

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

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

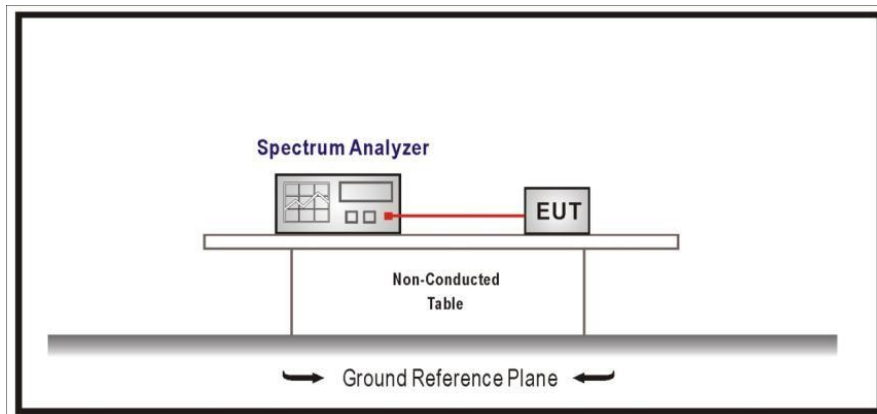
LIMITS

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 (or port 3 and 4) transmitting at the same time in the 2X2 MIMO mode.

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

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)	15.83	16.01	16.31
PSD at Port 2 (dBm/MHz)	16.55	15.74	16.29
Summed PSD (dBm/MHz)	19.22	18.89	19.31
Maximum declared antenna gain (dBi)	9.00	9.00	9.00
Maximum PSD (dBm/MHz)	28.22	27.89	28.31
Measurement Uncertainty	$< \pm 0.95$		

Port 3 and 4

	Lowest frequency 3555 MHz	Middle frequency 3625 MHz	Highest frequency 3695 MHz
PSD at Port 1 (dBm/MHz)	15.95	16.06	15.77
PSD at Port 2 (dBm/MHz)	16.31	16.52	16.77
Summed PSD (dBm/MHz)	19.14	19.31	19.31
Maximum declared antenna gain (dBi)	9.00	9.00	9.00
Maximum PSD (dBm/MHz)	28.14	28.31	28.31
Measurement Uncertainty	$< \pm 0.95$		

20MHz BW

Port 1 and 2

	Lowest frequency 3555 MHz	Middle frequency 3625 MHz	Highest frequency 3695 MHz
PSD at Port 1 (dBm/MHz)	15.56	15.57	15.07
PSD at Port 2 (dBm/MHz)	15.58	16.09	15.71
Summed PSD (dBm/MHz)	18.58	18.85	18.41
Maximum declared antenna gain (dBi)	9.00	9.00	9.00
Maximum PSD (dBm/MHz)	27.58	27.85	27.41
Measurement Uncertainty	$< \pm 0.95$		

TEST RESULTS (Cont.):

Port 3 and 4

	Lowest frequency 3555 MHz	Middle frequency 3625 MHz	Highest frequency 3695 MHz
PSD at Port 1 (dBm/MHz)	16.01	15.94	15.56
PSD at Port 2 (dBm/MHz)	15.20	15.66	16.01
Summed PSD (dBm/MHz)	18.63	18.81	18.80
Maximum declared antenna gain (dBi)	9.00	9.00	9.00
Maximum PSD (dBm/MHz)	27.63	27.81	27.80
Measurement Uncertainty	$< \pm 0.95$		

10MHz BW Summed PSD

Port 1,2,3 and 4

	Lowest frequency 3560 MHz	Middle frequency 3625 MHz	Highest frequency 3690 MHz
PSD at Port 1 & 2 (dBm/MHz)	19.22	18.89	19.31
PSD at Port 3 & 4 (dBm/MHz)	19.14	19.31	19.31
Summed PSD (dBm/MHz)	22.19	22.11	22.32
Maximum declared antenna gain (dBi)	9.00	9.00	9.00
Maximum PSD (dBm/MHz)	31.19	31.11	31.32
Measurement Uncertainty	$< \pm 0.95$		

20MHz BW Summed PSD

Port 1,2,3 and 4

	Lowest frequency 3560 MHz	Middle frequency 3625 MHz	Highest frequency 3690 MHz
PSD at Port 1 & 2 (dBm/MHz)	18.58	18.85	18.41
PSD at Port 3 & 4 (dBm/MHz)	18.63	18.81	18.80
Summed PSD (dBm/MHz)	21.62	21.84	21.62
Maximum declared antenna gain (dBi)	9.00	9.00	9.00
Maximum PSD (dBm/MHz)	30.62	30.84	30.62
Measurement Uncertainty	$< \pm 0.95$		

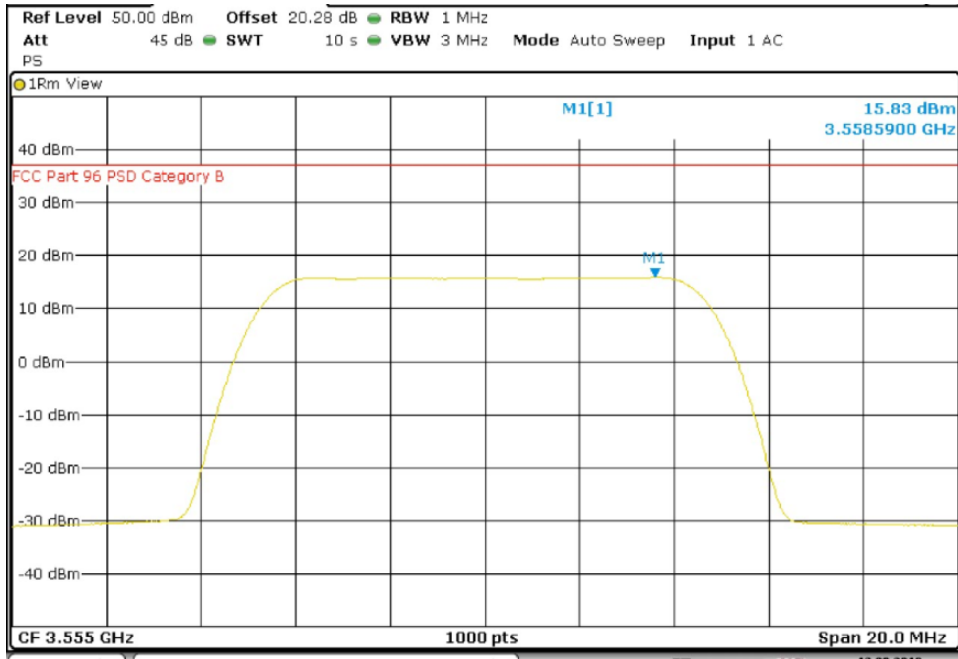
(See next plots showing QPSK only)

TEST RESULTS (Cont.):

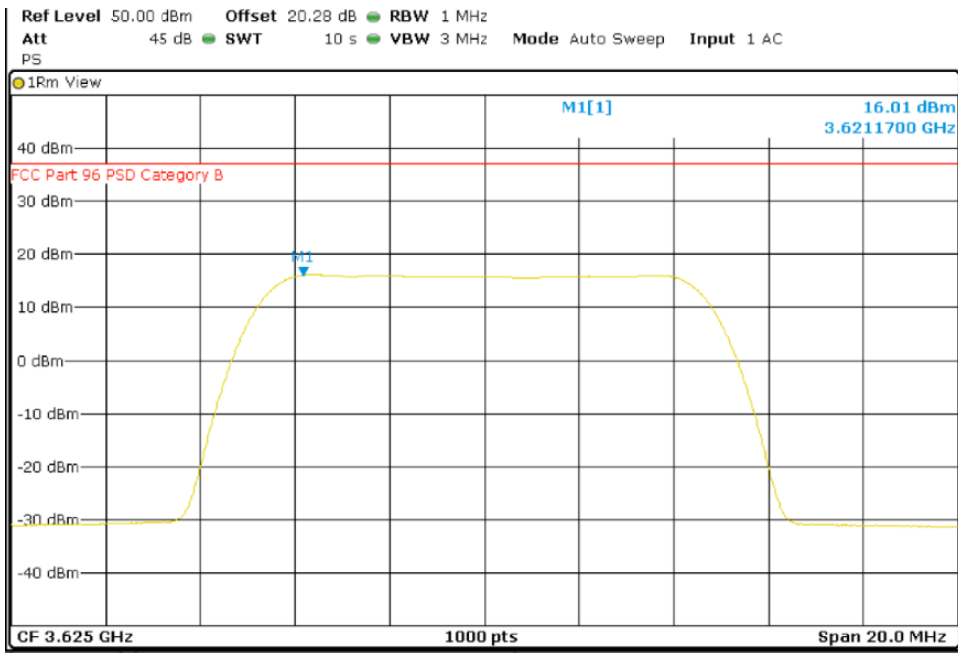
Port 1

10 MHz BW

Lowest Channel (3555 MHz)

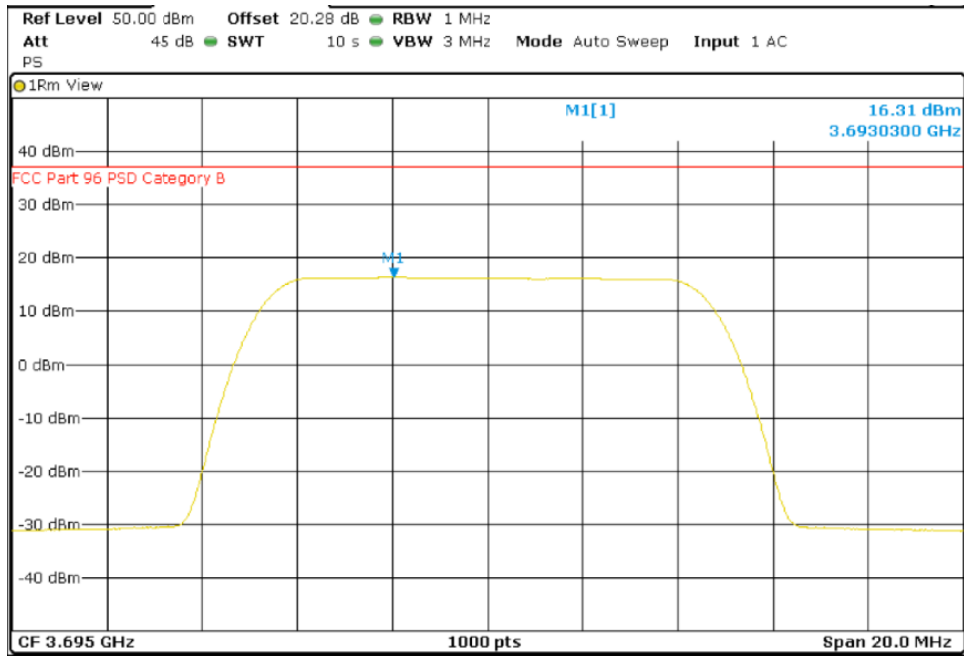


Middle Channel (3625 MHz)



