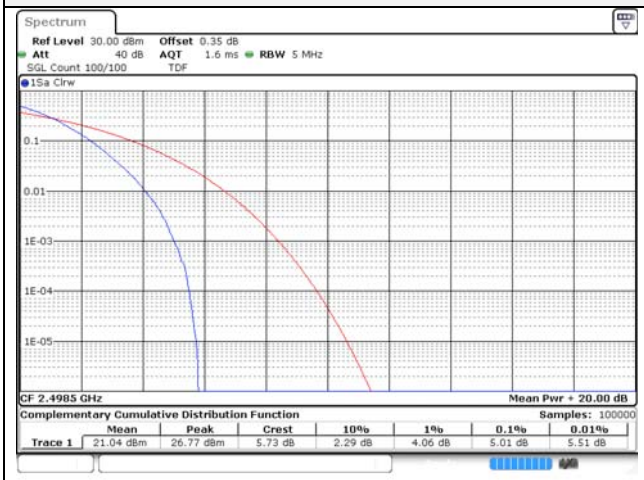
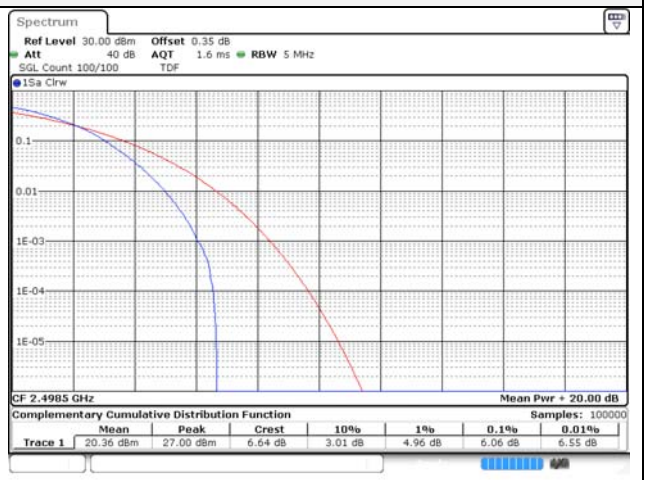
Test mode: LTE Band 41

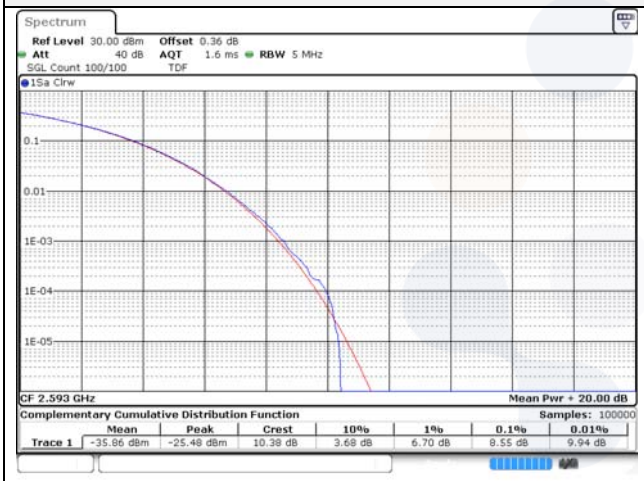
5M BW QPSK Low ch.



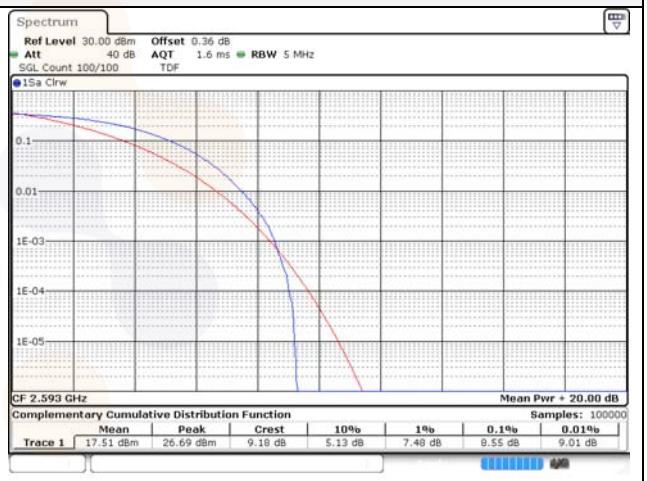
5M BW 16QAM Low ch.



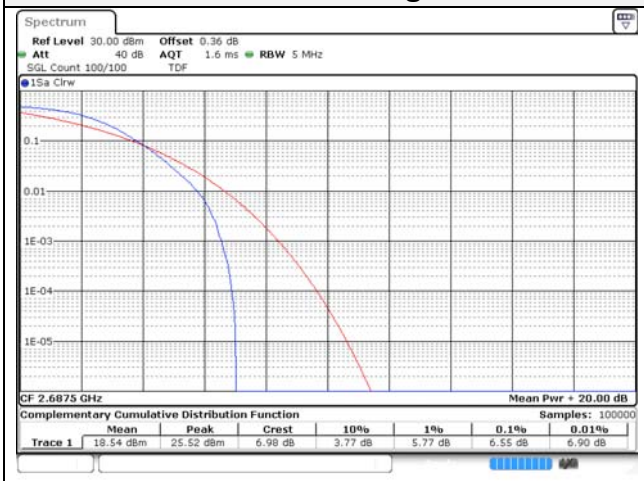
5M BW QPSK Mid ch.



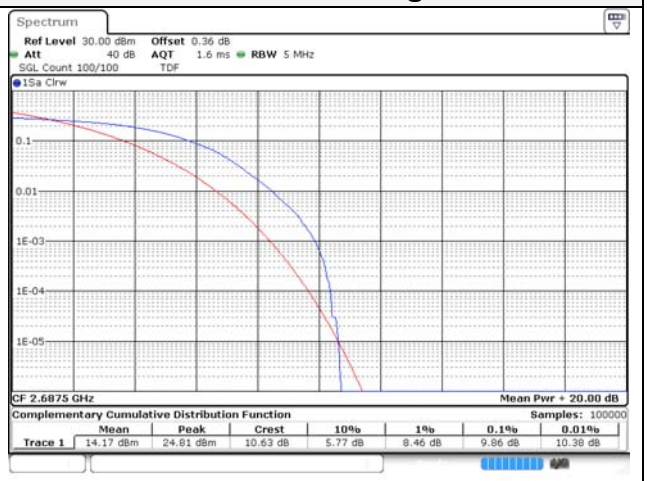
5M BW 16QAM Mid ch.



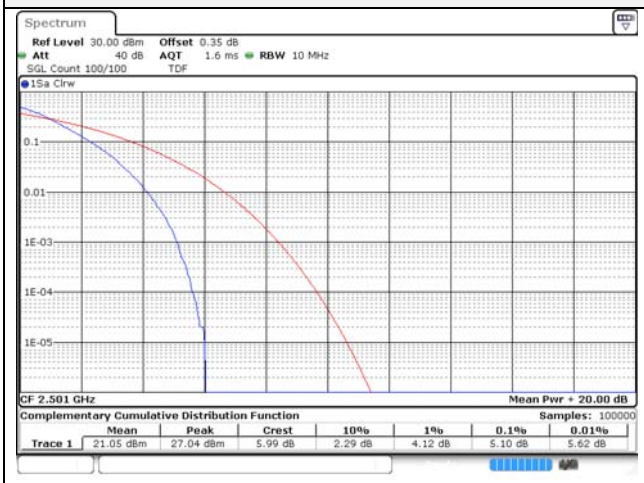
5M BW QPSK High ch.



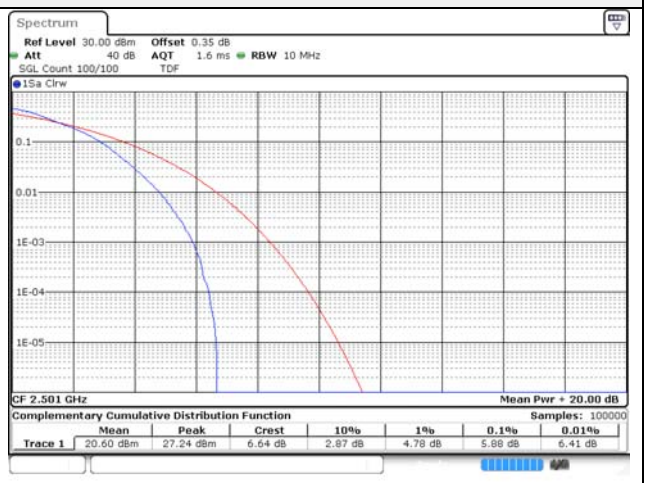
5M BW 16QAM High ch.



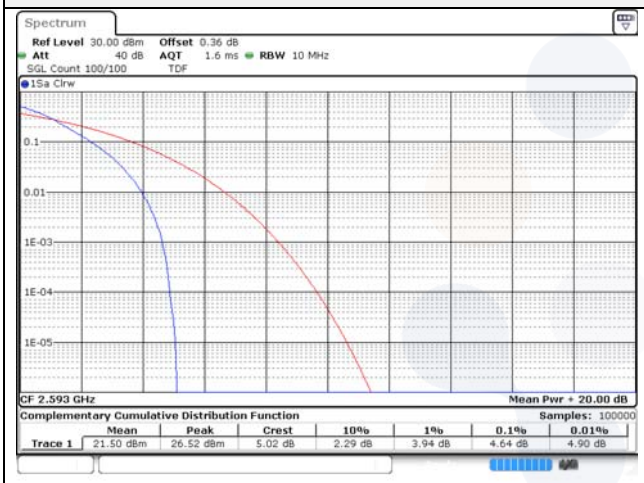
10M BW QPSK Low ch.



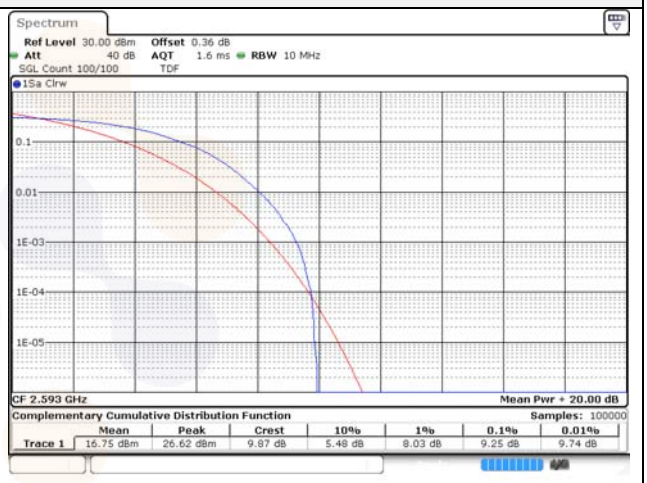
10M BW 16QAM Low ch.



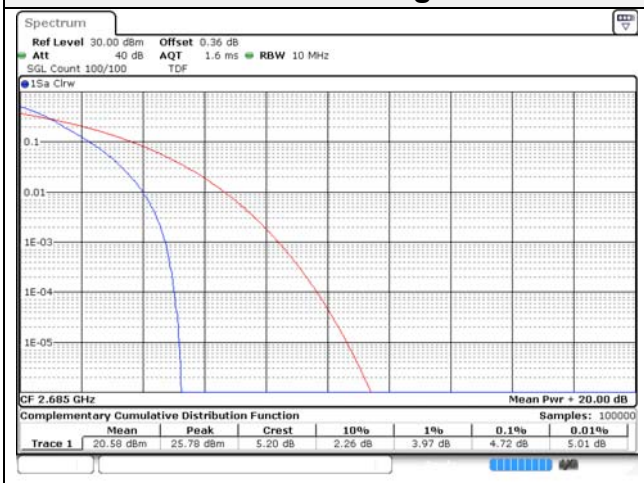
10M BW QPSK Mid ch.



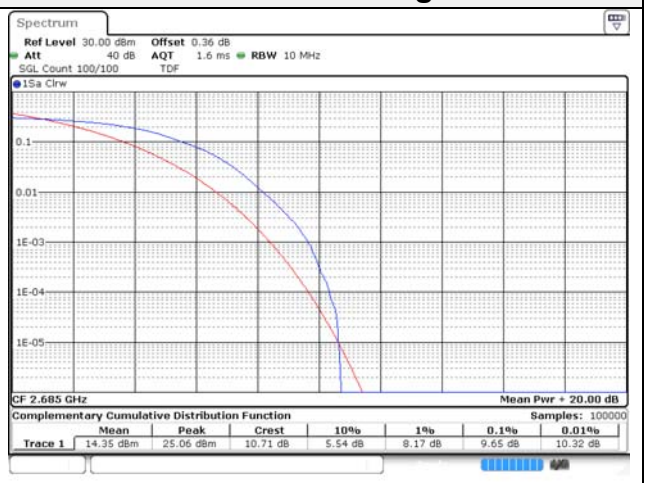
10M BW 16QAM Mid ch.



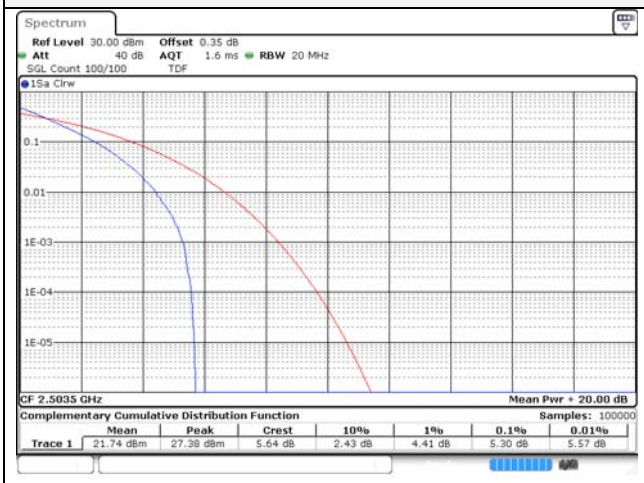
10M BW QPSK High ch.



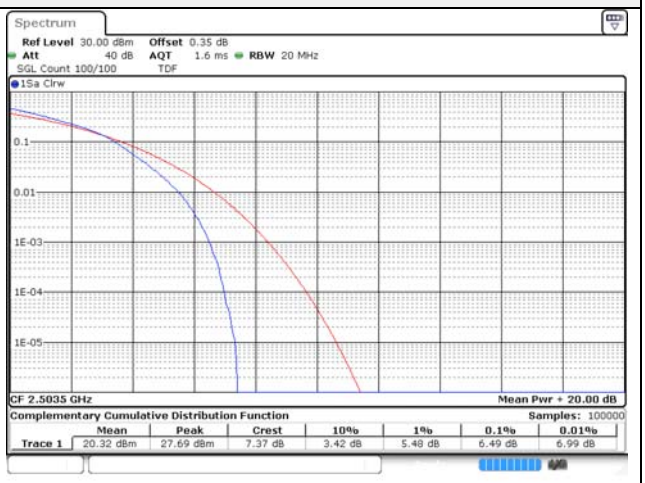
10M BW 16QAM High ch.



