

Report on the Radio Testing  
For  
Cambium Networks Ltd  
on  
3GHz PMP 450m  
Report no. TRA-041375-47-06C  
9<sup>th</sup> April 2019



Report Number: TRA-041375-47-06C  
Issue: C

REPORT ON THE RADIO TESTING OF A  
Cambium Networks Ltd  
3GHz PMP 450m  
WITH RESPECT TO SPECIFICATION  
FCC Part 96

TEST DATE: 2018-09-03 to 2018-09-20

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Date: 9<sup>th</sup> April 2019

Disclaimers:

[1] THIS DOCUMENT MAY BE REPRODUCED ONLY IN ITS ENTIRETY AND WITHOUT CHANGE  
[2] THE RESULTS CONTAINED IN THIS DOCUMENT RELATE ONLY TO THE ITEM(S) TESTED

## 1 Revision Record

<i>Issue Number</i>	<i>Issue Date</i>	<i>Revision History</i>
A	9 November 2018	Original
B	28 November 2018	Update to power results
C	9 <sup>th</sup> April 2019	Addition of Stability and Bandwidth information

## 2 Summary

TEST REPORT NUMBER: TRA-041375-47-06C

WORKS ORDER NUMBER: TRA-041375-02

PURPOSE OF TEST: Testing of radio frequency equipment per the relevant authorization procedure of chapter 47 of CFR (code of federal regulations) Part 2, subpart J.

TEST SPECIFICATION(S): Part 96

EQUIPMENT UNDER TEST (EUT): 3GHz PMP 450m

FCC IDENTIFIER: QWP-30450M

MAC ADDRESS: 0a-00-3e-60-47-a0

MANUFACTURER/AGENT: Cambium Networks Ltd

ADDRESS: Unit B2  
Linhay Business Park  
Eastern Road  
Ashburton  
Devon  
TQ13 7UP  
United Kingdom

CLIENT CONTACT: Don Reid  
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✉ Don.Reid@Cambiumnetworks.com

ORDER NUMBER: NP82695747

TEST DATE: 2018-09-03 to 2018-09-20

TESTED BY: D Moncayola  
D Garvey  
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Element

## 2.1 Test Summary

<i>Test Method and Description</i>	<i>Requirement Clause Part 96</i>	<i>Applicable to this equipment</i>	<i>Result / Note</i>
Transmitter Unwanted Emissions	96.41 (e)	☒	<i>Pass</i>
Emission Mask	96.41 (e)	☒	<i>Pass</i>
Peak-to-average power ratio (PAPR)	96.41 (g)	☒	<i>Pass</i>
Peak EIRP Density and Equivalent Isotropically Radiated Power (e.i.r.p)	96.41 (b)	☒	<i>Pass</i>
Occupied bandwidth	2.1049	☒	<i>Pass</i>
Frequency Stability	2.1055	☒	<i>Pass</i>

### Notes:

**Note:** Part 15 B compliance can be found in TRA-041375-47-04A report, the test was performed on the same unit therefore the standby mode is identical.

The results contained in this report relate only to the items tested, in the condition at time of test, and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

The apparatus was set up and exercised using the configurations, modes of operation and arrangements defined in this report only. Any modifications made are identified in Section 8 of this report.

Particular operating modes, apparatus monitoring methods and performance criteria required by the standards tested to have been performed except where identified in Section 5.2 of this test report (Deviations from Test Standards).

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## 4 Introduction

This report TRA-041375-47-06C presents the results of the Radio testing on a Cambium Networks Ltd, 3GHz PMP 450m to specification Part 96—Citizens Broadband Radio Service.

The testing was carried out for Cambium Networks Ltd by Element, at the addresses detailed below.

<input checked="" type="checkbox"/> 30 Meter Open Area Test Site Pershore Airfield, Long Lane, Throckmorton, Worcs, WR10 2JH UK	<input checked="" type="checkbox"/> Element Skelmersdale Unit 1 Pendle Place Skemersdale West Lancashire WN8 9PN UK
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This report details the configuration of the equipment, the test methods used and any relevant modifications where appropriate.

All test and measurement equipment under the control of the laboratory and requiring calibration is subject to an established programme and procedures to control and maintain measurement standards. The quality management system meets the principles of ISO 9001, and has quality control procedures for monitoring the validity of tests undertaken. Records and sufficient detail are retained to establish an audit trail of calibration records relating to its test results for a defined period. Under control of the established calibration programme, key quantities or values of the test & measurement instrumentation are within specification and comply with the relevant traceable internationally recognised and appropriate standard specifications, which are UKAS calibrated as such where these properties have a significant effect on results. Participation in inter-laboratory comparisons and proficiency testing ensures satisfactory correlation of results conform to Elements own procedures, as well as statistical techniques for analysis of test data providing the appropriate confidence in measurements.

Throughout this report EUT denotes equipment under test.

### FCC Site Listing:

Element is accredited for the above sites under the US-EU MRA, Designation number UK0009, 100 Frobisher Business Park, Malvern, Worcestershire, WR14 1BX, United Kingdom.

### IC Registration Number(s):

Element Hull	3483A
Element North West	3930B

The test site requirements of ANSI C63.4-2014 are met up to 1GHz.

The test site SVSWR requirements of CISPR 16-1-4:2010 are met over the frequency range 1 GHz to 18 GHz.



## 5 Test Specifications

### 5.1 Normative References

- FCC 47 CFR Ch. I – Part 96 – Citizens Broadband Radio Service
- ANSI C63.26-2015 – American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.
- ANSI C63.4-2014 – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

### 5.2 Deviations from Test Standards

Maximum conducted output power

Due to the nature of the equipment it is not possible to measure the power conducted so a radiated measurement was performed. This measurement was performed at 30m to ensure the measurement was made in the antenna far field.

Spectral Power Density

Due to the nature of the equipment it is not possible to measure the power conducted so a radiated measurement was performed. This measurement was performed at 30m to ensure the measurement was made in the antenna far field.

### 5.3 Minimisation of reflections

Due to the use of a 30 meter open area test site with no RF absorbing material for the measurement of the fundamental attempts were made to minimise the influence of reflections.

To minimise the reflections the following precautions were taken.

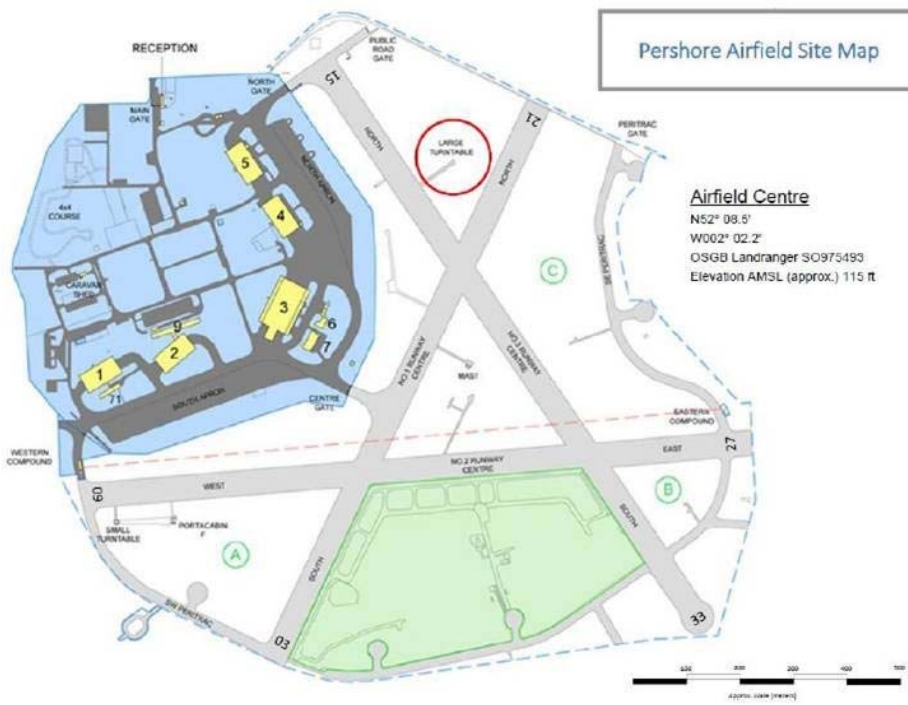
Test performed over a grassed area to try and ensure no sub surface artefacts produce reflections.

The EUT was raised to a height of 4 meters above the ground plane to help reduce the effects of any reflected paths at 30 meters

The EUTs antennas are set with a 2 degree down tilt, and an 8 degree beam width, to negate this down tilt the EUT was rotated 180 degrees though the vertical plane (ie turned upside down to normal operation) and the EUT was angled so the bore sight was parallel to the grassed area.

Due to the increased height of the EUT the measurement antenna was varied between 1 and 6 meters to encompass the height of the EUT and its potential bandwidth

### 5.4 Open area test site information



## 6 Glossary of Terms

<b>§</b>	denotes a section reference from the standard, not this document
<b>AC</b>	Alternating Current
<b>ANSI</b>	American National Standards Institute
<b>BW</b>	bandwidth
<b>C</b>	Celsius
<b>CFR</b>	Code of Federal Regulations
<b>CW</b>	Continuous Wave
<b>dB</b>	decibel
<b>dBm</b>	dB relative to 1 milliwatt
<b>DC</b>	Direct Current
<b>DSSS</b>	Direct Sequence Spread Spectrum
<b>EIRP</b>	Equivalent Isotropically Radiated Power
<b>ERP</b>	Effective Radiated Power
<b>EUT</b>	Equipment Under Test
<b>FCC</b>	Federal Communications Commission
<b>FHSS</b>	Frequency Hopping Spread Spectrum
<b>Hz</b>	hertz
<b>IC</b>	Industry Canada
<b>ITU</b>	International Telecommunication Union
<b>LBT</b>	Listen Before Talk
<b>m</b>	metre
<b>max</b>	maximum
<b>MIMO</b>	Multiple Input and Multiple Output
<b>min</b>	minimum
<b>MRA</b>	Mutual Recognition Agreement
<b>N/A</b>	Not Applicable
<b>PCB</b>	Printed Circuit Board
<b>PDF</b>	Portable Document Format
<b>Pt-mpt</b>	Point-to-multipoint
<b>Pt-pt</b>	Point-to-point
<b>RF</b>	Radio Frequency
<b>RH</b>	Relative Humidity
<b>RMS</b>	Root Mean Square
<b>Rx</b>	receiver
<b>s</b>	second
<b>SVSWR</b>	Site Voltage Standing Wave Ratio
<b>Tx</b>	transmitter
<b>UKAS</b>	United Kingdom Accreditation Service
<b>V</b>	volt
<b>W</b>	watt
<b>Ω</b>	ohm

## 7 Equipment Under Test

### 7.1 EUT Identification

- Name: 3GHz PMP 450m
- MAC Address: 0a-00-3e-60-47-a0
- Model Number: 3083HH
- Software Revision: CANOPY 15.2.100 (W)
- Build Level / Revision Number: R4.2

### 7.2 System Equipment

Equipment listed below forms part of the overall test setup and is required for equipment functionality and/or monitoring during testing. The compliance levels achieved in this report relate only to the EUT and not items given in the following list.

- Name: Netgear 5 port 10/100/1000M switch
- Serial Number: 2N211B3D00F3C
- Model Number: GS605 v4
- Name: Dell Latitude Laptop PC
- Serial Number:
- Model Number: E6440

### 7.3 EUT Mode of Operation

#### 7.3.1 Transmission

The mode of operation for Transmit tests was as follows:

The unit was transmitting modulated or unmodulated signals with 100 % duty cycle.

#### Operating Frequencies

Operating frequency band tested 3550 MHz -3700 MHz.

#### Operating modes

There are three unique operating modes. These only affect the antenna radiation pattern.

#### Sector Mode

This mode produces a broad antenna radiation beam.

#### Beamforming Mode

This produces a narrow, focused antenna beam.

#### MU-MIMO mode

This produces several narrow, focused antenna beams.

#### Modulation Modes

Supported modulation modes are QPSK, 16QAM, 64QAM and 256QAM. Each of these four modulation mode can be configured to be MIMO A or MIMO B. The differences between these MIMO modes are described below.

#### MIMO A

The data streams transmitted in both horizontal and vertical antenna polarisations are identical.

#### MIMO B

The data streams transmitted in the horizontal and vertical polarisations are independent.

## 7.4 EUT Radio Parameters

### 7.4.1 General

<b>Frequency of operation:</b>	3.55 GHz – 3.70 GHz band
<b>Modulation type(s):</b>	QPSK; 16QAM; 64QAM and 256QAM
<b>Occupied channel bandwidth(s):</b>	5 MHz; 20 MHz and 40 MHz
<b>Channel spacing:</b>	5 MHz; 20 MHz and 40 MHz
<b>Declared output power(s):</b>	47dBm/10MHz (e.i.r.p)
<b>Nominal Supply Voltage:</b>	48 V dc
<b>Location of notice for license exempt use:</b>	Not applicable, license device
<b>Method of prevention of use on non-US / non-Canadian frequencies:</b>	Not stated
<b>Duty cycle:</b>	100 % for testing only

### 7.4.2 Antennas

<b>Type:</b>	Integral antenna
<b>Frequency range:</b>	3.55 GHz – 3.70 GHz
<b>Impedance:</b>	50 $\Omega$
<b>Gain:</b>	16 dBi
<b>Connector type:</b>	Not applicable, integral antenna
<b>Length:</b>	500 × 650 × 120
<b>Weight:</b>	20 kg
<b>Mounting:</b>	Professionally installed

### 7.4.3 Product specific declarations

<b>Multiple antenna configuration(s), e.g. MIMO:</b>	Sector, Beamforming and MU-MIMO
<b>Fixed pt-pt operations (yes/no):</b>	No, Fixed pt-mpt operation only
<b>Installation manual advice on pt-pt operational restrictions (yes/no):</b>	N/A Professionally installed
<b>Fixed pt-mpt operations (yes/no):</b>	Yes
<b>Simultaneous tx (yes/no):</b>	Yes

## 7.5 EUT Description

The EUT is a point-to-multipoint (PMP) wireless broadband platform working in the band 3.55 GHz – 3.70 GHz.

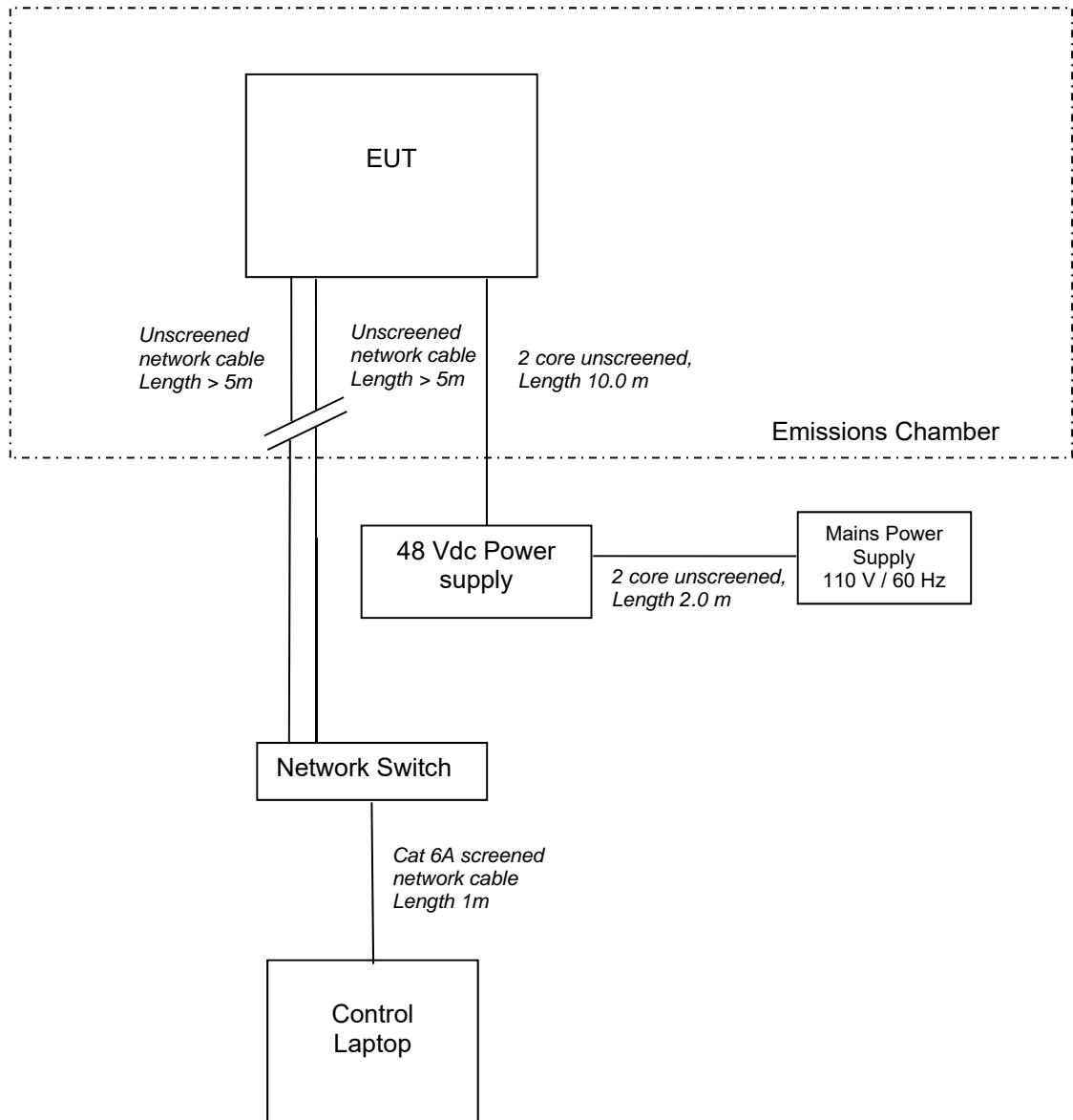
## 8 Modifications

No modifications were performed during this assessment.

## 9 EUT Test Setup

### 9.1 Block Diagram

The following diagram shows basic EUT interconnections with cable type and cable lengths identified:



## 9.2 General Set-up Photograph

The following photograph shows basic EUT set-up:



## 10 General Technical Parameters

### 10.1 Normal Conditions

The E U T was tested under the normal environmental conditions of the test laboratory, except where otherwise stated. The normal power source applied was 48 V dc from the adaptor.

### 10.2 Varying Test Conditions

There are no specific frequency stability requirements for the type of device. The results contained in this report demonstrate that the occupied bandwidth is contained within the authorised band and the manufacturer has declared sufficient frequency stability (refer to section 7.4).

Variation of supply voltage is required to ensure stability of the declared output power. During carrier power testing the following variations were made:

	<b>Category</b>	<b>Nominal</b>	<b>Variation</b>
<input type="checkbox"/>	Mains	110 V ac +/-2 %	85 % and 115 %
<input type="checkbox"/>	Battery	New battery	N/A
<input checked="" type="checkbox"/>	Power supply	48 V dc	85 % and 115 %



## 11 Transmitter Unwanted Emissions

### 11.1 Definitions

#### *Spurious emissions*

Emissions on a frequency or frequencies, which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.

### 11.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	Radio Chamber
Test Standard and Clause:	Part 96.41 (e)
EUT Frequencies Measured:	3552.5 MHz, 3625 MHz and 3697.5 MHz
EUT Channel Bandwidths:	5 MHz
Deviations From Standard:	None
Measurement BW:	30 MHz to 1 GHz: 120 kHz Above 1 GHz: 1 MHz
Measurement Detector:	Up to 1 GHz: Peak Above 1 GHz: Peak

### Environmental Conditions (Normal Environment)

Temperature: 24 °C	+15 °C to +35 °C (as declared)
Humidity: 60 % RH	20 % RH to 75 % RH (as declared)
Supply: 48 V dc	48 V dc (as declared)

### 11.3 Test Limit

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed  $-13$  dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed  $-25$  dBm/MHz.

*Additional protection levels.* The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed  $-40$  dBm/MHz.

## 11.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure i, the emissions from the EUT were measured on a spectrum analyzer / EMI receiver.

Radiated electromagnetic emissions from the EUT are checked first by preview scans. Preview scans for all spectrum and modulation characteristics are checked, using a peak detector and where applicable worst-case determined for function, operation, orientation, etc. for both vertical and horizontal polarisations. Pre-scan plots are shown with a peak detector and 100 kHz RBW.

If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in ANSI C63.26 are followed. Alternatively, a layout closest to normal use (as declared by the provider) is employed, (see EUT setup photographs for more detail).

Emissions between 30 MHz and 1 GHz are measured using calibrated broadband antennas. Emissions above 1 GHz are characterized using standard gain horn antennas. Pre-amplifiers and filters are used where required. Care is taken to ensure that test receiver resolution bandwidth, video bandwidth and detector type(s) meet the regulatory requirements.

For both horizontal and vertical polarizations, the EUT is then rotated through 360 degrees in azimuth until the highest emission is detected. At the previously determined azimuth the test antenna is raised and lowered from 1 to 4 m in height until a maximum emission level is detected, this maximum value is recorded.

Power values measured on the test receiver / analyzer are converted to field strength, FS, in dB $\mu$ V/m at the regulatory distance, using:

$$FS = PR + CL + AF - PA + DC - CF$$

Where,

PR is the power recorded on the receiver / spectrum analyzer in dB $\mu$ V;

CL is the cable loss in dB;

AF is the test antenna factor in dB/m;

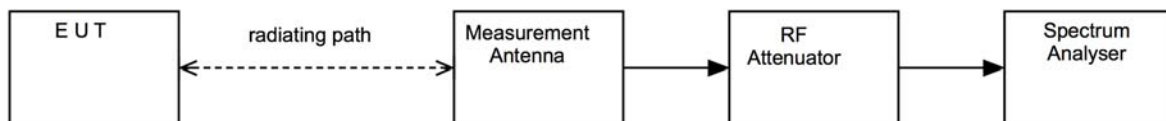
PA is the pre-amplifier gain in dB (where used);

DC is the duty correction factor in dB (where used, e.g. harmonics of pulsed fundamental);

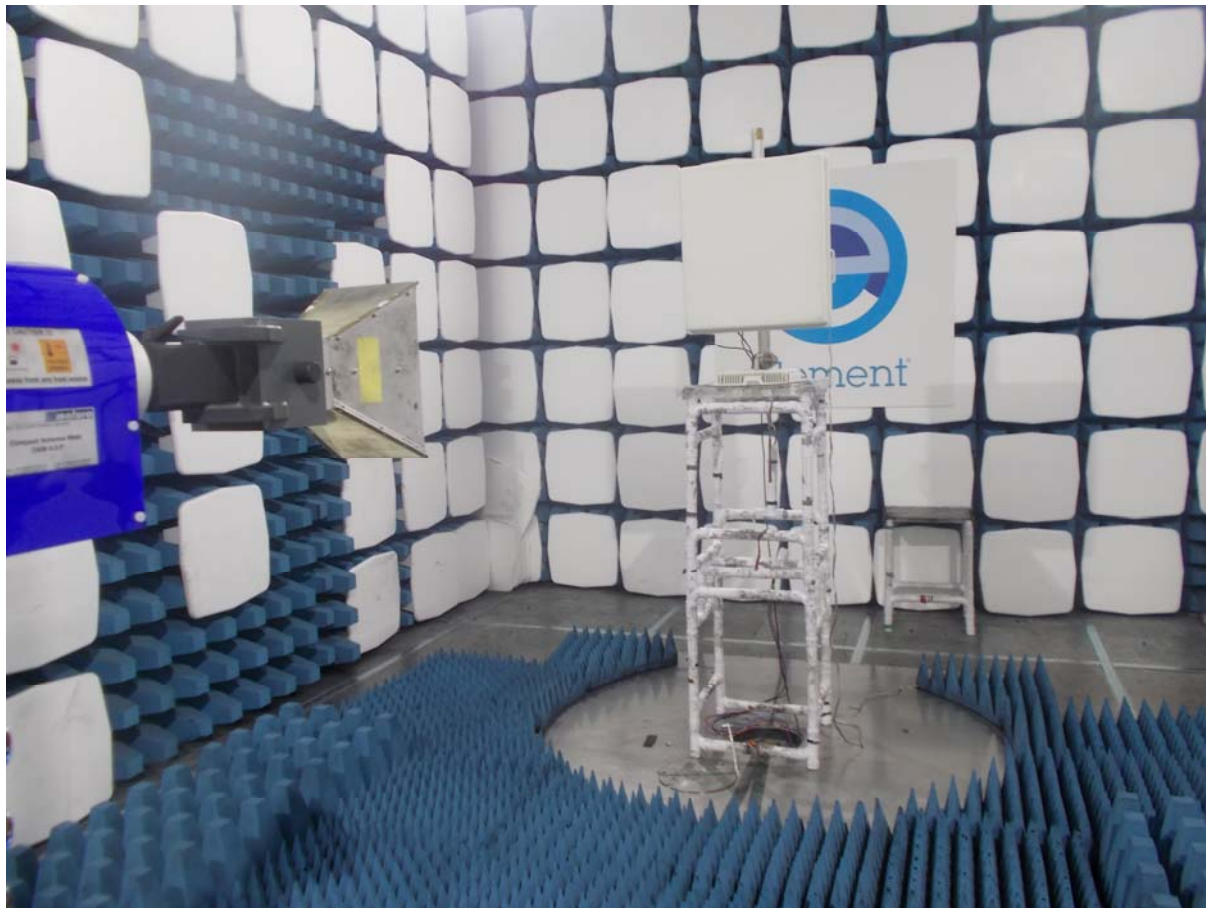
CF is the distance factor in dB (where measurement distance different to limit distance);

This field strength value is then compared with the regulatory limit.

**Figure i Test Setup**



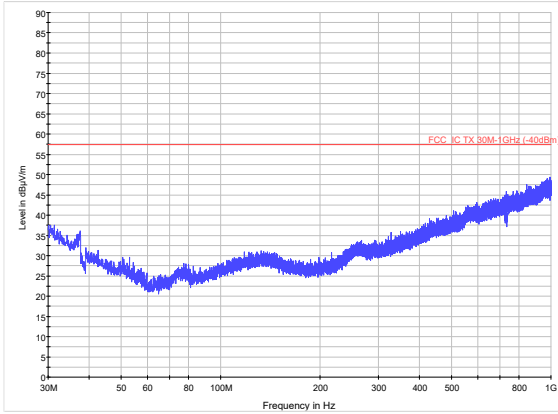
### 11.5 Test Set-up Photograph



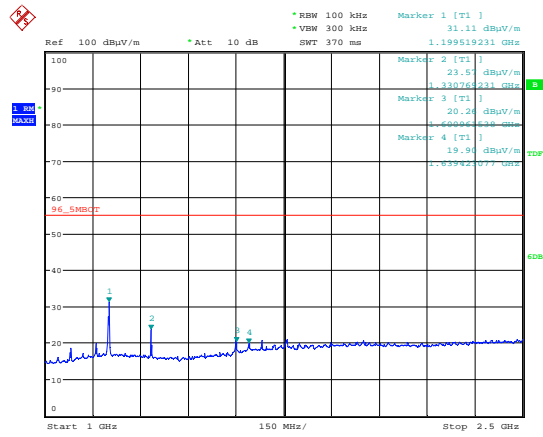
### 11.6 Test Equipment

Equipment Type	Manufacturer	Equipment Description	Element No	Due For Calibration
CBL611/A	Chase	Bilog	U573	2019-08-02
ESR7	R&S	EMI Receiver	U456	2018-09-12
3115	EMCO	1-18GHz Horn	L139	2019-09-25
FSU50	R&S	Spectrum Analyser	U544	2019-05-22
20240-20	Flann	Horn 18-26GHz (&U330)	L300	2020-04-24
22240-20	Flann	Standard Gain Horn 26-40	L301	2019-08-10

### 11.7 Test Results

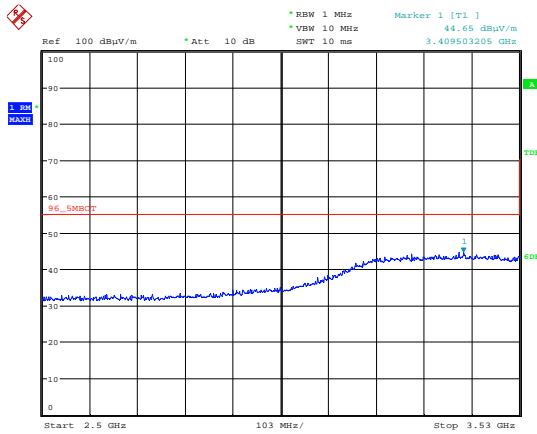


30 MHz to 1 GHz; Beamform; QPSK; MIMO.A.



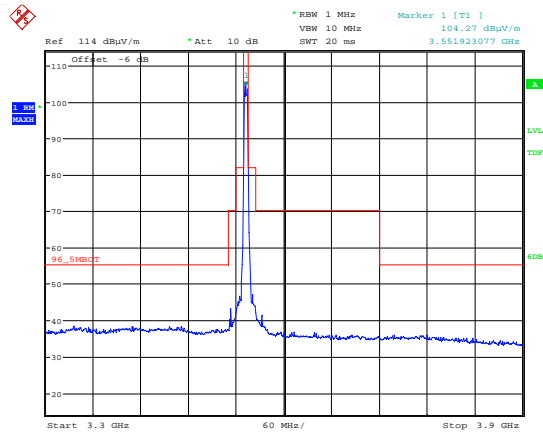
Date: 6.AUG.2018 23:26:26

1 GHz to 2.5 GHz; Beamform; QPSK; MIMO.A.



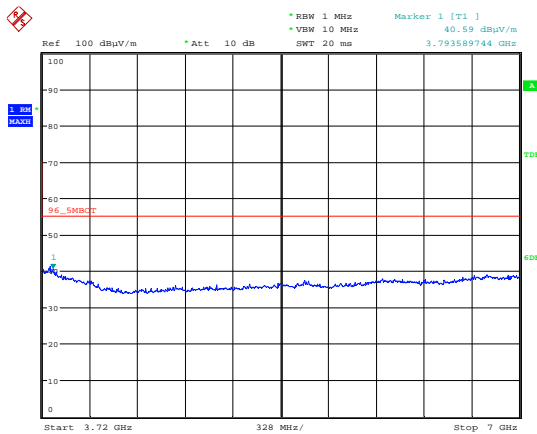
Date: 5.AUG.2018 02:18:41

2.5 GHz to 3.53 GHz; Beamform; QPSK; MIMO.A.



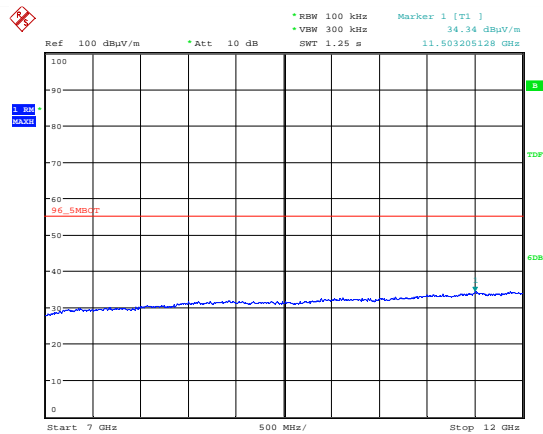
Date: 13.AUG.2018 15:07:49

3.3 GHz to 3.9 GHz; Beamform; QPSK; MIMO.A.



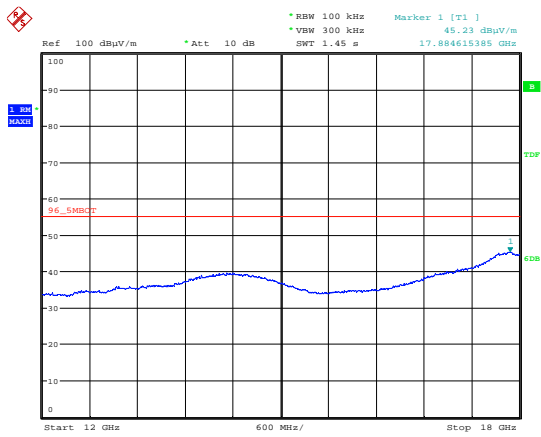
Date: 5.AUG.2018 01:43:54

3.72 GHz to 7 GHz; Beamform; QPSK; MIMO.A.



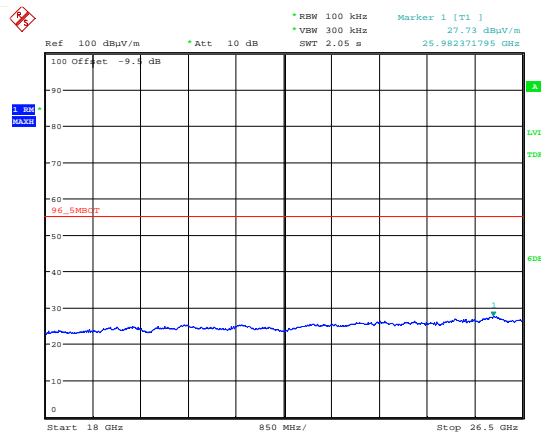
Date: 5.AUG.2018 04:16:22

7 GHz to 12 GHz; Beamform; QPSK; MIMO.A.



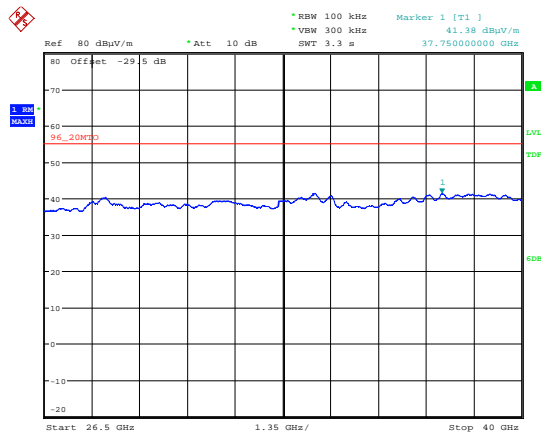
Date: 5.AUG.2018 04:13:52

12 GHz to 18 GHz; Beamform; QPSK; MIMO.A.



Date: 7.AUG.2018 03:09:01

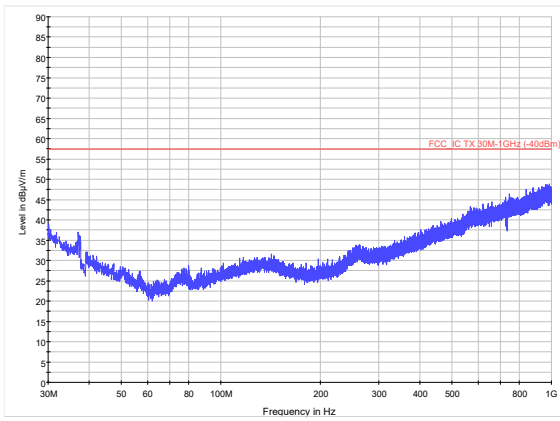
18 GHz to 26.5 GHz; Beamform; QPSK; MIMO.A.



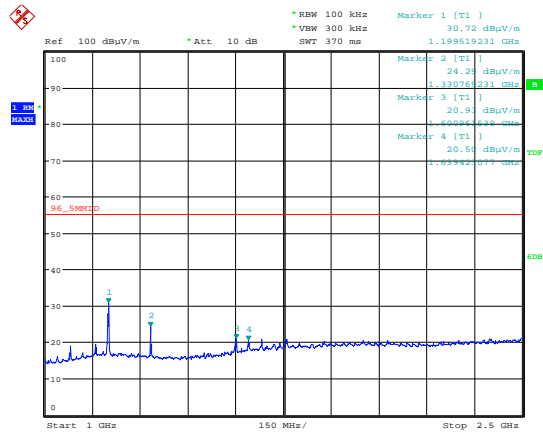
Date: 7.AUG.2018 16:34:21

26.5 GHz to 40 GHz; Beamform; QPSK; MIMO.A.

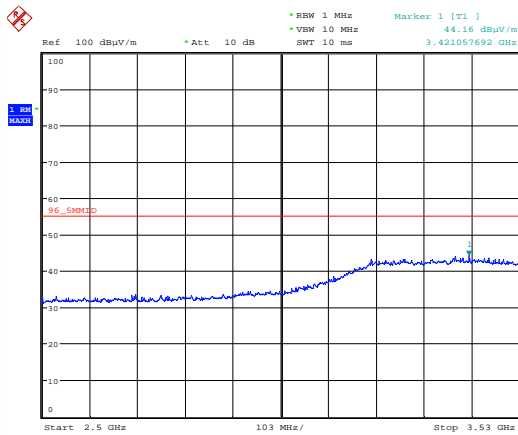
Beamforming; Power setting: 45.5; QPSK MIMO.A; Channel: 3552.5 MHz										
Detector	Freq. (MHz)	Meas'd Emission (dBμV)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-amp Gain (dB)	Duty Cycle Corr'n (dB)	Distance Extrap'n Factor (dB)	Field Strength (dBμV/m)	Field Strength (μV/m)	Limit (μV/m)
No emissions within 20 dB of the limit										



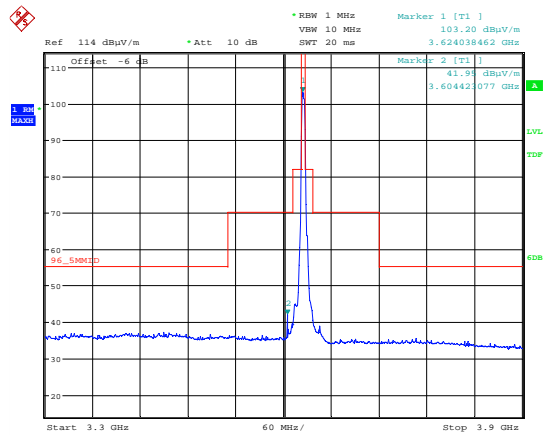
30 MHz to 1 GHz; Beamform; QPSK; MIMO.A.



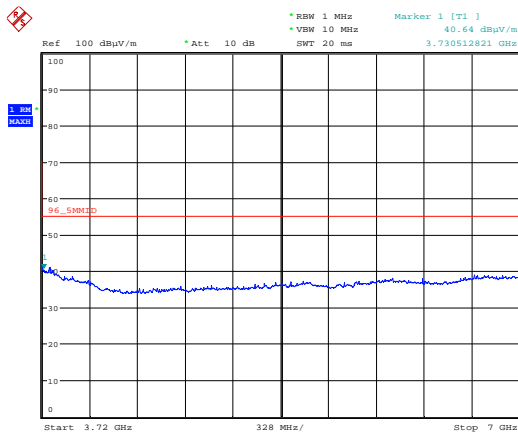
1 GHz to 2.5 GHz; Beamform; QPSK; MIMO.A.



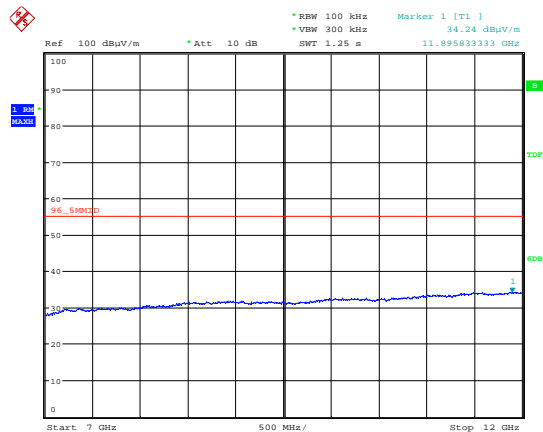
2.5 GHz to 3.53 GHz; Beamform; QPSK; MIMO.A.



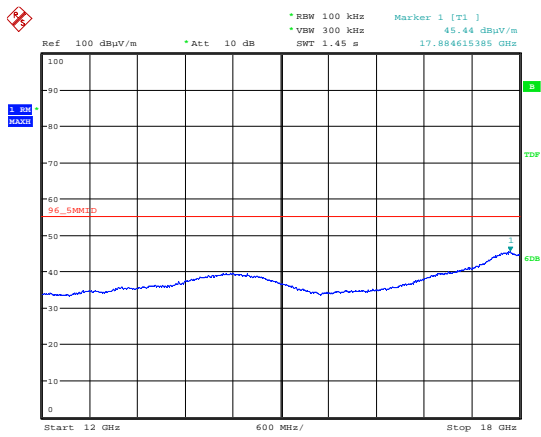
3.3 GHz to 3.9 GHz; Beamform; QPSK; MIMO.A.



3.72 GHz to 7 GHz; Beamform; QPSK; MIMO.A.

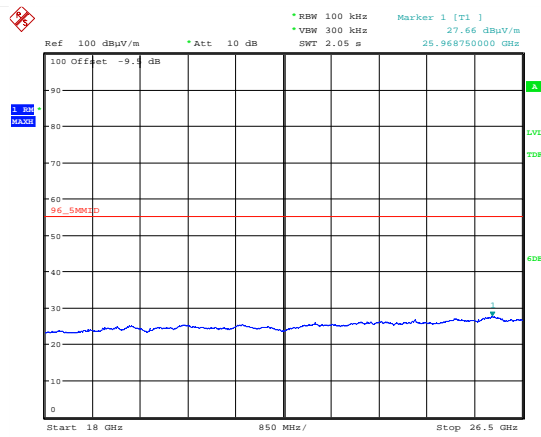


7 GHz to 12 GHz; Beamform; QPSK; MIMO.A.



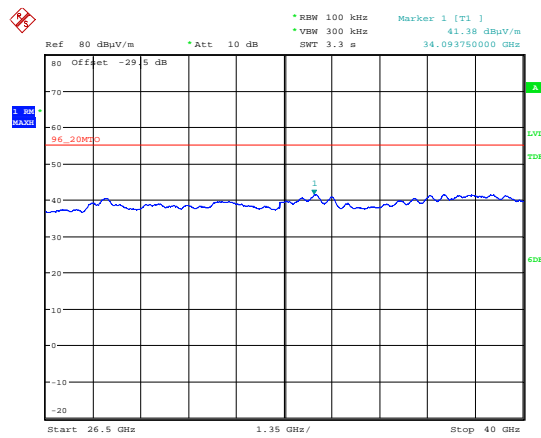
Date: 5.AUG.2018 04:12:00

12 GHz to 18 GHz; Beamform; QPSK; MIMO.A.



Date: 7.AUG.2018 03:12:40

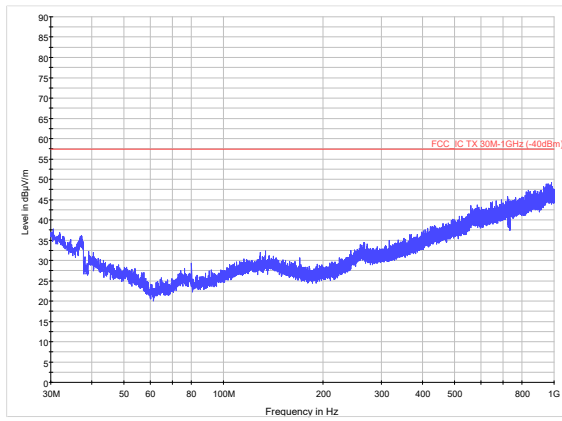
18 GHz to 26.5 GHz; Beamform; QPSK; MIMO.A.



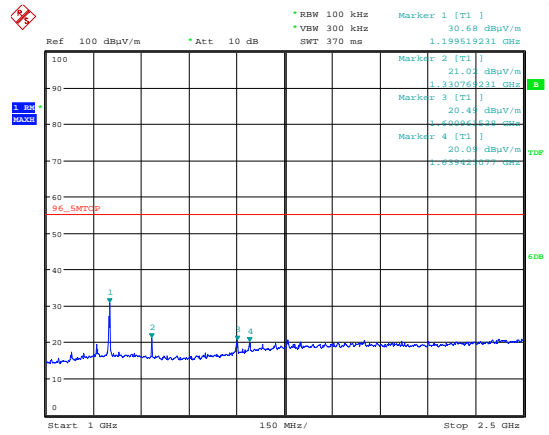
Date: 7.AUG.2018 16:36:48

26.5 GHz to 40 GHz; Beamform; QPSK; MIMO.A.

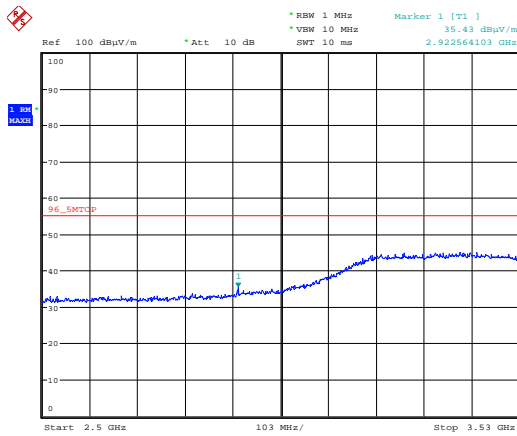
Beamforming; Power setting: 43.8; QPSK MIMO.A; Channel: 3625 MHz										
Detector	Freq. (MHz)	Meas'd Emission (dBμV)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-amp Gain (dB)	Duty Cycle Corr'n (dB)	Distance Extrap'n Factor (dB)	Field Strength (dBμV/m)	Field Strength (μV/m)	Limit (μV/m)
No emissions within 20 dB of the limit										



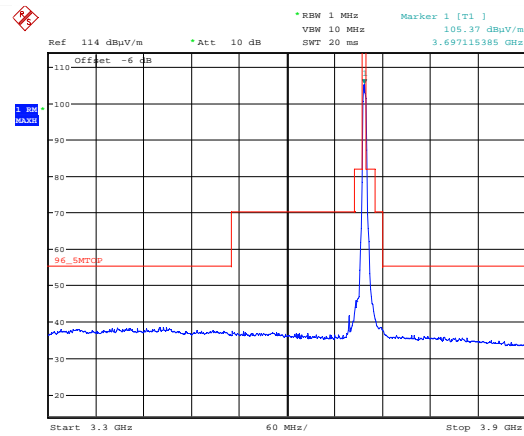
30 MHz to 1 GHz; Beamform; QPSK; MIMO.A.



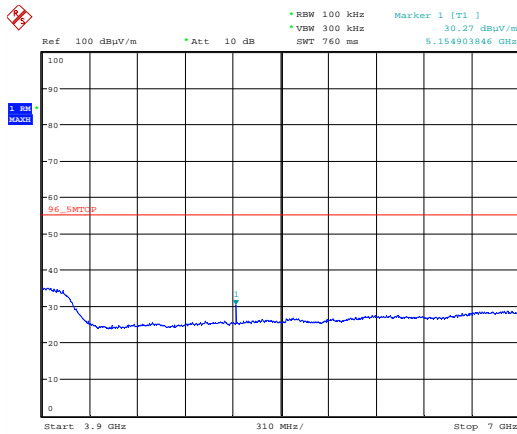
1 GHz to 2.5 GHz; Beamform; QPSK; MIMO.A.



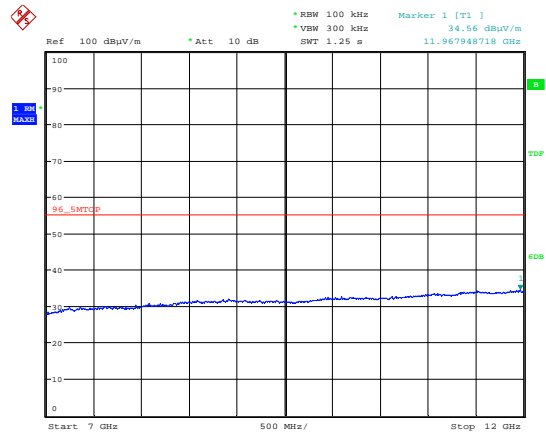
2.5 GHz to 3.53 GHz; Beamform; QPSK; MIMO.A.



3.3 GHz to 3.9 GHz; Beamform; QPSK; MIMO.A.

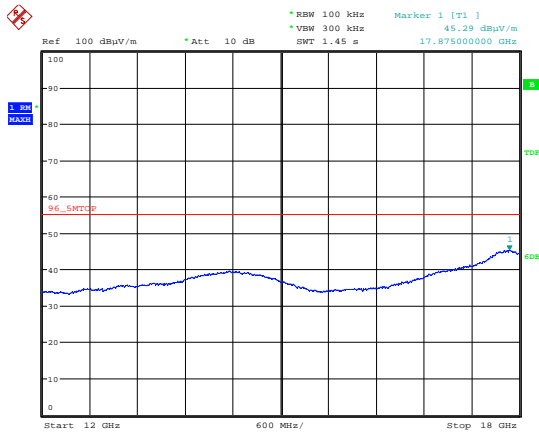


3.9 GHz to 7 GHz; Beamform; QPSK; MIMO.A.



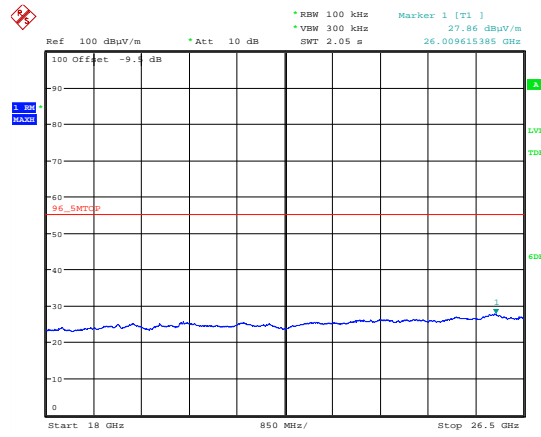
7 GHz to 12 GHz; Beamform; QPSK; MIMO.A.





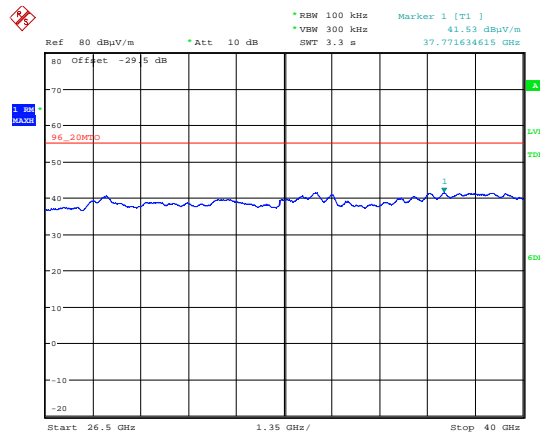
Date: 5.AUG.2018 04:05:01

12 GHz to 18 GHz; Beamform; QPSK; MIMO.



Date: 7.AUG.2018 03:14:37

18 GHz to 26.5 GHz; Beamform; QPSK; MIMO.



Date: 7.AUG.2018 16:42:34

26.5 GHz to 40 GHz; Beamform; QPSK; MIMO.

Beamforming; Power setting: 45.5; QPSK MIMO; Channel: 3697.5 MHz										
Detector	Freq. (MHz)	Meas'd Emission (dBμV)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-amp Gain (dB)	Duty Cycle Corr'n (dB)	Distance Extrap'n Factor (dB)	Field Strength (dBμV/m)	Field Strength (μV/m)	Limit (μV/m)
No emissions within 20 dB of the limit										

## 12 Emission Mask

### 12.1 Definition

#### *Out-of-band emission.*

Emission on a frequency or frequencies immediately outside the necessary bandwidth that results from the modulation process but excluding spurious emissions.

#### *Spurious emission.*

Emission on a frequency or frequencies that are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products, and frequency conversion products, but exclude out-of-band emissions.

### 12.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	Radio Chamber
Test Standard and Clause:	Part 96.41 (e)
EUT Channels:	Low / Mid / High
EUT Channel Bandwidths:	5 MHz, 20 MHz and 40 MHz
Deviations From Standard:	None
Measurement BW:	1 MHz
Spectrum Analyzer Video BW: (requirement at least 3x RBW)	10 MHz
Measurement Detector:	RMS

### Environmental Conditions (Normal Environment)

Temperature: 24 °C	+15 °C to +35 °C (as declared)
Humidity: 60 % RH	20 % RH to 75 % RH (as declared)
Supply: 48 V dc	48 V dc (as declared)

### 12.3 Test Limit

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed  $-13$  dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed  $-25$  dBm/MHz.

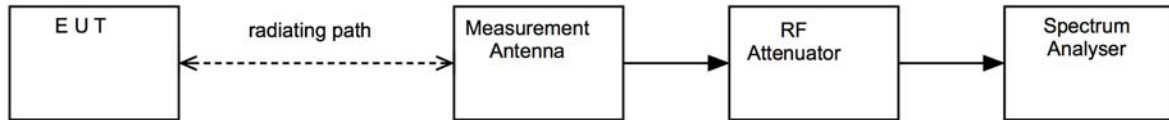
*Additional protection levels.* The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed  $-40$  dBm/MHz.

## 12.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure v, the emissions from the EUT were measured on a spectrum analyser.

The measurements were performed with EUT set at its maximum duty. All modulation schemes, data rates and power settings were used to observe the worst case configuration in each bandwidth.

**Figure v Test Setup**

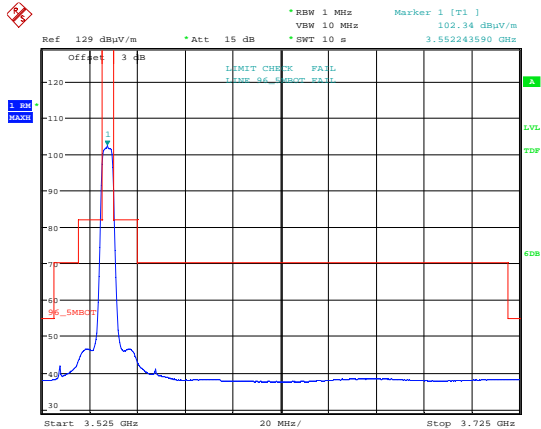


## 12.5 Test Equipment

Equipment Type	Manufacturer	Equipment Description	Element No	Due For Calibration
3115	EMCO	1-18GHz Horn	L139	2019-09-25
FSU50	R&S	Spectrum Analyser	U544	2019-05-22

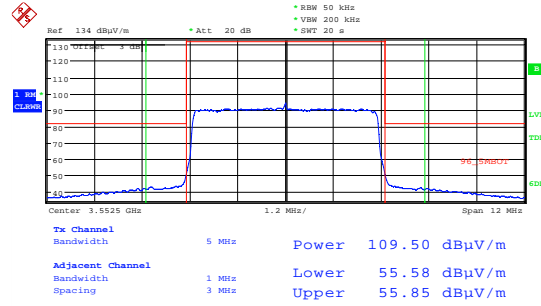
12.6 Test Results

Sector Mode; 5 MHz bandwidth; Bottom channel



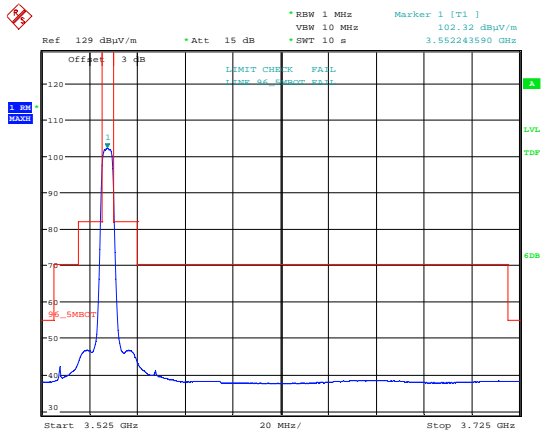
Date: 14.AUG.2018 15:42:56

Emission Mask QPSK; 3552.5 MHz. MIMO A



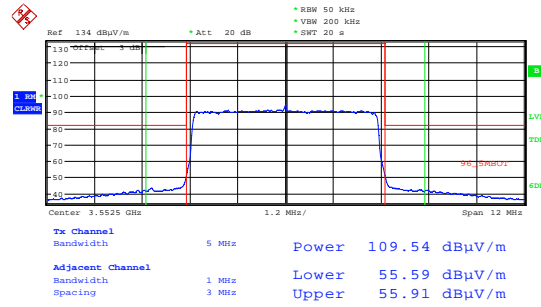
Date: 14.AUG.2018 15:42:22

Emission Mask QPSK; 3552.5 MHz; MIMO A Integration Method.



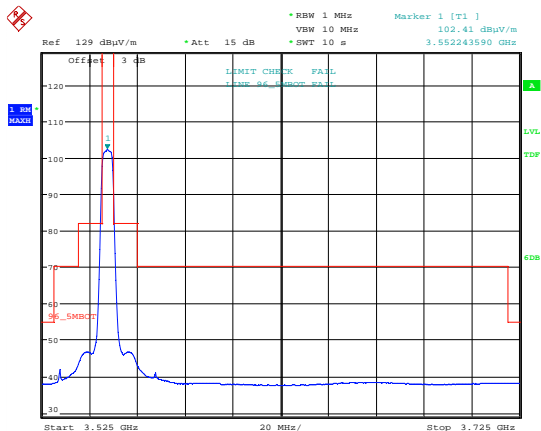
Date: 14.AUG.2018 15:49:16

Emission Mask QPSK; 3552.5 MHz. MIMO B



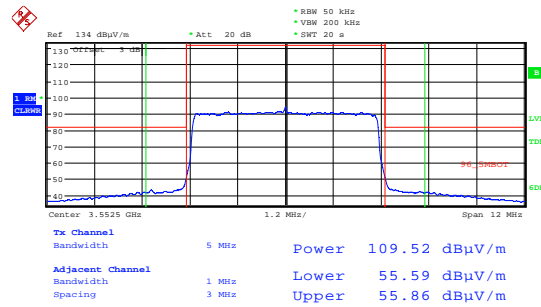
Date: 14.AUG.2018 15:49:50

Emission Mask QPSK; 3552.5 MHz; MIMO B Integration Method.



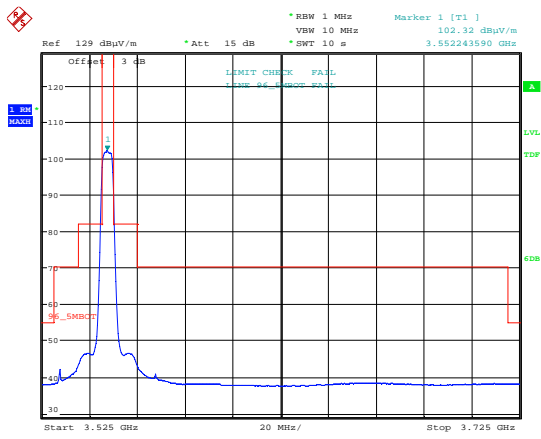
Date: 14.AUG.2018 15:43:33

Emission Mask 16 QAM; 3552.5 MHz. MIMO A



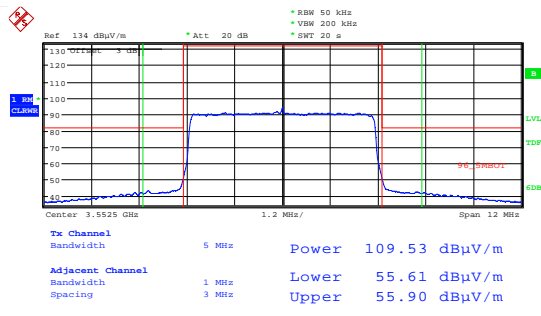
Date: 14.AUG.2018 15:44:05

Emission Mask 16 QAM; 3552.5 MHz; MIMO A Integration Method.



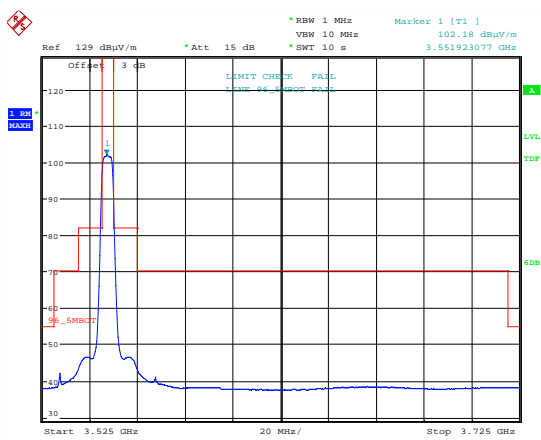
Date: 14.AUG.2018 15:50:49

Emission Mask 16 QAM; 3552.5 MHz. MIMOB



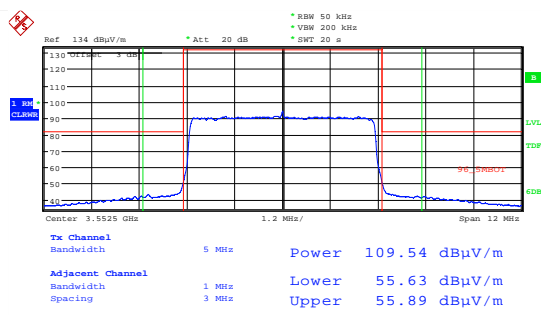
Date: 14.AUG.2018 15:51:45

Emission Mask 16 QAM; 3552.5 MHz; MIMOB Integration Method.



