

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23780	23790	23800
		Frequency (MHz)		709	710	711
10M	QPSK	1	0	22.60	22.98	22.85
		1	24	23.18	23.19	22.62
		1	49	22.87	22.52	22.56
		25	0	21.78	22.03	21.90
		25	12	22.19	21.67	22.05
		25	25	21.85	21.56	21.54
		50	0	21.61	21.92	21.56
10M	16QAM	1	0	21.95	21.61	21.98
		1	24	21.86	22.46	22.00
		1	49	21.75	21.84	21.91
		25	0	20.93	21.01	20.56
		25	12	20.98	20.68	21.09
		25	25	20.71	20.81	20.90
		50	0	20.57	20.77	20.84
10M	64QAM	1	0	20.99	20.95	21.17
		1	24	20.91	21.50	21.16
		1	49	20.79	20.96	20.73
		25	0	19.93	19.87	19.59
		25	12	19.82	19.63	20.10
		25	25	19.96	19.77	19.78
		50	0	19.90	19.59	20.08

*ERP = Conducted + antenna gain (2.02dBi) - 2.15

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23755	23790	23825
		Frequency (MHz)		706.5	710	713.5
5M	QPSK	1	0	22.71	22.90	22.49
		1	12	22.91	22.64	22.66
		1	24	22.65	22.82	22.47
		12	0	21.83	21.67	22.06
		12	6	21.97	21.84	21.68
		12	13	21.81	21.63	21.74
		25	0	21.82	21.59	21.57
5M	16QAM	1	0	21.80	21.56	21.75
		1	12	22.16	22.37	22.05
		1	24	21.78	21.71	21.85
		12	0	20.83	20.80	20.80
		12	6	20.91	21.07	20.92
		12	13	20.84	20.82	20.97
		25	0	20.86	20.62	21.03
5M	64QAM	1	0	20.96	20.88	21.17
		1	12	21.21	21.28	21.12
		1	24	20.89	20.76	20.73
		12	0	19.85	20.15	19.96
		12	6	19.90	19.89	19.98
		12	13	19.79	19.97	19.61
		25	0	19.84	19.67	19.68

*ERP = Conducted + antenna gain (2.02dBi) - 2.15

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132072	132322	132572
		Frequency (MHz)		1720	1745	1770
20M	QPSK	1	0	24.20	23.68	24.03
		1	50	24.12	24.52	24.13
		1	99	24.05	23.84	24.02
		50	0	23.24	22.92	23.19
		50	25	23.25	22.99	23.19
		50	50	22.91	23.08	22.90
		100	0	23.19	23.04	23.39
20M	16QAM	1	0	23.25	23.15	23.30
		1	50	23.30	23.76	23.38
		1	99	23.67	23.32	23.66
		50	0	21.64	21.93	21.68
		50	25	21.77	22.26	22.29
		50	50	22.09	21.93	22.28
		100	0	21.90	21.83	22.03
20M	64QAM	1	0	22.08	22.35	22.15
		1	50	22.16	22.44	22.57
		1	99	22.14	22.34	22.41
		50	0	21.19	21.27	20.95
		50	25	20.91	21.00	20.98
		50	50	20.89	21.15	21.35
		100	0	20.93	21.24	21.01

*EIRP = Conducted + antenna gain (1.57dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132047	132322	132597
		Frequency (MHz)		1717.5	1745	1772.5
15M	QPSK	1	0	23.69	23.86	24.21
		1	37	24.22	24.51	24.31
		1	74	23.92	24.06	23.92
		36	0	23.23	23.36	23.16
		36	19	22.85	23.31	23.26
		36	39	22.96	22.92	23.40
		75	0	23.08	22.82	22.95
15M	16QAM	1	0	23.23	23.26	23.12
		1	37	23.76	23.44	23.38
		1	74	23.60	23.70	23.35
		36	0	22.18	21.94	21.96
		36	19	22.03	22.06	21.96
		36	39	22.15	21.84	21.86
		75	0	22.18	22.26	21.75
15M	64QAM	1	0	22.21	22.13	22.20
		1	50	22.48	22.41	22.29
		1	99	22.16	22.14	22.39
		50	0	21.11	21.31	21.39
		50	25	21.05	21.46	21.22
		50	50	21.39	21.22	20.87
		100	0	21.19	21.16	21.13

