



FCC RADIO TEST REPORT

FCC ID : S9GQ710US02
Equipment : LTE Access Point
Brand Name : Ruckus
Model Name : Q710US02
Applicant : Ruckus Wireless Inc.
350 W. Java Dr., Sunnyvale CA 94089 USA
Manufacturer : Ruckus Wireless Inc.
350 W. Java Dr., Sunnyvale CA 94089 USA
Standard : 47 CFR Part 2, 96

The product was received on Apr. 23, 2020 and testing was started from Apr. 28, 2020 and completed on May 08, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Ken Chen

Sporton International (USA) Inc.
1175 Montague Expressway, Milpitas, CA 95035



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Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items | Result (PASS/FAIL) | Remark |
|---------------|-------------------|---|--------------------|--------|
| 3.2 | §2.1046 | Conducted Output Power | Reporting only | - |
| - | §96.41 | Peak-to-Average Ratio | Not Required | - |
| 3.3 | §96.41 | Effective Isotropic Radiated Power | Pass | - |
| | | Power Density | Pass | - |
| 3.4 | §2.1049 §96.41 | Occupied Bandwidth | Reporting only | - |
| - | §2.1051 §96.41 | Conducted Band Edge Measurement | Not Required | - |
| - | §2.1051 §96.41 | Conducted Spurious Emission | Not Required | - |
| - | §2.1055 | Frequency Stability for Temperature & Voltage | Not Required | - |
| - | §2.1051 §96.41 | Radiated Spurious Emission | Not Required | - |

Remark: This is a variant report by adding 256QAM modulation. All the test cases were performed on original report which can be referred to FCC ID: S9GQ710US02.

| |
|--|
| Declaration of Conformity: |
| The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. |
| Comments and Explanations: |
| The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification. |



1 General Description

1.1 Product Feature of Equipment Under Test

LTE

| Product Specification subjective to this standard | |
|---|---------------------------|
| Antenna Type | Internal BeamFlex Antenna |

1.2 Modification of EUT

No modifications are made to the EUT during all test items.

1.3 Testing Location

| | |
|--------------------|---|
| Test Site | Sporton International (USA) Inc. |
| Test Site Location | 1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300 |
| Test Site No. | Sporton Site No. |
| | TH01-CA |
| Test Engineer | Jordan Huang |
| Temperature | 21~25°C |
| Relative Humidity | 51~54% |

1.4 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ 47 CFR Part 2, 96
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 940660 D01 Part 96 CBRS Eqpt v02
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

| Test Items | Band | Bandwidth (MHz) | | | | | | Modulation | | | | RB # | | | Test Channel | | |
|------------------------|---|-----------------|---|---|----|----|----|------------|-------|-------|--------|------|------|------|--------------|---|---|
| | | 1.4 | 3 | 5 | 10 | 15 | 20 | QPSK | 16QAM | 64QAM | 256QAM | 1 | Half | Full | L | M | H |
| Max. Output Power | 48 | - | - | | v | | v | | | | v | v | v | v | v | v | v |
| EIRP Power Density | 48 | - | - | | v | | v | | | | v | | | v | v | v | v |
| 26dB and 99% Bandwidth | 48 | - | - | | v | | v | | | | v | | | v | v | v | v |
| E.R.P / E.I.R.P | 48 | - | - | | v | | v | | | | v | | | v | v | v | v |
| Remark | <ol style="list-style-type: none"> The mark "v" means that this configuration is chosen for testing The mark "-" means that this bandwidth is not supported. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. | | | | | | | | | | | | | | | | |

| Test Items | Band | Bandwidth (MHz) | | | | | | | Modulation | | | | RB # | | | Test Channel | | |
|------------------------|---|-----------------|------|-------|-------|-------|-------|-------|------------|-------|-------|--------|------|------|------|--------------|---|---|
| | | 5+20 | 20+5 | 10+20 | 20+10 | 15+20 | 20+15 | 20+20 | QPSK | 16QAM | 64QAM | 256QAM | 1 | Half | Full | L | M | H |
| Max. Output Power | 48C_CA | | | | | | | v | | | | v | v | v | v | v | v | |
| EIRP Power Density | 48C_CA | | | | | | | v | | | | v | | | v | v | v | |
| 26dB and 99% Bandwidth | 48C_CA | | | | | | | v | | | | v | | | v | v | v | |
| E.I.R.P. | 48C_CA | | | | | | | v | | | | v | | | v | v | v | |
| Remark | <ol style="list-style-type: none"> The mark "v" means that this configuration is chosen for testing The mark "-" means that this bandwidth is not supported. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. | | | | | | | | | | | | | | | | | |



2.2 EUT Operation Test Setup

The RF test items, utility “TMCIDVtClient tool ” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

2.3 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

$$\text{Offset} = \text{RF cable loss} + \text{attenuator factor}.$$

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 4.2 + 10 = 14.2 \text{ (dB)} \end{aligned}$$

2.4 Frequency List of Low/Middle/High Channels

| LTE Band 48 Channel and Frequency List | | | | |
|--|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 55340 | 55990 | 56640 |
| | Frequency | 3560.0 | 3625.0 | 3690.0 |
| 10 | Channel | 55290 | 55990 | 56690 |
| | Frequency | 3555.0 | 3625.0 | 3695.0 |

| LTE Band 48C Channel and Frequency List_CA | | | | | |
|--|------------------------|-----------|--------|---------|--------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest | |
| 20M + 20M | PCC | Channel | 55340 | 55891 | 56442 |
| | | Frequency | 3560 | 3615.1 | 3670.2 |
| | SCC | Channel | 55538 | 56089 | 56640 |
| | | Frequency | 3579.8 | 3634.9 | 3690 |

3 Conducted Test Items

3.1 Measuring Instruments

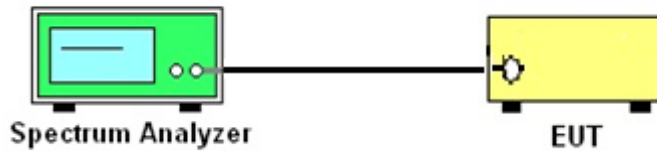
See list of measuring instruments of this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 EIRP Power Density, Occupied Bandwidth



3.1.4 Test Result of Conducted Test

Please refer to Appendix A.



3.2 Conducted Output Power

3.2.1 Description of the Conducted Output Power Measurement

The EUT shall be set at maximum power through commands provided by manufacturer. The measured power in the radio frequency at the transmitter output terminals shall be reported.

3.2.2 Test Procedures

1. Connect the transmitter output port of EUT to the spectrum analyzer.
2. Set EUT to transmit at maximum output power.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum power at RF output terminals.



3.3 EIRP and Power Density

3.3.1 Description of the EIRP and Power Density Measurement

The EUT shall be set at maximum power through commands provided by manufacturer, and the EIRP limit shall apply to any 10 MHz portion of the bandwidth.

The testing follows ANSI C63.26-2015 Section 5.2.5.5

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

EIRP and PSD limits for CBRS equipment as below tabel:

| Device | Maximum EIRP (dBm/10 MHz) | Maximum PSD (dBm/MHz) |
|-----------------|------------------------------|--------------------------|
| Category A CBSD | 30 | 20 |

3.3.2 Test Procedures

The testing follows procedure in Section 5.2 of ANSI C63.26-2015 and KDB 940660 D01 Part 96 Eqpt v02 Section 3.2(b)

1. Set instrument center frequency to OBW center frequency.
2. Set span to at least 1.5 times the OBW.
3. Set the RBW to the specified reference bandwidth (often 1 MHz).
4. Set VBW $\geq 3 \times$ RBW.
5. Detector = RMS (power averaging).
6. Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Use the peak marker function to determine the maximum amplitude level within the reference bandwidth (PSD).
10. Determine the EIRP by adding the effective antenna gain to the adjusted power level.
11. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
Method (a): Measure and sum the spectra across the outputs.
The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points; the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.



3.4 Occupied Bandwidth

3.4.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.4.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

1. The EUT was connected to spectrum analyzer via a power divider.
2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
3. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
4. Set the detection mode to peak, and the trace mode to max hold.
5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.
(this is the reference value)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.



4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|-----------------|--------------------|-----------|------------|-----------------|------------------|---------------------------------|---------------|------------------------|
| Hygrometer | Testo | 608-H1 | 45142595 | N/A | Aug. 07, 2019 | Apr. 28, 2020~ May 08, 2020 | Aug. 06, 2020 | Conducted (TH01-CA) |
| Signal Analyzer | Rohde & Schwarz | FSV40 | 101089 | 10Hz~40GHz | Aug. 29, 2019 | Apr. 28, 2020 ~ May 08, 2020 | Aug. 28, 2020 | Conducted (TH01-CA) |



Appendix A. Test Results of Conducted Test



LTE Band 48

Average Power

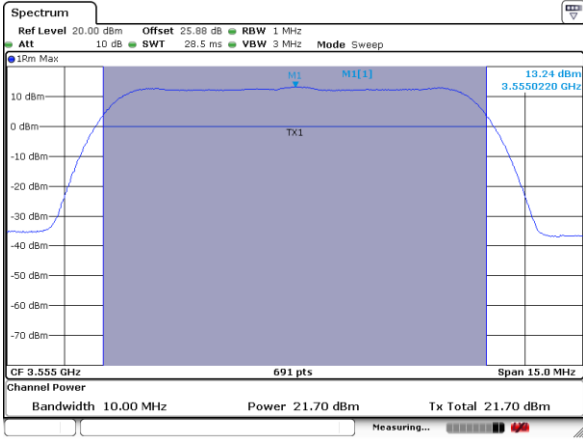
| LTE_10MHz_256QAM_2TX | | | | | | |
|----------------------|-----------------|----------|--------------|--------------|-------------|-----------|
| Channel | Frequency (MHz) | DG (dBi) | Port 1 (dBm) | Port 2 (dBm) | Power (dBm) | Power (W) |
| 55290 | 3555 | 2.1 | 21.70 | 21.56 | 24.64 | 0.2911 |
| 55990 | 3625 | 2.1 | 21.47 | 21.55 | 24.52 | 0.2832 |
| 56690 | 3695 | 2.1 | 21.67 | 21.89 | 24.79 | 0.3014 |

| LTE_20MHz_256QAM_2TX | | | | | | |
|----------------------|-----------------|----------|--------------|--------------|-------------|-----------|
| Channel | Frequency (MHz) | DG (dBi) | Port 1 (dBm) | Port 2 (dBm) | Power (dBm) | Power (W) |
| 55340 | 3560 | 2.1 | 22.86 | 22.94 | 25.91 | 0.3900 |
| 55990 | 3625 | 2.1 | 22.98 | 22.98 | 25.99 | 0.3972 |
| 56640 | 3690 | 2.1 | 23.11 | 23.20 | 26.17 | 0.4136 |