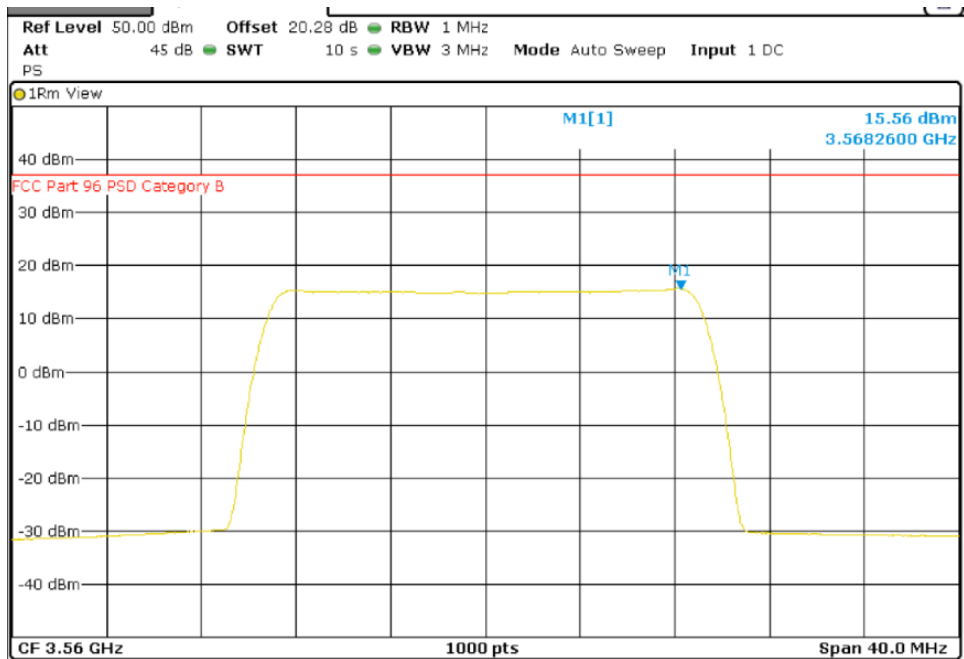
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



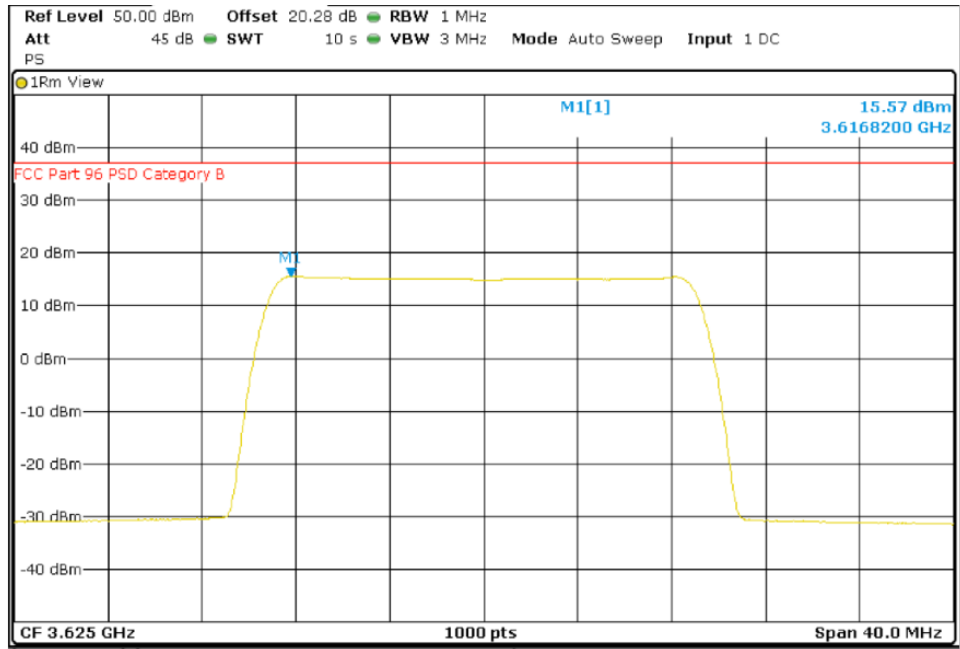
20 MHz BW

Lowest Channel (3560 MHz)

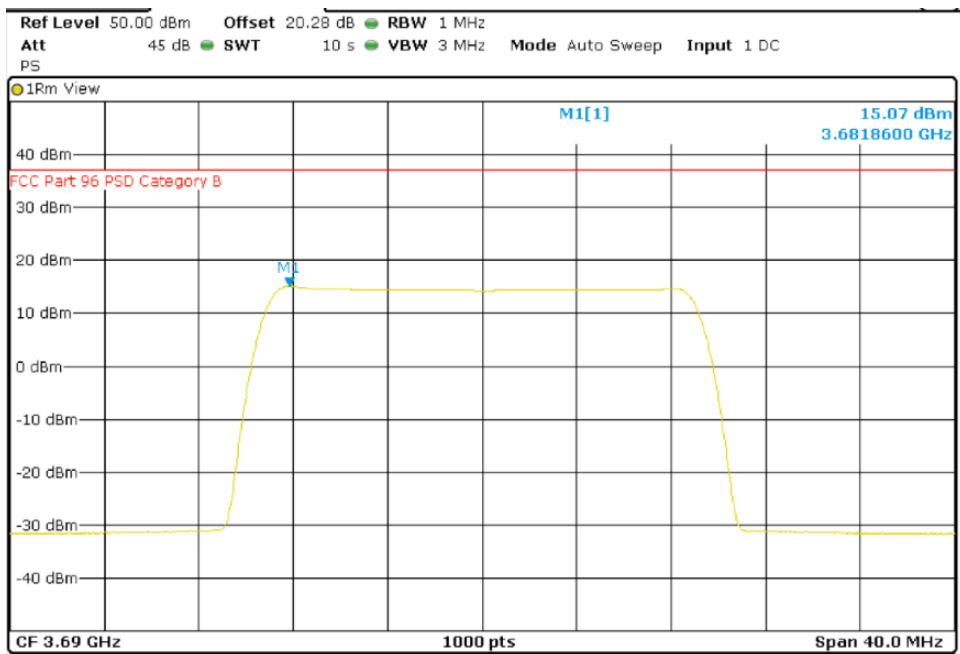


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)

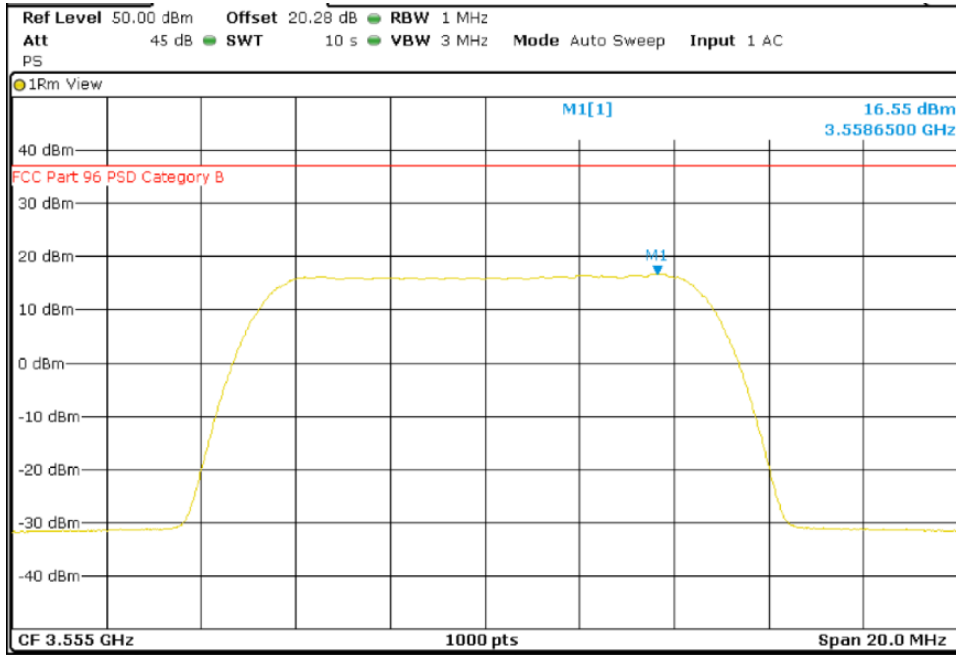


TEST RESULTS (Cont.):

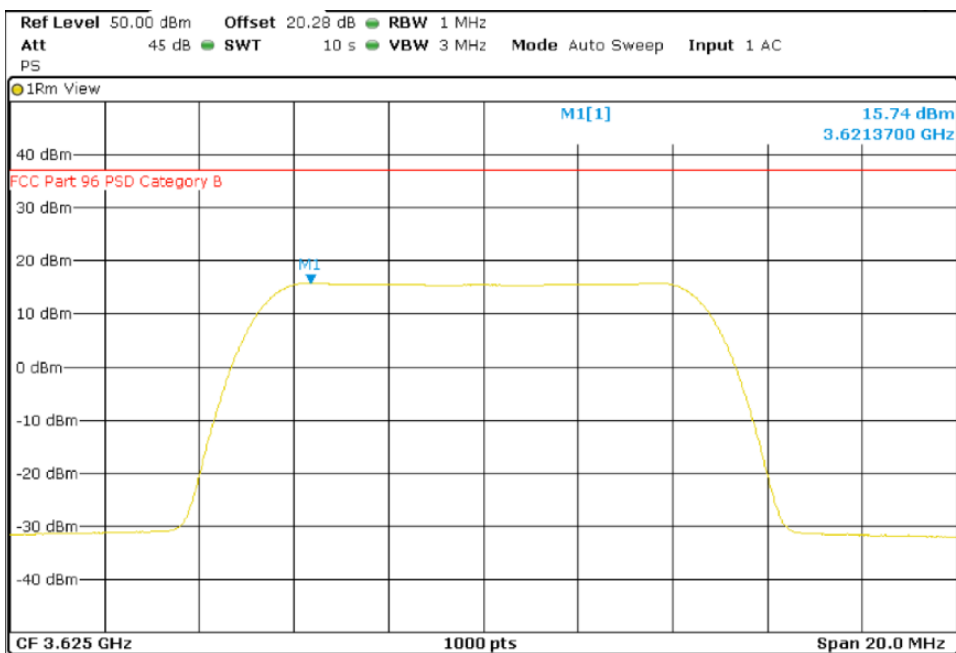
Port 2

10 MHz BW

Lowest Channel (3555 MHz)

