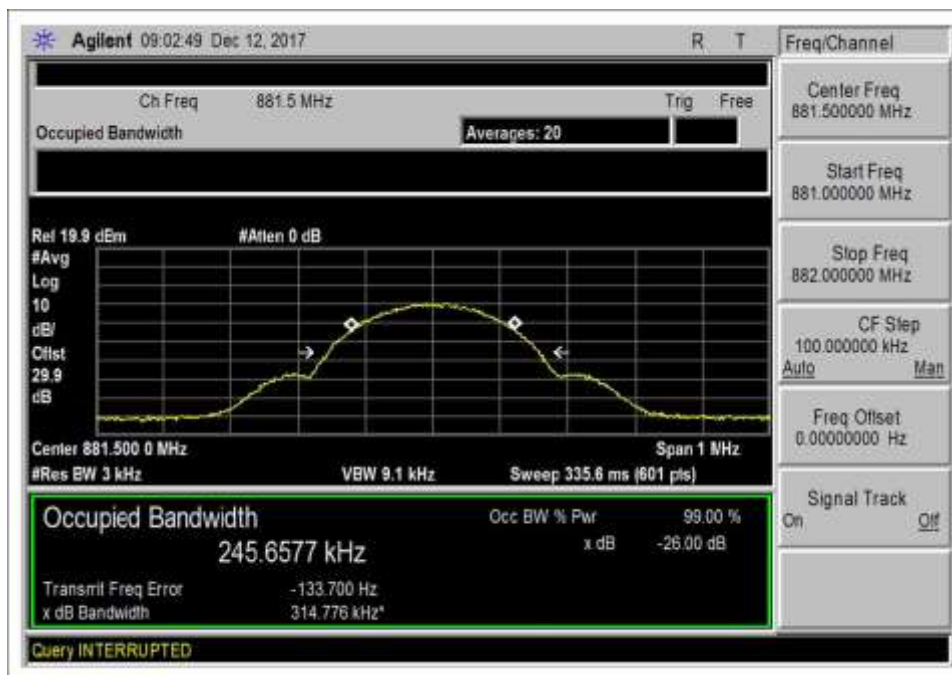
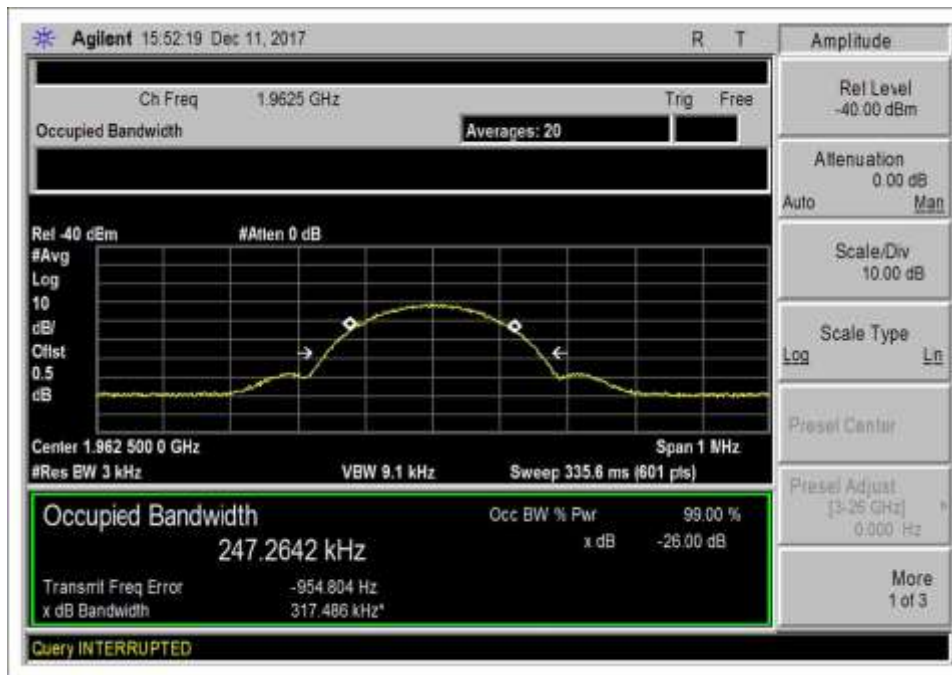




