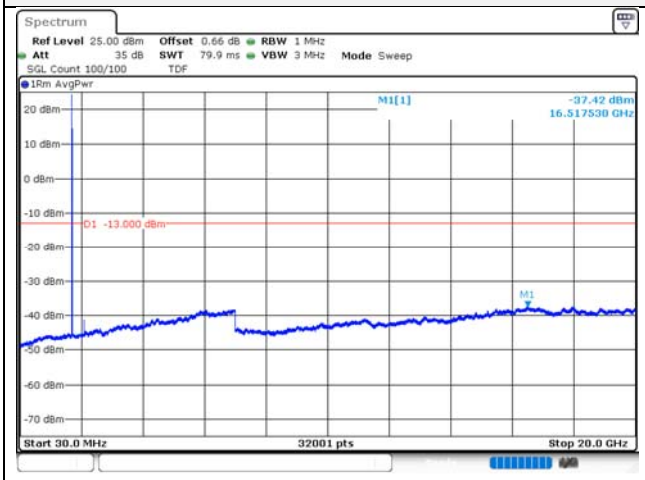
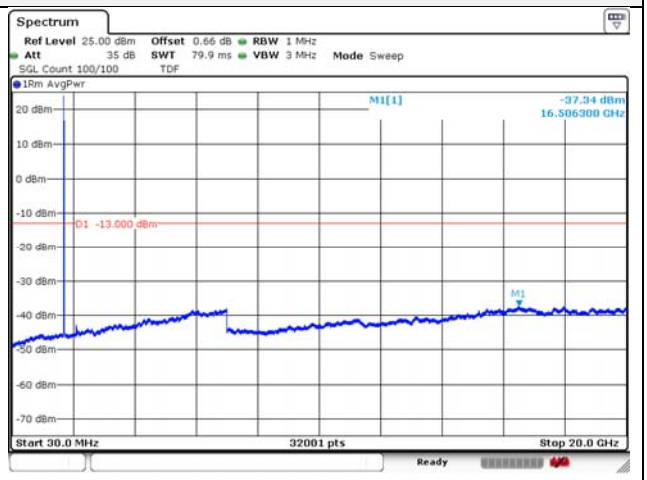
Test mode: NR N66

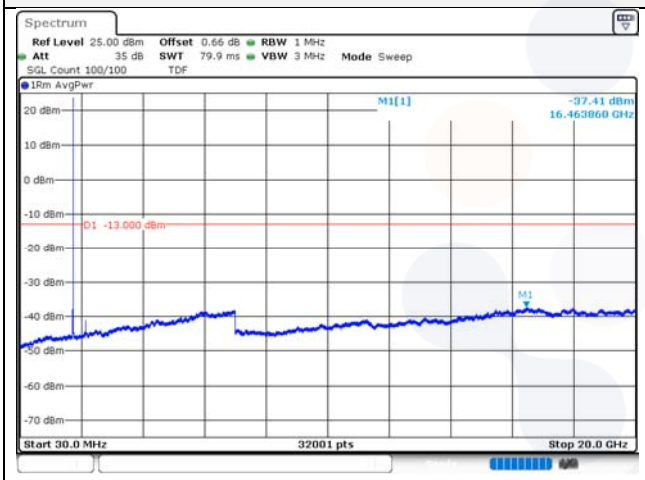
5M BW QPSK Low ch.



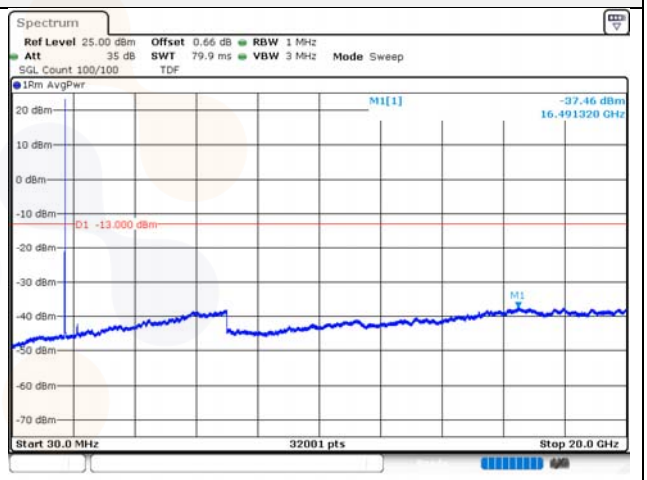
10M BW QPSK Low ch.



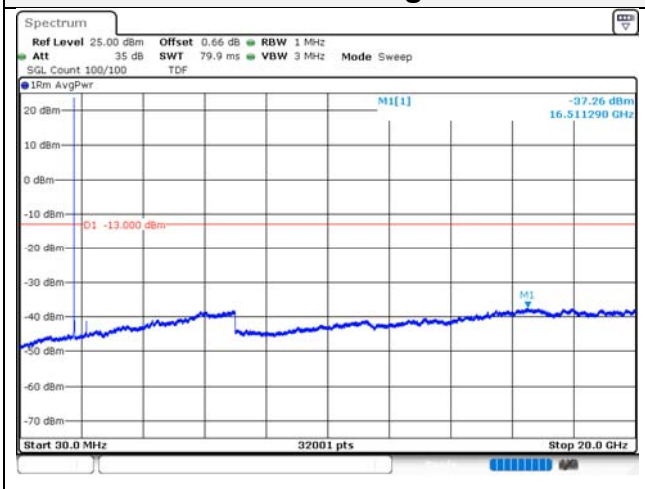
5M BW QPSK Mid ch.



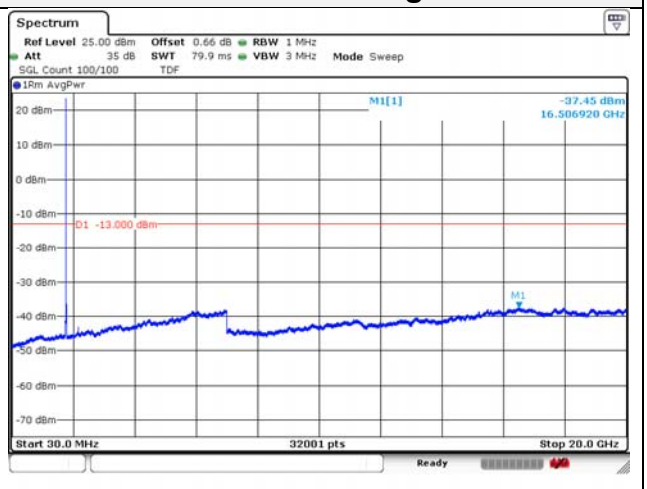
10M BW QPSK Mid ch.

