

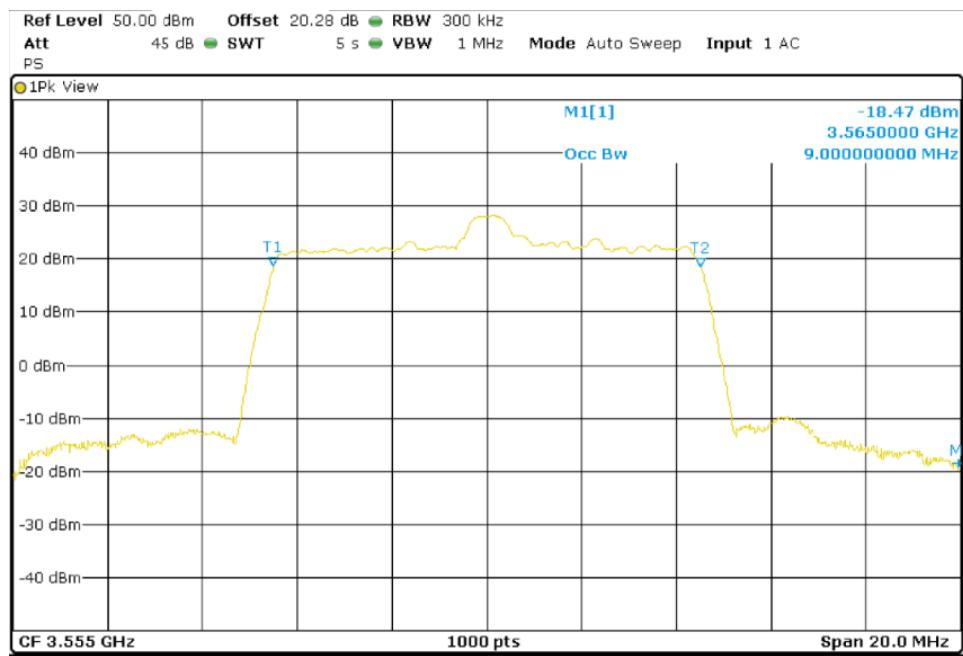
TEST RESULTS (Cont.):

Port 2

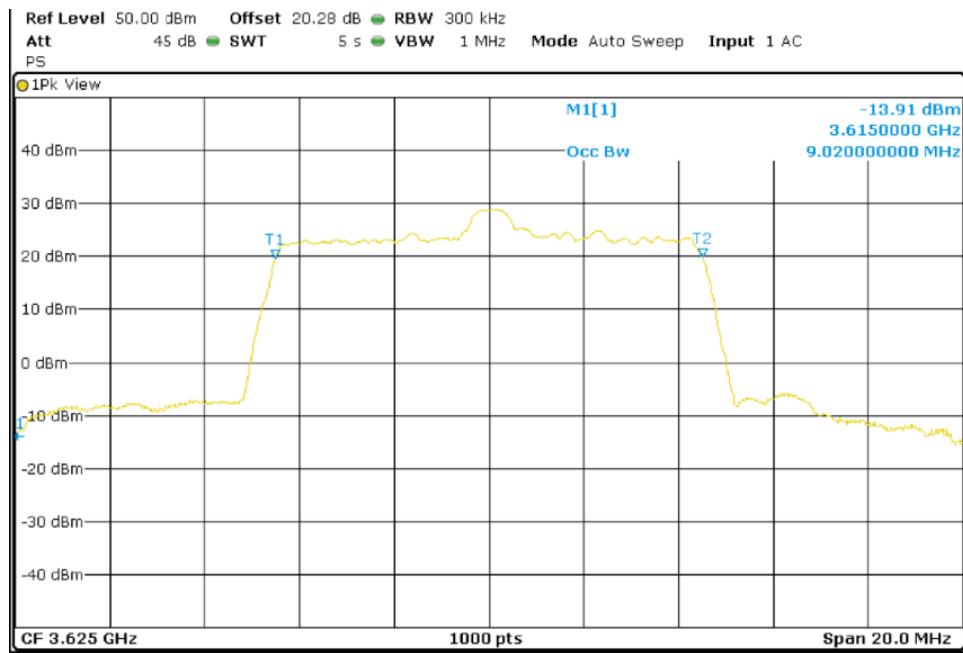
10 MHz BW

QPSK

Lowest Channel (3555 MHz)

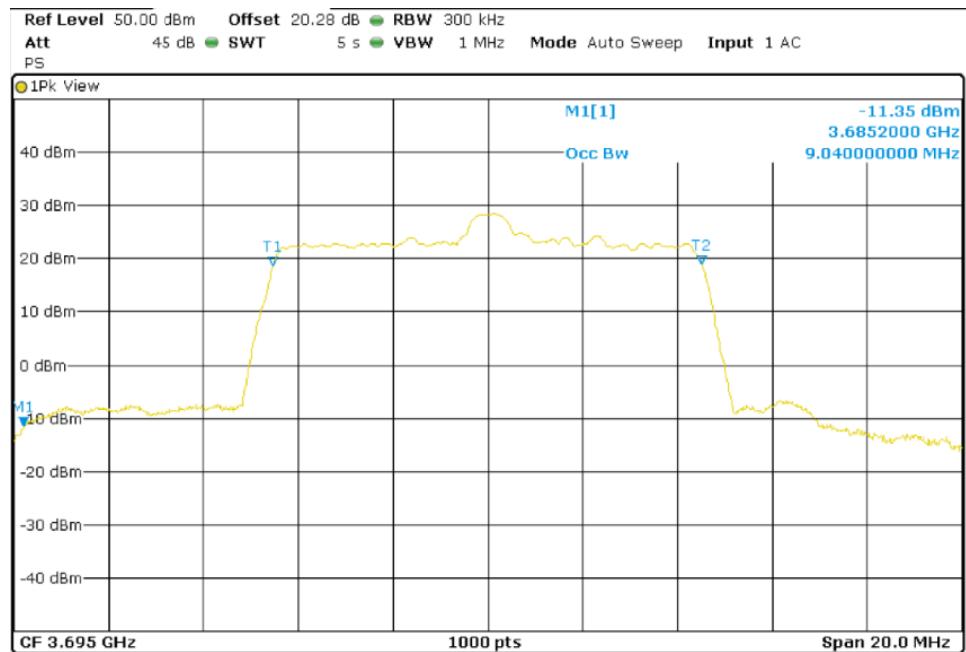


Middle Channel (3625 MHz)



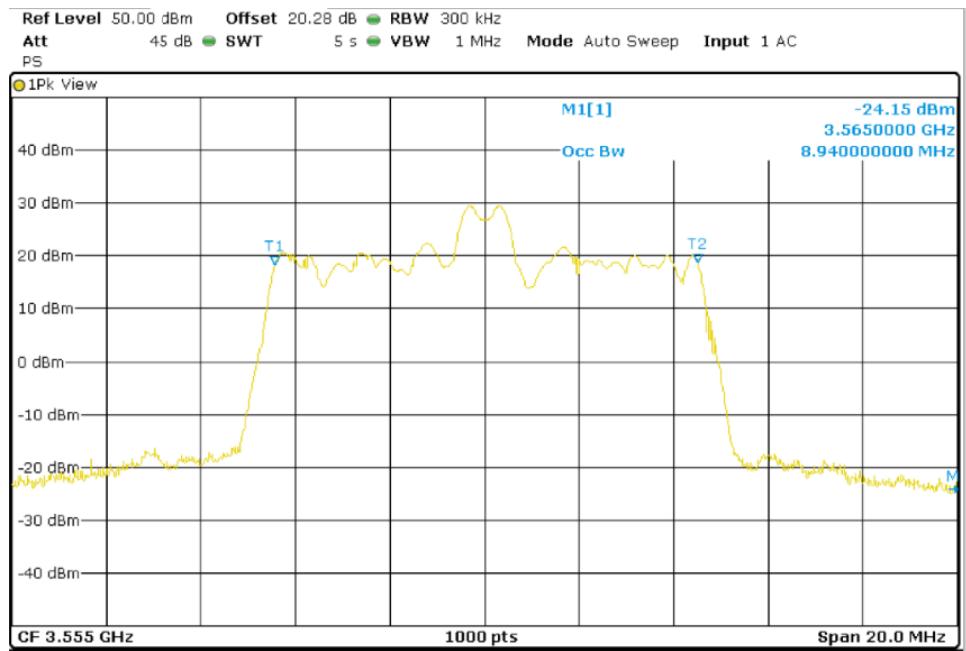
TEST RESULTS (Cont.):

High Channel (3695 MHz)



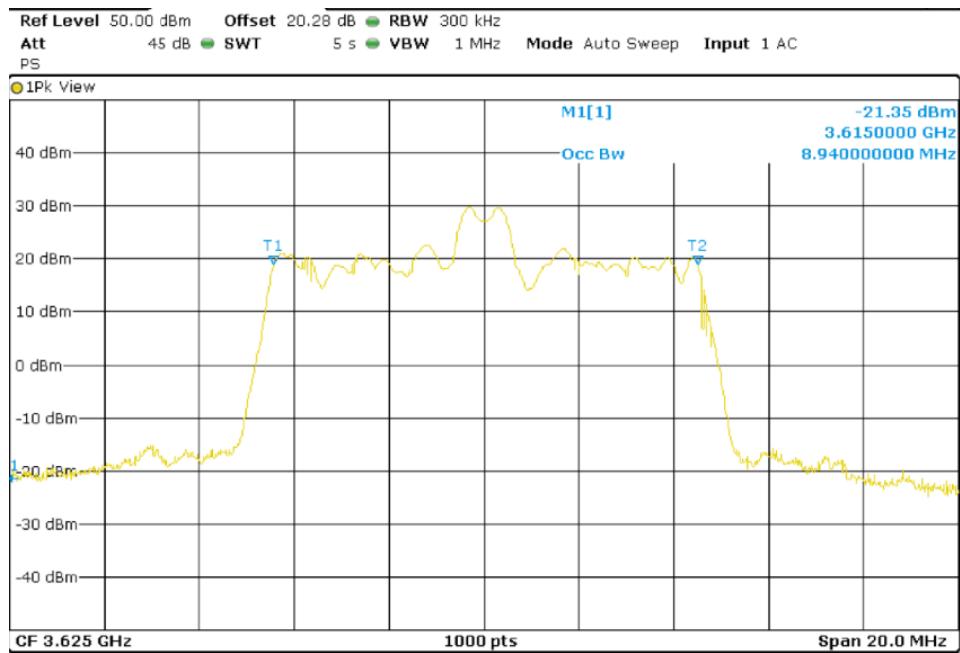
64QAM

Lowest Channel (3555 MHz)

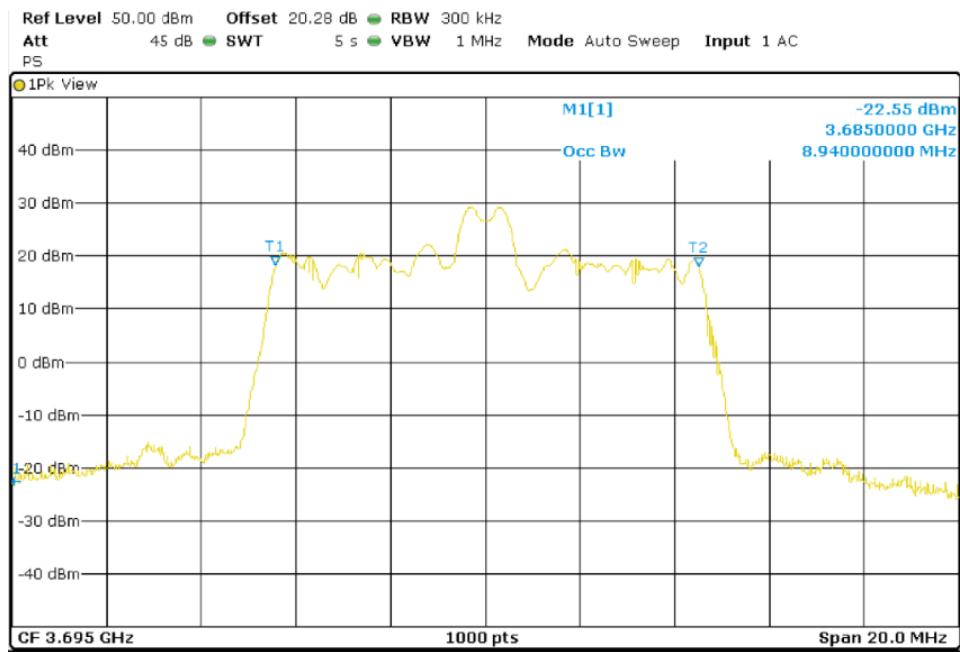


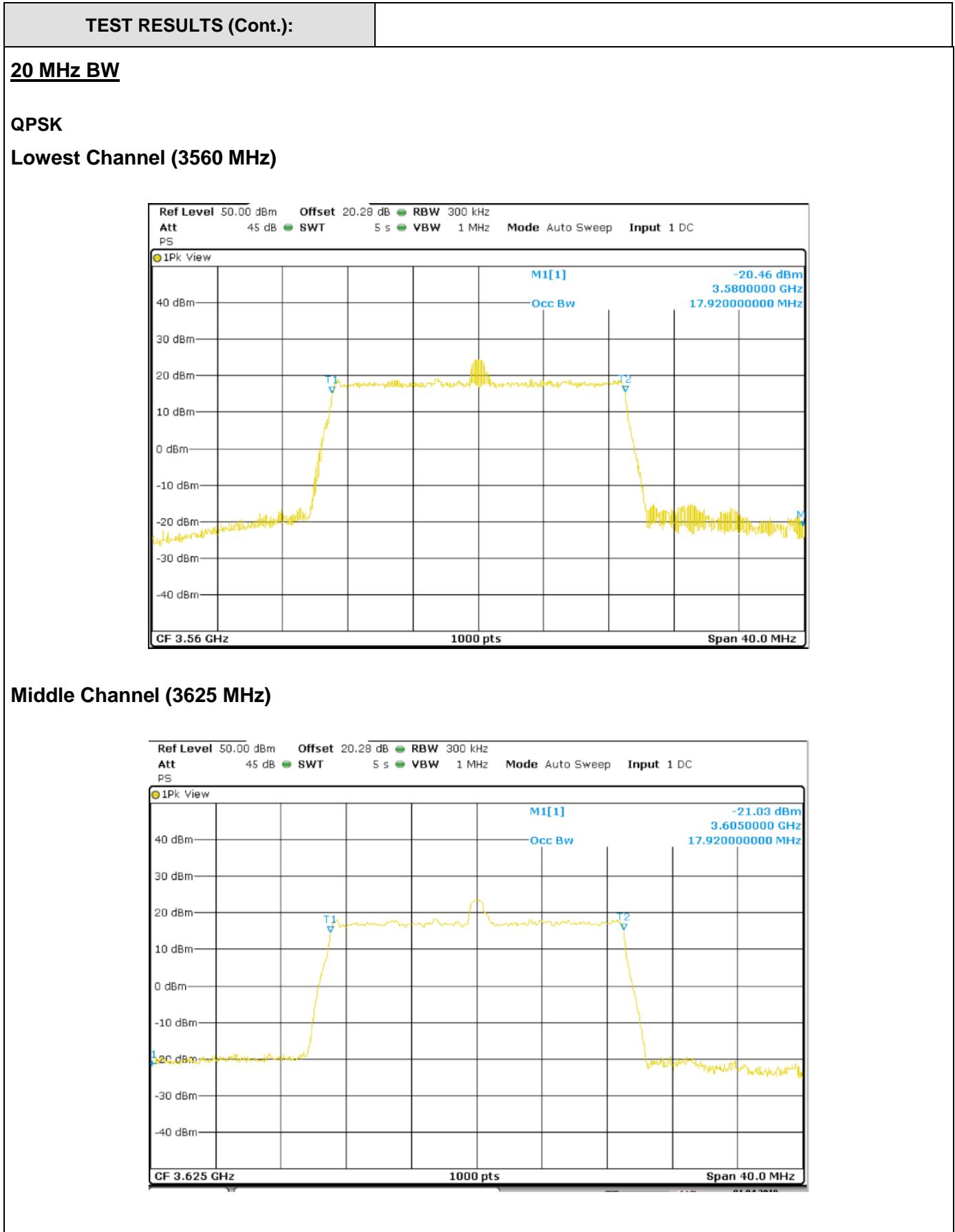
TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



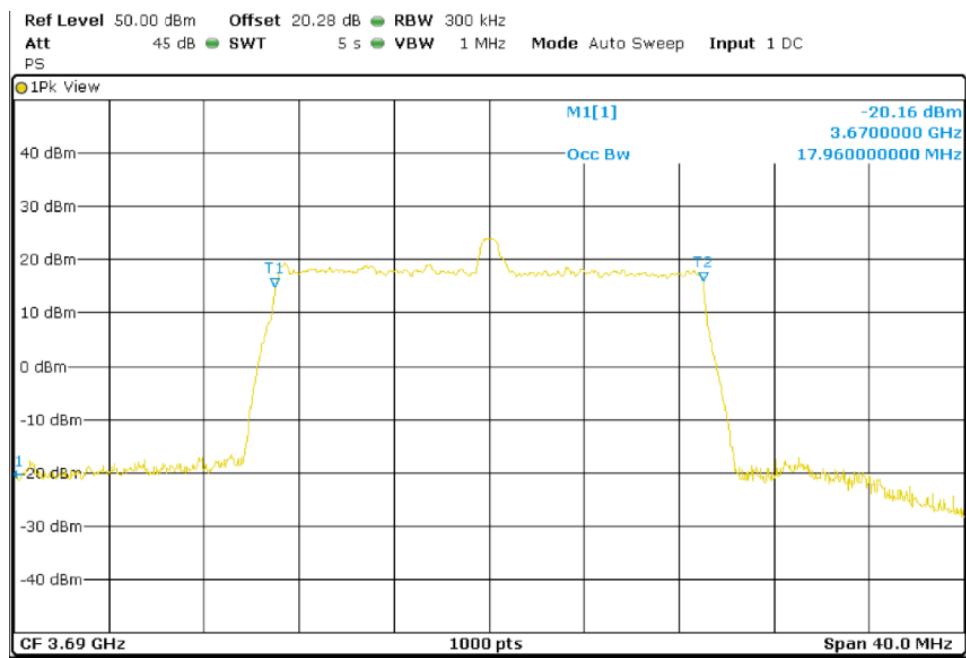
High Channel (3695 MHz)





