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

2G:

GPRS MODULATION.

Channel	Average power at antenna port (dBm)	Maximum declared antenna gain (dBi)	Maximum E.I.R.P. average power (dBm)	PAPR (dB)
Lowest	32.54	2.0	34.54	9.71
Middle	32.60	2.0	34.60	9.91
Highest	32.62	2.0	34.62	11.54
Measurement uncertainty (dB)			<±0.95	

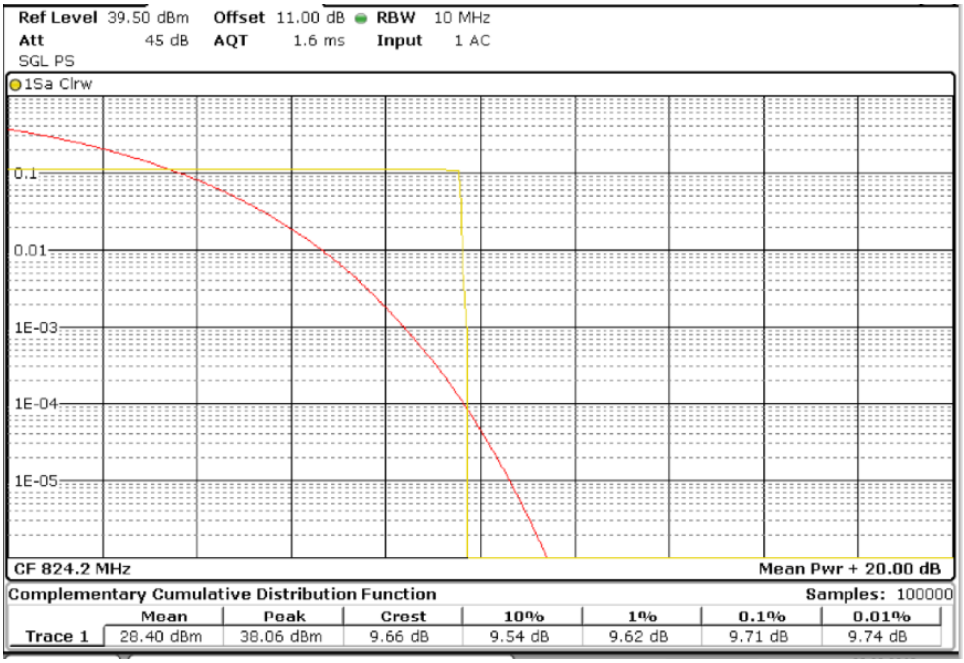
EDGE MODULATION.

Channel	Average power at antenna port (dBm)	Maximum declared antenna gain (dBi)	Maximum E.I.R.P. average power (dBm)	PAPR (dB)
Lowest	23.79	2.0	25.79	9.86
Middle	23.65	2.0	25.65	10.43
Highest	23.42	2.0	25.42	9.19
Measurement uncertainty (dB)			<±0.95	

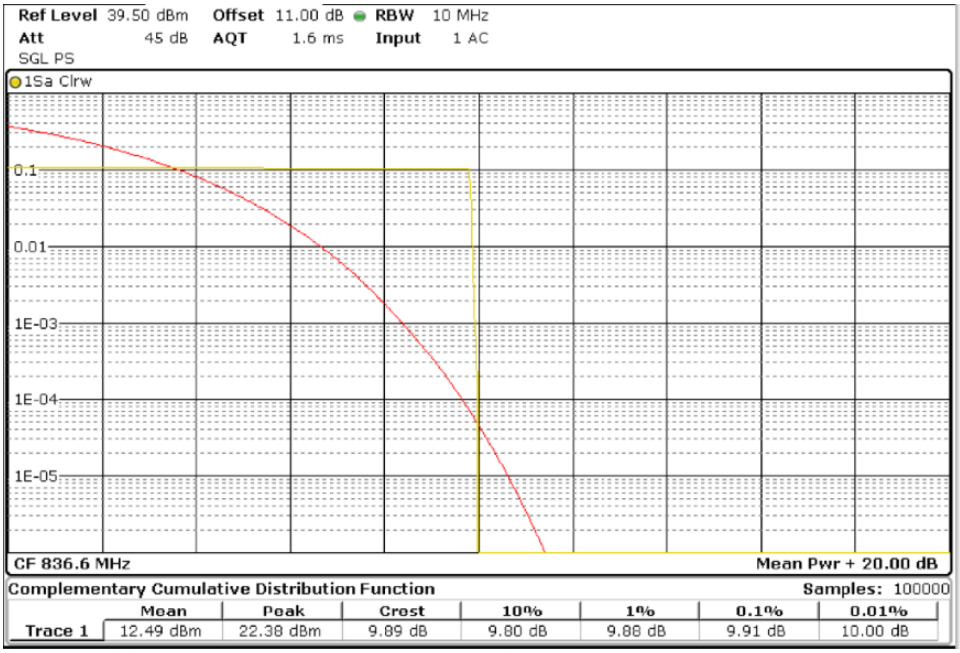
TEST RESULTS (Cont):	

GPRS:

Lowest channel

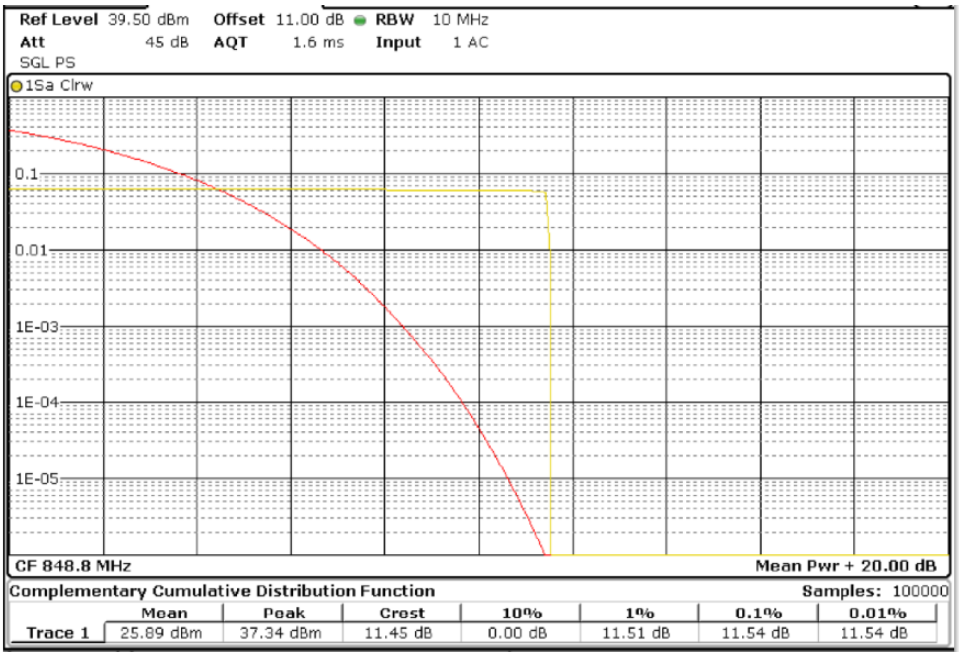


Middle channel



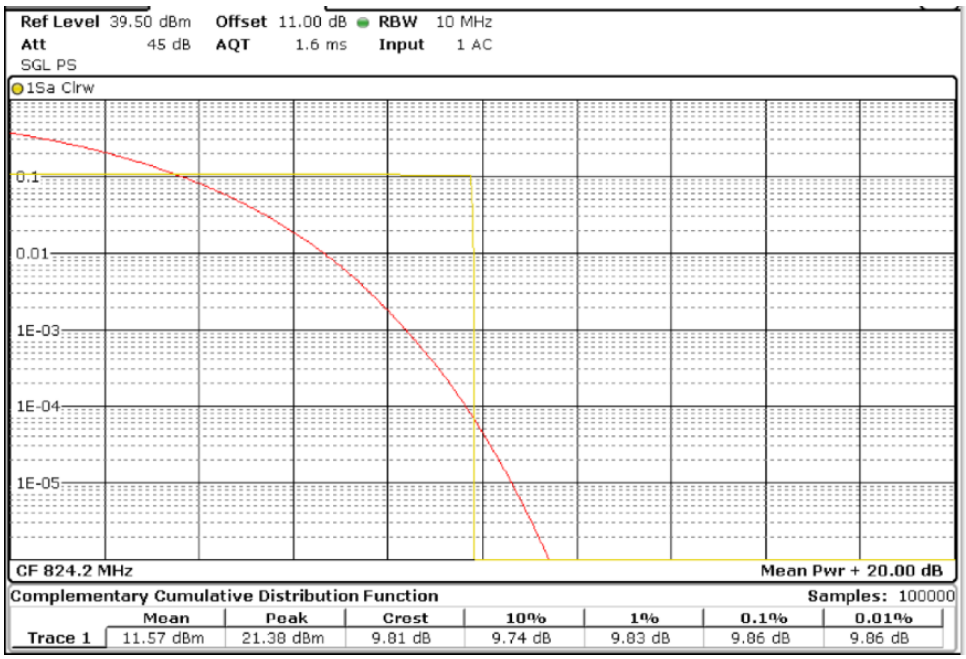
TEST RESULTS (Cont):	

High channel



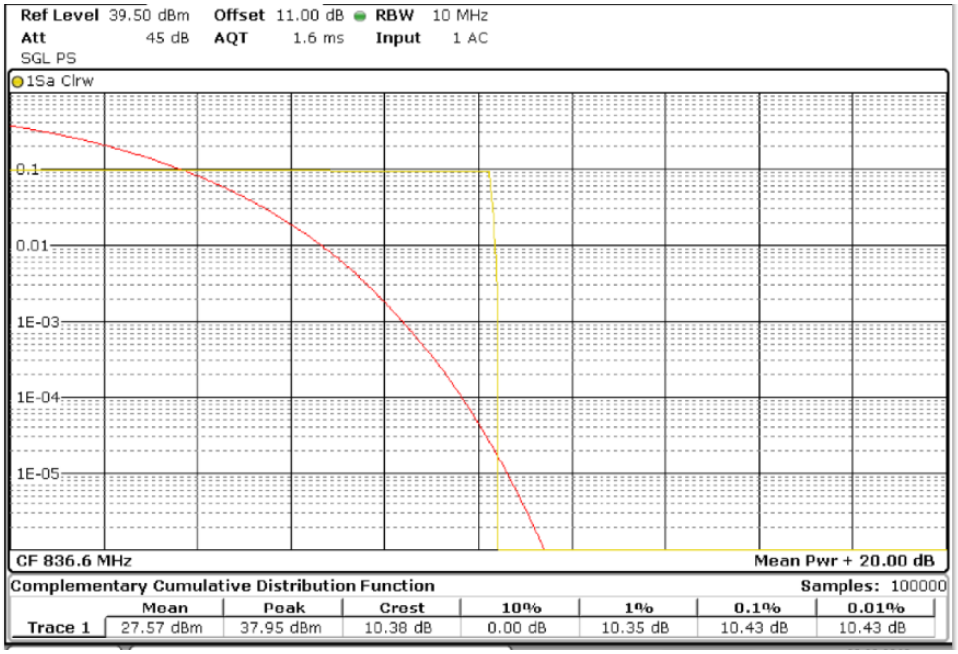
<u>EDGE:</u>

Lowest channel

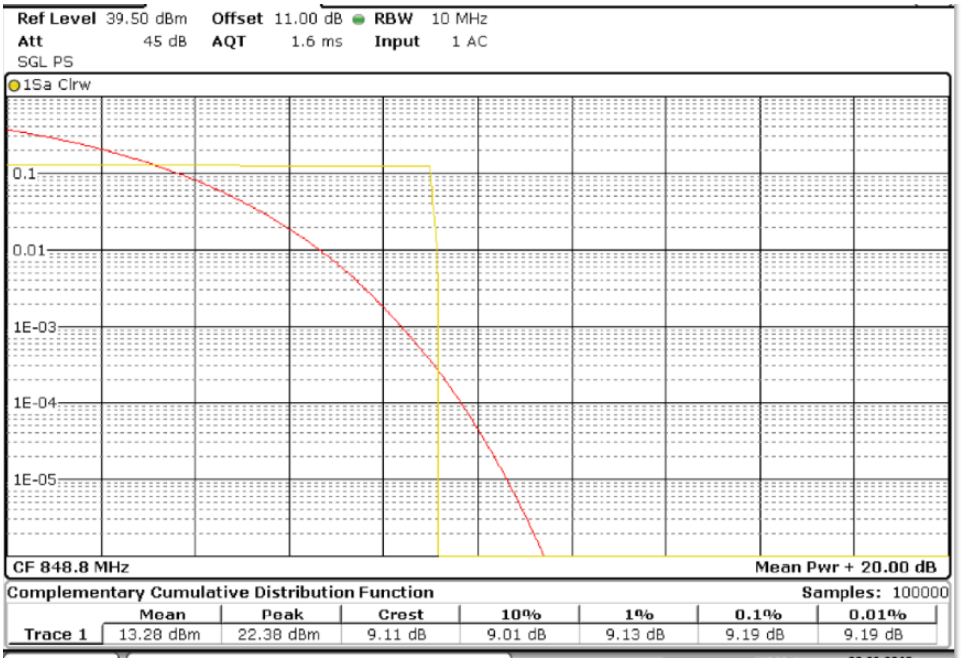


TEST RESULTS (Cont):	

