

Test report

REP0031625-2R1TRFWL

Date of issue: November 1, 2023

Applicant:

SOLID CO., LTD

Product Name:

SOLID O-RAN ORU CBR5

Model:

O-LRU_CBRSM2

Model variant:

None

FCC ID:

W6UOLRCBRSM2

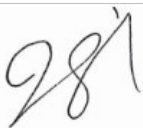
Specifications:

◆ **FCC 47 CFR Part 96**

Citizens Broadband Radio Service

Lab and test locations

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Tested by	Chenhao Mao, Wireless Technician
Reviewed by	James Cunningham, EMC/WL Manager
Review date	November 1, 2023
Reviewer signature	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko USA's ISO/IEC 17025 accreditation.

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Section 1. Report summary

1.1 Applicant and manufacturer

Company name	SOLiD CO., LTD
Address	800 Klein Road, Suite 200
City	Plano
Province/State	TX
Postal/Zip code	75074
Country	United States of America

1.2 Test specifications

FCC 47 CFR Part 96	Citizens Broadband Radio Service
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1.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.4 Exclusions

None

1.5 Test report revision history

Revision #	Details of changes made to test report
REP0031625-2TRFWL	Original report issued
REP0031625-2R1TRFWL	Updated following TCB feedback

Section 2. Summary of test results

2.1 FCC Part 96 test results

Part	Test description	Verdict
§96.41(a)	Modulation type	Pass
§2.1049(h)	99% Occupied bandwidth	Pass
§2.1049(h)	26 dB Occupied bandwidth	Pass
§2.1055	Frequency stability	Pass
§96.41(b)	Power limits (EIRP)	Pass
§96.41(b)	Power limits (power spectral density)	Pass
§96.41(e)	Conducted spurious emissions	Pass
§96.41(e)	Radiated spurious emissions	Pass
§96.41(g)	Peak to average power ratio	Pass

Note: None.

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	April 27, 2023
Nemko sample ID number	PRJ0031625

3.2 EUT information

Product name	SOLID O-RAN ORU CBRS
Model	O-LRU_CBRS2
Part Number	N/A
Serial number	6853032250007
FCC ID:	W6UOLRCS2
Software Details	FW Version 1.1.10 with Domain-Proxy version 4.4.2-72
Hardware Details	0.0.1

3.3 Technical information

Frequency band	3550 – 3700 MHz (Band TDD48)
RF power Max (W), Conducted	Measured: Highest total channel power across all ports: 32.35 dBm (1718 mW)
Supported bandwidths:	10, 20, 30, 40 MHz
Type of modulation	QPSK; 16QAM; 64QAM, 256QAM
Power requirements	100 – 240 VAC / 50/60 Hz via AC/DC adaptor, 48 VDC nominal
Antenna information	The EUT is professionally installed.
Number of antenna ports	2 Transmit, 2 Receive. 2 transmit antenna are correlated (per manufacturer's declaration)
Maximum antenna gain	5.5 dBi

3.4 Product description and theory of operation

The O-RAN compliant SURFplatform enables private LTE networks based on licensed LTE and CBRS spectrum, as well as a migration path in supporting 5G NR.

3.5 EUT exercise details

The EUT was controlled via suitable connected support equipment to permit configuration of the radio in the desired modes for testing.

3.6 EUT setup diagram

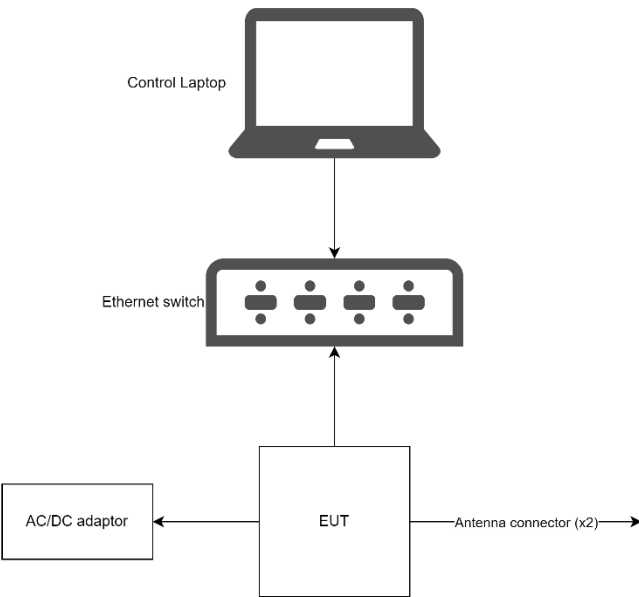


Figure 3.6-1: Setup diagram

3.7 EUT sub-assemblies

Table 3.7-1: EUT sub-assemblies and auxiliary equipment

Description	Brand Name	Model / Part Number	Serial Number / System Name
Router	CISCO	RV340	PSZ24211QPD
DU	SUPERMICRO / NETGEAR	ENG. SAMPLE	ENG. SAMPLE
Control Laptop	DELL		23964452246

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ± 5 %, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of $K = 2$ with 95% certainty.

Table 6.1-1: *Measurement uncertainty.*

Test name	Measurement uncertainty,
All antenna port measurements/ including OBW	0.55
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78
AC power line conducted emissions	1.38
Supply Voltages	0.05%
Time	2.09%

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMC Test Receiver	Rohde & Schwarz	ESU 40	E1121	1 year	31-May-2023
System Controller	Sunol Sciences	SC104V	E1191	NCR	NCR
Antenna, Bilog	Schaffner-Chase	CBL 6111D	1763	2 years	01-Apr-2024
Antenna, DRG Horn	ETS-Lindgren	3117-PA	E1139	2 years	19-Apr-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	E1302	1 year	20-Oct-2023
Band Reject Filter	Micro-Tronics	BRM50711	EW102	NCR	NCR
Environmental Chamber	TESTEQUITY	115A	E1162	1 year	29-Aug-2023
Standard Gain Horn Antenna	Eravant	SAZ-2410-42-S1	E107	VOU	VOU

Notes: N/A – not applicable
 NCR – no calibration required
 VOU – verify on use

Section 8. Testing data

8.1 FCC §96.41(a) Modulation type

8.1.1 Definitions and limits

(a) Digital modulation. Systems operating in the Citizens Broadband Radio Service must use digital modulation techniques.

8.1.2 Test summary

Test date	April 27, 2023	Temperature	21 °C
Test engineer	Chenhao Mao, Wireless Technician	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	48 %

8.1.3 Observations, settings, and special notes

None

8.1.4 Test data

Band TDD48:

Bandwidth (MHz)	Emission type
10	QPSK, 16QAM, 64QAM, 256QAM
20	QPSK, 16QAM, 64QAM, 256QAM
30	QPSK, 16QAM, 64QAM, 256QAM
40	QPSK, 16QAM, 64QAM, 256QAM

Table 8.1-1: Types of emission

8.2 FCC §2.1049(h) 99% Occupied Bandwidth and frequency ranges

8.2.1 Definitions and limits

§2.1049 (h) Transmitters employing digital modulation techniques—when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the use.

8.2.2 Test summary

Test date	April 27, 2023	Temperature	18 °C
Test engineer	Chenhao Mao, Wireless Technician	Air pressure	1001 mbar
Verdict	Pass	Relative humidity	62%

8.2.3 Observations, settings, and special notes

Selection of Antenna Port 2 was according to section 8.2.4 of this document.

Test method: ANSI C63.26 Section 5.4.4

Spectrum analyzer settings:

Resolution bandwidth	1% - 5% OBW
Video bandwidth	3*RBW
Frequency span	2*OBW
Detector mode	Peak
Trace mode	Max Hold

8.2.4 Test data

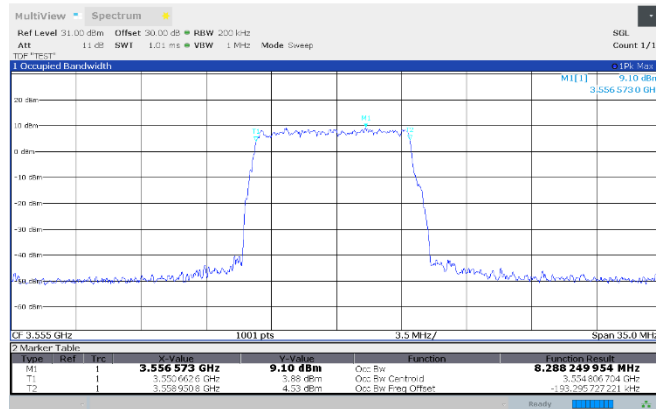
Band TDD48:

Band	Port	Channel Bandwidth (Declared)	Modulation	Center Frequency (MHz)	99% OBW (MHz)
TDD48	2	10 MHz	QPSK	3555	8.288
TDD48	2	10 MHz	16QAM	3555	8.295
TDD48	2	10 MHz	64QAM	3555	8.290
TDD48	2	10 MHz	256QAM	3555	8.246
TDD48	2	10 MHz	QPSK	3625	8.268
TDD48	2	10 MHz	16QAM	3625	8.289
TDD48	2	10 MHz	64QAM	3625	8.267
TDD48	2	10 MHz	256QAM	3625	8.268
TDD48	2	10 MHz	QPSK	3695	8.269
TDD48	2	10 MHz	16QAM	3695	8.298
TDD48	2	10 MHz	64QAM	3695	8.273
TDD48	2	10 MHz	256QAM	3695	8.265
TDD48	2	20 MHz	QPSK	3560	17.880
TDD48	2	20 MHz	16QAM	3560	17.897
TDD48	2	20 MHz	64QAM	3560	17.954
TDD48	2	20 MHz	256QAM	3560	17.899
TDD48	2	20 MHz	QPSK	3625	17.894
TDD48	2	20 MHz	16QAM	3625	17.912
TDD48	2	20 MHz	64QAM	3625	17.939
TDD48	2	20 MHz	256QAM	3625	17.878
TDD48	2	20 MHz	QPSK	3690	17.925
TDD48	2	20 MHz	16QAM	3690	17.921
TDD48	2	20 MHz	64QAM	3690	17.936
TDD48	2	20 MHz	256QAM	3690	17.913
TDD48	2	30 MHz	QPSK	3565	27.563
TDD48	2	30 MHz	16QAM	3565	27.530
TDD48	2	30 MHz	64QAM	3565	27.515
TDD48	2	30 MHz	256QAM	3565	27.588
TDD48	2	30 MHz	QPSK	3625	27.550
TDD48	2	30 MHz	16QAM	3625	27.504
TDD48	2	30 MHz	64QAM	3625	27.508
TDD48	2	30 MHz	256QAM	3625	27.561
TDD48	2	30 MHz	QPSK	3685	27.527
TDD48	2	30 MHz	16QAM	3685	27.579
TDD48	2	30 MHz	64QAM	3685	27.517
TDD48	2	30 MHz	256QAM	3685	27.547
TDD48	2	40 MHz	QPSK	3570	37.545
TDD48	2	40 MHz	16QAM	3570	37.543
TDD48	2	40 MHz	64QAM	3570	37.584
TDD48	2	40 MHz	256QAM	3570	37.615
TDD48	2	40 MHz	QPSK	3625	37.578
TDD48	2	40 MHz	16QAM	3625	37.515
TDD48	2	40 MHz	64QAM	3625	37.570
TDD48	2	40 MHz	256QAM	3625	37.541
TDD48	2	40 MHz	QPSK	3690	37.584
TDD48	2	40 MHz	16QAM	3690	37.516
TDD48	2	40 MHz	64QAM	3690	37.650
TDD48	2	40 MHz	256QAM	3690	37.577

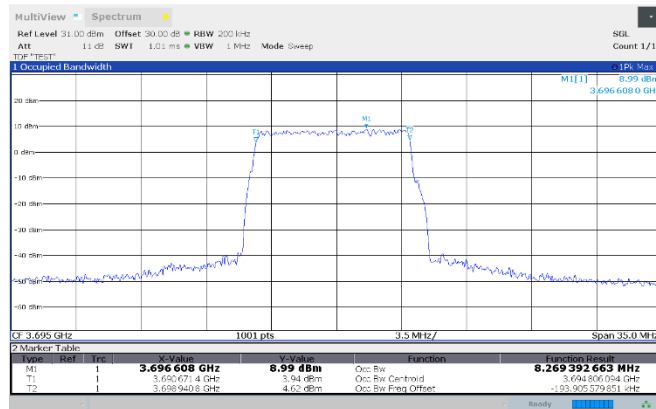
Table 8.2-1: 99% Occupied bandwidth

Band TDD48

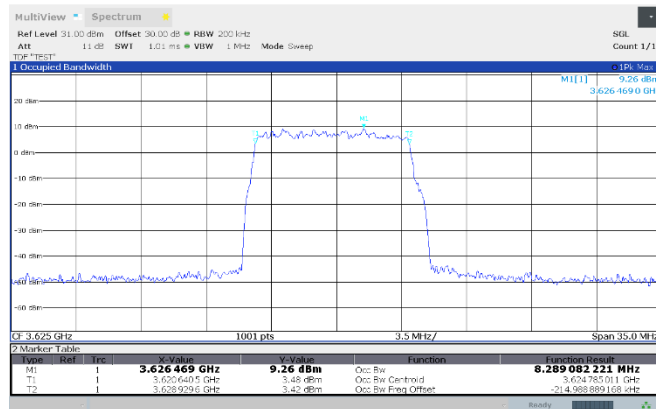
Occupied bandwidth (99 %), TX: 3555 MHz, BW: 10MHz, MOD: QPSK



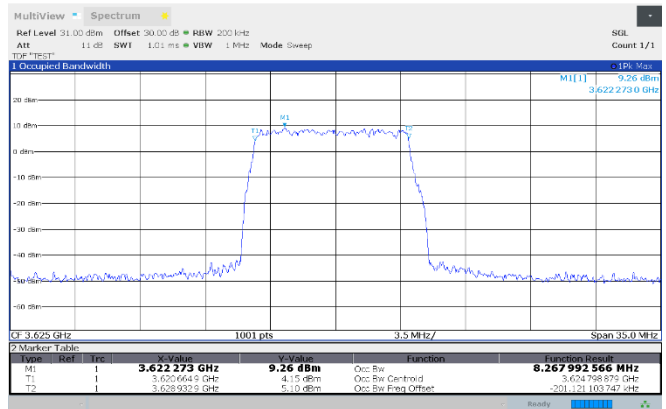
Occupied bandwidth (99 %), TX: 3695 MHz, BW: 10MHz, MOD: QPSK



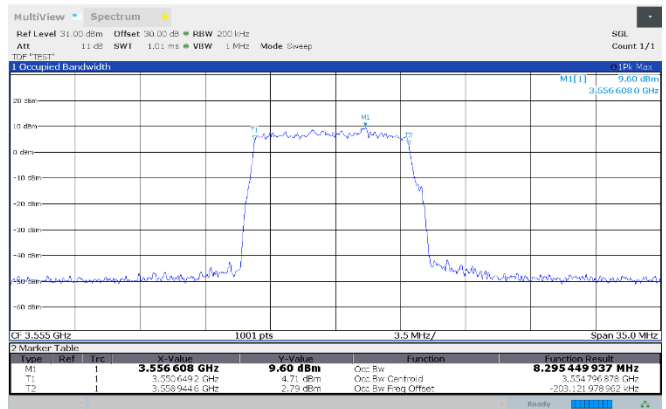
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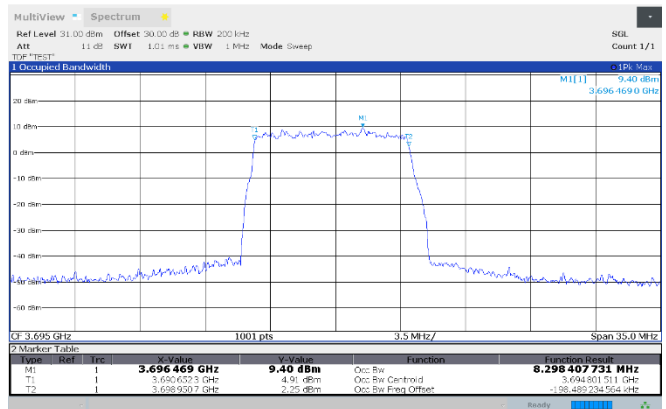
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Occupied bandwidth (99 %), TX: 3555 MHz, BW: 10MHz, MOD: 16QAM



