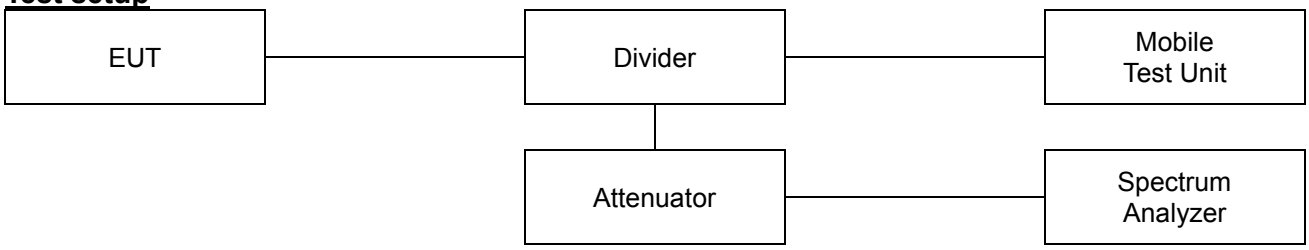
7.2. Spurious Emissions at Antenna Terminal

Test setup



Limit

According to §22.917(a), §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) ㏈.

According to §27.53(h), except as otherwise specified below, for operations in the 1695~1710 ㎒, 1710 ~ 1755 ㎒, 1755 ~ 1780 ㎒, 1915~1920 ㎒, 1995~2000 ㎒, 2000~2020 ㎒, 2110~2155 ㎒, 2155~2180 ㎒, and 2180~2200 bands, the power of an emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10log($P_{[Watts]}$) ㏈.

Test procedure

971168 D01 v03r01 - Section 6
ANSI 63.26-2015 – Section 5.7

Test settings

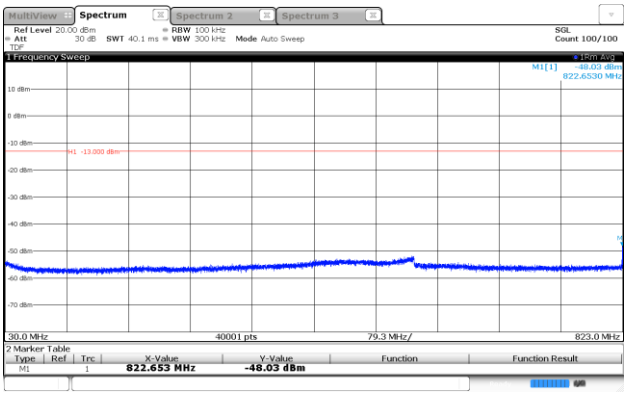
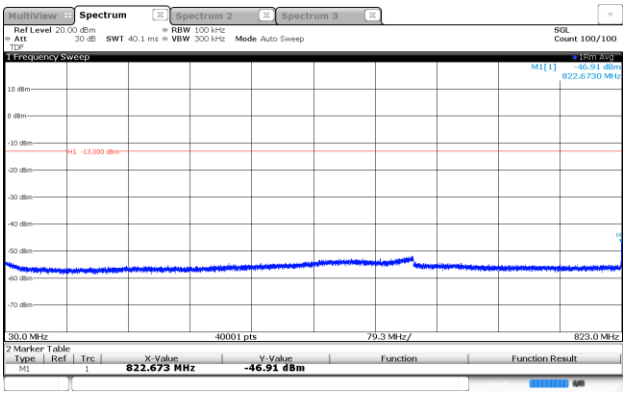
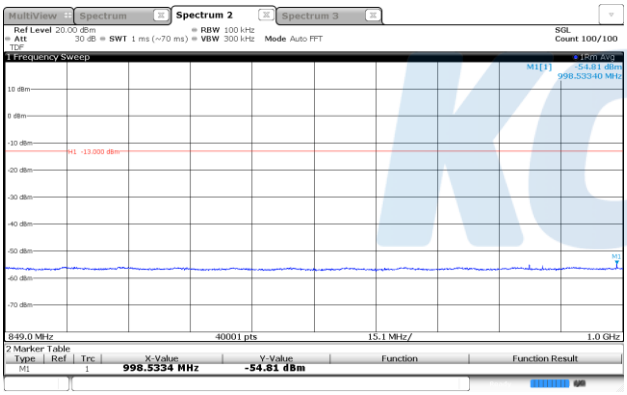
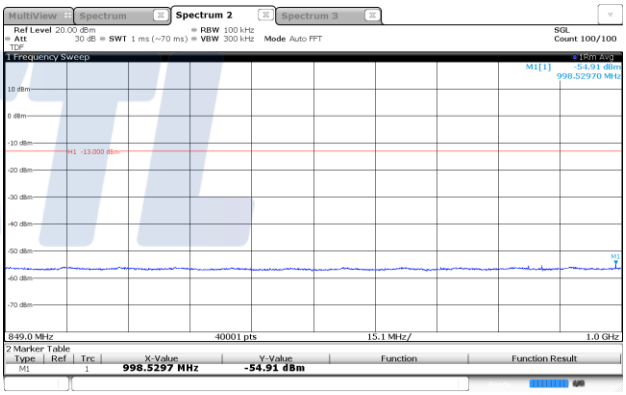
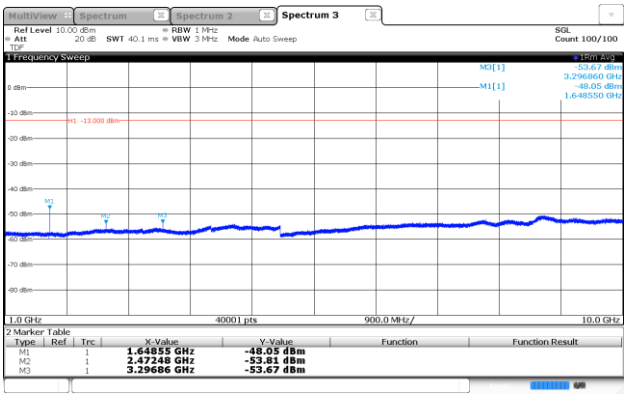
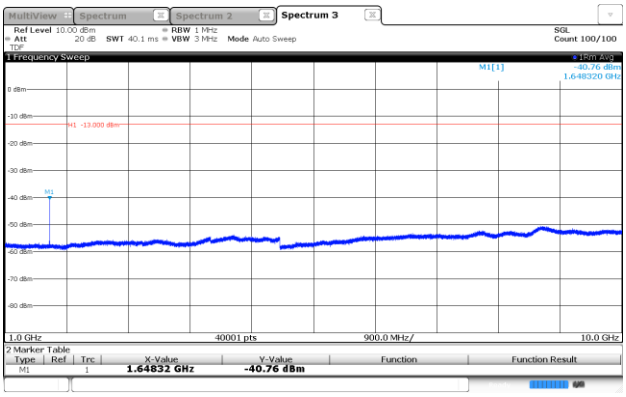
1) Start frequency was set to 30 ㎒ and stop frequency was set to at least 10th the fundamental frequency.
2) Detector = RMS
3) Sweep time = auto couple.
4) Trace mode = trace average
5) Allow trace to fully stabilize.
6) Please see test notes below RBW and VBW settings.

Notes:

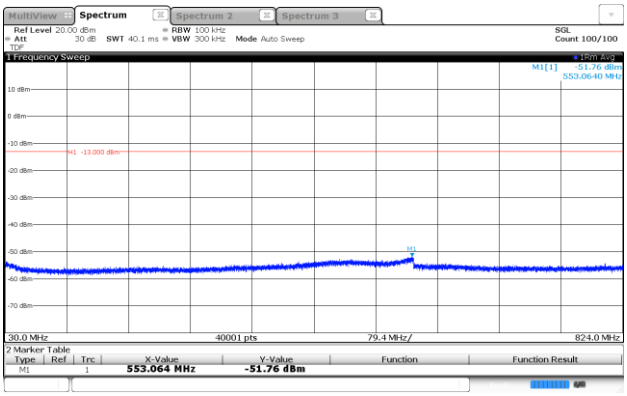
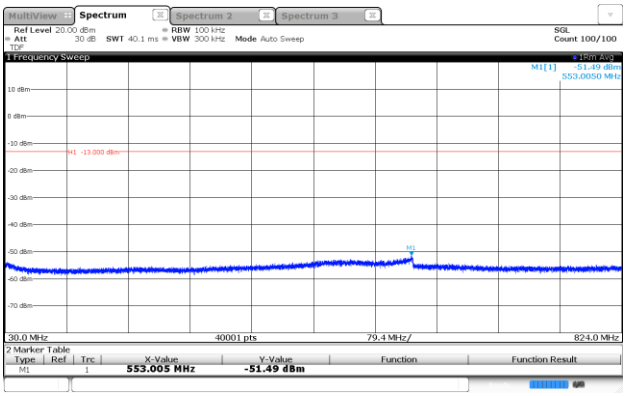
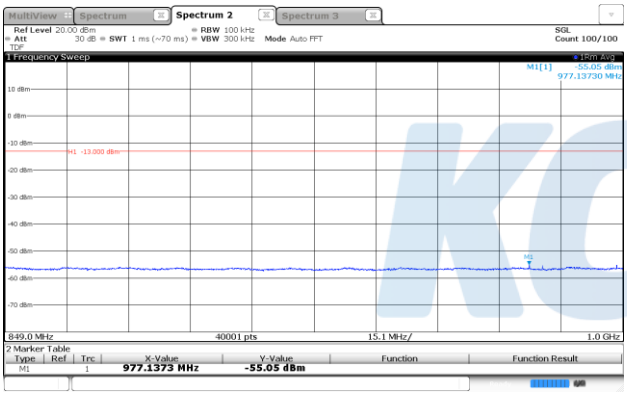
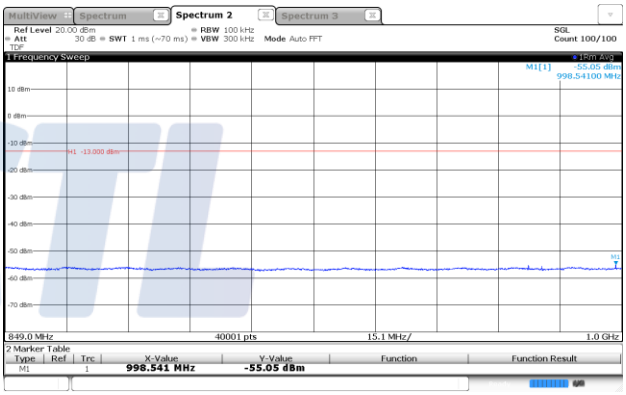
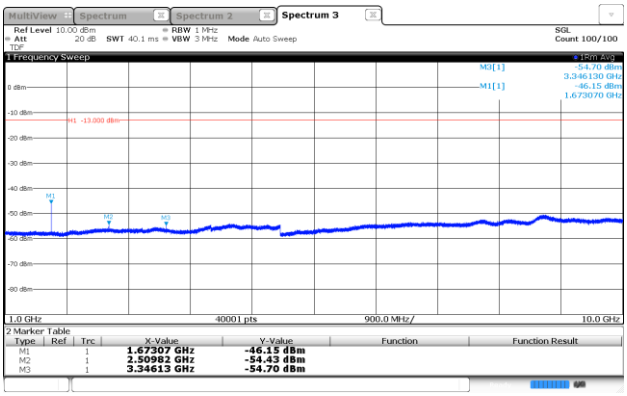
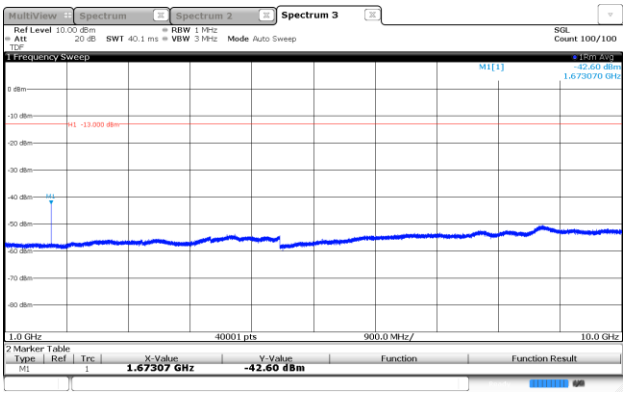
1. Per 22.917(b),24.238(b),27.53(h) compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 ㎑ or greater for frequencies less than 1 ㎓ and 1 ㎒ or greater for frequencies greater than 1 ㎓.
2. All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function. Please refer to the page 10.

