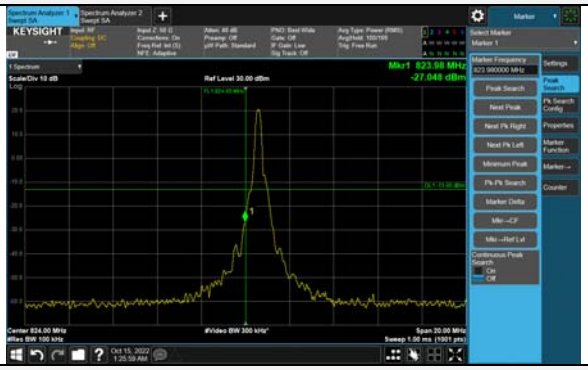
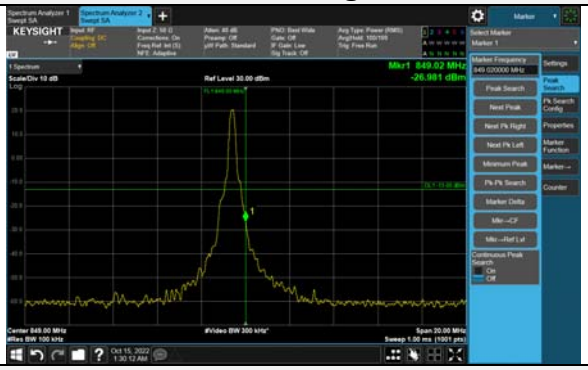
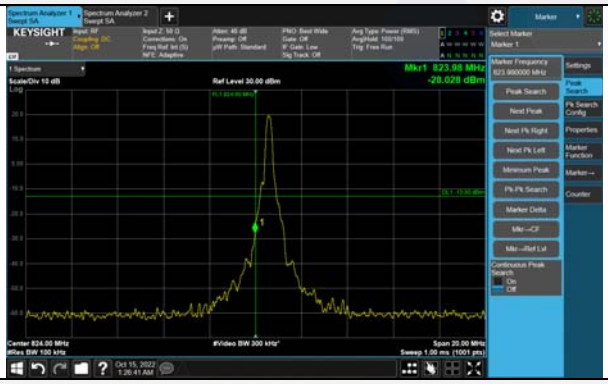
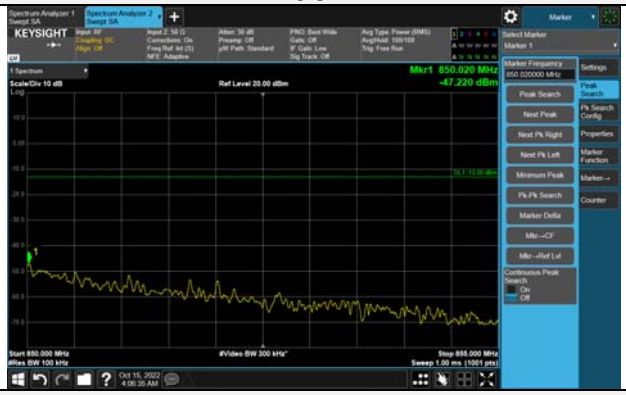
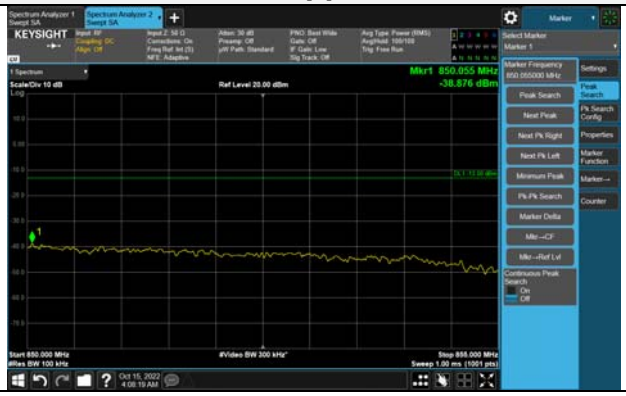
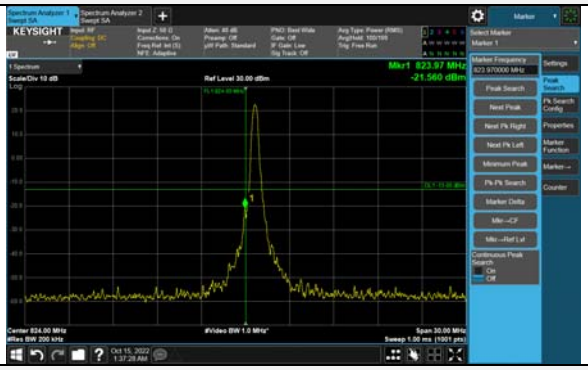
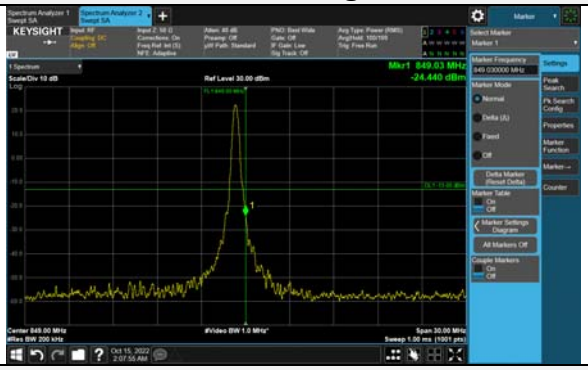
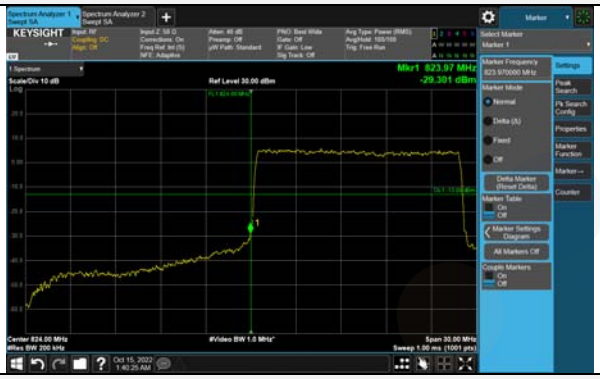
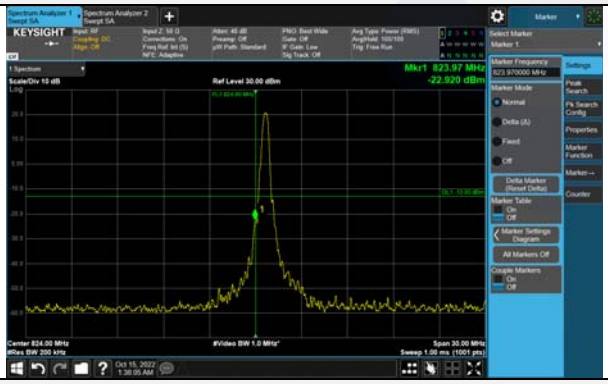
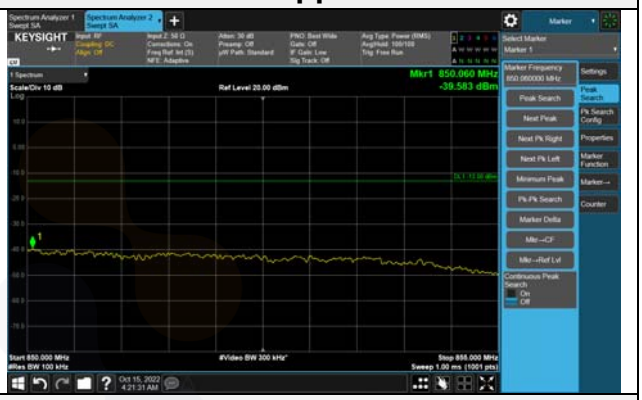
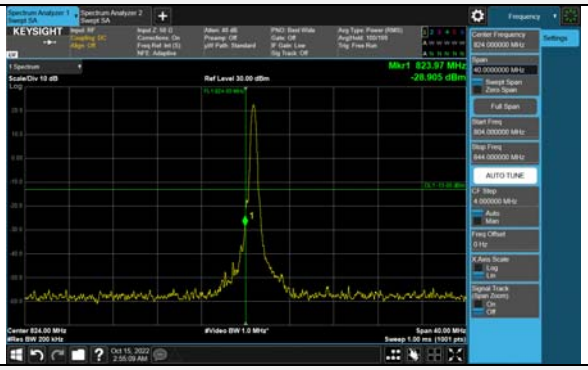
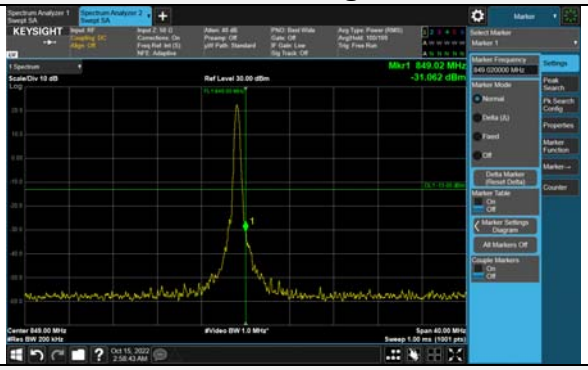
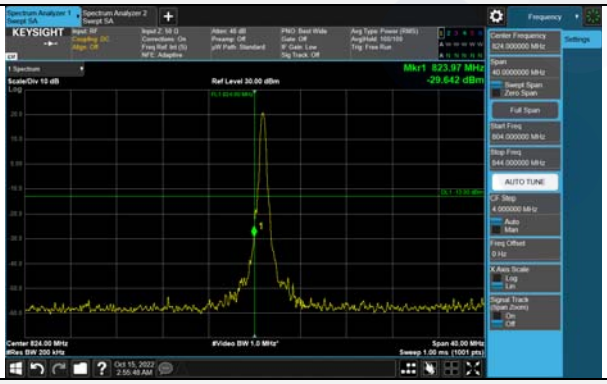
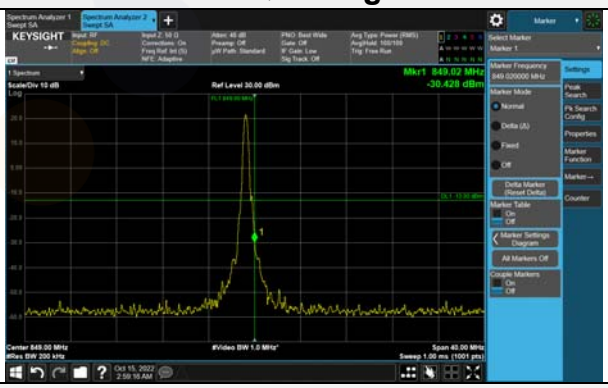
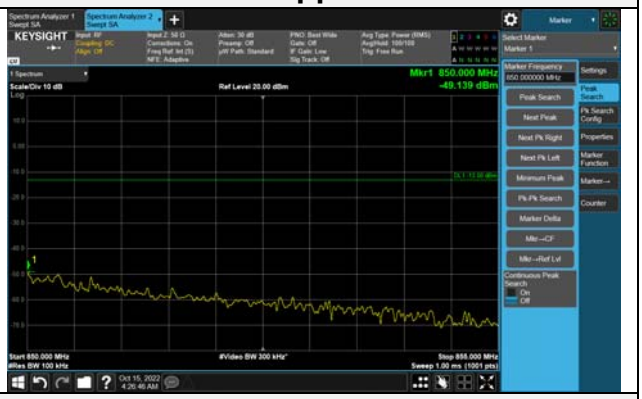
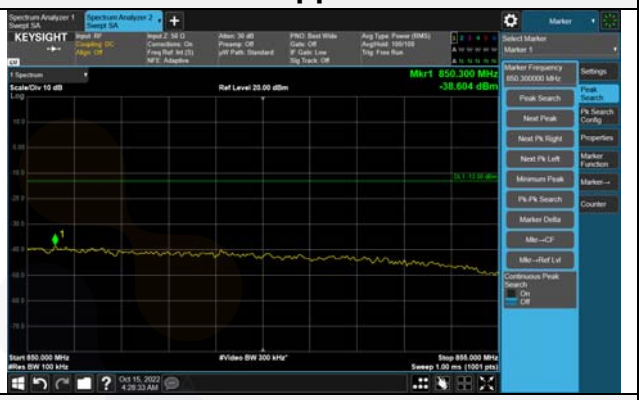
10M BW QPSK Low ch. 1RB	10M BW QPSK High ch. 1RB
	