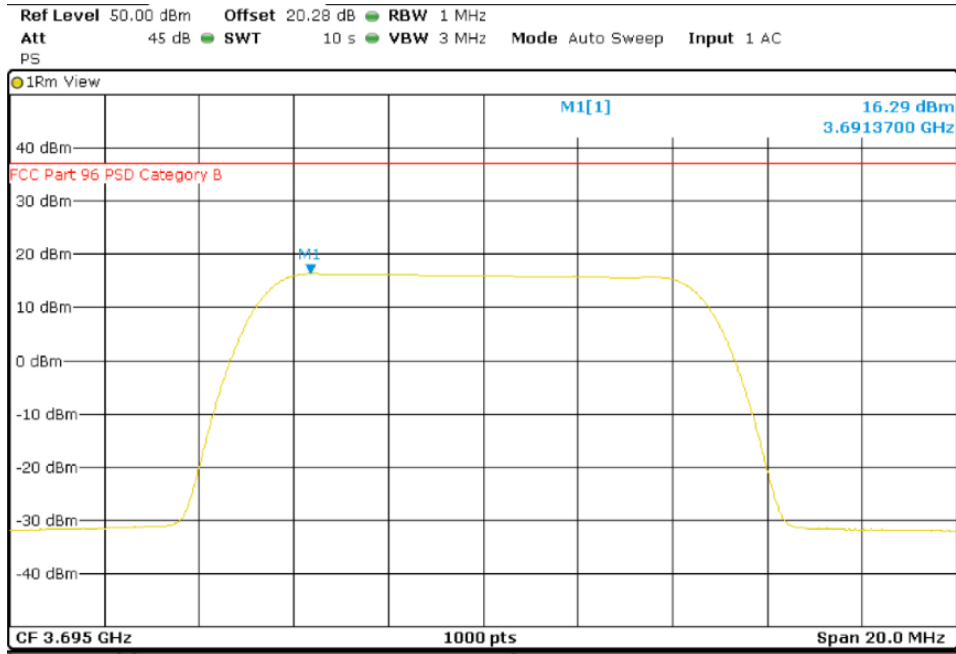


Middle Channel (3625 MHz)



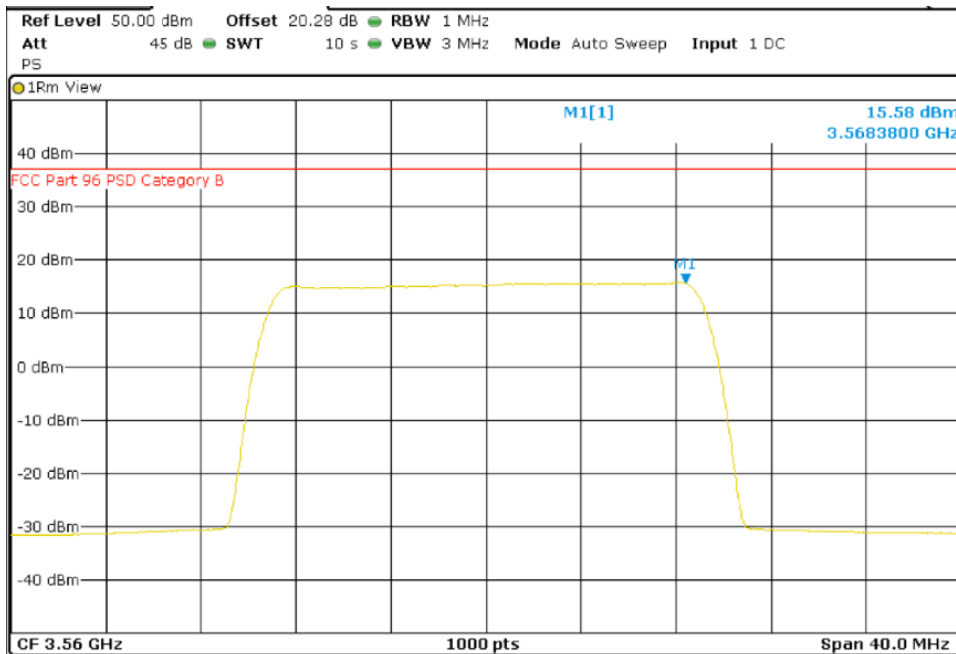
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



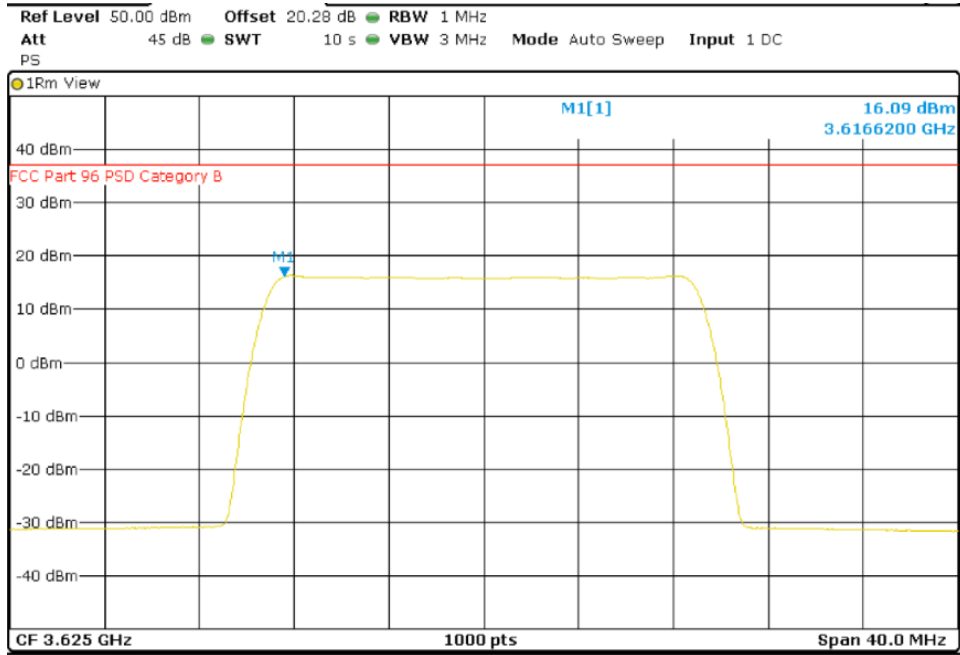
20 MHz BW

Lowest Channel (3560 MHz)

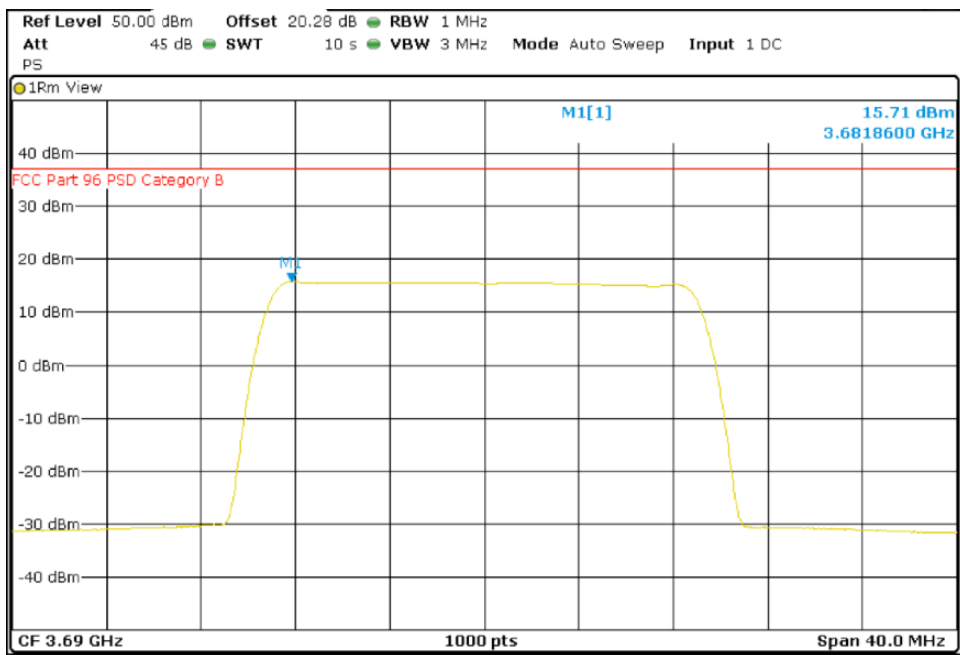


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



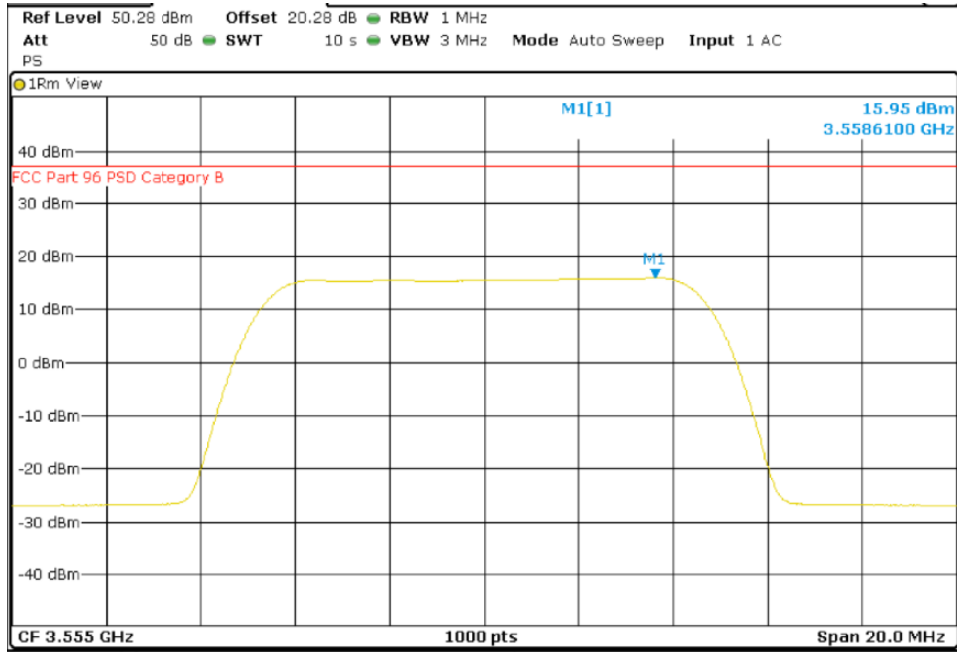
Highest Channel (3690 MHz)



