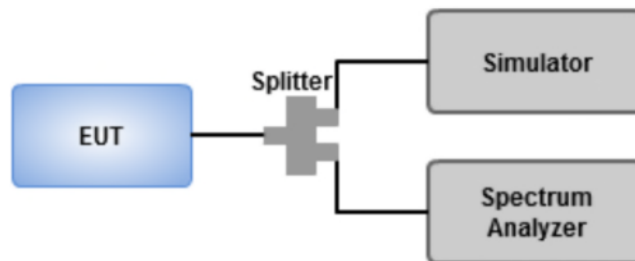


## 3.5 Occupied and 26 dB Bandwidth

### 3.5.1 Test Procedures

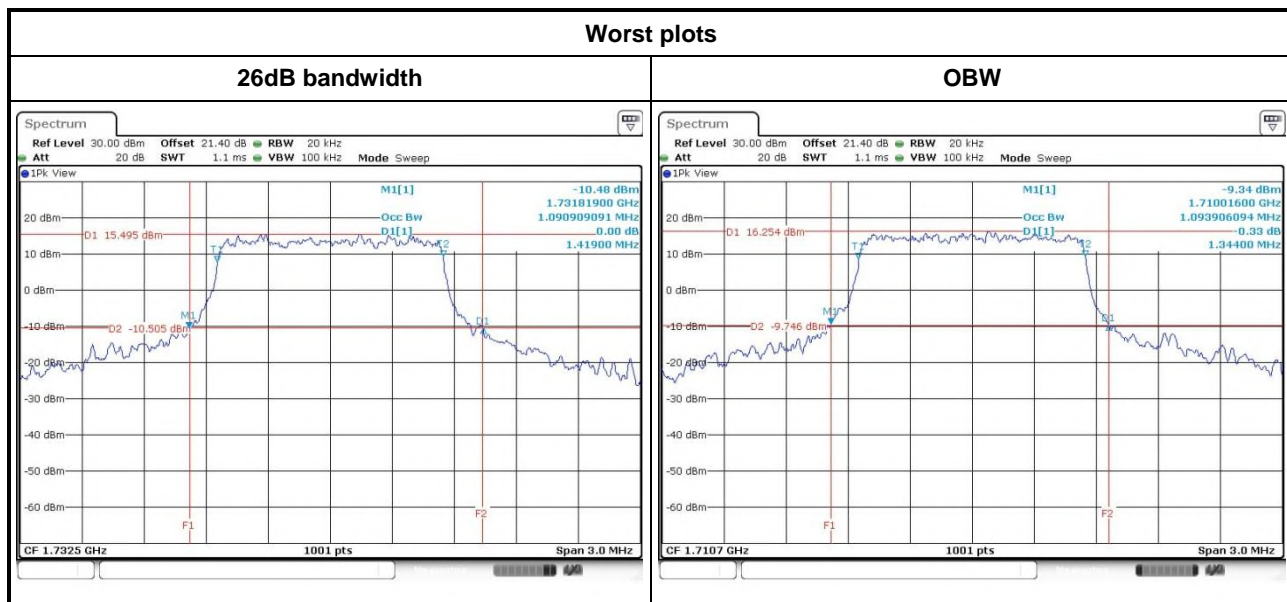
1. Set RBW = 20 / 50 / 100 / 200 / 200 / 300 kHz, VBW = 100 / 200 / 300 / 1000 / 1000 / 1000 kHz for LTE channel bandwidth 1.4 / 3 / 5 / 10 / 15 / 20 MHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Using occupied bandwidth measurement function of spectrum analyzer to measure occupied bandwidth.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 26dB relative to the maximum level measured in the fundamental emission.

