

# CommScope Technologies, LLC

## TEST REPORT

**SCOPE OF WORK**

EMISSIONS TESTING – RPM-A5A11-B13 with W/ 4G LTE With OneCell® RP5100

**REPORT NUMBER**

104989879BOX-001

**ISSUE DATE**

March 24, 2022

**[REVISED DATE]**

Original Issue

**DOCUMENT CONTROL NUMBER**

Non-Specific Radio Report Shell Rev. December 2017  
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## EMISSIONS TEST REPORT (FULL COMPLIANCE)

**Report Number:** 104989879BOX-001

**Project Number:** G104989879

**Report Issue Date:** March 24, 2022

**Model(s) Tested:** RPM-A5A11-B13 with W/ 4G LTE With  
OneCell® RP5100

**Model(s) Partially Tested:** None

**Model(s) Not Tested but declared equivalent by the client:** None

**Standards:** CFR47 FCC Part 27 (03/2022)

Tested by:  
Intertek Testing Services NA, Inc.  
70 Codman Hill Road  
Boxborough, MA 01719  
USA

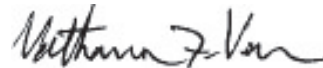
Client:  
CommScope Technologies LLC  
900 Chelmsford St.  
Lowell, MA 01851  
USA

Report prepared by



Kouma Sinn / EMC Engineering Supervisor

Report reviewed by



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## 1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

## 2 Test Summary

| Section | Test full name                                                                                       | Result |
|---------|------------------------------------------------------------------------------------------------------|--------|
| 3       | Client Information                                                                                   | --     |
| 4       | Description of Equipment Under Test and Variant Models                                               | --     |
| 5       | System Setup and Method                                                                              | --     |
| 6       | Maximum ERP Output Power<br>CFR47 FCC Part 27.50 (b) (4)                                             | Pass   |
| 7       | 26 dB Bandwidth and Occupied Bandwidth<br>CFR47 FCC Parts 2.1049                                     | Pass   |
| 8       | Band Edge Compliance<br>CFR47 FCC Parts 2.1051, 2.1053, and 27.53 (c)(1)(5)                          | Pass   |
| 9       | Frequency Stability<br>CFR47 FCC Parts 2.1055 and 27.54                                              | Pass   |
| 10      | Transmitter Spurious Emissions<br>CFR47 FCC Parts 2.1051, 2.1053, 2.1057 and 27.53 (c)(1)(5) and (f) | Pass   |
| 11      | Revision History                                                                                     | --     |

### 3 Client Information

This EUT was tested at the request of:

**Client:** CommScope Technologies LLC  
900 Chelmsford St.  
Lowell, MA 01851  
USA

**Contact:** Zac Johnson  
**Telephone:** (978) 250-2678  
**Fax:** None  
**Email:** zac.johnson@commscope.com

### 4 Description of Equipment Under Test and Variant Models

**Manufacturer:** CommScope Telecommunications (China) Ltd.  
68 Su Hong Xi Lu, Suzhou Industrial Park.  
Suzhou, Jiangsu, 215021, China

| Equipment Under Test                           |                            |               |               |
|------------------------------------------------|----------------------------|---------------|---------------|
| Description                                    | Manufacturer               | Model Number  | Serial Number |
| Band 13 Radio Module With OneCell® RP5100 host | CommScope Technologies LLC | RPM-A5A11-B13 | 21308490124   |
| OneCell® RP5100                                | CommScope Technologies LLC | RP-A51xxi     | 19198000019   |

|                     |            |
|---------------------|------------|
| Receive Date:       | 03/09/2022 |
| Received Condition: | Good       |
| Type:               | Production |

#### Description of Equipment Under Test (provided by client)

The Radio Module is band specific using the Analog devices RF Agile Transceiver IC, AD936x. The device combines an RF front end with a flexible mixed-signal baseband section and integrated frequency synthesizers providing a configurable digital interface to the processor. The Radio Module also contains a band specific front end, band specific antenna and required power rails. All power rails required are derived from the 12 VDC bus supplied by the Baseband card. The reference frequency for the radio IC is 38.4 MHz is derived from the from an OCXO which is disciplined from a 1588 reference clock.

It supports bandwidths of 5 and 10 MHz with four modulations; TM1.1-QPSK, TM3.2-16QAM, TM3.1-64QAM, and TM3.1a-256QAM. The radio is fixed.

#### Description of Radio Host (provided by client)

The OneCell® RP5100 family is factory configurable with 2 – 4 Radios Modules mounted to a Baseband card. The same PCB's will be used in both indoor and outdoor version of the radio point. The device is fixed.

The baseband card is the host for the modular radios. It contains a two ethernet PHY's with one supporting 100M/1G/2.5G/5G/10G ethernet and the other supporting 100M/1G. The main processor is Zynlinx Ultrascale+ MPSoC with 2 GB DDR3 and 4 GB Flash memory. The baseband PCBA converts POE power to +12 VDC bus voltage require as input to the radio modules.

| Equipment Under Test Power Configuration |                       |                 |                  |
|------------------------------------------|-----------------------|-----------------|------------------|
| Rated Voltage                            | Rated Current         | Rated Frequency | Number of Phases |
| 48 VDC                                   | 0.960 mA per pair max | DC              | N/A              |

**Operating modes of the EUT:**

| No. | Descriptions of EUT Exercising                                                                                                                    |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Pre-programmed to transmit at Low, Mid, and High channels at four different modulations, TM1.1-QPSK, TM3.2-16QAM, TM3.1-64QAM, and TM3.1a-256QAM. |

**Software used by the EUT:**

| No. | Descriptions of EUT Exercising |
|-----|--------------------------------|
| 1   | RP5200_B13 03/08/2022          |
|     |                                |

| Radio/Receiver Characteristics                                    |                                                                                                                                                                                                |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Frequency Band(s)</b>                                          | 748.5-753.5 MHz                                                                                                                                                                                |
| <b>Modulation Type(s)</b>                                         | TM1.1-QPSK, TM3.2-16QAM, TM3.1-64 QAM, TM3.1a-256QAM                                                                                                                                           |
| <b>Maximum Output Power (conducted):</b>                          | 21.48 dBm, Conducted (worst-case)                                                                                                                                                              |
| <b>Test Channels</b>                                              | Low, Middle, High Channels of 5 MHz and 10 MHz Bandwidths, Single channel operation only                                                                                                       |
| <b>Occupied Bandwidth</b>                                         | 8.959 MHz (Worst-case)                                                                                                                                                                         |
| <b>MIMO Information (# of Transmit and Receive antenna ports)</b> | 2x2 MIMO using cross polarized antennas and uncorrelated data streams                                                                                                                          |
| <b>Equipment Type</b>                                             | Module in a host                                                                                                                                                                               |
| <b>Antenna Type and Gain</b>                                      | Detachable Antenna: +4 dBi (as provided by the client. Intertek takes no responsibility for the accuracy of this information. Actual antenna gain will be determined at the time of licensing) |

**Variant Models:**

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

**5 System Setup and Method**

| Cables |                       |            |           |          |             |
|--------|-----------------------|------------|-----------|----------|-------------|
| ID     | Description           | Length (m) | Shielding | Ferrites | Termination |
| --     | LAN (POE Power Cable) | 2.17       | None      | None     | POE P/S     |
| --     | LAN (Communication)   | 9.00       | None      | None     | Laptop      |

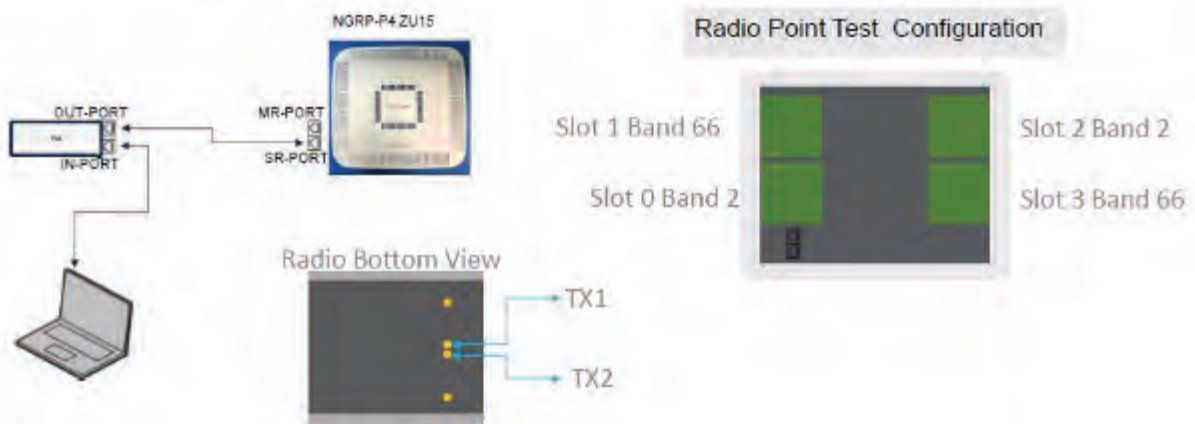
Notes: Longer cables were used to accommodate emission testing in the 10m Chamber.

| Support Equipment |                    |               |               |
|-------------------|--------------------|---------------|---------------|
| Description       | Manufacturer       | Model Number  | Serial Number |
| POE Power Supply  | Sifos Technologies | PDA-604A      | 604A0107      |
| Laptop            | Dell               | Latitude 3520 | None          |

## 5.1 Method:

Configuration as required by ANSI C63.26-2015, KDB 662911, and CFR47 FCC Part 27 (03/2022).

## 5.2 EUT Block Diagram:



## 6 Maximum ERP Output Power

### 6.1 Method

Tests are performed in accordance with CFR47 FCC Parts 2.1046 and 27, KDB662911, and ANSI C63.26 Section 5.2.4.4.

**TEST SITE:** EMC Lab

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

### 6.2 Test Equipment Used:

| Asset           | Description                        | Manufacturer      | Model    | Serial    | Cal Date   | Cal Due    |
|-----------------|------------------------------------|-------------------|----------|-----------|------------|------------|
| DS40'           | Temp, humidity, pressure gauge     | Digi Sense        | 68000-49 | 181717625 | 11/09/2021 | 11/09/2022 |
| ROS005-1'       | Signal and Spectrum Analyzer       | Rohde and Shwartz | FSW43    | 100646    | 11/02/2021 | 11/02/2022 |
| CEN001'         | DC-40GHz attenuator 20dB           | Centric RF        | C411-20  | CEN001    | 01/26/2022 | 01/26/2023 |
| CBLHF2012-2M-2' | 2m 9kHz-40GHz Coaxial Cable - SET2 | Huber & Suhner    | SF102    | 252675002 | 02/10/2022 | 02/10/2023 |

#### Software Utilized:

| Name | Manufacturer | Version |
|------|--------------|---------|
| None | --           | --      |

### 6.3 Results:

The sample tested was found to Comply as the maximum ERP output power was measured to be 23.33 dBm, which is much less than the ERP limit of:

FCC Part 27.50 (b) (4) – Fixed and base stations transmitting a signal in the 746-757 MHz and 776-787 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP in accordance with Table 3 of this section.

Output power from the two antenna ports was not summed since the data streams are uncorrelated and the antennas are cross polarized.

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK**

| Channel | Frequency (MHz) | Antenna Port | Conducted Output Power (dBm) | ERP (dBm) | ERP Limit (dBm) | ERP Margin (dB) |
|---------|-----------------|--------------|------------------------------|-----------|-----------------|-----------------|
| Low     | 748.50          | ANT0         | 20.98                        | 22.83     | 60              | -37.17          |
|         |                 | ANT1         | 20.29                        | 22.14     | 60              | -37.86          |
| Mid     | 751.00          | ANT0         | 21.25                        | 23.10     | 60              | -36.90          |
|         |                 | ANT1         | 20.89                        | 22.74     | 60              | -37.26          |
| High    | 753.50          | ANT0         | 20.80                        | 22.65     | 60              | -37.35          |
|         |                 | ANT1         | 20.87                        | 22.72     | 60              | -37.28          |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM**

| Channel | Frequency (MHz) | Antenna Port | Conducted Output Power (dBm) | ERP (dBm) | ERP Limit (dBm) | ERP Margin (dB) |
|---------|-----------------|--------------|------------------------------|-----------|-----------------|-----------------|
| Low     | 748.50          | ANT0         | 20.72                        | 22.57     | 60              | -37.43          |
|         |                 | ANT1         | 21.43                        | 23.28     | 60              | -36.72          |
| Mid     | 751.00          | ANT0         | 21.21                        | 23.06     | 60              | -36.94          |
|         |                 | ANT1         | 20.86                        | 22.71     | 60              | -37.29          |
| High    | 753.50          | ANT0         | 20.80                        | 22.65     | 60              | -37.35          |
|         |                 | ANT1         | 20.84                        | 22.69     | 60              | -37.31          |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM**

| Channel | Frequency (MHz) | Antenna Port | Conducted Output Power (dBm) | ERP (dBm) | ERP Limit (dBm) | ERP Margin (dB) |
|---------|-----------------|--------------|------------------------------|-----------|-----------------|-----------------|
| Low     | 748.50          | ANT0         | 21.48                        | 23.33     | 60              | -36.67          |
|         |                 | ANT1         | 20.76                        | 22.61     | 60              | -37.39          |
| Mid     | 751.00          | ANT0         | 21.22                        | 23.07     | 60              | -36.93          |
|         |                 | ANT1         | 20.88                        | 22.73     | 60              | -37.27          |
| High    | 753.50          | ANT0         | 20.79                        | 22.64     | 60              | -37.36          |
|         |                 | ANT1         | 20.85                        | 22.70     | 60              | -37.30          |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM**

| Channel | Frequency (MHz) | Antenna Port | Conducted Output Power (dBm) | ERP (dBm) | ERP Limit (dBm) | ERP Margin (dB) |
|---------|-----------------|--------------|------------------------------|-----------|-----------------|-----------------|
| Low     | 748.50          | ANT0         | 21.46                        | 23.31     | 60              | -36.69          |
|         |                 | ANT1         | 20.75                        | 22.60     | 60              | -37.40          |
| Mid     | 751.00          | ANT0         | 21.24                        | 23.09     | 60              | -36.91          |
|         |                 | ANT1         | 20.87                        | 22.72     | 60              | -37.28          |
| High    | 753.50          | ANT0         | 20.81                        | 22.66     | 60              | -37.34          |
|         |                 | ANT1         | 20.85                        | 22.70     | 60              | -37.30          |

Notes: ERP = Conducted Power (dBm) + Gain (dBd), where Gain (dBd) = Antenna Gain (dBi)-2.15,  
 ERP = Conducted Power + (4-2.15) or Conducted Power + 1.85 dBd

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK**

| Channel | Frequency (MHz) | Antenna Port | Conducted Output Power (dBm) | ERP (dBm) | ERP Limit (dBm) | ERP Margin (dB) |
|---------|-----------------|--------------|------------------------------|-----------|-----------------|-----------------|
| Mid     | 751.00          | ANT0         | 21.15                        | 23.00     | 60              | -37.00          |
|         |                 | ANT1         | 20.80                        | 22.65     | 60              | -37.35          |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM**

| Channel | Frequency (MHz) | Antenna Port | Conducted Output Power (dBm) | ERP (dBm) | ERP Limit (dBm) | ERP Margin (dB) |
|---------|-----------------|--------------|------------------------------|-----------|-----------------|-----------------|
| Mid     | 751.00          | ANT0         | 21.13                        | 22.98     | 60              | -37.02          |
|         |                 | ANT1         | 20.79                        | 22.64     | 60              | -37.36          |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM**

| Channel | Frequency (MHz) | Antenna Port | Conducted Output Power (dBm) | ERP (dBm) | ERP Limit (dBm) | ERP Margin (dB) |
|---------|-----------------|--------------|------------------------------|-----------|-----------------|-----------------|
| Mid     | 751.00          | ANT0         | 21.16                        | 23.01     | 60              | -36.99          |
|         |                 | ANT1         | 20.83                        | 22.68     | 60              | -37.32          |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM**

| Channel | Frequency (MHz) | Antenna Port | Conducted Output Power (dBm) | ERP (dBm) | ERP Limit (dBm) | ERP Margin (dB) |
|---------|-----------------|--------------|------------------------------|-----------|-----------------|-----------------|
| Mid     | 751.00          | ANT0         | 21.17                        | 23.02     | 60              | -36.98          |
|         |                 | ANT1         | 20.82                        | 22.67     | 60              | -37.33          |

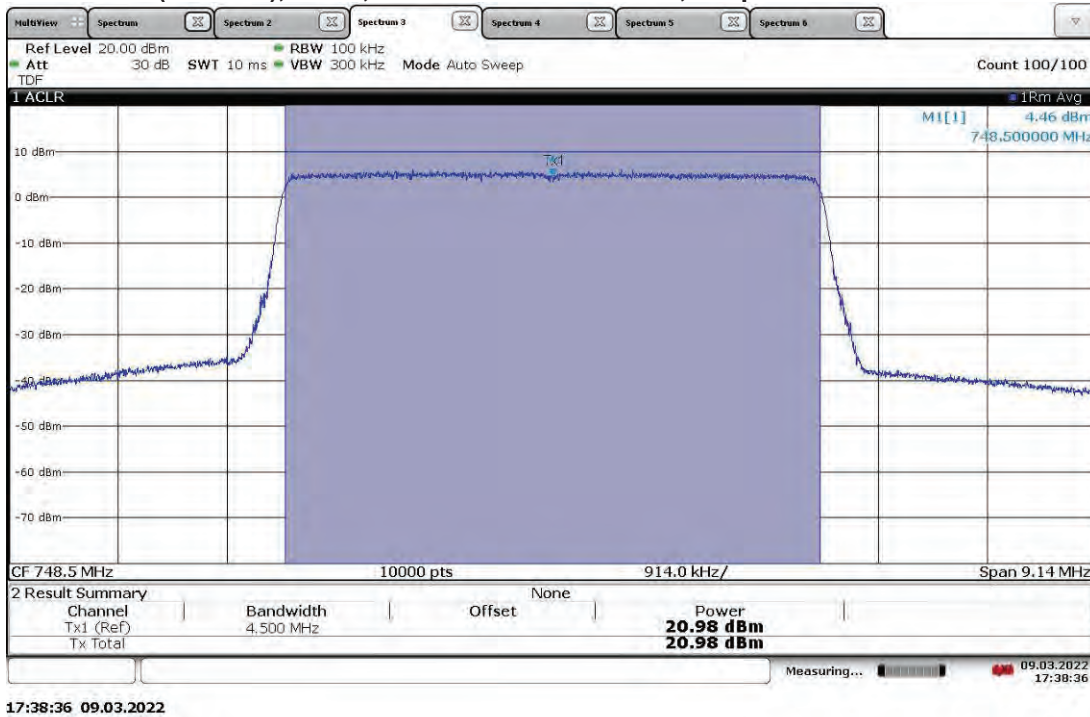
Notes: The radio only transmit at mid channel with 10 MHz Bandwidth.

#### **6.4 Setup Photograph:**

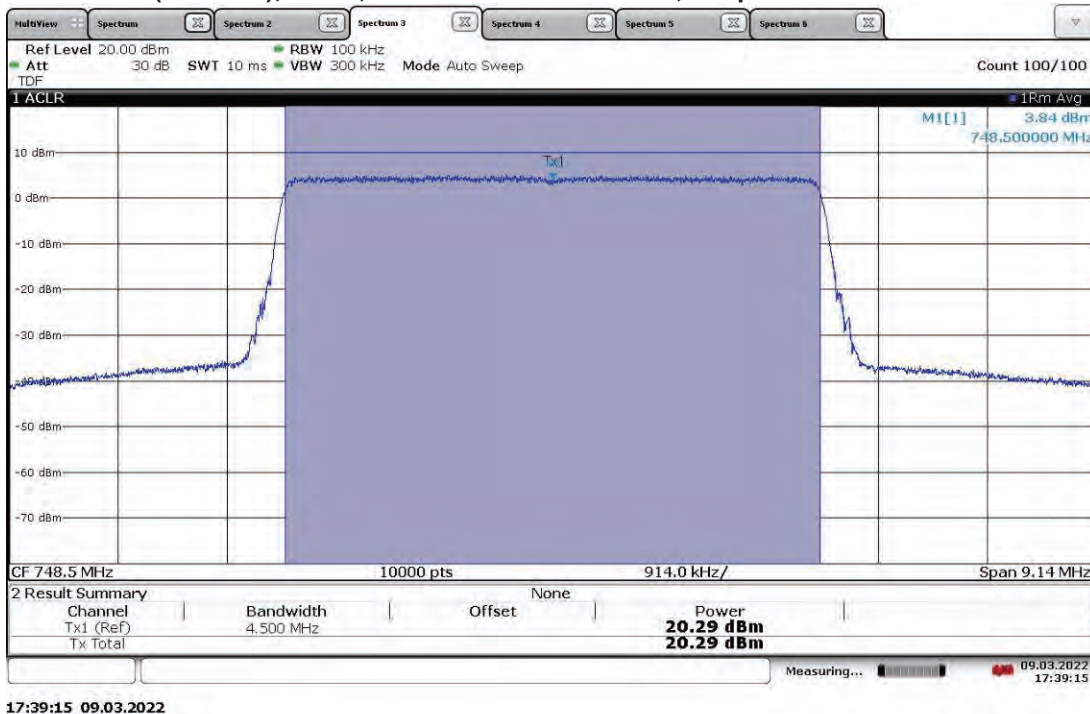
Confidential – Photos not included in this report

## 6.5 Plots/Data:

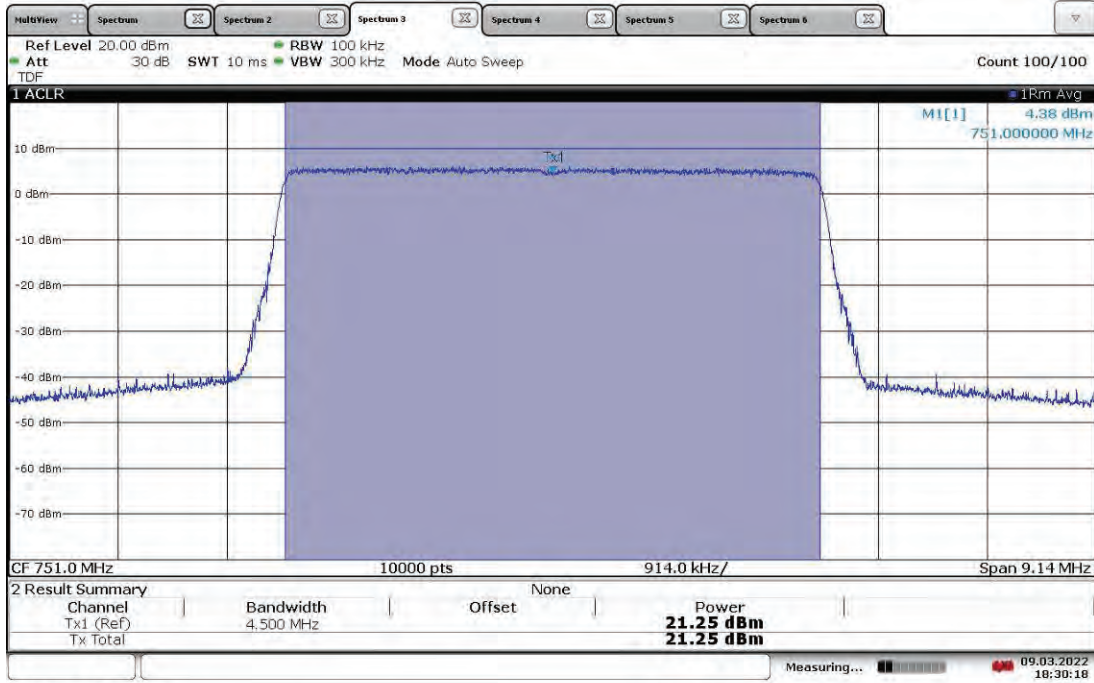
### TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host Slot 0 (Band 13), ANT0, Low Channel 748.5 MHz, Output Power = 20.98dBm



### TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host Slot 0 (Band 13), ANT1, Low Channel 748.5 MHz, Output Power = 20.29 dBm

