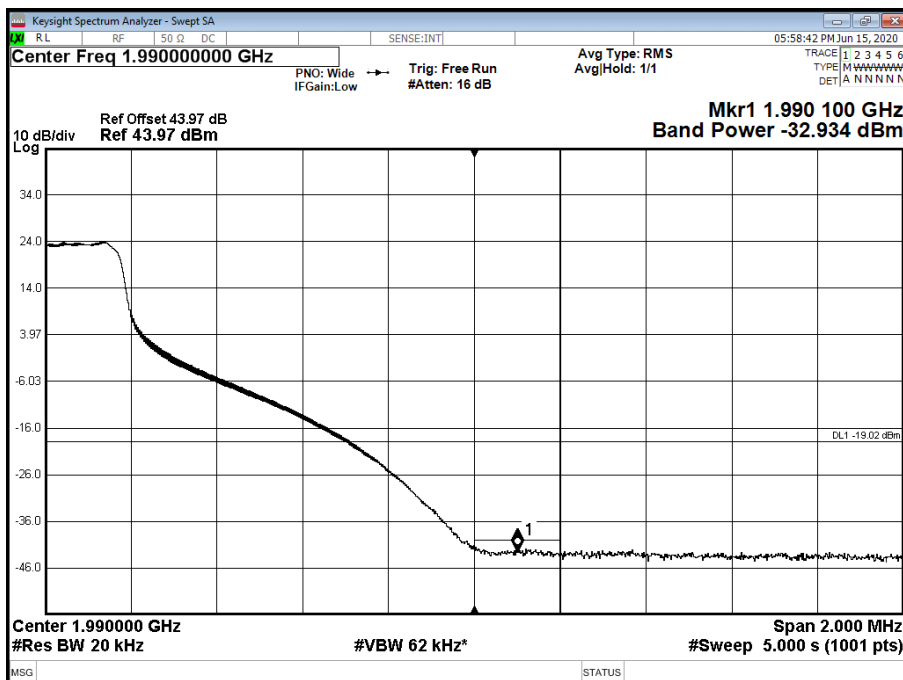




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW



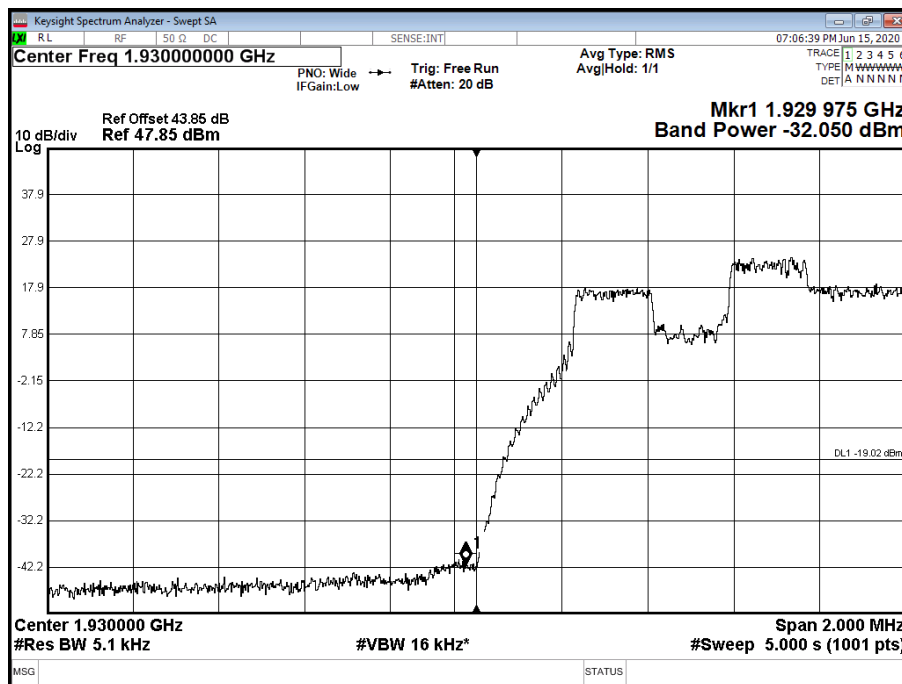


Configuration 3

Maximum Output Power 47.8 dBm

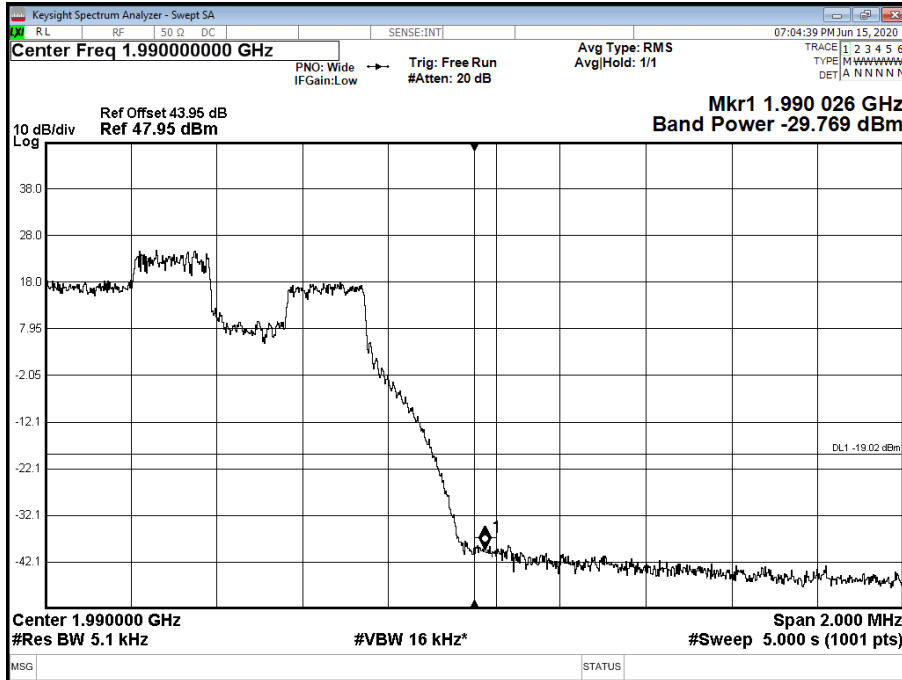
| Antenna | LTE / NB-IoT IB Modulation | LTE / NB-IoT IB Carrier Bandwidth | Band Edge (MHz)        |                        |
|---------|----------------------------|-----------------------------------|------------------------|------------------------|
|         |                            |                                   | Channel Position BRFBW | Channel Position TRFBW |
| A       | 64QAM / N:QPSK             | 5.0 MHz +NB-IoT IB                | 1932.5                 | 1987.5                 |
| A       | 64QAM / N:QPSK             | 20.0 MHz +NB-IoT IB               | 1940                   | 1980                   |

Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 5.0 MHz +NB-IoT IB - Channel Position BRFBW

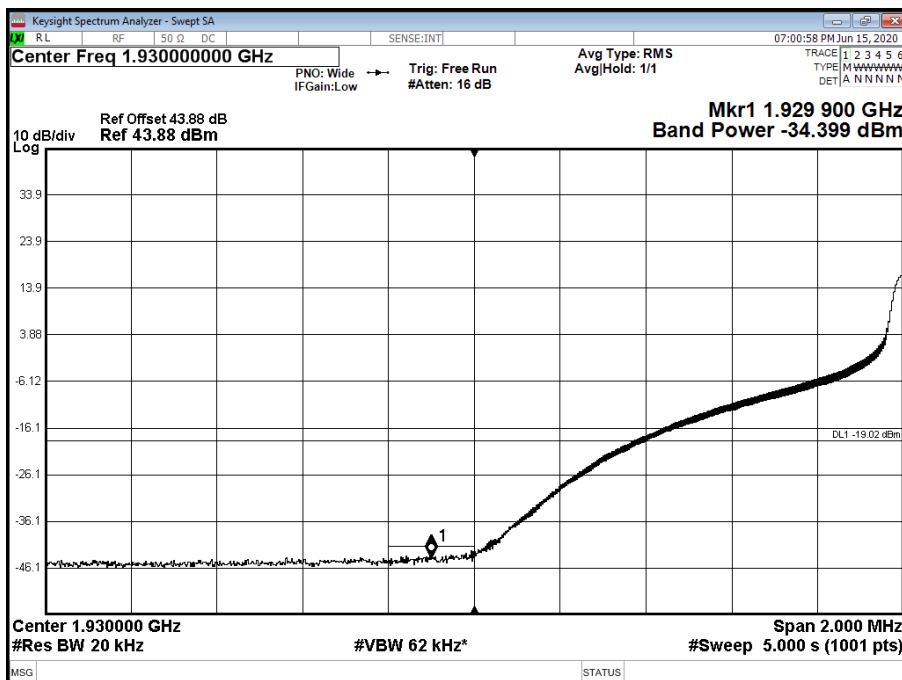




Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 5.0 MHz +NB-IoT IB- Channel Position TRFBW

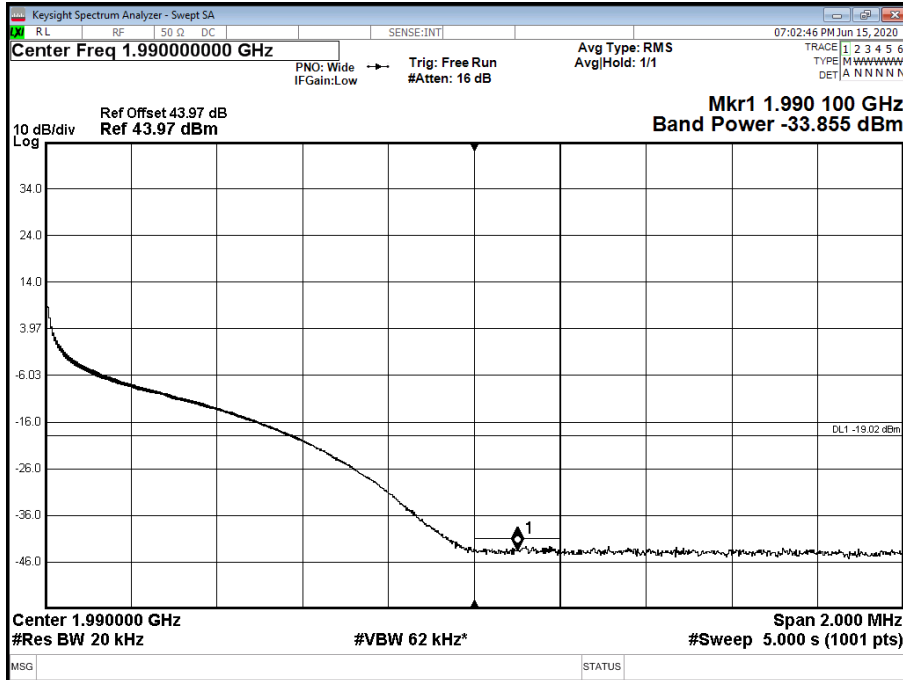


Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 20.0 MHz +NB-IoT IB - Channel Position BRFBW





Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 20.0 MHz + NB-IoT IB- Channel Position TRFBW



|       |         |
|-------|---------|
| Limit | -19 dBm |
|-------|---------|





## **2.4 TRANSMITTER SPURIOUS EMISSIONS**

### **2.4.1 Specification Reference**

FCC CFR 47 Part 2, Clause 2.1051  
FCC CFR 47 Part 24, Clause 24.238 (a)

### **2.4.2 Date of Test and Modification State**

04 June 2020 - Modification State 0

### **2.4.3 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.4.4 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 22.9°C |
| Relative Humidity   | 38.2%  |

### **2.4.5 Test Method**

All measurements were made in accordance with FCC KDB 971168 D01.

Each antenna port has been declared as being equivalent, therefore measurements were made on one antenna port only. To account for this, the limit was tightened by  $10 * \text{Log}(N)$ , where N is equal to the number of MIMO antenna ports.

For single port, the limit was calculated as being  $-13 \text{ dBm} - 10 * \text{Log}(1) = -13 \text{ dBm}$ .

For dual port, the limit was calculated as being  $-13 \text{ dBm} - 10 * \text{Log}(4) = -19 \text{ dBm}$ .

### **2.4.6 Test Results**

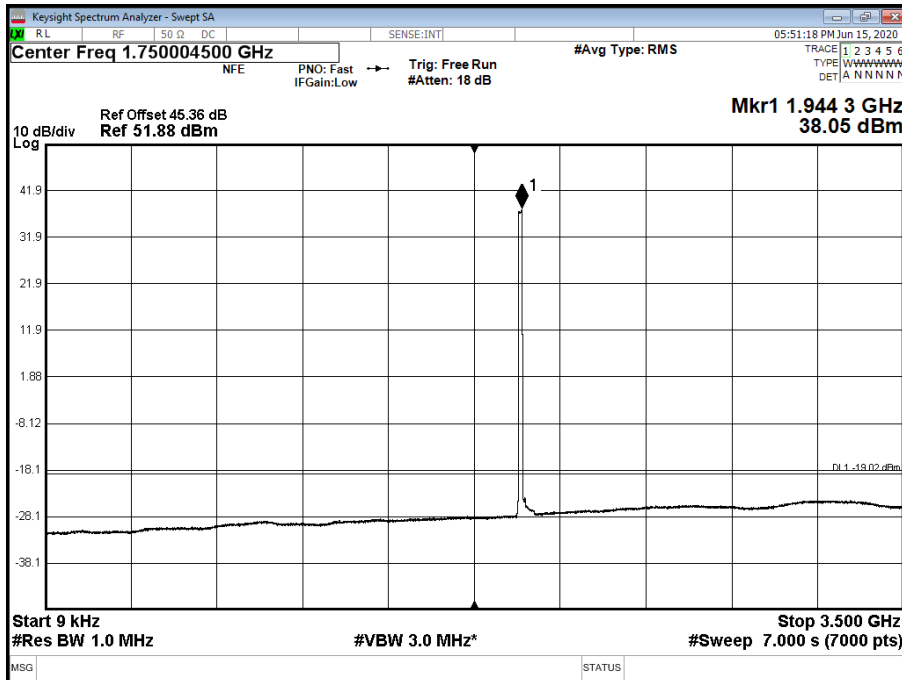
Configuration 1

Maximum Output Power 47.8 dBm

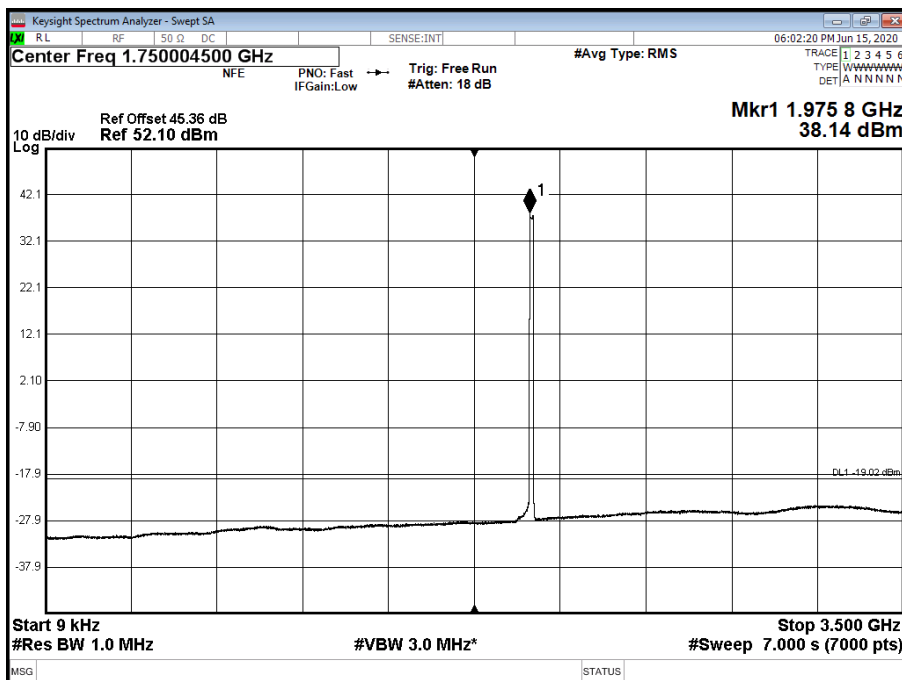




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 1 - Range 0.009  
to 3500 MHz

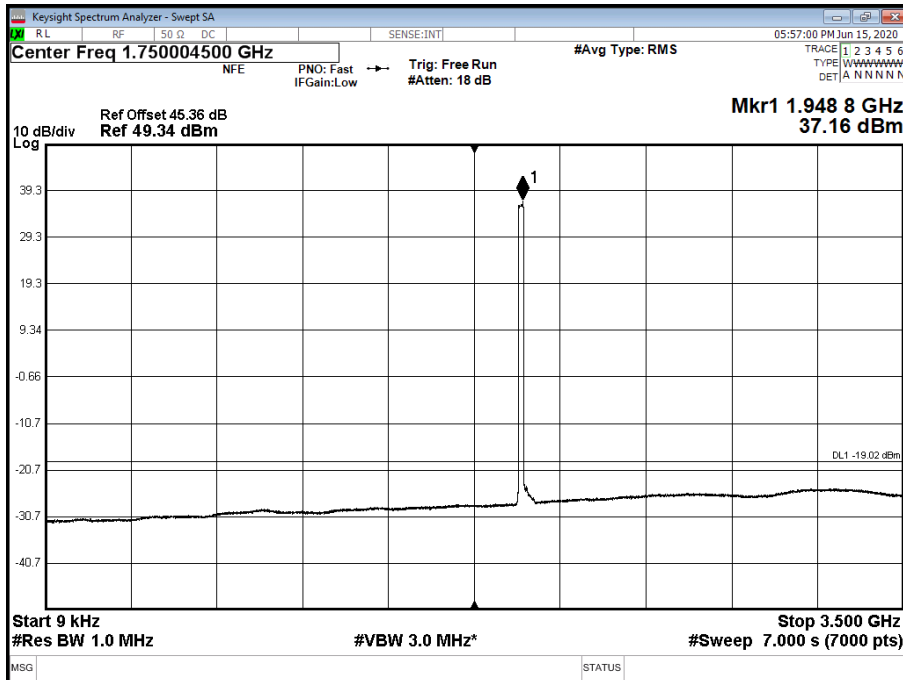


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 1 - Range 0.009  
to 3500 MHz

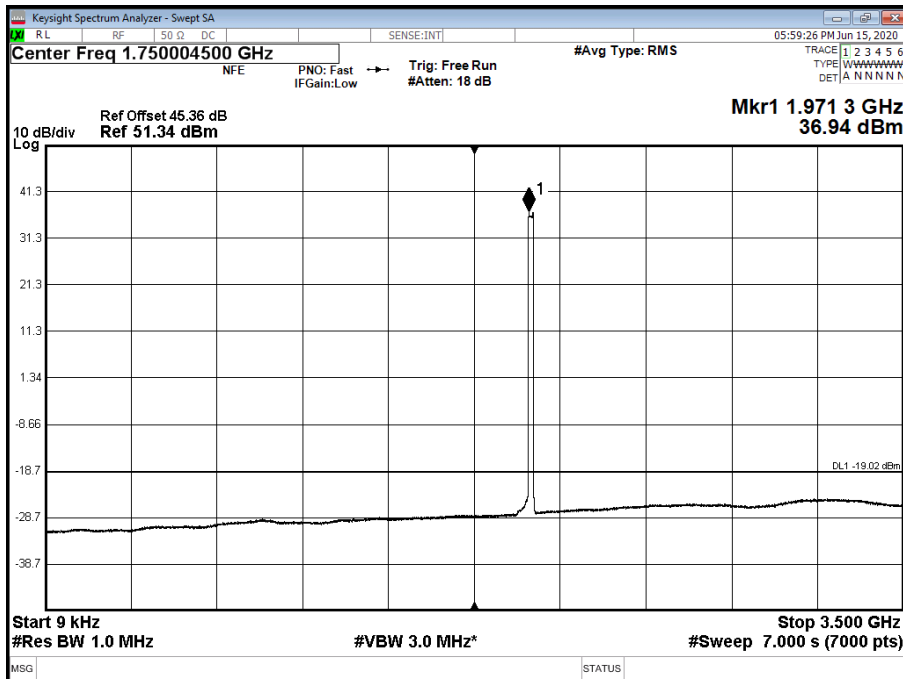




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 1 - Range 0.009  
to 3500 MHz

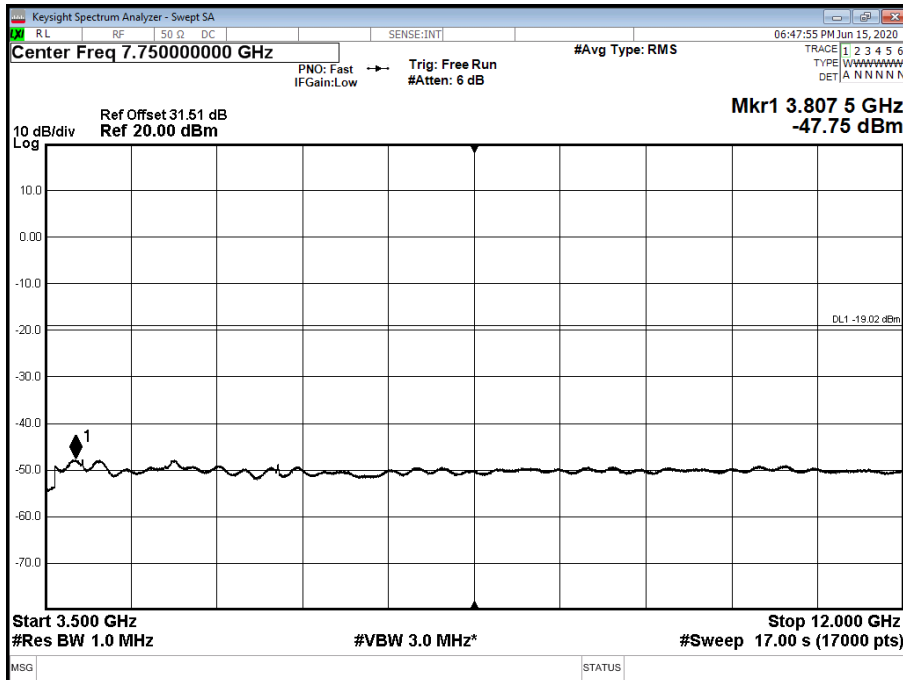


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 1 - Range 0.009  
to 3500 MHz