Middle channel



High channel



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS	PASS

3G:

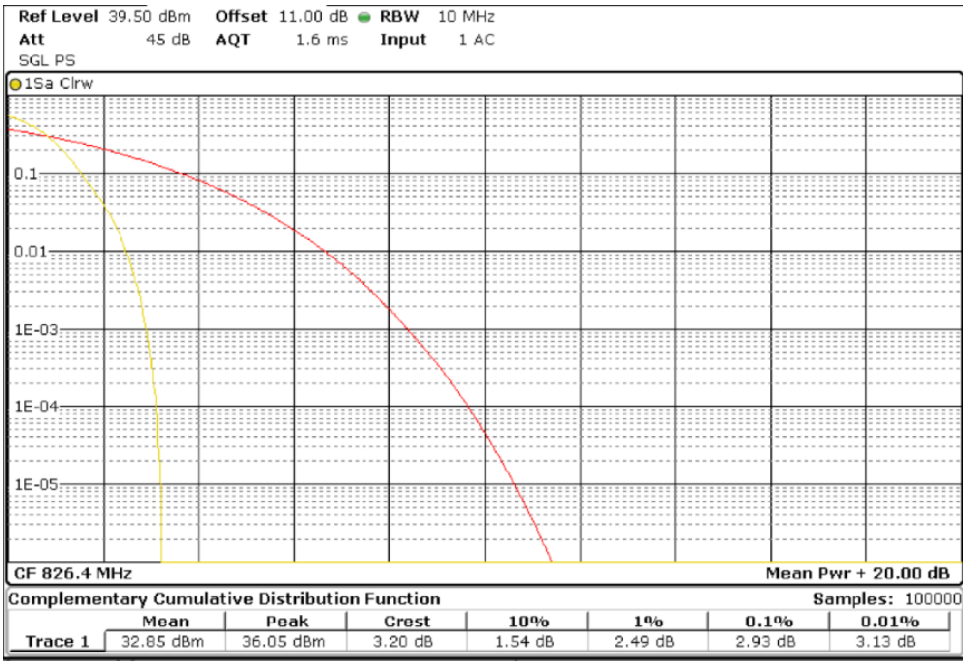
WCDMA MODULATION.

Channel	Average power at antenna port (dBm)	Maximum declared antenna gain (dBi)	Maximum E.I.R.P. average power (dBm)	PAPR (dB)
Lowest	23.05	2.0	25.05	2.93
Middle	23.11	2.0	25.11	3.33
Highest	23.07	2.0	25.07	3.22
Measurement uncertainty (dB)			<±0.95	

HSUPA MODULATION.

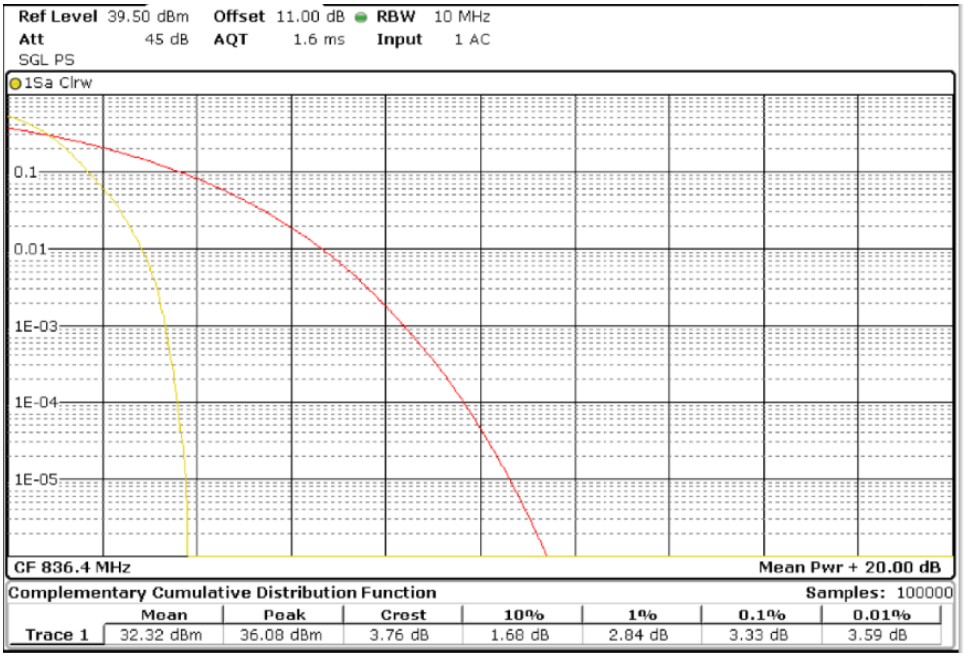
Channel	Average power at antenna port (dBm)	Maximum declared antenna gain (dBi)	Maximum E.I.R.P. average power (dBm)
Lowest	21.22	2.0	23.22
Middle	21.32	2.0	23.32
Highest	21.42	2.0	23.42
Measurement uncertainty (dB) <±0.95			

Lowest channel

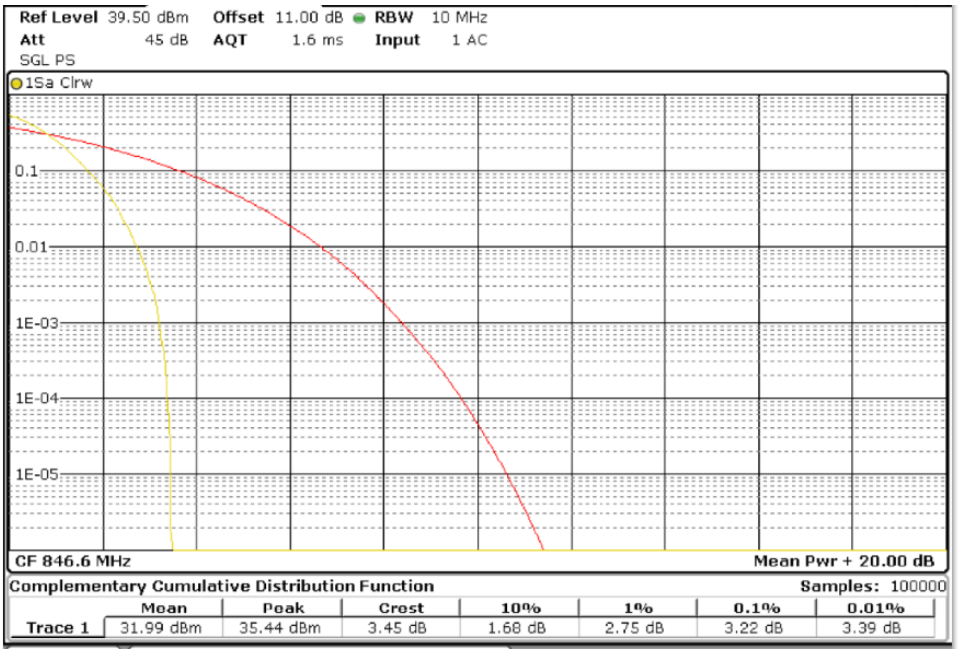


TEST RESULTS (Cont):	

Middle channel



Highest channel



TEST A.2: MODULATION CHARACTERISTICS

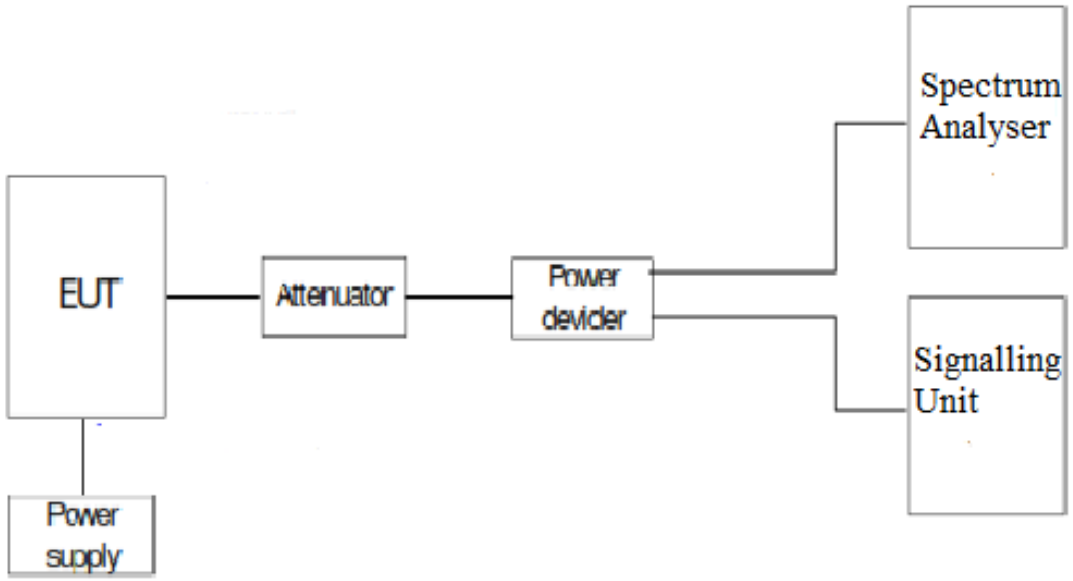
LIMITS:	Product standard:	FCC Part 22 / IC RSS-132
	Test standard:	FCC §2.1047 / RSS-132 Clause 5.2

LIMITS

A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

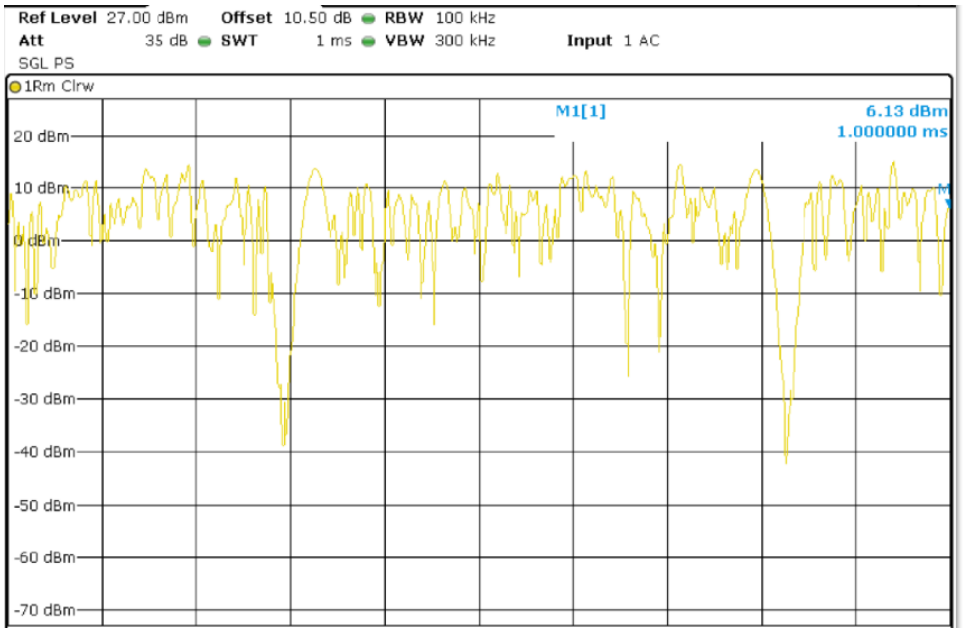
TEST SETUP

For LTE the EUT operates with QPSK and 16QAM modulation modes in which the information is digitized and coded into a bit stream. The RF transmission is multiplexed using Orthogonal Frequency Division Multiplexing (OFDM) using different possible arrangement of subcarriers (Resource Blocks RB).

