6.5 Test data for Uplink

-. Test Date : October 22, 2014

-. Test Result : Pass

Modulation	Channel	26 dB Bandwidth (kHz)	99 % Occupied Bandwidth (kHz)
CDMA 2000	Low	1.51	1.31
	Middle	1.52	1.86
	High	1.51	1.86
LTE 5 M	QPSK	4.62	4.10
LTE 10 M	QPSK	9.35	8.68
LTE 15 M	QPSK	13.98	13.29

Remark: 1. According to above result, the carrier frequency shall be within the frequency block edges.

2. As a result of preliminary testing., the formal test was performed with the maximum payload mode of worst cases for QPSK.

Tested by: hyung-kwon, Oh / Project Engineer

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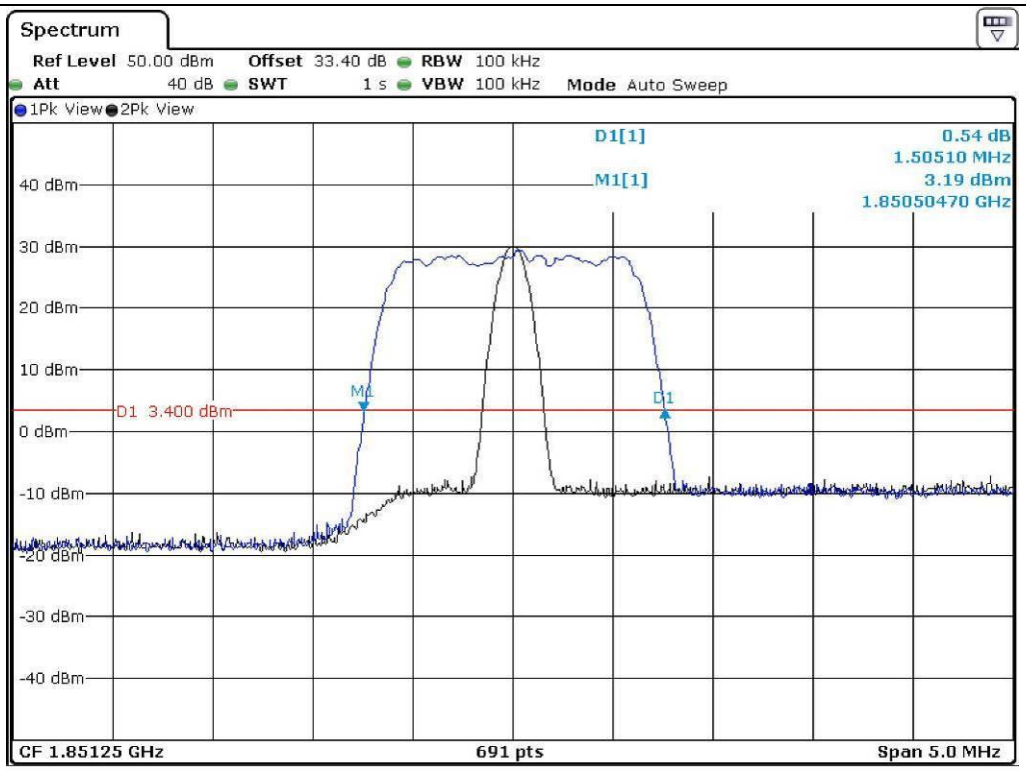
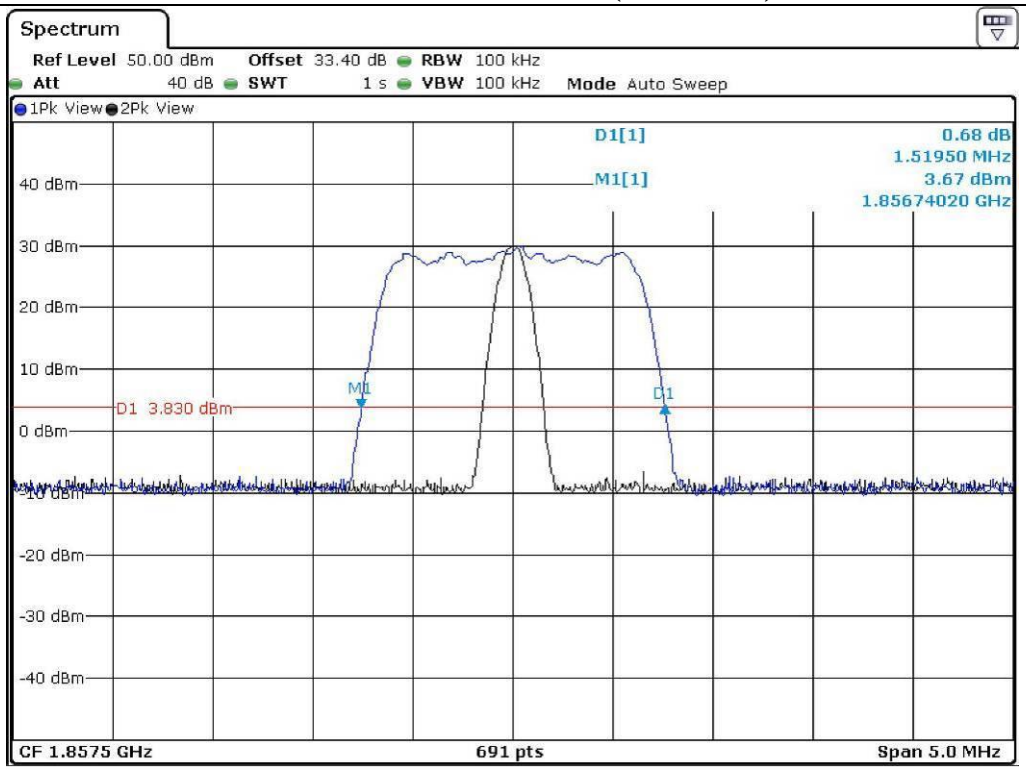


CDMA 2000 – 26 dB Bandwidth (Low Channel)



CDMA 2000 – 26 dB Bandwidth (Middle Channel)

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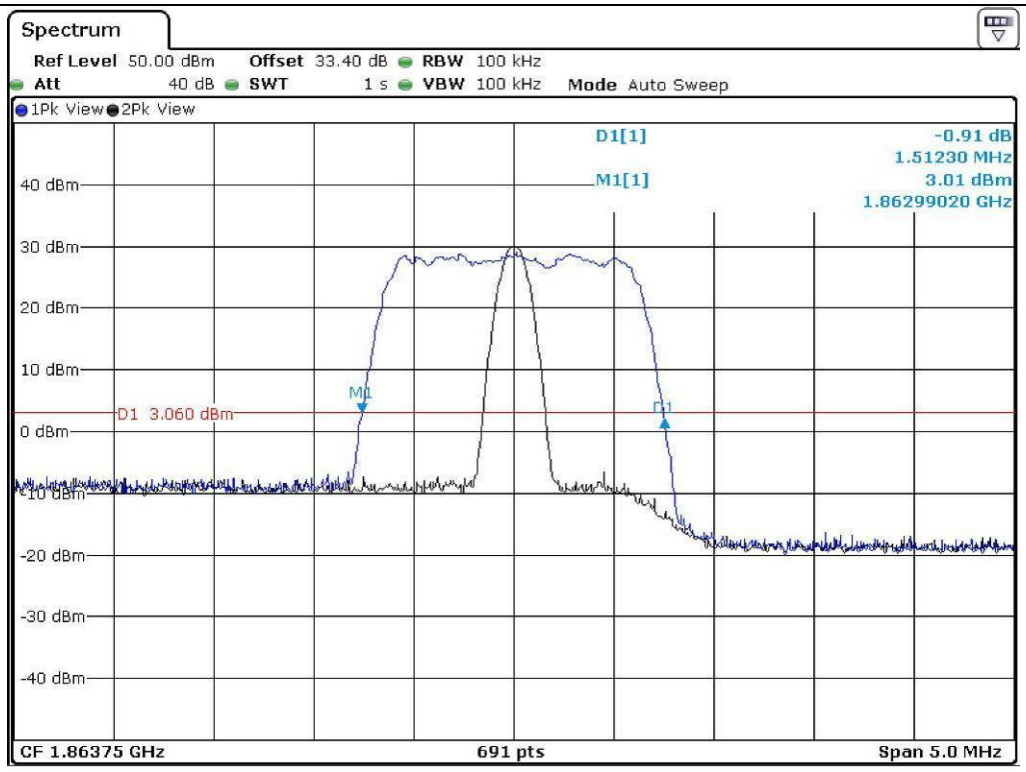

CDMA 2000 – 26 dB Bandwidth (High Channel)

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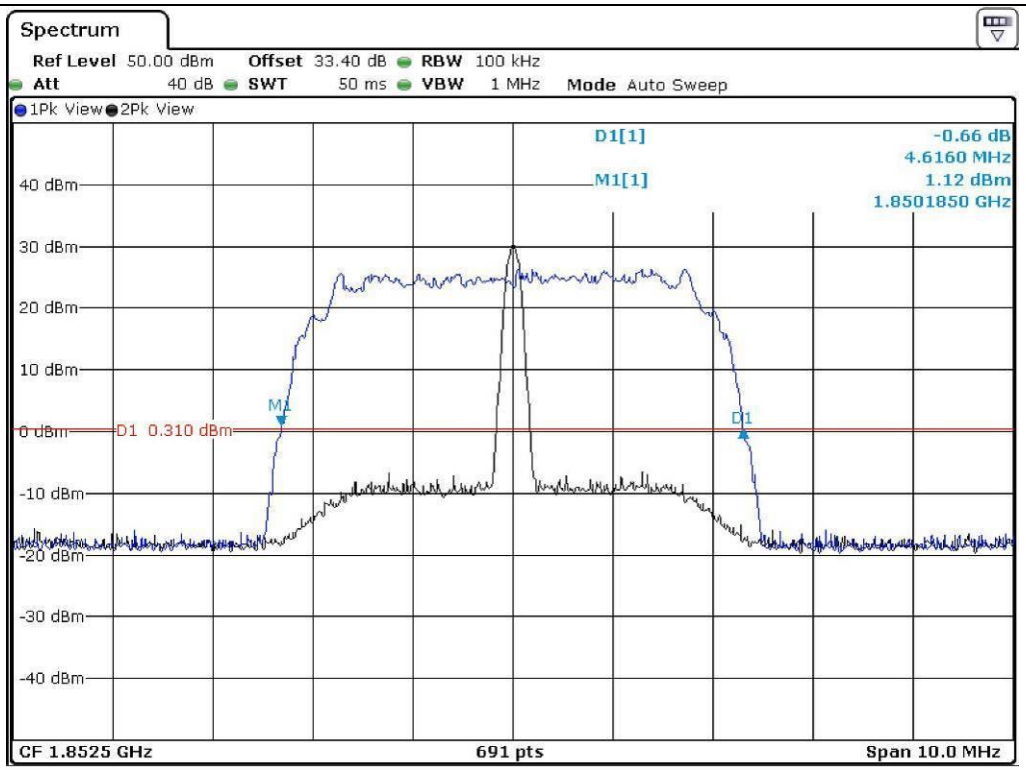
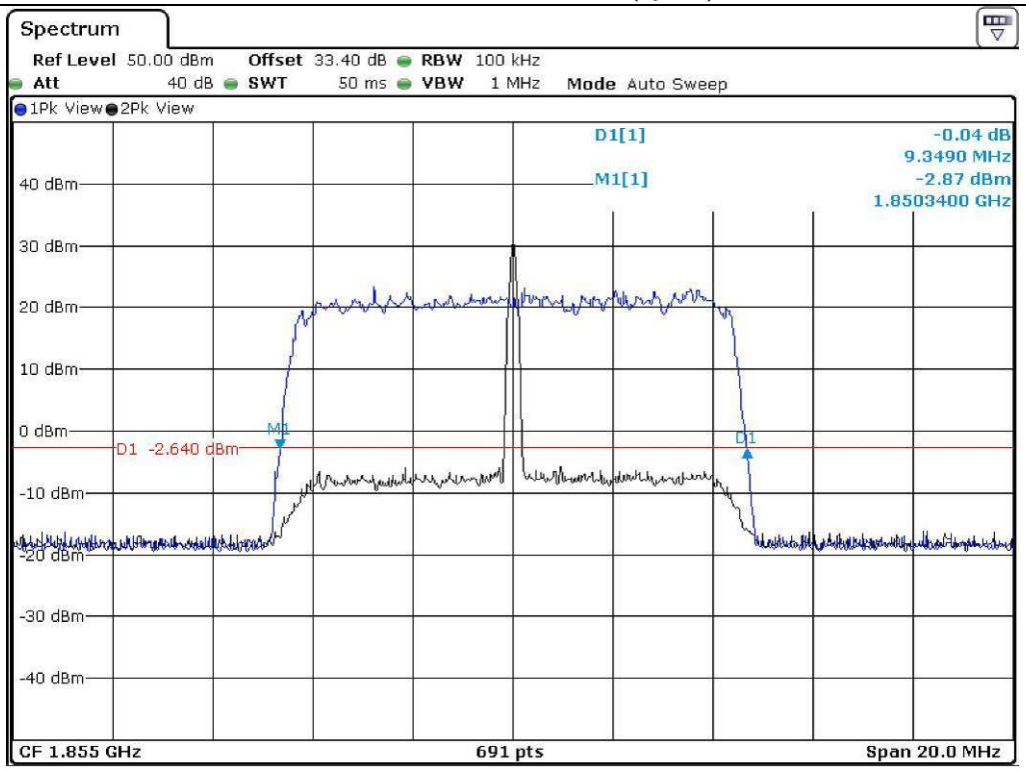


LTE 5 M – 26 dB Bandwidth (QPSK)



LTE 10 M – 26 dB Bandwidth (QPSK)

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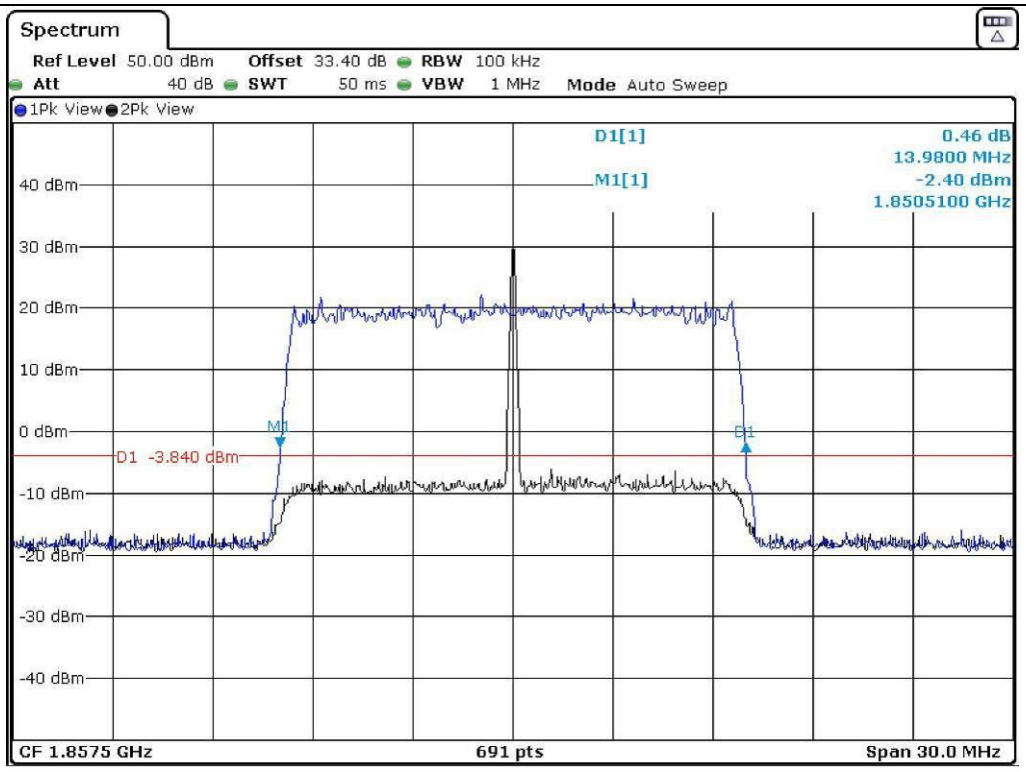

LTE 15 M – 26 dB Bandwidth (QPSK)

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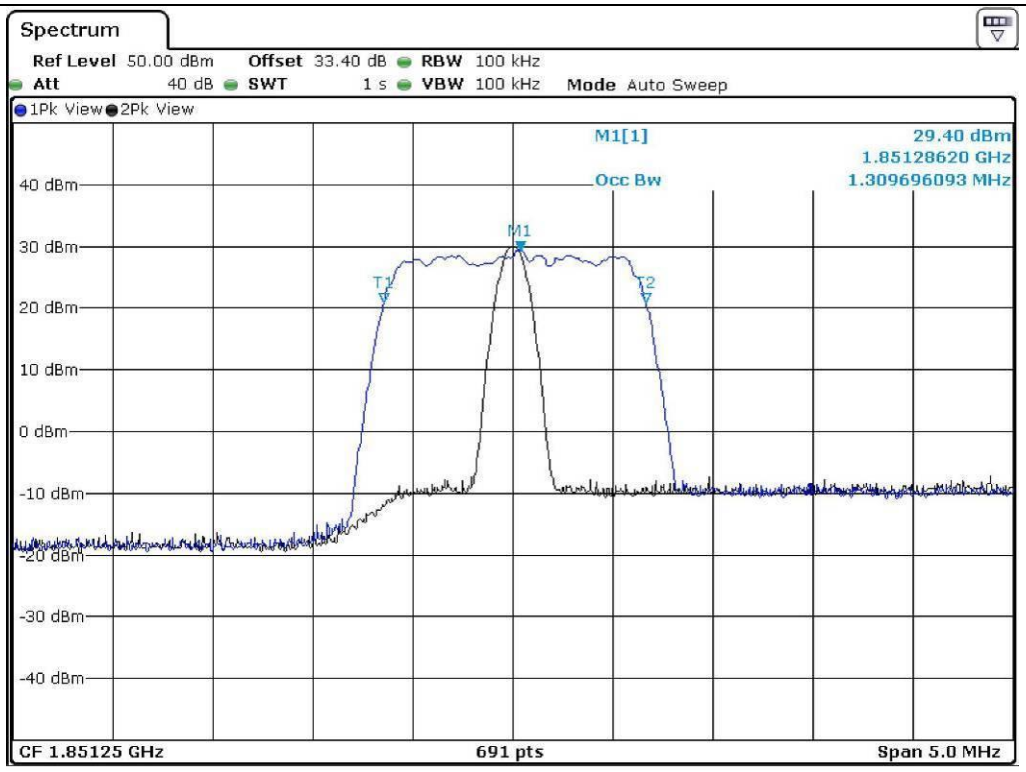
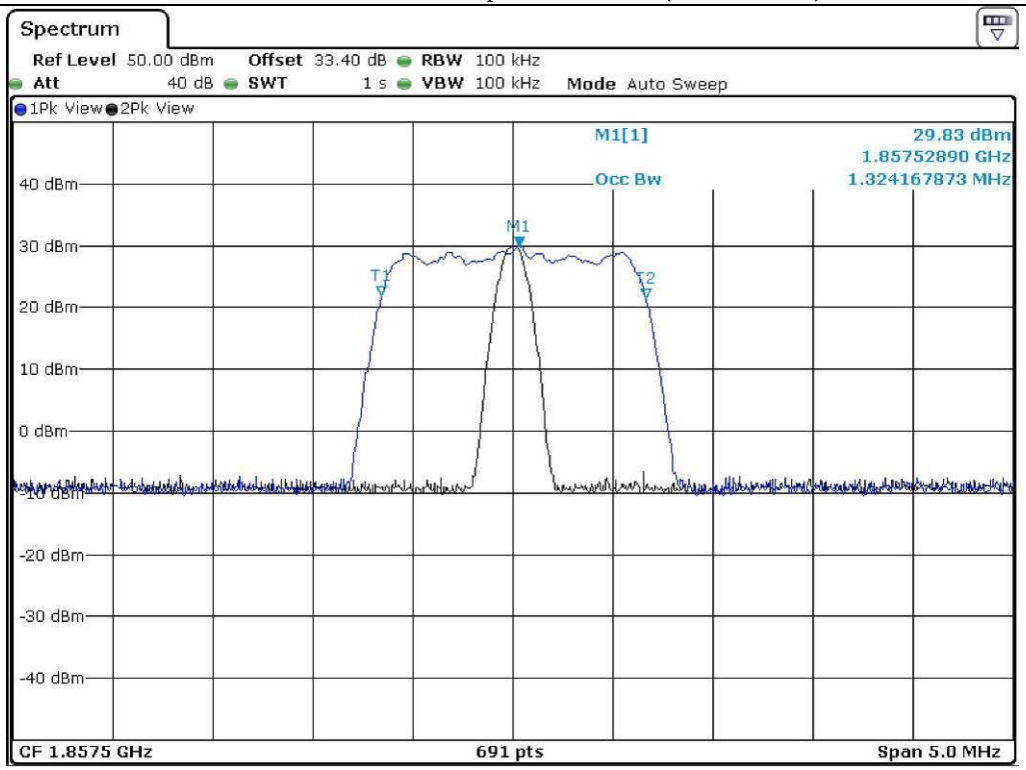


