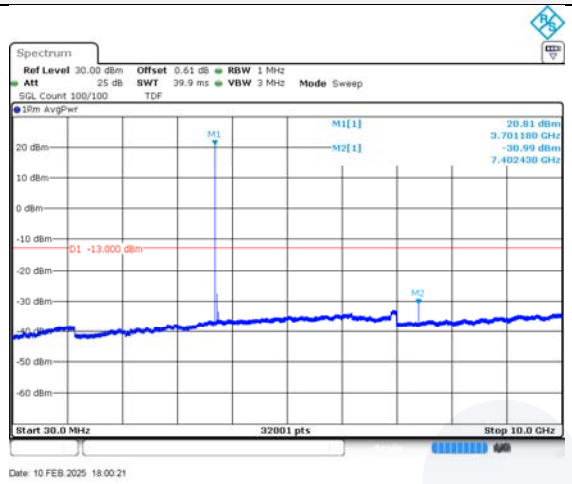
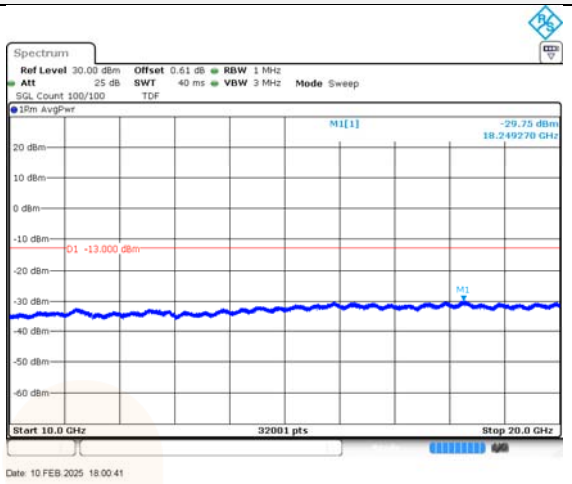
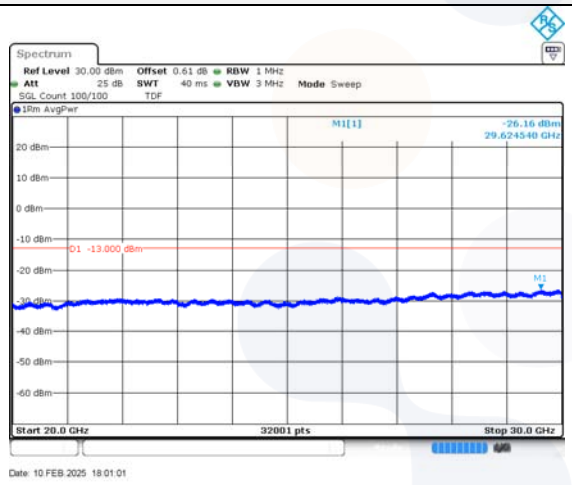
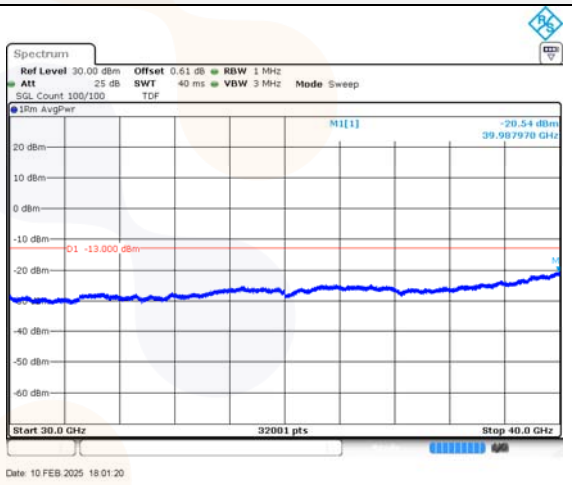
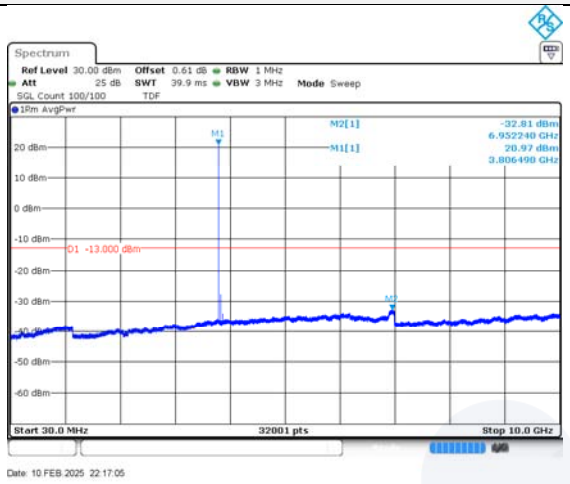
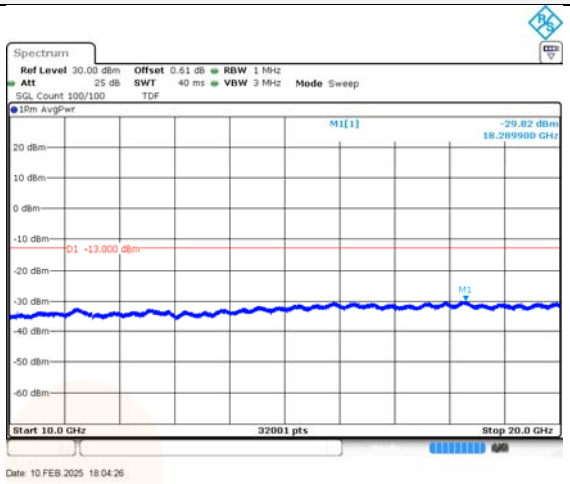
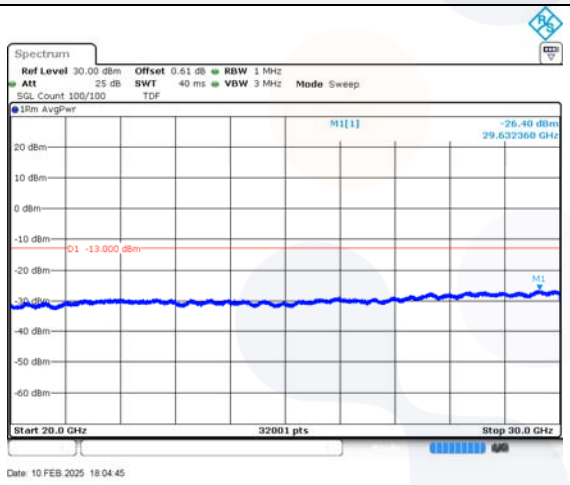
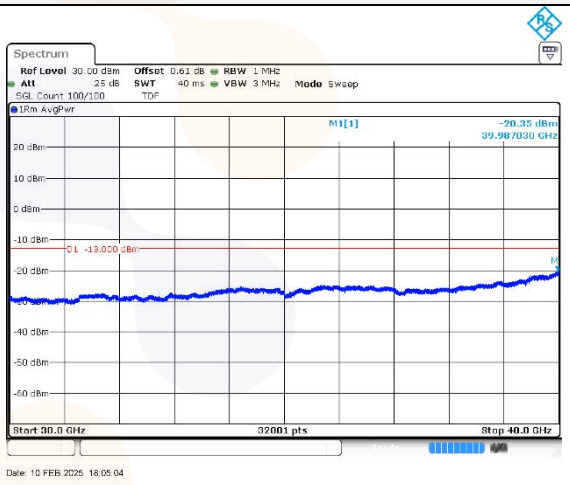
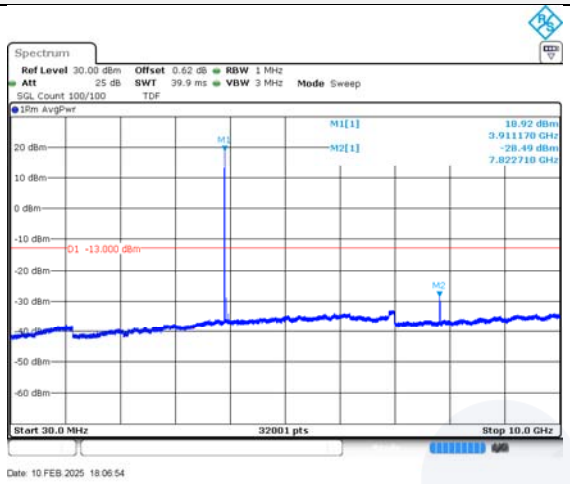
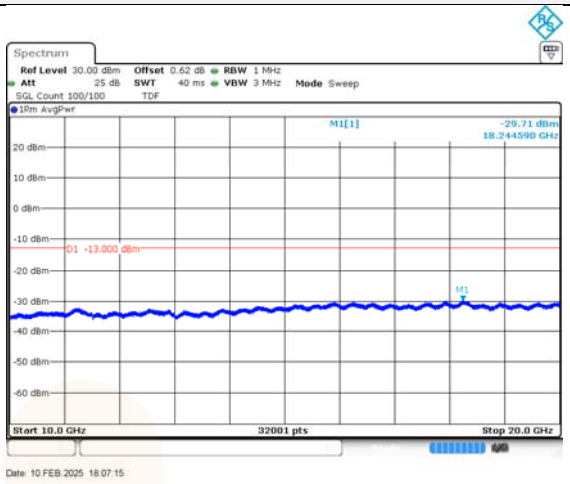
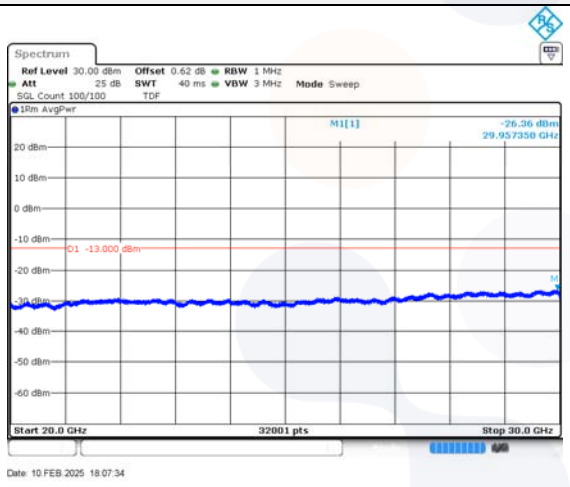
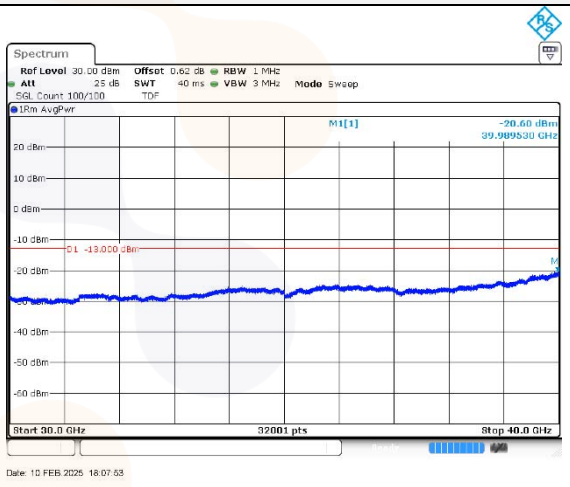
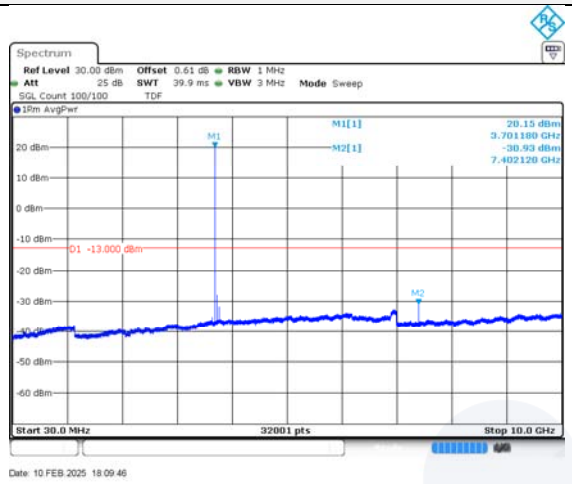
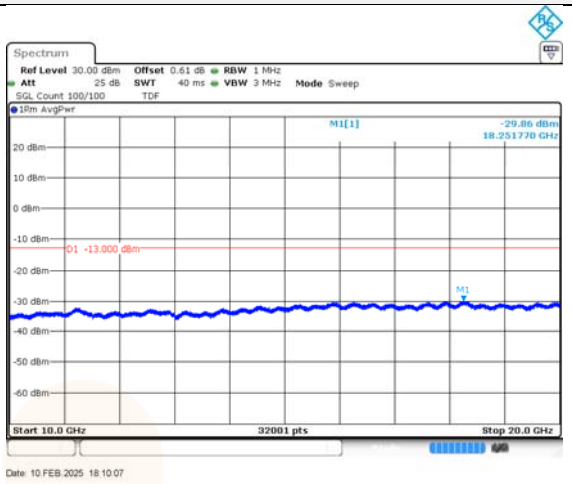
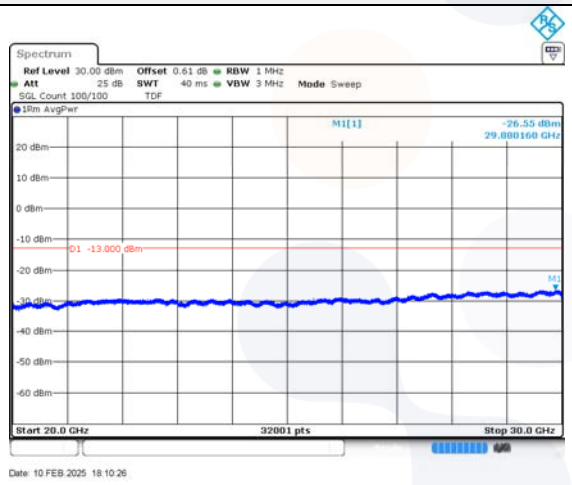
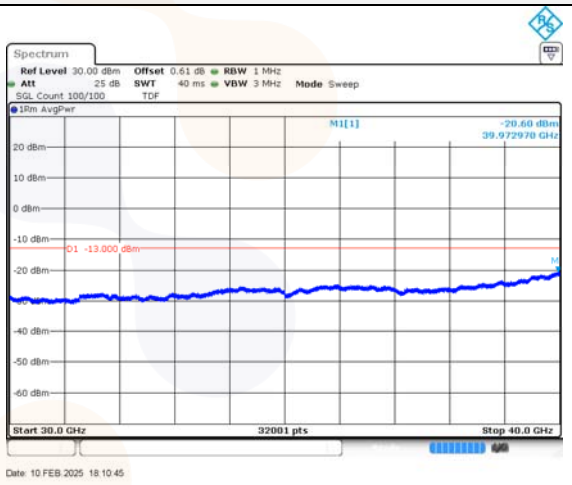
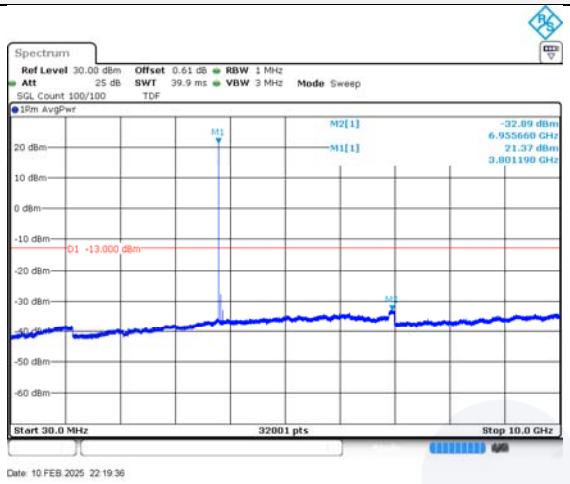
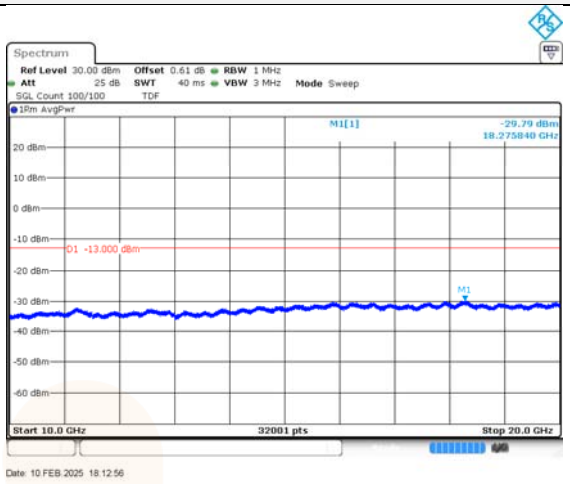
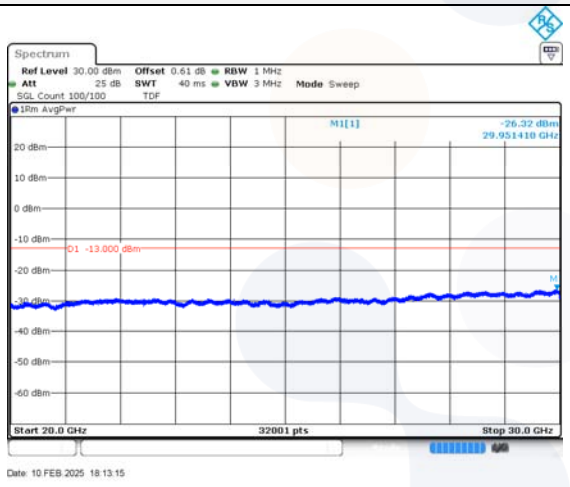
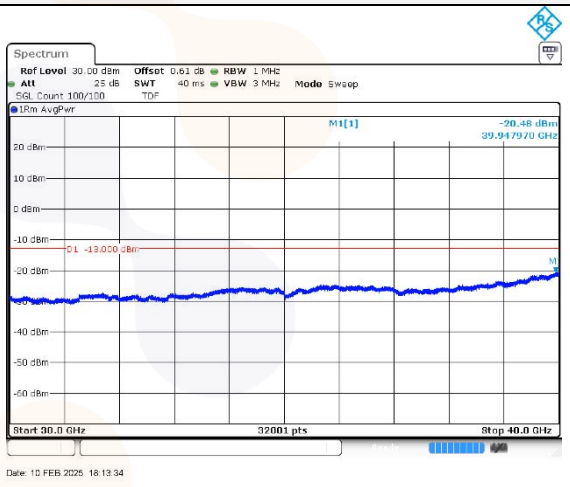
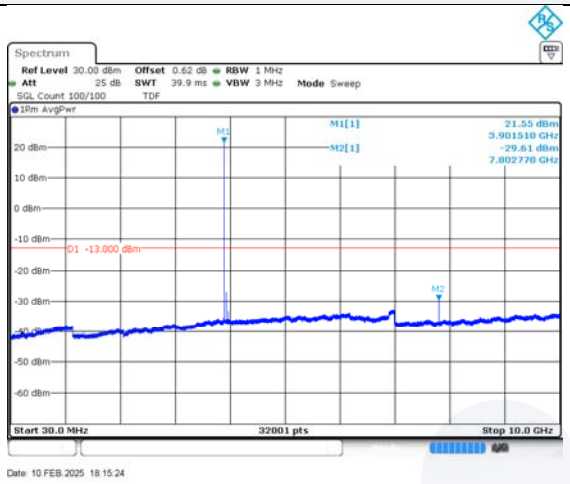
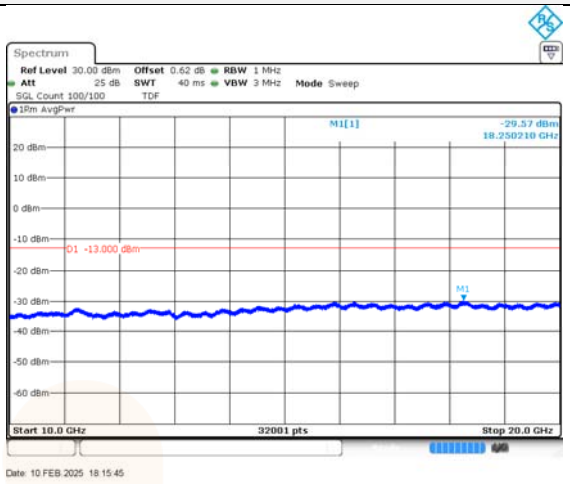
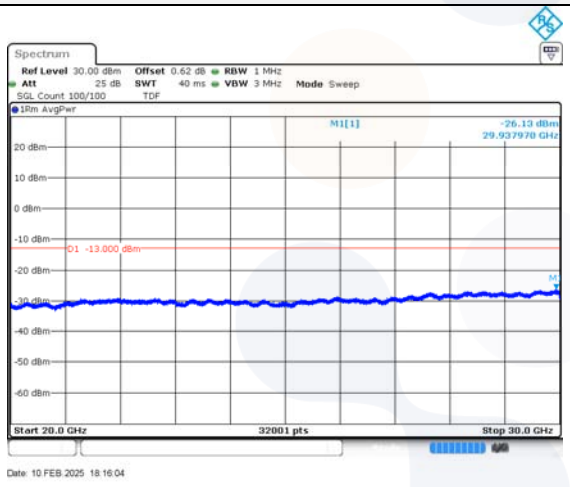
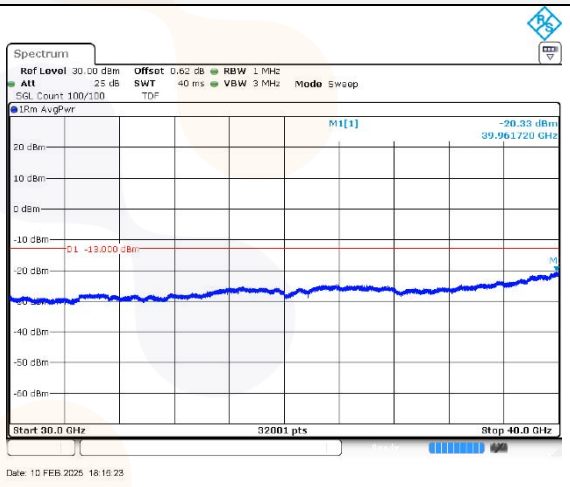
70M BW QPSK	
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (10 ㎓ ~ 20 ㎓)**
	