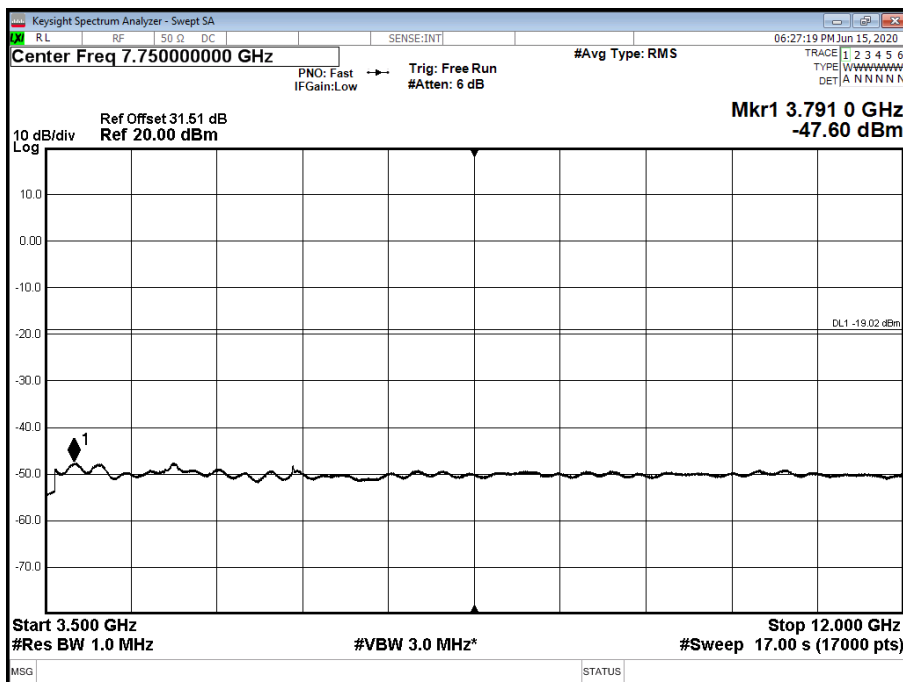




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 2 - Range 3500  
to 12000 MHz

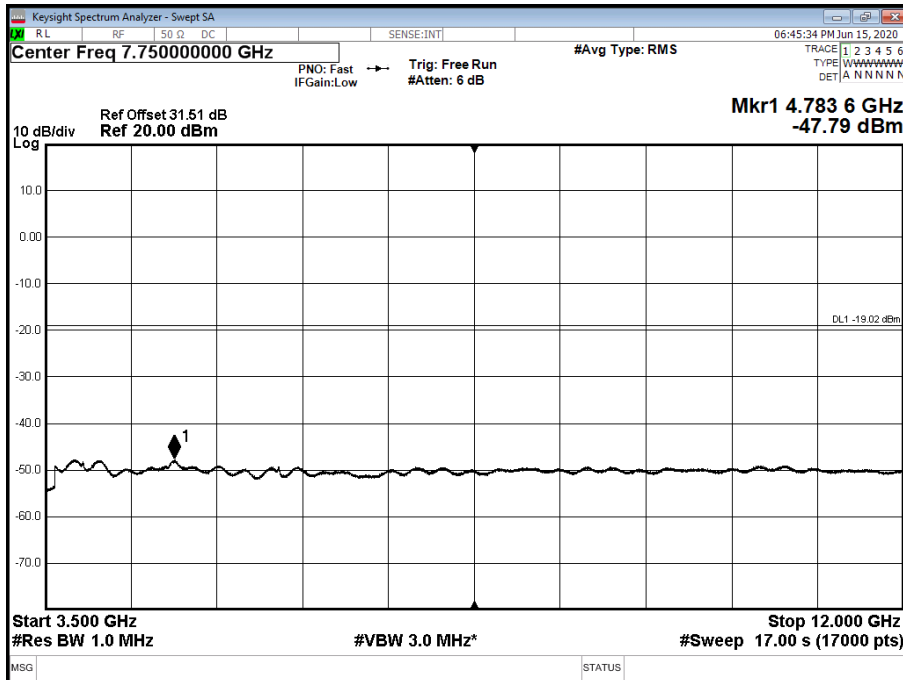


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 2 - Range 3500  
to 12000 MHz

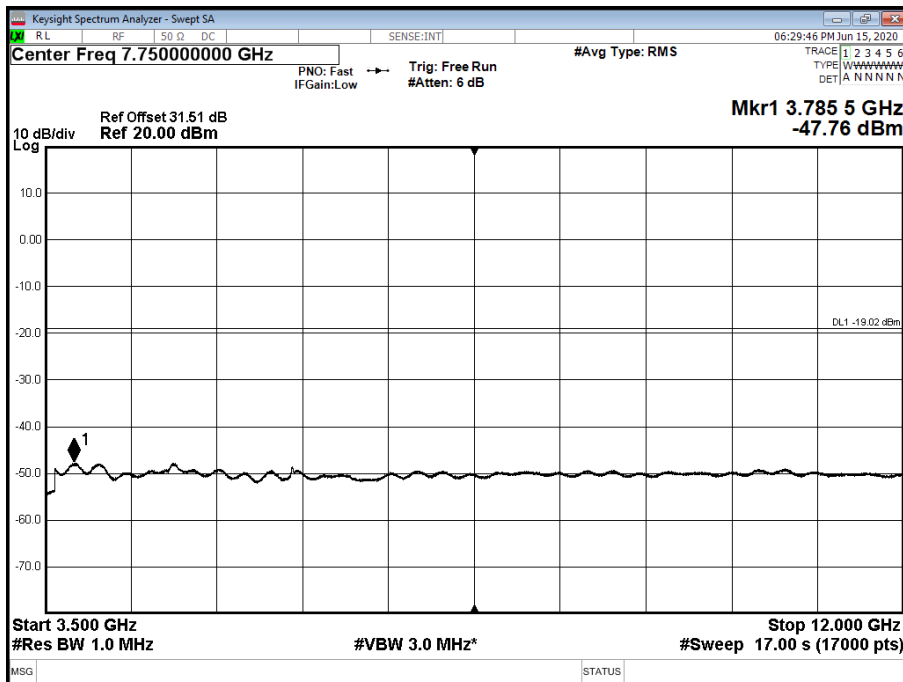




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 2 - Range 3500  
to 12000 MHz

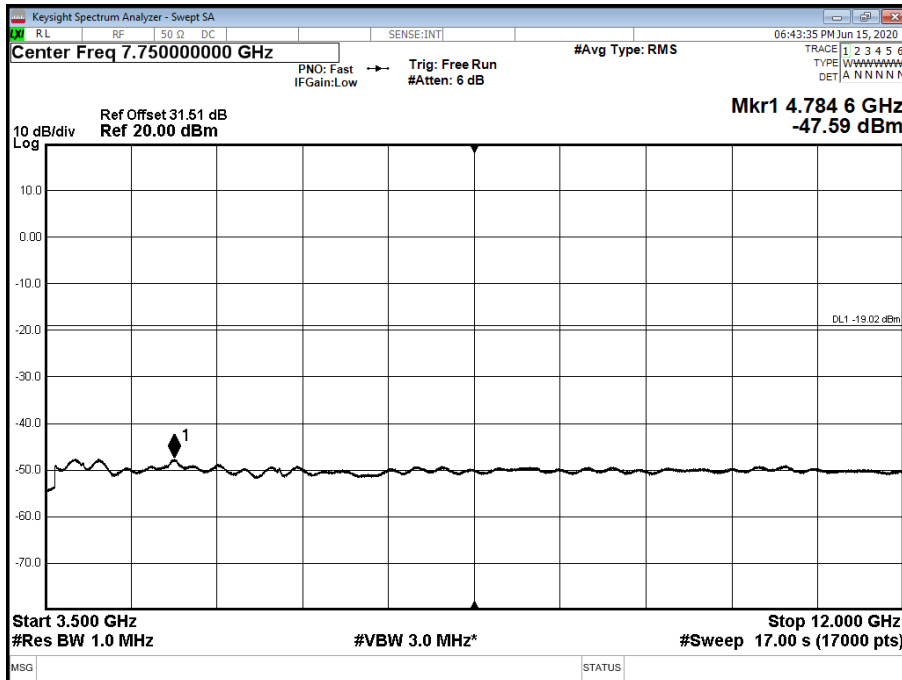


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 2 - Range 3500  
to 12000 MHz

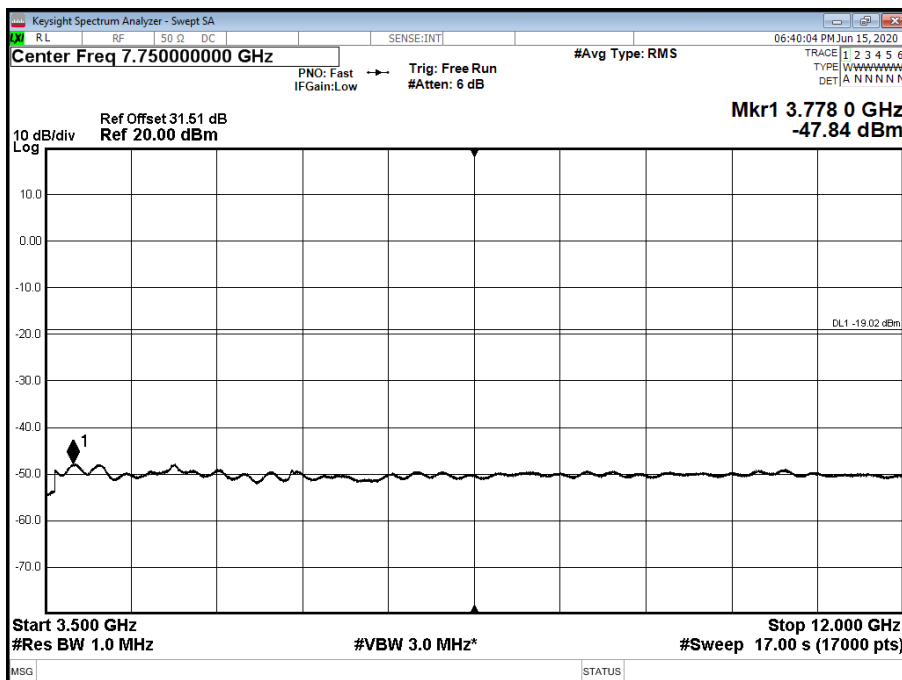




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 2 - Range 3500  
to 12000 MHz

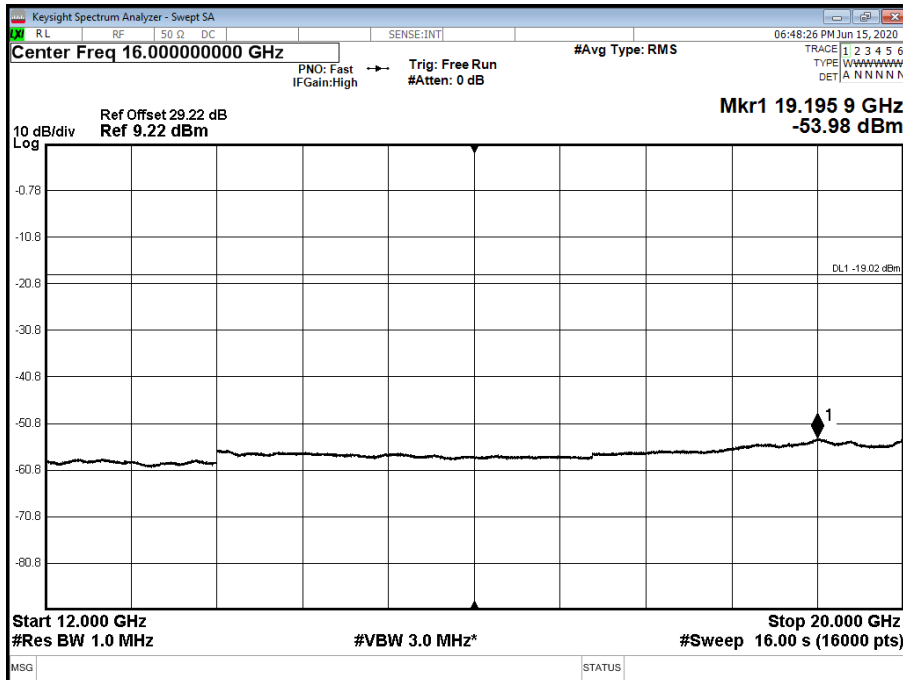


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 2 - Range 3500  
to 12000 MHz

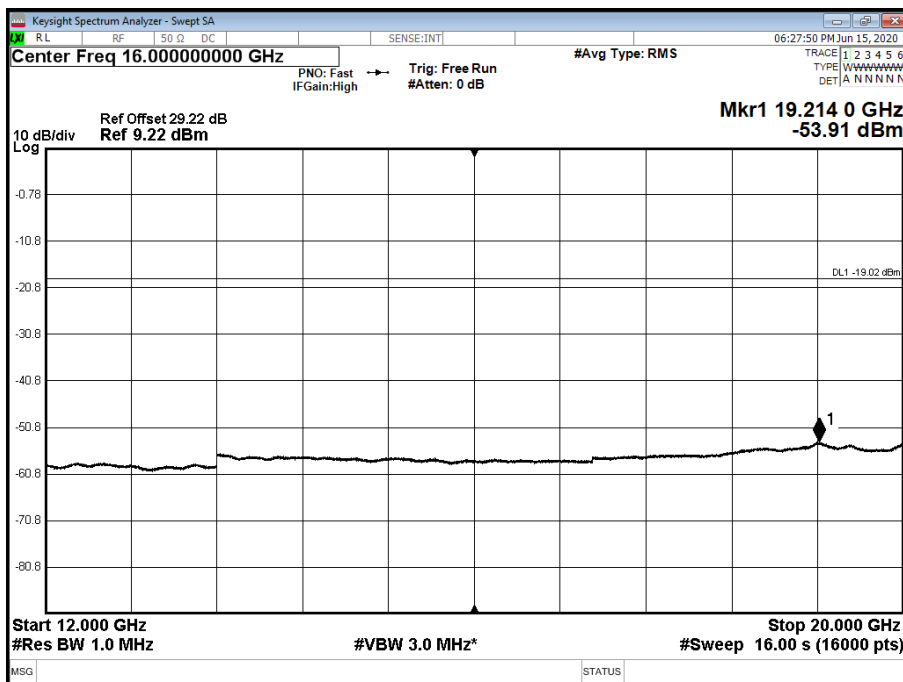




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 3 - Range  
12000 to 20000 MHz



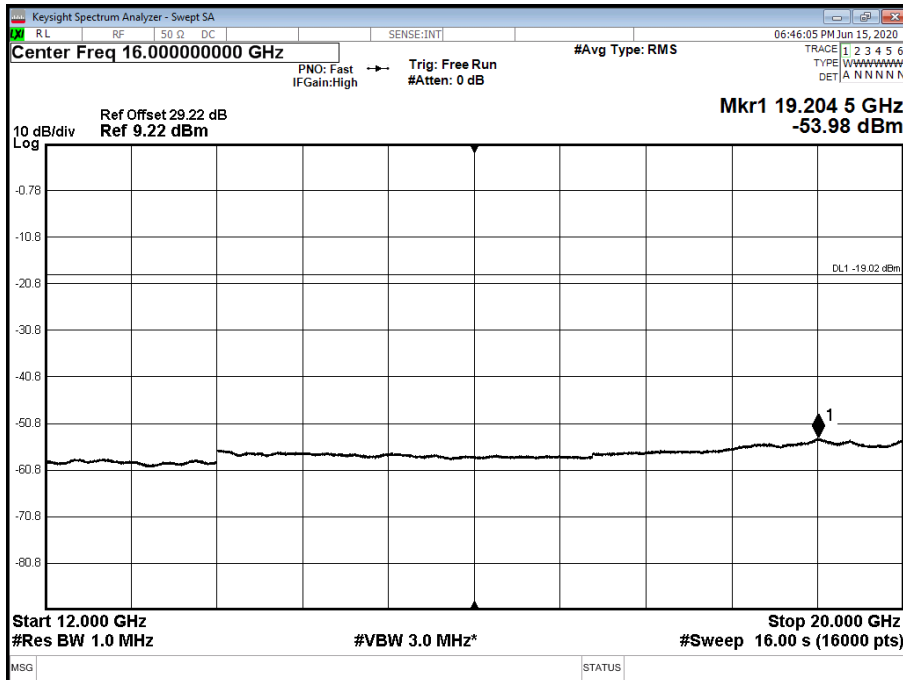
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 3 - Range  
12000 to 20000 MHz



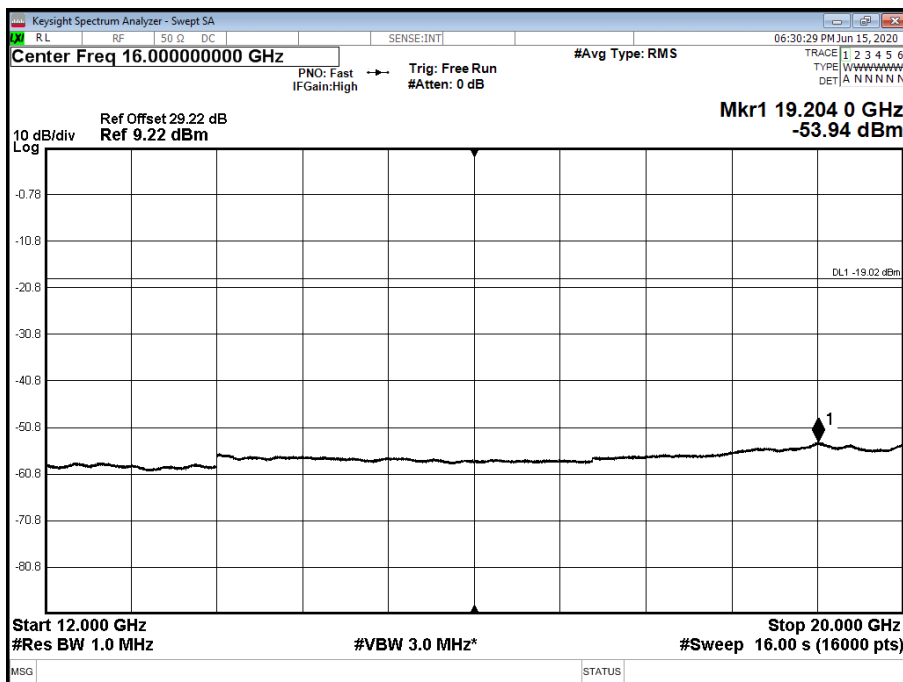




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 3 - Range  
12000 to 20000 MHz

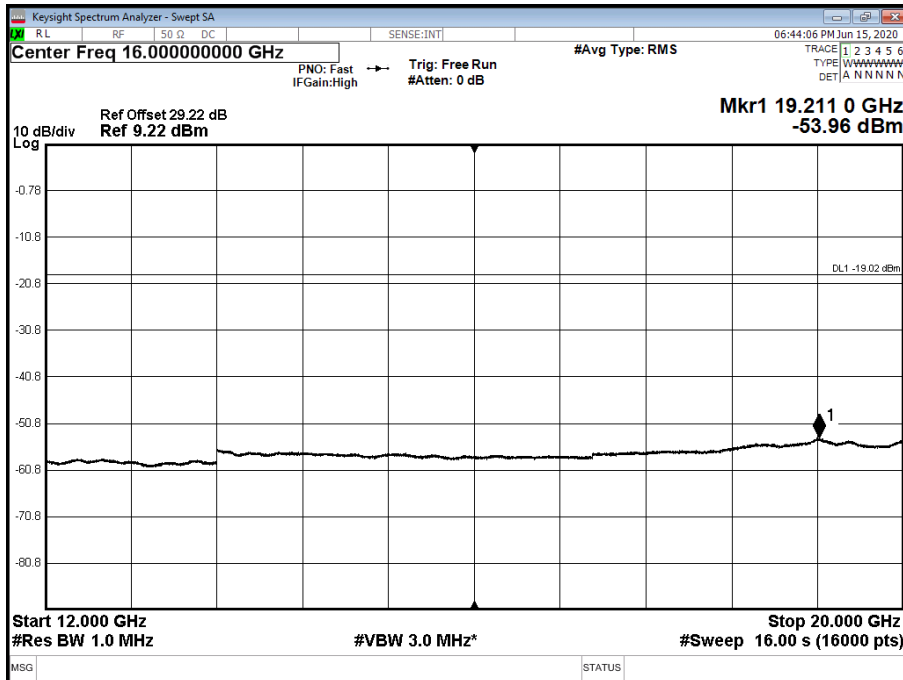


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 3 - Range  
12000 to 20000 MHz

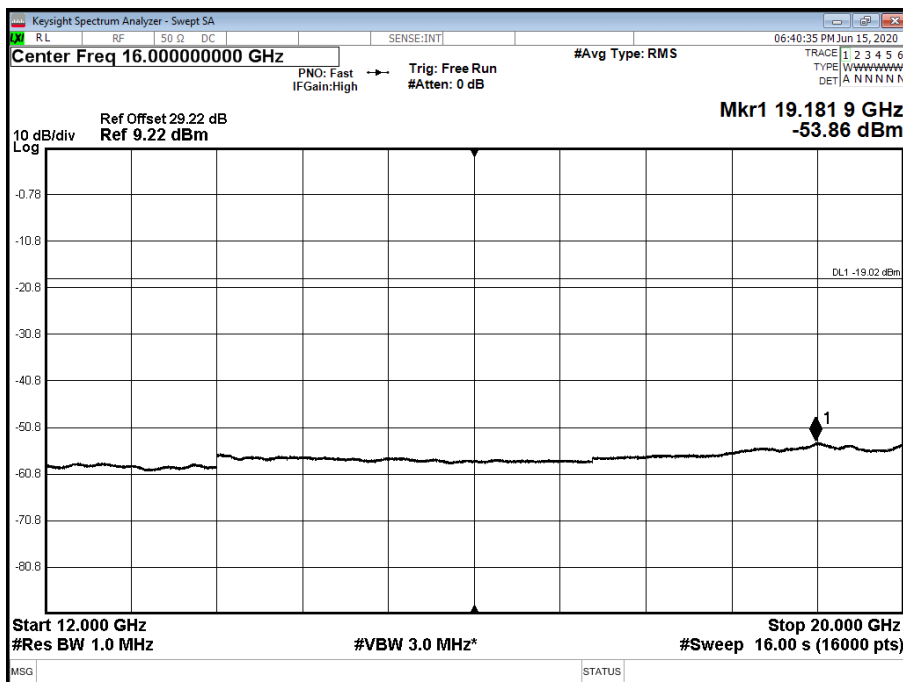




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 3 - Range  
12000 to 20000 MHz