CDMA 2000 – 99 % Occupied Bandwidth (Low Channel)



CDMA 2000 – 99 % Occupied Bandwidth (Middle Channel)

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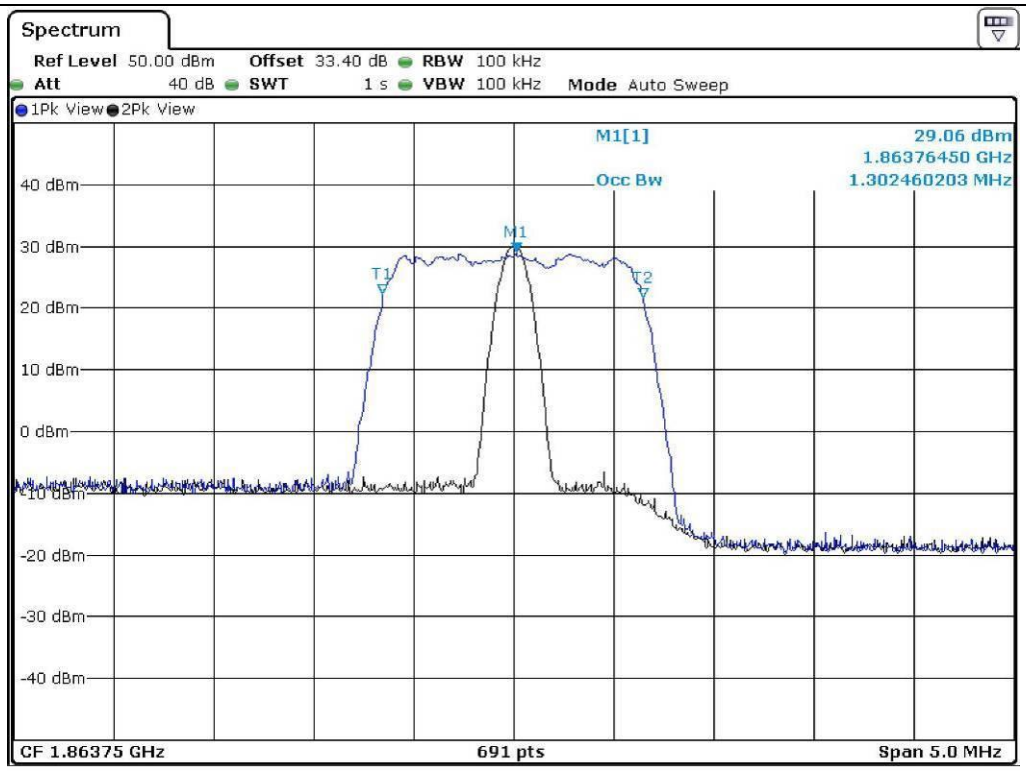

CDMA 2000 – 99 % Occupied Bandwidth (High Channel)

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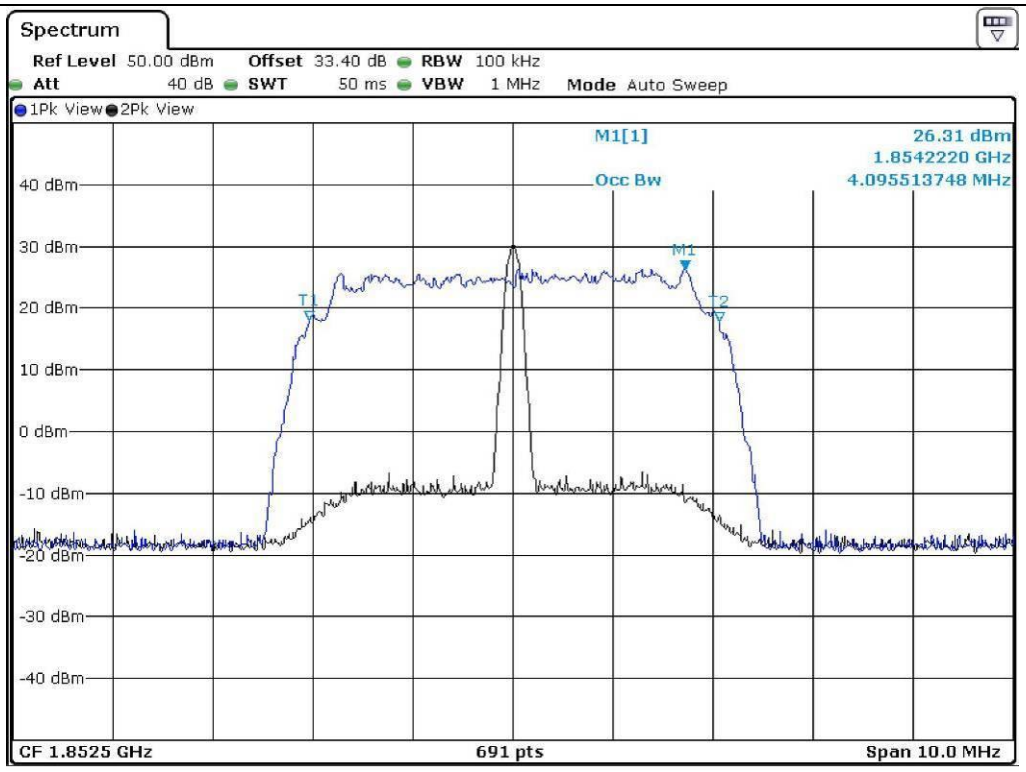
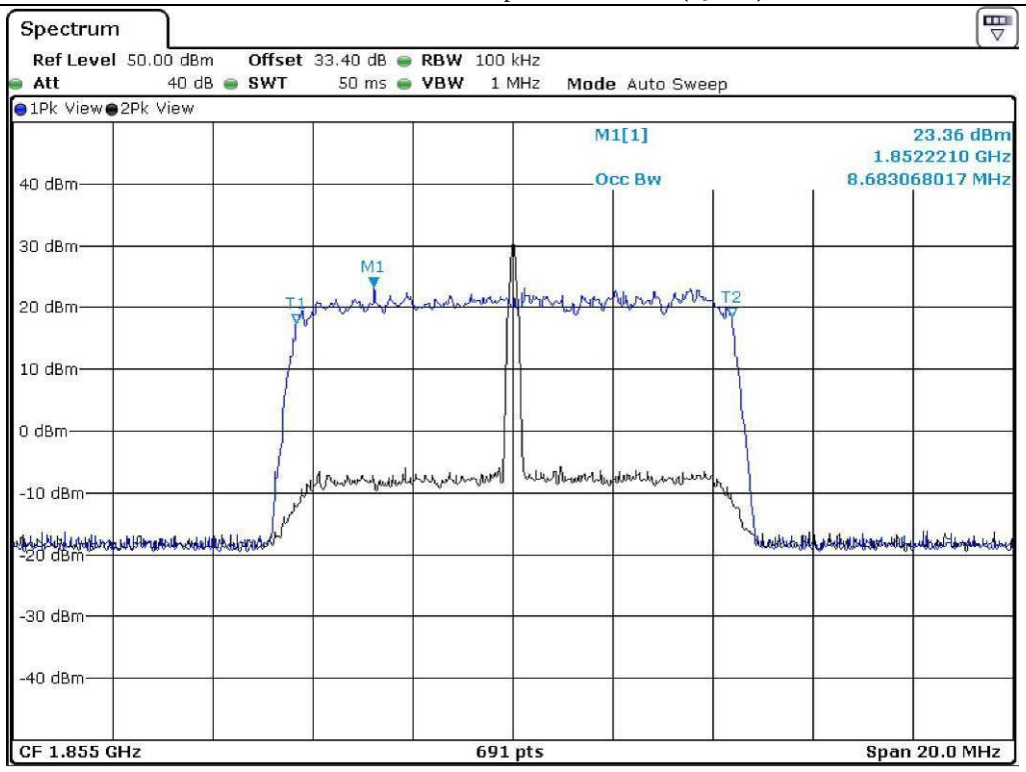


LTE 5 M – 99 % Occupied Bandwidth (QPSK)



LTE 10 M – 99 % Occupied Bandwidth (QPSK)

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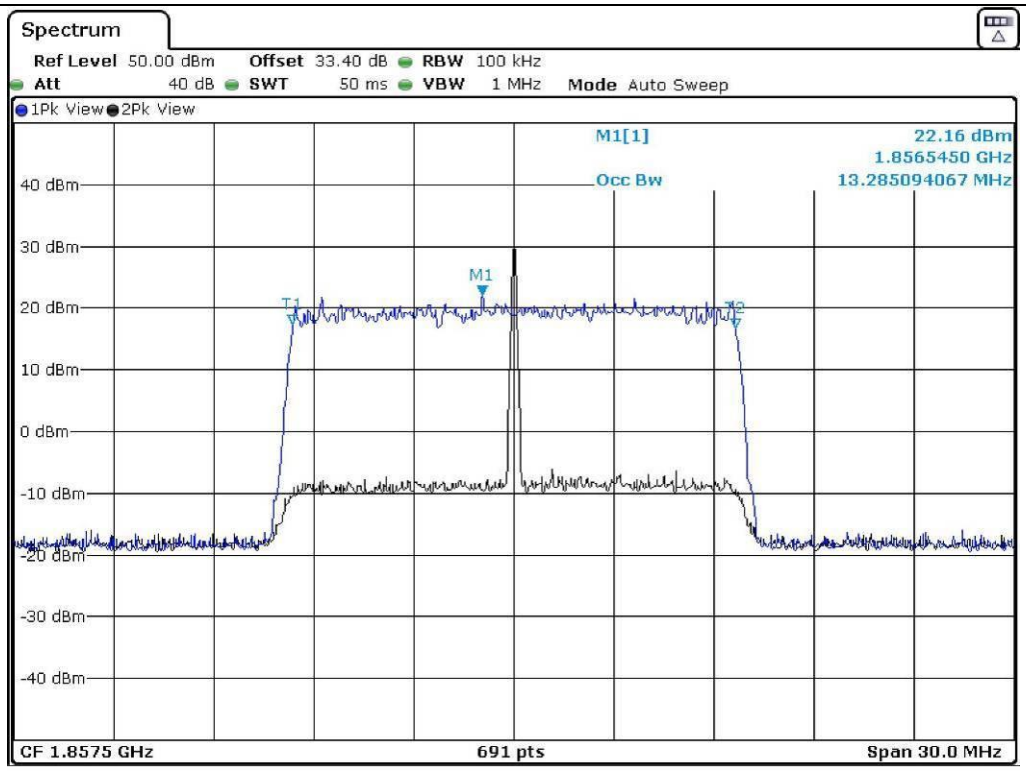

LTE 15 M – 99 % Occupied Bandwidth (QPSK)

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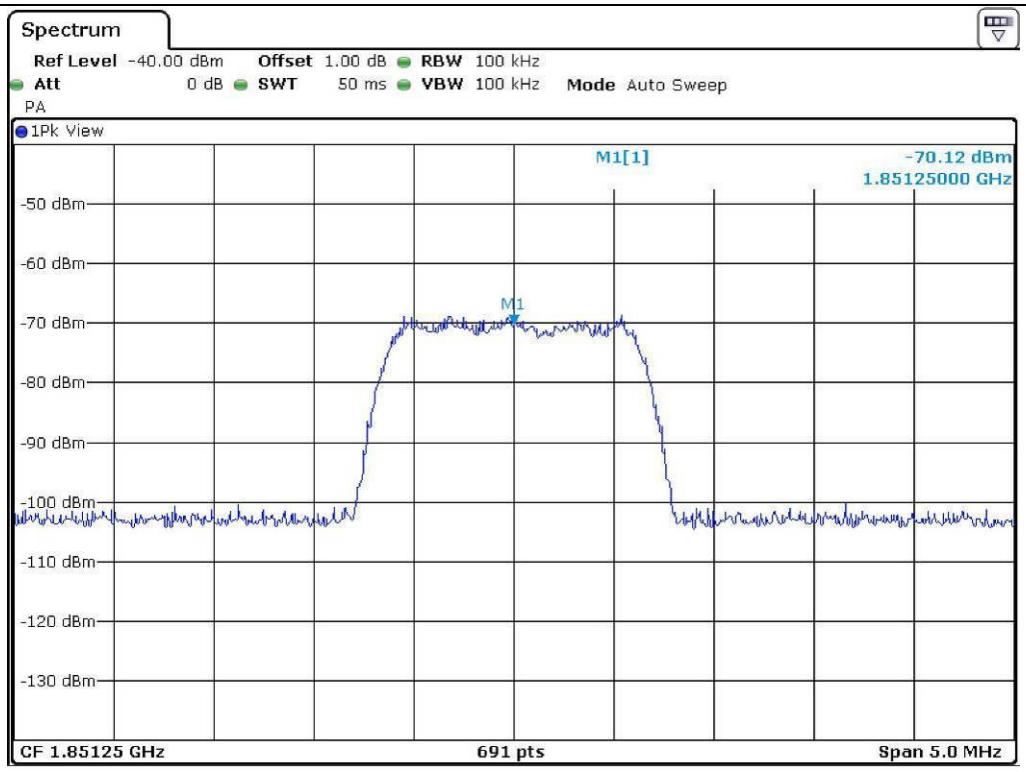
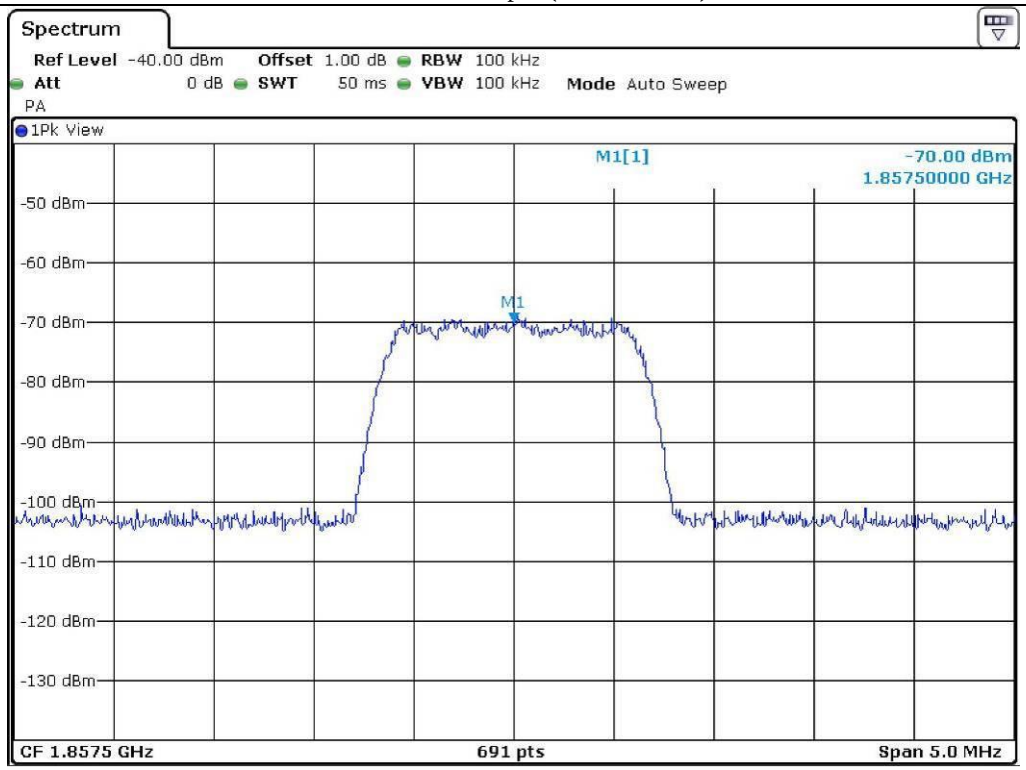


CDMA 2000 – Input (Low Channel)



CDMA 2000 – Input (Middle Channel)

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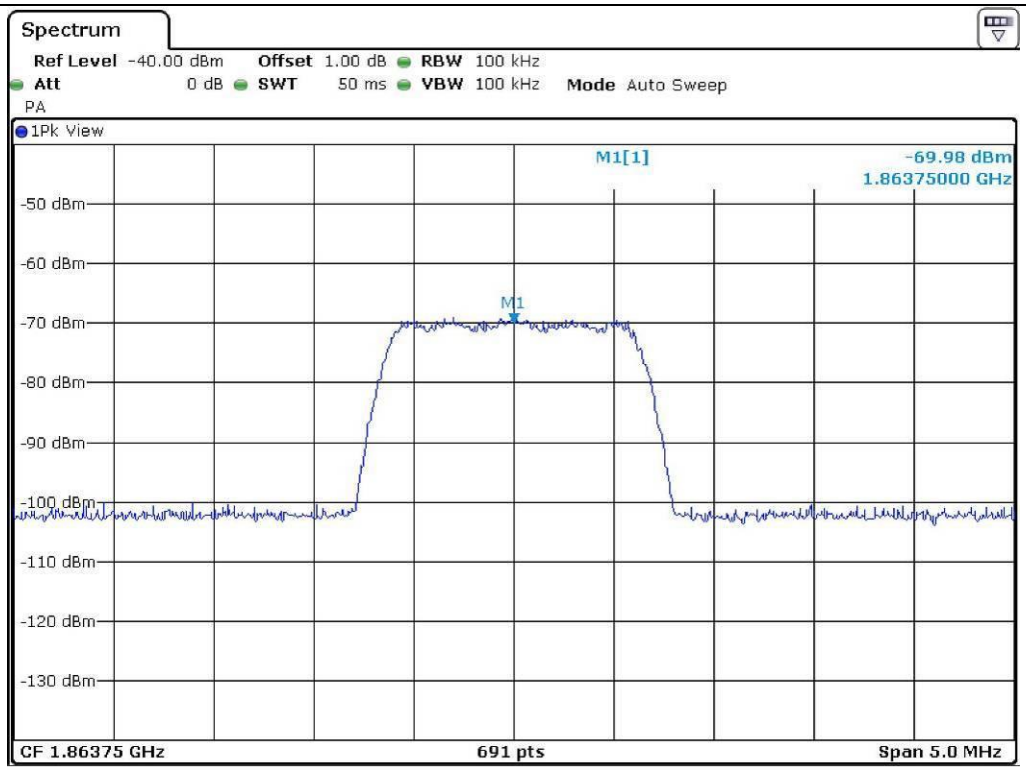