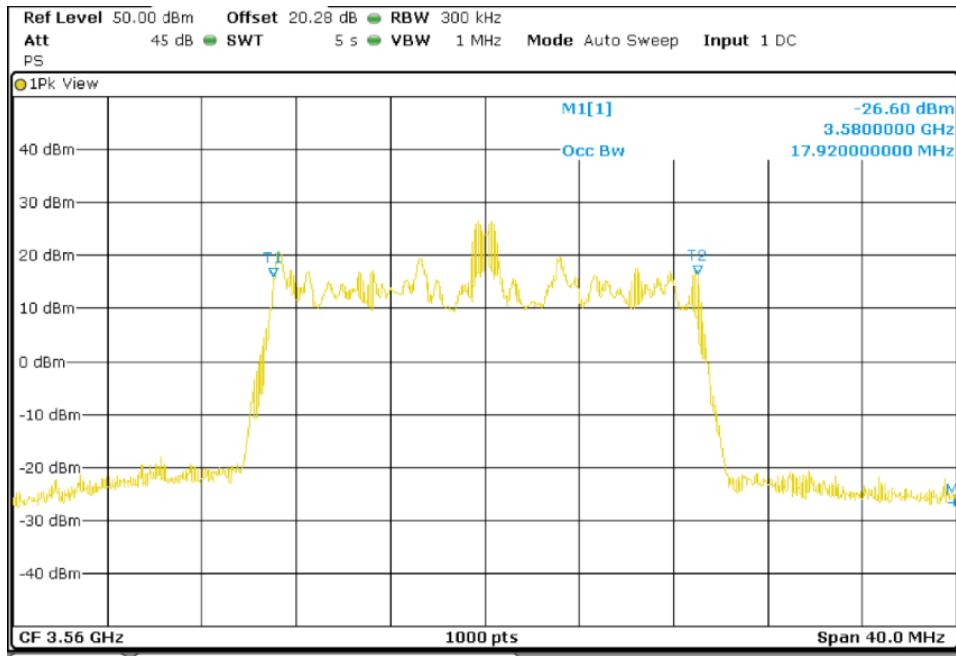
TEST RESULTS (Cont.):

High Channel (3690 MHz)



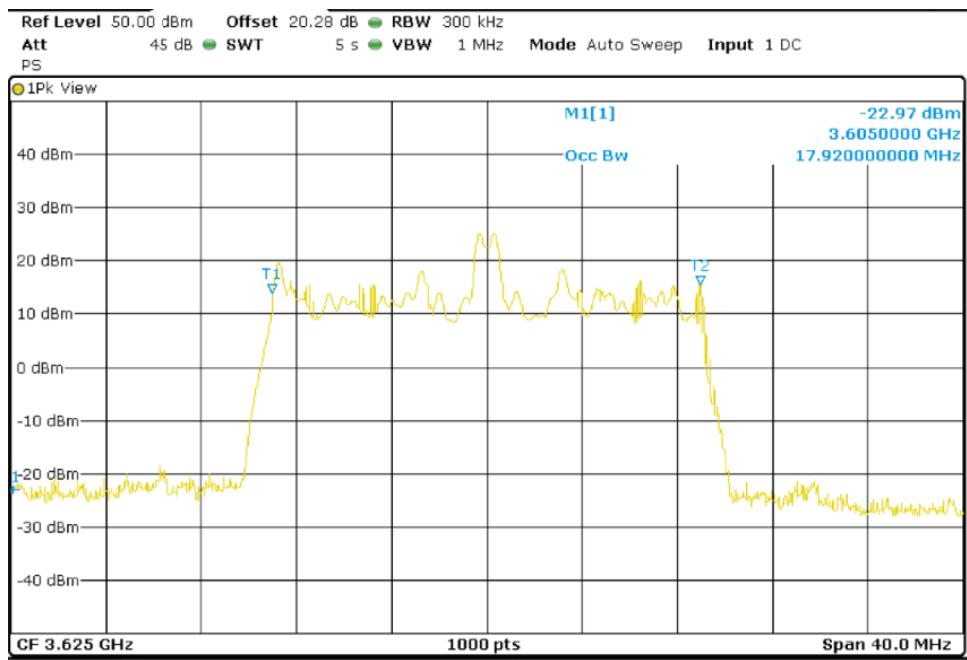
64QAM

Lowest Channel (3560 MHz)

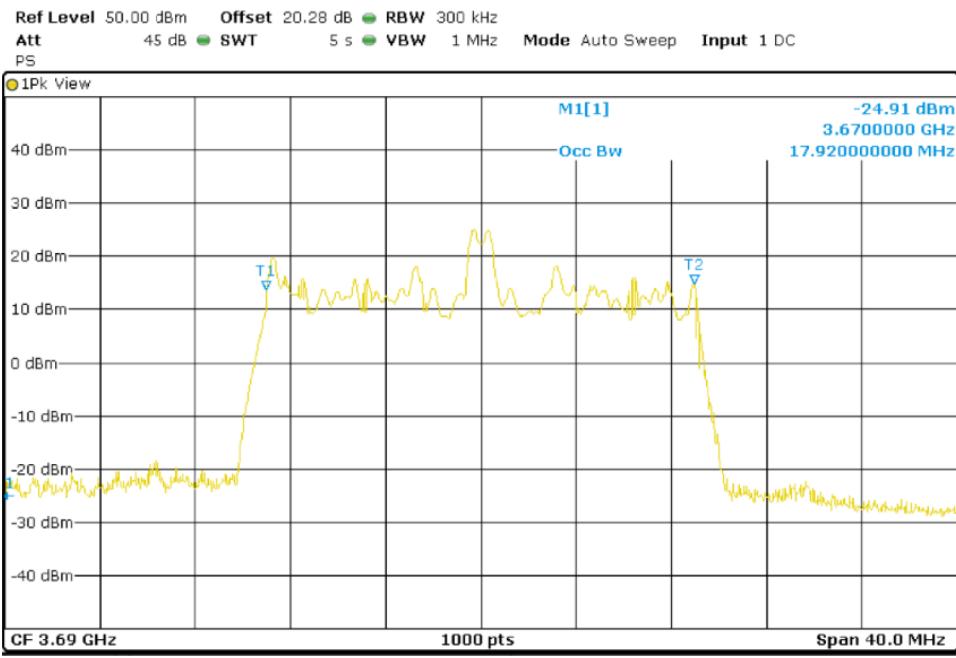


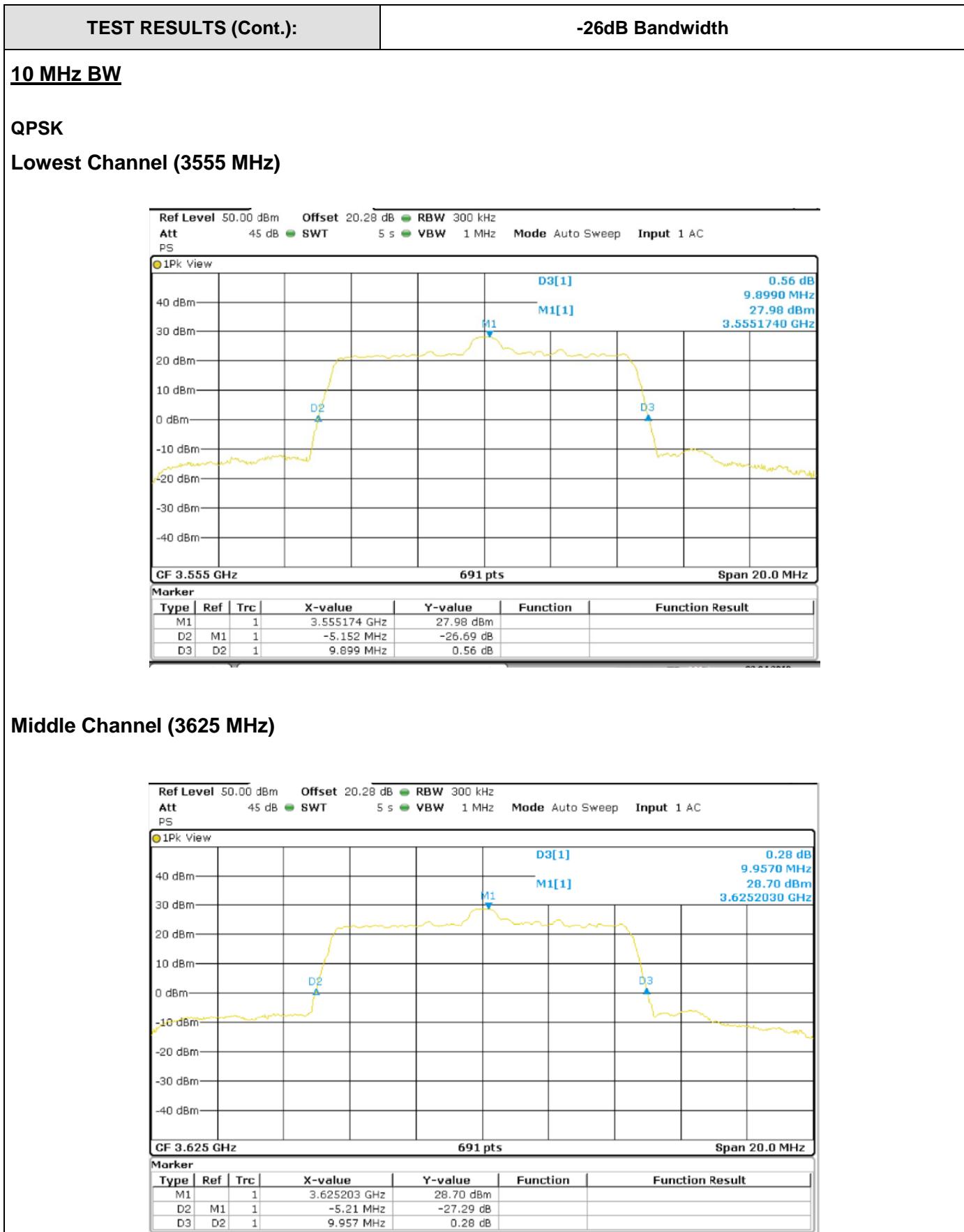
TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



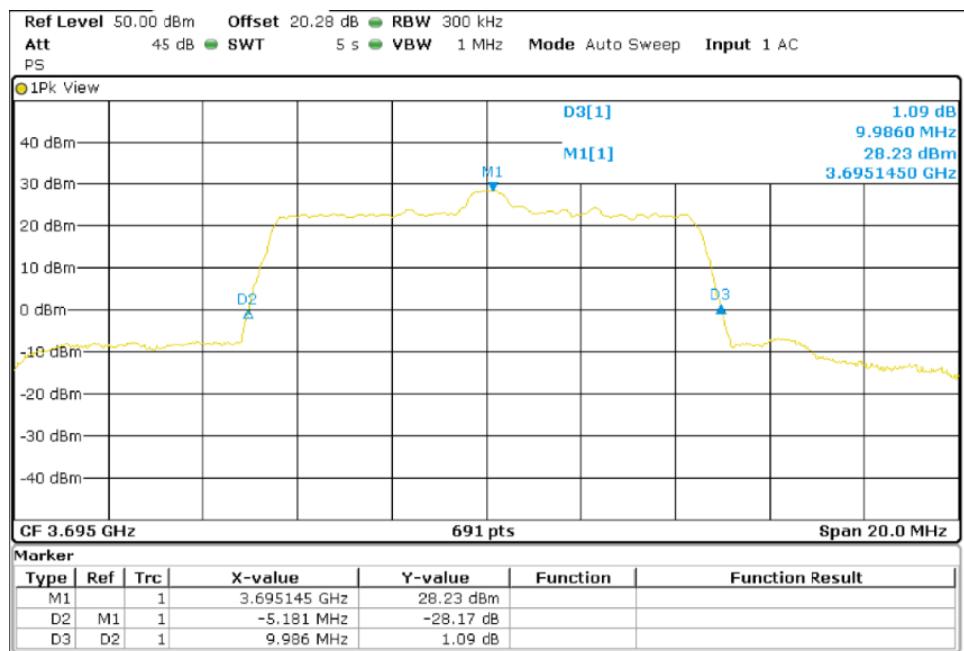
High Channel (3690 MHz)





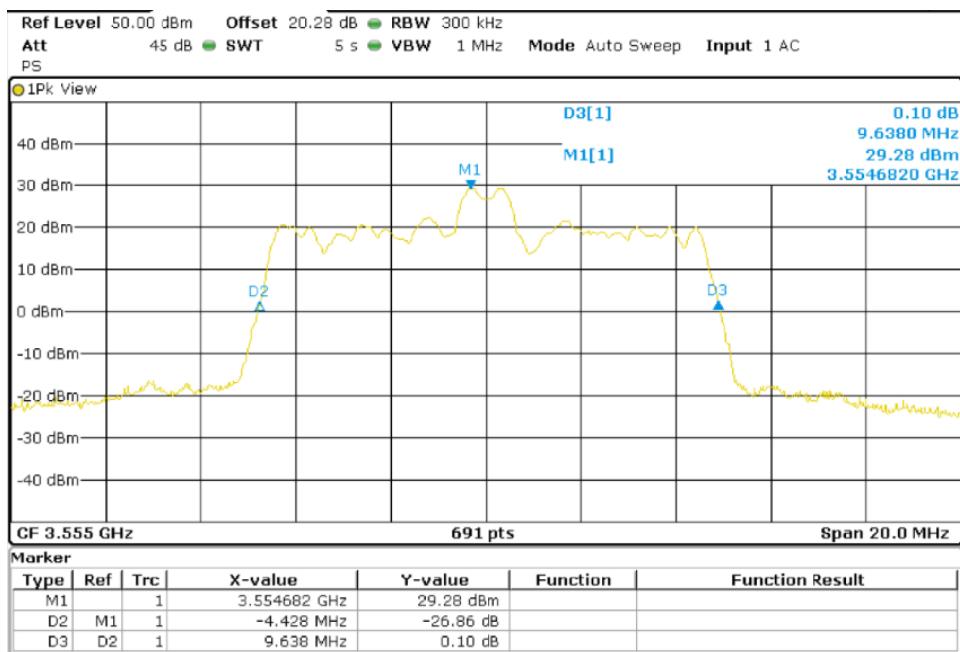
TEST RESULTS (Cont.):

High Channel (3695 MHz)



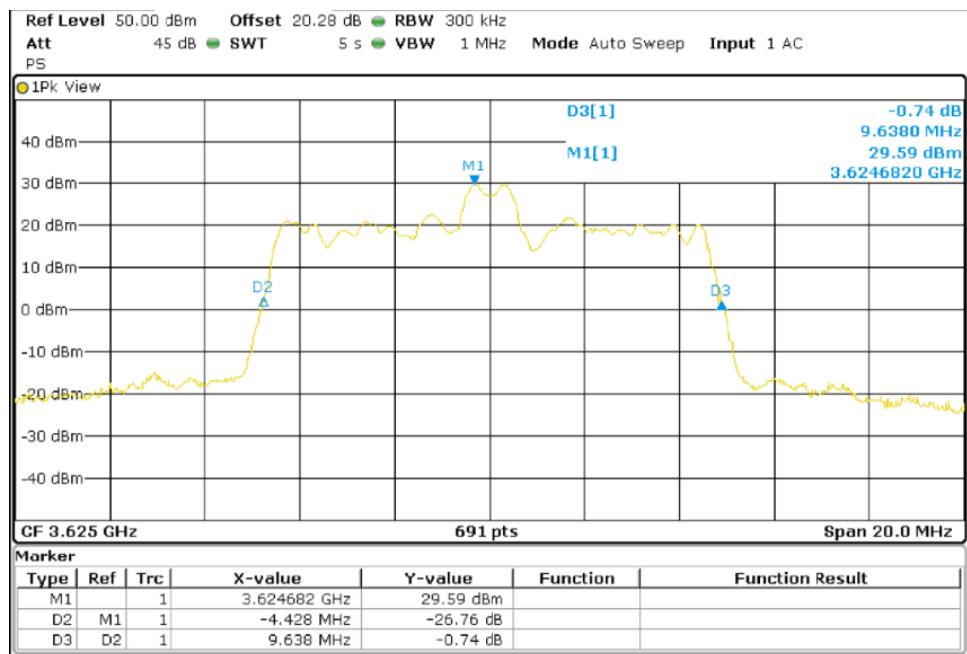
64QAM

Lowest Channel (3555 MHz)