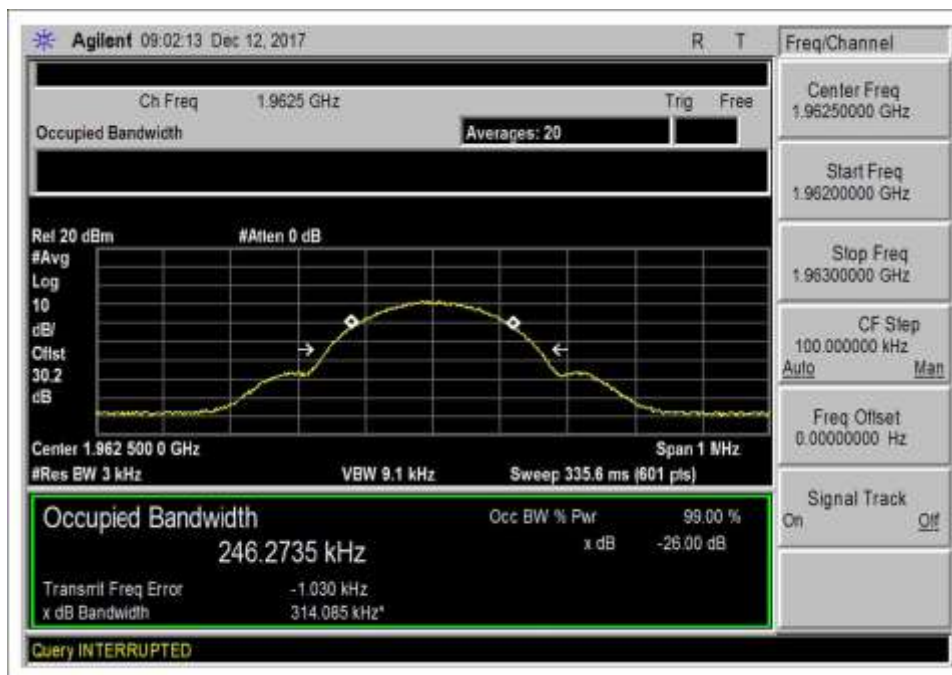
7.10 DL 869-894\_GSM\_IN



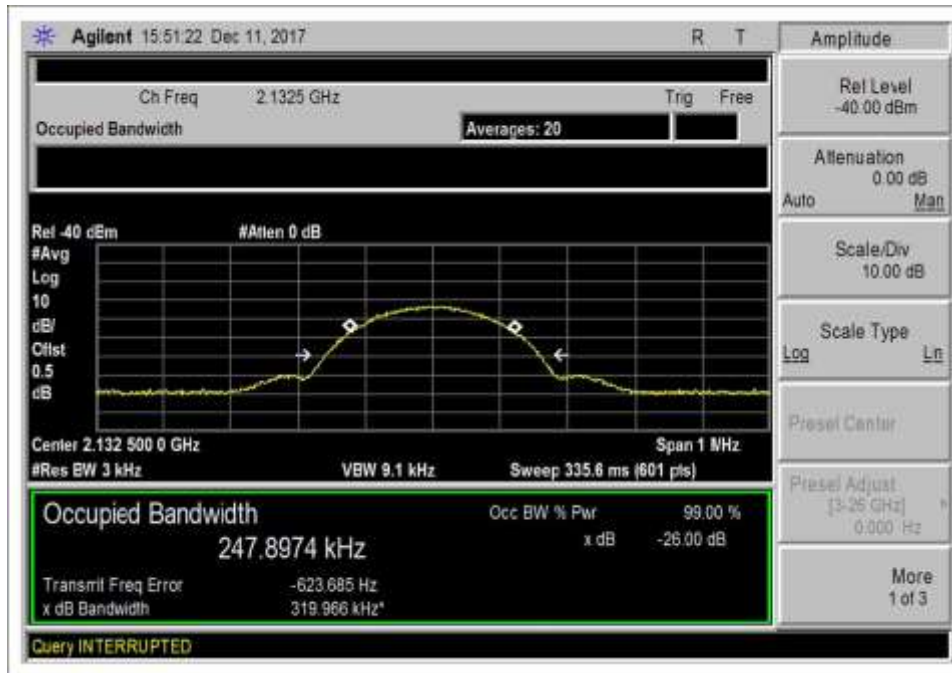
7.10 DL 869-894\_GSM\_OUT



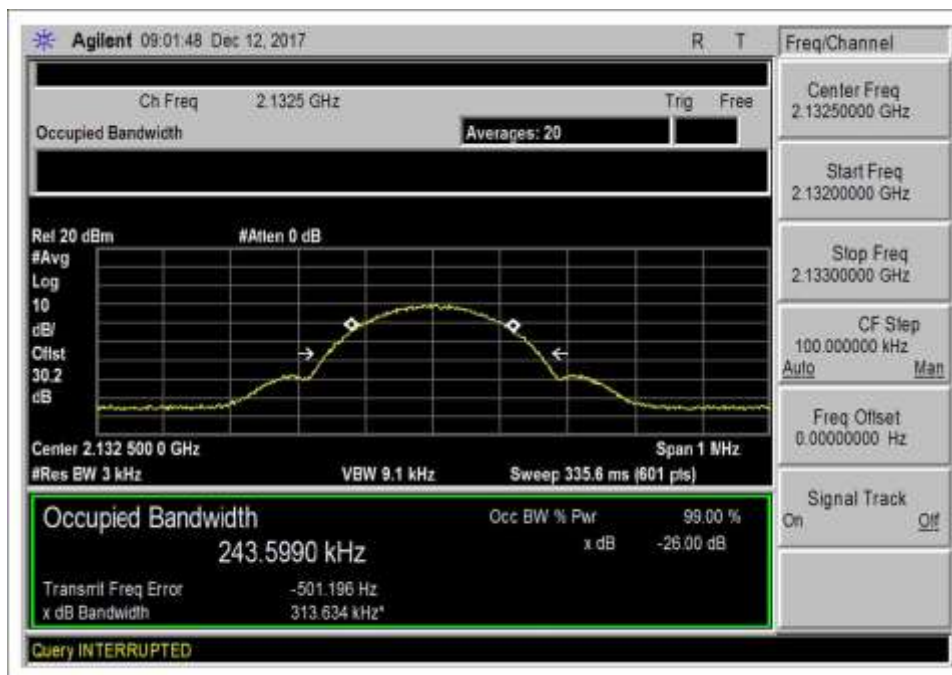
7.10 DL 1930-1995\_GSM\_IN



7.10 DL 1930-1995\_GSM\_OUT

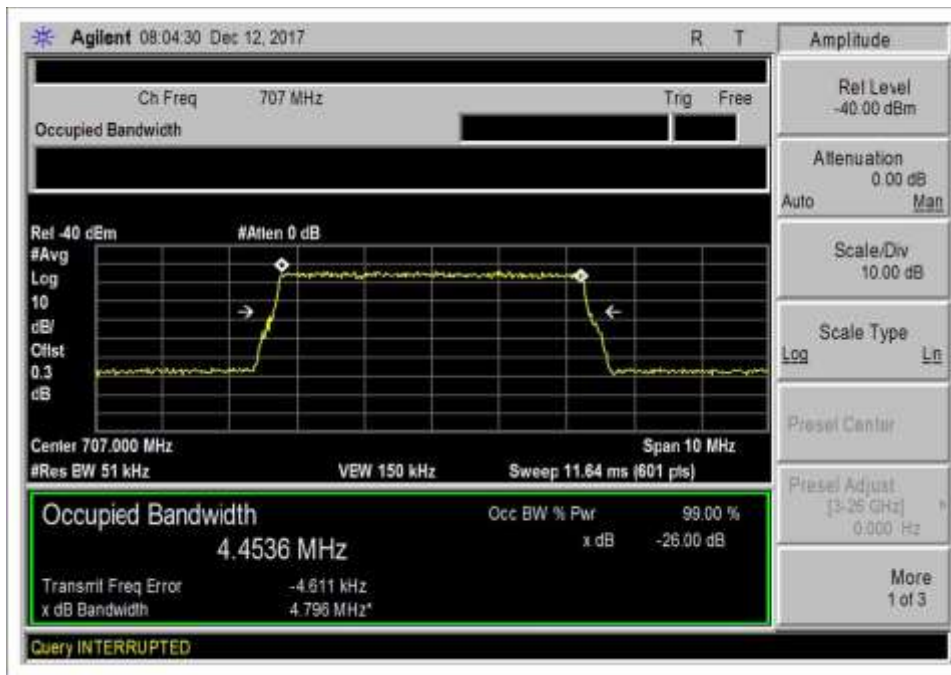


7.10 DL 2110-2155\_GSM\_IN



7.10 DL 2110-2155\_GSM\_OUT

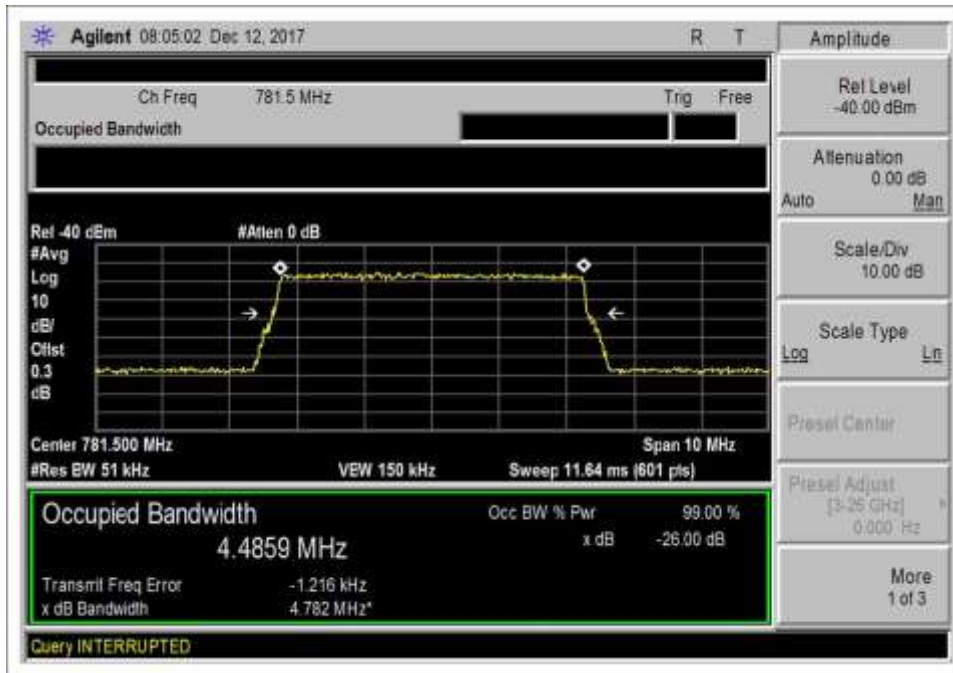
LTE



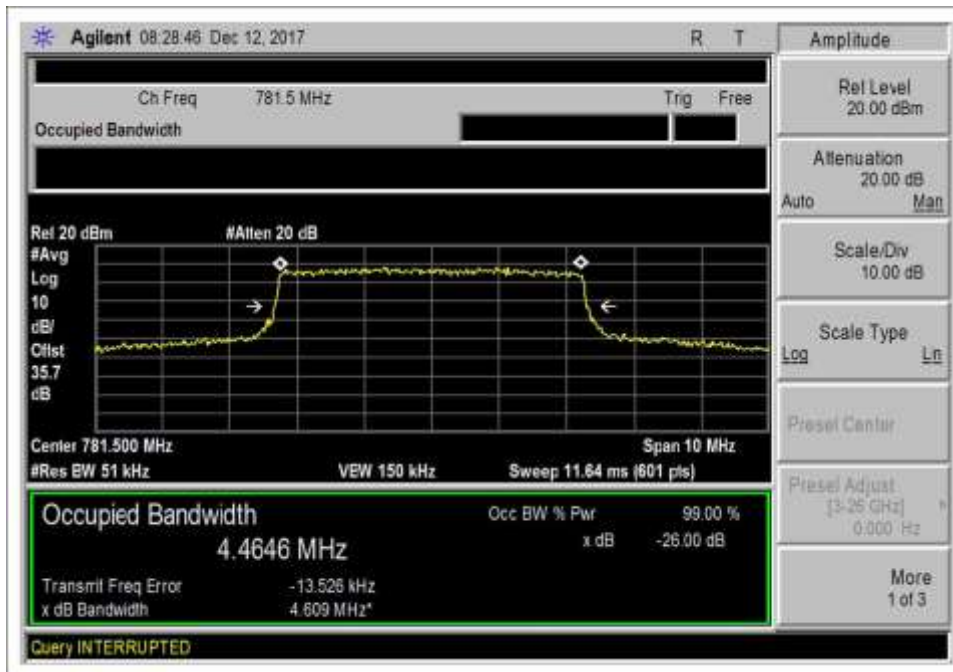
7.10 UL 698-716\_LTE\_IN



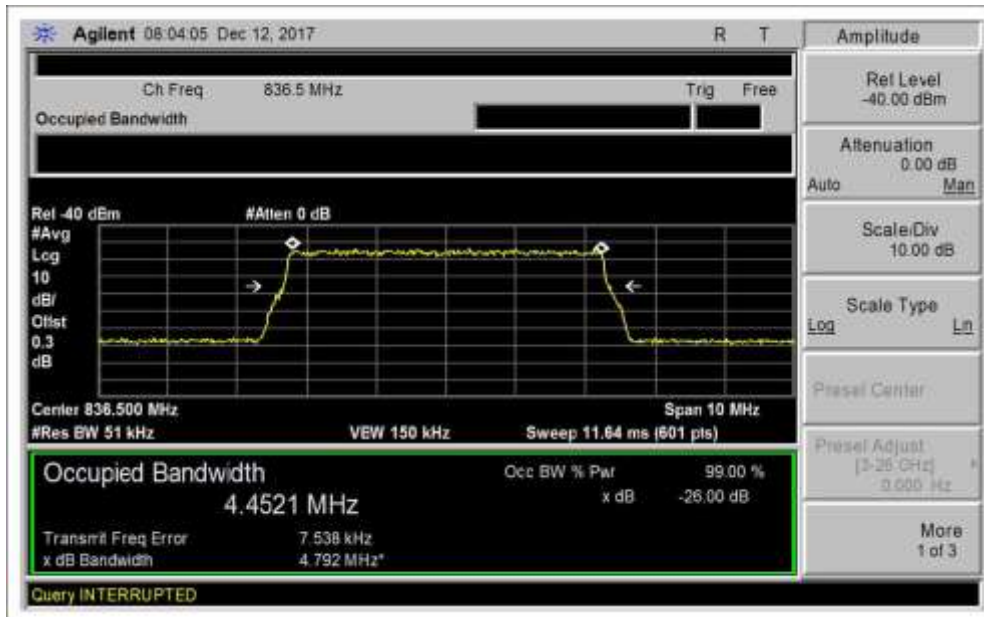
7.10 UL 698-716\_LTE\_OUT



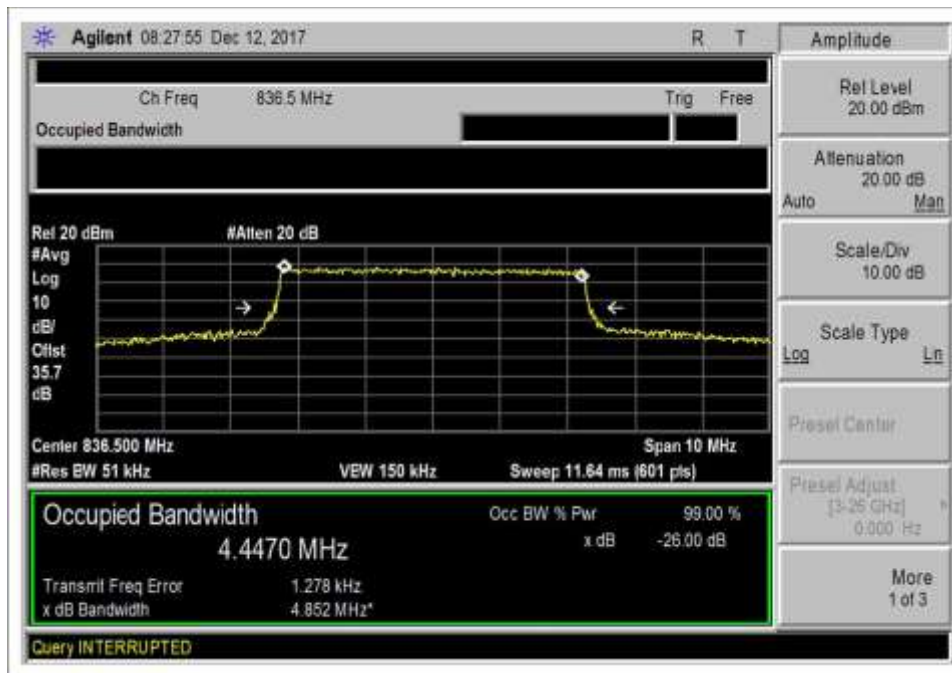
7.10 UL 776-787\_LTE\_IN



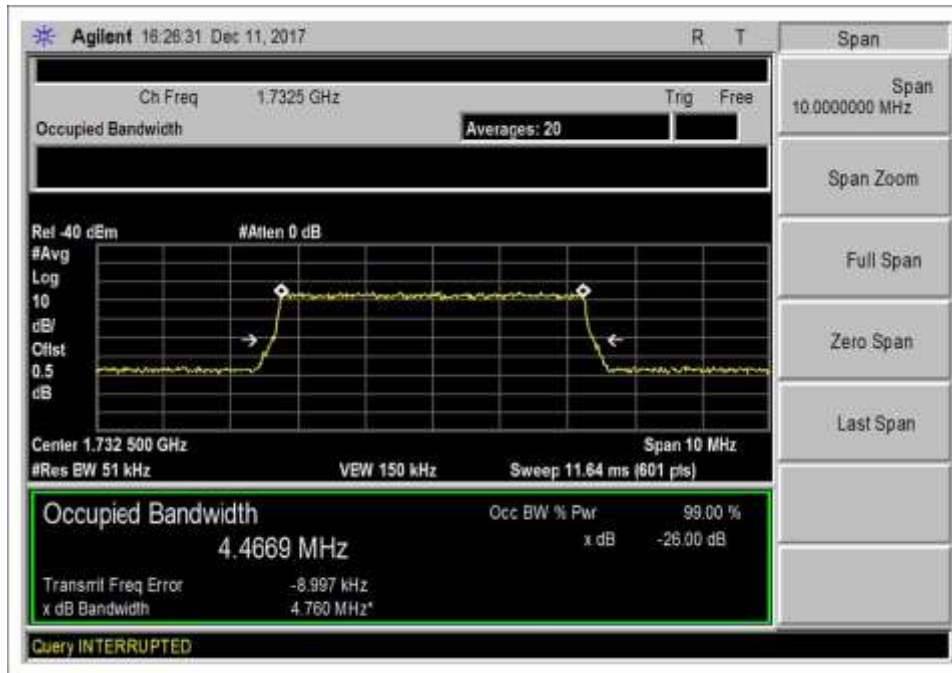
7.10 UL 776-787\_LTE\_OUT



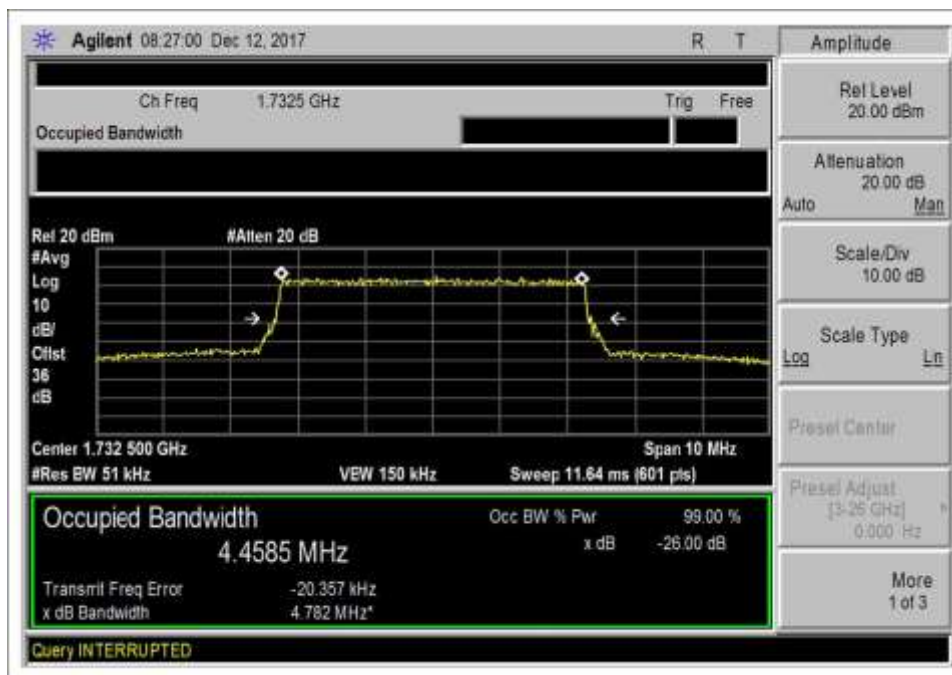
7.10 UL 824-849\_LTE\_IN



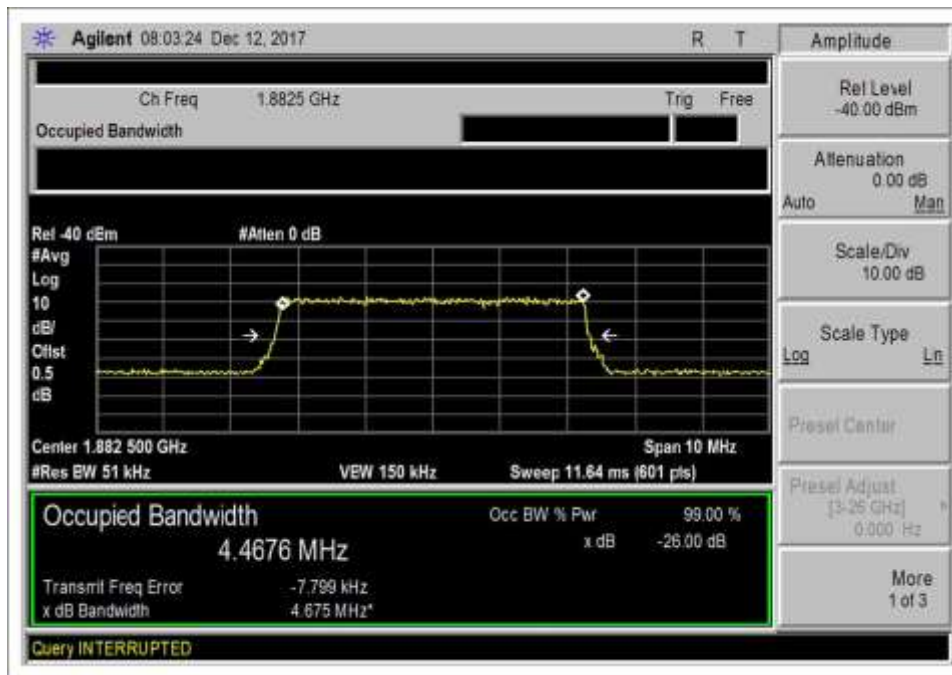
7.10 UL 824-849\_LTE\_OUT



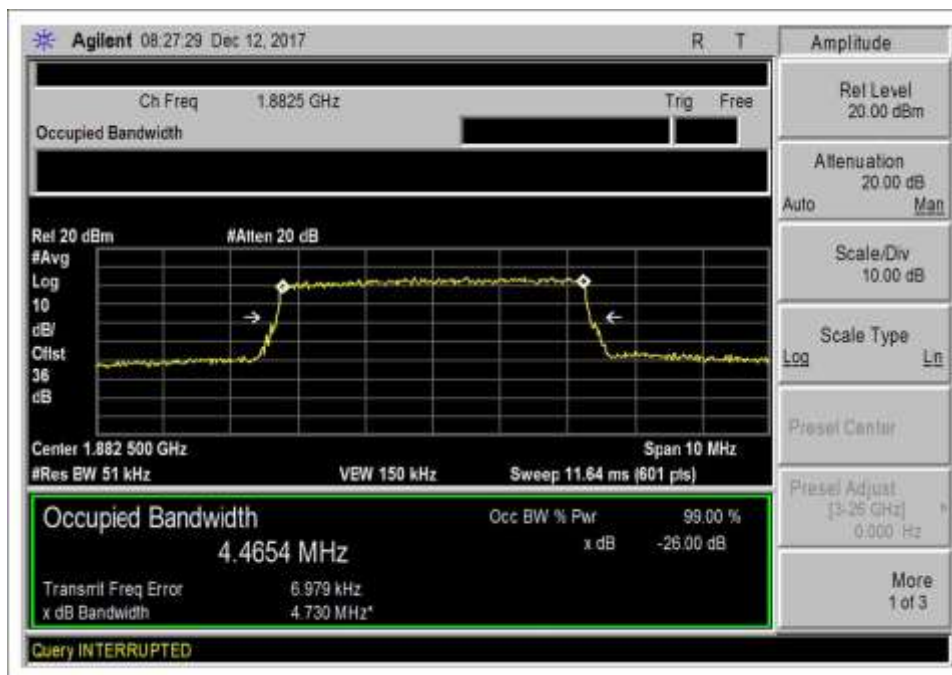
7.10 UL 1710-1755\_LTE\_IN



7.10 UL 1710-1755\_LTE\_OUT

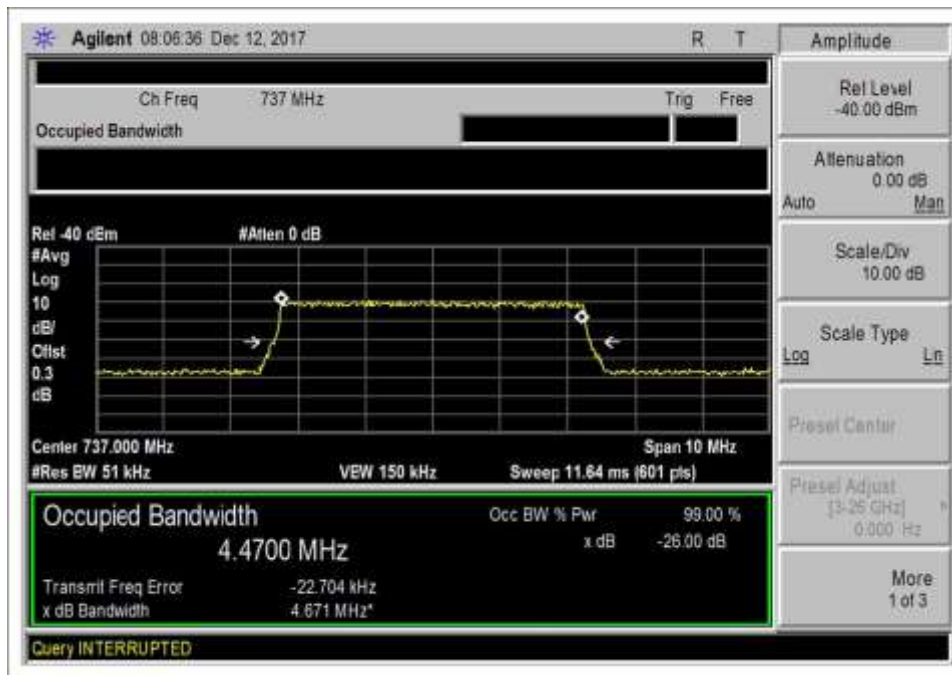


7.10 UL 1850-1915\_LTE\_IN

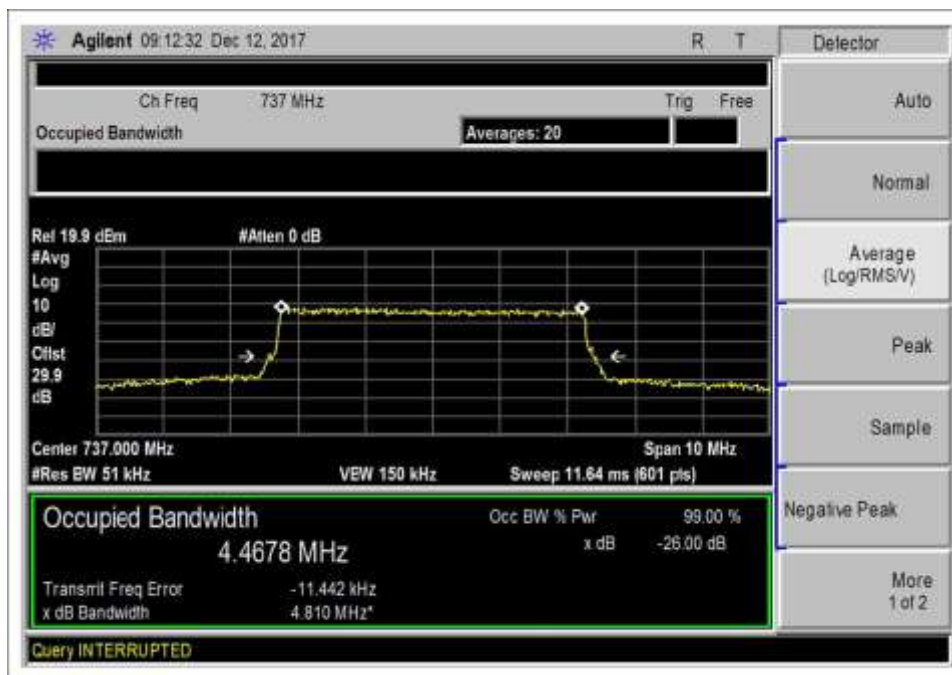


7.10 UL 1850-1915\_LTE\_OUT

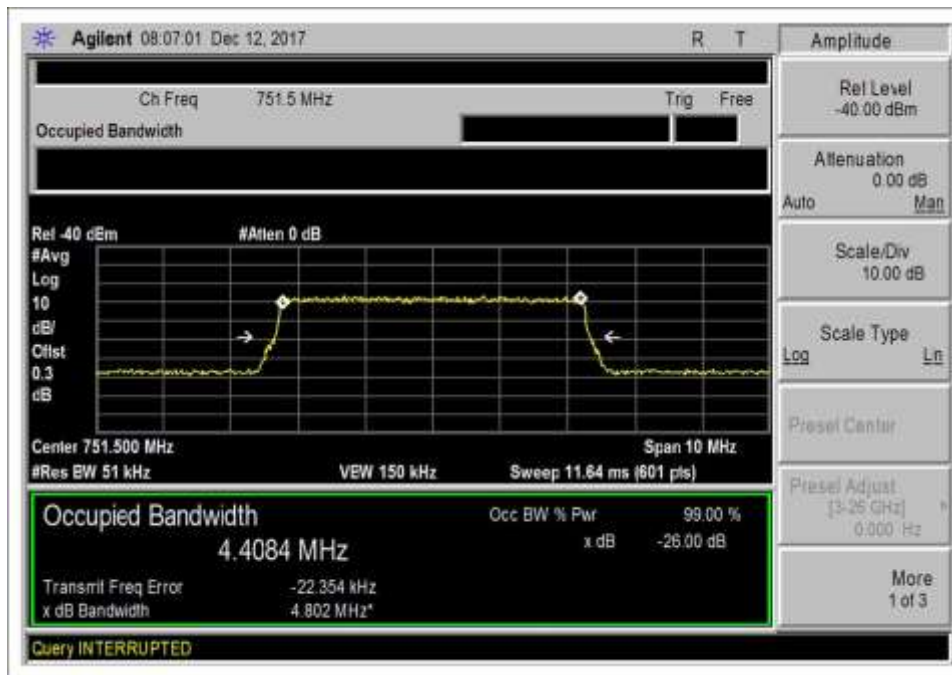




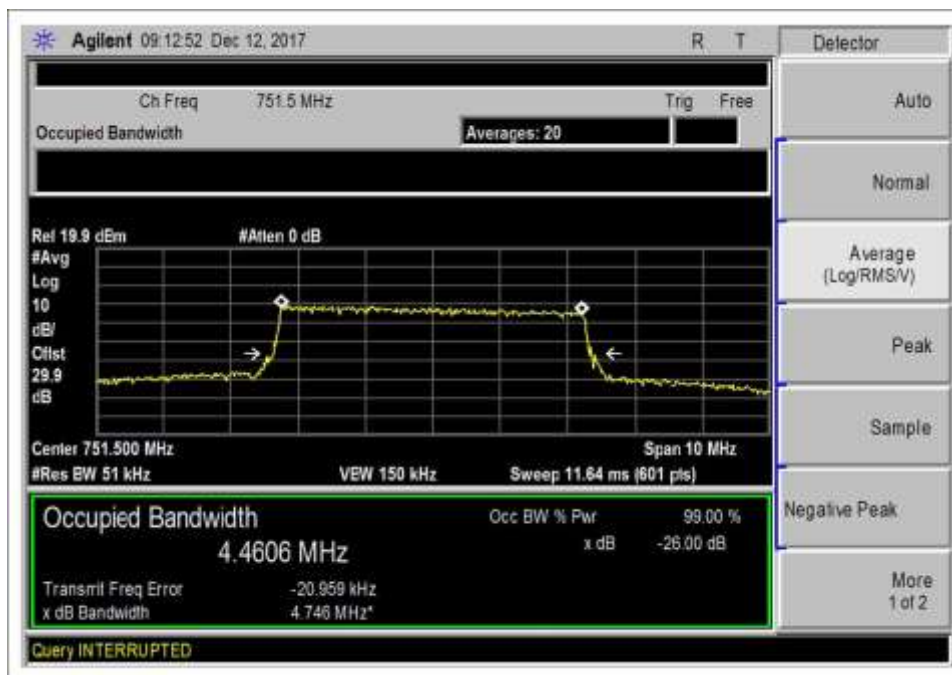
7.10 DL 728-746\_LTE\_IN



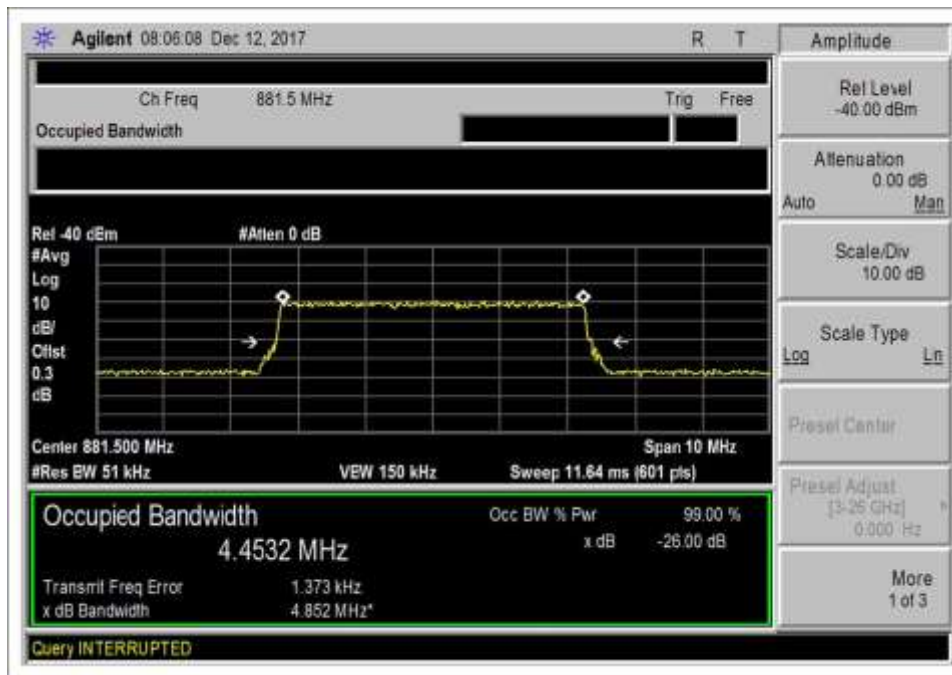
7.10 DL 728-746\_LTE\_OUT



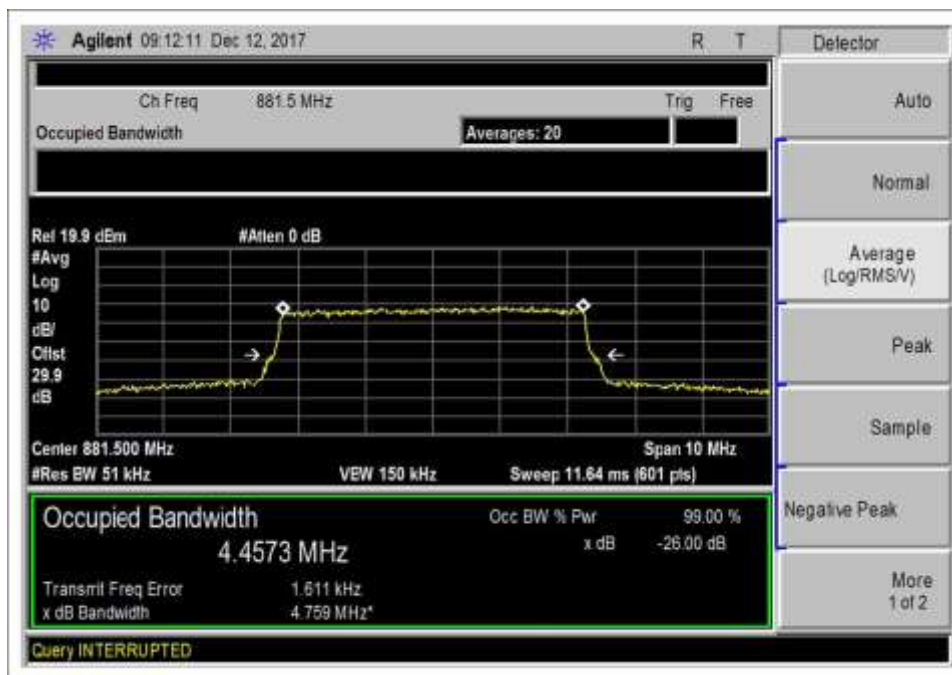
7.10 DL 746-757\_LTE\_IN



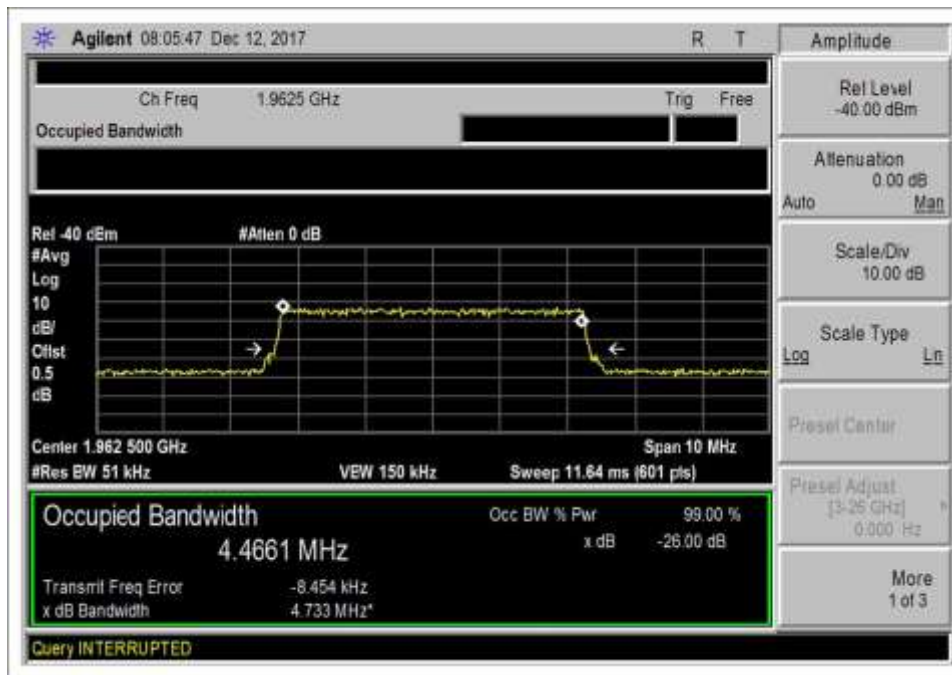
7.10 DL 746-757\_LTE\_OUT



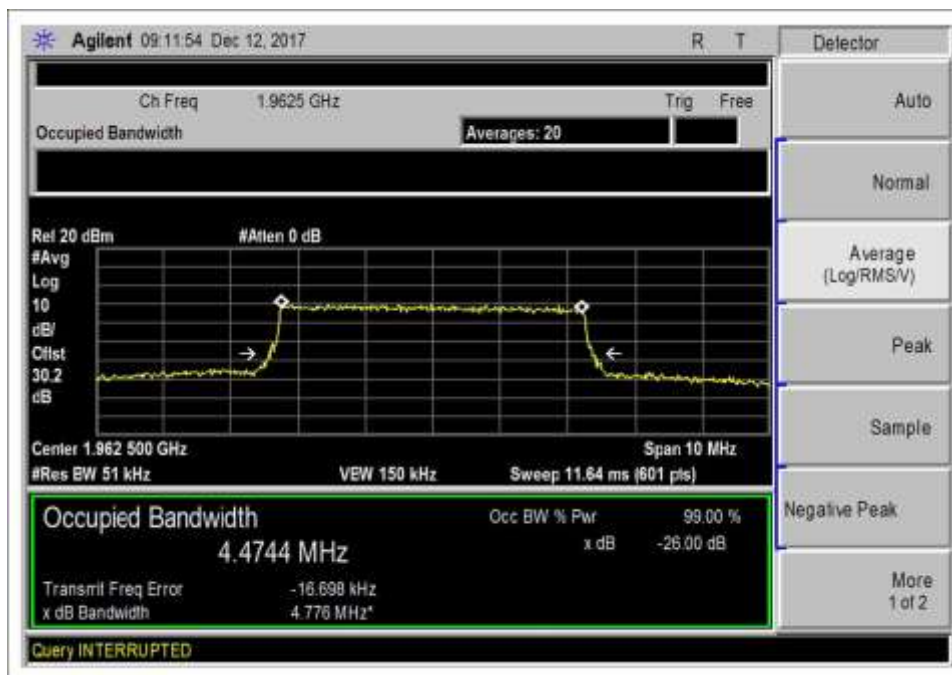
7.10 DL 869-894\_LTE\_IN



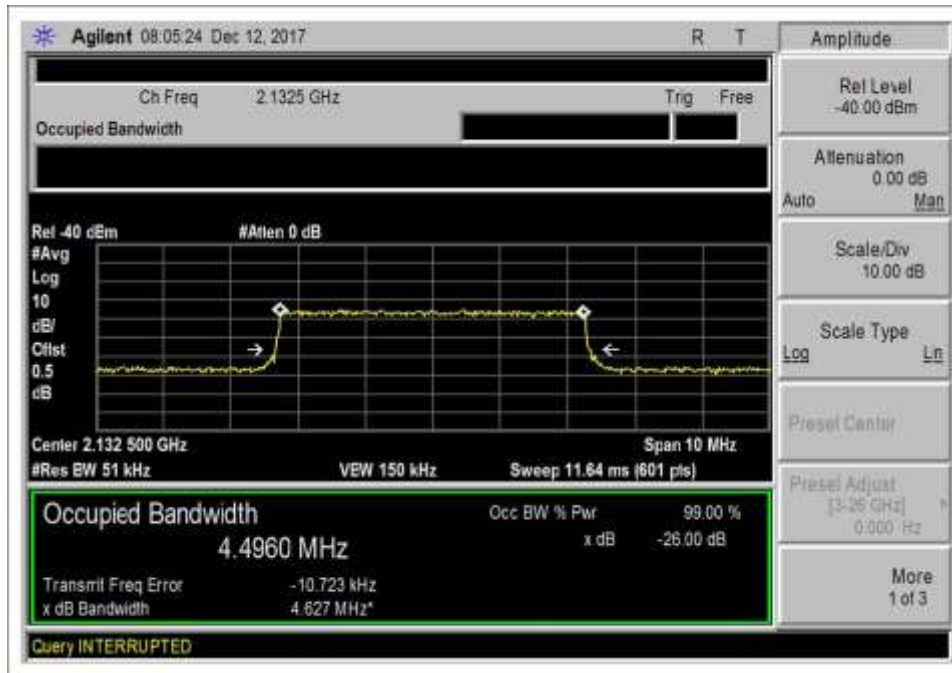
7.10 DL 869-894\_LTE\_OUT



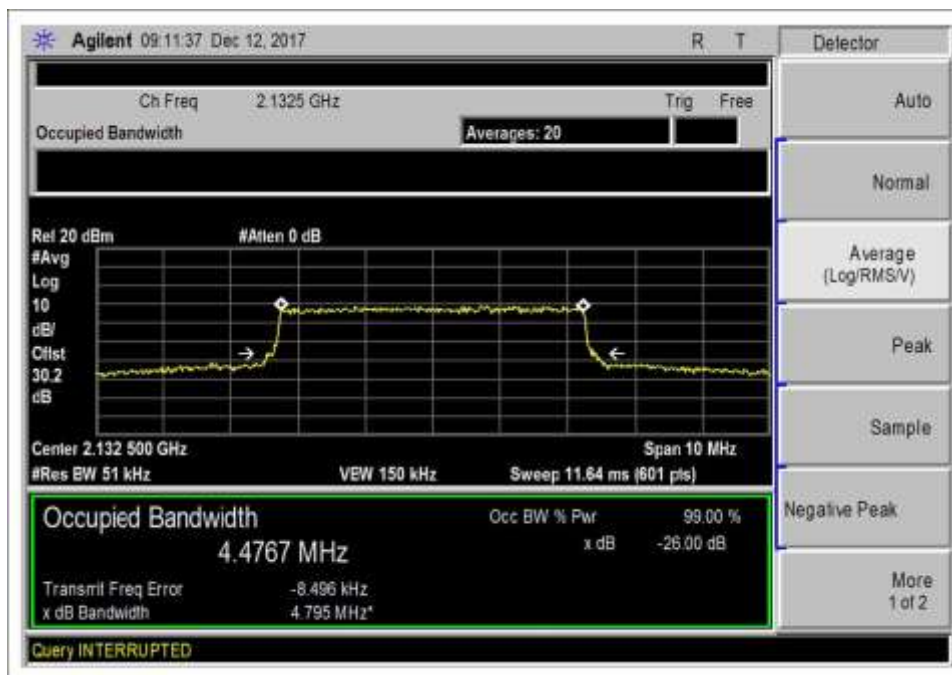
7.10 DL 1930-1995\_LTE\_IN



7.10 DL 1930-1995\_LTE\_OUT

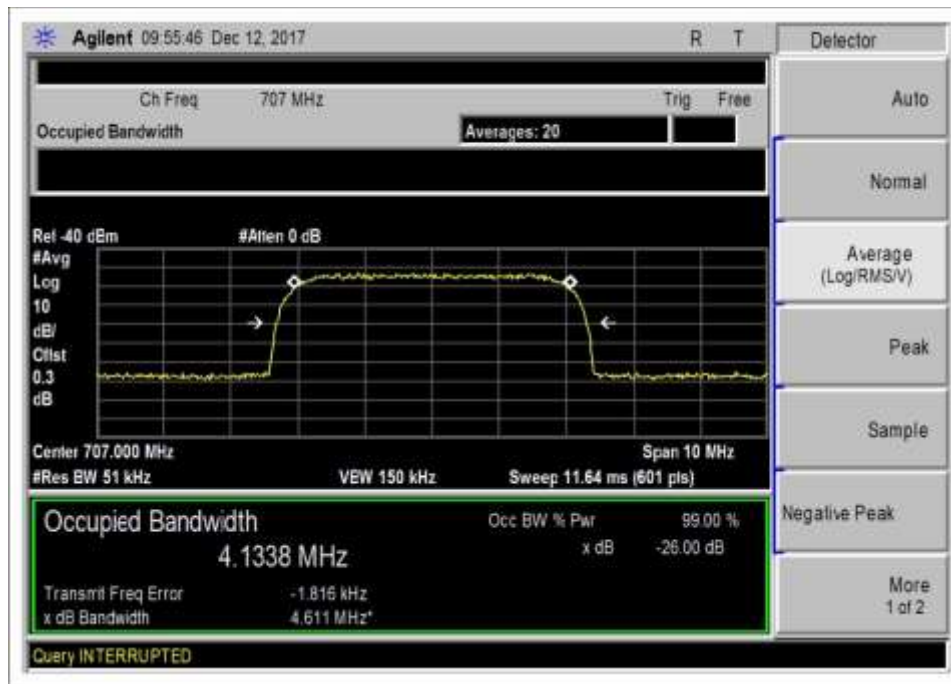


7.10 DL 2110-2155\_LTE\_IN

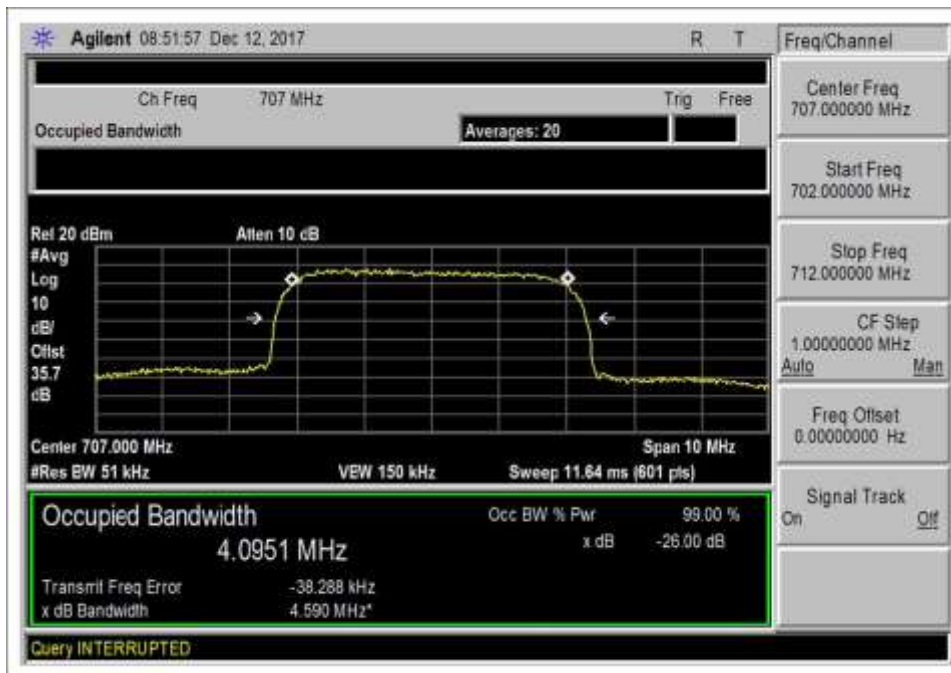


7.10 DL 2110-2155\_LTE\_OUT

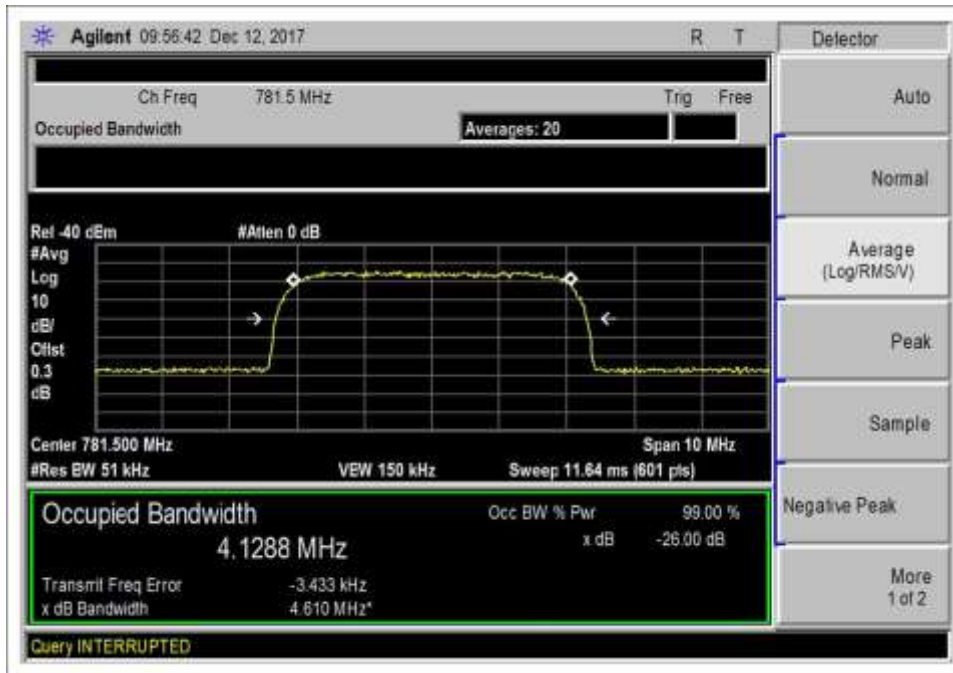
**WCDMA**



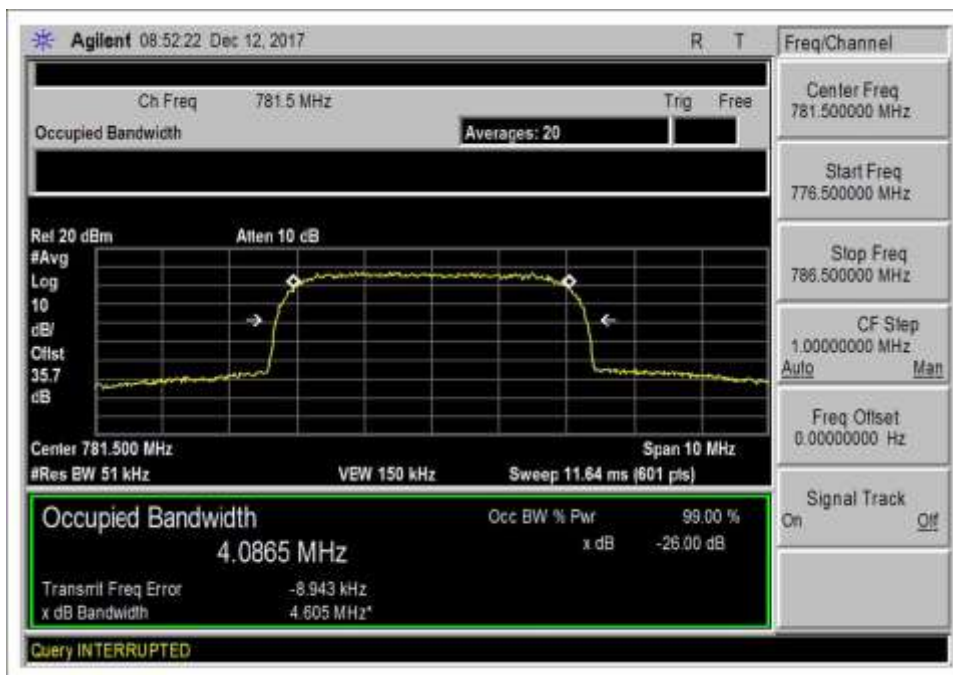
7.10 UL 698-716\_WCDMA\_IN



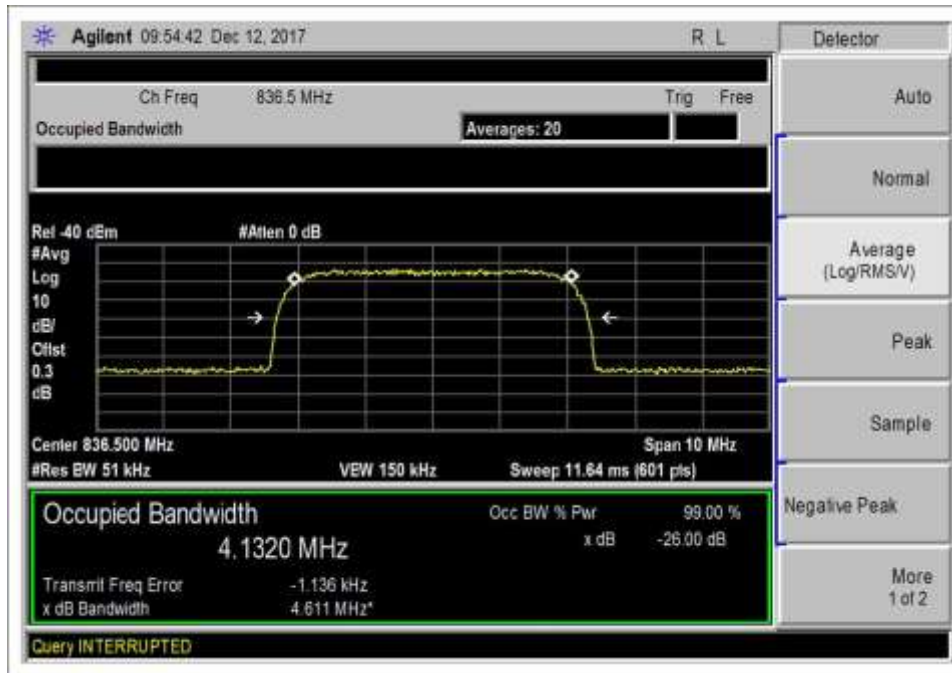
7.10 UL 698-716\_WCDMA\_OUT



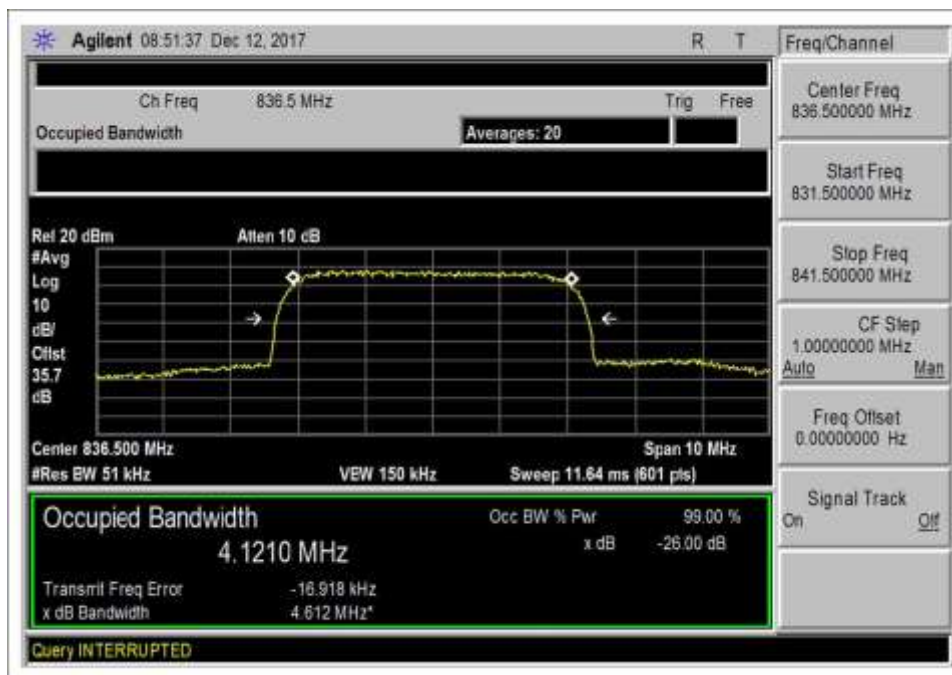
7.10 UL 776-787\_WCDMA\_IN



7.10 UL 776-787\_WCDMA\_OUT