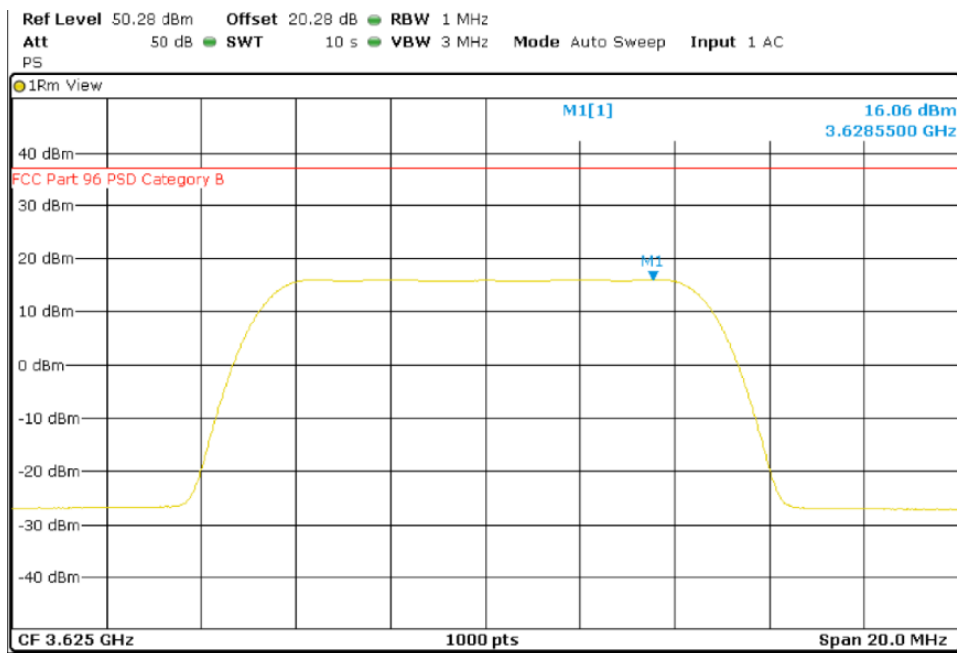
TEST RESULTS (Cont.):

Port 3

**10 MHz BW
 Lowest Channel (3555 MHz)**

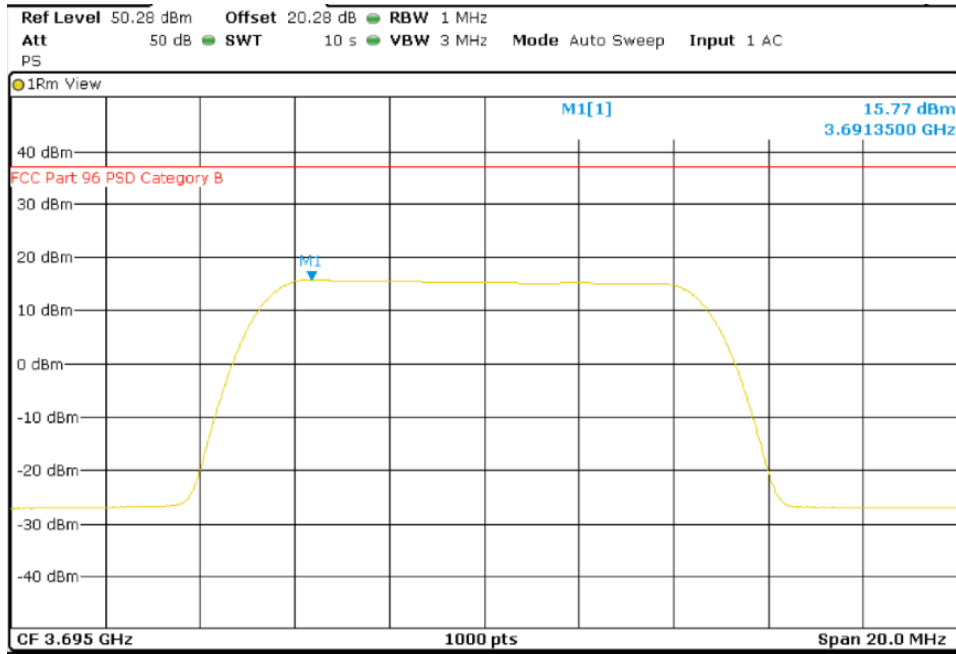


Middle Channel (3625 MHz)



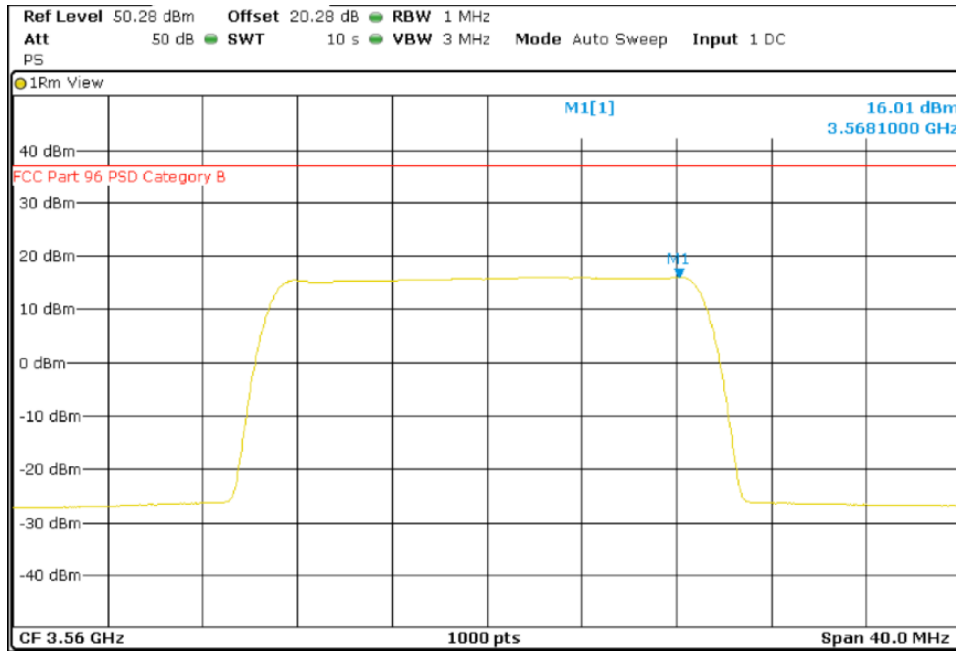
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



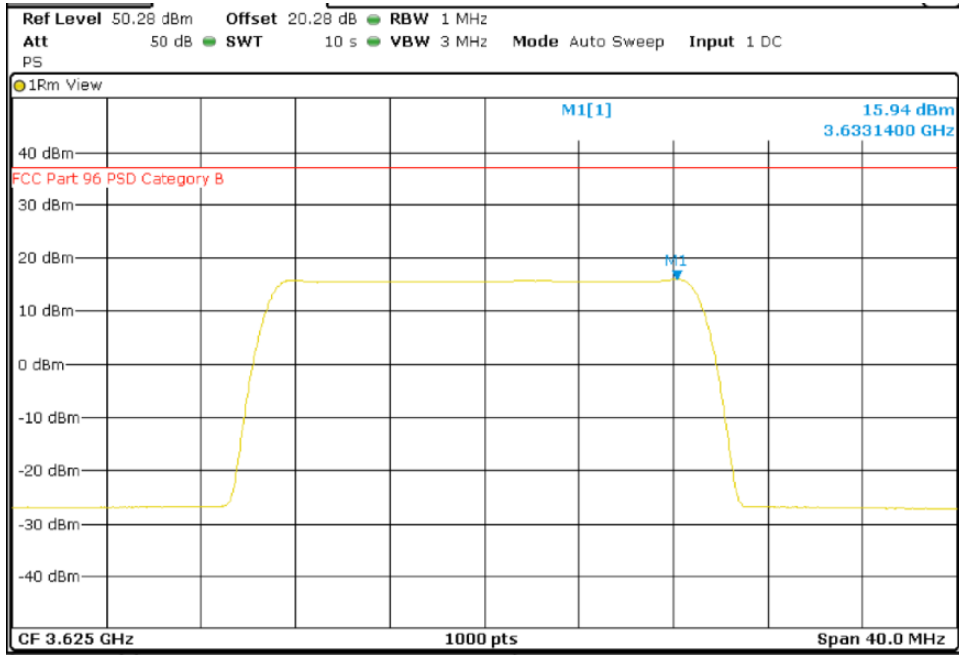
20 MHz BW

Lowest Channel (3560 MHz)

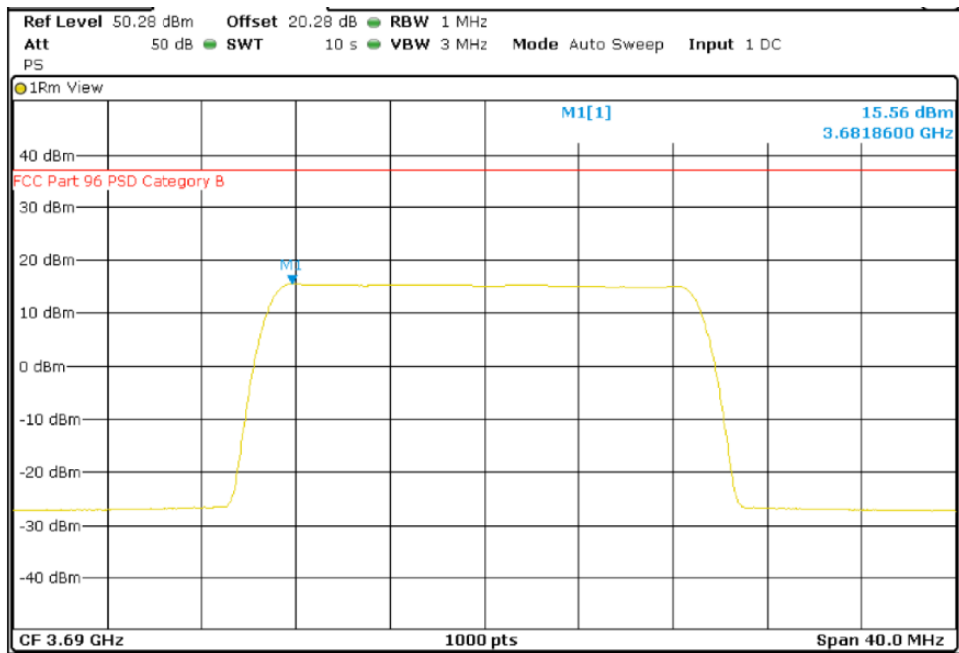


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)