Occupied bandwidth (99 %), TX: 3695 MHz, BW: 10MHz, MOD: 16QAM

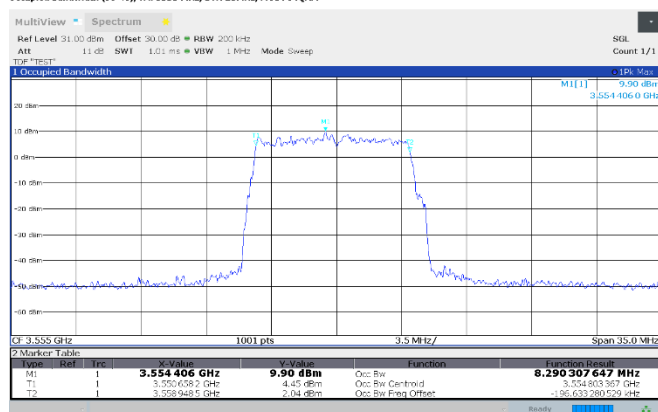


Section 8
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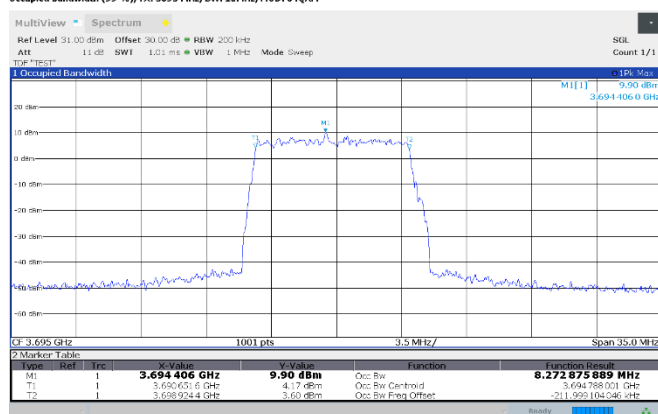
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FCC §2.1049(h) 99% Occupied Bandwidth
FCC Part 96



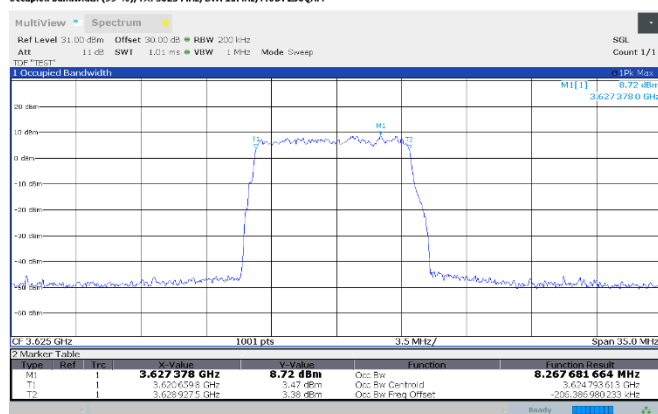
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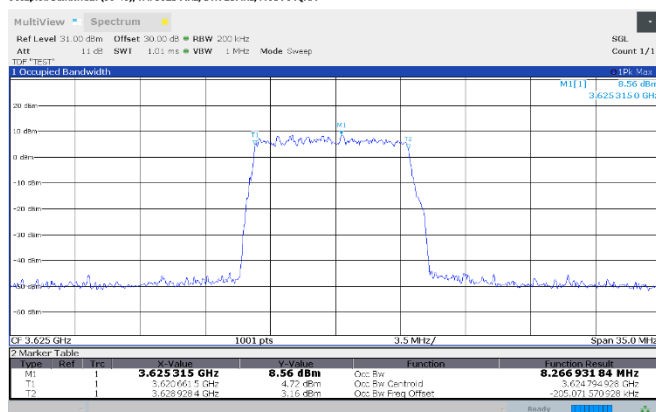
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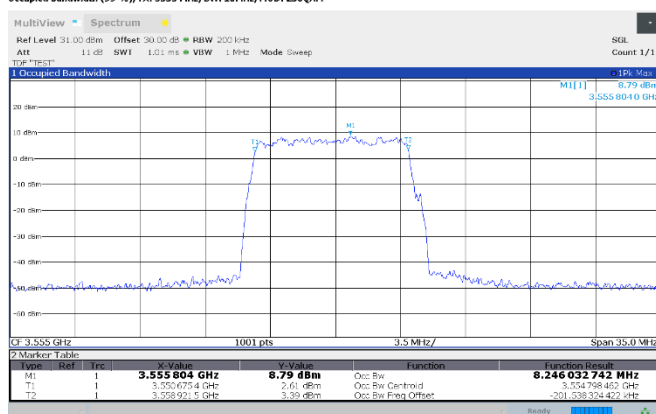
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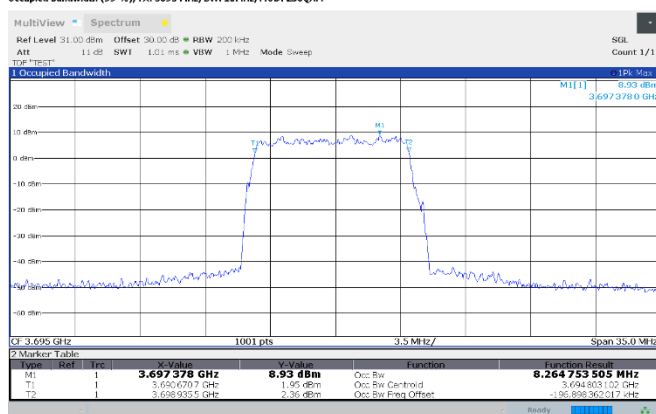
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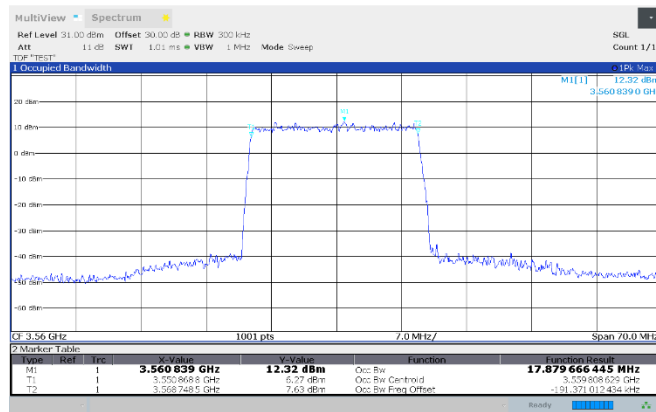


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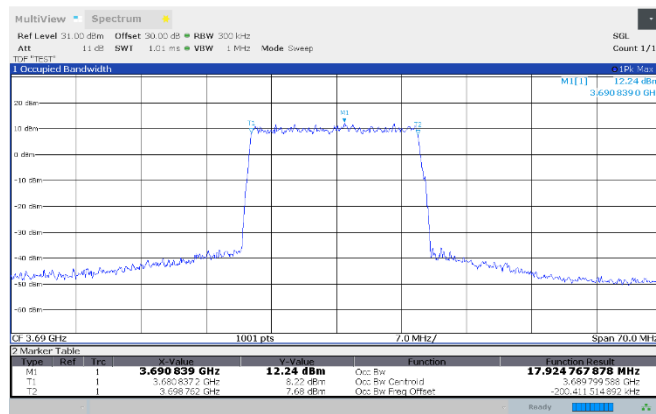
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FCC §2.1049(h) 99% Occupied Bandwidth
FCC Part 96



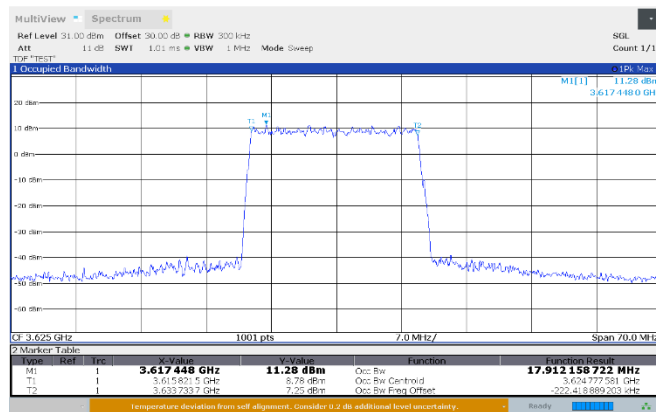
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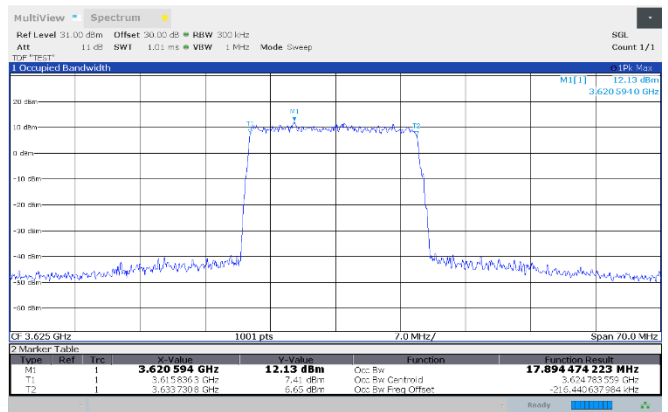
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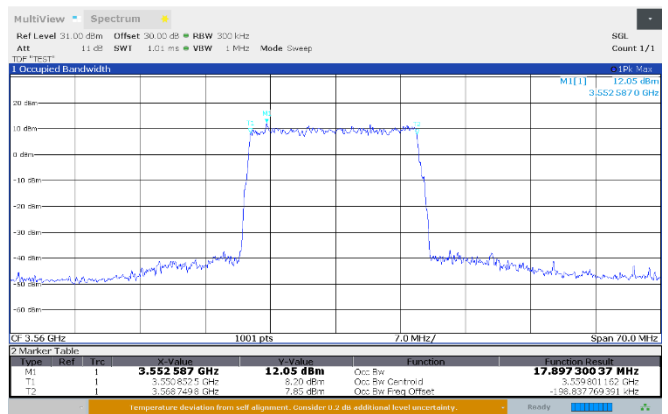
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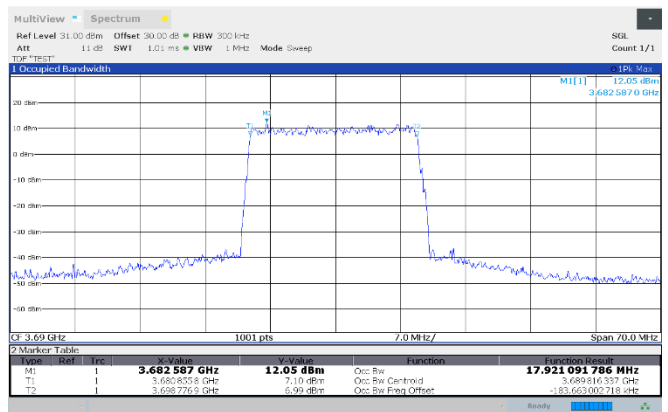
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Occupied bandwidth (99 %), TX: 3560 MHz, BW: 20MHz, MOD: 16QAM



Occupied bandwidth (99 %), TX: 3690 MHz, BW: 20MHz, MOD: 16QAM

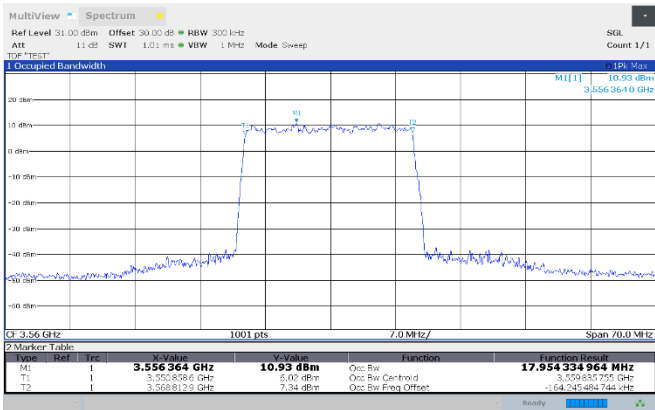


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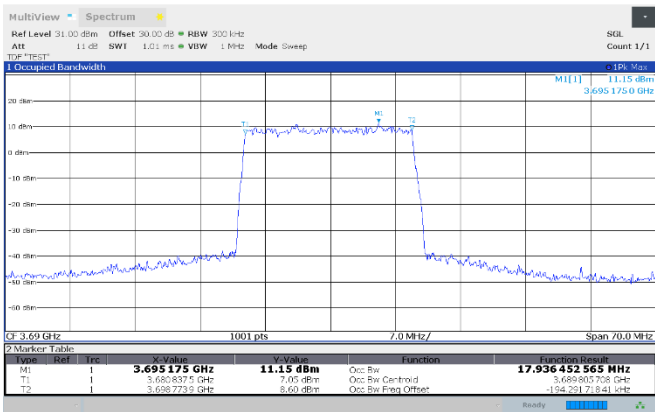
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FCC Part 96



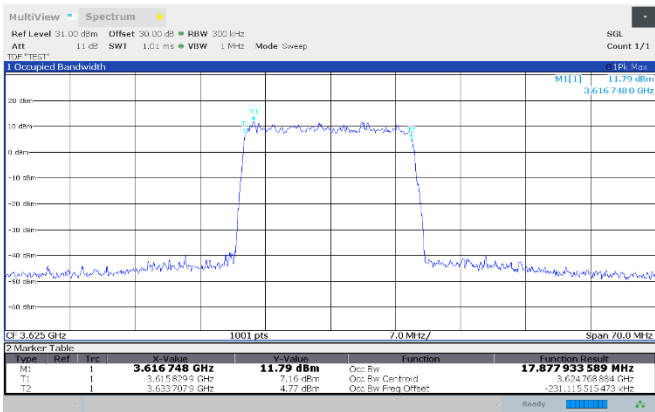
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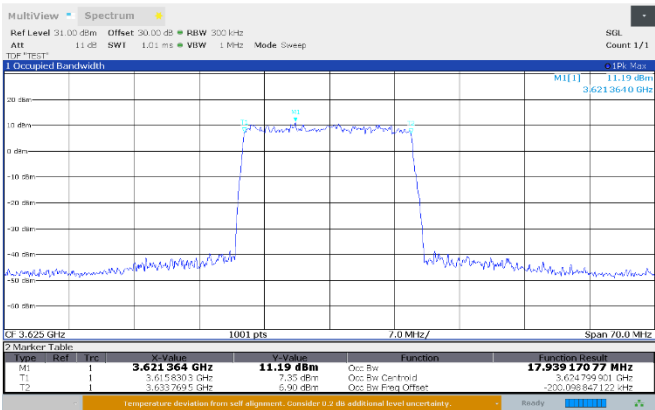
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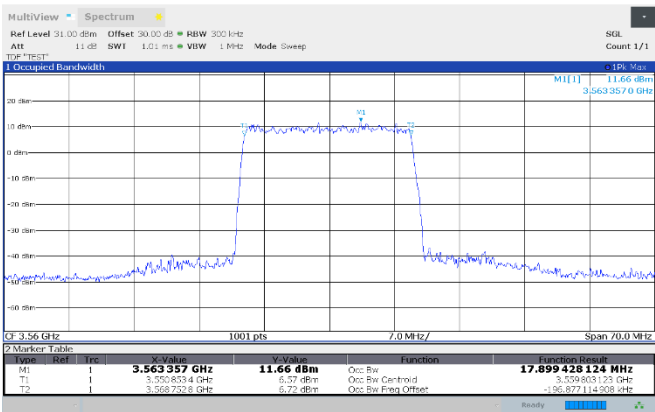
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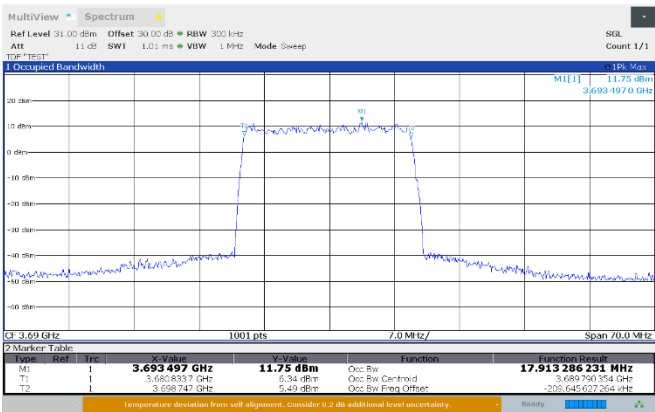
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Occupied bandwidth (99 %), TX: 3560 MHz, BW: 20MHz, MOD: 256QAM