Low channel (20 ㎓ ~ 30 ㎓)	**Low channel (30 ㎓ ~ 40 ㎓)**
	

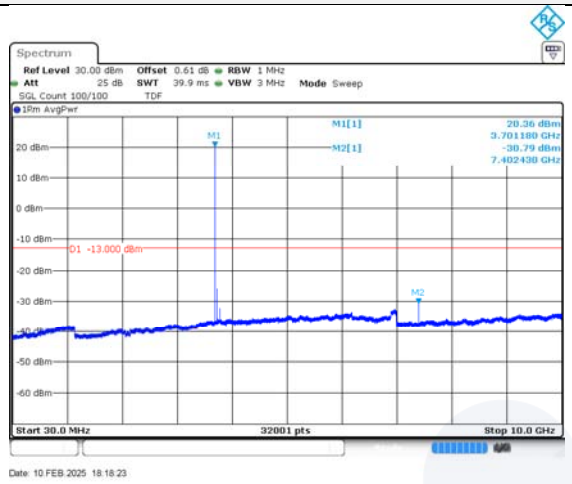
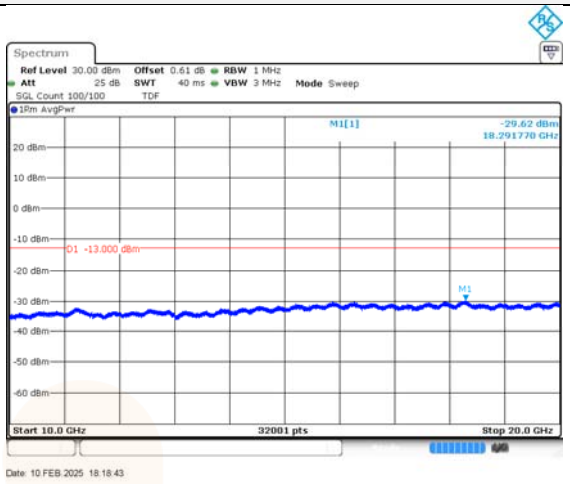
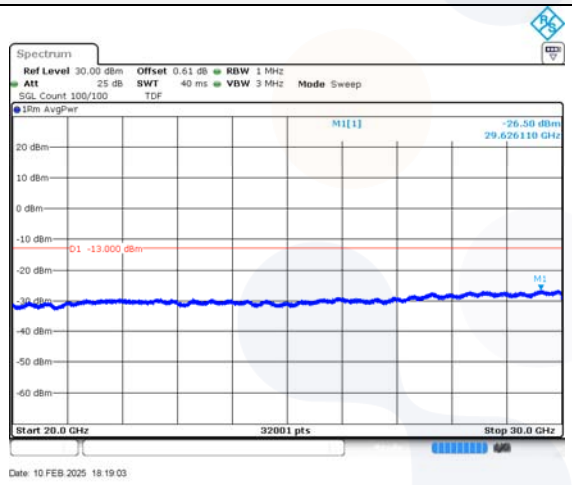
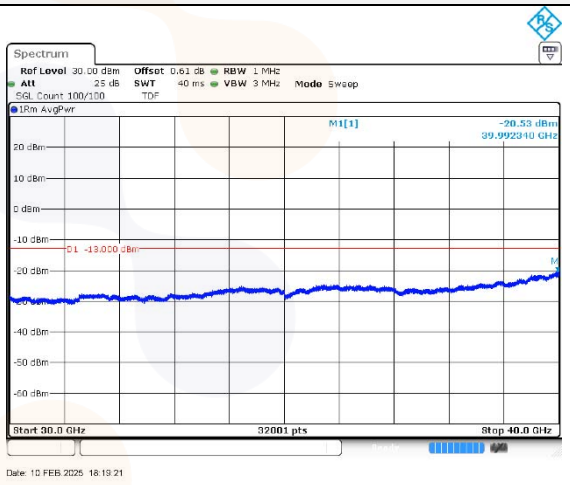
70M BW QPSK	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (10 ㎓ ~ 20 ㎓)**
	
Middle channel (20 ㎓ ~ 30 ㎓)	**Middle channel (30 ㎓ ~ 40 ㎓)**
	

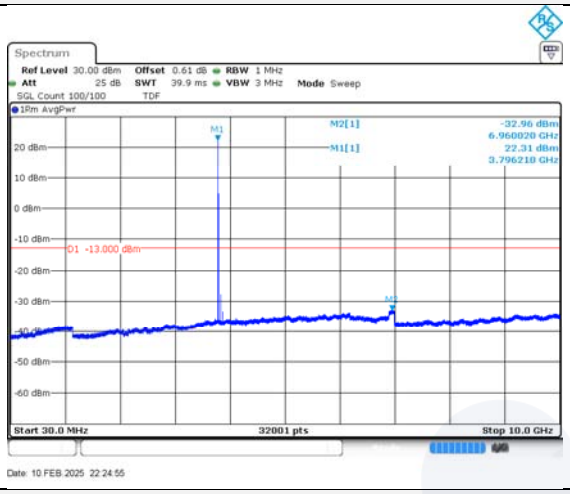
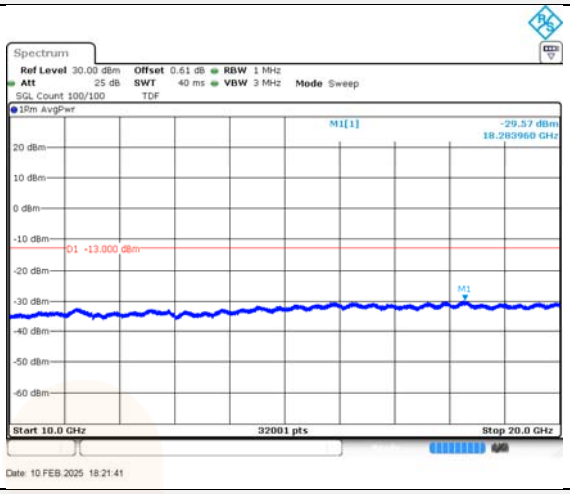
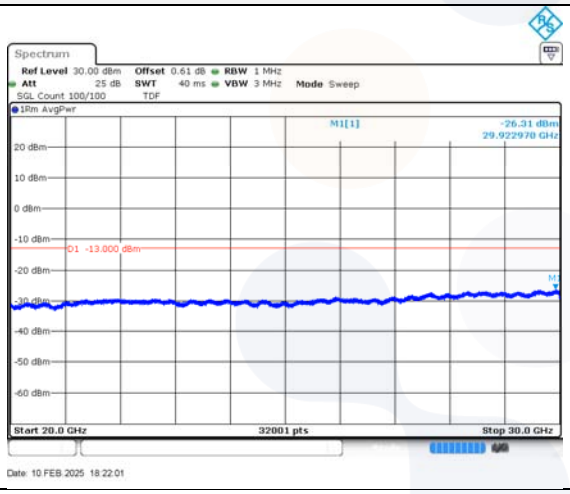
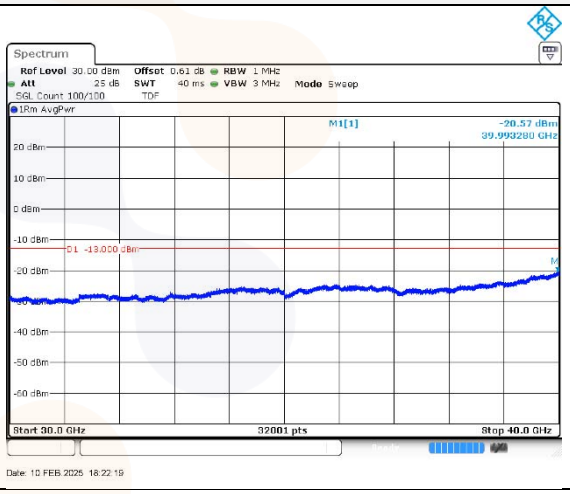
70M BW QPSK	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (10 ㎓ ~ 20 ㎓)**
	
High channel (20 ㎓ ~ 30 ㎓)	**High channel (30 ㎓ ~ 40 ㎓)**
	

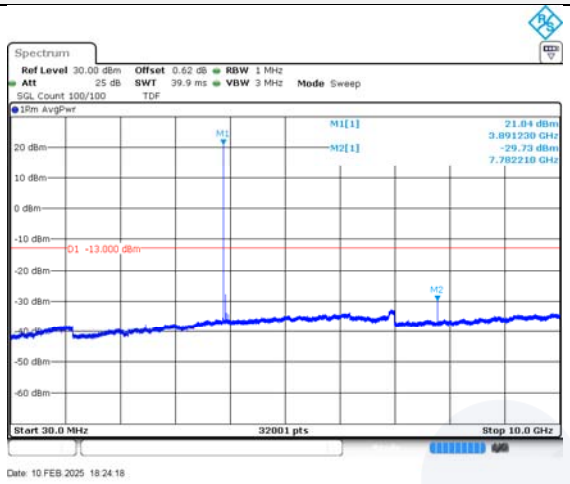
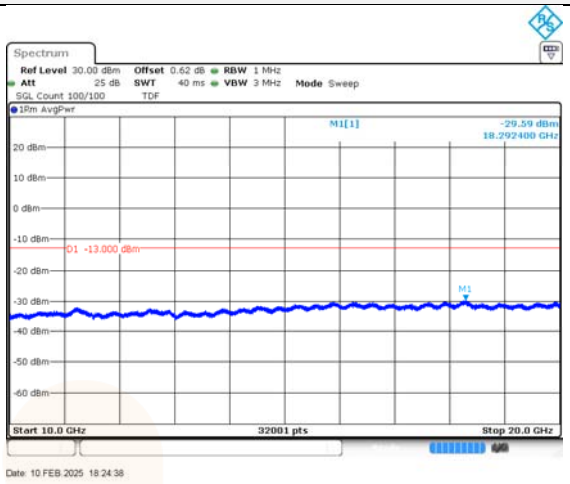
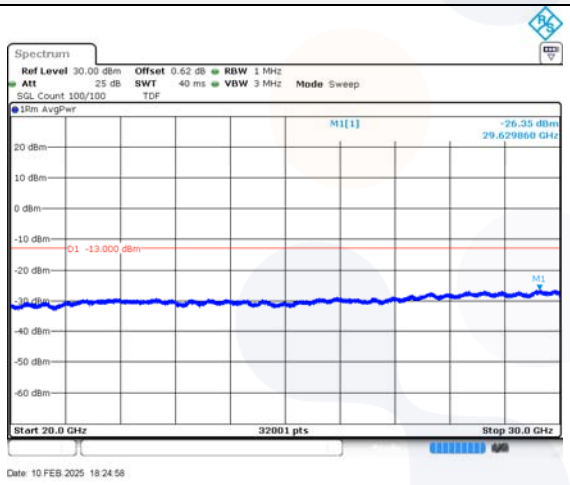
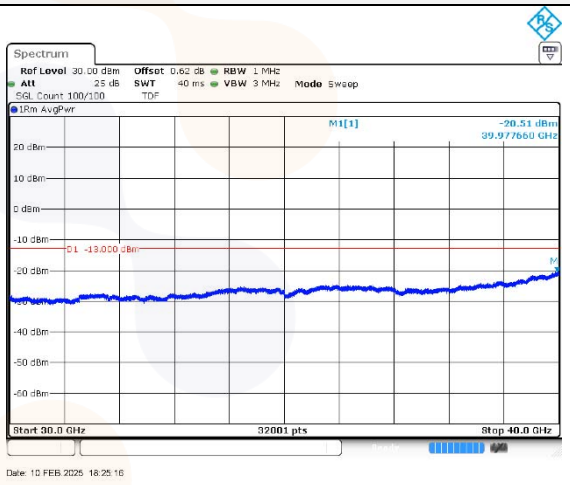
80M BW QPSK	
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (10 ㎓ ~ 20 ㎓)**
	
