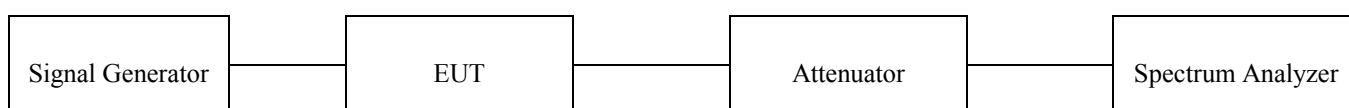


## 7. SPURIOUS EMISSION AT ANTENNA TERMINAL

### 7.1 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.



### 7.2 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	E4432B	HP	Signal Generator	US38440950	June 15, 2009
■ -	SMJ100A	R/S	Signal Generator	101038	Feb. 04, 2009
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 15, 2009
□ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 11, 2009

All test equipment used is calibrated on a regular basis.

### 7.3 Test data

#### 7.3.1 Test Result for VHF

- . Test Date : November 09, 2009
- . Temperature : 24 °C
- . Relative humidity : 47 % R.H.
- . Frequency range : 30 MHz ~ 20 GHz
- . Result : Pass
- . Modulation : FM with 2.5 kHz sine wave signal

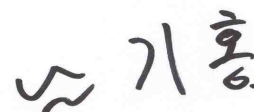
Channel Spacing (kHz)	Modulation (kHz)	Harmonic Frequency (MHz)		Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
25	2.5	Low	474.60	- 41.67	0.17	- 41.50	- 13.00	- 28.50
			3 460.00	- 35.00	0.83	- 34.17		- 21.17
		Middle	464.90	- 41.67	0.17	- 41.50		- 28.50
			3 310.00	- 34.67	0.83	- 33.84		- 20.84
		High	422.90	- 42.50	0.17	- 42.33		- 29.33
			2 920.00	- 34.67	0.67	- 34.00		- 21.00
12.5	2.5	Low	473.00	- 41.83	0.17	- 41.66	- 20.00	- 21.66
			2 995.00	- 34.67	0.67	- 34.00		- 14.00
		Middle	461.70	- 42.00	0.17	- 41.83		- 21.83
			3 250.00	- 34.33	0.83	- 33.50		- 13.50
		High	440.60	- 42.17	0.17	- 42.00		- 22.00
			2 815.00	- 35.33	0.67	- 34.66		- 14.66

According to Part 90I, out of band emission shall be attenuated by  $43 + 10 \log (P)$  dBc, equates to -13.0 dBm.

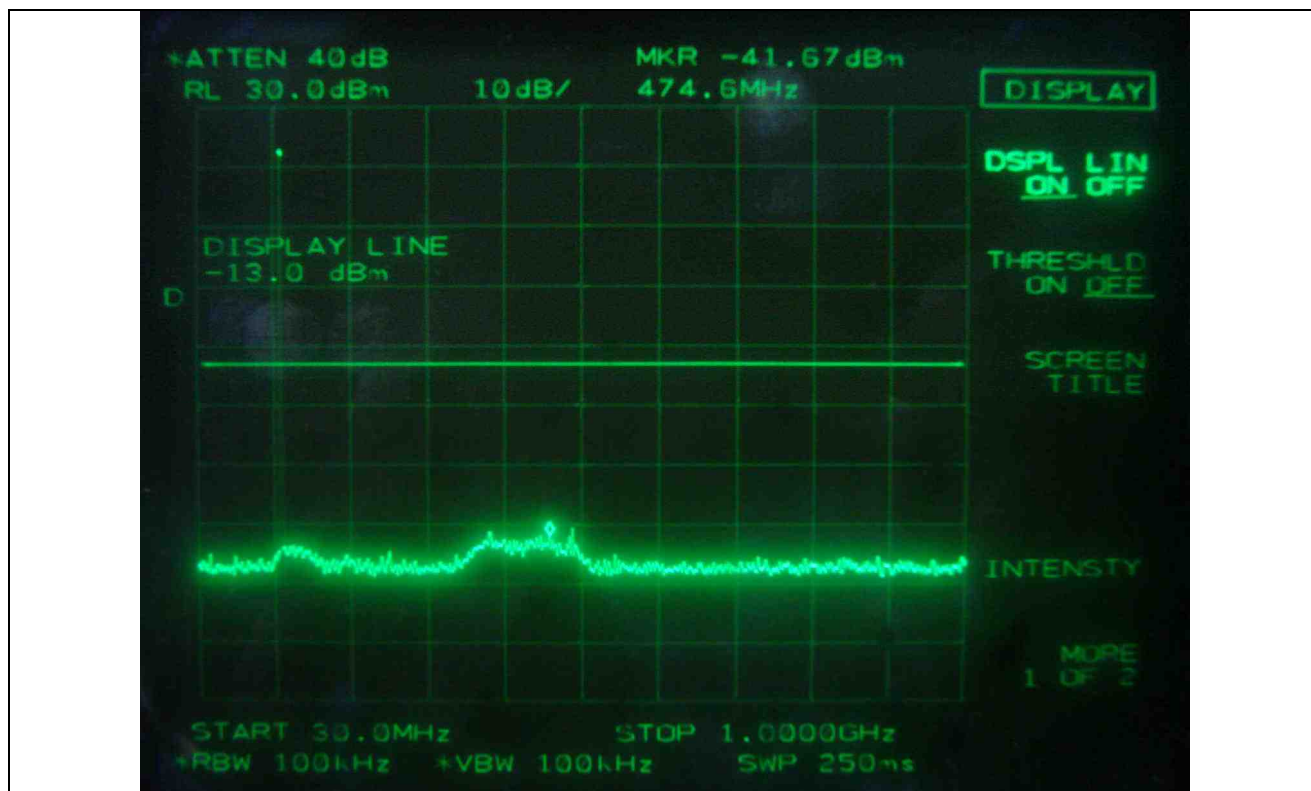
-. Modulation : FM with an external 9 600 b/s random data source

Channel Spacing (kHz)	Modulation (b/s)	Harmonic Frequency (MHz)		Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
25	9 600	Low	464.90	- 42.50	0.17	- 42.33	- 13.00	- 29.33
			2 710.00	- 35.17	0.67	- 34.50		- 21.50
		Middle	437.40	- 42.17	0.17	- 42.00		- 29.00
			2 410.00	- 35.00	0.50	- 34.50		- 21.50
		High	456.80	- 41.67	0.17	- 41.50		- 28.50
			2 200.00	- 35.67	0.50	- 35.17		- 22.17
12.5	9 600	Low	416.40	- 41.83	0.17	- 41.66	- 20.00	- 21.66
			2 305.00	- 35.50	0.50	- 35.00		- 15.00
		Middle	414.80	- 41.83	0.17	- 41.66		- 21.66
			2 350.00	- 35.50	0.50	- 35.00		- 15.00
		High	452.00	- 42.33	0.17	- 42.16		- 22.16
			2 545.00	- 35.50	0.50	- 35.00		- 15.00

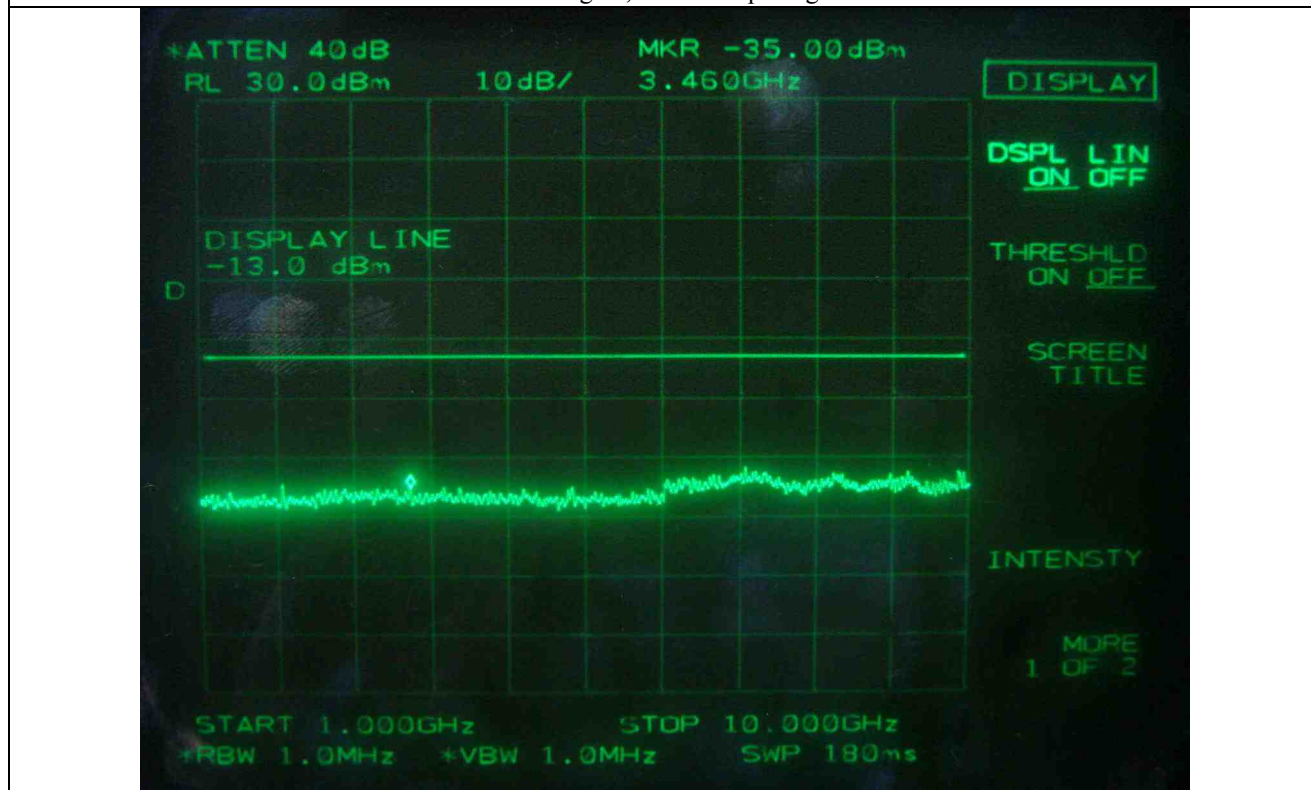
According to Part 90I, out of band emission shall be attenuated by  $43 + 10 \log (P)$  dBc, equates to -13.0 dBm.



Tested by: Ki-Hong, Nam / Project Engineer



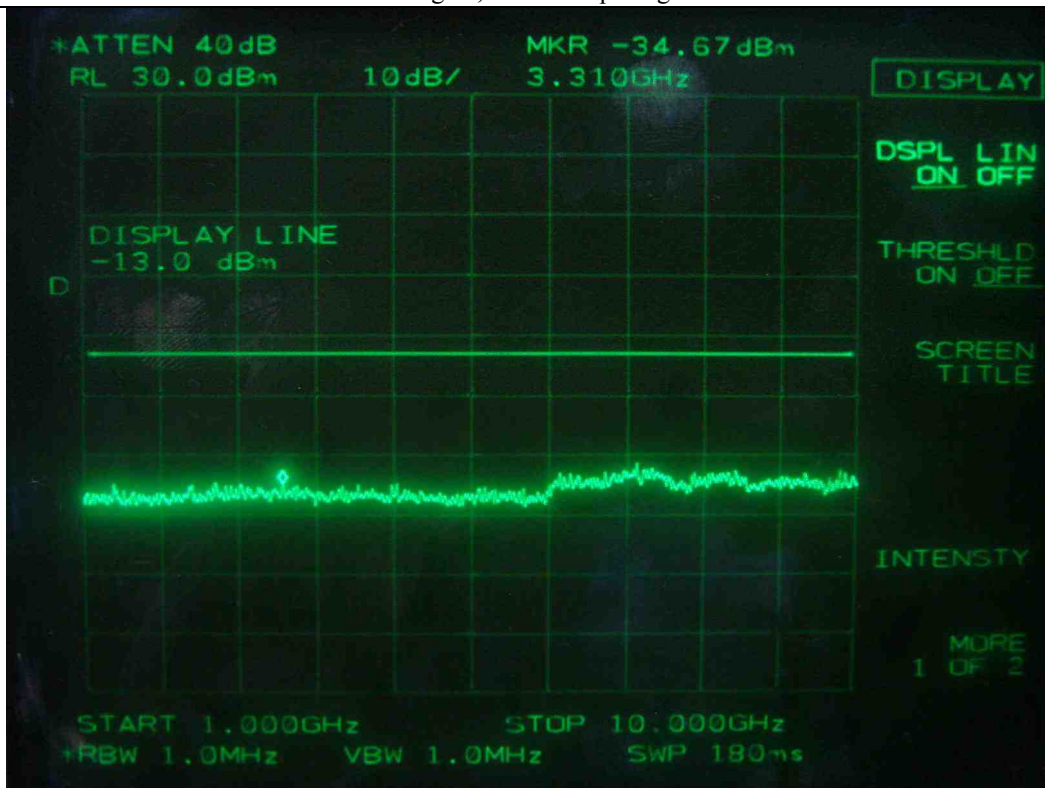
FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - Low Channel



FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - Low Channel

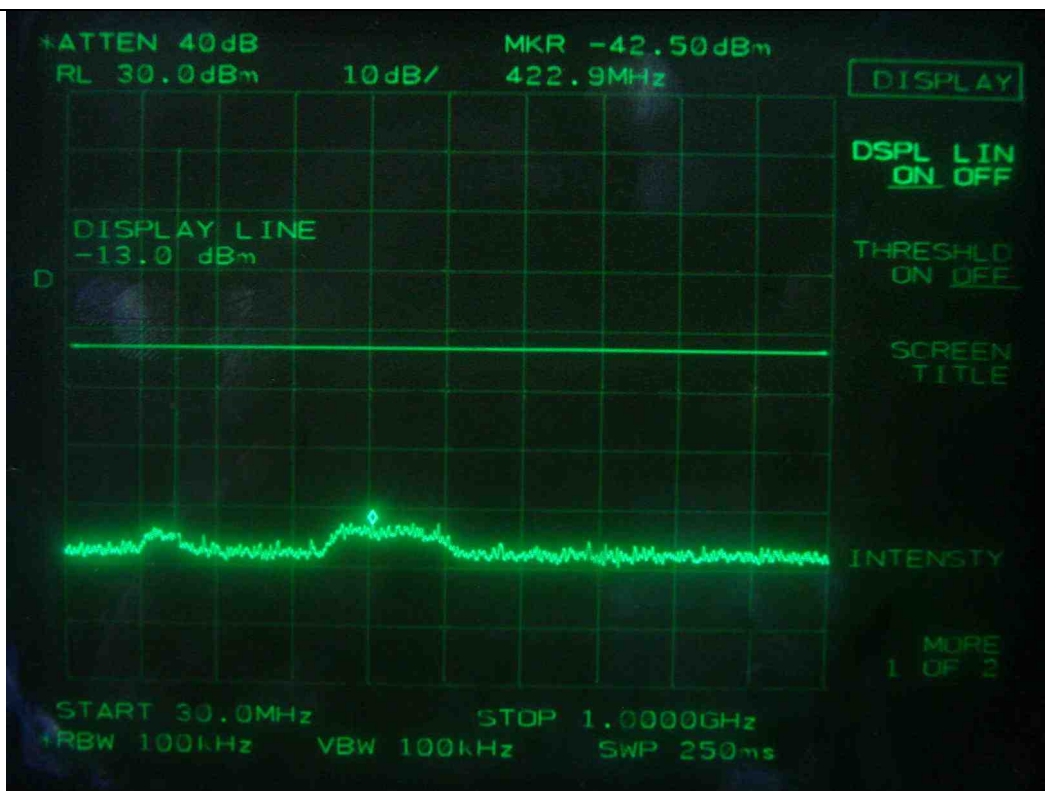


FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - Middle Channel

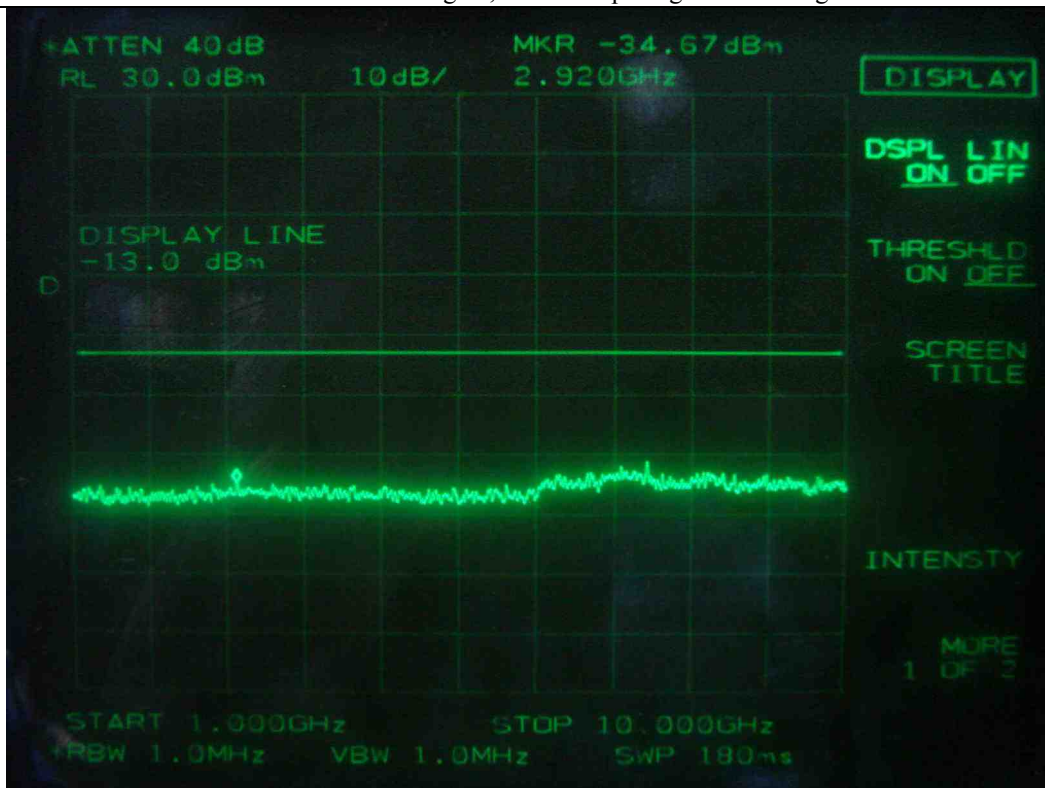


FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - Middle Channel

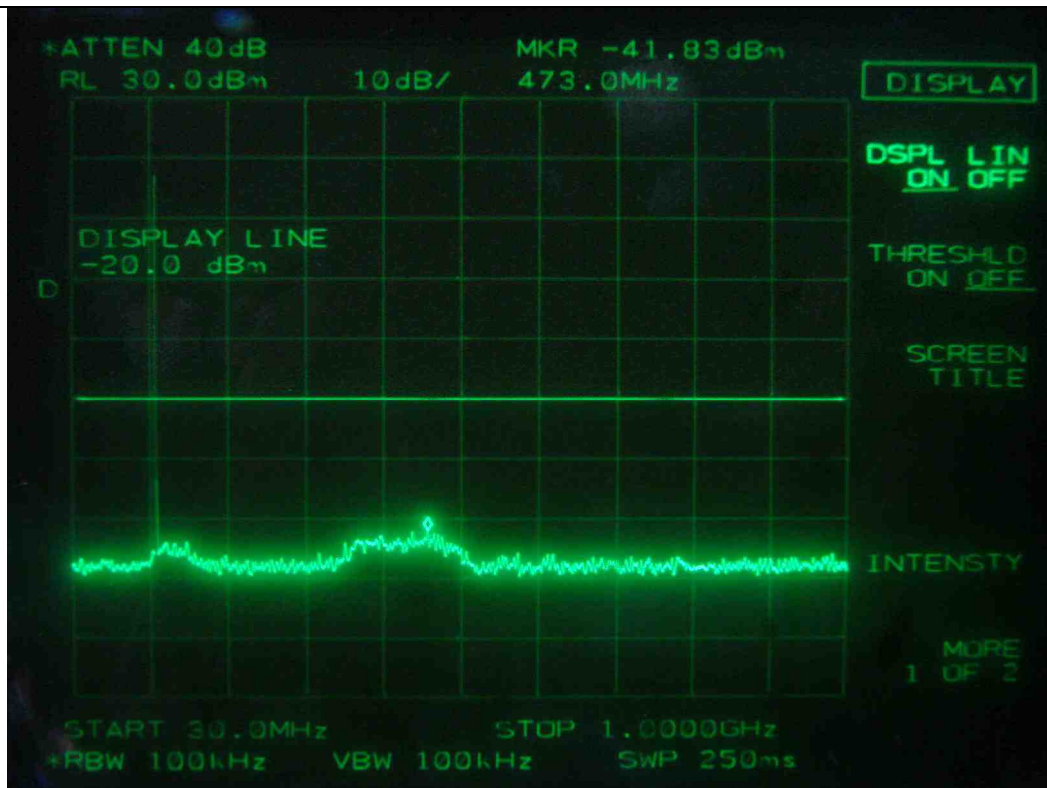




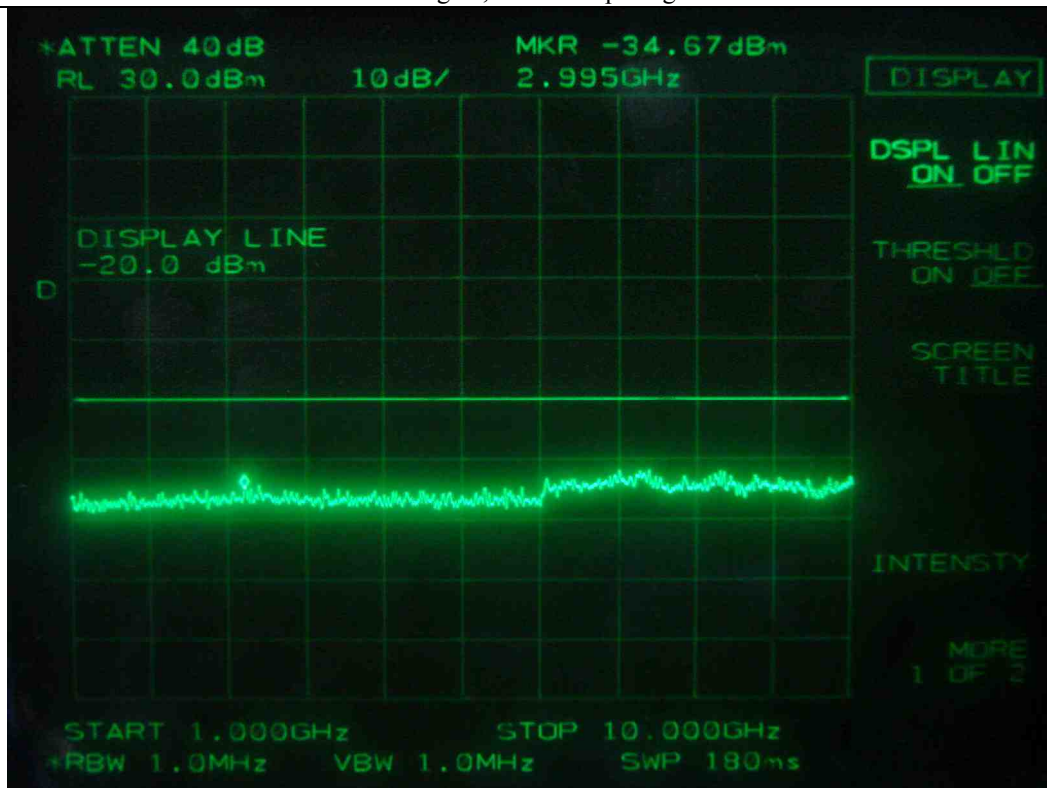
FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - High Channel



