

TEST A.6: 3.5 GHZ EMISSION AND INTERFERENCE LIMITS

LIMITS:	Product standard:	Part 96.41 Subclause (e)
	Test standard:	ANSI C63.26-2015

LIMITS

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

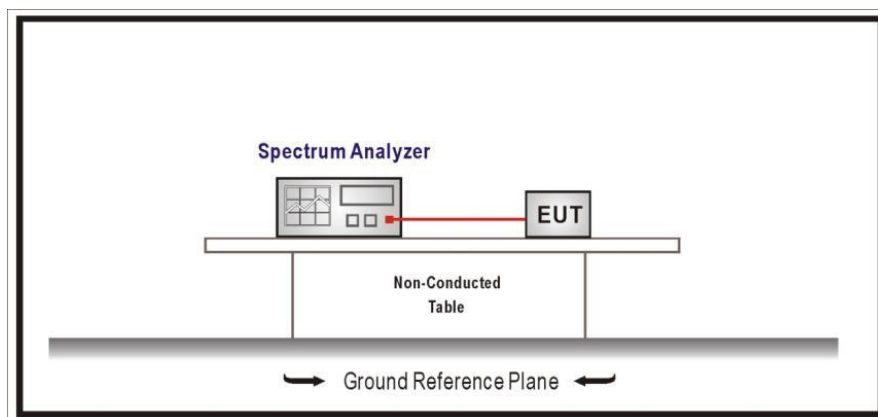
Confirm that the device satisfies the emission limits specified in Section 96.41(e) for all declared channel sizes, at the lowest and highest edges of the band, and in the middle of the band. The RMS detector was used for the measurement at each frequency with 400 MHz span.

A narrower RBW is permitted in all cases to improve measurement accuracy, provided the measured power is integrated over the full reference bandwidth.

The limits for emission outside the fundamental are stated below.

- within 0-10 MHz above and below the assigned channel ≤ -13 dBm/MHz
- greater than 10 MHz above and below the assigned channel ≤ -25 dBm/MHz
- any emission below 3530 MHz and above 3720 MHz ≤ -40 dBm/MHz

TEST SETUP



The following duty cycle correction was added in RF level offset to get the accurate measured emission level in the average power measurement.

The duty cycle correction = $10 \log (1/0.67) = 1.67$ (dB)

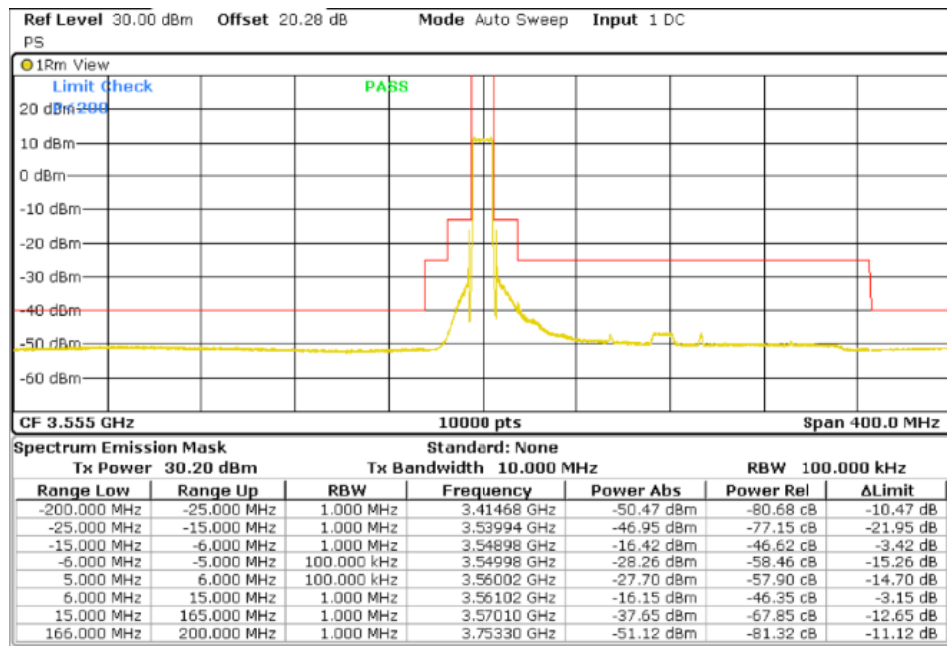
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (Band 48)
TEST RESULTS:	PASS
<p><u>2x2 MIMO</u></p> <p><u>Port 1 and 2:</u></p> <p><u>10 MHz BW</u></p> <p>The spurious signals detected were more than 20 dB below the reference limit for the lowest, middle and highest operating channels.</p> <p><u>20 MHz BW</u></p> <p>The spurious signals detected were more than 20 dB below the reference limit for the lowest, middle and highest operating channels.</p> <p><u>Port 3 and 4:</u></p> <p><u>10 MHz BW</u></p> <p>The spurious signals detected were more than 20 dB below the reference limit for the lowest, middle and highest operating channels.</p> <p><u>20 MHz BW</u></p> <p>The spurious signals detected were more than 20 dB below the reference limit for the lowest, middle and highest operating channels.</p> <p><u>4x4 MIMO</u></p> <p><u>Port 1,2,3 and 4</u></p> <p><u>10 MHz BW</u></p> <p>The spurious signals detected were more than 20 dB below the reference limit for the lowest, middle and highest operating channels.</p> <p><u>20 MHz BW</u></p> <p>The spurious signals detected were more than 20 dB below the reference limit for the lowest, middle and highest operating channels.</p> <p>(See next plots)</p>	

TEST RESULTS (Cont.):

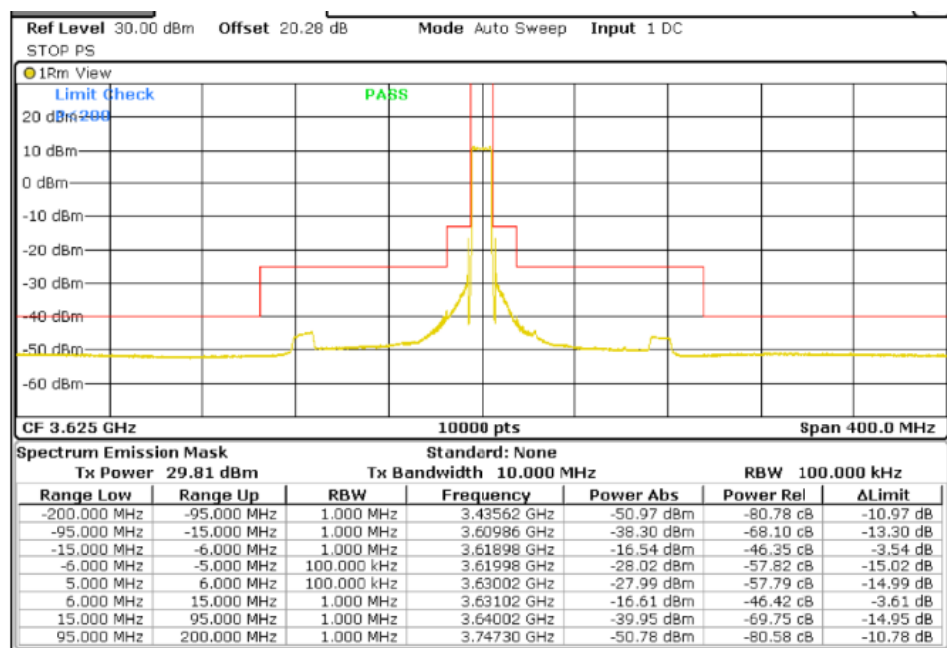
Port 1

10 MHz BW

Lowest Channel (3555 MHz)

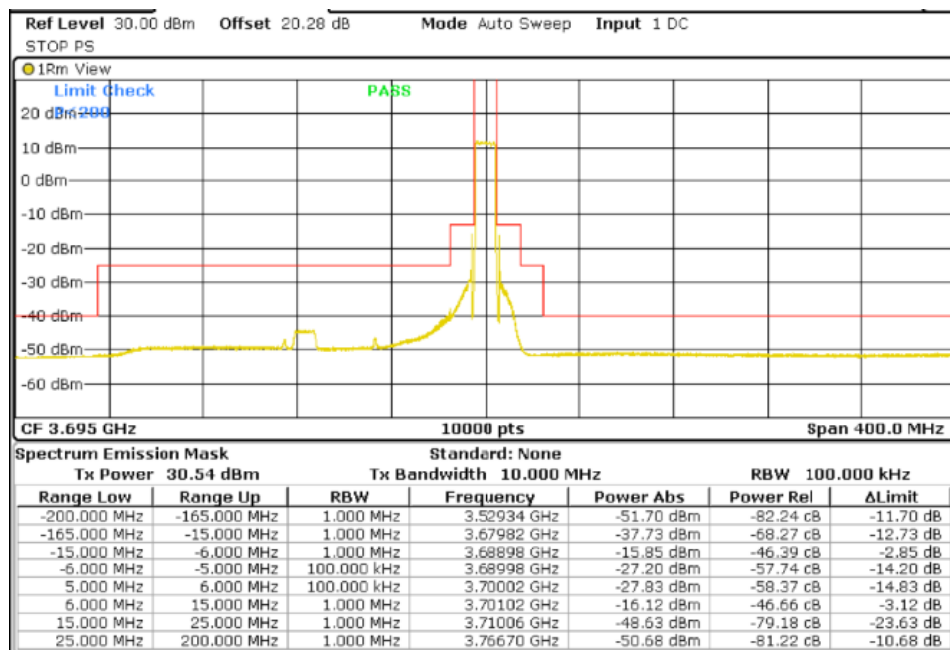


Middle Channel (3625 MHz)



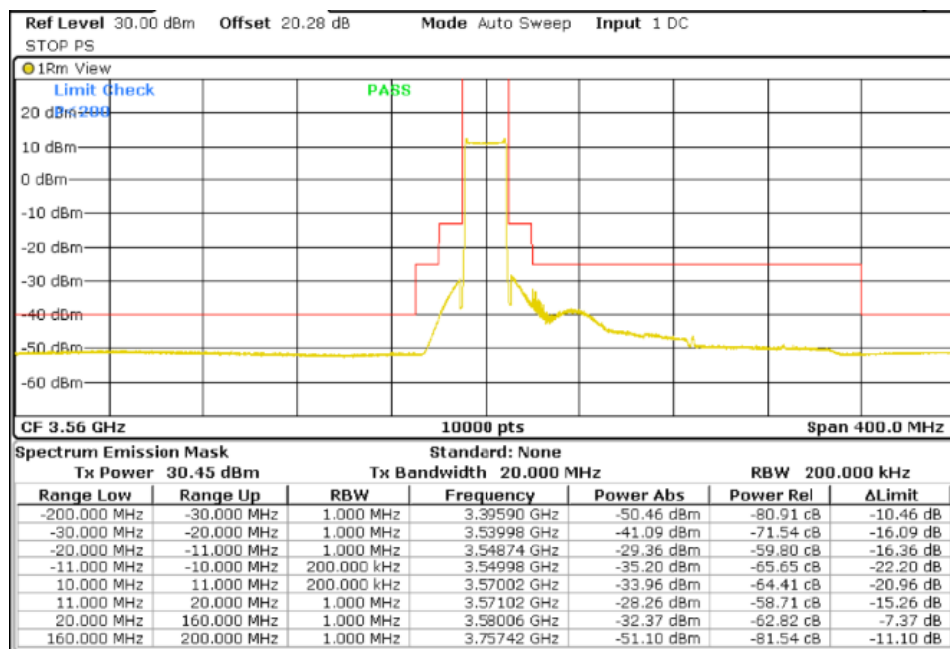
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



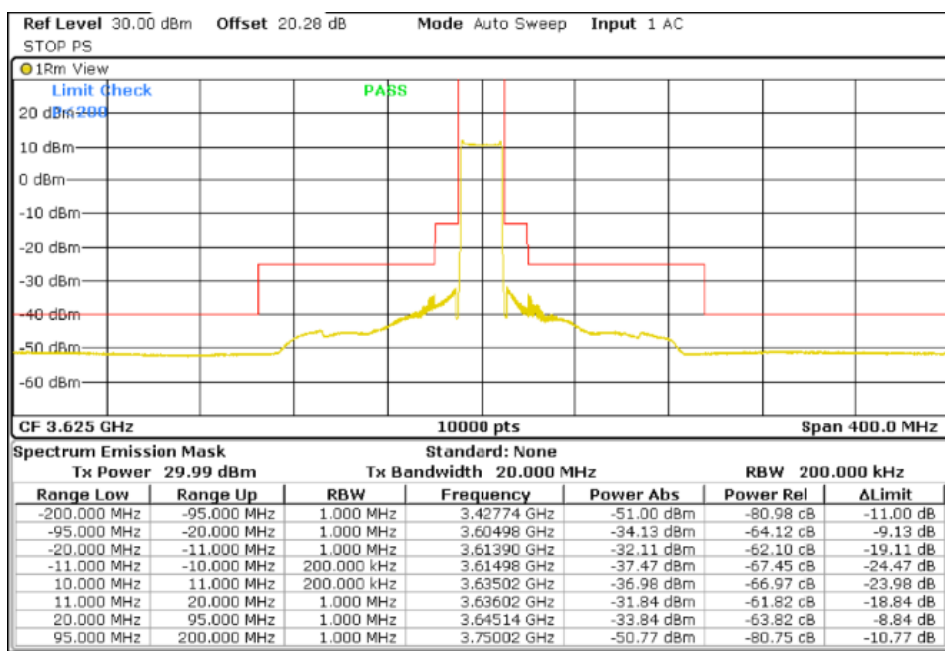
20 MHz BW

Lowest Channel (3560 MHz)