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 3 - Range  
12000 to 20000 MHz

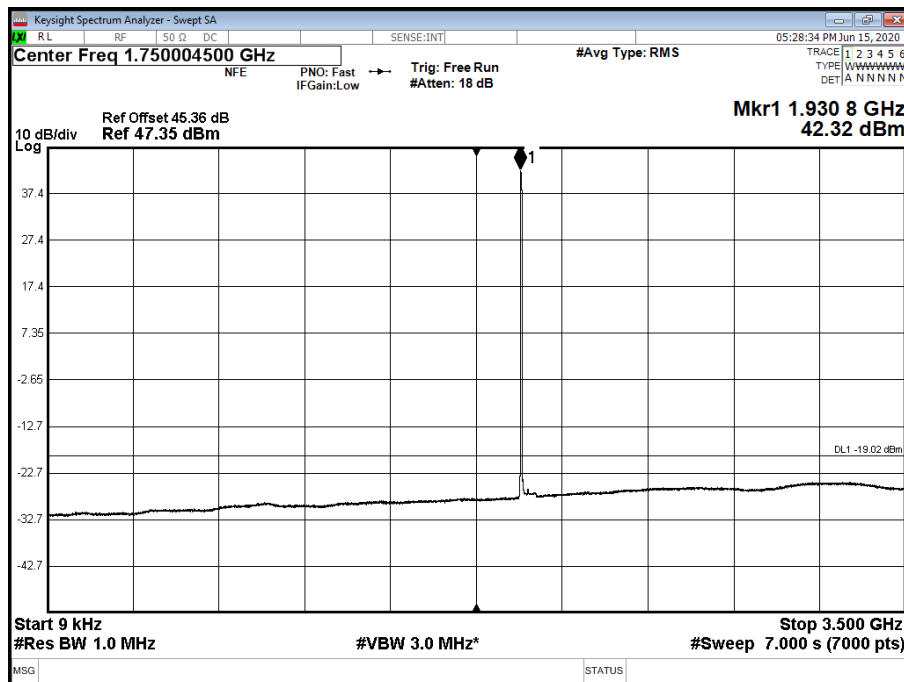




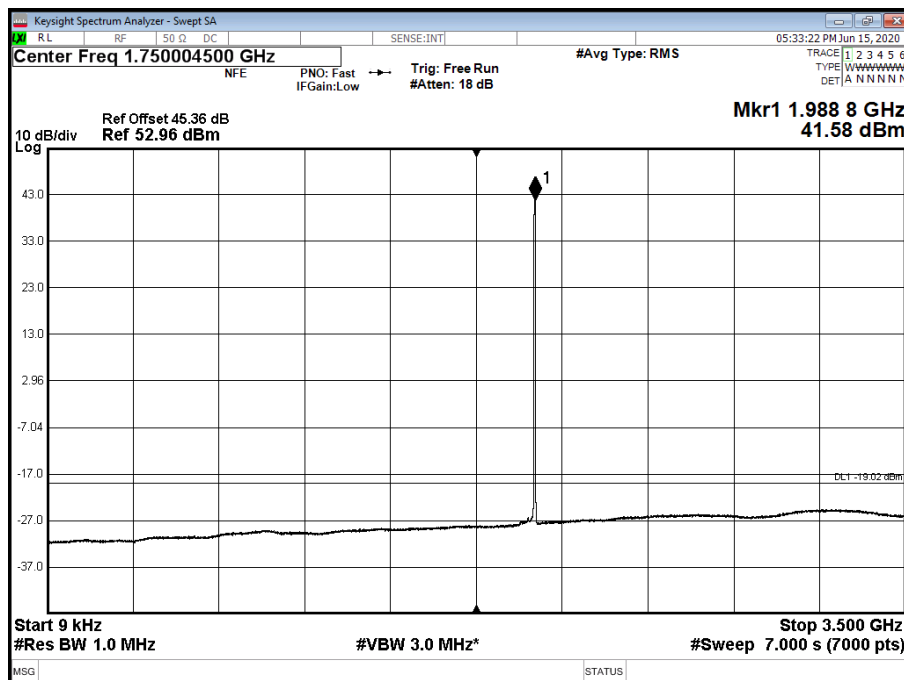
### Configuration 3

Maximum Output Power 47.8 dBm

Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 5.0 MHz +NB-IoT IB - Channel Position BRFBW - Band 1 - Range 0.009 to 3500 MHz

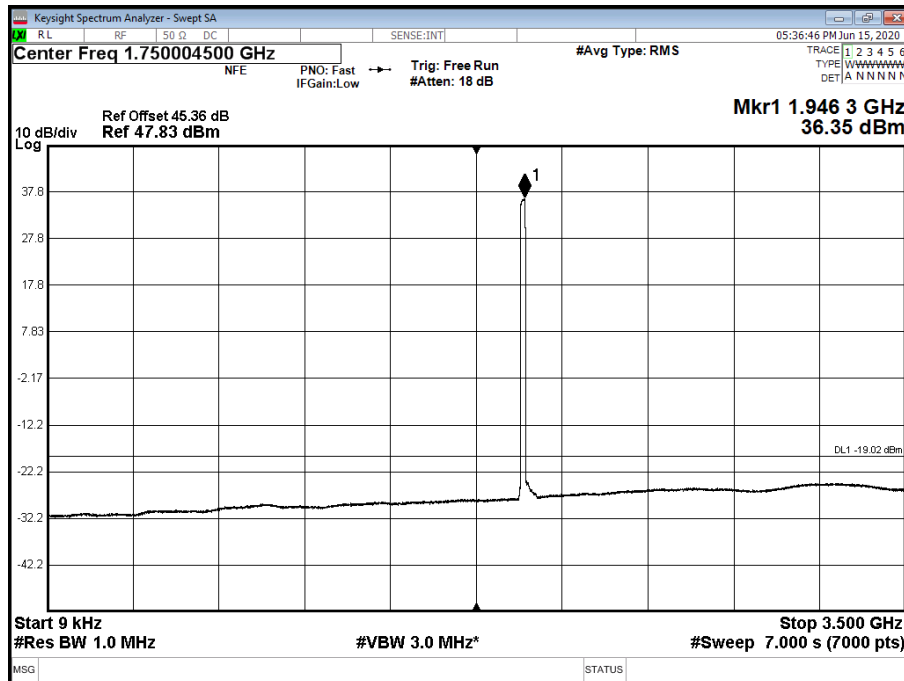


Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 5.0 MHz +NB-IoT IB - Channel Position TRFBW - Band 1 - Range 0.009 to 3500 MHz

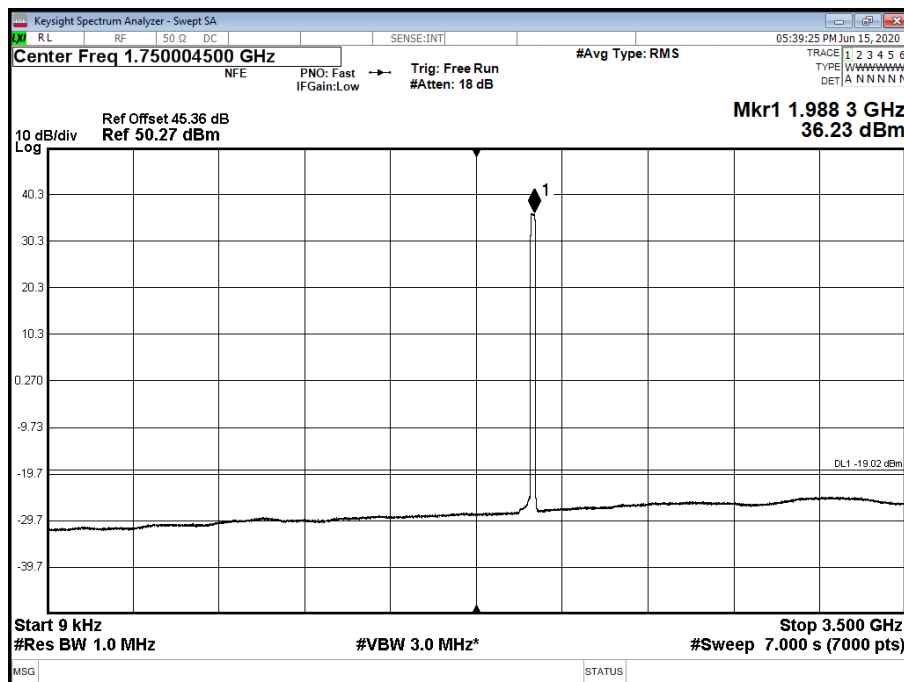




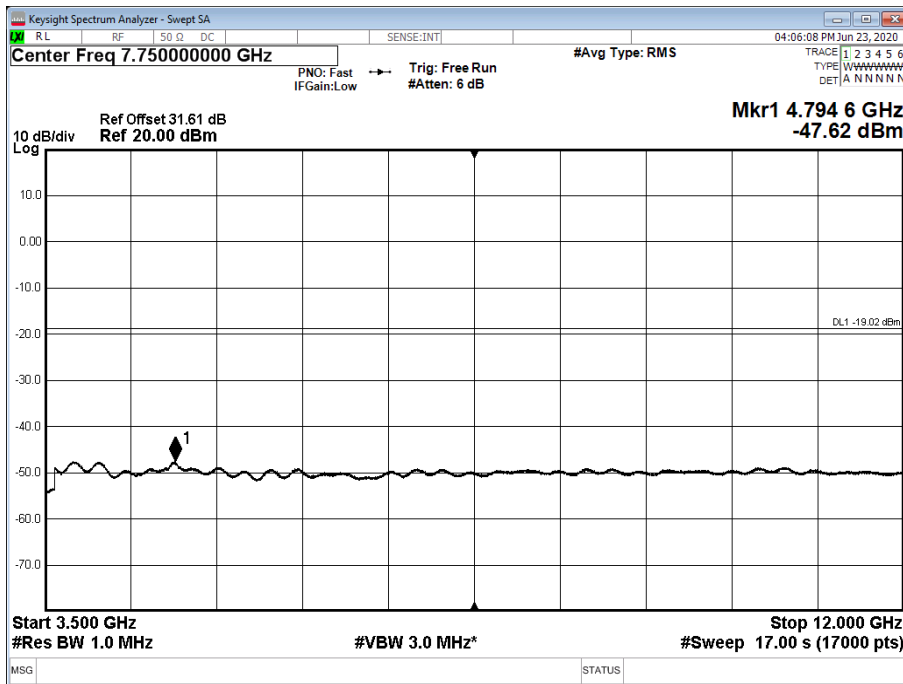
Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 20.0 MHz +NB-IoT IB - Channel Position BRFBW - Band 1 - Range 0.009 to 3500 MHz



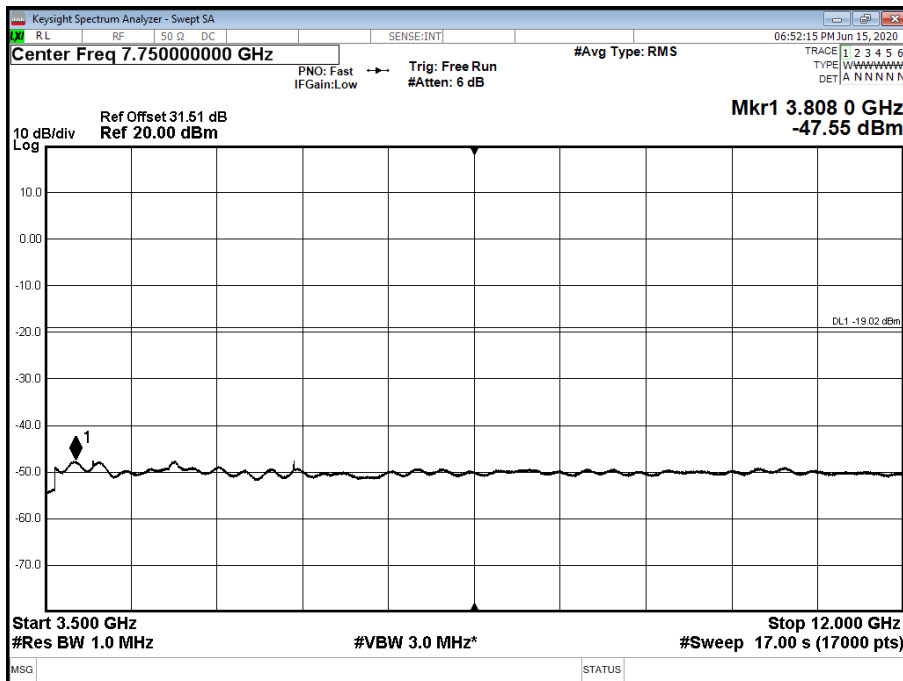
Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 20.0 MHz +NB-IoT IB - Channel Position TRFBW - Band 1 - Range 0.009 to 3500 MHz



Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 5.0 MHz +NB-IoT IB - Channel Position BRFBW - Band 2 - Range 3500 to 12000 MHz

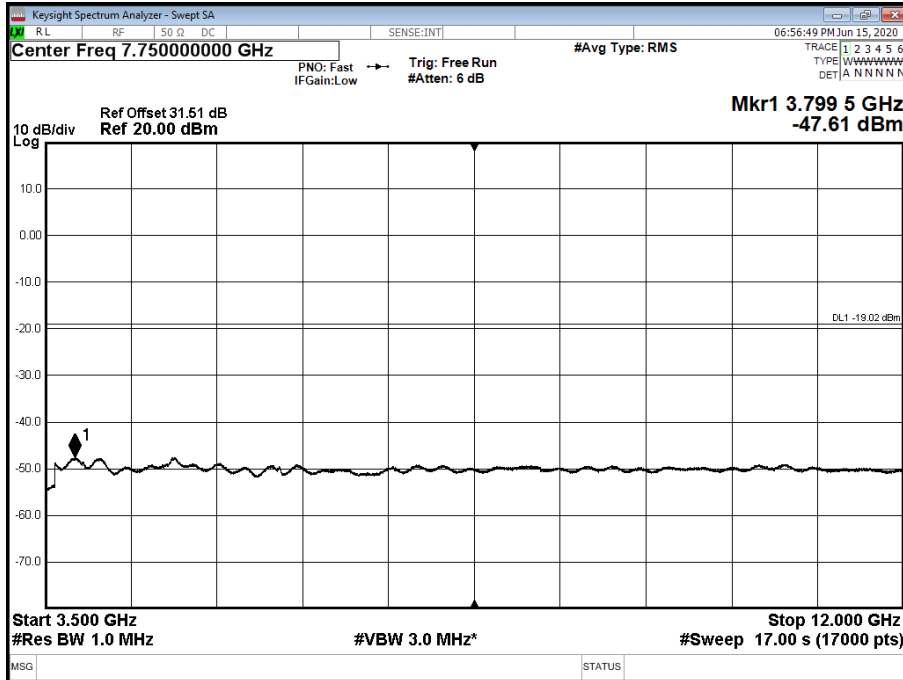


Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 5.0 MHz +NB-IoT IB - Channel Position TRFBW - Band 2 - Range 3500 to 12000 MHz

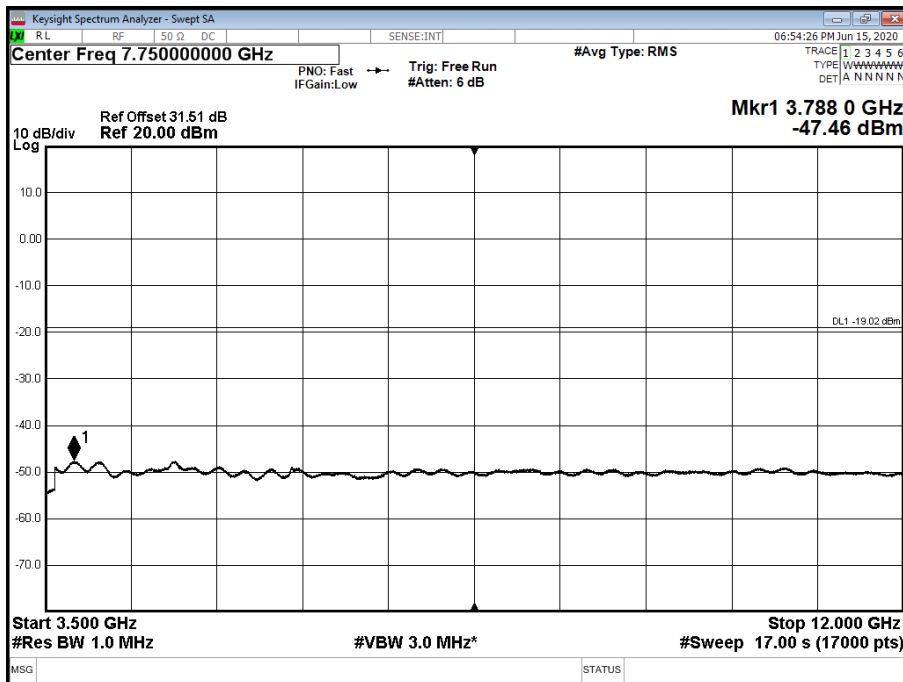




Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 20.0 MHz +NB-IoT IB- Channel Position BRFBW - Band 2 - Range 3500 to 12000 MHz

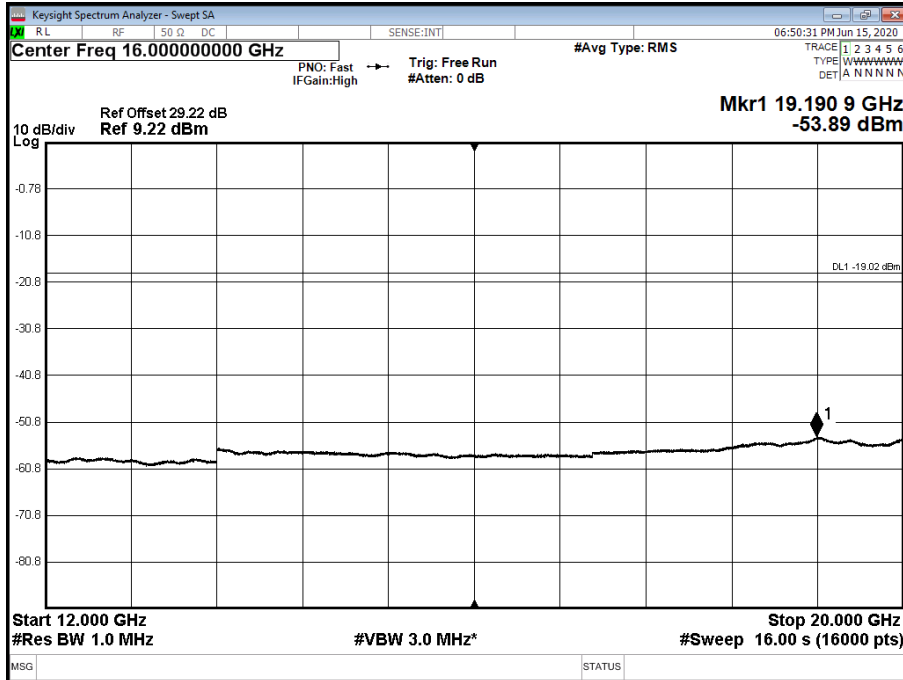


Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 20.0 MHz +NB-IoT IB - Channel Position TRFBW - Band 2 - Range 3500 to 12000 MHz

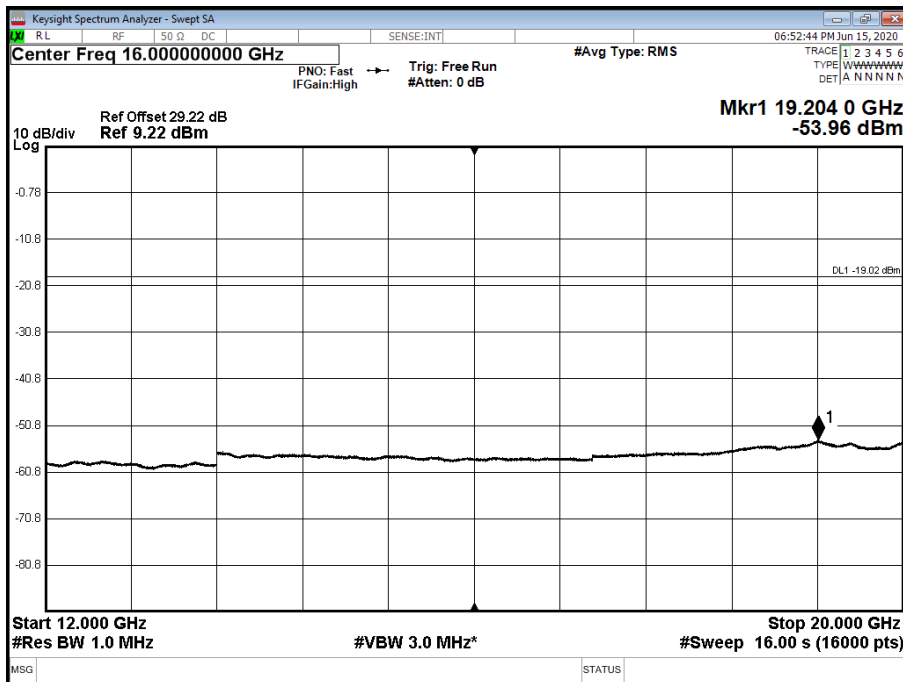




Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 5.0 MHz +NB-IoT IB- Channel Position BRFBW - Band 3 - Range 12000 to 20000 MHz

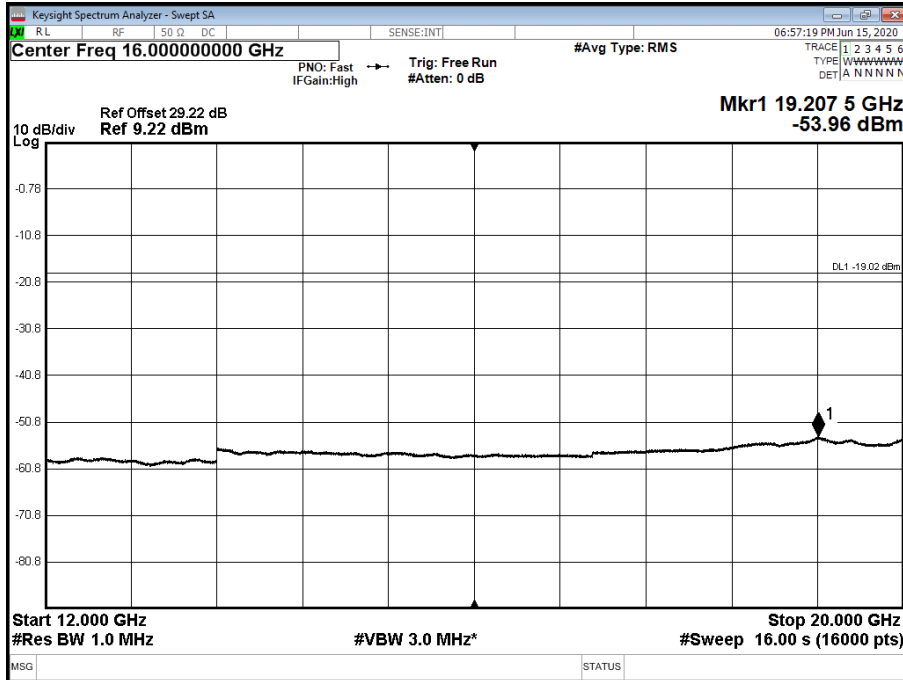


Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 5.0 MHz + NB-IoT IB - Channel Position TRFBW - Band 3 - Range 12000 to 20000 MHz

