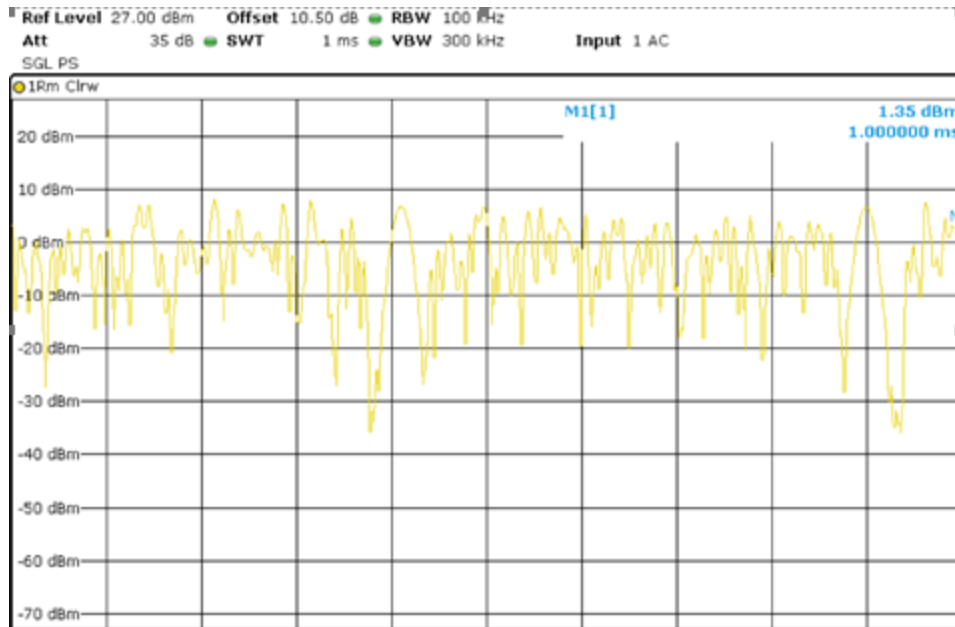
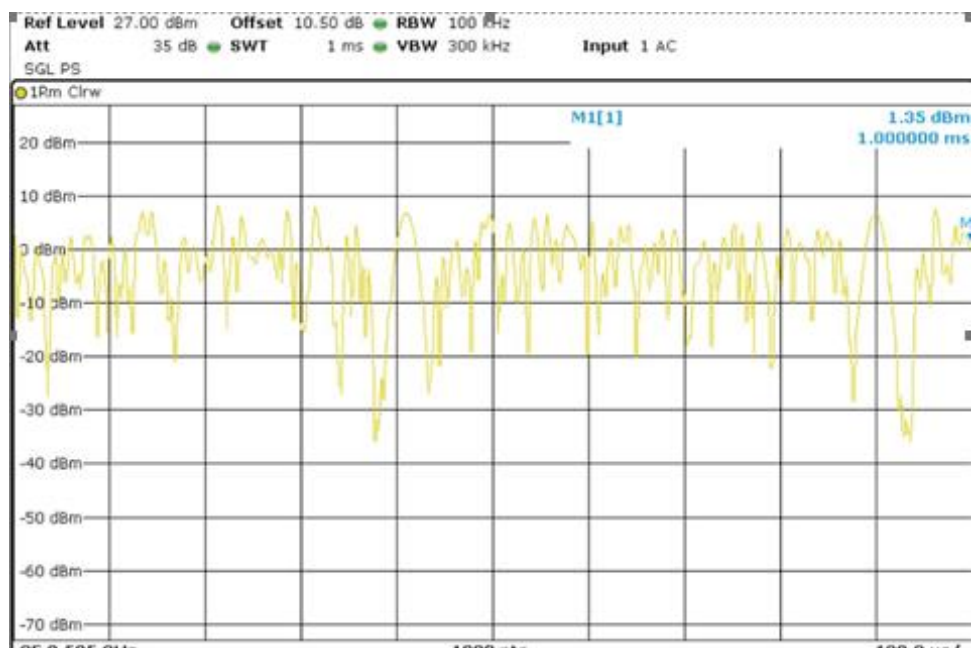


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

QPSK Modulation



16QAM Modulation



TEST A3: FREQUENCY STABILITY

LIMITS:	Product standard:	FCC Part 27 / IC RSS-199 / RSS-130/RSS-139
	Test standard:	FCC §2.1055 and § 27.54 / RSS-199 Clause 4.3 / RSS-130 Clause 4.5 / RSS-139 Clause 6.4

LIMITS

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

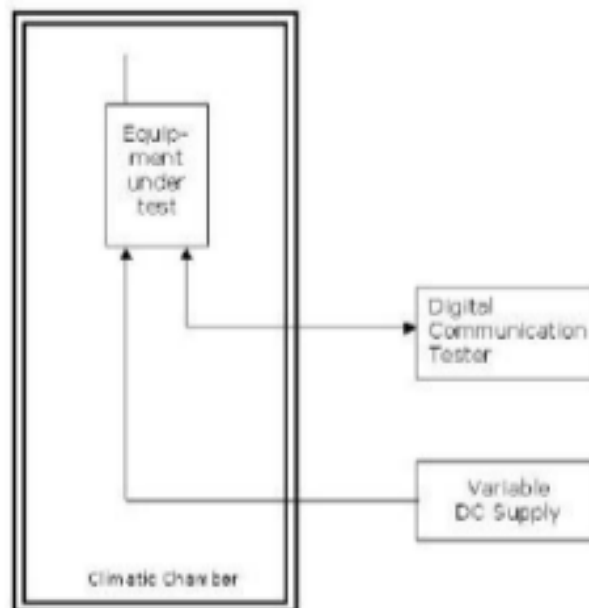
TEST SETUP

The frequency tolerance measurements over temperature variations were made over the temperature range of -30°C to $+50^{\circ}\text{C}$. The EUT was placed inside a climatic chamber and the temperature was raised hourly in 10°C steps from -30°C up to $+50^{\circ}\text{C}$.

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 (Band 4)
TEST RESULTS:	PASS

LTE QPSK MODULATION. BW = 20 MHz

Frequency stability over temperature variations

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
50	7.67	0.0044	0.00000044
40	7.94	0.0046	0.00000046
30	6.51	0.0038	0.00000038
20	9.2	0.0053	0.00000053
10	9.57	0.0055	0.00000055
0	7.68	0.0044	0.00000044
-10	7.93	0.0046	0.00000046
-20	10.19	0.0059	0.00000059
-30	11.89	0.0069	0.00000069

Frequency stability over voltage variations

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.4	11.19	0.0065	0.00000065
Vmin	3.3	10.69	0.0062	0.00000062

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (Band 7)
TEST RESULTS:	PASS

LTE QPSK MODULATION. BW = 15 MHz

Frequency stability over temperature variations

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
50	9.27	0.0037	0.00000037
40	3.83	0.0015	0.00000015
30	2.45	0.0010	0.00000010
20	10.81	0.0043	0.00000043
10	7.37	0.0029	0.00000029
0	2.43	0.0010	0.00000010
-10	5.47	0.0022	0.00000022
-20	4.91	0.0019	0.00000019
-30	7.17	0.0028	0.00000028

Frequency stability over voltage variations

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.4	10.09	0.0040	0.00000040
Vmin	3.3	5.22	0.0021	0.00000021

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (Band 12)
TEST RESULTS:	PASS

LTE QPSK MODULATION. BW = 3 MHz

Frequency stability over temperature variations

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
50	-7.54	-0.0107	-0.00000107
40	2.42	0.0034	0.00000034
30	-3.56	-0.0050	-0.00000050
20	-4.68	-0.0066	-0.00000066
10	-4.22	-0.0060	-0.00000060
0	-1.54	-0.0022	-0.00000022
-10	-0.16	-0.0002	-0.00000002
-20	-5.76	-0.0081	-0.00000081
-30	-3.09	-0.0044	-0.00000044

