

9.5. PEAK-TO-AVERAGE POWER RATIO

LIMITS

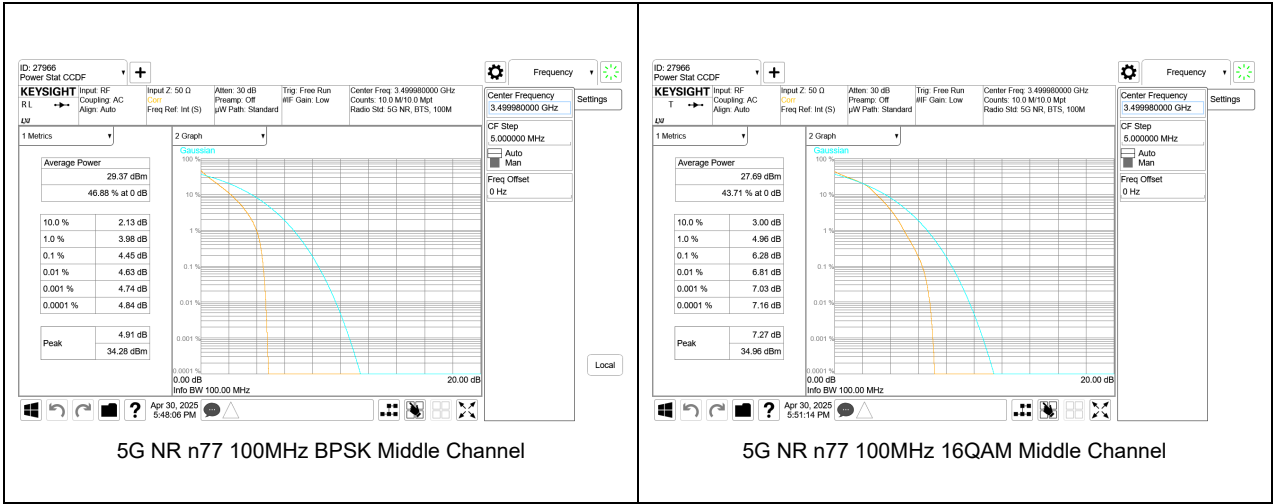
FCC: \$27.50
(k) (4) In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

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RESULT

Antenna 7 was used to measure as the worst case; full resource block (FRB) for each bandwidth was used to measure as the worst case. The results from all CCDF measurements are passed with 13dB peak-to-average power ratio criteria.

Example Plots: FULL RB



9.5.1. 5G NR n77 (FCC Part 27 3450-3550MHz)

Test Engineer ID:	50822	Test Date:	2025-02-07
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Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
5G NR n77	10MHz	3500.0	24	0	BPSK	34.26	29.75	4.51
					16QAM	35.02	28.24	6.78
	15MHz		36	0	BPSK	34.33	29.67	4.66
					16QAM	35.21	28.19	7.02
	20MHz		50	0	BPSK	34.63	29.87	4.76
					16QAM	35.34	28.12	7.22
	25MHz		64	0	BPSK	34.81	29.86	4.95
					16QAM	35.62	28.27	7.35
	30MHz		75	0	BPSK	34.73	29.75	4.98
					16QAM	35.54	28.21	7.33
	40MHz		100	0	BPSK	34.76	29.82	4.94
					16QAM	35.42	28.08	7.34
	50MHz		128	0	BPSK	34.68	29.71	4.97
					16QAM	35.49	28.09	7.40
	60MHz		162	0	BPSK	34.03	29.32	4.71
					16QAM	35.11	27.63	7.48
	70MHz	180	0	BPSK	34.14	29.18	4.96	
				16QAM	35.18	27.58	7.60	
	80MHz	216	0	BPSK	34.64	29.27	5.37	
				16QAM	35.28	27.58	7.70	
	90MHz	243	0	BPSK	33.86	29.28	4.58	
				16QAM	34.78	27.78	7.00	
	100MHz	270	0	BPSK	34.28	29.37	4.91	
				16QAM	34.96	27.69	7.27	
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