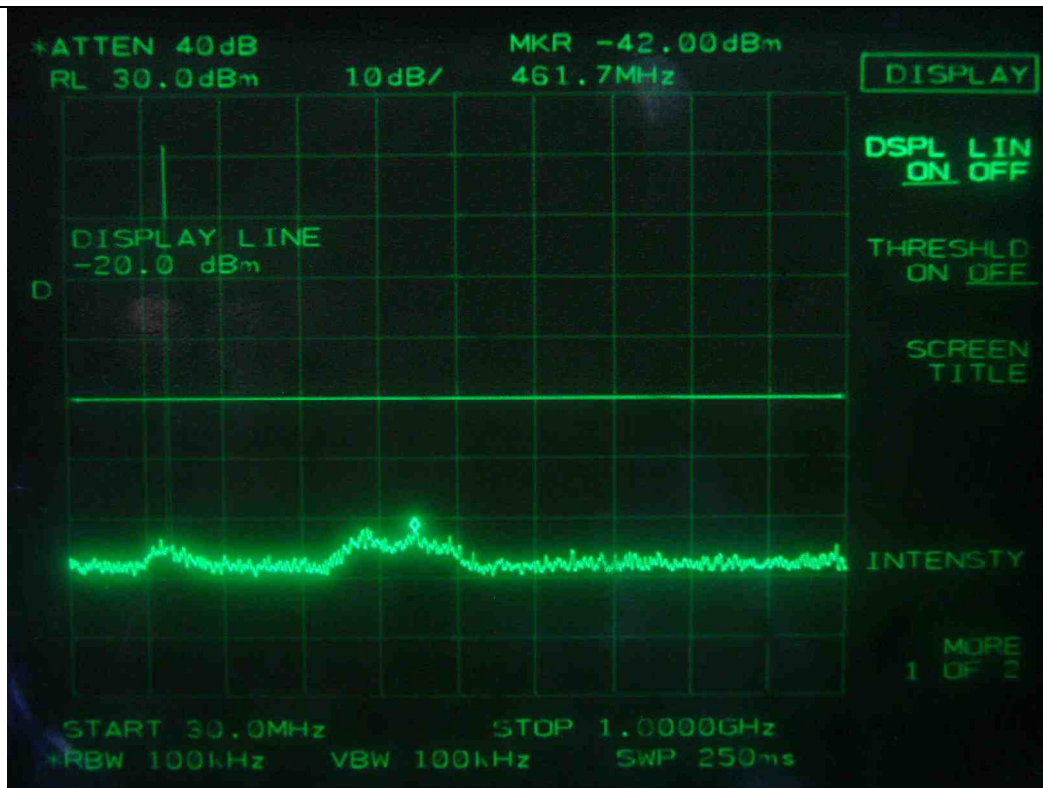
FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - High Channel



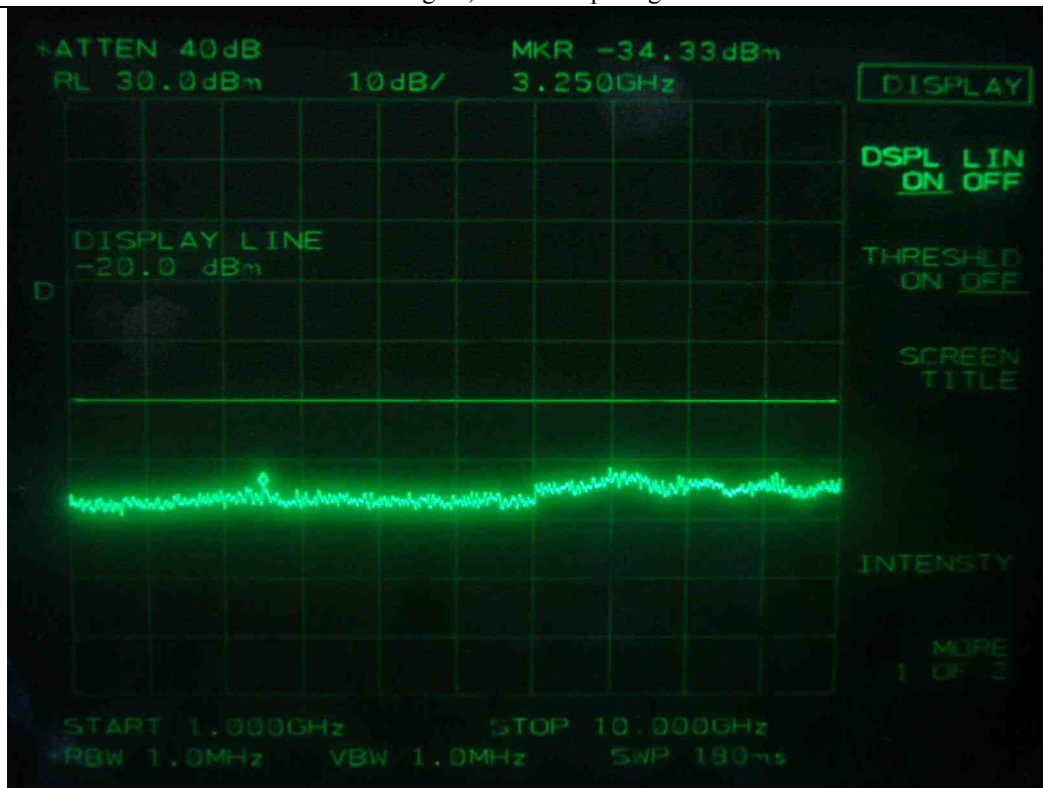
FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - Low Channel



FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - Low Channel



FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - Middle Channel

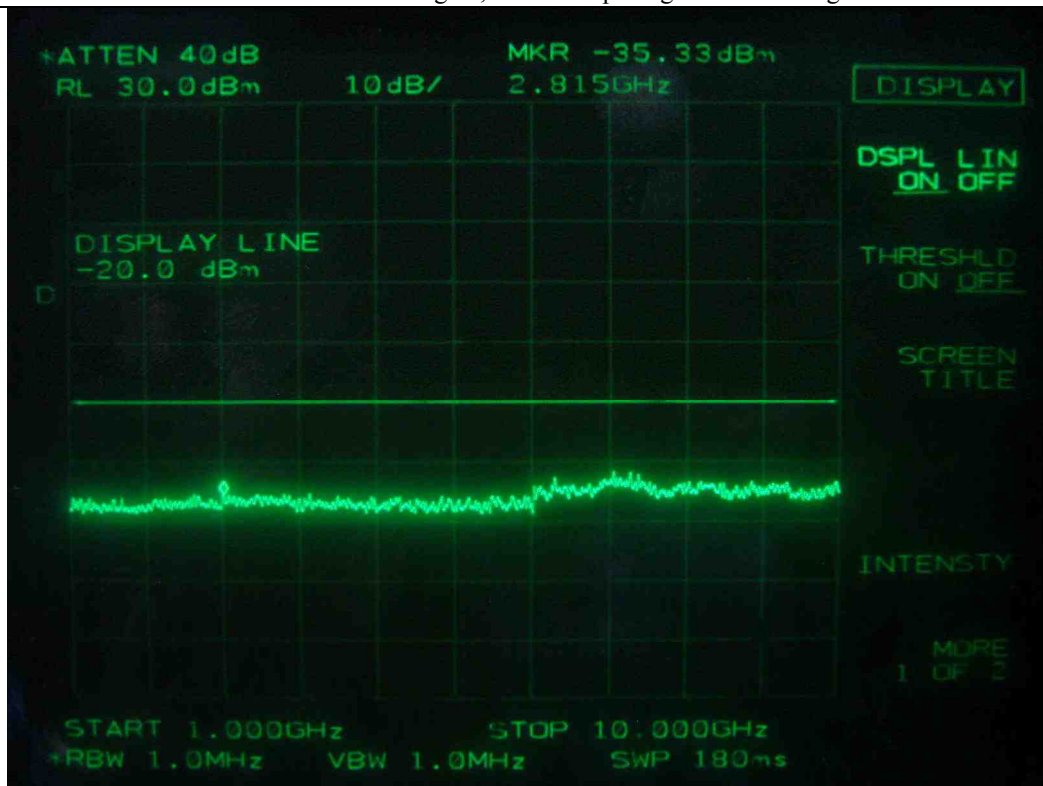


FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - Middle Channel

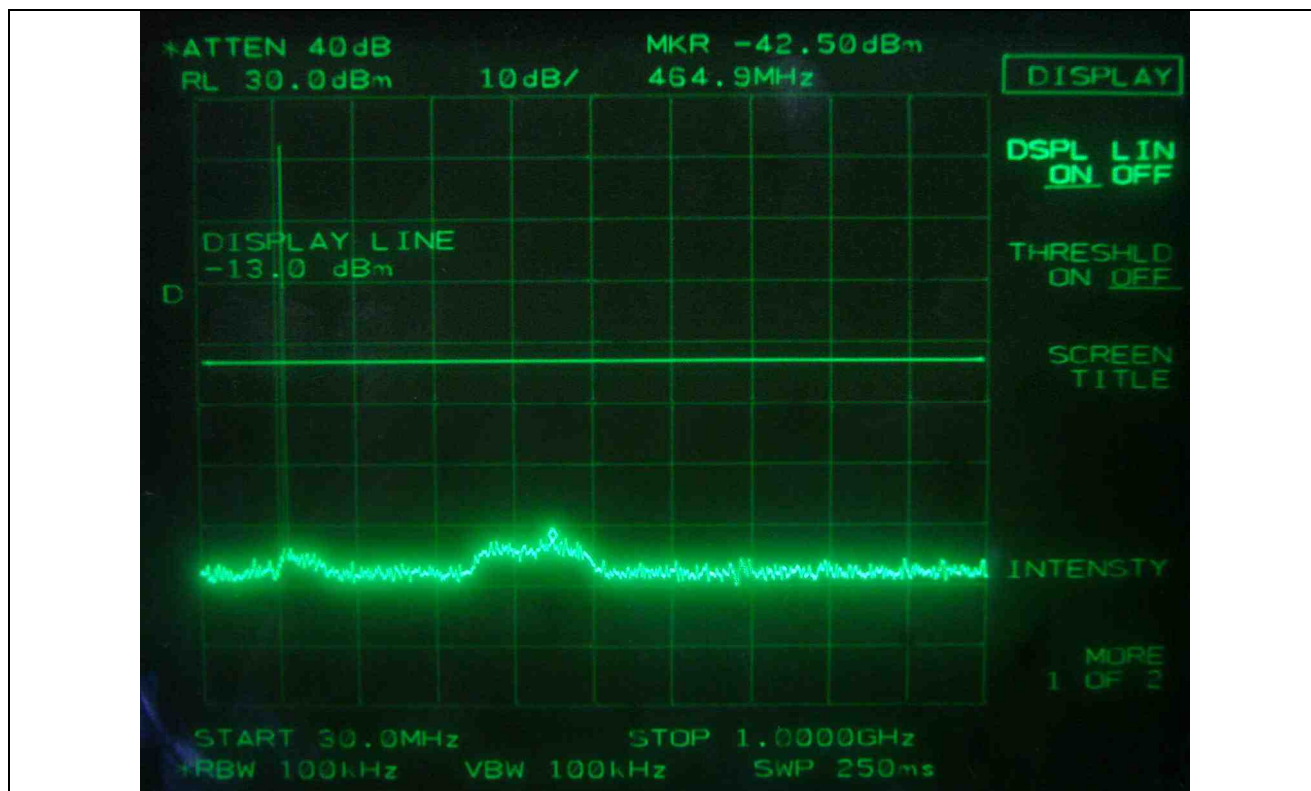




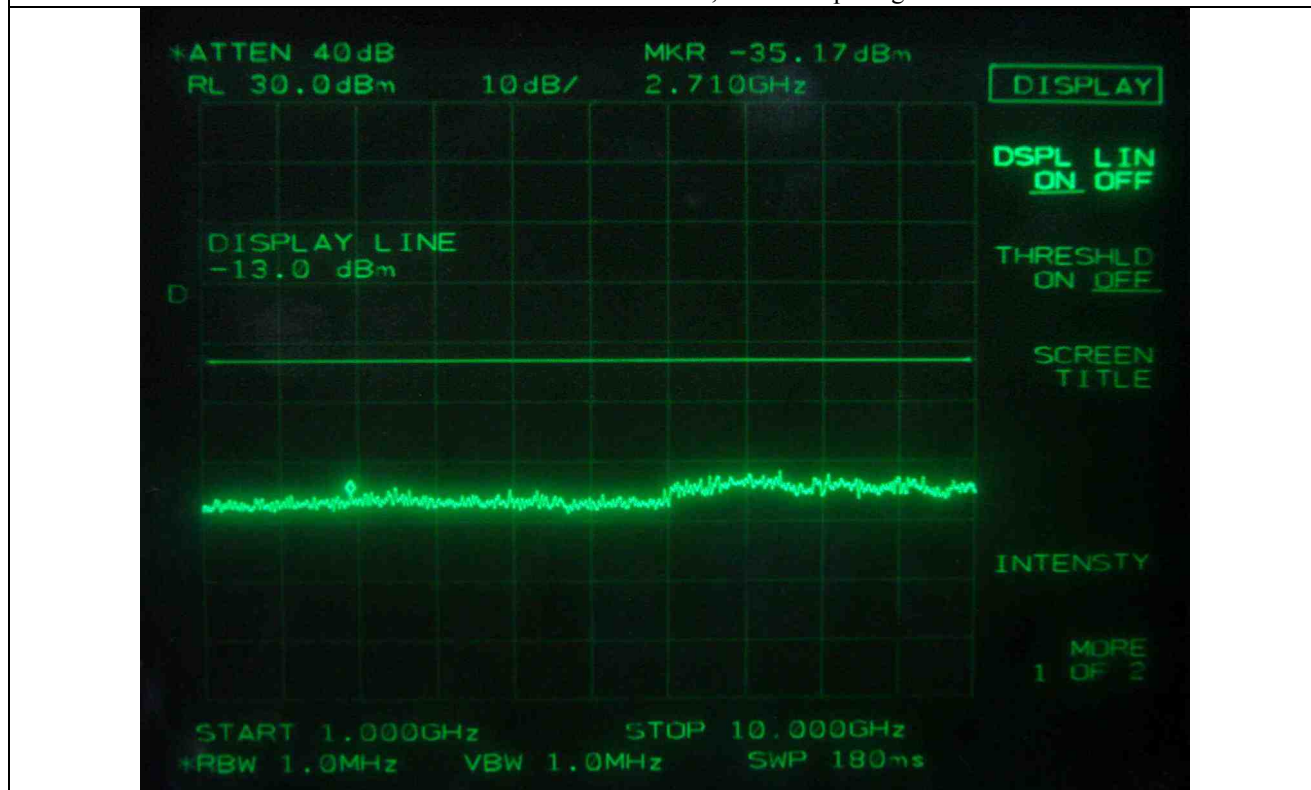
FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - High Channel



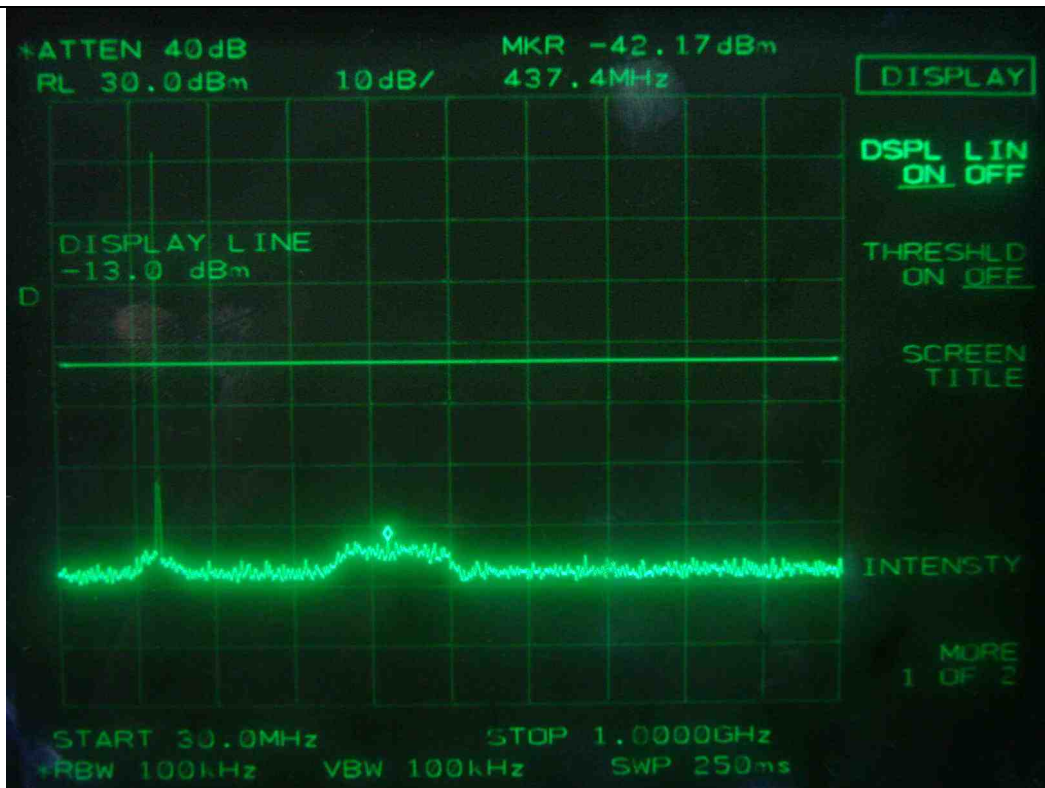
FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - High Channel



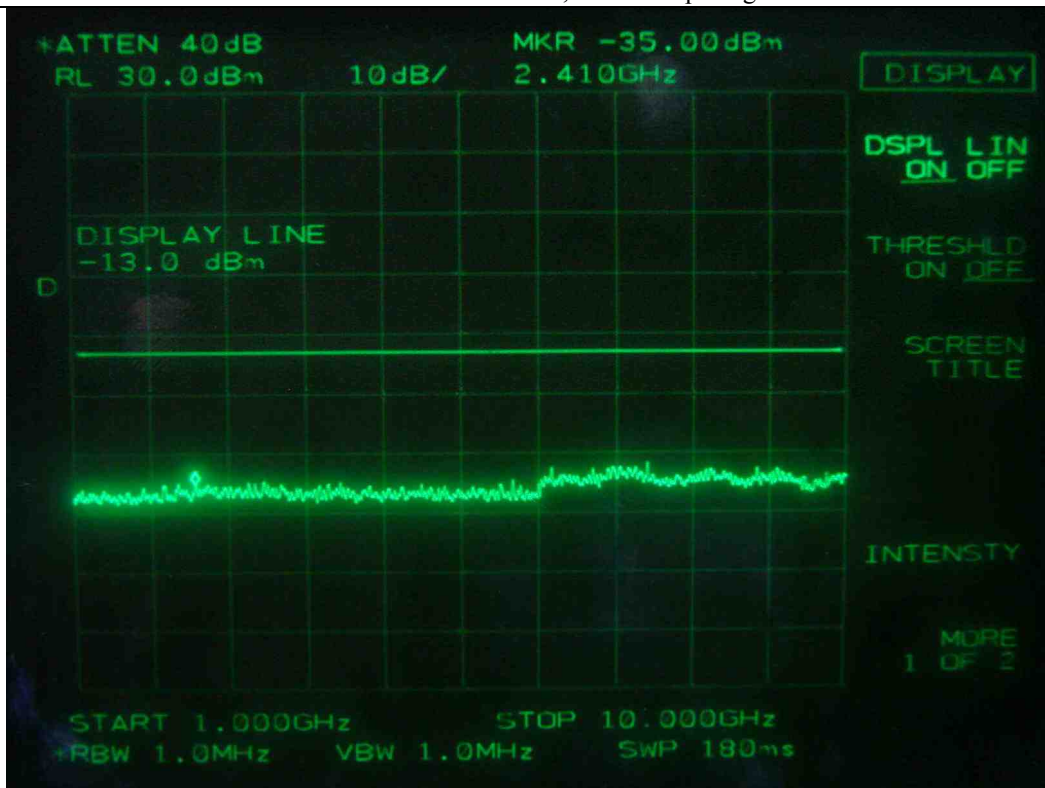
FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - Low Channel



FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - Low Channel

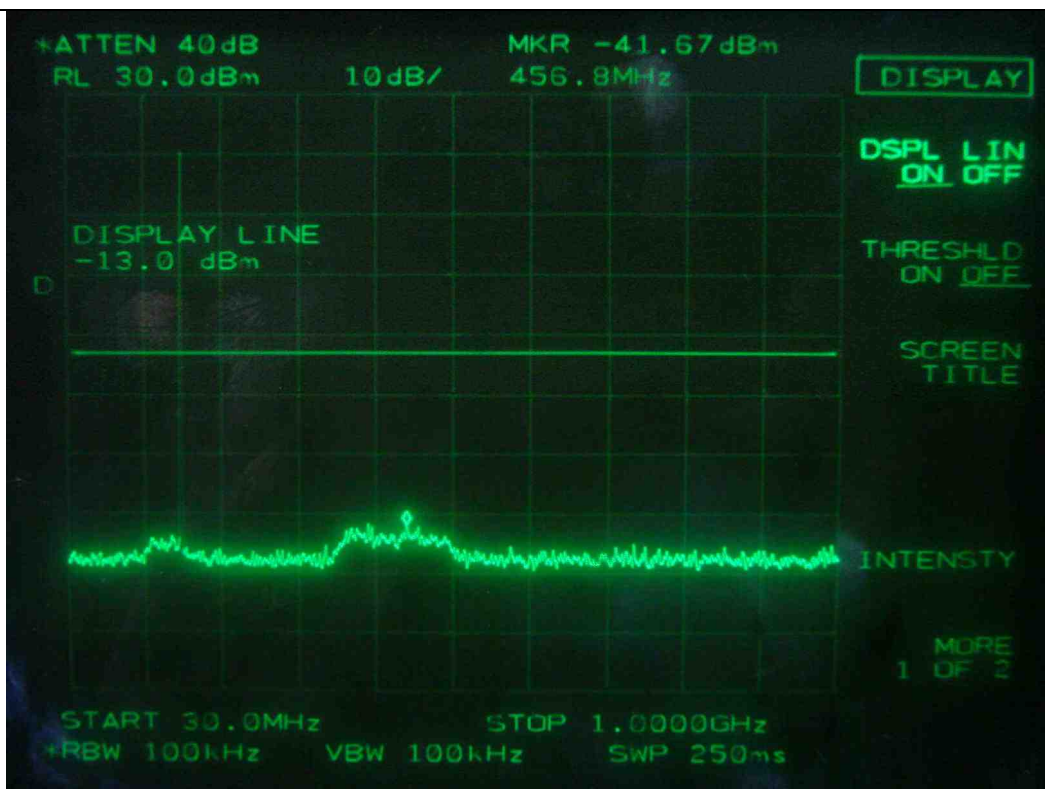


FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - Middle Channel

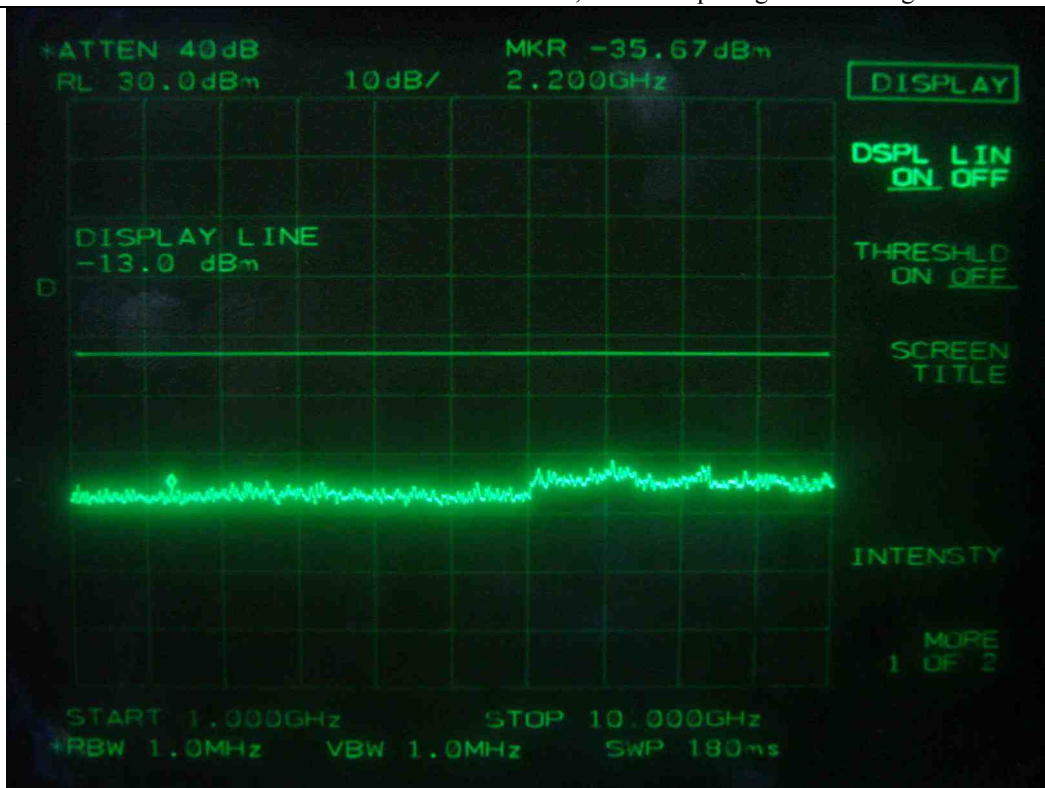


FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - Middle Channel



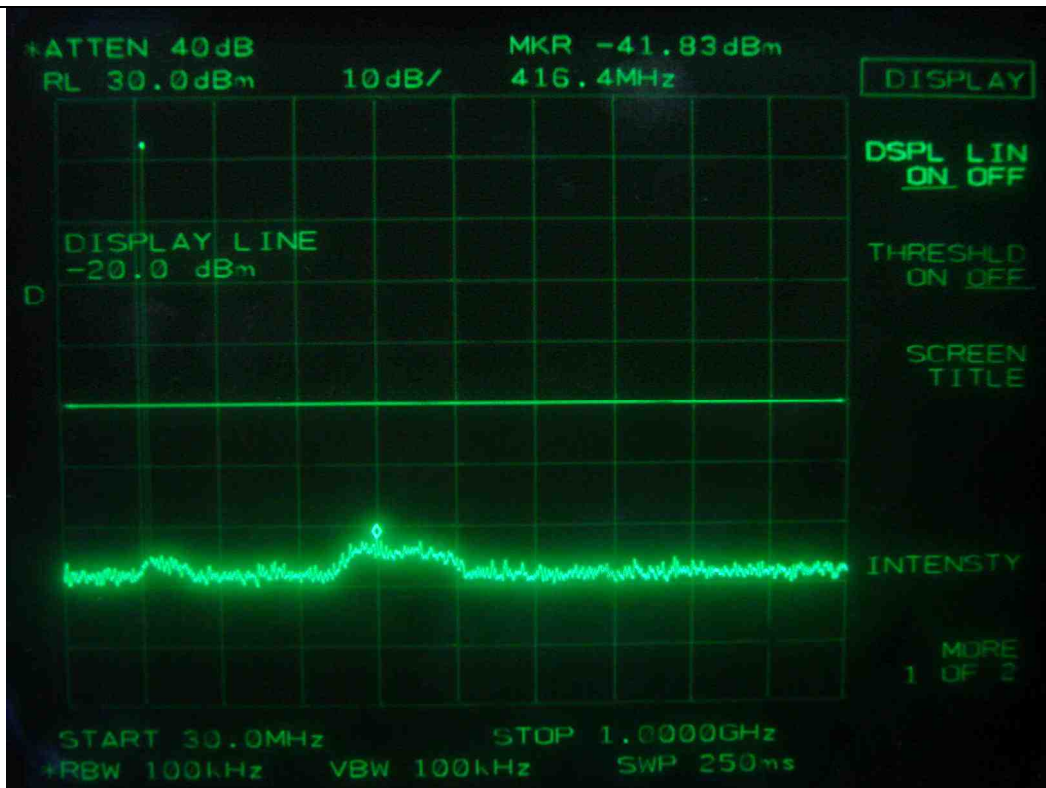


FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - High Channel

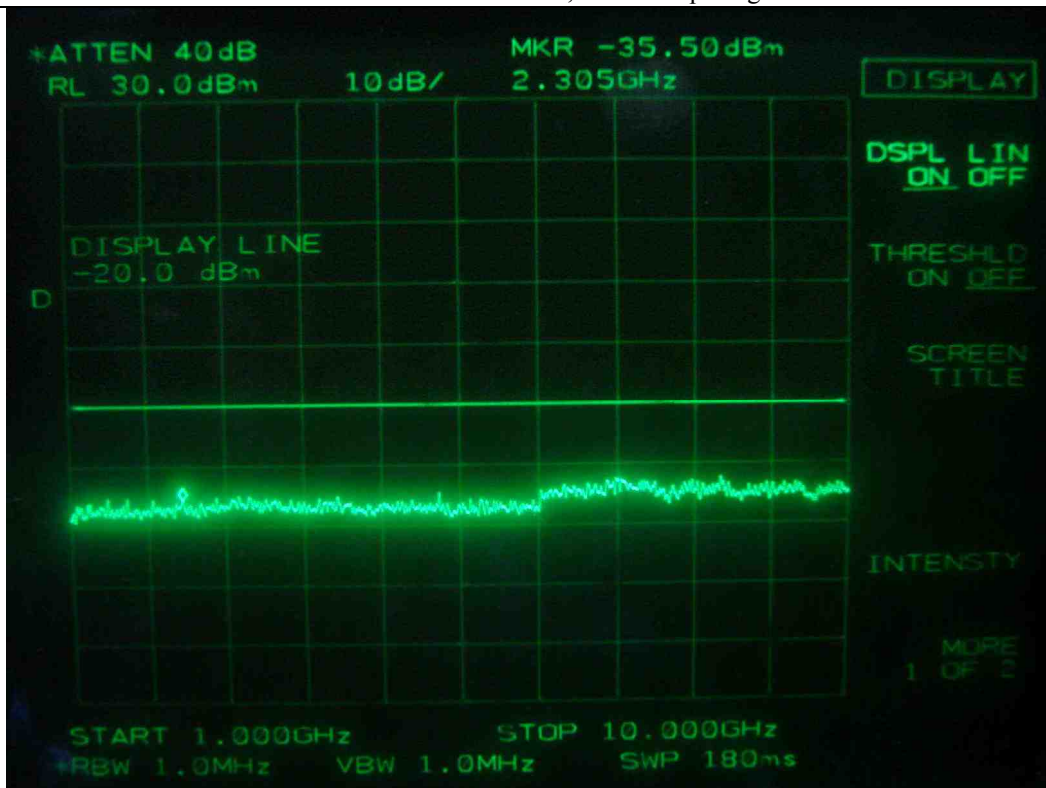


FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - High Channel

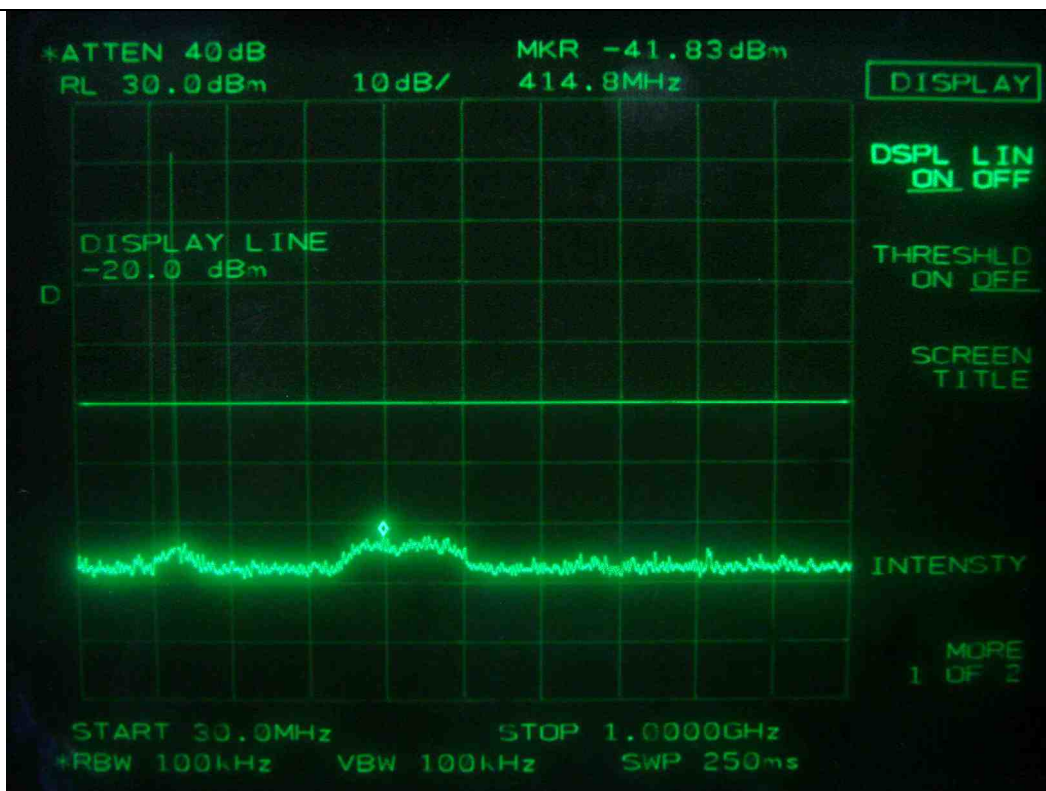




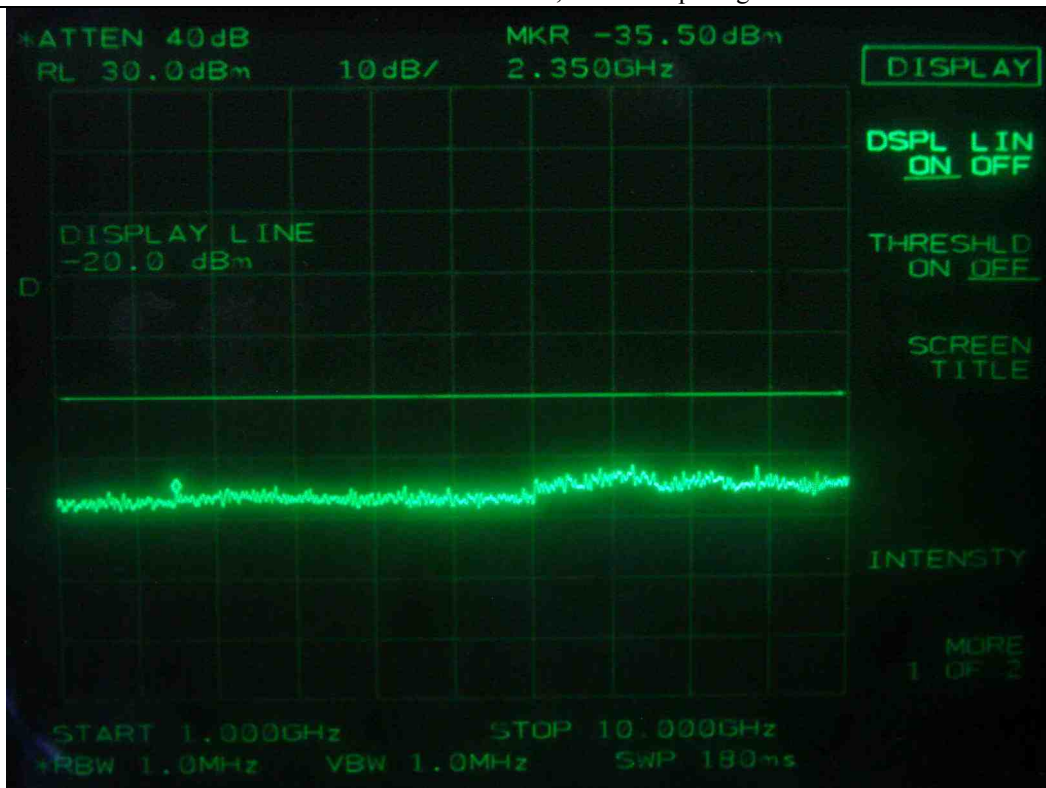
FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - Low Channel



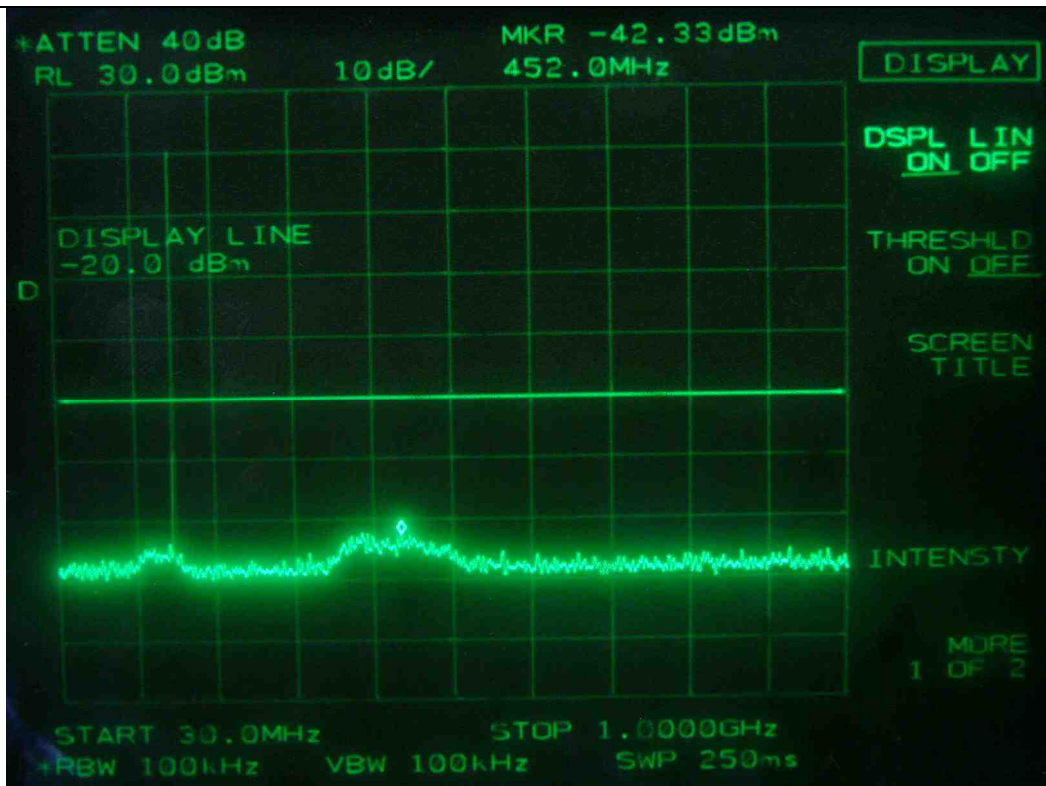
FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - Low Channel



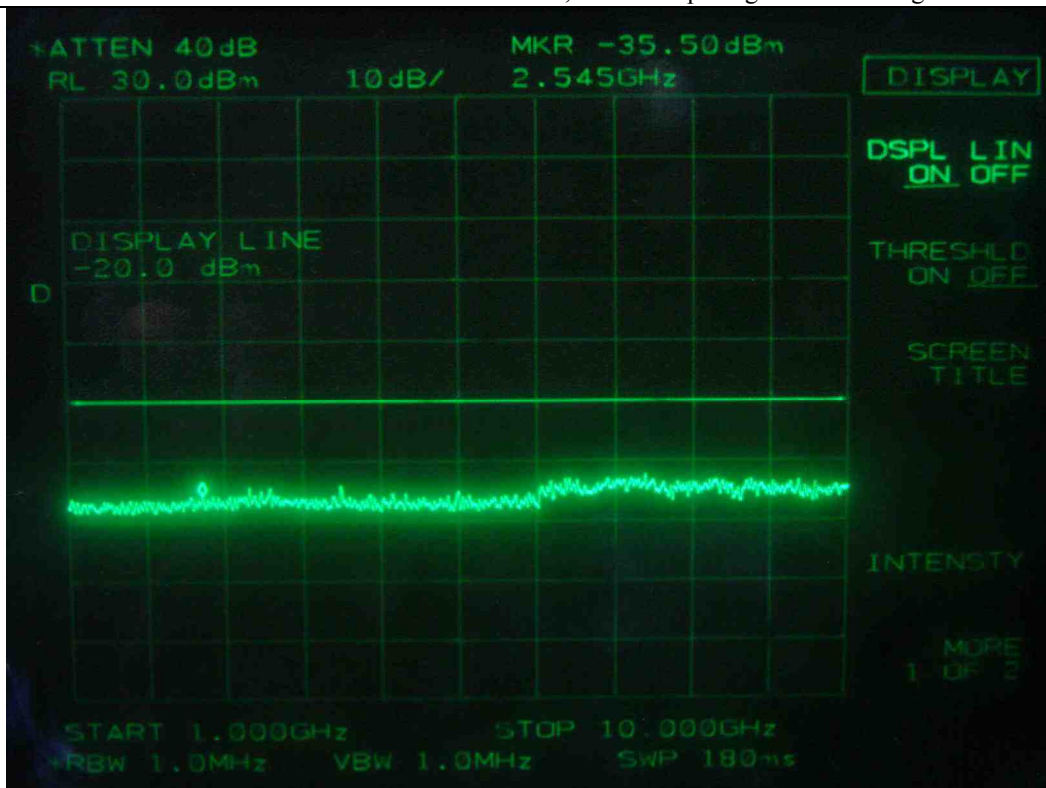
FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz- Middle Channel



FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - Middle Channel



FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - High Channel



FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - High Channel

### 7.3.2 Test Result for UHF-B1

-. Test Date : November 03, 2009  
-. Temperature : 22 °C  
-. Relative humidity : 45 % R.H.  
-. Frequency range : 30 MHz ~ 20 GHz  
-. Result : Pass  
-. Modulation : FM with 2.5 kHz sine wave signal

Channel Spacing (kHz)	Modulation (kHz)	Harmonic Frequency (MHz)		Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
25	2.5	Low	508.50	- 42.00	0.17	- 41.83	- 13.00	- 28.83
			3 085.00	- 34.00	0.83	- 33.17		- 20.17
		Middle	502.10	- 41.33	0.17	- 41.16		- 28.16
			3 280.00	- 34.17	0.83	- 33.34		- 20.34
		High	502.10	- 41.83	0.17	- 41.66		- 28.66
			3 235.00	- 34.50	0.83	- 33.67		- 20.67
12.5	2.5	Low	502.10	- 41.50	0.17	- 41.33	- 20.00	- 21.33
			2 680.00	- 34.00	0.67	- 33.33		- 13.33
		Middle	497.20	- 43.17	0.17	- 43.00		- 23.00
			3 130.00	- 35.00	0.83	- 34.17		- 14.17
		High	502.10	- 42.50	0.17	- 42.33		- 22.33
			3 550.00	- 34.83	0.83	- 34.00		- 14.00
6.25	0.8	Low	502.10	- 41.17	0.17	- 41.00	- 25.00	- 16.00
			3 340.00	- 35.50	0.83	- 34.67		- 9.67
		Middle	502.10	- 42.50	0.17	- 42.33		- 17.33
			3 265.00	- 35.00	0.83	- 34.17		- 9.17
		High	494.00	- 43.50	0.17	- 43.33		- 18.33
			3 205.00	- 34.67	0.83	- 33.84		- 8.84

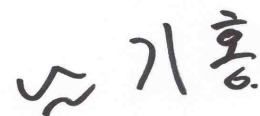
According to Part 90I, out of band emission shall be attenuated by  $43 + 10 \log (P)$  dBc, equates to -13.0 dBm.



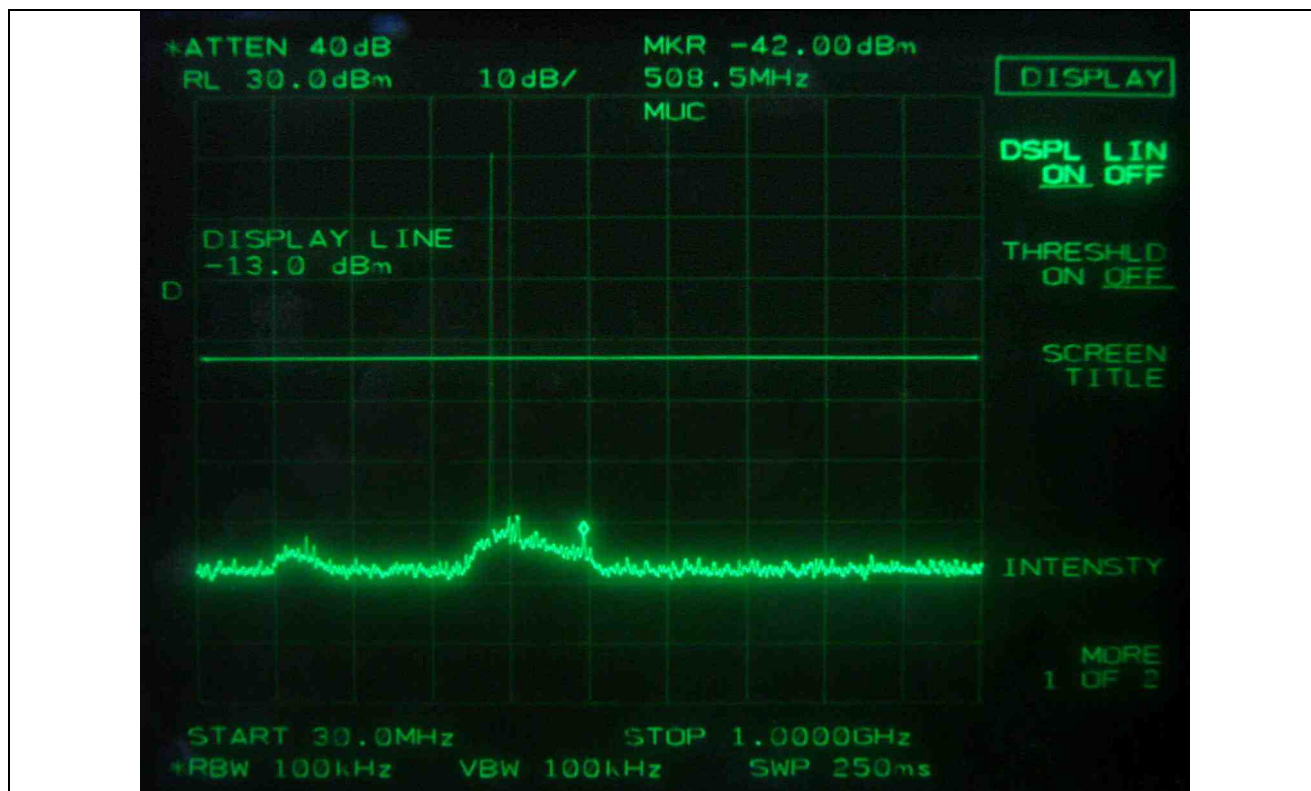
-. Modulation : FM with an external 9 600 b/s random data source

Channel Spacing (kHz)	Modulation (b/s)	Harmonic Frequency (MHz)		Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
25	9 600	Low	502.10	- 42.33	0.17	- 42.16	- 13.00	- 29.16
			3 235.00	- 35.17	0.83	- 34.34		- 21.34
		Middle	502.10	- 42.50	0.17	- 42.33		- 29.33
			3 865.00	- 34.67	0.83	- 33.84		- 20.84
		High	502.10	- 41.83	0.17	- 41.66		- 28.66
			3 790.00	- 34.83	0.83	- 34.00		- 21.00
12.5	9 600	Low	502.10	- 41.17	0.17	- 41.00	- 20.00	- 21.00
			2 620.00	- 35.00	0.67	- 34.33		- 14.33
		Middle	502.10	- 42.83	0.17	- 42.66		- 22.66
			2 950.00	- 35.67	0.67	- 35.00		- 15.00
		High	502.10	- 42.50	0.17	- 42.33		- 22.33
			2 890.00	- 34.83	0.67	- 34.16		- 14.16
6.25	4 800	Low	502.10	- 42.17	0.17	- 42.00	- 25.00	- 17.00
			3 025.00	- 34.67	0.67	- 34.00		- 9.00
		Middle	502.10	- 43.17	0.17	- 43.00		- 18.00
			3 370.00	- 34.50	0.83	- 33.67		- 8.67
		High	502.10	- 41.33	0.17	- 41.16		- 16.16
			3 070.00	- 34.50	0.67	- 33.83		- 8.83

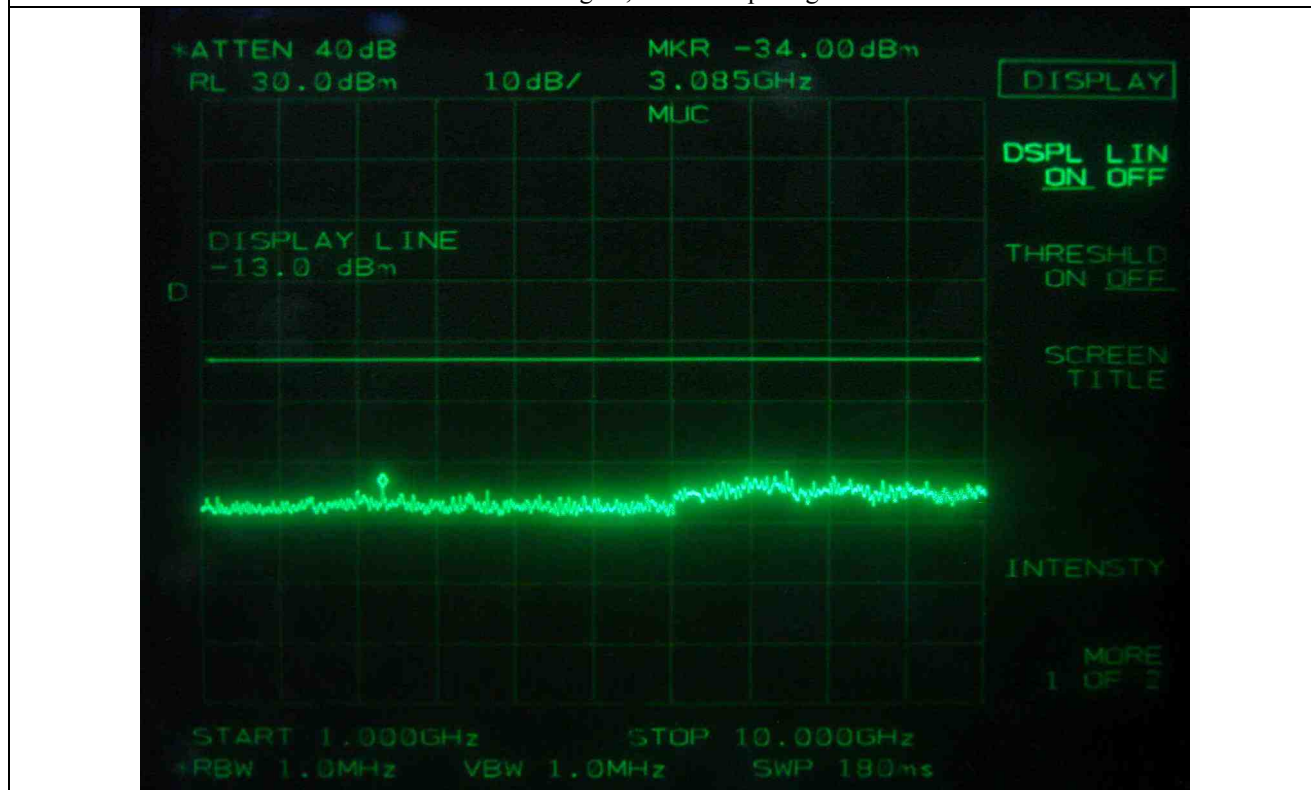
According to Part 90I, out of band emission shall be attenuated by  $43 + 10 \log (P)$  dBc, equates to -13.0 dBm.



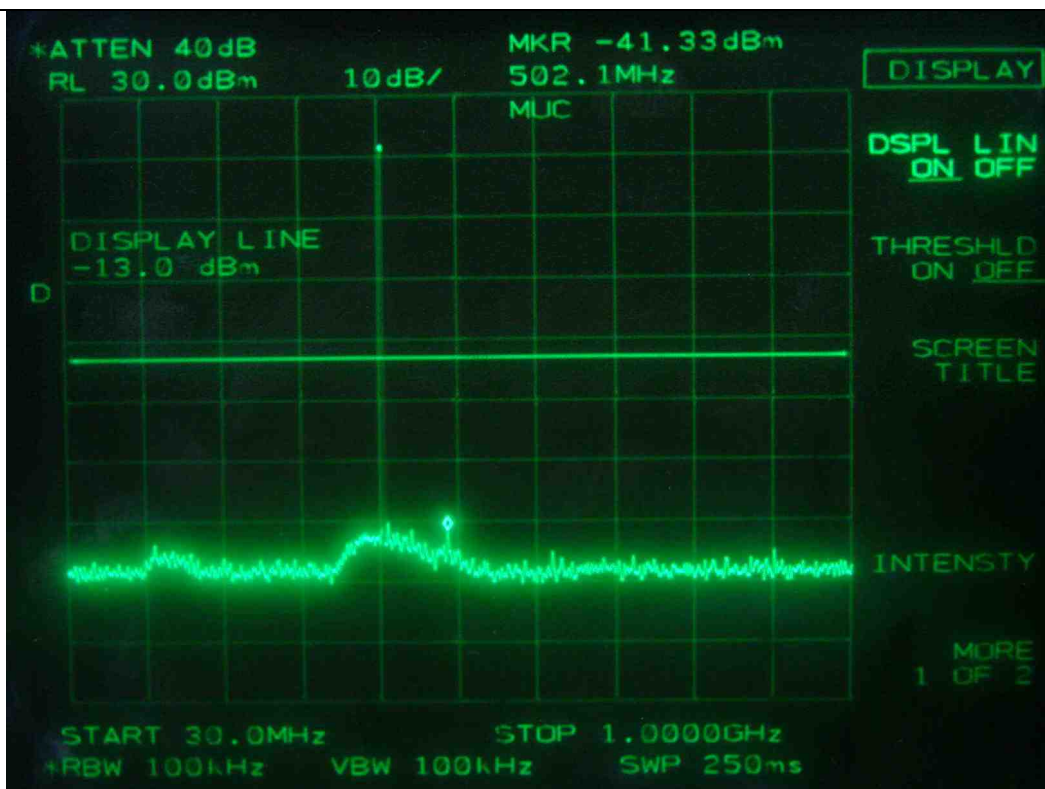
Tested by: Ki-Hong, Nam / Project Engineer



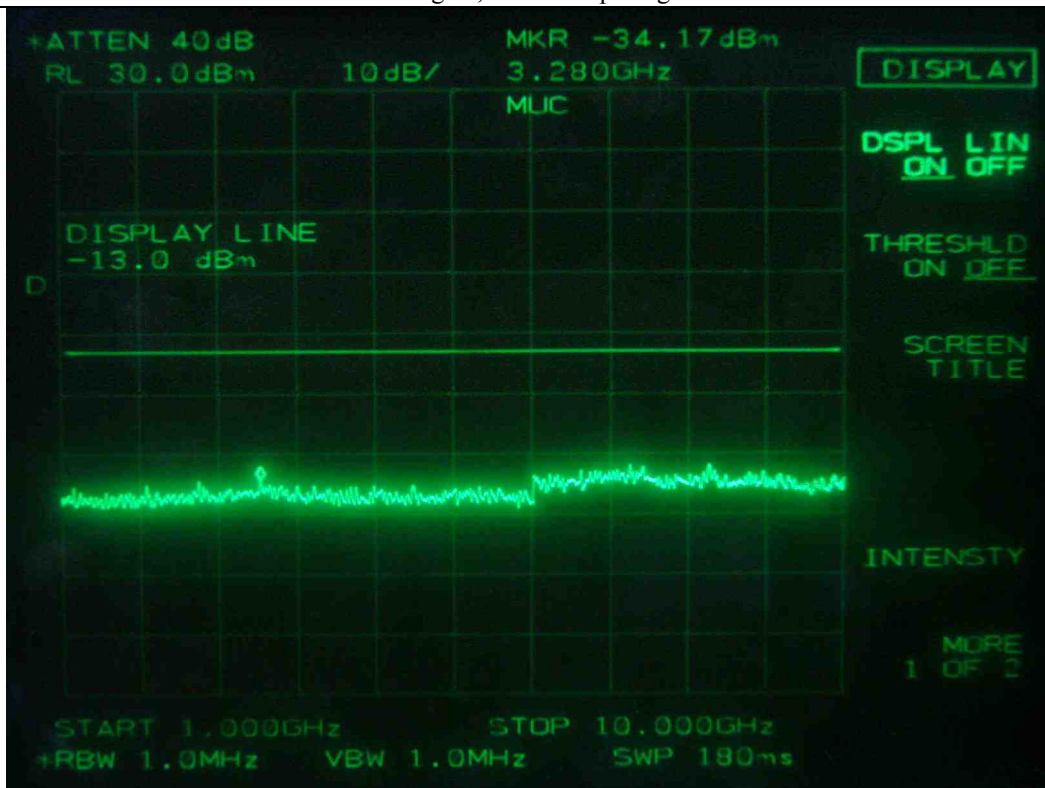
FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - Low Channel



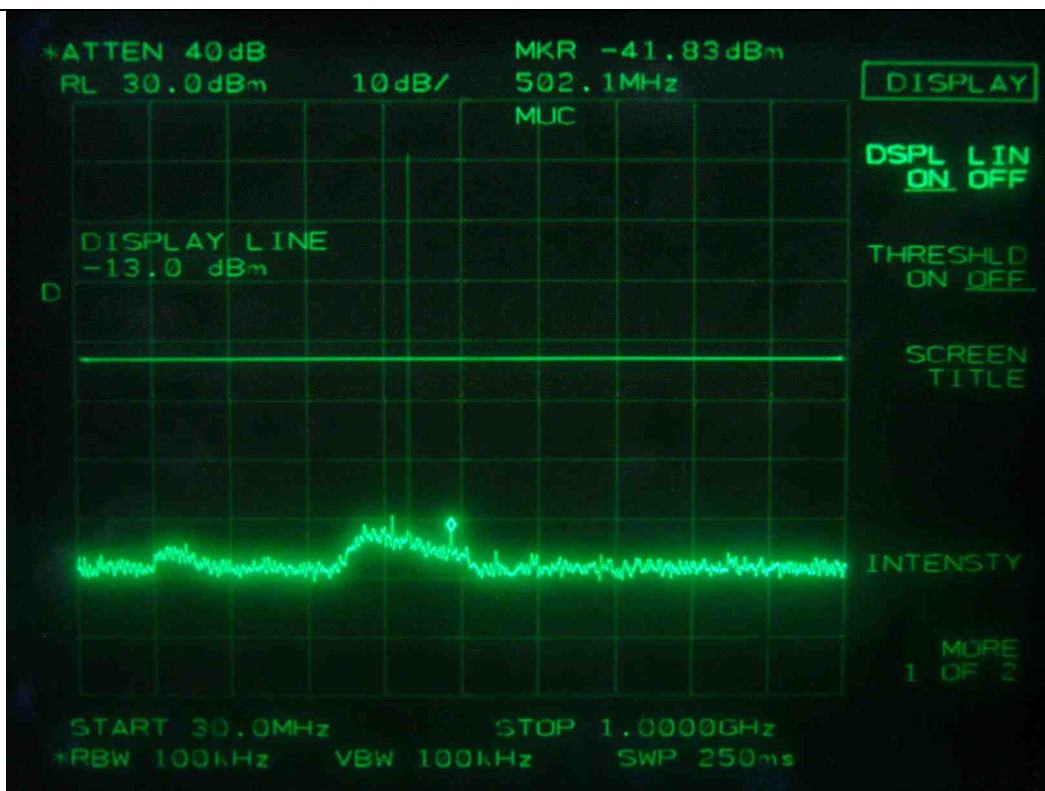
FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - Low Channel



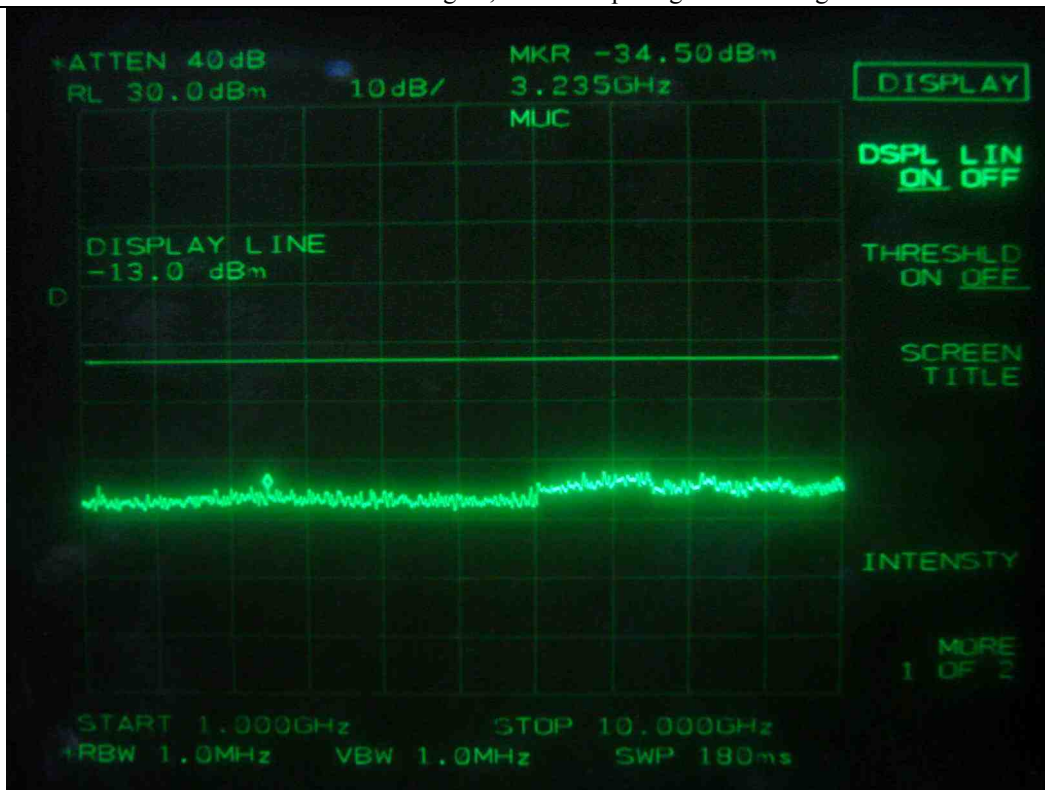
FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - Middle Channel



FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - Middle Channel

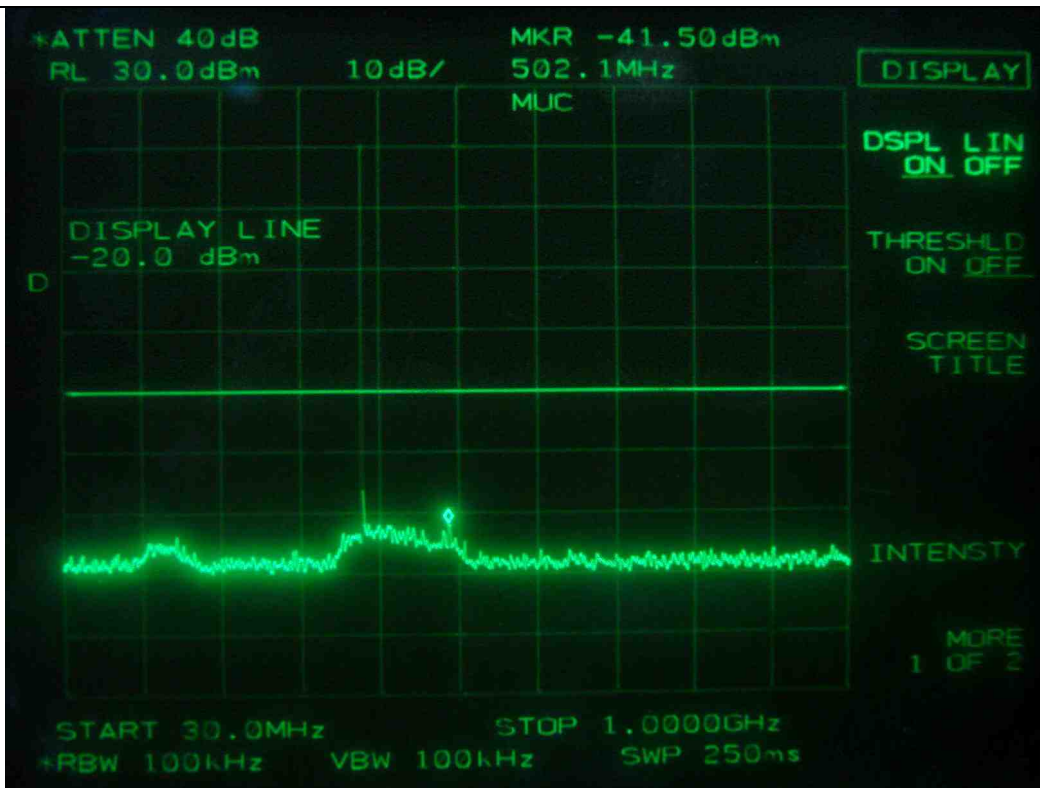


FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - High Channel

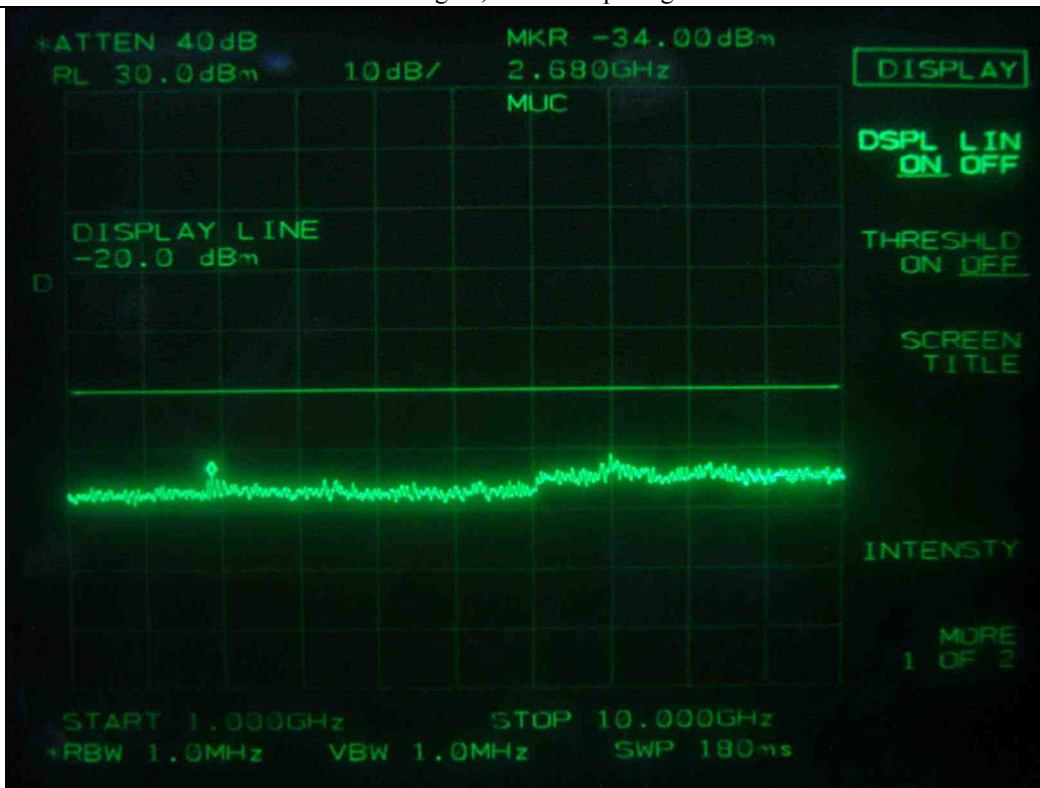


FM with 2.5 kHz sine wave signal, Channel Spacing 25 kHz - High Channel

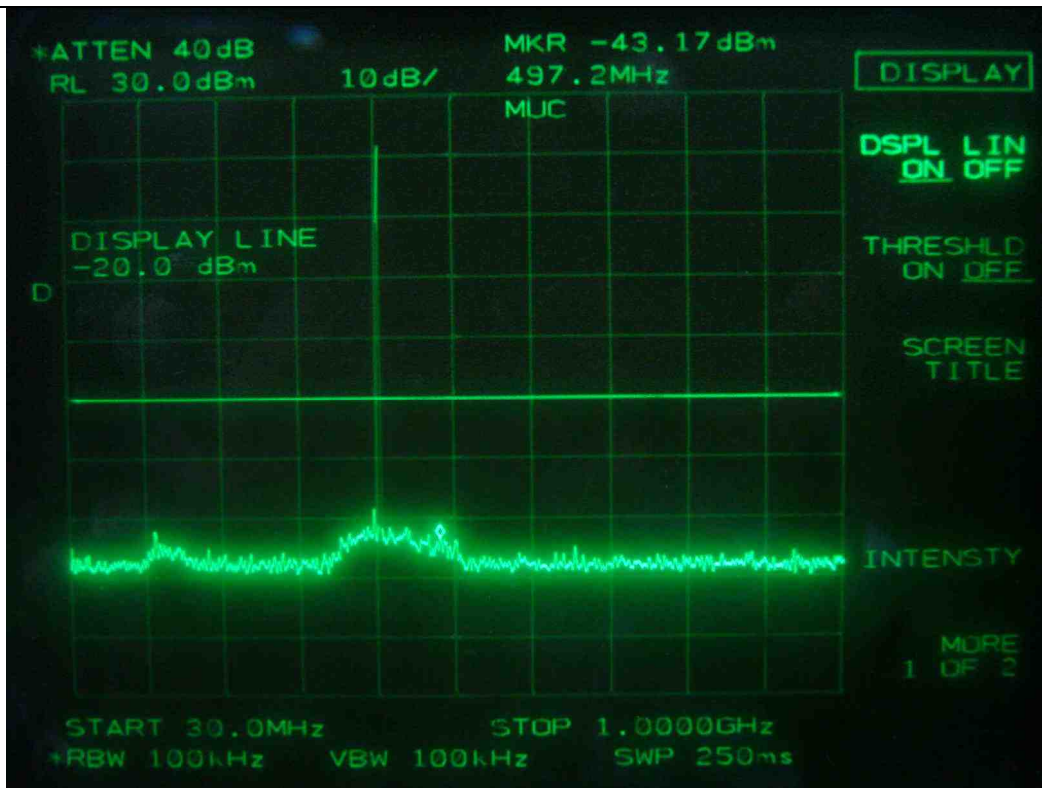




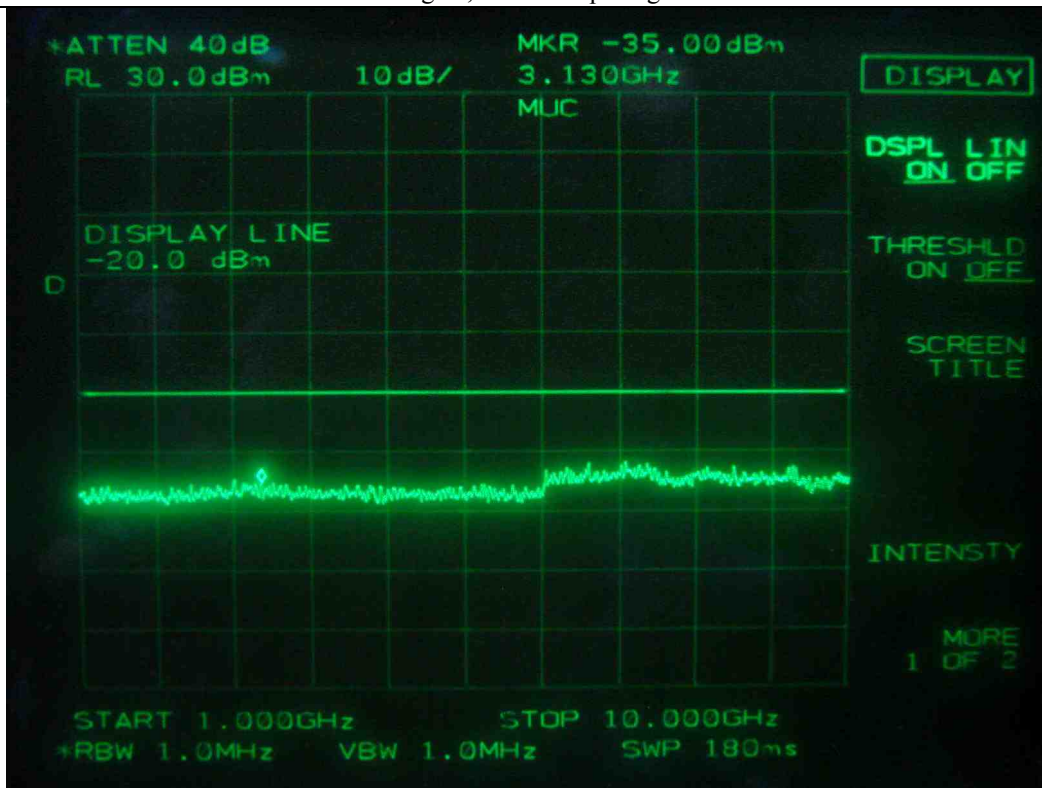
FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - Low Channel



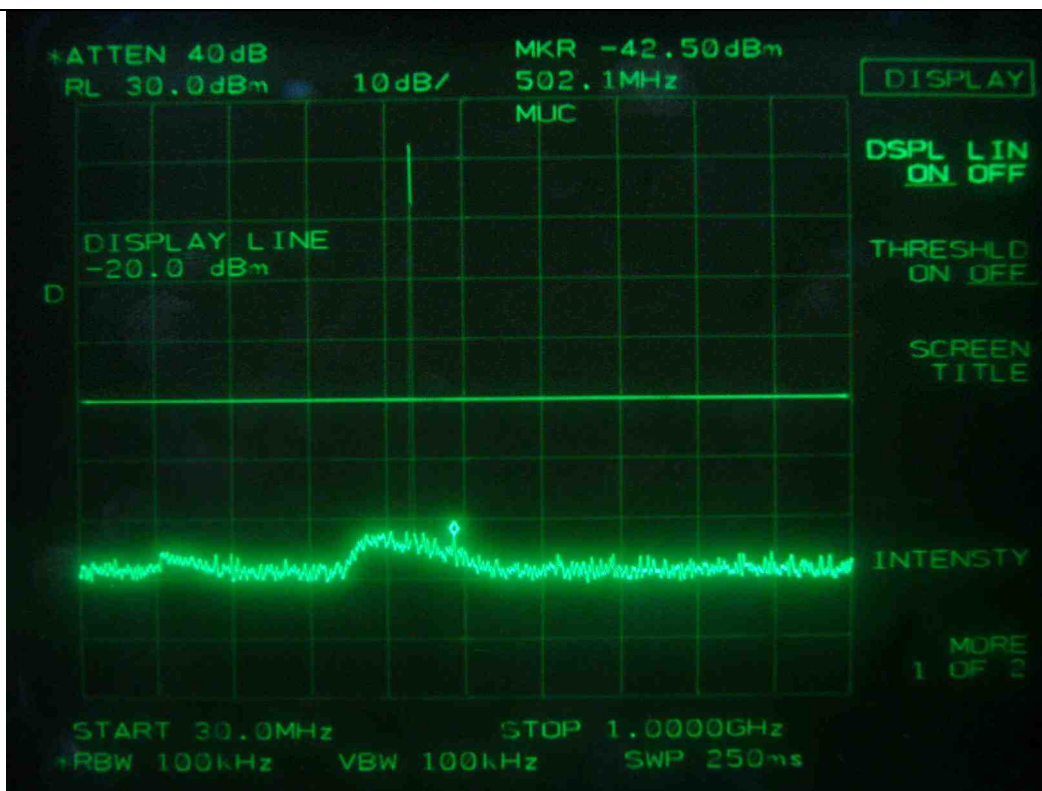
FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - Low Channel



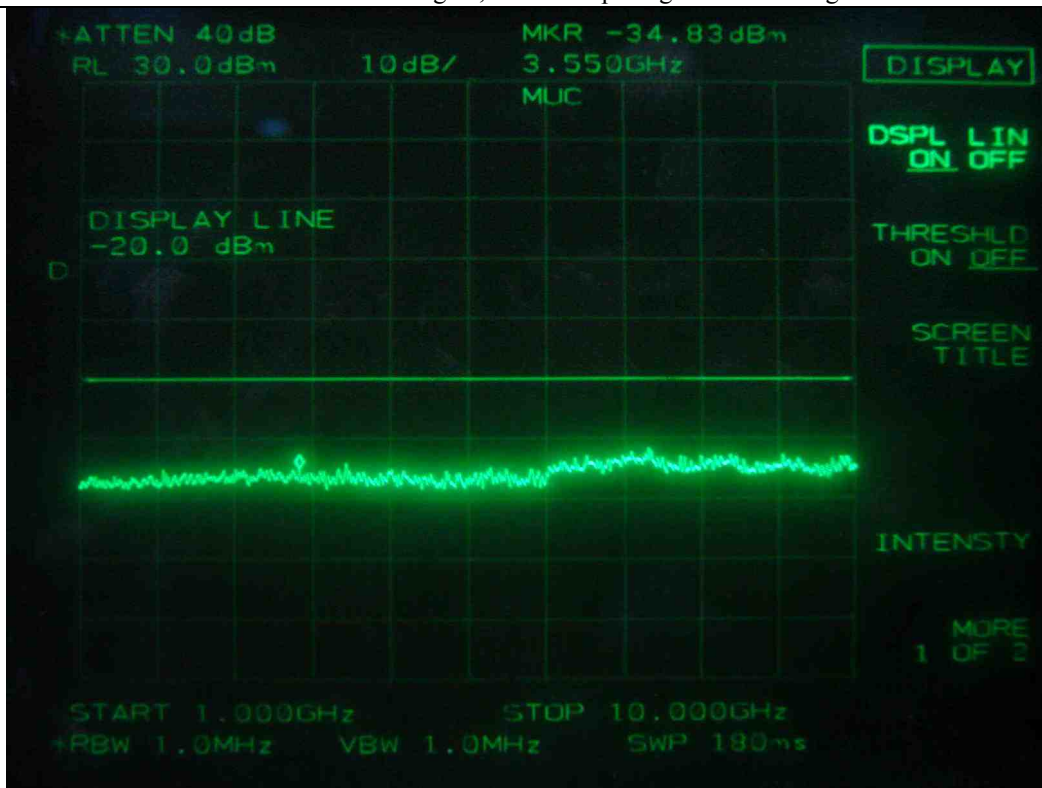
FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - Middle Channel



FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - Middle Channel

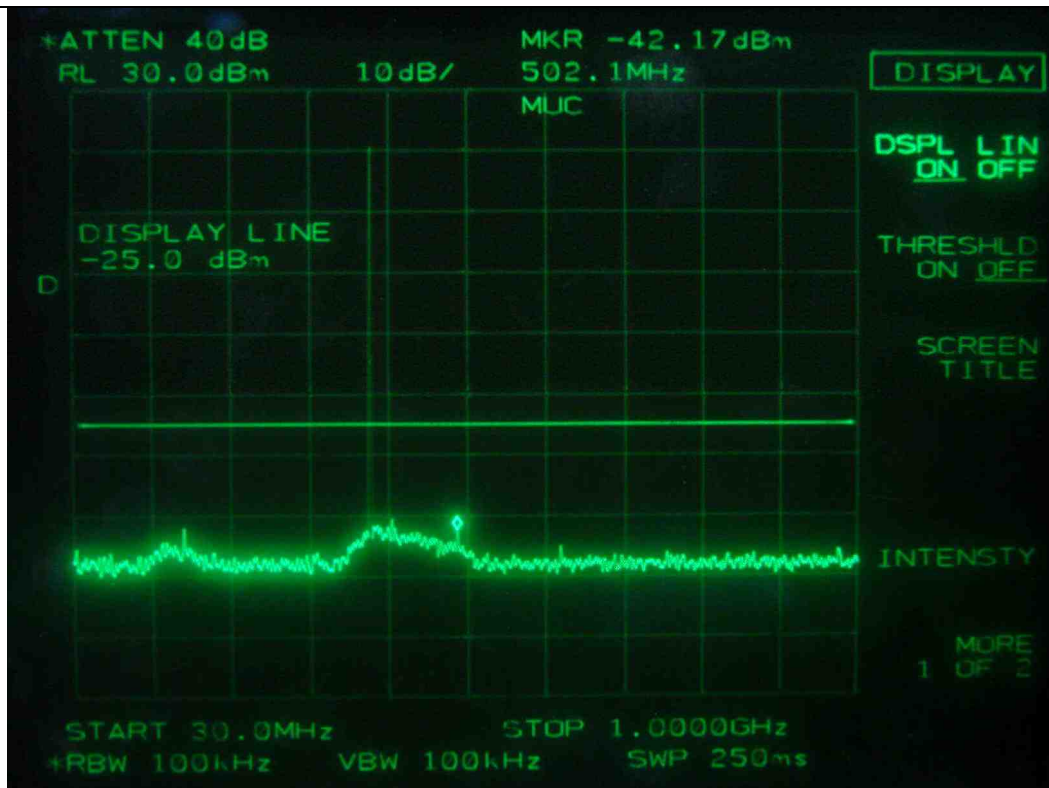


FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - High Channel

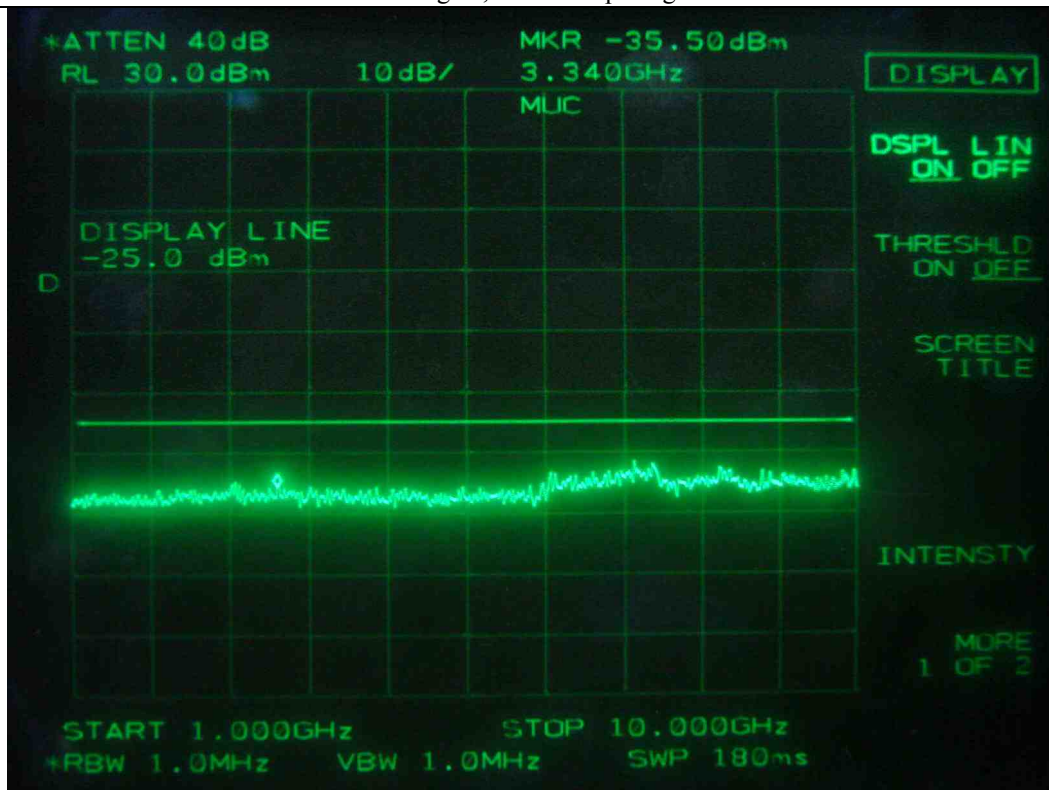


FM with 2.5 kHz sine wave signal, Channel Spacing 12.5 kHz - High Channel



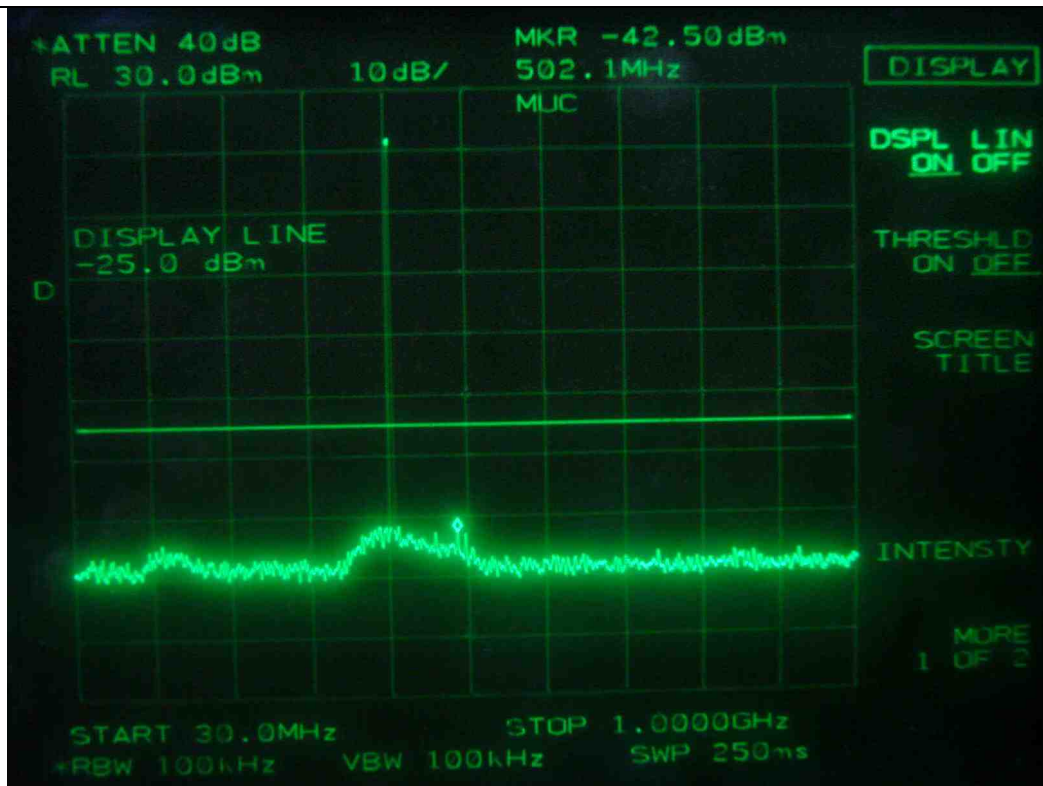


FM with 2.5 kHz sine wave signal, Channel Spacing 6.25 kHz - Low Channel

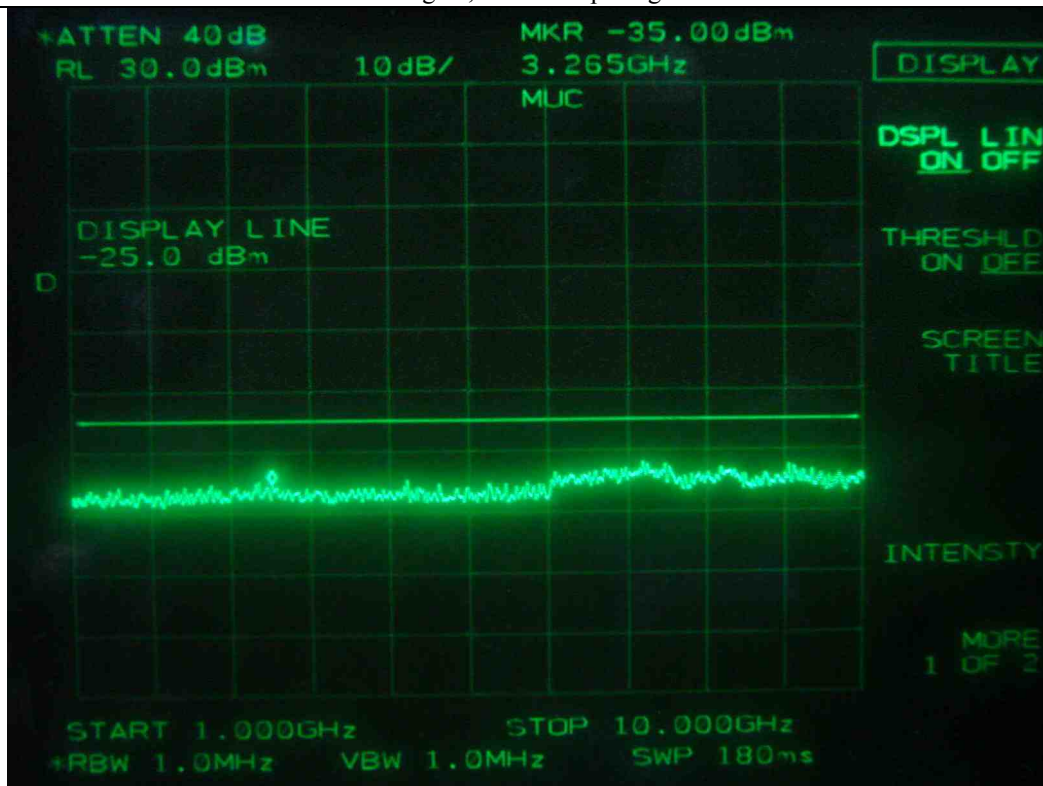


FM with 2.5 kHz sine wave signal, Channel Spacing 6.25 kHz - Low Channel

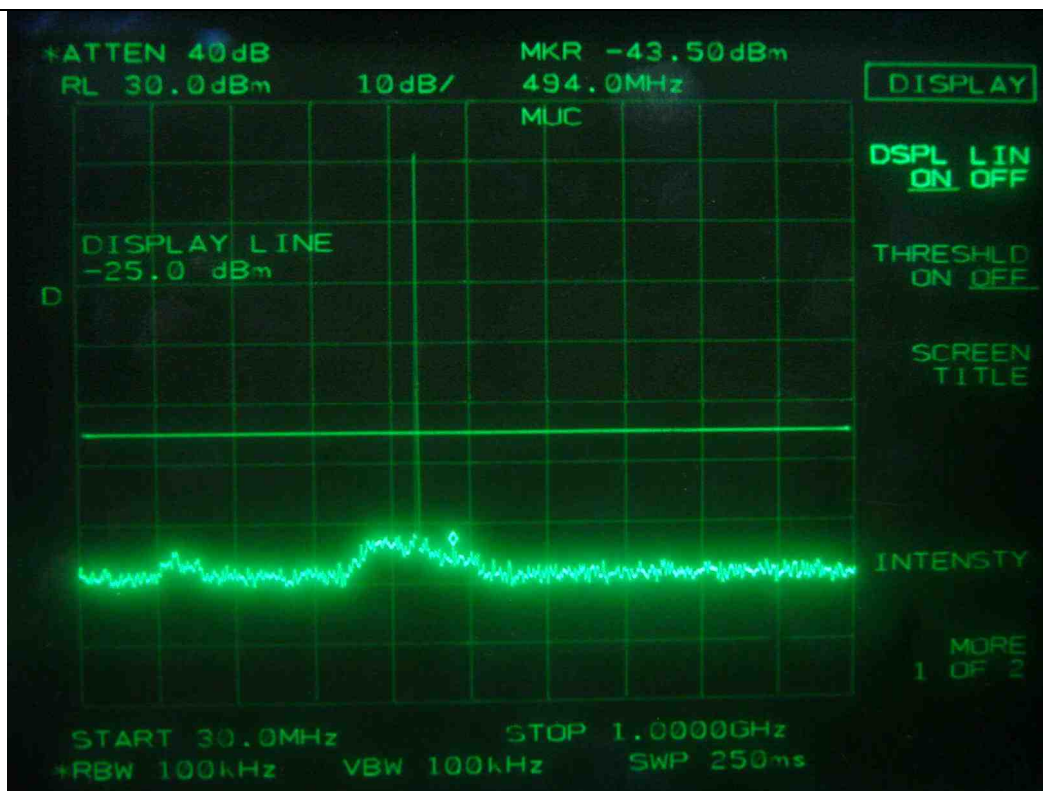




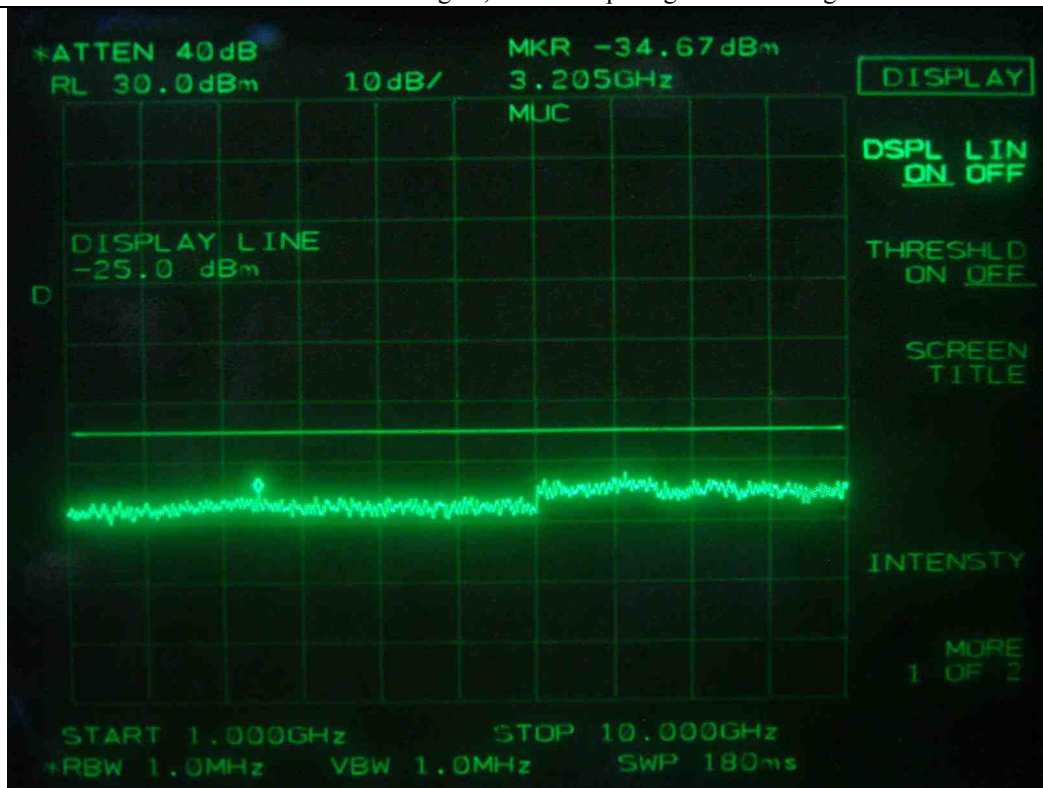
FM with 2.5 kHz sine wave signal, Channel Spacing 6.25 kHz - Middle Channel



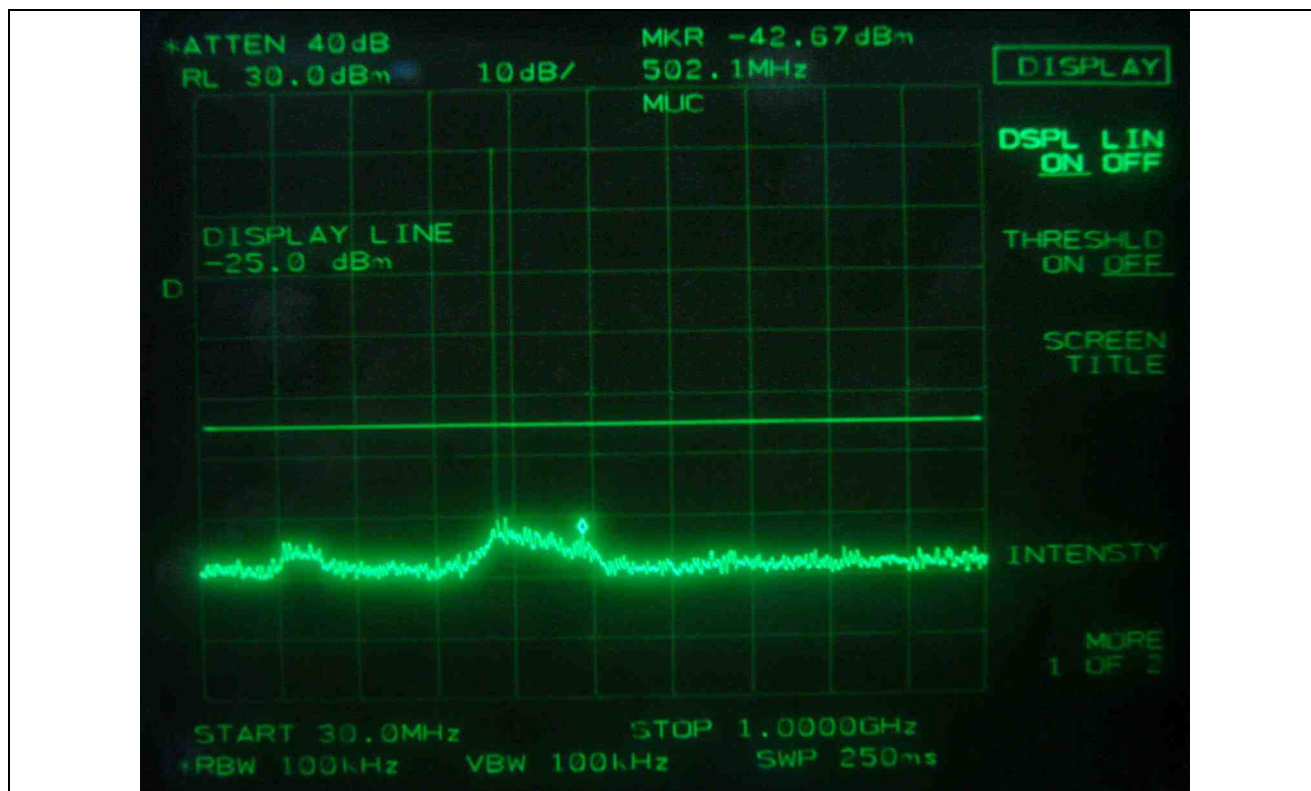
FM with 2.5 kHz sine wave signal, Channel Spacing 6.25 kHz - Middle Channel



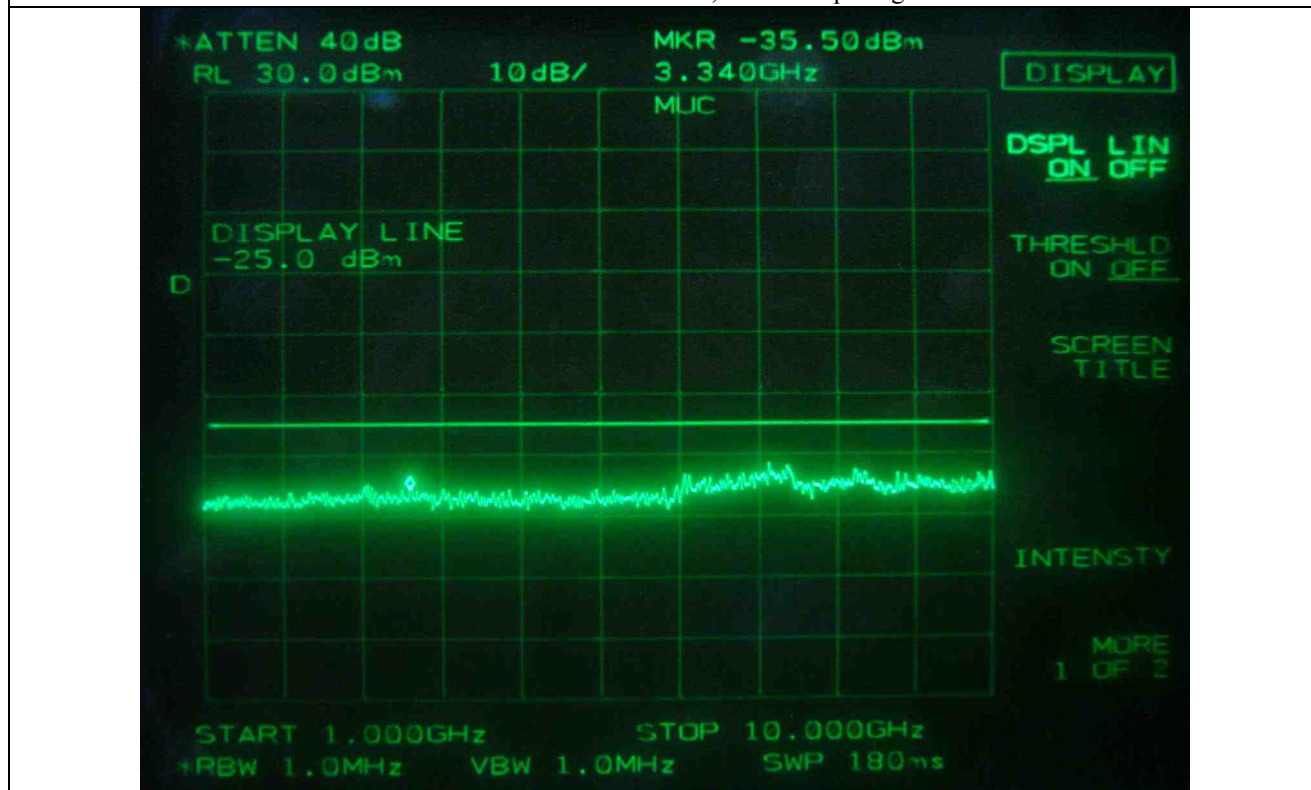
FM with 2.5 kHz sine wave signal, Channel Spacing 6.25 kHz- High Channel