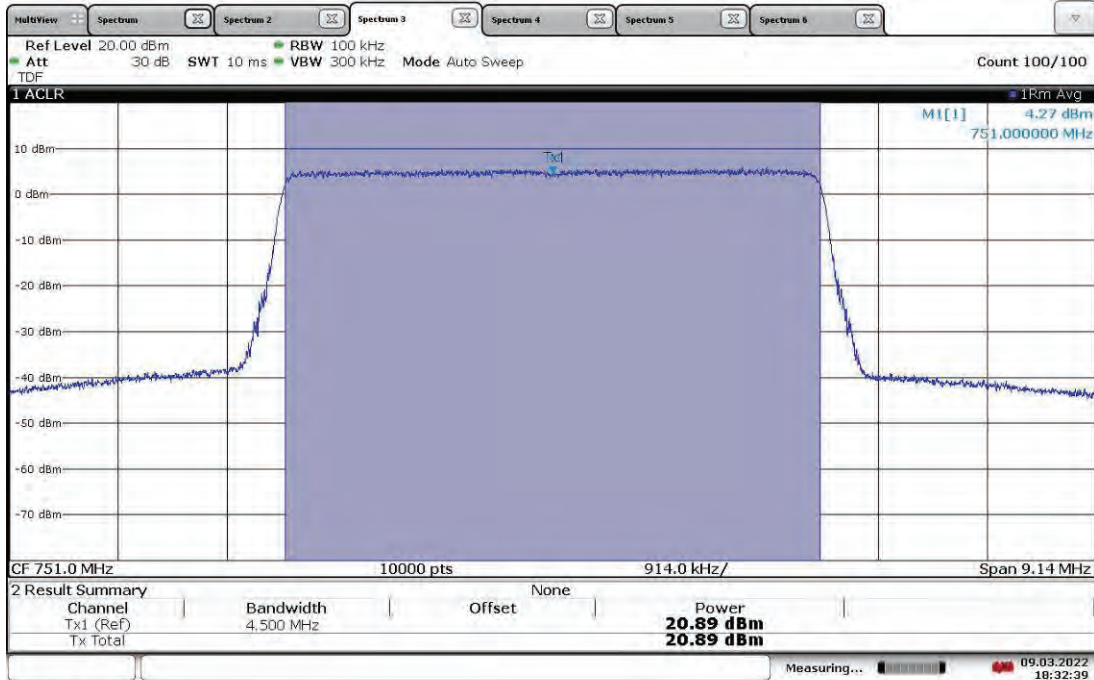


**TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel 751 MHz, Output Power = 21.25 dBm**



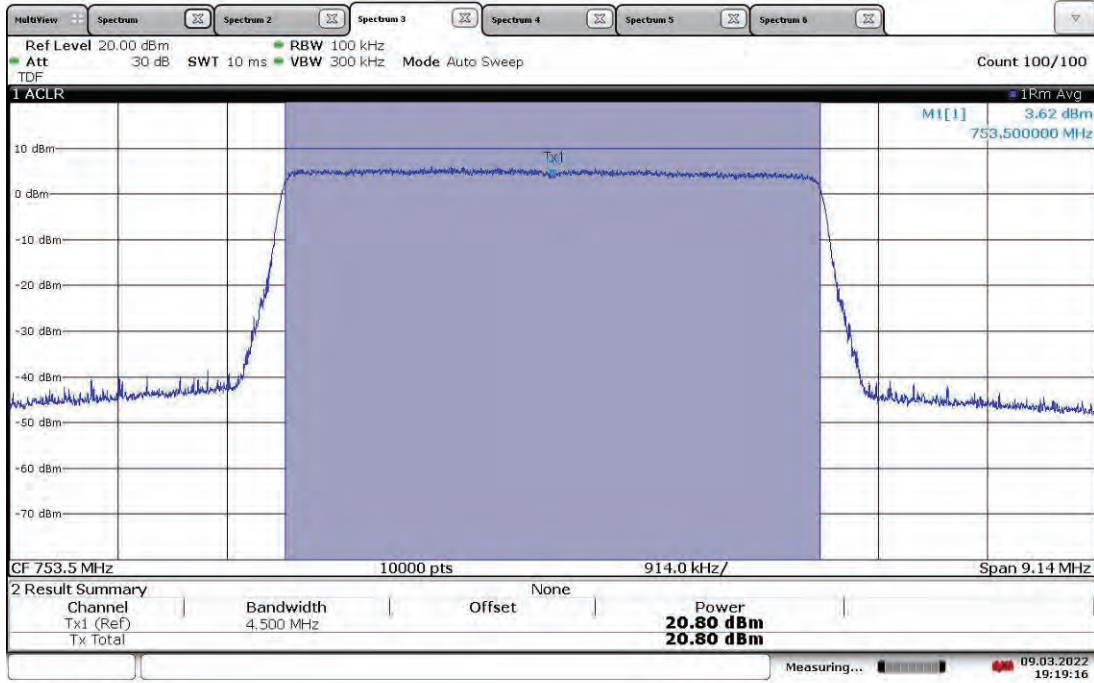
18:30:18 09.03.2022

**TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel 751 MHz, Output Power = 20.89 dBm**



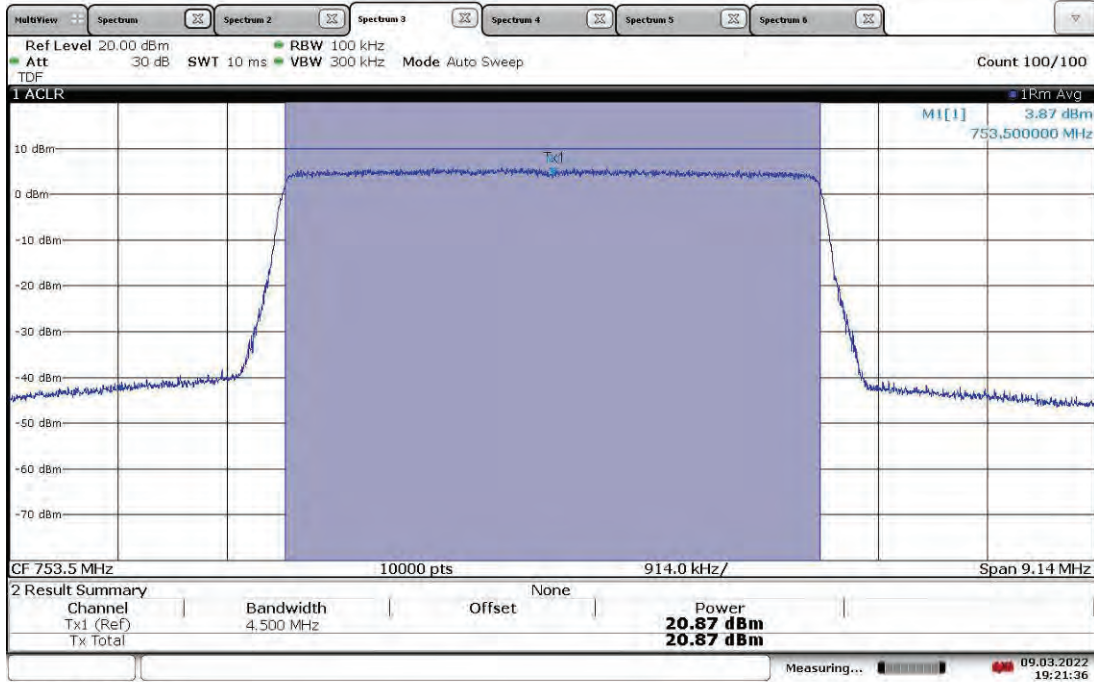
18:32:39 09.03.2022

**TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, High Channel 753.5 MHz, Output Power = 20.80 dBm**



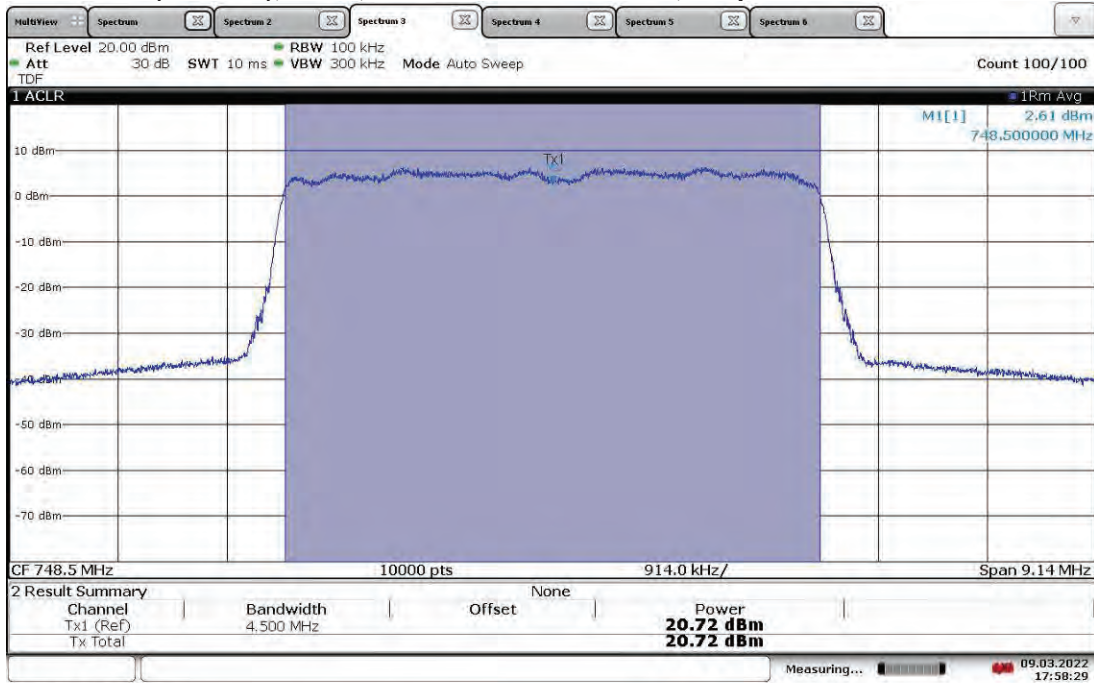
19:19:17 09.03.2022

**TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, High Channel 753.5 MHz, Output Power = 20.87 dBm**



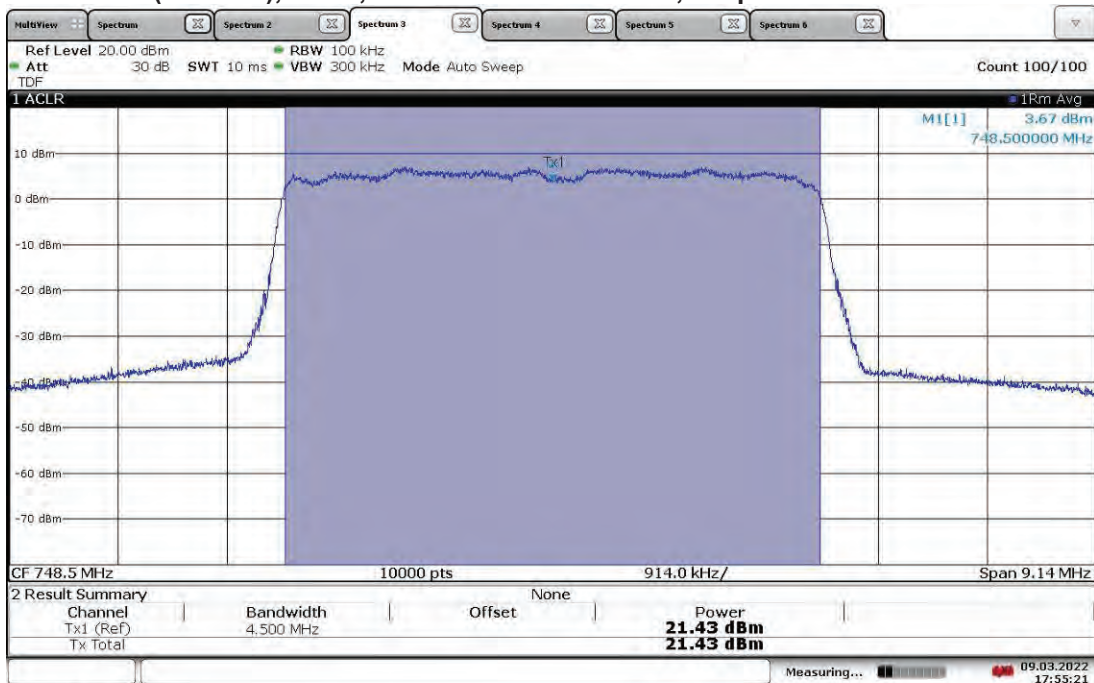
19:21:36 09.03.2022

**TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host**  
**Slot 0 (Band 13), ANT0, Low Channel 748.5 MHz, Output Power = 20.72 dBm**



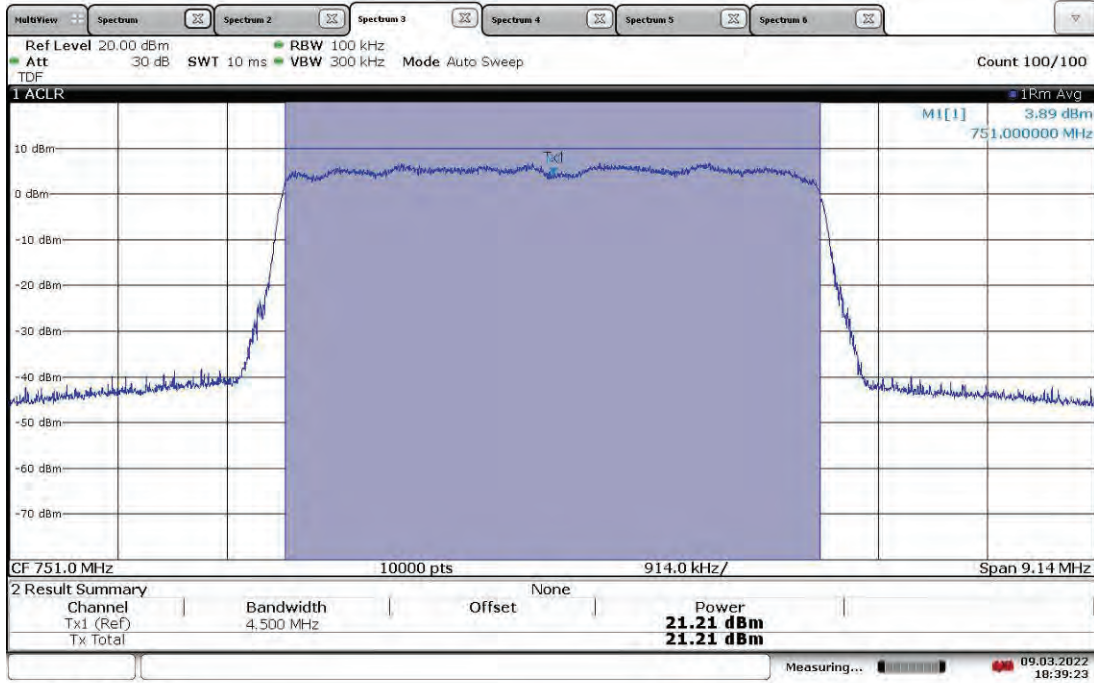
17:58:29 09.03.2022

**TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host**  
**Slot 0 (Band 13), ANT1, Low Channel 748.5 MHz, Output Power = 21.43 dBm**



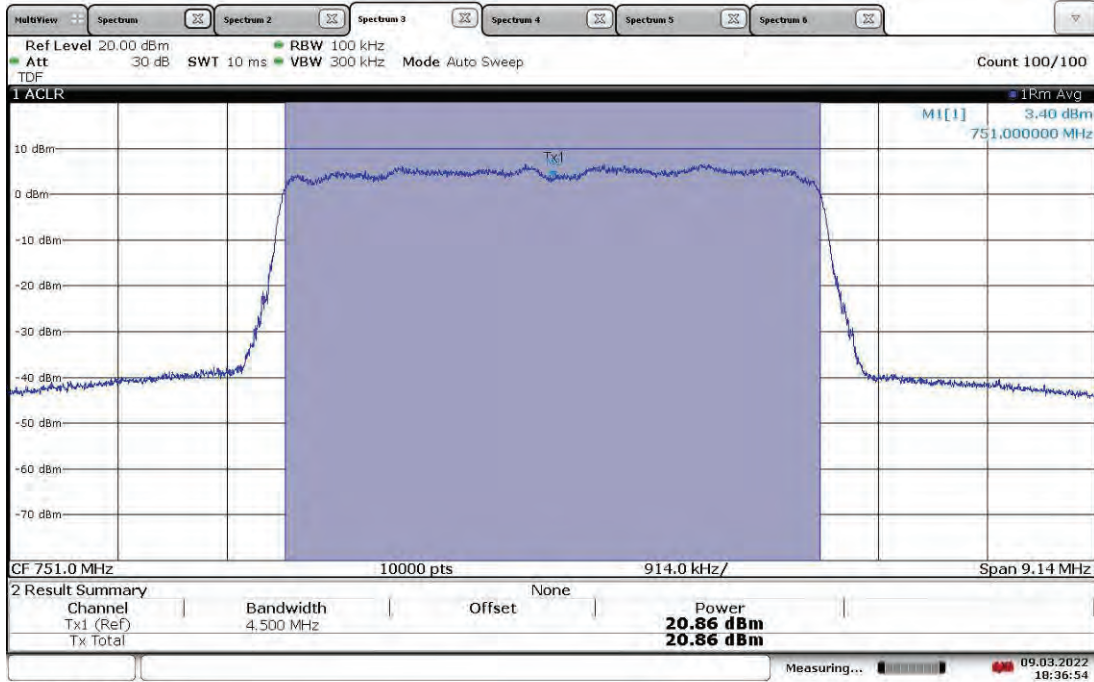
17:55:21 09.03.2022

**TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel 751 MHz, Output Power = 21.21 dBm**



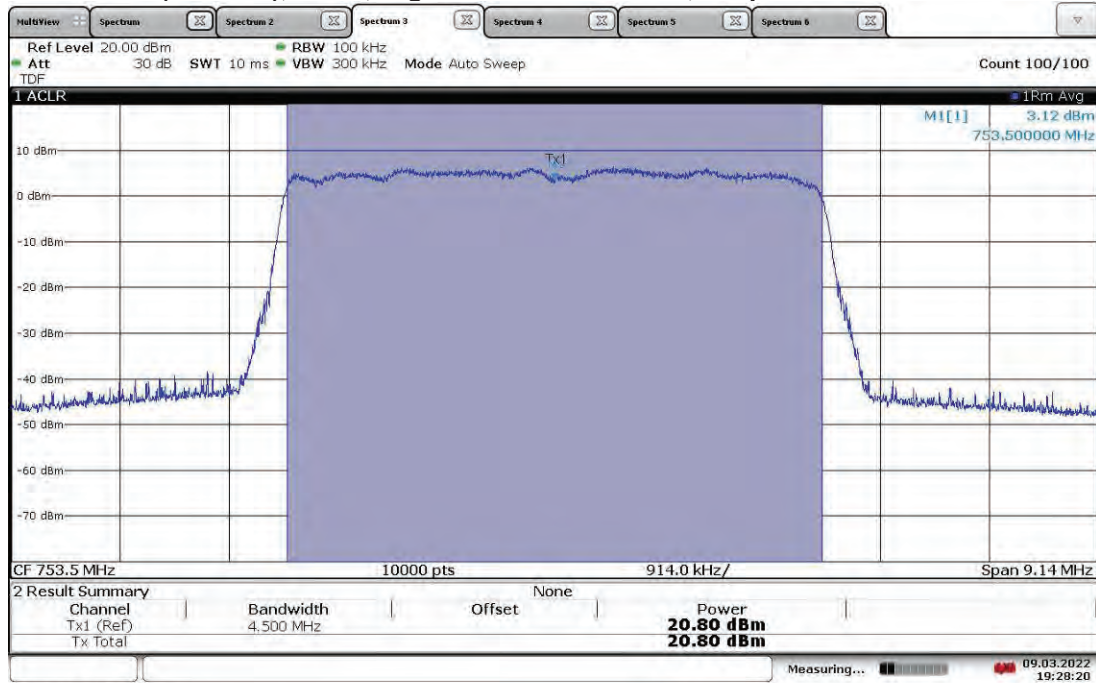
18:39:23 09.03.2022

**TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel 751 MHz, Output Power = 20.86 dBm**



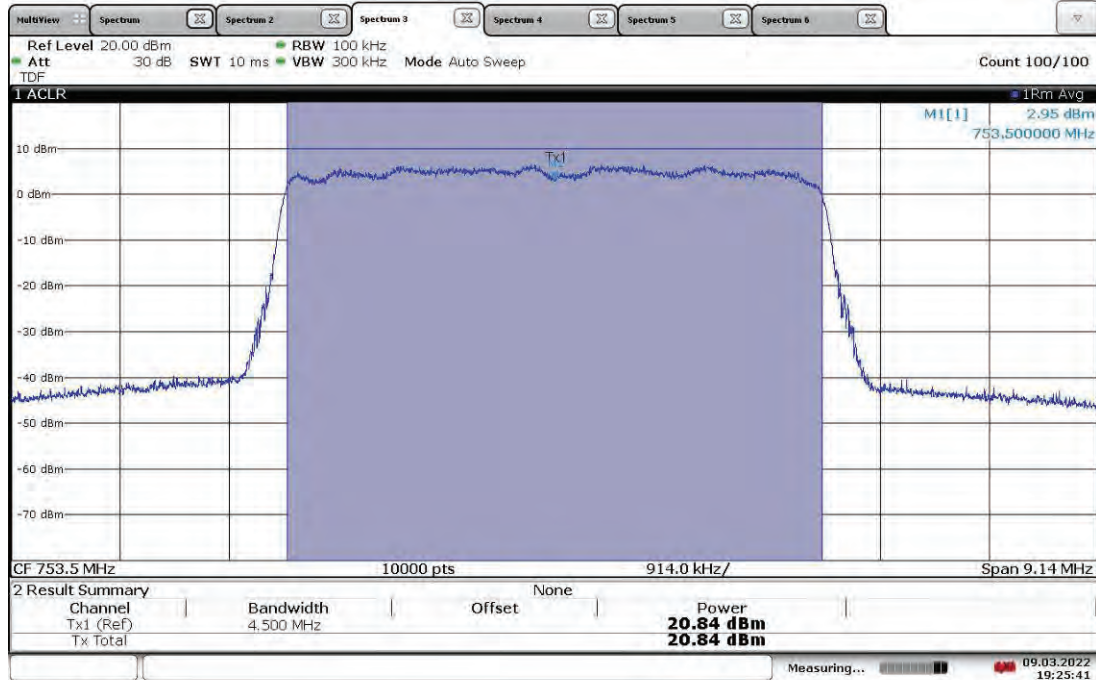
18:36:55 09.03.2022

TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, High Channel 753.5 MHz, Output Power = 20.8 dBm



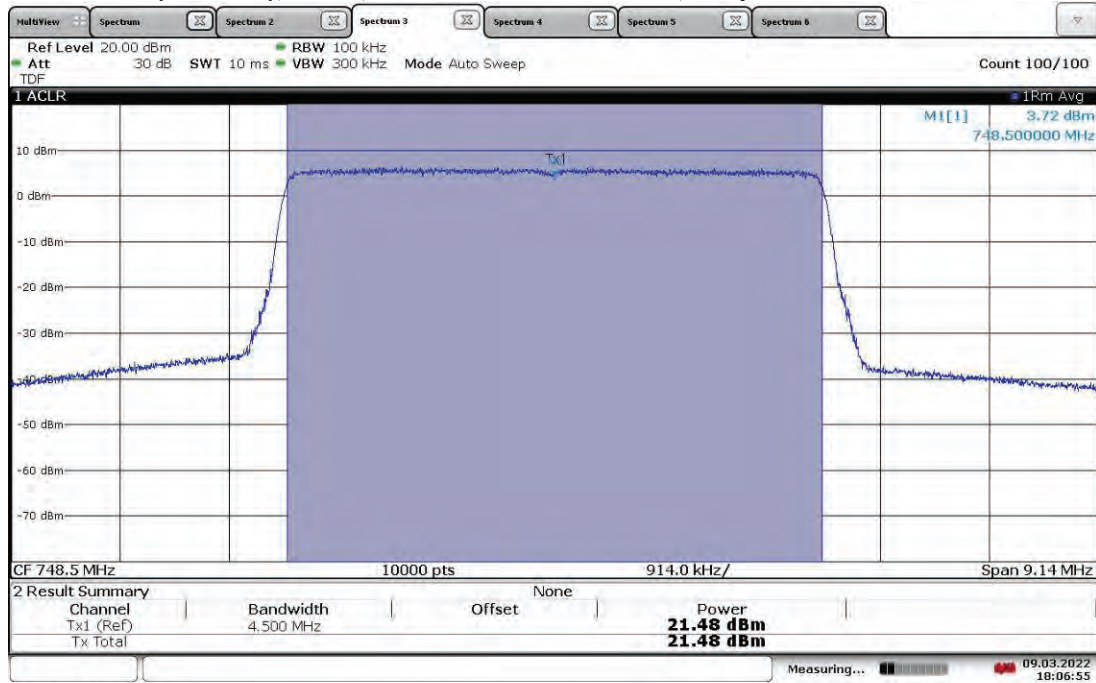
19:28:21 09.03.2022

TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, High Channel 753.5 MHz, Output Power = 20.84 dBm



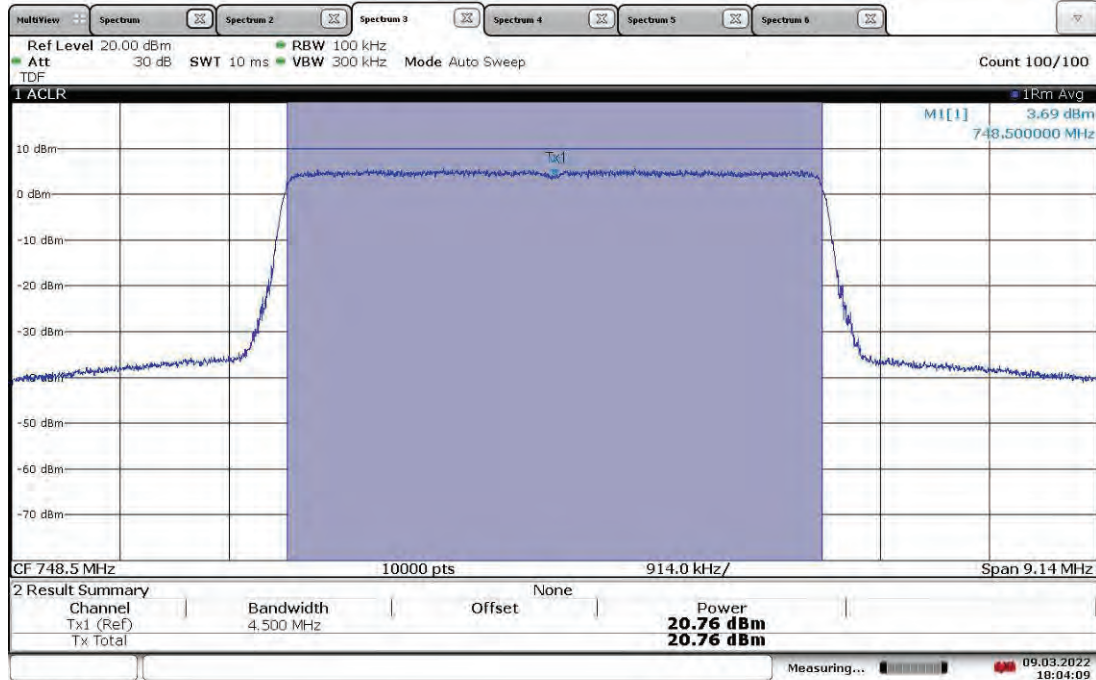
19:25:42 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host**  
**Slot 0 (Band 13), ANT0, Low Channel 748.5 MHz, Output Power = 21.48 dBm**



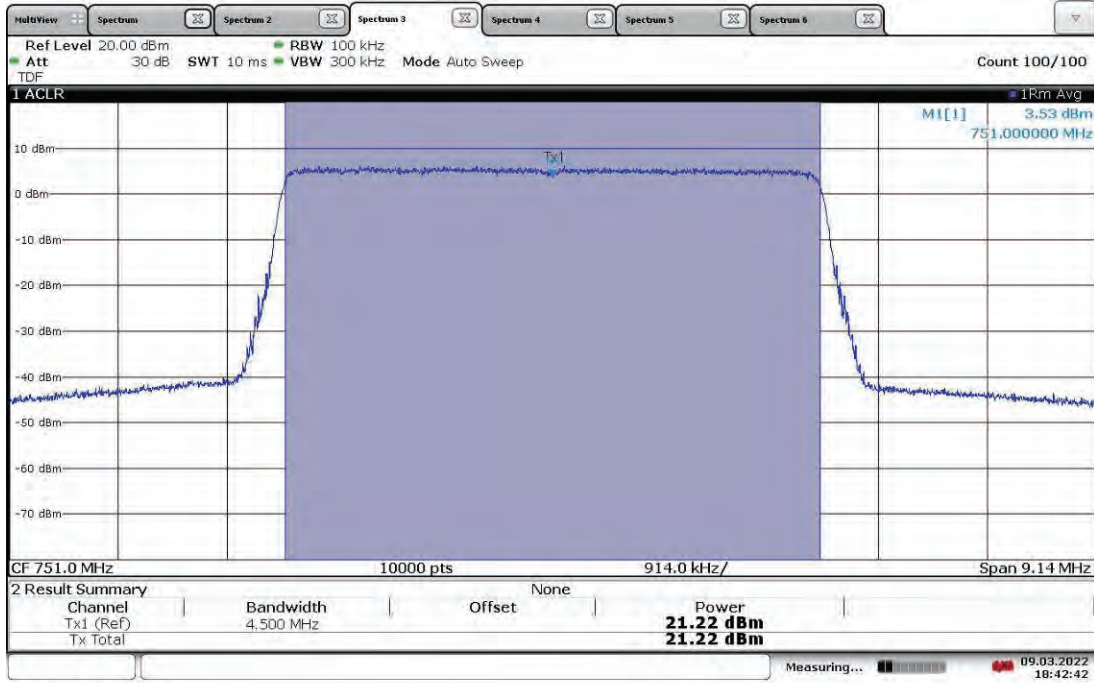
18:06:55 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host**  
**Slot 0 (Band 13), ANT1, Low Channel 748.5 MHz, Output Power = 20.76 dBm**