*EIRP = Conducted + antenna gain (1.57dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132022	132322	132622
		Frequency (MHz)		1715	1745	1775
10M	QPSK	1	0	23.80	23.79	24.01
		1	24	24.06	24.04	24.28
		1	49	24.12	23.91	23.77
		25	0	23.11	22.83	23.37
		25	12	22.87	23.25	23.02
		25	25	23.37	22.90	23.05
		50	0	23.13	23.32	23.41
10M	16QAM	1	0	23.29	23.19	23.24
		1	24	23.70	23.50	23.69
		1	49	23.10	23.48	23.53
		25	0	22.07	21.68	21.68
		25	12	22.00	22.30	21.94
		25	25	22.05	21.93	22.13
		50	0	22.04	21.97	22.06
10M	64QAM	1	0	22.24	22.35	21.97
		1	50	22.30	22.41	22.60
		1	99	21.85	22.40	21.96
		50	0	20.87	21.09	20.86
		50	25	21.20	21.10	21.16
		50	50	21.23	20.87	21.02
		100	0	21.37	21.31	21.32

*EIRP = Conducted + antenna gain (1.57dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131997	132322	132647
		Frequency (MHz)		1712.5	1745	1777.5
5M	QPSK	1	0	23.94	23.65	23.91
		1	12	24.34	24.39	24.20
		1	24	23.96	24.04	24.06
		12	0	23.10	22.82	23.33
		12	6	23.15	23.18	22.95
		12	13	23.10	22.87	23.20
		25	0	23.11	22.81	23.20
5M	16QAM	1	0	23.25	23.09	23.12
		1	12	23.55	23.36	23.50
		1	24	23.40	23.69	23.28
		12	0	21.92	21.98	21.99
		12	6	22.04	22.19	22.21
		12	13	22.05	22.34	22.26
		25	0	22.04	21.97	21.77
5M	64QAM	1	0	22.05	22.30	21.80
		1	50	22.35	22.18	22.27
		1	99	22.11	22.13	21.95
		50	0	21.09	21.12	21.25
		50	25	21.19	21.03	21.29
		50	50	21.13	20.87	21.39
		100	0	21.07	20.96	20.95

*EIRP = Conducted + antenna gain (1.57dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131987	132322	132657
		Frequency (MHz)		1711.5	1745	1778.5
3M	QPSK	1	0	23.80	23.97	24.06
		1	7	24.13	24.05	24.51
		1	14	24.11	23.72	23.68
		8	0	23.38	22.92	23.30
		8	3	23.35	22.95	23.30
		8	7	22.89	23.00	22.93
		15	0	22.88	22.88	22.90
3M	16QAM	1	0	23.11	23.26	23.08
		1	7	23.74	23.39	23.81
		1	14	23.36	23.65	23.19
		8	0	21.92	22.08	21.67
		8	3	22.09	21.96	21.75
		8	7	21.76	21.93	22.01
		15	0	22.13	21.91	22.24
3M	64QAM	1	0	21.80	22.32	21.95
		1	50	22.13	22.31	22.19
		1	99	21.95	22.29	22.27
		50	0	21.27	20.86	20.98
		50	25	21.12	21.11	21.08
		50	50	21.10	20.85	21.31
		100	0	20.85	21.07	21.31

*EIRP = Conducted + antenna gain (1.57dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131979	132322	132665
		Frequency (MHz)		1710.7	1745	1779.3
1.4M	QPSK	1	0	24.08	23.64	24.07
		1	2	24.14	24.10	24.31
		1	5	23.90	24.23	23.87
		3	0	23.38	22.86	23.14
		3	1	22.97	23.12	23.08
		3	3	22.95	23.09	22.84
		6	0	23.17	23.14	23.09
1.4M	16QAM	1	0	23.26	23.49	23.33
		1	2	23.25	23.41	23.38
		1	5	23.67	23.46	23.32
		3	0	21.86	21.64	21.82
		3	1	21.94	21.95	21.74
		3	3	22.26	21.89	22.04
		6	0	21.94	22.11	21.76
1.4M	64QAM	1	0	21.80	22.20	22.31
		1	50	22.12	22.34	22.10
		1	99	22.05	22.35	22.22
		50	0	20.89	21.37	20.94
		50	25	21.34	21.20	21.38
		50	50	21.22	21.26	21.03
		100	0	21.09	20.96	20.84

*EIRP = Conducted + antenna gain (1.57dBi)