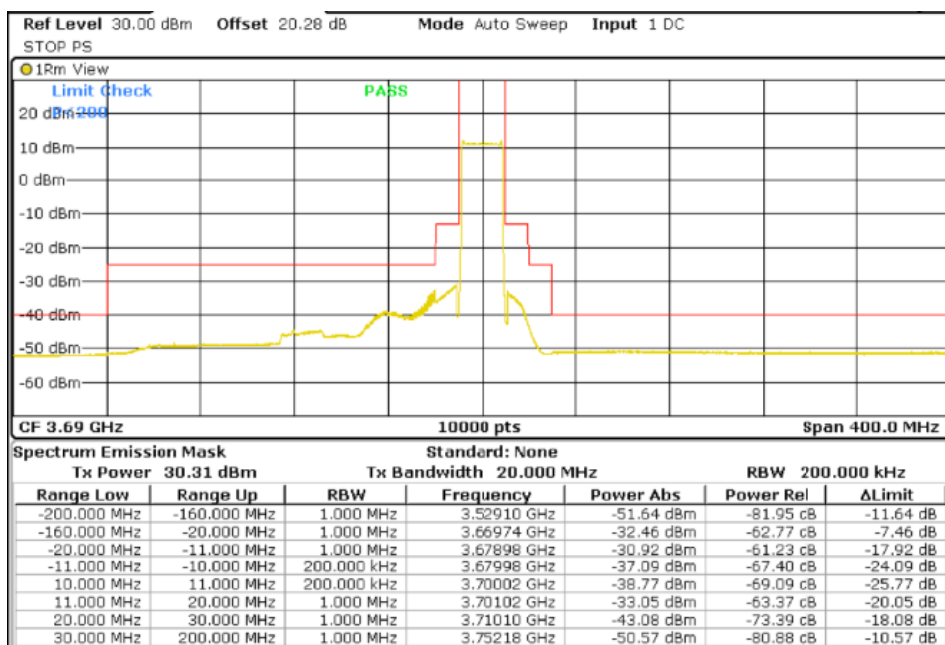


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)

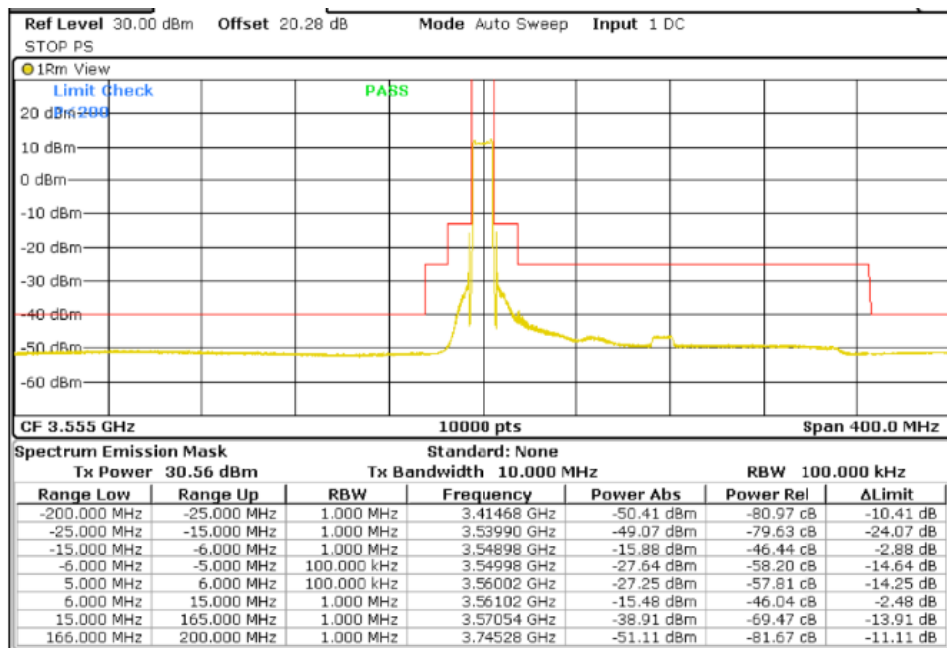


TEST RESULTS (Cont.):

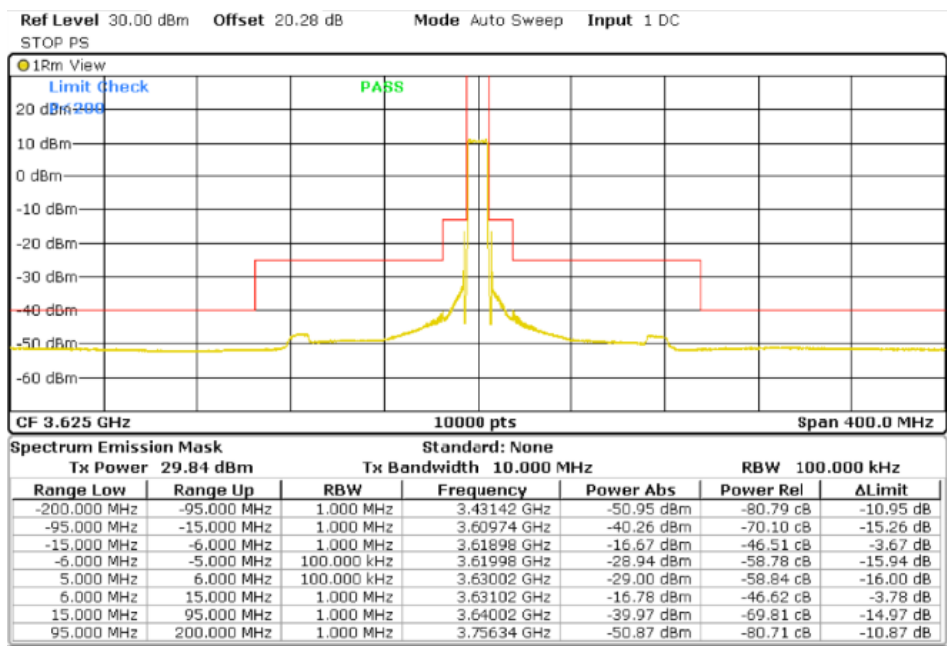
Port 2

10 MHz BW

Lowest Channel (3555 MHz)

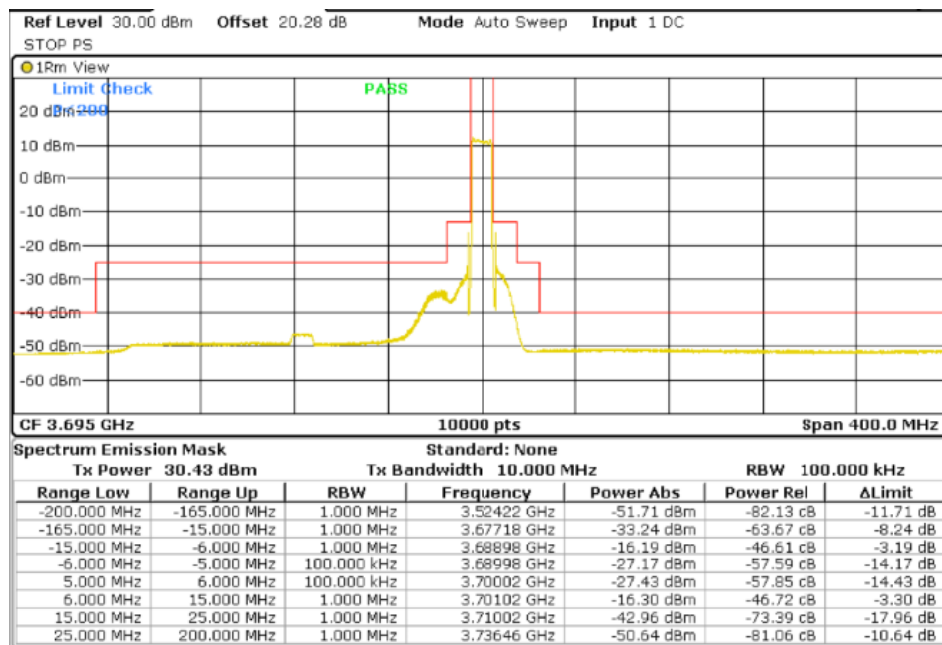


Middle Channel (3625 MHz)



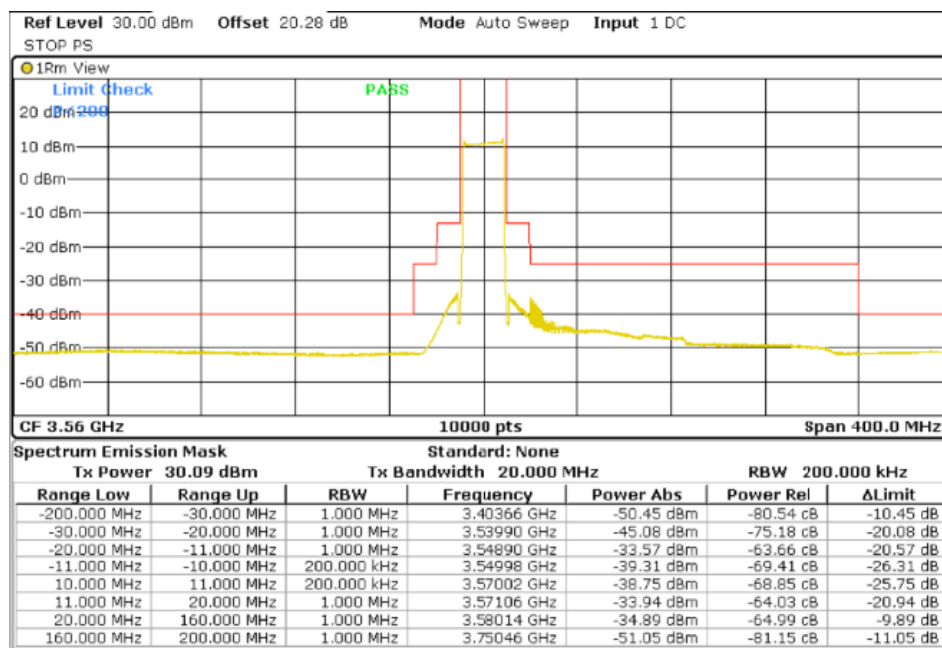
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



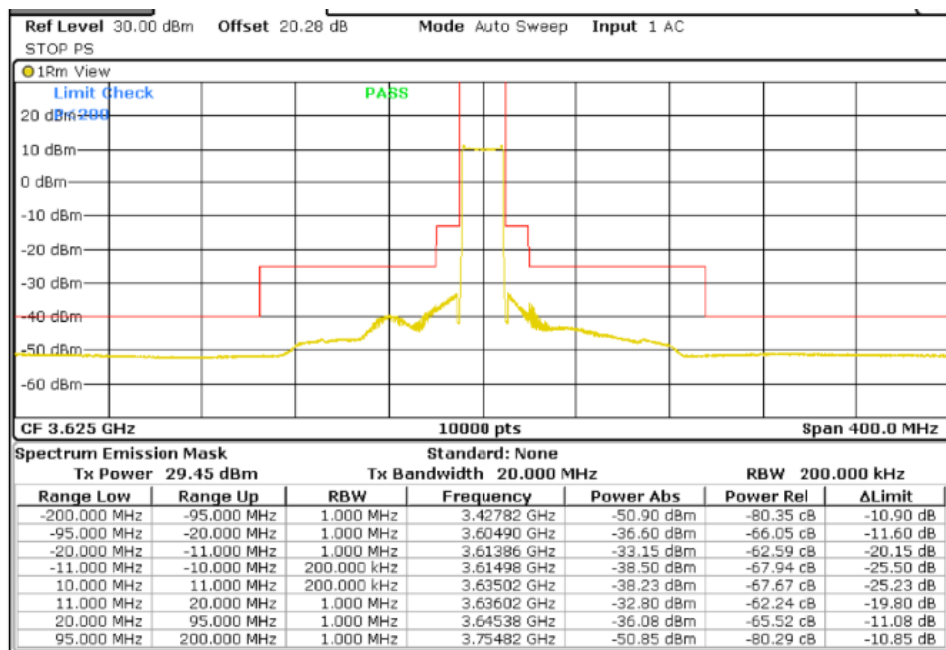
20 MHz BW

Lowest Channel (3560 MHz)

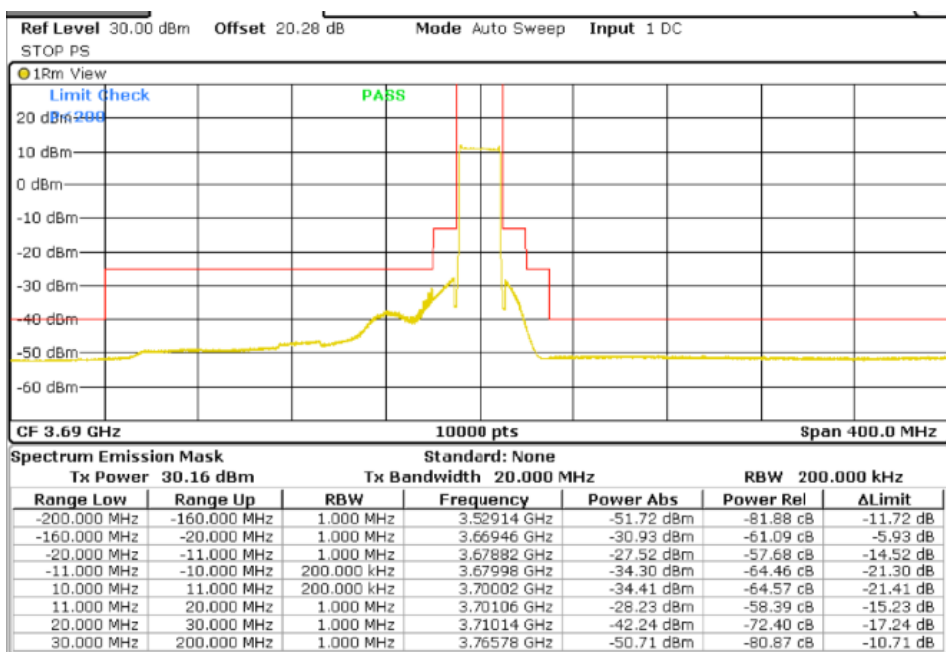


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)