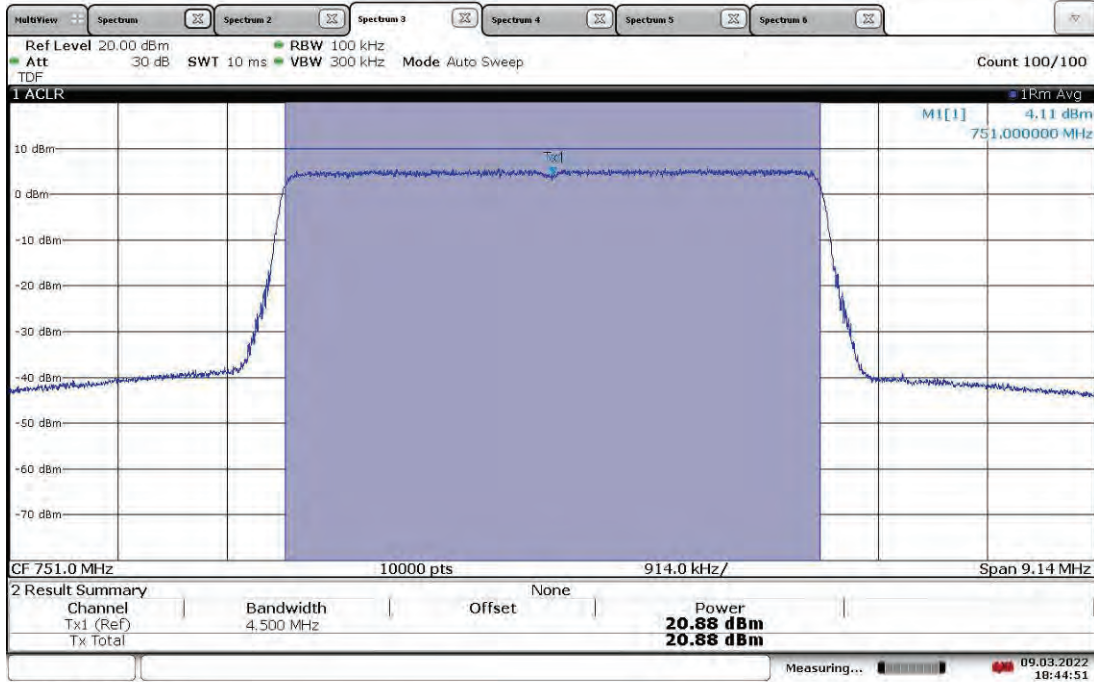
18:04:09 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel 751 MHz, Output Power = 21.22 dBm**



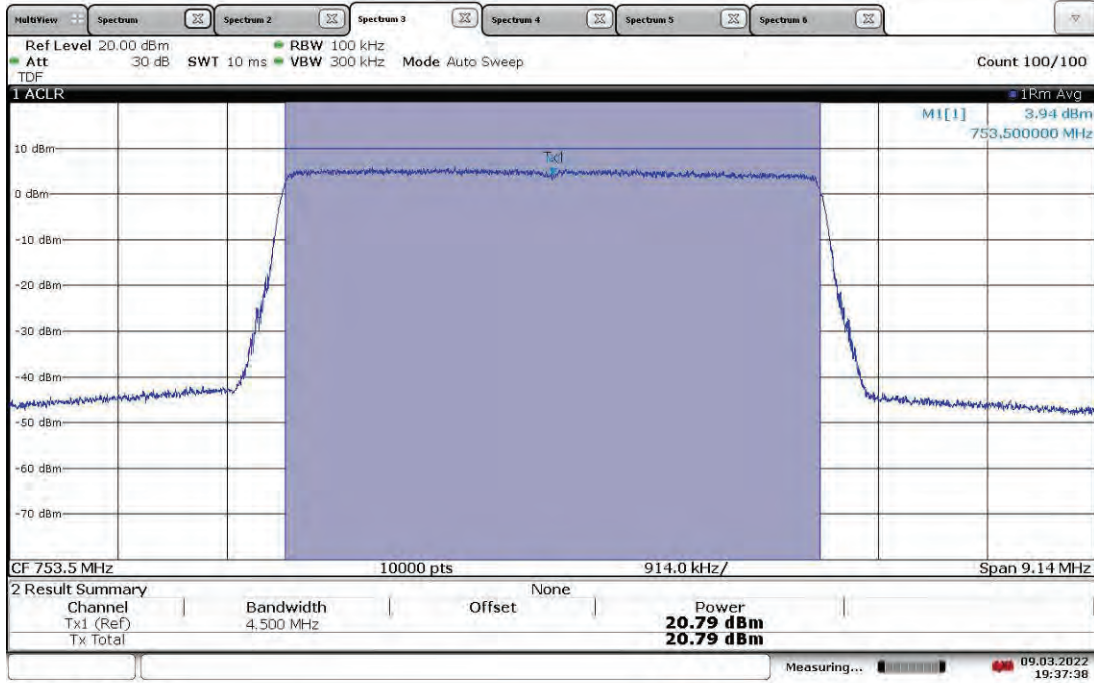
18:42:42 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel 751 MHz, Output Power = 20.88 dBm**



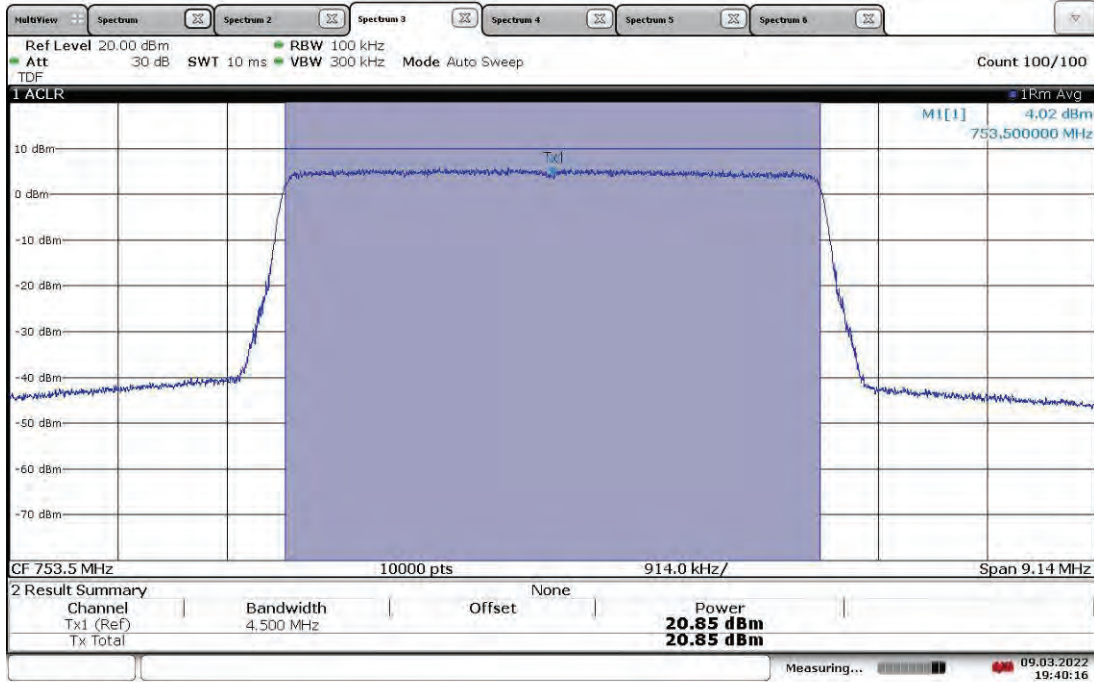
18:44:51 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, High Channel 753.5 MHz, Output Power = 20.79 dBm**



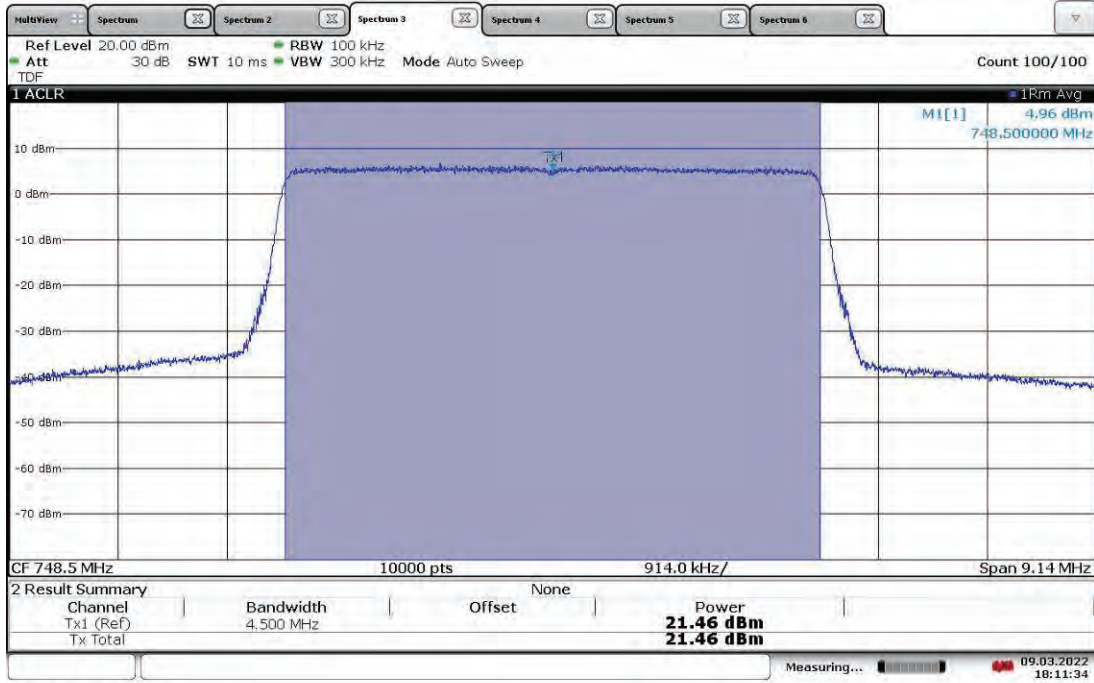
19:37:38 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, High Channel 753.5 MHz, Output Power = 20.85 dBm**



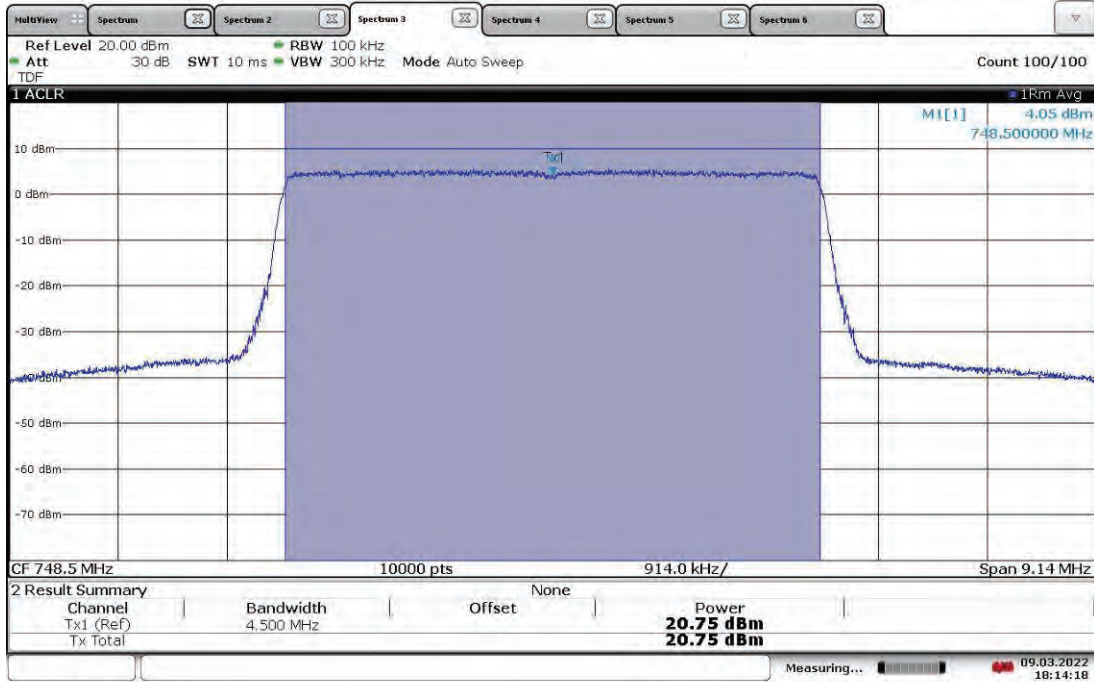
19:40:17 09.03.2022

**TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Low Channel 748.5 MHz, Output Power = 21.46 dBm**



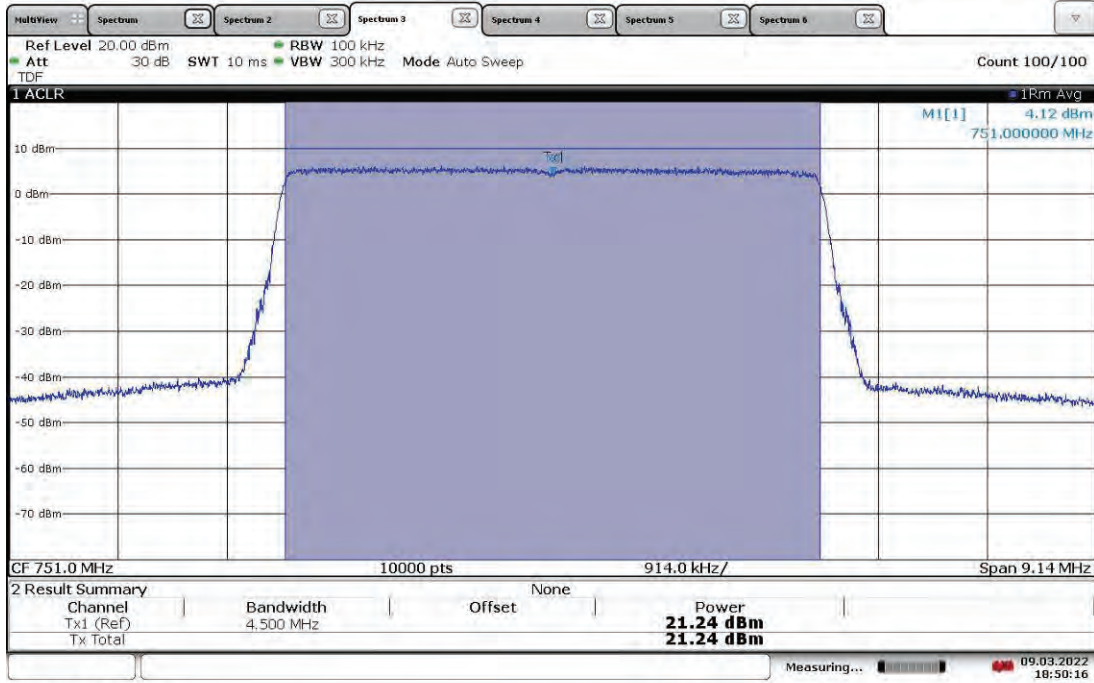
18:11:34 09.03.2022

**TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Low Channel 748.5 MHz, Output Power = 20.75 dBm**



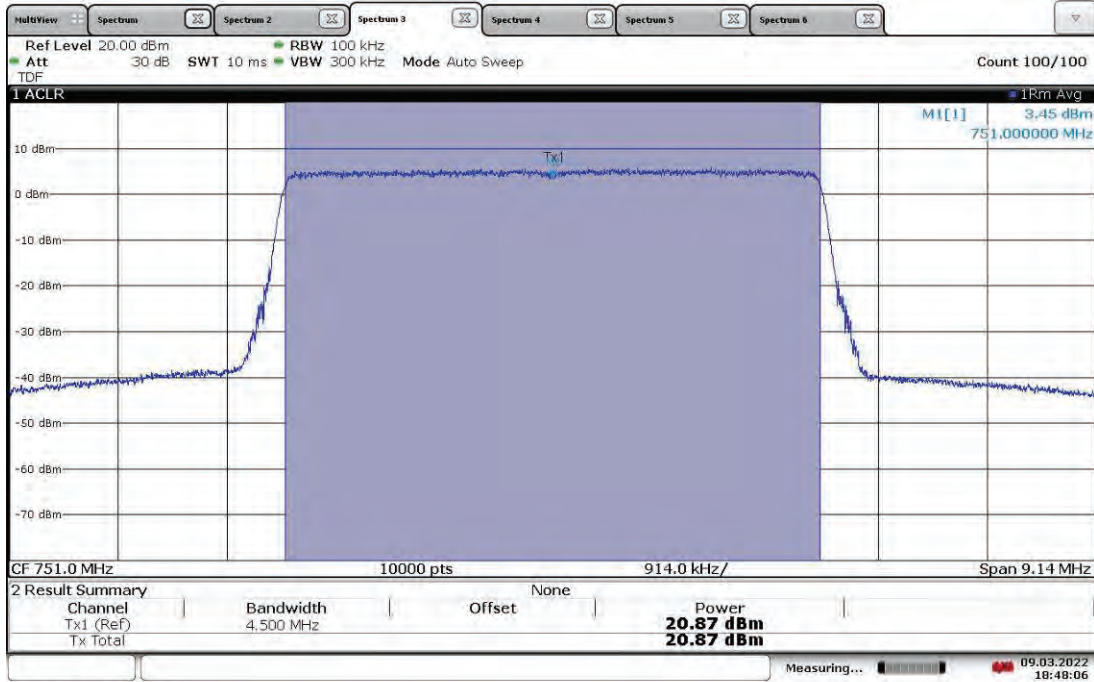
18:14:18 09.03.2022

**TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel 751 MHz, Output Power = 21.24 dBm**



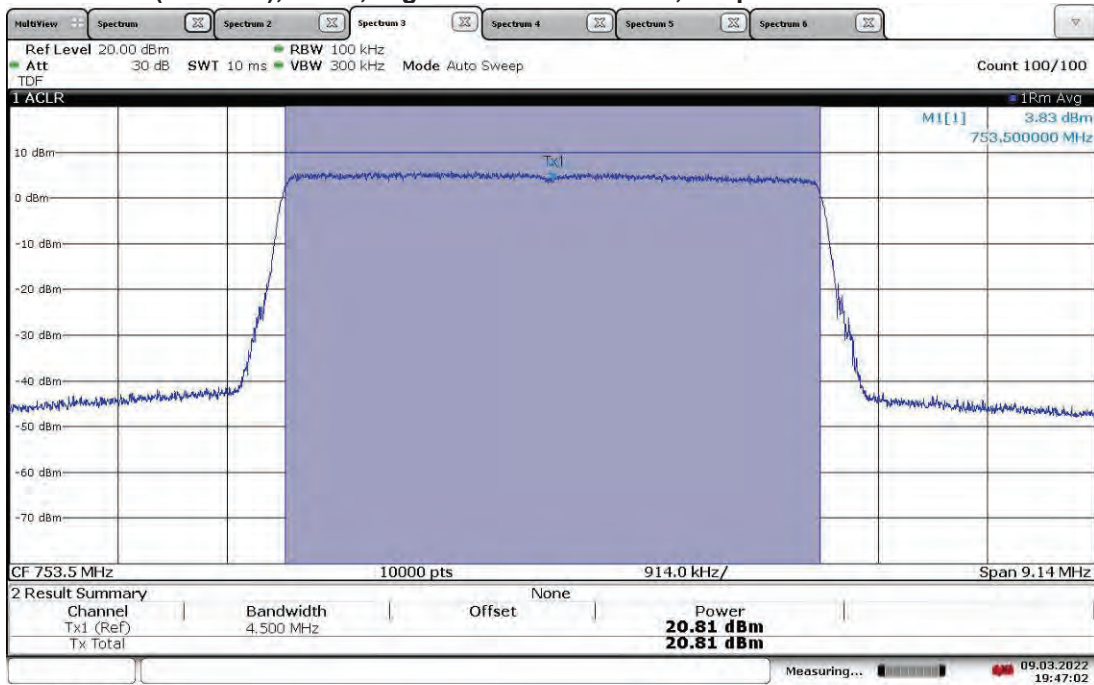
18:50:16 09.03.2022

**TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel 751 MHz, Output Power = 20.87 dBm**



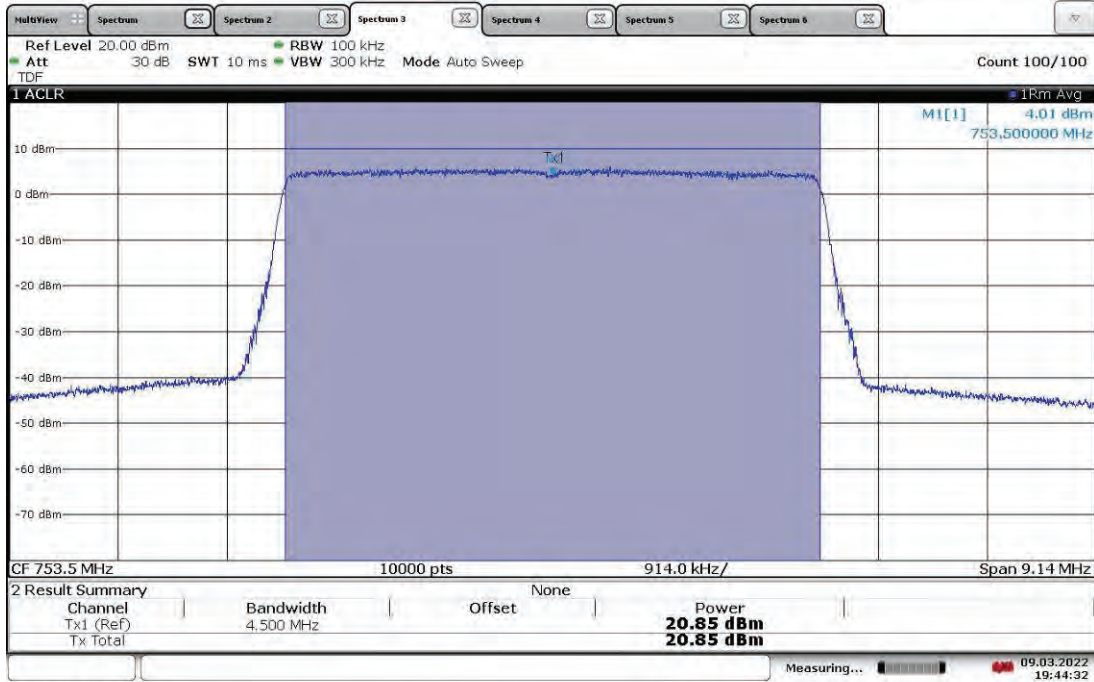
18:48:06 09.03.2022

**TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host**  
**Slot 0 (Band 13), ANT0, High Channel 753.5MHz, Output Power = 20.81 dBm**



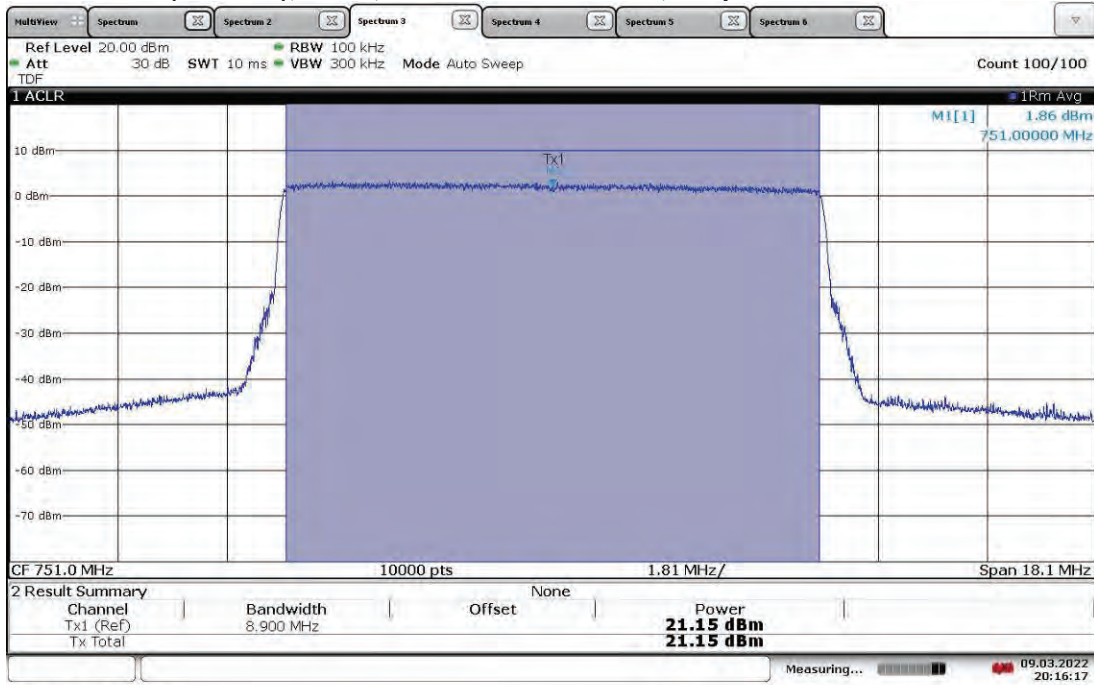
19:47:02 09.03.2022

**TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host**  
**Slot 0 (Band 13), ANT1, High Channel 753.5MHz, Output Power = 20.85 dBm**