### 3.5.2 Test Setup

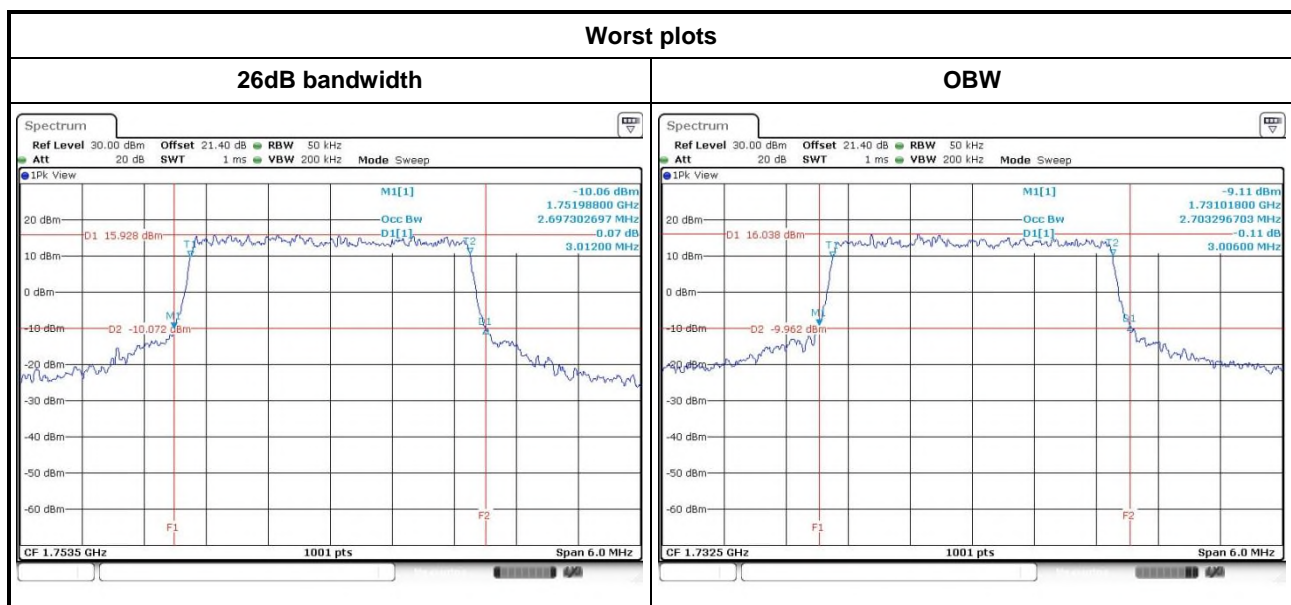


### 3.5.3 Test Result of Occupied Bandwidth

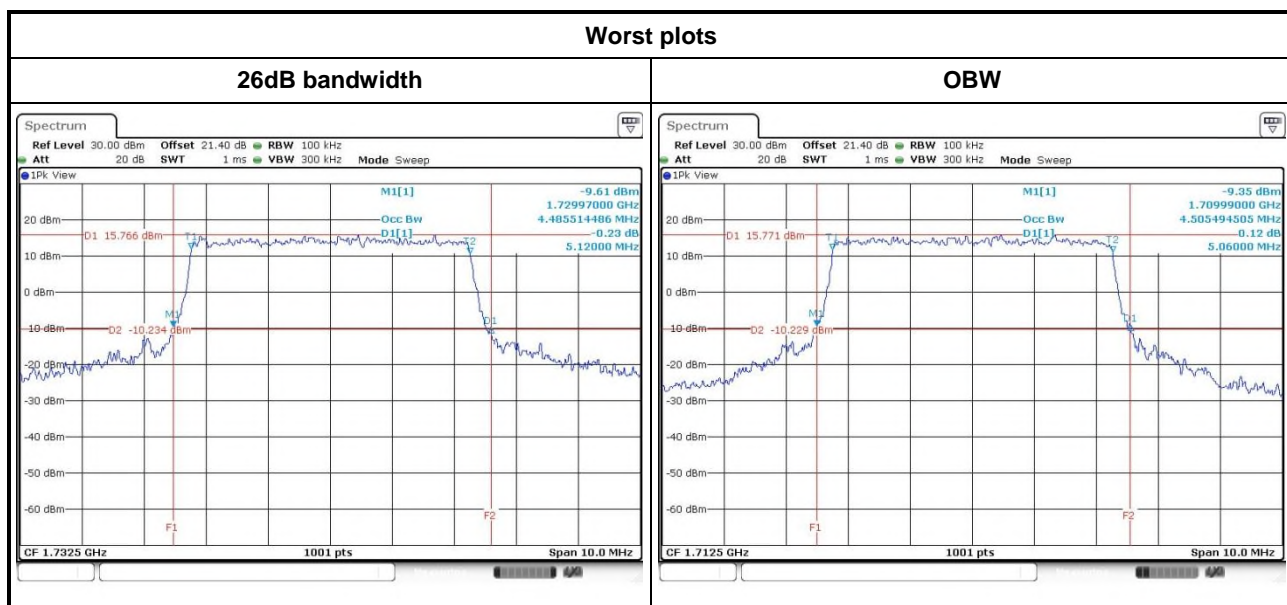
Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
LTE Band 4	1.4	QPSK	19957	1710.7	1.3440	1.0939
LTE Band 4	1.4	QPSK	20175	1732.5	1.3890	1.0939
LTE Band 4	1.4	QPSK	20393	1754.3	1.3950	1.0909
LTE Band 4	1.4	16QAM	19957	1710.7	1.3650	1.0909
LTE Band 4	1.4	16QAM	20175	1732.5	1.4190	1.0909
LTE Band 4	1.4	16QAM	20393	1754.3	1.3710	1.0909



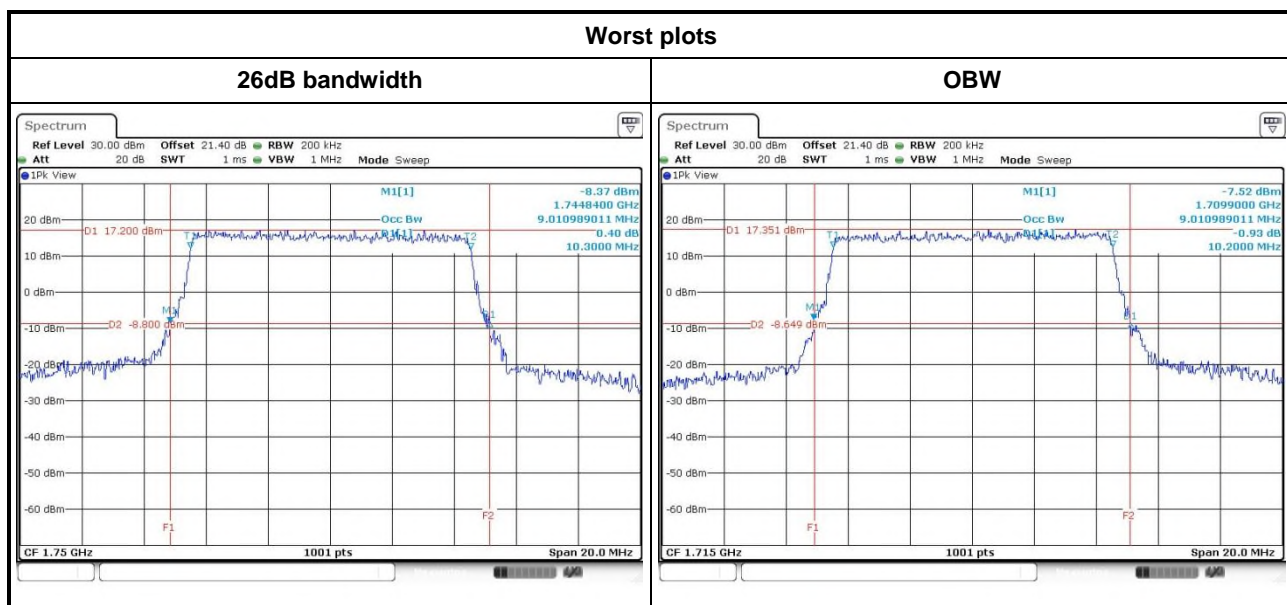
Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
LTE Band 4	3	QPSK	19965	1711.5	2.9580	2.6850
LTE Band 4	3	QPSK	20175	1732.5	2.9520	2.6850
LTE Band 4	3	QPSK	20385	1753.5	2.9520	2.6910
LTE Band 4	3	16QAM	19965	1711.5	3.0060	2.6910
LTE Band 4	3	16QAM	20175	1732.5	2.0060	2.7030
LTE Band 4	3	16QAM	20385	1753.5	3.0120	2.6970



