BTI Wireless

TEST REPORT FOR

850MHz 40W Remote Transmitting Unit
Model: mBSC0850-040-RUMF01

Tested To The Following Standards:

FCC Part 22H

Report No.: 95179-6

Date of issue: January 13, 2014

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

BTI Wireless
6185 Phyllis Dr., Unit D
Cypress, CA 90630

Representative: Raymond Shin
Customer Reference Number: 95179

REPORT PREPARED BY:

Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 95179

DATE OF EQUIPMENT RECEIPT: December 19, 2013
DATE(S) OF TESTING: December 19-20, 2013

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea D	US0060	SL2-IN-E-1146R	3082D-2	100638	A-0147

SUMMARY OF RESULTS

Standard / Specification: FCC Part 22H

Description	Test Procedure/Method	Results
RF Power Output	FCC Part 22H § 22.913(a) / 2.1046	Pass
Occupied Bandwidth	FCC Part 22H § 22.915 / 2.1049(I)	Pass
Antenna Conducted Emissions	FCC Part 22H § 22.917(a) / 2.1051	Pass
Field Strength of Radiated Emissions	FCC Part 22H § 22.917(a) / 2.1053	Pass
Bandedge	FCC Part 22H	Pass
Intermodulation	FCC Part 22H	Pass
Out of Band Rejection	FCC Part 22H	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

The following model has been tested by CKC Laboratories: **850MHz 40W Remote Transmitting Unit, mBSC0850-040-RUMF01**

The manufacturer states that the following additional models are identical electrically to the one which was tested, or any differences between them do not affect their EMC characteristics, and therefore they meet the level of testing equivalent to the tested. **mBSC0850-040-RUM**

850MHz 40W Remote Transmitting Unit
Manuf: BTI Wireless
Model: mBSC0850-040-RUMF01
Serial: MBSC0850040RUMF01-11010002

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Attenuator 30db Pad
Manuf: Weinschel
Model: 49-30-43
Serial: KW075

Attenuator 20db Pad
Manuf: Weinschel
Model: 33-20-24
Serial: BJ7479

Cable
Manuf: Pasternack
Model: Sucoflex 104A
Serial: 12237/4A

50 ohm Load (2)
Manuf: Generic
Model: NA
Serial: NA

RF to Fiber Optic Converter
Manuf: BTI Wireless
Model: mBSC9351-HU
Serial: mBSC9351HU-11021029

ESG Vector Signal Generator
Manuf: Agilent
Model: 4438C
Serial: MY45091601

FCC PART 22H

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR requirements for Public Mobile Services, Subpart H – Cellular Radiotelephone Service.

22.913(a) / 2.1046 RF Power Output

Test Conditions / Setup

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer:	**BTI Wireless**		
Specification:	**RF Output Power**		
Work Order #:	**95179**	Date:	12/20/2013
Test Type:	**Conducted Emissions**	Time:	15:17:27
Equipment:	**850MHz 40W Remote Transmitting Unit**	Sequence#:	0
Manufacturer:	BTI Wireless	Tested By:	Don Nguyen
Model:	mBSC0850-040-RUMF01		110V 60Hz
S/N:	MBSC0850040RUMF01-11010002		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T2	AN02945	Cable	32022-2-2909K-36TC	10/30/2013	10/30/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
850MHz 40W Remote Transmitting Unit*	BTI Wireless	mBSC0850-040-RUMF01	MBSC0850040RUMF01-11010002

Support Devices:

Function	Manufacturer	Model #	S/N
Attenuator 30db Pad	Weinschel	49-30-43	KW075
50 ohm Load	Generic	NA	NA
50 ohm Load	Generic	NA	NA
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
Cable	Pasternack	Sucoflex 104A	12237/4A
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 20db Pad	Weinschel	33-20-24	BJ7479

Test Conditions / Notes:

The EUT is placed on the test bench. RF to Fiber Optic Converter Tx1 In is connected to an ESG Signal generator via cable Sucoflex 104A. Fiber-1 port from the converter is connected to fiber port of EUT. ANT port of the EUT is connected to 30db attenuator and 20db attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-2909K-36TC. TX out and RX in port are terminated to 50 ohm loads.
Per manufacturer, the output frequency is independent of the components used in optical converter.
The EUT is a Fixed Gain Amplifier with fixed output power as set by ALC (Auto Level Control) Threshold level of 1±0.5dB higher than maximum rated output power.
The evaluation is performed at the antenna port.