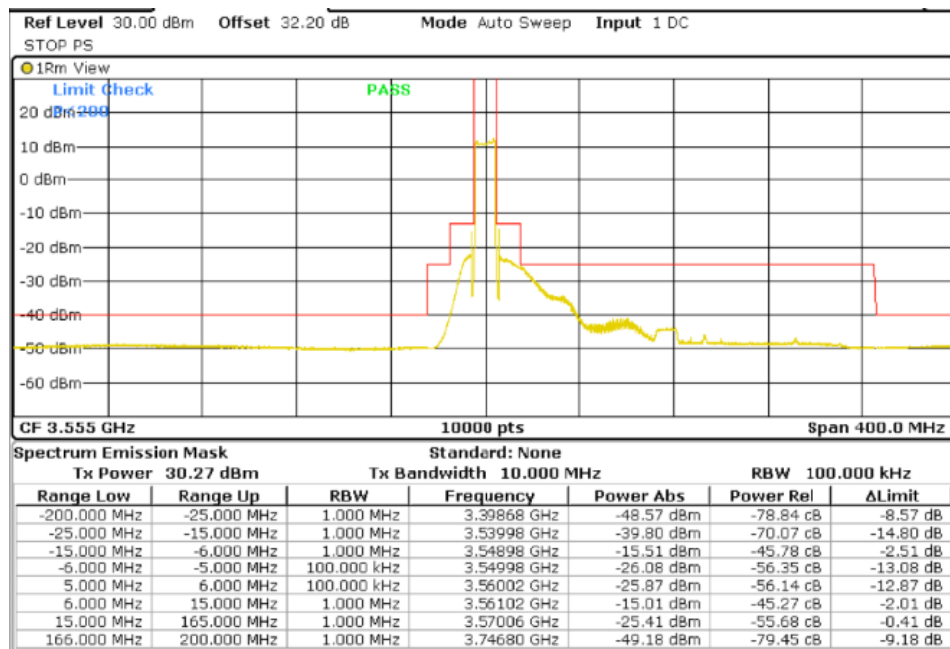


TEST RESULTS (Cont.):

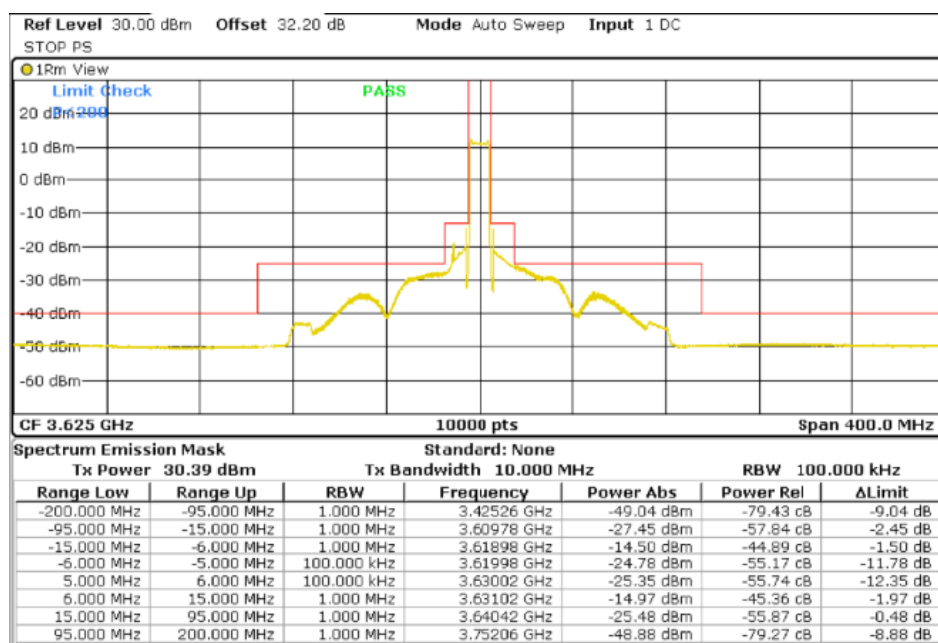
Port 3

10 MHz BW

Lowest Channel (3555 MHz)

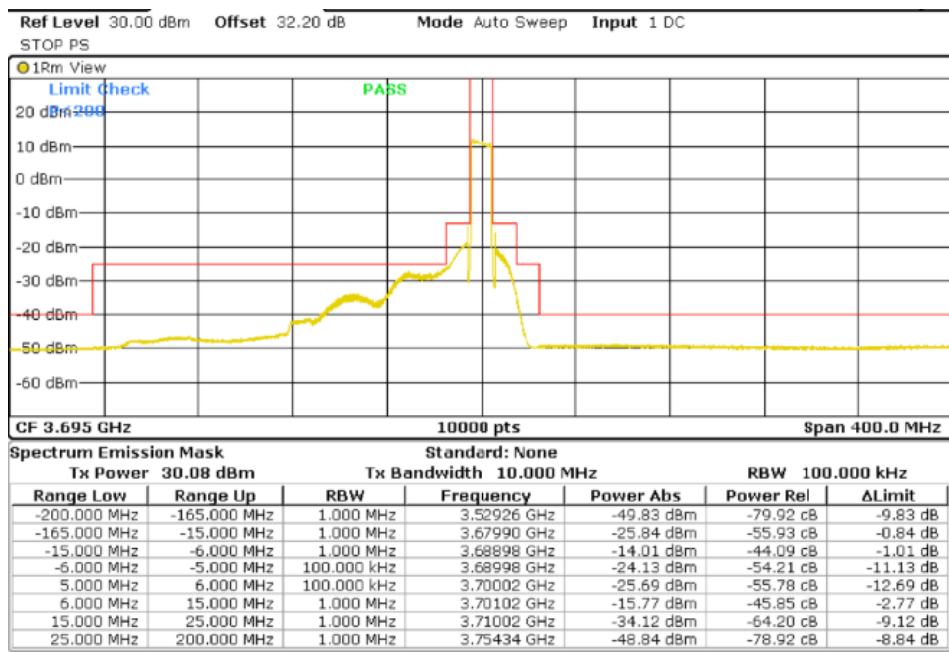


Middle Channel (3625 MHz)



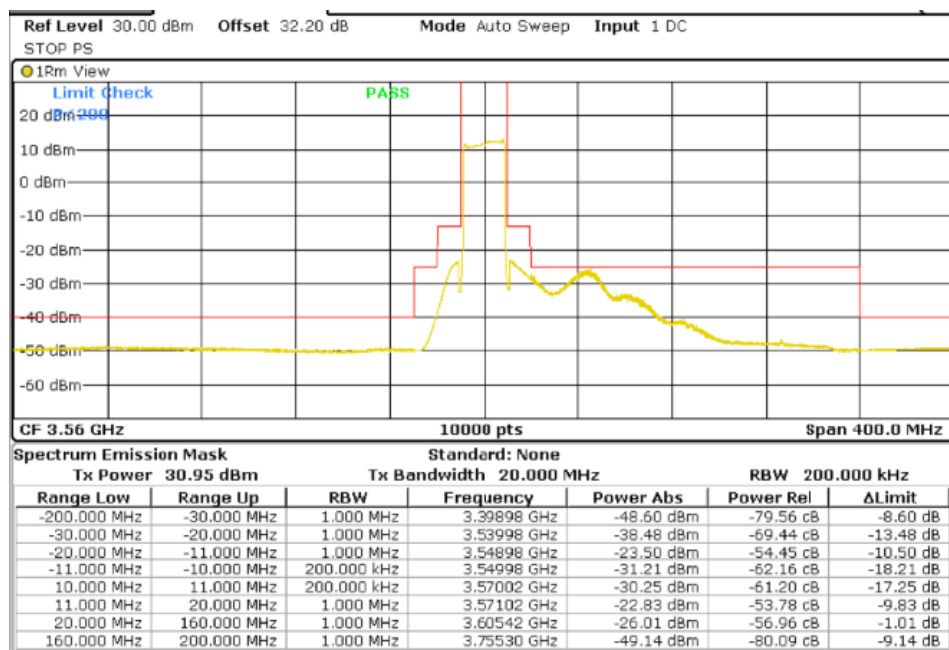
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



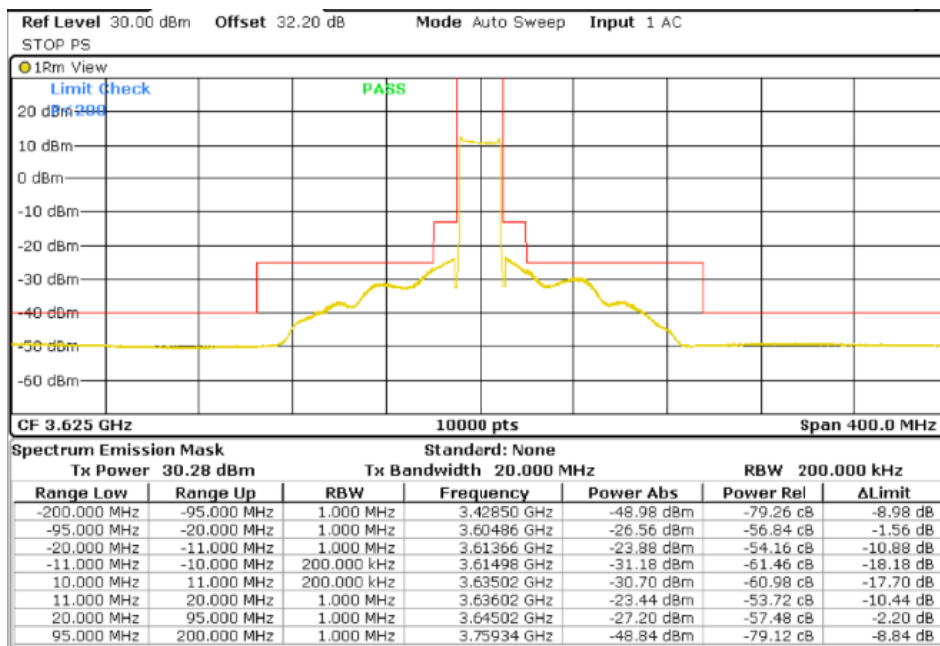
20 MHz BW

Lowest Channel (3560 MHz)

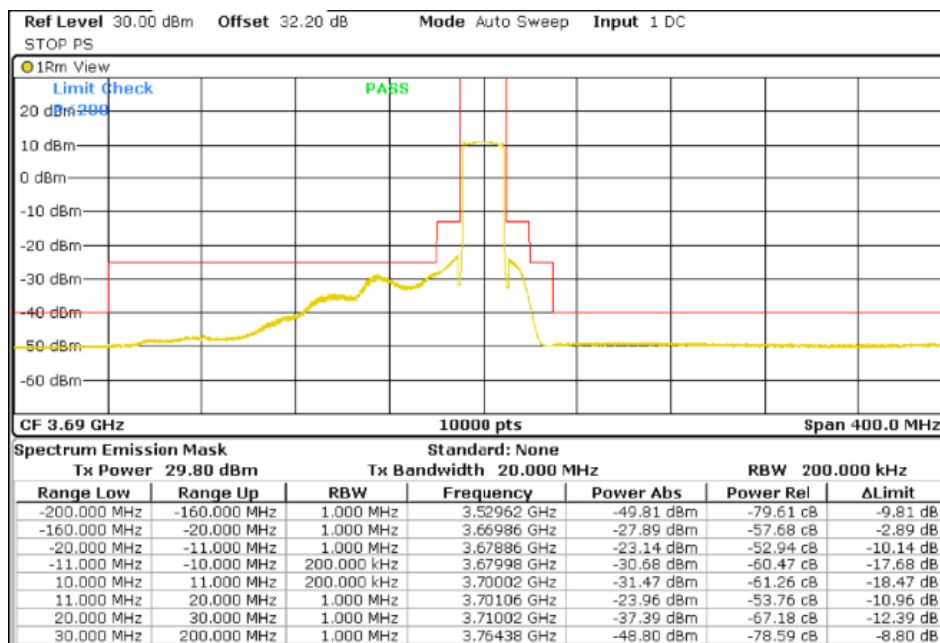


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)

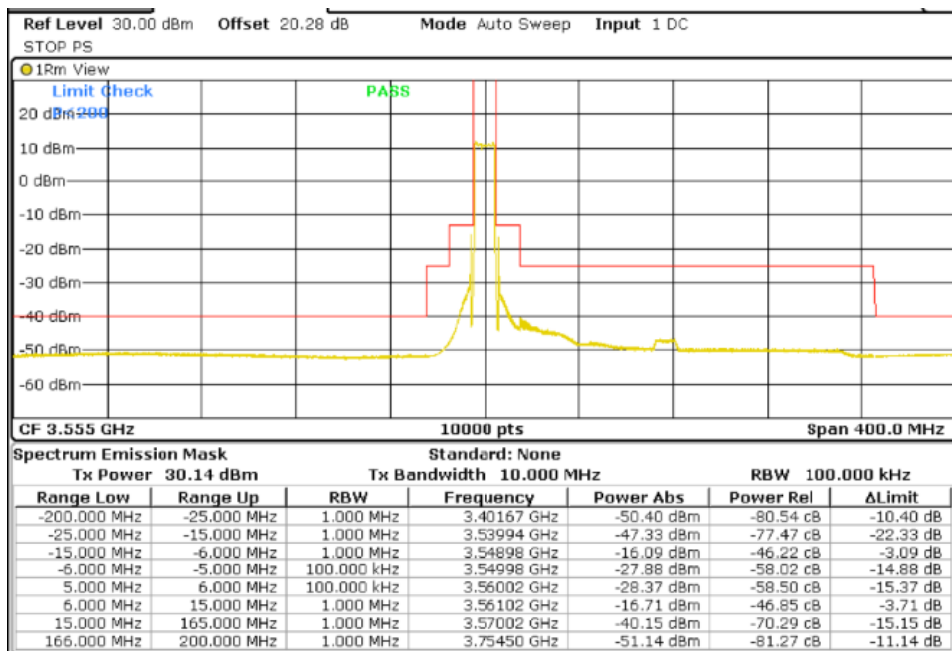


TEST RESULTS (Cont.):