Test results

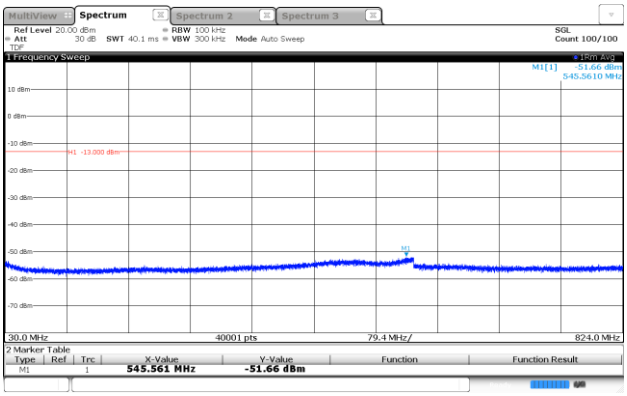
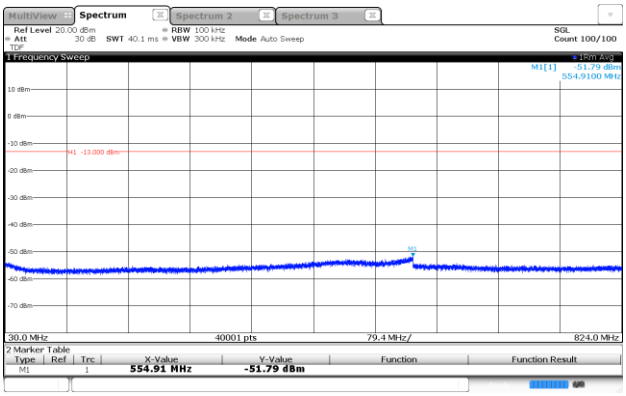
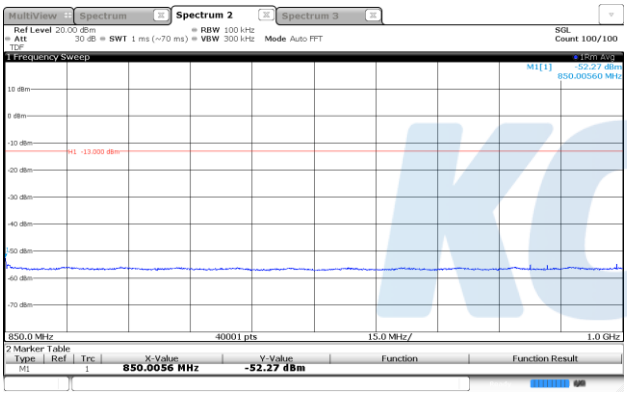
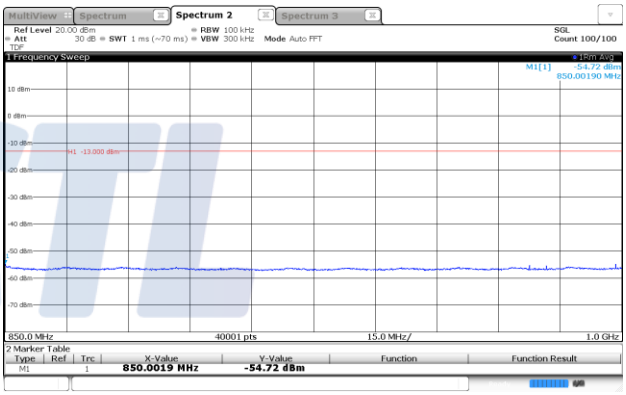
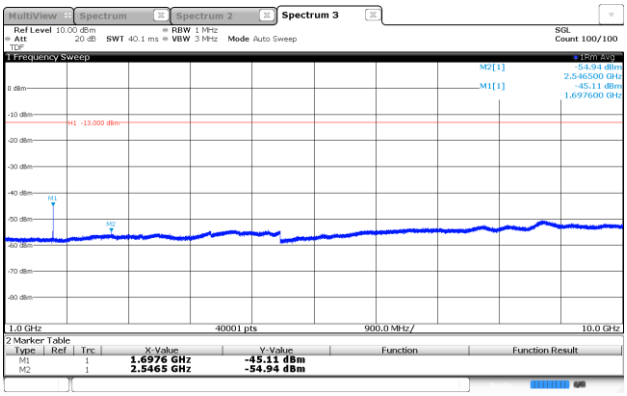
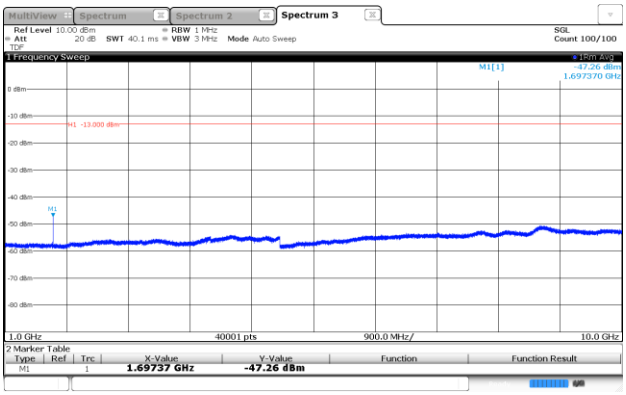
Test mode: GSM850

GPRS / Low ch.	EDGE / Low ch.
	
	
	

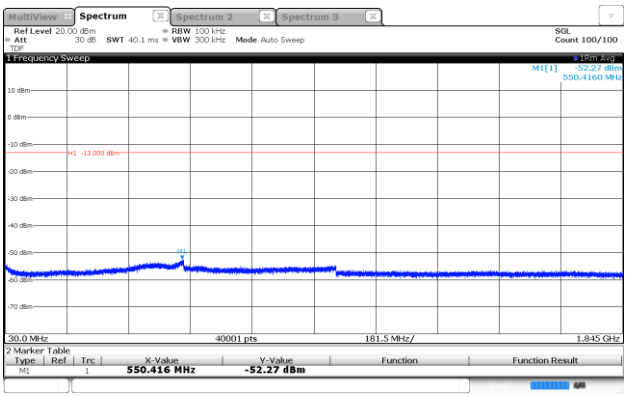
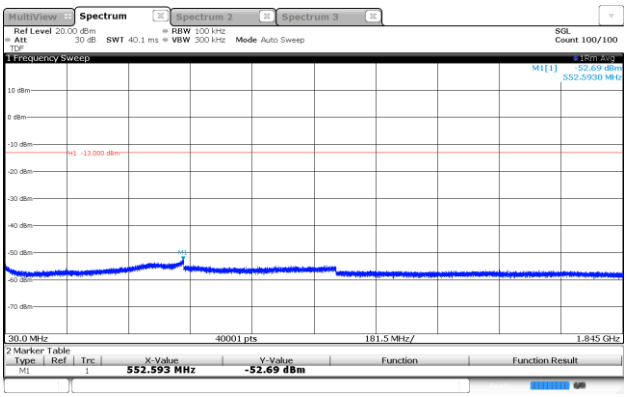
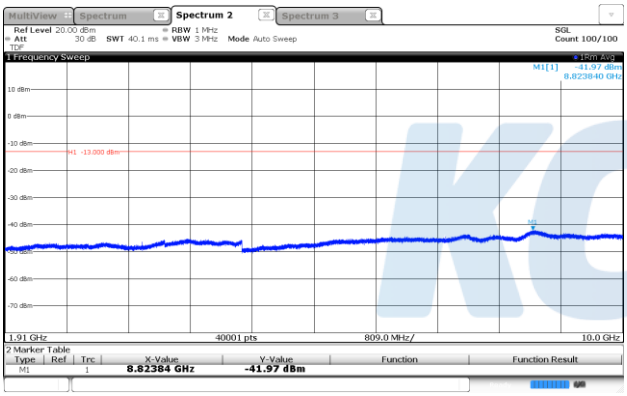
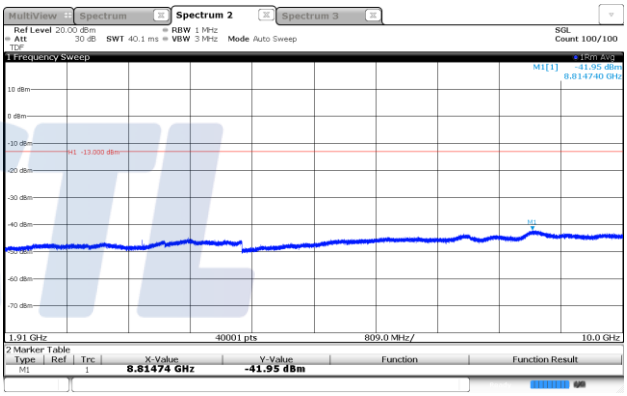
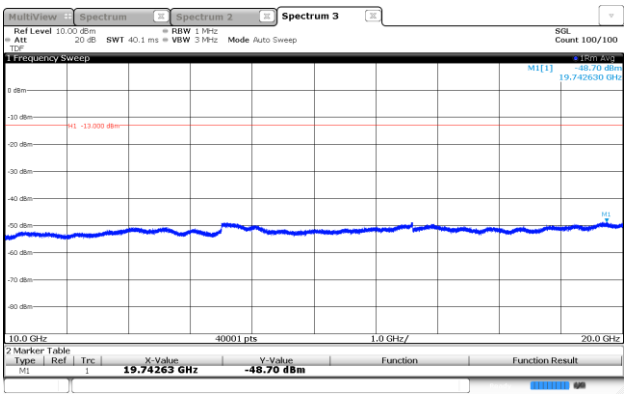
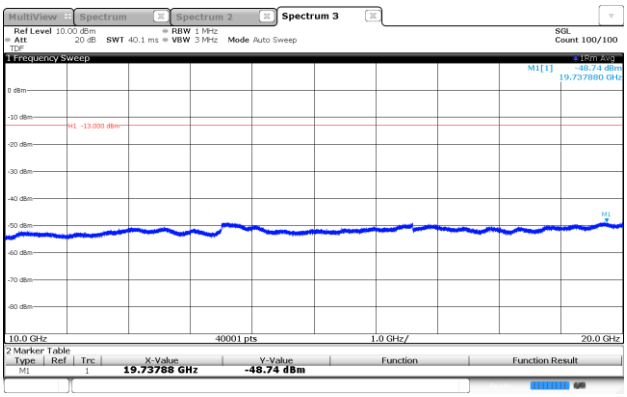
Test mode: GSM850

GPRS / Mid ch.	EDGE / Mid ch.
	
	
	

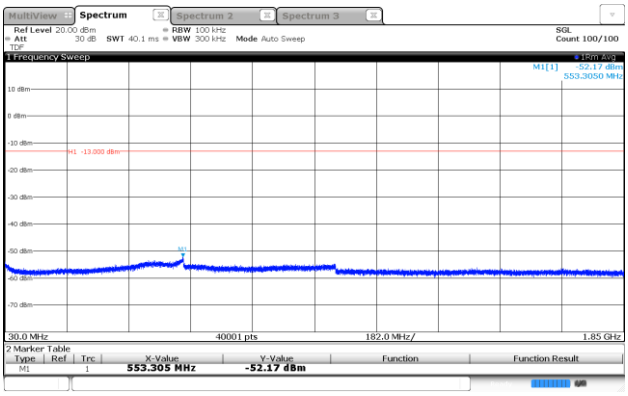
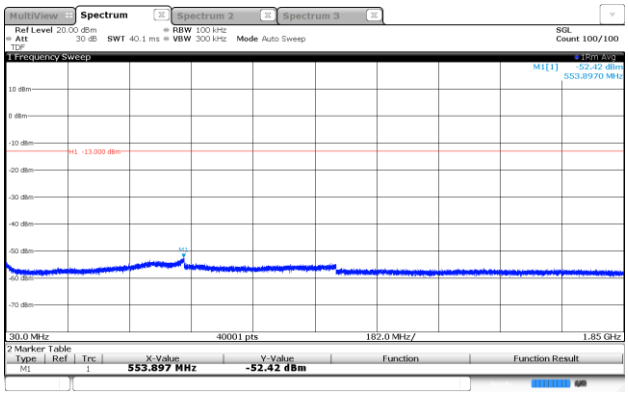
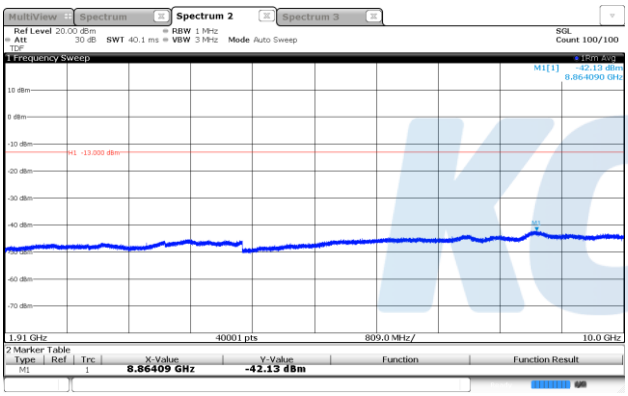
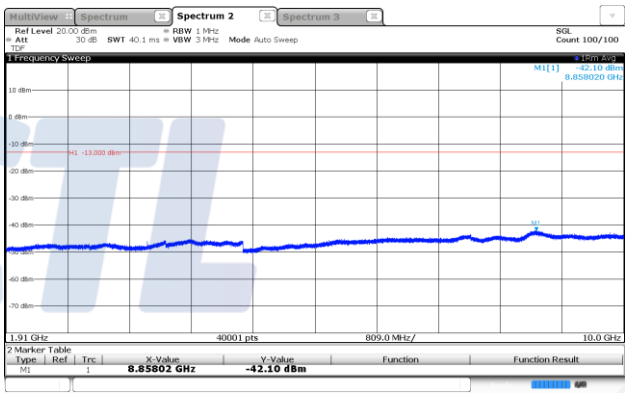
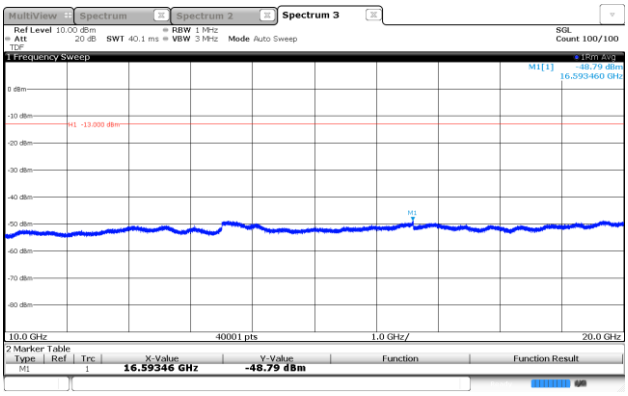
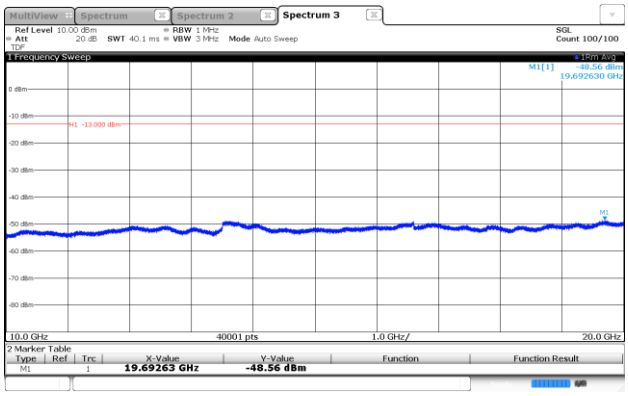
Test mode: GSM850

GPRS / High ch.	EDGE / High ch.
	