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

4.2.2 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector, The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.3 Test Setup



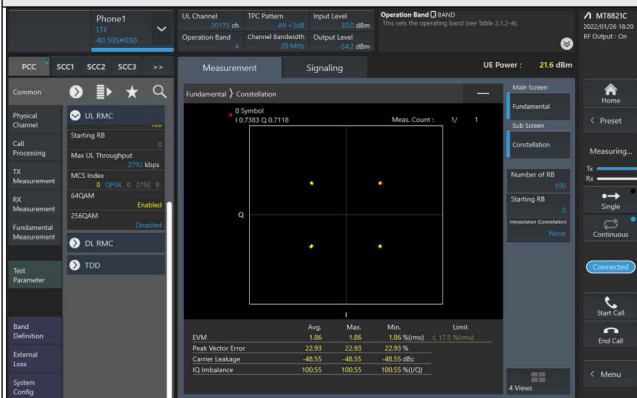
4.2.4 Test Results

LTE Band 4

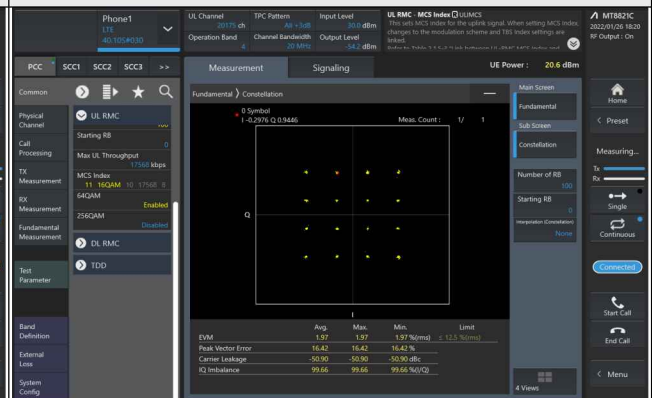
Spectrum Plot of Measurement Value

Channel: 20175 / Frequency (MHz): 1732.5MHz

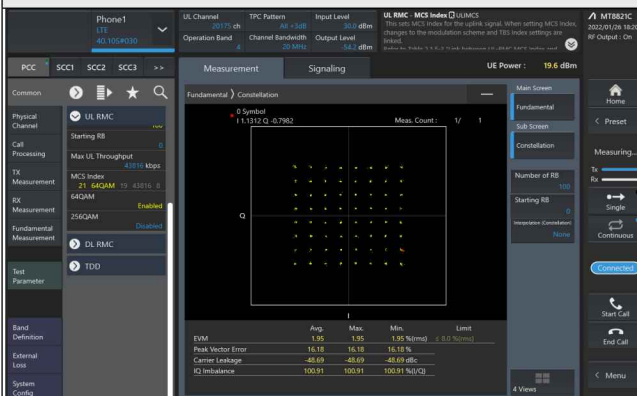
QPSK



16QAM



64QAM



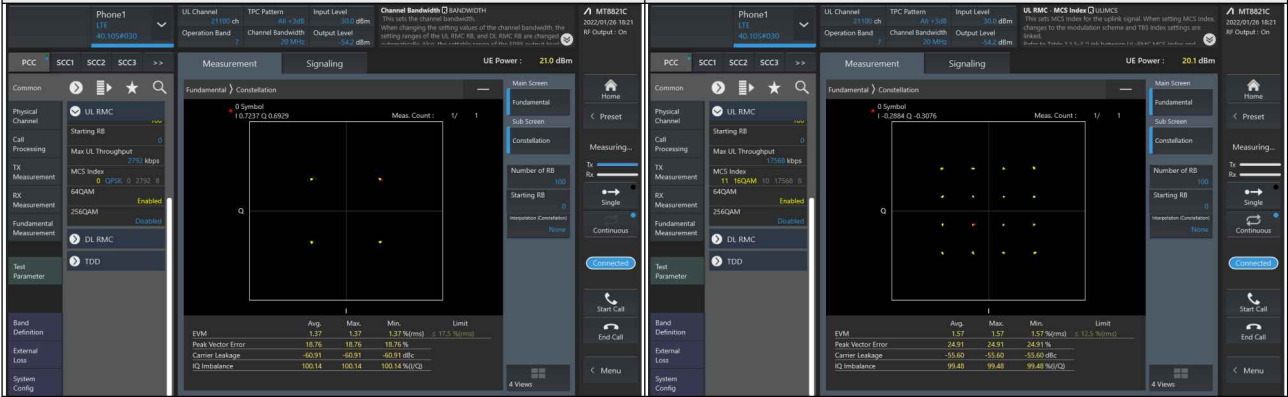
LTE Band 7

Spectrum Plot of Measurement Value

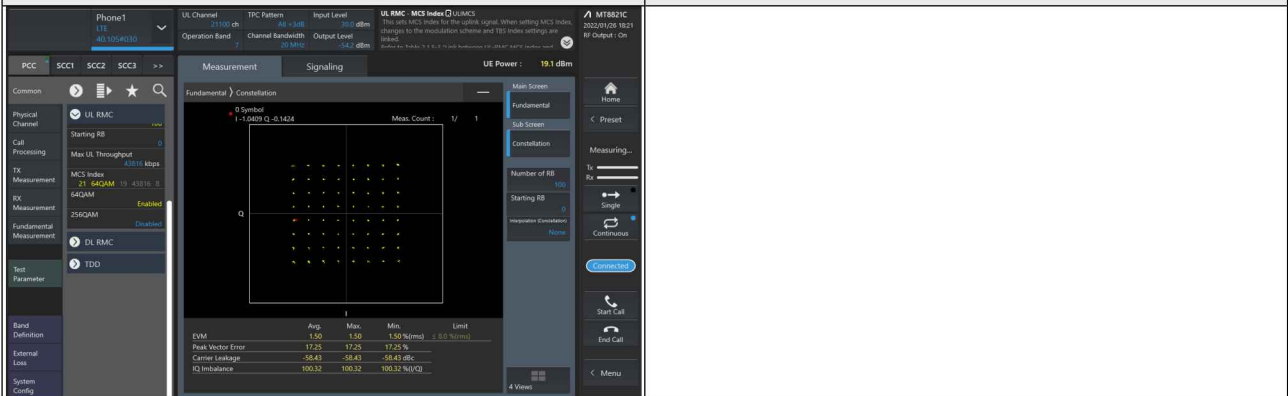
Channel: 21100 / Frequency (MHz): 2535.0MHz