CDMA 2000 – Input (High Channel)

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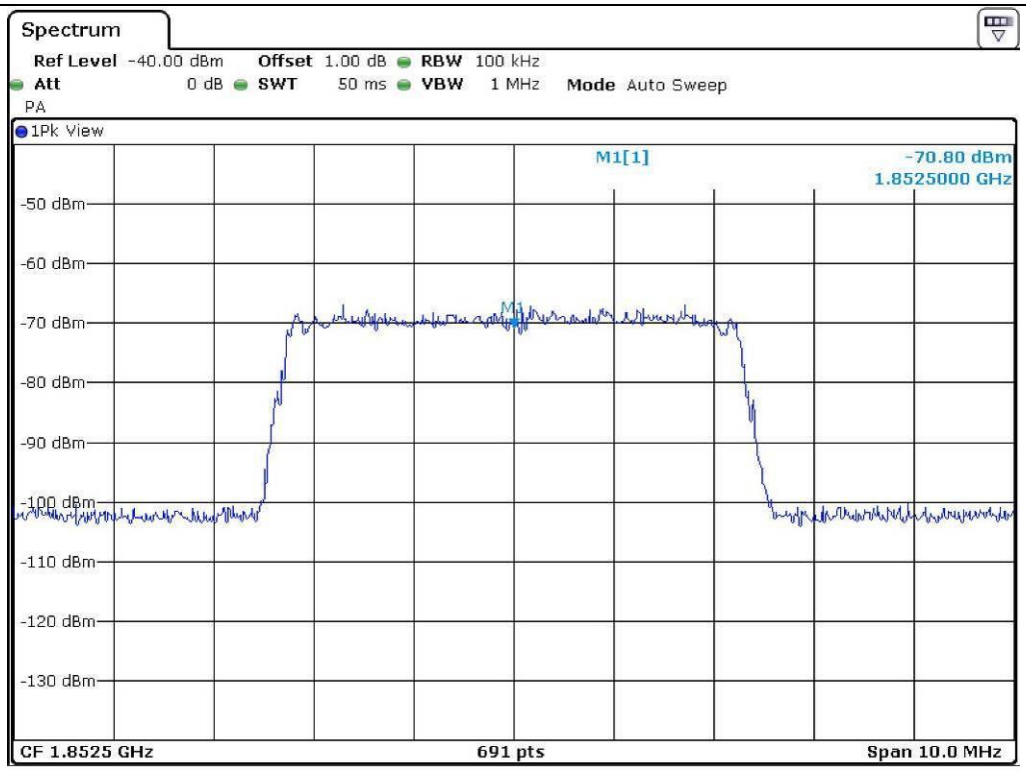
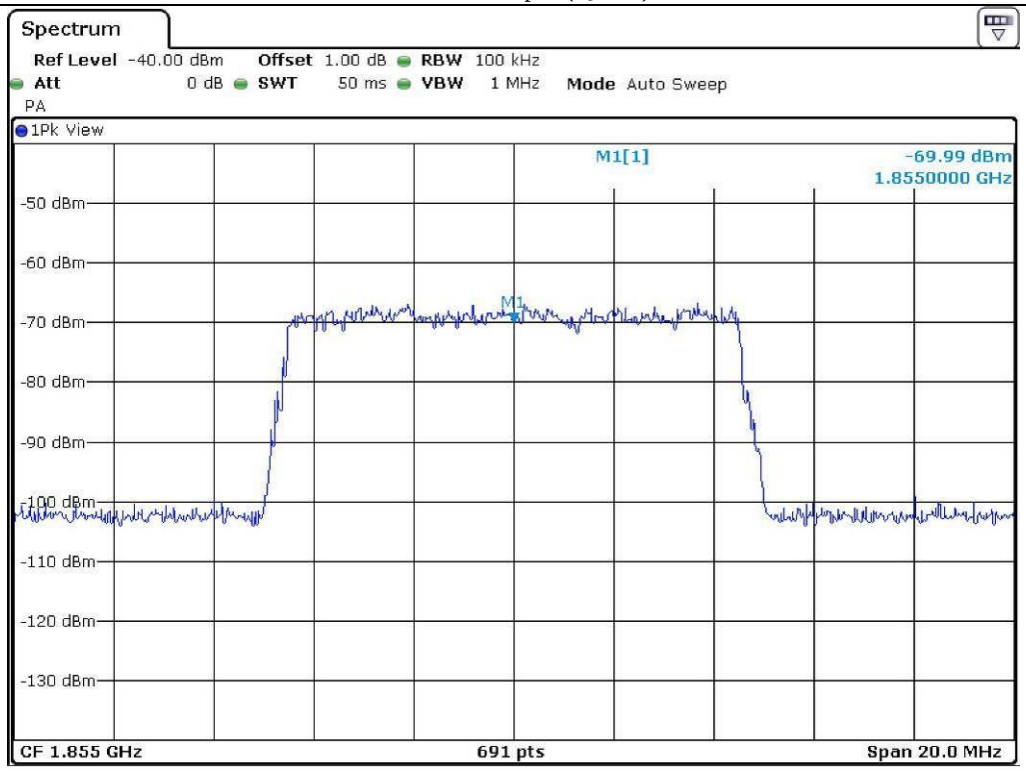


LTE 5 M – Input (QPSK)



LTE 10 M – Input (QPSK)

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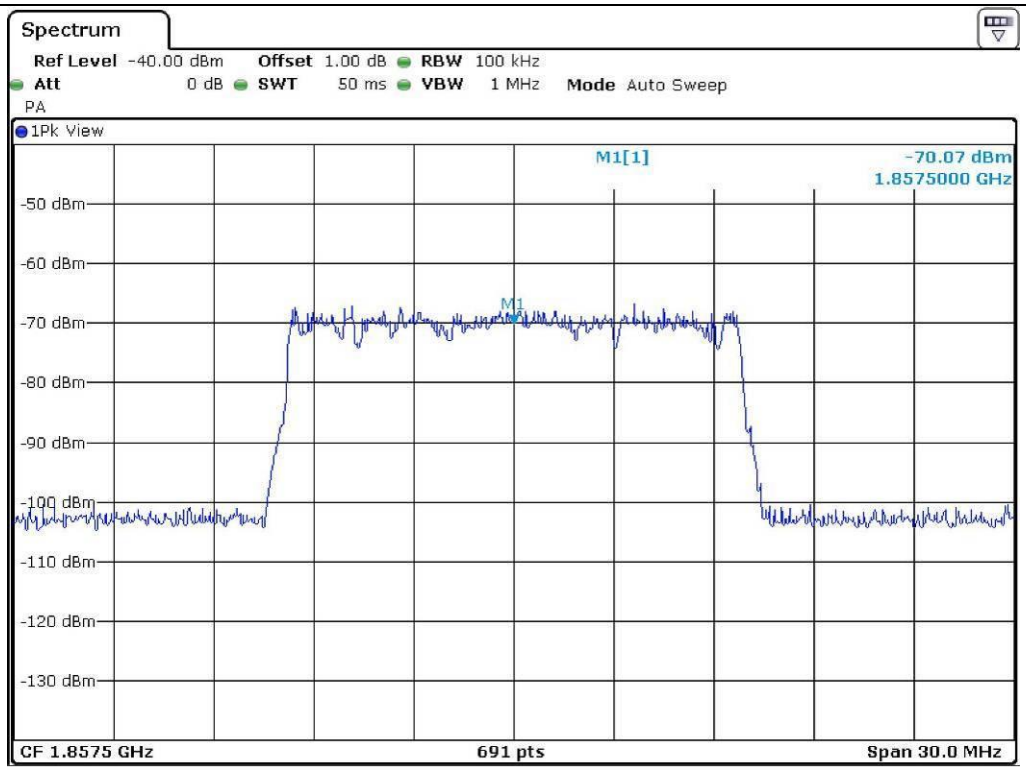

LTE 15 M – Input (QPSK)

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7. SPURIOUS EMISSION AT ANTENNA TERMINAL

7.1 Operating environment

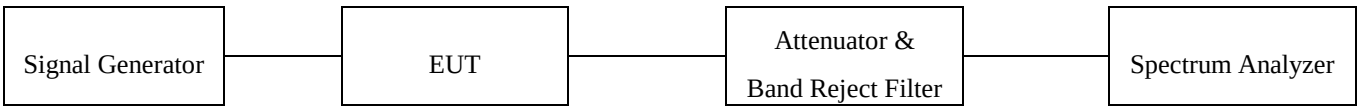
Temperature : 25 ℃

Relative humidity : 50 % R.H.

7.2 Test set-up for conducted measurement

The RF signal from the signal generator(s) was injected to the EUT and the amplified RF signal at the output of the EUT was connected to the power meter or spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

The resolution bandwidth and video bandwidth of the spectrum analyzer was set at 1 MHz and sufficient scans were taken to show any out of band emissions up to 20 GHz.



7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	SMJ100A	Rohde & Schwarz	Signal Generator	101038	Oct. 08, 2014 (1Y)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	Apr. 28, 2014(1Y)
■ -	WRCT 1850/2170-5/40-10SSK	Wainwright Instruments GmbH	Tunable Band Reject Filter	20	Oct. 10, 2014 (1Y)

All test equipment used is calibrated on a regular basis.

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7.4 Test data for Downlink

-. Test Date : October 23, 2014

-. Frequency range : 30 MHz ~ 26.5 GHz

-. Result : PASSED BY 10.58 dB at CDMA 2000 Mode

Modulation	Harmonic Frequency (MHz)		Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
CDMA 2000	Low	910.90	-46.82	0.51	-46.31	-13.00	33.31
		3 873.00	-27.75	2.30	-25.45		12.45
	Middle	954.40	-46.84	0.53	-46.31		33.31
		3 873.00	-25.88	2.30	-23.58		10.58
	High	887.00	-46.74	0.48	-46.26		33.26
		3 901.00	-28.04	2.31	-25.73		12.73
LTE 5 M	QPSK	823.80	-46.96	0.45	-46.51	-13.00	33.51
		3 873.00	-26.90	2.30	-24.60		11.60
LTE 10 M	QPSK	905.20	-46.89	0.51	-46.38	-13.00	33.38
		3 873.00	-27.50	2.30	-25.20		12.20
LTE 15 M	QPSK	828.00	-46.62	0.45	-46.17	-13.00	33.17
		3 873.00	-27.72	2.30	-25.42		12.42
Other frequencies up to 15 GHz have margin more than 20 dB.							

According to Part 24E, out of band emission shall be attenuated by 43 + 10 log (P) dBc, equates to -13.0 dBm.

As a result of preliminary testing., the formal test was performed with the maximum payload mode of worst cases for QPSK.

Tested by: hyung-kwon, Oh / Project Engineer

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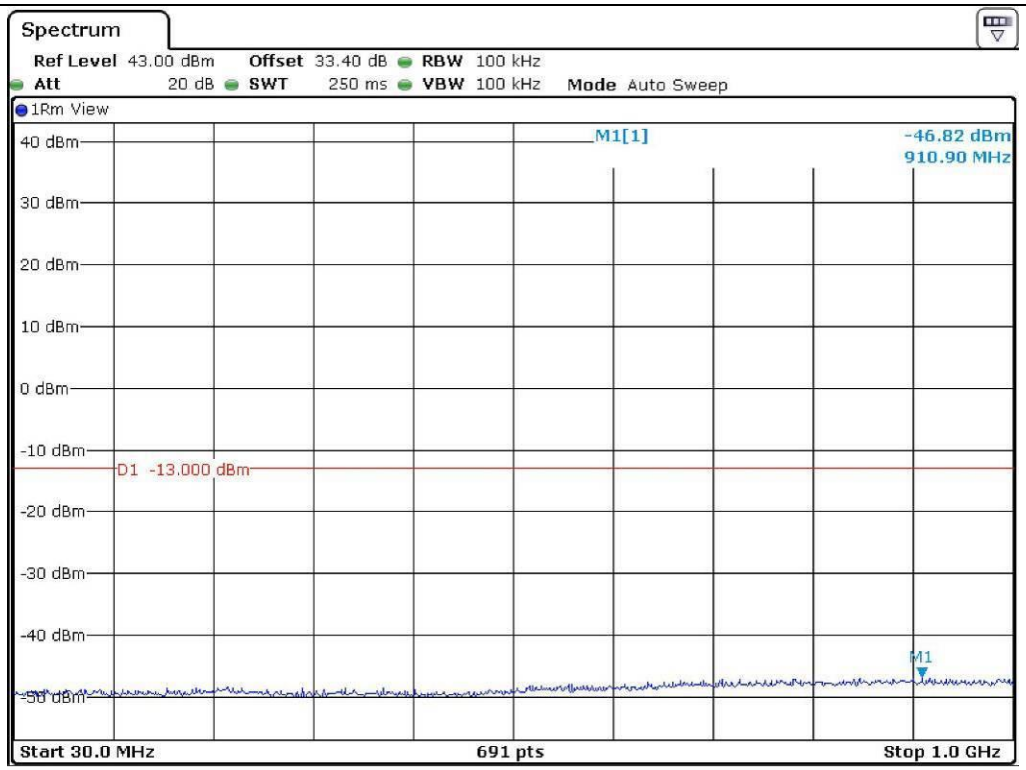
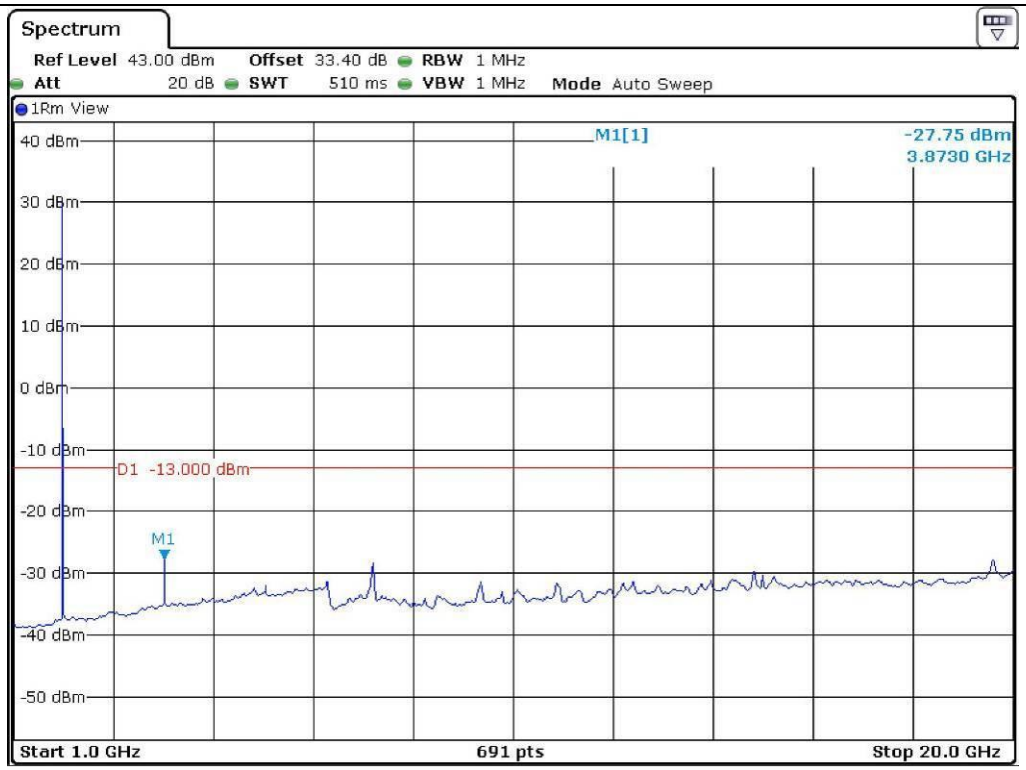


CDMA 2000 – Low Channel



CDMA 2000 – Low Channel

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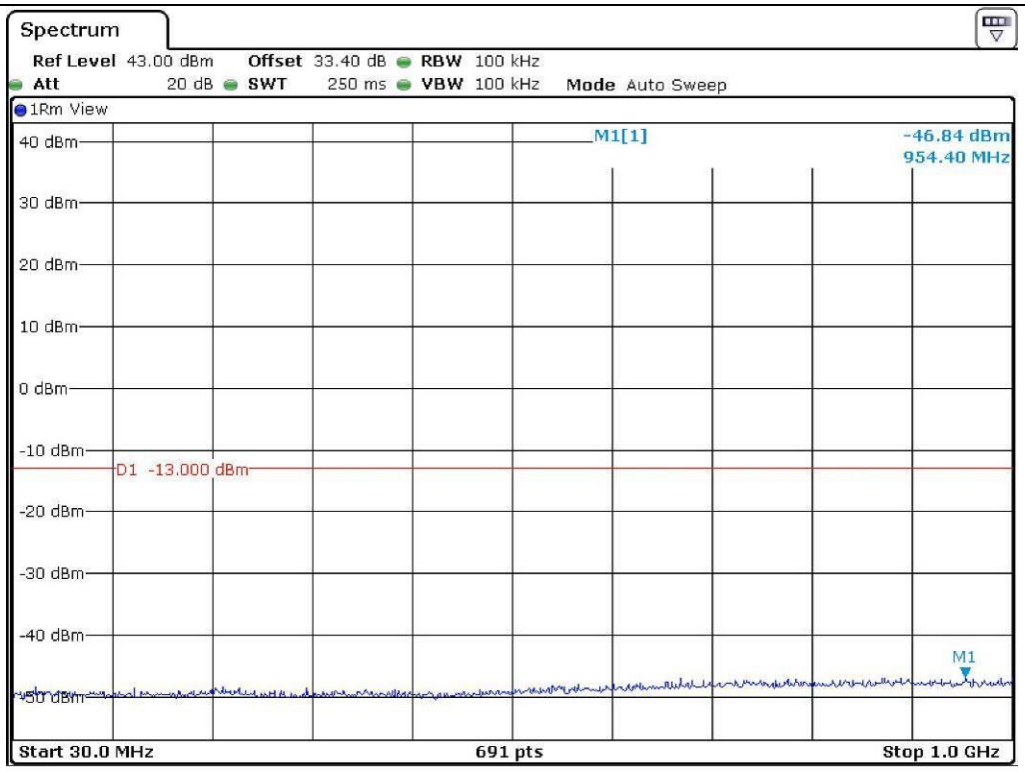
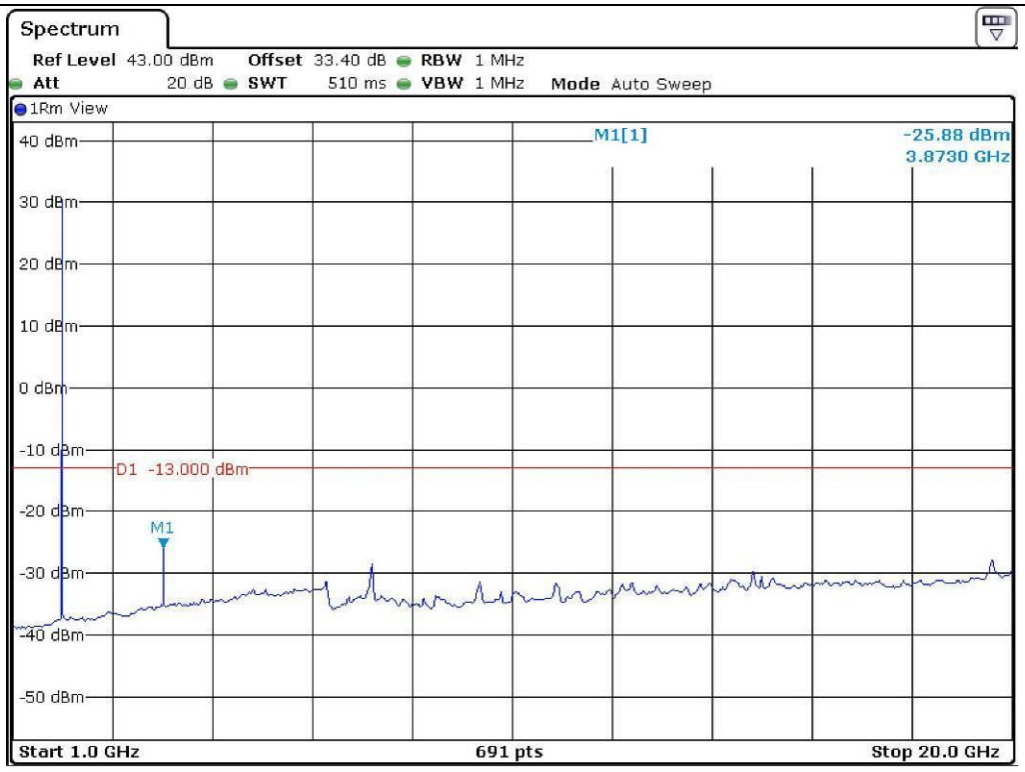