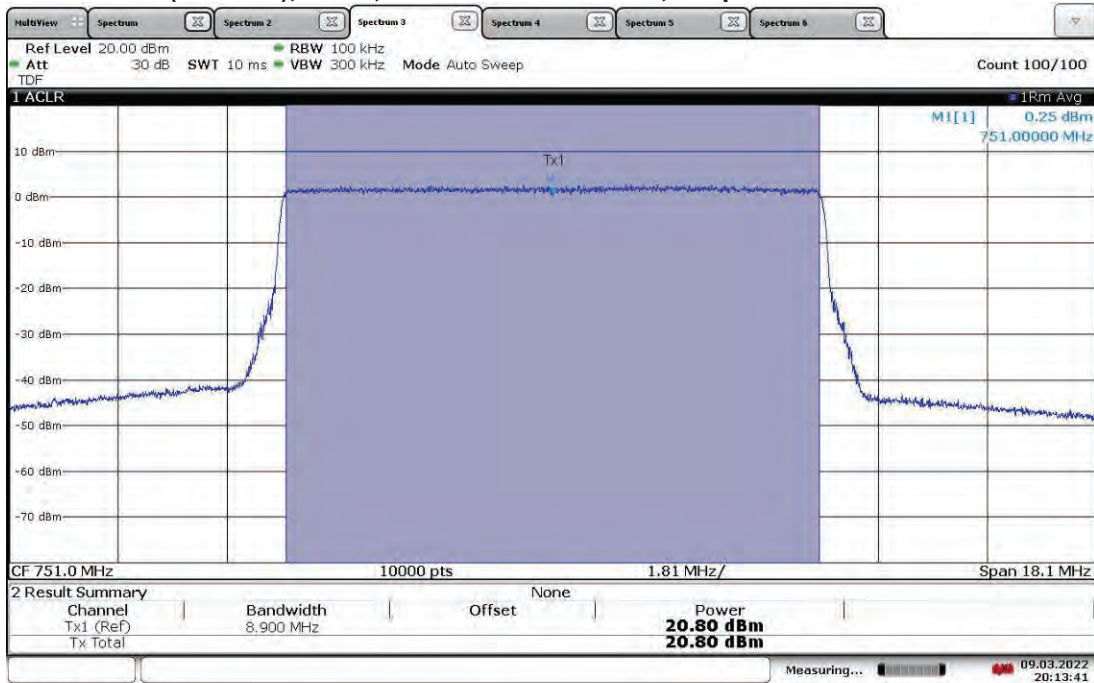
19:44:32 09.03.2022

**TM1.1-QPSK\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel 751 MHz, Output Power = 21.15 dBm**



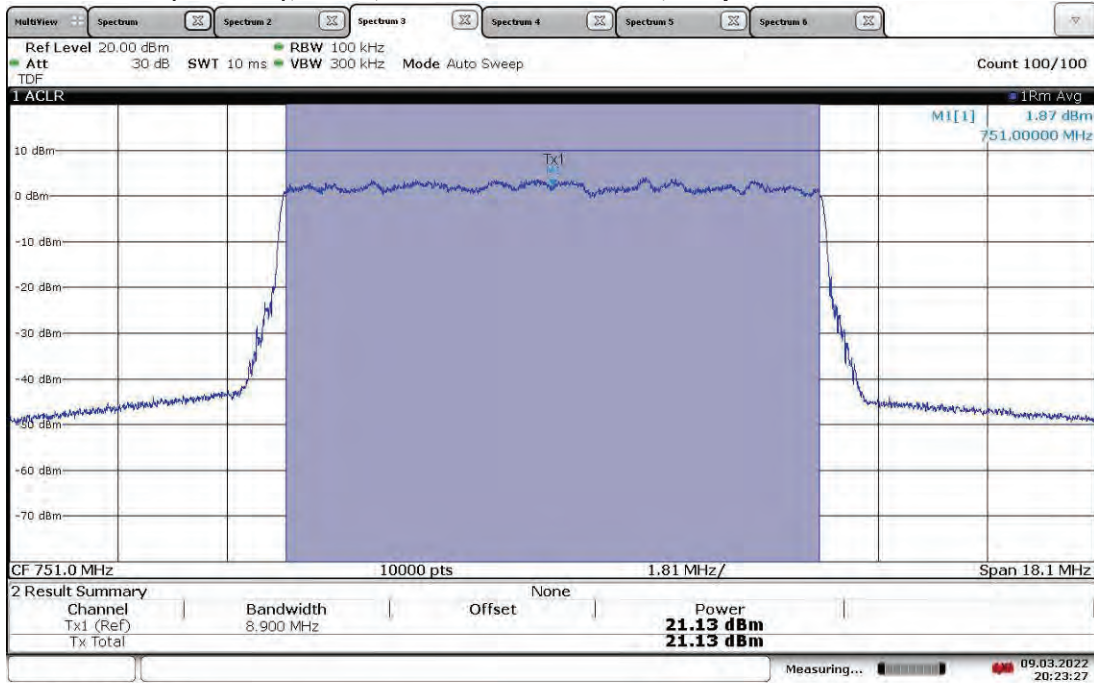
20:16:17 09.03.2022

**TM1.1-QPSK\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel 751 MHz, Output Power = 20.80 dBm**



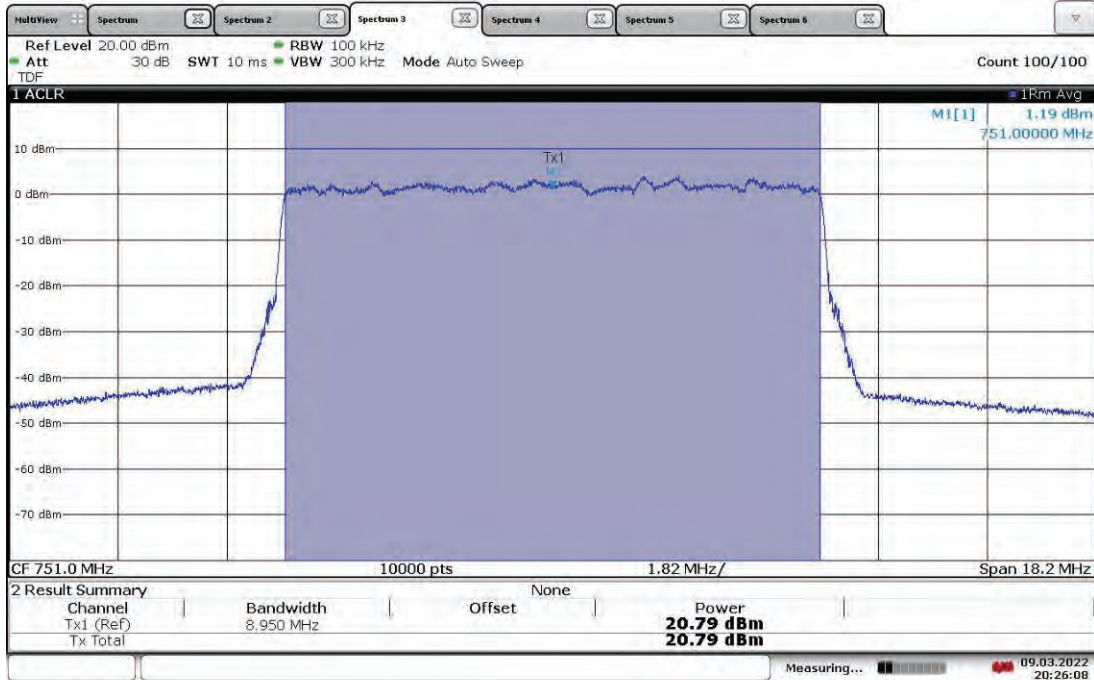
20:13:42 09.03.2022

**TM3.2-16QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host**  
**Slot 0 (Band 13), ANT0, Mid Channel 751 MHz, Output Power = 21.13 dBm**



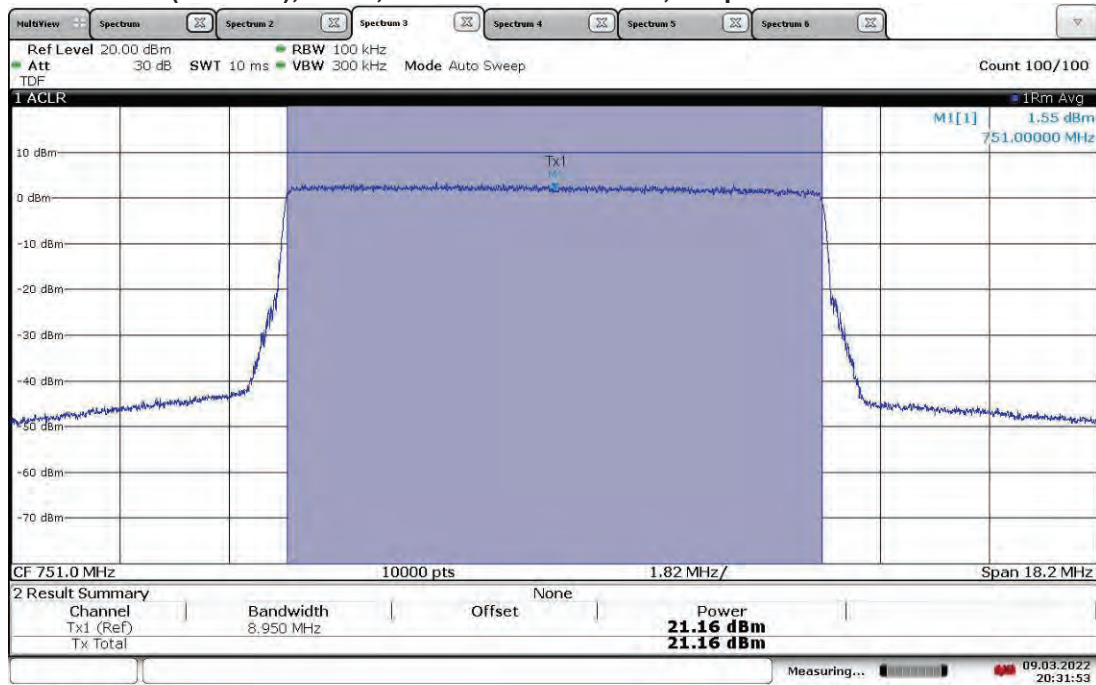
20:23:27 09.03.2022

**TM3.2-16QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host**  
**Slot 0 (Band 13), ANT1, Mid Channel 751 MHz, Output Power = 20.79 dBm**



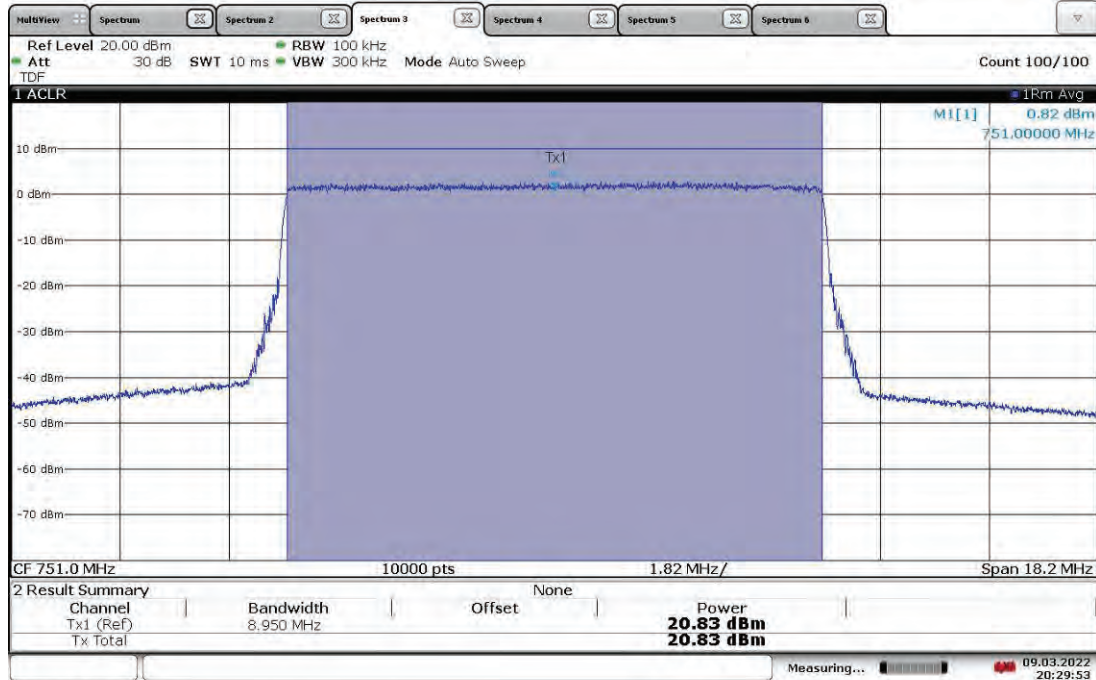
20:26:09 09.03.2022

TM3.1-64QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel 751 MHz, Output Power = 21.16 dBm



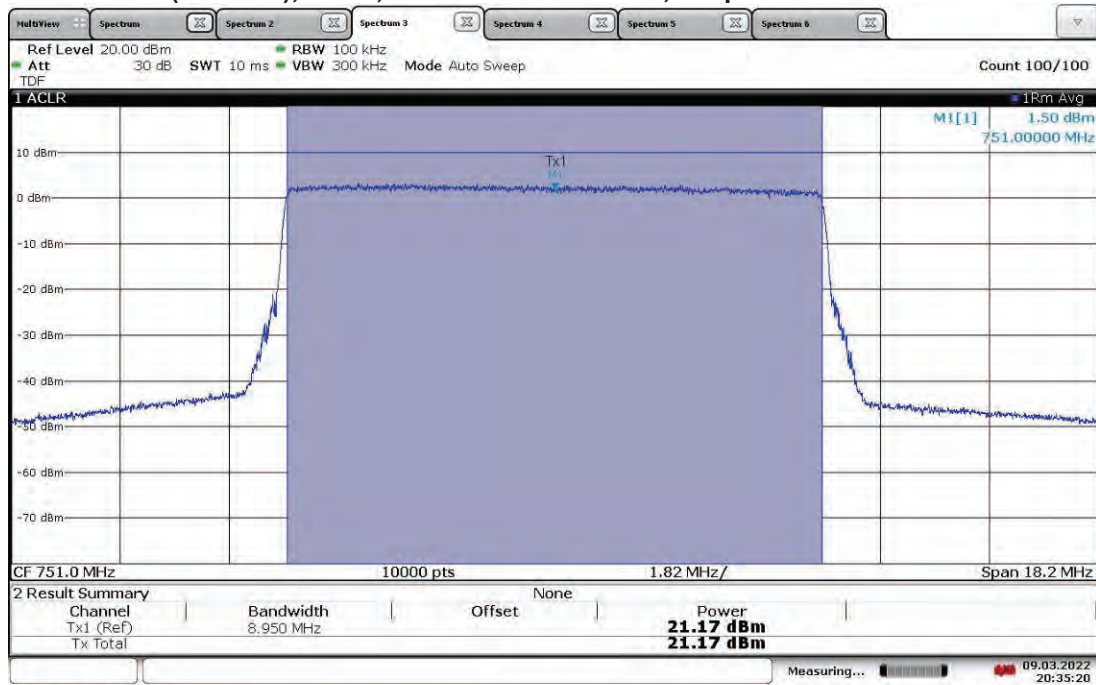
20:31:53 09.03.2022

TM3.1-64QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel 751 MHz, Output Power = 20.83 dBm



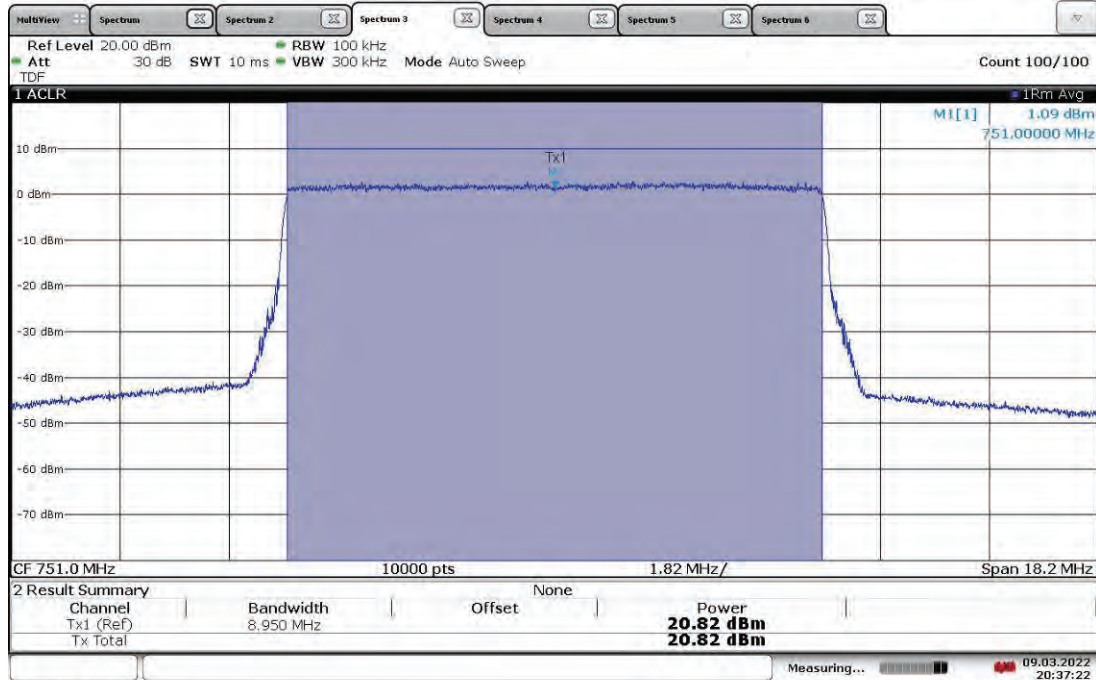
20:29:54 09.03.2022

**TM3.1a-256QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel 751 MHz, Output Power = 21.17 dBm**



20:35:20 09.03.2022

**TM3.1a-256QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel 751 MHz, Output Power = 20.82 dBm**



20:37:23 09.03.2022

Test Personnel: Kouma Sinn *KPS*  
Supervising/Reviewing  
Engineer:  
(Where Applicable) Vathana F. Ven *VSV*

Test Date: 03/09/2022

Product Standard: FCC Part 27  
Input Voltage: 48 VDC (POE)

Limit Applied: See report section 6.3

Pretest Verification w/  
Ambient Signals or  
BB Source: N/A

Ambient Temperature: 22 °C

Relative Humidity: 22 %

Atmospheric Pressure: 1005 mbars

Deviations, Additions, or Exclusions: None

## 7 26 dB Bandwidth and Occupied Bandwidth

### 7.1 Method

Tests are performed in accordance with ANSI C63.26 and CFR47 FCC Part 2.1049.

**TEST SITE:** EMC Lab

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

### 7.2 Test Equipment Used:

| Asset           | Description                        | Manufacturer      | Model    | Serial    | Cal Date   | Cal Due    |
|-----------------|------------------------------------|-------------------|----------|-----------|------------|------------|
| DS40'           | Temp, humidity, pressure gauge     | Digi Sense        | 68000-49 | 181717625 | 11/09/2021 | 11/09/2022 |
| ROS005-1'       | Signal and Spectrum Analyzer       | Rohde and Shwartz | FSW43    | 100646    | 11/02/2021 | 11/02/2022 |
| CEN001'         | DC-40GHz attenuator 20dB           | Centric RF        | C411-20  | CEN001    | 01/26/2022 | 01/26/2023 |
| CBLHF2012-2M-2' | 2m 9kHz-40GHz Coaxial Cable - SET2 | Huber & Suhner    | SF102    | 252675002 | 02/10/2022 | 02/10/2023 |

#### Software Utilized:

| Name | Manufacturer | Version |
|------|--------------|---------|
| None | --           | --      |

### 7.3 Results:

The sample tested was found to Comply.

§2.1049: The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK**

| Channel | Frequency (MHz) | Antenna Port | Occupied BW (MHz) | 26 dB BW (MHz) |
|---------|-----------------|--------------|-------------------|----------------|
| Low     | 748.50          | ANT0         | 4.492             | 4.96           |
|         |                 | ANT1         | 4.508             | 4.97           |
| Mid     | 751.00          | ANT0         | 4.502             | 4.95           |
|         |                 | ANT1         | 4.497             | 4.97           |
| High    | 753.50          | ANT0         | 4.489             | 4.96           |
|         |                 | ANT1         | 4.485             | 5.01           |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM**

| Channel | Frequency (MHz) | Antenna Port | Occupied BW (MHz) | 26 dB BW (MHz) |
|---------|-----------------|--------------|-------------------|----------------|
| Low     | 748.50          | ANT0         | 4.486             | 4.95           |
|         |                 | ANT1         | 4.478             | 4.93           |
| Mid     | 751.00          | ANT0         | 4.486             | 4.92           |
|         |                 | ANT1         | 4.491             | 4.94           |
| High    | 753.50          | ANT0         | 4.499             | 4.93           |
|         |                 | ANT1         | 4.483             | 4.96           |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM**

| Channel | Frequency (MHz) | Antenna Port | Occupied BW (MHz) | 26 dB BW (MHz) |
|---------|-----------------|--------------|-------------------|----------------|
| Low     | 748.50          | ANT0         | 4.497             | 4.97           |
|         |                 | ANT1         | 4.531             | 4.97           |
| Mid     | 751.00          | ANT0         | 4.529             | 4.97           |
|         |                 | ANT1         | 4.506             | 4.97           |
| High    | 753.50          | ANT0         | 4.535             | 4.98           |
|         |                 | ANT1         | 4.496             | 4.97           |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM**

| Channel | Frequency (MHz) | Antenna Port | Occupied BW (MHz) | 26 dB BW (MHz) |
|---------|-----------------|--------------|-------------------|----------------|
| Low     | 748.50          | ANT0         | 4.495             | 4.97           |
|         |                 | ANT1         | 4.498             | 4.99           |
| Mid     | 751.00          | ANT0         | 4.490             | 4.96           |
|         |                 | ANT1         | 4.511             | 4.97           |
| High    | 753.50          | ANT0         | 4.498             | 4.96           |
|         |                 | ANT1         | 4.493             | 4.97           |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK**

| Channel | Frequency (MHz) | Antenna Port | Occupied BW (MHz) | 26 dB BW (MHz) |
|---------|-----------------|--------------|-------------------|----------------|
| Mid     | 751.00          | ANT0         | 8.952             | 9.74           |
|         |                 | ANT1         | 8.929             | 9.75           |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM**

| Channel | Frequency (MHz) | Antenna Port | Occupied BW (MHz) | 26 dB BW (MHz) |
|---------|-----------------|--------------|-------------------|----------------|
| Mid     | 751.00          | ANT0         | 8.931             | 9.78           |
|         |                 | ANT1         | 8.950             | 9.71           |

**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM**

| Channel | Frequency (MHz) | Antenna Port | Occupied BW (MHz) | 26 dB BW (MHz) |
|---------|-----------------|--------------|-------------------|----------------|
| Mid     | 751.00          | ANT0         | 8.955             | 9.67           |
|         |                 | ANT1         | 8.959             | 9.81           |

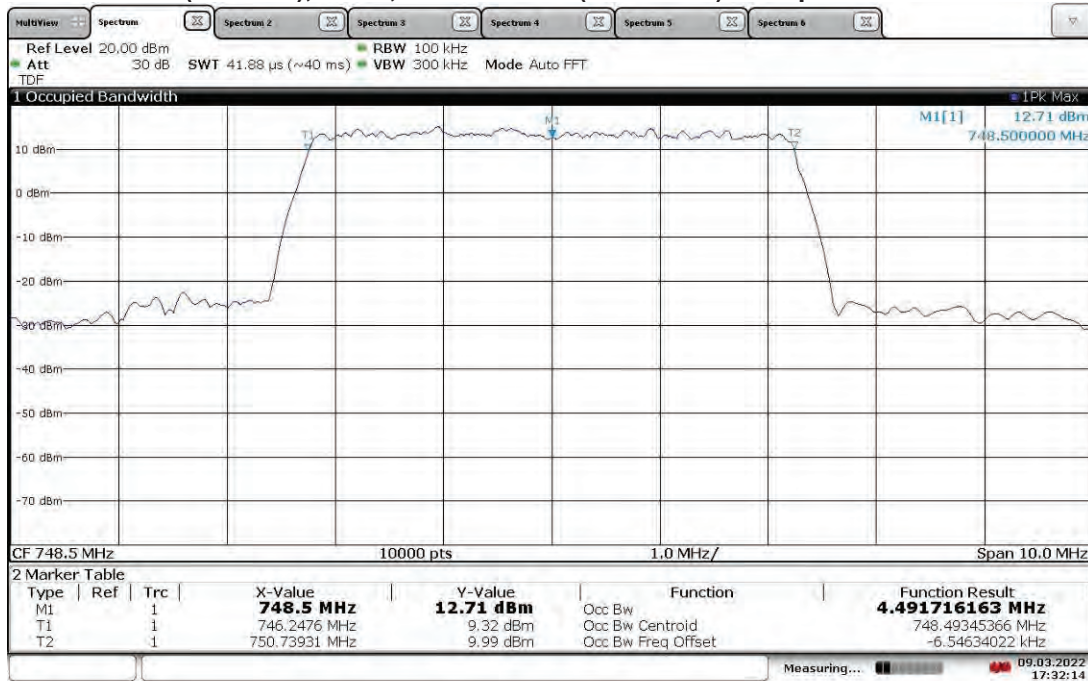
**Slot 0 (Band 13, 4G LTE) With RP5100 Host, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM**

| Channel | Frequency (MHz) | Antenna Port | Occupied BW (MHz) | 26 dB BW (MHz) |
|---------|-----------------|--------------|-------------------|----------------|
| Mid     | 751.00          | ANT0         | 8.952             | 9.63           |
|         |                 | ANT1         | 8.948             | 9.79           |

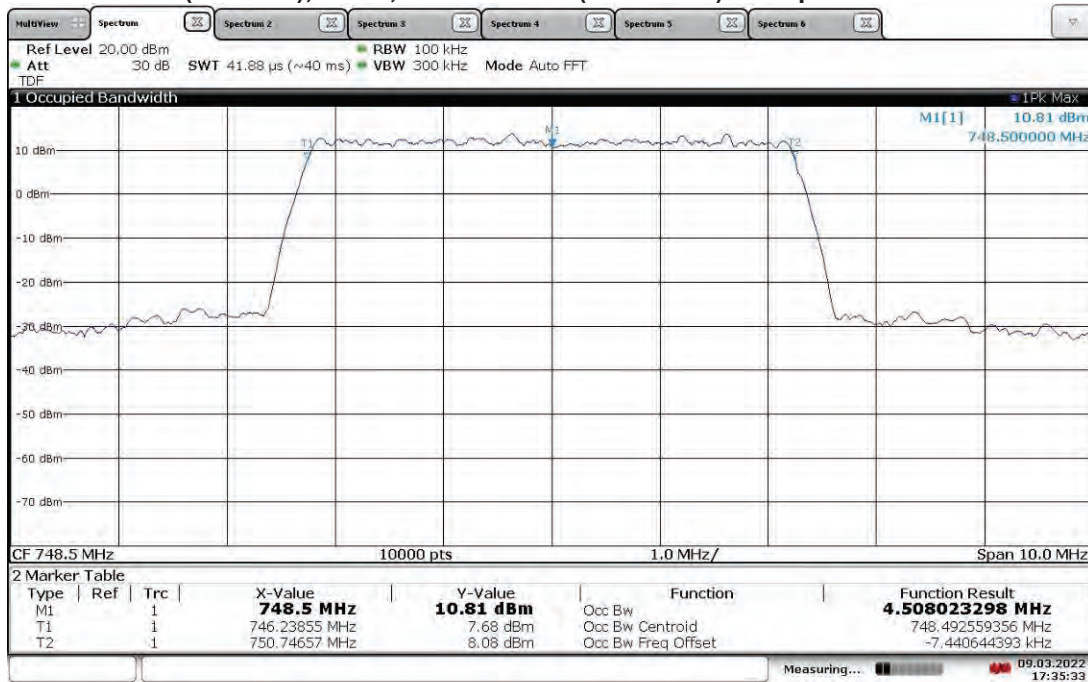
#### **7.4 Setup Photograph:**

Confidential – Photos not included in this report

## 7.5 Plots/Data:

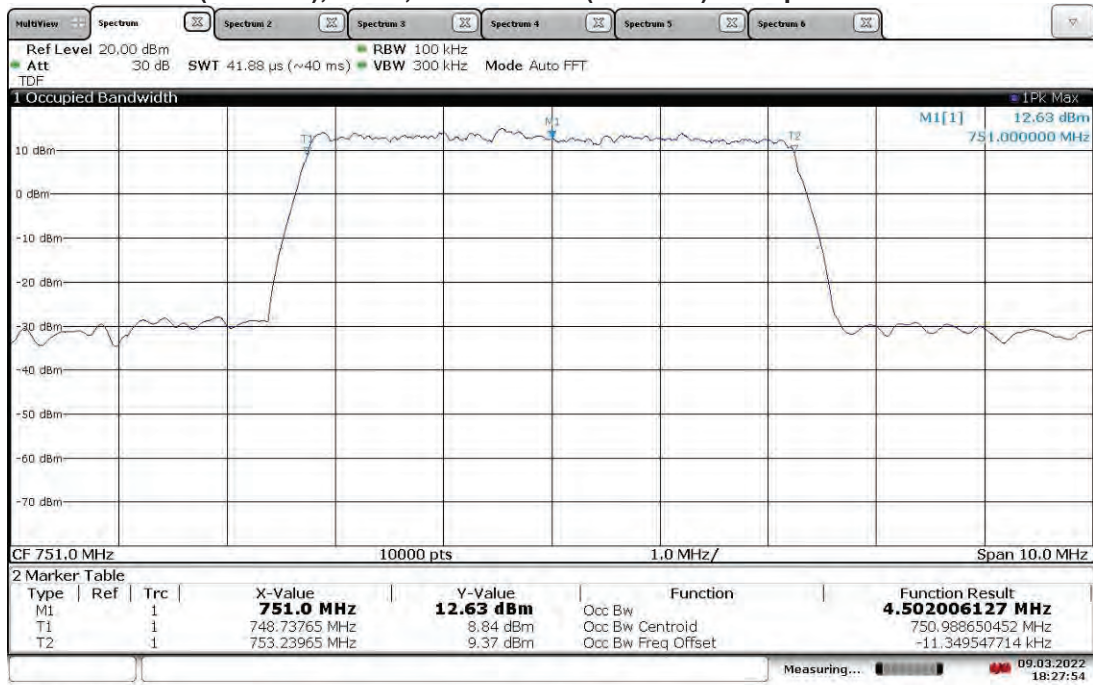
TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Low Channel (748.5 MHz) Occupied Bandwidth