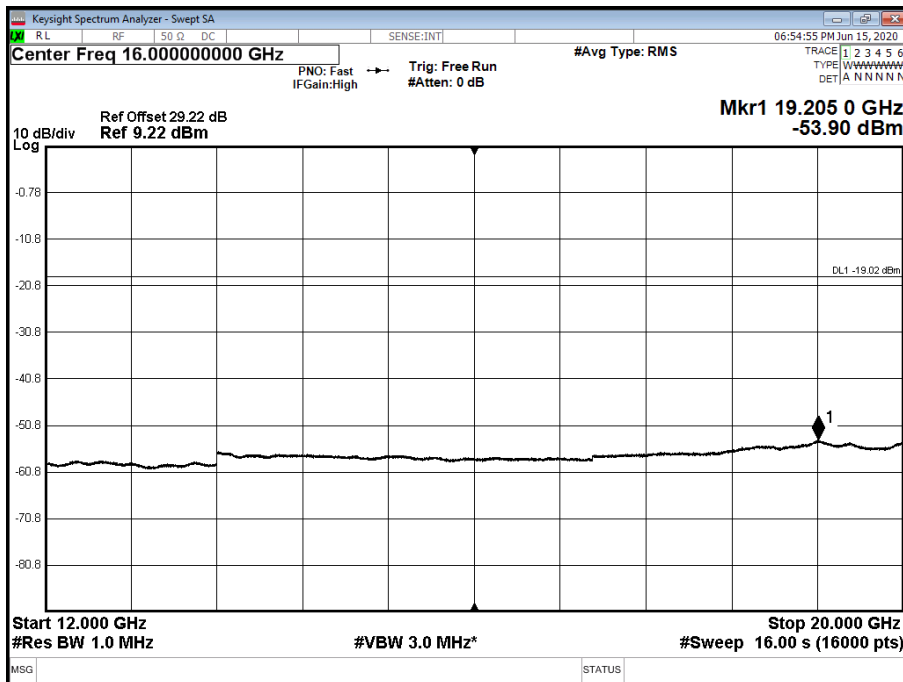




Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 20.0 MHz + NB-IoT IB - Channel Position BRFBW - Band 3 - Range 12000 to 20000 MHz



Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth 20.0 MHz +NB-IoT IB - Channel Position TRFBW - Band 3 - Range 12000 to 20000 MHz



|       |        |
|-------|--------|
| Limit | -19dBm |
|-------|--------|





## **2.5 RADIATED EMISSIONS**

### **2.5.1 Specification Reference**

FCC CFR 47 Part 2, Clause 2.1053

### **2.5.2 Date of Test and Modification State**

30 June – 03 July 2020 - Modification State 0

### **2.5.3 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.5.4 Environmental Conditions**

|                     |             |
|---------------------|-------------|
| Ambient Temperature | 20.3-21.4°C |
| Relative Humidity   | 44.1-47.2%  |

### **2.5.5 Test Method**

The test was performed in accordance with ANSI C63.26 Clause 5. The EUT was configured as defined in ANSI C63.26, clause 5.5.2.3.2.

The EUT was set up on a support replicating typical installation conditions at a height of 1.5 m above the reference ground plane, (see setup photos) within a semi-anechoic chamber on a remotely controlled turntable.

Pre-scan and final measurements were made using a Field Strength method in accordance with ANSI C63.26 Clause 5.5.4. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification. Final results were then converted to EIRP and are displayed in the plots below. The correction for field strength measurements to EIRP at 3 m was 95.2 dB and at 1 m was 85.2 dB. An RBW of 1 MHz and VBW of 3 MHz was used for all measurements with a Peak detector and trace set to Max Hold. In all cases below where the limit line is exceeded – this is the intentional transmit frequency and is not subject to the limits defined in FCC Part 27(m). A high pass filter in conjunction with a pre-amplifier was used for the measurement ranges of 8 – 22 GHz.