CDMA 2000 – Middle Channel



CDMA 2000 – Middle Channel

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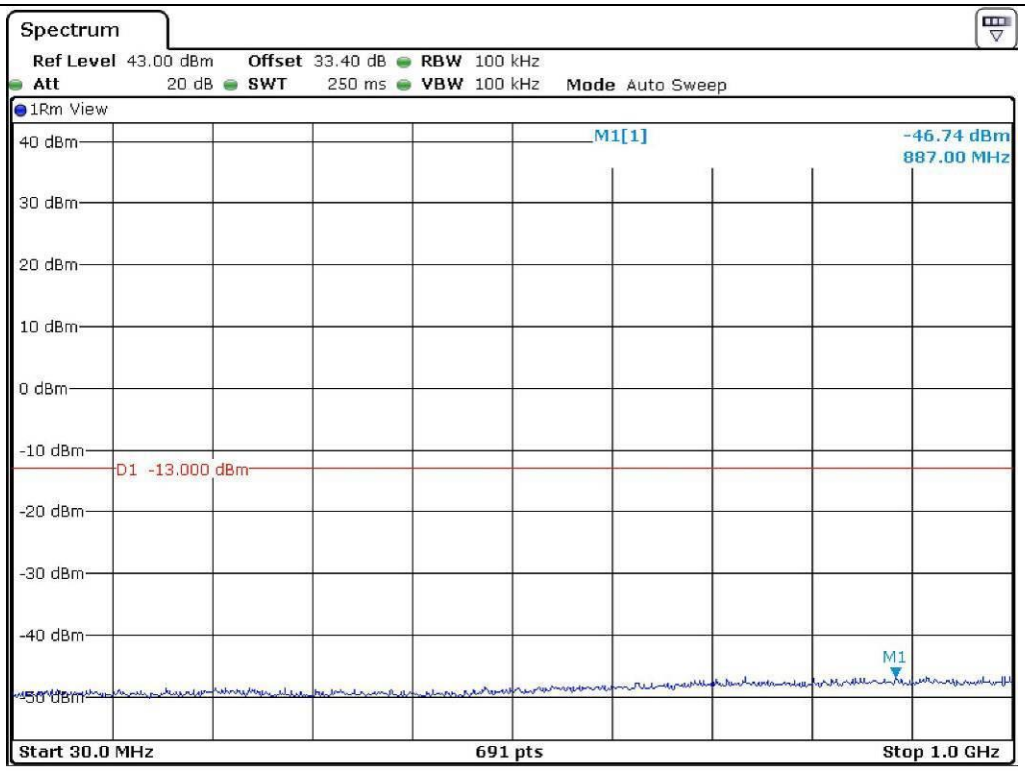
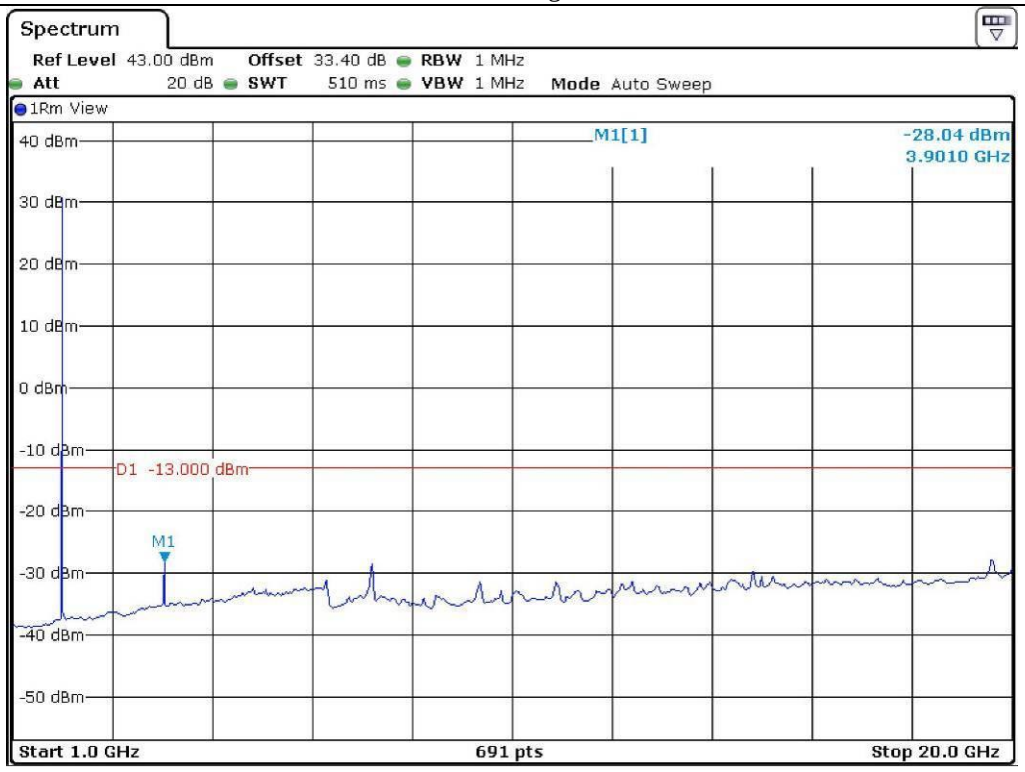


CDMA 2000 – High Channel



CDMA 2000 – High Channel

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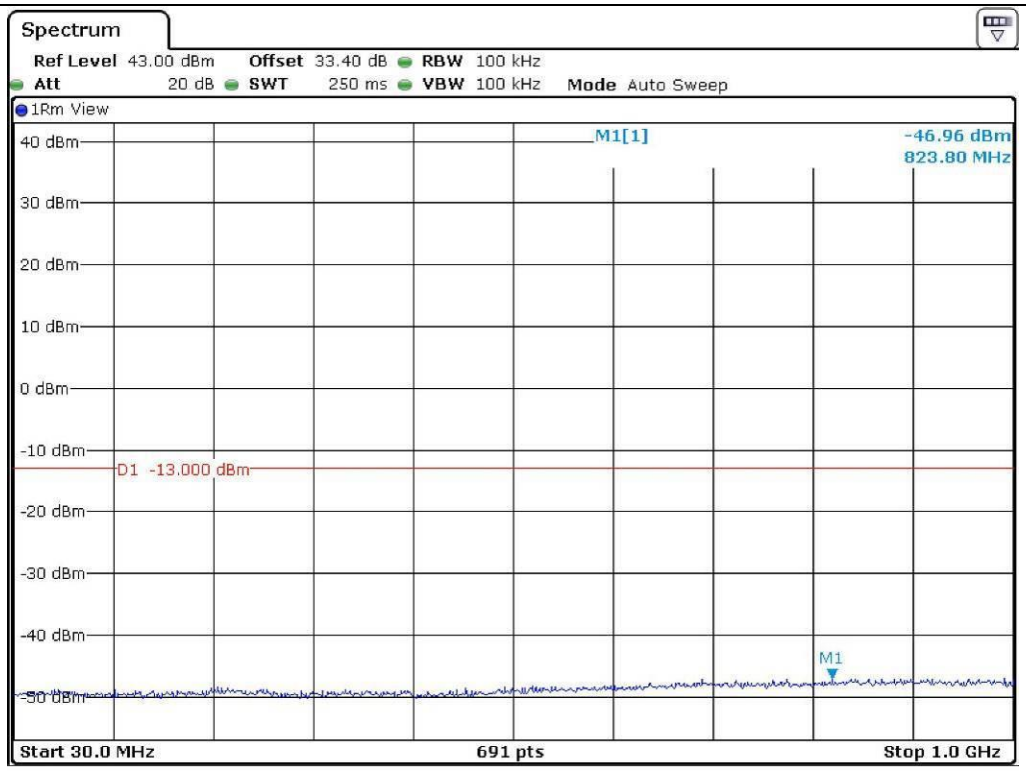
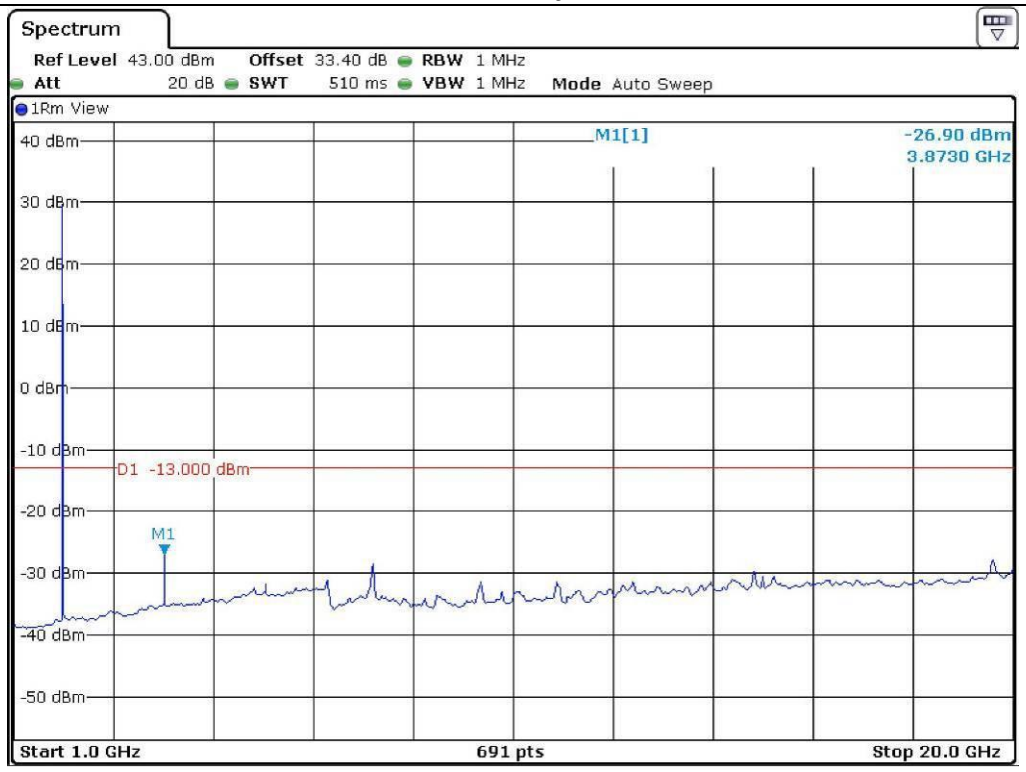


LTE 5 M – QPSK



LTE 5 M – QPSK

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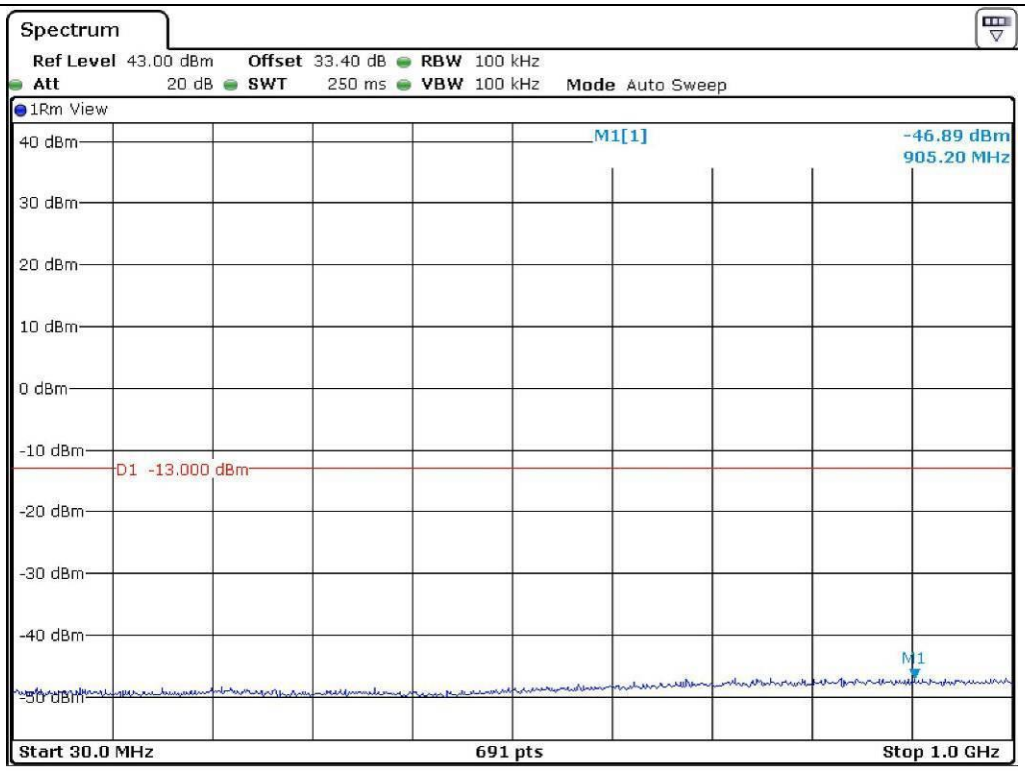
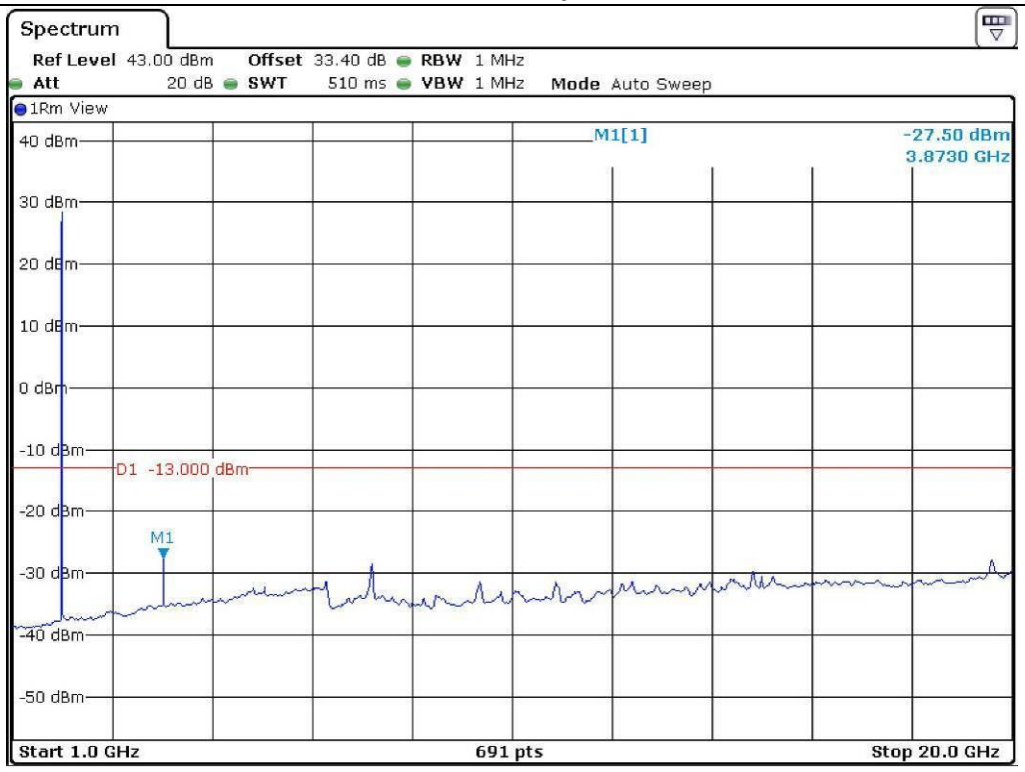


LTE 10 M – QPSK



LTE 10 M – QPSK

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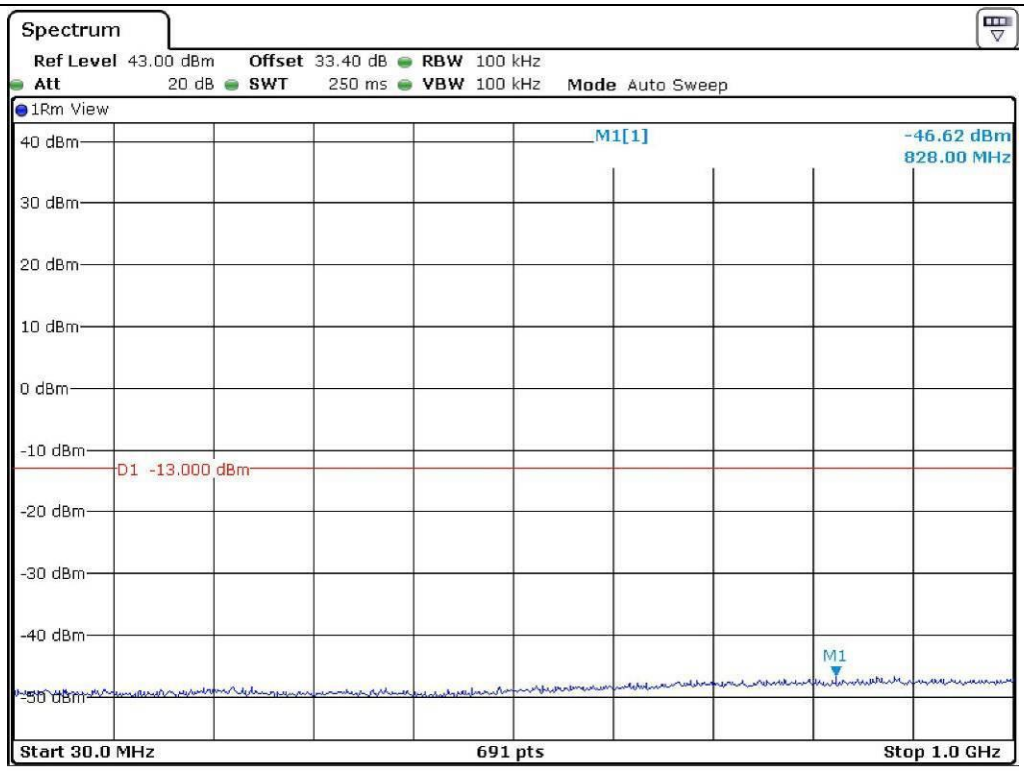
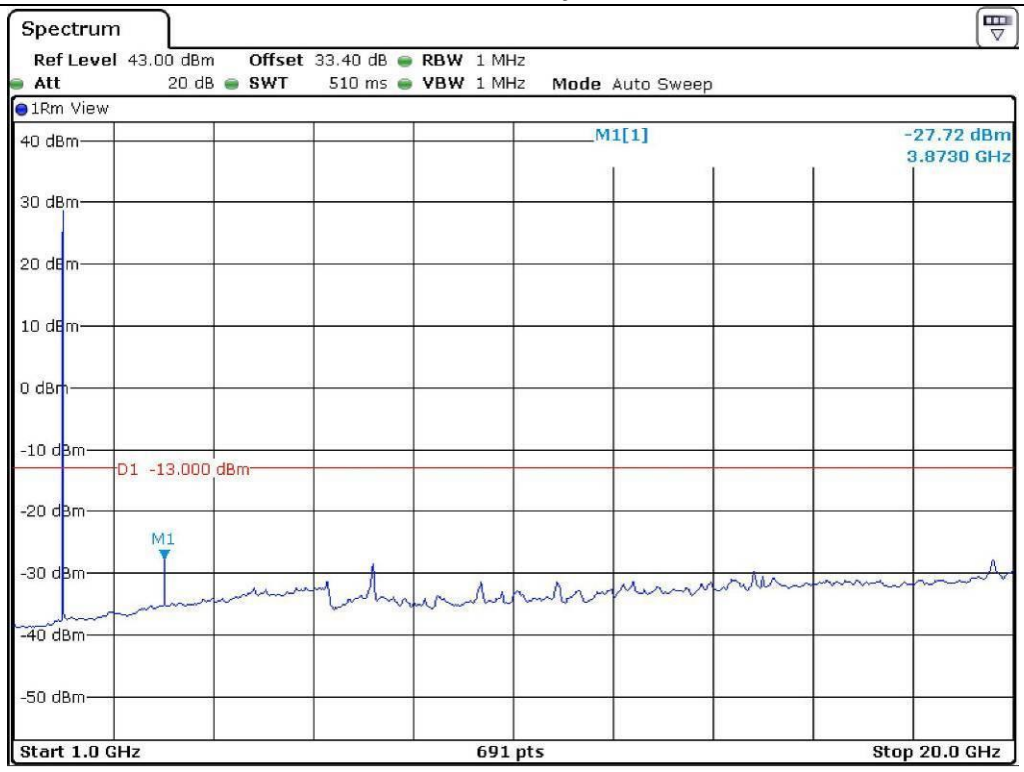