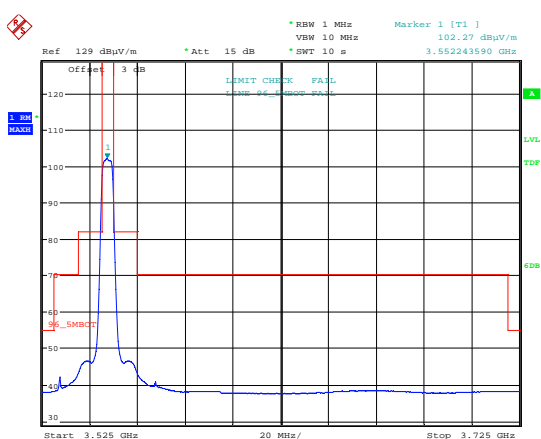
Date: 14.AUG.2018 15:45:22

Emission Mask 64 QAM; 3552.5 MHz. MIMOA



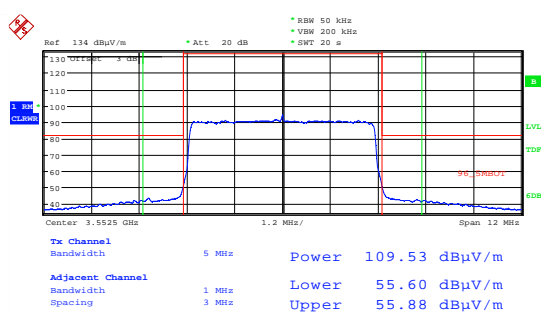
Date: 14.AUG.2018 15:45:55

Emission Mask 64 QAM; 3552.5 MHz; MIMOA Integration Method.



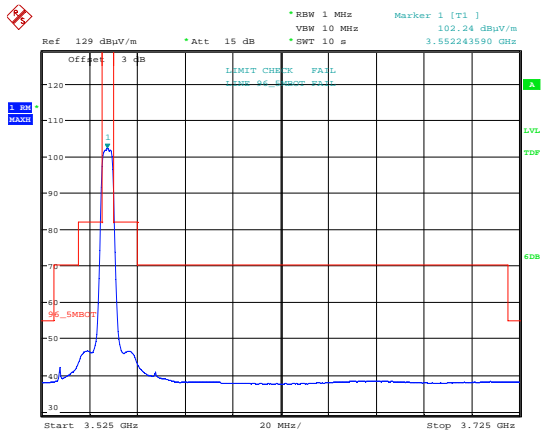
Date: 14.AUG.2018 15:52:34

Emission Mask 64 QAM; 3552.5 MHz. MIMOB



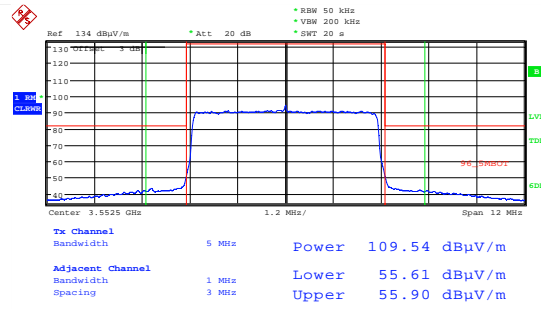
Date: 14.AUG.2018 15:53:13

Emission Mask 64 QAM; 3552.5 MHz; MIMOB Integration Method.



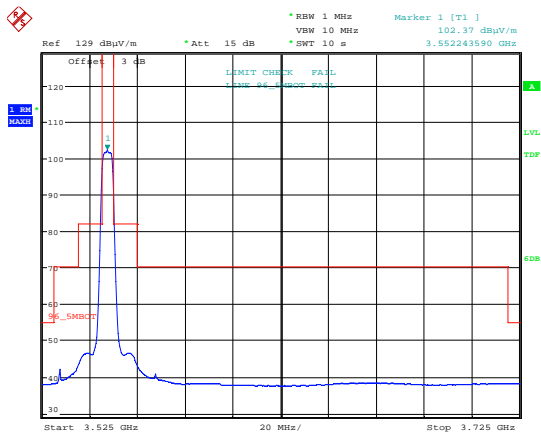
Date: 14.AUG.2018 15:48:09

Emission Mask 256 QAM; 3552.5 MHz. MIMO A



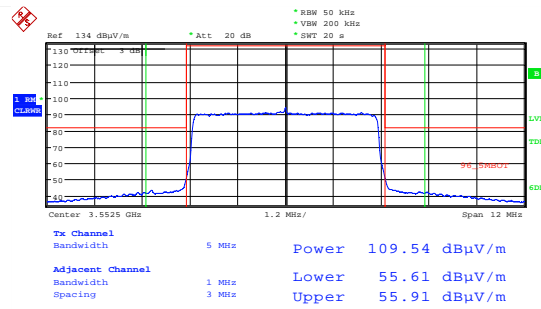
Date: 14.AUG.2018 15:48:40

Emission Mask 256 QAM; 3552.5 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 15:54:00

Emission Mask 256 QAM; 3552.5 MHz. MIMO B

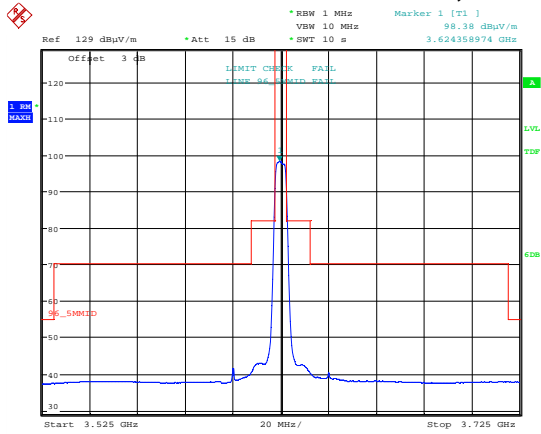


Date: 14.AUG.2018 15:54:38

Emission Mask 256 QAM; 3552.5 MHz; MIMO B Integration Method.

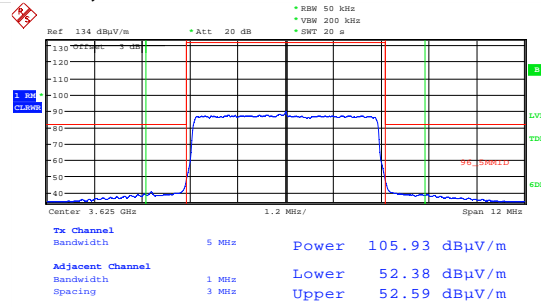
<b>Frequency: 3552.5 MHz; Sector Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	109.5	Lower Channel	N/A	55.58	82.24	Pass
			Upper Channel	N/A	55.85		Pass
	16 QAM	109.52	Lower Channel	N/A	55.59		Pass
			Upper Channel	N/A	55.86		Pass
	64 QAM	109.54	Lower Channel	N/A	55.63		Pass
			Upper Channel	N/A	55.89		Pass
	256 QAM	109.54	Lower Channel	N/A	55.61		Pass
			Upper Channel	N/A	55.9		Pass
B	QPSK	109.54	Lower Channel	N/A	55.59	Pass	
			Upper Channel	N/A	55.91	Pass	
	16 QAM	109.53	Lower Channel	N/A	55.61	Pass	
			Upper Channel	N/A	55.9	Pass	
	64 QAM	109.53	Lower Channel	N/A	55.6	Pass	
			Upper Channel	N/A	55.88	Pass	
	256 QAM	109.54	Lower Channel	N/A	55.61	Pass	
			Upper Channel	N/A	55.91	Pass	

### Sector Mode; 5 MHz bandwidth; Middle channel



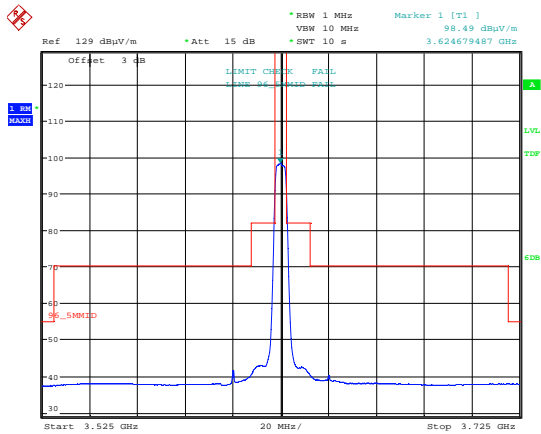
Date: 14.AUG.2018 15:58:32

Emission Mask QPSK; 3625 MHz. MIMO A



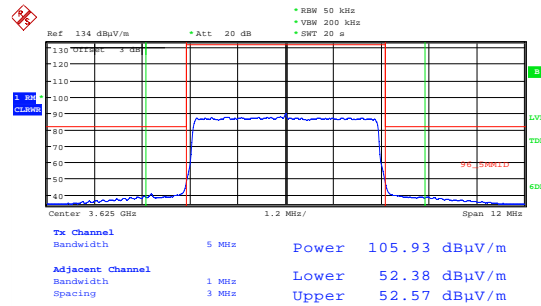
Date: 14.AUG.2018 15:59:03

Emission Mask QPSK; 3625 MHz; MIMO A Integration Method.



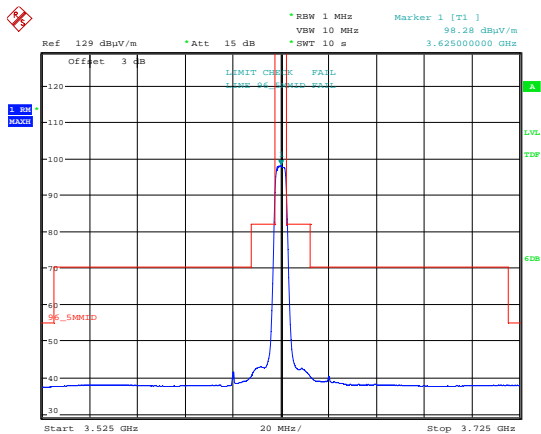
Date: 14.AUG.2018 16:03:33

Emission Mask QPSK; 3625 MHz. MIMO B



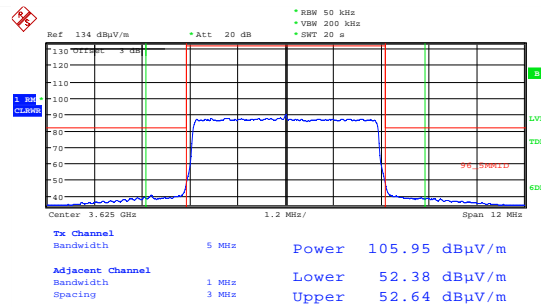
Date: 14.AUG.2018 16:04:09

Emission Mask QPSK; 3625 MHz; MIMO B Integration Method.



Date: 14.AUG.2018 15:59:45

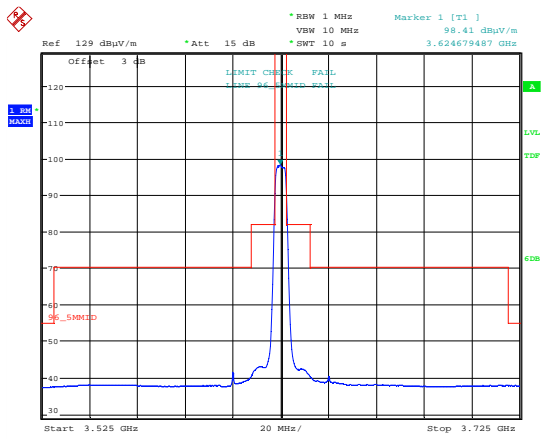
Emission Mask 16 QAM; 3625 MHz. MIMO A



Date: 14.AUG.2018 16:00:19

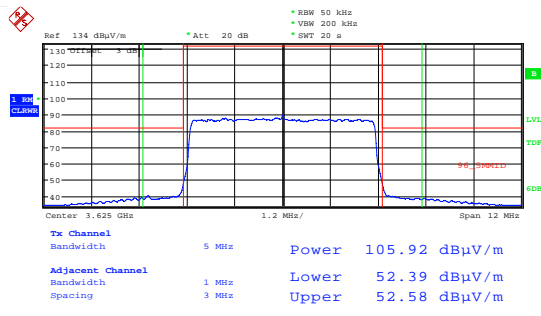
Emission Mask 16 QAM; 3625 MHz; MIMO A Integration Method.





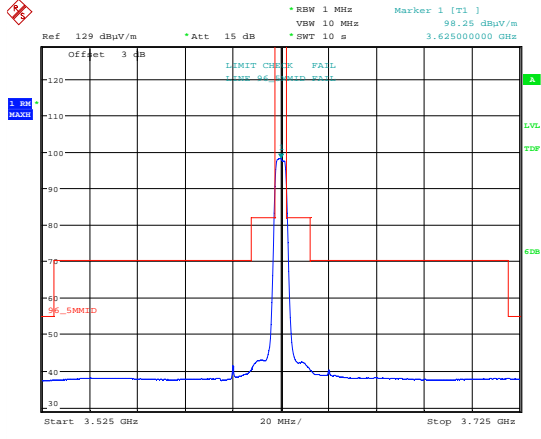
Date: 14.AUG.2018 16:04:53

Emission Mask 16 QAM; 3625 MHz. MIMOB



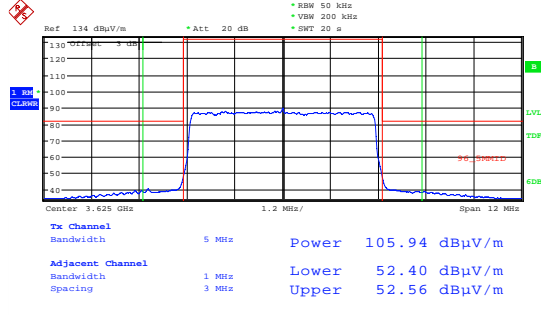
Date: 14.AUG.2018 16:05:35

Emission Mask 16 QAM; 3625 MHz; MIMOB Integration Method.



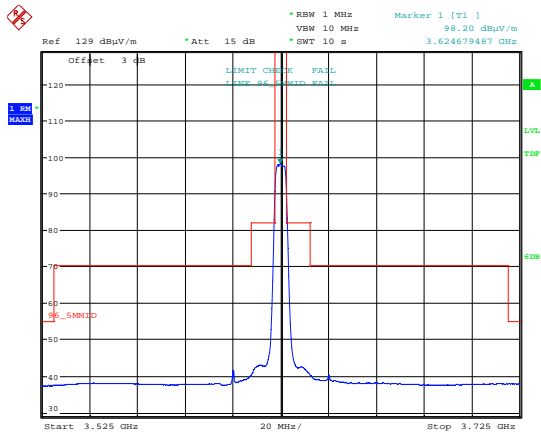
Date: 14.AUG.2018 16:01:10

Emission Mask 64 QAM; 3625 MHz. MIMO A



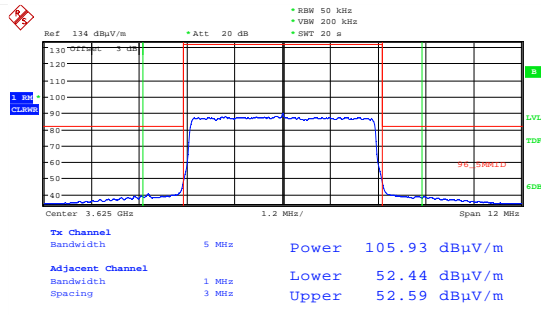
Date: 14.AUG.2018 16:01:43

Emission Mask 64 QAM; 3625 MHz; MIMO A Integration Method.



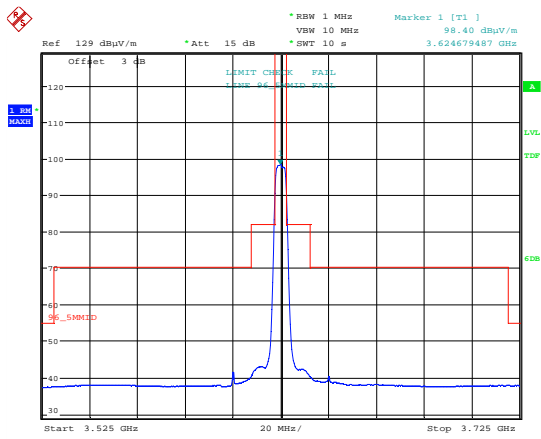
Date: 14.AUG.2018 16:06:18

Emission Mask 64 QAM; 3625 MHz. MIMO B



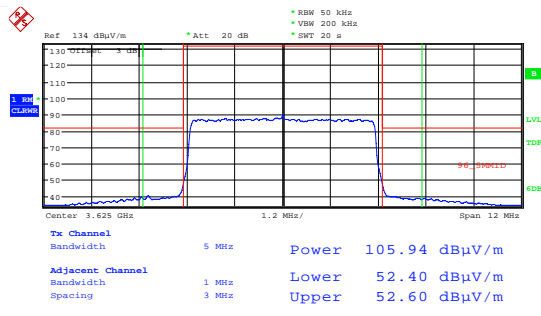
Date: 14.AUG.2018 16:07:02

Emission Mask 64 QAM; 3625 MHz; MIMO B Integration Method.



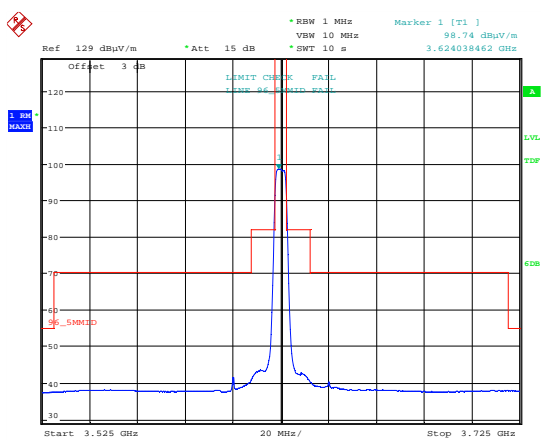
Date: 14.AUG.2018 16:02:22

Emission Mask 256 QAM; 3625 MHz. MIMO A



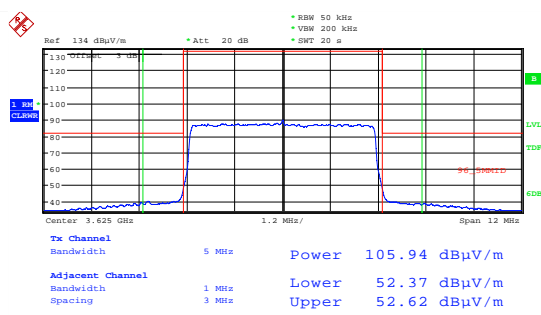
Date: 14.AUG.2018 16:02:55

Emission Mask 256 QAM; 3625 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 16:07:33

Emission Mask 256 QAM; 3625 MHz. MIMO B

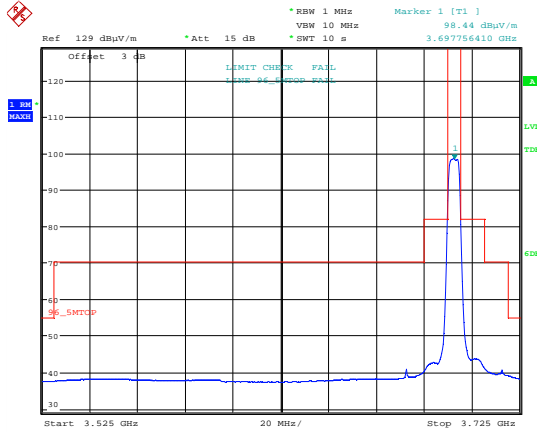


Date: 14.AUG.2018 16:08:08

Emission Mask 256 QAM; 3625 MHz; MIMO B Integration Method.

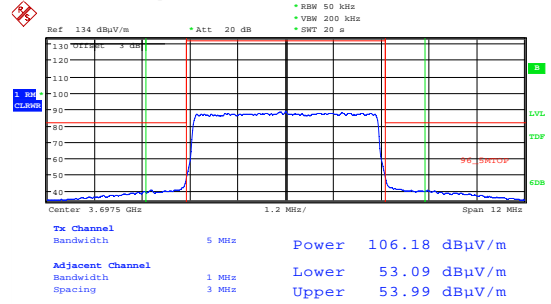
<b>Frequency: 3625 MHz; Sector Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	105.93	Lower Channel	N/A	52.38	82.24	Pass
			Upper Channel	N/A	52.59		Pass
	16 QAM	105.95	Lower Channel	N/A	52.38		Pass
			Upper Channel	N/A	52.64		Pass
	64 QAM	105.94	Lower Channel	N/A	52.4		Pass
			Upper Channel	N/A	52.56		Pass
	256 QAM	105.94	Lower Channel	N/A	52.4		Pass
			Upper Channel	N/A	52.6		Pass
B	QPSK	105.93	Lower Channel	N/A	52.38	Pass	
			Upper Channel	N/A	52.37	Pass	
	16 QAM	105.92	Lower Channel	N/A	52.39	Pass	
			Upper Channel	N/A	52.58	Pass	
	64 QAM	105.93	Lower Channel	N/A	52.44	Pass	
			Upper Channel	N/A	52.99	Pass	
	256 QAM	105.94	Lower Channel	N/A	52.37	Pass	
			Upper Channel	N/A	52.62	Pass	

### Sector Mode; 5 MHz bandwidth; Top channel



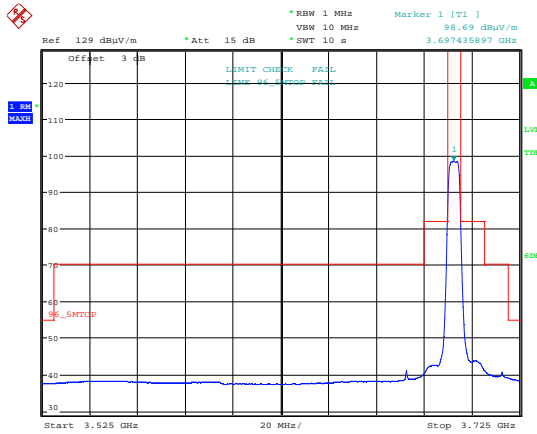
Date: 14.AUG.2018 16:12:45

Emission Mask QPSK; 3697.5 MHz. MIMO A



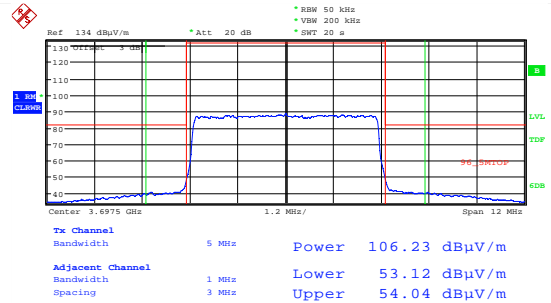
Date: 14.AUG.2018 16:13:17

Emission Mask QPSK; 3697.5 MHz; MIMO A Integration Method.



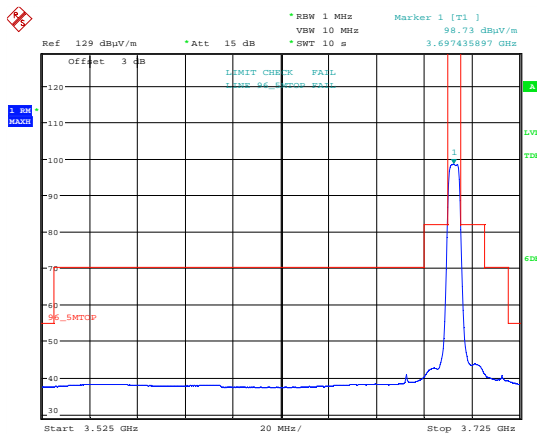
Date: 14.AUG.2018 16:17:39

Emission Mask QPSK; 3697.5 MHz. MIMO B



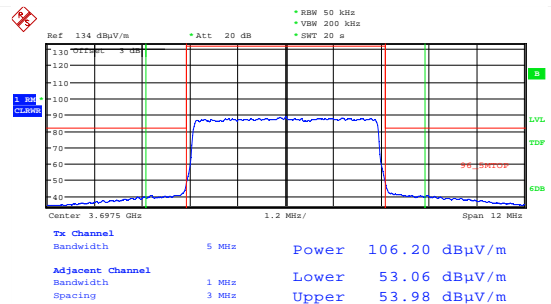
Date: 14.AUG.2018 16:18:13

Emission Mask QPSK; 3697.5 MHz; MIMO B Integration Method.



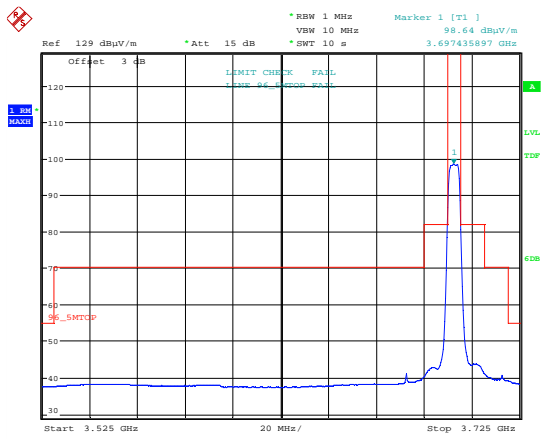
Date: 14.AUG.2018 16:13:58

Emission Mask 16 QAM; 3697.5 MHz. MIMO A



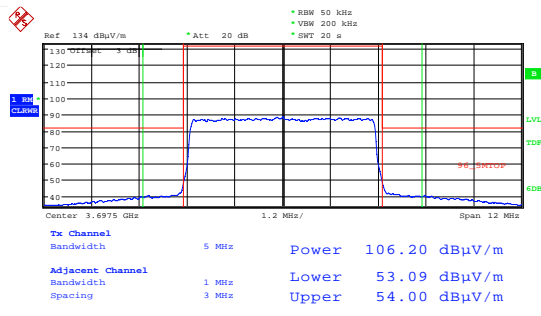
Date: 14.AUG.2018 16:14:30

Emission Mask 16 QAM; 3697.5 MHz; MIMO A Integration Method.



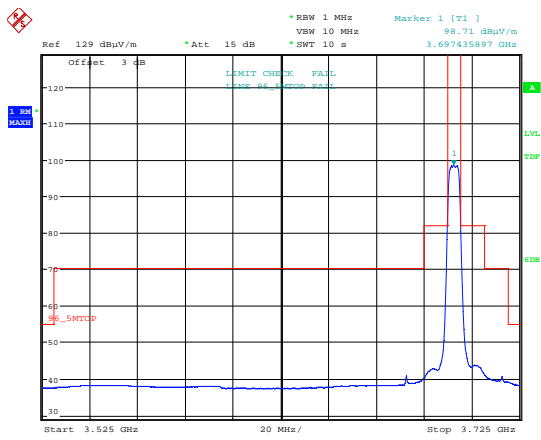
Date: 14.AUG.2018 16:19:03

Emission Mask 16 QAM; 3697.5 MHz. MIMOB



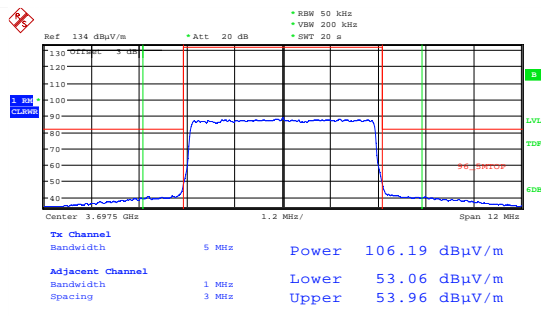
Date: 14.AUG.2018 16:19:42

Emission Mask 16 QAM; 3697.5 MHz; MIMOB Integration Method.



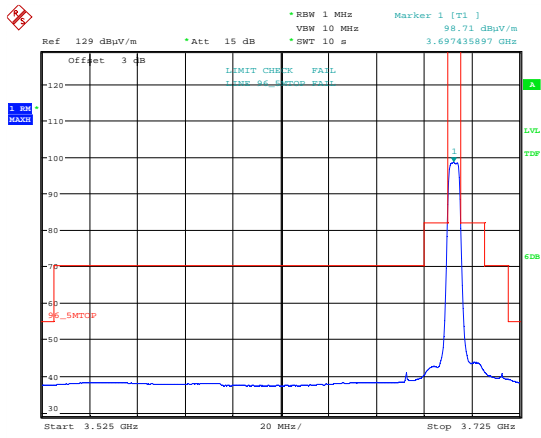
Date: 14.AUG.2018 16:15:19

Emission Mask 64 QAM; 3697.5 MHz. MIMOA



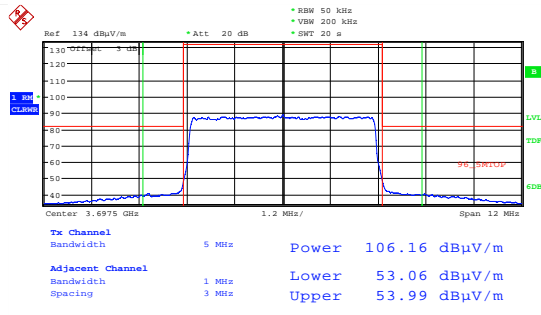
Date: 14.AUG.2018 16:15:52

Emission Mask 64 QAM; 3697.5 MHz; MIMOA Integration Method.



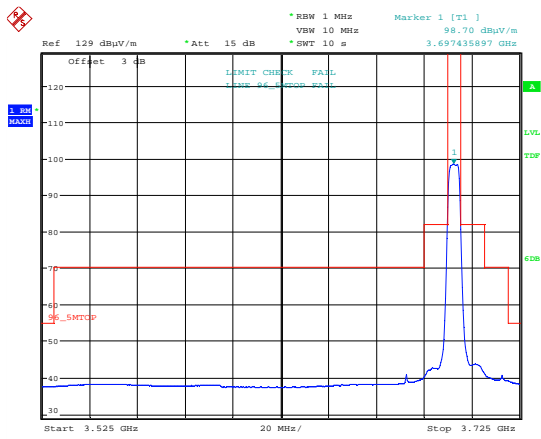
Date: 14.AUG.2018 16:20:27

Emission Mask 64 QAM; 3697.5 MHz. MIMOB



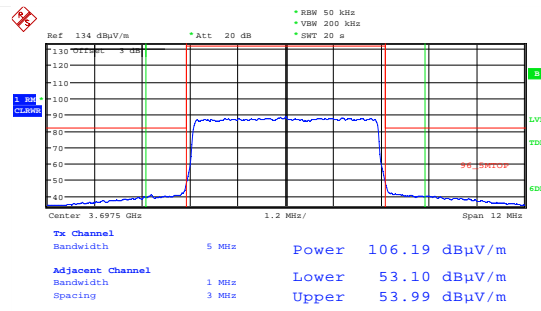
Date: 14.AUG.2018 16:21:13

Emission Mask 64 QAM; 3697.5 MHz; MIMOB Integration Method.



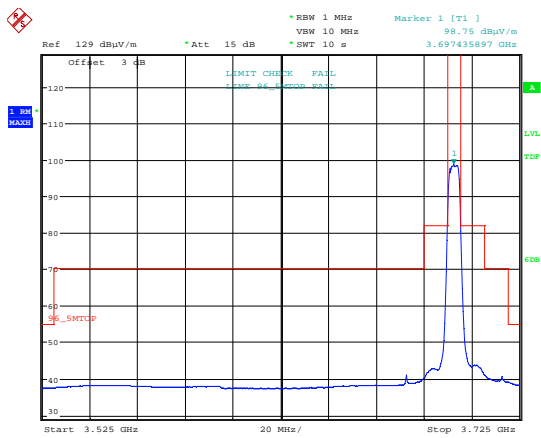
Date: 14.AUG.2018 16:16:26

Emission Mask 256 QAM; 3697.5 MHz. MIMO A



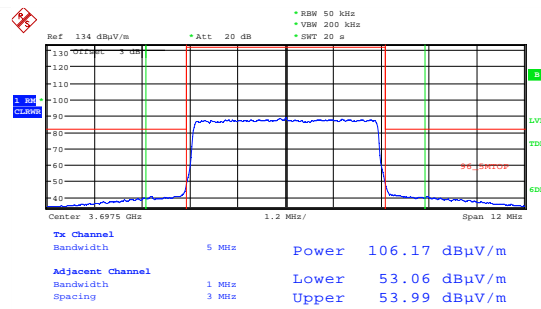
Date: 14.AUG.2018 16:17:00

Emission Mask 256 QAM; 3697.5 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 16:21:58

Emission Mask 256 QAM; 3697.5 MHz. MIMO B

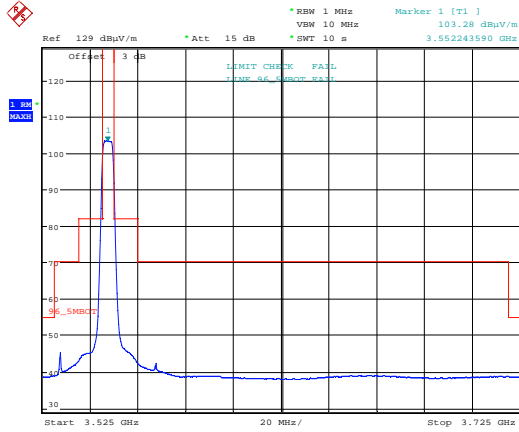


Date: 14.AUG.2018 16:22:36

Emission Mask 256 QAM; 3697.5 MHz; MIMO B Integration Method.

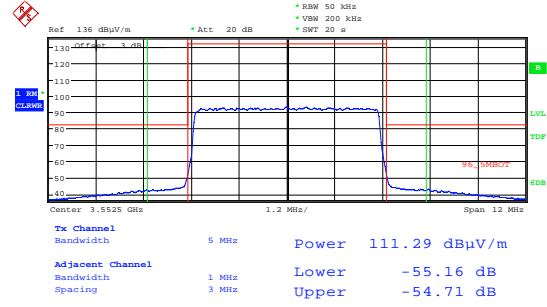
<b>Frequency: 3697.5 MHz; Sector Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	106.18	Lower Channel	N/A	53.09	82.24	Pass
			Upper Channel	N/A	53.09		Pass
	16 QAM	106.2	Lower Channel	N/A	53.06		Pass
			Upper Channel	N/A	53.98		Pass
	64 QAM	106.19	Lower Channel	N/A	53.06		Pass
			Upper Channel	N/A	53.96		Pass
	256 QAM	106.19	Lower Channel	N/A	53.1		Pass
			Upper Channel	N/A	53.99		Pass
B	QPSK	106.23	Lower Channel	N/A	53.12	Pass	
			Upper Channel	N/A	54.04	Pass	
	16 QAM	106.2	Lower Channel	N/A	53.09	Pass	
			Upper Channel	N/A	54	Pass	
	64 QAM	106.16	Lower Channel	N/A	53.06	Pass	
			Upper Channel	N/A	53.99	Pass	
	256 QAM	106.17	Lower Channel	N/A	53.06	Pass	
			Upper Channel	N/A	53.99	Pass	

### MuMIMO; 5 MHz Bandwidth; Bottom Channel



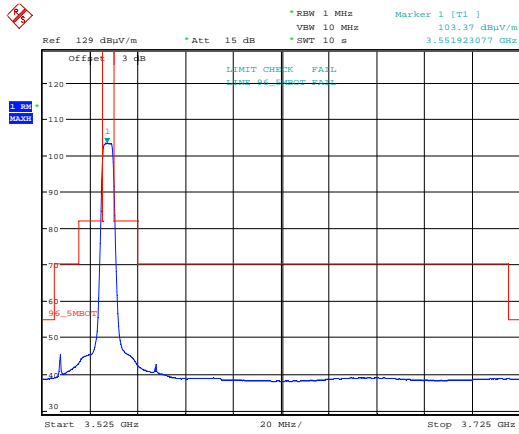
Date: 14.AUG.2018 16:38:03

Emission Mask QPSK; 3552.5 MHz; MIMO.A.



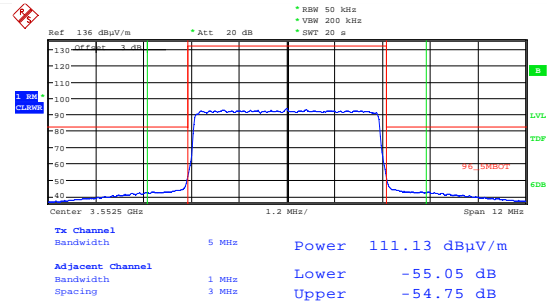
Date: 14.AUG.2018 16:42:09

Emission Mask QPSK; 3552.5 MHz; MIMO.A Integration Method.



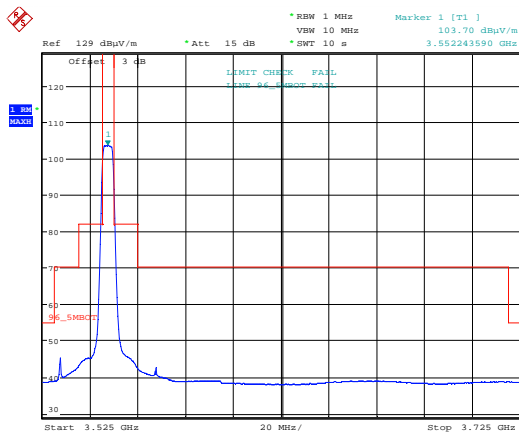
Date: 14.AUG.2018 16:40:36

Emission Mask QPSK; 3552.5 MHz; MIMO.B.



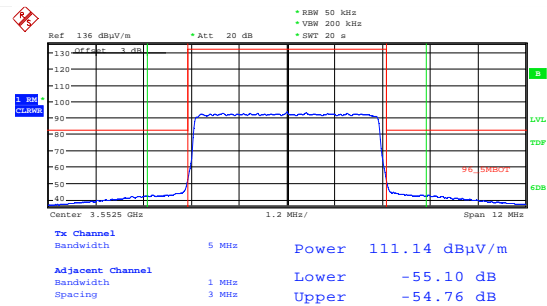
Date: 14.AUG.2018 16:41:39

Emission Mask QPSK; 3552.5 MHz; MIMO.B Integration Method.



Date: 14.AUG.2018 16:38:36

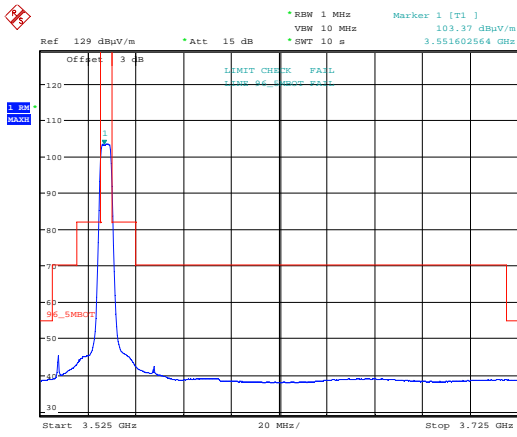
Emission Mask 16 QAM; 3552.5 MHz; MIMO.A.



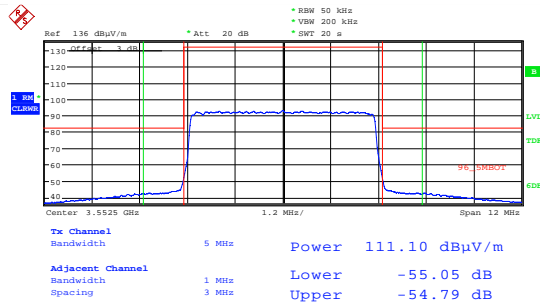
Date: 14.AUG.2018 16:42:50

Emission Mask 16 QAM; 3552.5 MHz; MIMO.A Integration Method.

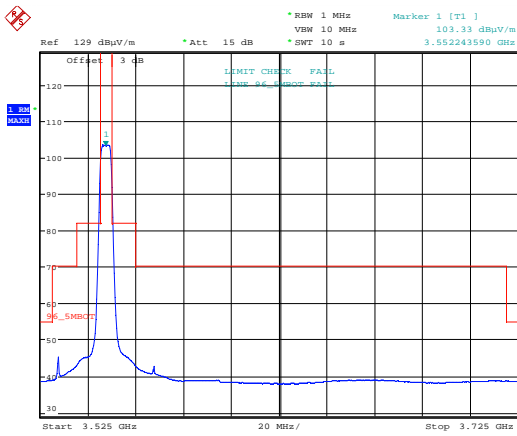




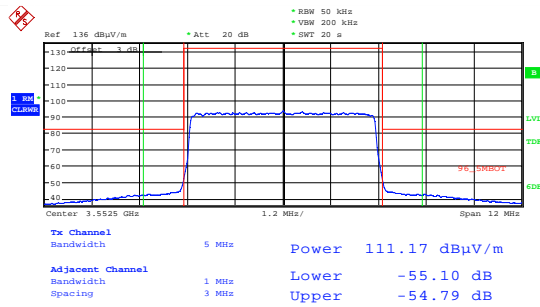
Date: 14.AUG.2018 16:48:19  
**Emission Mask 16 QAM; 3552.5 MHz;  
 MIMOB.**



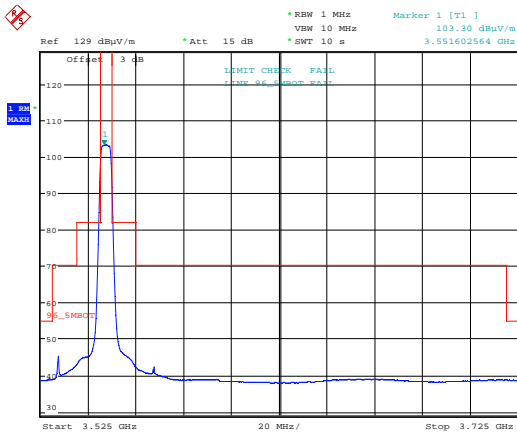
Date: 14.AUG.2018 16:46:04  
**Emission Mask 16 QAM; 3552.5 MHz;  
 MIMOB Integration Method.**



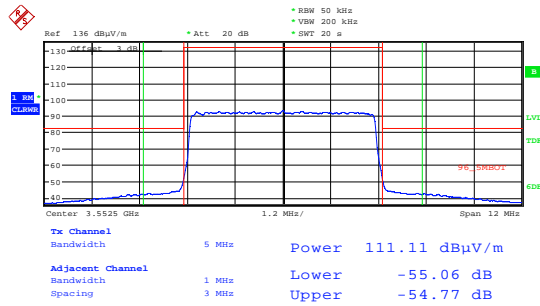
Date: 14.AUG.2018 16:39:12  
**Emission Mask 64 QAM; 3552.5 MHz;  
 MIMO A.**



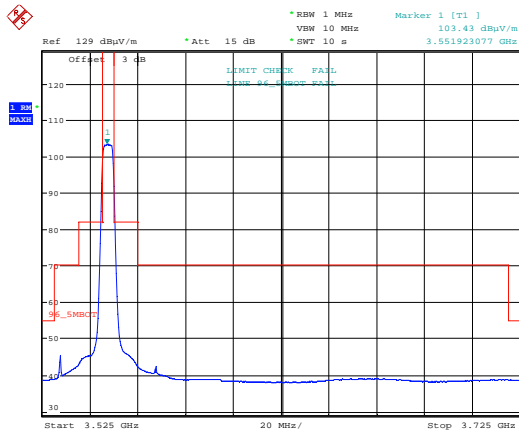
Date: 14.AUG.2018 16:43:27  
**Emission Mask 64 QAM; 3552.5 MHz;  
 MIMO A Integration Method.**



Date: 14.AUG.2018 16:47:46  
**Emission Mask 64 QAM; 3552.5 MHz;  
 MIMOB.**

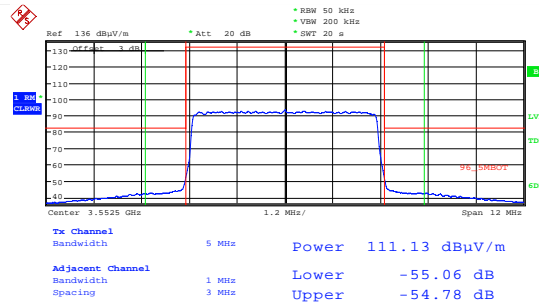


Date: 14.AUG.2018 16:46:58  
**Emission Mask 64 QAM; 3552.5 MHz;  
 MIMOB Integration Method.**



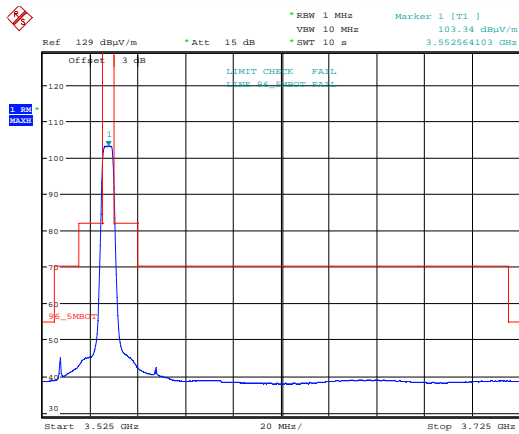
Date: 14.AUG.2018 16:39:51

Emission Mask 256 QAM; 3552.5 MHz;  
MIMO A.



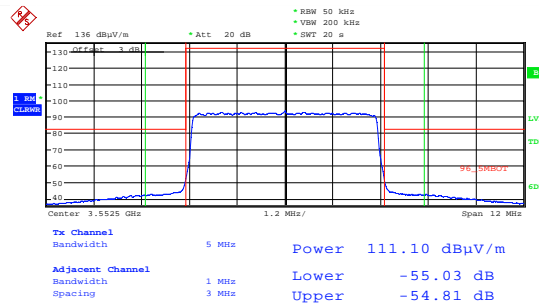
Date: 14.AUG.2018 16:44:09

Emission Mask 256 QAM; 3552.5 MHz;  
MIMO A Integration Method.



Date: 14.AUG.2018 16:49:01

Emission Mask 256 QAM; 3552.5 MHz;  
MIMO B.

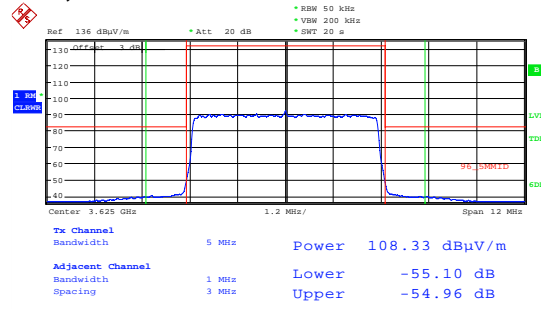
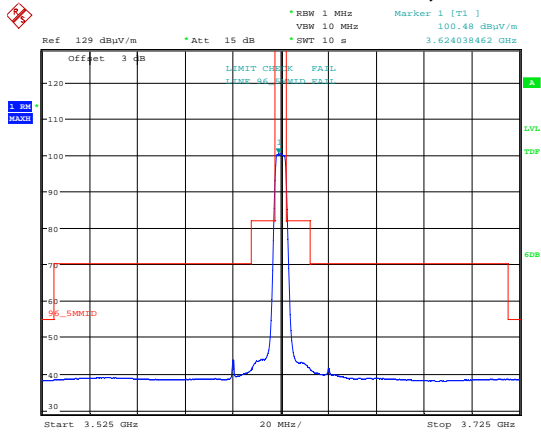


Date: 14.AUG.2018 16:49:46

Emission Mask 256 QAM; 3552.5 MHz;  
MIMO B Integration Method.

<b>Frequency: 3552.5 MHz; MuMIMO Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	111.29	Lower Channel	-55.16	56.13	82.24	Pass
			Upper Channel	-54.71	56.58		Pass
	16 QAM	111.14	Lower Channel	-55.1	56.04		Pass
			Upper Channel	-54.76	56.38		Pass
	64 QAM	111.17	Lower Channel	-55.1	56.07		Pass
			Upper Channel	-54.79	56.38		Pass
	256 QAM	111.13	Lower Channel	-55.06	56.07		Pass
			Upper Channel	-54.78	56.35		Pass
B	QPSK	111.13	Lower Channel	-55.05	56.08	Pass	
			Upper Channel	-54.75	56.38	Pass	
	16 QAM	111.1	Lower Channel	-55.05	56.05	Pass	
			Upper Channel	-54.79	56.31	Pass	
	64 QAM	111.11	Lower Channel	-55.06	56.05	Pass	
			Upper Channel	-54.77	56.34	Pass	
	256 QAM	111.1	Lower Channel	-55.03	56.07	Pass	
			Upper Channel	-54.81	56.29	Pass	

### MuMIMO; 5 MHz Bandwidth; Middle Channel

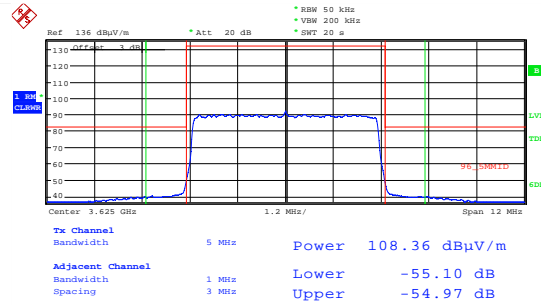
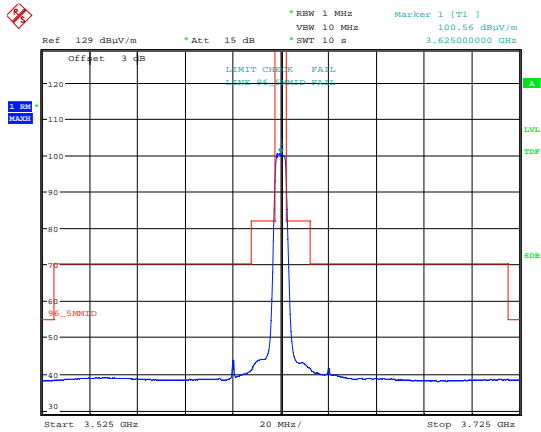


Date: 14.AUG.2018 17:20:04

Date: 14.AUG.2018 17:18:53

Emission Mask QPSK; 3625 MHz; MIMO A.

Emission Mask QPSK; 3625 MHz; MIMO A Integration Method.

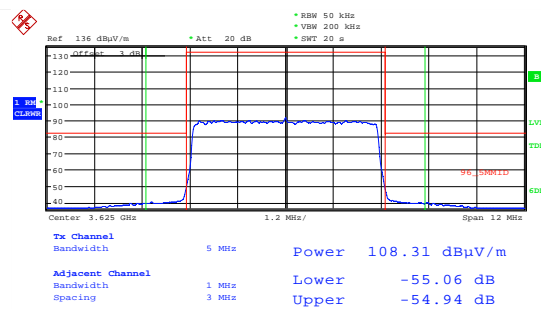
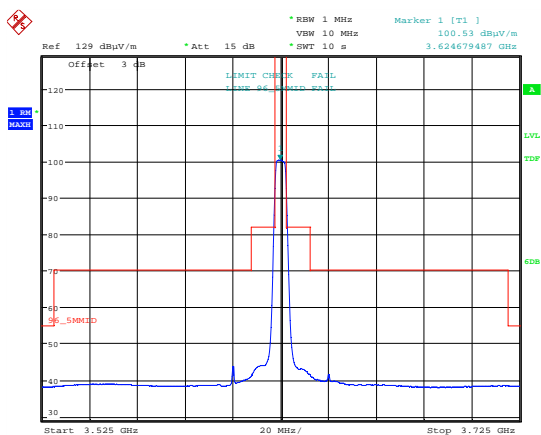


Date: 14.AUG.2018 17:22:35

Date: 14.AUG.2018 17:12:41

Emission Mask QPSK; 3625 MHz; MIMO B.

Emission Mask QPSK; 3625 MHz; MIMO B Integration Method.

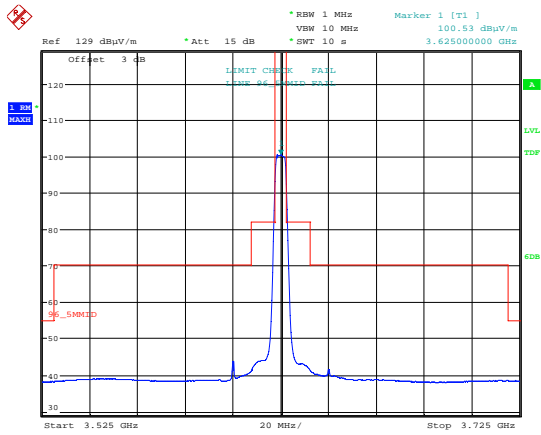


Date: 14.AUG.2018 17:20:43

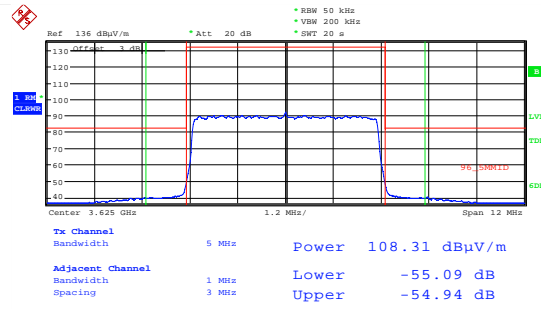
Date: 14.AUG.2018 17:10:49

Emission Mask 16 QAM; 3625 MHz; MIMO A.

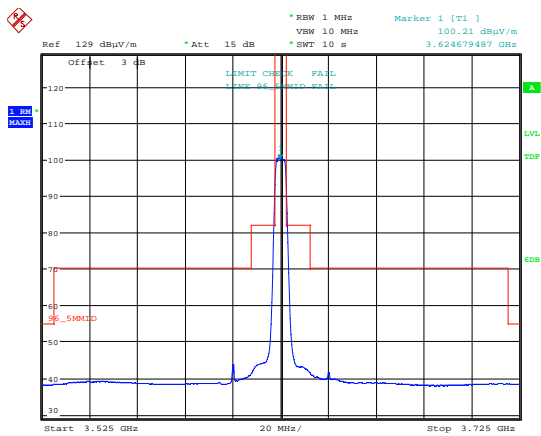
Emission Mask 16 QAM; 3625 MHz; MIMO A Integration Method.



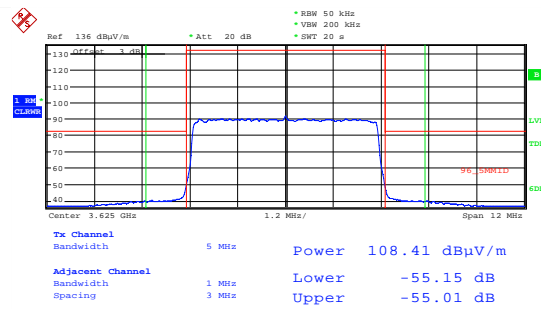
Date: 14.AUG.2018 17:23:18  
**Emission Mask 16 QAM; 3625 MHz; MIMOB.**



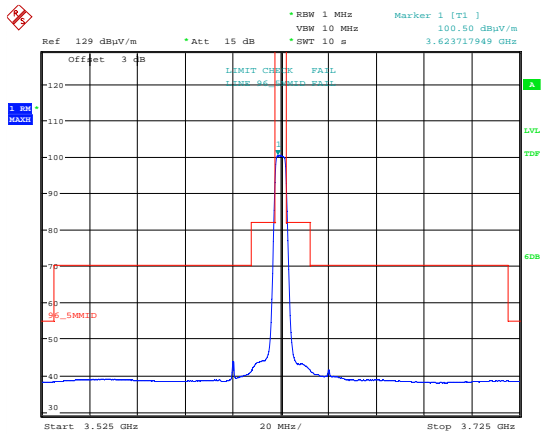
Date: 14.AUG.2018 17:14:13  
**Emission Mask 16 QAM; 3625 MHz; MIMOB Integration Method.**



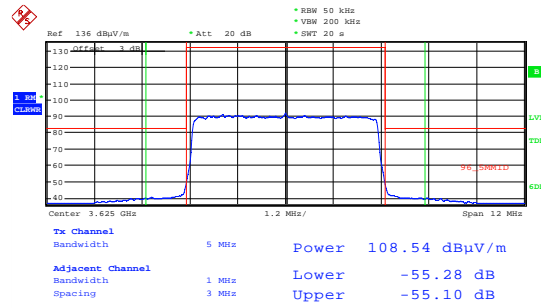
Date: 14.AUG.2018 17:21:16  
**Emission Mask 64 QAM; 3625 MHz; MIMO A.**



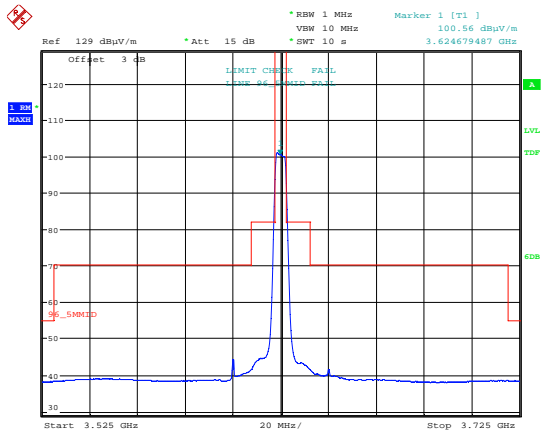
Date: 14.AUG.2018 17:11:24  
**Emission Mask 64 QAM; 3625 MHz; MIMO A Integration Method.**



Date: 14.AUG.2018 17:23:57  
**Emission Mask 64 QAM; 3625 MHz; MIMOB.**

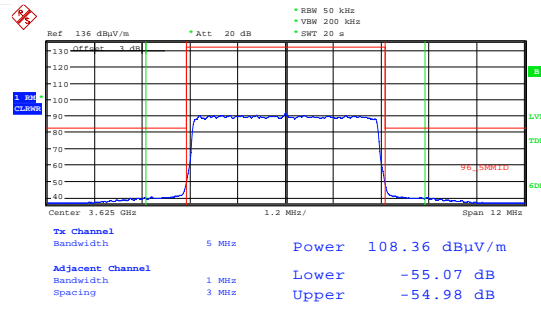


Date: 14.AUG.2018 17:14:42  
**Emission Mask 64 QAM; 3625 MHz; MIMOB Integration Method.**



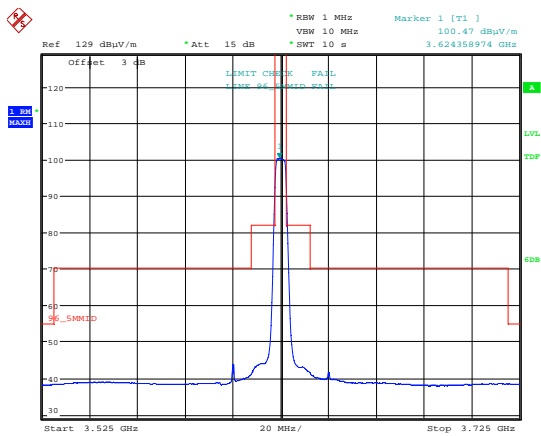
Date: 14.AUG.2018 17:21:58

Emission Mask 256 QAM; 3625 MHz; MIMO A.



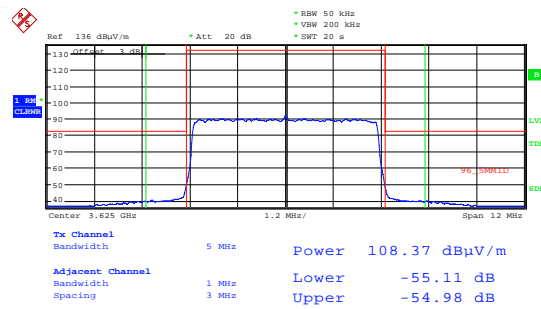
Date: 14.AUG.2018 17:12:01

Emission Mask 256 QAM; 3625 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 17:24:35

Emission Mask 256 QAM; 3625 MHz; MIMO B.