Low channel (20 ㎓ ~ 30 ㎓)	**Low channel (30 ㎓ ~ 40 ㎓)**
	

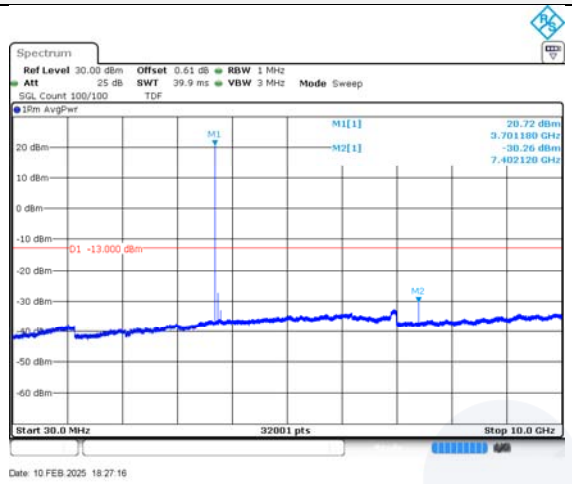
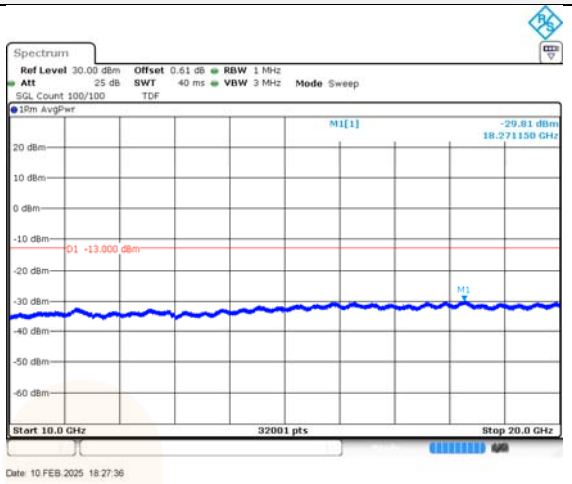
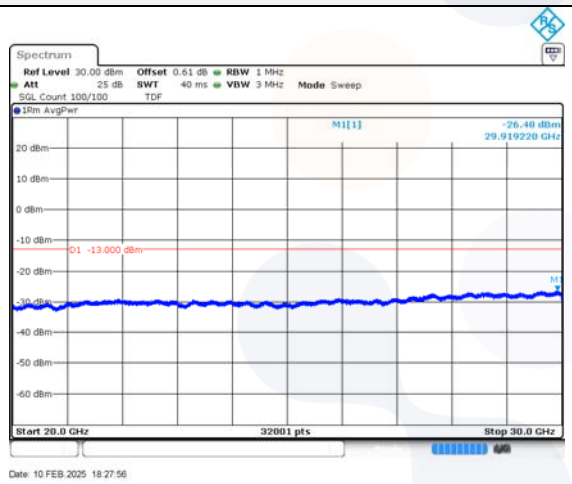
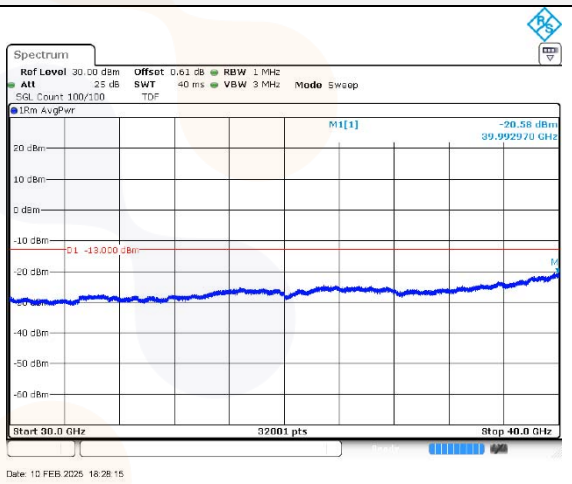
80M BW QPSK	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (10 ㎓ ~ 20 ㎓)**
	
Middle channel (20 ㎓ ~ 30 ㎓)	**Middle channel (30 ㎓ ~ 40 ㎓)**
	

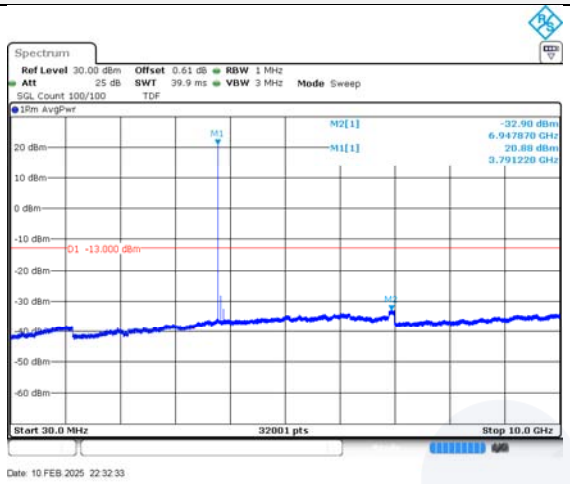
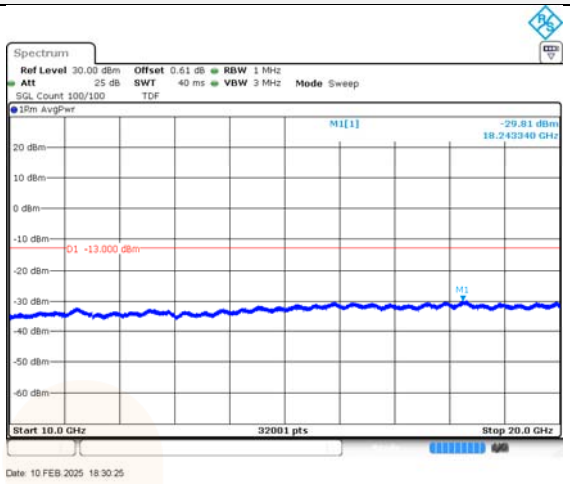
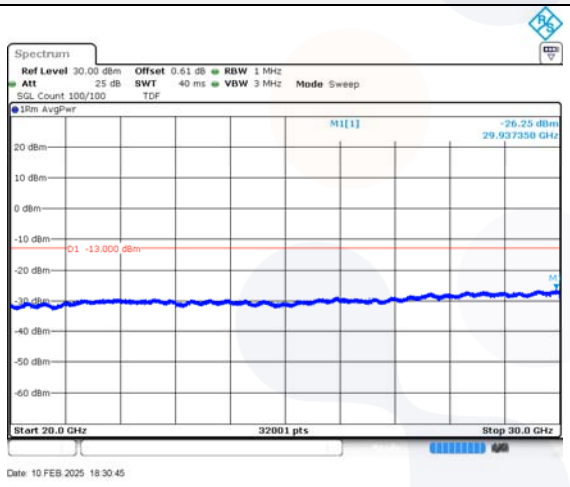
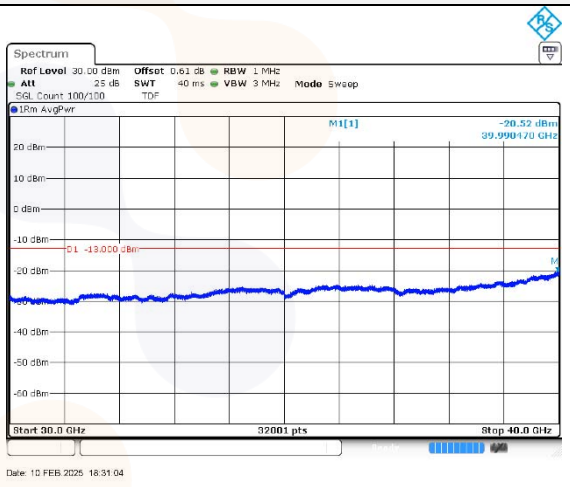
80M BW QPSK	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (10 ㎓ ~ 20 ㎓)**
	
High channel (20 ㎓ ~ 30 ㎓)	**High channel (30 ㎓ ~ 40 ㎓)**
	

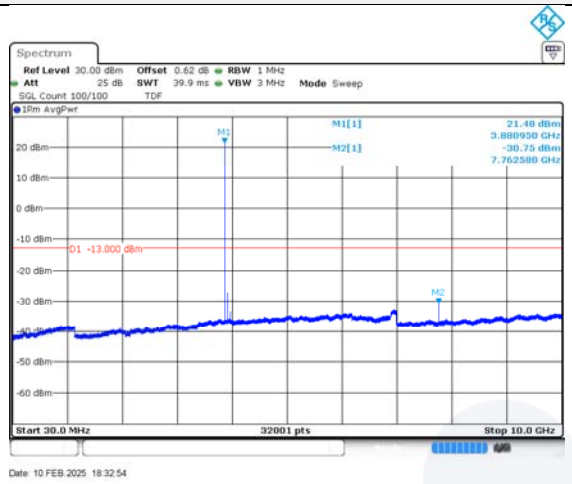
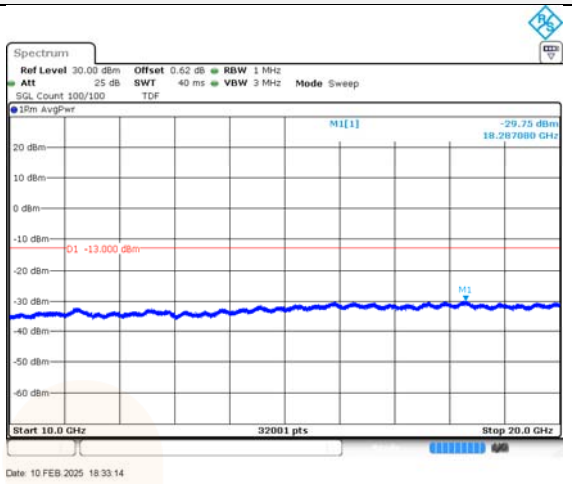
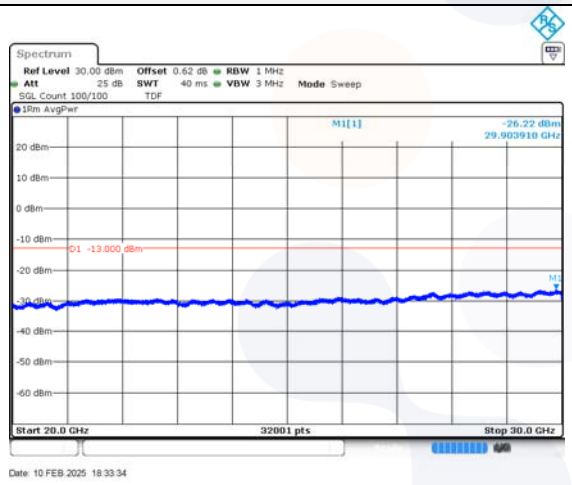
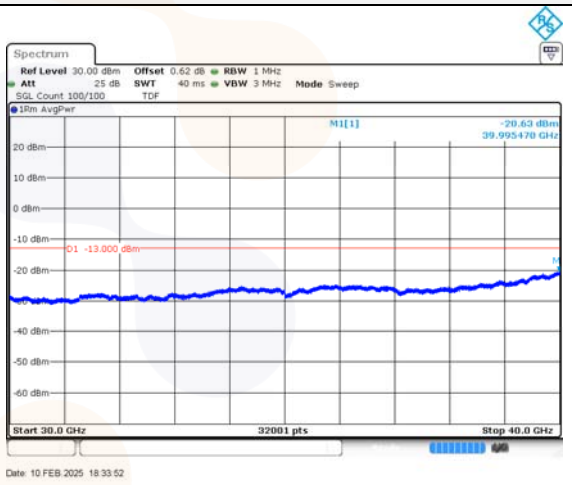
90M BW QPSK	
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (10 ㎓ ~ 20 ㎓)**
	
Low channel (20 ㎓ ~ 30 ㎓)	**Low channel (30 ㎓ ~ 40 ㎓)**
	

90M BW QPSK	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (10 ㎓ ~ 20 ㎓)**
	
Middle channel (20 ㎓ ~ 30 ㎓)	**Middle channel (30 ㎓ ~ 40 ㎓)**
	

90M BW QPSK	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (10 ㎓ ~ 20 ㎓)**
	
High channel (20 ㎓ ~ 30 ㎓)	**High channel (30 ㎓ ~ 40 ㎓)**
	

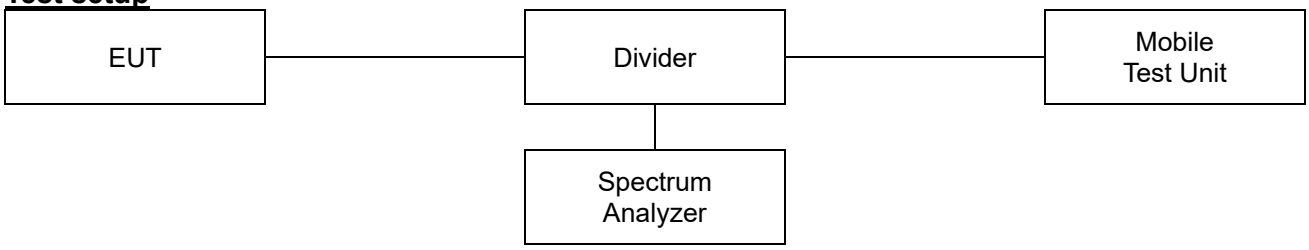
100M BW QPSK	
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (10 ㎓ ~ 20 ㎓)**
	
Low channel (20 ㎓ ~ 30 ㎓)	**Low channel (30 ㎓ ~ 40 ㎓)**
	

100M BW QPSK	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (10 ㎓ ~ 20 ㎓)**
	
Middle channel (20 ㎓ ~ 30 ㎓)	**Middle channel (30 ㎓ ~ 40 ㎓)**
	

100M BW QPSK	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (10 ㎓ ~ 20 ㎓)**
	
High channel (20 ㎓ ~ 30 ㎓)	**High channel (30 ㎓ ~ 40 ㎓)**
	

7.5. Peak to Average Power Ratio (PAPR)

Test setup



Limit

According to §27.50(d),

The peak-to-average ratio(PAR) of the transmission must not exceed 13 dB.