LTE 15 M – QPSK



LTE 15 M – QPSK

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7.5 Test data for Uplink

-. Test Date :

-. Frequency range : 30 MHz ~ 26.5 GHz

-. Result : PASSED BY 16.54 dB at LTE 15M Mode

Modulation	Harmonic Frequency (MHz)		Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
CDMA 2000	Low	856.10	-56.87	0.46	-56.41	-13.00	43.41
		19 601.00	-38.03	0.53	-37.50		24.50
	Middle	944.60	-56.84	0.52	-56.32		43.32
		19 574.00	-38.18	8.50	-29.68		16.68
	High	887.00	-56.99	0.48	-56.51		43.51
		19 601.00	-38.20	8.50	-29.70		16.70
LTE 5 M	QPSK	989.50	-56.69	0.55	-56.14	-13.00	43.14
		19 601.00	-38.12	8.50	-29.62		16.62
LTE 10 M	QPSK	996.50	-56.86	0.56	-56.30	-13.00	43.30
		19 601.00	-38.16	8.50	-29.66		16.66
LTE 15 M	QPSK	981.00	-56.48	0.55	-55.93	-13.00	42.93
		19 601.00	-38.04	8.50	-29.54		16.54
Other frequencies up to 15 GHz have margin more than 20 dB.							

According to Part 24E, out of band emission shall be attenuated by 43 + 10 log (P) dBc, equates to -13.0 dBm.
As a result of preliminary testing., the formal test was performed with the maximum payload mode of worst cases for QPSK.

Tested by: hyung-kwon, Oh / Project Engineer

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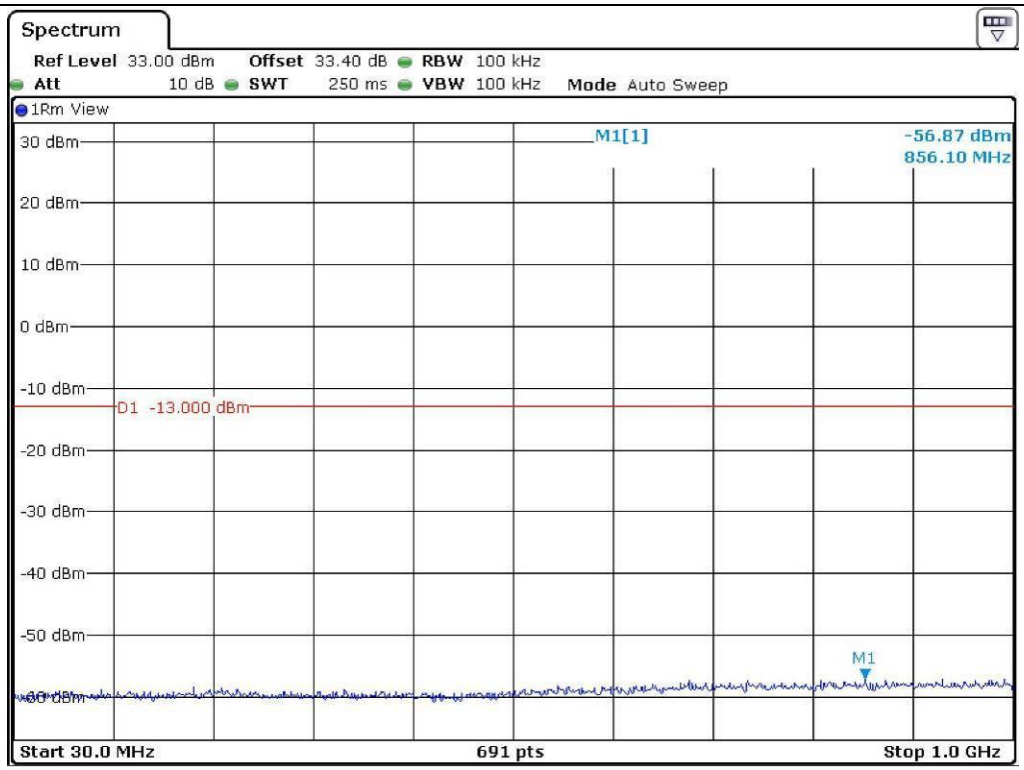
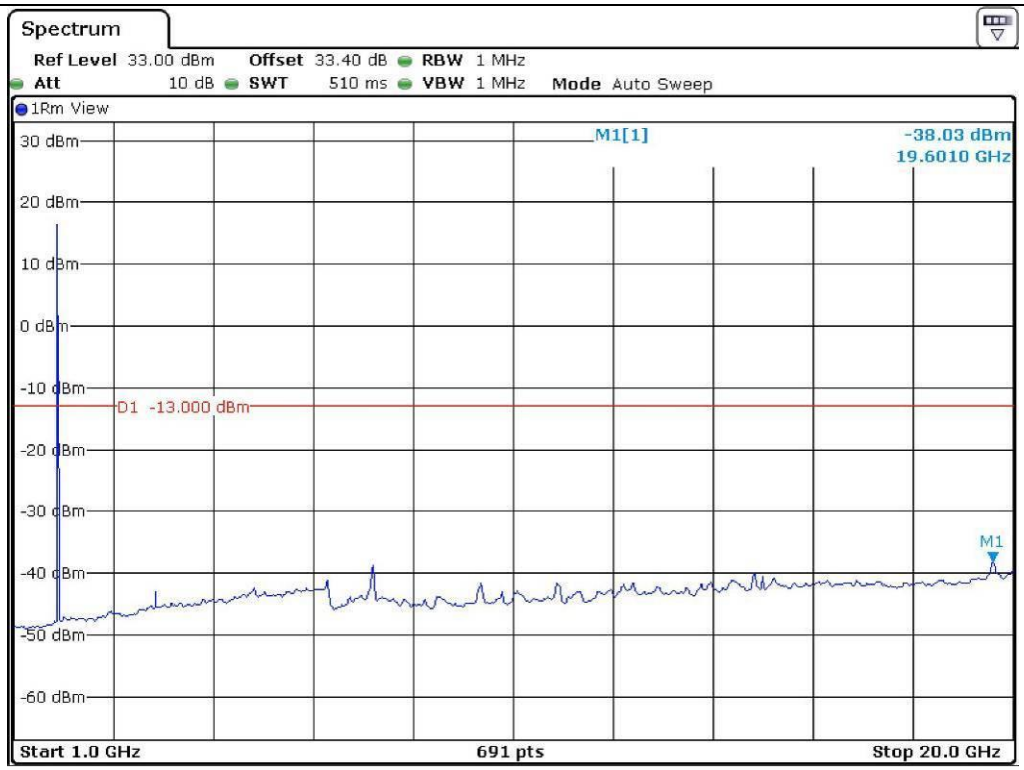


CDMA 2000 – Low Channel



CDMA 2000 – Low Channel

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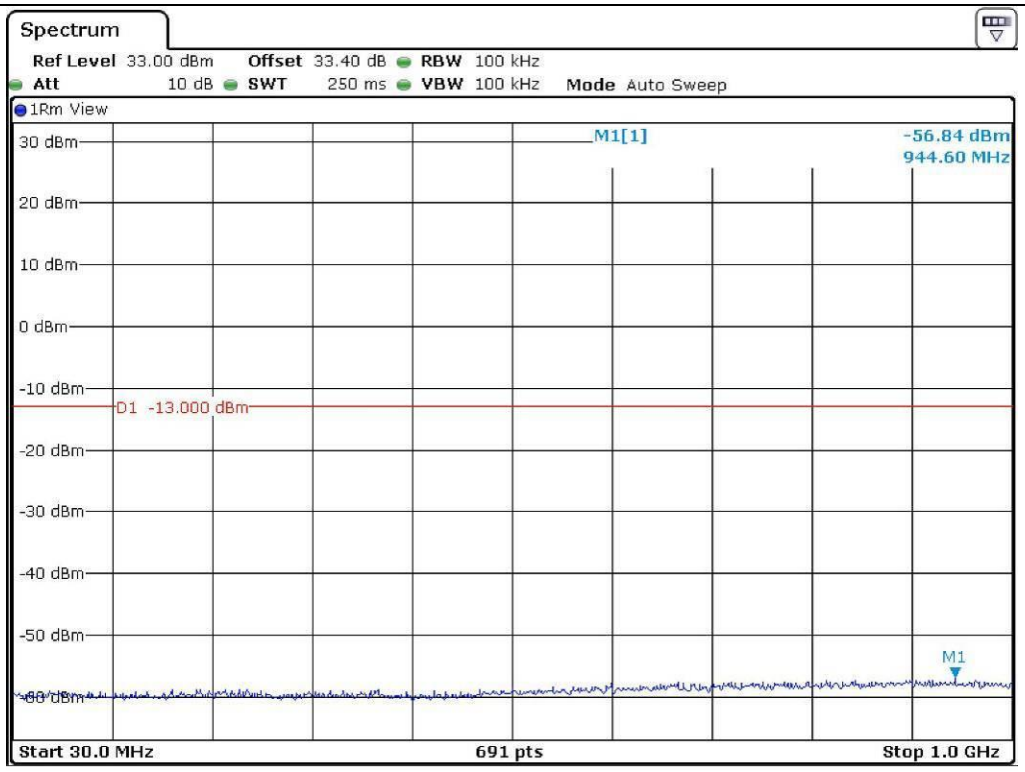
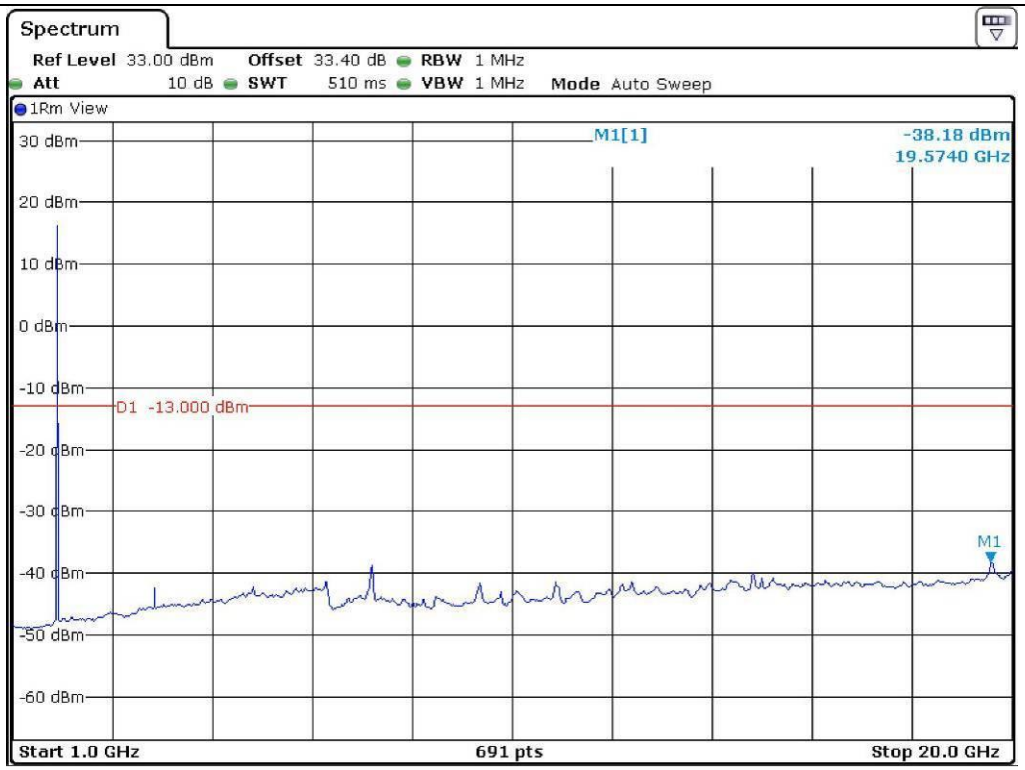


CDMA 2000 – Middle Channel



CDMA 2000 – Middle Channel

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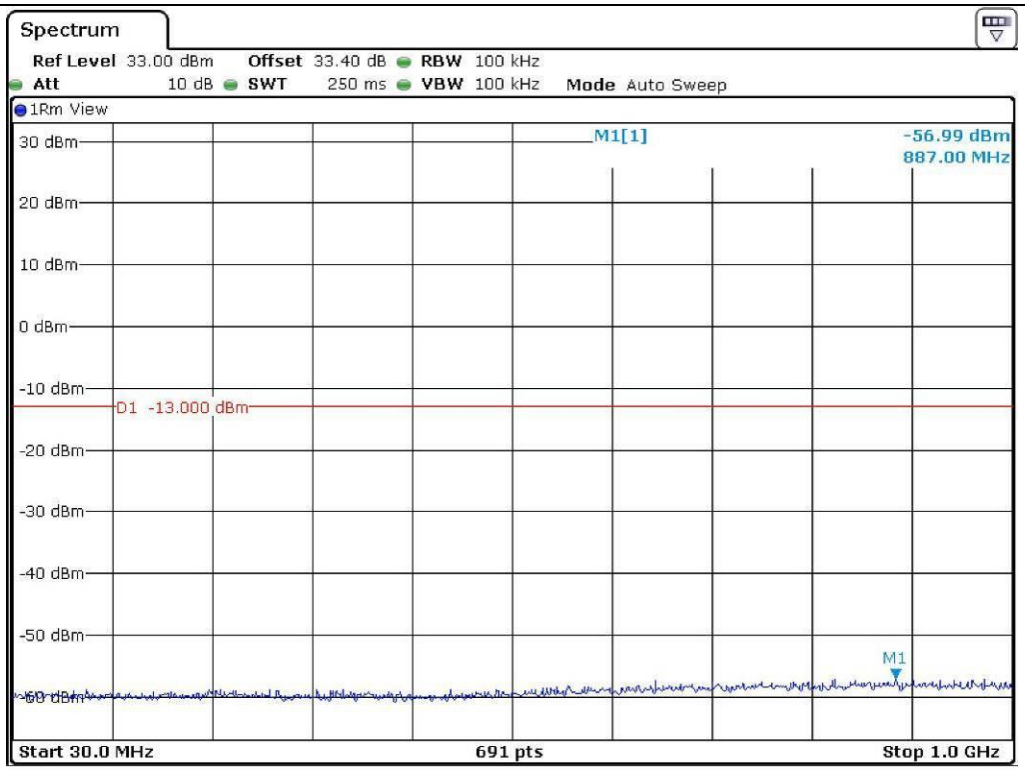
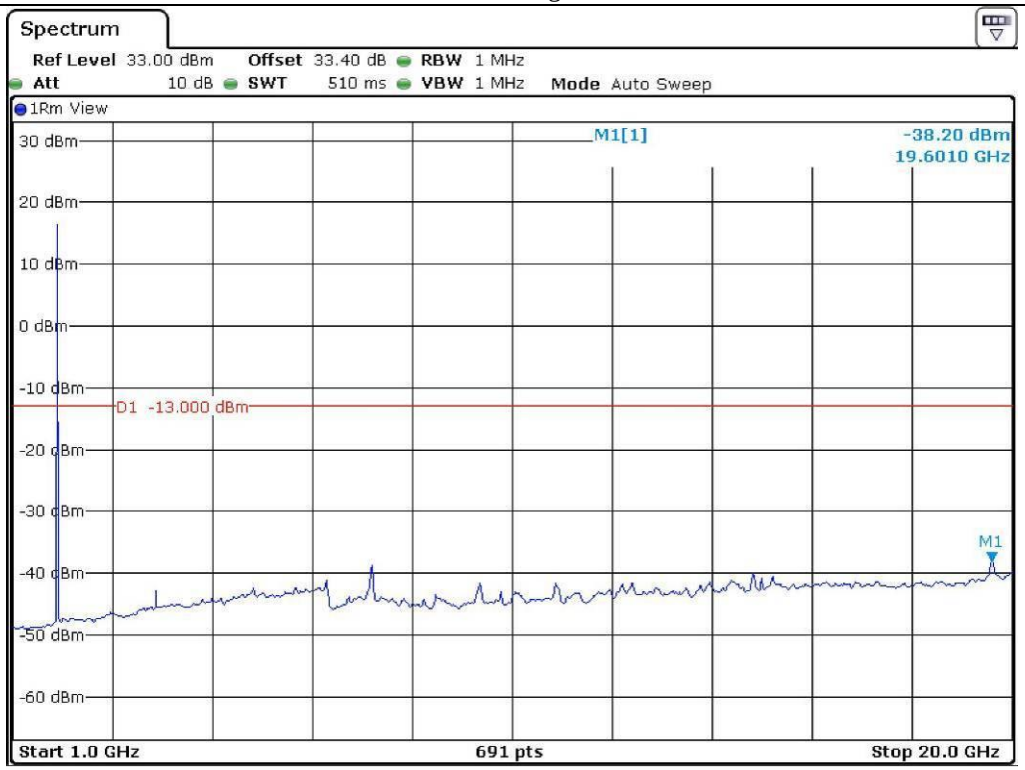