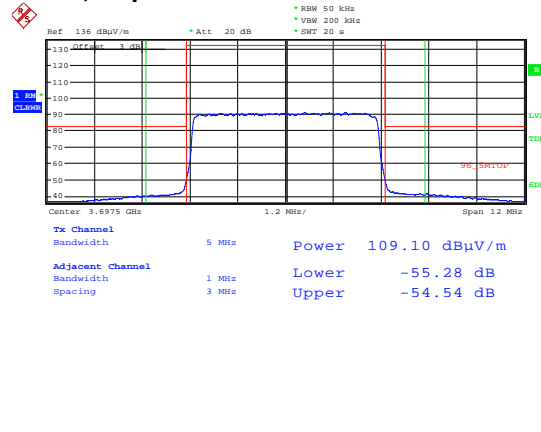
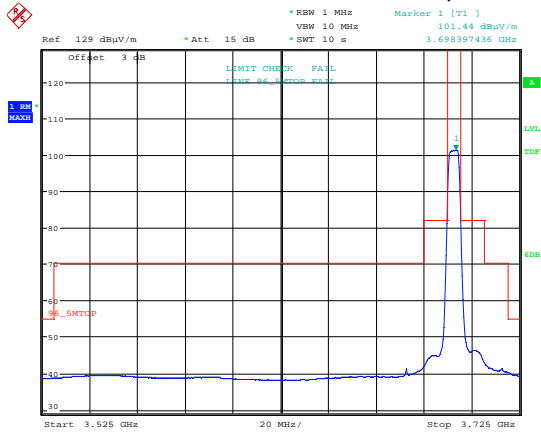


Date: 14.AUG.2018 17:15:20

Emission Mask 256 QAM; 3625 MHz; MIMO B Integration Method.

<b>Frequency: 3625 MHz; MuMIMO Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	108.33	Lower Channel	-55.1	53.23	82.24	Pass
			Upper Channel	-54.96	53.37		Pass
	16 QAM	108.31	Lower Channel	-55.06	53.25		Pass
			Upper Channel	-54.94	53.37		Pass
	64 QAM	108.41	Lower Channel	-55.15	53.26		Pass
			Upper Channel	-55.01	53.4		Pass
	256 QAM	108.36	Lower Channel	-55.07	53.29		Pass
			Upper Channel	-54.98	53.38		Pass
B	QPSK	108.36	Lower Channel	-55.1	53.26	Pass	
			Upper Channel	-54.97	53.39	Pass	
	16 QAM	108.31	Lower Channel	-55.09	53.22	Pass	
			Upper Channel	-54.94	53.37	Pass	
	64 QAM	108.54	Lower Channel	-55.28	53.26	Pass	
			Upper Channel	-55.1	53.44	Pass	
	256 QAM	108.37	Lower Channel	-55.11	53.26	Pass	
			Upper Channel	-54.98	53.39	Pass	

### MuMIMO; 5 MHz Bandwidth; Top Channel

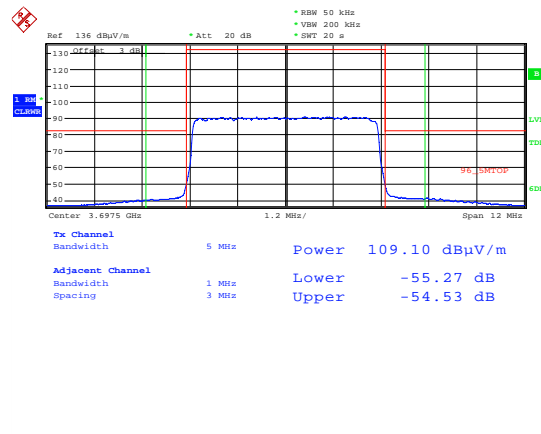
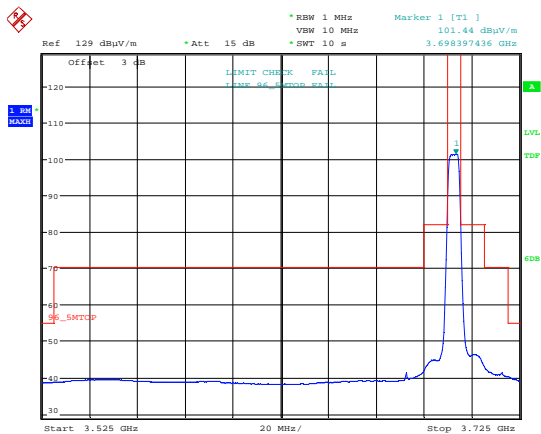


Date: 14.AUG.2018 17:27:32

Emission Mask QPSK; 3697.5 MHz; MIMO A.

Date: 14.AUG.2018 17:28:01

Emission Mask QPSK; 3697.5 MHz; MIMO A Integration Method.

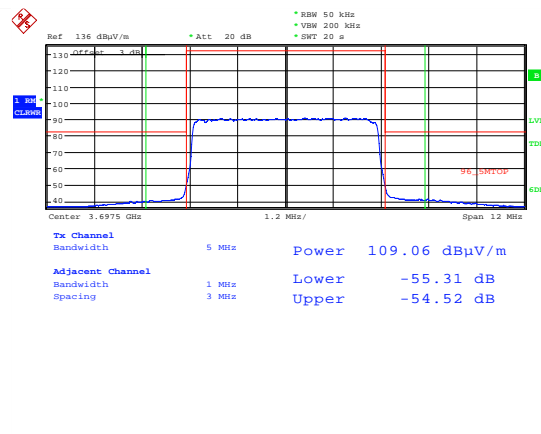
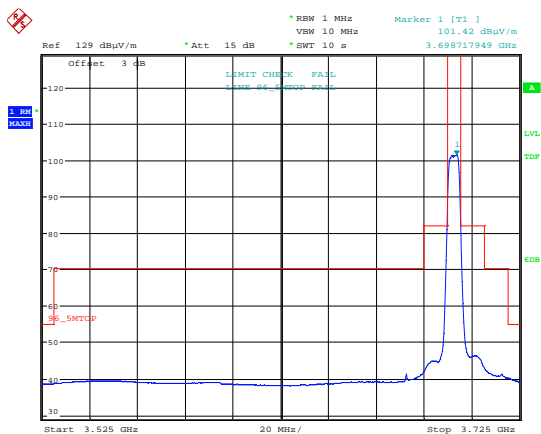


Date: 14.AUG.2018 17:32:32

Emission Mask QPSK; 3697.5 MHz; MIMO B.

Date: 14.AUG.2018 17:33:08

Emission Mask QPSK; 3697.5 MHz; MIMO B Integration Method.



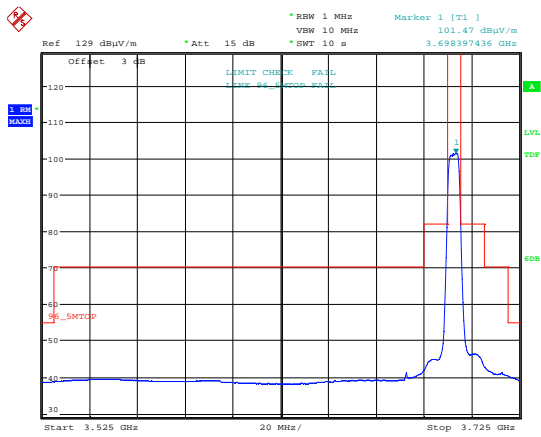
Date: 14.AUG.2018 17:28:43

Emission Mask 16 QAM; 3697.5 MHz; MIMO A.

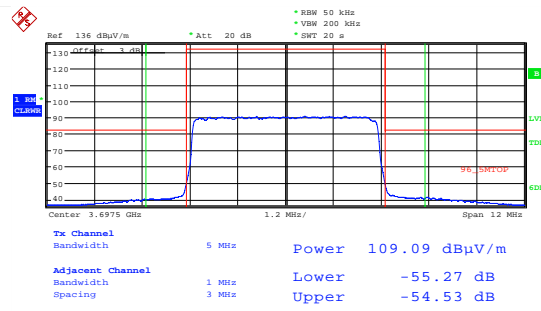
Date: 14.AUG.2018 17:29:16

Emission Mask 16 QAM; 3697.5 MHz; MIMO A Integration Method.

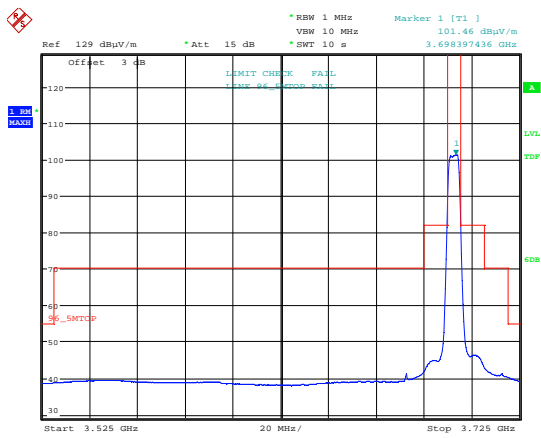




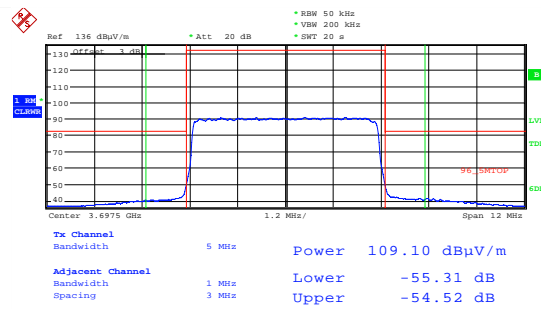
Date: 14.AUG.2018 17:33:58  
**Emission Mask 16 QAM; 3697.5 MHz; MIMOB.**



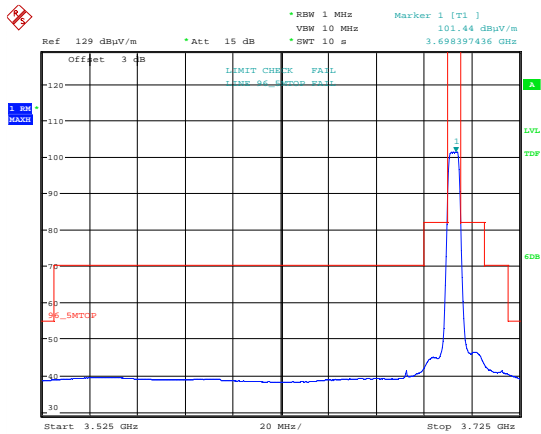
Date: 14.AUG.2018 17:34:38  
**Emission Mask 16 QAM; 3697.5 MHz; MIMOB Integration Method.**



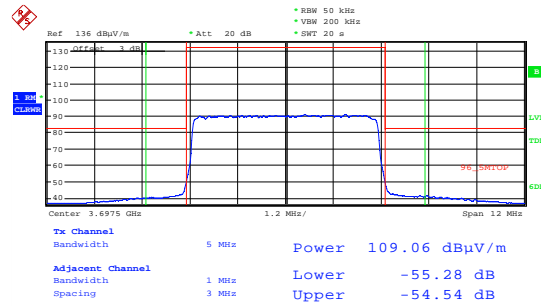
Date: 14.AUG.2018 17:29:53  
**Emission Mask 64 QAM; 3697.5 MHz; MIMO A.**



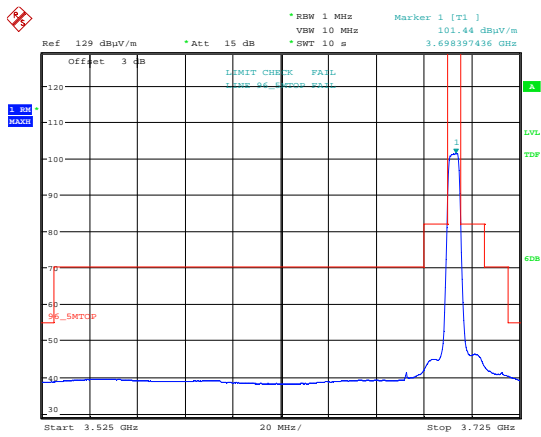
Date: 14.AUG.2018 17:30:23  
**Emission Mask 64 QAM; 3697.5 MHz; MIMO A Integration Method.**



Date: 14.AUG.2018 17:37:06  
**Emission Mask 64 QAM; 3697.5 MHz; MIMOB.**

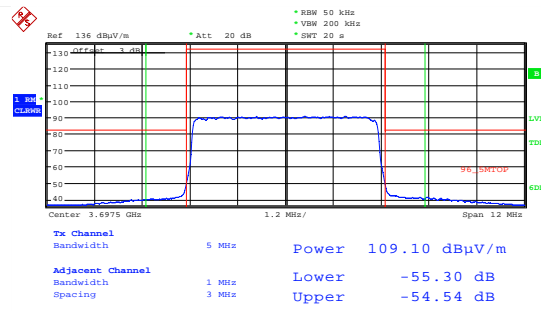


Date: 14.AUG.2018 17:37:45  
**Emission Mask 64 QAM; 3697.5 MHz; MIMOB Integration Method.**



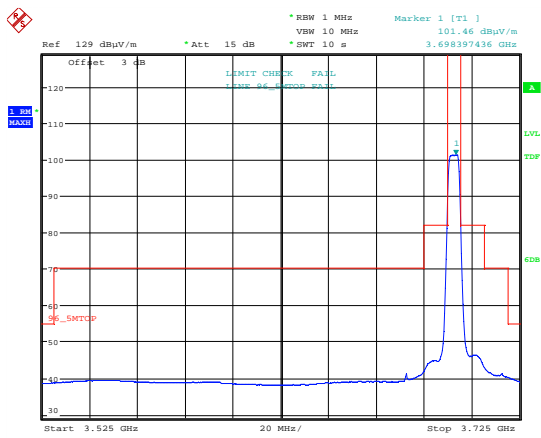
Date: 14.AUG.2018 17:31:23

Emission Mask 256 QAM; 3697.5 MHz; MIMO A.



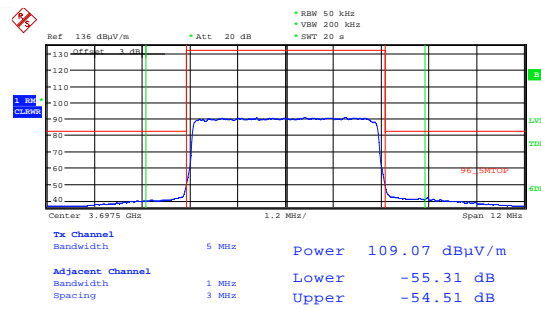
Date: 14.AUG.2018 17:31:56

Emission Mask 256 QAM; 3697.5 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 17:38:35

Emission Mask 256 QAM; 3697.5 MHz; MIMO B.

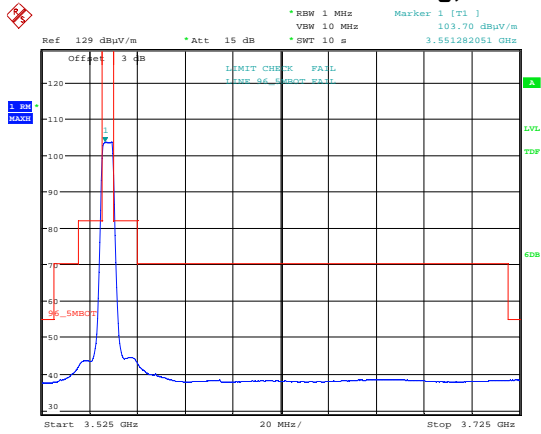


Date: 14.AUG.2018 17:39:12

Emission Mask 256 QAM; 3697.5 MHz; MIMO B Integration Method.

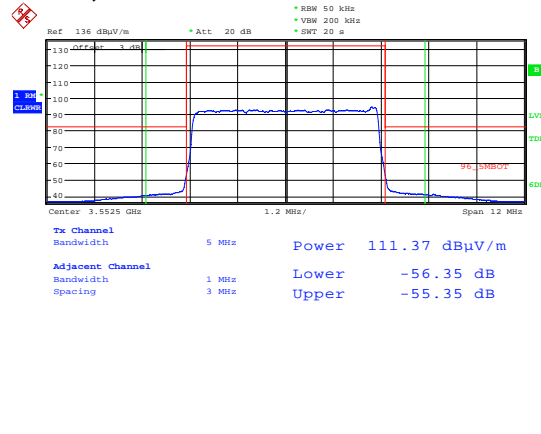
<b>Frequency: 3697.5 MHz; MuMIMO Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	109.1	Lower Channel	-55.28	53.82	82.24	Pass
			Upper Channel	-54.54	54.56		Pass
	16 QAM	109.06	Lower Channel	-55.31	53.75		Pass
			Upper Channel	-54.52	54.54		Pass
	64 QAM	109.1	Lower Channel	-55.31	53.79		Pass
			Upper Channel	-54.52	54.58		Pass
	256 QAM	109.1	Lower Channel	-55.3	53.8		Pass
			Upper Channel	-54.54	54.56		Pass
B	QPSK	109.1	Lower Channel	-55.27	53.83	Pass	
			Upper Channel	-54.53	54.57	Pass	
	16 QAM	109.09	Lower Channel	-55.27	53.82	Pass	
			Upper Channel	-54.53	54.56	Pass	
	64 QAM	109.06	Lower Channel	-55.28	53.78	Pass	
			Upper Channel	-54.54	54.52	Pass	
	256 QAM	109.07	Lower Channel	-55.31	53.76	Pass	
			Upper Channel	-54.51	54.56	Pass	

### Beamforming; 5 MHz Bandwidth; Bottom Channel



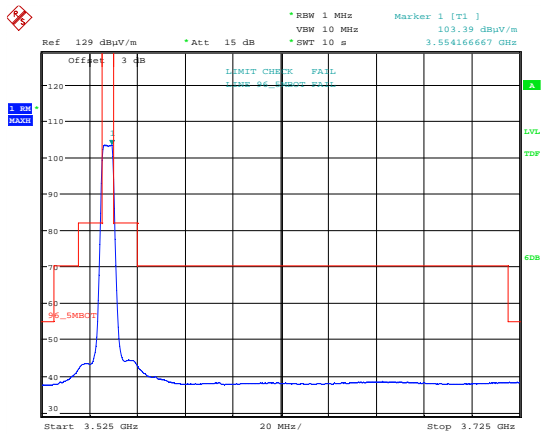
Date: 14.AUG.2018 18:21:33

Emission Mask QPSK; 3552.5 MHz; MIMO.A.



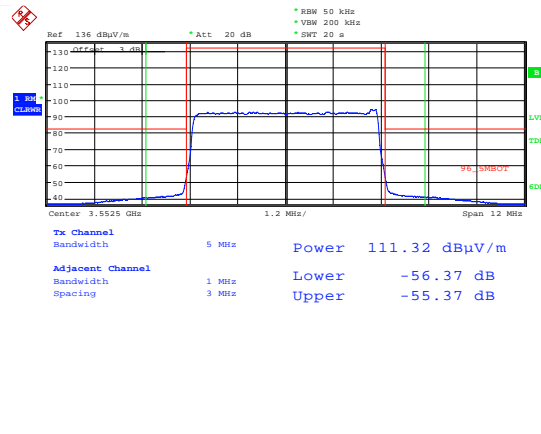
Date: 14.AUG.2018 18:22:07

Emission Mask QPSK; 3552.5 MHz; MIMO.A  
 Integration Method.



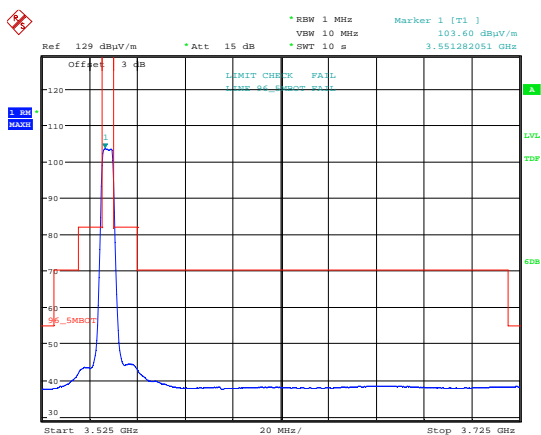
Date: 14.AUG.2018 18:26:33

Emission Mask QPSK; 3552.5 MHz; MIMO.B.



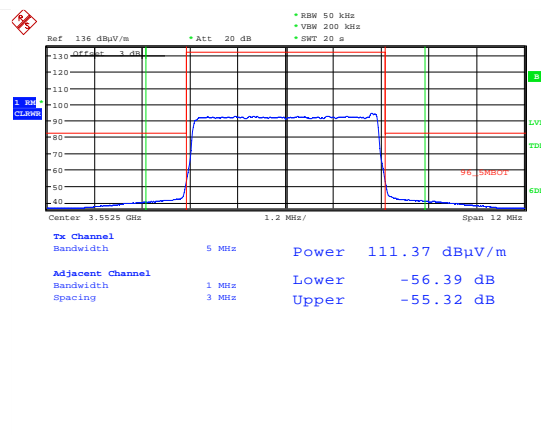
Date: 14.AUG.2018 18:27:11

Emission Mask QPSK; 3552.5 MHz; MIMO.B  
 Integration Method.



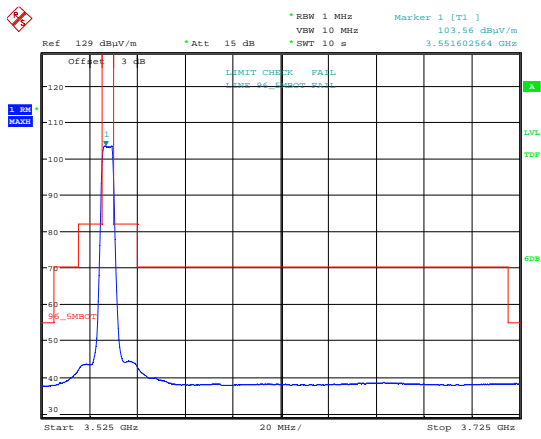
Date: 14.AUG.2018 18:22:40

Emission Mask 16 QAM; 3552.5 MHz; MIMO.A.



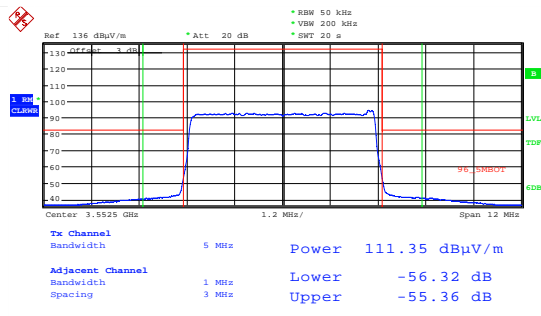
Date: 14.AUG.2018 18:23:15

Emission Mask 16 QAM; 3552.5 MHz; MIMO.A  
 Integration Method.



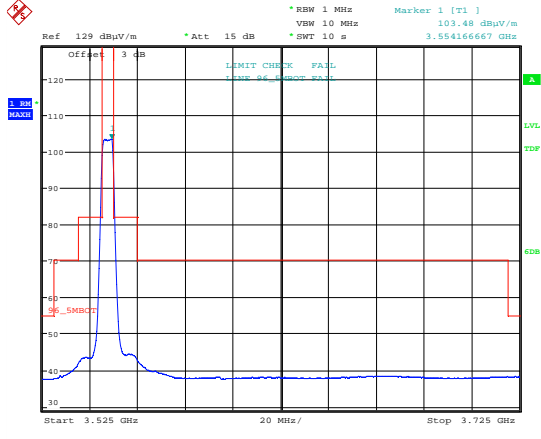
Date: 14.AUG.2018 18:28:00

Emission Mask 16 QAM; 3552.5 MHz; MIMOB.



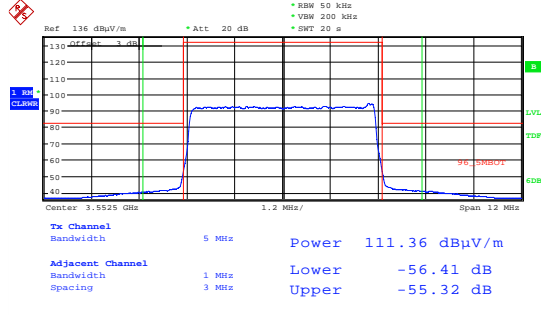
Date: 14.AUG.2018 18:28:38

Emission Mask 16 QAM; 3552.5 MHz; MIMOB Integration Method.



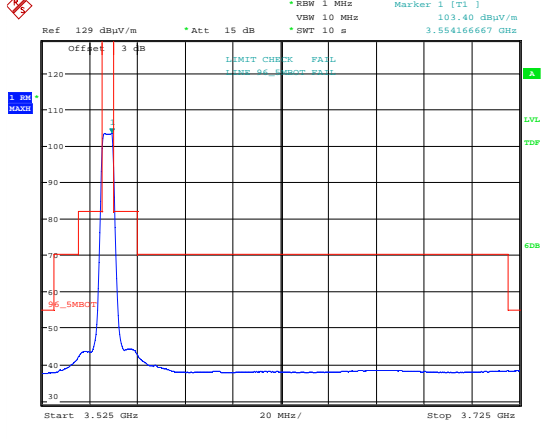
Date: 14.AUG.2018 18:23:55

Emission Mask 64 QAM; 3552.5 MHz; MIMOA.



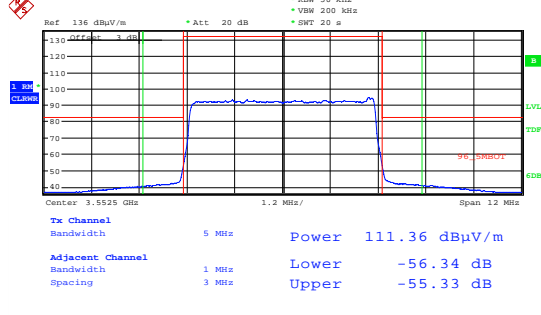
Date: 14.AUG.2018 18:24:38

Emission Mask 64 QAM; 3552.5 MHz; MIMOA Integration Method.



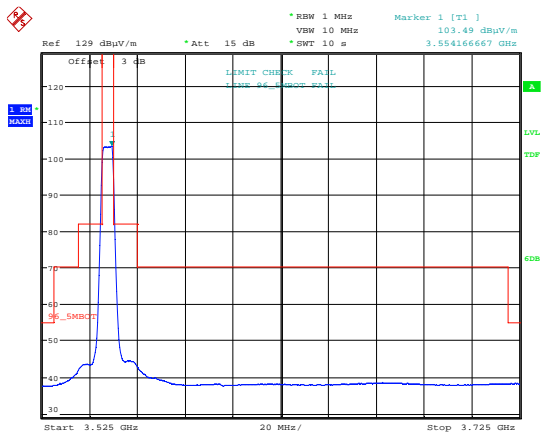
Date: 14.AUG.2018 18:29:59

Emission Mask 64 QAM; 3552.5 MHz; MIMOB.



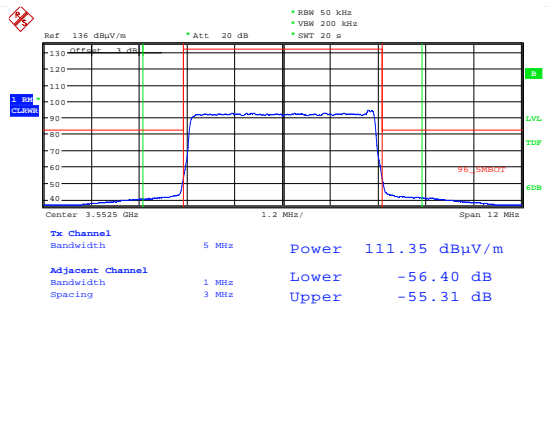
Date: 14.AUG.2018 18:30:17

Emission Mask 64 QAM; 3552.5 MHz; MIMOB Integration Method.



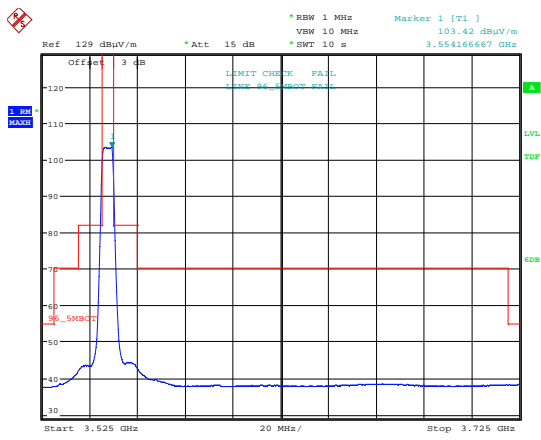
Date: 14.AUG.2018 18:25:22

Emission Mask 256 QAM; 3552.5 MHz; MIMO A.



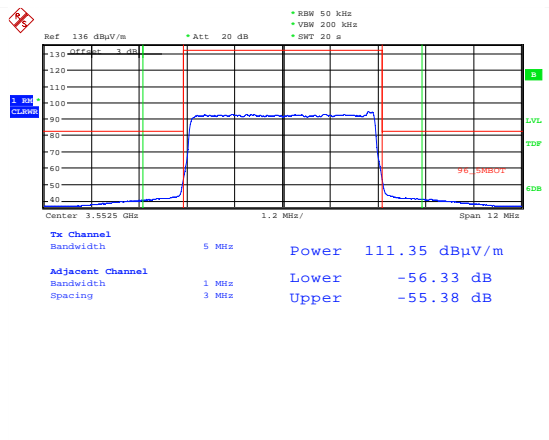
Date: 14.AUG.2018 18:25:57

Emission Mask 256 QAM; 3552.5 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 18:31:05

Emission Mask 256 QAM; 3552.5 MHz; MIMO B.

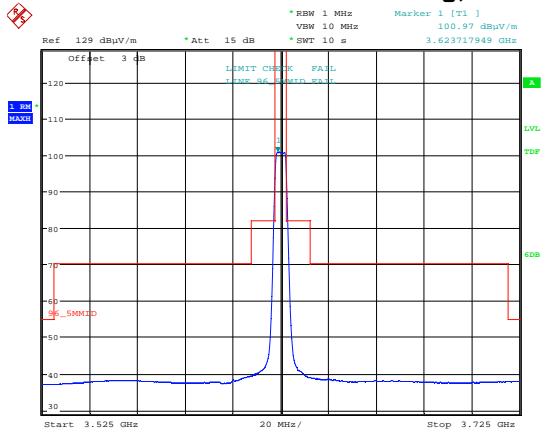


Date: 14.AUG.2018 18:31:51

Emission Mask 256 QAM; 3552.5 MHz; MIMO B Integration Method.

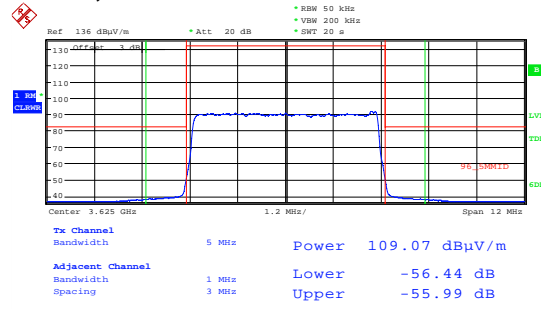
<b>Frequency: 3552.5 MHz; Beamforming Mode;</b>								
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>	
A	QPSK	111.37	Lower Channel	-56.35	55.02	82.24	Pass	
			Upper Channel	-55.35	56.02		Pass	
	16 QAM	111.37	Lower Channel	-56.39	54.98		Pass	
			Upper Channel	-55.32	56.05		Pass	
	64 QAM	111.36	Lower Channel	-56.41	54.95		Pass	
			Upper Channel	-55.32	56.04		Pass	
	256 QAM	111.35	Lower Channel	-56.4	54.95		Pass	
			Upper Channel	-55.31	56.04		Pass	
	B	QPSK	111.32	Lower Channel	-56.37		54.95	Pass
				Upper Channel	-55.37		55.95	Pass
16 QAM		111.35	Lower Channel	-56.32	55.03	Pass		
			Upper Channel	-55.36	55.99	Pass		
64 QAM		111.36	Lower Channel	-56.34	55.02	Pass		
			Upper Channel	-55.33	56.03	Pass		
256 QAM		111.35	Lower Channel	-56.33	55.02	Pass		
			Upper Channel	-55.38	55.97	Pass		

### Beamforming; 5 MHz Bandwidth; Middle Channel



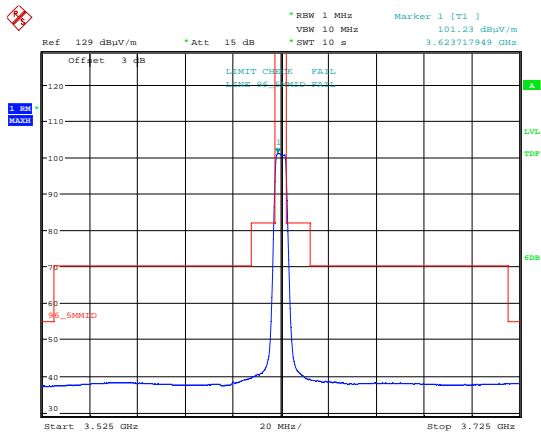
Date: 14.AUG.2018 18:01:48

Emission Mask QPSK; 3625 MHz; MIMO A.



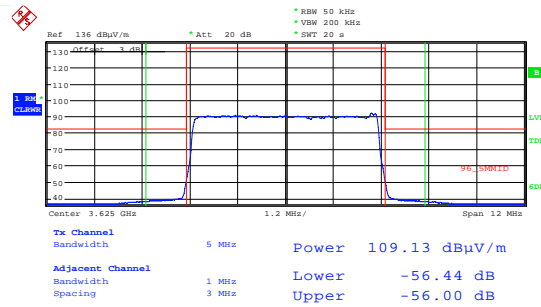
Date: 14.AUG.2018 18:00:52

Emission Mask QPSK; 3625 MHz; MIMO A Integration Method.



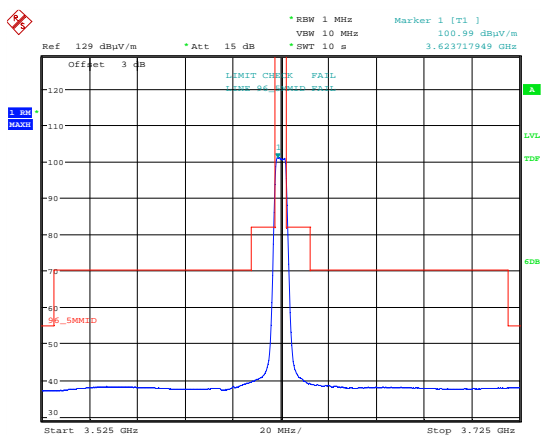
Date: 14.AUG.2018 18:07:28

Emission Mask QPSK; 3625 MHz; MIMO B.



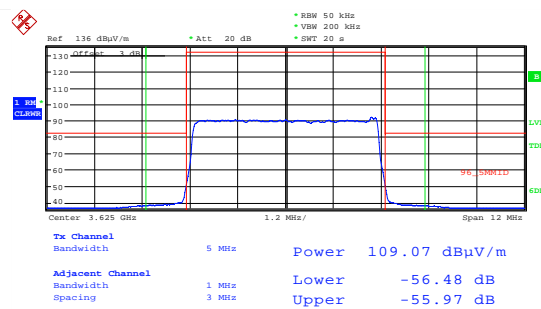
Date: 14.AUG.2018 18:18:01

Emission Mask QPSK; 3625 MHz; MIMO B Integration Method.



Date: 14.AUG.2018 18:02:25

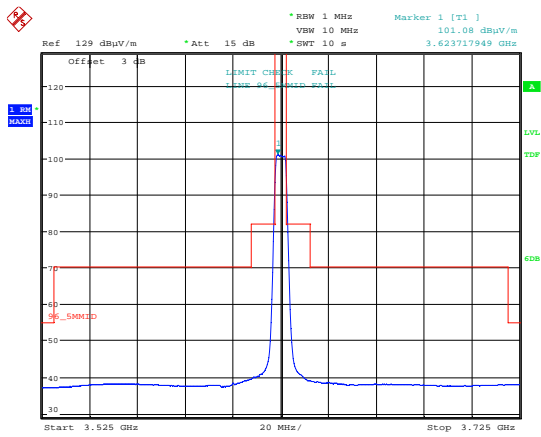
Emission Mask 16 QAM; 3625 MHz; MIMO A.



Date: 14.AUG.2018 18:04:20

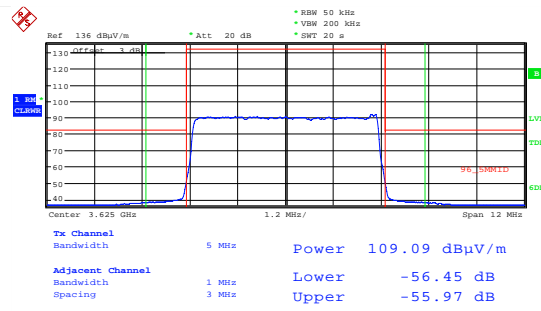
Emission Mask 16 QAM; 3625 MHz; MIMO A Integration Method.





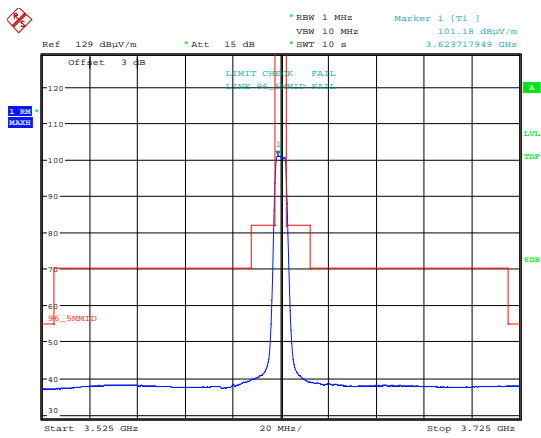
Date: 14.AUG.2018 18:08:53

Emission Mask 16 QAM; 3625 MHz; MIMOB.



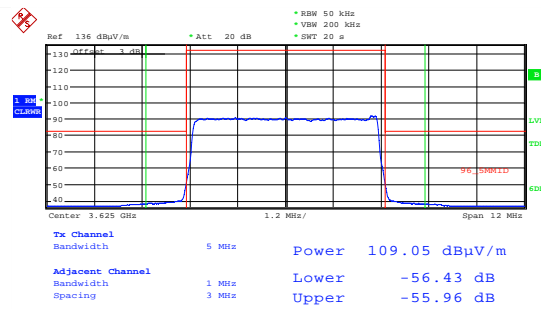
Date: 14.AUG.2018 18:17:17

Emission Mask 16 QAM; 3625 MHz; MIMOB Integration Method.



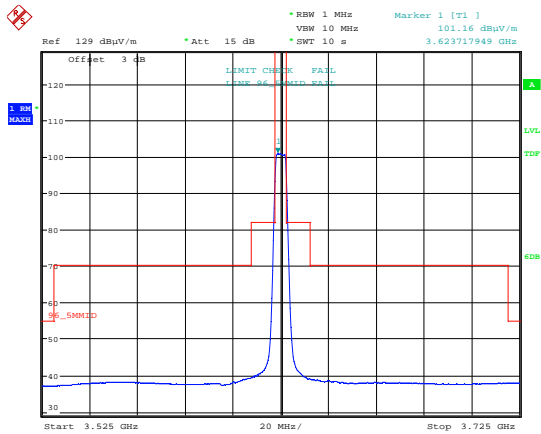
Date: 14.AUG.2018 18:03:08

Emission Mask 64 QAM; 3625 MHz; MIMO A.



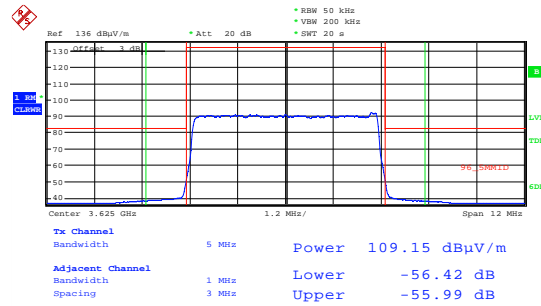
Date: 14.AUG.2018 18:03:39

Emission Mask 64 QAM; 3625 MHz; MIMO A Integration Method.



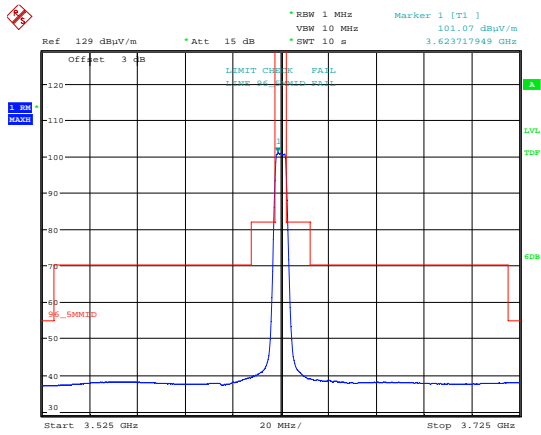
Date: 14.AUG.2018 18:10:12

Emission Mask 64 QAM; 3625 MHz; MIMOB.



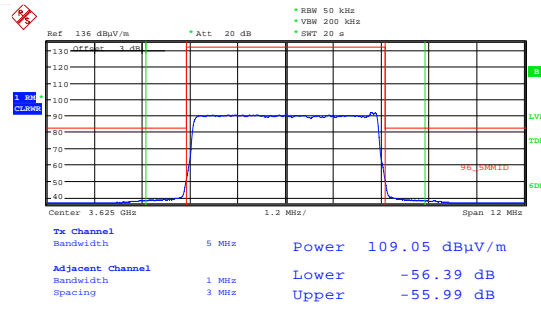
Date: 14.AUG.2018 18:16:22

Emission Mask 64 QAM; 3625 MHz; MIMOB Integration Method.



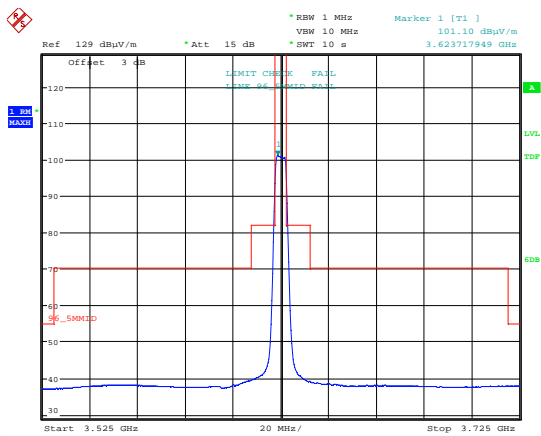
Date: 14.AUG.2018 18:06:24

Emission Mask 256 QAM; 3625 MHz; MIMO A.



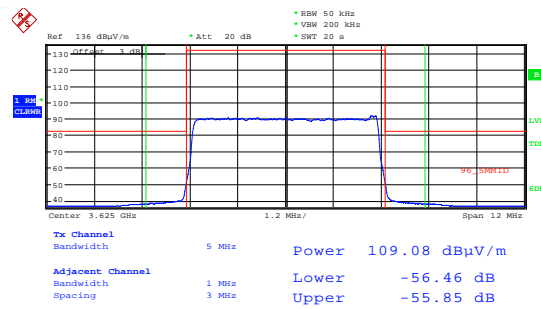
Date: 14.AUG.2018 18:05:32

Emission Mask 256 QAM; 3625 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 18:11:31

Emission Mask 256 QAM; 3625 MHz; MIMO B.

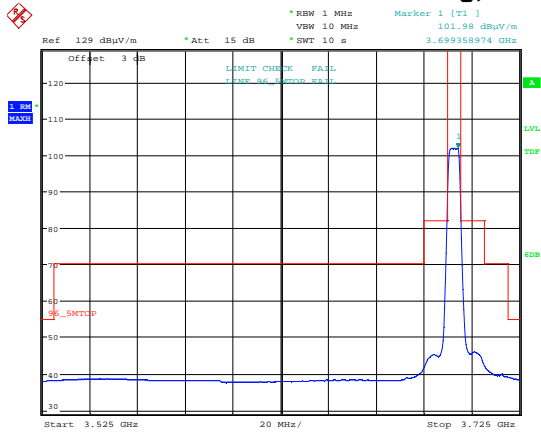


Date: 14.AUG.2018 18:14:05

Emission Mask 256 QAM; 3625 MHz; MIMO B Integration Method.

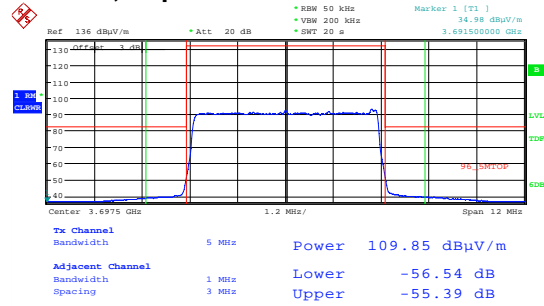
<b>Frequency: 3625 MHz; Beamforming Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	109.07	Lower Channel	-56.44	52.63	82.24	Pass
			Upper Channel	-55.99	53.08		Pass
	16 QAM	109.07	Lower Channel	-56.48	52.59		Pass
			Upper Channel	-55.97	53.1		Pass
	64 QAM	109.05	Lower Channel	-56.43	52.62		Pass
			Upper Channel	-55.96	53.09		Pass
	256 QAM	109.05	Lower Channel	-56.39	52.66		Pass
			Upper Channel	-55.99	53.06		Pass
B	QPSK	109.13	Lower Channel	-56.44	52.69	Pass	
			Upper Channel	-56	53.13	Pass	
	16 QAM	109.09	Lower Channel	-56.45	52.64	Pass	
			Upper Channel	-55.97	53.12	Pass	
	64 QAM	109.15	Lower Channel	-56.42	52.73	Pass	
			Upper Channel	-55.99	53.16	Pass	
	256 QAM	109.08	Lower Channel	-56.46	52.62	Pass	
			Upper Channel	-55.85	53.23	Pass	

### Beamforming; 5 MHz Bandwidth; Top Channel



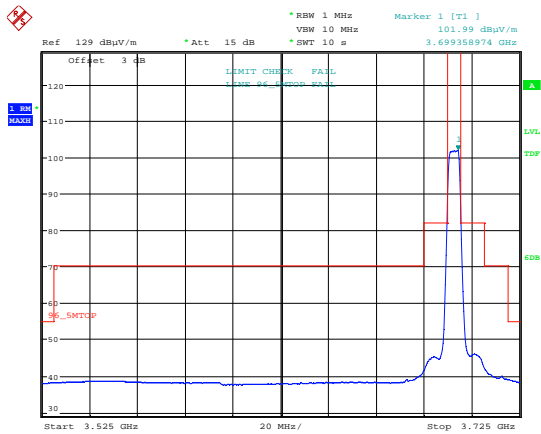
Date: 14.AUG.2018 17:44:18

Emission Mask QPSK; 3697.5 MHz; MIMO.A.



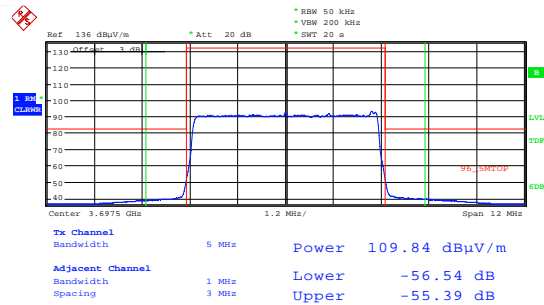
Date: 14.AUG.2018 17:44:49

Emission Mask QPSK; 3697.5 MHz; MIMO.A  
Integration Method.



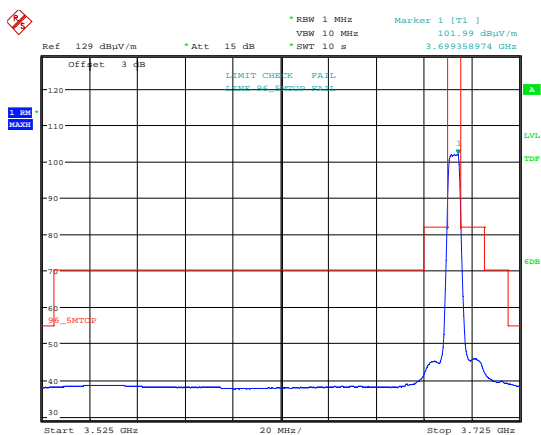
Date: 14.AUG.2018 17:49:20

Emission Mask QPSK; 3697.5 MHz; MIMO.B.



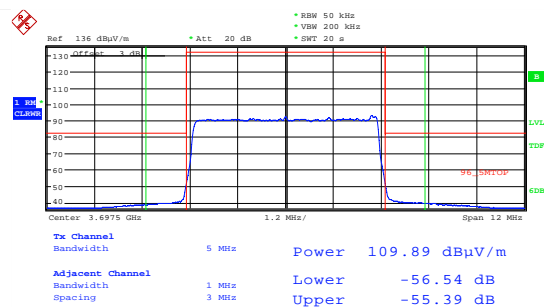
Date: 14.AUG.2018 17:49:56

Emission Mask QPSK; 3697.5 MHz; MIMO.B  
Integration Method.



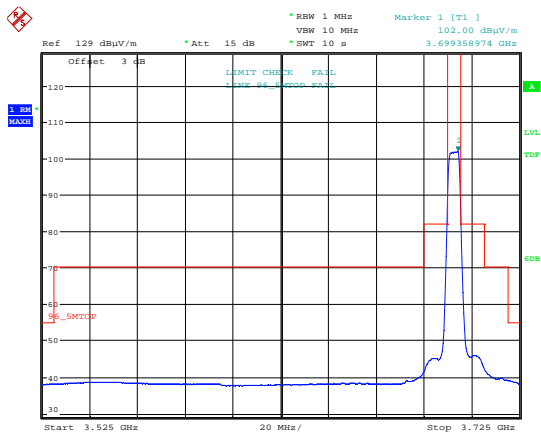
Date: 14.AUG.2018 17:45:26

Emission Mask 16 QAM; 3697.5 MHz; MIMO.A.

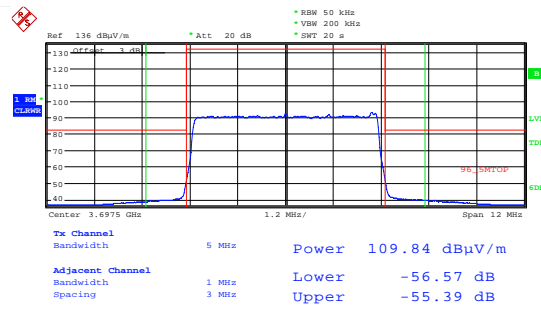


Date: 14.AUG.2018 17:46:00

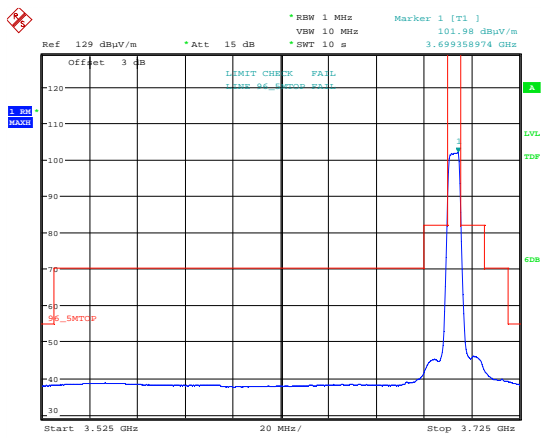
Emission Mask 16 QAM; 3697.5 MHz; MIMO.A  
Integration Method.



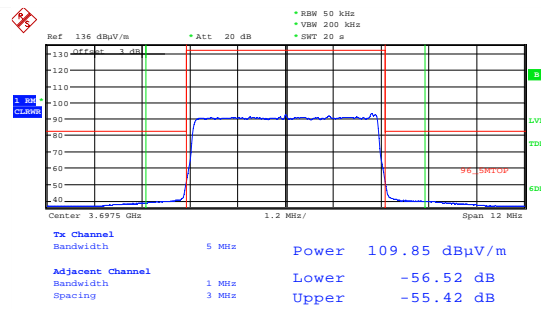
Date: 14.AUG.2018 17:50:38  
 Emission Mask 16 QAM; 3697.5 MHz; MIMOB.



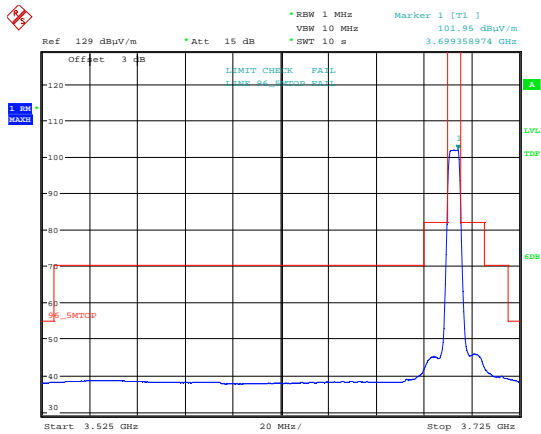
Date: 14.AUG.2018 17:51:21  
 Emission Mask 16 QAM; 3697.5 MHz; MIMOB Integration Method.



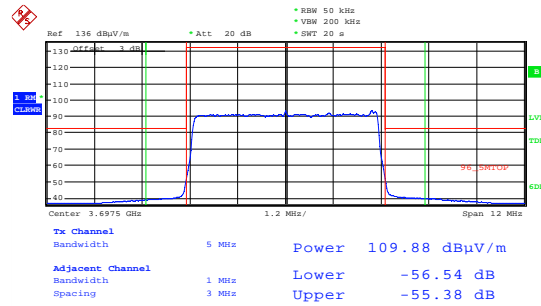
Date: 14.AUG.2018 17:46:51  
 Emission Mask 64 QAM; 3697.5 MHz; MIMO A.



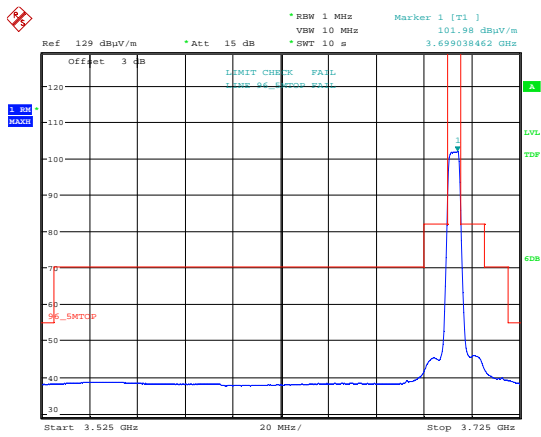
Date: 14.AUG.2018 17:47:27  
 Emission Mask 64 QAM; 3697.5 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 17:52:35  
 Emission Mask 64 QAM; 3697.5 MHz; MIMOB.

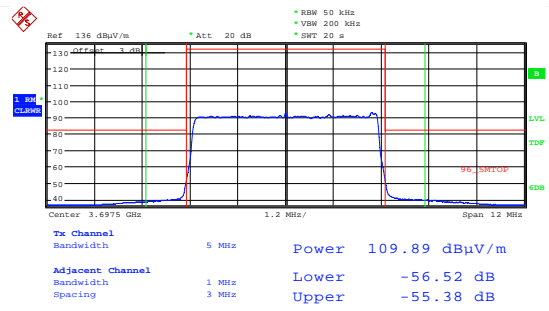


Date: 14.AUG.2018 17:53:15  
 Emission Mask 64 QAM; 3697.5 MHz; MIMOB Integration Method.



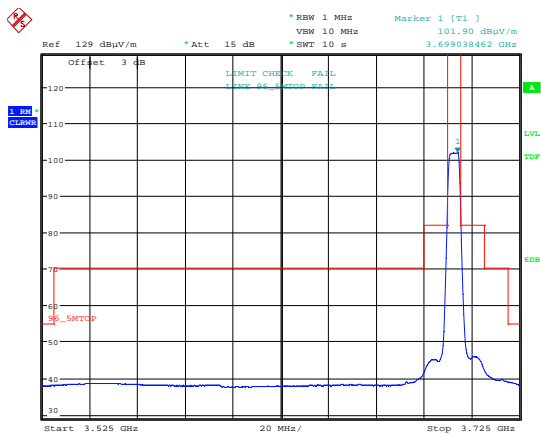
Date: 14.AUG.2018 17:48:04

Emission Mask 256 QAM; 3697.5 MHz; MIMO A.



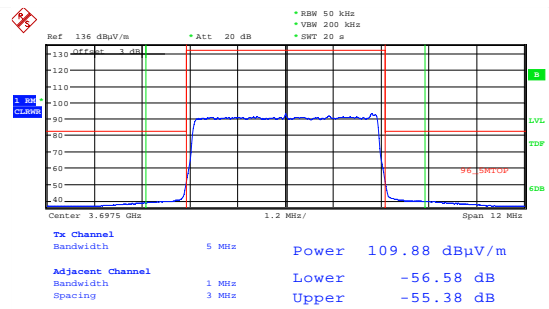
Date: 14.AUG.2018 17:48:38

Emission Mask 256 QAM; 3697.5 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 17:53:52

Emission Mask 256 QAM; 3697.5 MHz; MIMO B.

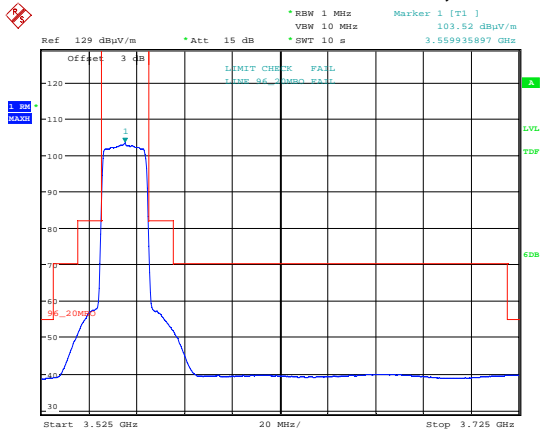


Date: 14.AUG.2018 17:54:25

Emission Mask 256 QAM; 3697.5 MHz; MIMO B Integration Method.

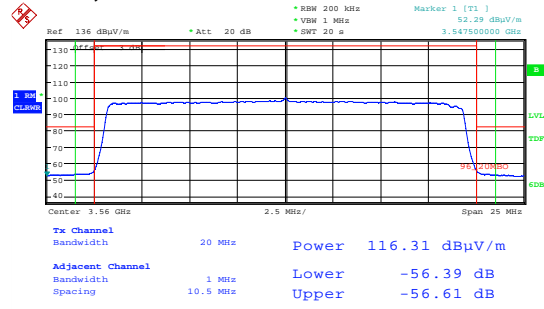
<b>Frequency: 3697.5 MHz; Beamforming Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	109.85	Lower Channel	-56.54	53.31	82.24	Pass
			Upper Channel	-55.39	54.46		Pass
	16 QAM	109.89	Lower Channel	-56.54	53.35		Pass
			Upper Channel	-55.39	54.5		Pass
	64 QAM	109.85	Lower Channel	-56.52	53.33		Pass
			Upper Channel	-55.42	54.43		Pass
	256 QAM	109.89	Lower Channel	-56.52	53.37		Pass
			Upper Channel	-55.38	54.51		Pass
B	QPSK	109.84	Lower Channel	-56.54	53.3	Pass	
			Upper Channel	-55.39	54.45	Pass	
	16 QAM	109.84	Lower Channel	-56.57	53.27	Pass	
			Upper Channel	-55.39	54.45	Pass	
	64 QAM	109.88	Lower Channel	-56.54	53.34	Pass	
			Upper Channel	-55.38	54.5	Pass	
	256 QAM	109.88	Lower Channel	-56.58	53.3	Pass	
			Upper Channel	-55.38	54.5	Pass	

### Sector Mode; 20 MHz bandwidth; Bottom channel



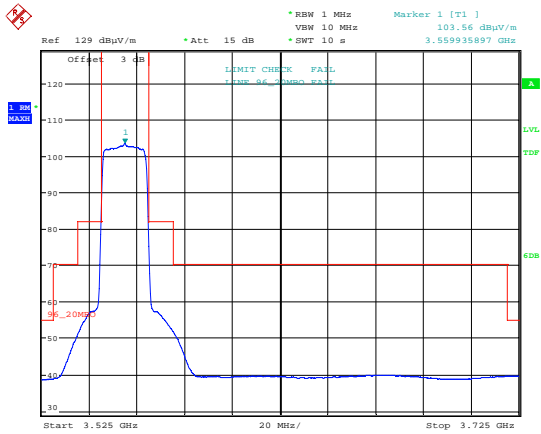
Date: 14.AUG.2018 18:59:23

Emission Mask QPSK; 3560 MHz; MIMO A.



