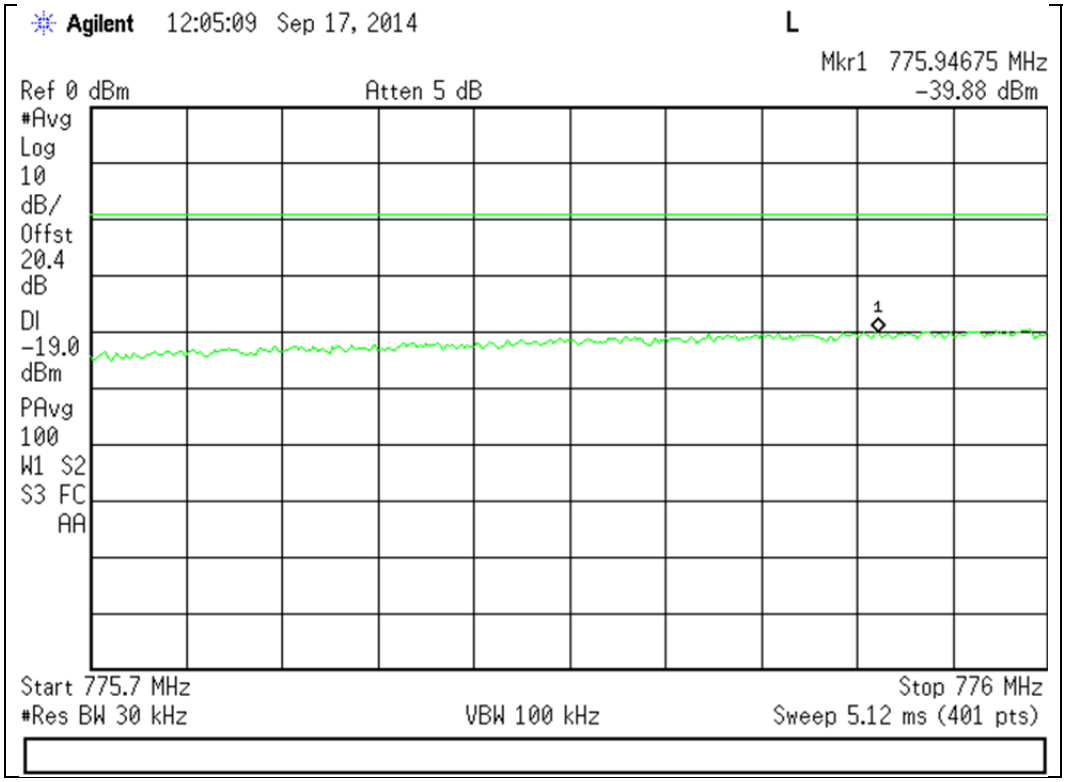
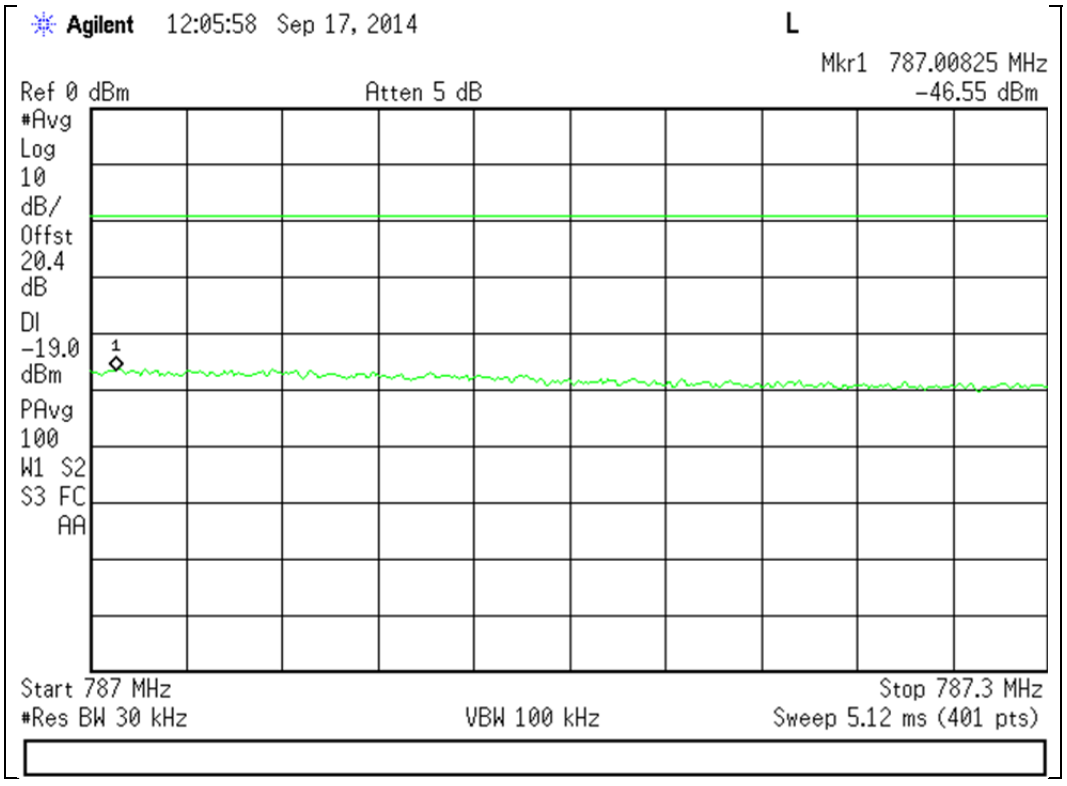
776 - 787 MHz Band

