

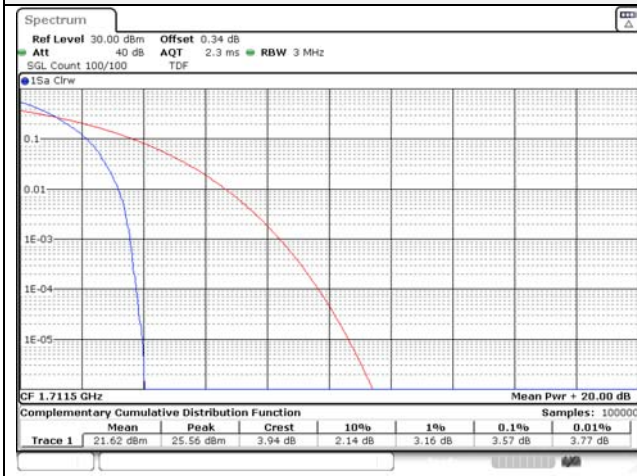
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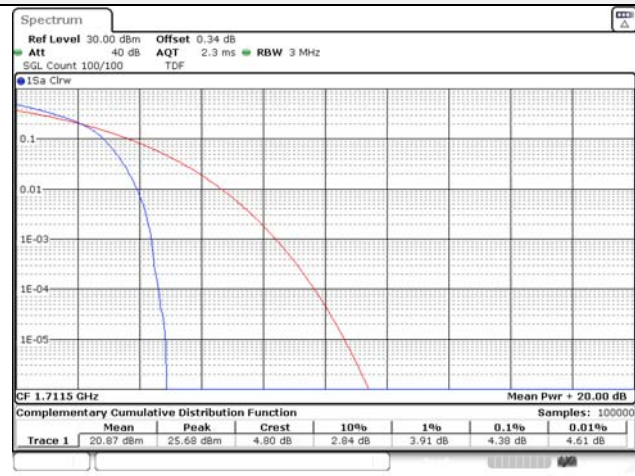
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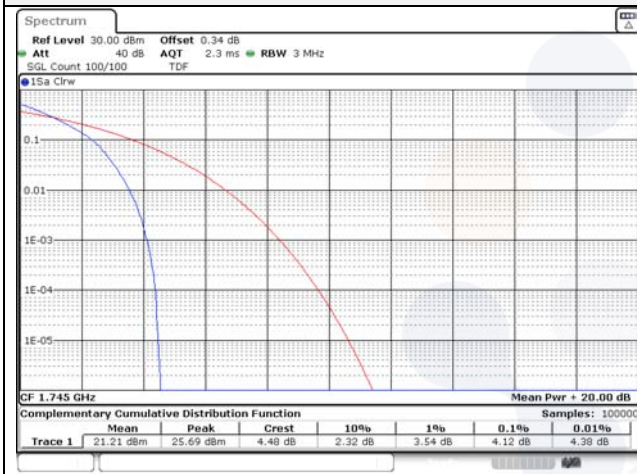
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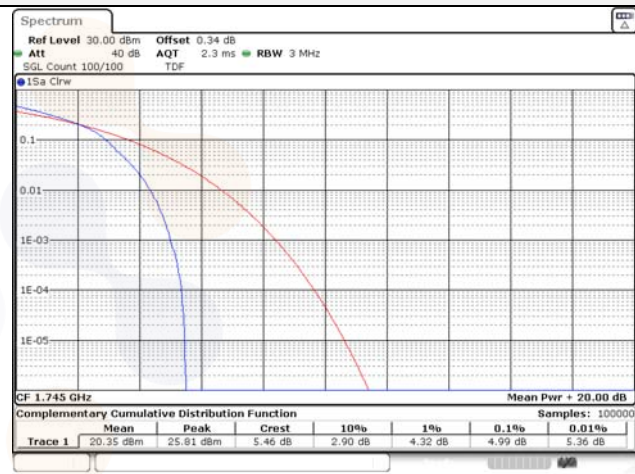
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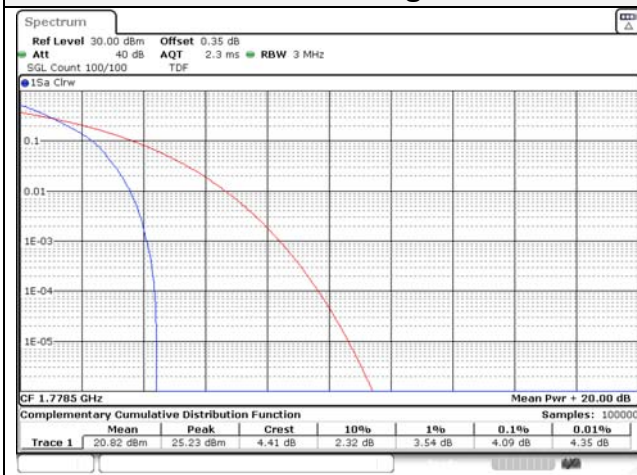
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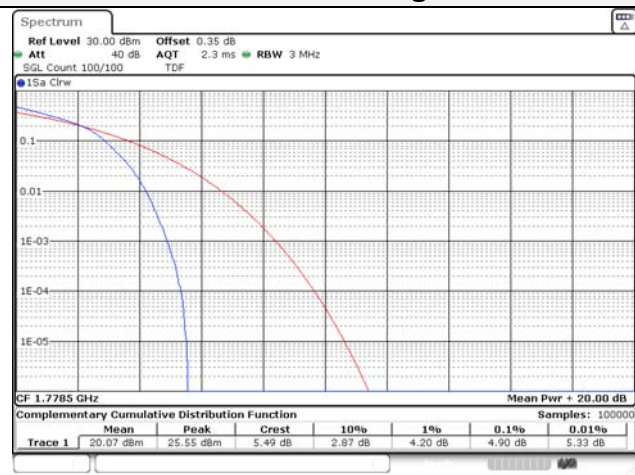
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3M BW QPSK High ch.



3M BW 16QAM High ch.



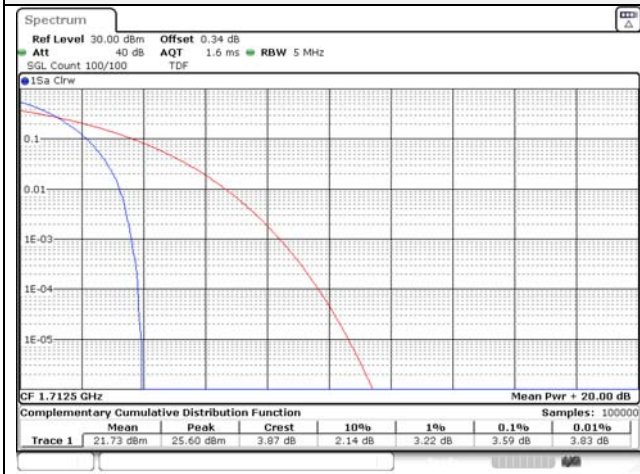
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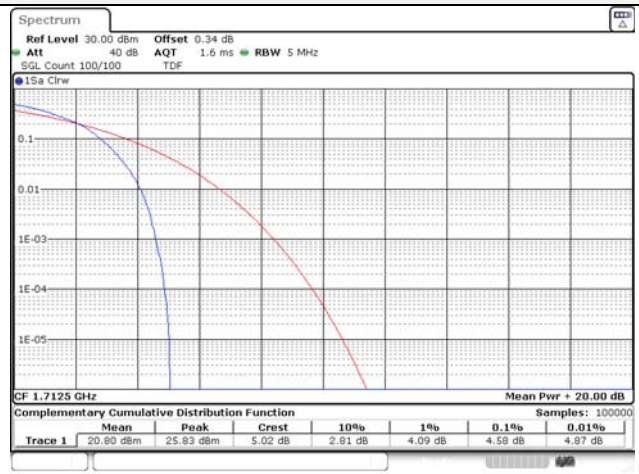
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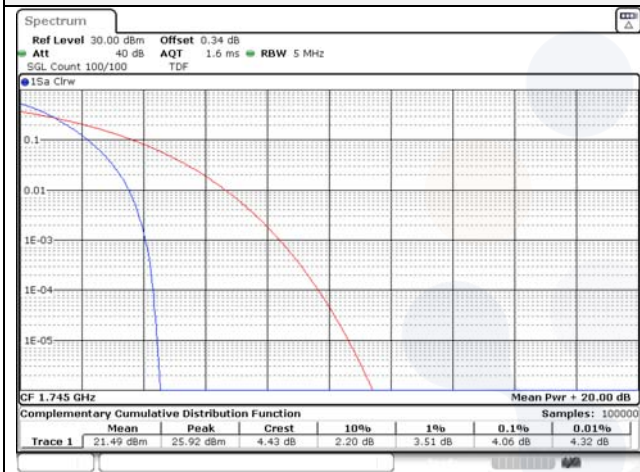
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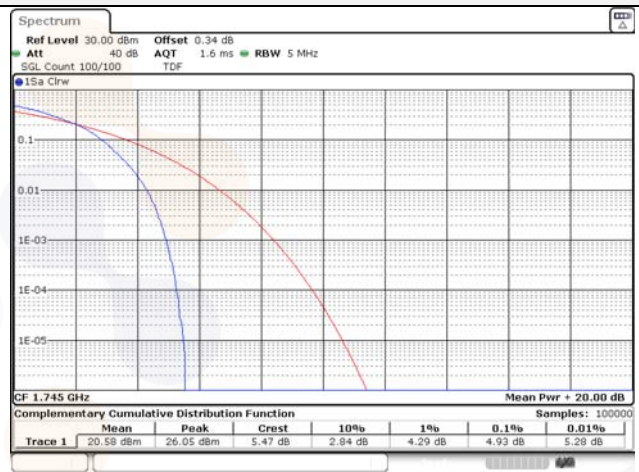
5M BW 16QAM Low ch.



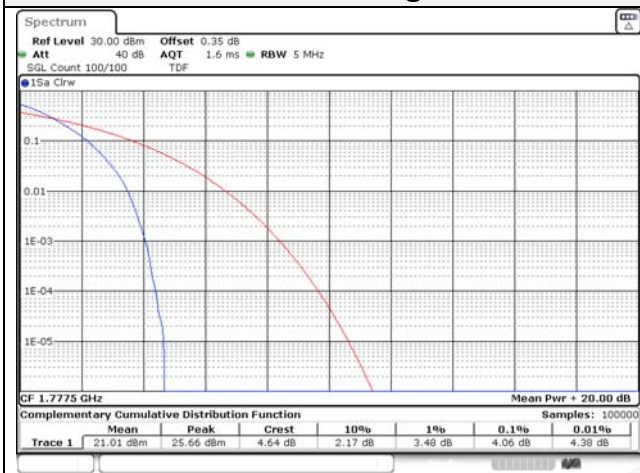
5M BW QPSK Mid ch.



5M BW 16QAM Mid ch.



5M BW QPSK High ch.



5M BW 16QAM High ch.