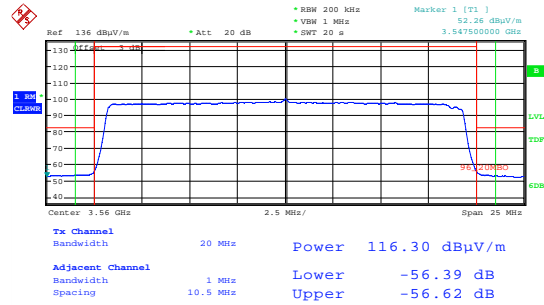
Date: 14.AUG.2018 18:59:55

Emission Mask QPSK; 3560 MHz; MIMO A Integration Method.



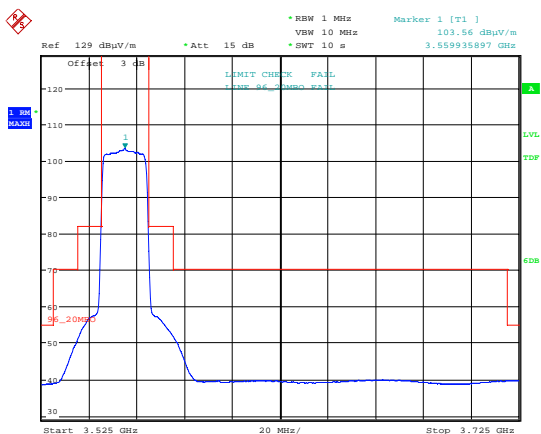
Date: 14.AUG.2018 19:04:22

Emission Mask QPSK; 3560 MHz; MIMO B.



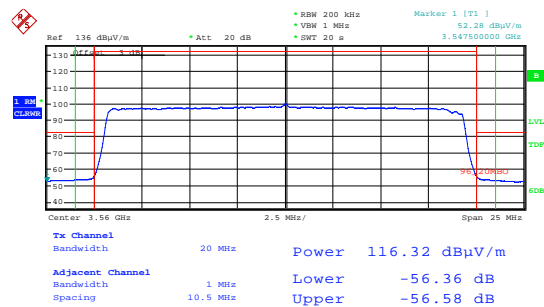
Date: 14.AUG.2018 19:04:56

Emission Mask QPSK; 3560 MHz; MIMO B Integration Method.



Date: 14.AUG.2018 19:00:41

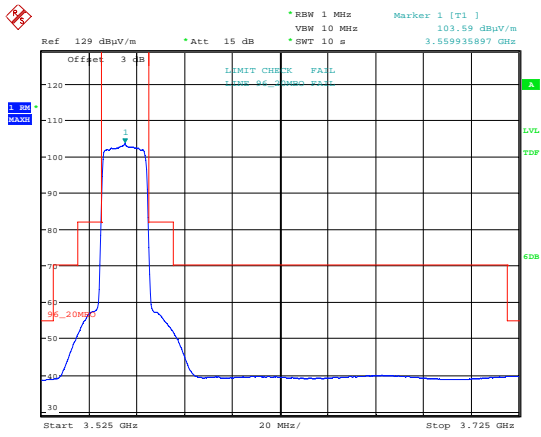
Emission Mask 16 QAM; 3560 MHz; MIMO A.



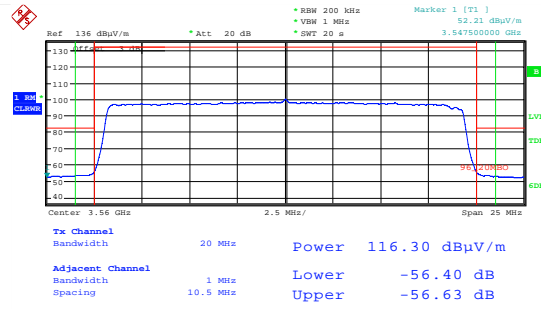
Date: 14.AUG.2018 19:01:14

Emission Mask 16 QAM; 3560 MHz; MIMO A Integration Method.

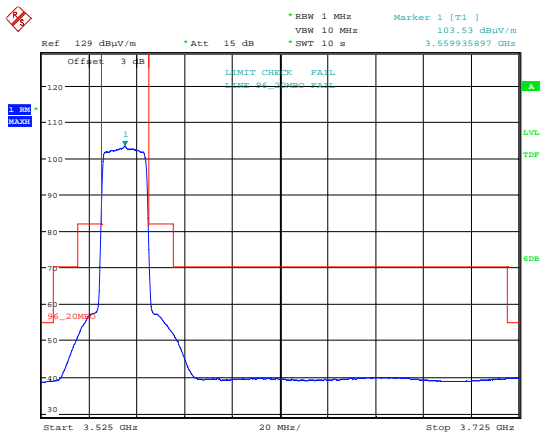




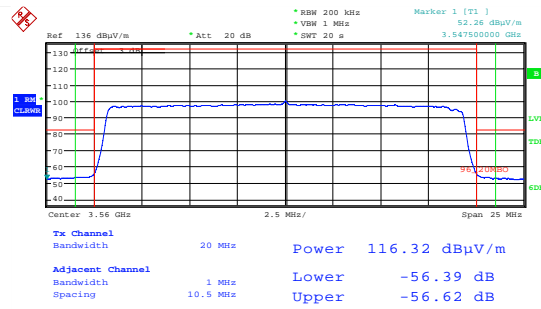
Date: 14.AUG.2018 19:05:35  
**Emission Mask 16 QAM; 3560 MHz; MIMOB.**



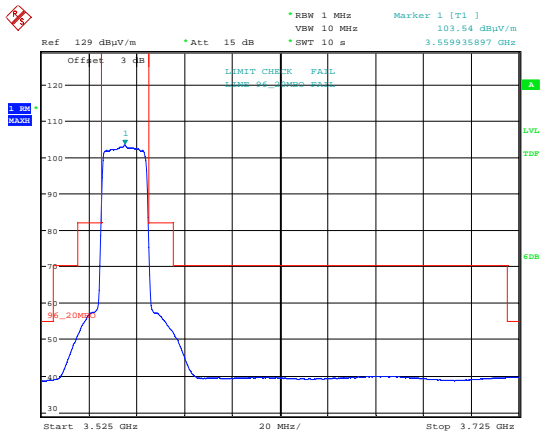
Date: 14.AUG.2018 19:06:10  
**Emission Mask 16 QAM; 3560 MHz; MIMOB Integration Method.**



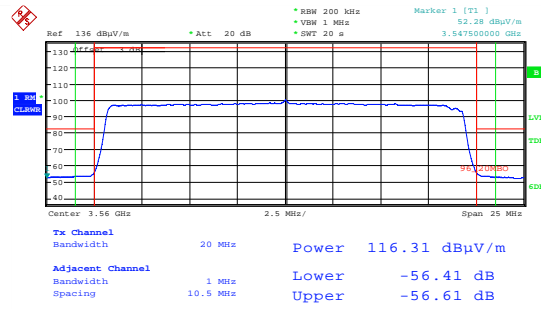
Date: 14.AUG.2018 19:01:58  
**Emission Mask 64 QAM; 3560 MHz; MIMO.**



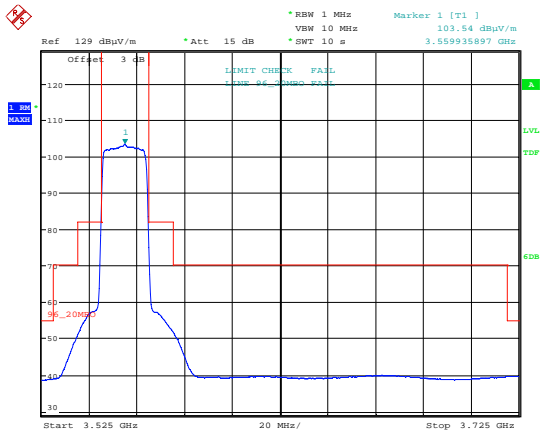
Date: 14.AUG.2018 19:02:31  
**Emission Mask 64 QAM; 3560 MHz; MIMO Integration Method.**



Date: 14.AUG.2018 19:06:49  
**Emission Mask 64 QAM; 3560 MHz; MIMOB.**

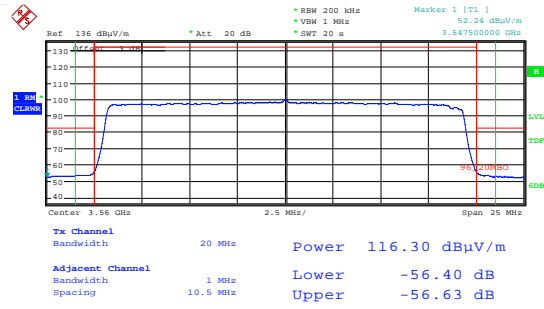


Date: 14.AUG.2018 19:07:29  
**Emission Mask 64 QAM; 3560 MHz; MIMOB Integration Method.**



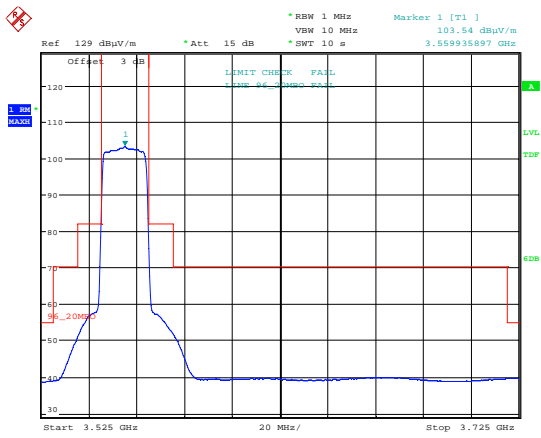
Date: 14.AUG.2018 19:03:15

Emission Mask 256 QAM; 3560 MHz; MIMO A.



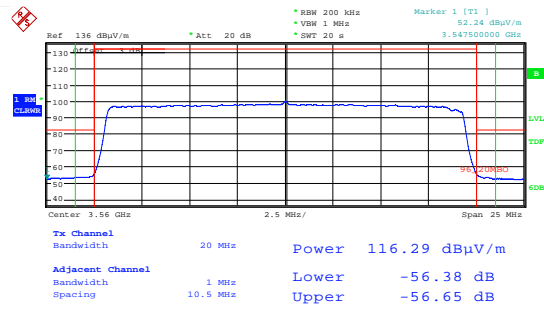
Date: 14.AUG.2018 19:03:46

Emission Mask 256 QAM; 3560 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 19:08:08

Emission Mask 256 QAM; 3560 MHz; MIMO B.

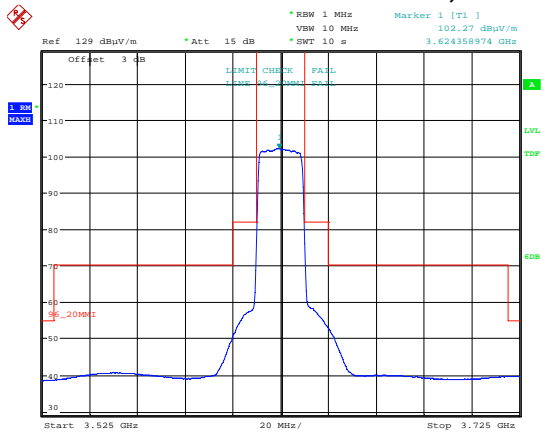


Date: 14.AUG.2018 19:08:39

Emission Mask 256 QAM; 3560 MHz; MIMO B Integration Method.

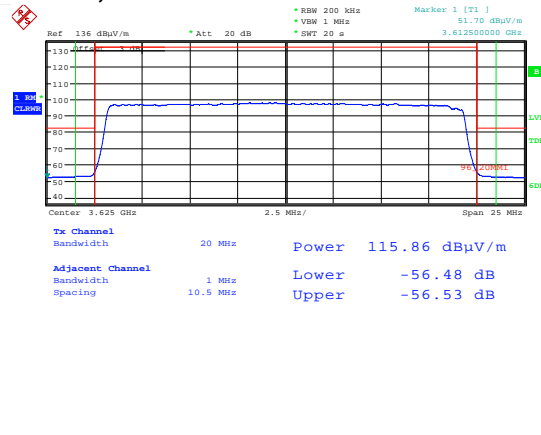
<b>Frequency: 3560 MHz; Sector Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	116.31	Lower Channel	-56.39	59.92	82.24	Pass
			Upper Channel	-56.61	59.7		Pass
	16 QAM	116.32	Lower Channel	-56.36	59.96		Pass
			Upper Channel	-56.58	59.74		Pass
	64 QAM	116.32	Lower Channel	-56.39	59.93		Pass
			Upper Channel	-56.62	59.7		Pass
	256 QAM	116.3	Lower Channel	-56.4	59.9		Pass
			Upper Channel	-56.4	59.9		Pass
B	QPSK	116.3	Lower Channel	-56.39	59.91	Pass	
			Upper Channel	-56.62	59.68	Pass	
	16 QAM	116.3	Lower Channel	-56.4	59.9	Pass	
			Upper Channel	-56.63	59.67	Pass	
	64 QAM	116.31	Lower Channel	-56.41	59.9	Pass	
			Upper Channel	-56.61	59.7	Pass	
	256 QAM	116.29	Lower Channel	-56.38	59.91	Pass	
			Upper Channel	-56.65	59.64	Pass	

### Sector Mode; 20 MHz bandwidth; Middle channel



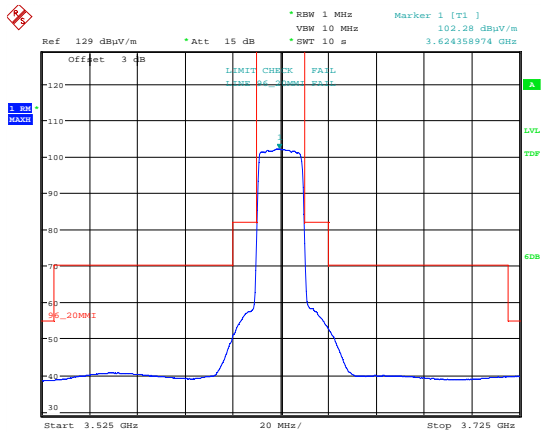
Date: 14.AUG.2018 19:11:14

Emission Mask QPSK; 3625 MHz; MIMO A.



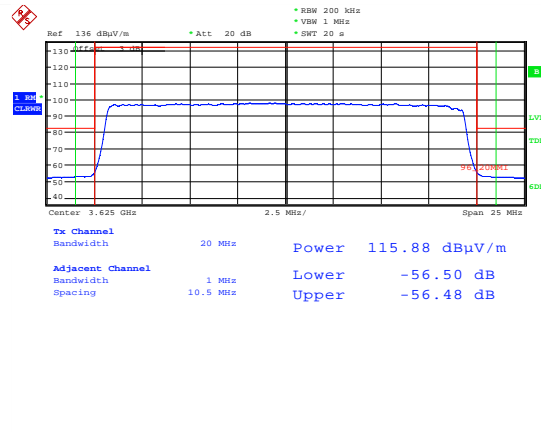
Date: 14.AUG.2018 19:11:50

Emission Mask QPSK; 3625 MHz; MIMO A Integration Method.



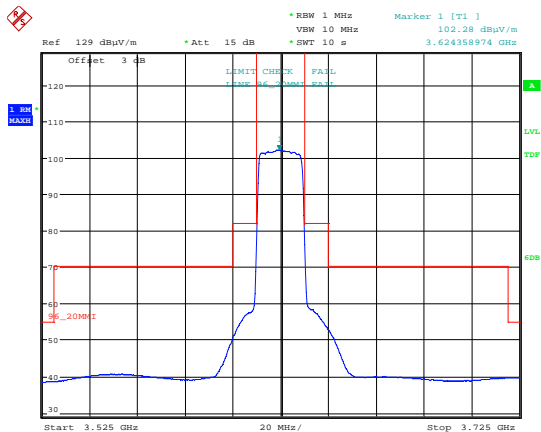
Date: 14.AUG.2018 19:16:17

Emission Mask QPSK; 3625 MHz; MIMO B.



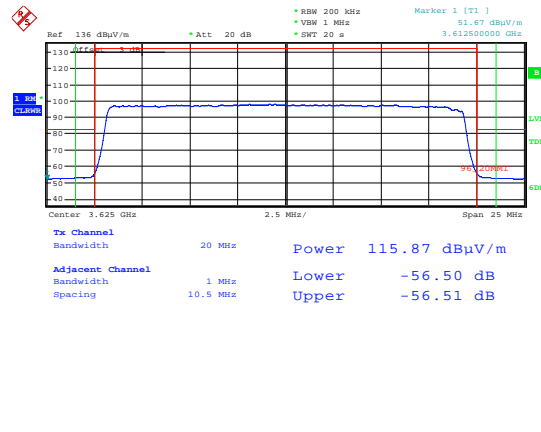
Date: 14.AUG.2018 19:16:52

Emission Mask QPSK; 3625 MHz; MIMO B Integration Method.



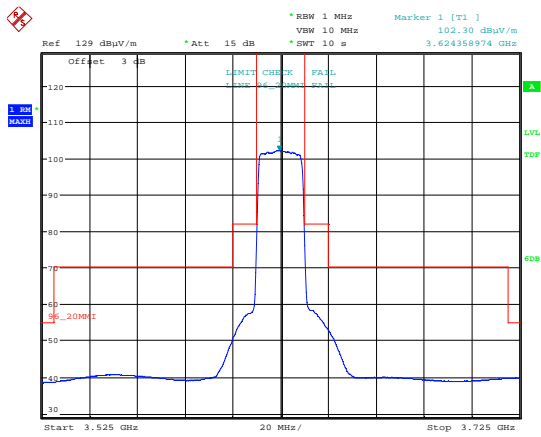
Date: 14.AUG.2018 19:12:27

Emission Mask 16 QAM; 3625 MHz; MIMO A.



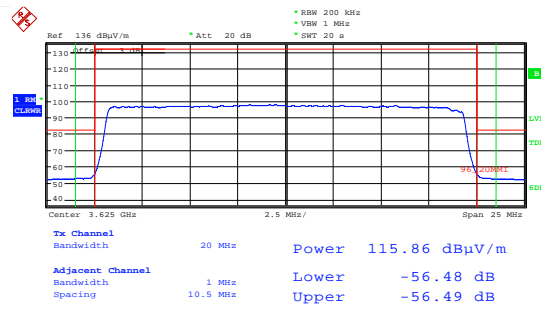
Date: 14.AUG.2018 19:13:02

Emission Mask 16 QAM; 3625 MHz; MIMO A Integration Method.



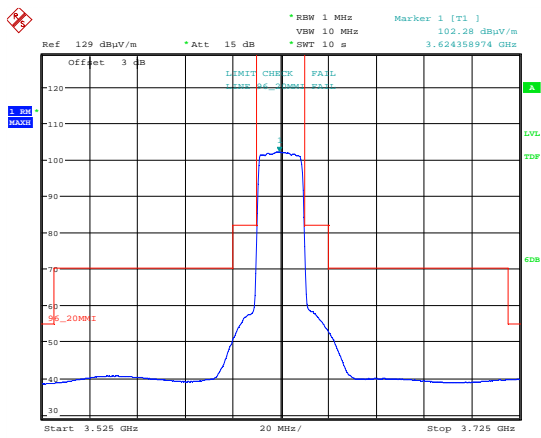
Date: 14.AUG.2018 19:17:34

Emission Mask 16 QAM; 3625 MHz; MIMOB.



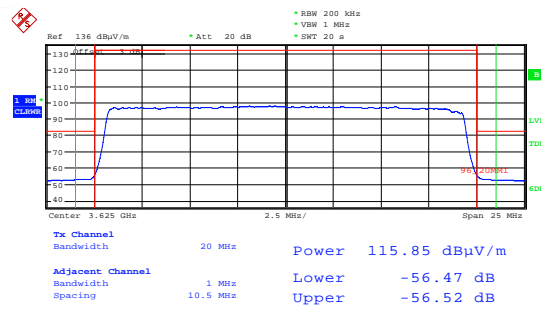
Date: 14.AUG.2018 19:18:12

Emission Mask 16 QAM; 3625 MHz; MIMOB Integration Method.



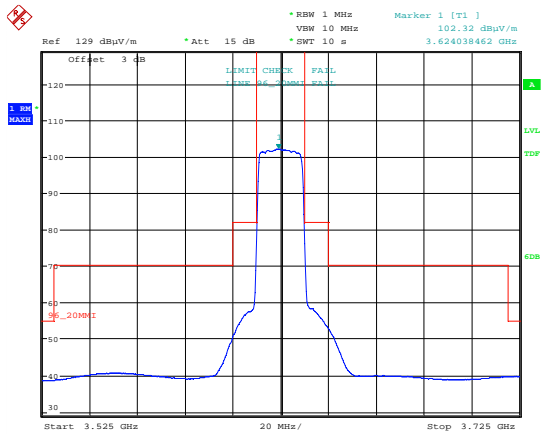
Date: 14.AUG.2018 19:13:38

Emission Mask 64 QAM; 3625 MHz; MIMO A.



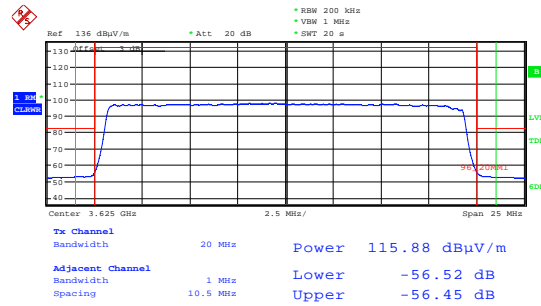
Date: 14.AUG.2018 19:14:25

Emission Mask 64 QAM; 3625 MHz; MIMO A Integration Method.



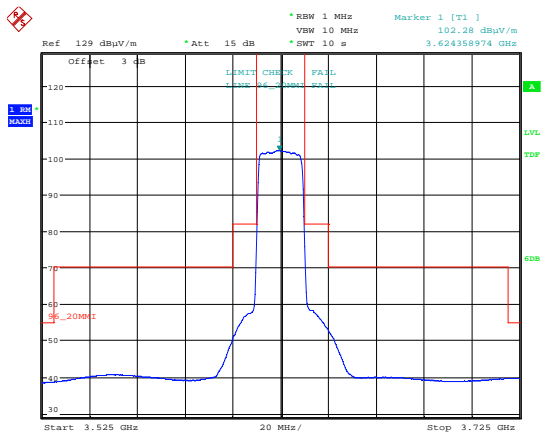
Date: 14.AUG.2018 19:18:52

Emission Mask 64 QAM; 3625 MHz; MIMOB.



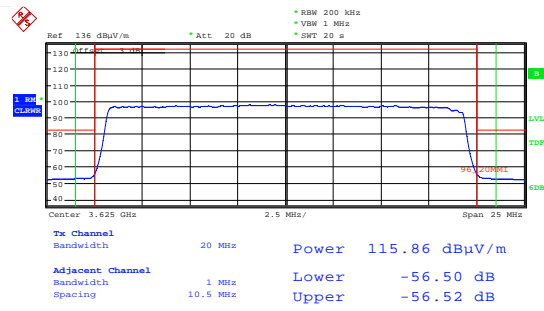
Date: 14.AUG.2018 19:19:27

Emission Mask 64 QAM; 3625 MHz; MIMOB Integration Method.



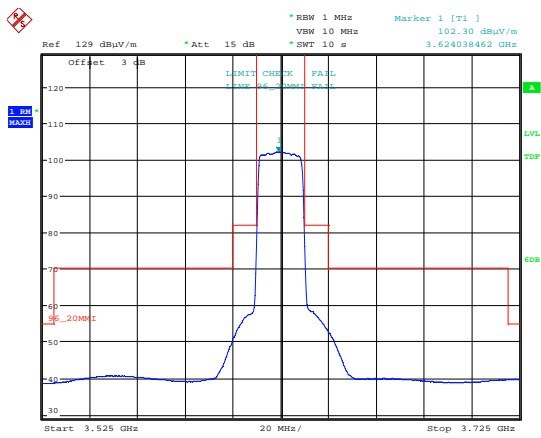
Date: 14.AUG.2018 19:15:07

Emission Mask 256 QAM; 3625 MHz; MIMO A.



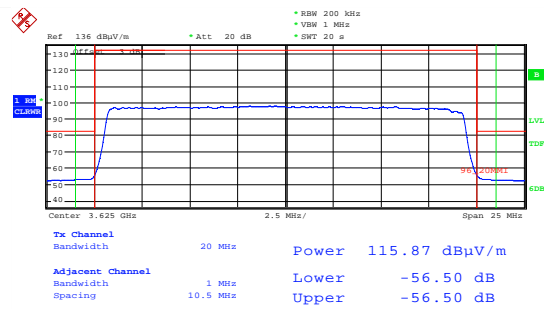
Date: 14.AUG.2018 19:15:41

Emission Mask 256 QAM; 3625 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 19:20:07

Emission Mask 256 QAM; 3625 MHz; MIMO B.

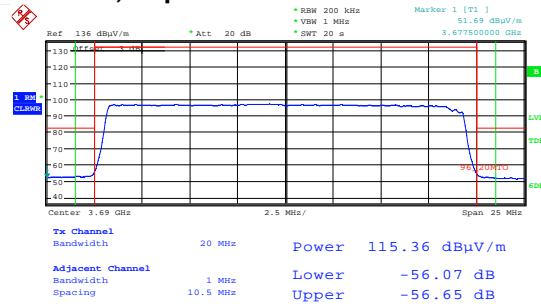
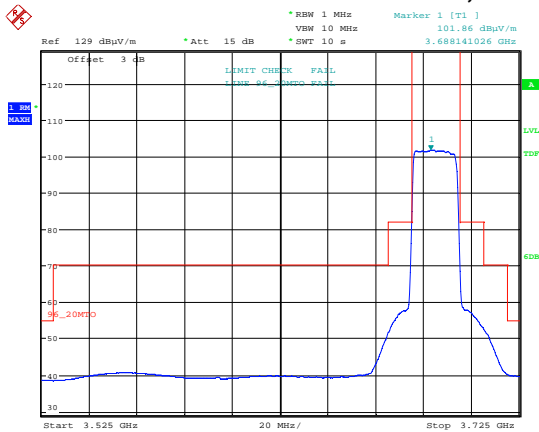


Date: 14.AUG.2018 19:20:39

Emission Mask 256 QAM; 3625 MHz; MIMO B Integration Method.

<b>Frequency: 3625 MHz; Sector Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	115.86	Lower Channel	-56.48	59.38	82.24	Pass
			Upper Channel	-56.53	59.33		Pass
	16 QAM	115.87	Lower Channel	-56.5	59.37		Pass
			Upper Channel	-56.51	59.36		Pass
	64 QAM	115.85	Lower Channel	-56.47	59.38		Pass
			Upper Channel	-56.52	59.33		Pass
	256 QAM	115.86	Lower Channel	-56.5	59.36		Pass
			Upper Channel	-56.52	59.34		Pass
B	QPSK	115.88	Lower Channel	-56.5	59.38	Pass	
			Upper Channel	-56.48	59.4	Pass	
	16 QAM	115.86	Lower Channel	-56.48	59.38	Pass	
			Upper Channel	-56.49	59.37	Pass	
	64 QAM	115.88	Lower Channel	-56.52	59.36	Pass	
			Upper Channel	-56.45	59.43	Pass	
	256 QAM	115.87	Lower Channel	-56.5	59.37	Pass	
			Upper Channel	-56.5	59.37	Pass	

### Sector Mode; 20 MHz bandwidth; Top channel

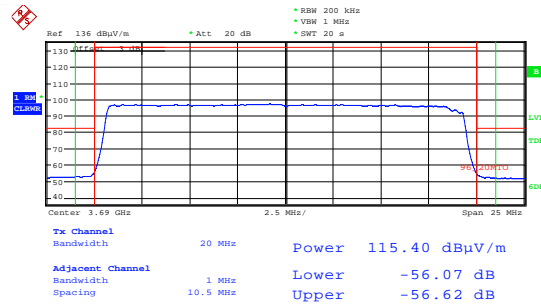
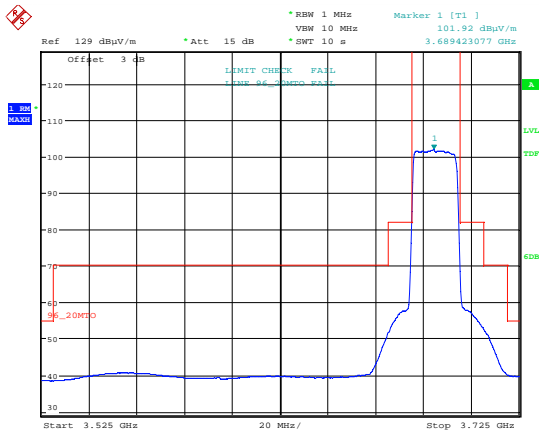


Date: 14.AUG.2018 19:25:00

Date: 14.AUG.2018 19:25:30

Emission Mask QPSK; 3690 MHz; MIMO.A.

Emission Mask QPSK; 3690 MHz; MIMO.A  
Integration Method.

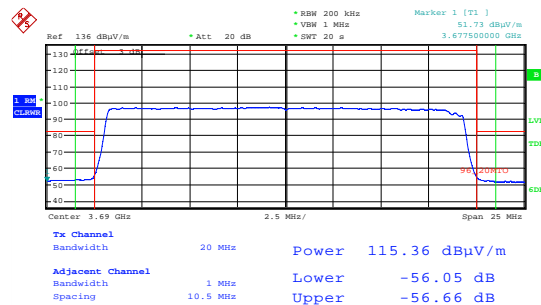
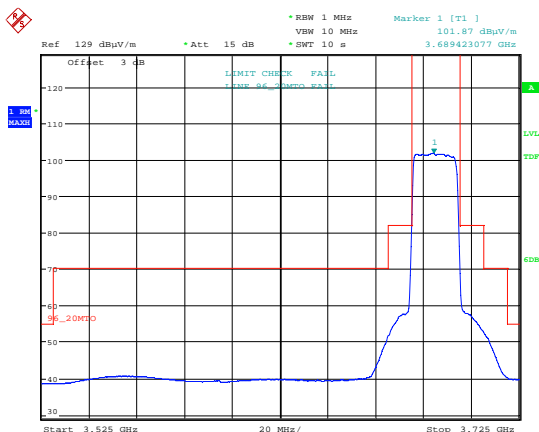


Date: 14.AUG.2018 19:29:59

Date: 14.AUG.2018 19:30:35

Emission Mask QPSK; 3690 MHz; MIMOB.

Emission Mask QPSK; 3690 MHz; MIMOB  
Integration Method.



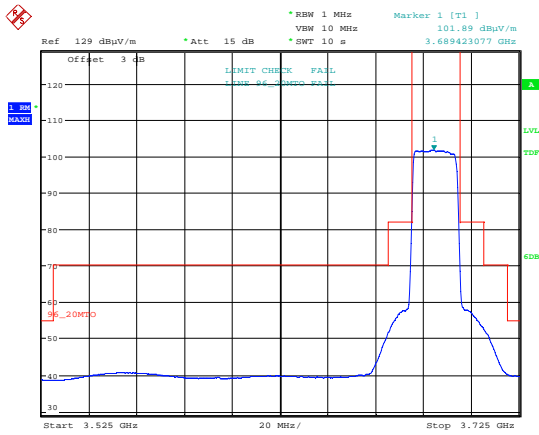
Date: 14.AUG.2018 19:26:18

Date: 14.AUG.2018 19:26:50

Emission Mask 16 QAM; 3690 MHz; MIMO.A.

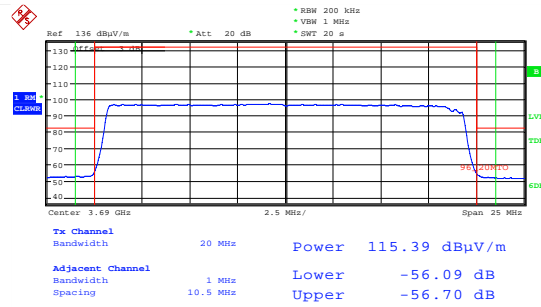
Emission Mask 16 QAM; 3690 MHz; MIMO.A  
Integration Method.





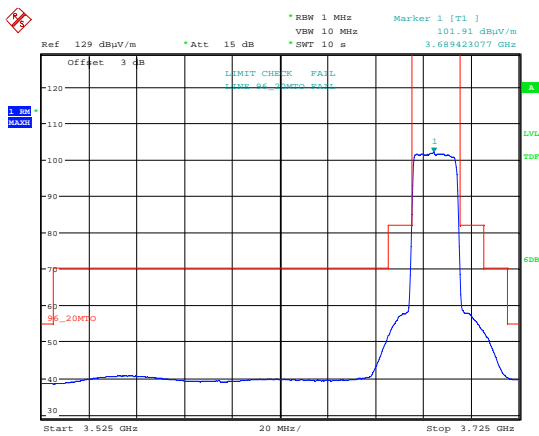
Date: 14.AUG.2018 19:31:16

Emission Mask 16 QAM; 3690 MHz; MIMOB.



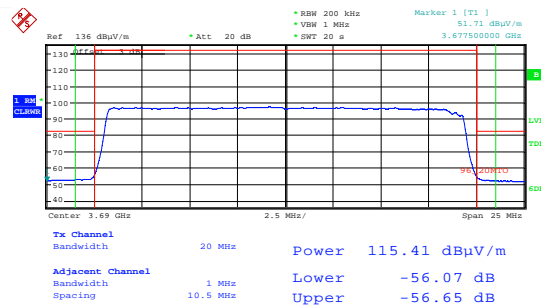
Date: 14.AUG.2018 19:31:57

Emission Mask 16 QAM; 3690 MHz; MIMOB Integration Method.



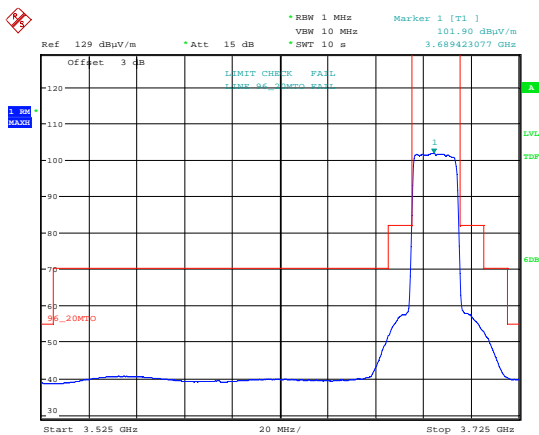
Date: 14.AUG.2018 19:27:28

Emission Mask 64 QAM; 3690 MHz; MIMO A.



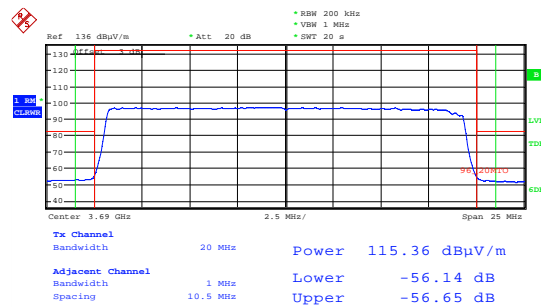
Date: 14.AUG.2018 19:27:59

Emission Mask 64 QAM; 3690 MHz; MIMO A Integration Method.



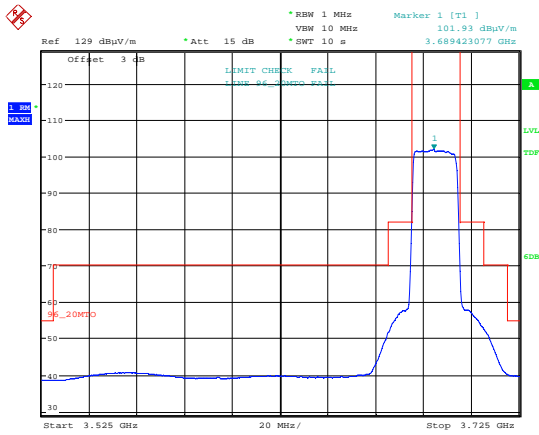
Date: 14.AUG.2018 19:37:06

Emission Mask 64 QAM; 3690 MHz; MIMOB.



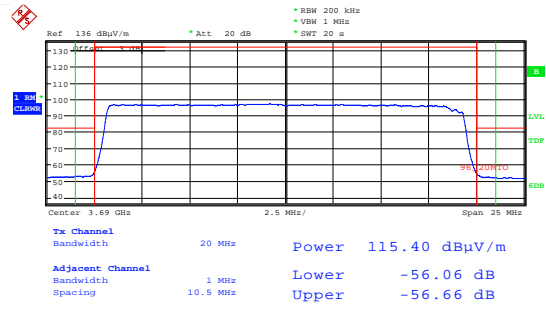
Date: 14.AUG.2018 19:37:41

Emission Mask 64 QAM; 3690 MHz; MIMOB Integration Method.



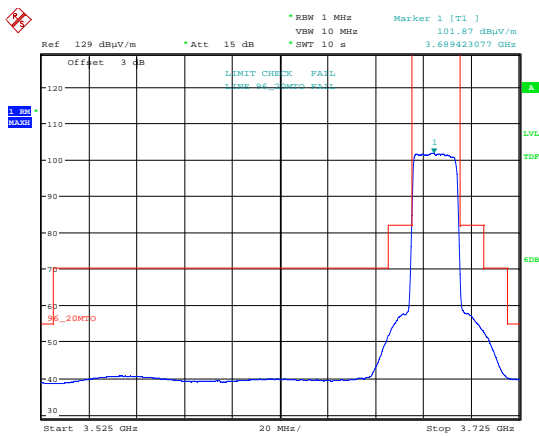
Date: 14.AUG.2018 19:28:39

Emission Mask 256 QAM; 3690 MHz; MIMO A.



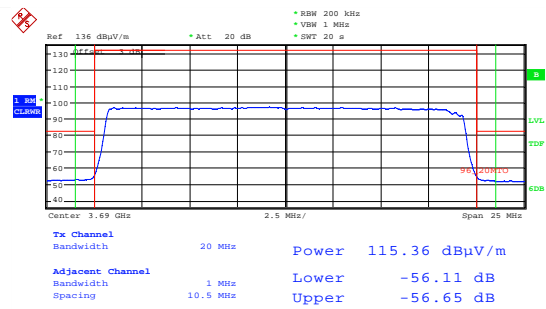
Date: 14.AUG.2018 19:29:11

Emission Mask 256 QAM; 3690 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 19:38:32

Emission Mask 256 QAM; 3690 MHz; MIMO B.

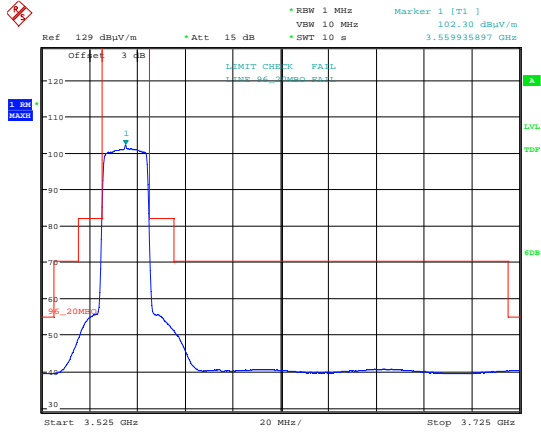


Date: 14.AUG.2018 19:39:06

Emission Mask 256 QAM; 3690 MHz; MIMO B Integration Method.

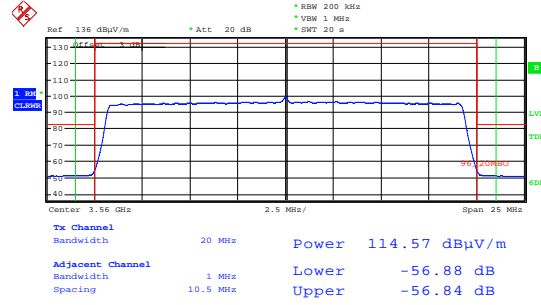
<b>Frequency: 3690 MHz; Sector Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	115.36	Lower Channel	-56.07	59.29	82.24	Pass
			Upper Channel	-56.65	58.71		Pass
	16 QAM	115.36	Lower Channel	-56.05	59.31		Pass
			Upper Channel	-56.66	58.7		Pass
	64 QAM	115.41	Lower Channel	-56.07	59.34		Pass
			Upper Channel	-56.65	58.76		Pass
	256 QAM	115.4	Lower Channel	-56.06	59.34		Pass
			Upper Channel	-56.66	58.74		Pass
B	QPSK	115.4	Lower Channel	-56.07	59.33	Pass	
			Upper Channel	-56.62	58.78	Pass	
	16 QAM	115.39	Lower Channel	-56.09	59.3	Pass	
			Upper Channel	-56.7	58.69	Pass	
	64 QAM	115.36	Lower Channel	-56.14	59.22	Pass	
			Upper Channel	-56.65	58.71	Pass	
	256 QAM	115.36	Lower Channel	-56.11	59.25	Pass	
			Upper Channel	-56.65	58.71	Pass	

### MuMIMO; 20 MHz Bandwidth; Bottom Channel



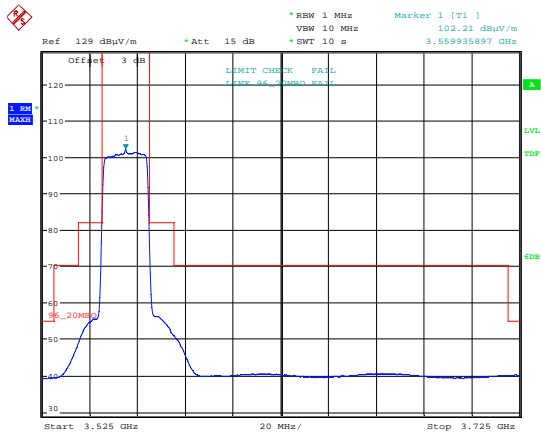
Date: 14.AUG.2018 20:11:55

Emission Mask QPSk; 3560 MHz; MIMO A.



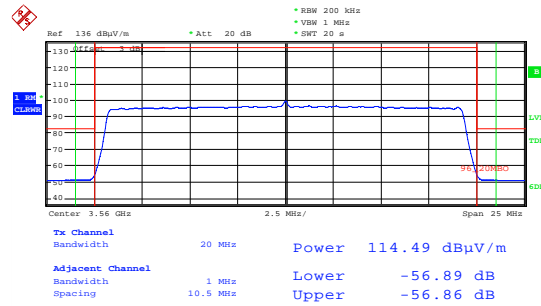
Date: 14.AUG.2018 20:12:26

Emission Mask QPSk; 3560 MHz; MIMO A Integration Method.



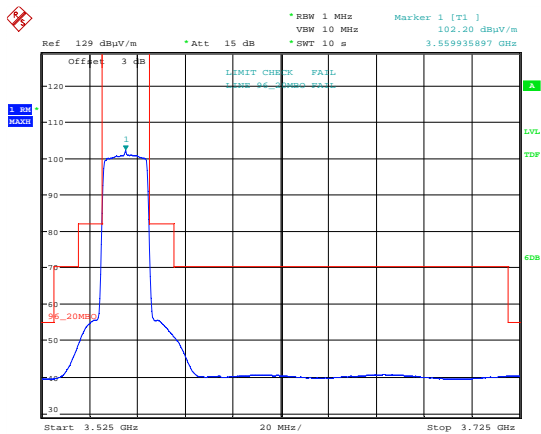
Date: 14.AUG.2018 20:46:59

Emission Mask QPSk; 3560 MHz; MIMO B.



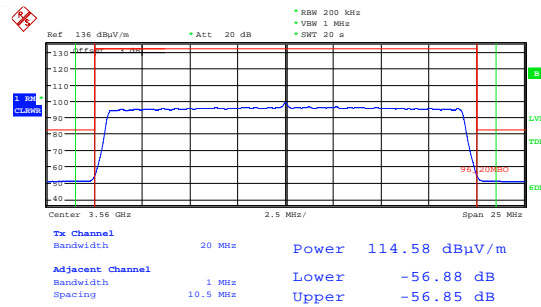
Date: 14.AUG.2018 20:47:39

Emission Mask QPSk; 3560 MHz; MIMO B Integration Method.



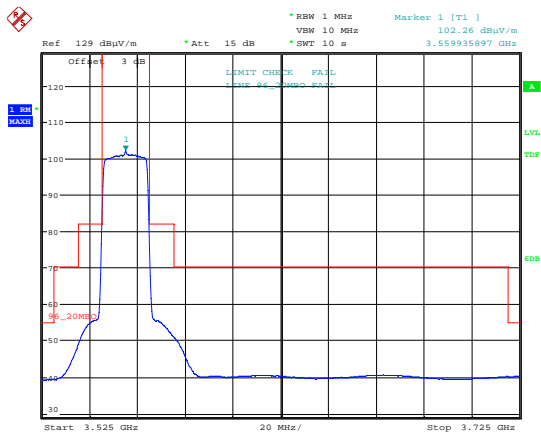
Date: 14.AUG.2018 20:28:59

Emission Mask 16 QAM; 3560 MHz; MIMO A.



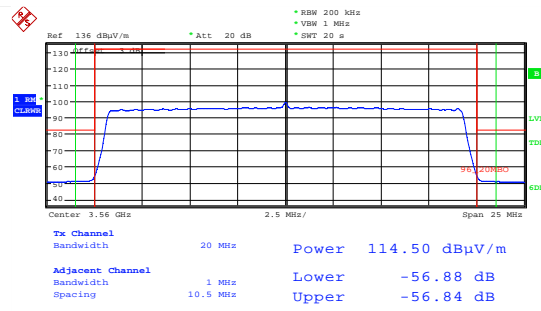
Date: 14.AUG.2018 20:29:32

Emission Mask 16 QAM; 3560 MHz; MIMO A Integration Method.



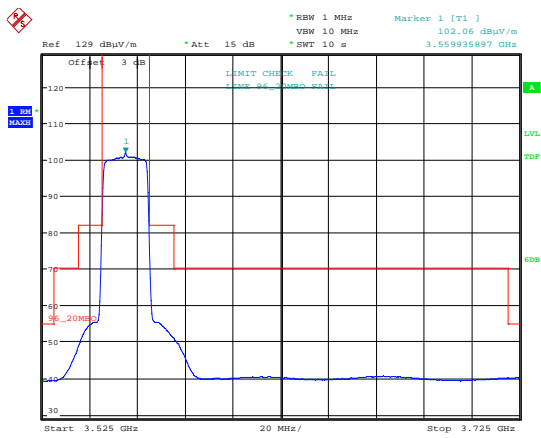
Date: 14.AUG.2018 20:48:51

Emission Mask 16 QAM; 3560 MHz; MIMOB.



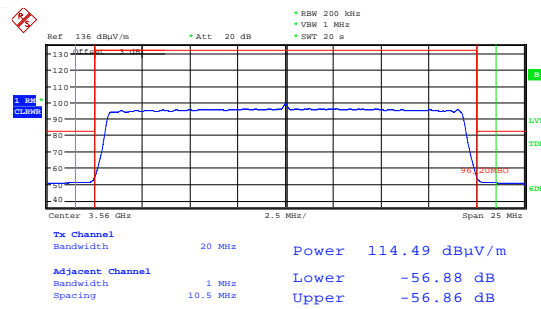
Date: 14.AUG.2018 20:49:41

Emission Mask 16 QAM; 3560 MHz; MIMOB Integration Method.



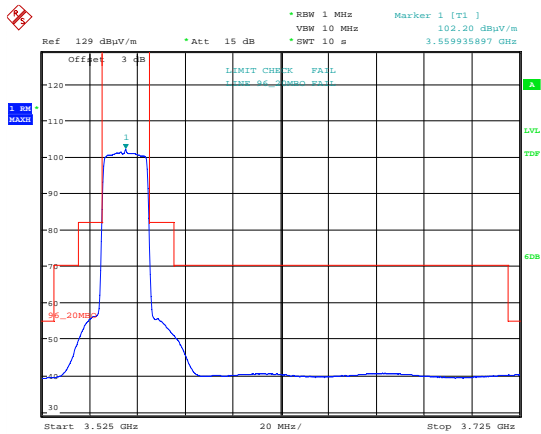
Date: 14.AUG.2018 20:44:52

Emission Mask 64 QAM; 3560 MHz; MIMO A.



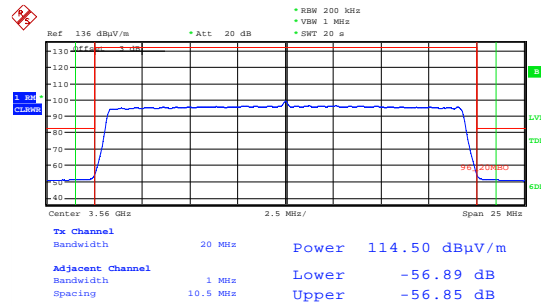
Date: 14.AUG.2018 20:45:26

Emission Mask 64 QAM; 3560 MHz; MIMO A Integration Method.



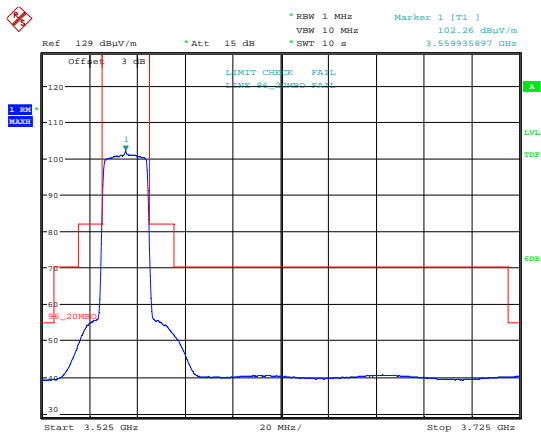
Date: 14.AUG.2018 20:50:30

Emission Mask 64 QAM; 3560 MHz; MIMOB.



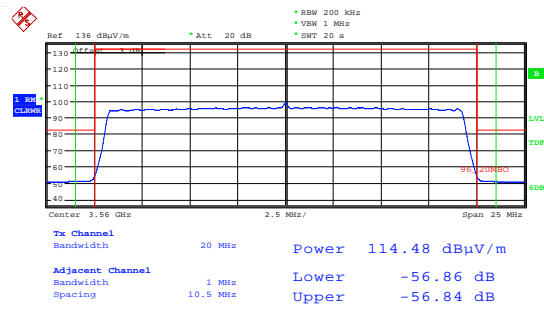
Date: 14.AUG.2018 20:51:09

Emission Mask 64 QAM; 3560 MHz; MIMOB Integration Method.



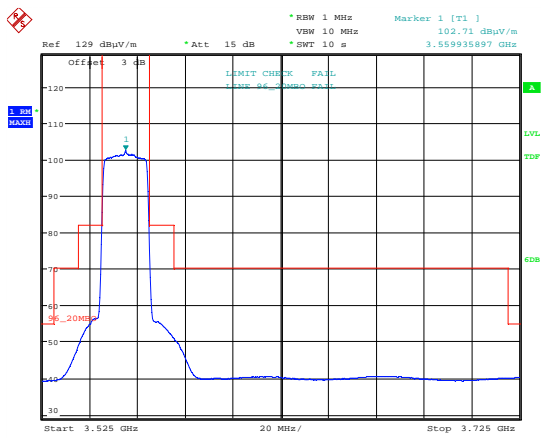
Date: 14.AUG.2018 20:45:55

Emission Mask 256 QAM; 3560 MHz; MIMO A.



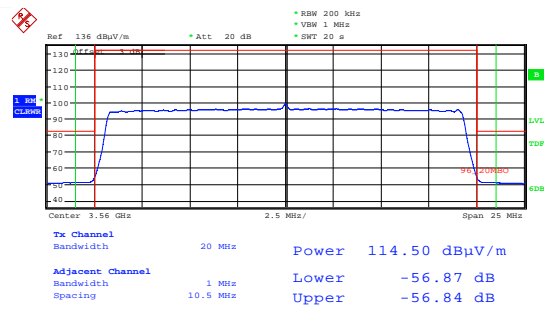
Date: 14.AUG.2018 20:46:27

Emission Mask 256 QAM; 3560 MHz; MIMO A  
Integration Method.



Date: 14.AUG.2018 20:51:38

Emission Mask 256 QAM; 3560 MHz; MIMO B.

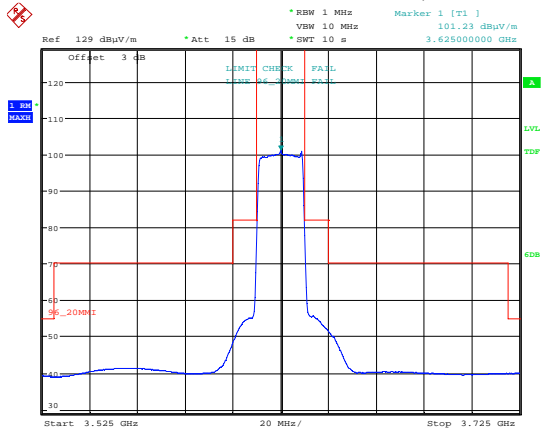


Date: 14.AUG.2018 20:52:17

Emission Mask 256 QAM; 3560 MHz; MIMO B  
Integration Method.

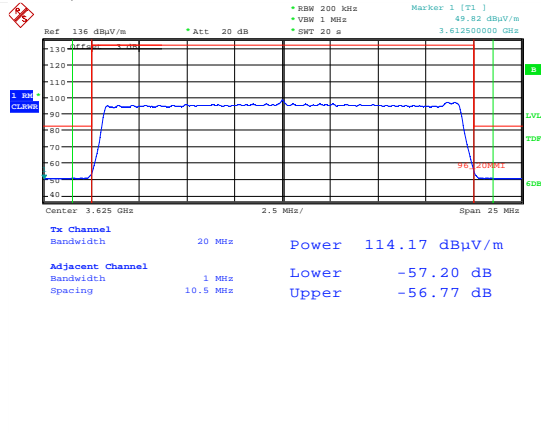
<b>Frequency: 3560 MHz; MuMIMO Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	114.57	Lower Channel	-56.88	57.69	82.24	Pass
			Upper Channel	-56.84	57.73		Pass
	16 QAM	114.58	Lower Channel	-56.88	57.7		Pass
			Upper Channel	-56.85	57.73		Pass
	64 QAM	114.49	Lower Channel	-56.88	57.61		Pass
			Upper Channel	-56.86	57.63		Pass
	256 QAM	114.48	Lower Channel	-56.86	57.62		Pass
			Upper Channel	-56.84	57.64		Pass
B	QPSK	114.49	Lower Channel	-56.89	57.6	Pass	
			Upper Channel	-56.86	57.63	Pass	
	16 QAM	114.58	Lower Channel	-56.88	57.7	Pass	
			Upper Channel	-56.85	57.73	Pass	
	64 QAM	114.5	Lower Channel	-56.89	57.61	Pass	
			Upper Channel	-56.85	57.65	Pass	
	256 QAM	114.5	Lower Channel	-56.87	57.63	Pass	
			Upper Channel	-56.84	57.66	Pass	

### MuMIMO; 20 MHz Bandwidth; Middle Channel



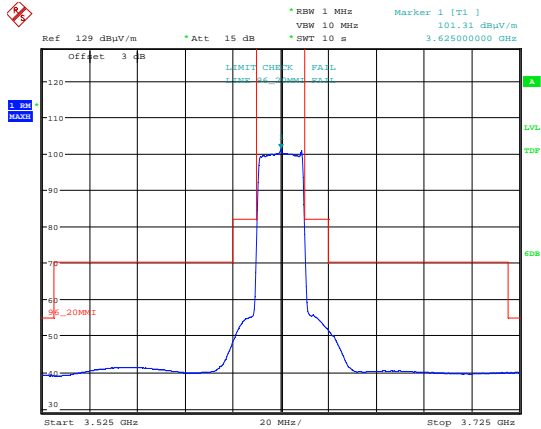
Date: 14.AUG.2018 19:58:44

Emission Mask QPSK; 3625 MHz; MIMO.A.



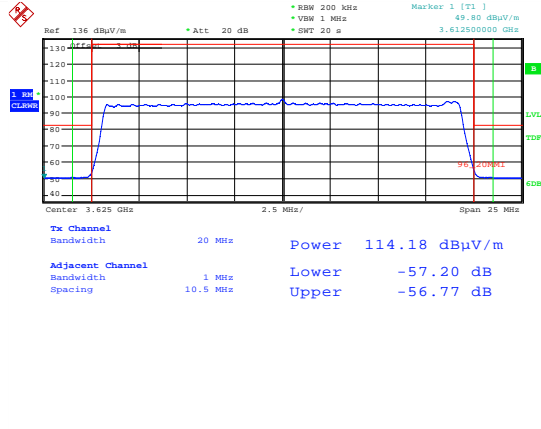
Date: 14.AUG.2018 19:59:14

Emission Mask QPSK; 3625 MHz; MIMO.A  
 Integration Method.



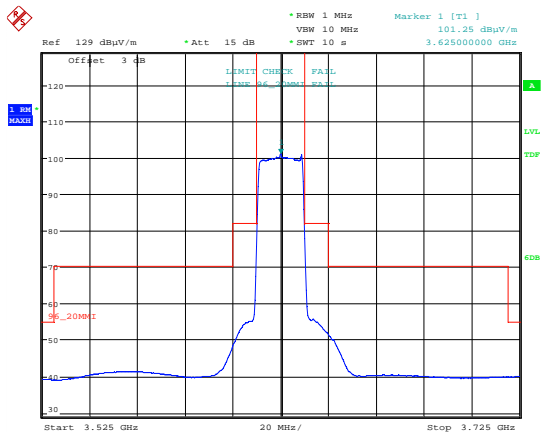
Date: 14.AUG.2018 20:03:37

Emission Mask QPSK; 3625 MHz; MIMO.B.



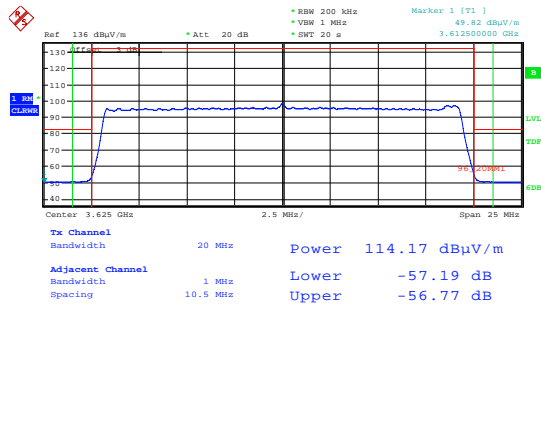
Date: 14.AUG.2018 20:04:12

Emission Mask QPSK; 3625 MHz; MIMO.B  
 Integration Method.



Date: 14.AUG.2018 19:59:51

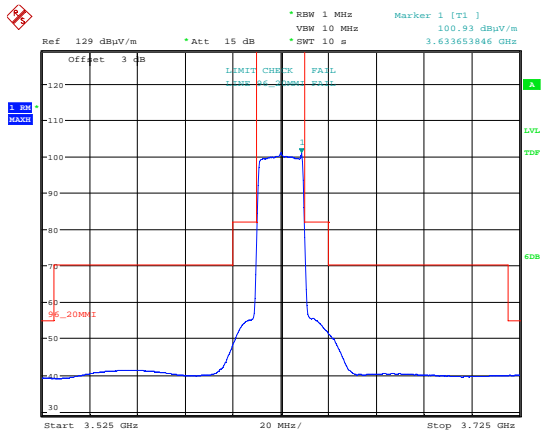
Emission Mask 16 QAM; 3625 MHz; MIMO.A.