10M BW QPSK Low ch. FRB	**10M BW QPSK High ch. FRB**
	
10M BW 16QAM Low ch. 1RB	**10M BW 16QAM High ch. 1RB**
	
10M BW 16QAM Low ch. FRB	**10M BW 16QAM High ch. FRB**
	

10M BW QPSK Lower extended 1RB	10M BW QPSK Upper extended 1RB
	
10M BW QPSK Lower extended FRB	**10M BW QPSK Upper extended FRB**
	
10M BW 16QAM Lower extended 1RB	**10M BW 16QAM Upper extended 1RB**
	
10M BW 16QAM Lower extended FRB	**10M BW 16QAM Upper extended FRB**
	

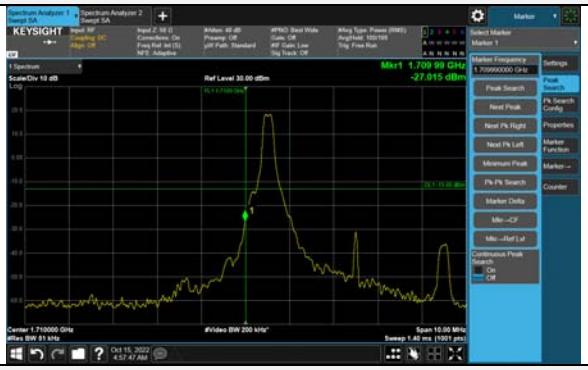
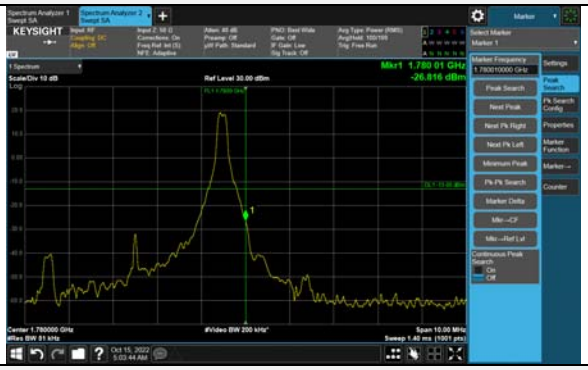
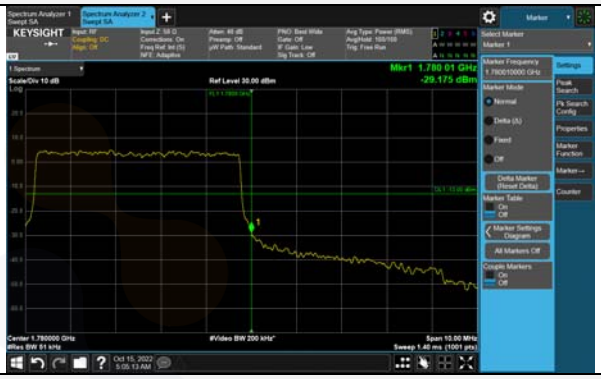
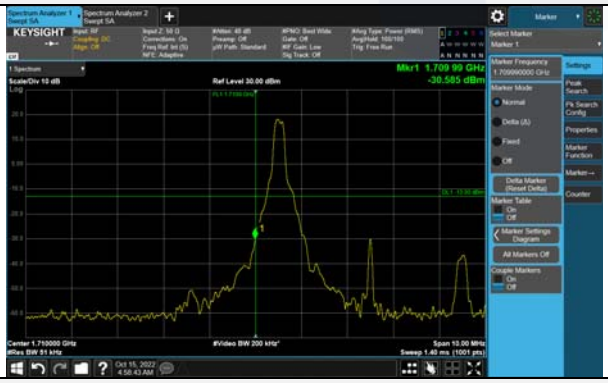
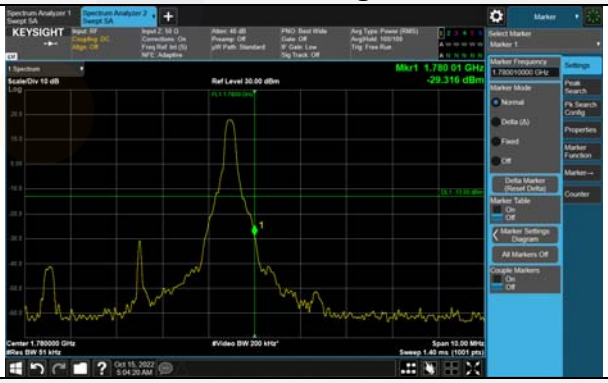
15M BW QPSK Low ch. 1RB	15M BW QPSK High ch. 1RB
	
15M BW QPSK Low ch. FRB	**15M BW QPSK High ch. FRB**
	
15M BW 16QAM Low ch. 1RB	**15M BW 16QAM High ch. 1RB**
	
15M BW 16QAM Low ch. FRB	**15M BW 16QAM High ch. FRB**
	

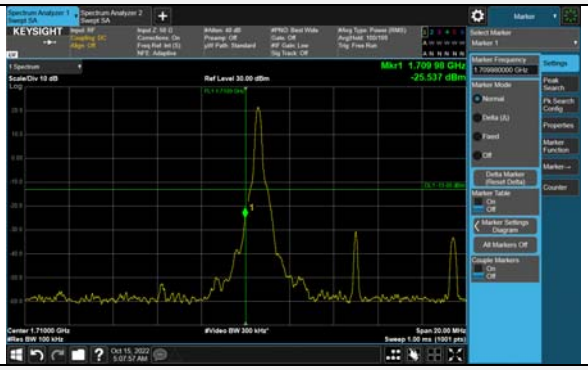
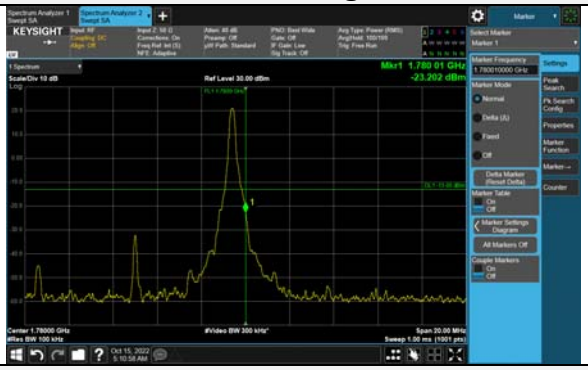
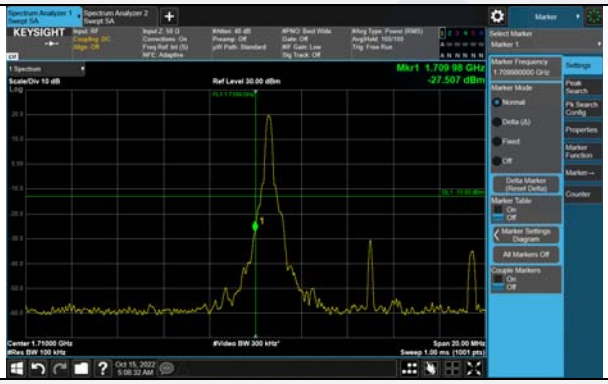
15M BW QPSK Lower extended 1RB	15M BW QPSK Upper extended 1RB
	
15M BW QPSK Lower extended FRB	**15M BW QPSK Upper extended FRB**
	
15M BW 16QAM Lower extended 1RB	**15M BW 16QAM Upper extended 1RB**
	
15M BW 16QAM Lower extended FRB	**15M BW 16QAM Upper extended FRB**
	

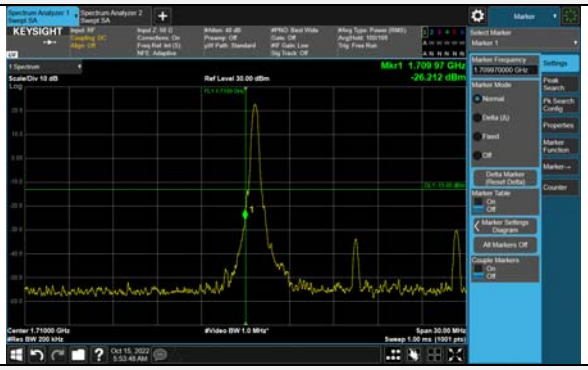
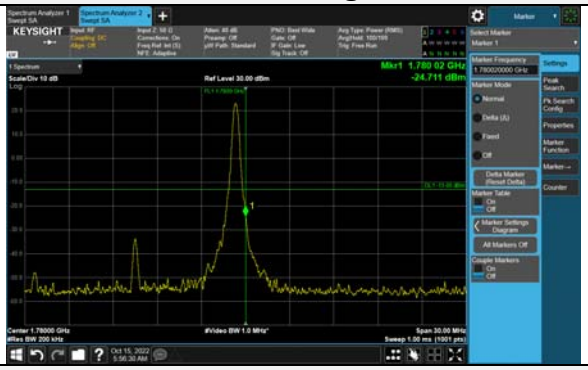
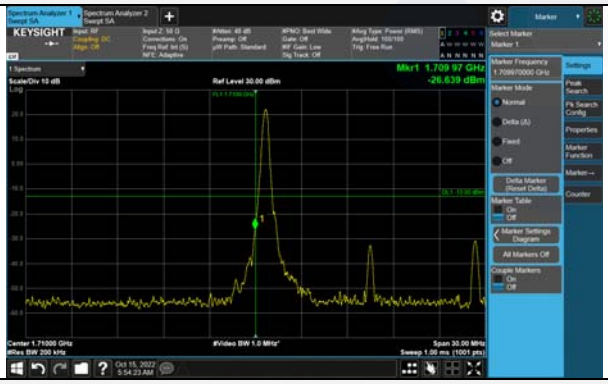
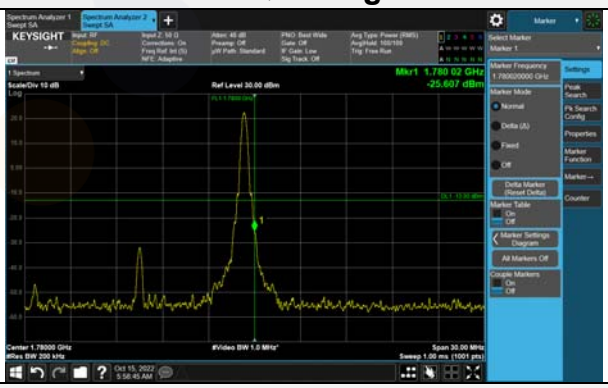
20M BW QPSK Low ch. 1RB	20M BW QPSK High ch. 1RB
	
20M BW QPSK Low ch. FRB	**20M BW QPSK High ch. FRB**
	
20M BW 16QAM Low ch. 1RB	**20M BW 16QAM High ch. 1RB**
	
20M BW 16QAM Low ch. FRB	**20M BW 16QAM High ch. FRB**
	

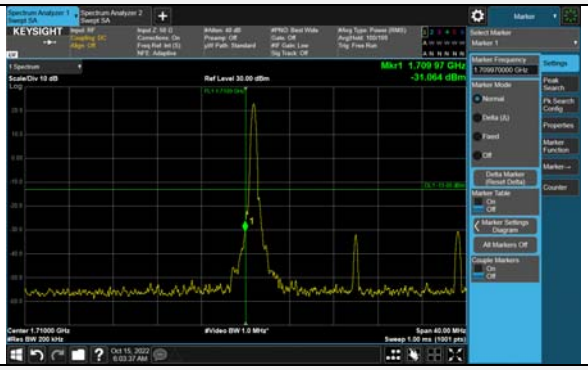
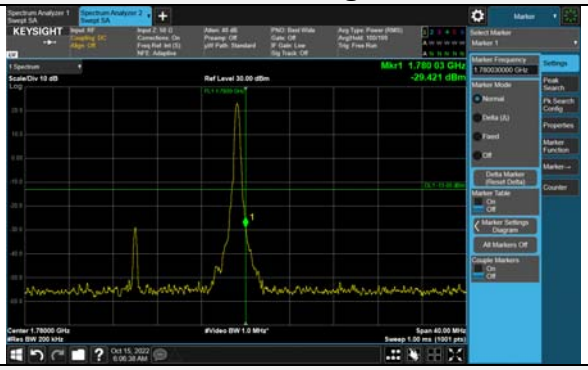
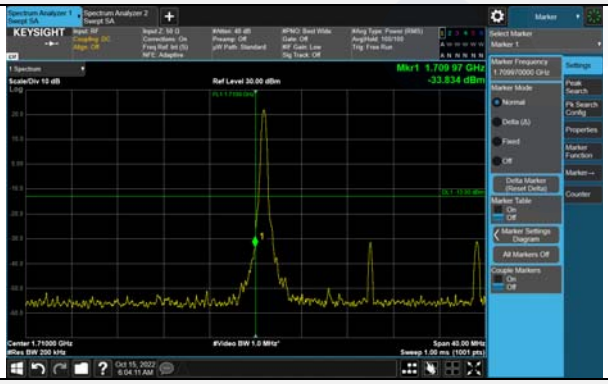
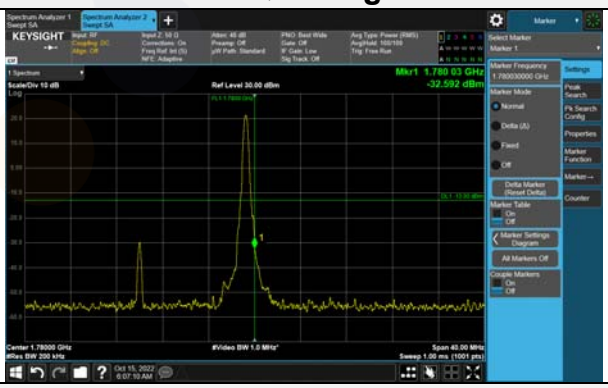
20M BW QPSK Lower extended 1RB	20M BW QPSK Upper extended 1RB
	