Frequency stability over voltage variations

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.4	1.53	0.0022	0.00000022
Vmin	3.3	3.72	0.0053	0.00000053

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#04 (Band 13)
TEST RESULTS:	PASS

LTE QPSK MODULATION. BW = 5 MHz

Frequency stability over temperature variations

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
50	1.36	0.0017	0.00000017
40	1.77	0.0023	0.00000023
30	3.36	0.0043	0.00000043
20	-2.63	-0.0034	-0.00000034
10	0.47	0.0006	0.00000006
0	-7.14	-0.0091	-0.00000091
-10	-2.5	-0.0032	-0.00000032
-20	-1.14	-0.0015	-0.00000015
-30	1.89	0.0024	0.00000024

Frequency stability over voltage variations

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.4	0.82	0.0010	0.00000010
Vmin	3.3	1.99	0.0025	0.00000025

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#05 (Band 66)
TEST RESULTS:	PASS

LTE QPSK MODULATION. BW = 20 MHz

Frequency stability over temperature variations

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
50	13.52	0.0077	0.00000077
40	5.66	0.0032	0.00000032
30	7.93	0.0045	0.00000045
20	10.47	0.0060	0.00000060
10	7.64	0.0044	0.00000044
0	5.51	0.0031	0.00000031
-10	7.12	0.0041	0.00000041
-20	9.68	0.0055	0.00000055
-30	12.33	0.0070	0.00000070

Frequency stability over voltage variations

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.4	9.83	0.0056	0.00000056
Vmin	3.3	8.6	0.0049	0.00000049

TEST A.4: OCCUPIED BANDWIDTH

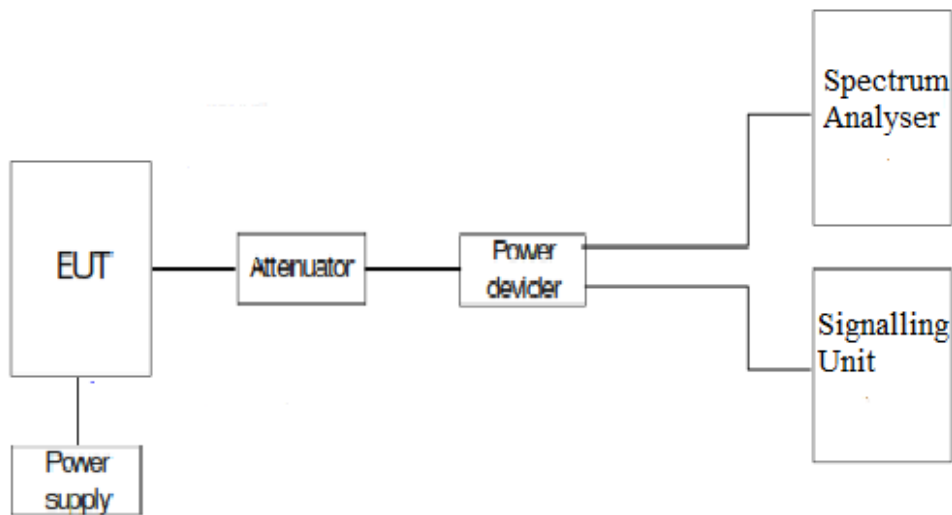
LIMITS:	Product standard:	FCC Part 27 / IC RSS-199
	Test standard:	FCC § 2.1049 / RSS-199 Clause 4.2

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 (Band 4)
TEST RESULTS:	PASS

LTE QPSK MODULATION. BW = 1.4 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	1.11	1.12	1.10
-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)	1.10	1.11	1.11
-26 dBc bandwidth (MHz)	1.26	1.28	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)	3.08	3.09	3.09

LTE 16QAM MODULATION. BW = 3 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	2.74	2.73	2.73
-26 dBc bandwidth (MHz)	3.10	3.08	3.09

LTE QPSK MODULATION. BW = 5 MHz

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	4.58	4.56	4.57
-26 dBc bandwidth (MHz)	5.14	5.15	5.14

LTE 16QAM MODULATION. BW = 5 MHz

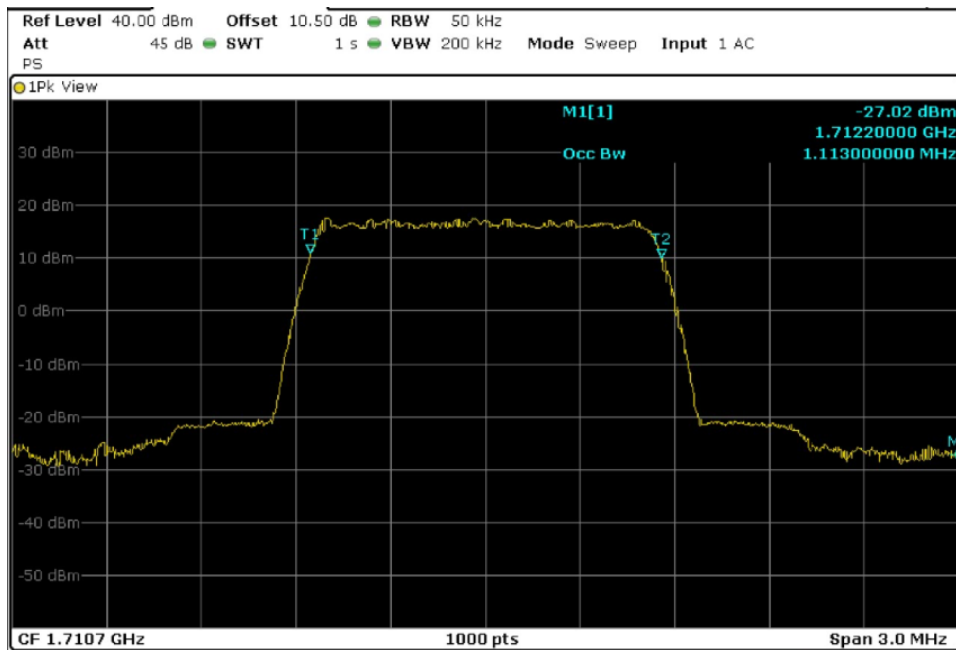
Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	4.55	4.57	4.57
-26 dBc bandwidth (MHz)	5.15	5.17	5.15

TEST RESULTS (Cont):			
LTE QPSK MODULATION. BW = 10 MHz			
Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	8.98	8.96	8.96
-26 dBc bandwidth (MHz)	9.90	9.87	9.90
LTE 16QAM MODULATION. BW = 10 MHz			
Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	8.96	8.98	8.98
-26 dBc bandwidth (MHz)	9.84	9.90	9.90
LTE QPSK MODULATION. BW = 15 MHz			
Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	13.44	13.38	13.44
-26 dBc bandwidth (MHz)	14.67	14.61	14.63
LTE 16QAM MODULATION. BW = 15 MHz			
Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	13.41	13.41	13.41
-26 dBc bandwidth (MHz)	14.59	14.61	14.59
LTE QPSK MODULATION. BW = 20 MHz			
Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	17.88	17.88	17.88
-26 dBc bandwidth (MHz)	19.22	19.40	19.69
LTE 16QAM MODULATION. BW = 20 MHz			
Channel	Lowest	Middle	Highest
99% Occupied bandwidth (MHz)	17.92	17.88	17.88
-26 dBc bandwidth (MHz)	19.22	19.63	19.40