9.5.2. 5G NR n77 (FCC Part 27 3700-3980MHz)

Test Engineer ID:	50822	Test Date:	2025-02-10
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Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
5G NR n77	10MHz	3840.0	24	0	BPSK	33.59	29.31	4.28
					16QAM	34.32	27.79	6.53
	15MHz		36	0	BPSK	33.50	29.31	4.19
					16QAM	34.24	27.77	6.47
	20MHz		50	0	BPSK	33.33	29.27	4.06
					16QAM	34.20	27.55	6.65
	25MHz		64	0	BPSK	33.27	28.92	4.35
					16QAM	33.99	27.32	6.67
	30MHz		75	0	BPSK	32.99	28.73	4.26
					16QAM	33.85	27.16	6.69
	40MHz		100	0	BPSK	33.20	28.52	4.68
					16QAM	33.89	26.86	7.03
	50MHz		128	0	BPSK	33.60	29.35	4.25
					16QAM	34.63	27.79	6.84
	60MHz		162	0	BPSK	33.68	29.19	4.49
					16QAM	34.39	27.56	6.83
	70MHz		180	0	BPSK	33.55	29.22	4.33
					16QAM	34.48	27.61	6.87
	80MHz		216	0	BPSK	33.79	29.53	4.26
					16QAM	34.66	27.75	6.91
	90MHz		243	0	BPSK	33.79	29.33	4.46
					16QAM	34.66	27.75	6.91
	100MHz		270	0	BPSK	34.16	29.40	4.76
					16QAM	34.98	27.73	7.25
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

10. RADIATED TEST RESULTS

LIMITS

FCC: §27.53

Emission limits

(n) 3.45 GHz Service. The following emission limits apply to stations transmitting in the 3450-3550 MHz band:

(2) For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz.

FCC: §27.53

(l) 3.7 GHz Service. The following emission limits apply to stations transmitting in the 3700-3980 MHz band:

(2) For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz.

Radiated measurement using the Field Strength Method

Using the test configuration shown in Figure 6 below, the radiated emissions is measured directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits. As stated in 5.5.1 of ANSI C63.26-2015, the field strength measurement method using a test site validated to the requirements of ANSI C63.4 is an alternative to the substitution measurement.

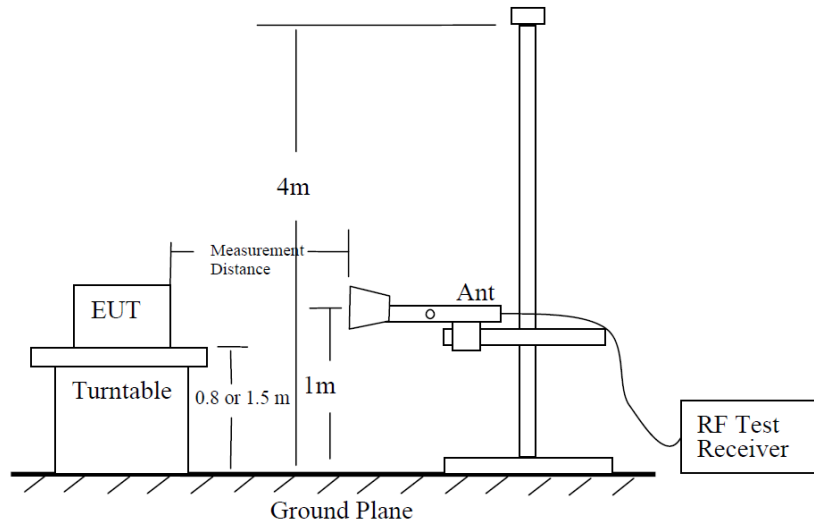


Figure 6 —Test site-up for radiated ERP and/or EIRP measurements

Radiated Power Measurement Calculation According to ANSI C63.26-2015

- a) $E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}.$
- b) $E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}.$
- c) $E \text{ (dB}\mu\text{V/m)} = \text{EIRP (dBm)} - 20\log(D) + 104.8$; where D is the measurement distance (in the far field region) in m.
- d) $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.