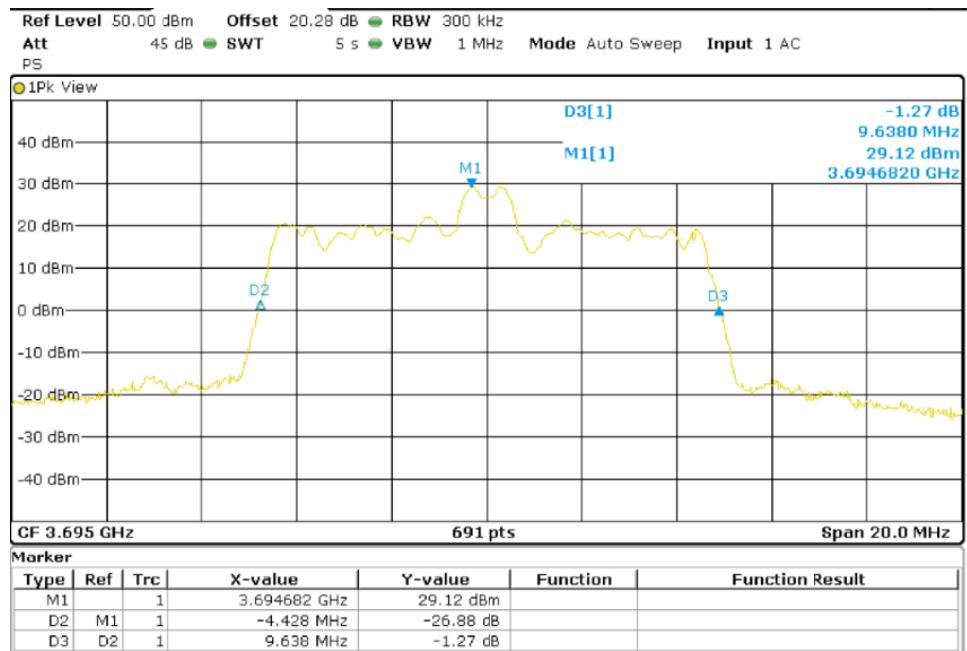


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



High Channel (3695 MHz)

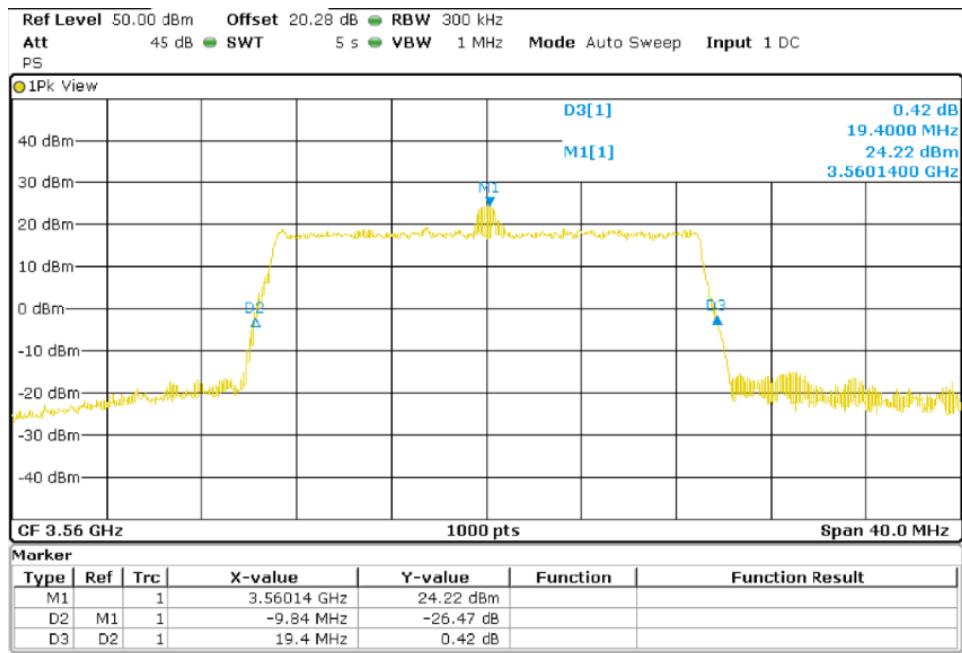


TEST RESULTS (Cont.):

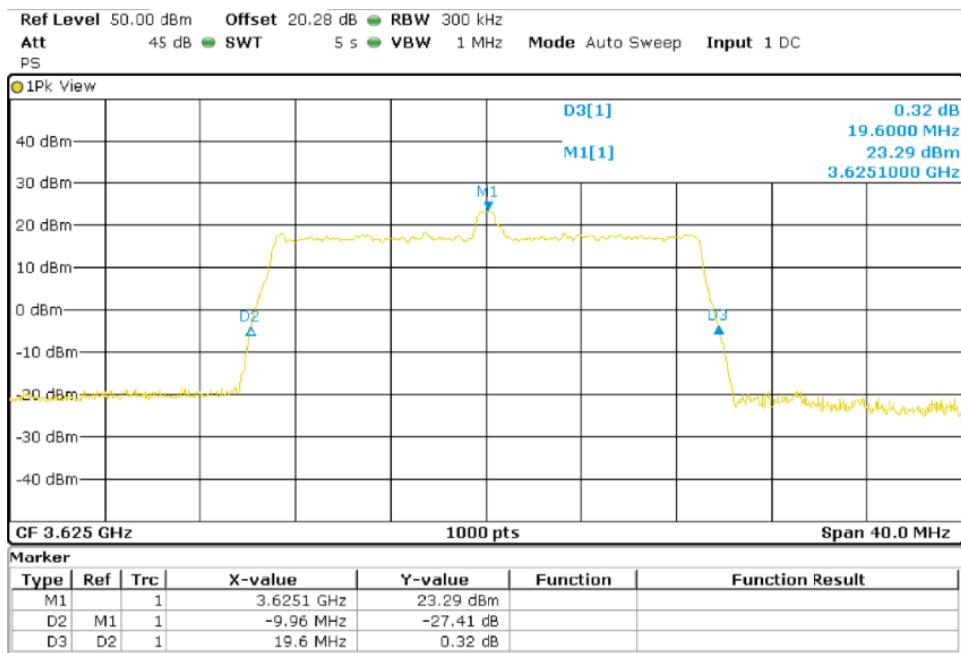
20 MHz BW

QPSK

Lowest Channel (3560 MHz)

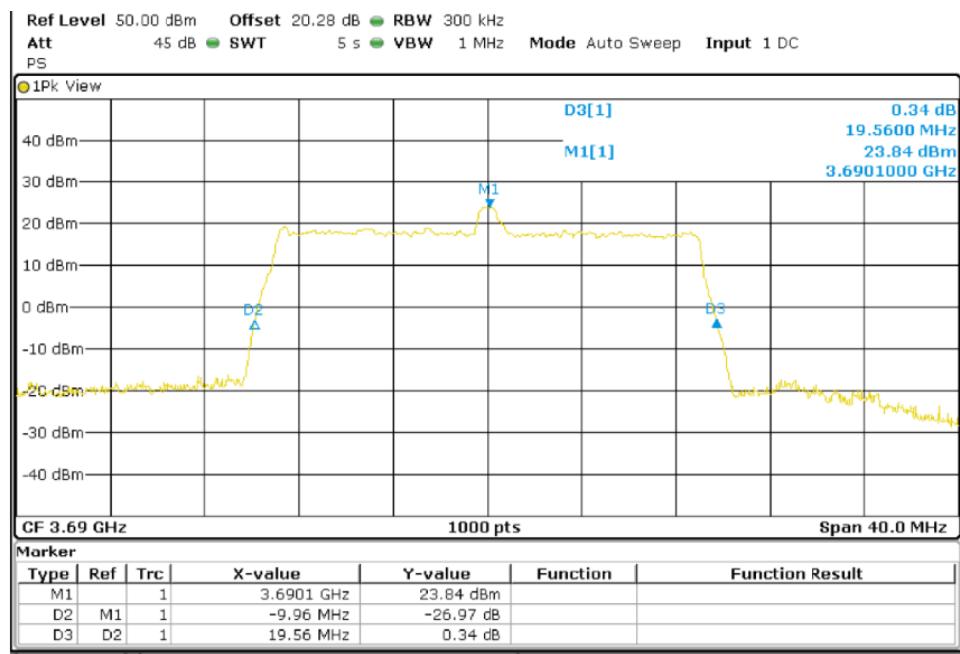


Middle Channel (3625 MHz)



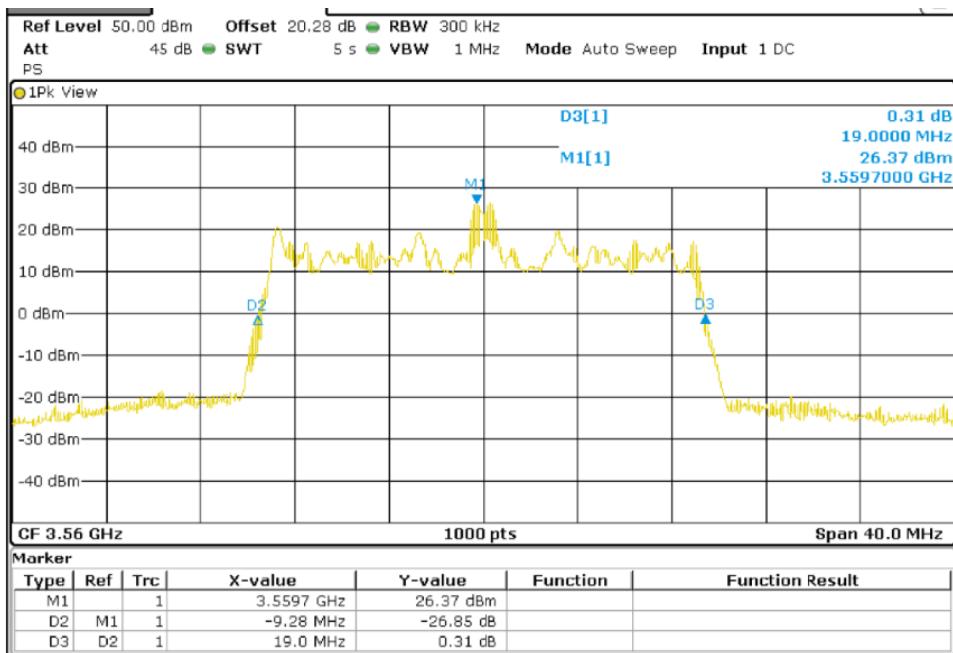
TEST RESULTS (Cont.):

High Channel (3690 MHz)



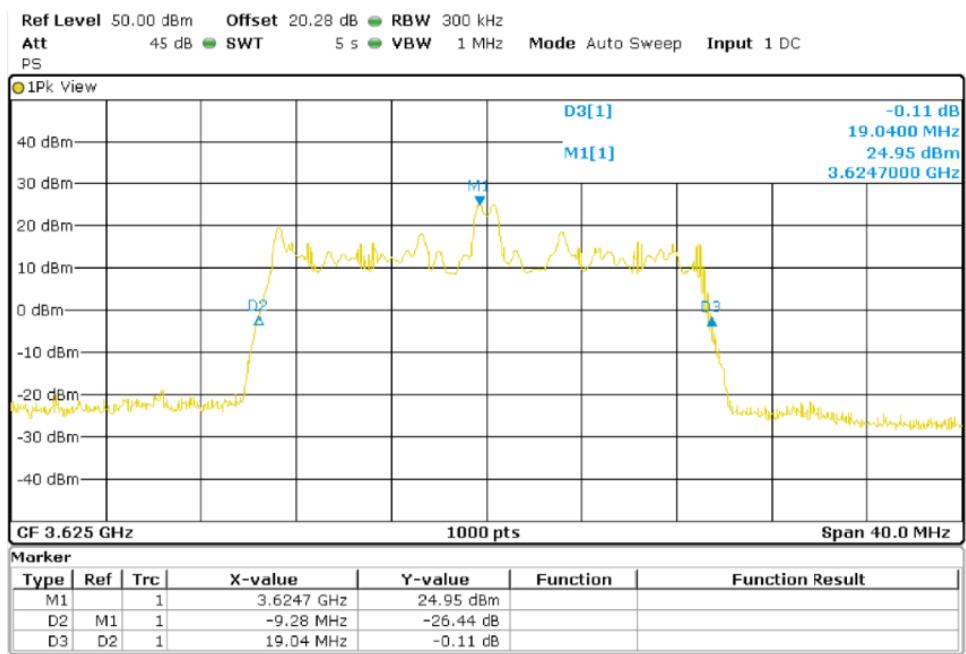
64QAM

Lowest Channel (3560 MHz)

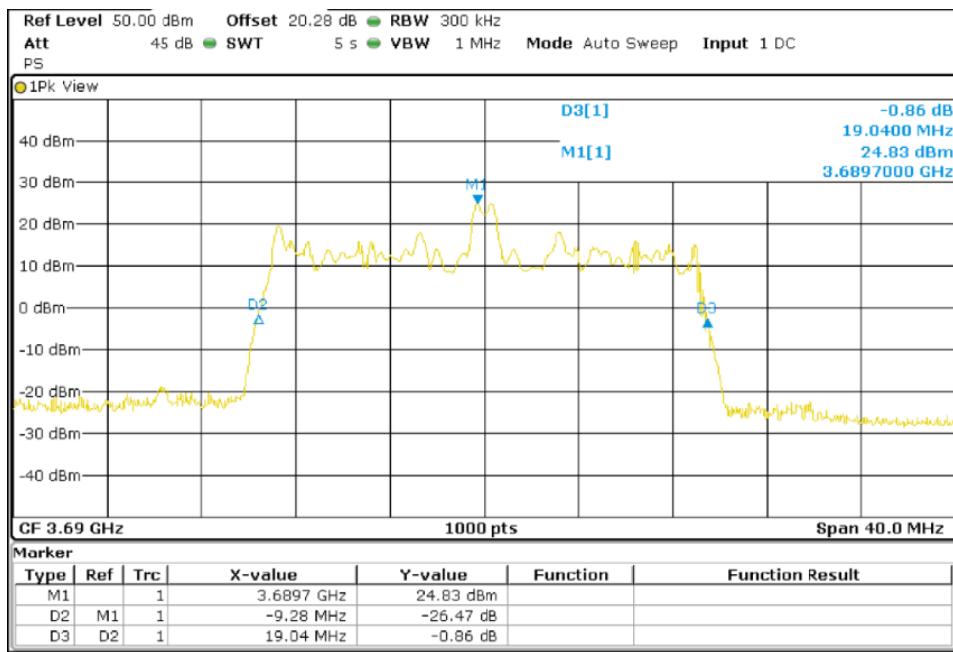


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



High Channel (3690 MHz)



TEST A.4: MAXIMUM POWER SPECTRAL DENSITY (PSD)

LIMITS:	Product standard:	Part 96.41 SUBCLAUSE (B)
	Test standard:	ANSI C63.26-2015

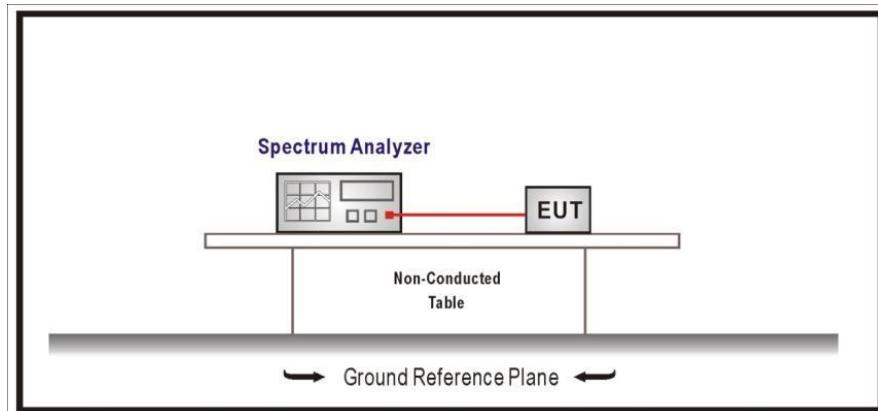
LIMITS

The procedure in Section 5.2 of ANSI C63.26-2015 is acceptable for performing power measurements. Measurements can be made using either a peak or average (RMS) detector, if the appropriate procedure is followed. The RMS detector was used for the measurement at each frequency with following the procedure stated in the Section 5.2.4.4.2 of ANSI C63.26-2015.

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 following table.

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

TEST SETUP



The maximum equivalent isotropically radiated power (e.i.r.p.) is calculated by adding the declared maximum antenna gain (dBi) and 10 log (1/duty cycle) was added in RF level offset to get the accurate measured power level in the average power measurement.

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

The measured values from the two ports were summed by using the measure-and-sum technique in E 1) of KDB 662911 D01 Multiple Transmitter Output v02r01 and based on two ports, port 1 and 2 transmitting at the same time in the 2X2 MIMO mode.