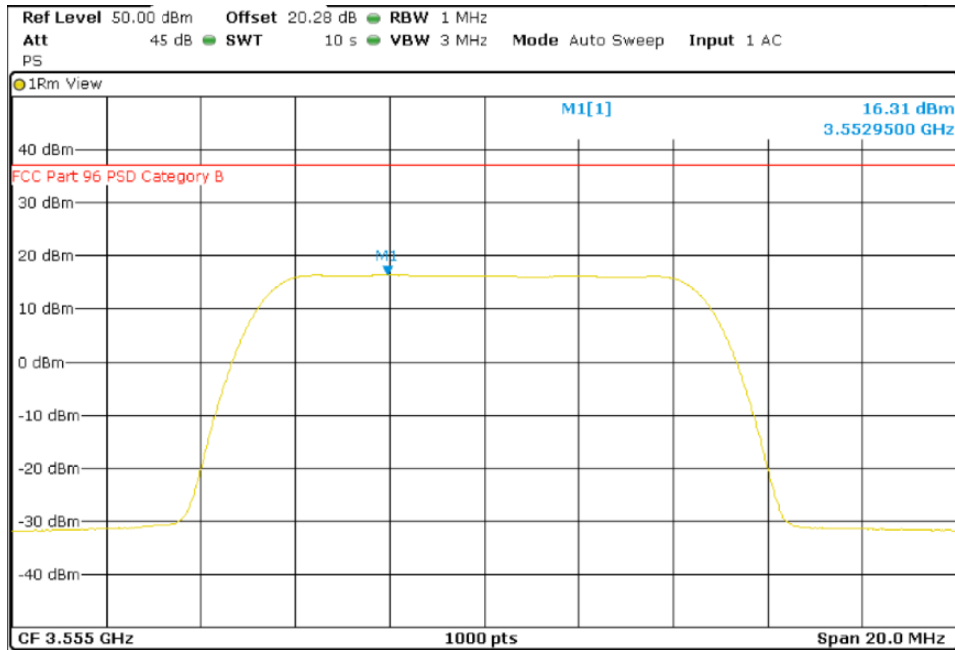


TEST RESULTS (Cont.):

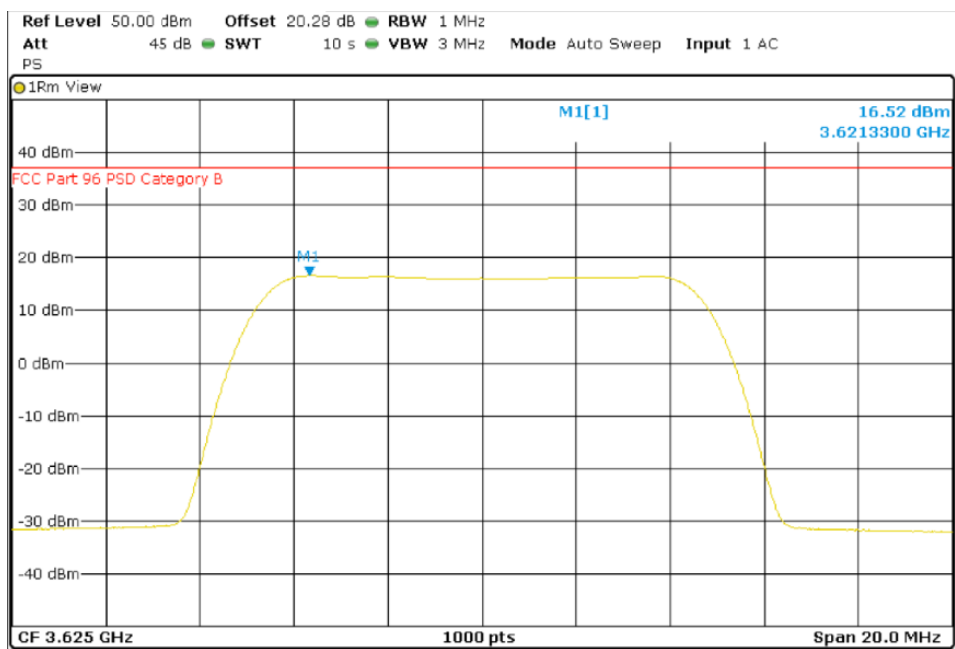
Port 4

10 MHz BW

Lowest Channel (3555 MHz)

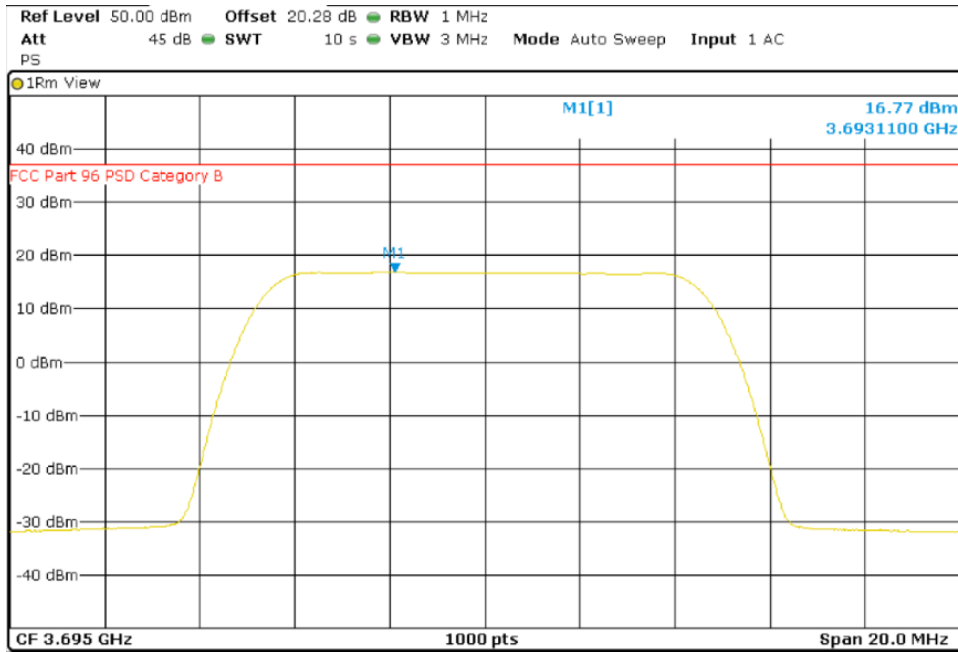


Middle Channel (3625 MHz)



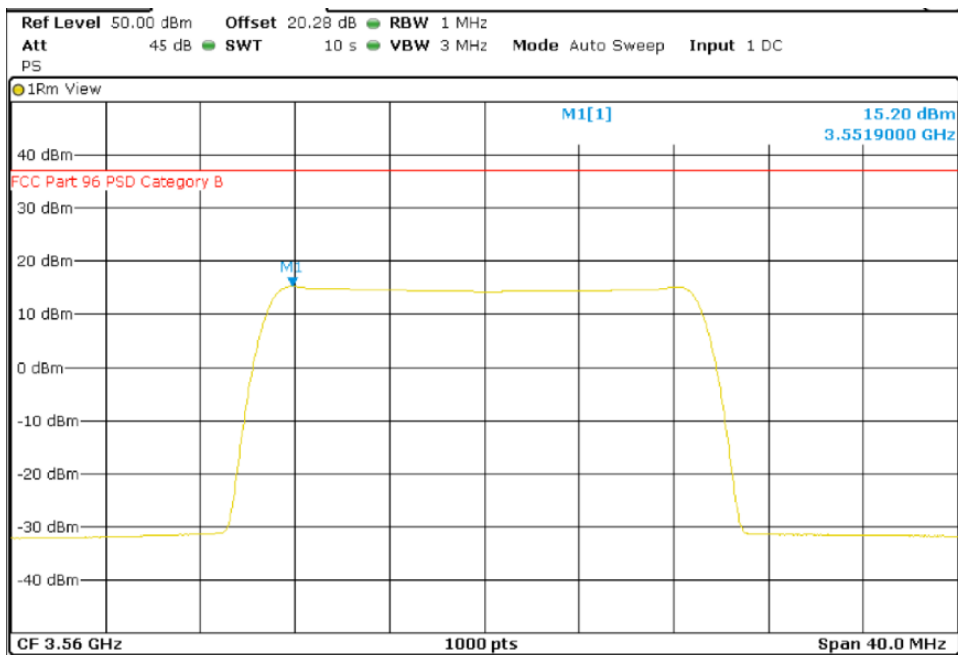
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



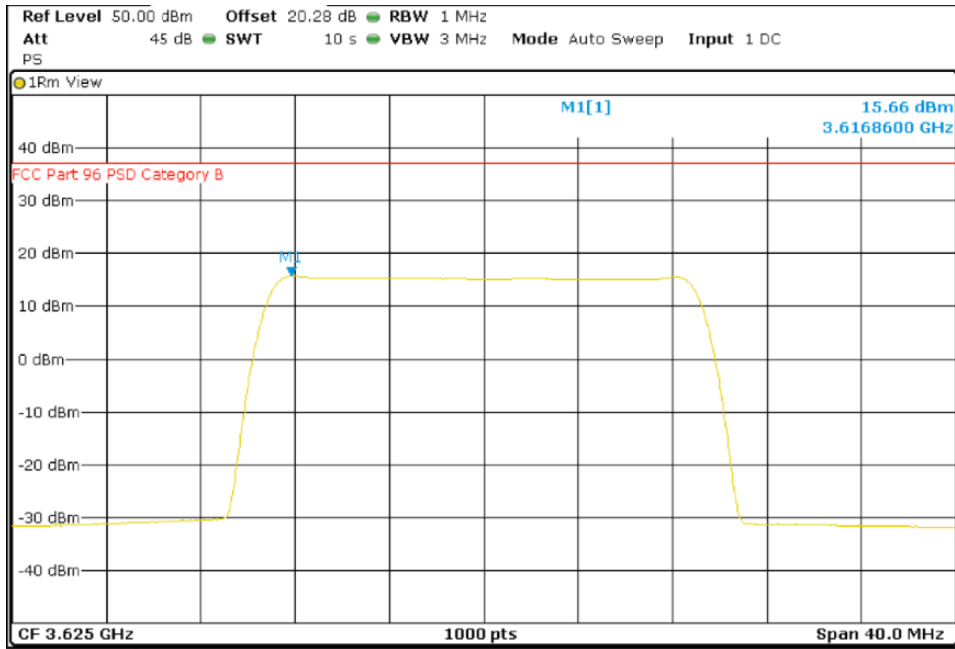
20 MHz BW

Lowest Channel (3560 MHz)