QPSK

16QAM



64QAM

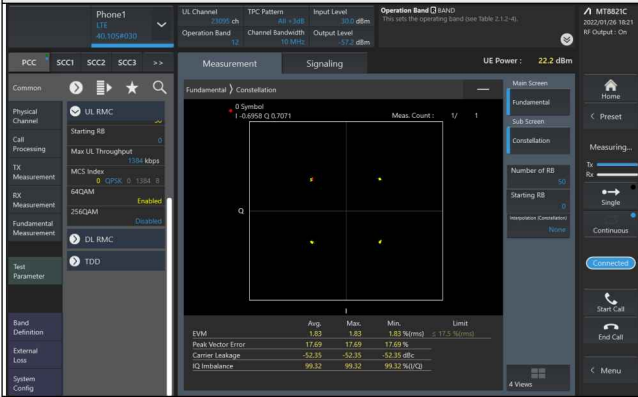


LTE Band 12

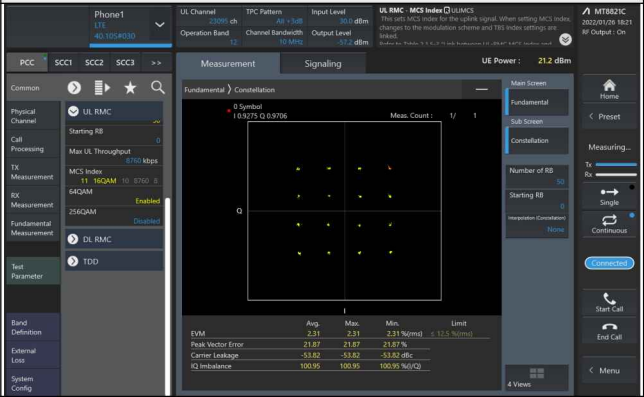
Spectrum Plot of Measurement Value

Channel: 23095 / Frequency (MHz): 707.5MHz

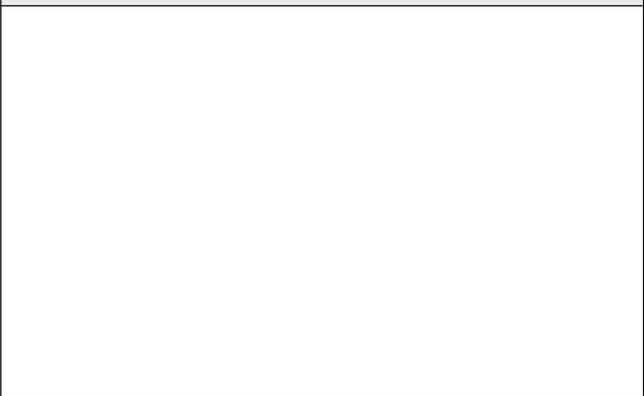
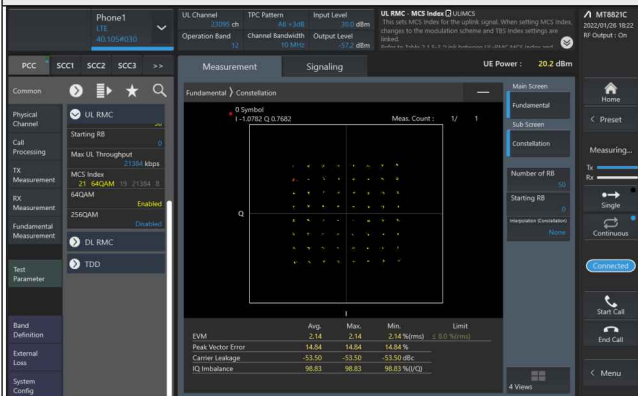
QPSK