Occupied bandwidth (99 %), TX: 3690 MHz, BW: 20MHz, MOD: 256QAM

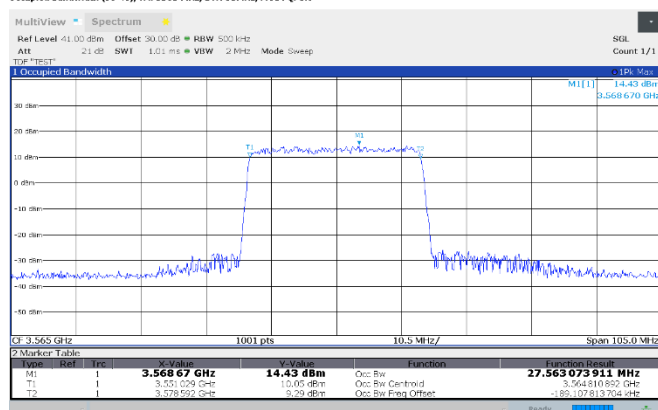


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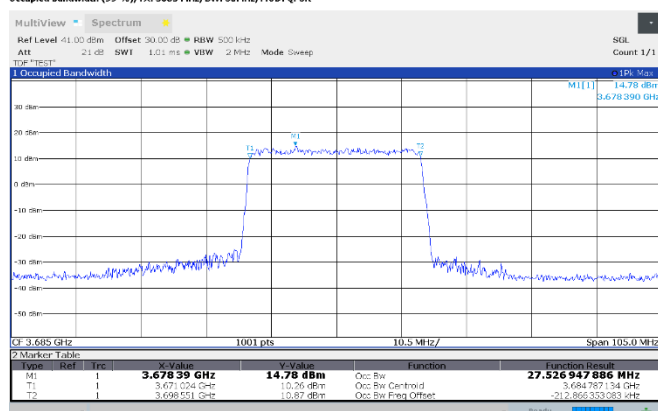
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FCC §2.1049(h) 99% Occupied Bandwidth
FCC Part 96



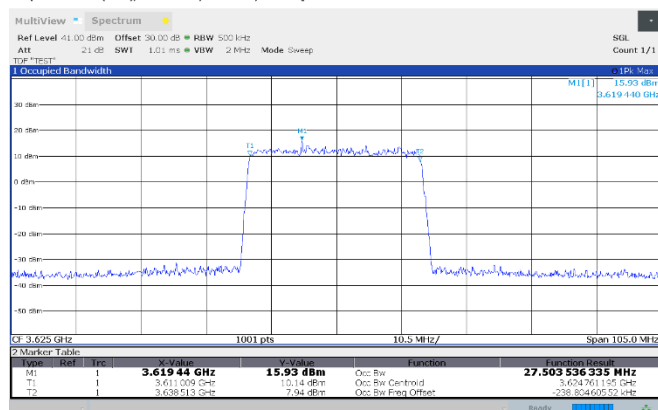
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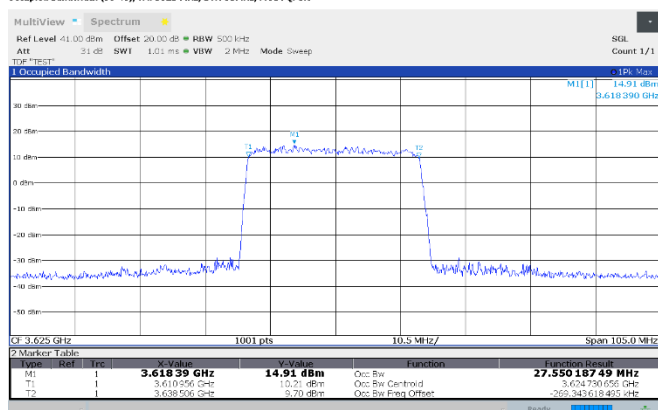
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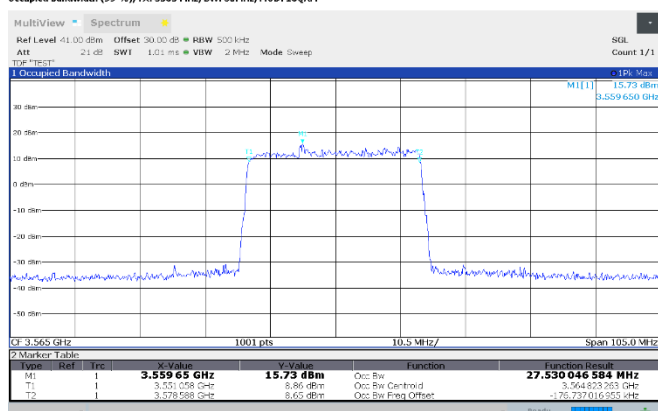
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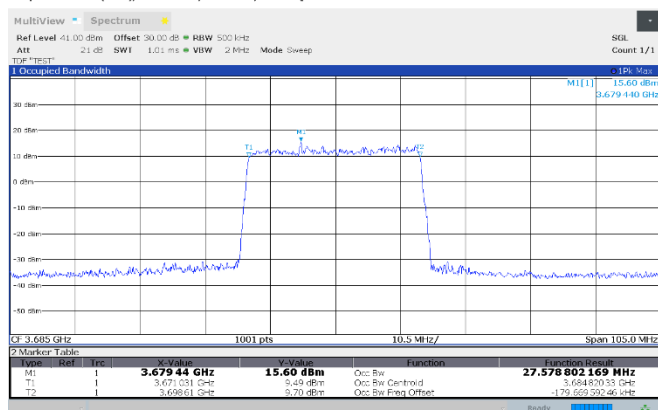
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Occupied bandwidth (99 %), TX: 3565 MHz, BW: 30MHz, MOD: 16QAM



Occupied bandwidth (99 %), TX: 3685 MHz, BW: 30MHz, MOD: 16QAM

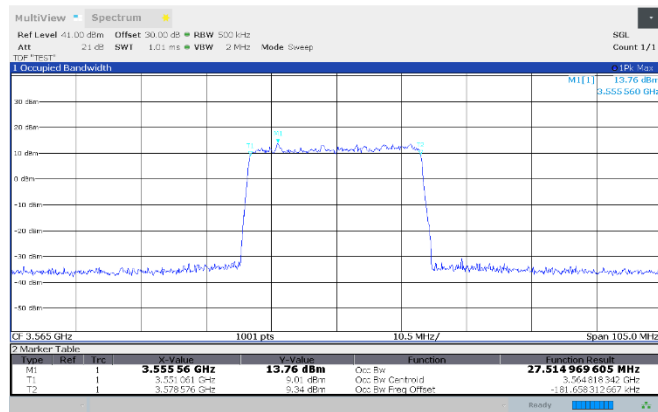


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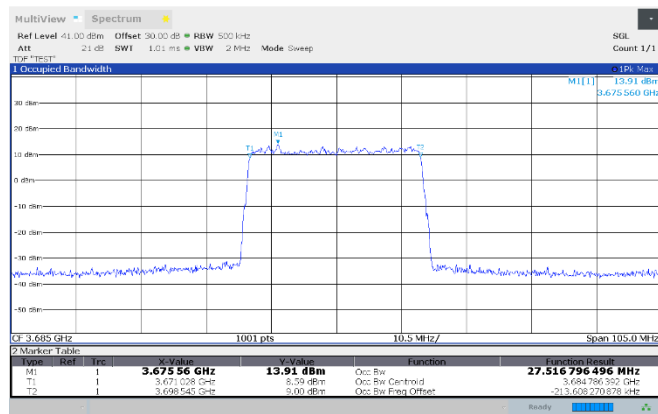
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FCC §2.1049(h) 99% Occupied Bandwidth
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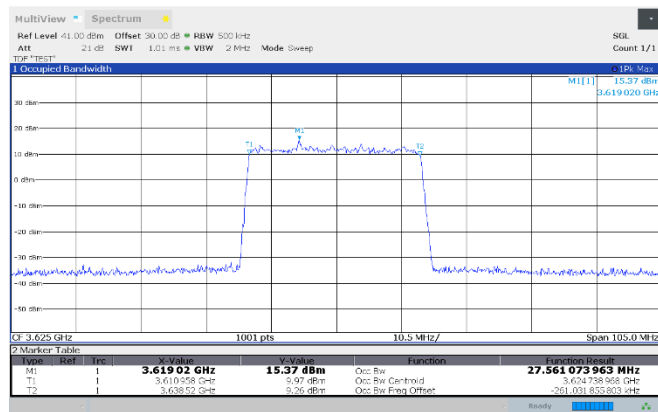
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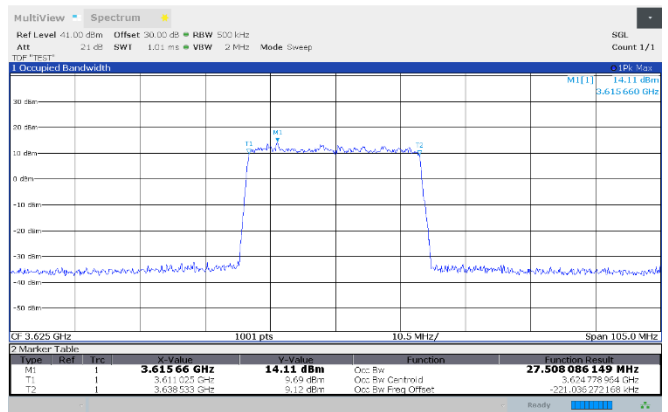
Occupied bandwidth (99 %), TX: 3685 MHz, BW: 30MHz, MOD: 64QAM



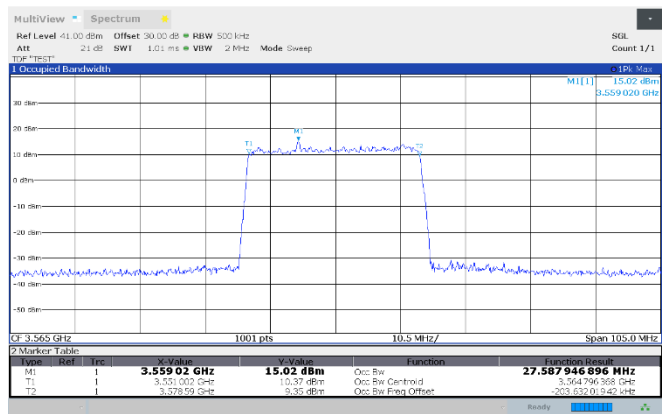
Occupied bandwidth (99 %), TX: 3625 MHz, BW: 30MHz, MOD: 256QAM



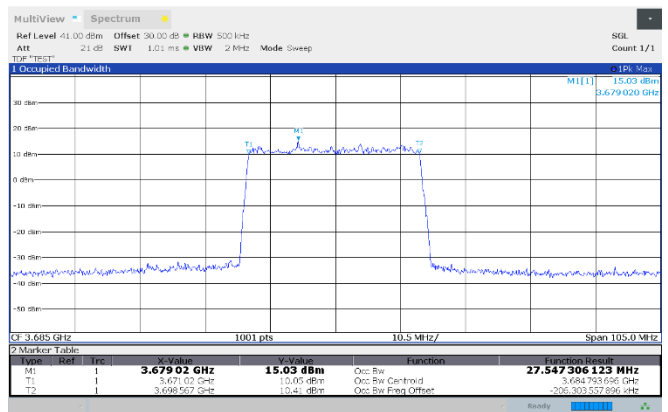
Occupied bandwidth (99 %), TX: 3625 MHz, BW: 30MHz, MOD: 64QAM



Occupied bandwidth (99 %), TX: 3565 MHz, BW: 30MHz, MOD: 256QAM



Occupied bandwidth (99 %), TX: 3685 MHz, BW: 30MHz, MOD: 256QAM

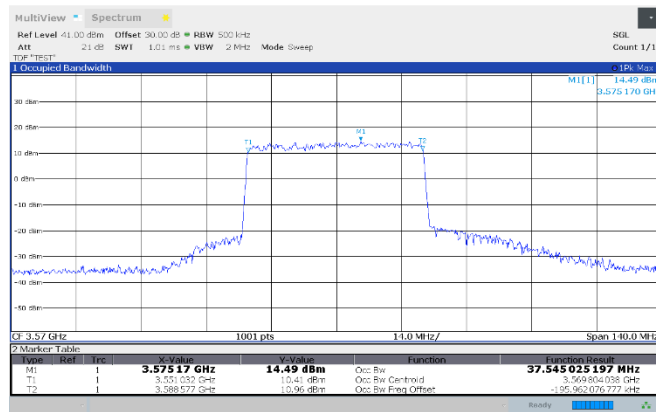


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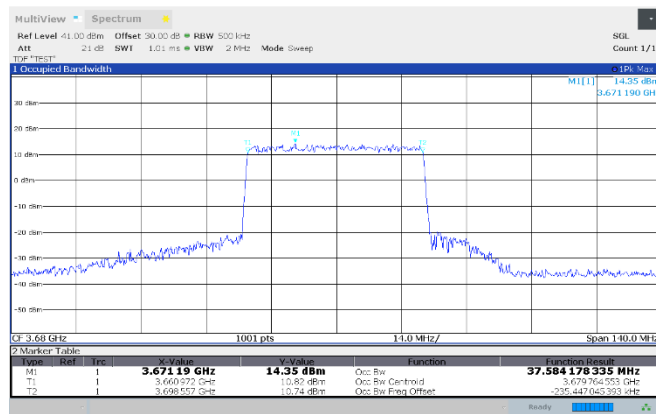
Testing data
FCC §2.1049(h) 99% Occupied Bandwidth
FCC Part 96



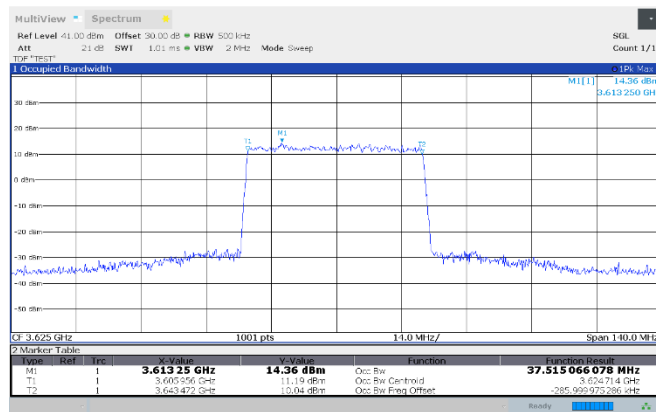
Occupied bandwidth (99 %), TX: 3570 MHz, BW: 40MHz, MOD: QPSK