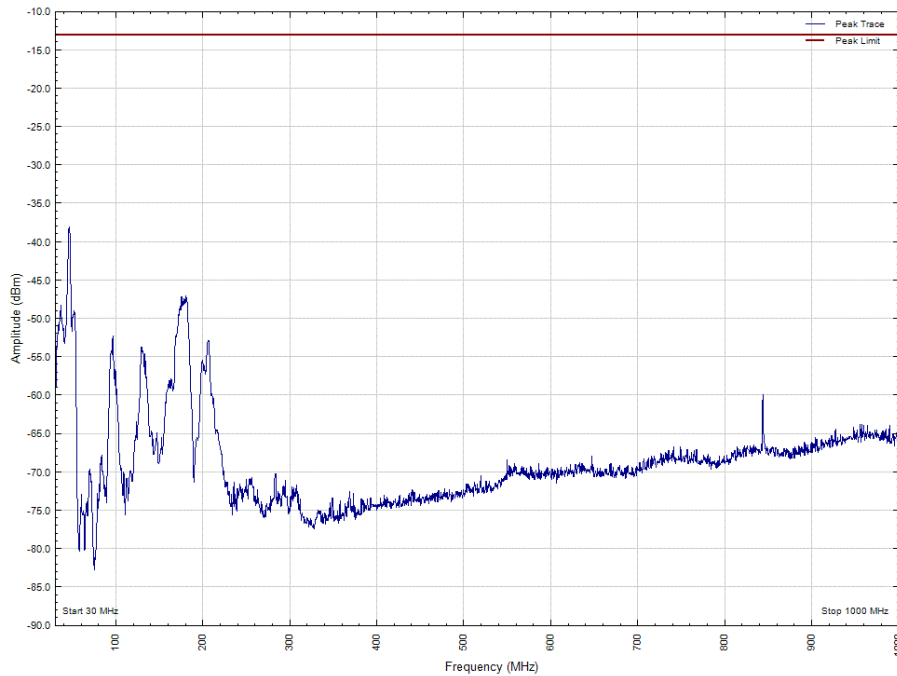
### **2.5.6 Test Results**

Configuration 1

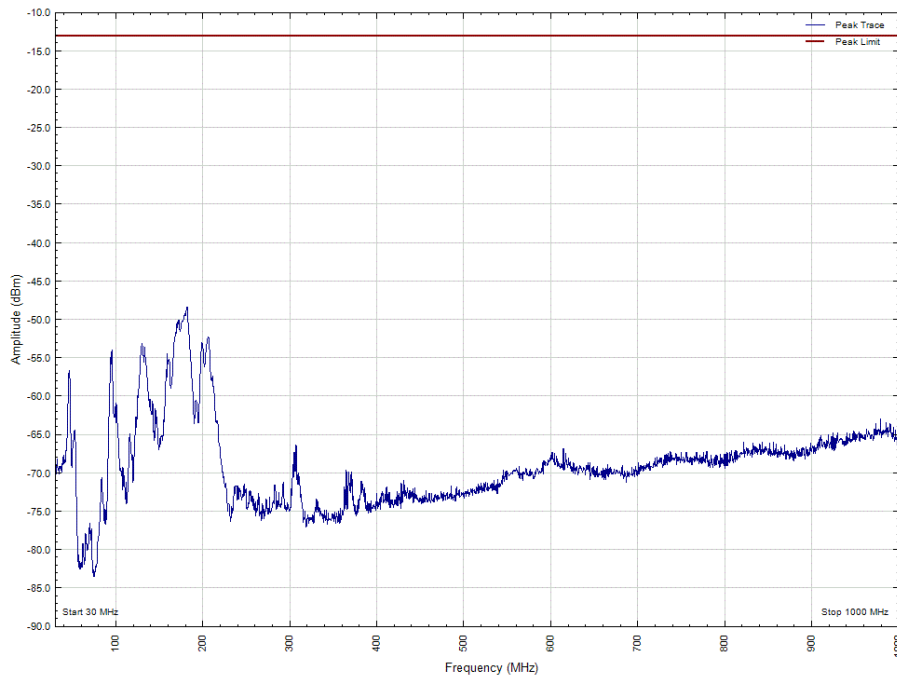
Maximum Output Power 47.8 dBm



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 30 - 1000 MHz

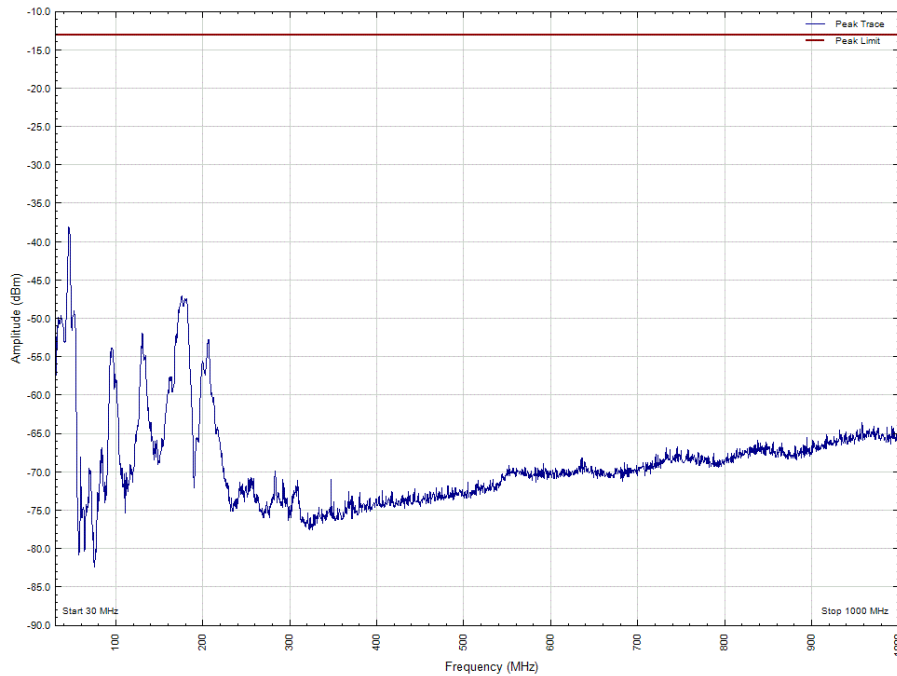


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 30 - 1000 MHz

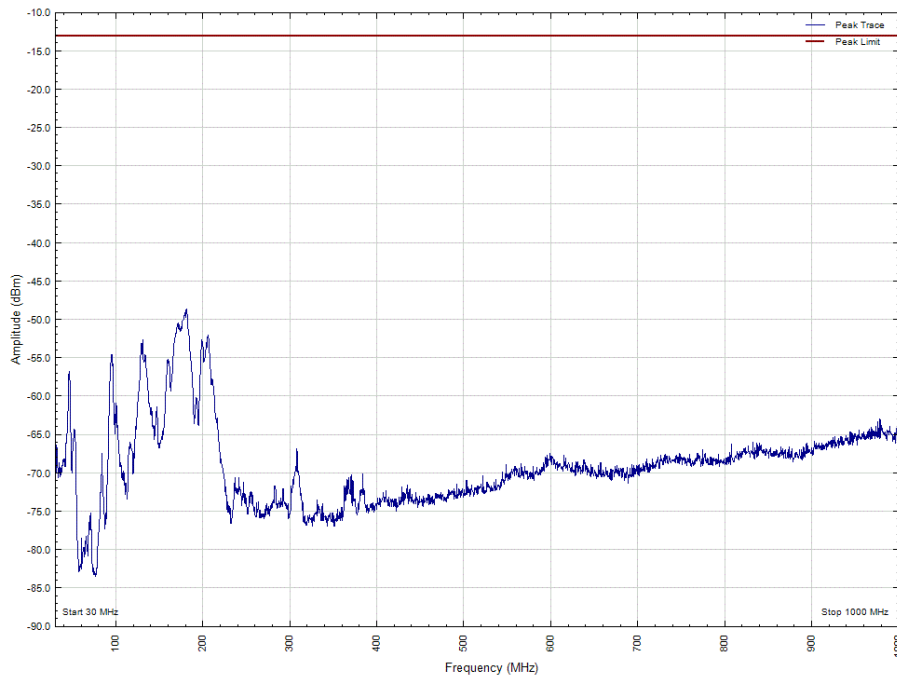




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 30 - 1000 MHz

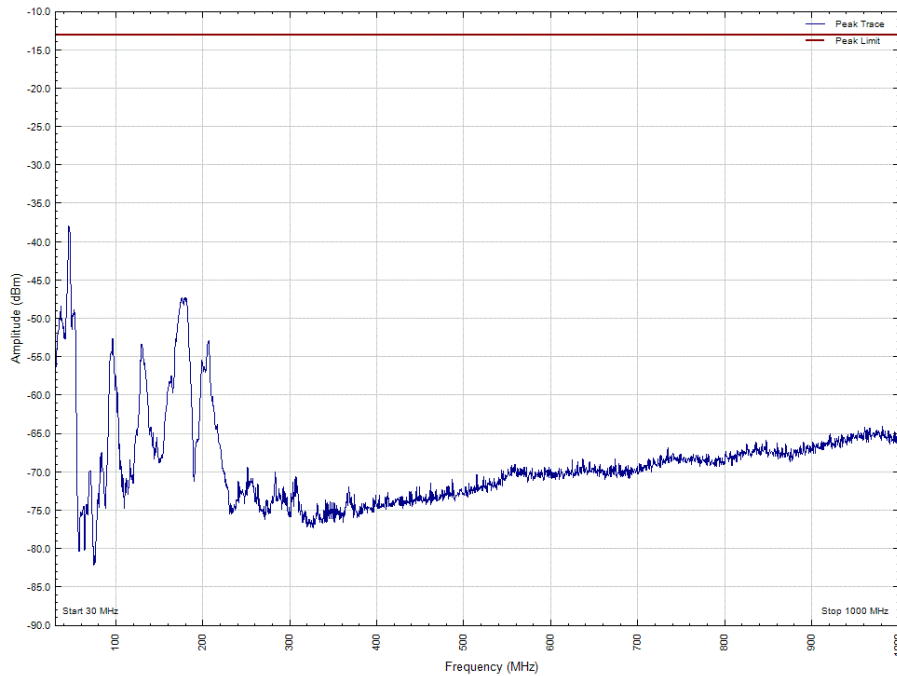


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 30 - 1000 MHz

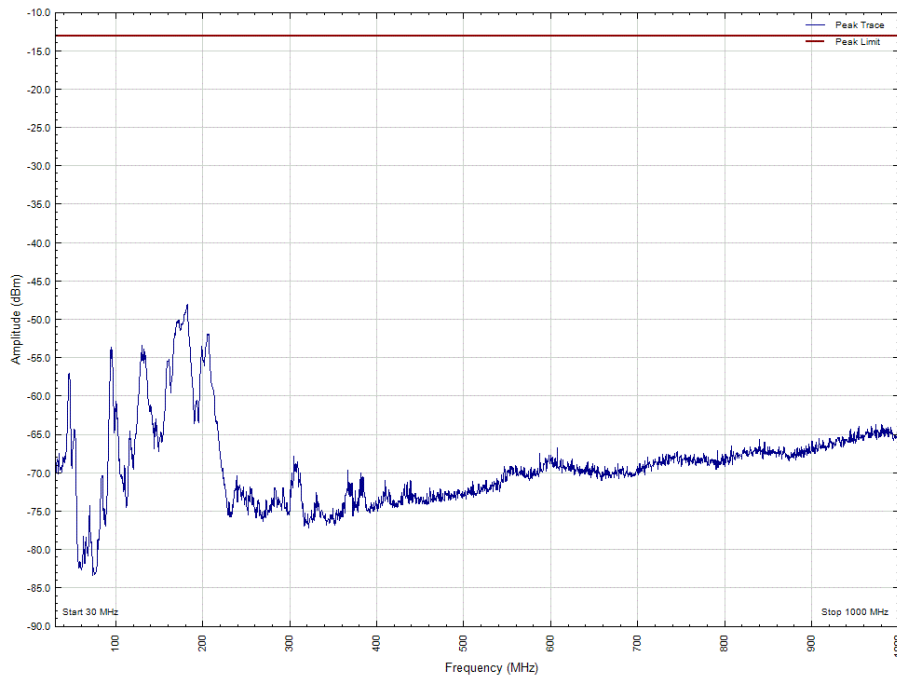




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 30 - 1000 MHz

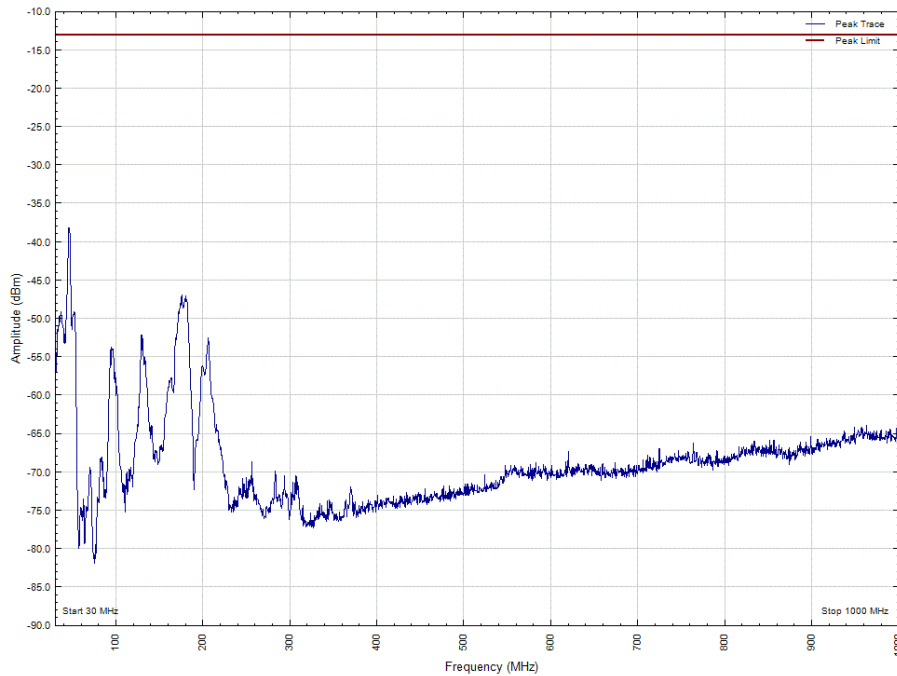


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 30 - 1000 MHz

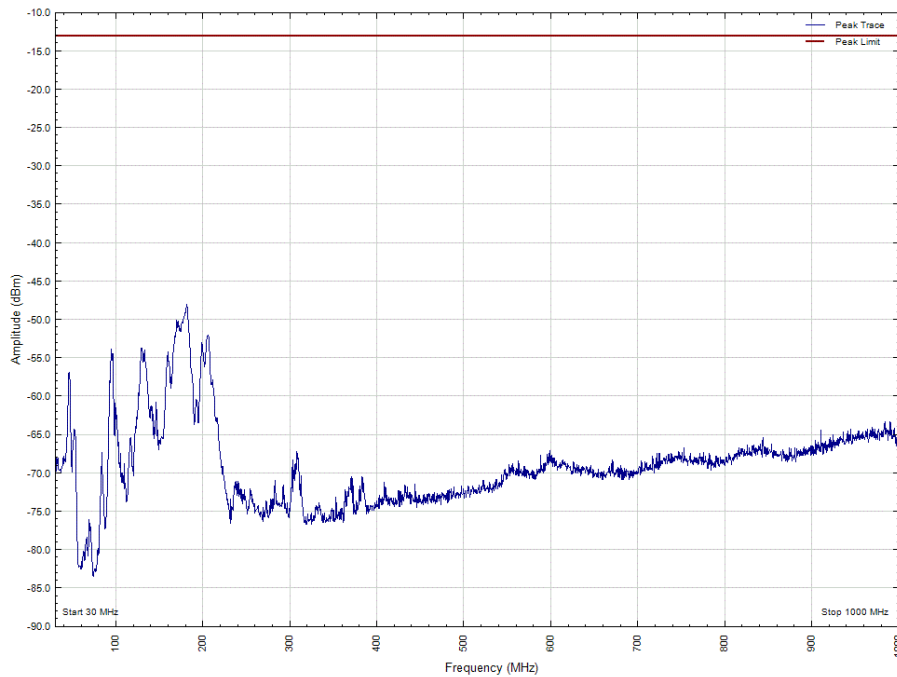




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 30 - 1000 MHz

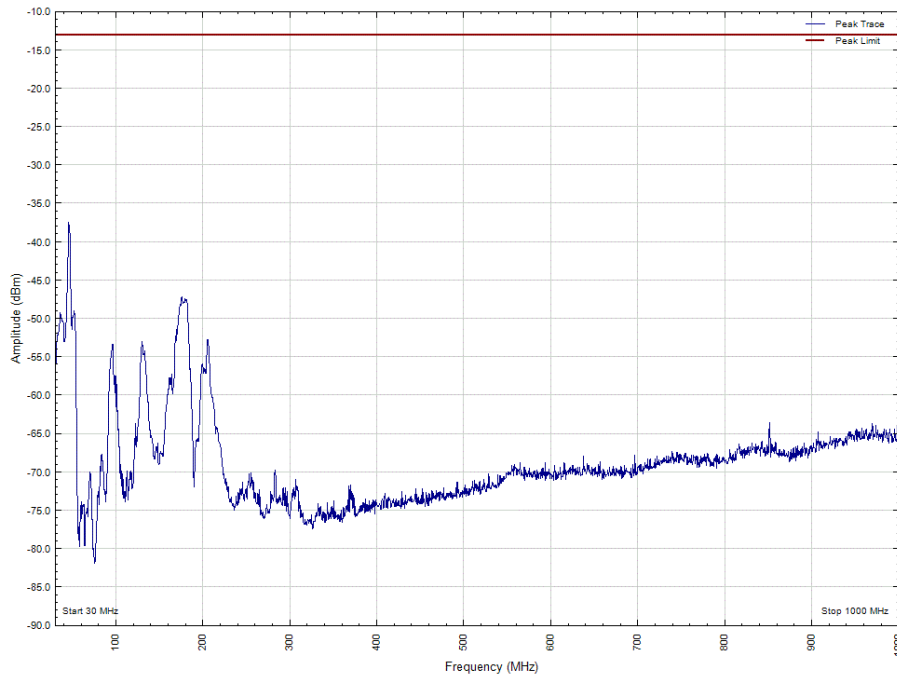


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 30 - 1000 MHz

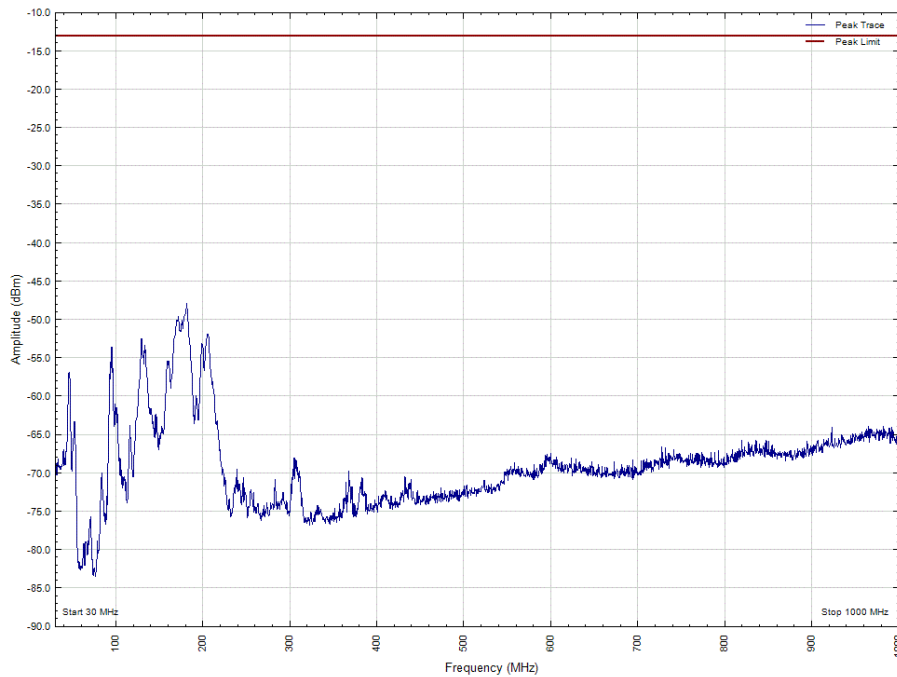




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 30 - 1000 MHz

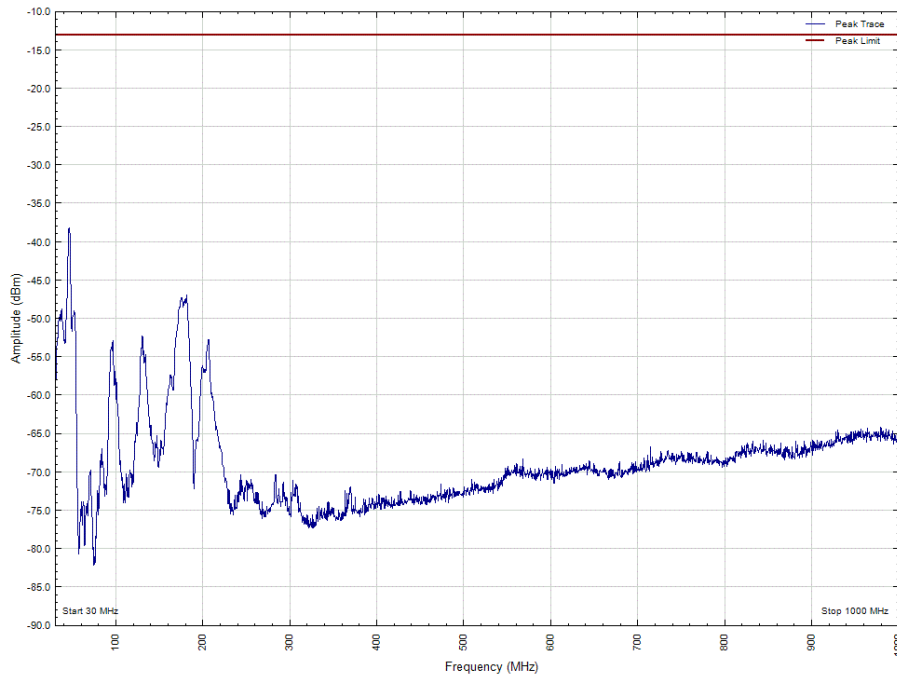


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 30 - 1000 MHz

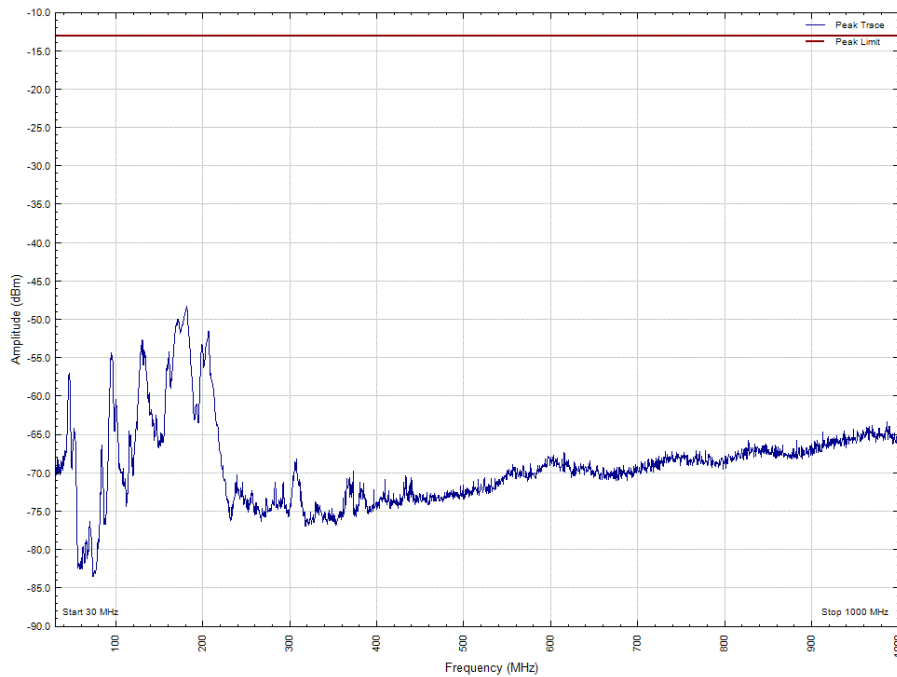




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 30 - 1000 MHz

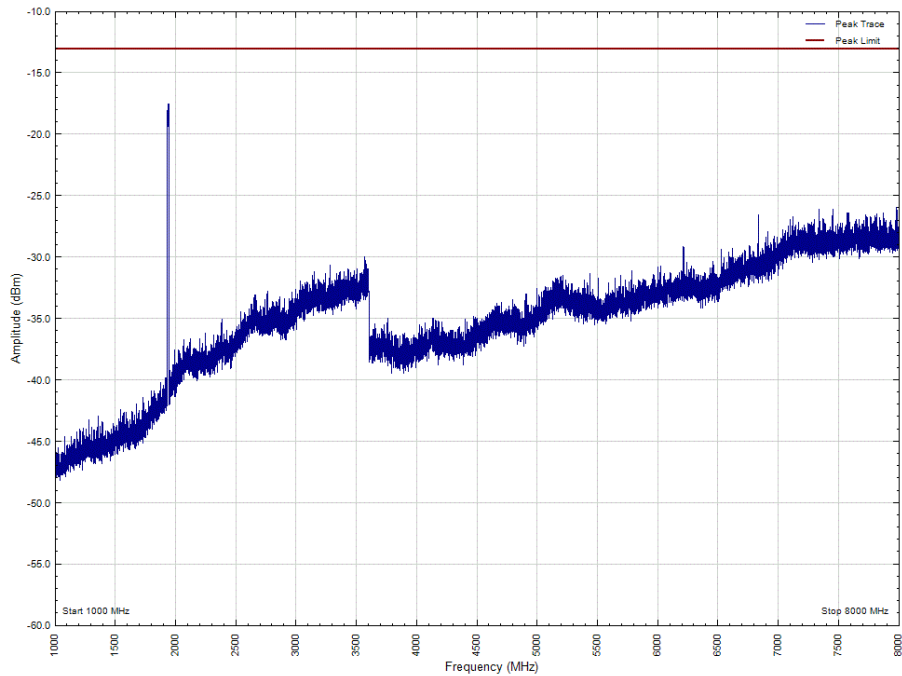


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 30 - 1000 MHz

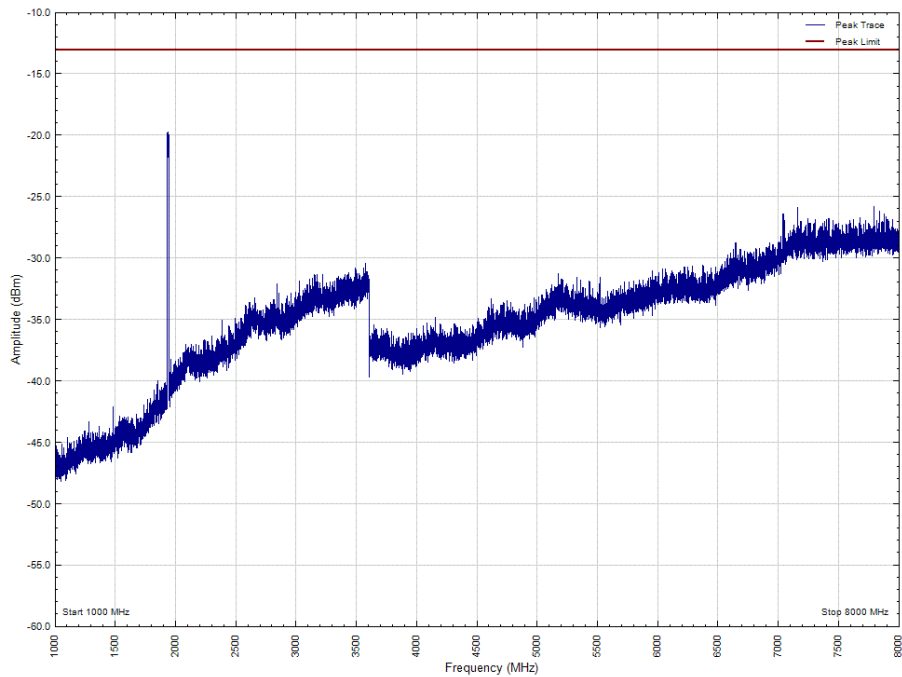




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 1000 - 8000 MHz



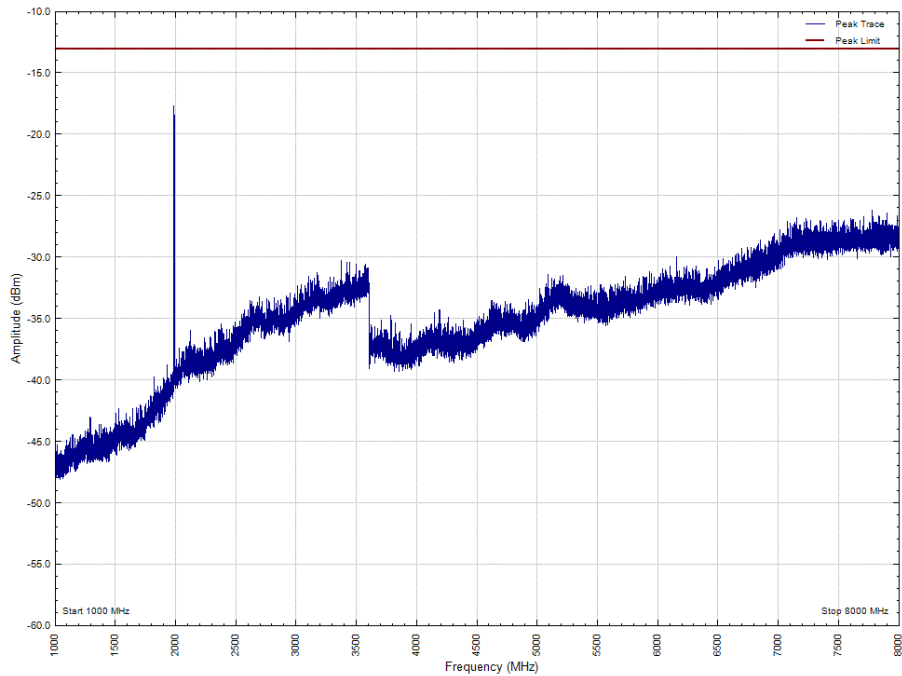
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 1000 - 8000 MHz



