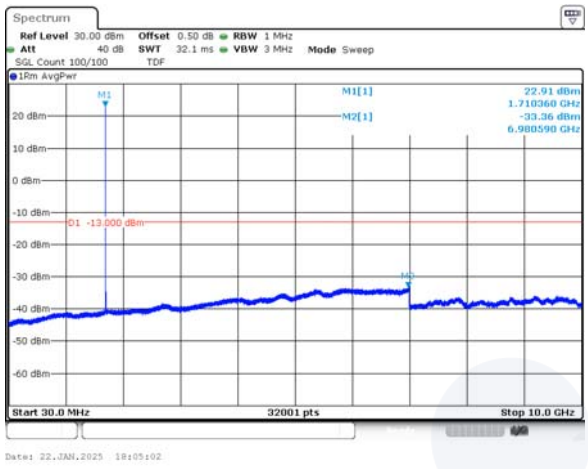
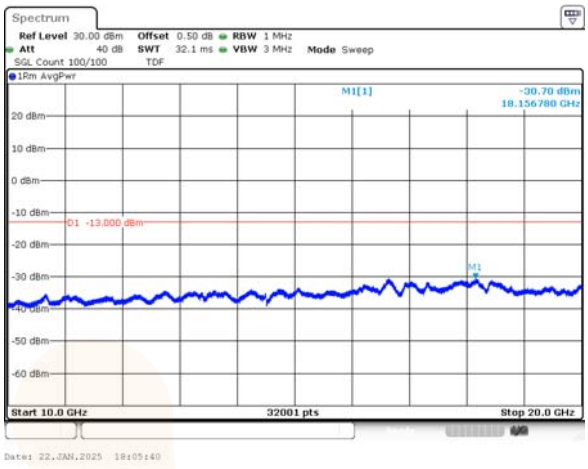
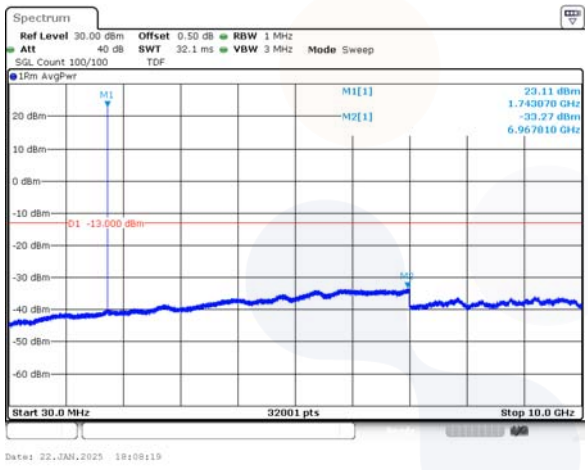
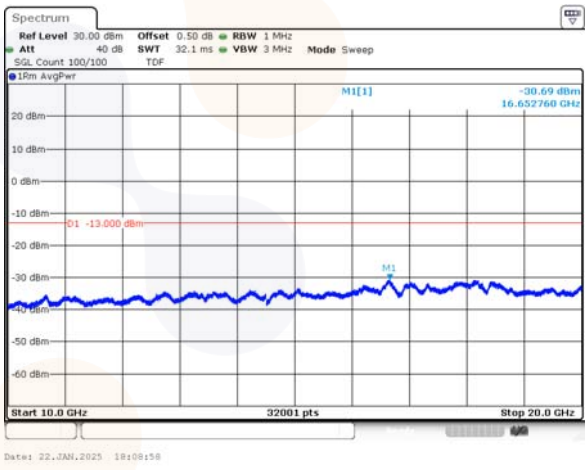
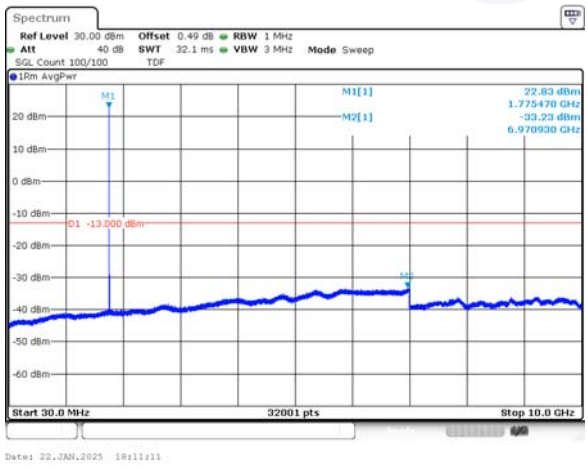
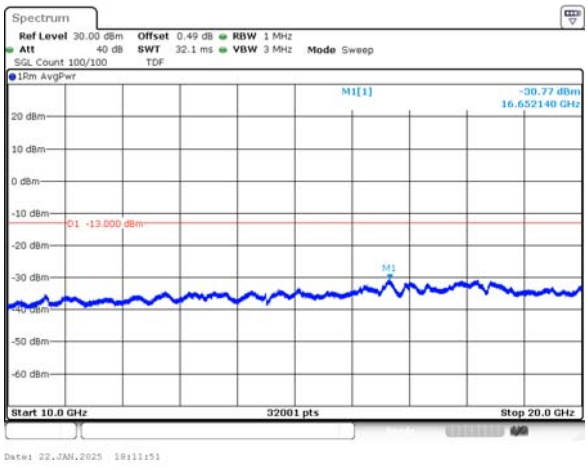
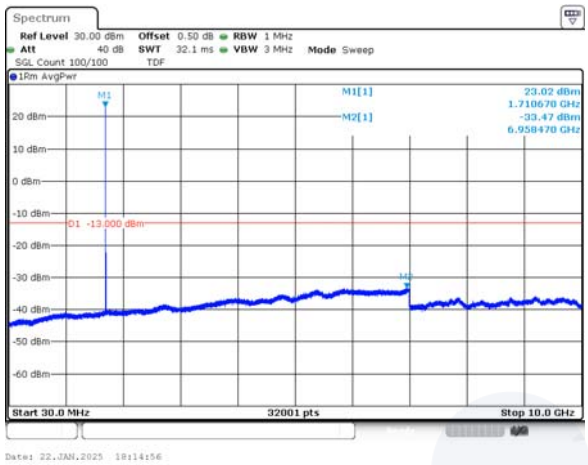
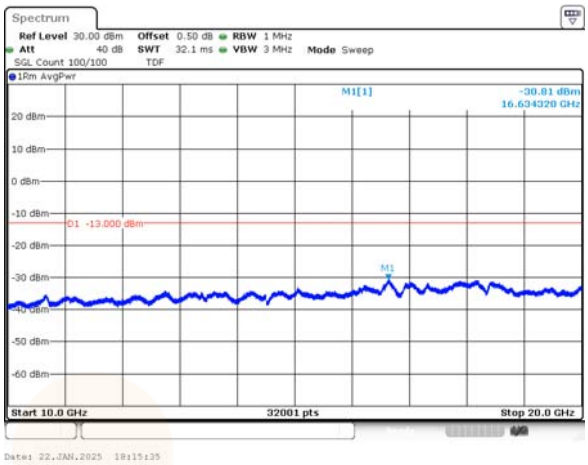
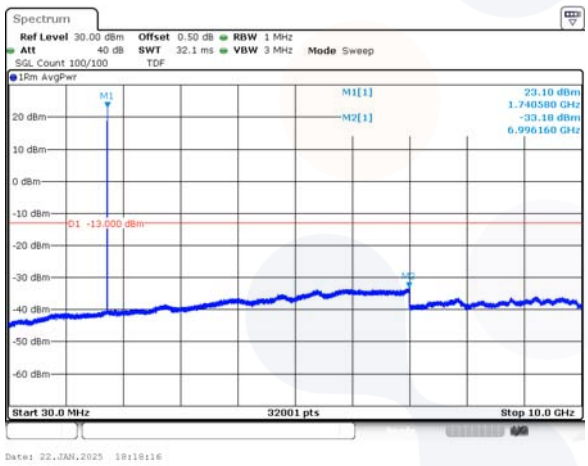
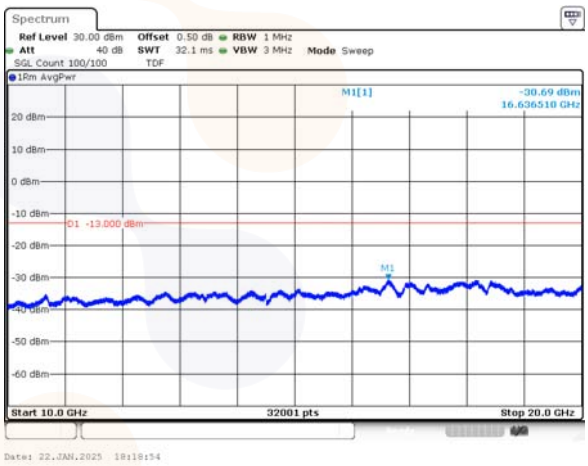
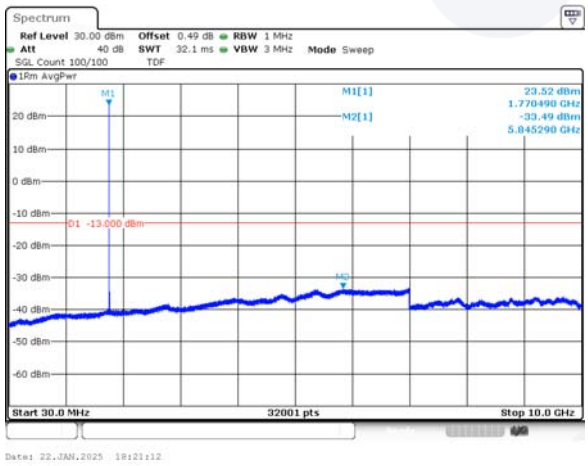
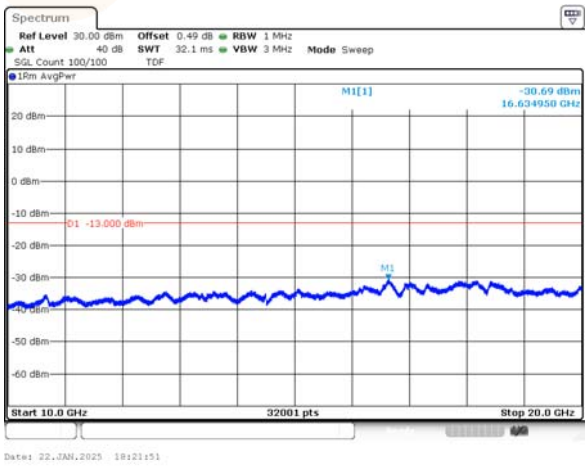
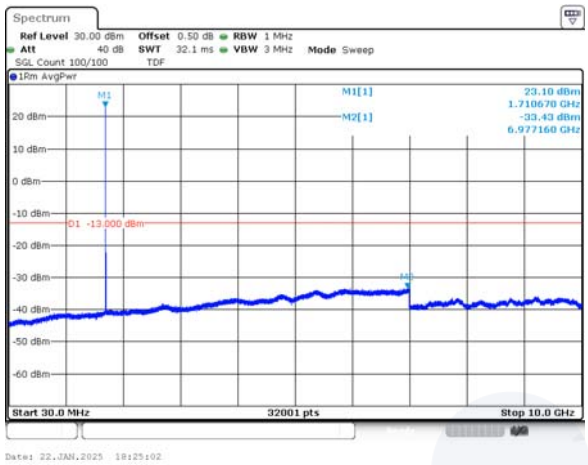
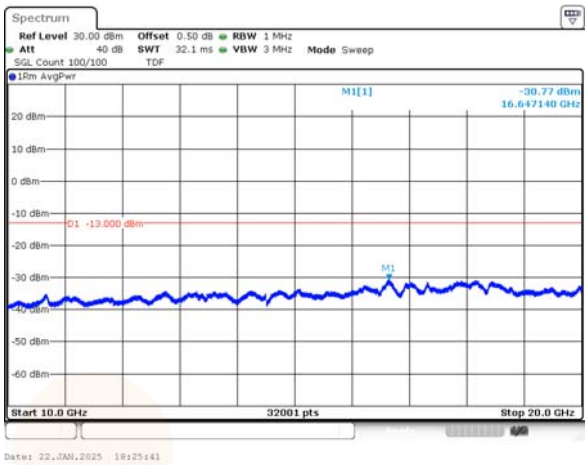
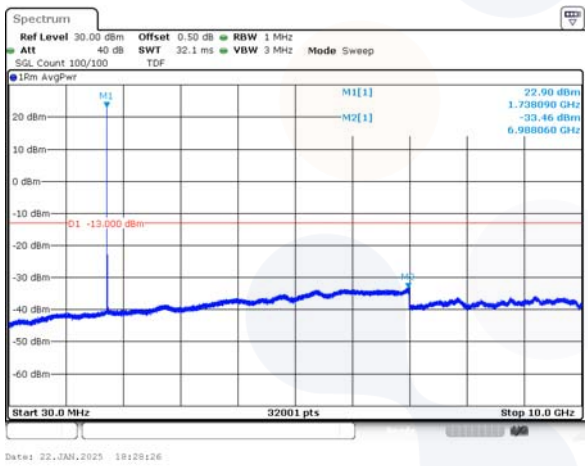
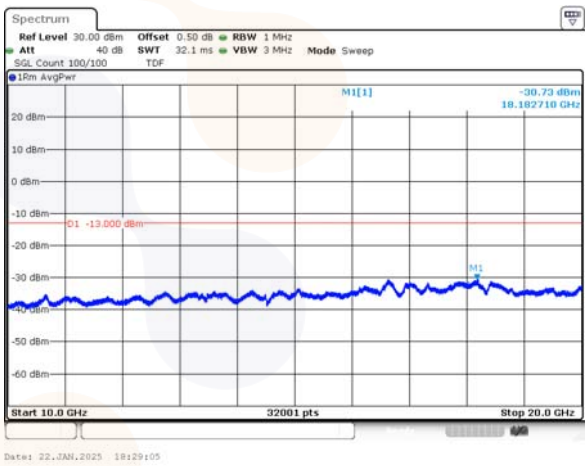
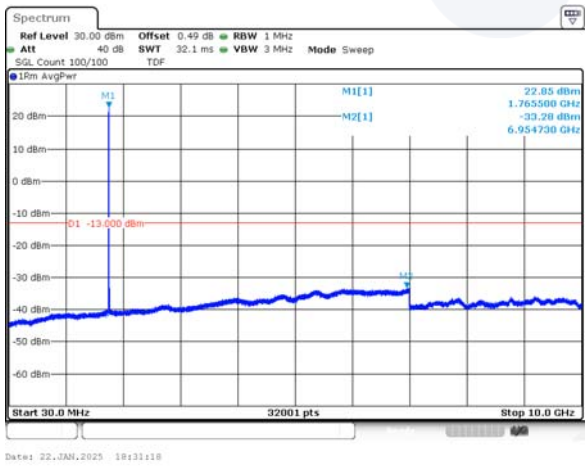
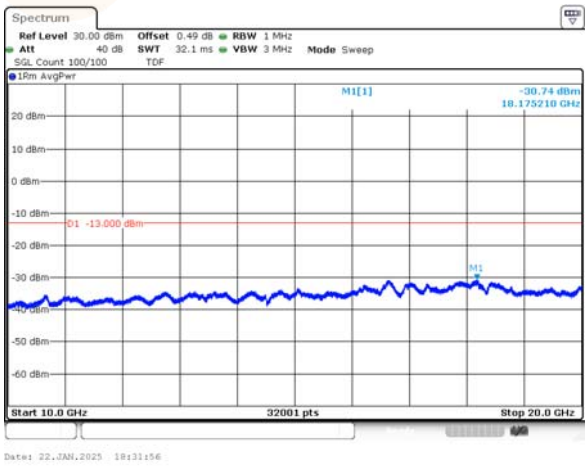
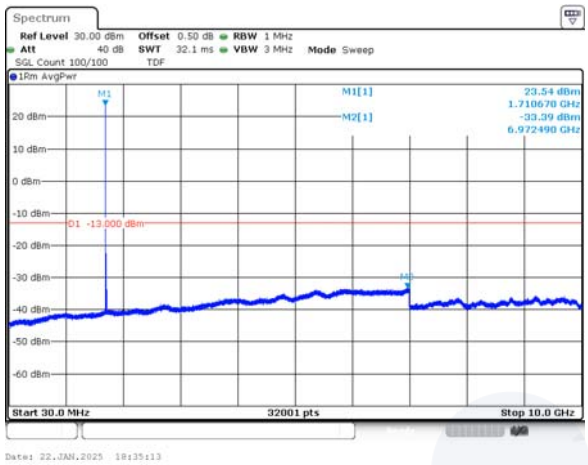
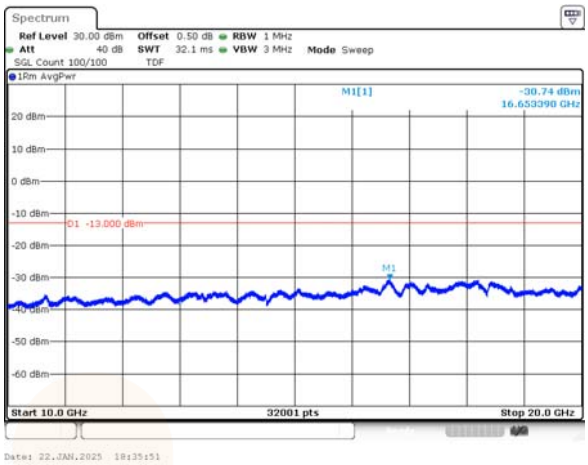
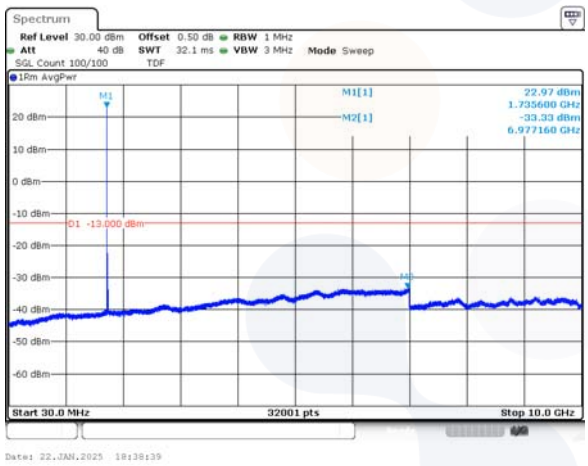
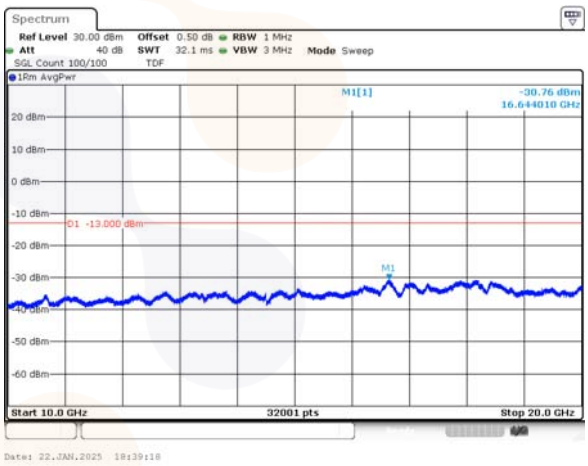
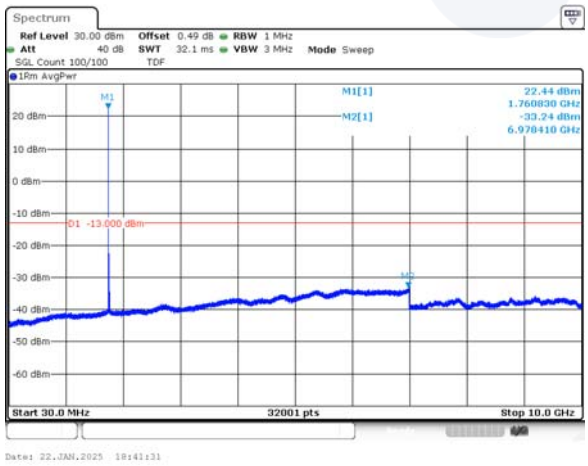
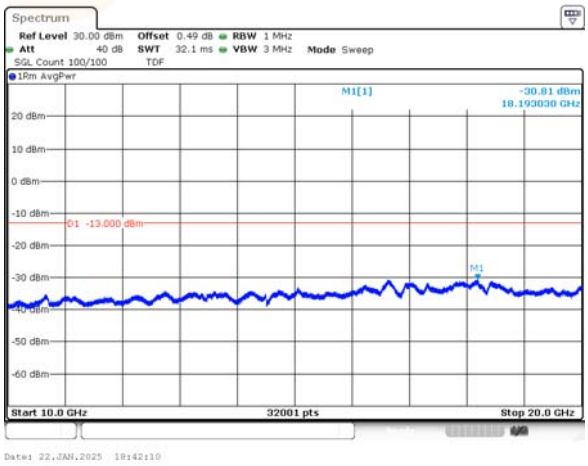
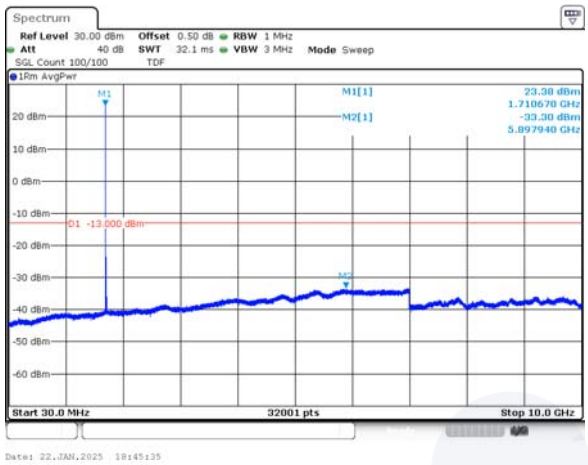
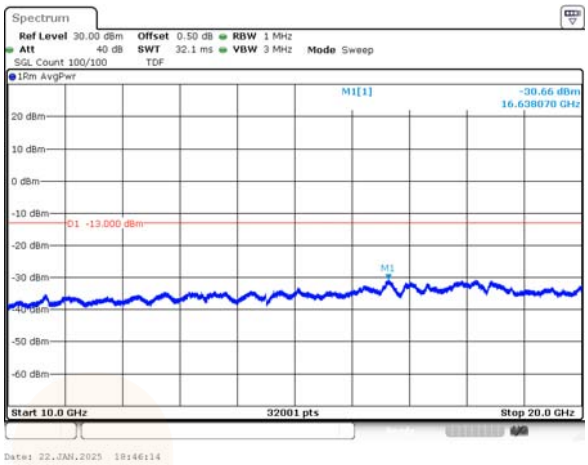
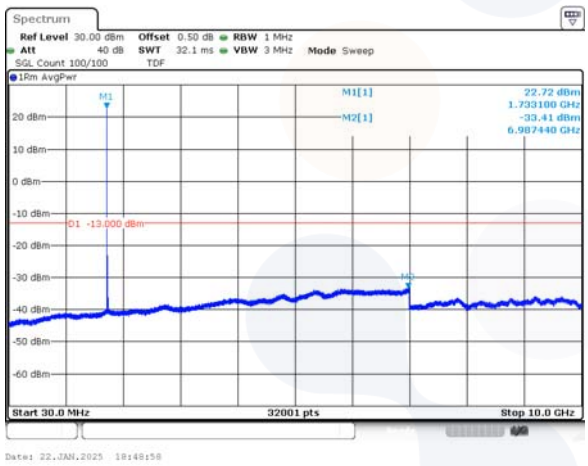
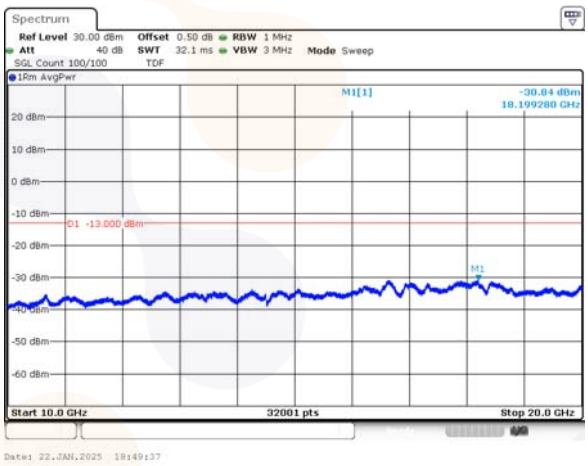
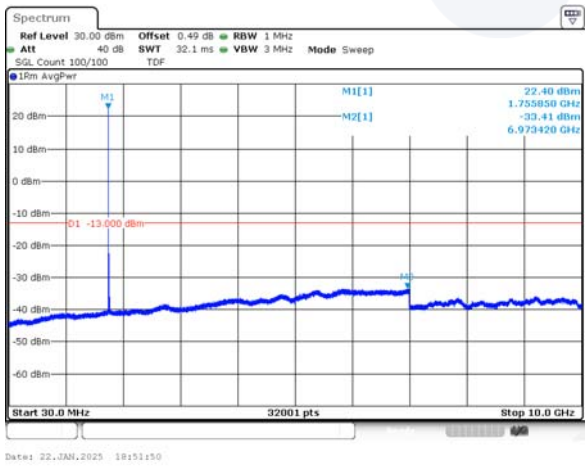
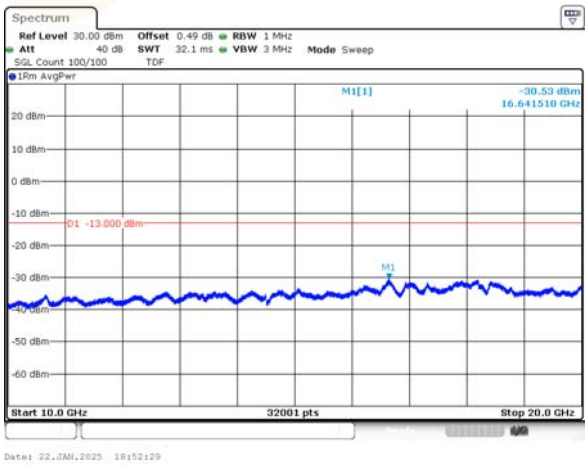
Test mode: 5G NR n66 DFT-s OFDM

