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

LTE QPSK MODULATION. BW = 20 MHz

Frequency stability over temperature variations

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
50	10.13	0.0010	0.00000010
40	11.27	0.0014	0.00000014
30	10.21	0.0022	0.00000022
20	7.08	0.0015	0.00000015
10	9.93	0.0025	0.00000025
0	1.06	0.0012	0.00000012
-10	4.51	0.0034	0.00000034
-20	5.16	0.0011	0.00000011
-30	8.74	-0.0014	-0.00000014

Frequency stability over voltage variations

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.37	0.11	0.0035	0.00000035
Vmin	3.23	8.01	-0.0001	-0.00000001

TEST A.4: OCCUPIED BANDWIDTH

LIMITS:	Product standard:	FCC Part 24 / IC RSS-133
	Test standard:	FCC § 2.1049/ RSS-133 Clause 2.3

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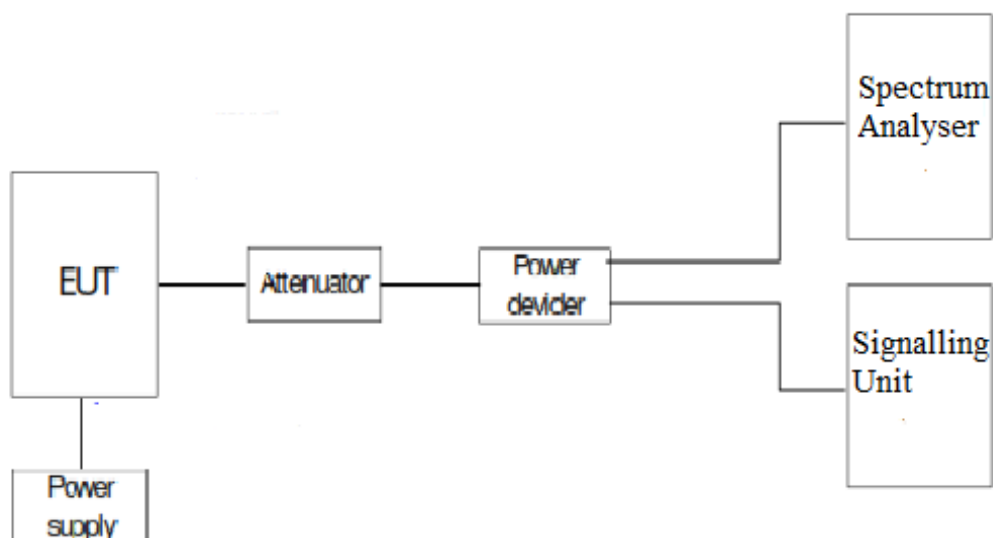
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

LTE QPSK MODULATION. BW = 5 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.11	1.11	1.11
-26 dBc bandwidth (MHz)	1.43	1.42	1.41

LTE 16QAM MODULATION. BW = 5 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.12	1.12	1.11
-26 dBc bandwidth (MHz)	1.47	1.47	1.34

LTE QPSK MODULATION. BW = 10 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.11	1.11	1.11
-26 dBc bandwidth (MHz)	1.42	1.47	1.43

LTE 16QAM MODULATION. BW = 10 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.13	1.12	1.11
-26 dBc bandwidth (MHz)	1.45	1.53	1.45

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 15 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.11	1.12	1.11
-26 dBc bandwidth (MHz)	1.46	1.48	1.45

LTE 16QAM MODULATION. BW = 15 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.12	1.11	1.12
-26 dBc bandwidth (MHz)	1.53	1.47	1.49

LTE QPSK MODULATION. BW = 20 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.11	1.12	1.11
-26 dBc bandwidth (MHz)	1.43	1.48	1.45

LTE 16QAM MODULATION. BW = 20 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.12	1.11	1.12
-26 dBc bandwidth (MHz)	1.49	1.47	1.49

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 5 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

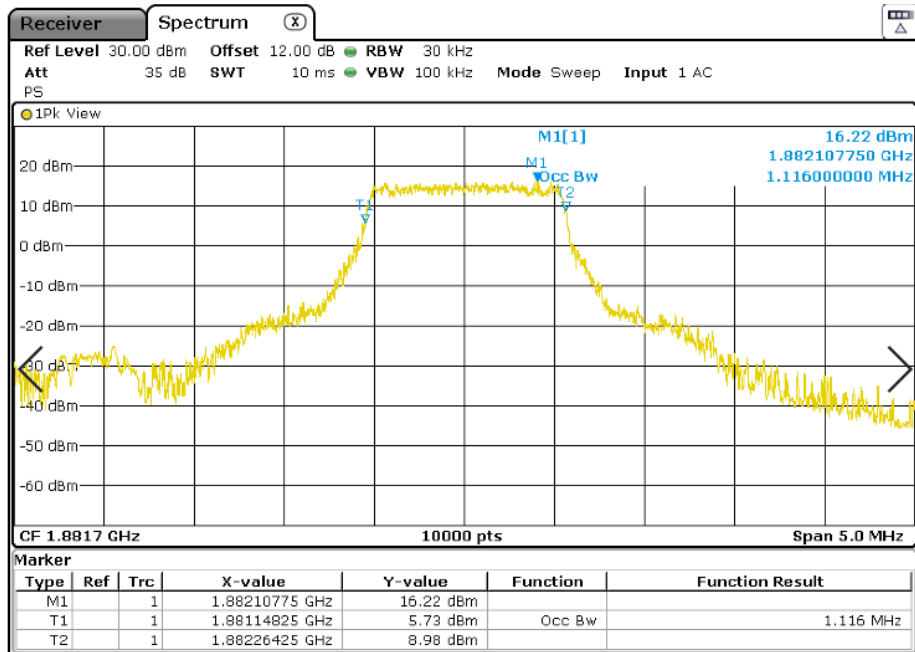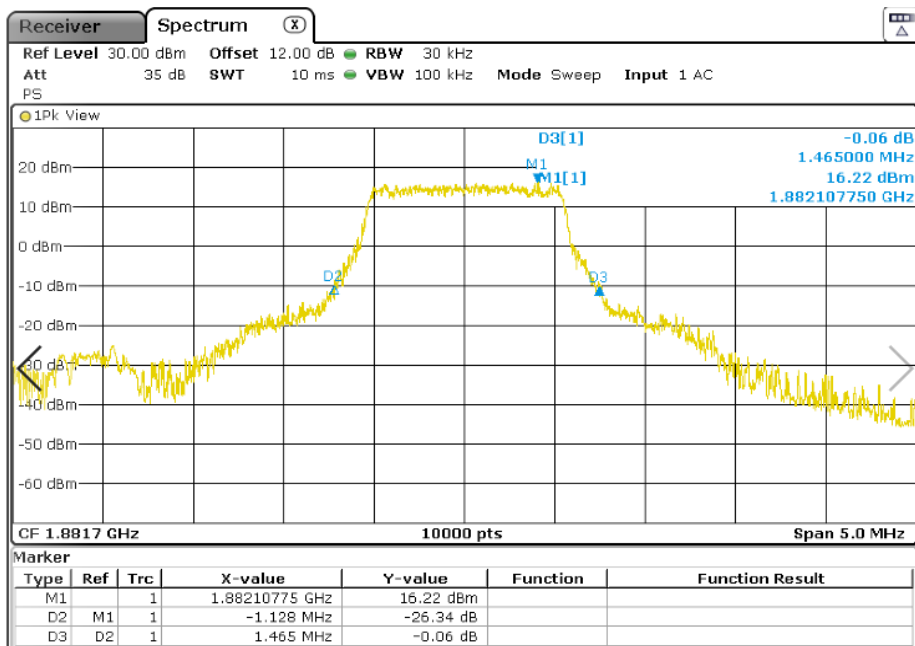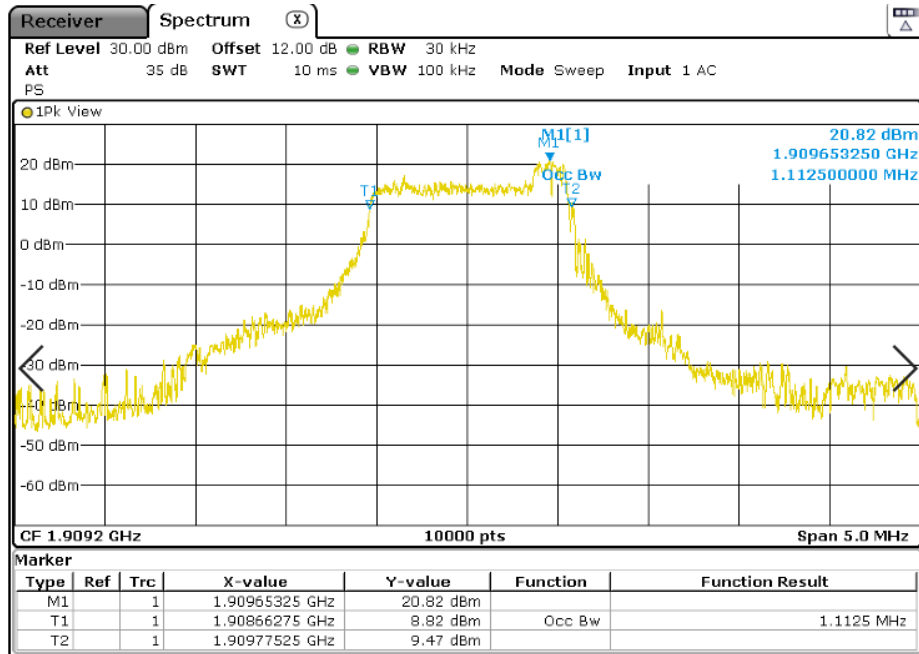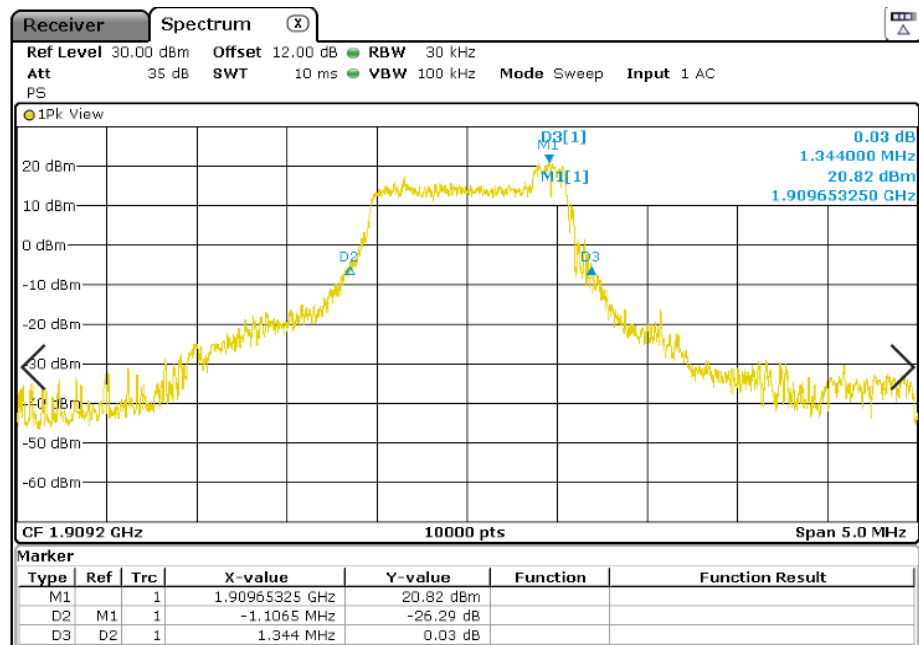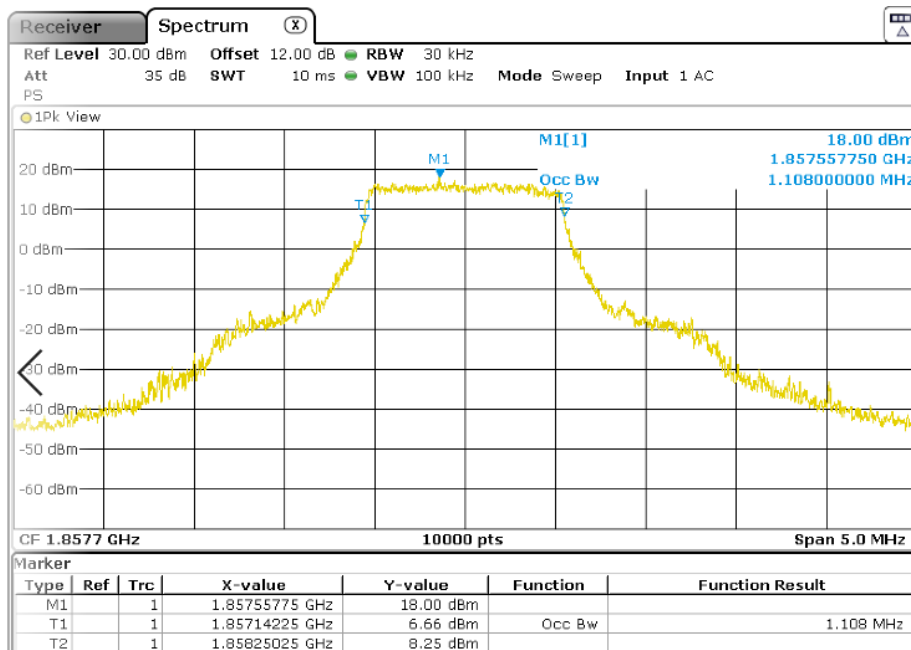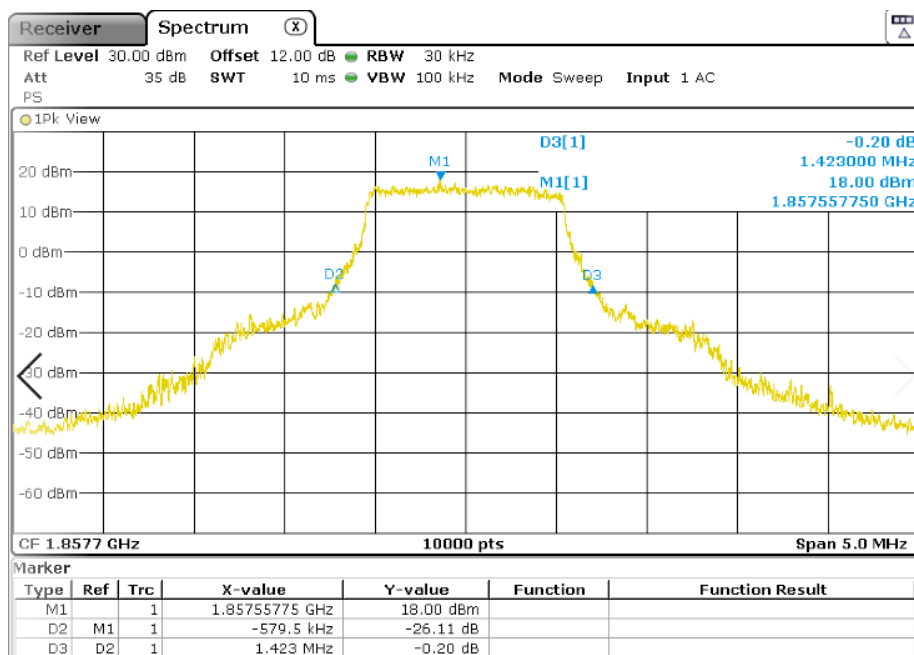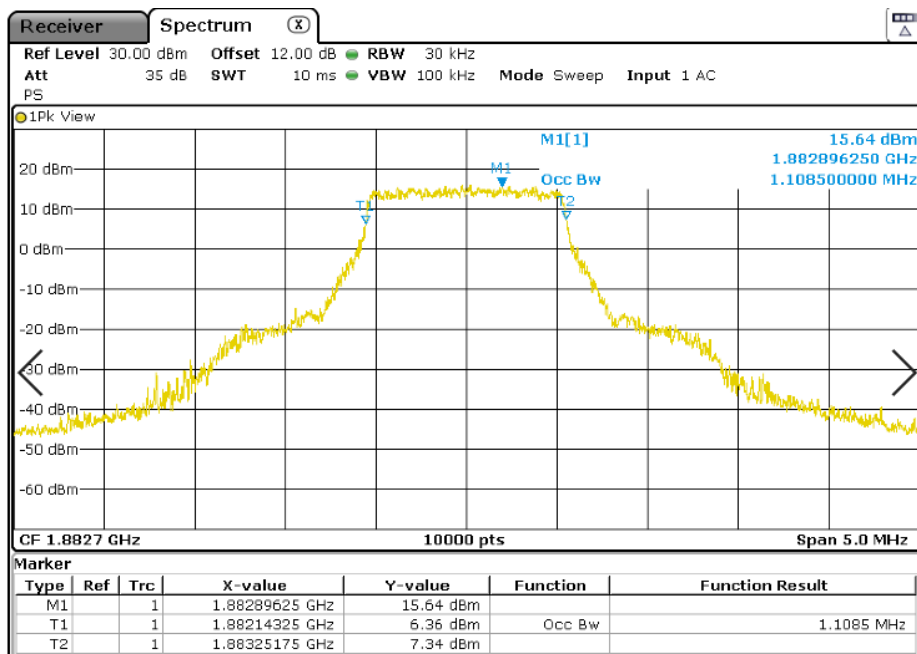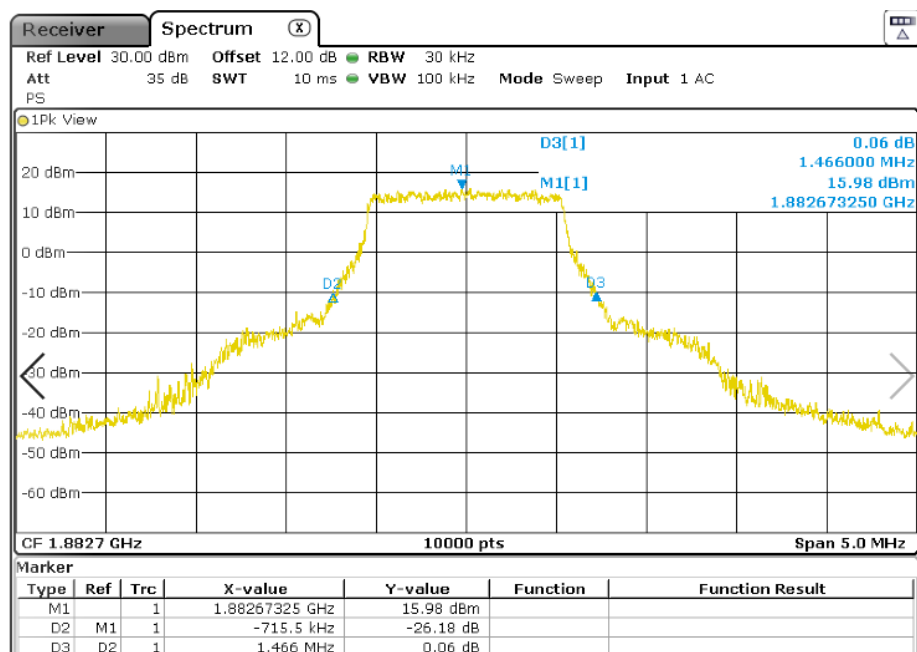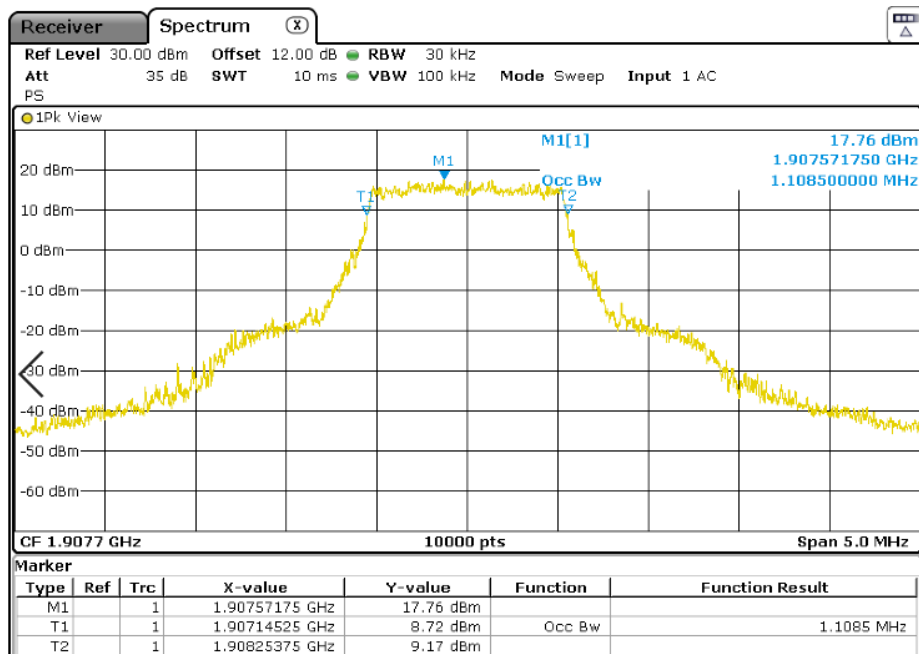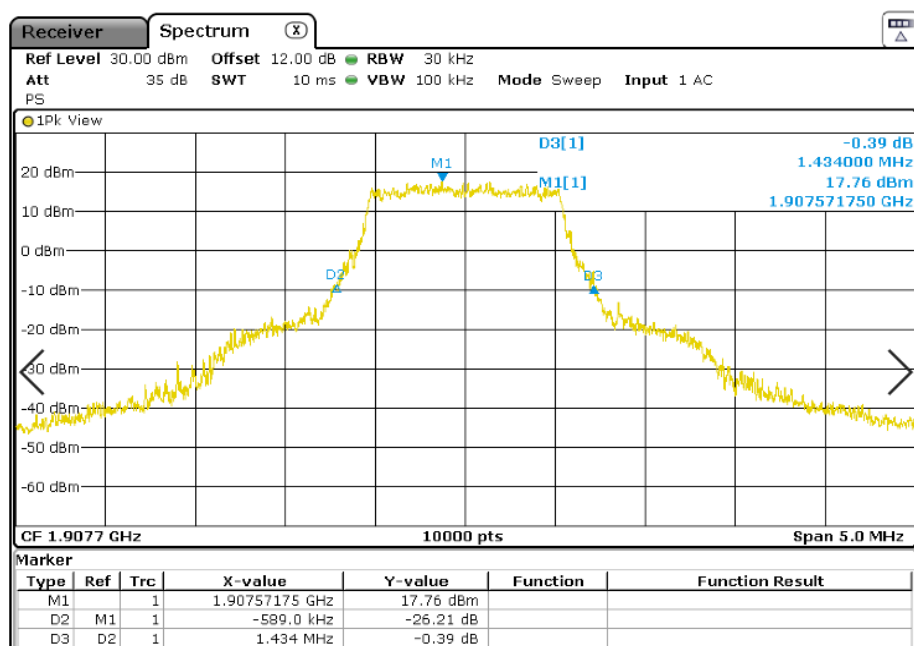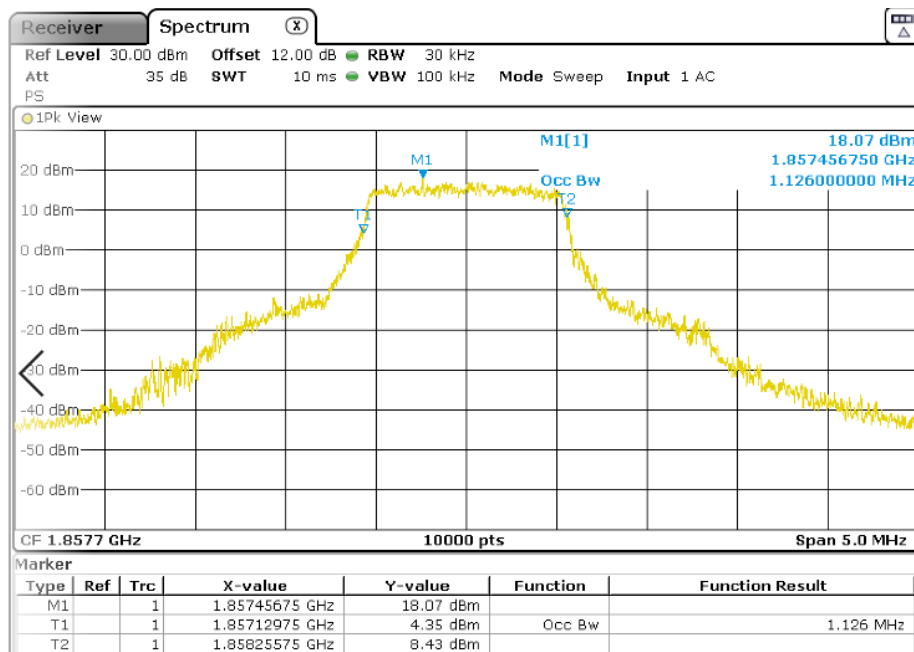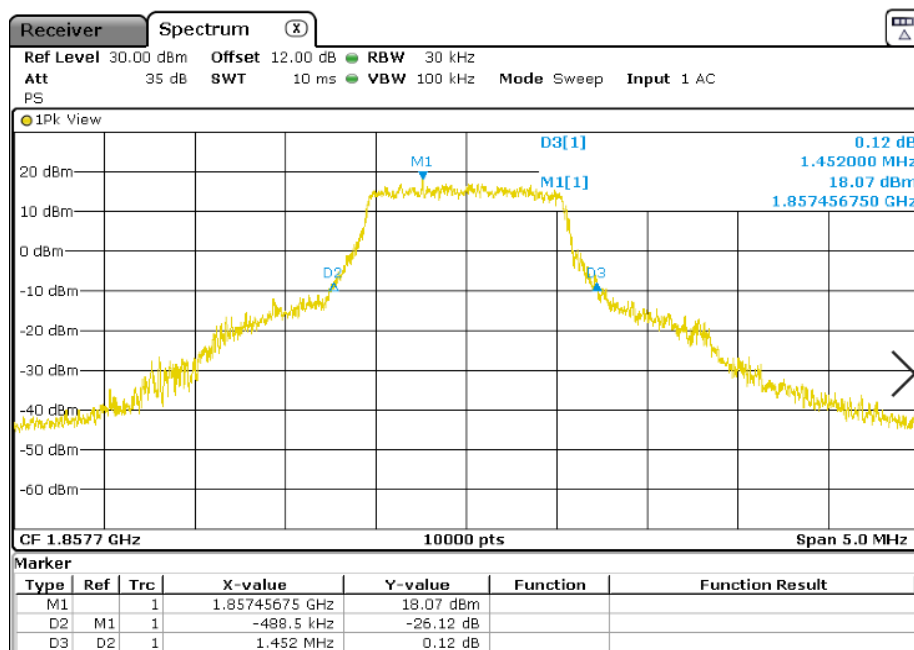| TEST RESULTS (Cont):	