Date: 14.AUG.2018 20:00:21

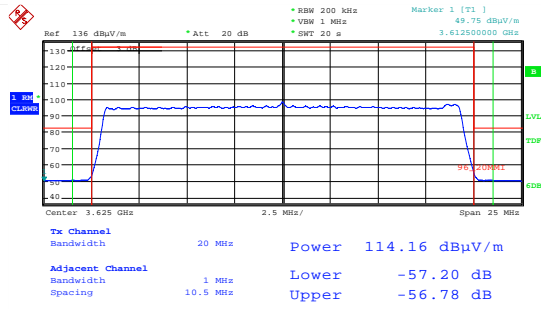
Emission Mask 16 QAM; 3625 MHz; MIMO.A  
 Integration Method.





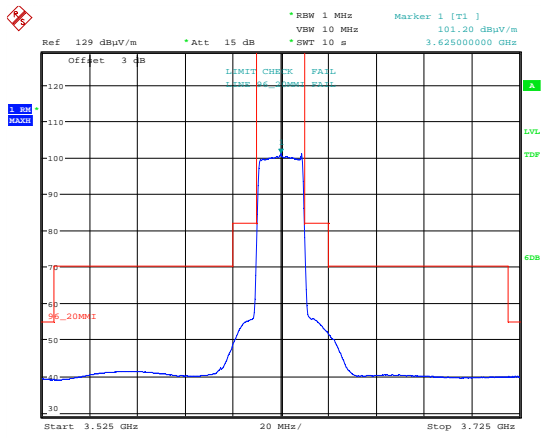
Date: 14.AUG.2018 20:04:56

Emission Mask 16 QAM; 3625 MHz; MIMOB.



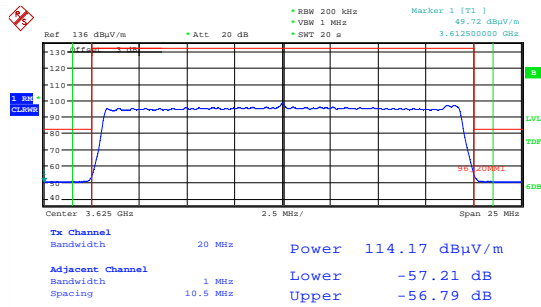
Date: 14.AUG.2018 20:05:32

Emission Mask 16 QAM; 3625 MHz; MIMOB Integration Method.



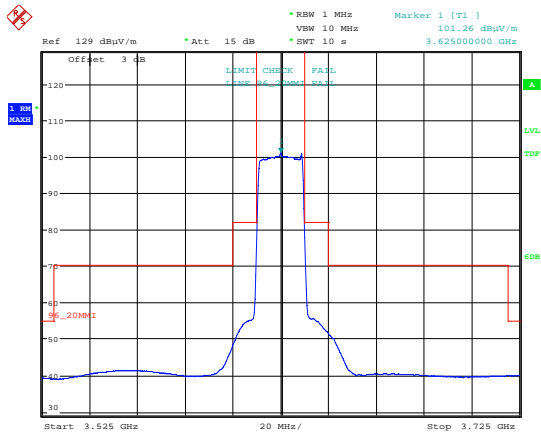
Date: 14.AUG.2018 20:01:55

Emission Mask 64 QAM; 3625 MHz; MIMO A.



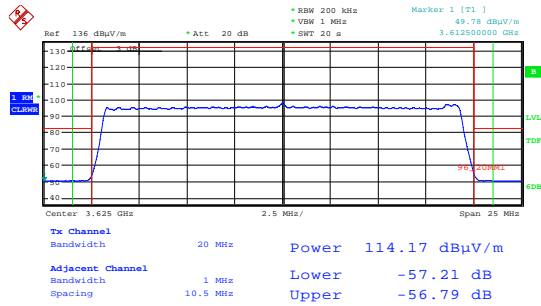
Date: 14.AUG.2018 20:01:18

Emission Mask 64 QAM; 3625 MHz; MIMO A Integration Method.



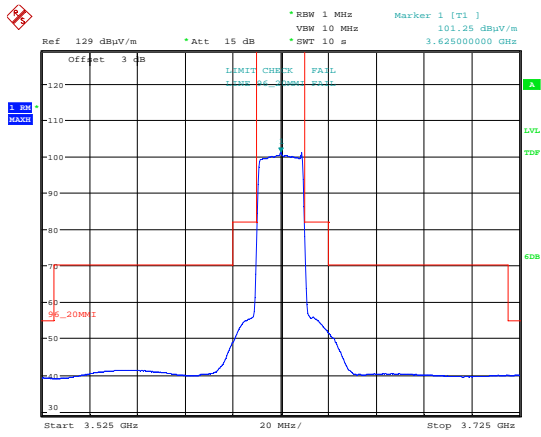
Date: 14.AUG.2018 20:06:13

Emission Mask 64 QAM; 3625 MHz; MIMOB.



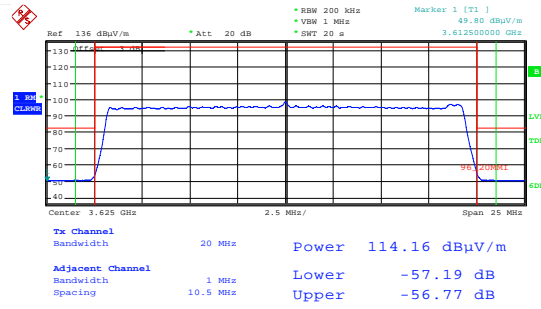
Date: 14.AUG.2018 20:06:55

Emission Mask 64 QAM; 3625 MHz; MIMOB Integration Method.



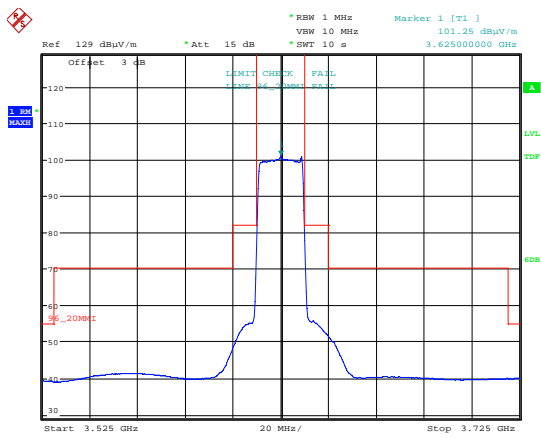
Date: 14.AUG.2018 20:02:30

Emission Mask 256 QAM; 3625 MHz; MIMO A.



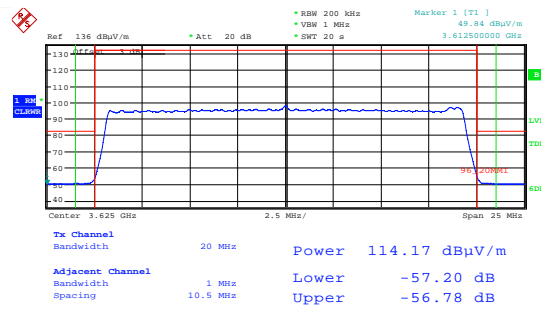
Date: 14.AUG.2018 20:03:02

Emission Mask 256 QAM; 3625 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 20:07:37

Emission Mask 256 QAM; 3625 MHz; MIMO B.

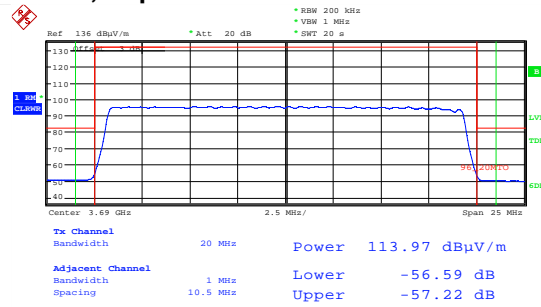
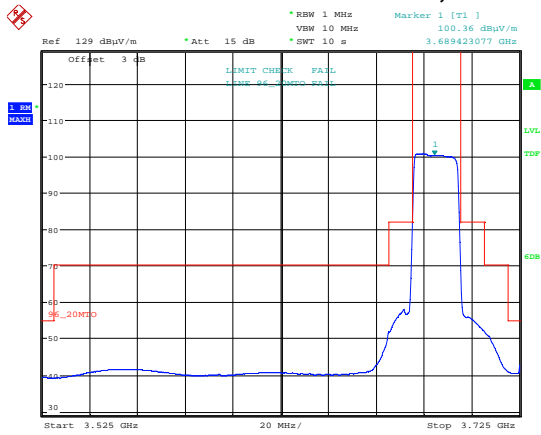


Date: 14.AUG.2018 20:08:09

Emission Mask 256 QAM; 3625 MHz; MIMO B Integration Method.

<b>Frequency: 3625 MHz; MuMIMO Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	114.17	Lower Channel	-57.2	56.97	82.24	Pass
			Upper Channel	-56.77	57.4		Pass
	16 QAM	114.17	Lower Channel	-57.19	56.98		Pass
			Upper Channel	-56.77	57.4		Pass
	64 QAM	114.17	Lower Channel	-57.21	56.96		Pass
			Upper Channel	-56.79	57.38		Pass
	256 QAM	114.16	Lower Channel	-57.19	56.97		Pass
			Upper Channel	-56.77	57.39		Pass
B	QPSK	114.18	Lower Channel	-57.2	56.98	Pass	
			Upper Channel	-56.77	57.41	Pass	
	16 QAM	114.16	Lower Channel	-57.2	56.96	Pass	
			Upper Channel	-56.78	57.38	Pass	
	64 QAM	114.17	Lower Channel	-57.21	56.96	Pass	
			Upper Channel	-56.79	57.38	Pass	
	256 QAM	114.17	Lower Channel	-57.2	56.97	Pass	
			Upper Channel	-56.78	57.39	Pass	

### MuMIMO; 20 MHz Bandwidth; Top Channel

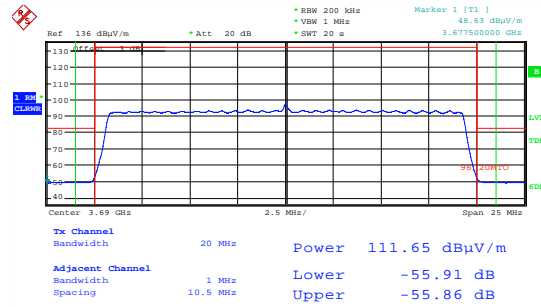
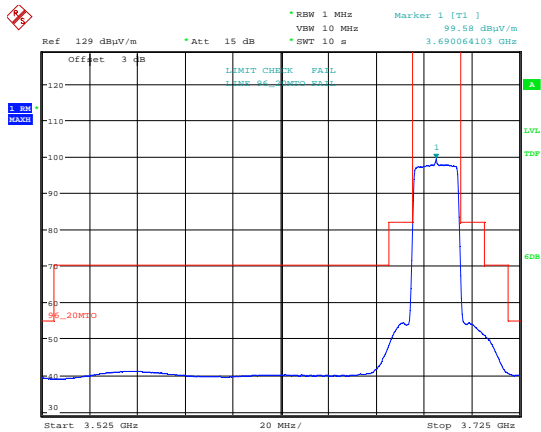


Date: 14.AUG.2018 19:41:16

Date: 14.AUG.2018 19:41:47

### Emission Mask QPSK; 3690 MHz; MIMO.A.

### Emission Mask QPSK; 3690 MHz; MIMO.A Integration Method.

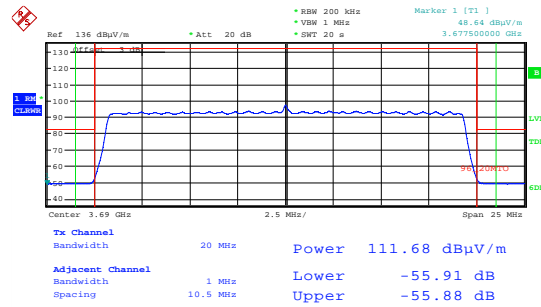
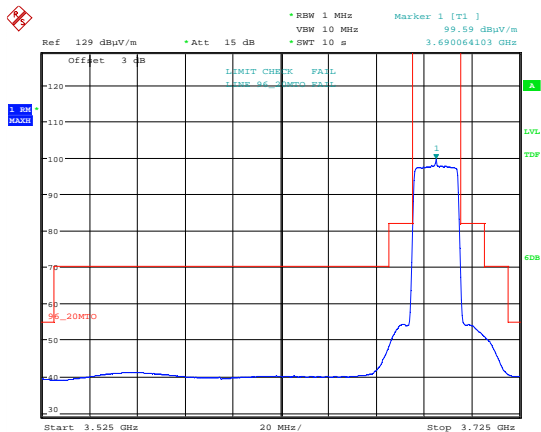


Date: 14.AUG.2018 19:49:10

Date: 14.AUG.2018 19:50:15

### Emission Mask QPSK; 3690 MHz; MIMOB.

### Emission Mask QPSK; 3690 MHz; MIMOB Integration Method.

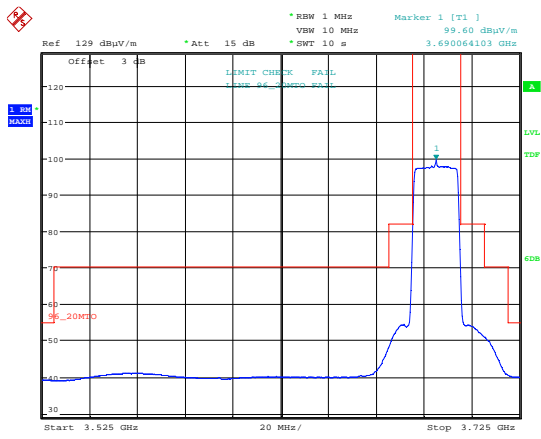


Date: 14.AUG.2018 19:46:28

Date: 14.AUG.2018 19:47:01

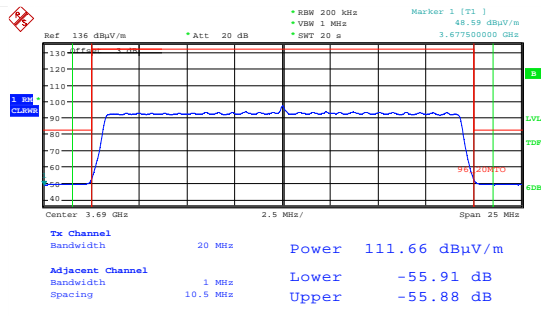
### Emission Mask 16 QAM; 3690 MHz; MIMO.A.

### Emission Mask 16 QAM; 3690 MHz; MIMO.A Integration Method.



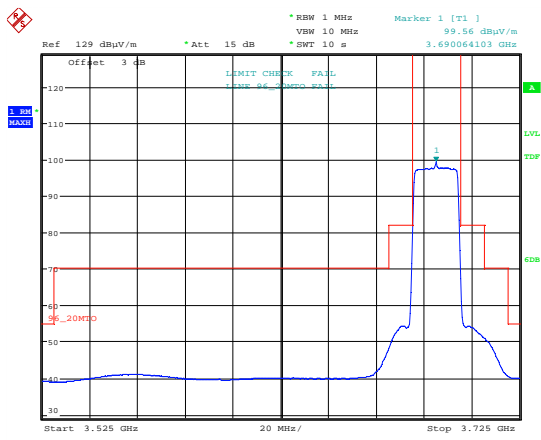
Date: 14.AUG.2018 19:51:01

Emission Mask 16 QAM; 3690 MHz; MIMOB.



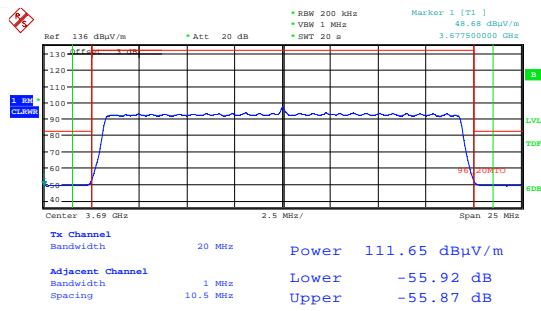
Date: 14.AUG.2018 19:51:32

Emission Mask 16 QAM; 3690 MHz; MIMOB Integration Method.



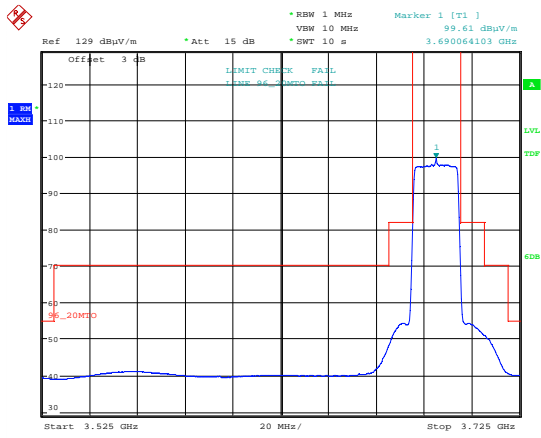
Date: 14.AUG.2018 19:47:36

Emission Mask 64 QAM; 3690 MHz; MIMO A.



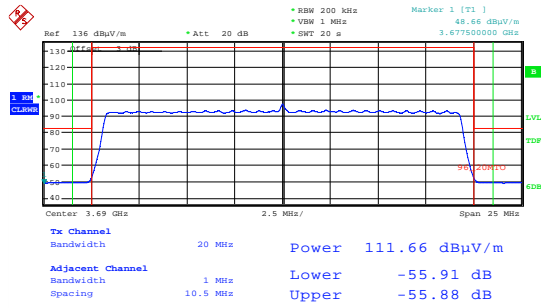
Date: 14.AUG.2018 19:48:06

Emission Mask 64 QAM; 3690 MHz; MIMO A Integration Method.



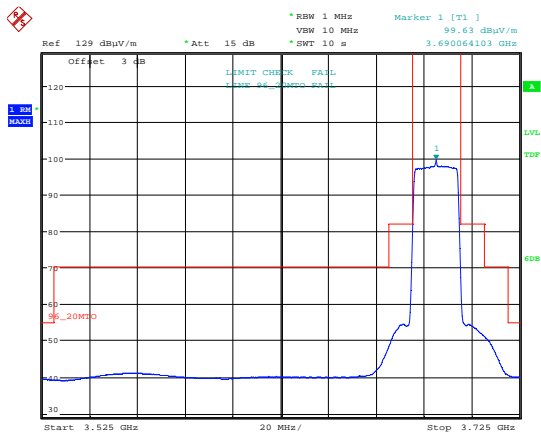
Date: 14.AUG.2018 19:52:14

Emission Mask 64 QAM; 3690 MHz; MIMOB.



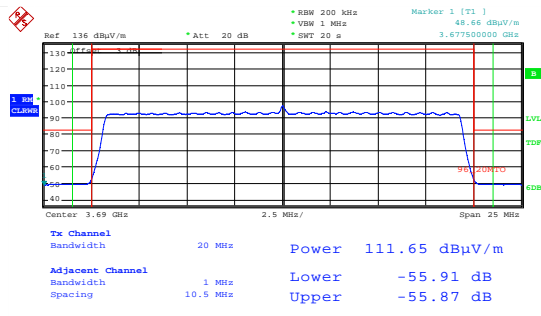
Date: 14.AUG.2018 19:52:51

Emission Mask 64 QAM; 3690 MHz; MIMOB Integration Method.



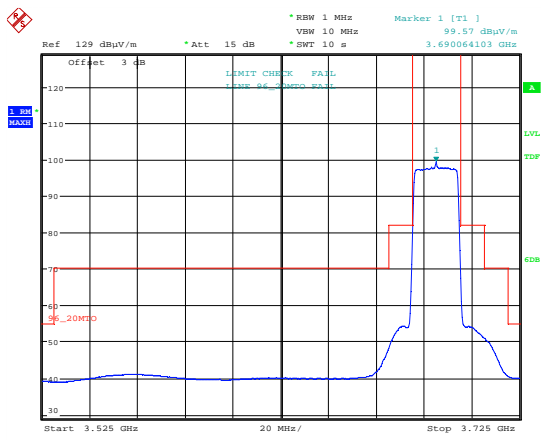
Date: 14.AUG.2018 19:48:36

Emission Mask 256 QAM; 3690 MHz; MIMO A.



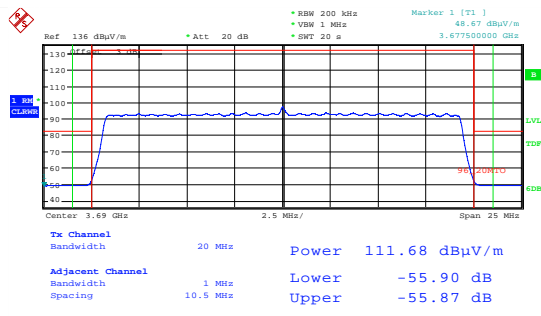
Date: 14.AUG.2018 19:49:06

Emission Mask 256 QAM; 3690 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 19:53:29

Emission Mask 256 QAM; 3690 MHz; MIMO B.

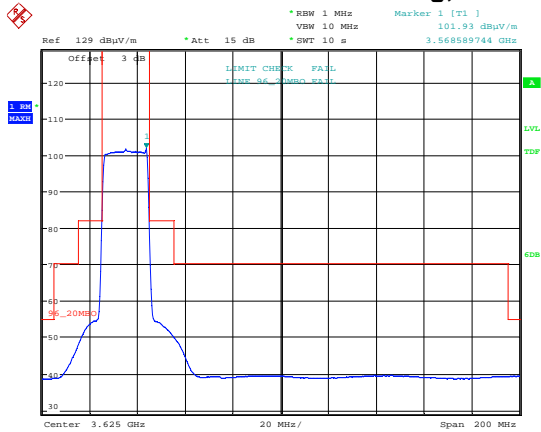


Date: 14.AUG.2018 19:54:02

Emission Mask 256 QAM; 3690 MHz; MIMO B Integration Method.

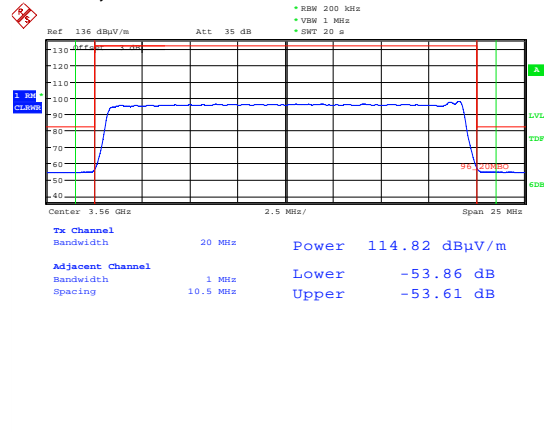
<b>Frequency: 3690 MHz; MuMIMO Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	113.97	Lower Channel	-56.59	57.38	82.24	Pass
			Upper Channel	-57.22	56.75		Pass
	16 QAM	111.68	Lower Channel	-55.91	55.77		Pass
			Upper Channel	-55.88	55.8		Pass
	64 QAM	111.65	Lower Channel	-55.92	55.73		Pass
			Upper Channel	-55.87	55.78		Pass
	256 QAM	111.65	Lower Channel	-55.91	55.74		Pass
			Upper Channel	-55.87	55.78		Pass
B	QPSK	113.97	Lower Channel	-56.59	57.38	82.24	Pass
			Upper Channel	-57.22	56.75		Pass
	16 QAM	111.66	Lower Channel	-55.91	55.75		Pass
			Upper Channel	-55.88	55.78		Pass
	64 QAM	111.66	Lower Channel	-55.91	55.75		Pass
			Upper Channel	-55.88	55.78		Pass
	256 QAM	111.68	Lower Channel	-55.9	55.78		Pass
			Upper Channel	-55.87	55.81		Pass

### Beamforming; 20 MHz Bandwidth; Bottom Channel



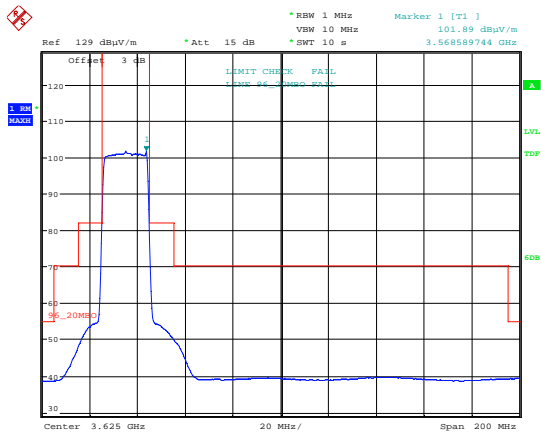
Date: 14.AUG.2018 21:57:25

Emission Mask QPSK; 3560 MHz; MIMO A.



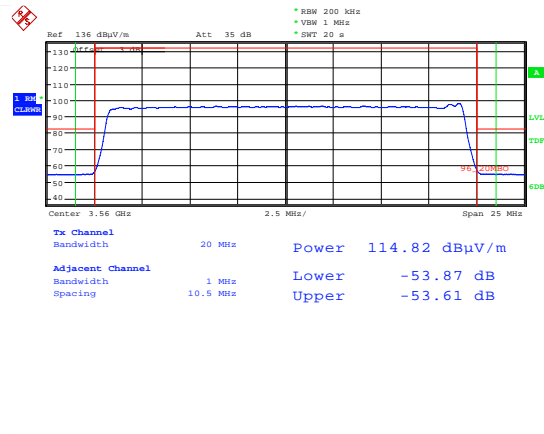
Date: 14.AUG.2018 23:57:56

Emission Mask QPSK; 3560 MHz; MIMO A Integration Method.



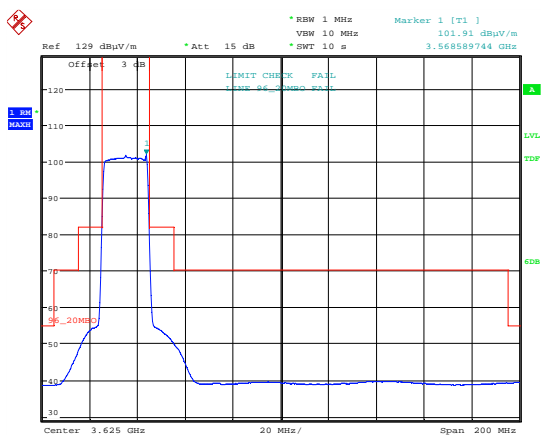
Date: 14.AUG.2018 21:30:27

Emission Mask QPSK; 3560 MHz; MIMO B.



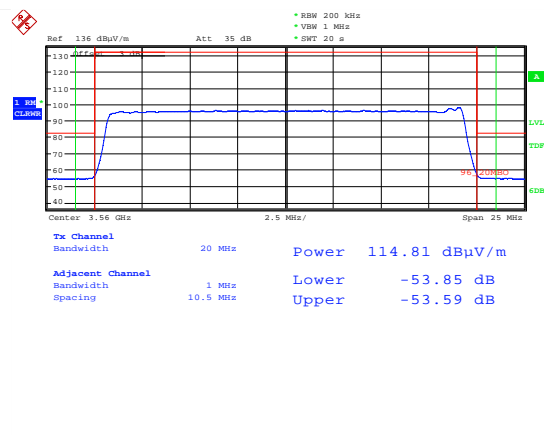
Date: 14.AUG.2018 23:56:02

Emission Mask QPSK; 3560 MHz; MIMO B Integration Method.



Date: 14.AUG.2018 21:41:30

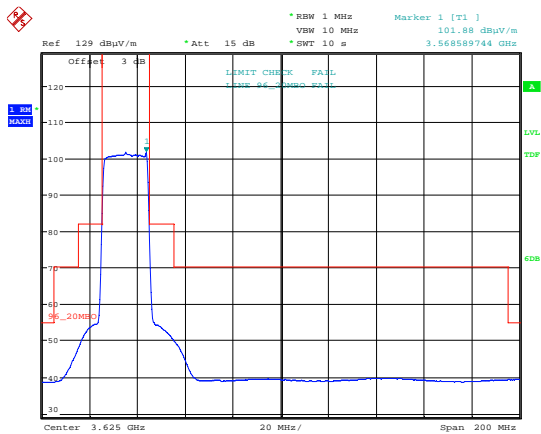
Emission Mask 16 QAM; 3560 MHz; MIMO A.



Date: 15.AUG.2018 00:01:58

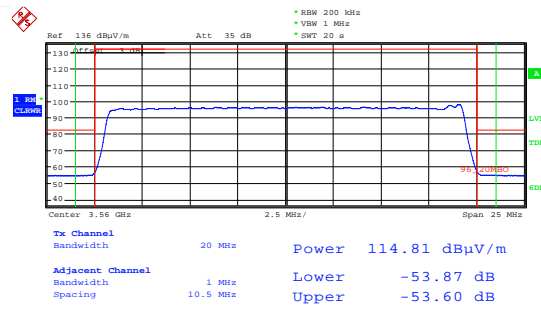
Emission Mask 16 QAM; 3560 MHz; MIMO A Integration Method.





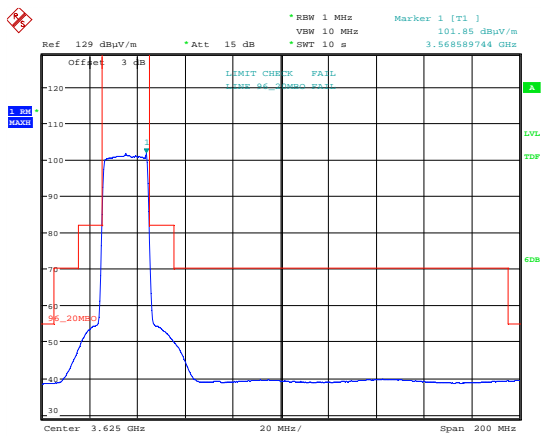
Date: 14.AUG.2018 21:20:45

Emission Mask 16 QAM; 3560 MHz; MIMOB.



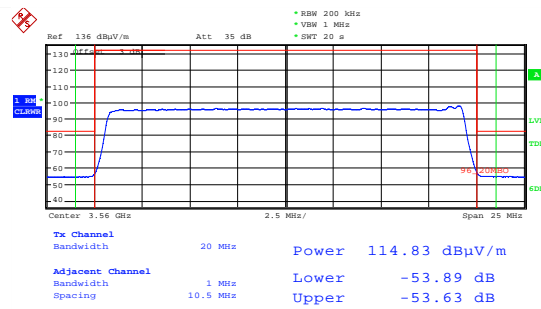
Date: 14.AUG.2018 23:59:44

Emission Mask 16 QAM; 3560 MHz; MIMOB Integration Method.



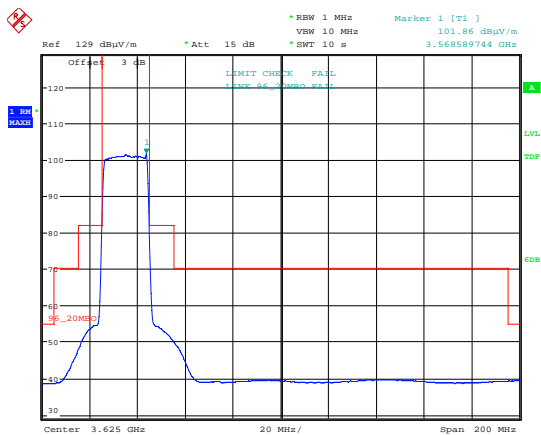
Date: 14.AUG.2018 21:40:47

Emission Mask 64 QAM; 3560 MHz; MIMO A.



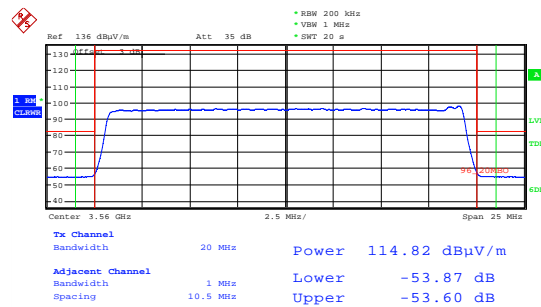
Date: 14.AUG.2018 23:54:44

Emission Mask 64 QAM; 3560 MHz; MIMO A Integration Method.



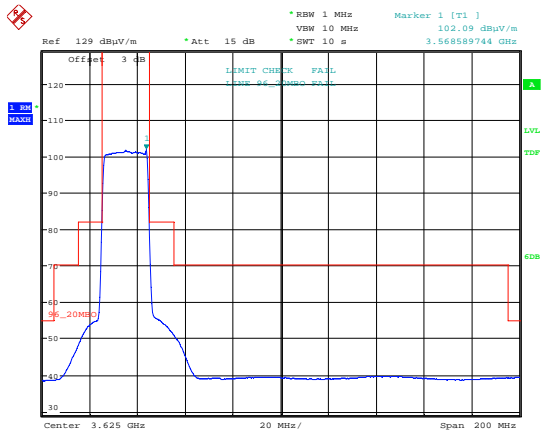
Date: 14.AUG.2018 21:19:38

Emission Mask 64 QAM; 3560 MHz; MIMOB.



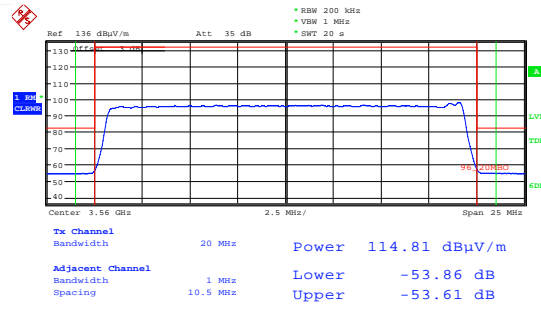
Date: 14.AUG.2018 23:57:00

Emission Mask 64 QAM; 3560 MHz; MIMOB Integration Method.



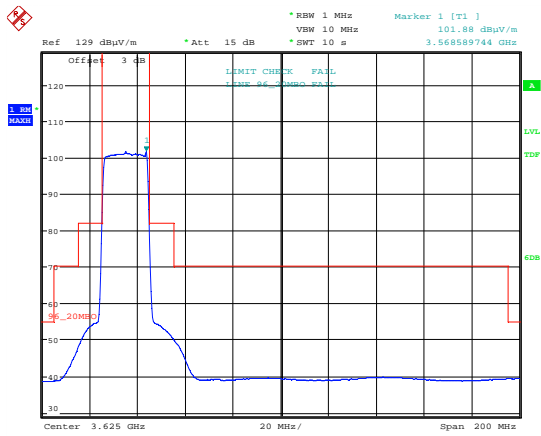
Date: 14.AUG.2018 21:38:25

Emission Mask 256 QAM; 3560 MHz; MIMO A.



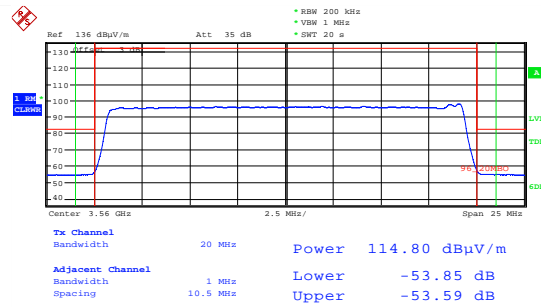
Date: 14.AUG.2018 23:58:52

Emission Mask 256 QAM; 3560 MHz; MIMO A  
Integration Method.



Date: 14.AUG.2018 21:16:40

Emission Mask 256 QAM; 3560 MHz; MIMO B.

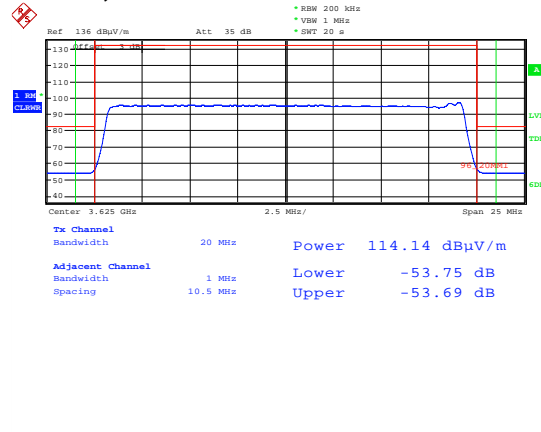
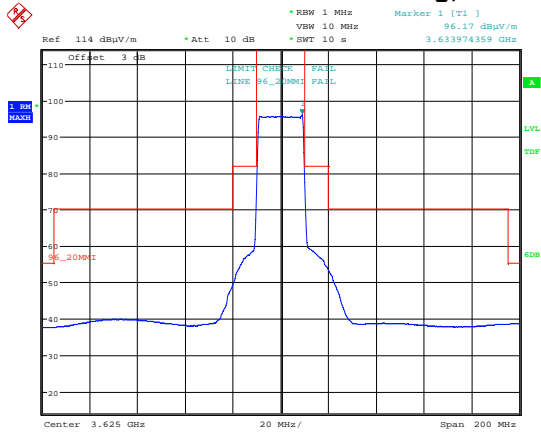


Date: 15.AUG.2018 00:01:06

Emission Mask 256 QAM; 3560 MHz; MIMO B  
Integration Method.

<b>Frequency: 3560 MHz; Beamforming Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	114.82	Lower Channel	-53.86	60.96	82.24	Pass
			Upper Channel	-53.61	61.21		Pass
	16 QAM	114.81	Lower Channel	-53.85	60.96		Pass
			Upper Channel	-53.59	61.22		Pass
	64 QAM	114.83	Lower Channel	-53.89	60.94		Pass
			Upper Channel	-53.63	61.2		Pass
	256 QAM	114.81	Lower Channel	-53.86	60.95		Pass
			Upper Channel	-53.61	61.2		Pass
B	QPSK	114.82	Lower Channel	-53.87	60.95	Pass	
			Upper Channel	-53.61	61.21	Pass	
	16 QAM	114.81	Lower Channel	-53.87	60.94	Pass	
			Upper Channel	-53.6	61.21	Pass	
	64 QAM	114.82	Lower Channel	-53.87	60.95	Pass	
			Upper Channel	-53.6	61.22	Pass	
	256 QAM	114.8	Lower Channel	-53.85	60.95	Pass	
			Upper Channel	-53.59	61.21	Pass	

### Beamforming; 20 MHz Bandwidth; Middle Channel

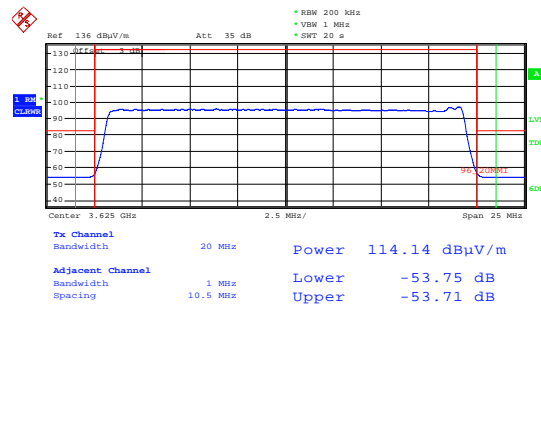
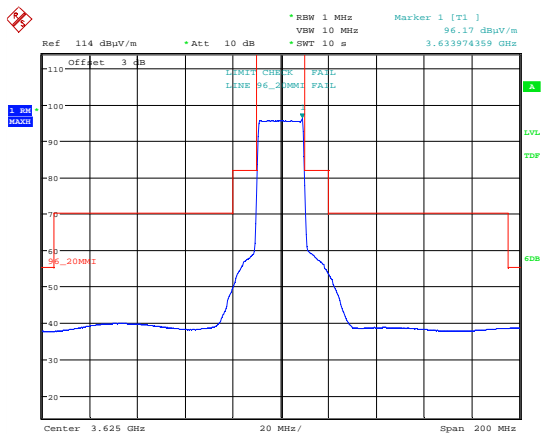


Date: 14.AUG.2018 22:16:13

Date: 14.AUG.2018 23:35:53

### Emission Mask QPSK; 3625 MHz; MIMO A.

### Emission Mask QPSK; 3625 MHz; MIMO A Integration Method.

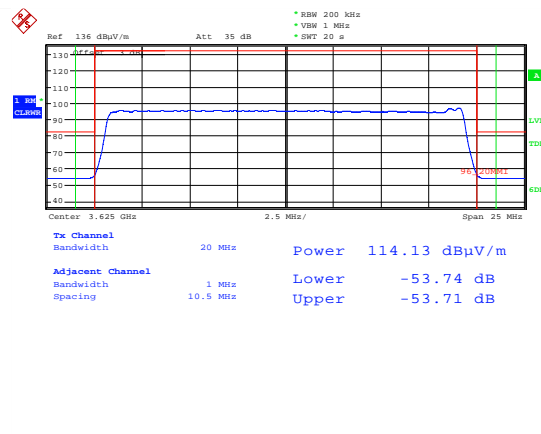
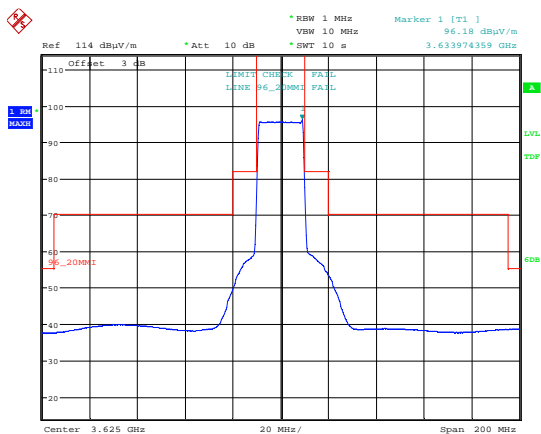


Date: 14.AUG.2018 22:26:25

Date: 14.AUG.2018 23:40:11

### Emission Mask QPSK; 3625 MHz; MIMO B.

### Emission Mask QPSK; 3625 MHz; MIMO B Integration Method.

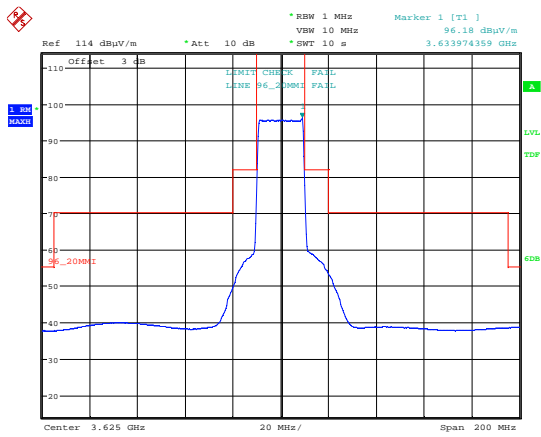


Date: 14.AUG.2018 22:17:24

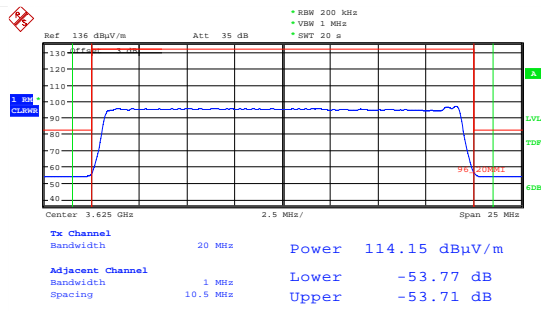
Date: 14.AUG.2018 23:37:08

### Emission Mask 16 QAM; 3625 MHz; MIMO A.

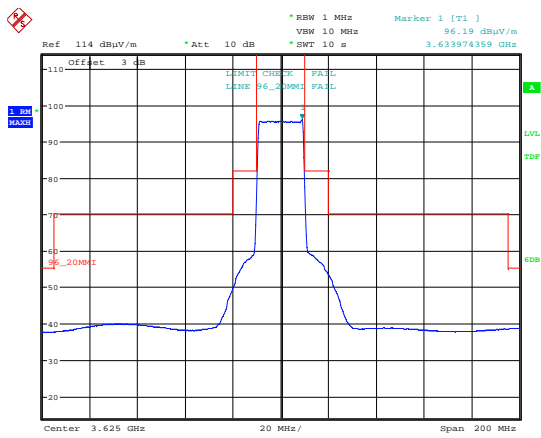
### Emission Mask 16 QAM; 3625 MHz; MIMO A Integration Method.



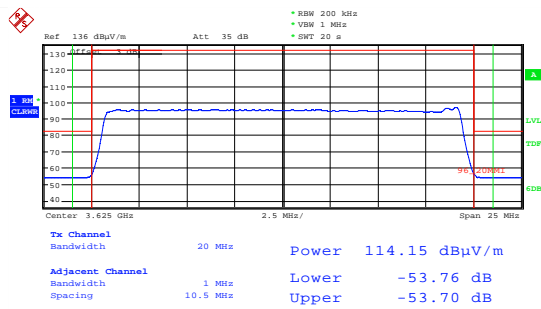
Date: 14.AUG.2018 22:29:19  
**Emission Mask 16 QAM; 3625 MHz; MIMOB.**



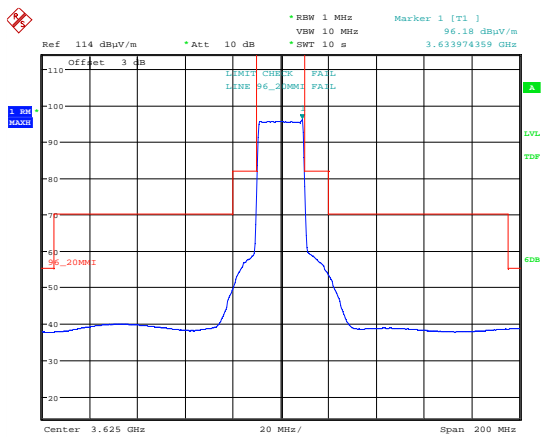
Date: 14.AUG.2018 23:41:00  
**Emission Mask 16 QAM; 3625 MHz; MIMOB Integration Method.**



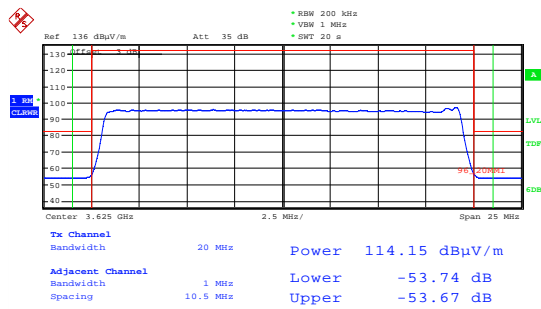
Date: 14.AUG.2018 22:21:10  
**Emission Mask 64 QAM; 3625 MHz; MIMOA.**



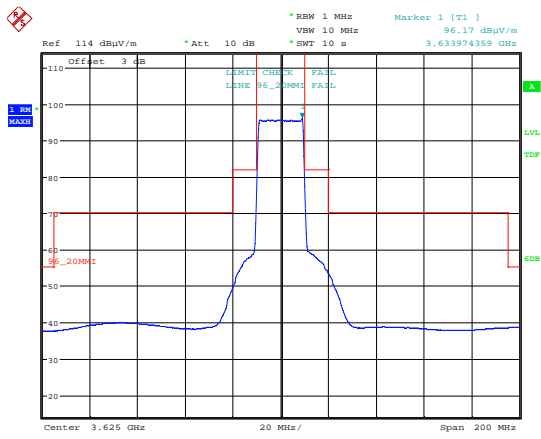
Date: 14.AUG.2018 23:38:05  
**Emission Mask 64 QAM; 3625 MHz; MIMOA Integration Method.**



Date: 14.AUG.2018 22:30:42  
**Emission Mask 64 QAM; 3625 MHz; MIMOB.**

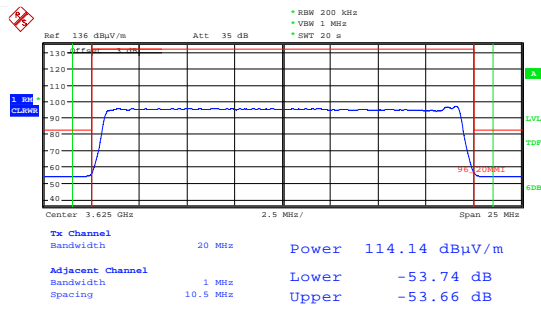


Date: 14.AUG.2018 23:41:50  
**Emission Mask 64 QAM; 3625 MHz; MIMOB Integration Method.**



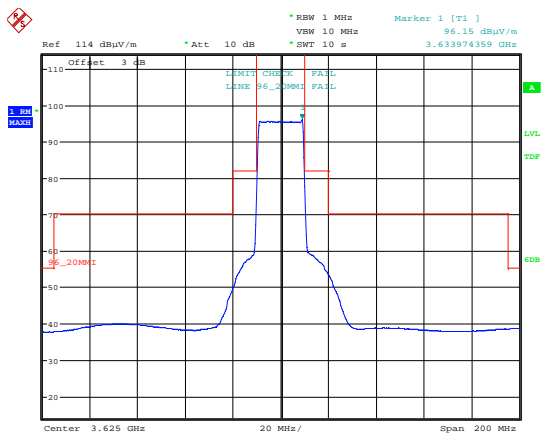
Date: 14.AUG.2018 22:24:17

Emission Mask 256 QAM; 3625 MHz; MIMO A.



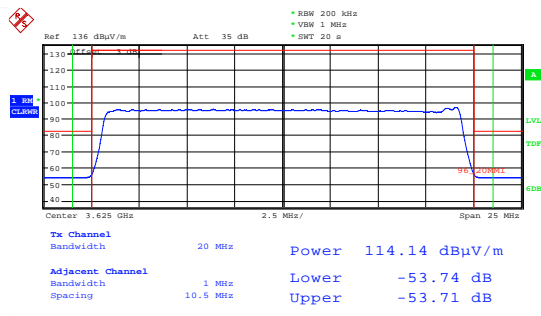
Date: 14.AUG.2018 23:39:00

Emission Mask 256 QAM; 3625 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 22:33:40

Emission Mask 256 QAM; 3625 MHz; MIMO B.

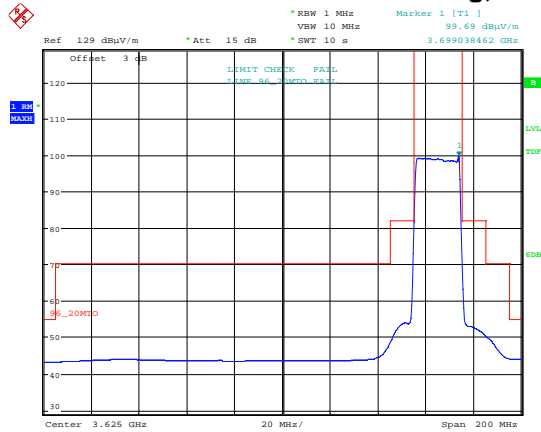


Date: 14.AUG.2018 23:42:47

Emission Mask 256 QAM; 3625 MHz; MIMO B Integration Method.

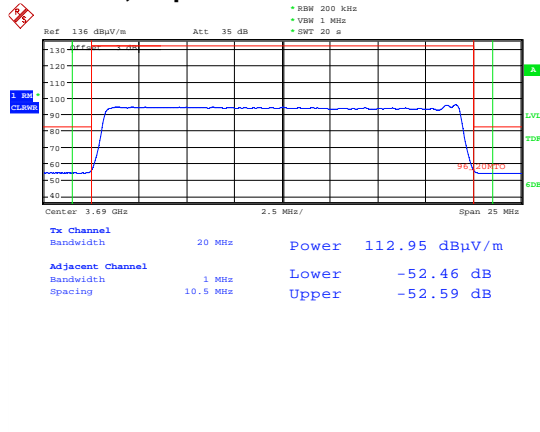
<b>Frequency: 3625 MHz; Beamforming Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	114.14	Lower Channel	-53.75	60.39	82.24	Pass
			Upper Channel	-53.69	60.45		Pass
	16 QAM	114.13	Lower Channel	-53.74	60.39		Pass
			Upper Channel	-53.71	60.42		Pass
	64 QAM	114.15	Lower Channel	-53.76	60.39		Pass
			Upper Channel	-53.7	60.45		Pass
	256 QAM	114.14	Lower Channel	-53.74	60.4		Pass
			Upper Channel	-53.66	60.48		Pass
B	QPSK	114.14	Lower Channel	-53.75	60.39	Pass	
			Upper Channel	-53.71	60.43	Pass	
	16 QAM	114.15	Lower Channel	-53.74	60.41	Pass	
			Upper Channel	-53.67	60.48	Pass	
	64 QAM	114.15	Lower Channel	-53.77	60.38	Pass	
			Upper Channel	-53.71	60.44	Pass	
	256 QAM	114.14	Lower Channel	-53.74	60.4	Pass	
			Upper Channel	-53.71	60.43	Pass	

### Beamforming; 20 MHz Bandwidth; Top Channel



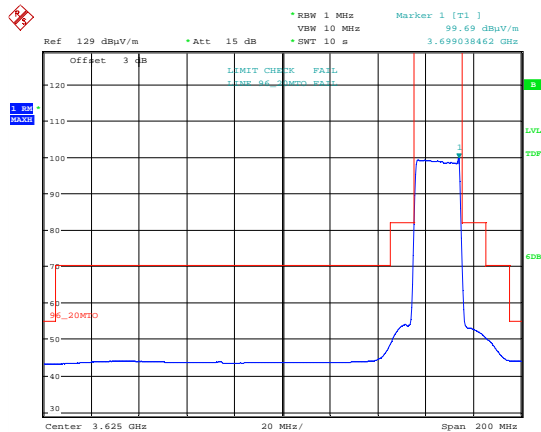
Date: 14.AUG.2018 23:28:33

Emission Mask QPSK; 3690 MHz; MIMO.A.



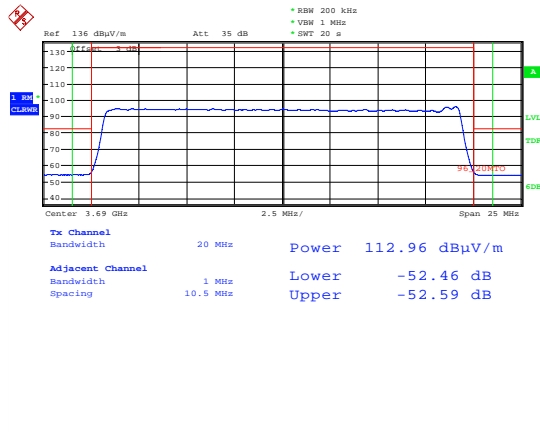
Date: 14.AUG.2018 23:29:16

Emission Mask QPSK; 3690 MHz; MIMO.A  
Integration Method.



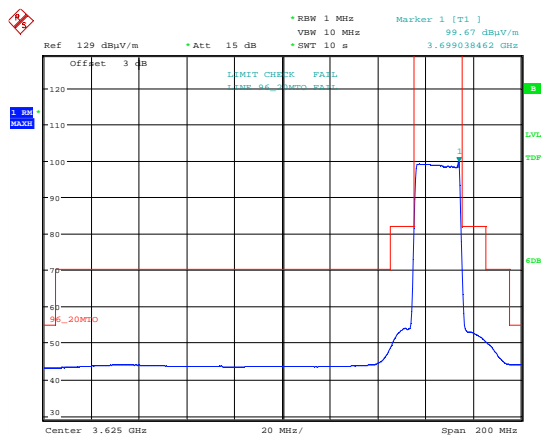
Date: 14.AUG.2018 23:21:35

Emission Mask QPSK; 3690 MHz; MIMO.B.



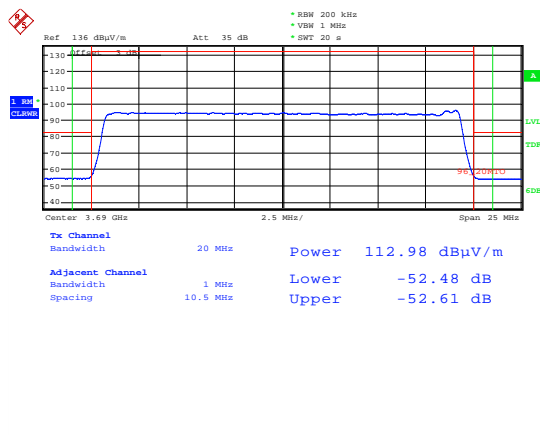
Date: 14.AUG.2018 23:22:17

Emission Mask QPSK; 3690 MHz; MIMO.B  
Integration Method.



Date: 14.AUG.2018 23:27:27

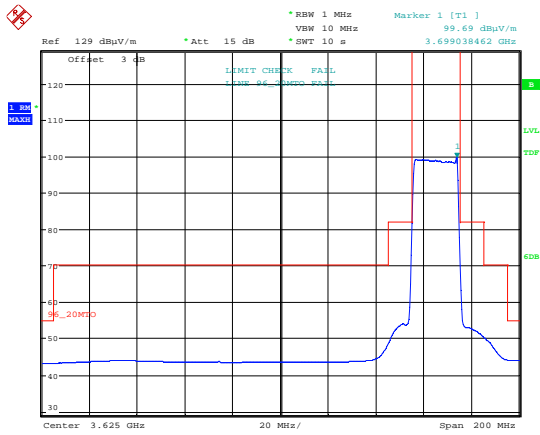
Emission Mask 16 QAM; 3690 MHz; MIMO.A.



Date: 14.AUG.2018 23:26:59

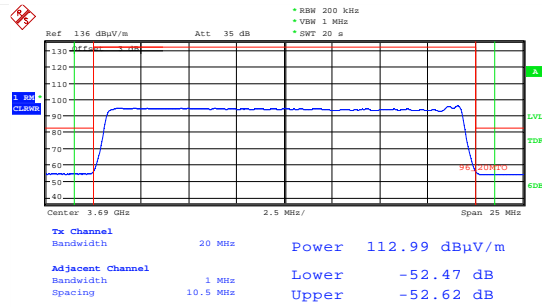
Emission Mask 16 QAM; 3690 MHz; MIMO.A  
Integration Method.





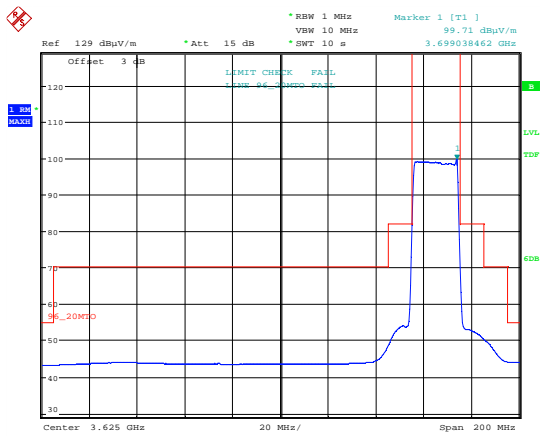
Date: 14.AUG.2018 23:19:39

Emission Mask 16 QAM; 3690 MHz; MIMOB.



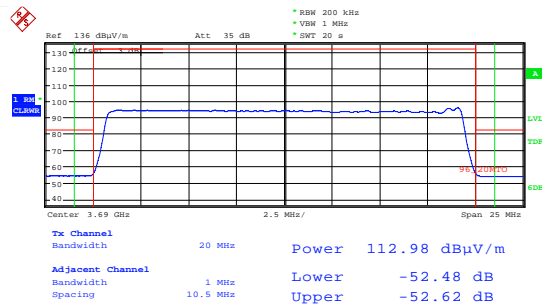
Date: 14.AUG.2018 23:20:26

Emission Mask 16 QAM; 3690 MHz; MIMOB Integration Method.



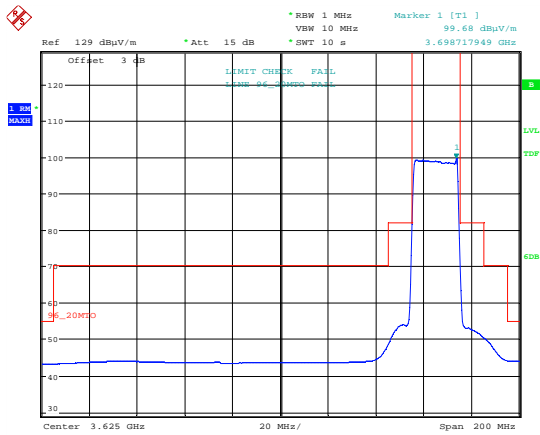
Date: 14.AUG.2018 23:25:18

Emission Mask 64 QAM; 3690 MHz; MIMOA.