17:32:15 09.03.2022

TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Low Channel (748.5 MHz) Occupied Bandwidth

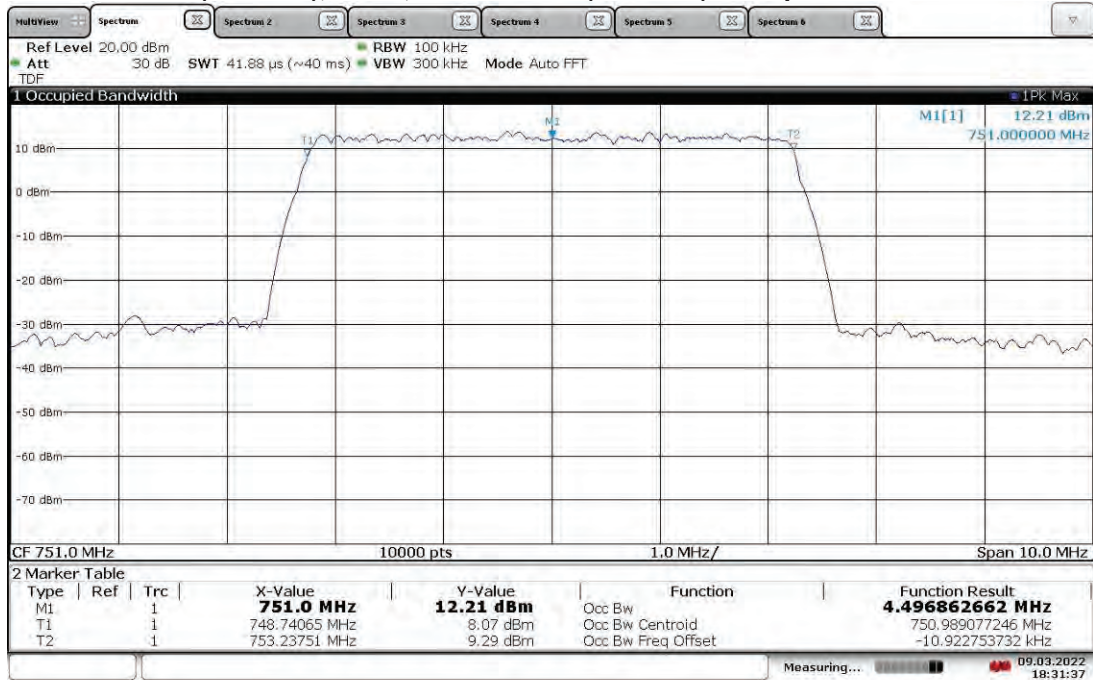
17:35:33 09.03.2022

TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel (751 MHz) Occupied Bandwidth



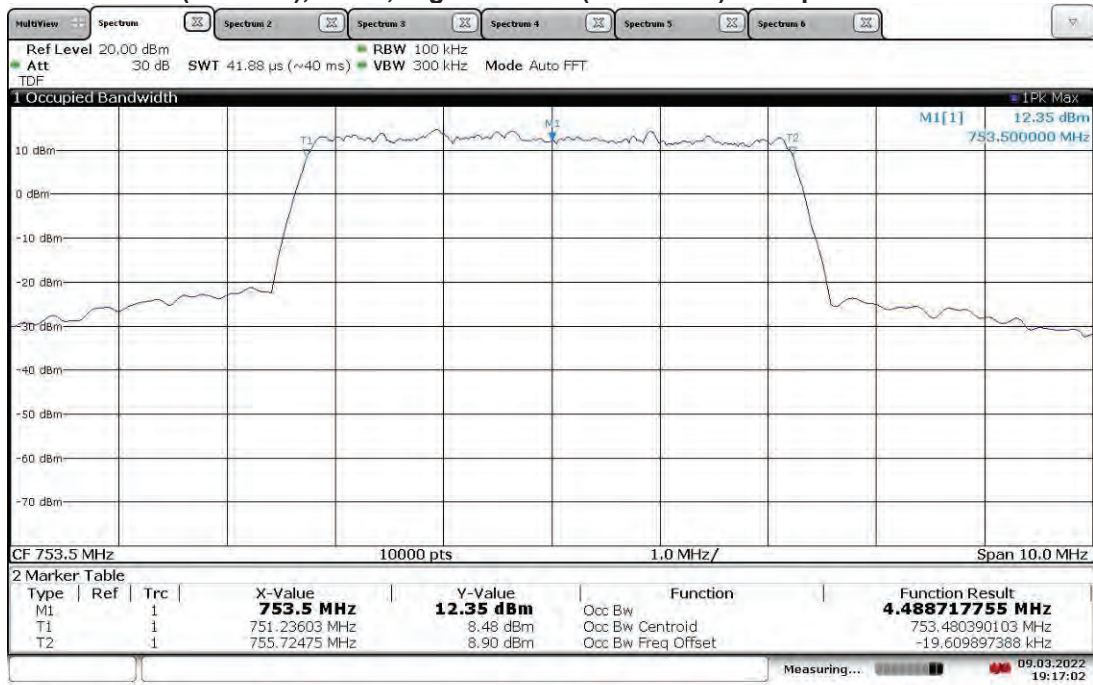
18:27:54 09.03.2022

TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel (751 MHz) Occupied Bandwidth



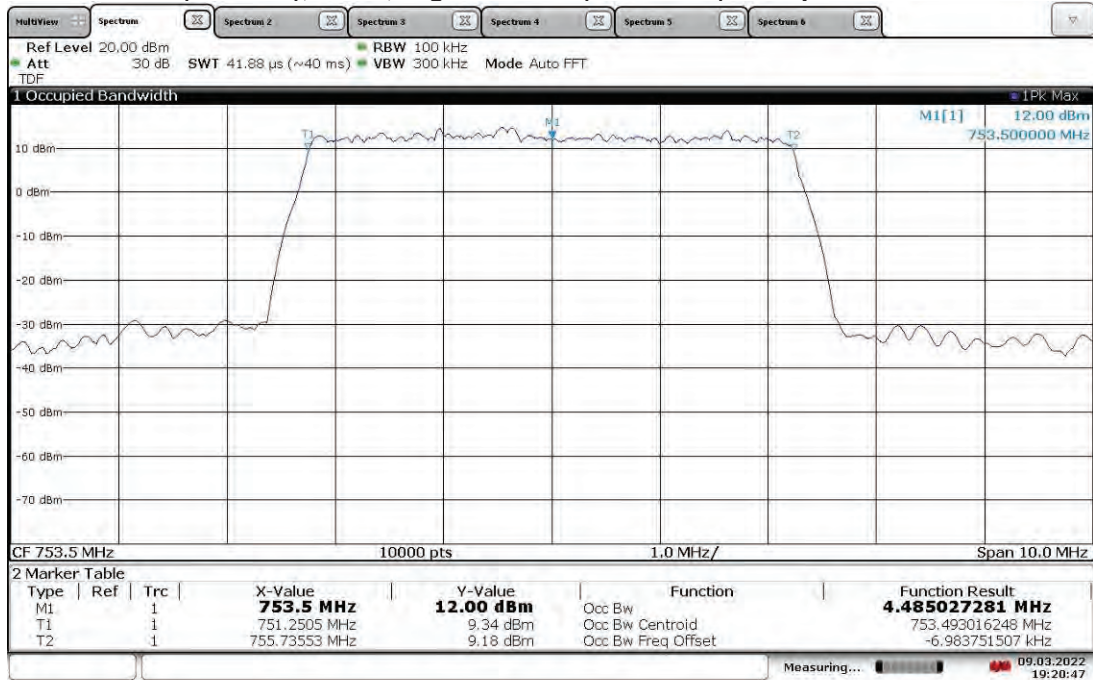
18:31:37 09.03.2022

TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, High Channel (753.5 MHz) Occupied Bandwidth



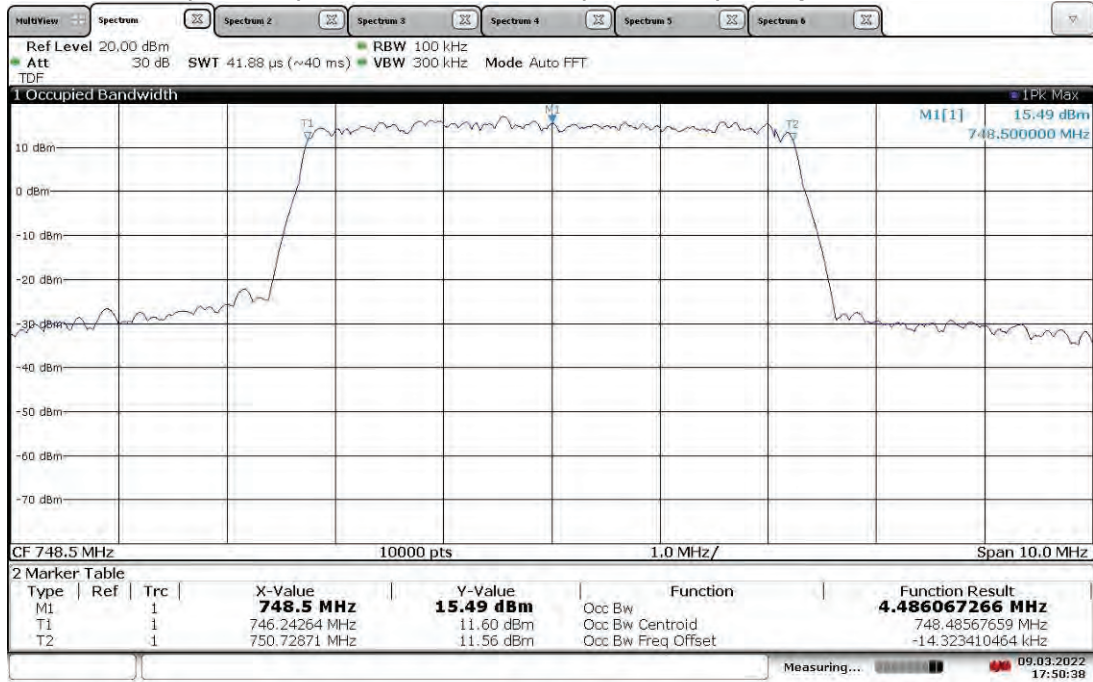
19:17:02 09.03.2022

TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, High Channel (753.5 MHz) Occupied Bandwidth



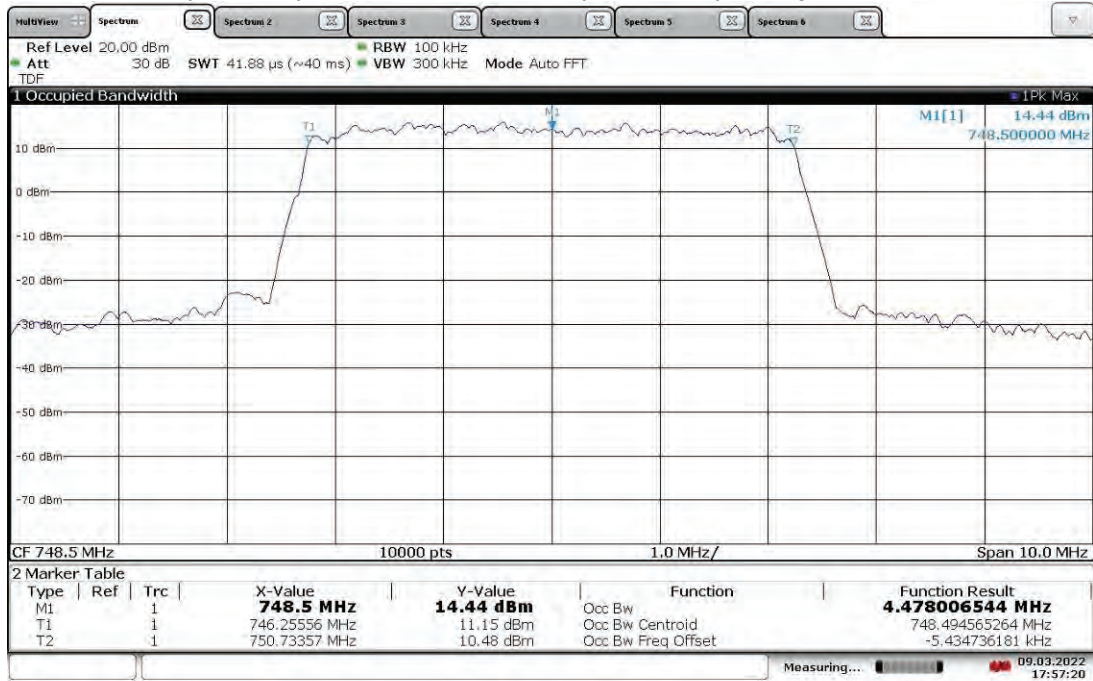
19:20:47 09.03.2022

TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Low Channel (748.5 MHz) Occupied Bandwidth



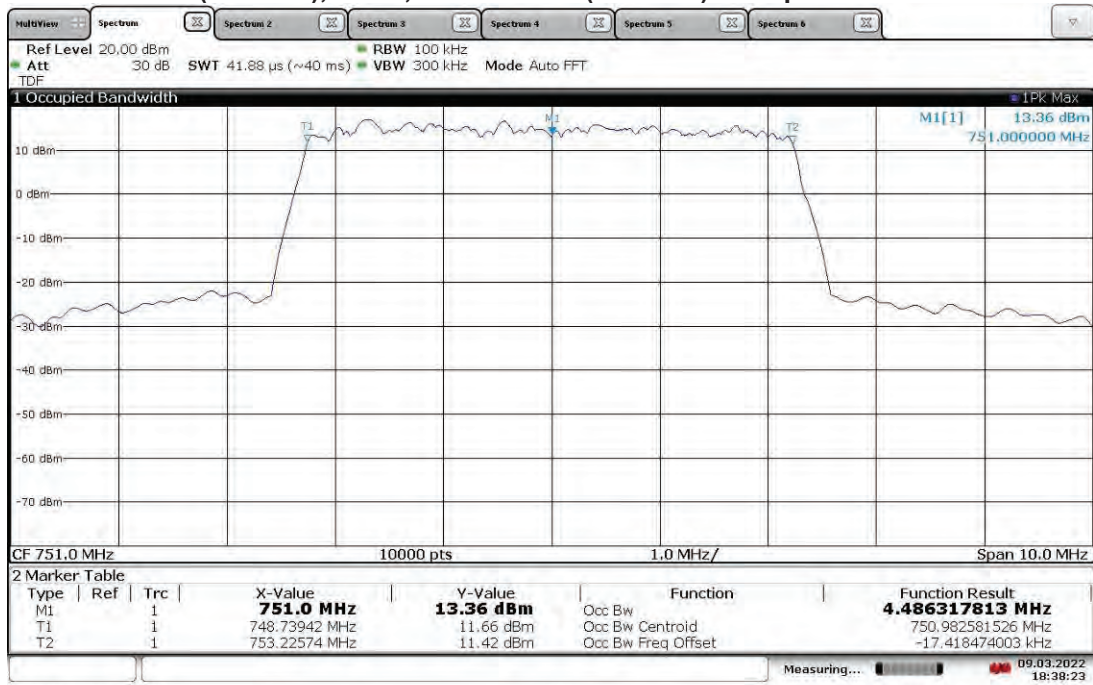
17:50:39 09.03.2022

TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Low Channel (748.5 MHz) Occupied Bandwidth



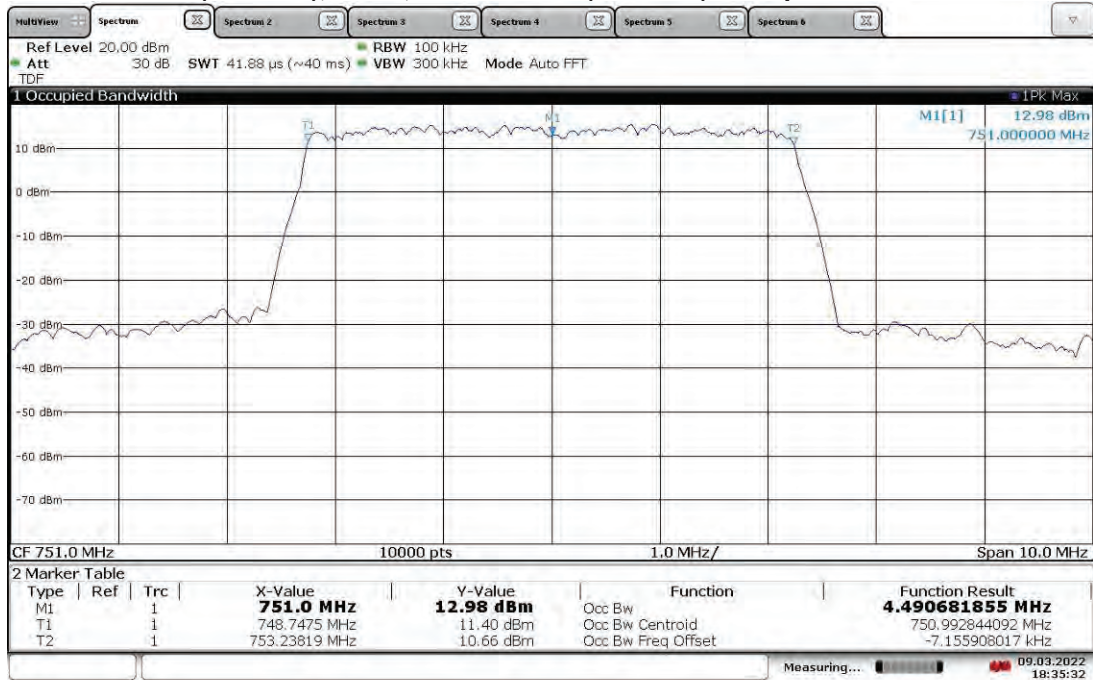
17:57:21 09.03.2022

**TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel (751 MHz) Occupied Bandwidth**



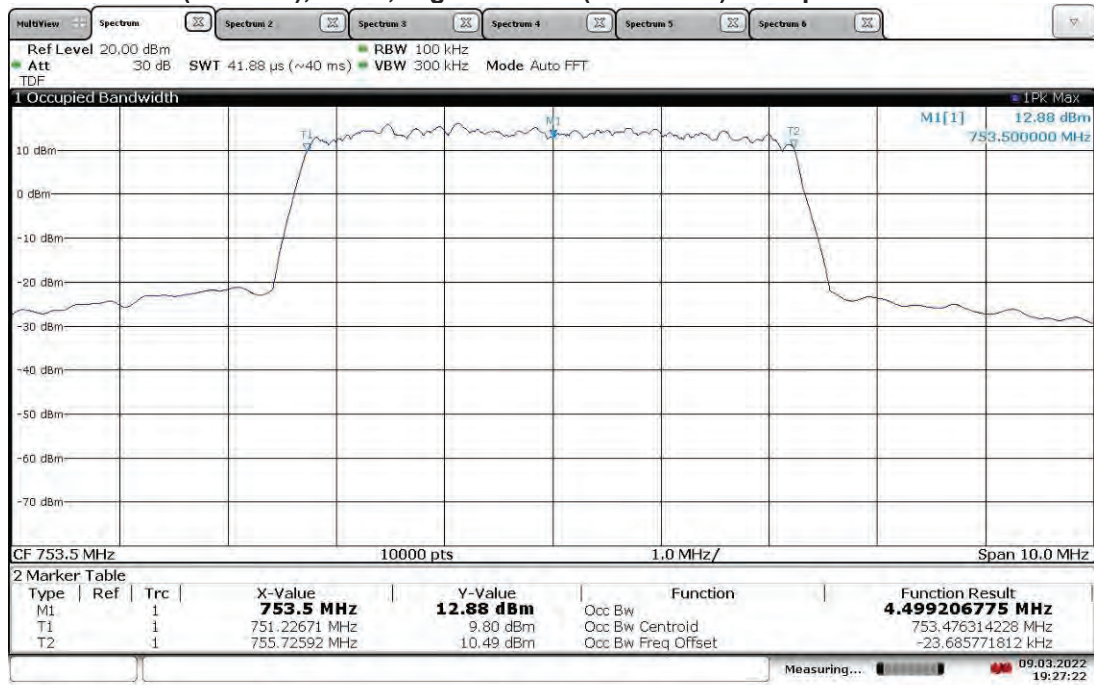
18:38:23 09.03.2022

**TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel (751 MHz) Occupied Bandwidth**



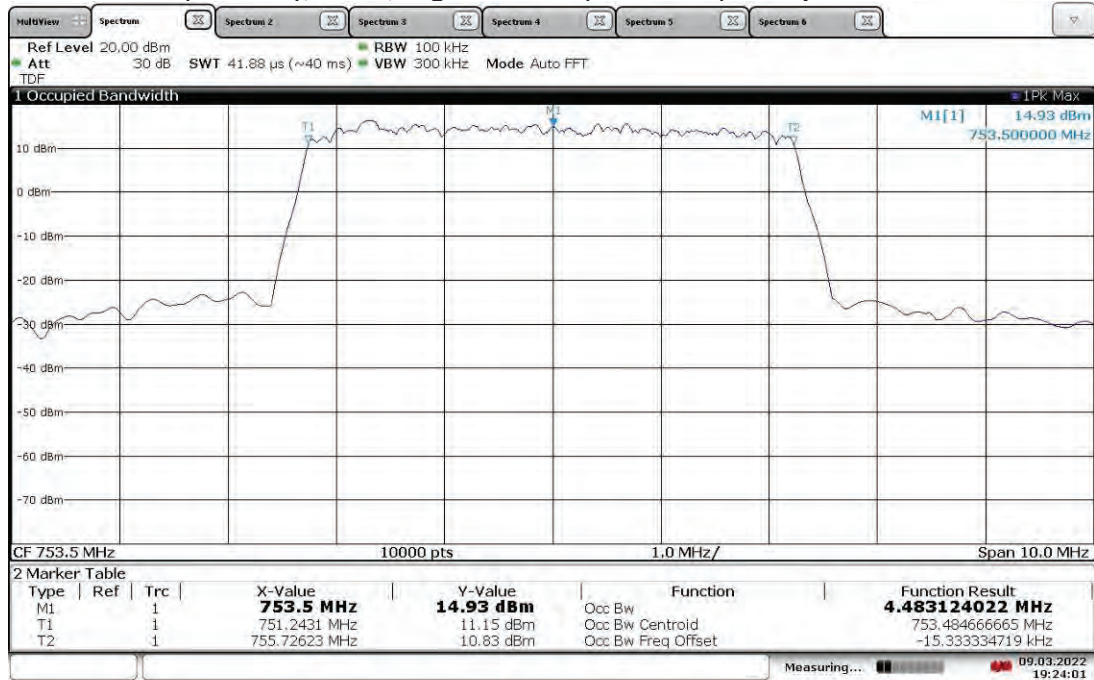
18:35:33 09.03.2022

**TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, High Channel (753.5 MHz) Occupied Bandwidth**



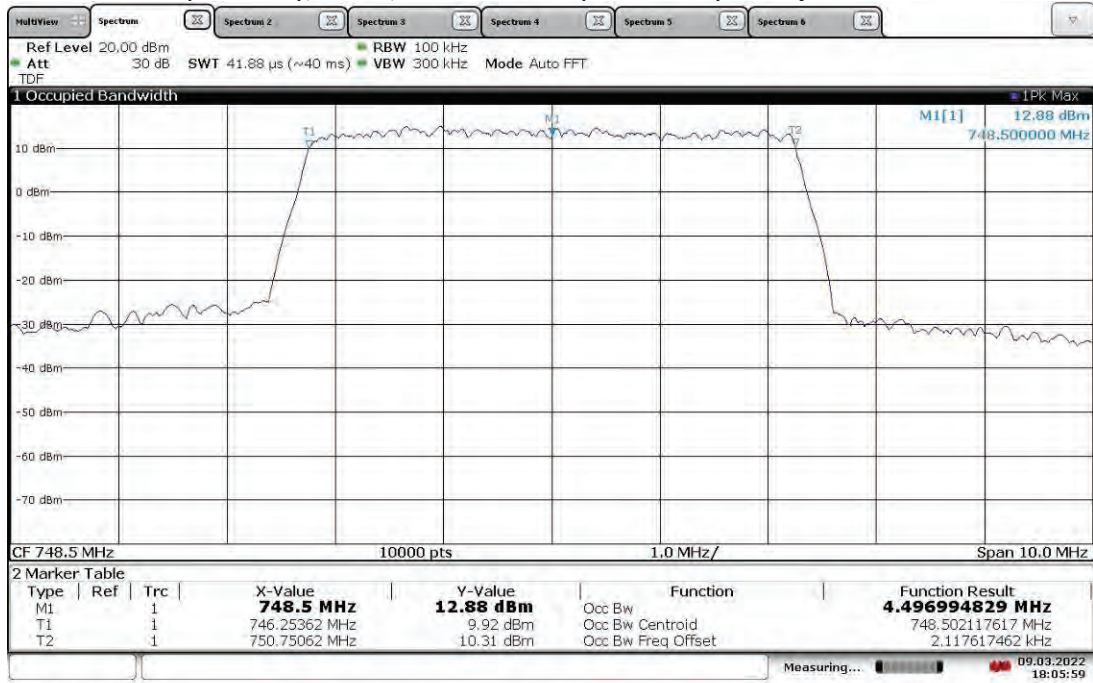
19:27:22 09.03.2022

**TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, High Channel (753.5 MHz) Occupied Bandwidth**



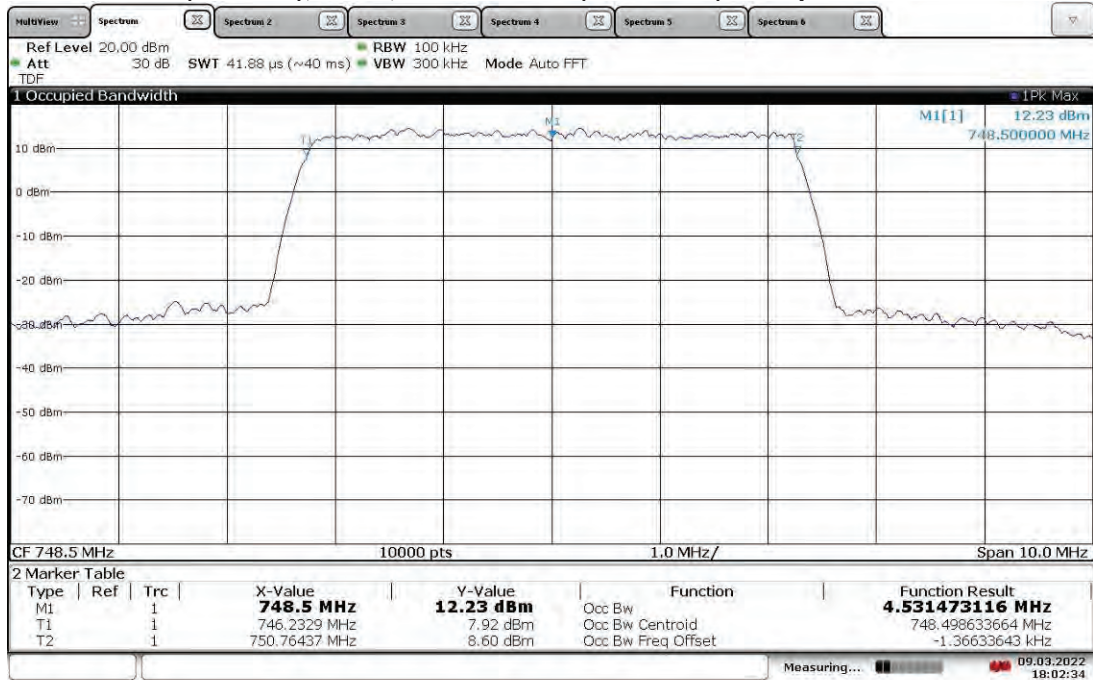
19:24:01 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Low Channel (748.5 MHz) Occupied Bandwidth**



