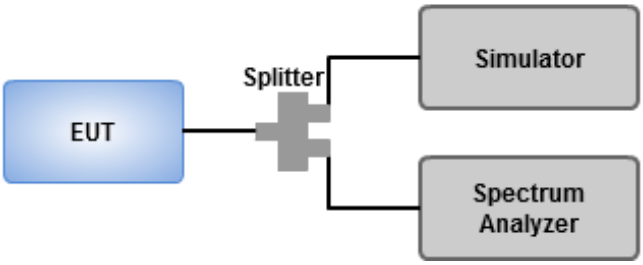
3.5 Occupied Bandwidth

3.5.1 Test Procedures

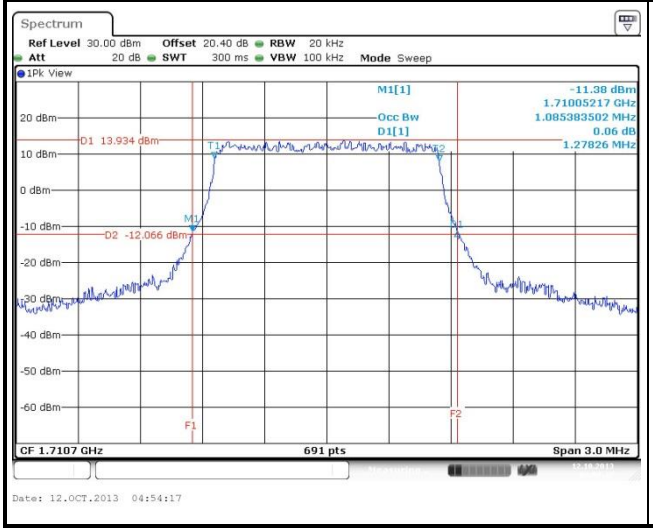
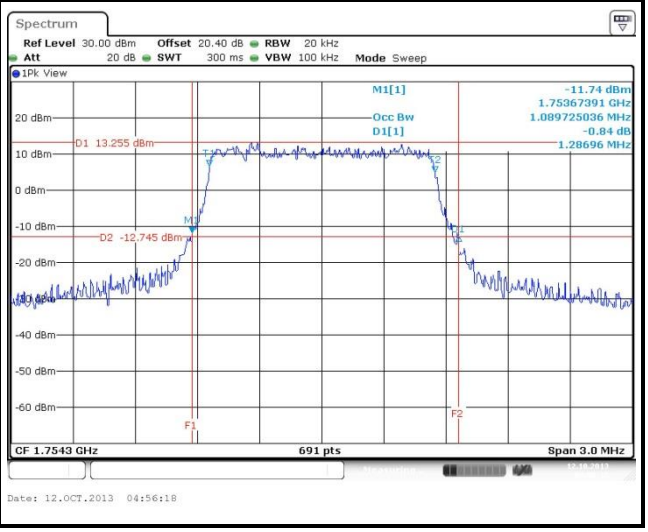
1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth=300kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Using occupied bandwidth measurement function of spectrum analyzer to measure occupied bandwidth.

3.5.2 Test Setup

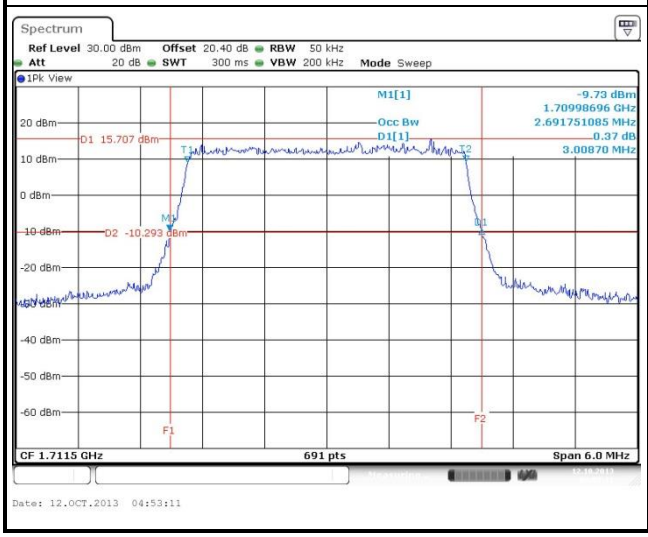
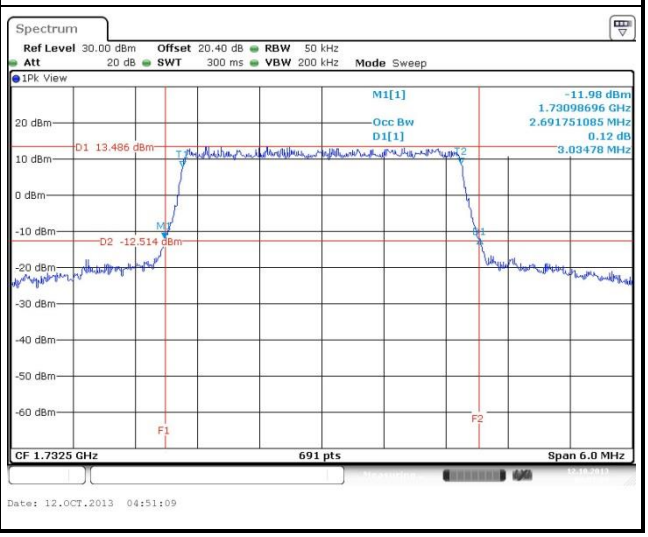