Freq: 869-894MHz
Signal protocol: GSM, EDGE, CDMA, UMTS WCDMA 3GPP, LTE 1.4MHz, LTE 5MHz, LTE 20MHz

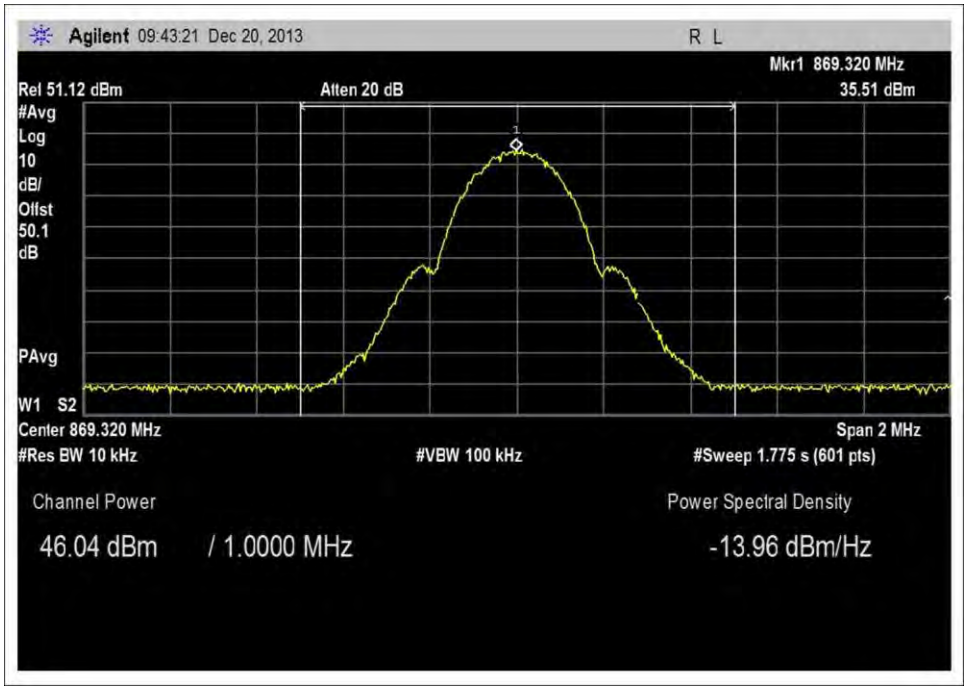
22.913(a) Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