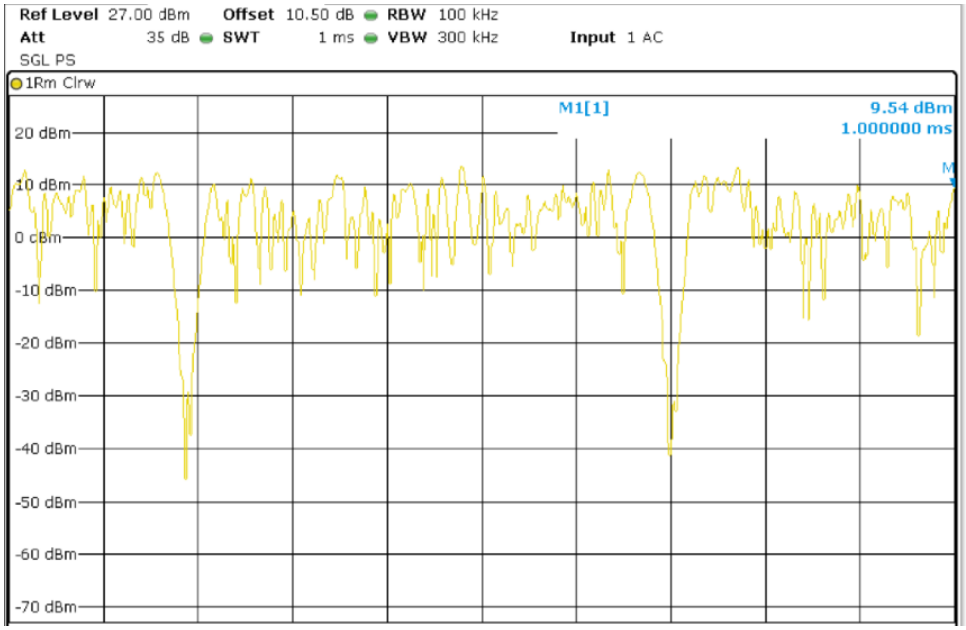


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

QPSK Modulation

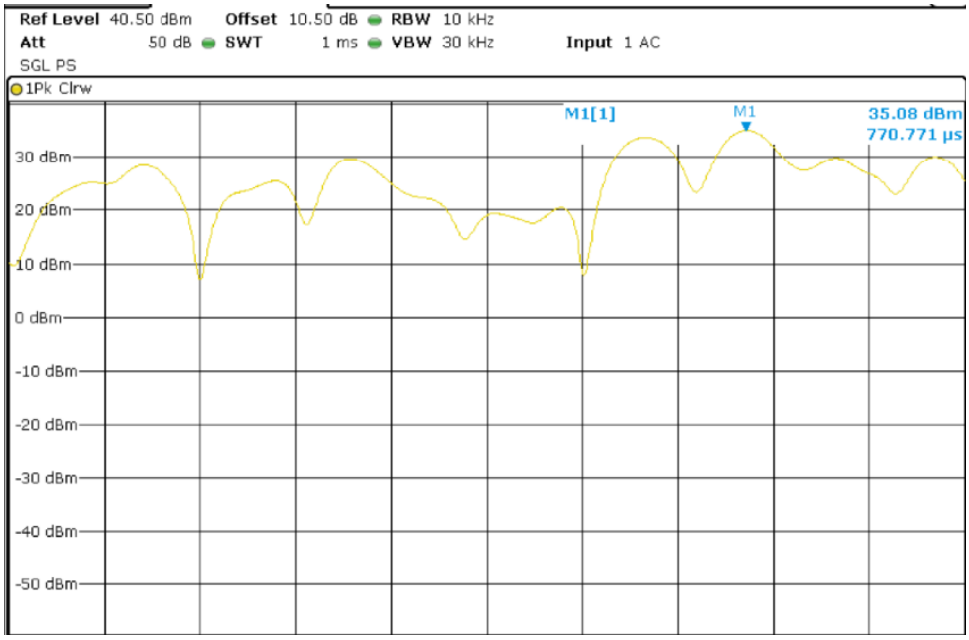


16QAM Modulation

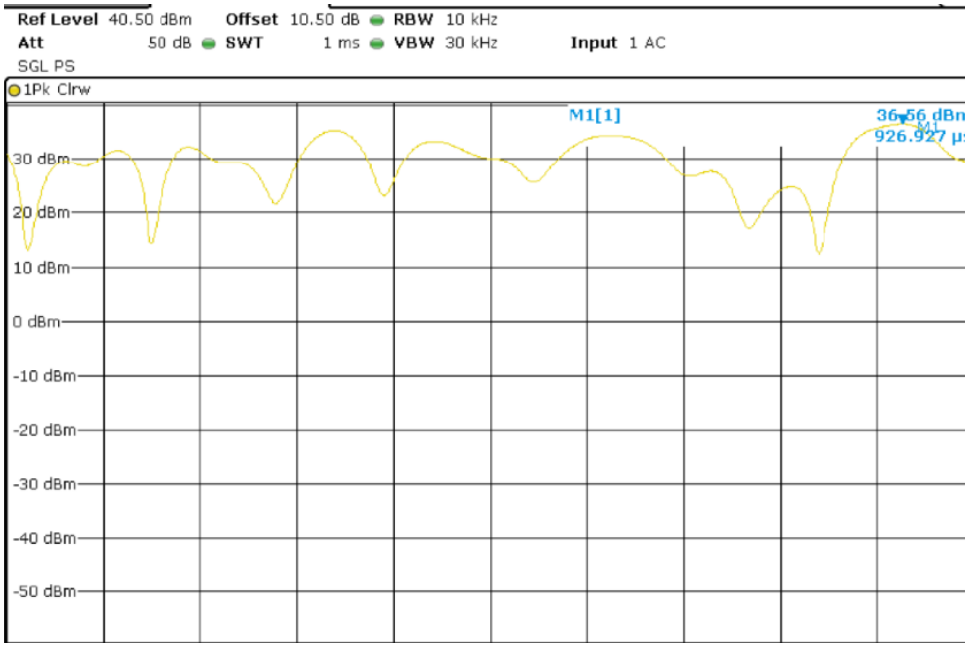


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

GPRS Modulation

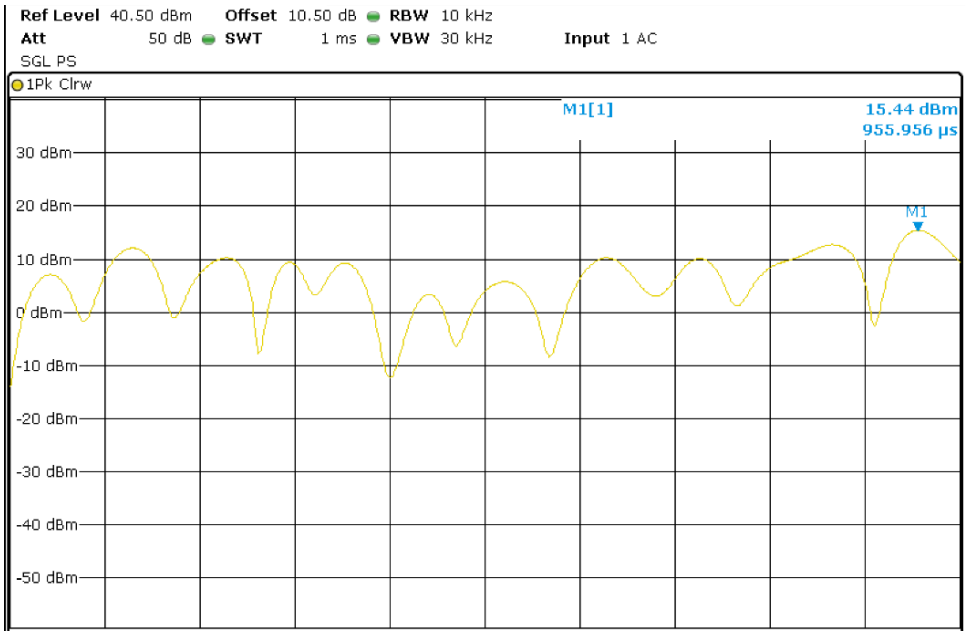


EDGE Modulation



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS:	PASS

WCDMA Modulation



TEST A.3: FREQUENCY STABILITY

LIMITS:	Product standard:	FCC Part 22 / IC RSS-132
	Test standard:	FCC §2.1055 and § 22.355 / 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	

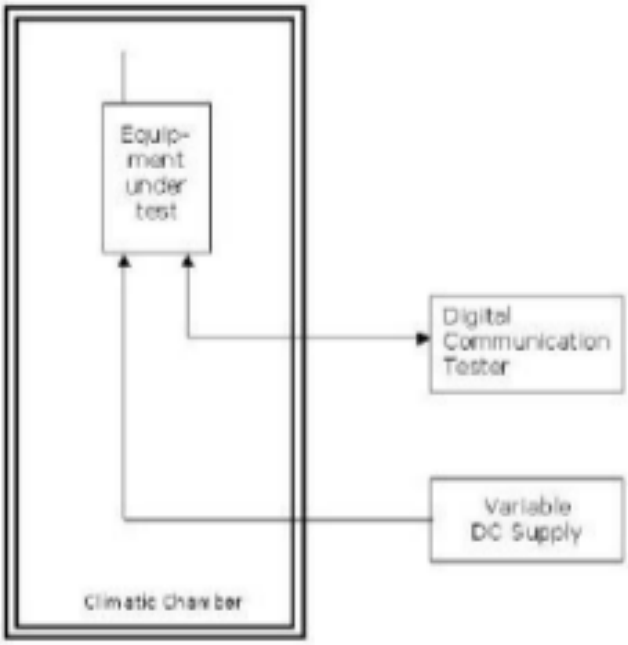
The frequency tolerance measurements over temperature variations were made over the temperature range of

–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 = 3 MHz

Frequency stability over temperature variations

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
50	-7.88	-0.0094	-0.00000094
40	-3.63	-0.0043	-0.00000043
30	4.38	0.0052	0.00000052
20	-5.05	-0.0060	-0.00000060
10	-6.67	-0.0080	-0.00000080
0	-4.98	-0.0060	-0.00000060
-10	-3.19	-0.0038	-0.00000038
-20	-5.25	-0.0063	-0.00000063
-30	8.45	0.0101	0.00000101

Frequency stability over voltage variations

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	13.8	-8.27	-0.0099	-0.00000099
Vmin	10.2	-9.76	-0.0117	-0.00000117

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

GPRS MODULATION.

Frequency stability over temperature variations

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
50	14.3	0.0171	0.00000171
40	13.82	0.0165	0.00000165
30	18.11	0.0216	0.00000216
20	15.66	0.0187	0.00000187
10	25.6	0.0306	0.00000306
0	35.55	0.0425	0.00000425
-10	40.65	0.0486	0.00000486
-20	39.94	0.0477	0.00000477
-30	32.54	0.0389	0.00000389

Frequency stability over voltage variations

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	13.8	17.92	0.0214	0.00000214
Vmin	10.2	19.11	0.0228	0.00000228

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS:	PASS

WCDMA MODULATION.

Frequency stability over temperature variations

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
50	2.6	0.0145	0.00000145
40	0.39	0.0133	0.00000133
30	0.79	0.0106	0.00000106
20	-0.11	0.0108	0.00000108
10	-1.09	0.0129	0.00000128
0	-0.77	-0.0143	-0.00000143
-10	-0.82	-0.0062	-0.00000062
-20	-1.52	0.0236	0.00000236
-30	0.31	0.0159	0.00000159

Frequency stability over voltage variations

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	13.8	-0.25	-0.0087	-0.00000087
Vmin	10.2	-5.44	0.0147	0.00000147

TEST A.4: OCCUPIED BANDWIDTH

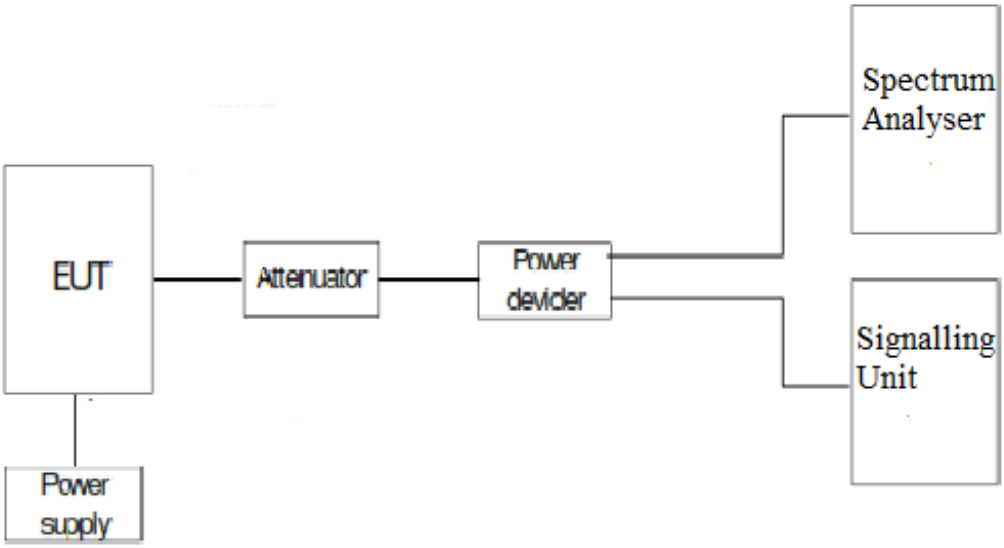
LIMITS:	Product standard:	FCC Part 22 / IC RSS-132
	Test standard:	FCC § 2.1049/ RSS-132 Clause 5.1

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	1.11	1.11
-26 dBc bandwidth (MHz)	1.28	1.27	1.27

LTE 16QAM MODULATION. BW = 1.4 MHz

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

LTE QPSK MODULATION. BW = 3 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	2.74	2.74	2.74
-26 dBc bandwidth (MHz)	3.11	3.11	3.07