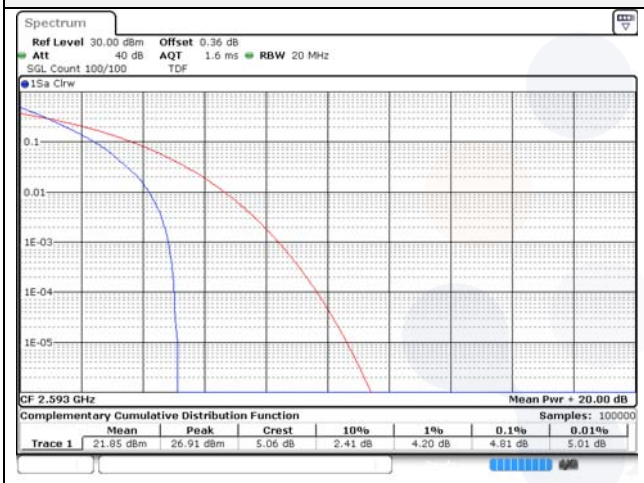
15M BW QPSK Low ch.



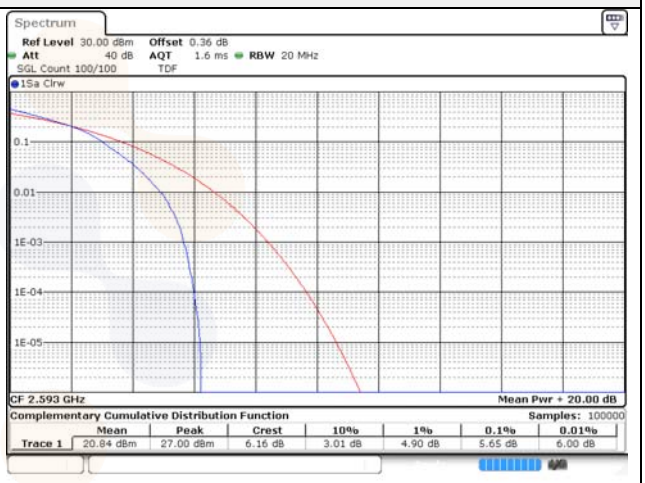
15M BW 16QAM Low ch.



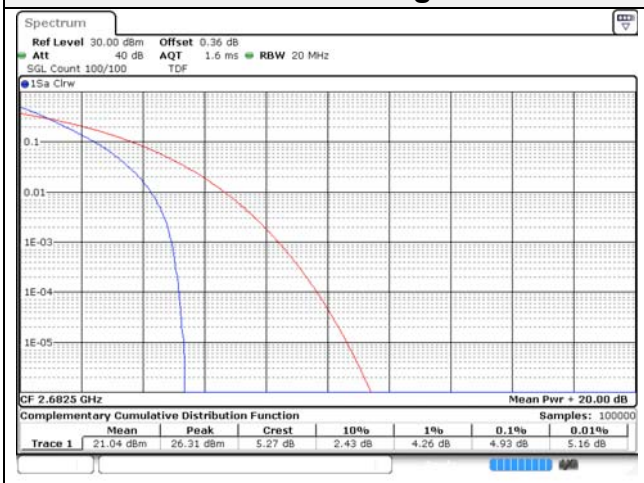
15M BW QPSK Mid ch.



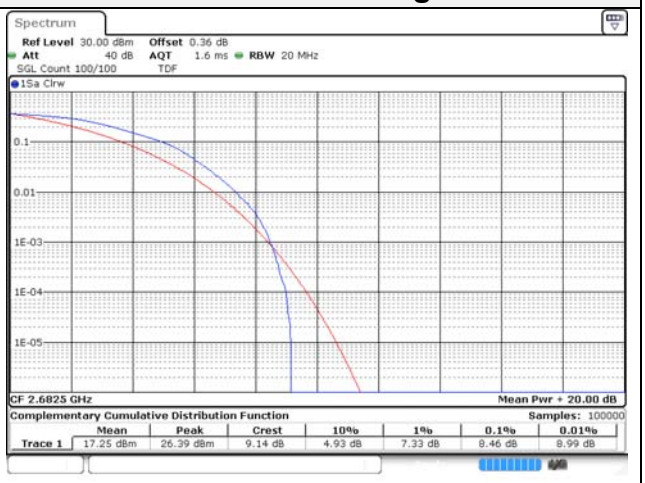
15M BW 16QAM Mid ch.



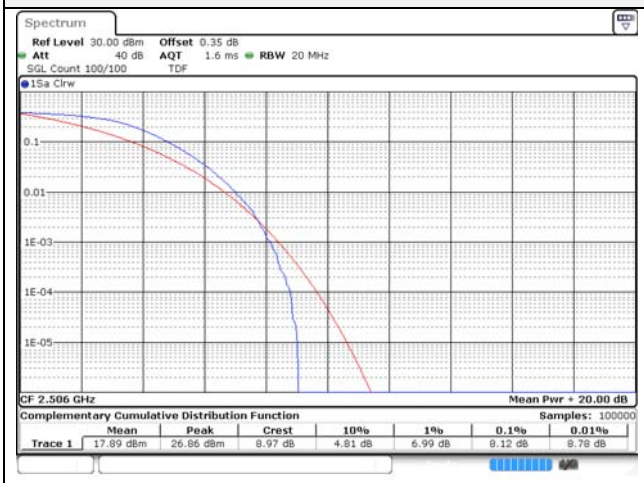
15M BW QPSK High ch.



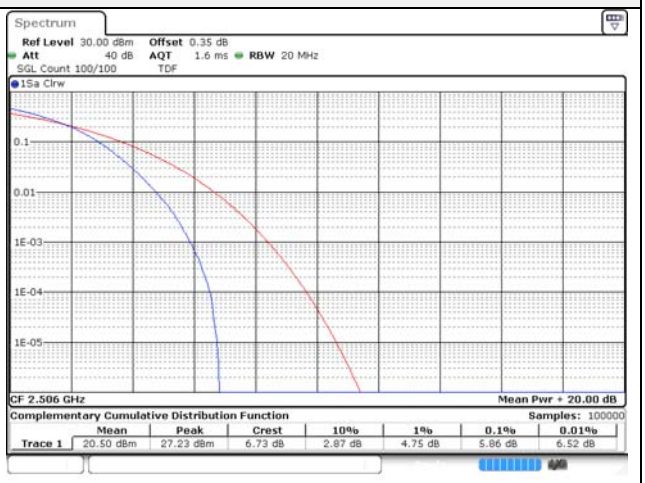
15M BW 16QAM High ch.



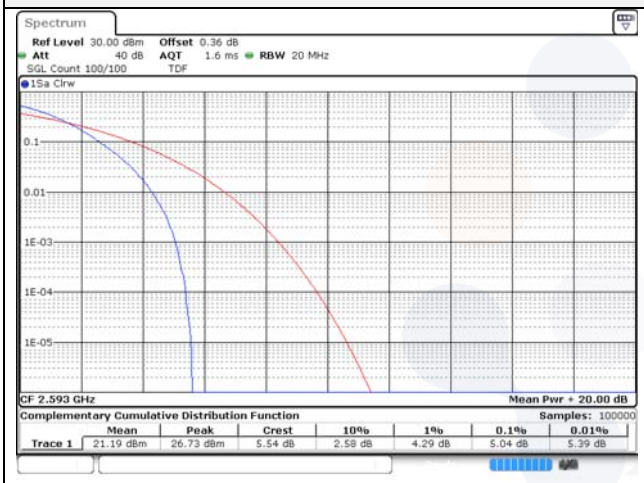
20M BW QPSK Low ch.



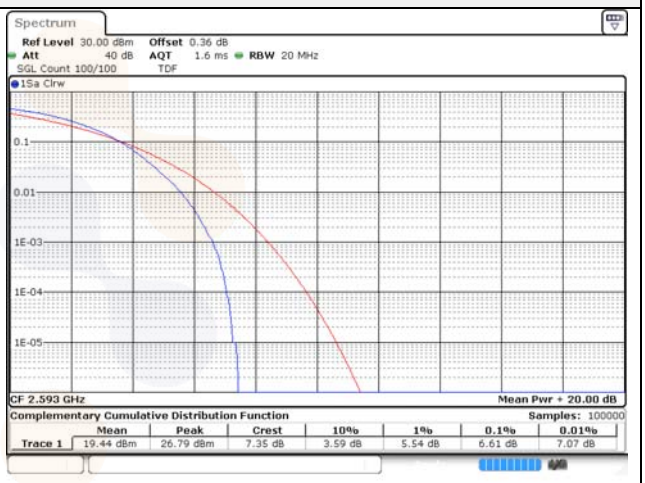
20M BW 16QAM Low ch.



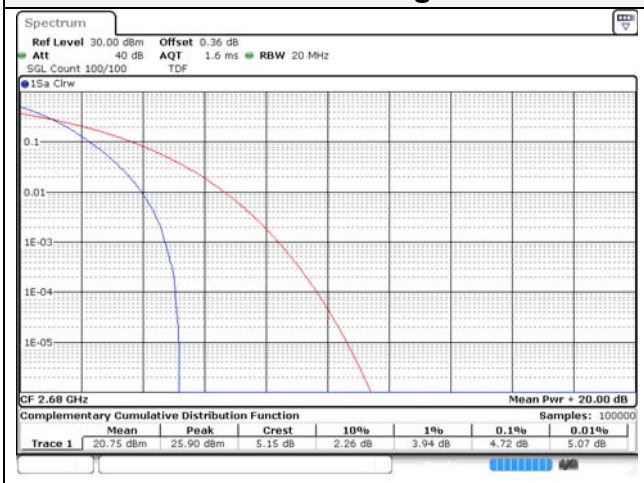
20M BW QPSK Mid ch.



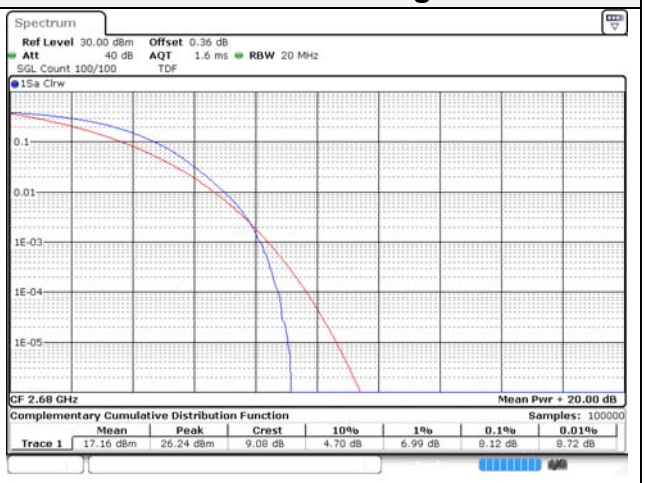
20M BW 16QAM Mid ch.



20M BW QPSK High ch.

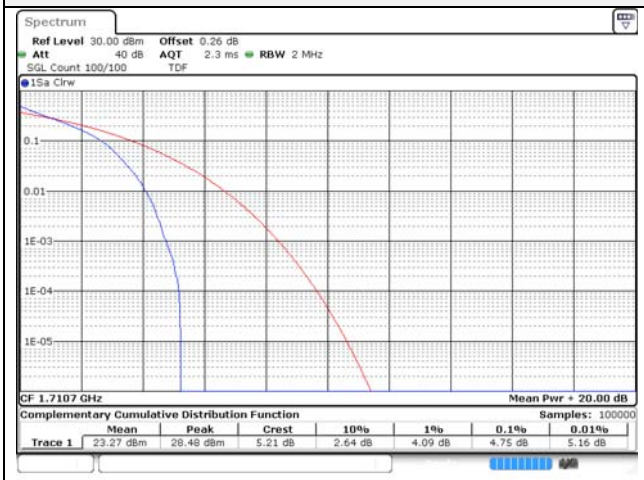


20M BW 16QAM High ch.

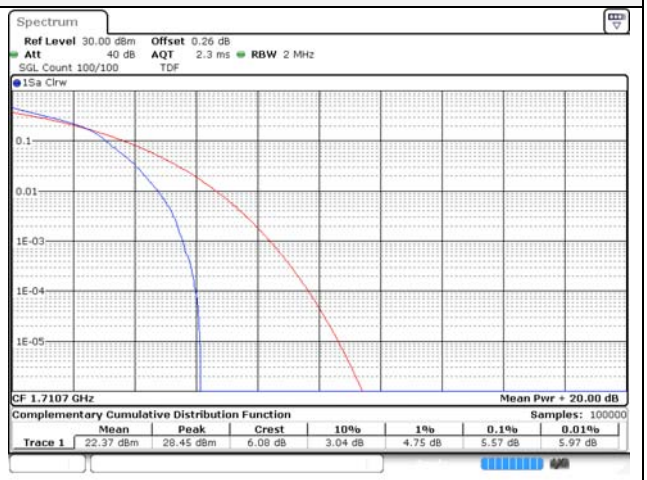


Test mode: LTE Band 66

1.4M BW QPSK Low ch.

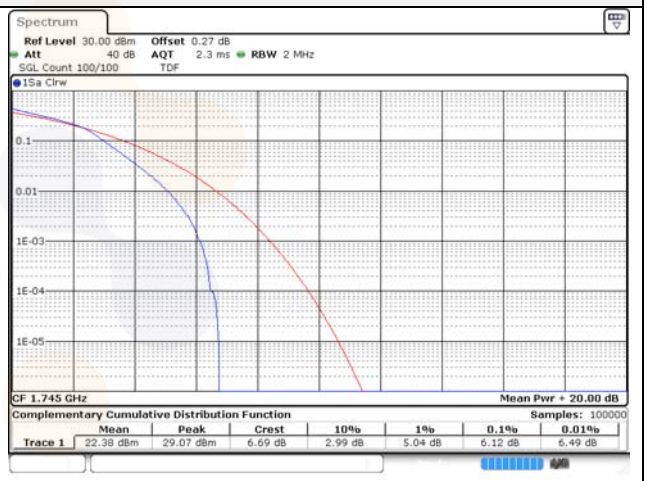


1.4M BW 16QAM Low ch.

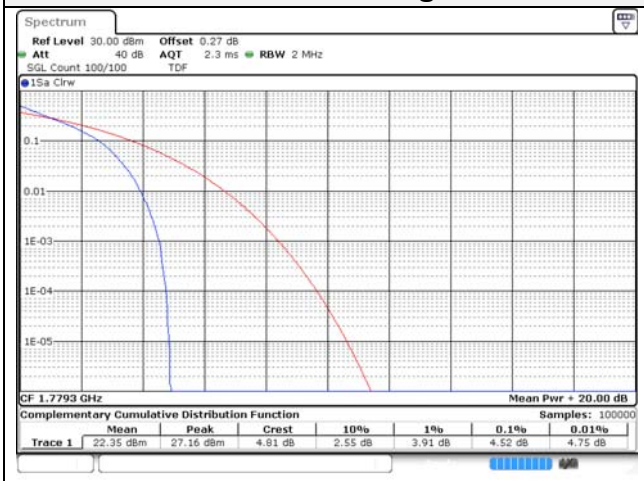


1.4M BW QPSK Mid ch.

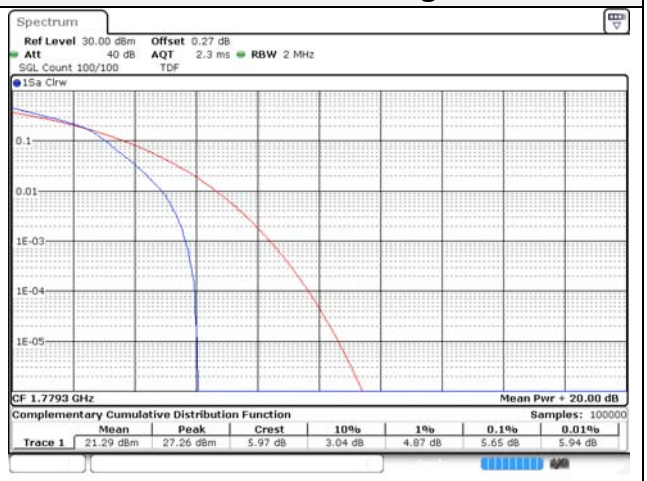
1.4M BW 16QAM Mid ch.