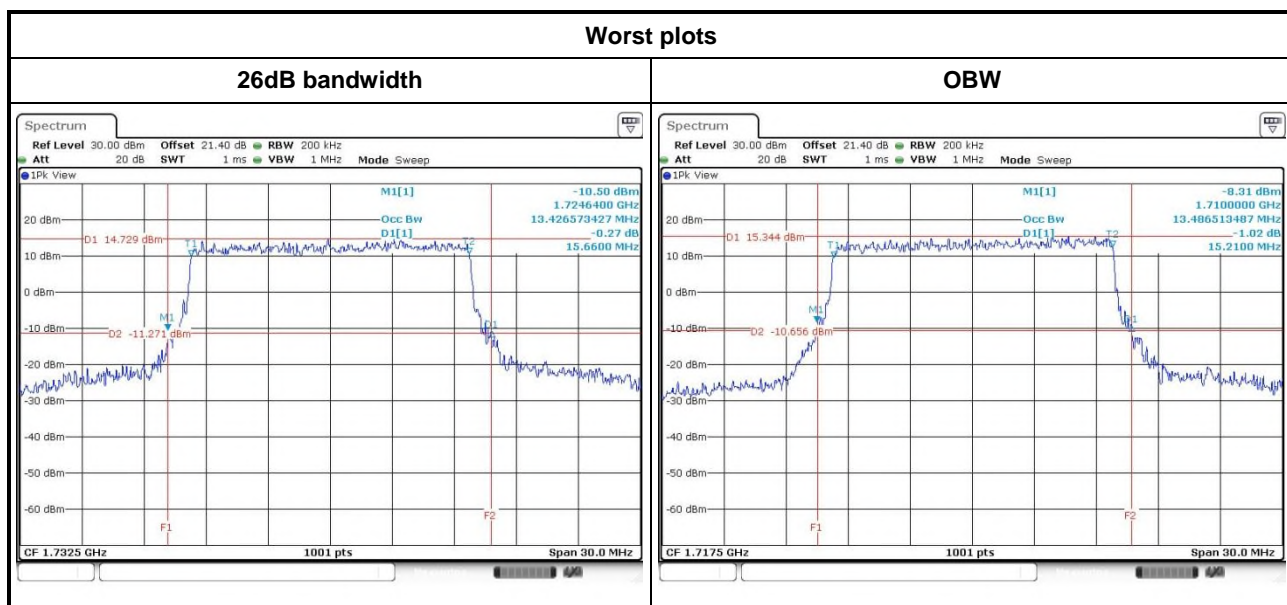
Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
LTE Band 4	5	QPSK	19975	1712.5	5.0600	4.4950
LTE Band 4	5	QPSK	20175	1732.5	5.0400	4.5050
LTE Band 4	5	QPSK	20375	1752.5	5.0200	4.4950
LTE Band 4	5	16QAM	19975	1712.5	5.0600	4.5050
LTE Band 4	5	16QAM	20175	1732.5	5.1200	4.4855
LTE Band 4	5	16QAM	20375	1752.5	5.0900	4.4955



Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
LTE Band 4	10	QPSK	20000	1715.0	10.2000	9.0109
LTE Band 4	10	QPSK	20175	1732.5	10.1800	8.9710
LTE Band 4	10	QPSK	20350	1750.0	10.3000	9.0109
LTE Band 4	10	16QAM	20000	1715.0	10.2200	8.9710
LTE Band 4	10	16QAM	20175	1732.5	10.0200	9.0109
LTE Band 4	10	16QAM	20350	1750.0	10.0800	8.9710



Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
LTE Band 4	15	QPSK	20025	1717.5	15.2100	13.4865
LTE Band 4	15	QPSK	20175	1732.5	14.9400	13.4265
LTE Band 4	15	QPSK	20325	1747.5	15.2100	13.4265
LTE Band 4	15	16QAM	20025	1717.5	15.2700	13.4265
LTE Band 4	15	16QAM	20175	1732.5	15.6600	13.4265
LTE Band 4	15	16QAM	20325	1747.5	15.1200	13.4565



Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
LTE Band 4	20	QPSK	20050	1720.0	20.2000	17.9820
LTE Band 4	20	QPSK	20175	1732.5	20.1600	17.9020
LTE Band 4	20	QPSK	20300	1745.0	20.2000	17.9420
LTE Band 4	20	16QAM	20050	1720.0	20.1600	17.9800
LTE Band 4	20	16QAM	20175	1732.5	20.1200	17.9000
LTE Band 4	20	16QAM	20300	1745.0	20.0400	17.9400



## 3.6 Peak to Average Ratio

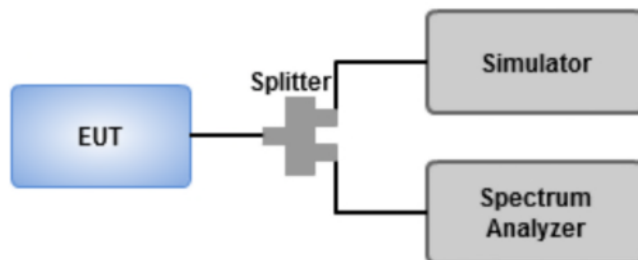
### 3.6.1 Limit of Peak to Average Ratio

The Peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 3.6.2 Test Procedures

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth.
2. Set the number of counts to a value that stabilizes the measured CCDF curve.
3. Set the measurement interval to 1 ms.
4. Record the maximum PAPR level associated with a probability of 0.1%.

