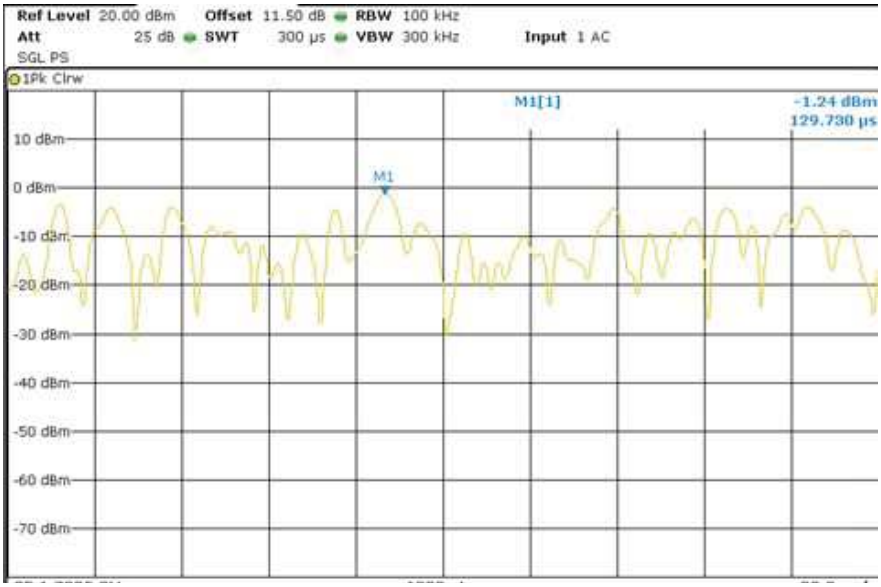
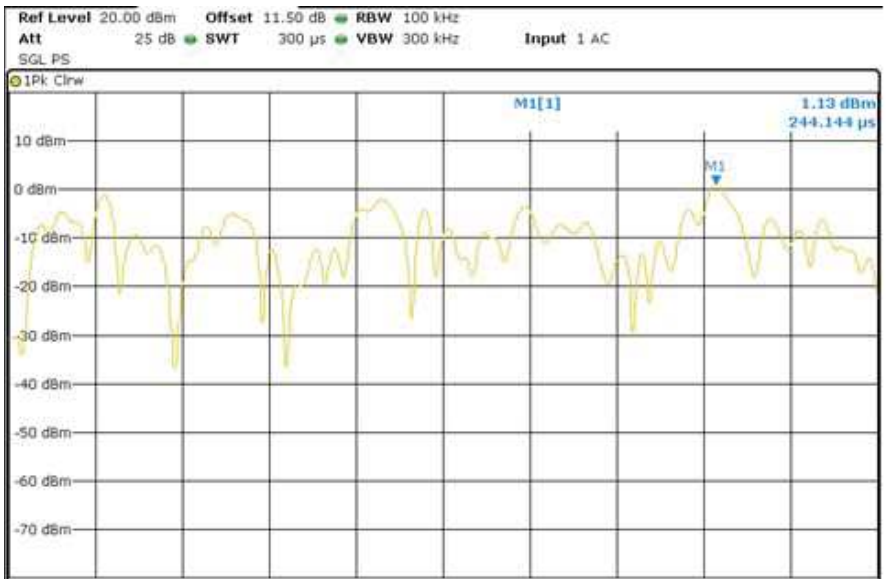
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

QPSK Modulation



16QAM Modulation



TEST A.3: FREQUENCY STABILITY

LIMITS:	Product standard:	FCC Part 22 / IC RSS-132
	Test standard:	FCC §2.1055 and § 22.535/ RSS-132 Clause 5.3

LIMITS

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

TEST SETUP	

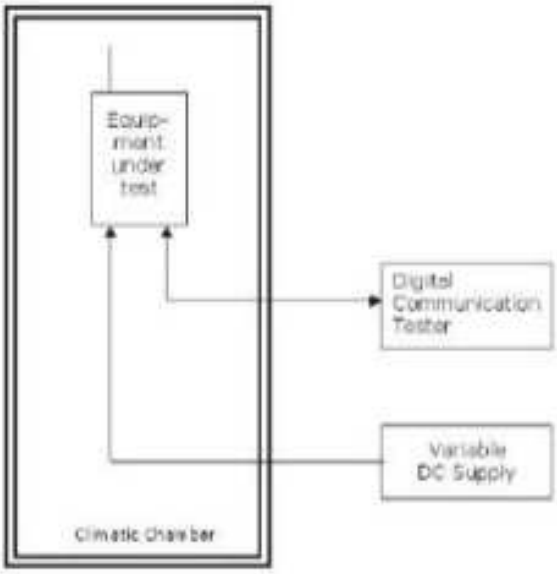
The frequency tolerance measurements over temperature variations were made over the temperature range of

–30ºC to +50ºC. The EUT was placed inside a climatic chamber and the temperature was raised hourly in 10ºC steps from –30ºC up to +50ºC.

The supply voltage was varied between 85% and 115% of nominal voltage.

The EUT was set in “call mode” in the middle channel using the Universal Radio Communication tester R&S CMW500 and the maximum frequency error was measured using the built-in calibrated frequency meter.

For LTE mode the QPSK modulation was used for the test as it is the worst case for conducted power.



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

LTE QPSK MODULATION. BW = 5 MHz

Frequency stability over temperature variations

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
50	1.7	0.0020	0.00000020
40	-0.83	-0.0010	-0.00000010
30	0.59	0.0007	0.00000007
20	-2.03	-0.0024	-0.00000024
10	0.5	0.0006	0.00000006
0	-0.2	-0.0002	-0.00000002
-10	-0.86	-0.0010	-0.00000010
-20	0.76	0.0009	0.00000009
-30	-0.54	-0.0006	-0.00000006

Frequency stability over voltage variations

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.4	0.1	0.0001	0.00000001
Vmin	3.3	-0.83	-0.0010	-0.00000010

TEST A.4: OCCUPIED BANDWIDTH

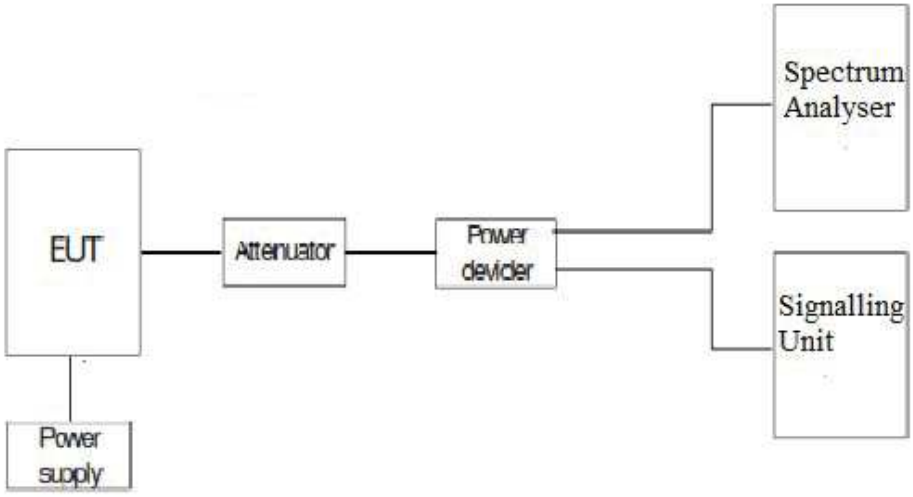
LIMITS:	Product standard:	FCC Part 22 / IC RSS-132
	Test standard:	FCC § 2.1049/ RSS-132 Clause 5.1

LIMITS

Reference only.

TEST SETUP	

The occupied bandwidth measurement was performed at the output terminals of the EUT using an attenuator, power splitter and spectrum analyzer. The EUT was controlled via the Universal Radio Communication Tester R&S CMW500 selecting maximum transmission power of the EUT and different modes of modulation. The 99% occupied bandwidth and the -26 dBc bandwidth were measured directly using the built-in bandwidth measuring option of spectrum analyzer.



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

LTE QPSK MODULATION. BW = 1.4 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.11	1.12	1.11
-26 dBc bandwidth (MHz)	1.28	1.27	1.28

LTE 16QAM MODULATION. BW = 1.4 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.10	1.11	1.11
-26 dBc bandwidth (MHz)	1.27	1.27	1.28

LTE QPSK MODULATION. BW = 3 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	2.74	2.74	2.74
-26 dBc bandwidth (MHz)	3.10	3.08	3.08

LTE 16QAM MODULATION. BW = 3 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	2.76	2.73	2.73
-26 dBc bandwidth (MHz)	3.11	3.09	3.08

LTE QPSK MODULATION. BW = 5 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	4.58	4.56	4.57
-26 dBc bandwidth (MHz)	5.18	5.17	5.15

TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 5 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	4.56	4.56	4.57
-26 dBc bandwidth (MHz)	5.15	5.17	5.17

LTE QPSK MODULATION. BW = 10 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	8.94	9.22	9.54
-26 dBc bandwidth (MHz)	11.98	11.81	12.29

LTE 16QAM MODULATION. BW = 10 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	5.92	5.92	6.80
-26 dBc bandwidth (MHz)	10.80	9.70	11.19

LTE QPSK MODULATION. BW = 15 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	13.92	13.89	13.83
-26 dBc bandwidth (MHz)	15.28	17.15	17.00

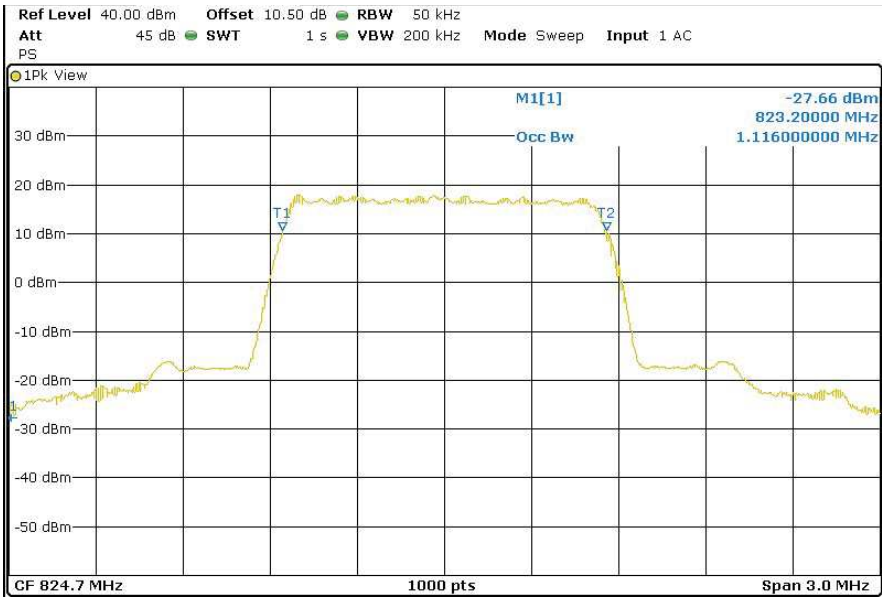
LTE 16QAM MODULATION. BW = 15 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	7.41	7.68	7.23
-26 dBc bandwidth (MHz)	12.07	11.20	11.14

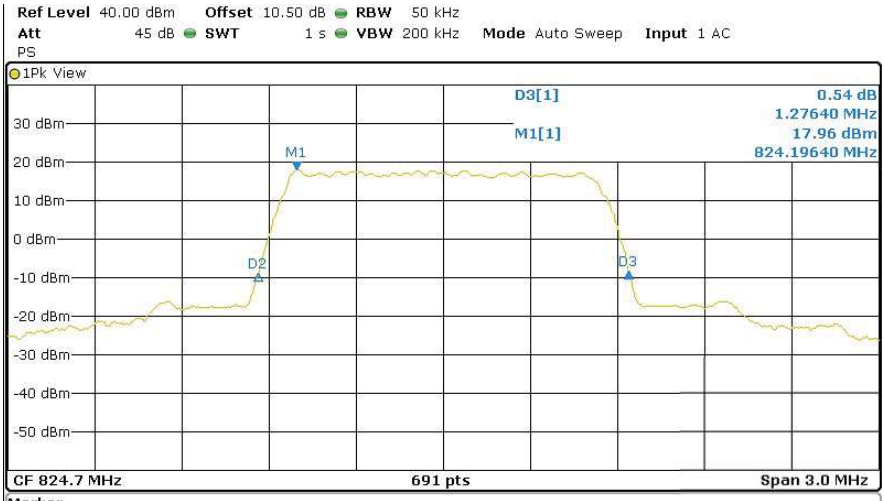
TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 1.4 MHz

Lowest Channel 99% Occupied Bandwidth



Lowest Channel -26dBc Bandwidth

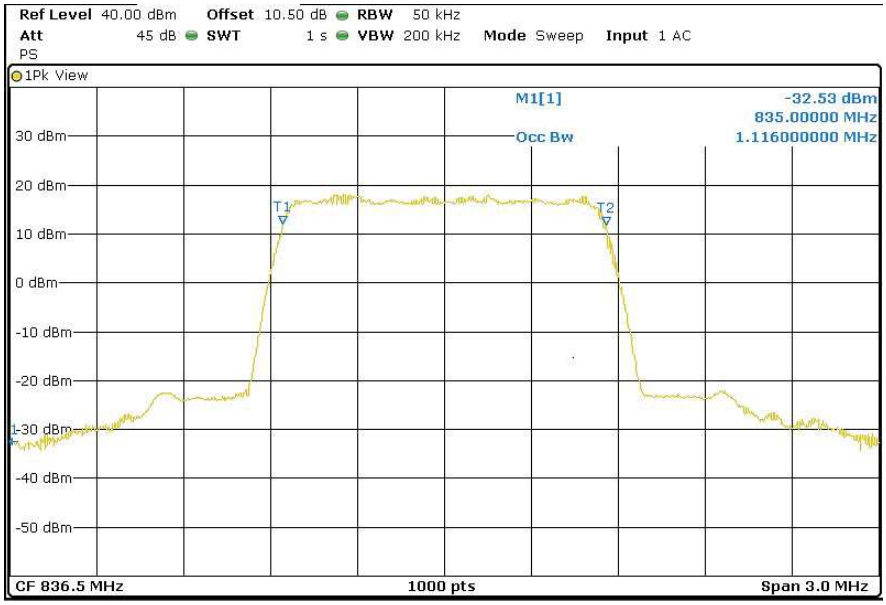


Marker

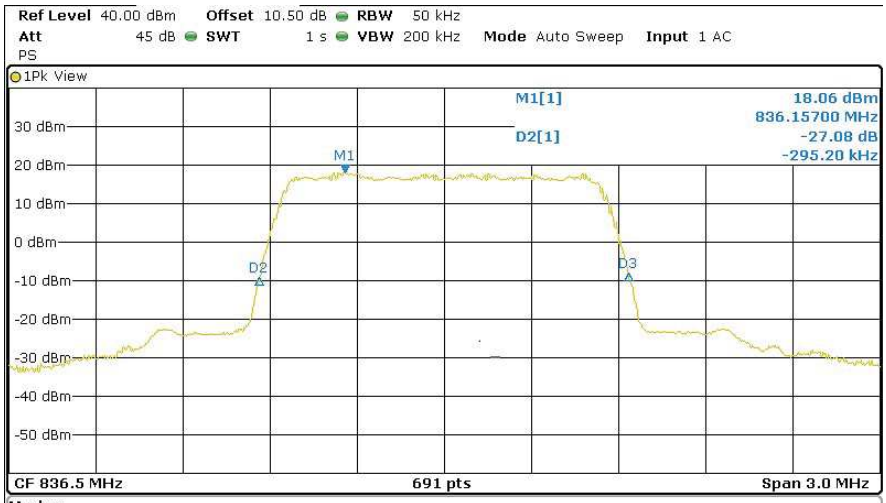
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	824.1964 MHz	17.96 dBm		
D2	M1	1	-134.6 kHz	-26.86 dB		
D3	D2	1	1.2764 MHz	0.54 dB		