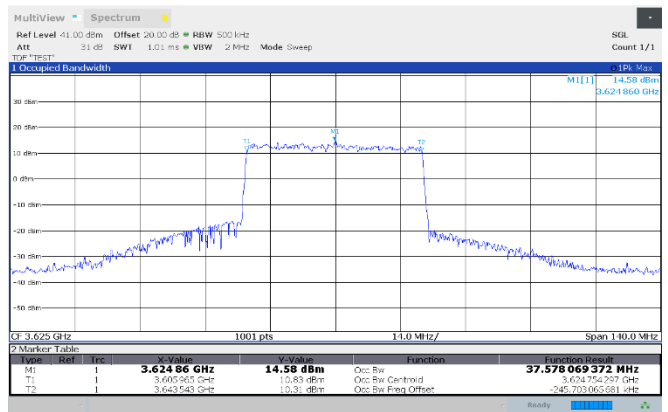
Occupied bandwidth (99 %), TX: 3680 MHz, BW: 40MHz, MOD: QPSK



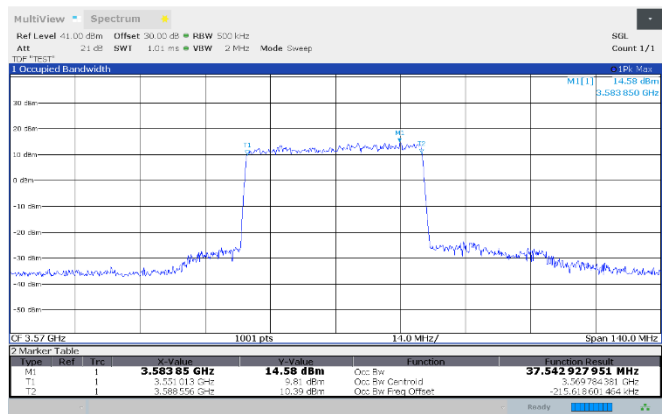
Occupied bandwidth (99 %), TX: 3625 MHz, BW: 40MHz, MOD: 16QAM



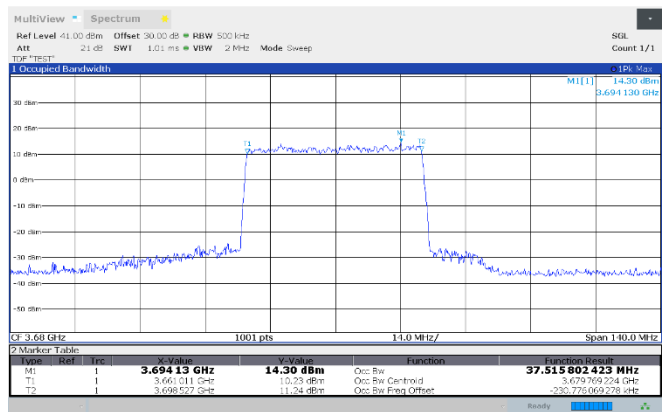
Occupied bandwidth (99 %), TX: 3625 MHz, BW: 40MHz, MOD: QPSK



Occupied bandwidth (99 %), TX: 3570 MHz, BW: 40MHz, MOD: 16QAM



Occupied bandwidth (99 %), TX: 3680 MHz, BW: 40MHz, MOD: 16QAM

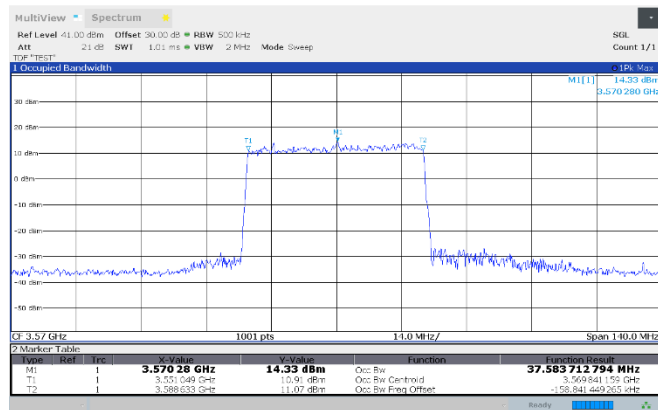


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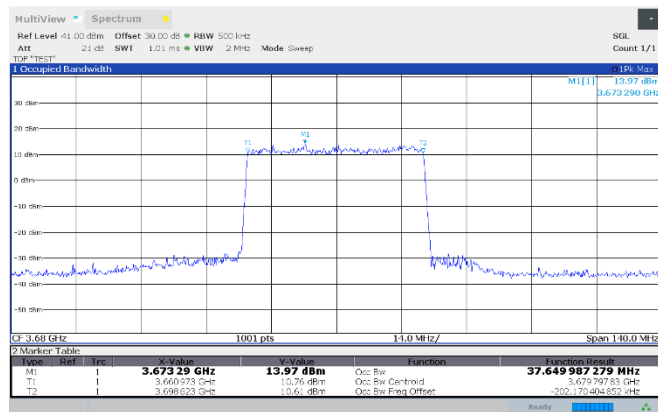
Testing data
FCC §2.1049(h) 99% Occupied Bandwidth
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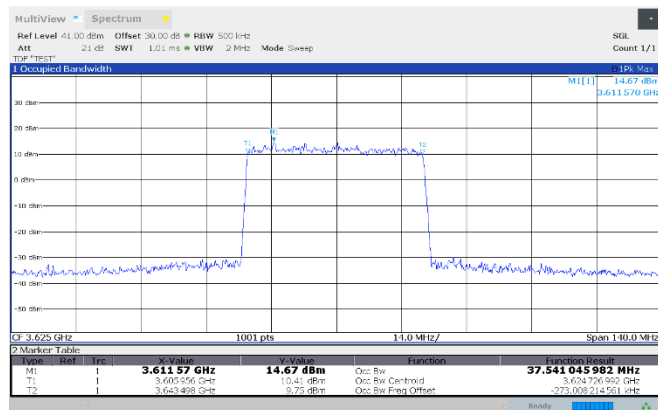
Occupied bandwidth (99 %), TX: 3570 MHz, BW: 40MHz, MOD: 64QAM



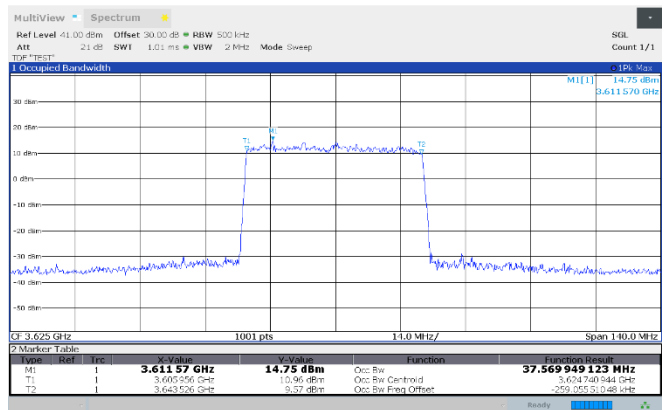
Occupied bandwidth (99 %), TX: 3680 MHz, BW: 40MHz, MOD: 64QAM



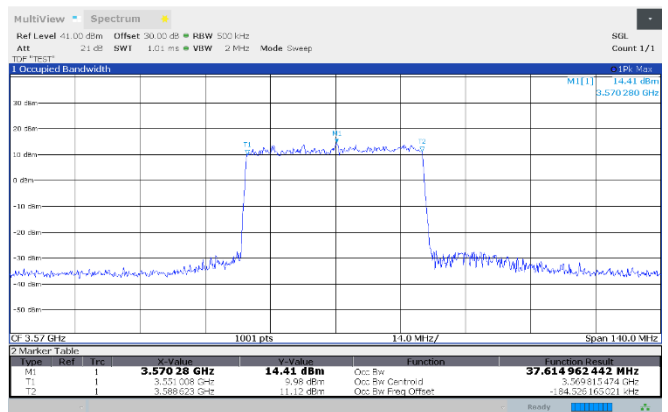
Occupied bandwidth (99 %), TX: 3625 MHz, BW: 40MHz, MOD: 256QAM



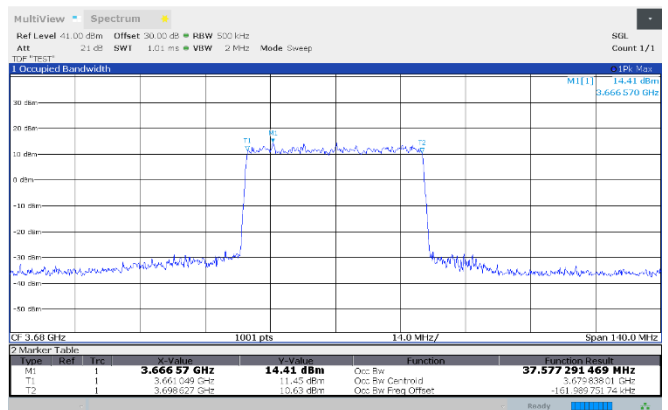
Occupied bandwidth (99 %), TX: 3625 MHz, BW: 40MHz, MOD: 64QAM



Occupied bandwidth (99 %), TX: 3570 MHz, BW: 40MHz, MOD: 256QAM



Occupied bandwidth (99 %), TX: 3680 MHz, BW: 40MHz, MOD: 256QAM



8.3 FCC §96.41(b) 26 dB Occupied Bandwidth

8.3.1 Definitions and limits

(3) Measurement procedure. (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

8.3.2 Test summary

Test date	April 27, 2023	Temperature	18 °C
Test engineer	Chenhao Mao, Wireless Technician	Air pressure	1001 mbar
Verdict	Pass	Relative humidity	62%

8.3.3 Observations, settings and special notes

Selection of Port 2 was according to section 8.2.4 of this document.

Test method: ANSI C63.26 Section 5.4.3

Spectrum analyzer settings:

Resolution bandwidth	1% - 5% OBW
Video bandwidth	3*RBW
Frequency span	2*OBW
Detector mode	Peak
Trace mode	Max Hold

8.3.4 Test data

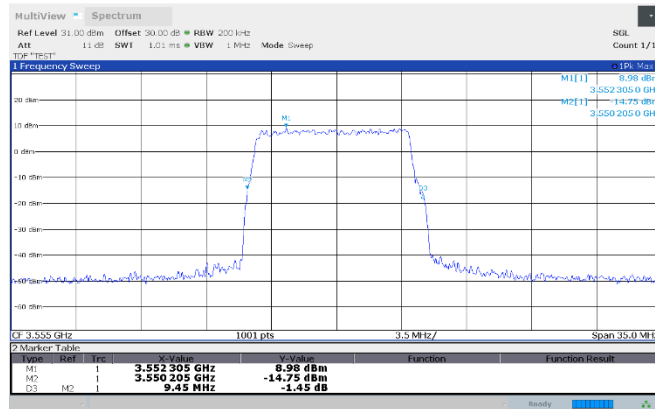
Band TDD48:

Band	Port	Channel Bandwidth (Declared)	Modulation	Center Frequency (MHz)	26 BW (MHz)
TDD48	2	10 MHz	QPSK	3555	9.450
TDD48	2	10 MHz	16QAM	3555	9.450
TDD48	2	10 MHz	64QAM	3555	9.310
TDD48	2	10 MHz	256QAM	3555	9.345
TDD48	2	10 MHz	QPSK	3625	9.485
TDD48	2	10 MHz	16QAM	3625	9.450
TDD48	2	10 MHz	64QAM	3625	9.205
TDD48	2	10 MHz	256QAM	3625	9.345
TDD48	2	10 MHz	QPSK	3695	9.450
TDD48	2	10 MHz	16QAM	3695	9.520
TDD48	2	10 MHz	64QAM	3695	9.380
TDD48	2	10 MHz	256QAM	3695	9.380
TDD48	2	20 MHz	QPSK	3560	19.390
TDD48	2	20 MHz	16QAM	3560	19.320
TDD48	2	20 MHz	64QAM	3560	19.320
TDD48	2	20 MHz	256QAM	3560	19.110
TDD48	2	20 MHz	QPSK	3625	19.180
TDD48	2	20 MHz	16QAM	3625	19.320
TDD48	2	20 MHz	64QAM	3625	19.250
TDD48	2	20 MHz	256QAM	3625	19.110
TDD48	2	20 MHz	QPSK	3690	19.250
TDD48	2	20 MHz	16QAM	3690	19.110
TDD48	2	20 MHz	64QAM	3690	19.180
TDD48	2	20 MHz	256QAM	3690	19.040
TDD48	2	30 MHz	QPSK	3565	29.505
TDD48	2	30 MHz	16QAM	3565	29.295
TDD48	2	30 MHz	64QAM	3565	29.610
TDD48	2	30 MHz	256QAM	3565	29.400
TDD48	2	30 MHz	QPSK	3625	29.610
TDD48	2	30 MHz	16QAM	3625	29.190
TDD48	2	30 MHz	64QAM	3625	29.190
TDD48	2	30 MHz	256QAM	3625	29.295
TDD48	2	30 MHz	QPSK	3685	29.610
TDD48	2	30 MHz	16QAM	3685	29.505
TDD48	2	30 MHz	64QAM	3685	29.400
TDD48	2	30 MHz	256QAM	3685	29.295
TDD48	2	40 MHz	QPSK	3570	39.480
TDD48	2	40 MHz	16QAM	3570	39.480
TDD48	2	40 MHz	64QAM	3570	39.340
TDD48	2	40 MHz	256QAM	3570	39.480
TDD48	2	40 MHz	QPSK	3625	39.340
TDD48	2	40 MHz	16QAM	3625	39.760
TDD48	2	40 MHz	64QAM	3625	39.480
TDD48	2	40 MHz	256QAM	3625	39.480
TDD48	2	40 MHz	QPSK	3690	39.480
TDD48	2	40 MHz	16QAM	3690	39.760
TDD48	2	40 MHz	64QAM	3690	39.480
TDD48	2	40 MHz	256QAM	3690	39.340

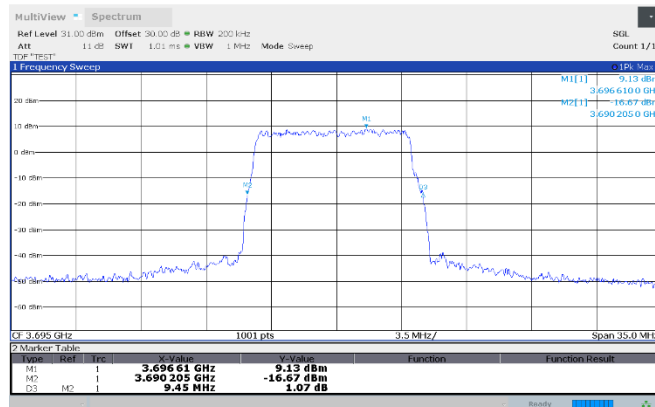
Table 8.3-1: 26 dB Occupied bandwidth

Band TDD48

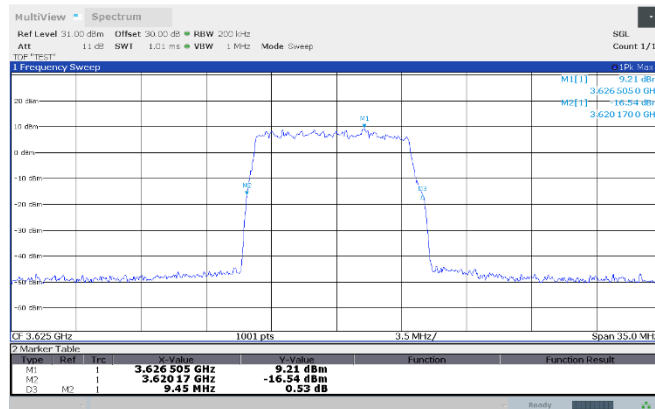
Occupied bandwidth (26 dB), TX: 3555 MHz, BW: 10MHz, MOD: QPSK