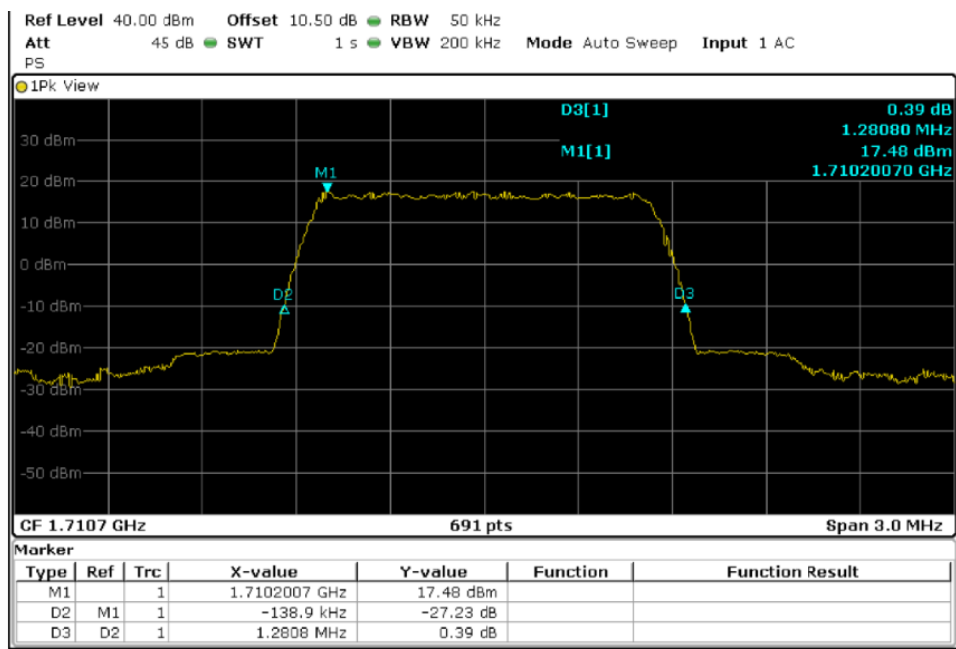
TEST RESULTS (Cont):

LTE QPSK MODULATION. BW = 1.4 MHz

Lowest Channel 99% Occupied Bandwidth

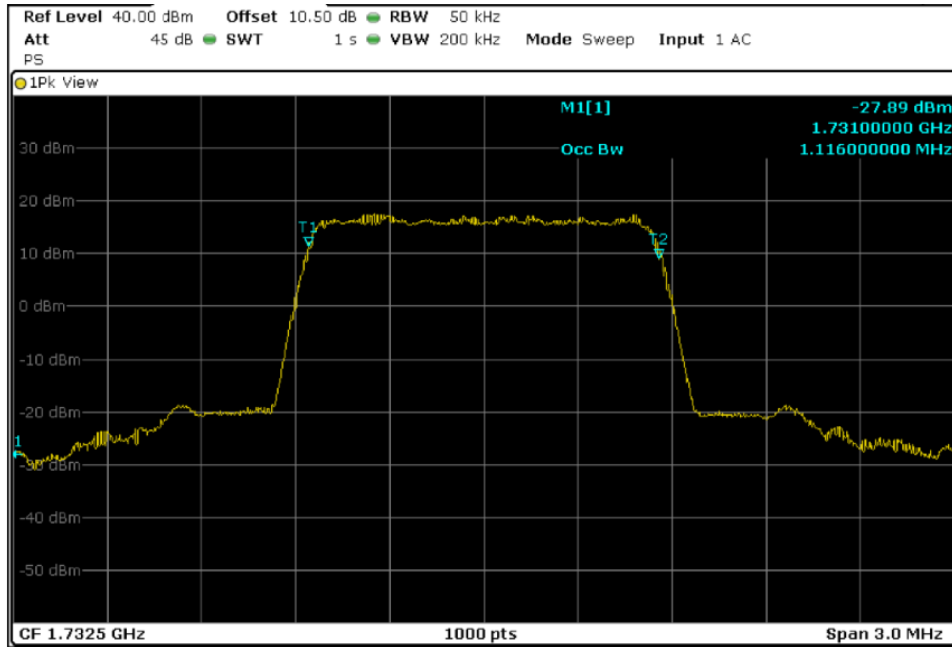


Lowest Channel -26dBc Bandwidth kHz

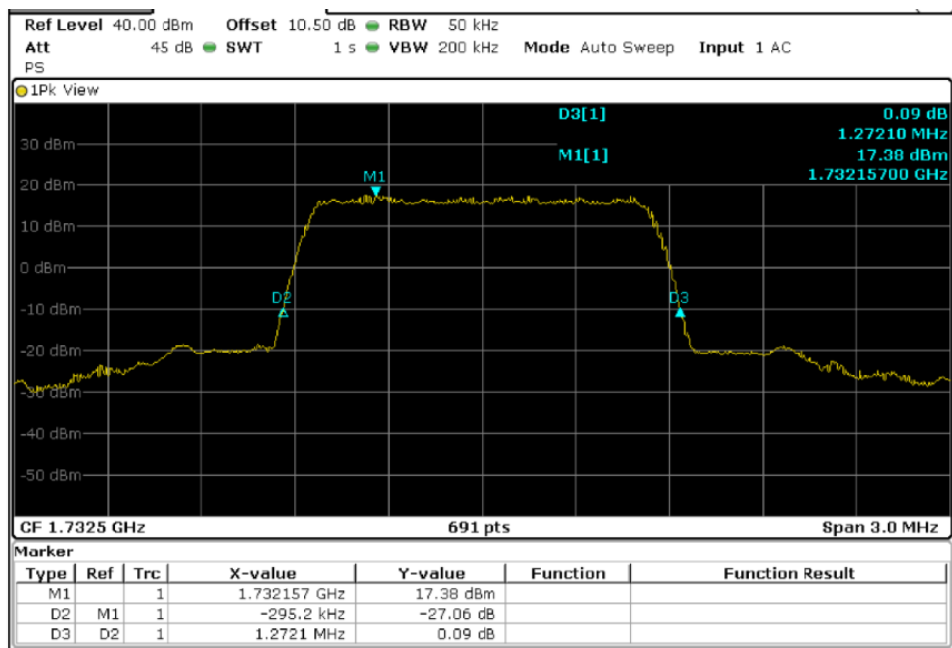


TEST RESULTS (Cont):