19°C, 63%Relative Humidity
Site D

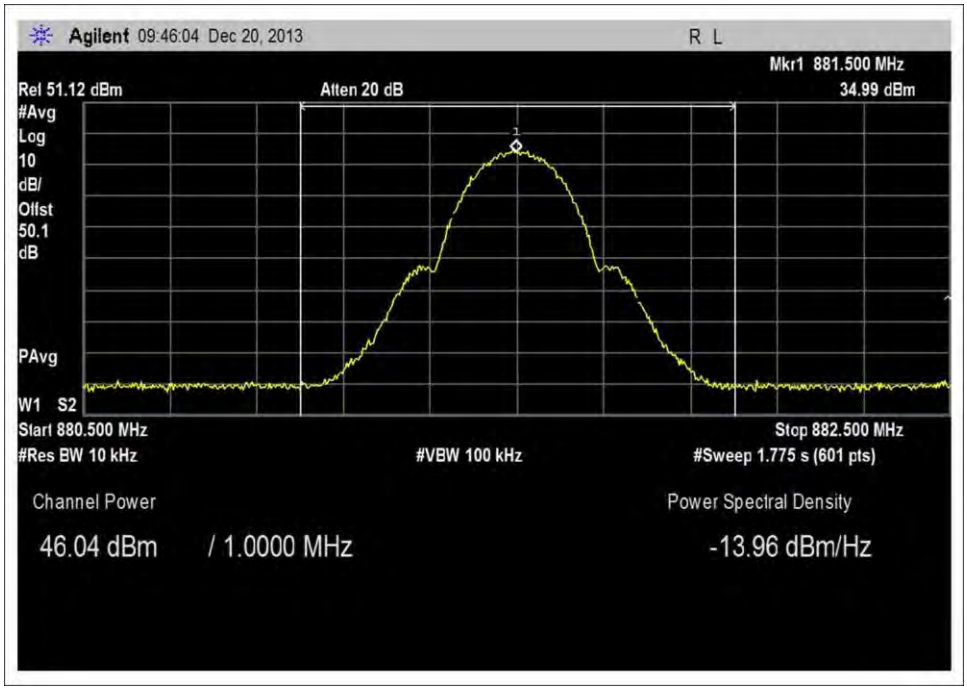
Test Data

40W

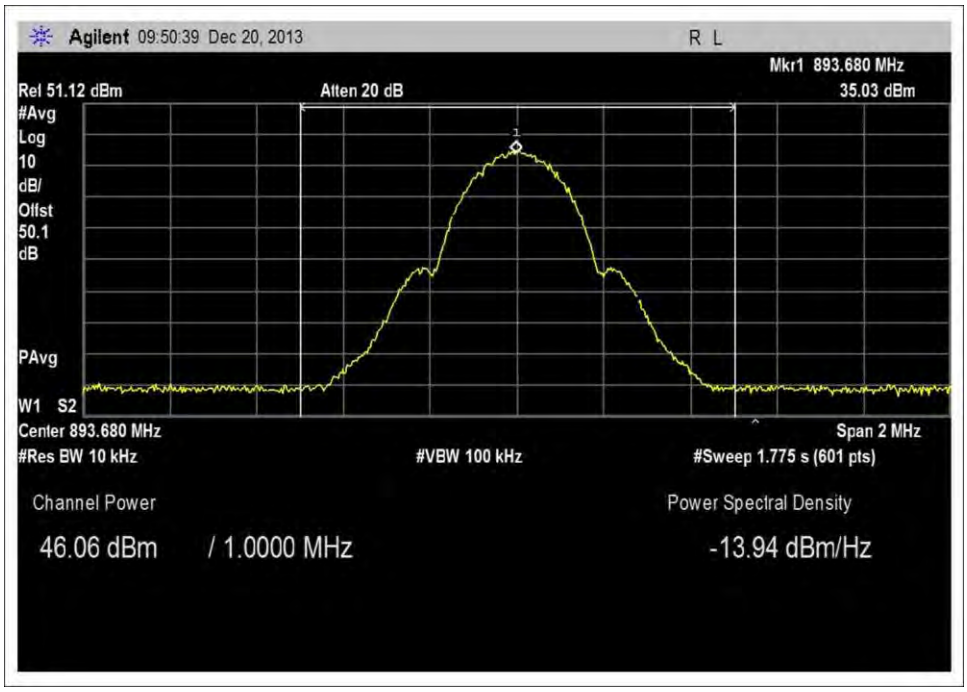
Modulation	Signal Generator Output Power (dbm)	Cable Loss (db)	Input Power (dbm)	Measured Output Power (dbm)	Measured Output Power (W)
GSM					
869.32MHz	-1.18	0.8	-1.98	46.04	40.17908108
881.5MHz	-1.84	0.8	-2.64	46.04	40.17908108
893.68MHz	-0.34	0.8	-1.14	46.06	40.3645393
EDGE					
869.3MHz	-1.16	0.8	-1.96	46.02	39.99447498
881.5MHz	-1.7	0.8	-2.5	46.01	39.90249024
893.7MHz	-0.2	0.8	-1	46.03	40.08667176
CDMA (IS95A)					
869.76MHz	-1.3	0.8	-2.1	46.04	40.17908108
881.5MHz	-1.86	0.8	-2.66	46.04	40.17908108
893.24MHz	-0.48	0.8	-1.28	46.03	40.08667176
UMTS (WCMDA 3GPP)					
871.5MHz	-1.6	0.8	-2.4	46.02	39.99447498
881.5MHz	-1.9	0.8	-2.7	46.02	39.99447498
891.5MHz	-0.74	0.8	-1.54	46.04	40.17908108
LTE 1.4MHz					
869.75MHz	-1.24	0.8	-2.04	46.02	39.99447498
881.5MHz	-1.8	0.8	-2.6	46.03	40.08667176
893.25MHz	-0.42	0.8	-1.22	46.03	40.08667176
LTE 5MHz					
871.65MHz	-1.62	0.8	-2.42	46.03	40.08667176
881.5MHz	-1.92	0.8	-2.72	46.03	40.08667176
891.35MHz	-0.76	0.8	-1.56	46.04	40.17908108
LTE 20MHz					
879.25MHz	-1.82	0.8	-2.62	46.03	40.08667176
881.5MHz	-1.76	0.8	-2.56	46.02	39.99447498
883.75MHz	-1.64	0.8	-2.44	46.02	39.99447498