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

2X2 MIMO

10 MHz BW

Port 1 and 2

	Lowest frequency 3555 MHz	Middle frequency 3625 MHz	Highest frequency 3695 MHz
PSD at Port 1 (dBm/MHz)	11.78	11.99	12.36
PSD at Port 2 (dBm/MHz)	11.12	12.32	11.70
Summed PSD (dBm/MHz)	14.47	15.17	15.05
Maximum declared antenna gain (dBi)	17.00	17.00	17.00
Maximum PSD (dBm/MHz)	31.47	32.17	32.05
Measurement Uncertainty	< ± 0.95		

20MHz BW

Port 1 and 2

	Lowest frequency 3560 MHz	Middle frequency 3625 MHz	Highest frequency 3690 MHz
PSD at Port 1 (dBm/MHz)	9.56	9.09	9.71
PSD at Port 2 (dBm/MHz)	9.19	8.31	9.10
Summed PSD (dBm/MHz)	12.39	11.73	12.43
Maximum declared antenna gain (dBi)	17.00	17.00	17.00
Maximum PSD (dBm/MHz)	29.39	28.73	29.43
Measurement Uncertainty	< ± 0.95		

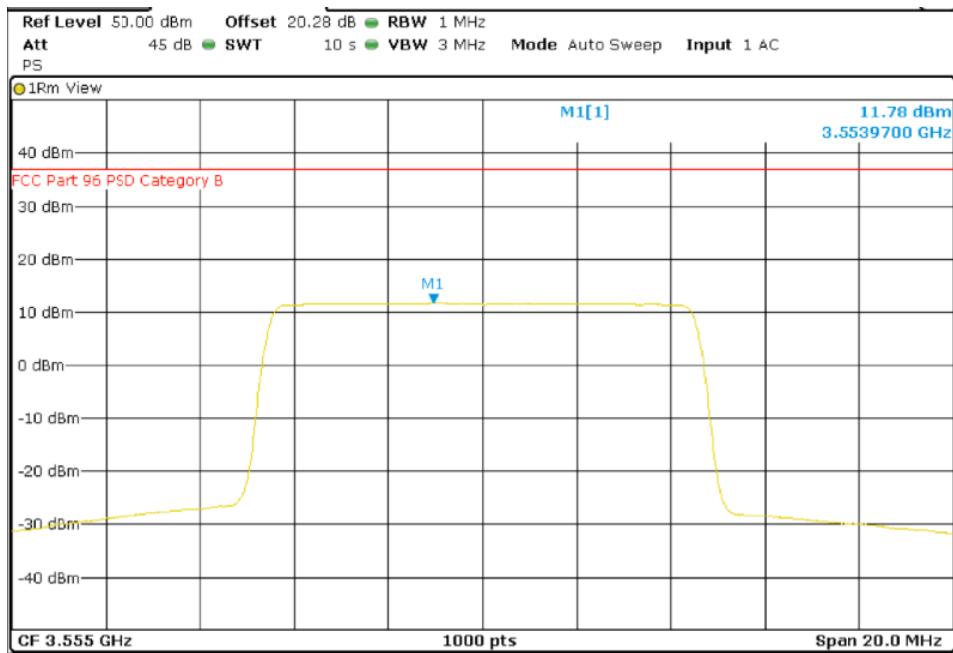
See plots below

TEST RESULTS (Cont.):

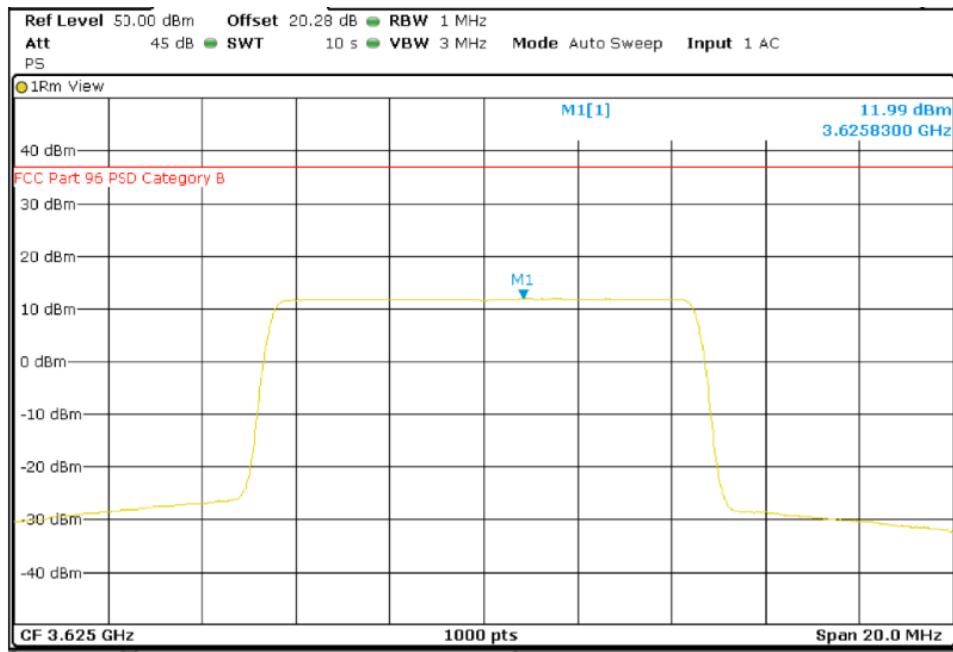
Port 1:

10 MHz BW

Lowest Channel (3555 MHz)

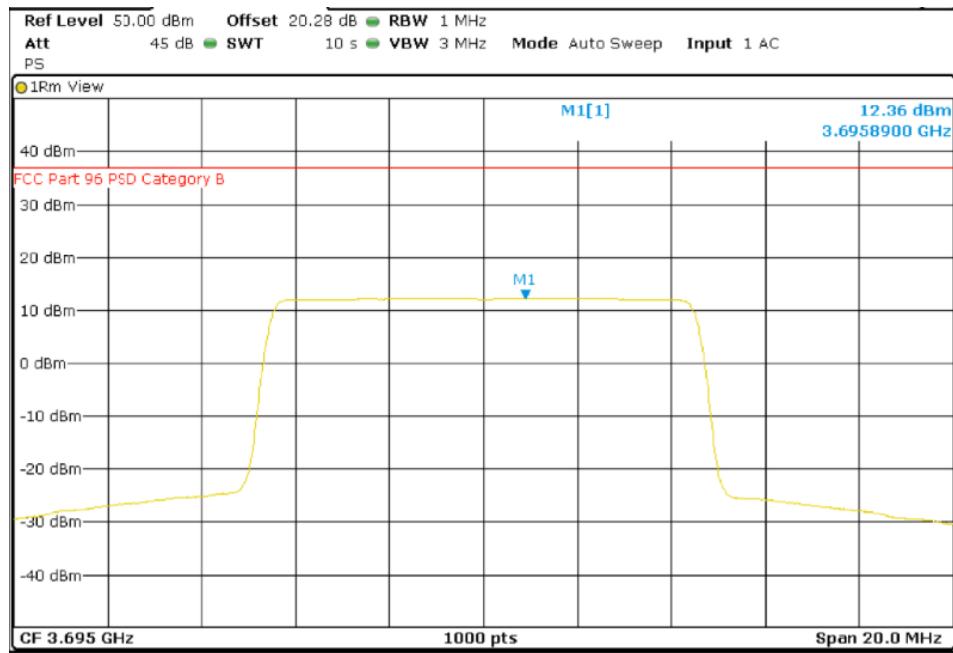


Middle Channel (3625 MHz)



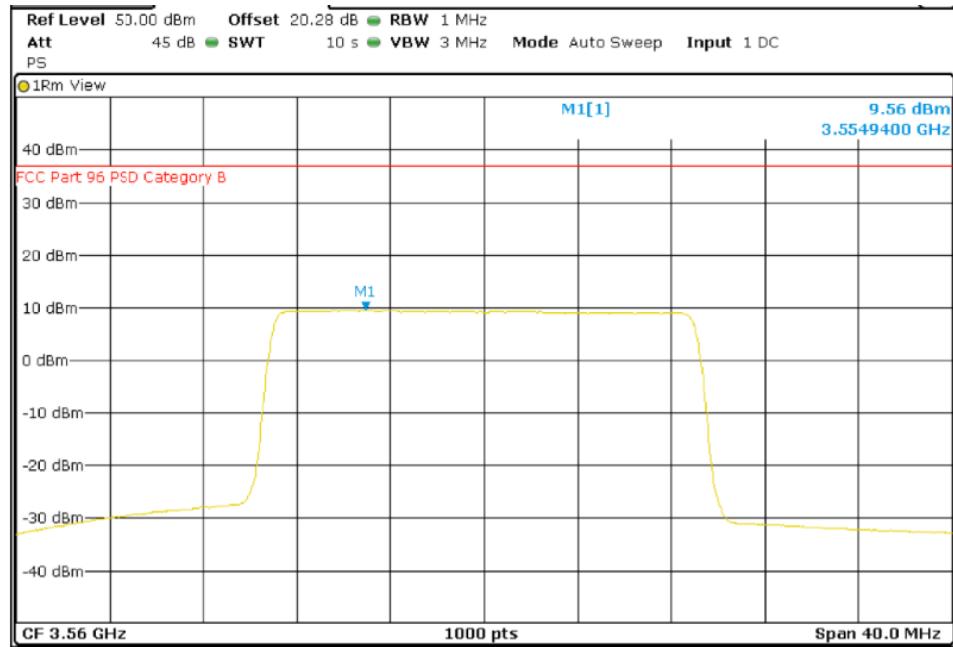
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



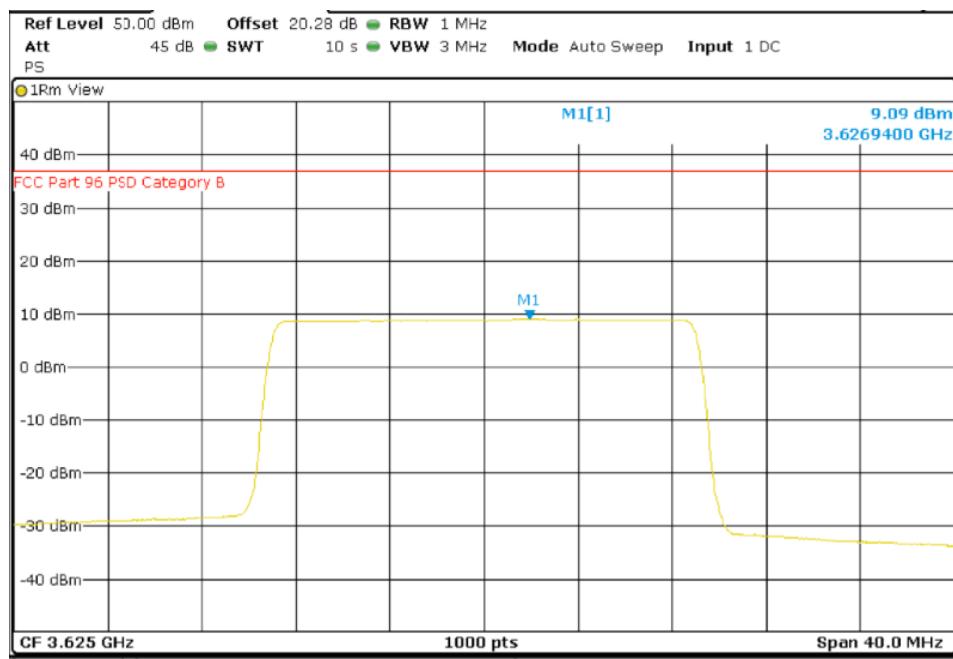
20 MHz BW

Lowest Channel (3560 MHz)

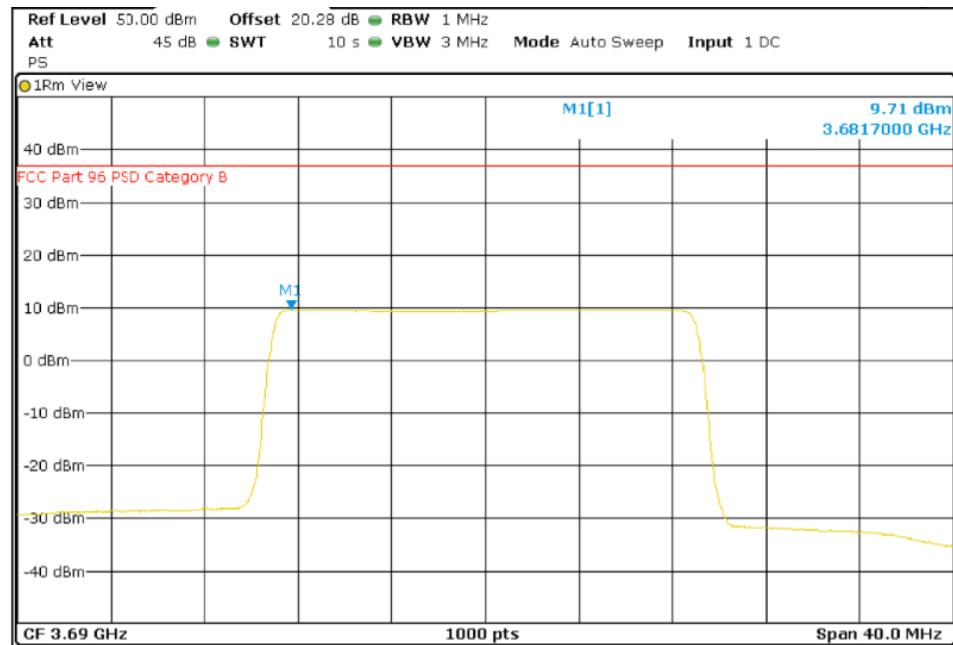


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)

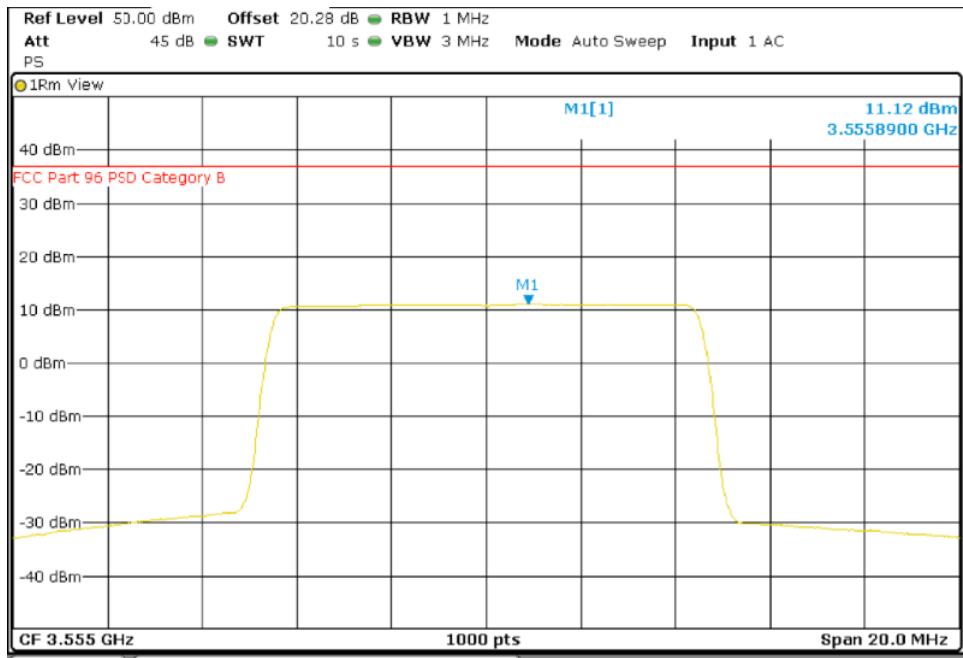


TEST RESULTS (Cont.):

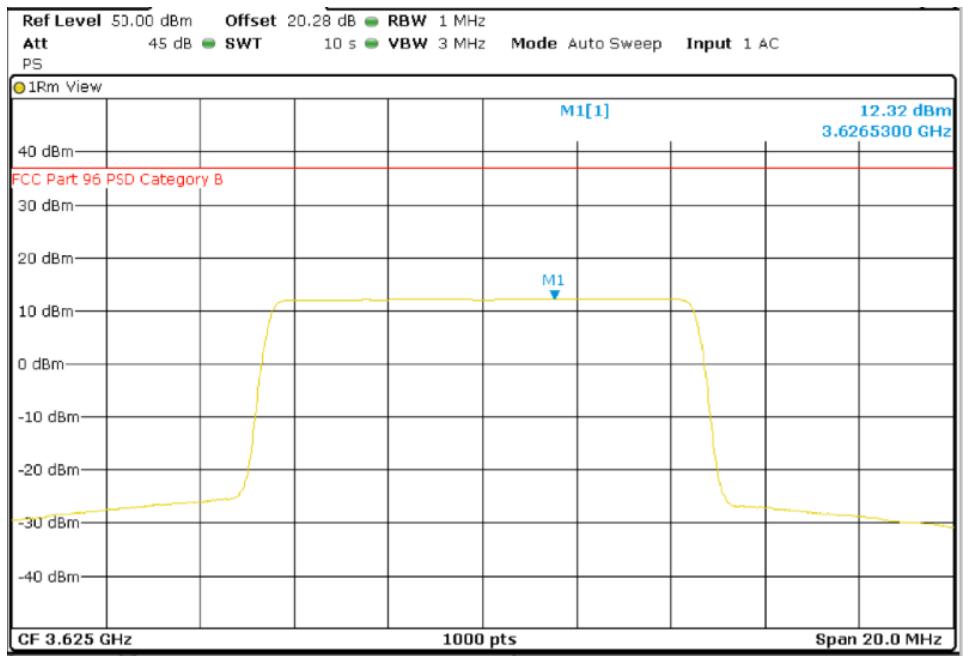
Port 2:

10 MHz BW

Lowest Channel (3555 MHz)