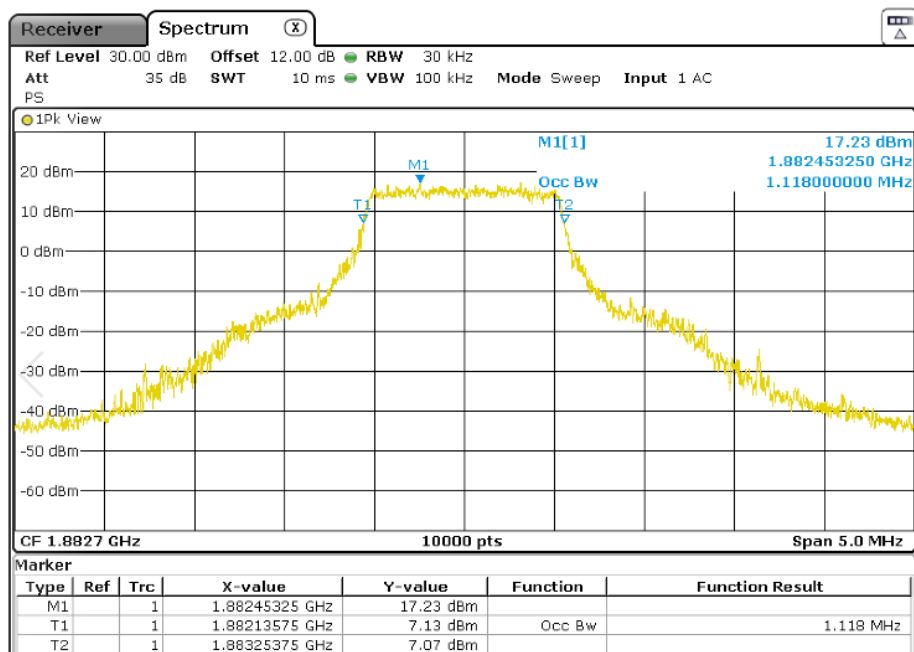LTE 16QAM MODULATION. BW = 5 MHz

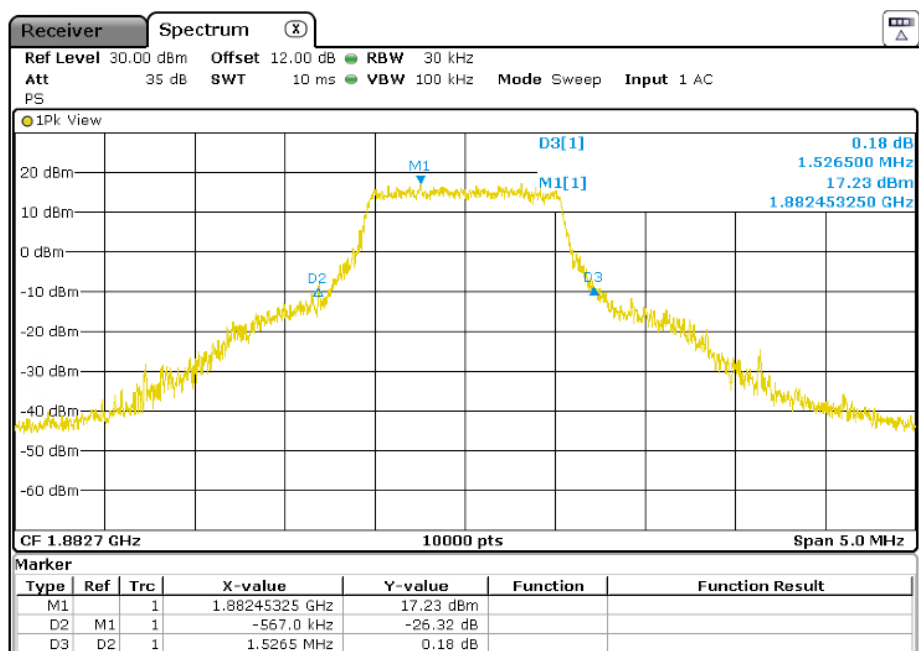Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

Middle Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

Marker						
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.90965325 GHz	20.82 dBm		
T1		1	1.90866275 GHz	8.82 dBm	Occ Bw	1.1125 MHz
T2		1	1.90977525 GHz	9.47 dBm		

Highest Channel -26dBc Bandwidth

Marker						
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.90965325 GHz	20.82 dBm		
D2	M1	1	-1.1065 MHz	-26.29 dB		
D3	D2	1	1.344 MHz	0.03 dB		

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 10 MHz

Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

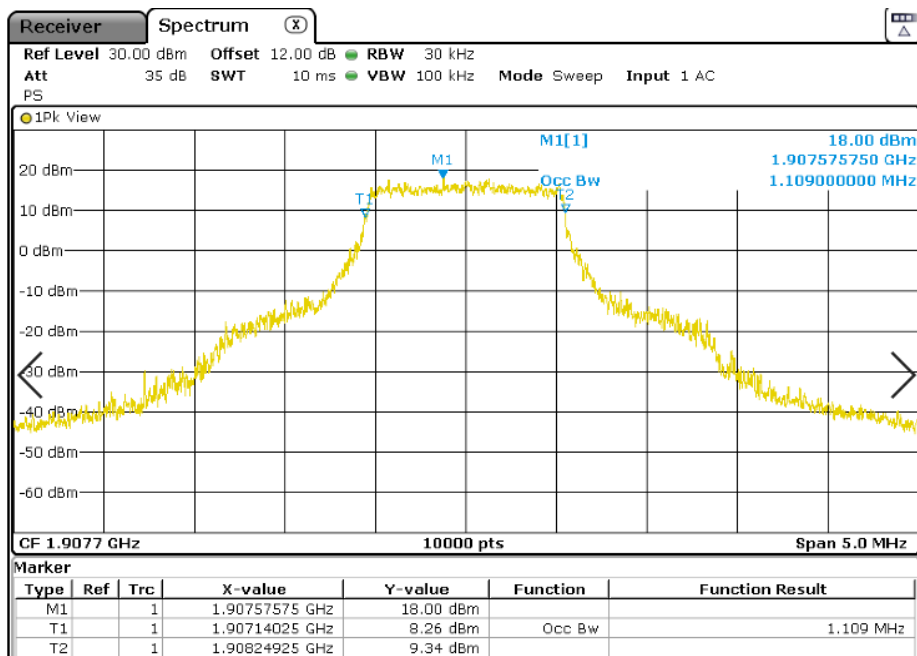| TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

Middle Channel -26dBc Bandwidth

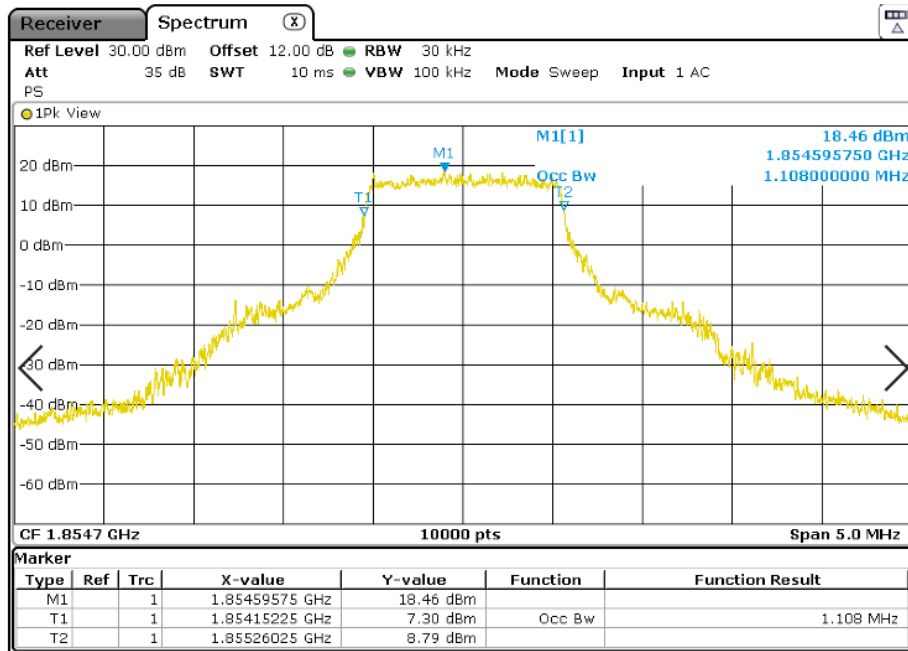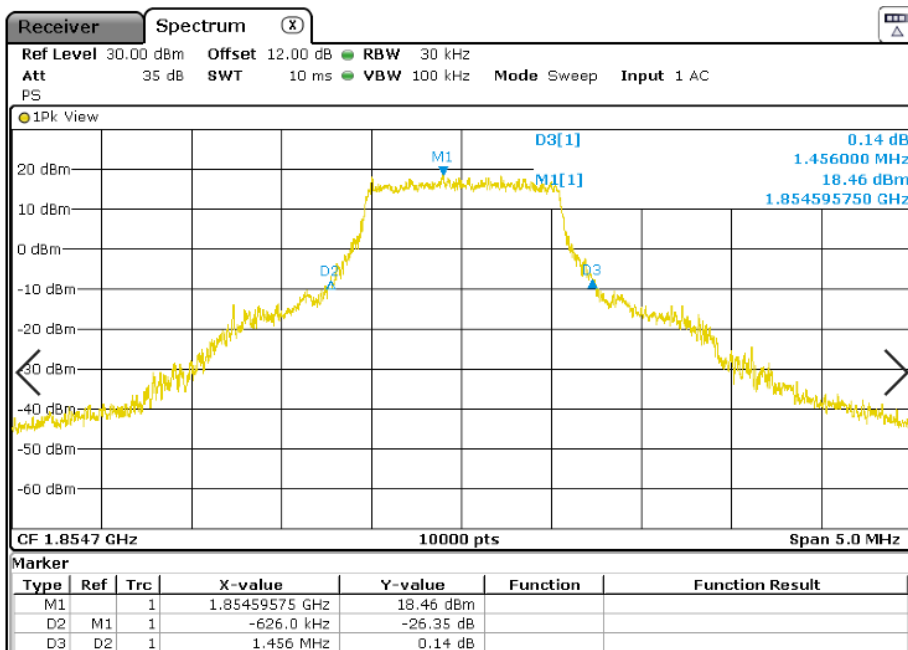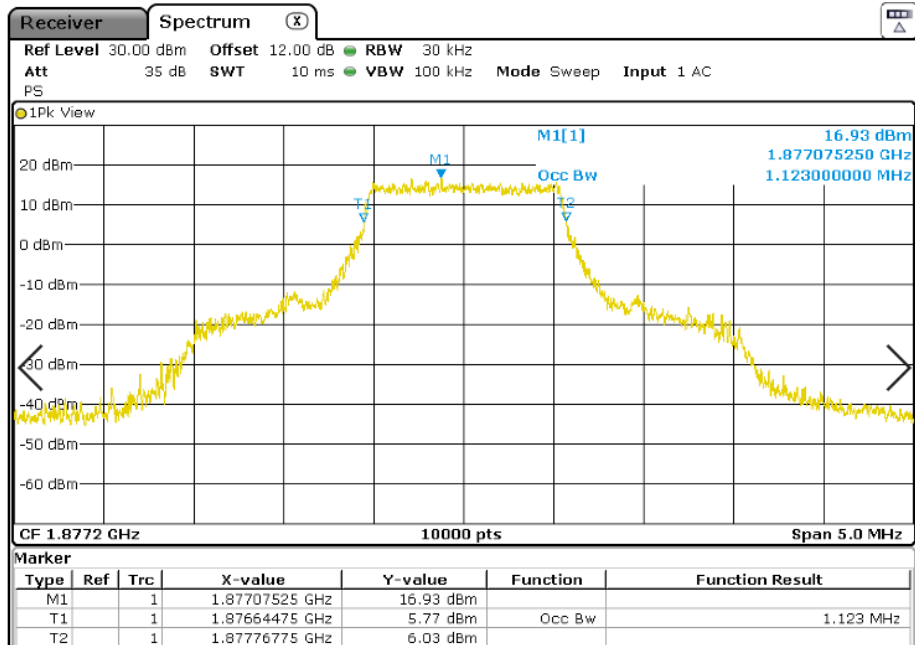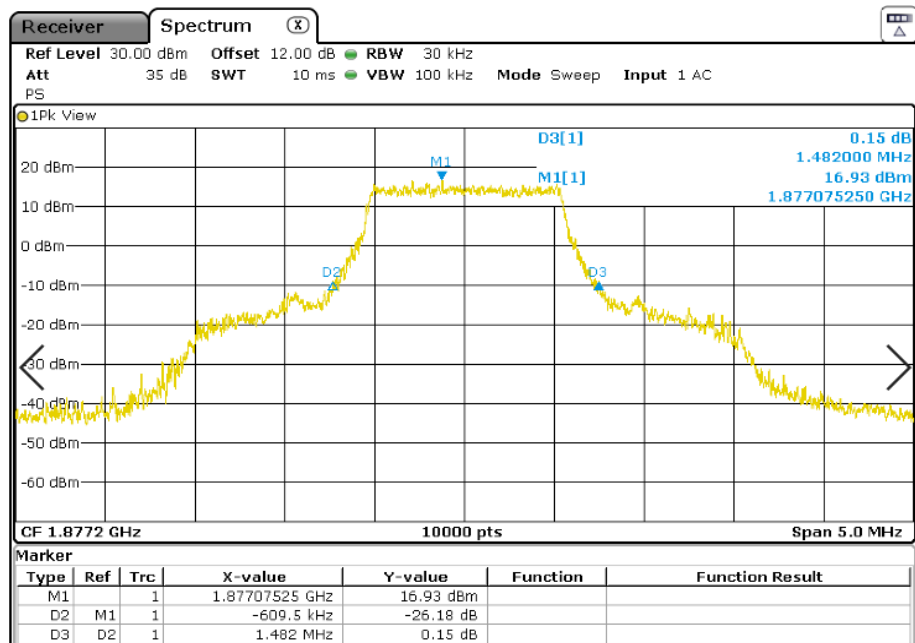| TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