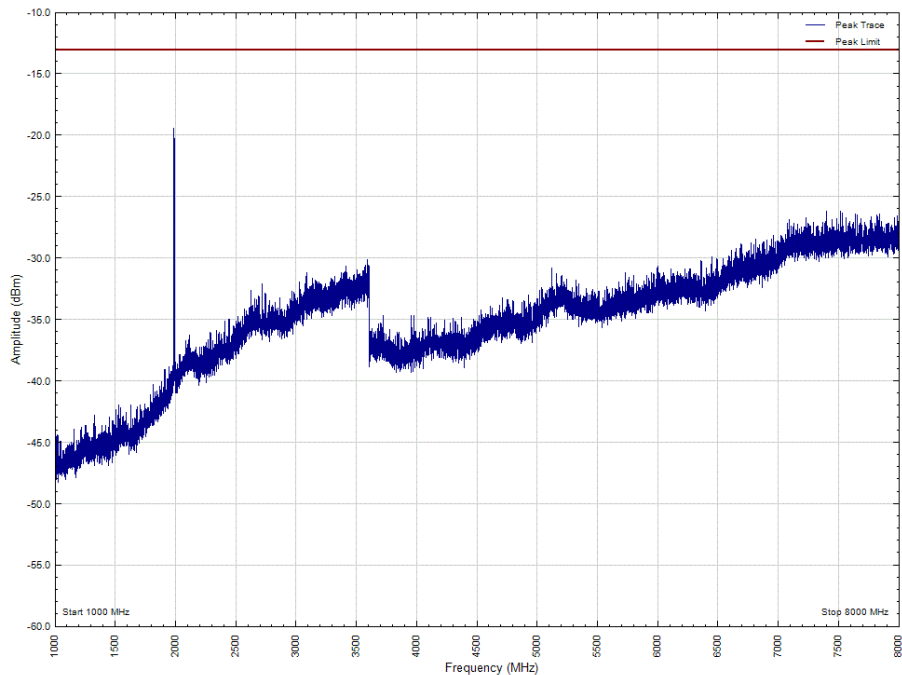




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 1000 - 8000 MHz

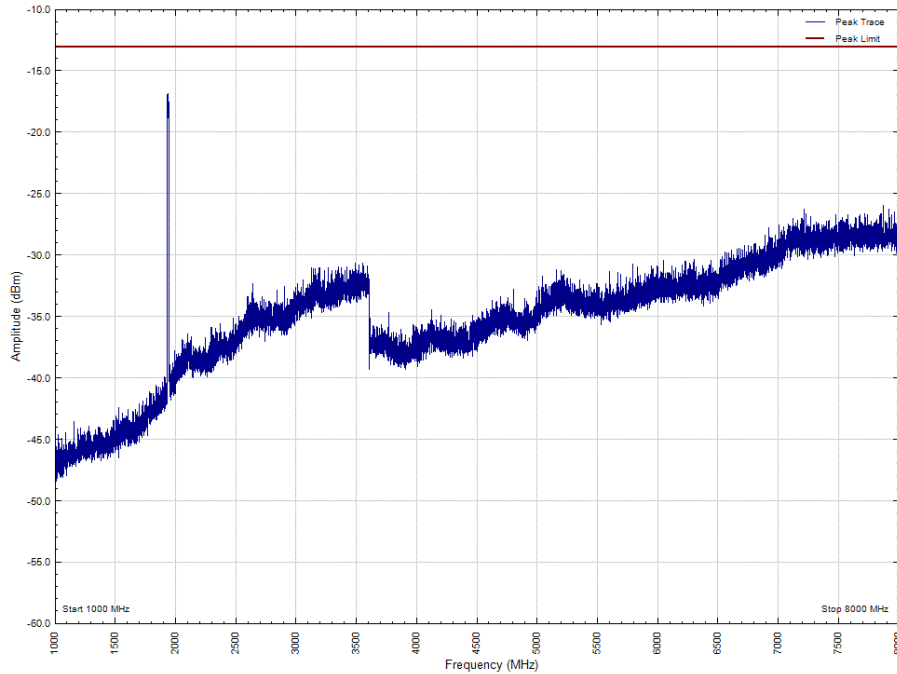


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 1000 - 8000 MHz

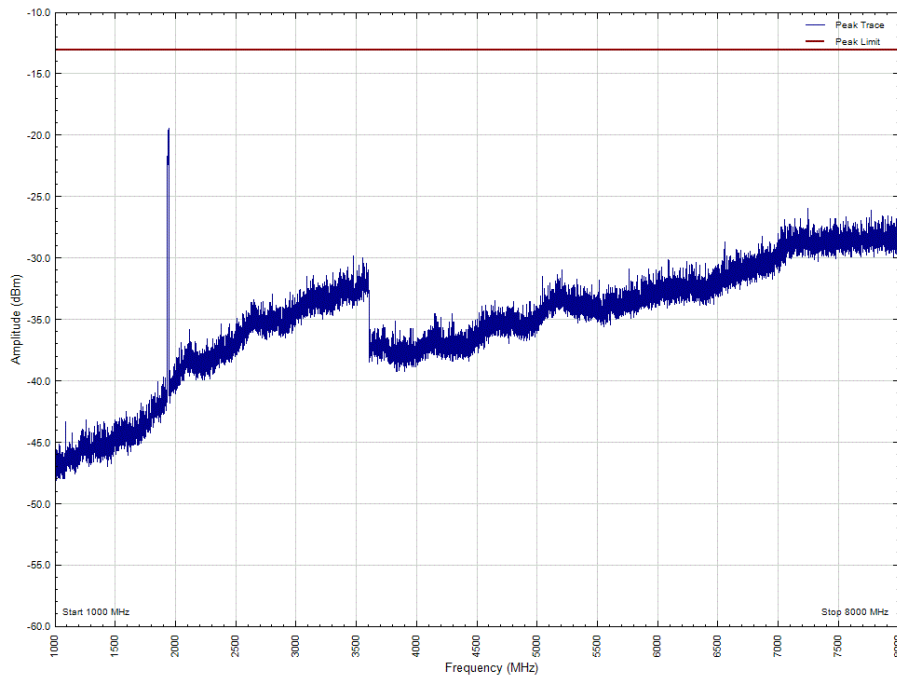




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 1000 - 8000 MHz

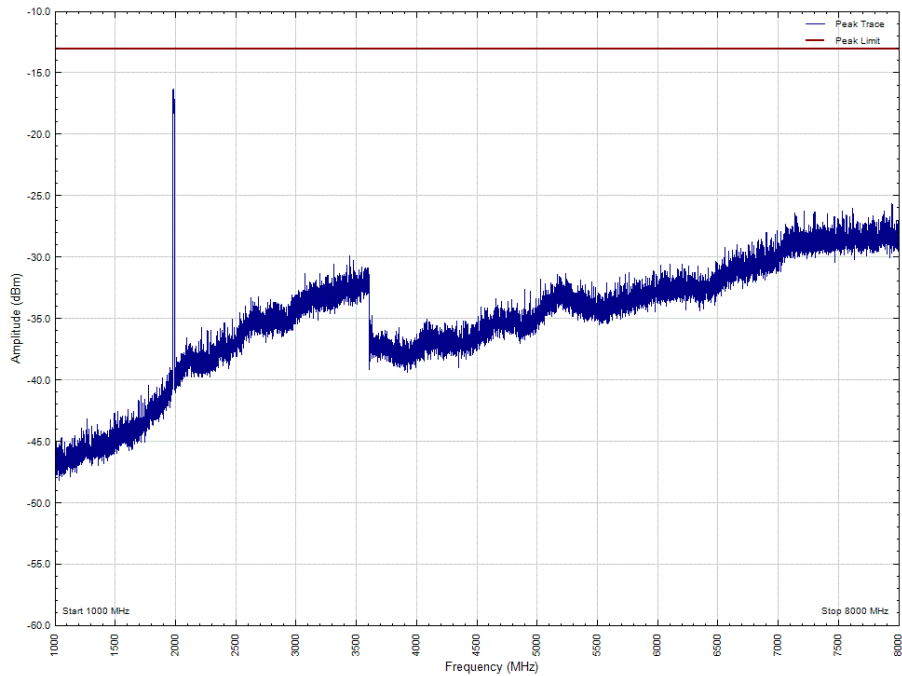


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 1000 - 8000 MHz

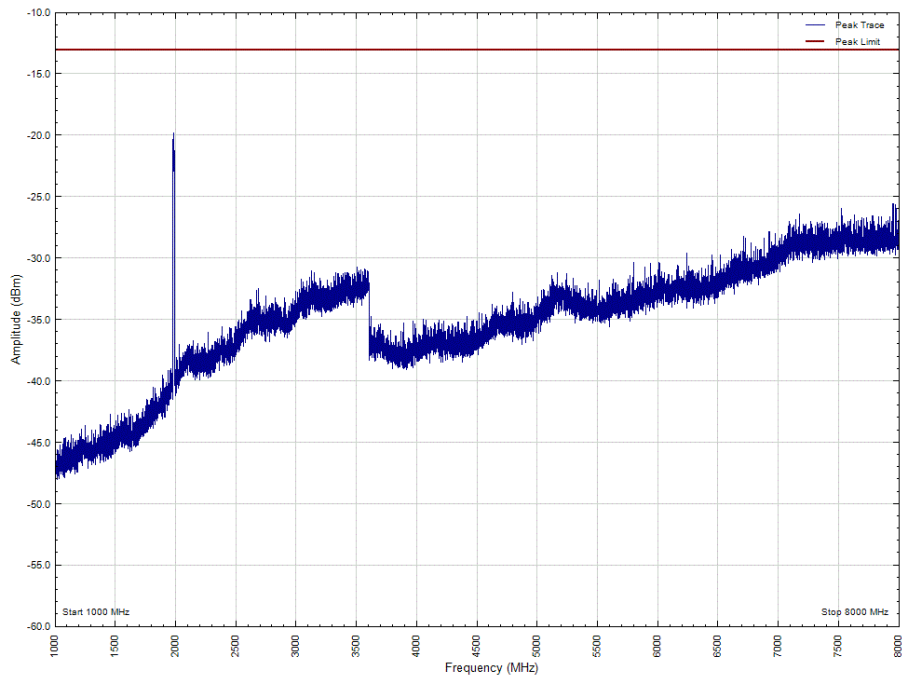




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 1000 - 8000 MHz

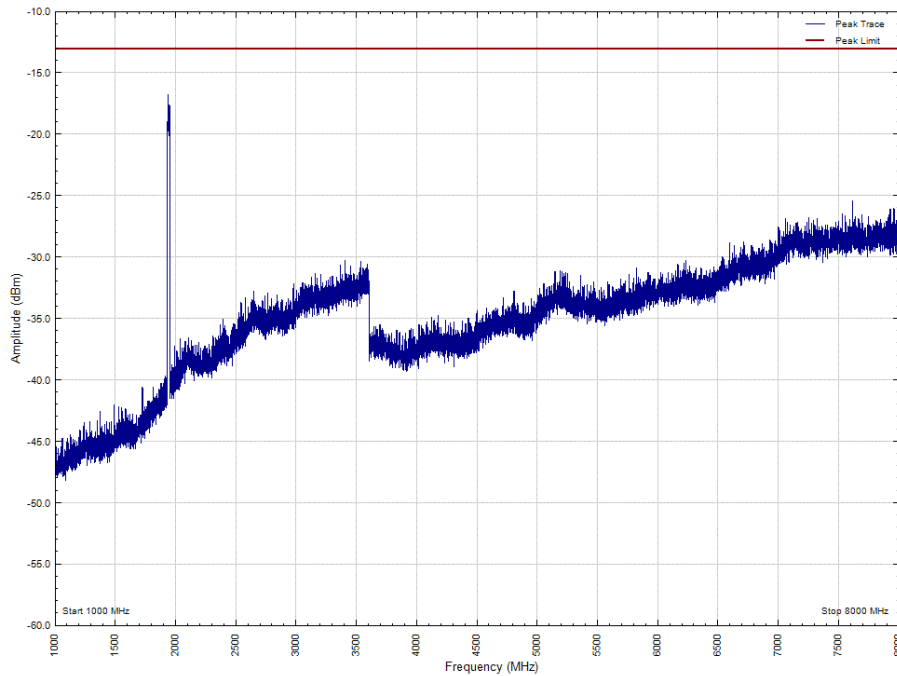


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 1000 - 8000 MHz

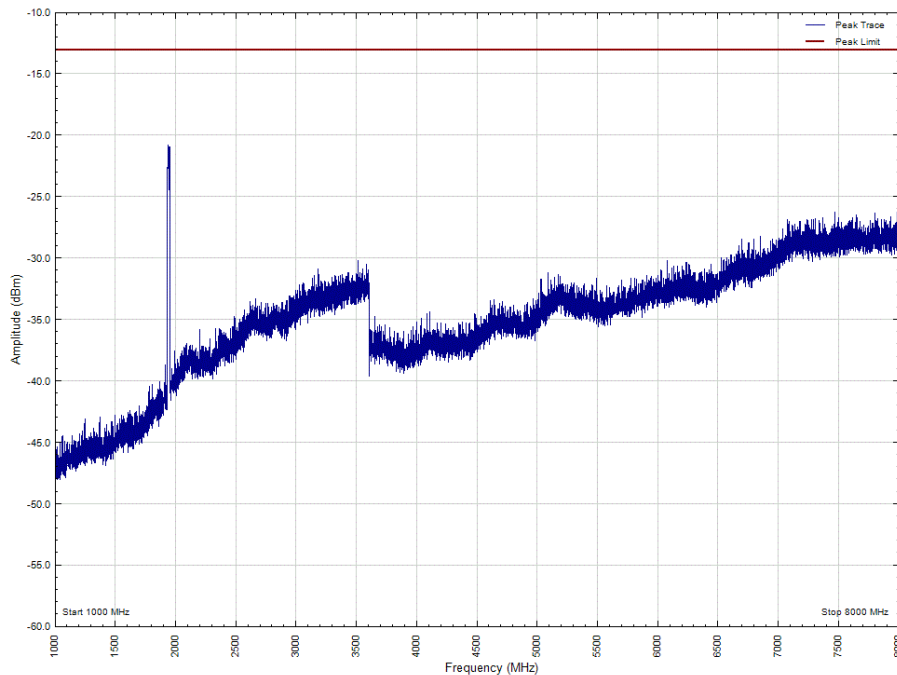




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 1000 - 8000 MHz

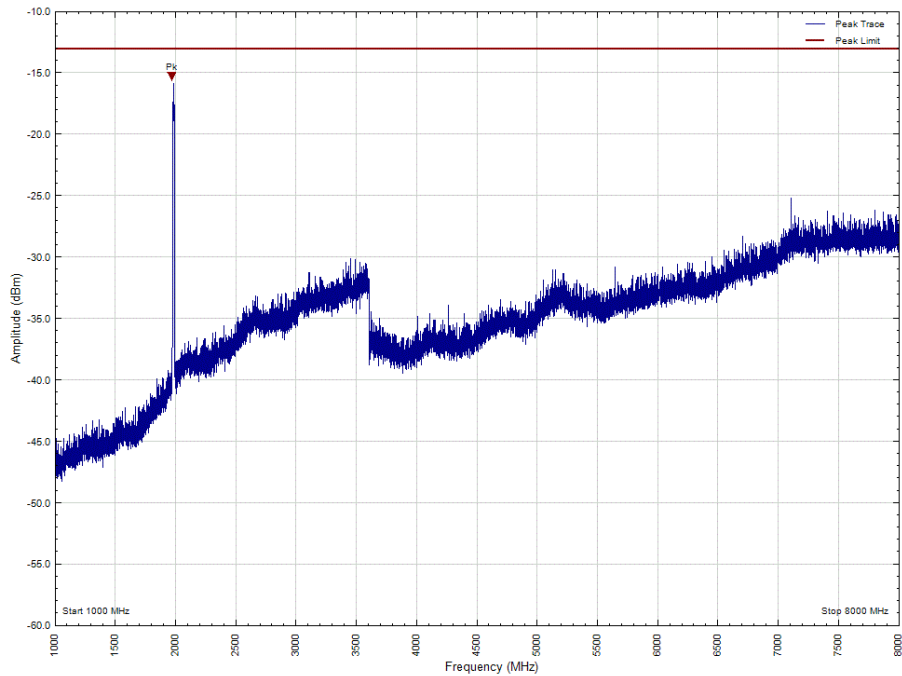


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 1000 - 8000 MHz

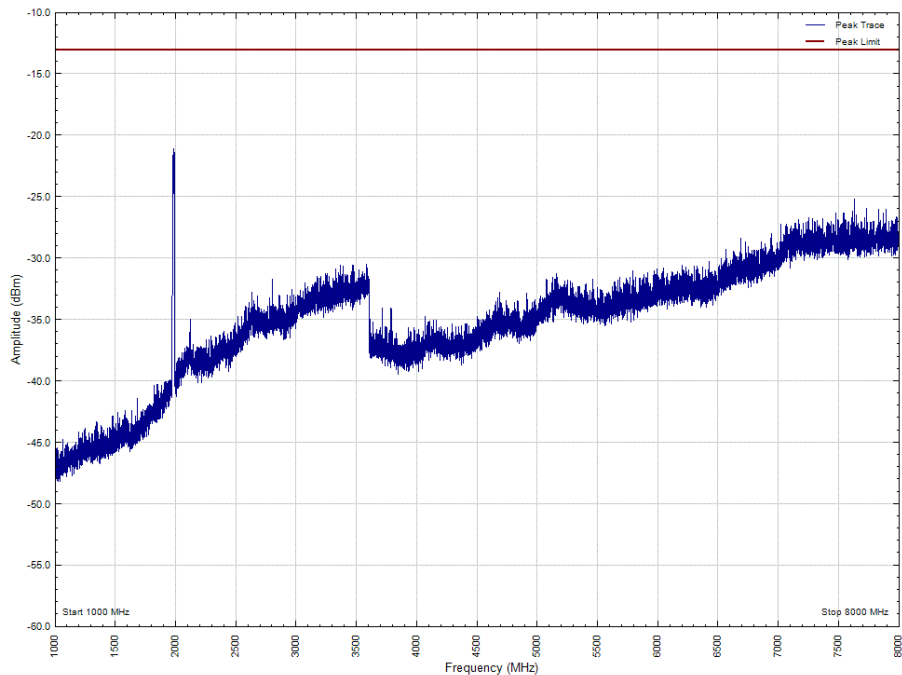




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 1000 - 8000 MHz

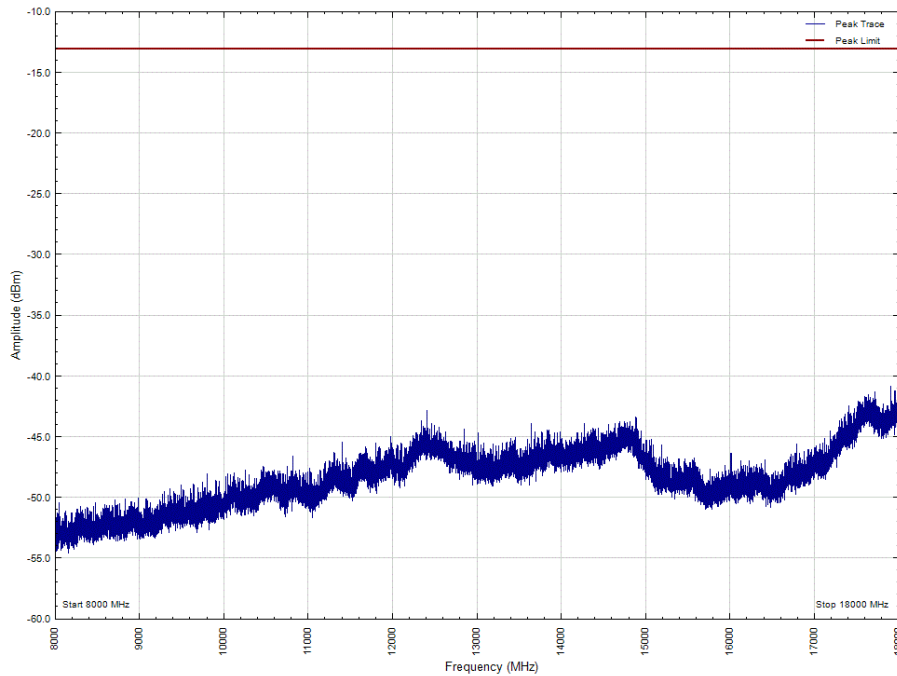


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 1000 - 8000 MHz

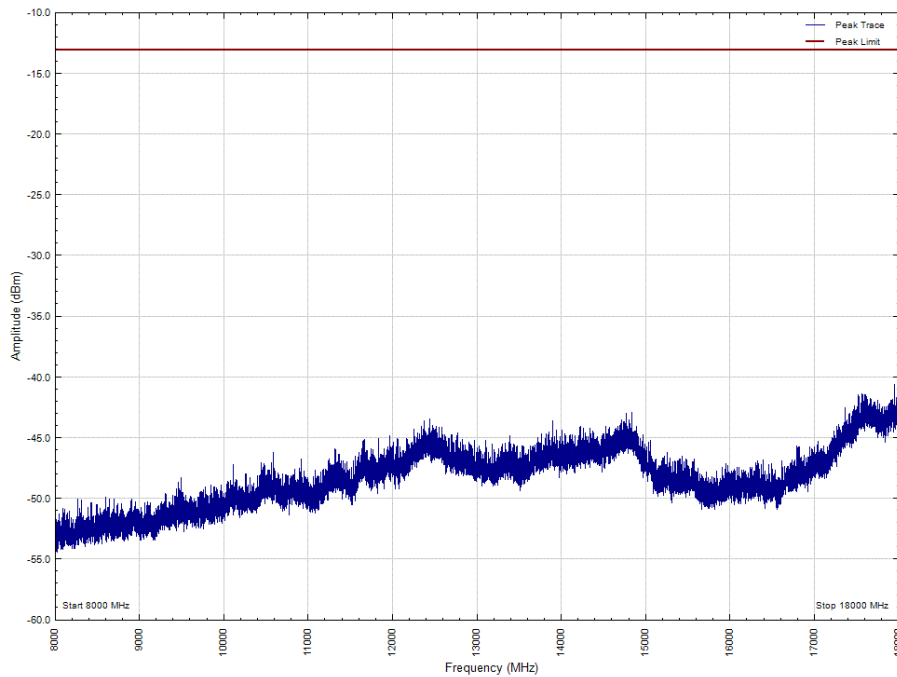




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 8000 - 18000 MHz

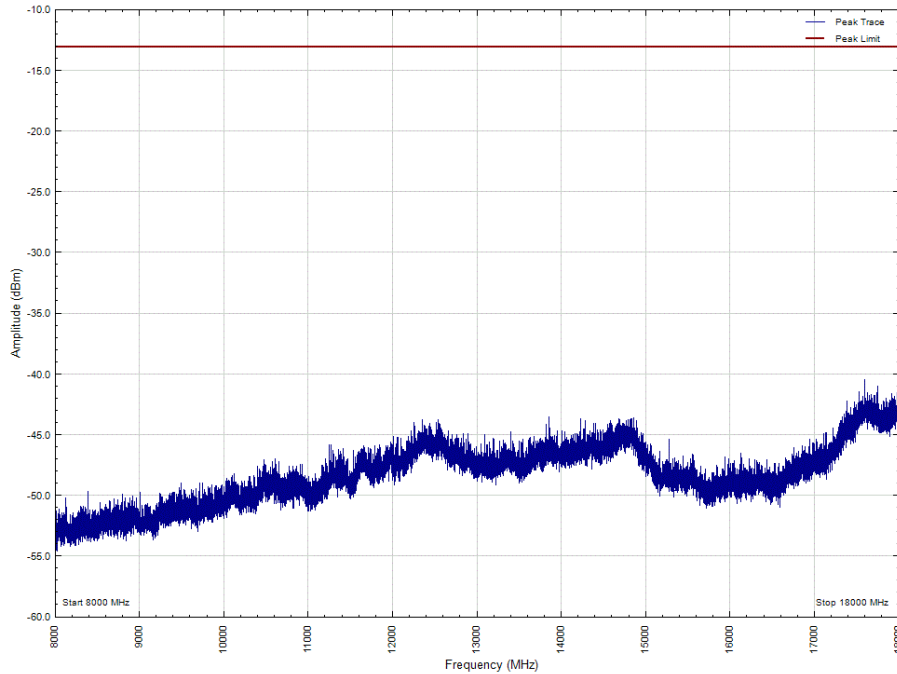


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 8000 - 18000 MHz

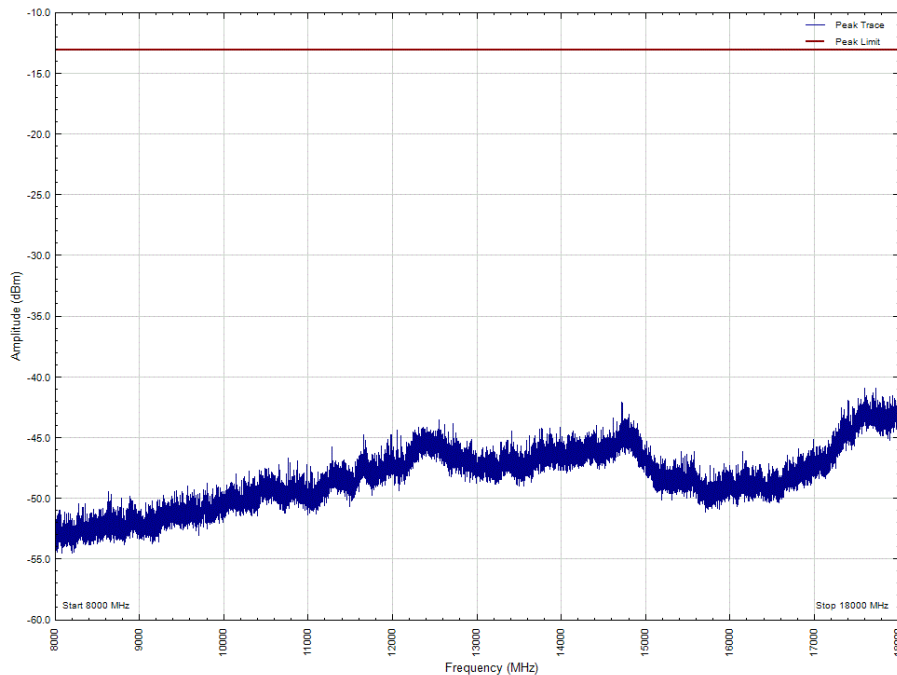




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 8000 - 18000 MHz

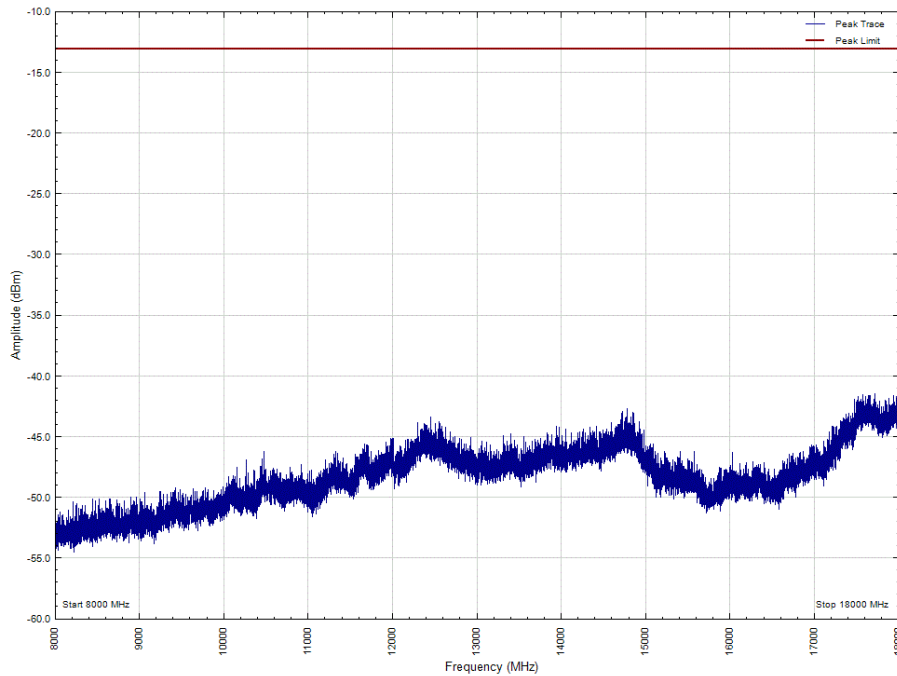


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 8000 - 18000 MHz

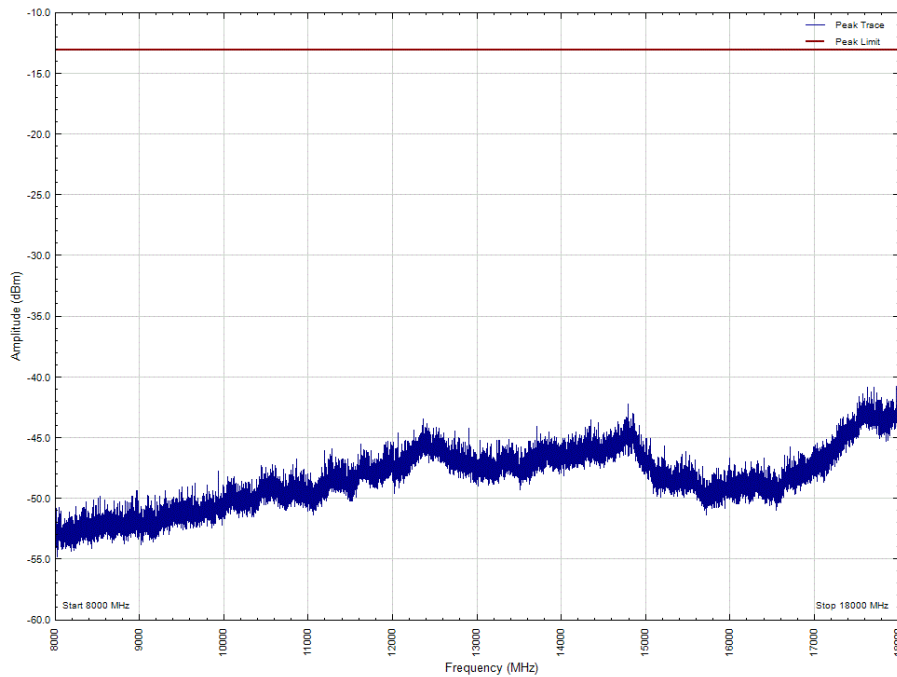




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 8000 - 18000 MHz



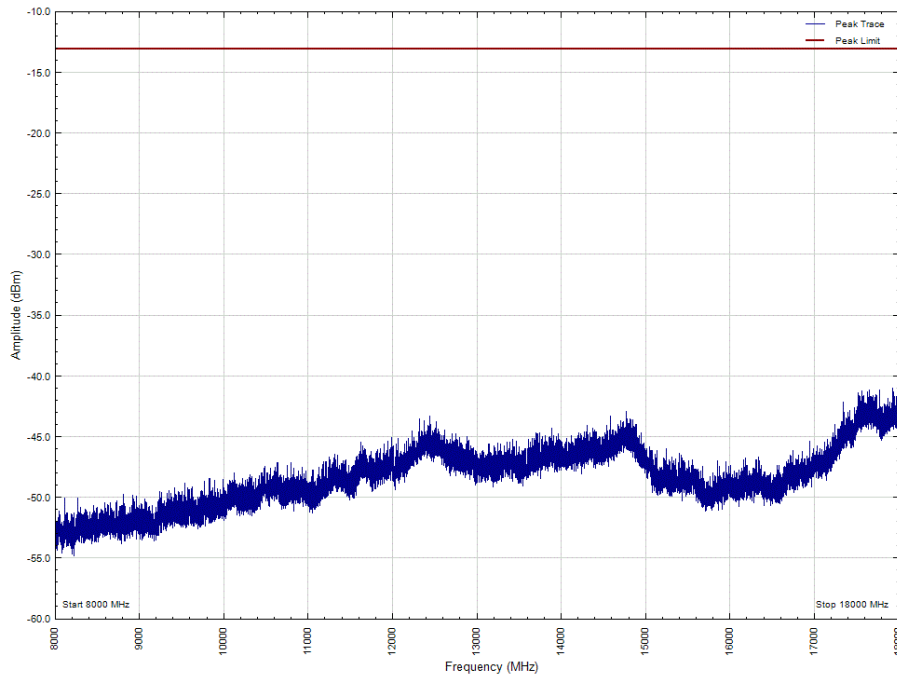
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 8000 - 18000 MHz