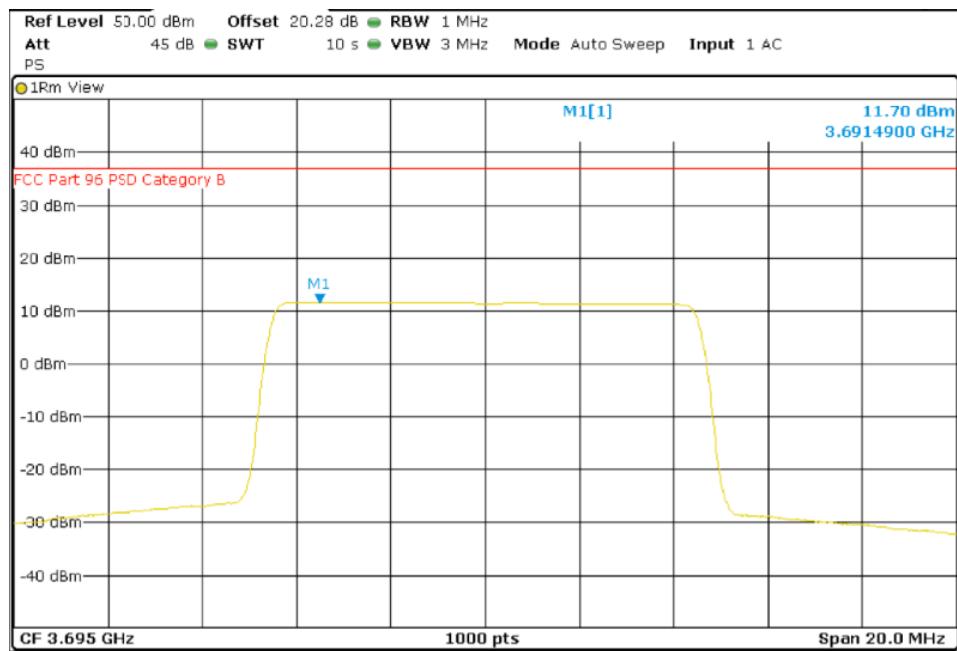


Middle Channel (3625 MHz)



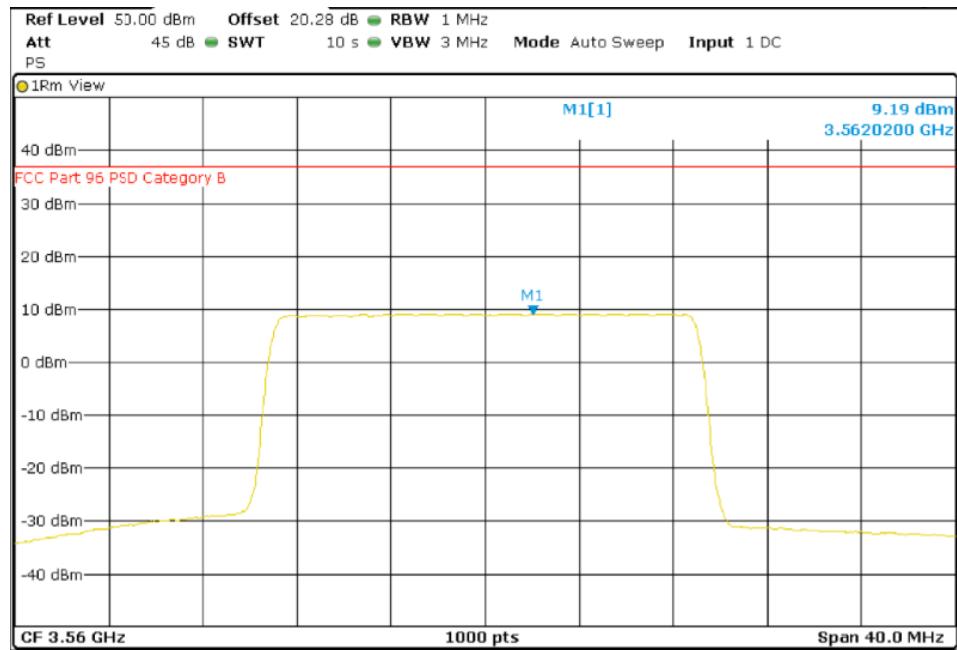
TEST RESULTS (Cont.):

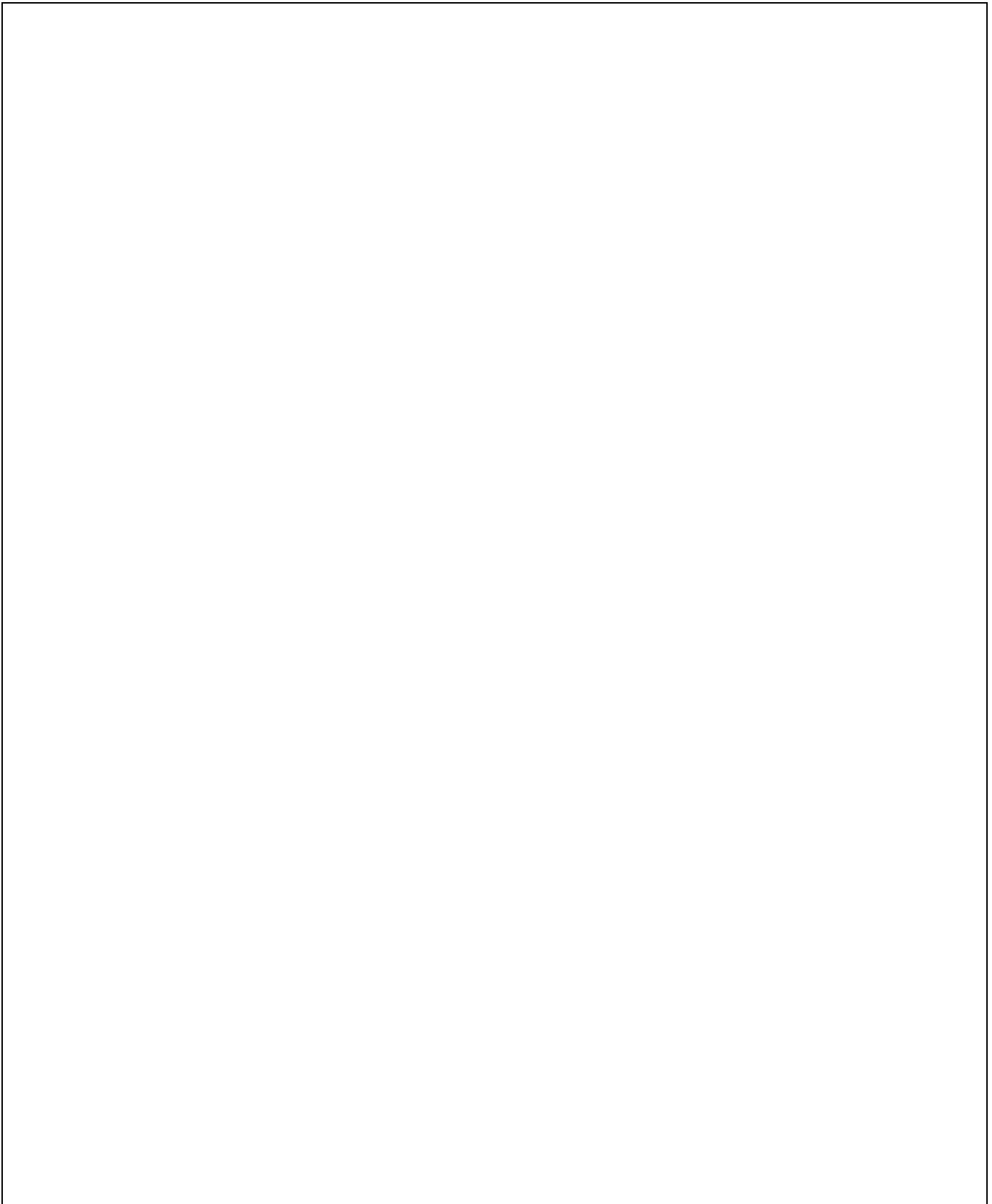
Highest Channel (3695 MHz)



20 MHz BW

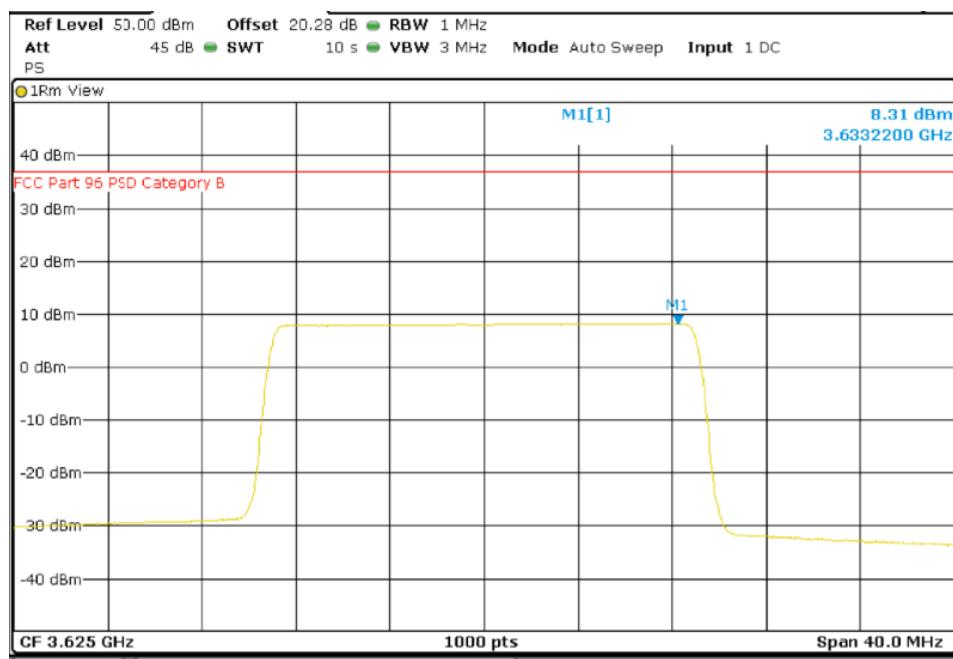
Lowest Channel (3560 MHz)



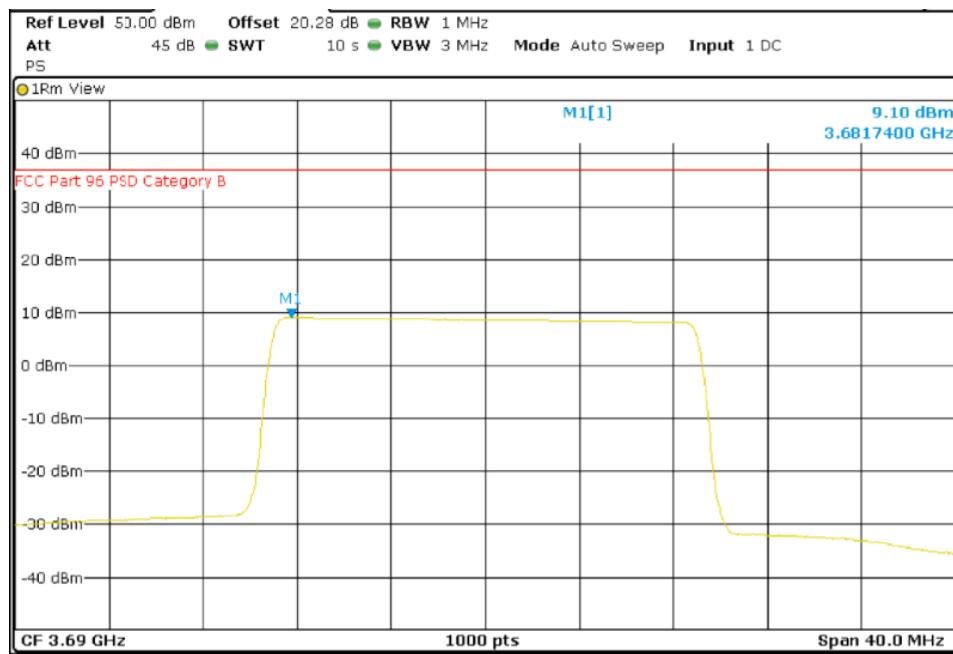


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)



TEST A.5: PEAK-TO-AVERAGE POWER RATIO (PAPR)

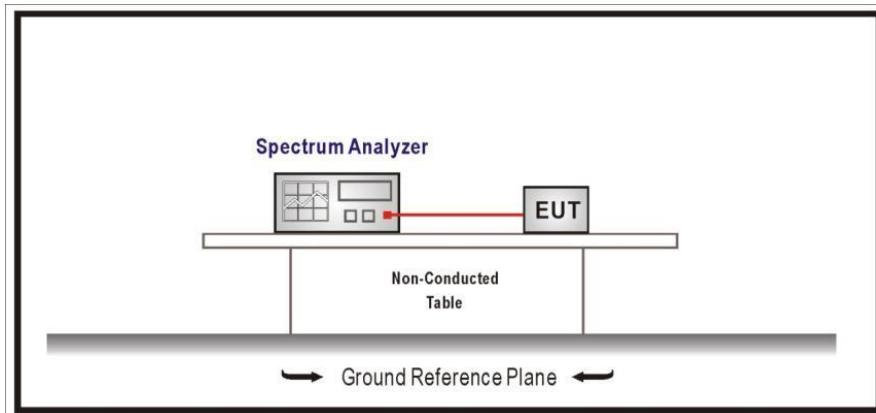
LIMITS:	Product standard:	Part 96.41 Subclause (g)
	Test standard:	ANSI C63.26-2015

LIMITS

In addition to the power limits in Section 96.41, CBSDs need to meet a PAPR limit. For this measurement, the procedure in Section 5.2.6 of ANSI C63.26-2015 is acceptable. CCDF (Complementary Cumulative Distribution Function) measurement was utilized in the spectrum analyzer and the maximum PAPR level with 0.1 % probability values were recorded.

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

TEST SETUP



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

10 MHz BW

Port 1

	Lowest frequency 3555 MHz	Middle frequency 3625 MHz	Highest frequency 3695 MHz
Peak (dBm)	36.35	36.53	36.23
Mean (dBm)	24.05	24.20	24.70
PAPR at 0.1% probability (dB)	10.67	10.87	10.38
Measurement uncertainty (dB)		<±1.11	

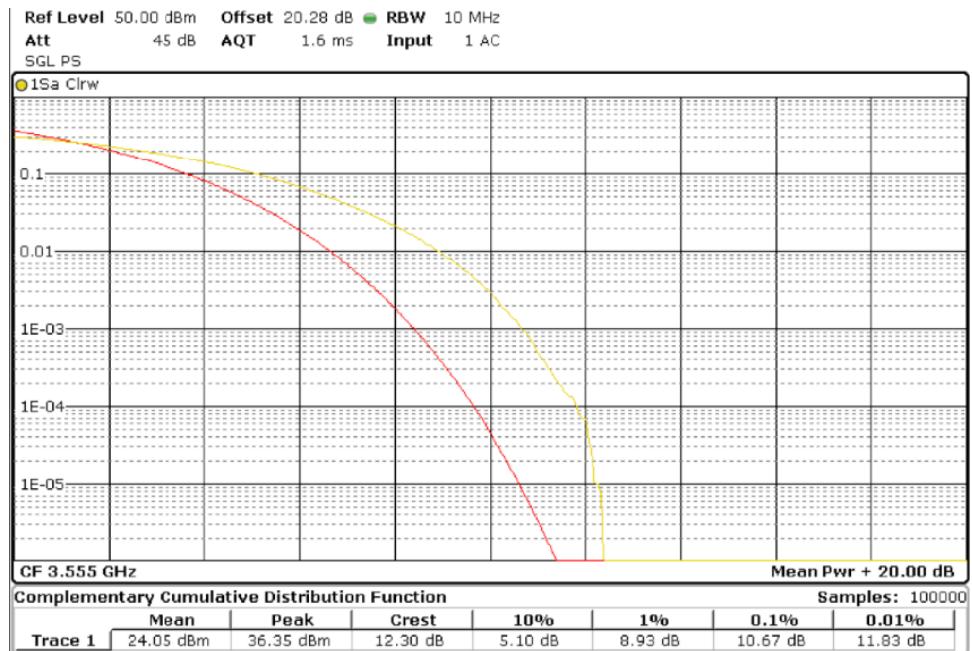
TEST RESULTS (Cont.):							
<u>10 MHz BW</u>							
Port 2							
		Lowest frequency 3555 MHz	Middle frequency 3625 MHz	Highest frequency 3695 MHz			
Peak (dBm)	36.17	36.68	36.08				
Mean (dBm)	24.02	24.56	24.02				
PAPR at 0.1% probability (dB)	10.41	10.75	10.67				
Measurement uncertainty (dB)		<±1.11					
<u>20MHz BW</u>							
Port 1							
		Lowest frequency 3560 MHz	Middle frequency 3625 MHz	Highest frequency 3690 MHz			
Peak (dBm)	33.77	34.40	33.96				
Mean (dBm)	21.48	20.95	21.42				
PAPR at 0.1% probability (dB)	10.38	10.90	10.55				
Measurement uncertainty (dB)		<±1.11					
Port 2							
		Lowest frequency 3560 MHz	Middle frequency 3625 MHz	Highest frequency 3690 MHz			
Peak (dBm)	35.02	34.25	34.59				
Mean (dBm)	23.62	22.70	23.21				
PAPR at 0.1% probability (dB)	9.01	9.16	9.13				
Measurement uncertainty (dB)		<±1.11					
See plots below							

TEST RESULTS (Cont.):