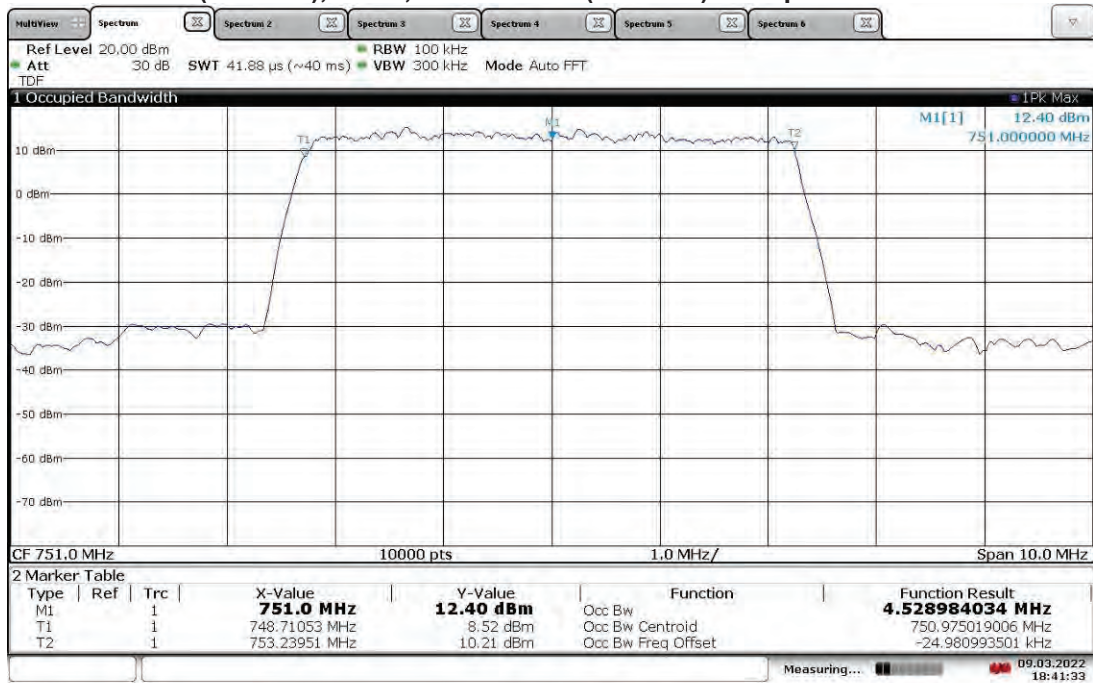
18:05:59 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Low Channel (748.5 MHz) Occupied Bandwidth**



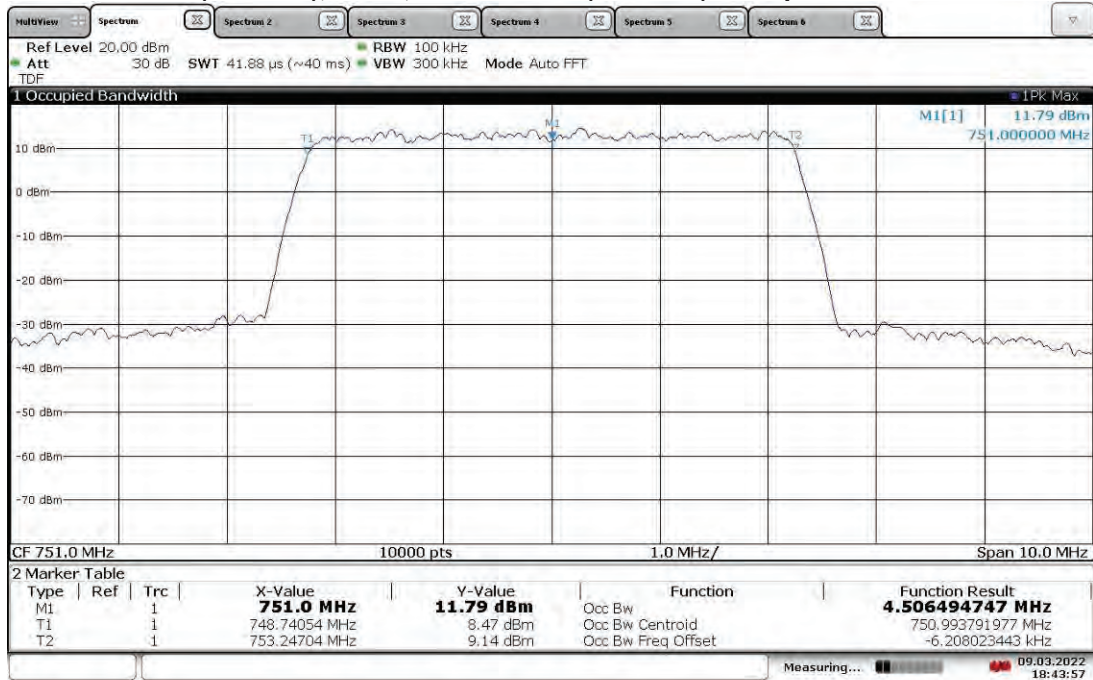
18:02:35 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel (751 MHz) Occupied Bandwidth**



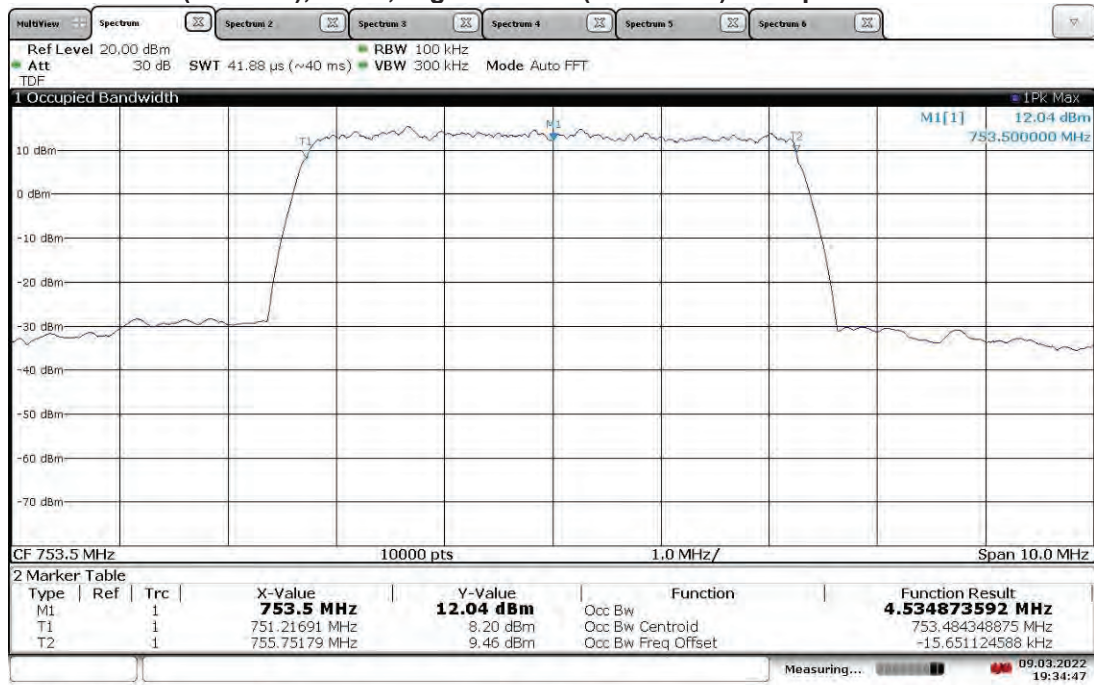
18:41:33 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel (751 MHz) Occupied Bandwidth**



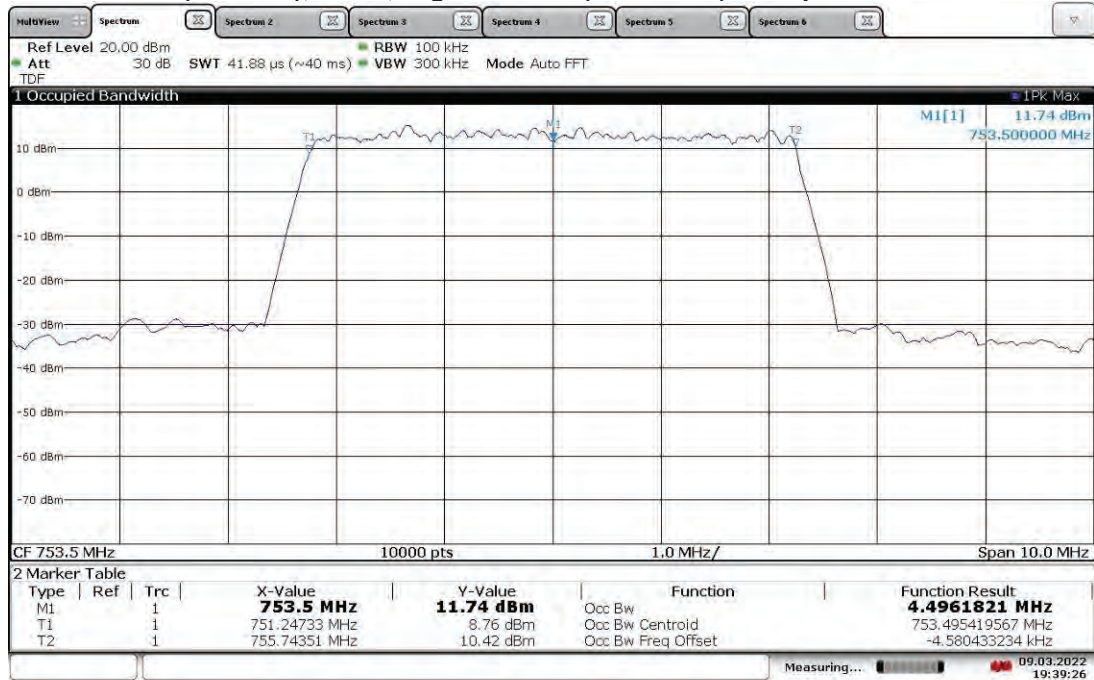
18:43:57 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, High Channel (753.5 MHz) Occupied Bandwidth**



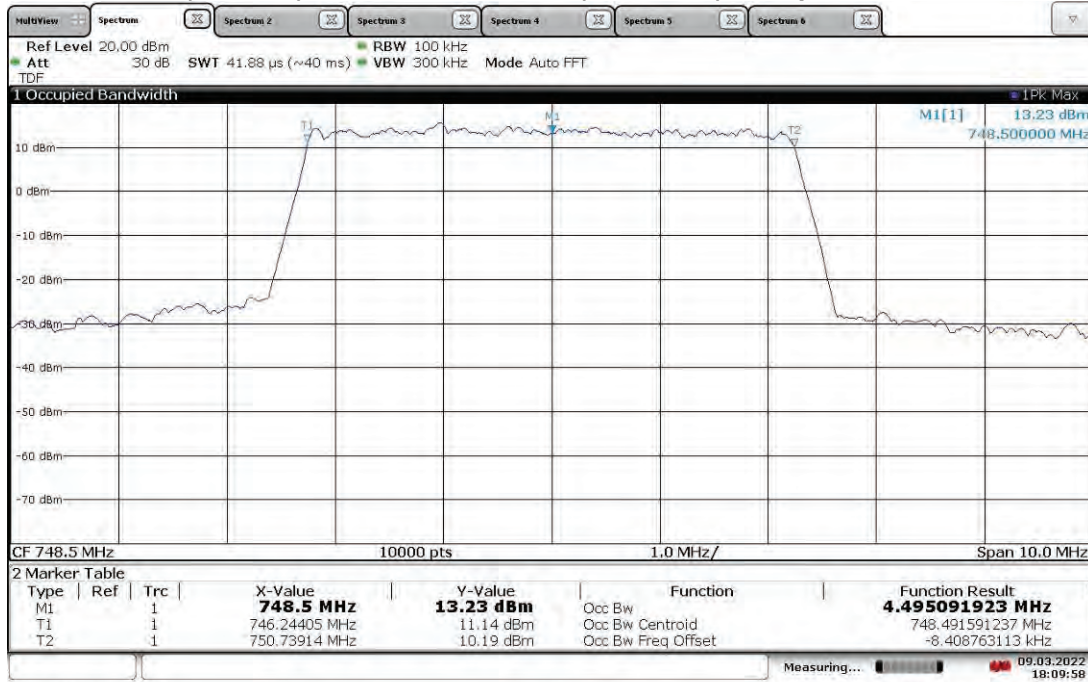
19:34:47 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, High Channel (753.5 MHz) Occupied Bandwidth**



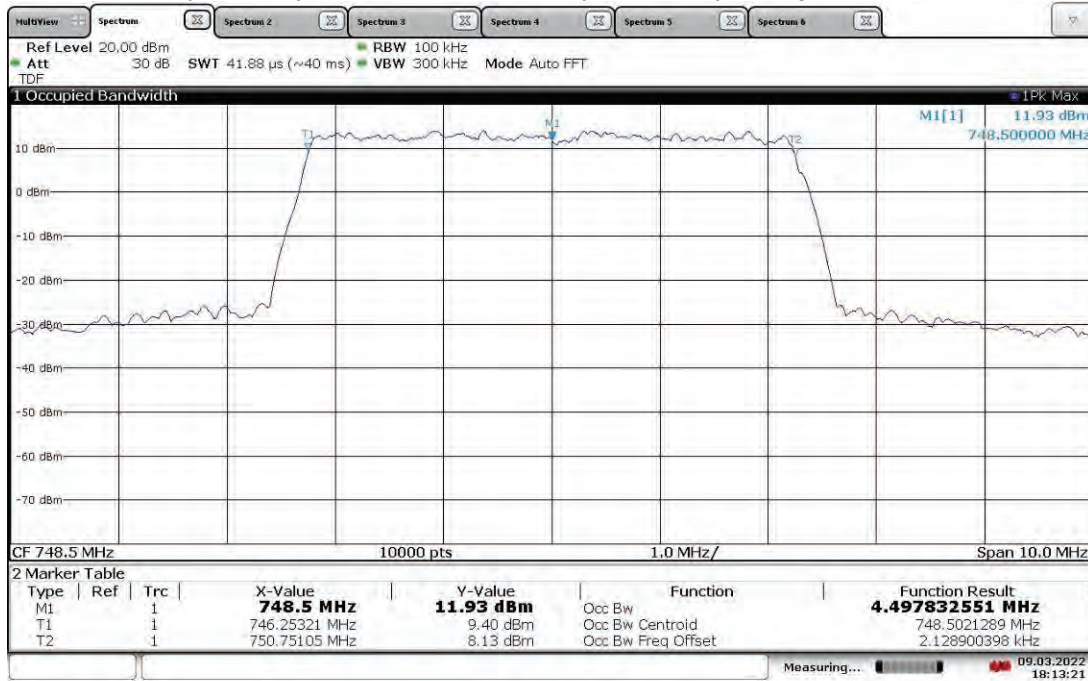
19:39:26 09.03.2022

TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Low Channel (748.5 MHz) Occupied Bandwidth

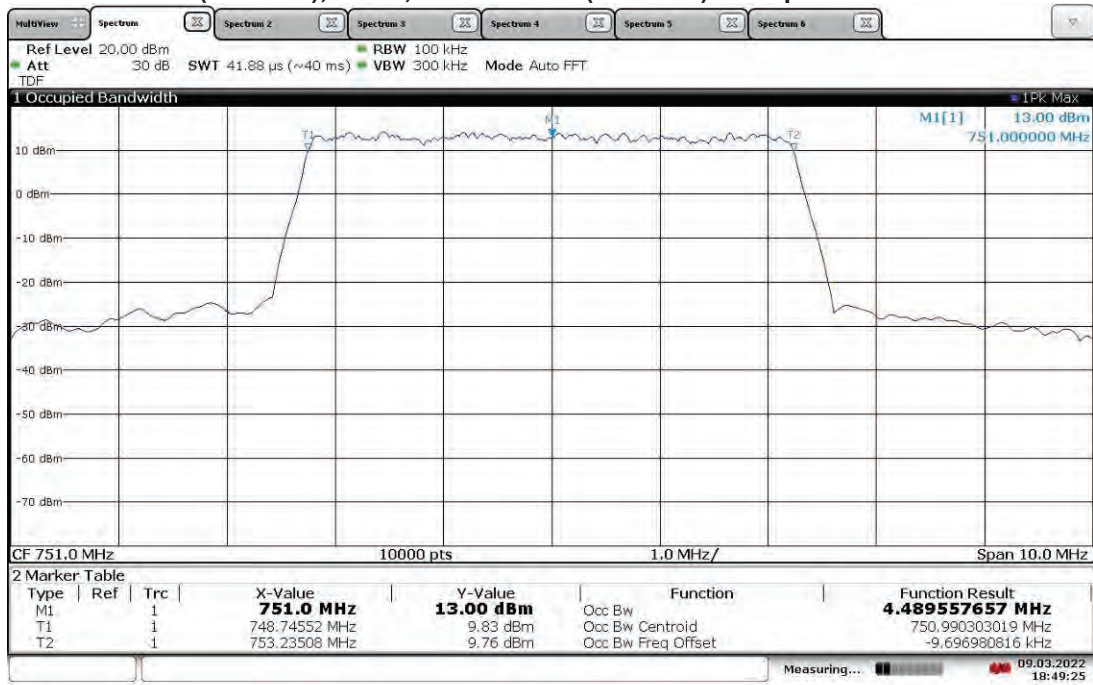


18:09:59 09.03.2022

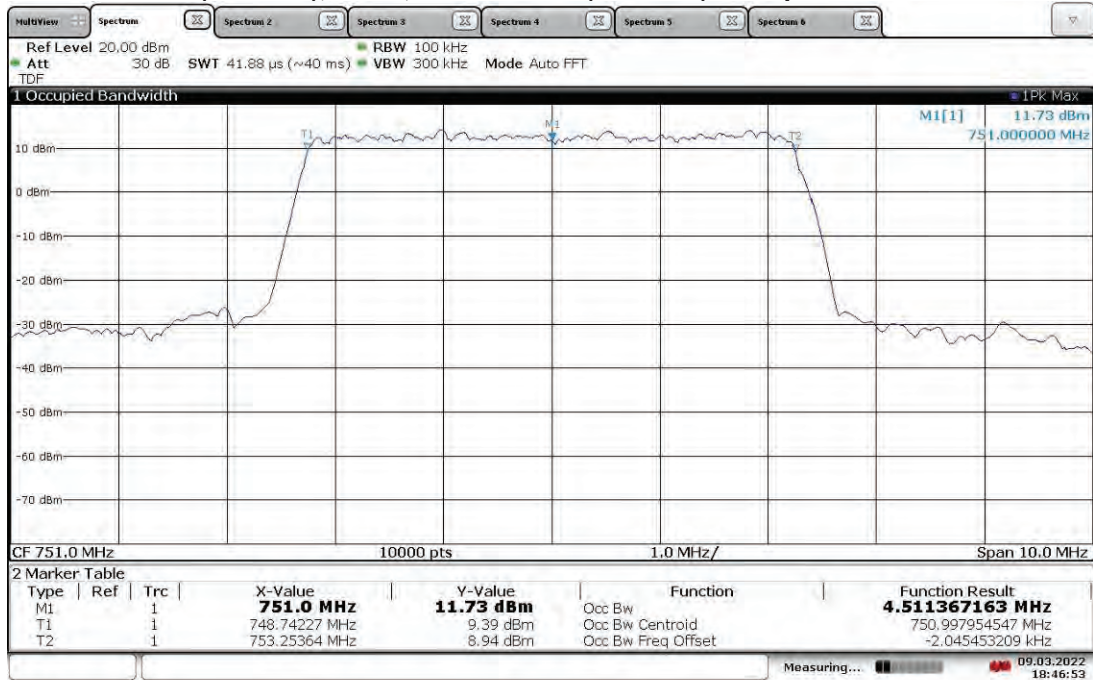
TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Low Channel (748.5 MHz) Occupied Bandwidth



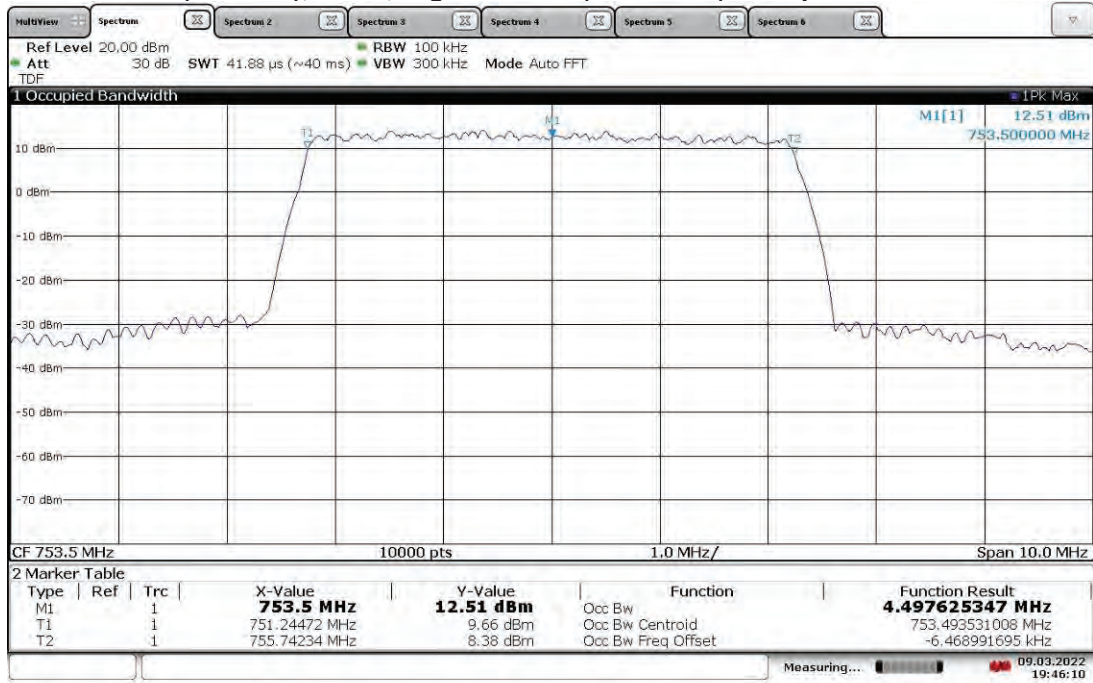
18:13:21 09.03.2022

**TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel (751 MHz) Occupied Bandwidth**

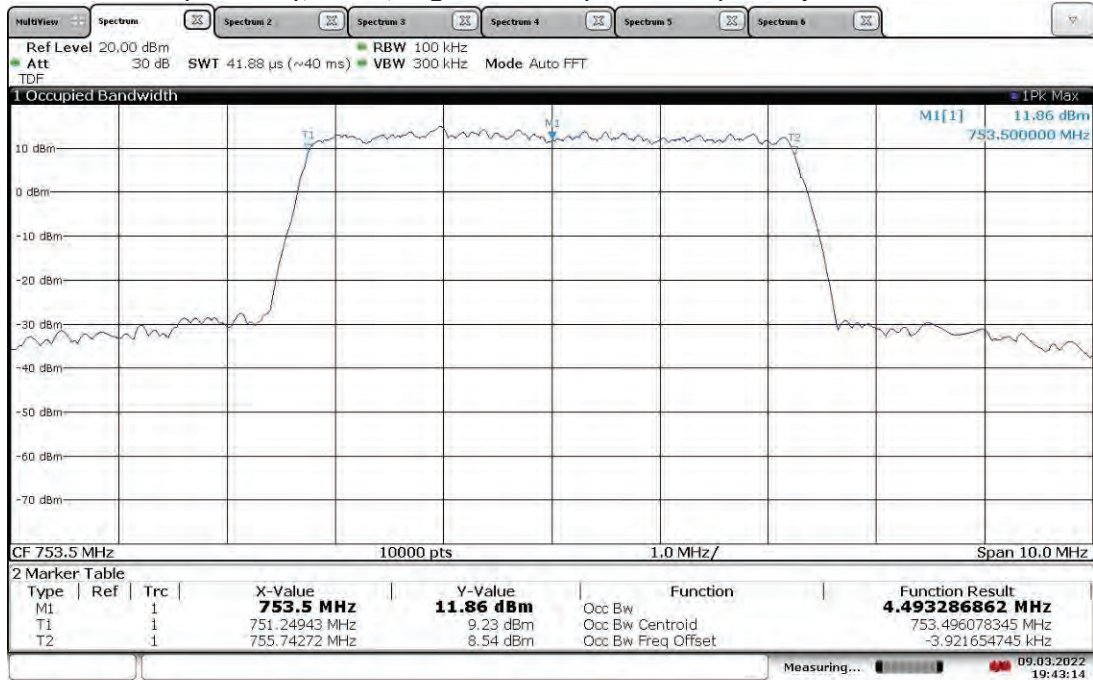
18:49:25 09.03.2022

**TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel (751 MHz) Occupied Bandwidth**

18:46:54 09.03.2022

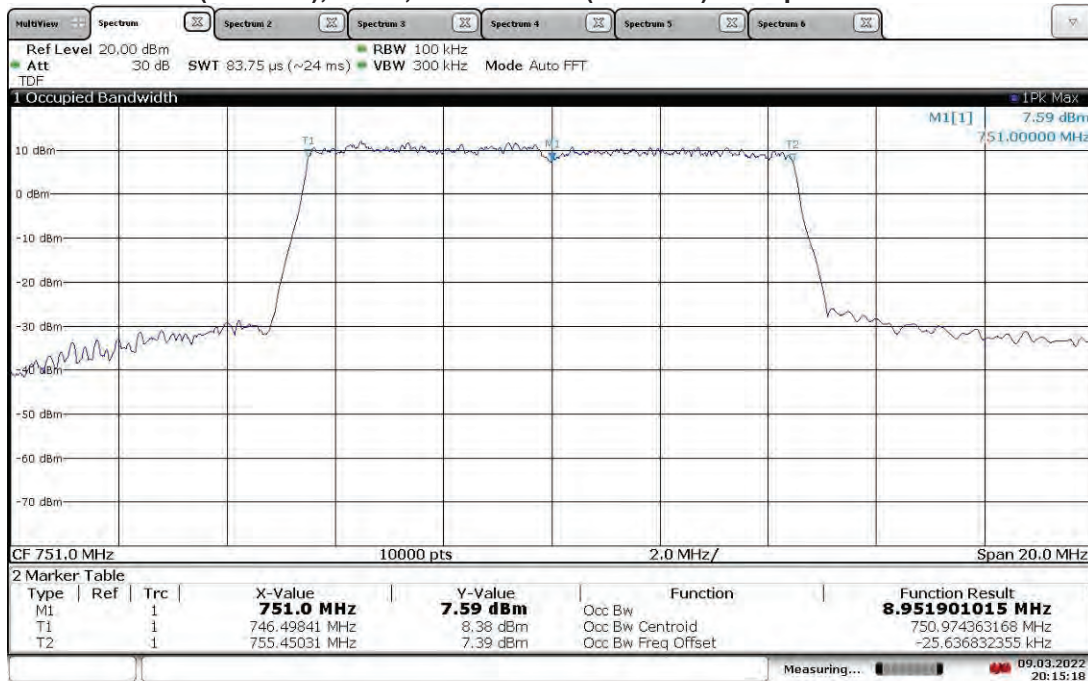
**TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, High Channel (753.5 MHz) Occupied Bandwidth**