Lower Band Edge

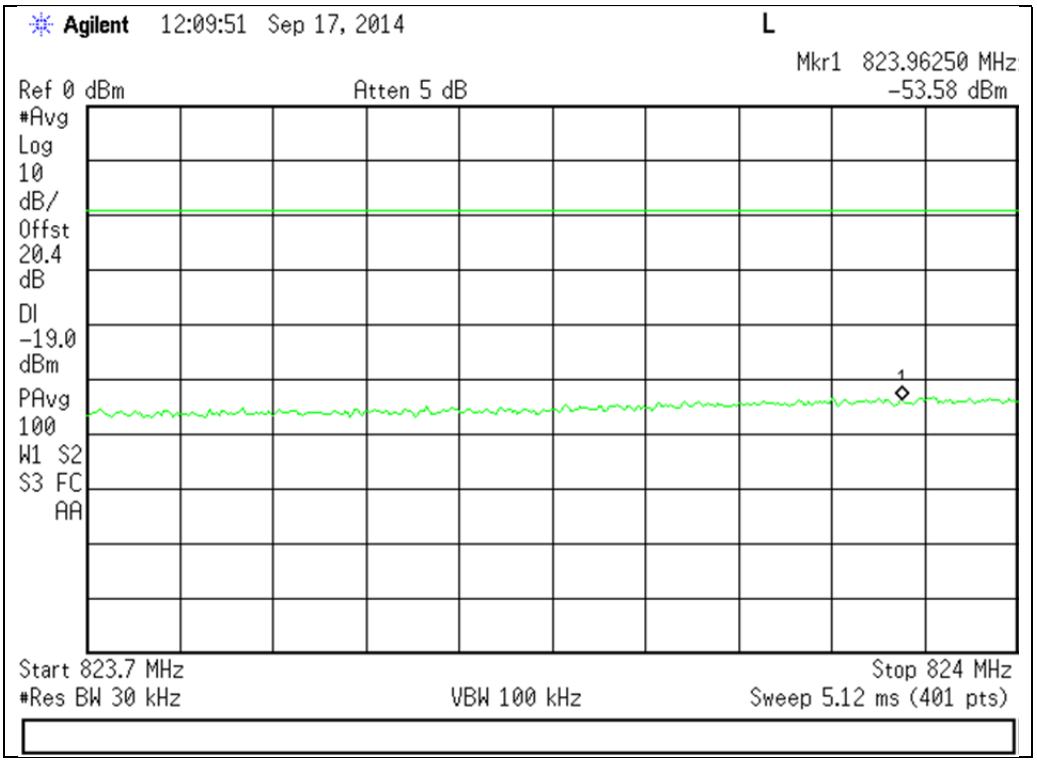


Upper Band Edge

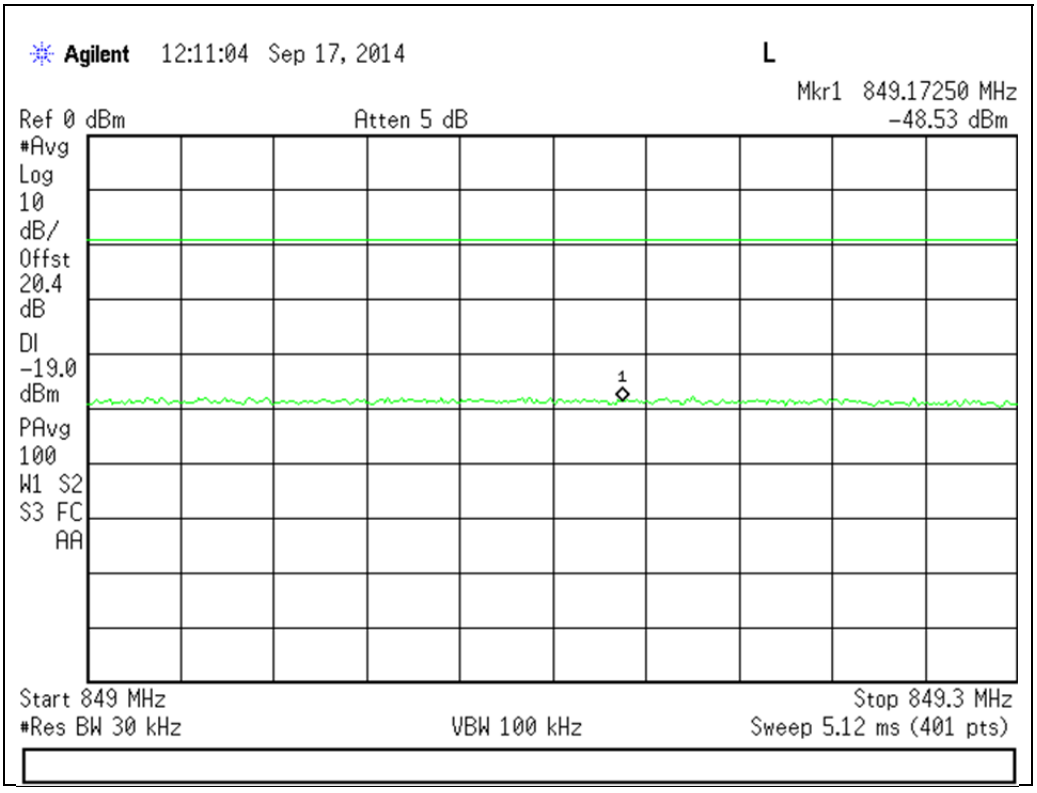


824 - 849 MHz Band

Lower Band Edge

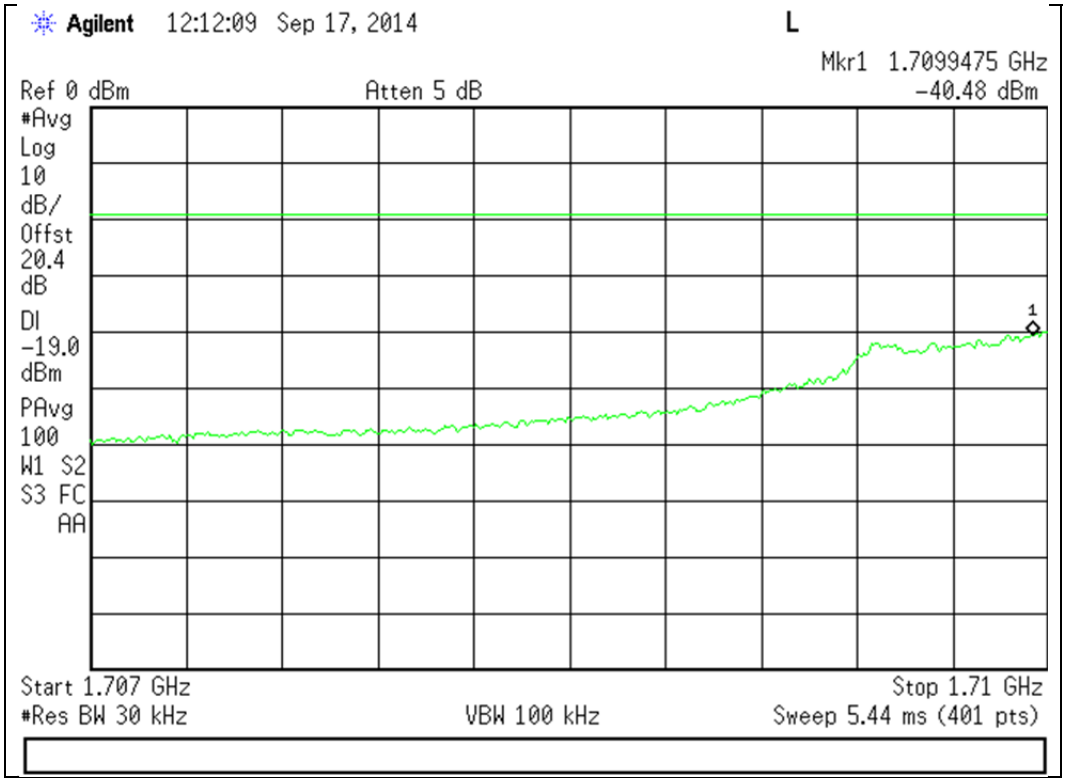


Upper Band Edge

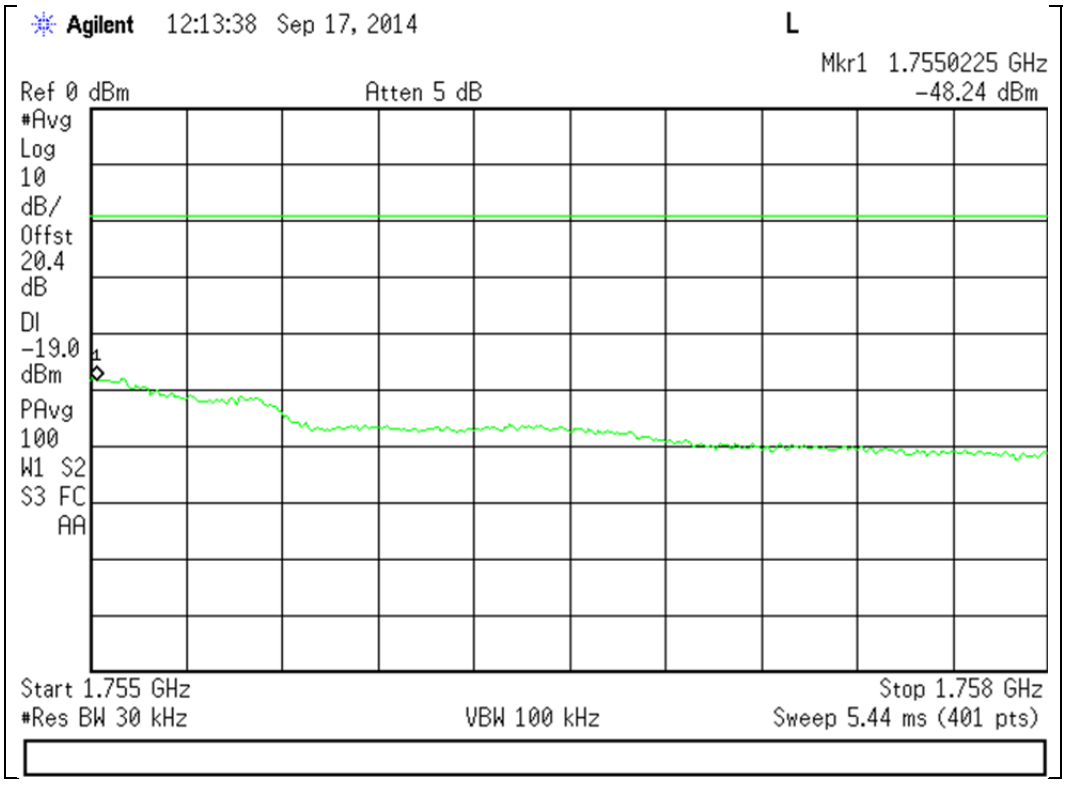


1710 - 1755 MHz Band

Lower Band Edge

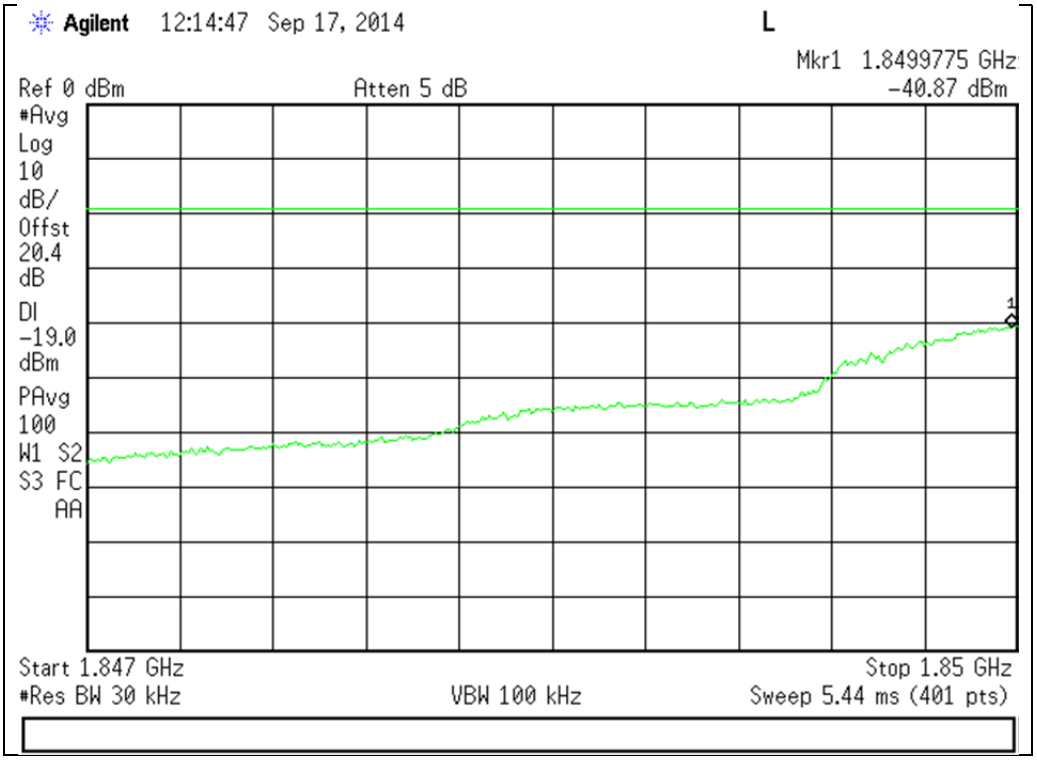


Upper Band Edge

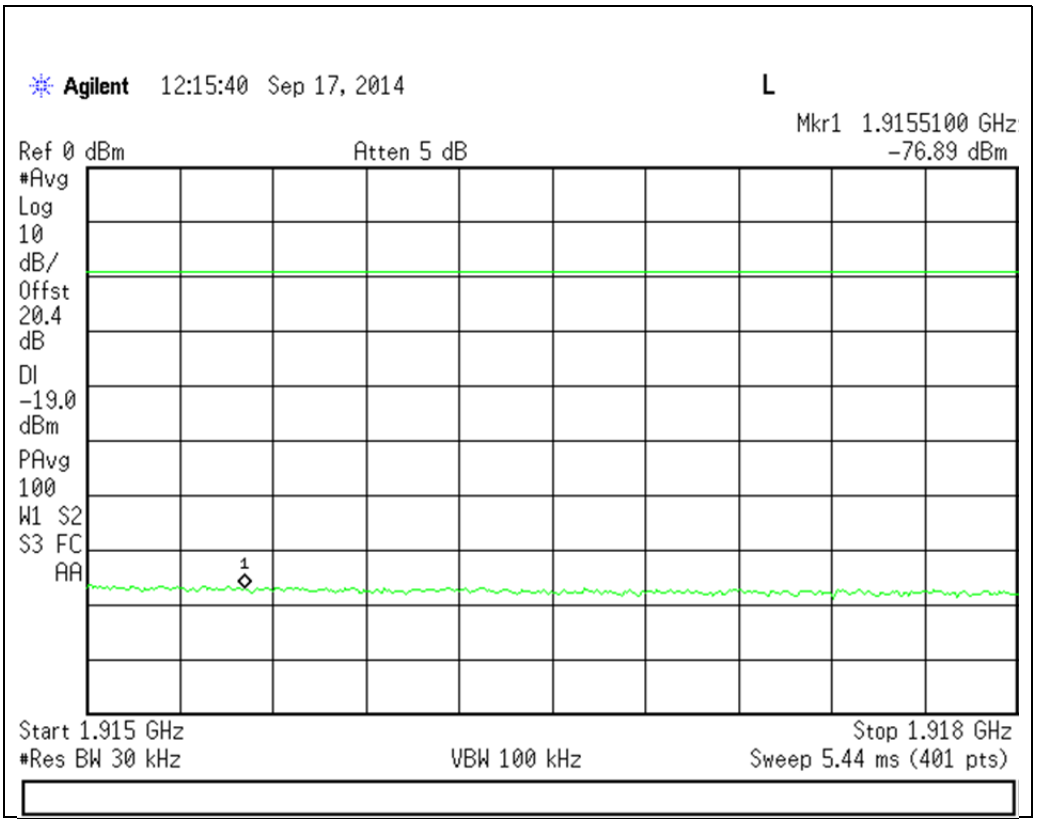


1850 - 1910 MHz Band

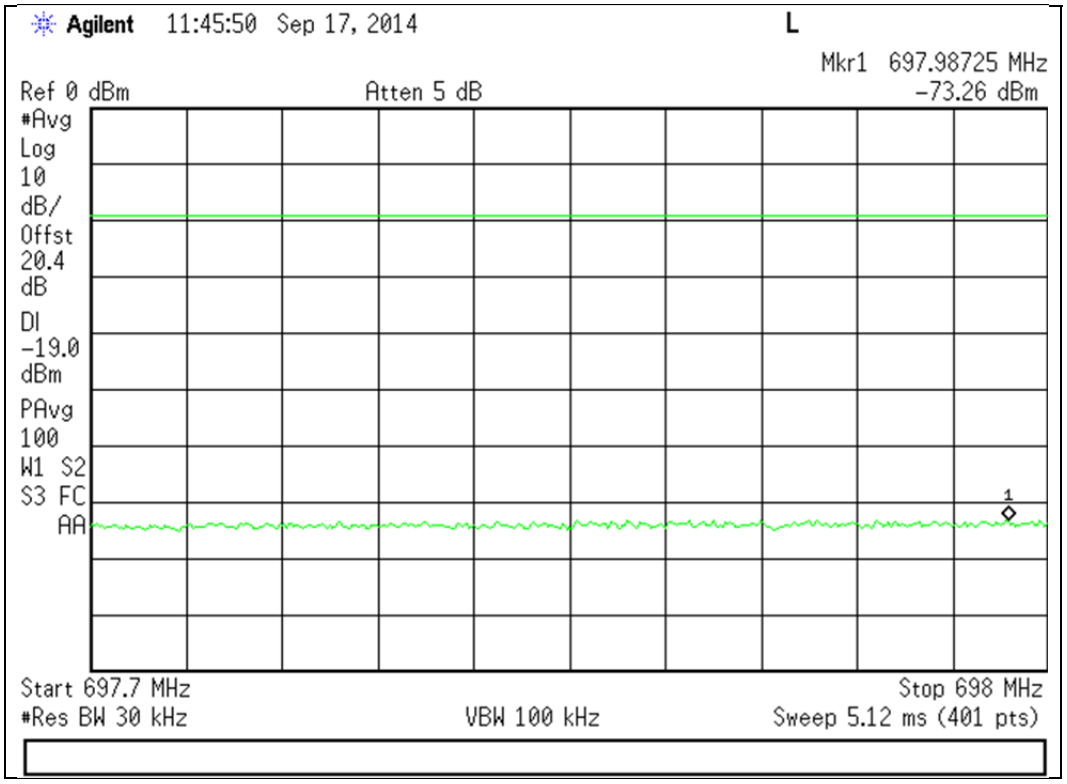
Lower Band Edge



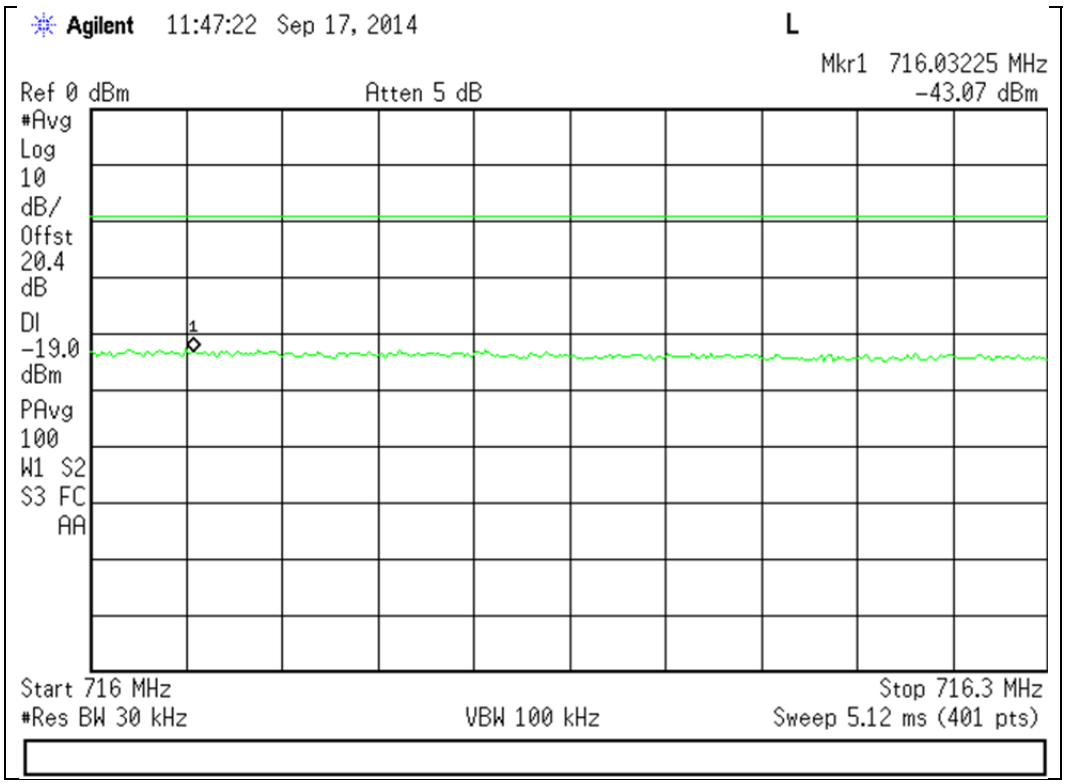
Upper Band Edge



WCDMA Uplink Test Plots
704 - 716 MHz Band
Lower Band Edge

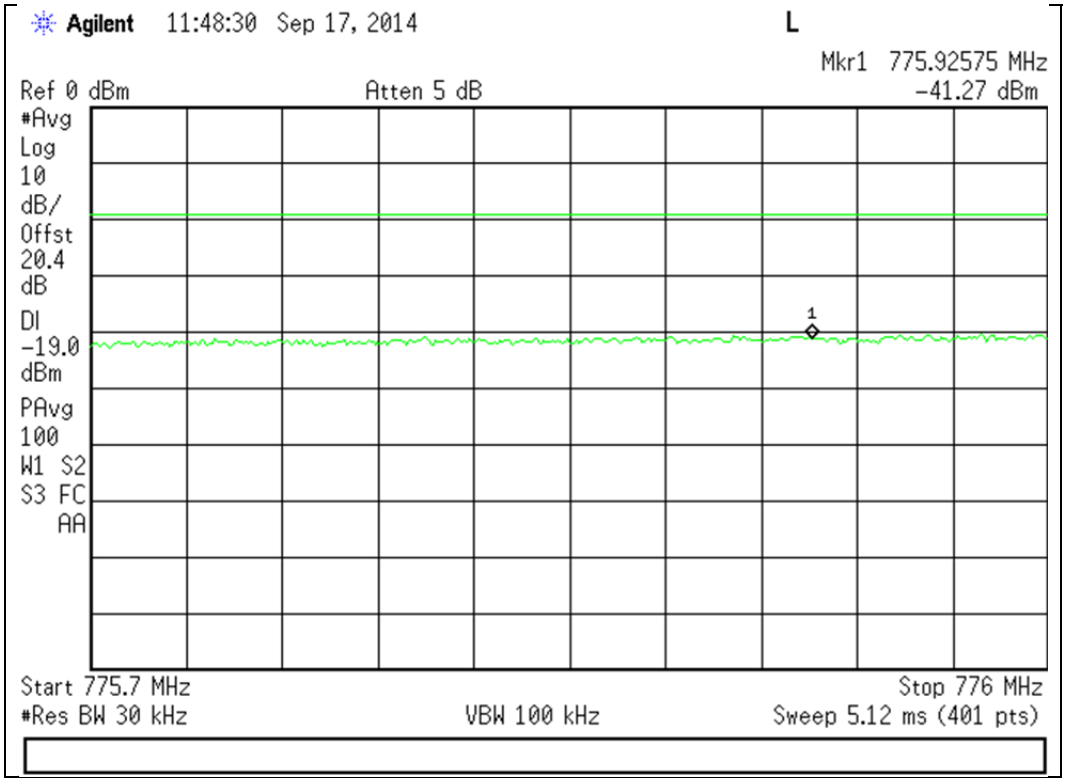


Upper Band Edge

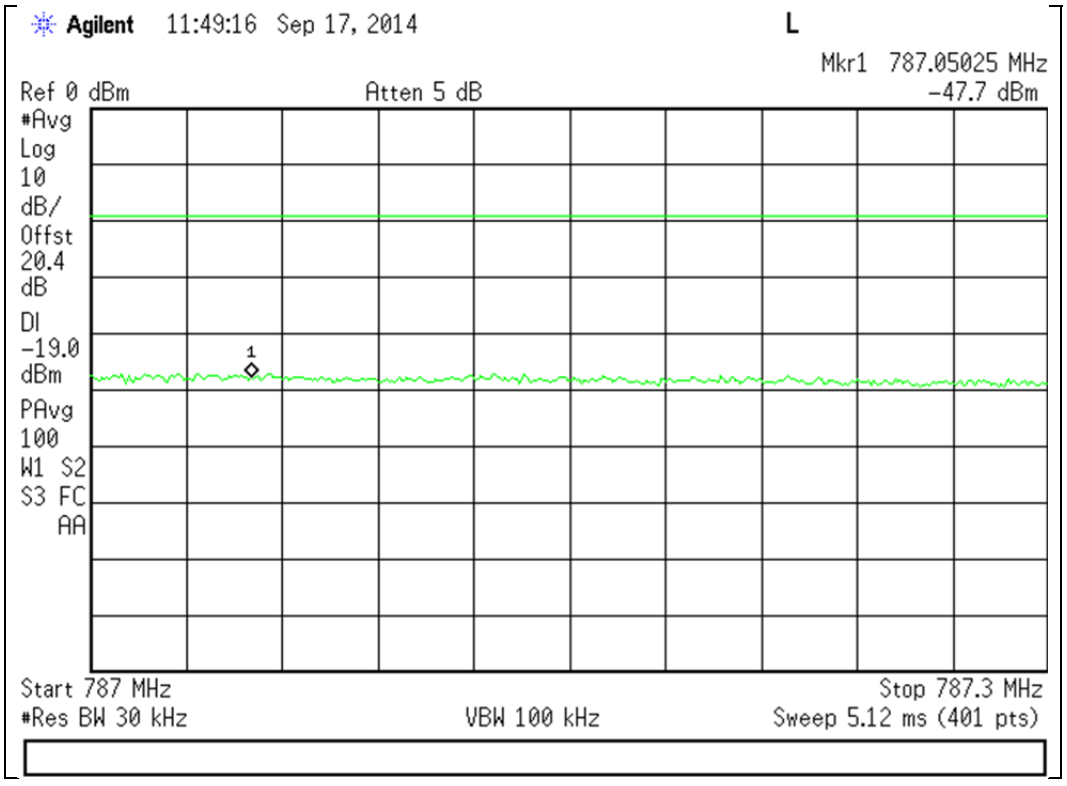


776 - 787 MHz Band

Lower Band Edge

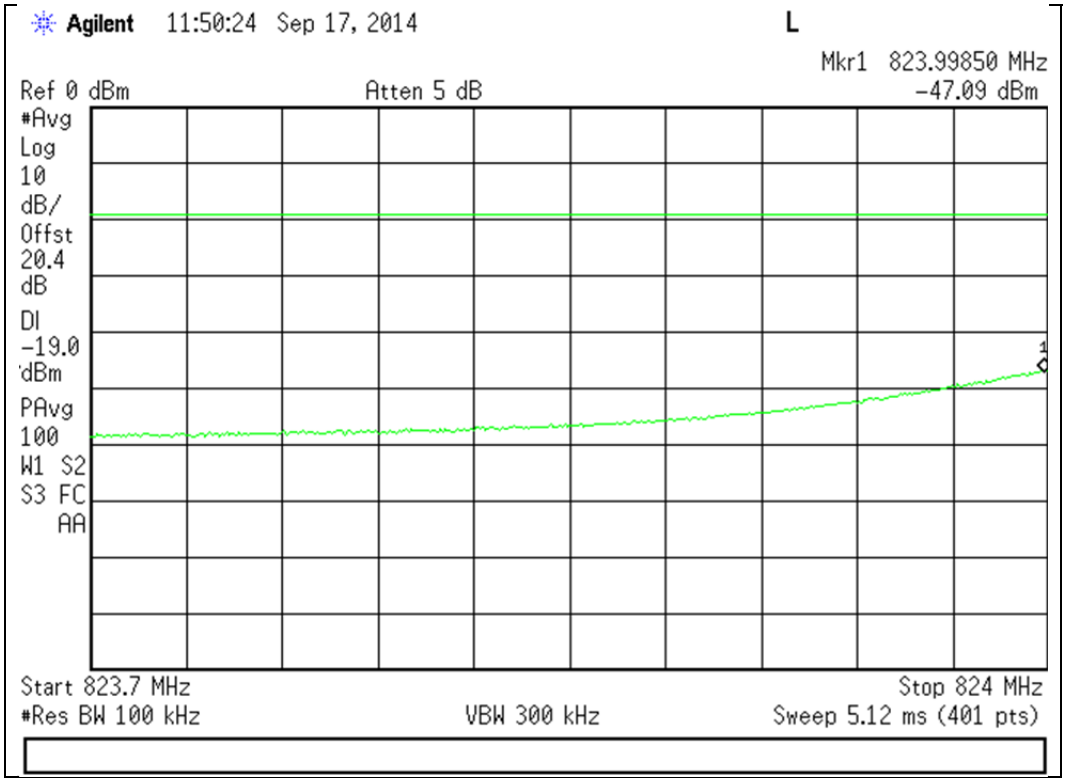


Upper Band Edge

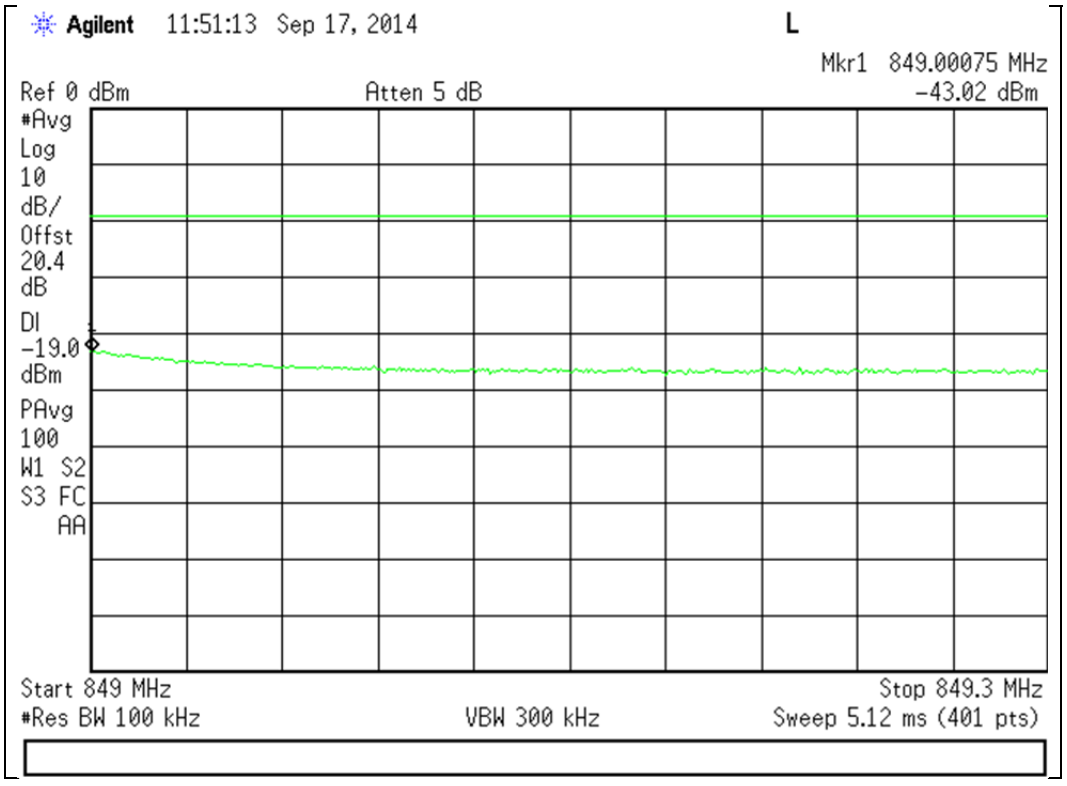


824 - 849 MHz Band

Lower Band Edge

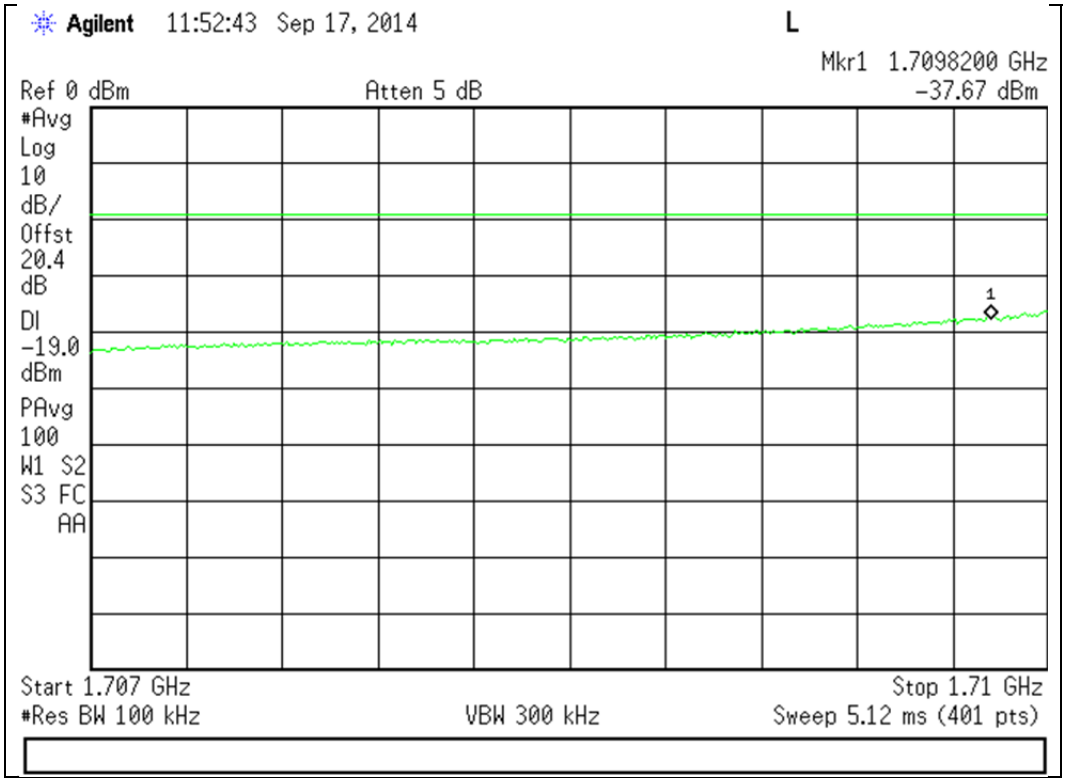