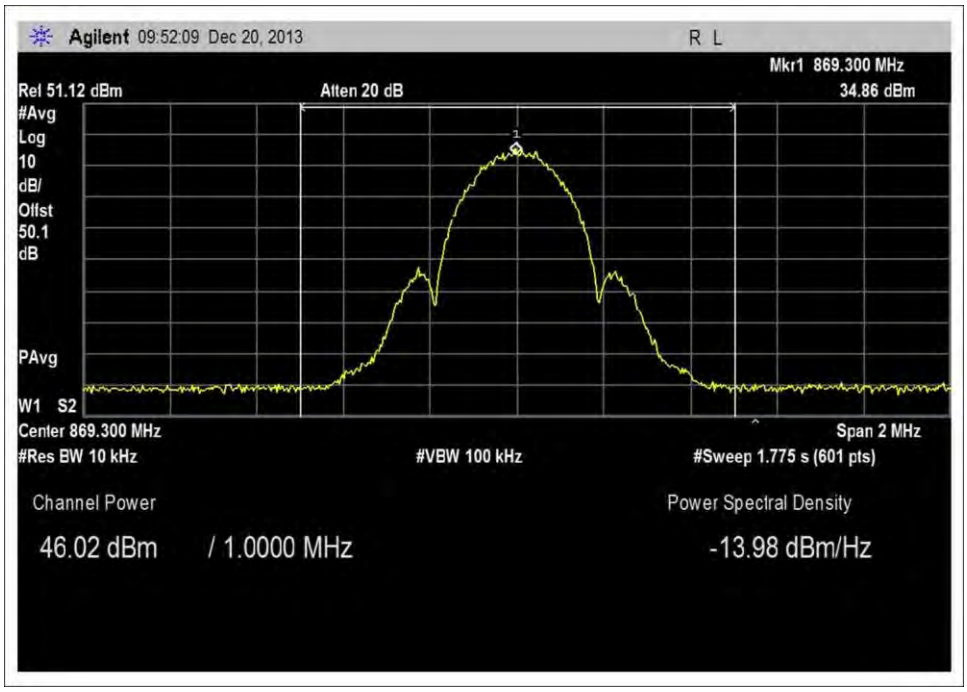
Low Channel, GSM 40W



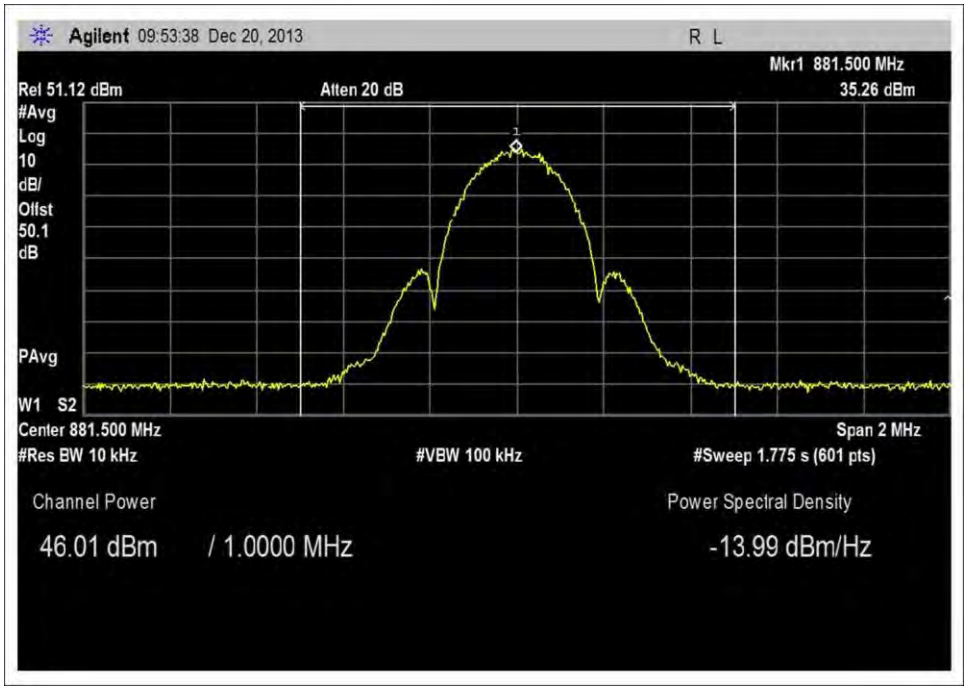
Middle Channel, GSM 40W