Middle Channel 99% Occupied Bandwidth

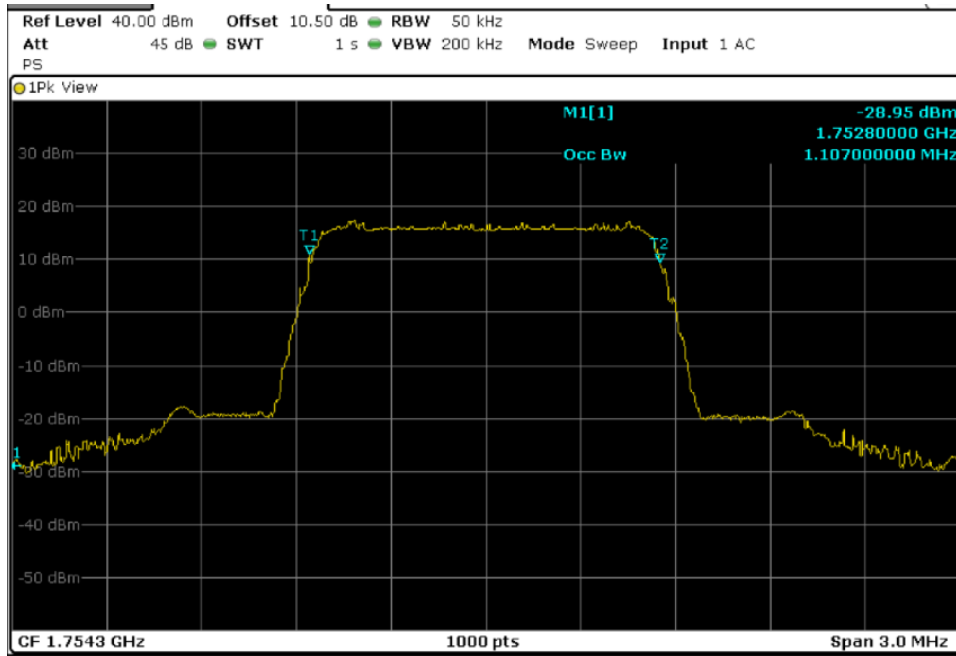


Middle Channel -26dBc Bandwidth kHz

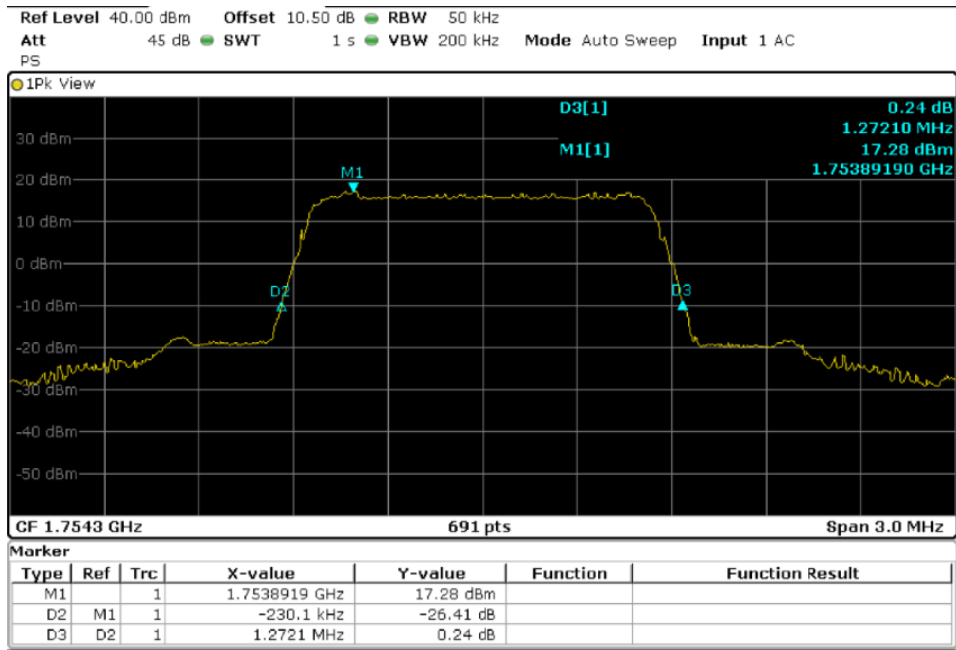


TEST RESULTS (Cont):

Highest Channel 99% Occupied Bandwidth



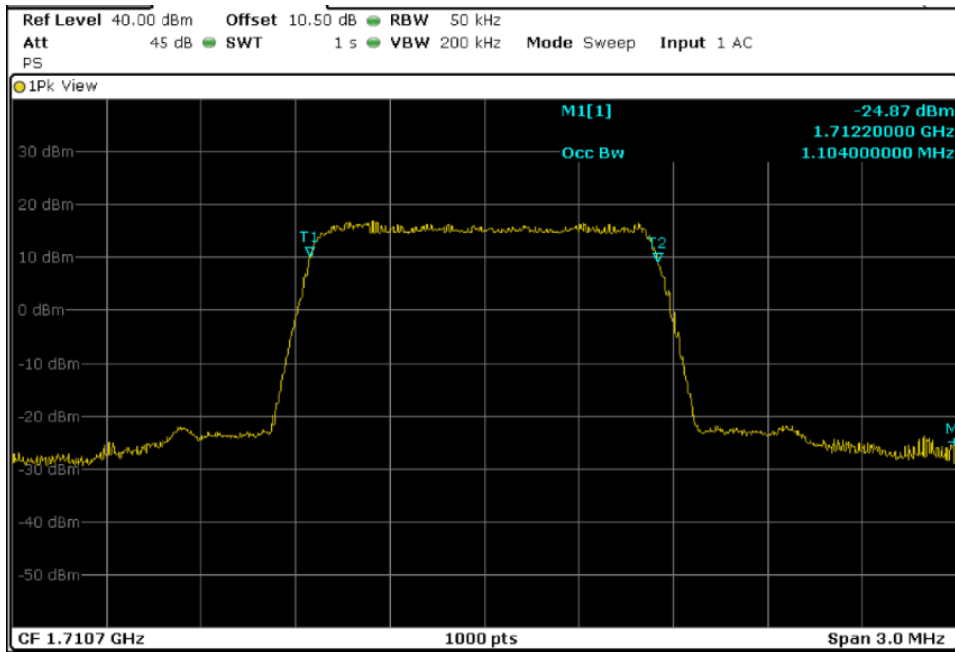
Highest Channel -26dBc Bandwidth kHz



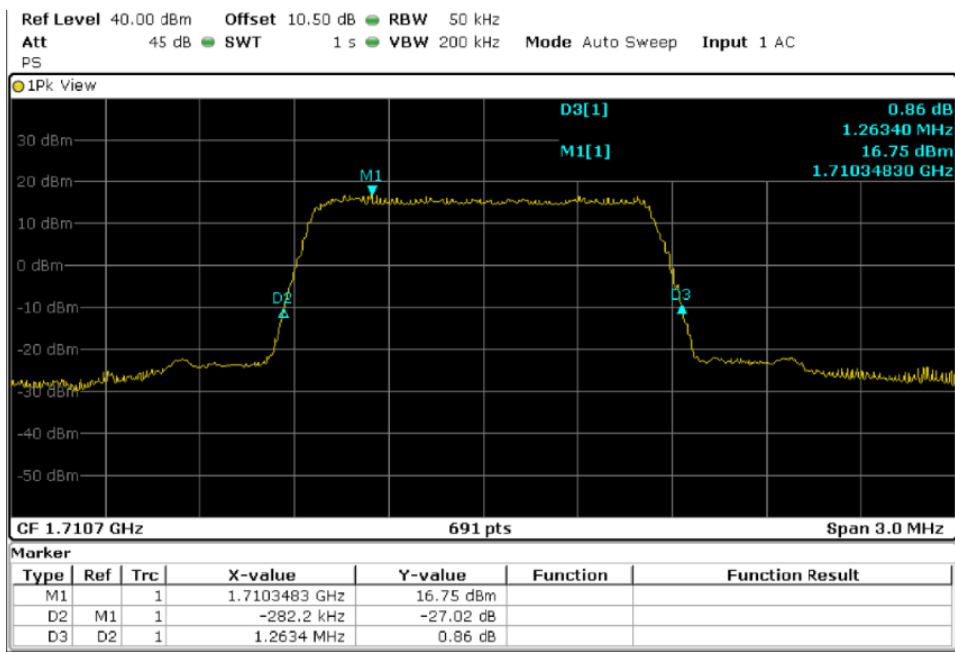
TEST RESULTS (Cont):