20M BW QPSK Lower extended FRB	**20M BW QPSK Upper extended FRB**
	
20M BW 16QAM Lower extended 1RB	**20M BW 16QAM Upper extended 1RB**
	
20M BW 16QAM Lower extended FRB	**20M BW 16QAM Upper extended FRB**
	

Test mode: NR N66

5M BW QPSK Low ch. 1RB	5M BW QPSK High ch. 1RB
	
5M BW QPSK Low ch. FRB	**5M BW QPSK High ch. FRB**
	
5M BW 16QAM Low ch. 1RB	**5M BW 16QAM High ch. 1RB**
	
5M BW 16QAM Low ch. FRB	**5M BW 16QAM High ch. FRB**
	

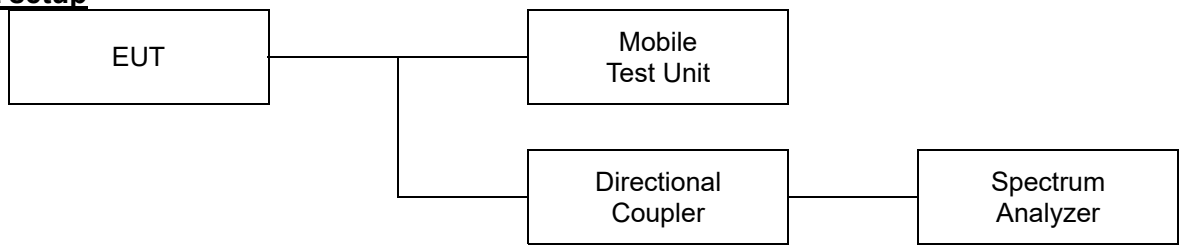
10M BW QPSK Low ch. 1RB	10M BW QPSK High ch. 1RB
	
10M BW QPSK Low ch. FRB	**10M BW QPSK High ch. FRB**
	
10M BW 16QAM Low ch. 1RB	**10M BW 16QAM High ch. 1RB**
	
10M BW 16QAM Low ch. FRB	**10M BW 16QAM High ch. FRB**
	

15M BW QPSK Low ch. 1RB	15M BW QPSK High ch. 1RB
	
15M BW QPSK Low ch. FRB	**15M BW QPSK High ch. FRB**
	
15M BW 16QAM Low ch. 1RB	**15M BW 16QAM High ch. 1RB**
	
15M BW 16QAM Low ch. FRB	**15M BW 16QAM High ch. FRB**
	

20M BW QPSK Low ch. 1RB	20M BW QPSK High ch. 1RB
	
20M BW QPSK Low ch. FRB	**20M BW QPSK High ch. FRB**
	
20M BW 16QAM Low ch. 1RB	**20M BW 16QAM High ch. 1RB**
	
20M BW 16QAM Low ch. FRB	**20M BW 16QAM High ch. FRB**
	

7.5. Peak to Average Power Ratio (PAPR)

Test setup



Limit

According to §27.50(d)(5), the peak-to-average ratio(PAR) of the transmission must not exceed 13 dB.

Test procedure

971168 D01 v03r01 - Section 5.7.2
971168 D02 v02r01 – Section VII
ANSI 63.26-2015 – Section 5.2.3.4

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%

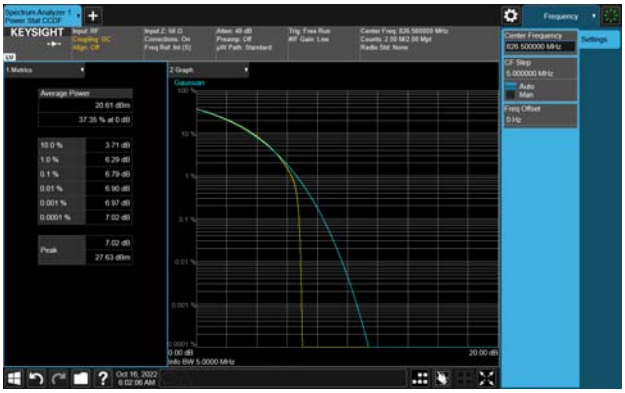
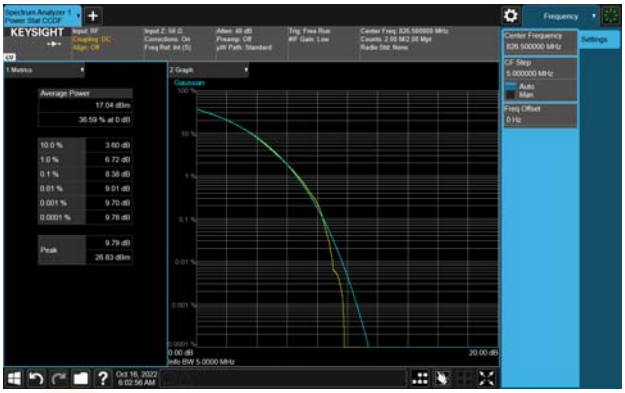
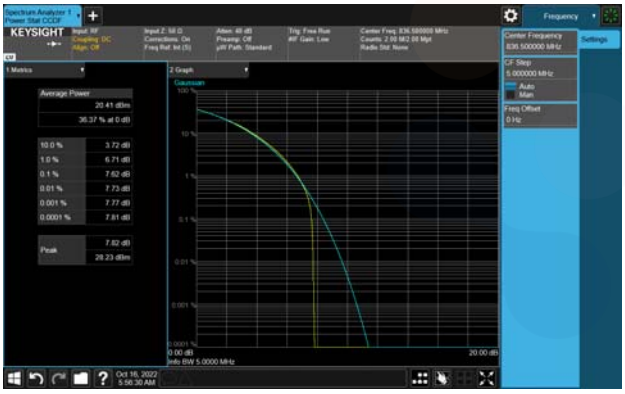
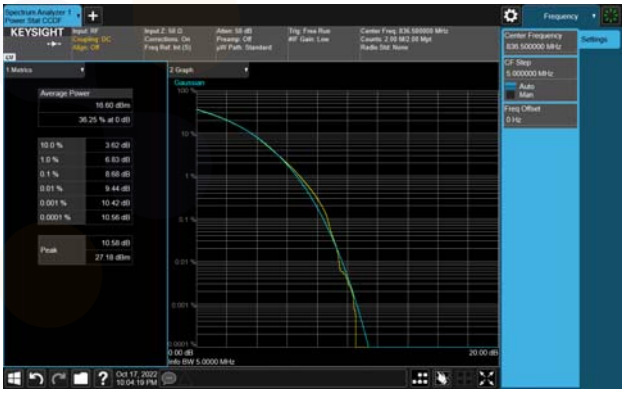
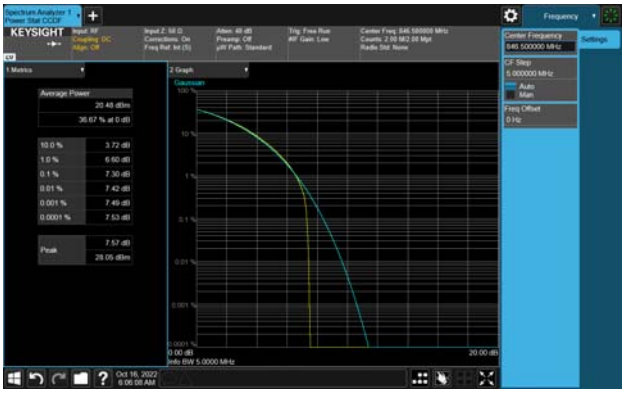
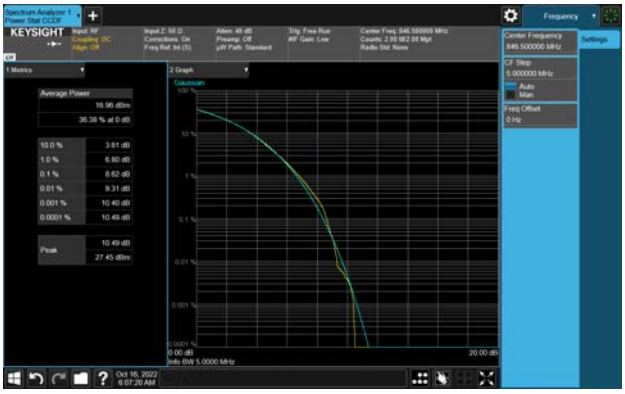
5.2.6 Peak-to-average power ratio

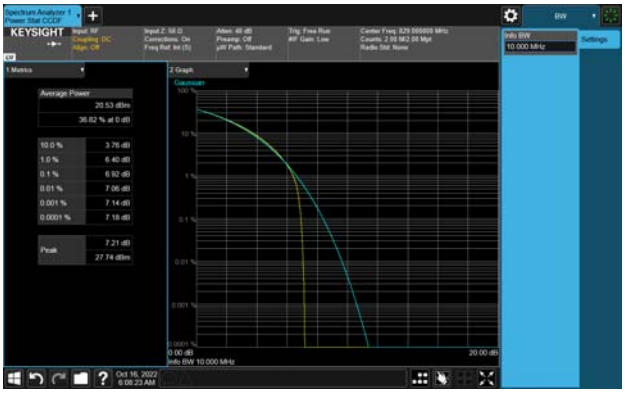
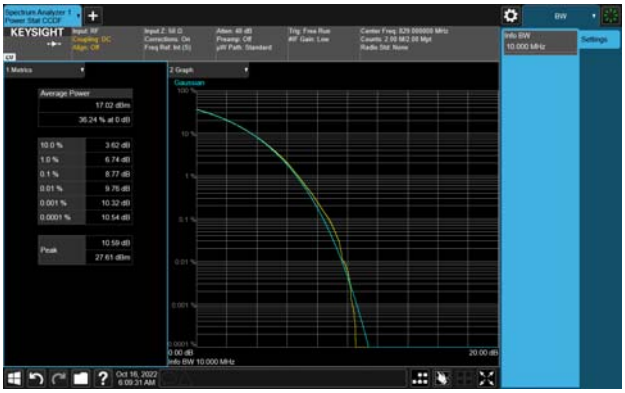
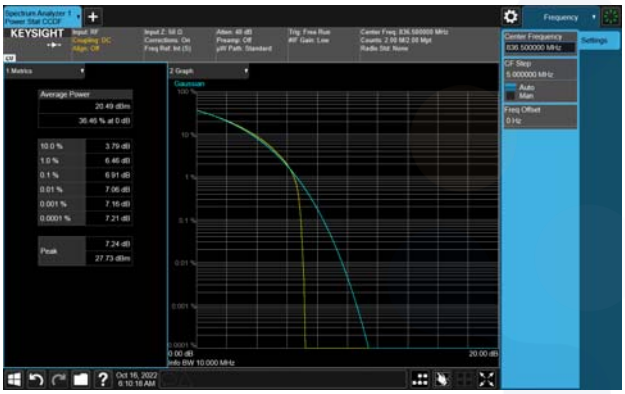
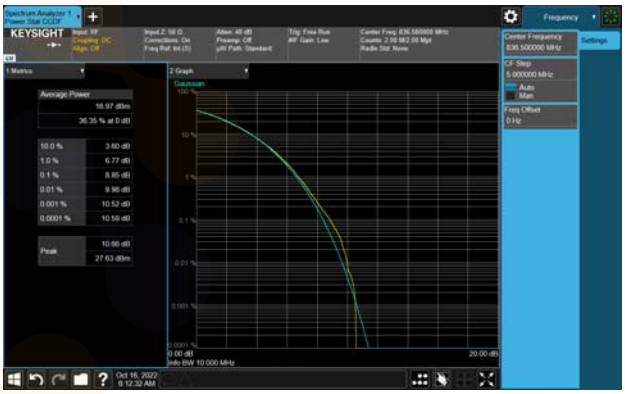
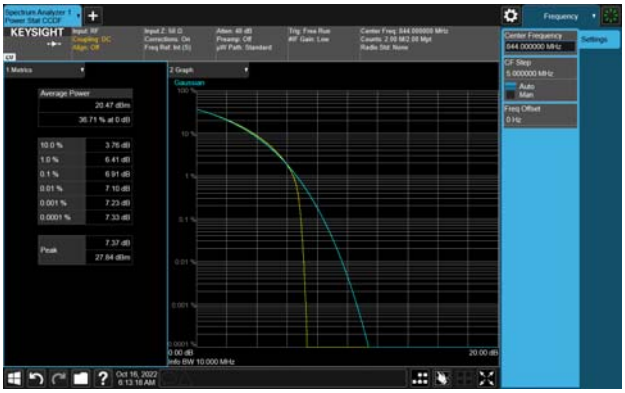
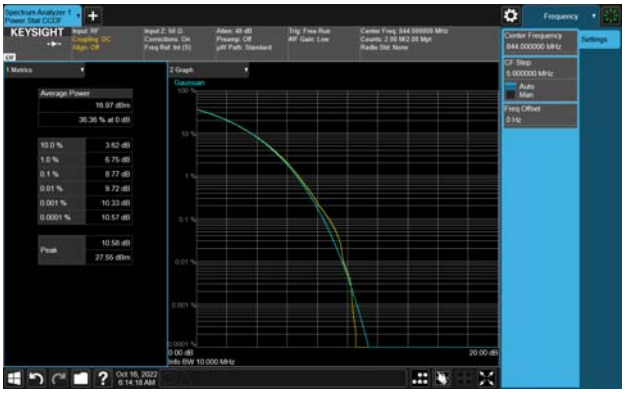
Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as P_{PK}.
Use one of the applicable procedure presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{AG}. Determine the P.A.P.R from:

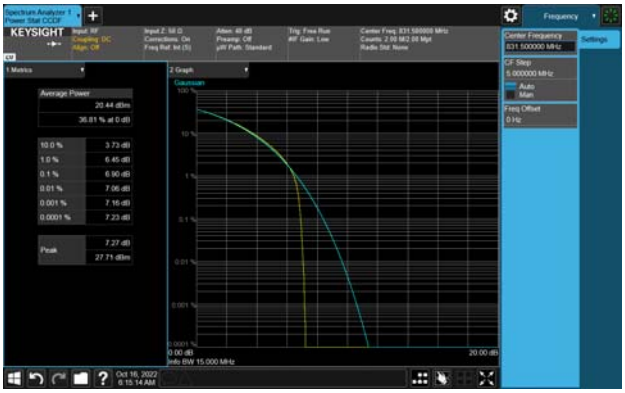
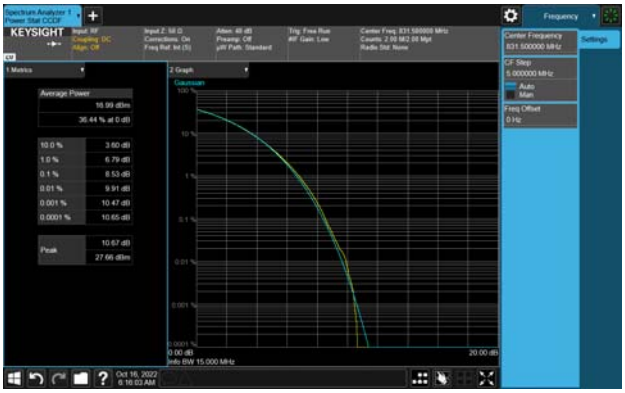
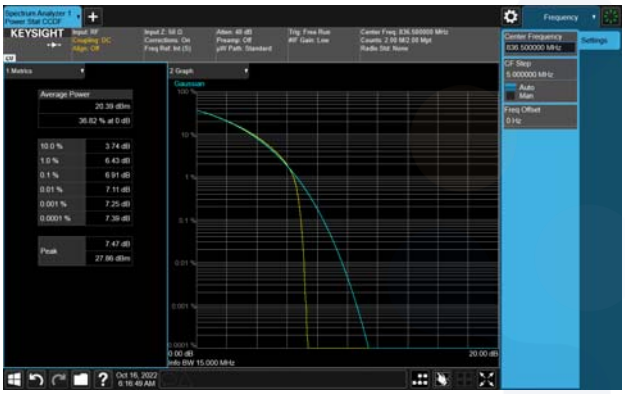
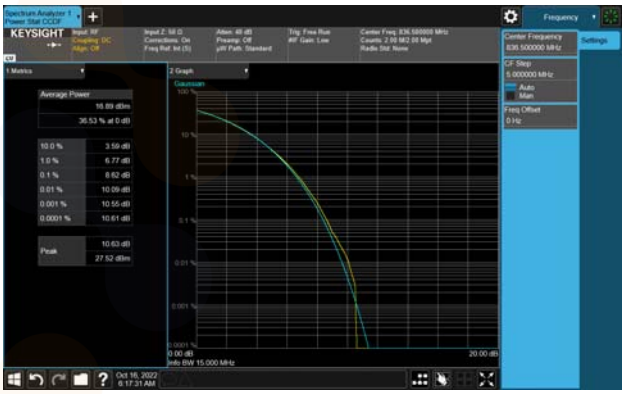
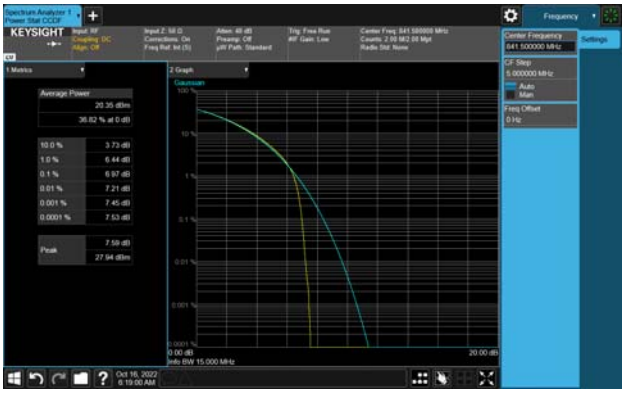
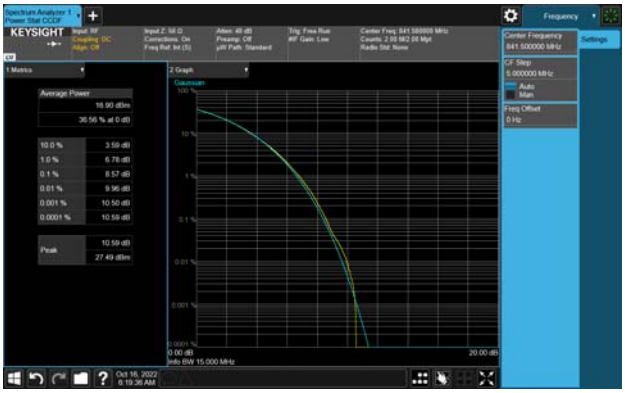
$PAPR(dB) = P_{PK}(dBm \text{ or } dBW) - P_{AG}(dBm \text{ or } dBW)$

Test results

Test mode: NR N5

5M BW QPSK Low ch.	5M BW 256QAM Low ch.
	
5M BW QPSK Mid ch.	**5M BW 256QAM Mid ch.**
	
5M BW QPSK High ch.	**5M BW 256QAM High ch.**
	

10M BW QPSK Low ch.	10M BW 256QAM Low ch.
	
10M BW QPSK Mid ch.	**10M BW 256QAM Mid ch.**
	
10M BW QPSK High ch.	**10M BW 256QAM High ch.**
	

15M BW QPSK Low ch.	15M BW 256QAM Low ch.
	
15M BW QPSK Mid ch.	**15M BW 256QAM Mid ch.**
	
15M BW QPSK High ch.	**15M BW 256QAM High ch.**
	

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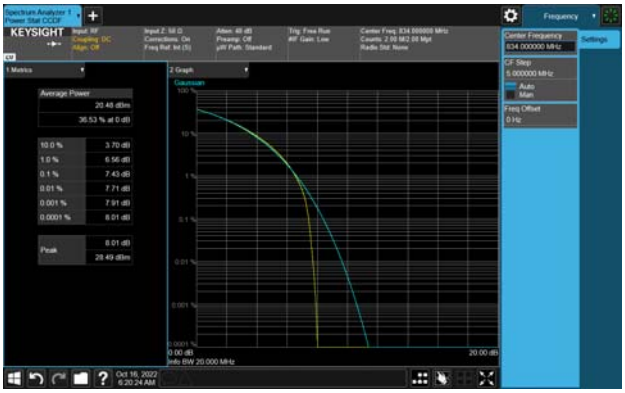	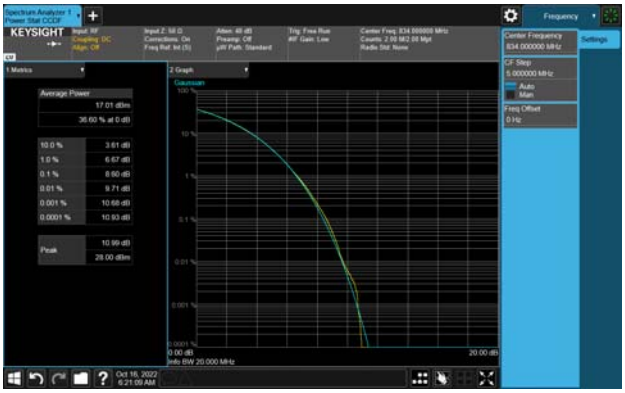
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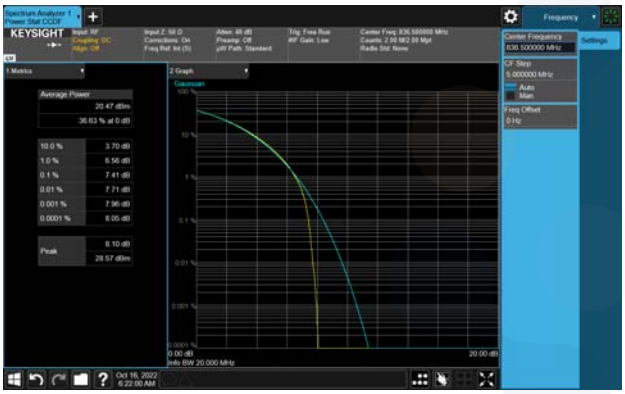	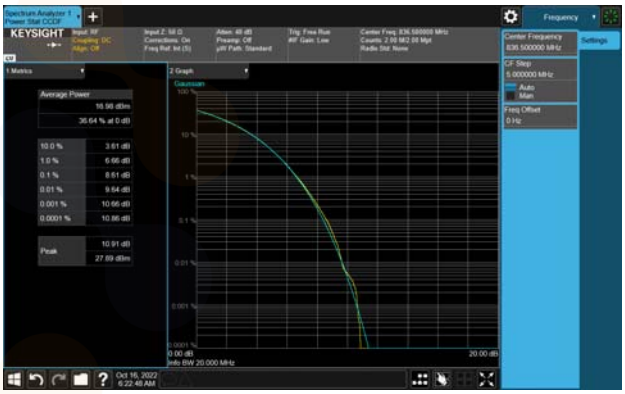
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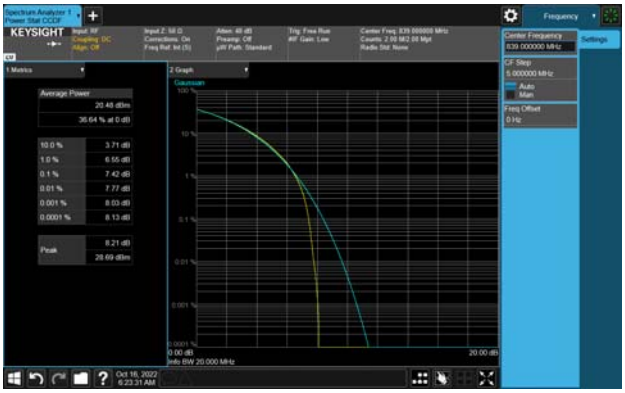
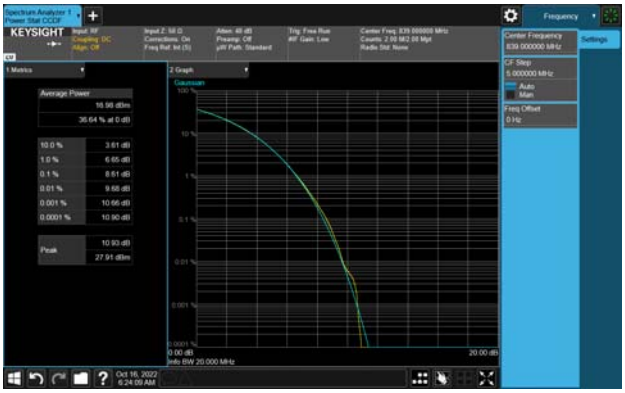
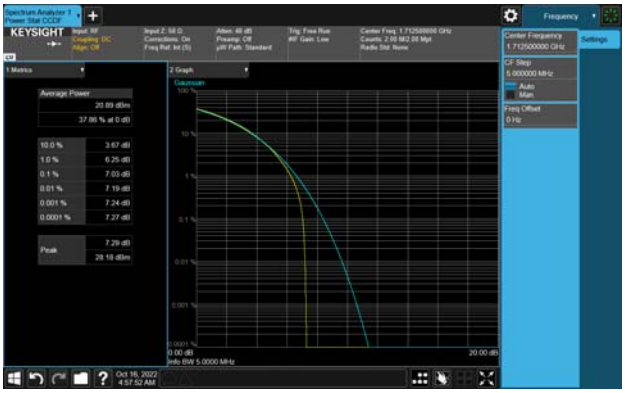
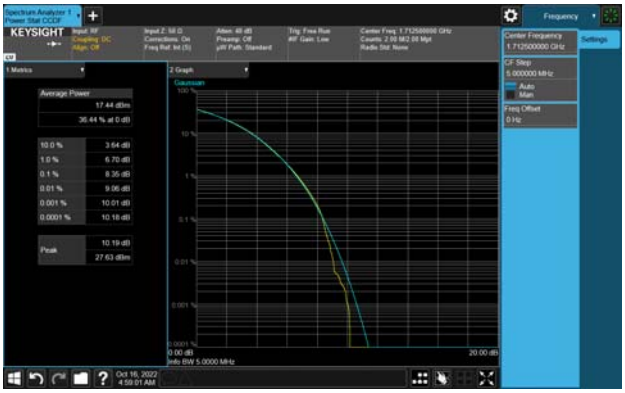
	