Highest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 10 MHz

Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

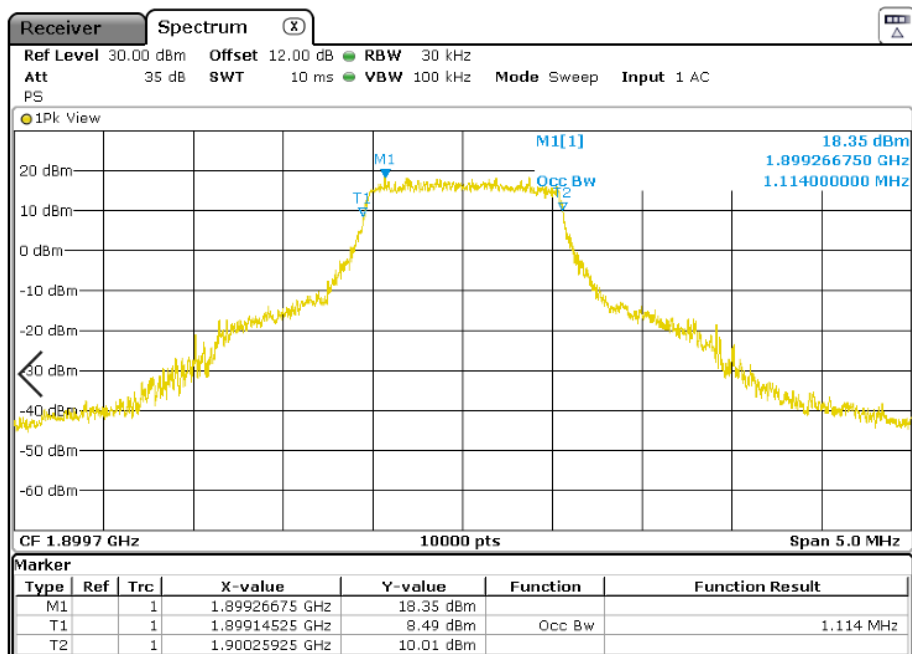| TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

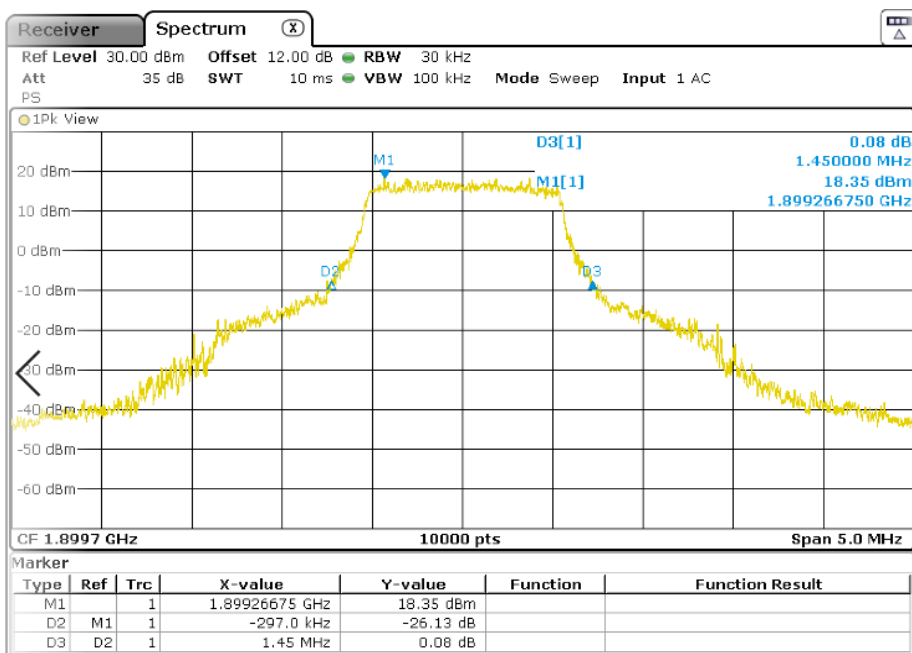Middle Channel -26dBc Bandwidth

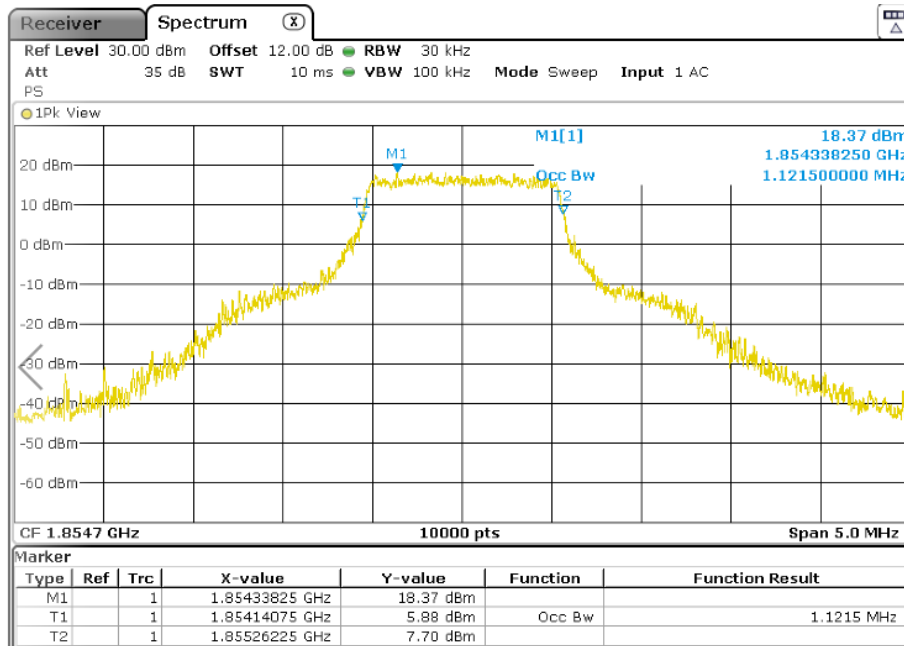| TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

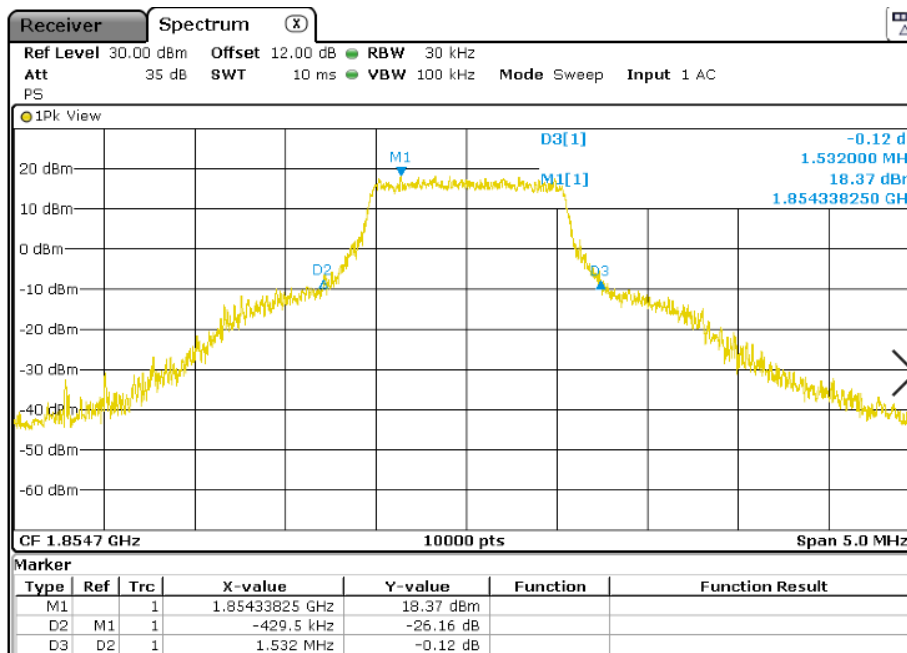Highest Channel -26dBc Bandwidth

| TEST RESULTS (Cont): | |

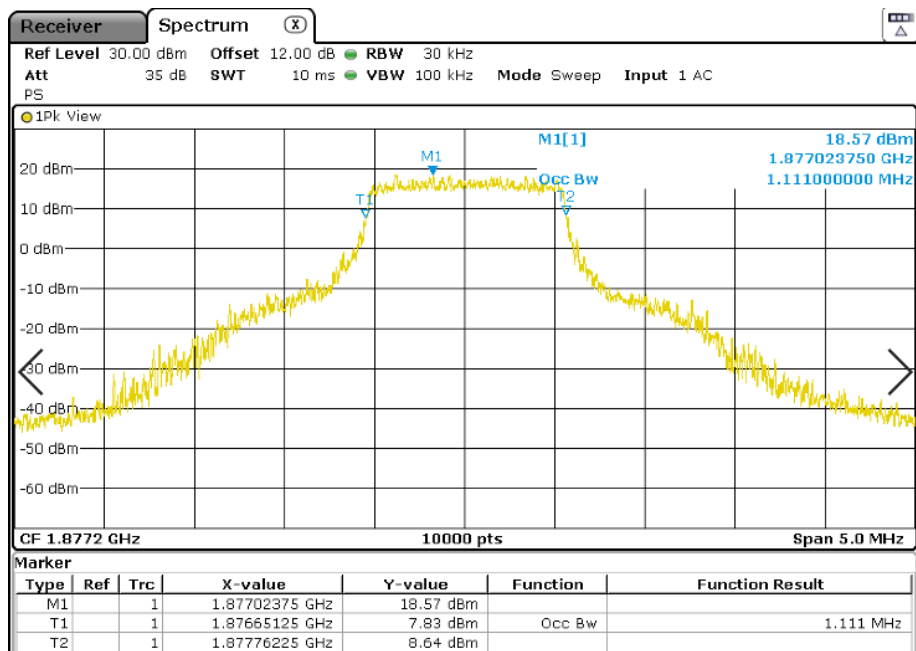LTE QPSK MODULATION. BW = 15 MHz

Lowest Channel 99% Occupied Bandwidth
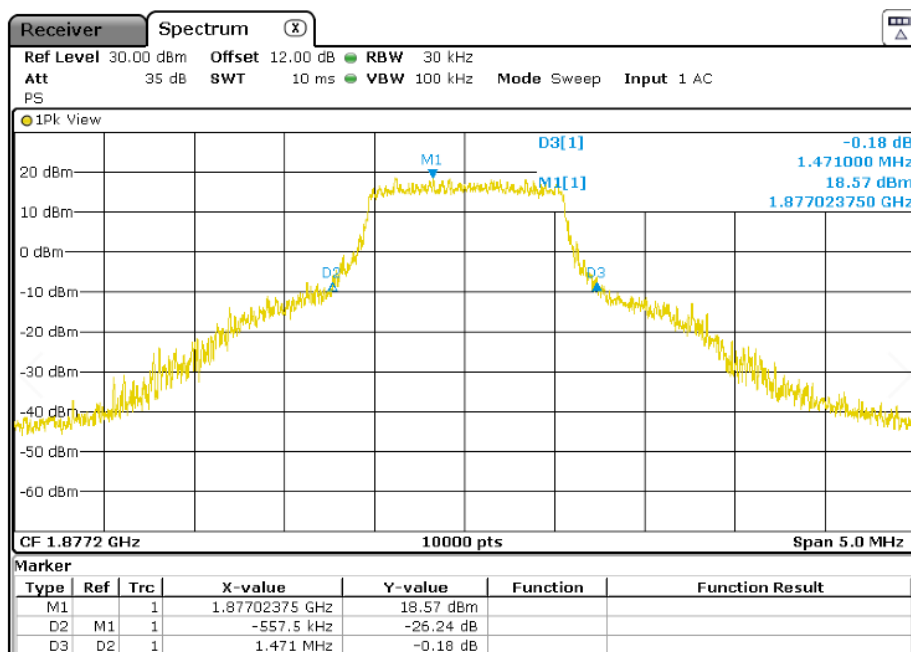

Lowest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

Middle Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

Highest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 15 MHz

Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

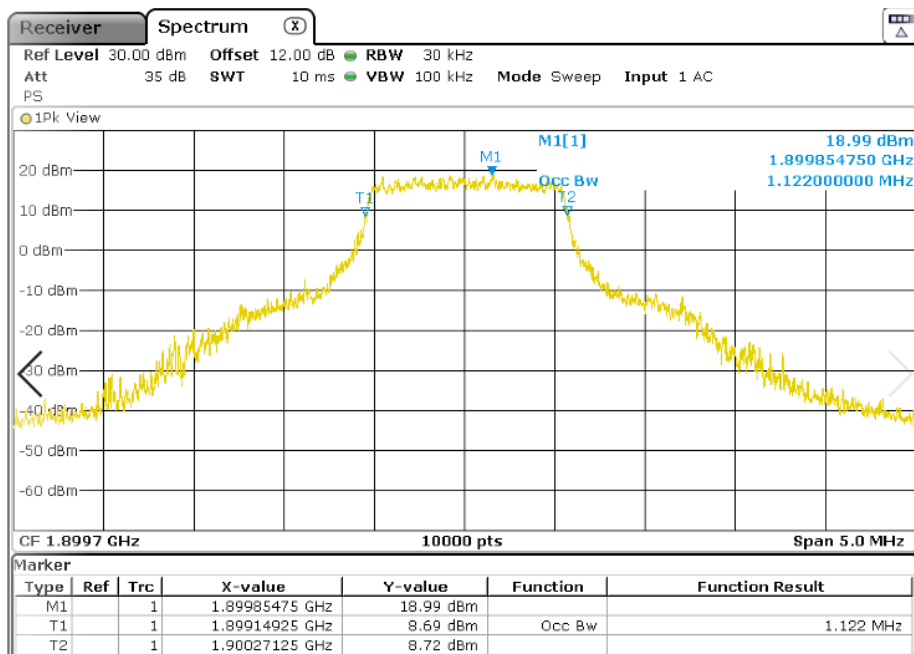| TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

Middle Channel -26dBc Bandwidth
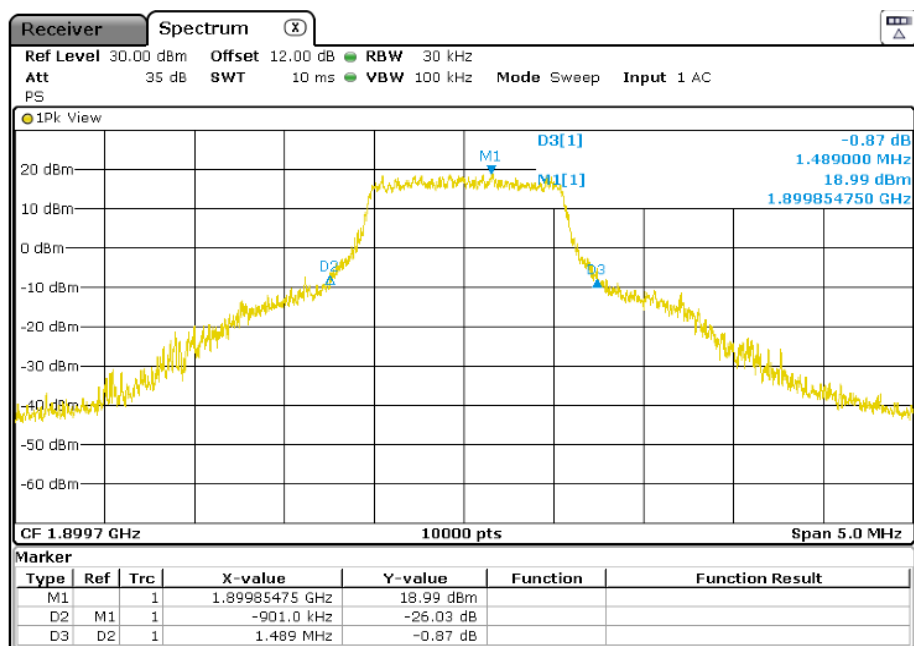
TEST RESULTS (Cont):	

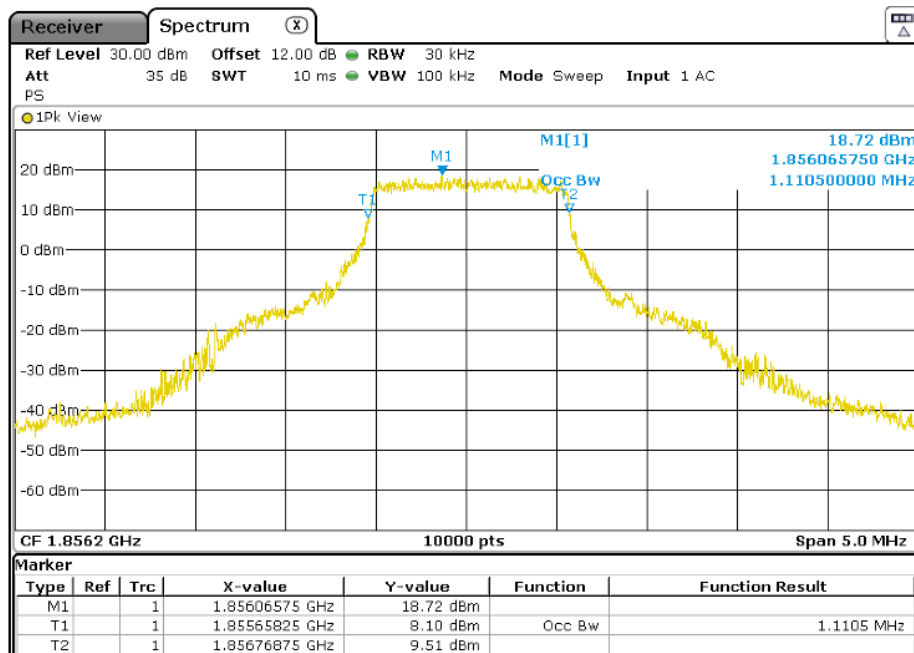## Highest Channel 99% Occupied Bandwidth

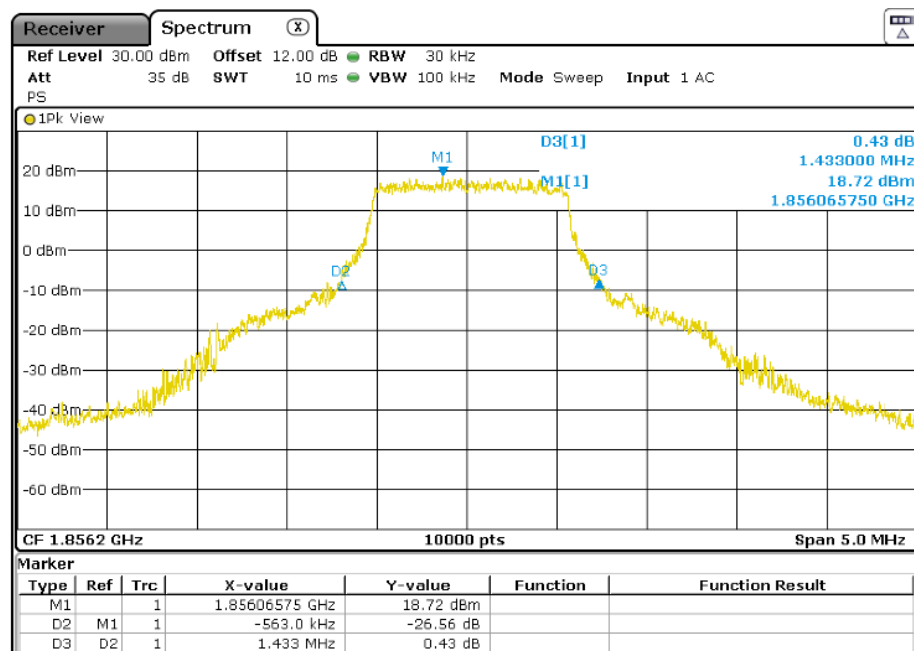

Highest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 20 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

TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 20 MHz
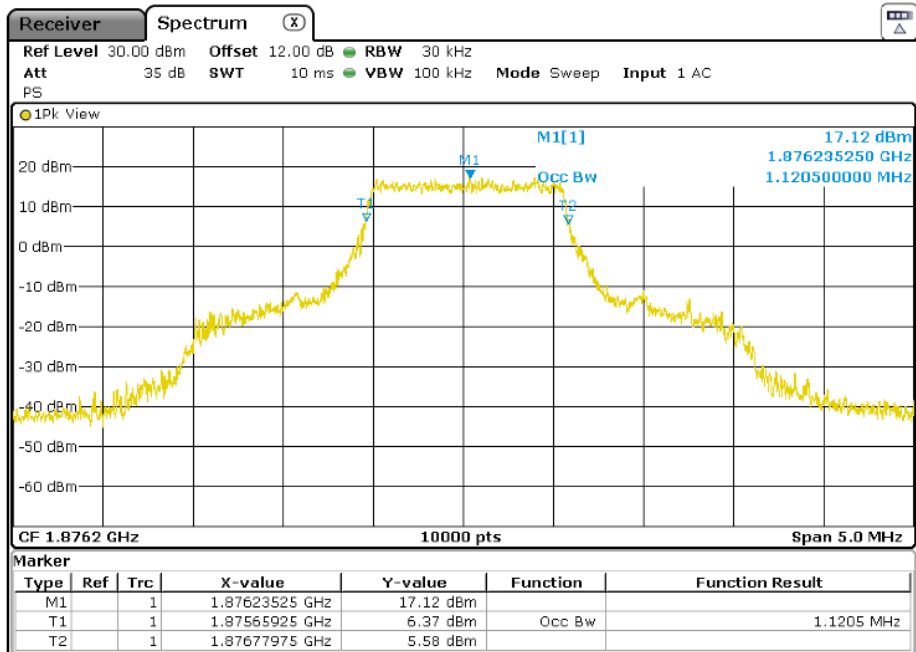
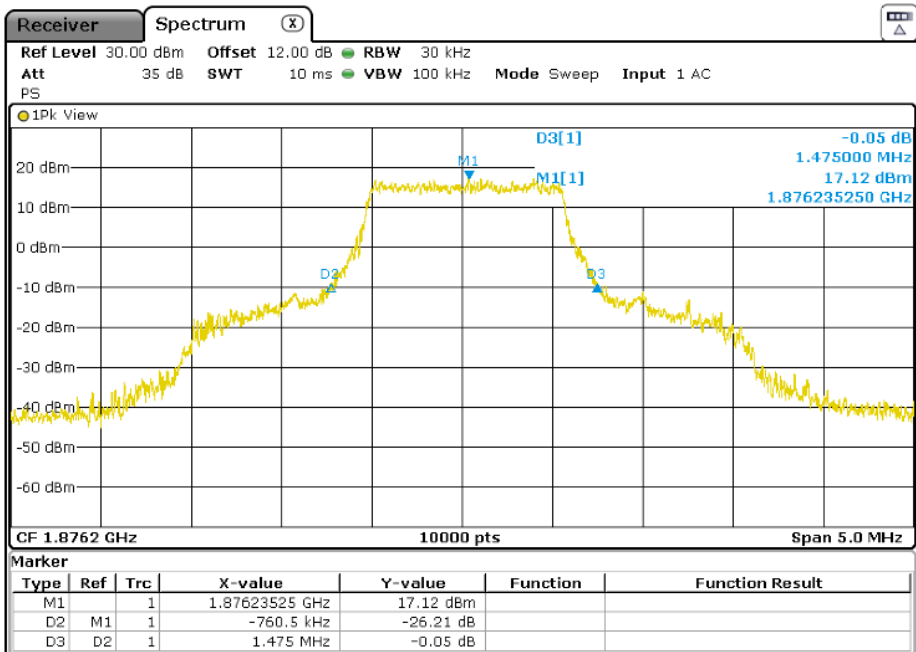Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

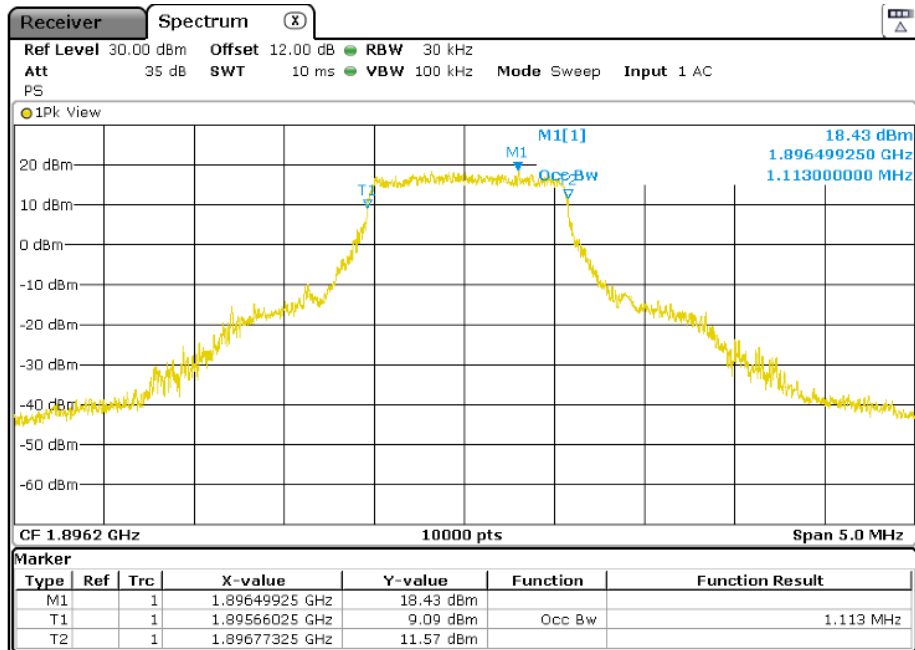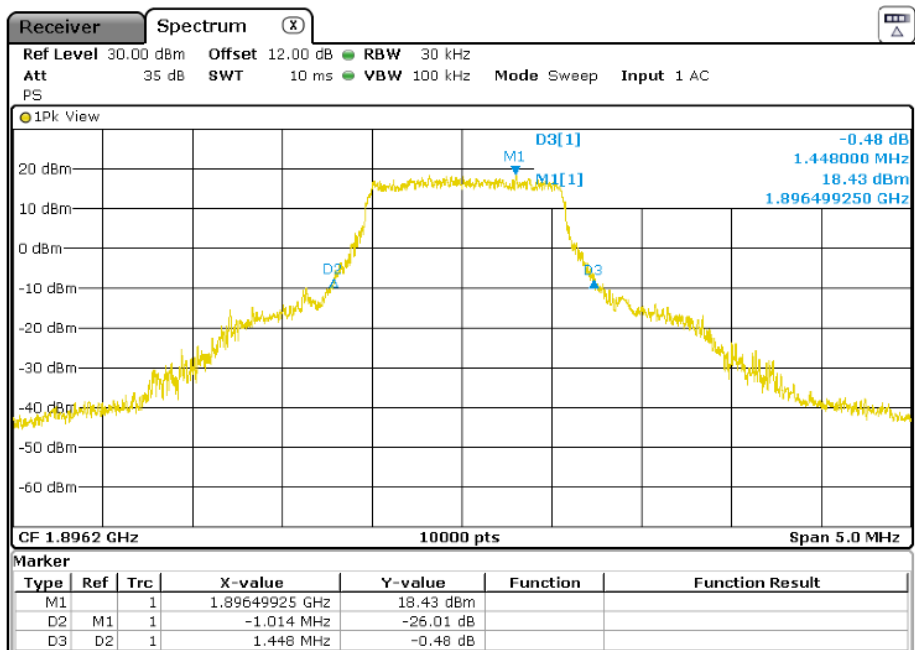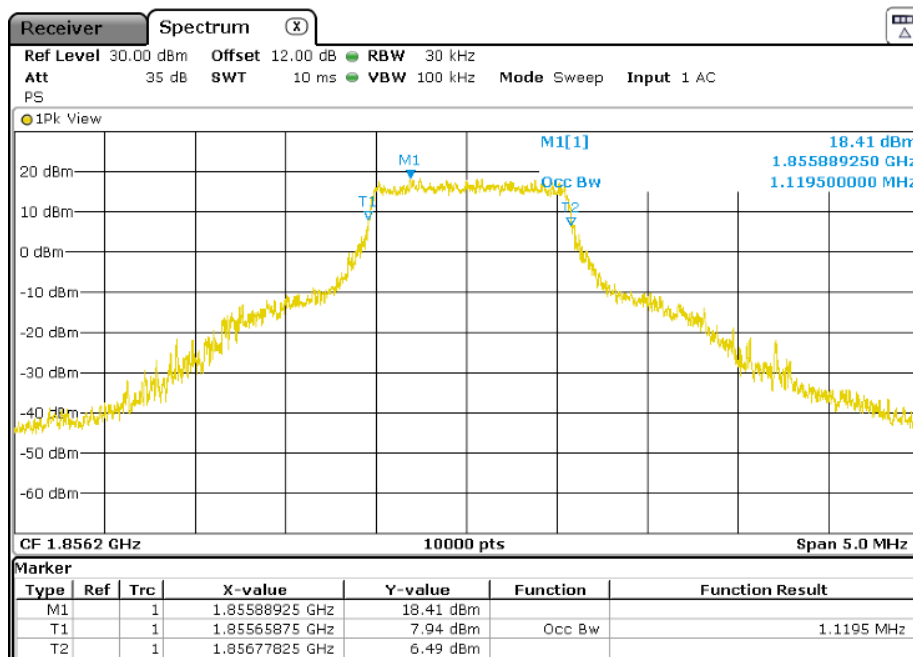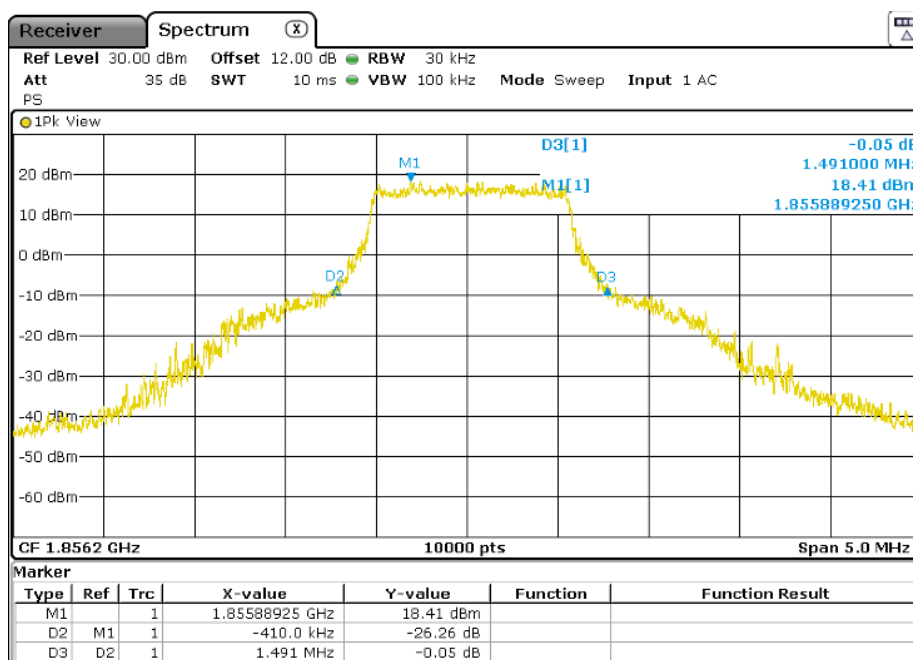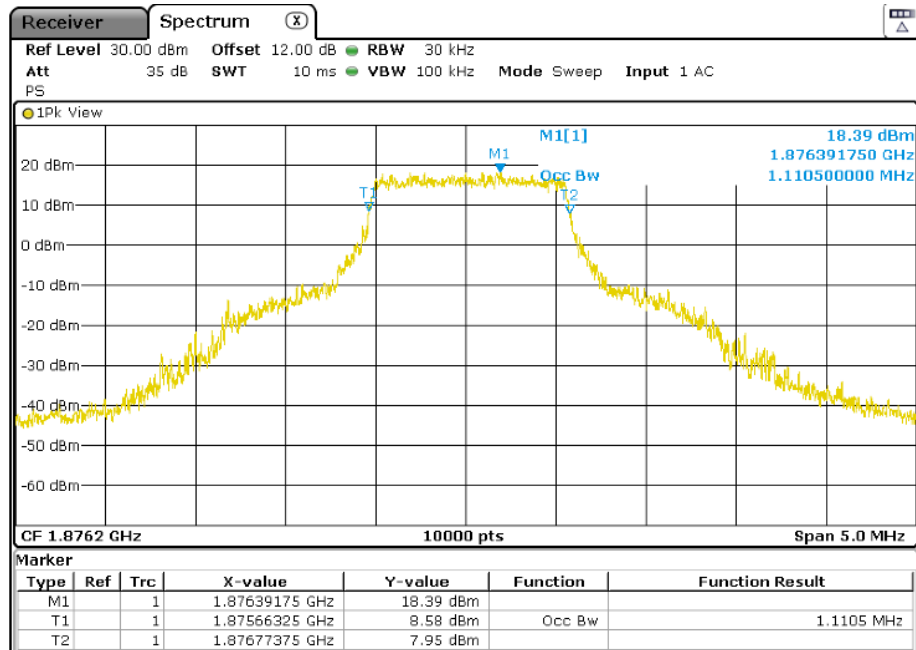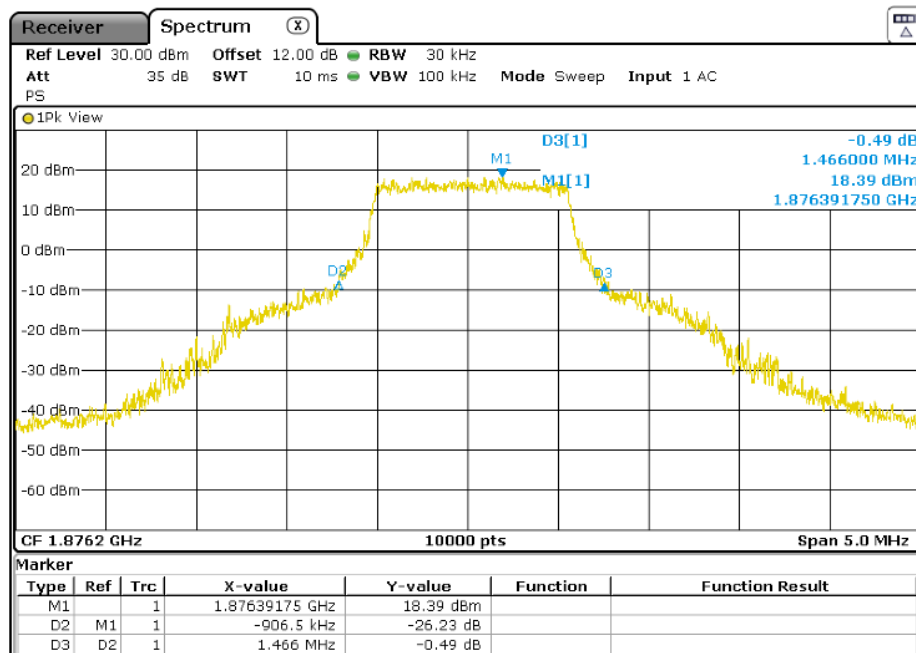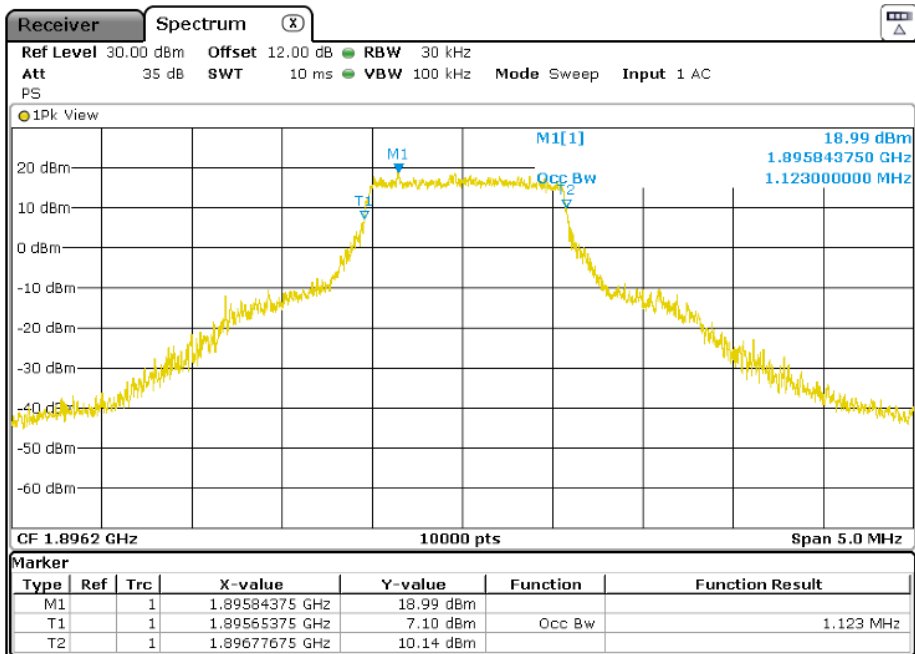| TEST RESULTS (Cont):	

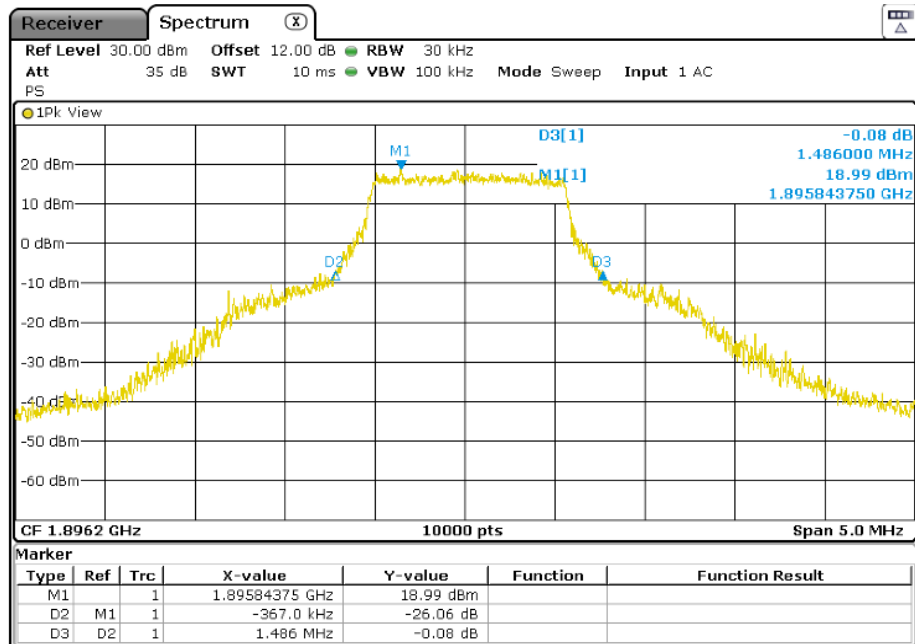Middle Channel 99% Occupied Bandwidth

Middle Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

Highest Channel -26dBc Bandwidth

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

LTE QPSK MODULATION. BW = 5 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.11	1.10	1.11
-26 dBc bandwidth (MHz)	1.45	1.42	1.42

LTE 16QAM MODULATION. BW = 5 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.12	1.10	1.11
-26 dBc bandwidth (MHz)	1.35	1.42	1.38

LTE QPSK MODULATION. BW = 10 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.11	1.11	1.11
-26 dBc bandwidth (MHz)	1.43	1.43	1.45

LTE 16QAM MODULATION. BW = 10 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.12	1.10	1.12
-26 dBc bandwidth (MHz)	1.46	1.46	1.46

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 15 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.12	1.13	1.11
-26 dBc bandwidth (MHz)	1.46	1.46	1.46

LTE 16QAM MODULATION. BW = 15 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.12	1.12	1.12
-26 dBc bandwidth (MHz)	1.48	1.50	1.49