	
	

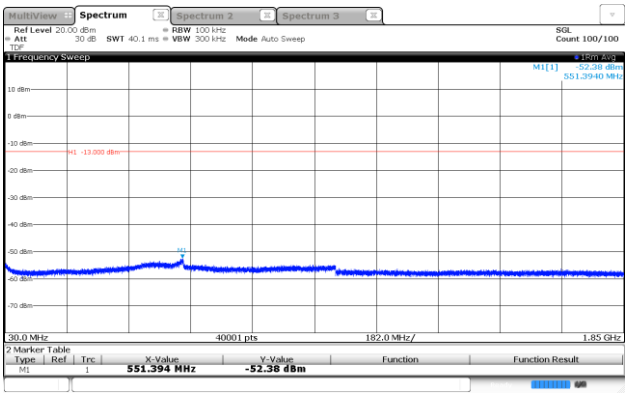
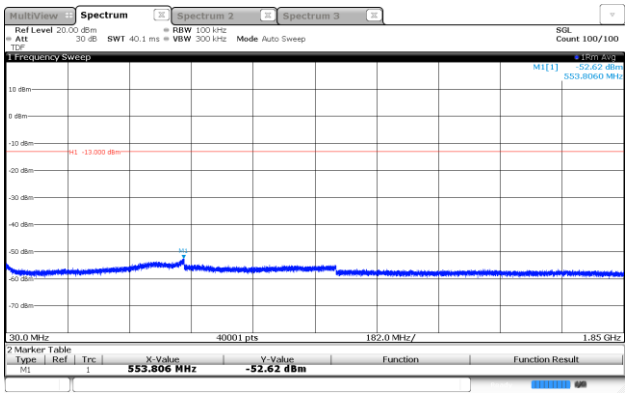
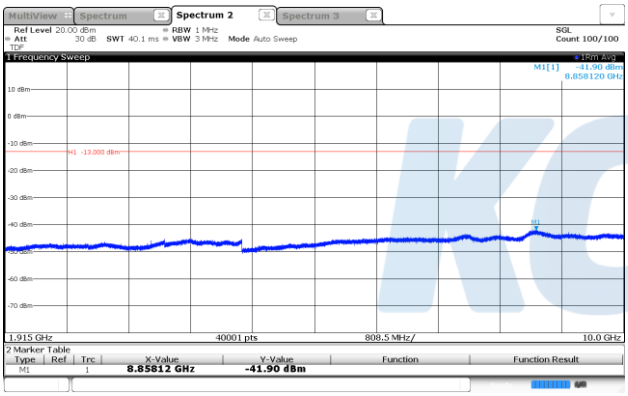
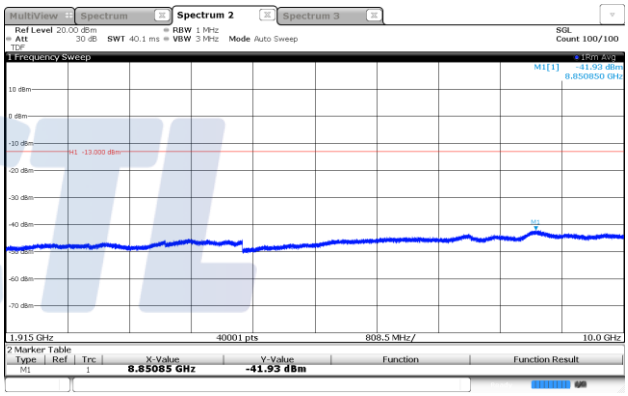
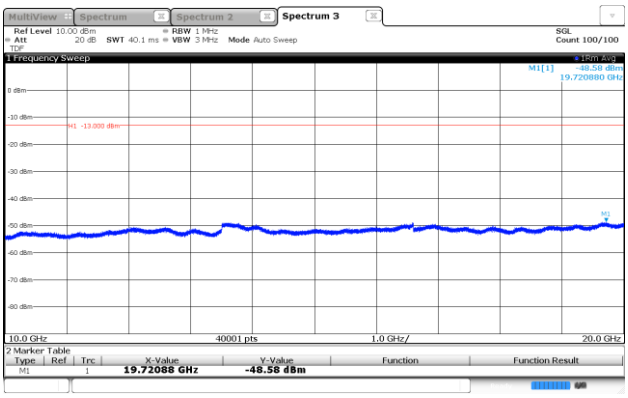
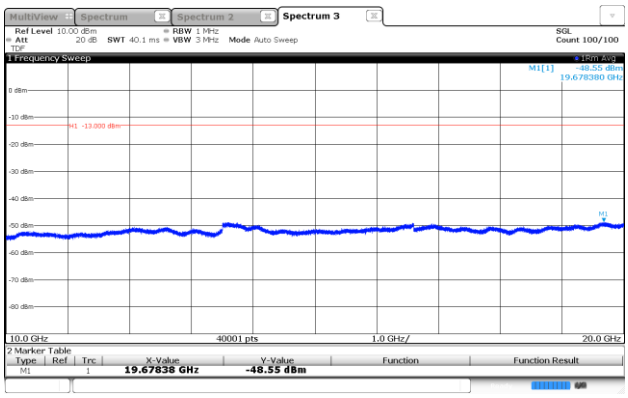
Test mode: GSM1900

GPRS / Low ch.	EDGE / Low ch.
	
	
	

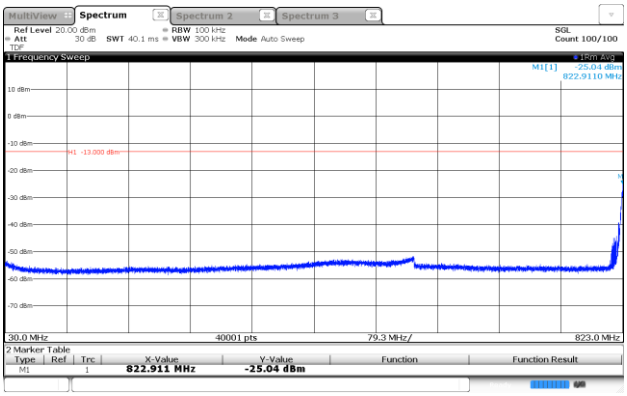
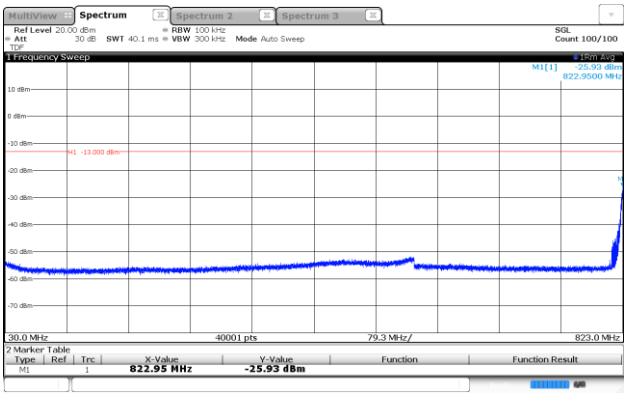
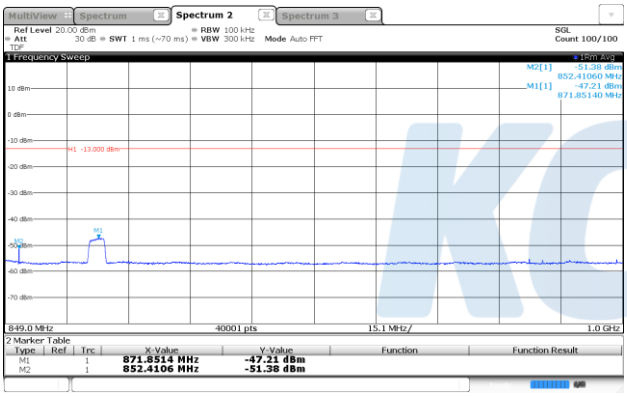
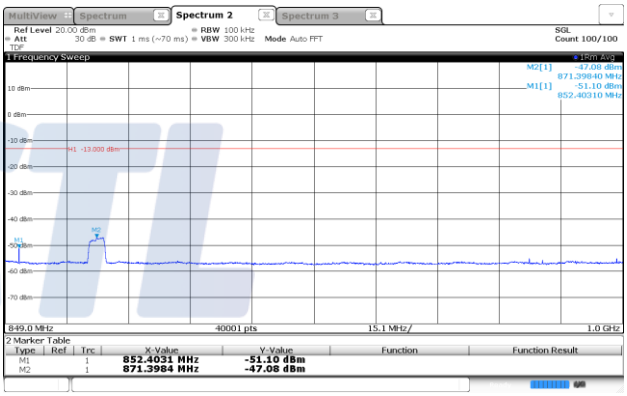
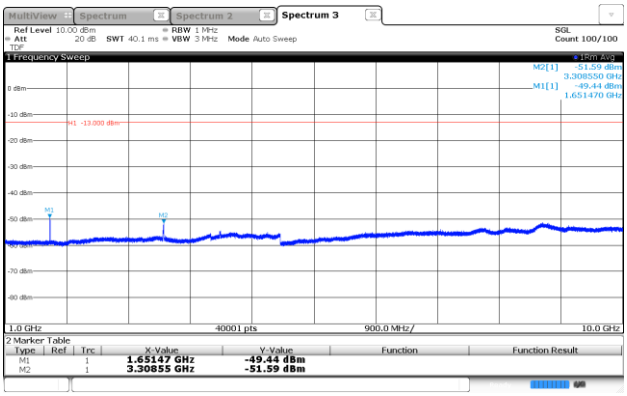
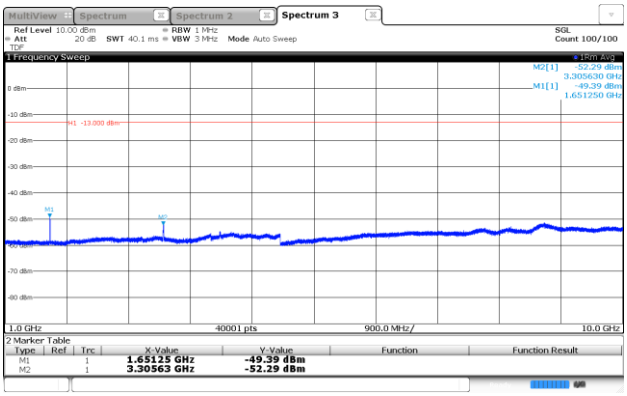
Test mode: GSM1900

GPRS / Mid ch.	EDGE / Mid ch.
	
	
	

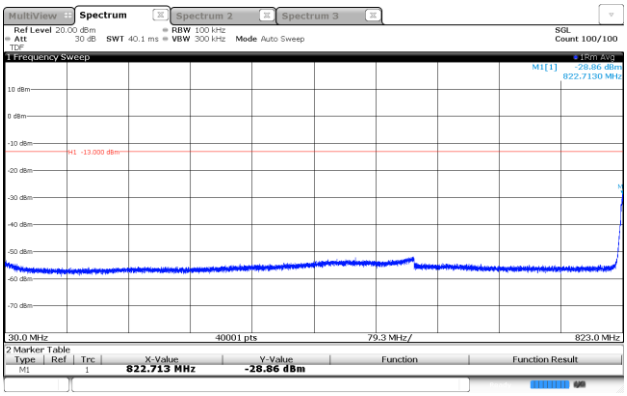
Test mode: GSM1900

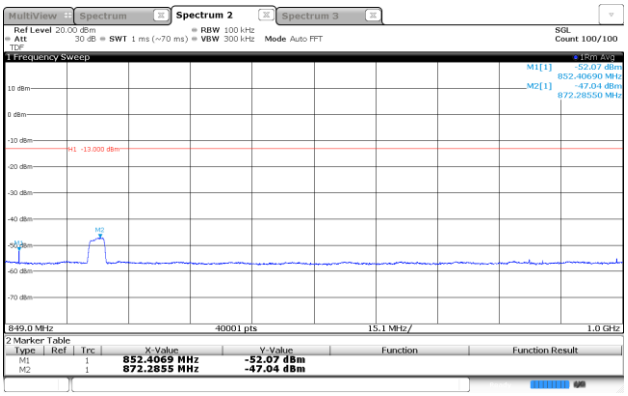
GPRS / High ch.	EDGE / High ch.
	
	
	

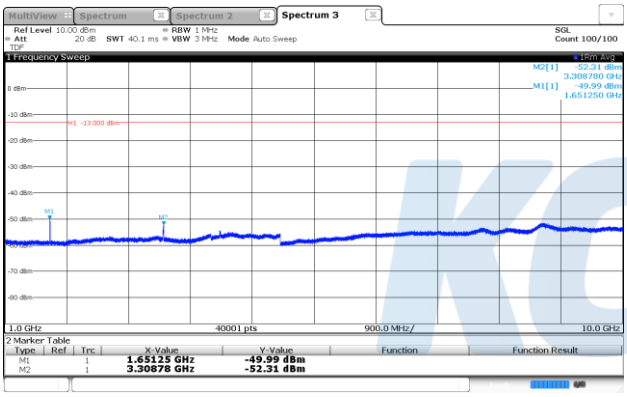
Test mode: WCDMA850

RMC / Low ch.	HSDPA / Low ch.
	
	
	

HSUPA / Low ch.