Test mode: NR nN66

5M BW QPSK Low ch.	5M BW 256QAM Low ch.
	
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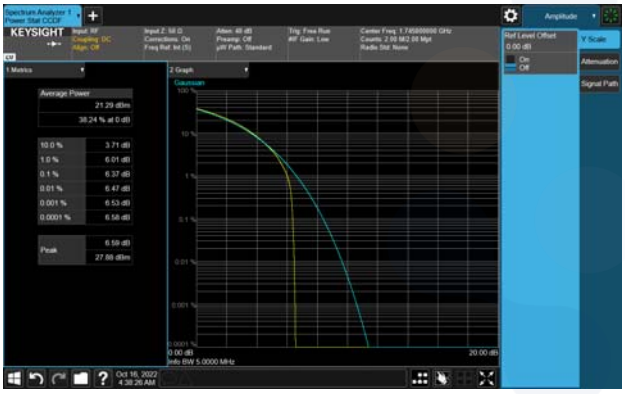	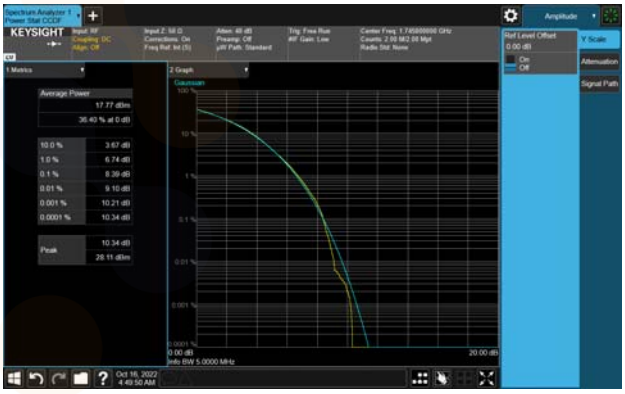
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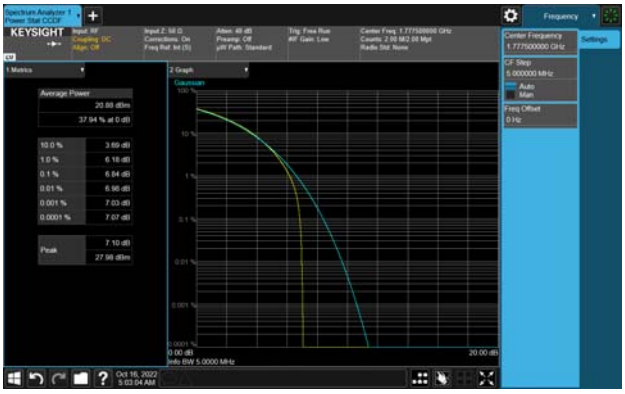	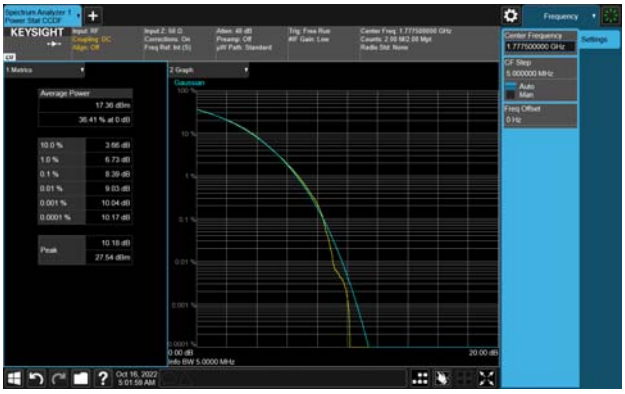

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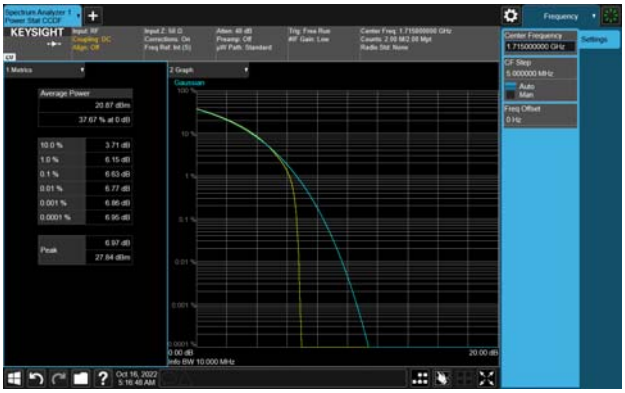	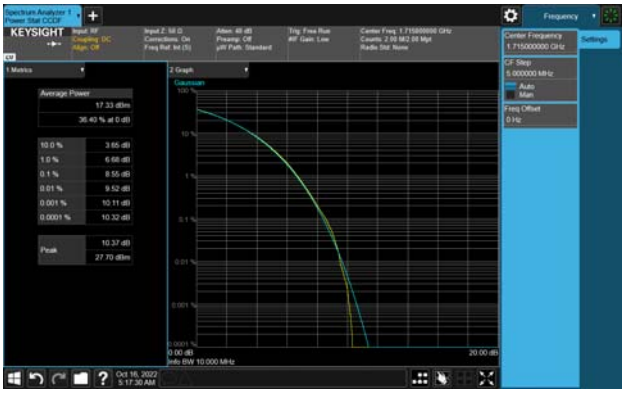
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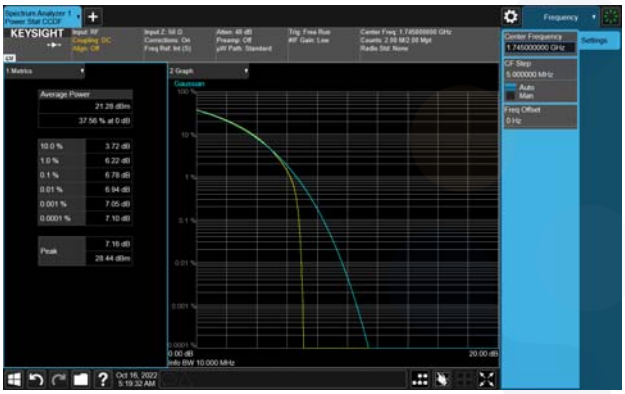
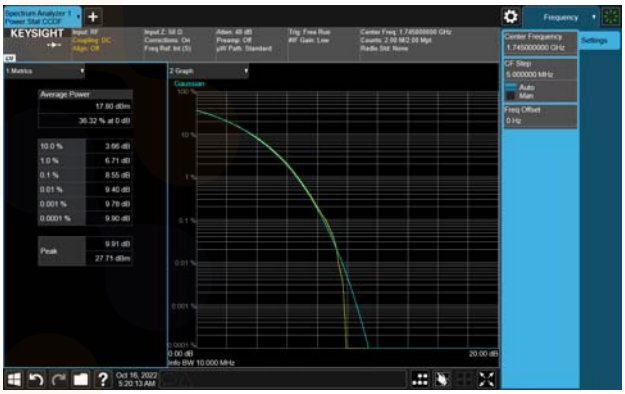
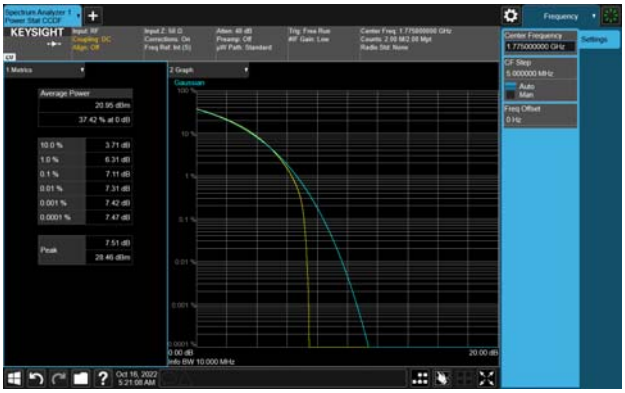
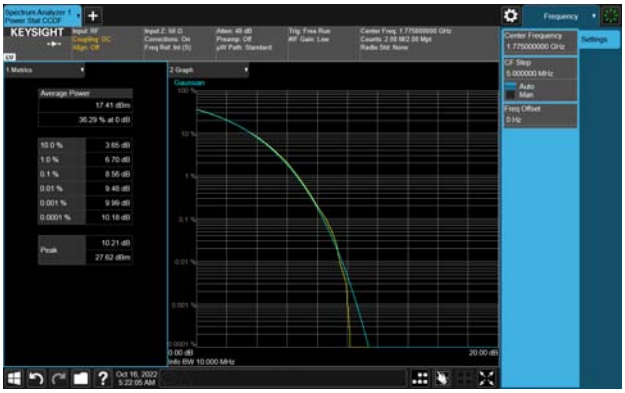
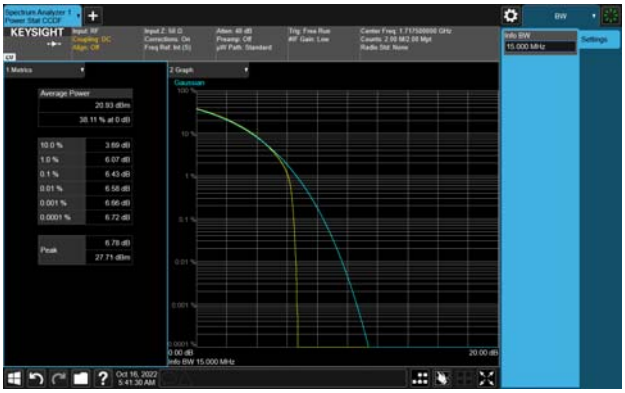
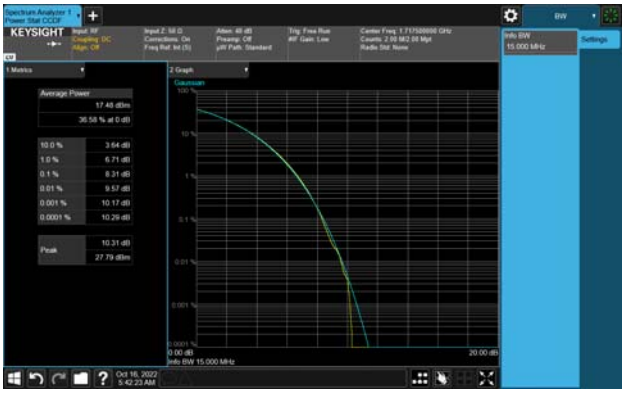
	
10M BW QPSK High ch.	**10M BW 256QAM High ch.**
	

15M BW QPSK Low ch.	15M BW 256QAM Low ch.
	