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth



Middle Channel -26dBc Bandwidth

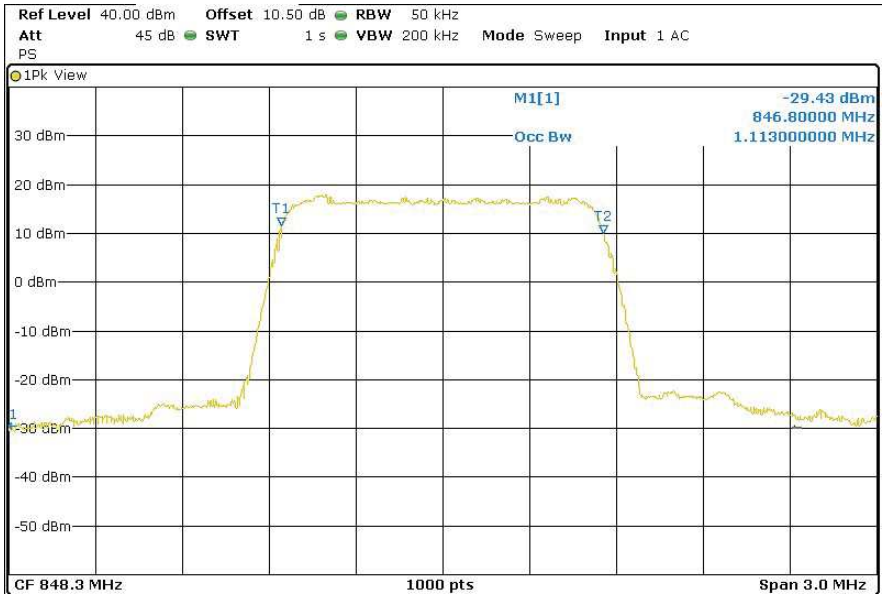


Marker

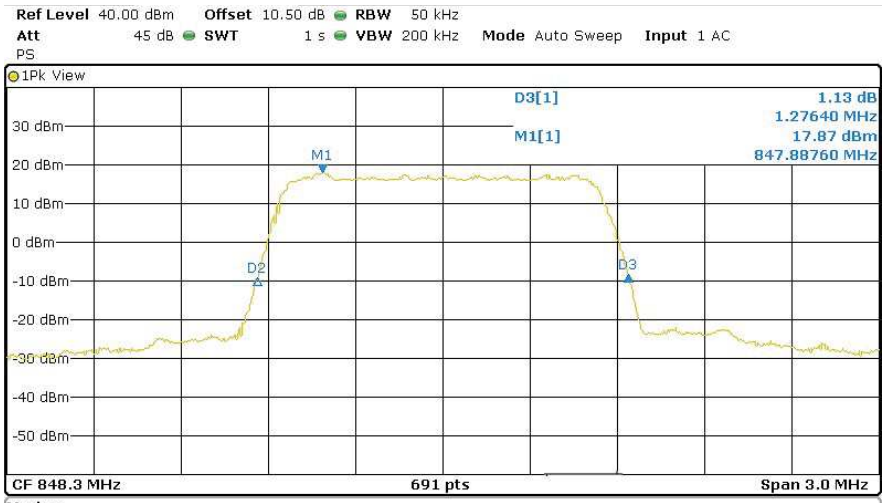
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	836.157 MHz	18.06 dBm		
D2	M1	1	-295.2 kHz	-27.08 dB		
D3	D2	1	1.2721 MHz	0.93 dB		

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth



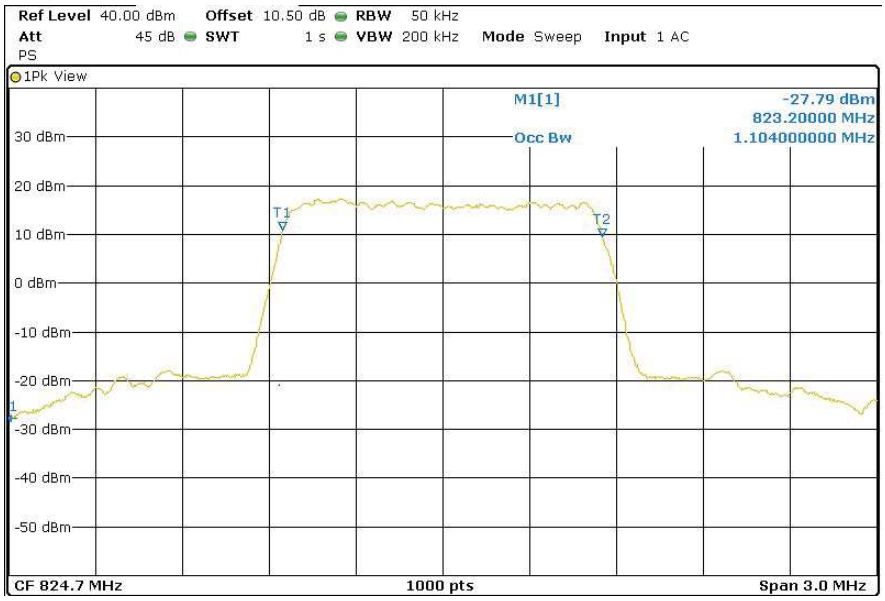
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	847.8876 MHz	17.87 dBm		
D2	M1	1	-225.8 kHz	-27.14 dB		
D3	D2	1	1.2764 MHz	1.13 dB		

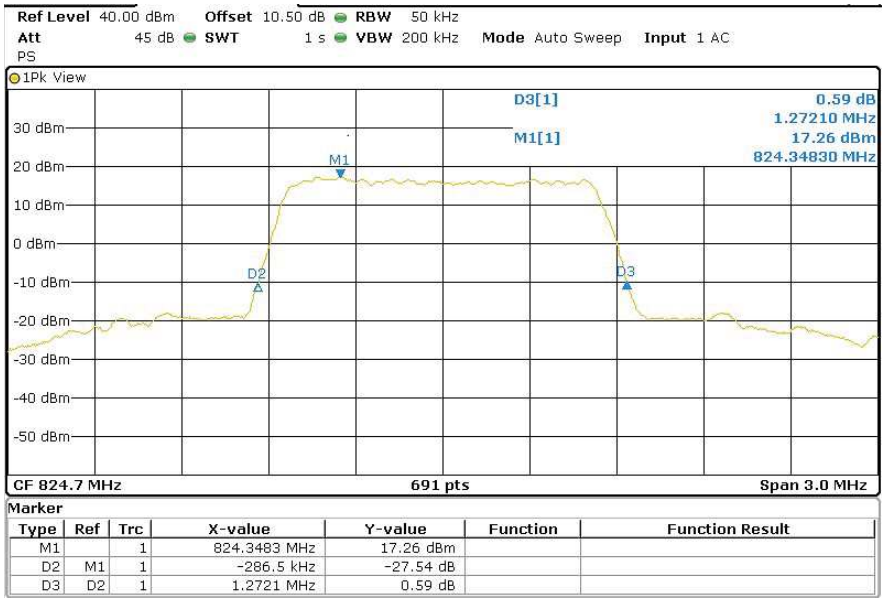
TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 1.4 MHz

Lowest Channel 99% Occupied Bandwidth



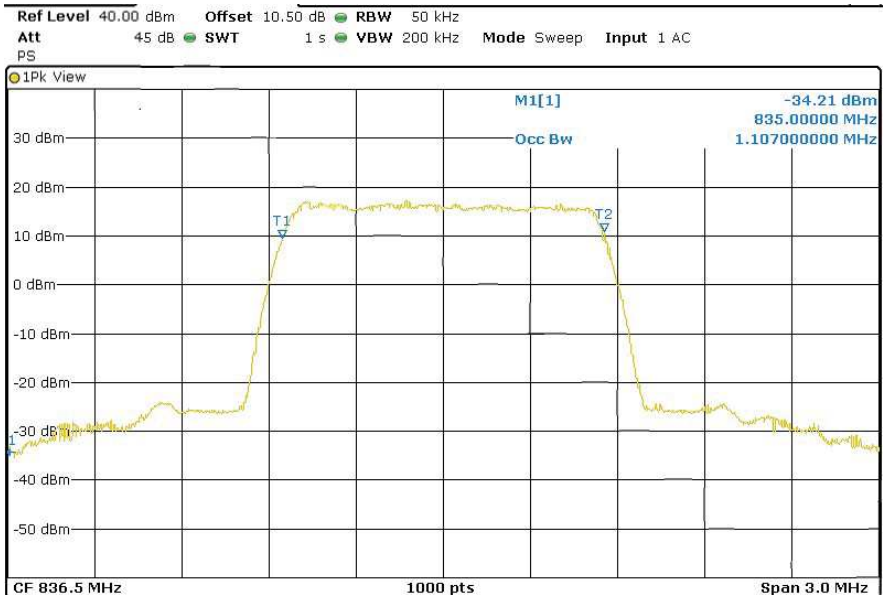
Lowest Channel -26dBc Bandwidth



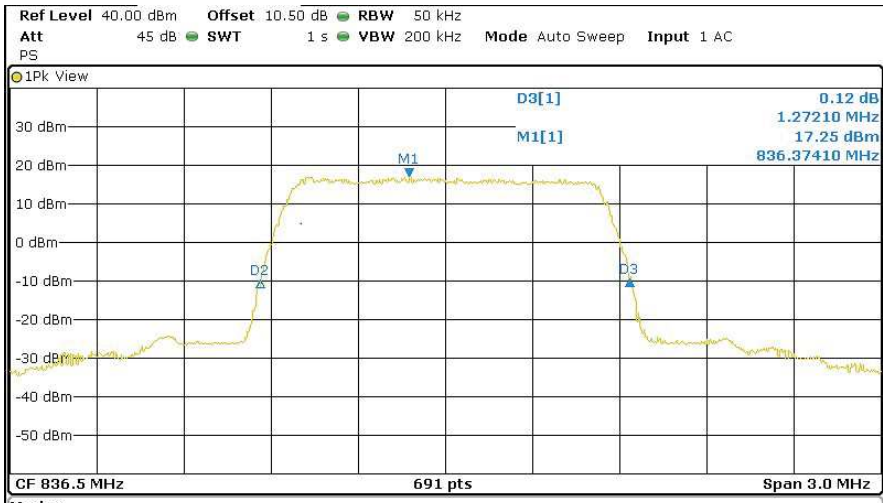
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	824.3483 MHz	17.26 dBm		
D2	M1	1	-286.5 kHz	-27.54 dB		
D3	D2	1	1.2721 MHz	0.59 dB		

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth



Middle Channel -26dBc Bandwidth

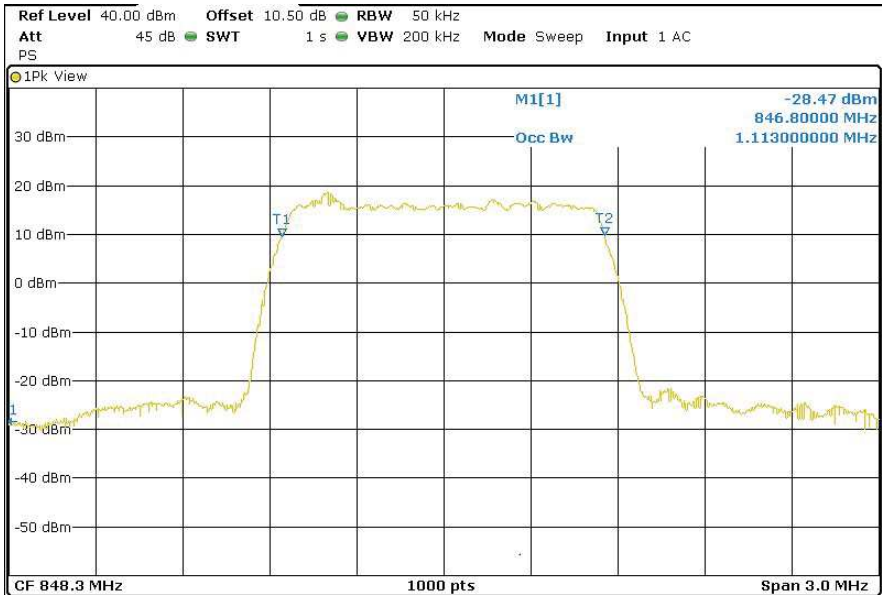


Marker

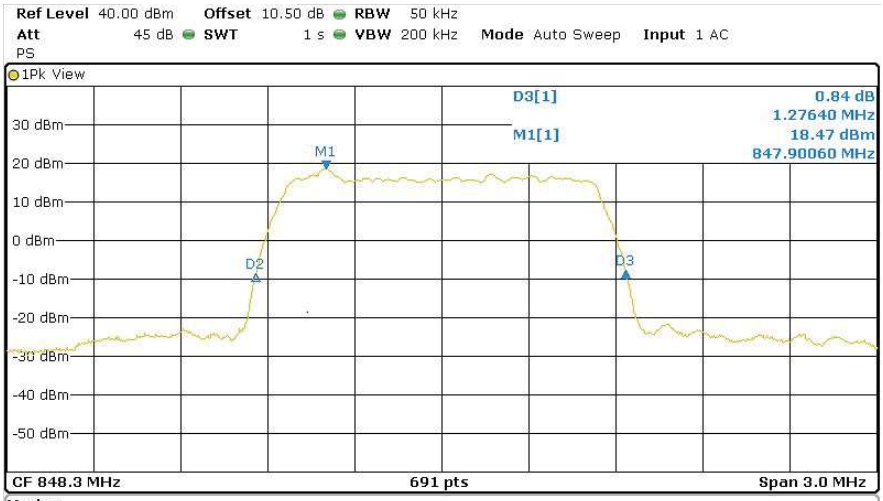
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	836.3741 MHz	17.25 dBm		
D2	M1	1	-512.3 kHz	-26.94 dB		
D3	D2	1	1.2721 MHz	0.12 dB		