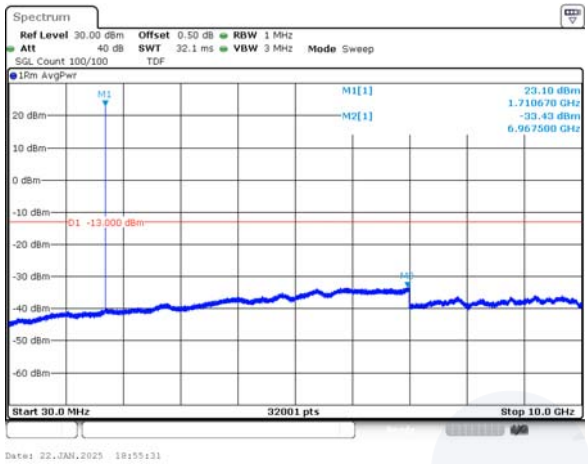
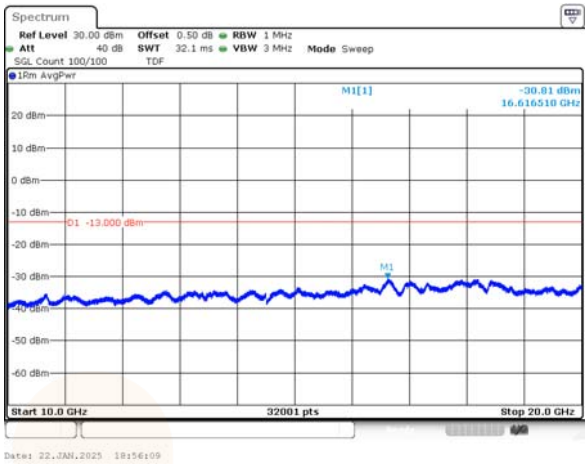
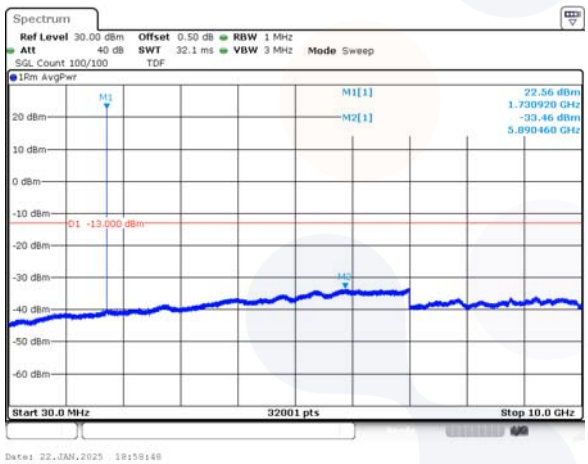
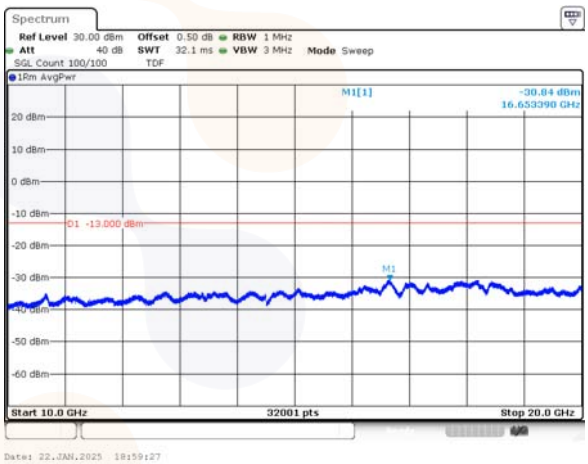
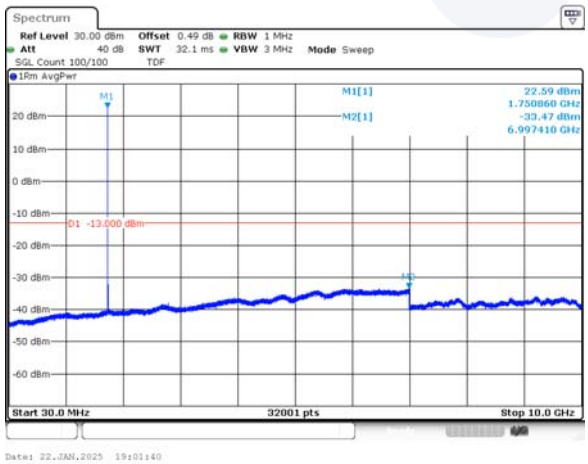
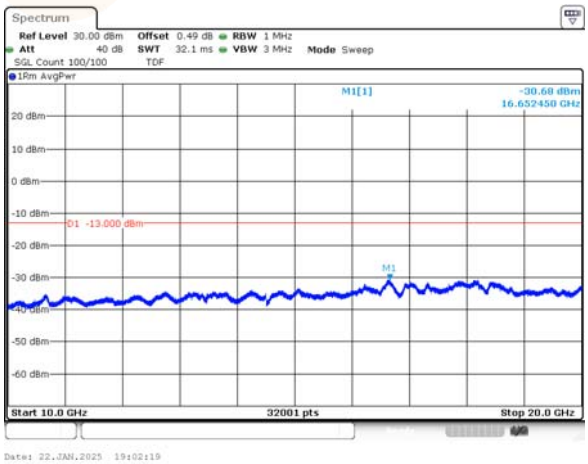
5M BW QPSK	
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (10 ㎓ ~ 20 ㎓)**
	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (10 ㎓ ~ 20 ㎓)**
	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (10 ㎓ ~ 20 ㎓)**
	

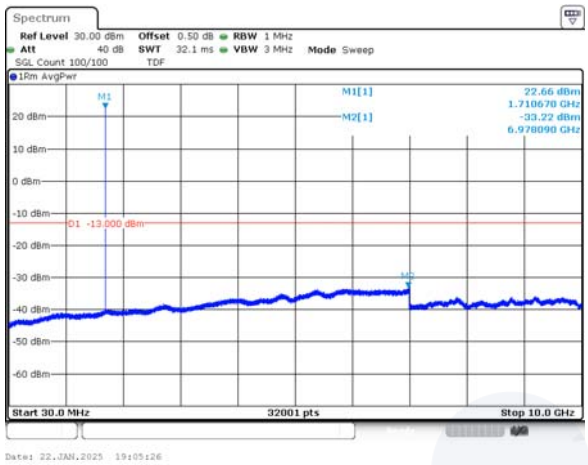
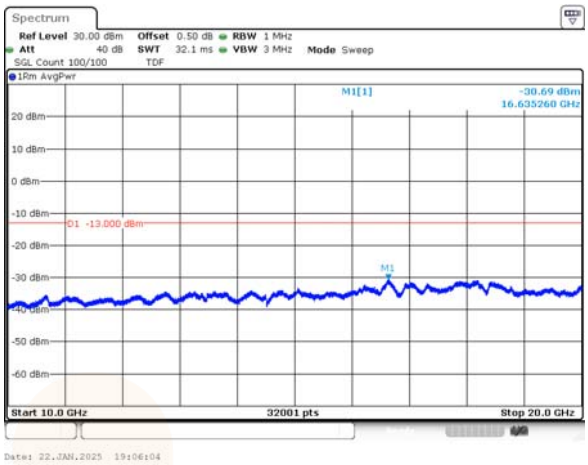
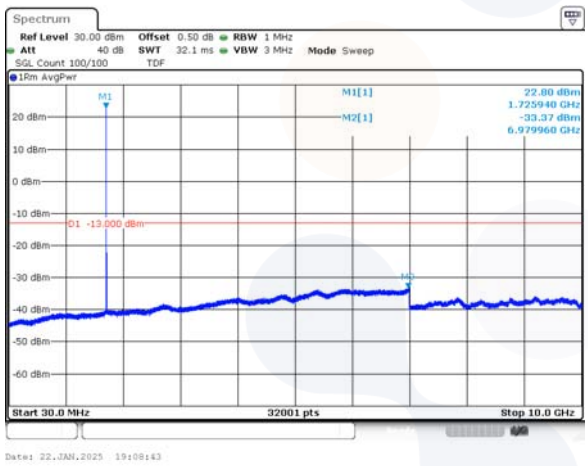
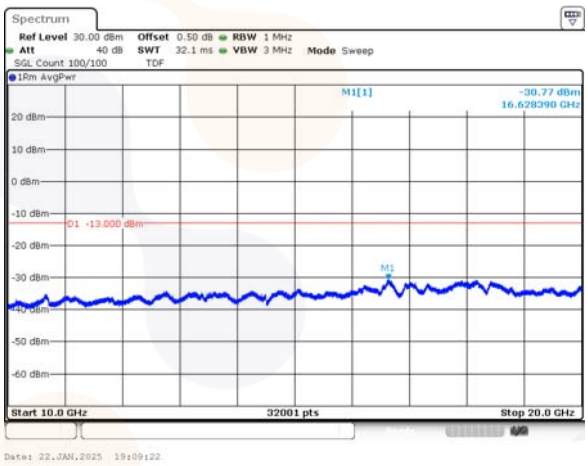
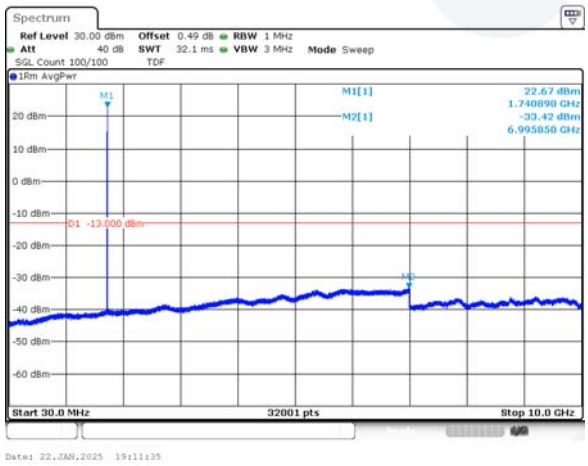
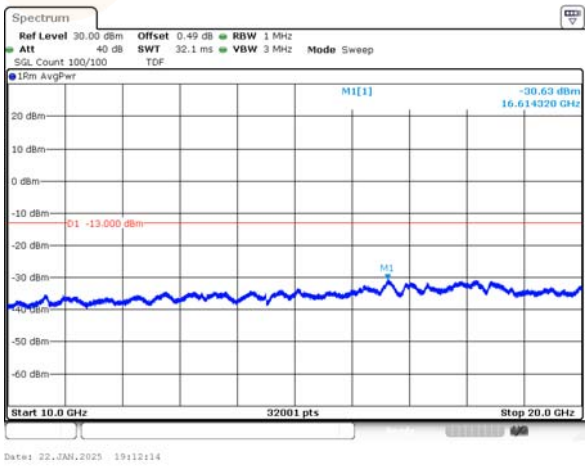
10M BW QPSK	
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (10 ㎓ ~ 20 ㎓)**
	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (10 ㎓ ~ 20 ㎓)**
	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (10 ㎓ ~ 20 ㎓)**
	