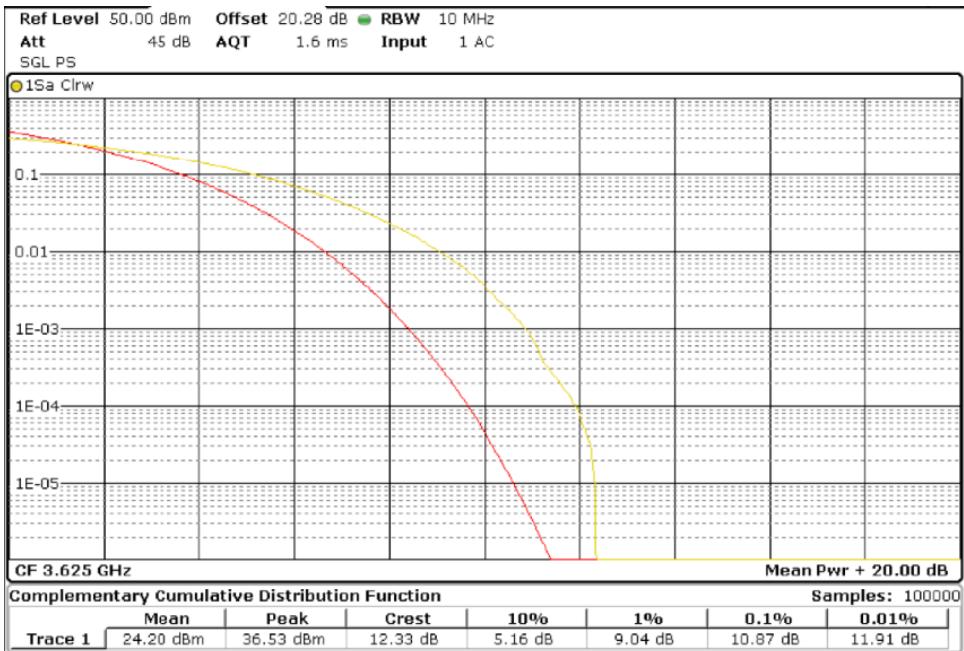
Port 1:

10 MHz BW

Lowest Channel (3555 MHz)

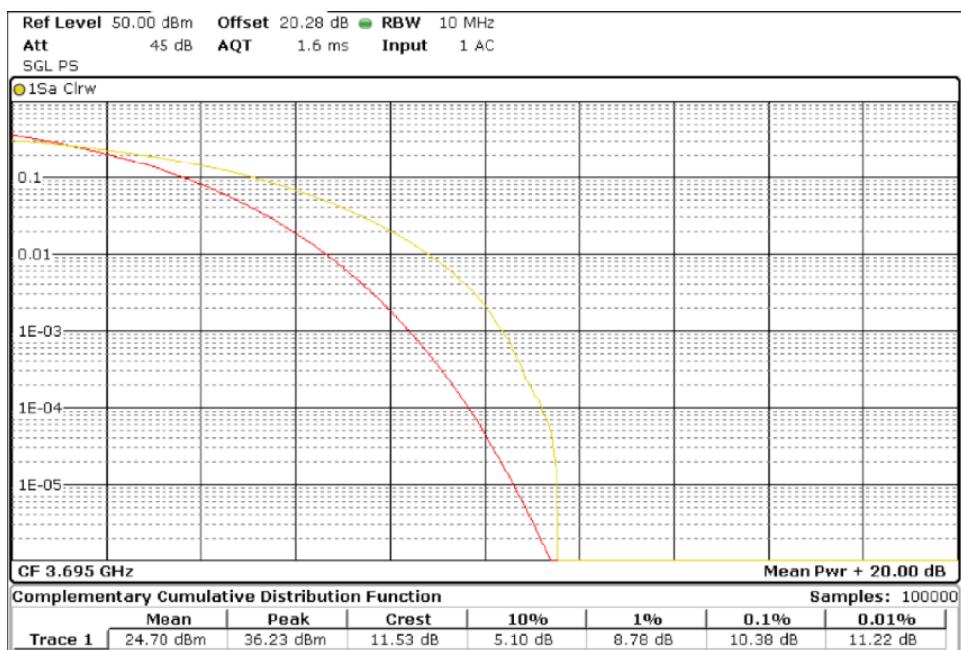


Middle Channel (3625 MHz)



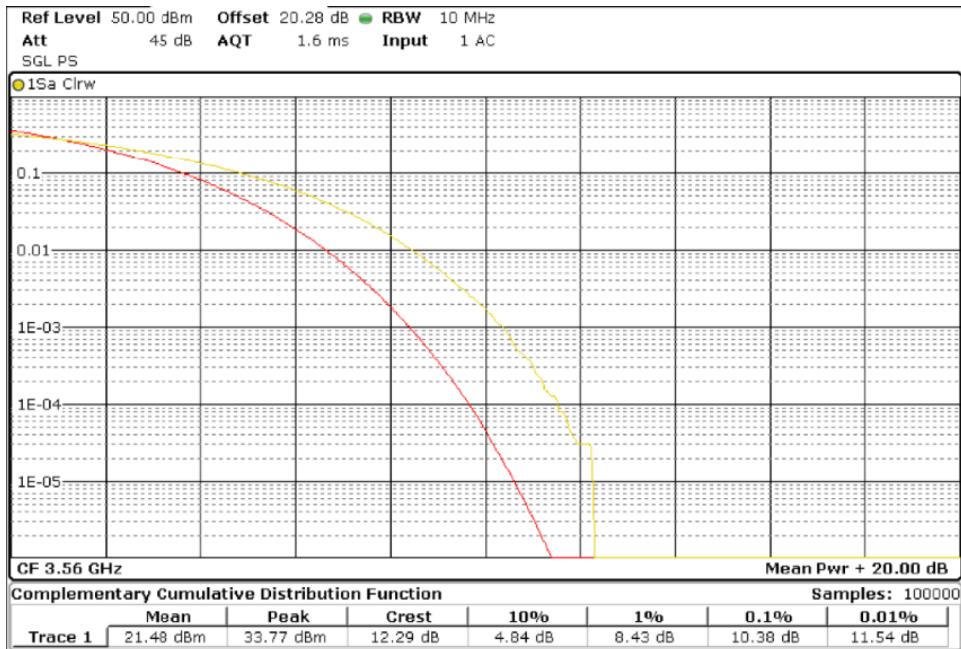
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



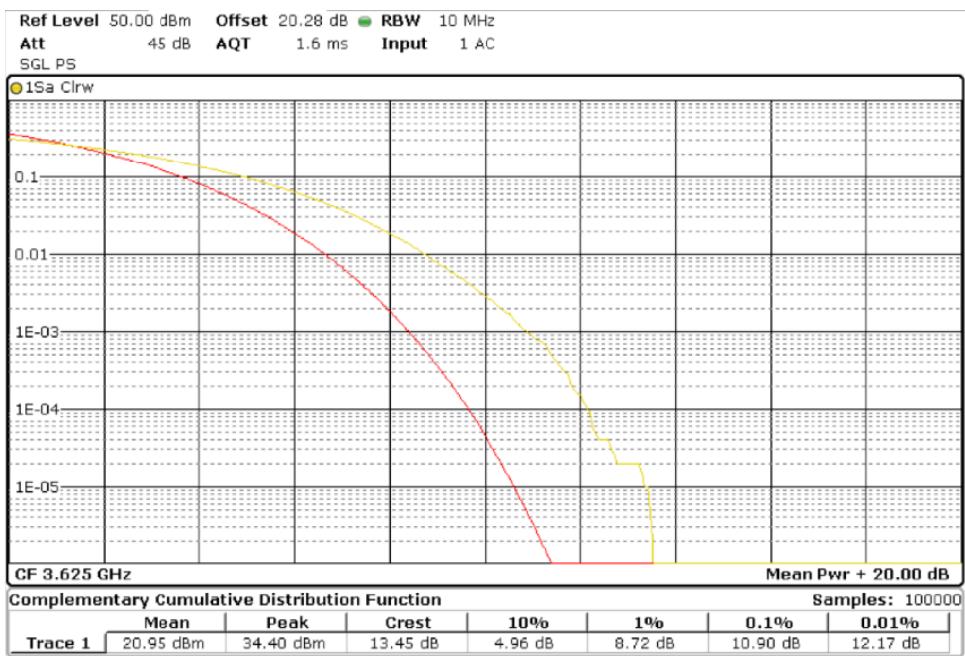
20 MHz BW

Lowest Channel (3560 MHz)

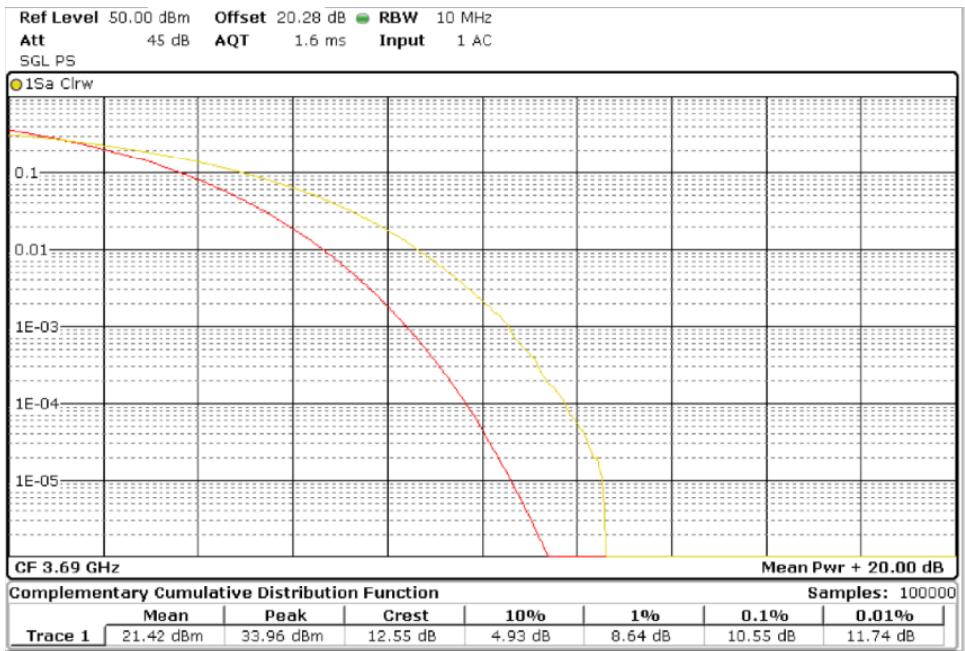


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)

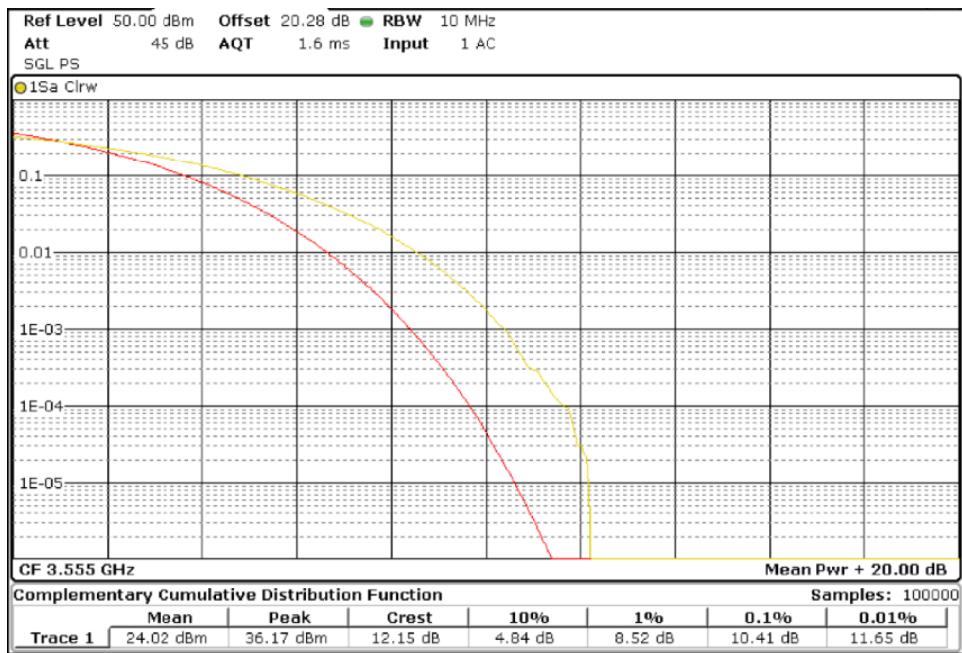


TEST RESULTS (Cont.):

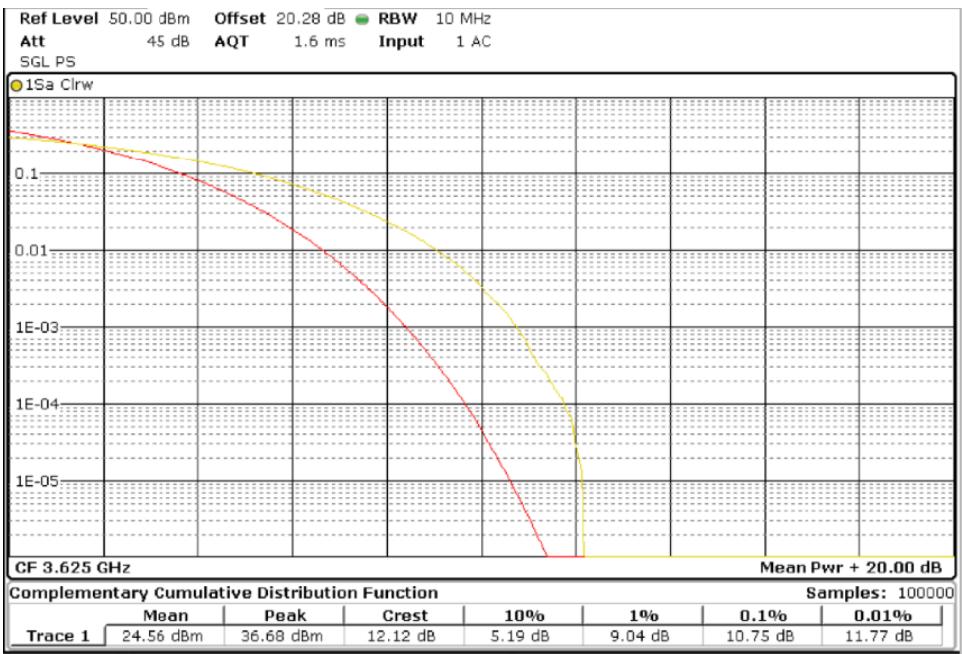
Port 2:

10 MHz BW

Lowest Channel (3555 MHz)

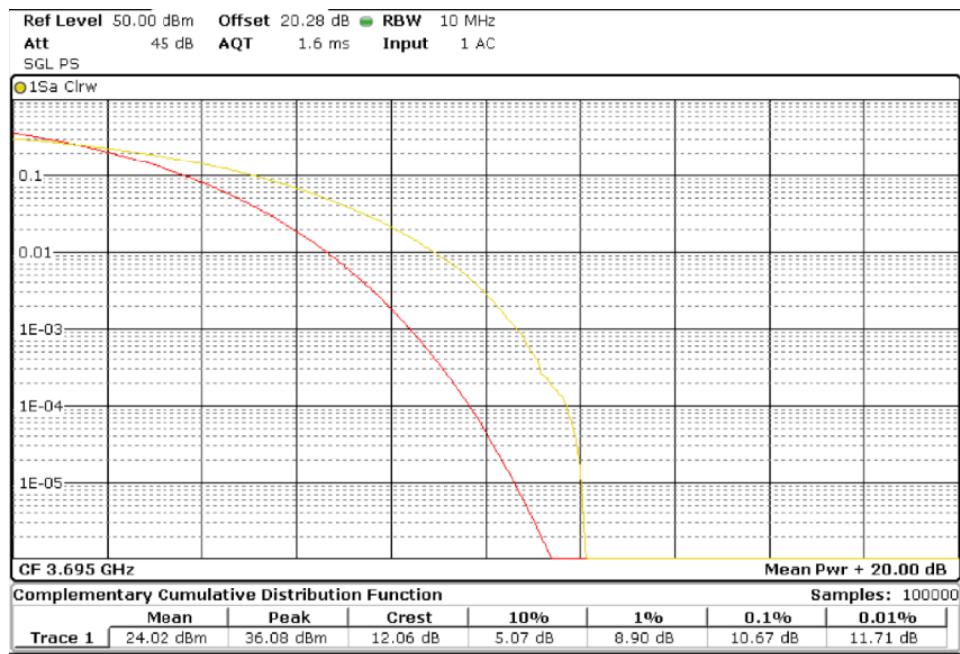


Middle Channel (3625 MHz)



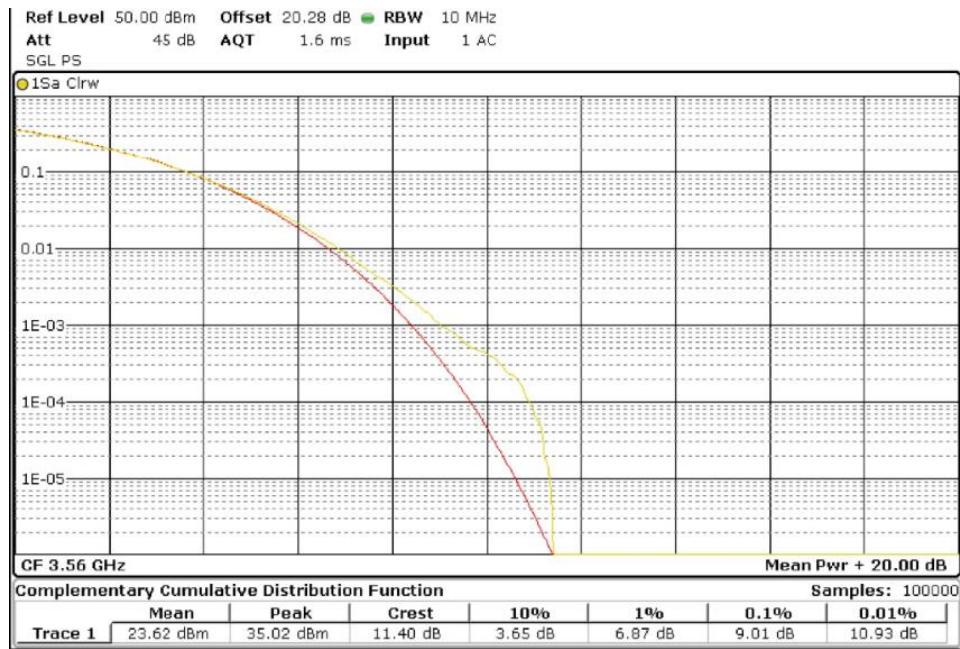
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