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth



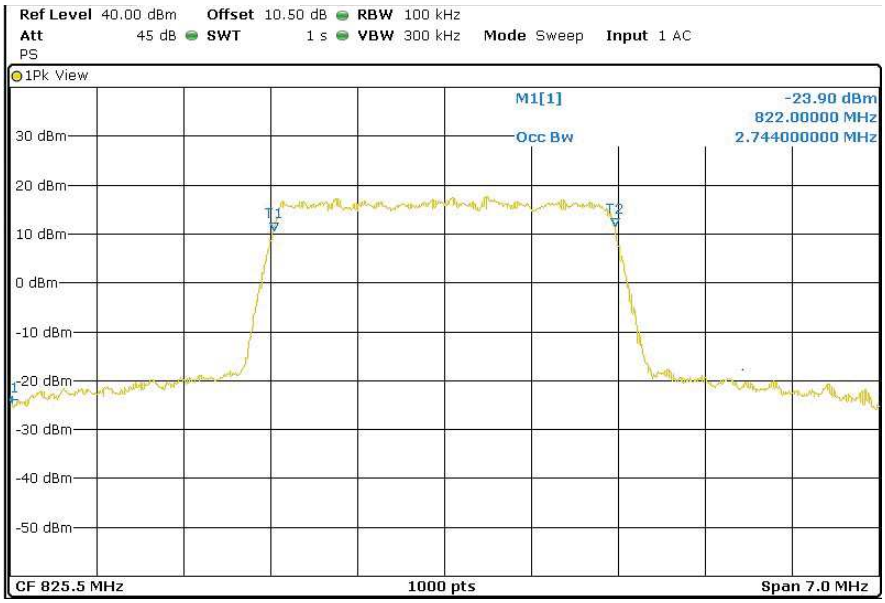
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	847.9006 MHz	18.47 dBm		
D2	M1	1	-243.1 kHz	-27.07 dB		
D3	D2	1	1.2764 MHz	0.84 dB		

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 3 MHz

Lowest Channel 99% Occupied Bandwidth

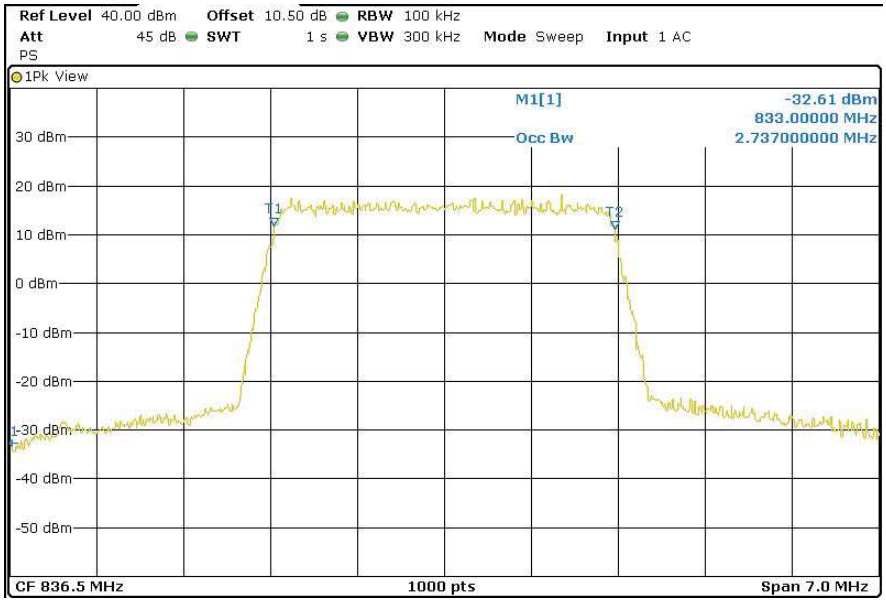


Lowest Channel -26dBc Bandwidth

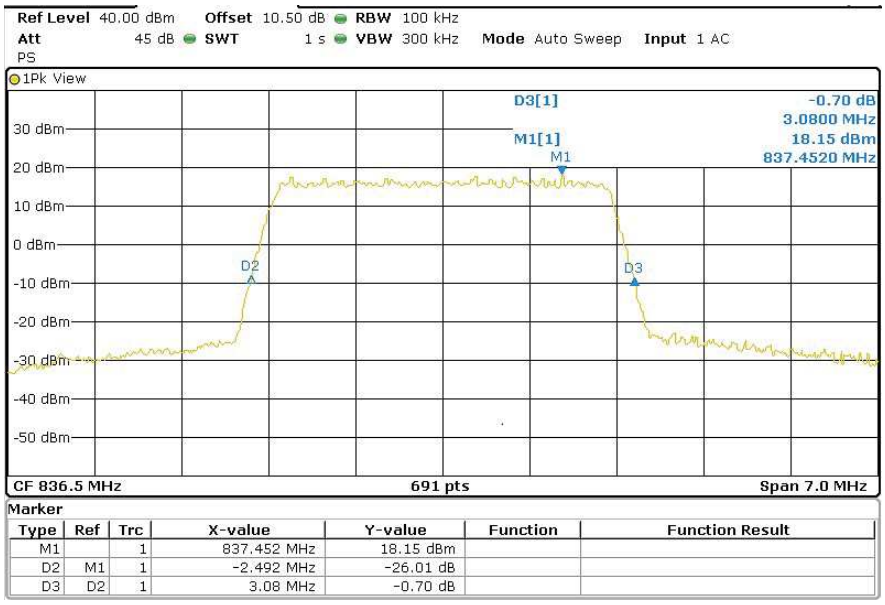
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	825.834 MHz	17.61 dBm		
D2	M1	1	-1.884 MHz	-26.43 dB		
D3	D2	1	3.1 MHz	0.20 dB		

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

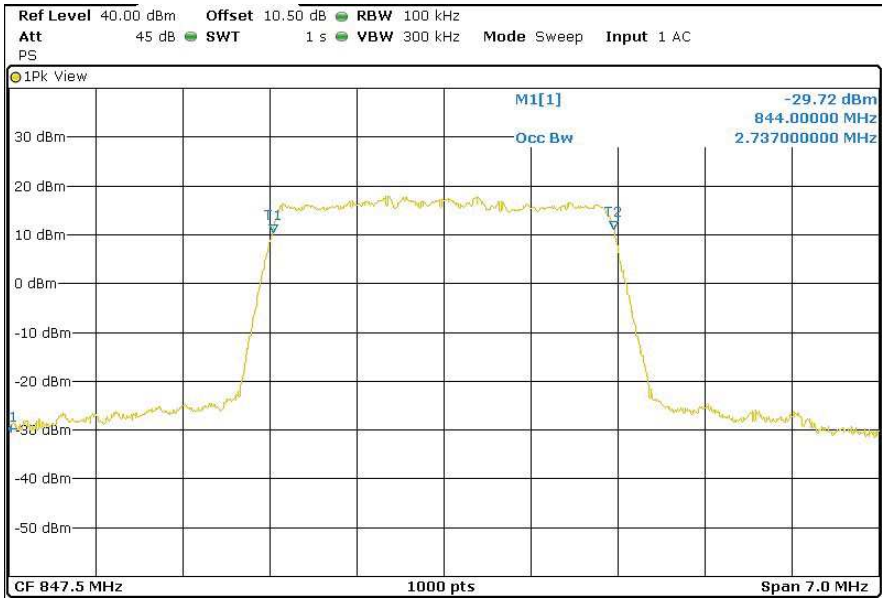


Middle Channel -26dBc Bandwidth

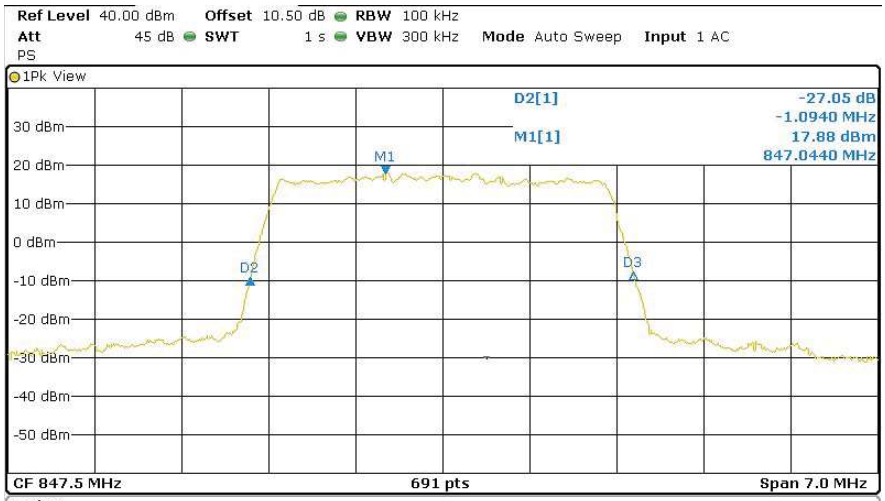


TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth



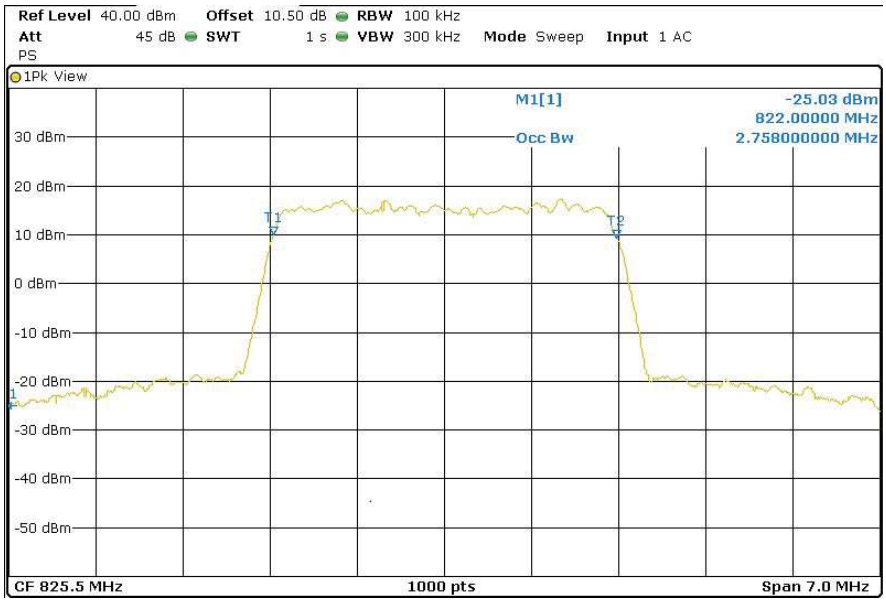
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	847.044 MHz	17.88 dBm		
D2	M1	1	-1.094 MHz	-27.05 dB		
D3	D2	1	3.08 MHz	1.35 dB		

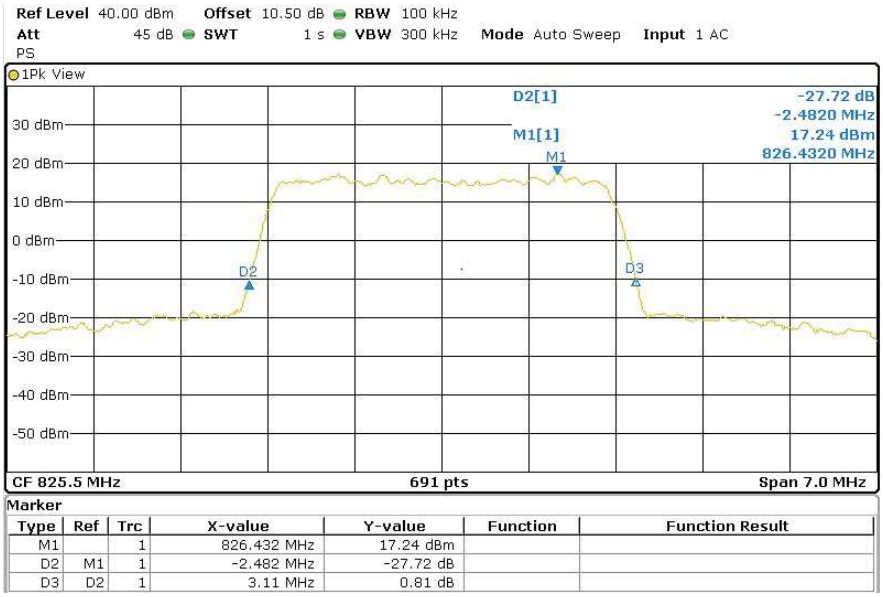
TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 3 MHz