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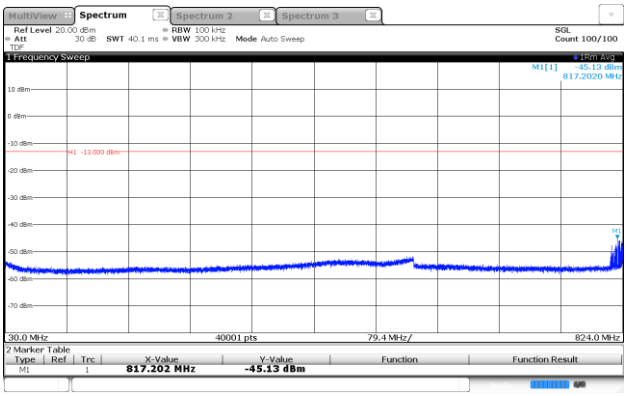
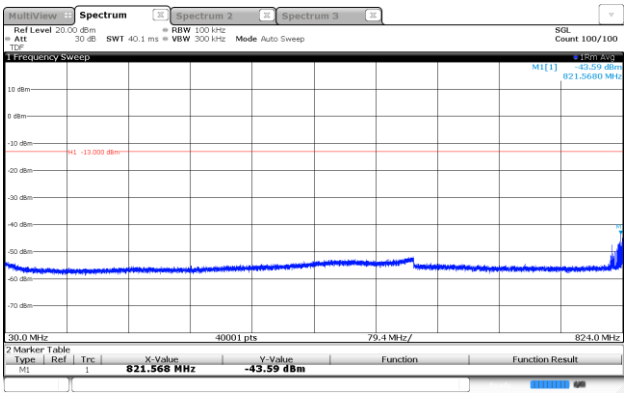
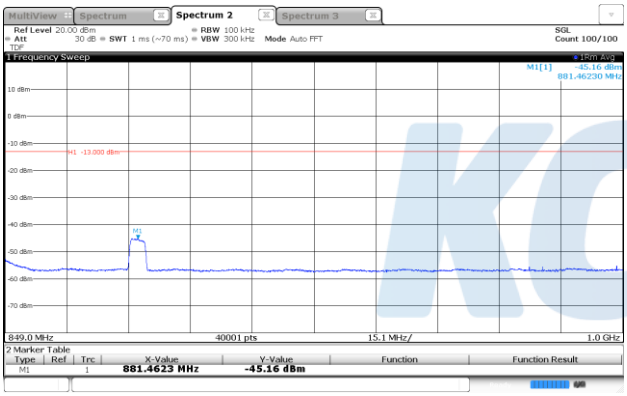
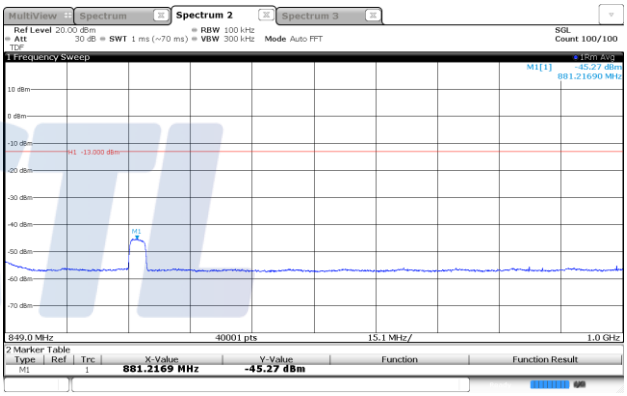
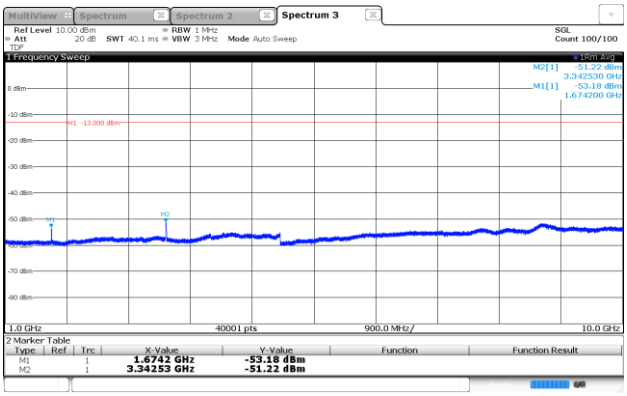
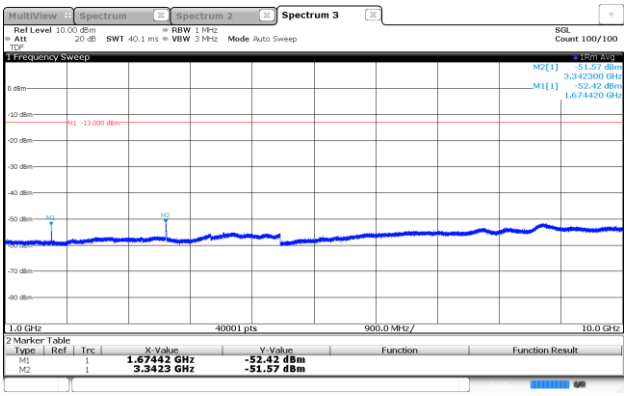
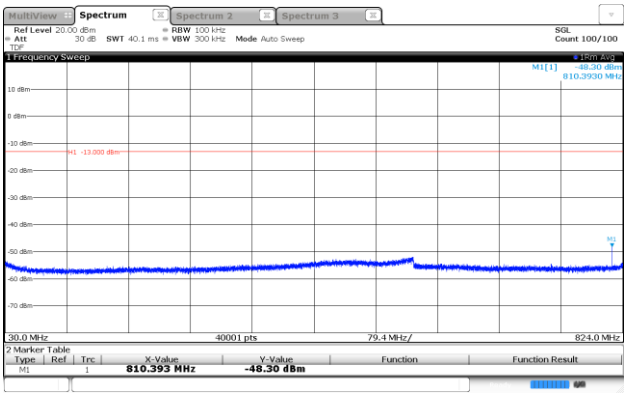
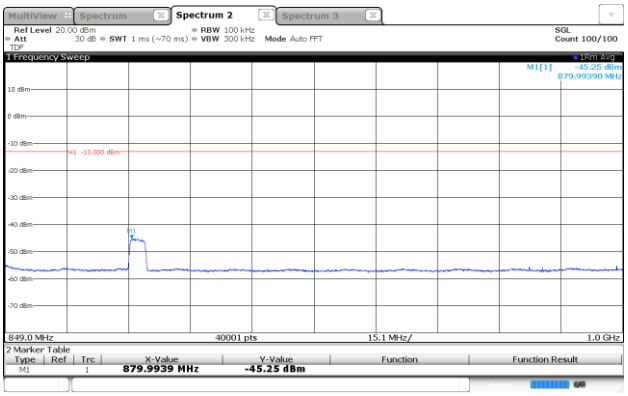
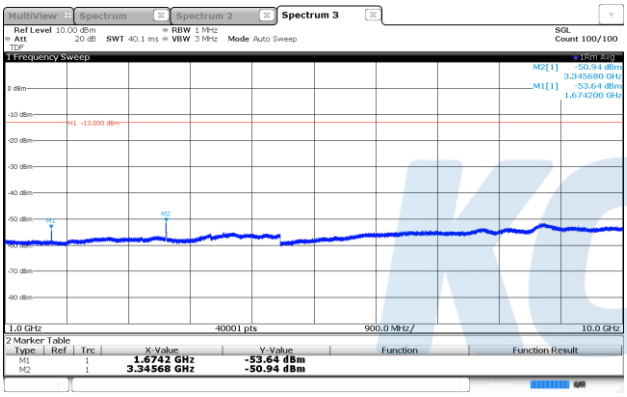
Test mode: WCDMA850

RMC / Mid ch.	HSDPA / Mid ch.
	
	
	

HSUPA / Mid ch.







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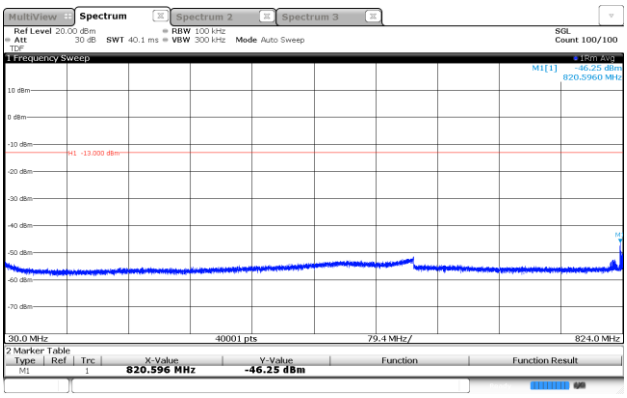
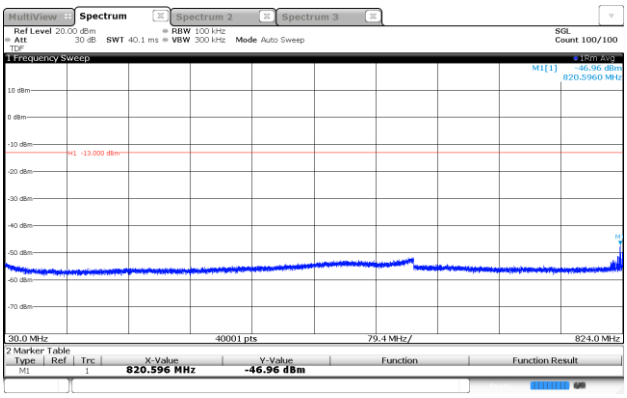
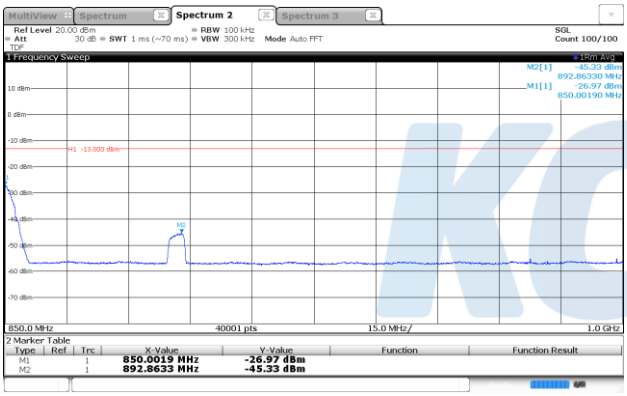
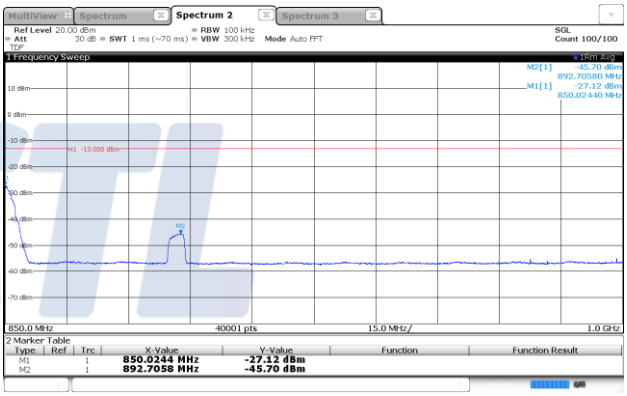
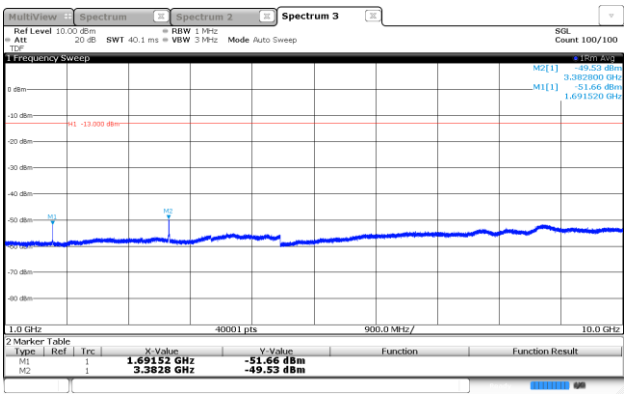
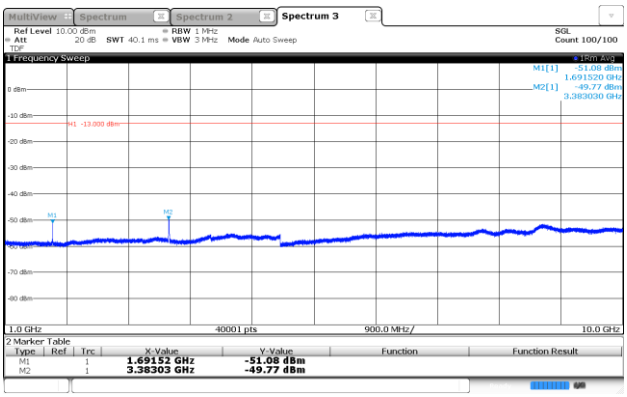
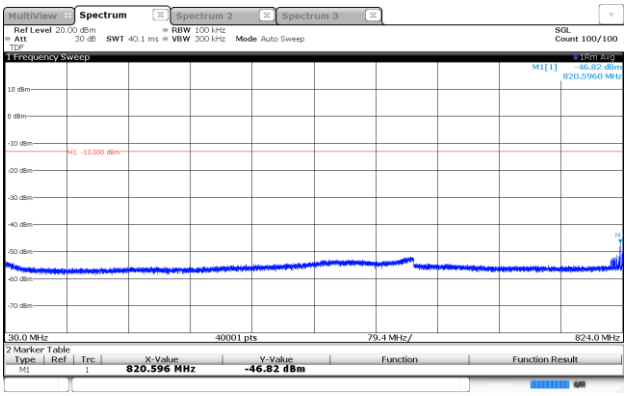
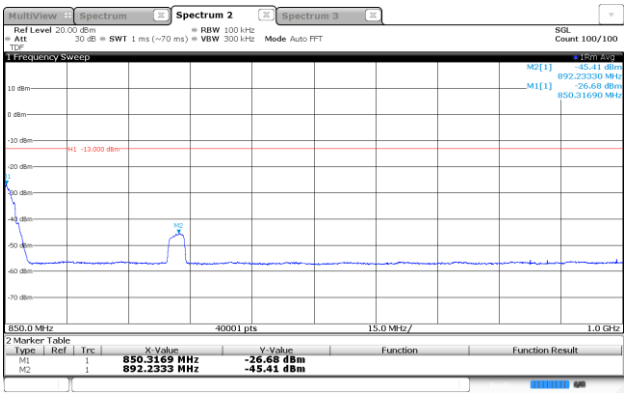
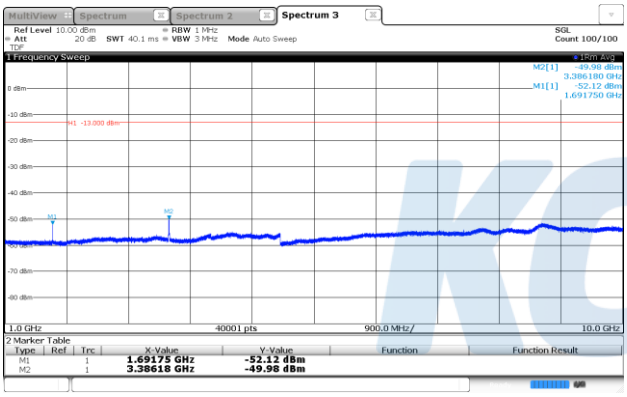
Test mode: WCDMA850

RMC / High ch.	HSDPA / High ch.
	
	
	

HSUPA / High ch.