3.5.3 Test Result of Occupied Bandwidth

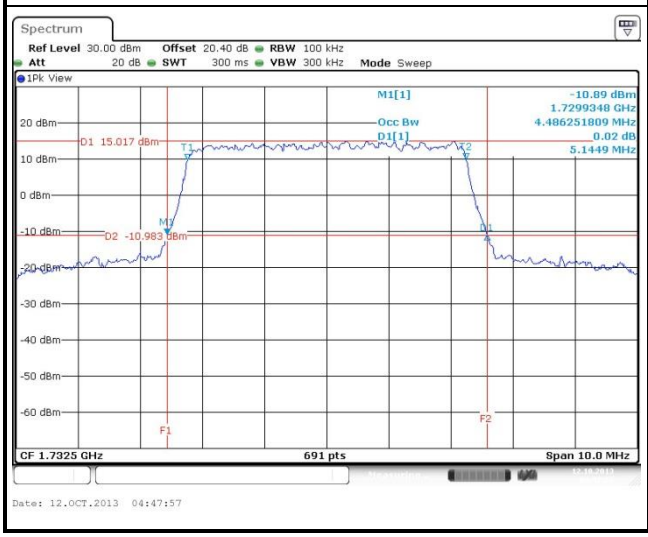
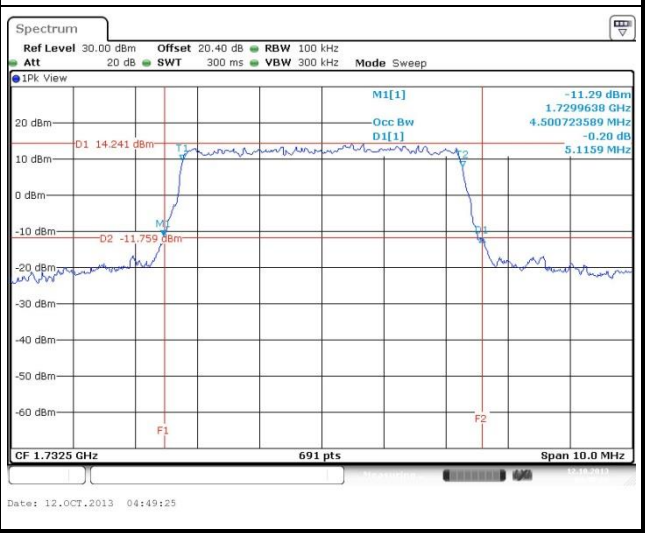
BW (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
1.4	QPSK	19957	1710.7	1.2783	1.09
1.4	QPSK	20175	1732.5	1.2609	1.09
1.4	QPSK	20393	1754.3	1.2783	1.09
1.4	16QAM	19957	1710.7	1.2739	1.09
1.4	16QAM	20175	1732.5	1.2870	1.09
1.4	16QAM	20393	1754.3	1.2870	1.09

Worst plots	
QPSK	16QAM
	

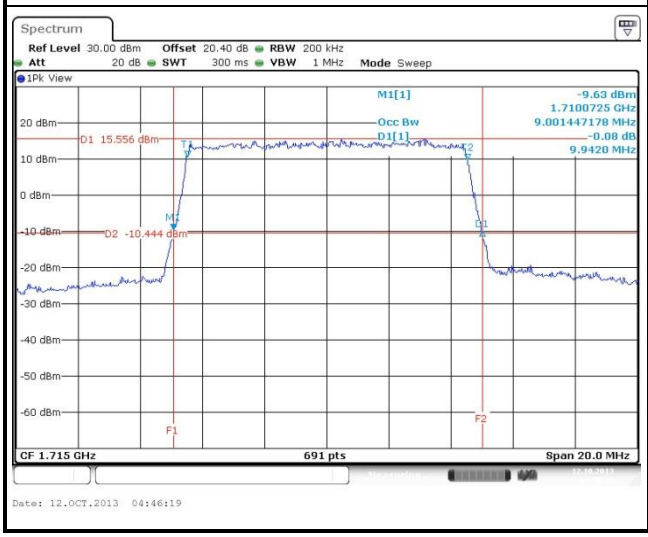
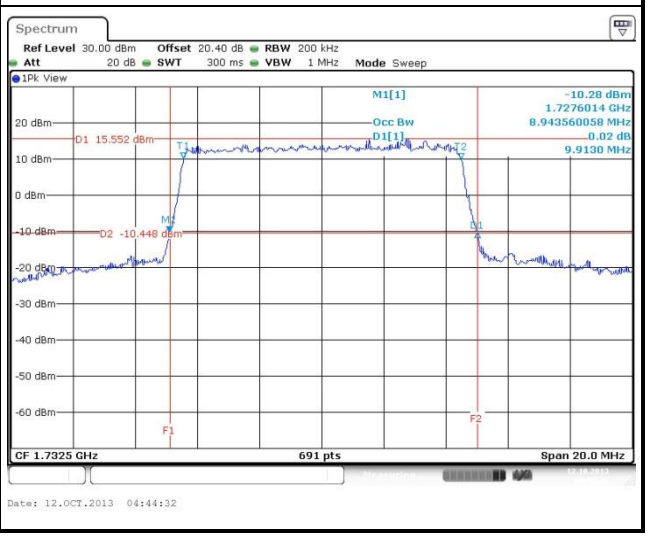
BW (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
3	QPSK	19965	1711.5	3.0087	2.69
3	QPSK	20175	1732.5	3.0087	2.69
3	QPSK	20385	1753.5	3.0000	2.68
3	16QAM	19965	1711.5	3.0174	2.69
3	16QAM	20175	1732.5	3.0348	2.69
3	16QAM	20385	1753.5	3.0000	2.69