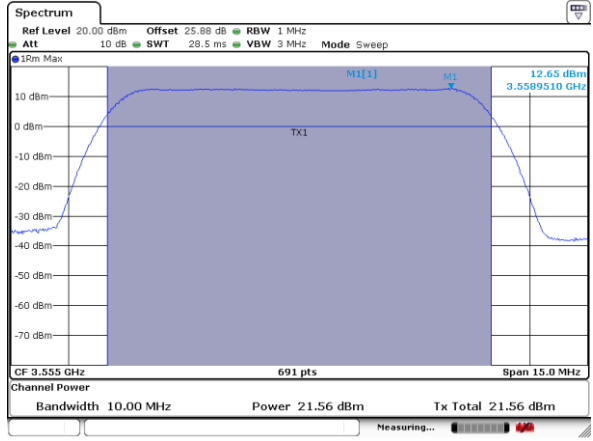


LTE Band 48

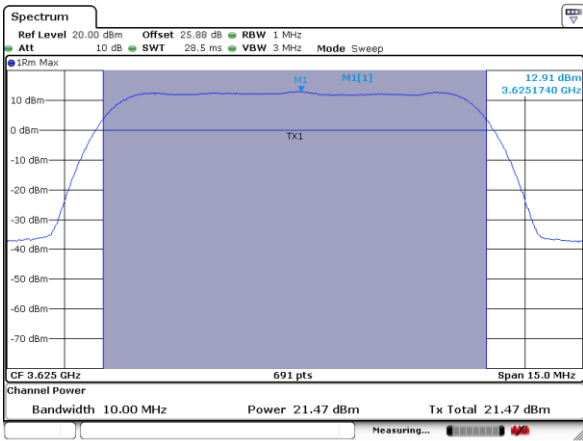
Lowest Channel / 10MHz / 256QAM_Port 1



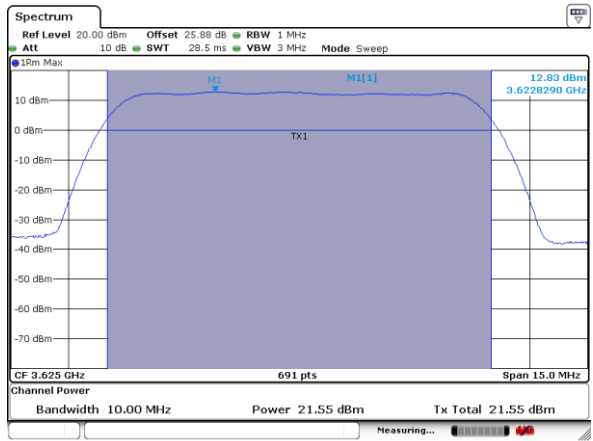
Lowest Channel / 10MHz / 256QAM_Port 2



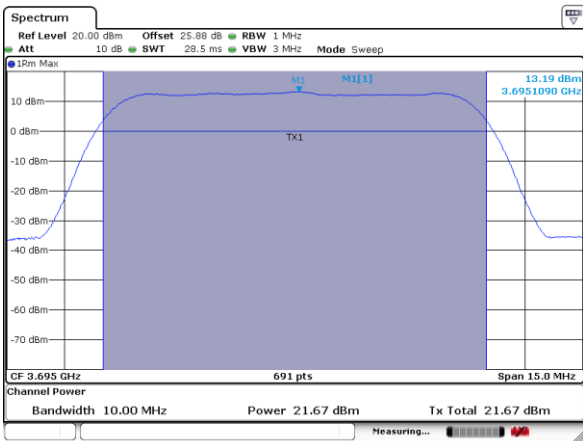
Middle Channel / 10MHz / 256QAM_Port 1



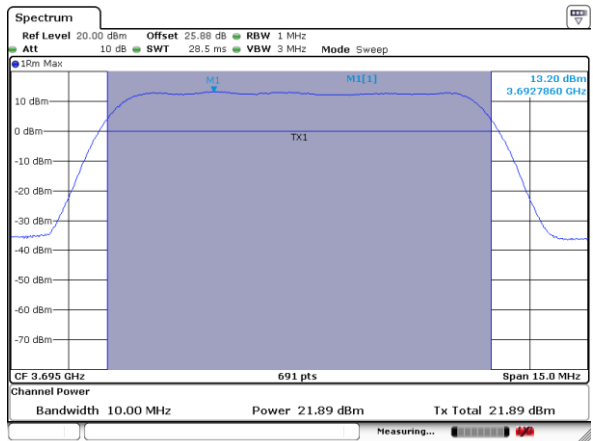
Middle Channel / 10MHz / 256QAM_Port 2



Highest Channel / 10MHz / 256QAM_Port 1



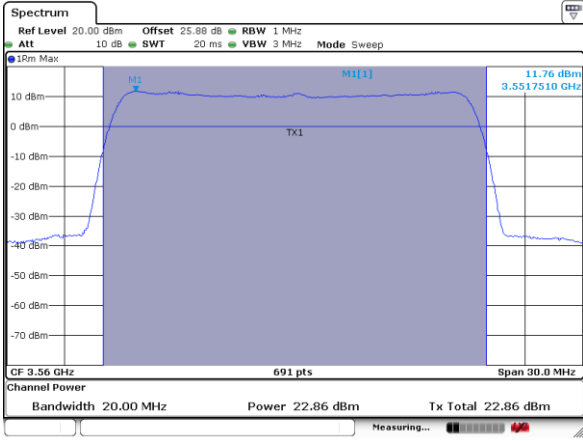
Highest Channel / 10MHz / 256QAM_Port 2





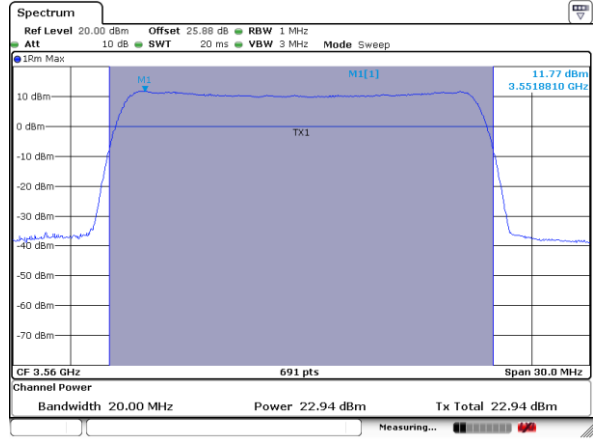
LTE Band 48

Lowest Channel / 20MHz / 256QAM_Port 1



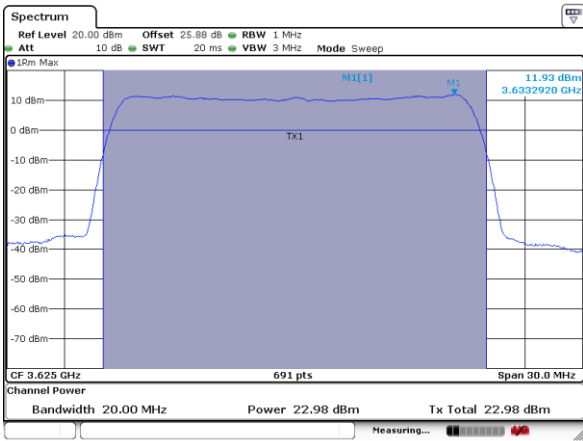
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Lowest Channel / 20MHz / 256QAM_Port 2



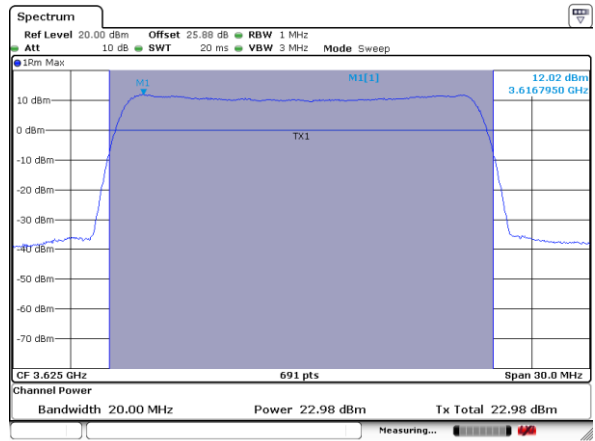
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Middle Channel / 20MHz / 256QAM_Port 1



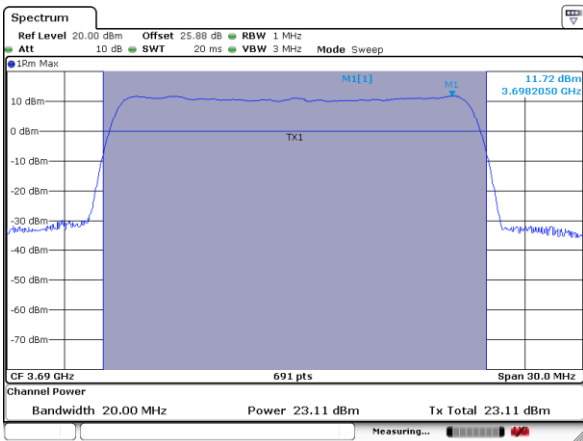
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Middle Channel / 20MHz / 256QAM_Port 2



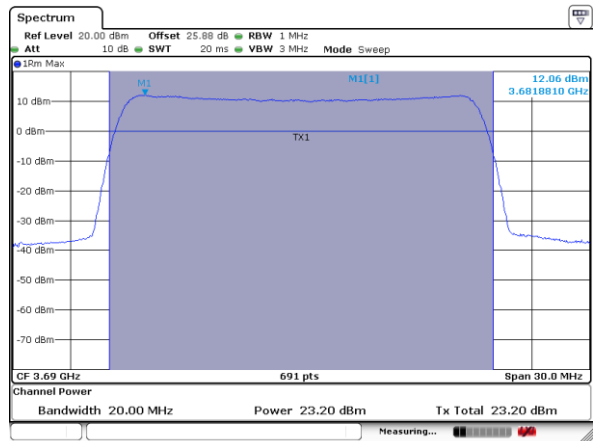
Date: 29 APR 2020 16:33:23

Highest Channel / 20MHz / 256QAM_Port 1



Date: 29 APR 2020 16:44:19

Highest Channel / 20MHz / 256QAM_Port 2



Date: 29 APR 2020 16:45:59



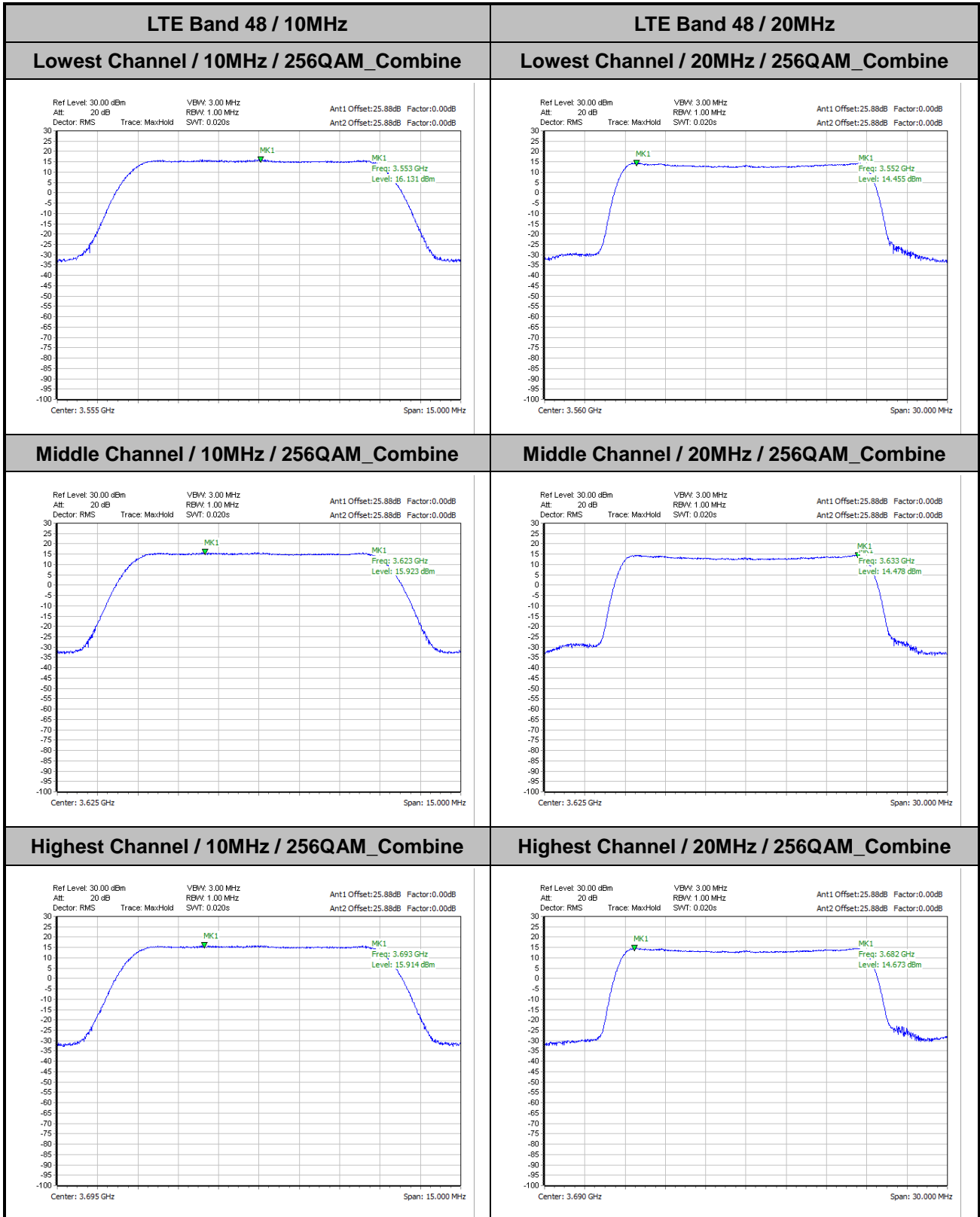
EIRP Power Density

| LTE_10MHz_256QAM_2TX | | | | | | |
|----------------------|-----------------|----------|-------------|-----------|------------|----------|
| Channel | Frequency (MHz) | DG (dBi) | Power (dBm) | Power (W) | EIRP (dBm) | EIRP (W) |
| 55290 | 3555 | 2.1 | 24.64 | 0.2911 | 26.74 | 0.4722 |
| 55990 | 3625 | 2.1 | 24.52 | 0.2832 | 26.62 | 0.4592 |
| 56690 | 3695 | 2.1 | 24.79 | 0.3014 | 26.89 | 0.4888 |

| LTE_10MHz_256QAM_2TX | | | | | |
|----------------------|-----------------|----------|---------------|--------------------|--------------------------|
| Channel | Frequency (MHz) | DG (dBi) | PSD (dBm/MHz) | EIRP PSD (dBm/MHz) | EIRP PSD Limit (dBm/MHz) |
| 55290 | 3555 | 2.1 | 16.13 | 18.23 | 20 |
| 55990 | 3625 | 2.1 | 15.92 | 18.02 | |
| 56690 | 3695 | 2.1 | 15.91 | 18.01 | |

| LTE_20MHz_256QAM_2TX | | | | | | |
|----------------------|-----------------|----------|-------------|-----------|------------|----------|
| Channel | Frequency (MHz) | DG (dBi) | Power (dBm) | Power (W) | EIRP (dBm) | EIRP (W) |
| 55340 | 3560 | 2.1 | 25.91 | 0.3900 | 28.01 | 0.6325 |
| 55990 | 3625 | 2.1 | 25.99 | 0.3972 | 28.09 | 0.6442 |
| 56640 | 3690 | 2.1 | 26.17 | 0.4136 | 28.27 | 0.6707 |

| LTE_20MHz_256QAM_2TX | | | | | |
|----------------------|-----------------|----------|---------------|--------------------|--------------------------|
| Channel | Frequency (MHz) | DG (dBi) | PSD (dBm/MHz) | EIRP PSD (dBm/MHz) | EIRP PSD Limit (dBm/MHz) |
| 55340 | 3560 | 2.1 | 14.46 | 16.56 | 20 |
| 55990 | 3625 | 2.1 | 14.48 | 16.58 | |
| 56640 | 3690 | 2.1 | 14.67 | 16.77 | |