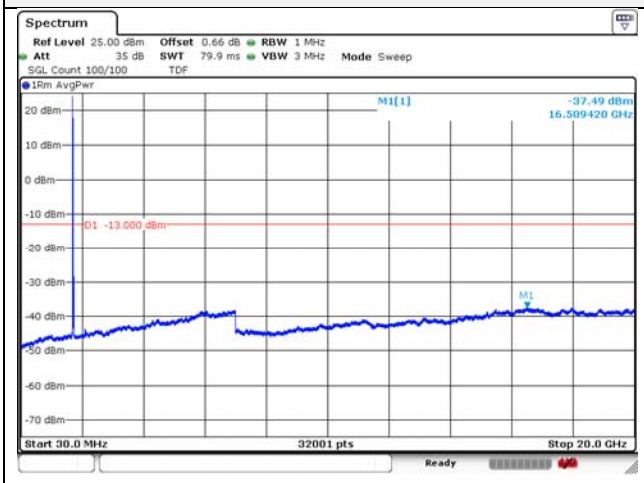
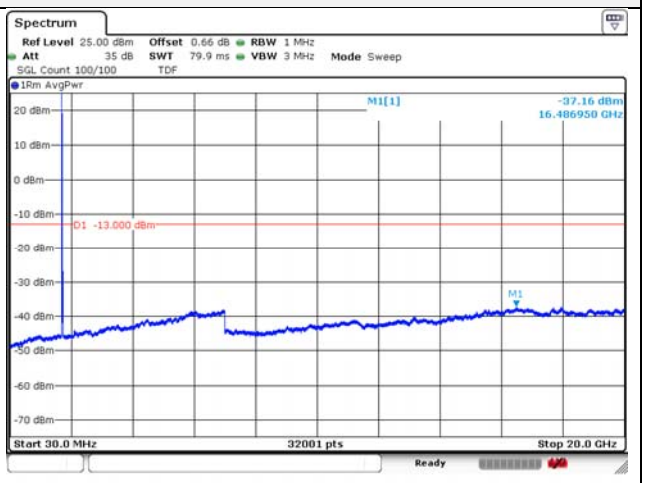
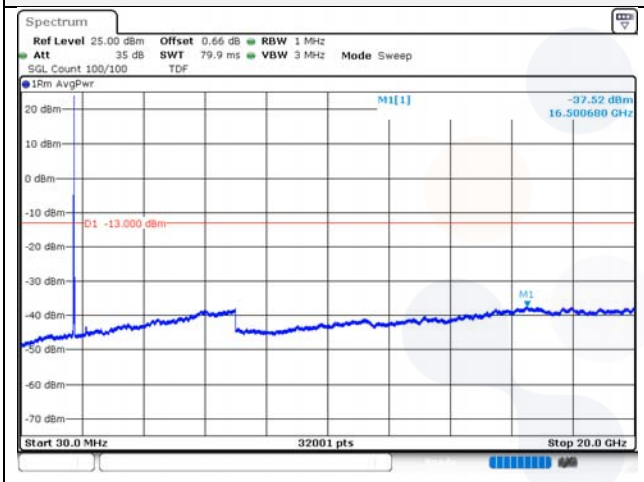
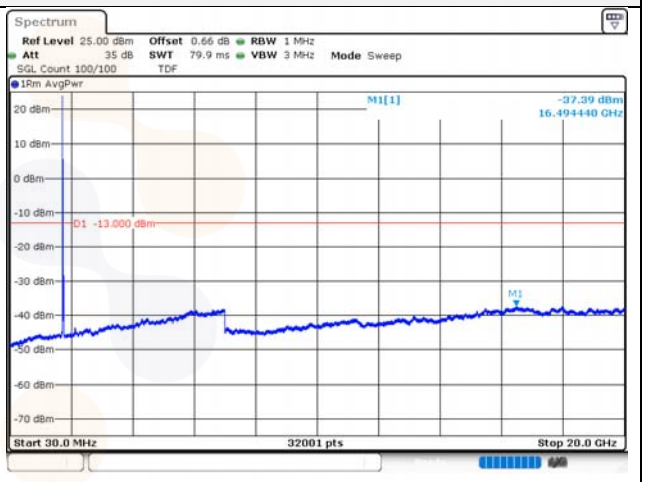
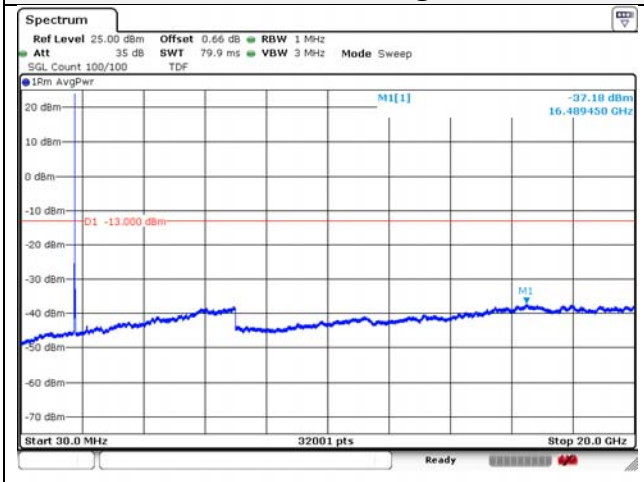
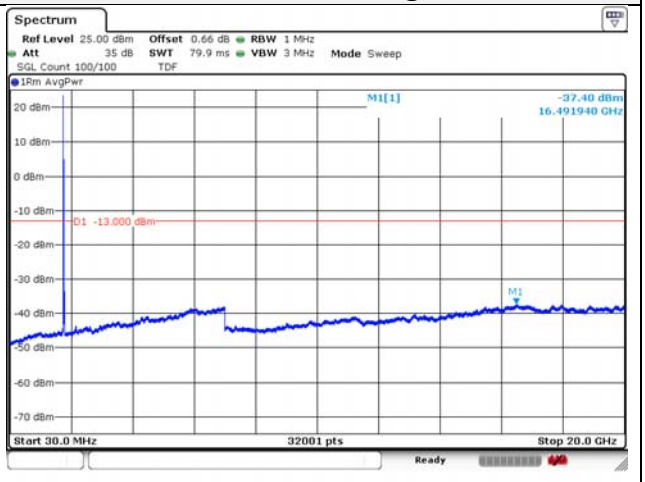


5M BW QPSK High ch.