Worst plots	
QPSK	16QAM
	

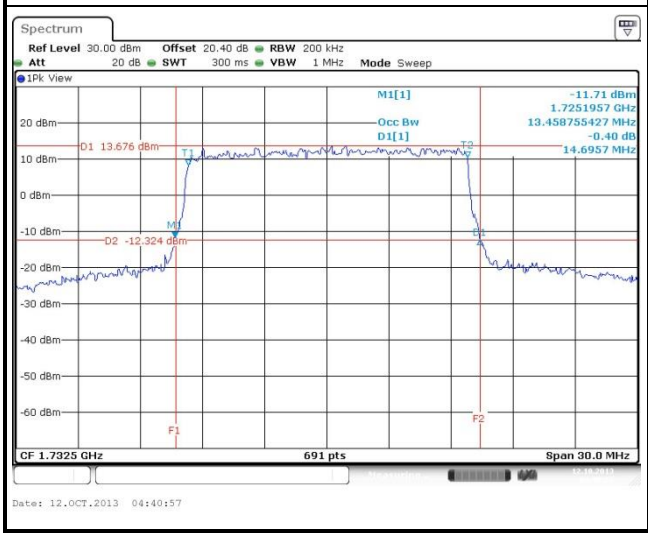
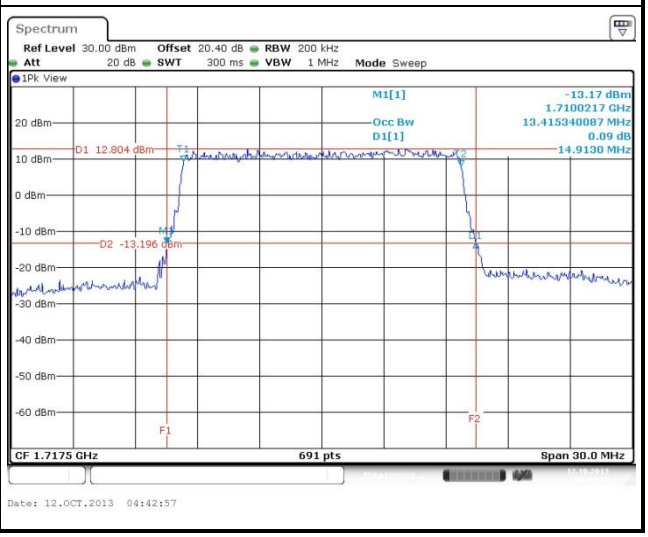
BW (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
5	QPSK	19975	1712.5	5.1159	4.50
5	QPSK	20175	1732.5	5.1449	4.49
5	QPSK	20375	1752.5	5.1304	4.50
5	16QAM	19975	1712.5	5.1014	4.49
5	16QAM	20175	1732.5	5.1159	4.50
5	16QAM	20375	1752.5	5.0580	4.50