15M BW QPSK	
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (10 ㎓ ~ 20 ㎓)**
	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (10 ㎓ ~ 20 ㎓)**
	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (10 ㎓ ~ 20 ㎓)**
	

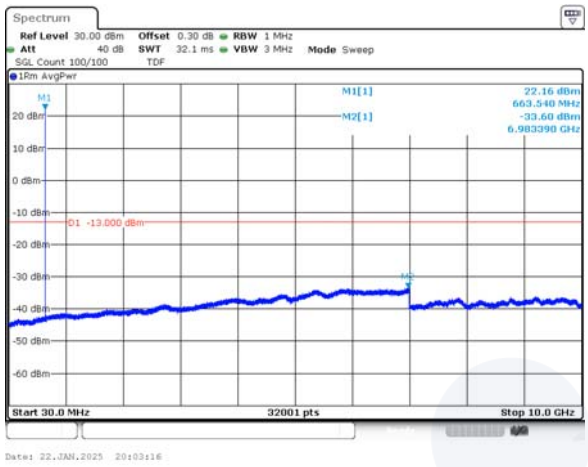
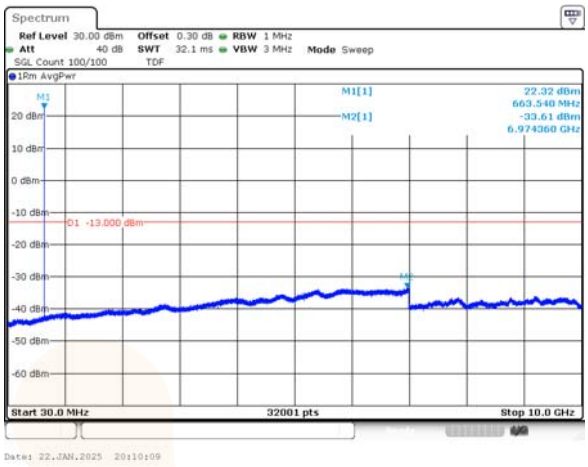
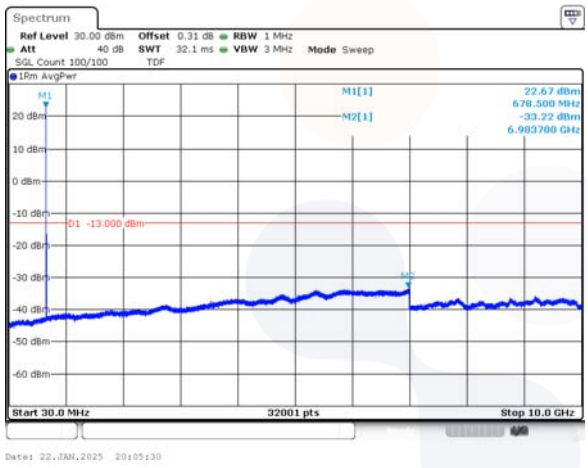
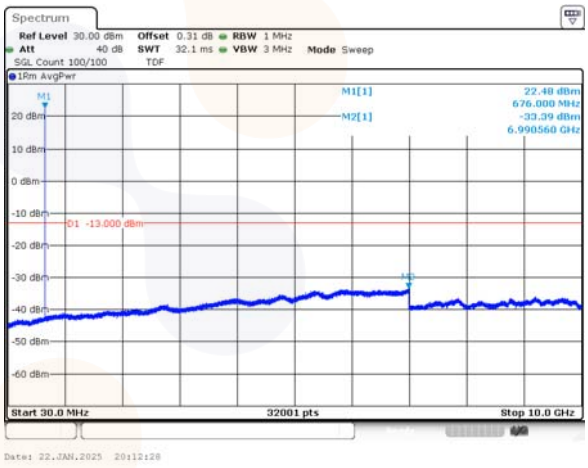
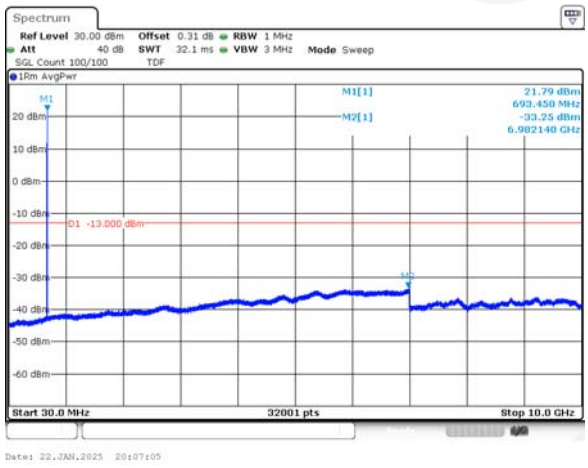
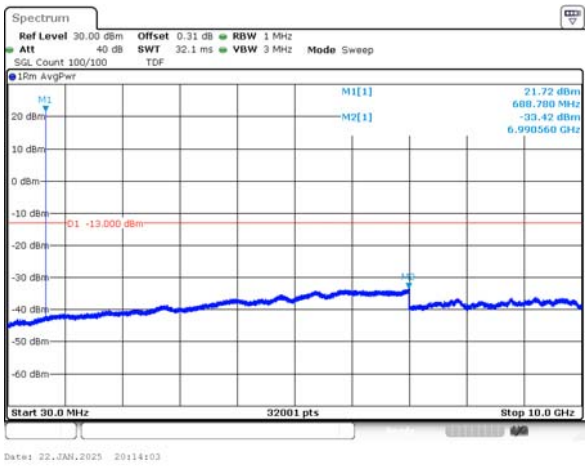
20M BW QPSK	
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (10 ㎓ ~ 20 ㎓)**
	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (10 ㎓ ~ 20 ㎓)**
	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (10 ㎓ ~ 20 ㎓)**
	

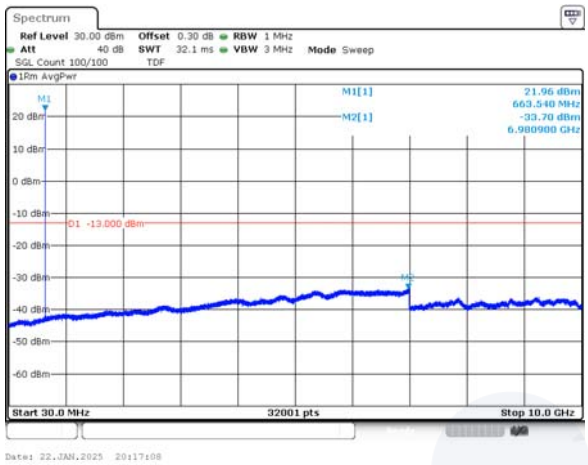
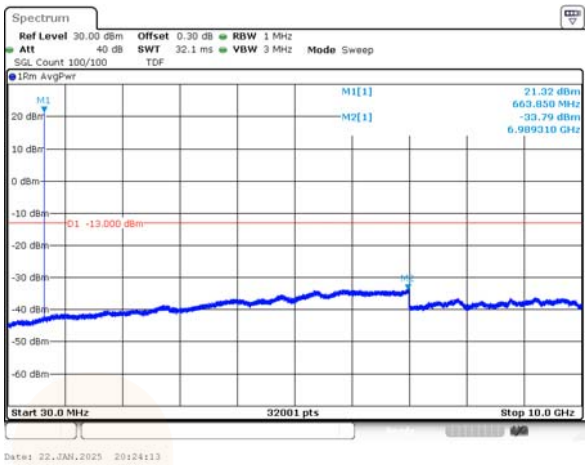
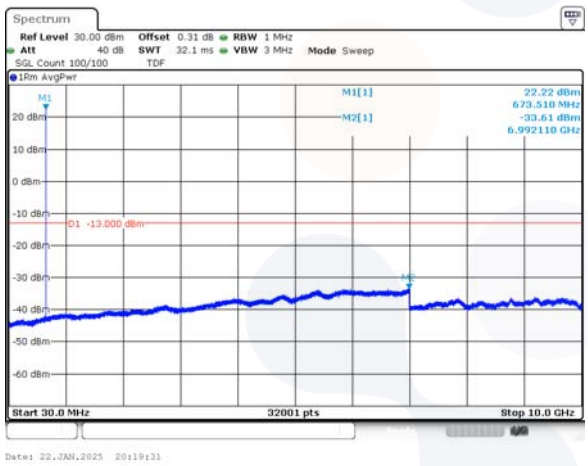
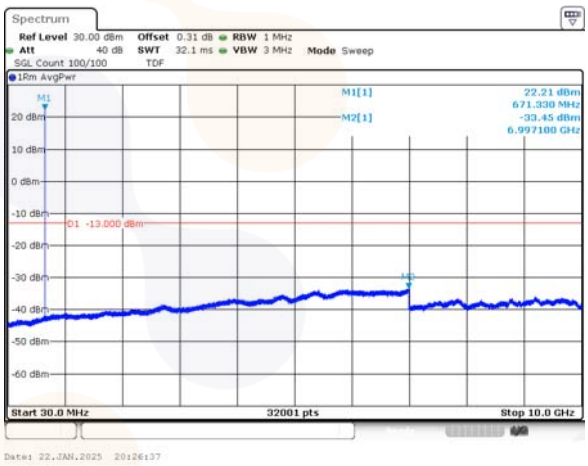
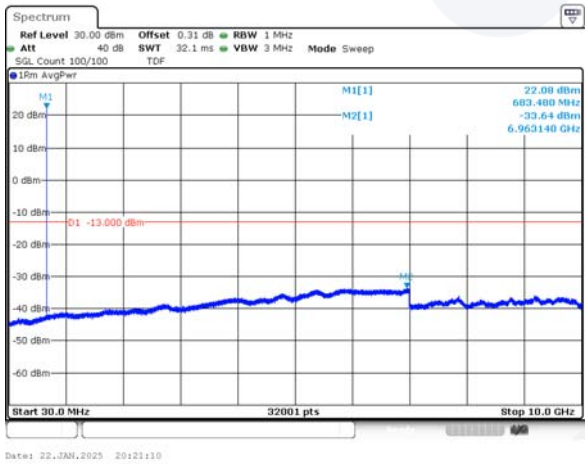
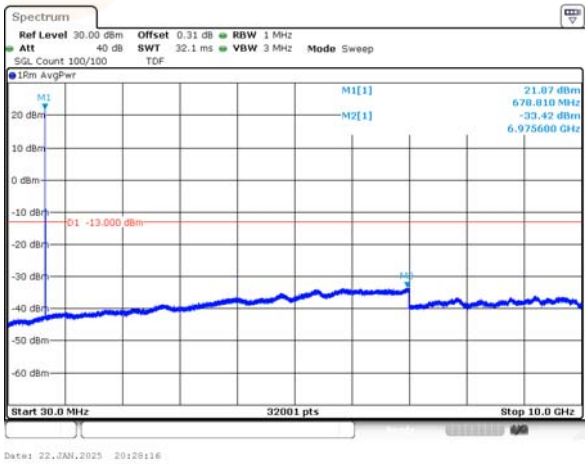
25M BW QPSK	
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (10 ㎓ ~ 20 ㎓)**
	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (10 ㎓ ~ 20 ㎓)**
	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (10 ㎓ ~ 20 ㎓)**
	

30M BW QPSK	
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (10 ㎓ ~ 20 ㎓)**
	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (10 ㎓ ~ 20 ㎓)**
	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (10 ㎓ ~ 20 ㎓)**
	

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

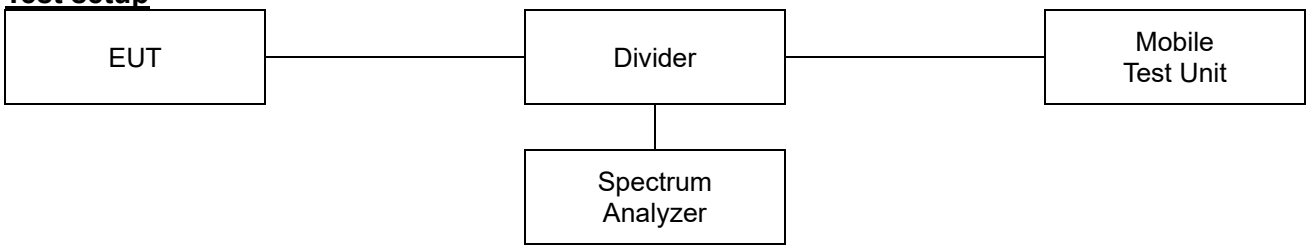
Test mode: 5G NR n71 DFT-s OFDM

5M BW QPSK	10M BW QPSK
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (30 ㎒ ~ 10 ㎓)**
	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (30 ㎒ ~ 10 ㎓)**
	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (30 ㎒ ~ 10 ㎓)**
	

15M BW QPSK	20M BW QPSK
Low channel (30 ㎒ ~ 10 ㎓)	**Low channel (30 ㎒ ~ 10 ㎓)**
	
Middle channel (30 ㎒ ~ 10 ㎓)	**Middle channel (30 ㎒ ~ 10 ㎓)**
	
High channel (30 ㎒ ~ 10 ㎓)	**High channel (30 ㎒ ~ 10 ㎓)**
	

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%

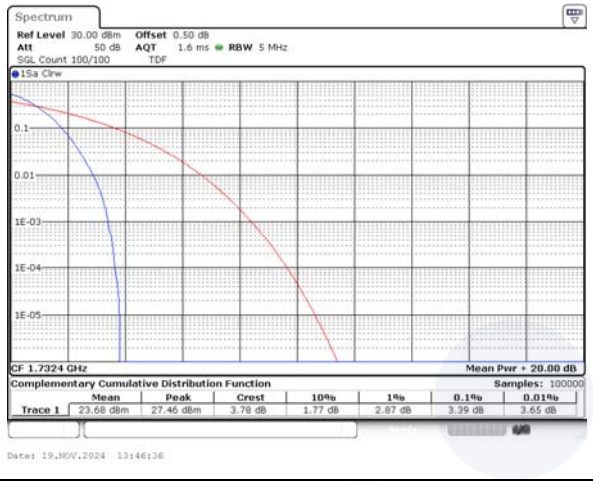
5.2.6 Peak-to-average power ratio

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:

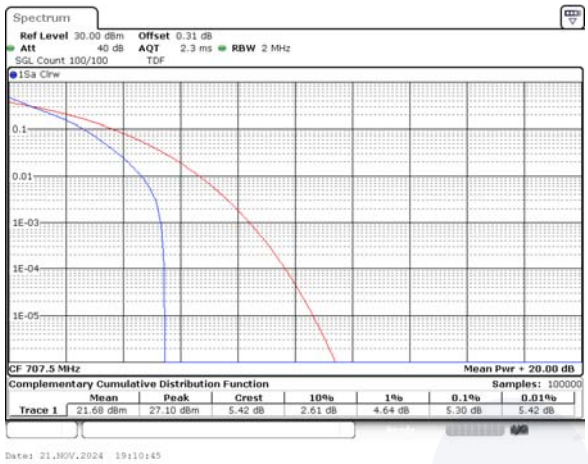
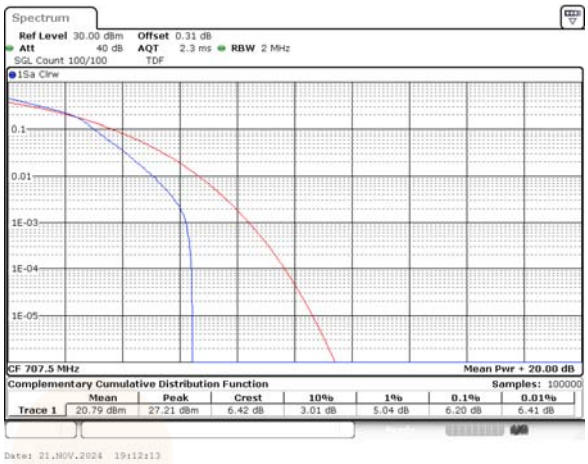
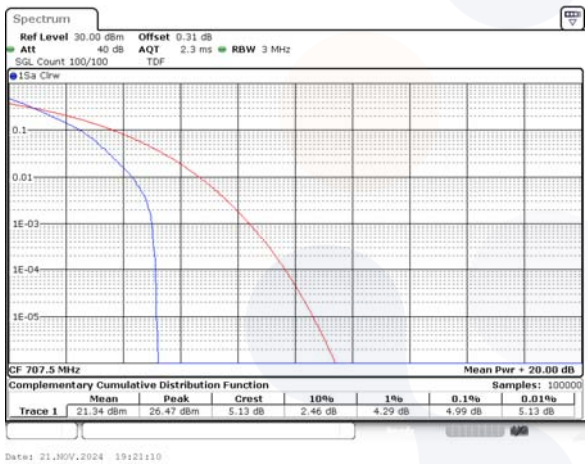
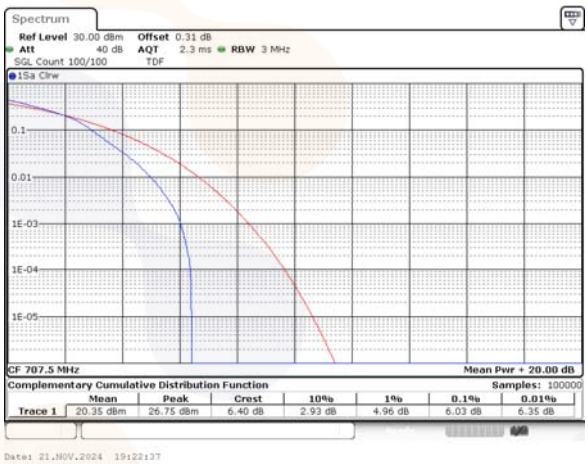
$$PAPR(dB) = P_{PK}(dBm \text{ or } dBW) - P_{AG}(dBm \text{ or } dBW)$$