LTE 16QAM MODULATION. BW = 3 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	2.74	2.74	2.74
-26 dBc bandwidth (MHz)	3.11	3.09	3.10

LTE QPSK MODULATION. BW = 5 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	4.57	4.58	4.57
-26 dBc bandwidth (MHz)	5.15	5.18	5.20

TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 5 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	4.57	4.57	4.58
-26 dBc bandwidth (MHz)	5.14	5.15	5.20

LTE QPSK MODULATION. BW = 10 MHz

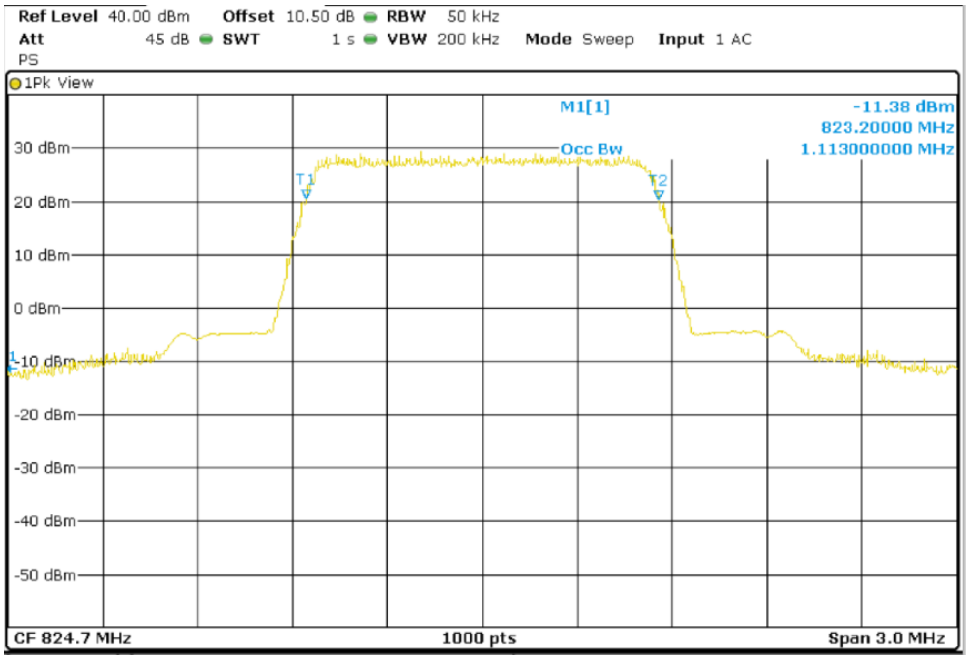
Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	8.96	9.00	8.94
-26 dBc bandwidth (MHz)	9.87	9.90	9.81

LTE 16QAM MODULATION. BW = 10 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	8.96	9.00	8.92
-26 dBc bandwidth (MHz)	9.87	9.95	9.81

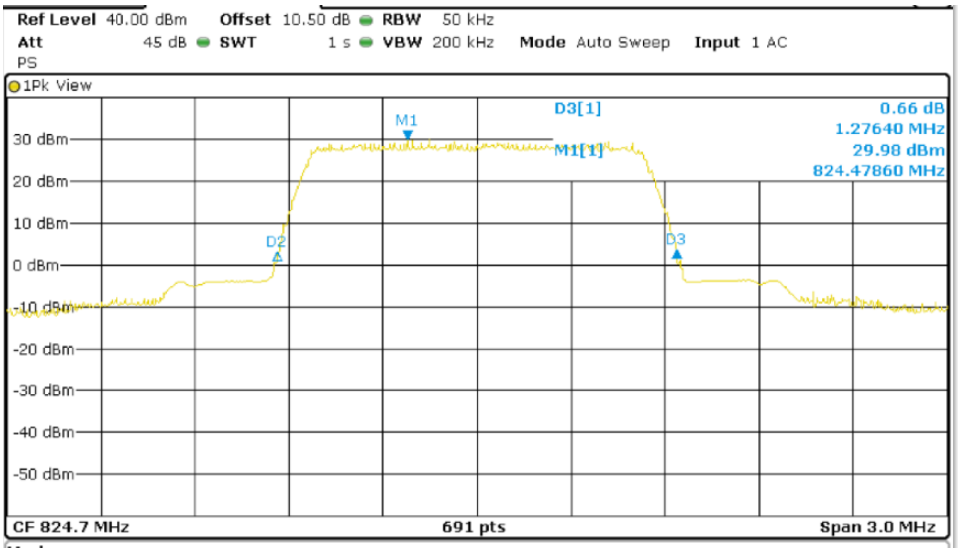
LTE QPSK MODULATION. BW = 1.4 MHz

Lowest Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

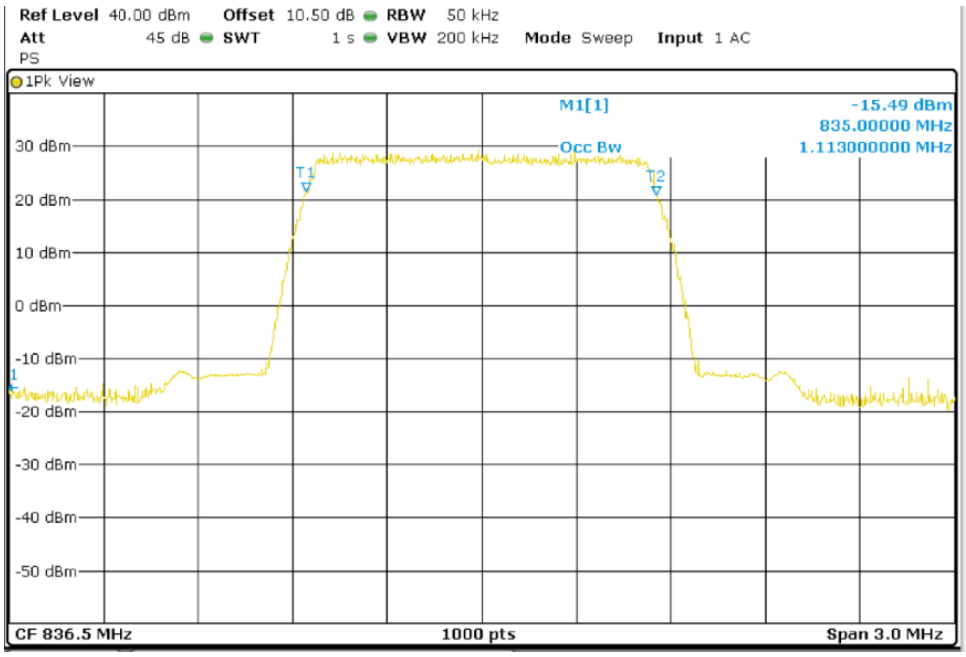
Lowest Channel -26dBc Bandwidth kHz



Marker

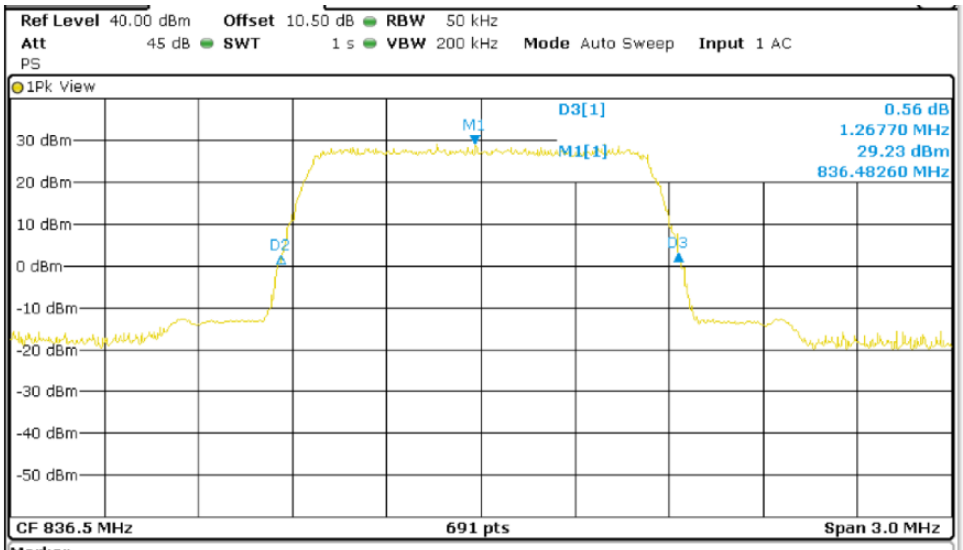
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	824.4786 MHz	29.98 dBm		
D2	M1	1	-416.79 kHz	-26.80 dB		
D3	D2	1	1.2764 MHz	0.66 dB		

Middle Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

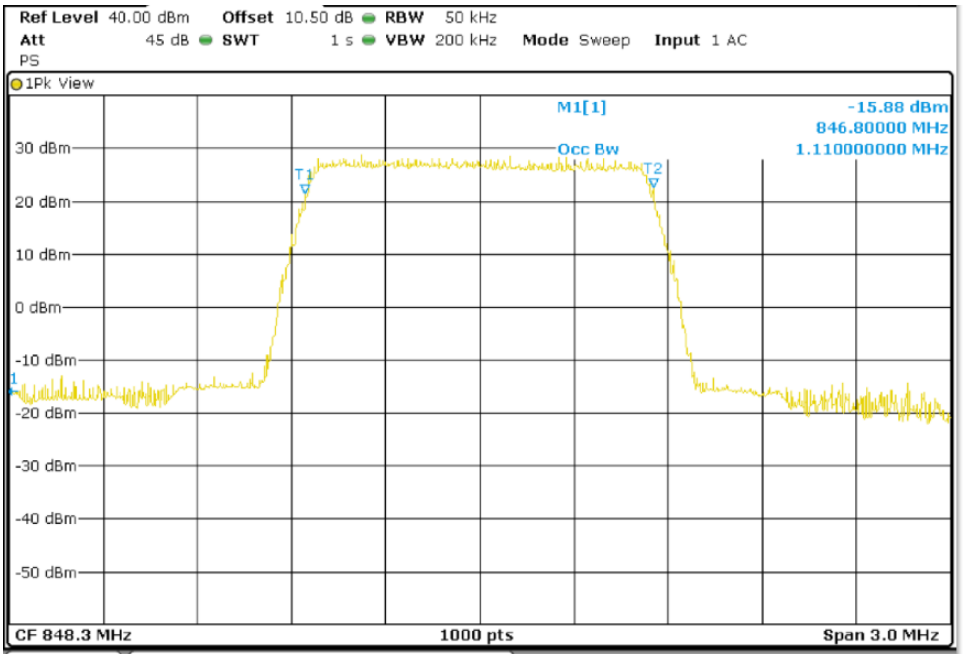
Middle Channel 26dBc Bandwidth kHz



Marker

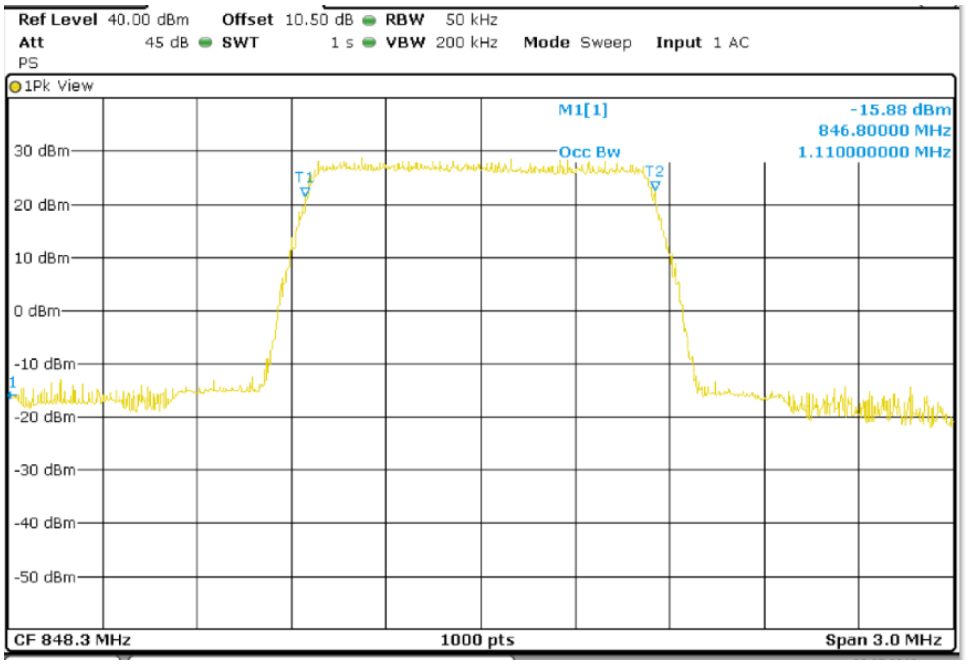
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	836.4826 MHz	29.23 dBm		
D2	M1	1	-620.8 kHz	-26.78 dB		
D3	D2	1	1.2677 MHz	0.56 dB		