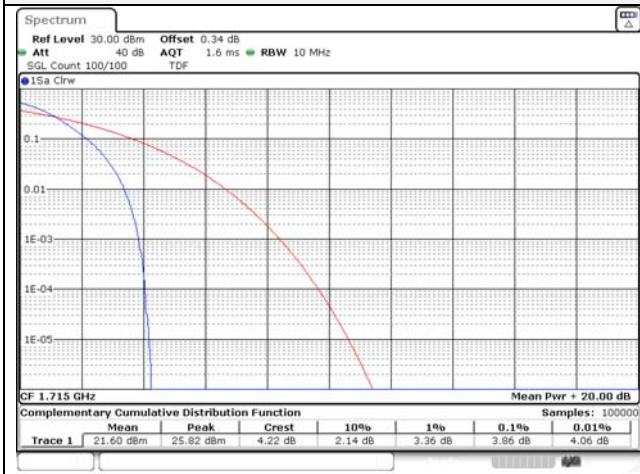
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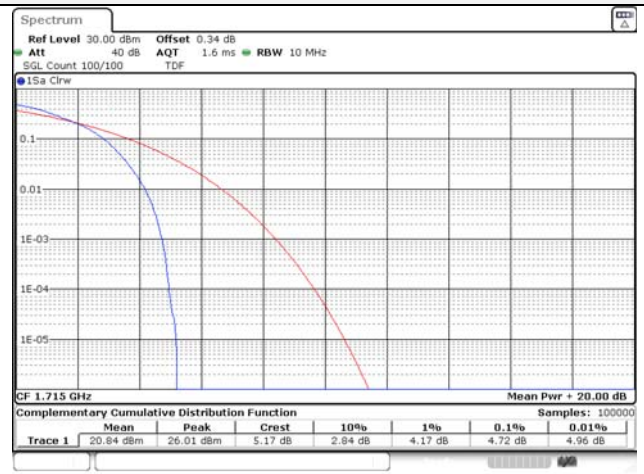
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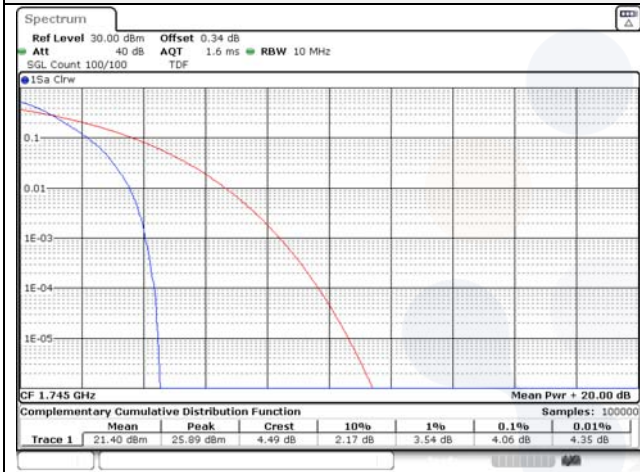
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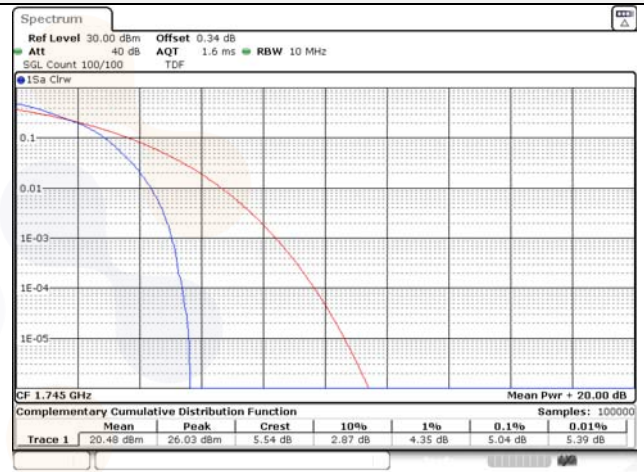
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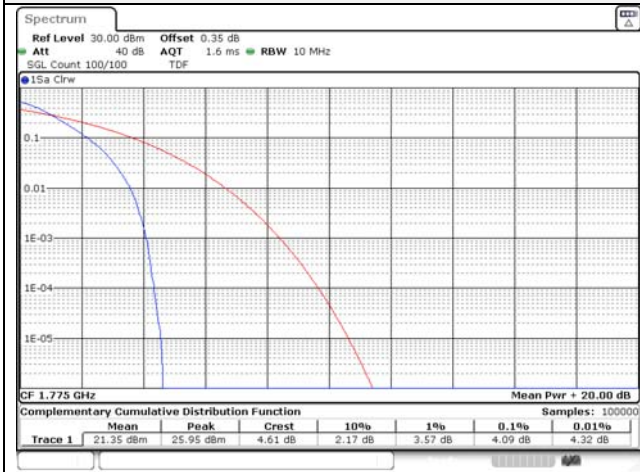
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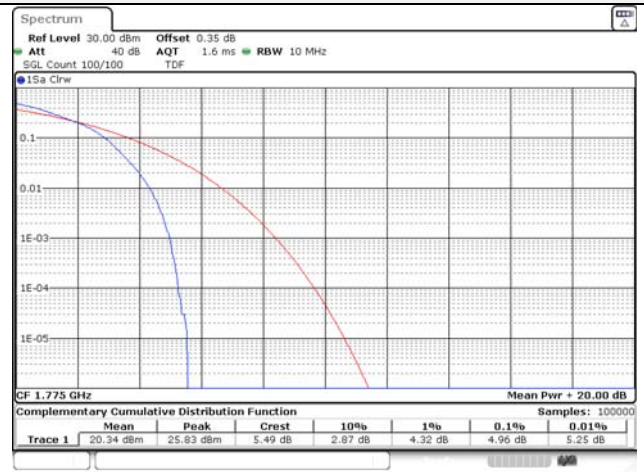
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10M BW QPSK High ch.



10M BW 16QAM High ch.



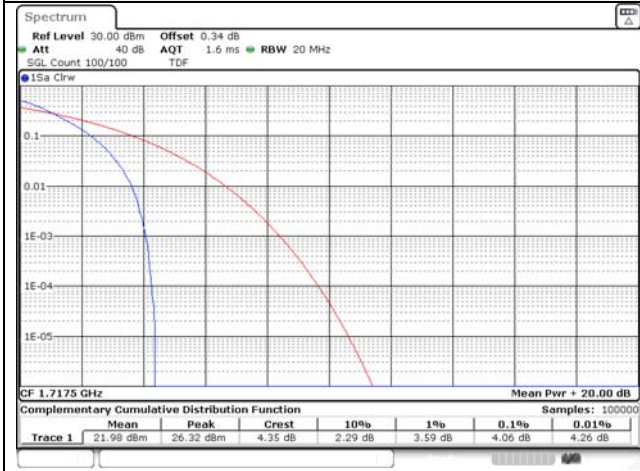
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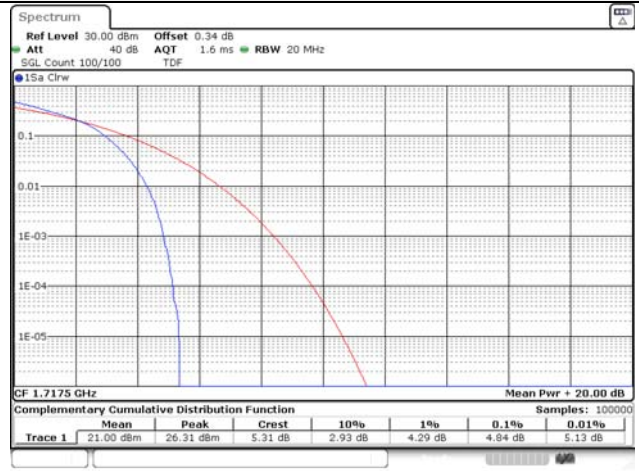
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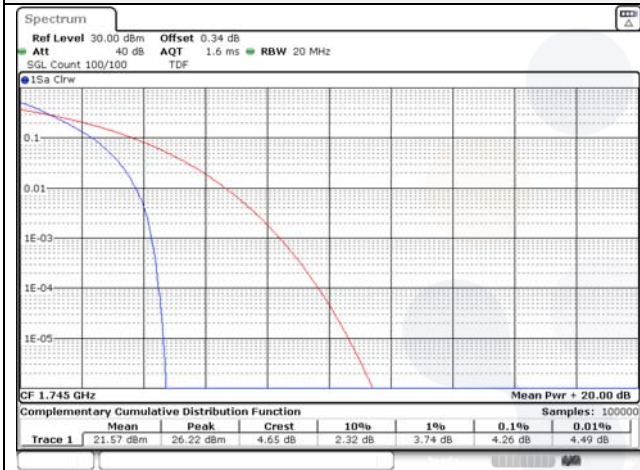
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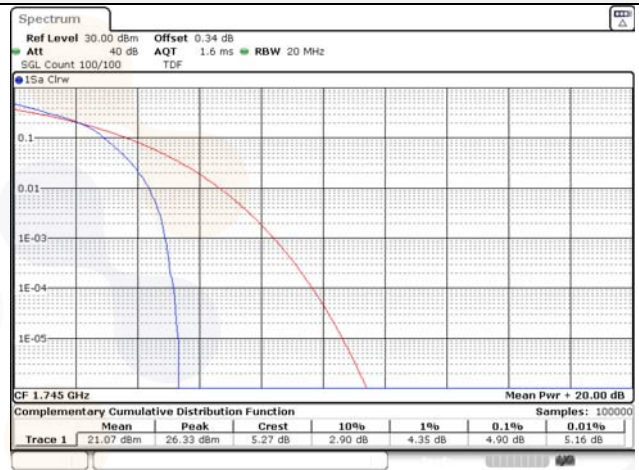
15M BW 16QAM Low ch.



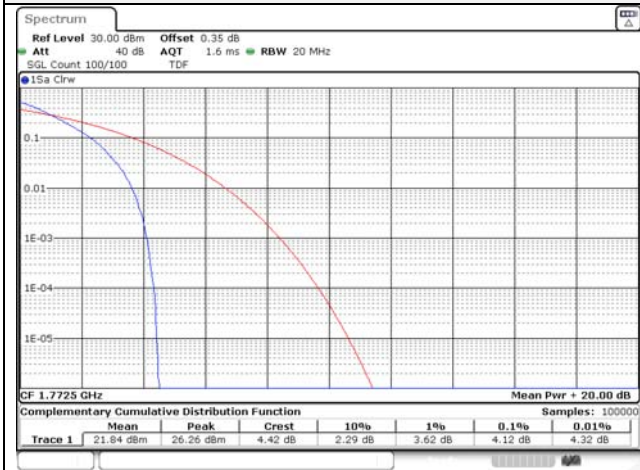
15M BW QPSK Mid ch.



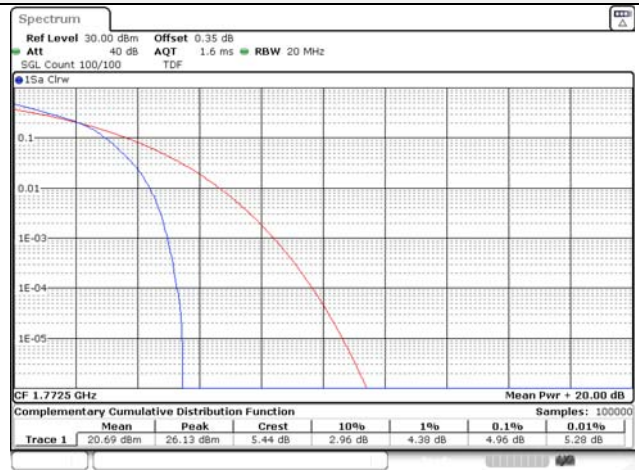
15M BW 16QAM Mid ch.