Upper Band Edge

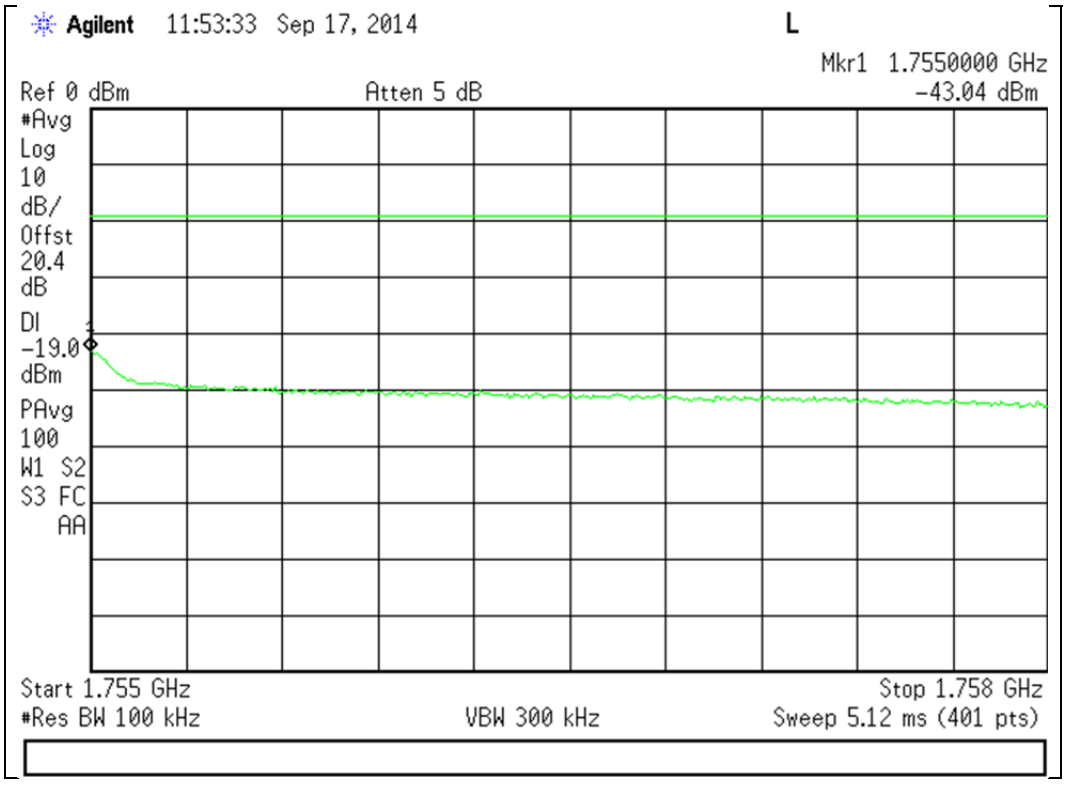


1710 - 1755 MHz Band

Lower Band Edge

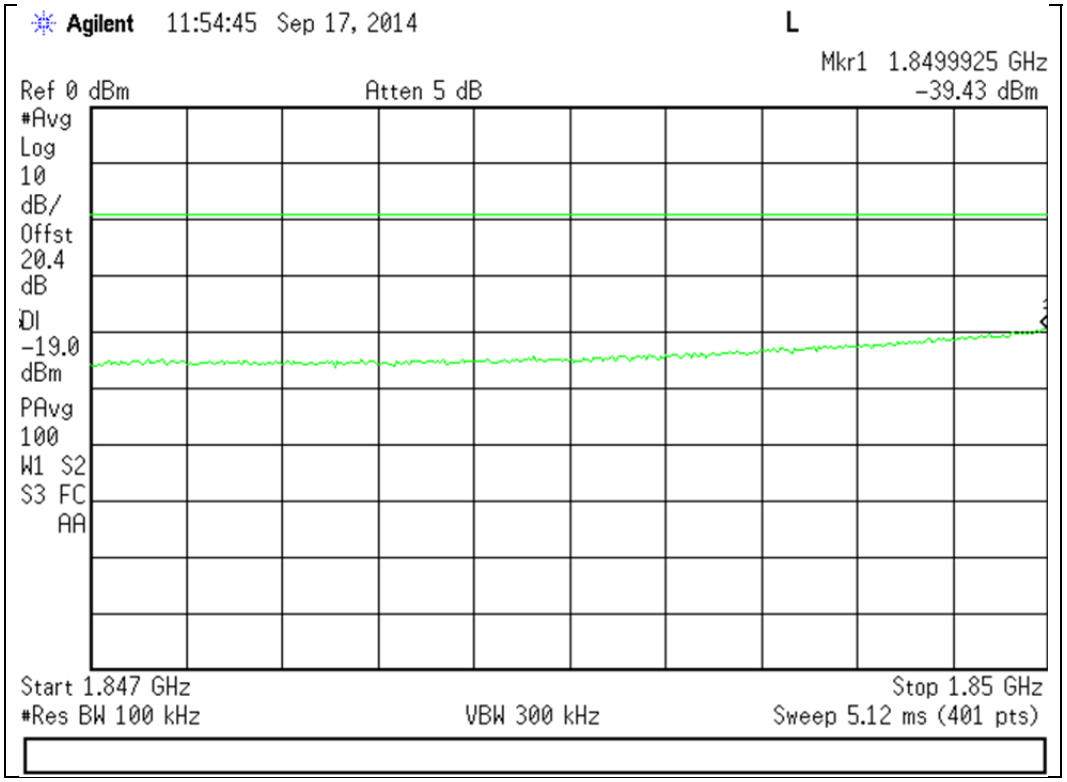


Upper Band Edge

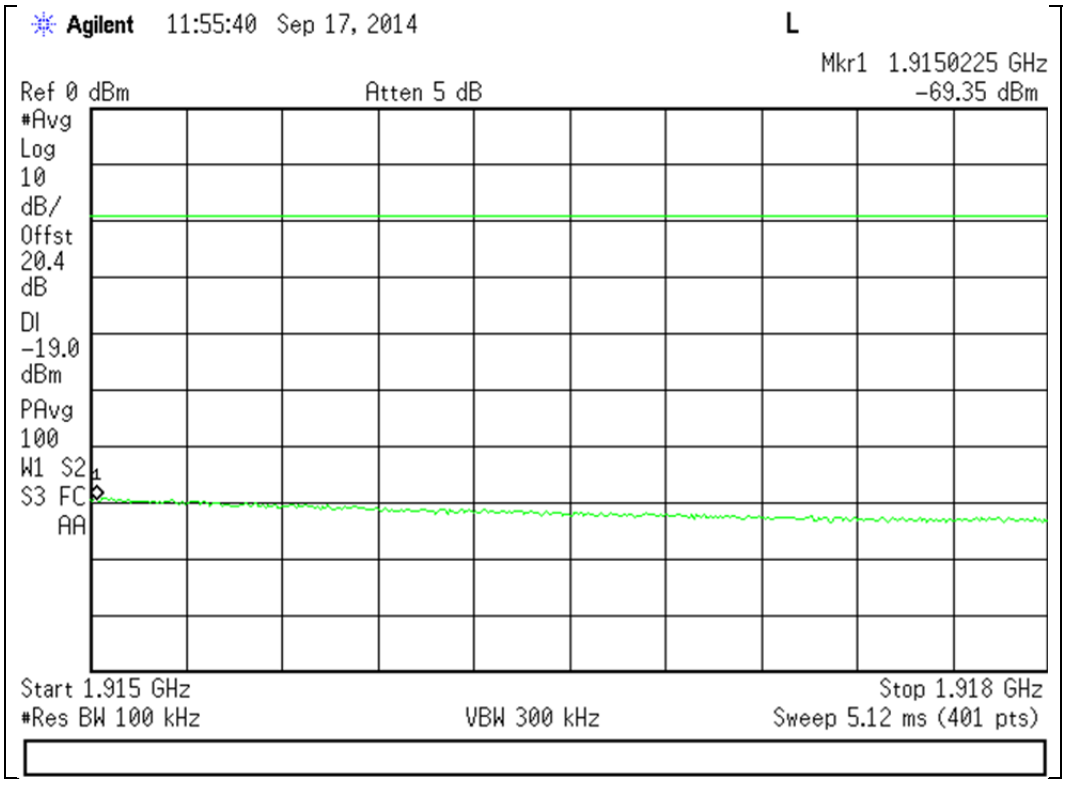


1850 - 1910 MHz Band

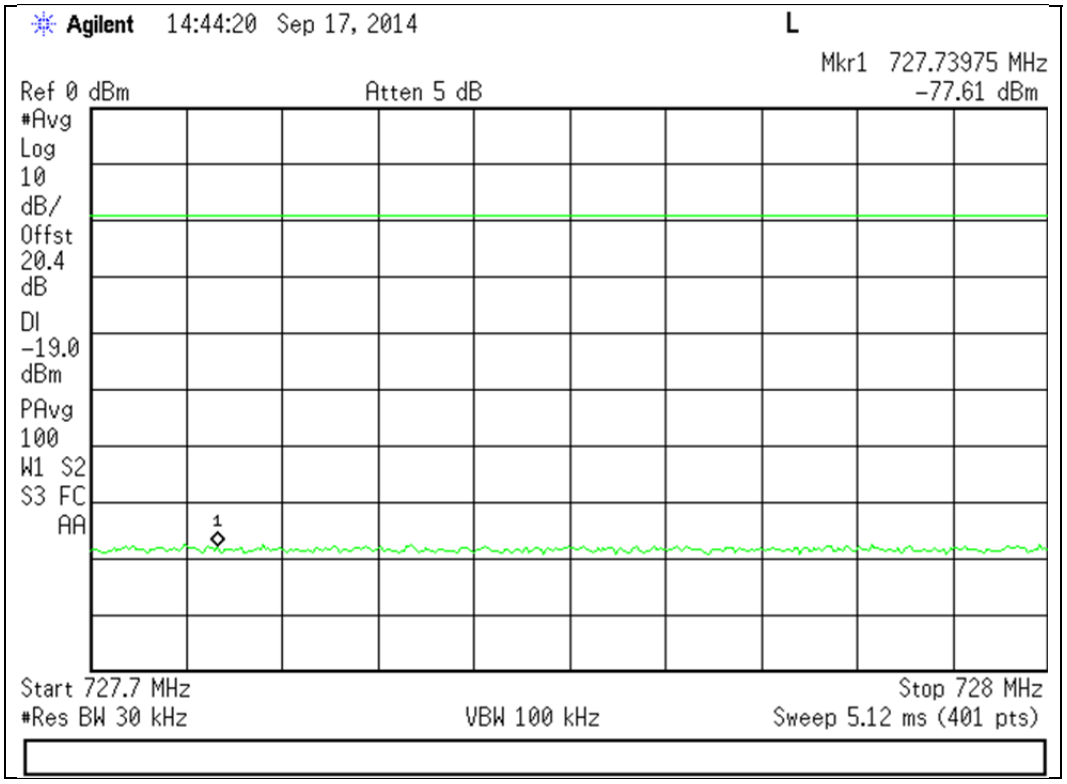
Lower Band Edge



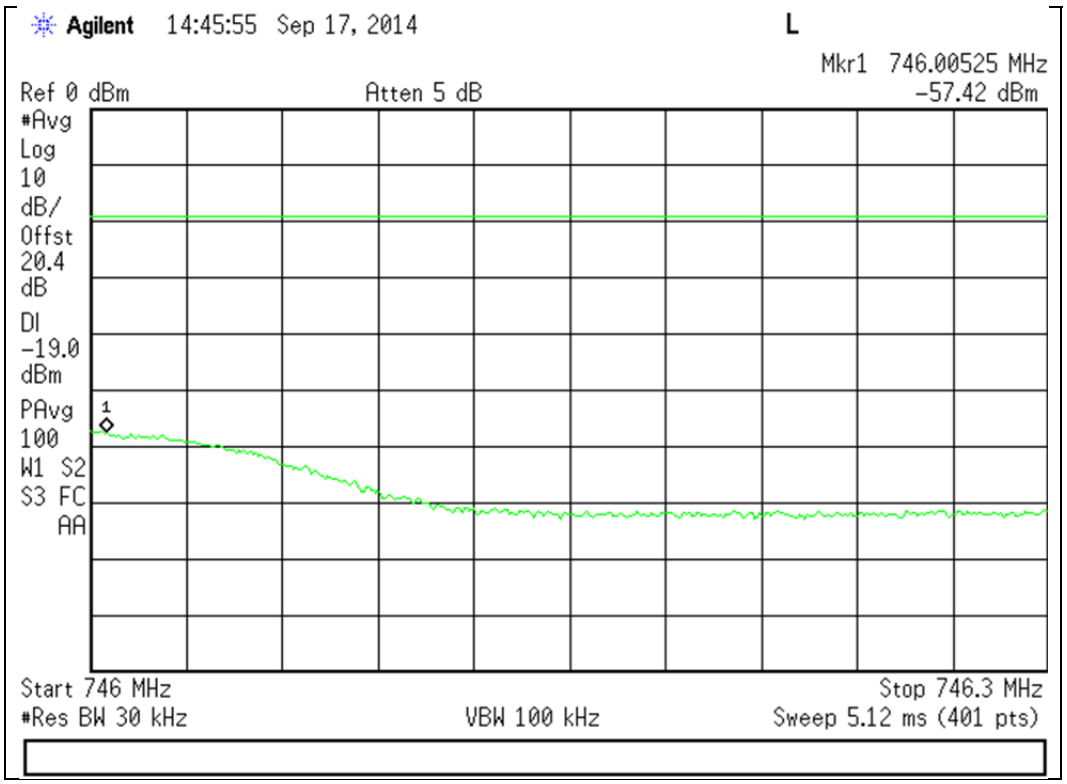
Upper Band Edge



GSM Downlink Test Plots
734 - 746 MHz Band
Lower Band Edge

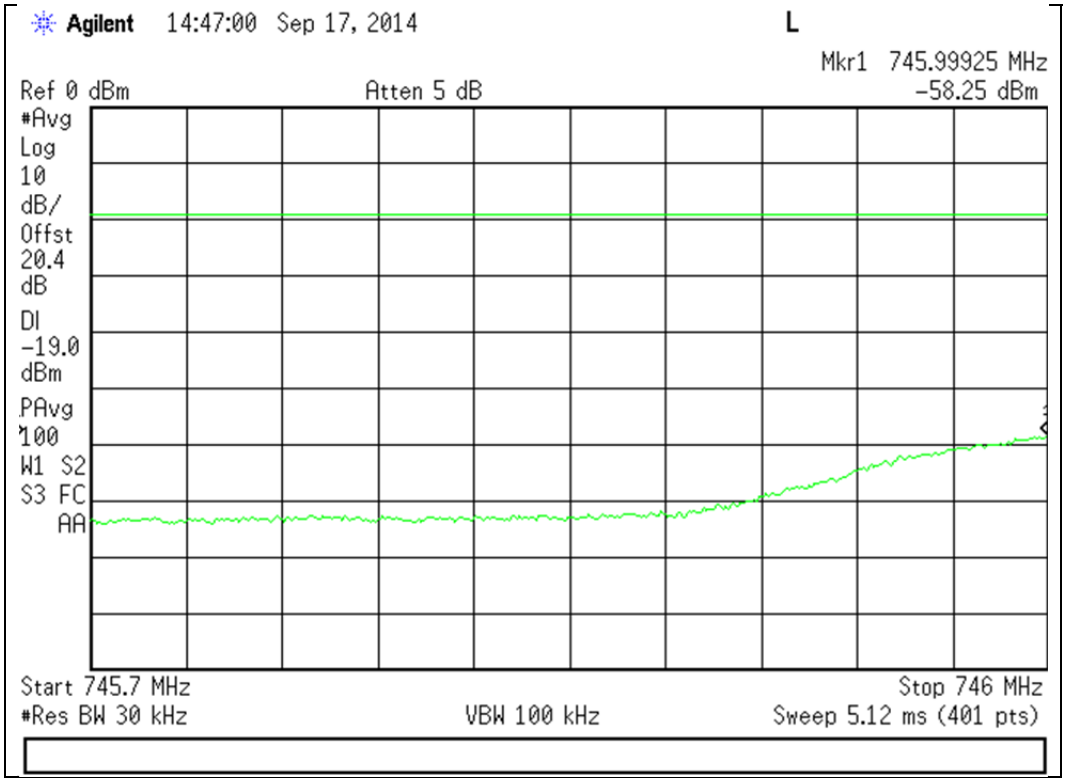


Upper Band Edge

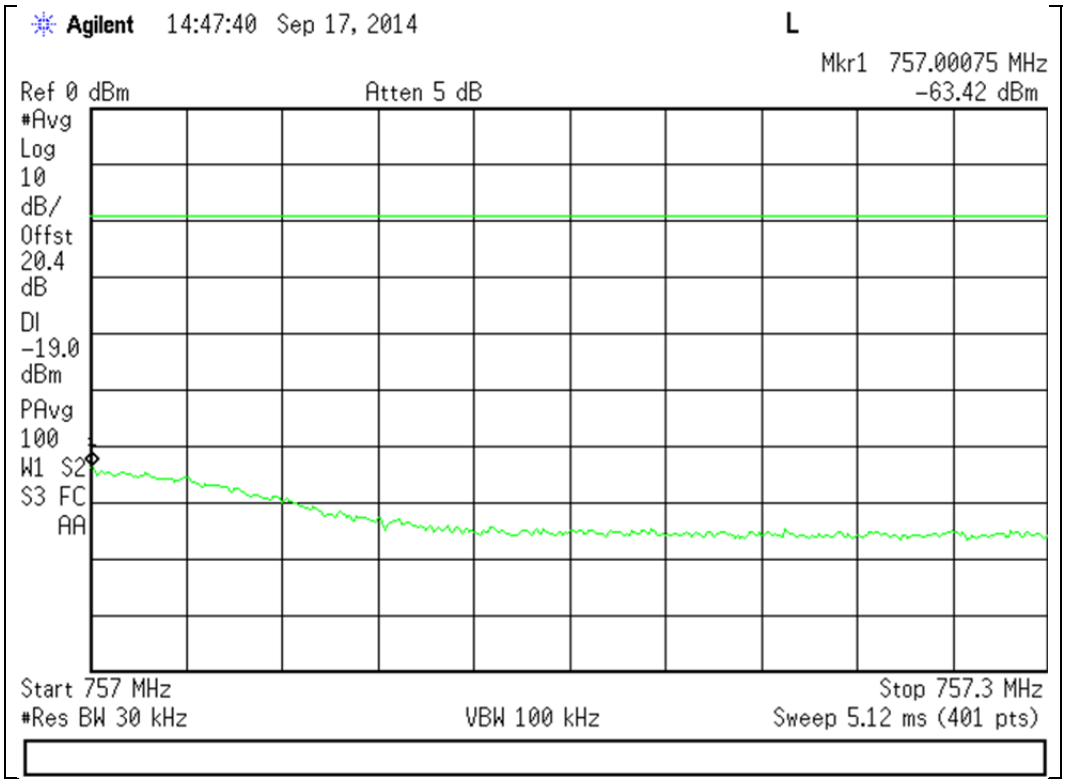


746 - 757 MHz Band

Lower Band Edge

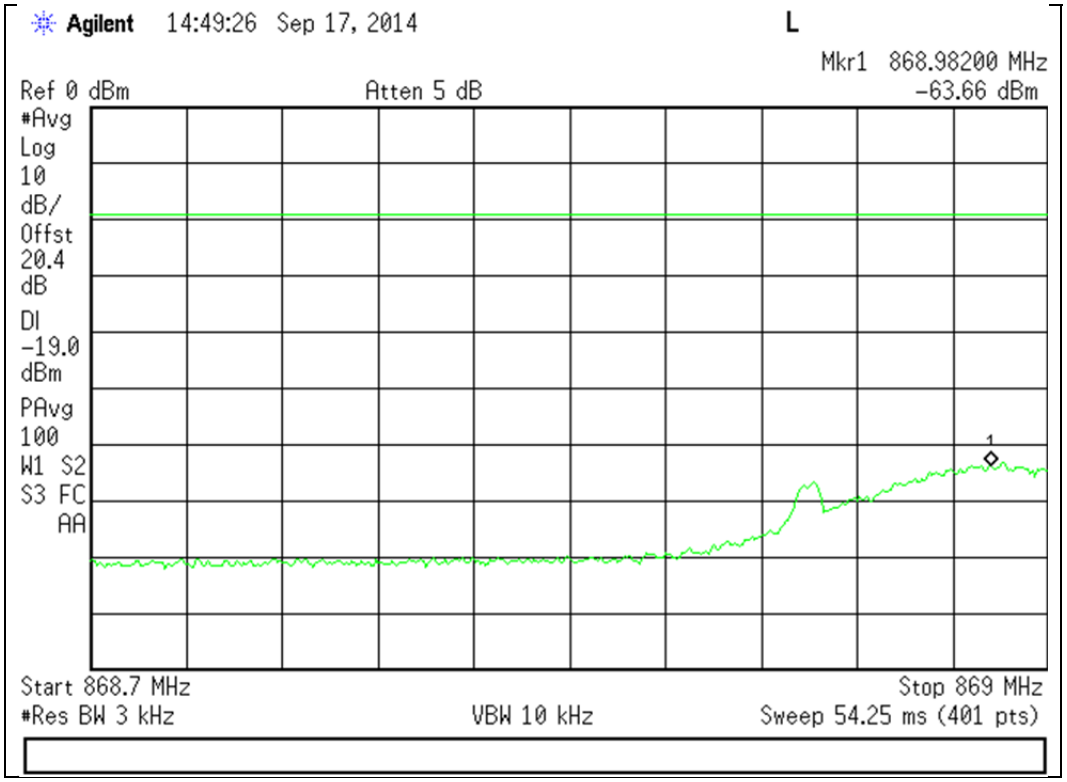


Upper Band Edge

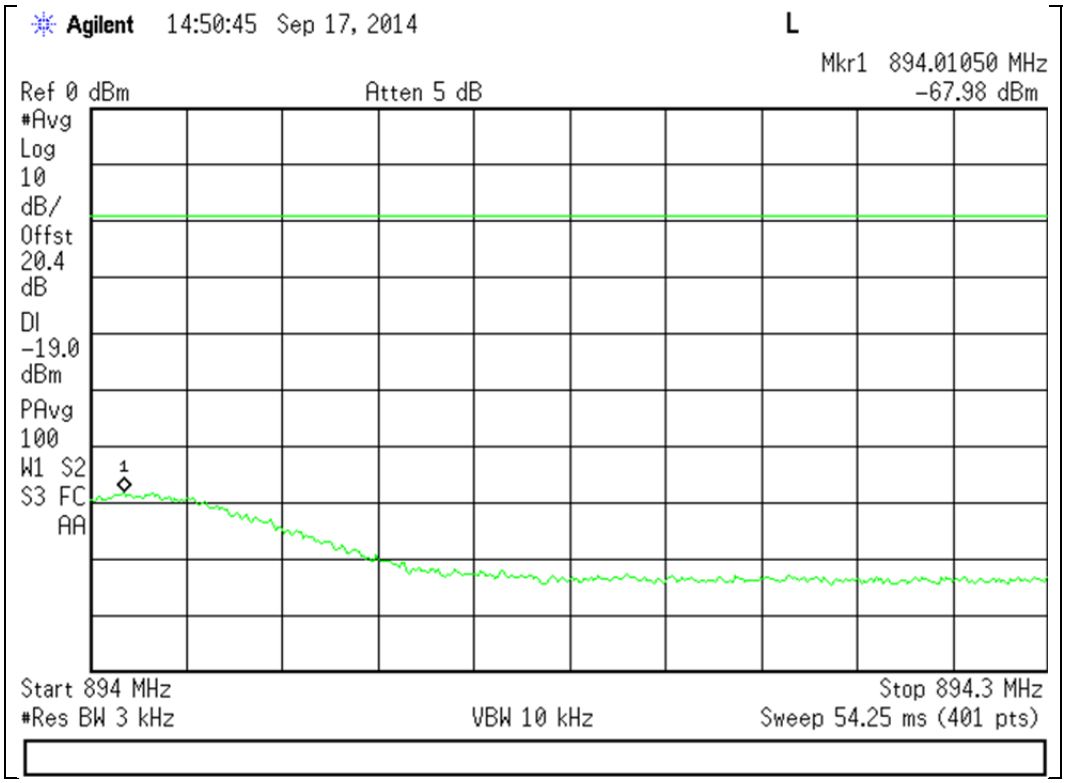


869 - 894 MHz Band

Lower Band Edge

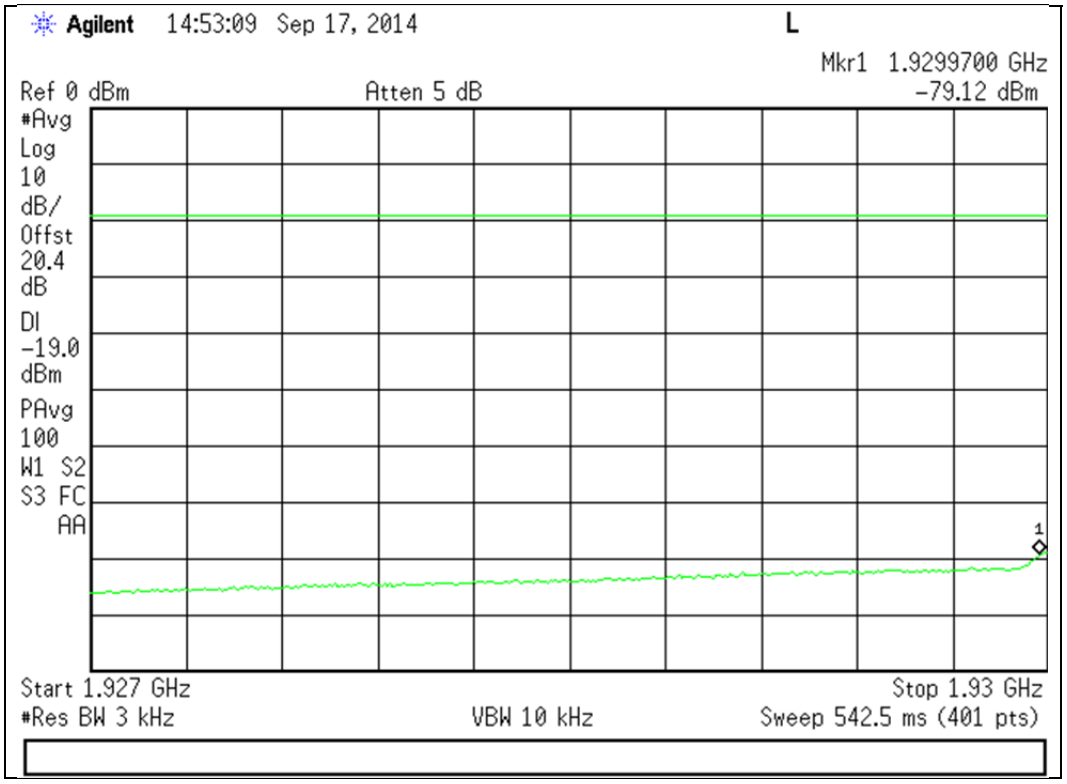


Upper Band Edge

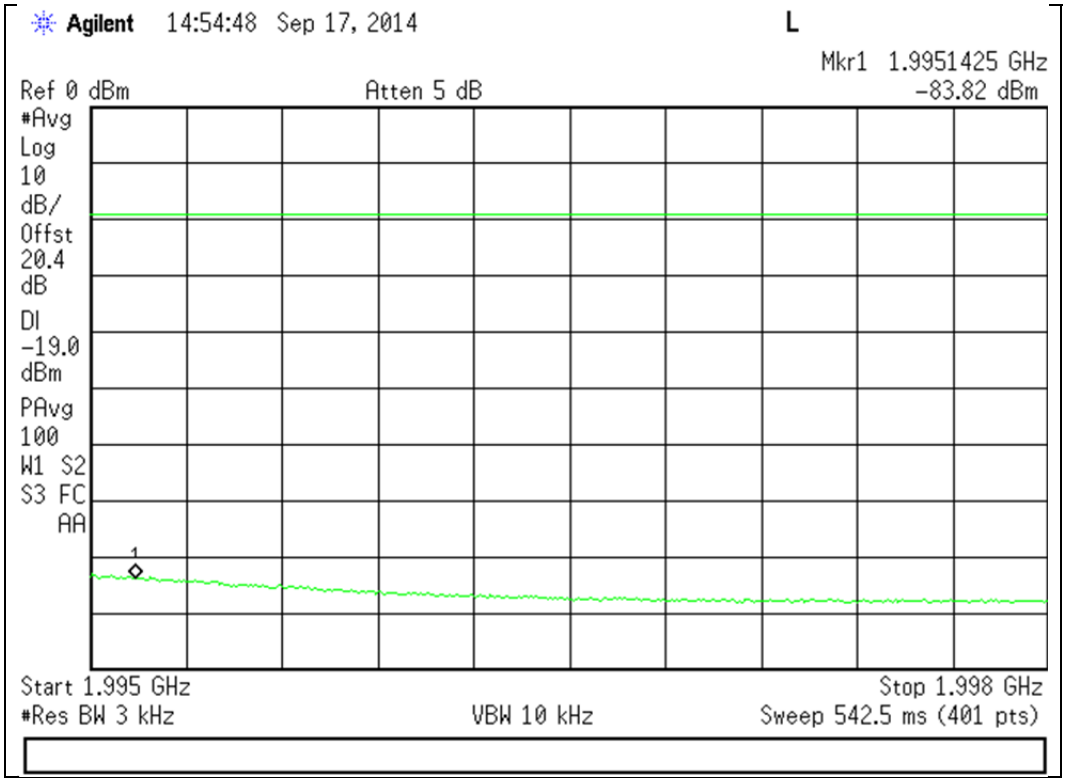


1930 - 1990 MHz Band

Lower Band Edge

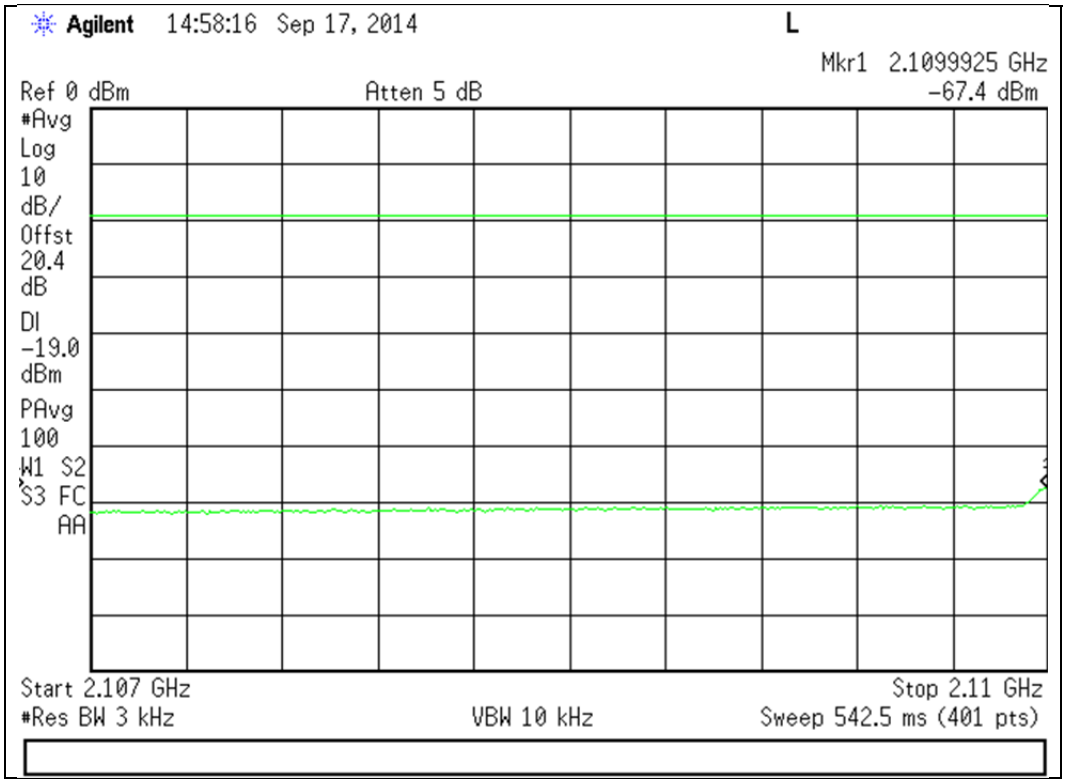


Upper Band Edge