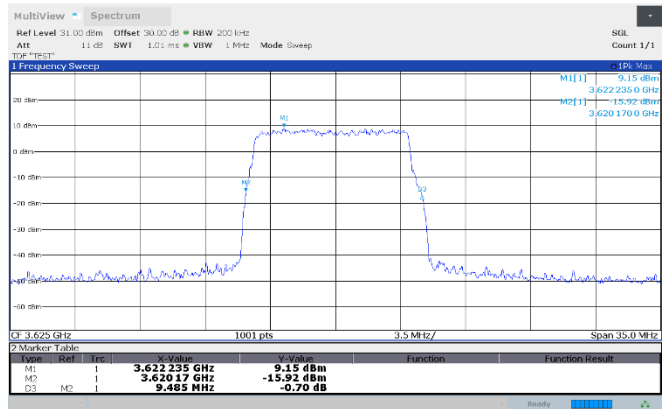
Occupied bandwidth (26 dB), TX: 3695 MHz, BW: 10MHz, MOD: QPSK



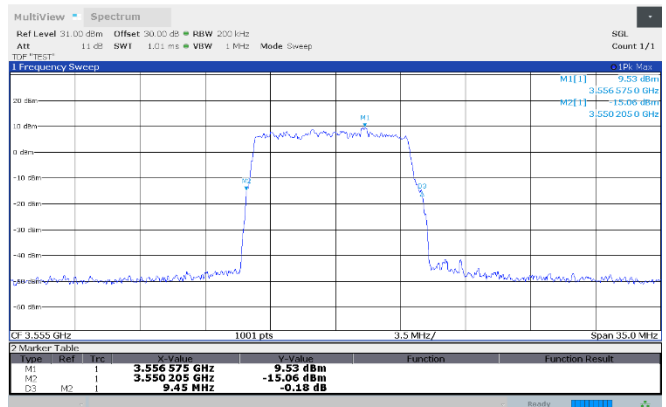
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 10MHz, MOD: 16QAM



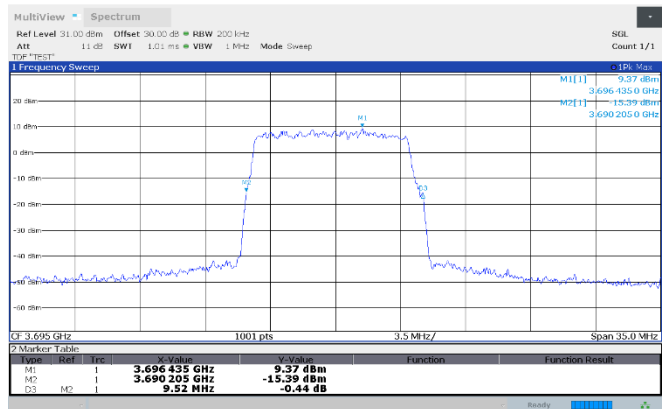
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 10MHz, MOD: QPSK



Occupied bandwidth (26 dB), TX: 3555 MHz, BW: 10MHz, MOD: 16QAM



Occupied bandwidth (26 dB), TX: 3695 MHz, BW: 10MHz, MOD: 16QAM

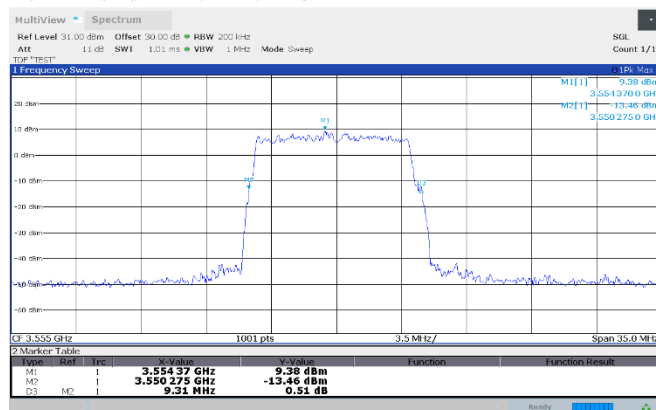


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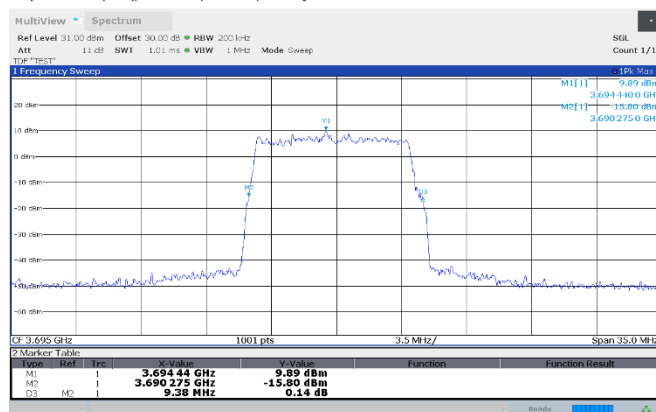
Testing data
FCC §96.41(b) 26 Occupied Bandwidth
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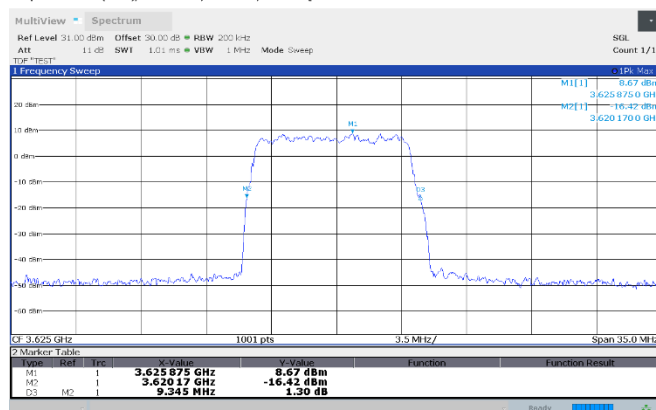
Occupied bandwidth (26 dB), TX: 3555 MHz, BW: 10MHz, MOD: 64QAM



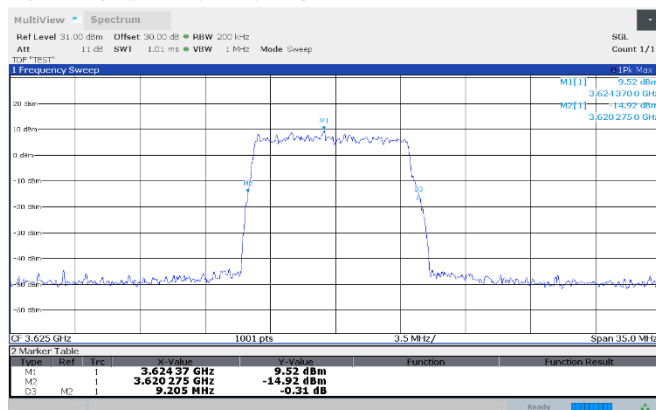
Occupied bandwidth (26 dB), TX: 3695 MHz, BW: 10MHz, MOD: 64QAM



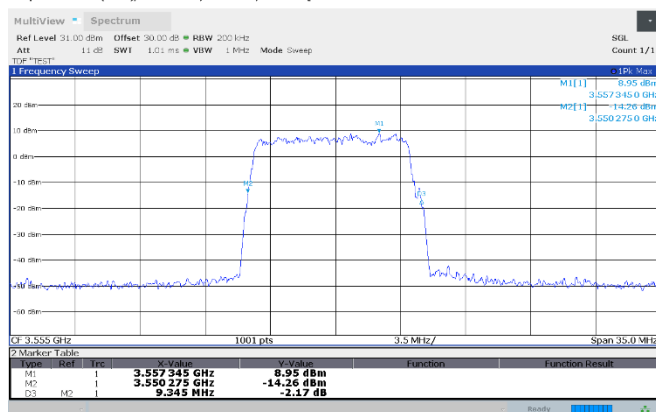
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 10MHz, MOD: 256QAM



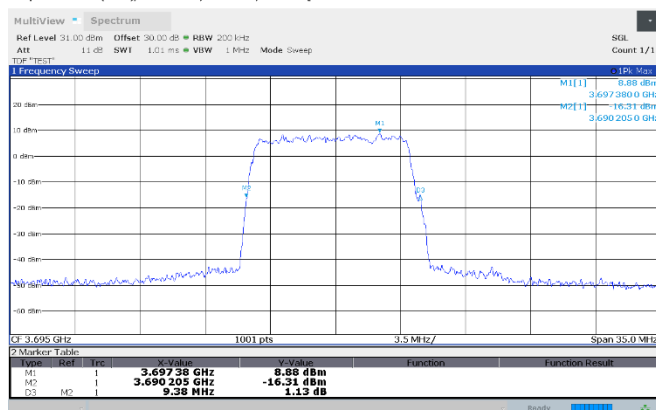
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 10MHz, MOD: 64QAM



Occupied bandwidth (26 dB), TX: 3555 MHz, BW: 10MHz, MOD: 256QAM



Occupied bandwidth (26 dB), TX: 3695 MHz, BW: 10MHz, MOD: 256QAM

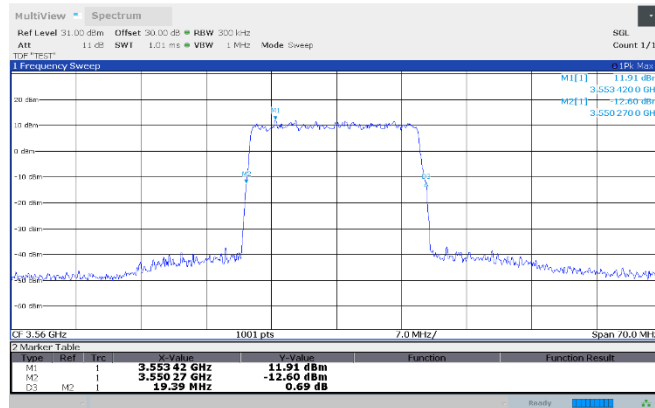


Section 8
Test name
Specification

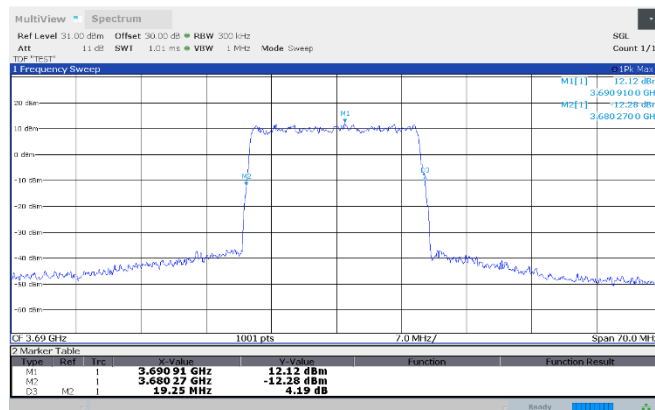
Testing data
FCC §96.41(b) 26 Occupied Bandwidth
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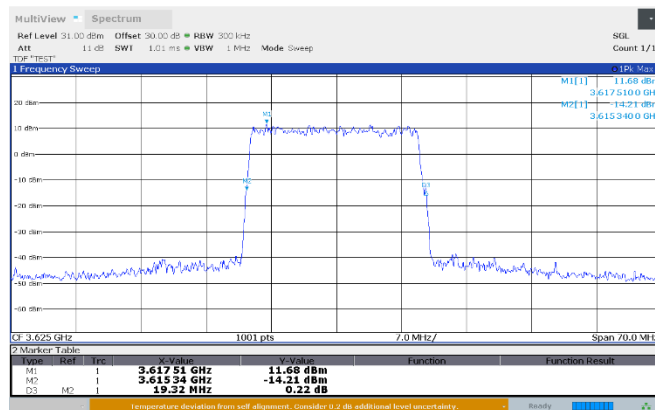
Occupied bandwidth (26 dB), TX: 3560 MHz, BW: 20MHz, MOD: QPSK



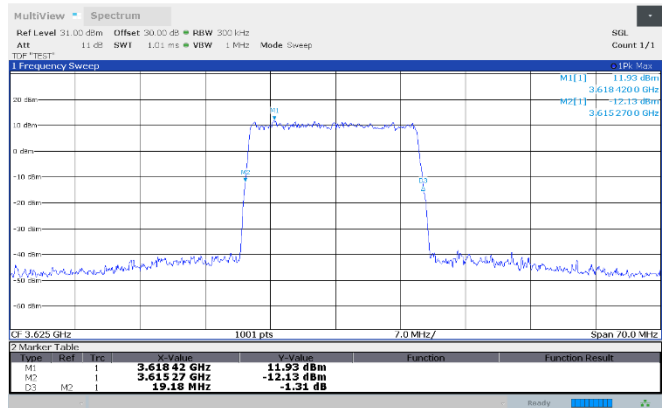
Occupied bandwidth (26 dB), TX: 3690 MHz, BW: 20MHz, MOD: QPSK



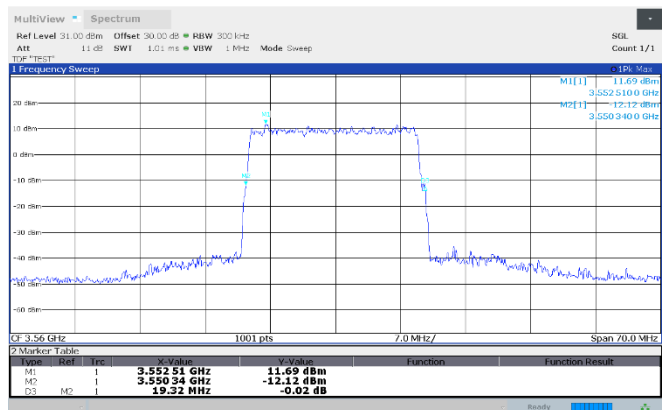
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 20MHz, MOD: 16QAM



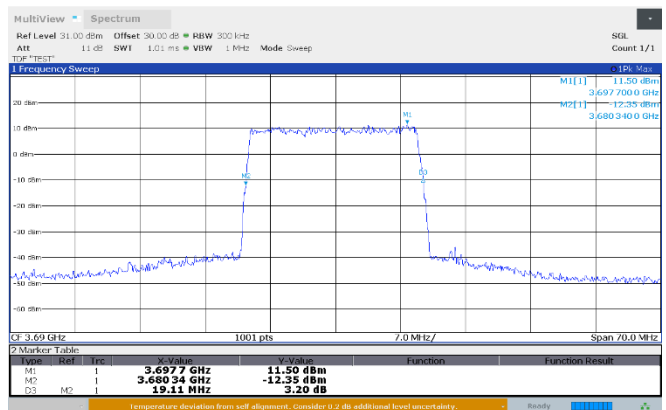
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 20MHz, MOD: QPSK