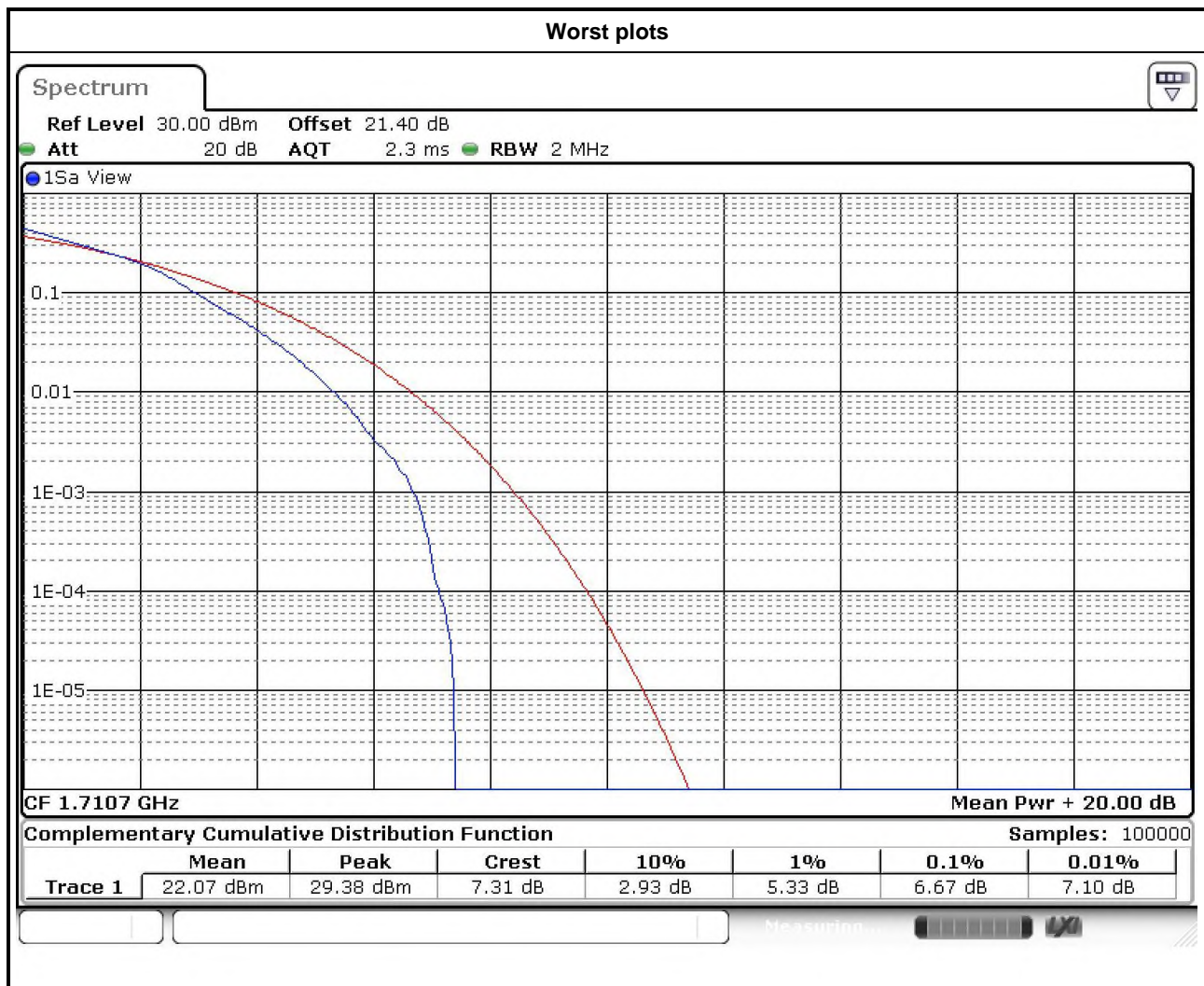
### 3.6.3 Test Setup



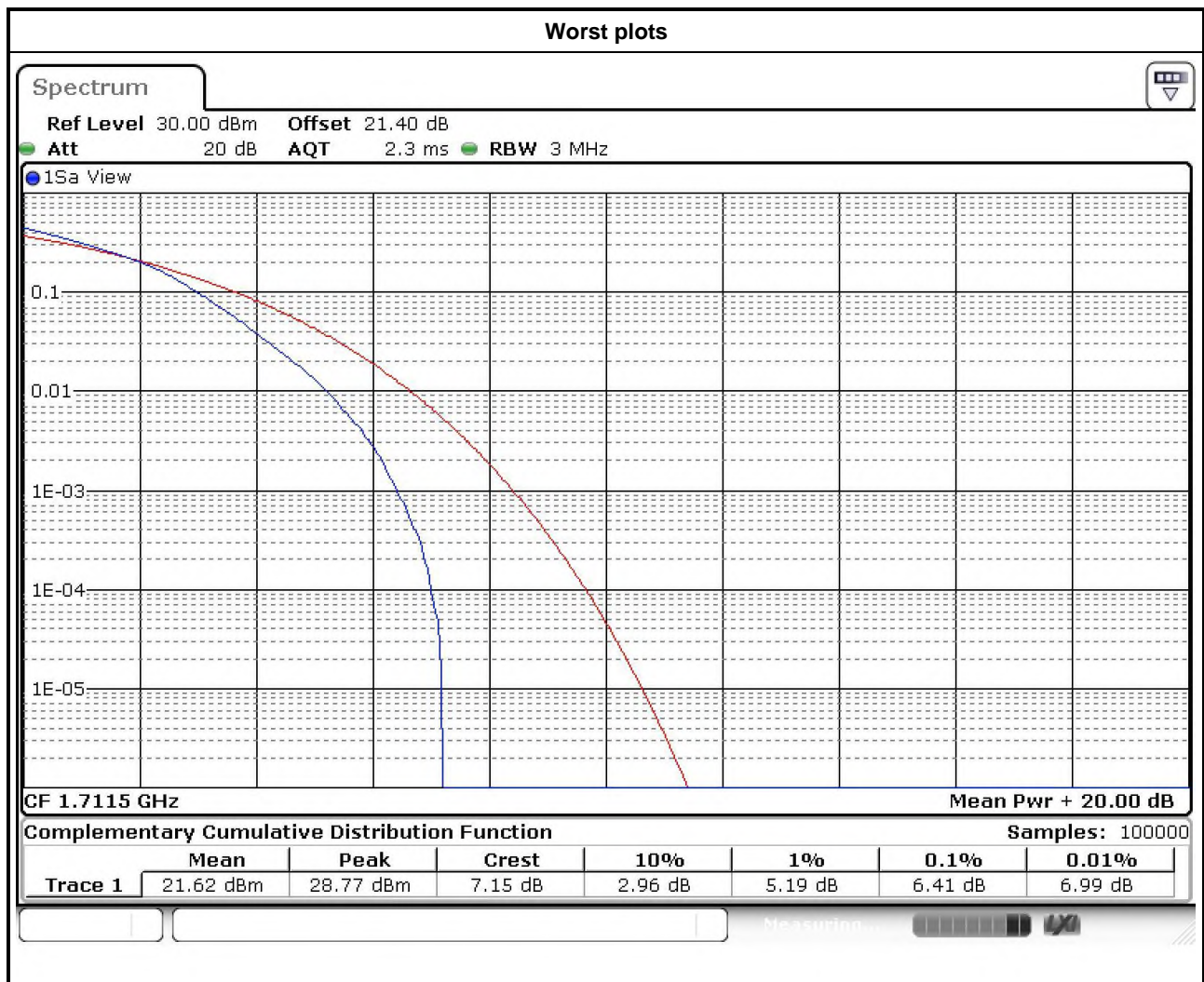


### 3.6.4 Test Result of Peak to Average Ratio

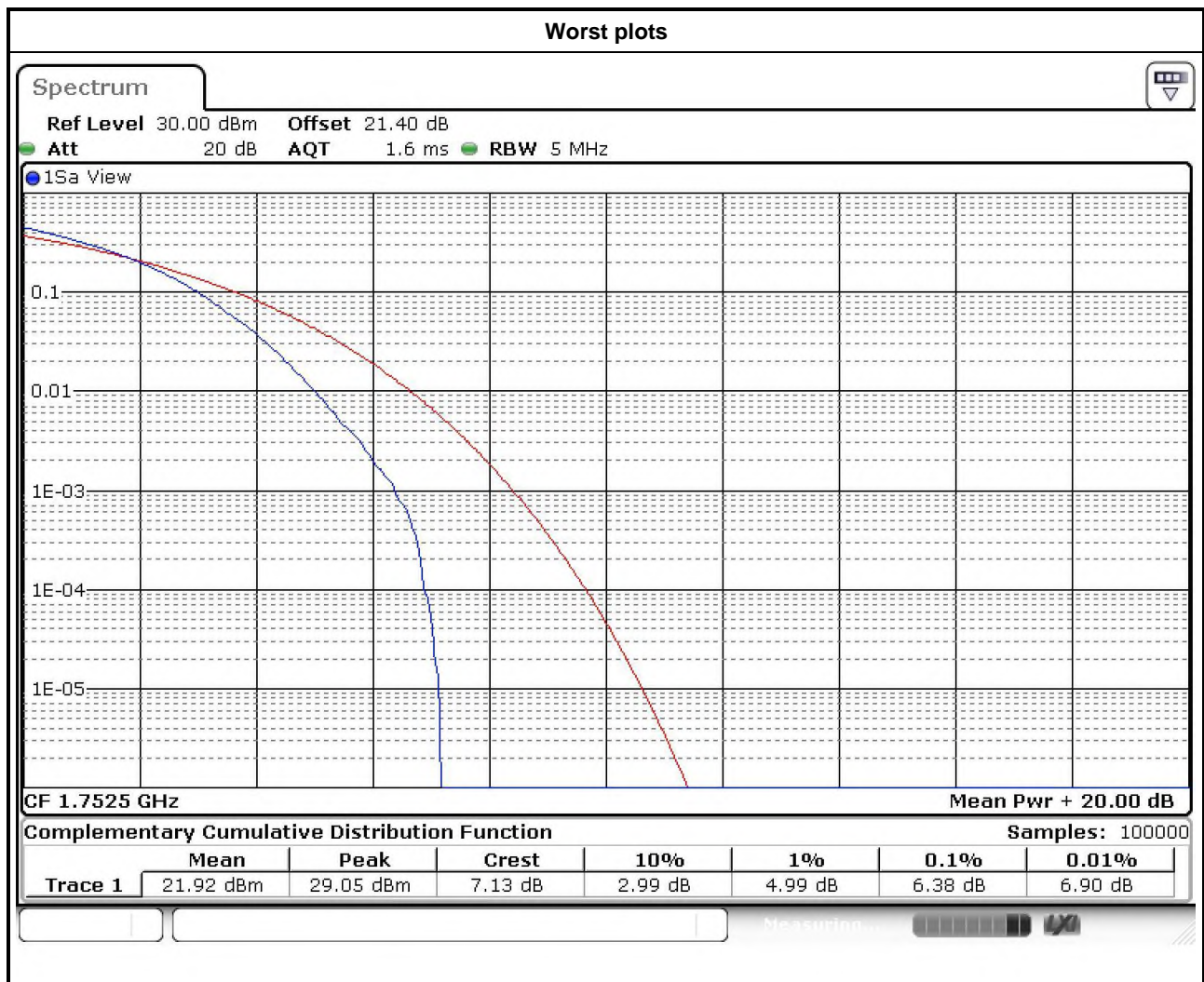
Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average ratio (dB)
LTE Band 4	1.4	QPSK	19957	1710.7	5.68
LTE Band 4	1.4	QPSK	20175	1732.5	5.10
LTE Band 4	1.4	QPSK	20393	1754.3	5.65
LTE Band 4	1.4	16QAM	19957	1710.7	6.67
LTE Band 4	1.4	16QAM	20175	1732.5	5.91
LTE Band 4	1.4	16QAM	20393	1754.3	6.41