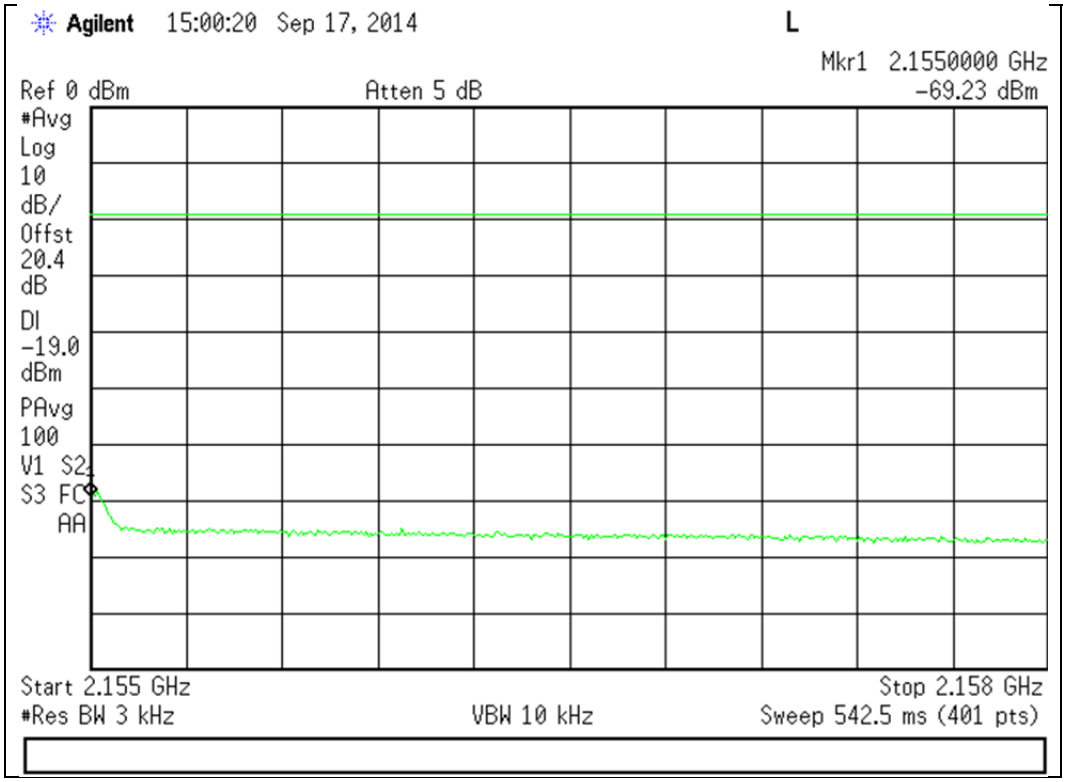


2110 - 2155 MHz Band

Lower Band Edge



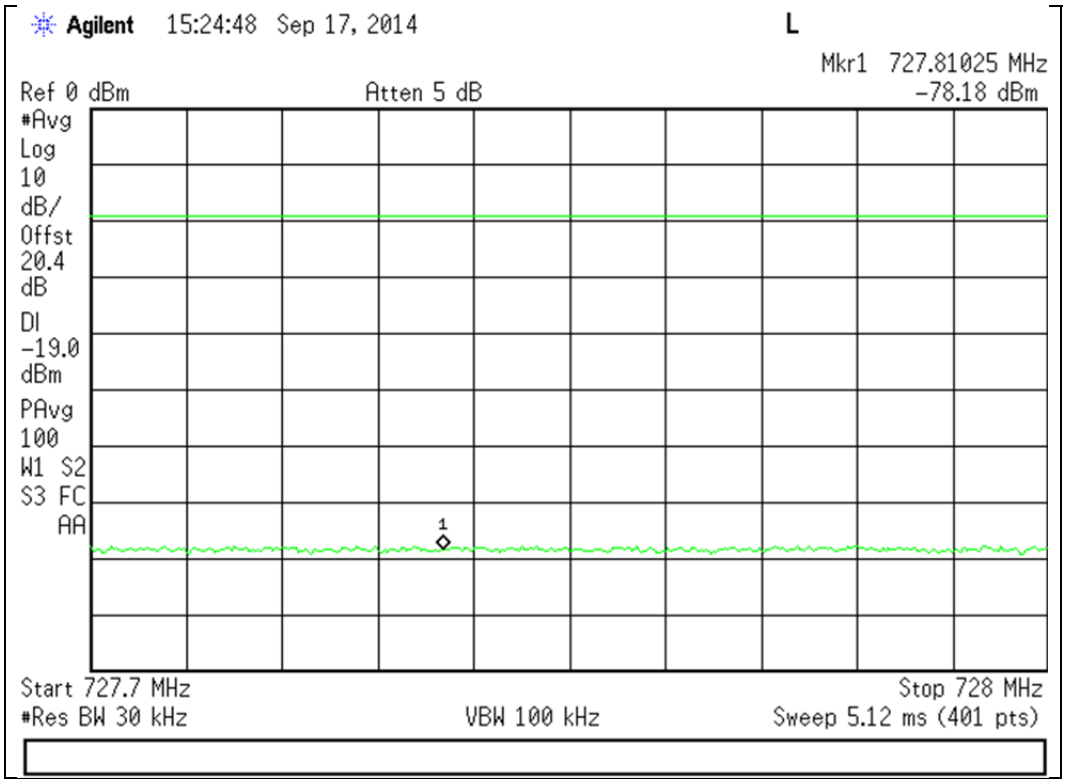
Upper Band Edge



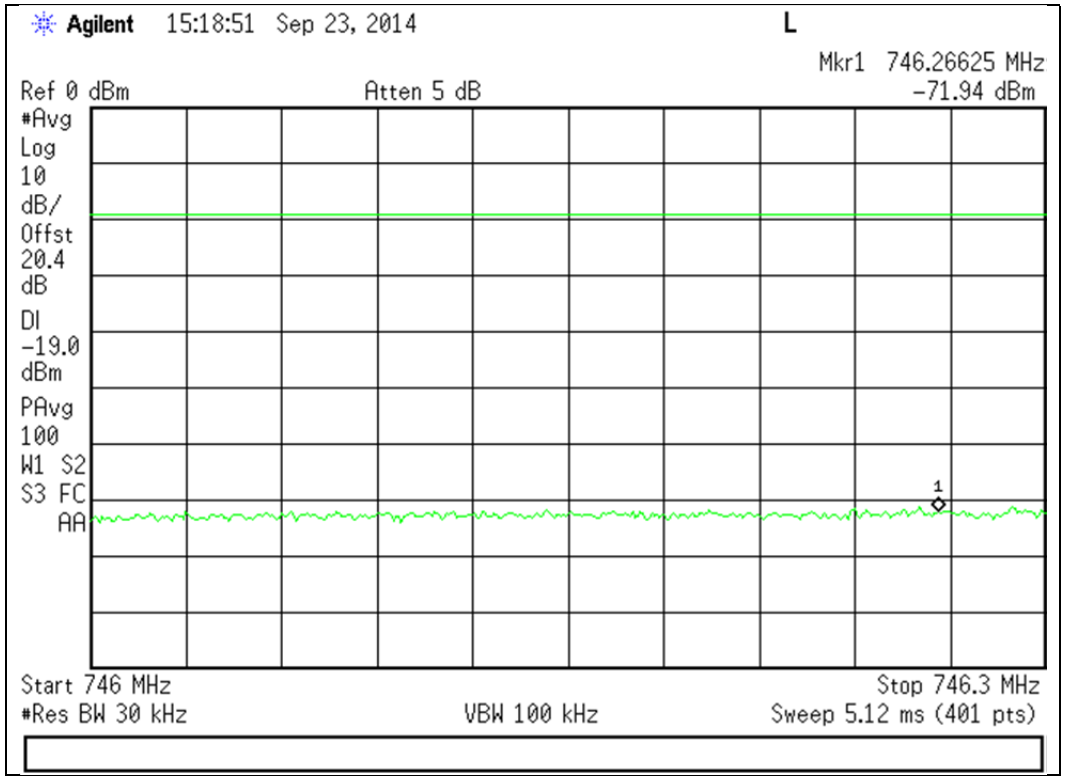
CDMA Downlink Test Plots

734 - 746 MHz Band

Lower Band Edge

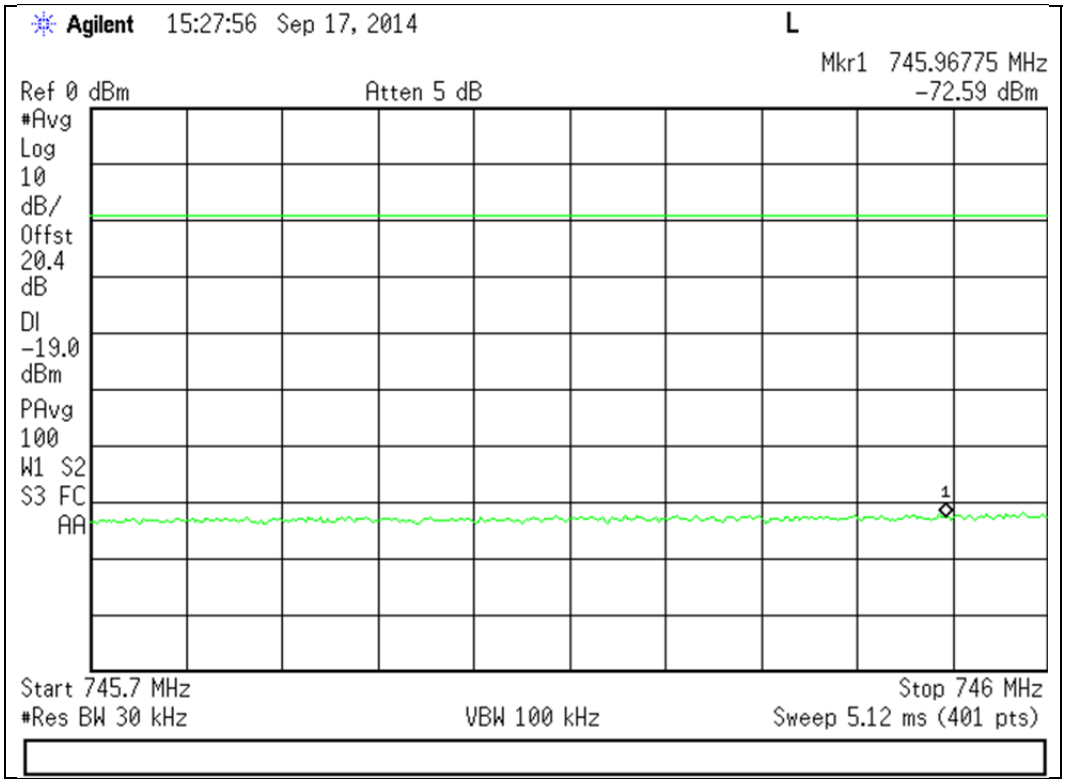


Upper Band Edge

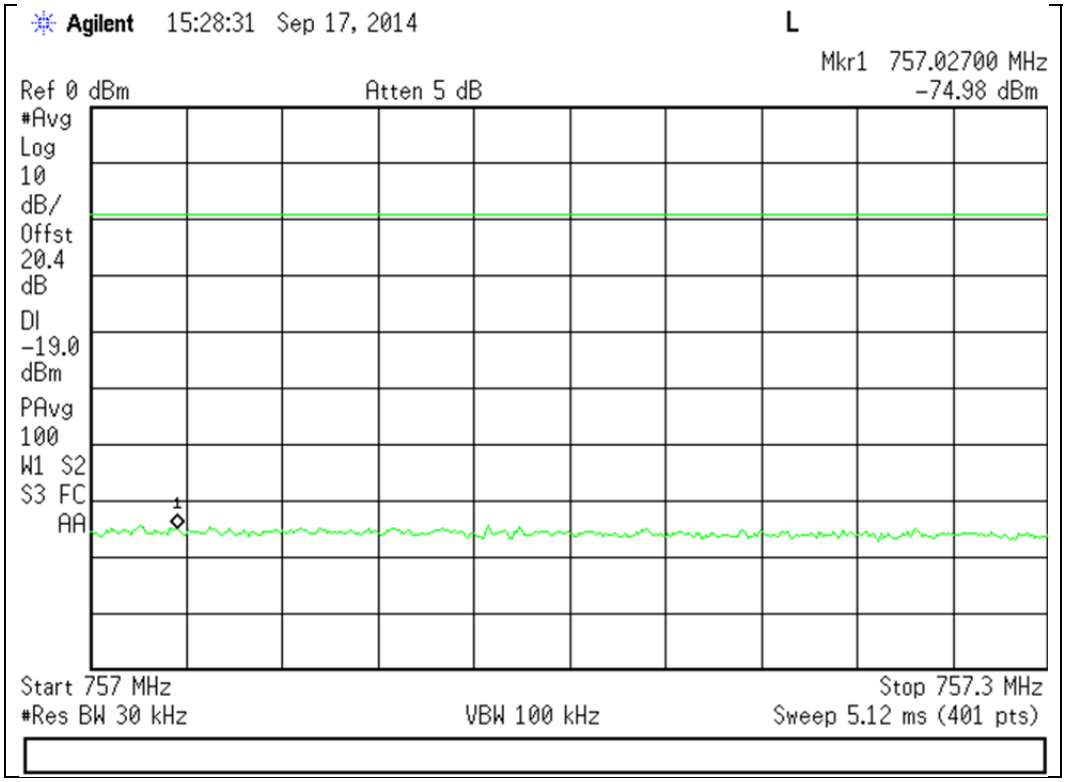


746 - 757 MHz Band

Lower Band Edge

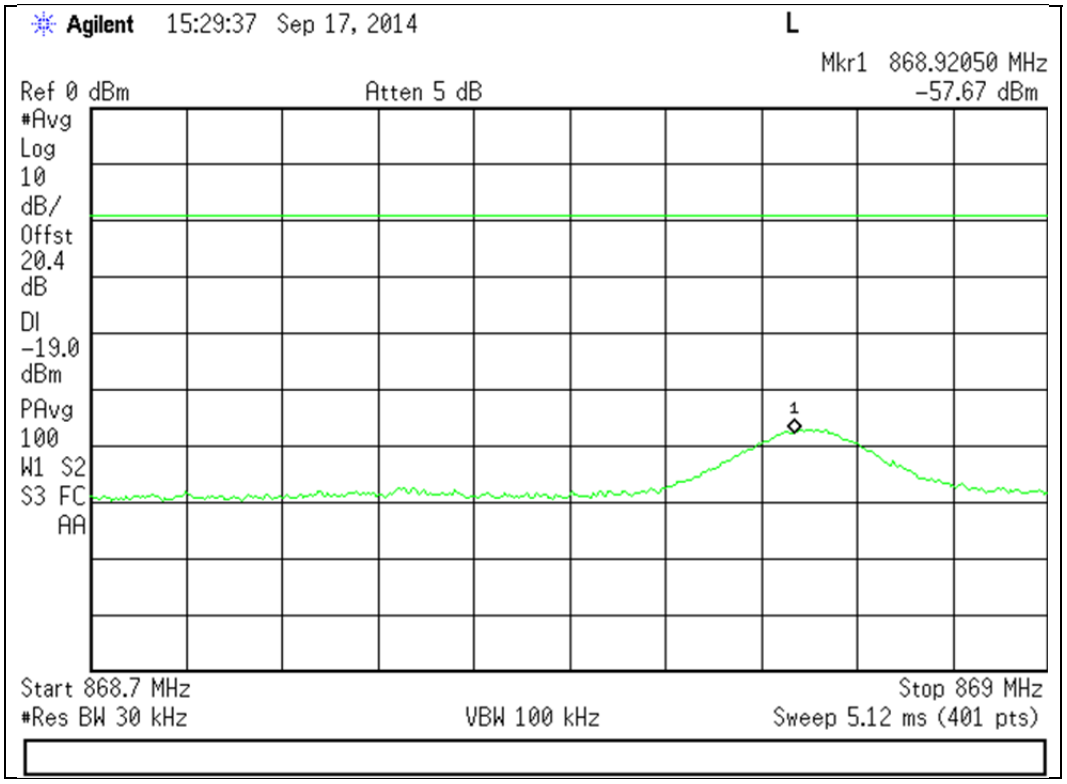


Upper Band Edge

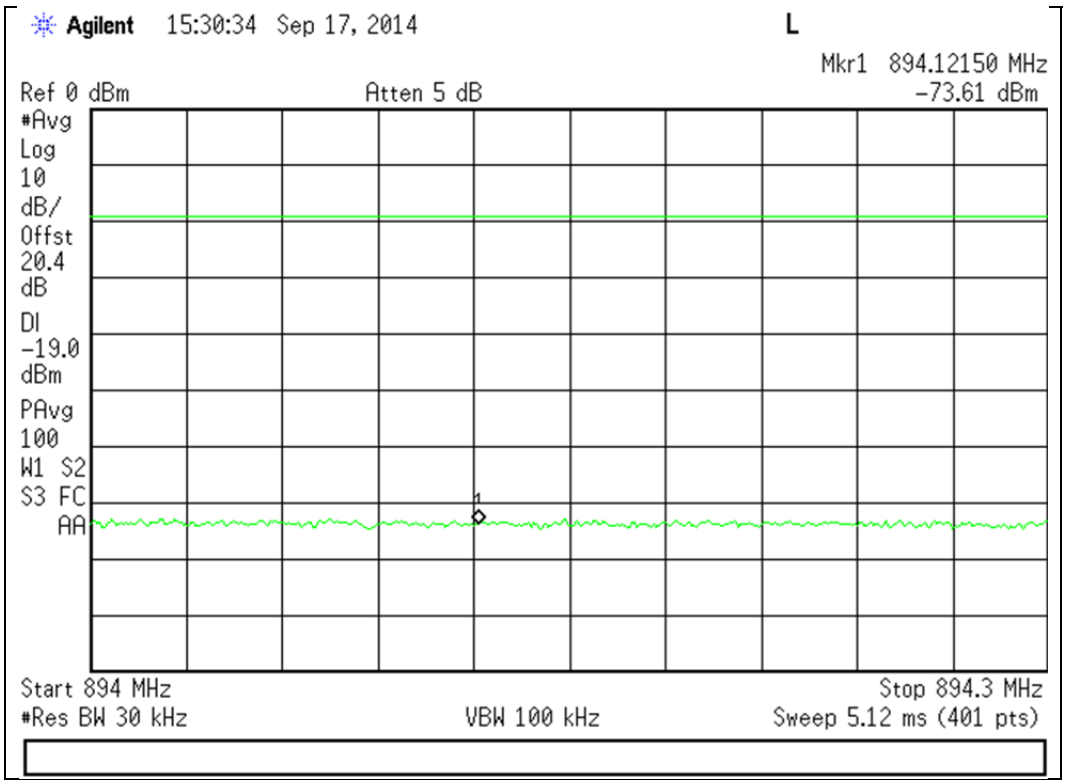


869 - 894 MHz Band

Lower Band Edge

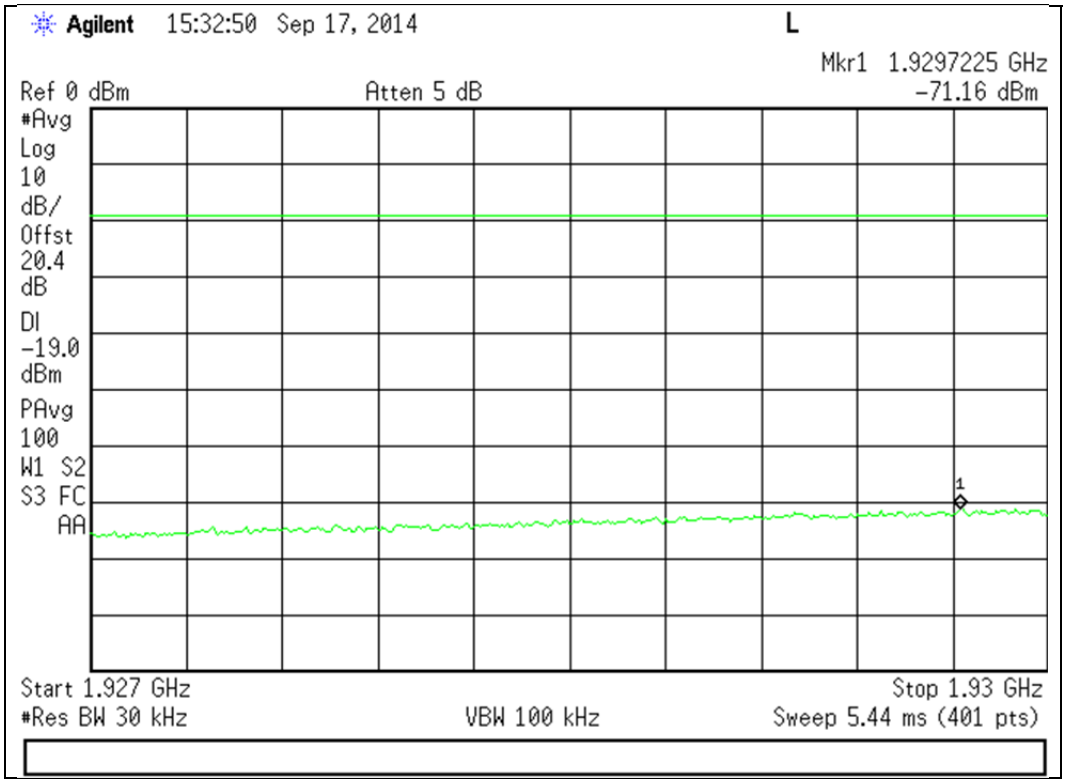


Upper Band Edge

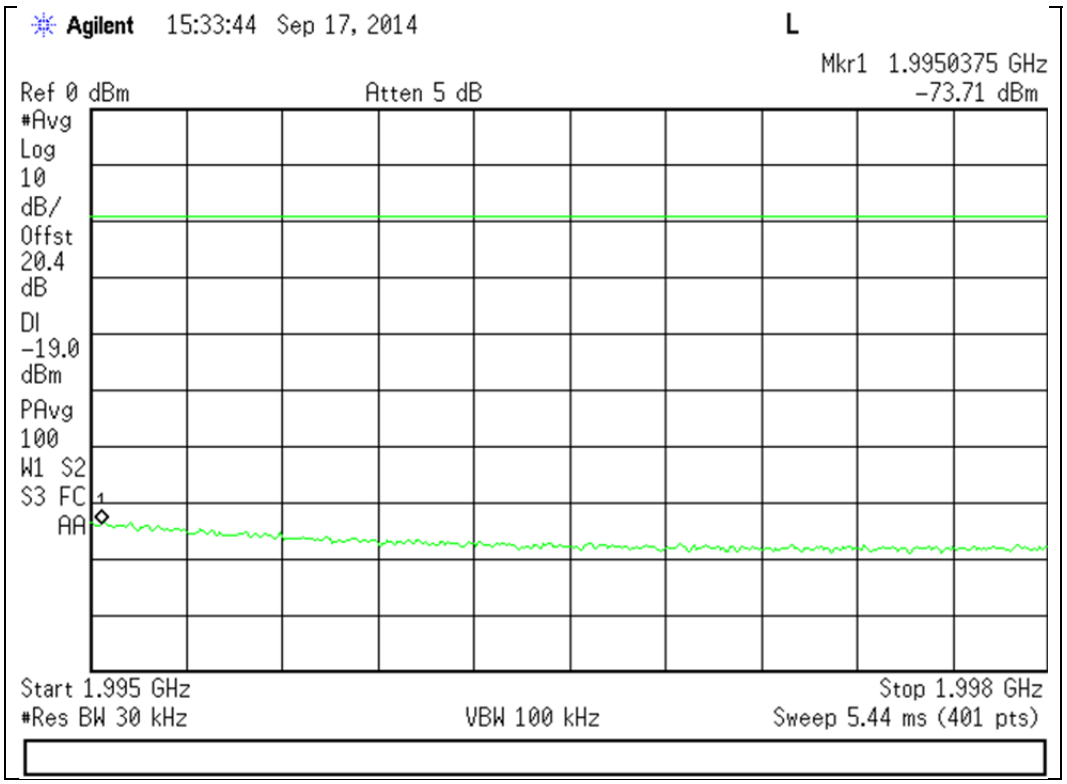


1930 - 1990 MHz Band

Lower Band Edge

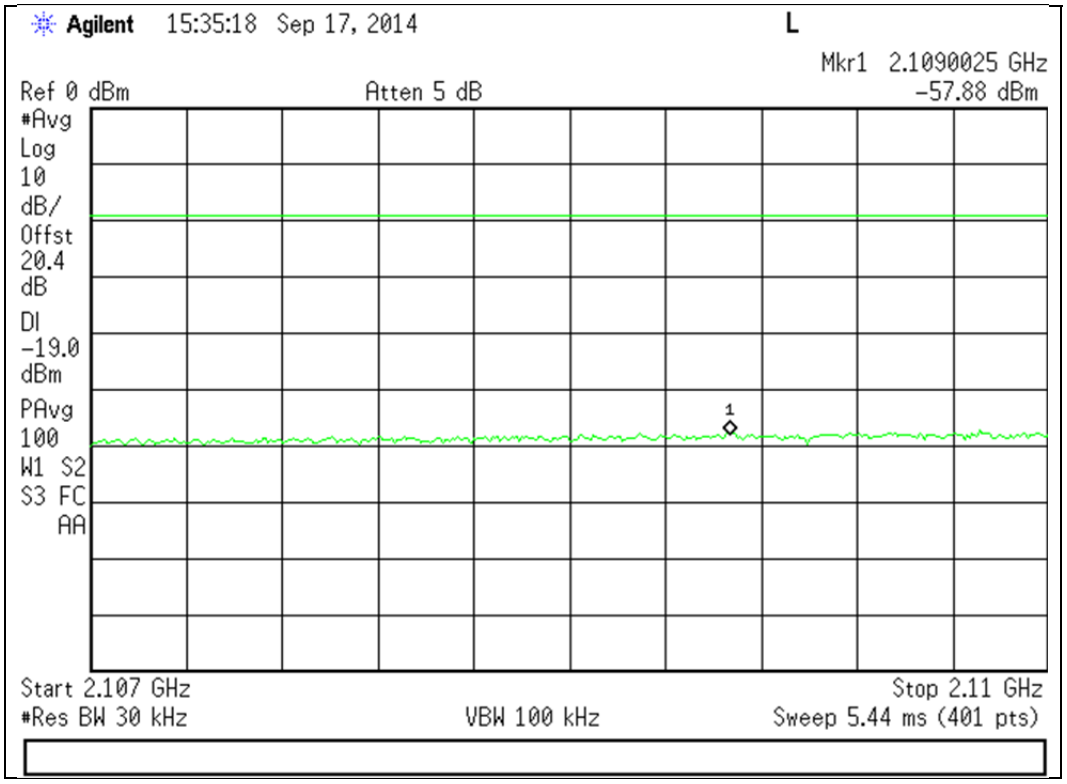


Upper Band Edge

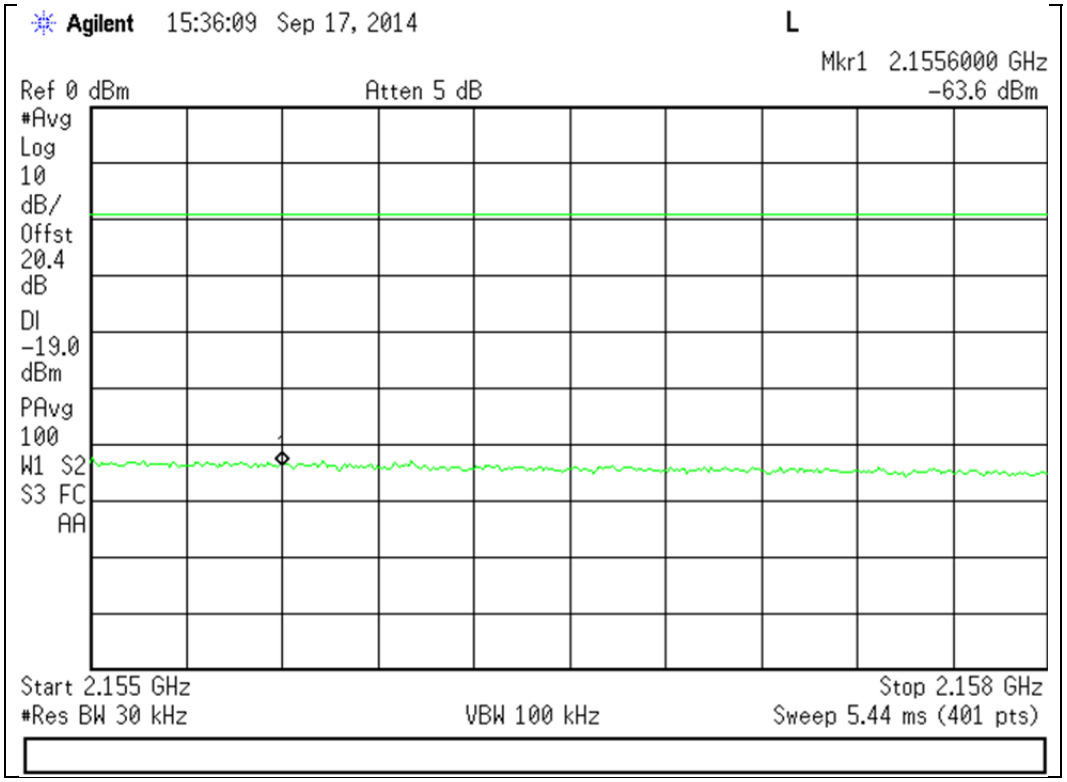


2110 - 2155 MHz Band

Lower Band Edge



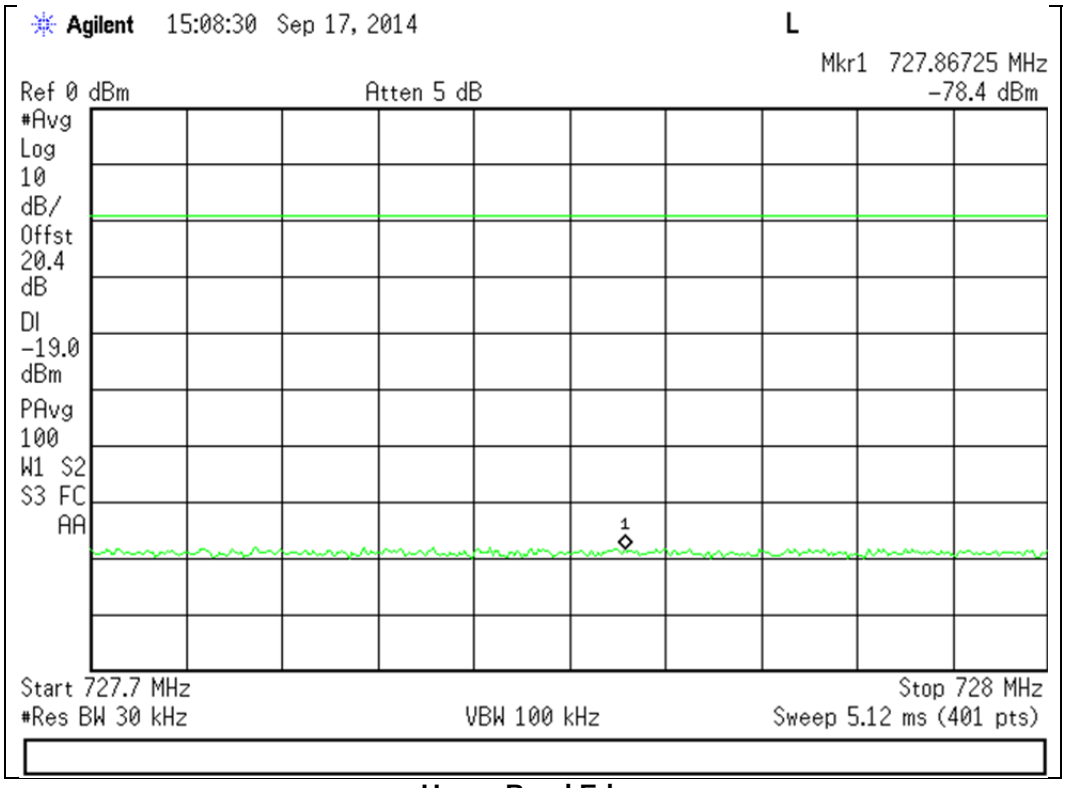
Upper Band Edge



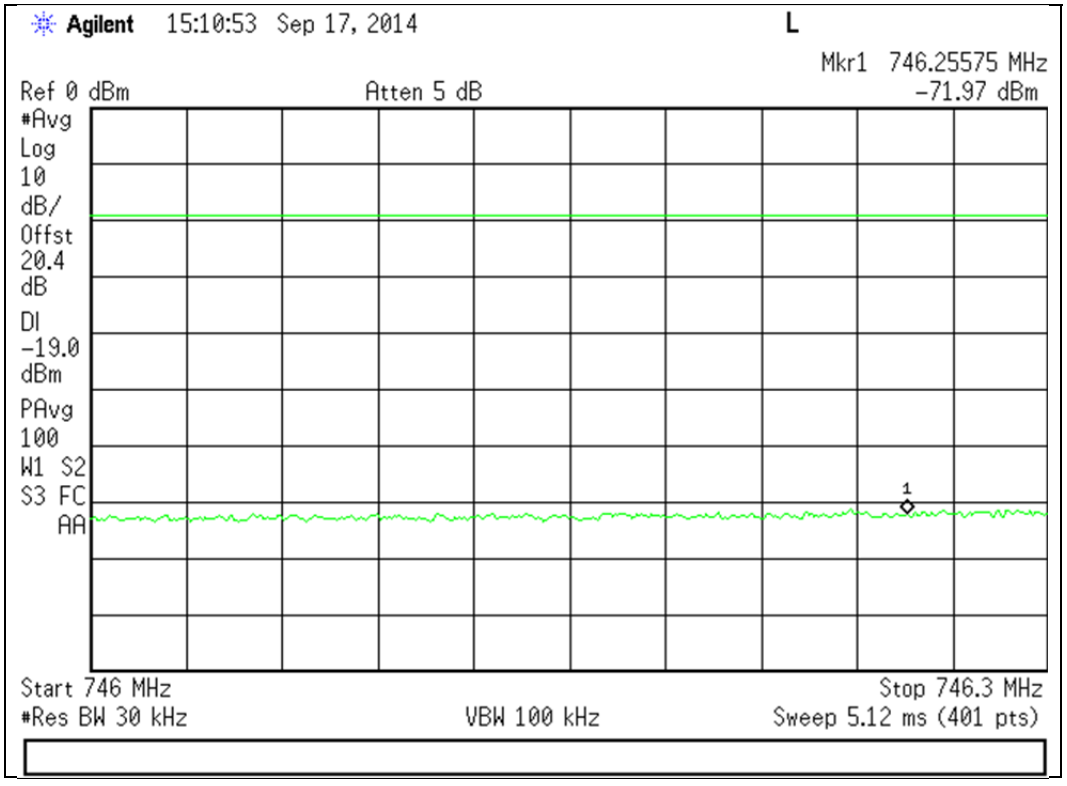