Occupied bandwidth (26 dB), TX: 3560 MHz, BW: 20MHz, MOD: 16QAM



Occupied bandwidth (26 dB), TX: 3690 MHz, BW: 20MHz, MOD: 16QAM

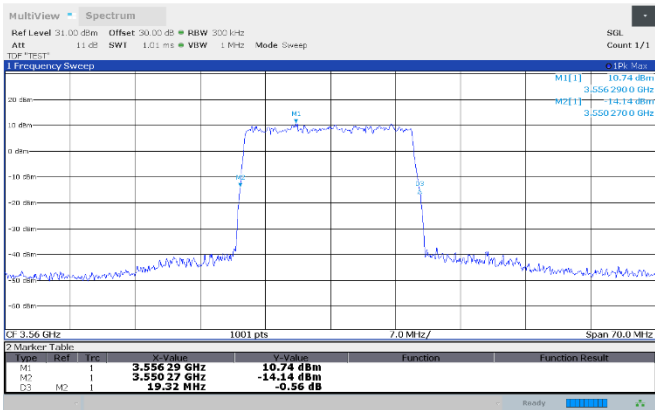


Section 8
Test name
Specification

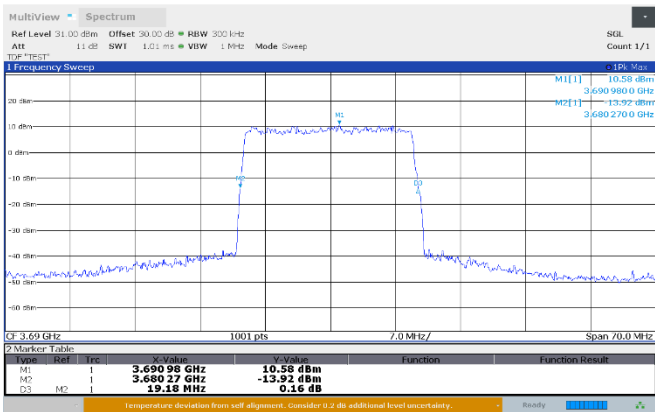
Testing data
FCC §96.41(b) 26 Occupied Bandwidth
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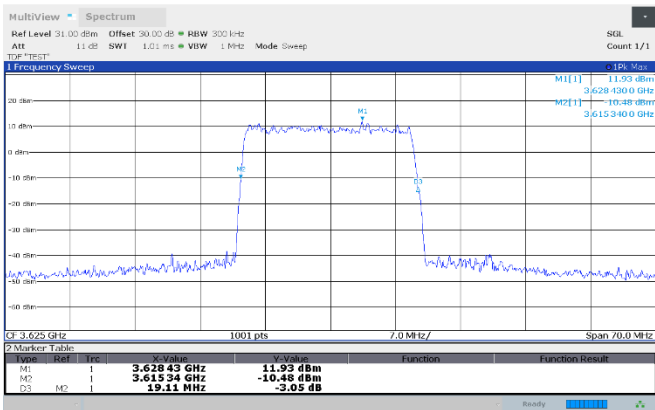
Occupied bandwidth (26 dB), TX: 3560 MHz, BW: 20MHz, MOD: 64QAM



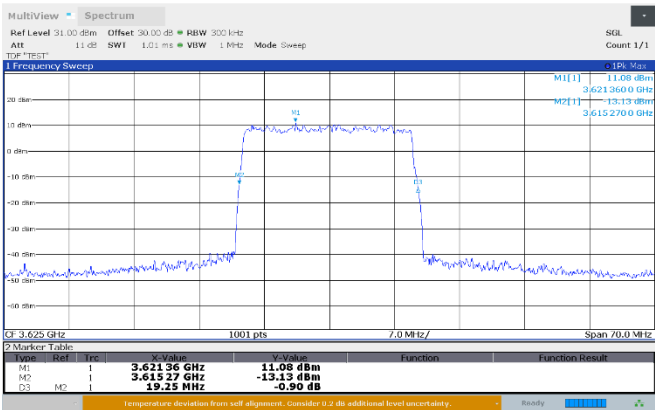
Occupied bandwidth (26 dB), TX: 3690 MHz, BW: 20MHz, MOD: 64QAM



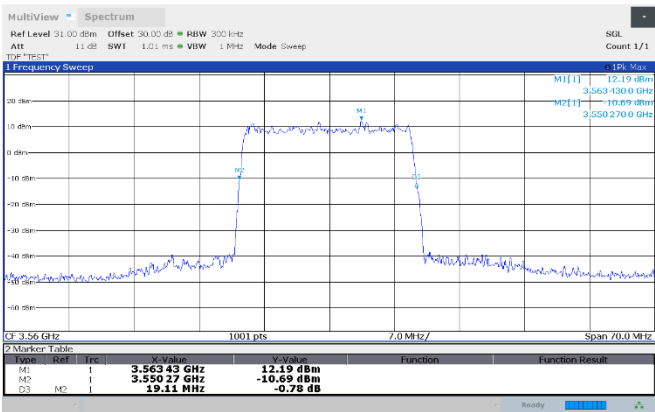
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 20MHz, MOD: 256QAM



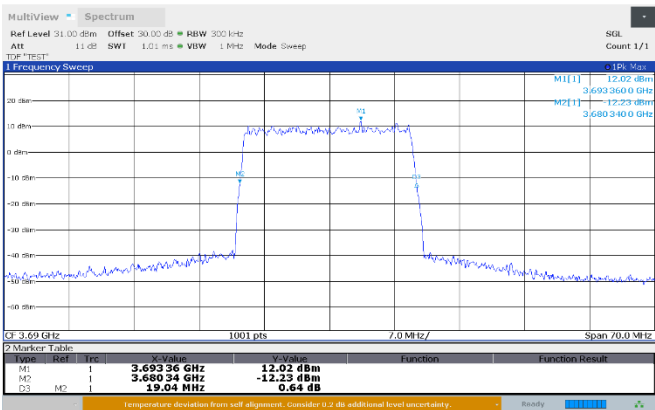
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 20MHz, MOD: 64QAM



Occupied bandwidth (26 dB), TX: 3560 MHz, BW: 20MHz, MOD: 256QAM



Occupied bandwidth (26 dB), TX: 3690 MHz, BW: 20MHz, MOD: 256QAM

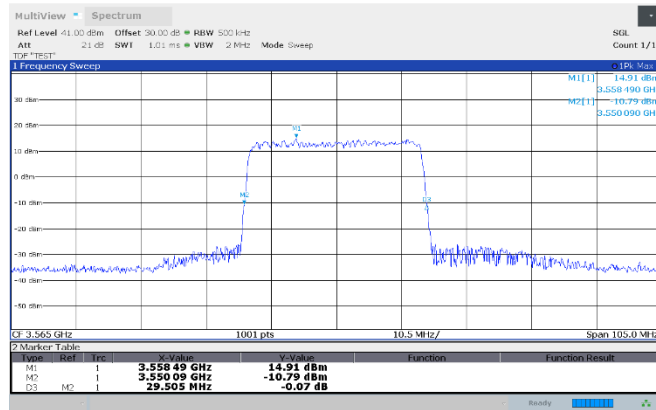


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Specification

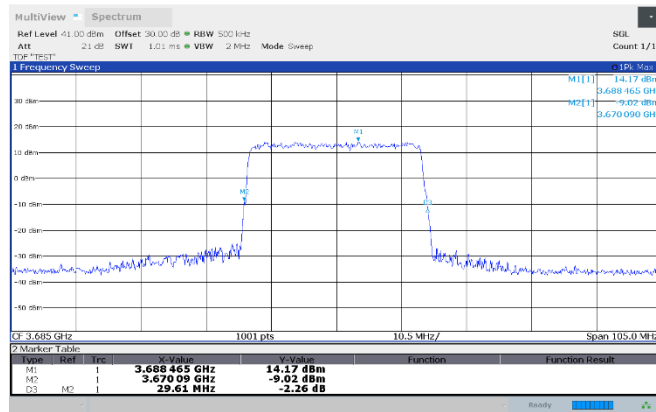
Testing data
FCC §96.41(b) 26 Occupied Bandwidth
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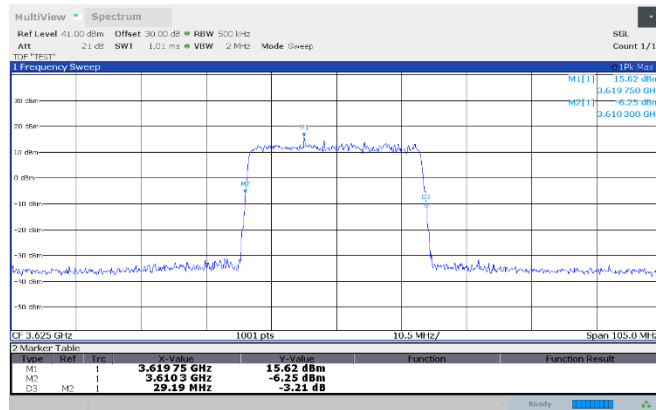
Occupied bandwidth (26 dB), TX: 3565 MHz, BW: 30MHz, MOD: QPSK



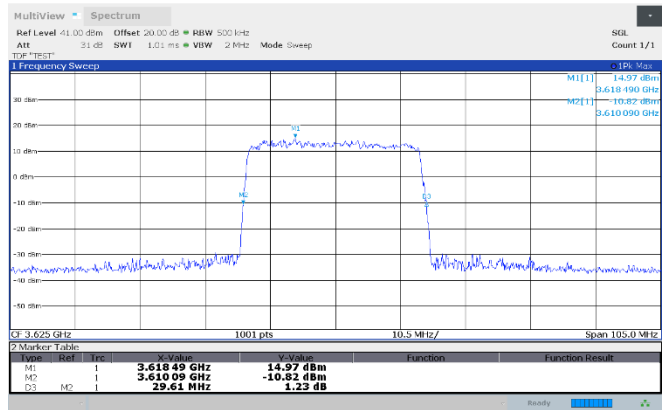
Occupied bandwidth (26 dB), TX: 3685 MHz, BW: 30MHz, MOD: QPSK



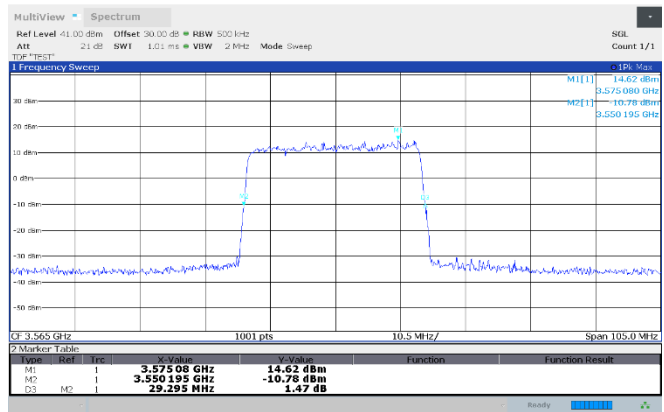
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 30MHz, MOD: 16QAM



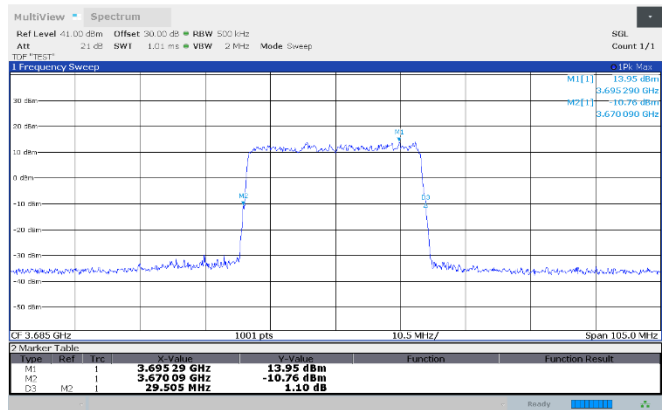
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 30MHz, MOD: QPSK



Occupied bandwidth (26 dB), TX: 3565 MHz, BW: 30MHz, MOD: 16QAM



Occupied bandwidth (26 dB), TX: 3685 MHz, BW: 30MHz, MOD: 16QAM

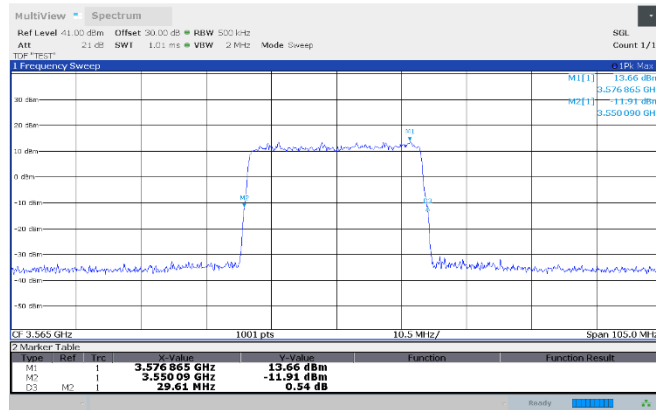


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Test name
Specification

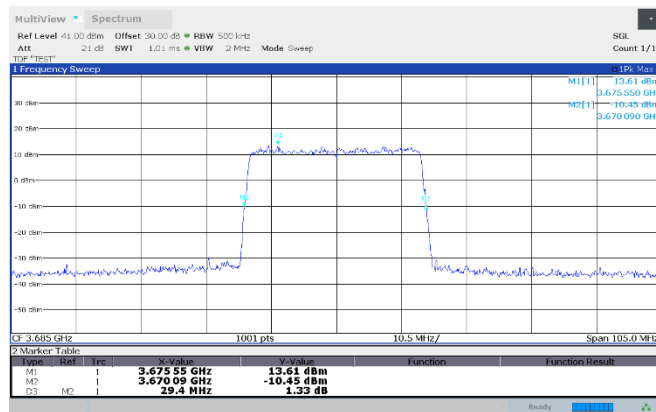
Testing data
FCC §96.41(b) 26 Occupied Bandwidth
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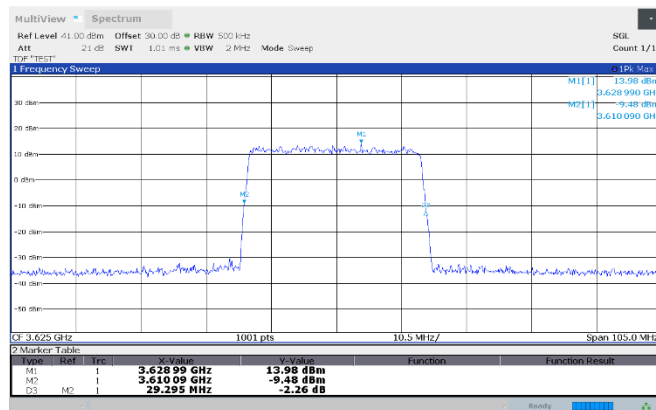
Occupied bandwidth (26 dB), TX: 3565 MHz, BW: 30MHz, MOD: 64QAM



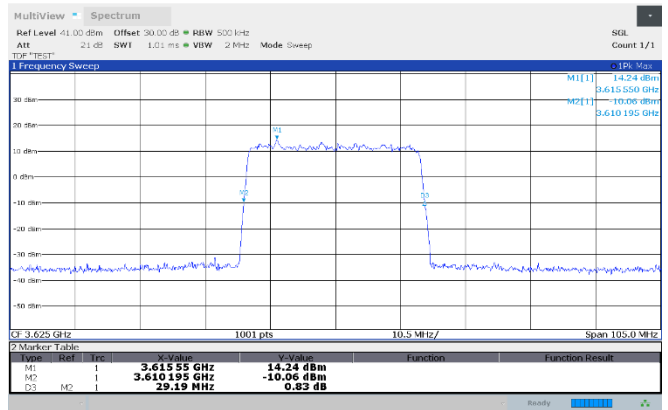
Occupied bandwidth (26 dB), TX: 3685 MHz, BW: 30MHz, MOD: 64QAM



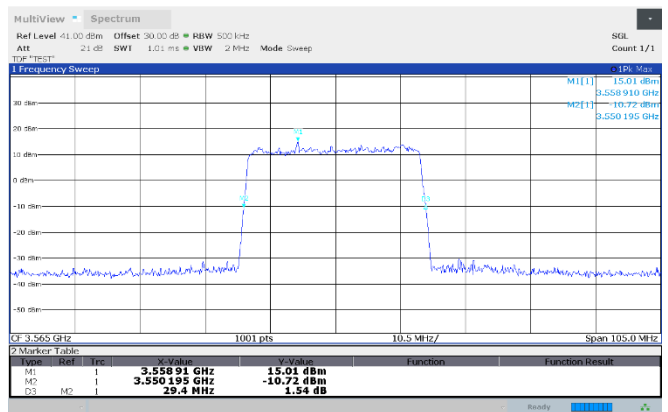
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 30MHz, MOD: 256QAM



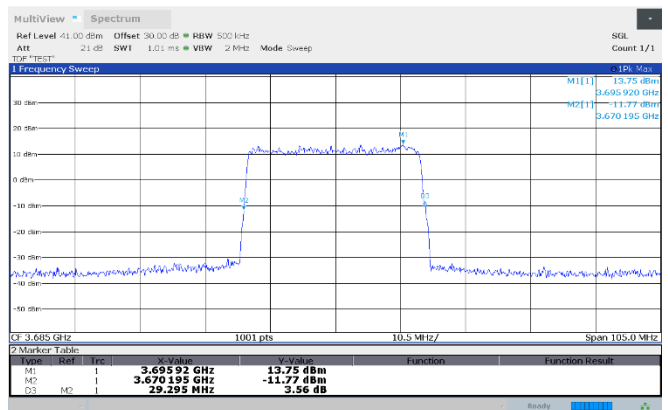
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 30MHz, MOD: 64QAM