LTE 16QAM MODULATION. BW = 1.4 MHz

Lowest Channel 99% Occupied Bandwidth

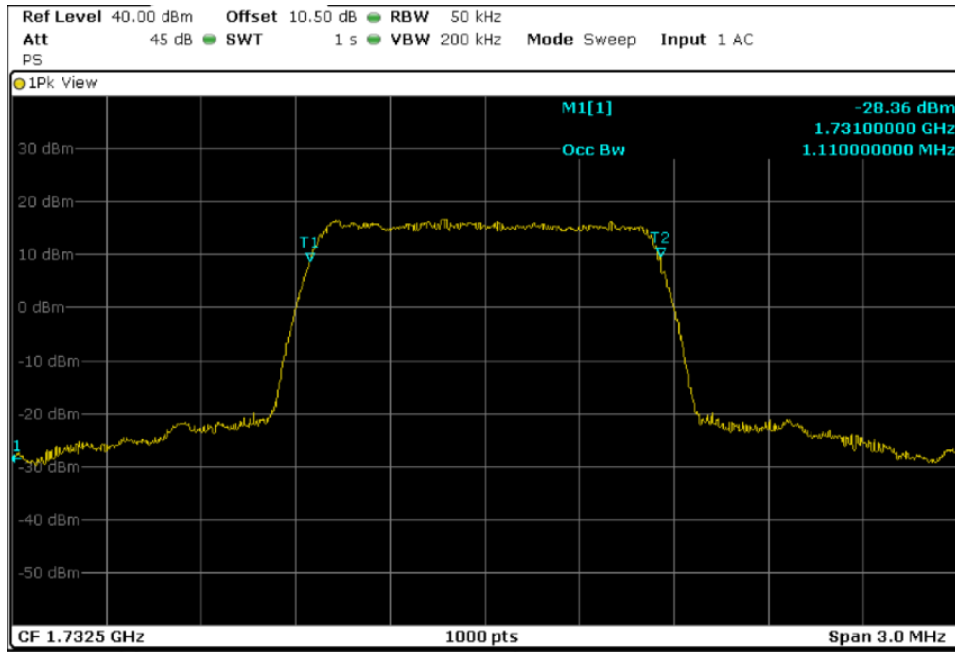


Lowest Channel -26dBc Bandwidth kHz

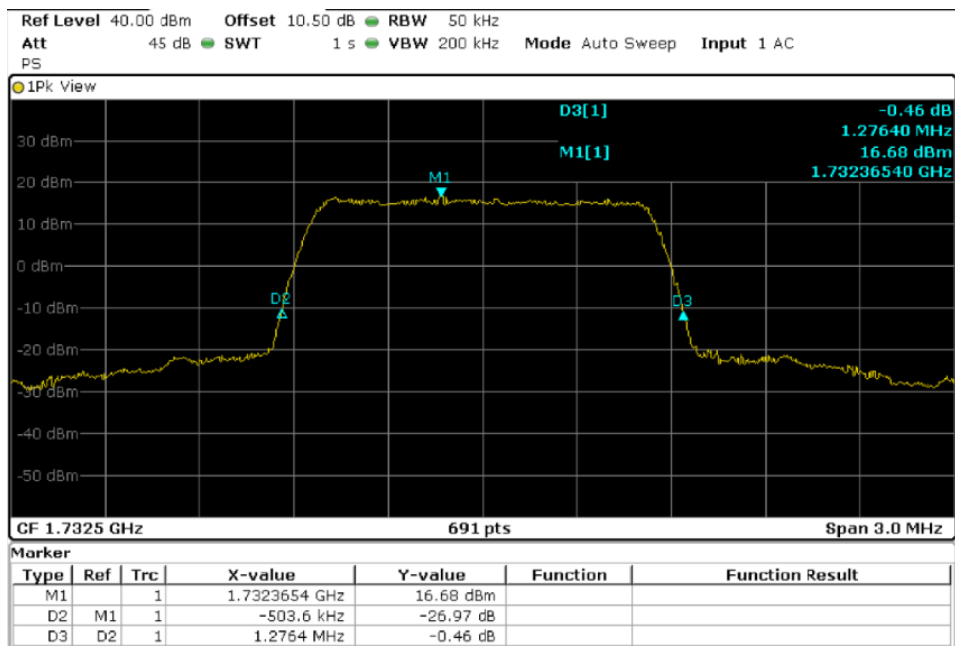


TEST RESULTS (Cont):

Middle Channel 99% Occupied Bandwidth

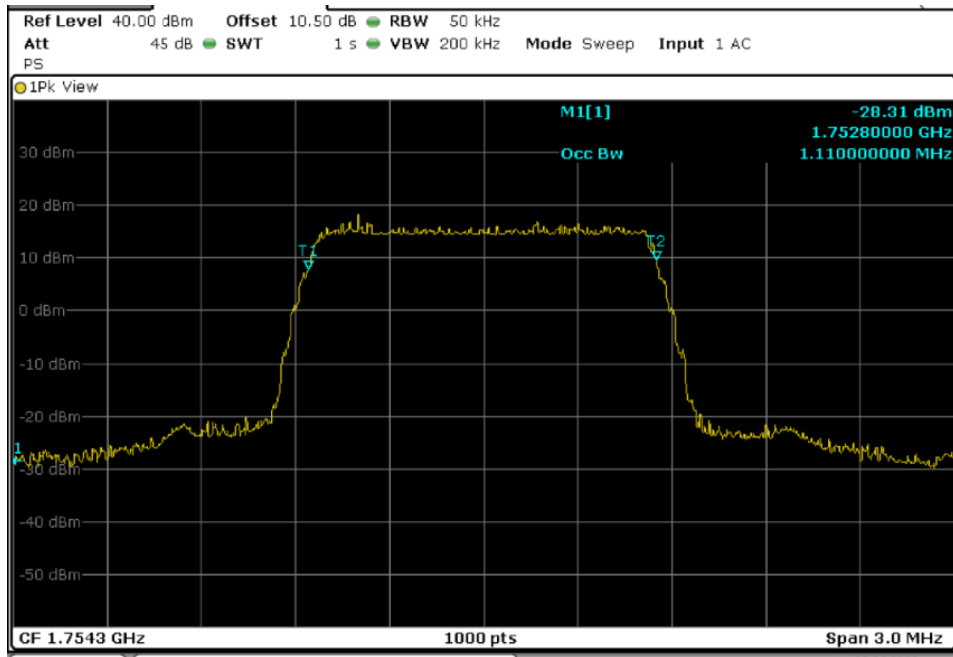


Middle Channel -26dBc Bandwidth kHz

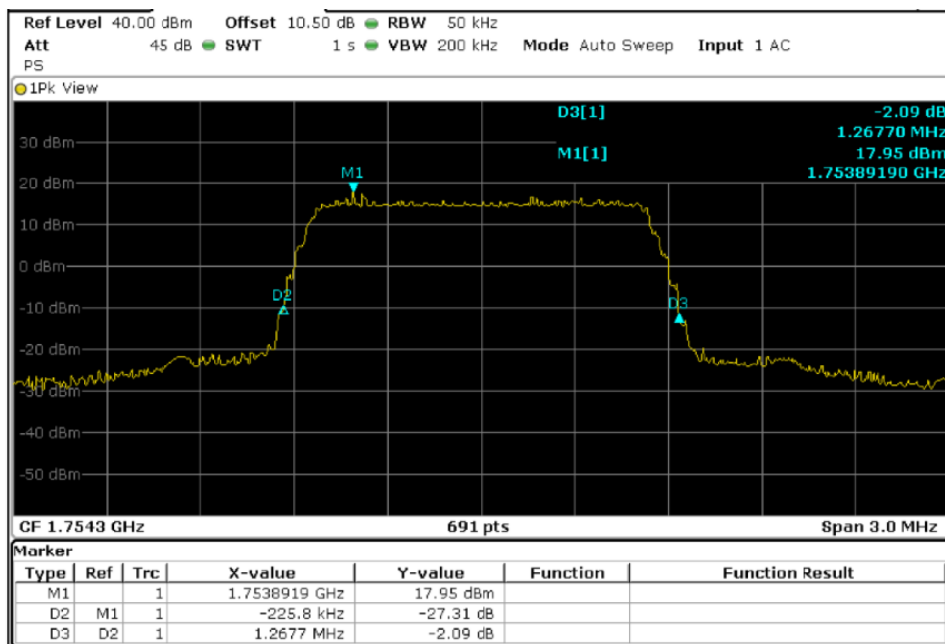


TEST RESULTS (Cont):