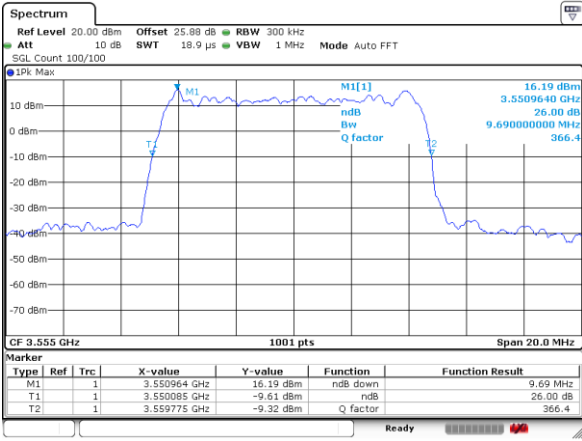
26dB Bandwidth

| Mode | LTE Band 48 : 26dB BW(MHz) | | | |
|------------|----------------------------|--------|--------|--------|
| Mod. | 256QAM | | | |
| BW | 10MHz | | 20MHz | |
| Port | Port 1 | Port 2 | Port 1 | Port 2 |
| Lowest CH | 9.69 | 9.71 | 18.74 | 18.78 |
| Middle CH | 9.69 | 9.77 | 18.86 | 19.02 |
| Highest CH | 10.09 | 10.09 | 18.82 | 18.86 |



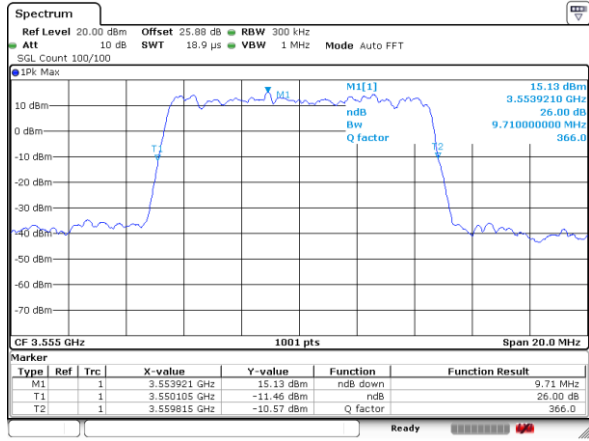
LTE Band 48_2TX

Lowest Channel / 10MHz / 256QAM_Port 1



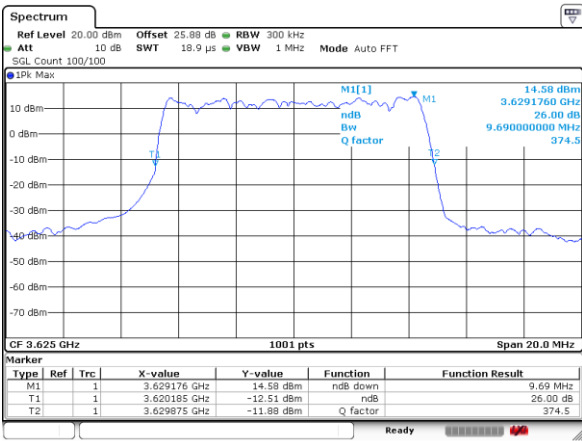
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Lowest Channel / 10MHz / 256QAM_Port 2



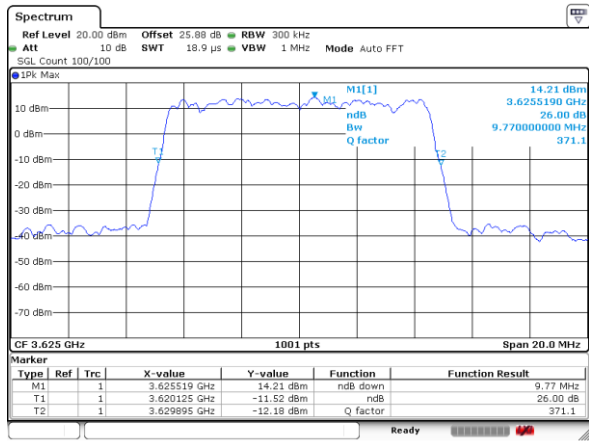
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Middle Channel / 10MHz / 256QAM_Port 1



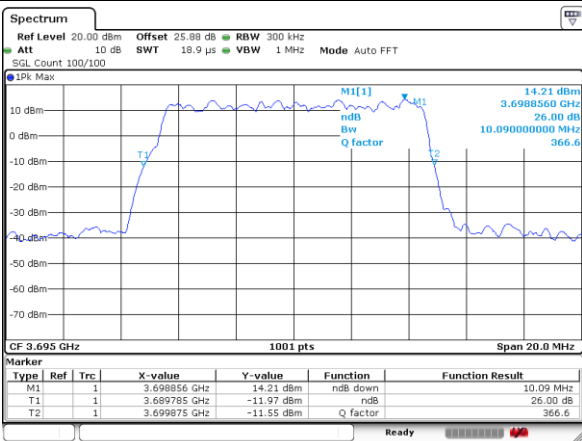
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Middle Channel / 10MHz / 256QAM_Port 2



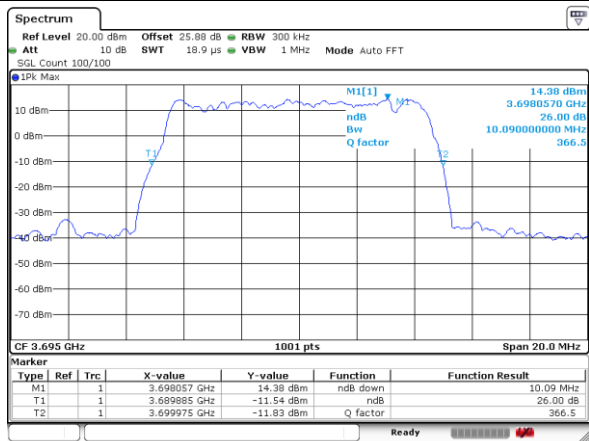
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Highest Channel / 10MHz / 256QAM_Port 1



Date: 29 APR 2020 15:51:37

Highest Channel / 10MHz / 256QAM_Port 2

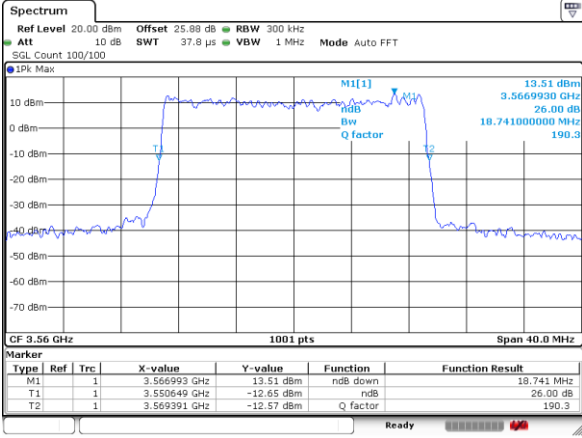


Date: 29 APR 2020 15:50:47



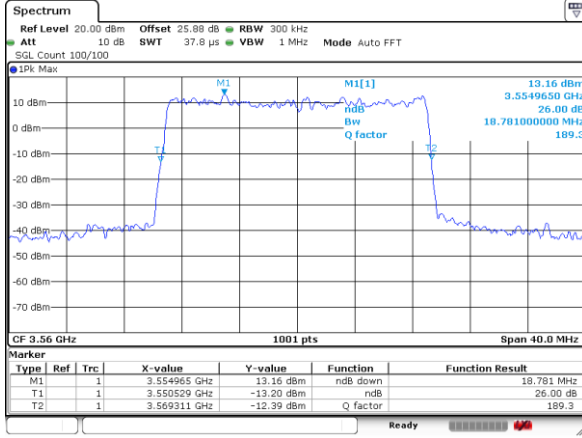
LTE Band 48_2TX

Lowest Channel / 20MHz / 256QAM_Port 1



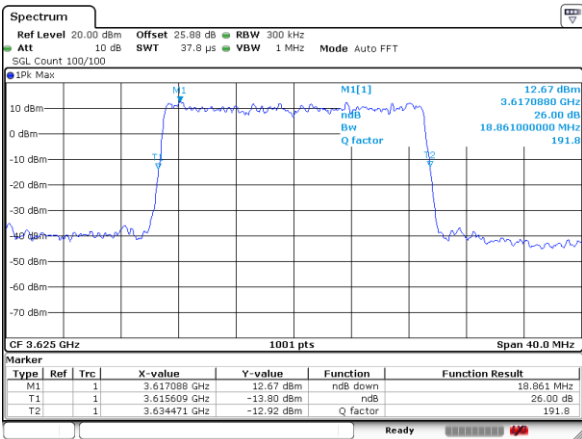
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Lowest Channel / 20MHz / 256QAM_Port 2



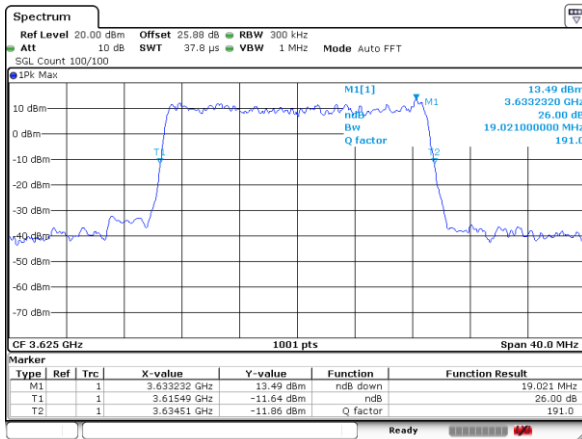
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Middle Channel / 20MHz / 256QAM_Port 1



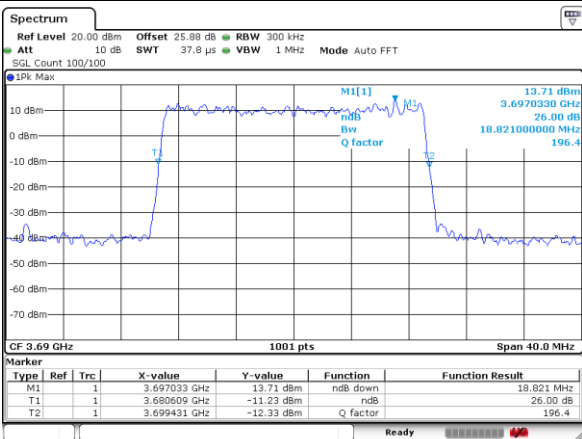
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Middle Channel / 20MHz / 256QAM_Port 2



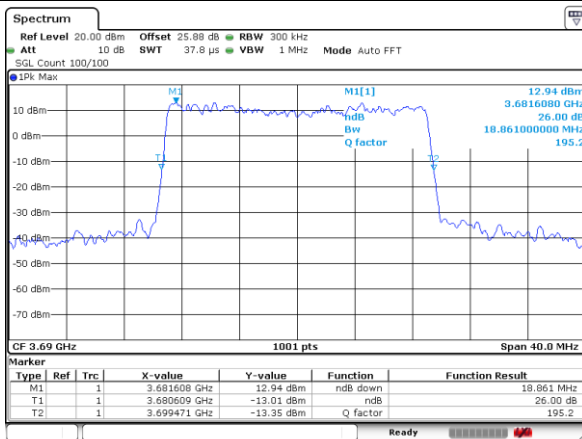
Date: 29 APR 2020 16:38:30

Highest Channel / 20MHz / 256QAM_Port 1



Date: 29 APR 2020 16:48:00

Highest Channel / 20MHz / 256QAM_Port 2



Date: 29 APR 2020 16:46:57



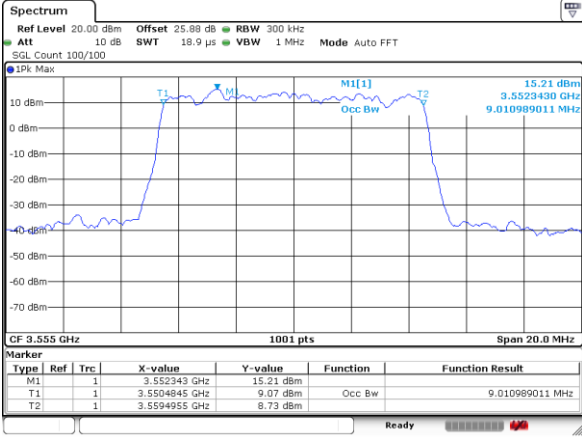
Occupied Bandwidth

| Mode | LTE Band 48 : 99%OBW(MHz) | | | |
|------------|---------------------------|--------|--------|--------|
| Mod. | 256QAM | | | |
| BW | 10MHz | | 20MHz | |
| Port | Port 1 | Port 2 | Port 1 | Port 2 |
| Lowest CH | 9.01 | 9.01 | 17.90 | 17.90 |
| Middle CH | 8.99 | 8.99 | 17.90 | 17.86 |
| Highest CH | 8.99 | 8.99 | 17.90 | 17.90 |