15M BW QPSK High ch.



15M BW 16QAM High ch.



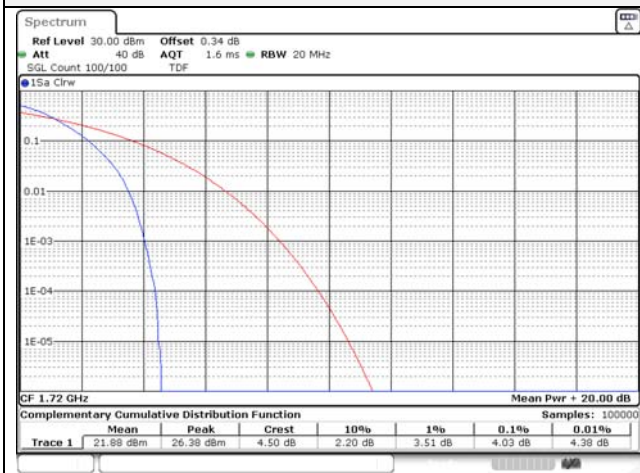
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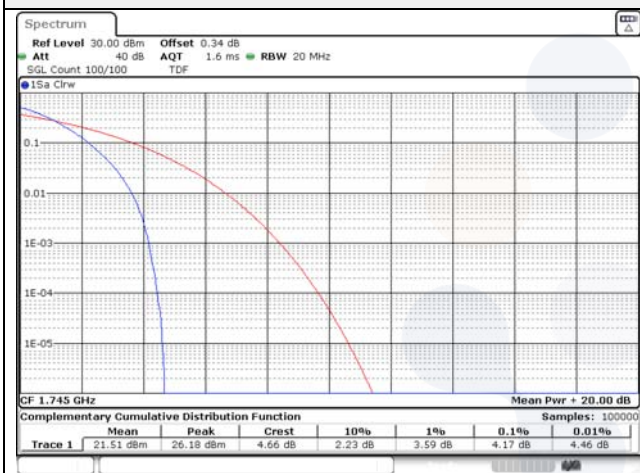
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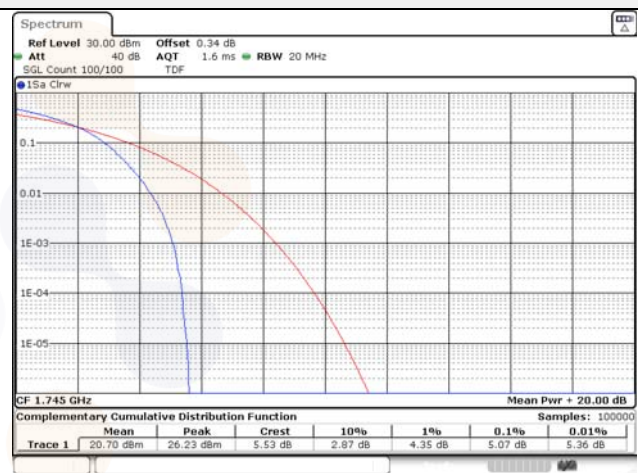
20M BW 16QAM Low ch.



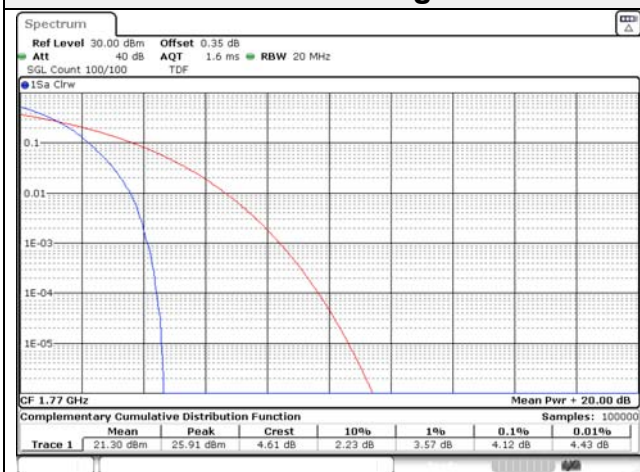
20M BW QPSK Mid ch.



20M BW 16QAM Mid ch.



20M BW QPSK High ch.

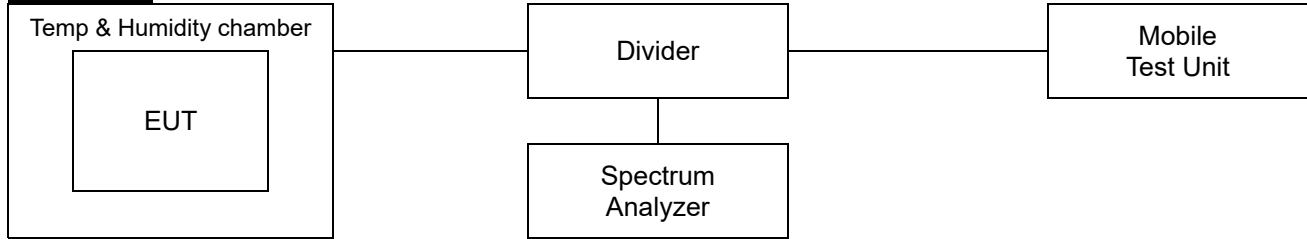


20M BW 16QAM High ch.



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 $+50^{\circ}$ centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
- 2) From -20° to $+50^{\circ}$ 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 MHz 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 $+50^{\circ}$ 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 and RSS-132(5.3),

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

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According to §24.235 and RSS-133(6.3),

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 and RSS-130(4.5),

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

According to §27.54 and RSS-139(6.4),

The frequency stability shall be sufficient to ensure that the fundamental emissions stay 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.

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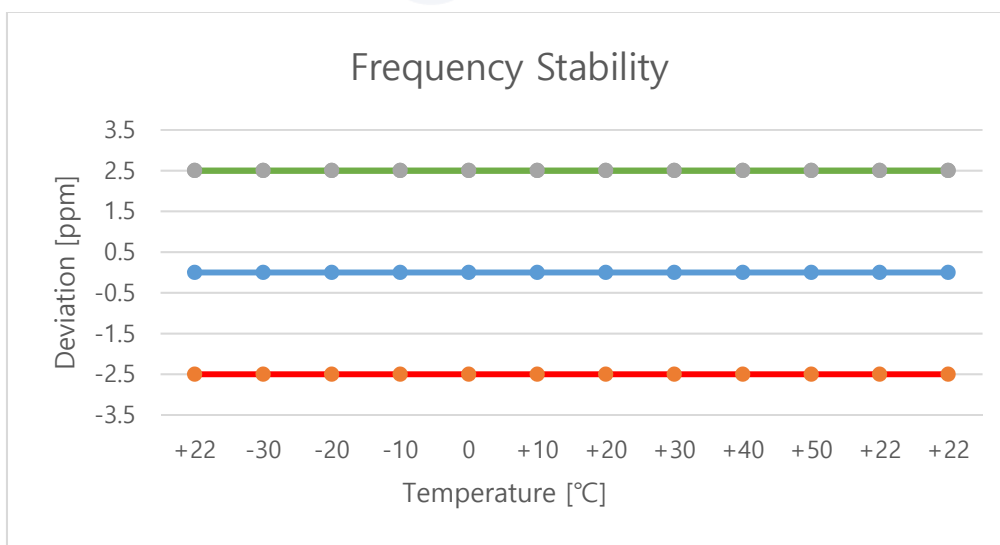
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Test results

Test mode : LTE Band 2
Frequency (Hz) : 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.
Deviation limit(IC) : ± 0.00025% or 2.5ppm

Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	1,879,999,998	-1.96	0.0	0.000000
		-30	1,879,999,998	-1.88	0.0	0.000000
		-20	1,879,999,998	-1.86	0.0	0.000000
		-10	1,879,999,998	-1.78	0.0	0.000000
		0	1,879,999,998	-1.66	0.0	0.000000
		+10	1,879,999,999	-1.24	0.0	0.000000
		+20	1,879,999,999	-1.10	0.0	0.000000
		+30	1,879,999,999	-1.25	0.0	0.000000
		+40	1,879,999,999	-0.88	0.0	0.000000
		+50	1,879,999,999	-0.75	0.0	0.000000
115%	4.46	+22(Ref)	1,880,000,001	1.10	0.0	0.000000
End point	3.40	+22(Ref)	1,880,000,001	0.97	0.0	0.000000



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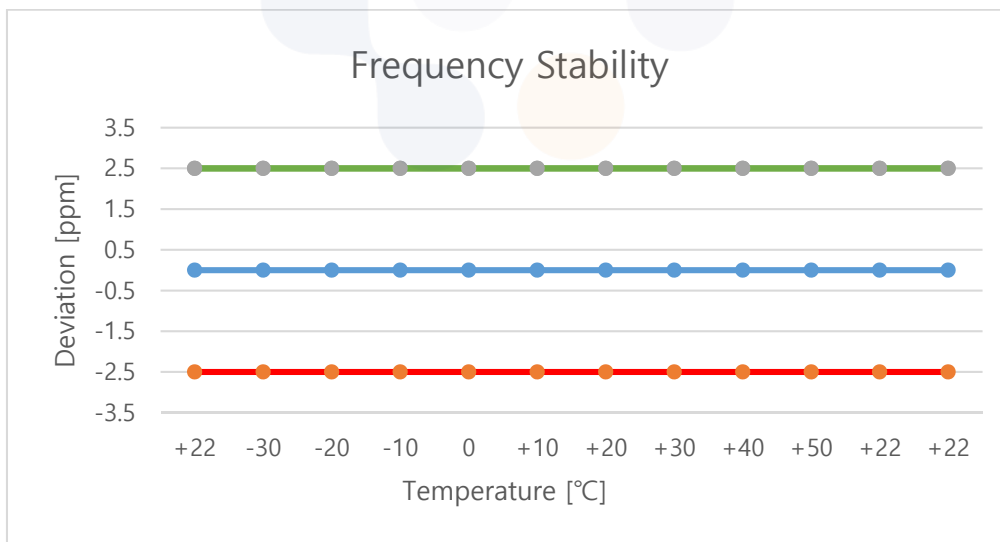
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Test mode : LTE Band 5
Frequency (Hz) : 836 500 000
Channel : 20525
Deviation limit : ±0.00025% or 2.5ppm

Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	836,500,002	1.80	0.0	0.000000
		-30	836,500,002	1.85	0.0	0.000000
		-20	836,500,002	1.93	0.0	0.000000
		-10	836,500,002	1.82	0.0	0.000000
		0	836,500,002	1.77	0.0	0.000000
		+10	836,500,002	1.69	0.0	0.000000
		+20	836,500,002	1.52	0.0	0.000000
		+30	836,500,001	1.35	0.0	0.000000
		+40	836,500,001	1.39	0.0	0.000000
		+50	836,500,001	1.29	0.0	0.000000
115%	4.46	+22(Ref)	836,500,001	1.24	0.0	0.000000
End point	3.40	+22(Ref)	836,500,001	1.04	0.0	0.000000