Highest Channel 99% Occupied Bandwidth



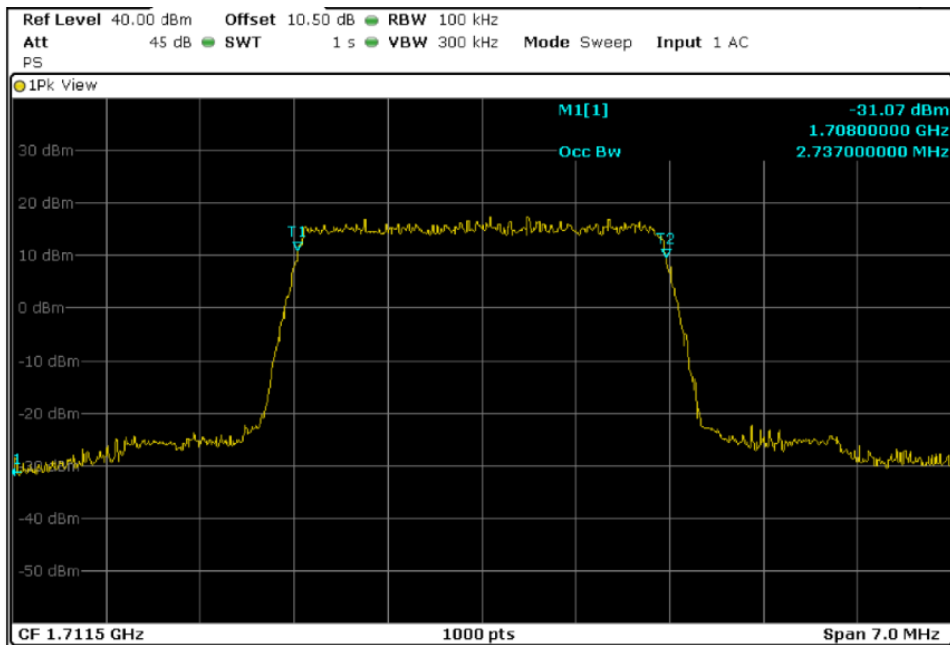
Highest Channel -26dBc Bandwidth kHz



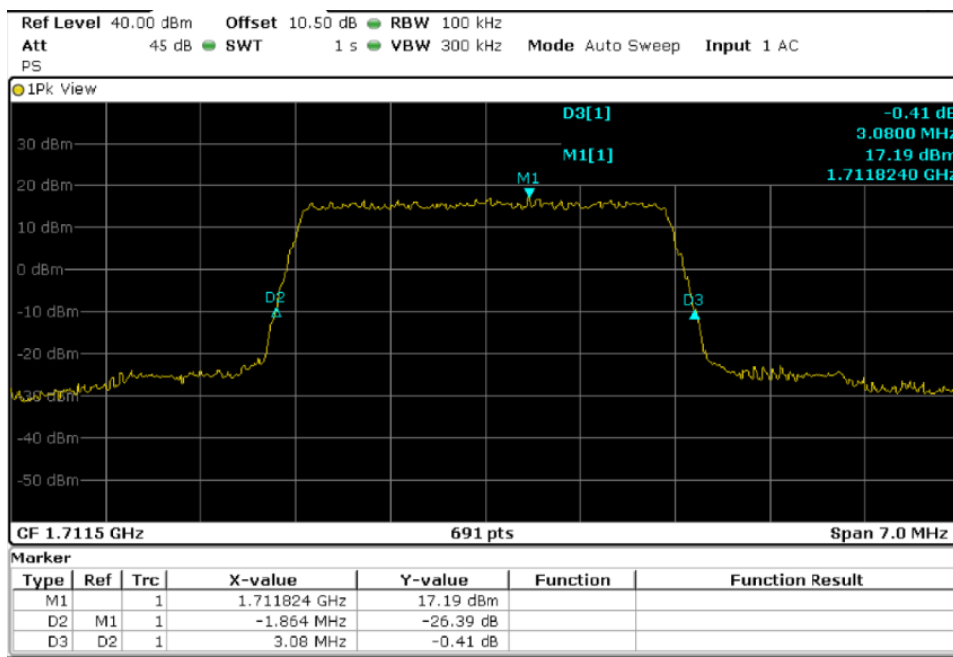
TEST RESULTS (Cont):

LTE QPSK MODULATION. BW = 3 MHz

Lowest Channel 99% Occupied Bandwidth

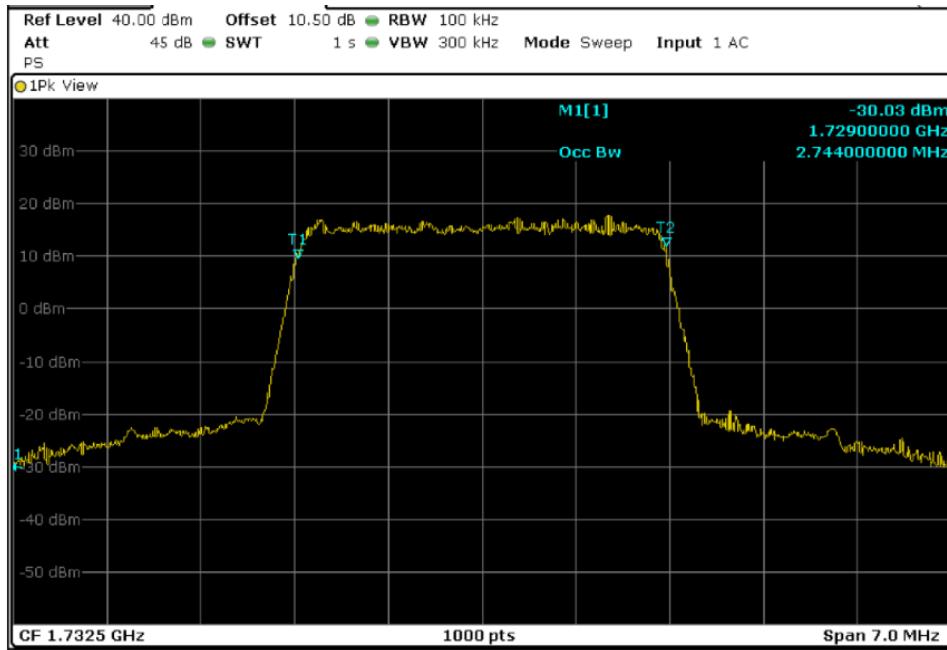


Lowest Channel -26dBc Bandwidth kHz

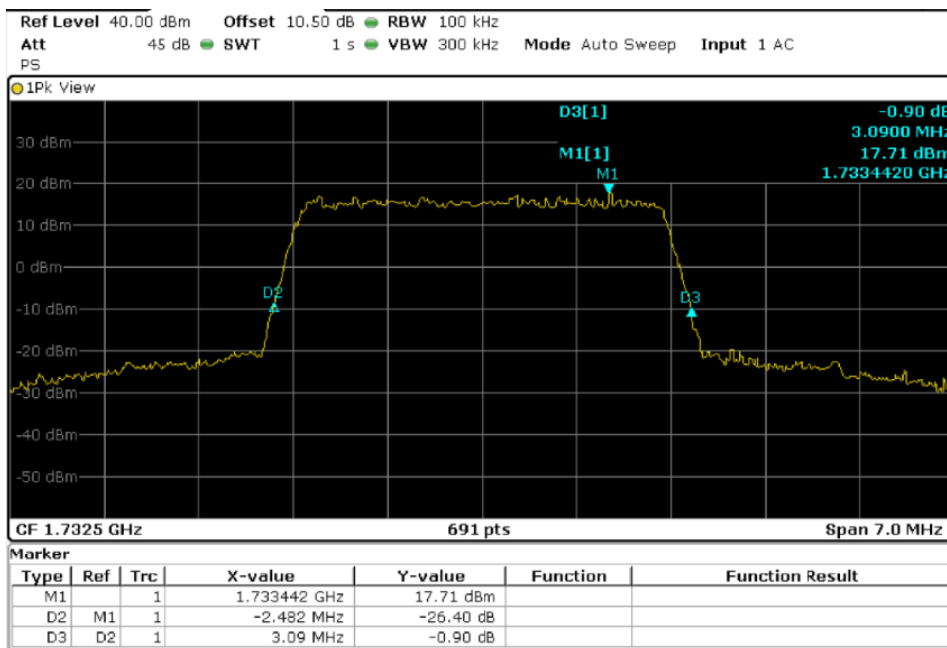


TEST RESULTS (Cont):