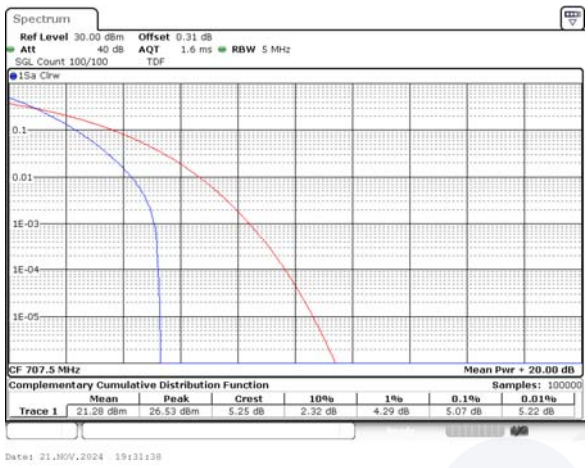
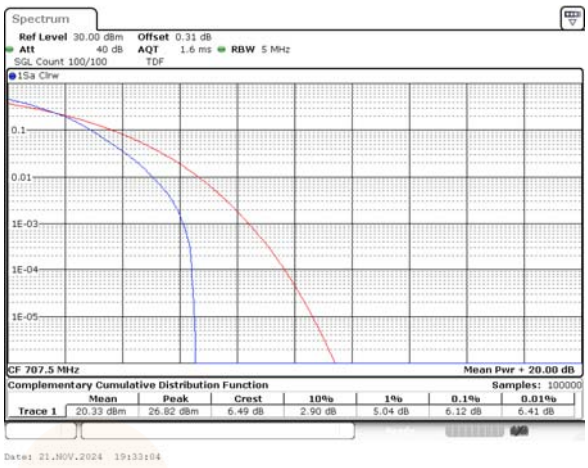
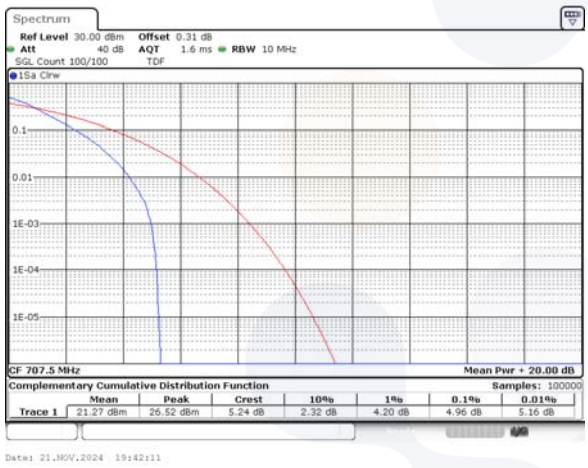
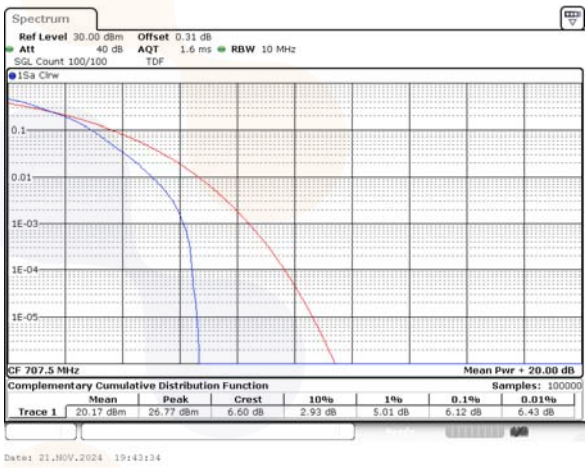
Test results

WCDMA 1700

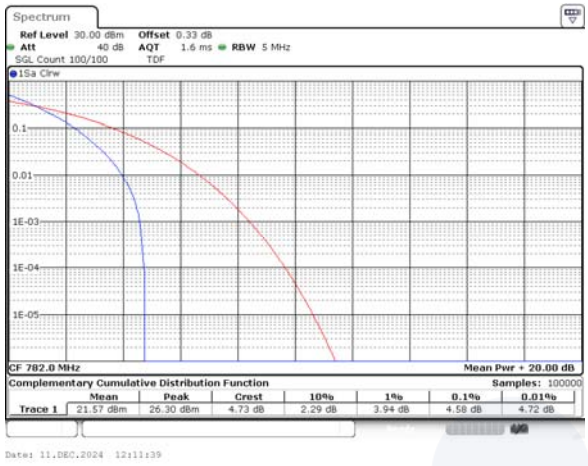
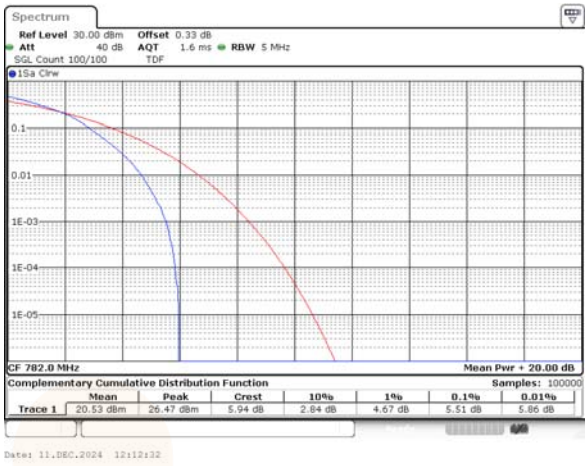
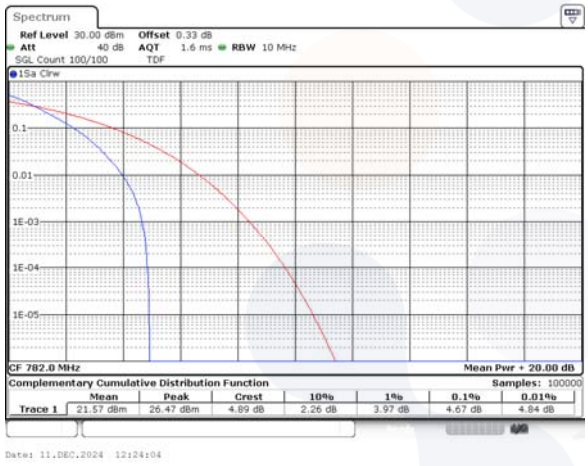
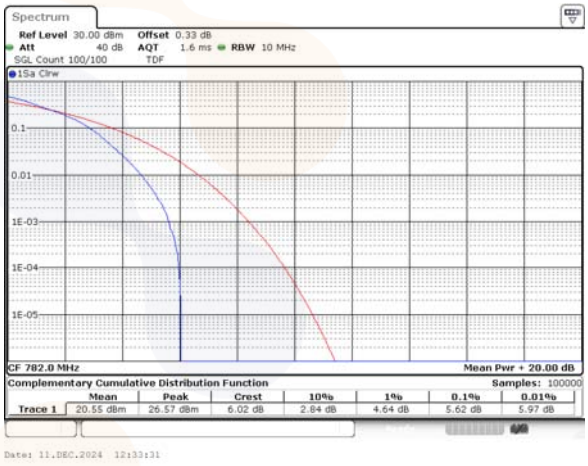
RMC Middle channel	-
	Blank

Test mode: LTE B12/17

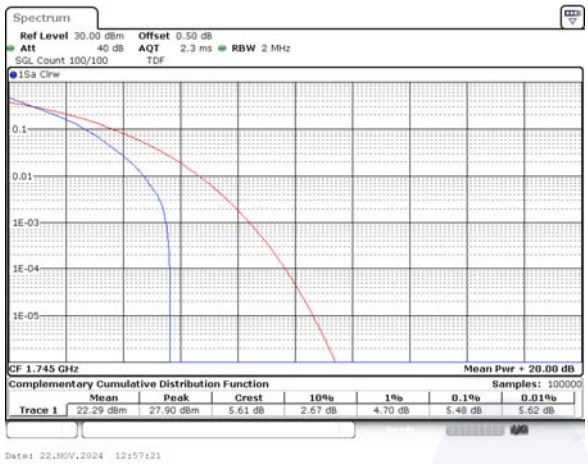
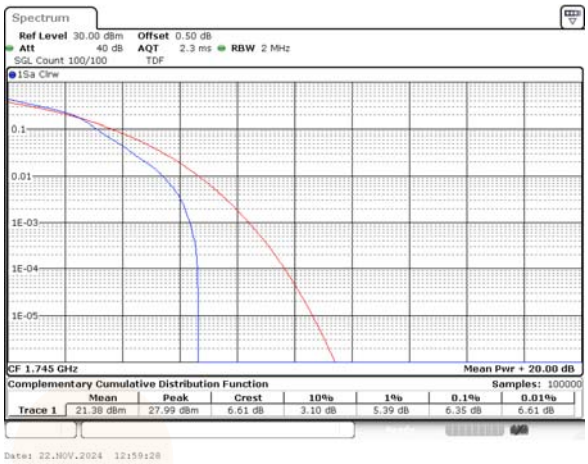
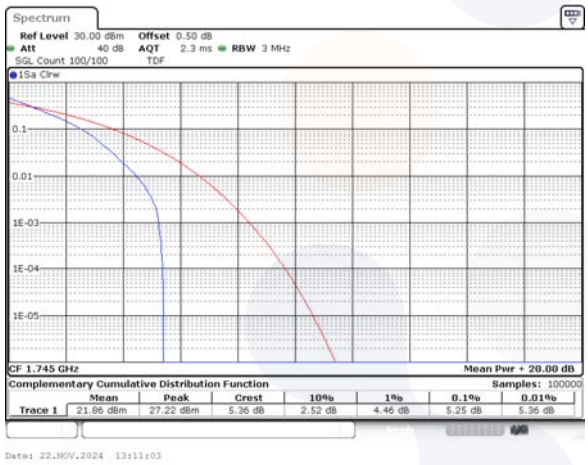
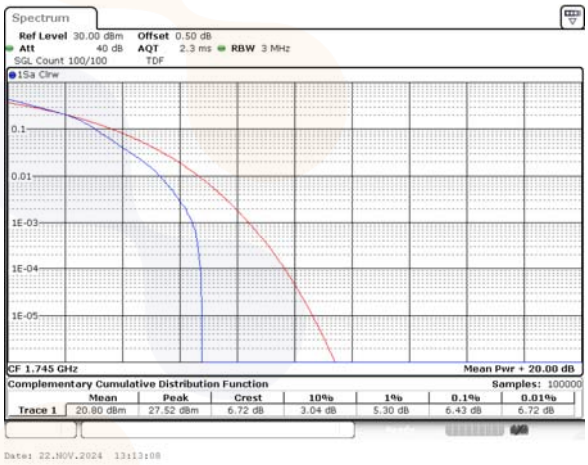
1.4M BW QPSK Middle channel	1.4M BW 16QAM Middle channel
	
3M BW QPSK Middle channel	**3M BW 16QAM Middle channel**
	

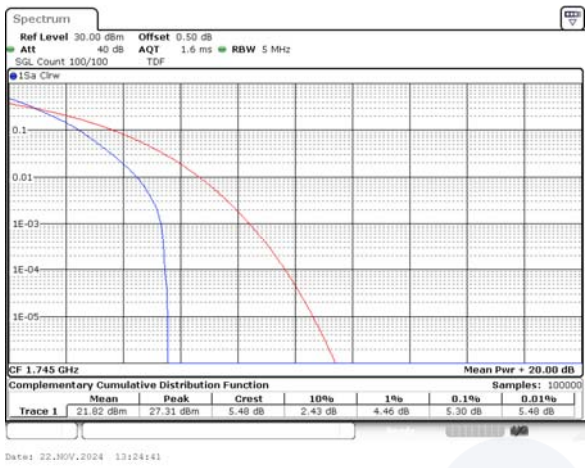
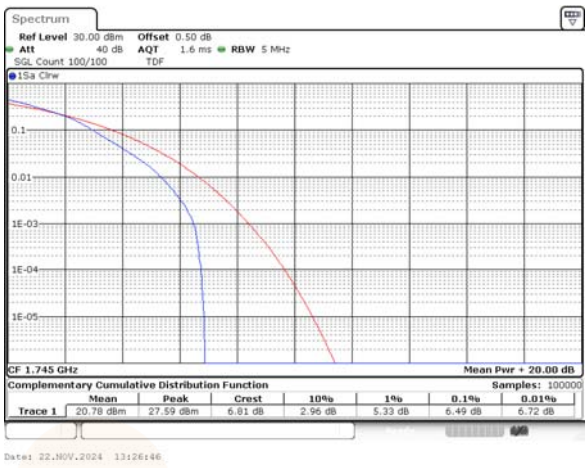
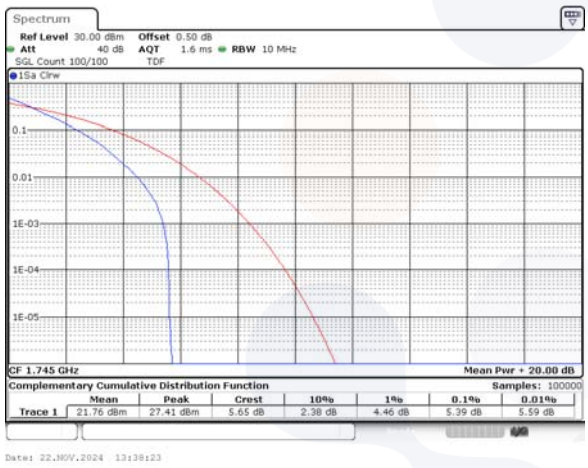
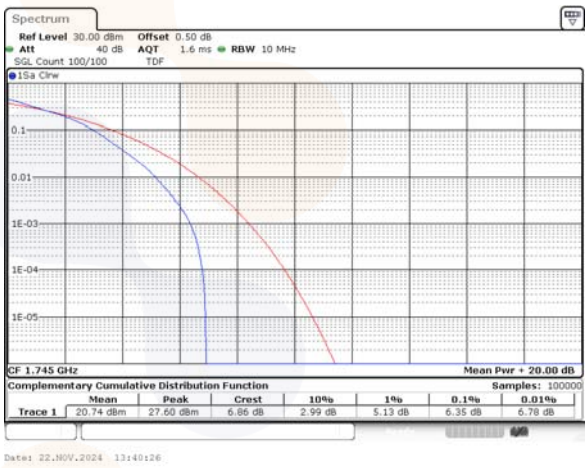
5M BW QPSK Middle channel	5M BW 16QAM Middle channel
	
10M BW QPSK Middle channel	**10M BW 16QAM Middle channel**
	

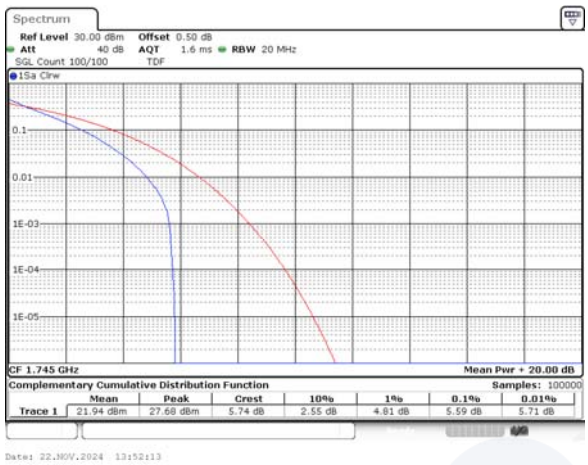
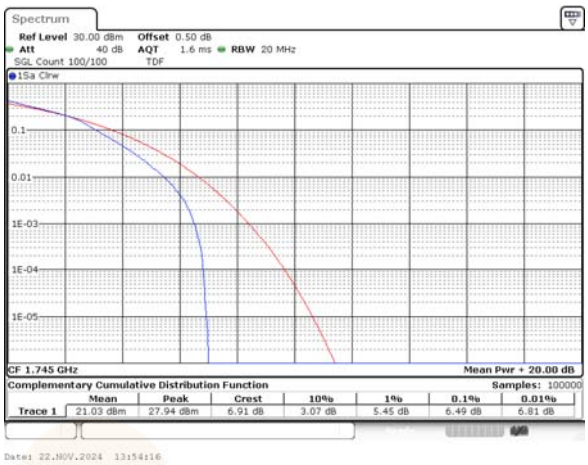
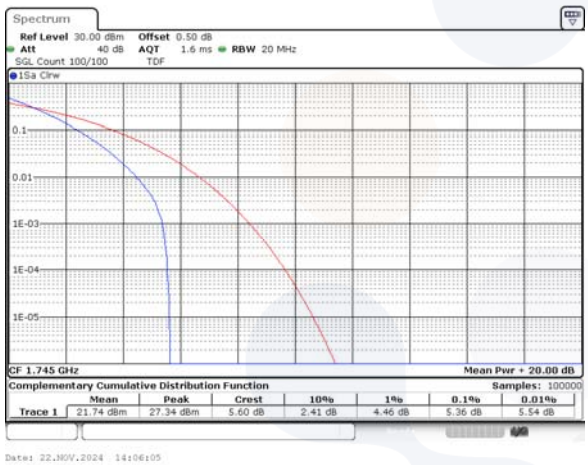
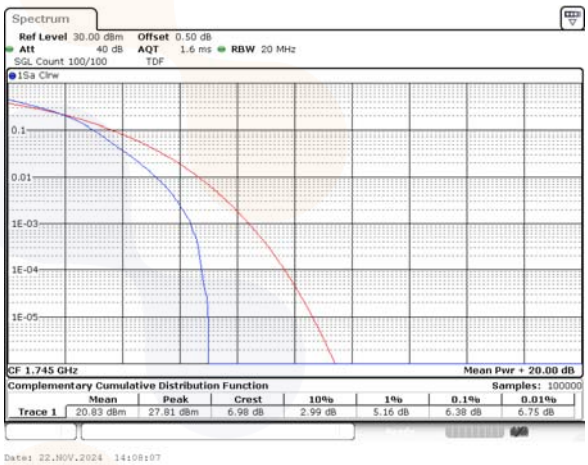
Test mode: LTE B13