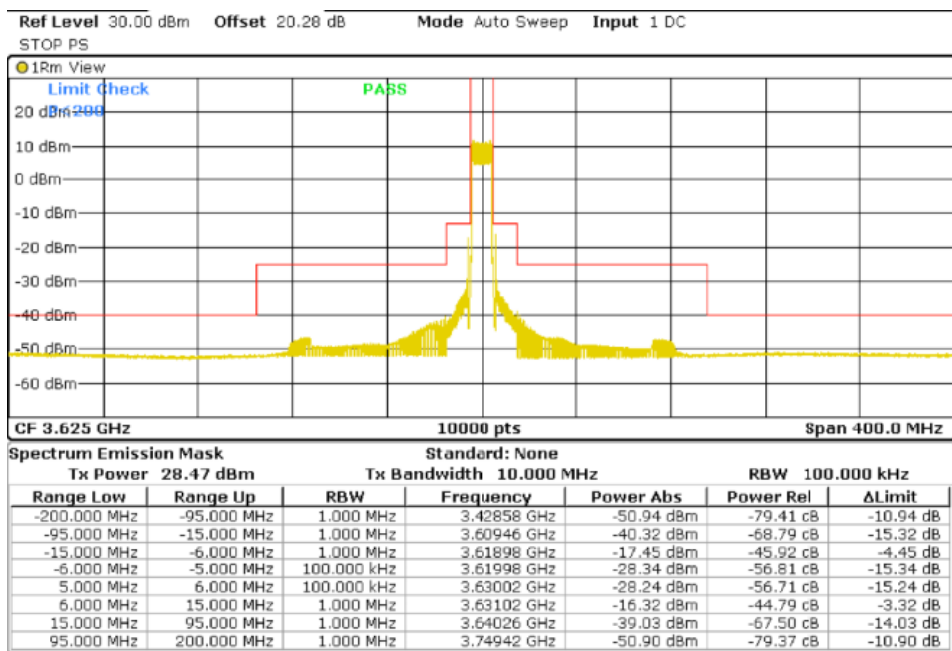
Port 4

10 MHz BW

Lowest Channel (3555 MHz)

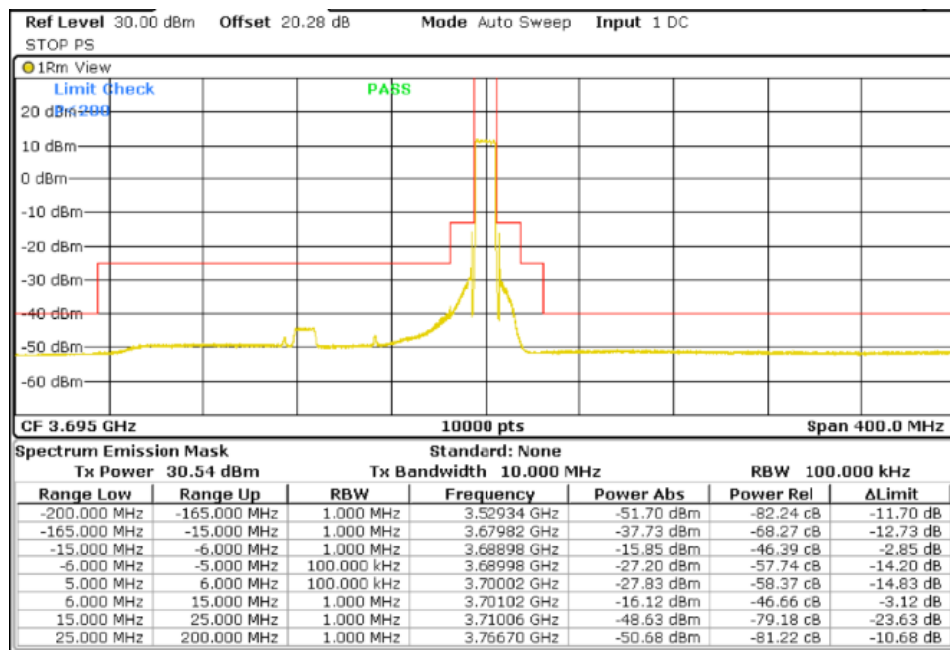


Middle Channel (3625 MHz)



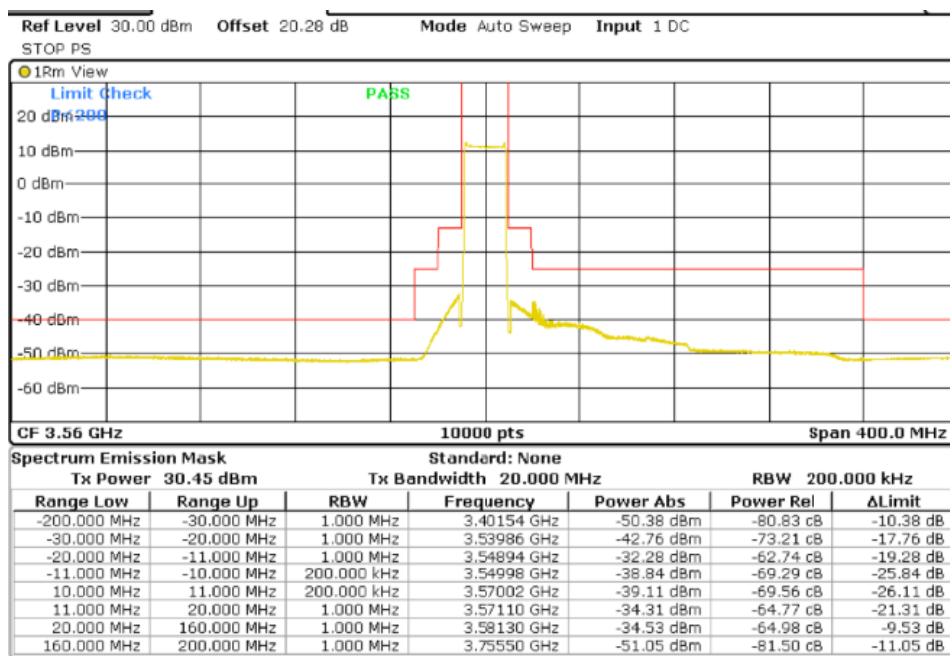
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



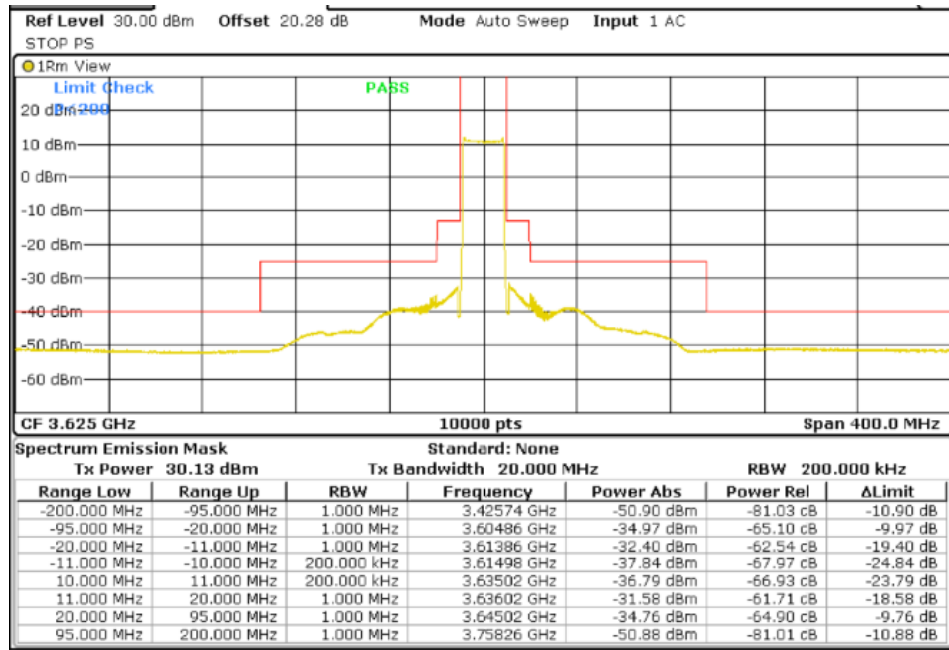
20 MHz BW

Lowest Channel (3560 MHz)

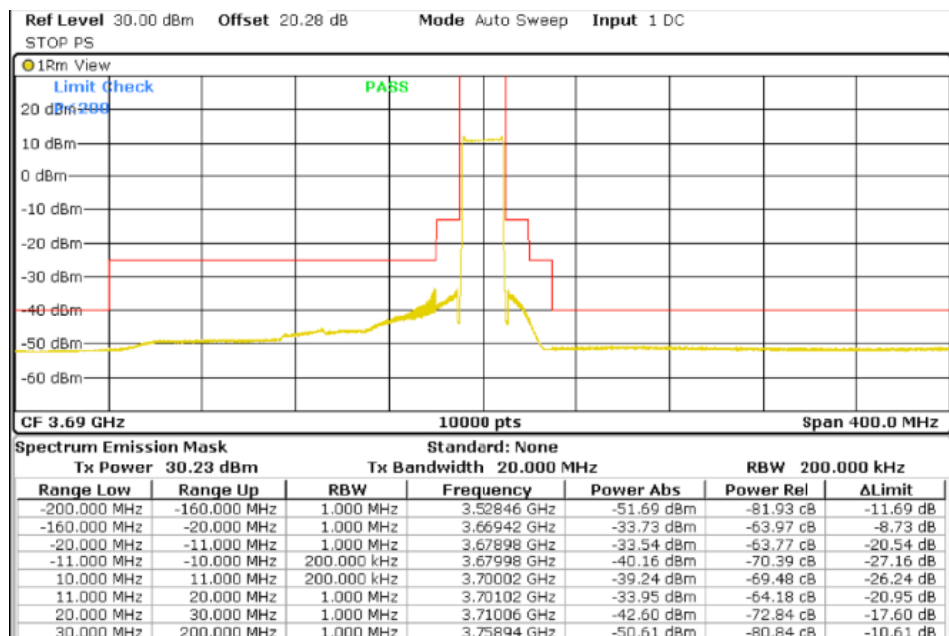


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)



TEST A.7: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

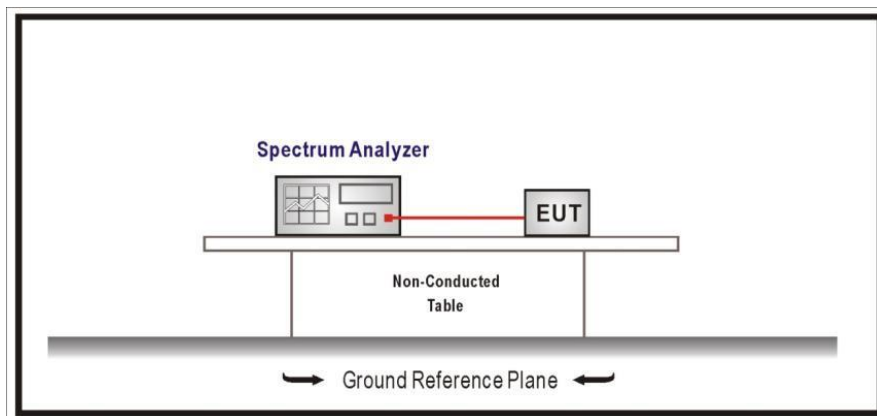
LIMITS:	Product standard:	Part 2.1051 and 96.41 Subclause (e)
	Test standard:	ANSI C63.26-2015

LIMITS

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

The limits for emission outside the fundamental for any emission below 3530 MHz and above 3720 MHz are -40 dBm/MHz.

TEST SETUP



The following duty cycle correction was added in RF level offset to get the accurate measured emission level in the average power measurement.