Test procedure

971168 D01 v03r01 - Section 5.7.2 or 5.7.3
ANSI 63.26-2015 – Section 5.2.3.4 or 5.2.6

Test settings

5.2.3.4 Measurement of peak power in a broadband noise-like signal using CCDF

1) Set resolution/measurement bandwidth ≥ OBW or specified reference bandwidth
2) Set the number of counts to a value that stabilizes the measured CCDF curve.
3) Set the measurement interval as follows:
   a) For continuous transmissions, set to the greater of [10 x (number of points in sweep) x (transmission symbol period)] or 1 ms.
   b) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement internal to a time that is less than or equal to the burst duration.
   c) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
4) Record the maximum PAPR level associated with a probability of 0.1%

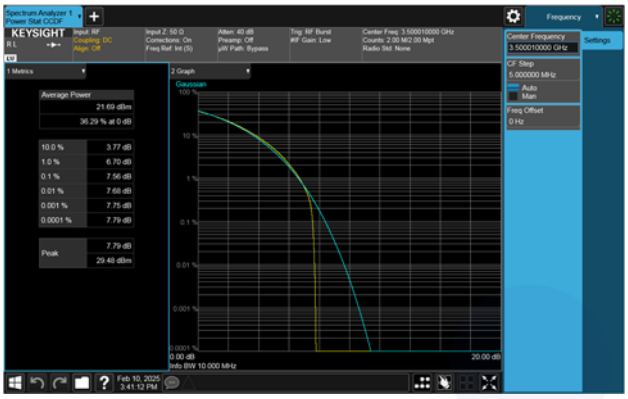
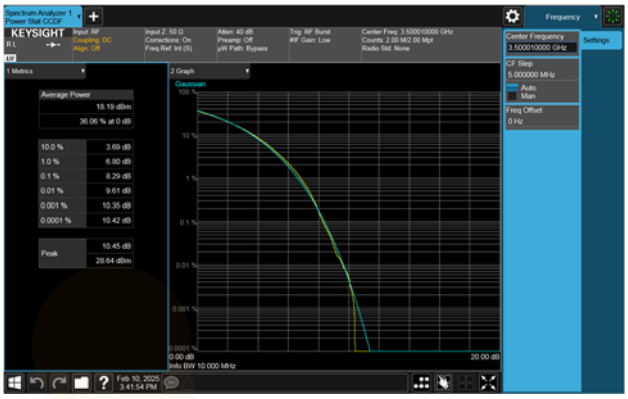
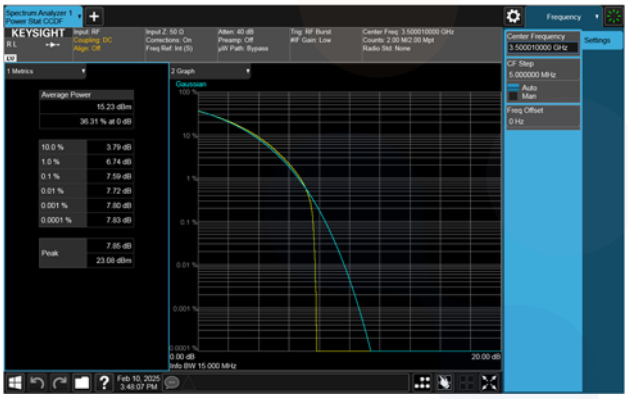
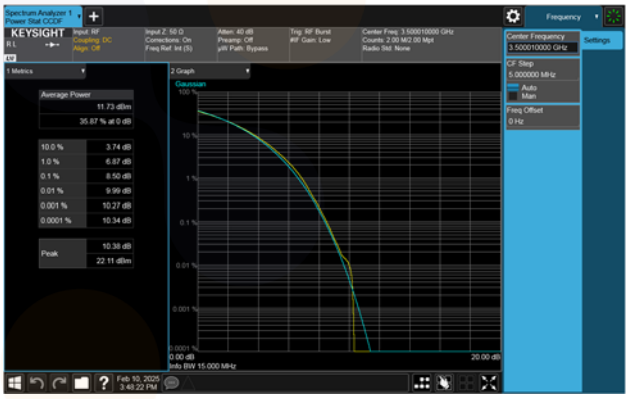
5.2.6 Peak-to-average power ratio

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as P_{PK}.
Use one of the applicable procedure presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{AG}. Determine the P.A.P.R from:

$$PAPR(dB) = P_{PK}(dBm \text{ or } dBW) - P_{AG}(dBm \text{ or } dBW)$$

Test results

Test mode: 5G NR n77/78 (Lower)(PC2) CP OFDM

10M BW QPSK Middle channel	10M BW 256QAM Middle channel
	
15M BW QPSK Middle channel	**15M BW 256QAM Middle channel**
	
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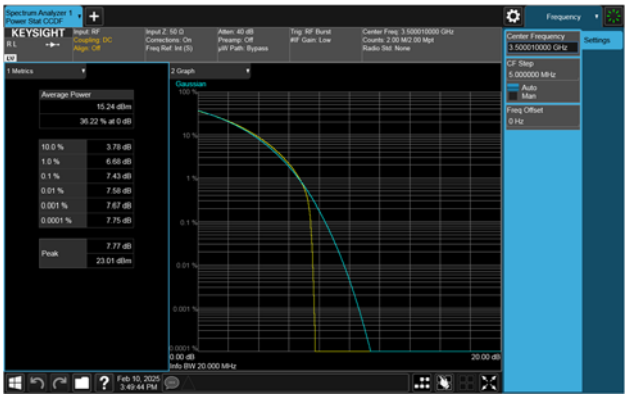	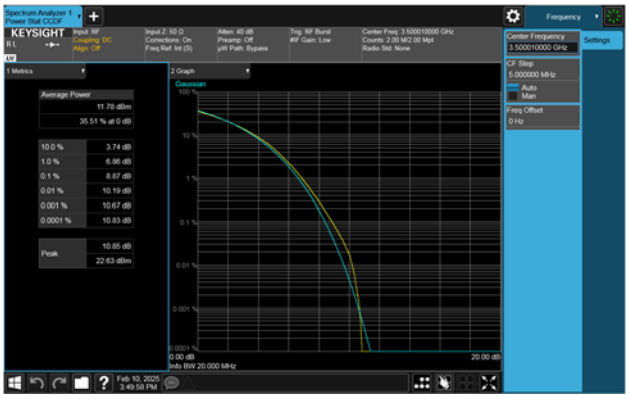