16QAM



64QAM

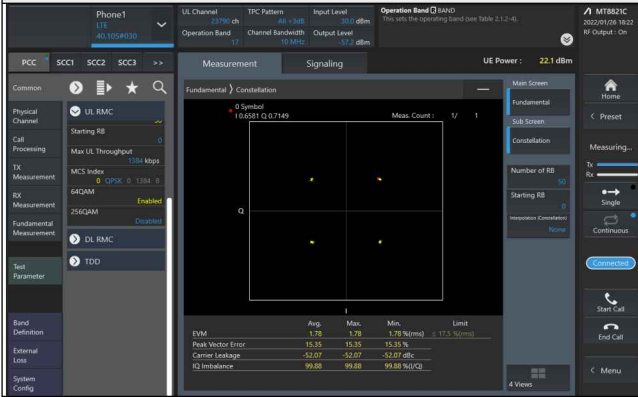


LTE Band 17

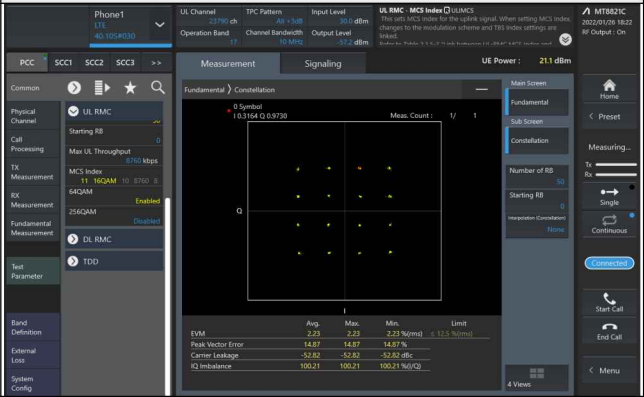
Spectrum Plot of Measurement Value

Channel: 23790 / Frequency (MHz): 710.0MHz

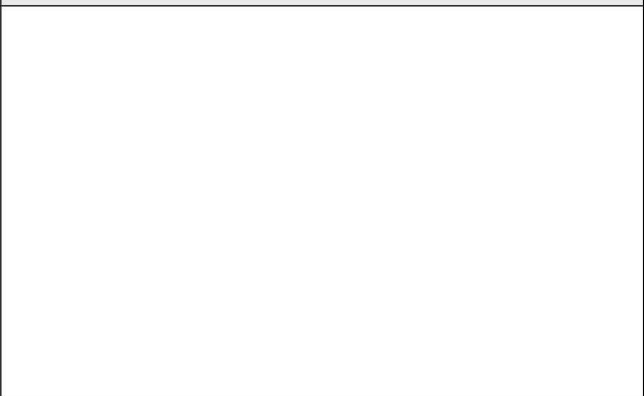
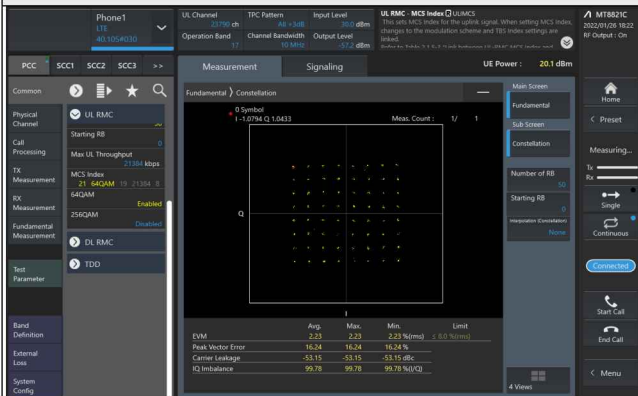
QPSK