Occupied bandwidth (26 dB), TX: 3565 MHz, BW: 30MHz, MOD: 256QAM



Occupied bandwidth (26 dB), TX: 3685 MHz, BW: 30MHz, MOD: 256QAM

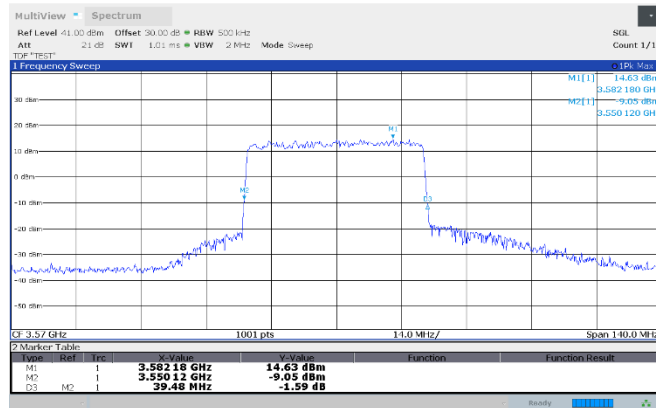


Section 8
Test name
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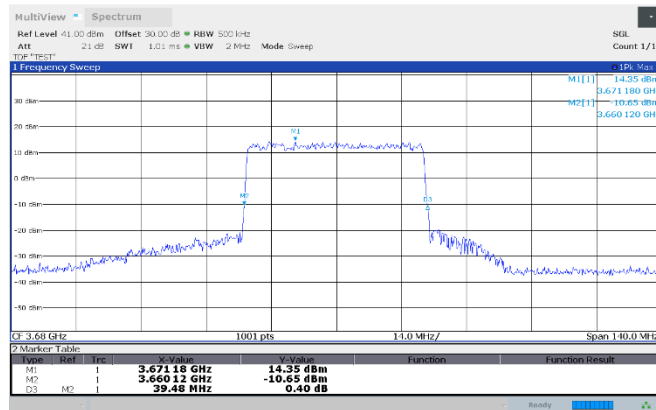
Testing data
FCC §96.41(b) 26 Occupied Bandwidth
FCC Part 96



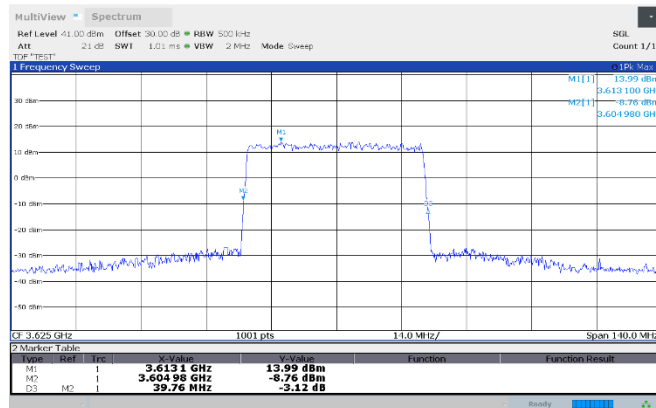
Occupied bandwidth (26 dB), TX: 3570 MHz, BW: 40MHz, MOD: QPSK



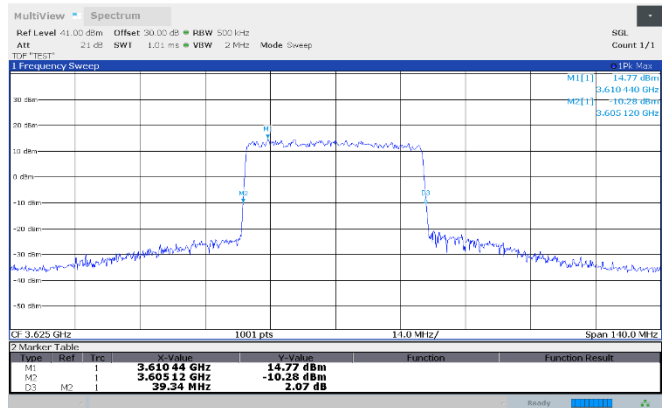
Occupied bandwidth (26 dB), TX: 3680 MHz, BW: 40MHz, MOD: QPSK



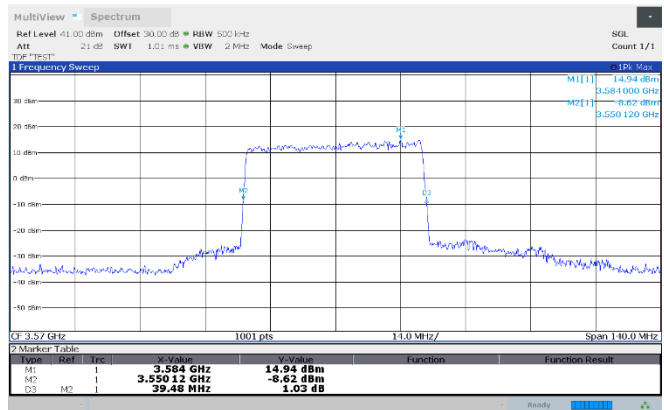
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 40MHz, MOD: 16QAM



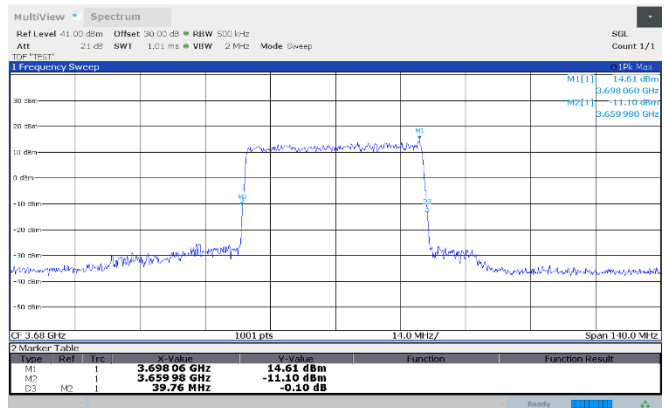
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 40MHz, MOD: QPSK



Occupied bandwidth (26 dB), TX: 3570 MHz, BW: 40MHz, MOD: 16QAM



Occupied bandwidth (26 dB), TX: 3680 MHz, BW: 40MHz, MOD: 16QAM

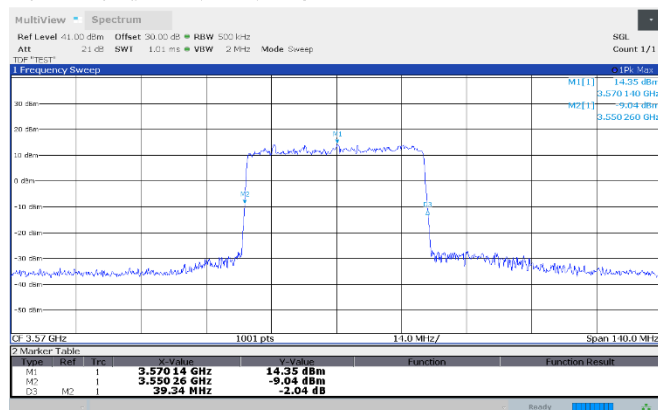


Section 8
Test name
Specification

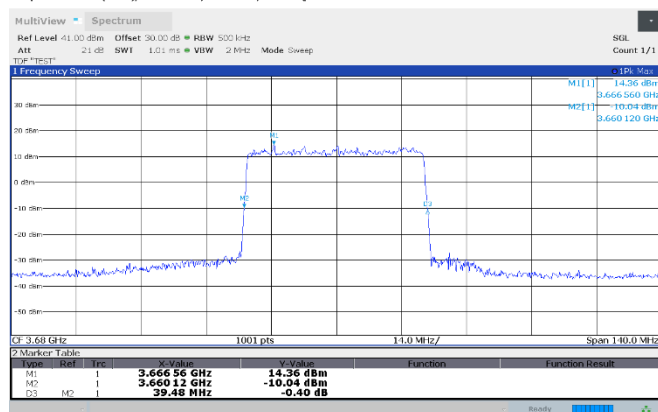
Testing data
FCC §96.41(b) 26 Occupied Bandwidth
FCC Part 96



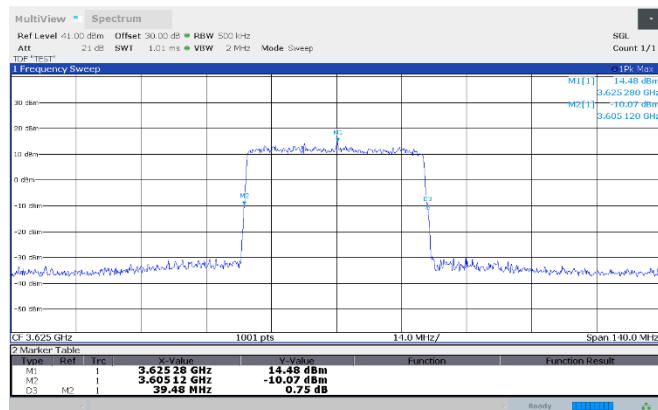
Occupied bandwidth (26 dB), TX: 3570 MHz, BW: 40MHz, MOD: 64QAM



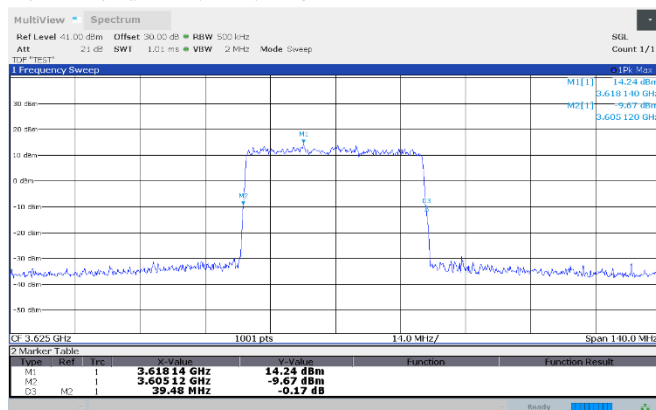
Occupied bandwidth (26 dB), TX: 3680 MHz, BW: 40MHz, MOD: 64QAM



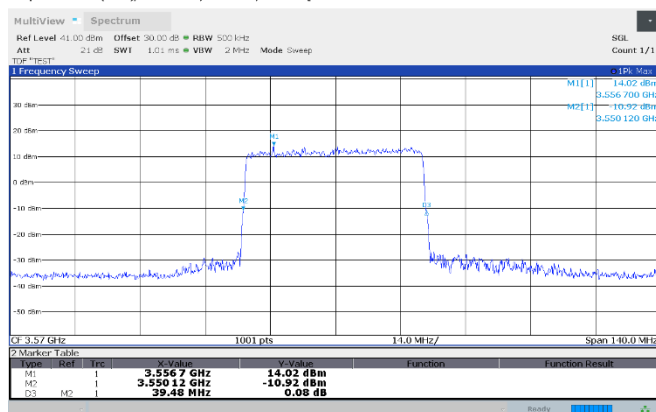
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 40MHz, MOD: 256QAM



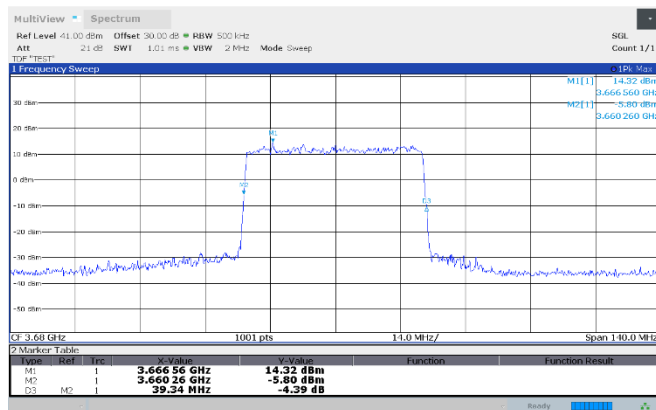
Occupied bandwidth (26 dB), TX: 3625 MHz, BW: 40MHz, MOD: 64QAM



Occupied bandwidth (26 dB), TX: 3570 MHz, BW: 40MHz, MOD: 256QAM



Occupied bandwidth (26 dB), TX: 3680 MHz, BW: 40MHz, MOD: 256QAM



8.4 FCC §2.1055(h) Frequency Stability

8.4.1 Definitions and limits

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

8.4.2 Test summary

Test date	April 27, 2023	Temperature	18 °C
Test engineer	Chenhao Mao, Wireless Technician	Air pressure	1001 mbar
Verdict	Pass	Relative humidity	62%

8.4.3 Observations, settings and special notes

The EUT was configured to continuously transmit an un-modulated continuous wave signal. The frequency measurement was performed using the marker->signal count functionality of the spectrum analyzer. The requirement is that the carrier stays within the allocated band.

8.4.4 Test data

Band TDD48:

Table 8.4-1: Frequency stability results, band TDD48

Test conditions	Frequency, MHz
+50 °C, Nominal	3624.999932840 MHz
+40 °C, Nominal	3624.999344667 MHz
+30 °C, Nominal	3624.999919268 MHz
+20 °C, 58 VDC	3624.999933336 MHz
+20 °C, Nominal	3624.99993471 MHz
+20 °C, 36 VDC	3624.999982535 MHz
+10 °C, Nominal	3624.999947445 MHz
0 °C, Nominal	3624.99997557 MHz
-10 °C, Nominal	3624.999929903 MHz
-20 °C, Nominal	3624.999943441 MHz

Note - All measurements within the authorized band of operation (3550 – 3700 MHz)

8.5 FCC §96.41(b) Power limits (EIRP)

8.5.1 Definitions and limits

(b) Power limits. Unless otherwise specified in this section, the maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the table in this paragraph (b):

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

8.5.2 Test summary

Test date	April 27, 2023	Temperature	18 °C
Test engineer	Chenhao Mao, Wireless Technician	Air pressure	1001 mbar
Verdict	Pass	Relative humidity	62%

8.5.3 Observations, settings and special notes

Test method: ANSI C63.26 Section 5.2.4.5_1.

Spectrum analyzer settings:

Resolution bandwidth	10 MHz
Video bandwidth	40 MHz
Frequency span	2 – 3- times OBW
Detector mode	RMS
Trace mode	Average (power averaging)
Number of sweeps	100

This test was made across the conducted port. A reference level offset was added to the measurement to compensate the loss of the used external attenuator. Interconnecting cable losses were included as a transducer factor in the spectrum analyzer.

The EUT has two ports which can transmit simultaneously in a correlated way.

To select the measurement port, a quick conducted channel power test was done. The four ports are nominally identical, however, the port with maximum power was chosen to make all the remaining tests.

Band	Modulation	OBW	Channel	Power Port 1	Power Port 2
TDD48	QPSK	10 MHz	3625 MHz	13.76 dBm/10 MHz	13.58 dBm/10 MHz
TDD48	QPSK	20 MHz	3625 MHz	15.13 dBm/10 MHz	15.07 dBm/10 MHz
TDD48	QPSK	30 MHz	3625 MHz	15.37 dBm/10 MHz	15.61 dBm/10 MHz
TDD48	QPSK	40 MHz	3625 MHz	15.36 dBm/10 MHz	15.79 dBm/10 MHz

Note: Port 2 is used to evaluate all further tests in this document.

Declared maximum antenna gain: 5.5 dBi.

Total channel power results are included below for informational purposes as they are required for RF exposure evaluation.

8.5.4 Test data

Note: EUT employs 2 correlated identical transmitters. Hence, correction of $10\log_{10}(2) = 3.01$ dB applied. EIRP density (total across all ports) = conducted power density + antenna gain + MIMO correction.