Worst plots	
QPSK	16QAM
	

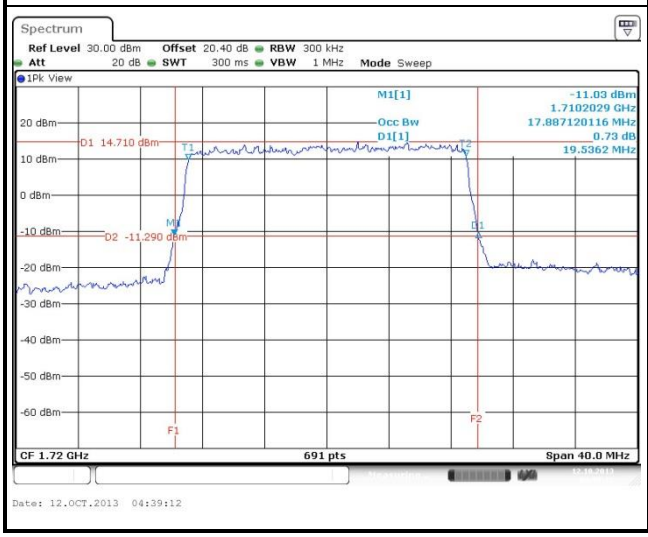
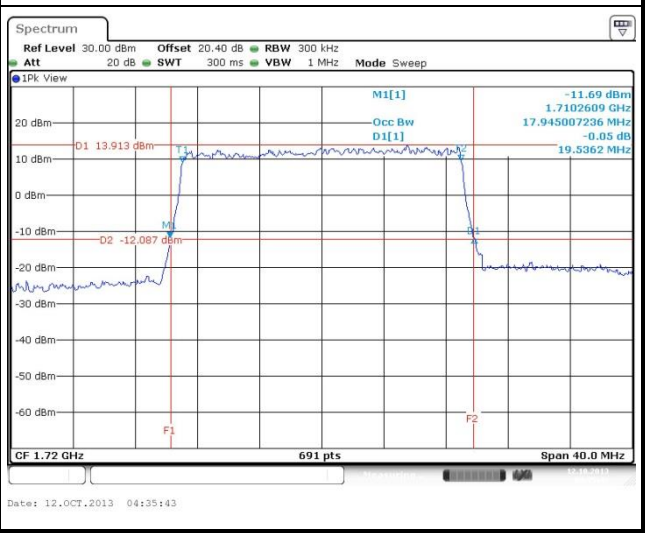
BW (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
10	QPSK	20000	1715.0	9.9420	9.00
10	QPSK	20175	1732.5	9.9420	9.03
10	QPSK	20350	1750.0	9.9130	9.03
10	16QAM	20000	1715.0	9.8551	8.94
10	16QAM	20175	1732.5	9.9130	8.94
10	16QAM	20350	1750.0	9.8551	8.94

Worst plots	
QPSK	16QAM
	

BW (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
15	QPSK	20025	1717.5	14.6522	13.42
15	QPSK	20175	1732.5	14.6957	13.46
15	QPSK	20325	1747.5	14.6087	13.42
15	16QAM	20025	1717.5	14.9130	13.42
15	16QAM	20175	1732.5	14.6957	13.42
15	16QAM	20325	1747.5	14.7826	13.42

Worst plots	
QPSK	16QAM
	

BW (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
20	QPSK	20050	1720.0	19.5362	17.89
20	QPSK	20175	1732.5	19.4783	17.89
20	QPSK	20300	1745.0	19.4783	17.83
20	16QAM	20050	1720.0	19.5362	17.95
20	16QAM	20175	1732.5	19.4783	17.89
20	16QAM	20300	1745.0	19.4783	17.89

Worst plots	
QPSK	16QAM
	

3.6 Peak to Average Ratio

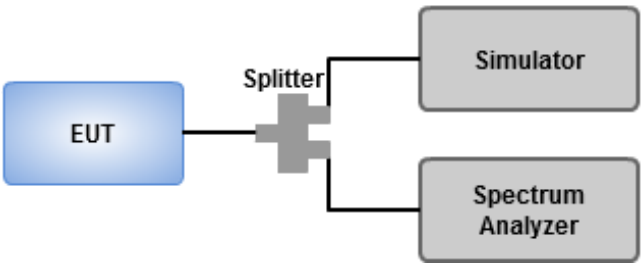
3.6.1 Limit of Peak to Average Ratio

The Peakto-average ratio (PAR) of the transmiss ion may not exceed 13 dB.