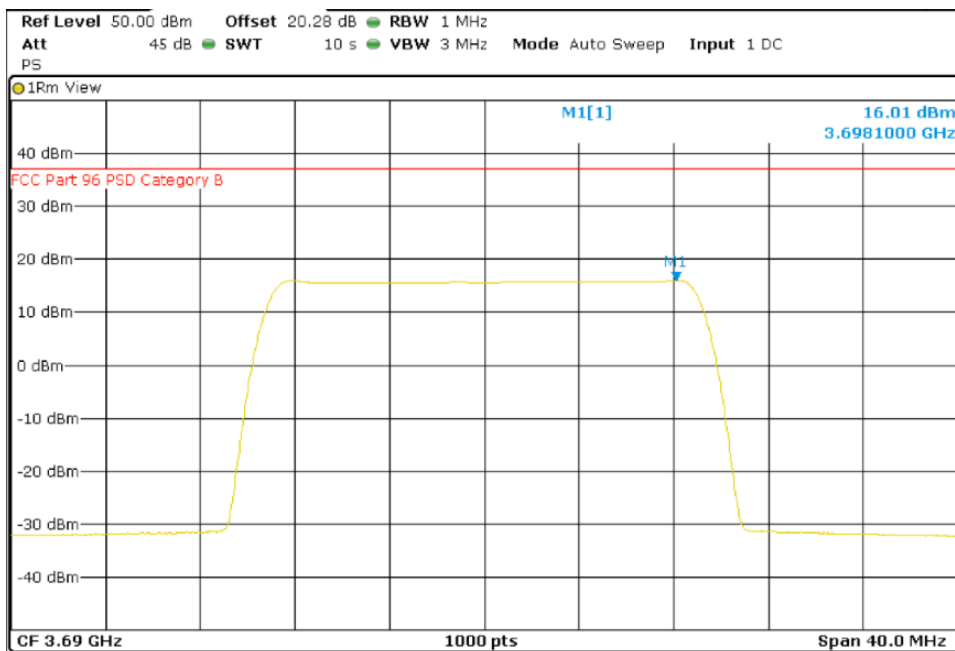


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)



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

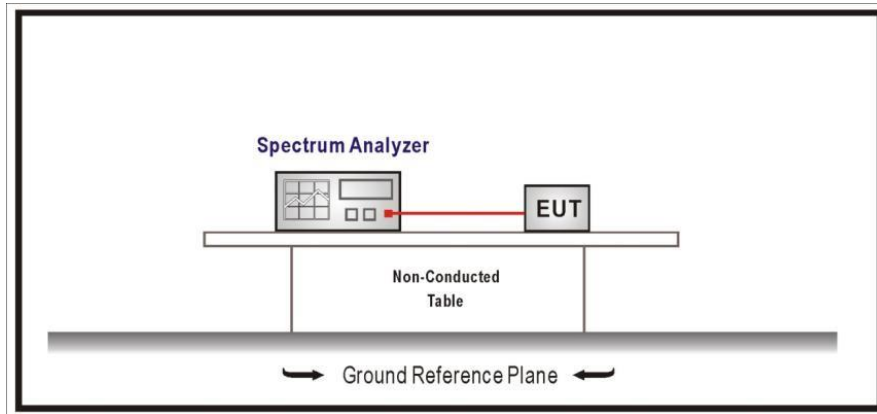
LIMITS:	Product standard:	Part 96.41 Subclause (g)
	Test standard:	ANSI C63.26-2015

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)	37.95	37.92	38.63
Mean (dBm)	26.03	26.25	27.07
PAPR at 0.1% probability (dB)	11.48	11.25	10.99
Measurement uncertainty (dB)	<±1.11		

TEST RESULTS (Cont.):

Port 2

	Lowest frequency 3555 MHz	Middle frequency 3625 MHz	Highest frequency 3695 MHz
Peak (dBm)	38.33	38.41	38.39
Mean (dBm)	28.18	27.92	27.78
PAPR at 0.1% probability (dB)	9.80	9.94	10.12
Measurement uncertainty (dB)	<±1.11		

Port 3

	Lowest frequency 3555 MHz	Middle frequency 3625 MHz	Highest frequency 3695 MHz
Peak (dBm)	37.82	37.98	37.44
Mean (dBm)	27.52	26.55	28.35
PAPR at 0.1% probability (dB)	10.00	11.13	8.78
Measurement uncertainty (dB)	<±1.11		

Port 4

	Lowest frequency 3555 MHz	Middle frequency 3625 MHz	Highest frequency 3695 MHz
Peak (dBm)	38.32	38.24	38.30
Mean (dBm)	26.80	25.47	28.29
PAPR at 0.1% probability (dB)	10.96	12.35	9.57
Measurement uncertainty (dB)	<±1.11		

20MHz BW

Port 1

	Lowest frequency 3560 MHz	Middle frequency 3625 MHz	Highest frequency 3690 MHz
Peak (dBm)	37.30	37.22	37.42
Mean (dBm)	26.06	24.57	26.19
PAPR at 0.1% probability (dB)	9.97	11.48	9.97
Measurement uncertainty (dB)	<±1.11		

TEST RESULTS (Cont.):

Port 2

	Lowest frequency 3560 MHz	Middle frequency 3625 MHz	Highest frequency 3690 MHz
Peak (dBm)	37.26	36.94	37.32
Mean (dBm)	26.69	26.02	26.57
PAPR at 0.1% probability (dB)	9.28	9.62	9.45
Measurement uncertainty (dB)	<±1.11		

Port 3

	Lowest frequency 3560 MHz	Middle frequency 3625 MHz	Highest frequency 3690 MHz
Peak (dBm)	38.02	37.10	36.84
Mean (dBm)	26.43	24.10	24.90
PAPR at 0.1% probability (dB)	10.17	11.74	10.67
Measurement uncertainty (dB)	<±1.11		

Port 4

	Lowest frequency 3560 MHz	Middle frequency 3625 MHz	Highest frequency 3690 MHz
Peak (dBm)	36.99	37.16	37.34
Mean (dBm)	25.01	24.48	25.92
PAPR at 0.1% probability (dB)	10.90	11.51	10.17
Measurement uncertainty (dB)	<±1.11		

(See next plots)

TEST RESULTS (Cont.):

Port 1

10 MHz BW

Lowest Channel (3555 MHz)

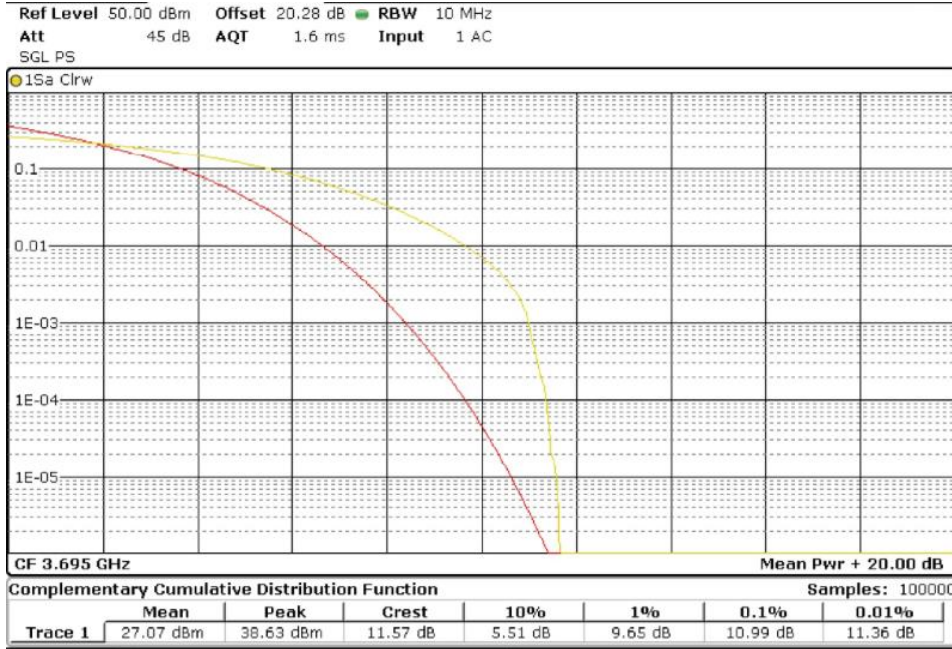


Middle Channel (3625 MHz)



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.):

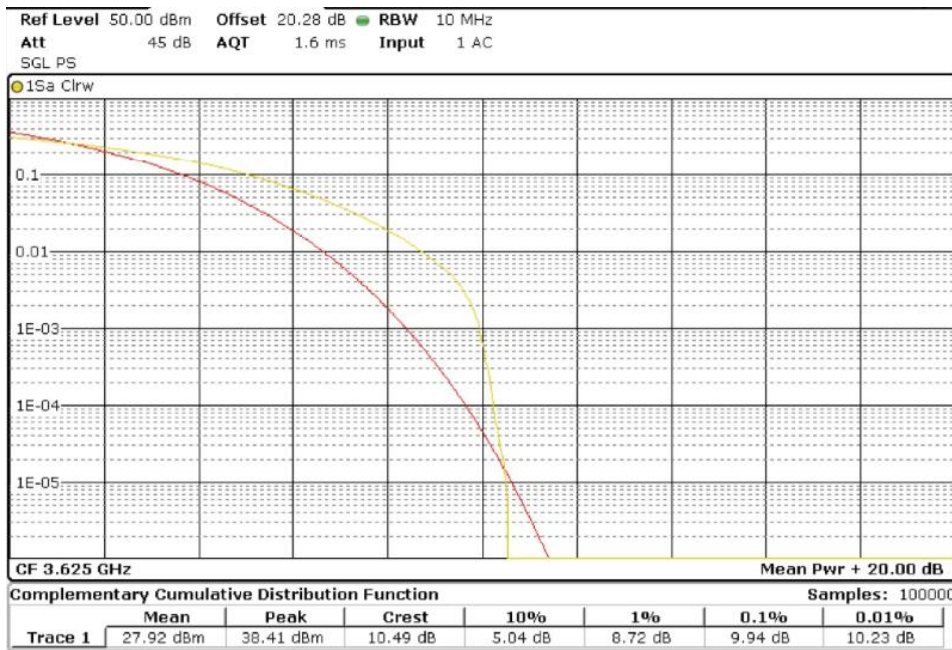
Port 2

10 MHz BW

Lowest Channel (3555 MHz)