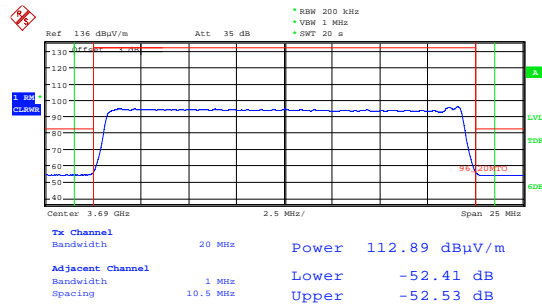
Date: 14.AUG.2018 23:26:03

Emission Mask 64 QAM; 3690 MHz; MIMOA Integration Method.



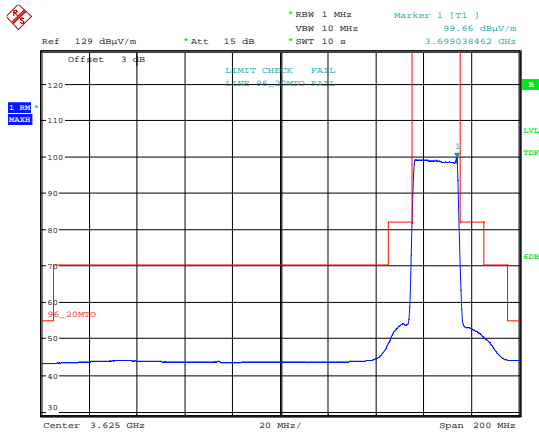
Date: 14.AUG.2018 23:18:03

Emission Mask 64 QAM; 3690 MHz; MIMOB.



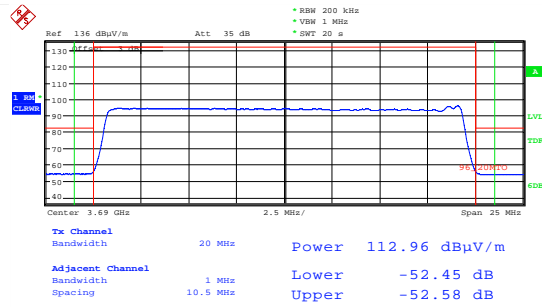
Date: 14.AUG.2018 23:10:07

Emission Mask 64 QAM; 3690 MHz; MIMOB Integration Method.



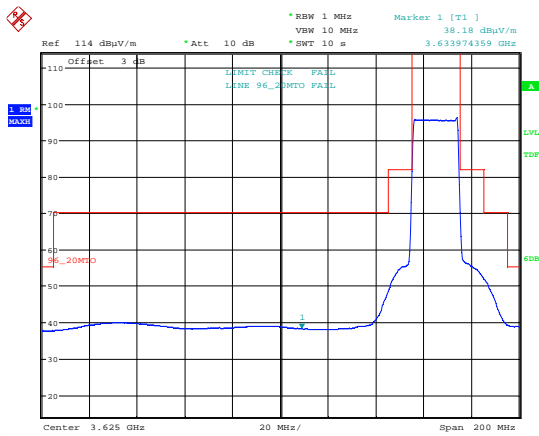
Date: 14.AUG.2018 23:24:07

Emission Mask 256 QAM; 3690 MHz; MIMO A.



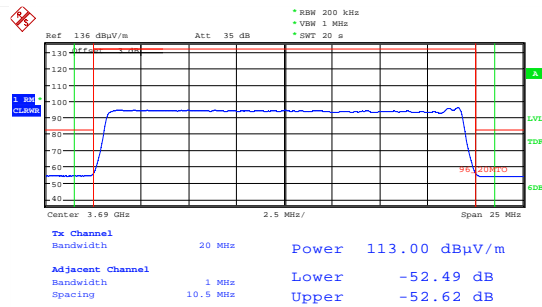
Date: 14.AUG.2018 23:23:29

Emission Mask 256 QAM; 3690 MHz; MIMO A Integration Method.



Date: 14.AUG.2018 22:38:43

Emission Mask 256 QAM; 3690 MHz; MIMO B.

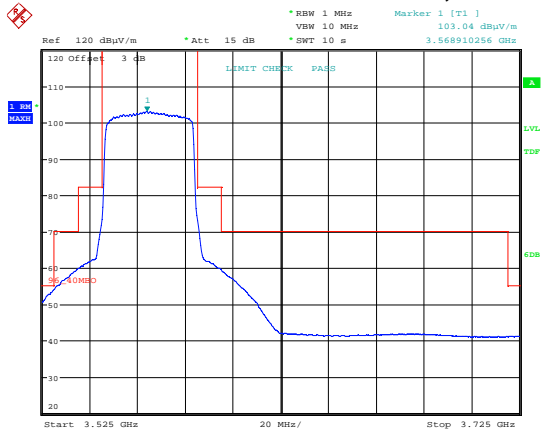


Date: 14.AUG.2018 23:08:35

Emission Mask 256 QAM; 3690 MHz; MIMO B Integration Method.

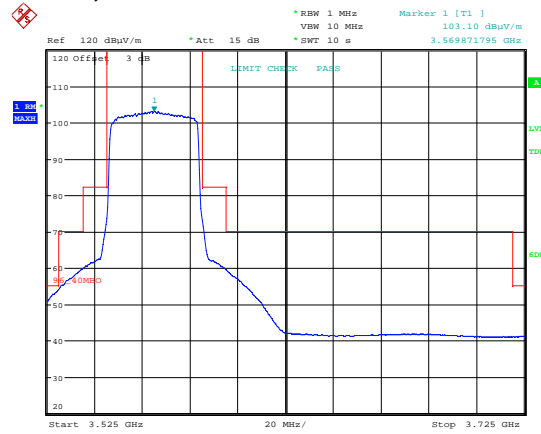
<b>Frequency: 3690 MHz; Beamforming Mode;</b>							
<b>MIMO</b>	<b>Modulation Mode</b>	<b>Channel power (dBuV/m)</b>	<b>Integration channel</b>	<b>Integration channel level (dBc)</b>	<b>Integration channel level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Verdict</b>
A	QPSK	112.95	Lower Channel	-52.46	60.49	82.24	Pass
			Upper Channel	-52.59	60.36		Pass
	16 QAM	112.99	Lower Channel	-52.47	60.52		Pass
			Upper Channel	-52.62	60.37		Pass
	64 QAM	112.89	Lower Channel	-52.41	60.48		Pass
			Upper Channel	-52.53	60.36		Pass
	256 QAM	112.96	Lower Channel	-52.45	60.51		Pass
			Upper Channel	-52.58	60.38		Pass
B	QPSK	112.96	Lower Channel	-52.46	60.5	Pass	
			Upper Channel	-52.59	60.37	Pass	
	16 QAM	112.98	Lower Channel	-52.48	60.5	Pass	
			Upper Channel	-52.61	60.37	Pass	
	64 QAM	112.98	Lower Channel	-52.48	60.5	Pass	
			Upper Channel	-52.62	60.36	Pass	
	256 QAM	113	Lower Channel	-52.49	60.51	Pass	
			Upper Channel	-52.62	60.38	Pass	

### Sector Mode; 40 MHz bandwidth; Bottom channel



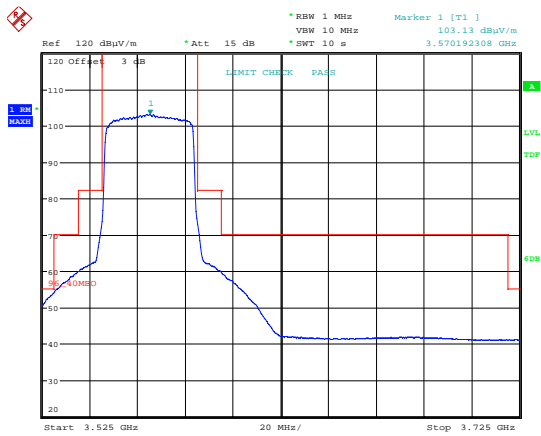
Date: 14.AUG.2018 02:24:07

Emission Mask QPSK; 3570 MHz; MIMO A.



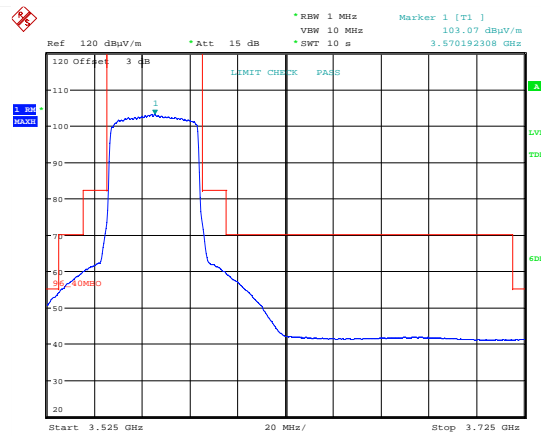
Date: 14.AUG.2018 02:21:21

Emission Mask QPSK; 3570 MHz; MIMO B.



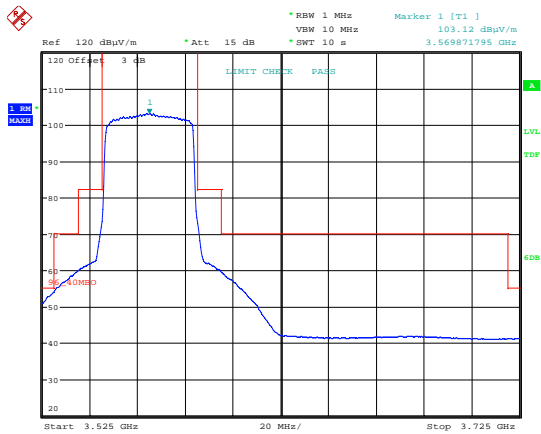
Date: 14.AUG.2018 02:23:24

Emission Mask 16 QAM; 3570 MHz; MIMO A.



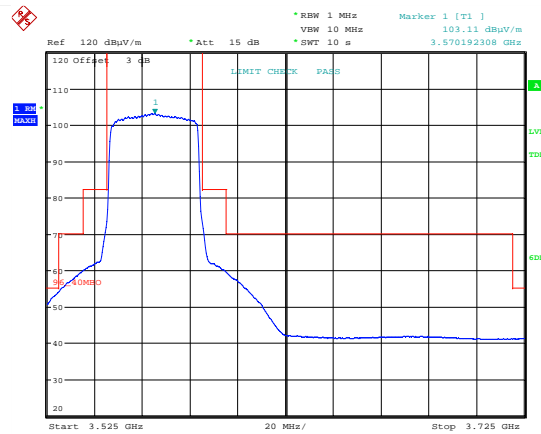
Date: 14.AUG.2018 02:20:38

Emission Mask 16 QAM; 3570 MHz; MIMO B.



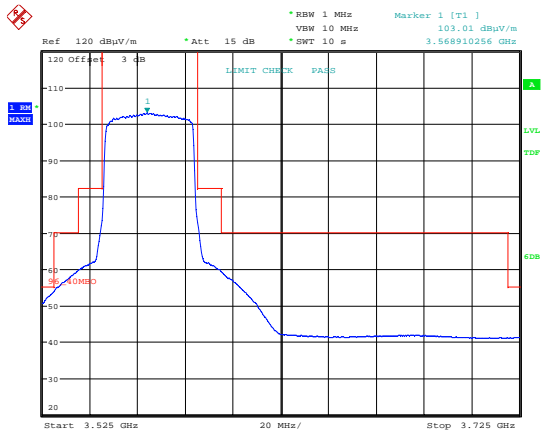
Date: 14.AUG.2018 02:22:48

Emission Mask 64 QAM; 3570 MHz; MIMO A.



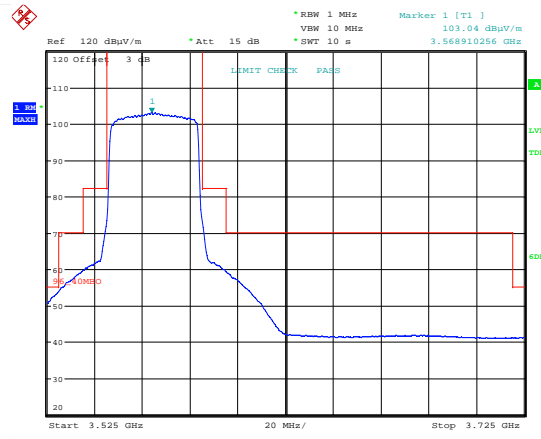
Date: 14.AUG.2018 02:19:12

Emission Mask 64 QAM; 3570 MHz; MIMO B.



Date: 14.AUG.2018 02:22:05

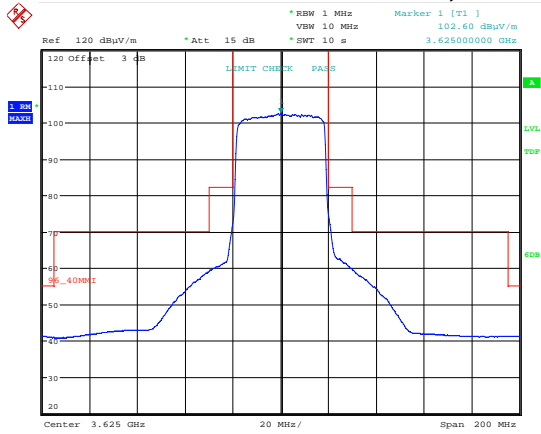
Emission Mask 256 QAM; 3570 MHz; MIMO A.



Date: 14.AUG.2018 02:19:54

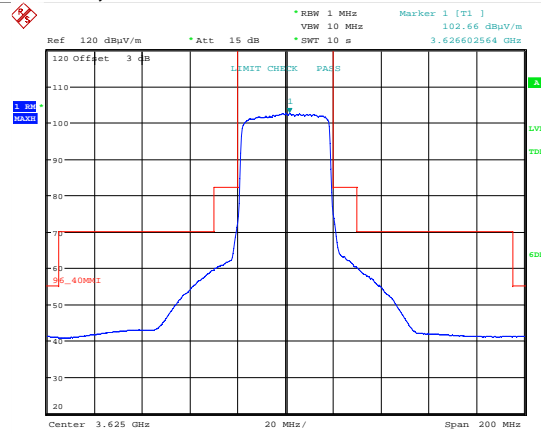
Emission Mask 256 QAM; 3570 MHz; MIMO B.

### Sector Mode; 40 MHz bandwidth; Middle channel



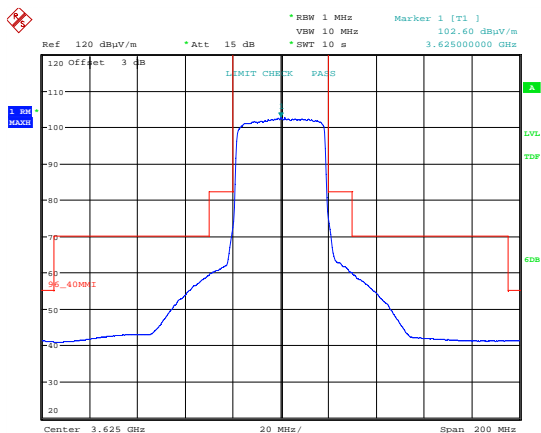
Date: 14.AUG.2018 02:25:58

Emission Mask QPSK; 3625 MHz; MIMO A.



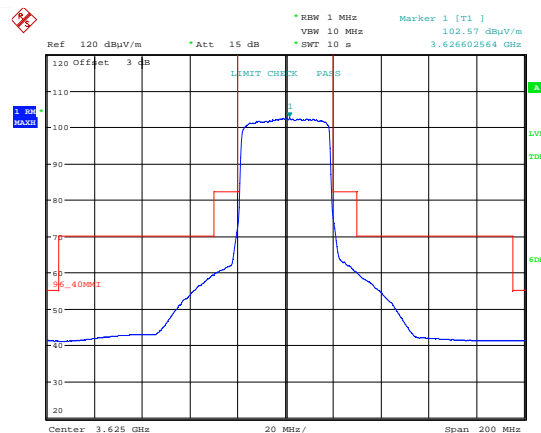
Date: 14.AUG.2018 02:28:20

Emission Mask QPSK; 3625 MHz; MIMO B.



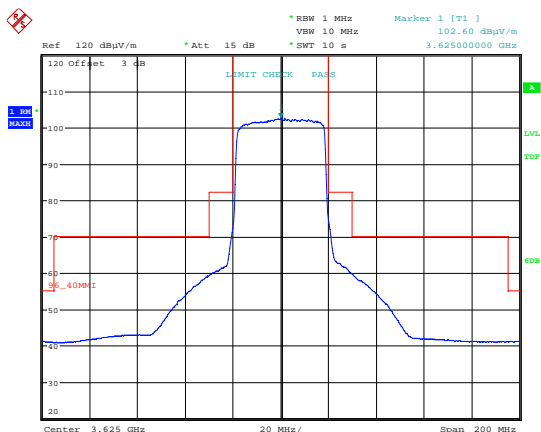
Date: 14.AUG.2018 02:26:39

Emission Mask 16 QAM; 3625 MHz; MIMO A.



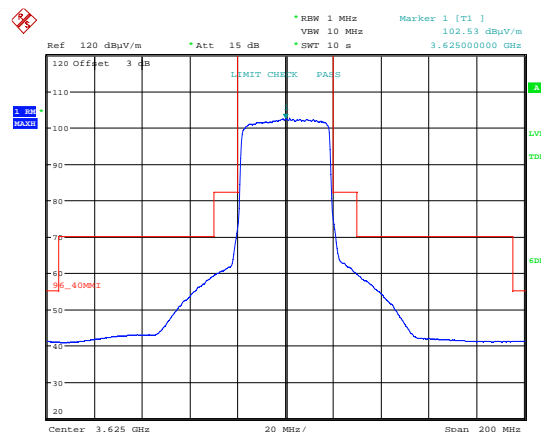
Date: 14.AUG.2018 02:32:04

Emission Mask 16 QAM; 3625 MHz; MIMO B.



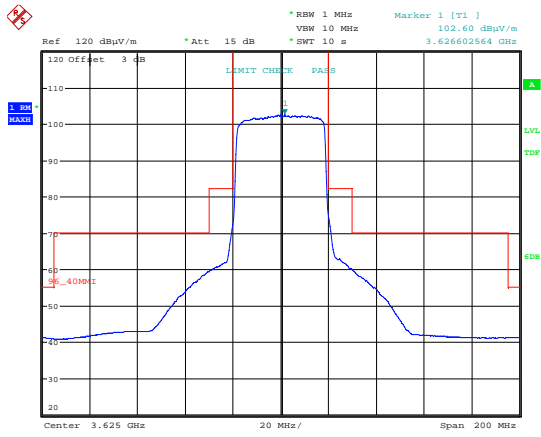
Date: 14.AUG.2018 02:27:09

Emission Mask 64 QAM; 3625 MHz; MIMO A.



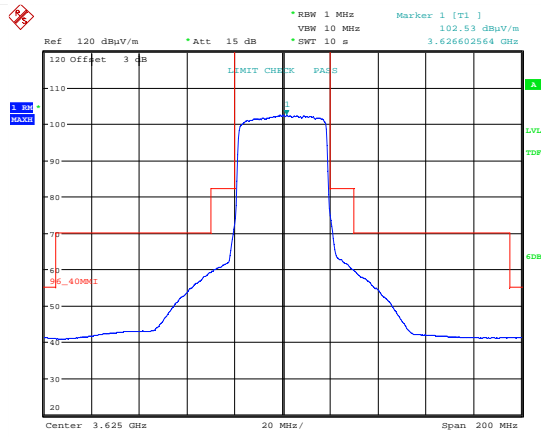
Date: 14.AUG.2018 02:32:59

Emission Mask 64 QAM; 3625 MHz; MIMO B.



Date: 14.AUG.2018 02:27:48

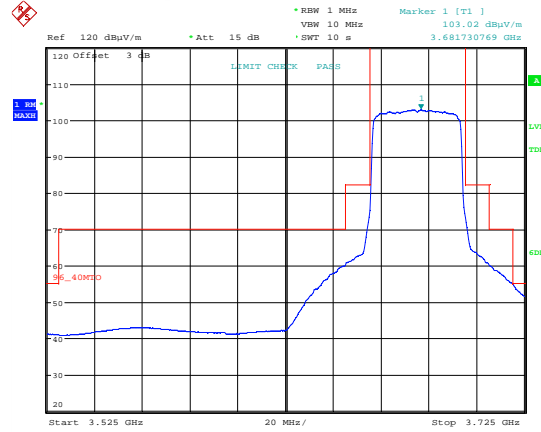
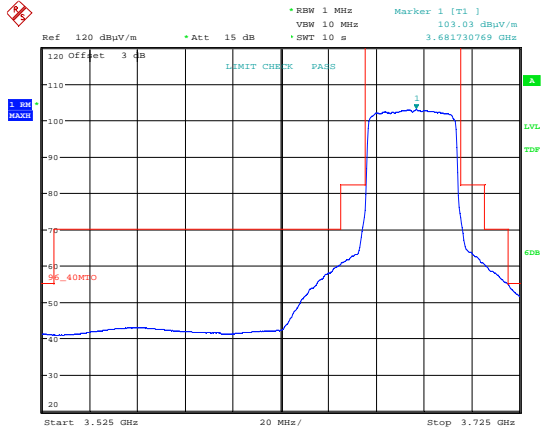
Emission Mask 256 QAM; 3625 MHz; MIMO A.



Date: 14.AUG.2018 02:33:47

Emission Mask 256 QAM; 3625 MHz; MIMO B.

### Sector Mode; 40 MHz bandwidth; Top channel

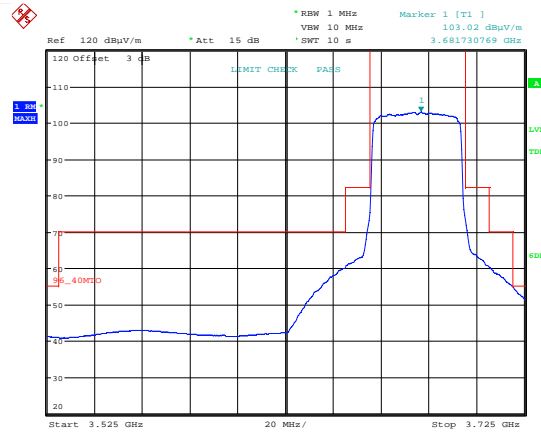
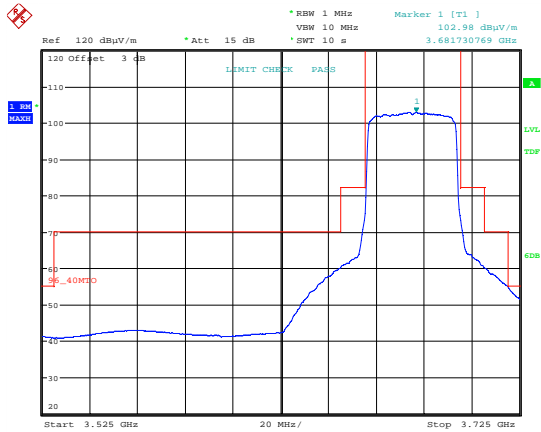


Date: 14.AUG.2018 02:44:35

Date: 14.AUG.2018 02:40:54

Emission Mask QPSK; 3680 MHz; MIMO A.

Emission Mask QPSK; 3680 MHz; MIMO B.

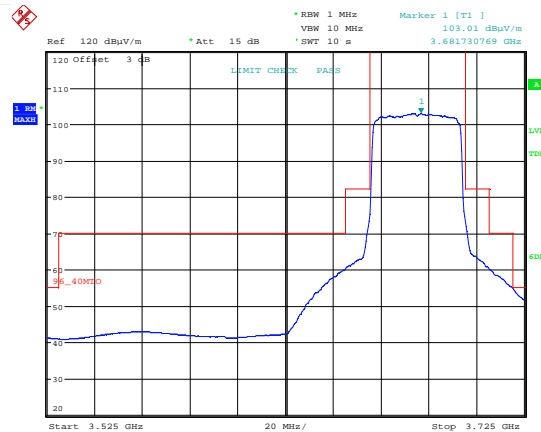
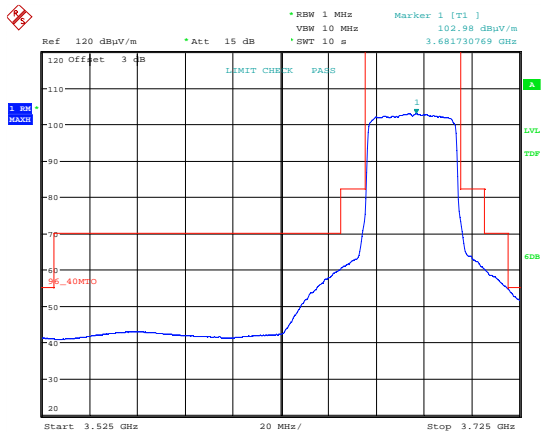


Date: 14.AUG.2018 02:43:00

Date: 14.AUG.2018 02:40:12

Emission Mask 16 QAM; 3680 MHz; MIMO A.

Emission Mask 16 QAM; 3680 MHz; MIMO B.



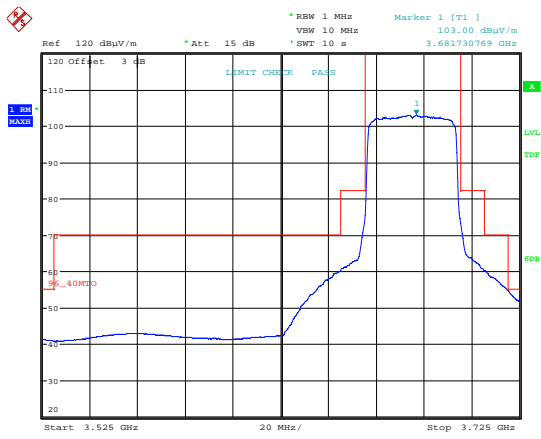
Date: 14.AUG.2018 02:42:15

Date: 14.AUG.2018 02:38:47

Emission Mask 64 QAM; 3680 MHz; MIMO A.

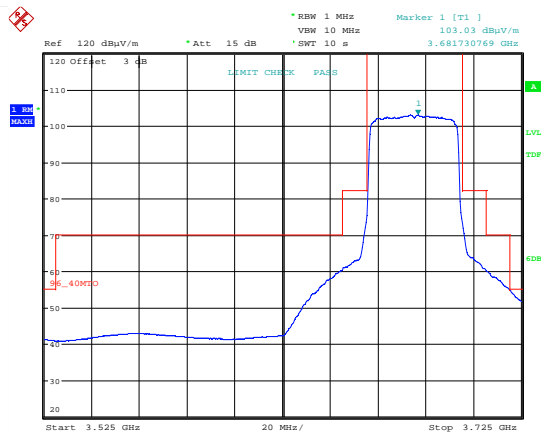
Emission Mask 64 QAM; 3680 MHz; MIMO B.





Date: 14.AUG.2018 02:41:31

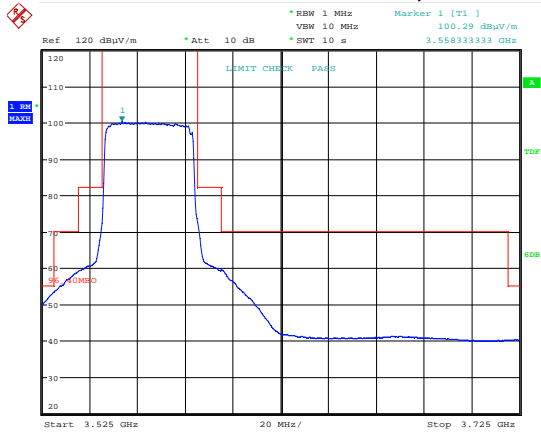
Emission Mask 256 QAM; 3680 MHz; MIMO A.



Date: 14.AUG.2018 02:36:43

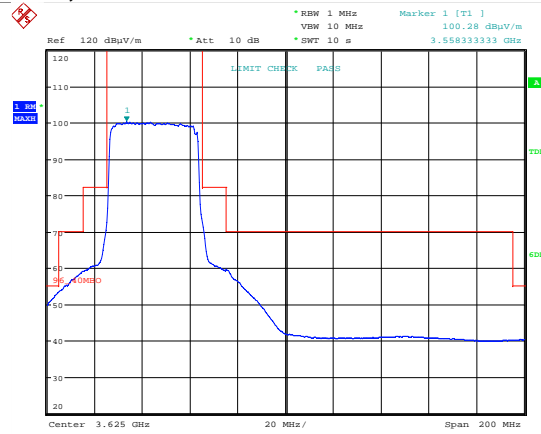
Emission Mask 256 QAM; 3680 MHz; MIMO B.

### MuMIMO; 40 MHz Bandwidth; Bottom Channel



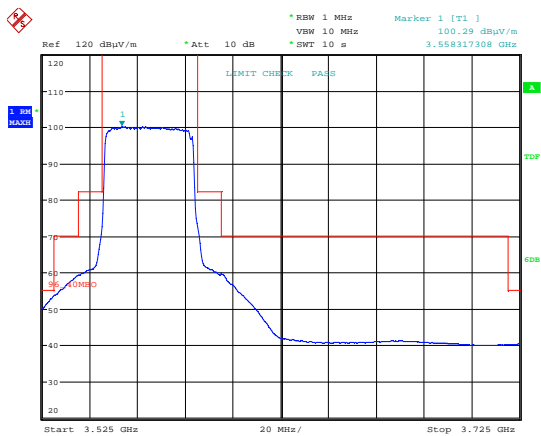
Date: 14.AUG.2018 00:25:10

Emission Mask QPSK; 3570 MHz; MIMO.A.



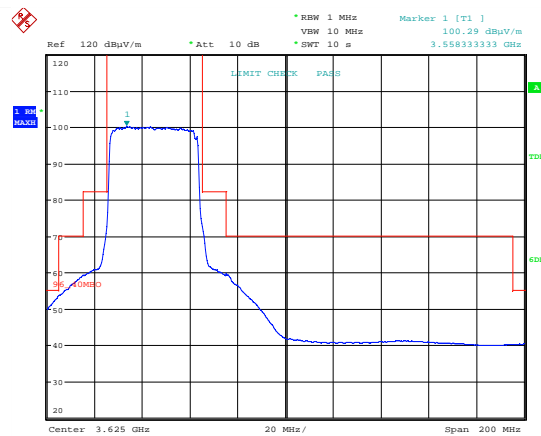
Date: 14.AUG.2018 00:54:43

Emission Mask QPSK; 3570 MHz; MIMOB.



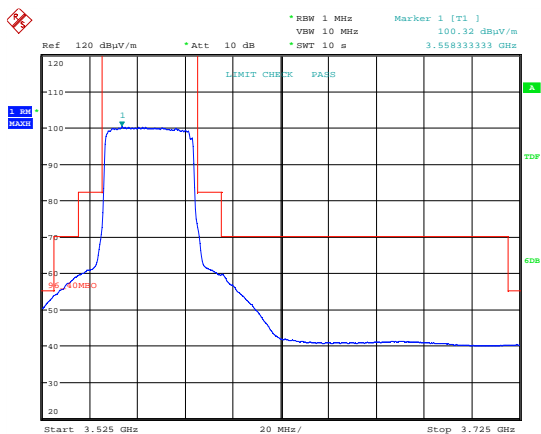
Date: 14.AUG.2018 00:21:54

Emission Mask 16 QAM; 3570 MHz; MIMO.A.



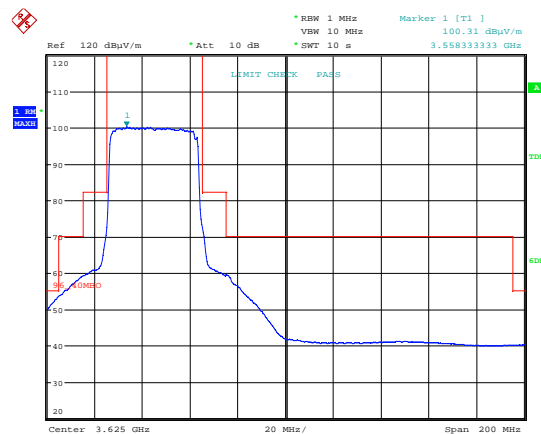
Date: 14.AUG.2018 00:55:29

Emission Mask 16 QAM; 3570 MHz; MIMOB.



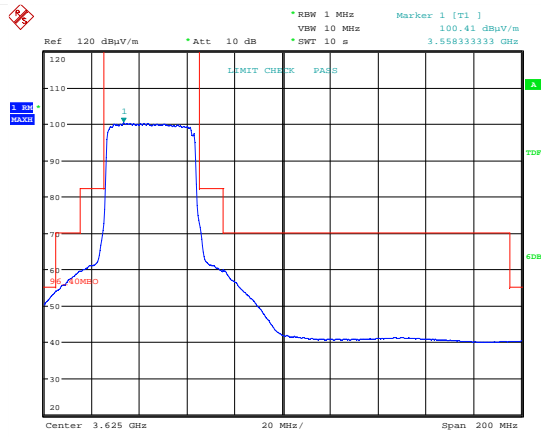
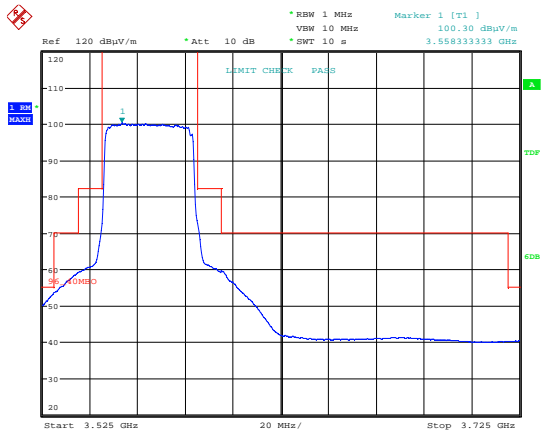
Date: 14.AUG.2018 00:22:35

Emission Mask 64 QAM; 3570 MHz; MIMO.A.



Date: 14.AUG.2018 00:56:22

Emission Mask 64 QAM; 3570 MHz; MIMOB.



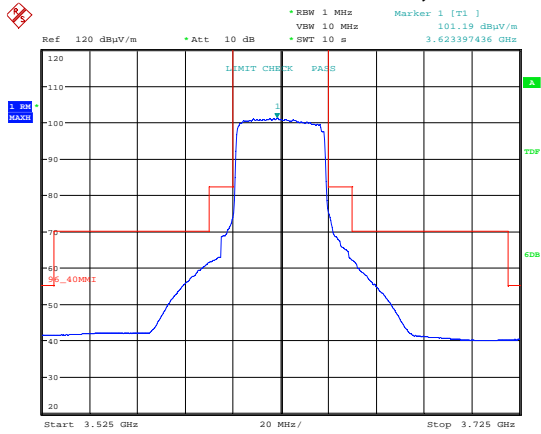
Date: 14.AUG.2018 00:27:18

Date: 14.AUG.2018 00:57:04

Emission Mask 256 QAM; 3570 MHz; MIMO A.

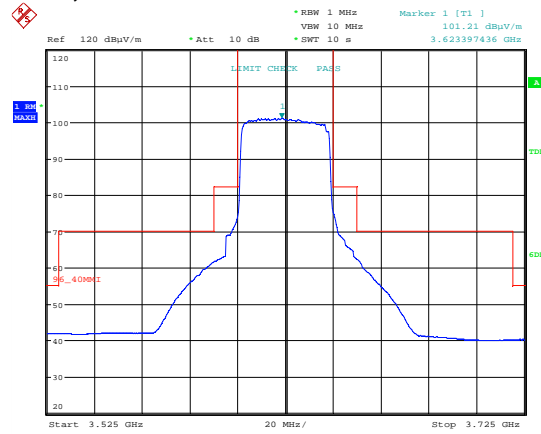
Emission Mask 256 QAM; 3570 MHz; MIMO B.

### MuMIMO; 40 MHz Bandwidth; Middle Channel



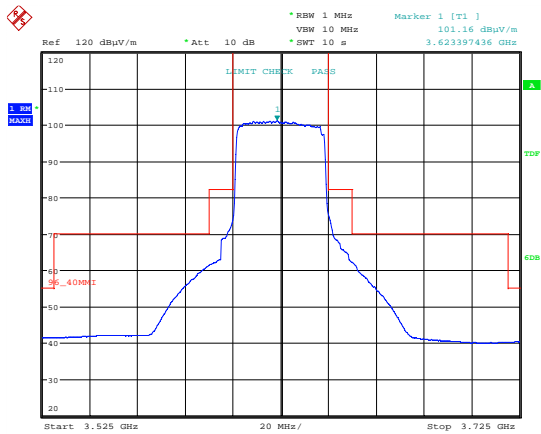
Date: 14.AUG.2018 00:53:14

Emission Mask QPSK; 3625 MHz; MIMO A.



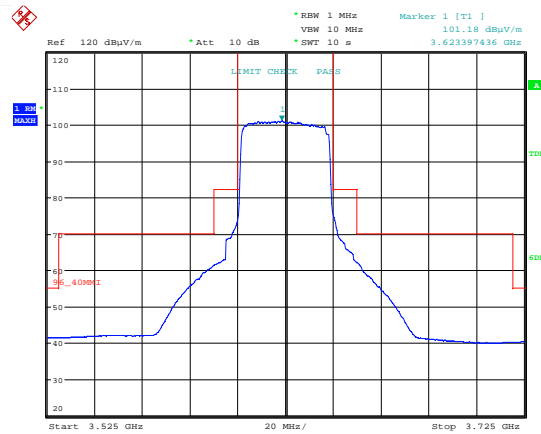
Date: 14.AUG.2018 00:46:34

Emission Mask QPSK; 3625 MHz; MIMO B.



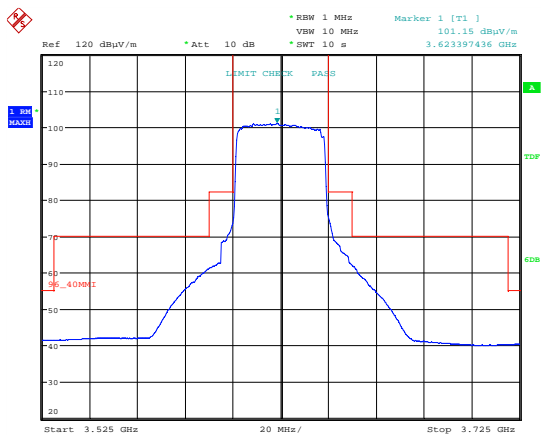
Date: 14.AUG.2018 00:52:37

Emission Mask 16 QAM; 3625 MHz; MIMO A.



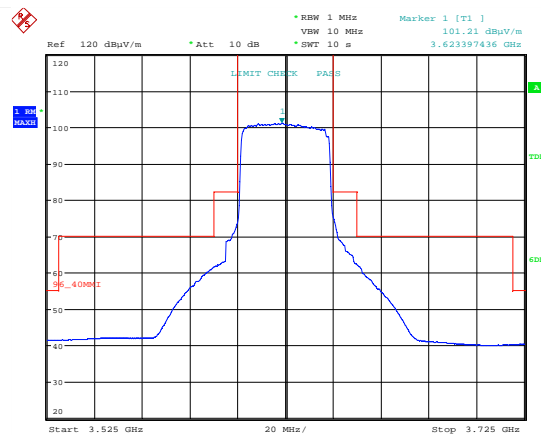
Date: 14.AUG.2018 00:45:42

Emission Mask 16 QAM; 3625 MHz; MIMO B.



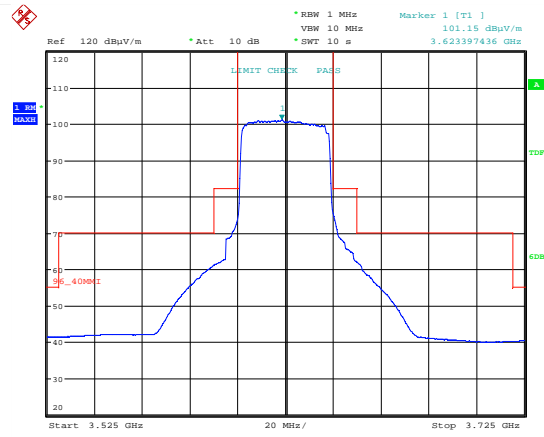
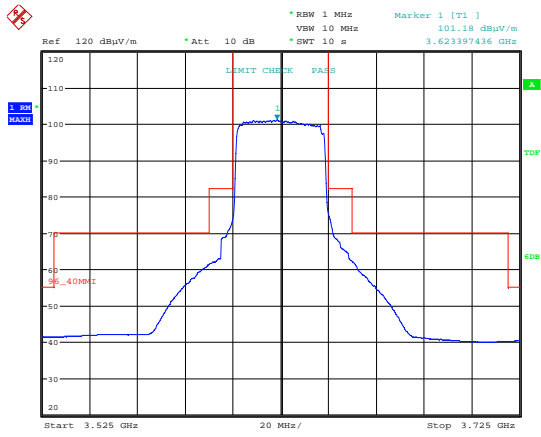
Date: 14.AUG.2018 00:51:39

Emission Mask 64 QAM; 3625 MHz; MIMO A.



Date: 14.AUG.2018 00:44:42

Emission Mask 64 QAM; 3625 MHz; MIMO B.



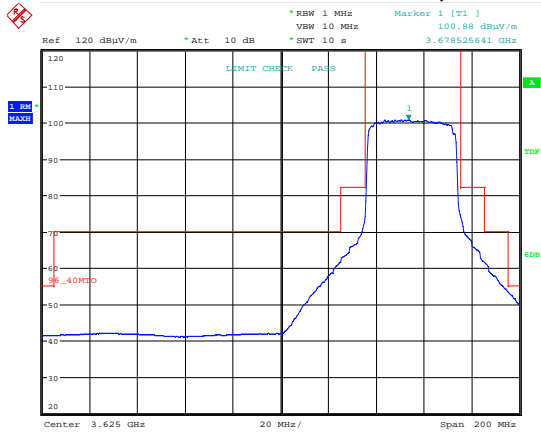
Date: 14.AUG.2018 00:47:40

Date: 14.AUG.2018 00:43:55

Emission Mask 256 QAM; 3625 MHz; MIMO A.

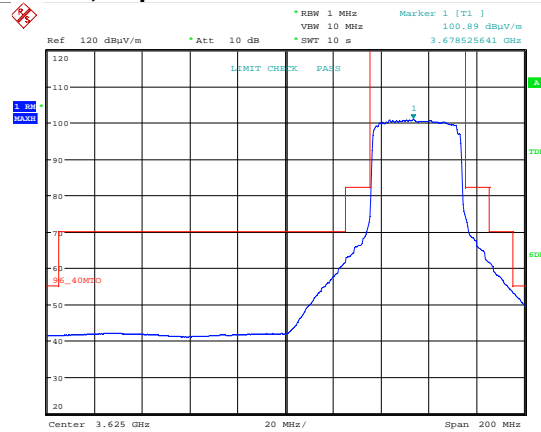
Emission Mask 256 QAM; 3625 MHz; MIMO B.

### MuMIMO; 40 MHz Bandwidth; Top Channel



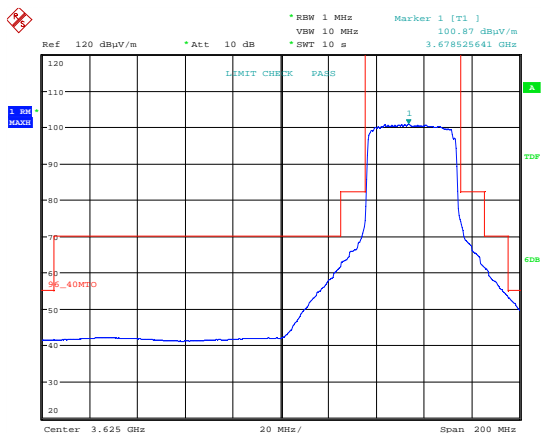
Date: 14.AUG.2018 01:06:33

Emission Mask QPSK; 3680 MHz; MIMO.A.



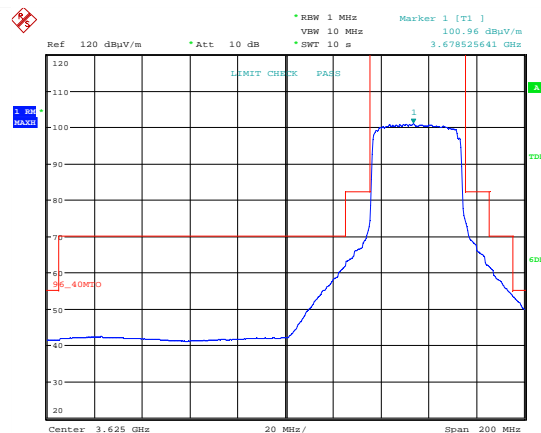
Date: 14.AUG.2018 01:02:55

Emission Mask QPSK; 3680 MHz; MIMOB.



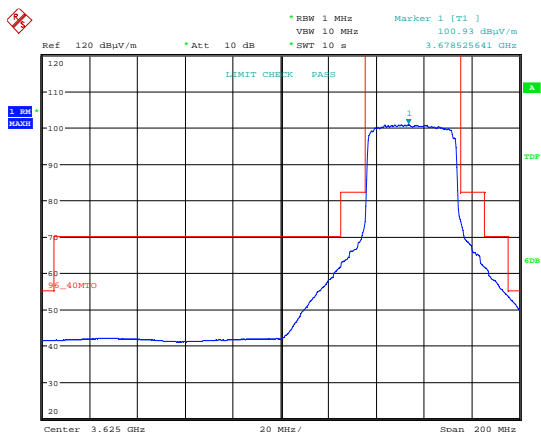
Date: 14.AUG.2018 01:05:37

Emission Mask 16 QAM; 3680 MHz; MIMO.A.



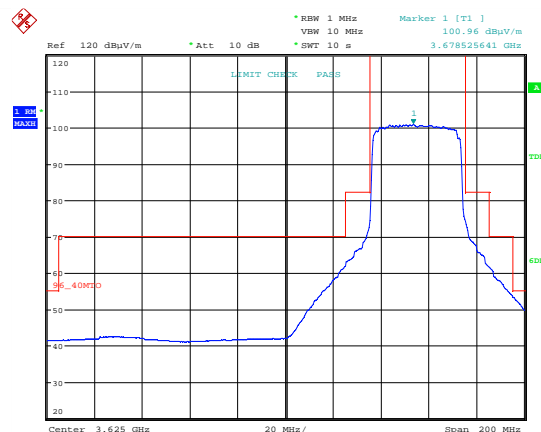
Date: 14.AUG.2018 01:00:23

Emission Mask 16 QAM; 3680 MHz; MIMOB.



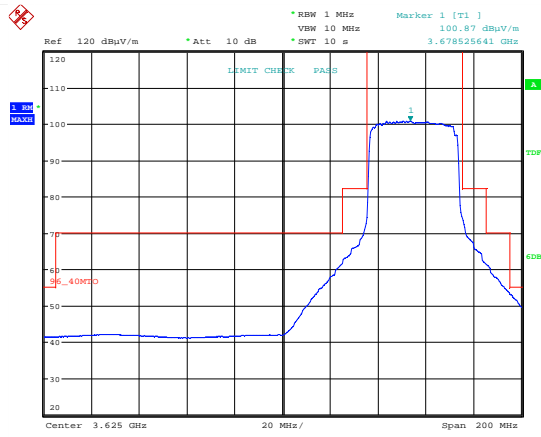
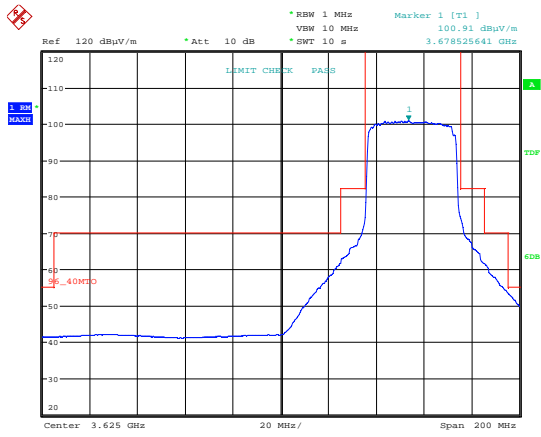
Date: 14.AUG.2018 01:03:31

Emission Mask 64 QAM; 3680 MHz; MIMO.A.



Date: 14.AUG.2018 00:59:38

Emission Mask 64 QAM; 3680 MHz; MIMOB.



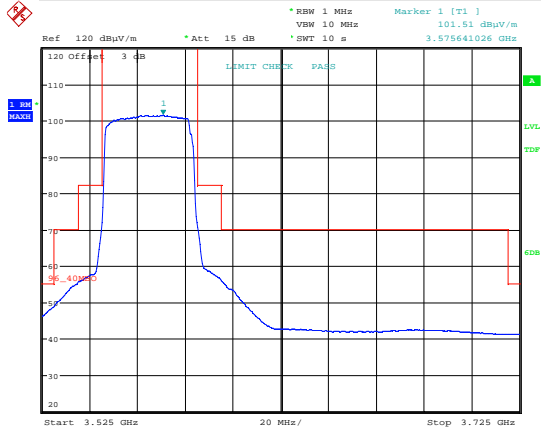
Date: 14.AUG.2018 01:01:37

Date: 14.AUG.2018 00:59:04

Emission Mask 256 QAM; 3680 MHz; MIMO A.

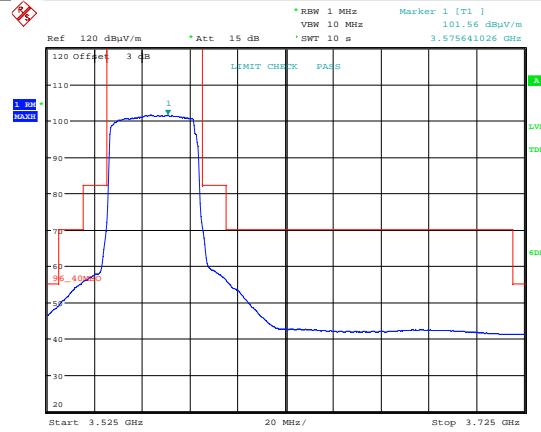
Emission Mask 256 QAM; 3680 MHz; MIMO B.

### Beamforming; 40 MHz Bandwidth; Bottom Channel



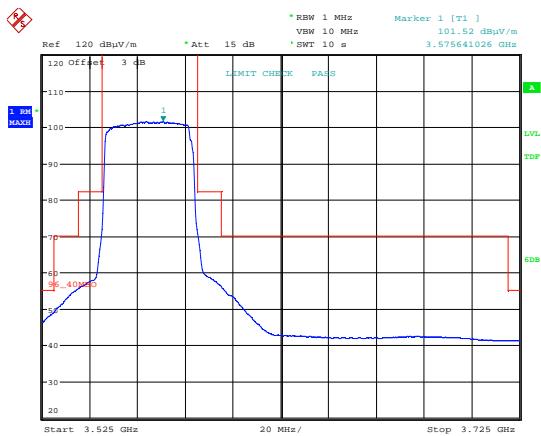
Date: 14.AUG.2018 02:02:20

Emission Mask QPSK; 3570 MHz; MIMO A.



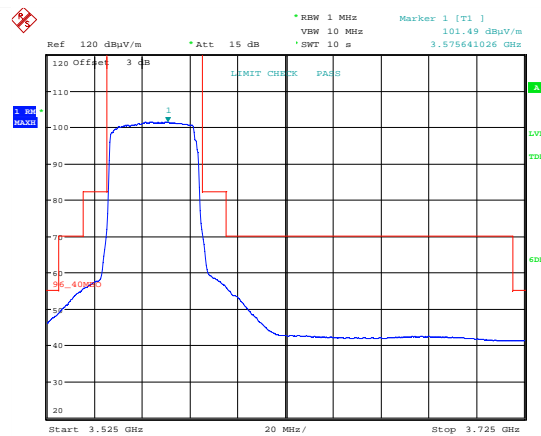
Date: 14.AUG.2018 02:06:00

Emission Mask QPSK; 3570 MHz; MIMO B.



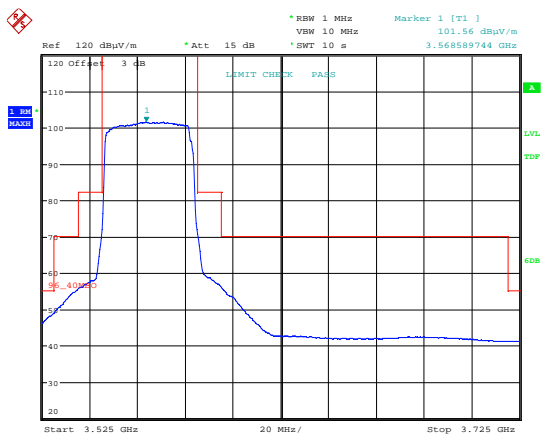
Date: 14.AUG.2018 02:03:21

Emission Mask 16 QAM; 3570 MHz; MIMO A.



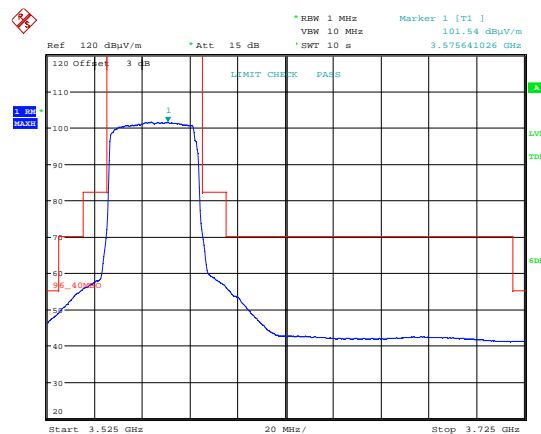
Date: 14.AUG.2018 02:07:02

Emission Mask 16 QAM; 3570 MHz; MIMO B.



Date: 14.AUG.2018 02:03:58

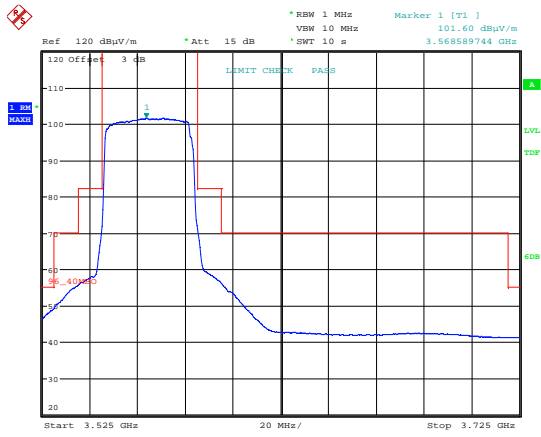
Emission Mask 64 QAM; 3570 MHz; MIMO A.



Date: 14.AUG.2018 02:07:40

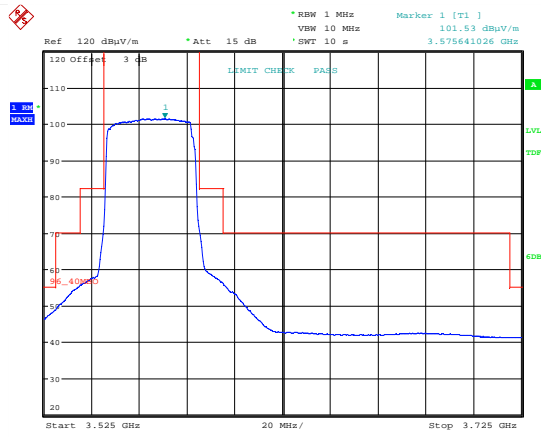
Emission Mask 64 QAM; 3570 MHz; MIMO B.





Date: 14.AUG.2018 02:04:33

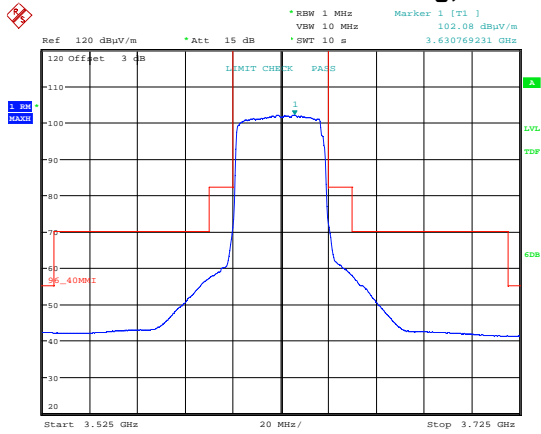
Emission Mask 256 QAM; 3570 MHz; MIMO A.



Date: 14.AUG.2018 02:08:22

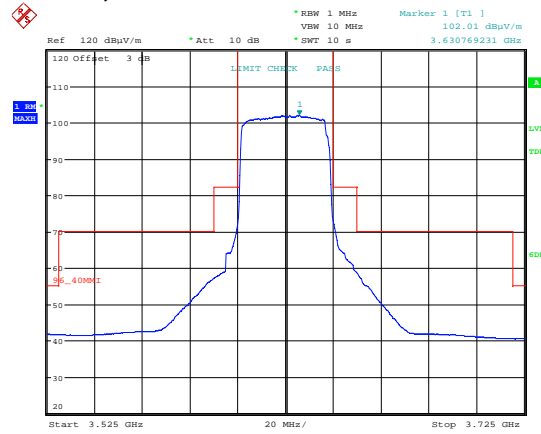
Emission Mask 256 QAM; 3570 MHz; MIMO B.

### Beamforming; 40 MHz Bandwidth; Middle Channel



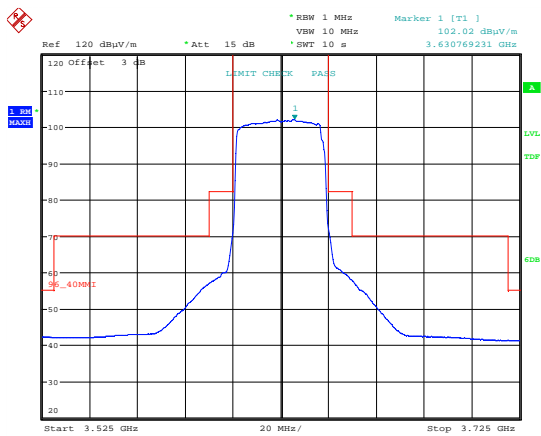
Date: 14.AUG.2018 02:00:54

Emission Mask QPSK; 3625 MHz; MIMO A.



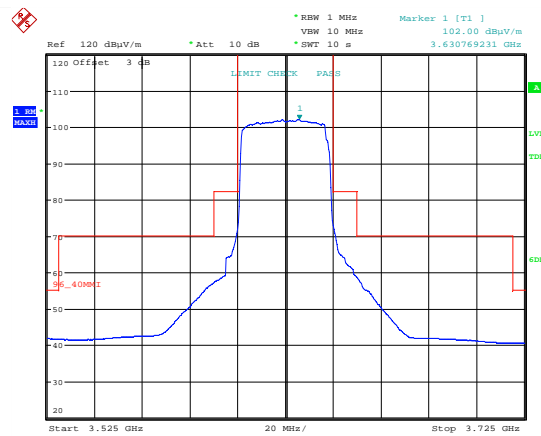
Date: 14.AUG.2018 01:56:52

Emission Mask QPSK; 3625 MHz; MIMO B.



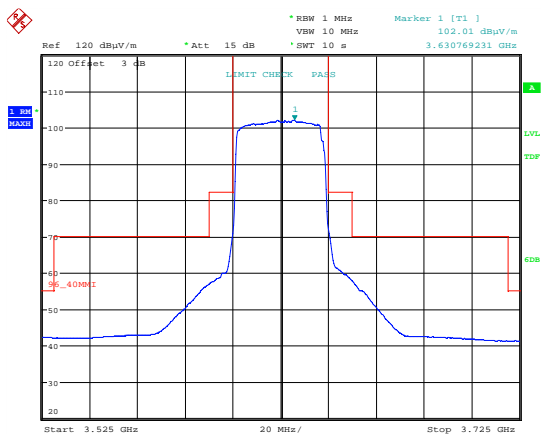
Date: 14.AUG.2018 02:00:02

Emission Mask 16 QAM; 3625 MHz; MIMO A.