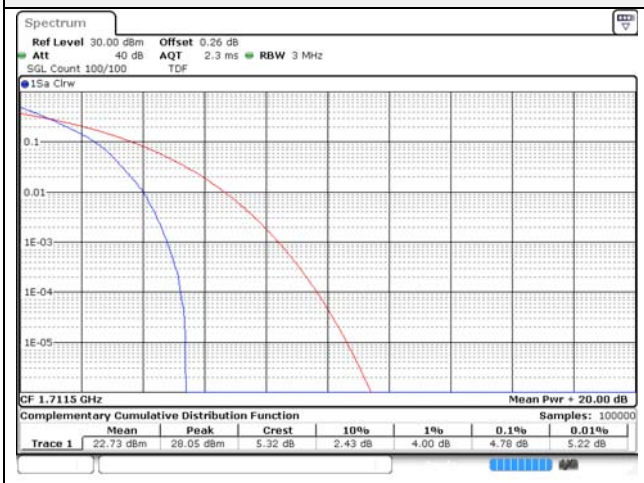
1.4M BW QPSK High ch.



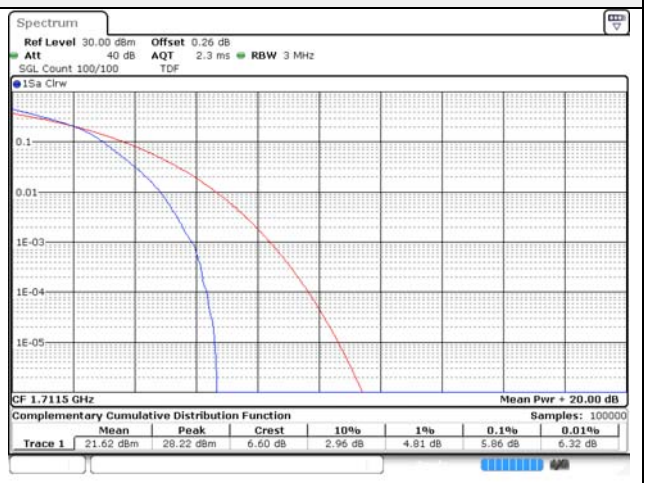
1.4M BW 16QAM High ch.



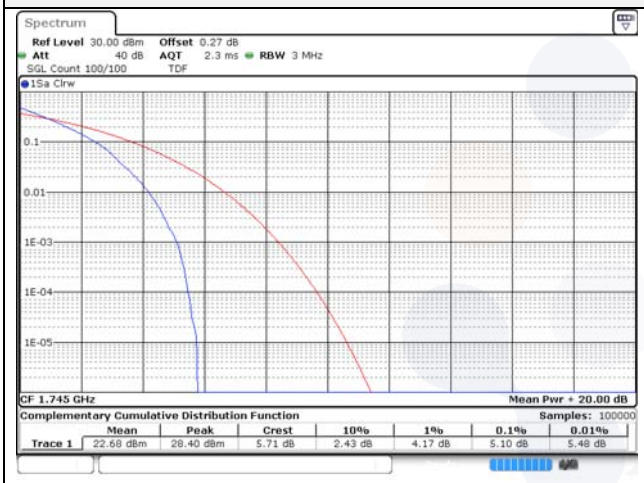
3M BW QPSK Low ch.



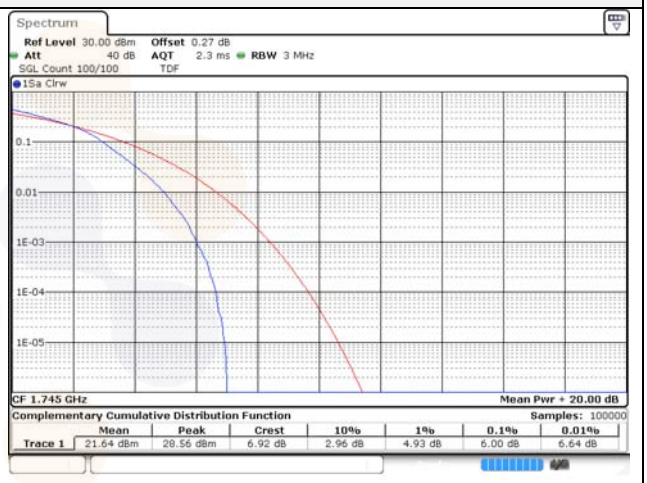
3M BW 16QAM Low ch.



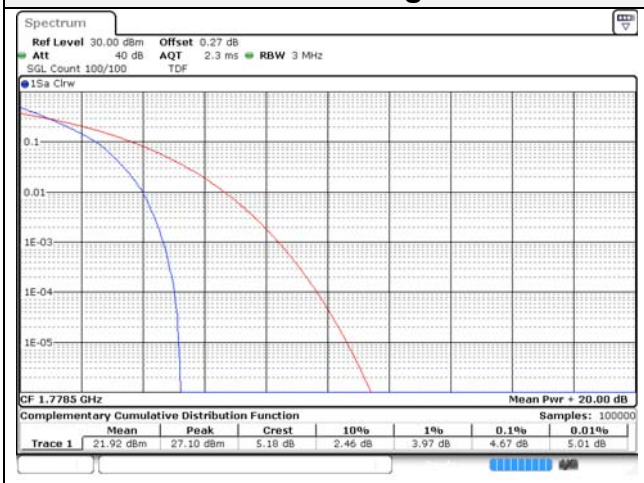
3M BW QPSK Mid ch.



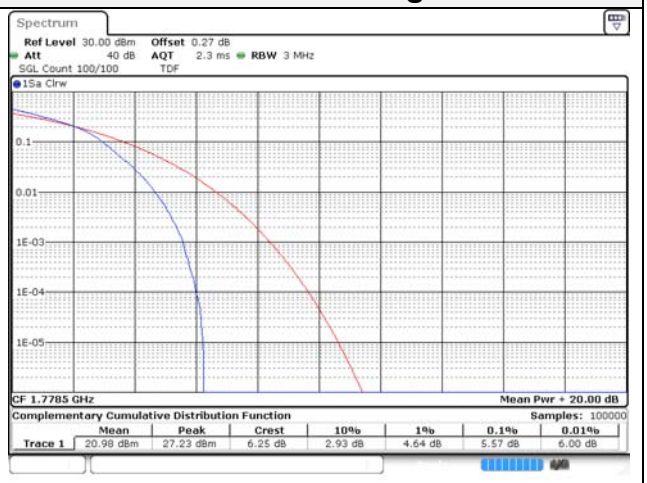
3M BW 16QAM Mid ch.



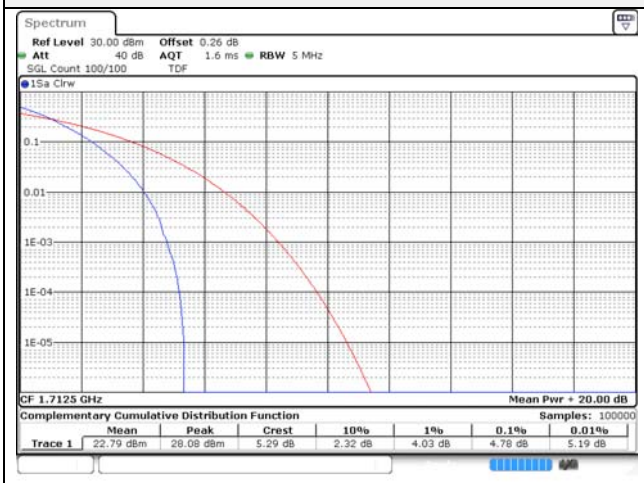
3M BW QPSK High ch.



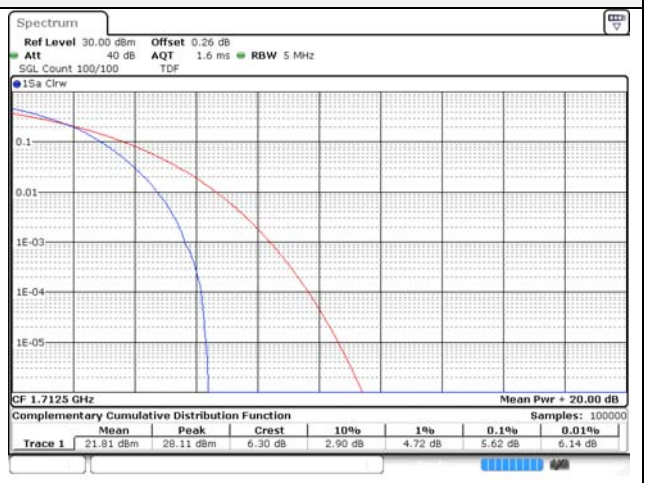
3M BW 16QAM High ch.



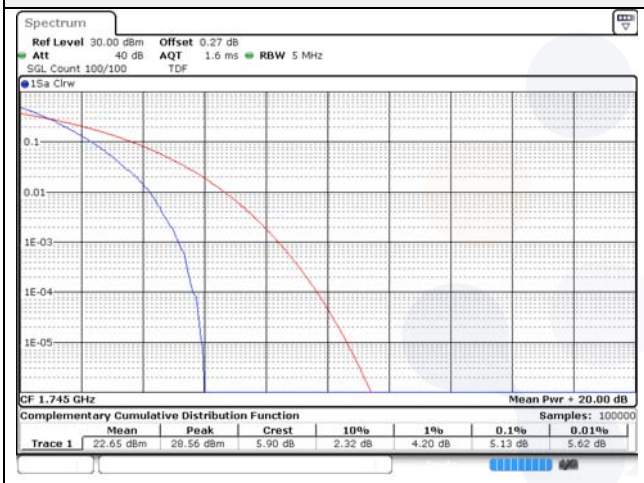
5M BW QPSK Low ch.



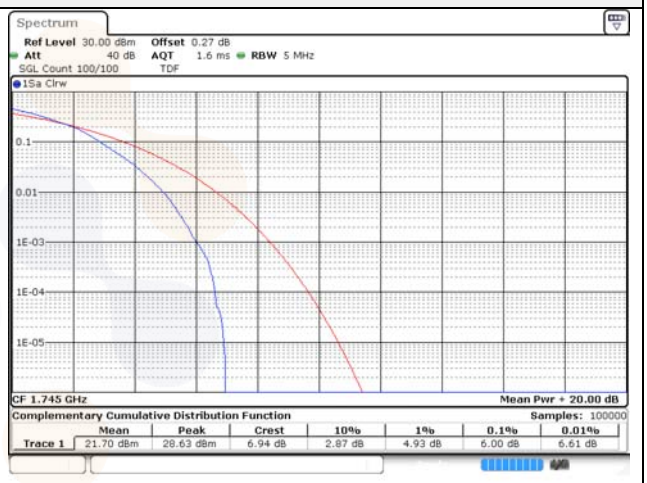
5M BW 16QAM Low ch.



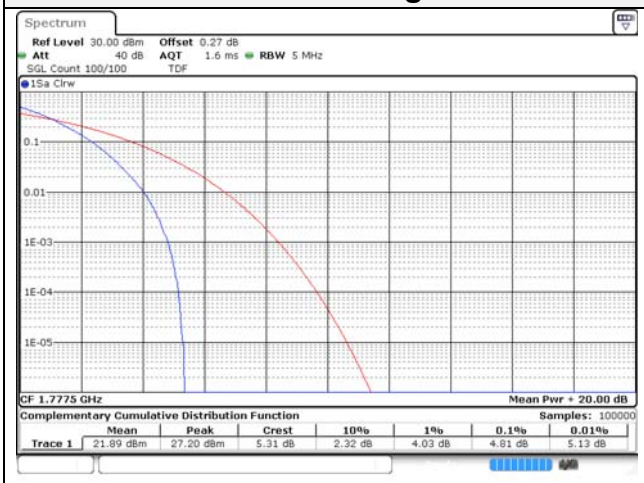
5M BW QPSK Mid ch.



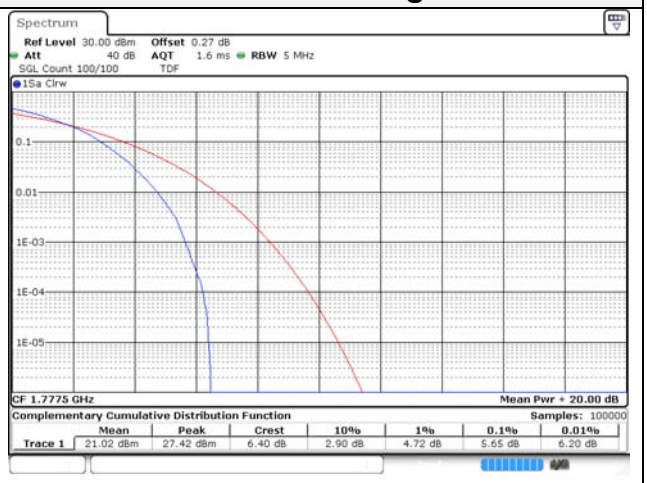
5M BW 16QAM Mid ch.