3.6.2 Test Procedures

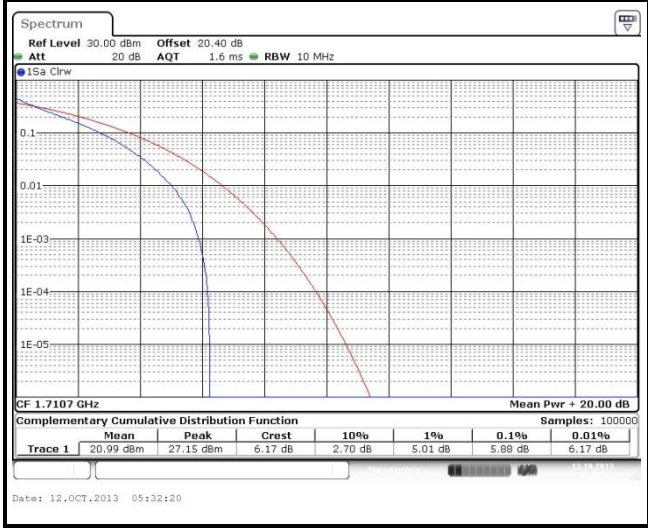
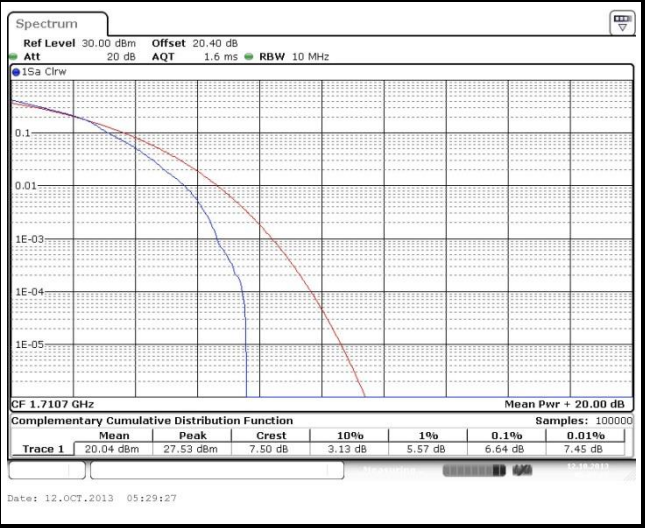
1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth.
2. Set the number of counts to a value that stabilizes the measured CCDF curve.
3. Set the measurement interval to 1 ms.
4. Record the maximum PAPR level associated with a probability of 0.1%.

3.6.3 Test Setup



3.6.4 Test Result of Peak to Average Ratio

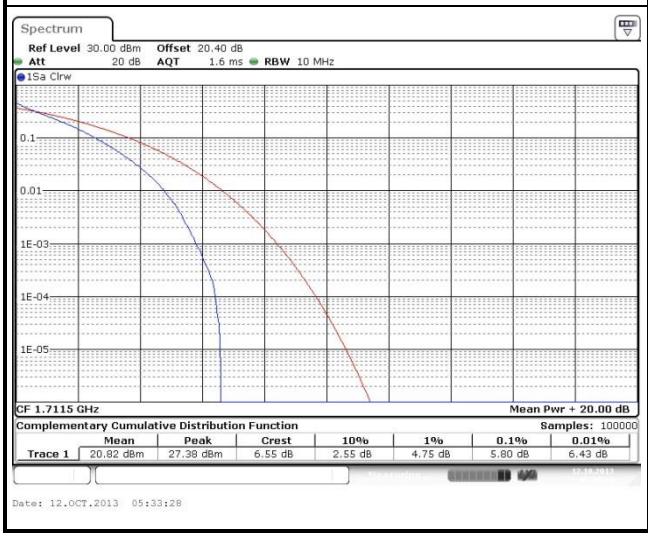
BW (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average Ratio (dB)
1.4	QPSK	19957	1710.7	5.88
1.4	QPSK	20175	1732.5	4.46
1.4	QPSK	20393	1754.3	5.36
1.4	16QAM	19957	1710.7	6.64
1.4	16QAM	20175	1732.5	5.33
1.4	16QAM	20393	1754.3	6.12

Worst plots	
QPSK	16QAM
	

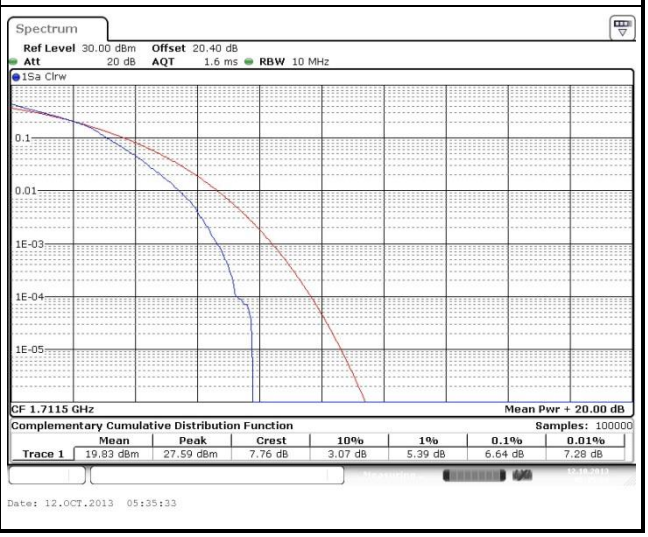
BW (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average Ratio (dB)
3	QPSK	19965	1711.5	5.80
3	QPSK	20175	1732.5	4.58
3	QPSK	20385	1753.5	5.01
3	16QAM	19965	1711.5	6.64
3	16QAM	20175	1732.5	5.42
3	16QAM	20385	1753.5	6.12