Total channel power (conducted) (dBm) measured for RF exposure calculation purposes. Total channel power estimated from EIRP density (dBm/10 MHz) by adding $10\log_{10}(\text{Channel Bandwidth (MHz)} / 10 \text{ MHz})$.

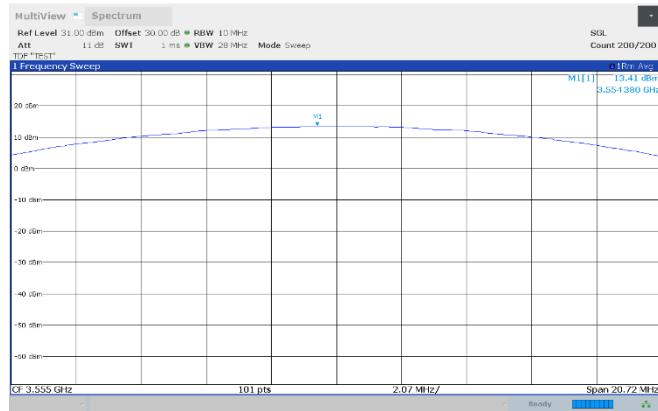
Band TDD48:

Table 8.5-1: Power limits (EIRP density) results, band TDD48

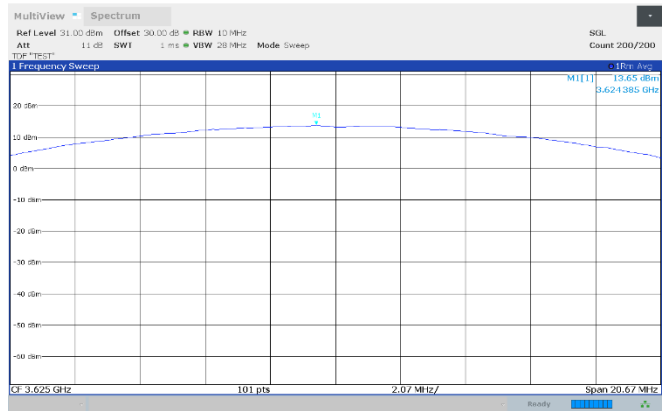
Band	Modulation	OBW (MHz)	Port	Frequency (MHz)	Conducted power density (dBm/10 MHz)	Antenna gain (dBi)	MIMO Correction (dB)	EIRP density (dBm/10 MHz)	Total channel power (conducted) (dBm)
TDD48	QPSK	10	2	3555	13.41	5.50	3.01	21.92	21.92
TDD48	16QAM	10	2	3555	14.04	5.50	3.01	22.55	22.55
TDD48	64QAM	10	2	3555	13.62	5.50	3.01	22.13	22.13
TDD48	256QAM	10	2	3555	13.47	5.50	3.01	21.98	21.98
TDD48	QPSK	10	2	3625	13.65	5.50	3.01	22.16	22.16
TDD48	16QAM	10	2	3625	14.16	5.50	3.01	22.67	22.67
TDD48	64QAM	10	2	3625	13.09	5.50	3.01	21.60	21.60
TDD48	256QAM	10	2	3625	16.50	5.50	3.01	25.01	25.01
TDD48	QPSK	10	2	3695	13.31	5.50	3.01	21.82	21.82
TDD48	16QAM	10	2	3695	14.07	5.50	3.01	22.58	22.58
TDD48	64QAM	10	2	3695	13.01	5.50	3.01	21.52	21.52
TDD48	256QAM	10	2	3695	13.50	5.50	3.01	22.01	22.01
TDD48	QPSK	20	2	3560	16.73	5.50	3.01	25.24	28.25
TDD48	16QAM	20	2	3560	15.95	5.50	3.01	24.46	27.47
TDD48	64QAM	20	2	3560	15.12	5.50	3.01	23.63	26.64
TDD48	256QAM	20	2	3560	15.09	5.50	3.01	23.60	26.61
TDD48	QPSK	20	2	3625	16.44	5.50	3.01	24.95	27.96
TDD48	16QAM	20	2	3625	15.74	5.50	3.01	24.25	27.26
TDD48	64QAM	20	2	3625	15.00	5.50	3.01	23.51	26.52
TDD48	256QAM	20	2	3625	15.06	5.50	3.01	23.57	26.58
TDD48	QPSK	20	2	3690	16.48	5.50	3.01	24.99	28.00
TDD48	16QAM	20	2	3690	16.15	5.50	3.01	24.66	27.67
TDD48	64QAM	20	2	3690	15.00	5.50	3.01	23.51	26.52
TDD48	256QAM	20	2	3690	15.12	5.50	3.01	23.63	26.64
TDD48	QPSK	30	2	3565	17.64	5.50	3.01	26.15	30.92
TDD48	16QAM	30	2	3565	17.21	5.50	3.01	25.72	30.49
TDD48	64QAM	30	2	3565	15.75	5.50	3.01	24.26	29.03
TDD48	256QAM	30	2	3565	16.27	5.50	3.01	24.78	29.55
TDD48	QPSK	30	2	3625	15.67	5.50	3.01	24.18	28.95
TDD48	16QAM	30	2	3625	17.46	5.50	3.01	25.97	30.74
TDD48	64QAM	30	2	3625	15.88	5.50	3.01	24.39	29.16
TDD48	256QAM	30	2	3625	16.21	5.50	3.01	24.72	29.49
TDD48	QPSK	30	2	3685	16.89	5.50	3.01	25.40	30.17
TDD48	16QAM	30	2	3685	17.06	5.50	3.01	25.57	30.34
TDD48	64QAM	30	2	3685	15.51	5.50	3.01	24.02	28.79
TDD48	256QAM	30	2	3685	15.76	5.50	3.01	24.27	29.04
TDD48	QPSK	40	2	3570	17.44	5.50	3.01	25.95	31.97
TDD48	16QAM	40	2	3570	17.82	5.50	3.01	26.33	32.35
TDD48	64QAM	40	2	3570	17.24	5.50	3.01	25.75	31.77
TDD48	256QAM	40	2	3570	17.29	5.50	3.01	25.80	31.82
TDD48	QPSK	40	2	3625	17.29	5.50	3.01	25.80	31.82
TDD48	16QAM	40	2	3625	17.57	5.50	3.01	26.08	32.10
TDD48	64QAM	40	2	3625	17.55	5.50	3.01	26.06	32.08
TDD48	256QAM	40	2	3625	17.51	5.50	3.01	26.02	32.04
TDD48	QPSK	40	2	3680	16.77	5.50	3.01	25.28	31.30
TDD48	16QAM	40	2	3680	15.34	5.50	3.01	23.85	29.87
TDD48	64QAM	40	2	3680	17.21	5.50	3.01	25.72	31.74
TDD48	256QAM	40	2	3680	17.19	5.50	3.01	25.70	31.72

Band TDD48 (Power limits (dBm/10 MHz) Results)

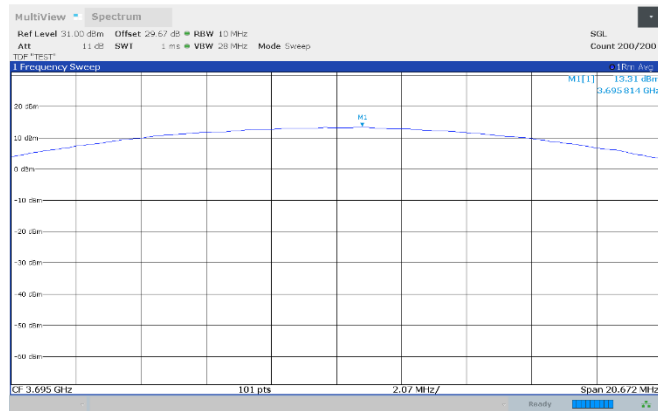
Average PSD, TX: 3555 MHz, BW: 10MHz, MOD: QPSK



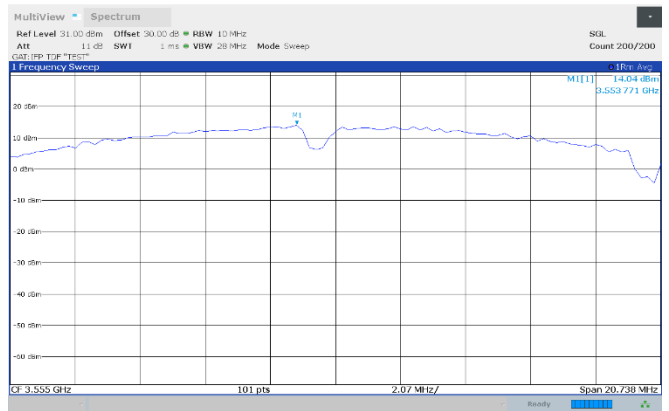
Average PSD, TX: 3625 MHz, BW: 10MHz, MOD: QPSK



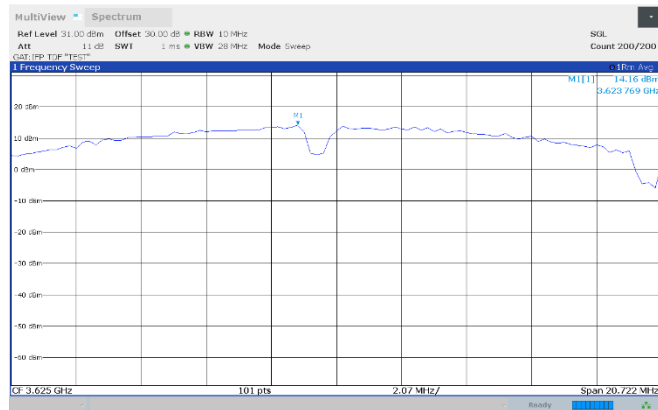
Average PSD, TX: 3695 MHz, BW: 10MHz, MOD: QPSK



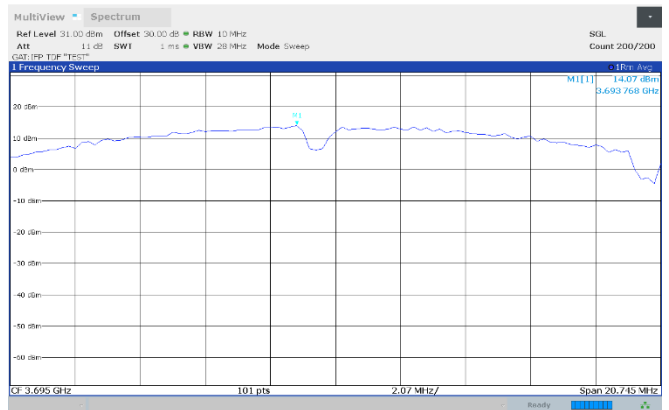
Average PSD, TX: 3555 MHz, BW: 10MHz, MOD: 16QAM



Average PSD, TX: 3625 MHz, BW: 10MHz, MOD: 16QAM



Average PSD, TX: 3695 MHz, BW: 10MHz, MOD: 16QAM

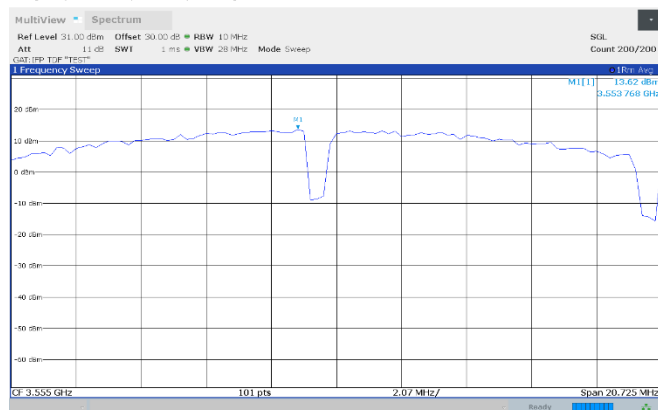


Section 8
Test name
Specification

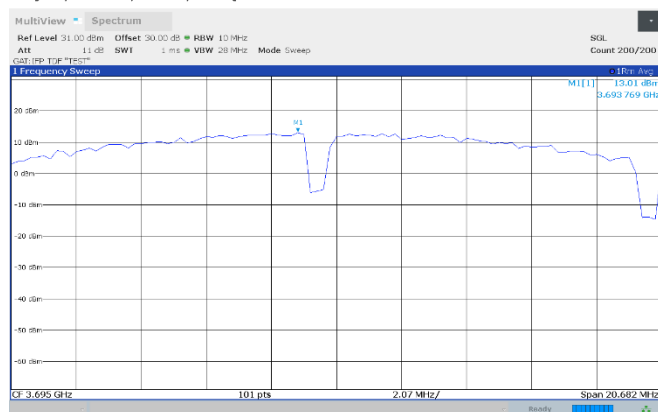
Testing
 FCC §96.41(b) Power limits (EIRP)
 FCC Part 96



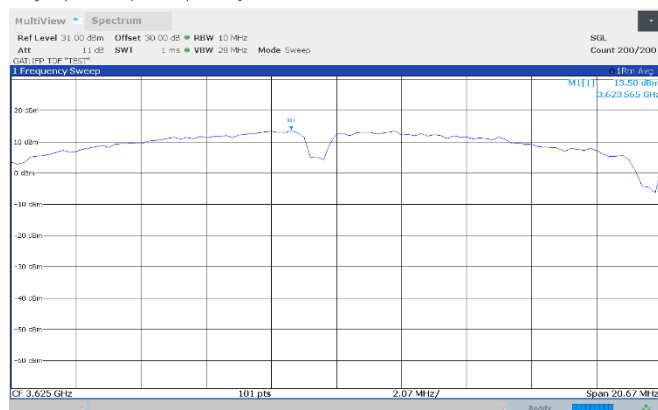
Average PSD, TX: 3555 MHz, BW: 10MHz, MOD: 64QAM



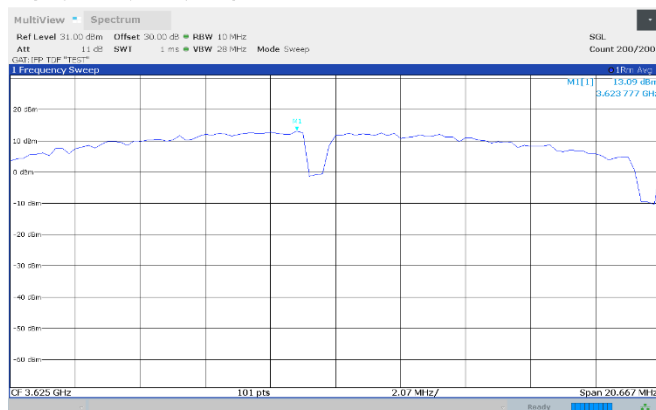
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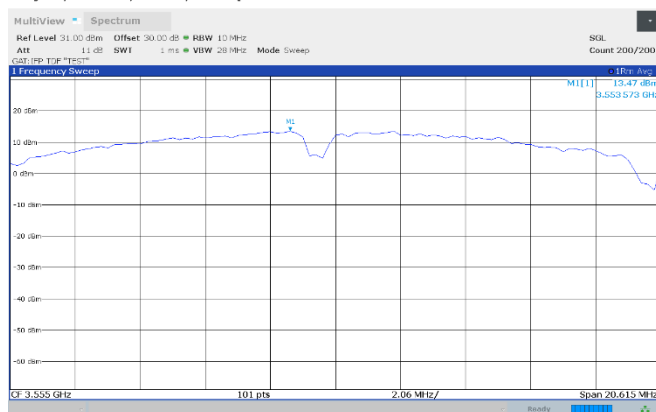
Average PSD, TX: 3625 MHz, BW: 10MHz, MOD: 256QAM



Average PSD, TX: 3625 MHz, BW: 10MHz, MOD: 64QAM



Average PSD, TX: 3555 MHz, BW: 10MHz, MOD: 256QAM



Average PSD, TX: 3695 MHz, BW: 10MHz, MOD: 256QAM