WCDMA Downlink Test Plots

734 - 746 MHz Band

Lower Band Edge

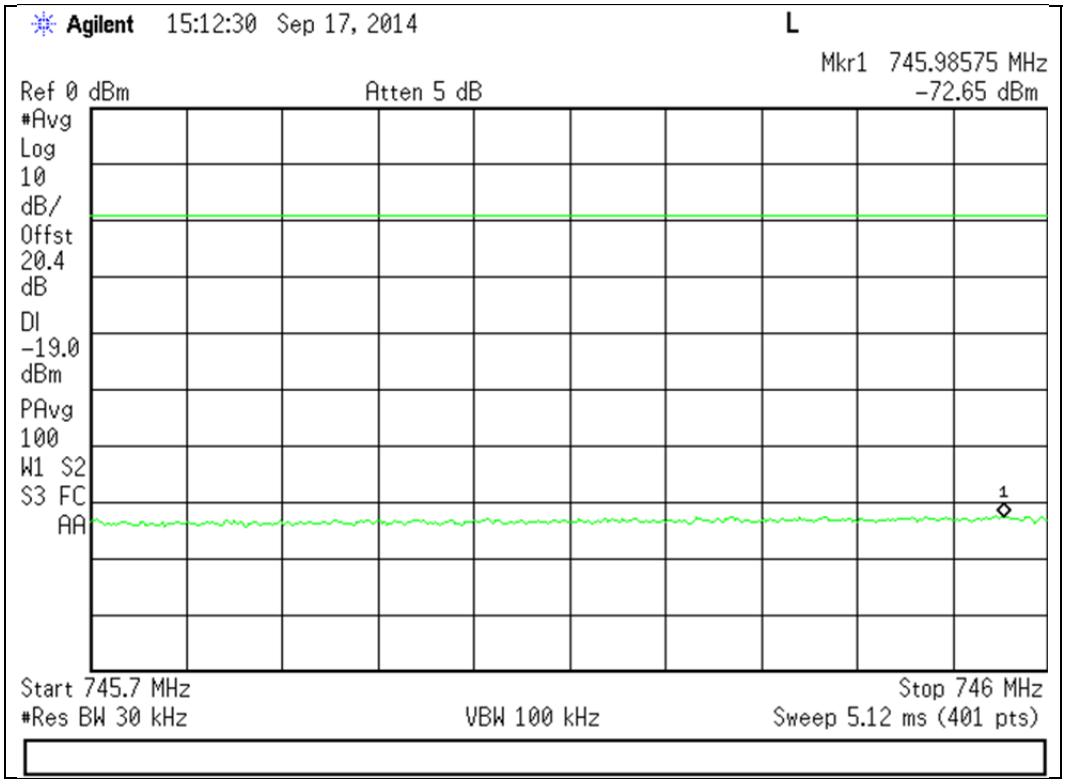


Upper Band Edge

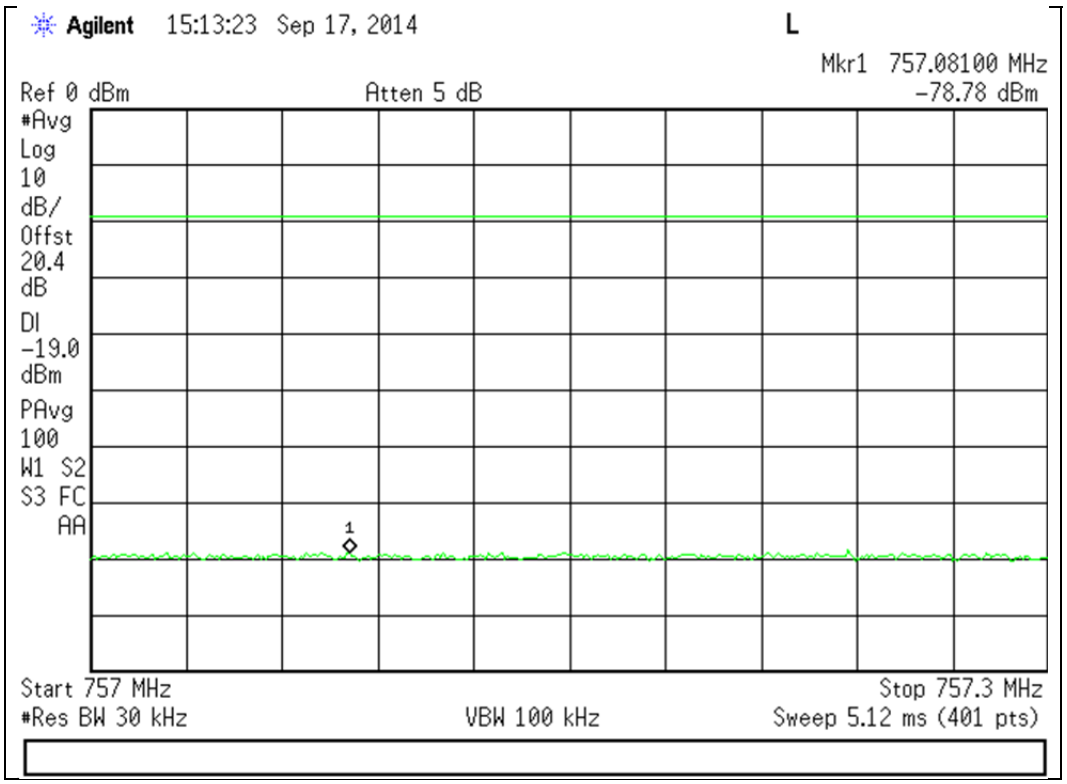


746 - 757 MHz Band

Lower Band Edge

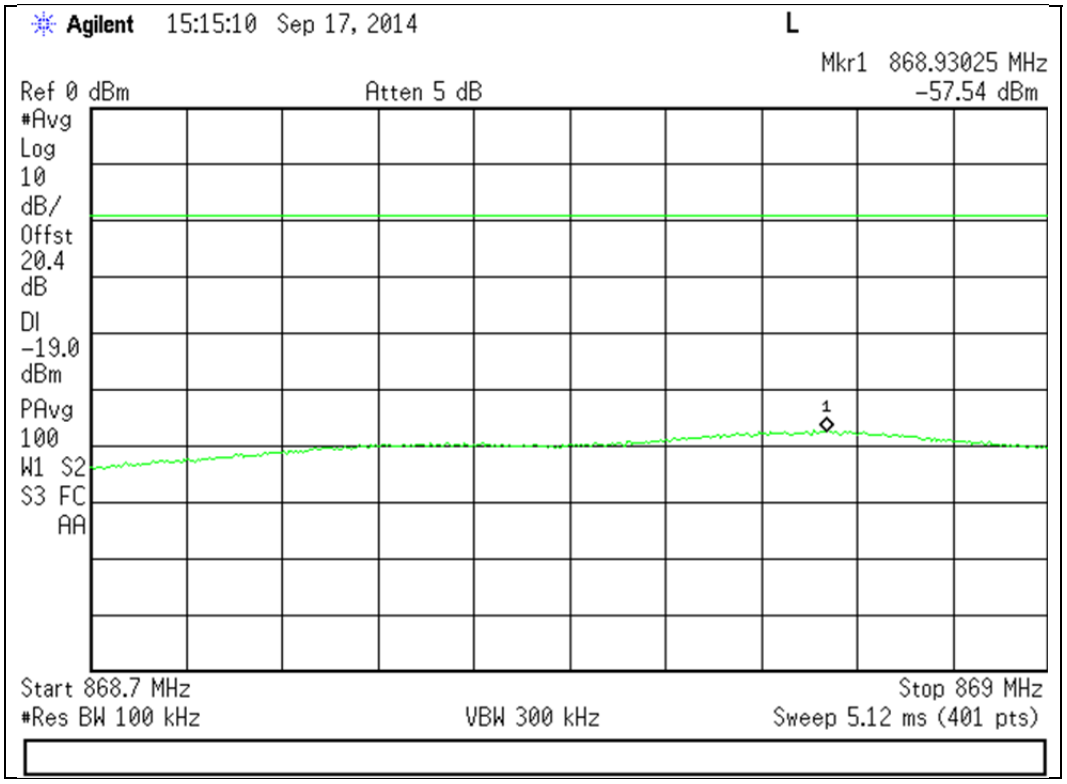


Upper Band Edge

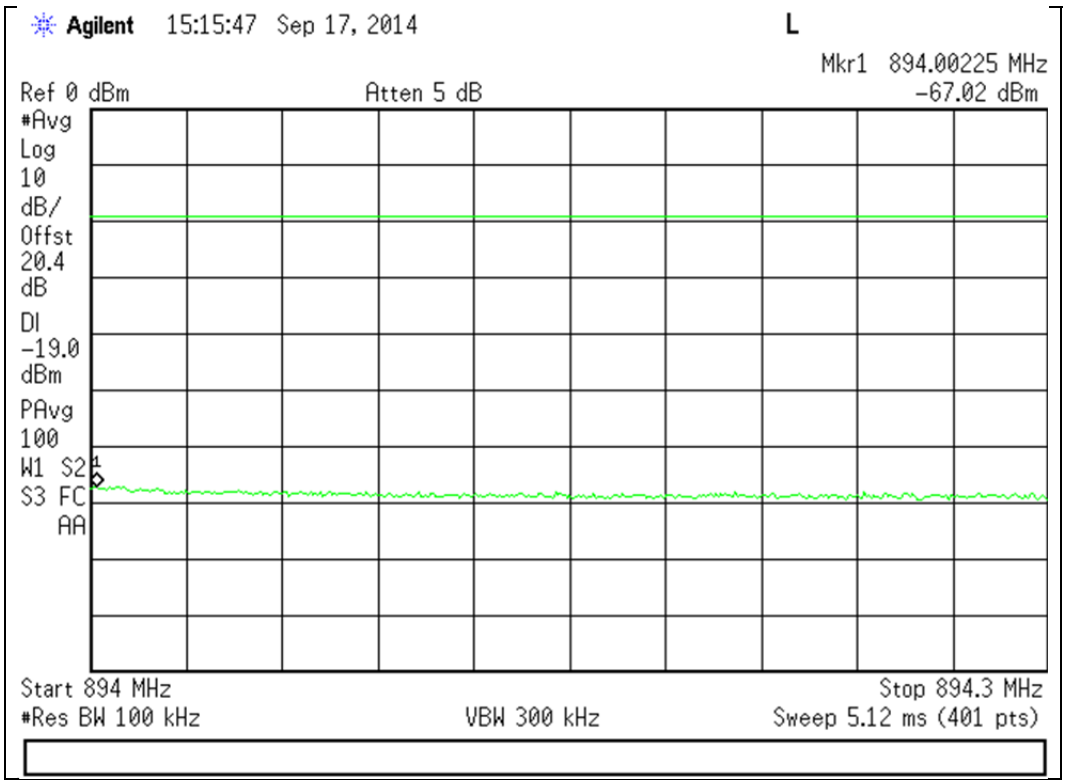


869 - 894 MHz Band

Lower Band Edge

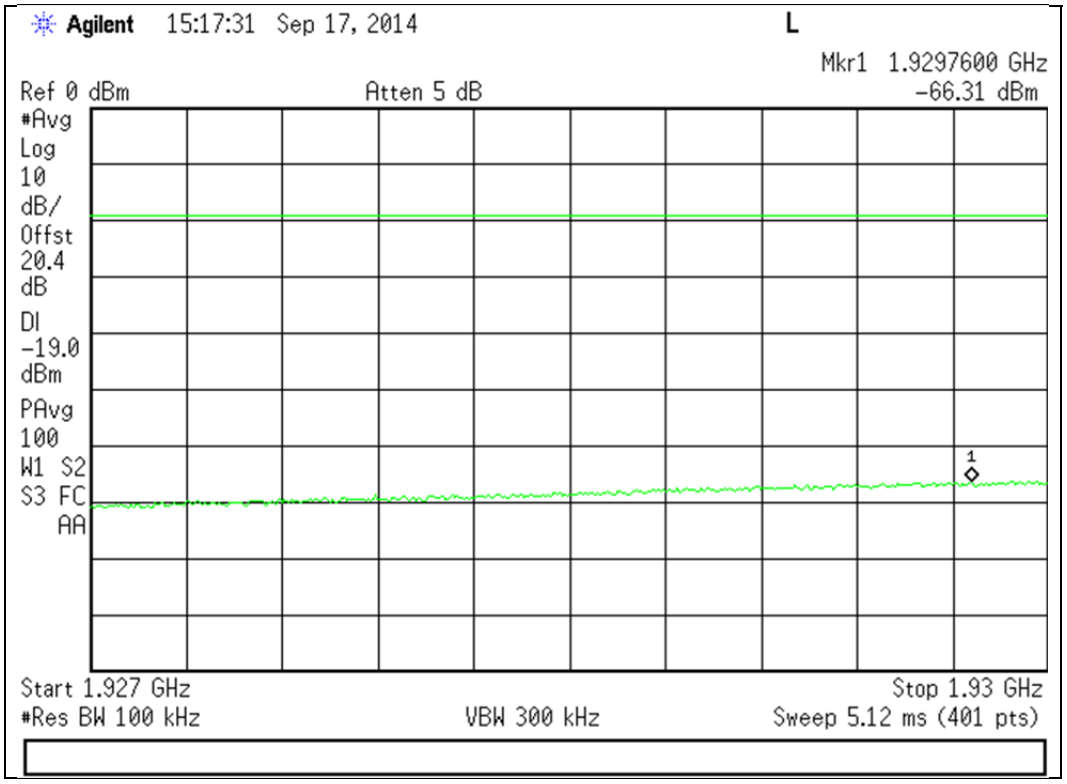


Upper Band Edge

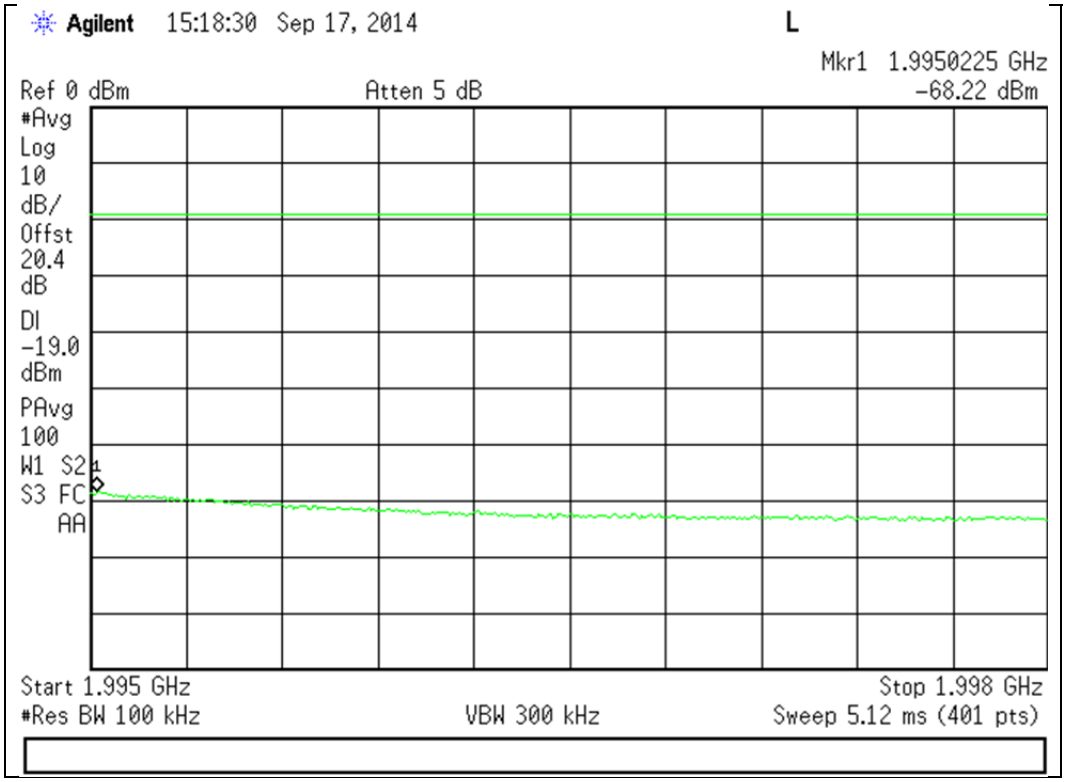


1930 - 1990 MHz Band

Lower Band Edge

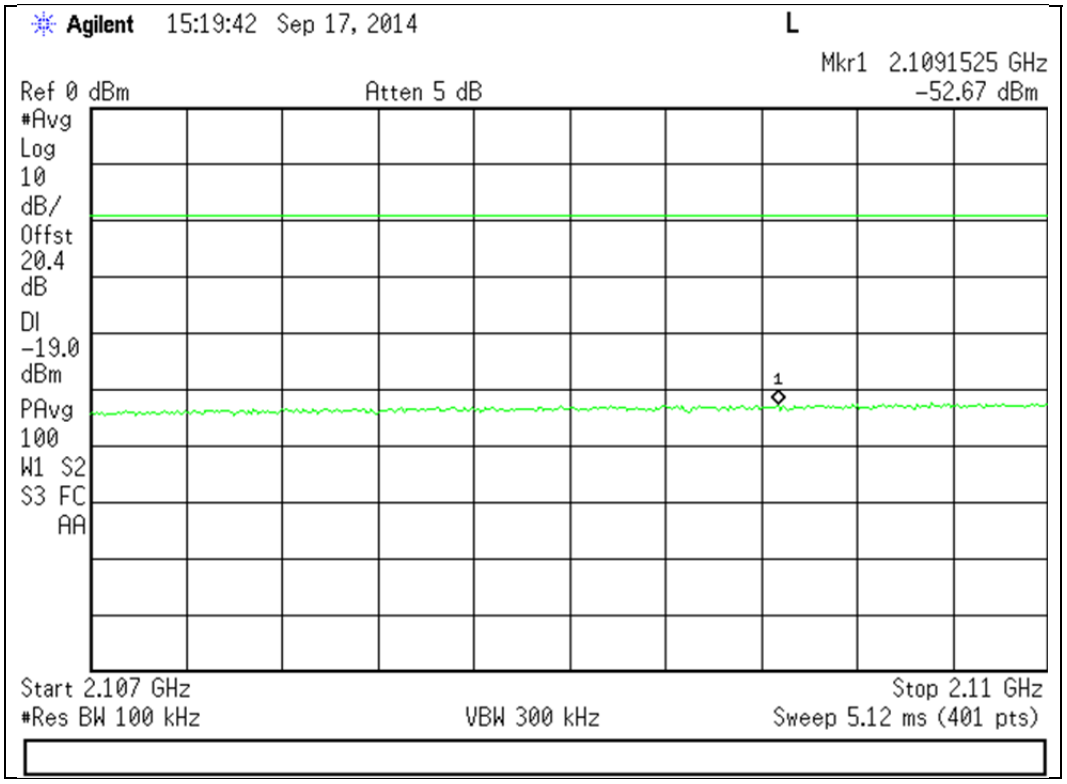


Upper Band Edge

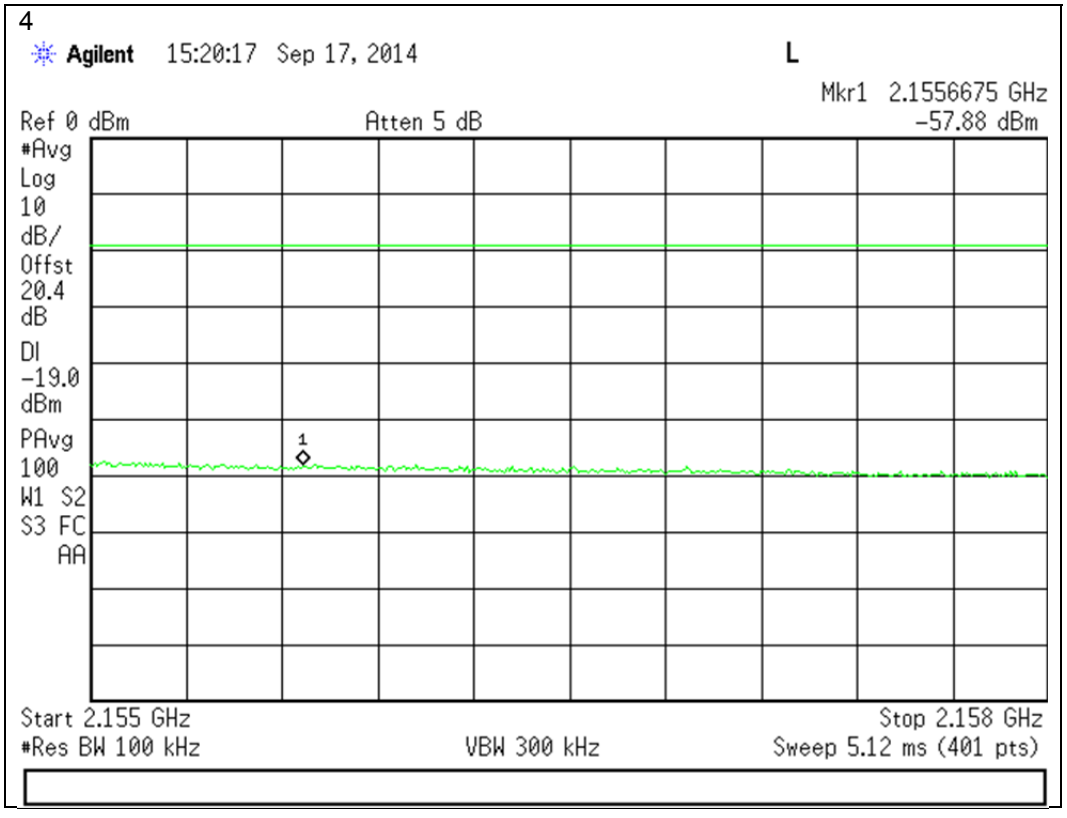


2110 - 2155 MHz Band

Lower Band Edge



Upper Band Edge



Conducted Spurious Emissions

Name of Test: Conducted Spurious Emissions **Engineer:** Mike Graffeo
Test Equipment Utilized: i00379 and i00405 **Test Date:** 9/18/14

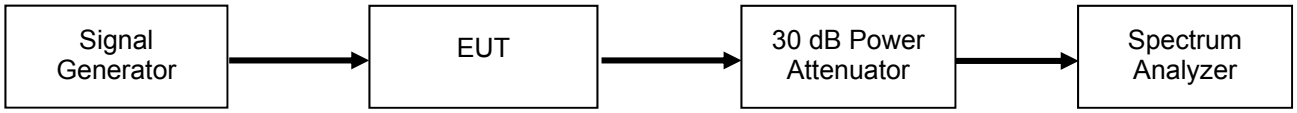
Test Procedure