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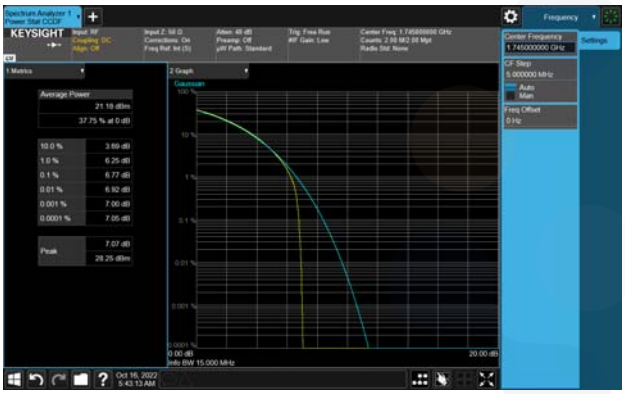
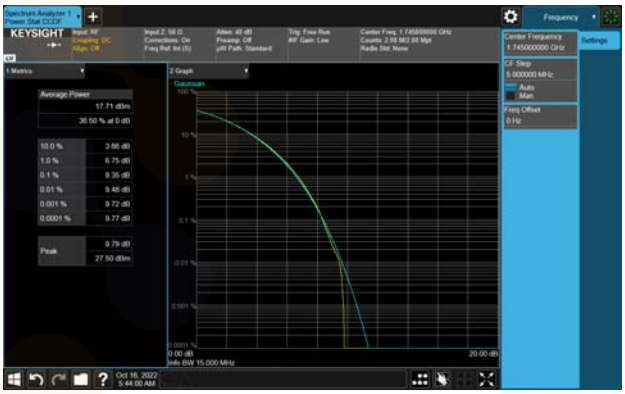
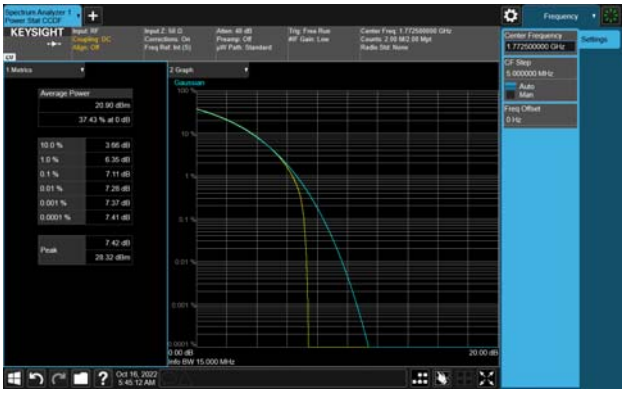
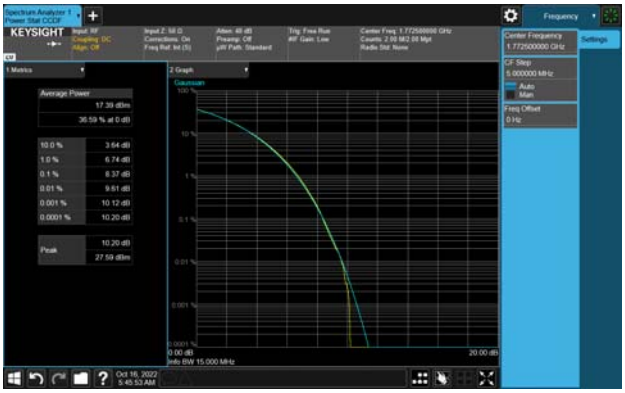
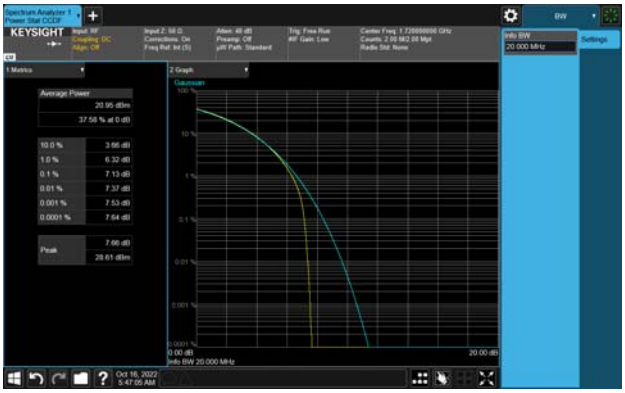
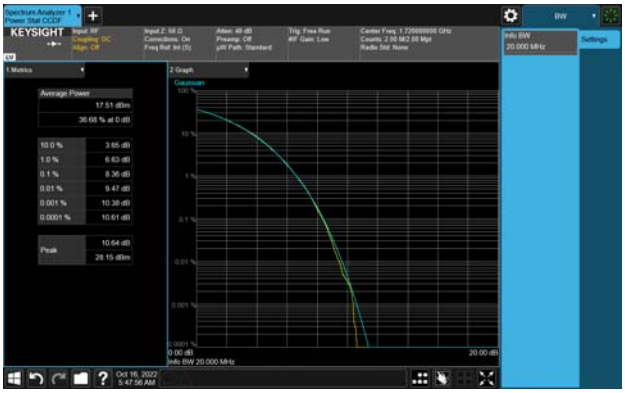
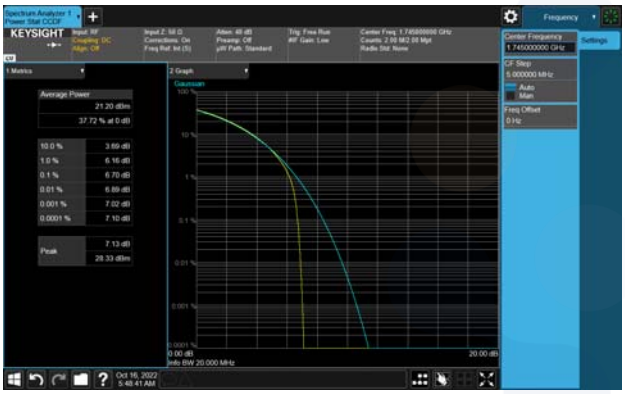
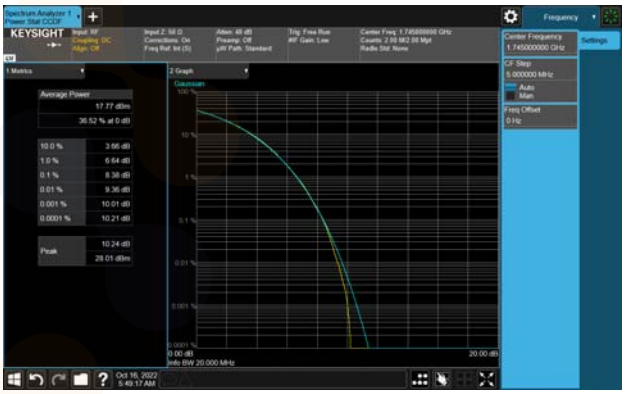
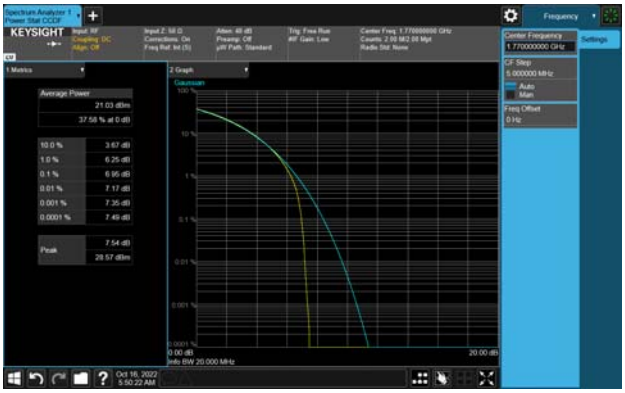
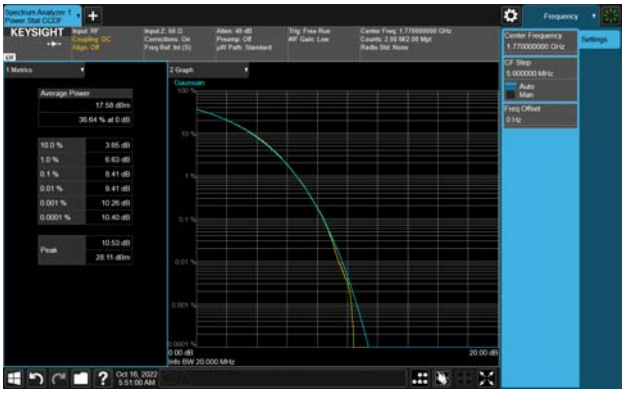
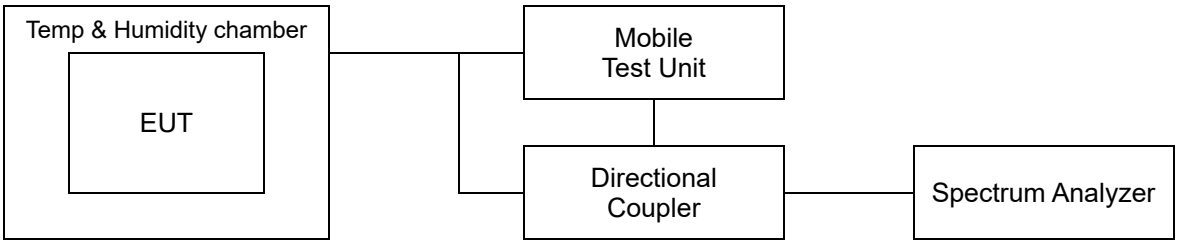
	
15M BW QPSK High ch.	**15M BW 256QAM High ch.**
	

20M BW QPSK Low ch.	20M BW 256QAM Low ch.
	
20M BW QPSK Mid ch.	**20M BW 256QAM Mid ch.**
	
20M BW QPSK High ch.	**20M BW 256QAM High ch.**
	

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 §22.355,

The carrier frequency of each transmitter in the public mobile services must be maintained within the tolerances given in Table of this section.

For mobile devices operating in the 824 to 849 ㎒ band at a power level than or equal to 3 Watts, the limit specified in Table C-1 is ±2.5 ppm.

According to §27.54,
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block (bands of operation).