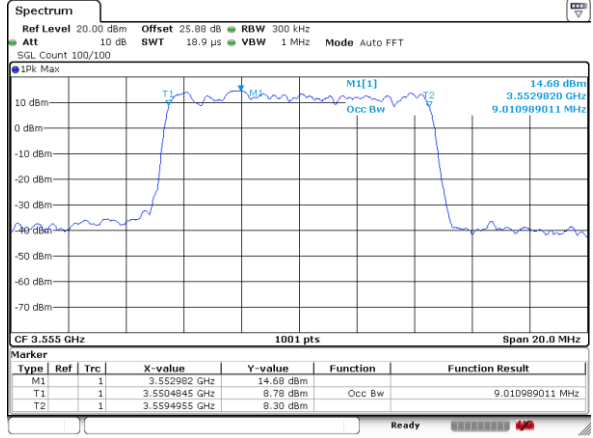
LTE Band 48_2TX

Lowest Channel / 10MHz / 256QAM_Port 1



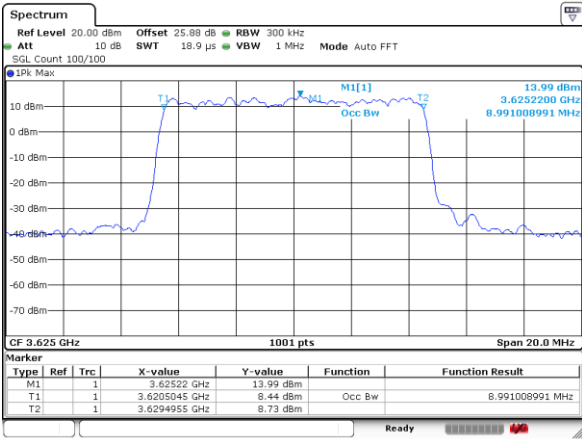
Date: 29 APR 2020 15:25:19

Lowest Channel / 10MHz / 256QAM_Port 2



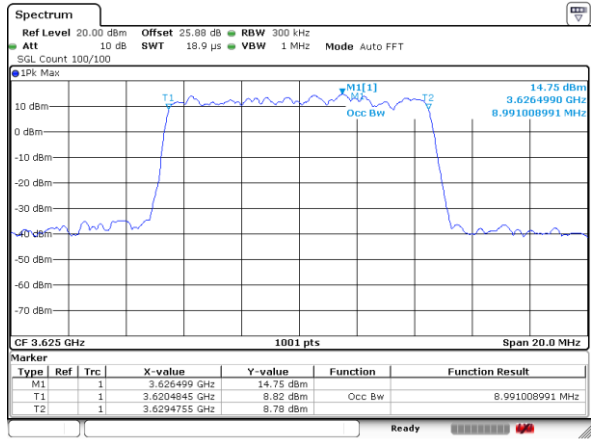
Date: 29 APR 2020 15:24:22

Middle Channel / 10MHz / 256QAM_Port 1



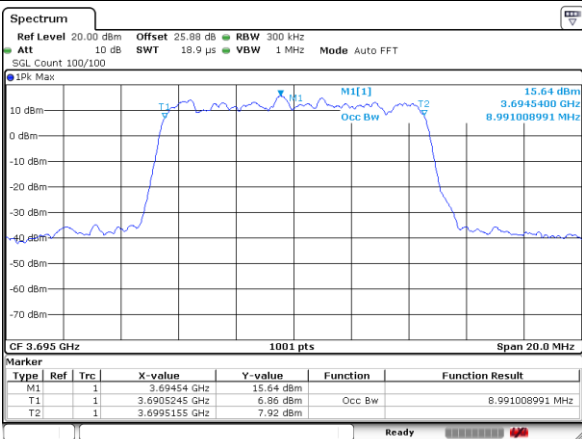
Date: 29 APR 2020 15:34:08

Middle Channel / 10MHz / 256QAM_Port 2



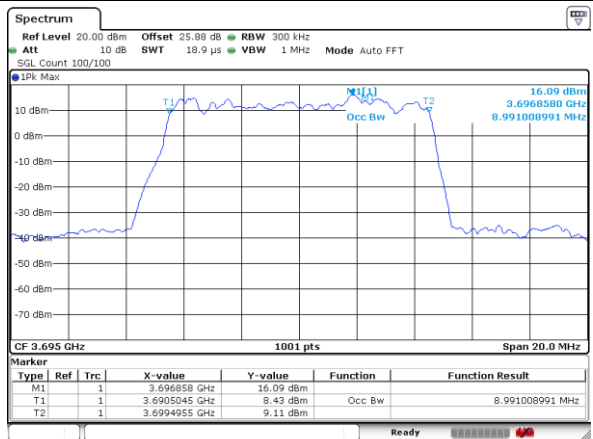
Date: 29 APR 2020 15:34:38

Highest Channel / 10MHz / 256QAM_Port 1



Date: 29 APR 2020 15:48:30

Highest Channel / 10MHz / 256QAM_Port 2

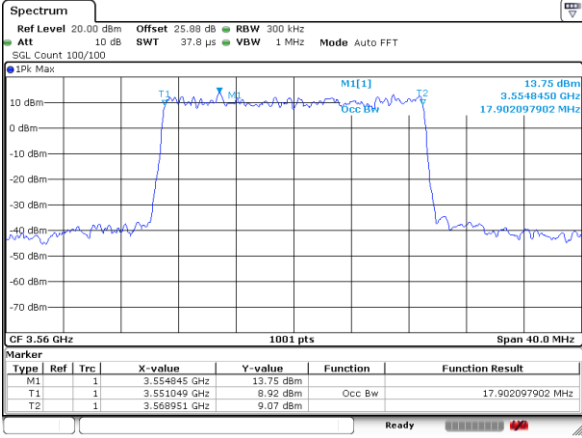


Date: 29 APR 2020 15:49:33



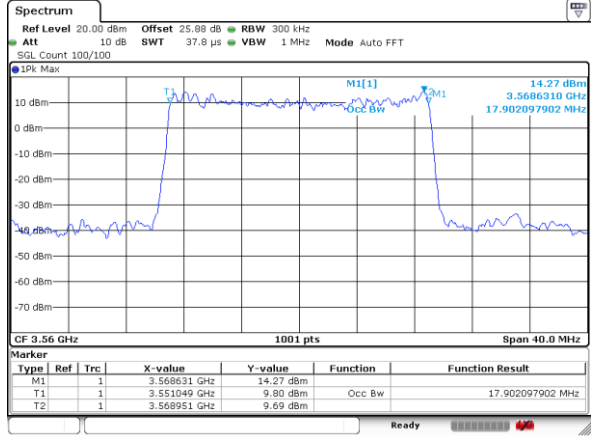
LTE Band 48_2TX

Lowest Channel / 20MHz / 256QAM_Port 1



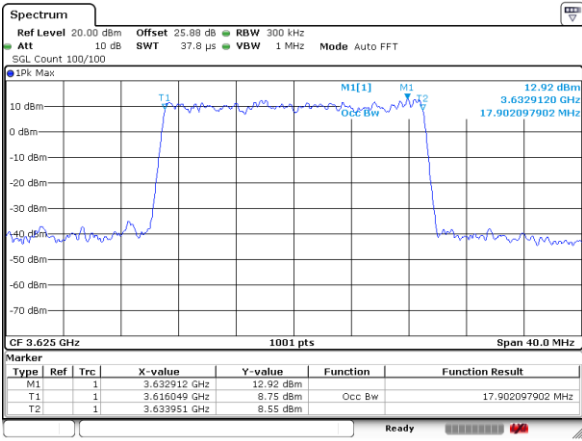
Date: 29 APR 2020 16:18:38

Lowest Channel / 20MHz / 256QAM_Port 2



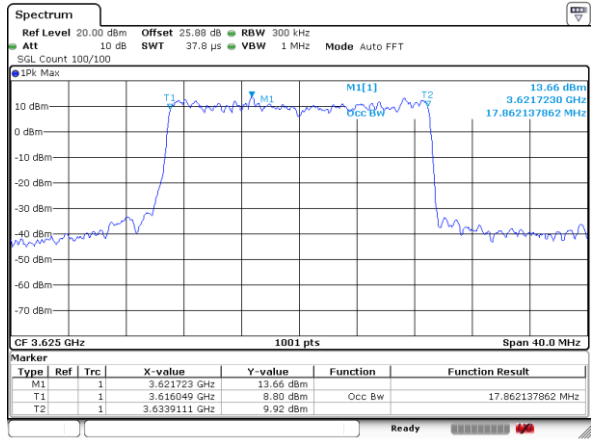
Date: 29 APR 2020 16:17:57

Middle Channel / 20MHz / 256QAM_Port 1



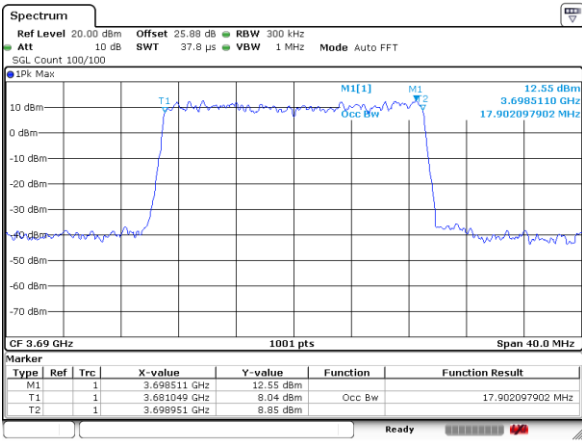
Date: 29 APR 2020 16:36:10

Middle Channel / 20MHz / 256QAM_Port 2



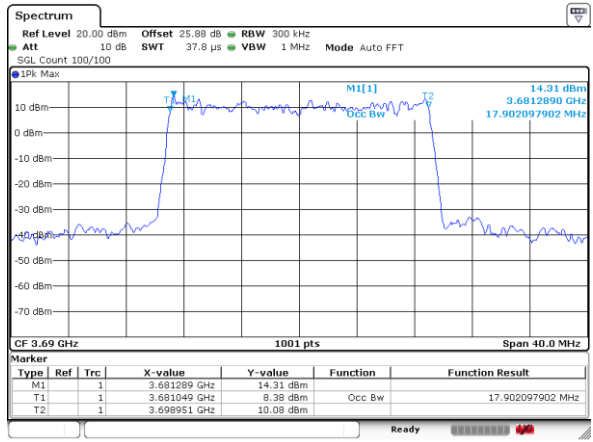
Date: 29 APR 2020 16:37:11

Highest Channel / 20MHz / 256QAM_Port 1



Date: 29 APR 2020 16:48:33

Highest Channel / 20MHz / 256QAM_Port 2



Date: 29 APR 2020 16:49:12



LTE Band 48_CA

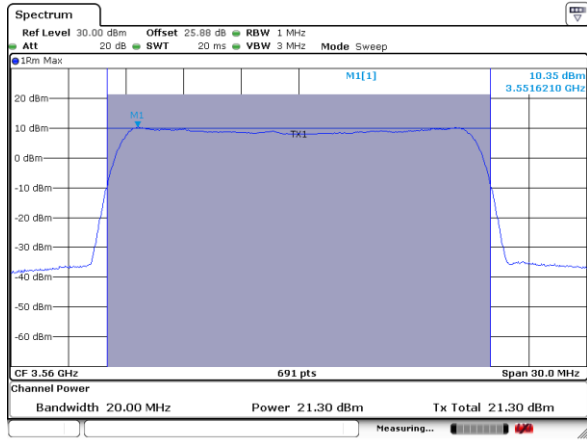
Average Power

| LTE_20MHz+20MHz_256QAM_4TX | | | | | | | | |
|----------------------------|-----------------|----------|--------------|--------------|--------------|--------------|-------------|-----------|
| Channel | Frequency (MHz) | DG (dBi) | Port 1 (dBm) | Port 2 (dBm) | Port 3 (dBm) | Port 4 (dBm) | Power (dBm) | Power (W) |
| 55340 + 55540 | 3560 + 3580 | 2.25 | 21.30 | 21.48 | 20.84 | 21.30 | 24.40 | 0.2755 |
| 55890 + 56090 | 3615 + 3635 | 2.25 | 21.23 | 21.41 | 21.15 | 21.45 | 24.33 | 0.2711 |
| 56440 + 56640 | 3670 + 3690 | 2.25 | 21.22 | 21.35 | 21.27 | 21.82 | 24.56 | 0.2860 |
| 55340 + 56640 | 3560 + 3690 | 2.25 | 21.19 | 21.45 | 21.27 | 21.82 | 24.56 | 0.2860 |