The EUT was connected to a spectrum analyzer through an attenuator, with the losses being input into the spectrum analyzer as a combination of reference level offset and correction factor as needed to ensure accurate readings. A signal generator was utilized to produce a 4.1 MHz AWGN signal operating at the maximum allowable power. The conducted spurious emissions from 9 kHz to 10 times the highest tunable frequency for each operational band were measured (excluding the band defined by the Out of band emissions test). The emissions were plotted and the highest level was recorded in the summary table.

The following formulas are used for calculating the limits.

Conducted Spurious Emissions Limit = P1 – (43+ 10Log(P2)) = -13 dBm
P1 = power in dBm
P2 = power in Watts

Test Setup



Uplink Test Results

Frequency Band (MHz)	Measured Frequency (MHz)	Measured Level (dBm)	Limit (dBm)	Result
704 - 716	716.1	-24.45	-13	Pass
776 - 787	787.1	-17.95	-13	Pass
824 - 849	1890.9	-33.44	-13	Pass
1710 - 1755	3463.7	-24.75	-13	Pass
1850 – 1910	1716.3	-34.59	-13	Pass

Downlink Test Results

Frequency Band (MHz)	Measured Frequency (MHz)	Measured Level (dBm)	Limit (dBm)	Result
734 - 746	2113.3	-35.24	-13	Pass
746 - 757	1962.3	-36.31	-13	Pass
869 - 894	8662.0	-25.36	-13	Pass
1930 – 1990	8661.2	-26.30	-13	Pass
2110 - 2155	8660.2	-26.25	-13	Pass

For the 746 – 758 downlink and 776 – 788 Uplink bands of operation, the following additional spurious emissions requirements apply.

FCC 27.53(c)
For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(3) On all frequencies between 763-775 MHz and 793-805MHz, by a factor of not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations

The test is performed using a 10 kHz RBW. Since the limit is referenced to a 6.25 kHz BW, the following correction factor is applied to the measured data.