The duty cycle correction = $10 \log (1/0.68) = 1.67 \text{ (dB)}$

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (Band 48)
TEST RESULTS:	PASS

2x2 MIMO

10 MHz BW

Port 1 and 2

Lowest 3555 MHz		Middle 3625 MHz		Highest 3695 MHz	
Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)
No Spurious		7246.18	-48.23	7389.68	-47.65
		7248.68	-48.11	7390.18	-48.54
				7389.68/7390.18	-45.06(*)
Measurement uncertainty (dB)					<± 2.03

*: Emission levels from two different ports were summed due to the frequency separation within 1 MHz

Port 3 and 4

Lowest 3555 MHz		Middle 3625 MHz		Highest 3695 MHz	
Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)
No Spurious		7250.68	-45.29	7386.68	-46.79
		7249.18	-45.90	7390.68	-47.39
		7249.18/7250.68	-42.57(*)		
Measurement uncertainty (dB)					<± 2.03

*: Emission levels from two different ports were summed due to the frequency separation within 1 MHz

Port 1, 2, 3 and 4

Lowest 3555 MHz		Middle 3625 MHz		Highest 3695 MHz	
Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)
No Spurious		7246.18	-48.23	7386.68	-46.79
		7248.68	-48.11	7390.68	-47.39
		7249.18/7250.68	-42.57	7389.68/7390.18	-45.06
		7248.68/7249.18/7250.68	-41.50(*)	7389.68/7390.18/7390.68	-43.06(*)
Measurement uncertainty (dB)					<± 2.03

*: Emission levels from two different ports were summed due to the frequency separation within 1 MHz

TEST RESULTS (Cont.):

20 MHz BW

Port 1 and 2:

Lowest 3560 MHz		Middle 3625 MHz		Highest 3690 MHz	
Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)
7119.5	-50.68	7246.49	-49.28	7377.99	-50.20
		7250.18	-50.21	7370.99	-50.25
Measurement uncertainty (dB)					<± 2.03

Port 3 and 4:

Lowest 3560 MHz		Middle 3625 MHz		Highest 3690 MHz	
Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)
7119.50	-52.24	7250.18	-48.01	7384.99	-49.14
		7247.49	-48.28	7382.99	-50.29
Measurement uncertainty (dB)					<± 2.03

Port 1, 2, 3 and 4:

Lowest 3560 MHz		Middle 3625 MHz		Highest 3690 MHz	
Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)	Spurious Frequency (MHz)	Emission Level (dBm/MHz)
7119.50	-50.68	7246.49	-49.28	7370.99	-50.25
7119.50	-52.24	7247.49	-48.28	7377.99	-50.20
7119.50/7119.50	-48.38(*)	7246.49/7247.49	-45.74(*)	7382.99	-50.29
		7250.18	-48.01	7384.99	-49.14
		7250.18	-50.21		
		7250.18/7250.18	-45.96(*)		
Measurement uncertainty (dB)					<± 2.03

*: Emission levels from two different ports were summed due to the frequency separation within 1 MHz

(See next plots)

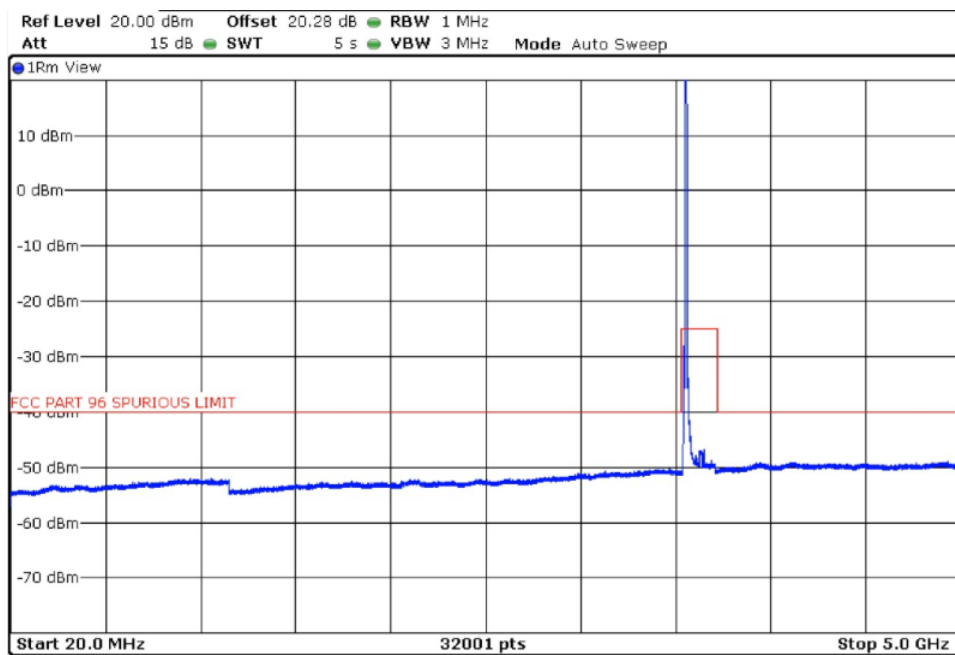
TEST RESULTS (Cont.):

Port 1

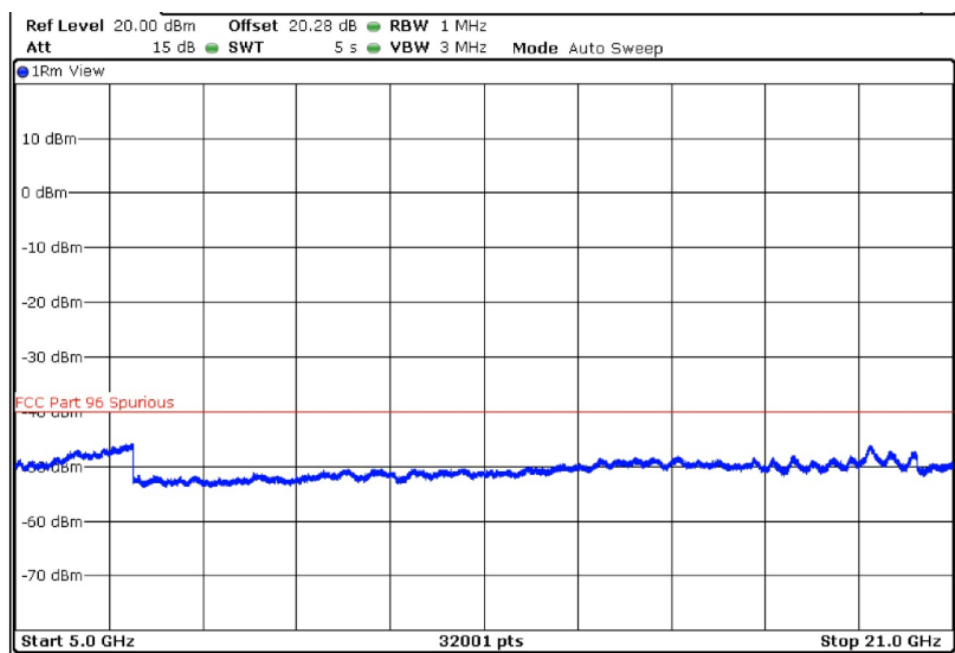
10MHz BW

Lowest Channel (3555 MHz)

FREQUENCY RANGE 20 MHz-5 GHz

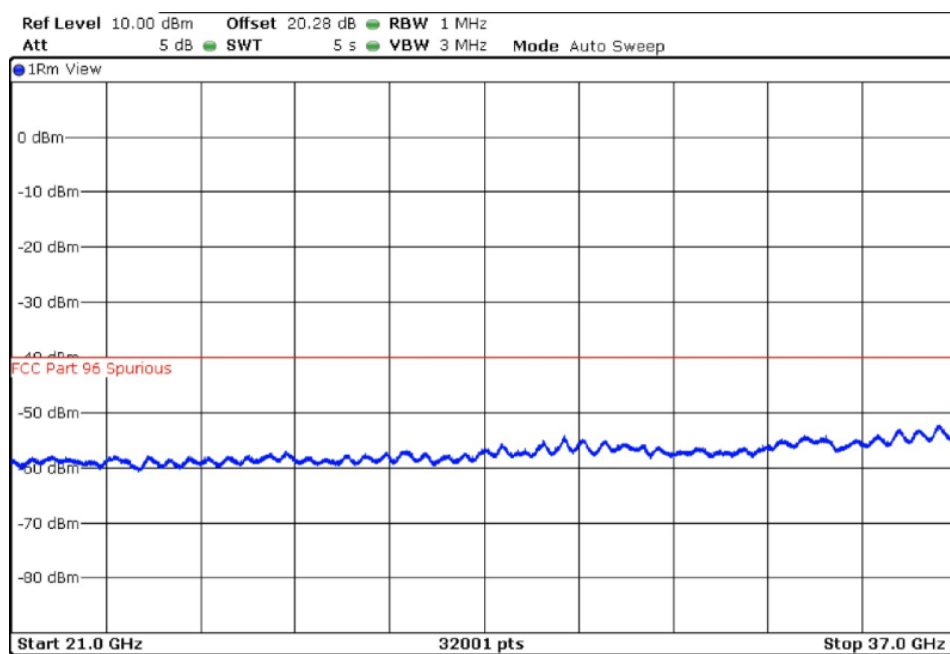


FREQUENCY RANGE 5-21 GHz



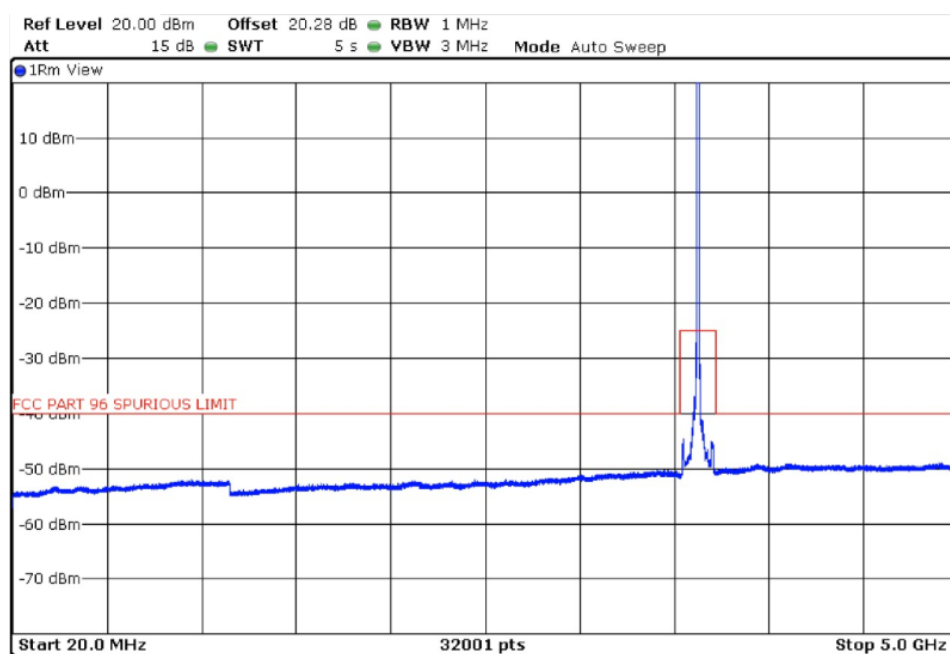
TEST RESULTS (Cont.):

FREQUENCY RANGE 21-37 GHz



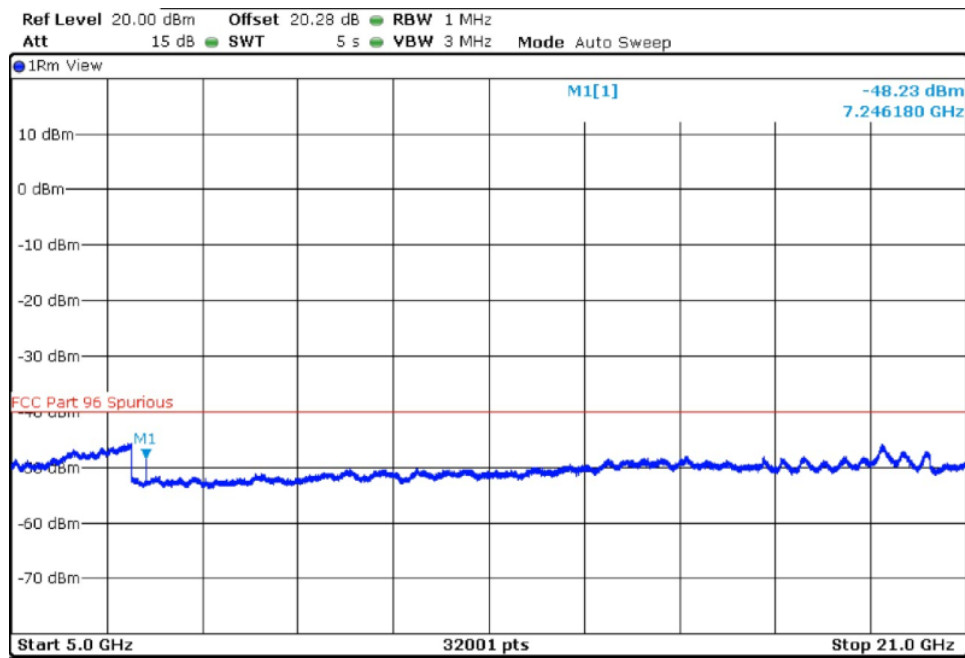
Middle Channel (3625 MHz)

FREQUENCY RANGE 20 MHz-5 GHz

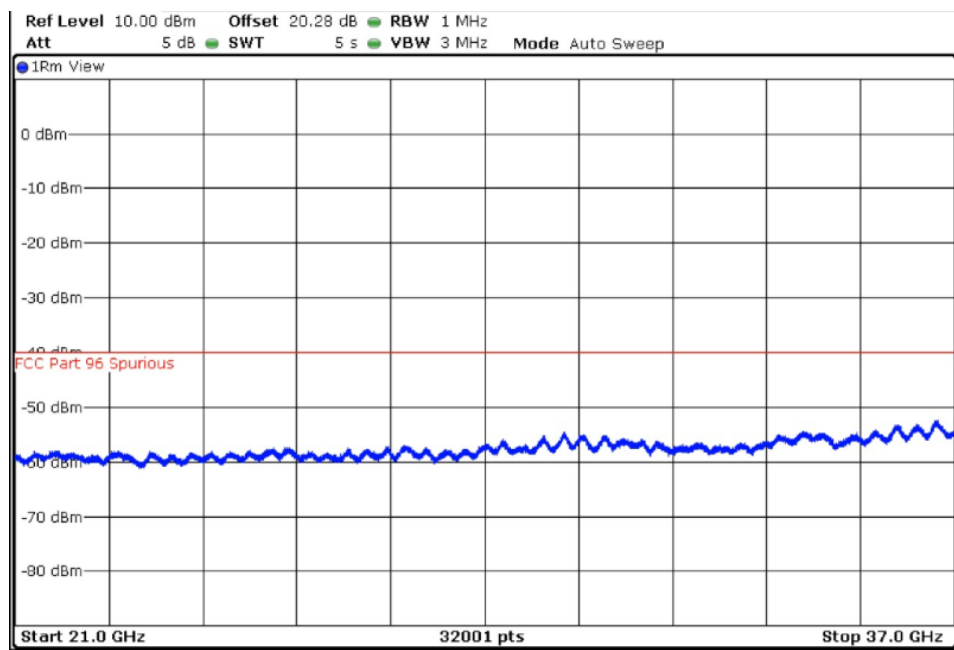


TEST RESULTS (Cont.):