CDMA 2000 – High Channel



CDMA 2000 – High Channel

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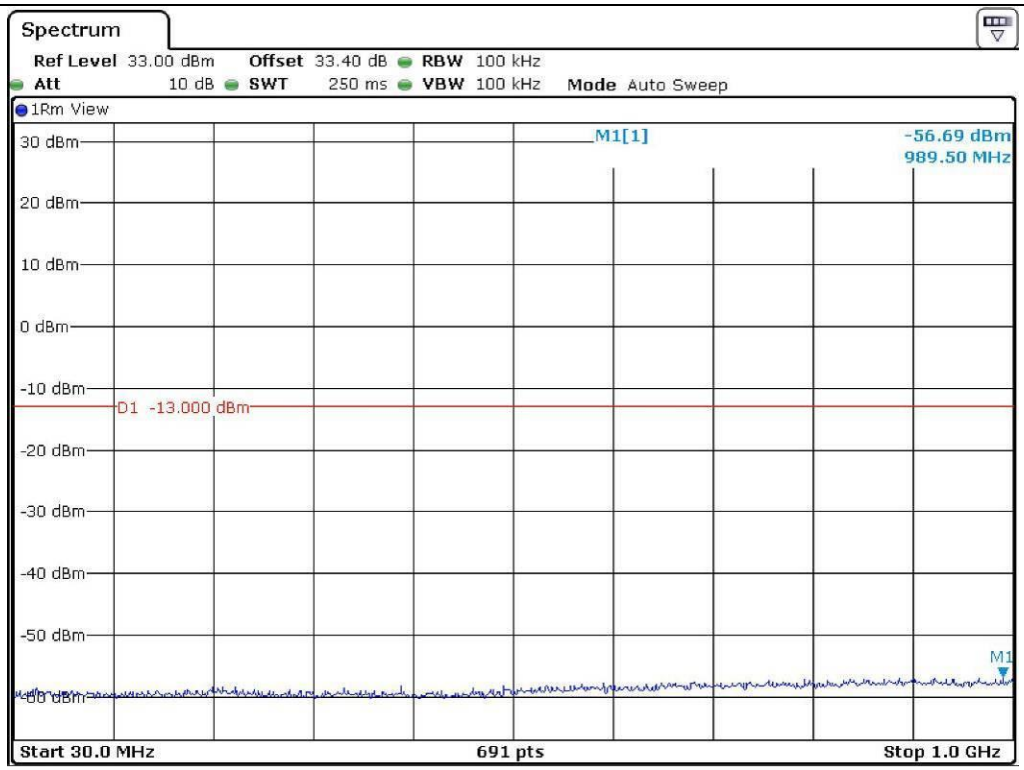
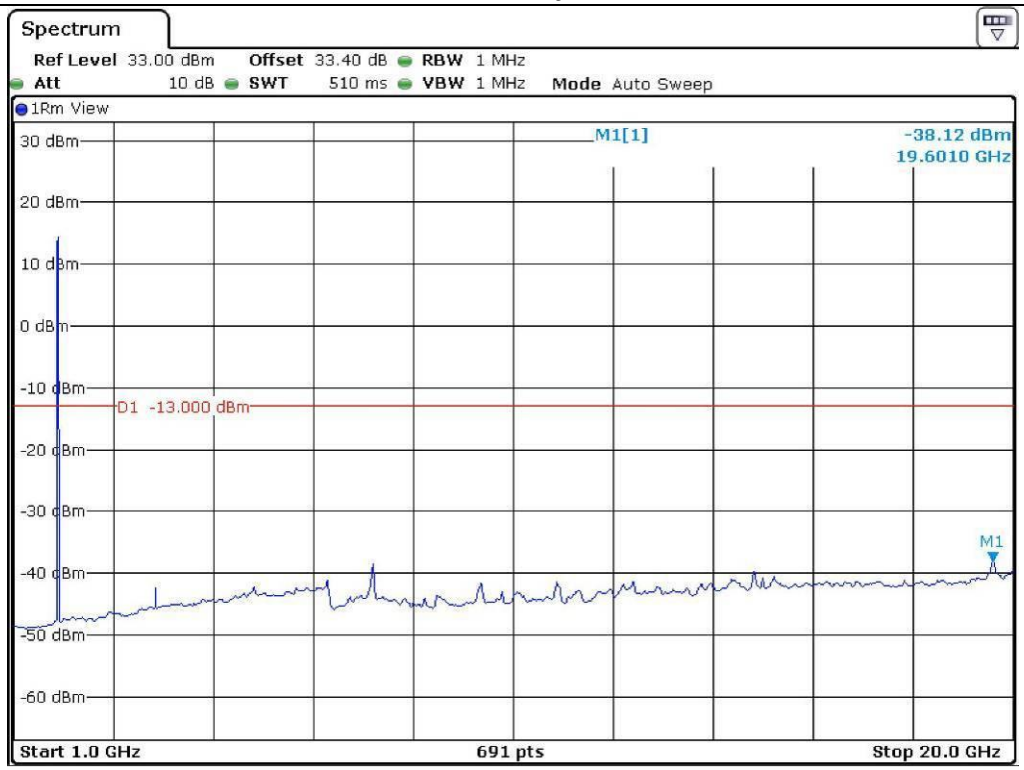


LTE 5 M – QPSK



LTE 5 M – QPSK

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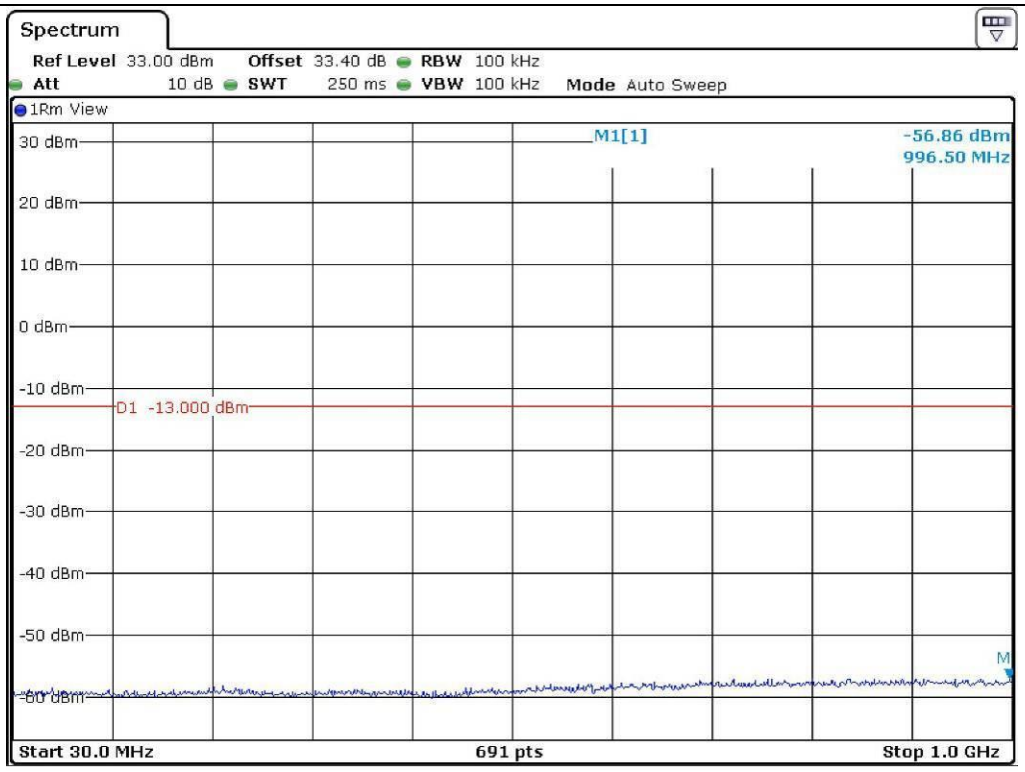
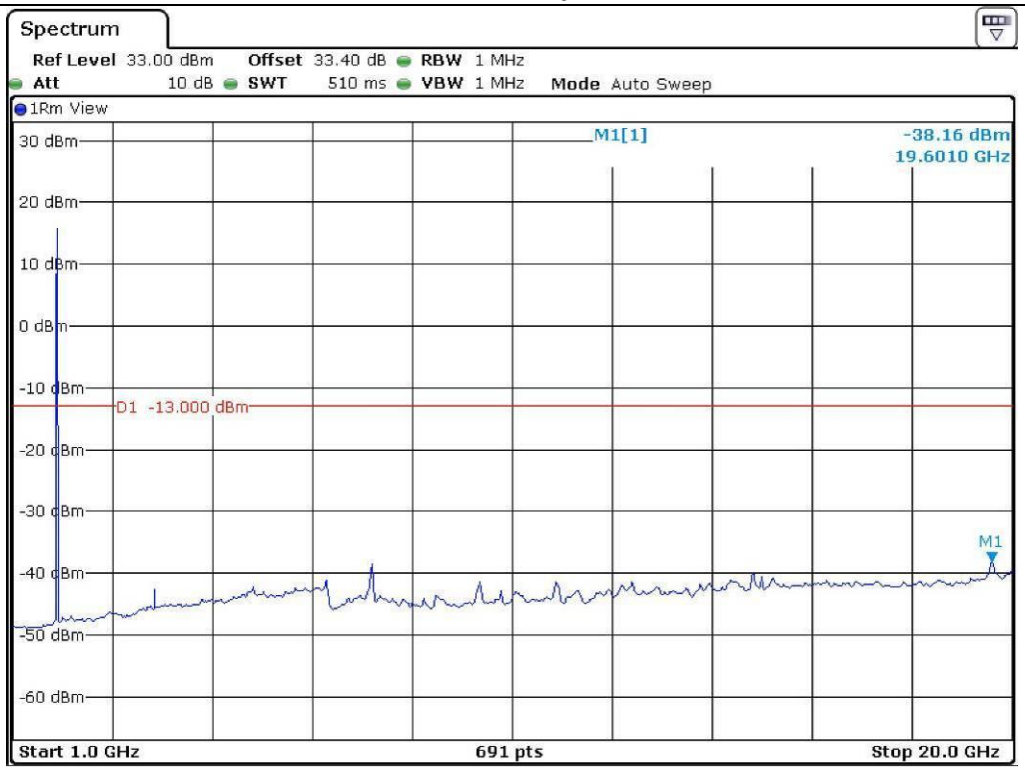


LTE 10 M – QPSK



LTE 10 M – QPSK

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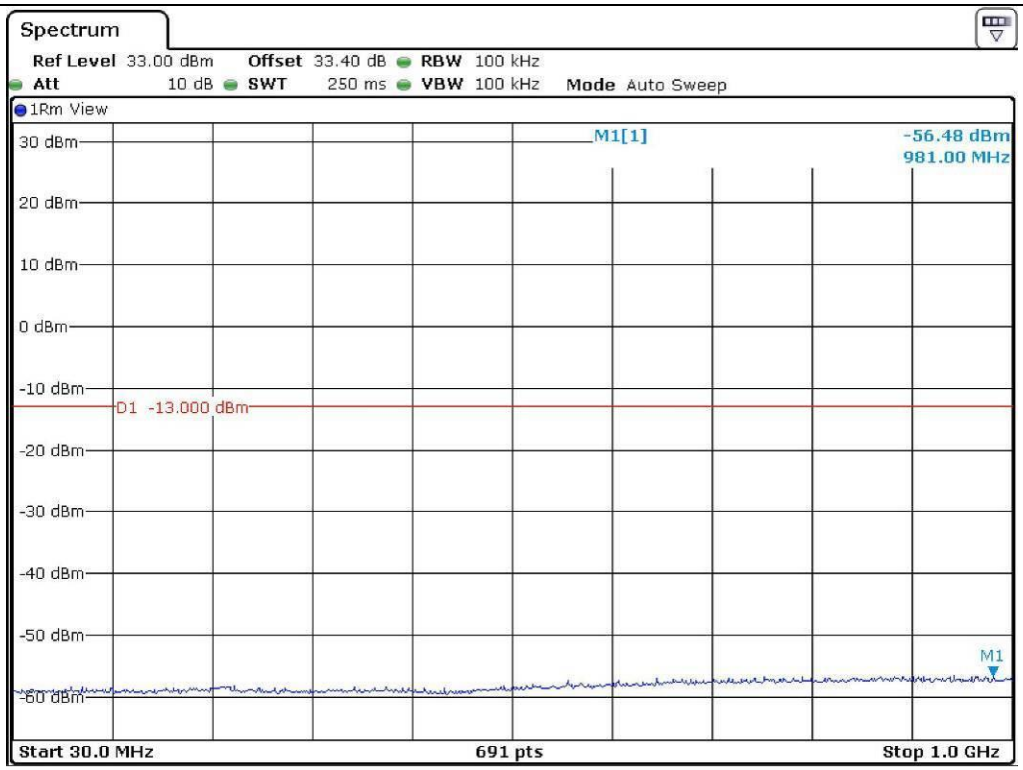
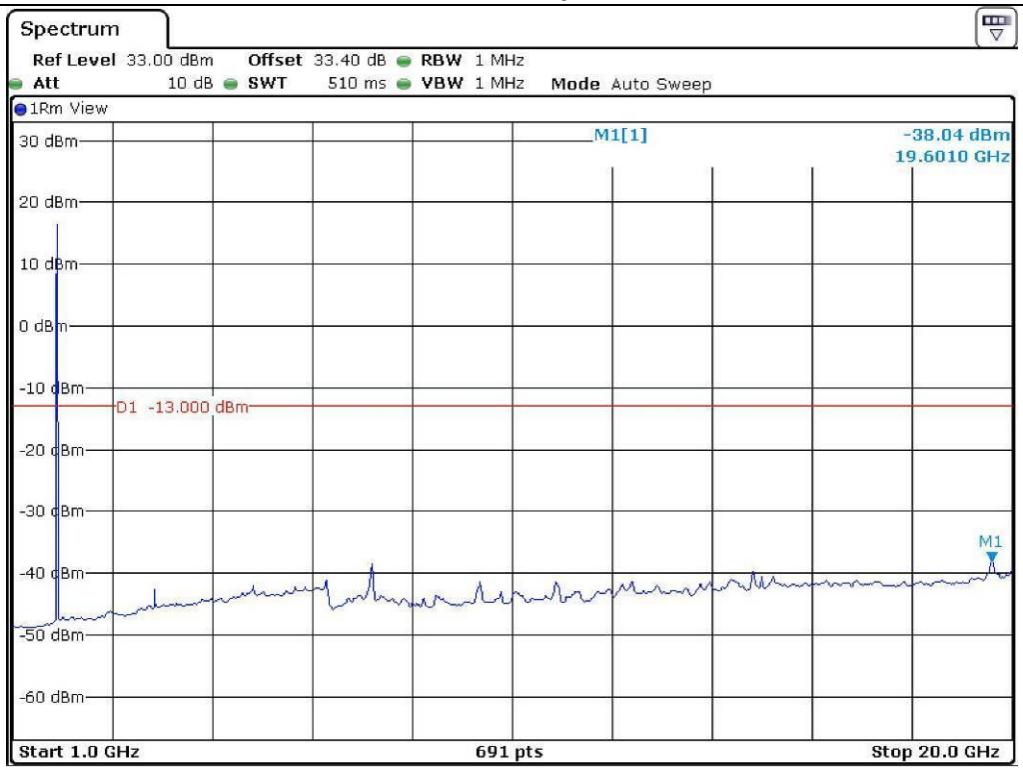


LTE 15 M – QPSK



LTE 15 M – QPSK

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8. BAND EDGE MEASUREMENT

8.1 Operating environment

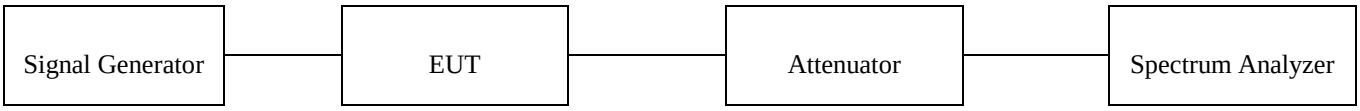
Temperature : 25 ℃

Relative humidity : 50 % R.H.

8.2 Test set-up for conducted measurement

The RF signal from the signal generator(s) was injected to the EUT and the amplified RF signal at the output of the EUT was connected to the power meter or spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

The resolution bandwidth and video bandwidth of the spectrum analyzer was set according to the regulation and sufficient scans were taken to show any out of band emissions.



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	SMJ100A	Rohde & Schwarz	Signal Generator	101038	Oct. 08, 2014 (1Y)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	Apr. 28, 2014(1Y)

All test equipment used is calibrated on a regular basis.

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8.4 Test data for Downlink

-. Test Date : October 23, 2014

-. Result : PASSED BY 8.50 dB at LTE 5 M_QPSK Mode

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)	Margin (dB)
CDMA 2000	Low	1 930.00	-21.84	-13.00	8.84
	High	1 945.00	-25.93		12.93
LTE 5 M_QPSK	Low	1 930.00	-21.50		8.50
	High	1 945.00	-23.80		10.80
LTE 10 M_QPSK	Low	1 930.00	-24.55		11.55
	High	1 945.00	-26.28		13.28
LTE 15 M_QPSK	Low	1 930.00	-25.75		12.75
	High	1 945.00	-26.01		13.01

According to Part 24E, out of band emission shall be attenuated by 43 + 10 log (P) dBc, equates to -13.0dBm.
As a result of preliminary testing., the formal test was performed with the maximum payload mode of worst cases for QPSK.

Tested by: hyung-kwon, Oh / Project Engineer

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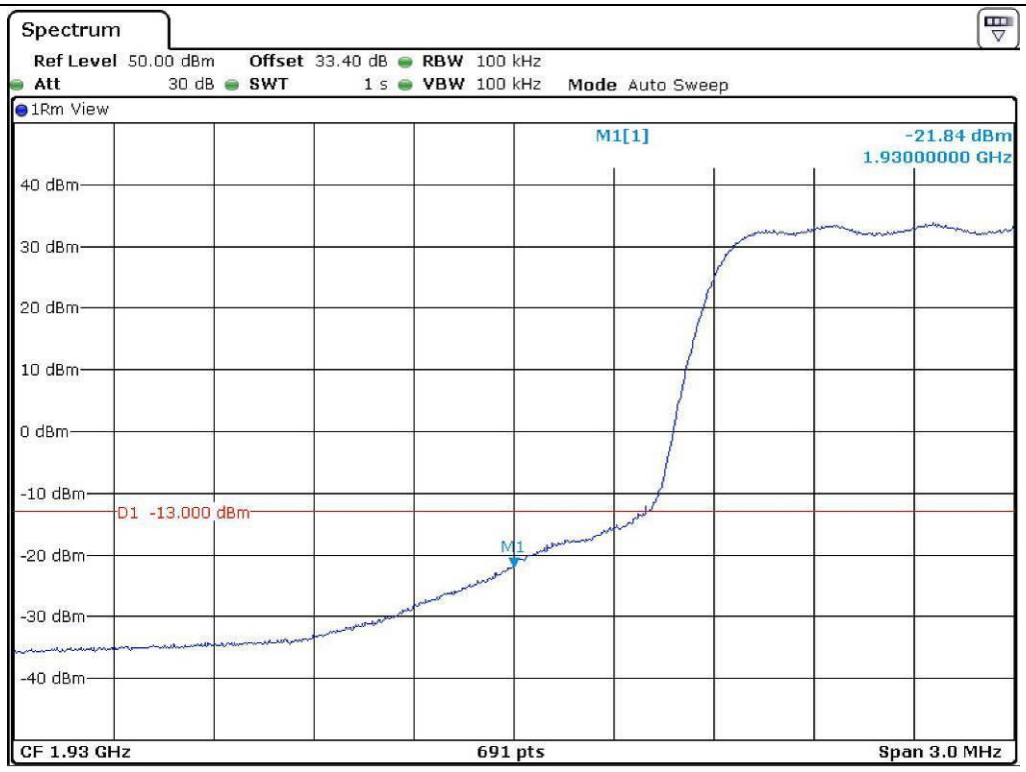
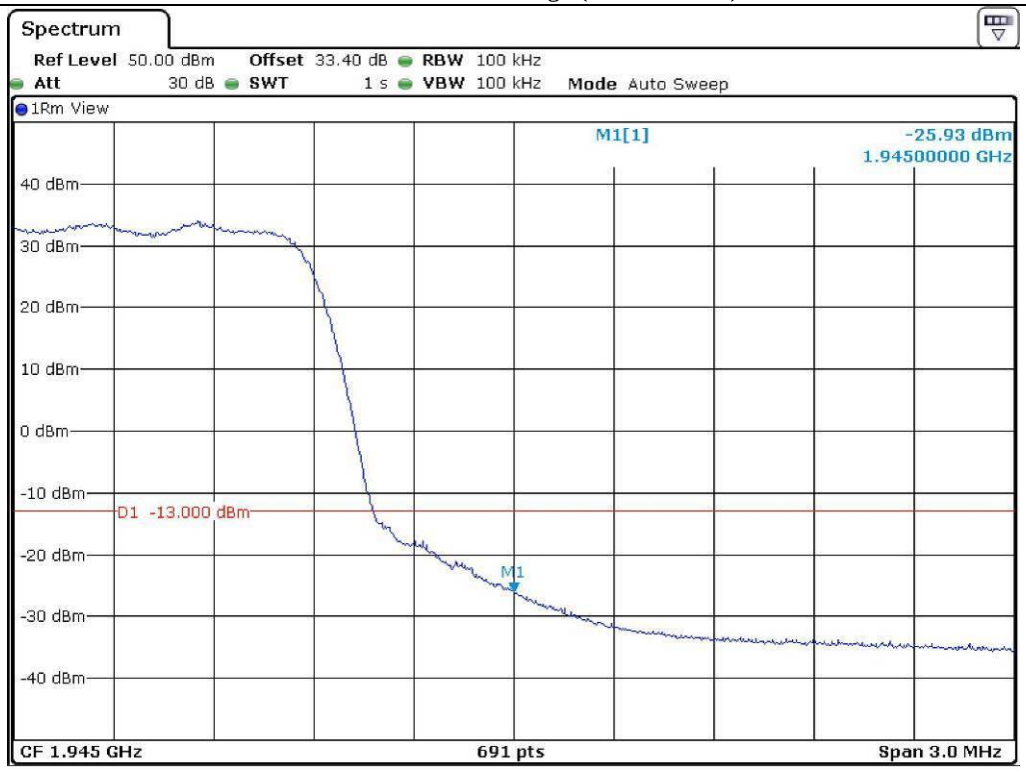