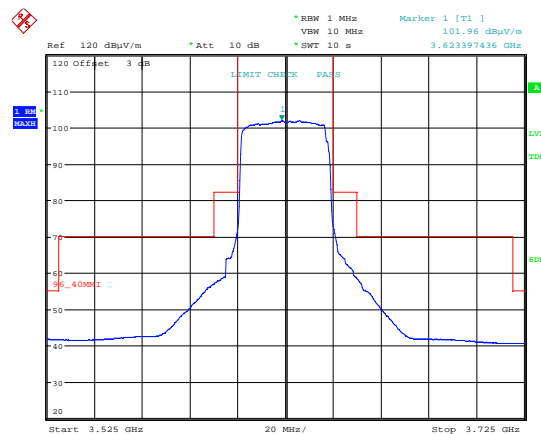
Date: 14.AUG.2018 01:56:15

Emission Mask 16 QAM; 3625 MHz; MIMO B.



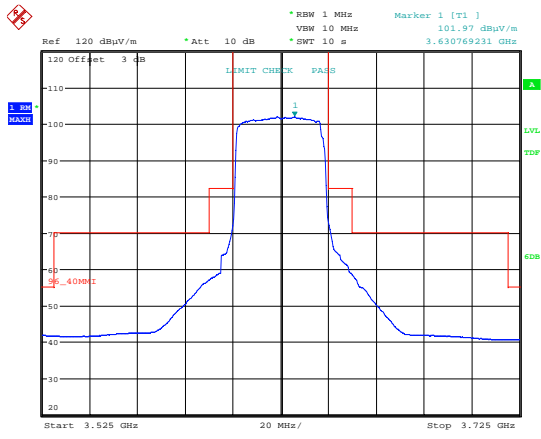
Date: 14.AUG.2018 01:59:14

Emission Mask 64 QAM; 3625 MHz; MIMO A.



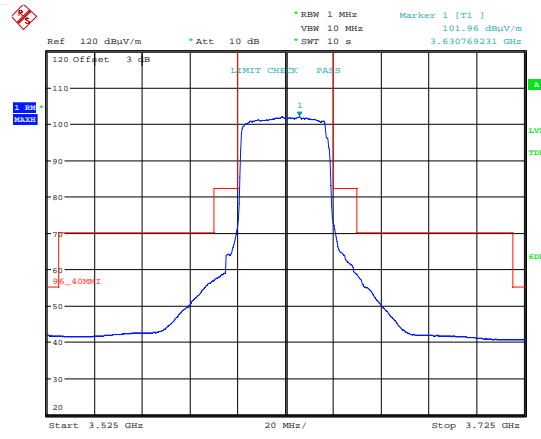
Date: 14.AUG.2018 01:55:08

Emission Mask 64 QAM; 3625 MHz; MIMO B.



Date: 14.AUG.2018 01:57:46

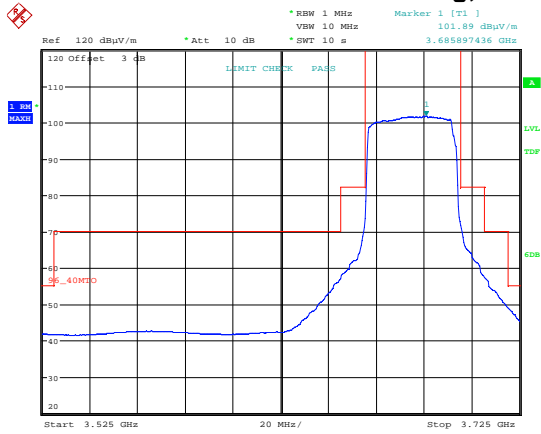
Emission Mask 256 QAM; 3625 MHz; MIMO A.



Date: 14.AUG.2018 01:54:21

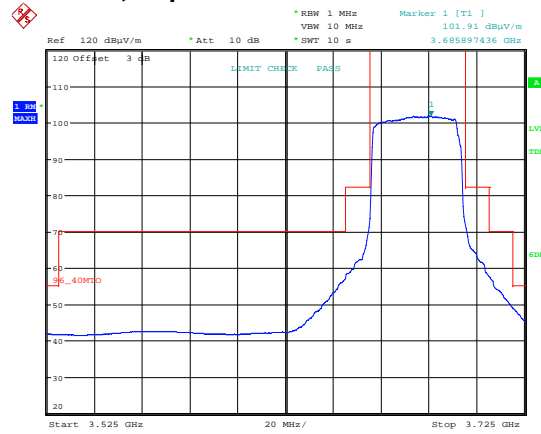
Emission Mask 256 QAM; 3625 MHz; MIMO B.

### Beamforming; 40 MHz Bandwidth; Top Channel



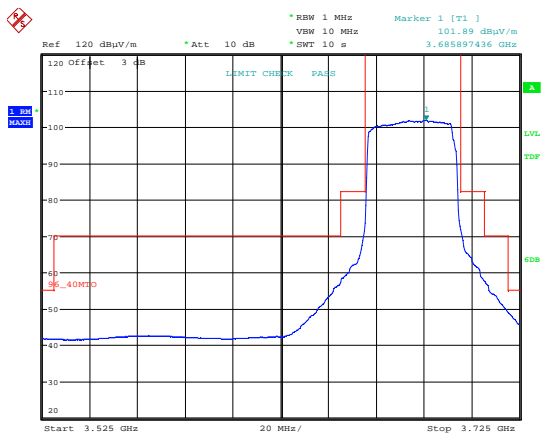
Date: 14.AUG.2018 01:44:47

Emission Mask QPSK; 3680 MHz; MIMO A.



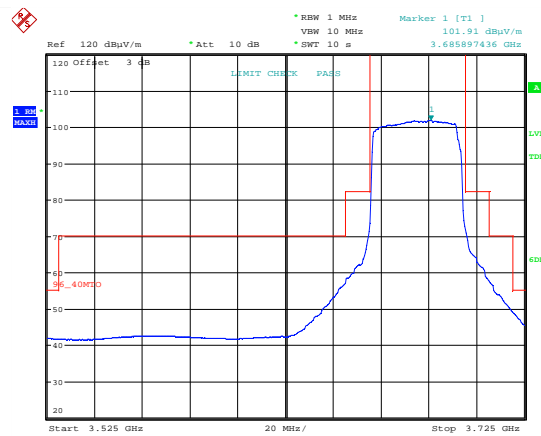
Date: 14.AUG.2018 01:48:26

Emission Mask QPSK; 3680 MHz; MIMO B.



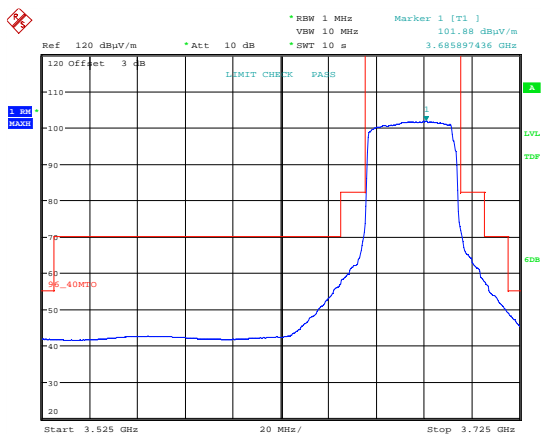
Date: 14.AUG.2018 01:45:33

Emission Mask 16 QAM; 3680 MHz; MIMO A.



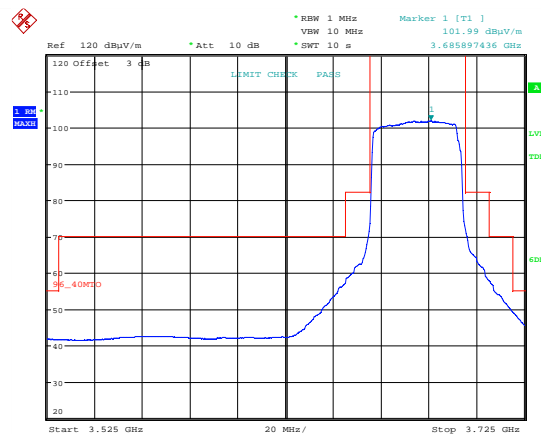
Date: 14.AUG.2018 01:49:14

Emission Mask 16 QAM; 3680 MHz; MIMO B.



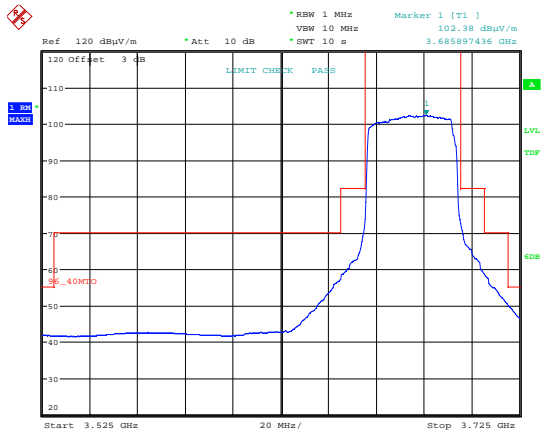
Date: 14.AUG.2018 01:46:30

Emission Mask 64 QAM; 3680 MHz; MIMO A.



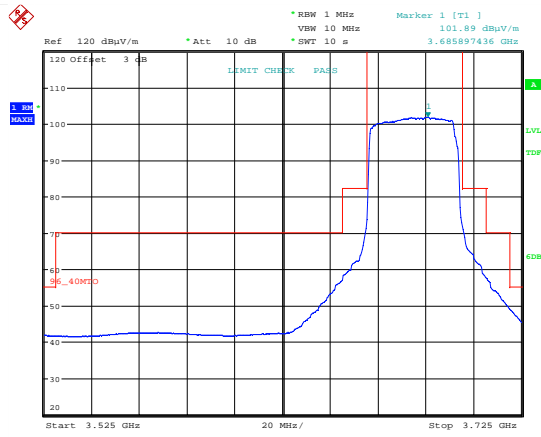
Date: 14.AUG.2018 01:49:43

Emission Mask 64 QAM; 3680 MHz; MIMO B.



Date: 14.AUG.2018 01:47:40

Emission Mask 256 QAM; 3680 MHz; MIMO A.



Date: 14.AUG.2018 01:51:31

Emission Mask 256 QAM; 3680 MHz; MIMO B.

### 13 Peak-to-average power ratio (PAPR)

#### 13.1 Definition

Peak to average power ratio is define as the difference between peak power (or Peak PSD) and the average power (or Average PSD).

#### 13.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	Radio Chamber
Test Standard and Clause:	96.41 (g)
Channels / Frequencies Measured:	Low/ Middle / Top
Resolution Bandwidth: ( Requirement 1 % of the Occupied Channel Bandwidth):	1 MHz
Modulation:	QPSK, 16 QAM, 64 QAM and 256 QAM
Deviations From Standard:	None
Temperature Extreme Environment Test Range:	N/A
Voltage Extreme Environment Test Range:	N/A

#### Environmental Conditions (Normal Environment)

Temperature: 24 °C	Standard Requirement: +20 °C
Humidity: 60 %RH	20 % RH to 75 % RH (as declared)

#### 13.3 Test Limit

The peak-to-average power ratio (PAPR) of any CBSD transmitter output power must not exceed 13 dB.

#### 13.4 Test Method

The following formula was use:

$$PAPR (dB) = P_{PK} (dBm \text{ or } dBW) - P_{Avg} (dBm \text{ or } dBW)$$

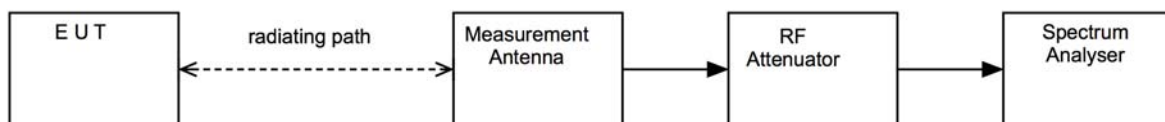
Where:

**PAPR** peak-to-average power ratio, in dB

**P<sub>PK</sub>** measured peak power or peak PSD level, in dBm or dBW

**P<sub>Avg</sub>** measured average power or average PSD level, in dBm or dBW

#### Figure v Test Setup



#### 13.5 Test Equipment

Equipment Type	Manufacturer	Equipment Description	Element No	Due For Calibration
3115	EMCO	1-18GHz Horn	L139	2019-09-25
N1911A	Agilent	Power Meter	REF836	2019-08-28

## 13.6 Test Results

## 5 MHz Bandwidth

## Bottom Channel

<i>Frequency 3552.5 MHz; Sector Mode</i>					
<i>MIMO</i>	<i>Mod Mode</i>	<i>Peak to average Ratio (dB)</i>	<i>Limit (dB)</i>	<i>Probability (%)</i>	<i>Verdict</i>
A	QPSK	8.8	13	0	PASS
	16 QAM	8.8	13	0	PASS
	64 QAM	8.8	13	0	PASS
	256 QAM	8.8	13	0	PASS

<i>Frequency 3552.5 MHz; MuMIMO Mode</i>					
<i>MIMO</i>	<i>Mod Mode</i>	<i>Peak to average Ratio (dB)</i>	<i>Limit (dB)</i>	<i>Probability (%)</i>	<i>Verdict</i>
A	QPSK	9.1	13	0	PASS
	16 QAM	9.1	13	0	PASS
	64 QAM	9.1	13	0	PASS
	256 QAM	9.1	13	0	PASS

<i>Frequency 3552.5 MHz; Beamforming Mode</i>					
<i>MIMO</i>	<i>Mod Mode</i>	<i>Peak to average Ratio (dB)</i>	<i>Limit (dB)</i>	<i>Probability (%)</i>	<i>Verdict</i>
A	QPSK	9.2	13	0	PASS
	16 QAM	9.4	13	0	PASS
	64 QAM	9.3	13	0	PASS
	256 QAM	9.3	13	0	PASS

## Middle Channel

<b>Frequency 3625 MHz; Sector Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.7	13	0	PASS
	16 QAM	8.7	13	0	PASS
	64 QAM	8.9	13	0	PASS
	256 QAM	8.9	13	0	PASS
B	QPSK	8.9	13	0	PASS
	16 QAM	9	13	0	PASS
	64 QAM	9	13	0	PASS
	256 QAM	8.8	13	0	PASS

<b>Frequency 3625 MHz; MuMIMO Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.9	13	0	PASS
	16 QAM	9	13	0	PASS
	64 QAM	8.7	13	0	PASS
	256 QAM	8.9	13	0	PASS
B	QPSK	8.7	13	0	PASS
	16 QAM	8.7	13	0	PASS
	64 QAM	8.7	13	0	PASS
	256 QAM	8.7	13	0	PASS

<b>Frequency 3625 MHz; Beamforming Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	9.3	13	0	PASS
	16 QAM	9.2	13	0	PASS
	64 QAM	9.3	13	0	PASS
	256 QAM	9.2	13	0	PASS
B	QPSK	9	13	0	PASS
	16 QAM	8.9	13	0	PASS
	64 QAM	9	13	0	PASS
	256 QAM	8.8	13	0	PASS



### Top Channel

<b>Frequency 3697.5 MHz; MuMIMO Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.8	13	0	PASS
	16 QAM	8.8	13	0	PASS
	64 QAM	8.6	13	0	PASS
	256 QAM	8.9	13	0	PASS

<b>Frequency 3697.5 MHz; MuMIMO Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	9.2	13	0	PASS
	16 QAM	9.4	13	0	PASS
	64 QAM	8.9	13	0	PASS
	256 QAM	9.1	13	0	PASS

<b>Frequency 3697.5 MHz; Beamforming Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	9.2	13	0	PASS
	16 QAM	9.4	13	0	PASS
	64 QAM	9.5	13	0	PASS
	256 QAM	9.4	13	0	PASS

**20 MHz Bandwidth****Bottom Channel**

<b>Frequency 3560 MHz; Sector Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.3	13	0	PASS
	16 QAM	8.3	13	0	PASS
	64 QAM	8.4	13	0	PASS
	256 QAM	8.4	13	0	PASS

<b>Frequency 3560 MHz; MuMIMO Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.9	13	0	PASS
	16 QAM	9	13	0	PASS
	64 QAM	8.9	13	0	PASS
	256 QAM	9	13	0	PASS

<b>Frequency 3560 MHz; Beamforming Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.6	13	0	PASS
	16 QAM	8.8	13	0	PASS
	64 QAM	8.7	13	0	PASS
	256 QAM	8.8	13	0	PASS

## Middle Channel

<b>Frequency 3625 MHz; Sector Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.4	13	0	PASS
	16 QAM	8.3	13	0	PASS
	64 QAM	8.3	13	0	PASS
	256 QAM	8.3	13	0	PASS
B	QPSK	8.3	13	0	PASS
	16 QAM	8.3	13	0	PASS
	64 QAM	8.3	13	0	PASS
	256 QAM	8.3	13	0	PASS

<b>Frequency 3625 MHz; MuMIMO Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.8	13	0	PASS
	16 QAM	8.9	13	0	PASS
	64 QAM	8.7	13	0	PASS
	256 QAM	8.6	13	0	PASS
B	QPSK	8.6	13	0	PASS
	16 QAM	8.5	13	0	PASS
	64 QAM	8.6	13	0	PASS
	256 QAM	8.5	13	0	PASS

<b>Frequency 3625 MHz; Beamforming Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.8	13	0	PASS
	16 QAM	8.7	13	0	PASS
	64 QAM	8.6	13	0	PASS
	256 QAM	8.8	13	0	PASS
B	QPSK	8.5	13	0	PASS
	16 QAM	8.4	13	0	PASS
	64 QAM	8.5	13	0	PASS
	256 QAM	8.5	13	0	PASS

### Top Channel

<i>Frequency 3690 MHz; MuMIMO Mode</i>					
<i>MIMO</i>	<i>Mod Mode</i>	<i>Peak to average Ratio (dB)</i>	<i>Limit (dB)</i>	<i>Probability (%)</i>	<i>Verdict</i>
A	QPSK	8.5	13	0	PASS
	16 QAM	8.4	13	0	PASS
	64 QAM	8.3	13	0	PASS
	256 QAM	8.3	13	0	PASS

<i>Frequency 3690 MHz; MuMIMO Mode</i>					
<i>MIMO</i>	<i>Mod Mode</i>	<i>Peak to average Ratio (dB)</i>	<i>Limit (dB)</i>	<i>Probability (%)</i>	<i>Verdict</i>
A	QPSK	9	13	0	PASS
	16 QAM	9	13	0	PASS
	64 QAM	9.2	13	0	PASS
	256 QAM	8.8	13	0	PASS

<i>Frequency 3690 MHz; Beamforming Mode</i>					
<i>MIMO</i>	<i>Mod Mode</i>	<i>Peak to average Ratio (dB)</i>	<i>Limit (dB)</i>	<i>Probability (%)</i>	<i>Verdict</i>
A	QPSK	8.8	13	0	PASS
	16 QAM	9.1	13	0	PASS
	64 QAM	9	13	0	PASS
	256 QAM	9	13	0	PASS

**40 MHz Bandwidth****Bottom Channel**

<b>Frequency 3570 MHz; Sector Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.3	13	0	PASS
	16 QAM	8.3	13	0	PASS
	64 QAM	8.3	13	0	PASS
	256 QAM	8.5	13	0	PASS

<b>Frequency 3570 MHz; MuMIMO Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.8	13	0	PASS
	16 QAM	8.9	13	0	PASS
	64 QAM	8.6	13	0	PASS
	256 QAM	8.7	13	0	PASS

<b>Frequency 3570 MHz; Beamforming Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.7	13	0	PASS
	16 QAM	8.8	13	0	PASS
	64 QAM	8.7	13	0	PASS
	256 QAM	8.7	13	0	PASS

## Middle Channel

<b>Frequency 3625 MHz; Sector Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.6	13	0	PASS
	16 QAM	8.5	13	0	PASS
	64 QAM	8.5	13	0	PASS
	256 QAM	8.2	13	0	PASS
B	QPSK	8.2	13	0	PASS
	16 QAM	8.2	13	0	PASS
	64 QAM	8.1	13	0	PASS
	256 QAM	8.3	13	0	PASS

<b>Frequency 3625 MHz; MuMIMO Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.5	13	0	PASS
	16 QAM	8.9	13	0	PASS
	64 QAM	8.7	13	0	PASS
	256 QAM	8.8	13	0	PASS
B	QPSK	8.6	13	0	PASS
	16 QAM	8.6	13	0	PASS
	64 QAM	8.3	13	0	PASS
	256 QAM	8.6	13	0	PASS

<b>Frequency 3625 MHz; Beamforming Mode</b>					
<b>MIMO</b>	<b>Mod Mode</b>	<b>Peak to average Ratio (dB)</b>	<b>Limit (dB)</b>	<b>Probability (%)</b>	<b>Verdict</b>
A	QPSK	8.8	13	0	PASS
	16 QAM	8.5	13	0	PASS
	64 QAM	8.8	13	0	PASS
	256 QAM	8.7	13	0	PASS
B	QPSK	8.4	13	0	PASS
	16 QAM	8.5	13	0	PASS
	64 QAM	8.4	13	0	PASS
	256 QAM	8.2	13	0	PASS

## Top Channel

<i>Frequency 3680 MHz; MuMIMO Mode</i>					
<i>MIMO</i>	<i>Mod Mode</i>	<i>Peak to average Ratio (dB)</i>	<i>Limit (dB)</i>	<i>Probability (%)</i>	<i>Verdict</i>
A	QPSK	8.7	13	0	PASS
	16 QAM	8.8	13	0	PASS
	64 QAM	8.7	13	0	PASS
	256 QAM	8.5	13	0	PASS

<i>Frequency 3680 MHz; MuMIMO Mode</i>					
<i>MIMO</i>	<i>Mod Mode</i>	<i>Peak to average Ratio (dB)</i>	<i>Limit (dB)</i>	<i>Probability (%)</i>	<i>Verdict</i>
A	QPSK	8.8	13	0	PASS
	16 QAM	8.6	13	0	PASS
	64 QAM	8.7	13	0	PASS
	256 QAM	8.8	13	0	PASS

<i>Frequency 3680 MHz; Beamforming Mode</i>					
<i>MIMO</i>	<i>Mod Mode</i>	<i>Peak to average Ratio (dB)</i>	<i>Limit (dB)</i>	<i>Probability (%)</i>	<i>Verdict</i>
A	QPSK	9.8	13	0	PASS
	16 QAM	9.4	13	0	PASS
	64 QAM	9.3	13	0	PASS
	256 QAM	9	13	0	PASS

## 14 Peak EIRP Density and Equivalent Isotropically Radiated Power (EIRP)

### 14.1 Definition

The power per unit bandwidth.

### 14.2 Test Parameters

Test Location:	Pershore Airfield
Test Chamber:	Air field
Test Standard and Clause:	Part 96.41 (b)
EUT Channels / Frequencies Measured:	Low / Mid / High
EUT Channel Bandwidths:	5 MHz, 20 MHz and 40 MHz
Deviations From Standard:	None
Measurement BW:	1 MHz/ 10 MHz
Spectrum Analyzer Video BW: (requirement at least 3x RBW)	3 MHz / 30 MHz
Measurement Detector:	Peak

### Environmental Conditions (Normal Environment)

Temperature: 20 °C	+15 °C to +35 °C (as declared)
Humidity: 50 % RH	20 % RH to 75 % RH (as declared)
Supply: 48 V dc	48 V dc (as declared)

### 14.3 Test Limit

The limit are shown in table 2:

<i>Device</i>	<i>Maximum EIRP (dBm/10 MHz)</i>	<i>Maximum PSD (dBm/ MHz)</i>
End user Device	23	N/A
Category A CBSD	30	20
Category B CBSD	47	37

**Table 2—EIRP and PSD limits for CBRS equipment**

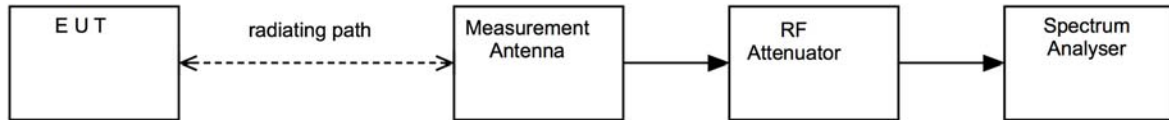


#### 14.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure vi, the peak emission of the EUT was measured on a spectrum analyser, with path losses taken into account.

The measurements were performed with EUT set at its maximum duty. All modulation schemes, data rates and power settings were used to observe the worst case configuration in each bandwidth.

**Figure vi Test Setup**



#### 14.5 Test Equipment

Equipment Type	Manufacturer	Equipment Description	Element No	Due For Calibration
3115	EMCO	1-18GHz Horn	U223	2019-10-25
FSU50	R&S	Spectrum Analyser	U544	2019-05-22
3161	EMCO	2- 4 GHz Horn	9910-1058	2019-02-18

### 14.6 Test Results – Peak EIRP Density

<b>Bottom channel; Bandwidth: 5 MHz;</b>						
<b>Channel Frequency (MHz)</b>	<b>Transition Mode</b>	<b>Modulation</b>	<b>MIMO</b>	<b>Maximum PSD (dBm/ MHz)</b>	<b>Limit (dBm/ MHz)</b>	<b>Result</b>
3552.5	Sector	QPSK	A	37	37	PASS
3552.5	MuMIMO		A	37	37	PASS
3552.5	Beamform		A	36.8	37	PASS

<b>Middle channel; Bandwidth: 5 MHz</b>						
<b>Channel Frequency (MHz)</b>	<b>Transition Mode</b>	<b>Modulation</b>	<b>MIMO</b>	<b>Maximum PSD (dBm/ MHz)</b>	<b>Limit (dBm/ MHz)</b>	<b>Result</b>
3625	Sector	QPSK	A	37	37	PASS
3625			B	37	37	PASS
3625	MuMIMO		A	37	37	PASS
3625	Beamform		A	36.9	37	PASS
3625	Sector	16 QAM	A	36.8	37	PASS
3625			B	36.9	37	PASS
3625	MuMIMO		A	36.8	37	PASS
3625	Beamform		A	36.5	37	PASS
3625	Sector	64 QAM	A	36.8	37	PASS
3625			B	36.8	37	PASS
3625	MuMIMO		A	36.8	37	PASS
3625	Beamform		A	36.5	37	PASS
3625	Sector	256 QAM	A	36.8	37	PASS
3625			B	36.8	37	PASS
3625	MuMIMO		A	36.8	37	PASS
3625	Beamform		A	36.6	37	PASS

<b>Top channel; Bandwidth: 5 MHz</b>						
<b>Channel Frequency (MHz)</b>	<b>Transition Mode</b>	<b>Modulation</b>	<b>MIMO</b>	<b>Maximum PSD (dBm/ MHz)</b>	<b>Limit (dBm/ MHz)</b>	<b>Result</b>
3697.5	Sector	QPSK	A	37	37	PASS
3697.5	MuMIMO		A	36.2	37	PASS
3697.5	Beamform		A	36.8	37	PASS

<b>Bottom channel; Bandwidth: 20 MHz</b>						
<b>Channel Frequency (MHz)</b>	<b>Transition Mode</b>	<b>Modulation</b>	<b>MIMO</b>	<b>Maximum PSD (dBm/ MHz)</b>	<b>Limit (dBm/ MHz)</b>	<b>Result</b>
3560	Sector	QPSK	A	36.4	37	PASS
3560	MuMIMO		A	36.6	37	PASS
3560	Beamform		A	36.0	37	PASS

<b>Middle channel; Bandwidth: 20 MHz</b>						
<b>Channel Frequency (MHz)</b>	<b>Transition Mode</b>	<b>Modulation</b>	<b>MIMO</b>	<b>Maximum PSD (dBm/ MHz)</b>	<b>Limit (dBm/ MHz)</b>	<b>Result</b>
3625	Sector	QPSK	A	36.8	37	PASS
3625			B	36.8	37	PASS
3625	MuMIMO		A	36.9	37	PASS
3625	Beamform		A	36.9	37	PASS
3625	Sector	16 QAM	A	36.8	37	PASS
3625			B	36.8	37	PASS
3625	MuMIMO		A	36.9	37	PASS
3625	Beamform		A	36.9	37	PASS
3625	Sector	64 QAM	A	36.8	37	PASS
3625			B	36.8	37	PASS
3625	MuMIMO		A	36.9	37	PASS
3625	Beamform		A	36.9	37	PASS
3625	Sector	256 QAM	A	36.8	37	PASS
3625			B	36.8	37	PASS
3625	MuMIMO		A	36.9	37	PASS
3625	Beamform		A	36.9	37	PASS

<b>Top channel; Bandwidth: 20 MHz</b>						
<b>Channel Frequency (MHz)</b>	<b>Transition Mode</b>	<b>Modulation</b>	<b>MIMO</b>	<b>Maximum PSD (dBm/ MHz)</b>	<b>Limit (dBm/ MHz)</b>	<b>Result</b>
3690	Sector	QPSK	A	36.9	37	PASS
3690	MuMIMO		A	36.8	37	PASS
3690	Beamform		A	36.6	37	PASS

<b>Bottom channel; Bandwidth: 40 MHz</b>						
<b>Channel Frequency (MHz)</b>	<b>Transition Mode</b>	<b>Modulation</b>	<b>MIMO</b>	<b>Maximum PSD (dBm/ MHz)</b>	<b>Limit (dBm/ MHz)</b>	<b>Result</b>
3570	Sector	QPSK	A	36.2	37	PASS
3570	MuMIMO		A	34.7	37	PASS
3570	Beamform		A	36.3	37	PASS

<b>Middle channel; Bandwidth: 40 MHz</b>						
<b>Channel Frequency (MHz)</b>	<b>Transition Mode</b>	<b>Modulation</b>	<b>MIMO</b>	<b>Maximum PSD (dBm/ MHz)</b>	<b>Limit (dBm/ MHz)</b>	<b>Result</b>
3625	Sector	QPSK	A	35.3	37	PASS
3625			B	35.3	37	PASS
3625	MuMIMO		A	34.7	37	PASS
3625	Beamform		A	36.6	37	PASS
3625	Sector	16 QAM	A	35.3	37	PASS
3625			B	35.3	37	PASS
3625	MuMIMO		A	34.7	37	PASS
3625	Beamform		A	36.6	37	PASS
3625	Sector	64 QAM	A	35.3	37	PASS
3625			B	35.3	37	PASS
3625	MuMIMO		A	34.7	37	PASS
3625	Beamform		A	36.6	37	PASS
3625	Sector	256 QAM	A	35.3	37	PASS
3625			B	35.3	37	PASS
3625	MuMIMO		A	34.7	37	PASS
3625	Beamform		A	36.6	37	PASS

<b>Top channel; Bandwidth: 40 MHz</b>						
<b>Channel Frequency (MHz)</b>	<b>Transition Mode</b>	<b>Modulation</b>	<b>MIMO</b>	<b>Maximum PSD (dBm/ MHz)</b>	<b>Limit (dBm/ MHz)</b>	<b>Result</b>
3680	Sector	QPSK	A	35.1	37	PASS
3680	MuMIMO		A	34.2	37	PASS
3680	Beamform		A	36.3	37	PASS

## 14.7 Test Results – Equivalent Isotropic Radiated Power (EIRP)

<b>Bottom Channel: 3552.5 MHz ; Bandwidth: 5 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	38.7
H	47	40.6
<b>Total: dBm</b>		42.8
<b>Result:</b>		PASS

<b>Bottom Channel: 3552.5 MHz ; Bandwidth: 5 MHz; Modulation: QPSK ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	40.2
H	47	38.8
<b>Total: dBm</b>		42.6
<b>Result:</b>		PASS

<b>Bottom Channel: 3552.5 MHz ; Bandwidth: 5 MHz; Modulation: QPSK ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	39.4
H	47	39.7
<b>Total: dBm</b>		42.1
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	39.0
H	47	40.1
<b>Total: dBm</b>		42.6
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	36.4
H	47	37.0
<b>Total: dBm</b>		39.7
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: QPSK ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	38.7
H	47	40.3
<b>Total: dBm</b>		42.6
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: QPSK ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	38.7
H	47	39.7
<b>Total: dBm</b>		42.2
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 16 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	36.2
H	47	37.0
<b>Total: dBm</b>		39.6
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 16 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	36.1
H	47	37.0
<b>Total: dBm</b>		39.6
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 16 QAM ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	37.4
H	47	38.7
<b>Total: dBm</b>		41.3
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 16 QAM ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	37.4
H	47	38.2
<b>Total: dBm</b>		40.8
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 64 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	36.1
H	47	37.1
<b>Total: dBm</b>		39.6
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 64 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	36.0
H	47	37.0
<b>Total: dBm</b>		39.5
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 64 QAM ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	37.4
H	47	38.7
<b>Total: dBm</b>		41.1
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 64 QAM ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	37.6
H	47	38.2
<b>Total: dBm</b>		40.9
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 256 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	36.1
H	47	37.0
<b>Total: dBm</b>		39.6
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 256 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	36.1
H	47	37.0
<b>Total: dBm</b>		39.6
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 256 QAM ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	37.3
H	47	38.9
<b>Total: dBm</b>		41.2
<b>Result:</b>		PASS

<b>Middle Channel: 3625 MHz ; Bandwidth: 5 MHz; Modulation: 256 QAM ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	37.6
H	47	38.1
<b>Total: dBm</b>		40.9
<b>Result:</b>		PASS

<b>Top Channel: 3697.5 MHz ; Bandwidth: 5 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	37.2
H	47	37.8
<b>Total: dBm</b>		40.5
<b>Result:</b>		PASS



<b>Top Channel: 3697.5 MHz ; Bandwidth: 5 MHz; Modulation: QPSK ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	34.8
H	47	36.9
<b>Total: dBm</b>		39.0
<b>Result:</b>		PASS

<b>Top Channel: 3697.5 MHz ; Bandwidth: 5 MHz; Modulation: QPSK ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Limit EIRP (dBm/10 MHz)</b>	<b>Maximum EIRP (dBm/10 MHz)</b>
V	47	36.1
H	47	36.9
<b>Total: dBm</b>		39.5
<b>Result:</b>		PASS

<b>Bottom Channel: 3560 MHz ; Bandwidth: 20 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	40.2	47
V	40.3	
H	41.7	
H	42.2	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.4
<b>Total Power (dBm/20MHz)</b>		47.2

<b>Bottom Channel: 3560 MHz ; Bandwidth: 20 MHz; Modulation: QPSK ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.0	47
V	41.2	
H	41.4	
H	41.4	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.4
<b>Total Power (dBm/20MHz)</b>		47.3

<b>Bottom Channel: 3560 MHz ; Bandwidth: 20 MHz; Modulation: QPSK ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	40.1	47
V	40.6	
H	40.9	
H	40.9	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		43.8
<b>Total Power (dBm/20MHz)</b>		46.7

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.5	47
V	41.7	
H	41.9	
H	42.2	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.9
<b>Total Power (dBm/20MHz)</b>		47.9

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.5	47
V	41.7	
H	41.9	
H	42.2	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		45.0
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: QPSK ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.6	47
V	41.7	
H	41.9	
H	41.9	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.8
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: QPSK ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.2	47
V	41.6	
H	42.1	
H	42.1	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.9
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 16 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.5	47
V	41.7	
H	41.9	
H	42.2	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		45.0
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 16 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.5	47
V	41.7	
H	41.9	
H	42.2	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		45.0
<b>Total Power (dBm/20MHz)</b>		47.9

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 16 QAM ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.6	47
V	41.7	
H	41.9	
H	41.9	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.8
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 16 QAM ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.2	47
V	41.6	
H	42.1	
H	42.1	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.9
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 64 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.5	47
V	41.7	
H	41.9	
H	42.2	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		45.0
<b>Total Power (dBm/20MHz)</b>		47.9

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 64 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.5	47
V	41.7	
H	41.9	
H	42.2	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		45.0
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 64 QAM ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.6	47
V	41.7	
H	41.9	
H	41.9	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.8
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 64 QAM ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.2	47
V	41.6	
H	42.1	
H	42.1	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.9
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 256 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.5	47
V	41.7	
H	41.9	
H	42.1	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.9
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 256 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.5	47
V	41.7	
H	41.9	
H	42.1	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.9
<b>Total Power (dBm/20MHz)</b>		47.9

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 256 QAM ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.6	47
V	41.7	
H	41.9	
H	41.9	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.8
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Middle Channel: 3625 MHz ; Bandwidth: 20 MHz; Modulation: 256 QAM ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	42.1	47
V	41.5	
H	42.1	
H	42.1	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.9
<b>Total Power (dBm/20MHz)</b>		48.0

<b>Top Channel: 3690 MHz ; Bandwidth: 20 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.0	47
V	41.0	
H	42.2	
H	42.6	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.9
<b>Total Power (dBm/20MHz)</b>		47.8

<b>Top Channel: 3690 MHz ; Bandwidth: 20 MHz; Modulation: QPSK ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.4	47
V	41.6	
H	41.7	
H	41.7	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.7
<b>Total Power (dBm/20MHz)</b>		47.6



<b>Top Channel: 3690 MHz ; Bandwidth: 20 MHz; Modulation: QPSK ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	41.0	47
V	41.4	
H	41.6	
H	41.5	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.5
<b>Total Power (dBm/20MHz)</b>		47.4

<b>Bottom Channel: 3570 MHz ; Bandwidth: 40 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.5	47
V	40.4	
V	40.8	
V	38.9	
H	41.4	
H	42.3	
H	42.6	
H	42.0	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.8
<b>Total Power (dBm/40MHz)</b>		50.2

<b>Bottom Channel: 3570 MHz ; Bandwidth: 40 MHz; Modulation: QPSK ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	38.8	47
V	39.7	
V	40.0	
V	38.6	
H	39.8	
H	40.8	
H	41.1	
H	39.6	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		43.6
<b>Total Power (dBm/40MHz)</b>		48.9

<b>Bottom Channel: 3570 MHz ; Bandwidth: 40 MHz; Modulation: QPSK ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	40.1	47
V	40.9	
V	41.1	
V	40.7	
H	41.2	
H	42.2	
H	42.6	
H	40.7	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.8
<b>Total Power (dBm/40MHz)</b>		50.3

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.2	47
V	39.5	
V	39.9	
V	39.2	
H	41.0	
H	41.6	
H	42.2	
H	40.4	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.2
<b>Total Power (dBm/40MHz)</b>		49.5

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.2	47
V	39.5	
V	39.9	
V	39.2	
H	41.0	
H	41.6	
H	42.2	
H	40.4	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.2
<b>Total Power (dBm/40MHz)</b>		49.5

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: QPSK ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.0	47
V	39.6	
V	40.0	
V	38.7	
H	40.1	
H	40.8	
H	41.2	
H	39.6	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		43.6
<b>Total Power (dBm/40MHz)</b>		49.0

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: QPSK ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	40.6	47
V	41.0	
V	41.4	
V	40.7	
H	41.8	
H	42.5	
H	43.0	
H	31.4	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		45.3
<b>Total Power (dBm/40MHz)</b>		50.6

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 16 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.2	47
V	39.5	
V	39.9	
V	39.2	
H	41.1	
H	41.7	
H	42.2	
H	40.4	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.2
<b>Total Power (dBm/40MHz)</b>		49.5

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 16 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.2	47
V	39.5	
V	39.9	
V	39.2	
H	41.1	
H	41.7	
H	42.2	
H	40.4	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.2
<b>Total Power (dBm/40MHz)</b>		49.6

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 16 QAM ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.0	47
V	39.6	
V	40.0	
V	38.7	
H	40.1	
H	40.8	
H	41.2	
H	39.6	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		43.6
<b>Total Power (dBm/40MHz)</b>		49.0

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 16 QAM ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	40.6	47
V	41.0	
V	41.4	
V	40.7	
H	41.8	
H	42.5	
H	43.0	
H	40.9	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		45.3
<b>Total Power (dBm/40MHz)</b>		50.6

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 64 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.2	47
V	39.5	
V	39.9	
V	39.2	
H	41.1	
H	41.7	
H	42.2	
H	40.4	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.2
<b>Total Power (dBm/40MHz)</b>		49.6

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 64 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.2	47
V	39.5	
V	39.9	
V	39.2	
H	41.1	
H	41.7	
H	42.2	
H	40.4	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.2
<b>Total Power (dBm/40MHz)</b>		49.6

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 64 QAM ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.0	47
V	39.6	
V	40.0	
V	38.7	
H	40.1	
H	40.8	
H	41.2	
H	39.6	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		43.6
<b>Total Power (dBm/40MHz)</b>		49.0



<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 64 QAM ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	40.6	47
V	41.0	
V	41.4	
V	40.7	
H	41.8	
H	42.5	
H	43.0	
H	40.9	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		45.3
<b>Total Power (dBm/40MHz)</b>		50.6

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 256 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.2	47
V	39.5	
V	39.9	
V	39.2	
H	41.1	
H	41.7	
H	42.2	
H	40.4	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.2
<b>Total Power (dBm/40MHz)</b>		49.6

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 256 QAM ; EUT Mode: Sector; EUT Data Mode: MIMO B</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.2	47
V	39.5	
V	39.9	
V	39.2	
H	41.1	
H	41.7	
H	42.2	
H	40.4	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.2
<b>Total Power (dBm/40MHz)</b>		49.6

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 256 QAM ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	39.0	47
V	39.6	
V	40.0	
V	38.7	
H	40.1	
H	40.8	
H	41.2	
H	39.6	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		43.6
<b>Total Power (dBm/40MHz)</b>		49.0

<b>Middle Channel: 3625 MHz ; Bandwidth: 40 MHz; Modulation: 256 QAM ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	40.6	47
V	41.0	
V	41.4	
V	40.7	
H	41.8	
H	42.5	
H	43.0	
H	40.9	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		45.3
<b>Total Power (dBm/40MHz)</b>		50.6

<b>Top Channel: 3680 MHz ; Bandwidth: 40 MHz; Modulation: QPSK ; EUT Mode: Sector; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	40.3	47
V	41.2	
V	41.2	
V	40.5	
H	39.6	
H	40.6	
H	40.6	
H	39.0	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		43.9
<b>Total Power (dBm/40MHz)</b>		49.5

<b>Top Channel: 3680 MHz ; Bandwidth: 40 MHz; Modulation: QPSK ; EUT Mode: MuMIMO; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	38.9	47
V	39.8	
V	39.8	
V	38.9	
H	39.7	
H	40.6	
H	40.5	
H	39.2	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		43.3
<b>Total Power (dBm/40MHz)</b>		48.8

<b>Top Channel: 3680 MHz ; Bandwidth: 40 MHz; Modulation: QPSK ; EUT Mode: Beamform; EUT Data Mode: MIMO A</b>		
<b>Antenna Pol</b>	<b>Maximum EIRP (dBm/10 MHz)</b>	<b>Limit EIRP (dBm/10 MHz)</b>
V	40.2	47
V	41.1	
V	41.0	
V	40.8	
H	41.0	
H	42.0	
H	42.1	
H	40.2	
<b>Result:</b>		PASS
<b>Total Power (dBm/10MHz)</b>		44.6
<b>Total Power (dBm/40MHz)</b>		50.2

## 15 Occupied Bandwidth

### 15.1 Definition

The OBW is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

### 15.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	Radio Chamber
Test Standard and Clause:	Part 2.1049
EUT Channel Bandwidths:	5 MHz, 20 MHz and 40 MHz
EUT Test Modulations:	QPSK MIMO A & B, 16QAM MIMO A & B, 64QAM MIMO A & B and 256QAM MIMO A & B
Deviations From Standard:	None
Measurement BW:	200 kHz and 500 kHz
(Requirement: 1% to 5% OBW)	
Spectrum Analyzer Video BW:	500 kHz and 2 MHz
(requirement at least 3x RBW)	
Measurement Span:	7.5 MHz, 30 MHz and 60 MHz
(requirement 2 to 5 times OBW)	
Measurement Detector:	Peak

### Environmental Conditions (Normal Environment)

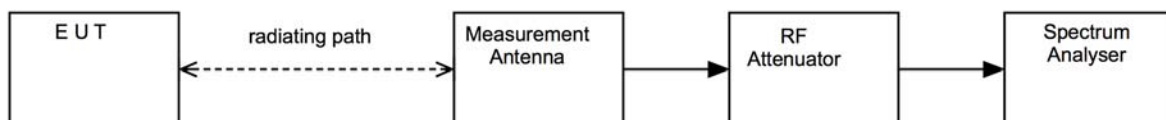
Temperature: 24 °C	+15 °C to +35 °C (as declared)
Humidity: 60 % RH	20 % RH to 75 % RH (as declared)
Supply: 48 V dc	48 V dc (as declared)

### 15.3 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure iii, the bandwidth of the EUT was measured on a spectrum analyser.

The measurements were performed with EUT set at its maximum duty. All modulation schemes, data rates and power settings were used to observe the worst-case configuration in each bandwidth.

**Figure iii Test Setup**

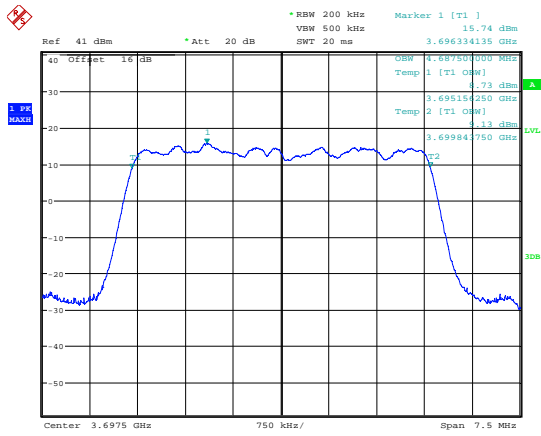


### 15.4 Test Equipment

Equipment Type	Manufacturer	Equipment Description	Element No	Due For Calibration
3115	EMCO	1-18GHz Horn	L139	2019-09-25
FSU50	R&S	Spectrum Analyser	U544	2019-05-22

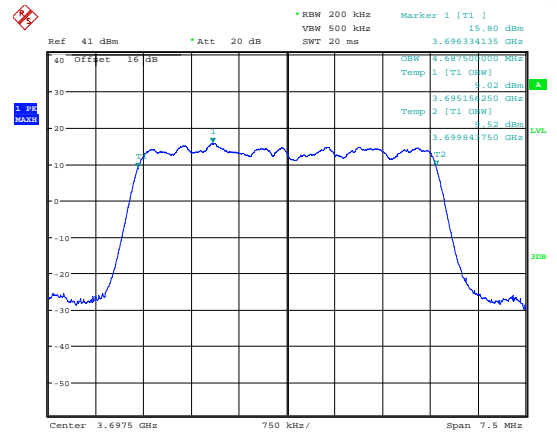
### 15.5 Test Results

## 5 MHz Bandwidth Beamforming



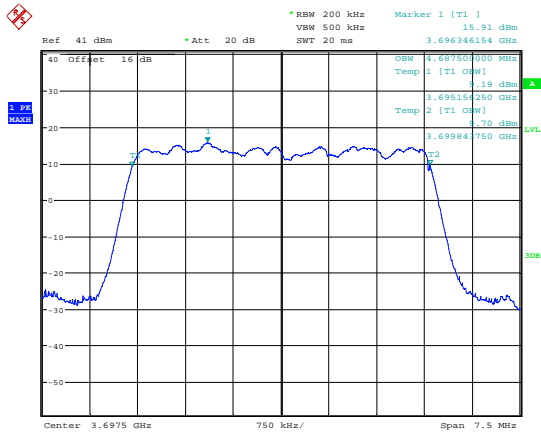
Date: 7.JUL.2018 19:14:39

99 % Bandwidth; QPSK; 3697.5 MHz; MIMO A.



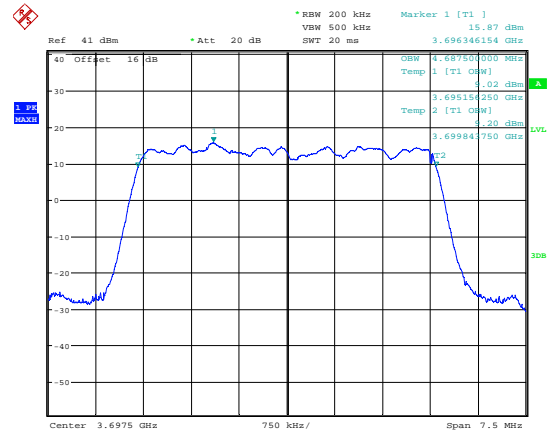
Date: 7.JUL.2018 19:12:07

99 % Bandwidth; QPSK; 3697.5 MHz; MIMO B.



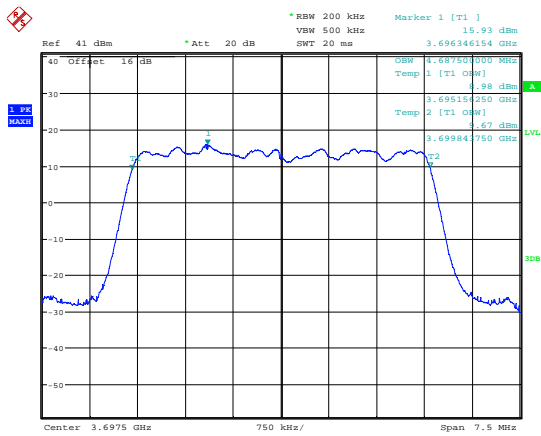
Date: 7.JUL.2018 19:13:58

99 % Bandwidth; 16QAM; 3697.5 MHz; MIMO A.



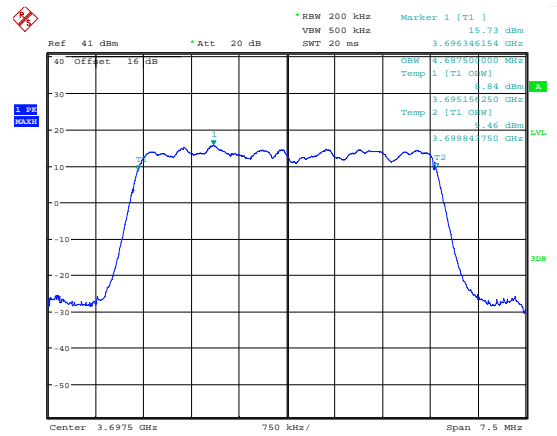
Date: 7.JUL.2018 19:11:09

99 % Bandwidth; 16QAM; 3697.5 MHz; MIMO B.



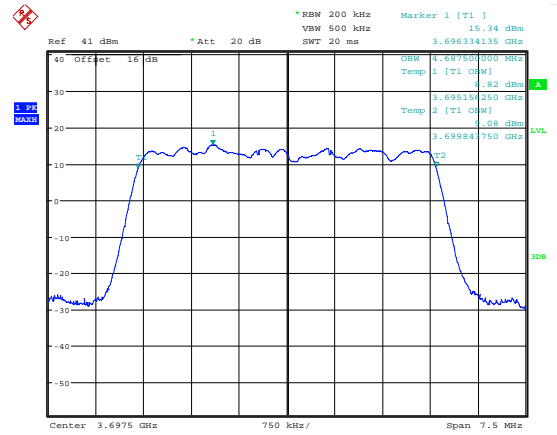
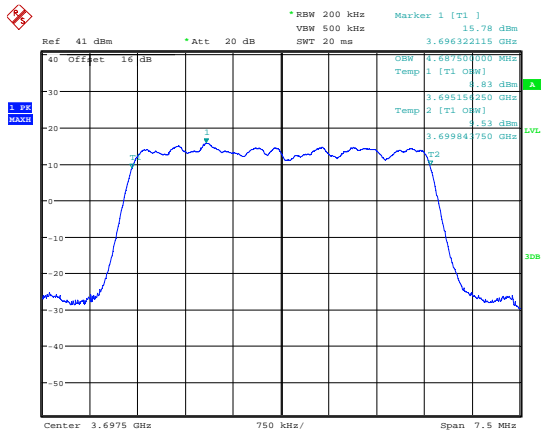
Date: 7.JUL.2018 19:13:25

99 % Bandwidth; 64QAM; 3697.5 MHz; MIMO A.



Date: 7.JUL.2018 19:10:36

99 % Bandwidth; 64QAM; 3697.5 MHz; MIMO B.



Date: 7.JUL.2018 19:12:47

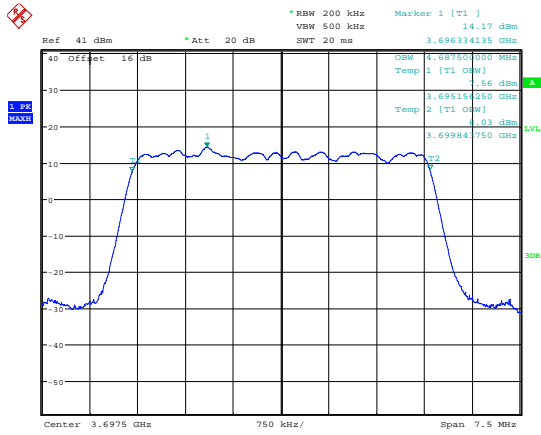
Date: 7.JUL.2018 19:10:00

99 % Bandwidth; 256QAM; 3697.5 MHz; MIMO A.

99 % Bandwidth; 256QAM; 3697.5 MHz; MIMO B.

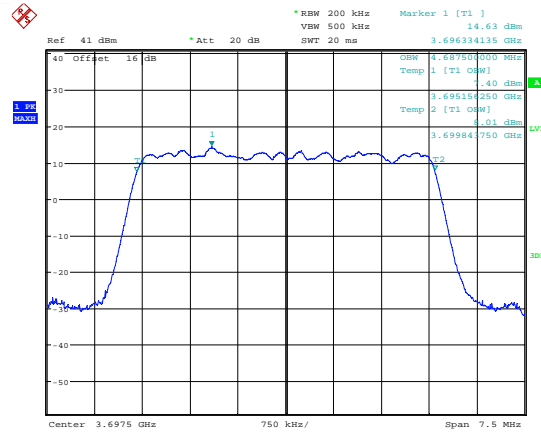
5 MHz bandwidth						
Frequency (MHz)	Modulation Mode	MIMO	FL (MHz)	FH (MHz)	99 % Bandwidth (kHz)	Result
3697.5	QPSK	A	3695.156	3699.843	4687	Pass
3697.5	QPSK	B	3695.156	3699.843	4687	Pass
3697.5	16QAM	A	3695.156	3699.843	4687	Pass
3697.5	16QAM	B	3695.156	3699.843	4687	Pass
3697.5	64QAM	A	3695.156	3699.843	4687	Pass
3697.5	64QAM	B	3695.156	3699.843	4687	Pass
3697.5	256QAM	A	3695.156	3699.843	4687	Pass
3697.5	256QAM	B	3695.156	3699.843	4687	Pass

### 5 MHz Bandwidth Sector



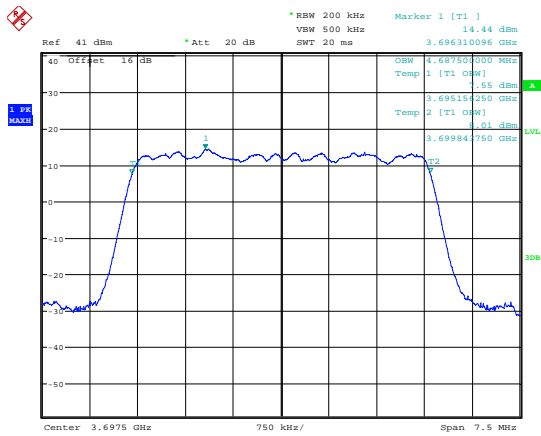
Date: 7.JUL.2018 19:16:23

99 % Bandwidth; QPSK; 3697.5 MHz; MIMO A.



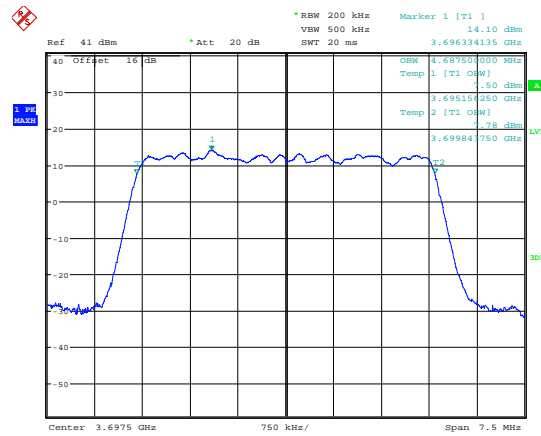
Date: 7.JUL.2018 19:19:11

99 % Bandwidth; QPSK; 3697.5 MHz; MIMO B.



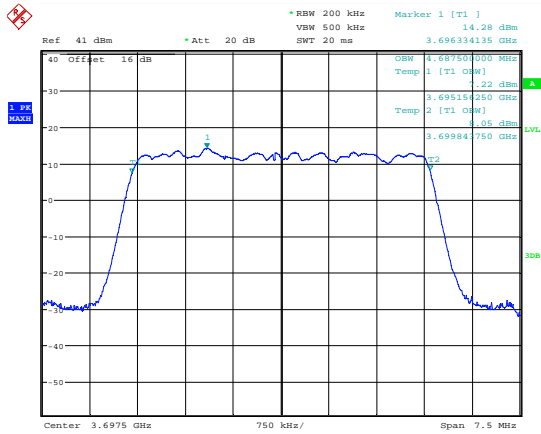
Date: 7.JUL.2018 19:17:14

99 % Bandwidth; 16QAM; 3697.5 MHz; MIMO A.



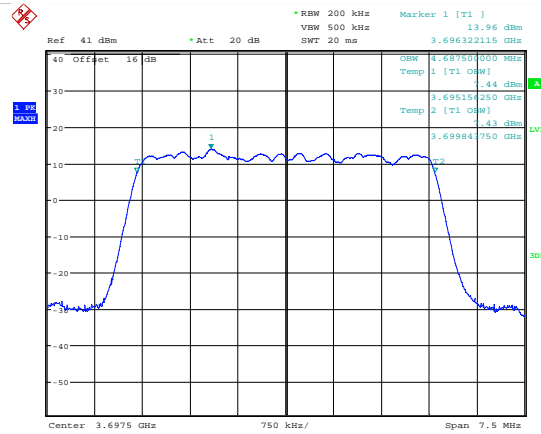
Date: 7.JUL.2018 19:19:49

99 % Bandwidth; 16QAM; 3697.5 MHz; MIMO B.



Date: 7.JUL.2018 19:17:52

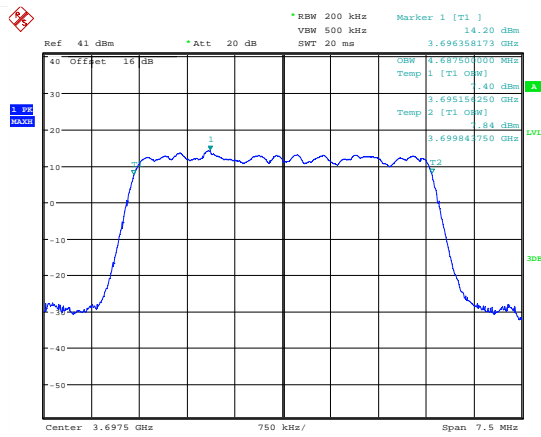
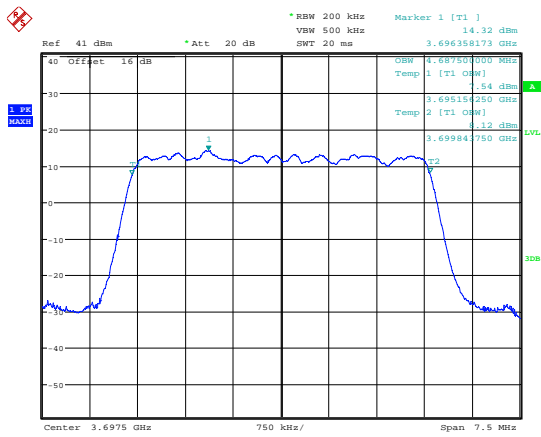
99 % Bandwidth; 64QAM; 3697.5 MHz; MIMO A.



Date: 7.JUL.2018 19:20:33

99 % Bandwidth; 64QAM; 3697.5 MHz; MIMO B.