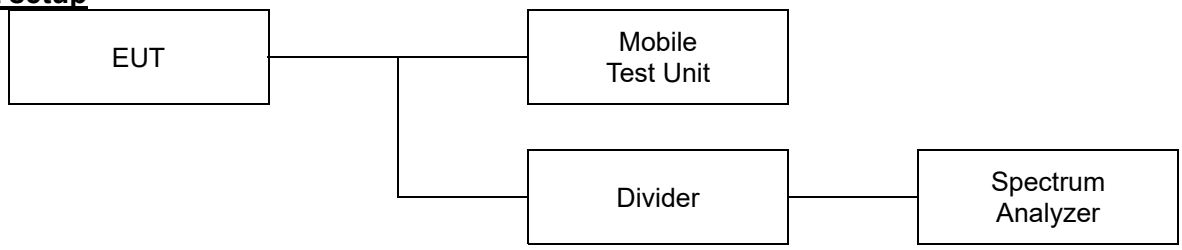
10M BW QPSK High ch.



15M BW QPSK Low ch.	20M BW QPSK Low ch.
	
15M BW QPSK Mid ch.	**20M BW QPSK Mid ch.**
	
15M BW QPSK High ch.	**20M BW QPSK High ch.**
	

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 v02r02 – 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%

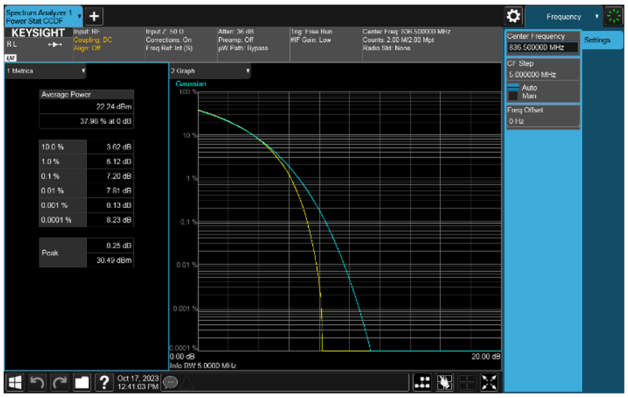
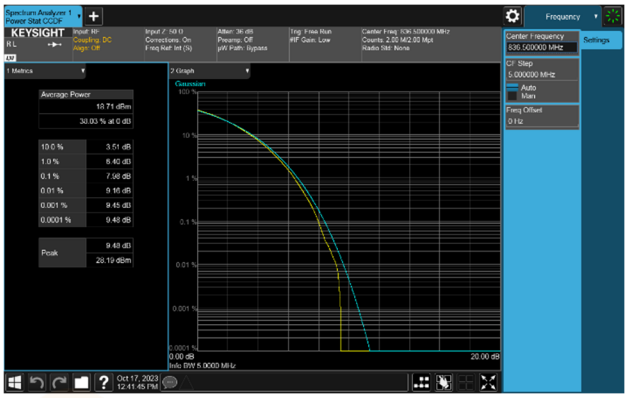
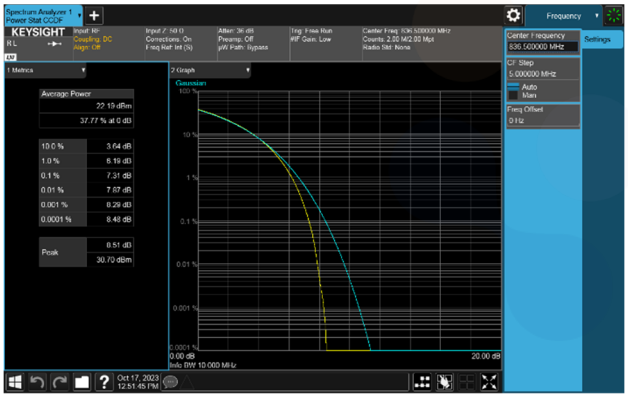
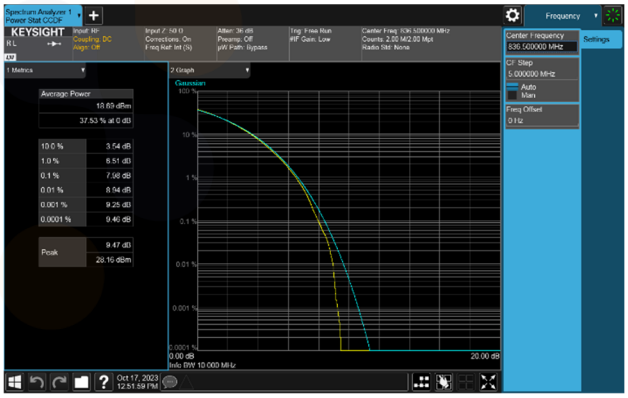
5.2.6 Peak-to-average power ratio

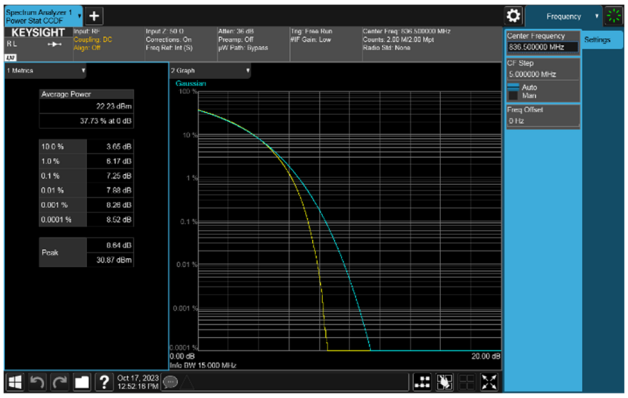
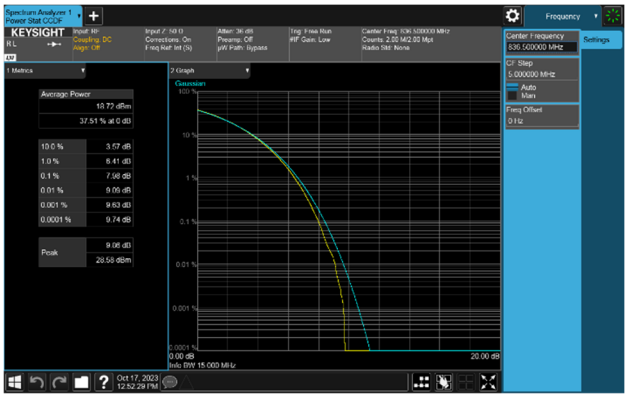
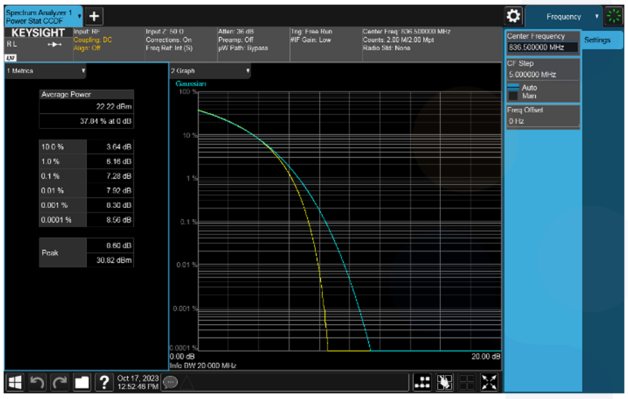
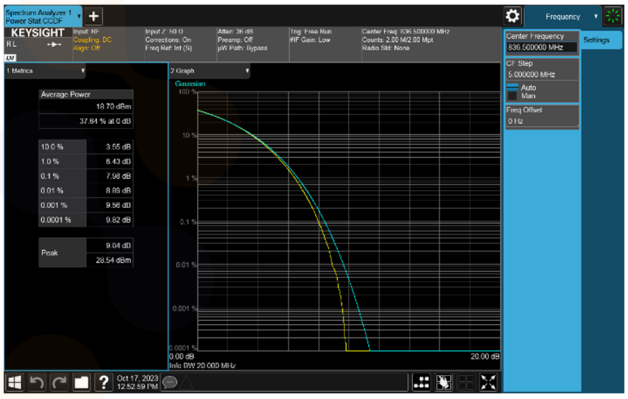
Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as P_{PK}.
Use one of the applicable procedure presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{AG}. Determine the P.A.P.R from:

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

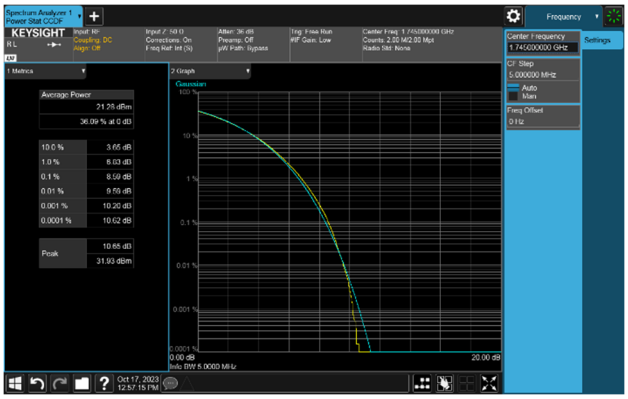
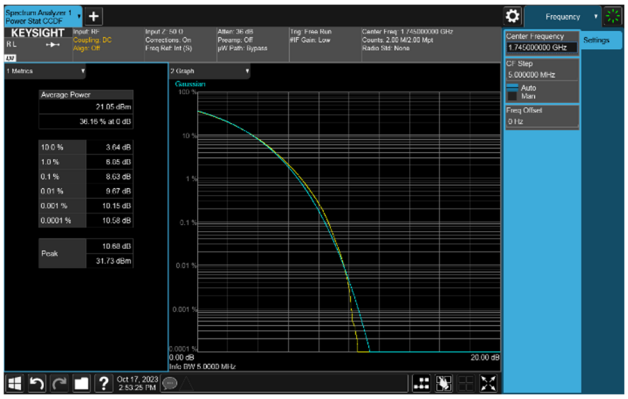
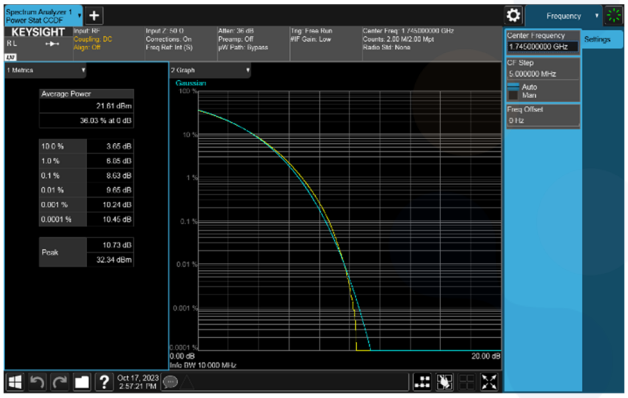
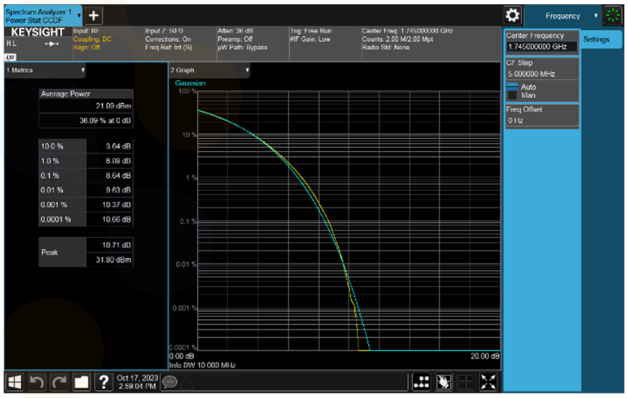
Test results