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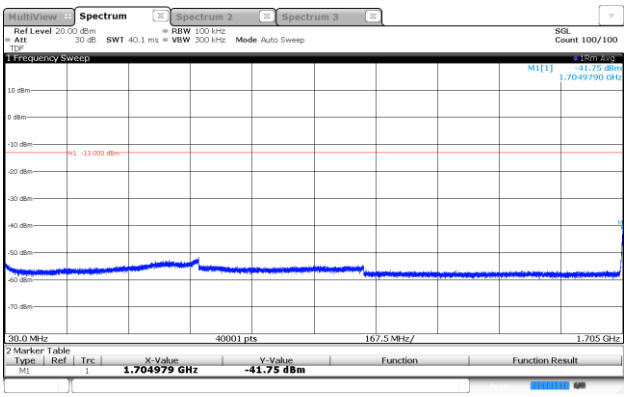
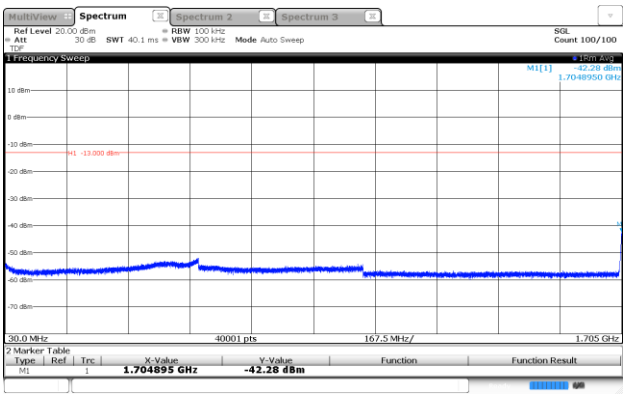
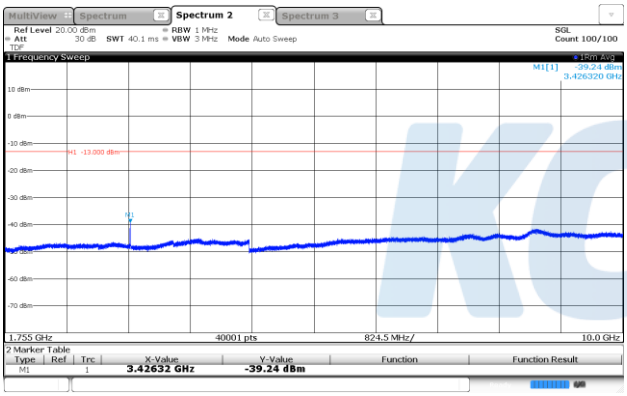
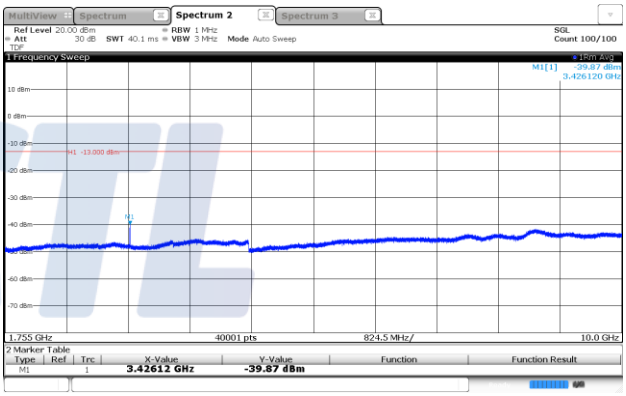
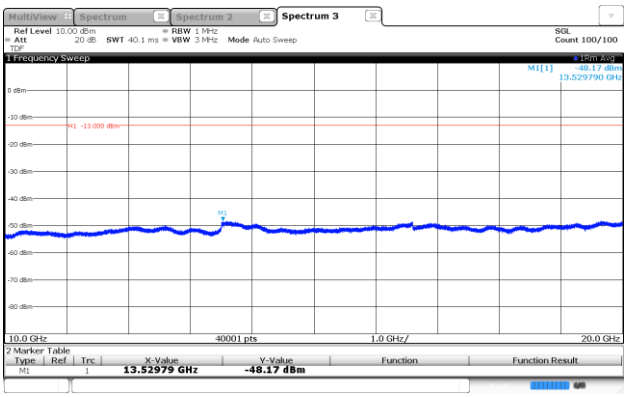
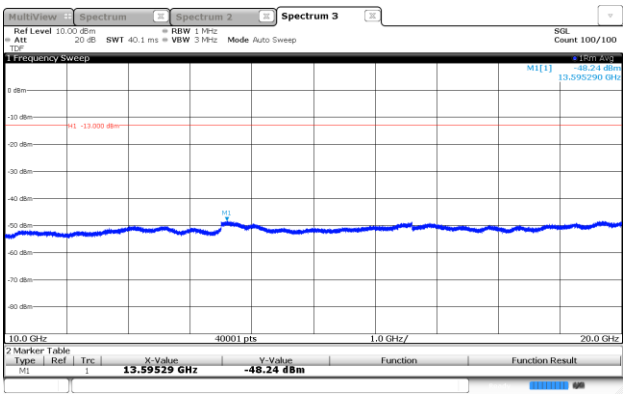
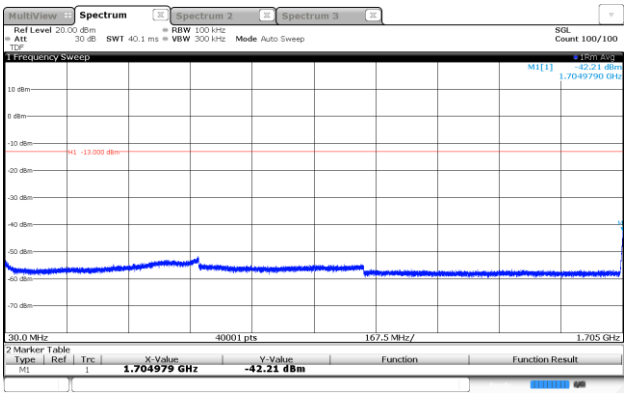
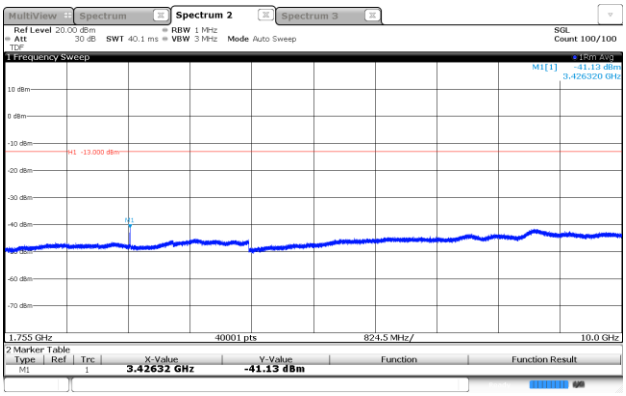
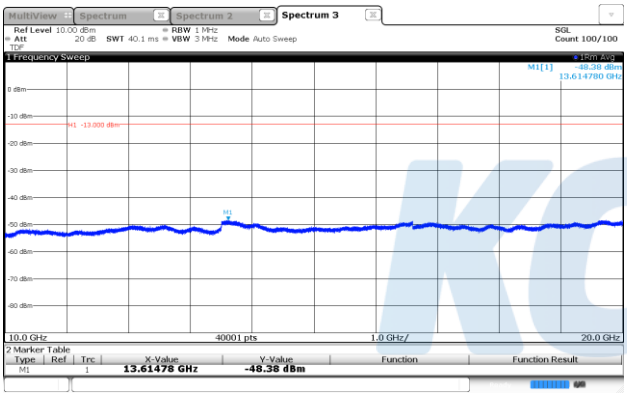
Test mode: WCDMA1700

RMC / Low ch.	HSDPA / Low ch.
	
	
	

HSUPA / Low ch.







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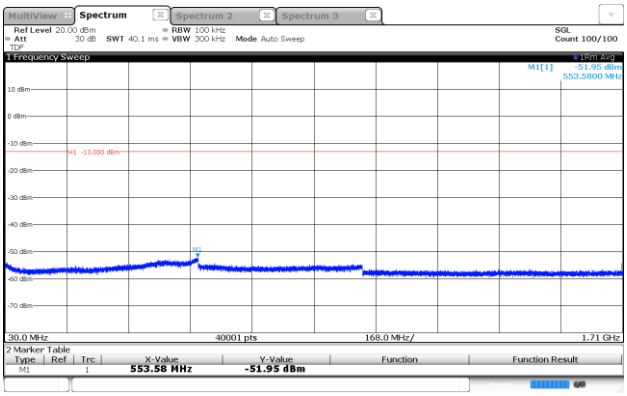
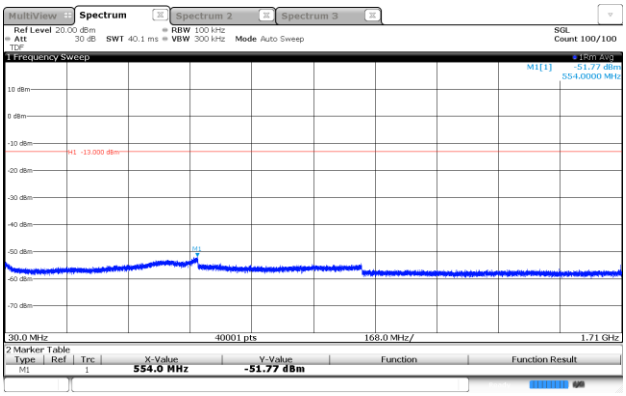
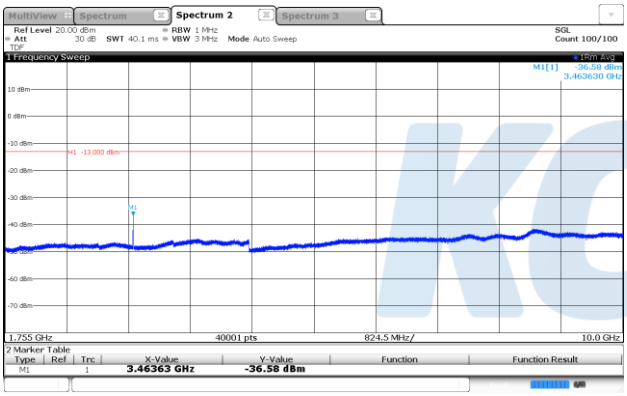
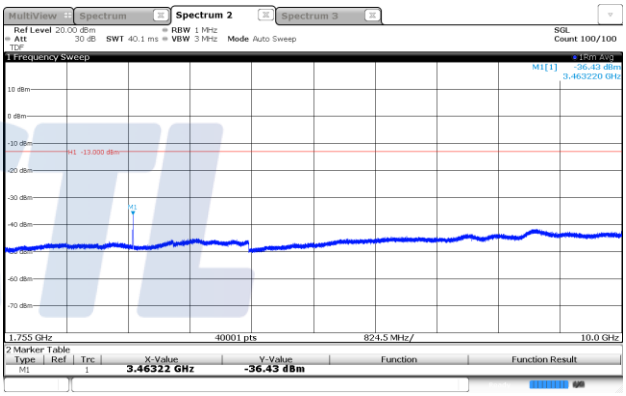
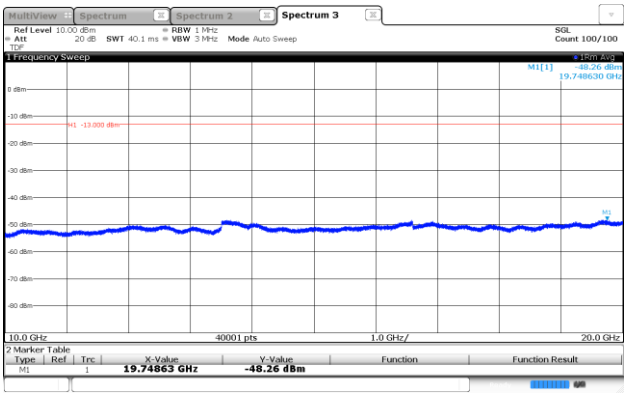
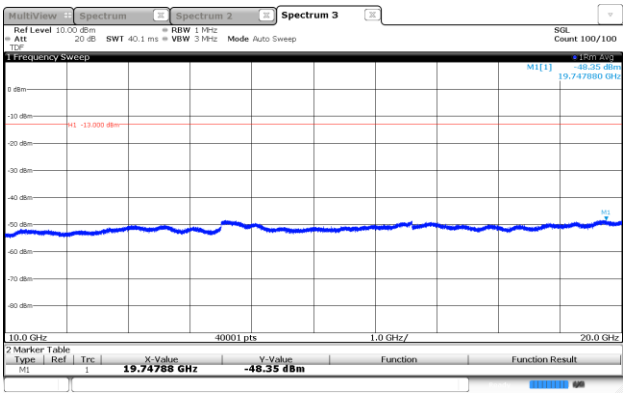
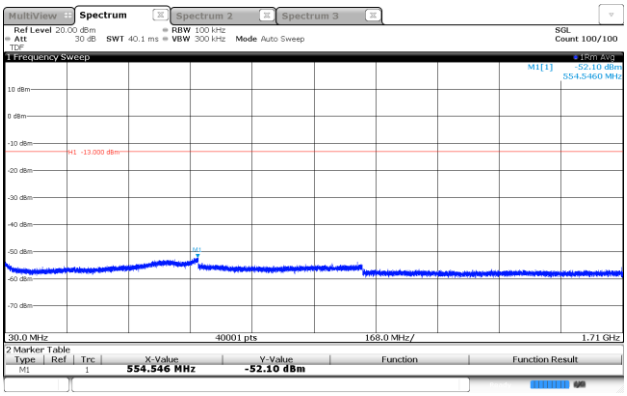
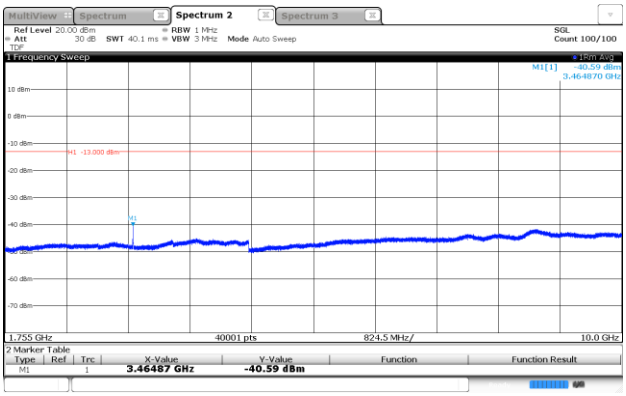
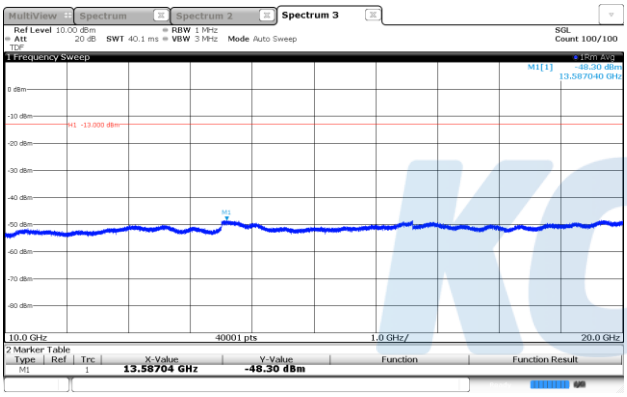
Test mode: WCDMA1700

RMC / Mid ch.	HSDPA / Mid ch.
	
	
	

HSUPA / Mid ch.