FREQUENCY RANGE 5-21 GHz



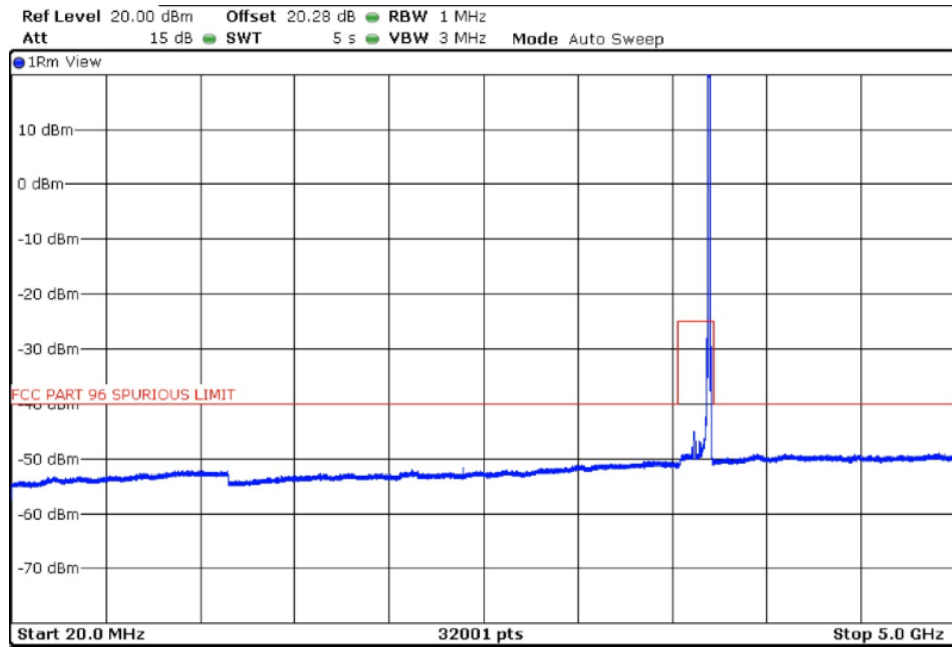
FREQUENCY RANGE 21-37 GHz



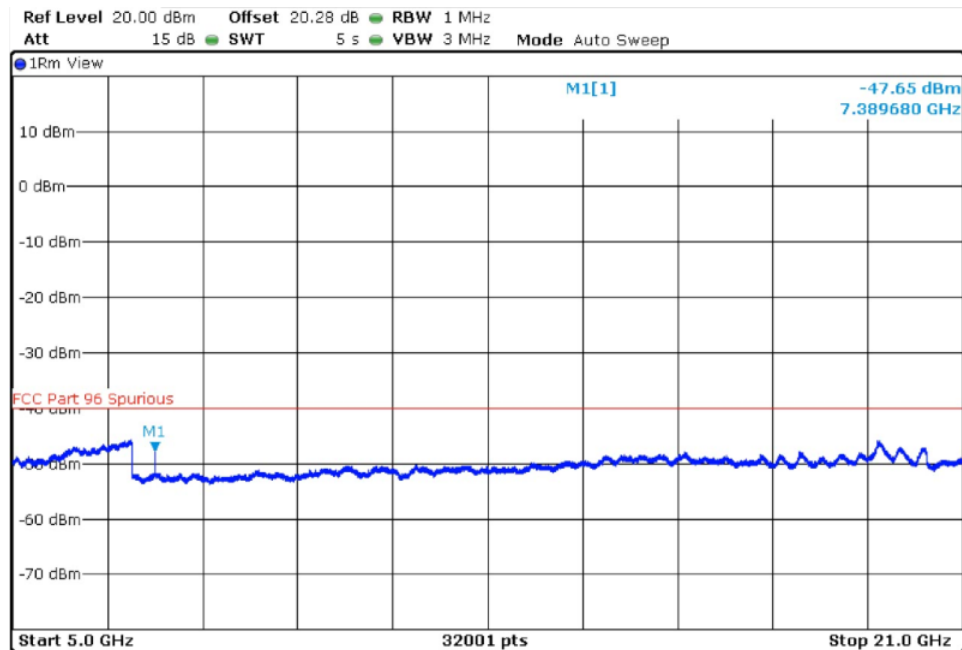
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)

FREQUENCY RANGE 20 MHz-5 GHz

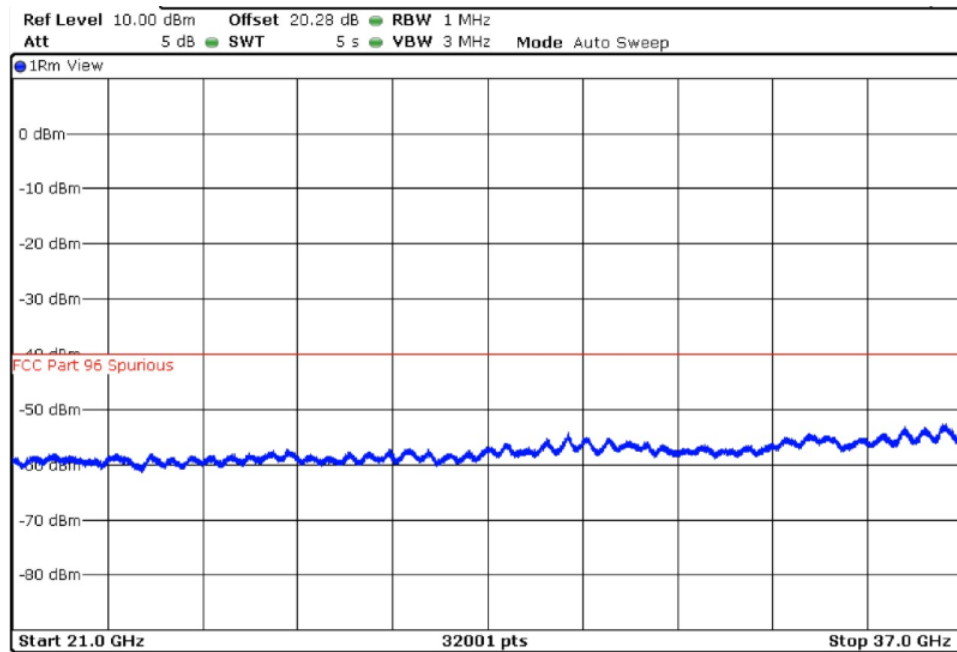


FREQUENCY RANGE 5-21 GHz



TEST RESULTS (Cont.):

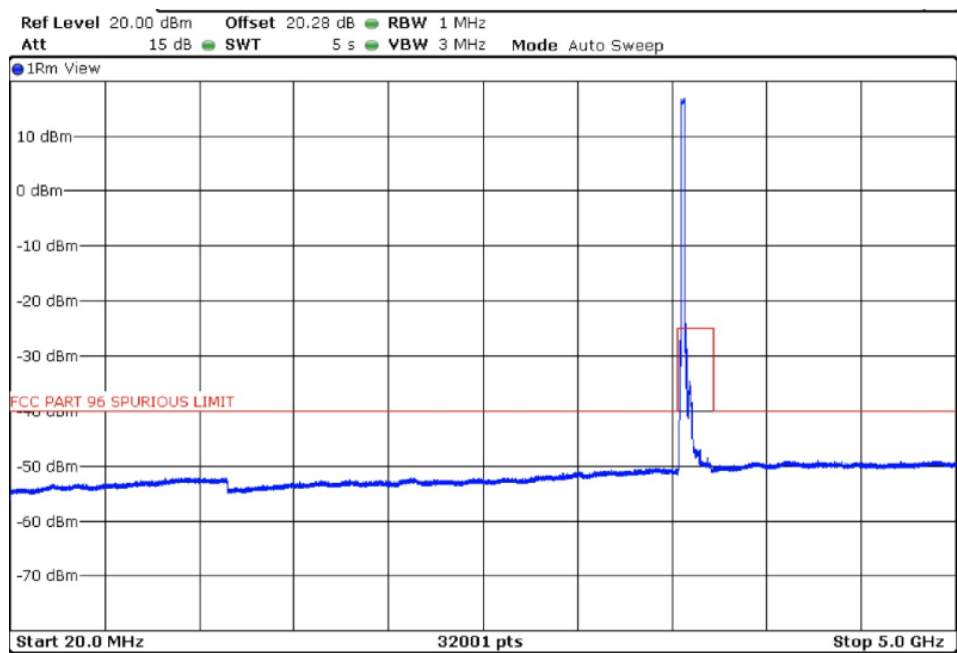
FREQUENCY RANGE 21-37 GHz



20 MHz BW

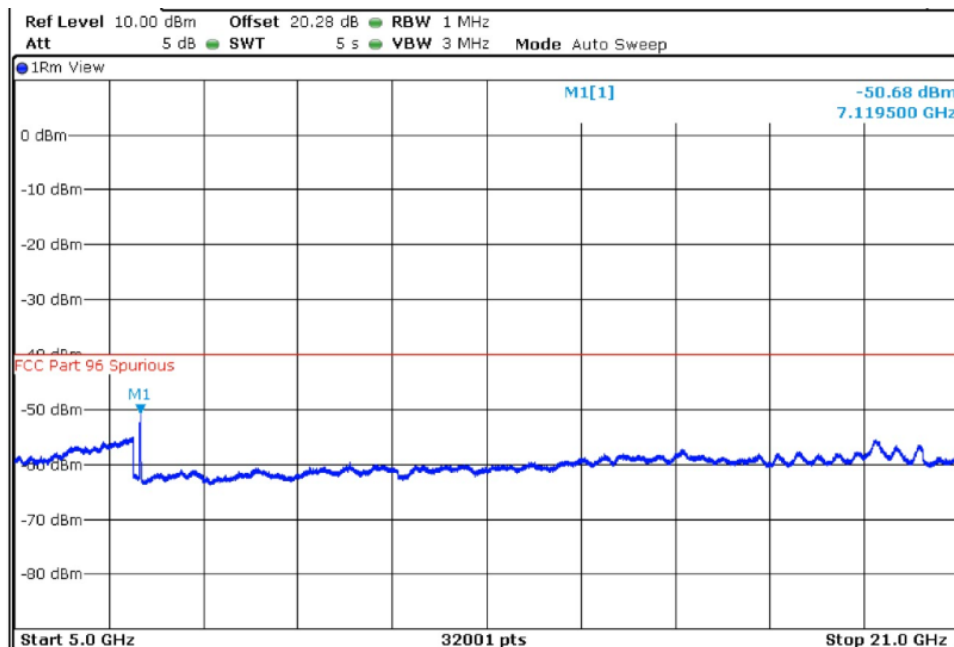
Lowest Channel (3560 MHz)

FREQUENCY RANGE 20 MHz-5 GHz

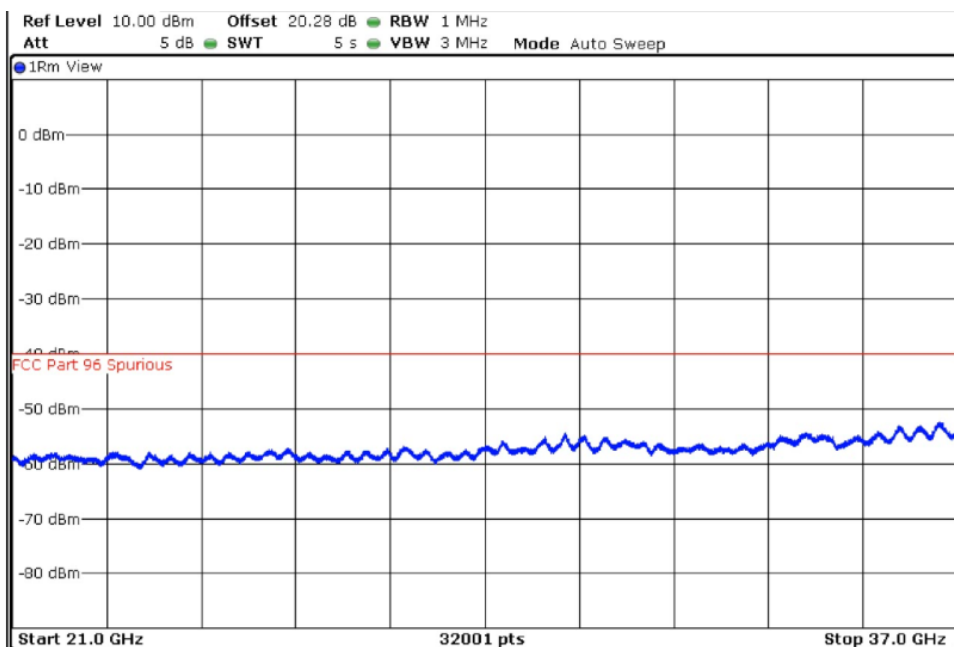


TEST RESULTS (Cont.):