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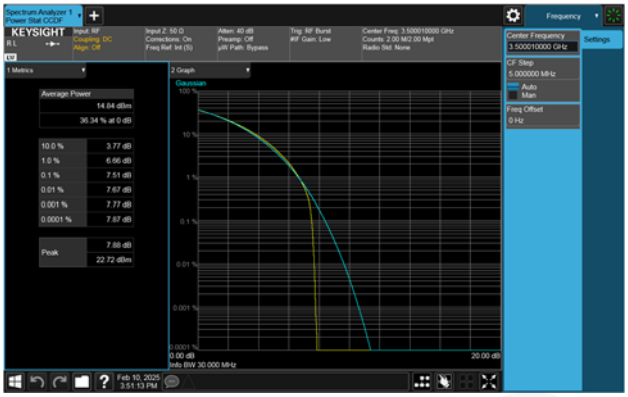	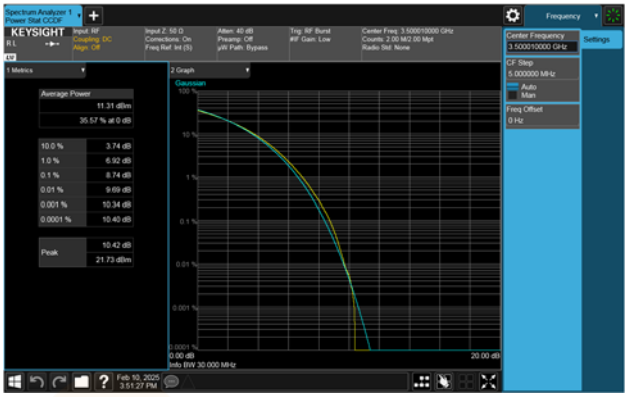
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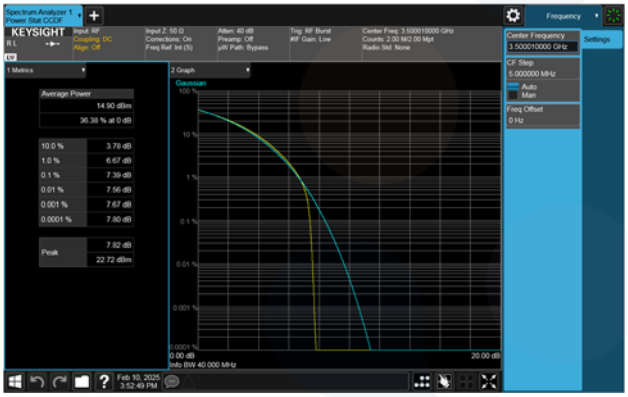
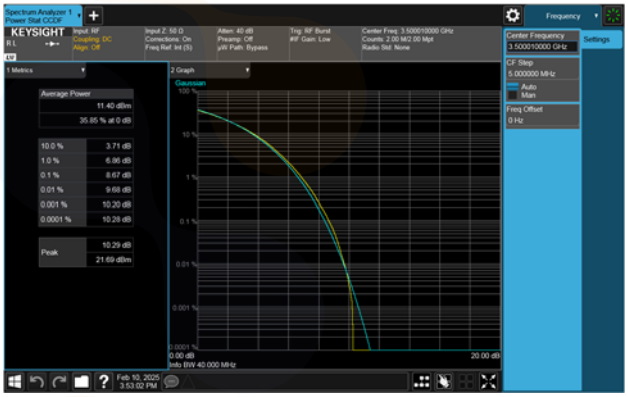
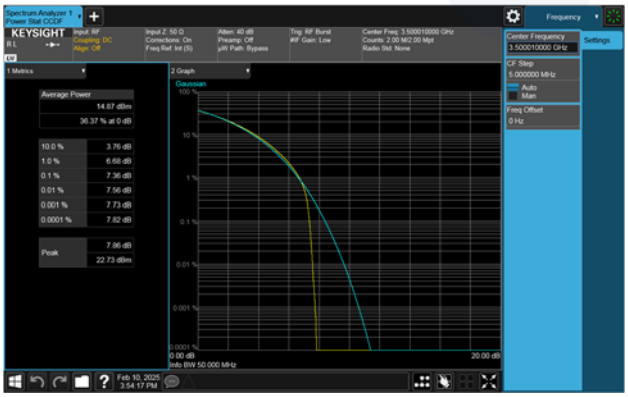
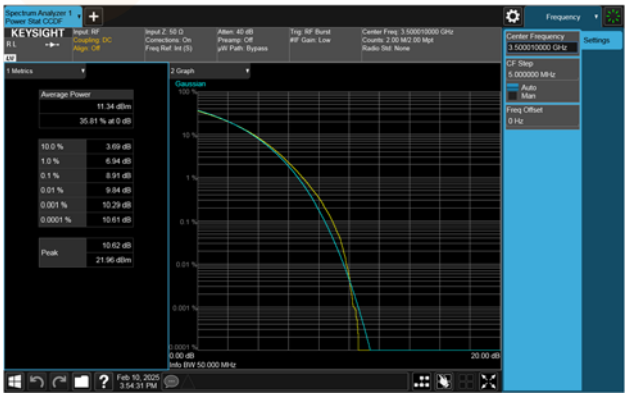
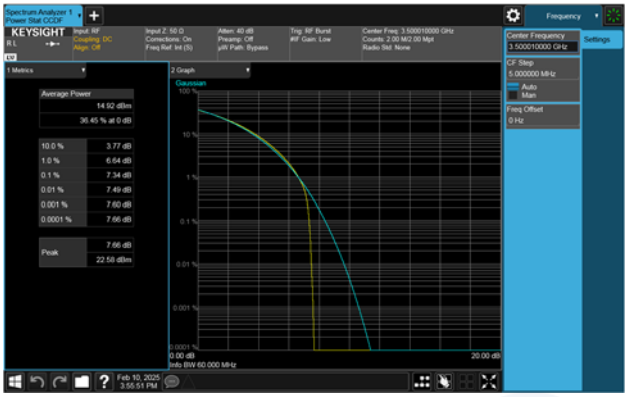
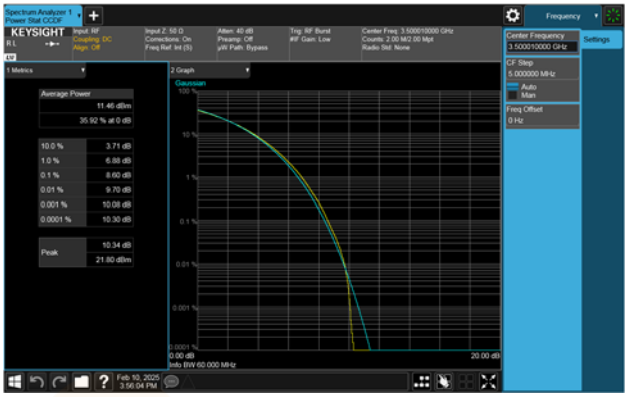
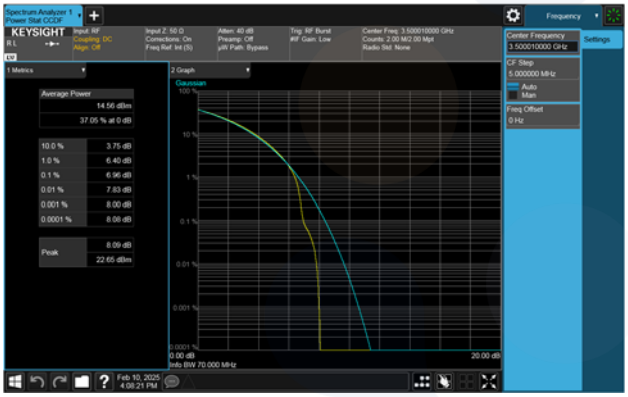
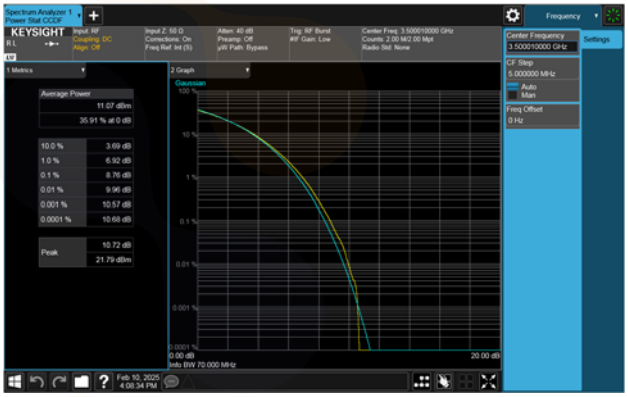
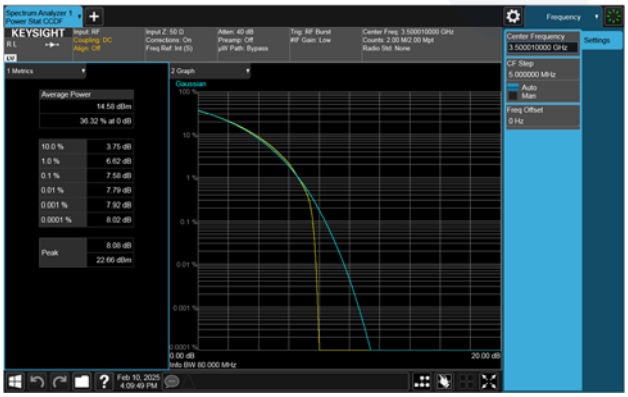
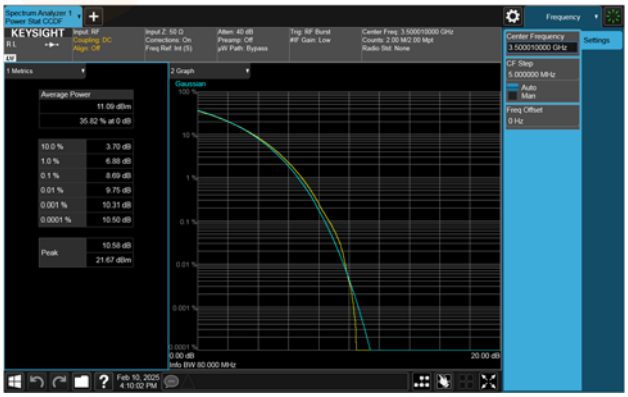
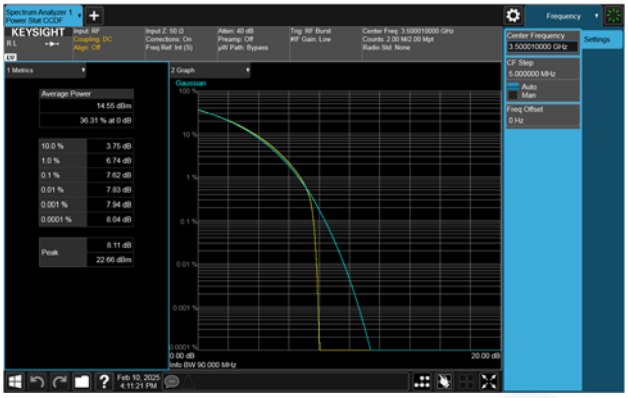
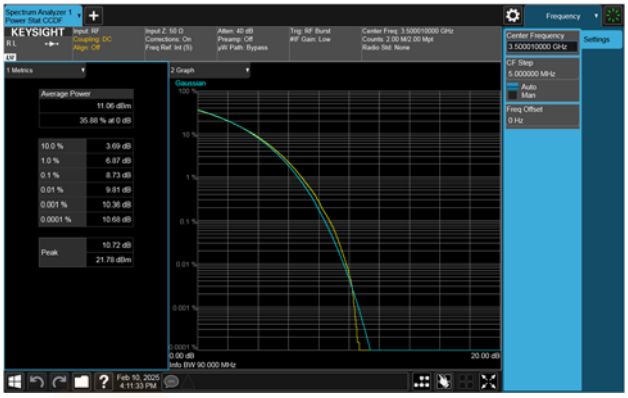
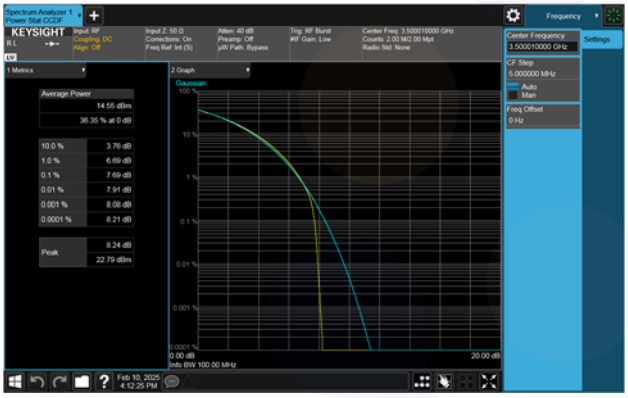
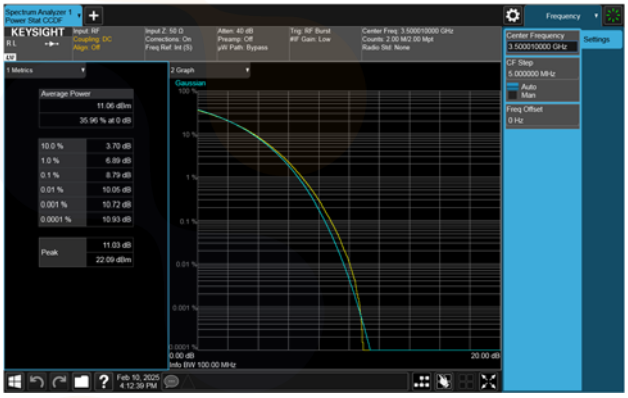
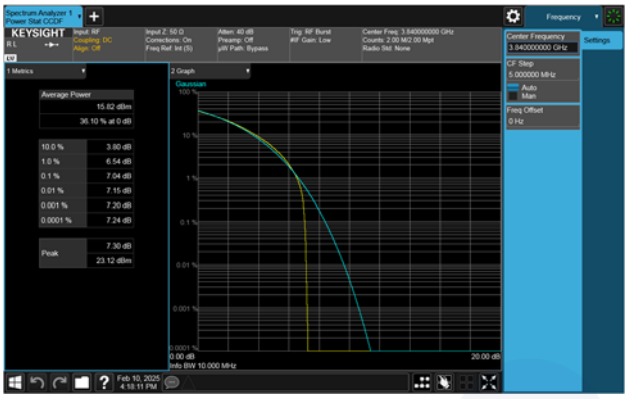
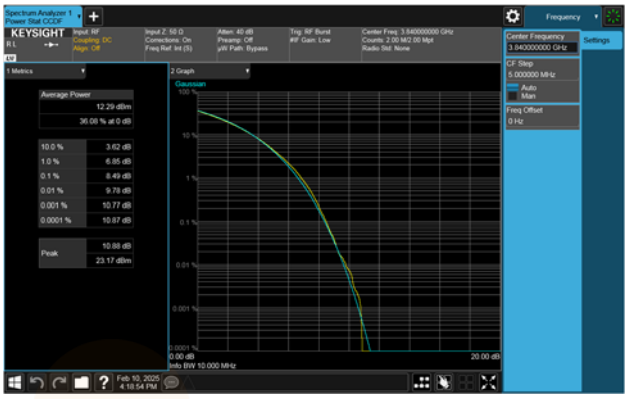
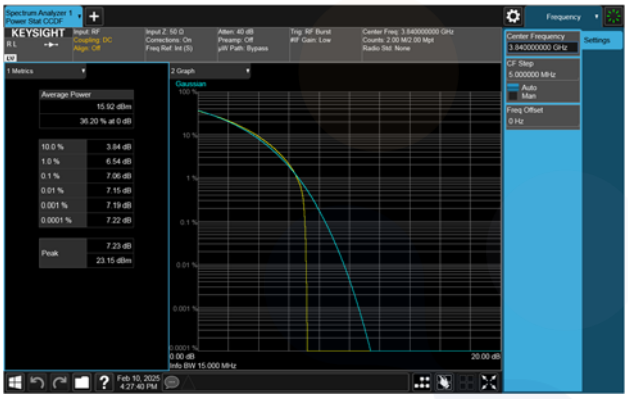
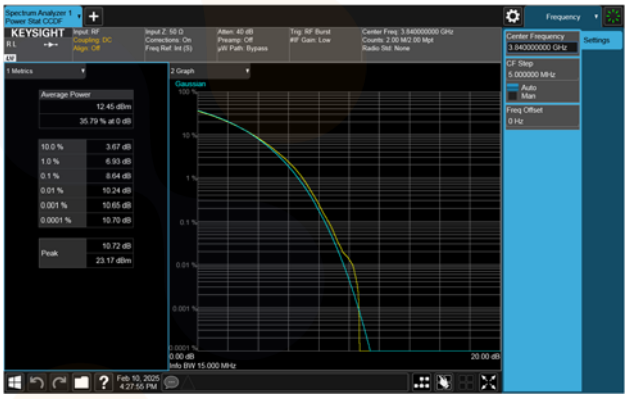
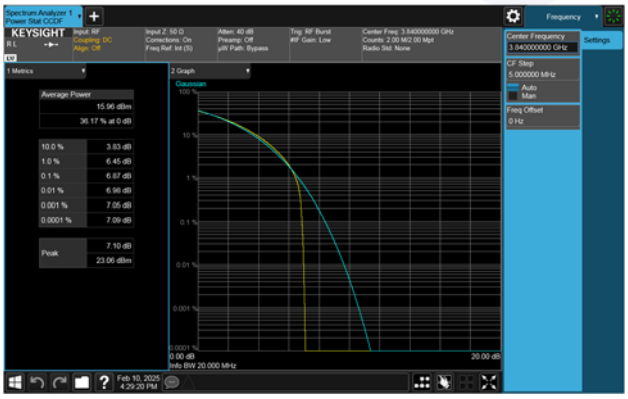
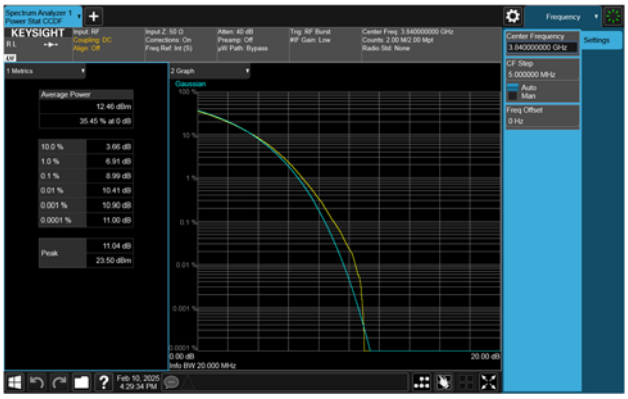
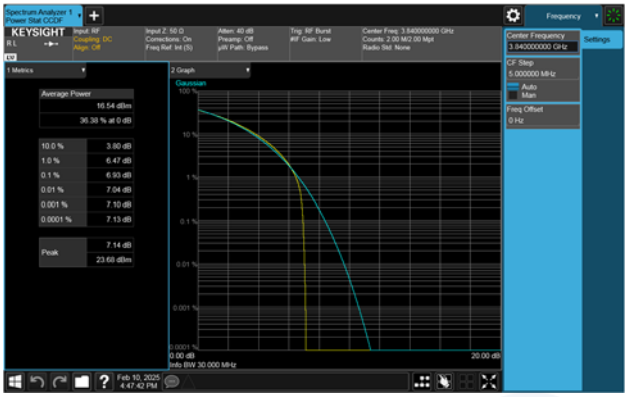
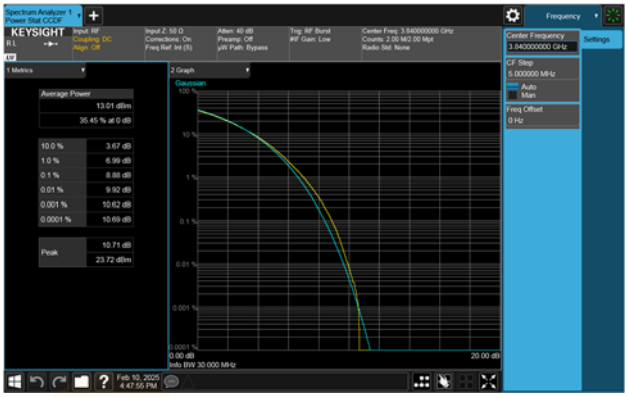
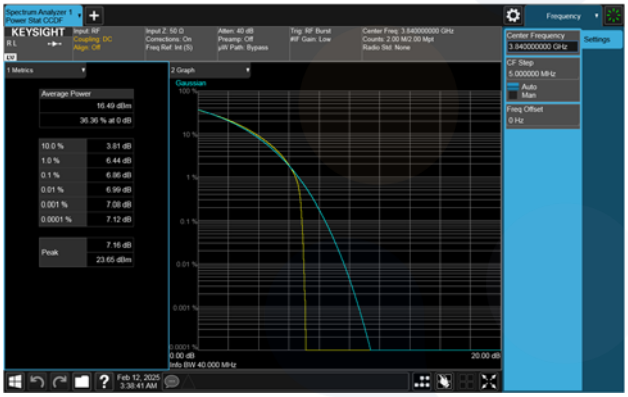
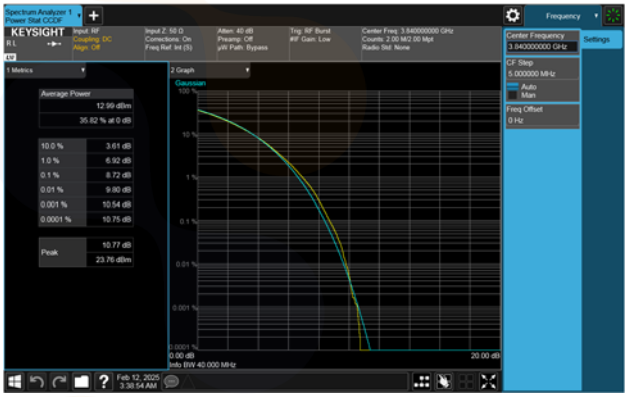
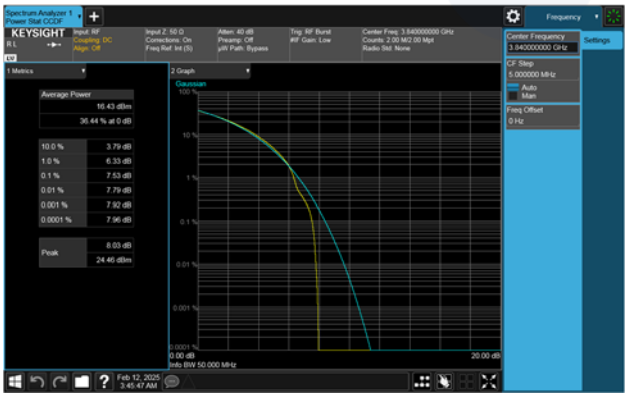
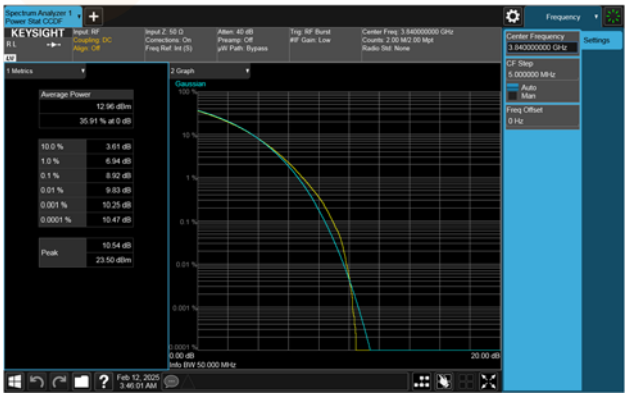
	
50M BW QPSK Middle channel	**50M BW 256QAM Middle channel**
	

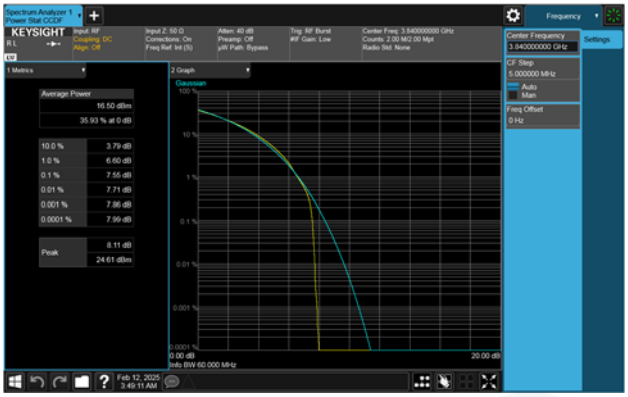
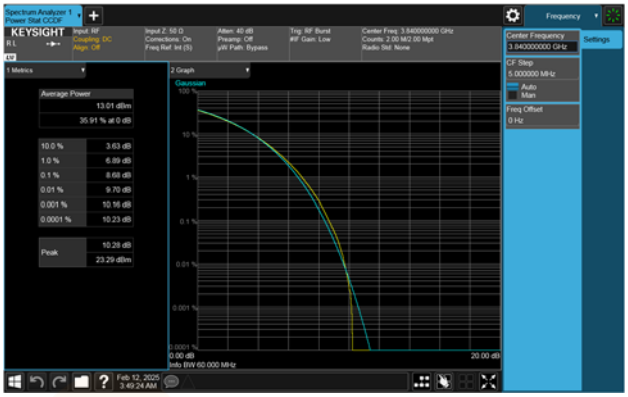
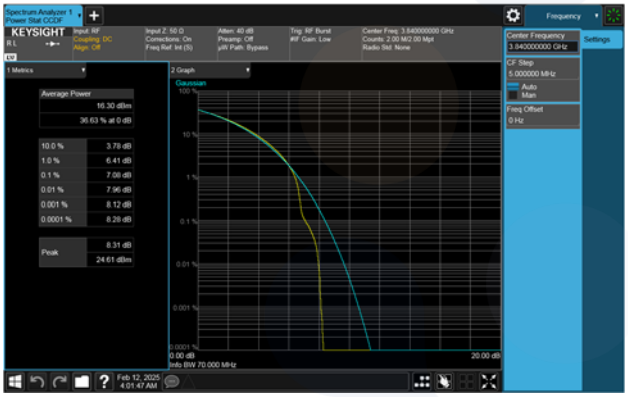
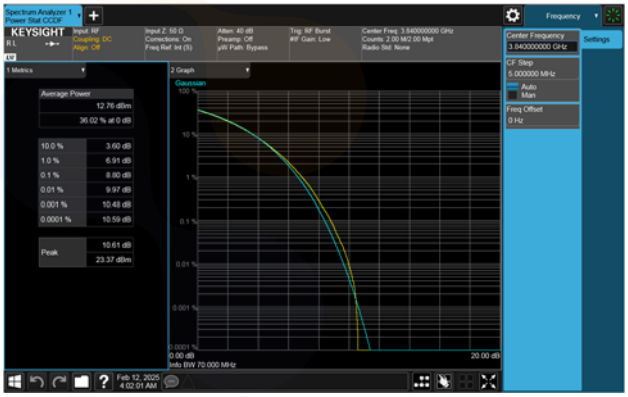
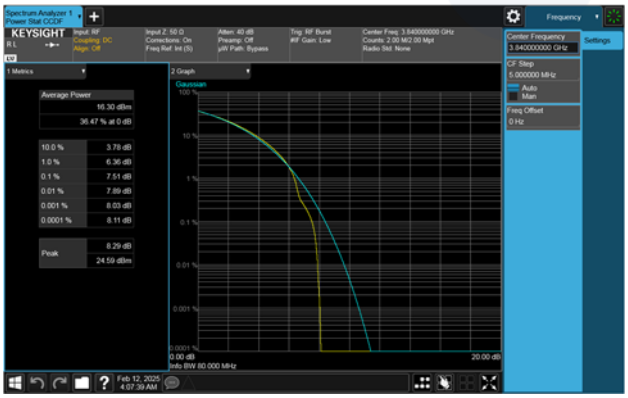
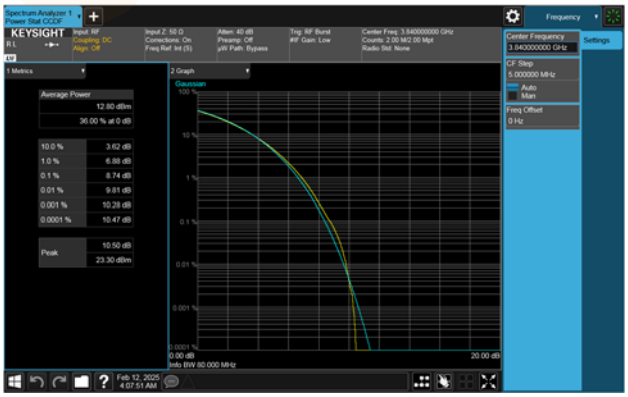
60M BW QPSK Middle channel	60M BW 256QAM Middle channel
	