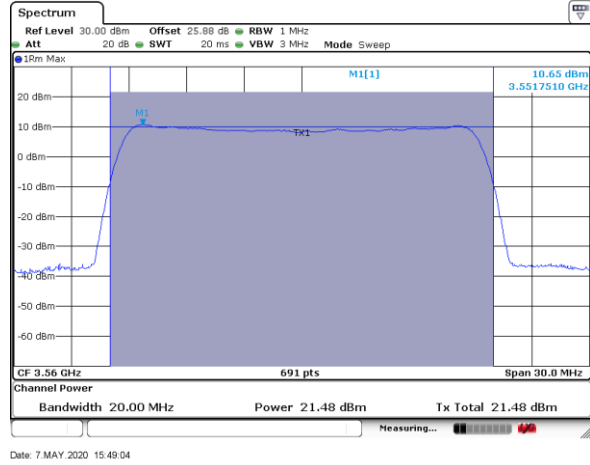


LTE Band 48 CA_20MHz+20MHz

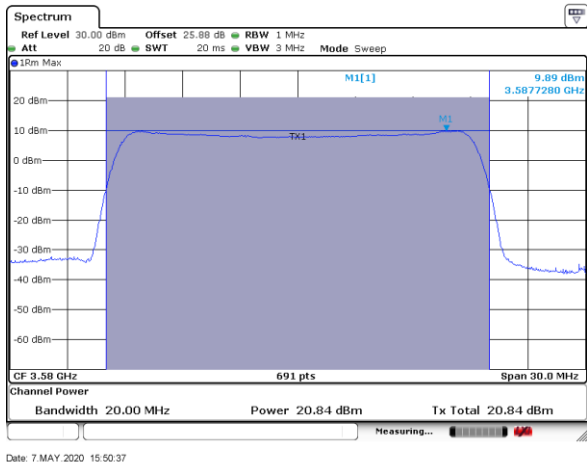
3560 MHz + 3580 MHz / 256QAM Port 1



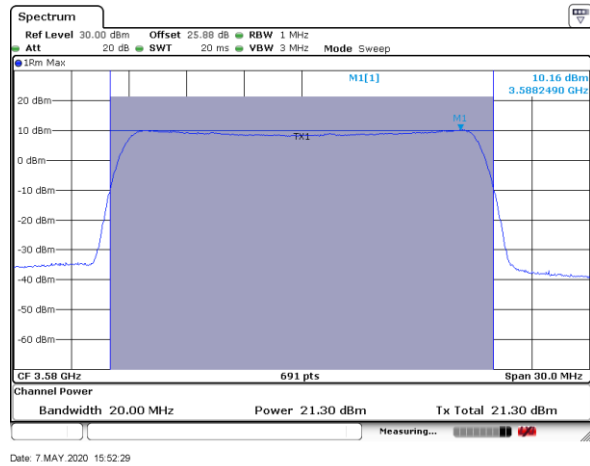
3560 MHz + 3580 MHz / 256QAM Port 2



3560 MHz + 3580 MHz / 256QAM Port 3



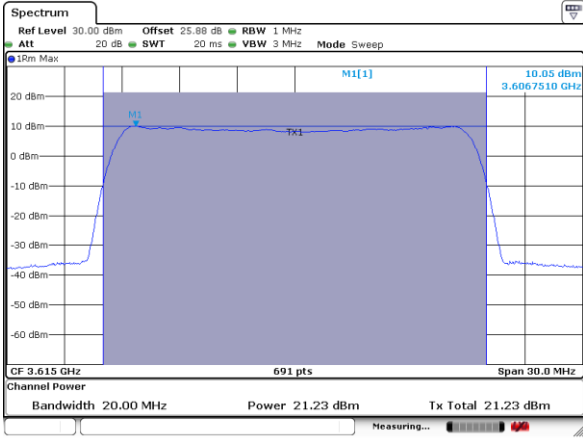
3560 MHz + 3580 MHz / 256QAM Port 4





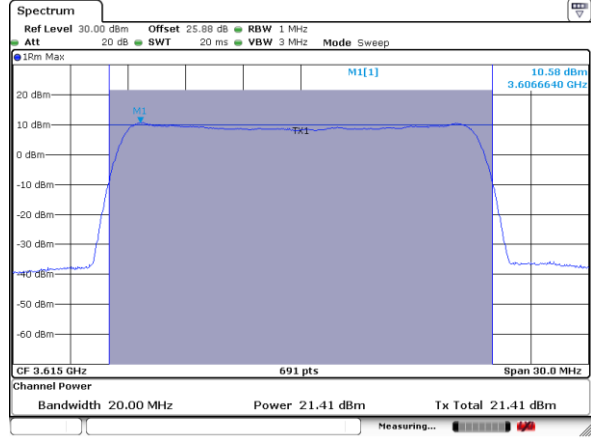
LTE Band 48 CA_20MHz+20MHz

3615 MHz + 3635 MHz / 256QAM Port 1



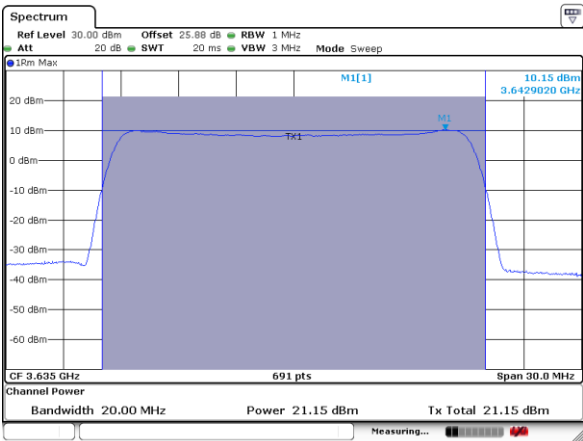
Date: 7 MAY 2020 16:21:55

3615 MHz + 3635 MHz / 256QAM Port 2



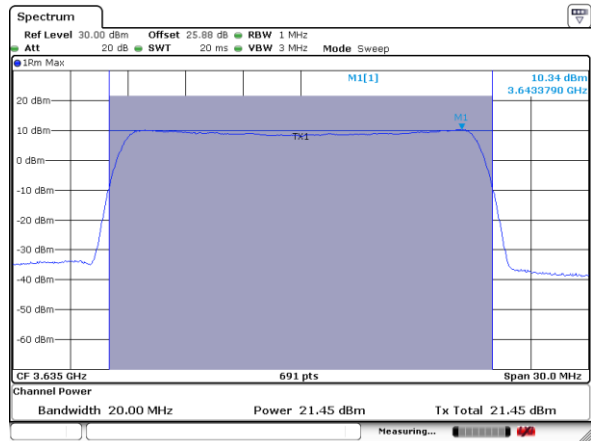
Date: 7 MAY 2020 16:24:39

3615 MHz + 3635 MHz / 256QAM Port 3



Date: 7 MAY 2020 16:27:10

3615 MHz + 3635 MHz / 256QAM Port 4

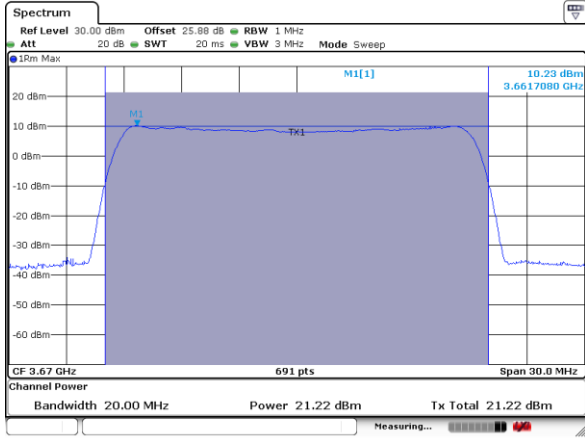


Date: 7 MAY 2020 16:29:26

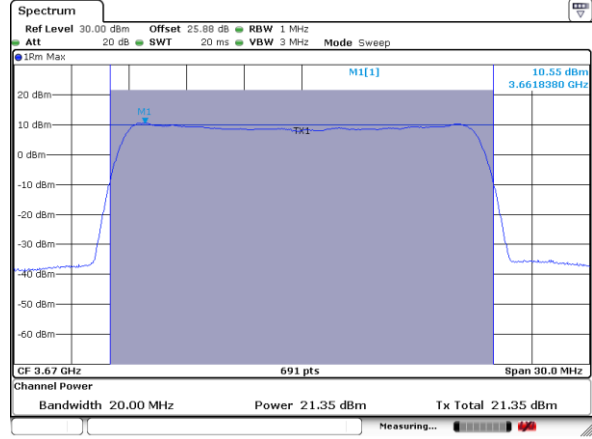


LTE Band 48 CA_20MHz+20MHz

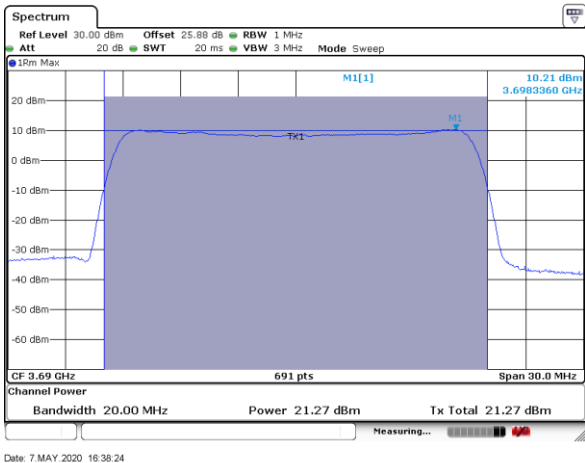
3670 MHz + 3690 MHz / 256QAM Port 1



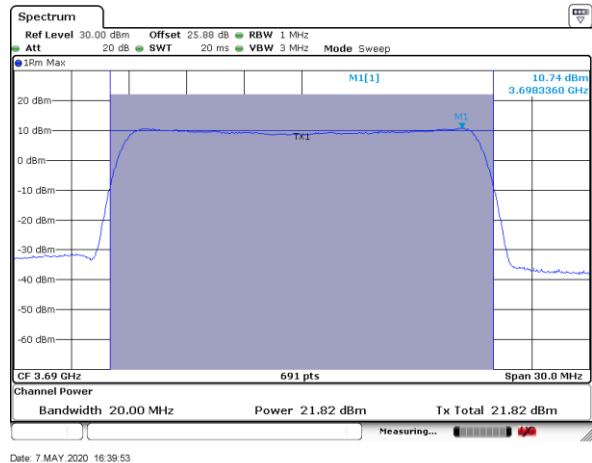
3670 MHz + 3690 MHz / 256QAM Port 2



3670 MHz + 3690 MHz / 256QAM Port 3



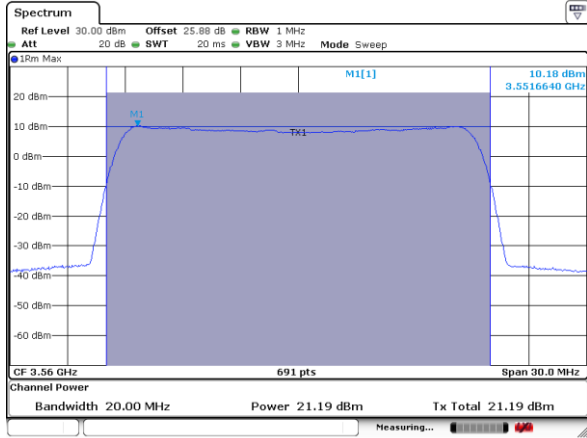
3670 MHz + 3690 MHz / 256QAM Port 4





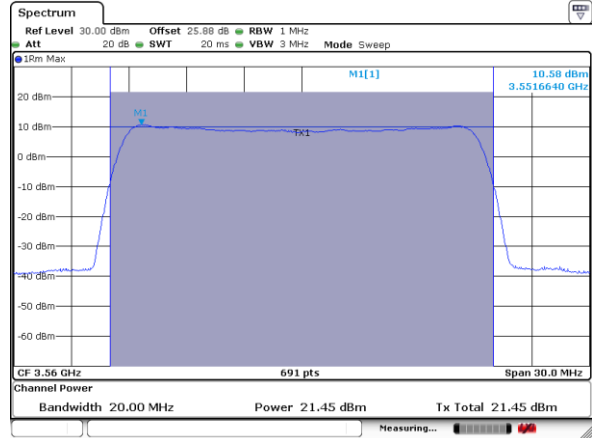
LTE Band 48 CA_20MHz+20MHz

3560 MHz + 3690 MHz / 256QAM Port 1



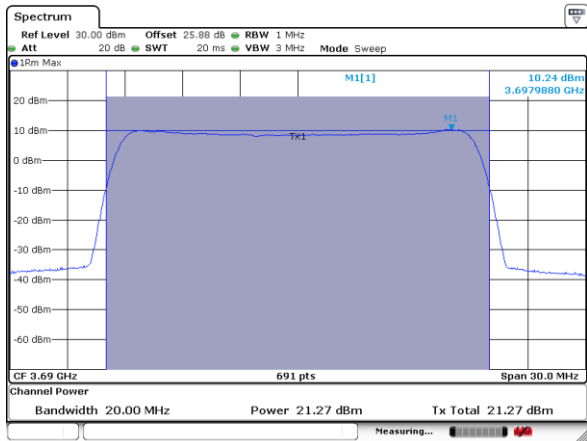
Date: 7 MAY 2020 15:56:10

3560 MHz + 3690 MHz / 256QAM Port 2



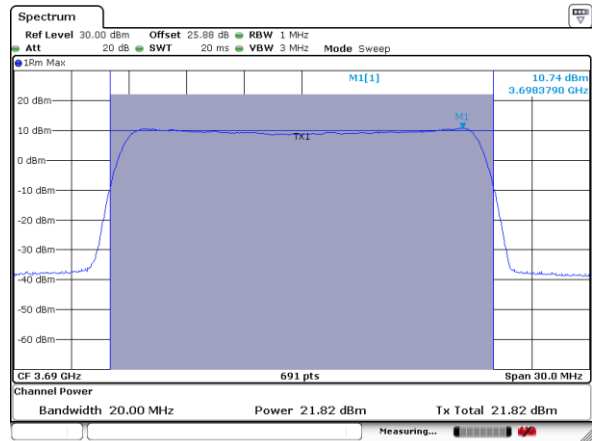
Date: 7 MAY 2020 16:02:09

3560 MHz + 3690 MHz / 256QAM Port 3



Date: 7 MAY 2020 16:04:47

3560 MHz + 3690 MHz / 256QAM Port 4



Date: 7 MAY 2020 16:10:12



EIRP Power Density

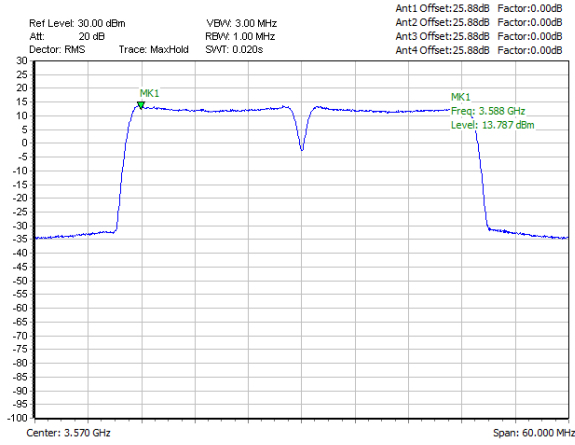
| LTE_20MHz+20MHz_256QAM_4TX | | | | | | |
|----------------------------|-----------------|----------|-------------|-----------|------------|----------|