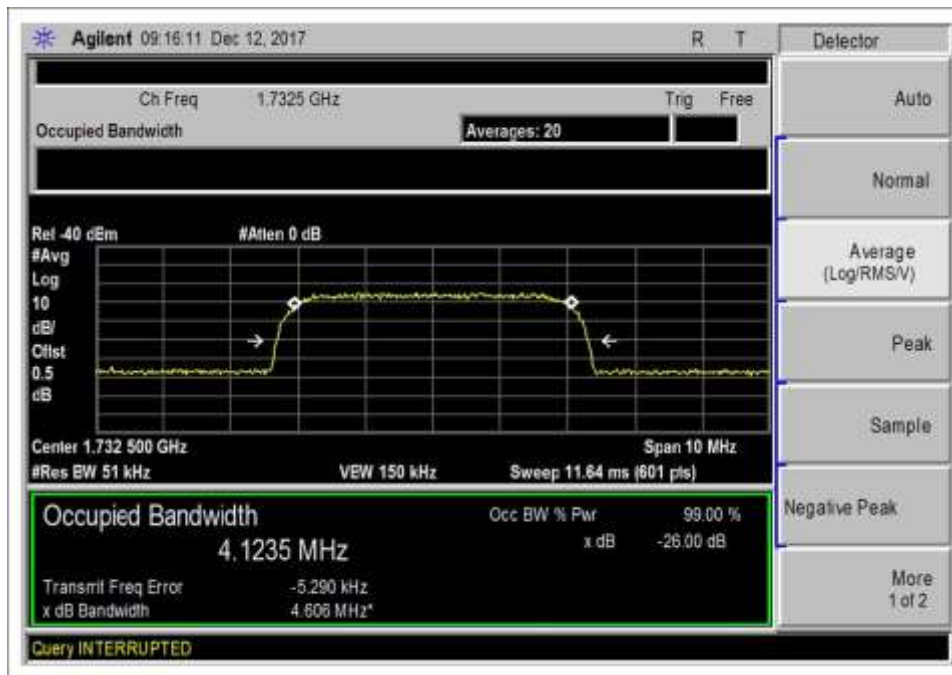


7.10 UL 824-849\_WCDMA\_IN

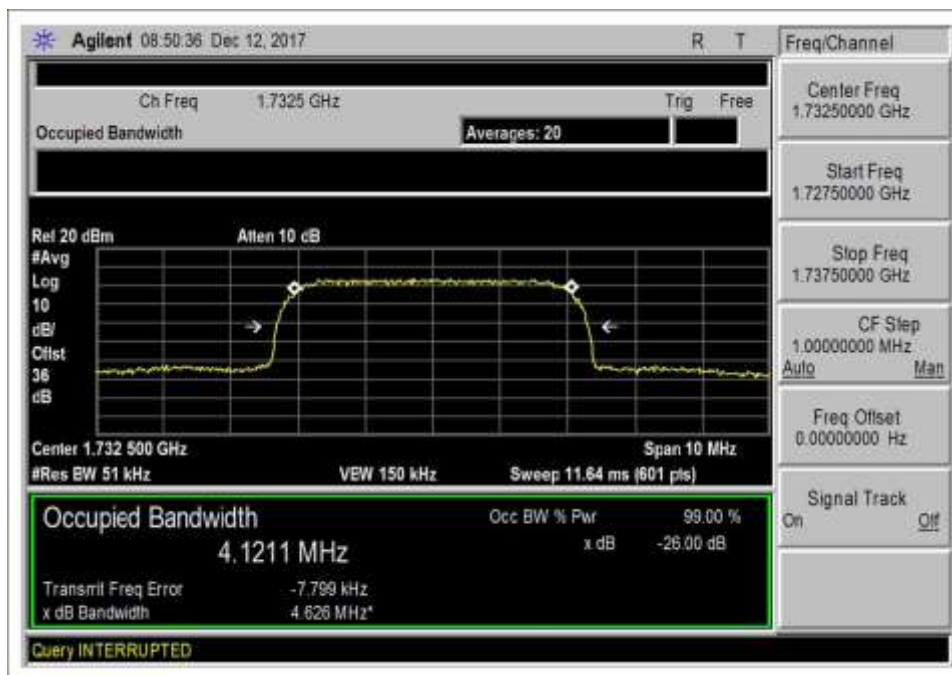


7.10 UL 824-849\_WCDMA\_OUT

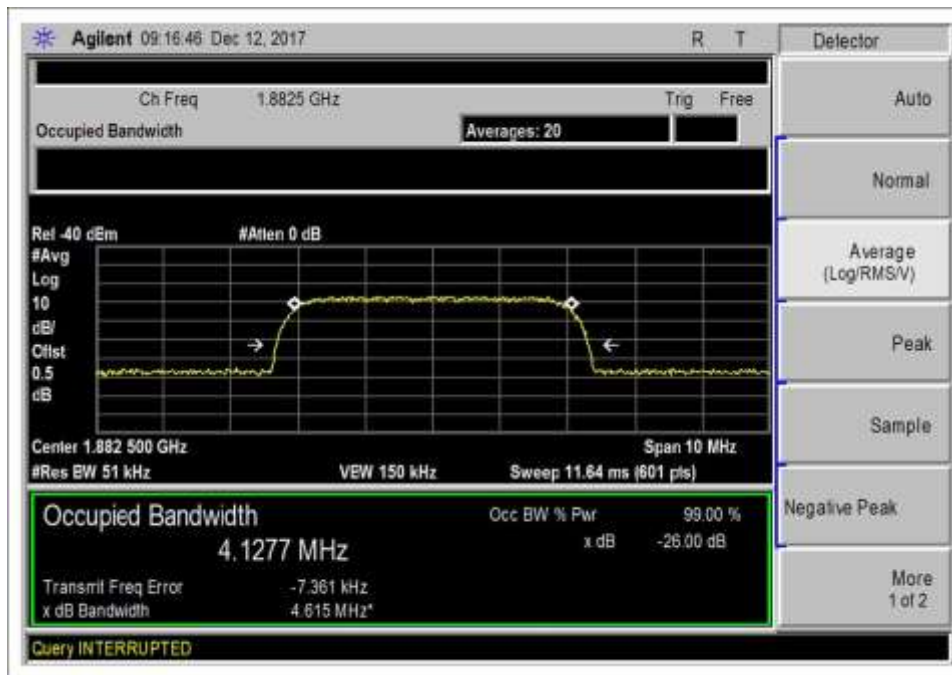




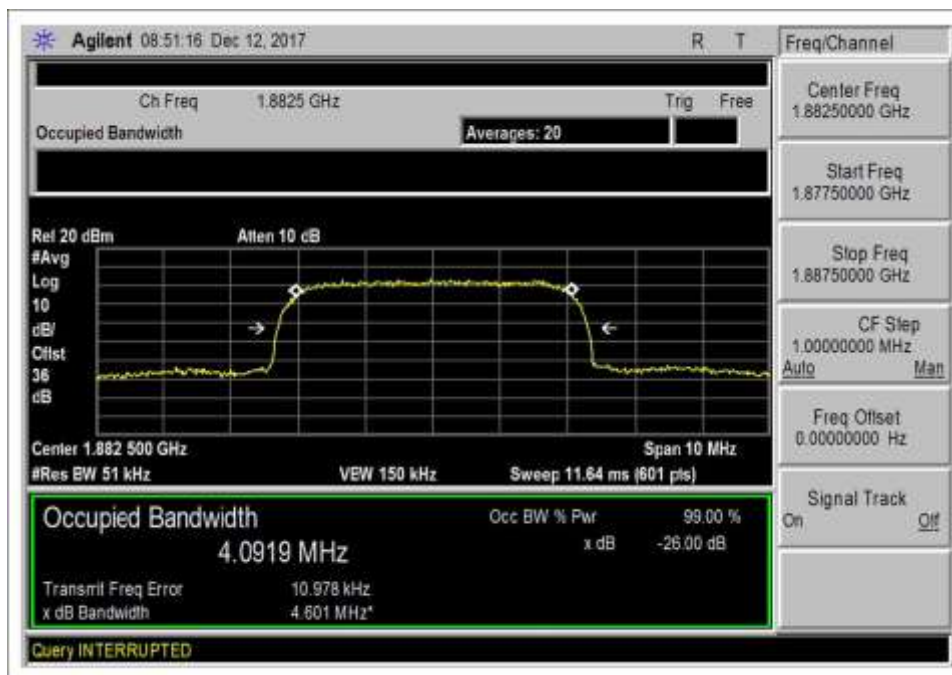
7.10 UL 1710-1755\_WCDMA\_IN



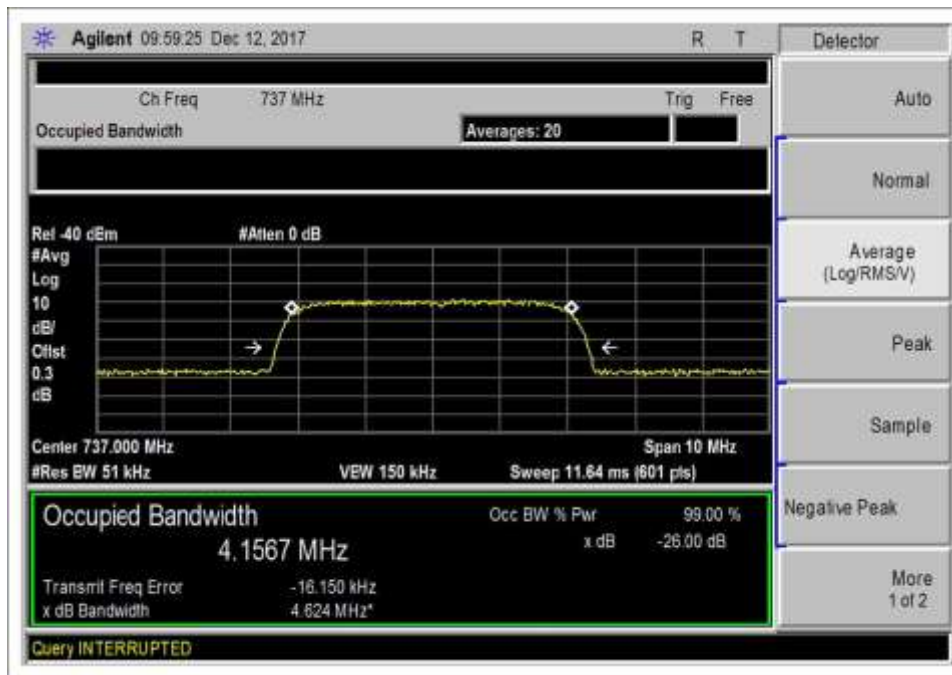
7.10 UL 1710-1755\_WCDMA\_OUT



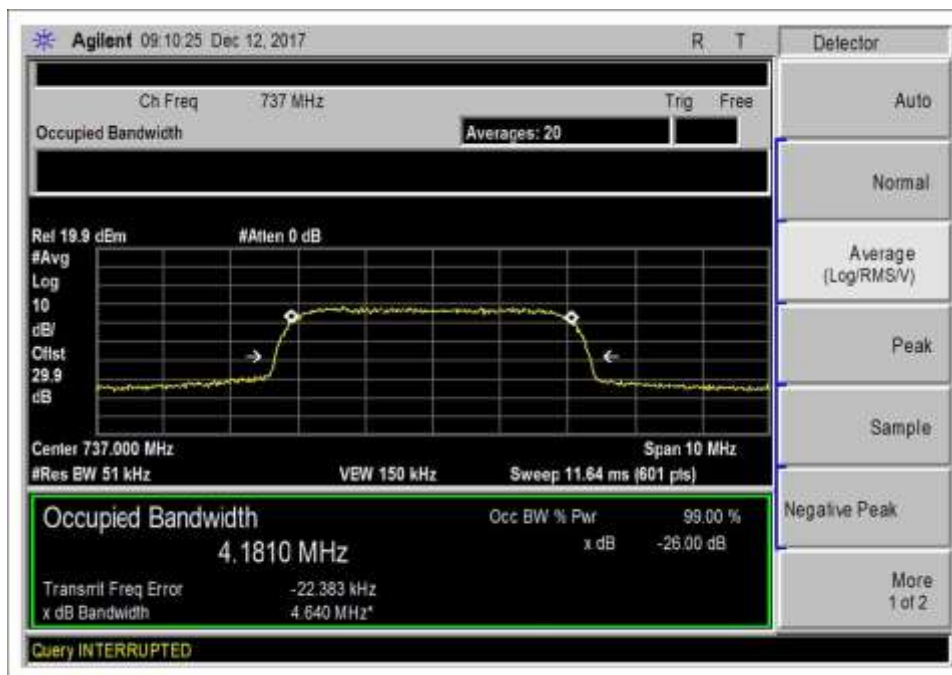
7.10 UL 1850-1915\_WCDMA\_IN



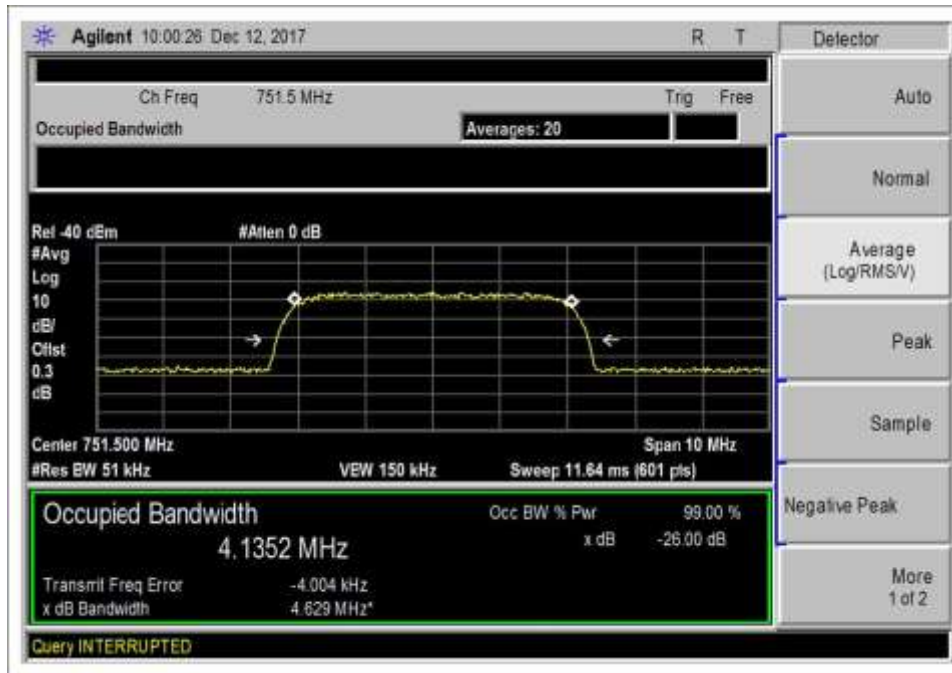
7.10 UL 1850-1915\_WCDMA\_OUT



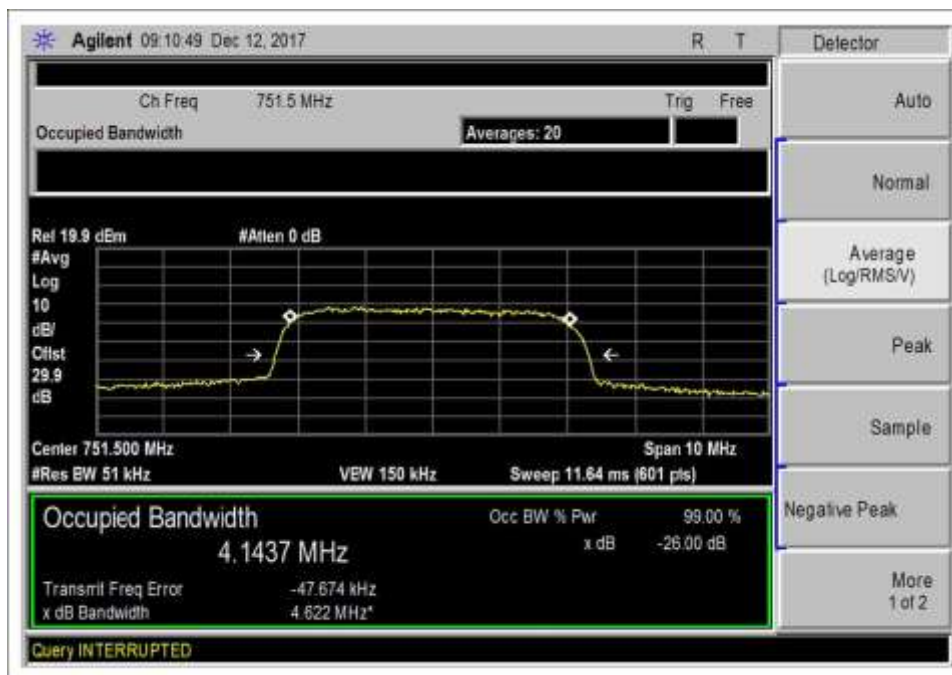
7.10 DL 728-746\_WCDMA\_IN



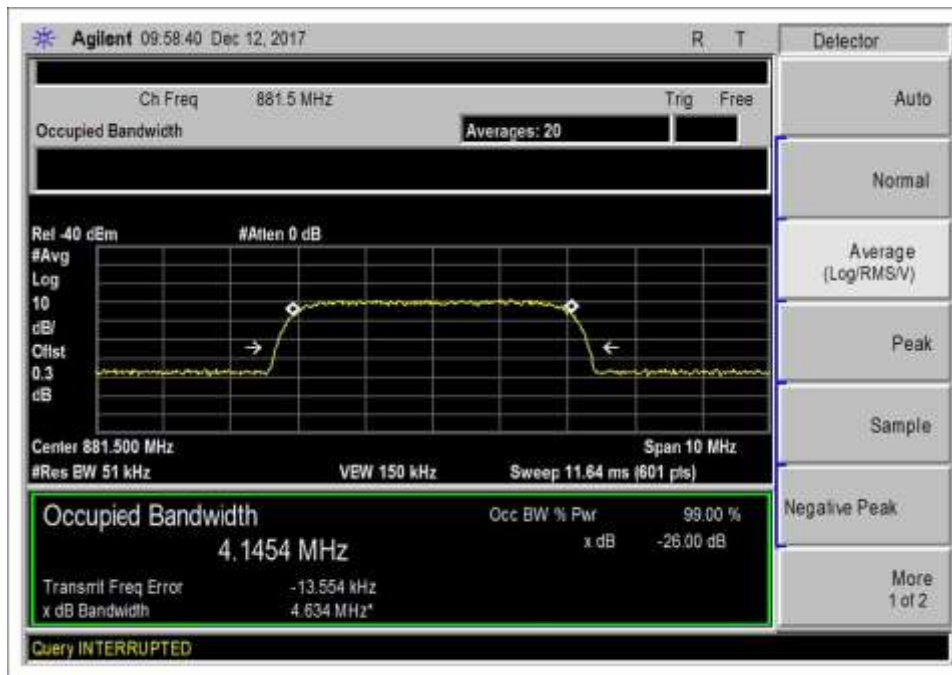
7.10 DL 728-746\_WCDMA\_OUT



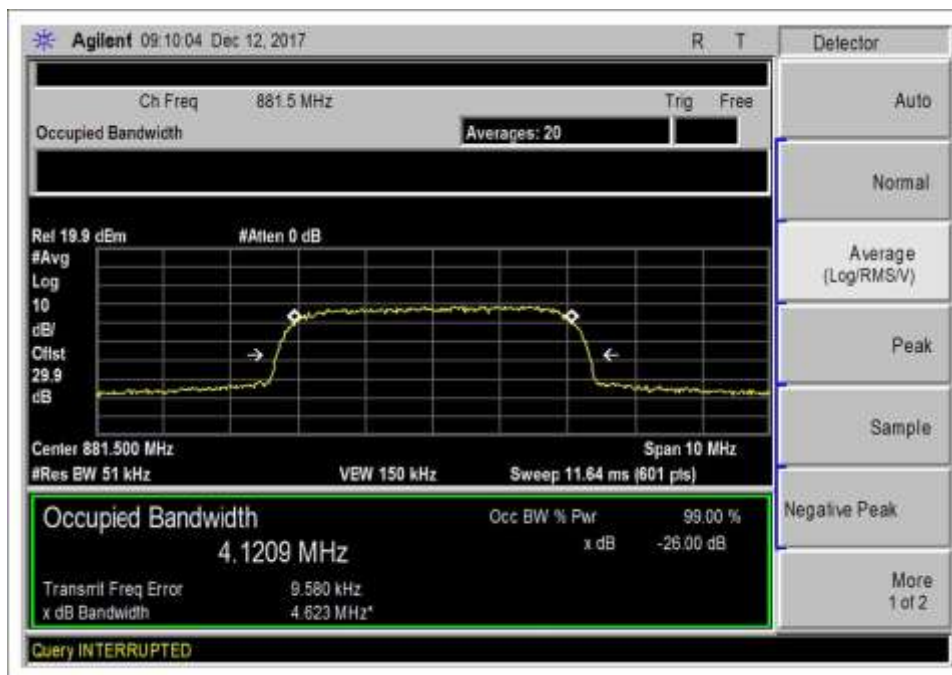
7.10 DL 746-757\_WCDMA\_IN



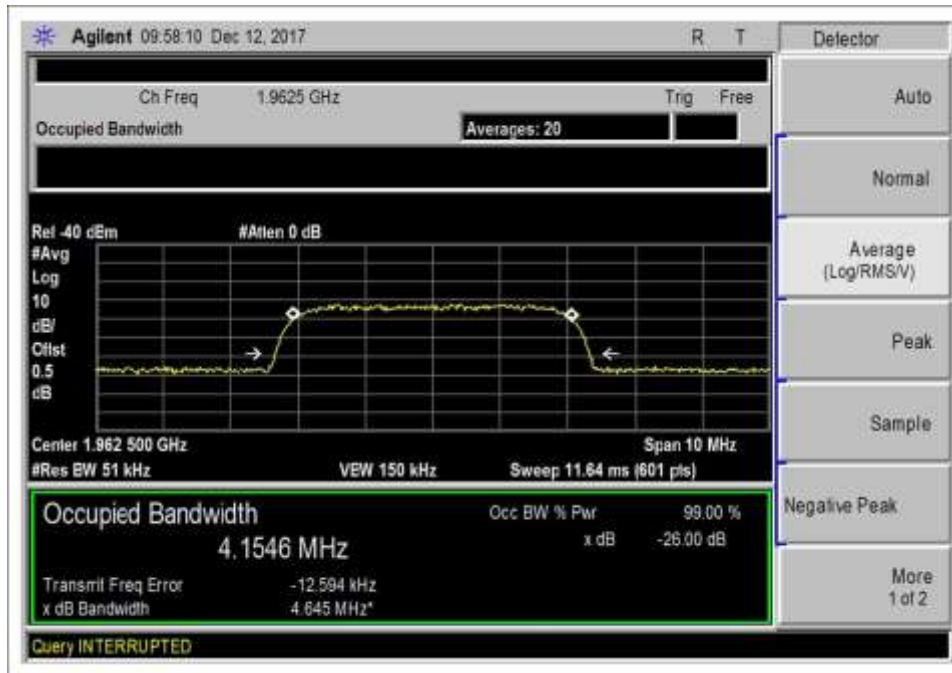
7.10 DL 746-757\_WCDMA\_OUT



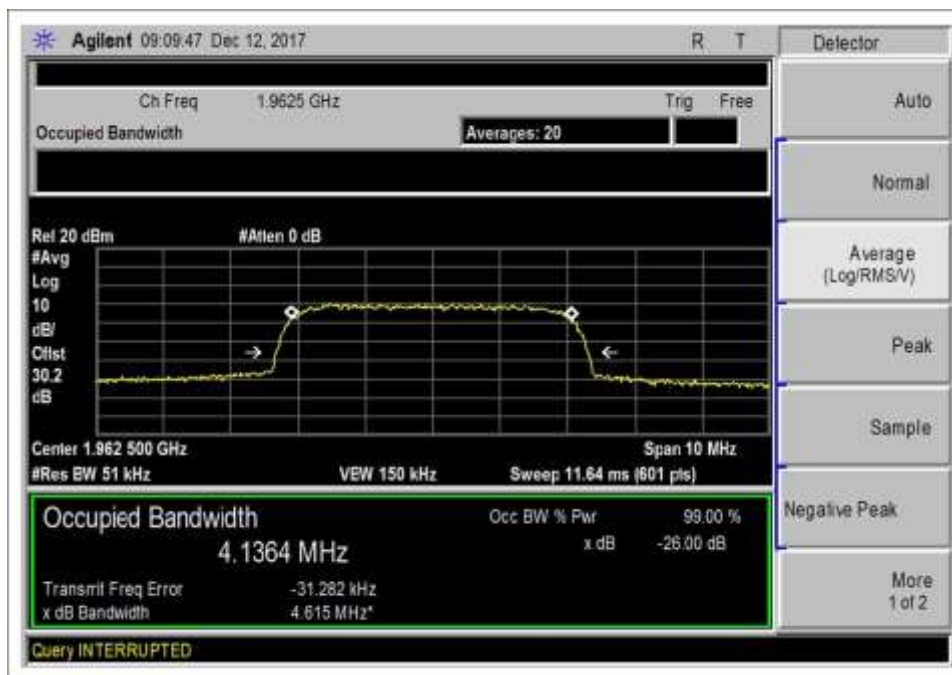
7.10 DL 869-894\_WCDMA\_IN



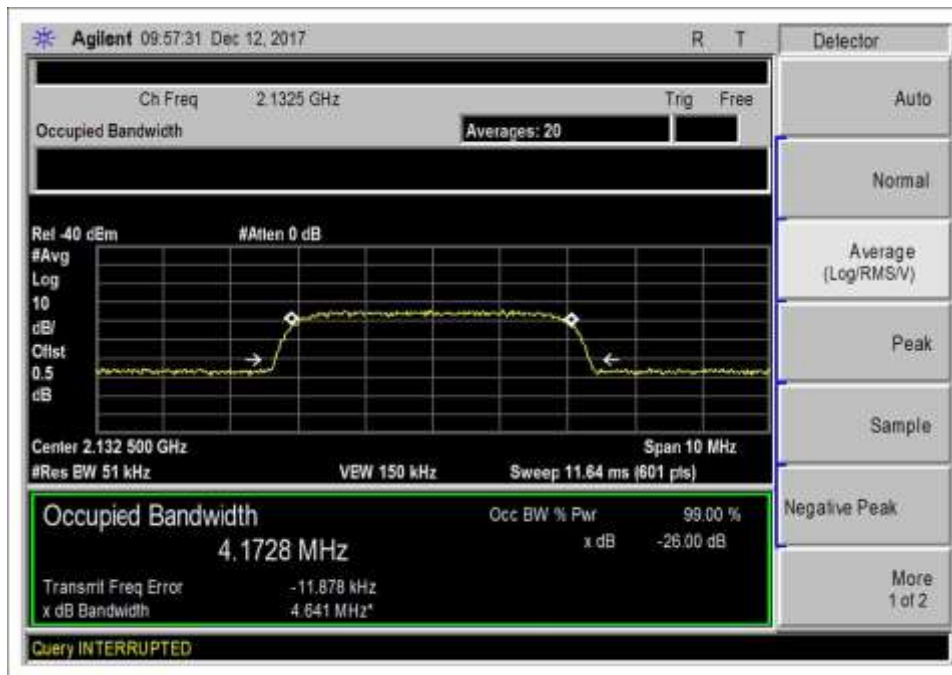
7.10 DL 869-894\_WCDMA\_OUT



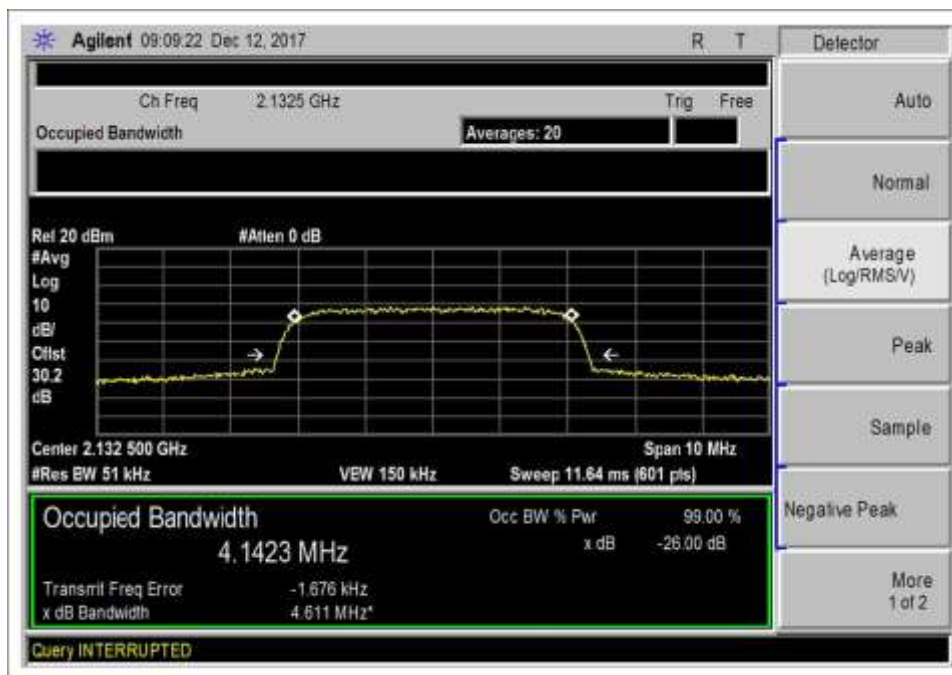
7.10 DL 1930-1995\_WCDMA\_IN



7.10 DL 1930-1995\_WCDMA\_OUT



7.10 DL 2110-2155\_WCDMA\_IN



7.10 DL 2110-2155\_WCDMA\_OUT

## 7.11 Oscillation Detection

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. •  
 110 N. Olinda Pl, Brea, CA 92823  
 1120 Fulton Place • Fremont, CA 94539  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.11 Anti-Oscillation (Oscillation Restarts / Oscillation mitigation or shutdown)**  
 Work Order #: **100654** Date: 12/12/2017 and 12/20/2017  
 Test Type: **Conducted Emissions**  
 Tested By: **Don Nguyen/ Eddie Wong**  
 Software: EMITest 5.03.11

***Equipment Tested:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Test Conditions / Notes:***

The equipment under test (EUT) is a Fixed Wideband Consumer Booster.  
 The EUT is placed on the test bench. Evaluation performed at the Outside (Donor) and Inside (Server) antenna port.  
 The EUT Server port is a type N connector and 50-ohm impedance.  
 The EUT Donor port is type F connector and 75-ohm impedance.

Part 22  
 UL: 824-849MHz  
 DL: 869-894MHz  
 Part 24  
 UL: 1850-1915MHz  
 DL: 1930-1995MHz  
 Part 27  