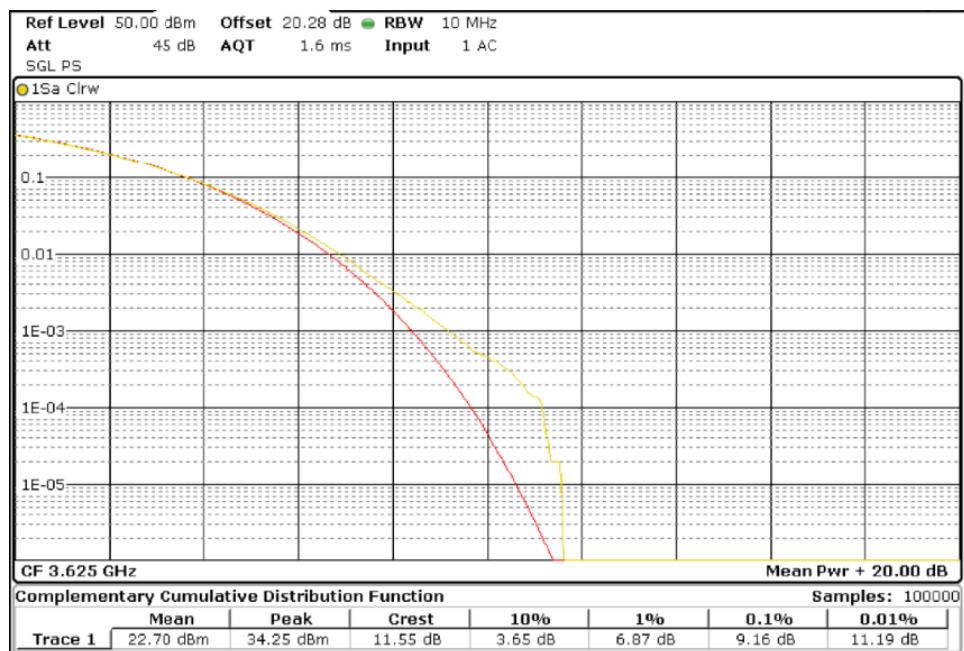
20 MHz BW

Lowest Channel (3560 MHz)

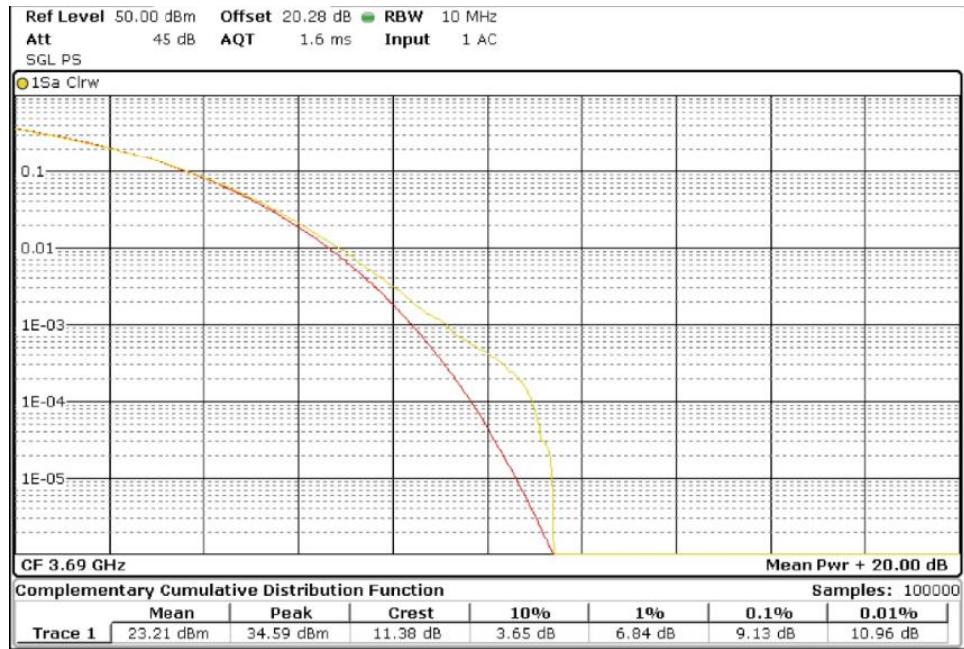


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)



TEST 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.

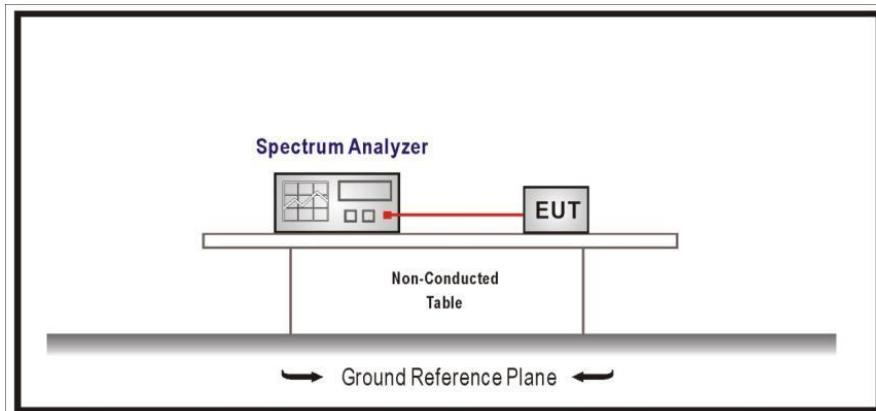
Confirm that the device satisfies the emission limits specified in Section 96.41(e) for all declared channel sizes, at the lowest and highest edges of the band, and in the middle of the band. The RMS detector was used for the measurement at each frequency with 400 MHz span.

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 $\leq -13 \text{ dBm/MHz}$
- greater than 10 MHz above and below the assigned channel $\leq -25 \text{ dBm/MHz}$
- any emission below 3530 MHz and above 3720 MHz $\leq -40 \text{ dBm/MHz}$

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

Port 1 and 2:

10 MHz BW

The spurious signals detected were more than 20 dB below the reference limit for the lowest, middle and highest operating channels.

20 MHz BW

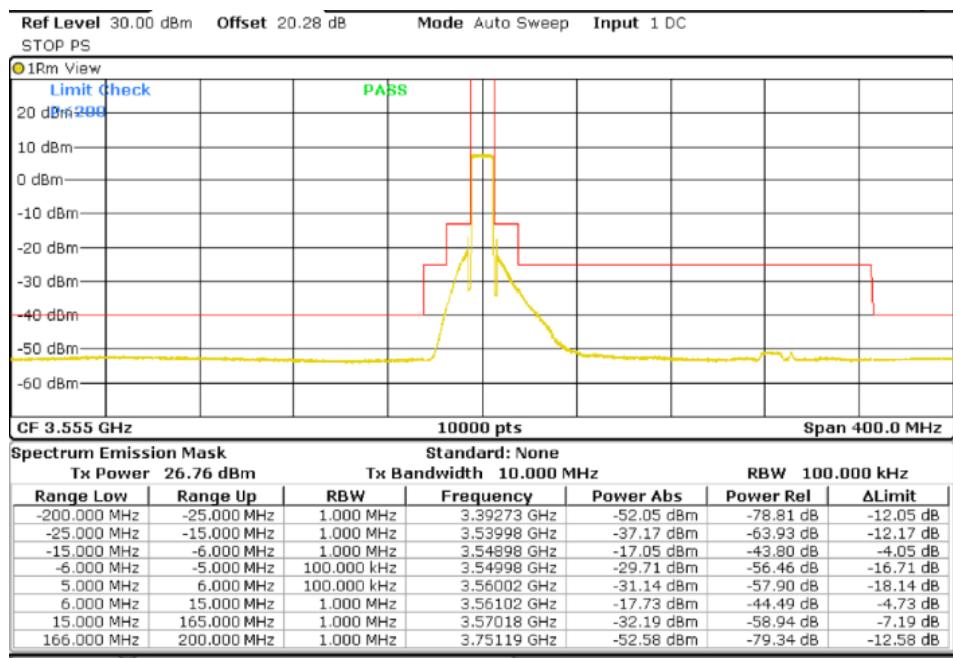
The spurious signals detected were more than 20 dB below the reference limit for the lowest, middle and highest operating channels.

TEST RESULTS (Cont.):

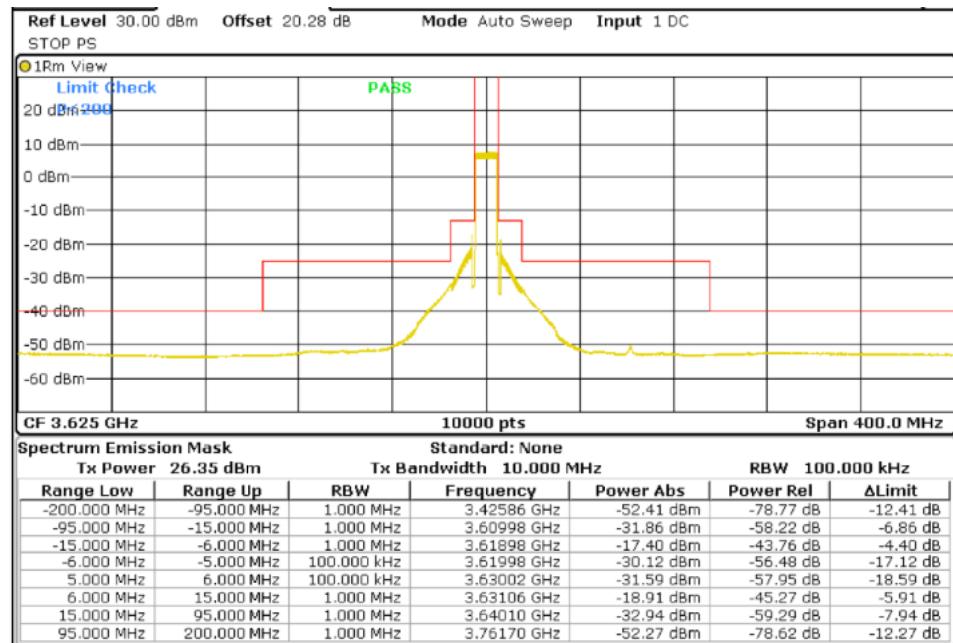
Port 1:

10 MHz BW

Lowest Channel (3555 MHz)

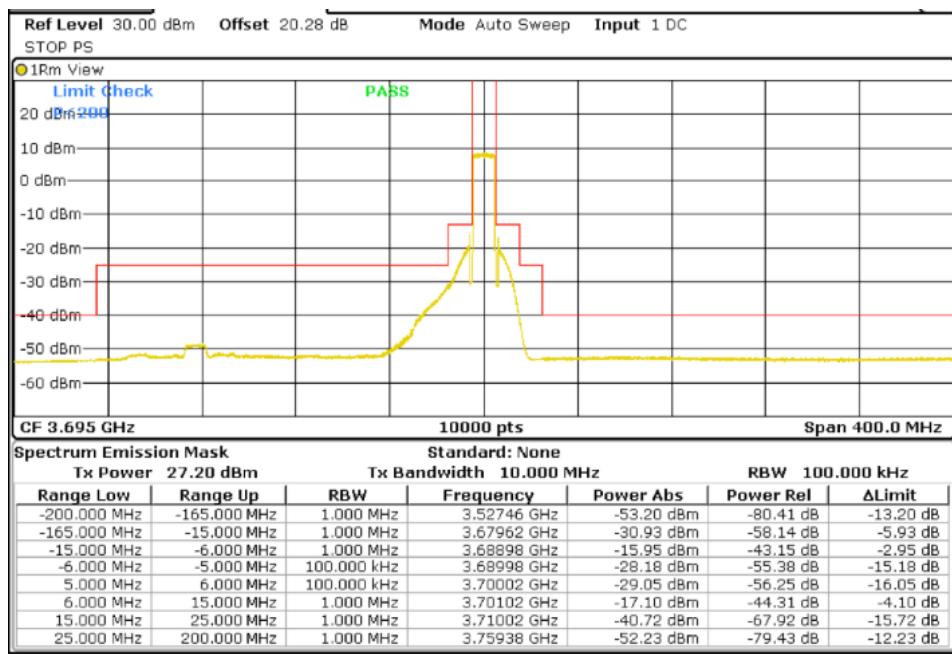


Middle Channel (3625 MHz)



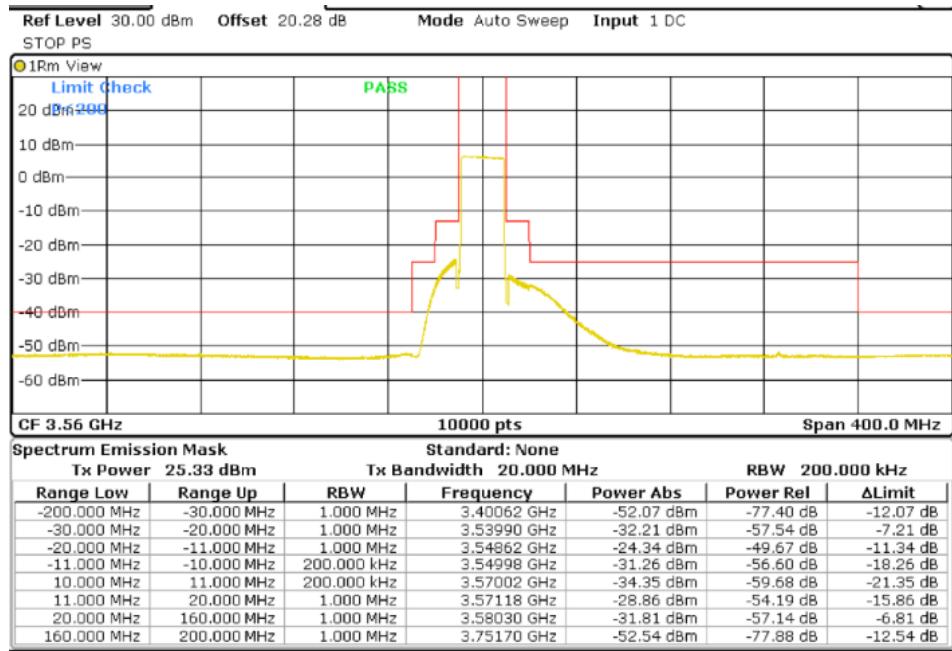
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



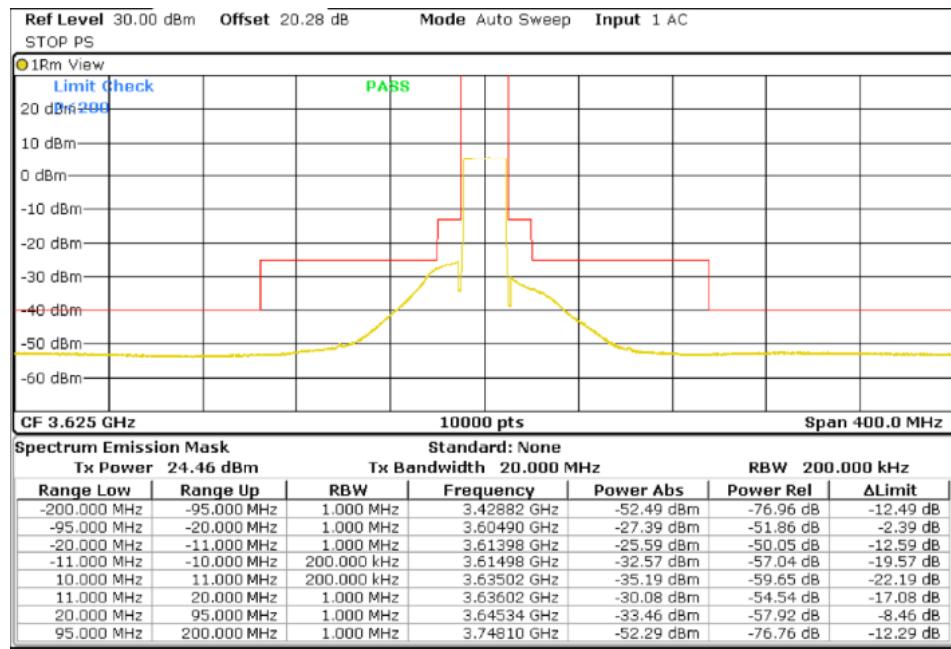
20 MHz BW

Lowest Channel (3560 MHz)