| Channel | Frequency (MHz) | DG (dBi) | Power (dBm) | Power (W) | EIRP (dBm) | EIRP (W) |
| 55340 + 55540 | 3560 + 3580 | 2.25 | 24.40 | 0.2755 | 26.65 | 0.4625 |
| 55890 + 56090 | 3615 + 3635 | 2.25 | 24.33 | 0.2711 | 26.58 | 0.4551 |
| 56440 + 56640 | 3670 + 3690 | 2.25 | 24.56 | 0.2860 | 26.81 | 0.4802 |
| 55340 + 56640 | 3560 + 3690 | 2.25 | 24.56 | 0.2860 | 26.81 | 0.4802 |

| LTE_20MHz+20MHz_256QAM_4TX | | | | | |
|----------------------------|-----------------|----------|---------------|--------------------|----------------|
| Channel | Frequency (MHz) | DG (dBi) | PSD (dBm/MHz) | EIRP PSD (dBm/MHz) | EIRP PSD Limit |
| 55340 + 55540 | 3560 + 3580 | 2.25 | 13.79 | 16.04 | 20 |
| 55890 + 56090 | 3615 + 3635 | 2.25 | 13.85 | 16.10 | |
| 56440 + 56640 | 3670 + 3690 | 2.25 | 14.03 | 16.28 | |
| 55340 + 56640 | 3560 + 3690 | 2.25 | 13.83 | 16.08 | |

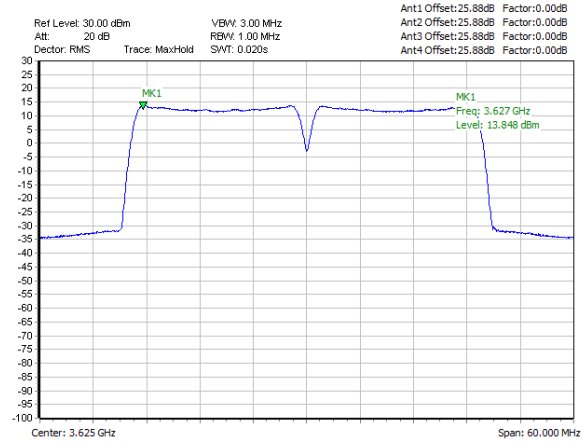


LTE Band 48 CA_20MHz+20MHz

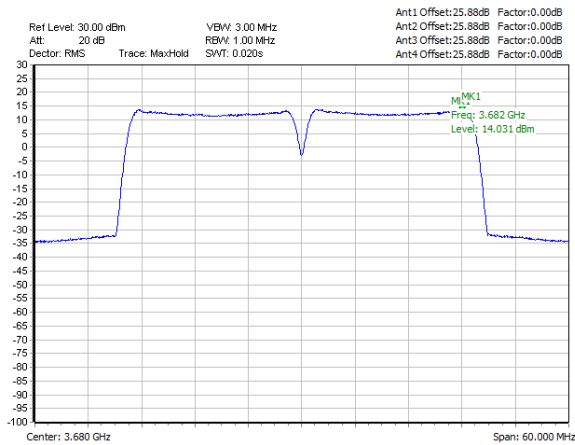
3560 MHz + 3580 MHz / 256QAM Combine



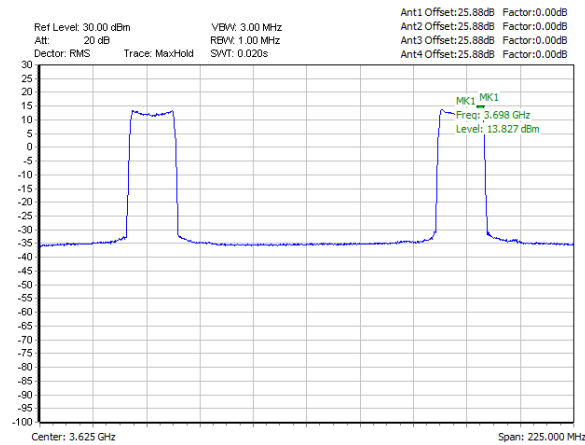
3615 MHz + 3635 MHz / 256QAM Combine



3670 MHz + 3690 MHz / 256QAM Combine



3560 MHz + 3690 MHz / 256QAM Combine





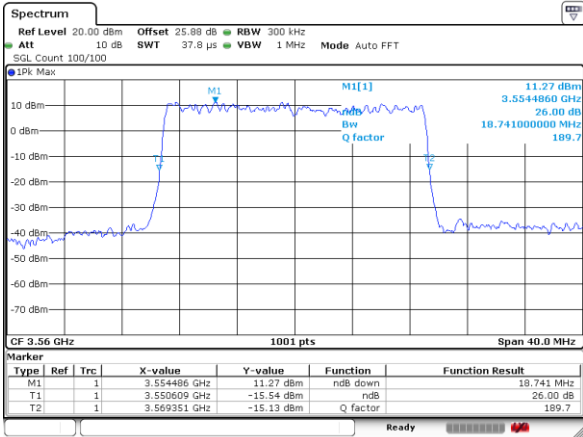
26dB Bandwidth

| Mode | | LTE Band 48 : 26dB BW(MHz) | | | |
|---------------|-----------------|----------------------------|--------|--------|--------|
| BW | | 20MHz+20MHz | | | |
| Mod. | | 256QAM | | | |
| Channel | Frequency (MHz) | Port 1 | Port 2 | Port 3 | Port 4 |
| 55340 + 55540 | 3560 + 3580 | 18.74 | 18.74 | 18.74 | 18.78 |
| 55890 + 56090 | 3615 + 3635 | 18.70 | 18.70 | 18.74 | 18.74 |
| 56440 + 56640 | 3670 + 3690 | 18.78 | 18.74 | 18.74 | 18.74 |
| 55340 + 56640 | 3560 + 3690 | 18.74 | 18.74 | 18.74 | 18.74 |