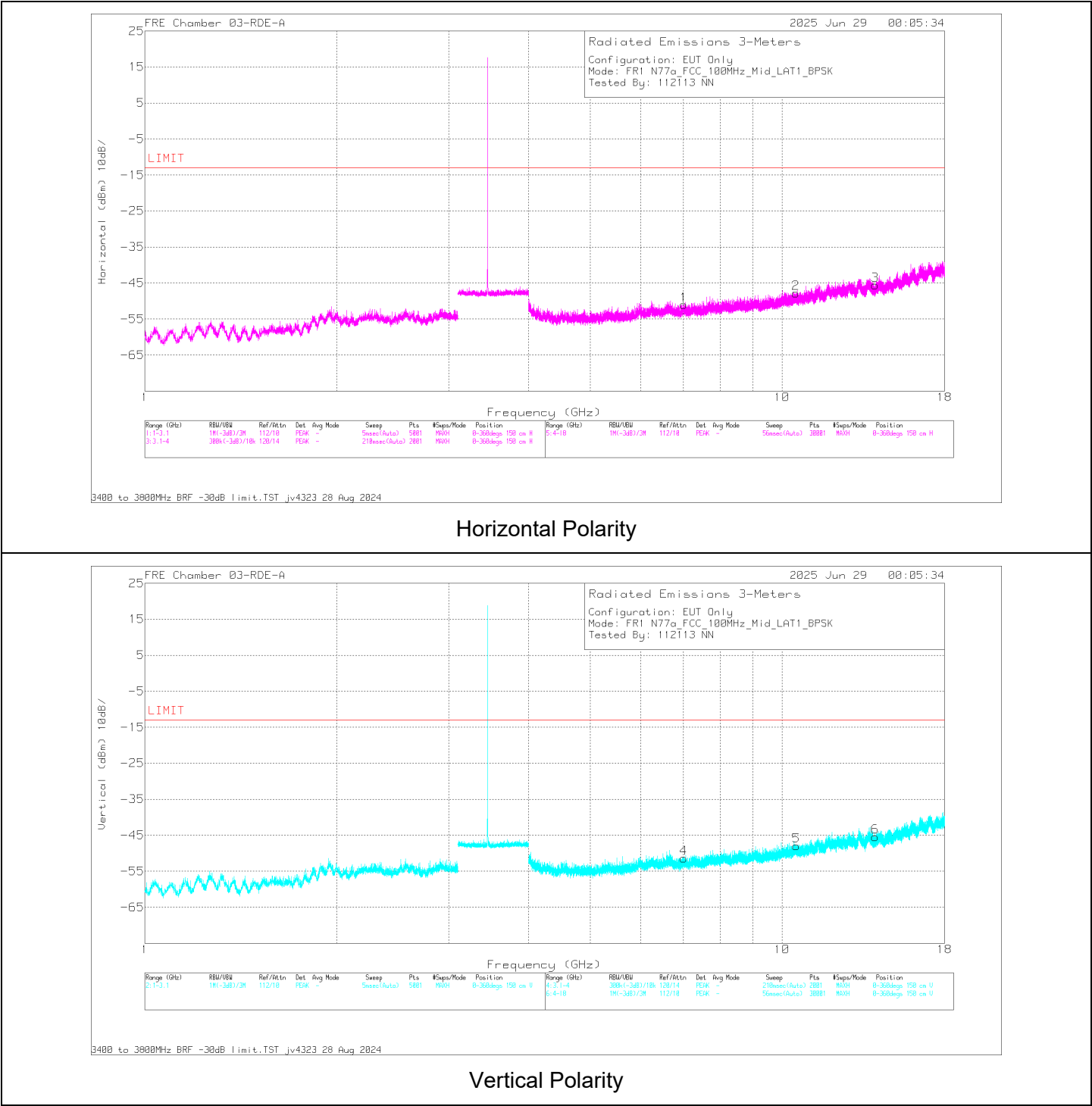
So, from d)

The measuring distance is usually at 3m, then $20 \cdot \log(3) = 9.5424$

Then, $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 9.5424 - 104.8 = E \text{ (dB}\mu\text{V/m)} - 95.2576$

Note: Confidence check of each chamber is performed daily to see if any degradation from expected/normal reading reference data. Ambient check of each chamber is performed monthly.