LTE QPSK MODULATION. BW = 20 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.11	1.11	1.11
-26 dBc bandwidth (MHz)	1.47	1.46	1.45

LTE 16QAM MODULATION. BW = 20 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.12	1.13	1.12
-26 dBc bandwidth (MHz)	1.50	1.47	1.50

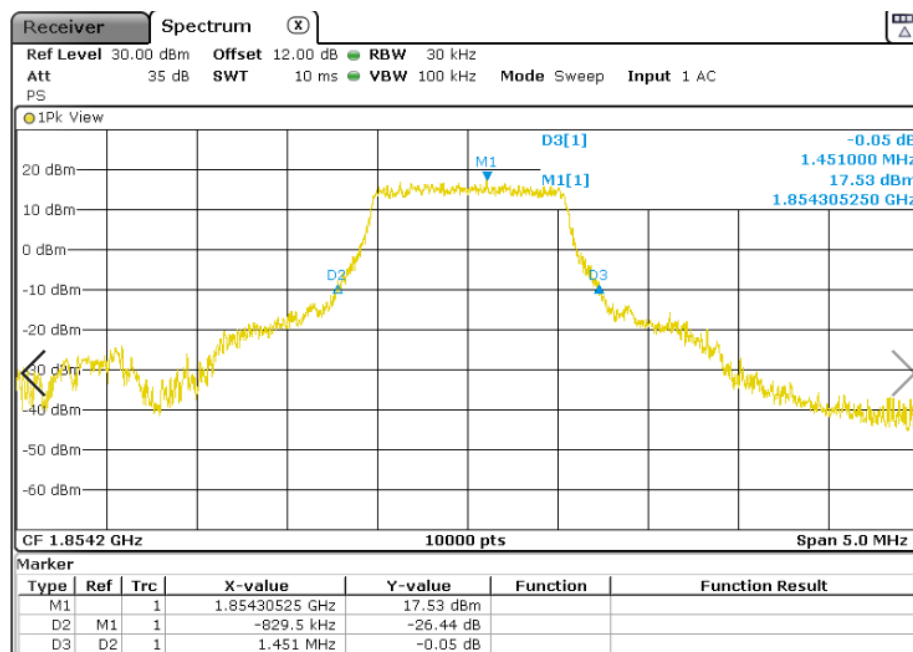| TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 5 MHz
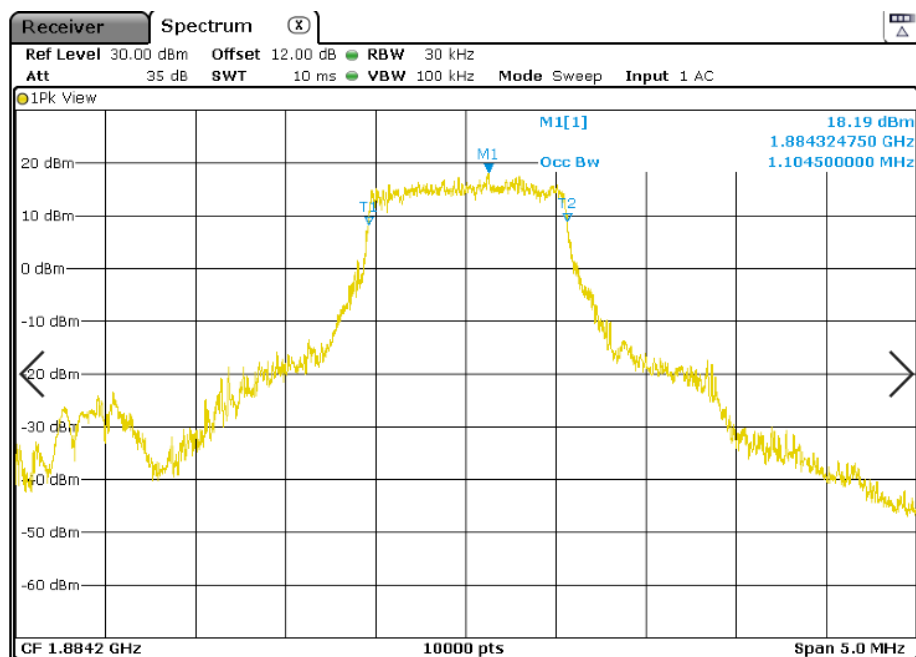
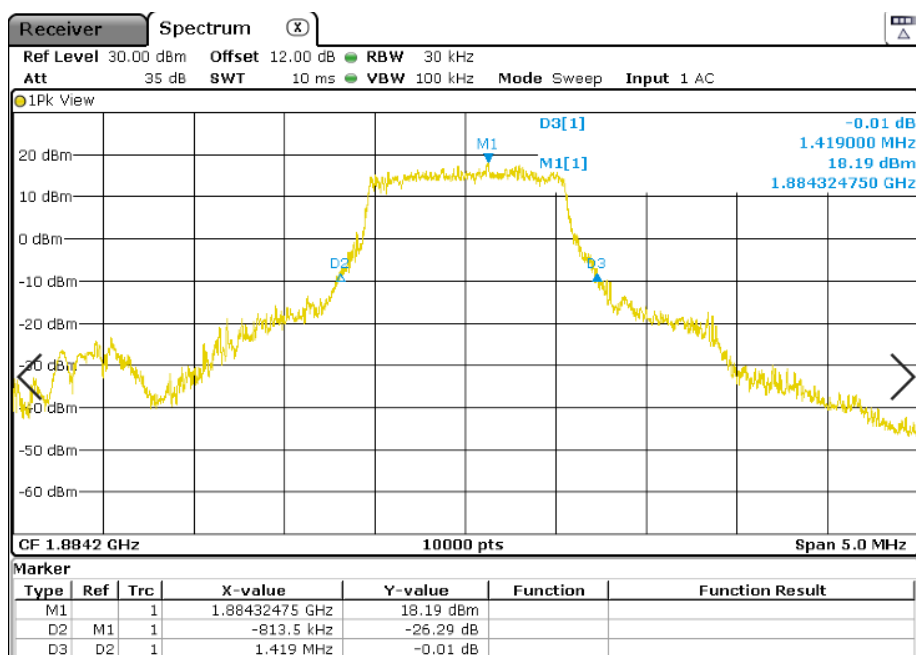Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

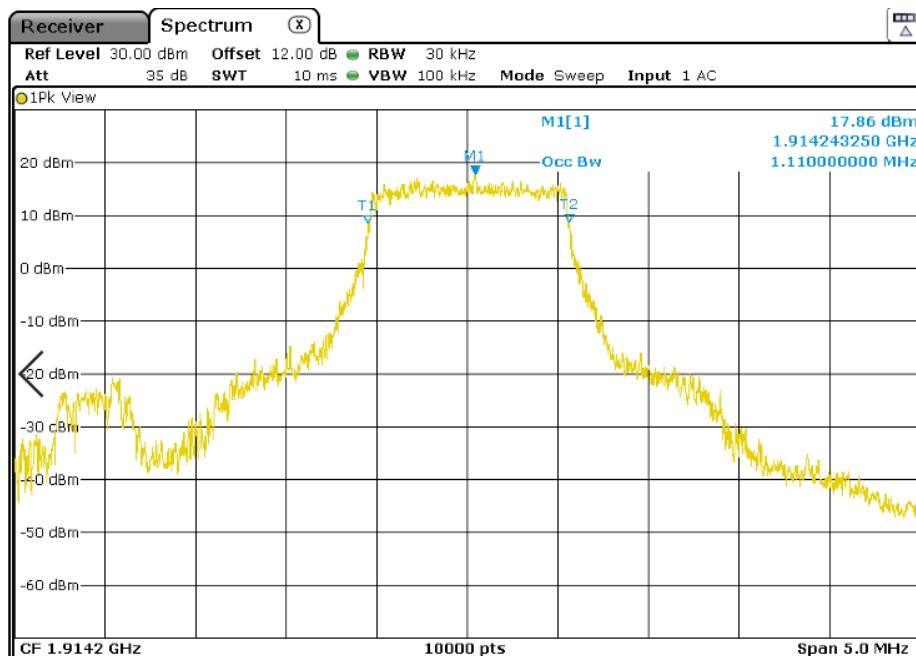| TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

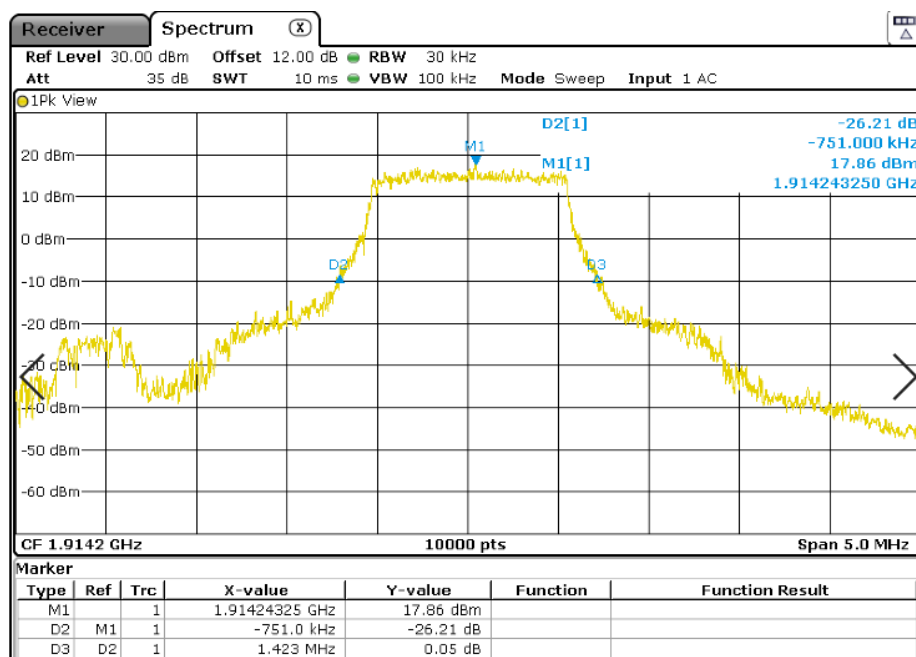Middle Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

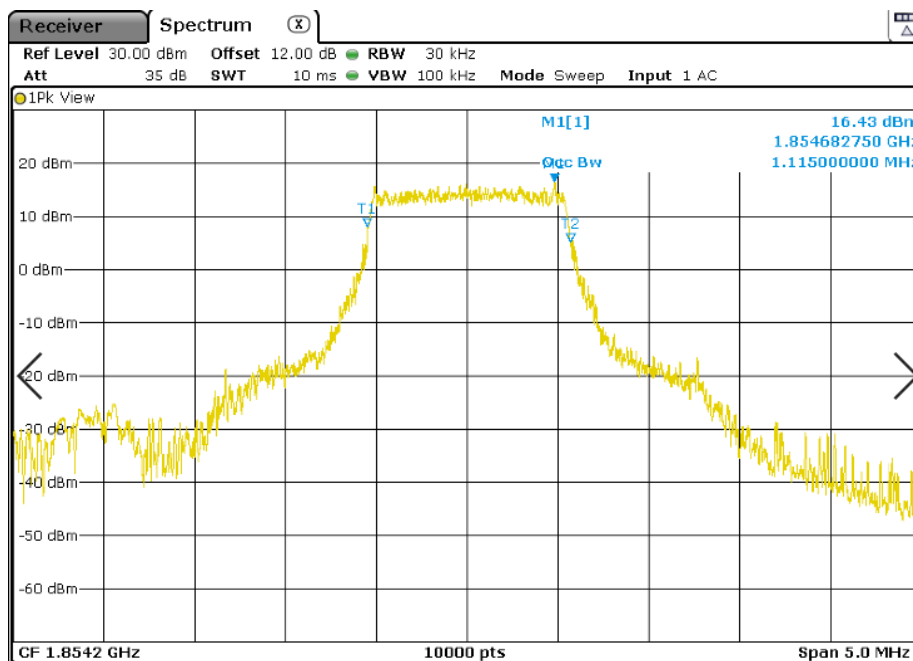Highest Channel 99% Occupied Bandwidth
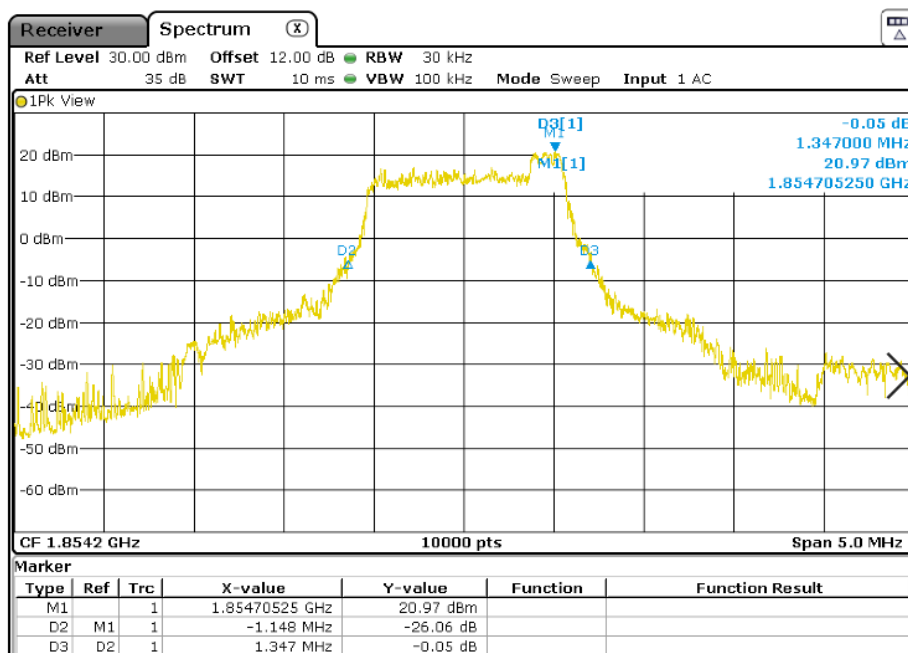

Highest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

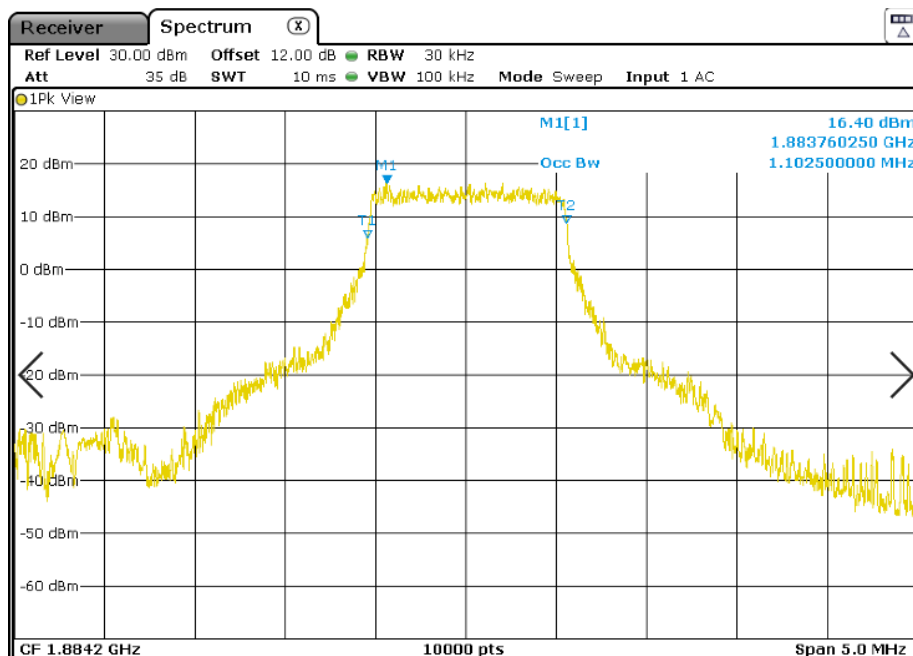LTE 16QAM MODULATION. BW = 5 MHz

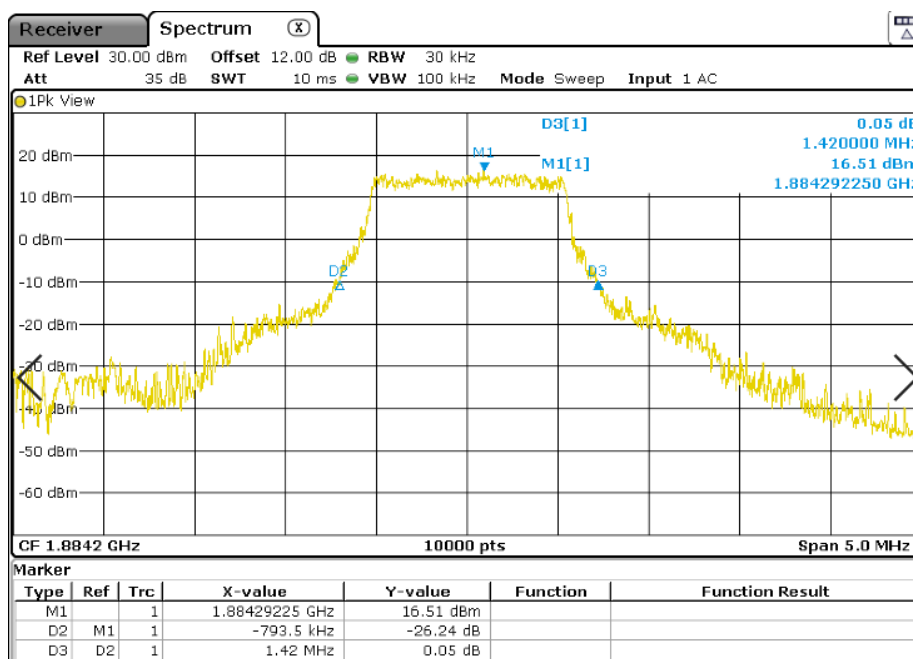Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

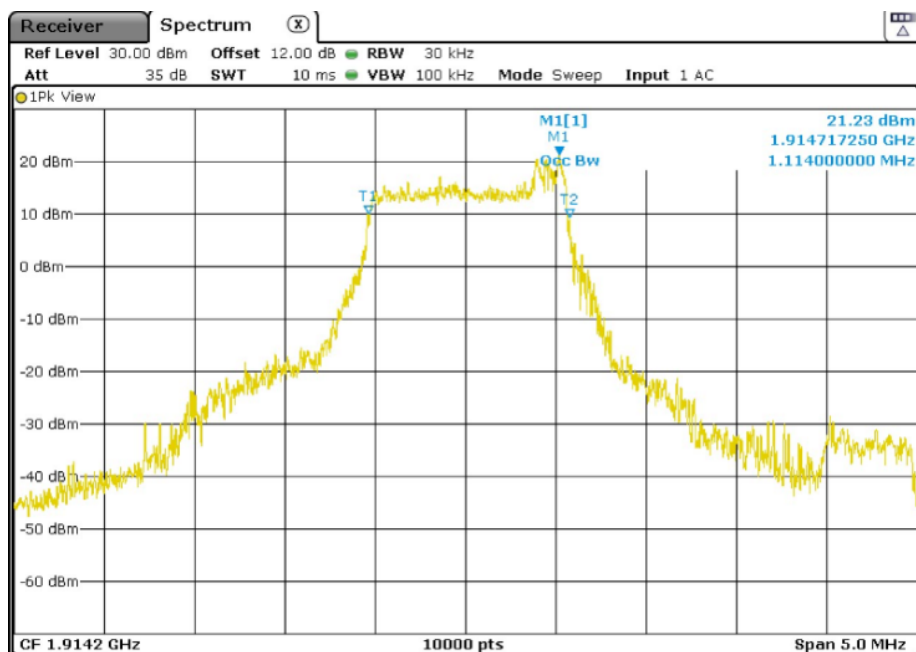| TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

Middle Channel -26dBc Bandwidth

Marker						
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.88429225 GHz	16.51 dBm		
D2	M1	1	-793.5 kHz	-26.24 dB		
D3	D2	1	1.42 MHz	0.05 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	1.91471725 GHz	21.23 dBm		
D2	M1	1	-1.1815 MHz	-26.03 dB		
D3	D2	1	1.3755 MHz	-0.48 dB		