Lowest Channel 99% Occupied Bandwidth



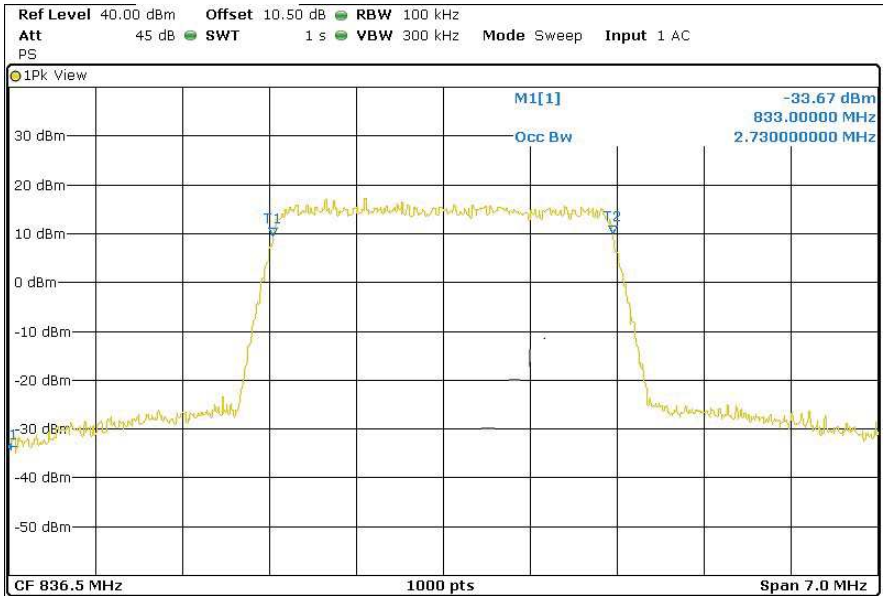
Lowest Channel -26dBc Bandwidth



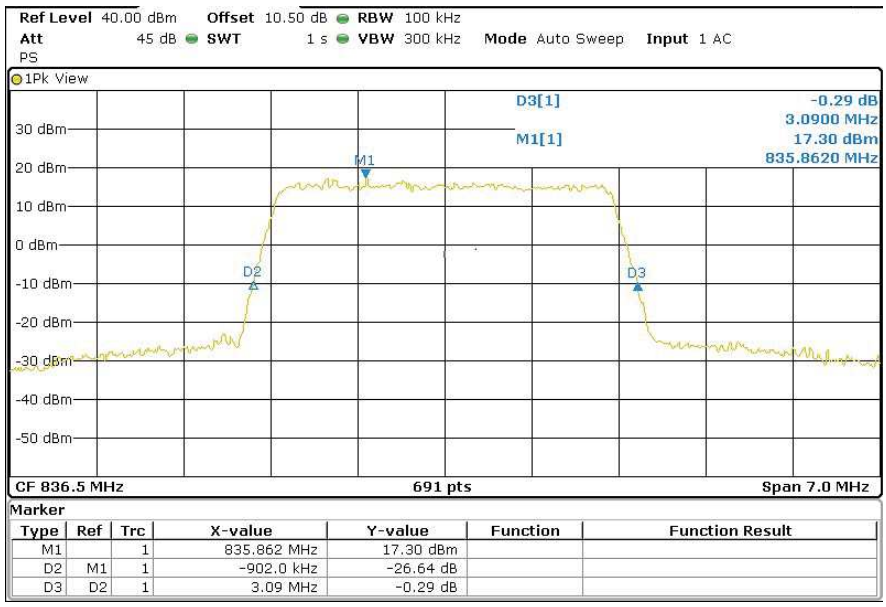
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	826.432 MHz	17.24 dBm		
D2	M1	1	-2.482 MHz	-27.72 dB		
D3	D2	1	3.11 MHz	0.81 dB		

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth



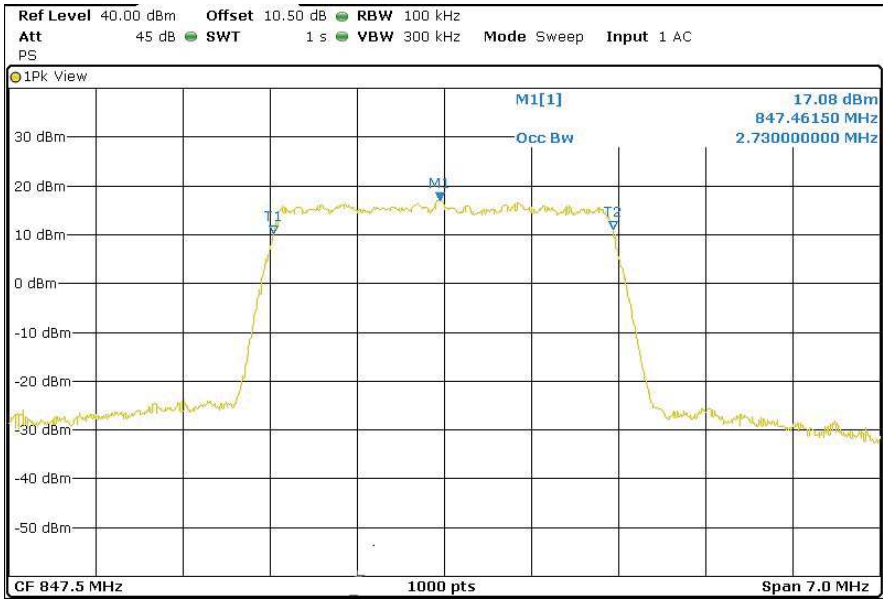
Middle Channel -26dBc Bandwidth



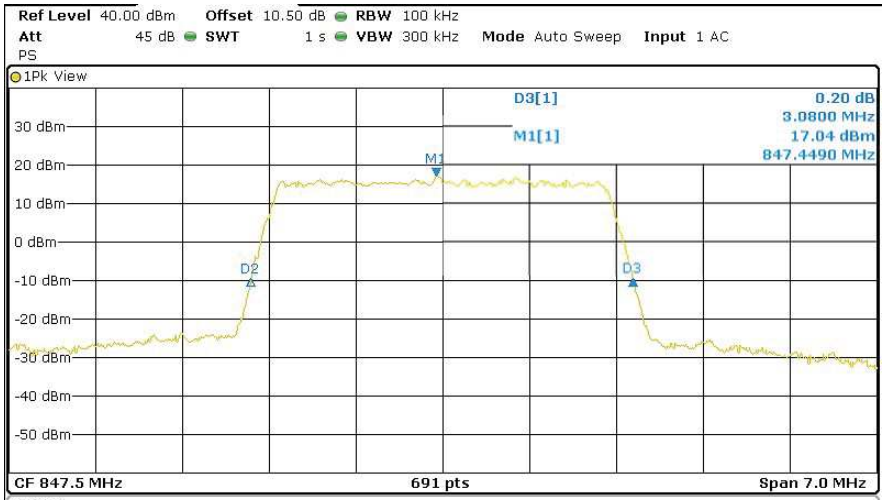
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	835.862 MHz	17.30 dBm		
D2	M1	1	-902.0 kHz	-26.64 dB		
D3	D2	1	3.09 MHz	-0.29 dB		

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth



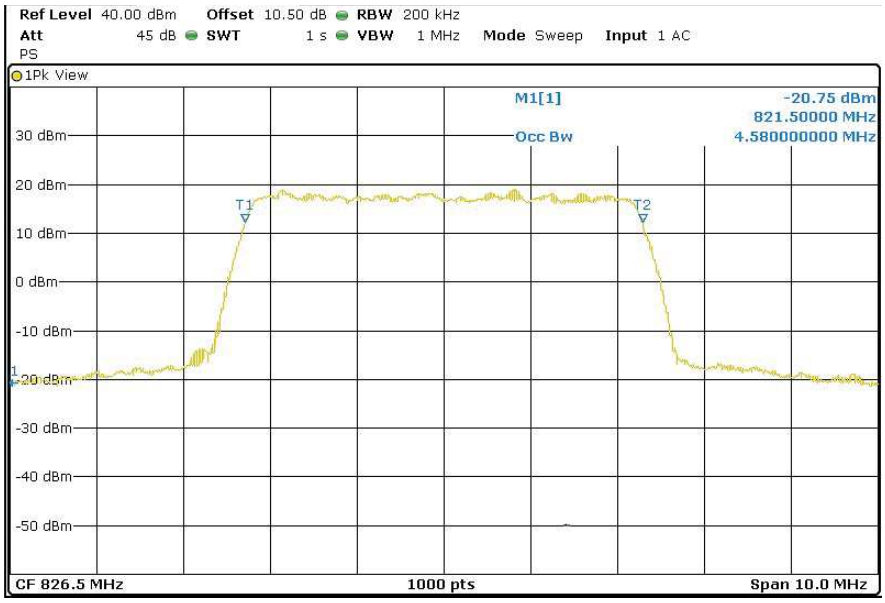
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	847.449 MHz	17.04 dBm		
D2	M1	1	-1.499 MHz	-26.58 dB		
D3	D2	1	3.08 MHz	0.20 dB		

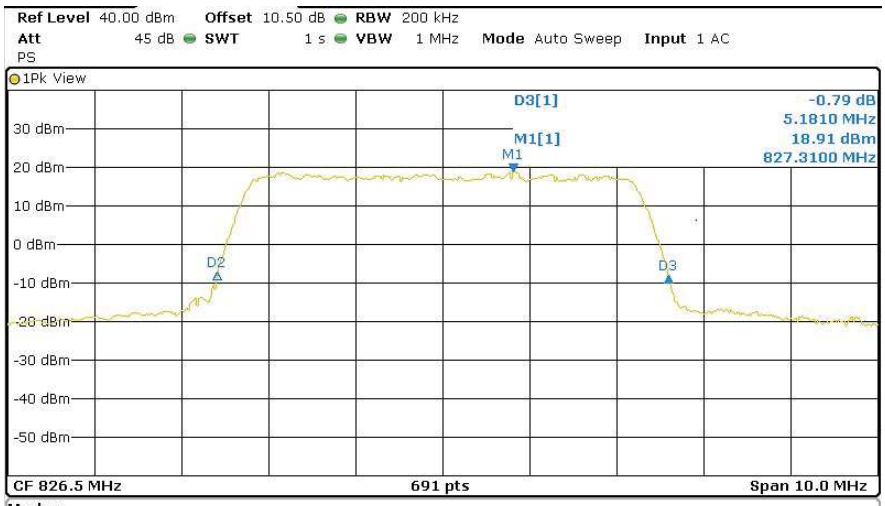
TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 5 MHz

Lowest Channel 99% Occupied Bandwidth



Lowest Channel -26dBc Bandwidth

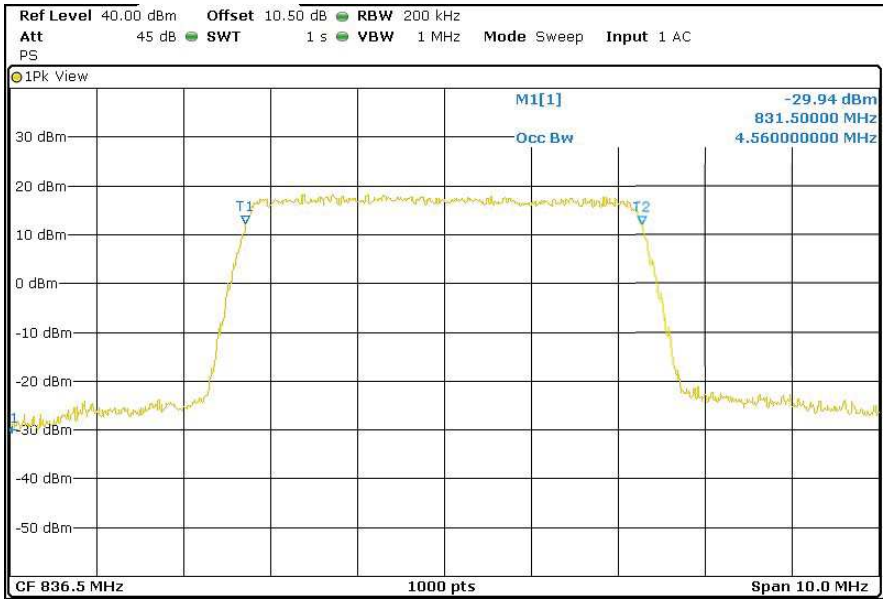


Marker

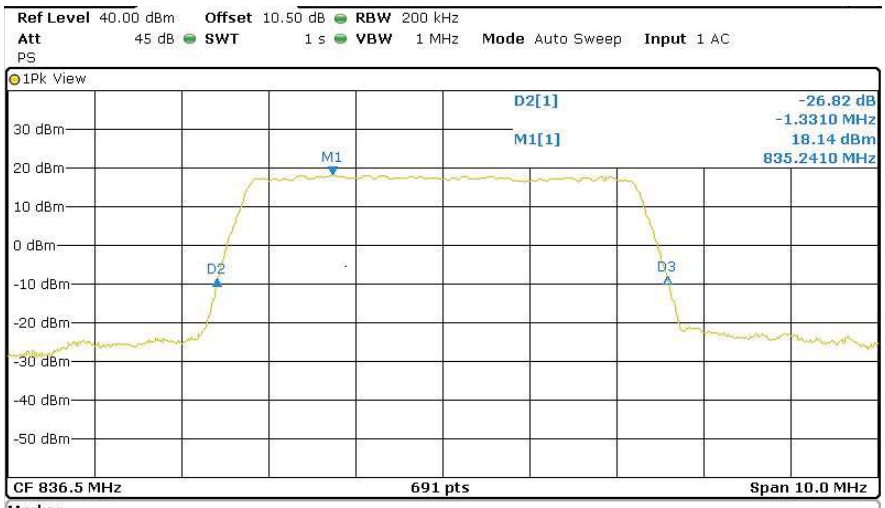
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	827.31 MHz	18.91 dBm		
D2	M1	1	-3.401 MHz	-26.05 dB		
D3	D2	1	5.181 MHz	-0.79 dB		

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth



Middle Channel -26dBc Bandwidth

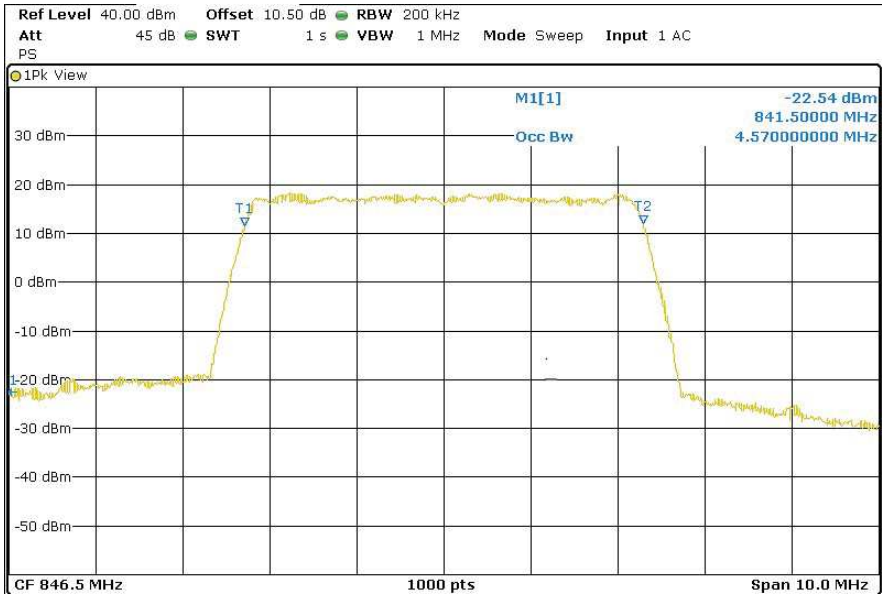


Marker

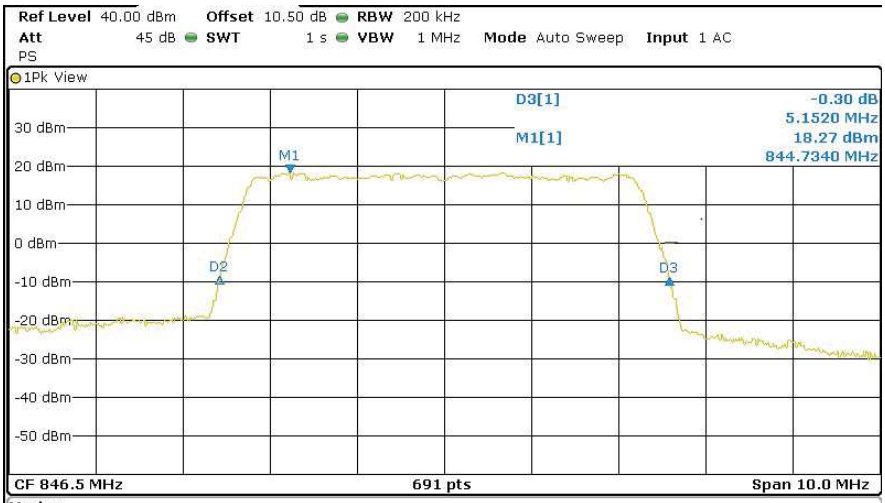
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	835.241 MHz	18.14 dBm		
D2	M1	1	-1.331 MHz	-26.82 dB		
D3	D2	1	5.166 MHz	0.82 dB		