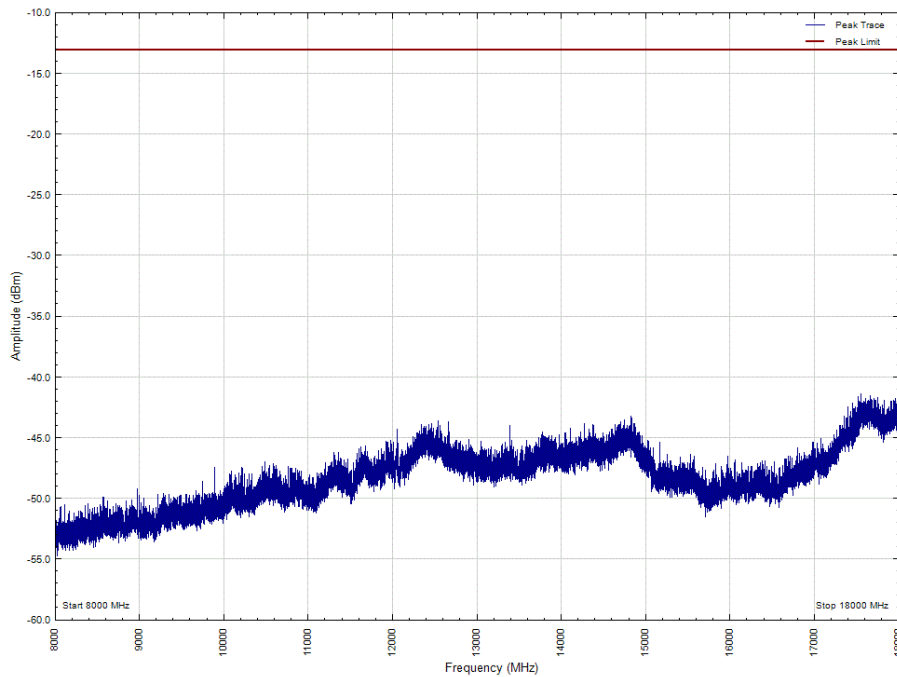




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 8000 - 18000 MHz

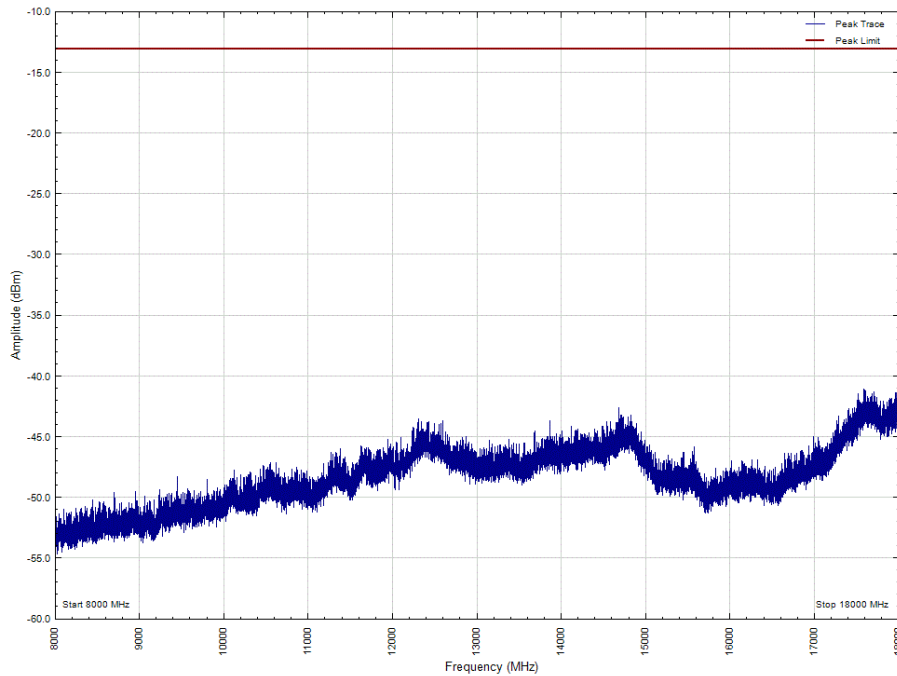


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 8000 - 18000 MHz

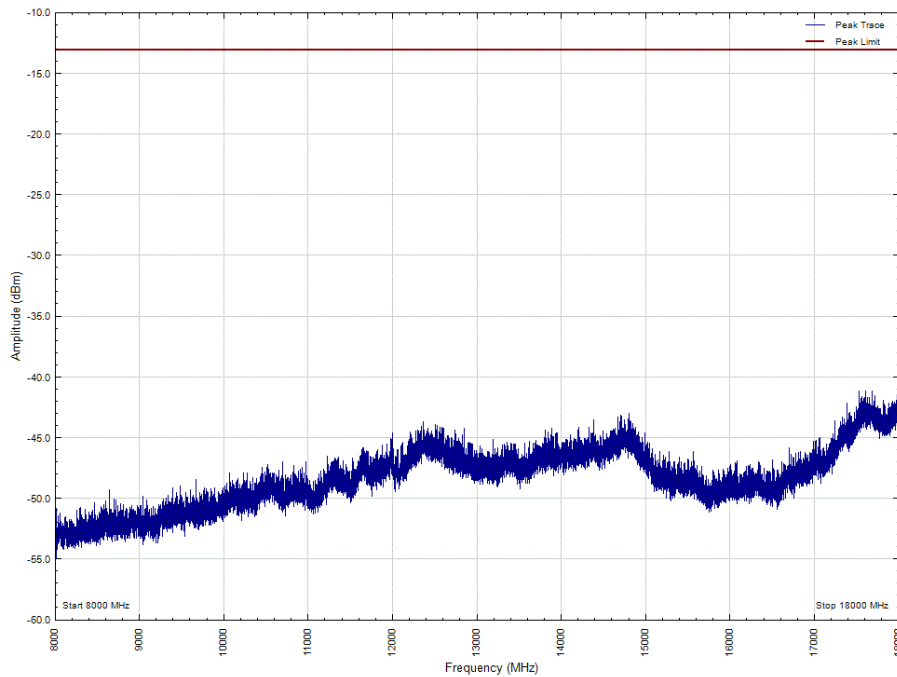




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 8000 - 18000 MHz

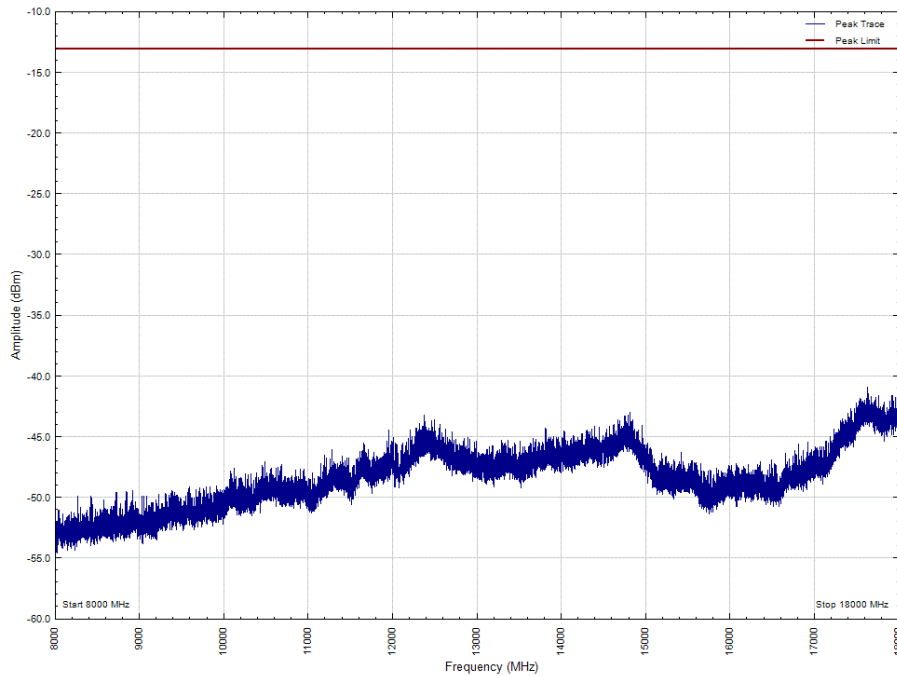


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 8000 - 18000 MHz

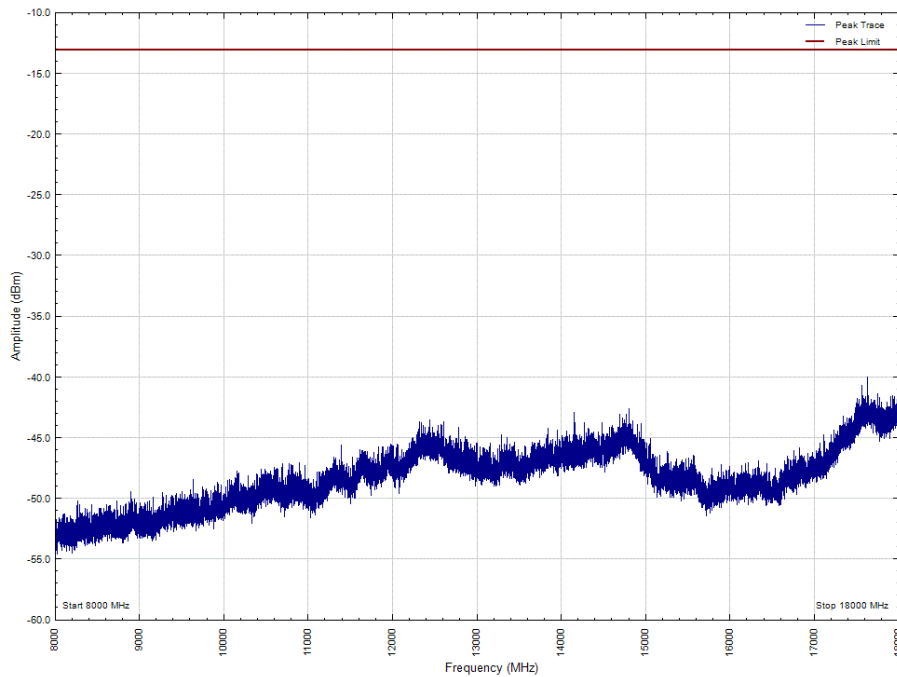




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 8000 - 18000 MHz

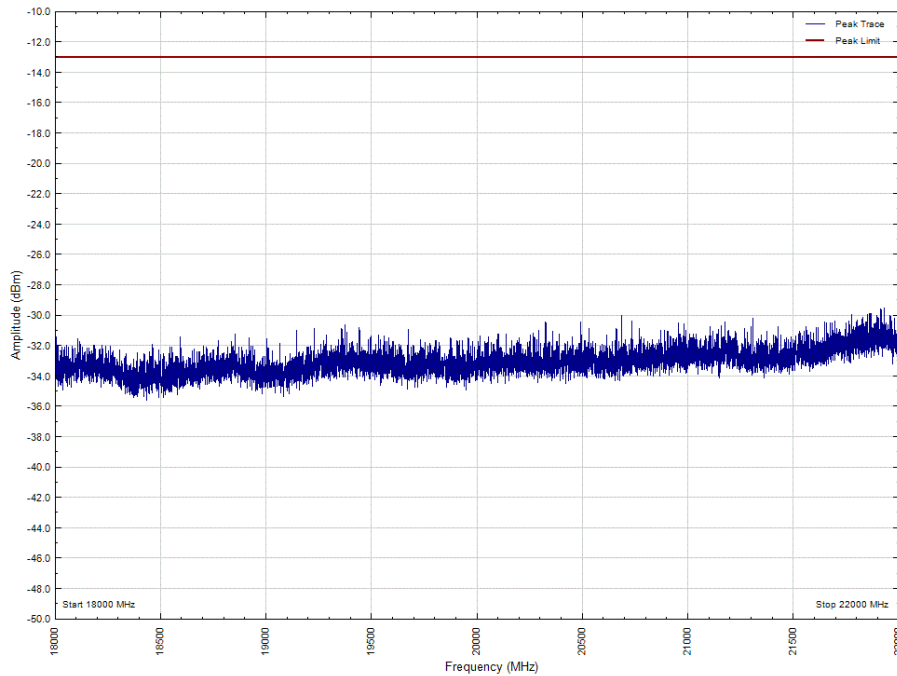


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 8000 - 18000 MHz

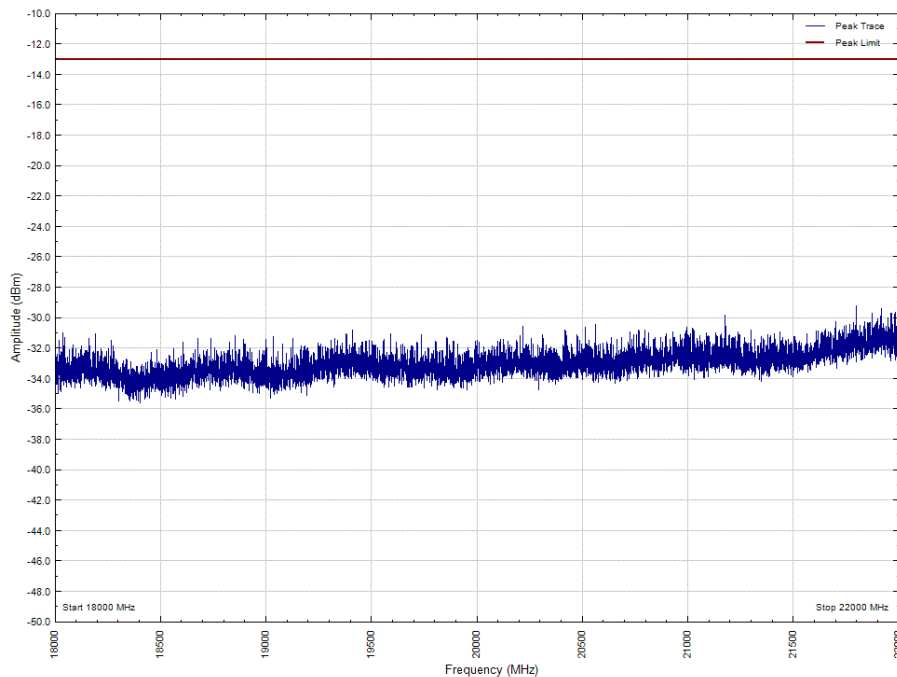




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 18000 - 22000 MHz

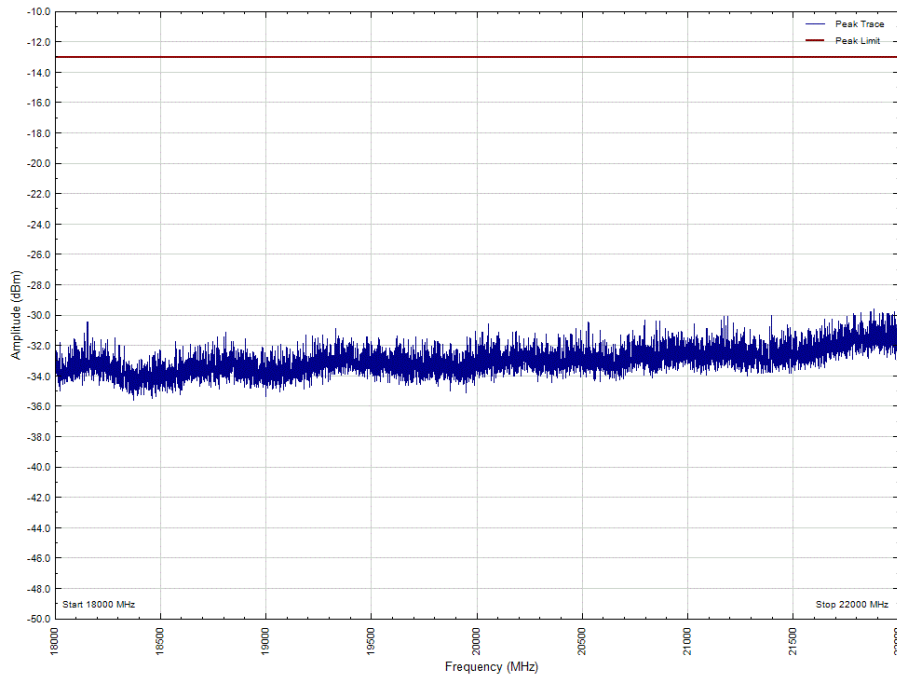


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 18000 - 22000 MHz

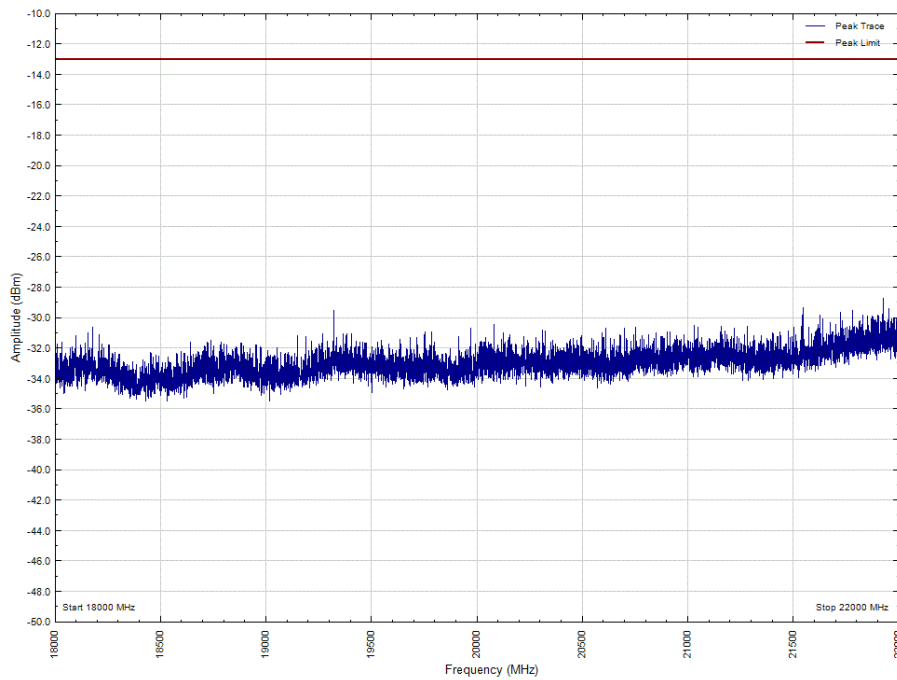




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 18000 - 22000 MHz

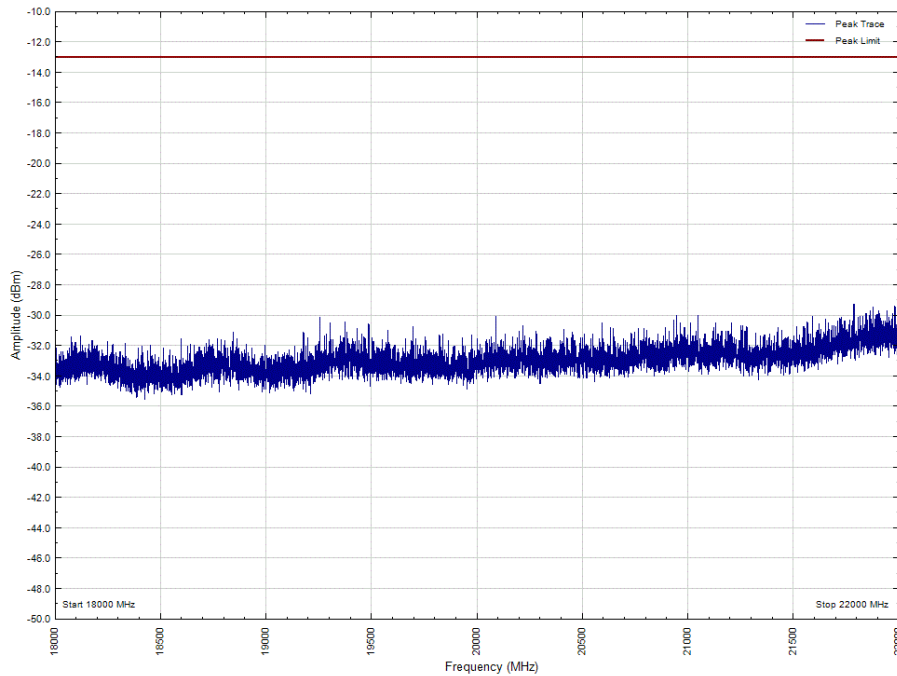


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 18000 - 22000 MHz

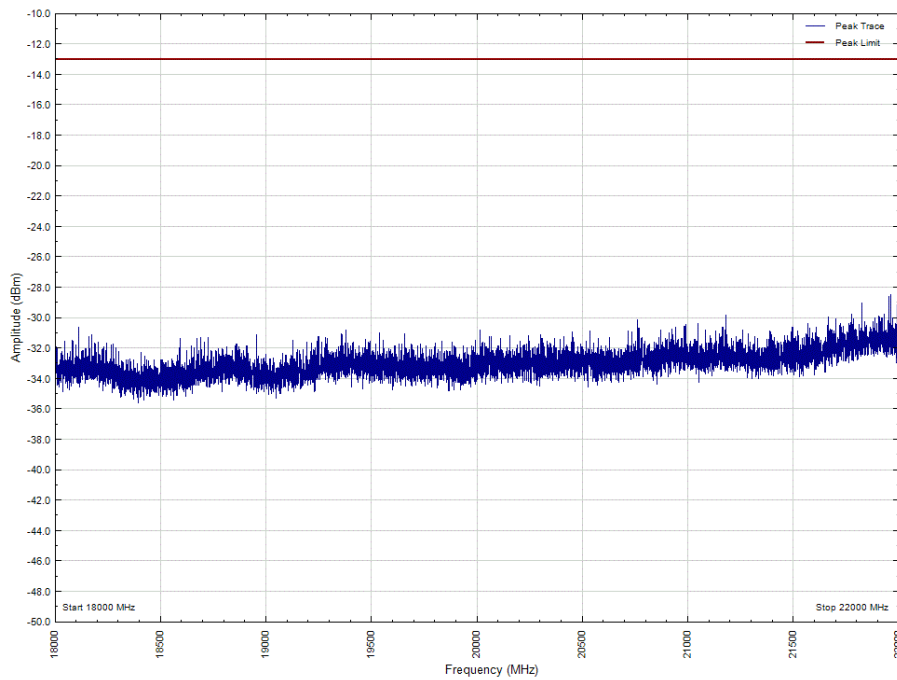




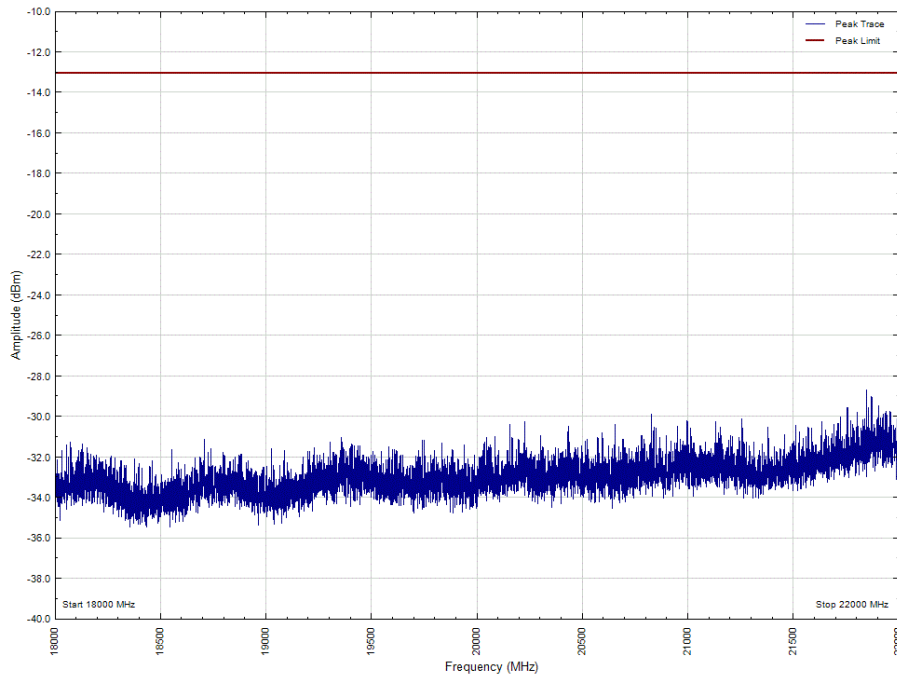
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 18000 - 22000 MHz