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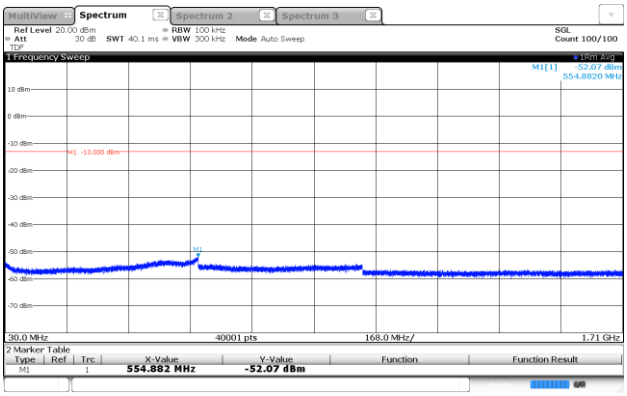
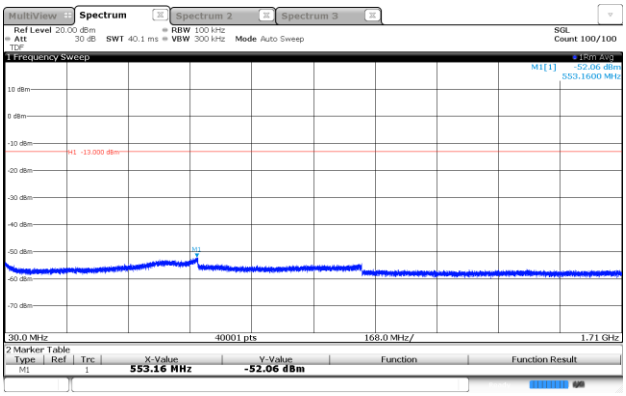
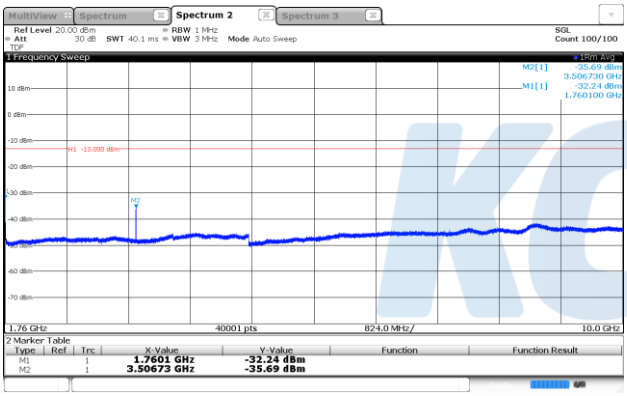
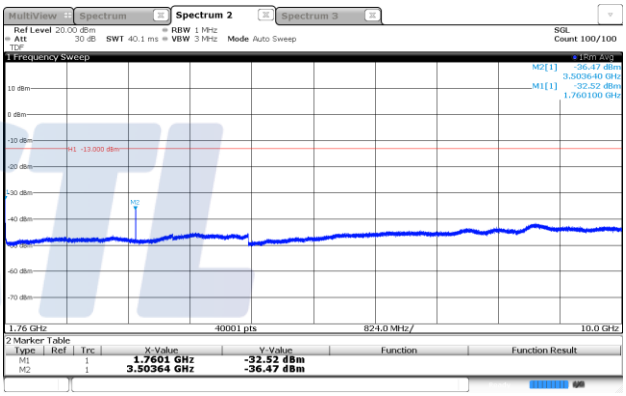
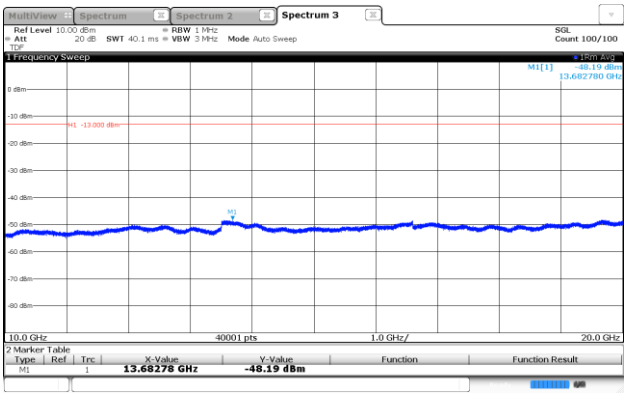
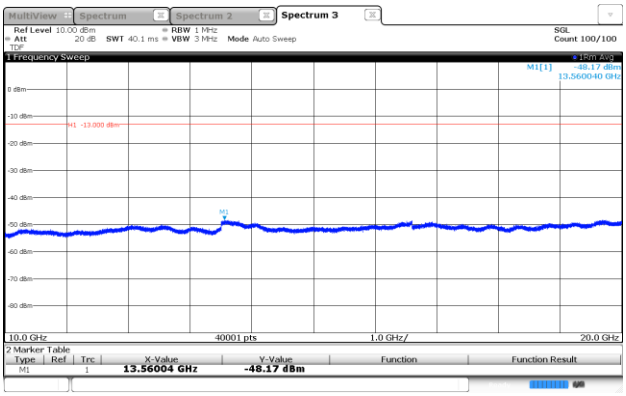
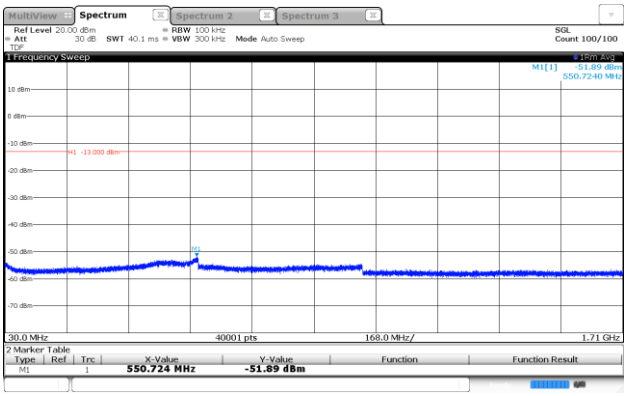
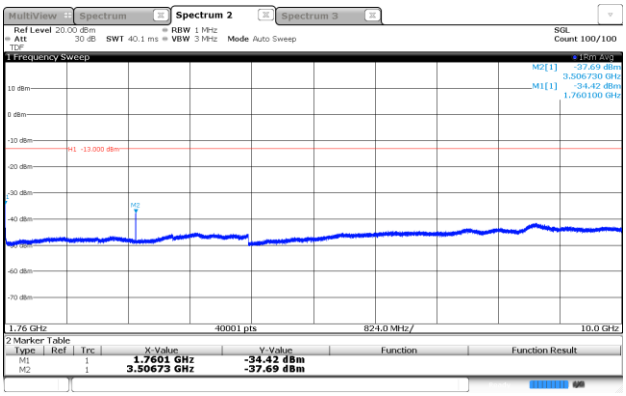
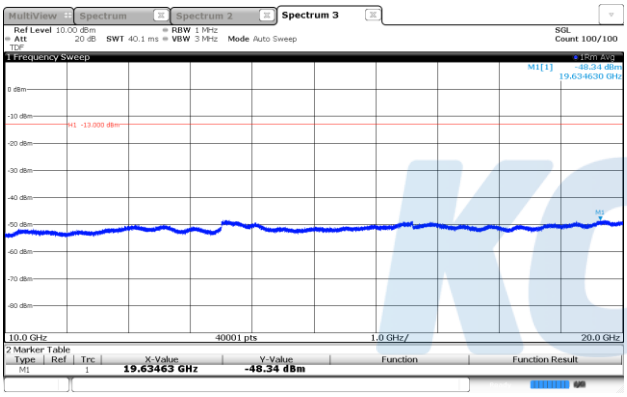
Test mode: WCDMA1700

RMC / High ch.	HSDPA / High ch.
	
	
	

HSUPA / High ch.







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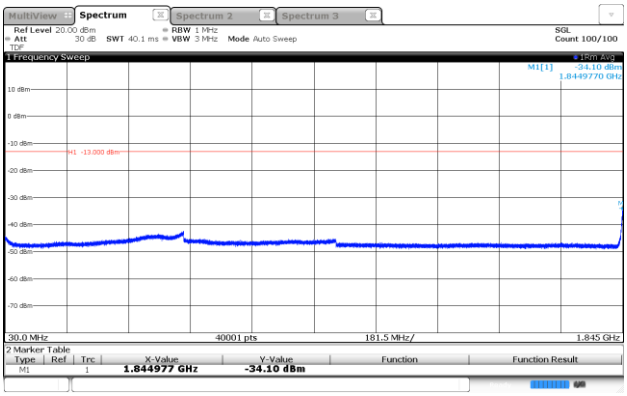
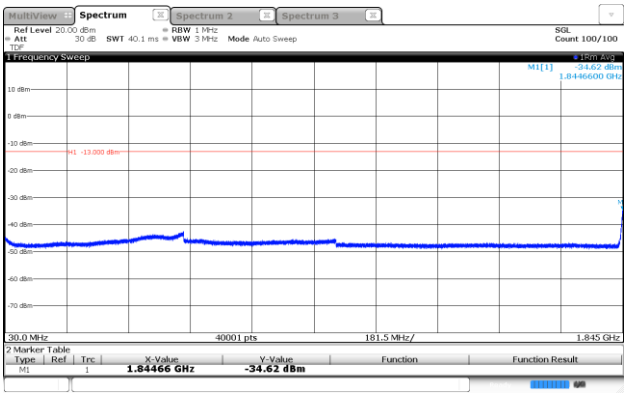
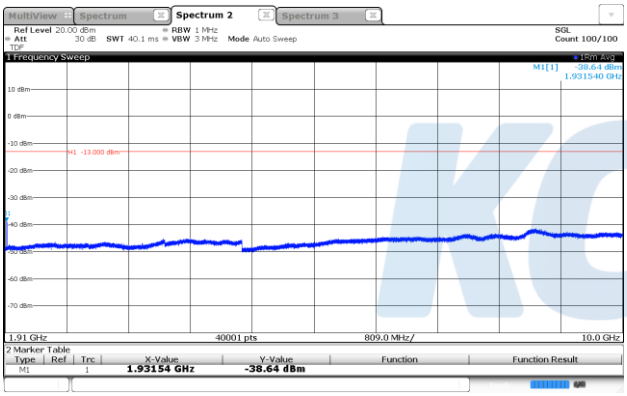
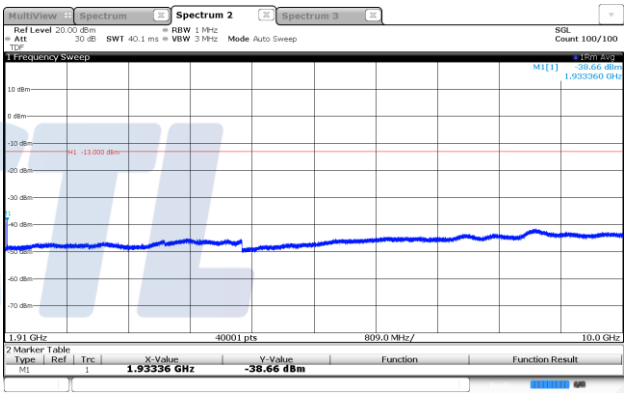
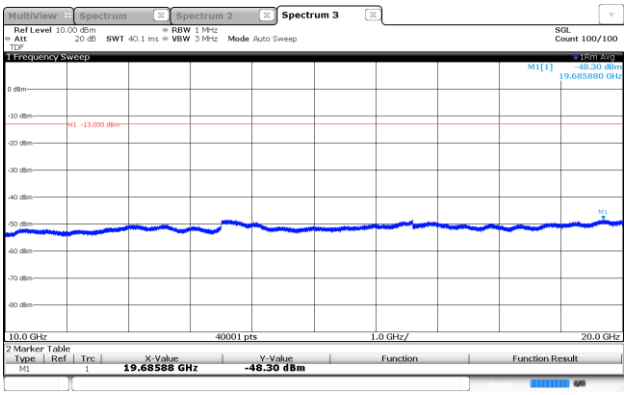
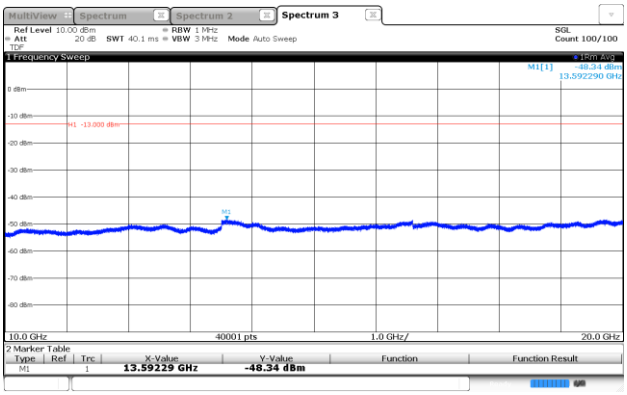
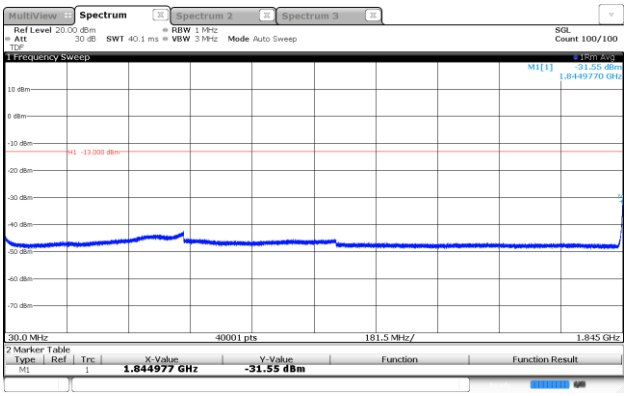
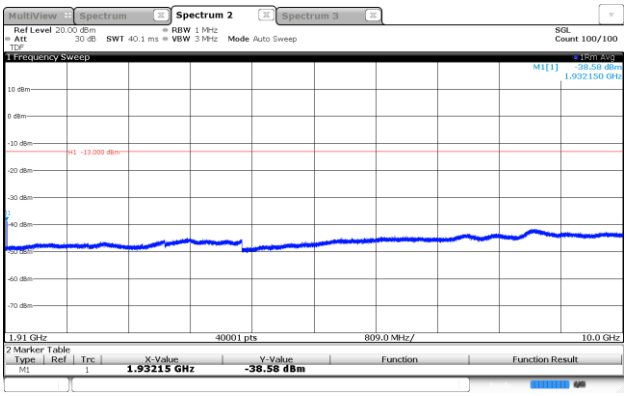
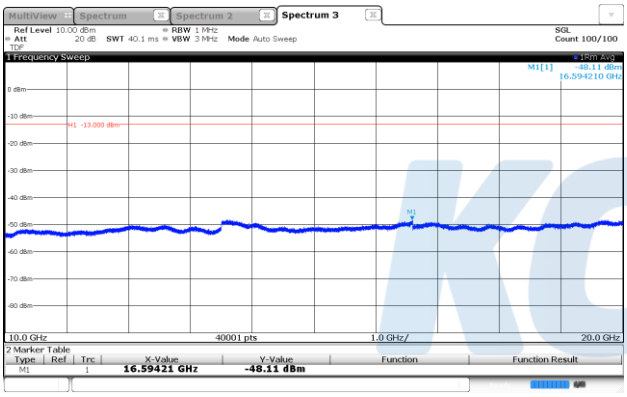
Test mode: WCDMA1900

RMC / Low ch.	HSDPA / Low ch.
	
	
	

HSUPA / Low ch.