Highest Channel 99% Occupied Bandwidth



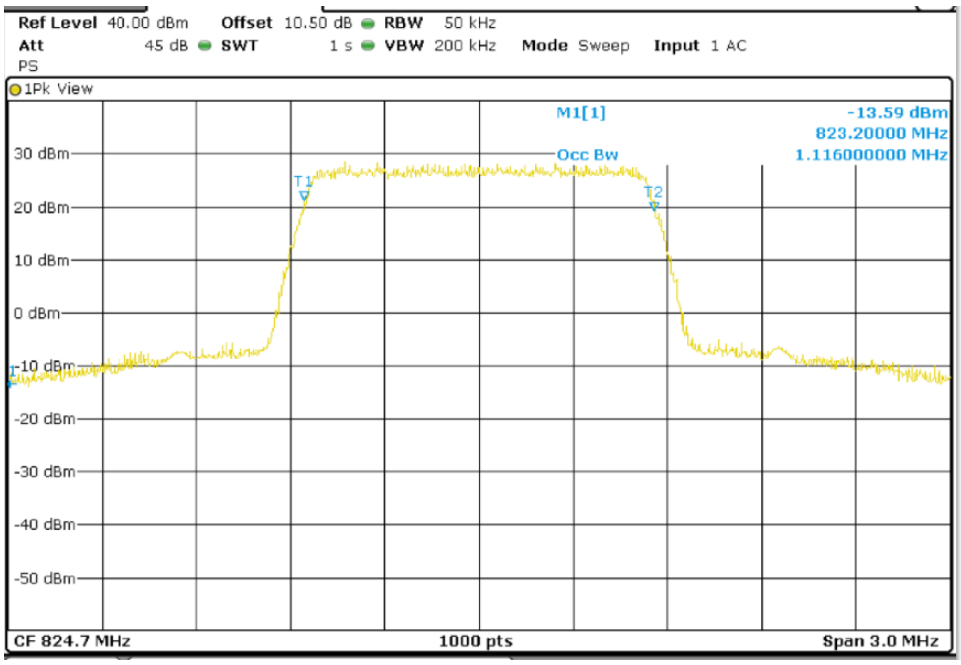
TEST RESULTS (Cont):	

Highest Channel 26dBc Bandwidth kHz



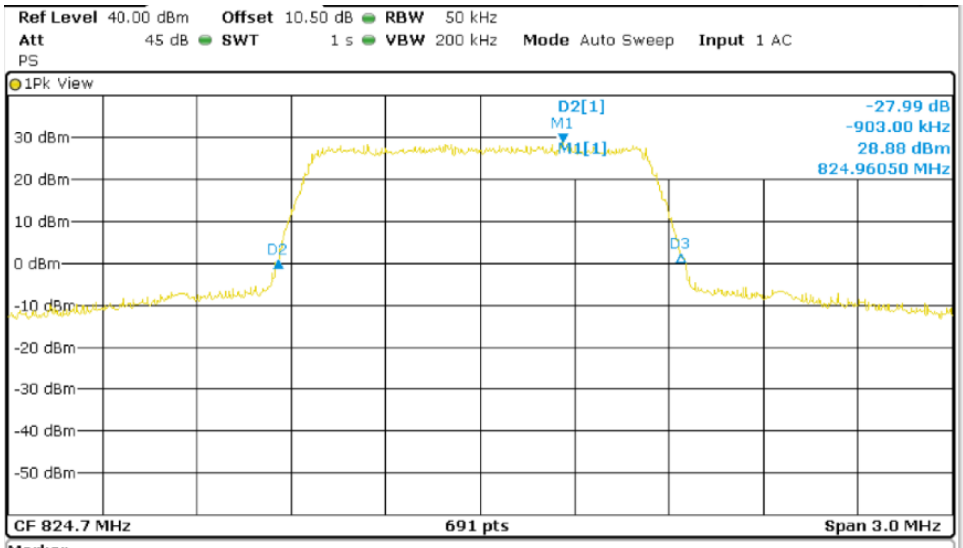
LTE 16QAM MODULATION. BW = 1.4 MHz

Lowest Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

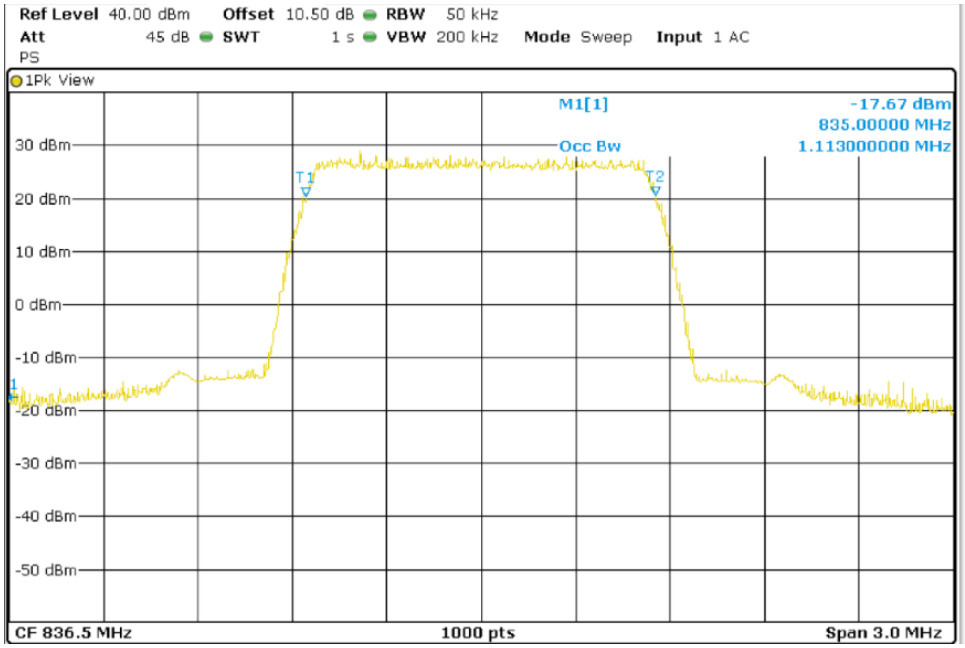
Lowest Channel -26dBc Bandwidth kHz



Marker

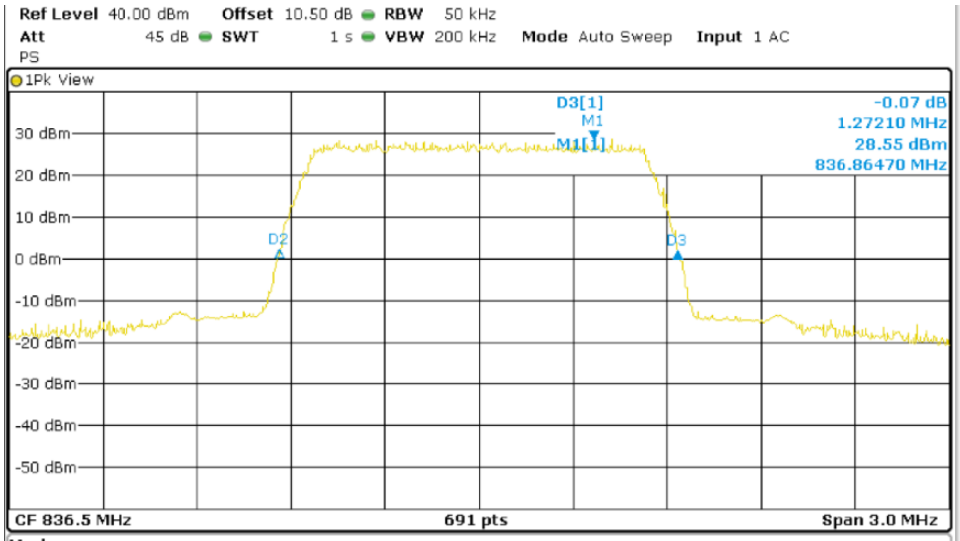
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	824.9605 MHz	28.88 dBm		
D2	M1	1	-903.0 kHz	-27.99 dB		
D3	D2	1	1.2808 MHz	1.39 dB		

Middle Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

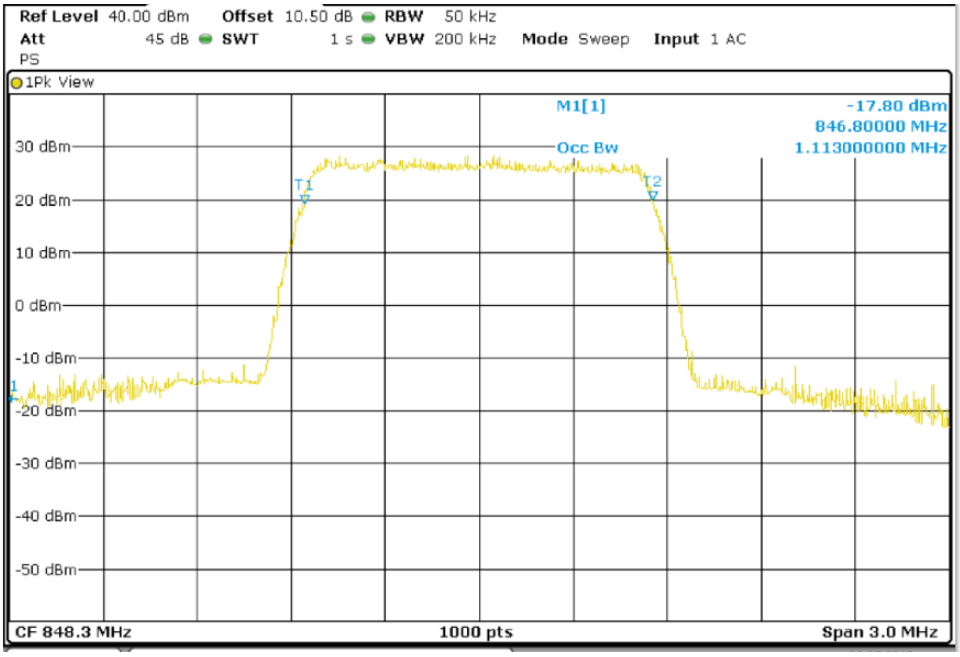
Middle Channel 26dBc Bandwidth kHz



Marker

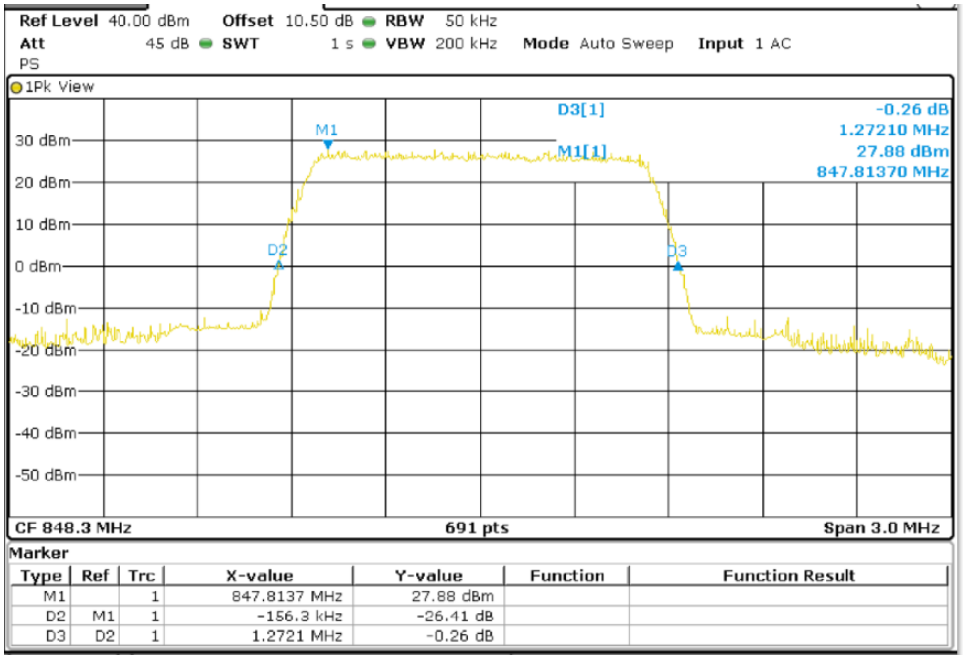
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	836.8647 MHz	28.55 dBm		
D2	M1	1	-1.0029 MHz	-26.34 dB		
D3	D2	1	1.2721 MHz	-0.07 dB		