16QAM



64QAM



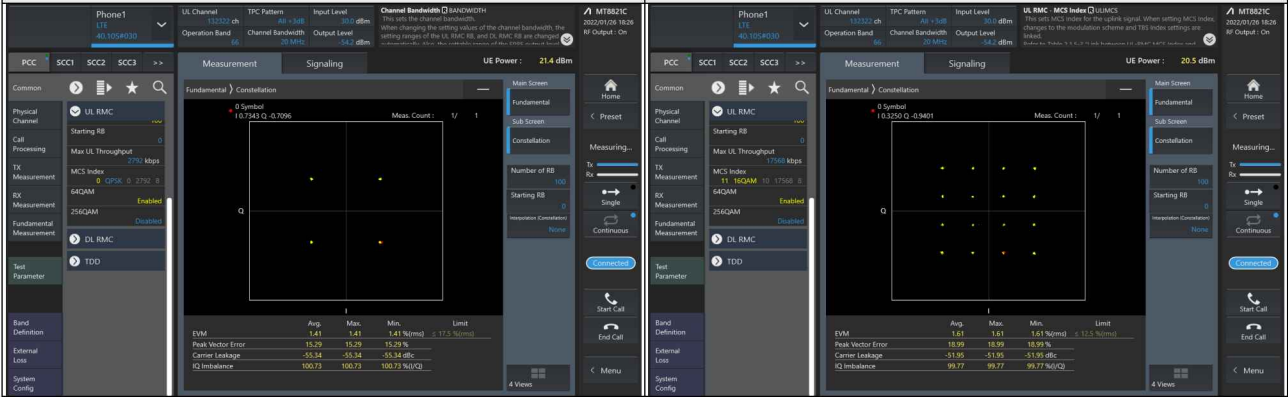
LTE Band 66

Spectrum Plot of Measurement Value

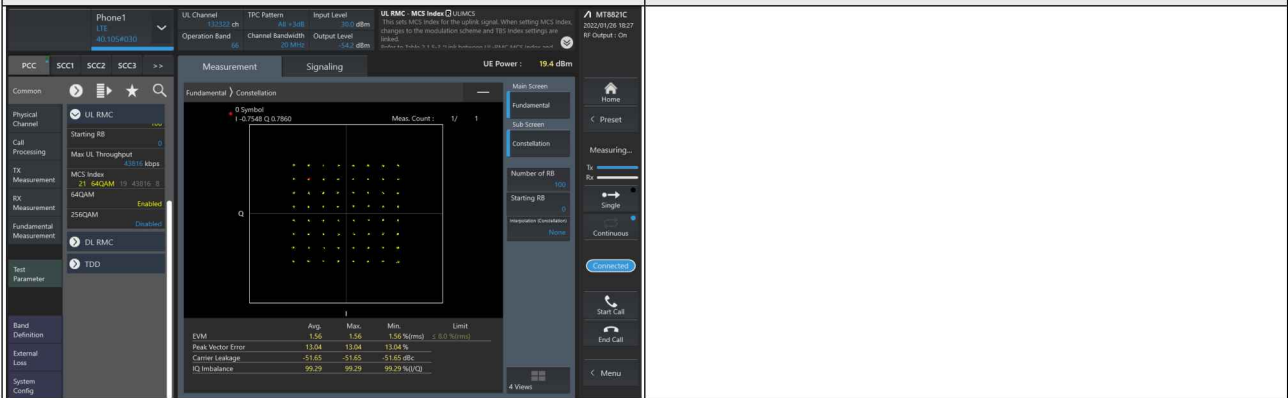
Channel: 132322 / Frequency (MHz): 1745.0MHz