19:46:10 09.03.2022

**TM3.1a-256QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, High Channel (753.5 MHz) Occupied Bandwidth**

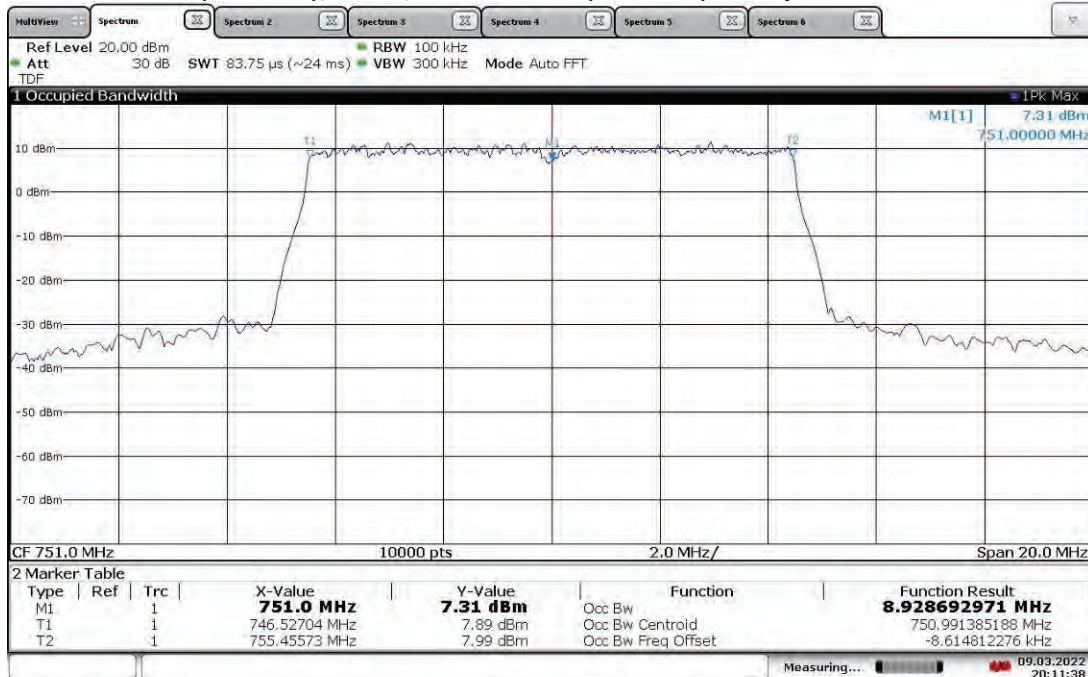
19:43:15 09.03.2022

TM1.1-QPSK\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel (751 MHz) Occupied Bandwidth



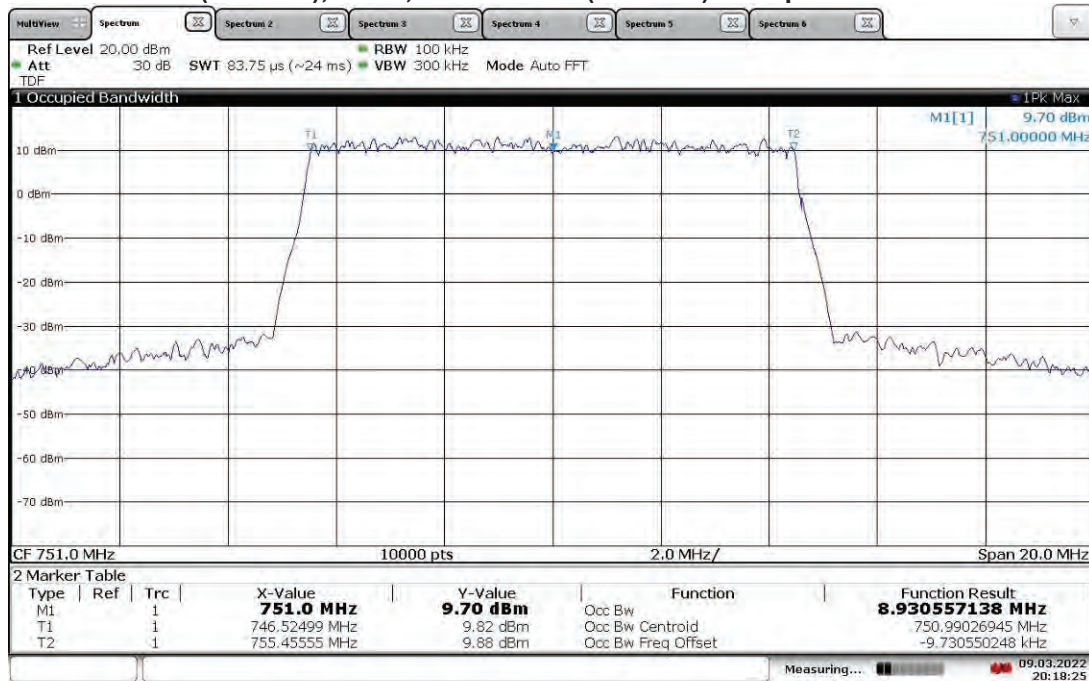
20:15:18 09.03.2022

TM1.1-QPSK\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel (751 MHz) Occupied Bandwidth



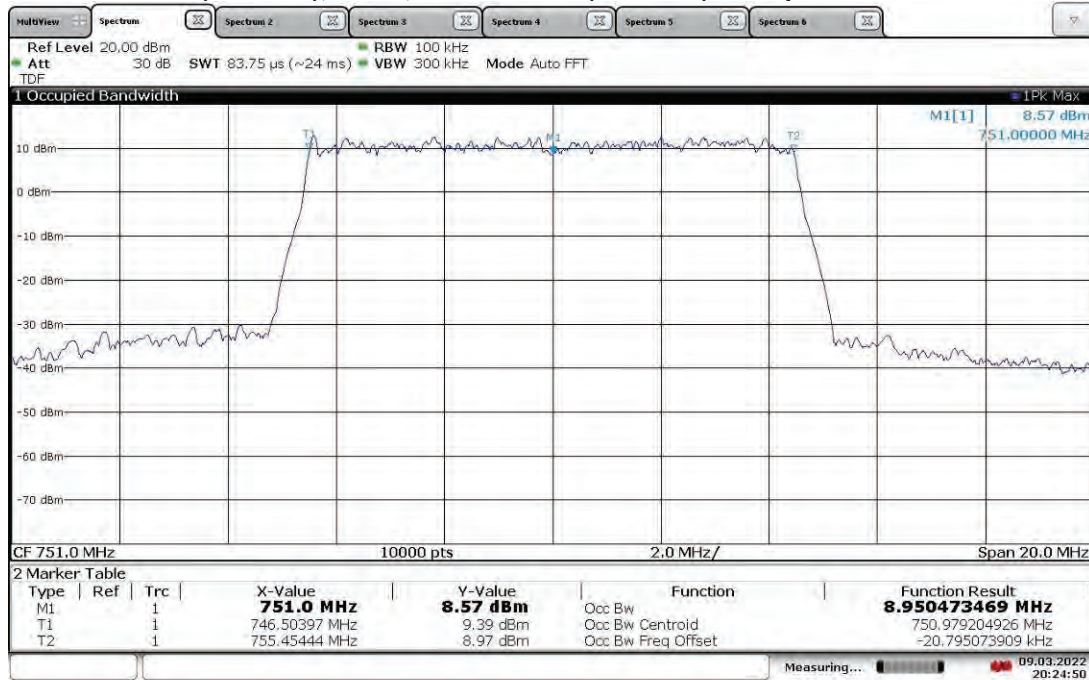
20:11:38 09.03.2022

TM3.2-16QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel (751 MHz) Occupied Bandwidth



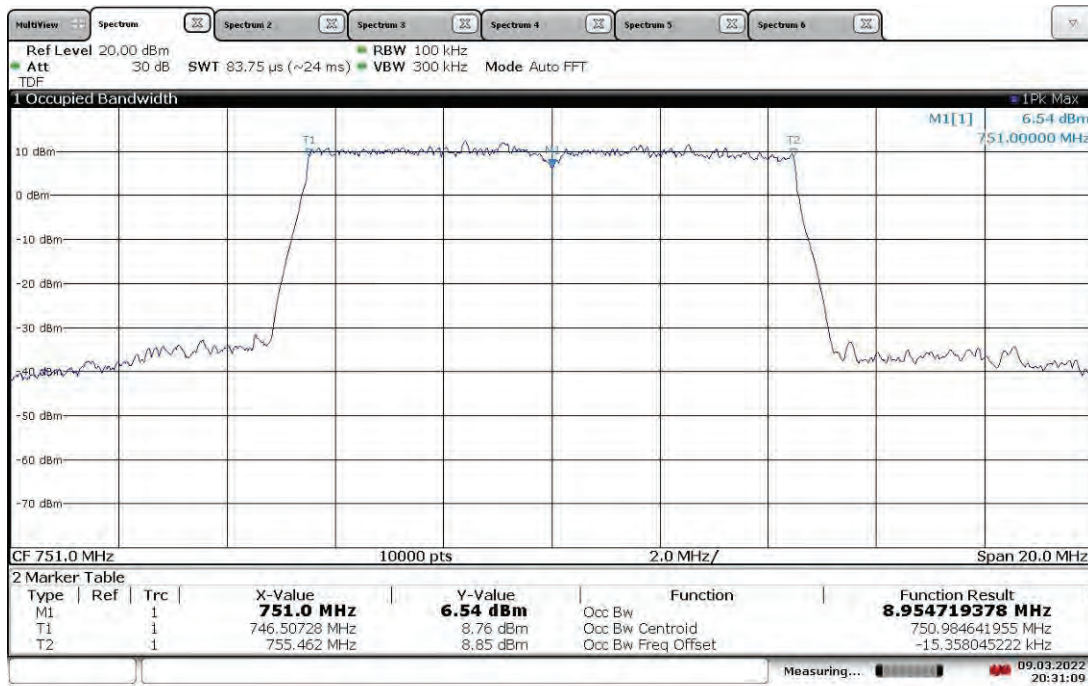
20:18:26 09.03.2022

TM3.2-16QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel (751 MHz) Occupied Bandwidth



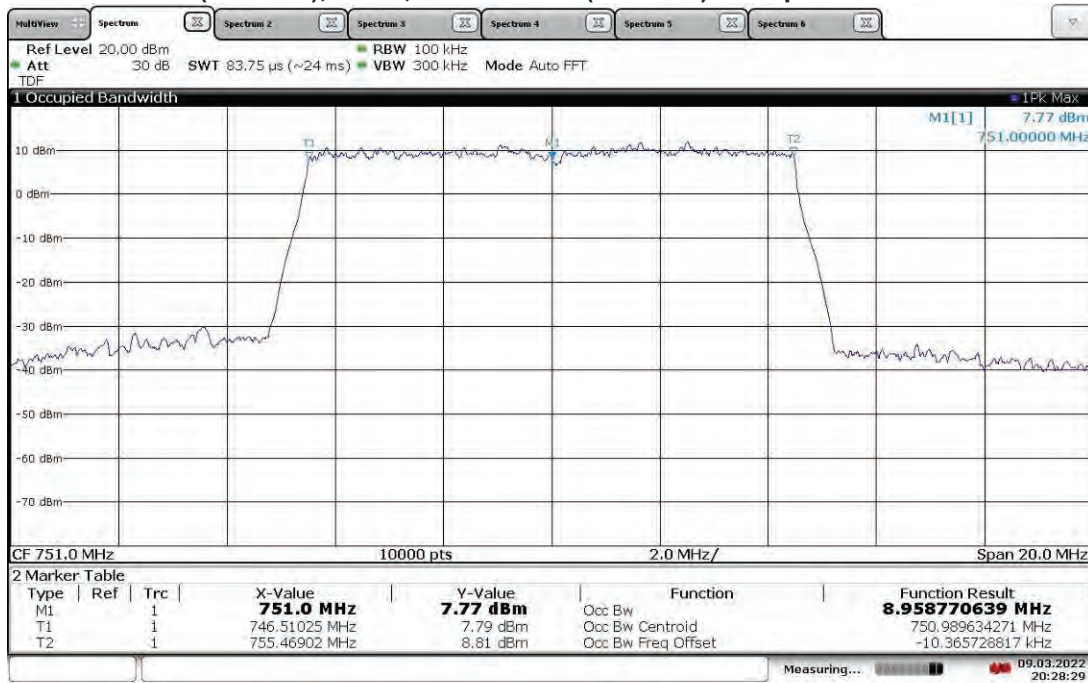
20:24:50 09.03.2022

**TM3.1-64QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel (751 MHz) Occupied Bandwidth**

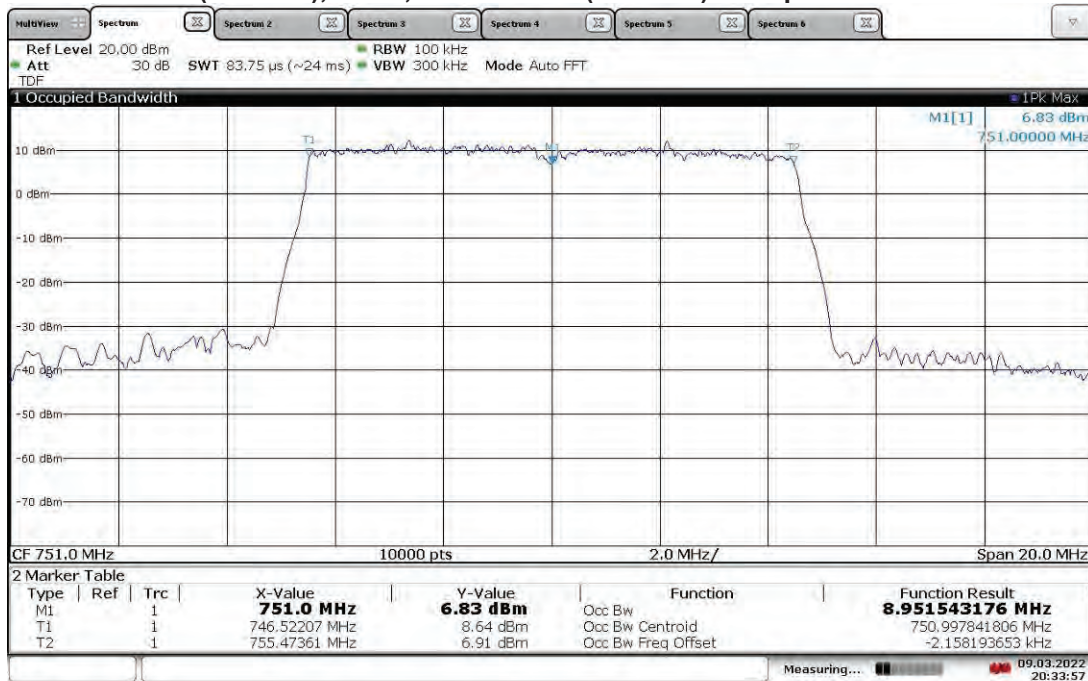


20:31:09 09.03.2022

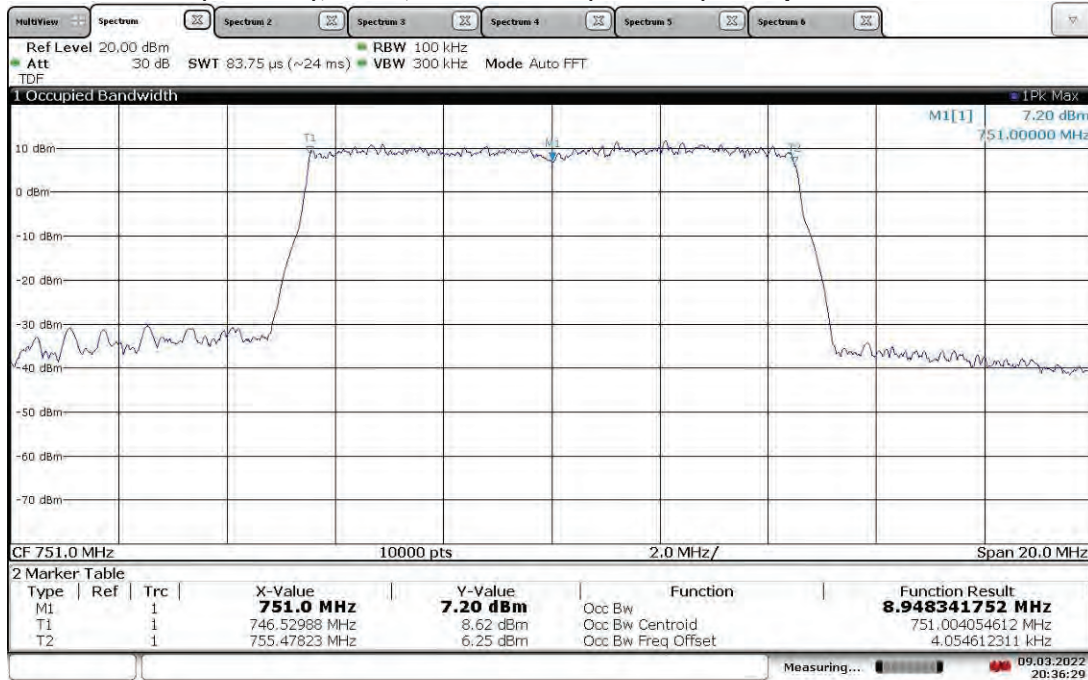
**TM3.1-64QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel (751 MHz) Occupied Bandwidth**



20:28:30 09.03.2022

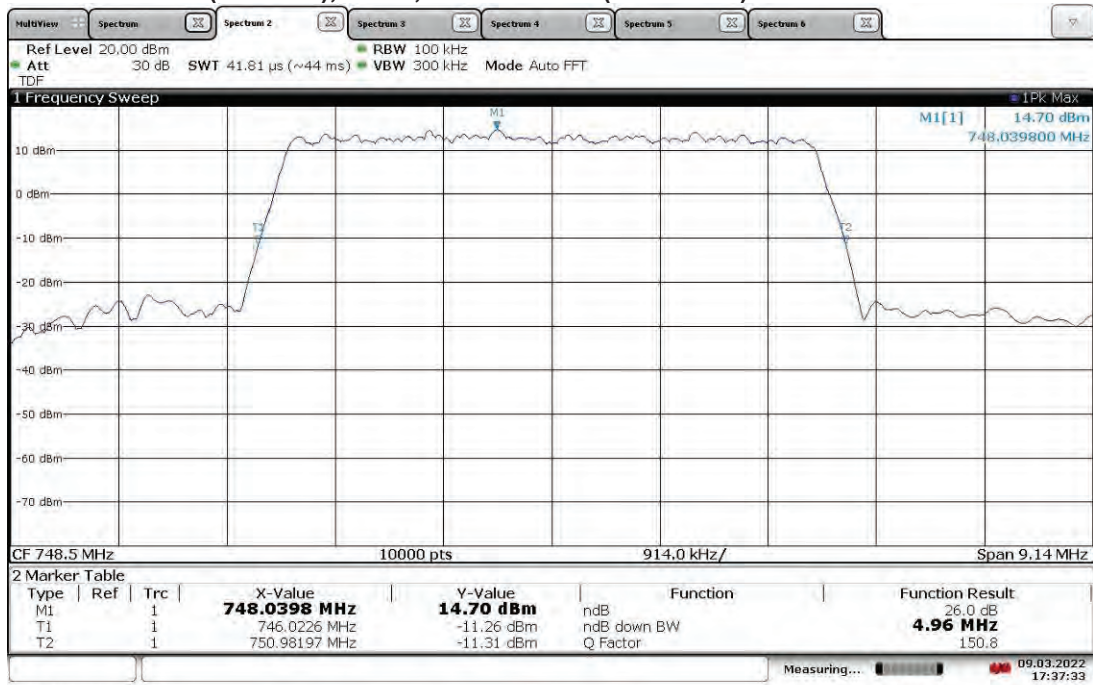
**TM3.1a-256QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel (751 MHz) Occupied Bandwidth**

20:33:57 09.03.2022

**TM3.1a-256QAM\_10 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel (751 MHz) Occupied Bandwidth**

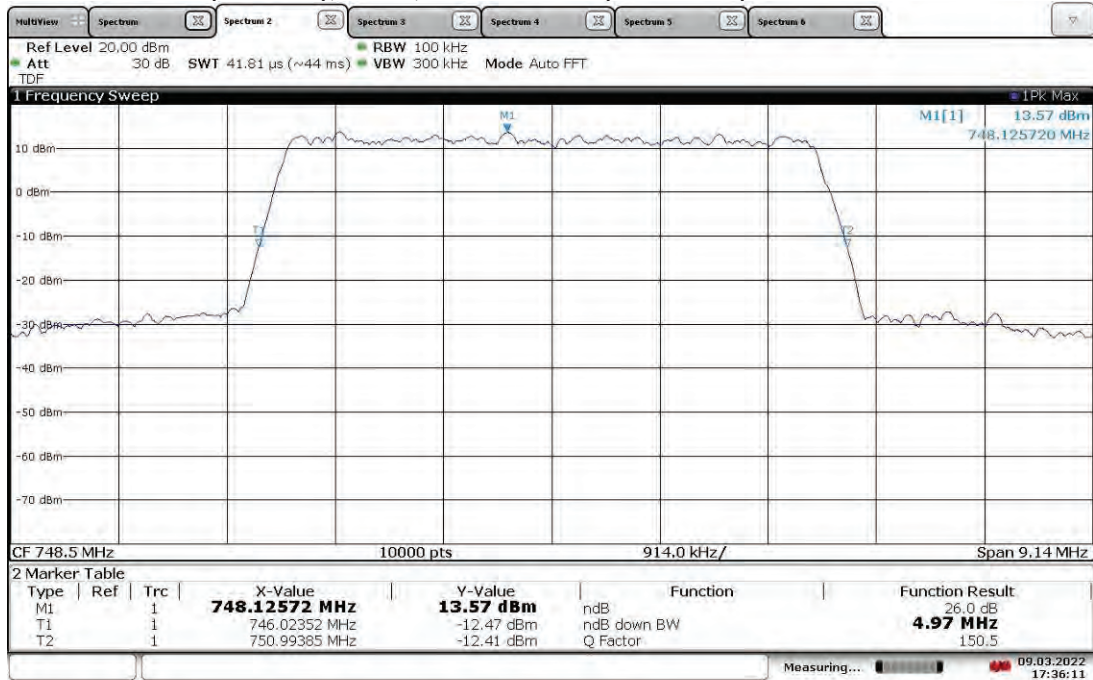
20:36:30 09.03.2022

TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Low Channel (748.5 MHz) 26 dB Bandwidth



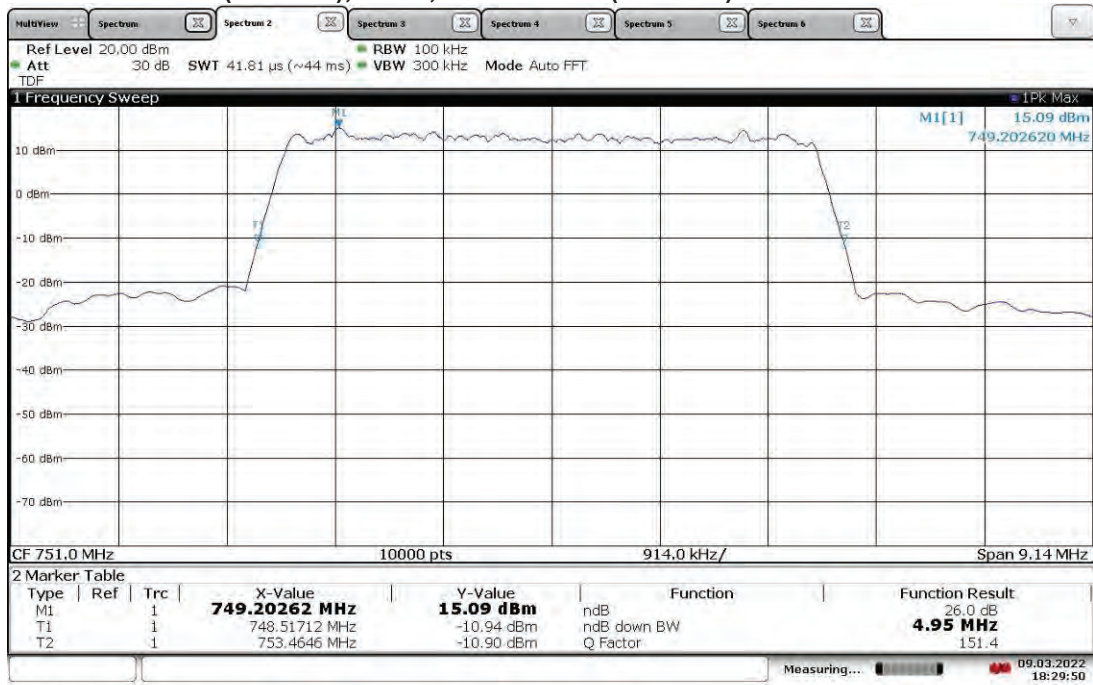
17:37:33 09.03.2022

TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Low Channel (748.5 MHz) 26 dB Bandwidth