 UL: 1710-1755MHz, 698-716MHz, 776-787MHz  
 DL: 2110-2155MHz, 728-746MHz, 746-757MHz

Test procedure:  
 The test was performed in accordance with section 7.11 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04r01 Dated October 27, 2017

Test environment conditions:  
 Temperature: 23°C, 34% relative humidity, 101.0 kPa



**Test Equipment:**

Asset	Description	Manufacturer	Model	Calibration Date	Cal Due Date
P07191	Cable	Astro	32022-29094K-29094K-48TC	10/30/2017	10/30/2019
03471	Spectrum Analyzer	Agilent	E4440A	1/4/2016	1/4/2018
03412	Band Pass Filter	Pasternack	PE8705	8/16/2017	8/16/2019
03413	Band Pass Filter	Pasternack	PE8706	8/16/2017	8/16/2019
03414	Band Pass Filter	Pasternack	PE8707	8/16/2017	8/16/2019
03415	Band Pass Filter	Pasternack	PE8708	8/16/2017	8/16/2019
03447	Band Pass Filter	Pasternack	PE8710	8/16/2017	8/16/2019
03448	Band Pass Filter	Pasternack	PE8711	8/16/2017	8/16/2019
03446	Band Pass Filter	Pasternack	4FV50-707/H18-O/O	8/16/2017	8/16/2019
03467	Band Pass Filter	Pasternack	4FV50-731/H30-O/O	8/16/2017	8/16/2019
03468	Band Pass Filter	Pasternack	4CS10-781.5/E12.2-O/O	8/16/2017	8/16/2019
03469	Band Pass Filter	Pasternack	4CS10-751.5/E12-O/O	8/16/2017	8/16/2019
02475	1 dB step Attenuator	HP	8494B	6/8/2017	6/8/2019
03429	10dB step Attenuator	HP	8496B	11/8/2017	11/8/2019
C00082	RF Coupler	MECA Electronics, Inc.	722-10-1.500V	9/18/2017	9/18/2019
C00087	Combiner	Anaren	44000	1/07/2016	1/07/2018
P06958	Attenuator	Pasternack	PE7083	2/5/2016	2/5/2018
P06554	Cable	Astrolab	32022-29094K-29094K-24TC	12/30/2015	12/30/2017
P06662	Cable	Gore	PHASEFLEX EJR01N01024.0	4/5/2016	4/5/2018
03432	Attenuator	Aeroflex/Weinschel	90-30-34	10/27/2017	10/27/2019
02869	Spectrum Analyzer	Agilent	E4440A	8/1/2017	8/1/2018
*C00126	Attenuator	Fairview Microwave	IS1595	12/19/2017	12/19/2019

\*This piece of equipment was used on the test date of 12/20/2017.

## Summary of Results

Pass: All oscillations detections and mitigations occur within 0.3 seconds in uplink bands, within 1 second in the downlink bands and the noise level is below the -70dBm/MHz limit.