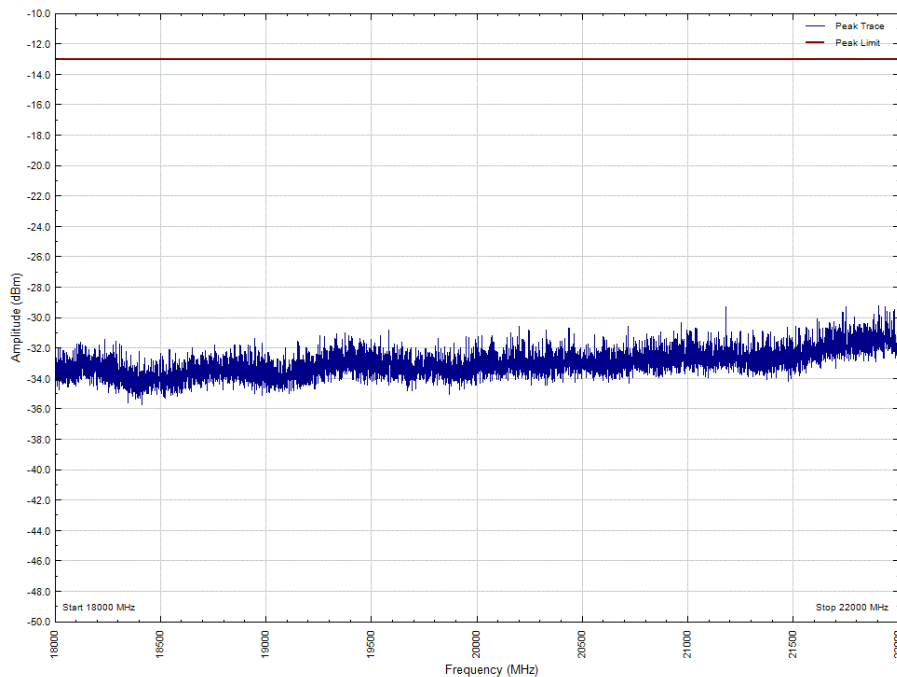
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 18000 - 22000 MHz



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 18000 - 22000 MHz

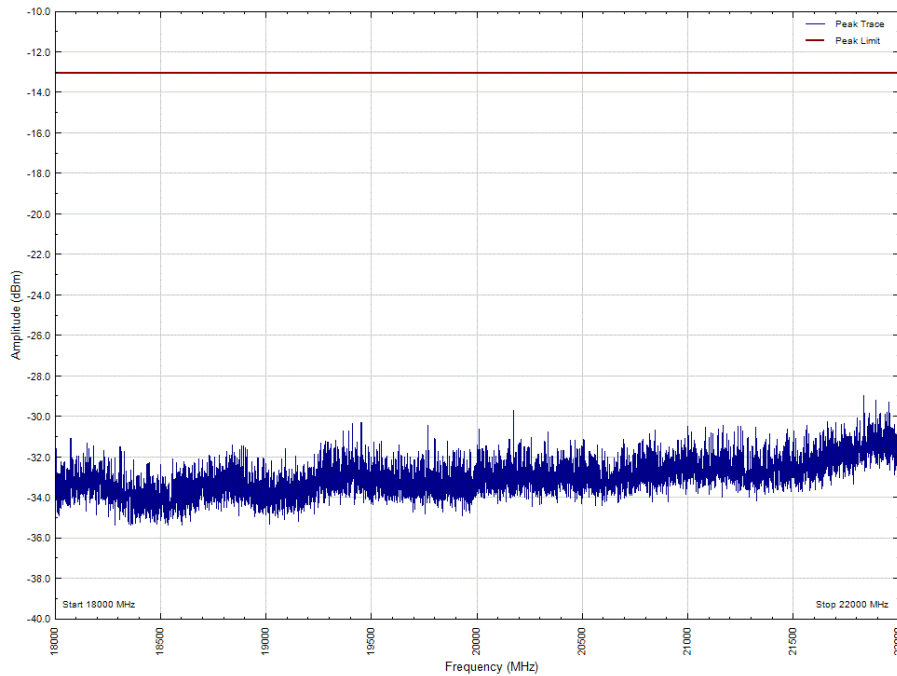


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 18000 - 22000 MHz

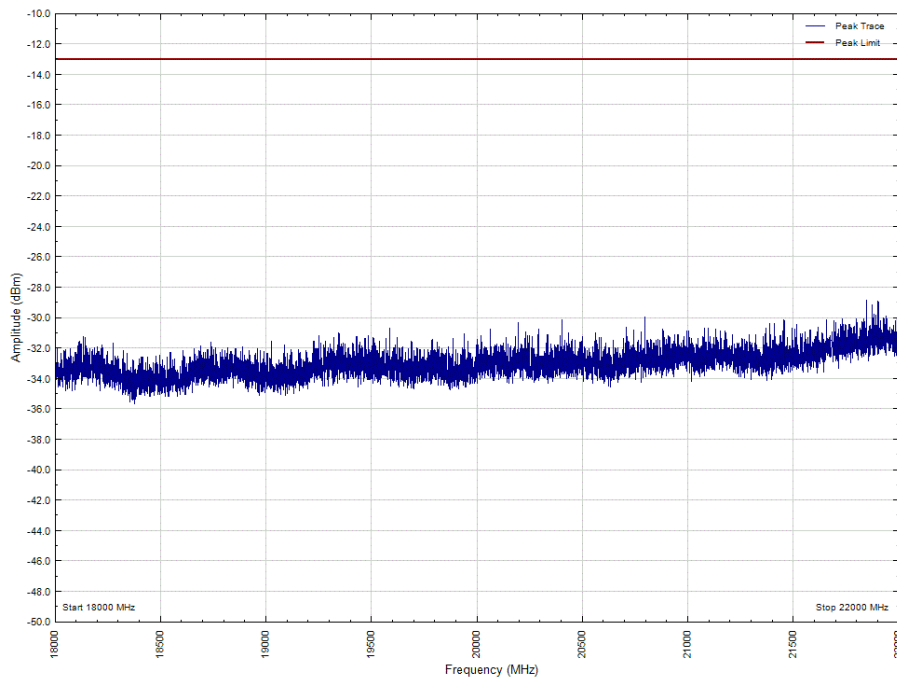




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 18000 - 22000 MHz



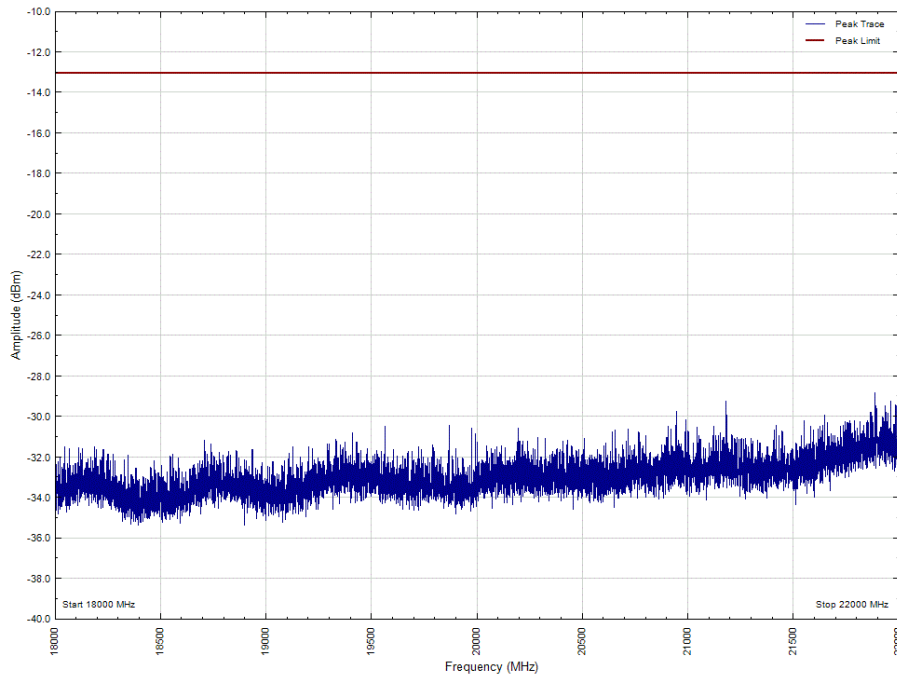
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position BRFBW - Band 2 -  
Range 18000 - 22000 MHz



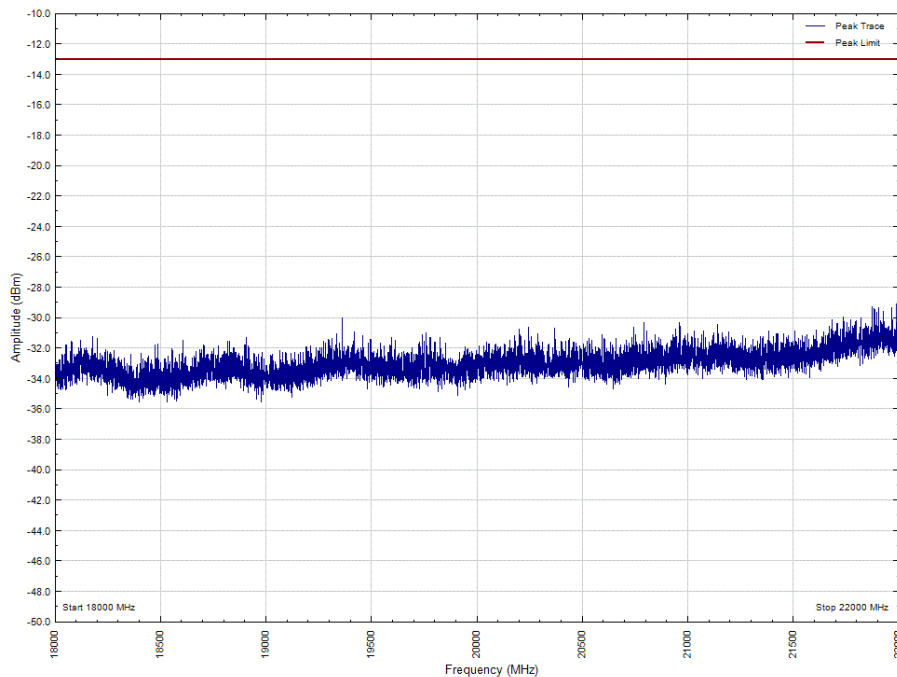




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 18000 - 22000 MHz



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB  
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position TRFBW - Band 2 -  
Range 18000 - 22000 MHz





Limit

|       |  |
|-------|--|
| Limit | 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. |
|-------|--|



### **SECTION 3**

#### **TEST EQUIPMENT USED**



### 3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

| Instrument   | Manufacturer         | Type No.    | TE No.          | Calibration Period (months) | Calibration Due |
|--|----------------------|-------------|-----------------|-----------------------------|-----------------|
| <b>Maximum Peak Output Power and Peak to Average Ratio - Conducted</b> |                      |             |                 |                             |                 |
| Signal Analyser  | Keysight             | PXA         | BAMS 1001562403 | 12                          | 02-Dec-2020     |
| Network Analyser   | Agilent              | N5230A      | BAMS1000635869  | 12                          | 22-Sep-2020     |
| Electronic Calibration Module  | Agilent              | N4690-60003 | BAMS1001752184  | 12                          | 21-Jan-2021     |
| Attenuator   | Weinschel            | 6834-20-11  | QM935           | -                           | OP MON          |
| Attenuator   | Weinschel            | 56-3        | T4390           | -                           | OP MON          |
| Attenuator   | Weinschel            | 6834-20-11  | QC181           | -                           | OP MON          |
| Power Supply   | Delta Electronika    | SM 52-30    | BAMS 1000077230 | -                           | OP MON          |
| Hygrometer   | Rotronic             | TE5004      | 0463721         | 12                          | 02-Oct-2020     |
| Digital Voltmeter  | Fluke                | 79          | TE3057          | 12                          | 19-Aug-2020     |
| RF Load  | Wienschel associates | WA49-40-33  | A1855           | -                           | OP MON          |
| RF Load  | Wienschel associates | WA49-40-34  | S2393           | -                           | OP MON          |
| RF Load  | Wienschel associates | WA49-40-35  | SX810           | -                           | OP MON          |
| RF Load  | Wienschel associates | WA49-40-36  | A1810           | -                           | OP MON          |
| <b>Occupied Bandwidth</b>  |                      |             |                 |                             |                 |
| Signal Analyser  | Keysight             | PXA         | BAMS 1002016870 | 12                          | 02-Dec-2020     |
| Network Analyser   | Agilent              | N5230A      | BAMS1000635869  | 12                          | 22-Sep-2020     |
| Electronic Calibration Module  | Agilent              | N4690-60003 | BAMS1001752184  | 12                          | 21-Jan-2021     |
| Attenuator   | Weinschel            | 6834-20-11  | QM935           | -                           | OP MON          |
| Attenuator   | Weinschel            | 56-3        | T4390           | -                           | OP MON          |
| Attenuator   | Weinschel            | 6834-20-11  | QC181           | -                           | OP MON          |
| Power Supply   | Delta Electronika    | SM 52-30    | BAMS 1000077230 | -                           | OP MON          |
| Hygrometer   | Rotronic             | TE5004      | 0463721         | 12                          | 02-Oct-2020     |
| Digital Voltmeter  | Fluke                | 79          | TE3057          | 12                          | 19-Aug-2020     |
| RF Load  | Wienschel associates | WA49-40-33  | A1855           | -                           | OP MON          |
| RF Load  | Wienschel associates | WA49-40-34  | S2393           | -                           | OP MON          |
| RF Load  | Wienschel associates | WA49-40-35  | SX810           | -                           | OP MON          |
| RF Load  | Wienschel associates | WA49-40-36  | A1810           | -                           | OP MON          |
| <b>Band Edge</b>   |                      |             |                 |                             |                 |
| Signal Analyser  | Keysight             | PXA         | BAMS 1002016870 | 12                          | 02-Dec-2020     |
| Network Analyser   | Agilent              | N5230A      | BAMS1000635869  | 12                          | 22-Sep-2020     |
| Electronic Calibration Module  | Agilent              | N4690-60003 | BAMS1001752184  | 12                          | 21-Jan-2021     |
| Attenuator   | Weinschel            | 6834-20-11  | QM935           | -                           | OP MON          |
| Attenuator   | Weinschel            | 56-3        | T4390           | -                           | OP MON          |
| RF Load  | Wienschel associates | WA49-40-33  | A1855           | -                           | OP MON          |
| RF Load  | Wienschel associates | WA49-40-34  | S2393           | -                           | OP MON          |
| RF Load  | Wienschel associates | WA49-40-35  | SX810           | -                           | OP MON          |
| RF Load  | Wienschel associates | WA49-40-36  | A1810           | -                           | OP MON          |
| Attenuator   | Weinschel            | 6834-20-11  | QC181           | -                           | OP MON          |
| Power Supply   | Delta Electronika    | SM 52-30    | BAMS 1000077230 | -                           | OP MON          |



| Instrument                     | Manufacturer             | Type No.          | TE No.          | Calibration Period (months) | Calibration Due |
|--------------------------------|--------------------------|-------------------|-----------------|-----------------------------|-----------------|
| Hygrometer                     | Rotronic                 | 0463721           | TE5004          | 12                          | 02-Oct-2020     |
| Digital Voltmeter              | Fluke                    | 79                | TE3057          | 12                          | 19-Aug-2020     |
| Transmitter Spurious Emissions |                          |                   |                 |                             |                 |
| Signal Analyser                | Keysight                 | PXA               | BAMS 1002016870 | 12                          | 02-Dec-2020     |
| Network Analyser               | Agilent                  | N5230A            | BAMS1000635869  | 12                          | 22-Sep-2020     |
| Electronic Calibration Module  | Agilent                  | N4690-60003       | BAMS1001752184  | 12                          | 21-Jan-2021     |
| Attenuator                     | Weinschel                | 6834-20-11        | QM935           | -                           | OP MON          |
| High pass Filter               | Wainwright               | WHNX3.8/26.5G-6SS | SN11            | -                           | OP MON          |
| Attenuator                     | Weinschel                | 56-3              | T4390           | -                           | OP MON          |
| RF Load                        | Wienschel associates     | WA49-40-33        | A1855           | -                           | OP MON          |
| RF Load                        | Wienschel associates     | WA49-40-34        | S2393           | -                           | OP MON          |
| RF Load                        | Wienschel associates     | WA49-40-35        | SX810           | -                           | OP MON          |
| RF Load                        | Wienschel associates     | WA49-40-36        | A1810           | -                           | OP MON          |
| Attenuator                     | Weinschel                | 6834-20-11        | QC181           | -                           | OP MON          |
| Power Supply                   | Delta Electronika        | SM 52-30          | BAMS 1000077230 | -                           | OP MON          |
| Hygrometer                     | Rotronic                 | 0463721           | TE5004          | 12                          | 02-Oct-2020     |
| Digital Voltmeter              | Fluke                    | 79                | TE3057          | 12                          | 19-Aug-2020     |
| Radiated Emissions             |                          |                   |                 |                             |                 |
| BiLog antenna                  | Chase                    | CBL6111A          | IE-B928         | 12                          | 24-Jul-2020     |
| Cable                          | Unknown                  | N-Type            | K:W18.03_3m     | 12                          | 27-Aug-2020     |
| Preamp <1GHz                   | Force                    | 36-19067          | 36150           | 12                          | 28-Aug-2020     |
| Cable                          | Sucoflex                 | SMA               | K_W53.07_7m     | 12                          | 19-Apr-2021     |
| 7 GHz HiPass                   | Micro-Tronics            | HPM15120          | 36068           | 12                          | 13-Aug-2020     |
| Amplifier                      | Quinstar                 | Unknown           | 36021           | 12                          | 13-Aug-2020     |
| Receiver                       | Rohde and Schwarz        | ESU               | 36020           | 12                          | 15-Jan-2021     |
| Antenna                        | ARA                      | DRG-118/A         | E-1839          | -                           | -               |
| Antenna                        | Seibersdorf Laboratories | A-2444            | 36099           | -                           | -               |
| Hygrometer                     | Rotronic                 | HP21              | TE5004          | 12                          | 02-Oct-2020     |
| Digital Voltmeter              | Fluke                    | 79                | TE3057          | 12                          | 19-Aug-2020     |
| Multimeter                     | Fluke                    | 87                | E-P754          | -                           | 27-May-2021     |

N/A – Not Applicable

O/P Mon – Output Monitored with Calibrated Equipment



### 3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

| Test Discipline                     | Frequency / Parameter      |                  | MU              |
|-------------------------------------|----------------------------|------------------|-----------------|
| Conducted Maximum Peak Output Power | 30 MHz to 20 GHz Amplitude |                  | $\pm 0.8895$ dB |
| Conducted Emissions                 | 9kHz to 22 GHz Amplitude   |                  | $\pm 1.7835$ dB |
| Occupied Bandwidth                  | LTE                        | 10 MHz Bandwidth | $\pm 67172$ Hz  |
| -                                   | LTE                        | 15 MHz Bandwidth | $\pm 117076$ Hz |
| -                                   | LTE                        | 20 MHz Bandwidth | $\pm 145902$ Hz |
| Band Edge                           | 30 MHz to 20 GHz Amplitude |                  | $\pm 0.8895$ dB |
| Radiated Spurious Emissions         | 30 MHz to 1GHz             |                  | $\pm 5.2$ dB    |
|                                     | 1 GHz to 40GHz             |                  | $\pm 6.3$ dB    |

#### Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.



## **SECTION 5**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



#### 4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Accred. no. 10363  
Testing  
ISO/IEC 17025

This report relates only to the actual item/items tested.

Our Swedac Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our Swedac Accreditation.

Results of tests not covered by our Swedac Accreditation Schedule are marked NSA (Not Swedac Accredited).

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## **ANNEX A**

### **MODULE LIST**



| Product            | Product No    | R-State   | Serial No  |
|--------------------|---------------|-----------|------------|
| CT11               | LPC 102 487/1 | R1C       | T01F375047 |
| Radio 8843 B2 B66A | KRC 161 707/2 | R1H       | E238267455 |
| Software Version:  | CXP9013268/15 | Revision: | R81KM      |