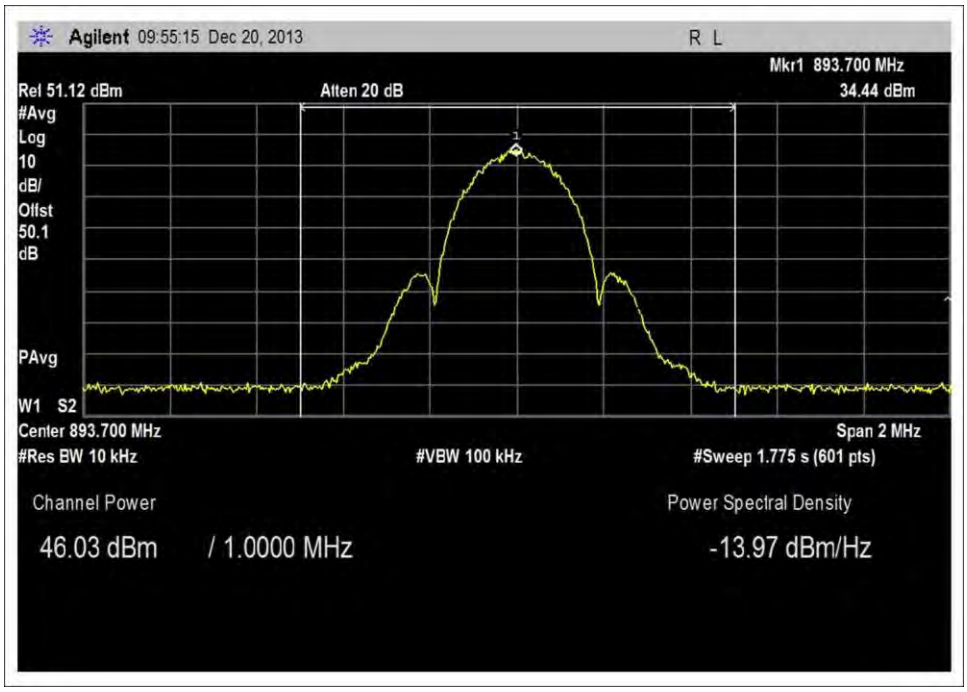
High Channel, GSM 40W



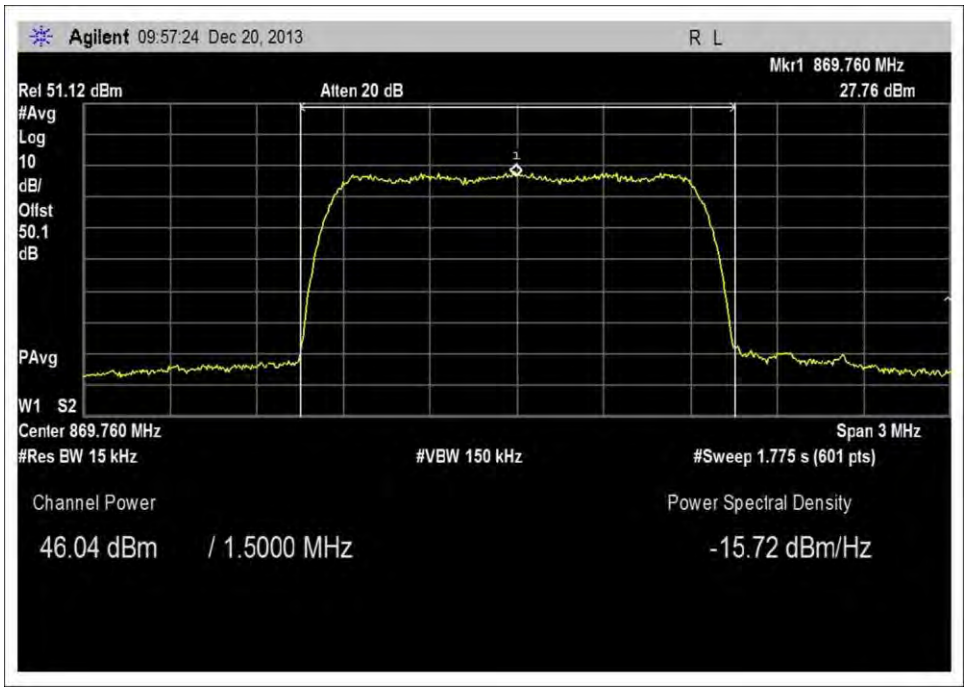
Low Channel, EDGE 40W