### 7.11.2 Oscillation restart tests

Oscillation detection				Time Between restart		Number of restart	
Frequency	Measured	Limit	Peak Level	Measured	Limit	Measured	Limit
MHz	Sec	Sec	dBm	Sec	At least sec		
UL 1710-1755	0.1667	0.30	27.29	70	60	3	5
UL 1850-1915	0.1417	0.30	27.39	69	60	3	5
UL 824-894	0.2333	0.30	31.38	70	60	3	5
UL 698-716	0.2917	0.30	30.38	70	60	3	5
UL 776-787	0.2333	0.30	31.29	69	60	3	5
DL 2110-2155	0.2917	1.00	22.66	70	60	3	5
DL 1930-1995	0.3750	1.00	25.98	70	60	3	5
DL 869-894	0.2833	1.00	25.14	70	60	3	5
DL 728-746	0.2750	1.00	21.22	70	60	3	5
DL 746-757	0.2500	1.00	21.49	69	60	3	5

### 7.11.3 Test procedure for measuring oscillation mitigation or shutdown

	UL 1710-1755	UL1850-1915	UL 824-894	UL 698-716	UL 776-787	
Max Gain Isolation	Pk-Pk Difference	Pk-Pk Difference	Pk-Pk Difference	Pk-Pk Difference	Pk-Pk Difference	Limit
dB	dB	dB	dB	dB	dB	dB
+5dB	11.7	11.7	(15.0)*	(16.6)*	(15.7)*	12.0
+4dB	(13.4)*	11.6	(16.4)*	(19.4)*	(17.8)*	12.0
+3dB	(15.5)*	(12.7)*	(19.1)*	(22.8)*	(19.7)*	12.0
+2dB	(18.0)*	(13.8)*	(23.6)*	(28.4)*	(22.9)*	12.0
+1dB	(22.0)*	(15.4)*	(35.8)*	**	(35.1)*	12.0
0dB	(29.7)*	(16.9)*	**	**	**	12.0
-1dB	**	(19.2)*	**	**	**	12.0
-2dB	**	(23.0)*	**	**	**	12.0
-3dB	**	(29.2)*	**	**	**	12.0
-4dB	**	**	**	**	**	12.0
-5dB	**	**	**	**	**	12.0

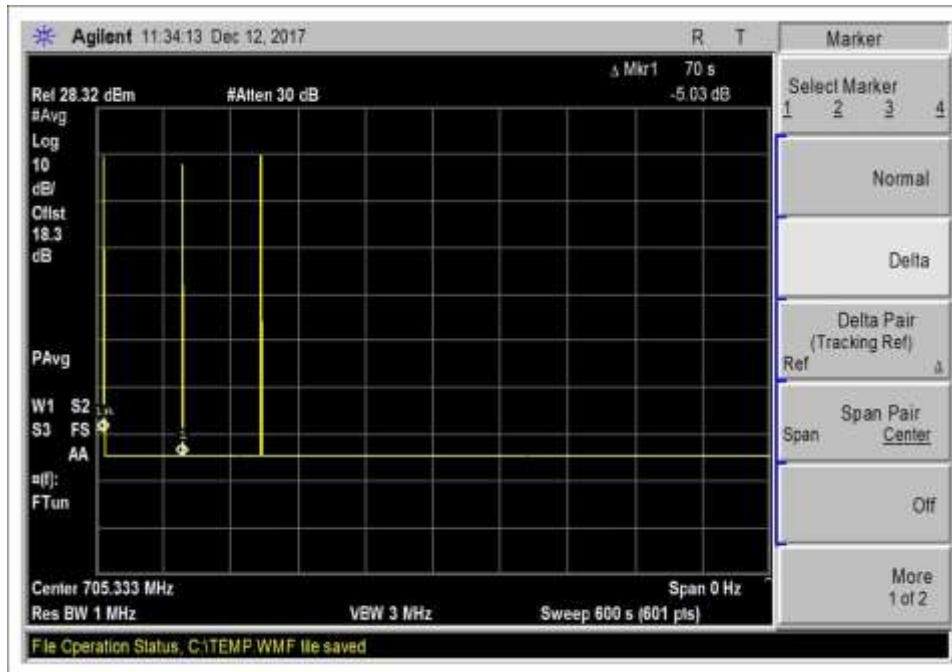
	DL 2110-2155	DL 1930-1995	DL 869-894	DL 728-746	DL 746-775	
Max Gain Isolation	Pk-Pk Difference	Pk-Pk Difference	Pk-Pk Difference	Pk-Pk Difference	Pk-Pk Difference	Limit
dB	dB	dB	dB	dB	dB	dB
+5dB	8.0	10.1	8.1	8.4	3.0	12.0
+4dB	8.1	(12.3)*	7.6	9.1	3.8	12.0
+3dB	10.7	(15)*	8.0	10.5	4.5	12.0
+2dB	11.0	(18)*	8.3	11.5	5.6	12.0
+1dB	(14)*	(26)*	11.0	(13.6)*	6.2	12.0
0dB	(16)*	**	11.8	(16.3)*	7.2	12.0
-1dB	(20)*	**	(12.4)*	(20)*	8.1	12.0
-2dB	(25)*	**	(15.6)*	(20)*	10.0	12.0
-3dB	**	**	(17)*	(58)*	11.3	12.0
-4dB	**	**	(24.4)*	**	11.5	12.0
-5dB	**	**	(32.5)*	**	(16.8)*	12.0

Note:

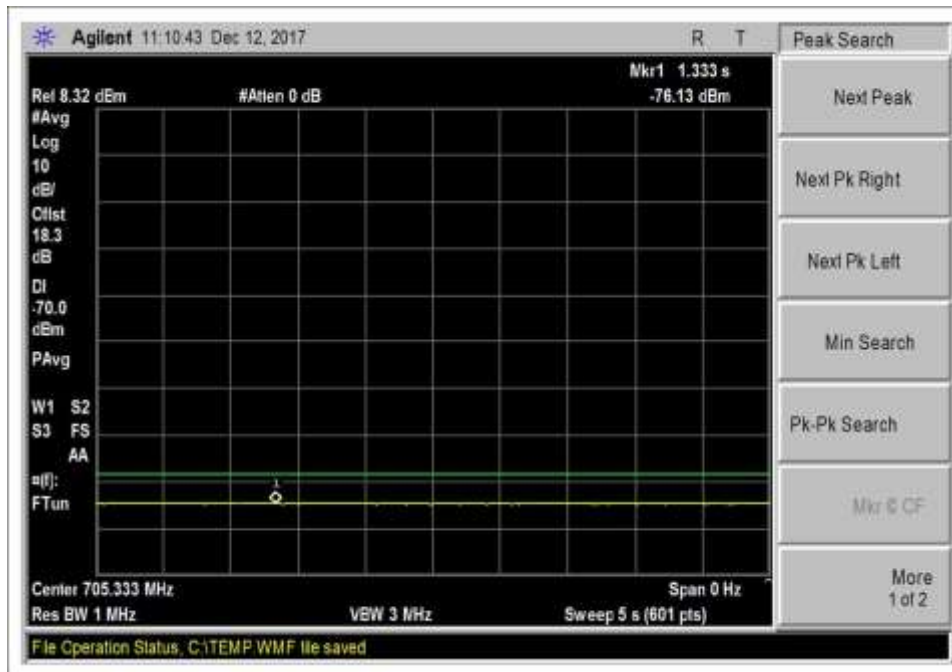
\* The measured difference exceeds the limit for a period of less than 300 second before device mitigates or shuts down. The maximum recorded time prior to shutdown was 234 seconds for the Uplink bands and 287 seconds for the Downlink bands.

\*\* The device shuts down immediately.