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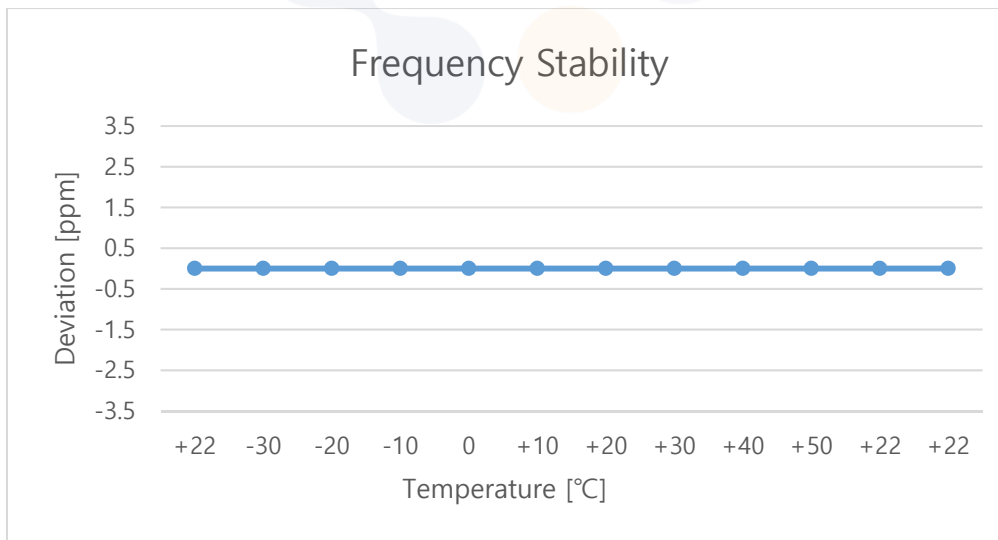
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Test mode : LTE Band 12
 Frequency (Hz) : 707 500 000
 Channel : 23095
 Deviation limit(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized bands of operation

Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	707,500,001	0.82	0.0	0.000000
		-30	707,500,001	0.99	0.0	0.000000
		-20	707,500,001	1.24	0.0	0.000000
		-10	707,500,001	1.35	0.0	0.000000
		0	707,500,001	1.45	0.0	0.000000
		+10	707,500,002	1.66	0.0	0.000000
		+20	707,500,002	1.51	0.0	0.000000
		+30	707,500,002	1.98	0.0	0.000000
		+40	707,500,002	2.13	0.0	0.000000
		+50	707,500,002	2.44	0.0	0.000000
115%	4.46	+22(Ref)	707,500,003	3.32	0.0	0.000000
End point	3.40	+22(Ref)	707,500,001	1.42	0.0	0.000000



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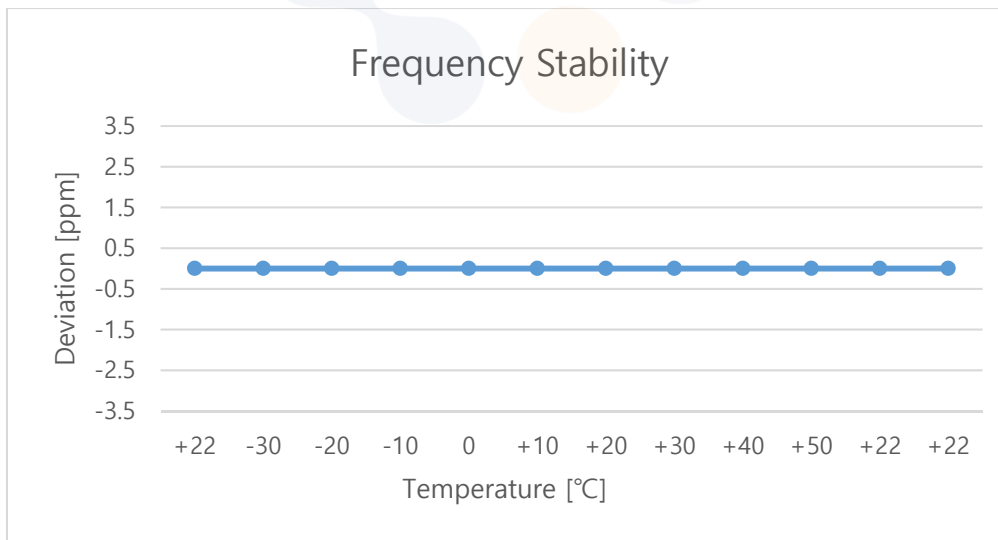
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Test mode : LTE Band 13
 Frequency (Hz) : 782 000 000
 Channel : 23230
 Deviation limit(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized bands of operation

Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	782,000,002	1.62	0.0	0.000000
		-30	782,000,002	1.55	0.0	0.000000
		-20	782,000,002	1.74	0.0	0.000000
		-10	782,000,002	1.89	0.0	0.000000
		0	782,000,001	1.33	0.0	0.000000
		+10	782,000,002	1.77	0.0	0.000000
		+20	782,000,002	2.11	0.0	0.000000
		+30	782,000,002	2.05	0.0	0.000000
		+40	782,000,002	1.83	0.0	0.000000
		+50	782,000,001	0.83	0.0	0.000000
115%	4.46	+22(Ref)	781,999,999	-1.02	0.0	0.000000
End point	3.40	+22(Ref)	782,000,002	2.17	0.0	0.000000



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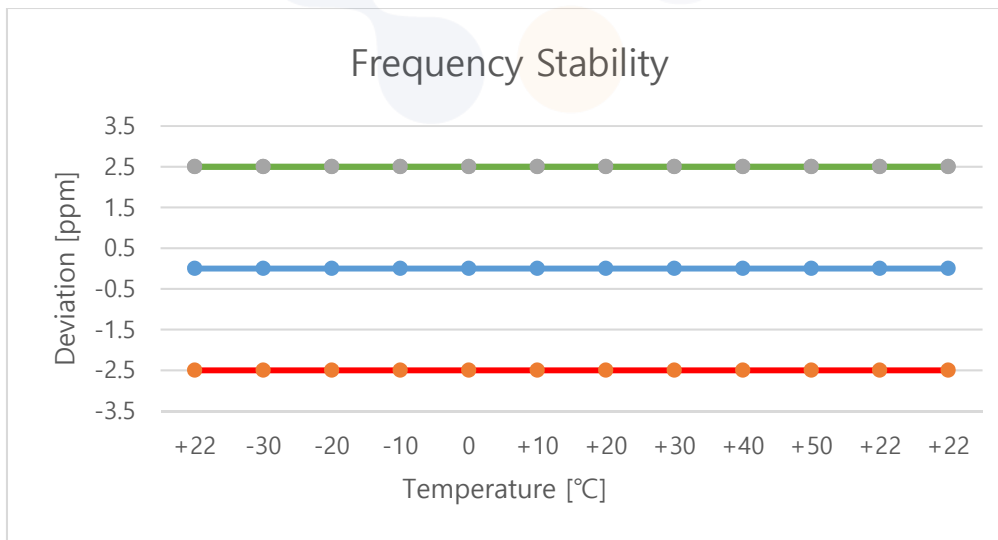
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Test mode : LTE Band 25
 Frequency (Hz) : 1 882 500 000
 Channel : 26365
 Deviation limit(FCC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	1,882,499,998	-1.77	0.0	0.000000
		-30	1,882,499,998	-1.65	0.0	0.000000
		-20	1,882,499,998	-1.53	0.0	0.000000
		-10	1,882,499,999	-1.28	0.0	0.000000
		0	1,882,499,998	-1.66	0.0	0.000000
		+10	1,882,499,999	-1.14	0.0	0.000000
		+20	1,882,499,998	-1.83	0.0	0.000000
		+30	1,882,499,999	-1.23	0.0	0.000000
		+40	1,882,499,999	-0.88	0.0	0.000000
		+50	1,882,499,999	-0.74	0.0	0.000000
115%	4.46	+22(Ref)	1,882,499,998	-1.95	0.0	0.000000
End point	3.40	+22(Ref)	1,882,500,002	1.69	0.0	0.000000



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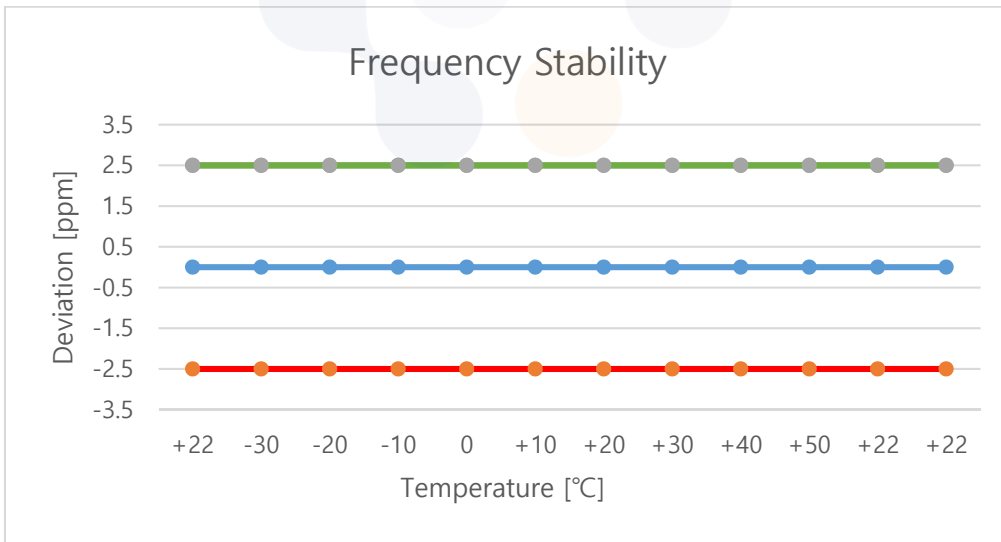
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Test mode : LTE Band 26
 Frequency (Hz) : 836 500 000
 Channel : 26915
 Deviation limit(FCC) : ±0.00025% or 2.5ppm

Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	836,499,998	-1.79	0.0	0.000000
		-30	836,499,998	-1.88	0.0	0.000000
		-20	836,499,998	-1.94	0.0	0.000000
		-10	836,499,998	-1.76	0.0	0.000000
		0	836,499,998	-1.65	0.0	0.000000
		+10	836,499,998	-1.54	0.0	0.000000
		+20	836,499,999	-1.12	0.0	0.000000
		+30	836,499,999	-0.98	0.0	0.000000
		+40	836,499,999	-0.87	0.0	0.000000
		+50	836,499,999	-0.83	0.0	0.000000
115%	4.46	+22(Ref)	836,500,002	1.66	0.0	0.000000
End point	3.40	+22(Ref)	836,500,001	0.94	0.0	0.000000