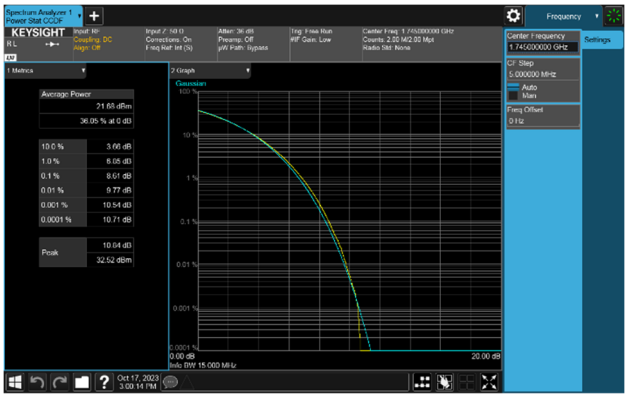
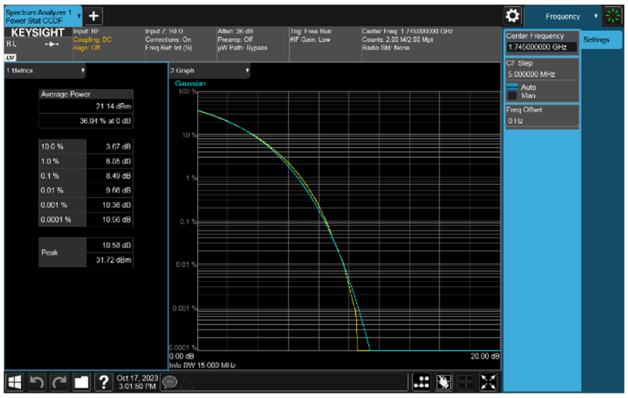
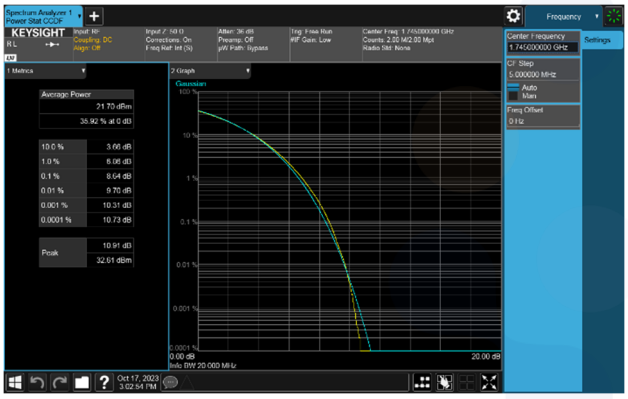
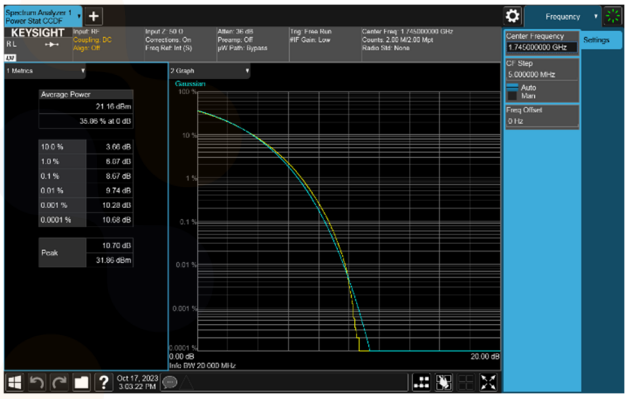
Test mode: NR N5

5M BW QPSK Mid ch.	5M BW 256QAM Mid ch.
	
10M BW QPSK Mid ch.	**10M BW 256QAM Mid ch.**
	

15M BW QPSK Mid ch.	15M BW 256QAM Mid ch.
	
20M BW QPSK Mid ch.	**20M BW 256QAM Mid ch.**
	

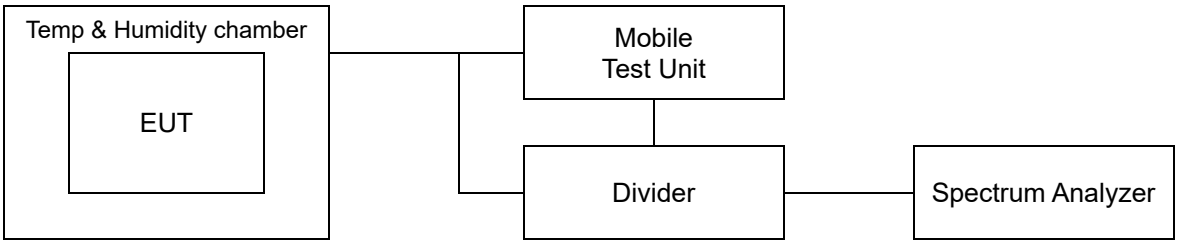
Test mode: NR N66

5M BW QPSK Mid ch.	5M BW 64QAM Mid ch.
	
10M BW QPSK Mid ch.	**10M BW 64QAM Mid ch.**
	

15M BW QPSK Mid ch.	15M BW 64QAM Mid ch.
	
20M BW QPSK Mid ch.	**20M BW 64QAM Mid 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).

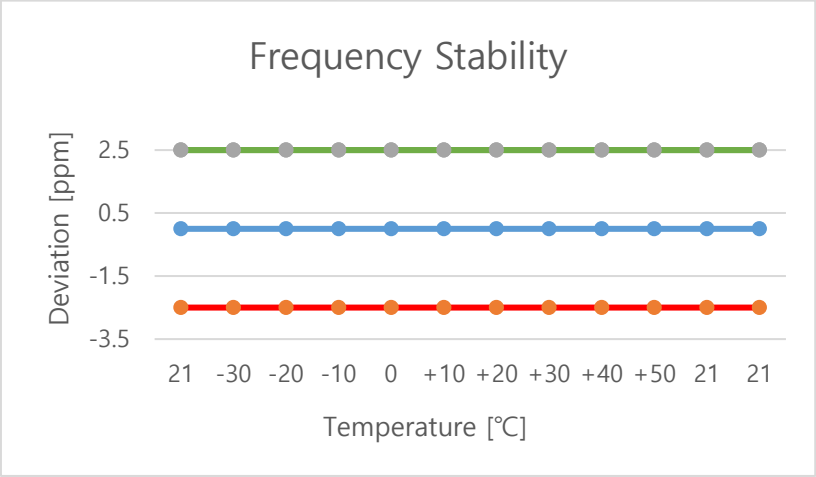
Test procedure
ANSI 63.26-2015 – Section 5.6

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

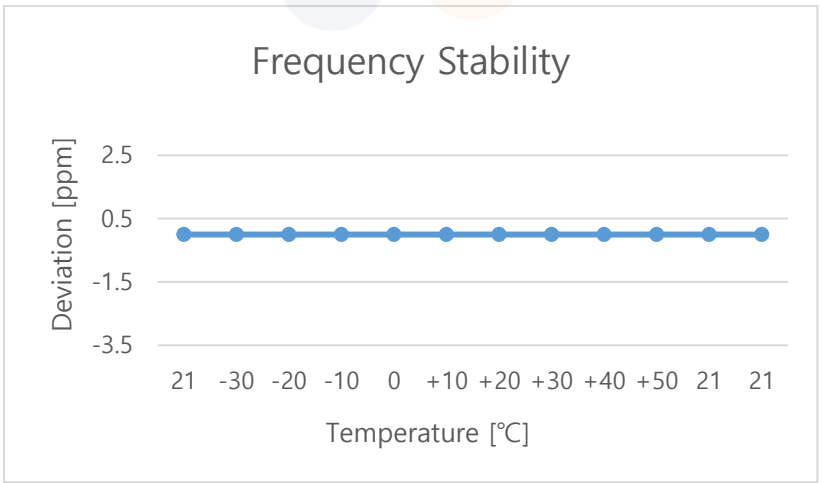
Test mode	:	5GNR N5
Waveform	:	DFT-s OFDM
SCS (㎑)	:	15
Frequency (㎐)	:	836 500 000
Channel	:	167300
Deviation limit	:	±0.00025% or 2.5ppm

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+21(Ref)	836,500,000	0.0000018	0.0	0.000000
		-30	836,500,000	0.0000011	0.0	0.000000
		-20	836,500,000	0.0000023	0.0	0.000000
		-10	836,500,000	0.0000014	0.0	0.000000
		0	836,500,000	0.0000023	0.0	0.000000
		+10	836,500,000	0.0000018	0.0	0.000000
		+20	836,500,000	0.0000025	0.0	0.000000
		+30	836,500,000	0.0000022	0.0	0.000000
		+40	836,500,000	0.0000015	0.0	0.000000
		+50	836,500,000	0.0000020	0.0	0.000000
115%	4.46	+22(Ref)	836,500,000	0.0000025	0.0	0.000000
End point	3.40	+22(Ref)	836,500,000	0.0000029	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.