Example Plot



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	226673 ACF (dB/m)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT (dBm)	Margin (dB)	Polarity
4	7.014669	53.60	Pk	35.8	-95.2	-45.60	-51.40	-13	-38.40	V
1	7.018402	53.89	Pk	35.8	-95.2	-45.56	-51.07	-13	-38.07	H
2	10.509071	54.73	Pk	37.6	-95.2	-45.00	-47.87	-13	-34.87	H
5	10.528205	54.37	Pk	37.6	-95.2	-44.70	-47.93	-13	-34.93	V
3	14.003940	53.57	Pk	39.0	-95.2	-42.91	-45.54	-13	-32.54	H
6	14.009540	53.72	Pk	39.0	-95.2	-43.00	-45.48	-13	-32.48	V

10.1. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz

TEST PROCEDURE

KDB 971168 D01 /D02

All tests above 1GHz were done with a Resolution Bandwidth of 1MHz, and a Video Bandwidth of 3MHz

RESULTS

10.1.1. 5G NR n77 (FCC Part 27 3450-3550MHz)

BPSK 5G NR n77 (100.0MHZ BANDWIDTH, ANT 7)

Project #:	15496277
Date:	2025-06-29
Test Engineer:	112113
Configuration:	EUT Only
Mode	5G NR n77 BPSK 100MHz
Chamber #:	03-RDE-A

Frequency (GHz)	Meter Reading (dBuV)	Det	226673 ACF (dBm)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT (dBm)	Margin (dB)	Polarity
Mid Channel, 3500MHz									
7.014669	53.60	Pk	35.8	-95.2	-45.6	-51.40	-13	-38.40	V
7.018402	53.89	Pk	35.8	-95.2	-45.56	-51.07	-13	-38.07	H
10.509071	54.73	Pk	37.6	-95.2	-45.00	-47.87	-13	-34.87	H
10.528205	54.37	Pk	37.6	-95.2	-44.70	-47.93	-13	-34.93	V
14.003940	53.57	Pk	39.0	-95.2	-42.91	-45.54	-13	-32.54	H
14.009540	53.72	Pk	39.0	-95.2	-43.00	-45.48	-13	-32.48	V

BPSK 5G NR n77 (100.0MHZ BANDWIDTH, ANT 8)

Project #:	15496277
Date:	2025-06-29
Test Engineer:	112113
Configuration:	EUT Only
Mode	5G NR n77 BPSK 100MHz
Chamber #:	03-RDE-A

Frequency (GHz)	Meter Reading (dBuV)	Det	226673 ACF (dBm)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT (dBm)	Margin (dB)	Polarity
Mid Channel, 3500MHz									
7.014202	54.18	Pk	35.8	-95.2	-45.6	-50.82	-13	-37.82	H
7.032869	54.98	Pk	35.8	-95.2	-45.5	-49.92	-13	-36.92	V
10.447471	55.08	Pk	37.6	-95.2	-45.05	-47.57	-13	-34.57	V
10.484805	55.09	Pk	37.6	-95.2	-45.10	-47.61	-13	-34.61	H
14.013274	53.36	Pk	39.0	-95.2	-43.00	-45.84	-13	-32.84	H
14.018407	54.02	Pk	39.0	-95.2	-42.86	-45.04	-13	-32.04	V

BPSK 5G NR n77 (100.0MHZ BANDWIDTH, ANT 9)

Project #:	15496277
Date:	2025-06-29
Test Engineer:	112113
Configuration:	EUT Only
Mode	5G NR n77 BPSK 100MHz
Chamber #:	03-RDE-A