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth



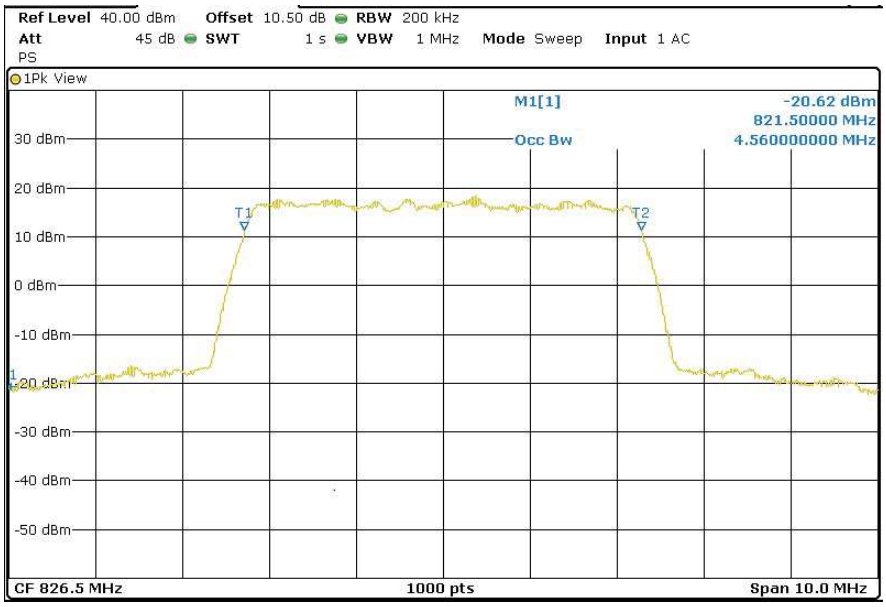
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	844.734 MHz	18.27 dBm		
D2	M1	1	-810.0 kHz	-26.73 dB		
D3	D2	1	5.152 MHz	-0.30 dB		

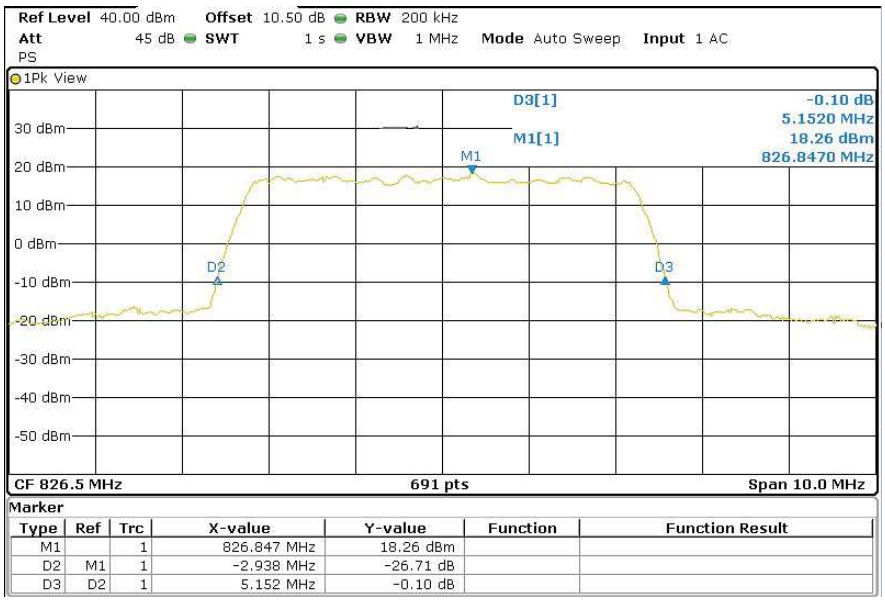
TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 5 MHz

Lowest Channel 99% Occupied Bandwidth



Lowest Channel -26dBc Bandwidth

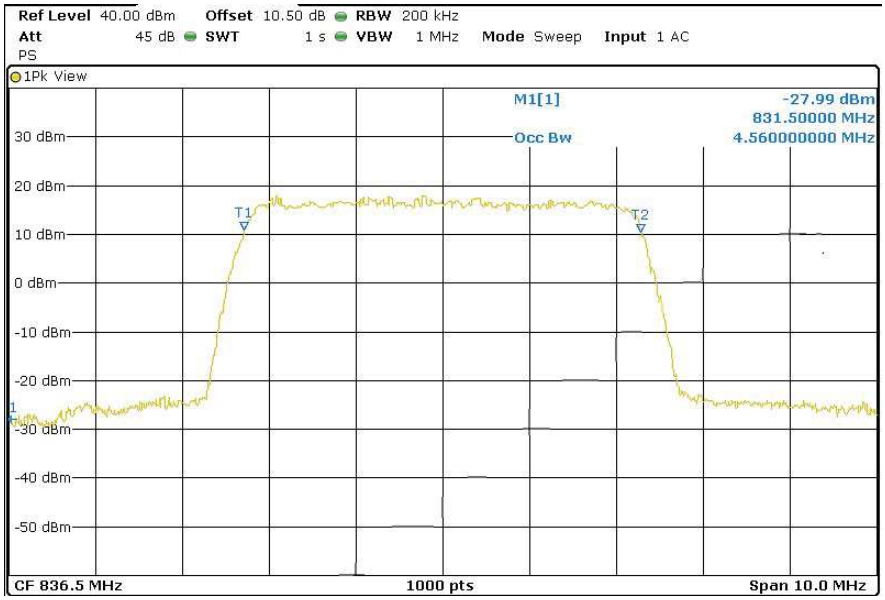


Marker

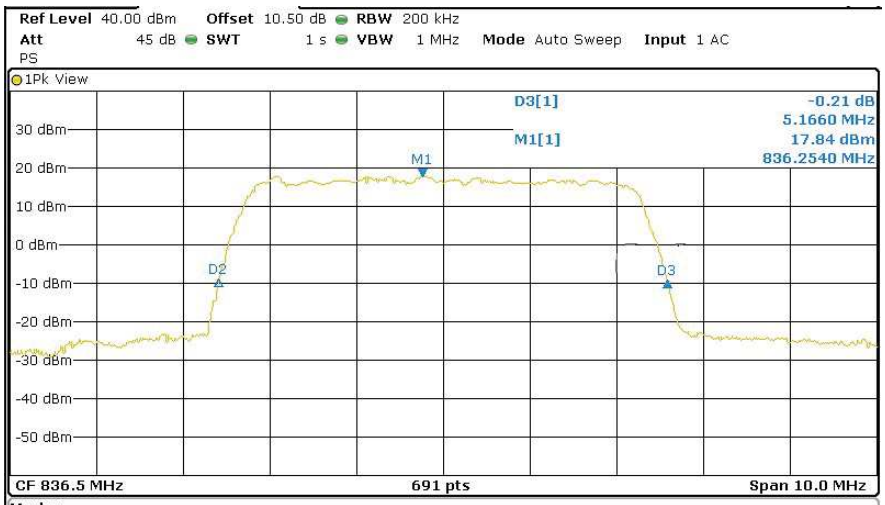
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	826.847 MHz	18.26 dBm		
D2	M1	1	-2.938 MHz	-26.71 dB		
D3	D2	1	5.152 MHz	-0.10 dB		

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth



Middle Channel -26dBc Bandwidth

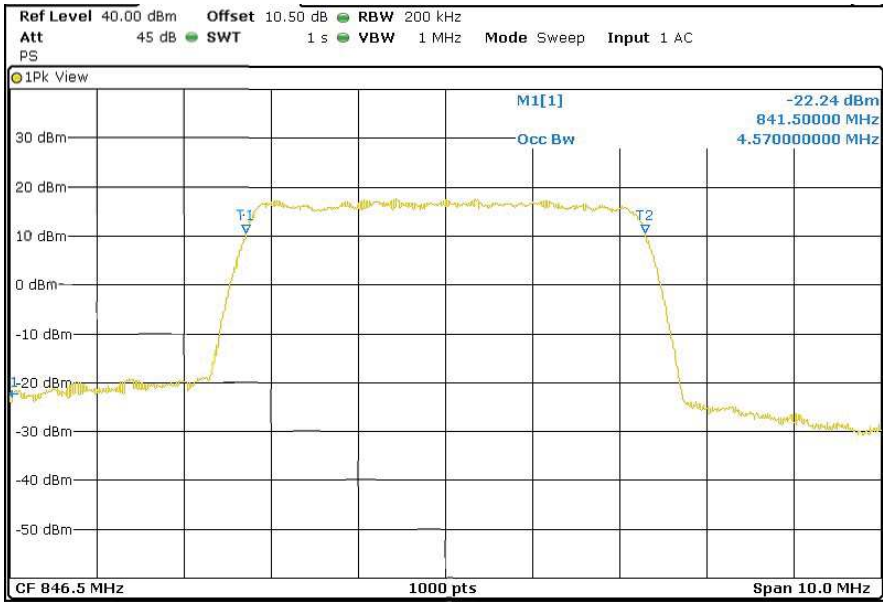


Marker

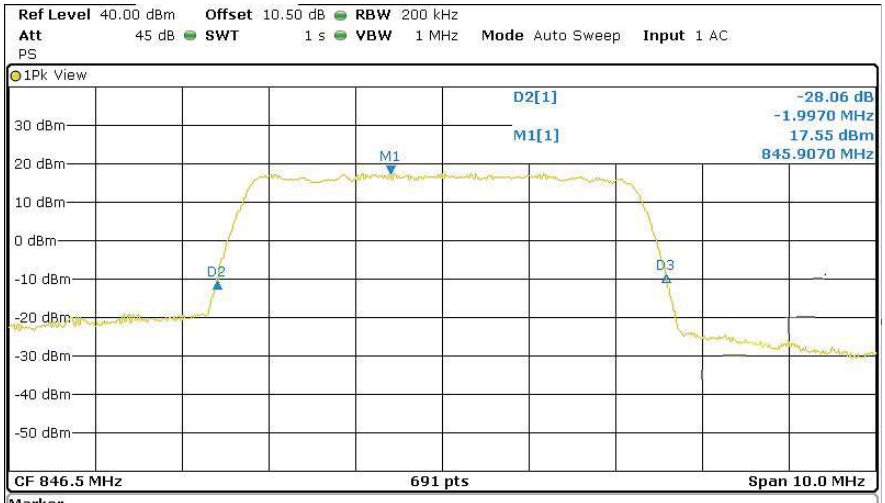
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	836.254 MHz	17.84 dBm		
D2	M1	1	-2.344 MHz	-26.65 dB		
D3	D2	1	5.166 MHz	-0.21 dB		

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth



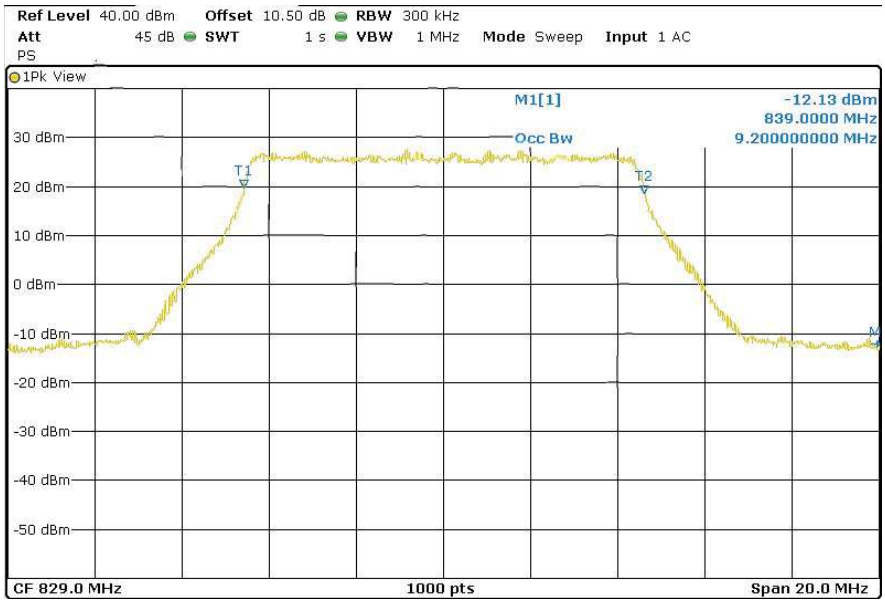
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	845.907 MHz	17.55 dBm		
D2	M1	1	-1.997 MHz	-28.06 dB		
D3	D2	1	5.166 MHz	1.71 dB		

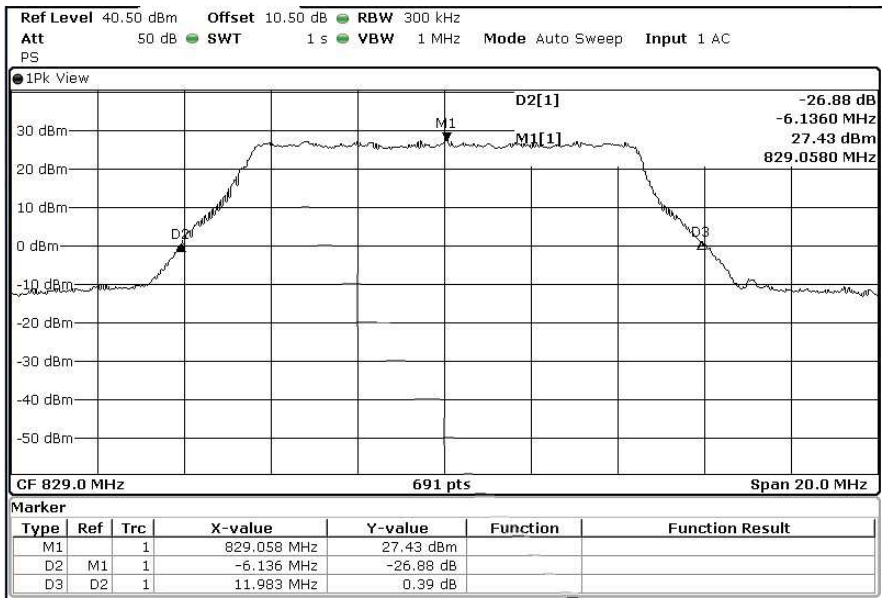
TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 10 MHz