Highest Channel 99% Occupied Bandwidth



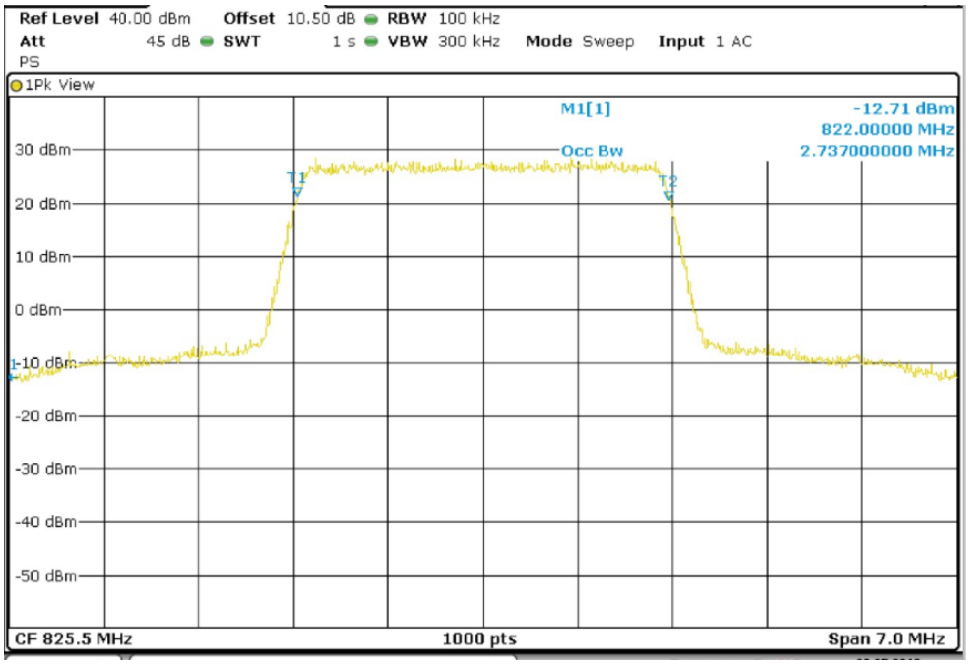
TEST RESULTS (Cont):	

Highest Channel 26dBc Bandwidth kHz



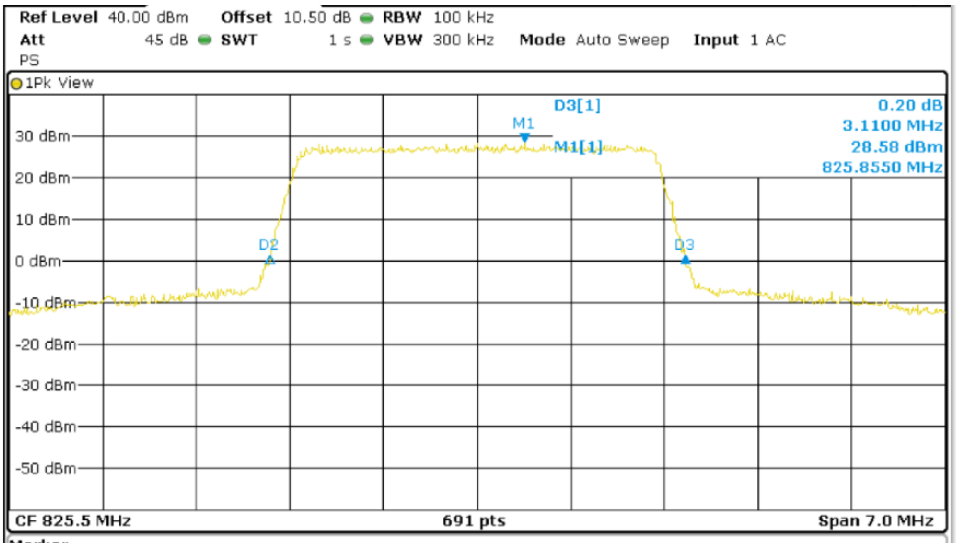
LTE QPSK MODULATION. BW = 3 MHz

Lowest Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

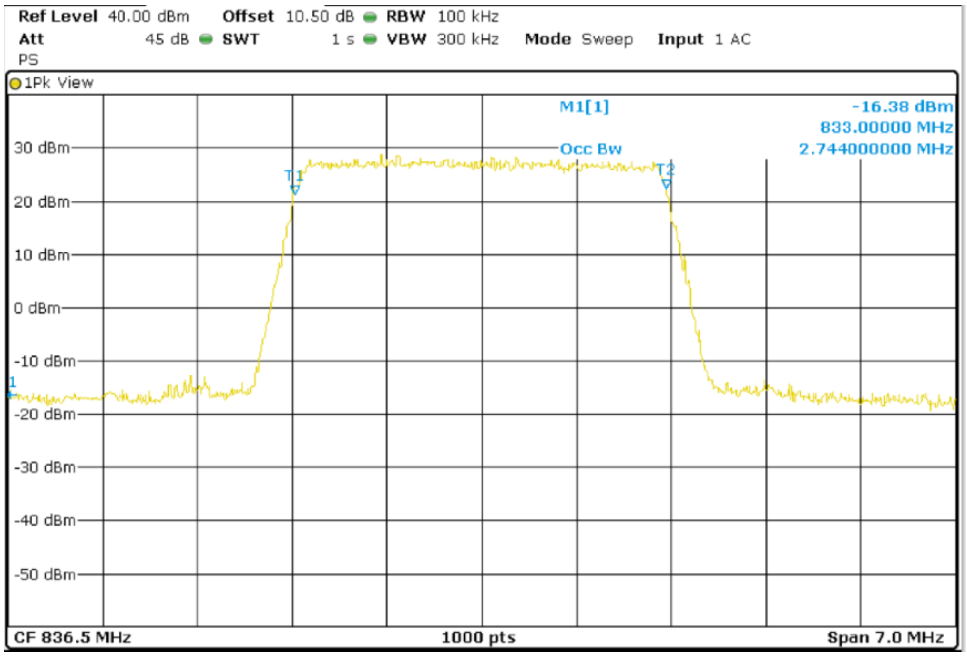
Lowest Channel -26dBc Bandwidth kHz



Marker

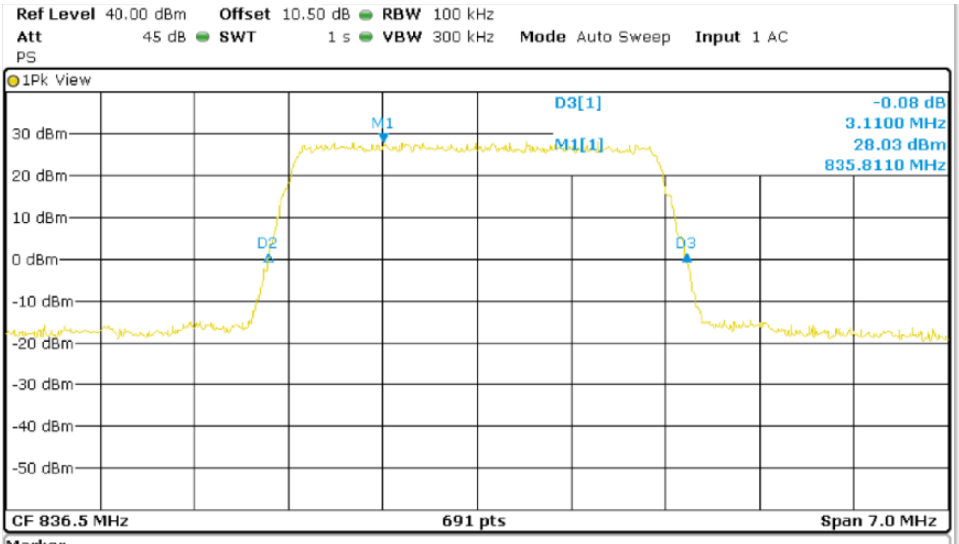
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	825.855 MHz	28.58 dBm		
D2	M1	1	-1.904 MHz	-27.24 dB		
D3	D2	1	3.11 MHz	0.20 dB		

Middle Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

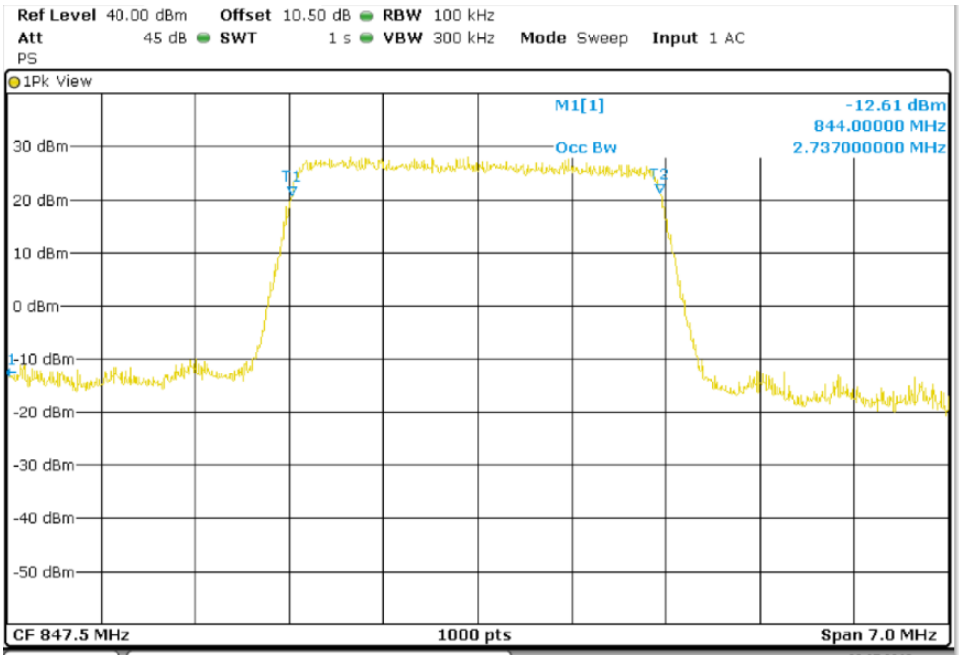
Middle Channel 26dBc Bandwidth kHz



Marker

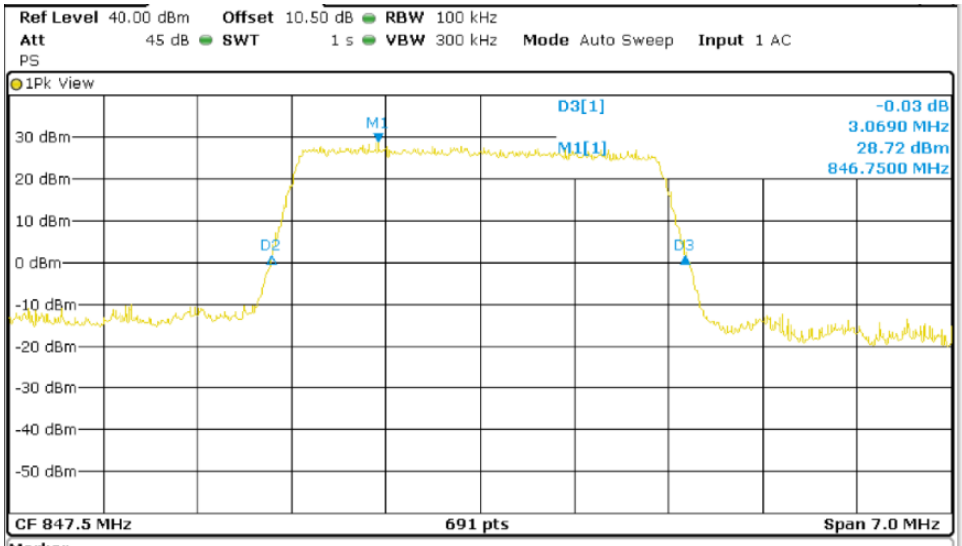
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	835.811 MHz	28.03 dBm		
D2	M1	1	-861.0 kHz	-26.56 dB		
D3	D2	1	3.11 MHz	-0.08 dB		

Highest Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

Highest Channel 26dBc Bandwidth kHz

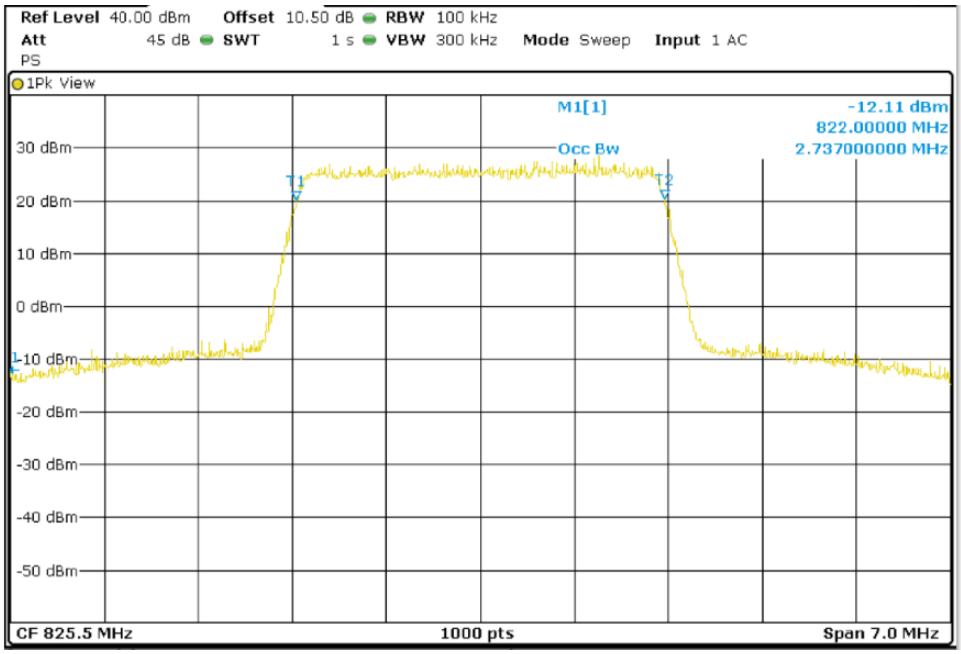


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	846.75 MHz	28.72 dBm		
D2	M1	1	-800.0 kHz	-26.87 dB		
D3	D2	1	3.069 MHz	-0.03 dB		