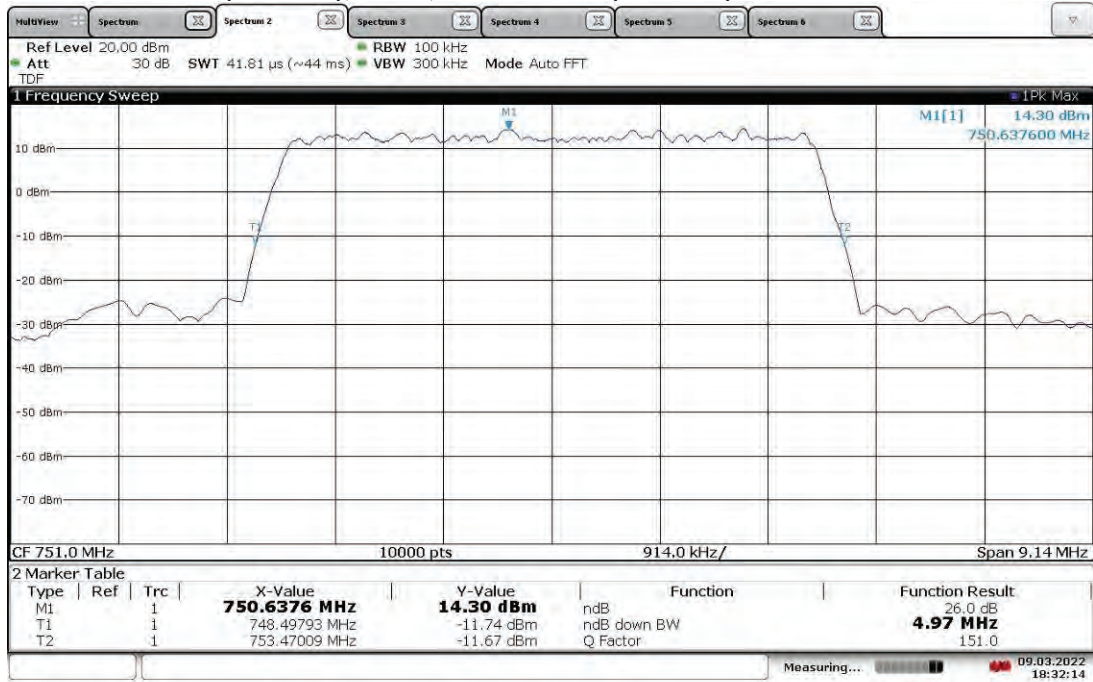
17:36:11 09.03.2022

TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel (751 MHz) 26 dB Bandwidth



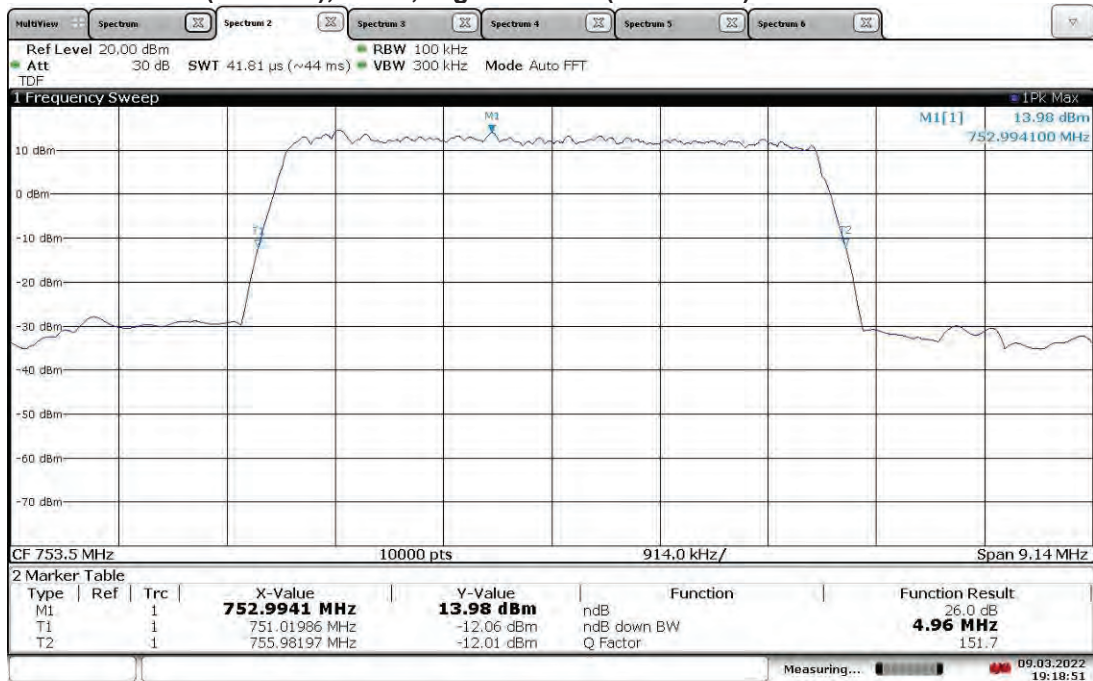
18:29:50 09.03.2022

TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel (751 MHz) 26 dB Bandwidth



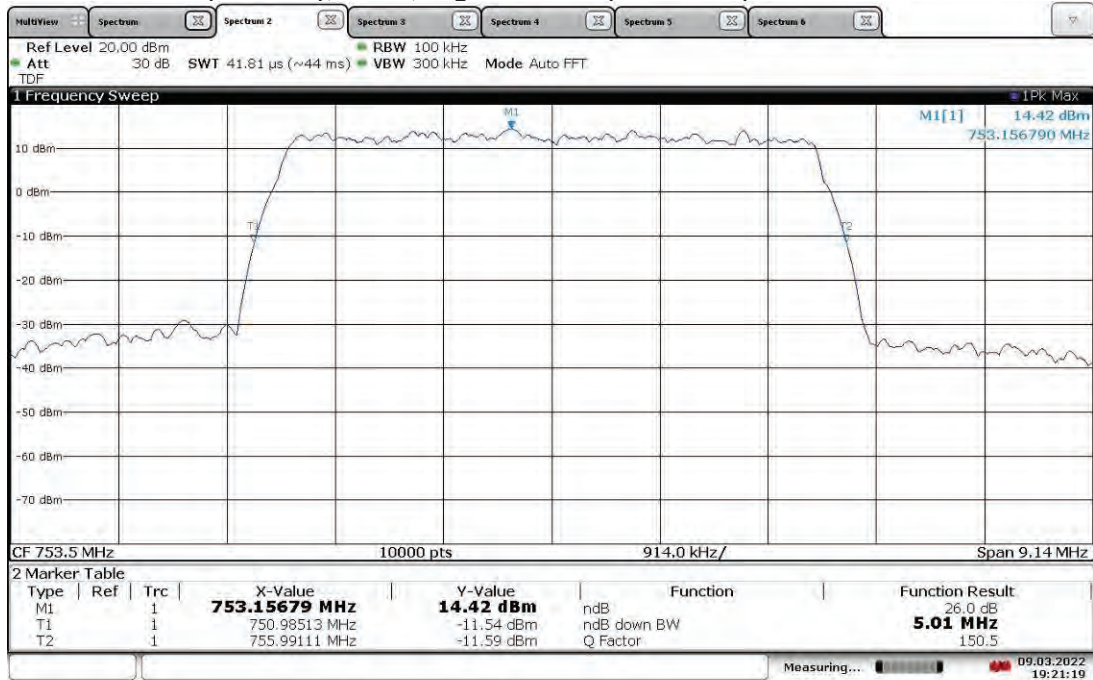
18:32:15 09.03.2022

TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, High Channel (753.5 MHz) 26 dB Bandwidth

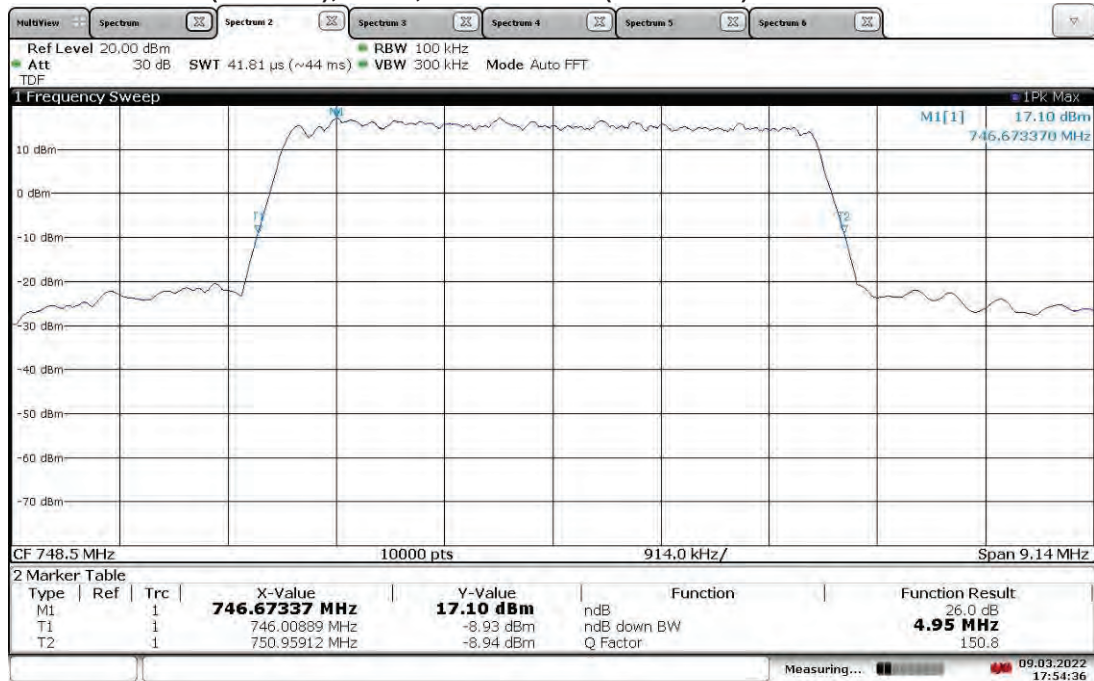


19:18:51 09.03.2022

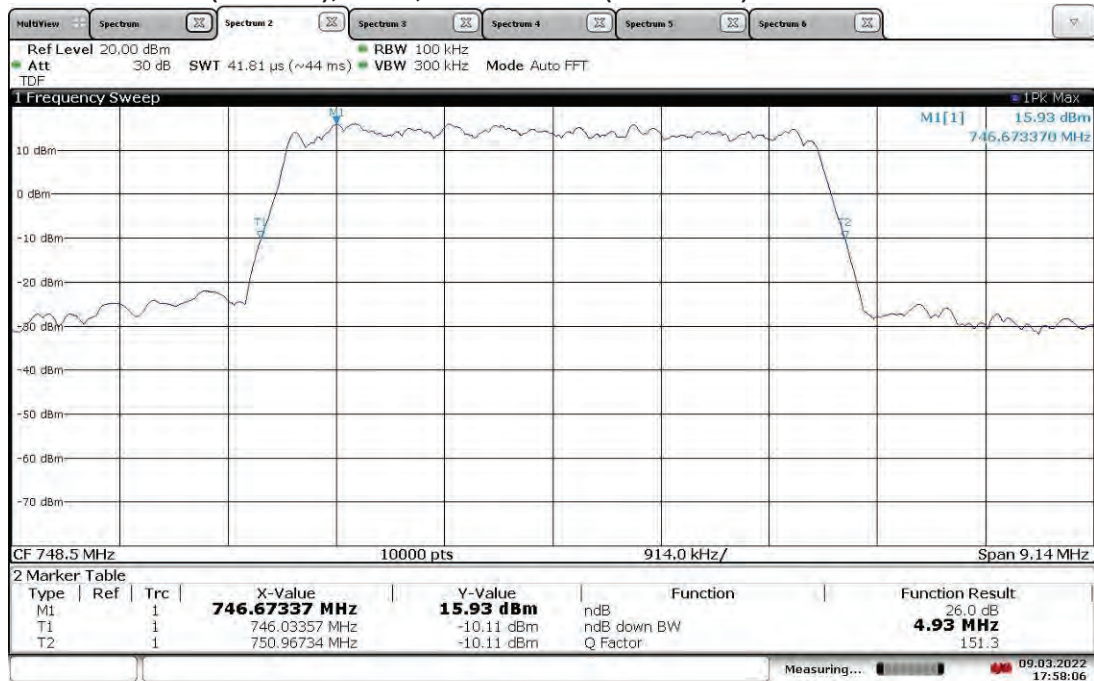
TM1.1-QPSK\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, High Channel (753.5 MHz) 26 dB Bandwidth



19:21:19 09.03.2022

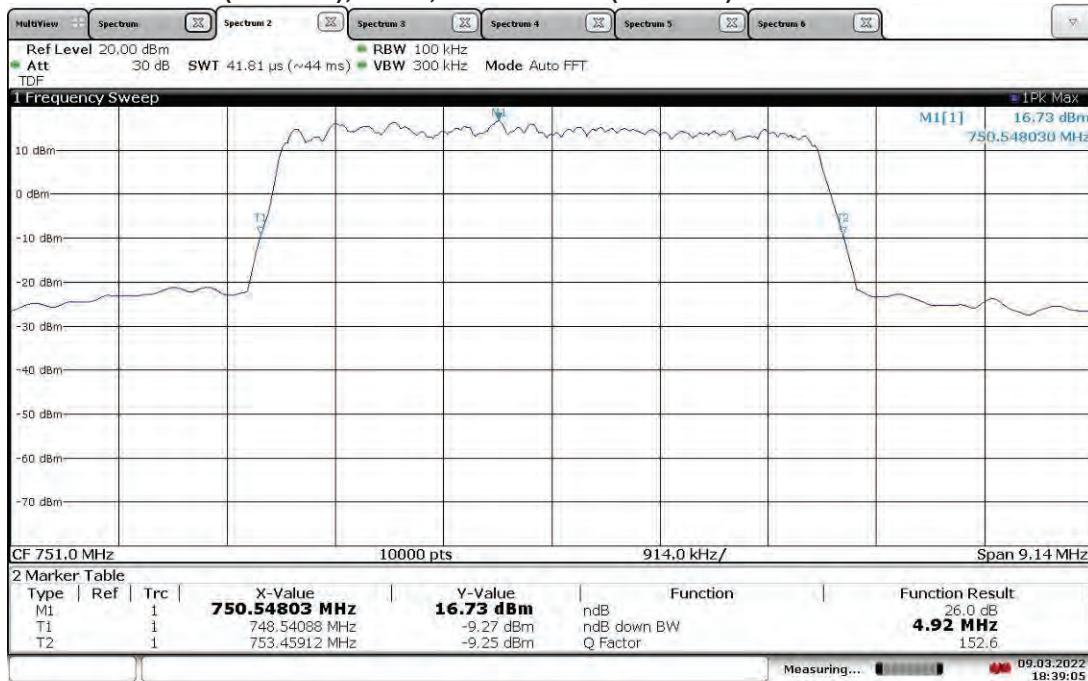
**TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Low Channel (748.5 MHz) 26 dB Bandwidth**

17:54:36 09.03.2022

**TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Low Channel (748.5 MHz) 26 dB Bandwidth**

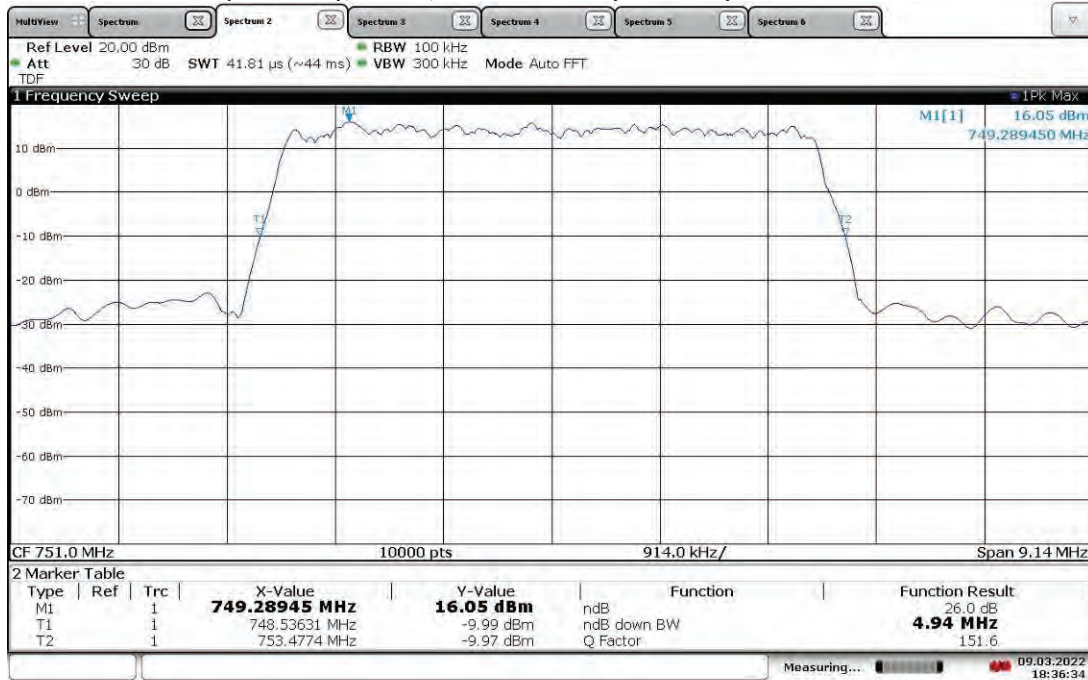
17:58:06 09.03.2022

TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Mid Channel (751 MHz) 26 dB Bandwidth



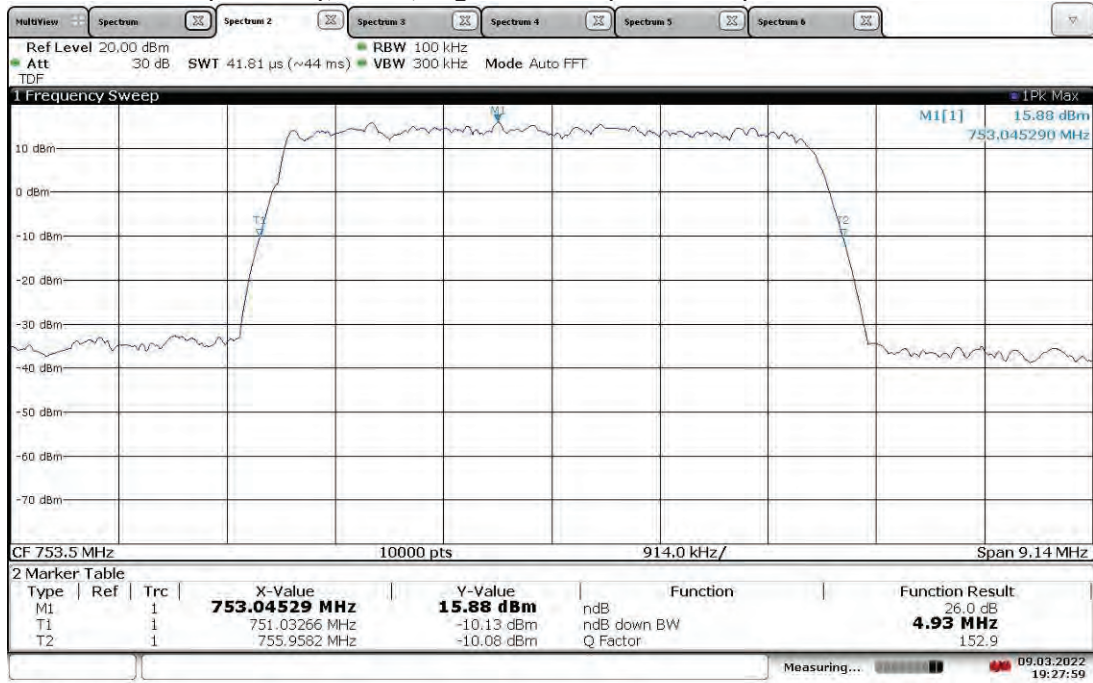
18:39:05 09.03.2022

TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Mid Channel (751 MHz) 26 dB Bandwidth



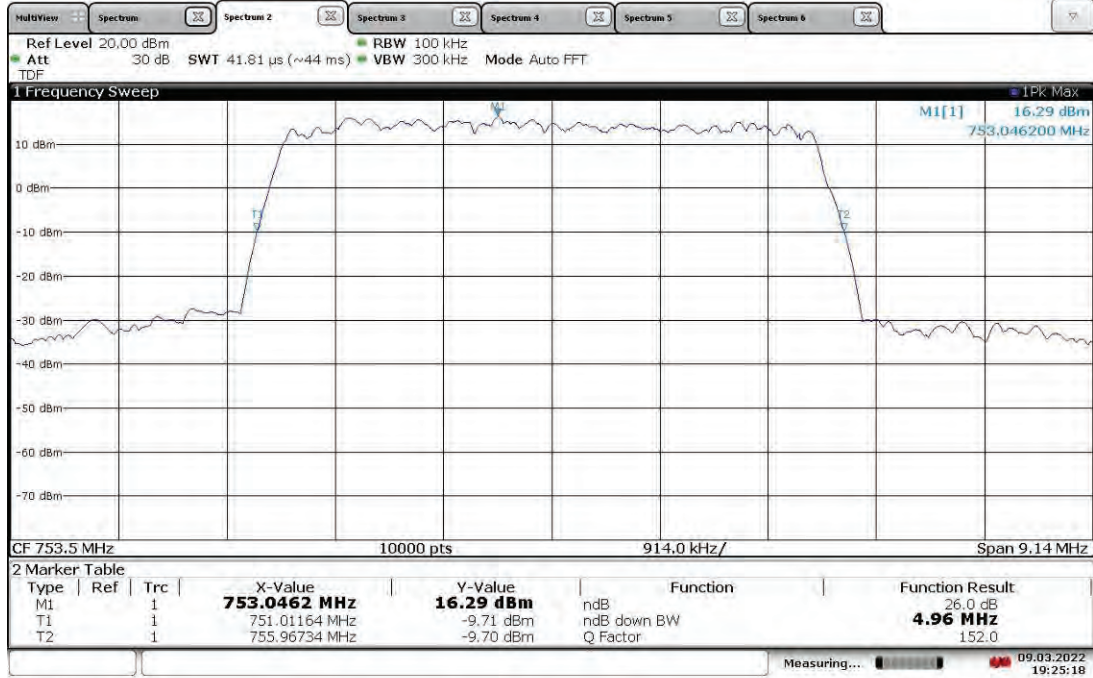
18:36:34 09.03.2022

TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, High Channel (753.5 MHz) 26 dB Bandwidth

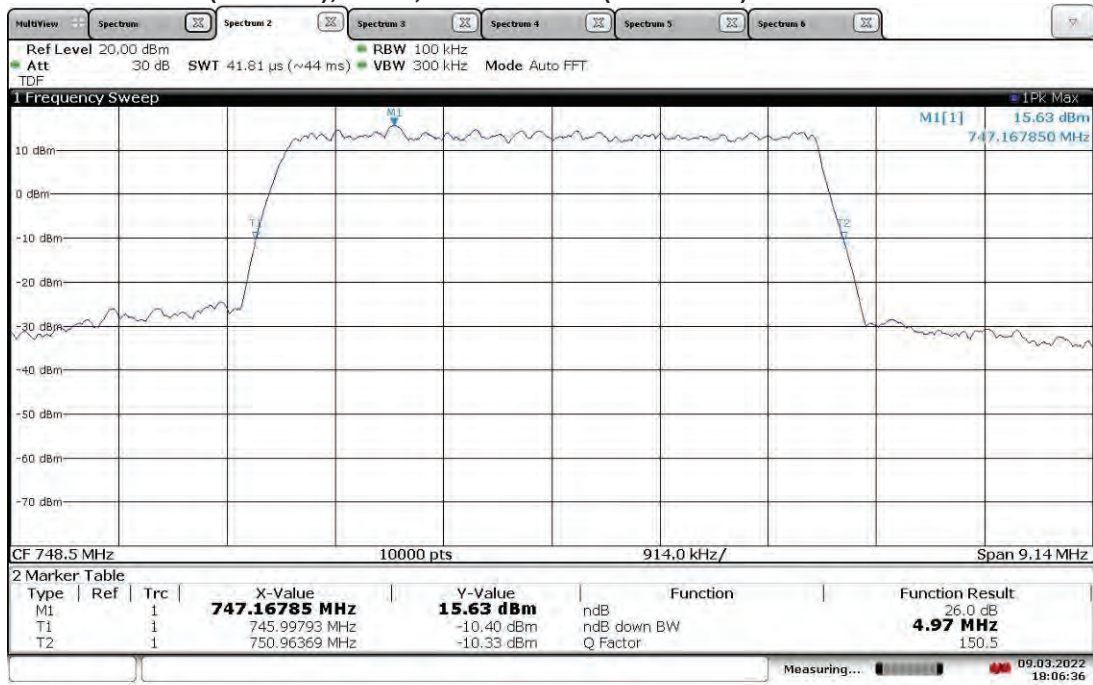


19:27:59 09.03.2022

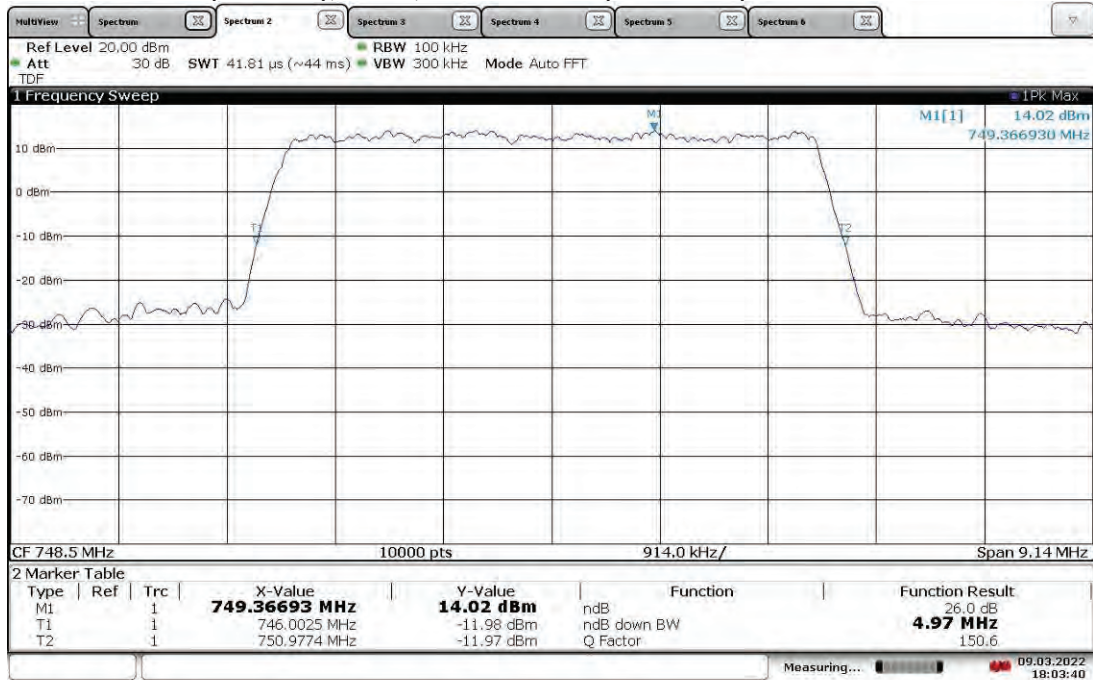
TM3.2-16QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, High Channel (753.5 MHz) 26 dB Bandwidth



19:25:18 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT0, Low Channel (748.5 MHz) 26 dB Bandwidth**

18:06:37 09.03.2022

**TM3.1-64QAM\_5 MHz Bandwidth (4G LTE) With RP5100 Host  
Slot 0 (Band 13), ANT1, Low Channel (748.5 MHz) 26 dB Bandwidth**

18:03:40 09.03.2022