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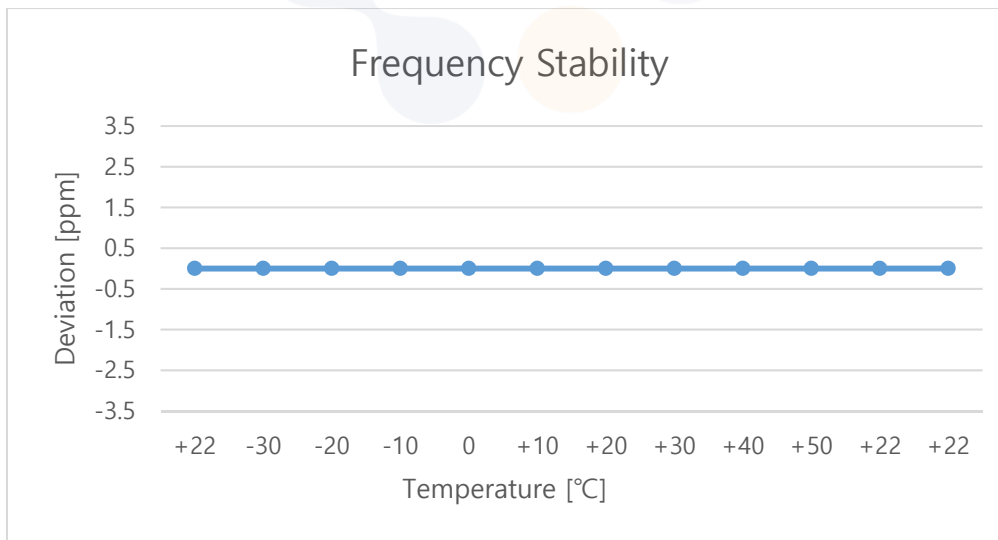
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Test mode : LTE Band 66/4
 Frequency (Hz) : 1 745 000 000
 Channel : 132322
 Deviation limit(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized bands of operation.

Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	1,745,000,001	0.62	0.0	0.000000
		-30	1,744,999,998	-1.55	0.0	0.000000
		-20	1,744,999,998	-1.64	0.0	0.000000
		-10	1,744,999,998	-1.71	0.0	0.000000
		0	1,744,999,999	-1.10	0.0	0.000000
		+10	1,744,999,999	-0.88	0.0	0.000000
		+20	1,744,999,999	-1.34	0.0	0.000000
		+30	1,744,999,998	-1.52	0.0	0.000000
		+40	1,744,999,999	-1.06	0.0	0.000000
		+50	1,744,999,999	-1.28	0.0	0.000000
115%	4.46	+22(Ref)	1,744,999,999	-1.22	0.0	0.000000
End point	3.40	+22(Ref)	1,744,999,998	-2.12	0.0	0.000000



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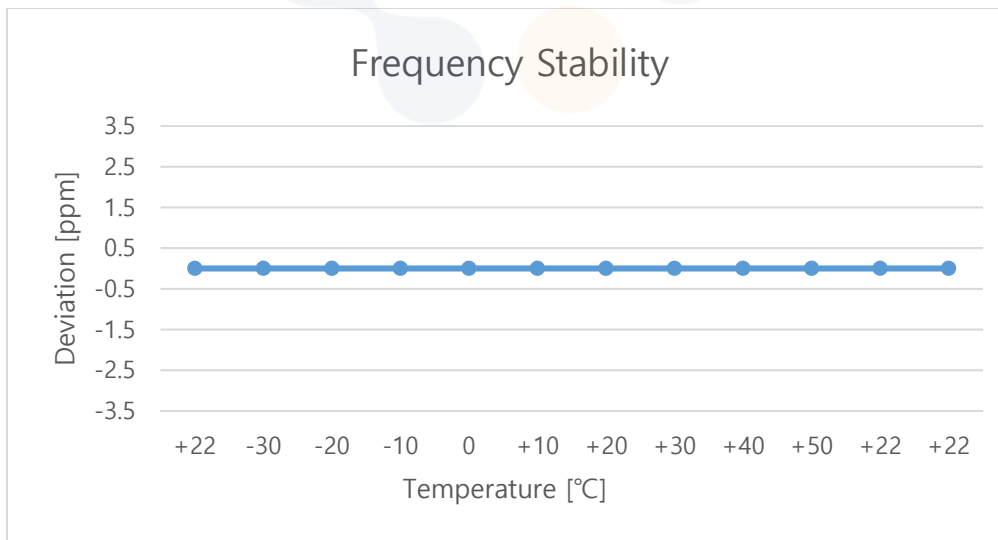
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Test mode : LTE Band 71
 Frequency (Hz) : 680 500 000
 Channel : 133297
 Deviation limit(FCC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized bands of operation.

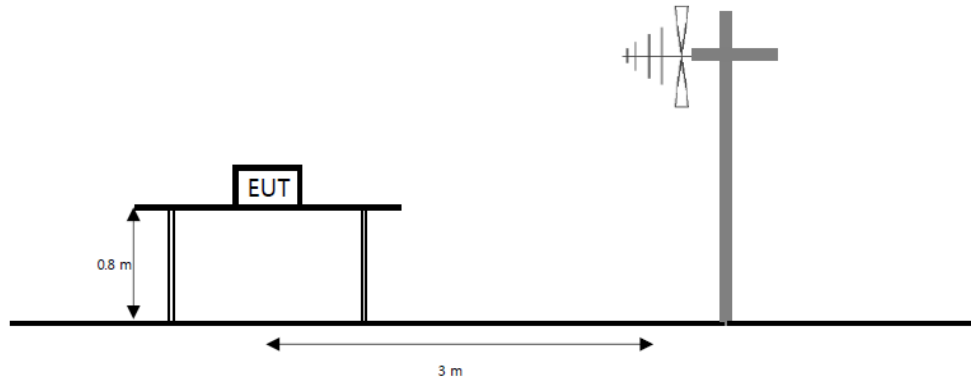
Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	3.88	+22(Ref)	680,500,002	2.35	0.0	0.000000
		-30	680,500,002	2.11	0.0	0.000000
		-20	680,500,002	2.06	0.0	0.000000
		-10	680,500,002	1.88	0.0	0.000000
		0	680,500,001	1.45	0.0	0.000000
		+10	680,499,999	-1.25	0.0	0.000000
		+20	680,499,999	-1.18	0.0	0.000000
		+30	680,499,999	-0.85	0.0	0.000000
		+40	680,500,001	1.37	0.0	0.000000
		+50	680,500,002	1.66	0.0	0.000000
115%	4.46	+22	680,500,000	-0.37	0.0	0.000000
End point	3.40	+22	680,500,001	1.49	0.0	0.000000



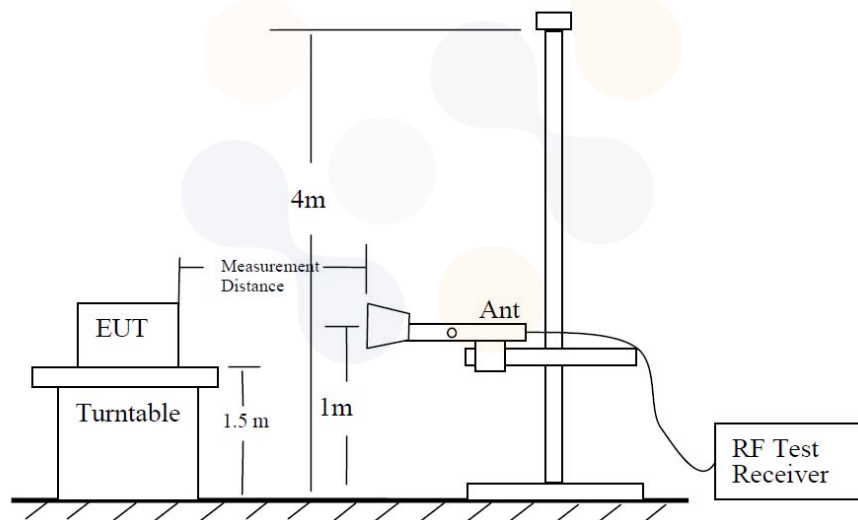
7.7. Radiated Power (ERP/EIRP)

Test setup

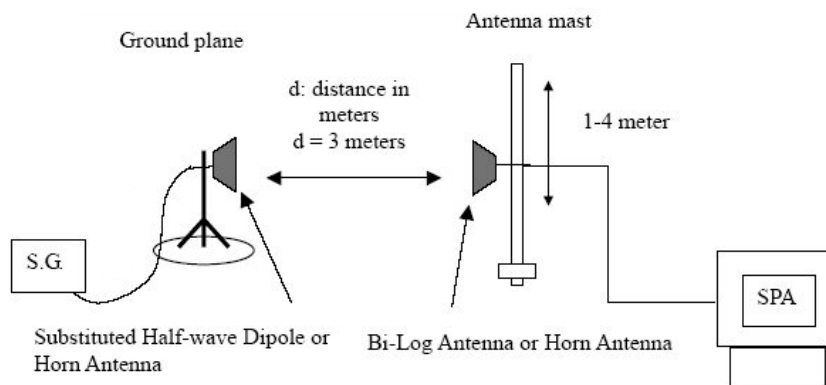
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



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



The diagram below shows the test setup for substituted method.



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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 RSS-132(5.4), the equivalent isotropically radiated power (e.i.r.p) for mobile equipment shall not exceed 11.5 watts. Refer to SRSP-503 for base stations e.i.r.p limits.

According to §24.232(c) and RSS-133(6.4), 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) and RSS-130(4.6), Portable stations (hand-held devices) in the 698 -746 MHz, 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited 3 watts ERP.

According to §27.50(d)(4) and RSS-139(6.5), Fixed, mobile and portable (hand-held) stations operating in the 1710-1755 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

Test procedure

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

Test settings

- 1) RBW = 1 % to 5 % of the OBW.
- 2) VBW $\geq 3 \times$ RBW.
- 3) SPAN = 2 \times to 3 \times the OBW.
- 4) Number of measurement points in sweep $\geq 2 \times$ span / RBW.
- 5) Sweep time :
 - 1) Auto couple, or
 - 2) $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission period})]$ 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.

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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 GHz below) or horn antenna (1 GHz above) connected to a signal generator.
The power is calculated by the following formula;
$$Pd(\text{dBm}) = Pg(\text{dBm}) - \text{Cable loss (dB)} + \text{Antenna gain (dB)}$$

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 dBm, 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.