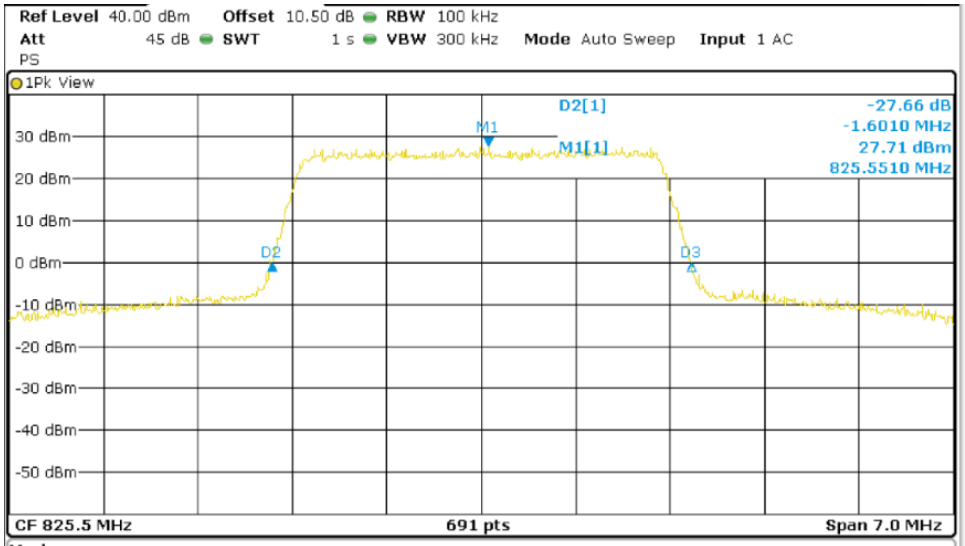
LTE 16QAM MODULATION. BW = 3 MHz

Lowest Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

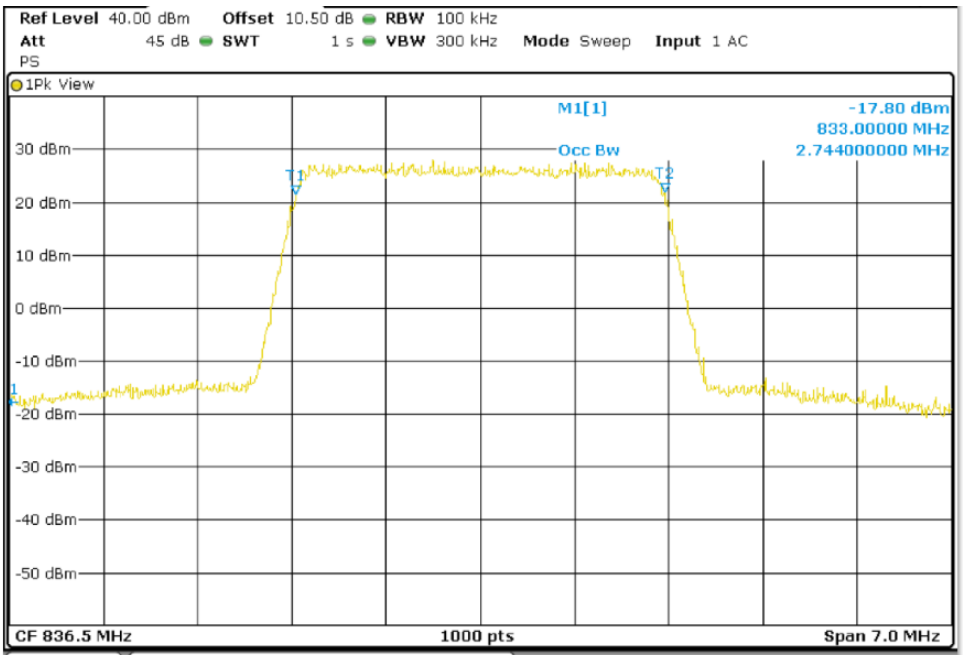
Lowest Channel 26dBc Bandwidth kHz



Marker

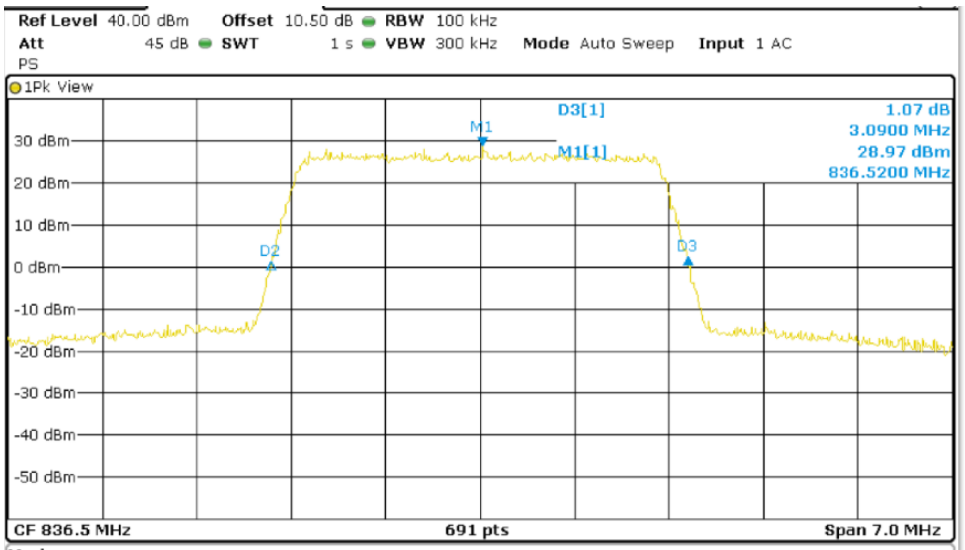
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	825.551 MHz	27.71 dBm		
D2	M1	1	-1.601 MHz	-27.66 dB		
D3	D2	1	3.11 MHz	0.07 dB		

Middle Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

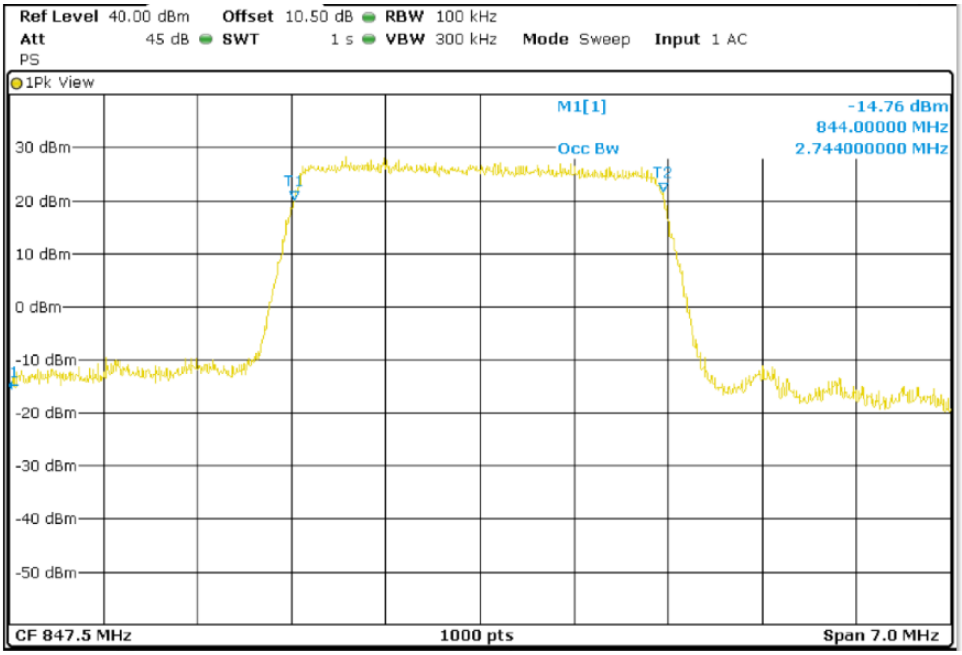
Middle Channel 26dBc Bandwidth kHz



Marker

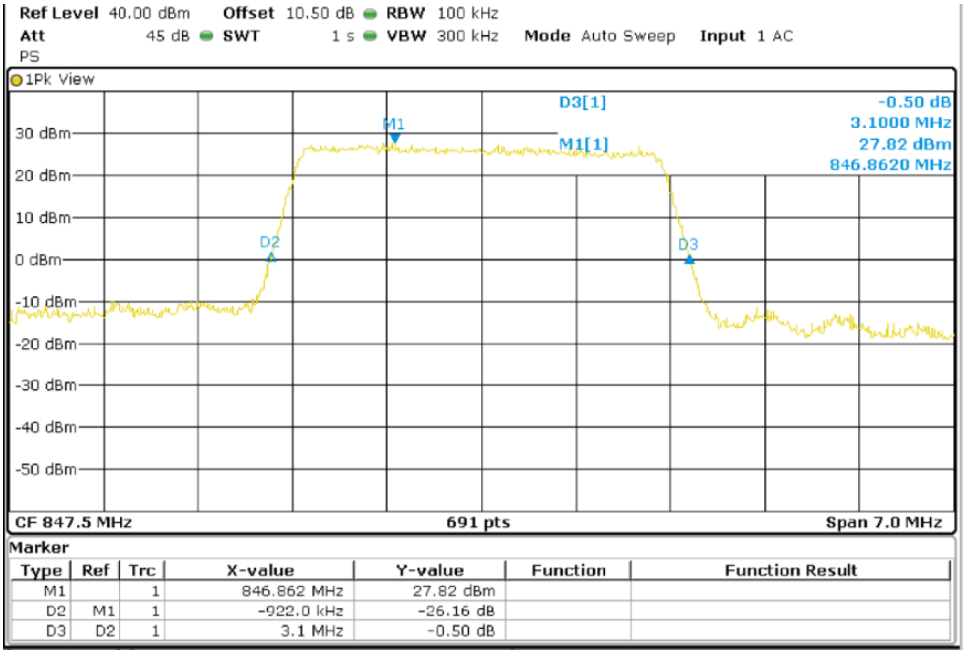
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	836.52 MHz	28.97 dBm		
D2	M1	1	-1.57 MHz	-27.40 dB		
D3	D2	1	3.09 MHz	1.07 dB		

Highest Channel 99% Occupied Bandwidth



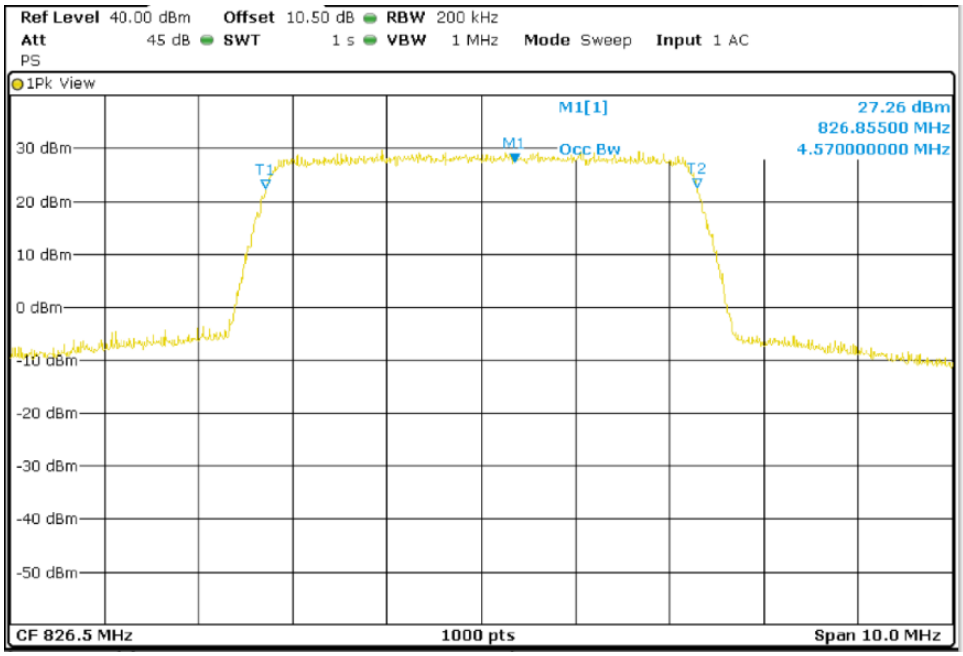
TEST RESULTS (Cont):	