Lowest Channel 99% Occupied Bandwidth



Lowest Channel -26dBc Bandwidth

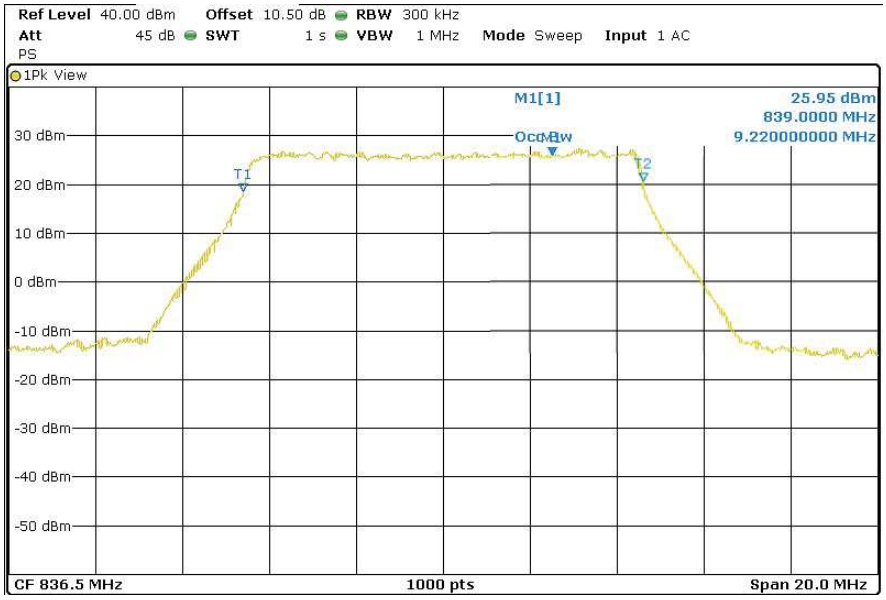


Marker

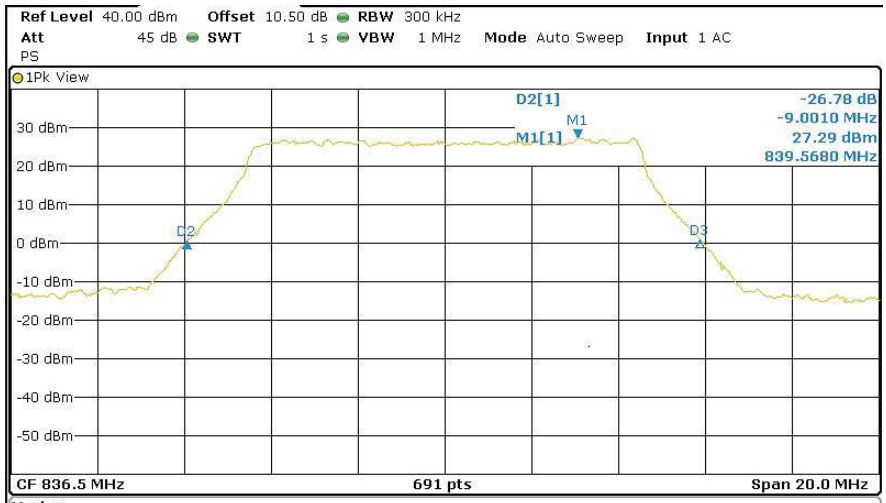
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	829.058 MHz	27.43 dBm		
D2	M1	1	-6.136 MHz	-26.88 dB		
D3	D2	1	11.983 MHz	0.39 dB		

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth



Middle Channel -26dBc Bandwidth

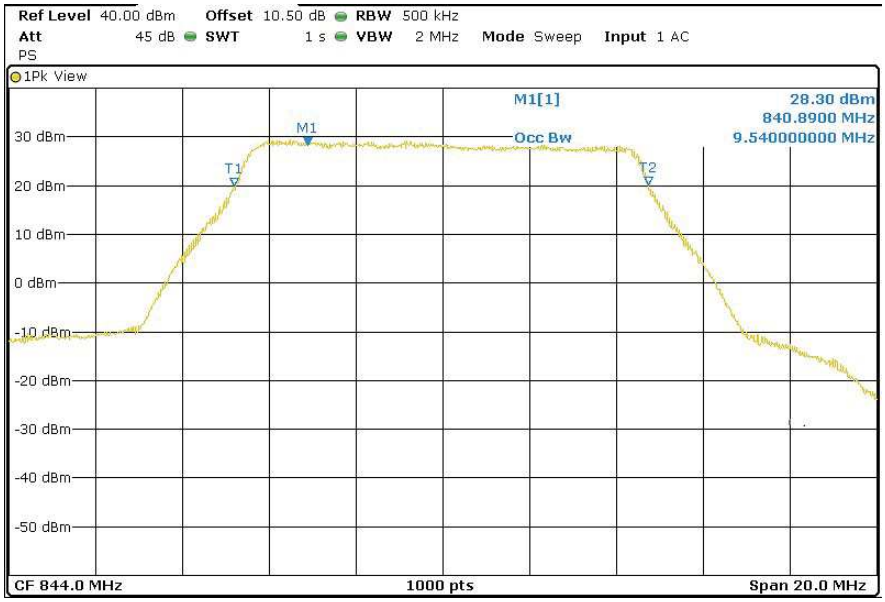


Marker

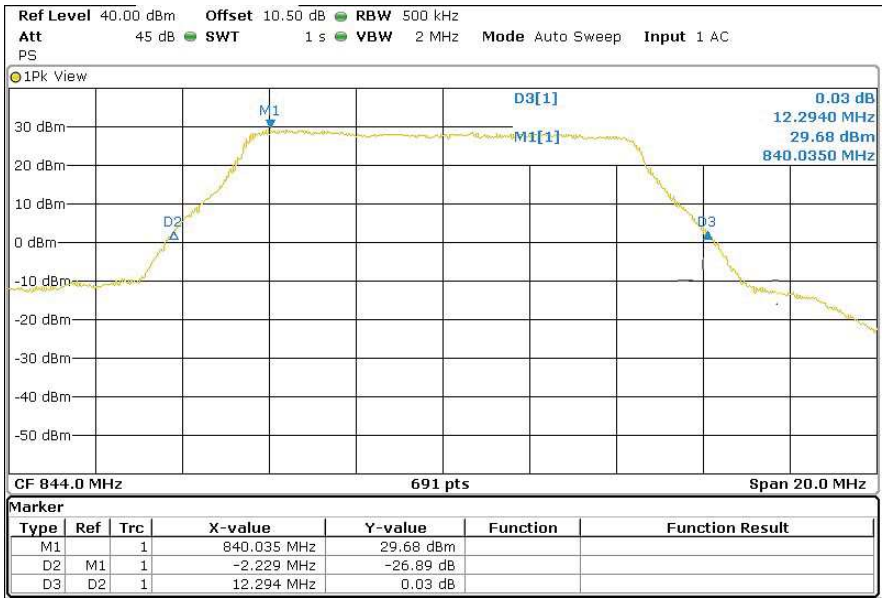
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	839.568 MHz	27.29 dBm		
D2	M1	1	-9.001 MHz	-26.78 dB		
D3	D2	1	11.805 MHz	0.41 dB		

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth



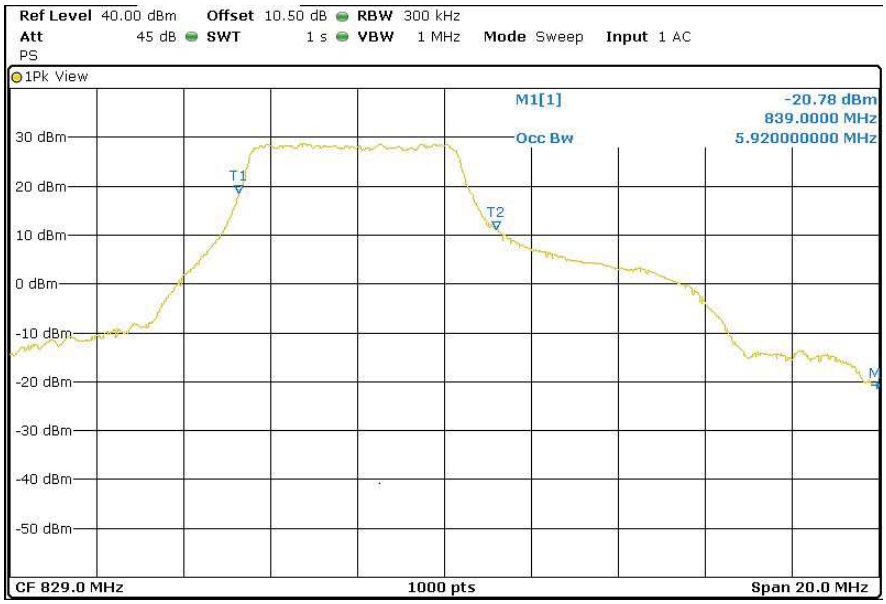
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	840.035 MHz	29.68 dBm		
D2	M1	1	-2.229 MHz	-26.89 dB		
D3	D2	1	12.294 MHz	0.03 dB		

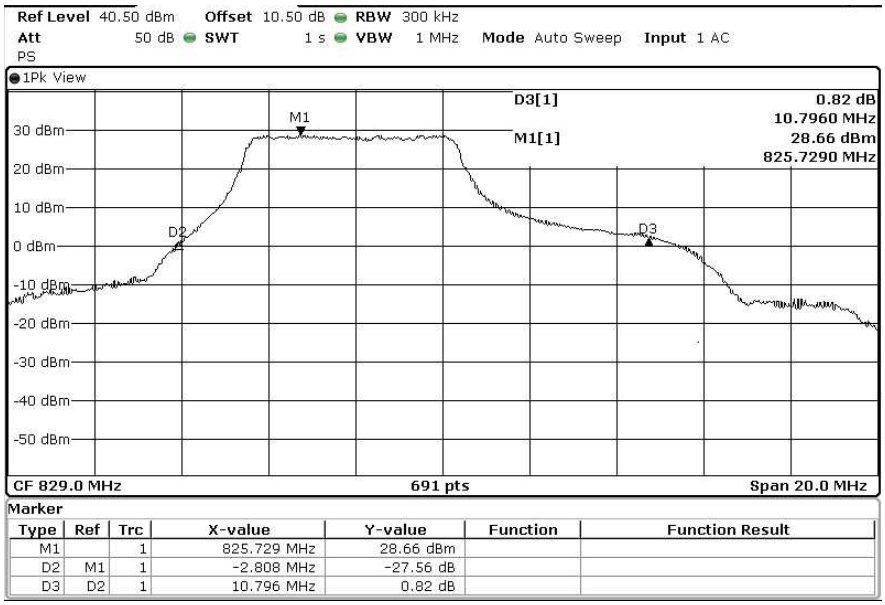
TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 10 MHz