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**Test results****Test mode: LTE Band 2**

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	1 850.7	V	5.46	7.66	15.35	13.15	0.021
		1 880.0	V	5.39	7.76	15.32	12.95	0.020
		1 909.3	V	5.32	7.84	15.94	13.42	0.022
	16QAM	1 850.7	V	5.46	7.66	14.00	11.80	0.015
		1 880.0	V	5.39	7.76	14.40	12.03	0.016
		1 909.3	V	5.32	7.84	14.94	12.42	0.017
3 M	QPSK	1 851.5	V	5.46	7.66	16.02	13.82	0.024
		1 880.0	V	5.39	7.76	16.81	14.44	0.028
		1 908.5	V	5.32	7.84	16.27	13.75	0.024
	16QAM	1 851.5	V	5.46	7.66	15.13	12.93	0.020
		1 880.0	V	5.39	7.76	15.42	13.05	0.020
		1 908.5	V	5.32	7.84	15.10	12.58	0.018
5 M	QPSK	1 852.5	V	5.45	7.66	15.66	13.45	0.022
		1 880.0	V	5.39	7.76	15.49	13.12	0.021
		1 907.5	V	5.32	7.84	14.53	12.01	0.016
	16QAM	1 852.5	V	5.45	7.66	14.71	12.50	0.018
		1 880.0	V	5.39	7.76	14.47	12.10	0.016
		1 907.5	V	5.32	7.84	13.43	10.91	0.012
10 M	QPSK	1 855.0	V	5.45	7.66	14.98	12.77	0.019
		1 880.0	V	5.39	7.76	14.77	12.40	0.017
		1 905.0	V	5.33	7.84	14.59	12.08	0.016
	16QAM	1 855.0	V	5.45	7.66	13.84	11.63	0.015
		1 880.0	V	5.39	7.76	13.92	11.55	0.014
		1 905.0	V	5.33	7.84	13.63	11.12	0.013
15 M	QPSK	1 857.5	V	5.44	7.69	14.15	11.90	0.015
		1 880.0	V	5.39	7.76	13.72	11.35	0.014
		1 902.5	V	5.33	7.84	15.17	12.66	0.018
	16QAM	1 857.5	V	5.44	7.69	13.29	11.04	0.013
		1 880.0	V	5.39	7.76	12.92	10.55	0.011
		1 902.5	V	5.33	7.84	13.76	11.25	0.013
20 M	QPSK	1 860.0	V	5.44	7.70	15.28	13.02	0.020
		1 880.0	V	5.39	7.76	14.58	12.21	0.017
		1 900.0	V	5.34	7.86	15.04	12.52	0.018
	16QAM	1 860.0	V	5.44	7.70	14.00	11.74	0.015
		1 880.0	V	5.39	7.76	14.04	11.67	0.015
		1 900.0	V	5.34	7.86	14.22	11.70	0.015

Note.

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

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**Test mode: LTE Band 5**

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP		EIRP ^{Note.1}	
		[MHz]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]	[dBm]	[W]
1.4 M	QPSK	824.7	H	-1.98	5.03	19.42	12.41	0.017	14.56	0.029
		836.5	H	-2.43	5.13	19.14	11.58	0.014	13.73	0.024
		848.3	H	-2.78	5.18	18.72	10.76	0.012	12.91	0.020
	16QAM	824.7	H	-1.98	5.03	18.07	11.06	0.013	13.21	0.021
		836.5	H	-2.43	5.13	18.08	10.52	0.011	12.67	0.018
		848.3	H	-2.78	5.18	17.82	9.86	0.010	12.01	0.016
3 M	QPSK	825.5	H	-1.90	5.04	19.70	12.76	0.019	14.91	0.031
		836.5	H	-2.43	5.13	19.53	11.97	0.016	14.12	0.026
		847.5	H	-2.80	5.18	18.79	10.81	0.012	12.96	0.020
	16QAM	825.5	H	-1.90	5.04	18.59	11.65	0.015	13.80	0.024
		836.5	H	-2.43	5.13	18.57	11.01	0.013	13.16	0.021
		847.5	H	-2.80	5.18	17.39	9.41	0.009	11.56	0.014
5 M	QPSK	826.5	H	-1.80	5.05	19.62	12.77	0.019	14.92	0.031
		836.5	H	-2.43	5.13	19.53	11.97	0.016	14.12	0.026
		846.5	H	-2.82	5.17	19.00	11.01	0.013	13.16	0.021
	16QAM	826.5	H	-1.80	5.05	18.62	11.77	0.015	13.92	0.025
		836.5	H	-2.43	5.13	18.80	11.24	0.013	13.39	0.022
		846.5	H	-2.82	5.17	17.59	9.60	0.009	11.75	0.015
10 M	QPSK	829.0	H	-1.55	5.07	19.90	13.28	0.021	15.43	0.035
		836.5	H	-2.43	5.13	19.85	12.29	0.017	14.44	0.028
		844.0	H	-2.87	5.16	19.13	11.10	0.013	13.25	0.021
	16QAM	829.0	H	-1.55	5.07	19.28	12.66	0.018	14.81	0.030
		836.5	H	-2.43	5.13	18.94	11.38	0.014	13.53	0.023
		844.0	H	-2.87	5.16	17.99	9.96	0.010	12.11	0.016

Note.

1. The E.I.R.P conversion formula for IC : E.I.R.P result (dBm)

$$= \text{E.R.P result (dBm)} + 2.15 \text{ (dB)}$$

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

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**Test mode: LTE Band 12**

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[MHz]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	699.7	H	-2.85	4.56	19.31	11.90	0.015
		707.5	H	-2.55	4.60	18.96	11.81	0.015
		715.3	H	-2.66	4.63	18.92	11.63	0.015
	16QAM	699.7	H	-2.85	4.56	18.07	10.66	0.012
		707.5	H	-2.55	4.60	18.06	10.91	0.012
		715.3	H	-2.66	4.63	18.05	10.76	0.012
3 M	QPSK	700.5	H	-2.83	4.56	18.97	11.58	0.014
		707.5	H	-2.55	4.60	18.83	11.68	0.015
		714.5	H	-2.63	4.62	19.19	11.94	0.016
	16QAM	700.5	H	-2.83	4.56	18.04	10.65	0.012
		707.5	H	-2.55	4.60	17.95	10.80	0.012
		714.5	H	-2.63	4.62	17.80	10.55	0.011
5 M	QPSK	701.5	H	-2.79	4.57	19.19	11.83	0.015
		707.5	H	-2.55	4.60	18.86	11.71	0.015
		713.5	H	-2.59	4.62	19.14	11.93	0.016
	16QAM	701.5	H	-2.79	4.57	18.02	10.66	0.012
		707.5	H	-2.55	4.60	17.94	10.79	0.012
		713.5	H	-2.59	4.62	18.20	10.99	0.013
10 M	QPSK	704.0	H	-2.69	4.59	19.03	11.75	0.015
		707.5	H	-2.55	4.60	18.88	11.73	0.015
		711.0	H	-2.49	4.62	19.67	12.56	0.018
	16QAM	704.0	H	-2.69	4.59	18.04	10.76	0.012
		707.5	H	-2.55	4.60	17.84	10.69	0.012
		711.0	H	-2.49	4.62	18.59	11.48	0.014

Test mode: LTE Band 13

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[MHz]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
5 M	QPSK	779.5	H	-1.57	4.81	19.50	13.12	0.021
		782.0	H	-1.65	4.82	19.47	13.00	0.020
		784.5	H	-1.78	4.82	19.76	13.16	0.021
	16QAM	779.5	H	-1.57	4.81	18.24	11.86	0.015
		782.0	H	-1.65	4.82	18.52	12.05	0.016
		784.5	H	-1.78	4.82	18.35	11.75	0.015
10 M	QPSK	782.0	H	-1.65	4.82	19.72	13.25	0.021
	16QAM	782.0	H	-1.65	4.82	18.31	11.84	0.015

Note.

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

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**Test mode: LTE Band 25**

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	1 850.7	V	5.46	7.66	15.10	12.90	0.019
		1 882.5	V	5.38	7.76	14.74	12.36	0.017
		1 914.3	V	5.31	7.82	15.57	13.05	0.020
	16QAM	1 850.7	V	5.46	7.66	14.11	11.91	0.016
		1 882.5	V	5.38	7.76	13.70	11.32	0.014
		1 914.3	V	5.31	7.82	14.68	12.16	0.016
3 M	QPSK	1 851.5	V	5.46	7.66	15.21	13.01	0.020
		1 882.5	V	5.38	7.76	15.18	12.80	0.019
		1 913.5	V	5.31	7.82	15.48	12.97	0.020
	16QAM	1 851.5	V	5.46	7.66	14.28	12.08	0.016
		1 882.5	V	5.38	7.76	14.07	11.69	0.015
		1 913.5	V	5.31	7.82	14.58	12.07	0.016
5 M	QPSK	1 852.5	V	5.45	7.66	14.61	12.40	0.017
		1 882.5	V	5.38	7.76	15.29	12.91	0.020
		1 912.5	V	5.31	7.82	15.64	13.13	0.021
	16QAM	1 852.5	V	5.45	7.66	13.39	11.18	0.013
		1 882.5	V	5.38	7.76	14.32	11.94	0.016
		1 912.5	V	5.31	7.82	14.95	12.44	0.018
10 M	QPSK	1 855.0	V	5.45	7.66	15.52	13.31	0.021
		1 882.5	V	5.38	7.76	15.69	13.31	0.021
		1 910.0	V	5.32	7.82	16.90	14.40	0.028
	16QAM	1 855.0	V	5.45	7.66	14.31	12.10	0.016
		1 882.5	V	5.38	7.76	14.60	12.22	0.017
		1 910.0	V	5.32	7.82	15.69	13.19	0.021
15 M	QPSK	1 857.5	V	5.44	7.69	14.89	12.64	0.018
		1 882.5	V	5.38	7.76	15.39	13.01	0.020
		1 907.5	V	5.32	7.84	14.67	12.15	0.016
	16QAM	1 857.5	V	5.44	7.69	13.74	11.49	0.014
		1 882.5	V	5.38	7.76	14.44	12.06	0.016
		1 907.5	V	5.32	7.84	13.77	11.25	0.013
20 M	QPSK	1 860.0	V	5.44	7.70	14.90	12.64	0.018
		1 882.5	V	5.38	7.76	15.19	12.81	0.019
		1 905.0	V	5.33	7.84	15.36	12.85	0.019
	16QAM	1 860.0	V	5.44	7.70	14.03	11.77	0.015
		1 882.5	V	5.38	7.76	14.18	11.80	0.015
		1 905.0	V	5.33	7.84	14.18	11.67	0.015

Note.

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

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**Test mode: LTE Band 26**

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[MHz]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	824.7	H	-1.98	5.03	19.99	12.98	0.020
		836.5	H	-2.43	5.13	19.25	11.69	0.015
		848.3	H	-2.78	5.18	17.96	10.00	0.010
	16QAM	824.7	H	-1.98	5.03	18.66	11.65	0.015
		836.5	H	-2.43	5.13	17.84	10.28	0.011
		848.3	H	-2.78	5.18	16.62	8.66	0.007
3 M	QPSK	825.5	H	-1.90	5.04	19.86	12.92	0.020
		836.5	H	-2.43	5.13	19.40	11.84	0.015
		847.5	H	-2.80	5.18	17.87	9.89	0.010
	16QAM	825.5	H	-1.90	5.04	18.55	11.61	0.014
		836.5	H	-2.43	5.13	18.12	10.56	0.011
		847.5	H	-2.80	5.18	16.68	8.70	0.007
5 M	QPSK	826.5	H	-1.80	5.05	19.82	12.97	0.020
		836.5	H	-2.43	5.13	19.31	11.75	0.015
		846.5	H	-2.82	5.17	18.21	10.22	0.011
	16QAM	826.5	H	-1.80	5.05	18.53	11.68	0.015
		836.5	H	-2.43	5.13	18.17	10.61	0.012
		846.5	H	-2.82	5.17	17.00	9.01	0.008
10 M	QPSK	829.0	H	-1.55	5.07	19.77	13.15	0.021
		836.5	H	-2.43	5.13	19.21	11.65	0.015
		844.0	H	-2.87	5.16	17.59	9.56	0.009
	16QAM	829.0	H	-1.55	5.07	18.59	11.97	0.016
		836.5	H	-2.43	5.13	18.05	10.49	0.011
		844.0	H	-2.87	5.16	16.45	8.42	0.007
15 M	QPSK	831.5	H	-1.68	5.10	19.74	12.96	0.020
		836.5	H	-2.43	5.13	19.80	12.24	0.017
		841.5	H	-2.92	5.17	18.74	10.65	0.012
	16QAM	831.5	H	-1.68	5.10	18.48	11.70	0.015
		836.5	H	-2.43	5.13	18.49	10.93	0.012
		841.5	H	-2.92	5.17	17.38	9.29	0.008

Note.