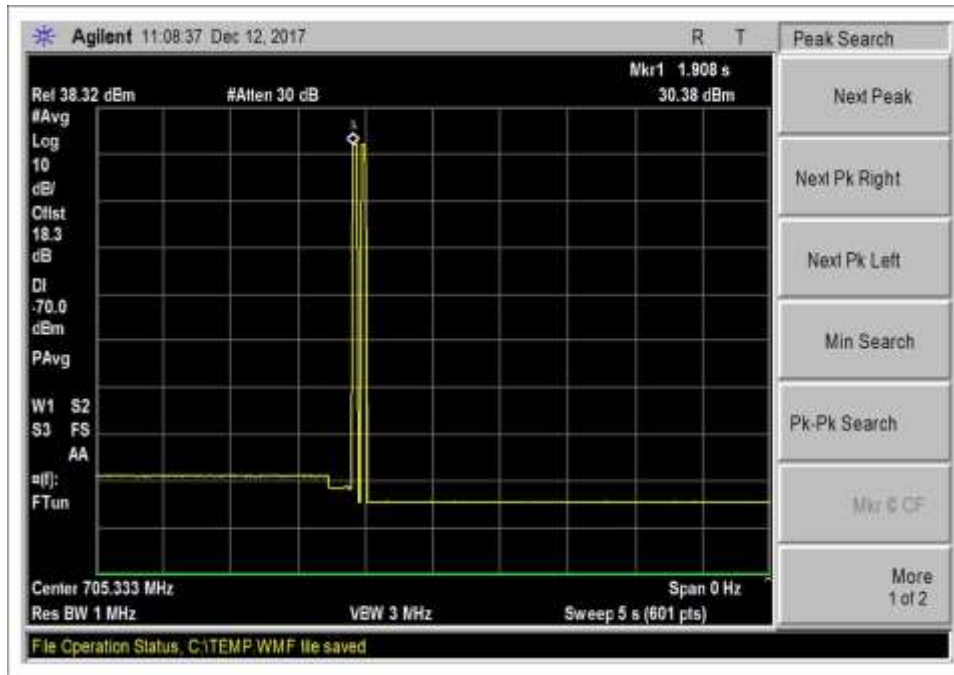
## Plots



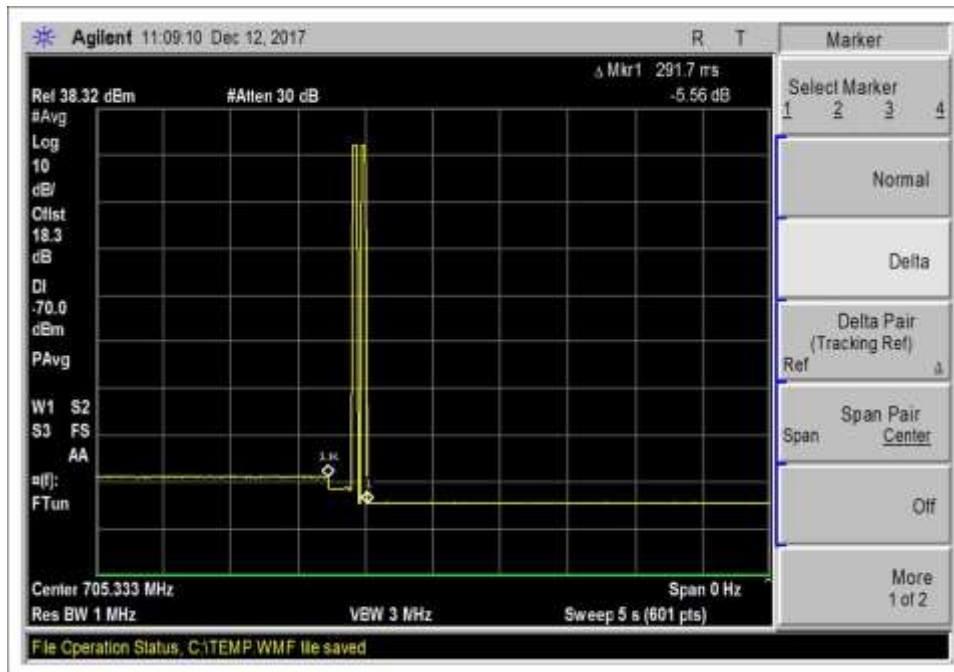
7.11.2 UL 698-716 600s



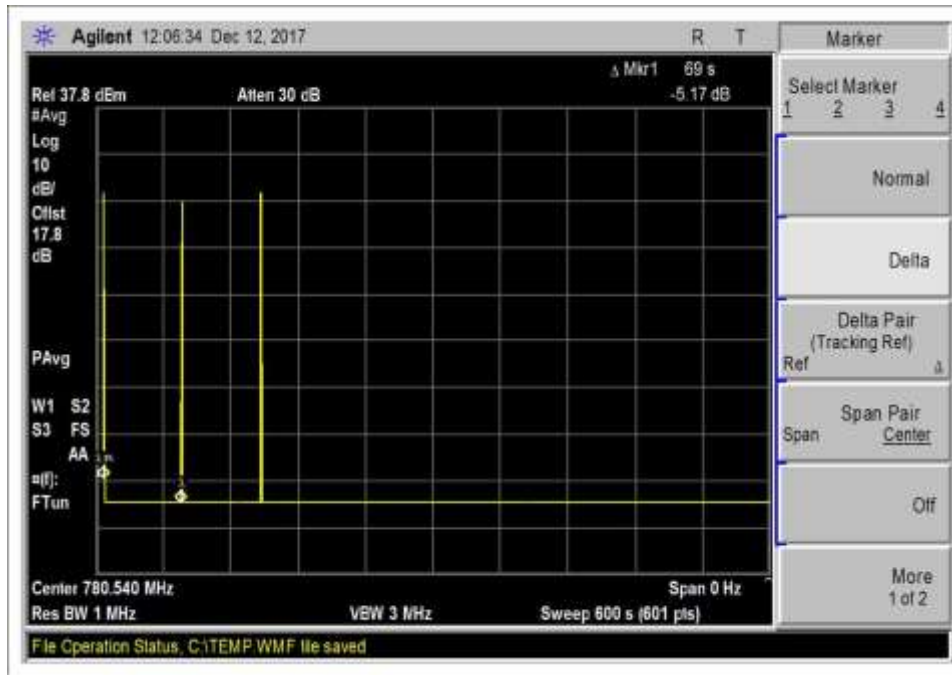
7.11.2 UL 698-716 after osc



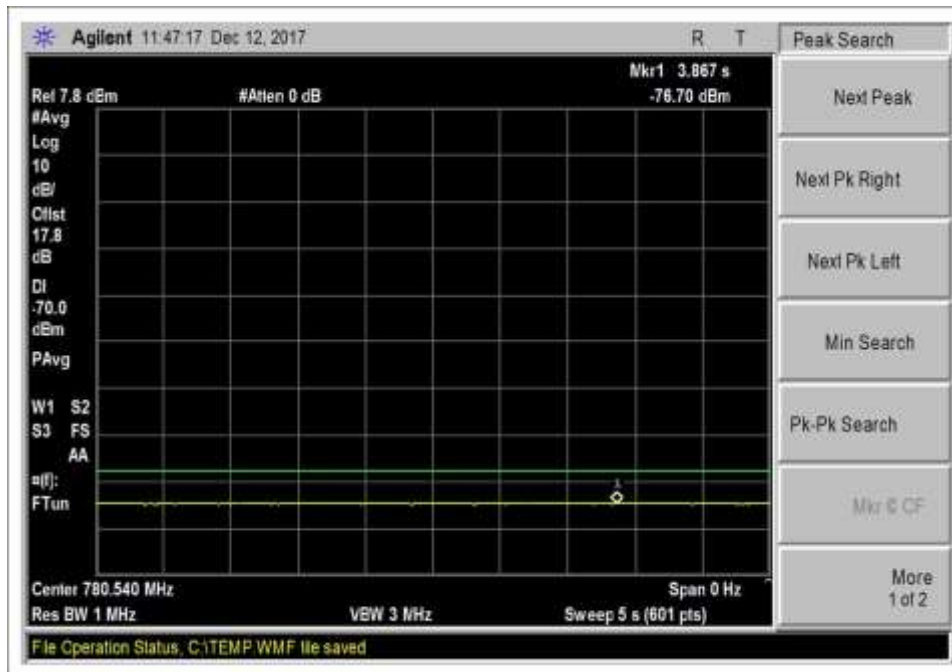
7.11.2 UL 698-716 peak



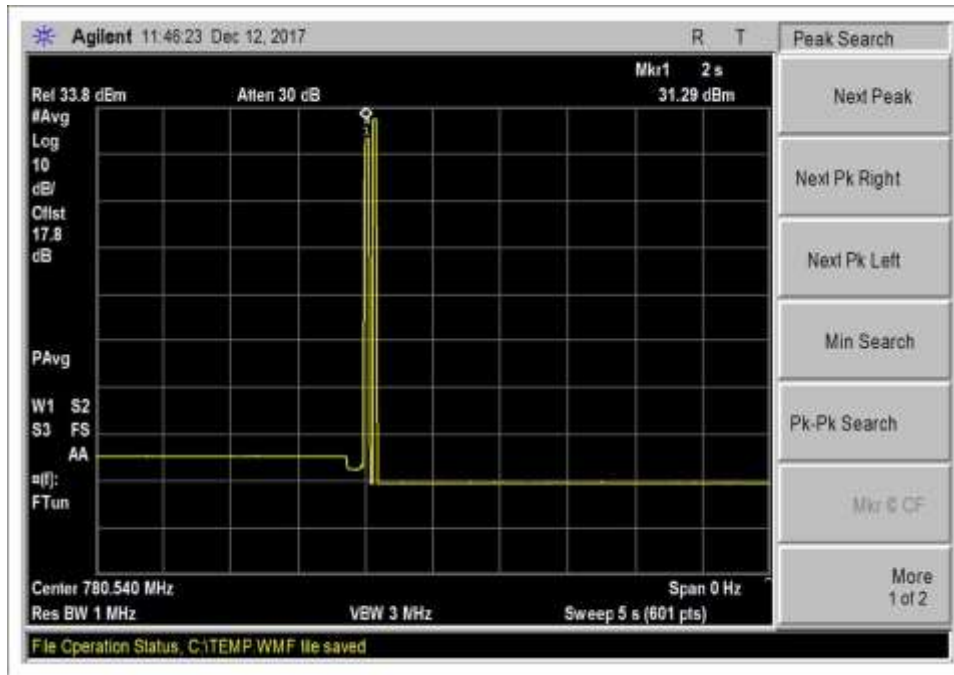
7.11.2 UL 698-716 time



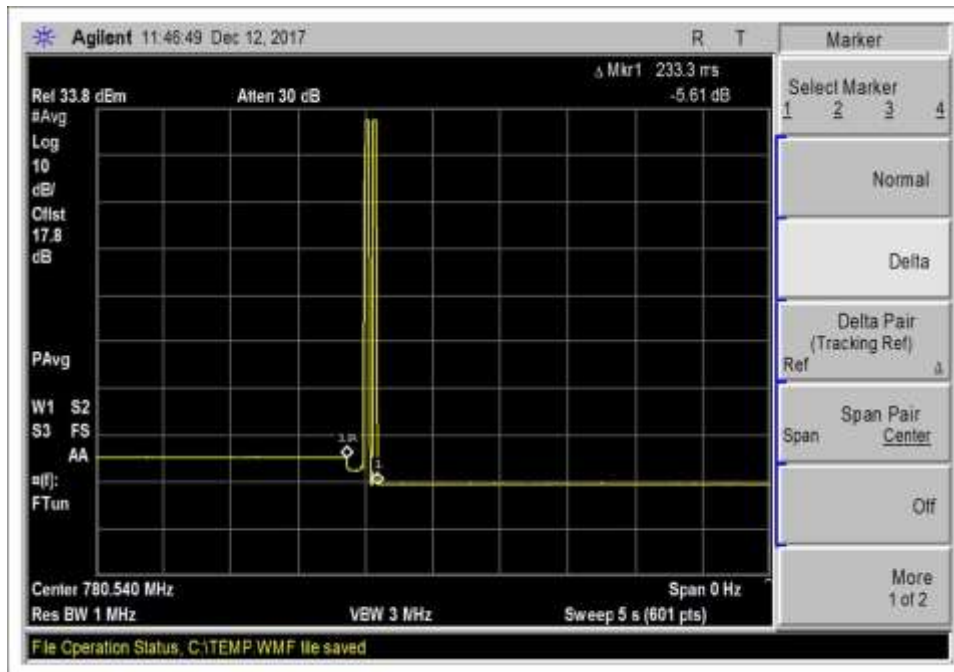
7.11.2 UL 776-787 600s



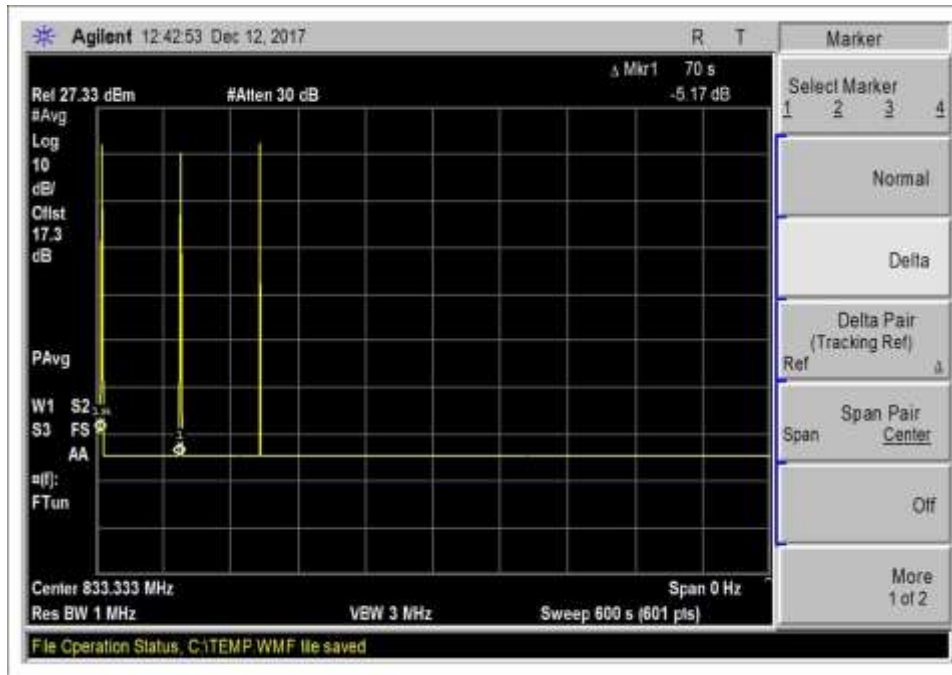
7.11.2 UL 776-787 after osc



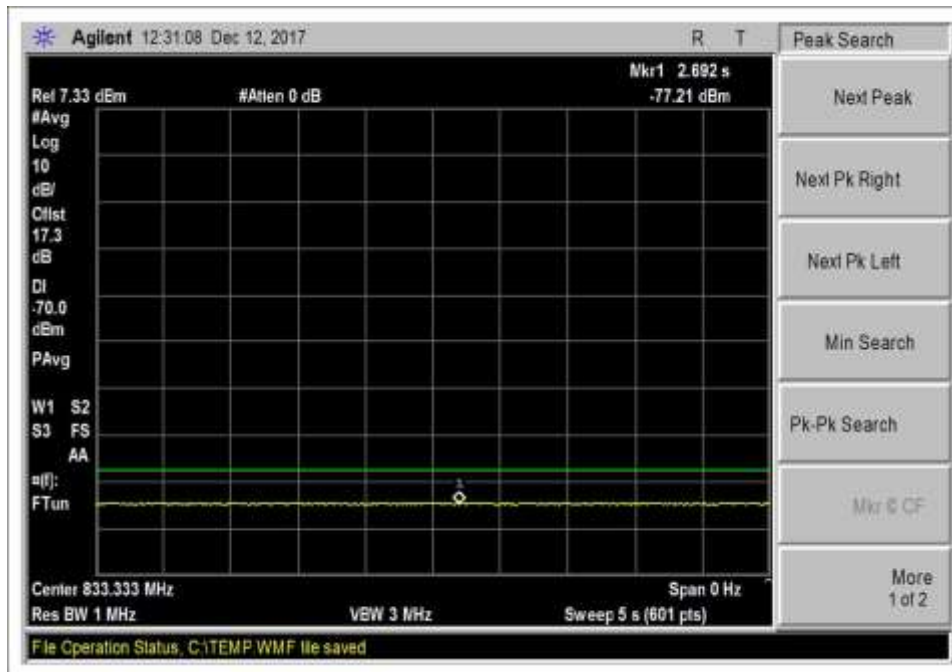
7.11.2 UL 776-787 peak



7.11.2 UL 776-787 time

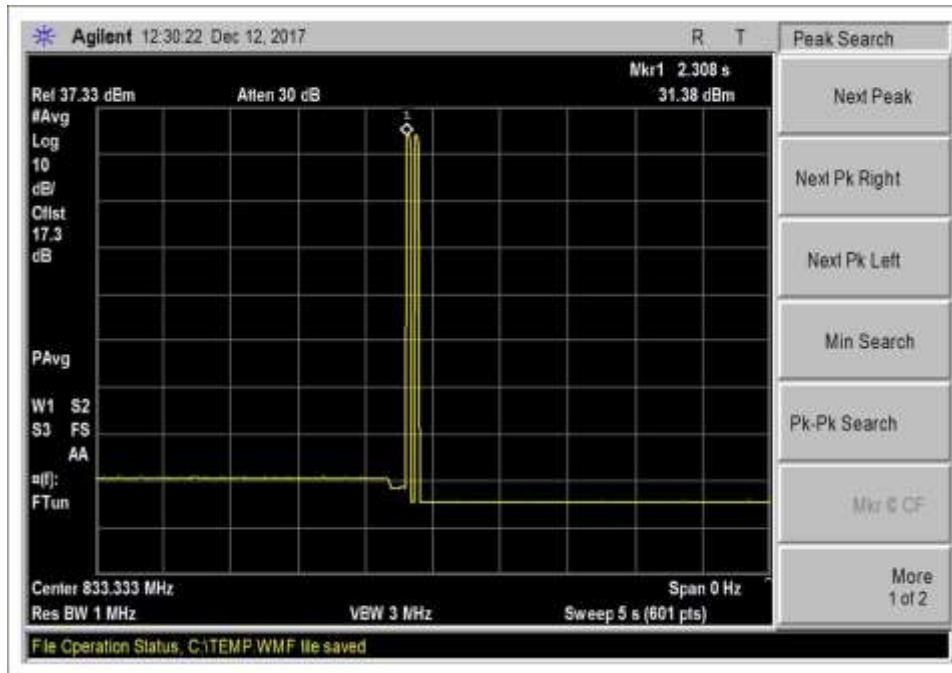


7.11.2 UL 824-849 600s

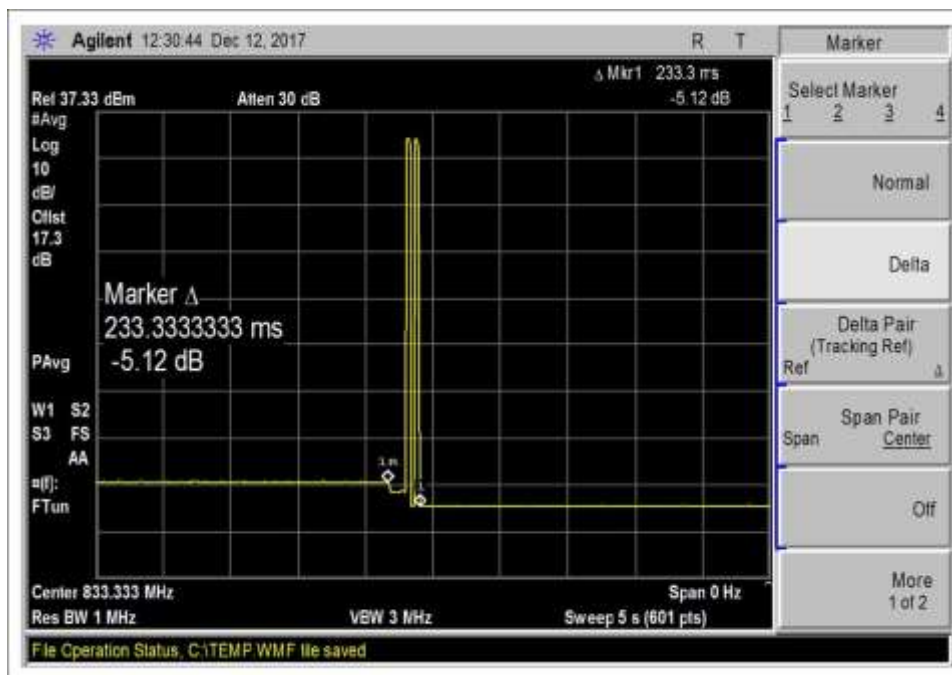


7.11.2 UL 824-849 after osc

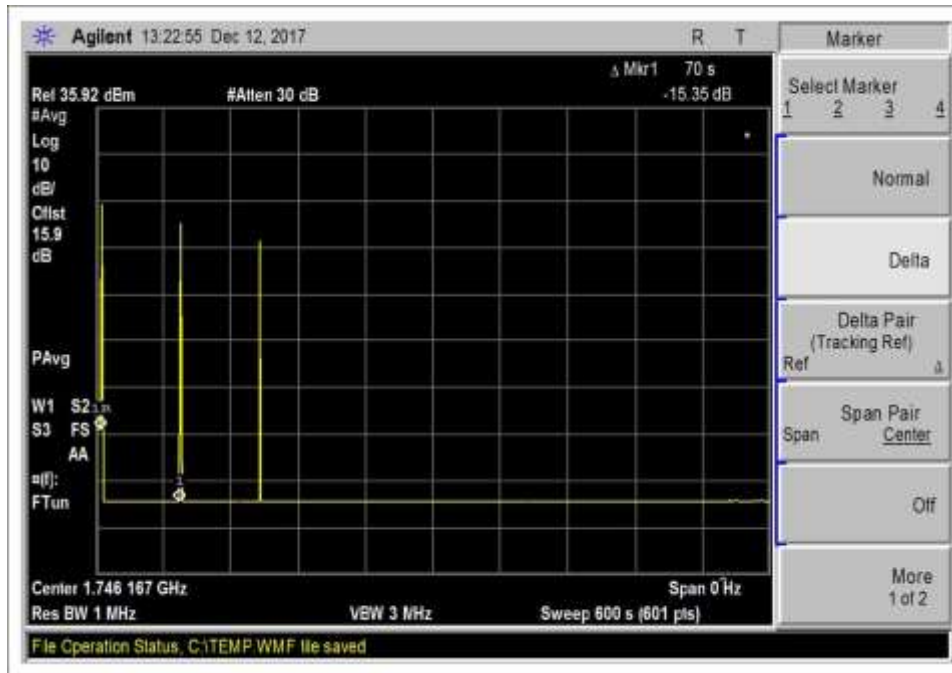




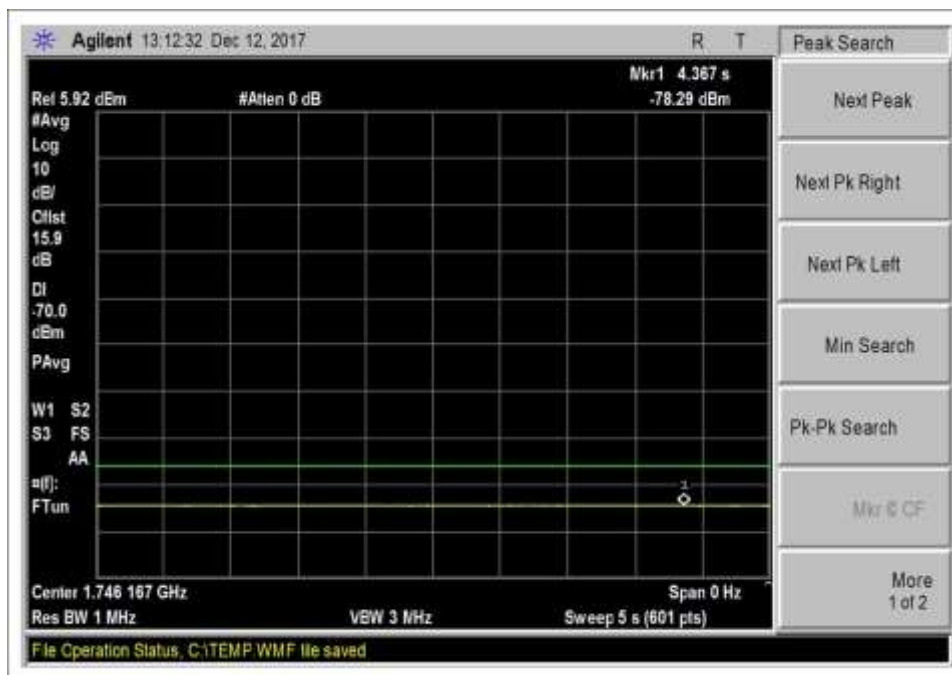
7.11.2 UL 824-849 peak



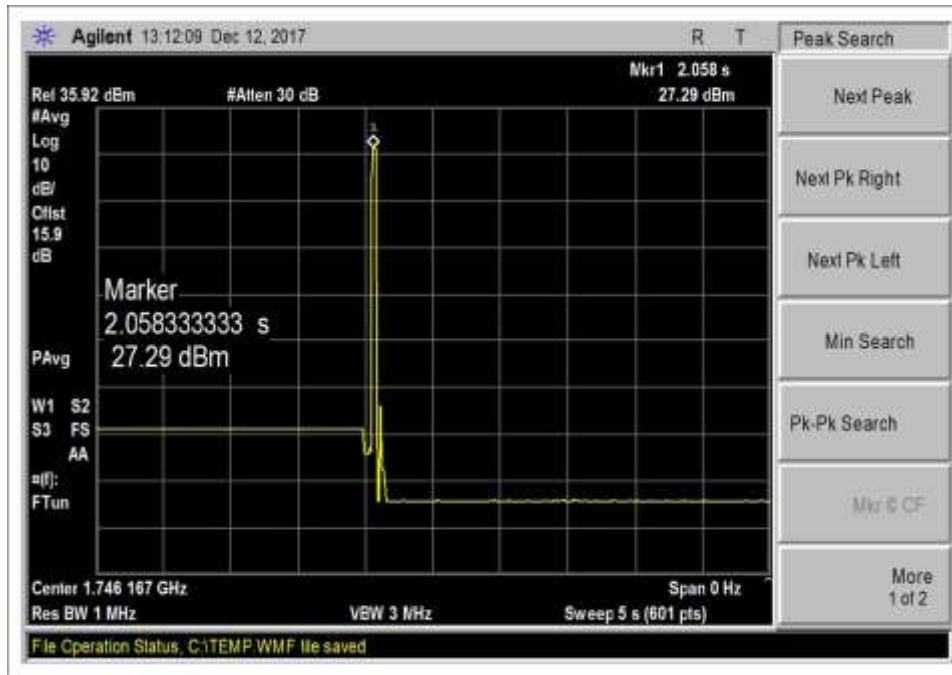
7.11.2 UL 824-849 time



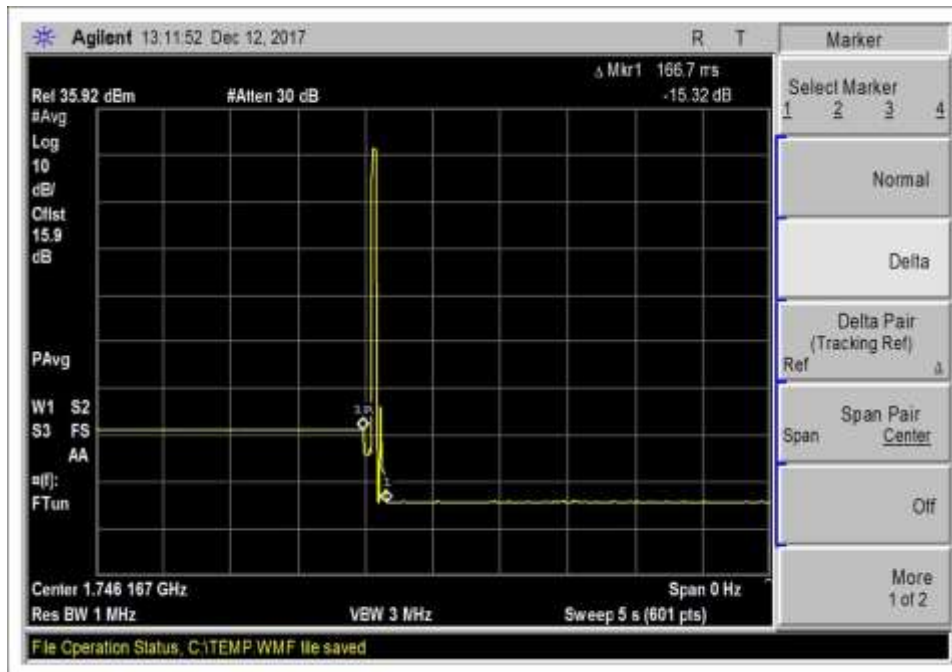
7.11.2 UL 1710-1755 600s



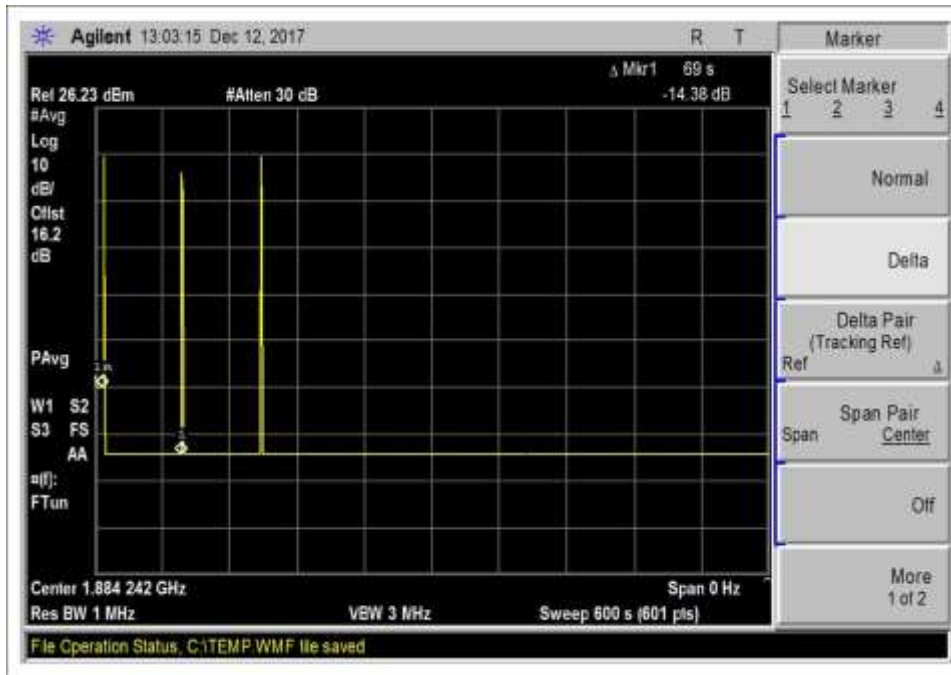
7.11.2 UL 1710-1755 after osc



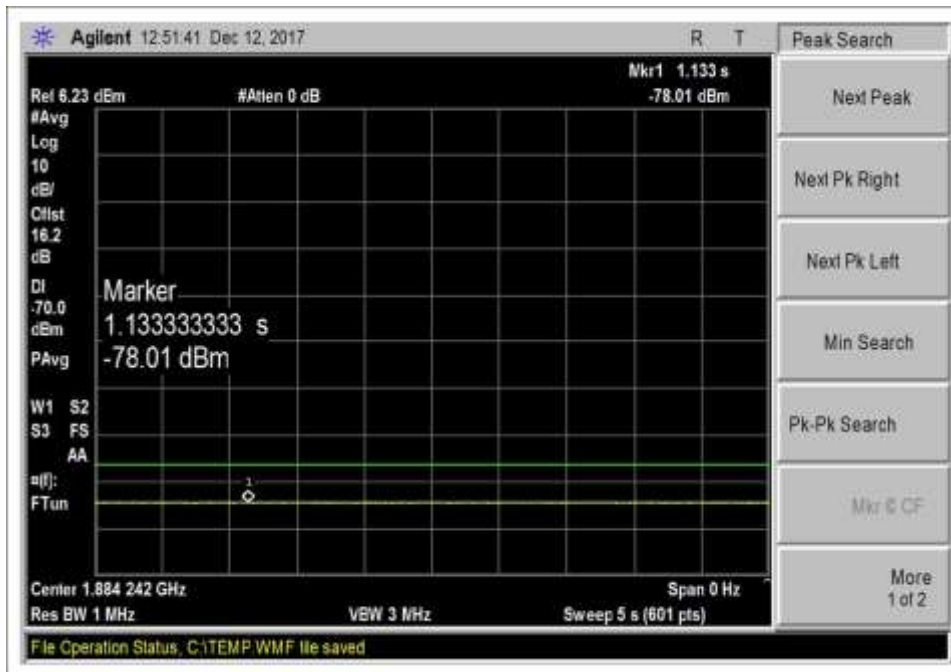
7.11.2 UL 1710-1755 peak



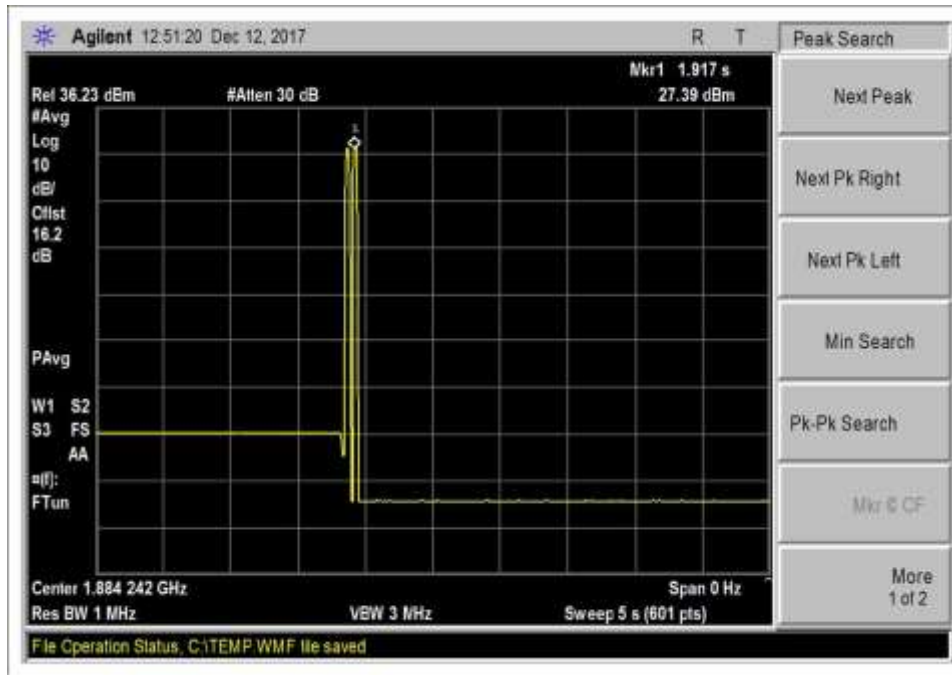
7.11.2 UL 1710-1755 time



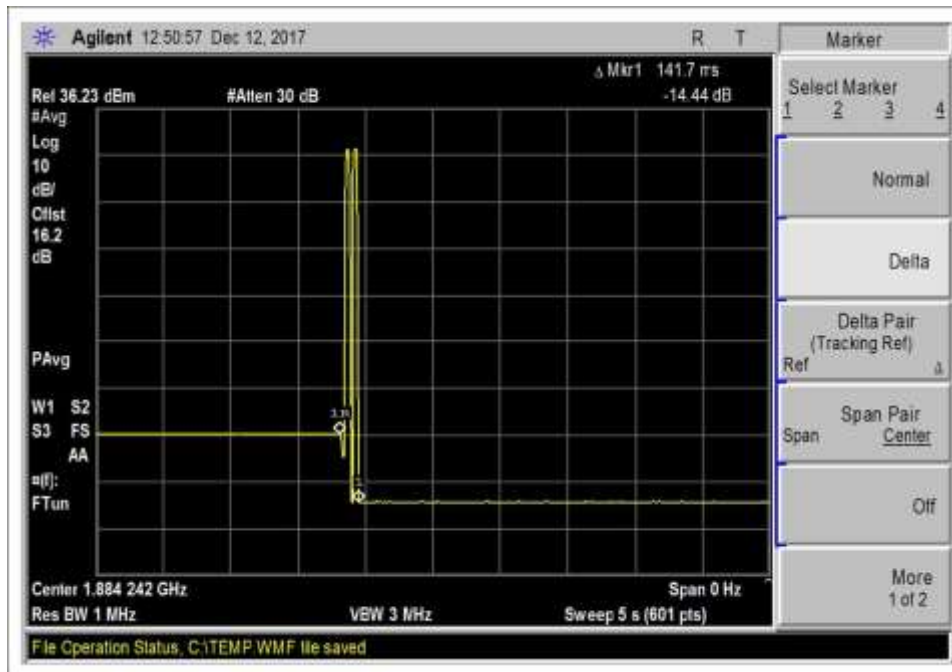
7.11.2 UL 1850-1915 600s



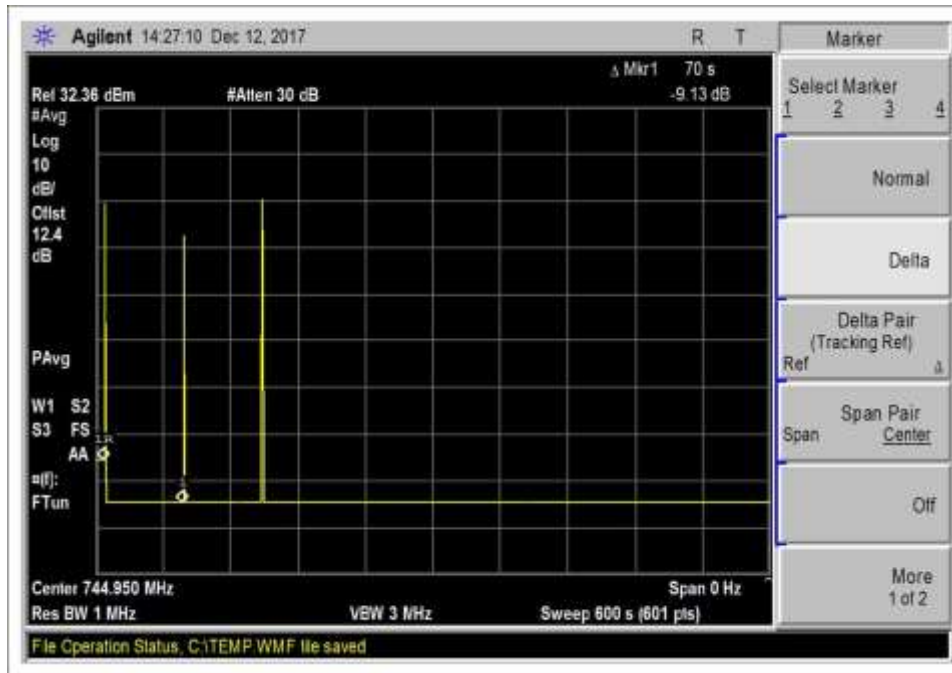
7.11.2 UL 1850-1915 after osc



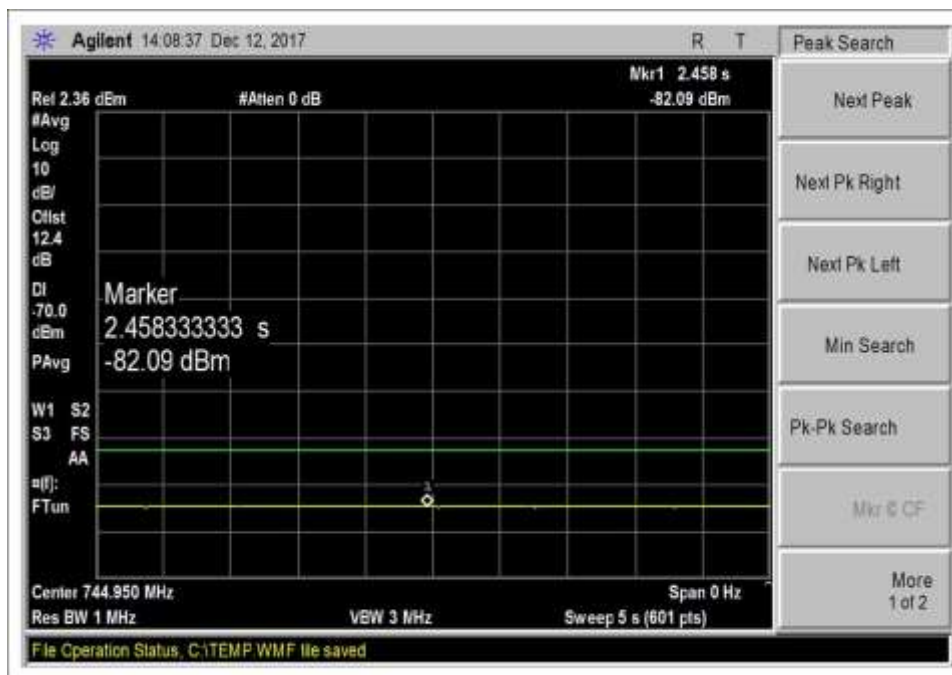
7.11.2 UL 1850-1915 peak



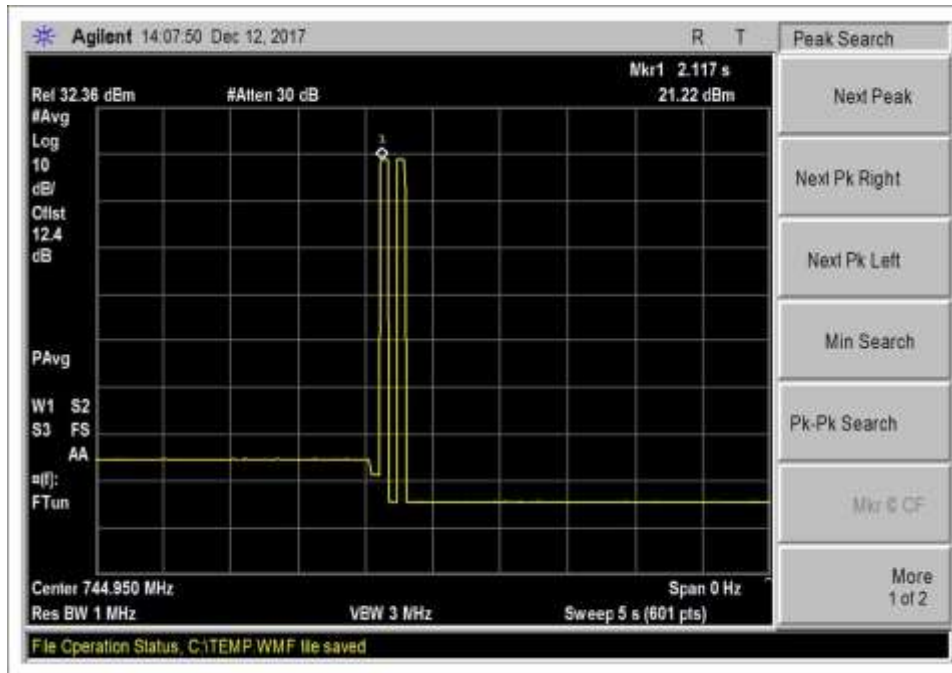
7.11.2 UL 1850-1915 time



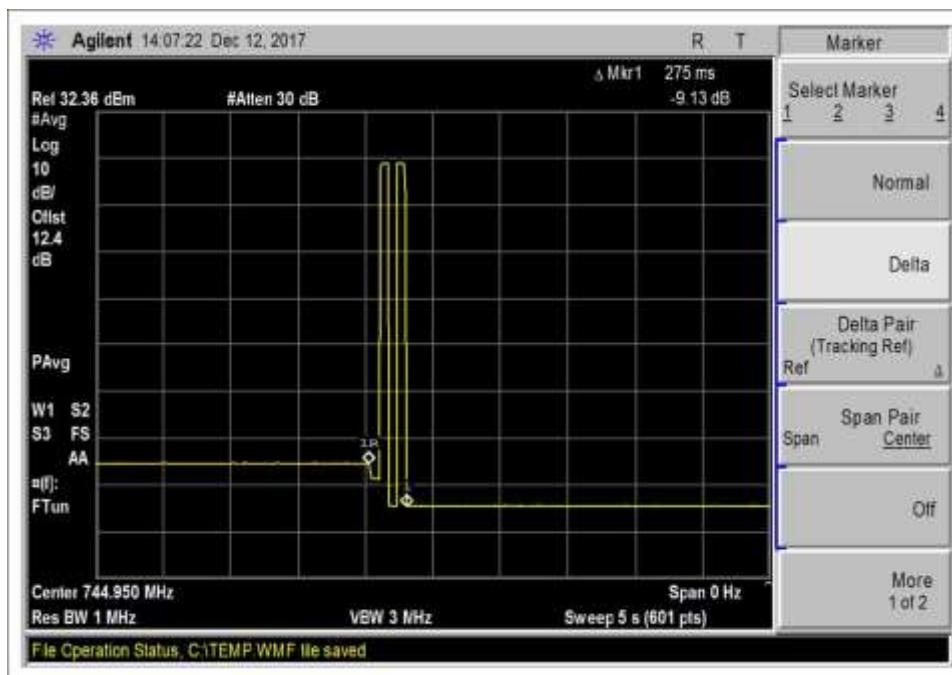
7.11.2 DL 728-746 600s



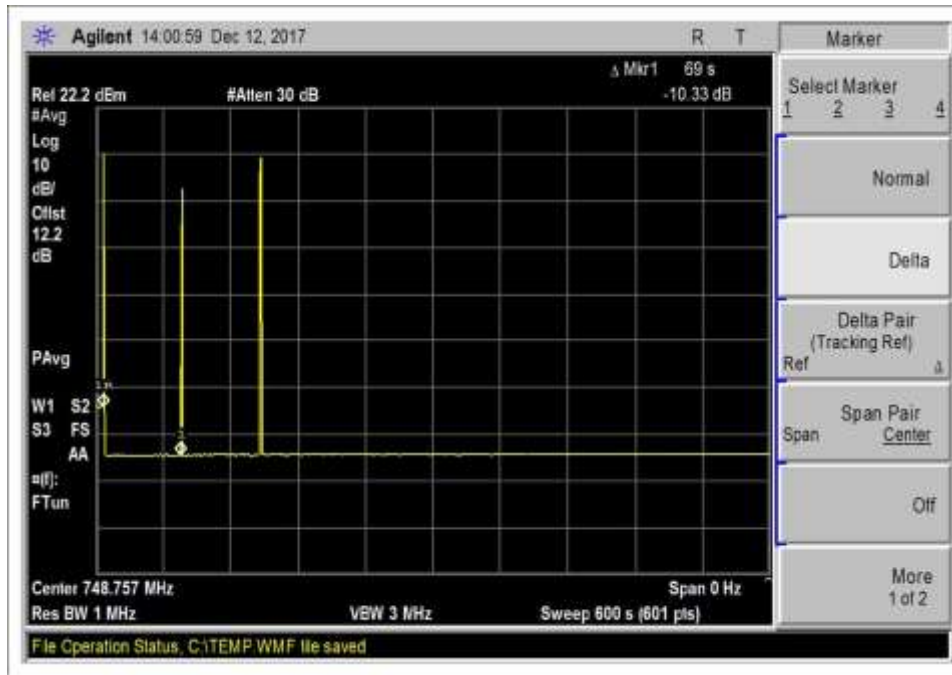
7.11.2 DL 728-746 after osc



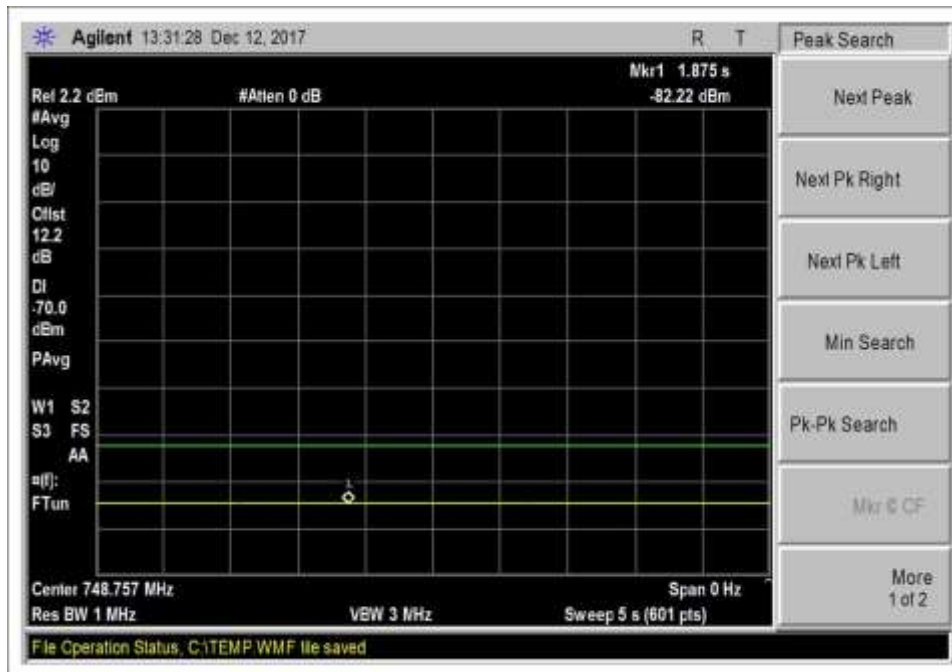
7.11.2 DL 728-746 peak



7.11.2 DL 728-746 time

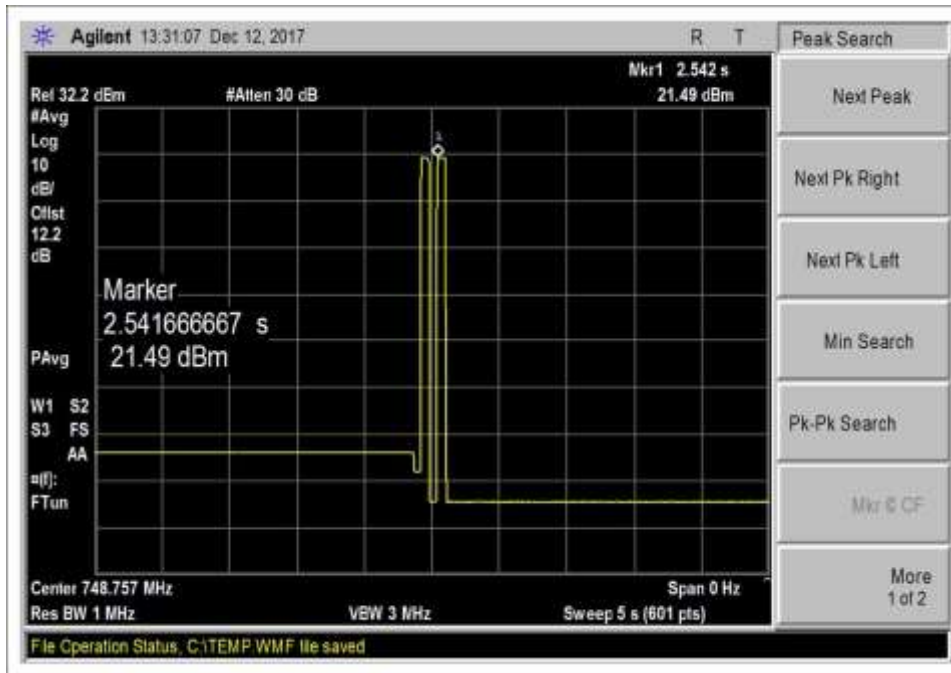


7.11.2 DL 746-757 600s

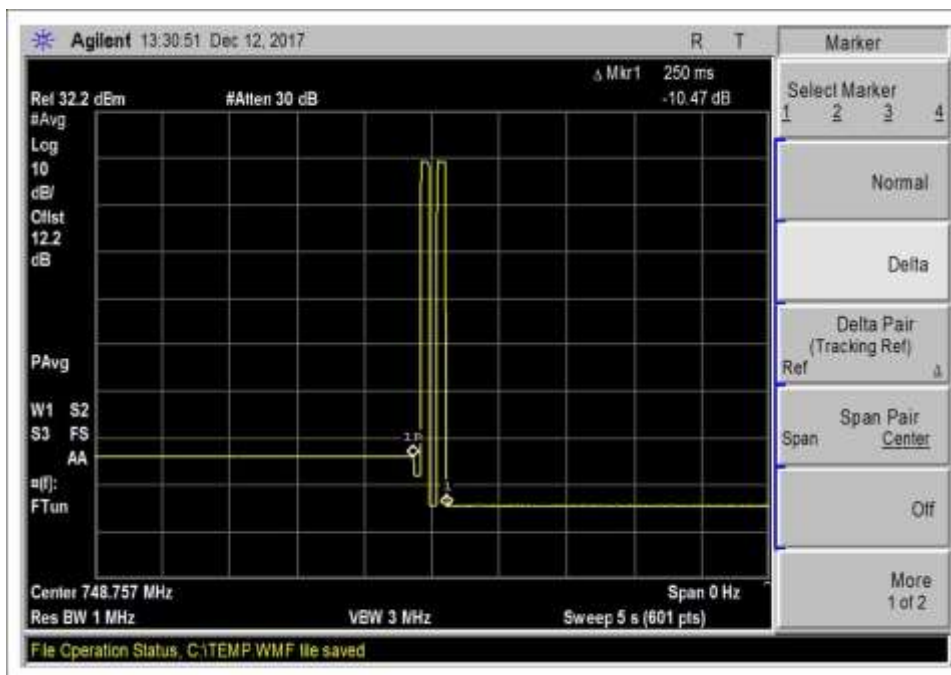


7.11.2 DL 746-757 after osc

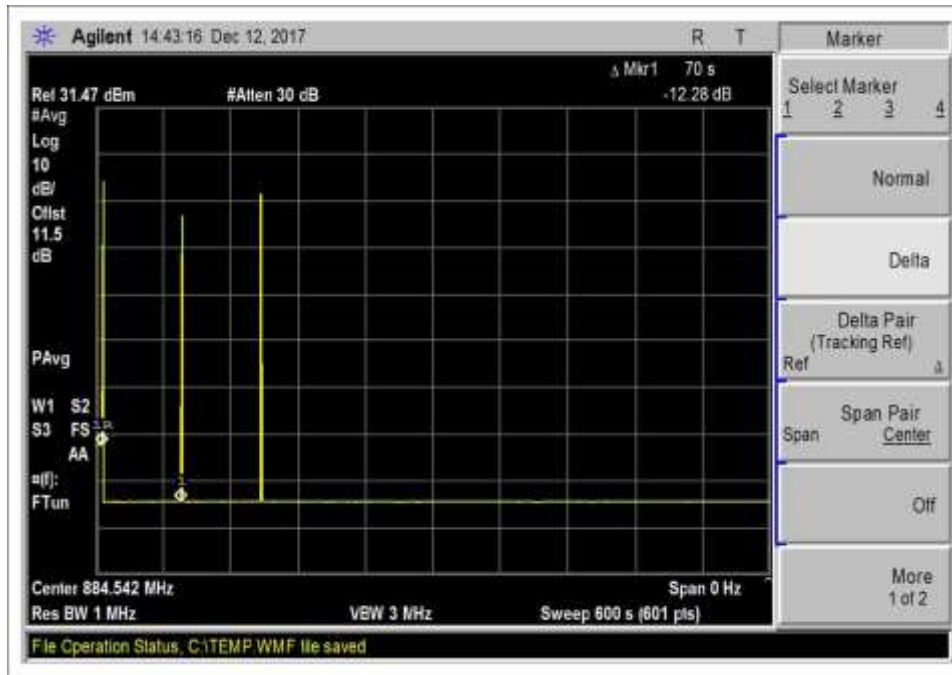




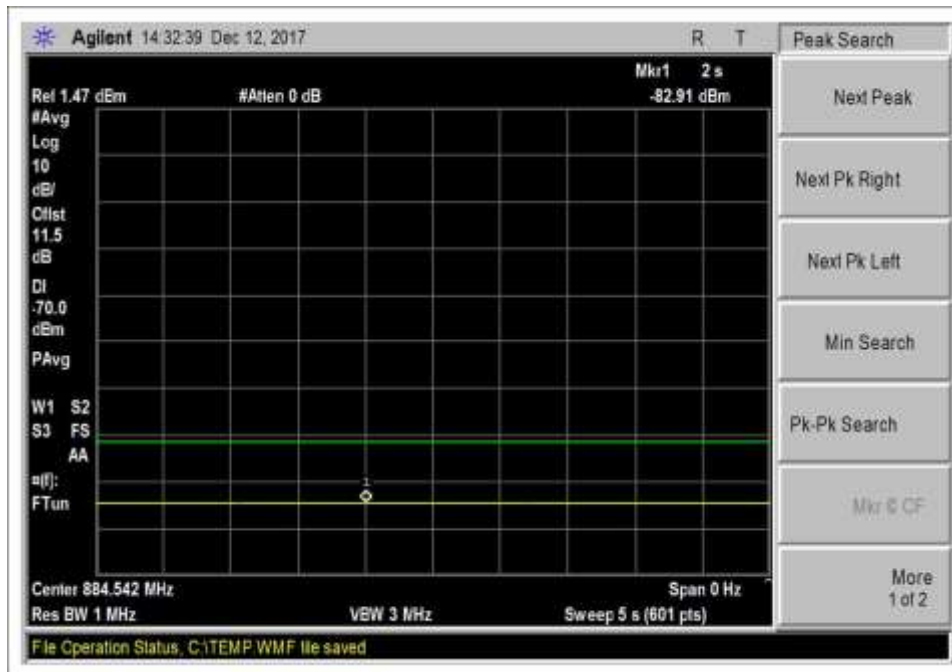
7.11.2 DL 746-757 peak



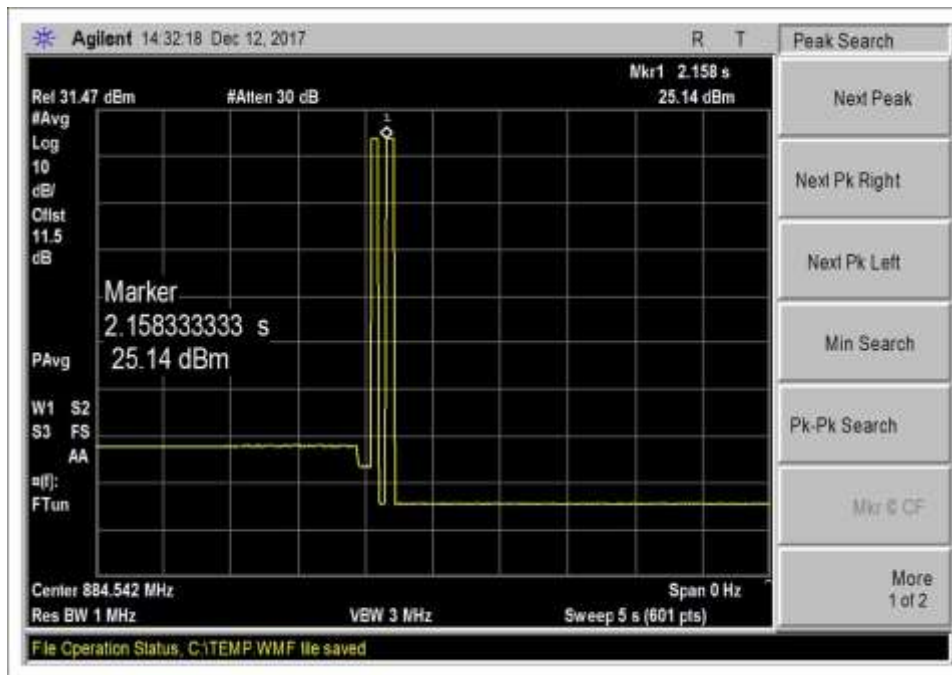
7.11.2 DL 746-757 time



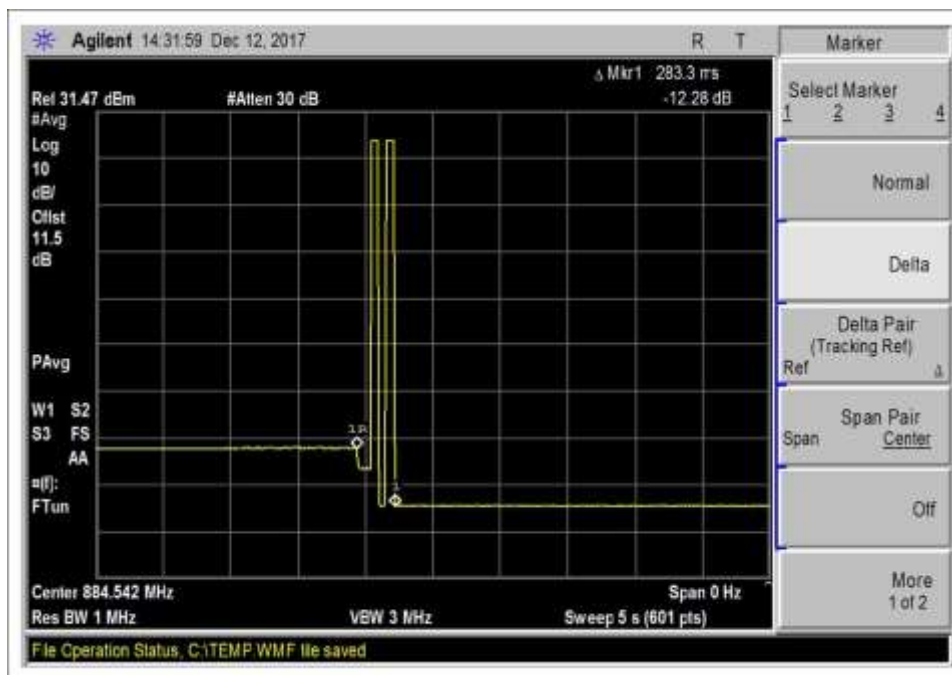
7.11.2 DL 869-894 600s



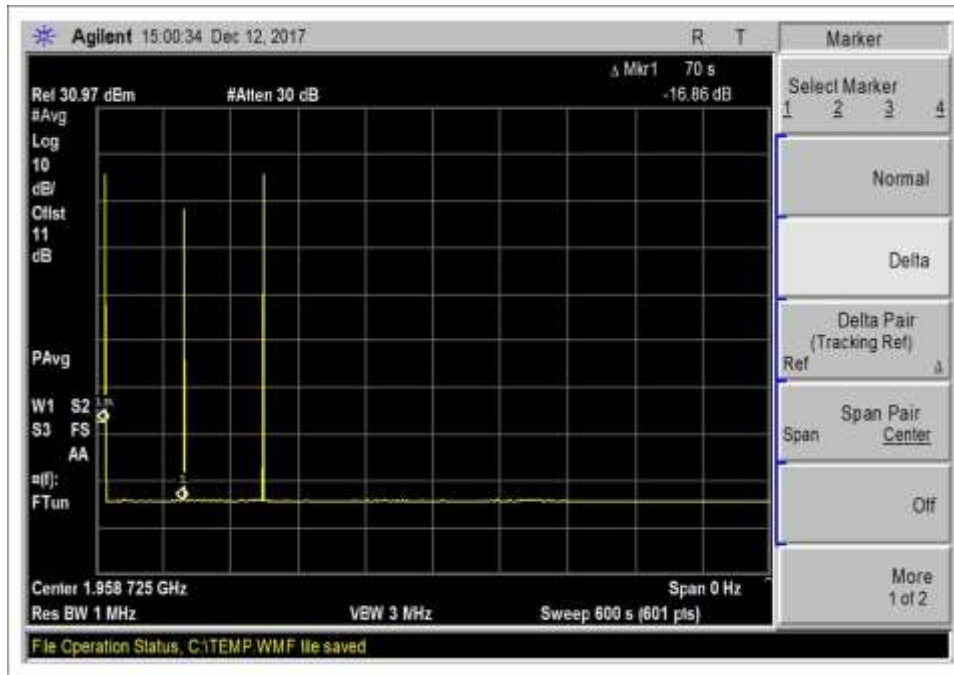
7.11.2 DL 869-894 after osc



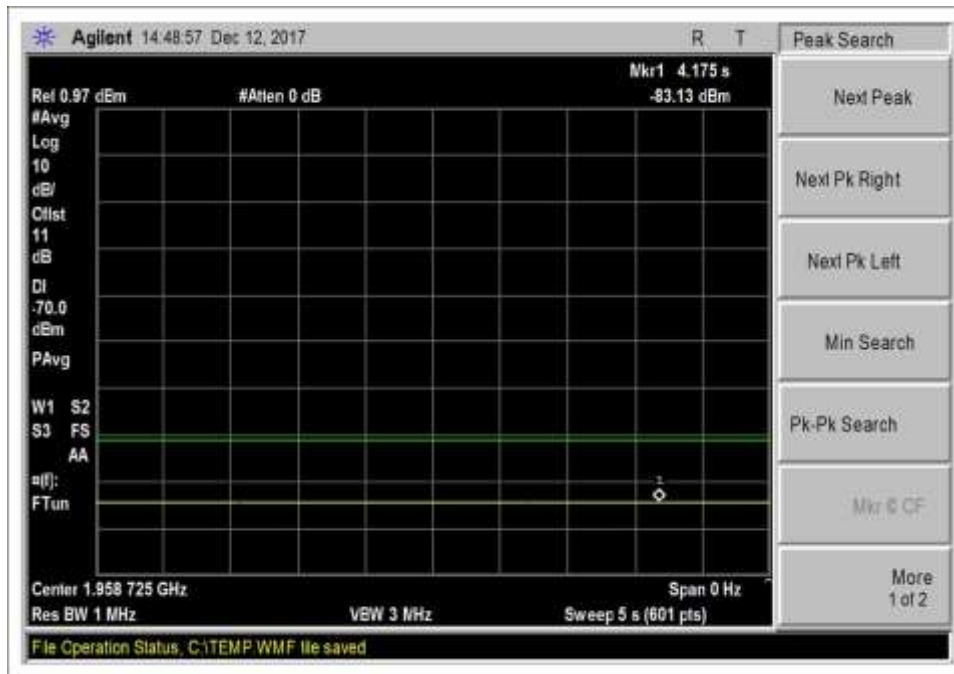
7.11.2 DL 869-894 peak



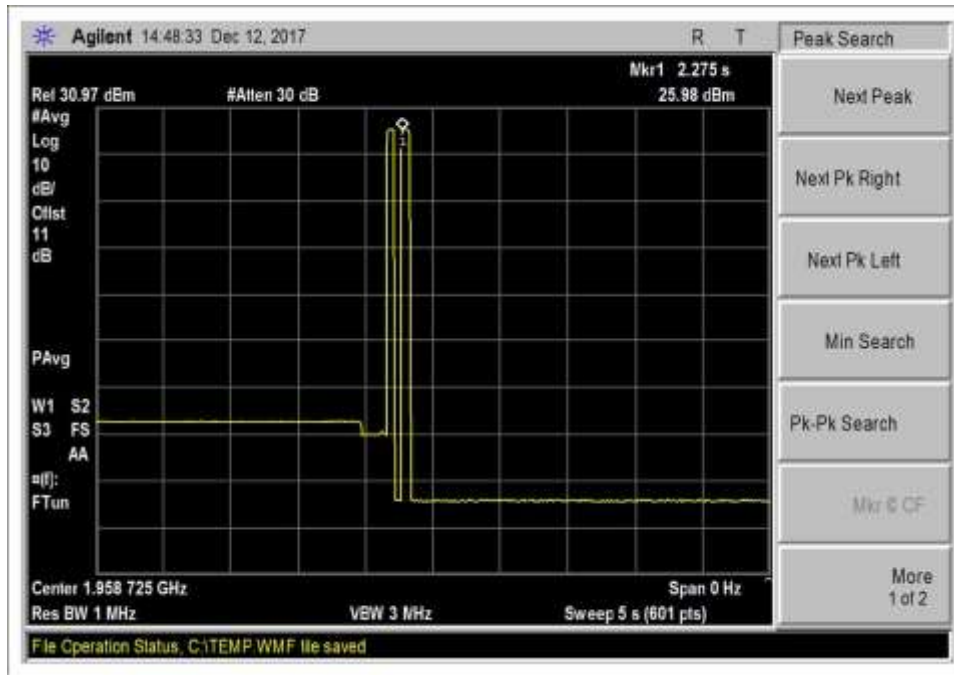
7.11.2 DL 869-894 time



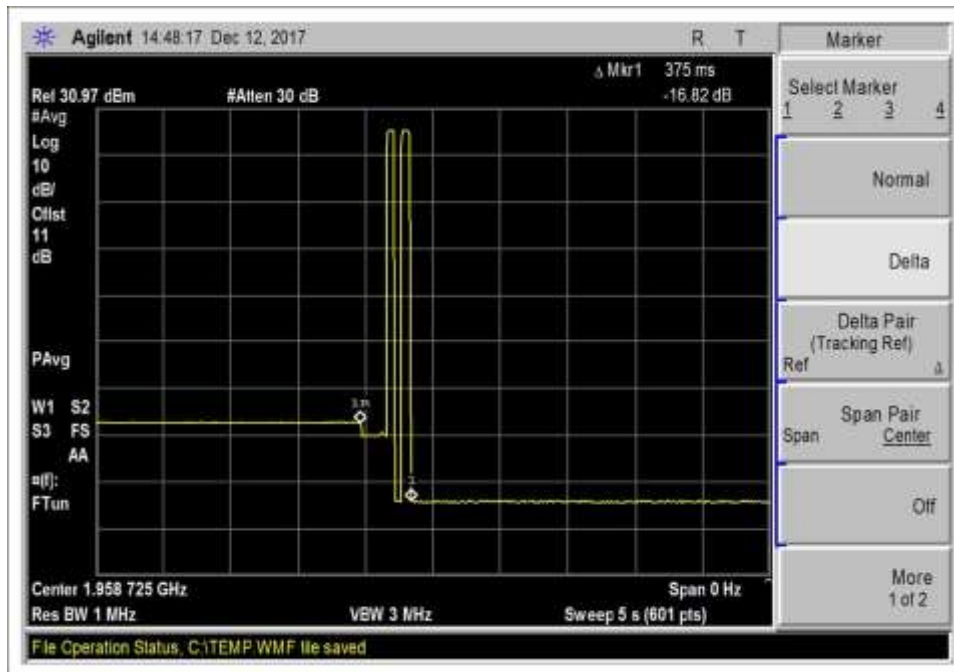
7.11.2 DL 1930-1995 600s



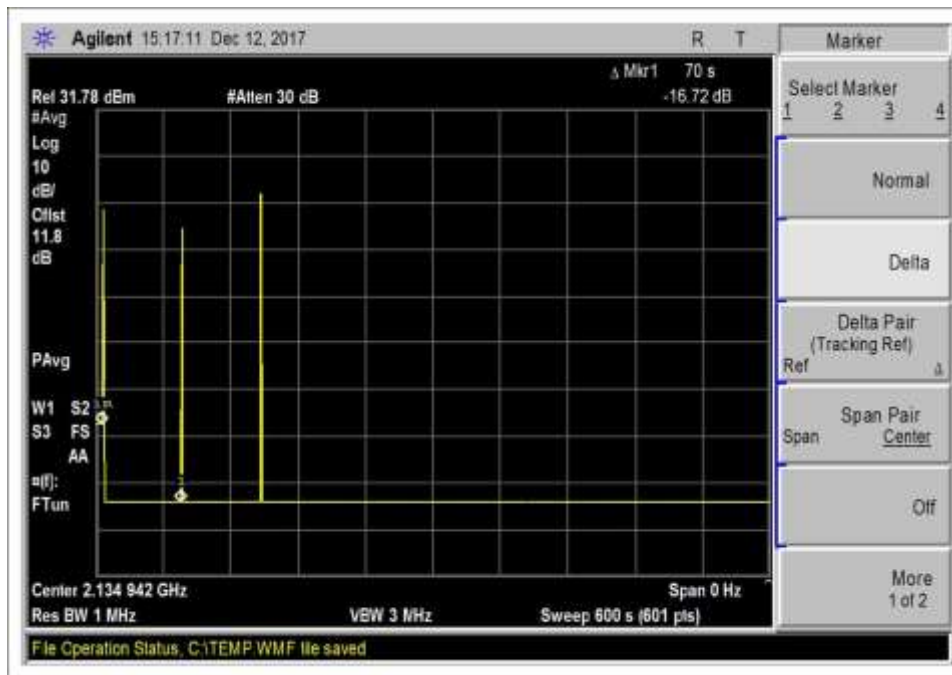
7.11.2 DL 1930-1995 after osc



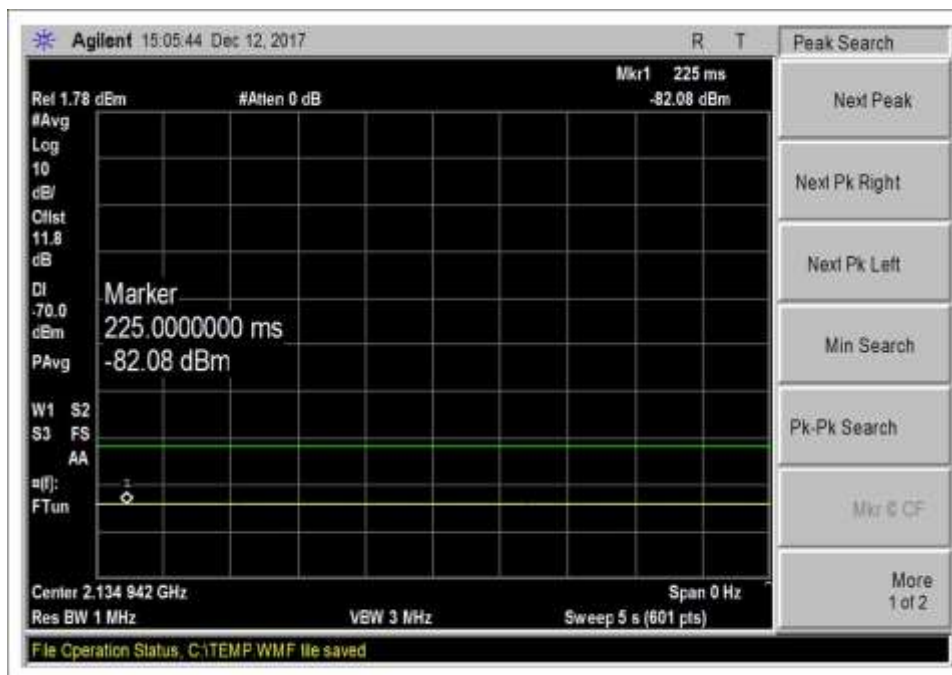
7.11.2 DL 1930-1995 peak



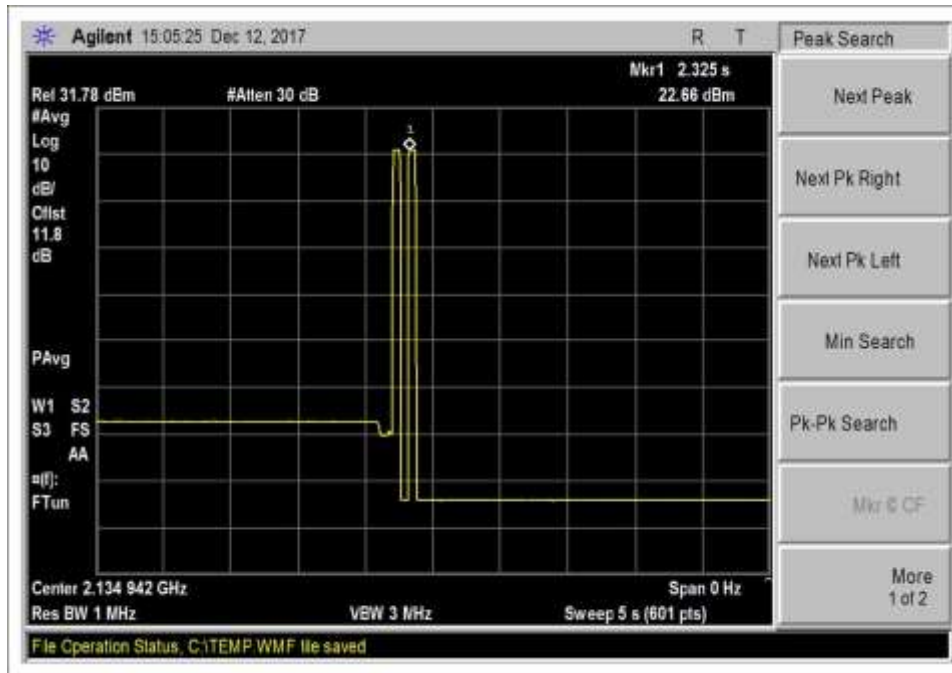
7.11.2 DL 1930-1995 time



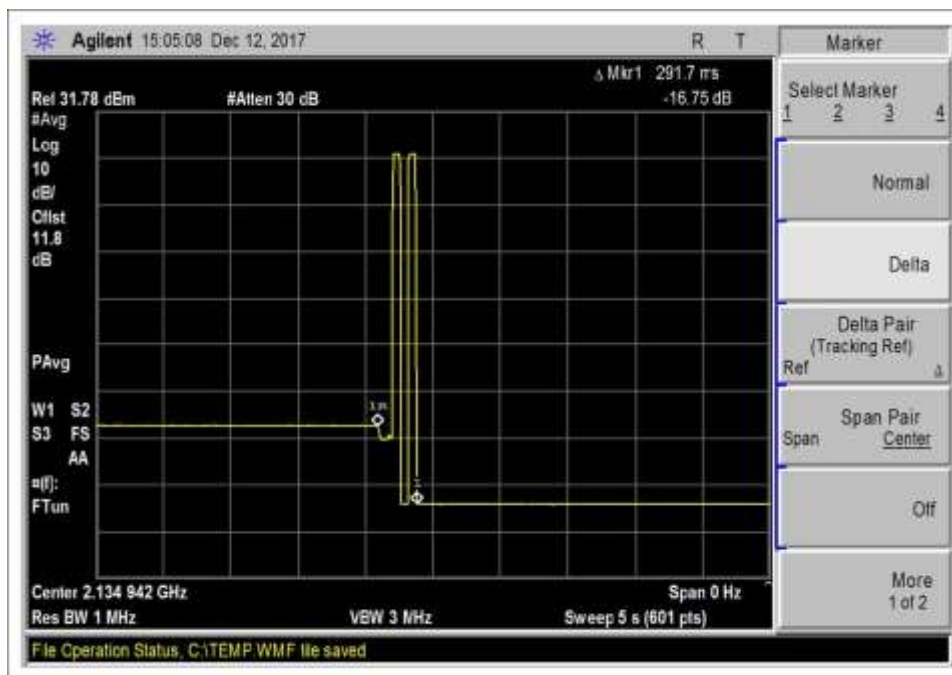
7.11.2 DL 2110-2155 600s



7.11.2 DL 2110-2155 after osc



7.11.2 DL 2110-2155 peak



7.11.2 DL 2110-2155 time

## 7.12 Radiated Spurious Emissions

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.12 Radiated Spurious Emissions / 2.1053 Radiated Spurious Emissions**  
**47 CFR §22.917(a) Radiated Spurious Emissions**  
**47 CFR §24.238(a) Radiated Spurious Emissions**  
**47 CFR §27.53(c), (f), (g) and (h) Spurious Emissions**

Work Order #: **100654** Date: 01/03/2018  