Test procedure
ANSI 63.26-2015 – Section 5.6

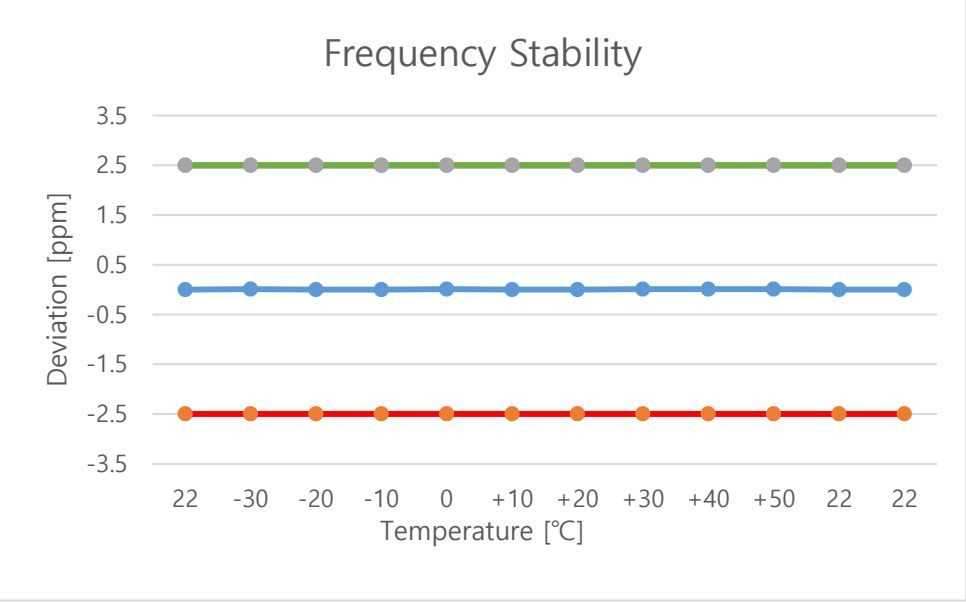
Test settings

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

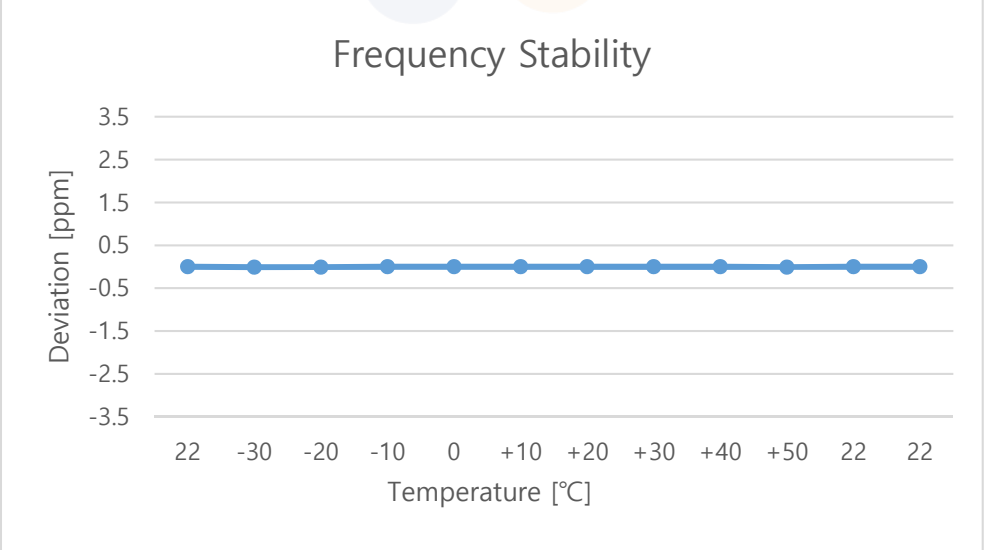
Test mode	:	5GNR N5
Waveform	:	DFT-s OFDM
SCS (㎑)	:	15
Frequency (㎐)	:	836 500 000
Channel	:	167300
Deviation limit	:	±0.00025% or 2.5ppm

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	7.72	+23(Ref)	836,500,000	-0.0000005	0.0	0.000000
		30	836,500,000	-0.0000042	0.0	0.000000
		-20	836,500,000	-0.0000021	0.0	0.000000
		-10	836,500,000	-0.0000022	0.0	0.000000
		0	836,500,000	-0.0000013	0.0	0.000000
		+10	836,500,000	-0.0000005	0.0	0.000000
		+20	836,500,000	0.0000014	0.0	0.000000
		+30	836,500,000	0.0000009	0.0	0.000000
		+40	836,500,000	-0.0000010	0.0	0.000000
		+50	836,500,000	-0.0000019	0.0	0.000000
115%	8.88	+23(Ref)	836,500,000	0.0000033	0.0	0.000000
End point	7.00	+23(Ref)	836,500,000	0.0000030	0.0	0.000000



Test mode : 5GNR N66
Waveform : DFT-s OFDM
SCS (㎑) : 15
Frequency (㎐) : 1 745 000 000
Channel : 349000
Deviation limit : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized bands of operation.

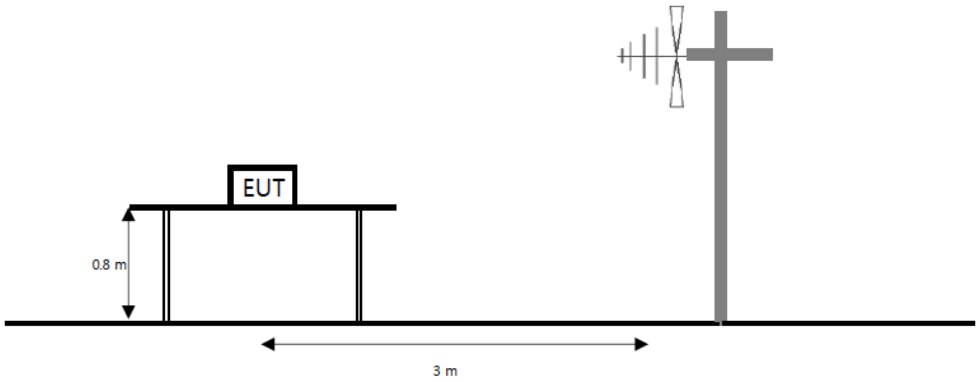
Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	7.72	+23(Ref)	1,745,000,000	0.0000028	0.0	0.000000
		30	1,745,000,000	-0.0000061	0.0	0.000000
		-20	1,745,000,000	-0.0000055	0.0	0.000000
		-10	1,745,000,000	-0.0000028	0.0	0.000000
		0	1,745,000,000	-0.0000026	0.0	0.000000
		+10	1,745,000,000	-0.0000011	0.0	0.000000
		+20	1,745,000,000	0.0000037	0.0	0.000000
		+30	1,745,000,000	0.0000044	0.0	0.000000
		+40	1,745,000,000	0.0000050	0.0	0.000000
		+50	1,745,000,000	0.0000068	0.0	0.000000
115%	8.88	+23(Ref)	1,745,000,000	0.0000012	0.0	0.000000
End point	7.00	+23(Ref)	1,745,000,000	0.0000004	0.0	0.000000



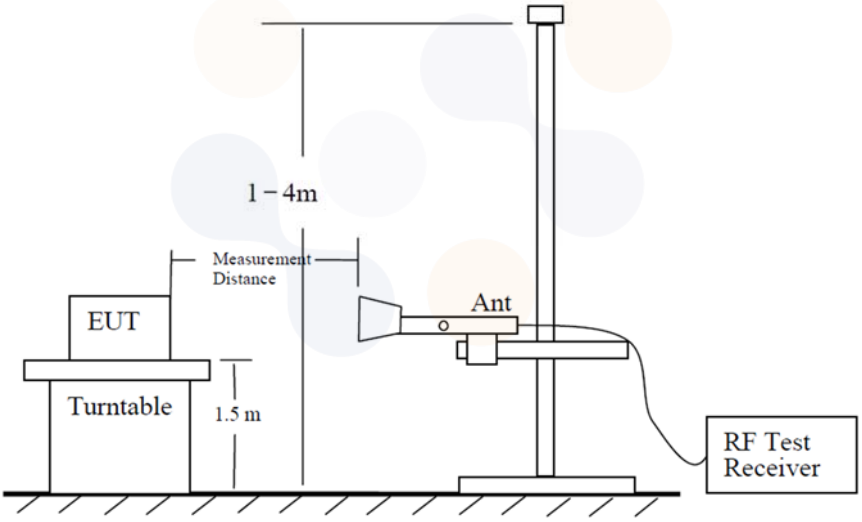
7.7. Radiated Power (ERP/EIRP)

Test setup

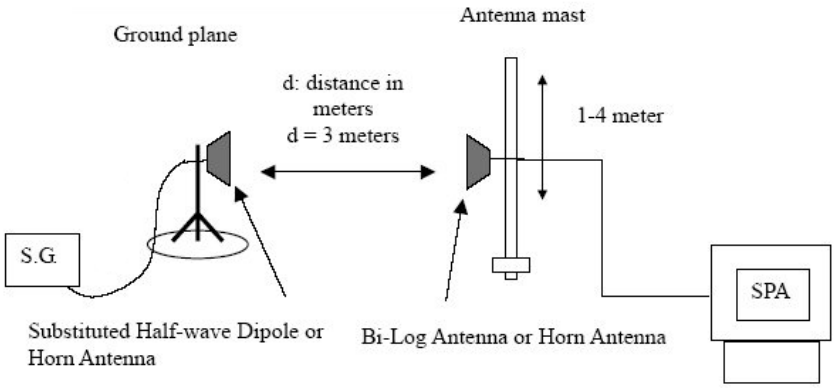
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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 §22.913(a)(5), the ERP of transmitters in the cellular radiotelephone service must not exceed the limits in this section. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to §27.50(d)(4), Fixed, mobile and portable (hand-held) stations operating in the 1710-1755 ㎒ and 1755-1780 ㎒ bands are limited to 1 watt EIRP.

Test procedure

971168 D01 v03r01 - Section 5.2 and 5.8, 412172 D01 v01r01
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.
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

Test mode: 5GNR N5

Bandwidth	Waveform	SCS (㎑)	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
				[㎒]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
5 M	DFT-s OFDM	15	QPSK	826.5	H	0.13	4.89	28.47	23.71	0.235
				836.5	H	-0.32	4.97	28.70	23.41	0.219
				846.5	H	-0.73	5.03	28.44	22.68	0.185
			16QAM	826.5	H	0.13	4.89	27.47	22.71	0.187
				836.5	H	-0.32	4.97	27.57	22.28	0.169
				846.5	H	-0.73	5.03	27.69	21.93	0.156
10 M			QPSK	829.0	H	0.18	4.91	28.72	23.99	0.251
				836.5	H	-0.32	4.97	28.69	23.40	0.219
				844.0	H	-0.68	5.03	28.21	22.50	0.178
			16QAM	829.0	H	0.18	4.91	27.79	23.06	0.202
				836.5	H	-0.32	4.97	27.99	22.70	0.186
				844.0	H	-0.68	5.03	27.46	21.75	0.150
15 M			QPSK	831.5	H	0.08	4.92	28.69	23.85	0.243
				836.5	H	-0.32	4.97	28.64	23.35	0.216
				841.5	H	-0.63	5.02	28.48	22.83	0.192
			16QAM	831.5	H	0.08	4.92	27.86	23.02	0.200
				836.5	H	-0.32	4.97	27.92	22.63	0.183
				841.5	H	-0.63	5.02	27.71	22.06	0.161
20 M			QPSK	834.0	H	-0.12	4.95	28.41	23.34	0.216
				836.5	H	-0.32	4.97	28.92	23.63	0.231
				839.0	H	-0.52	4.99	29.34	23.83	0.242
			16QAM	834.0	H	-0.12	4.95	27.47	22.40	0.174
				836.5	H	0.13	4.97	27.46	22.62	0.183
				839.0	H	-0.32	4.99	28.39	23.08	0.203

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

Test mode: 5GNR n66

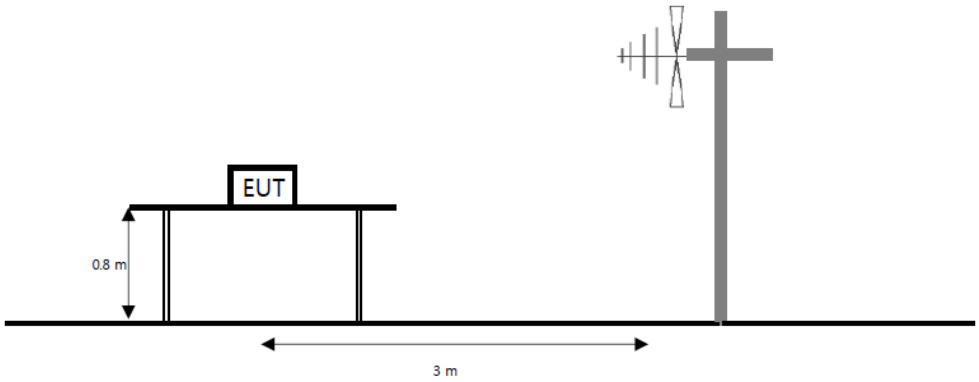
Bandwidth	Waveform	SCS (㎑)	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
				[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
5 M	DFT-s OFDM	15	QPSK	1712.5	H	5.41	6.88	25.53	24.05	0.254
				1745.0	H	5.31	6.93	21.84	20.22	0.105
				1777.5	H	5.22	7.02	25.12	23.32	0.215
			16QAM	1712.5	H	5.41	6.88	24.54	23.06	0.202
				1745.0	H	5.31	6.93	21.04	19.42	0.087
				1777.5	H	5.22	7.02	24.30	22.50	0.178
10 M			QPSK	1715.0	H	5.40	6.87	25.17	23.70	0.234
				1745.0	H	5.31	6.93	21.79	20.17	0.104
				1775.0	H	5.23	7.00	24.88	23.11	0.205
			16QAM	1715.0	H	5.40	6.87	24.54	23.07	0.203
				1745.0	H	5.31	6.93	20.90	19.28	0.085
				1775.0	H	5.23	7.00	23.93	22.16	0.164
15 M			QPSK	1717.5	H	5.39	6.89	25.41	23.91	0.246
				1745.0	H	5.31	6.93	21.70	20.08	0.102
				1772.5	H	5.24	7.00	24.76	23.00	0.200
			16QAM	1717.5	H	5.39	6.89	24.77	23.27	0.212
				1745.0	H	5.31	6.93	20.59	18.97	0.079
				1772.5	H	5.24	7.00	23.85	22.09	0.162
20 M			QPSK	1720.0	H	5.38	6.89	25.34	23.83	0.242
				1745.0	H	5.31	6.93	21.79	20.17	0.104
				1770.0	H	5.24	7.00	24.72	22.96	0.198
			16QAM	1720.0	H	5.38	6.89	24.38	22.87	0.194
				1745.0	H	5.31	6.93	20.90	19.28	0.085
				1770.0	H	5.24	7.00	23.79	22.03	0.160