FREQUENCY RANGE 5-21 GHz



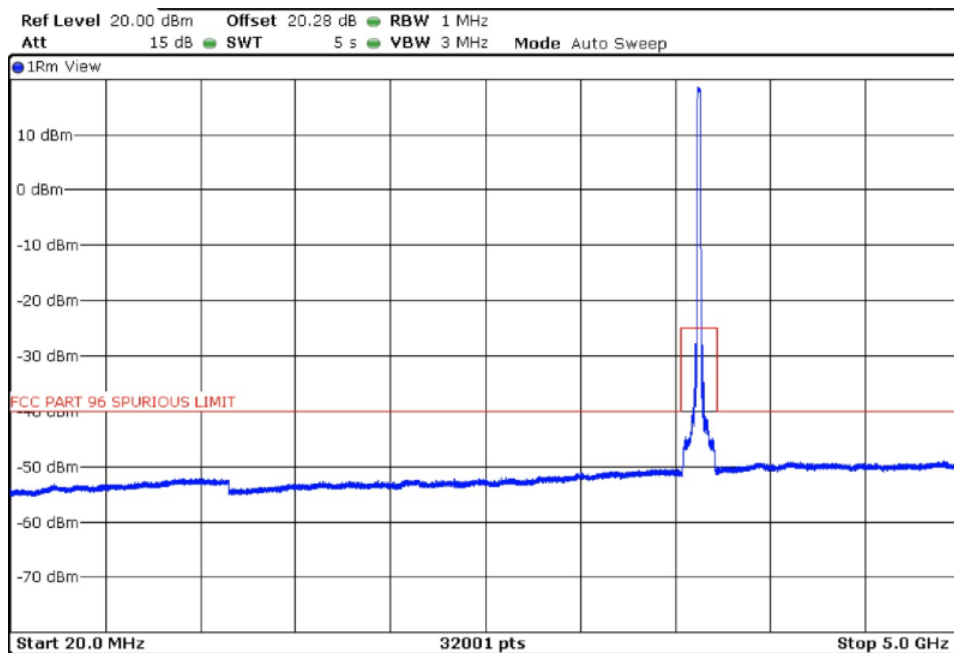
FREQUENCY RANGE 21-37 GHz



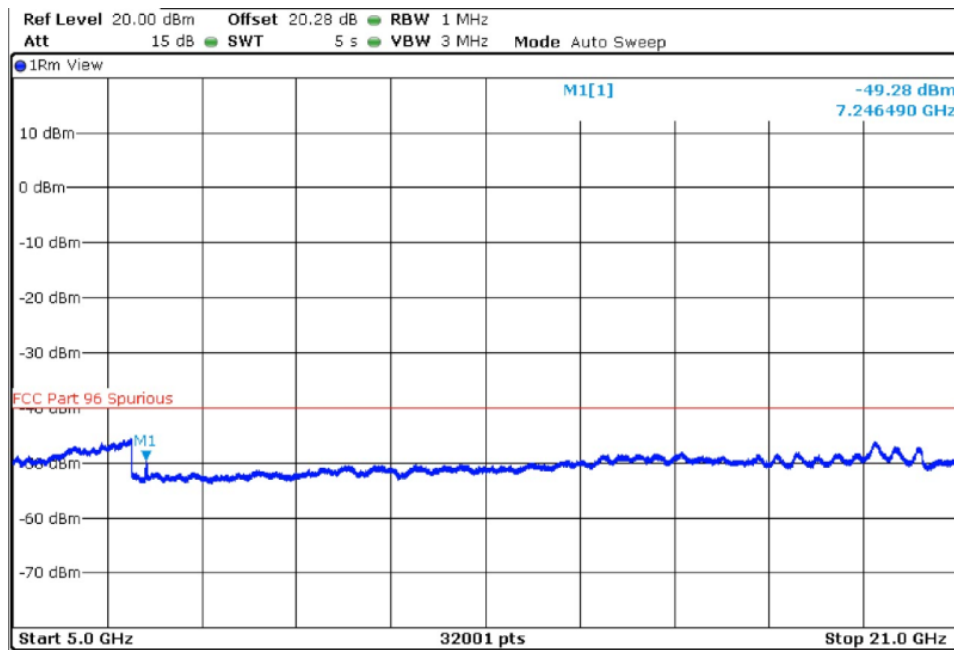
TEST RESULTS (Cont.):

Middle Channel (3625 MHz)

FREQUENCY RANGE 20 MHz-5 GHz

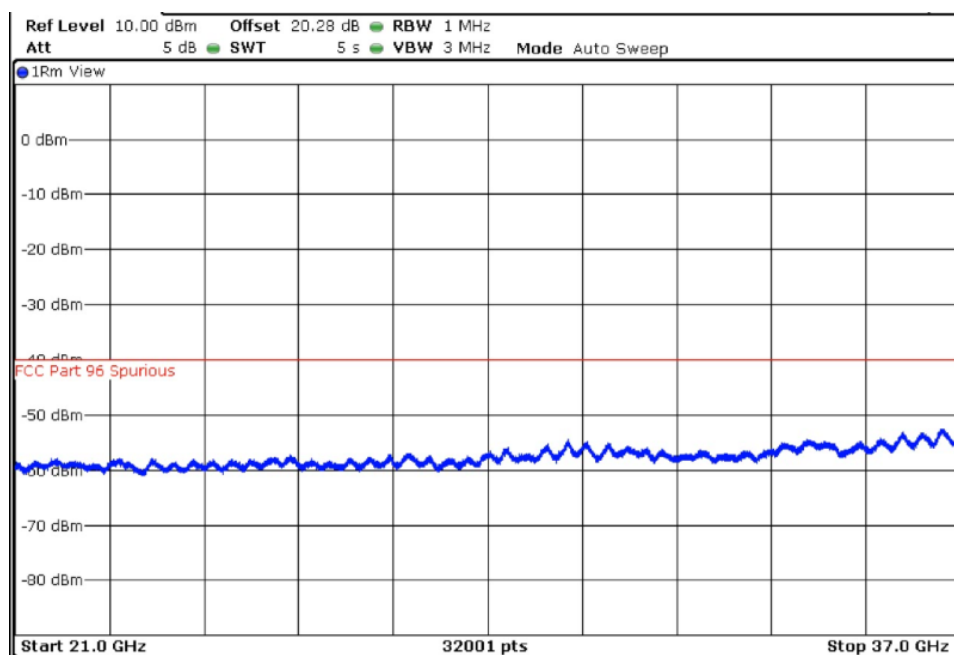


FREQUENCY RANGE 5-21 GHz



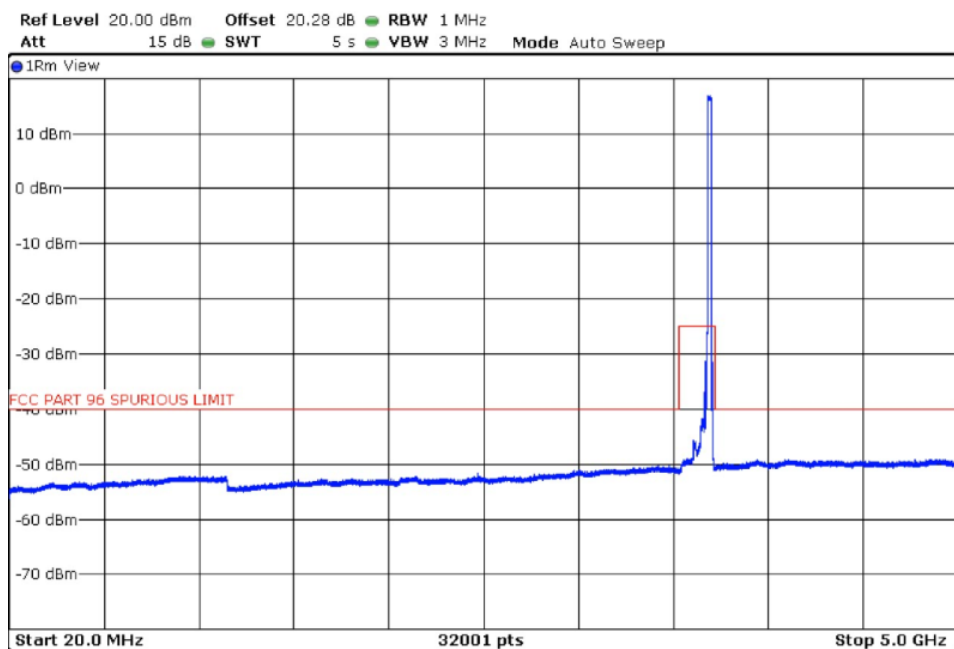
TEST RESULTS (Cont.):

FREQUENCY RANGE 21-37 GHz



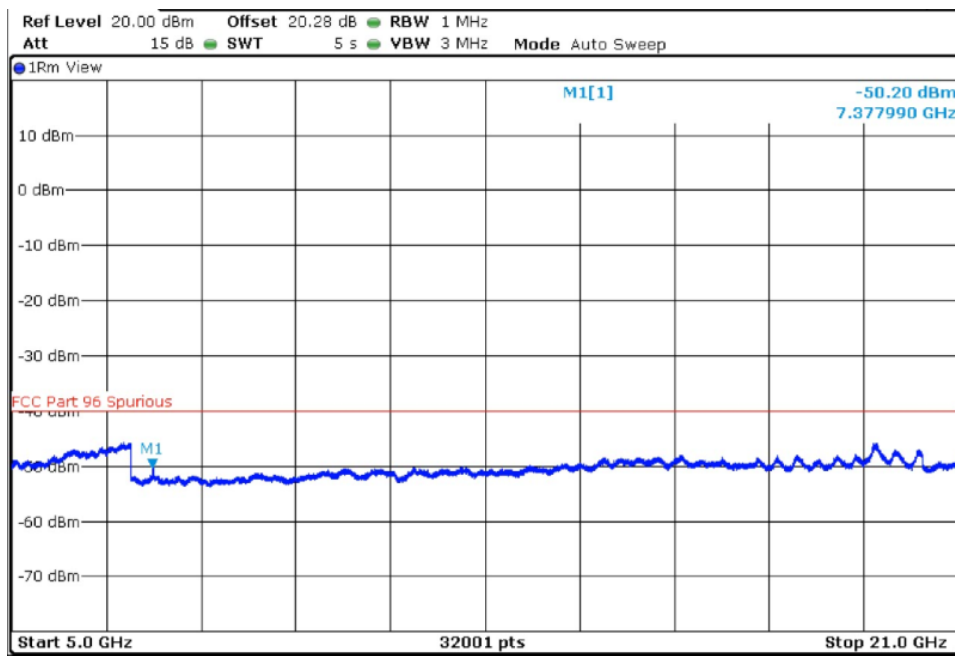
Highest Channel (3690 MHz)

FREQUENCY RANGE 20 MHz-5 GHz

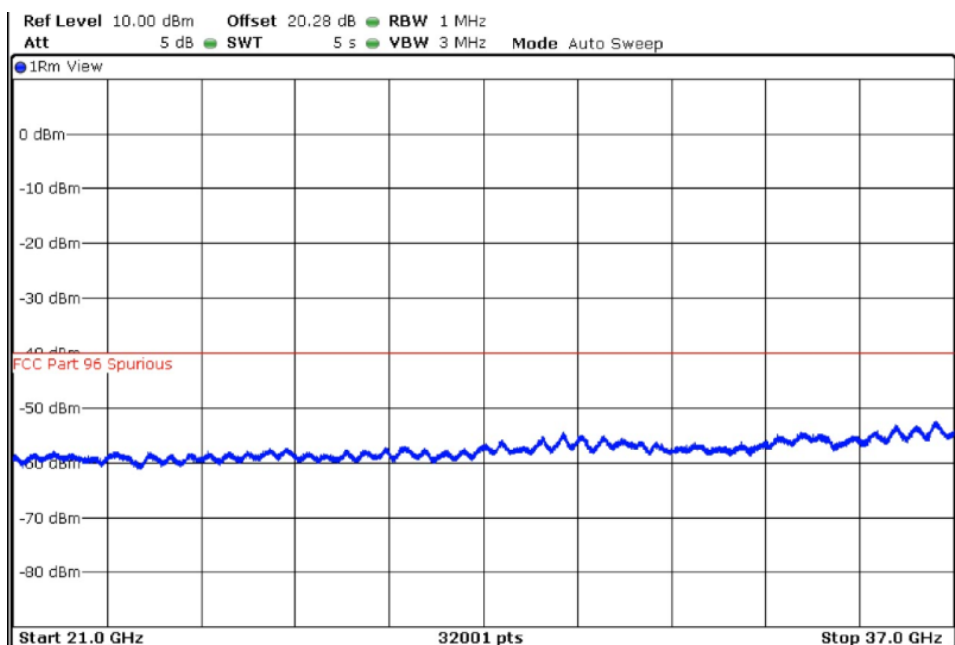


TEST RESULTS (Cont.):

FREQUENCY RANGE 5-21 GHz



FREQUENCY RANGE 21-37 GHz



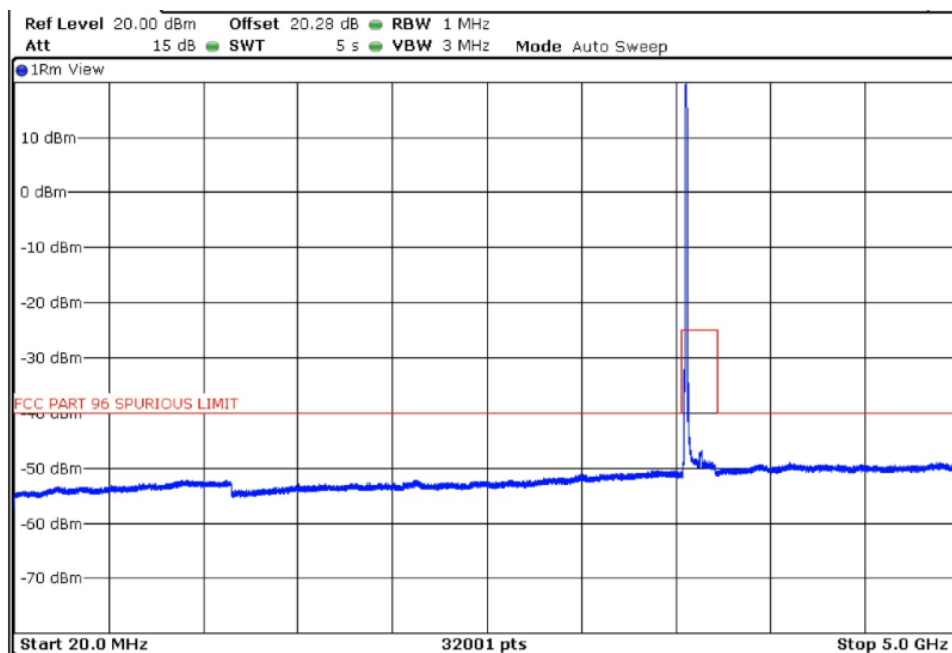
TEST RESULTS (Cont.):