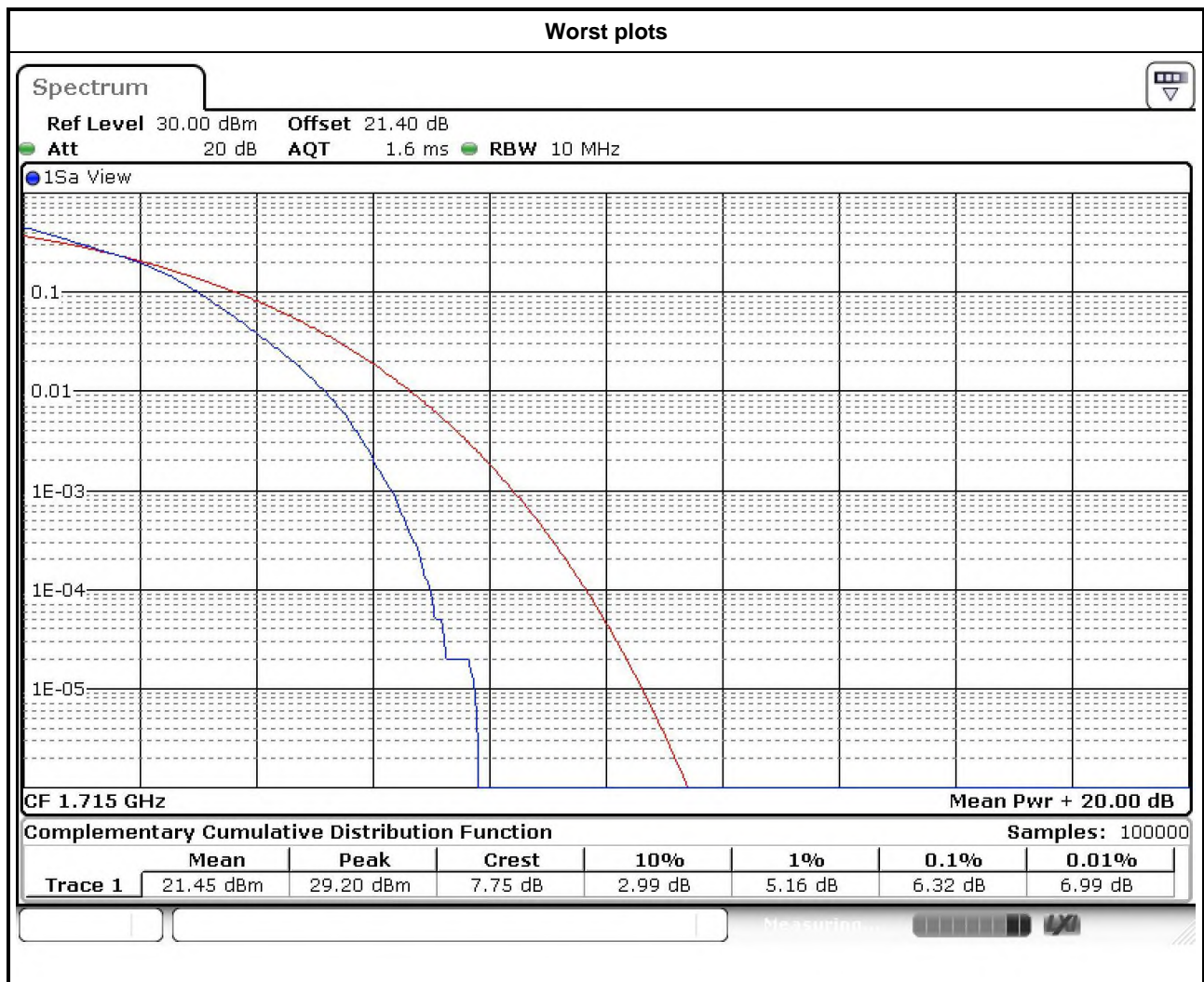
Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average ratio (dB)
LTE Band 4	3	QPSK	19965	1711.5	5.54
LTE Band 4	3	QPSK	20175	1732.5	4.90
LTE Band 4	3	QPSK	20385	1753.5	5.39
LTE Band 4	3	16QAM	19965	1711.5	6.41
LTE Band 4	3	16QAM	20175	1732.5	5.91
LTE Band 4	3	16QAM	20385	1753.5	6.38



Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average ratio (dB)
LTE Band 4	5	QPSK	19975	1712.5	5.42
LTE Band 4	5	QPSK	20175	1732.5	4.90
LTE Band 4	5	QPSK	20375	1752.5	5.42
LTE Band 4	5	16QAM	19975	1712.5	6.17
LTE Band 4	5	16QAM	20175	1732.5	4.87
LTE Band 4	5	16QAM	20375	1752.5	6.38