5M BW QPSK Middle channel	5M BW 16QAM Middle channel
	
10M BW QPSK Middle channel	**10M BW 16QAM Middle channel**
	

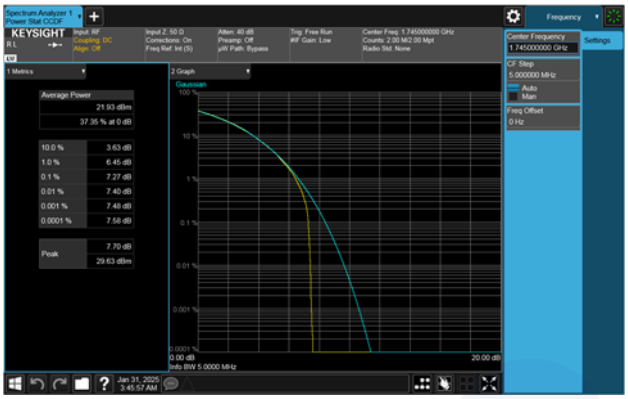
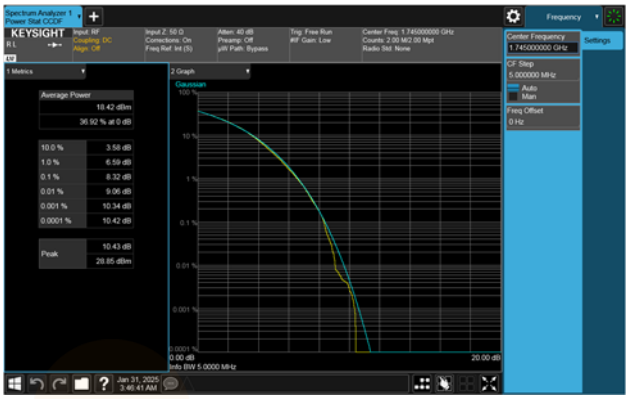
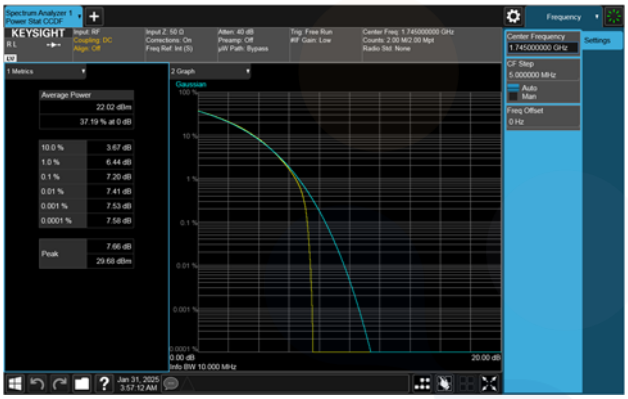
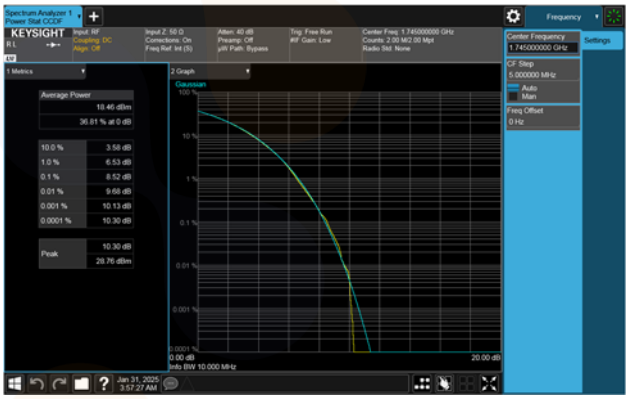
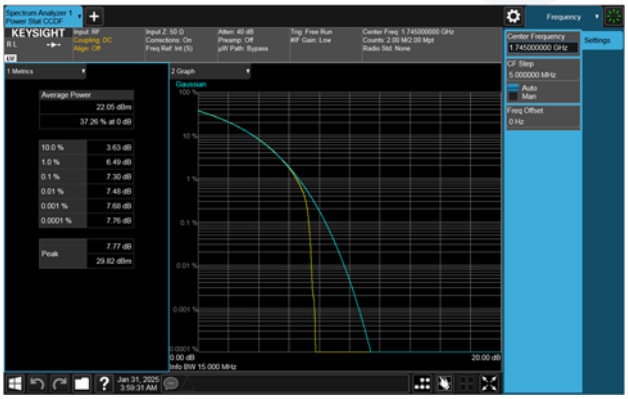
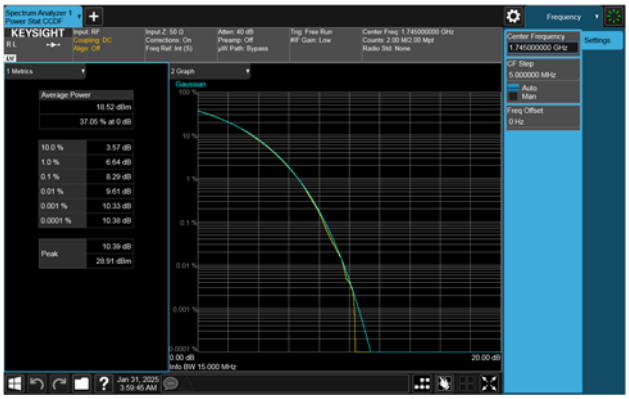
Test mode: LTE B66/4

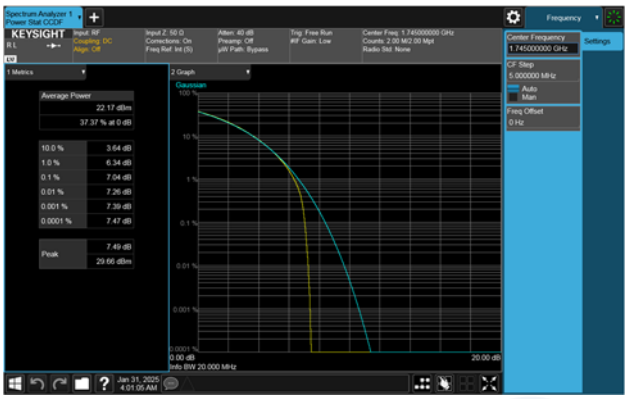
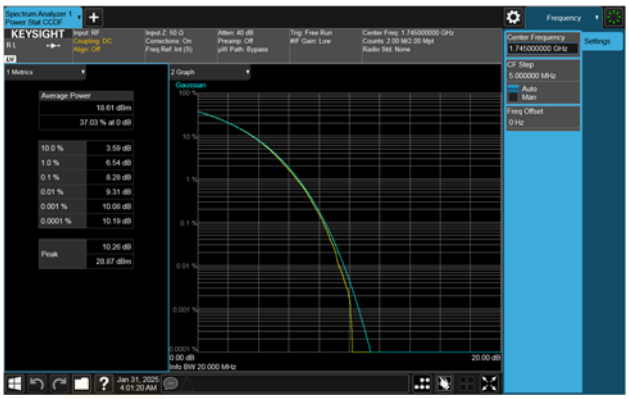
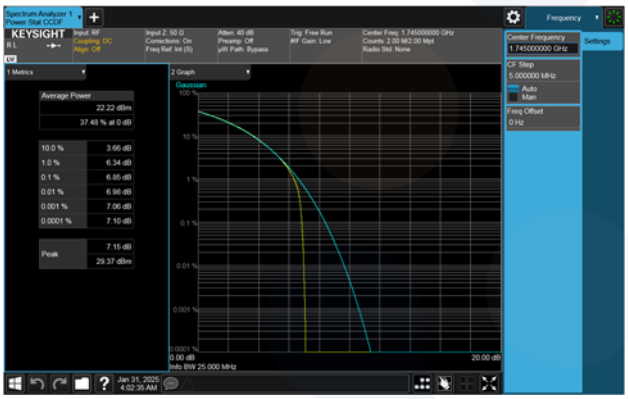
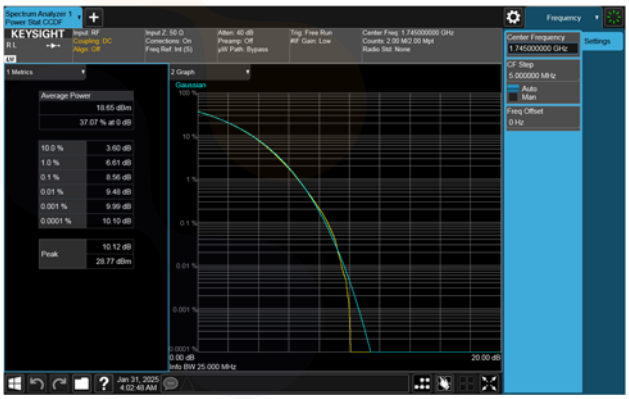
1.4M BW QPSK Middle channel	1.4M BW 16QAM Middle channel
	
3M BW QPSK Middle channel	**3M BW 16QAM Middle channel**
	

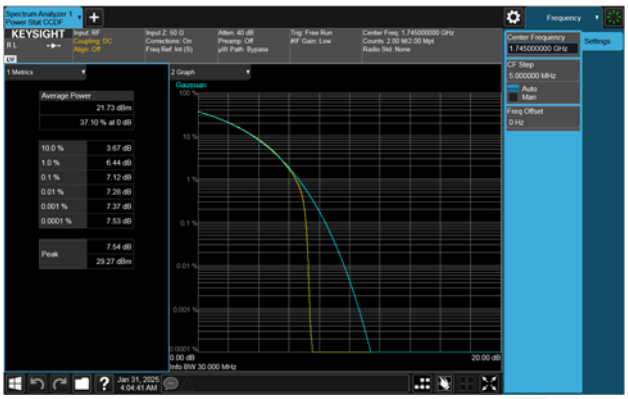
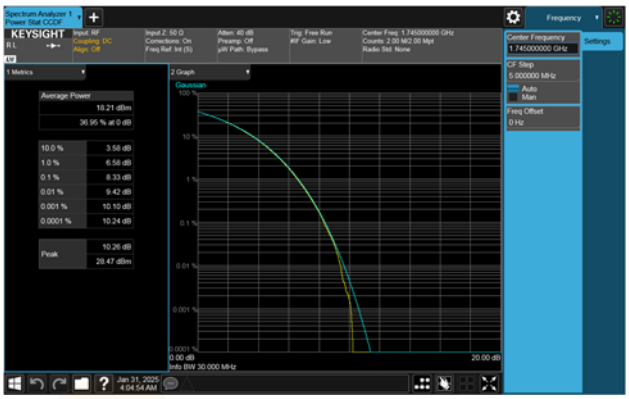
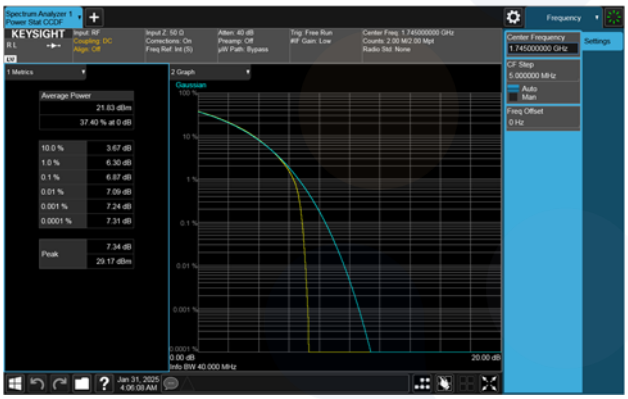
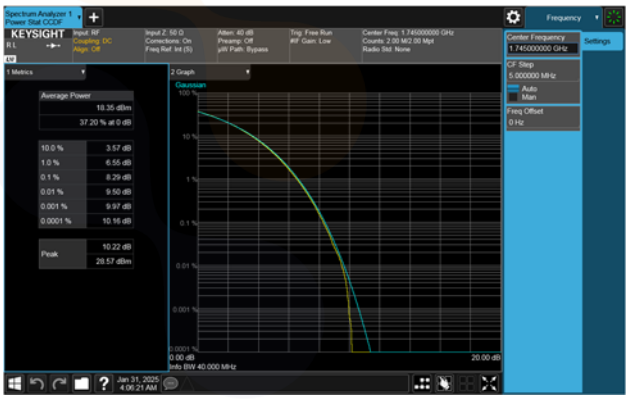
5M BW QPSK Middle channel	5M BW 16QAM Middle channel
	
10M BW QPSK Middle channel	**10M BW 16QAM Middle channel**
	

15M BW QPSK Middle channel	15M BW 16QAM Middle channel
	
20M BW QPSK Middle channel	**20M BW 16QAM Middle channel**
	

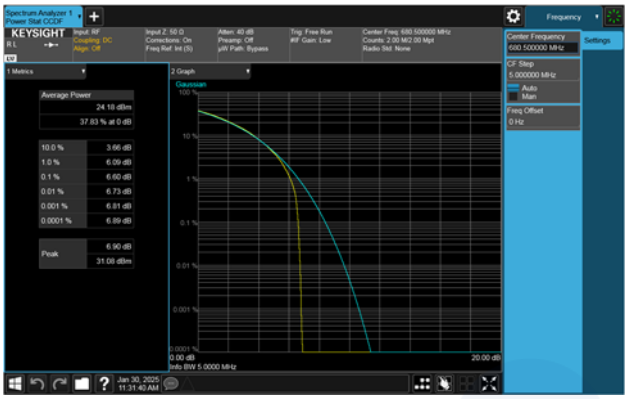
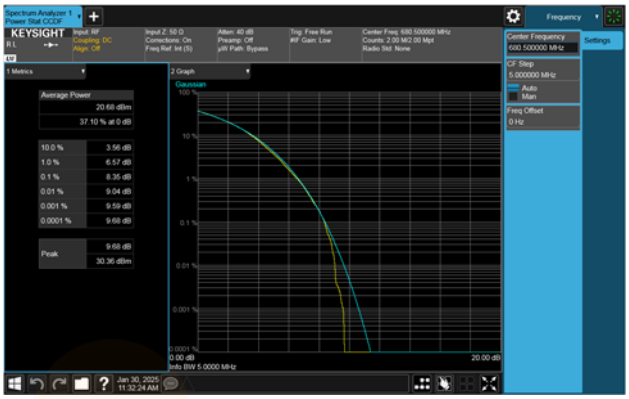
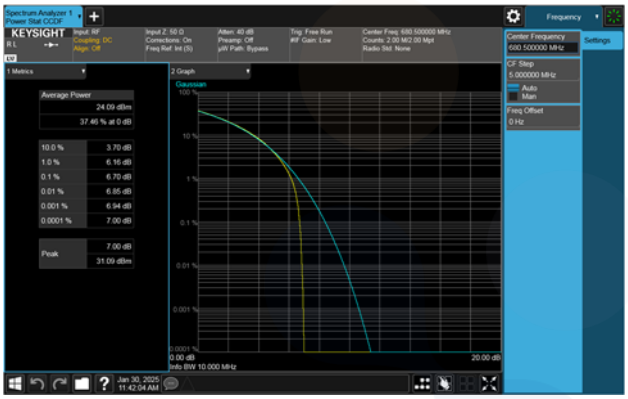
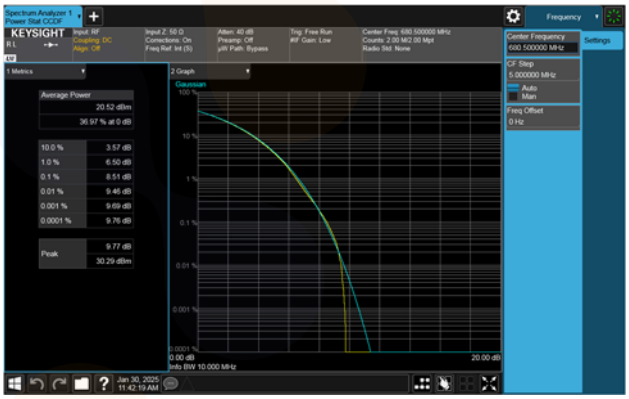
Test mode: 5G NR n66 CP OFDM

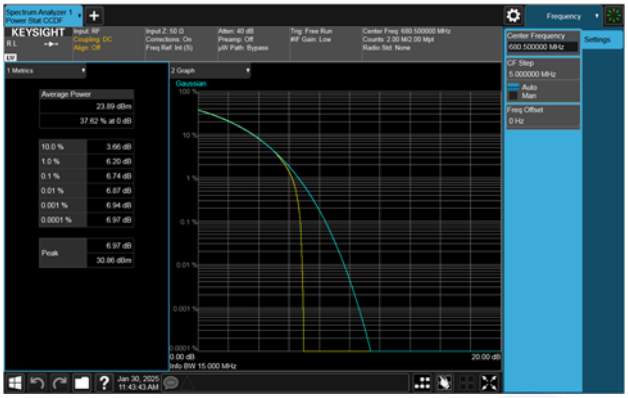
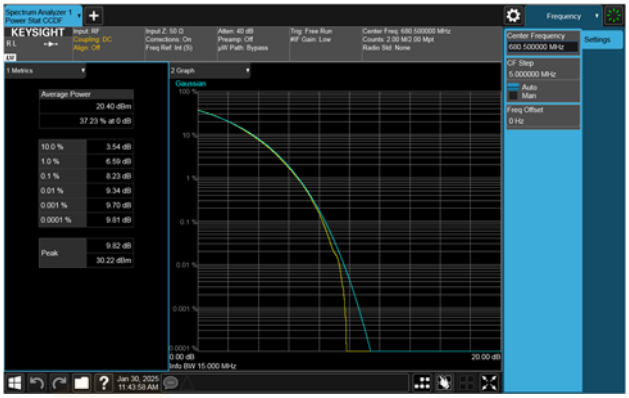
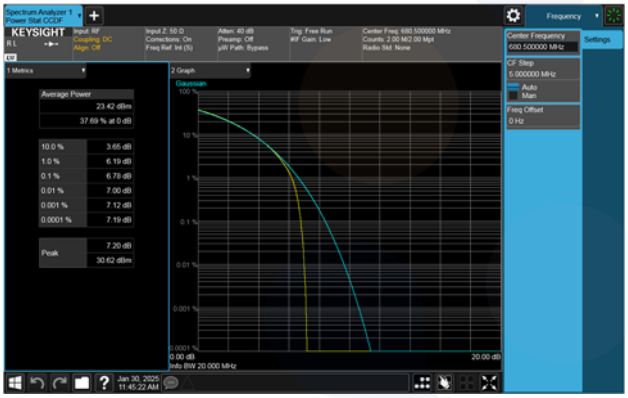
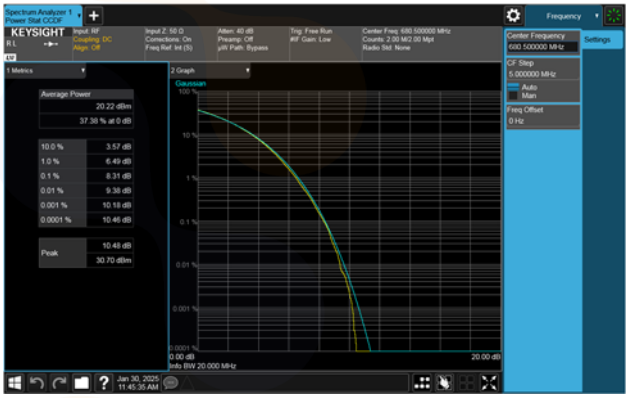
5M BW QPSK Middle channel	5M BW 256QAM Middle channel
	