FM with 2.5 kHz sine wave signal, Channel Spacing 6.25 kHz - High Channel

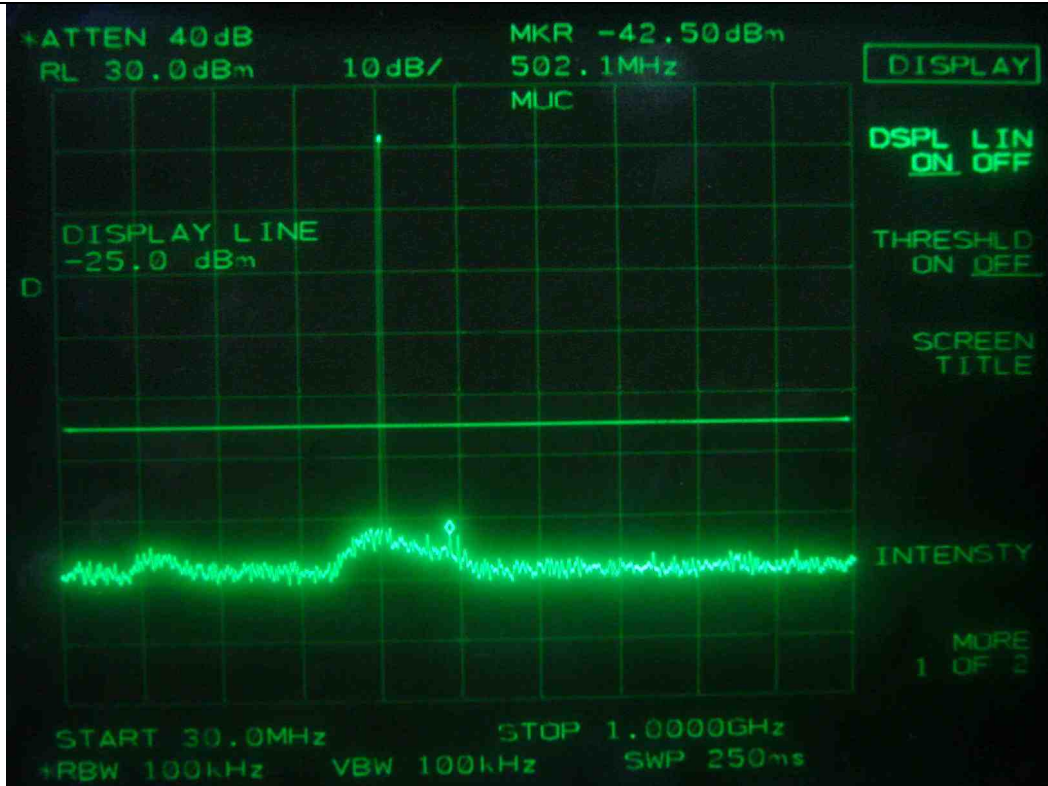


FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - Low Channel

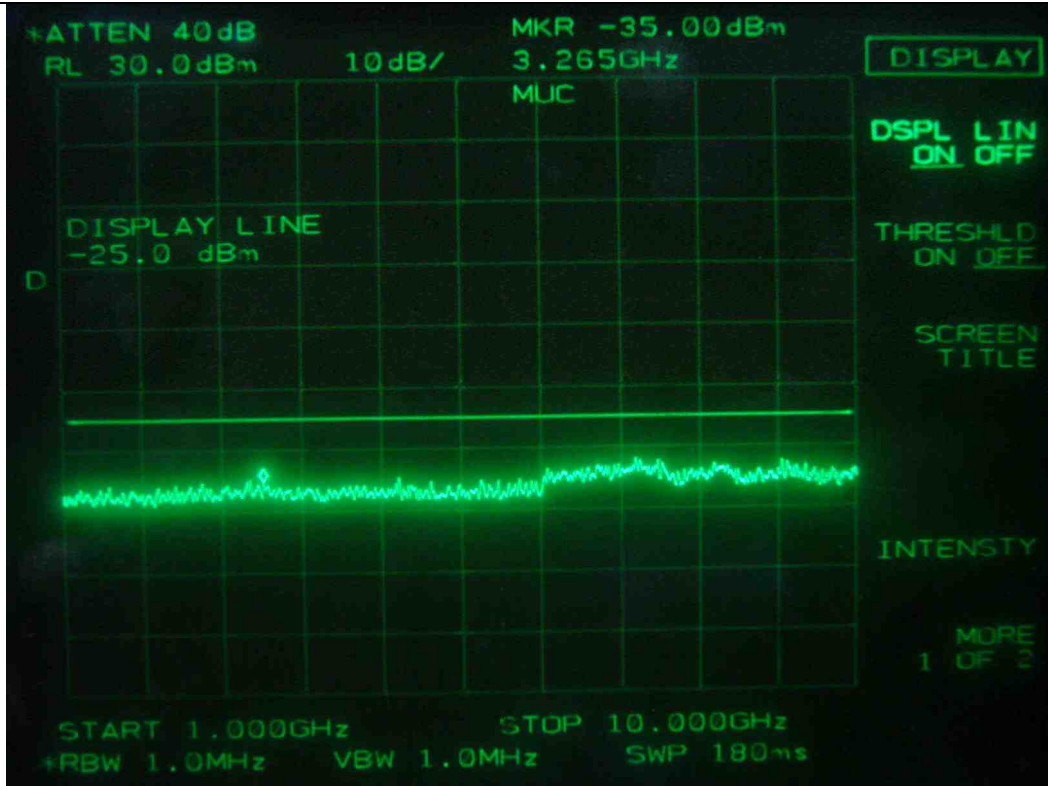


FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - Low Channel



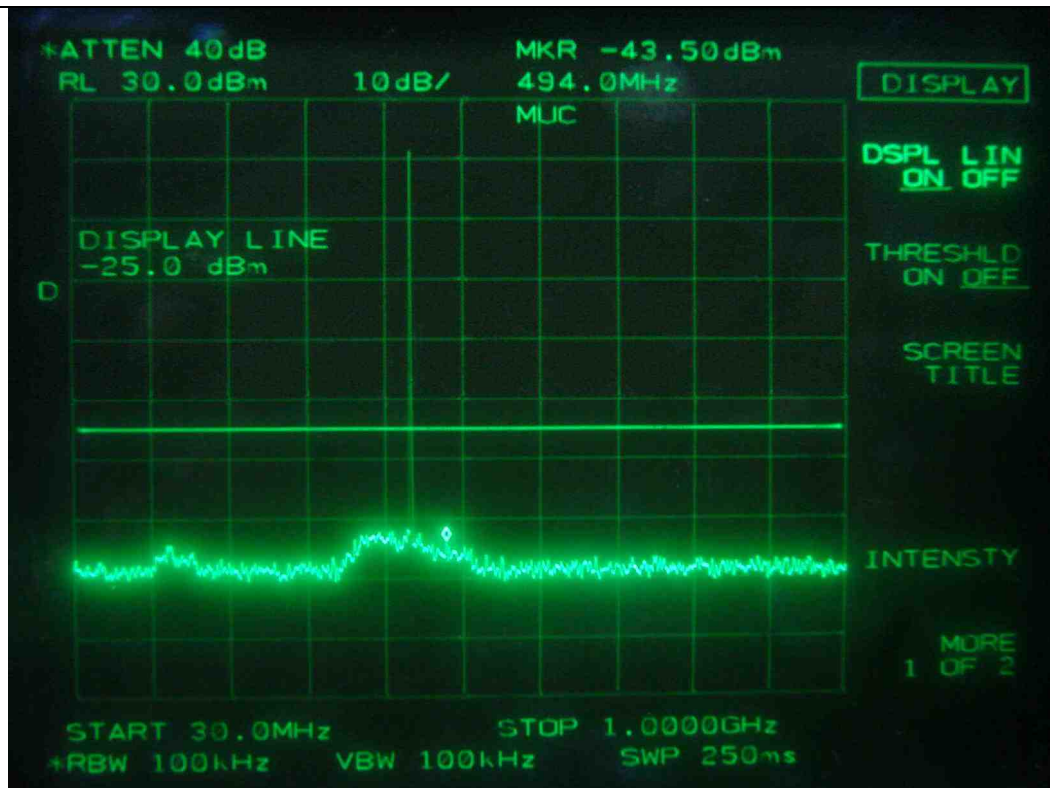


FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - Middle Channel

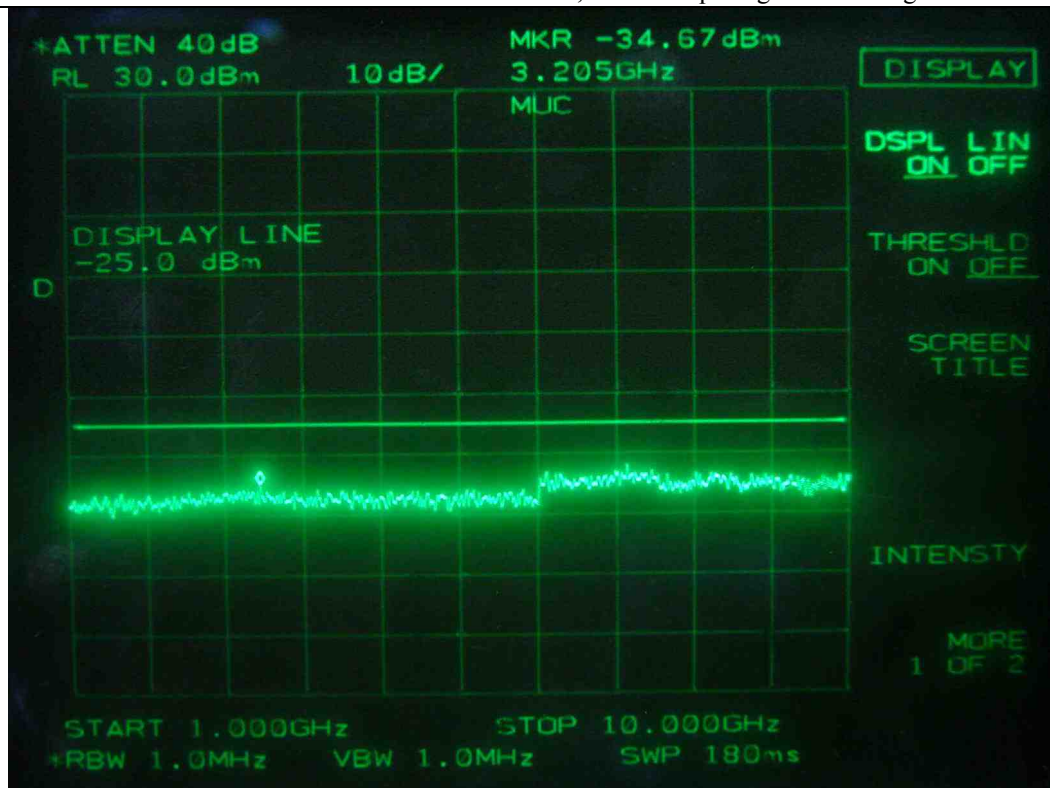


FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - Middle Channel

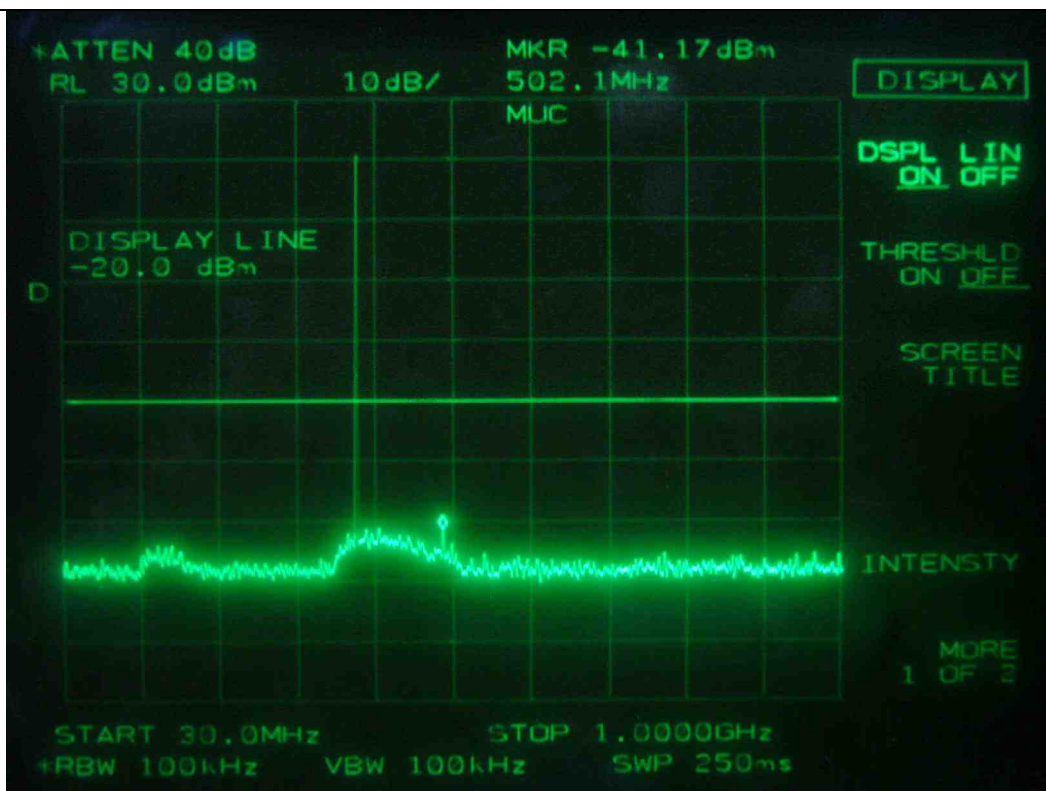




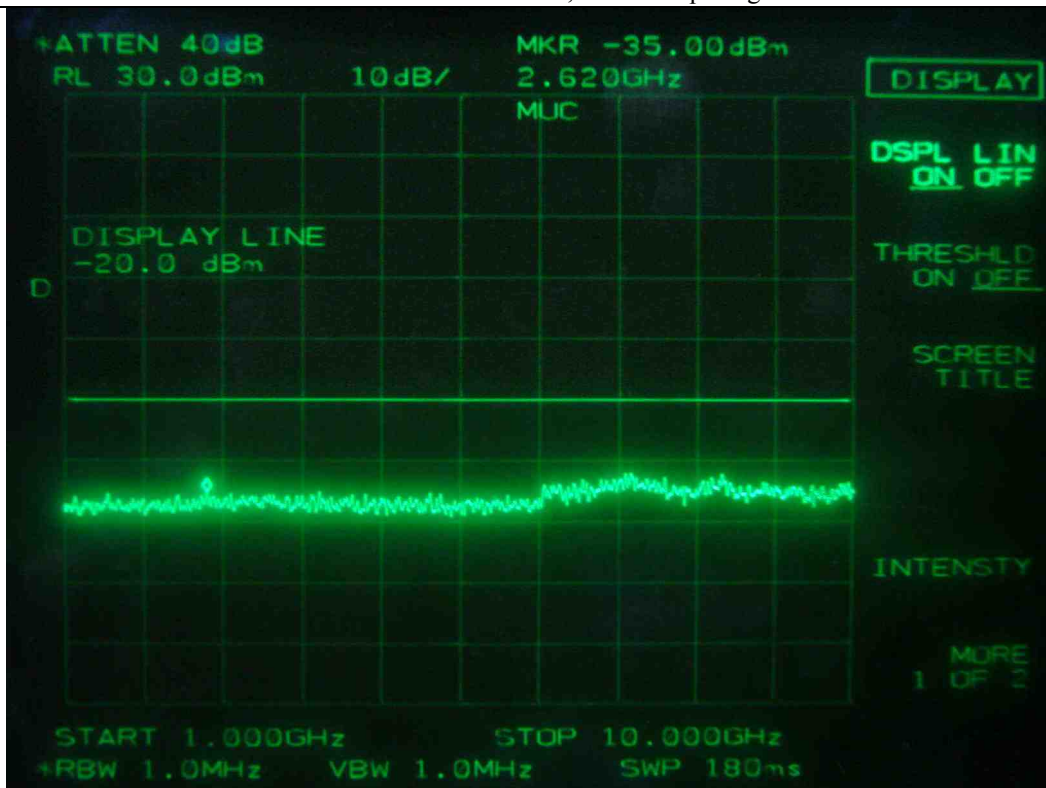
FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - High Channel



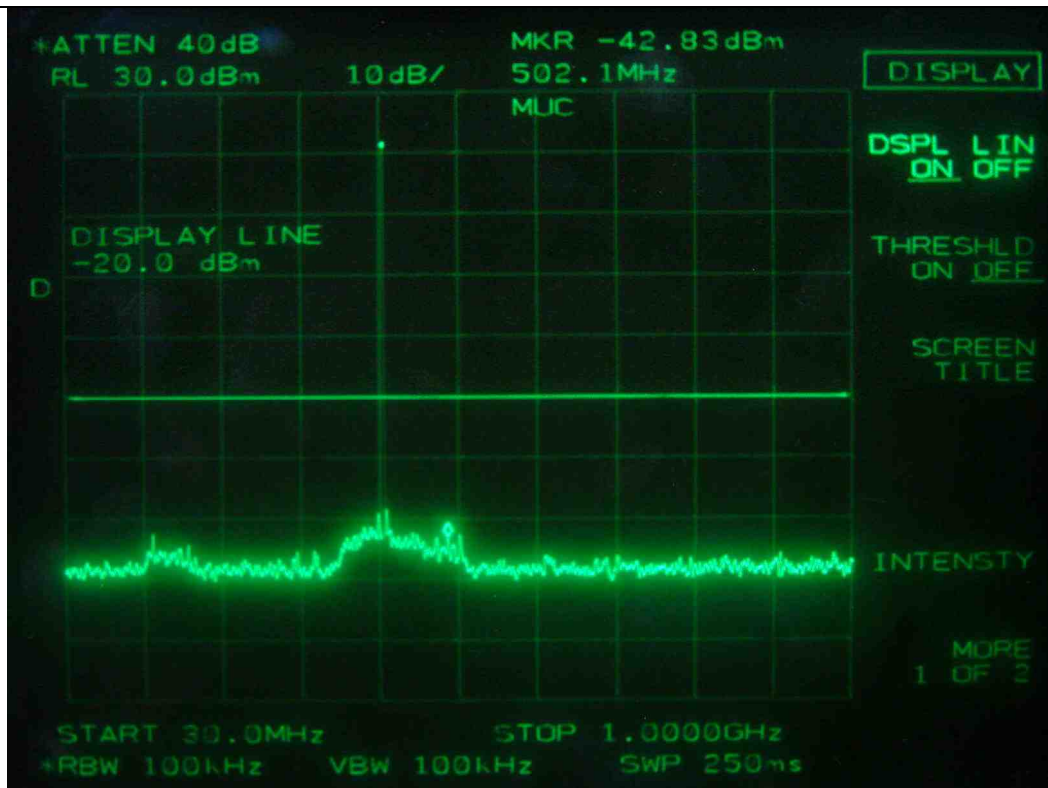
FM with an external 9 600 b/s random data source, Channel Spacing 25 kHz - High Channel



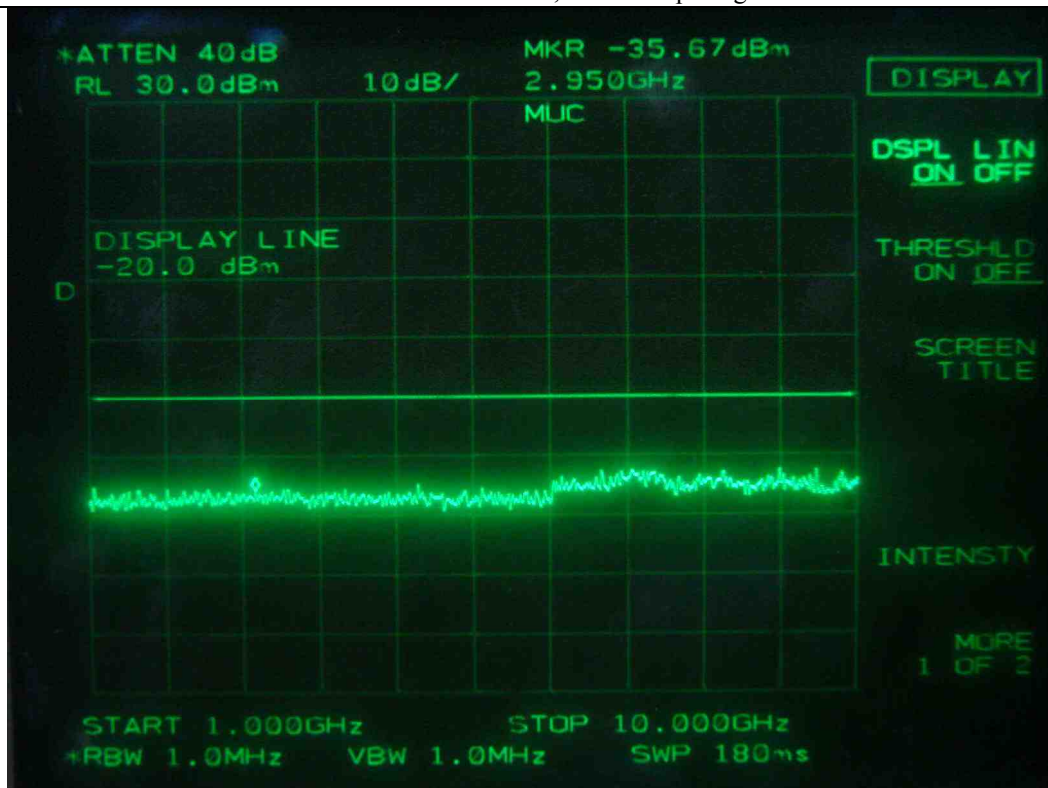
FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - Low Channel



FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - Low Channel

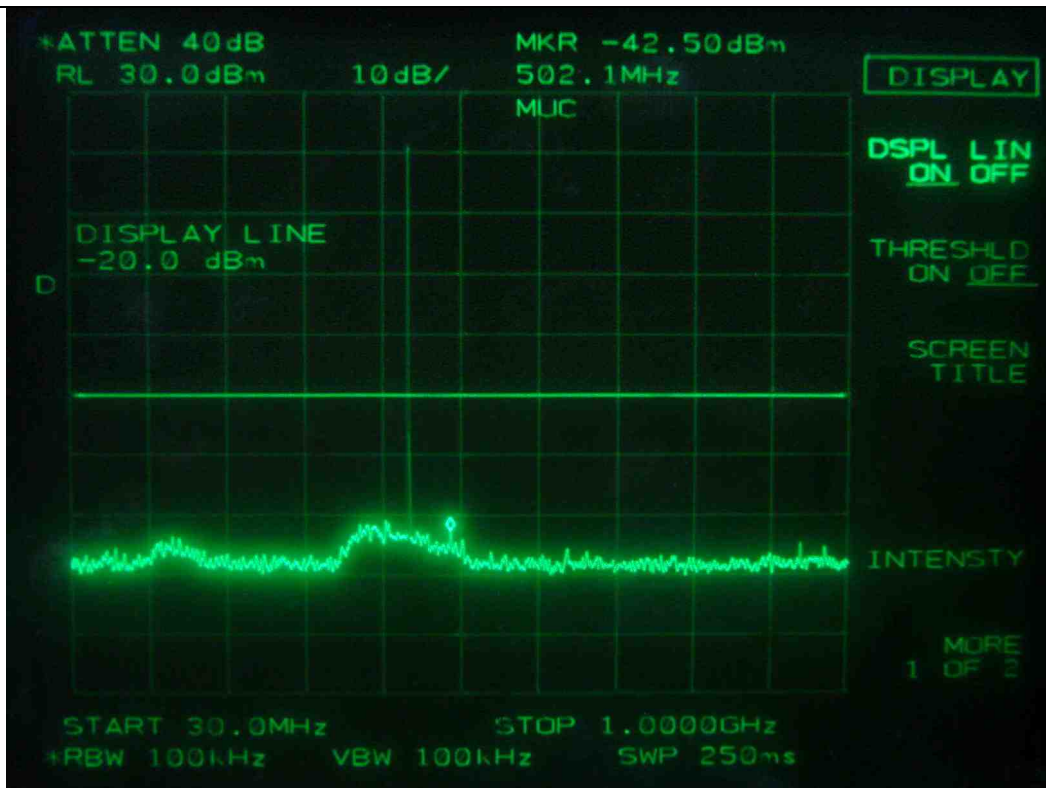


FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - Middle Channel

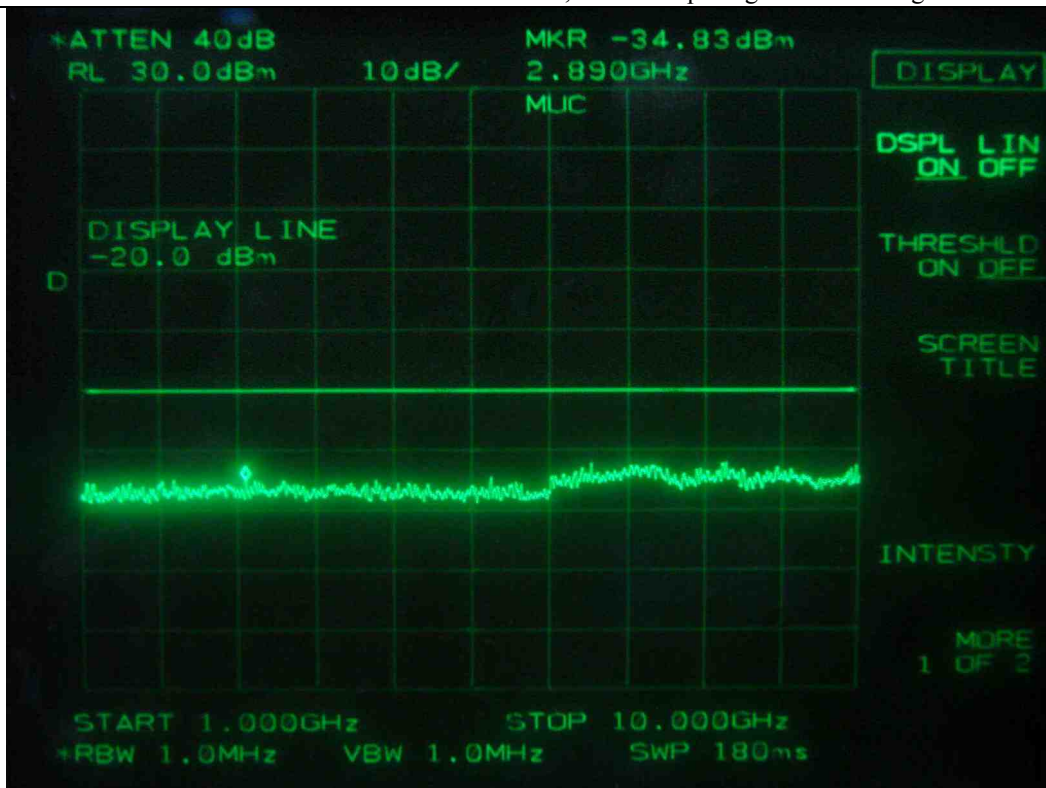


FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - Middle Channel



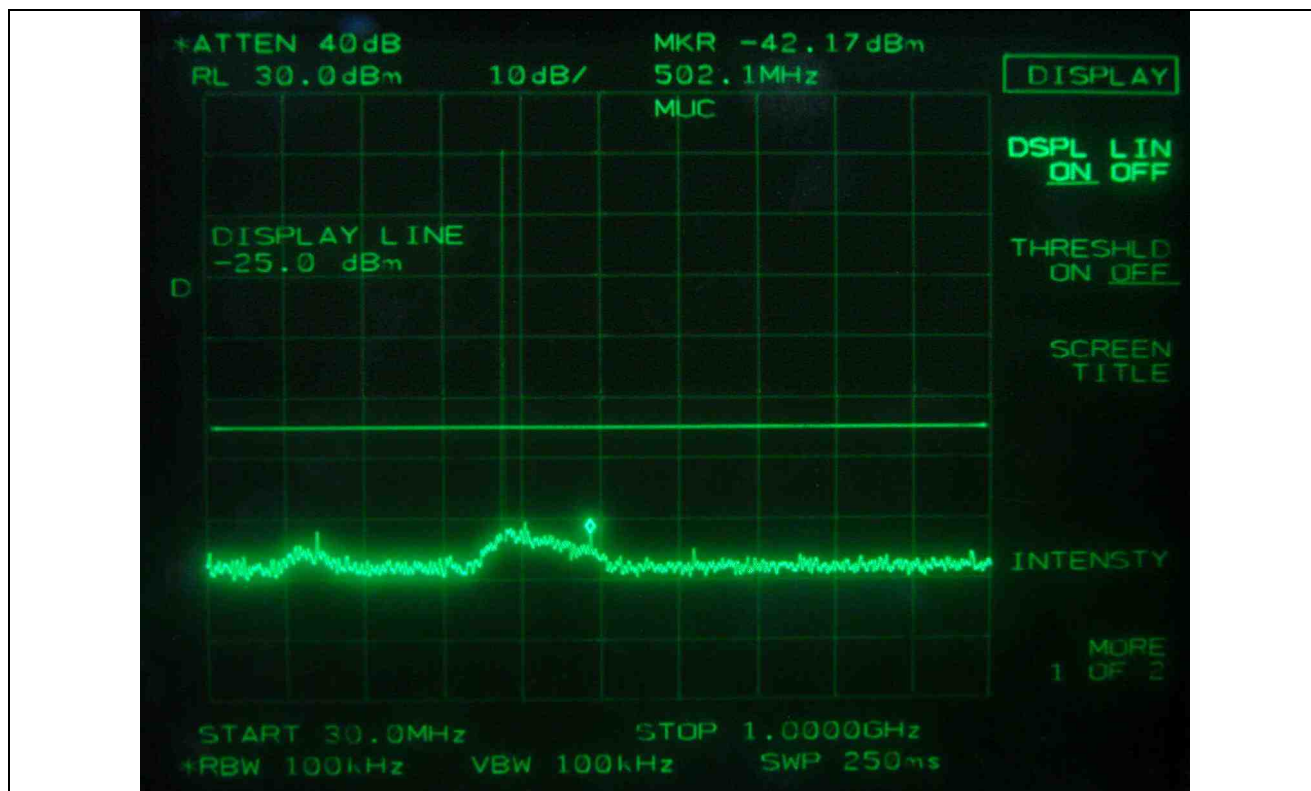


FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - High Channel

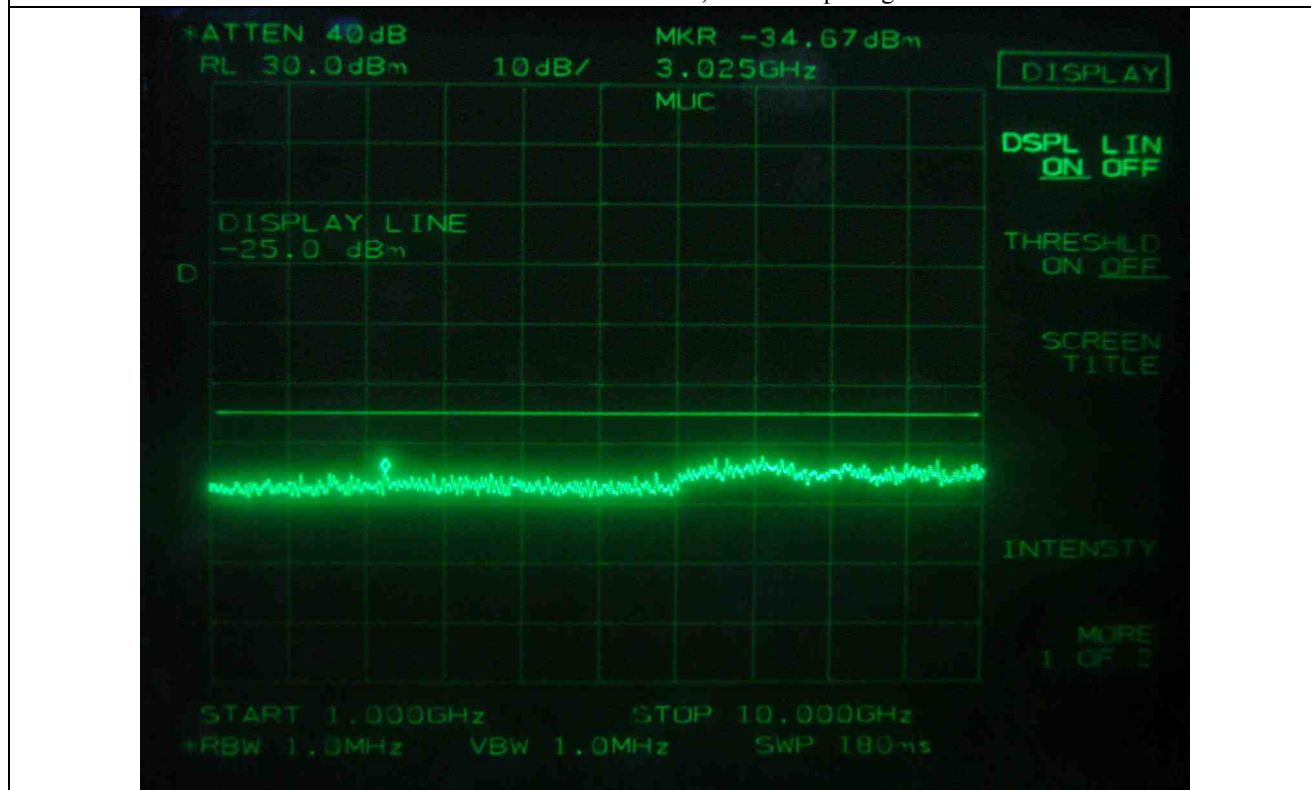


FM with an external 9 600 b/s random data source, Channel Spacing 12.5 kHz - High Channel

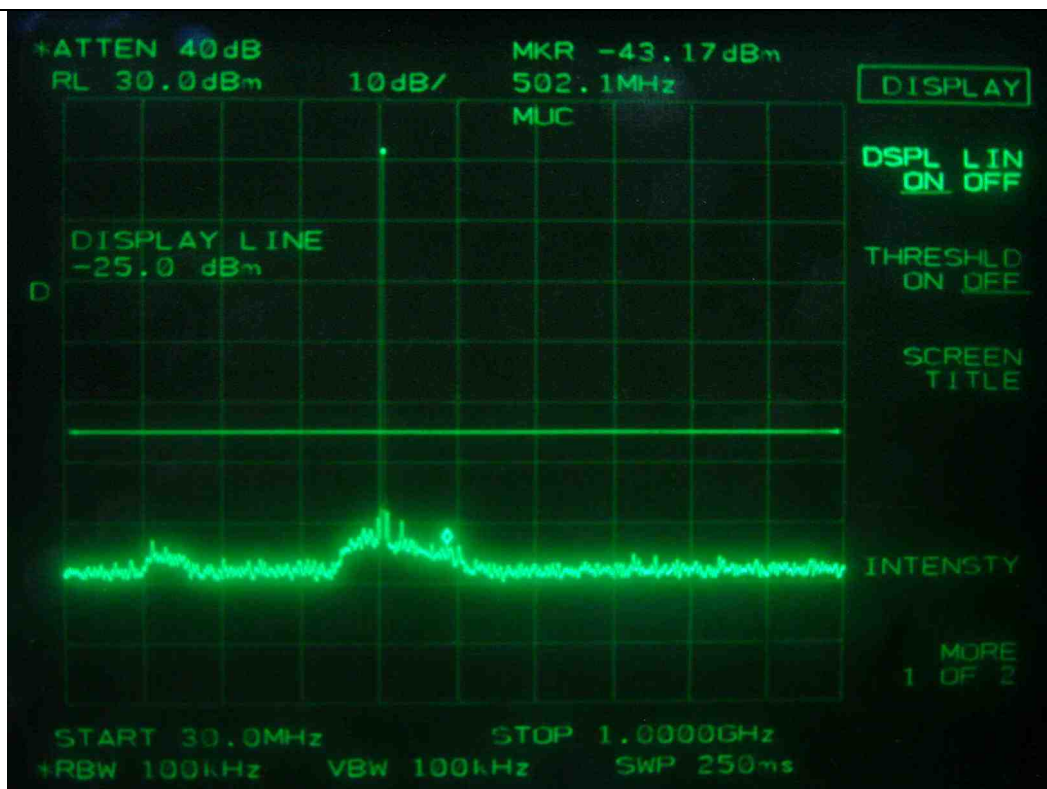




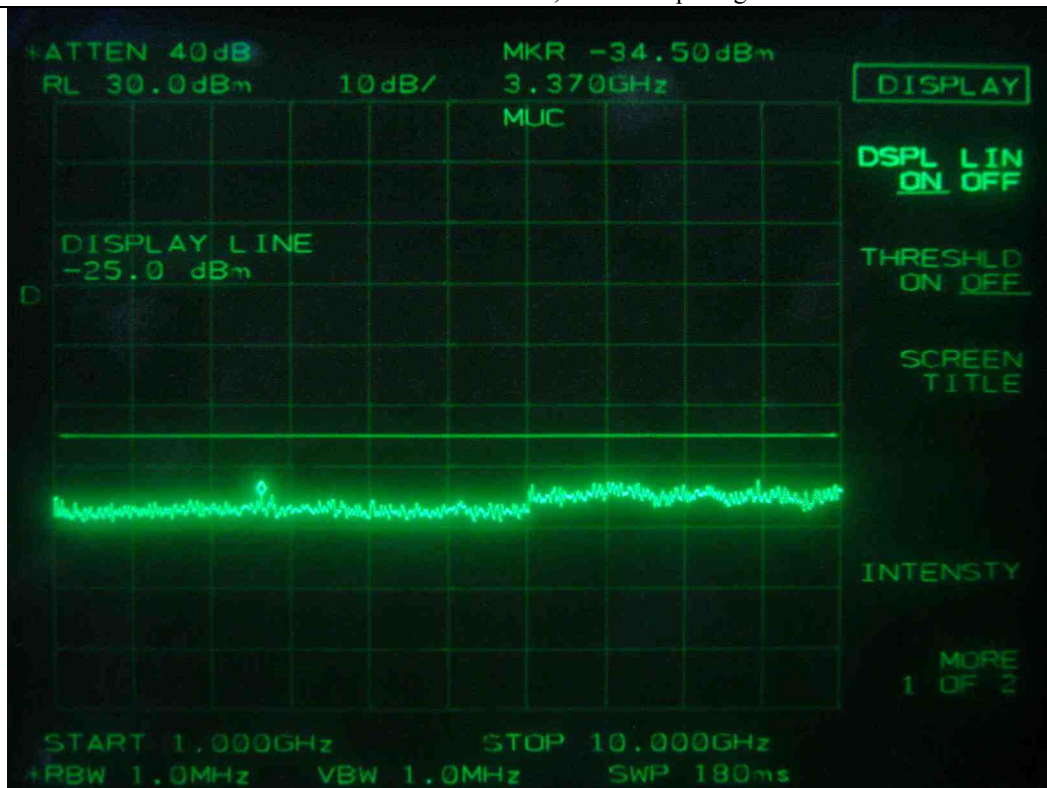
FM with an external 9 600 b/s random data source, Channel Spacing 6.25 kHz - Low Channel



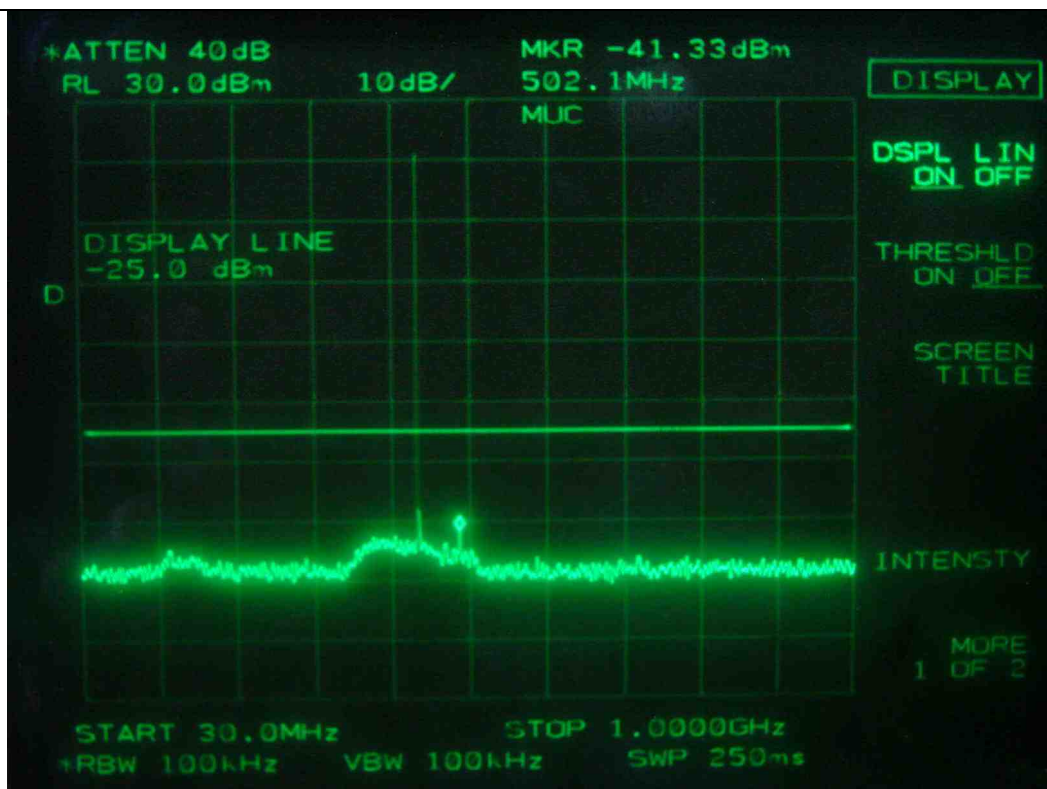
FM with an external 9 600 b/s random data source, Channel Spacing 6.25 kHz - Low Channel



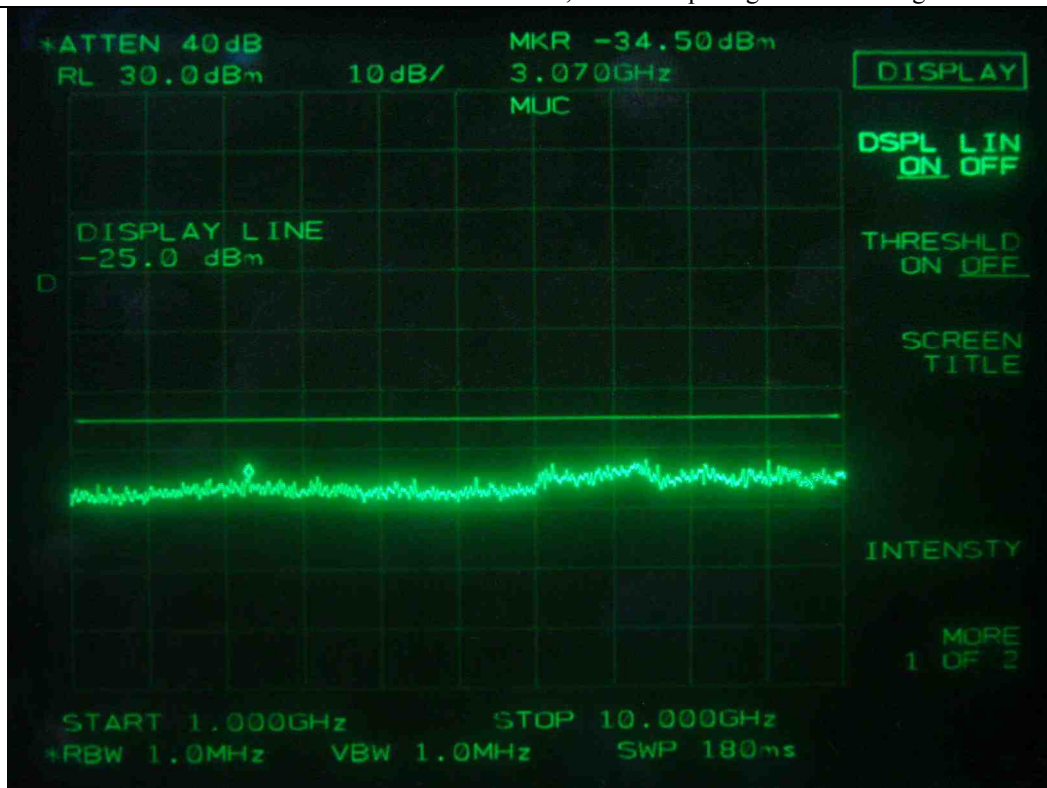
FM with an external 9 600 b/s random data source, Channel Spacing 6.25 kHz - Middle Channel



FM with an external 9 600 b/s random data source, Channel Spacing 6.25 kHz - Middle Channel



FM with an external 9 600 b/s random data source, Channel Spacing 6.25 kHz - High Channel



FM with an external 9 600 b/s random data source, Channel Spacing 6.25 kHz - High Channel