Lowest Channel 99% Occupied Bandwidth

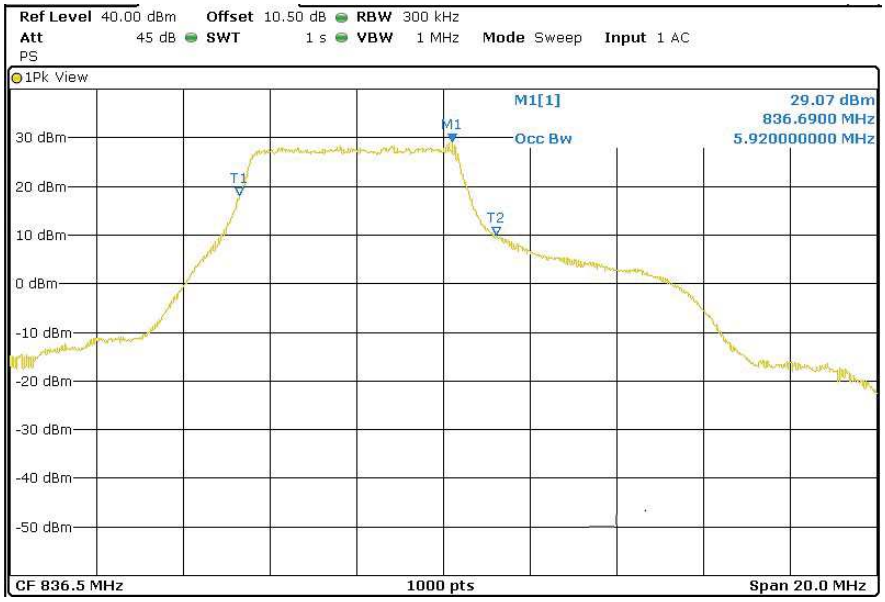


Lowest Channel -26dBc Bandwidth

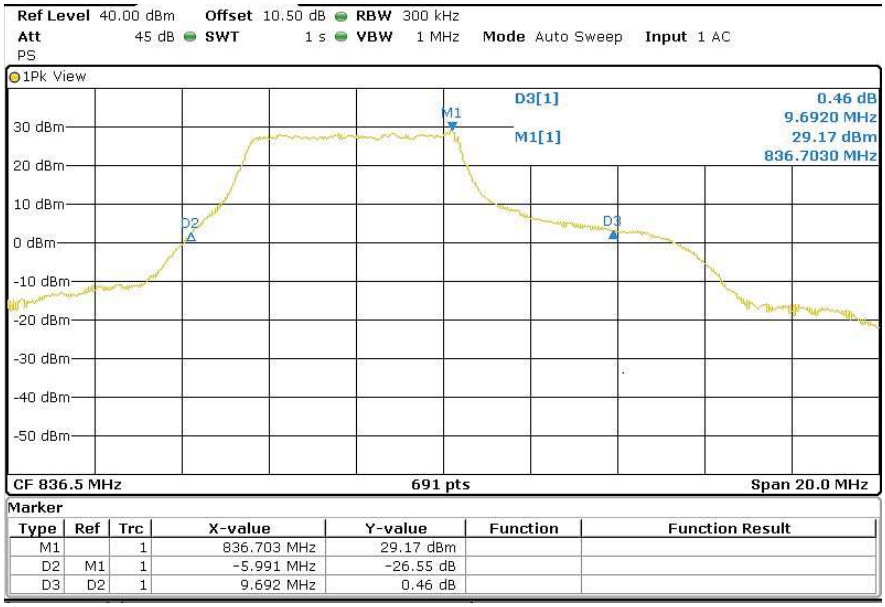


TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

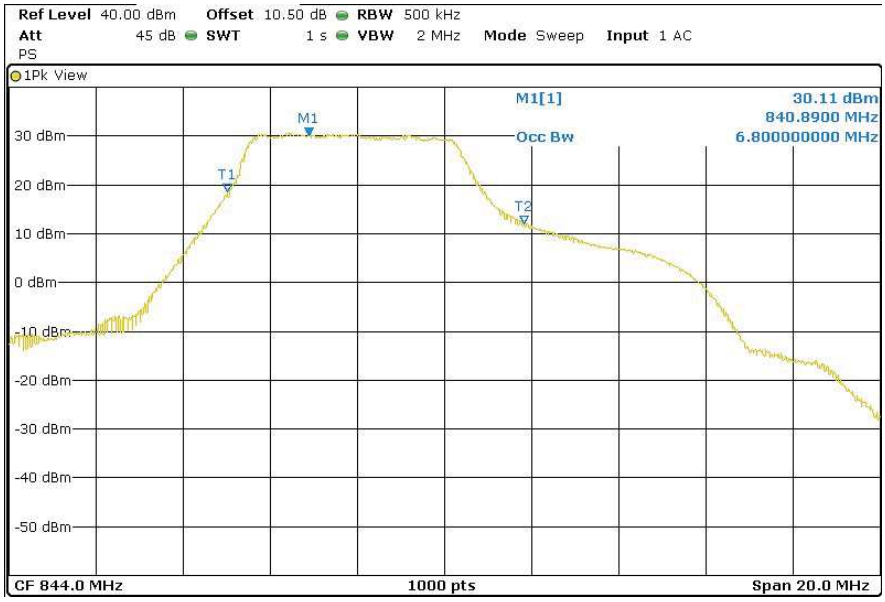


Middle Channel -26dBc Bandwidth

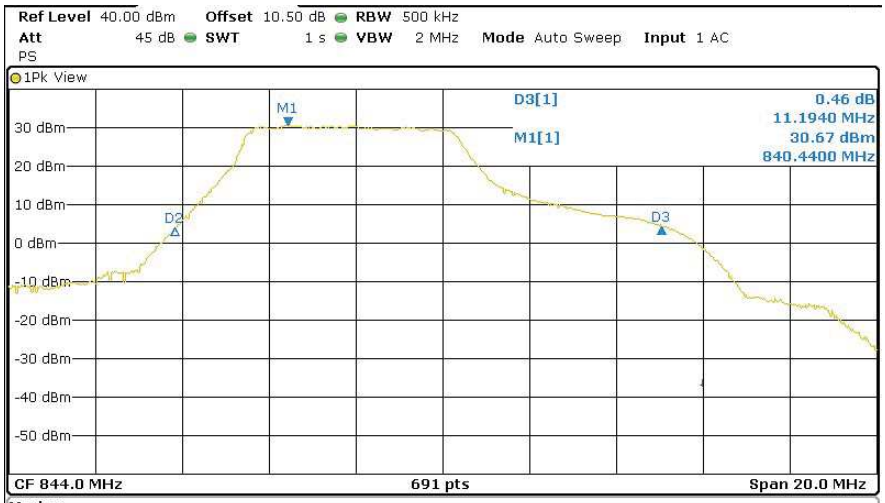


TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth



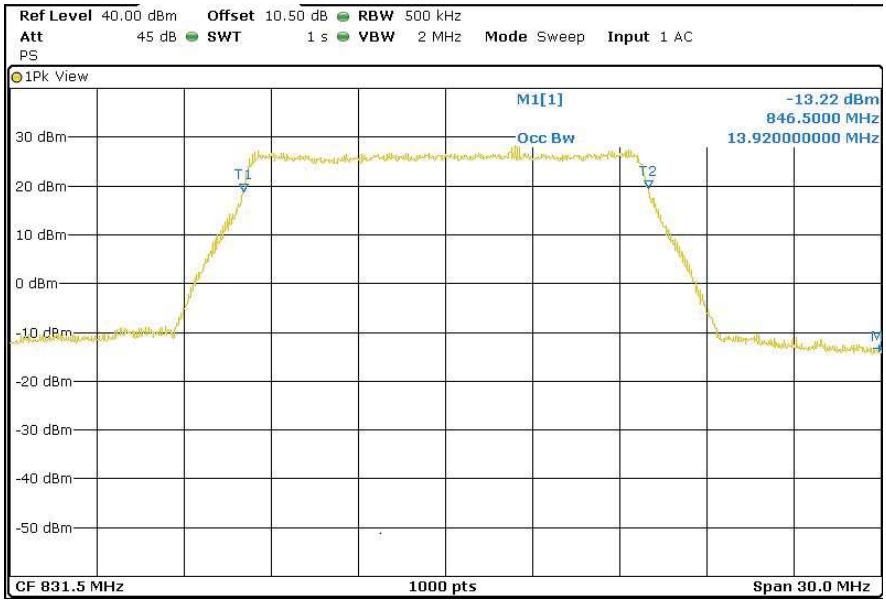
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	840.44 MHz	30.67 dBm		
D2	M1	1	-2.605 MHz	-26.79 dB		
D3	D2	1	11.194 MHz	0.46 dB		

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 15 MHz

Lowest Channel 99% Occupied Bandwidth



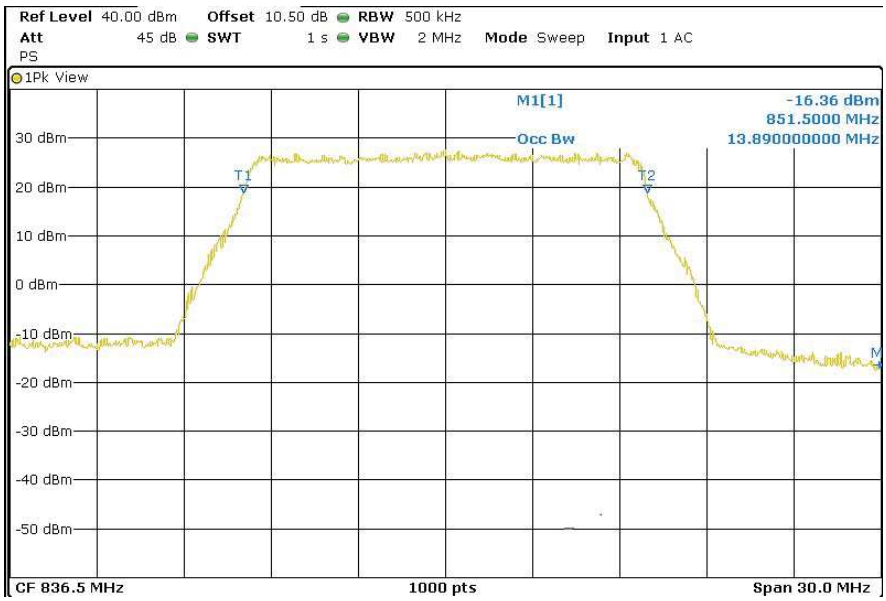
Lowest Channel -26dBc Bandwidth

Marker

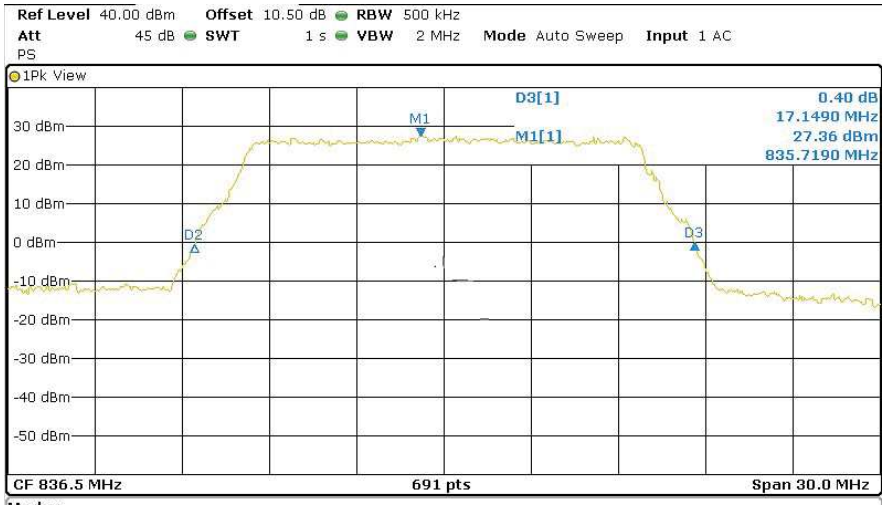
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	834.235 MHz	18.51 dBm		
D2	M1	1	-10.376 MHz	-28.01 dB		
D3	D2	1	15.282 MHz	0.24 dB		

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth



Middle Channel -26dBc Bandwidth

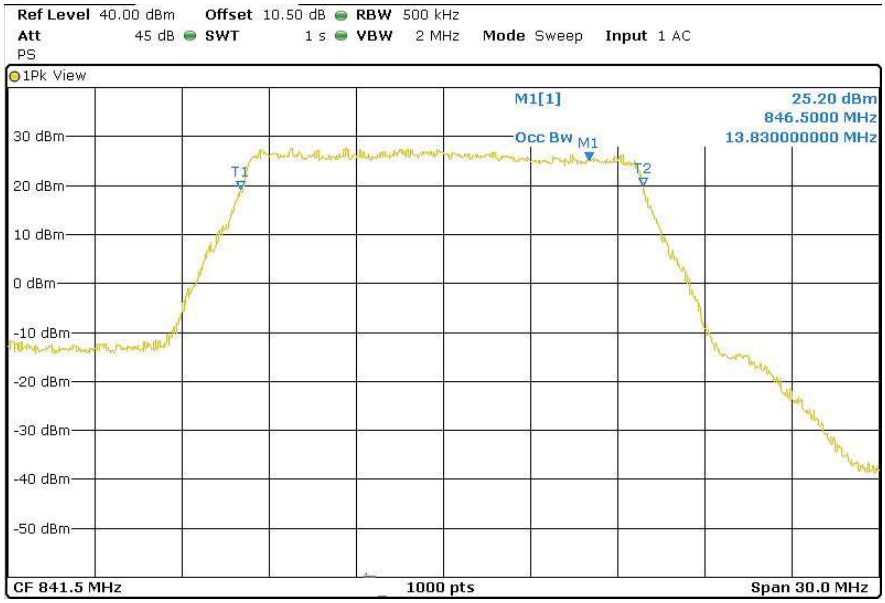


Marker

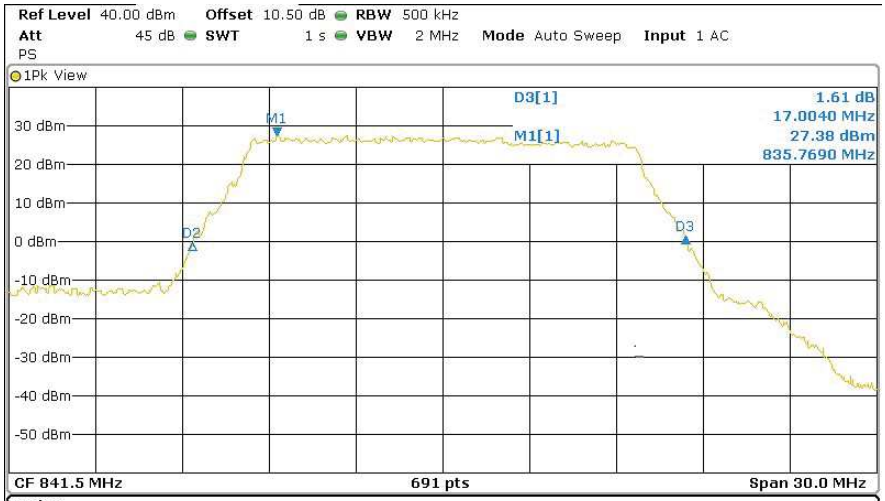
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	835.719 MHz	27.36 dBm		
D2	M1	1	-7.779 MHz	-27.83 dB		
D3	D2	1	17.149 MHz	0.40 dB		

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth



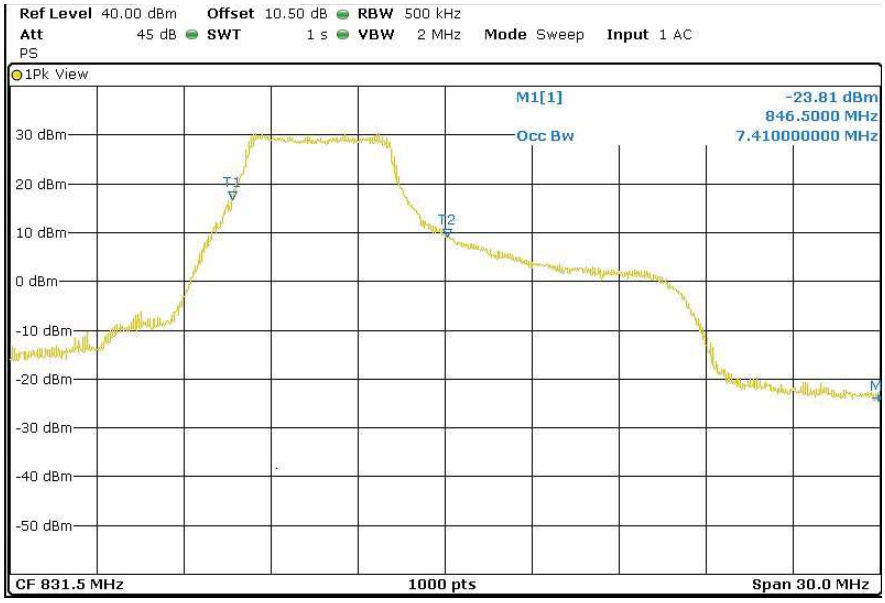
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	835.769 MHz	27.38 dBm		
D2	M1	1	-2.909 MHz	-27.67 dB		
D3	D2	1	17.004 MHz	1.61 dB		