QPSK

16QAM



64QAM



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

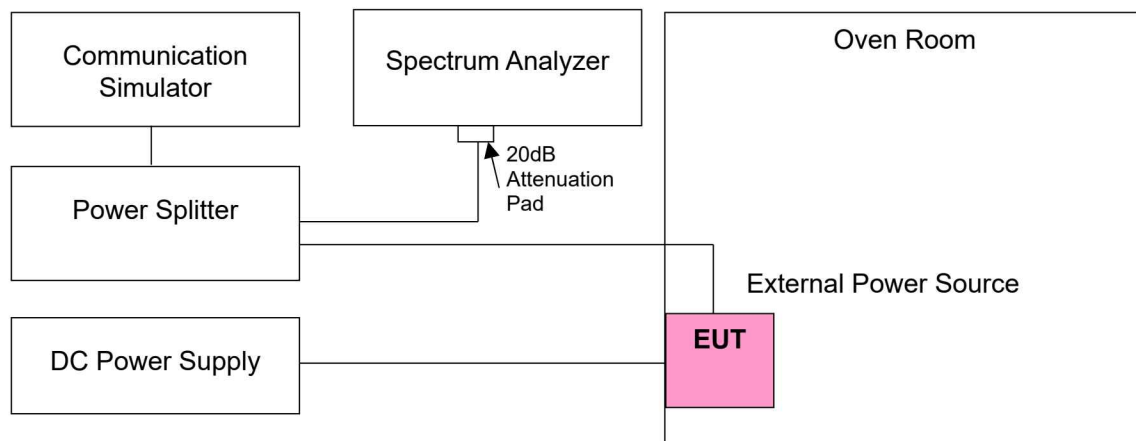
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

4.3.2 Test Procedure

- a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5 °C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	1710.700004	0.002	1754.300001	0.001
3.4	1710.700001	0.001	1754.300004	0.002
4.6	1710.700004	0.002	1754.300002	0.001

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1710.700003	0.002	1754.300004	0.002
-30	1710.700003	0.002	1754.300004	0.002
-20	1710.700001	0.001	1754.300001	0.001
-10	1710.700003	0.002	1754.300003	0.002
0	1710.700002	0.001	1754.300002	0.001
10	1710.700001	0.001	1754.300003	0.002
20	1710.699999	-0.001	1754.299996	-0.002
30	1710.699999	-0.001	1754.299998	-0.001
40	1710.699998	-0.001	1754.299999	-0.001
50	1710.699998	-0.001	1754.299997	-0.002
60	1710.699997	-0.002	1754.299997	-0.002
70	1710.699996	-0.002	1754.299997	-0.002
80	1710.699999	-0.001	1754.299998	-0.001
85	1710.699998	-0.001	1754.299996	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	1711.500003	0.002	1753.500001	0.001
3.4	1711.500002	0.001	1753.500003	0.002
4.6	1711.500002	0.001	1753.500003	0.002

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1711.500003	0.002	1753.500004	0.002
-30	1711.500001	0.001	1753.500004	0.002
-20	1711.500001	0.001	1753.500002	0.001
-10	1711.500002	0.001	1753.500003	0.002
0	1711.500004	0.002	1753.500001	0.001
10	1711.500004	0.002	1753.500002	0.001
20	1711.499996	-0.002	1753.499997	-0.002
30	1711.499996	-0.002	1753.499997	-0.002
40	1711.499996	-0.002	1753.499996	-0.002
50	1711.499999	-0.001	1753.499999	-0.001
60	1711.499996	-0.002	1753.499998	-0.001
70	1711.499998	-0.001	1753.499998	-0.001
80	1711.499997	-0.002	1753.499996	-0.002
85	1711.499996	-0.002	1753.499998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	1712.500002	0.001	1752.500003	0.002
3.4	1712.500003	0.002	1752.500002	0.001
4.6	1712.500001	0.001	1752.500001	0.001