10M BW QPSK Middle channel	**10M BW 256QAM Middle channel**
	
15M BW QPSK Middle channel	**15M BW 256QAM Middle channel**
	

20M BW QPSK Middle channel	20M BW 256QAM Middle channel
	
25M BW QPSK Middle channel	**25M BW 256QAM Middle channel**
	

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

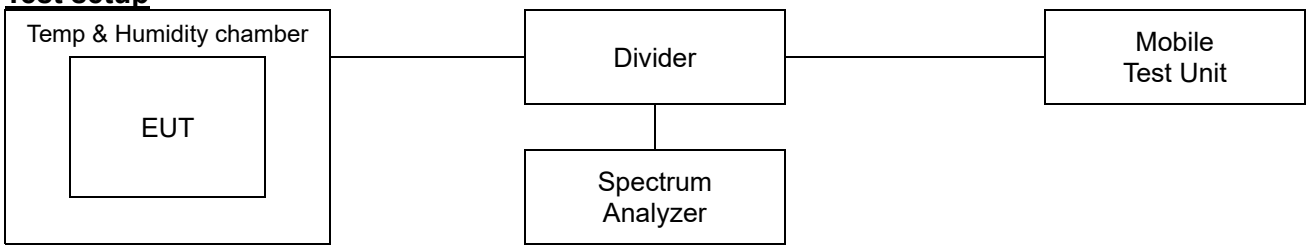
Test mode: 5G NR n71 CP OFDM

5M BW QPSK Middle channel	5M BW 256QAM Middle channel
	
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**
	

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

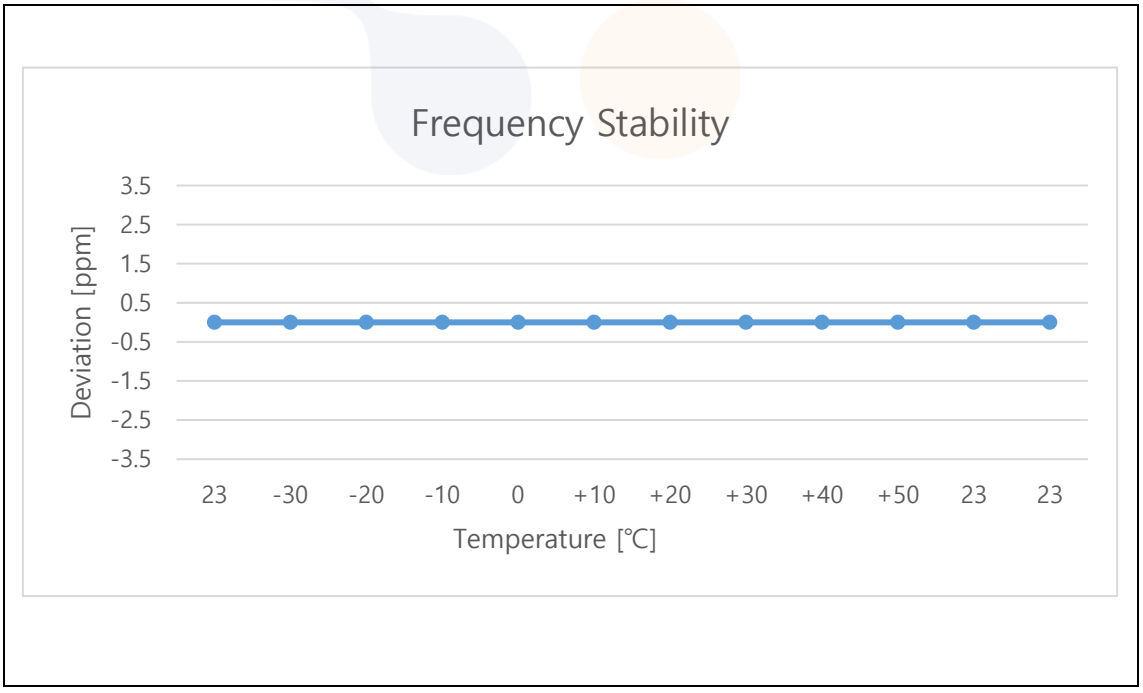
Test settings

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

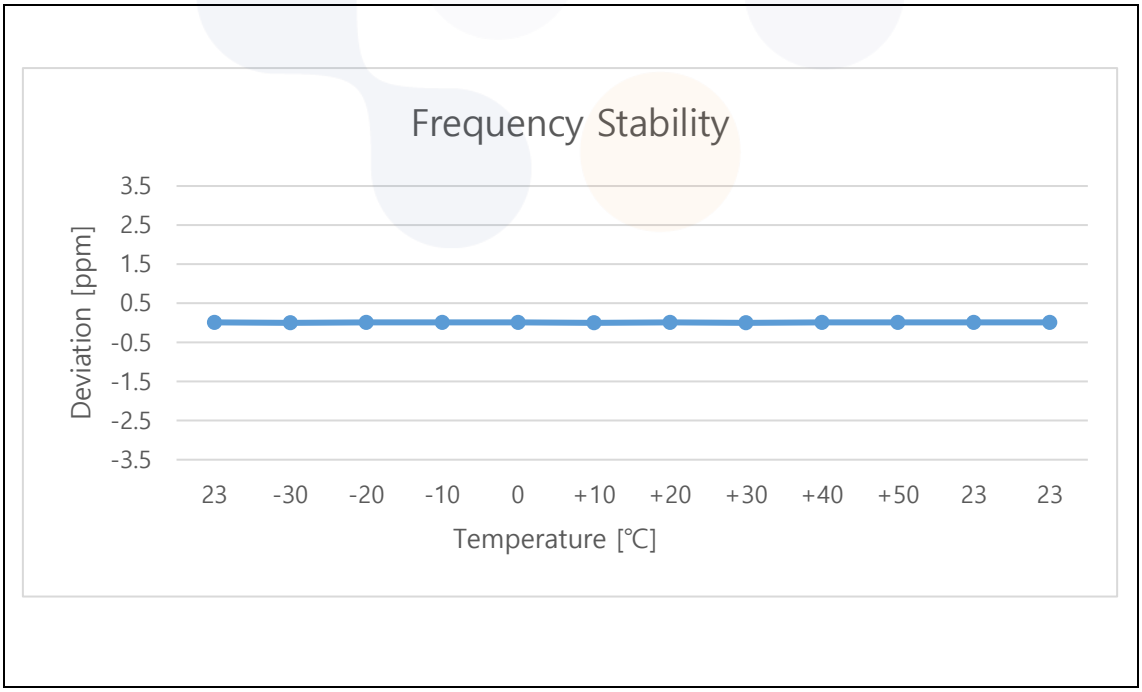
Test mode : WCDMA 1700
Frequency (㎐) : 1 732 400 000
Channel : 1 412
Deviation limit : The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+23(Ref)	1,732,400,001	0.83	0.0	0.000 000
		-30	1,732,400,004	4.10	0.0	0.000 000
		-20	1,732,400,003	3.39	0.0	0.000 000
		-10	1,732,400,005	5.06	0.0	0.000 000
		0	1,732,400,004	4.48	0.0	0.000 000
		+10	1,732,400,001	1.09	0.0	0.000 000
		+20	1,732,400,002	2.08	0.0	0.000 000
		+30	1,732,400,003	3.31	0.0	0.000 000
		+40	1,732,400,002	2.19	0.0	0.000 000
		+50	1,732,399,996	-4.28	0.0	0.000 000
115%	4.43	+23(Ref)	1,732,400,001	1.01	0.0	0.000 000
End point	2.75	+23(Ref)	1,732,400,002	1.62	0.0	0.000 000



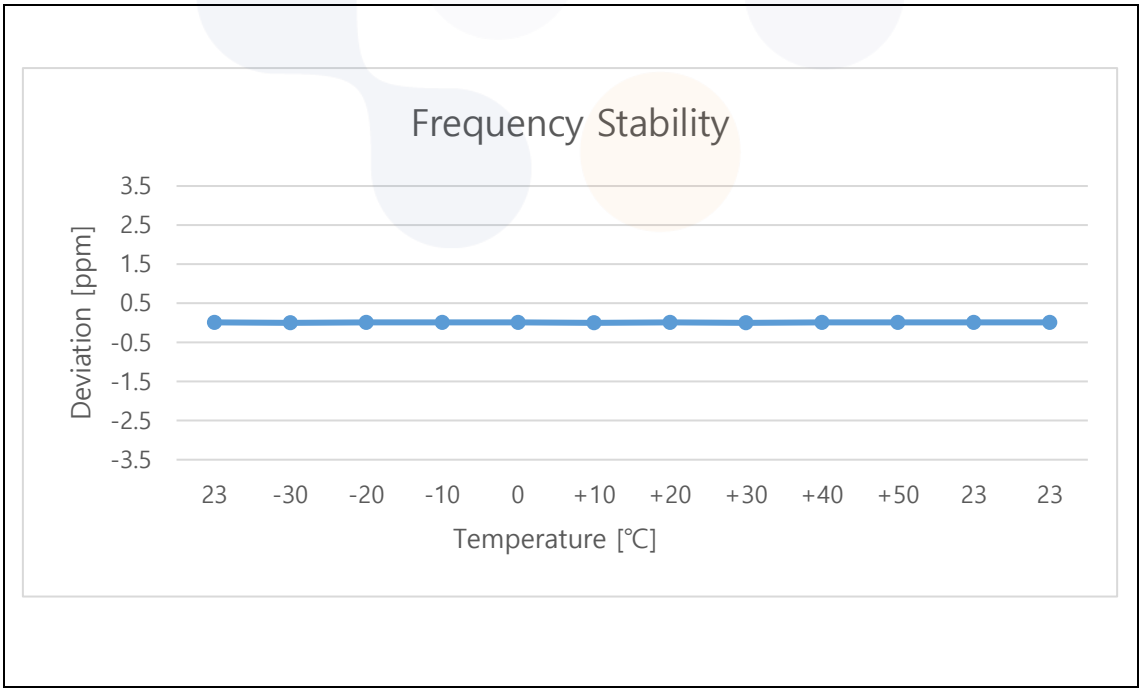
Test mode : LTE B12/17
Frequency (㎐) : 707 500 000
Channel : 23095
Deviation limit : The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+23(Ref)	707,499,994	-5.91	0.0	-0.000 001
		-30	707,500,004	4.03	0.0	0.000 001
		-20	707,500,003	3.34	0.0	0.000 000
		-10	707,500,002	1.85	0.0	0.000 000
		0	707,500,006	5.64	0.0	0.000 001
		+10	707,500,002	2.19	0.0	0.000 000
		+20	707,499,996	-3.58	0.0	-0.000 001
		+30	707,499,998	-2.16	0.0	0.000 000
		+40	707,499,999	-1.11	0.0	0.000 000
		+50	707,499,996	-3.64	0.0	-0.000 001
115%	4.43	+23(Ref)	707,499,996	-4.38	0.0	-0.000 001
End point	2.75	+23(Ref)	707,499,997	-3.25	0.0	0.000 000



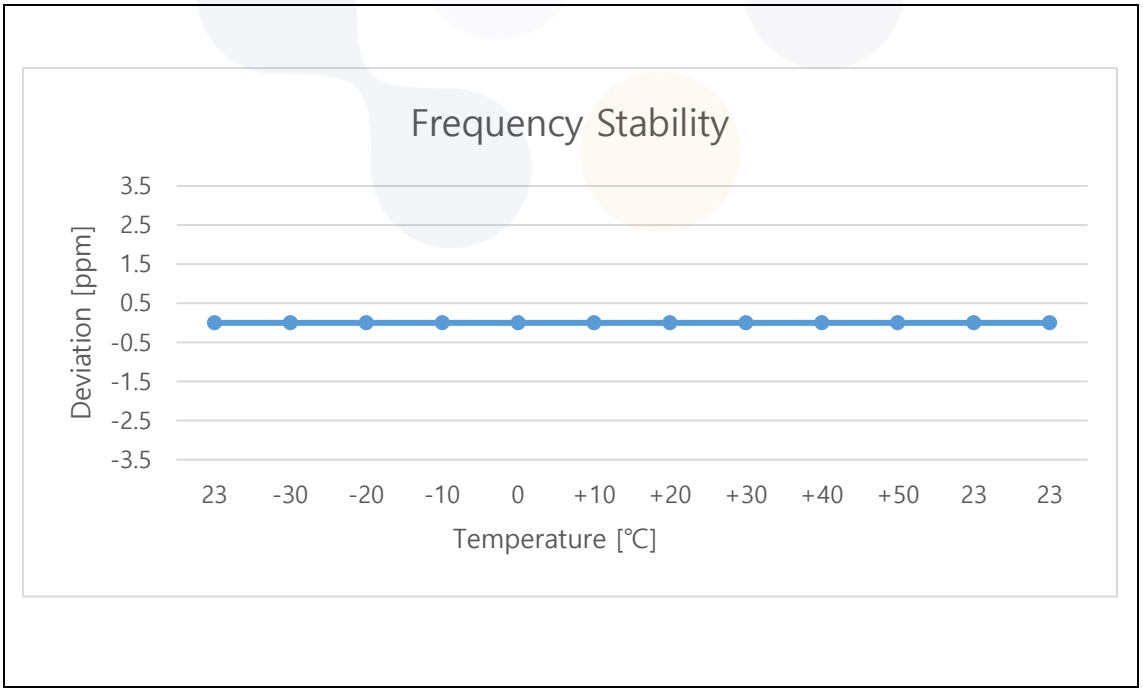
Test mode : LTE B13
Frequency (㎐) : 782 000 000
Channel : 23230
Deviation limit : The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+23(Ref)	782,000,006	6.34	0.0	0.000 001
		-30	782,000,002	2.18	0.0	0.000 000
		-20	782,000,008	8.30	0.0	0.000 001
		-10	782,000,007	7.49	0.0	0.000 001
		0	782,000,004	4.40	0.0	0.000 001
		+10	782,000,003	3.31	0.0	0.000 000
		+20	782,000,005	5.33	0.0	0.000 001
		+30	782,000,003	2.78	0.0	0.000 000
		+40	782,000,008	7.65	0.0	0.000 001
		+50	782,000,010	10.08	0.0	0.000 001
115%	4.43	+23(Ref)	782,000,005	4.86	0.0	0.000 001
End point	2.75	+23(Ref)	782,000,006	6.41	0.0	0.000 001



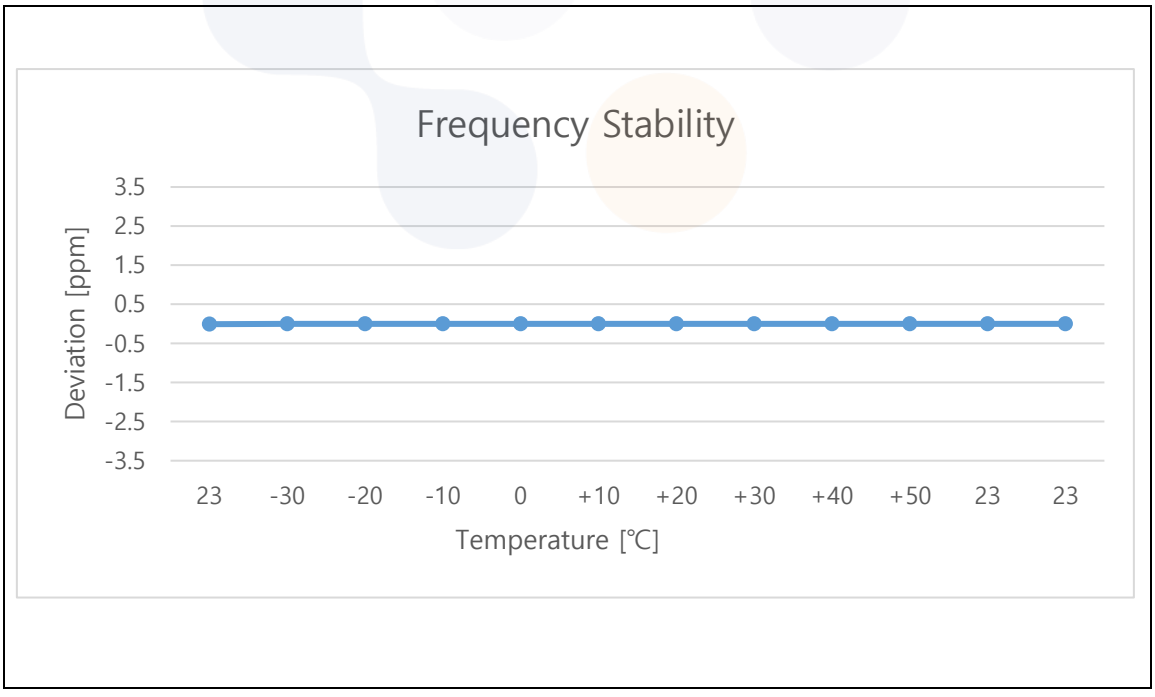
Test mode : LTE B66/4
Frequency (㎐) : 1 745 000 000
Channel : 132322
Deviation limit : The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+23(Ref)	1,745,000,005	4.63	0.0	0.000 000
		-30	1,744,999,995	-5.41	0.0	0.000 000
		-20	1,744,999,997	-3.20	0.0	0.000 000
		-10	1,744,999,992	-7.88	0.0	0.000 000
		0	1,744,999,996	-4.19	0.0	0.000 000
		+10	1,745,000,001	1.11	0.0	0.000 000
		+20	1,745,000,006	5.55	0.0	0.000 000
		+30	1,745,000,003	3.10	0.0	0.000 000
		+40	1,745,000,002	1.57	0.0	0.000 000
		+50	1,745,000,003	2.60	0.0	0.000 000
115%	4.43	+23(Ref)	1,745,000,005	4.81	0.0	0.000 000
End point	2.75	+23(Ref)	1,745,000,007	6.58	0.0	0.000 000