Highest Channel 26dBc Bandwidth kHz



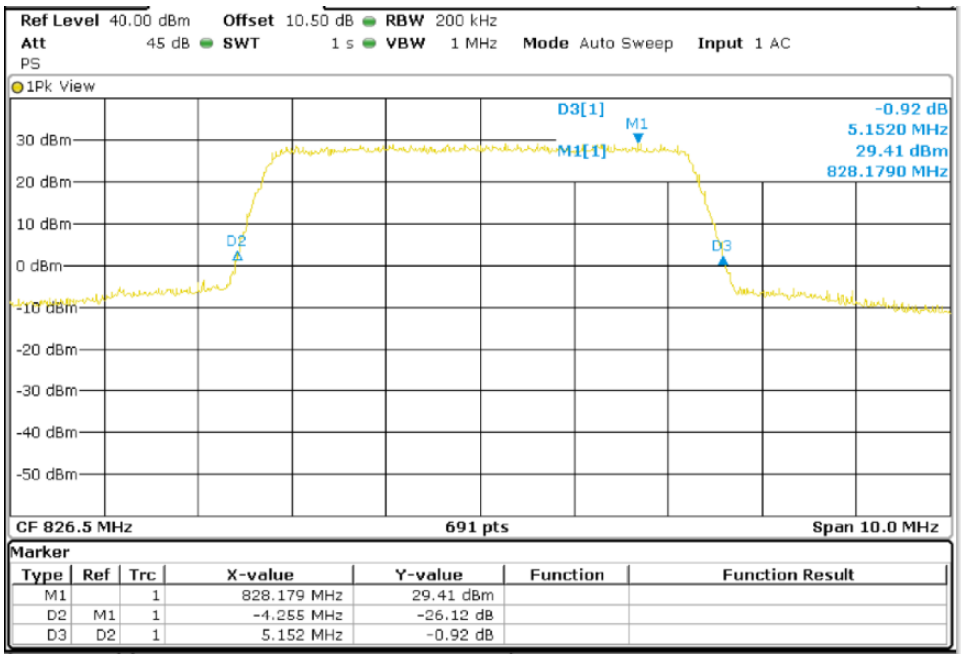
LTE QPSK MODULATION. BW = 5 MHz

Lowest Channel 99% Occupied Bandwidth

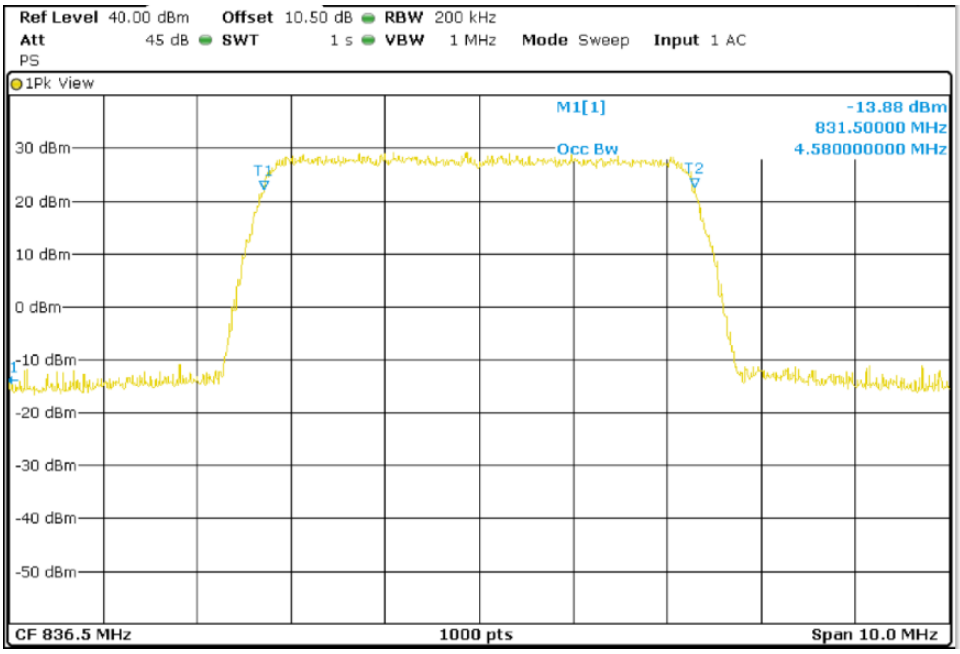


TEST RESULTS (Cont):	

Lowest Channel 26dBc Bandwidth kHz

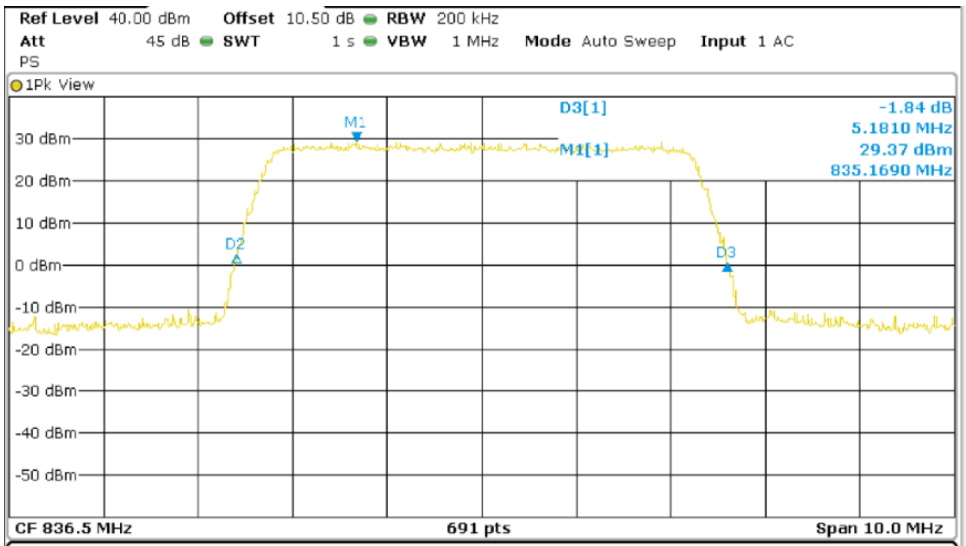


Middle Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

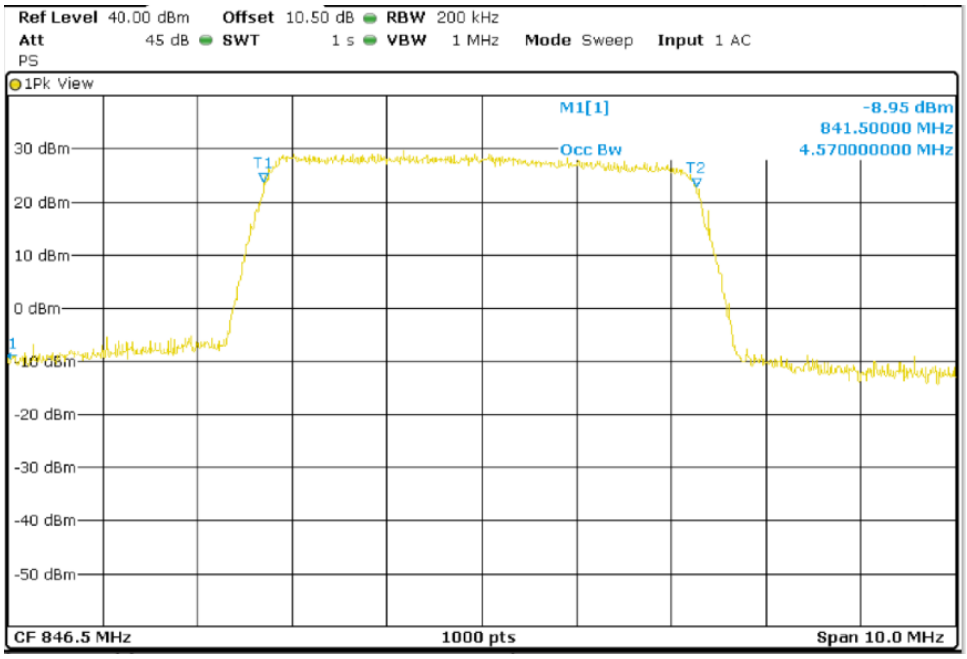
Middle Channel 26dBc Bandwidth kHz



Marker

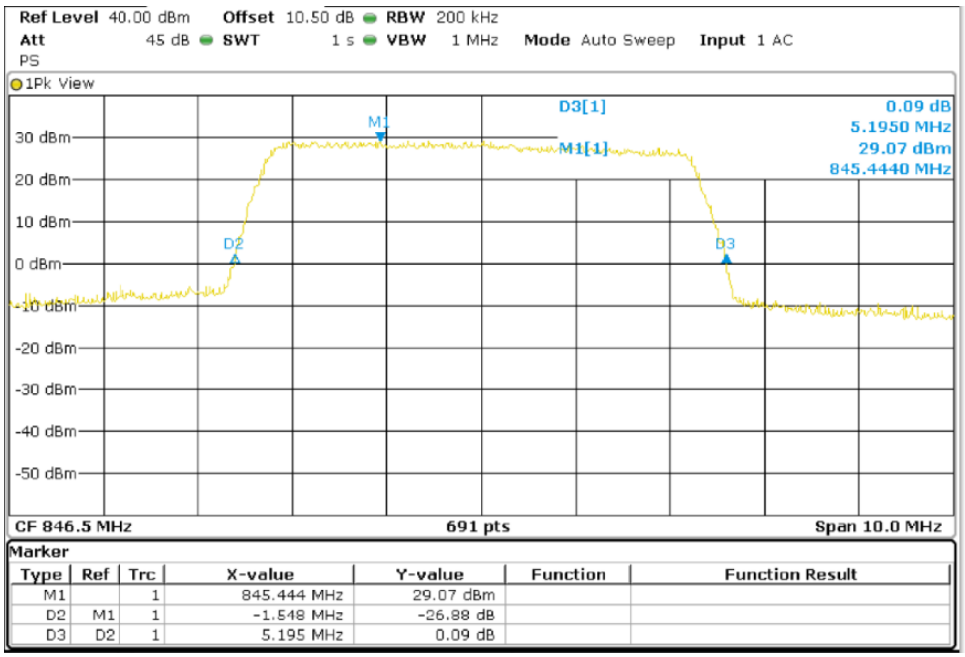
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	835.169 MHz	29.37 dBm		
D2	M1	1	-1.259 MHz	-26.92 dB		
D3	D2	1	5.181 MHz	-1.84 dB		

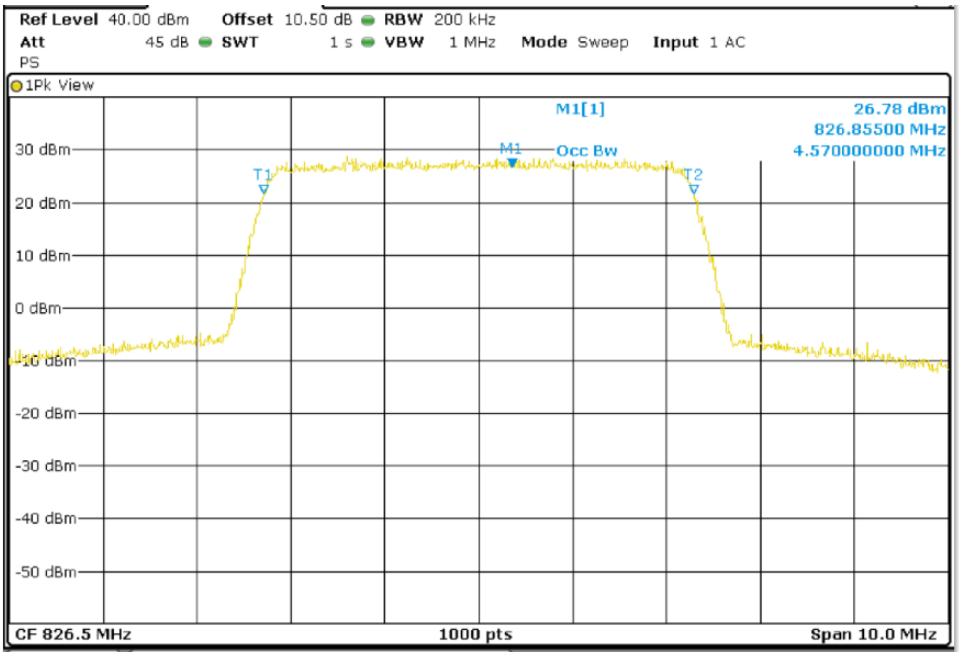
Highest Channel 99% Occupied Bandwidth



TEST RESULTS (Cont):	

Highest Channel 26dBc Bandwidth kHz



LTE 16QAM MODULATION. BW = 5 MHz

Lowest Channel 99% Occupied Bandwidth