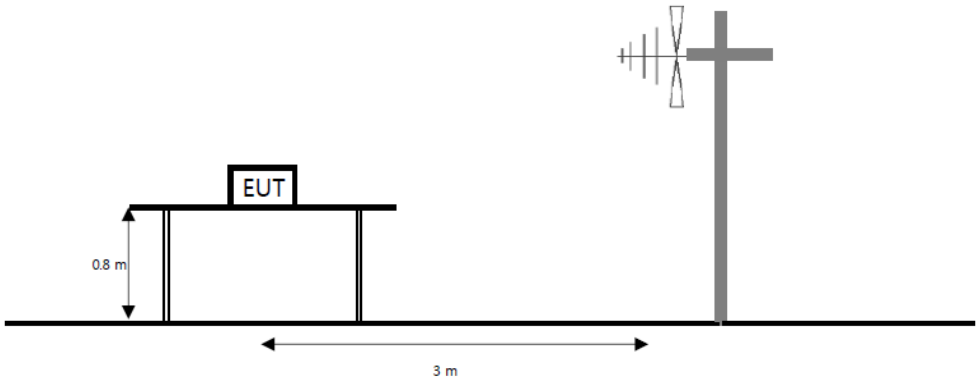
Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+21(Ref)	1,745,000,000	0.0000079	0.0	0.000000
		-30	1,745,000,000	0.0000070	0.0	0.000000
		-20	1,745,000,000	0.0000031	0.0	0.000000
		-10	1,745,000,000	0.0000048	0.0	0.000000
		0	1,745,000,000	0.0000039	0.0	0.000000
		+10	1,745,000,000	0.0000011	0.0	0.000000
		+20	1,745,000,000	0.0000047	0.0	0.000000
		+30	1,745,000,000	0.0000083	0.0	0.000000
		+40	1,745,000,000	0.0000028	0.0	0.000000
		+50	1,745,000,000	0.0000020	0.0	0.000000
115%	4.46	+22(Ref)	1,745,000,000	0.0000037	0.0	0.000000
End point	3.40	+22(Ref)	1,745,000,000	0.0000069	0.0	0.000000



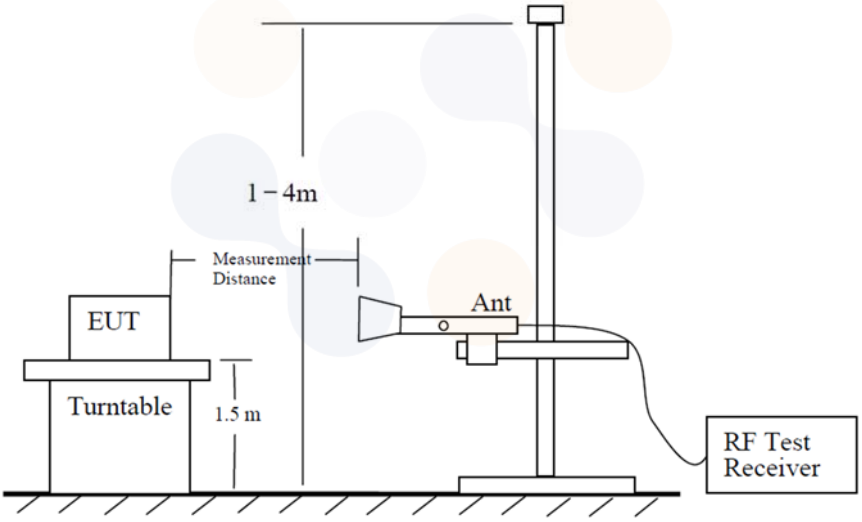
7.7. Radiated Power (ERP/EIRP)

Test setup

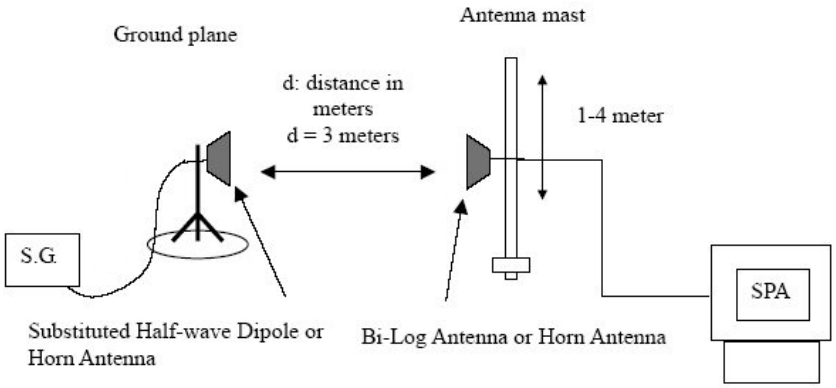
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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	5.57	6.13	23.79	23.22	0.210
				836.5	H	5.60	6.22	23.36	22.74	0.188
				846.5	H	5.41	6.24	23.77	22.93	0.196
			16QAM	826.5	H	5.57	6.13	22.78	22.21	0.166
				836.5	H	5.60	6.22	22.32	21.70	0.148
				846.5	H	5.41	6.24	22.75	21.91	0.155
10 M			QPSK	829.0	H	5.59	6.13	23.93	23.39	0.218
				836.5	H	5.60	6.22	23.66	23.04	0.201
				844.0	H	5.48	6.22	24.15	23.41	0.219
			16QAM	829.0	H	5.59	6.13	22.94	22.40	0.174
				836.5	H	5.60	6.22	22.87	22.25	0.168
				844.0	H	5.48	6.22	23.18	22.44	0.175
15 M			QPSK	831.5	H	5.60	6.14	23.79	23.25	0.211
				836.5	H	5.60	6.22	23.87	23.25	0.211
				841.5	H	5.56	6.24	24.16	23.47	0.222
			16QAM	831.5	H	5.60	6.14	22.97	22.43	0.175
				836.5	H	5.60	6.22	22.88	22.26	0.168
				841.5	H	5.56	6.24	23.25	22.56	0.180
20 M			QPSK	834.0	H	5.60	6.19	24.04	23.45	0.221
				836.5	H	5.60	6.22	24.01	23.39	0.218
				839.0	H	5.60	6.25	23.85	23.20	0.209
			16QAM	834.0	H	5.60	6.19	23.11	22.52	0.179
				836.5	H	5.60	6.22	23.09	22.47	0.177
				839.0	H	5.60	6.25	23.02	22.37	0.173