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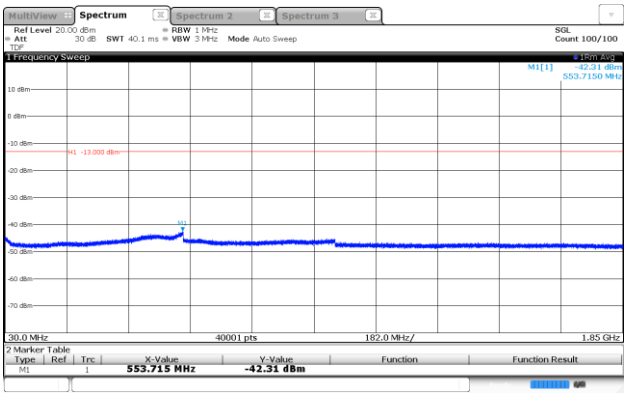
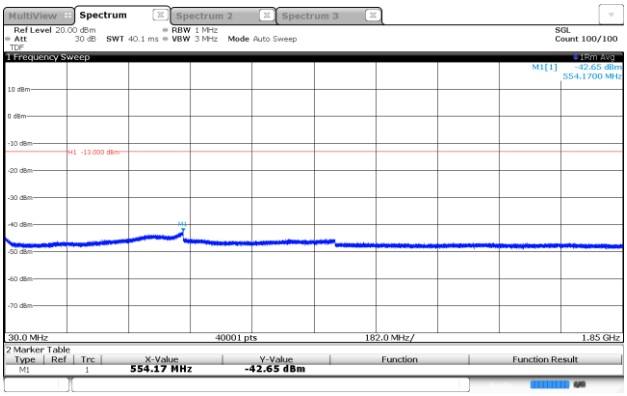
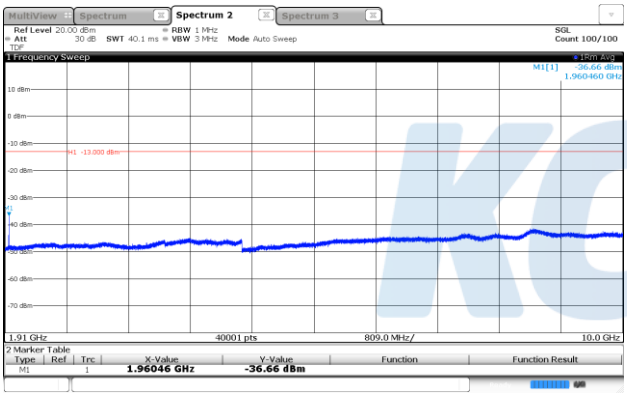
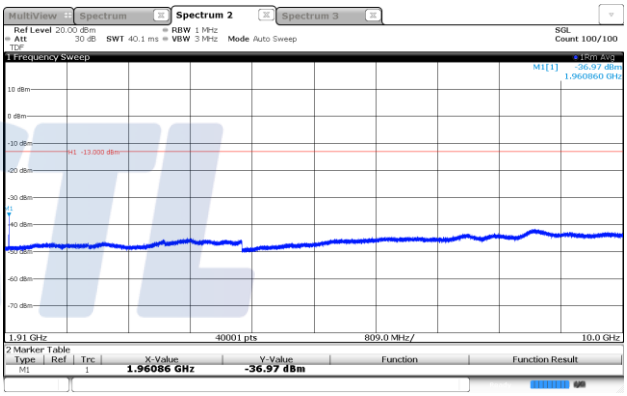
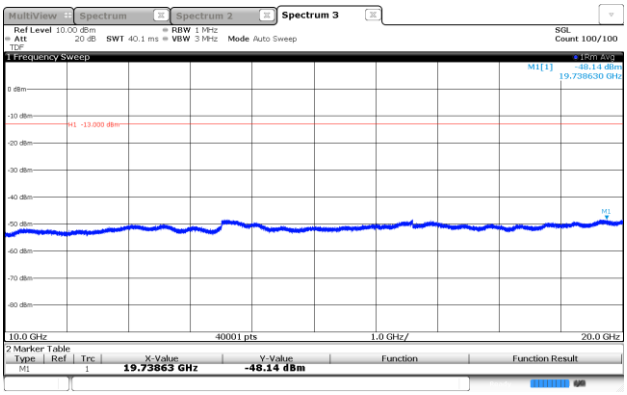
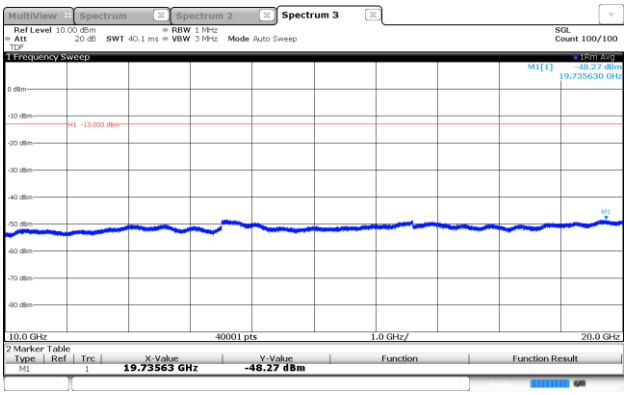
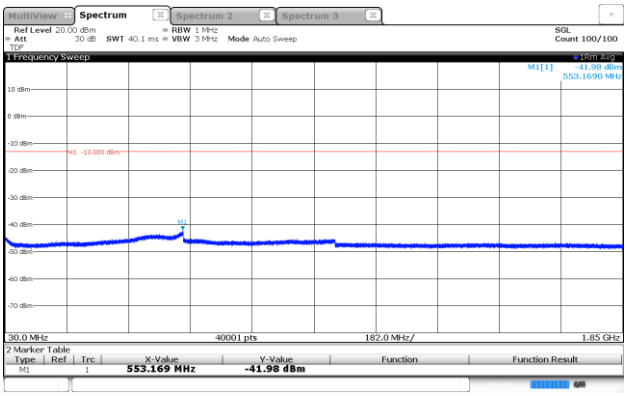
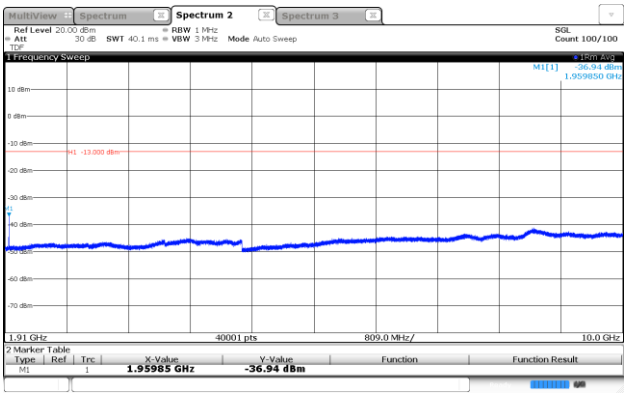
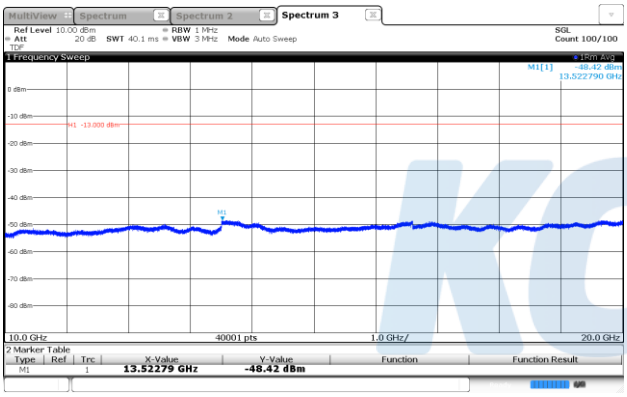
Test mode: WCDMA1900

RMC / Mid ch.	HSDPA / Mid ch.
	
	
	

HSUPA / Mid ch.







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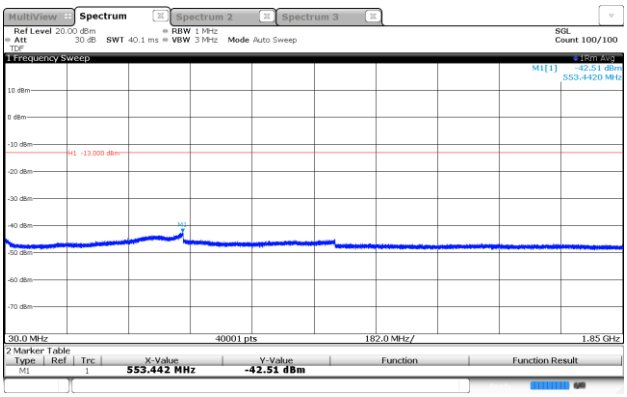
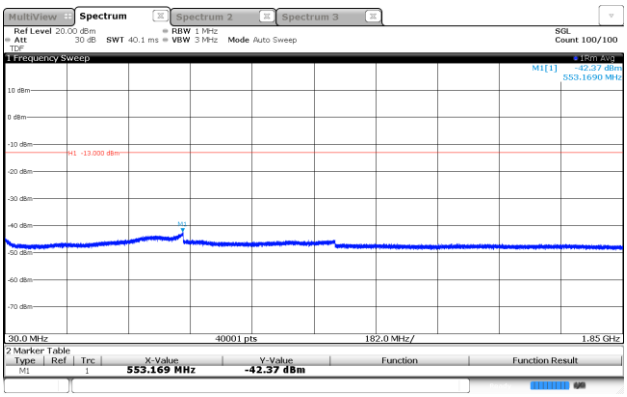
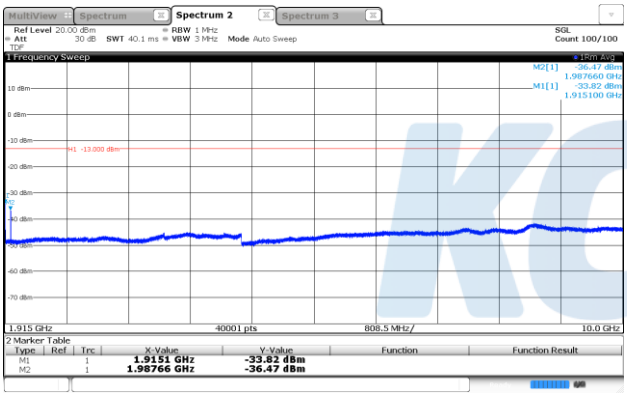
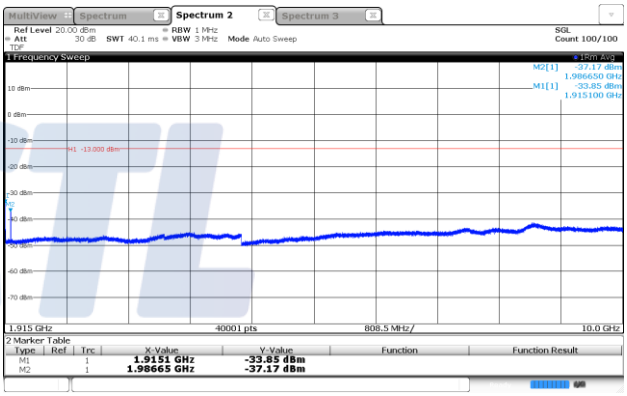
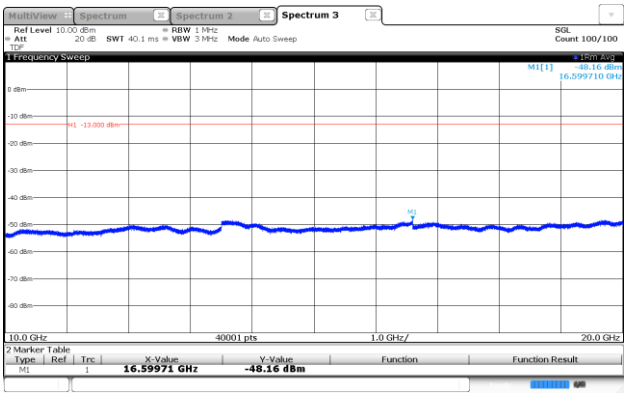
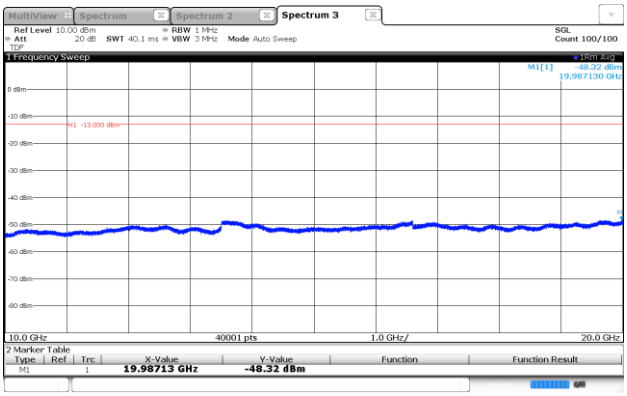
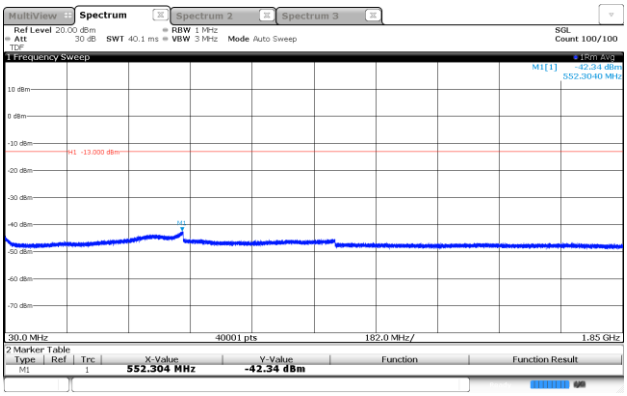
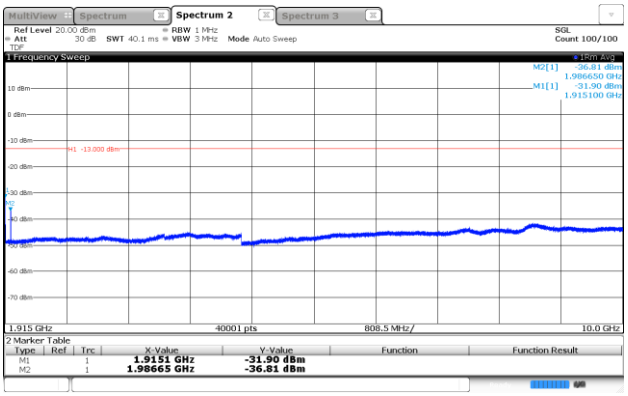
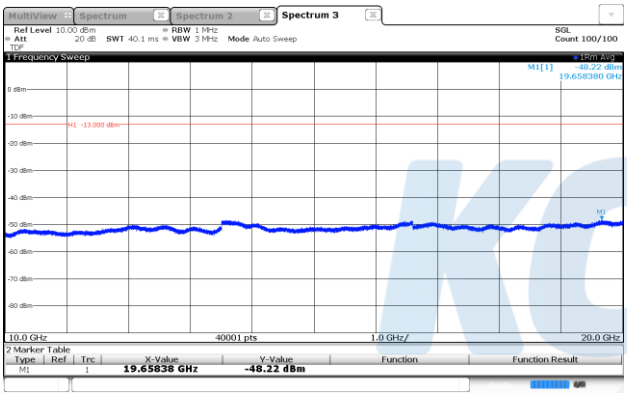
Test mode: WCDMA1900

RMC / High ch.	HSDPA / High ch.
	
	
	

HSUPA / High ch.







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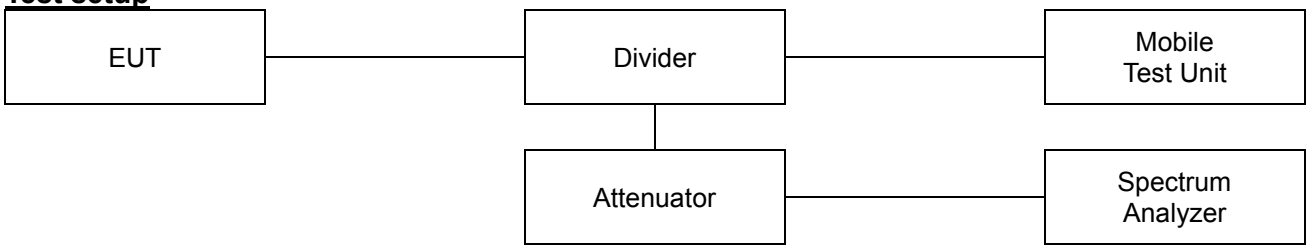
7.3. Band Edge Emissions at Antenna Terminal

Test setup



Limit

According to §22.917(a), §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) ㏈.