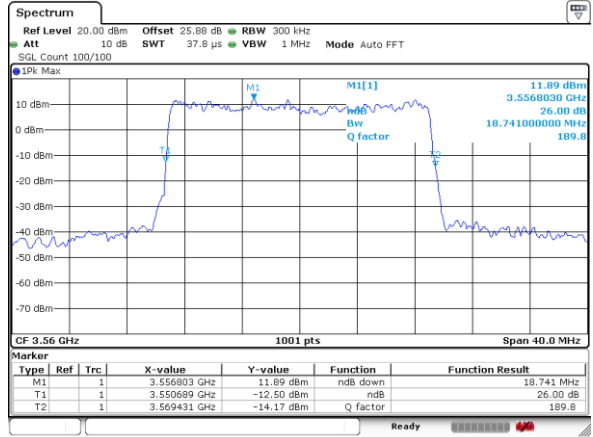
LTE Band 48 CA_20MHz+20MHz

3560 MHz + 3580 MHz / 256QAM Port 1



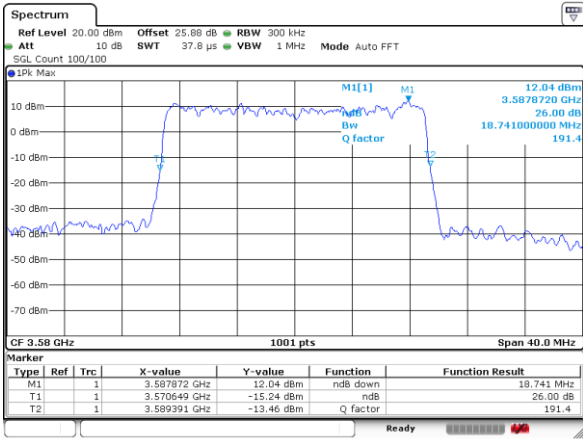
Date: 8 MAY 2020 13:27:22

3560 MHz + 3580 MHz / 256QAM Port 2



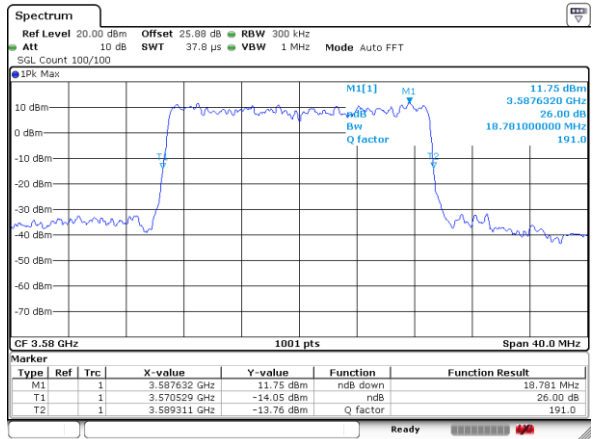
Date: 8 MAY 2020 13:27:56

3560 MHz + 3580 MHz / 256QAM Port 3



Date: 8 MAY 2020 13:28:36

3560 MHz + 3580 MHz / 256QAM Port 4

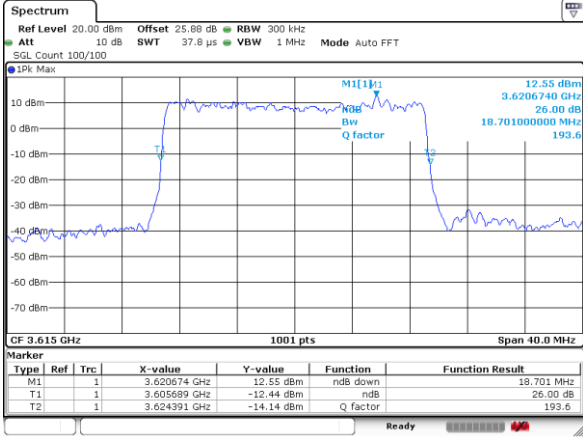


Date: 8 MAY 2020 13:29:02

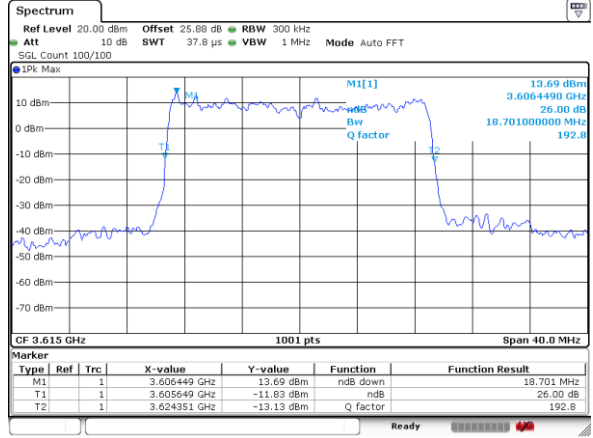


LTE Band 48 CA_20MHz+20MHz

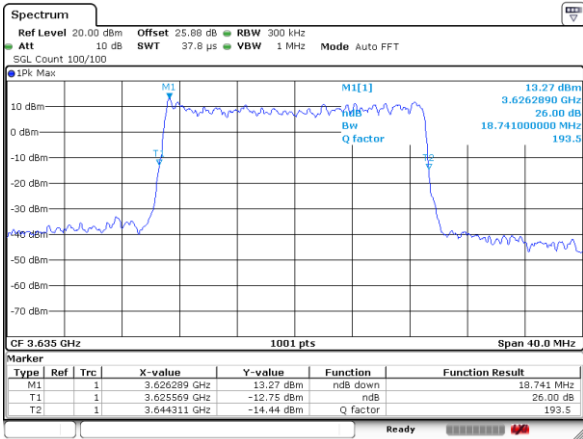
3615 MHz + 3635 MHz / 256QAM Port 1



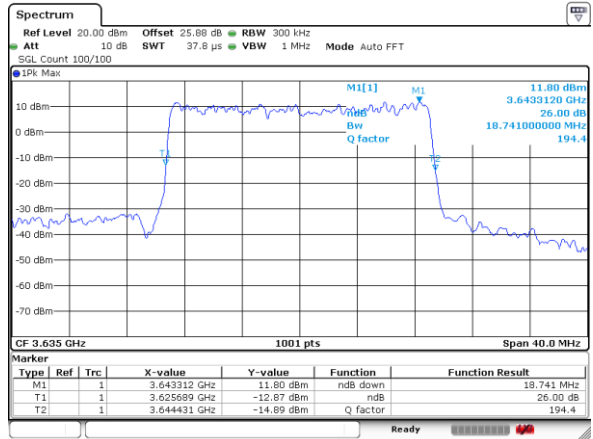
3615 MHz + 3635 MHz / 256QAM Port 2



3615 MHz + 3635 MHz / 256QAM Port 3



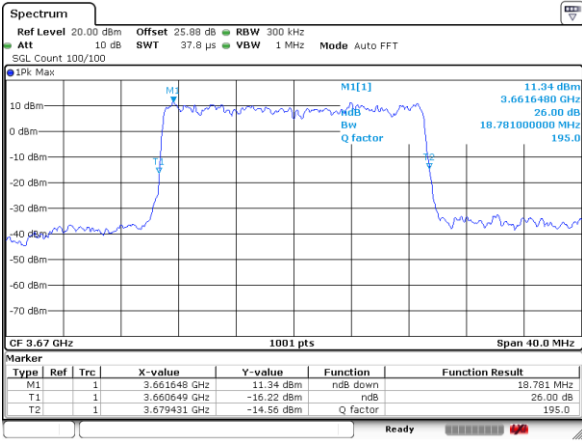
3615 MHz + 3635 MHz / 256QAM Port 4





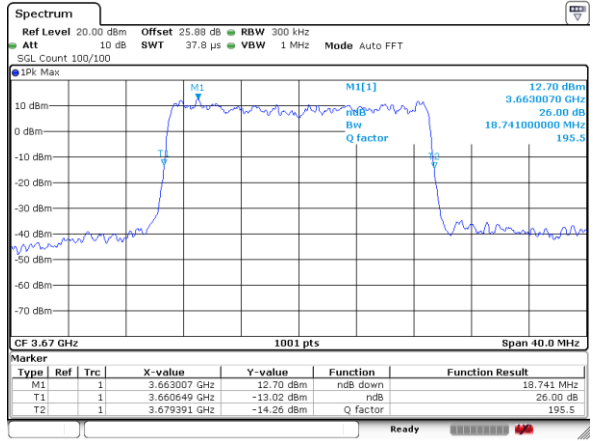
LTE Band 48 CA_20MHz+20MHz

3670 MHz + 3690 MHz / 256QAM Port 1



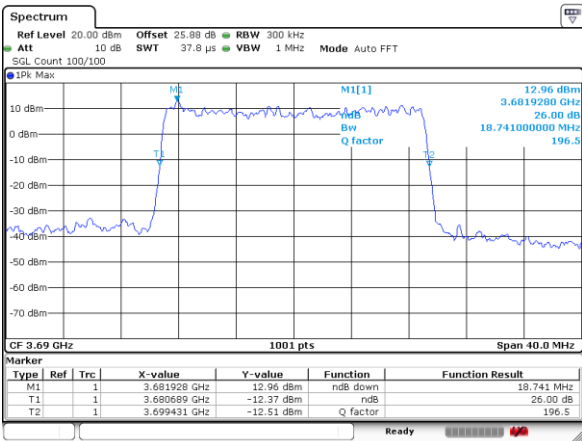
Date: 8 MAY 2020 14:43:37

3670 MHz + 3690 MHz / 256QAM Port 2



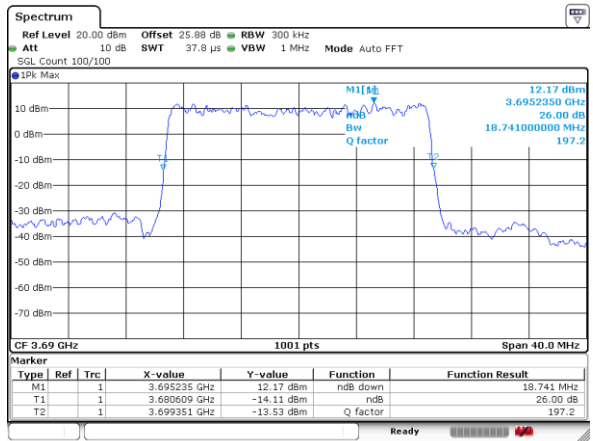
Date: 8 MAY 2020 14:43:59

3670 MHz + 3690 MHz / 256QAM Port 3



Date: 8 MAY 2020 14:44:24

3670 MHz + 3690 MHz / 256QAM Port 4

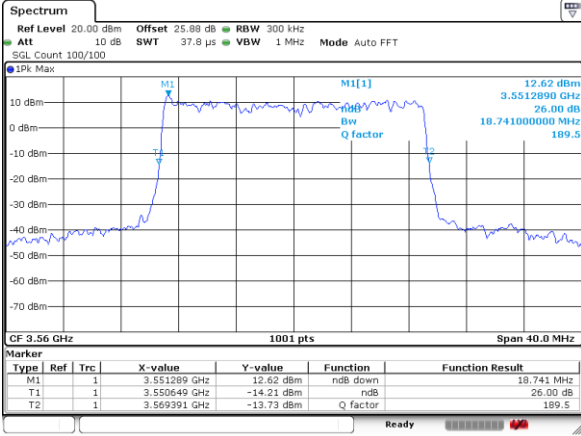


Date: 8 MAY 2020 14:44:43



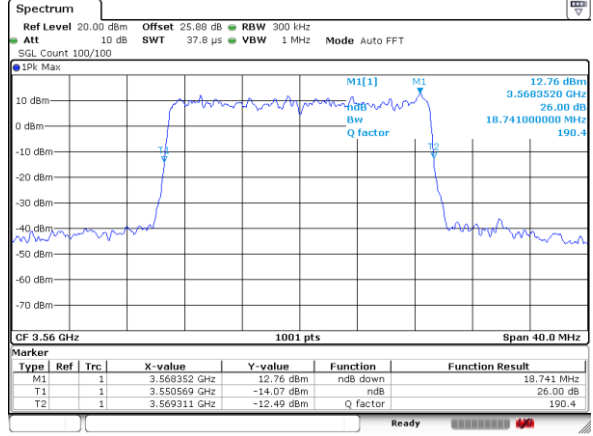
LTE Band 48 CA_20MHz+20MHz

3560 MHz + 3690 MHz / 256QAM Port 1



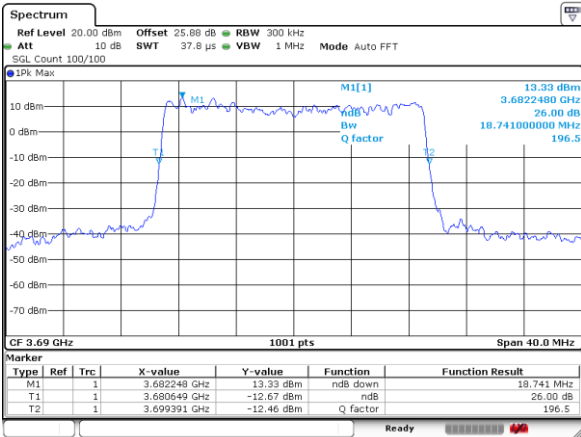
Date: 8 MAY 2020 13:52:03

3560 MHz + 3690 MHz / 256QAM Port 2



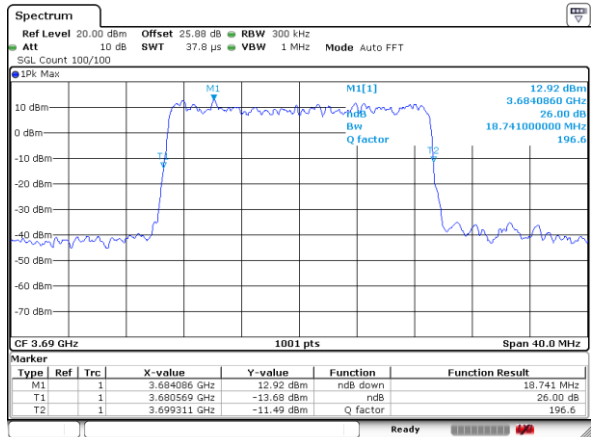
Date: 8 MAY 2020 13:52:37

3560 MHz + 3690 MHz / 256QAM Port 3



Date: 8 MAY 2020 13:53:07

3560 MHz + 3690 MHz / 256QAM Port 4



Date: 8 MAY 2020 13:53:40



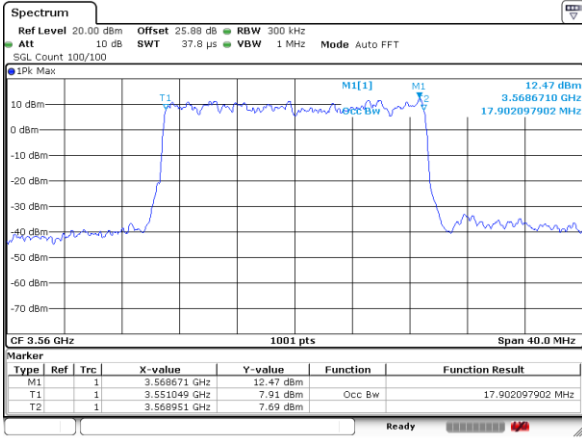
Occupied Bandwidth

| Mode | | LTE Band 48 : 99%OBW(MHz) | | | |
|---------------|-----------------|---------------------------|--------|--------|--------|
| BW | | 20MHz+20MHz | | | |
| Mod. | | 256QAM | | | |
| Channel | Frequency (MHz) | Port 1 | Port 2 | Port 3 | Port 4 |
| 55340 + 55540 | 3560 + 3580 | 17.90 | 17.90 | 17.90 | 17.90 |
| 55890 + 56090 | 3615 + 3635 | 17.90 | 17.90 | 17.90 | 17.90 |
| 56440 + 56640 | 3670 + 3690 | 17.90 | 17.90 | 17.90 | 17.90 |
| 55340 + 56640 | 3560 + 3690 | 17.90 | 17.90 | 17.90 | 17.90 |