Middle Channel 99% Occupied Bandwidth

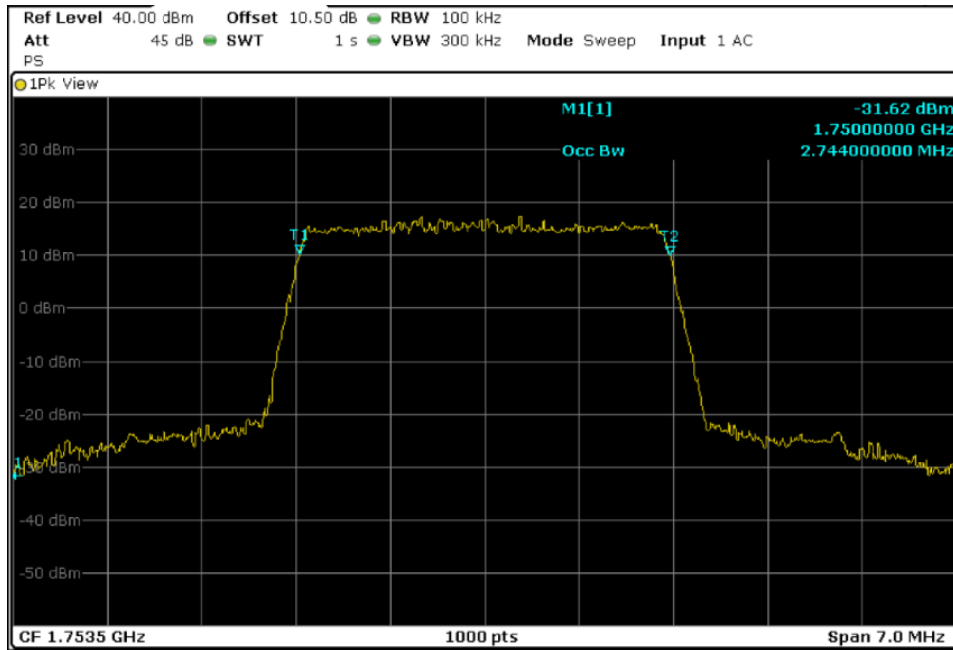


Middle Channel -26dBc Bandwidth kHz

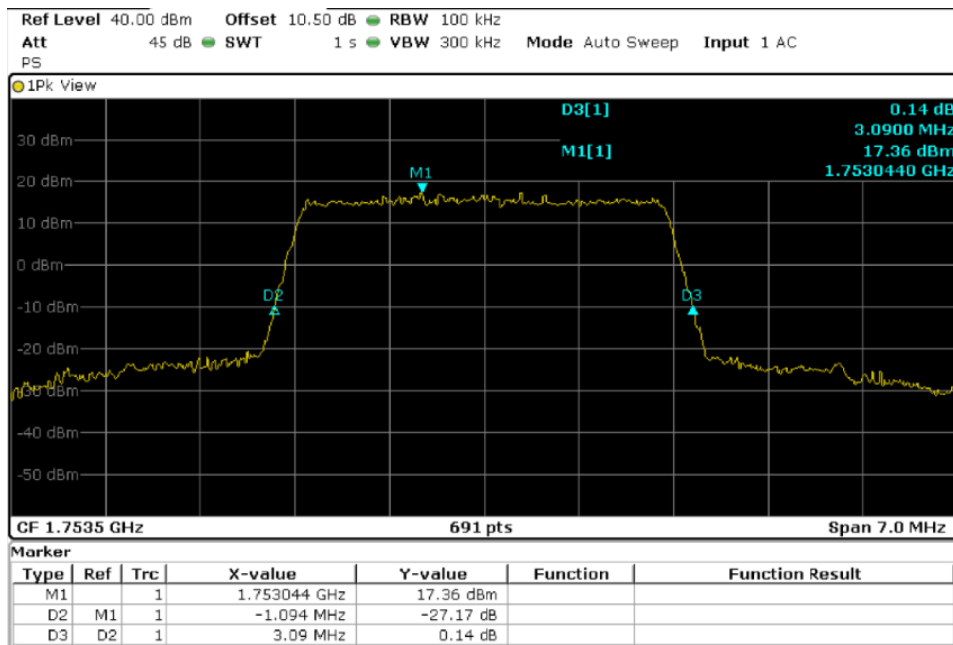


TEST RESULTS (Cont):