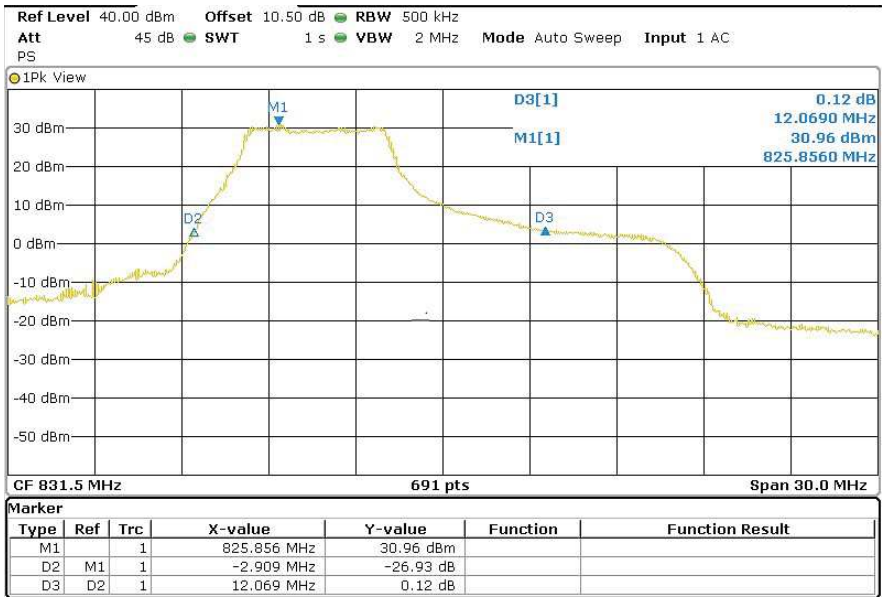
TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 15 MHz

Lowest Channel 99% Occupied Bandwidth



Lowest Channel -26dBc Bandwidth

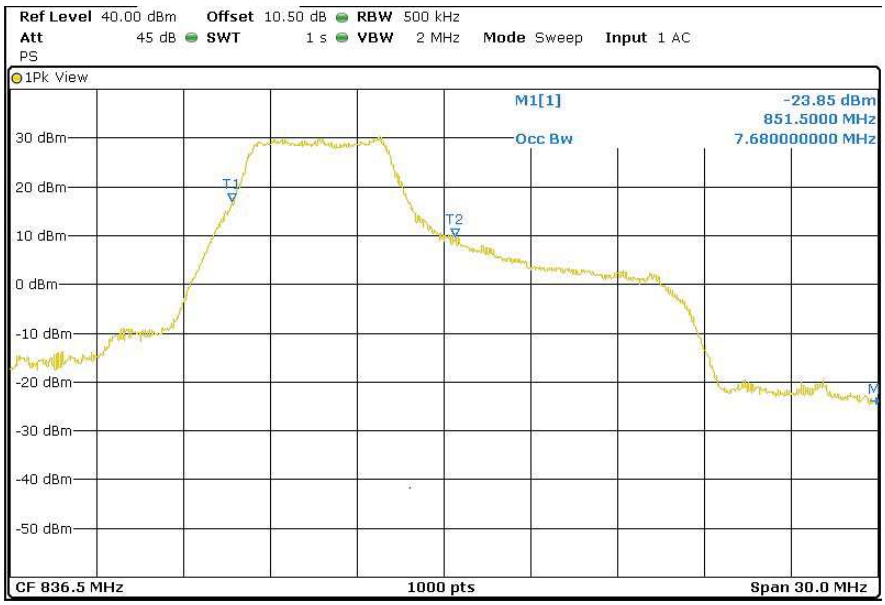


Marker

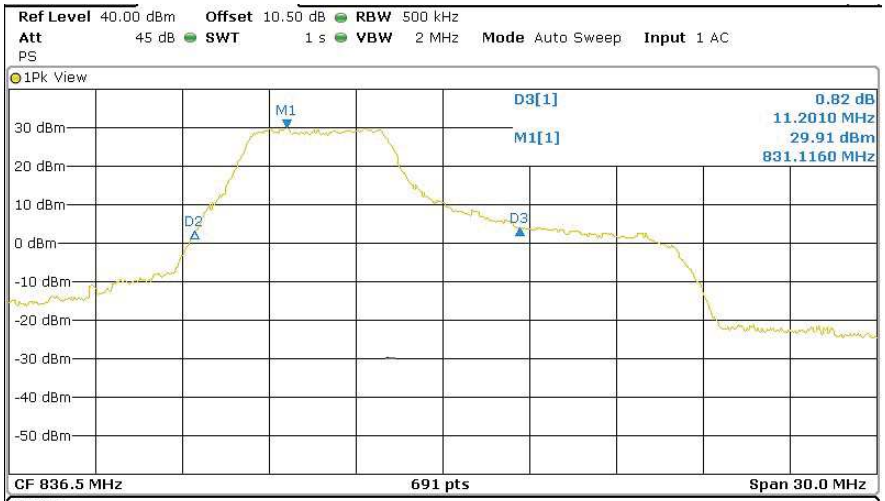
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	825.856 MHz	30.96 dBm		
D2	M1	1	-2.909 MHz	-26.93 dB		
D3	D2	1	12.069 MHz	0.12 dB		

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth



Middle Channel -26dBc Bandwidth



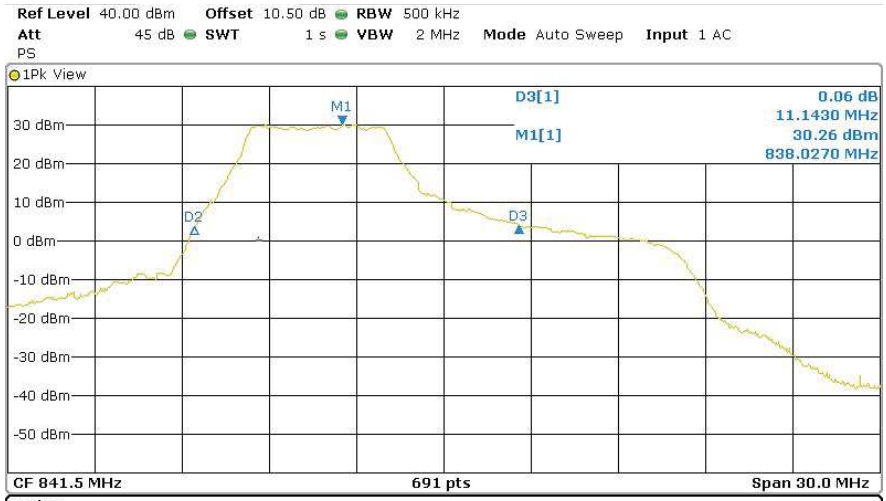
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	831.116 MHz	29.91 dBm		
D2	M1	1	-3.177 MHz	-26.86 dB		
D3	D2	1	11.201 MHz	0.82 dB		

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

Highest Channel -26dBc Bandwidth



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	838.027 MHz	30.26 dBm		
D2	M1	1	-5.08 MHz	-26.50 dB		
D3	D2	1	11.143 MHz	0.06 dB		

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

LTE QPSK MODULATION. BW = 1.4 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	1.11

LTE 16QAM MODULATION. BW = 1.4 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	1.11

LTE QPSK MODULATION. BW = 3 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	2.70

LTE 16QAM MODULATION. BW = 3 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	2.70

LTE QPSK MODULATION. BW = 5 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	4.52

LTE 16QAM MODULATION. BW = 5 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	4.50

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 10 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	8.96

LTE 16QAM MODULATION. BW = 10 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	8.94

LTE QPSK MODULATION. BW = 15 MHz

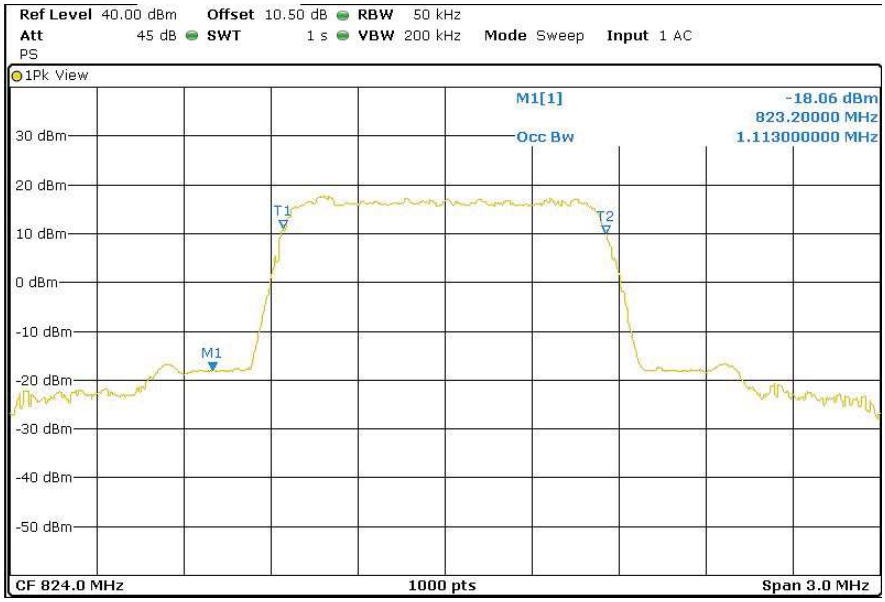
Frequency	824.0
99% Occupied bandwidth (MHz)	13.44

LTE 16QAM MODULATION. BW = 15 MHz

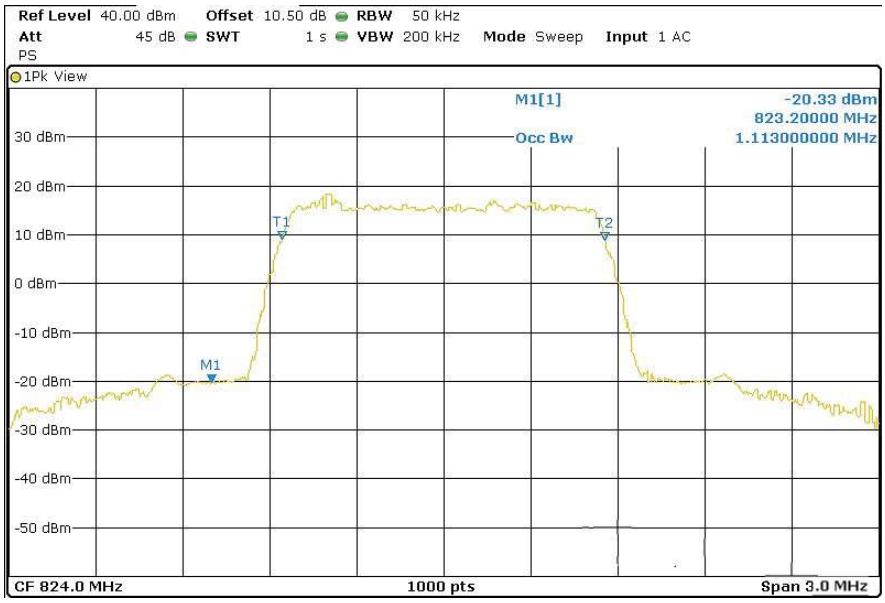
Frequency	824.0
99% Occupied bandwidth (MHz)	13.41

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 1.4 MHz

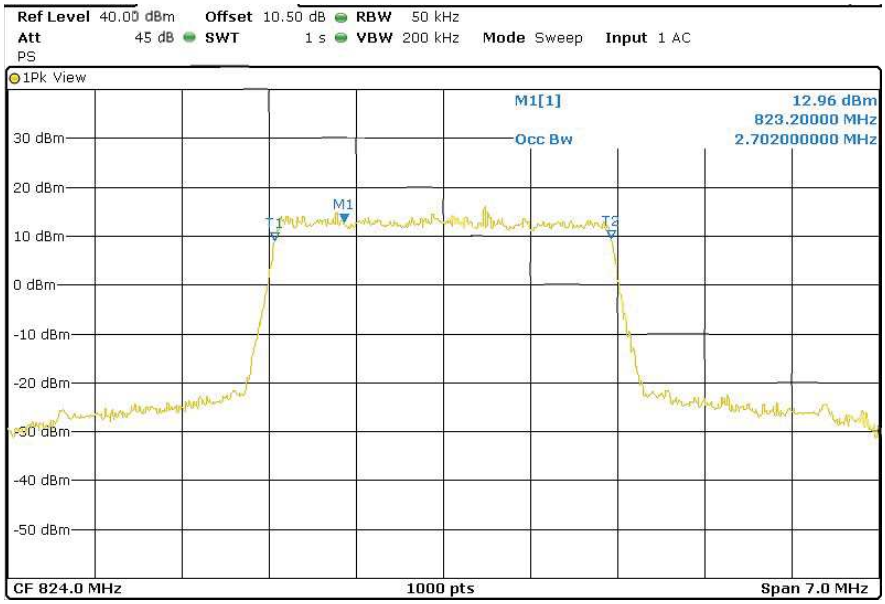
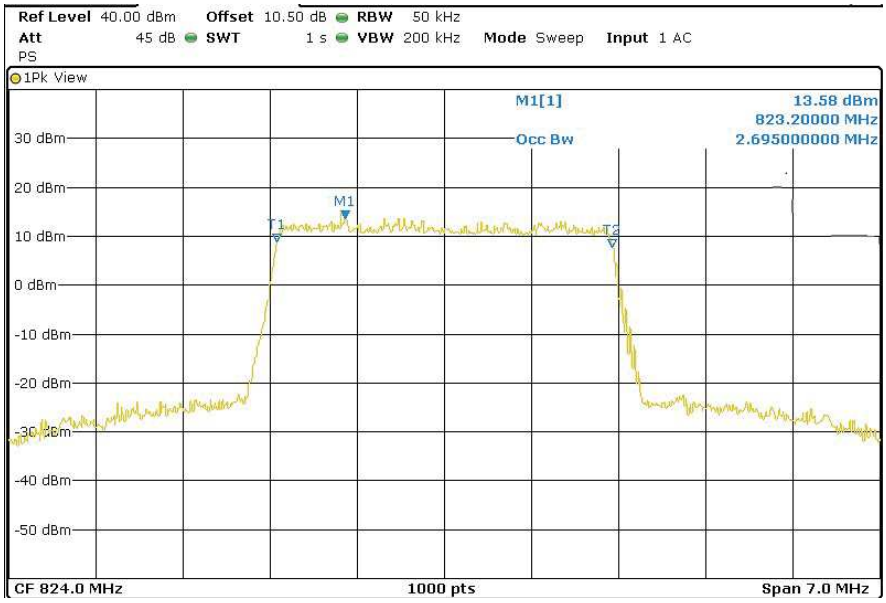


LTE 16QAM MODULATION. BW = 1.4 MHz



TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 3 MHz



LTE 16QAM MODULATION. BW = 3 MHz