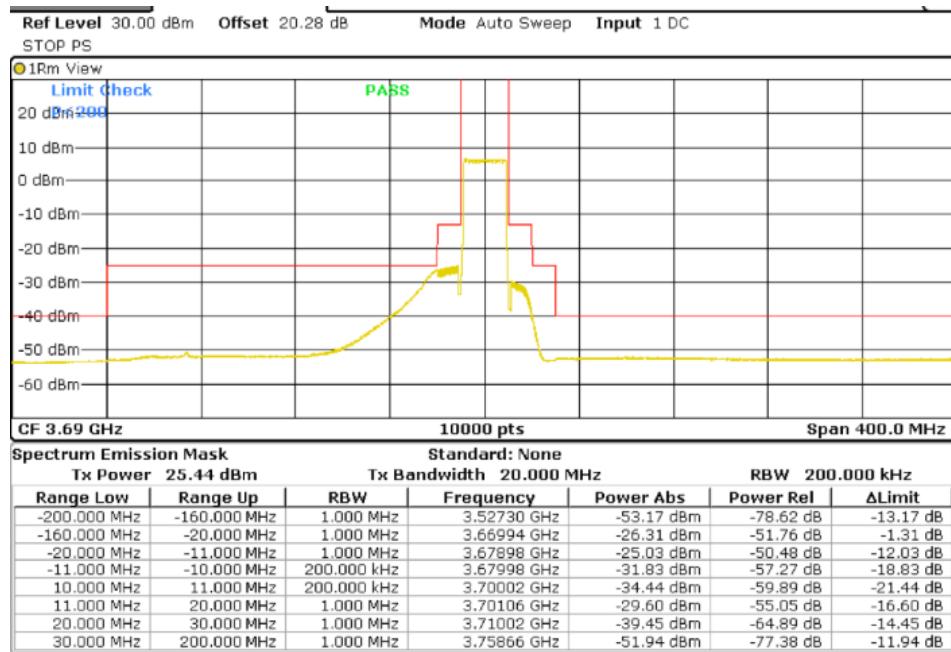


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)

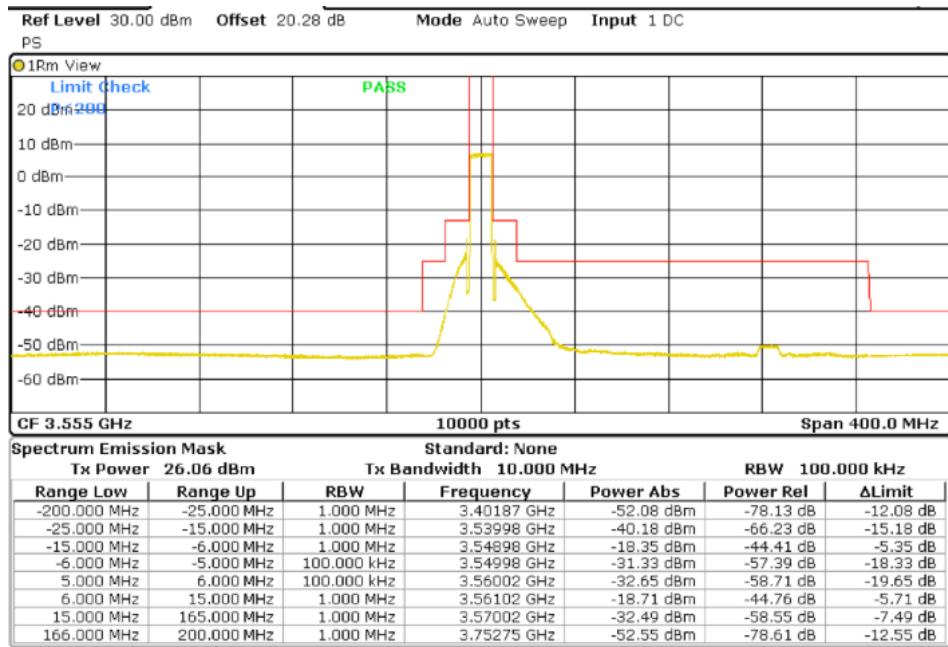


TEST RESULTS (Cont.):

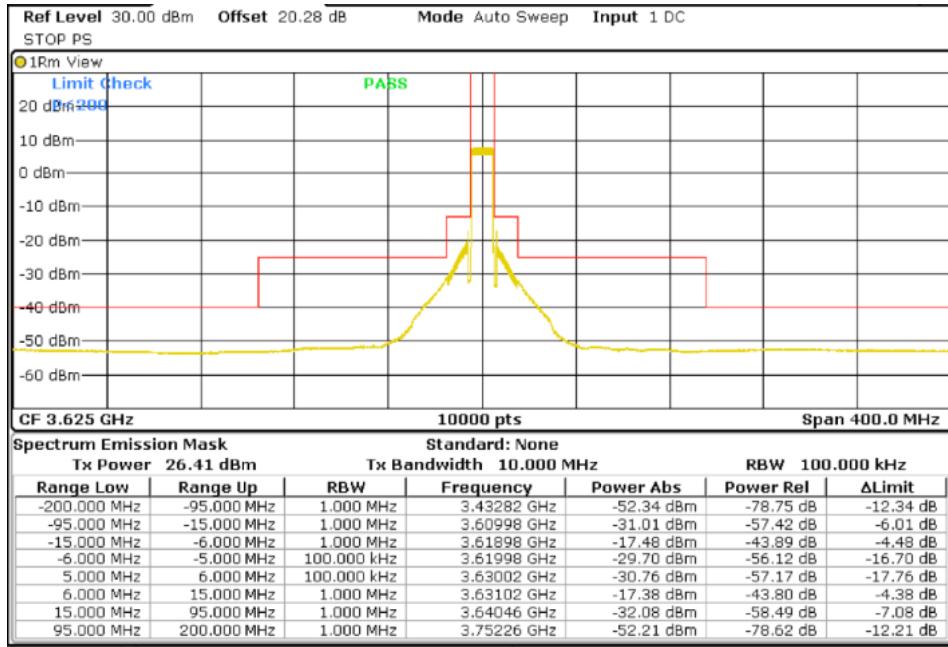
Port 2:

10 MHz BW

Lowest Channel (3555 MHz)

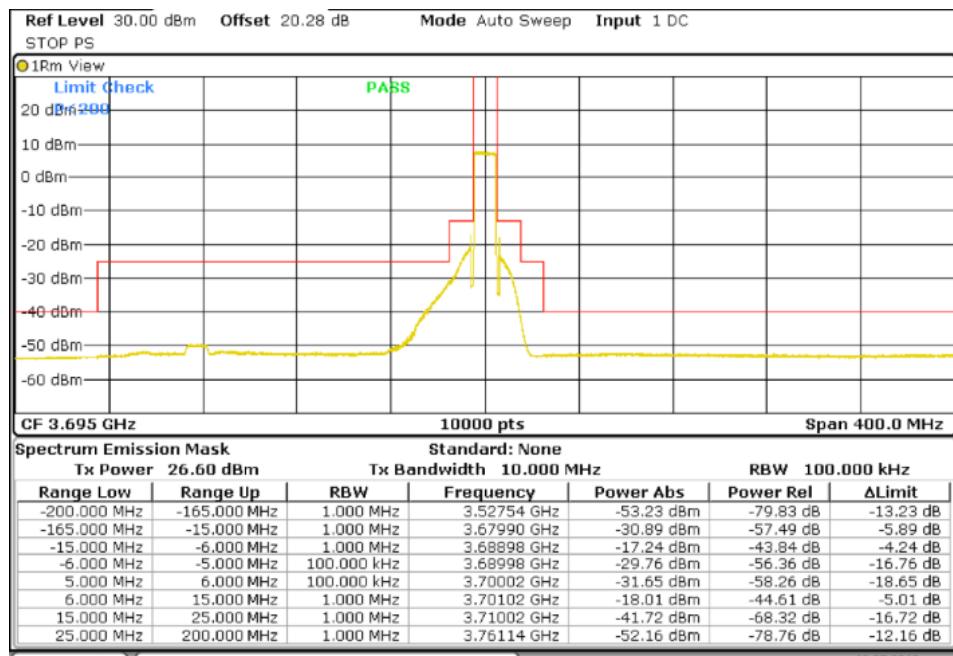


Middle Channel (3625 MHz)



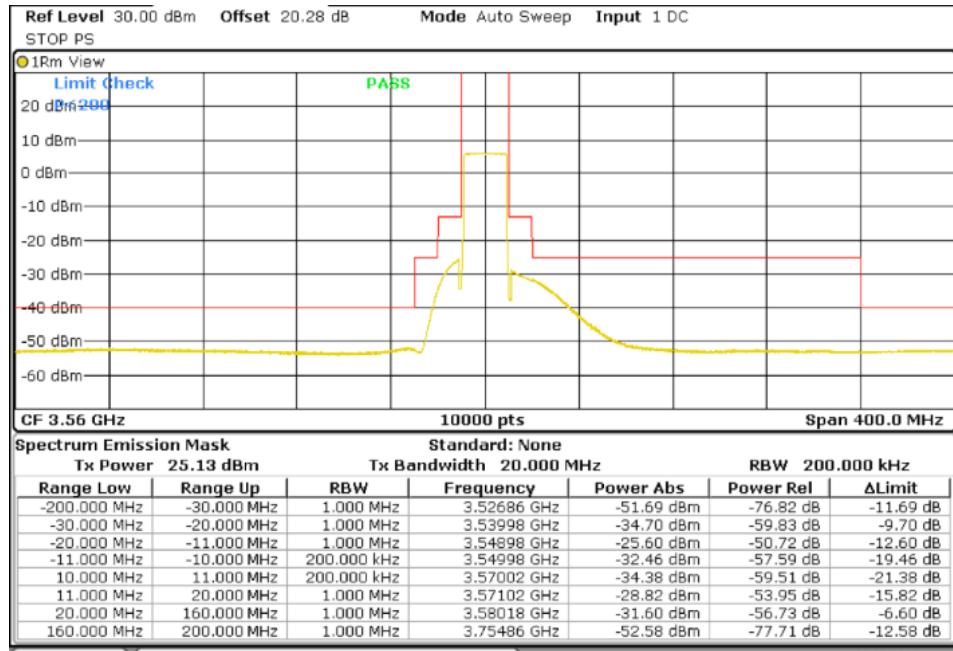
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



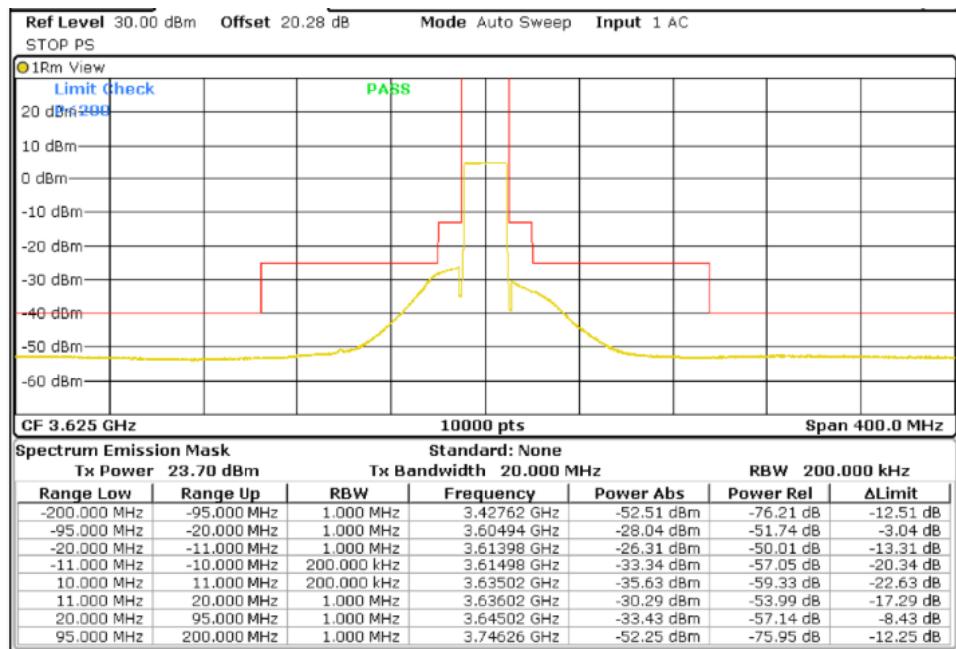
20 MHz BW

Lowest Channel (3560 MHz)

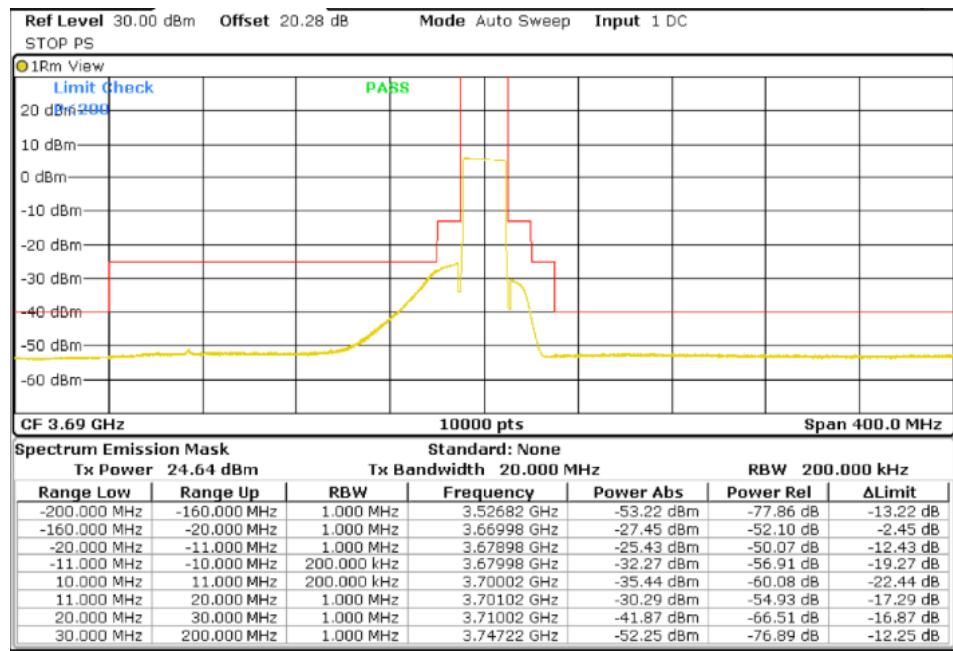


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)



TEST A.7: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

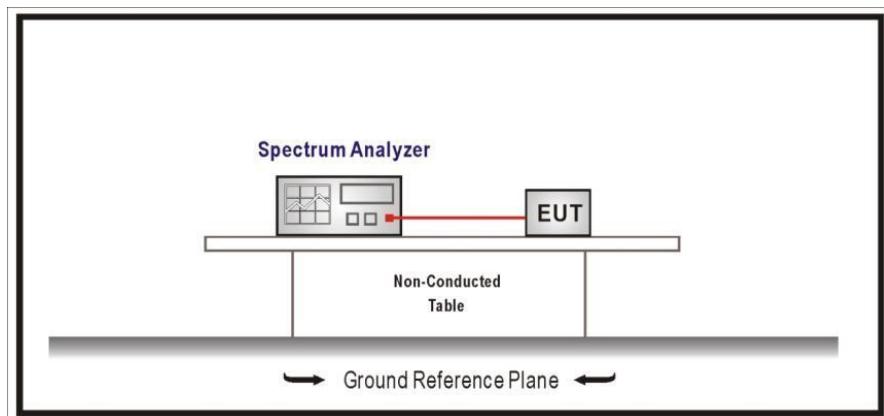
LIMITS:	Product standard:	Part 2.1051 and 96.41 Subclause (e)
	Test standard:	ANSI C63.26-2015

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 = $10 \log (1/0.68) = 1.67$ (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	7249.68	-50.66	7391.18	-49.98	
	7251.68	-50.85	7389.68	-49.39	
Measurement uncertainty (dB)					<± 2.03

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)
No spurious	7246.18	-51.79	7383.18	-50.67	
			7380.18	-50.81	
Measurement uncertainty (dB)					<± 2.03

See plots below

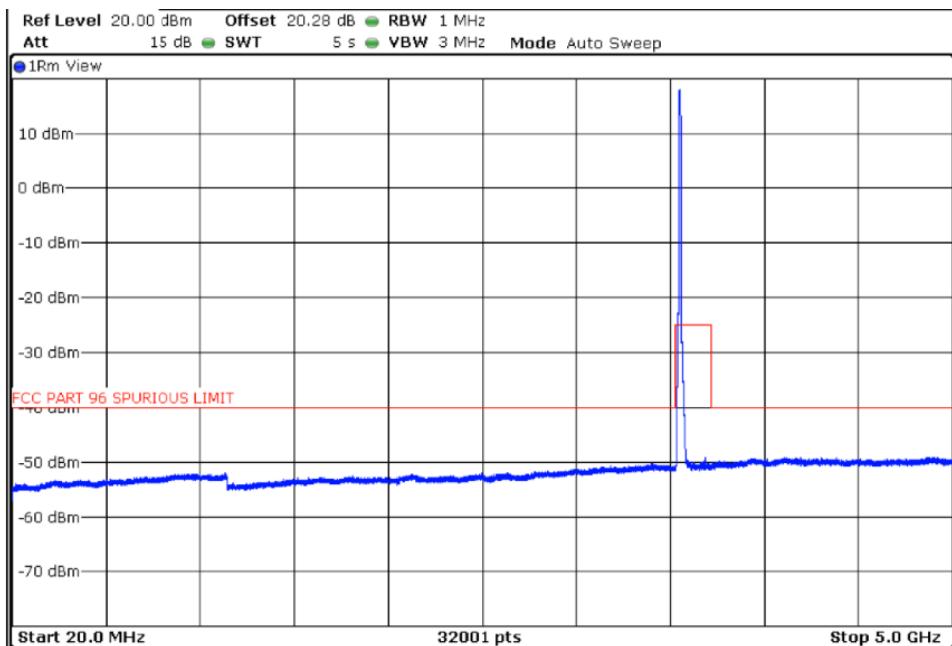
TEST RESULTS (Cont.):

Port 1

10MHz BW

Lowest Channel (3555 MHz)

FREQUENCY RANGE 20 MHz-5 GHz



FREQUENCY RANGE 5-21 GHz