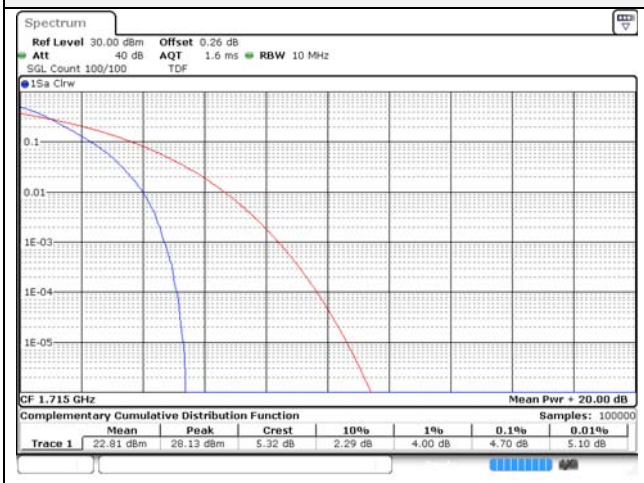
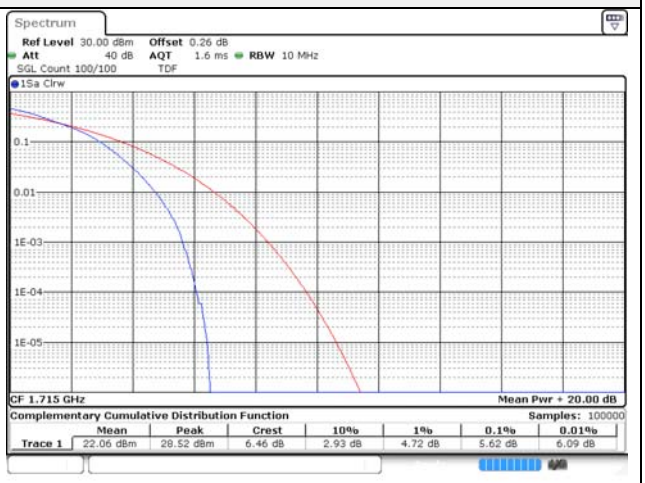
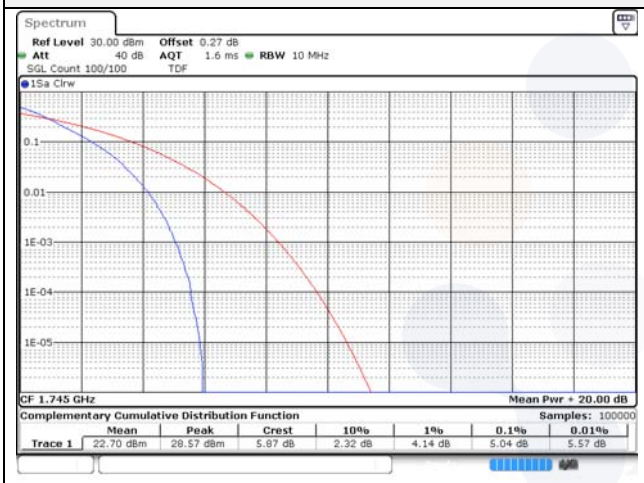
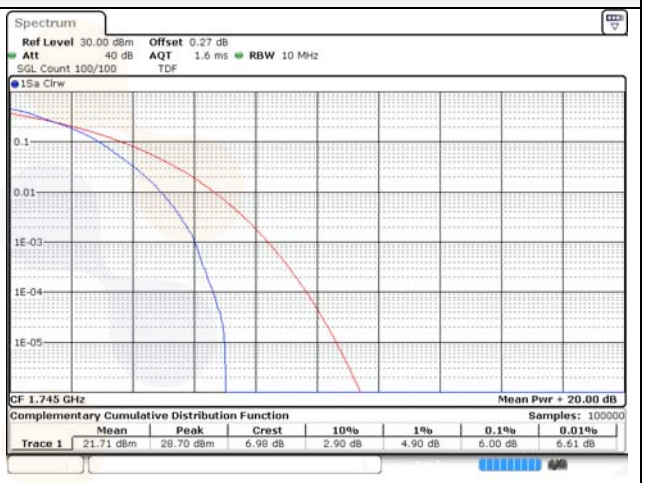
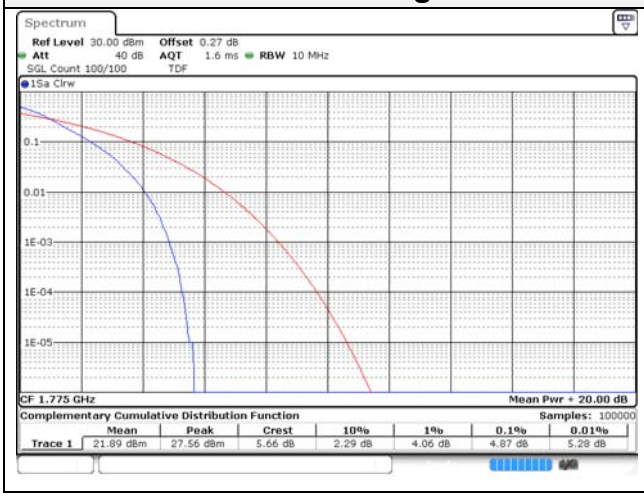
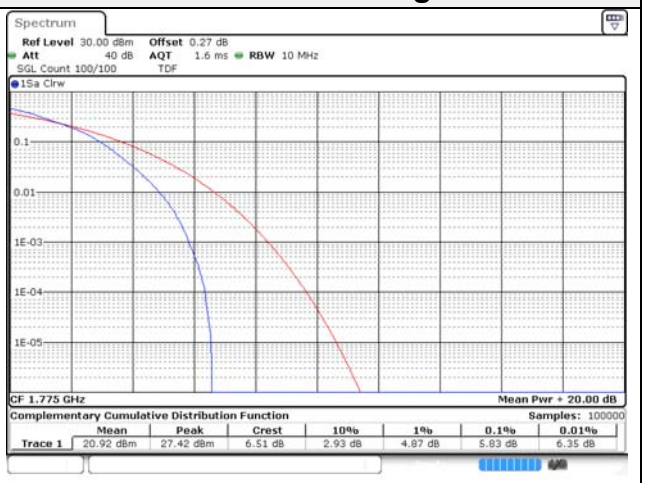


5M BW QPSK High ch.

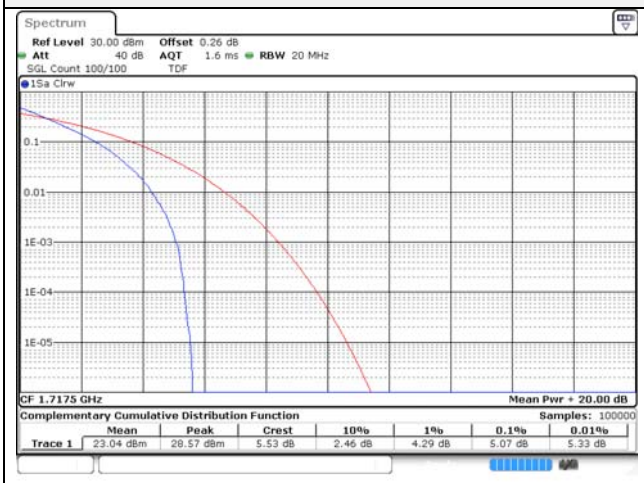


5M BW 16QAM High ch.

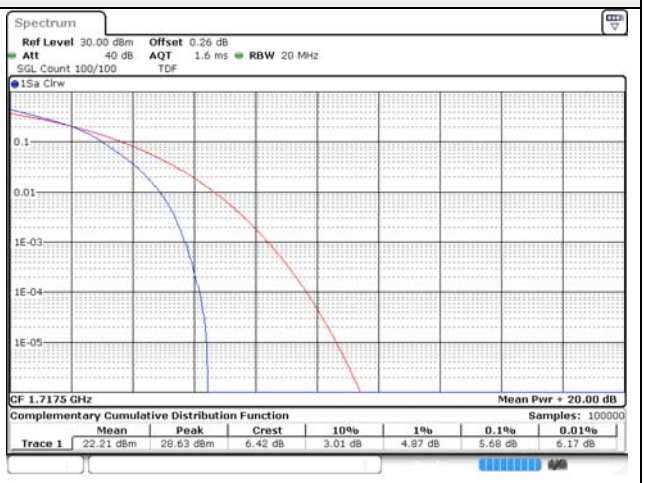


10M BW QPSK Low ch.	10M BW 16QAM Low ch.
	
10M BW QPSK Mid ch.	**10M BW 16QAM Mid ch.**
	
10M BW QPSK High ch.	**10M BW 16QAM High ch.**
	

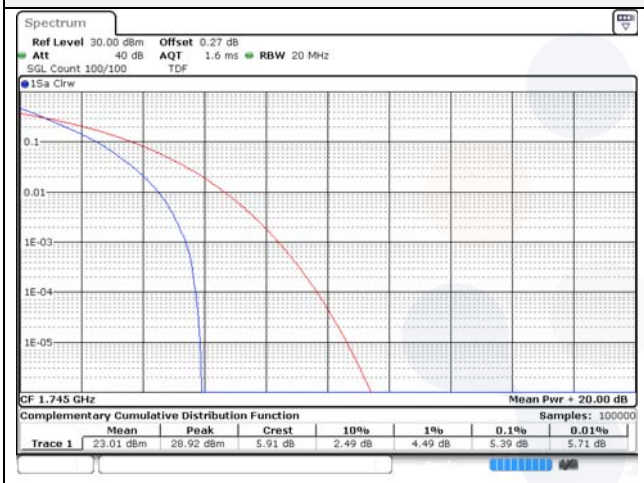
15M BW QPSK Low ch.



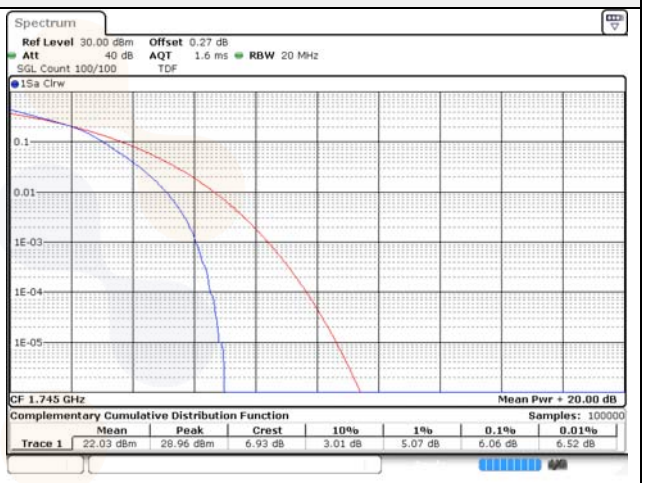
15M BW 16QAM Low ch.



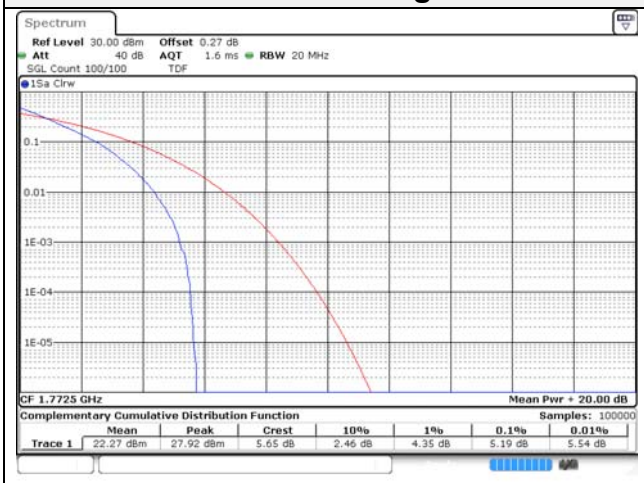
15M BW QPSK Mid ch.



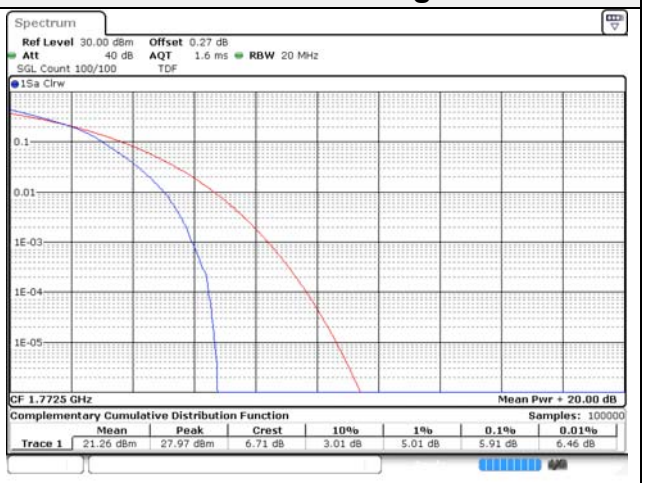
15M BW 16QAM Mid ch.



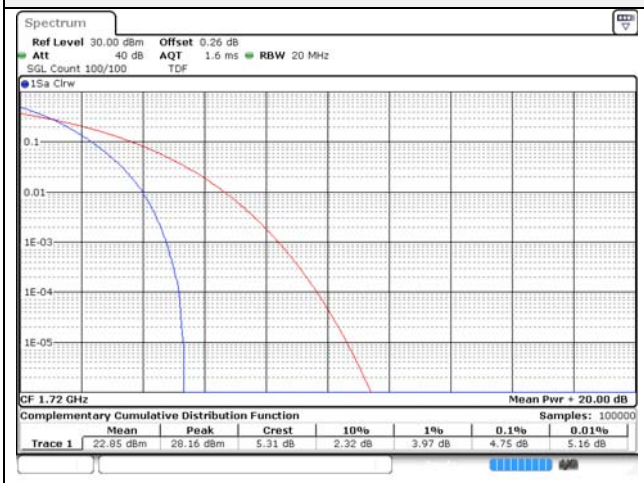
15M BW QPSK High ch.



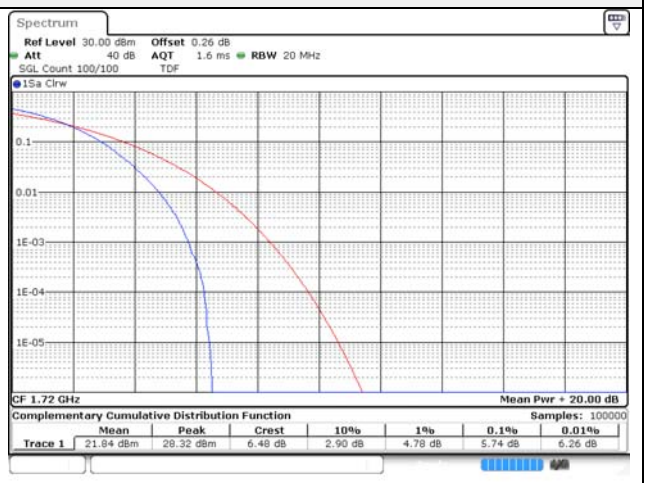
15M BW 16QAM High ch.



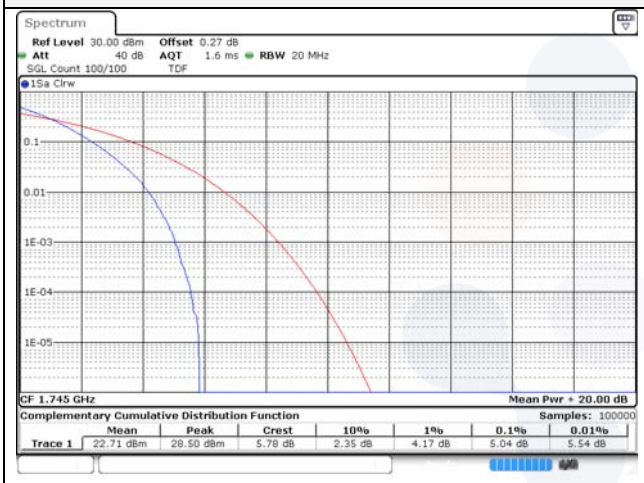
20M BW QPSK Low ch.



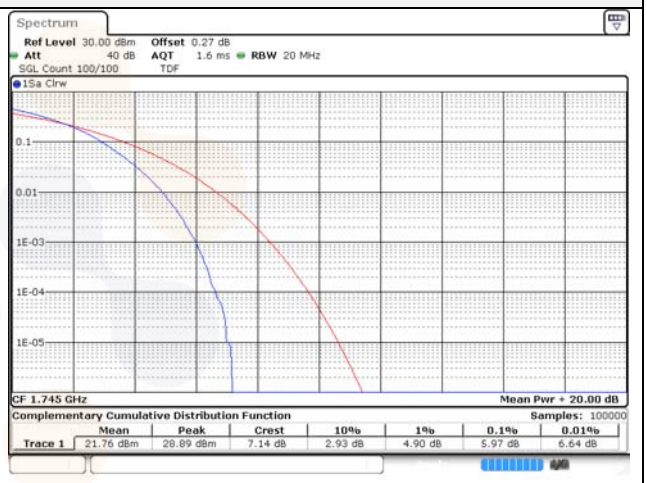
20M BW 16QAM Low ch.