Frequency (GHz)	Meter Reading (dBuV)	Det	226673 ACF (dBm)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT (dBm)	Margin (dB)	Polarity
Mid Channel, 3500MHz									
7.010002	54.70	Pk	35.8	-95.2	-45.50	-50.20	-13	-37.20	V
7.028669	53.79	Pk	35.8	-95.2	-45.50	-51.11	-13	-38.11	H
10.526805	56.11	Pk	37.6	-95.2	-44.70	-46.19	-13	-33.19	H
10.536138	54.92	Pk	37.6	-95.2	-44.60	-47.28	-13	-34.28	V
14.004874	54.31	Pk	39.0	-95.2	-42.99	-44.88	-13	-31.88	H
14.034741	53.76	Pk	39.0	-95.2	-43.00	-45.44	-13	-32.44	V

BPSK 5G NR n77 (100.0MHZ BANDWIDTH, ANT 4)

Project #:	15496277
Date:	2025-06-29
Test Engineer:	112113
Configuration:	EUT Only
Mode	5G NR n77 BPSK 100MHz
Chamber #:	03-RDE-A

Frequency (GHz)	Meter Reading (dBuV)	Det	226673 ACF (dBm)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT (dBm)	Margin (dB)	Polarity
Mid Channel, 3500MHz									
6.988069	53.73	Pk	35.8	-95.2	-45.60	-51.27	-13	-38.27	V
6.997869	54.50	Pk	35.8	-95.2	-45.50	-50.40	-13	-37.40	H
10.496471	54.49	Pk	37.6	-95.2	-45.00	-48.11	-13	-35.11	V
10.519338	55.49	Pk	37.6	-95.2	-44.87	-46.98	-13	-33.98	H
13.997874	53.74	Pk	39.0	-95.2	-42.90	-45.36	-13	-32.36	V
14.009074	53.59	Pk	39.0	-95.2	-43.00	-45.61	-13	-32.61	H

10.1.2. 5G NR n77 (FCC Part 27 3700-3980MHz)

BPSK 5G NR n77 (100.0MHZ BANDWIDTH, ANT 7)

Project #:	15496277
Date:	2025-05-02
Test Engineer:	32934
Configuration:	EUT Only
Mode	5G NR n77 BPSK 100MHz
Chamber #:	05-RDE-B

Frequency (GHz)	Meter Reading (dBuV)	Det	223084 ACF (dBm)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT (dBm)	Margin (dB)	Polarity
Low Channel, 3750MHz									
7.454124	55.57	Pk	35.7	-95.2	-47.60	-51.53	-13	-38.53	V
7.515865	55.92	Pk	35.7	-95.2	-48.00	-51.58	-13	-38.58	H
11.104085	61.15	Pk	37.9	-95.2	-46.49	-42.64	-13	-29.64	H
11.104087	64.19	Pk	37.9	-95.2	-46.49	-39.60	-13	-26.60	V
14.971863	55.29	Pk	39.7	-95.2	-45.50	-45.71	-13	-32.71	V
15.010899	55.07	Pk	39.6	-95.2	-45.20	-45.73	-13	-32.73	H
Mid Channel, 3840MHz									
7.659265	56.50	Pk	35.8	-95.2	-46.90	-49.80	-13	-36.80	V
7.683165	55.79	Pk	35.8	-95.2	-47.10	-50.71	-13	-37.71	H
11.373863	60.34	Pk	38.1	-95.2	-46.10	-42.86	-13	-29.86	H
11.374130	62.70	Pk	38.1	-95.2	-46.10	-40.50	-13	-27.50	V
15.337532	55.89	Pk	39.9	-95.2	-45.45	-44.86	-13	-31.86	V
15.360237	54.82	Pk	39.9	-95.2	-45.08	-45.56	-13	-32.56	H
High Channel, 3930MHz									
7.867992	55.55	Pk	35.9	-95.2	-47.40	-51.15	-13	-38.15	H
7.869585	56.25	Pk	35.9	-95.2	-47.46	-50.51	-13	-37.51	V
11.624272	53.82	Pk	38.4	-95.2	-45.73	-48.71	-13	-35.71	V
11.644013	57.20	Pk	38.4	-95.2	-46.00	-45.60	-13	-32.60	H
15.752197	53.97	Pk	40.4	-95.2	-44.98	-45.81	-13	-32.81	V
15.760164	54.64	Pk	40.4	-95.2	-44.80	-44.96	-13	-31.96	H