Highest Channel 99% Occupied Bandwidth



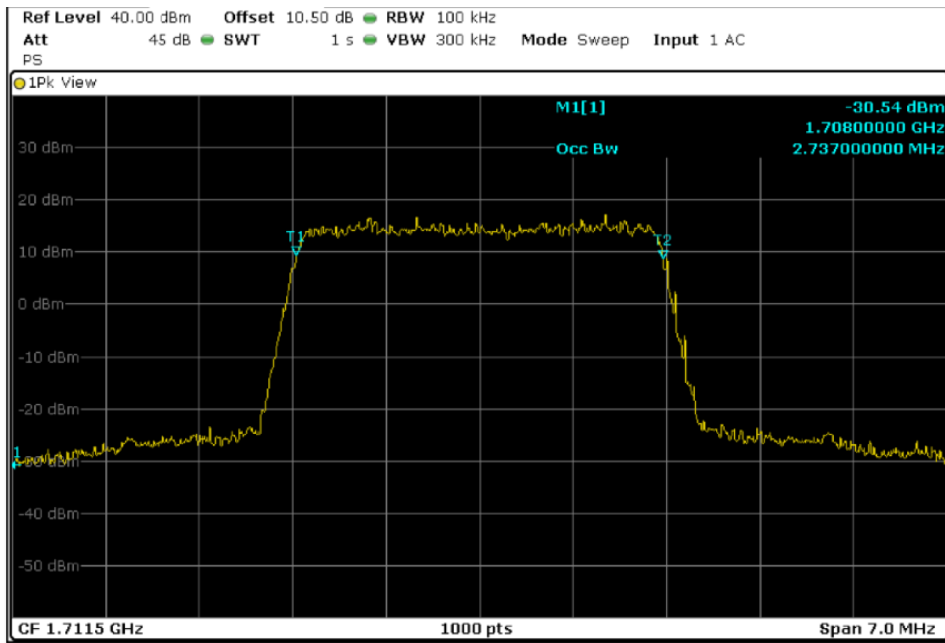
Highest Channel -26dBc Bandwidth kHz



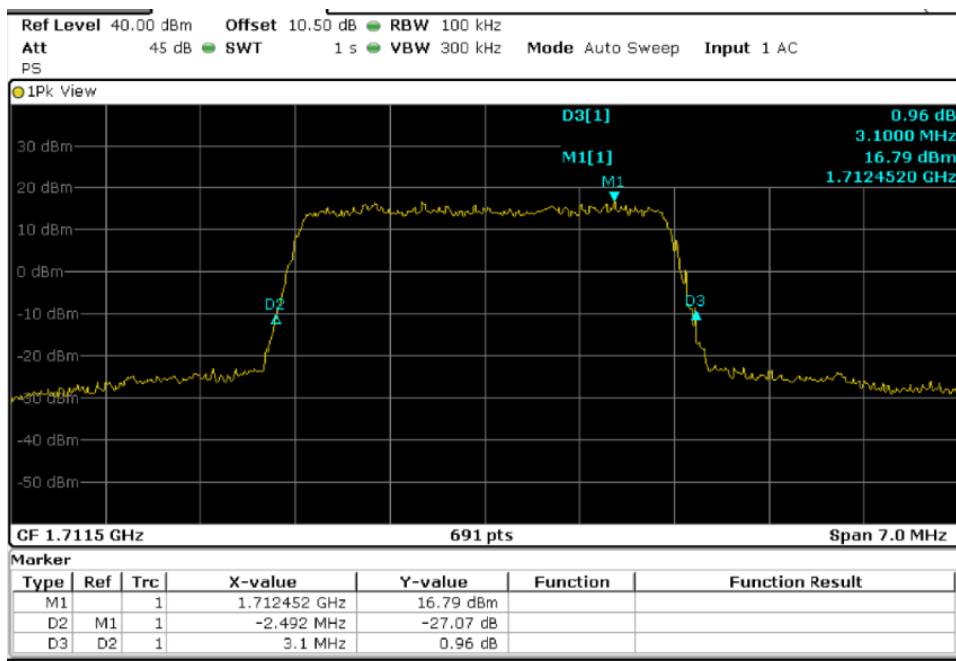
TEST RESULTS (Cont):

LTE 16QAM MODULATION. BW = 3 MHz

Lowest Channel 99% Occupied Bandwidth

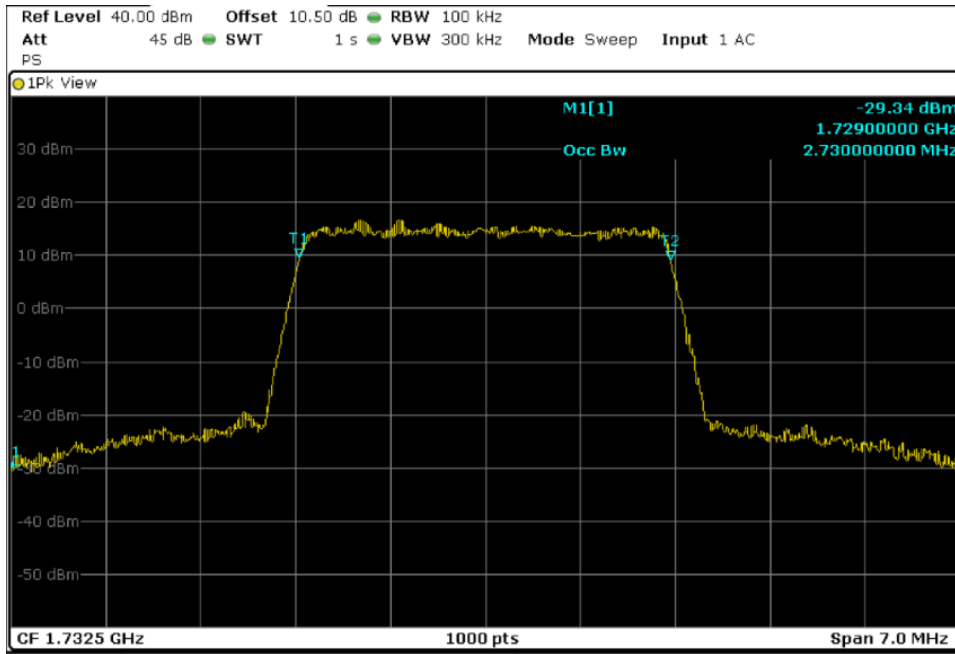


Lowest Channel -26dBc Bandwidth kHz

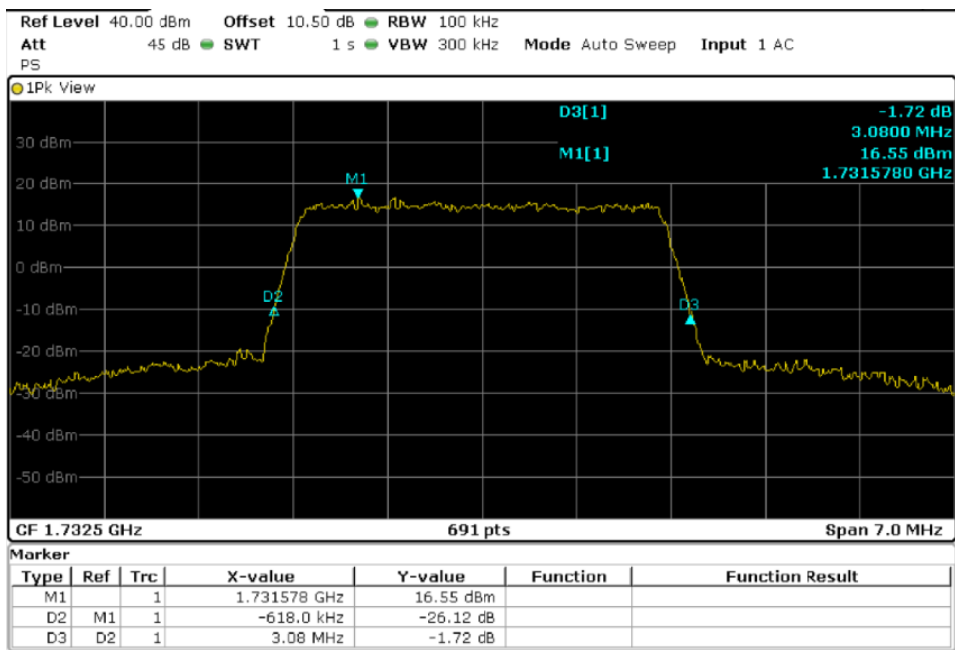


TEST RESULTS (Cont):

Middle Channel 99% Occupied Bandwidth

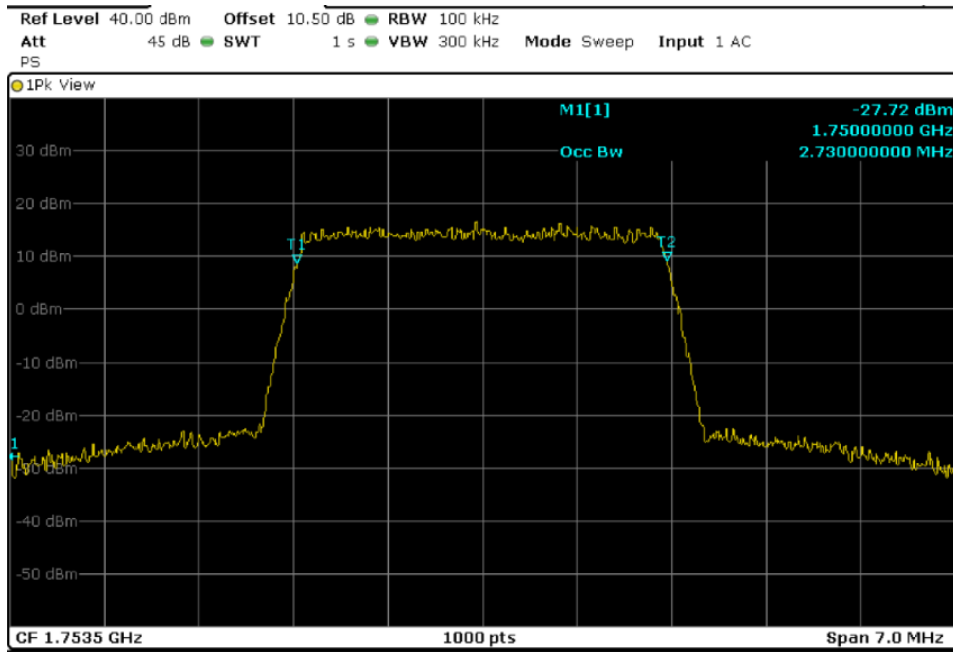


Middle Channel -26dBc Bandwidth kHz



TEST RESULTS (Cont):

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth kHz