CDMA 2000 – Band Edge (Low Channel)



CDMA 2000– Band Edge (High Channel)

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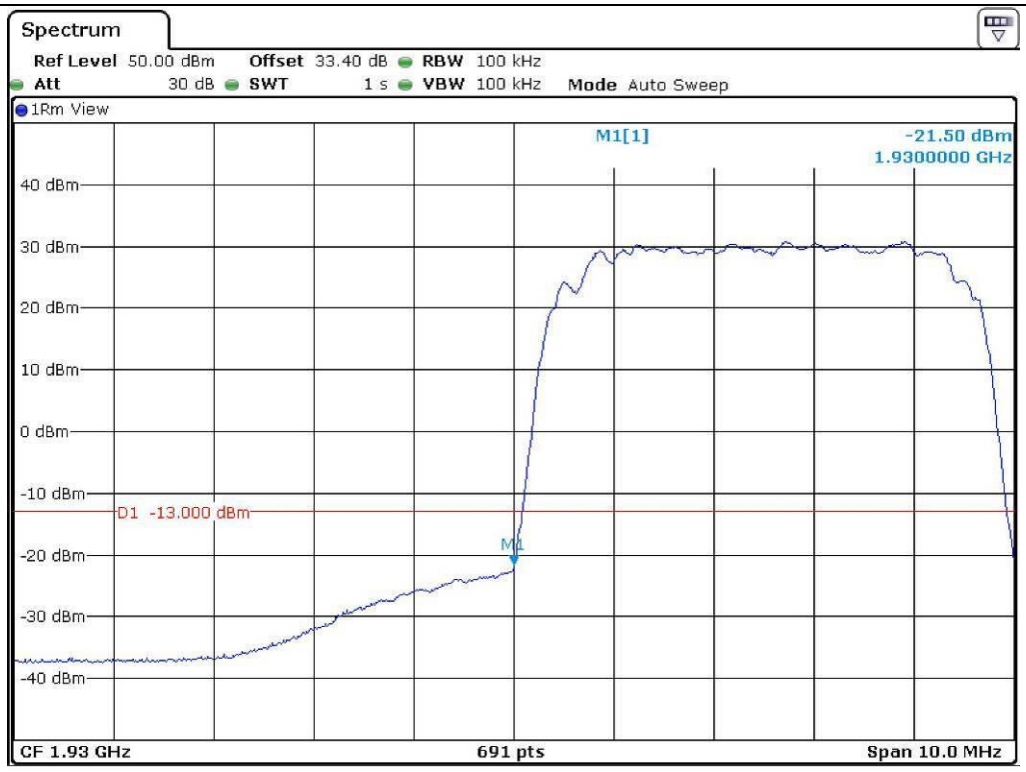
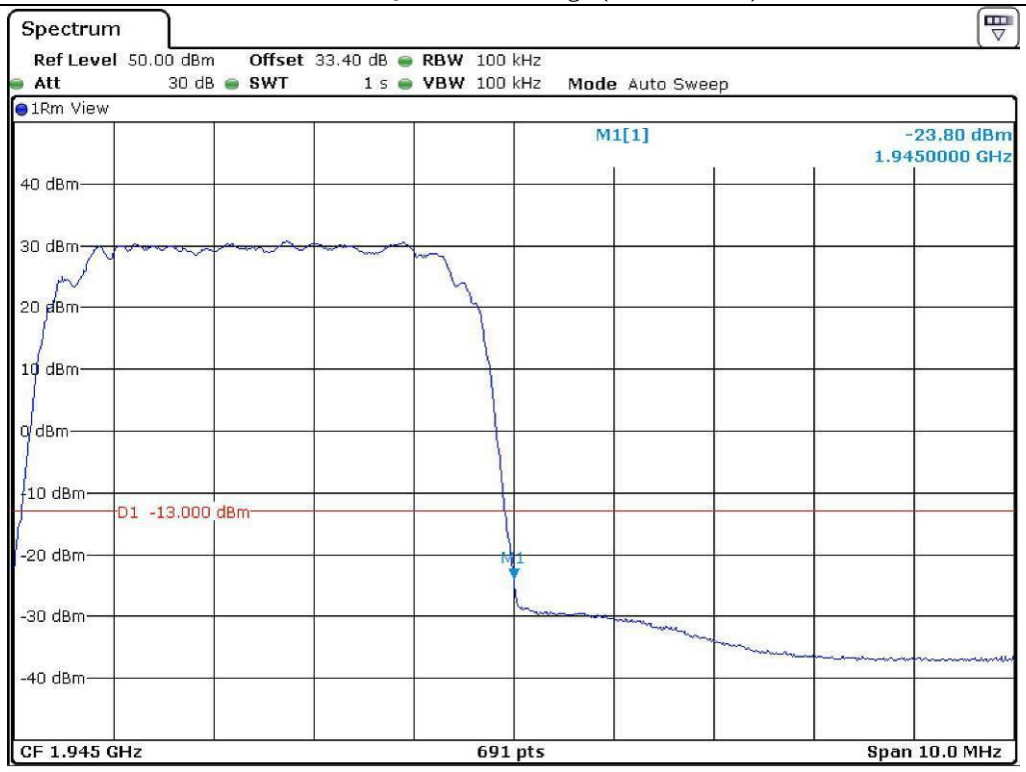


LTE 5 M_QPSK – Band Edge (Low Channel)



LTE 5 M_QPSK – Band Edge (High Channel)

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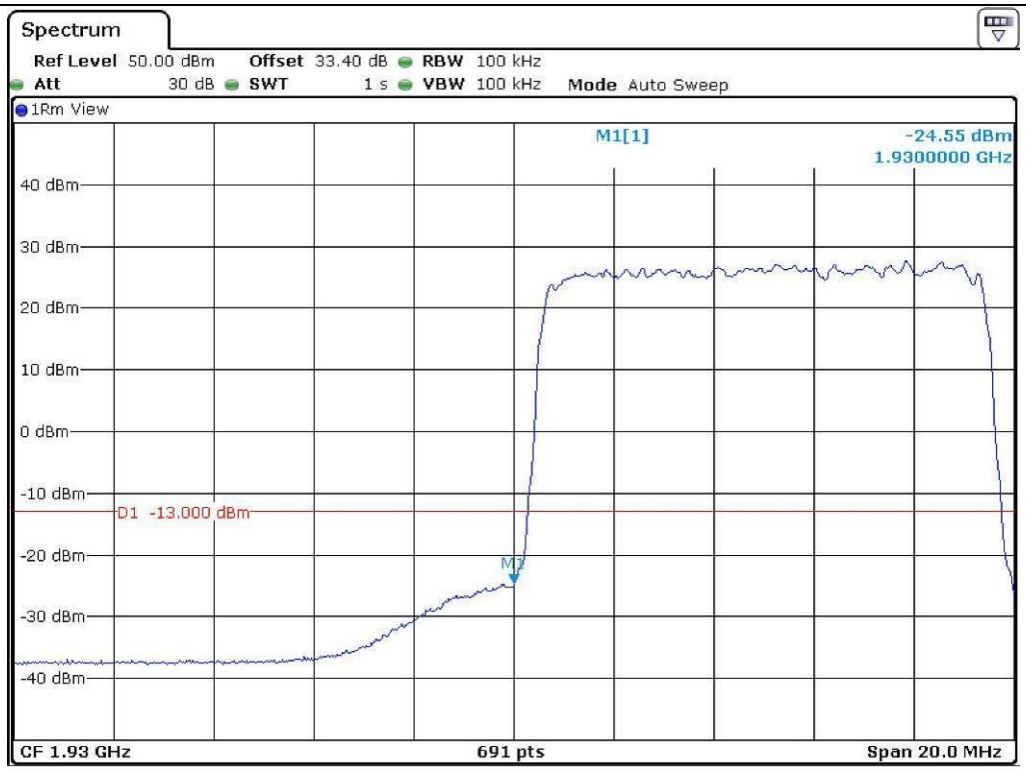
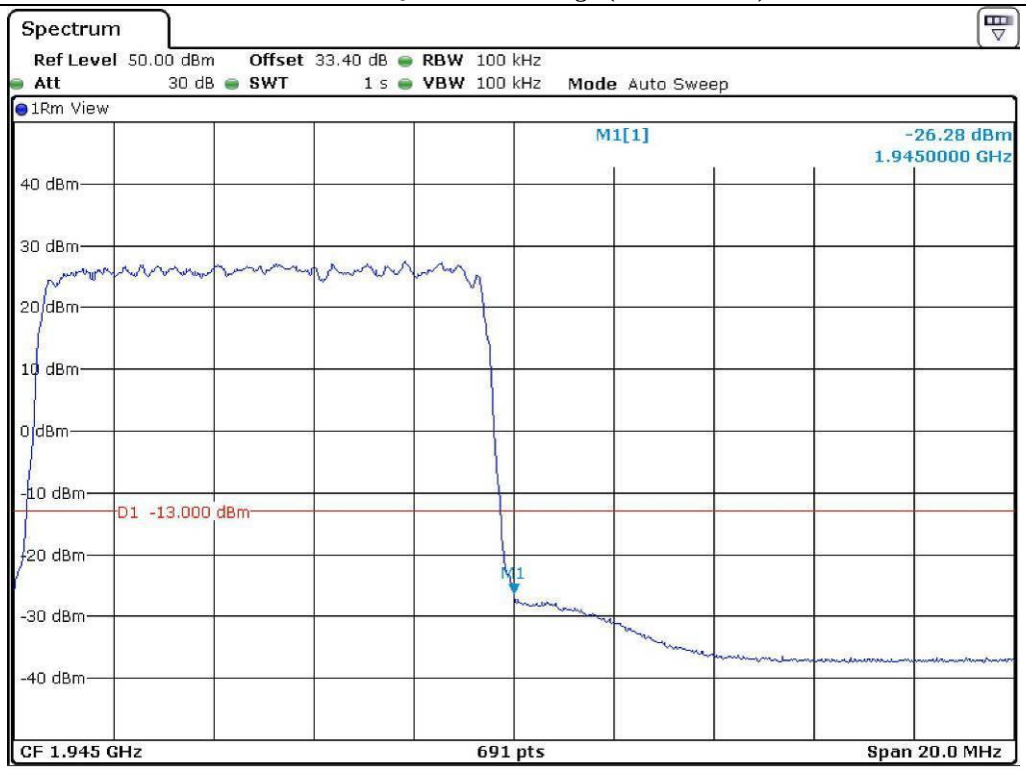


LTE 10 M_QPSK – Band Edge (Low Channel)



LTE 10 M_QPSK – Band Edge (High Channel)

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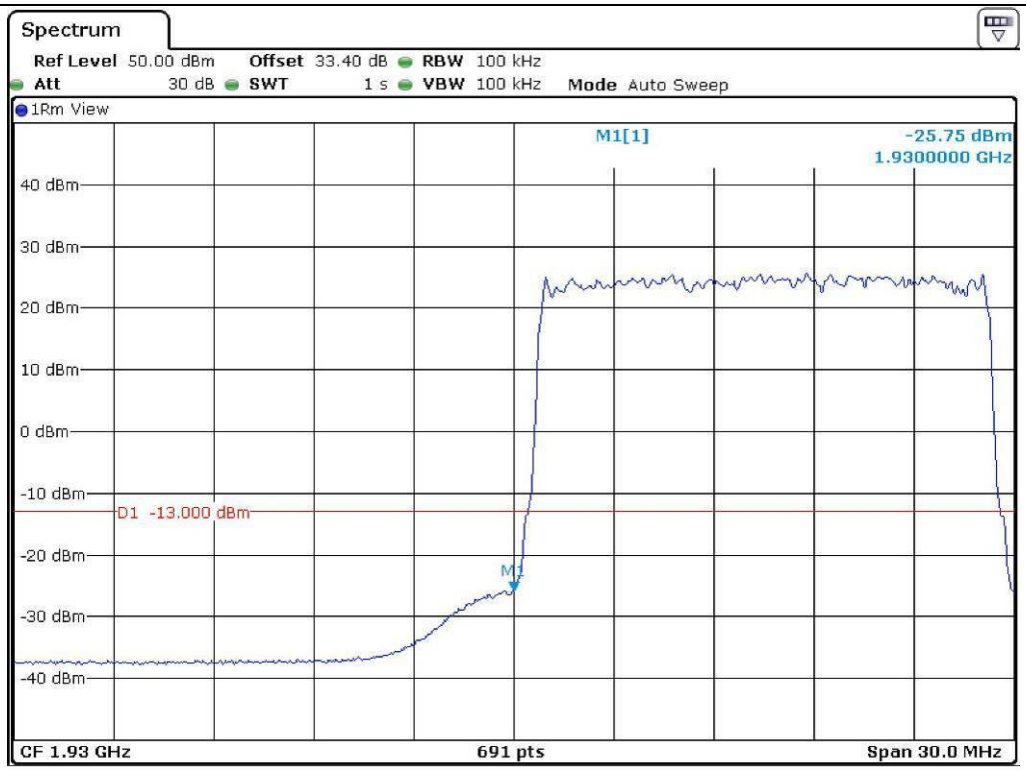
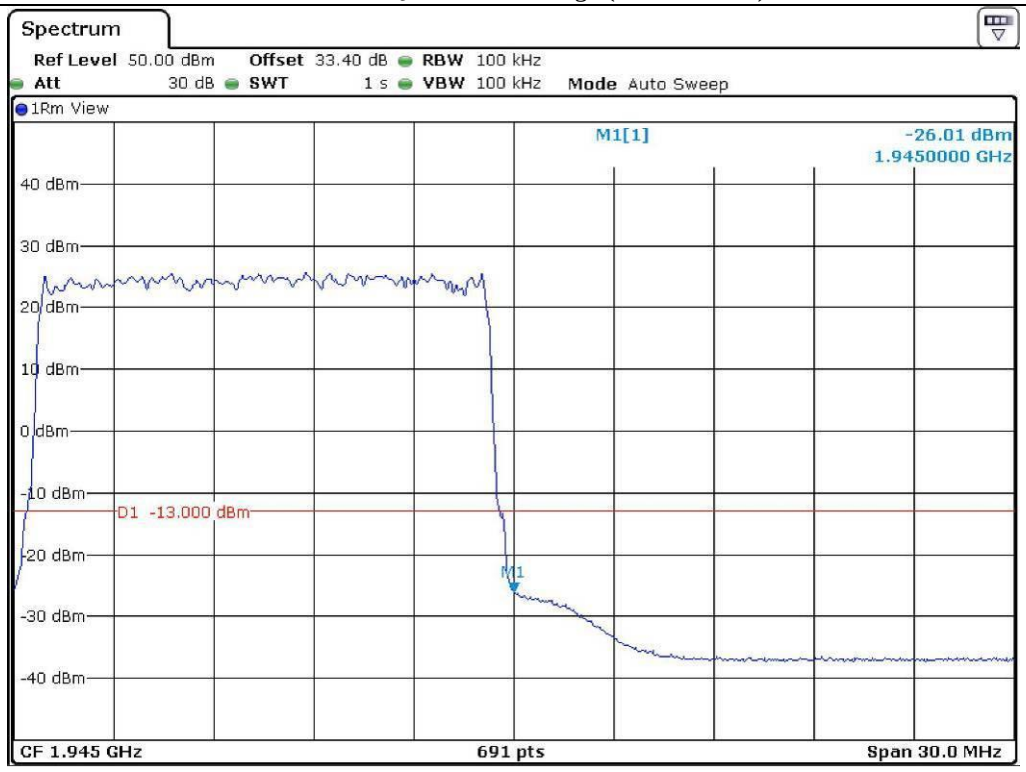


LTE 15 M_QPSK – Band Edge (Low Channel)



LTE 15 M_QPSK – Band Edge (High Channel)

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8.5 Test data for Uplink

-. Test Date : October 23, 2014

-. Result : PASSED BY 23.81 dB at LTE 5 M_QPSK Mode

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)	Margin (dB)
CDMA 2000	Low	1 850.00	-38.78	-13.00	25.78
	High	1 865.00	-39.32		26.32
LTE 5 M_QPSK	Low	1 850.00	-36.96		23.96
	High	1 865.00	-36.81		23.81
LTE 10 M_QPSK	Low	1 850.00	-39.98		26.98
	High	1 865.00	-39.78		26.78
LTE 15 M_QPSK	Low	1 850.00	-41.56		28.56
	High	1 865.00	-41.08		28.08

According to Part 24E, out of band emission shall be attenuated by 43 + 10 log (P) dBc, equates to -13.0dBm.

As a result of preliminary testing., the formal test was performed with the maximum payload mode of worst cases for QPSK.