According to §27.53(h), except as otherwise specified below, for operations in the 1695~1710 ㎒, 1710 ~ 1755 ㎒, 1755 ~ 1780 ㎒, 1915~1920 ㎒, 1995~2000 ㎒, 2000~2020 ㎒, 2110~2155 ㎒, 2155~2180 ㎒, and 2180~2200 bands, the power of an emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10log($P_{[Watts]}$) ㏈.

Test procedure

971168 D01 v03r01 - Section 6
ANSI C63.26-2015 – Section 5.7

Test settings

1) Start frequency was set to 30 ㎒ and stop frequency was set to at least 10th the fundamental frequency.
2) Span was set large enough so as to capture all out of band emissions near the band edge.
3) Set the RBW > 1% of the emission bandwidth.
4) Set the VBW ≥ 3 x RBW.
5) Set the number of sweep points ≥ 2 x Span/RBW
6) Detector = RMS
7) Trace mode = trace average
8) Sweep time should be auto for peak detection. For RMS detection the sweep time should be set as follows:
   a) If the device can be configured to transmit continuously (duty cycle ≥ 98%), set the (sweep time) > (number of points in sweep) x (symbol period) (e.g., by a factor of 10 x symbol period x number of points) Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols.
   b) If the device cannot transmit continuously (duty cycle < 98%), a gated sweep shall be used when possible (i.e., gate triggered such that the analyzer only sweeps when the device is transmitting at full power), set the sweep time > (number of points in sweep) x (symbol period) but the sweep time shall always be maintained at a value that is less than or equal to the minimum transmission time
   c) If the device cannot be configured to transmit continuously (duty cycle > 98%), and a free-running sweep must be used, set the sweep time so that the

averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%).

d) If the device cannot be configured to transmit continuously and a free-running sweep must be used, and if the transmissions exhibit a non-constant duty cycle (duty cycle variations > ±2%), set the sweep time so that the averaging is performed over the on-period by setting the sweep time > (symbol period) × (number of points), while also maintaining the sweep time < (transmitter on-time). The trace mode shall be set to max hold, since not every display point will be averaged only over just the on-time. Thus, multiple sweeps (e.g., 100) in maximum hold art necessary to ensure that the maximum power is measured.

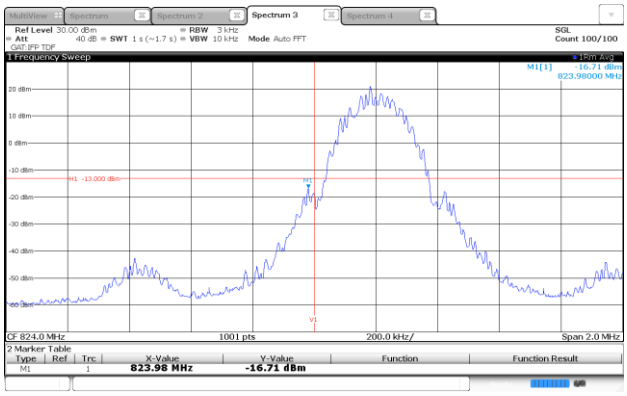
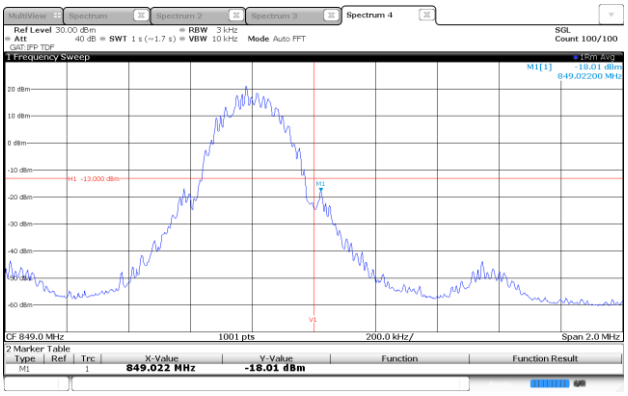
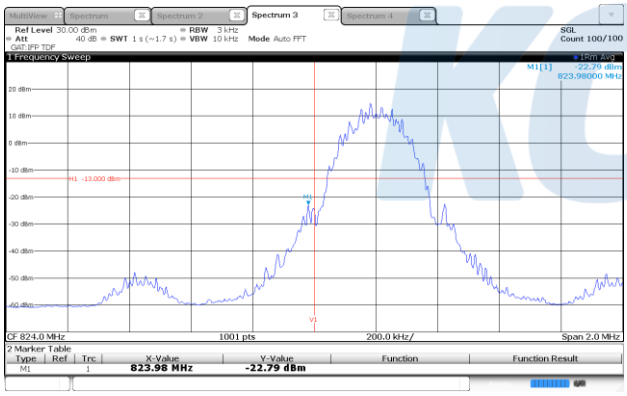
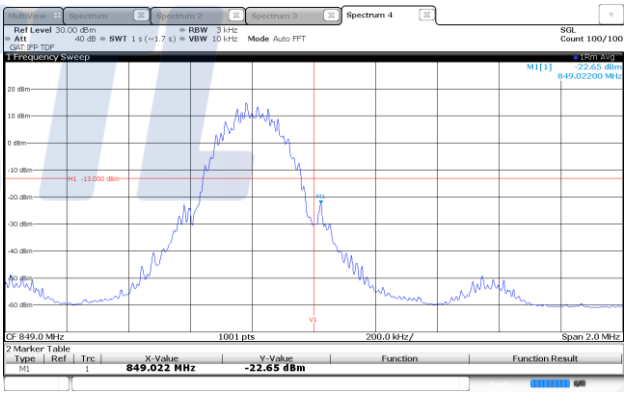
9) Allow trace to fully stabilize.

Notes:

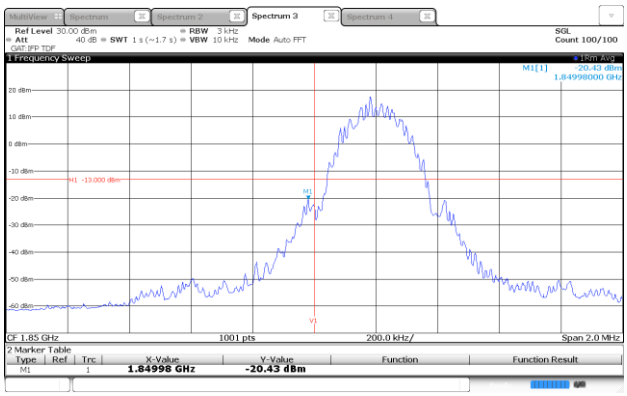
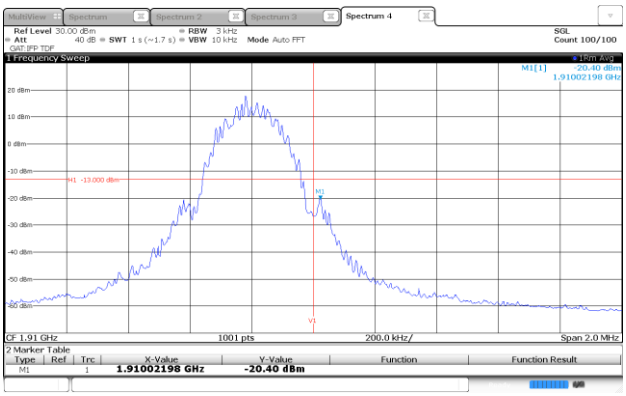
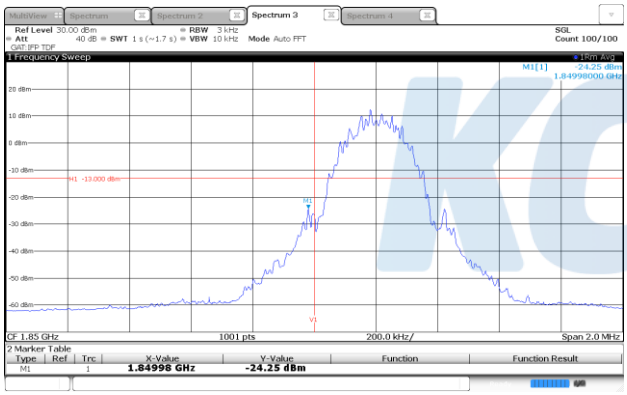
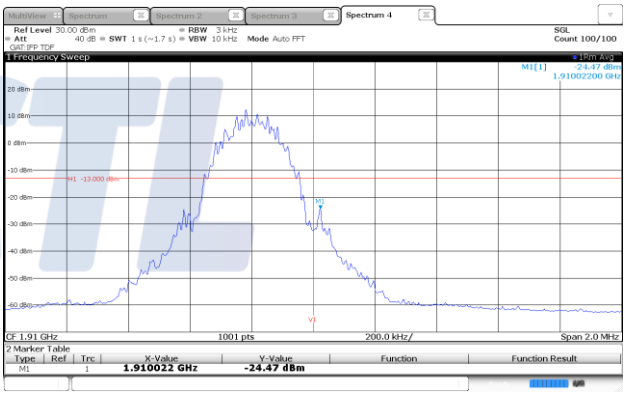
1. Per 22.917(b), 24.238(b), 24.53(h)(3), compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 ㎒ or greater. However in the 1 ㎒ bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 ㏈ below the transmitter power.
2. All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function. Please refer to the page 10.

Test results

Test mode: GSM850

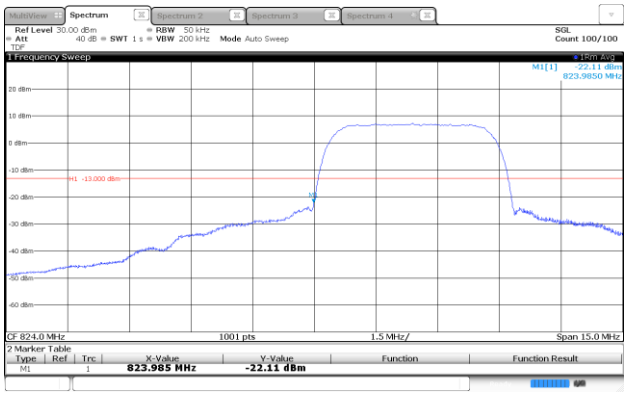
GPRS / Low ch.	GPRS / High ch.
	
EDGE / Low ch.	**EDGE / High ch.**
	

Test mode: GSM1900

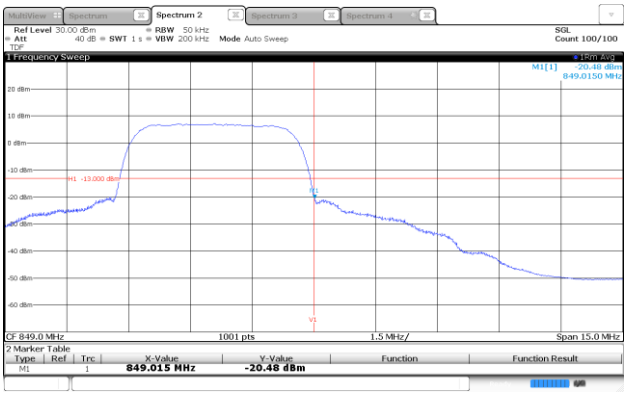
GPRS / Low ch.	GPRS / High ch.
	
EDGE / Low ch.	**EDGE / High ch.**
	

Test mode: WCDMA850

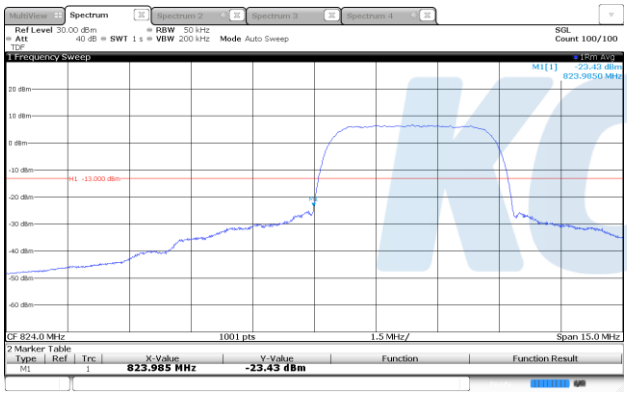
RMC / Low ch.



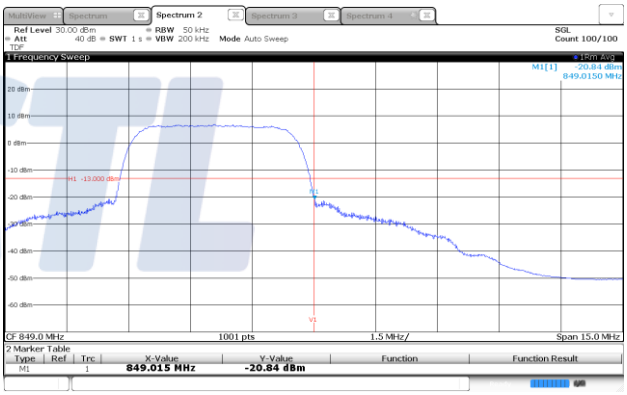
RMC / High ch.



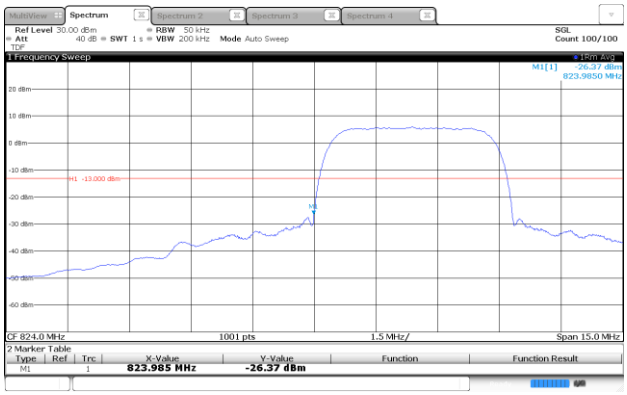
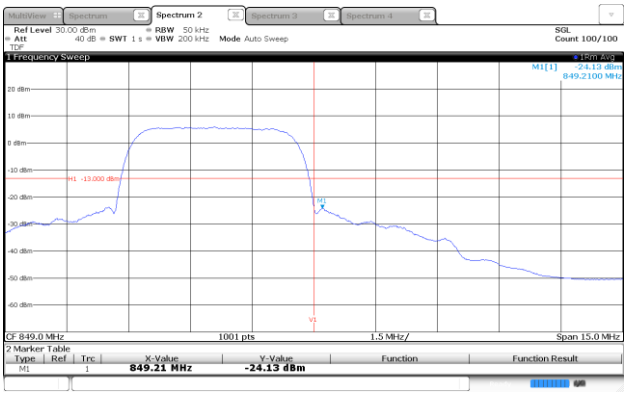
HSDPA / Low ch.



HSDPA / High ch.



HSUPA / Low ch.



HSUPA / High ch.