 Test Type: **Radiated Emissions** Time: 8:05:00 AM  
 Tested By: **Hieu Song Nguyenpham** Sequence#: 1  
 Software: EMITest 5.03.11

***Equipment Tested:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Test Conditions / Notes:***

Test environment conditions:  
 Temperature: 20.2°C, 46% relative humidity, 102.5 kPa

The equipment under test (EUT) is a CMRS Wideband Consumer Booster.  
 During testing, the (EUT) is placed on the Styrofoam table top.  
 Five different CW signals (one per each band) are injected sequentially to the input port of EUT using a signal generator. The signal generator is set to produce a CW signal with the frequency set to the center of each operational band under test and the power level is set at Pin as determined from 7.2 section of the test procedure indicated further below.

Evaluation of DL path was performed with signals fed into the Outside antenna port while Inside antenna port was terminated with equivalent 50 Ohm Pasternack load (MN: PE6187 / SN: 1443).  
 Evaluation of UL path was performed with signal fed into the Inside antenna port while Outside antenna port was terminated with the same above 50 Ohm load.

Part 22  
 UL: 824-849MHz  
 DL: 869-894MHz

Part 24  
 UL: 1850-1915MHz  
 DL: 1930-1995MHz

Part 27  
 UL: 1710-1755MHz, 698-716MHz, 776-787MHz  
 DL: 2110-2155MHz, 728-746MHz, 746-757MHz

Test procedure:  
 The test was performed in accordance with section 7.12 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04r01 Dated October 27, 2017  
 Firmware: V 3.2



TX Freq => Center frequency of above listed bands.  
 Modulation=> CW  
 Frequency range of measurement = 9 kHz- 22 GHz.  
 9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz  
 150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz  
 30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz  
 1000 MHz-22000MHz -> RBW=1 MHz VBW=1 MHz

**No spurious emissions were found within 20dB of the limit line.**

27.53(f) 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.

**Test Support Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN03418	Signal Generator	E4438C	6/19/2017	6/19/2019
	ANP05904	Cable	AstroLab	9/21/2017	9/21/2019

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN01996	Biconilog Antenna	CBL6111C	11/1/2016	11/1/2018
	ANP06049	Attenuator	PE7002-6	5/9/2016	5/9/2018
	ANP00880	Cable	RG214U	5/10/2016	5/10/2018
	ANP06691	Cable	PE3062-180	6/23/2016	6/23/2018
	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	ANP01187	Cable	CNT-195	8/8/2016	8/8/2018
	AN02113	Horn Antenna-ANSI C63.5	3115	2/6/2017	2/6/2019
	AN02870	Spectrum Analyzer	E4440A	3/31/2016	3/31/2018
	ANP01210	Cable	FSJ1P-50A-4A	1/16/2017	1/16/2019
	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
	AN03362	Cable	32022-2-29094-48TC	1/10/2017	1/10/2019
	AN03607	Preamp	AMF-7D-00101800-30-10P	6/6/2017	6/6/2019
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/27/2017	3/27/2019
	ANP00929	Cable	various	1/25/2016	1/25/2018
	ANP06126	Cable	32022-29094K-29094K-168TC	3/27/2017	3/27/2019