Tested by: hyung-kwon, Oh / Project Engineer

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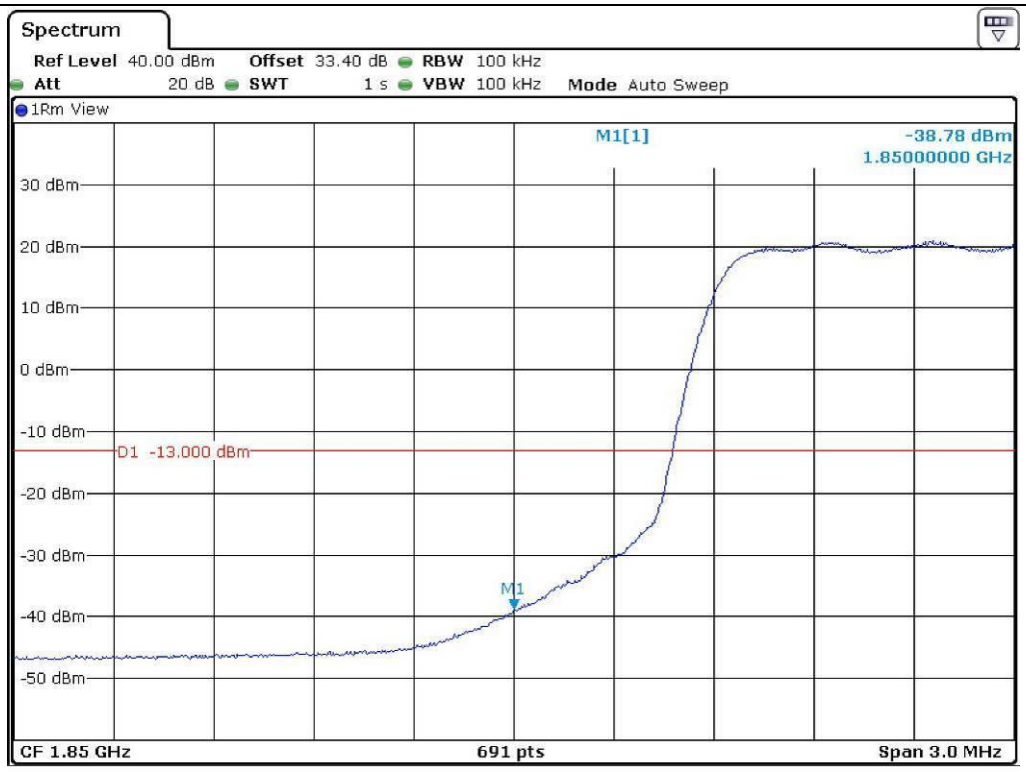
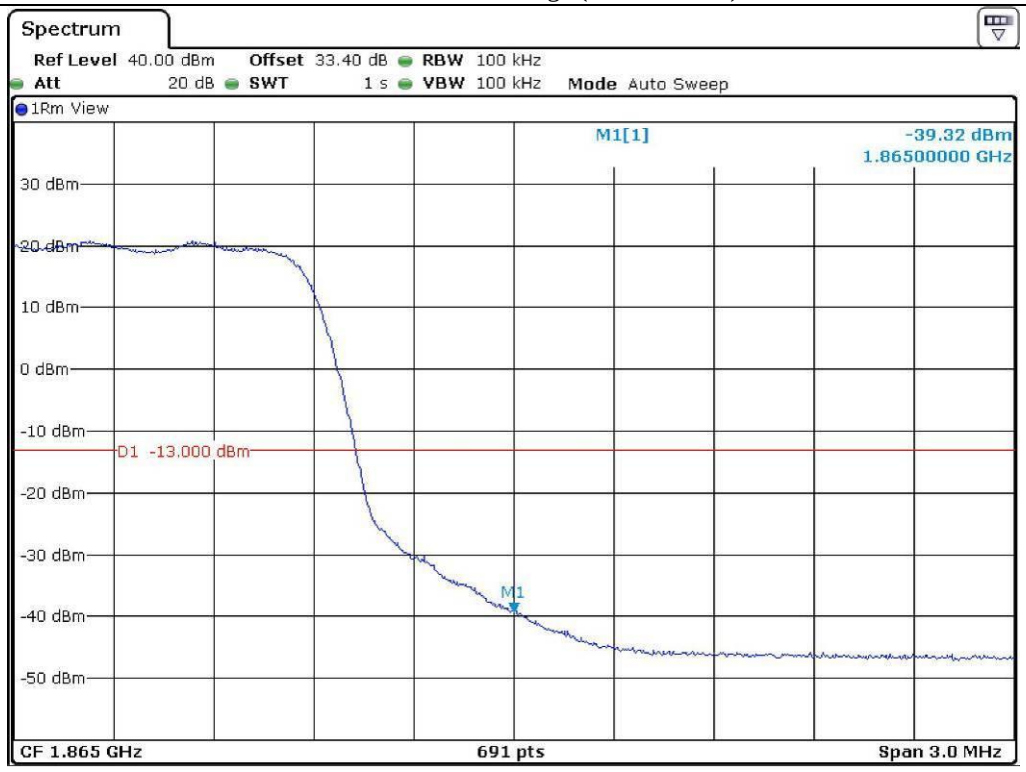


CDMA 2000 – Band Edge (Low Channel)



CDMA 2000– Band Edge (High Channel)

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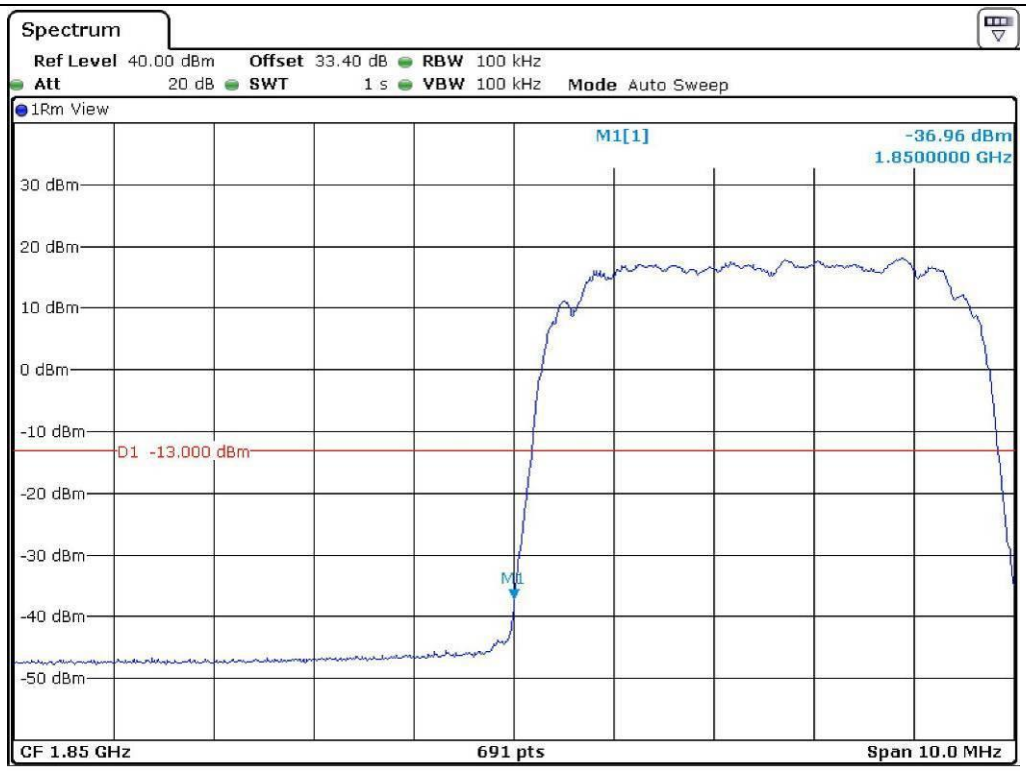
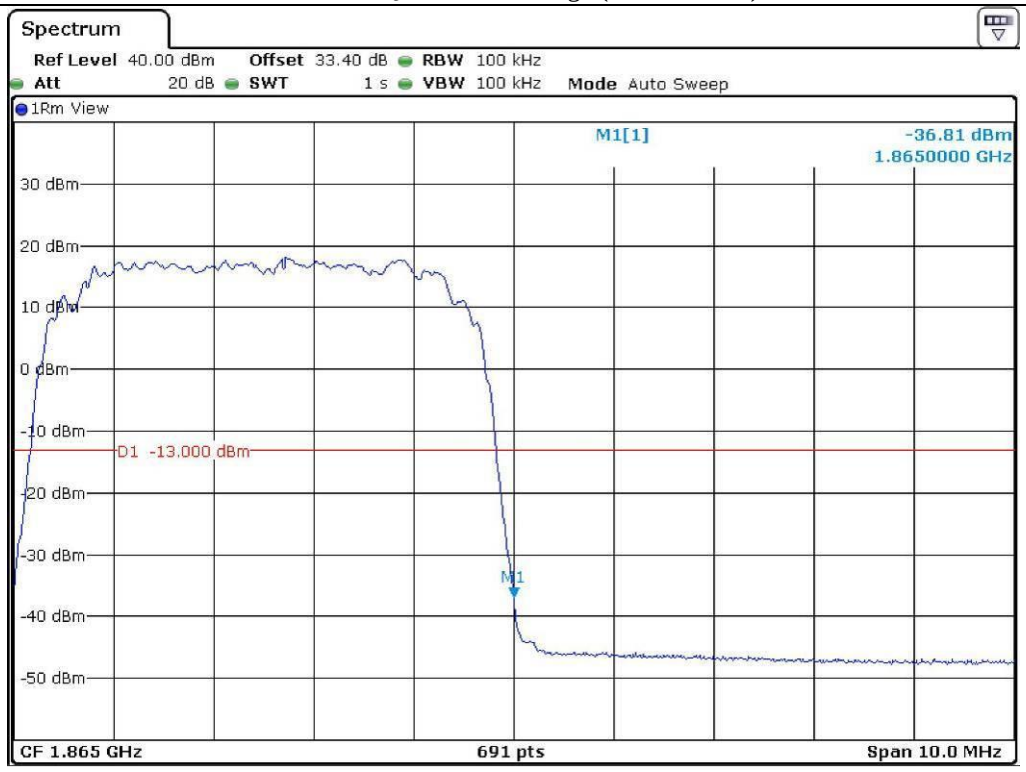


LTE 5 M_QPSK – Band Edge (Low Channel)



LTE 5 M_QPSK – Band Edge (High Channel)

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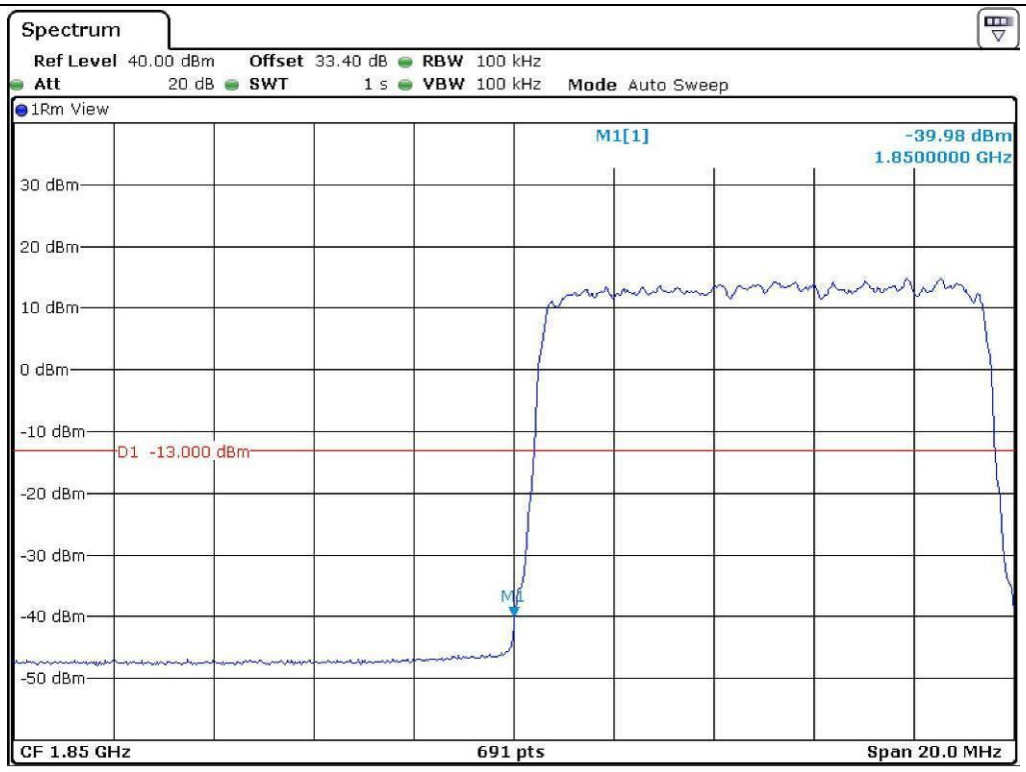
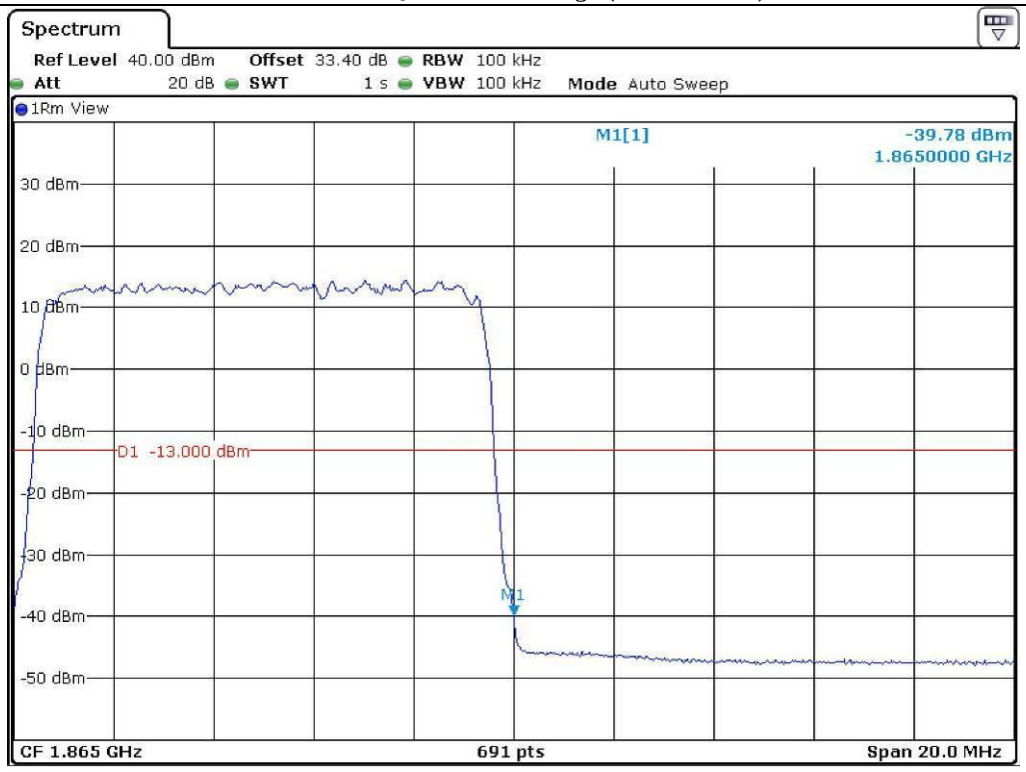


LTE 10 M_QPSK – Band Edge (Low Channel)



LTE 10 M_QPSK – Band Edge (High Channel)

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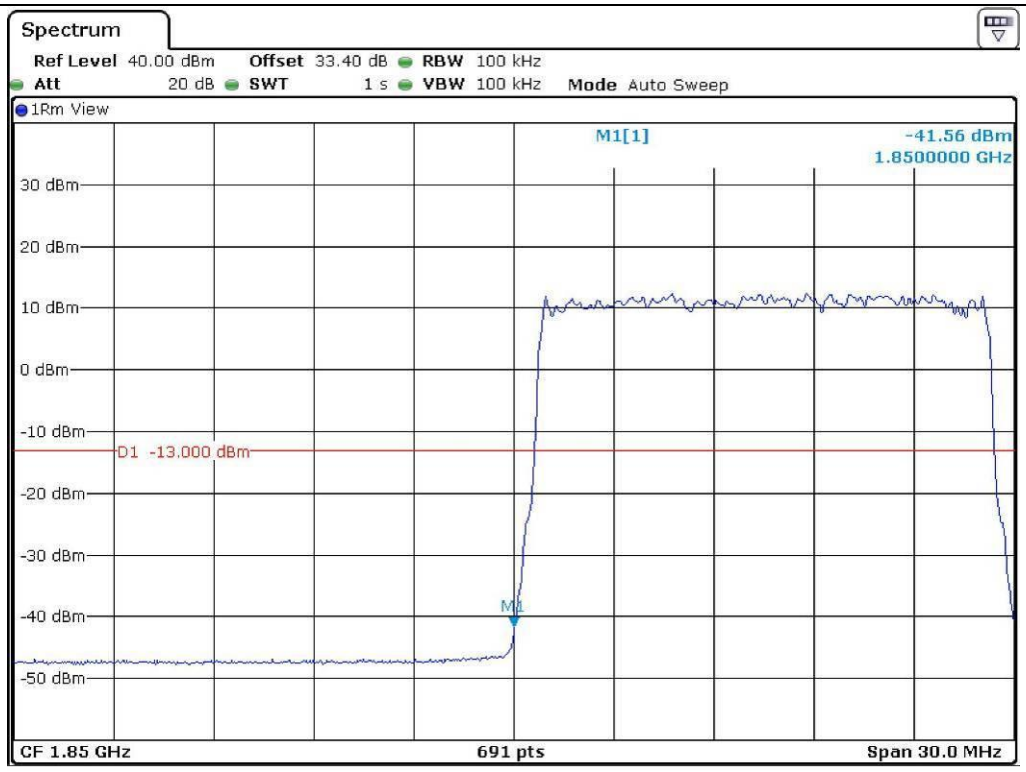
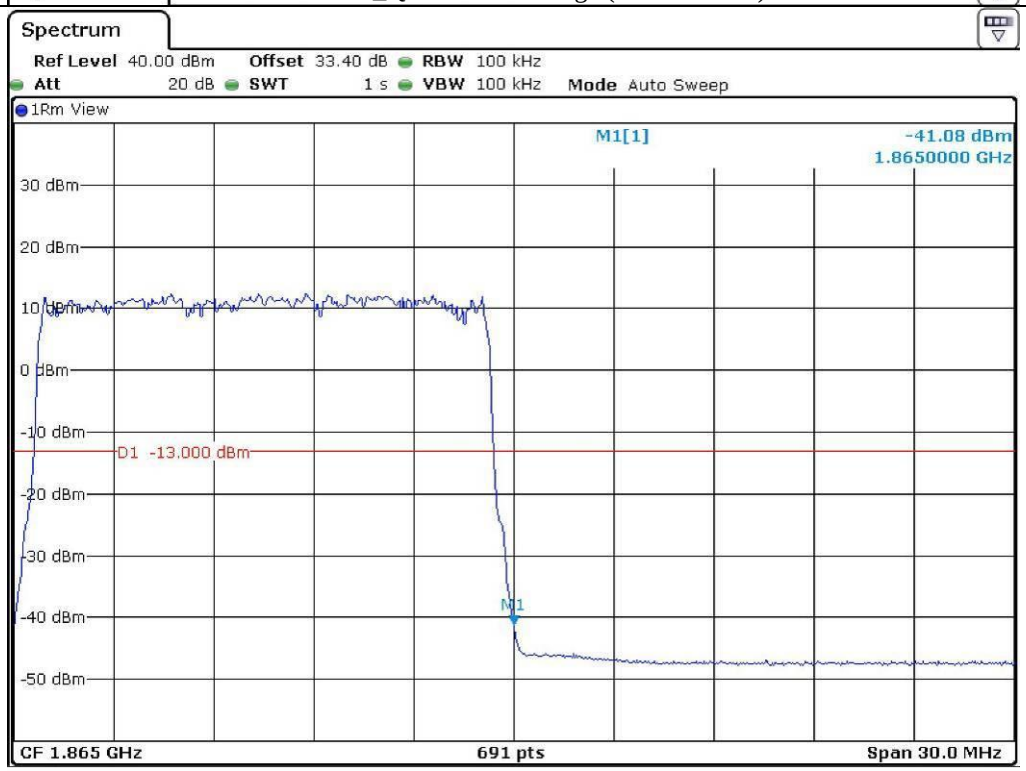


Spectrum LTE 15 M_QPSK – Band Edge (Low Channel)



LTE 15 M_QPSK – Band Edge (High Channel)

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