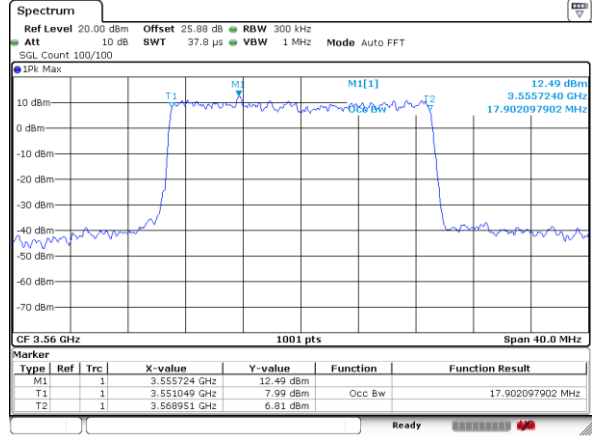
LTE Band 48 CA_20MHz+20MHz

3560 MHz + 3580 MHz / 256QAM Port 1



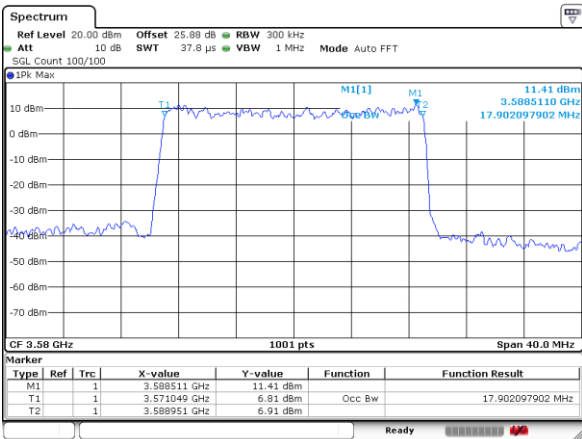
Date: 8 MAY 2020 13:29:56

3560 MHz + 3580 MHz / 256QAM Port 2



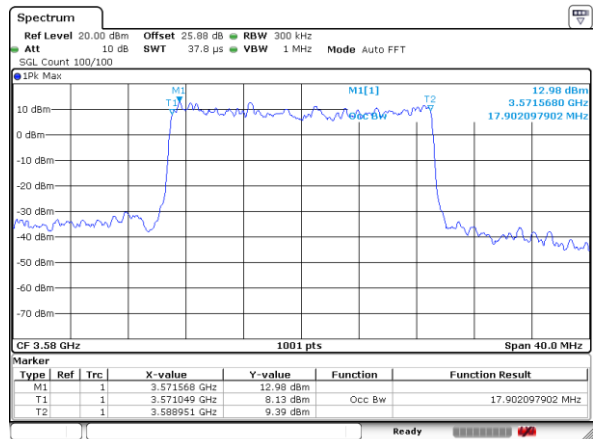
Date: 8 MAY 2020 13:31:07

3560 MHz + 3580 MHz / 256QAM Port 3



Date: 8 MAY 2020 13:32:32

3560 MHz + 3580 MHz / 256QAM Port 4

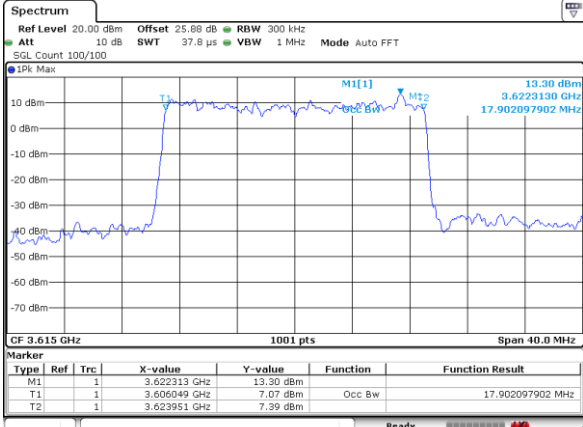


Date: 8 MAY 2020 13:32:56



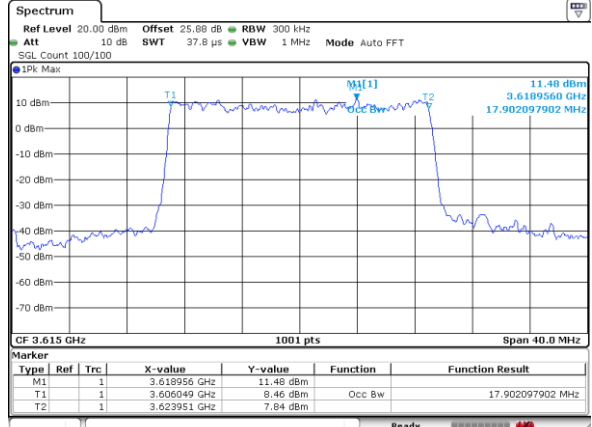
LTE Band 48 CA_20MHz+20MHz

3615 MHz + 3635 MHz / 256QAM Port 1



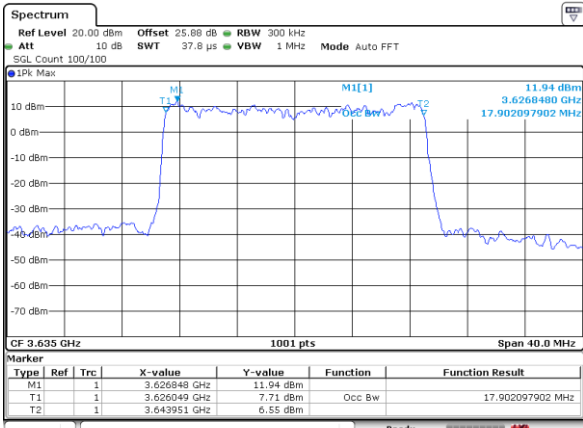
Date: 8 MAY 2020 14:32:50

3615 MHz + 3635 MHz / 256QAM Port 2



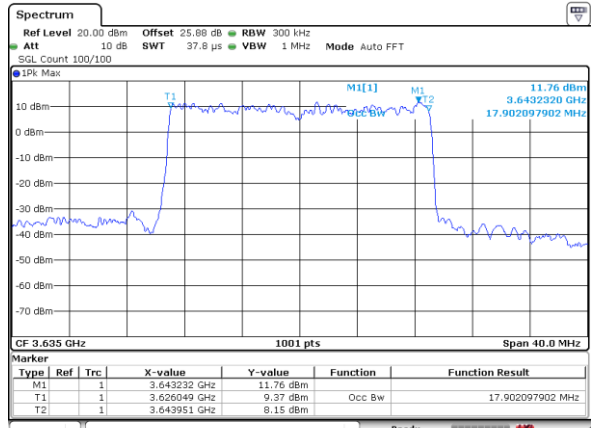
Date: 8 MAY 2020 14:33:25

3615 MHz + 3635 MHz / 256QAM Port 3



Date: 8 MAY 2020 14:34:00

3615 MHz + 3635 MHz / 256QAM Port 4

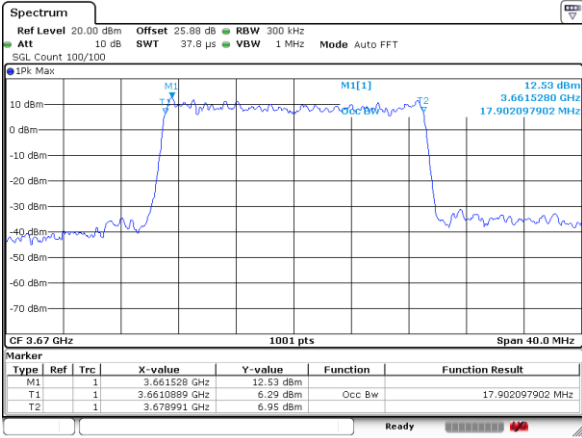


Date: 8 MAY 2020 14:34:25



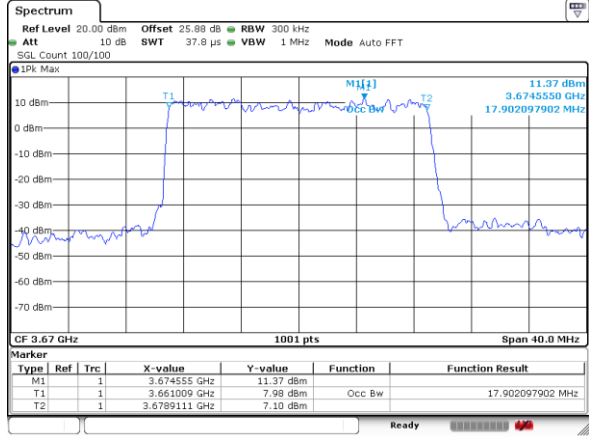
LTE Band 48 CA_20MHz+20MHz

3670 MHz + 3690 MHz / 256QAM Port 1



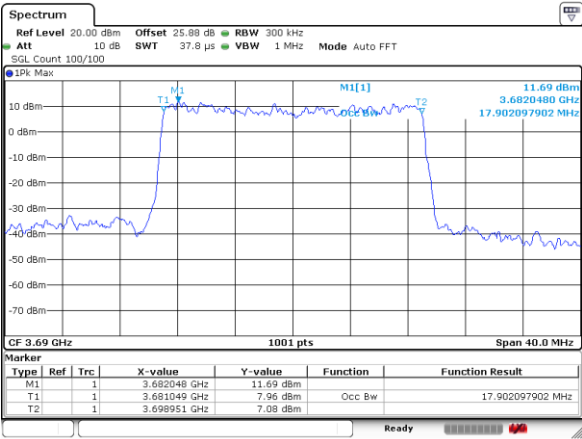
Date: 8 MAY 2020 14:45:26

3670 MHz + 3690 MHz / 256QAM Port 2



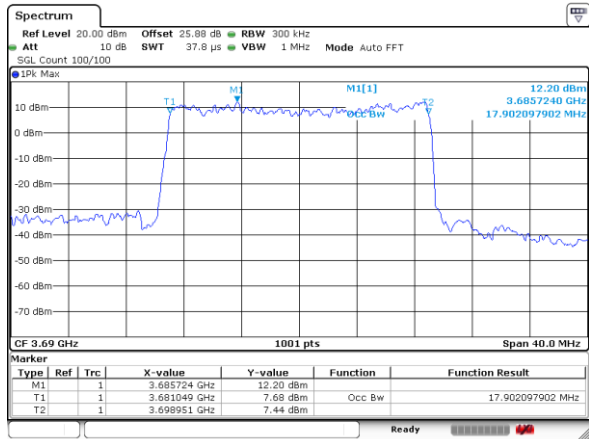
Date: 8 MAY 2020 14:45:47

3670 MHz + 3690 MHz / 256QAM Port 3



Date: 8 MAY 2020 14:46:08

3670 MHz + 3690 MHz / 256QAM Port 4

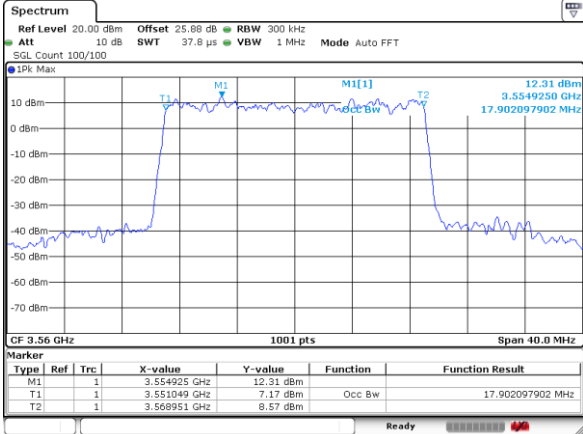


Date: 8 MAY 2020 14:46:32



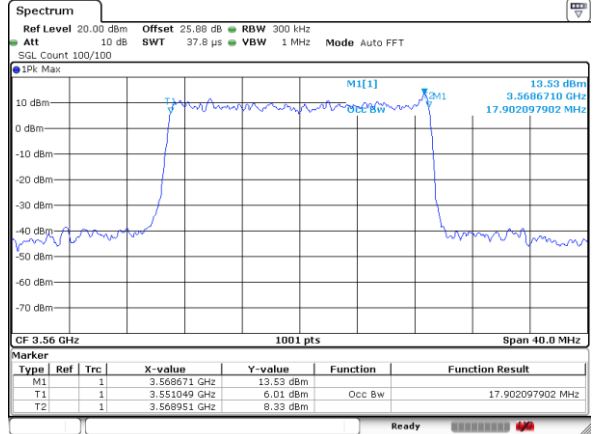
LTE Band 48 CA_20MHz+20MHz

3560 MHz + 3690 MHz / 256QAM Port 1



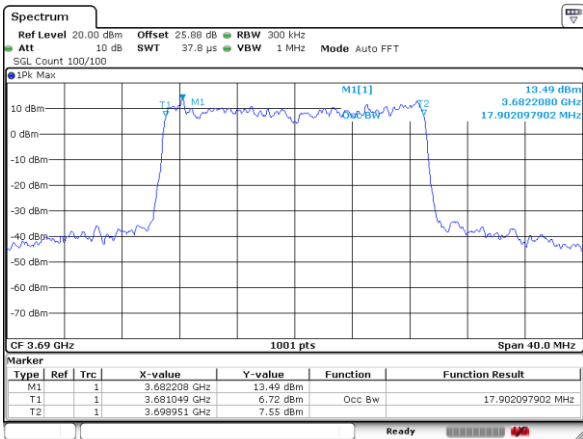
Date: 8 MAY 2020 13:54:53

3560 MHz + 3690 MHz / 256QAM Port 2



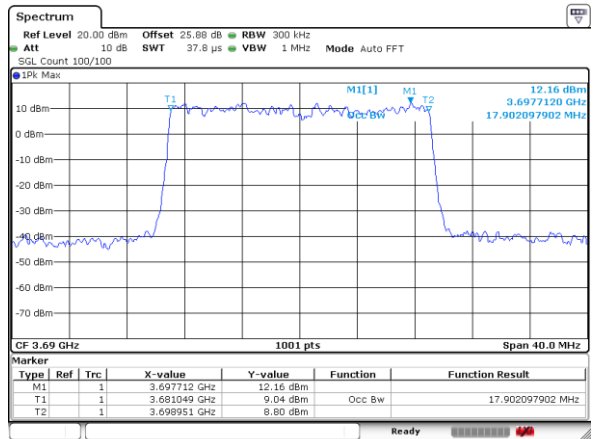
Date: 8 MAY 2020 13:55:30

3560 MHz + 3690 MHz / 256QAM Port 3



Date: 8 MAY 2020 13:54:36

3560 MHz + 3690 MHz / 256QAM Port 4



Date: 8 MAY 2020 13:54:11

—THE END—