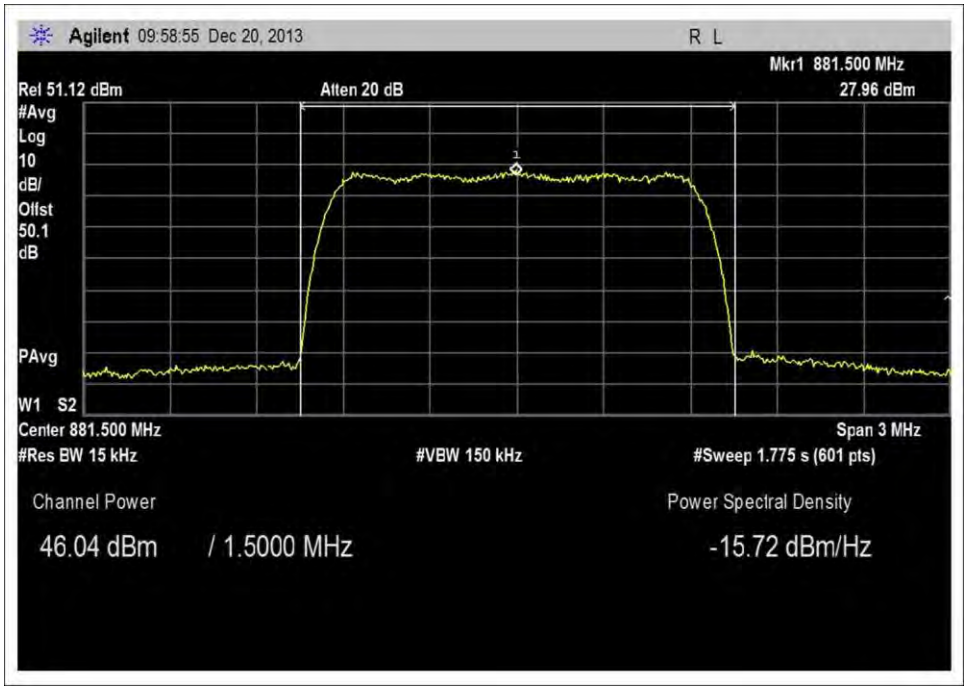
Middle Channel, EDGE 40W



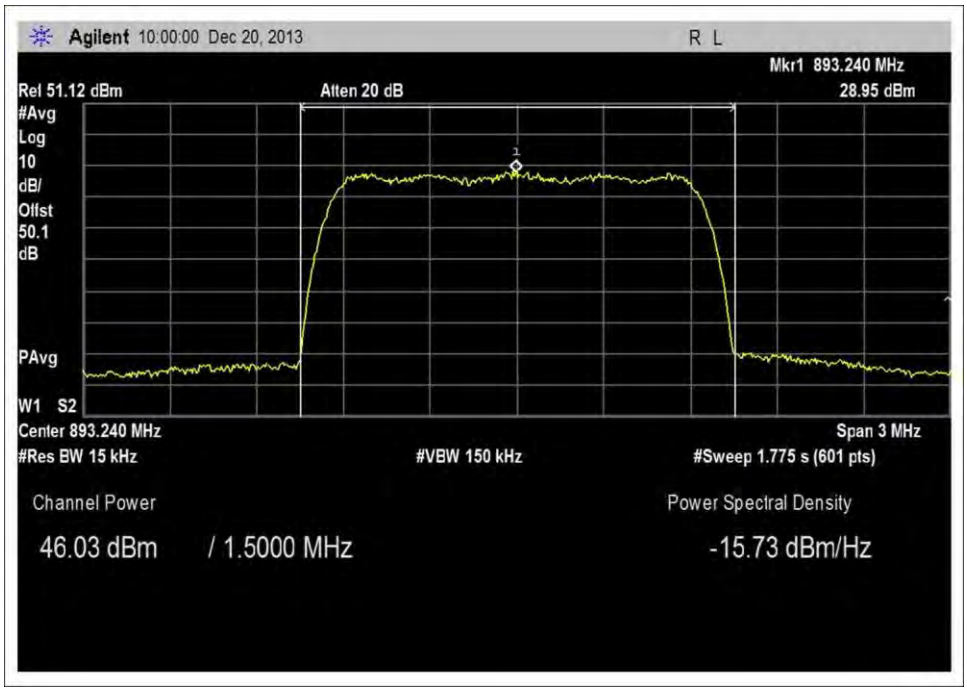
High Channel, EDGE 40W