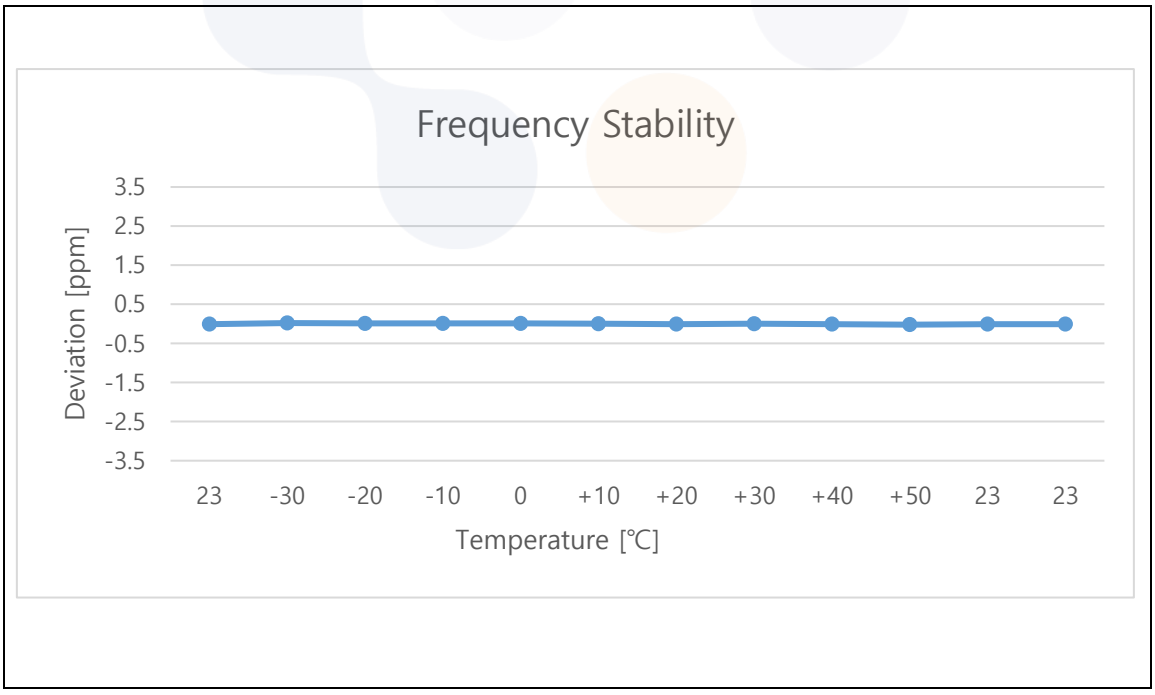
Test mode : 5G NR n66 DFT-s OFDM
Frequency (㎐) : 1 745 000 000
Channel : 349000
Deviation limit : The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+23(Ref)	1,744,999,991	-9.10	0.0	-0.000 001
		-30	1,744,999,999	-0.80	0.0	0.000 000
		-20	1,744,999,998	-2.00	0.0	0.000 000
		-10	1,745,000,004	4.10	0.0	0.000 000
		0	1,745,000,005	5.20	0.0	0.000 000
		+10	1,745,000,004	3.80	0.0	0.000 000
		+20	1,744,999,992	-7.70	0.0	0.000 000
		+30	1,744,999,996	-3.90	0.0	0.000 000
		+40	1,744,999,997	-2.80	0.0	0.000 000
		+50	1,744,999,995	-4.90	0.0	0.000 000
115%	4.43	+23(Ref)	1,744,999,995	-5.00	0.0	0.000 000
End point	2.75	+23(Ref)	1,744,999,993	-6.60	0.0	0.000 000



Test mode : 5G NR n71 DFT-s OFDM
Frequency (㎐) : 680 500 000
Channel : 136100
Deviation limit : The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

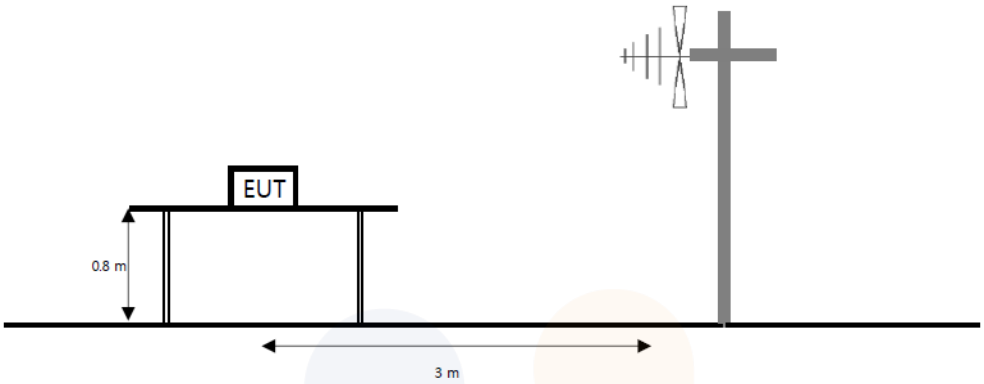
Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+23(Ref)	680,499,997	-3.50	0.0	-0.000 001
		-30	680,500,011	10.50	0.0	0.000 002
		-20	680,500,007	6.60	0.0	0.000 001
		-10	680,500,008	7.80	0.0	0.000 001
		0	680,500,004	4.10	0.0	0.000 001
		+10	680,499,998	-1.90	0.0	0.000 000
		+20	680,499,994	-6.20	0.0	-0.000 001
		+30	680,499,997	-2.80	0.0	0.000 000
		+40	680,499,996	-3.90	0.0	-0.000 001
		+50	680,499,989	-11.20	0.0	-0.000 002
115%	4.43	+23(Ref)	680,499,992	-8.40	0.0	-0.000 001
End point	2.75	+23(Ref)	680,499,996	-4.00	0.0	-0.000 001



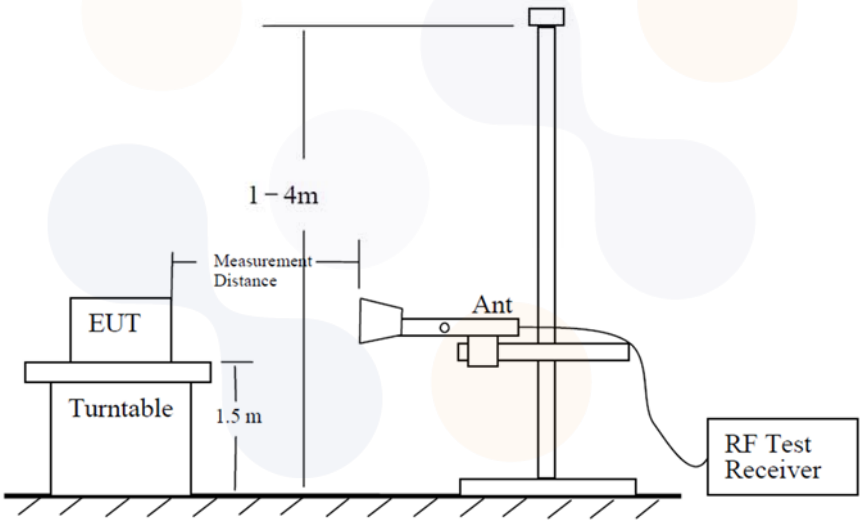
7.7. Radiated Power (ERP/EIRP)

Test setup

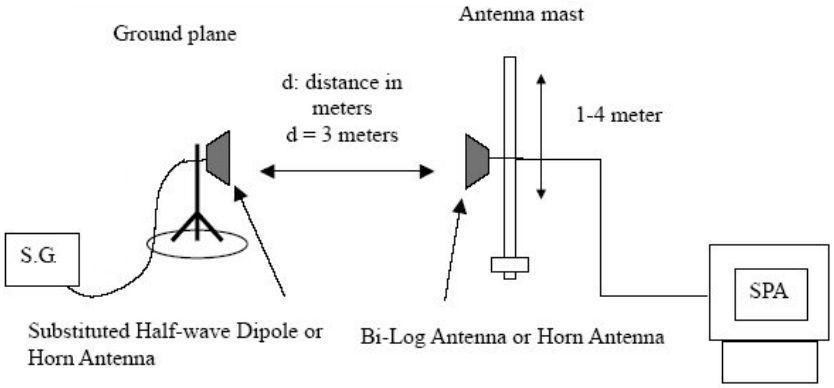
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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 §27.50(b)(10),

Portable stations (hand-held devices) in the 746-757 ㎒, 776-788 ㎒, and 805-806 ㎒ bands are limited to 3 watts ERP.

According to §27.50(c)(10),

Portable stations (hand-held devices) in the 600 ㎒ uplink band and the 698-746 ㎒ band, and fixed and mobile stations in the 600 ㎒ uplink band are limited to 3 watts ERP.

According to §27.50(d)(4),

Fixed, mobile and portable (hand-held) stations operating in the 1710-1755 ㎒ band and mobile and portable stations operating in the 1695-1710 ㎒ and 1755-1780 ㎒ bands are limited to 1 watt EIRP.

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

Main Antenna

Test mode: WCDMA 1700

Mode	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
RMC	Low	H	5.81	8.81	28.69	25.69	0.371
	Middle	H	5.72	8.83	28.41	25.30	0.339
	High	H	5.64	8.93	28.80	25.51	0.356

Note.

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

Test mode: LTE B12/17

Bandwidth [㎒]	Modulation	Channel [㎒]	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
			[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
1.4	QPSK	Low	H	2.55	5.61	26.29	23.23	0.210
		Middle	H	2.63	5.60	26.55	23.57	0.228
		High	H	2.60	5.63	26.82	23.78	0.239
	16QAM	Low	H	2.55	5.61	25.38	22.32	0.170
		Middle	H	2.63	5.60	25.65	22.68	0.185
		High	H	2.60	5.63	25.85	22.82	0.191
3	QPSK	Low	H	2.56	5.62	26.16	23.10	0.204
		Middle	H	2.63	5.60	26.47	23.49	0.223
		High	H	2.61	5.63	26.70	23.67	0.233
	16QAM	Low	H	2.56	5.62	25.26	22.19	0.166
		Middle	H	2.63	5.60	25.47	22.49	0.178
		High	H	2.61	5.63	25.97	22.95	0.197
5	QPSK	Low	H	2.57	5.62	26.29	23.24	0.211
		Middle	H	2.63	5.60	26.51	23.54	0.226
		High	H	2.62	5.63	26.70	23.68	0.233
	16QAM	Low	H	2.57	5.62	25.12	22.06	0.161
		Middle	H	2.63	5.60	25.64	22.66	0.185
		High	H	2.62	5.63	25.81	22.79	0.190
10	QPSK	Low	H	2.59	5.59	26.12	23.12	0.205
		Middle	H	2.63	5.60	26.32	23.34	0.216
		High	H	2.64	5.63	26.54	23.55	0.226
	16QAM	Low	H	2.59	5.59	25.24	22.24	0.167
		Middle	H	2.63	5.60	25.34	22.36	0.172
		High	H	2.64	5.63	25.73	22.74	0.188

Note.

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

Test mode: LTE B13

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
			[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
5	QPSK	Low	H	3.35	5.85	27.29	24.79	0.301
		Middle	H	3.31	5.87	27.33	24.77	0.300
		High	H	3.26	5.87	27.33	24.72	0.296
	16QAM	Low	H	3.35	5.85	26.27	23.77	0.238
		Middle	H	3.31	5.87	26.36	23.80	0.240
		High	H	3.26	5.87	26.44	23.83	0.242
10	QPSK	Middle	H	3.31	5.87	27.66	25.10	0.324
	16QAM	Middle	H	3.31	5.87	26.74	24.18	0.262

Note.

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

Test mode: LTE B66/4

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
			[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
1.4	QPSK	Low	H	5.82	8.80	28.56	25.57	0.361
		Middle	H	5.67	8.89	29.16	25.94	0.393
		High	H	5.53	9.01	28.54	25.06	0.320
	16QAM	Low	H	5.82	8.80	27.49	24.51	0.282
		Middle	H	5.67	8.89	28.29	25.07	0.321
		High	H	5.53	9.01	27.49	24.01	0.252
3	QPSK	Low	H	5.81	8.81	28.79	25.79	0.379
		Middle	H	5.67	8.89	29.21	25.99	0.397
		High	H	5.53	9.02	28.33	24.85	0.305
	16QAM	Low	H	5.81	8.81	27.81	24.82	0.303
		Middle	H	5.67	8.89	28.24	25.02	0.317
		High	H	5.53	9.02	27.30	23.81	0.241
5	QPSK	Low	H	5.81	8.81	28.63	25.63	0.366
		Middle	H	5.67	8.89	29.23	26.01	0.399
		High	H	5.53	9.00	28.20	24.74	0.298
	16QAM	Low	H	5.81	8.81	27.79	24.79	0.301
		Middle	H	5.67	8.89	28.28	25.06	0.321
		High	H	5.53	9.00	27.23	23.77	0.238
10	QPSK	Low	H	5.80	8.80	28.81	25.80	0.380
		Middle	H	5.67	8.89	29.28	26.06	0.404
		High	H	5.55	9.02	28.13	24.65	0.292
	16QAM	Low	H	5.80	8.80	27.75	24.75	0.299
		Middle	H	5.67	8.89	28.37	25.15	0.327
		High	H	5.55	9.02	27.09	23.61	0.230
15	QPSK	Low	H	5.79	8.81	28.97	25.95	0.393
		Middle	H	5.67	8.89	28.92	25.70	0.371
		High	H	5.56	9.02	28.29	24.83	0.304
	16QAM	Low	H	5.79	8.81	28.01	24.99	0.315
		Middle	H	5.67	8.89	27.94	24.72	0.296
		High	H	5.56	9.02	27.46	23.99	0.251
20	QPSK	Low	H	5.78	8.82	28.83	25.78	0.379
		Middle	H	5.67	8.89	28.87	25.65	0.367
		High	H	5.57	9.01	29.13	25.69	0.370
	16QAM	Low	H	5.78	8.82	27.97	24.92	0.311
		Middle	H	5.67	8.89	27.98	24.76	0.300
		High	H	5.57	9.01	28.15	24.71	0.296

Note.

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

Test mode: 5G NR n66 DFT-s-OFDM

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
			[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
5	QPSK	Low	H	5.81	8.81	27.41	24.41	0.276
		Middle	H	5.67	8.89	26.78	23.56	0.227
		High	H	5.53	9.00	27.69	24.22	0.264
	16QAM	Low	H	5.81	8.81	27.00	23.99	0.251
		Middle	H	5.67	8.89	26.55	23.33	0.215
		High	H	5.53	9.00	27.20	23.73	0.236
10	QPSK	Low	H	5.80	8.80	27.66	24.65	0.292
		Middle	H	5.67	8.89	27.24	24.02	0.252
		High	H	5.55	9.02	27.10	23.62	0.230
	16QAM	Low	H	5.80	8.80	27.50	24.50	0.282
		Middle	H	5.67	8.89	26.81	23.59	0.228
		High	H	5.55	9.02	26.53	23.05	0.202
15	QPSK	Low	H	5.79	8.81	28.09	25.07	0.321
		Middle	H	5.67	8.89	27.48	24.26	0.267
		High	H	5.56	9.02	27.33	23.86	0.243
	16QAM	Low	H	5.79	8.81	27.70	24.68	0.294
		Middle	H	5.67	8.89	27.07	23.85	0.243
		High	H	5.56	9.02	26.86	23.40	0.219
20	QPSK	Low	H	5.78	8.82	28.06	25.01	0.317
		Middle	H	5.67	8.89	27.57	24.35	0.272
		High	H	5.57	9.01	27.39	23.95	0.248
	16QAM	Low	H	5.78	8.82	27.46	24.42	0.277
		Middle	H	5.67	8.89	27.22	24.01	0.251
		High	H	5.57	9.01	26.97	23.53	0.225
25	QPSK	Low	H	5.77	8.83	27.40	24.34	0.272
		Middle	H	5.67	8.89	27.83	24.61	0.289
		High	H	5.58	8.96	27.99	24.61	0.289
	16QAM	Low	H	5.77	8.83	26.58	23.52	0.225
		Middle	H	5.67	8.89	27.13	23.91	0.246
		High	H	5.58	8.96	27.44	24.06	0.255
30	QPSK	Low	H	5.76	8.84	27.07	23.99	0.251
		Middle	H	5.67	8.89	27.30	24.08	0.256
		High	H	5.59	8.95	28.08	24.72	0.296
	16QAM	Low	H	5.76	8.84	26.65	23.57	0.227
		Middle	H	5.67	8.89	26.80	23.58	0.228
		High	H	5.59	8.95	27.51	24.15	0.260
40	QPSK	Low	H	5.73	8.86	27.49	24.36	0.273
		Middle	H	5.67	8.89	27.34	24.12	0.258
		High	H	5.61	8.94	27.42	24.09	0.256
	16QAM	Low	H	5.73	8.86	27.03	23.90	0.246
		Middle	H	5.67	8.89	26.86	23.64	0.231
		High	H	5.61	8.94	26.81	23.48	0.223

Note.

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

Test mode: 5G NR n71 DFT-s-OFDM

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
			[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
5	QPSK	Low	H	3.14	5.45	23.55	21.24	0.133
		Middle	H	2.84	5.49	24.64	21.98	0.158
		High	H	2.55	5.54	25.44	22.45	0.176
	16QAM	Low	H	3.14	5.45	22.86	20.55	0.113
		Middle	H	2.84	5.49	23.73	21.07	0.128
		High	H	2.55	5.54	24.41	21.42	0.139
10	QPSK	Low	H	3.09	5.49	23.84	21.44	0.139
		Middle	H	2.84	5.49	25.60	22.94	0.197
		High	H	2.55	5.54	26.55	23.56	0.227
	16QAM	Low	H	3.09	5.49	22.82	20.42	0.110
		Middle	H	2.84	5.49	24.22	21.57	0.143
		High	H	2.55	5.54	25.49	22.50	0.178
15	QPSK	Low	H	3.04	5.50	24.39	21.93	0.156
		Middle	H	2.84	5.49	25.48	22.82	0.192
		High	H	2.55	5.54	26.38	23.39	0.218
	16QAM	Low	H	3.04	5.50	23.60	21.14	0.130
		Middle	H	2.84	5.49	24.54	21.88	0.154
		High	H	2.55	5.54	25.41	22.42	0.174
20	QPSK	Low	H	2.99	5.47	25.14	22.66	0.185
		Middle	H	2.84	5.49	25.72	23.06	0.202
		High	H	2.61	5.55	26.24	23.30	0.214
	16QAM	Low	H	2.99	5.47	24.07	21.59	0.144
		Middle	H	2.84	5.49	24.67	22.01	0.159
		High	H	2.61	5.55	25.04	22.10	0.162

Note.