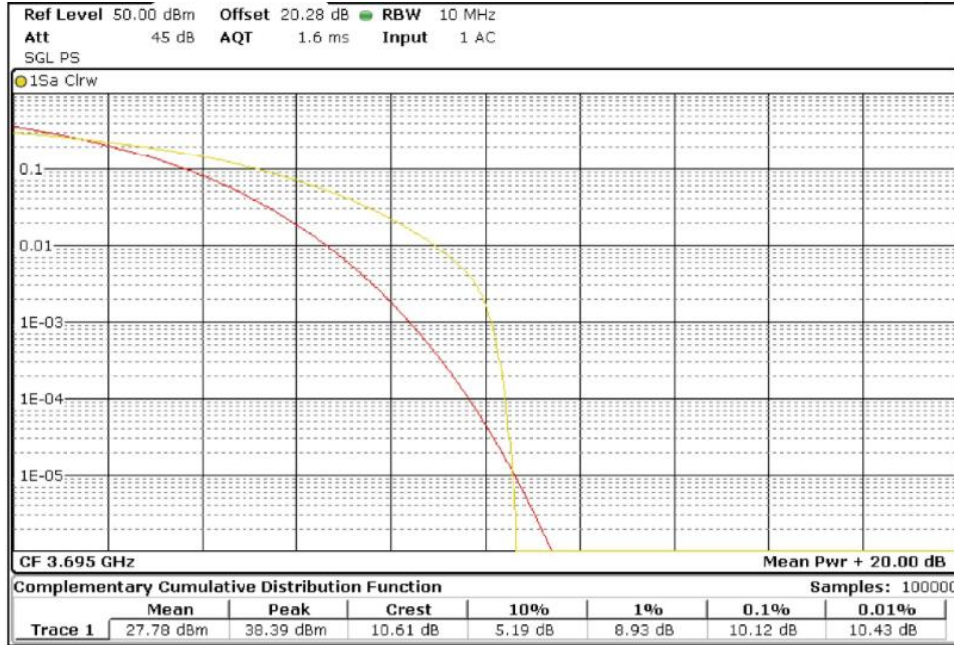


Middle Channel (3625 MHz)



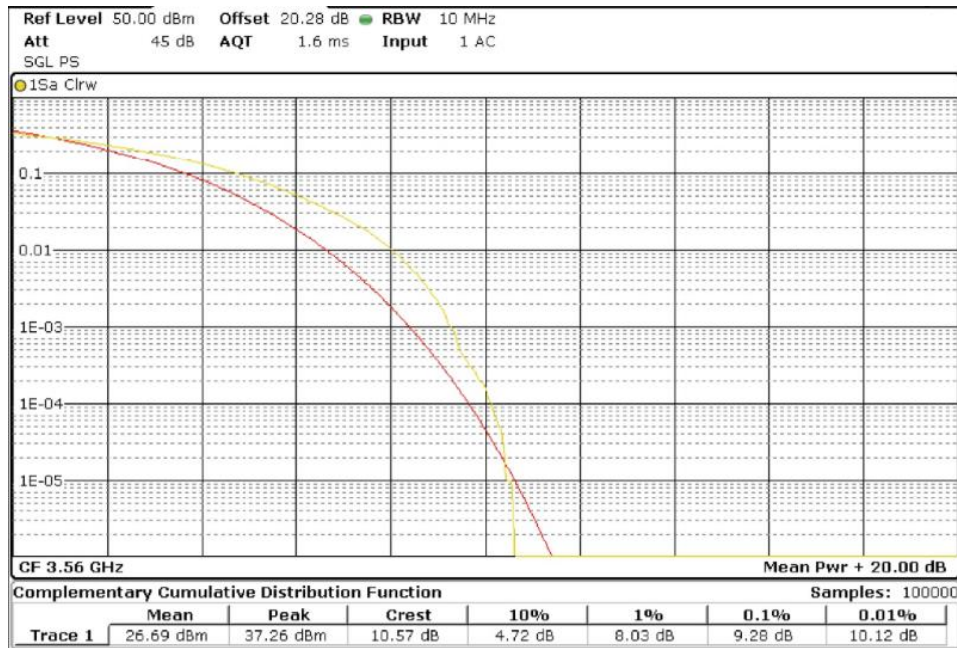
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



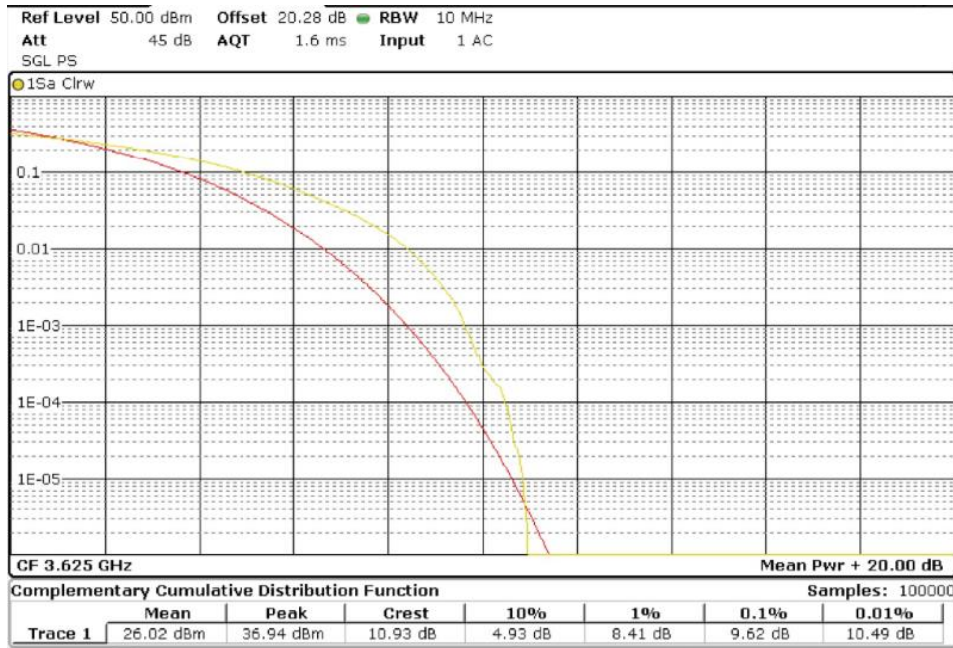
20 MHz BW

Lowest Channel (3560 MHz)



TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)



TEST RESULTS (Cont.):

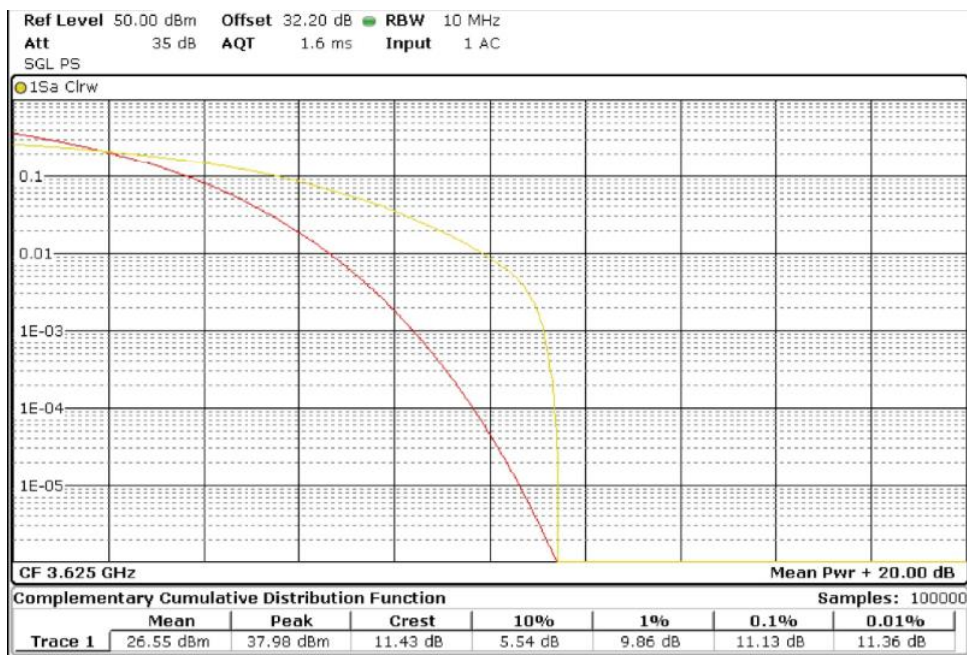
Port 3

10 MHz BW

Lowest Channel (3555 MHz)

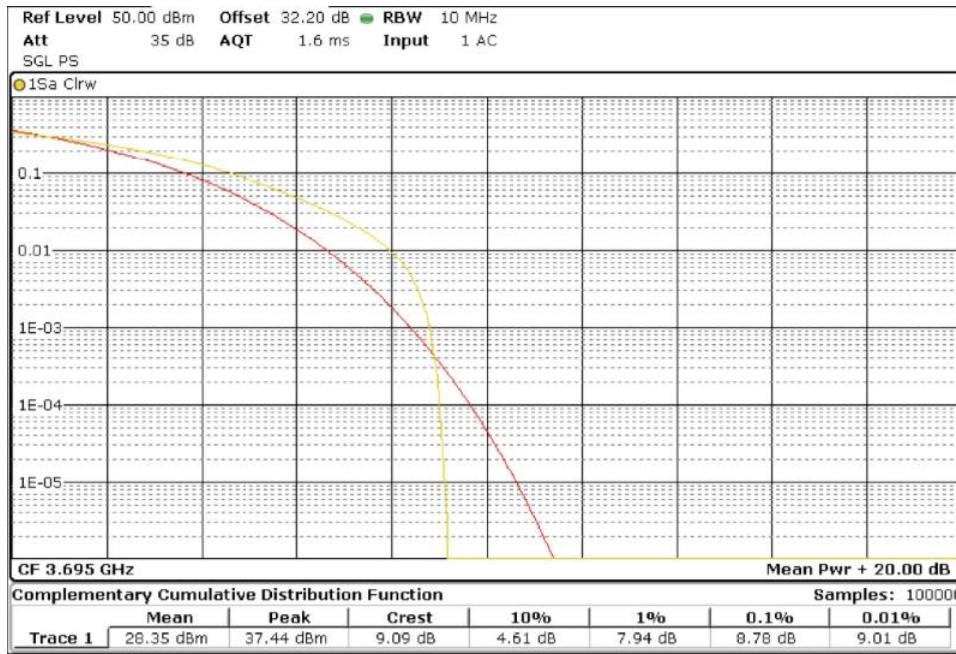


Middle Channel (3625 MHz)



TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



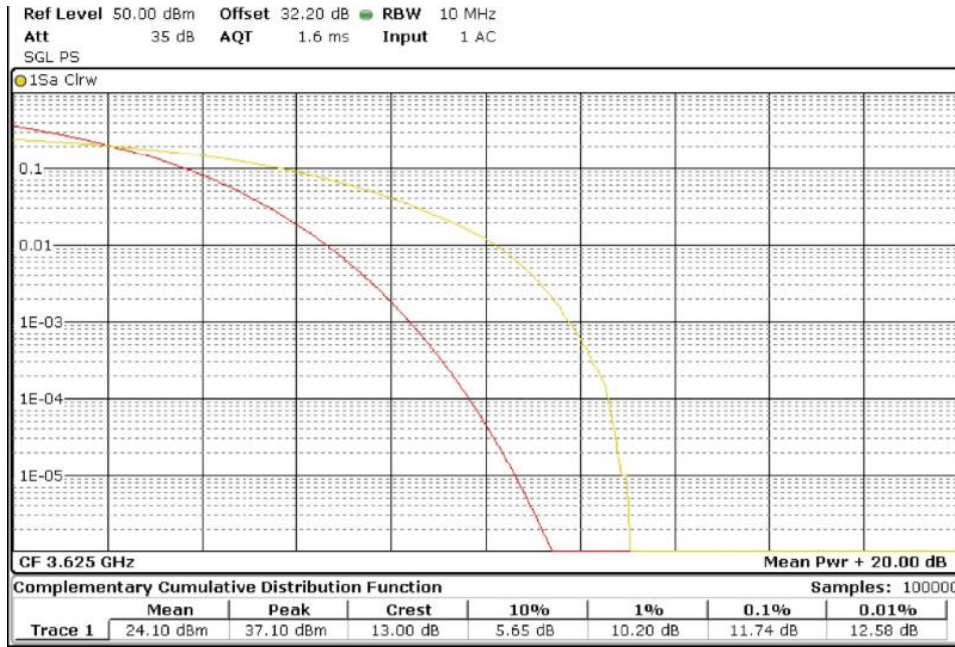
20 MHz BW

Lowest Channel (3560 MHz)

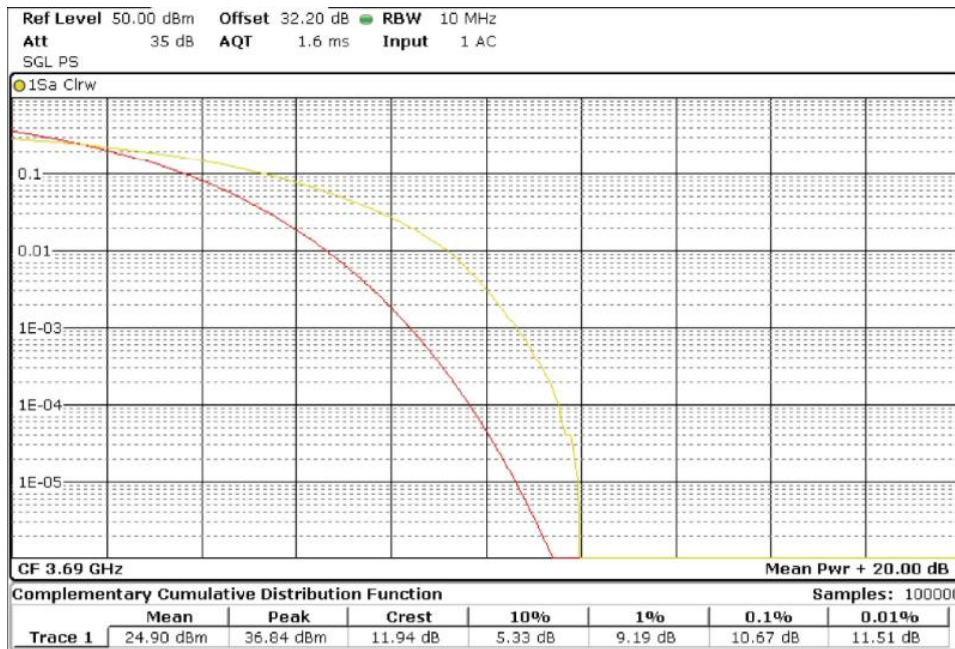


TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)



TEST RESULTS (Cont.):

Port 4

10 MHz BW

Lowest Channel (3555 MHz)

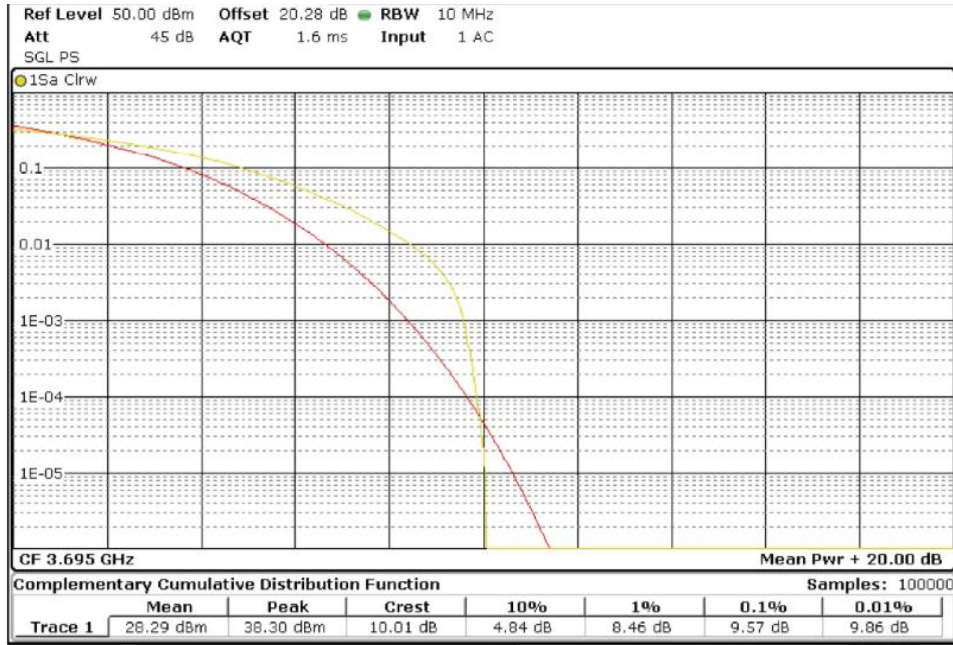


Middle Channel (3625 MHz)



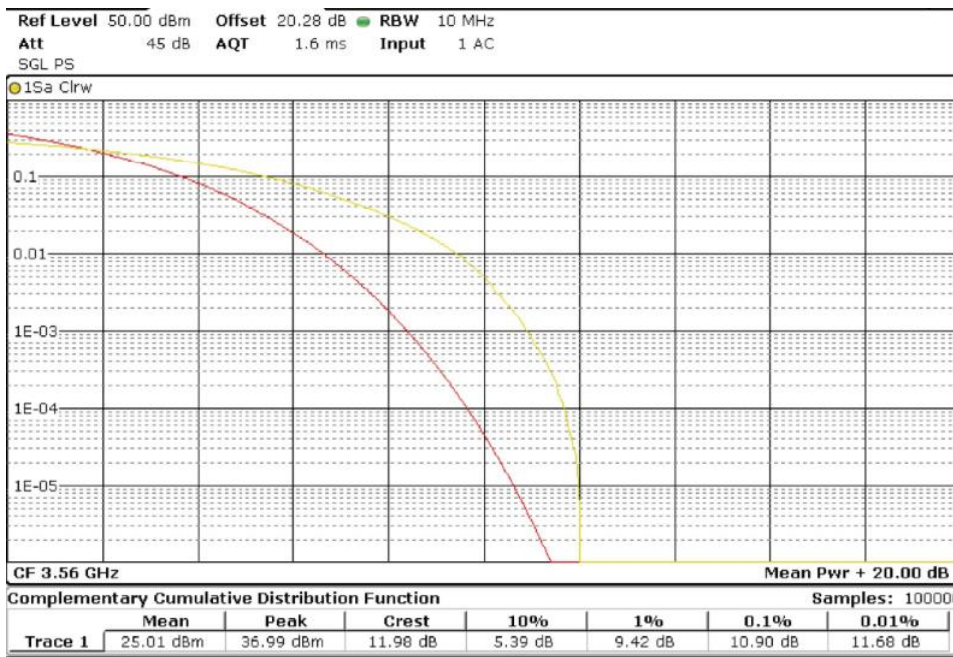
TEST RESULTS (Cont.):

Highest Channel (3695 MHz)



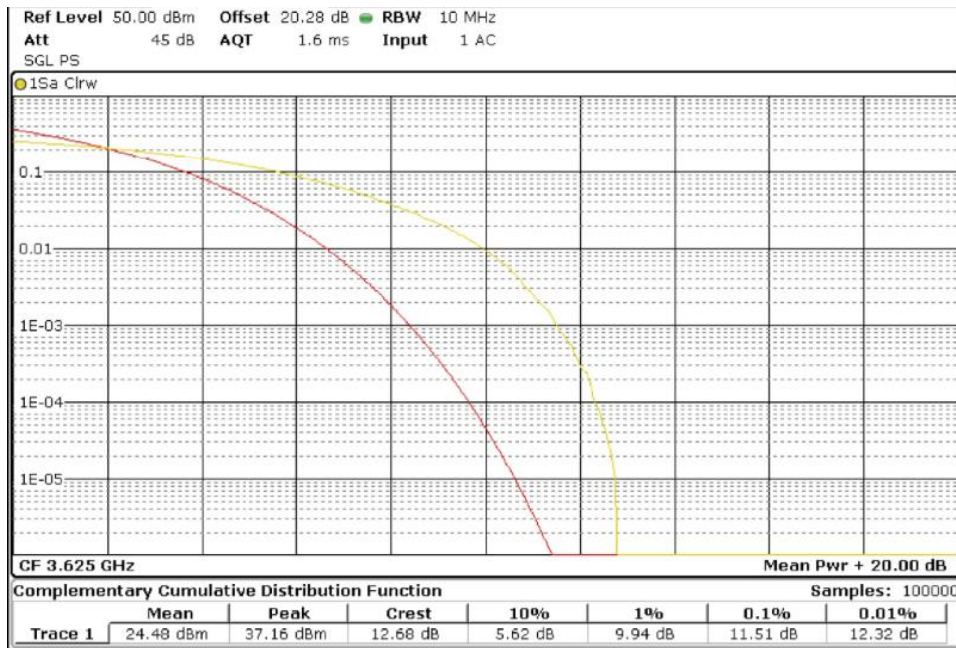
20 MHz BW

Lowest Channel (3560 MHz)



TEST RESULTS (Cont.):

Middle Channel (3625 MHz)



Highest Channel (3690 MHz)