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 10 MHz

Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

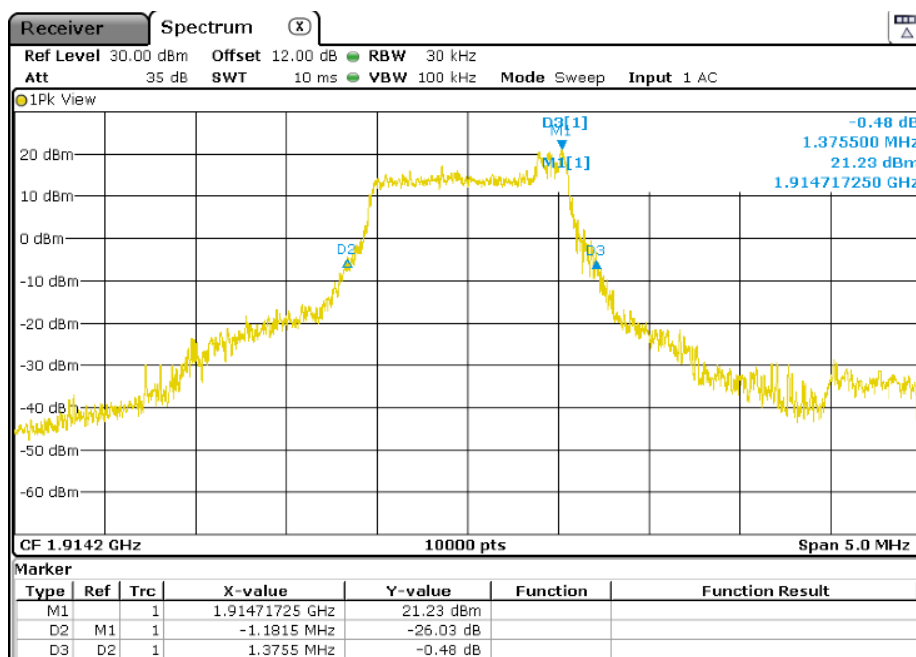Middle Channel 99% Occupied Bandwidth

Middle Channel -26dBc Bandwidth

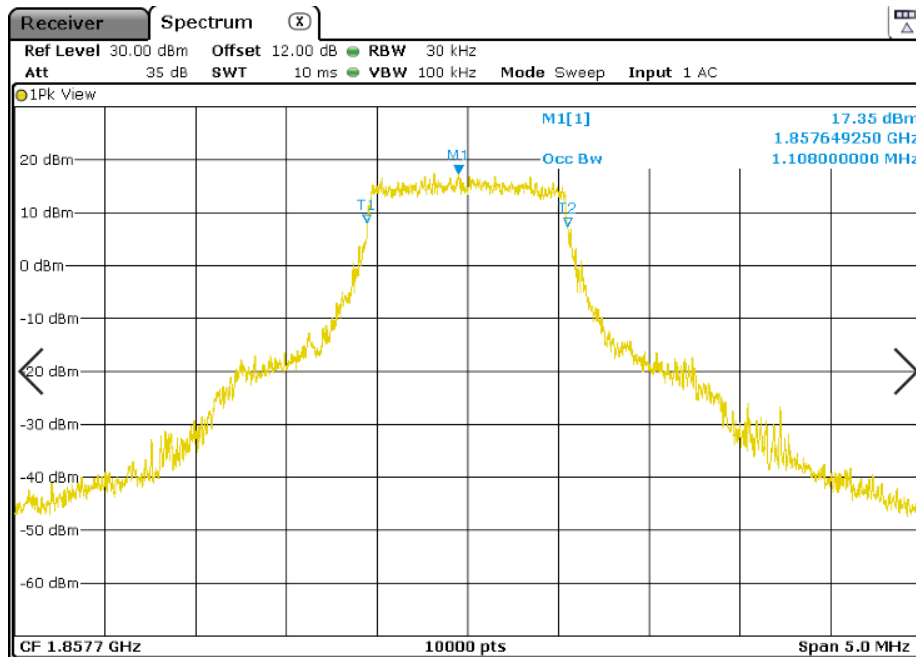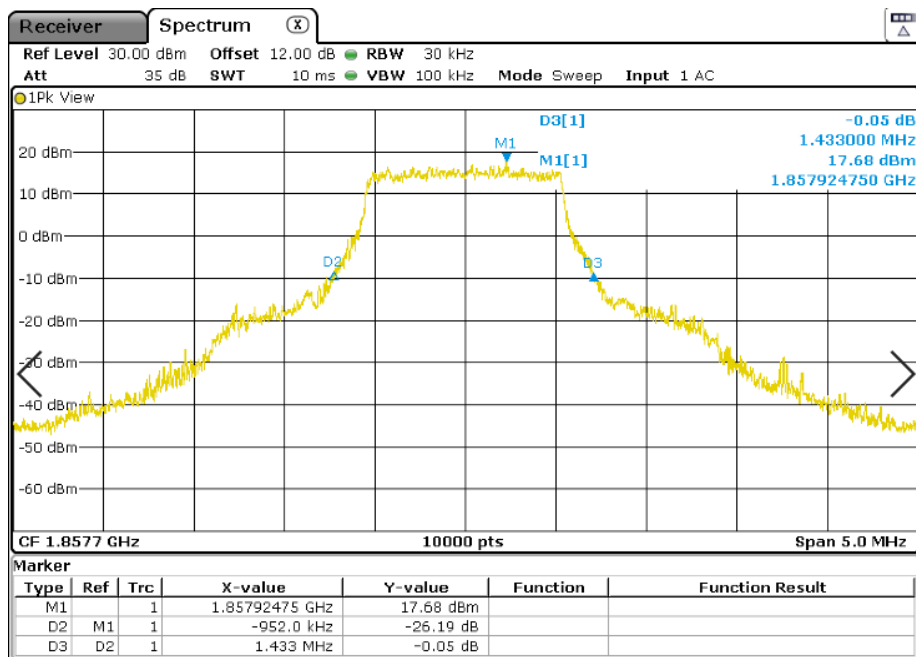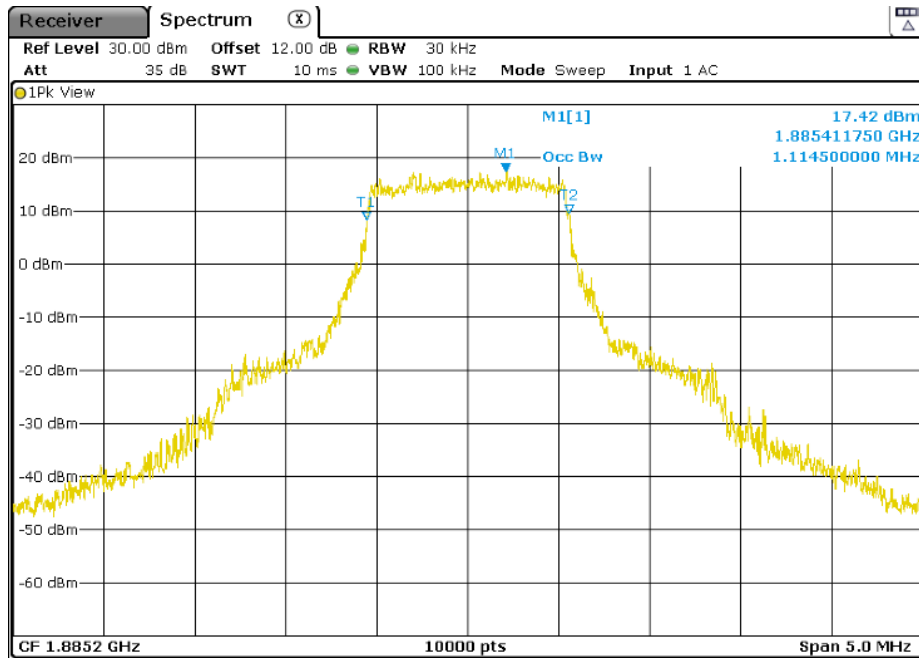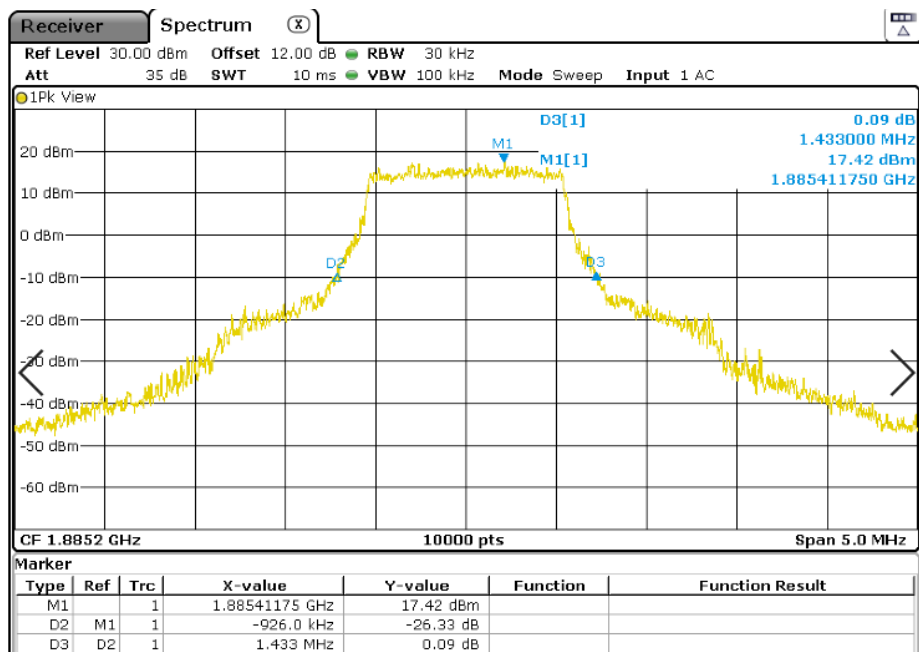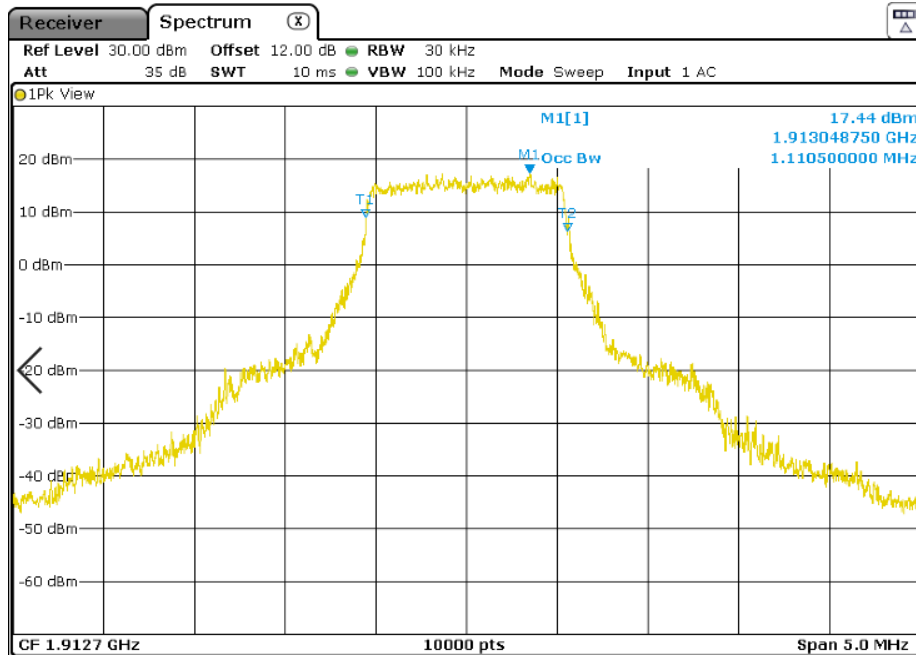| TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

Highest Channel -26dBc Bandwidth

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.91304875 GHz	17.44 dBm		
D2	M1	1	-1.075 MHz	-26.46 dB		
D3	D2	1	1.4525 MHz	-0.08 dB		

TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 10 MHz

Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

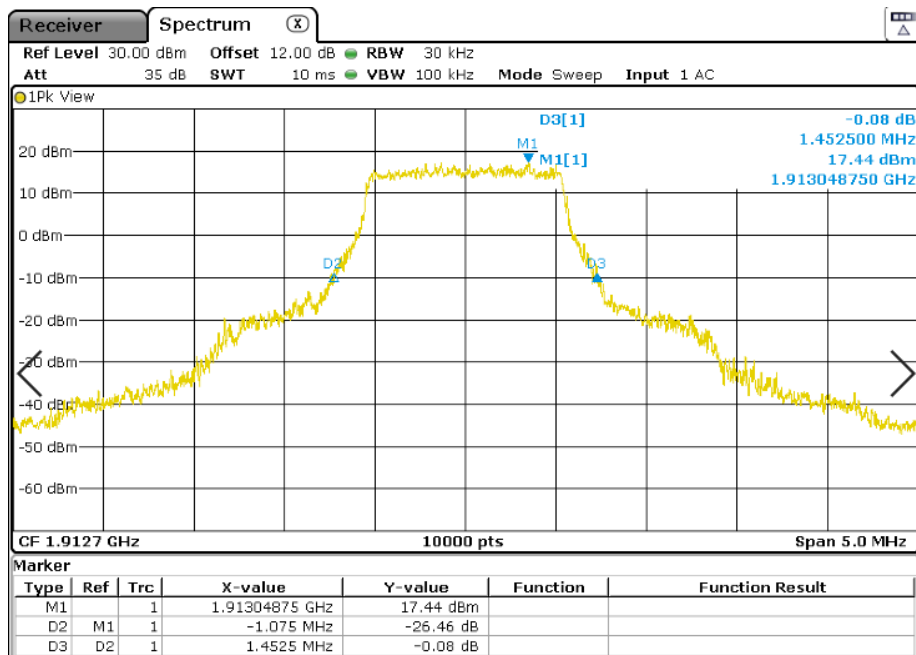Middle Channel 99% Occupied Bandwidth

Middle Channel -26dBc Bandwidth

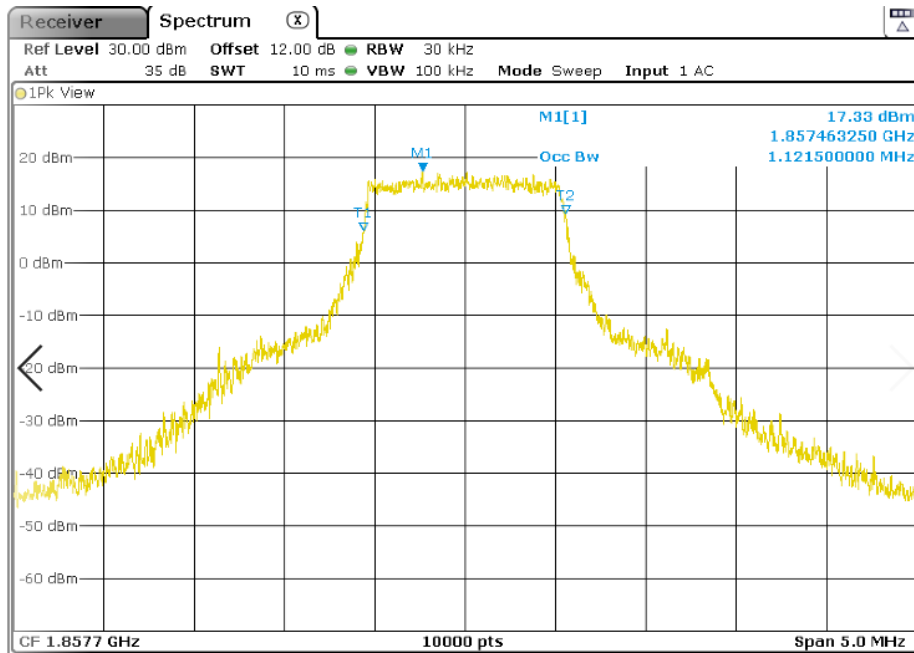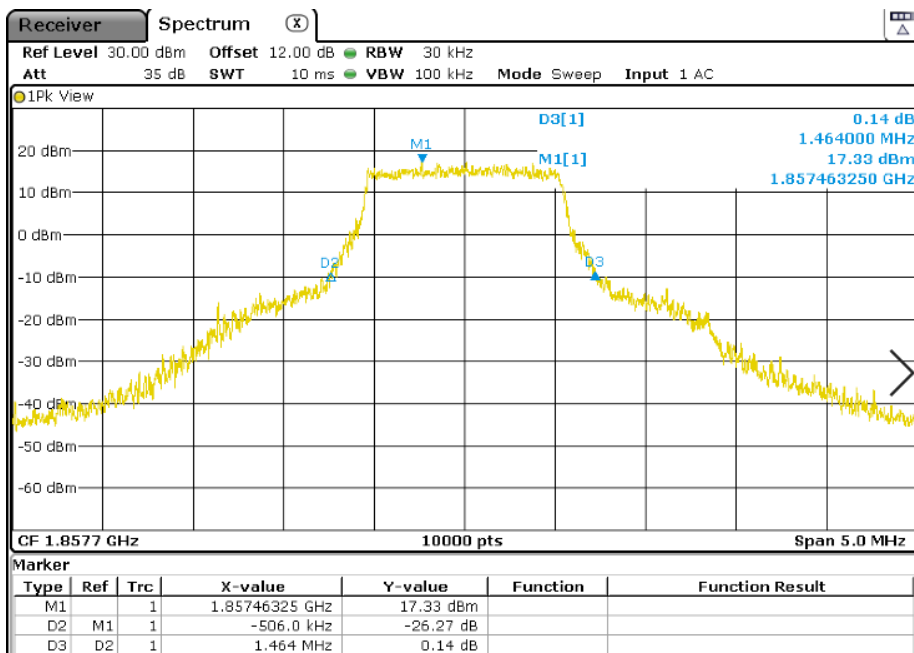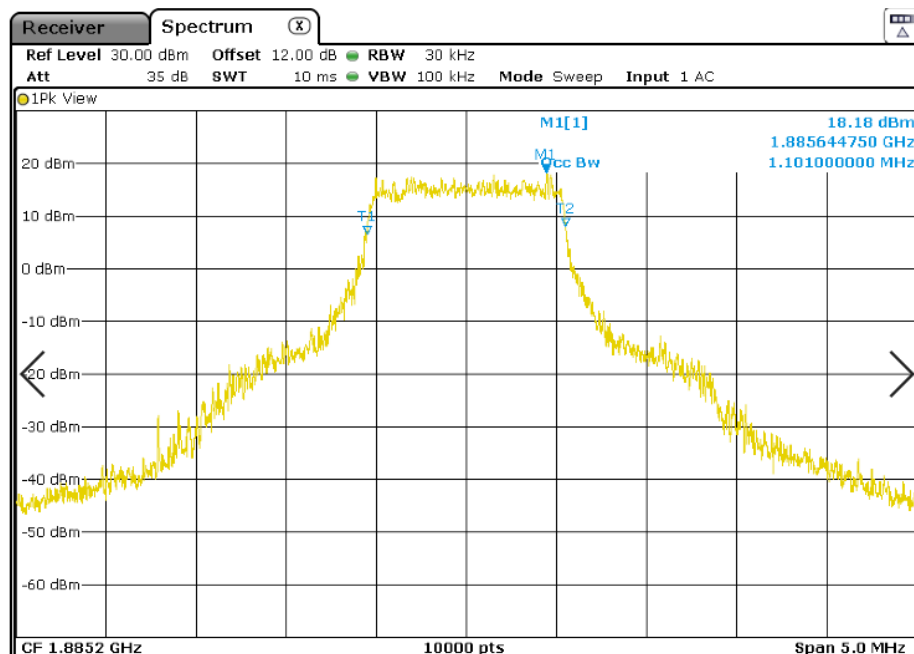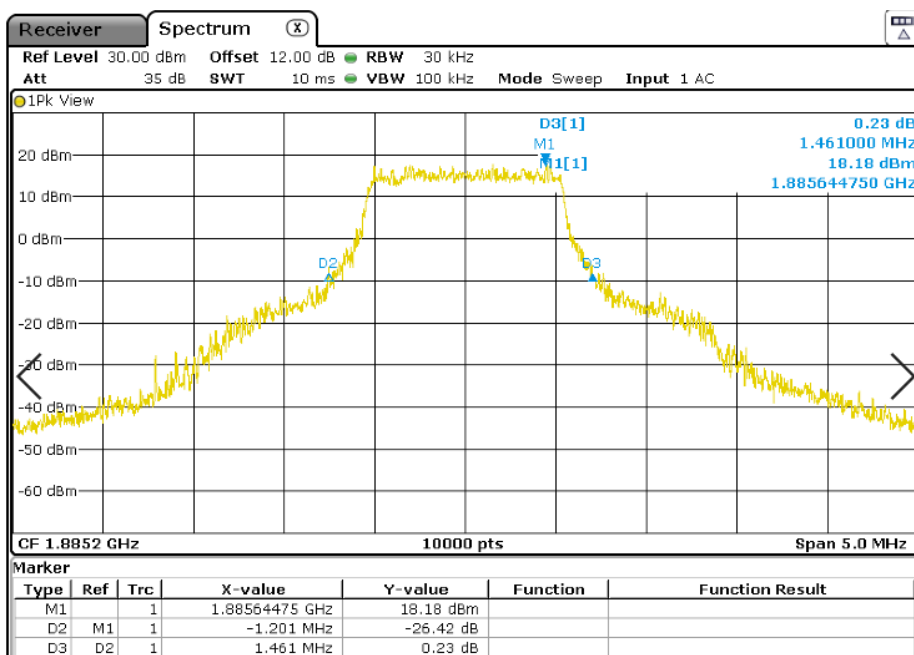| TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