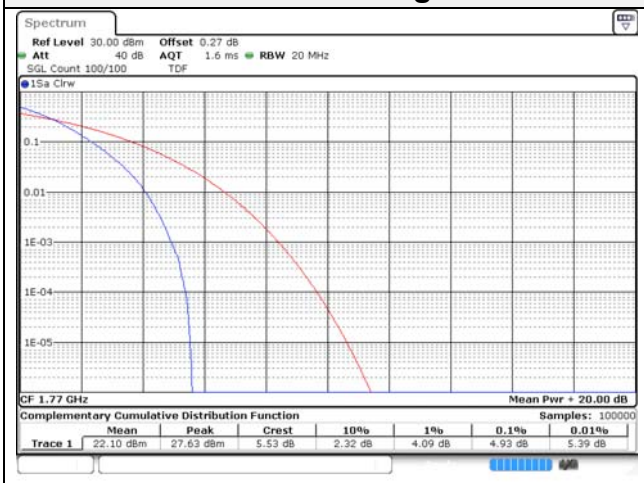
20M BW QPSK Mid ch.



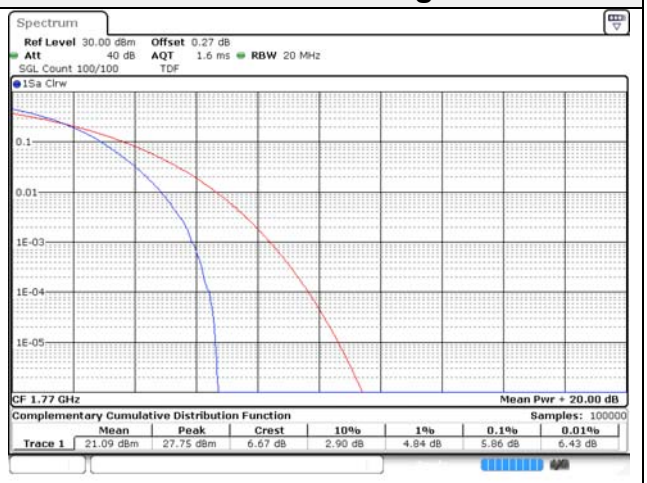
20M BW 16QAM Mid ch.



20M BW QPSK High ch.

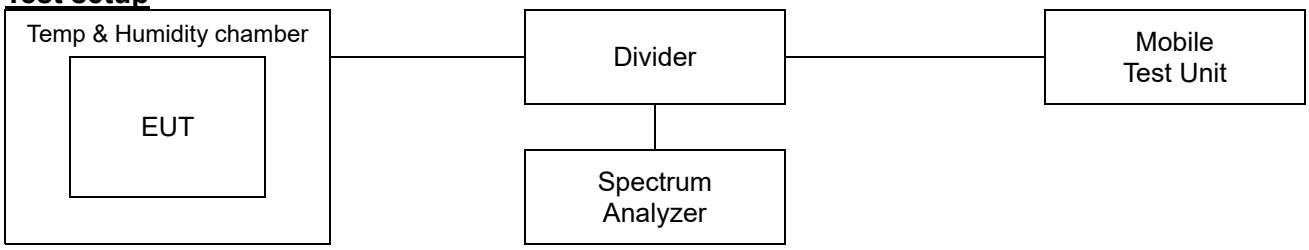


20M BW 16QAM High ch.



7.6. Frequency stability

Test setup



Limit

According to §2.1055(a),

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

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

According to §2.1055(d),

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

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

According to §22.355,

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

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

According to §24.235,
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and ±1.0 ppm for base stations.

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).

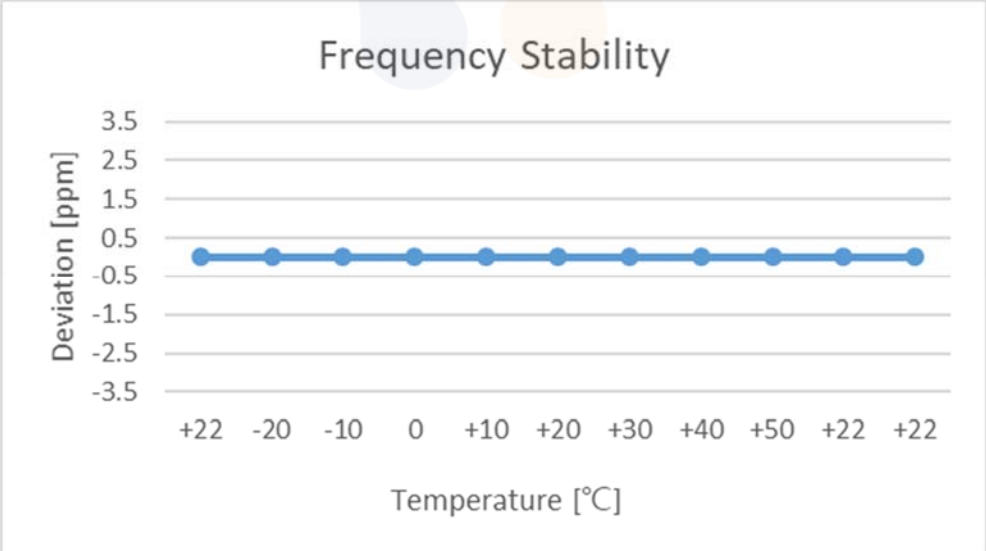
Test procedure
ANSI 63.26-2015 – Section 5.6

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 : LTE Band 2
Frequency (㎐) : 1 880 000 000
Channel : 18900
Deviation limit(FCC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	1,879,999,998	-1.67	0.0	0.000000
		-20	1,879,999,999	-1.36	0.0	0.000000
		-10	1,879,999,997	-3.15	0.0	0.000000
		0	1,880,000,000	-0.35	0.0	0.000000
		+10	1,880,000,000	-0.29	0.0	0.000000
		+20	1,879,999,998	-1.74	0.0	0.000000
		+30	1,879,999,999	-1.07	0.0	0.000000
		+40	1,879,999,998	-1.58	0.0	0.000000
		+50	1,880,000,000	-0.47	0.0	0.000000
115%	4.46	+22(Ref)	1,879,999,997	-2.59	0.0	0.000000
End point	3.40	+22(Ref)	1,879,999,997	-2.60	0.0	0.000000



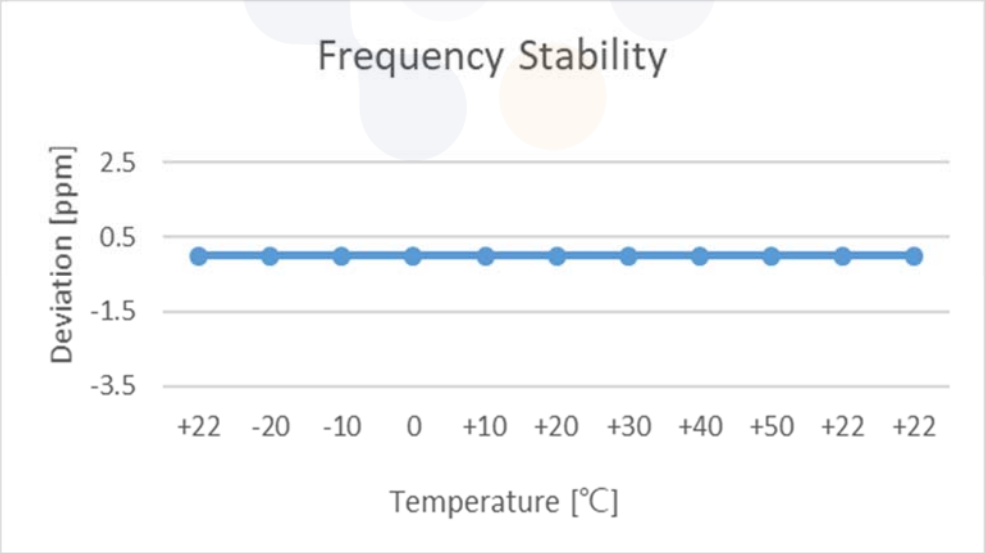
Test mode : LTE Band 4

Frequency (㎐) : 1 732 500 000

Channel : 20175

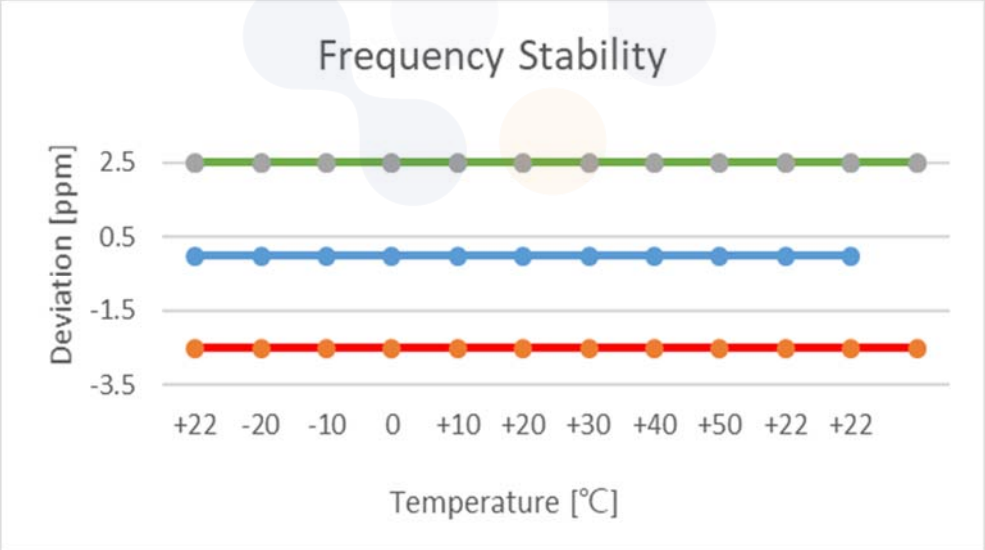
Deviation limit(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized bands of operation.

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	1,732,499,995	-5.29	0.0	0.000000
		-20	1,732,500,000	-0.27	0.0	0.000000
		-10	1,732,499,995	-5.14	0.0	0.000000
		0	1,732,499,999	-1.41	0.0	0.000000
		+10	1,732,499,994	-5.90	0.0	0.000000
		+20	1,732,499,998	-1.74	0.0	0.000000
		+30	1,732,499,995	-4.71	0.0	0.000000
		+40	1,732,499,998	-2.03	0.0	0.000000
		+50	1,732,499,994	-5.64	0.0	0.000000
115%	4.46	+22(Ref)	1,732,499,999	-1.29	0.0	0.000000
End point	3.40	+22(Ref)	1,732,499,998	-2.27	0.0	0.000000



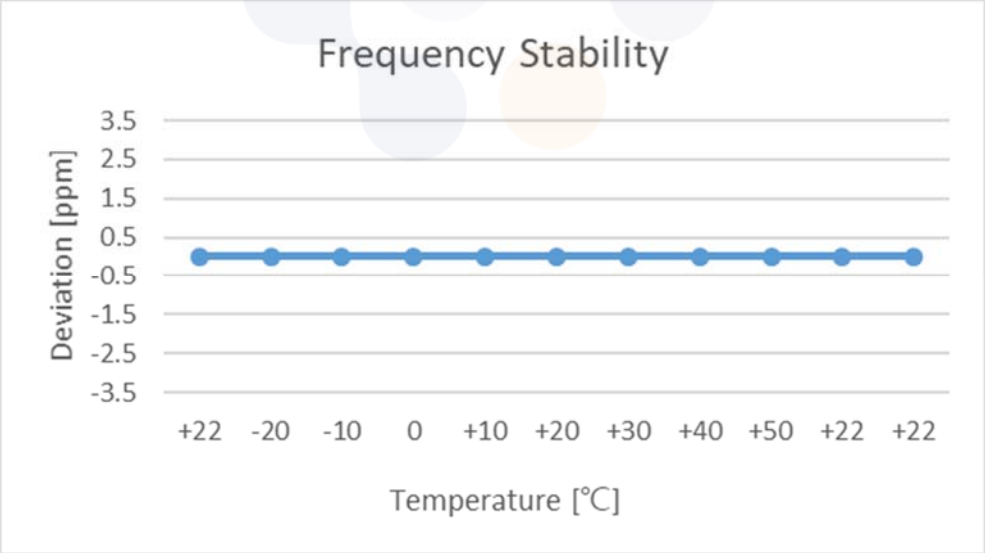
Test mode : LTE Band 5
Frequency (㎐) : 836 500 000
Channel : 20525
Deviation limit : ±0.00025% or 2.5ppm

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	836,500,003	2.86	0.0	0.000000
		-20	836,500,002	1.82	0.0	0.000000
		-10	836,500,002	1.63	0.0	0.000000
		0	836,500,003	3.24	0.0	0.000000
		+10	836,500,003	3.14	0.0	0.000000
		+20	836,500,004	3.72	0.0	0.000000
		+30	836,500,002	2.44	0.0	0.000000
		+40	836,500,004	3.78	0.0	0.000000
		+50	836,500,004	3.93	0.0	0.000000
115%	4.46	+22(Ref)	836,500,002	2.37	0.0	0.000000
End point	3.40	+22(Ref)	836,500,002	2.16	0.0	0.000000



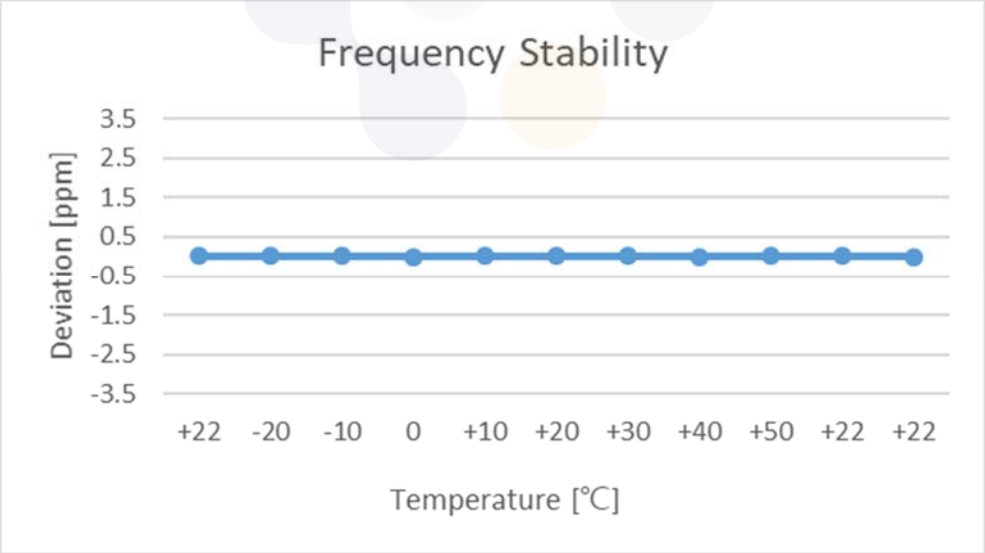
Test mode : LTE Band 12/17
Frequency (㎐) : 707 500 000
Channel : 23095
Deviation limit(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized bands of operation