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

Test mode: 5GNR N66

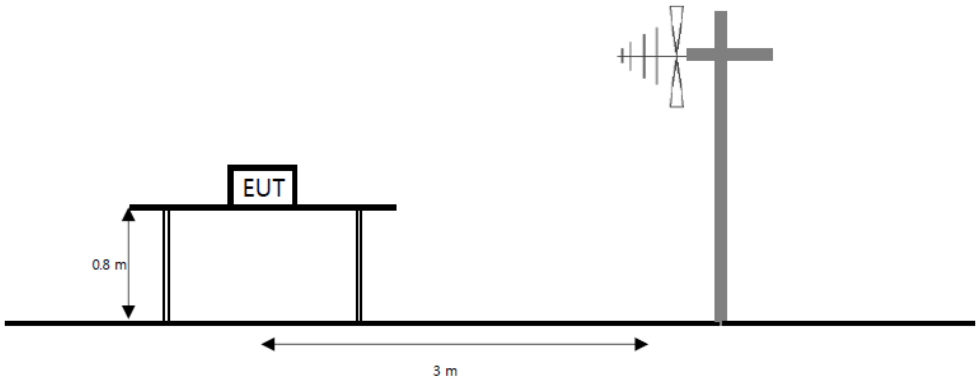
Bandwidth	Waveform	SCS (㎑)	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
				[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
5 M	DFT-s OFDM	15	QPSK	1 712.5	V	5.56	8.86	27.54	24.24	0.265
				1 745.0	V	5.47	8.93	26.78	23.31	0.214
				1 777.5	V	5.37	9.11	29.63	25.89	0.388
			16QAM	1 712.5	V	5.56	8.86	26.80	23.50	0.224
				1 745.0	V	5.47	8.93	25.89	22.42	0.175
				1 777.5	V	5.37	9.11	28.70	24.96	0.313
10 M			QPSK	1 715.0	V	5.56	8.87	27.43	24.11	0.258
				1 745.0	V	5.47	8.93	26.79	23.32	0.215
				1 775.0	V	5.38	9.08	29.62	25.91	0.390
			16QAM	1 715.0	V	5.56	8.87	26.53	23.21	0.209
				1 745.0	V	5.47	8.93	25.95	22.48	0.177
				1 775.0	V	5.38	9.08	28.82	25.11	0.324
15 M			QPSK	1 717.5	V	5.55	8.88	27.56	24.23	0.265
				1 745.0	V	5.47	8.93	26.97	23.50	0.224
				1 772.5	V	5.38	9.07	29.65	25.96	0.394
			16QAM	1 717.5	V	5.55	8.88	26.44	23.11	0.205
				1 745.0	V	5.47	8.93	25.99	22.52	0.179
				1 772.5	V	5.38	9.07	28.98	25.29	0.338
20 M			QPSK	1 720.0	V	5.54	8.88	27.96	24.62	0.290
				1 745.0	V	5.47	8.93	26.44	22.97	0.198
				1 770.0	V	5.39	9.07	29.53	25.85	0.385
			16QAM	1 720.0	V	5.54	8.88	27.19	23.85	0.243
				1 745.0	V	5.47	8.93	25.68	22.21	0.166
				1 770.0	V	5.39	9.07	28.61	24.93	0.311

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

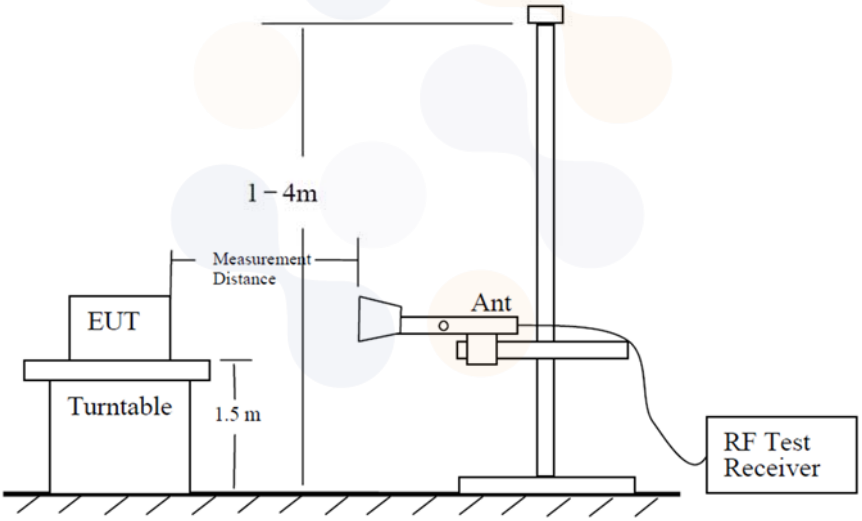
7.8. Radiated Spurious Emissions

Test setup

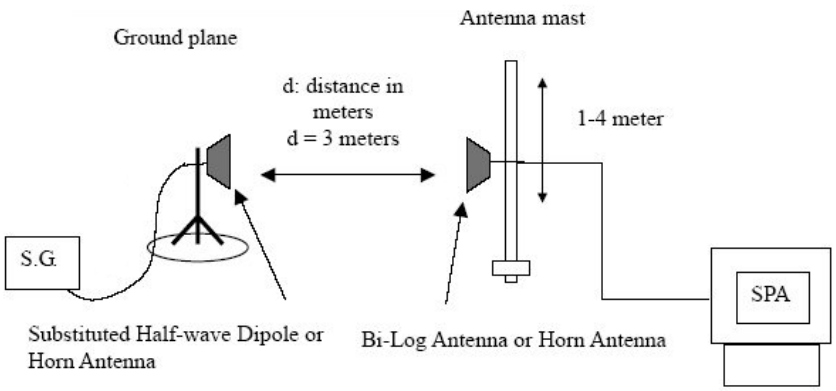
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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(㎒) : 831.5
Channel : 166300
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 649.06	H	5.75	8.70	-56.25	-59.20	-13.00	46.20
	2 470.85	H	5.92	10.78	-49.54	-54.40	-13.00	41.40
	3 297.96	V	7.90	11.99	-48.51	-52.60	-13.00	39.60
	4 117.70	V	9.29	13.40	-45.89	-50.00	-13.00	37.00