Worst plots

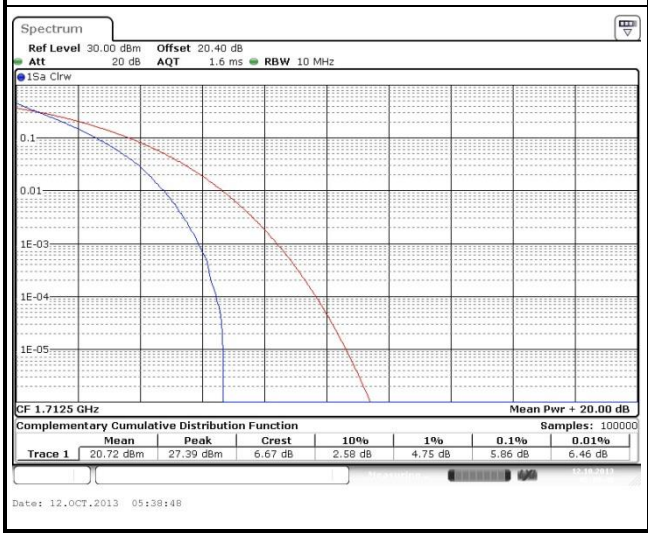
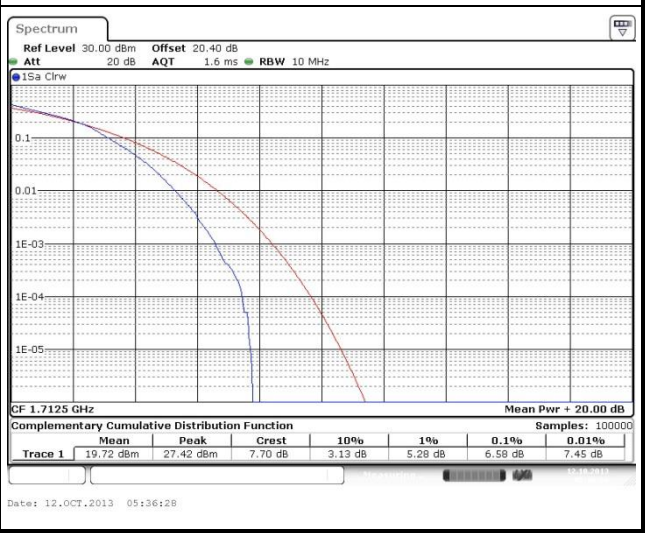
QPSK



16QAM



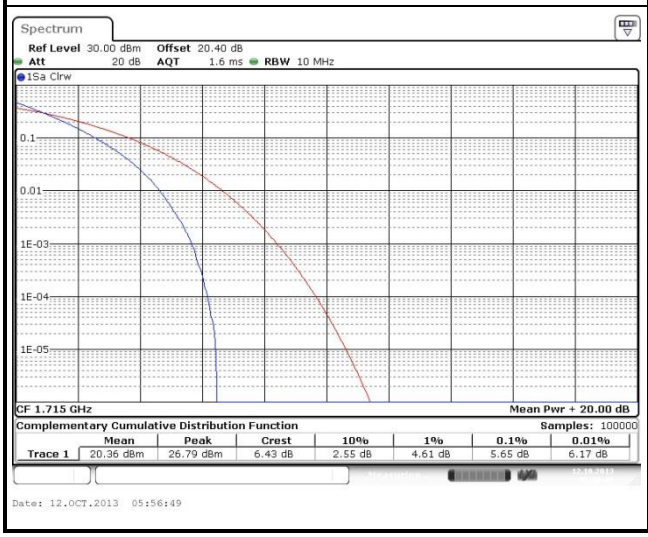
BW (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average Ratio (dB)
5	QPSK	19975	1712.5	5.86
5	QPSK	20175	1732.5	5.01
5	QPSK	20375	1752.5	5.04
5	16QAM	19975	1712.5	6.58
5	16QAM	20175	1732.5	5.51
5	16QAM	20375	1752.5	5.94

Worst plots	
QPSK	16QAM
	

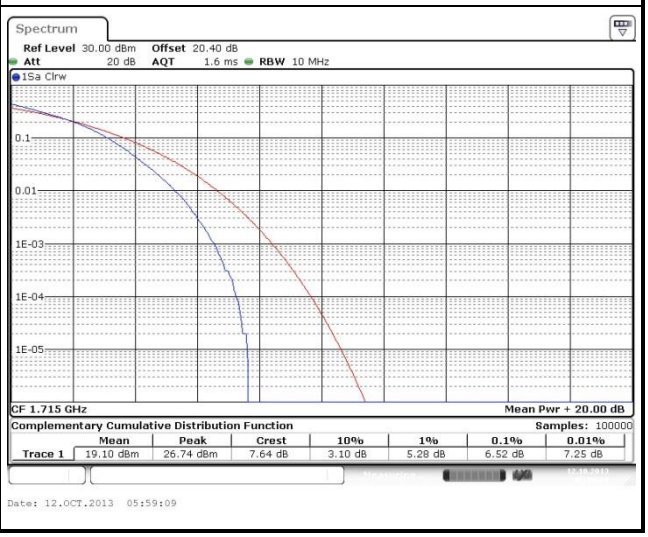
BW (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average Ratio (dB)
10	QPSK	20000	1715.0	5.65
10	QPSK	20175	1732.5	4.72
10	QPSK	20350	1750.0	4.67
10	16QAM	20000	1715.0	6.52
10	16QAM	20175	1732.5	5.62
10	16QAM	20350	1750.0	5.65