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	707,500,003	2.56	0.0	0.000000
		-20	707,500,001	1.04	0.0	0.000000
		-10	707,500,004	3.63	0.0	0.000001
		0	707,500,003	2.93	0.0	0.000000
		+10	707,500,003	2.52	0.0	0.000000
		+20	707,500,002	1.77	0.0	0.000000
		+30	707,500,002	1.78	0.0	0.000000
		+40	707,500,004	3.83	0.0	0.000001
		+50	707,500,002	1.61	0.0	0.000000
115%	4.46	+22(Ref)	707,500,002	2.32	0.0	0.000000
End point	3.40	+22(Ref)	707,500,002	2.25	0.0	0.000000



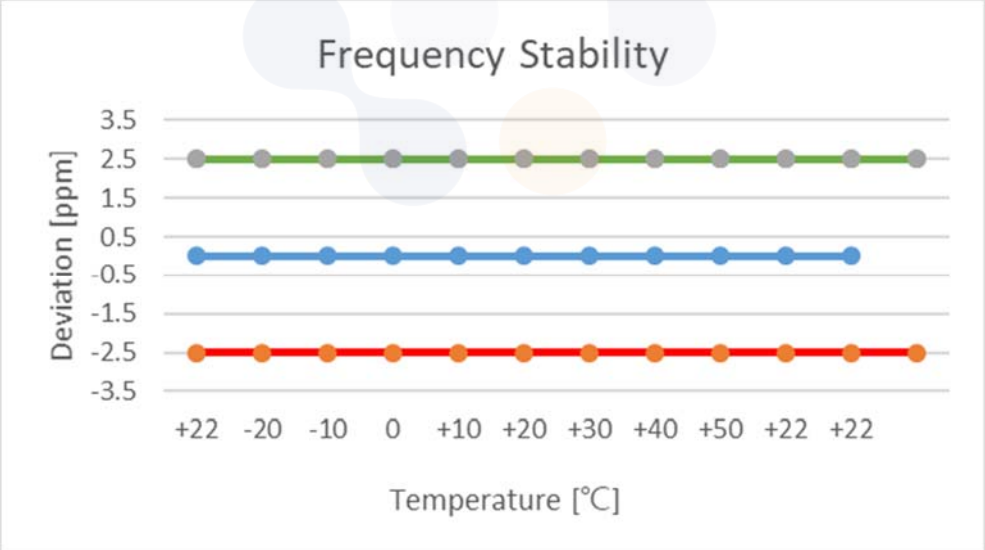
Test mode : LTE Band 13
Frequency (㎐) : 782 000 000
Channel : 23230
Deviation limit(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized bands of operation

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+22(Ref)	782,000,007	6.62	0.0	0.000001
		-20	782,000,006	6.41	0.0	0.000001
		-10	782,000,006	6.08	0.0	0.000001
		0	782,000,003	2.50	0.0	0.000000
		+10	782,000,004	4.36	0.0	0.000001
		+20	782,000,005	4.60	0.0	0.000001
		+30	782,000,006	5.87	0.0	0.000001
		+40	782,000,002	2.14	0.0	0.000000
		+50	782,000,005	4.84	0.0	0.000001
115%	4.43	+22(Ref)	782,000,004	4.23	0.0	0.000001
End point	3.60	+22(Ref)	782,000,003	3.22	0.0	0.000000



Test mode : LTE Band 26
Frequency (㎐) : 836 500 000
Channel : 26915
Deviation limit : ±0.00025% or 2.5ppm

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	836,500,003	3.35	0.0	0.000000
		-20	836,500,003	2.74	0.0	0.000000
		-10	836,500,006	5.55	0.0	0.000001
		0	836,500,005	4.80	0.0	0.000001
		+10	836,500,003	2.56	0.0	0.000000
		+20	836,500,006	5.69	0.0	0.000001
		+30	836,500,004	4.07	0.0	0.000000
		+40	836,500,003	2.57	0.0	0.000000
		+50	836,500,004	4.41	0.0	0.000001
115%	4.46	+22(Ref)	836,500,004	4.22	0.0	0.000001
End point	3.40	+22(Ref)	836,500,004	3.99	0.0	0.000000



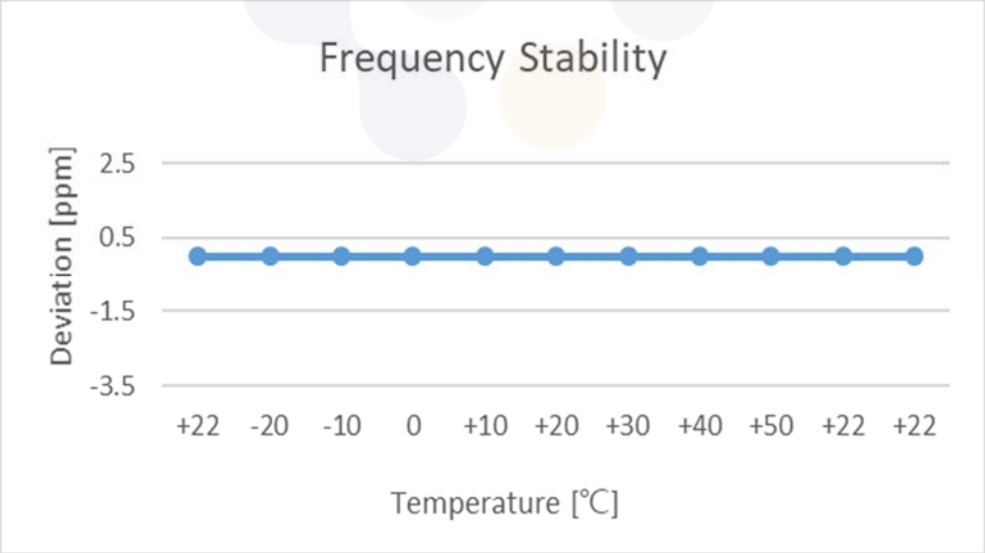
Test mode : LTE Band 41

Frequency (㎐) : 2 593 000 000

Channel : 40620

Deviation limit(FCC&IC) : 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%	3.88	+22(Ref)	2,593,000,003	3.48	0.0	0.000000
		-20	2,593,000,004	3.78	0.0	0.000000
		-10	2,593,000,004	4.12	0.0	0.000000
		0	2,593,000,004	3.93	0.0	0.000000
		+10	2,593,000,002	1.65	0.0	0.000000
		+20	2,593,000,003	2.69	0.0	0.000000
		+30	2,593,000,001	1.41	0.0	0.000000
		+40	2,593,000,002	1.56	0.0	0.000000
		+50	2,593,000,003	3.30	0.0	0.000000
115%	4.46	+22	2,593,000,005	4.95	0.0	0.000000
End point	3.40	+22	2,593,000,004	4.03	0.0	0.000000



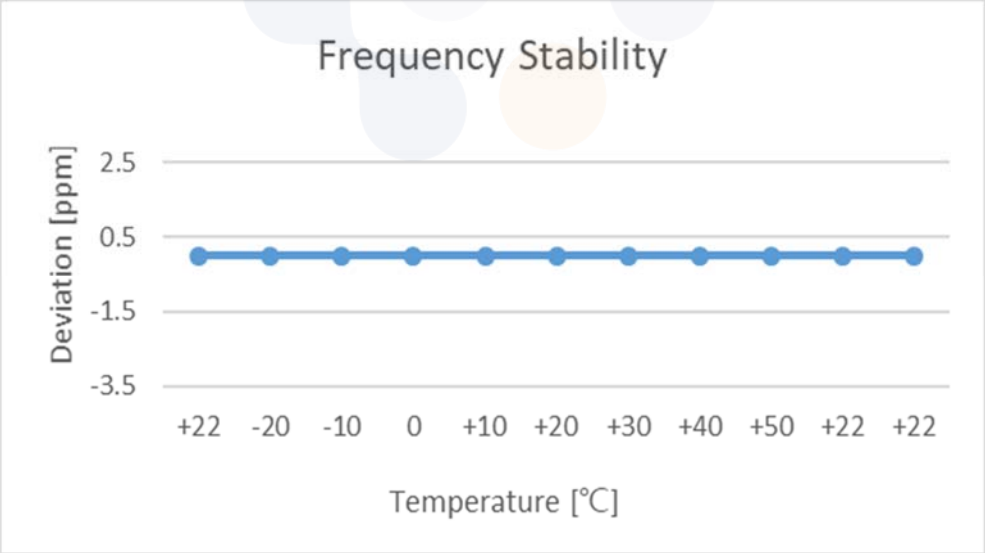
Test mode : LTE Band 66

Frequency (㎐) : 1 745 000 000

Channel : 132322

Deviation limit(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized bands of operation.

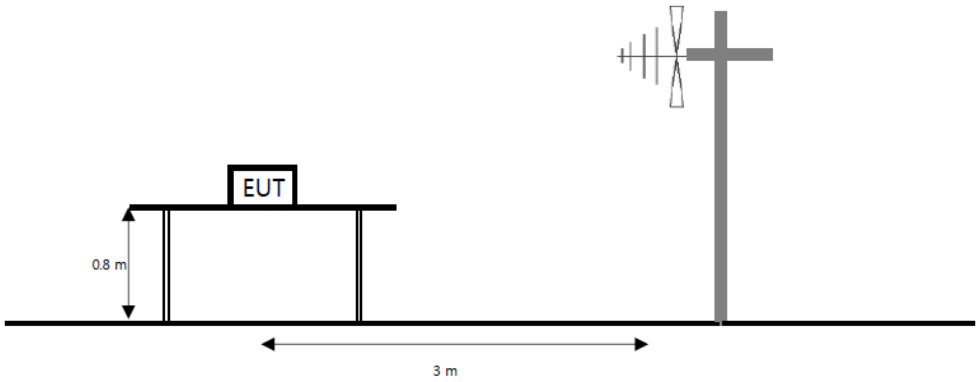
Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	1,744,999,997	-2.60	0.0	0.000000
		-20	1,744,999,996	-3.61	0.0	0.000000
		-10	1,744,999,998	-1.55	0.0	0.000000
		0	1,744,999,996	-3.86	0.0	0.000000
		+10	1,744,999,995	-4.98	0.0	0.000000
		+20	1,744,999,998	-1.62	0.0	0.000000
		+30	1,744,999,998	-1.91	0.0	0.000000
		+40	1,744,999,995	-4.62	0.0	0.000000
		+50	1,744,999,999	-1.34	0.0	0.000000
115%	4.46	+22(Ref)	1,744,999,996	-3.69	0.0	0.000000
End point	3.40	+22(Ref)	1,744,999,997	-3.45	0.0	0.000000



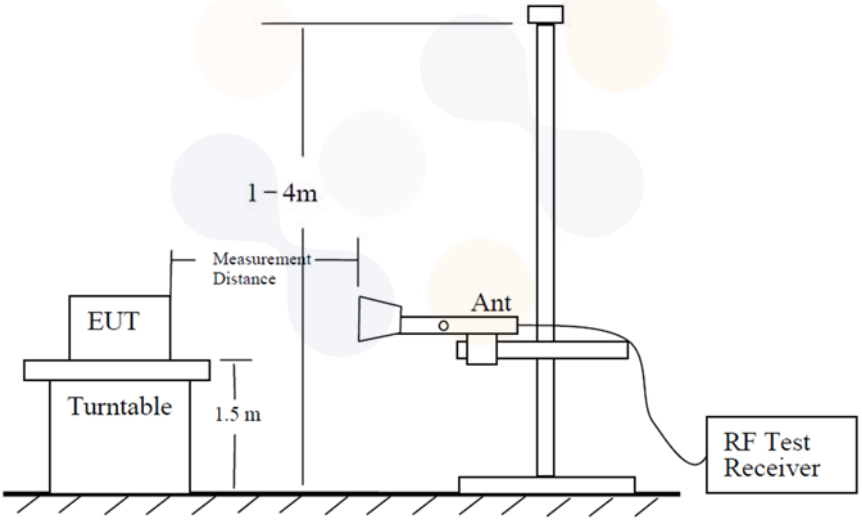
7.7. Radiated Power (ERP/EIRP)

Test setup

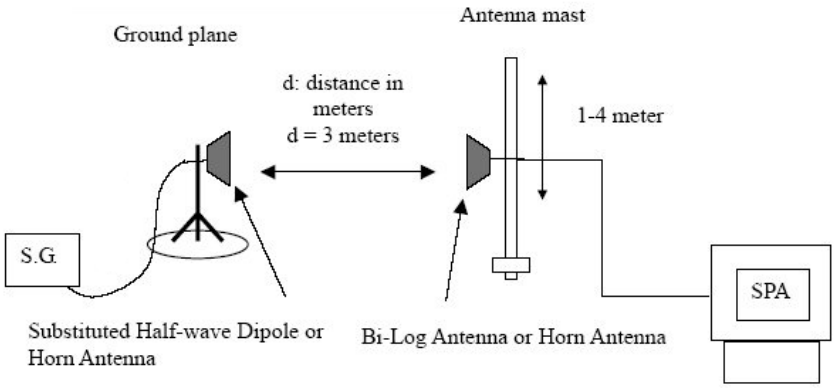
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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 §24.232(c), Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(b)(10), 27.50(c)(10), Portable stations (hand-held devices) in the 698 -746 ㎒, 746-757 ㎒, 776-788 ㎒, and 805-806 ㎒ bands are limited 3 watts ERP.

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.

According to §27.50(h)(2), Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

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: LTE Band 2

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	1 850.7	V	5.46	7.90	23.92	21.48	0.141
		1 880.0	V	5.39	7.96	24.52	21.95	0.157
		1 909.3	V	5.32	8.00	24.19	21.51	0.142
	16QAM	1 850.7	V	5.46	7.90	23.32	20.88	0.122
		1 880.0	V	5.39	7.96	22.99	20.42	0.110
		1 909.3	V	5.32	8.00	23.27	20.59	0.115
3 M	QPSK	1 851.5	V	5.46	7.91	23.94	21.49	0.141
		1 880.0	V	5.39	7.96	24.34	21.77	0.150
		1 908.5	V	5.32	8.00	24.08	21.40	0.138
	16QAM	1 851.5	V	5.46	7.91	22.92	20.47	0.111
		1 880.0	V	5.39	7.96	23.24	20.67	0.117
		1 908.5	V	5.32	8.00	23.13	20.45	0.111
5 M	QPSK	1 852.5	V	5.45	7.88	23.92	21.49	0.141
		1 880.0	V	5.39	7.96	23.80	21.23	0.133
		1 907.5	V	5.32	7.99	24.36	21.69	0.148
	16QAM	1 852.5	V	5.45	7.88	22.42	19.99	0.100
		1 880.0	V	5.39	7.96	23.73	21.16	0.131
		1 907.5	V	5.32	7.99	23.52	20.85	0.122
10 M	QPSK	1 855.0	V	5.45	7.89	23.64	21.20	0.132
		1 880.0	V	5.39	7.96	24.40	21.83	0.152
		1 905.0	V	5.33	7.99	24.02	21.36	0.137
	16QAM	1 855.0	V	5.45	7.89	22.33	19.89	0.097
		1 880.0	V	5.39	7.96	23.13	20.56	0.114
		1 905.0	V	5.33	7.99	23.30	20.64	0.116
15 M	QPSK	1 857.5	V	5.44	7.90	23.53	21.07	0.128
		1 880.0	V	5.39	7.96	24.41	21.84	0.153
		1 902.5	V	5.33	7.97	24.25	21.61	0.145
	16QAM	1 857.5	V	5.44	7.90	22.62	20.16	0.104
		1 880.0	V	5.39	7.96	23.67	21.10	0.129
		1 902.5	V	5.33	7.97	23.71	21.07	0.128
20 M	QPSK	1 860.0	V	5.44	7.91	23.28	20.81	0.121
		1 880.0	V	5.39	7.96	24.43	21.86	0.153
		1 900.0	V	5.34	7.99	24.28	21.63	0.146
	16QAM	1 860.0	V	5.44	7.91	22.40	19.93	0.098
		1 880.0	V	5.39	7.96	23.31	20.74	0.119
		1 900.0	V	5.34	7.99	23.37	20.72	0.118