BW correction Factor = 10Log B1/B2
BW correction Factor =10Log 6.25 / 10 = - 2.04 dB

Final Value (dBm) = conducted measurement +BW correction factor

776 – 787 MHz Uplink Band

Spurious Frequency Range (MHz)	Measured Frequency (MHz)	Measured Value (dB)	Bandwidth Correction Factor (dB)	Final Value (dBm)	Limit (dBm)	Margin (dB)
763 – 775	774.82	-57.48	-2.04	-59.52	-46	-13.52
793 – 805	793.03	-80.76	-2.04	-82.80	-46	-36.80

746 - 757 MHz Downlink Band

Spurious Frequency Range (MHz)	Measured Frequency (MHz)	Measured Value (dB)	Bandwidth Correction Factor (dB)	Final Value (dBm)	Limit (dBm)	Margin (dB)
763 – 775	772.41	-83.64	-2.04	-85.68	-46	-39.68
793 – 805	796.06	-85.03	-2.04	-87.07	-46	-41.07

FCC 27.53(e)
For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Since the limit is referenced to EIRP, the final data is computed using the Conducted Spurious Emission data and adding the BW correction factor plus the final gain/loss data from the antenna kitting information supplied by the manufacturer.

For the Narrowband measurement, the test is performed using a 10 kHz RBW. Since the limit is referenced to a 700 Hz BW, the following correction factor is applied to the measured data.

BW correction Factor = 10Log B1/B2
BW correction Factor =10Log 700 / 10000 = -11.55 dB

Final Value (dBm) = conducted measurement +BW correction factor + final gain/loss from Antenna Kitting document

The Limit for discreet (narrowband) emissions is -80dBW (-50 dBm) in 700 Hz BW.
The Limit for (wideband Emissions) is -70 dBW (-40 dBm) in a 1 MHz BW.

776 – 787 MHz Uplink Band

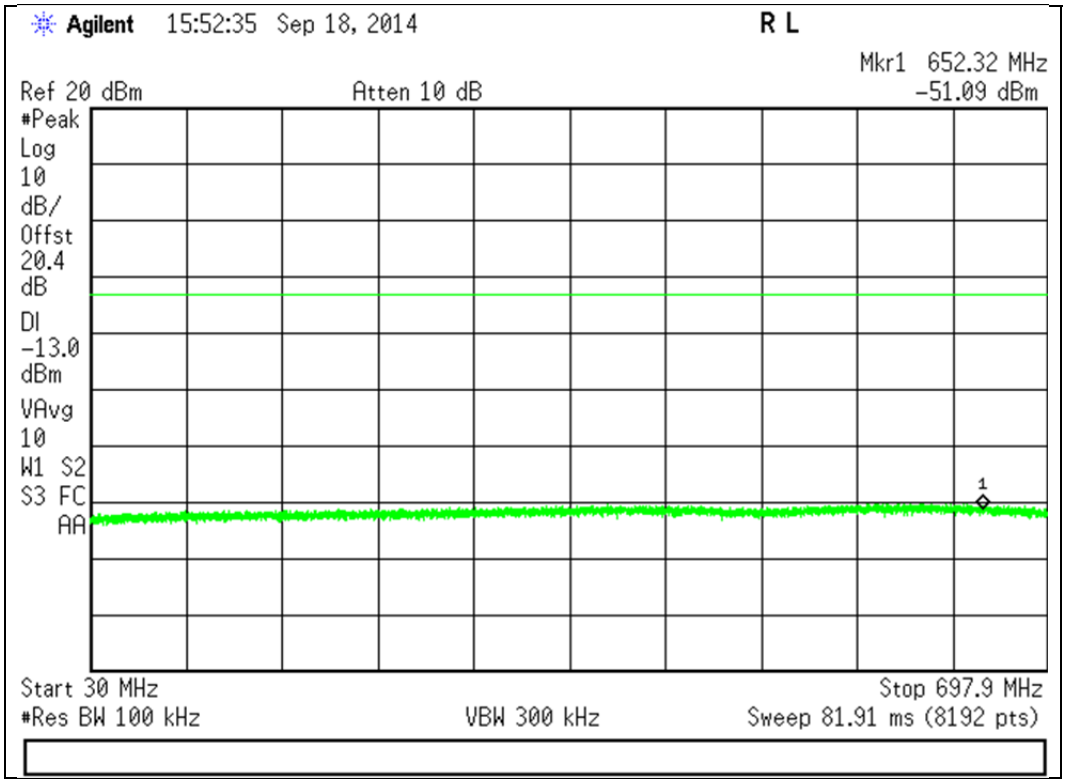
Spurious Frequency Range (MHz)	Measured Frequency (MHz)	Measured Value (dBm)	Bandwidth Correction Factor (dB)	Gain/Loss from Antenna Kitting Information (dB)	Final Value (dBm)	Limit (dBm)	Margin (dB)
1559 – 1610 (Wideband)	1561.5	-50.88	0.00	7.90	-42.98	-40	-2.98
1559 – 1610 (Narrowband)	1562.1	-74.74	-11.55	7.90	-78.39	-50	-28.39

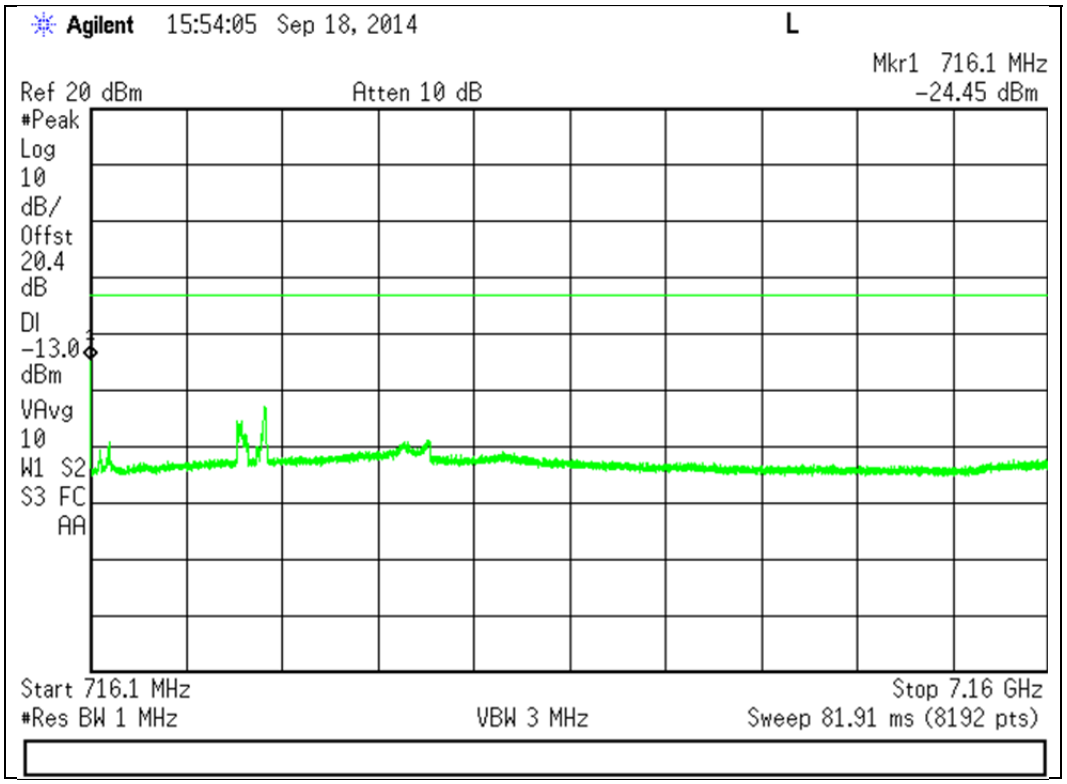
746 - 757 MHz Downlink Band

Spurious Frequency Range (MHz)	Measured Frequency (MHz)	Measured Value (dBm)	Bandwidth Correction Factor (dB)	Gain/Loss from Antenna Kitting information (dB)	Final Value (dBm)	Limit (dBm)	Margin (dB)
1559 – 1610 (Wideband)	1589.9	-57.45	0.00	7.90	-49.55	-40	-9.55
1559 – 1610 (Narrowband)	1571.1	-81.50	-11.55	7.90	-85.15	-50	-35.15

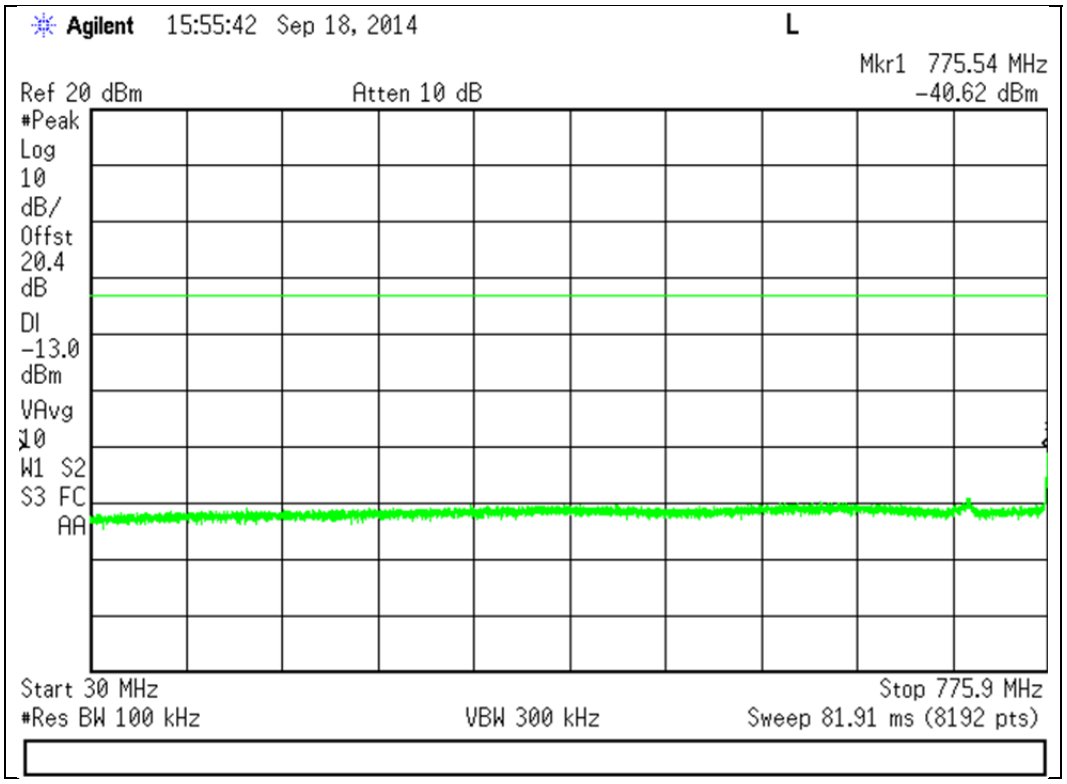
Uplink Test Plots

704 - 716 MHz Band

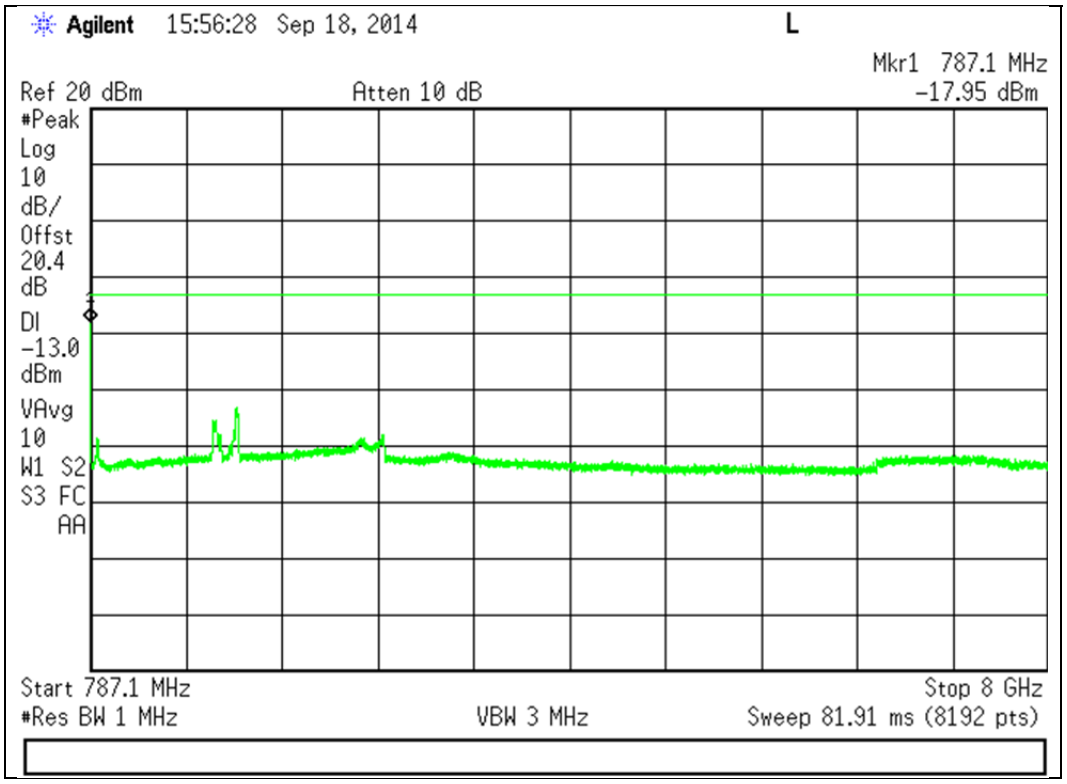




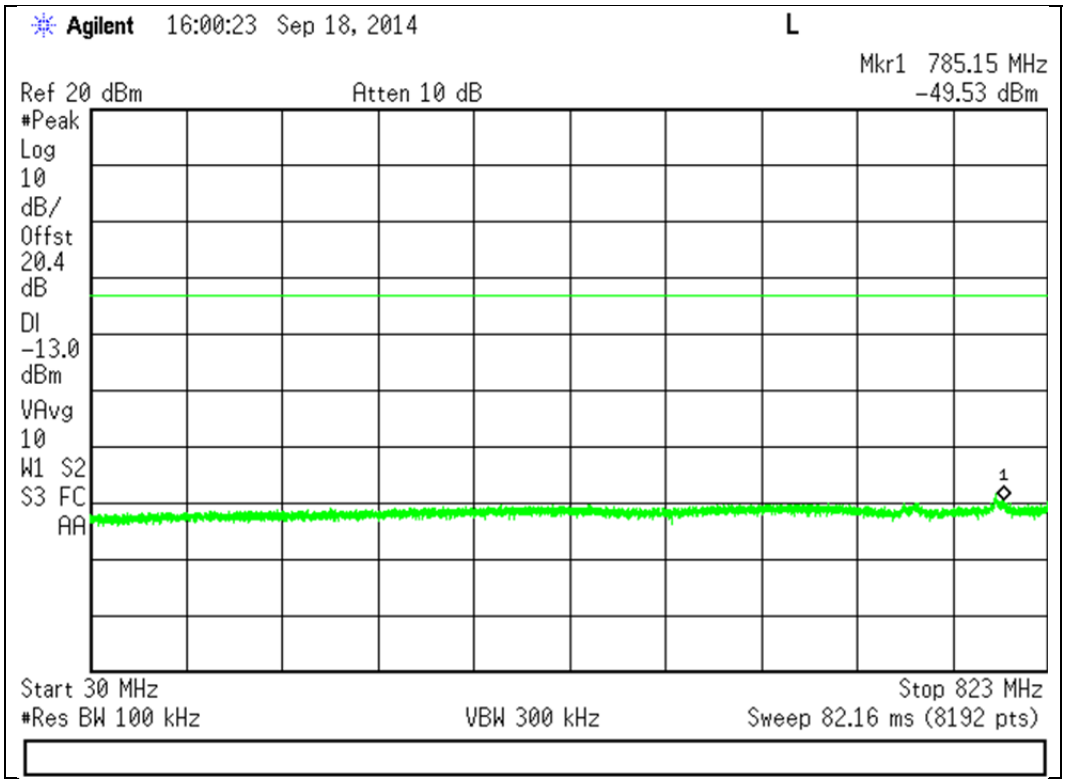
776 - 787 MHz Band

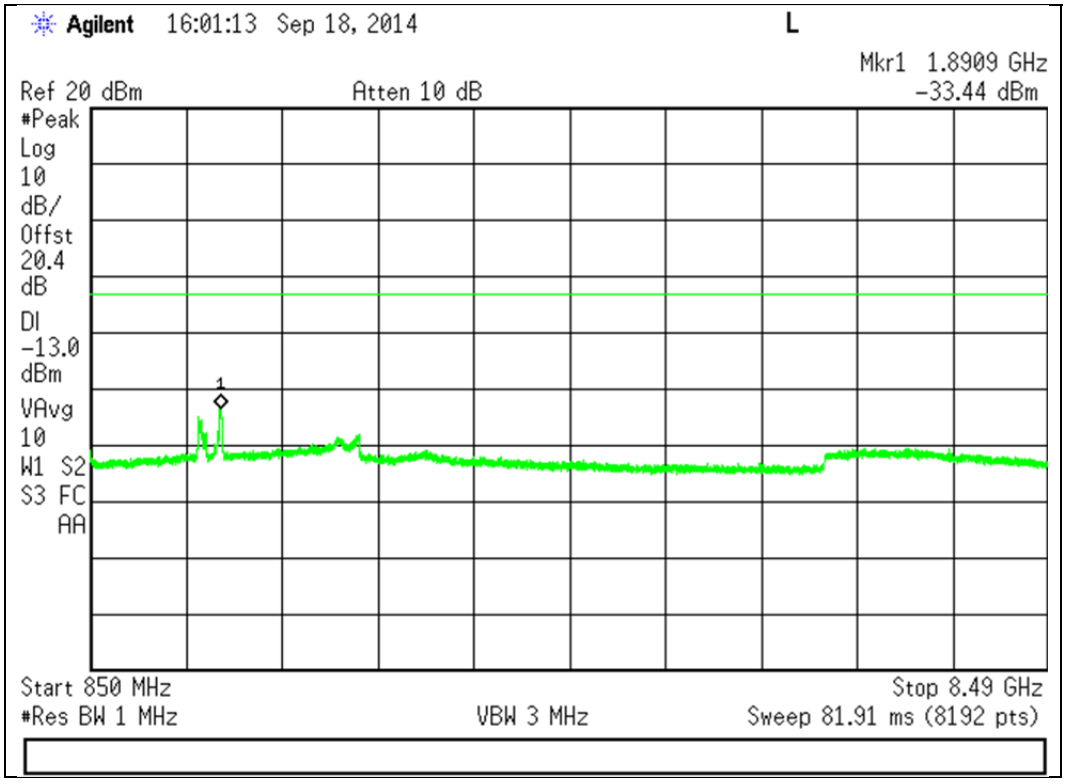


776 - 787 MHz Band



824 - 849 MHz Band





1710 - 1755 MHz Band