Note.
1. E.R.P & E.I.R.P(㏈m) = Substitute Level(㏈) + Antenna gain(㏈d&㏈i) - C.L(Cable loss) (㏈)

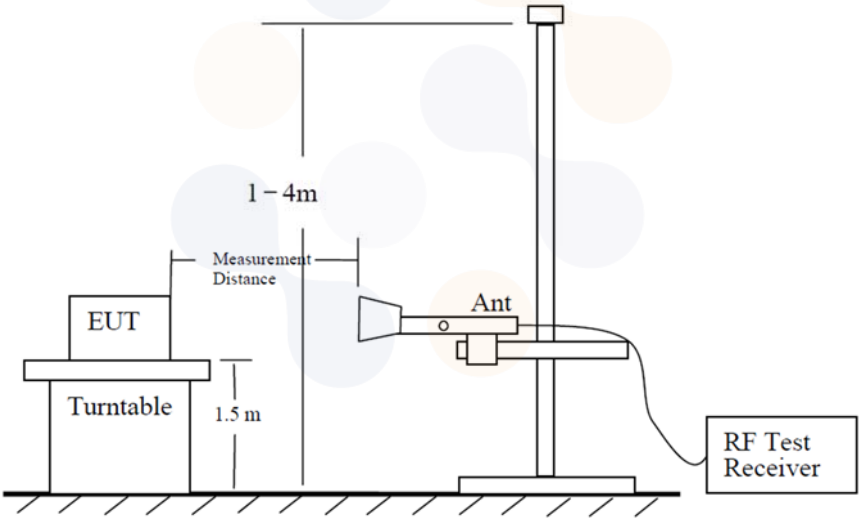
7.8. Radiated Spurious Emissions

Test setup

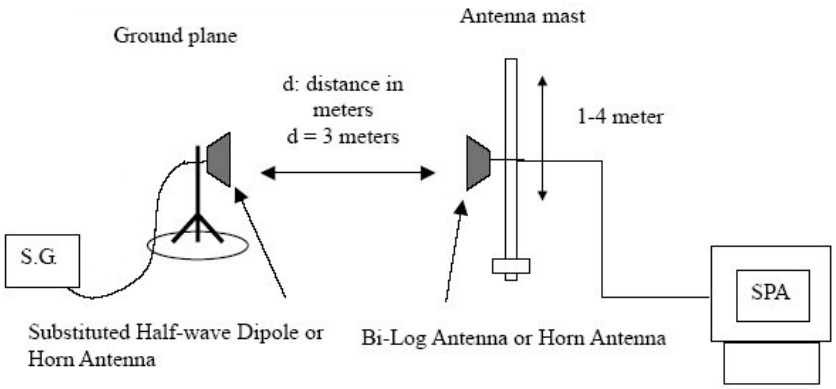
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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 §22.917(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log($P_{[Watts]}$) ㏈.

According to §27.53(h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10log($P_{[Watts]}$) ㏈.

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 ㎒)

Test mode : 5GNR N5
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 829.0
Channel : 165800
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 648.65	H	5.58	6.76	-59.82	-61.00	-13.00	48.00
	2 470.43	V	6.01	8.33	-53.48	-55.80	-13.00	42.80
	3 295.91	V	7.69	10.11	-53.88	-56.30	-13.00	43.30
	4 118.93	H	8.97	11.60	-53.87	-56.50	-13.00	43.50

Test mode : 5GNR N5
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 836.5
Channel : 167300
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 663.83	V	5.54	6.70	-57.74	-58.90	-13.00	45.90
	2 495.46	V	6.09	8.38	-53.21	-55.50	-13.00	42.50
	3 325.04	V	7.75	10.18	-54.27	-56.70	-13.00	43.70
	4 156.26	V	8.99	11.39	-54.50	-56.90	-13.00	43.90

Test mode : 5GNR N5
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 844.0
Channel : 168800
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 699.11	V	5.44	6.80	-56.44	-57.80	-13.00	44.80
	2 547.16	V	6.19	8.47	-52.12	-54.40	-13.00	41.40
	3 394.79	V	7.89	10.33	-54.86	-57.30	-13.00	44.30
	4 244.88	H	9.05	11.63	-53.22	-55.80	-13.00	42.80

Note.
1. E.R.P & E.I.R.P(㏈m) = Substitute Level(㏈) + Antenna gain(㏈d&㏈i) - C.L(Cable loss) (㏈)

Test mode : 5GNR N66
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1712.5
Channel : 342500
Bandwidth(㎒) : 5

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 420.00	V	7.94	10.39	-55.95	-58.40	-13.00	45.40
	5 130.00	V	9.93	13.09	-53.44	-56.60	-13.00	43.60
	6 839.25	H	11.44	15.26	-50.08	-53.90	-13.00	40.90
	8 549.25	V	12.90	16.90	-49.10	-53.10	-13.00	40.10

Test mode : 5GNR N66
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1745.0
Channel : 349000
Bandwidth(㎒) : 5

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 495.00	H	8.09	10.55	-53.94	-56.40	-13.00	43.40
	5 241.75	V	10.04	13.06	-52.28	-55.30	-13.00	42.30
	6 990.00	H	11.59	15.36	-50.53	-54.30	-13.00	41.30
	8 737.50	V	12.90	17.31	-48.99	-53.40	-13.00	40.40

Test mode : 5GNR N66
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1777.5
Channel : 355500
Bandwidth(㎒) : 5

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 555.75	V	8.19	10.13	-55.46	-57.40	-13.00	44.40
	5 332.50	H	10.13	13.26	-52.67	-55.80	-13.00	42.80
	7 109.25	V	11.62	15.33	-49.09	-52.80	-13.00	39.80
	8 889.00	V	12.90	17.04	-48.76	-52.90	-13.00	39.90

Note.
1. E.R.P & E.I.R.P(㏈m) = Substitute Level(㏈) + Antenna gain(㏈d&㏈i) - C.L(Cable loss) (㏈)

EN-DC Mode

Test mode : 2A-n5A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 829.0
Channel : 165800
Bandwidth(㎒) : 3 (LTE), 10 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 648.24	H	5.58	6.76	-57.22	-58.40	-13.00	45.40
	2 470.02	V	6.01	8.33	-51.08	-53.40	-13.00	40.40
	3 295.09	H	7.69	10.11	-51.88	-54.30	-13.00	41.30
	4 119.75	V	8.97	11.60	-50.97	-53.60	-13.00	40.60

Test mode : 66A-n5A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 829.0
Channel : 165800
Bandwidth(㎒) : 1.4 (LTE), 10 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 649.88	V	5.58	6.76	-57.22	-58.40	-13.00	45.40
	2 470.43	V	6.01	8.33	-52.38	-54.70	-13.00	41.70
	3 294.68	H	7.69	10.11	-52.88	-55.30	-13.00	42.30
	4 119.34	V	8.97	11.60	-53.07	-55.70	-13.00	42.70

Test mode : 2A-n66A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1712.5
Channel : 342500
Bandwidth(㎒) : 3 (LTE), 5 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 420.66	V	7.94	10.39	-54.15	-56.60	-13.00	43.60
	5 130.09	H	9.93	13.09	-52.94	-56.10	-13.00	43.10
	6 842.72	V	11.44	15.26	-48.68	-52.50	-13.00	39.50
	8 550.24	H	12.90	16.90	-50.30	-54.30	-13.00	41.30

Note.
1. E.R.P & E.I.R.P(㏈m) = Substitute Level(㏈) + Antenna gain(㏈d&㏈i) - C.L(Cable loss) (㏈)

Test mode : 5A-n66A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1712.5
Channel : 342500
Bandwidth(㎒) : 1.4 (LTE), 5 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 418.74	V	7.94	10.38	-56.06	-58.50	-13.00	45.50
	5 130.09	H	9.93	13.09	-53.04	-56.20	-13.00	43.20
	6 840.80	V	11.44	15.26	-49.98	-53.80	-13.00	40.80
	8 550.24	H	12.90	16.90	-48.60	-52.60	-13.00	39.60

Test mode : 12A-n66A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1712.5
Channel : 342500
Bandwidth(㎒) : 5 (LTE), 5 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 418.74	V	7.94	10.38	-54.86	-57.30	-13.00	44.30
	5 130.09	V	9.93	13.09	-51.94	-55.10	-13.00	42.10
	6 840.80	V	11.44	15.26	-49.28	-53.10	-13.00	40.10
	8 550.87	H	12.90	16.90	-48.30	-52.30	-13.00	39.30

Test mode : 13A-n66A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1712.5
Channel : 342500
Bandwidth(㎒) : 10 (LTE), 5 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 421.93	V	7.94	10.39	-56.15	-58.60	-13.00	45.60
	5 128.81	V	9.93	13.09	-51.84	-55.00	-13.00	42.00
	6 841.44	H	11.44	15.26	-48.78	-52.60	-13.00	39.60
	8 550.24	H	12.90	16.90	-47.70	-51.70	-13.00	38.70

Note.
1. E.R.P & E.I.R.P(㏈m) = Substitute Level(㏈) + Antenna gain(㏈d&㏈i) - C.L(Cable loss) (㏈)

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Biconical VHF-UHF Broadband Antenna	SCHWARZBECK	VUBA9117	275	24.03.30
Bilog Antenna	ETS.LINDGREN	3143B	00228420	23.09.28*
Horn Antenna	ETS.LINDGREN	3117	161225	23.05.04
Horn Antenna	ETS.LINDGREN	3117	00227509	23.09.20*
Horn Antenna	ETS.lindgren	3116	00086632	23.01.25
Horn Antenna	ETS.lindgren	3116	00086635	23.05.04
High Pass Filter	Wainwright Instruments GmbH	WHKX10-900-1000-15000-40SS	11	23.08.10
High Pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	32	23.08.10
Broadband Amplifier	SONOMA INSTRUMENT	310N	185799	23.01.19
Amplifier	LTC MICROWAVE	LLA01185522Q-B	142	23.05.20
Amplifier	L-3 Narda-MITEQ	JS44-18004000-33-8P	2000996	23.01.21
Vector Signal Generator	R&S	SMBV100A	257566	23.07.04
Signal Generator	R&S	SMB100A	176206	23.01.19
Spectrum Analyzer	AGILENT	N9040B	MY57010132	22.12.31
Radio Communication Analyzer	ANRITSU	MT8821C	6201807233	23.01.19
Radio Communication Analyzer	ANRITSU	MT8000A	6261923085	23.06.24
Radio Communication Analyzer	ANRITSU	MT8000A	6262093278	23.05.13
Antenna Stand	innco systems GmbH	AS1500-EP-10kg	N/A	-
Antenna Stand	innco systems GmbH	AS1500-EP-10kg	N/A	-
Compact Table	innco systems GmbH	CT1000	N/A	-
PXA Signal Analyzer	KEYSIGHT	N9040B	US55230151	23.07.11
DC Power Supply	AGILENT	E3632A	MY40018781	23.05.02
Directional Coupler	Marki Microwave, Inc.	CBR17-0026	0001	23.08.10
Temp & Humid Chamber	ESPEC CORP.	SH-642	93016978	23.03.02

* Tests related to this equipment were progressed after the calibration was completed.

End of test report