Worst plots

QPSK



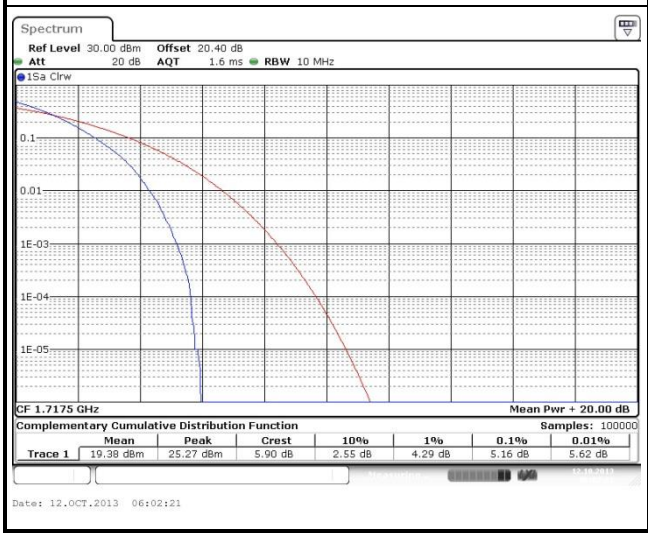
16QAM



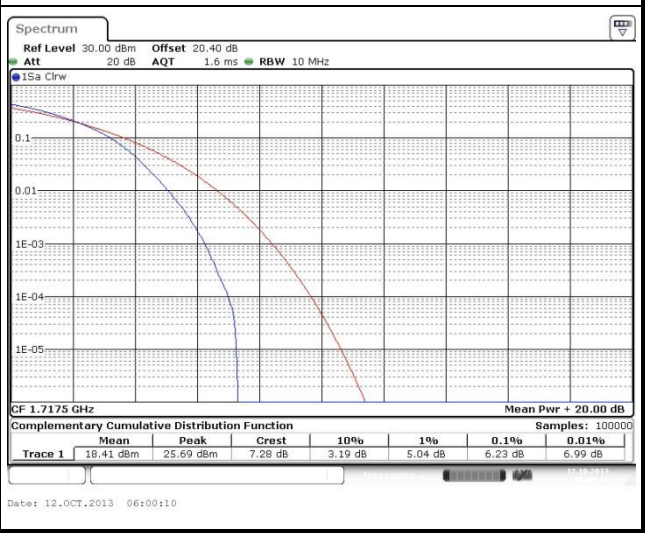
BW (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average Ratio (dB)
15	QPSK	20025	1717.5	5.16
15	QPSK	20175	1732.5	4.35
15	QPSK	20325	1747.5	4.38
15	16QAM	20025	1717.5	6.23
15	16QAM	20175	1732.5	5.68
15	16QAM	20325	1747.5	5.51