BPSK 5G NR n77 (100.0MHZ BANDWIDTH, ANT 8)

Project #:	15496277
Date:	2025-05-11
Test Engineer:	32933
Configuration:	EUT Only
Mode	5G NR n77 BPSK 100MHz
Chamber #:	04-RDE-P

Frequency (GHz)	Meter Reading (dBuV)	Det	2000897 ACF (dBm)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT (dBm)	Margin (dB)	Polarity
Low Channel, 3750MHz									
7.499932	53.76	Pk	35.7	-95.2	-47.90	-53.64	-13	-40.64	H
7.499932	54.66	Pk	35.7	-95.2	-47.90	-52.74	-13	-39.74	V
11.250237	51.25	Pk	38.0	-95.2	-46.10	-52.05	-13	-39.05	H
11.250237	53.15	Pk	38.0	-95.2	-46.10	-50.15	-13	-37.15	V
15.000543	53.23	Pk	39.6	-95.2	-45.35	-47.72	-13	-34.72	H
15.000543	54.21	Pk	39.6	-95.2	-45.35	-46.74	-13	-33.74	V
Mid Channel, 3840MHz									
7.509094	55.30	Pk	35.7	-95.2	-46.90	-51.10	-13	-38.10	H
7.504314	56.07	Pk	35.7	-95.2	-46.89	-50.32	-13	-37.32	V
11.219167	54.75	Pk	37.9	-95.2	-44.69	-47.24	-13	-34.24	H
11.237092	54.73	Pk	37.9	-95.2	-44.72	-47.29	-13	-34.29	V
14.980228	55.46	Pk	39.6	-95.2	-45.31	-45.45	-13	-32.45	H
14.990983	55.43	Pk	39.6	-95.2	-45.27	-45.44	-13	-32.44	V
High Channel, 3930MHz									
7.862813	55.32	Pk	35.9	-95.2	-47.05	-51.03	-13	-38.03	H
7.852855	55.67	Pk	35.8	-95.2	-46.98	-50.71	-13	-37.71	V
11.804717	54.01	Pk	38.6	-95.2	-44.90	-47.49	-13	-34.49	H
11.799937	53.75	Pk	38.6	-95.2	-44.87	-47.72	-13	-34.72	V
15.726305	55.17	Pk	40.4	-95.2	-45.20	-44.83	-13	-31.83	H
15.735865	55.32	Pk	40.4	-95.2	-45.27	-44.75	-13	-31.75	V

BPSK 5G NR n77 (100.0MHZ BANDWIDTH, ANT 9)

Project #:	15496277
Date:	2025-04-11
Test Engineer:	32933
Configuration:	EUT Only
Mode	5G NR n77 BPSK 100MHz
Chamber #:	04-RDE-P