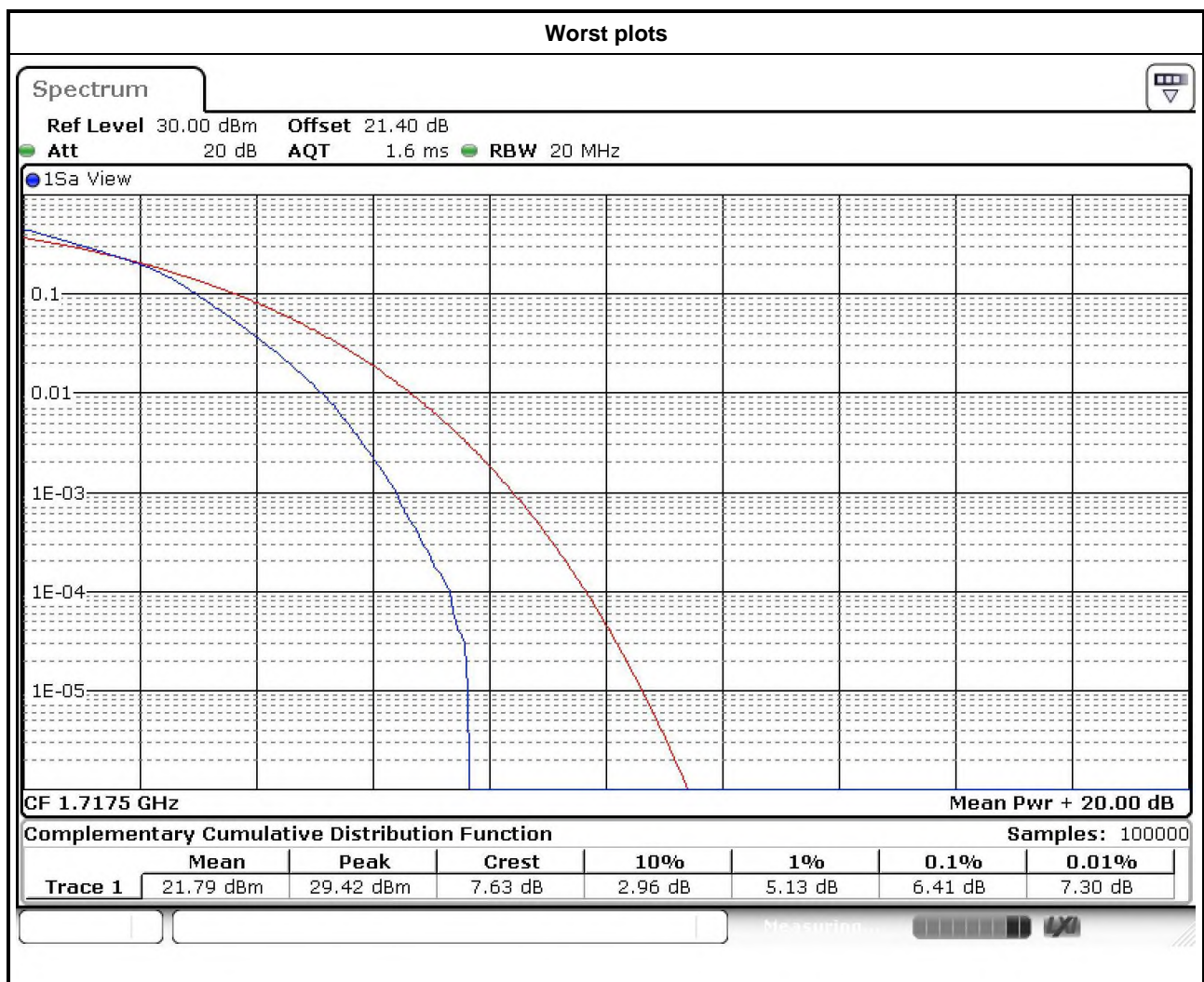


Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average ratio (dB)
LTE Band 4	10	QPSK	20000	1715.0	5.65
LTE Band 4	10	QPSK	20175	1732.5	4.96
LTE Band 4	10	QPSK	20350	1750.0	5.48
LTE Band 4	10	16QAM	20000	1715.0	6.32
LTE Band 4	10	16QAM	20175	1732.5	5.86
LTE Band 4	10	16QAM	20350	1750.0	6.20

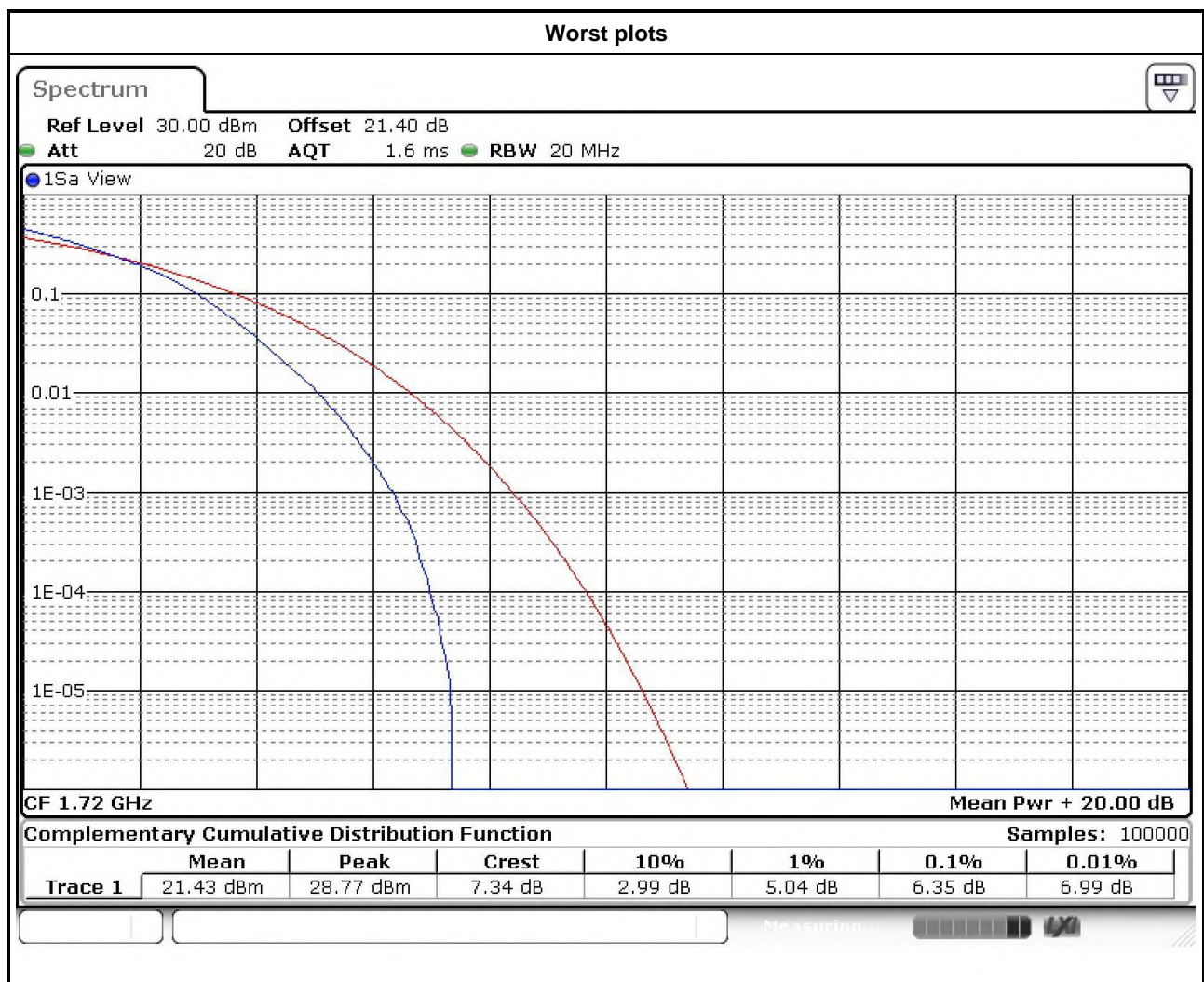




Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average ratio (dB)
LTE Band 4	15	QPSK	20025	1717.5	5.57
LTE Band 4	15	QPSK	20175	1732.5	4.99
LTE Band 4	15	QPSK	20325	1747.5	5.33
LTE Band 4	15	16QAM	20025	1717.5	6.41
LTE Band 4	15	16QAM	20175	1732.5	5.83
LTE Band 4	15	16QAM	20325	1747.5	6.12



Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average ratio (dB)
LTE Band 4	20	QPSK	20050	1720.0	5.36
LTE Band 4	20	QPSK	20175	1732.5	4.90
LTE Band 4	20	QPSK	20300	1745.0	5.13
LTE Band 4	20	16QAM	20050	1720.0	6.35
LTE Band 4	20	16QAM	20175	1732.5	5.91
LTE Band 4	20	16QAM	20300	1745.0	6.06



## 3.7 Frequency Stability

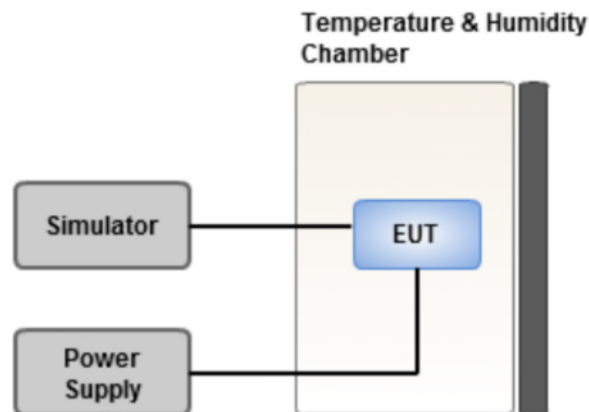
### 3.7.1 Limit of Frequency Stability

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### 3.7.2 Test Procedures

1. EUT was placed at temperature chamber and connected to an external power supply.
2. Temperature and voltage condition shall be tested to confirm frequency stability.
3. Temperature range is from -30~55°C and voltage range is from lowest to highest working voltage.
4. Tem Link up EUT and simulator. Confirm frequency drift value of simulator and record it.

### 3.7.3 Test Setup



### 3.7.4 Test Result of Frequency Stability

LTE Band 4, CB: 1.4MHz			
Temperature (°C)	Voltage (dc)	Frequency Drift (ppm)	Limit (ppm)
55	3.7	0.013	2.5
50	3.7	0.013	2.5
40	3.7	0.012	2.5
30	3.7	0.011	2.5
20	3.7	0.009	2.5
10	3.7	0.010	2.5
0	3.7	0.012	2.5
-10	3.7	0.013	2.5
-20	3.7	0.011	2.5
-30	3.7	0.010	2.5
20	4.5	0.012	2.5
20	3.2	0.011	2.5

LTE Band 4, CB: 3MHz			
Temperature (°C)	Voltage (dc)	Frequency Drift (ppm)	Limit (ppm)
55	3.7	0.013	2.5
50	3.7	0.015	2.5
40	3.7	0.012	2.5
30	3.7	0.013	2.5
20	3.7	0.011	2.5
10	3.7	0.009	2.5
0	3.7	0.010	2.5
-10	3.7	0.012	2.5
-20	3.7	0.011	2.5
-30	3.7	0.010	2.5
20	4.5	0.013	2.5
20	3.2	0.012	2.5



<b>LTE Band 4, CB: 5MHz</b>			
<b>Temperature (°C)</b>	<b>Voltage (dc)</b>	<b>Frequency Drift (ppm)</b>	<b>Limit (ppm)</b>
55	3.7	0.014	2.5
50	3.7	0.013	2.5
40	3.7	0.015	2.5
30	3.7	0.012	2.5
20	3.7	0.011	2.5
10	3.7	0.010	2.5
0	3.7	0.009	2.5
-10	3.7	0.011	2.5
-20	3.7	0.012	2.5
-30	3.7	0.013	2.5
20	4.5	0.013	2.5
20	3.2	0.011	2.5

<b>LTE Band 4, CB: 10MHz</b>			
<b>Temperature (°C)</b>	<b>Voltage (dc)</b>	<b>Frequency Drift (ppm)</b>	<b>Limit (ppm)</b>
55	3.7	0.013	2.5
50	3.7	0.012	2.5
40	3.7	0.011	2.5
30	3.7	0.010	2.5
20	3.7	0.013	2.5
10	3.7	0.013	2.5
0	3.7	0.010	2.5
-10	3.7	0.012	2.5
-20	3.7	0.013	2.5
-30	3.7	0.013	2.5
20	4.5	0.013	2.5
20	3.2	0.012	2.5

<b>LTE Band 4, CB: 15MHz</b>			
<b>Temperature (°C)</b>	<b>Voltage (dc)</b>	<b>Frequency Drift (ppm)</b>	<b>Limit (ppm)</b>
55	3.7	0.013	2.5
50	3.7	0.011	2.5
40	3.7	0.012	2.5
30	3.7	0.010	2.5
20	3.7	0.009	2.5
10	3.7	0.010	2.5
0	3.7	0.011	2.5
-10	3.7	0.012	2.5
-20	3.7	0.012	2.5
-30	3.7	0.014	2.5
20	4.5	0.013	2.5
20	3.2	0.012	2.5

<b>LTE Band 4, CB: 20MHz</b>			
<b>Temperature (°C)</b>	<b>Voltage (dc)</b>	<b>Frequency Drift (ppm)</b>	<b>Limit (ppm)</b>
55	3.7	0.013	2.5
50	3.7	0.015	2.5
40	3.7	0.012	2.5
30	3.7	0.012	2.5
20	3.7	0.010	2.5
10	3.7	0.011	2.5
0	3.7	0.013	2.5
-10	3.7	0.012	2.5
-20	3.7	0.014	2.5
-30	3.7	0.013	2.5
20	4.5	0.011	2.5
20	3.2	0.010	2.5

## 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp, it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website <http://www.icertifi.com.tw>.

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Yuan Hsien 333, Taiwan, R.O.C.

### **Kwei Shan Site II**

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St., Kwei Shan Hsiang, Tao  
Yuan Hsien 333, Taiwan, R.O.C.

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