70M BW QPSK Middle channel	**70M BW 256QAM Middle channel**
	
80M BW QPSK Middle channel	**80M BW 256QAM Middle channel**
	

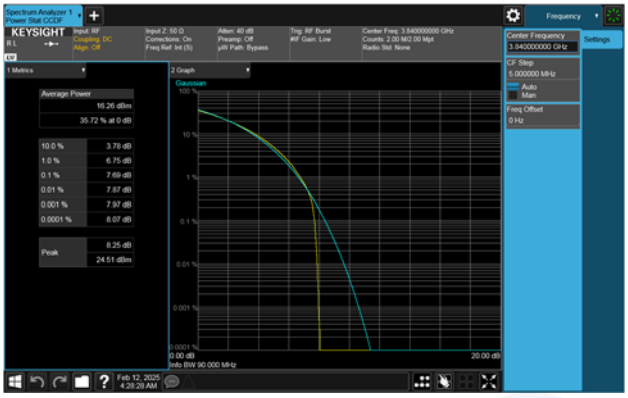
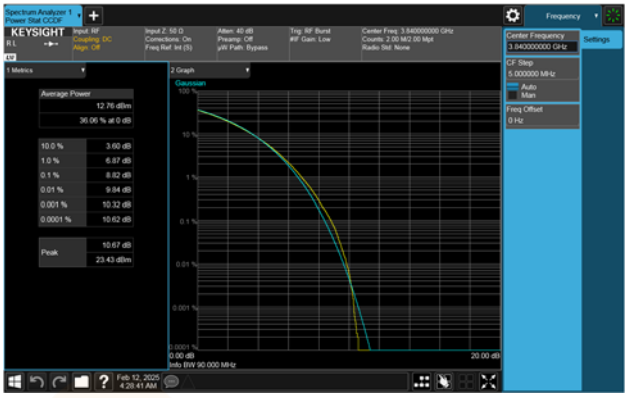
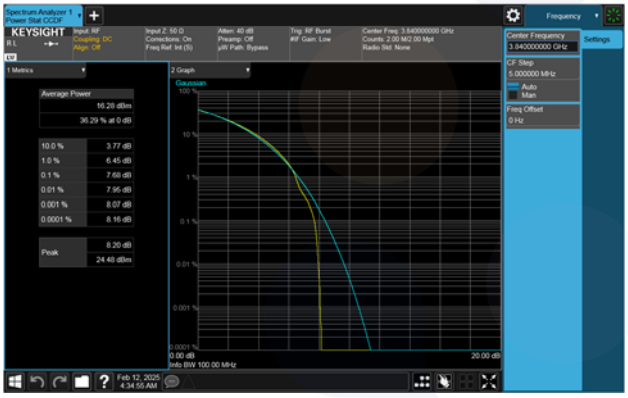
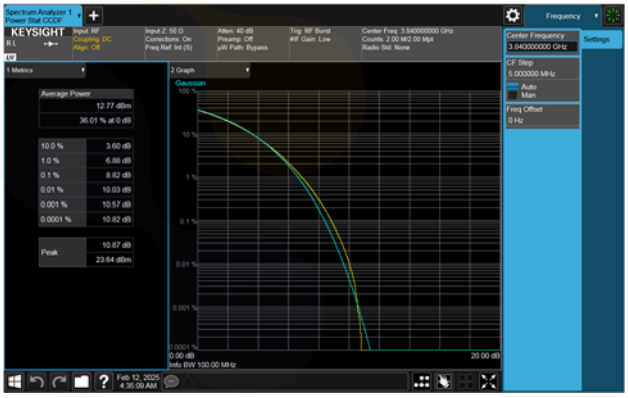
90M BW QPSK Middle channel	90M BW 256QAM Middle channel
	
100M BW QPSK Middle channel	**100M BW 256QAM Middle channel**
	

Test mode: 5G NR n77 (Upper)(PC2) CP OFDM

10M BW QPSK Middle channel	10M BW 256QAM Middle channel
	
15M BW QPSK Middle channel	**15M BW 256QAM Middle channel**
	
20M BW QPSK Middle channel	**20M BW 256QAM Middle channel**
	

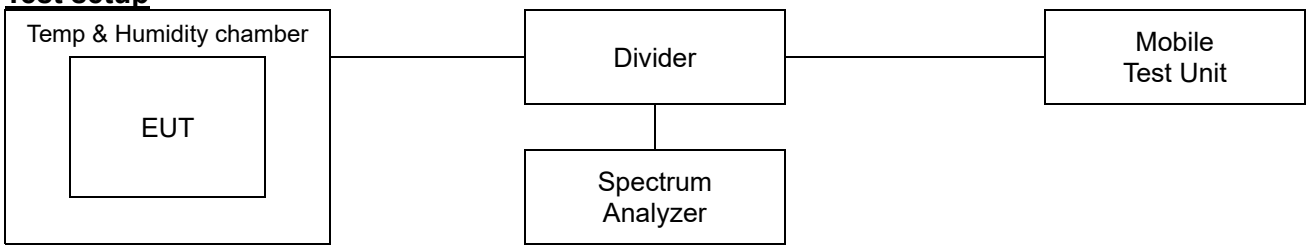
30M BW QPSK Middle channel	30M BW 256QAM Middle channel
	
40M BW QPSK Middle channel	**40M BW 256QAM Middle channel**
	
50M BW QPSK Middle channel	**50M BW 256QAM Middle channel**
	

60M BW QPSK Middle channel	60M BW 256QAM Middle channel
	
70M BW QPSK Middle channel	**70M BW 256QAM Middle channel**
	
80M BW QPSK Middle channel	**80M BW 256QAM Middle channel**
	

90M BW QPSK Middle channel	90M BW 256QAM Middle channel
	
100M BW QPSK Middle channel	**100M BW 256QAM Middle channel**
	

7.6. Frequency stability

Test setup



Limit

According to §2.1055(a),

The frequency stability shall be measured with variation of ambient temperature as follows:

1) From -30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
2) From -20° to + 50° centigrade for equipment to be licensed for use in the maritime services under part 80 of this chapter, except for class A, B, and S emergency position indicating radiobeacons (EPIRBS), and equipment to be licensed for use above 952 ㎒ at operational fixed stations in all services, stations in the local television transmission service and point-to-point microwave radio service under part 21 of this chapter, equipment licensed for use aboard aircraft in the aviation services under part 87 of this chapter, and equipment authorized for use in the family radio service under part 95 of this chapter.
3) From 0° to + 50° centigrade for equipment to be licensed for use in the radio broadcast Services under part 73 of this chapter.

According to §2.1055(d),

The frequency stability shall be measured with variation of primary supply Voltage as follows:

1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating and point which shall be specified by the manufacturer.
3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

According to §27.54,

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

Test procedure

ANSI 63.26-2015 – Section 5.6

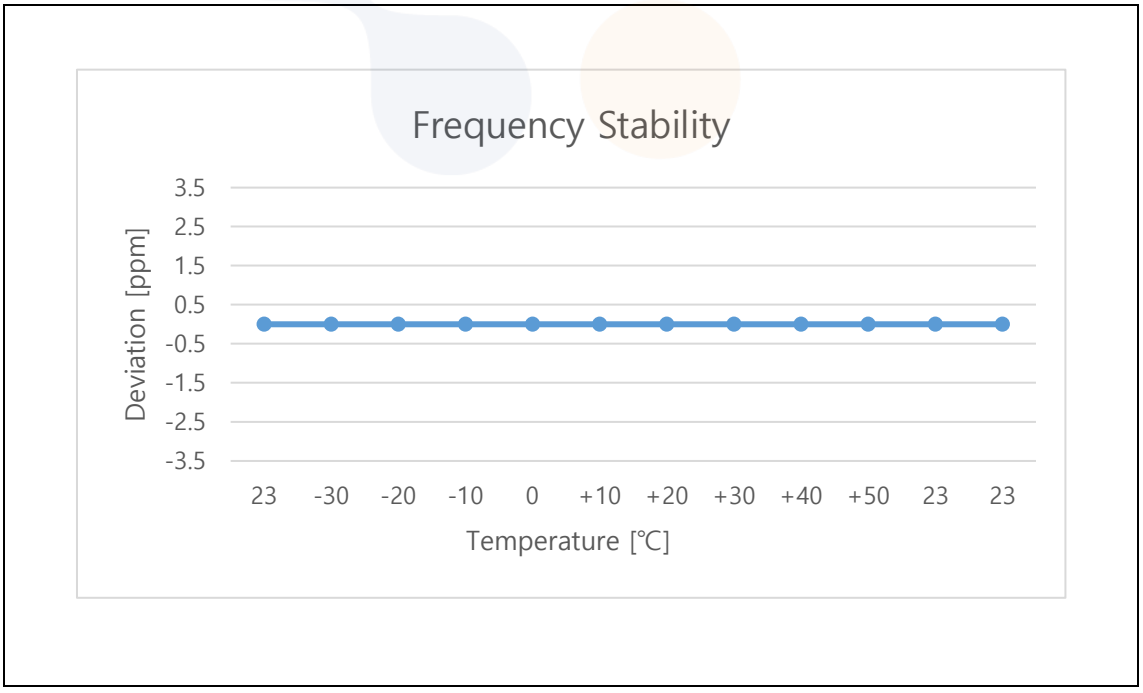
Test settings

1) The carrier frequency of the transmitter is measured at room temperature. (20°C to provide a reference)
2) The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3) Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each Temperature level.

Test results

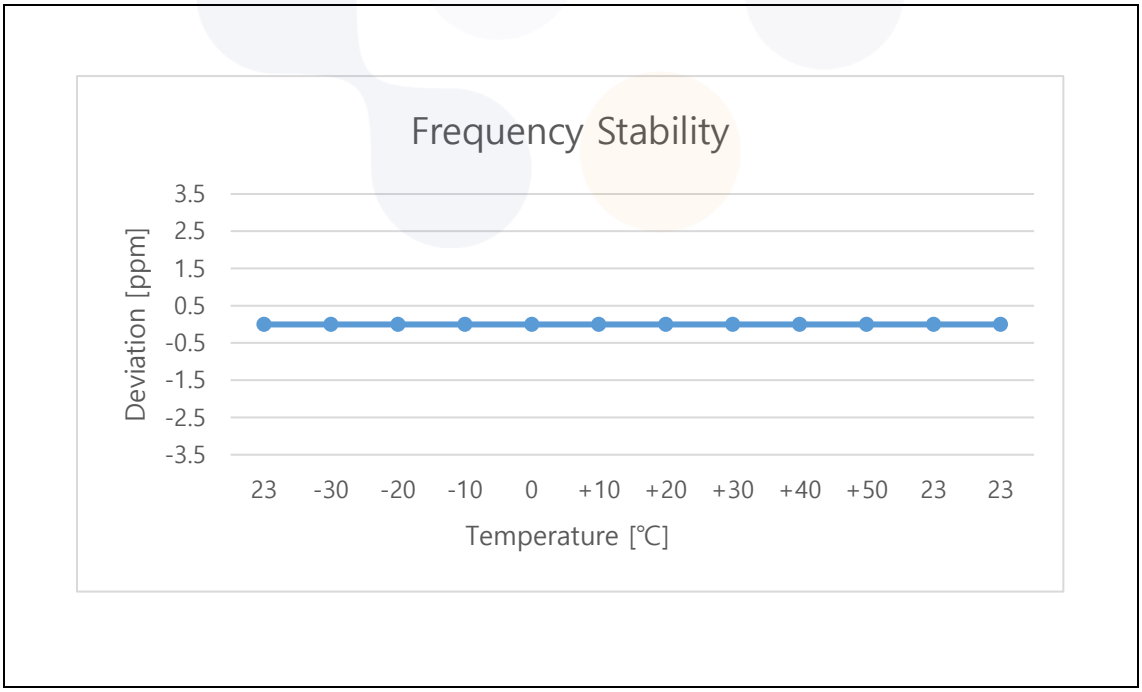
Test mode : 5G NR n77/78 (Lower) DFT-s OFDM
Frequency (㎐) : 3 500 010 000
Channel : 633334
Deviation limit : The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+23(Ref)	3,500,010,009	8.60	0.0	0.000000
		-30	3,500,010,008	7.70	0.0	0.000000
		-20	3,500,010,005	5.20	0.0	0.000000
		-10	3,500,010,002	1.90	0.0	0.000000
		0	3,500,009,995	-4.80	0.0	0.000000
		+10	3,500,009,997	-3.40	0.0	0.000000
		+20	3,500,010,005	5.20	0.0	0.000000
		+30	3,500,010,002	1.90	0.0	0.000000
		+40	3,500,009,995	-4.80	0.0	0.000000
		+50	3,500,009,990	-9.60	0.0	0.000000
115%	4.43	+23(Ref)	3,500,009,992	-8.30	0.0	0.000000
End point	2.75	+23(Ref)	3,500,010,003	2.60	0.0	0.000000



Test mode : 5G NR n77 (Upper) DFT-s OFDM
Frequency (㎐) : 3 840 000 000
Channel : 656000
Deviation limit : The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

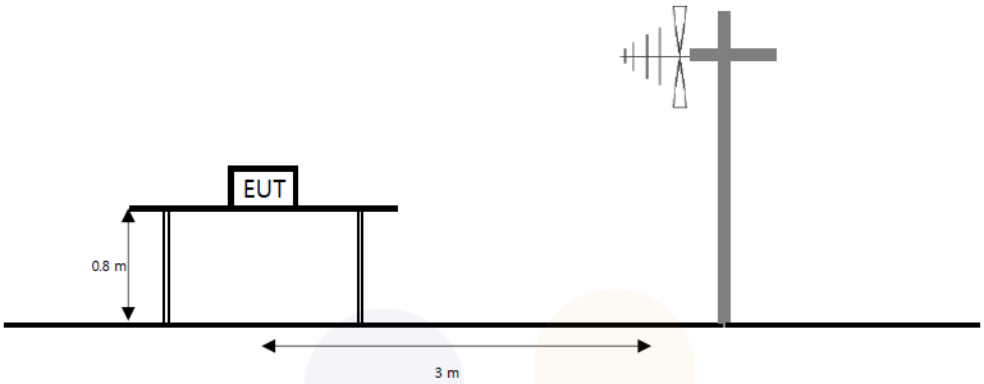
Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+23(Ref)	3,839,999,995	-5.10	0.0	0.000000
		-30	3,839,999,992	-7.60	0.0	0.000000
		-20	3,839,999,989	-10.60	0.0	0.000000
		-10	3,839,999,996	-3.60	0.0	0.000000
		0	3,840,000,001	1.30	0.0	0.000000
		+10	3,840,000,001	0.80	0.0	0.000000
		+20	3,840,000,004	4.10	0.0	0.000000
		+30	3,840,000,002	1.60	0.0	0.000000
		+40	3,839,999,996	-4.20	0.0	0.000000
		+50	3,839,999,993	-6.60	0.0	0.000000
115%	4.43	+23(Ref)	3,840,000,006	6.30	0.0	0.000000
End point	2.75	+23(Ref)	3,840,000,002	2.00	0.0	0.000000