Highest Channel -26dBc Bandwidth

Marker						
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.91263475 GHz	17.72 dBm		
D2	M1	1	-671.5 kHz	-26.17 dB		
D3	D2	1	1.457 MHz	-0.20 dB		

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 15 MHz

Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

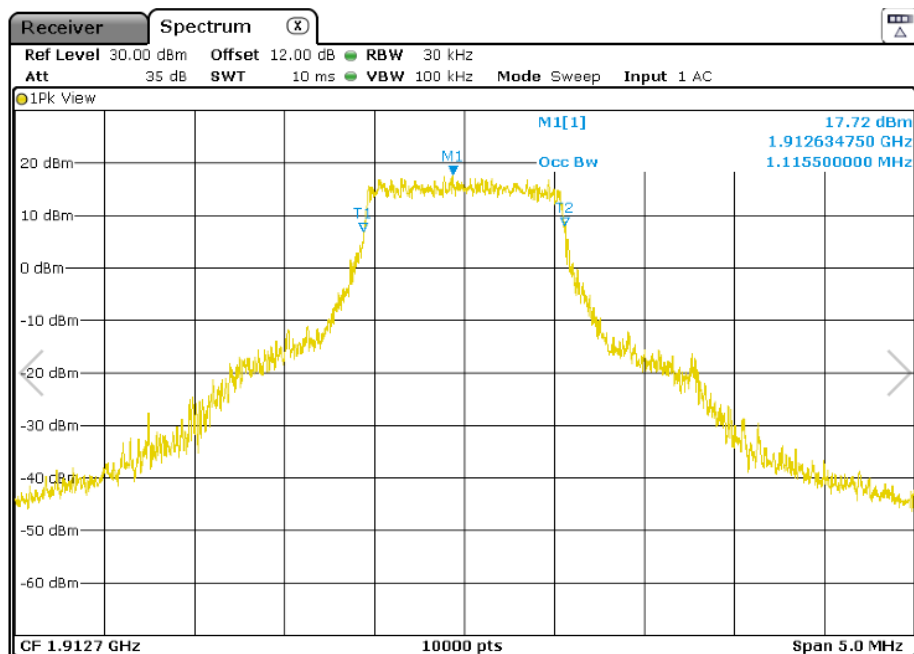| TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

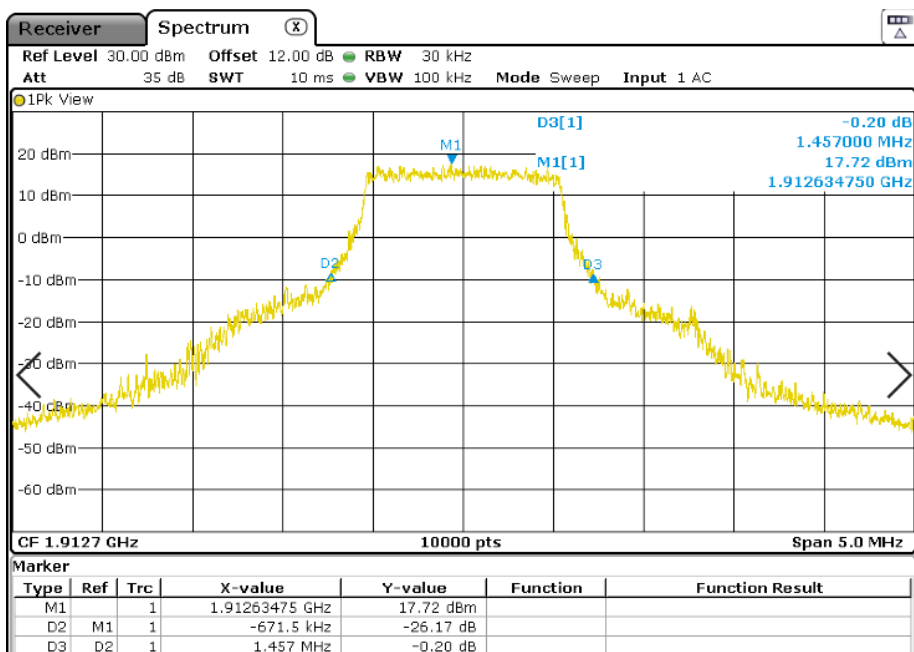Middle Channel -26dBc Bandwidth

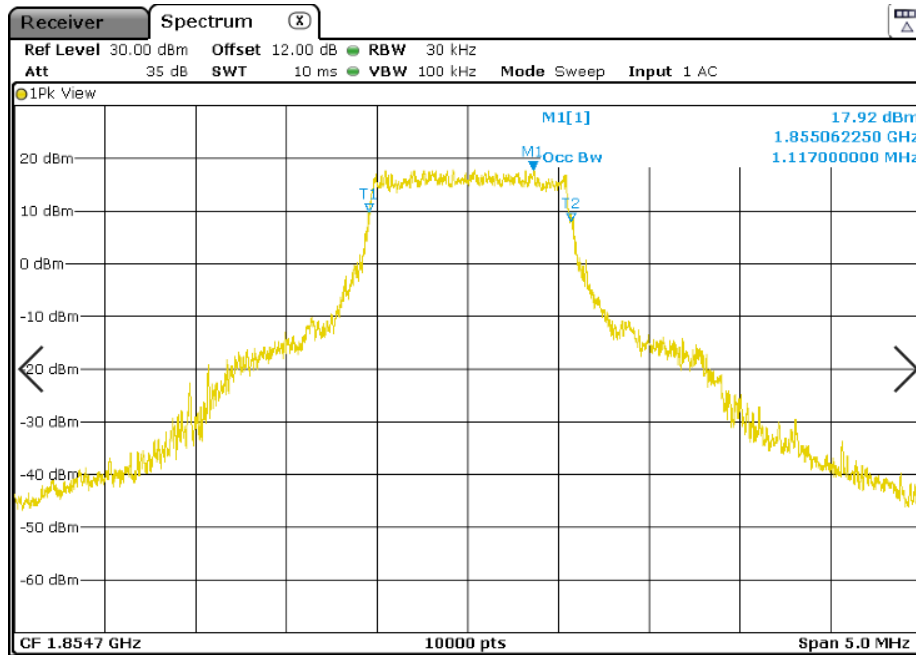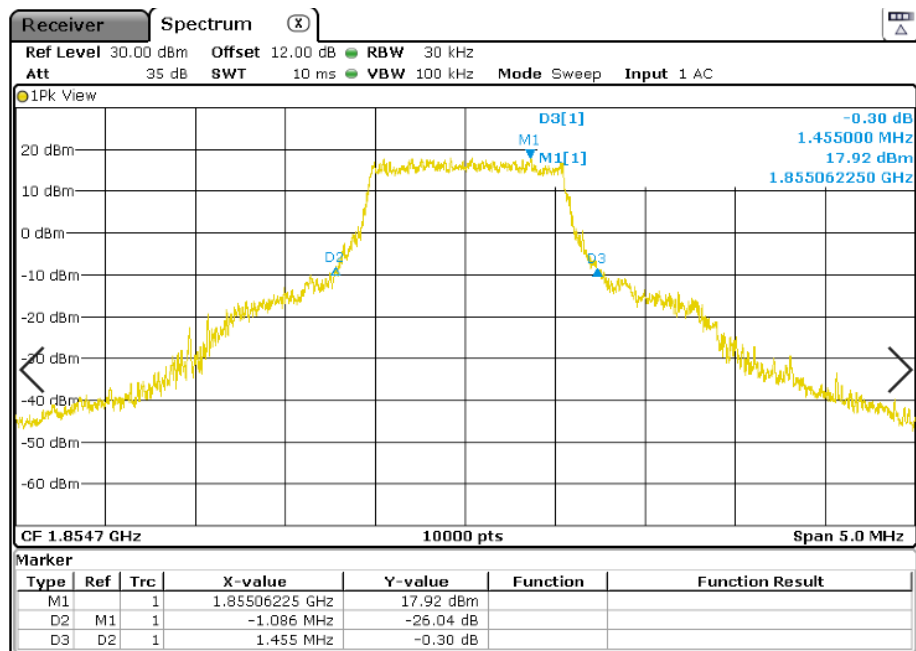| TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

Highest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

LTE 16QAM MODULATION. BW = 15 MHz

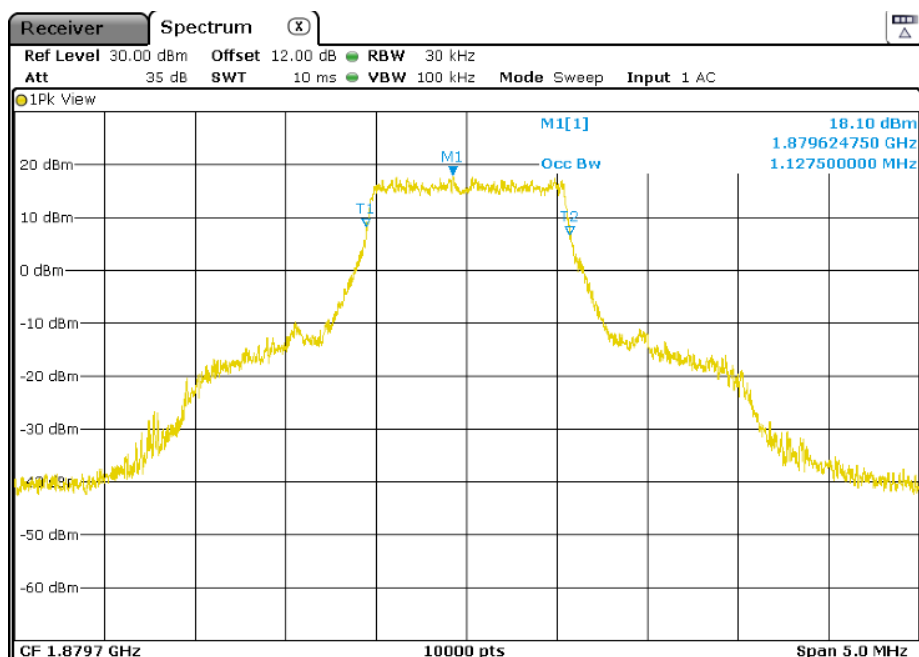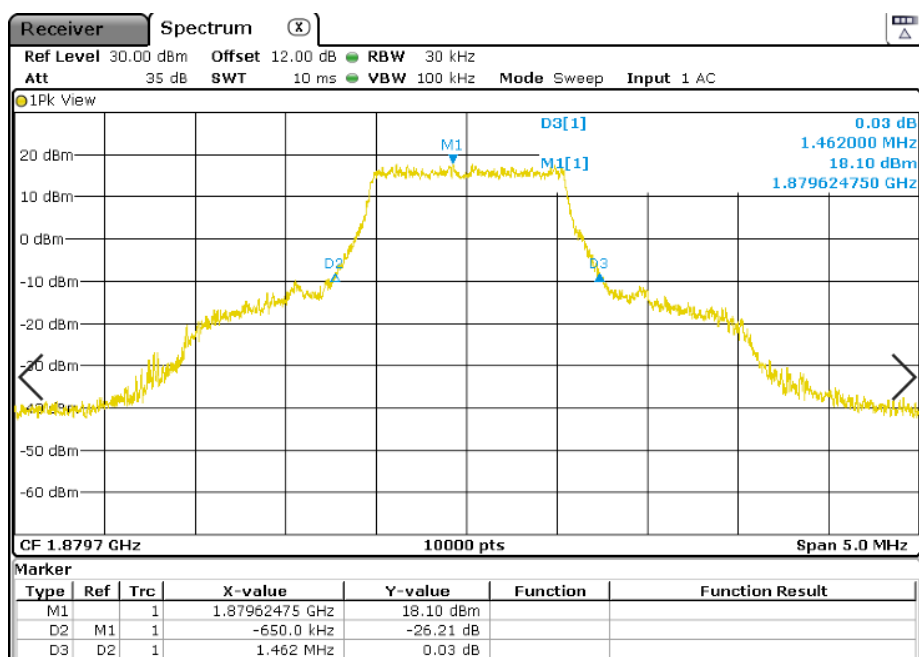Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

TEST RESULTS (Cont):
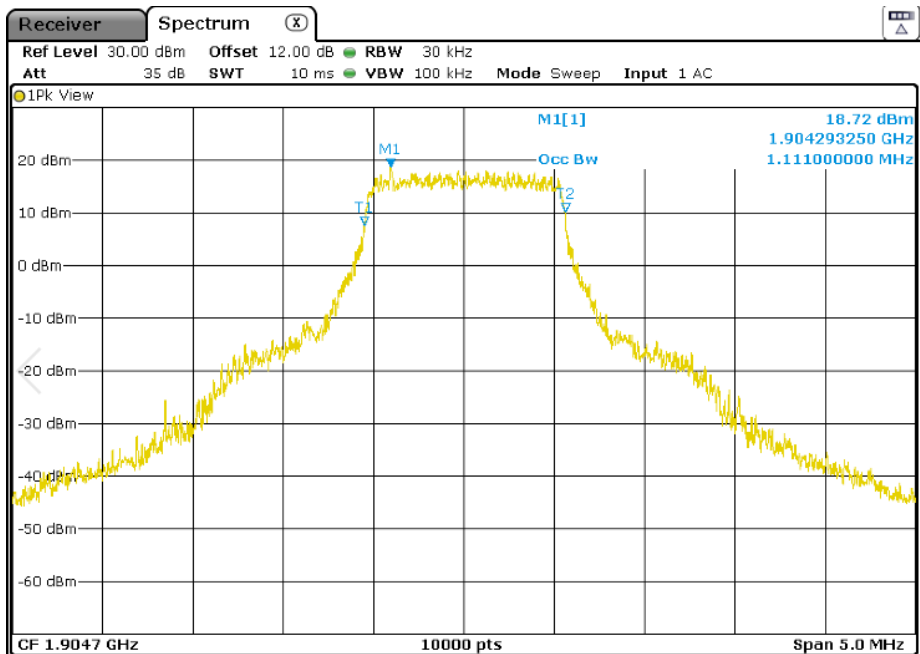
Middle Channel 99% Occupied Bandwidth

Middle Channel -26dBc Bandwidth

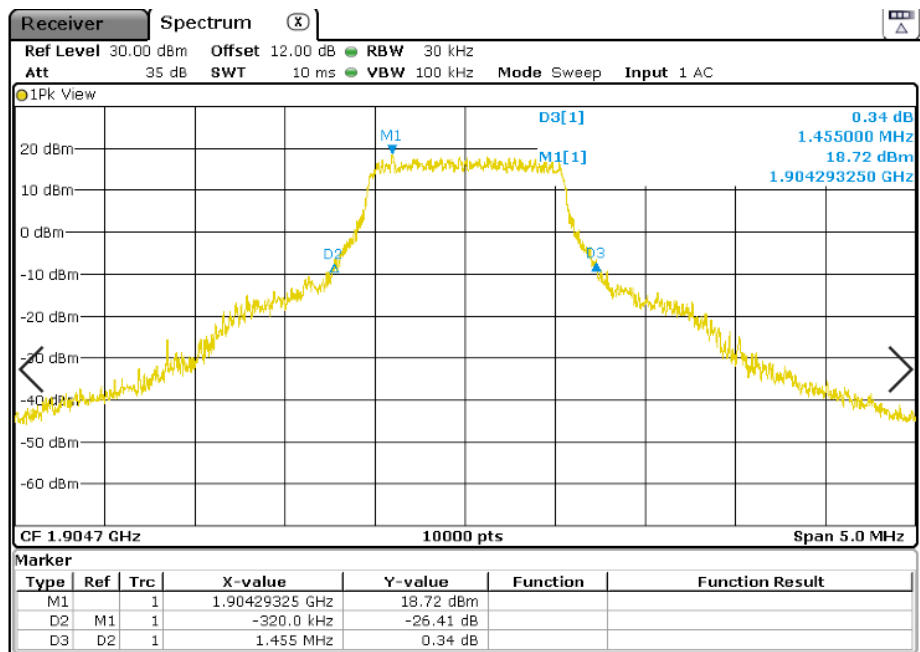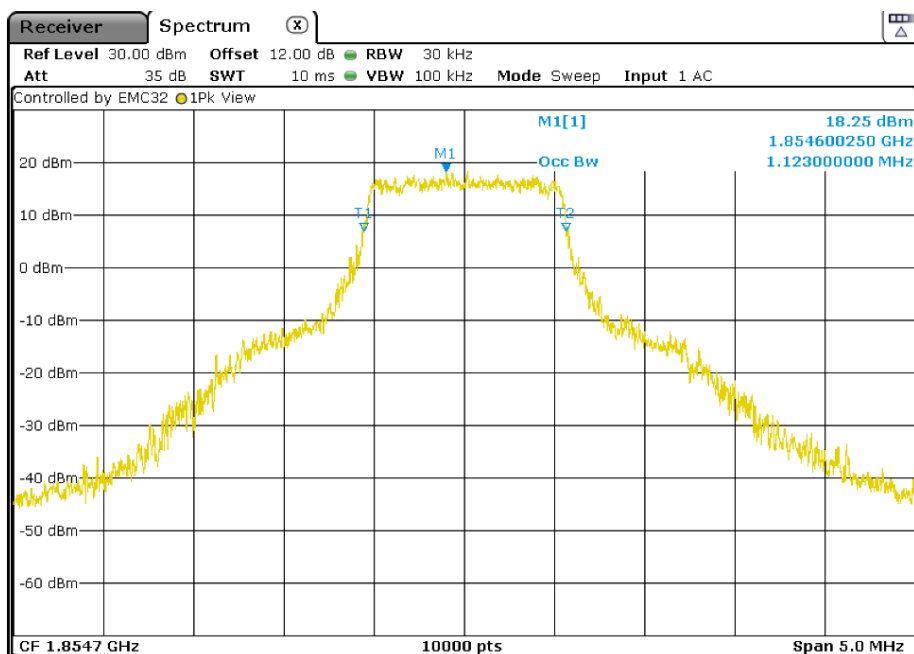| Marker						
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.87988675 GHz	17.94 dBm		
D2	M1	1	-944.0 kHz	-26.24 dB		
D3	D2	1	1.496 MHz	-0.10 dB		