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

Test mode: LTE Band 4

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	1 710.7	V	5.79	7.59	23.65	21.85	0.153
		1 732.5	V	5.74	7.64	22.58	20.68	0.117
		1 754.3	V	5.69	7.70	23.03	21.02	0.126
	16QAM	1 710.7	V	5.79	7.59	22.83	21.03	0.127
		1 732.5	V	5.74	7.64	21.59	19.69	0.093
		1 754.3	V	5.69	7.70	21.54	19.53	0.090
3 M	QPSK	1 711.5	V	5.79	7.61	23.85	22.03	0.160
		1 732.5	V	5.74	7.64	23.25	21.35	0.136
		1 753.5	V	5.69	7.70	23.19	21.18	0.131
	16QAM	1 711.5	V	5.79	7.61	23.06	21.24	0.133
		1 732.5	V	5.74	7.64	22.56	20.66	0.116
		1 753.5	V	5.69	7.70	22.44	20.43	0.110
5 M	QPSK	1 712.5	V	5.79	7.62	23.69	21.86	0.153
		1 752.5	V	5.74	7.64	23.03	21.13	0.130
		1 777.5	V	5.69	7.69	23.21	21.21	0.132
	16QAM	1 712.5	V	5.79	7.62	22.69	20.86	0.122
		1 732.5	V	5.74	7.64	22.29	20.39	0.109
		1 752.5	V	5.69	7.69	22.02	20.02	0.100
10 M	QPSK	1 715.0	V	5.78	7.61	23.92	22.09	0.162
		1 732.5	V	5.74	7.64	22.92	21.02	0.126
		1 750.0	V	5.70	7.70	23.52	21.52	0.142
	16QAM	1 715.0	V	5.78	7.61	22.81	20.98	0.125
		1 732.5	V	5.74	7.64	22.17	20.27	0.106
		1 750.0	V	5.70	7.70	22.24	20.24	0.106
15 M	QPSK	1 717.5	V	5.78	7.59	23.60	21.79	0.151
		1 732.5	V	5.74	7.64	22.82	20.92	0.124
		1 747.5	V	5.71	7.69	23.25	21.27	0.134
	16QAM	1 717.5	V	5.78	7.59	22.58	20.77	0.119
		1 732.5	V	5.74	7.64	21.94	20.04	0.101
		1 747.5	V	5.71	7.69	22.54	20.56	0.114
20 M	QPSK	1 720.0	V	5.77	7.62	23.23	21.38	0.137
		1 732.5	V	5.74	7.64	22.82	20.92	0.124
		1 745.0	V	5.71	7.68	23.33	21.36	0.137
	16QAM	1 720.0	V	5.77	7.62	22.34	20.49	0.112
		1 732.5	V	5.74	7.64	22.02	20.12	0.103
		1 745.0	V	5.71	7.68	22.41	20.44	0.111

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

Test mode: LTE Band 5

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[㎒]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	824.7	H	-1.98	5.31	26.29	19.00	0.079
		836.5	H	-2.43	5.40	26.39	18.56	0.072
		848.3	H	-2.78	5.45	25.89	17.66	0.058
	16QAM	824.7	H	-1.98	5.31	25.75	18.46	0.070
		836.5	H	-2.43	5.40	25.39	17.56	0.057
		848.3	H	-2.78	5.45	25.14	16.91	0.049
3 M	QPSK	825.5	H	-1.90	5.33	26.18	18.95	0.079
		836.5	H	-2.43	5.40	25.83	18.00	0.063
		847.5	H	-2.80	5.45	26.22	17.97	0.063
	16QAM	825.5	H	-1.90	5.33	25.18	17.95	0.062
		836.5	H	-2.43	5.40	25.56	17.73	0.059
		847.5	H	-2.80	5.45	25.40	17.15	0.052
5 M	QPSK	826.5	H	-1.80	5.33	26.18	19.05	0.080
		836.5	H	-2.43	5.40	25.92	18.09	0.064
		846.5	H	-2.82	5.44	26.29	18.03	0.064
	16QAM	826.5	H	-1.80	5.33	25.26	18.13	0.065
		836.5	H	-2.43	5.40	25.43	17.60	0.058
		846.5	H	-2.82	5.44	25.37	17.11	0.051
10 M	QPSK	829.0	H	-1.55	5.34	26.28	19.39	0.087
		836.5	H	-2.43	5.40	26.23	18.40	0.069
		844.0	H	-2.87	5.43	26.71	18.41	0.069
	16QAM	829.0	H	-1.55	5.34	25.15	18.26	0.067
		836.5	H	-2.43	5.40	25.56	17.73	0.059
		844.0	H	-2.87	5.43	26.02	17.72	0.059

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

Test mode: LTE Band 12/17

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[㎒]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	699.7	V	-2.85	4.87	24.41	16.69	0.047
		707.5	V	-2.55	4.89	23.86	16.42	0.044
		715.3	V	-2.66	4.91	23.49	15.92	0.039
	16QAM	699.7	V	-2.85	4.87	23.40	15.68	0.037
		707.5	V	-2.55	4.89	23.17	15.73	0.037
		715.3	V	-2.66	4.91	22.91	15.34	0.034
3 M	QPSK	700.5	V	-2.83	4.86	24.26	16.57	0.045
		707.5	V	-2.55	4.89	23.83	16.39	0.044
		714.5	V	-2.63	4.91	23.44	15.90	0.039
	16QAM	700.5	V	-2.83	4.86	23.15	15.46	0.035
		707.5	V	-2.55	4.89	23.16	15.72	0.037
		714.5	V	-2.63	4.91	22.25	14.71	0.030
5 M	QPSK	701.5	V	-2.79	4.87	24.14	16.48	0.044
		707.5	V	-2.55	4.89	23.67	16.23	0.042
		713.5	V	-2.59	4.91	23.28	15.78	0.038
	16QAM	701.5	V	-2.79	4.87	23.31	15.65	0.037
		707.5	V	-2.55	4.89	23.00	15.56	0.036
		713.5	V	-2.59	4.91	22.71	15.21	0.033
10 M	QPSK	704.0	V	-2.69	4.89	23.78	16.20	0.042
		707.5	V	-2.55	4.89	23.96	16.52	0.045
		711.0	V	-2.49	4.90	24.22	16.83	0.048
	16QAM	704.0	V	-2.69	4.89	22.87	15.29	0.034
		707.5	V	-2.55	4.89	23.10	15.66	0.037
		711.0	V	-2.49	4.90	23.47	16.08	0.041

Test mode: LTE Band 13

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[㎒]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
5 M	QPSK	779.5	V	-1.57	5.12	24.12	17.43	0.055
		782.0	V	-1.65	5.13	24.37	17.59	0.057
		784.5	V	-1.78	5.13	24.11	17.20	0.052
	16QAM	779.5	V	-1.57	5.12	23.07	16.38	0.043
		782.0	V	-1.65	5.13	23.28	16.50	0.045
		784.5	V	-1.78	5.13	23.61	16.70	0.047
10 M	QPSK	782.0	V	-1.65	5.13	24.46	17.68	0.059
	16QAM	782.0	V	-1.65	5.13	24.19	17.41	0.055

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

Test mode: LTE Band 26

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[㎒]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	824.7	H	-1.98	5.31	26.16	18.87	0.077
		836.5	H	-2.43	5.40	25.85	18.02	0.063
		848.3	H	-2.78	5.45	26.21	17.98	0.063
	16QAM	824.7	H	-1.98	5.31	25.10	17.81	0.060
		836.5	H	-2.43	5.40	24.97	17.14	0.052
		848.3	H	-2.78	5.45	25.51	17.28	0.053
3 M	QPSK	825.5	H	-1.90	5.33	26.10	18.87	0.077
		836.5	H	-2.43	5.40	25.88	18.05	0.064
		847.5	H	-2.80	5.45	26.21	17.96	0.063
	16QAM	825.5	H	-1.90	5.33	24.88	17.65	0.058
		836.5	H	-2.43	5.40	24.96	17.13	0.052
		847.5	H	-2.80	5.45	25.47	17.22	0.053
5 M	QPSK	826.5	H	-1.80	5.33	25.85	18.72	0.074
		836.5	H	-2.43	5.40	25.92	18.09	0.064
		846.5	H	-2.82	5.44	26.20	17.94	0.062
	16QAM	826.5	H	-1.80	5.33	24.80	17.67	0.058
		836.5	H	-2.43	5.40	25.04	17.21	0.053
		846.5	H	-2.82	5.44	25.34	17.08	0.051
10 M	QPSK	829.0	H	-1.55	5.34	26.11	19.22	0.084
		836.5	H	-2.43	5.40	26.14	18.31	0.068
		844.0	H	-2.87	5.43	26.33	18.03	0.064
	16QAM	829.0	H	-1.55	5.34	25.18	18.29	0.067
		836.5	H	-2.43	5.40	25.60	17.77	0.060
		844.0	H	-2.87	5.43	25.72	17.42	0.055
15 M	QPSK	831.5	H	-1.68	5.37	26.39	19.34	0.086
		836.5	H	-2.43	5.40	26.03	18.20	0.066
		841.5	H	-2.92	5.43	26.16	17.81	0.060
	16QAM	831.5	H	-1.68	5.37	25.37	18.32	0.068
		836.5	H	-2.43	5.40	25.83	18.00	0.063
		841.5	H	-2.92	5.43	25.14	16.79	0.048

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

Test mode: LTE Band 41

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
5 M	QPSK	2 498.5	H	6.20	9.21	22.35	19.34	0.086
		2 593.0	H	6.33	9.39	22.88	19.82	0.096
		2 687.5	H	6.46	9.59	21.67	18.54	0.071
	16QAM	2 498.5	H	6.20	9.21	20.81	17.80	0.060
		2 693.0	H	6.33	9.39	21.97	18.91	0.078
		2 687.5	H	6.46	9.59	20.66	17.53	0.057
10 M	QPSK	2 501.0	H	6.20	9.22	23.92	20.90	0.123
		2 593.0	H	6.33	9.39	24.37	21.31	0.135
		2 685.0	H	6.46	9.58	22.36	19.24	0.084
	16QAM	2 501.0	H	6.20	9.22	21.04	18.02	0.063
		2 593.0	H	6.33	9.39	22.74	19.68	0.093
		2 685.0	H	6.46	9.58	22.45	19.33	0.086
15 M	QPSK	2 503.5	H	6.20	9.21	24.00	20.99	0.126
		2 593.0	H	6.33	9.39	24.26	21.20	0.132
		2 682.5	H	6.46	9.59	22.36	19.23	0.084
	16QAM	2 503.5	H	6.20	9.21	21.64	18.63	0.073
		2 593.0	H	6.33	9.39	22.66	19.60	0.091
		2 682.5	H	6.46	9.59	19.89	16.76	0.047
20 M	QPSK	2 506.0	H	6.21	9.24	23.74	20.71	0.118
		2 593.0	H	6.33	9.39	24.46	21.40	0.138
		2 680.0	H	6.45	9.58	22.85	19.72	0.094
	16QAM	2 506.0	H	6.21	9.24	22.83	19.80	0.095
		2 593.0	H	6.33	9.39	22.32	19.26	0.084
		2 680.0	H	6.45	9.58	21.59	18.46	0.070

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

Test mode: LTE Band 66

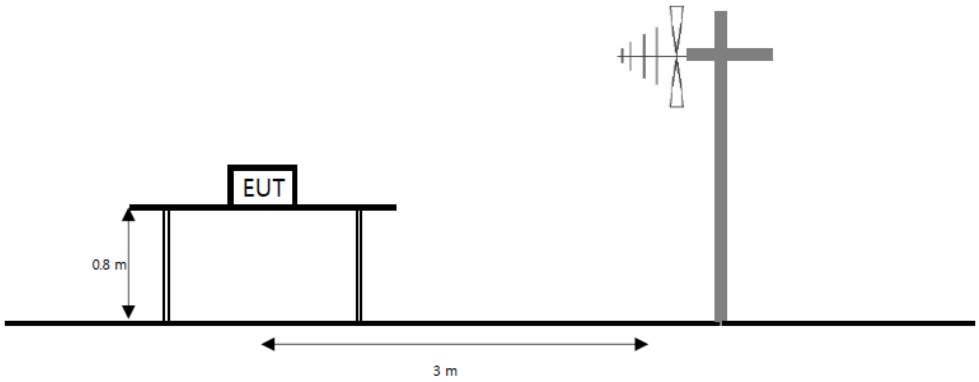
Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	1 710.7	V	5.79	7.59	23.47	21.67	0.147
		1 745.0	V	5.71	7.68	22.77	20.80	0.120
		1 779.3	V	5.63	7.79	21.35	19.19	0.083
	16QAM	1 710.7	V	5.79	7.59	22.31	20.51	0.112
		1 745.0	V	5.71	7.68	21.95	19.98	0.100
		1 779.3	V	5.63	7.79	20.49	18.33	0.068
3 M	QPSK	1 711.5	V	5.79	7.61	23.29	21.47	0.140
		1 745.0	V	5.71	7.68	22.79	20.82	0.121
		1 778.5	V	5.63	7.79	21.95	19.79	0.095
	16QAM	1 711.5	V	5.79	7.61	22.17	20.35	0.108
		1 745.0	V	5.71	7.68	22.28	20.31	0.107
		1 778.5	V	5.63	7.79	21.23	19.07	0.081
5 M	QPSK	1 712.5	V	5.79	7.62	23.44	21.61	0.145
		1 745.0	V	5.71	7.68	22.28	20.31	0.107
		1 777.5	V	5.63	7.78	21.49	19.34	0.086
	16QAM	1 712.5	V	5.79	7.62	22.39	20.56	0.114
		1 745.0	V	5.71	7.68	21.80	19.83	0.096
		1 777.5	V	5.63	7.78	20.58	18.43	0.070
10 M	QPSK	1 715.0	V	5.78	7.61	23.38	21.55	0.143
		1 745.0	V	5.71	7.68	22.86	20.89	0.123
		1 775.0	V	5.64	7.77	21.51	19.38	0.087
	16QAM	1 715.0	V	5.78	7.61	22.62	20.79	0.120
		1 745.0	V	5.71	7.68	21.97	20.00	0.100
		1 775.0	V	5.64	7.77	20.35	18.22	0.066
15 M	QPSK	1 717.5	V	5.78	7.59	23.64	21.83	0.152
		1 745.0	V	5.71	7.68	23.00	21.03	0.127
		1 772.5	V	5.65	7.75	20.82	18.72	0.074
	16QAM	1 717.5	V	5.78	7.59	22.76	20.95	0.124
		1 745.0	V	5.71	7.68	21.99	20.02	0.100
		1 772.5	V	5.65	7.75	19.81	17.71	0.059
20 M	QPSK	1 720.0	V	5.77	7.62	23.09	21.24	0.133
		1 745.0	V	5.71	7.68	22.62	20.65	0.116
		1 770.0	V	5.65	7.76	21.87	19.76	0.095
	16QAM	1 720.0	V	5.77	7.62	22.45	20.60	0.115
		1 745.0	V	5.71	7.68	21.89	19.92	0.098
		1 770.0	V	5.65	7.76	21.09	18.98	0.079