	AN02695	Active Horn Antenna	AMFW-5F-260400-33-8P	5/11/2017	5/11/2019
	AN02694	Horn Antenna	AMFW-5F-18002650-20-10P	5/11/2017	5/11/2019
	AN00432	Loop Antenna	6502	5/30/2017	5/30/2019

**Summary of Results**

Pass: All Radiated Spurious Emissions were found with more than 20dB margin of the limit line.

**Frequency Range of measurement 9kHz -> 22GHz**

**LIMIT LINE FOR SPURIOUS RADIATED EMISSION**

**REQUIRED ATTENUATION = 43+10 LOG P (DB)**

For Radiated Spurious Emission Measured At 3 Meter Test Distance,

Required attenuation = 43+10 Log P<sub>t at 3 meter</sub> dB  
 Limit line (dBuV) = E<sub>dBuv</sub> - Attenuation

E<sub>dBuv</sub> = Measured field strength at 3 meter in dBuV/m

**Power Density (Isotropic)**

$$P_D = \frac{P_t}{4\pi r^2}$$

- P<sub>D</sub> = Power Density in Watts /m<sup>2</sup>
- P<sub>t</sub> = Average Transmit Power
- r = Test distance

**Field Intensity E (V/m)**

$$E = \sqrt{P_D \times 377}$$

$$E = \frac{\sqrt{P_t \times 377}}{4\pi r^2}$$

$$E = \sqrt{\frac{P_t \times 30}{r^2}}$$

$$P_t = \left( \frac{E^2 \times r^2}{30} \right)$$

$$10 \text{ Log } P_t = 10 \text{ Log } E^2 (\text{V/m}) + 10 \text{ Log } r^2 - 10 \text{ Log } 30$$

$$10 \text{ Log } P_t = 20 \text{ Log } E (\text{V/m}) + 20 \text{ Log } r - 10 \text{ Log } 30$$

At 3 meter,  $r = 3 \text{ m}$

$$10 \text{ Log } P_t = 20 \text{ Log } E (\text{V/m}) + 20 \text{ Log } 3 - 10 \text{ Log } 30$$

$$10 \text{ Log } P_t = 20 \text{ Log } E (\text{V/m}) + 9.54 - 14.77$$

$$10 \text{ Log } P_t = 20 \text{ Log } E (\text{V/m}) - 5.23$$

$$\text{Since } 20 \text{ Log } E (\text{V/m}) = 20 \text{ Log } E (\text{uV/m}) - 120$$

$$10 \text{ Log } P_t = 20 \text{ Log } E (\text{uV/m}) - 120 - 5.23$$

$$10 \text{ Log } P_t = 20 \text{ Log } E (\text{uV/m}) - 125.23$$

$$\begin{aligned} \text{Limit line (dBuV) at 3 meter} &= E_{\text{dBuV}} - \text{Attenuation} \\ &= E_{\text{dBuV}} - (43 + 10 \text{ Log } P_t \text{ at 3 meter}) \\ &= E_{\text{dBuV}} - 43 - 10 \text{ Log } P_t \text{ at 3 meter} \\ &= E_{\text{dBuV}} - 43 - (20 \text{ Log } E (\text{uV/m}) - 125.23) \\ &= E_{\text{dBuV}} - 43 - 20 \text{ Log } E (\text{uV/m}) + 125.23 \\ &= E_{\text{dBuV}} - 20 \text{ Log } E (\text{uV/m}) + 82.23 \end{aligned}$$

$$\text{Since } 20 \text{ Log } E (\text{uV/m}) = E \text{ in dBuV/m} = E_{\text{dBuV}} - E_{\text{dBuV}} + 82.23$$

$$\text{Radiated Emission limit 3 meter} = 82.23 \text{ dBuV at any power level measured in dBuV}$$

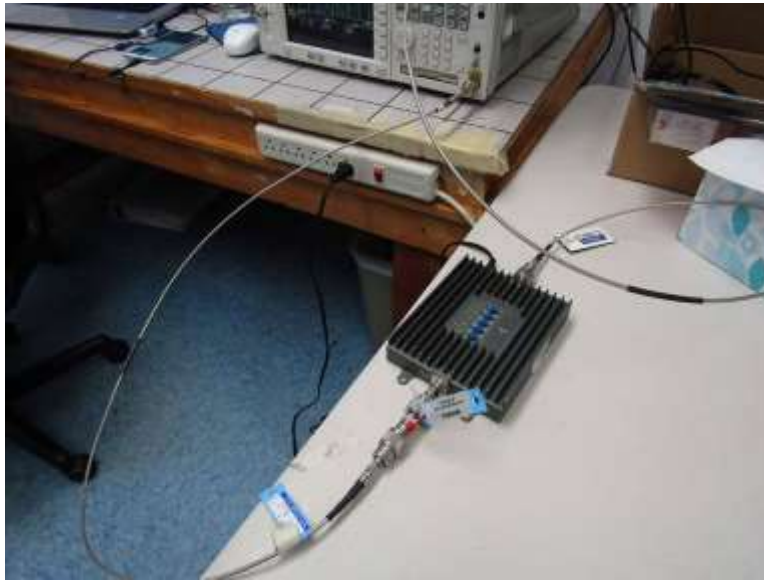
**Exhibit A: Test Setup Photos**



Section 7.1 Test Setup



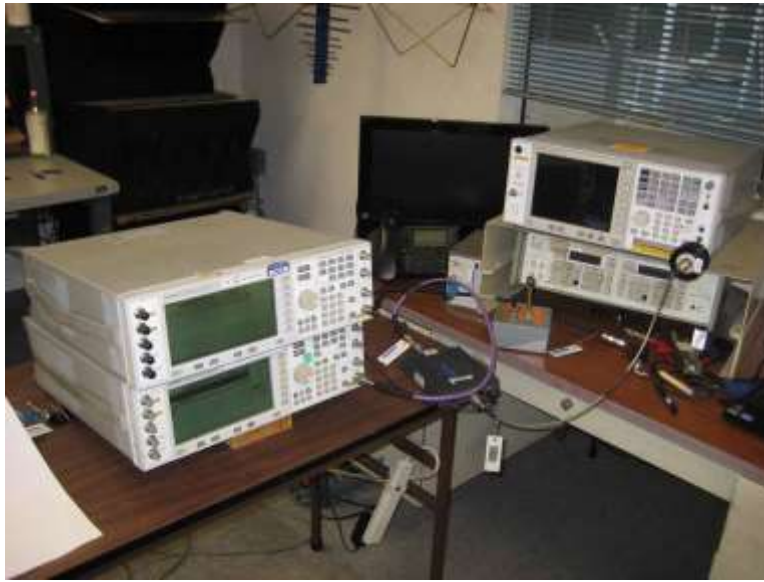
Section 7.2 and 7.3 Test Setup



Section 7.4 Test Setup



Section 7.5 Test Setup



Section 7.6 Test Setup



Section 7.7.1 a-g Test Setup



Section 7.7.1 h-n and 7.7.2 Test Setup



Section 7.8 Test Setup

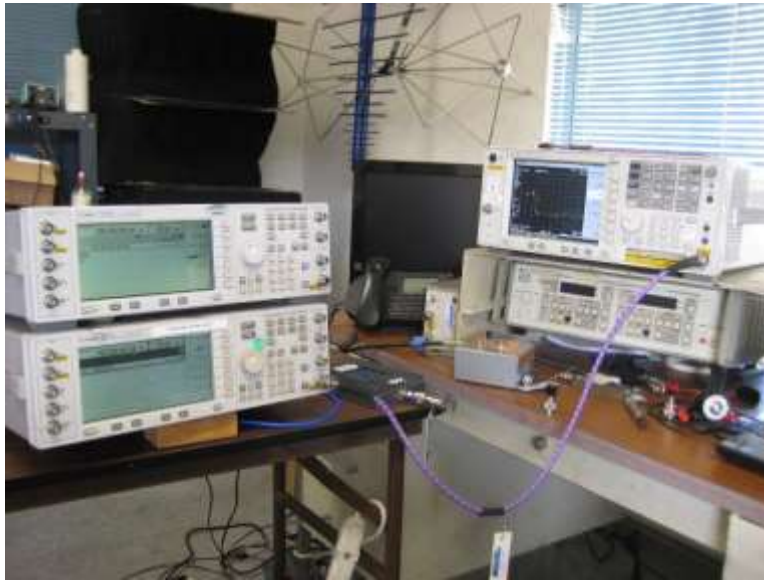


Section 7.9 Test Setup

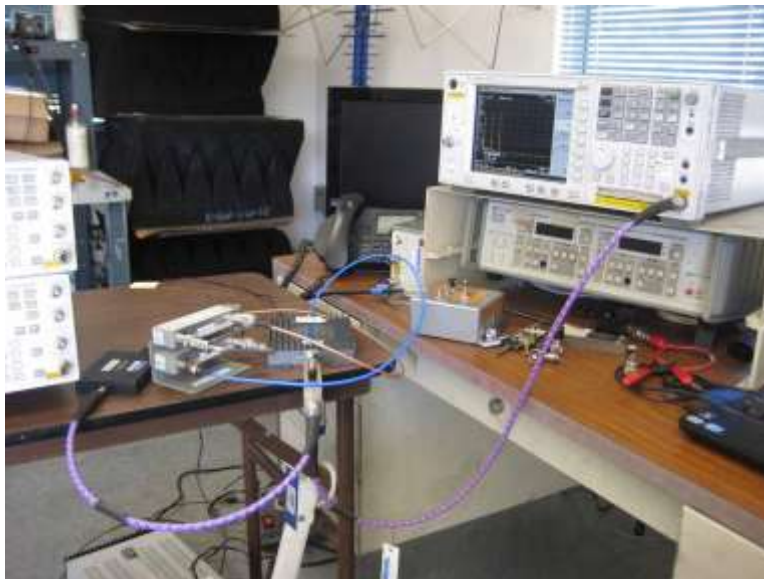


Section 7.10a Test Setup





Section 7.10b Test Setup



Section 7.11.2 Test Setup



Section 7.11.3 Test Setup



Section 7.12 Test Setup



Section 7.12 Test Setup