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

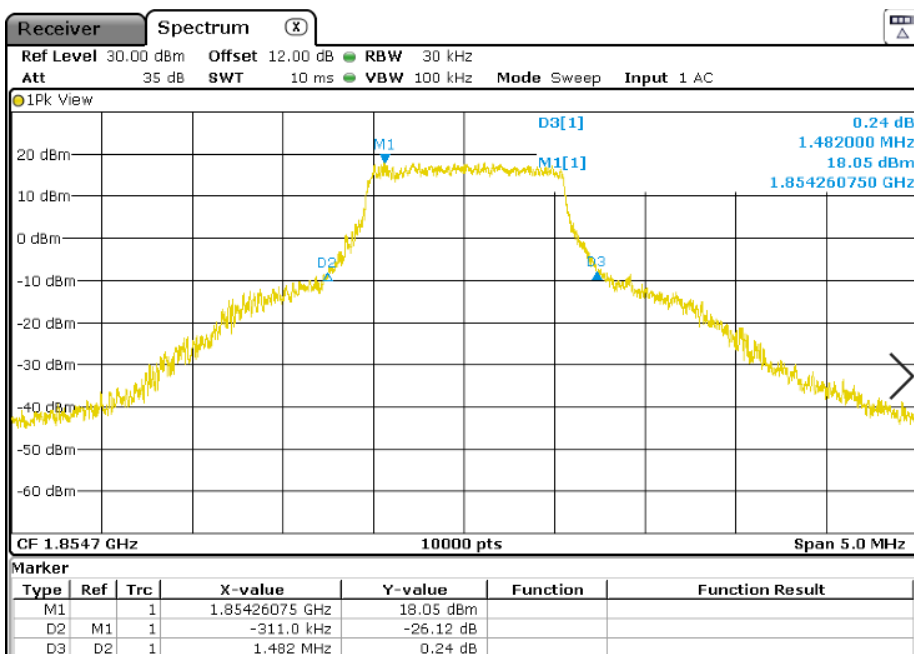
Highest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 20 MHz

Lowest Channel 99% Occupied Bandwidth

Lowest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

Middle Channel 99% Occupied Bandwidth

Middle Channel -26dBc Bandwidth

![DEKRA logo]

TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth

Highest Channel -26dBc Bandwidth

TEST RESULTS (Cont):	

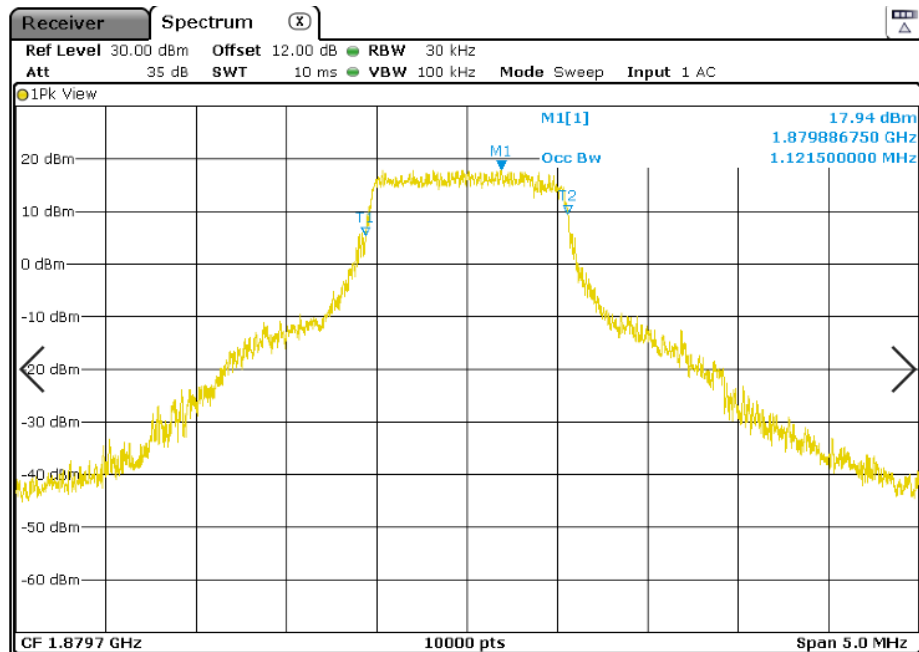LTE 16QAM MODULATION. BW = 20 MHz
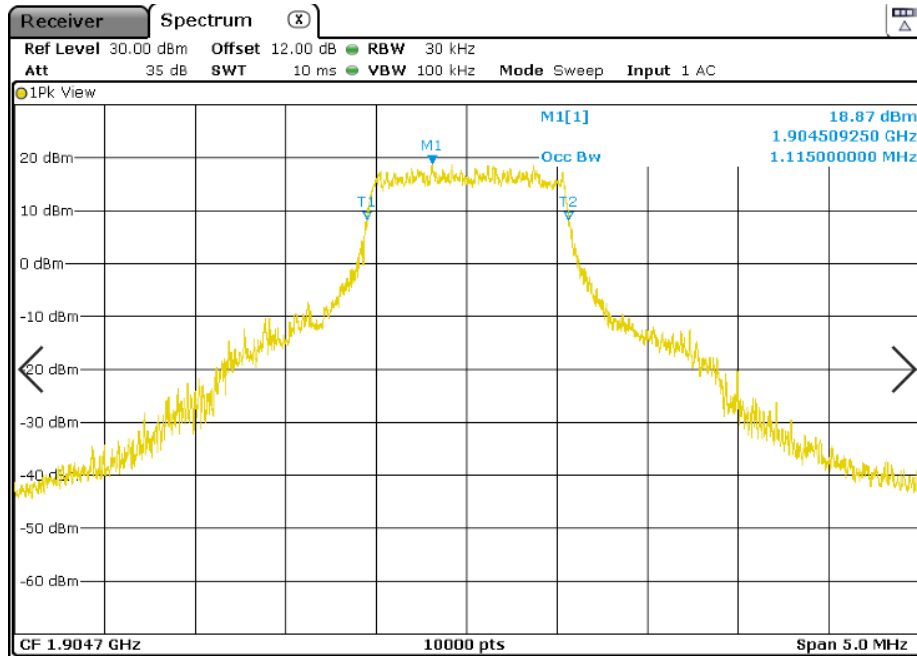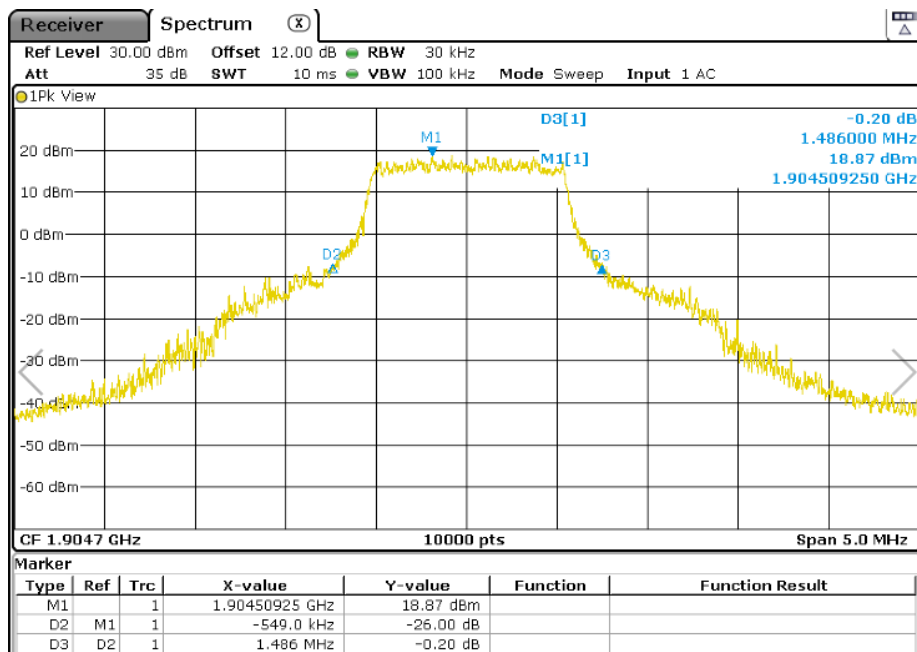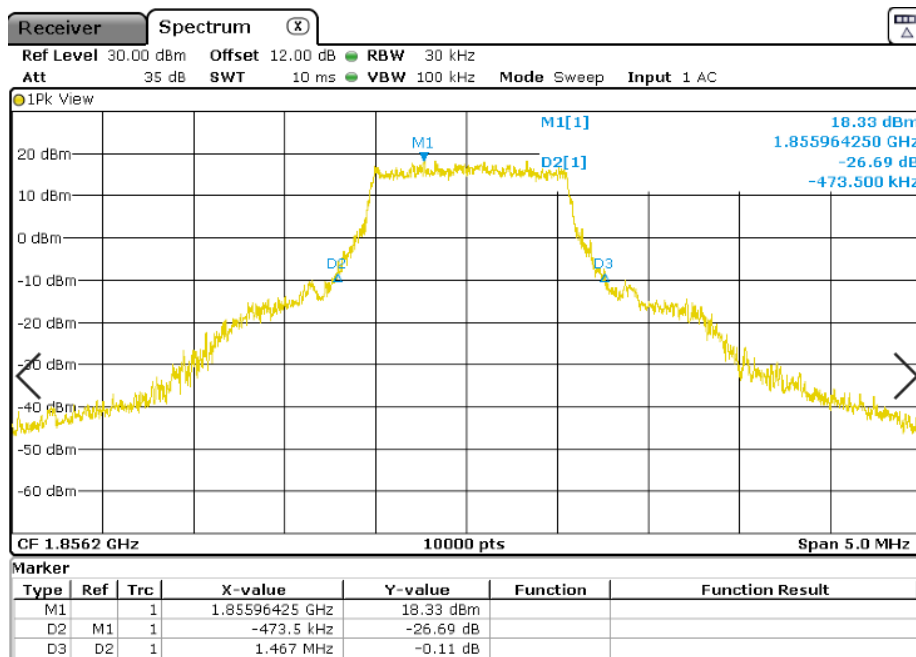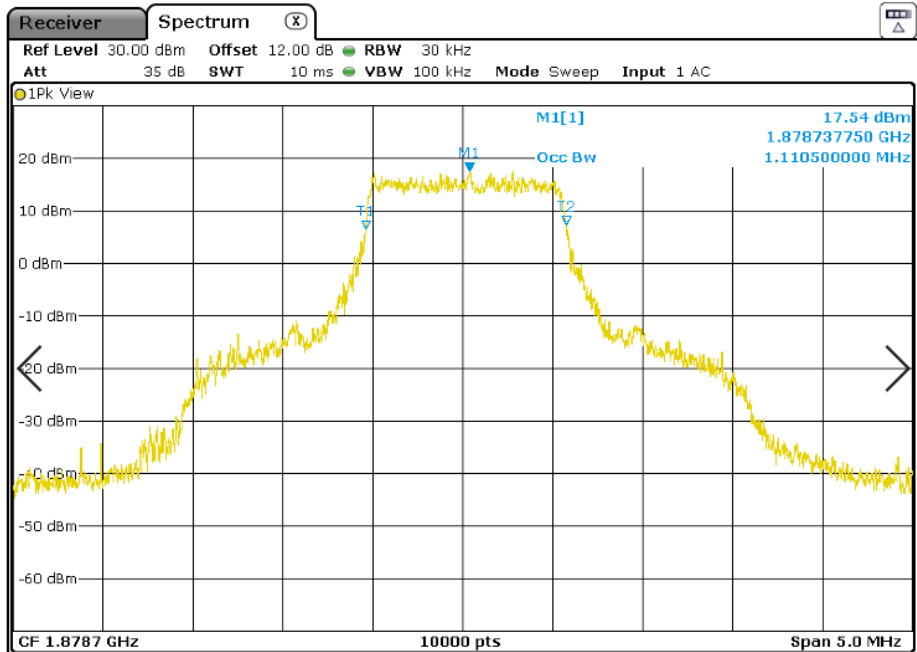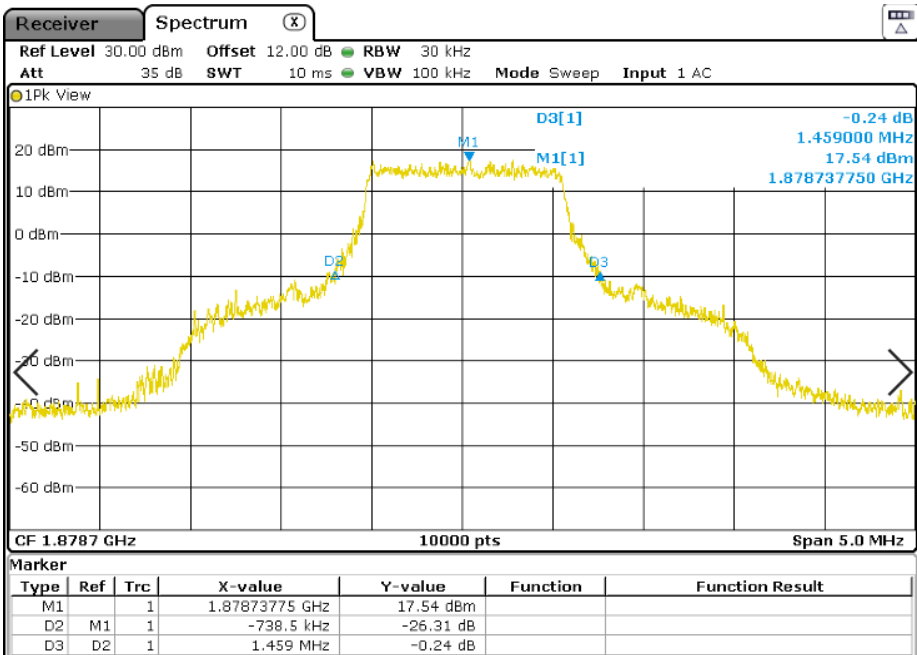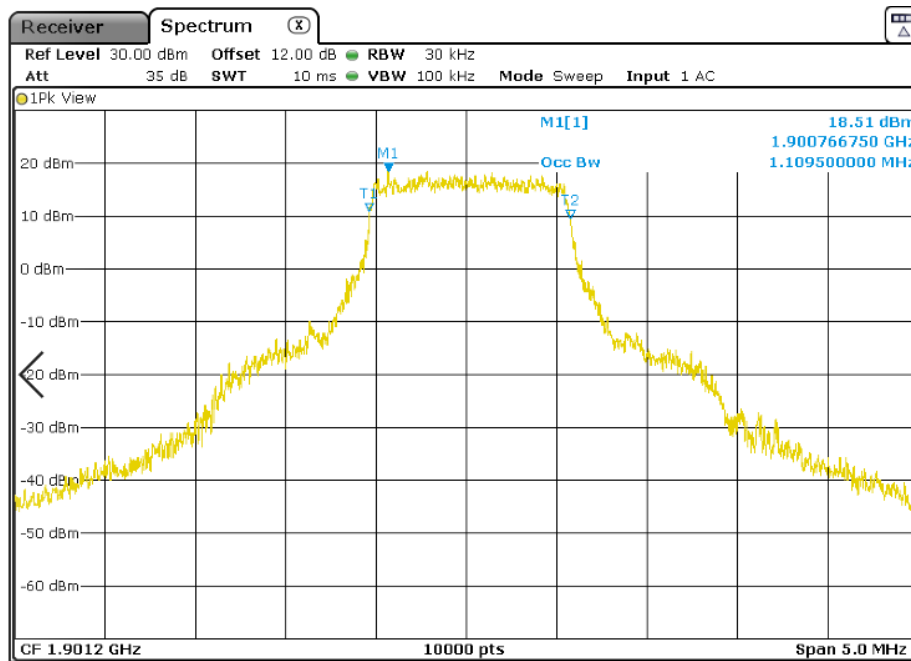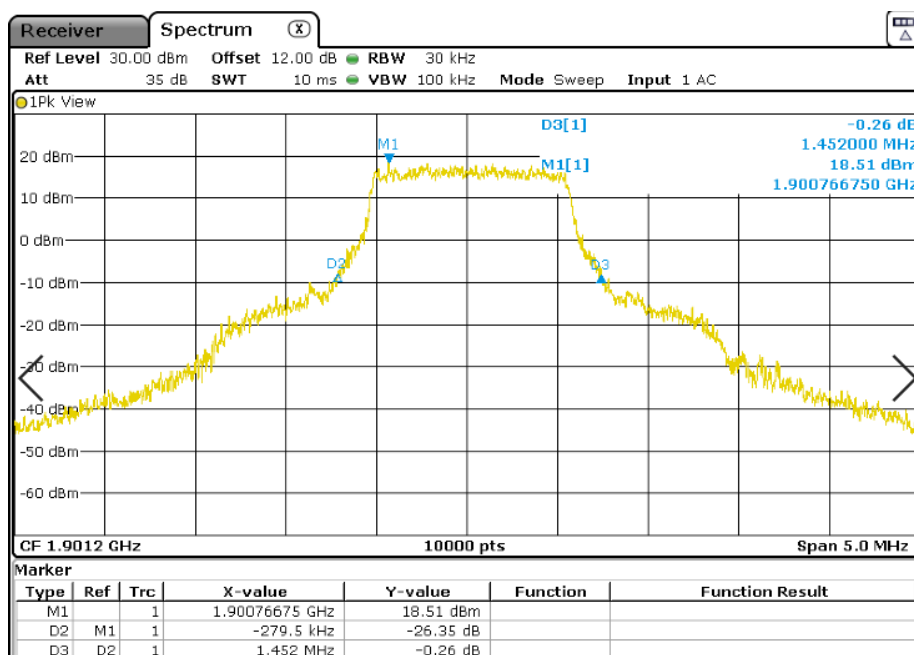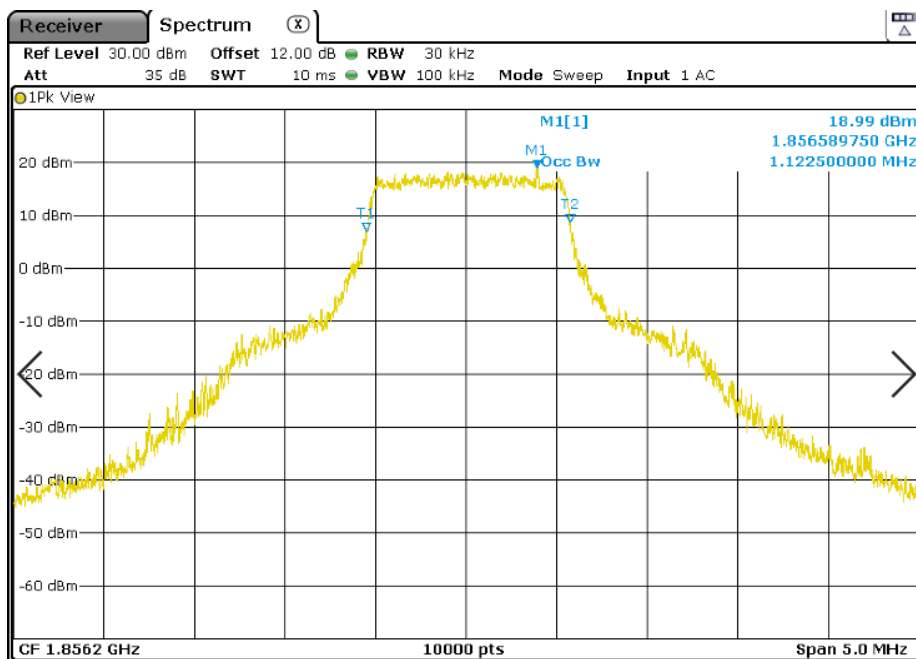
Lowest Channel 99% Occupied Bandwidth

Receiver | Spectrum (X)
Ref Level 30.00 dBm   Offset 12.00 dB ● RBW 30 kHz
Att 35 dB   SWT 10 ms ● VBW 100 kHz   Mode Sweep   Input 1 AC
●1Pk View

M1[1]   18.99 dBm
1.856589750 GHz
1.122500000 MHz
M1 Occ Bw

CF 1.8562 GHz   10000 pts   Span 5.0 MHz

Lowest Channel -26dBc Bandwidth

Receiver | Spectrum (X)
Ref Level 30.00 dBm   Offset 12.00 dB ● RBW 30 kHz
Att 35 dB   SWT 10 ms ● VBW 100 kHz   Mode Sweep   Input 1 AC
●1Pk View

D3[1]   -0.03 dB
1.497000 MHz
M1
M1[1]   18.99 dBm
1.856589750 GHz
D2   D3

CF 1.8562 GHz   10000 pts   Span 5.0 MHz

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.85658975 GHz	18.99 dBm		
D2	M1	1	-1.118 MHz	-26.13 dB		
D3	D2	1	1.497 MHz	-0.03 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	1.87855575 GHz	18.22 dBm			
D2	M1	1	-570.5 kHz	-26.23 dB			
D3	D2	1	1.474 MHz	0.22 dB			