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

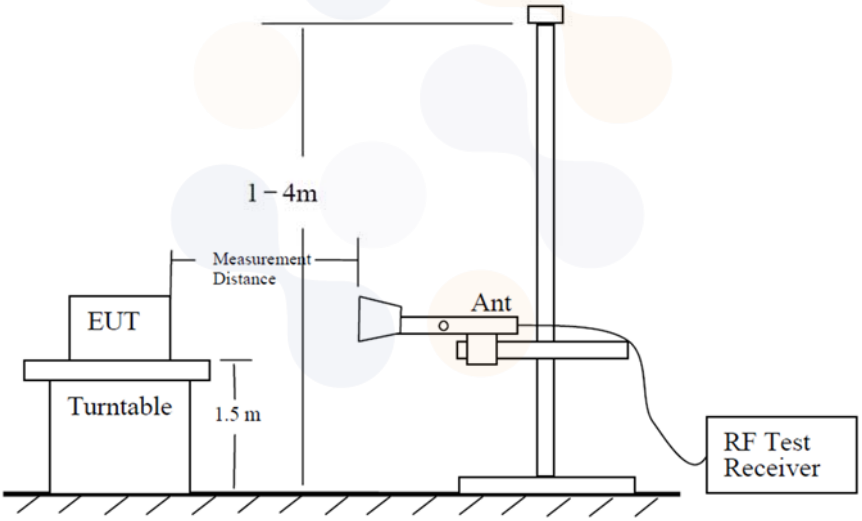
7.8. Radiated Spurious Emissions

Test setup

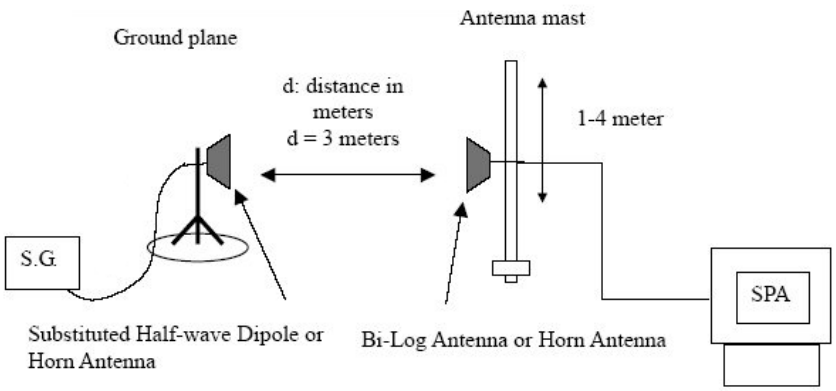
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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), §24.238(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(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($P_{[Watts]}$) ㏈.
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($P_{[Watts]}$) ㏈.

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($P_{[Watts]}$) ㏈.

According to §27.53(m)(4), the minimum permissible attenuation level of any spurious emission is 53 + 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.

For the narrowband spurious settings:

1) RBW = 1 ㎑
2) VBW = 3 ㎑
3) Detector = RMS
4) Trace mode = Max hold
5) Sweep speed slow enough to maintain measurement calibration.

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 : LTE Band 2
Frequency(㎒) : 1 850.7
Channel : 18607
Bandwidth(㎒) : 1.4

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 703.88	V	8.54	11.63	-52.11	-55.20	-13.00	42.20
	5 551.67	V	10.51	14.51	-50.10	-54.10	-13.00	41.10
	7 401.76	H	11.96	16.81	-46.25	-51.10	-13.00	38.10
	9 251.86	V	13.20	18.73	-45.87	-51.40	-13.00	38.40

Test mode : LTE Band 2
Frequency(㎒) : 1 880.0
Channel : 18900
Bandwidth(㎒) : 1.4

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 760.04	V	8.61	11.52	-50.29	-53.20	-13.00	40.20
	5 639.37	V	10.53	14.44	-48.09	-52.00	-13.00	39.00
	7 518.69	H	12.11	16.81	-46.40	-51.10	-13.00	38.10
	9 401.10	V	13.20	18.93	-45.47	-51.20	-13.00	38.20

Test mode : LTE Band 2
Frequency(㎒) : 1 909.3
Channel : 19193
Bandwidth(㎒) : 1.4

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 817.69	V	8.68	11.69	-52.39	-55.40	-13.00	42.40
	5 726.29	H	10.55	14.57	-48.68	-52.70	-13.00	39.70
	7 636.79	H	12.21	17.10	-47.81	-52.70	-13.00	39.70
	9 545.38	H	13.19	18.99	-44.30	-50.10	-13.00	37.10

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

Test mode : LTE Band 4
Frequency(㎒) : 1 715.0
Channel : 20000
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 430.23	H	8.10	10.76	-40.34	-43.00	-13.00	30.00
	5 145.41	V	10.22	14.10	-43.62	-47.50	-13.00	34.50
	6 860.59	H	11.23	15.54	-36.39	-40.70	-13.00	27.70
	8 572.58	H	13.03	17.47	-45.96	-50.40	-13.00	37.40

Test mode : LTE Band 4
Frequency(㎒) : 1 732.5
Channel : 20175
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 465.34	H	8.20	10.82	-46.98	-49.60	-13.00	36.60
	5 197.75	V	10.26	14.14	-41.72	-45.60	-13.00	32.60
	6 930.17	H	11.32	15.43	-37.79	-41.90	-13.00	28.90
	8 663.22	V	13.07	17.16	-44.81	-48.90	-13.00	35.90

Test mode : LTE Band 4
Frequency(㎒) : 1 750.0
Channel : 20350
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 497.89	V	8.29	10.88	-53.61	-56.20	-13.00	43.20
	5 250.73	V	10.30	13.49	-49.01	-52.20	-13.00	39.20
	7 001.02	V	11.40	15.70	-47.20	-51.50	-13.00	38.50
	8 752.58	H	13.10	17.17	-46.03	-50.10	-13.00	37.10

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

Test mode : LTE Band 5
Frequency(㎒) : 829.0
Channel : 20450
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 658.09	H	5.92	7.48	-59.64	-61.20	-13.00	48.20
	2 486.44	H	6.17	9.20	-54.77	-57.80	-13.00	44.80
	3 316.84	H	7.79	10.86	-51.53	-54.60	-13.00	41.60
	4 148.06	V	8.81	12.29	-48.32	-51.80	-13.00	38.80

Test mode : LTE Band 5
Frequency(㎒) : 836.5
Channel : 20525
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 683.11	V	5.86	7.53	-60.43	-62.10	-13.00	49.10
	2 527.46	H	6.24	9.29	-52.85	-55.90	-13.00	42.90
	3 365.66	V	7.92	10.96	-52.96	-56.00	-13.00	43.00
	4 206.32	V	8.78	12.14	-49.84	-53.20	-13.00	40.20

Test mode : LTE Band 5
Frequency(㎒) : 844.0
Channel : 20600
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 689.68	H	5.84	7.55	-58.49	-60.20	-13.00	47.20
	2 529.93	H	6.24	9.30	-54.34	-57.40	-13.00	44.40
	3 376.33	V	7.95	10.98	-51.87	-54.90	-13.00	41.90
	4 222.32	V	8.77	12.18	-49.79	-53.20	-13.00	40.20

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

Test mode : LTE Band 12/17
Frequency(㎒) : 704.0
Channel : 23060
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 408.23	V	5.69	6.93	-55.36	-56.60	-13.00	43.60
	2 110.21	H	5.34	8.41	-54.33	-57.40	-13.00	44.40
	2 814.66	V	6.64	9.85	-54.59	-57.80	-13.00	44.80
	3 519.10	H	8.32	11.27	-52.55	-55.50	-13.00	42.50

Test mode : LTE Band 12/17
Frequency(㎒) : 707.5
Channel : 23095
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 406.18	V	5.68	6.92	-53.46	-54.70	-13.00	41.70
	2 106.52	H	5.33	8.41	-55.62	-58.70	-13.00	45.70
	2 808.09	H	6.63	9.83	-54.40	-57.60	-13.00	44.60
	3 512.54	H	8.32	11.25	-53.17	-56.10	-13.00	43.10

Test mode : LTE Band 12/17
Frequency(㎒) : 711.0
Channel : 23130
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 412.74	V	5.72	6.94	-55.88	-57.10	-13.00	44.10
	2 117.19	H	5.36	8.43	-54.23	-57.30	-13.00	44.30
	2 824.91	V	6.65	9.87	-53.48	-56.70	-13.00	43.70
	3 533.46	V	8.34	11.29	-51.65	-54.60	-13.00	41.60

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

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	1 557.98	H	6.16	7.20	-60.46	-61.50	-13.00	48.50
	*1 599.15	H	6.06	7.30	-55.96	-57.20	-50.00	7.20
	2 330.94	H	5.83	8.67	-53.86	-56.70	-13.00	43.70
	3 110.47	H	7.21	10.21	-49.50	-52.50	-13.00	39.50
	3 883.02	H	8.76	11.49	-50.87	-53.60	-13.00	40.60

Note.
1. Limit Calculation(dBm)= 43 + 10log($P_{[Watts]}$)
   Limit Calculation of wide-band (dBm/㎒) = -70dBW/㎒ (-40 dBm/㎒)
   Limit Calculation of narrow-band (dBm) = -80dBW (-50dBm)
2. ERP & E.I.R.P(dB m)= Substitute Level(dB) + Antenna gain(dBi) – Cable Loss(dB)
3. "*" Narrow-band (1 559 – 1 610 ㎒)

Test mode : LTE Band 26
Frequency(㎒) : 831.5
Channel : 26865
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 647.42	H	5.95	7.51	-57.14	-58.70	-13.00	45.70
	2 471.26	H	6.14	9.17	-53.87	-56.90	-13.00	43.90
	3 293.04	H	7.72	10.81	-50.91	-54.00	-13.00	41.00
	4 123.44	V	8.83	12.25	-48.28	-51.70	-13.00	38.70

Test mode : LTE Band 26
Frequency(㎒) : 836.5
Channel : 26915
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 658.50	H	5.92	7.48	-59.84	-61.40	-13.00	48.40
	2 485.62	H	6.17	9.20	-55.57	-58.60	-13.00	45.60
	3 316.84	H	7.79	10.86	-52.03	-55.10	-13.00	42.10
	4 146.83	V	8.81	12.29	-49.72	-53.20	-13.00	40.20

Test mode : LTE Band 26
Frequency(㎒) : 841.5
Channel : 26965
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 683.52	V	5.86	7.53	-59.23	-60.90	-13.00	47.90
	2 523.77	H	6.23	9.29	-53.54	-56.60	-13.00	43.60
	3 365.66	V	7.92	10.96	-52.66	-55.70	-13.00	42.70
	4 207.55	V	8.78	12.15	-50.43	-53.80	-13.00	40.80

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

Test mode : LTE Band 41
Frequency(㎒) : 2 506.0
Channel : 39750
Bandwidth(㎒) : 20

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	4 994.13	V	10.08	13.82	-48.56	-52.30	-13.00	39.30
	7 491.26	V	12.09	16.91	-40.18	-45.00	-13.00	32.00
	9 988.38	V	13.10	19.52	-36.38	-42.80	-13.00	29.80
	12 484.87	V	13.20	21.51	-39.09	-47.40	-13.00	34.40

Test mode : LTE Band 41
Frequency(㎒) : 2 593.0
Channel : 40620
Bandwidth(㎒) : 20

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	5 206.05	V	10.26	13.92	-51.24	-54.90	-13.00	41.90
	7 805.31	V	12.34	17.24	-38.10	-43.00	-13.00	30.00
	10 407.76	V	13.10	19.78	-40.22	-46.90	-13.00	33.90
	13 015.96	V	13.52	21.90	-39.32	-47.70	-13.00	34.70

Test mode : LTE Band 41
Frequency(㎒) : 2 680.0
Channel : 41490
Bandwidth(㎒) : 20

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	5 339.46	V	10.37	14.12	-50.35	-54.10	-13.00	41.10
	8 013.40	V	12.51	17.25	-38.56	-43.30	-13.00	30.30
	10 684.16	V	13.14	20.08	-37.06	-44.00	-13.00	31.00
	13 350.44	H	13.92	22.04	-40.28	-48.40	-13.00	35.40

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 66
Frequency(㎒) : 1 717.5
Channel : 132047
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 450.66	V	8.16	11.13	-52.53	-55.50	-13.00	42.50
	5 174.77	V	10.24	14.08	-50.36	-54.20	-13.00	41.20
	6 898.89	V	11.28	16.28	-46.20	-51.20	-13.00	38.20
	8 624.92	V	13.05	17.96	-47.39	-52.30	-13.00	39.30

Test mode : LTE Band 66
Frequency(㎒) : 1 745.0
Channel : 132322
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 475.55	H	8.23	11.18	-53.45	-56.40	-13.00	43.40
	5 211.16	H	10.27	13.93	-50.94	-54.60	-13.00	41.60
	6 951.87	V	11.34	16.15	-45.59	-50.40	-13.00	37.40
	8 688.75	V	13.08	18.04	-46.04	-51.00	-13.00	38.00

Test mode : LTE Band 66
Frequency(㎒) : 1 772.5
Channel : 132597
Bandwidth(㎒) : 15

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 546.41	V	8.36	11.32	-51.64	-54.60	-13.00	41.60
	5 317.12	V	10.35	14.09	-49.86	-53.60	-13.00	40.60
	7 089.75	H	11.53	16.41	-45.42	-50.30	-13.00	37.30
	8 860.46	V	13.14	18.24	-44.30	-49.40	-13.00	36.40

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
Spectrum Analyzer	R&S	FSV30	101437	22.07.27
Power Divider	AGILENT	11636B	54456	22.12.22
Vector Signal Generator	R&S	SMBV100A	257566	22.07.09
Signal Generator	R&S	SMB100A	176206	23.01.19*
Wideband Radio Communication Tester	R&S	CMW500	132423	22.02.25
Biconical VHF-UHF Broadband Antenna	SCHWARZBECK	VUBA9117	275	22.04.09
Bilog Antenna	ETS.LINDGREN	'3143B	00228420	23.09.28
Horn Antenna	ETS.LINDGREN	3117	161225	22.05.11
Horn Antenna	ETS.LINDGREN	3117	00227509	22.09.27
Horn Antenna	ETS.lindgren	3116	00086632	23.01.25*
Horn Antenna	ETS.lindgren	3116	00086635	22.05.17
High Pass Filter	Wainwright Instruments GmbH	WHKX10-900-1000-15000-40SS	11	22.08.20
High Pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	32	22.08.20
Broadband Amplifier	SONOMA INSTRUMENT	310N	186280	22.04.01
Amplifier	LTC MICROWAVE	LLA01185522Q-B	141	22.07.19
Amplifier	L-3 Narda-MITEQ	JS44-18004000-33-8P	2000997	22.07.29
Spectrum Analyzer	AGILENT	N9040B	MY57010132	22.12.31
Widebnad Radio Communication Tester	R & S	CMW500	141780	22.04.01
Antenna Stand	innco systems GmbH	AS1500-EP-10kg	N/A	N/A
Antenna Stand	innco systems GmbH	AS1500-EP-10kg	N/A	N/A
Compact Table	innco systems GmbH	CT1000	N/A	N/A

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

End of test report