Date: 7.JUL.2018 19:18:34

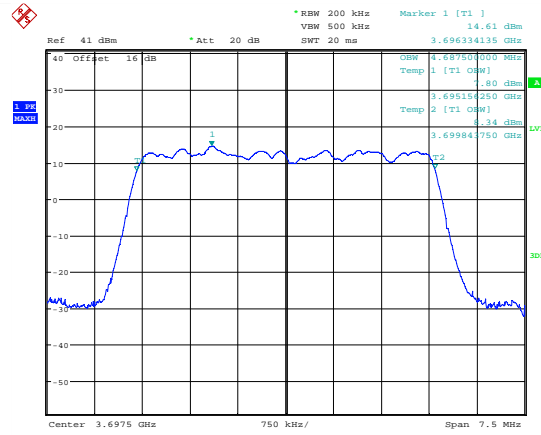
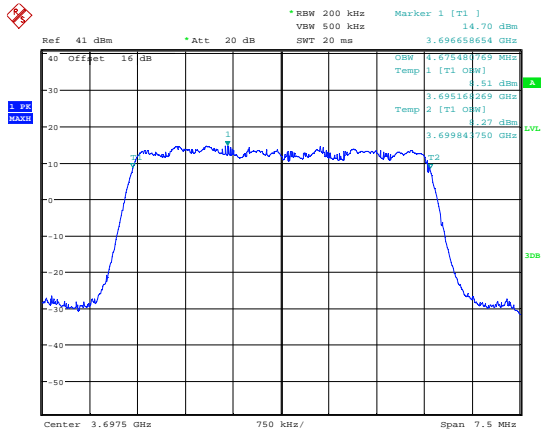
Date: 7.JUL.2018 19:21:05

99 % Bandwidth; 256QAM; 3697.5 MHz; MIMO A.

99 % Bandwidth; 256QAM; 3697.5 MHz; MIMO B.

5 MHz bandwidth						
Frequency (MHz)	Modulation Mode	MIMO	FL (MHz)	FH (MHz)	99 % Bandwidth (kHz)	Result
3697.5	QPSK	A	3695.156	3699.843	4687	Pass
3697.5	QPSK	B	3695.156	3699.843	4687	Pass
3697.5	16QAM	A	3695.156	3699.843	4687	Pass
3697.5	16QAM	B	3695.156	3699.843	4687	Pass
3697.5	64QAM	A	3695.156	3699.843	4687	Pass
3697.5	64QAM	B	3695.156	3699.843	4687	Pass
3697.5	256QAM	A	3695.156	3699.843	4687	Pass
3697.5	256QAM	B	3695.156	3699.843	4687	Pass

### 5 MHz Bandwidth MU-MIMO

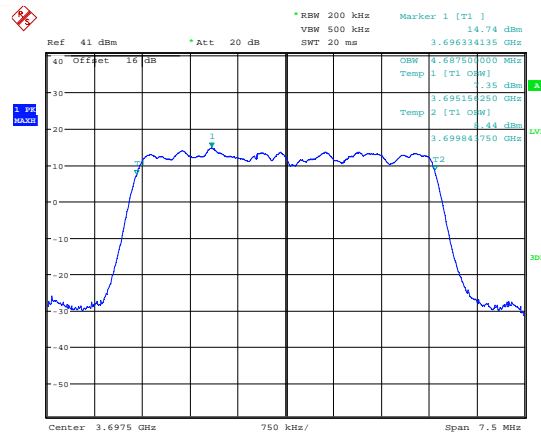
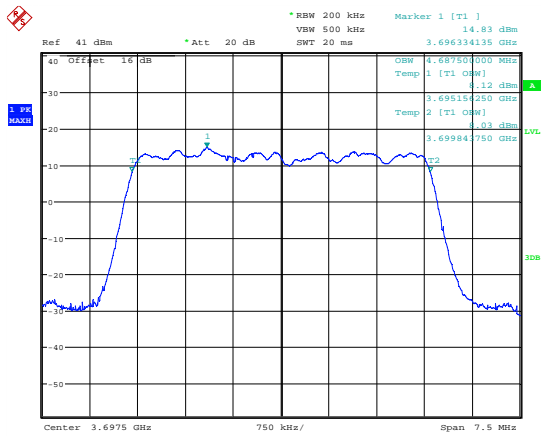


Date: 7.JUL.2018 19:03:40

Date: 7.JUL.2018 19:06:15

99 % Bandwidth QPSK; 3697.5 MHz; MIMO A.

99 % Bandwidth QPSK; 3697.5 MHz; MIMO B.

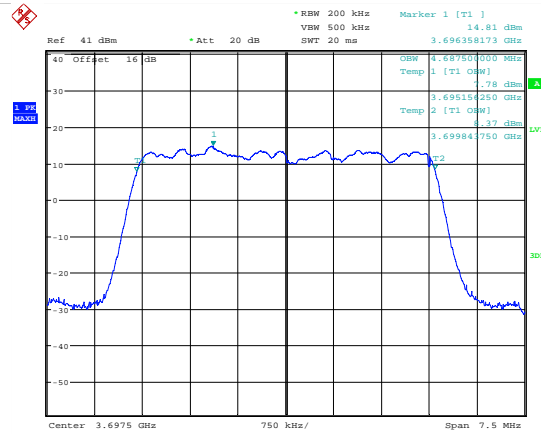
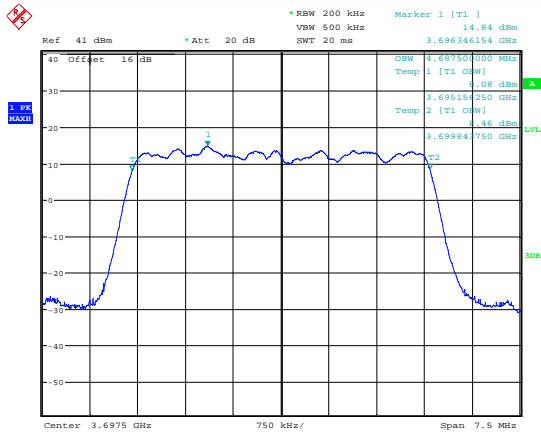


Date: 7.JUL.2018 19:04:11

Date: 7.JUL.2018 19:06:55

99 % Bandwidth; 16QAM; 3697.5 MHz; MIMO A.

99 % Bandwidth; 16QAM; 3697.5 MHz; MIMO B.

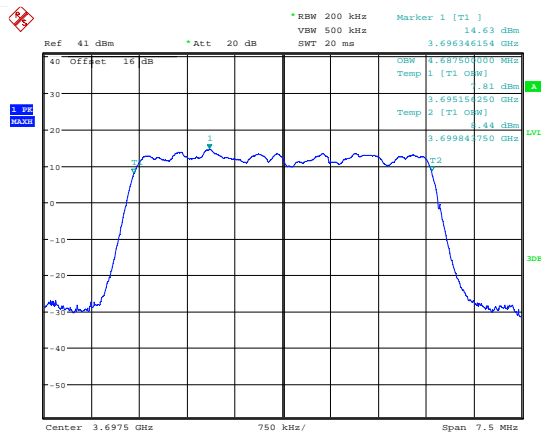
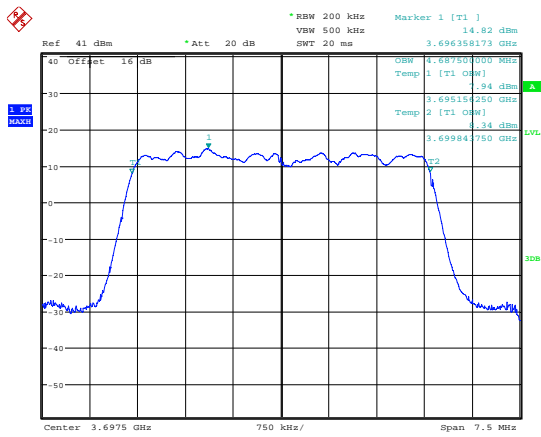


Date: 7.JUL.2018 19:04:49

Date: 7.JUL.2018 19:07:31

99 % Bandwidth; 64QAM; 3697.5 MHz; MIMO A.

99 % Bandwidth; 64QAM; 3697.5 MHz; MIMO B.



Date: 7.JUL.2018 19:05:27

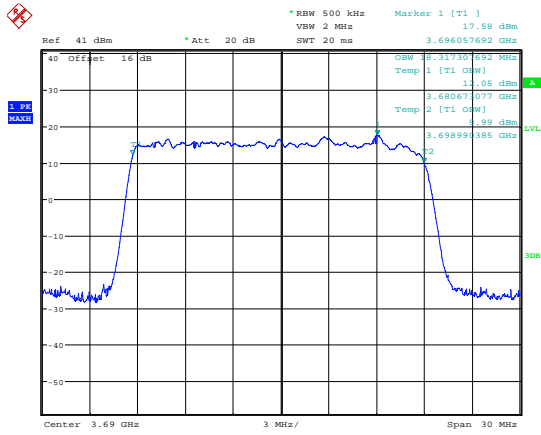
Date: 7.JUL.2018 19:08:17

99 % Bandwidth; 256QAM; 3697.5 MHz; MIMO A.

99 % Bandwidth; 256QAM; 3697.5 MHz; MIMO B.

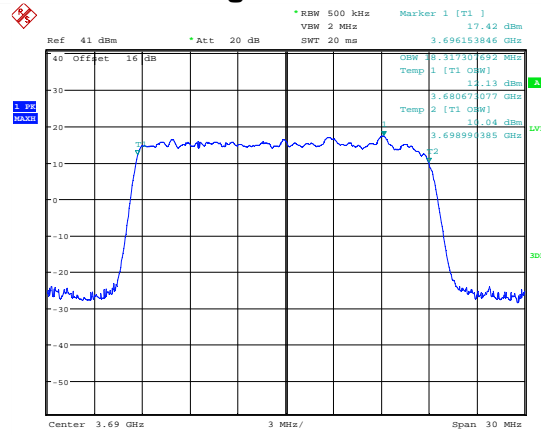
5 MHz bandwidth						
Frequency (MHz)	Modulation Mode	MIMO	FL (MHz)	FH (MHz)	99 % Bandwidth (kHz)	Result
3697.5	QPSK	A	3695.168	3699.843	4675	Pass
3697.5	QPSK	B	3695.156	3699.843	4687	Pass
3697.5	16QAM	A	3695.156	3699.843	4687	Pass
3697.5	16QAM	B	3695.156	3699.843	4687	Pass
3697.5	64QAM	A	3695.156	3699.843	4687	Pass
3697.5	64QAM	B	3695.156	3699.843	4687	Pass
3697.5	256QAM	A	3695.156	3699.843	4687	Pass
3697.5	256QAM	B	3695.156	3699.843	4687	Pass

## 20 MHz Bandwidth Beamforming



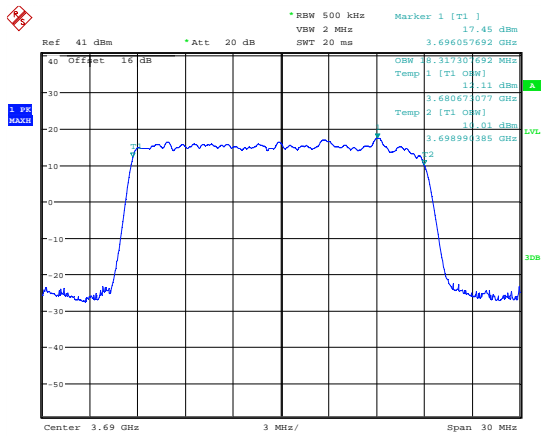
Date: 7.JUL.2018 17:34:24

99 % Bandwidth; QPSK; 3690 MHz; MIMO A.



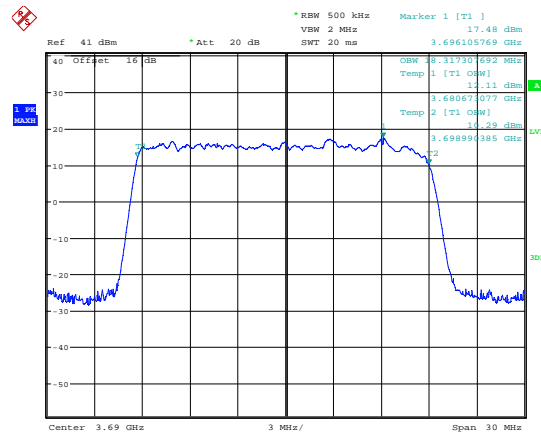
Date: 7.JUL.2018 17:38:29

99 % Bandwidth; QPSK; 3690 MHz; MIMO B.



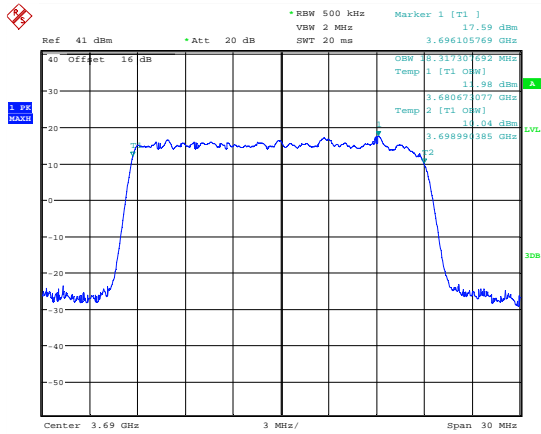
Date: 7.JUL.2018 17:36:23

99 % Bandwidth; 16QAM; 3690 MHz; MIMO A.



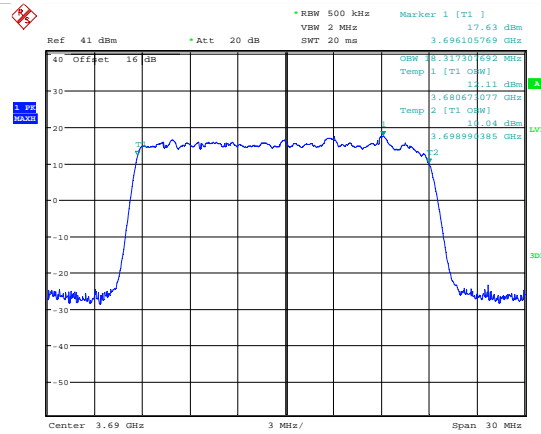
Date: 7.JUL.2018 17:39:11

99 % Bandwidth; 16QAM; 3690 MHz; MIMO B.



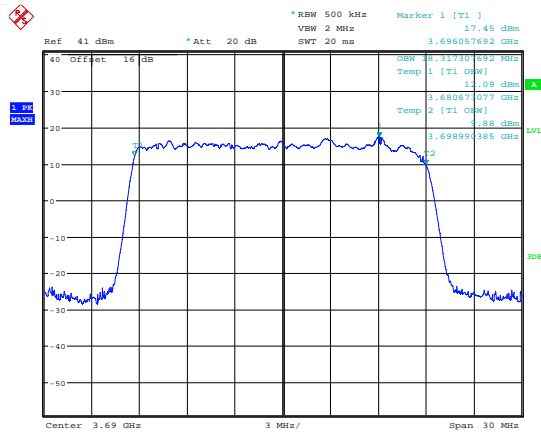
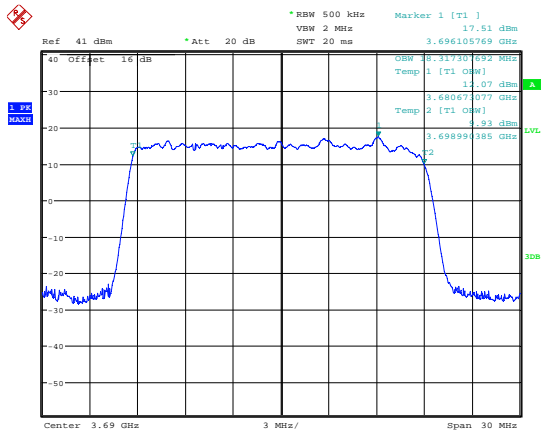
Date: 7.JUL.2018 17:36:55

99 % Bandwidth; 64QAM; 3690 MHz; MIMO A.



Date: 7.JUL.2018 17:39:54

99 % Bandwidth; 64QAM; 3690 MHz; MIMO B.



Date: 7.JUL.2018 17:37:37

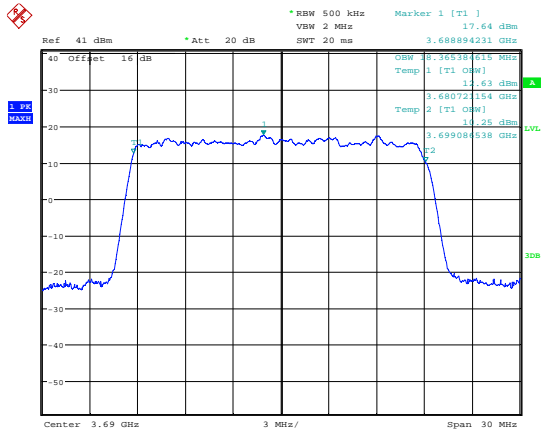
Date: 7.JUL.2018 17:40:38

99 % Bandwidth; 256QAM; 3690 MHz; MIMO A.

99 % Bandwidth; 256QAM; 3690 MHz; MIMO B.

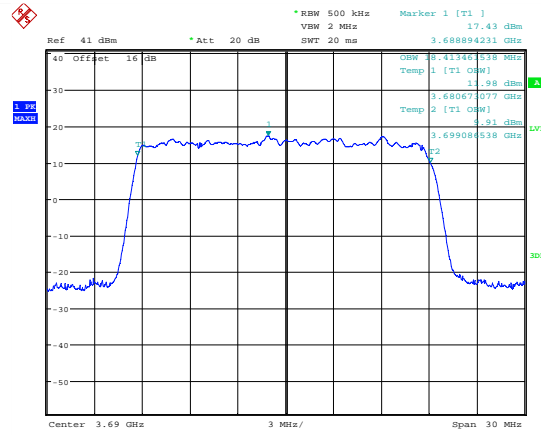
20 MHz bandwidth						
Frequency (MHz)	Modulation Mode	MIMO	FL (MHz)	FH (MHz)	99 % Bandwidth (kHz)	Result
3690	QPSK	A	3680.673	3698.99	18317	Pass
3690	QPSK	B	3680.673	3698.99	18317	Pass
3690	16QAM	A	3680.673	3698.99	18317	Pass
3690	16QAM	B	3680.673	3698.99	18317	Pass
3690	64QAM	A	3680.673	3698.99	18317	Pass
3690	64QAM	B	3680.673	3698.99	18317	Pass
3690	256QAM	A	3680.673	3698.99	18317	Pass
3690	256QAM	B	3680.673	3698.99	18317	Pass

## 20 MHz Bandwidth Sector



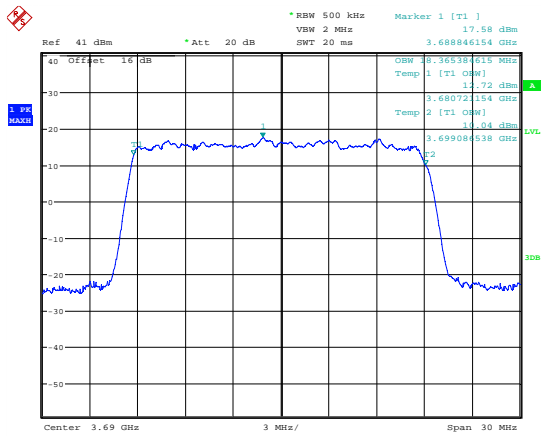
Date: 7.JUL.2018 17:27:18

99 % Bandwidth; QPSK; 3690 MHz; MIMO A.



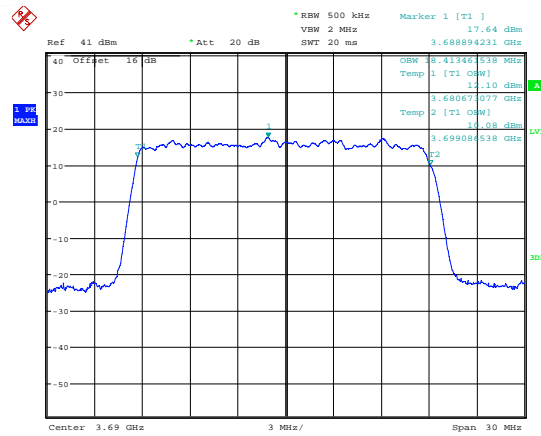
Date: 7.JUL.2018 17:29:53

99 % Bandwidth; QPSK; 3690 MHz; MIMO B.



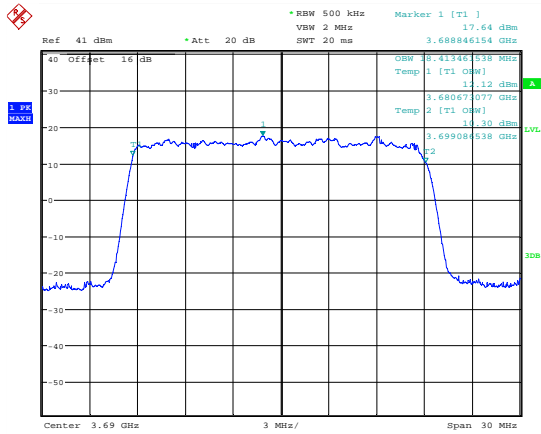
Date: 7.JUL.2018 17:27:56

99 % Bandwidth; 16QAM; 3690 MHz; MIMO A.



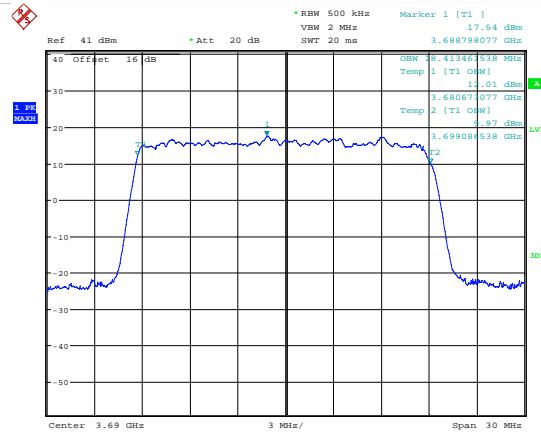
Date: 7.JUL.2018 17:31:00

99 % Bandwidth; 16QAM; 3690 MHz; MIMO B.



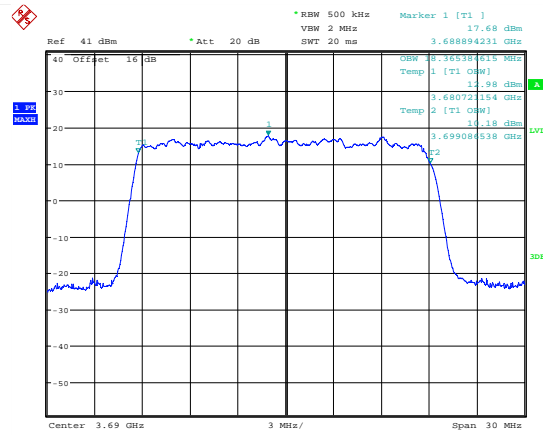
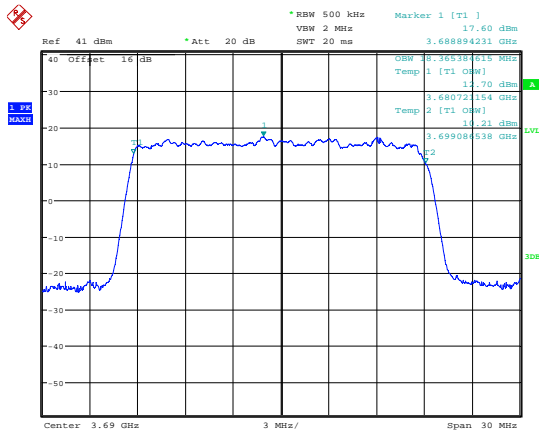
Date: 7.JUL.2018 17:28:29

99 % Bandwidth; 64QAM; 3690 MHz; MIMO A.



Date: 7.JUL.2018 17:31:52

99 % Bandwidth; 64QAM; 3690 MHz; MIMO B.



Date: 7.JUL.2018 17:29:11

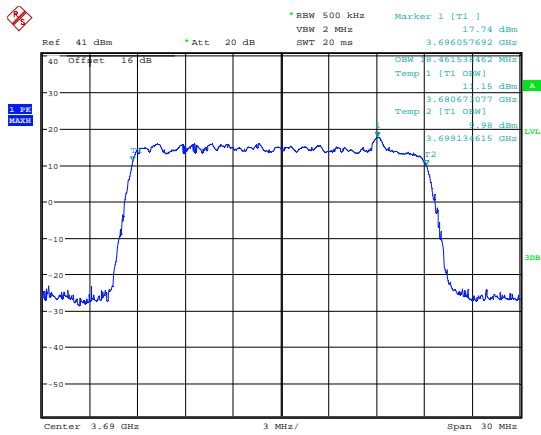
Date: 7.JUL.2018 17:32:34

99 % Bandwidth; 256QAM; 3690 MHz; MIMO A.

99 % Bandwidth; 256QAM; 3690 MHz; MIMO B.

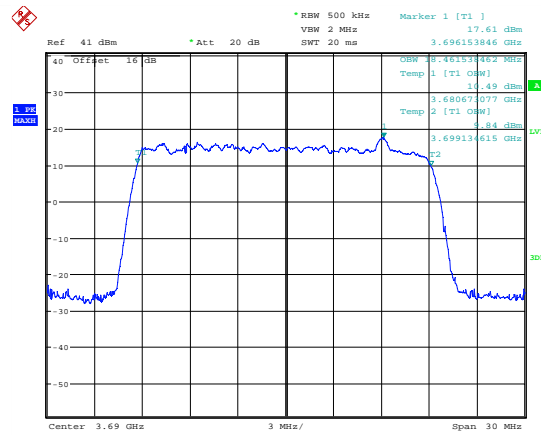
20 MHz bandwidth						
Frequency (MHz)	Modulation Mode	MIMO	FL (MHz)	FH (MHz)	99 % Bandwidth (kHz)	Result
3690	QPSK	A	3680.721	3699.086	18365	Pass
3690	QPSK	B	3680.673	3699.086	18413	Pass
3690	16QAM	A	3680.721	3699.086	18365	Pass
3690	16QAM	B	3680.673	3699.086	18413	Pass
3690	64QAM	A	3680.721	3699.086	18413	Pass
3690	64QAM	B	3680.673	3699.086	18413	Pass
3690	256QAM	A	3680.721	3699.086	18365	Pass
3690	256QAM	B	3680.721	3699.086	18365	Pass

## 20 MHz Bandwidth MU-MIMO



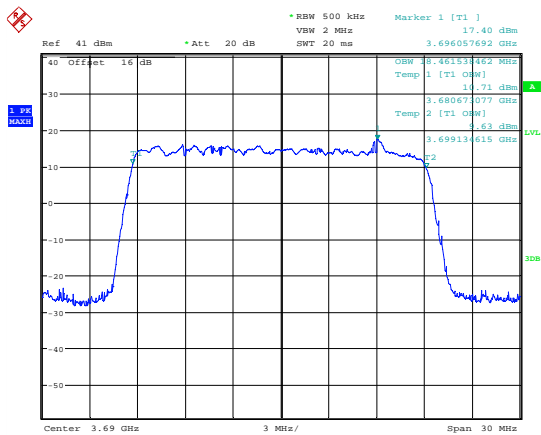
Date: 7.JUL.2018 17:47:52

99 % Bandwidth; QPSK; 3690 MHz; MIMO A.



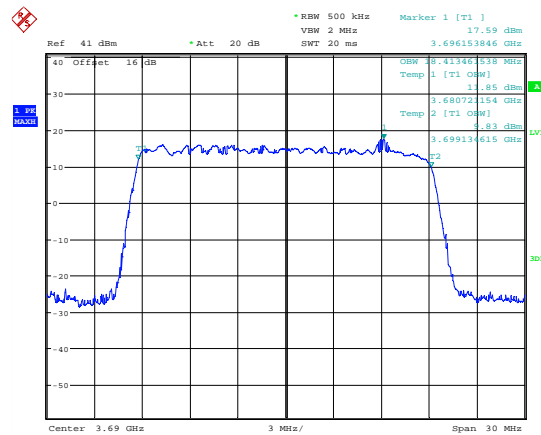
Date: 7.JUL.2018 17:44:46

99 % Bandwidth; QPSK; 3690 MHz; MIMO B.



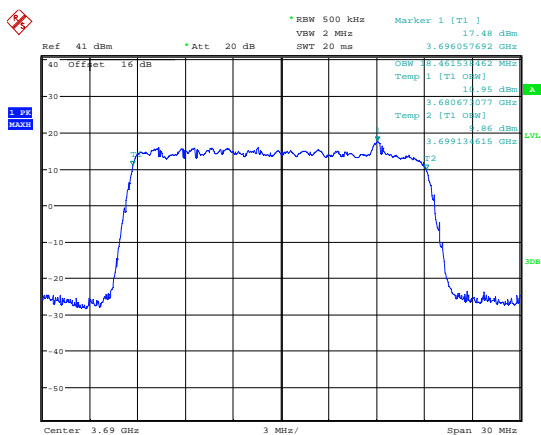
Date: 7.JUL.2018 17:47:10

99 % Bandwidth; 16QAM; 3690 MHz; MIMO A.



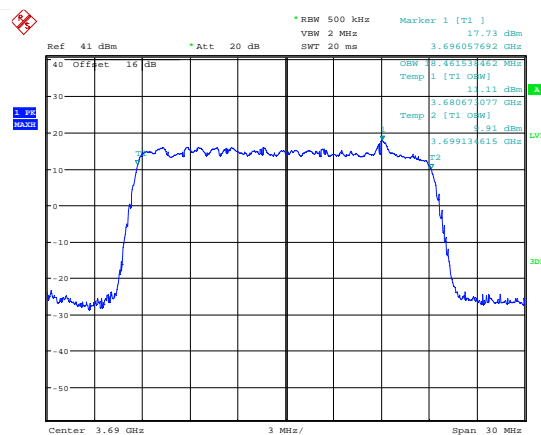
Date: 7.JUL.2018 17:43:42

99 % Bandwidth; 16QAM; 3690 MHz; MIMO B.



Date: 7.JUL.2018 17:46:20

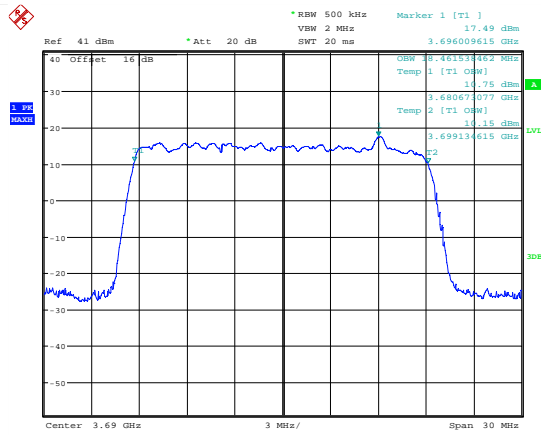
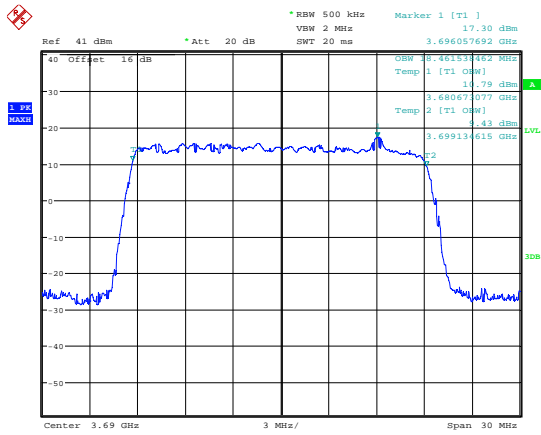
99 % Bandwidth; 64QAM; 3690 MHz; MIMO A.



Date: 7.JUL.2018 17:43:08

99 % Bandwidth; 64QAM; 3690 MHz; MIMO B.





Date: 7.JUL.2018 17:45:28

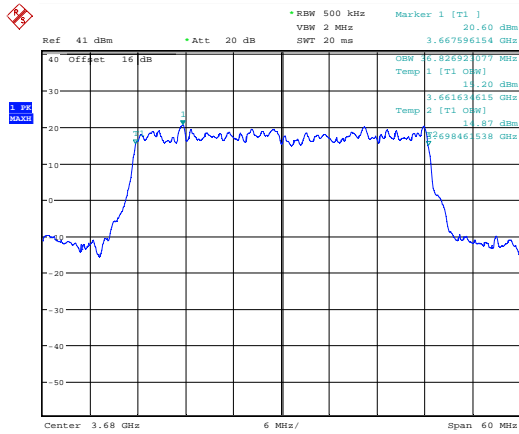
Date: 7.JUL.2018 17:42:32

99 % Bandwidth; 256QAM; 3690 MHz; MIMO A.

99 % Bandwidth; 256QAM; 3690 MHz; MIMO B.

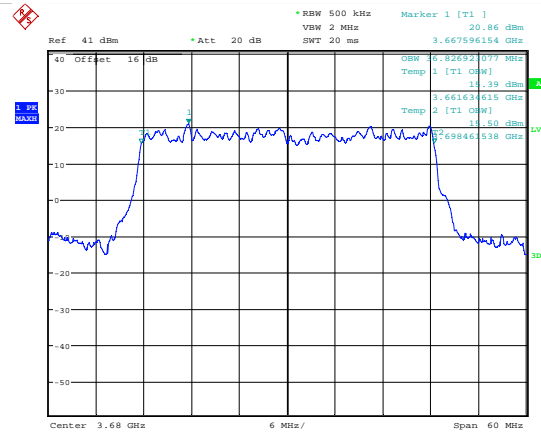
Top Channel 20 MHz bandwidth						
Frequency (MHz)	Modulation Mode	MIMO	FL (MHz)	FH (MHz)	99 % Bandwidth (kHz)	Result
3690	QPSK	A	3680.673	3699.134	18461	Pass
3690	QPSK	B	3680.673	3699.134	18461	Pass
3690	16QAM	A	3680.673	3699.134	18461	Pass
3690	16QAM	B	3680.721	3699.134	18413	Pass
3690	64QAM	A	3680.673	3699.134	18461	Pass
3690	64QAM	B	3680.673	3699.134	18461	Pass
3690	256QAM	A	3680.673	3699.134	18461	Pass
3690	256QAM	B	3680.673	3699.134	18461	Pass

# 40 MHz Bandwidth Beamforming



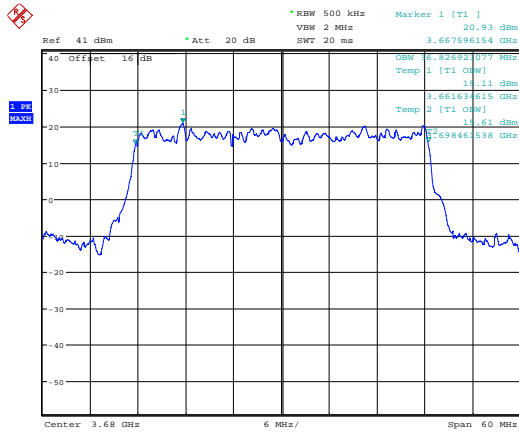
Date: 7.JUL.2018 20:22:33

99 % Bandwidth; QPSK; 3680 MHz; MIMO A.



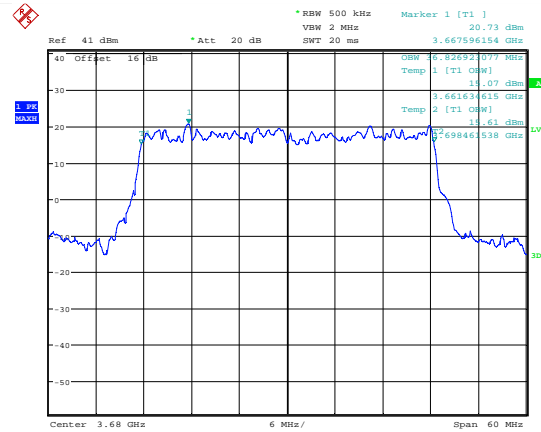
Date: 7.JUL.2018 20:19:55

99 % Bandwidth; QPSK; 3680 MHz; MIMO B.



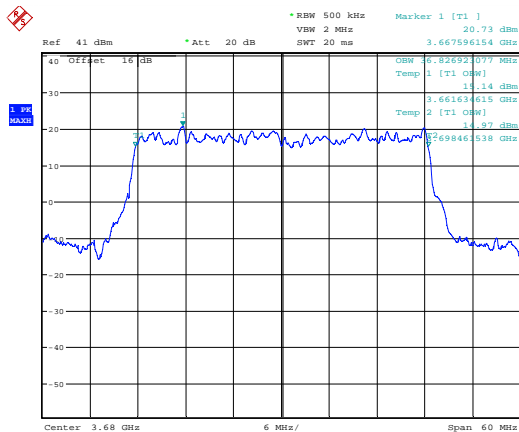
Date: 7.JUL.2018 20:21:47

99 % Bandwidth; 16QAM; 3680 MHz; MIMO A.



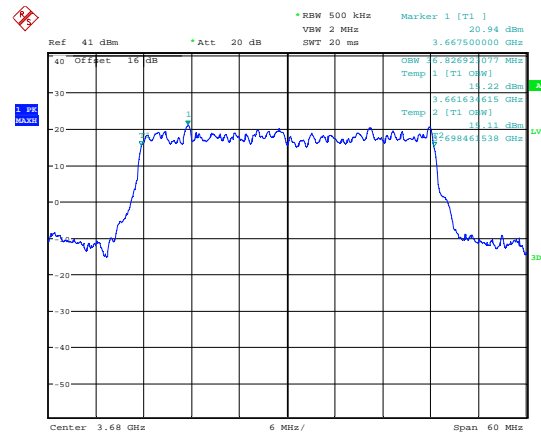
Date: 7.JUL.2018 20:19:12

99 % Bandwidth; 16QAM; 3680 MHz; MIMO B.



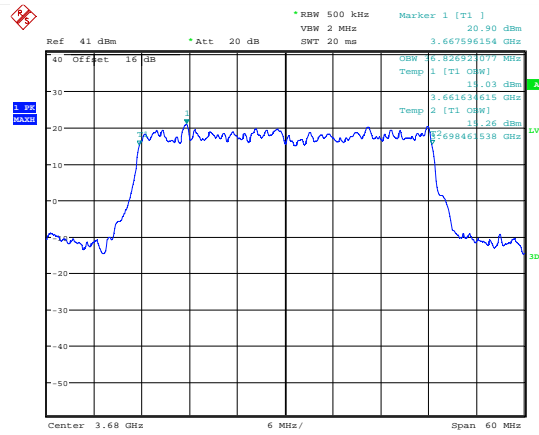
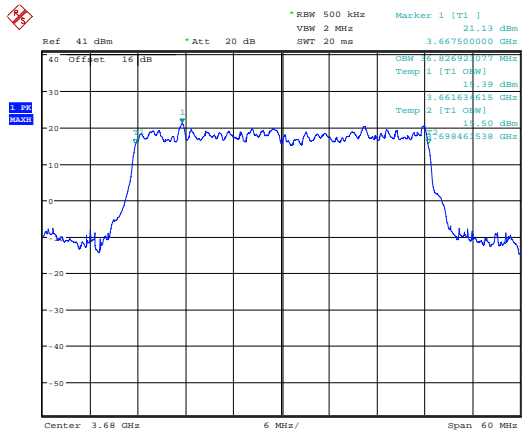
Date: 7.JUL.2018 20:21:15

99 % Bandwidth; 64QAM; 3680 MHz; MIMO A.



Date: 7.JUL.2018 20:18:38

99 % Bandwidth; 64QAM; 3680 MHz; MIMO B.



Date: 7.JUL.2018 20:20:39

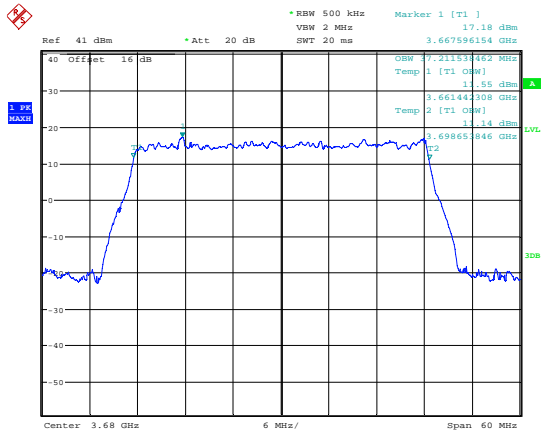
Date: 7.JUL.2018 20:18:06

99 % Bandwidth; 256QAM; 3680 MHz;  
MIMO A.

99 % Bandwidth; 256QAM; 3680 MHz;  
MIMO B.

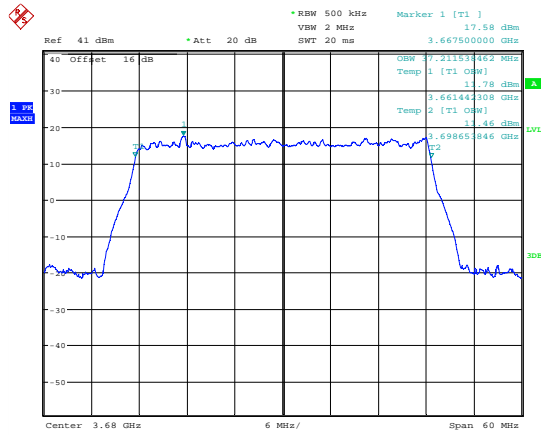
40 MHz bandwidth						
Frequency (MHz)	Modulation Mode	MIMO	FL (MHz)	FH (MHz)	99 % Bandwidth (kHz)	Result
3680	QPSK	A	3661.635	3698.462	36827	Pass
3680	QPSK	B	3661.635	3698.462	36827	Pass
3680	16QAM	A	3661.635	3698.462	36827	Pass
3680	16QAM	B	3661.635	3698.462	36827	Pass
3680	64QAM	A	3661.635	3698.462	36827	Pass
3680	64QAM	B	3661.635	3698.462	36827	Pass
3680	256QAM	A	3661.635	3698.462	36827	Pass
3680	256QAM	B	3661.635	3698.462	36827	Pass

### 40 MHz Bandwidth Sector



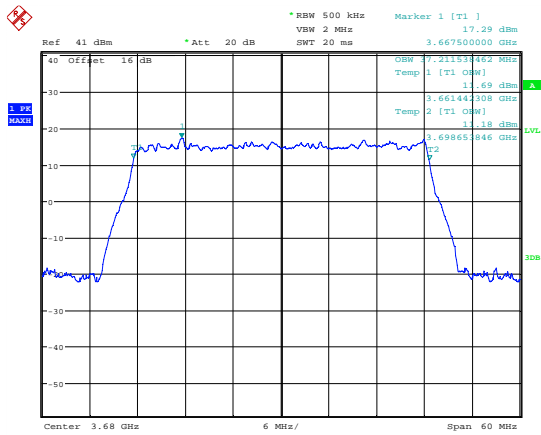
Date: 7.JUL.2018 20:08:51

99 % Bandwidth; QPSK; 3680 MHz; MIMO A.



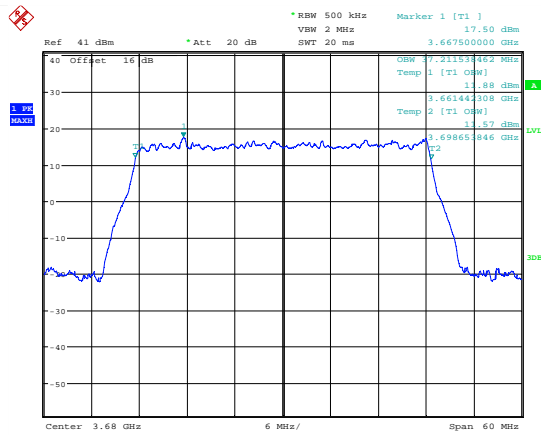
Date: 7.JUL.2018 20:12:43

99 % Bandwidth; QPSK; 3680 MHz; MIMO B.



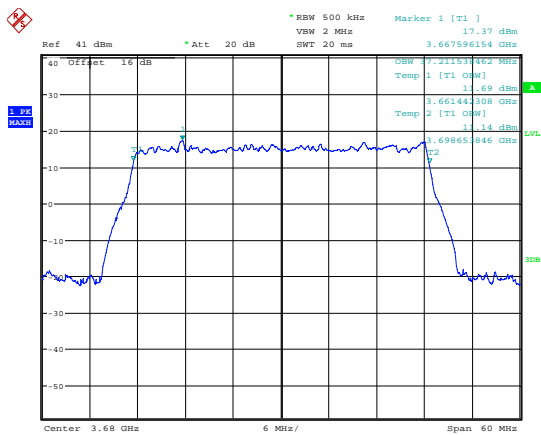
Date: 7.JUL.2018 20:09:30

99 % Bandwidth; 16QAM; 3680 MHz; MIMO A.



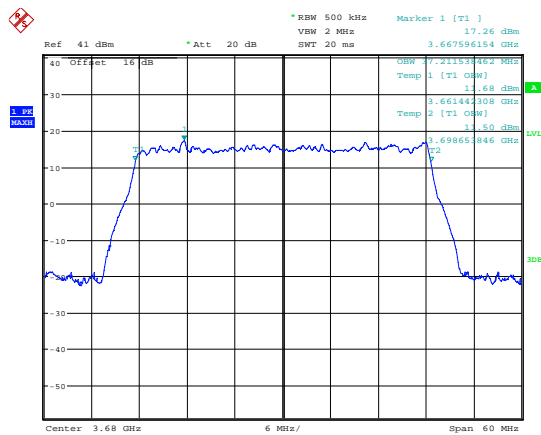
Date: 7.JUL.2018 20:13:40

99 % Bandwidth; 16QAM; 3680 MHz; MIMO B.



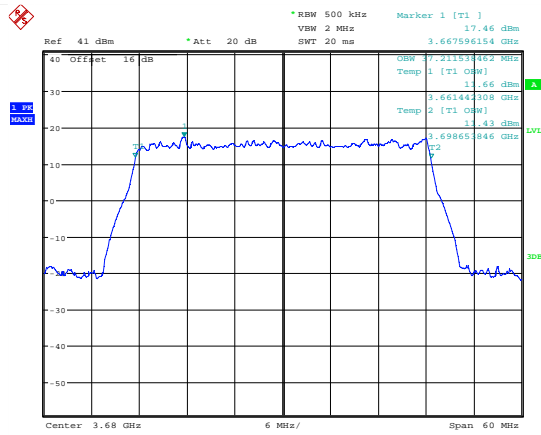
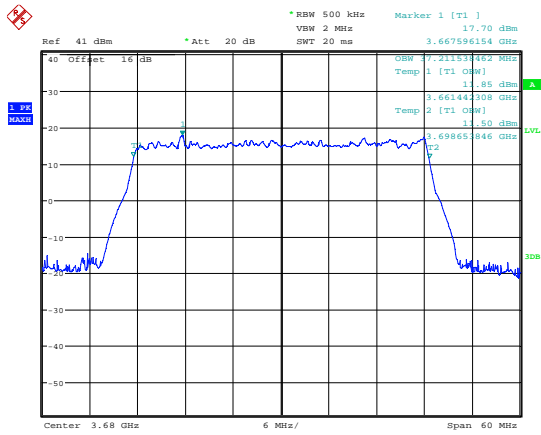
Date: 7.JUL.2018 20:10:07

99 % Bandwidth; 64QAM; 3680 MHz; MIMO A.



Date: 7.JUL.2018 20:14:40

99 % Bandwidth; 64QAM; 3680 MHz; MIMO B.



Date: 7.JUL.2018 20:10:55

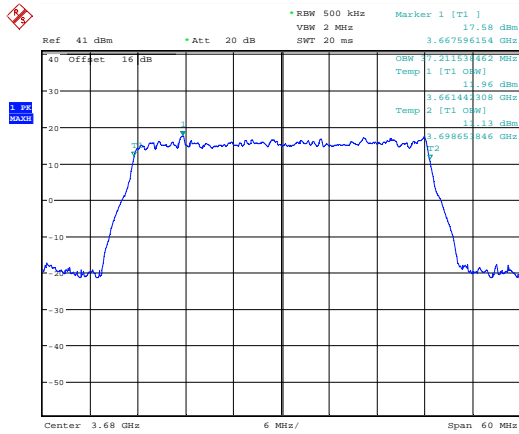
Date: 7.JUL.2018 20:16:17

99 % Bandwidth; 256QAM; 3680 MHz; MIMO A.

99 % Bandwidth; 256QAM; 3680 MHz; MIMO B.

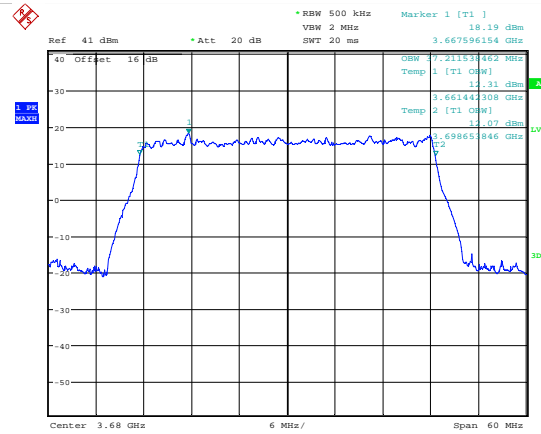
40 MHz bandwidth						
Frequency (MHz)	Modulation Mode	MIMO	FL (MHz)	FH (MHz)	99 % Bandwidth (kHz)	Result
3680	QPSK	A	3661.442	3698.654	37212	Pass
3680	QPSK	B	3661.442	3698.654	37212	Pass
3680	16QAM	A	3661.442	3698.654	37212	Pass
3680	16QAM	B	3661.442	3698.654	37212	Pass
3680	64QAM	A	3661.442	3698.654	37212	Pass
3680	64QAM	B	3661.442	3698.654	37212	Pass
3680	256QAM	A	3661.442	3698.654	37212	Pass
3680	256QAM	B	3661.442	3698.654	37212	Pass

### 40 MHz Bandwidth MU-MIMO



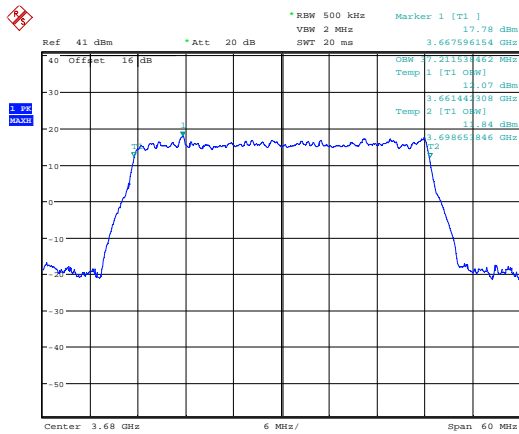
Date: 7.JUL.2018 20:24:09

99 % Bandwidth; QPSK; 3680 MHz; MIMO A.



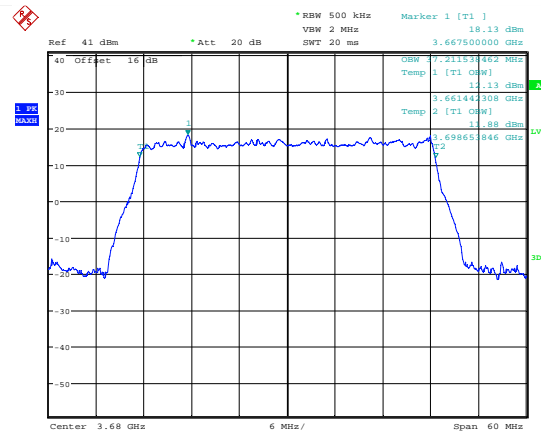
Date: 7.JUL.2018 20:26:19

99 % Bandwidth; QPSK; 3680 MHz; MIMO B.



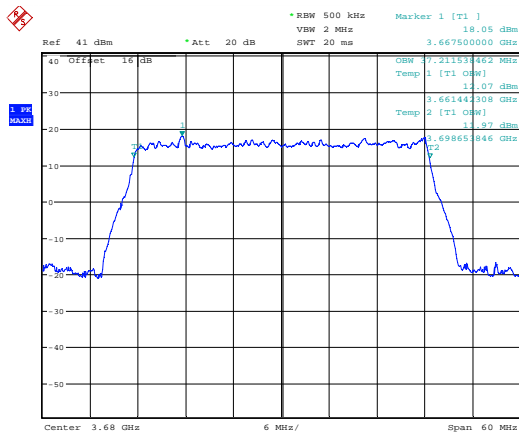
Date: 7.JUL.2018 20:24:51

99 % Bandwidth; 16QAM; 3680 MHz; MIMO A.



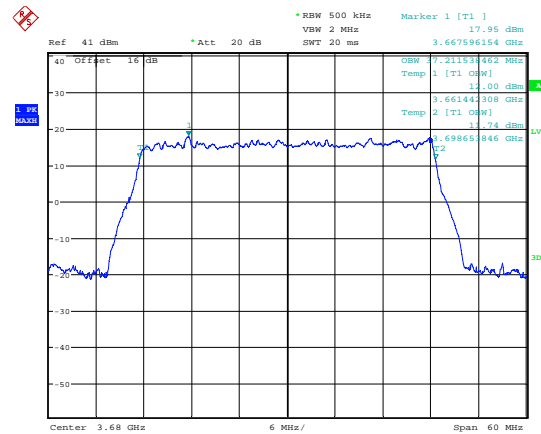
Date: 7.JUL.2018 20:26:44

99 % Bandwidth; 16QAM; 3680 MHz; MIMO B.



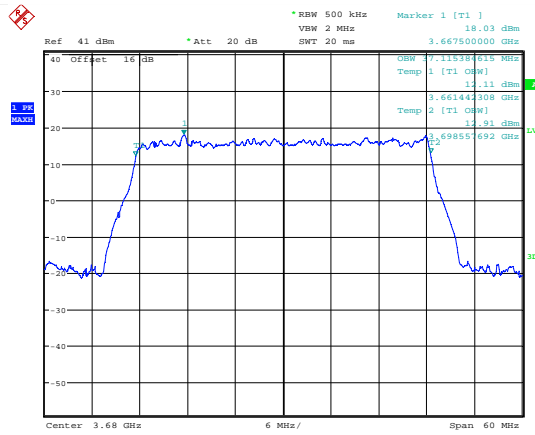
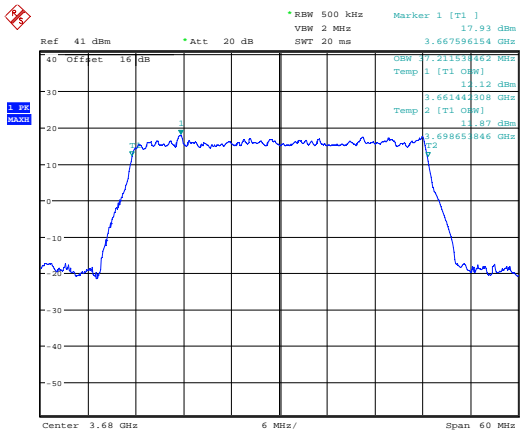
Date: 7.JUL.2018 20:25:19

99 % Bandwidth; 64QAM; 3680 MHz; MIMO A.



Date: 7.JUL.2018 20:27:14

99 % Bandwidth; 64QAM; 3680 MHz; MIMO B.



Date: 7.JUL.2018 20:25:55

Date: 7.JUL.2018 20:27:47

99 % Bandwidth; 256QAM; 3680 MHz; MIMO A.

99 % Bandwidth; 256QAM; 3680 MHz; MIMO B.

40 MHz bandwidth						
Frequency (MHz)	Modulation Mode	MIMO	FL (MHz)	FH (MHz)	99 % Bandwidth (kHz)	Result
3680	QPSK	A	3661.442	3698.654	37212	Pass
3680	QPSK	B	3661.442	3698.654	37212	Pass
3680	16QAM	A	3661.442	3698.654	37212	Pass
3680	16QAM	B	3661.442	3698.654	37212	Pass
3680	64QAM	A	3661.442	3698.654	37212	Pass
3680	64QAM	B	3661.442	3698.654	37212	Pass
3680	256QAM	A	3661.442	3698.654	37212	Pass
3680	256QAM	B	3661.442	3698.557	37115	Pass

## 16 Frequency stability

### 16.1 Definition

Frequency stability is a measure of frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at an appropriate reference temperature and the rated supply voltage.

### 16.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	Blocking Laboratory
Test Standard and Clause:	2.1055
Frequency Measured:	3697.5 MHz
Resolution Bandwidth: ( Requirement 1 % of the Occupied Channel Bandwidth):	50 kHz
Modulation:	Off
Deviations From Standard:	None
Temperature Extreme Environment Test Range:	-30 to +50 C
Voltage Extreme Environment Test Range:	Power = $\pm 15\%$ of Nominal;

### Environmental Conditions (Normal Environment)

Temperature: 24 °C	Standard Requirement: +20 °C
Humidity: 60 %RH	20 % RH to 75 % RH (as declared)

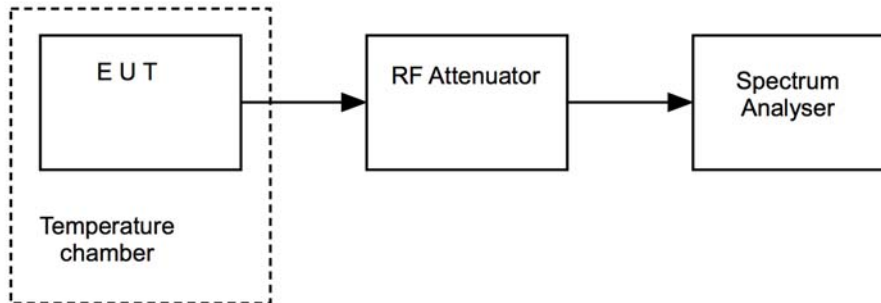


### 16.3 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure v, the frequency was measured under varying conditions of temperature and supply voltage.

The measurements were performed with EUT set in a CW mode of operation.

**Figure v Test Setup**



### 16.4 Test Equipment

Equipment Type	Manufacturer	Equipment Description	Element No	Due For Calibration
FSU50	R&S	Spectrum Analyser	U544	2019-05-22
34405a	Agilent	Multimeter	REF976	2019-01-17
52 Series II	Fluke	Temperature Indicator	L426	2019-06-18

**16.5 Test Results**

<b>EUT Frequency: 3697.5</b>					
<b>Test Environment</b>		<b>Measured Frequency (MHz)</b>	<b>Frequency error (kHz)</b>	<b>Drift (ppm)</b>	<b>Result</b>
-30 C	V <sub>nominal</sub>	3697.151923	7.21	1.95	PASS
-20 C	V <sub>nominal</sub>	3697.150321	5.61	1.52	PASS
-10 C	V <sub>nominal</sub>	3697.149679	4.97	1.34	PASS
0 C	V <sub>nominal</sub>	3697.153365	8.65	2.34	PASS
+10 C	V <sub>nominal</sub>	3697.148077	3.37	0.91	PASS
+20 C	V <sub>minimum</sub>	3697.144712	0.00	0.00	PASS
	V <sub>nominal</sub>	3697.144712	N/A	N/A	N/A
	V <sub>maximum</sub>	3697.145032	0.32	0.09	PASS
+30 C	V <sub>nominal</sub>	3697.147436	2.72	0.74	PASS
+40 C	V <sub>nominal</sub>	3697.144551	-0.16	-0.04	PASS
+50 C	V <sub>nominal</sub>	3697.144551	-0.16	-0.04	PASS

## 17 Measurement Uncertainty

### Calculated Measurement Uncertainties

All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95 % confidence:

#### [1] Radiated spurious emissions

Uncertainty in test result (30 MHz to 1 GHz) = **4.75 dB**

Uncertainty in test result (1 GHz to 18 GHz) = **4.46 dB**

#### [2] AC power line conducted emissions

Uncertainty in test result = **3.2 dB**

#### [3] Occupied bandwidth

Uncertainty in test result = **15.58 %**

#### [4] Conducted carrier power

Uncertainty in test result (Power Meter) = **0.93 dB**

#### [5] Conducted RF power out-of-band

Uncertainty in test result – up to 8.1 GHz = **3.31 dB**

Uncertainty in test result – 8.1 GHz to 15.3 GHz = **4.43 dB**

#### [6] Radiated RF power out-of-band

Uncertainty in test result (30 MHz to 1 GHz) = **4.75 dB**

Uncertainty in test result (1 GHz to 18 GHz) = **4.46 dB**

#### [7] Power spectral density

Uncertainty in test result (Spectrum Analyser) = **3.11 dB**

#### [8] ERP / EIRP

Uncertainty in test result (Laboratory) = **4.71 dB**

Uncertainty in test result (Persore OATS) = **4.26 dB**