Frequency (GHz)	Meter Reading (dBuV)	Det	200897 ACF (dBm)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT (dBm)	Margin (dB)	Polarity
Low Channel, 3750MHz									
7.512280	55.96	Pk	35.7	-95.2	-46.93	-50.47	-13	-37.47	H
7.511484	54.59	Pk	35.7	-95.2	-46.92	-51.83	-13	-38.83	V
11.205624	53.20	Pk	37.9	-95.2	-44.63	-48.73	-13	-35.73	H
11.205624	54.11	Pk	37.9	-95.2	-44.63	-47.82	-13	-34.82	V
14.977041	56.11	Pk	39.6	-95.2	-45.32	-44.81	-13	-31.81	H
14.979033	55.33	Pk	39.6	-95.2	-45.30	-45.57	-13	-32.57	V
Mid Channel, 3840MHz									
7.327454	55.75	Pk	35.7	-95.2	-47.28	-51.03	-13	-38.03	H
7.307936	56.47	Pk	35.7	-95.2	-47.07	-50.10	-13	-37.10	V
10.793349	55.73	Pk	37.7	-95.2	-45.34	-47.11	-13	-34.11	H
10.818444	54.79	Pk	37.7	-95.2	-44.96	-47.67	-13	-34.67	V
14.260838	55.87	Pk	39.1	-95.2	-45.97	-46.20	-13	-33.20	H
14.271195	55.59	Pk	39.1	-95.2	-45.99	-46.50	-13	-33.5	V
High Channel, 3930MHz									
7.845685	55.60	Pk	35.8	-95.2	-46.96	-50.76	-13	-37.76	H
7.858432	55.74	Pk	35.8	-95.2	-47.03	-50.69	-13	-37.69	V
11.780020	54.95	Pk	38.5	-95.2	-45.01	-46.76	-13	-33.76	H
11.800734	54.06	Pk	38.6	-95.2	-44.86	-47.40	-13	-34.40	V
15.726305	56.16	Pk	40.4	-95.2	-45.20	-43.84	-13	-30.84	H
15.739450	56.24	Pk	40.4	-95.2	-45.26	-43.82	-13	-30.82	V

BPSK 5G NR n77 (100.0MHZ BANDWIDTH, ANT 4)

Project #:	15496277
Date:	2025-04-11
Test Engineer:	45258
Configuration:	EUT Only
Mode	5G NR n77 BPSK 100MHz
Chamber #:	04-RDE-P

Frequency (GHz)	Meter Reading (dBuV)	Det	200897 ACF (dBm)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT (dBm)	Margin (dB)	Polarity
Low Channel, 3750MHz									
7.500330	54.77	Pk	35.7	-95.2	-46.85	-51.58	-13	-38.58	V
7.501127	56.27	Pk	35.7	-95.2	-46.86	-50.09	-13	-37.09	H
11.251034	52.66	Pk	37.9	-95.2	-44.65	-49.29	-13	-36.29	H
11.251432	52.38	Pk	37.9	-95.2	-44.65	-49.57	-13	-36.57	V
14.999348	53.86	Pk	39.6	-95.2	-45.27	-47.01	-13	-34.01	V
14.999746	54.03	Pk	39.6	-95.2	-45.27	-46.84	-13	-33.84	H
Mid Channel, 3840MHz									
7.679580	55.08	Pk	35.8	-95.2	-46.94	-51.26	-13	-38.26	H
7.680377	53.68	Pk	35.8	-95.2	-46.93	-52.65	-13	-39.65	V
11.519510	52.80	Pk	38.2	-95.2	-44.80	-49.00	-13	-36.00	H
11.520307	52.82	Pk	38.2	-95.2	-44.80	-48.98	-13	-35.98	V
15.359441	53.69	Pk	40.0	-95.2	-44.94	-46.45	-13	-33.45	H
15.359839	54.06	Pk	40.0	-95.2	-44.95	-46.09	-13	-33.09	V
High Channel, 3930MHz									
7.859627	54.63	Pk	35.8	-95.2	-47.05	-51.82	-13	-38.82	V
7.860423	54.34	Pk	35.8	-95.2	-47.05	-52.11	-13	-39.11	H
11.791572	52.69	Pk	38.5	-95.2	-44.97	-48.98	-13	-35.98	H
11.791572	52.25	Pk	38.5	-95.2	-44.97	-49.42	-13	-36.42	V
15.720330	53.81	Pk	40.4	-95.2	-45.14	-46.13	-13	-33.13	H
15.720330	54.07	Pk	40.4	-95.2	-45.14	-45.87	-13	-32.87	V

11. SETUP PHOTOS

Refer to 15496277-EP1 for setup photos.

END OF REPORT