Worst plots

QPSK



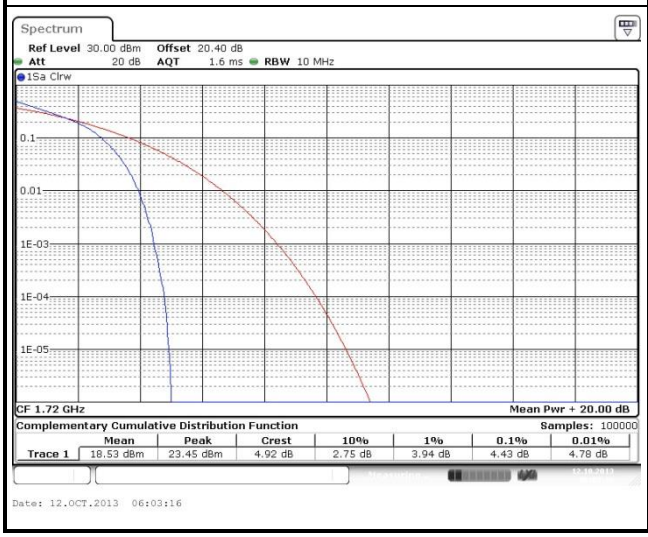
16QAM



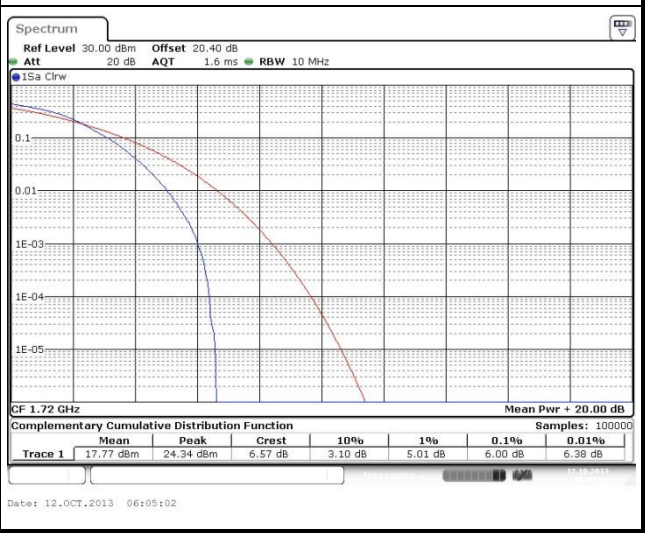
BW (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average Ratio (dB)
20	QPSK	20050	1720.0	4.43
20	QPSK	20175	1732.5	3.88
20	QPSK	20300	1745.0	3.74
20	16QAM	20050	1720.0	6.00
20	16QAM	20175	1732.5	5.68
20	16QAM	20300	1745.0	5.51

Worst plots

QPSK



16QAM



3.7 Frequency Stability

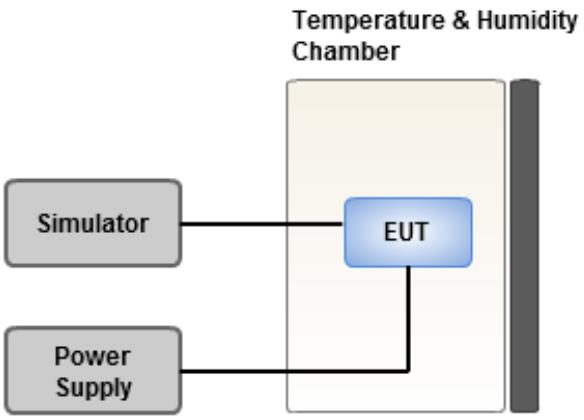
3.7.1 Limit of Frequency Stability

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 -30~50°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 (Vac)	Frequency Drift (ppm)	Limit (ppm)
50	110	0.009	2.5
40	110	0.008	2.5
30	110	0.010	2.5
20	110	0.009	2.5
10	110	0.010	2.5
0	110	0.008	2.5
-10	110	0.009	2.5
-20	110	0.008	2.5
-30	110	0.008	2.5
20	126.5	0.012	2.5
20	93.5	0.009	2.5

LTE Band 4, CB: 3MHz			
Temperature (°C)	Voltage (Vac)	Frequency Drift (ppm)	Limit (ppm)
50	110	0.011	2.5
40	110	0.010	2.5
30	110	0.010	2.5
20	110	0.009	2.5
10	110	0.009	2.5
0	110	0.009	2.5
-10	110	0.009	2.5
-20	110	0.009	2.5
-30	110	0.008	2.5
20	126.5	0.013	2.5
20	93.5	0.012	2.5

LTE Band 4, CB: 5MHz			
Temperature (°C)	**Voltage (Vac)**	**Frequency Drift (ppm)**	**Limit (ppm)**
50	110	0.013	2.5
40	110	0.011	2.5
30	110	0.009	2.5
20	110	0.010	2.5
10	110	0.011	2.5
0	110	0.012	2.5
-10	110	0.008	2.5
-20	110	0.009	2.5
-30	110	0.011	2.5
20	126.5	0.013	2.5
20	93.5	0.011	2.5

LTE Band 4, CB: 10MHz			
Temperature (°C)	**Voltage (Vac)**	**Frequency Drift (ppm)**	**Limit (ppm)**
50	110	0.013	2.5
40	110	0.012	2.5
30	110	0.012	2.5
20	110	0.010	2.5
10	110	0.009	2.5
0	110	0.011	2.5
-10	110	0.009	2.5
-20	110	0.009	2.5
-30	110	0.010	2.5
20	126.5	0.013	2.5
20	93.5	0.012	2.5

LTE Band 4, CB: 15MHz			
Temperature (°C)	**Voltage (Vac)**	**Frequency Drift (ppm)**	**Limit (ppm)**
50	110	0.010	2.5
40	110	0.009	2.5
30	110	0.012	2.5
20	110	0.010	2.5
10	110	0.010	2.5
0	110	0.009	2.5
-10	110	0.011	2.5
-20	110	0.008	2.5
-30	110	0.010	2.5
20	126.5	0.012	2.5
20	93.5	0.010	2.5

LTE Band 4, CB: 20MHz			
Temperature (°C)	**Voltage (Vac)**	**Frequency Drift (ppm)**	**Limit (ppm)**
50	110	0.011	2.5
40	110	0.013	2.5
30	110	0.010	2.5
20	110	0.008	2.5
10	110	0.009	2.5
0	110	0.010	2.5
-10	110	0.012	2.5
-20	110	0.012	2.5
-30	110	0.010	2.5
20	126.5	0.010	2.5
20	93.5	0.008	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.

Linkou

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.

Kwei Shan

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

==END==