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

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 659.73	H	5.72	8.67	-55.25	-58.20	-13.00	45.20
	2 485.62	H	5.96	10.81	-48.95	-53.80	-13.00	40.80
	3 315.20	V	7.93	12.01	-49.62	-53.70	-13.00	40.70
	4 144.78	H	9.32	13.46	-43.86	-48.00	-13.00	35.00

Test mode : 5GNR N5
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 841.5
Channel : 168300
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 669.98	V	5.69	8.70	-55.09	-58.10	-13.00	45.10
	2 503.26	H	6.01	10.88	-50.53	-55.40	-13.00	42.40
	3 337.76	V	7.98	12.04	-49.14	-53.20	-13.00	40.20
	4 169.39	H	9.34	13.13	-45.71	-49.50	-13.00	36.50

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(㎒) : 1 717.5
Channel : 343500
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 436.50	H	8.17	12.16	-50.11	-54.10	-13.00	41.10
	5 151.75	H	10.39	15.51	-44.58	-49.70	-13.00	36.70
	6 869.25	V	11.30	18.33	-40.07	-47.10	-13.00	34.10
	8 586.75	V	13.03	21.07	-37.46	-45.50	-13.00	32.50

Test mode : 5GNR N66
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1 745.0
Channel : 349000
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 506.25	H	8.31	12.24	-50.37	-54.30	-13.00	41.30
	5 257.50	V	10.45	15.41	-43.34	-48.30	-13.00	35.30
	7 008.00	H	11.41	18.53	-38.08	-45.20	-13.00	32.20
	8 762.25	V	13.10	21.06	-36.44	-44.40	-13.00	31.40

Test mode : 5GNR N66
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1 772.5
Channel : 354500
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 549.00	V	8.39	12.29	-50.30	-54.20	-13.00	41.20
	5 317.50	V	10.49	15.92	-43.57	-49.00	-13.00	36.00
	7 086.75	V	11.52	18.65	-39.17	-46.30	-13.00	33.30
	8 862.00	H	13.14	21.04	-36.60	-44.50	-13.00	31.50

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

EN-DC Mode (Worst case)

Test mode : 66A-n5A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 841.5
Channel : 168300
Bandwidth(㎒) : 20 (LTE Main Antenna 1), 15 (NR Main Antenna 1)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 666.29	H	5.70	8.69	-55.11	-58.10	-13.00	45.10
	2 502.03	H	6.01	10.87	-49.04	-53.90	-13.00	40.90
	3 338.58	V	7.98	12.04	-48.74	-52.80	-13.00	39.80
	4 168.16	H	9.33	13.12	-43.81	-47.60	-13.00	34.60

Test mode : 13A-n66A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1 772.5
Channel : 354500
Bandwidth(㎒) : 5 (LTE_Main Antenna 1), 15 (NR Main Antenna 1)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 547.05	V	8.38	12.29	-51.49	-55.40	-13.00	42.40
	5 315.84	H	10.49	15.92	-47.17	-52.60	-13.00	39.60
	7 089.11	V	11.52	18.66	-42.46	-49.60	-13.00	36.60
	8 864.29	V	13.15	21.04	-38.01	-45.90	-13.00	32.90

Test mode : 2A-n66A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1 772.5
Channel : 354500
Bandwidth(㎒) : 20 (LTE Sub Antenna 1), 15 (NR_Main Antenna 1)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 545.13	H	8.38	12.28	-53.00	-56.90	-13.00	43.90
	5 319.04	V	10.49	15.92	-46.47	-51.90	-13.00	38.90
	7 092.94	H	11.53	18.66	-41.27	-48.40	-13.00	35.40
	8 863.02	H	13.15	21.04	-37.11	-45.00	-13.00	32.00

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
PXA Signal Analyzer	KEYSIGHT	N9040B	US56050101	24.07.03
PXA Signal Analyzer	KEYSIGHT	N9040B	US55230151	24.07.03
Spectrum Analyzer	R&S	FSVA40	101574	24.03.28
DC Power Supply	AGILENT	E3632A	KR73001026	24.01.19
Divider	Marki Microwave, Inc.	PD-0040	D0003	24.07.04
Radio Communication Analyzer	ANRITSU	MT8821C	6201807233	24.01.19
Radio Communication Analyzer	ANRITSU	MT8000A	6261923085	24.06.19
Radio Communication Analyzer	ANRITSU	MT8000A	6262093278	24.04.26
Temp & Humid Chamber	Daejin Engineering	DJ-THR11000	10041	24.01.19
Vector Signal Generator	R&S	SMBV100A	257566	24.07.04
Signal Generator	R&S	SMB100A	176206	24.01.19
Bilog Antenna	Teseq GmbH	CBL 6112D	62027	24.11.17
Bilog Antenna	ETS.LINDGREN	'3143B	228420	25.07.20
Horn Antenna	ETS-LINDGREN	3117	251528	24.02.02
Horn Antenna	ETS.LINDGREN	3117	227509	24.07.12
Horn Antenna	ETS-Lindgren	3116	00086635	24.03.20
Horn Antenna	ETS-LINDGREN	3116C	251516	24.02.02
Amplifier	SONOMA INSTRUMENT	310N	421822	24.10.12*
Amplifier	C&K Technologies, Inc.	BZRT-00504000-481055-382525	26299-27735	24.07.04
Amplifier	C&K Technologies, Inc.	BZR-00504000-551028-252525	27736	24.07.04
High Pass Filter	Wainwright Instruments GmbH	WHKX10-900-1000-15000-40SS	11	24.07.04
High Pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	32	24.07.04
High Pass Filter	QOTANA TECHNOLOGIES	DBHF0508004000A	20070100016	24.07.04
Band Reject Filter	Wainwright Instruments GmbH	WRCGV1805/1880-1785/1900-50/10SS	2	24.01.19
Band Reject Filter	Wainwright Instruments GmbH	WRCG 824/849-814/859-60/10SS	32	24.07.03
Band Reject Filter	Wainwright Instruments GmbH	WRCG 1710/1785-1690/1805-60/12SS	43	24.01.19
Antenna Mast	innco systems GmbH	MA4640-XP-ET	N/A	-
Controller	innco systems GmbH	CO3000	1175/4585031 9/P	-

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

End of test report