Port 2

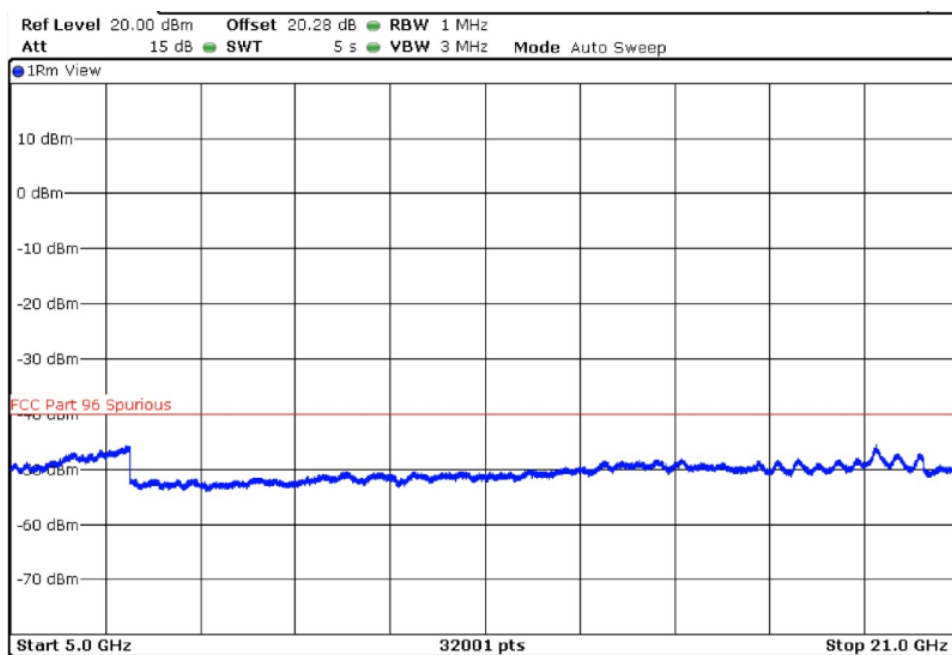
10MHz BW

Lowest Channel (3555 MHz)

FREQUENCY RANGE 20 MHz-5 GHz

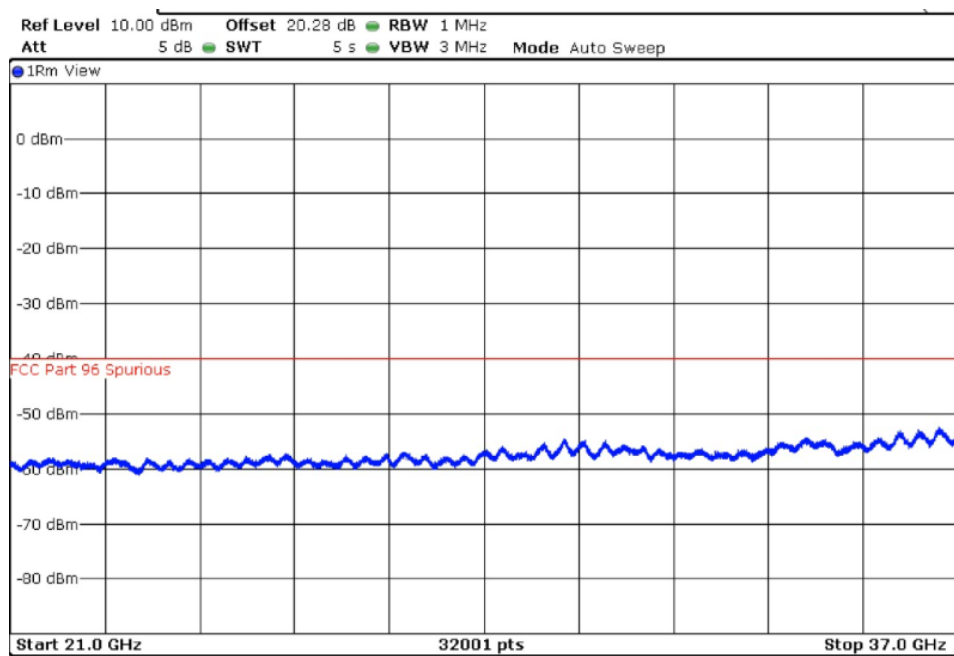


FREQUENCY RANGE 5-21 GHz



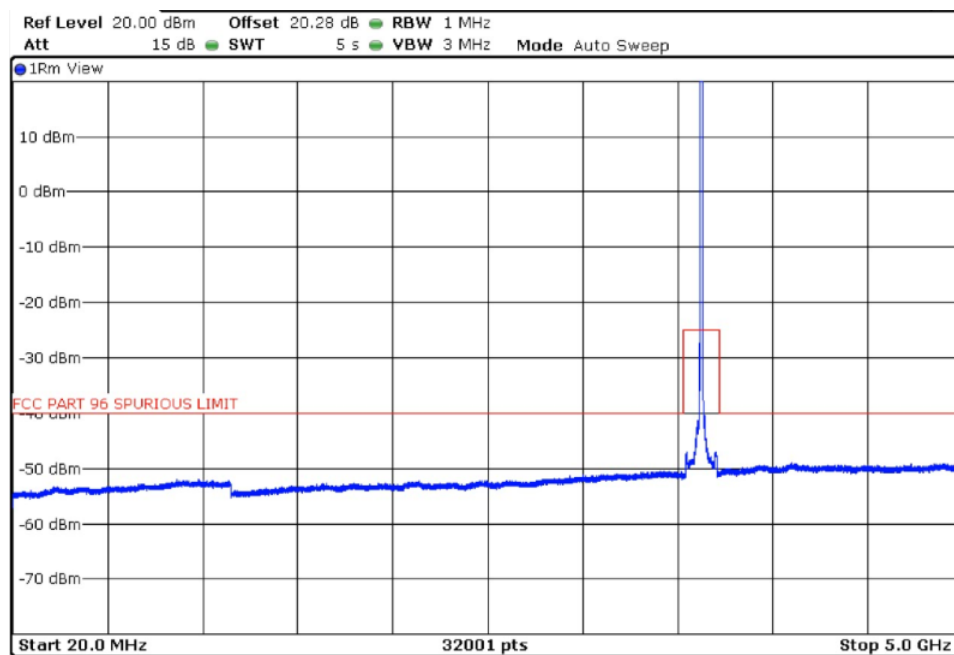
TEST RESULTS (Cont.):

FREQUENCY RANGE 21-37 GHz



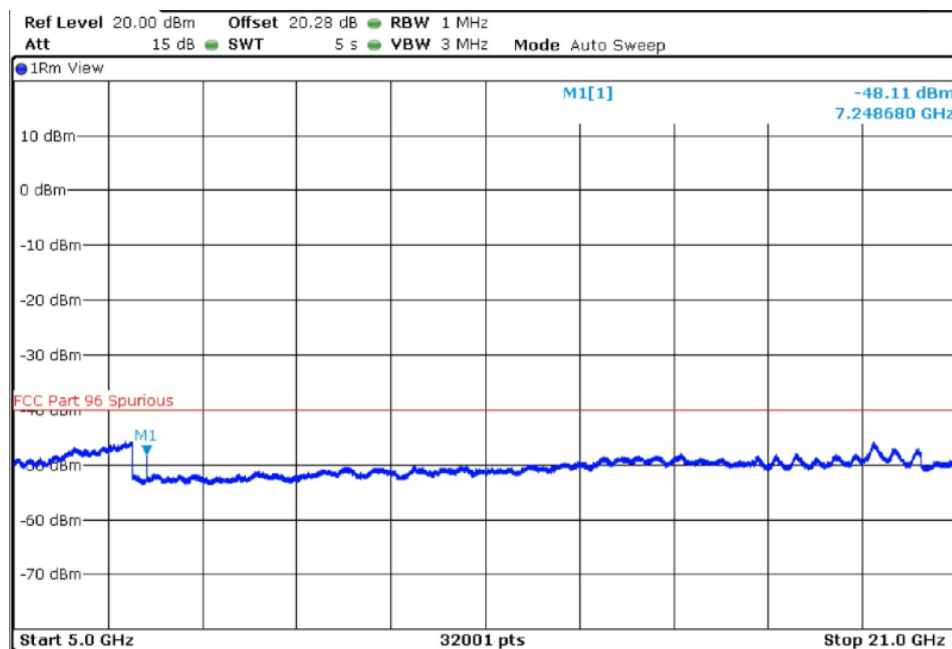
Middle Channel (3625 MHz)

FREQUENCY RANGE 20 MHz-5 GHz

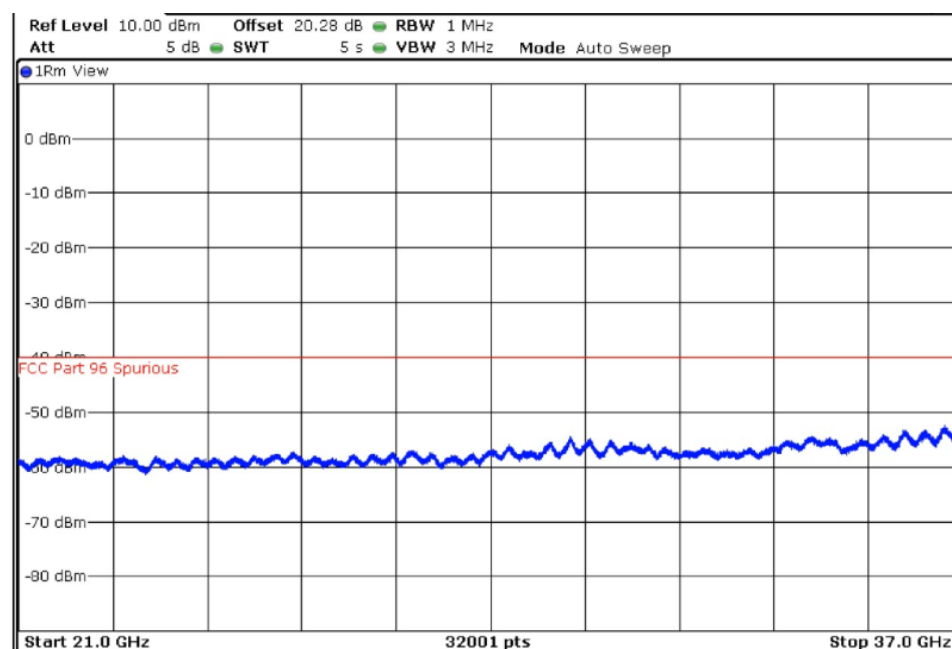


TEST RESULTS (Cont.):

FREQUENCY RANGE 5-21 GHz



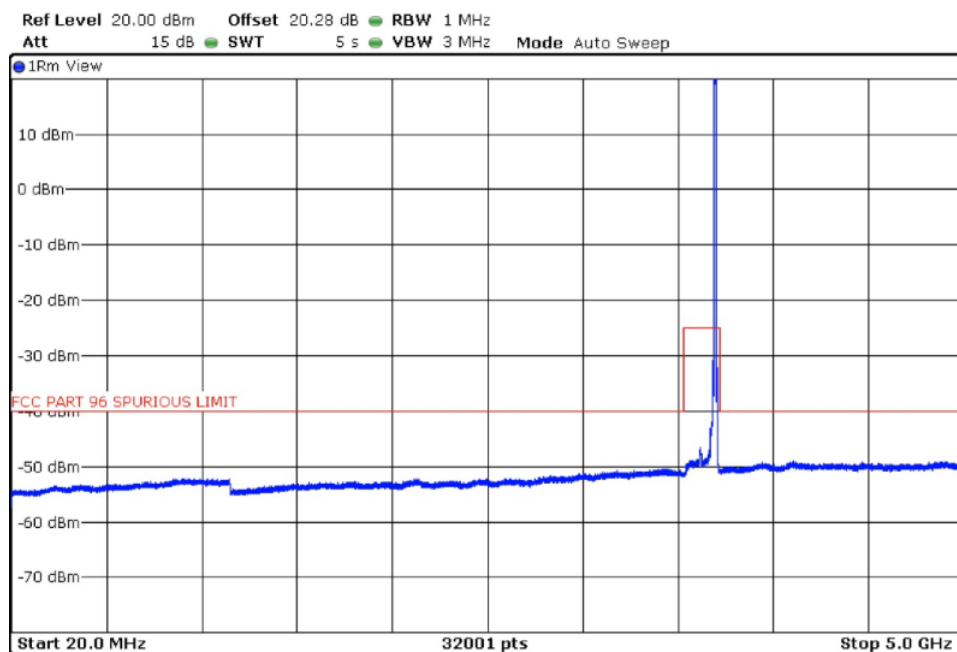
FREQUENCY RANGE 21-37 GHz



TEST RESULTS (Cont.):

Highest Channel (3695 MHz)

FREQUENCY RANGE 20 MHz-5 GHz



FREQUENCY RANGE 5-21 GHz