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

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**Test mode: LTE Band 66/4**

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
1.4 M	QPSK	1 710.7	V	5.79	7.39	14.01	12.41	0.017
		1 745.0	V	5.71	7.42	12.57	10.86	0.012
		1 779.3	V	5.63	7.54	12.73	10.82	0.012
	16QAM	1 710.7	V	5.79	7.39	13.16	11.56	0.014
		1 745.0	V	5.71	7.42	11.40	9.69	0.009
		1 779.3	V	5.63	7.54	11.94	10.03	0.010
3 M	QPSK	1 711.5	V	5.79	7.38	14.32	12.73	0.019
		1 745.0	V	5.71	7.42	12.65	10.94	0.012
		1 778.5	V	5.63	7.54	12.27	10.36	0.011
	16QAM	1 711.5	V	5.79	7.38	13.31	11.72	0.015
		1 745.0	V	5.71	7.42	11.46	9.75	0.009
		1 778.5	V	5.63	7.54	11.12	9.21	0.008
5 M	QPSK	1 712.5	V	5.79	7.39	14.06	12.46	0.018
		1 745.0	V	5.71	7.42	12.26	10.55	0.011
		1 777.5	V	5.63	7.52	13.23	11.34	0.014
	16QAM	1 712.5	V	5.79	7.39	13.01	11.41	0.014
		1 745.0	V	5.71	7.42	11.23	9.52	0.009
		1 777.5	V	5.63	7.52	12.24	10.35	0.011
10 M	QPSK	1 715.0	V	5.78	7.39	13.60	11.99	0.016
		1 745.0	V	5.71	7.42	12.41	10.70	0.012
		1 775.0	V	5.64	7.52	14.16	12.28	0.017
	16QAM	1 715.0	V	5.78	7.39	12.97	11.36	0.014
		1 745.0	V	5.71	7.42	11.26	9.55	0.009
		1 775.0	V	5.64	7.52	13.07	11.19	0.013
15 M	QPSK	1 717.5	V	5.78	7.39	13.84	12.23	0.017
		1 745.0	V	5.71	7.42	12.62	10.91	0.012
		1 772.5	V	5.65	7.51	13.95	12.09	0.016
	16QAM	1 717.5	V	5.78	7.39	12.65	11.04	0.013
		1 745.0	V	5.71	7.42	11.35	9.64	0.009
		1 772.5	V	5.65	7.51	13.04	11.18	0.013
20 M	QPSK	1 720.0	V	5.77	7.40	13.59	11.96	0.016
		1 745.0	V	5.71	7.42	12.40	10.69	0.012
		1 770.0	V	5.65	7.51	13.22	11.36	0.014
	16QAM	1 720.0	V	5.77	7.40	12.55	10.92	0.012
		1 745.0	V	5.71	7.42	11.48	9.77	0.009
		1 770.0	V	5.65	7.51	12.23	10.37	0.011

Note.

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

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**Test mode: LTE Band 71**

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[MHz]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
5 M	QPSK	665.50	H	-3.24	4.48	17.22	9.50	0.009
		680.50	H	-3.04	4.48	17.87	10.35	0.011
		695.50	H	-2.85	4.55	17.65	10.25	0.011
	16QAM	665.50	H	-3.24	4.48	15.93	8.21	0.007
		680.50	H	-3.04	4.48	16.61	9.09	0.008
		695.50	H	-2.85	4.55	16.53	9.13	0.008
10 M	QPSK	668.00	H	-3.41	4.49	17.34	9.44	0.009
		680.50	H	-3.04	4.48	17.96	10.44	0.011
		693.00	H	-2.85	4.54	17.98	10.59	0.011
	16QAM	668.00	H	-3.41	4.49	16.44	8.54	0.007
		680.50	H	-3.04	4.48	16.72	9.20	0.008
		693.00	H	-2.85	4.54	16.82	9.43	0.009
15 M	QPSK	670.50	H	-3.53	4.49	17.50	9.48	0.009
		680.50	H	-3.04	4.48	17.92	10.40	0.011
		690.50	H	-2.85	4.54	17.84	10.45	0.011
	16QAM	670.50	H	-3.53	4.49	16.42	8.40	0.007
		680.50	H	-3.04	4.48	16.73	9.21	0.008
		690.50	H	-2.85	4.54	16.58	9.19	0.008
20 M	QPSK	673.00	H	-3.40	4.49	17.29	9.40	0.009
		680.50	H	-3.04	4.48	17.52	10.00	0.010
		688.00	H	-2.89	4.53	17.55	10.13	0.010
	16QAM	673.00	H	-3.40	4.49	16.04	8.15	0.007
		680.50	H	-3.04	4.48	16.39	8.87	0.008
		688.00	H	-2.89	4.53	16.32	8.90	0.008

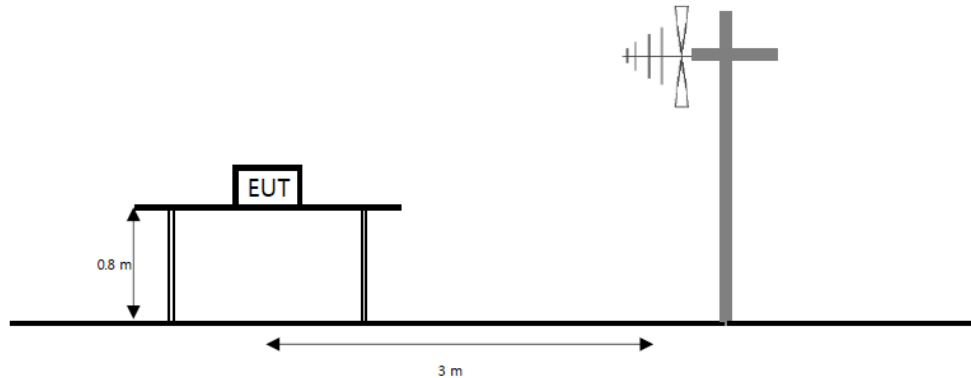
Note.

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

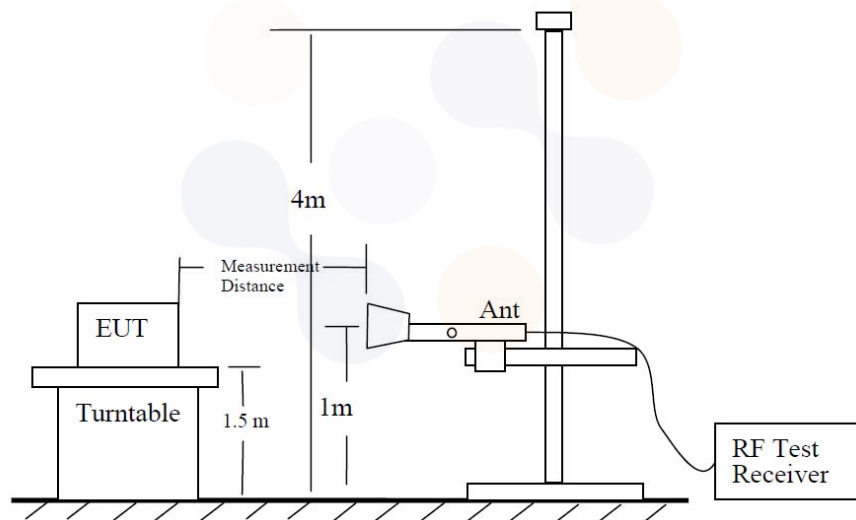
7.8. Radiated Spurious Emissions

Test setup

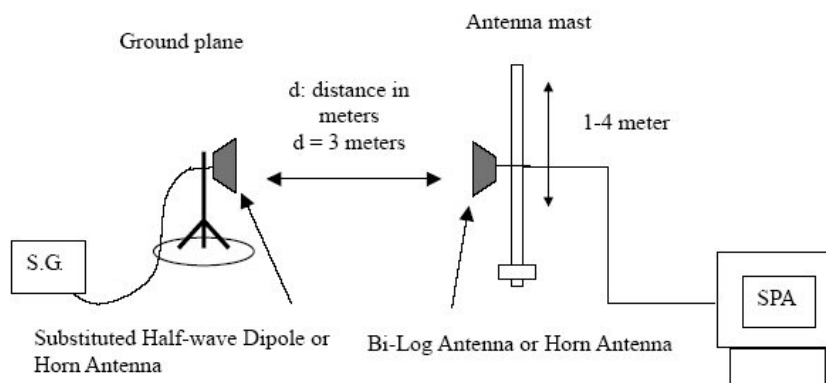
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



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



The diagram below shows the test setup for substituted method.



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Limit

According to §22.917(a), §24.238(a) and RSS-132(5.5), RSS-133(6.5), 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 $43 + 10\log(P_{\text{[Watts]}})$ dB.

According to §27.53(c)(2) and RSS-130(4.7), on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10\log(P_{\text{[Watts]}})$ dB.

According to §27.53(f), for operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz 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) and RSS-130(4.7), for operations in the 600 MHz band and the 698-746 MHz 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 $43 + 10\log(P_{\text{[Watts]}})$ dB.

According to §27.53(h) and RSS-139(6.6), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10\log(P_{\text{[Watts]}})$ dB.

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

For the narrowband spurious settings:

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

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**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 GHz below) or horn antenna (1 GHz 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 dBm, 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.

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**Test results (Above 1 000 MHz)**Test mode : LTE Band 2Frequency(MHz) : 1 851.5Channel : 18615Bandwidth(MHz) : 3

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 700.24	V	8.54	11.36	-54.08	-56.90	-13.00	43.90
	5 547.56	V	10.51	13.87	-53.84	-57.20	-13.00	44.20
	7 401.25	H	11.96	16.00	-51.36	-55.40	-13.00	42.40
	9 253.03	H	13.20	17.90	-48.50	-53.20	-13.00	40.20

Test mode : LTE Band 2Frequency(MHz) : 1 880.0Channel : 18900Bandwidth(MHz) : 3

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 760.25	V	8.61	11.26	-55.85	-58.50	-13.00	45.50
	5 640.75	V	10.53	13.84	-53.69	-57.00	-13.00	44.00
	7 522.53	V	12.12	16.18	-50.94	-55.00	-13.00	42.00
	9 401.76	H	13.20	18.04	-48.76	-53.60	-13.00	40.60

Test mode : LTE Band 2Frequency(MHz) : 1 908.5Channel : 19185Bandwidth(MHz) : 3

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 818.97	H	8.68	11.63	-56.45	-59.40	-13.00	46.40
	5 724.37	V	10.54	13.92	-53.02	-56.40	-13.00	43.40
	7 633.60	V	12.21	16.40	-51.61	-55.80	-13.00	42.80
	9 541.55	V	13.19	18.36	-48.33	-53.50	-13.00	40.50

Note.