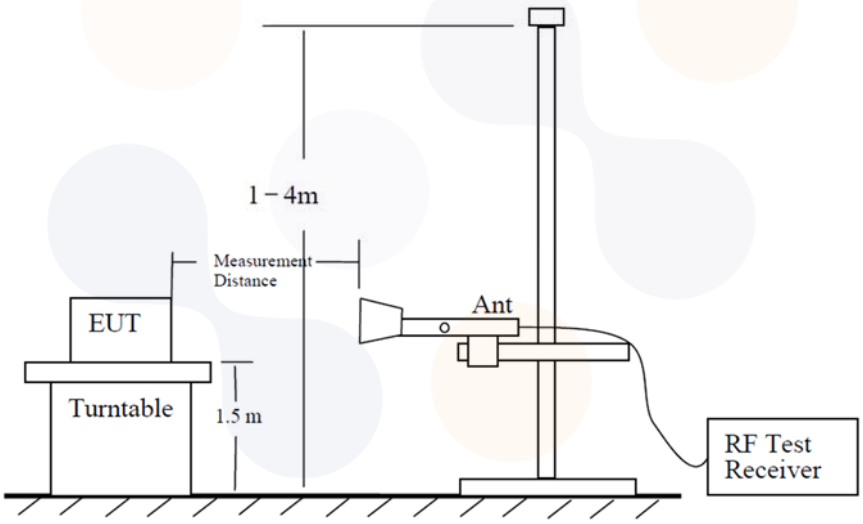
7.7. Radiated Power (EIRP)

Test setup

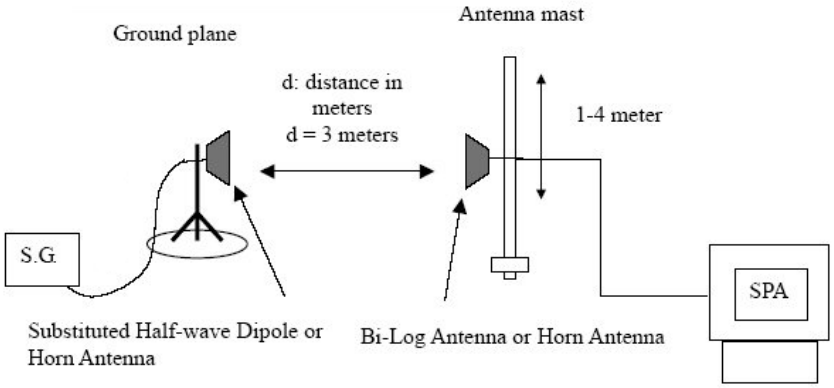
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to the tenth harmonic of the highest fundamental frequency or to 40 ㎓ emissions, whichever is lower.



The diagram below shows the test setup for substituted method.



Limit

According to §27.50(j)(3),

The following power requirements apply to stations transmitting in the 3700-3980 ㎒ band:
Mobile and portable stations are limited to 1 Watt EIRP. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(k)(3),

The following power requirements apply to stations transmitting in the 3450-3550 ㎒ band:
Mobile devices are limited to 1 Watt (30 ㏈m) EIRP. Mobile devices operating in these bands must employ a means for limiting power to the minimum necessary for successful communications

Test procedure

412172 D01 v01r01
971168 D01 v03r01 - Section 5.2 and 5.8
ANSI 63.26-2015 – Section 5.2
ANSI/TIA-603-E-2016 - Section 2.2.17

Test settings

1) RBW = 1 % to 5 % of the OBW.
2) VBW ≥ 3 × RBW.
3) SPAN = 2 × to 3 × the OBW.
4) Number of measurement points in sweep ≥ 2 × span / RBW.
5) Sweep time :
   1) Auto couple, or
   2) ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.
6) Detector = RMS
7) If the EUT can be configured to transmit continuously, then set the trigger to free run.
8) If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full -power transmissions).
9) Trace mode = trace averaging (RMS) over 100 sweeps.
10) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
11) Allow trace to fully stabilize.

Notes:

1. On a test site, the EUT shall be placed at 80 cm or 1.5 m height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to Correspond to the fundamental frequency of the transmitter.
3. The turntable is rotated through 360°, and the receiving antenna scans in order to determine the Level of the maximized emission.
4. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
5. The maximum signal level detected by the measuring receiver shall be noted.
6. The EUT was replaced by half-wave dipole (1 ㎓ below) or horn antenna (1 ㎓ above) connected to a signal generator.
   The power is calculated by the following formula;
   Pd(㏈m) = Pg(㏈m) – Cable loss (㏈) + Antenna gain (㏈)
   Note. Pd is the dipole equivalent power and Pg is the generator output power into the substitution antenna.
   The test antenna shall be raised and lowered through the specified range of height to ensure that
7. The maximum signal is received.
   The input signal to the substitution antenna shall be adjusted to the level that produces a level
8. Detected by the measuring corrected for the change of input attenuator setting of the measuring Receiver.
9. The input level to the substitution antenna shall be recorded as power level in ㏈m, corrected for Any change of input attenuator setting of the measuring receiver.
10. The measurement shall be repeated with the test antenna and the substitution antenna Orientated for horizontal polarization.

Test results

Test mode: 5G NR n77/78 (Lower)(PC2) DFT-s-OFDM

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
			[V/H]	[dBi]	[Db]	[dBm]	[dBm]	[W]
10	QPSK	Low	H	8.01	12.82	32.91	28.10	0.646
		Middle	H	8.10	12.91	31.62	26.81	0.480
		High	H	8.15	13.01	31.08	26.22	0.419
	16QAM	Low	H	8.01	12.82	32.21	27.40	0.550
		Middle	H	8.10	12.91	30.84	26.03	0.401
		High	H	8.15	13.01	30.45	25.60	0.363
15	QPSK	Low	H	8.16	13.02	33.20	28.34	0.683
		Middle	H	8.10	12.91	31.89	27.08	0.510
		High	H	8.15	13.01	30.91	26.06	0.404
	16QAM	Low	H	8.16	13.02	32.58	27.72	0.592
		Middle	H	8.10	12.91	31.54	26.73	0.471
		High	H	8.15	13.01	30.30	25.44	0.350
20	QPSK	Low	H	8.02	12.83	33.05	28.25	0.668
		Middle	H	8.10	12.91	32.86	28.05	0.638
		High	H	8.15	13.00	30.62	25.77	0.377
	16QAM	Low	H	8.02	12.83	32.48	27.68	0.586
		Middle	H	8.10	12.91	31.81	26.99	0.500
		High	H	8.15	13.00	30.02	25.16	0.328
30	QPSK	Low	H	8.03	12.84	33.00	28.19	0.659
		Middle	H	8.10	12.91	32.14	27.33	0.540
		High	H	8.14	12.99	31.39	26.55	0.452
	16QAM	Low	H	8.03	12.84	32.28	27.47	0.558
		Middle	H	8.10	12.91	31.48	26.67	0.464
		High	H	8.14	12.99	30.44	25.59	0.362
40	QPSK	Low	H	8.04	12.85	33.09	28.28	0.673
		Middle	H	8.10	12.91	32.55	27.73	0.593
		High	H	8.14	12.98	31.33	26.49	0.446
	16QAM	Low	H	8.04	12.85	32.35	27.55	0.568
		Middle	H	8.10	12.91	32.07	27.26	0.532
		High	H	8.14	12.98	30.51	25.67	0.369
50	QPSK	Low	H	8.05	12.86	32.63	27.83	0.606
		Middle	H	8.10	12.91	32.79	27.98	0.628
		High	H	8.13	12.97	31.26	26.42	0.439
	16QAM	Low	H	8.05	12.86	32.01	27.21	0.525
		Middle	H	8.10	12.91	32.08	27.27	0.533
		High	H	8.13	12.97	29.91	25.07	0.322

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
			[V/H]	[dBi]	[Db]	[dBm]	[dBm]	[W]
60	QPSK	Low	H	8.06	12.87	32.90	28.09	0.644
		Middle	H	8.10	12.91	32.66	27.84	0.608
		High	H	8.12	12.96	31.61	26.78	0.477
	16QAM	Low	H	8.06	12.87	32.10	27.29	0.535
		Middle	H	8.10	12.91	32.07	27.26	0.531
		High	H	8.12	12.96	30.68	25.84	0.384
70	QPSK	Low	H	8.07	12.88	32.66	27.85	0.609
		Middle	H	8.10	12.91	32.31	27.49	0.561
		High	H	8.12	12.95	31.81	26.98	0.499
	16QAM	Low	H	8.07	12.88	31.99	27.18	0.523
		Middle	H	8.10	12.91	31.78	26.97	0.497
		High	H	8.12	12.95	30.78	25.95	0.394
80	QPSK	Low	H	8.08	12.89	32.15	27.34	0.542
		Middle	H	8.10	12.91	32.79	27.98	0.628
		High	H	8.11	12.94	32.48	27.66	0.583
	16QAM	Low	H	8.08	12.89	31.20	26.39	0.436
		Middle	H	8.10	12.91	32.06	27.25	0.531
		High	H	8.11	12.94	31.63	26.80	0.479
90	QPSK	Low	H	8.09	12.90	33.03	28.22	0.663
		Middle	H	8.10	12.91	32.56	27.75	0.595
		High	H	8.11	12.92	32.18	27.36	0.545
	16QAM	Low	H	8.09	12.90	32.43	27.62	0.578
		Middle	H	8.10	12.91	31.92	27.11	0.514
		High	H	8.11	12.92	31.51	26.69	0.466
100	QPSK	Middle	H	8.10	12.91	32.91	28.10	0.645
	16QAM	Middle	H	8.10	12.91	32.36	27.55	0.568

Note.
1. E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBi) - C.L(Cable loss) (dB)

Test mode: 5G NR n77 (Upper)(PC2) DFT-s-OFDM

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
			[V/H]	[dBi]	[Db]	[dBm]	[dBm]	[W]
10	QPSK	Low	H	8.35	13.36	30.71	25.70	0.372
		Middle	H	8.51	13.48	32.19	27.22	0.527
		High	H	8.67	13.95	31.20	25.93	0.391
	16QAM	Low	H	8.35	13.36	29.65	24.63	0.291
		Middle	H	8.51	13.48	31.44	26.46	0.443
		High	H	8.67	13.95	30.42	25.15	0.327
15	QPSK	Low	H	8.35	13.36	30.82	25.80	0.381
		Middle	H	8.51	13.48	32.37	27.40	0.549
		High	H	8.45	13.57	31.71	26.60	0.457
	16QAM	Low	H	8.35	13.36	29.69	24.68	0.294
		Middle	H	8.51	13.48	31.70	26.72	0.470
		High	H	8.45	13.57	30.35	25.23	0.334
20	QPSK	Low	H	8.35	13.36	31.36	26.35	0.431
		Middle	H	8.51	13.48	32.15	27.18	0.522
		High	H	8.66	13.94	31.45	26.18	0.415
	16QAM	Low	H	8.35	13.36	30.82	25.81	0.381
		Middle	H	8.51	13.48	31.20	26.22	0.419
		High	H	8.66	13.94	30.87	25.60	0.363
30	QPSK	Low	H	8.36	13.37	31.21	26.20	0.417
		Middle	H	8.51	13.48	32.22	27.24	0.530
		High	H	8.66	13.93	31.09	25.82	0.382
	16QAM	Low	H	8.36	13.37	30.45	25.44	0.350
		Middle	H	8.51	13.48	31.40	26.42	0.438
		High	H	8.66	13.93	30.56	25.30	0.338
40	QPSK	Low	H	8.36	13.38	31.29	26.28	0.424
		Middle	H	8.51	13.48	32.27	27.30	0.537
		High	H	8.65	13.92	31.01	25.74	0.375
	16QAM	Low	H	8.36	13.38	30.79	25.78	0.378
		Middle	H	8.51	13.48	31.73	26.75	0.473
		High	H	8.65	13.92	30.04	24.78	0.300
50	QPSK	Low	H	8.37	13.39	31.22	26.21	0.417
		Middle	H	8.51	13.48	32.08	27.11	0.514
		High	H	8.65	13.91	30.81	25.55	0.359
	16QAM	Low	H	8.37	13.39	30.51	25.50	0.355
		Middle	H	8.51	13.48	31.32	26.35	0.431
		High	H	8.65	13.91	30.38	25.12	0.325

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
			[V/H]	[dBi]	[Db]	[dBm]	[dBm]	[W]
60	QPSK	Low	H	8.38	13.39	30.97	25.95	0.393
		Middle	H	8.51	13.48	32.64	27.66	0.584
		High	H	8.64	13.66	30.79	25.77	0.378
	16QAM	Low	H	8.38	13.39	30.59	25.57	0.361
		Middle	H	8.51	13.48	31.86	26.89	0.488
		High	H	8.64	13.66	30.17	25.15	0.327
70	QPSK	Low	H	8.38	13.40	31.44	26.43	0.439
		Middle	H	8.51	13.48	32.17	27.20	0.524
		High	H	8.63	13.65	30.75	25.73	0.374
	16QAM	Low	H	8.38	13.40	30.33	25.31	0.340
		Middle	H	8.51	13.48	31.26	26.29	0.425
		High	H	8.63	13.65	30.22	25.20	0.331
80	QPSK	Low	H	8.39	13.41	30.95	25.93	0.392
		Middle	H	8.51	13.48	31.84	26.86	0.486
		High	H	8.63	13.64	30.56	25.55	0.359
	16QAM	Low	H	8.39	13.41	30.29	25.27	0.337
		Middle	H	8.51	13.48	31.00	26.02	0.400
		High	H	8.63	13.64	29.60	24.58	0.287
90	QPSK	Low	H	8.39	13.41	30.63	25.61	0.364
		Middle	H	8.51	13.48	32.23	27.25	0.531
		High	H	8.62	13.64	30.43	25.42	0.348
	16QAM	Low	H	8.39	13.41	30.02	25.01	0.317
		Middle	H	8.51	13.48	31.32	26.35	0.431
		High	H	8.62	13.64	29.83	24.82	0.303
100	QPSK	Low	H	8.40	13.49	30.56	25.47	0.352
		Middle	H	8.51	13.48	31.85	26.88	0.487
		High	H	8.62	13.63	30.47	25.46	0.351
	16QAM	Low	H	8.40	13.49	29.65	24.56	0.286
		Middle	H	8.51	13.48	30.87	25.90	0.389
		High	H	8.62	13.63	29.76	24.75	0.298

Note.
1. E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBi) - C.L(Cable loss) (dB)

Test mode: 5G NR n78 (Lower)(PC2)(SRS2) DFT-s-OFDM

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
			[V/H]	[dBi]	[Db]	[dBm]	[dBm]	[W]
90	QPSK	Low	H	8.09	12.90	22.45	17.64	0.058
		Middle	H	8.10	12.91	22.22	17.40	0.055
		High	H	8.11	12.92	21.70	16.88	0.049

Test mode: 5G NR n78 (Lower)(PC2)(SRS3) DFT-s-OFDM

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
			[V/H]	[dBi]	[Db]	[dBm]	[dBm]	[W]
100	QPSK	Middle	H	8.10	12.91	21.61	16.80	0.048

Test mode: 5G NR n78 (Lower)(PC2)(SRS4) DFT-s-OFDM

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
			[V/H]	[dBi]	[Db]	[dBm]	[dBm]	[W]
15	QPSK	Low	H	8.02	12.82	22.31	17.51	0.056
		Middle	H	8.10	12.91	20.73	15.92	0.039
		High	H	8.15	13.01	19.60	14.75	0.030

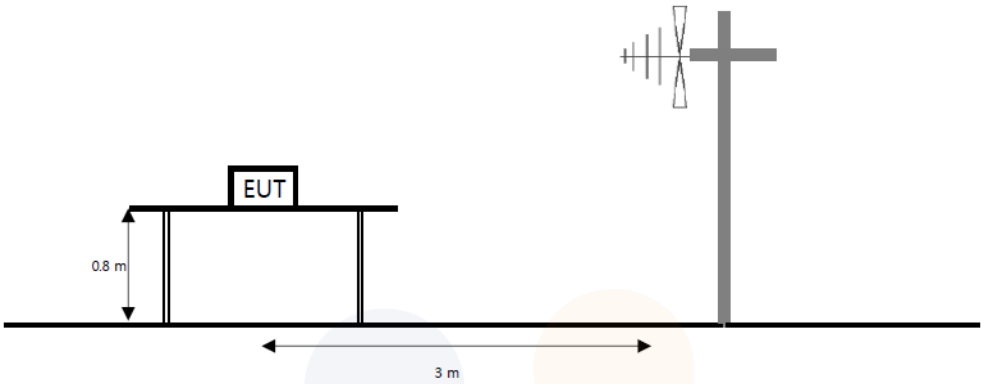
Note.