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1712.500001	0.001	1752.500001	0.001
-30	1712.500001	0.001	1752.500004	0.002
-20	1712.500004	0.002	1752.500001	0.001
-10	1712.500003	0.002	1752.500001	0.001
0	1712.500004	0.002	1752.500002	0.001
10	1712.500004	0.002	1752.500003	0.002
20	1712.499998	-0.001	1752.499998	-0.001
30	1712.499996	-0.002	1752.499999	-0.001
40	1712.499997	-0.002	1752.499997	-0.002
50	1712.499999	-0.001	1752.499999	-0.001
60	1712.499997	-0.002	1752.499996	-0.002
70	1712.499998	-0.001	1752.499997	-0.002
80	1712.499999	-0.001	1752.499999	-0.001
85	1712.499999	-0.001	1752.499997	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	1715.000001	0.001	1750.000003	0.002
3.4	1715.000002	0.001	1750.000002	0.001
4.6	1715.000003	0.002	1750.000004	0.002

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1715.000001	0.001	1750.000002	0.001
-30	1715.000003	0.002	1750.000004	0.002
-20	1715.000003	0.002	1750.000001	0.001
-10	1715.000002	0.001	1750.000002	0.001
0	1715.000003	0.002	1750.000001	0.001
10	1715.000001	0.001	1750.000001	0.001
20	1714.999996	-0.002	1749.999998	-0.001
30	1714.999996	-0.002	1749.999996	-0.002
40	1714.999996	-0.002	1749.999997	-0.002
50	1714.999998	-0.001	1749.999998	-0.001
60	1714.999996	-0.002	1749.999999	-0.001
70	1714.999997	-0.002	1749.999999	-0.001
80	1714.999998	-0.001	1749.999998	-0.001
85	1714.999998	-0.001	1749.999999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	1717.500002	0.001	1747.500003	0.002
3.4	1717.500004	0.002	1747.500002	0.001
4.6	1717.500001	0.001	1747.500002	0.001

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1717.500002	0.001	1747.500003	0.002
-30	1717.500003	0.002	1747.500003	0.002
-20	1717.500004	0.002	1747.500001	0.001
-10	1717.500001	0.001	1747.500003	0.002
0	1717.500003	0.002	1747.500003	0.002
10	1717.500004	0.002	1747.500003	0.002
20	1717.499999	-0.001	1747.499999	-0.001
30	1717.499997	-0.002	1747.499997	-0.002
40	1717.499999	-0.001	1747.499997	-0.002
50	1717.499996	-0.002	1747.499997	-0.002
60	1717.499999	-0.001	1747.499997	-0.002
70	1717.499998	-0.001	1747.499998	-0.001
80	1717.499998	-0.001	1747.499999	-0.001
85	1717.499998	-0.001	1747.499997	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	1720.000001	0.001	1745.000004	0.002
3.4	1720.000004	0.002	1745.000004	0.002
4.6	1720.000004	0.002	1745.000003	0.002

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1720.000003	0.002	1745.000001	0.001
-30	1720.000002	0.001	1745.000003	0.002
-20	1720.000002	0.001	1745.000001	0.001
-10	1720.000004	0.002	1745.000004	0.002
0	1720.000003	0.002	1745.000003	0.002
10	1720.000003	0.002	1745.000001	0.001
20	1719.999997	-0.002	1744.999996	-0.002
30	1719.999999	-0.001	1744.999997	-0.002
40	1719.999996	-0.002	1744.999999	-0.001
50	1719.999998	-0.001	1744.999997	-0.002
60	1719.999999	-0.001	1744.999999	-0.001
70	1719.999996	-0.002	1744.999999	-0.001
80	1719.999999	-0.001	1744.999996	-0.002
85	1719.999998	-0.001	1744.999999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 7			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	2502.500002	0.001	2567.500004	0.002
3.4	2502.500002	0.001	2567.500003	0.001
4.6	2502.500001	0.000	2567.500004	0.002

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 7			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	2502.500003	0.001	2567.500004	0.002
-30	2502.500001	0.000	2567.500004	0.002
-20	2502.500002	0.001	2567.500004	0.002
-10	2502.500002	0.001	2567.500002	0.001
0	2502.500004	0.002	2567.500001	0.000
10	2502.500002	0.001	2567.500001	0.000
20	2502.499997	-0.001	2567.499997	-0.001
30	2502.499999	0.000	2567.499996	-0.002
40	2502.499996	-0.002	2567.499999	0.000
50	2502.499999	0.000	2567.499998	-0.001
60	2502.499999	0.000	2567.499999	0.000
70	2502.499996	-0.002	2567.499996	-0.002
80	2502.499999	0.000	2567.499998	-0.001
85	2502.499999	0.000	2567.499999	0.000