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

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Test mode : LTE Band 5

Frequency(MHz) : 829

Channel : 20450

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 649.06	V	5.94	7.27	-53.57	-54.90	-13.00	41.90
	2 473.72	V	6.14	8.90	-54.54	-57.30	-13.00	44.30
	3 297.96	H	7.73	10.55	-55.18	-58.00	-13.00	45.00
	4 123.03	H	8.83	11.94	-48.29	-51.40	-13.00	38.40

Test mode : LTE Band 5

Frequency(MHz) : 836.5

Channel : 20525

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 664.24	V	5.91	7.22	-53.79	-55.10	-13.00	42.10
	2 496.28	V	6.19	8.94	-49.05	-51.80	-13.00	38.80
	3 328.32	H	7.82	10.61	-54.21	-57.00	-13.00	44.00
	4 159.96	H	8.80	11.73	-49.37	-52.30	-13.00	39.30

Test mode : LTE Band 5

Frequency(MHz) : 844

Channel : 20600

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 688.04	V	5.85	7.28	-52.67	-54.10	-13.00	41.10
	2 532.39	H	6.25	8.98	-47.67	-50.40	-13.00	37.40
	3 376.33	H	7.95	10.71	-55.14	-57.90	-13.00	44.90
	4 220.68	H	8.77	11.83	-50.44	-53.50	-13.00	40.50

Note.

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

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Test mode : LTE Band 12

Frequency(MHz) : 704

Channel : 23060

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 399.20	H	5.63	6.66	-55.37	-56.40	-13.00	43.40
	2 098.31	H	5.32	8.16	-53.36	-56.20	-13.00	43.20
	2 798.25	H	6.62	9.54	-49.68	-52.60	-13.00	39.60
	3 498.18	H	8.29	10.95	-52.24	-54.90	-13.00	41.90

Test mode : LTE Band 12

Frequency(MHz) : 707.5

Channel : 23095

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 415.20	H	5.74	6.70	-61.04	-62.00	-13.00	49.00
	2 122.52	H	5.37	8.20	-55.27	-58.10	-13.00	45.10
	2 830.25	H	6.66	9.61	-49.85	-52.80	-13.00	39.80
	3 537.98	H	8.35	11.03	-51.32	-54.00	-13.00	41.00

Test mode : LTE Band 12

Frequency(MHz) : 711

Channel : 23130

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 422.59	H	5.79	6.71	-60.88	-61.80	-13.00	48.80
	2 131.14	V	5.39	8.22	-57.37	-60.20	-13.00	47.20
	2 844.20	V	6.68	9.64	-51.04	-54.00	-13.00	41.00
	3 555.62	H	8.37	10.73	-51.44	-53.80	-13.00	40.80

Note.

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

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Test mode : LTE Band 13

Frequency(MHz) : 782.0

Channel : 23230

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 555.11	V	6.17	6.96	-57.61	-58.40	-13.00	45.40
	2 331.35	V	5.83	8.61	-57.12	-59.90	-13.00	46.90
	3 108.42	H	7.20	10.17	-55.03	-58.00	-13.00	45.00
	3 887.94	H	8.77	11.42	-49.45	-52.10	-13.00	39.10

Test mode : LTE Band 13

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

Channel : 23230

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 571.86	V	6.13	7.01	-57.72	-58.60	-40.00	18.60

Note.

1. Limit Calculation(dBm)= 43 + 10log(P_[Watts])

Limit Calculation of wide-band (dBm/MHz) = -70dBW/MHz (-40 dBm/MHz)

Limit Calculation of narrow-band (dBm) = -80dBW (-50dBm)

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

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Test mode : LTE Band 25

Frequency(MHz) : 1 855

Channel : 26090

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 698.97	H	8.54	11.37	-56.67	-59.50	-13.00	46.50
	5 549.47	V	10.51	13.87	-54.14	-57.50	-13.00	44.50
	7 404.44	V	11.97	16.01	-50.76	-54.80	-13.00	41.80
	9 249.20	V	13.20	17.90	-49.80	-54.50	-13.00	41.50

Test mode : LTE Band 25

Frequency(MHz) : 1 882.5

Channel : 26365

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 764.71	H	8.62	11.26	-56.76	-59.40	-13.00	46.40
	5 647.77	V	10.53	13.85	-53.08	-56.40	-13.00	43.40
	7 530.19	V	12.12	16.19	-50.73	-54.80	-13.00	41.80
	9 413.89	H	13.20	18.06	-49.64	-54.50	-13.00	41.50

Test mode : LTE Band 25

Frequency(MHz) : 1 910

Channel : 26640

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 810.67	H	8.67	11.62	-55.45	-58.40	-13.00	45.40
	5 712.88	H	10.54	13.91	-52.73	-56.10	-13.00	43.10
	7 618.92	H	12.20	16.39	-50.91	-55.10	-13.00	42.10
	9 524.32	V	13.20	18.34	-48.26	-53.40	-13.00	40.40

Note.

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

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Test mode : LTE Band 26

Frequency(MHz) : 829

Channel : 26840

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 649.47	V	5.94	7.27	-53.97	-55.30	-13.00	42.30
	2 473.72	H	6.14	8.90	-51.04	-53.80	-13.00	40.80
	3 298.37	H	7.74	10.55	-55.19	-58.00	-13.00	45.00
	4 123.03	H	8.83	11.94	-48.49	-51.60	-13.00	38.60

Test mode : LTE Band 26

Frequency(MHz) : 836.5

Channel : 26915

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 664.24	V	5.91	7.22	-56.99	-58.30	-13.00	45.30
	2 496.28	H	6.19	8.94	-53.25	-56.00	-13.00	43.00
	3 328.74	H	7.82	10.61	-54.91	-57.70	-13.00	44.70
	4 160.37	H	8.80	11.73	-52.77	-55.70	-13.00	42.70

Test mode : LTE Band 26

Frequency(MHz) : 844

Channel : 26990

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 679.42	V	5.87	7.26	-57.21	-58.60	-13.00	45.60
	2 518.44	H	6.23	8.95	-52.98	-55.70	-13.00	42.70
	3 357.86	V	7.90	10.67	-54.43	-57.20	-13.00	44.20
	4 197.70	H	8.78	11.79	-47.29	-50.30	-13.00	37.30

Note.

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

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Test mode : LTE Band 66/4

Frequency(MHz) : 1 711.5

Channel : 131987

Bandwidth(MHz) : 3

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 425.76	V	8.09	10.81	-56.48	-59.20	-13.00	46.20
	5 140.30	V	10.21	13.49	-54.32	-57.60	-13.00	44.60
	6 850.38	V	11.22	15.52	-51.10	-55.40	-13.00	42.40
	8 564.92	H	13.03	17.40	-49.33	-53.70	-13.00	40.70

Test mode : LTE Band 66/4

Frequency(MHz) : 1 745.0

Channel : 132322

Bandwidth(MHz) : 3

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 487.68	V	8.27	10.93	-55.84	-58.50	-13.00	45.50
	5 229.03	V	10.28	13.38	-53.60	-56.70	-13.00	43.70
	6 975.49	H	11.37	15.63	-50.34	-54.60	-13.00	41.60
	8 718.12	H	13.09	17.74	-50.45	-55.10	-13.00	42.10

Test mode : LTE Band 66/4

Frequency(MHz) : 1 778.5

Channel : 132657

Bandwidth(MHz) : 3

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 557.90	H	8.37	10.74	-56.63	-59.00	-13.00	46.00
	5 331.16	V	10.36	13.61	-52.95	-56.20	-13.00	43.20
	7 104.43	H	11.55	15.66	-50.69	-54.80	-13.00	41.80
	8 887.91	V	13.16	17.61	-49.95	-54.40	-13.00	41.40

Note.

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

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Test mode : LTE Band 71

Frequency(MHz) : 668.0

Channel : 133172

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 345.45	H	5.28	6.50	-59.28	-60.50	-13.00	47.50
	2 020.36	V	5.14	8.01	-56.03	-58.90	-13.00	45.90
	2 691.57	V	6.47	9.33	-57.44	-60.30	-13.00	47.30
	3 362.38	V	7.91	10.68	-55.93	-58.70	-13.00	45.70

Test mode : LTE Band 71

Frequency(MHz) : 680.5

Channel : 133297

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 370.07	H	5.44	6.59	-60.55	-61.70	-13.00	48.70
	2 054.82	H	5.22	8.08	-55.74	-58.60	-13.00	45.60
	2 743.27	V	6.54	9.43	-55.51	-58.40	-13.00	45.40
	3 428.02	V	8.10	10.81	-56.49	-59.20	-13.00	46.20

Test mode : LTE Band 71

Frequency(MHz) : 693.0



Channel : 133422

Bandwidth(MHz) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 374.99	V	5.47	6.60	-61.77	-62.90	-13.00	49.90
	2 063.44	H	5.24	8.09	-56.65	-59.50	-13.00	46.50
	2 752.30	H	6.55	9.45	-56.40	-59.30	-13.00	46.30
	3 438.69	V	8.13	10.83	-56.00	-58.70	-13.00	45.70

Note.

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

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8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Biconical VHF-UHF Broadband Antenna	SCHWARZBECK	VUBA9117	275	24.03.30
Bilog Antenna	ETS.LINDGREN	3143B	00228420	23.09.28
Horn Antenna	ETS.LINDGREN	3117	161225	23.05.04*
Horn Antenna	ETS.LINDGREN	3117	00227509	22.09.27
Horn Antenna	ETS.lindgren	3116	00086632	23.01.25
Horn Antenna	ETS.lindgren	3116	00086635	23.05.04*
High Pass Filter	Wainwright Instruments GmbH	WHKX10-900-1000-15000-40SS	11	22.08.20
High Pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	32	22.08.20
Broadband Amplifier	SONOMA INSTRUMENT	315	300314	23.01.19
Amplifier	LTC MICROWAVE	LLA01185522Q-B	139	22.07.19
Amplifier	L-3 Narda-MITEQ	JS44-18004000-33-8P	2000996	23.01.21
Spectrum Analyzer	AGILENT	N9040B	MY57010132	22.12.31
Wideband Radio Communication Tester	R&S	CMW500	141780	23.03.28
Spectrum Analyzer	R&S	FSV40-N	101462	23.01.06
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
Antenna Stand	innco systems GmbH	AS1500-EP-10kg	N/A	N/A
Antenna Stand	innco systems GmbH	AS1500-EP-10kg	N/A	N/A
Turn Device	innco systems GmbH	DE3700-RH	N/A	N/A

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

End of test report