1. E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBi) - C.L(Cable loss) (dB)

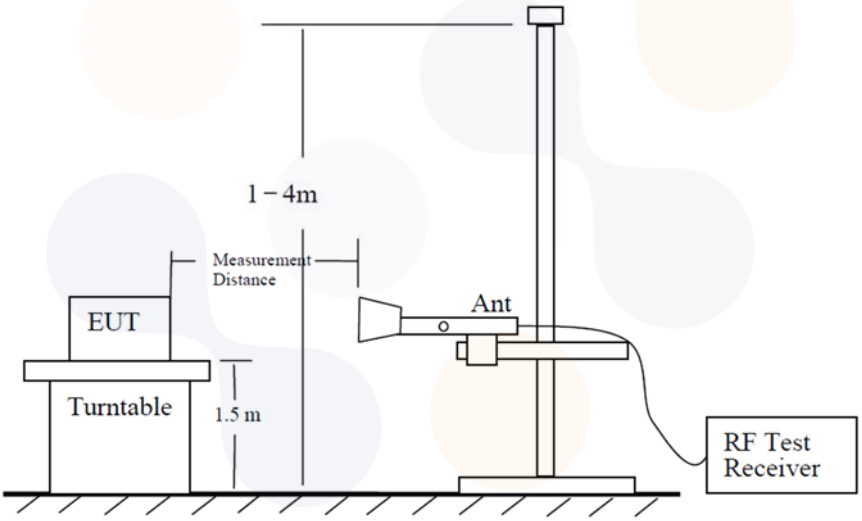
7.8. Radiated Spurious Emissions

Test setup

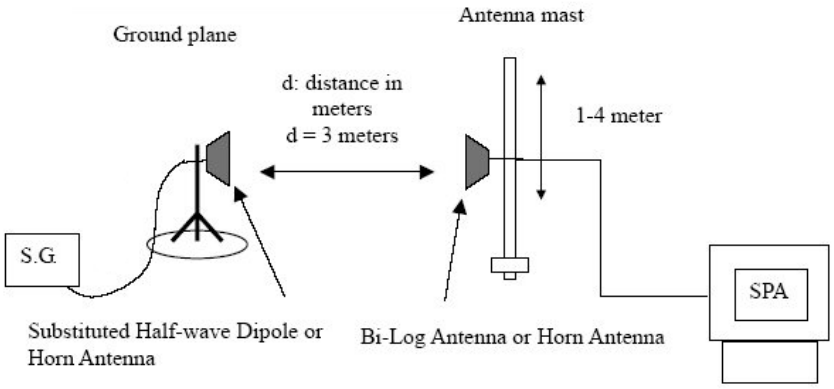
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to the tenth harmonic of the highest fundamental frequency or to 40 ㎓ emissions, whichever is lower.



The diagram below shows the test setup for substituted method.



Limit

According to §27.53(l)(2),

The following emission limits apply to stations transmitting in the 3700-3980 ㎒ band:

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

According to §27.53(n)(2),

The following emission limits apply to stations transmitting in the 3450-3550 ㎒ band:

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

Test procedure

971168 D01 v03r01 - Section 6.2
ANSI 63.26-2015 – Section 5.5
ANSI/TIA-603-E-2016 - Section 2.2.12

Test settings

1) RBW = 100 ㎑ for below 1 ㎓ and 1 ㎒ for above 1 ㎓.
2) VBW ≥ 3 × RBW.
3) Detector = RMS
4) Trace mode = Max hold
5) Sweep time = Auto couple
6) Number of sweep points ≥ 2 × span / RBW
7) Allow trace to fully stabilize.

Notes:

1. On a test site, the EUT shall be placed at 80 cm or 1.5 m height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to Correspond to the fundamental frequency of the transmitter.
3. The turntable is rotated through 360°, and the receiving antenna scans in order to determine the Level of the maximized emission.
4. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
5. The maximum signal level detected by the measuring receiver shall be noted.
6. The EUT was replaced by half-wave dipole (1 ㎓ below) or horn antenna (1 ㎓ above) connected to a signal generator.
7. The test antenna shall be raised and lowered through the specified range of height to ensure that The maximum signal is received.
8. The input signal to the substitution antenna shall be adjusted to the level that produces a level Detected by the measuring corrected for the change of input attenuator setting of the measuring Receiver.
9. The input level to the substitution antenna shall be recorded as power level in ㏈m, corrected for Any change of input attenuator setting of the measuring receiver.
10. The measurement shall be repeated with the test antenna and the substitution antenna Orientated for horizontal polarization.

Test results (Above 1 000 ㎒)

Main Antenna

Test mode : 5G NR n77 (Lower)(PC2) DFT-s OFDM
Frequency(㎒) : 3457.5
Channel : 630500
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	6 899.83	H	10.74	18.59	-40.85	-48.70	-13.00	35.70
	10 349.97	V	12.96	22.84	-34.92	-44.80	-13.00	31.80
	13 798.16	V	14.14	27.03	-30.11	-43.00	-13.00	30.00
	17 249.77	V	13.50	30.53	-21.07	-38.10	-13.00	25.10

Test mode : 5G NR n77 (Lower)(PC2) DFT-s OFDM
Frequency(㎒) : 3500.01
Channel : 633334
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 001.62	V	10.80	18.70	-40.00	-47.90	-13.00	34.90
	10 500.70	H	12.90	23.02	-34.88	-45.00	-13.00	32.00
	14 001.25	V	14.30	27.77	-28.03	-41.50	-13.00	28.50
	17 499.36	H	13.80	30.23	-20.97	-37.40	-13.00	24.40

Test mode : 5G NR n77 (Lower)(PC2) DFT-s OFDM
Frequency(㎒) : 3542.49
Channel : 636166
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 069.64	H	10.90	18.78	-41.12	-49.00	-13.00	36.00
	10 606.41	H	12.86	23.19	-33.77	-44.10	-13.00	31.10
	14 141.22	V	14.22	27.36	-28.36	-41.50	-13.00	28.50
	17 679.45	V	12.62	30.22	-20.50	-38.10	-13.00	25.10

Note.
1. E.R.P & E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBd&dBi) - C.L(Cable loss) (dB)

Test mode : 5G NR n77 (Upper)(PC2) DFT-s OFDM
Frequency(㎒) : 3730.02
Channel : 648668
Bandwidth(㎒) : 60

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 521.83	H	11.53	19.31	-40.72	-48.50	-13.00	35.50
	11 280.78	H	12.64	23.77	-31.57	-42.70	-13.00	29.70
	15 040.70	H	14.09	28.32	-25.67	-39.90	-13.00	26.90
	18 798.59	V	10.20	31.89	-22.81	-44.50	-13.00	31.50

Test mode : 5G NR n77 (Upper)(PC2) DFT-s OFDM
Frequency(㎒) : 3840.00
Channel : 656000
Bandwidth(㎒) : 60

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 680.39	H	11.79	19.61	-40.88	-48.70	-13.00	35.70
	11 520.09	H	12.60	23.93	-33.97	-45.30	-13.00	32.30
	15 360.27	V	14.03	28.36	-27.17	-41.50	-13.00	28.50
	19 200.22	V	10.08	32.27	-21.11	-43.30	-13.00	30.30

Test mode : 5G NR n77 (Upper)(PC2) DFT-s OFDM
Frequency(㎒) : 3949.98
Channel : 663332
Bandwidth(㎒) : 60

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 839.44	H	12.04	19.81	-42.43	-50.20	-13.00	37.20
	11 760.37	V	12.60	24.65	-31.55	-43.60	-13.00	30.60
	15 679.84	V	13.93	28.68	-27.95	-42.70	-13.00	29.70
	19 599.04	H	9.86	32.90	-19.46	-42.50	-13.00	29.50

Note.
1. E.R.P & E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBd&dBi) - C.L(Cable loss) (dB)

Sub Antenna

Test mode : 5G NR n78 (Lower)(PC2)(SRS2) DFT-s OFDM
Frequency(㎒) : 3495.00
Channel : 633000
Bandwidth(㎒) : 90

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 080.90	H	10.91	18.79	-40.72	-48.60	-13.00	35.60
	10 620.60	V	12.85	23.21	-33.54	-43.90	-13.00	30.90
	14 160.30	H	14.20	27.37	-27.33	-40.50	-13.00	27.50
	17 699.52	V	12.48	30.26	-20.92	-38.70	-13.00	25.70

Test mode : 5G NR n78 (Lower)(PC2)(SRS2) DFT-s OFDM
Frequency(㎒) : 3500.01
Channel : 633334
Bandwidth(㎒) : 90

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 090.20	H	10.93	18.80	-40.73	-48.60	-13.00	35.60
	10 635.28	V	12.85	23.22	-34.53	-44.90	-13.00	31.90
	14 180.86	H	14.19	27.39	-28.30	-41.50	-13.00	28.50
	17 724.96	V	12.32	30.69	-18.83	-37.20	-13.00	24.20

Test mode : 5G NR n78 (Lower)(PC2)(SRS2) DFT-s OFDM
Frequency(㎒) : 3504.99
Channel : 633666
Bandwidth(㎒) : 90

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 099.49	V	10.94	18.81	-39.53	-47.40	-13.00	34.40
	10 649.96	H	12.84	23.24	-34.50	-44.90	-13.00	31.90
	14 199.94	V	14.18	27.41	-28.67	-41.90	-13.00	28.90
	17 749.92	V	12.15	30.72	-22.13	-40.70	-13.00	27.70

Note.
1. E.R.P & E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBd&dBi) - C.L(Cable loss) (dB)

Test mode : 5G NR n78 (Lower)(PC2)(SRS3) DFT-s OFDM
Frequency(㎒) : 3500.01
Channel : 633334
Bandwidth(㎒) : 100

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 099.00	V	10.94	18.81	-41.53	-49.40	-13.00	36.40
	10 650.45	V	12.84	23.24	-33.70	-44.10	-13.00	31.10
	14 199.94	H	14.18	27.41	-28.87	-42.10	-13.00	29.10
	17 750.41	V	12.15	30.72	-22.13	-40.70	-13.00	27.70

Note.
1. E.R.P & E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBd&dBi) - C.L(Cable loss) (dB)

Test mode : 5G NR n78 (Lower)(PC2)(SRS4) DFT-s OFDM
Frequency(㎒) : 3457.50
Channel : 630500
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	6 930.66	V	10.76	18.57	-41.99	-49.80	-13.00	36.80
	10 395.48	V	12.94	22.88	-34.66	-44.60	-13.00	31.60
	13 859.33	V	14.19	27.09	-28.90	-41.80	-13.00	28.80
	17 325.14	H	13.59	30.06	-21.03	-37.50	-13.00	24.50

Test mode : 5G NR n78 (Lower)(PC2)(SRS4) DFT-s OFDM
Frequency(㎒) : 3500.01
Channel : 633334
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 014.83	V	10.82	18.72	-41.80	-49.70	-13.00	36.70
	10 522.72	H	12.89	23.04	-34.75	-44.90	-13.00	31.90
	14 030.13	V	14.28	27.79	-29.49	-43.00	-13.00	30.00
	17 536.06	V	13.56	30.72	-19.94	-37.10	-13.00	24.10

Test mode : 5G NR n78 (Lower)(PC2)(SRS4) DFT-s OFDM
Frequency(㎒) : 3542.49
Channel : 636166
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 099.49	H	10.94	18.81	-40.33	-48.20	-13.00	35.20
	10 649.96	H	12.84	23.24	-35.20	-45.60	-13.00	32.60
	14 200.92	H	14.18	27.75	-27.53	-41.10	-13.00	28.10
	17 749.92	H	12.15	30.72	-20.93	-39.50	-13.00	26.50

Note.
1. E.R.P & E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBd&dBi) - C.L(Cable loss) (dB)

EN-DC Mode (Worst case) DFT-s-OFDM

Test mode : 66A-n77A
Frequency(㎒) : 3457.5
Channel : 630500
Bandwidth(㎒) : 10 (LTE), 15 (NR)
RB Size/Offset : 1/0 (LTE), 1/1 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	6 899.34	H	10.74	18.59	-38.15	-46.00	-13.00	33.00
	10 350.46	V	12.96	22.84	-30.82	-40.70	-13.00	27.70
	13 800.12	H	14.14	27.05	-26.99	-39.90	-13.00	26.90
	17 250.26	H	13.50	30.53	-17.27	-34.30	-13.00	21.30

Test mode : 66A-n77A
Frequency(㎒) : 3840
Channel : 656000
Bandwidth(㎒) : 10 (LTE), 60 (NR)
RB Size/Offset : 1/0 (LTE), 1/81 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	7 681.86	H	11.79	19.61	-38.28	-46.10	-13.00	33.10
	11 520.09	V	12.60	23.93	-29.57	-40.90	-13.00	27.90
	15 358.80	V	14.03	28.36	-20.97	-35.30	-13.00	22.30
	19 200.22	V	10.08	32.27	-21.11	-43.30	-13.00	30.30

Test mode : 66A-n78A
Frequency(㎒) : 3457.5
Channel : 630500
Bandwidth(㎒) : 10 (LTE), 15 (NR)
RB Size/Offset : 1/0 (LTE), 1/1 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	6 900.32	V	10.74	18.53	-38.61	-46.40	-13.00	33.40
	10 351.93	H	12.96	22.84	-31.02	-40.90	-13.00	27.90
	13 799.63	H	14.14	27.03	-24.91	-37.80	-13.00	24.80
	17 249.77	V	13.50	30.53	-17.27	-34.30	-13.00	21.30

Test mode : 41A-n78A
Frequency(㎒) : 3457.5
Channel : 630500
Bandwidth(㎒) : 20 (LTE), 15 (NR)
RB Size/Offset : 1/99 (LTE), 1/1 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	6 899.34	V	10.74	18.59	-39.05	-46.90	-13.00	33.90
	10 350.46	H	12.96	22.84	-31.12	-41.00	-13.00	28.00
	13 799.63	H	14.14	27.03	-26.11	-39.00	-13.00	26.00
	17 249.77	V	13.50	30.53	-18.07	-35.10	-13.00	22.10

Note.
1. E.R.P & E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBi&dBd) - C.L(Cable loss) (dB)

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	Agilent	N9040B	US55230151	25.07.01
Spectrum Analyzer	Agilent	N9040B	US56050101	25.12.03
Spectrum Analyzer	R&S	FSV40	100989	25.10.10
Vector Signal Generator	R&S	SMBV100A	257566	25.07.01
Signal Generator	R&S	SMB100A	176206	26.01.17*
Divider	Marki Microwave, Inc.	PD-0040	D0006	25.06.24
DC Power Supply	AGILENT	E3632A	MY40004791	25.07.01
Radio Communication Analyzer	ANRITSU	MT8000A	6261923085	25.04.25
Radio Communication Analyzer	ANRITSU	MT8821C	6261806768	26.01.16*
Temp & Humid Chamber	ESPEC	SH-642	93016978	26.01.16*
Bi-log Antenna	Teseq GmbH	CBL 6112D	62027	26.10.17
Bi-log Antenna	ETS-LINDGREN	3143B	00228420	25.07.20
Horn Antenna	ETS-LINDGREN	3117	00251528	26.01.21*
Horn Antenna	ETS-LINDGREN	3117	00227509	25.06.28
Horn Antenna	ETS-LINDGREN	3116C	00251516	26.01.20*
Horn Antenna	ETS-LINDGREN	3116	00086635	26.01.21*
Amplifier	SONOMA INSTRUMENT	310N	421822	25.10.10
Amplifier	B&Z Technologies	BZRT-00504000-481055-382525	26299-27735	25.06.24
Amplifier	B&Z Technologies	BZR-0050400-551028-252525	27736	25.06.24
High pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	32	25.07.01
Band Reject Filter	Wainwright Instruments GmbH	WRCG 1710/1785-1690/1805-60/12SS	43	26.01.16*
Band Reject Filter	Wainwright Instruments GmbH	WRCJV24-2483.5-2496-2690-2702.5-45SS	SN6	25.10.10

*This equipment was calibrated during the test period, and was used after calibration.

End of test report