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

Sub Antenna

Test mode: LTE B66/4

Bandwidth [㎒]	Modulation	Channel	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
			[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
1.4	QPSK	Low	H	5.82	8.80	27.59	24.61	0.289
		Middle	H	5.67	8.89	26.15	22.93	0.196
		High	H	5.53	9.01	26.10	22.62	0.183
	16QAM	Low	H	5.82	8.80	26.78	23.80	0.240
		Middle	H	5.67	8.89	25.18	21.96	0.157
		High	H	5.53	9.01	25.31	21.83	0.152
3	QPSK	Low	H	5.81	8.81	27.46	24.47	0.280
		Middle	H	5.67	8.89	26.14	22.92	0.196
		High	H	5.53	9.02	26.16	22.67	0.185
	16QAM	Low	H	5.81	8.81	26.89	23.90	0.245
		Middle	H	5.67	8.89	25.33	22.12	0.163
		High	H	5.53	9.02	25.51	22.02	0.159
5	QPSK	Low	H	5.81	8.81	27.43	24.43	0.277
		Middle	H	5.67	8.89	26.22	23.01	0.200
		High	H	5.53	9.00	26.13	22.67	0.185
	16QAM	Low	H	5.81	8.81	26.84	23.84	0.242
		Middle	H	5.67	8.89	25.55	22.33	0.171
		High	H	5.53	9.00	25.58	22.12	0.163
10	QPSK	Low	H	5.80	8.80	27.58	24.57	0.287
		Middle	H	5.67	8.89	25.95	22.73	0.187
		High	H	5.55	9.02	26.13	22.66	0.184
	16QAM	Low	H	5.80	8.80	26.78	23.77	0.238
		Middle	H	5.67	8.89	25.18	21.96	0.157
		High	H	5.55	9.02	25.29	21.81	0.152
15	QPSK	Low	H	5.79	8.81	27.61	24.58	0.287
		Middle	H	5.67	8.89	25.97	22.75	0.188
		High	H	5.56	9.02	26.09	22.63	0.183
	16QAM	Low	H	5.79	8.81	27.04	24.02	0.252
		Middle	H	5.67	8.89	25.41	22.19	0.166
		High	H	5.56	9.02	25.42	21.96	0.157
20	QPSK	Low	H	5.78	8.82	27.56	24.51	0.283
		Middle	H	5.67	8.89	26.21	22.99	0.199
		High	H	5.57	9.01	27.03	23.58	0.228
	16QAM	Low	H	5.78	8.82	26.79	23.74	0.237
		Middle	H	5.67	8.89	25.38	22.16	0.164
		High	H	5.57	9.01	26.22	22.77	0.189

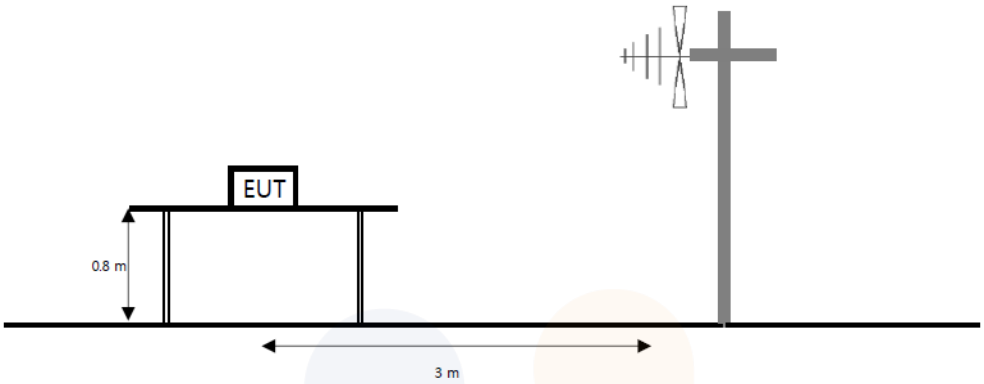
Note.

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

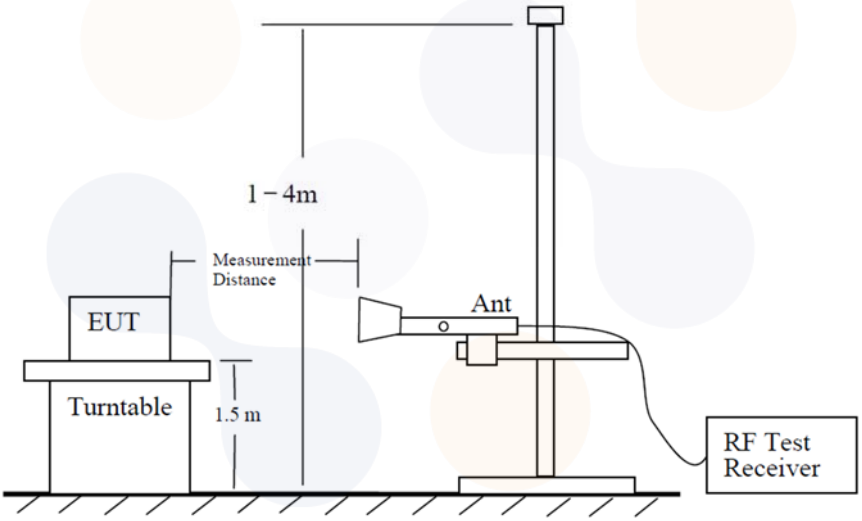
7.8. Radiated Spurious Emissions

Test setup

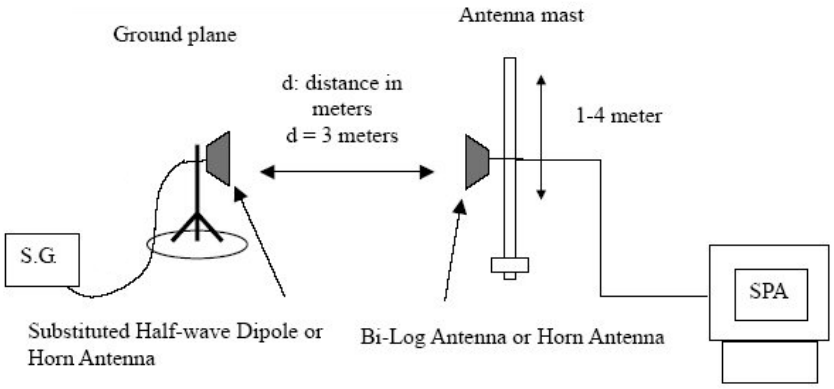
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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(c)(2),

On any frequency outside the 776-788 ㎒ band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10log(P) ㏈.

According to §27.53(f),

For operations in the 746-758 ㎒, 775-788 ㎒, and 805-806 ㎒ bands, emissions in the band 1559-1610 ㎒ shall be limited to -70 ㏈W/㎒ equivalent isotropically radiated power (EIRP) for wideband signals, and -80 ㏈W EIRP for discrete emissions of less than 700 ㎐ bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

According to §27.53(g),

For operations in the 600 ㎒ band and the 698-746 ㎒ band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10log(P) ㏈.

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) ㏈.

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 : WCDMA 1700

Frequency(㎒) : 1 712.4

Channel : 1312

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
RMC	3 423.85	V	7.95	12.75	-49.10	-53.90	-13.00	40.90
	5 137.75	H	10.01	16.71	-44.40	-51.10	-13.00	38.10
	6 849.74	H	10.71	18.53	-39.68	-47.50	-13.00	34.50
	8 561.73	H	12.81	20.68	-37.73	-45.60	-13.00	32.60

Test mode : WCDMA 1700

Frequency(㎒) : 1 732.4

Channel : 1412

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
RMC	3 465.98	H	8.03	12.84	-48.29	-53.10	-13.00	40.10
	5 197.75	H	10.06	16.77	-43.09	-49.80	-13.00	36.80
	6 928.89	H	10.76	18.57	-38.99	-46.80	-13.00	33.80
	8 661.94	H	12.83	20.58	-35.95	-43.70	-13.00	30.70

Test mode : WCDMA 1700

Frequency(㎒) : 1 752.6

Channel : 1513

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
RMC	3 504.28	H	8.11	12.92	-48.19	-53.00	-13.00	40.00
	5 260.95	V	10.11	16.03	-43.28	-49.20	-13.00	36.20
	7 009.96	V	10.81	18.71	-39.50	-47.40	-13.00	34.40
	8 765.35	H	12.85	20.64	-36.71	-44.50	-13.00	31.50

Note.

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

Test mode : LTE B12/17
Frequency(㎒) : 699.7
Channel : 23017
Bandwidth(㎒) : 1.4

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 396.74	V	5.85	7.95	-61.60	-63.70	-13.00	50.70
	2 099.13	V	4.86	9.76	-52.90	-57.80	-13.00	44.80
	2 797.43	V	6.61	11.38	-51.13	-55.90	-13.00	42.90
	3 494.08	H	8.09	12.90	-48.49	-53.30	-13.00	40.30

Test mode : LTE B12/17
Frequency(㎒) : 707.5
Channel : 23095
Bandwidth(㎒) : 1.4

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 411.51	V	5.97	8.00	-61.67	-63.70	-13.00	50.70
	2 119.24	H	4.91	9.81	-52.90	-57.80	-13.00	44.80
	2 826.15	V	6.68	11.44	-52.14	-56.90	-13.00	43.90
	3 533.87	H	8.14	12.99	-49.05	-53.90	-13.00	40.90

Test mode : LTE B12/17
Frequency(㎒) : 715.3
Channel : 23173
Bandwidth(㎒) : 1.4

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 431.61	V	6.14	8.05	-61.89	-63.80	-13.00	50.80
	2 143.85	V	4.97	9.87	-53.30	-58.20	-13.00	45.20
	2 858.15	V	6.76	11.51	-52.05	-56.80	-13.00	43.80
	3 573.26	V	8.19	12.77	-50.82	-55.40	-13.00	42.40

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

Test mode : LTE Band 13

Frequency(㎒) : 782.0

Channel : 23230

Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 555.93	V	6.47	8.37	-61.40	-63.30	-13.00	50.30
	2 330.94	V	5.46	10.39	-51.87	-56.80	-13.00	43.80
	3 110.06	V	7.32	12.06	-48.46	-53.20	-13.00	40.20
	3 884.66	H	8.56	13.60	-46.16	-51.20	-13.00	38.20

Test mode : LTE Band 13

Frequency(㎒) : 782.0 (1 559 – 1 610 ㎒)

Channel : 23230

Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 566.51	V	6.42	8.40	-54.32	-56.30	-40.00	16.30

Note.

1. Limit Calculation(㏈m)= 43 + 10log($P_{[Watts]}$)
   Limit Calculation of wide-band (㏈m/㎒) = -70㏈W/㎒ (-40 ㏈m/㎒)
   Limit Calculation of narrow-band (㏈m) = -80㏈W (-50㏈m)
2. E.R.P & E.I.R.P(㏈ m) = Substitute Level(㏈) + Antenna gain(㏈ i&㏈ d) - C.L(Cable loss) (㏈)

Test mode : LTE B66/4
Frequency(㎒) : 1 715.0
Channel : 132022
Bandwidth(㎒) : 10

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	12.74	-48.60	-53.40	-13.00	40.40
	5 130.73	H	10.00	16.71	-43.69	-50.40	-13.00	37.40
	6 840.16	H	10.70	18.51	-38.39	-46.20	-13.00	33.20
	8 550.87	H	12.81	20.67	-38.94	-46.80	-13.00	33.80

Test mode : LTE B66/4
Frequency(㎒) : 1 745.0
Channel : 132322
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 480.02	V	8.06	12.87	-49.99	-54.80	-13.00	41.80
	5 219.46	H	10.08	15.96	-43.42	-49.30	-13.00	36.30
	6 962.72	V	10.78	18.62	-39.36	-47.20	-13.00	34.20
	8 700.24	H	12.84	20.55	-38.39	-46.10	-13.00	33.10

Test mode : LTE B66/4
Frequency(㎒) : 1 775.0
Channel : 132622
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 539.39	H	8.15	13.00	-48.05	-52.90	-13.00	39.90
	5 310.10	H	10.15	16.29	-44.26	-50.40	-13.00	37.40
	7 079.54	V	10.91	18.79	-37.72	-45.60	-13.00	32.60
	8 848.97	V	12.87	20.75	-35.82	-43.70	-13.00	30.70

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 n66 DFT-s OFDM
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	3 434.70	H	7.97	12.77	-50.50	-55.30	-13.00	42.30
	5 151.79	H	10.02	16.73	-46.99	-53.70	-13.00	40.70
	6 869.53	H	10.72	18.55	-40.37	-48.20	-13.00	35.20
	8 587.90	V	12.82	20.71	-40.11	-48.00	-13.00	35.00

Test mode : 5G NR n66 DFT-s OFDM
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	3 505.55	H	8.11	12.93	-48.98	-53.80	-13.00	40.80
	5 259.03	H	10.11	16.03	-46.58	-52.50	-13.00	39.50
	7 010.60	H	10.81	18.71	-42.10	-50.00	-13.00	37.00
	8 762.16	H	12.85	20.64	-40.51	-48.30	-13.00	35.30

Test mode : 5G NR n66 DFT-s OFDM
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	3 545.13	H	8.15	13.01	-51.14	-56.00	-13.00	43.00
	5 317.76	V	10.15	16.30	-46.25	-52.40	-13.00	39.40
	7 089.11	V	10.92	18.80	-40.72	-48.60	-13.00	35.60
	8 861.10	V	12.87	20.77	-40.60	-48.50	-13.00	35.50

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 n71 DFT-s OFDM
Frequency(㎒) : 668.0
Channel : 133600
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 327.81	H	5.29	7.78	-51.21	-53.70	-13.00	40.70
	1 987.95	V	4.65	9.47	-45.68	-50.50	-13.00	37.50
	2 653.42	V	6.27	11.11	-40.56	-45.40	-13.00	32.40
	3 316.43	V	7.73	12.51	-39.22	-44.00	-13.00	31.00

Test mode : 5G NR n71 DFT-s OFDM
Frequency(㎒) : 680.5
Channel : 136100
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 373.76	V	5.66	7.88	-51.38	-53.60	-13.00	40.60
	2 056.46	V	4.75	9.66	-44.19	-49.10	-13.00	36.10
	2 743.27	V	6.48	11.26	-40.52	-45.30	-13.00	32.30
	3 429.25	H	7.96	12.76	-37.90	-42.70	-13.00	29.70

Test mode : 5G NR n71 DFT-s OFDM
Frequency(㎒) : 693.0
Channel : 138600
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 386.89	H	5.77	7.92	-53.05	-55.20	-13.00	42.20
	2 079.85	V	4.81	9.72	-43.49	-48.40	-13.00	35.40
	2 775.27	V	6.56	11.33	-41.53	-46.30	-13.00	33.30
	3 465.77	H	8.03	12.84	-38.99	-43.80	-13.00	30.80

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 : LTE B66/4
Frequency(㎒) : 1 701.7
Channel : 131979
Bandwidth(㎒) : 1.4

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	12.74	-50.40	-55.20	-13.00	42.20
	5 132.64	V	10.01	16.71	-42.00	-48.70	-13.00	35.70
	6 843.36	V	10.71	18.52	-41.49	-49.30	-13.00	36.30
	8 552.79	V	12.81	20.67	-38.34	-46.20	-13.00	33.20

Test mode : LTE B66/4
Frequency(㎒) : 1 745.0
Channel : 132322
Bandwidth(㎒) : 1.4

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 488.32	H	8.08	12.89	-51.89	-56.70	-13.00	43.70
	5 233.50	V	10.09	15.98	-41.61	-47.50	-13.00	34.50
	6 976.13	V	10.79	18.64	-42.65	-50.50	-13.00	37.50
	8 721.31	V	12.84	20.58	-39.56	-47.30	-13.00	34.30

Test mode : LTE B66/4
Frequency(㎒) : 1 779.3
Channel : 132665
Bandwidth(㎒) : 1.4

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 557.90	V	8.17	12.76	-52.21	-56.80	-13.00	43.80
	5 338.19	V	10.17	16.33	-43.44	-49.60	-13.00	36.60
	7 117.20	V	10.96	18.98	-41.78	-49.80	-13.00	36.80
	8 894.93	V	12.88	20.81	-39.27	-47.20	-13.00	34.20

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 : 13A-n66A
Frequency(㎒) : 1 717.5
Channel : 343500
Bandwidth(㎒) : 10 (LTE), 15 (NR)
RB Size/Offset 1/0 (LTE), 1/40 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 435.34	H	7.97	12.77	-50.20	-55.00	-13.00	42.00
	5 151.16	V	10.02	16.73	-44.69	-51.40	-13.00	38.40
	6 868.89	H	10.72	18.55	-42.57	-50.40	-13.00	37.40
	8 588.54	V	12.82	20.71	-40.81	-48.70	-13.00	35.70

Test mode : 2A-n66A
Frequency(㎒) : 1 717.5
Channel : 343500
Bandwidth(㎒) : 15 (LTE), 15 (NR)
RB Size/Offset 1/0 (LTE), 1/40 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 434.70	H	7.97	12.77	-51.90	-56.70	-13.00	43.70
	5 152.43	V	10.02	16.73	-46.29	-53.00	-13.00	40.00
	6 870.16	H	10.72	18.55	-41.67	-49.50	-13.00	36.50
	8 586.62	H	12.82	20.71	-40.71	-48.60	-13.00	35.60

Test mode : 66A-n71A
Frequency(㎒) : 693
Channel : 138600
Bandwidth(㎒) : 10 (LTE), 10 (NR)
RB Size/Offset 1/0 (LTE), 1/26 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 385.63	V	5.76	7.92	-49.44	-51.60	-13.00	38.60
	2 079.54	H	4.81	9.71	-41.00	-45.90	-13.00	32.90
	2 772.76	V	6.55	11.33	-39.02	-43.80	-13.00	30.80
	3 464.70	V	8.03	12.84	-38.89	-43.70	-13.00	30.70

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	FSV30	100810	25.07.01
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*
Wideband Radio Communication Tester	R&S	CMW500	141780	26.01.16*
Wideband Radio Communication Tester	R&S	CMW500	132423	26.02.10*
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	WHKX10-900-1000-15000-40SS	11	25.07.01
High pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	32	25.07.01
Band Reject Filter	Wainwright Instruments GmbH	WRCGV1805/1880-1785/1900-50/10SS	2	26.01.16*

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

End of test report