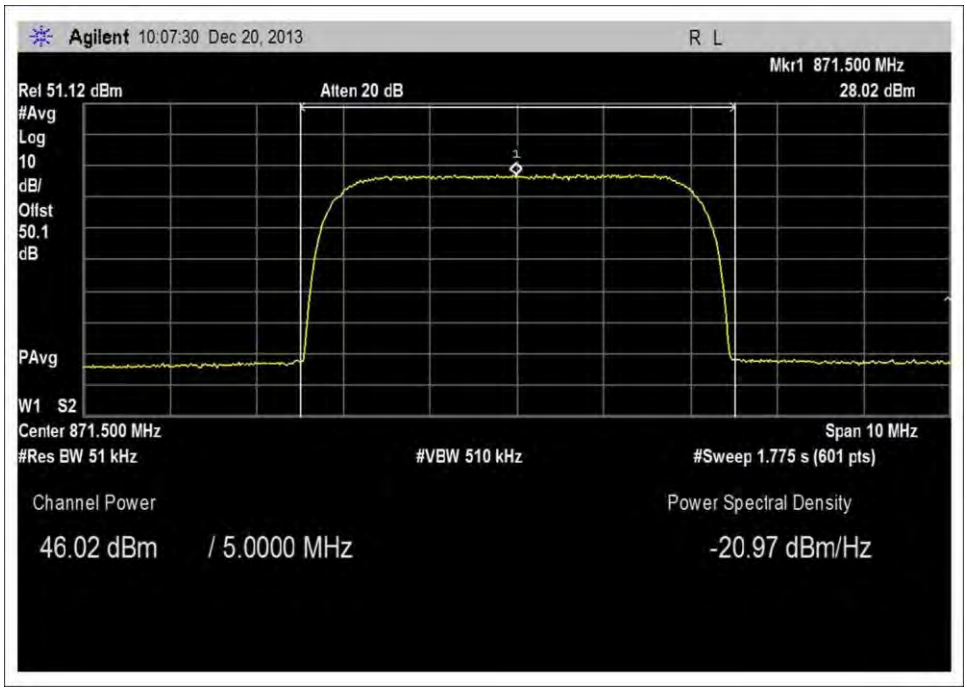
Low Channel, CDMA IS95A 40W



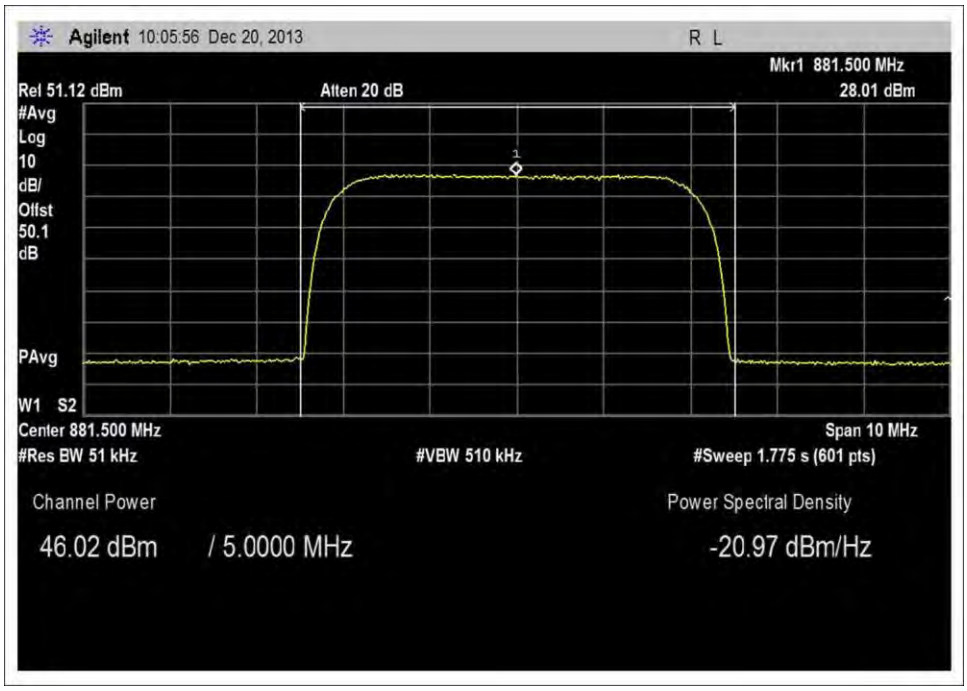
Middle Channel, CDMA IS95A 40W



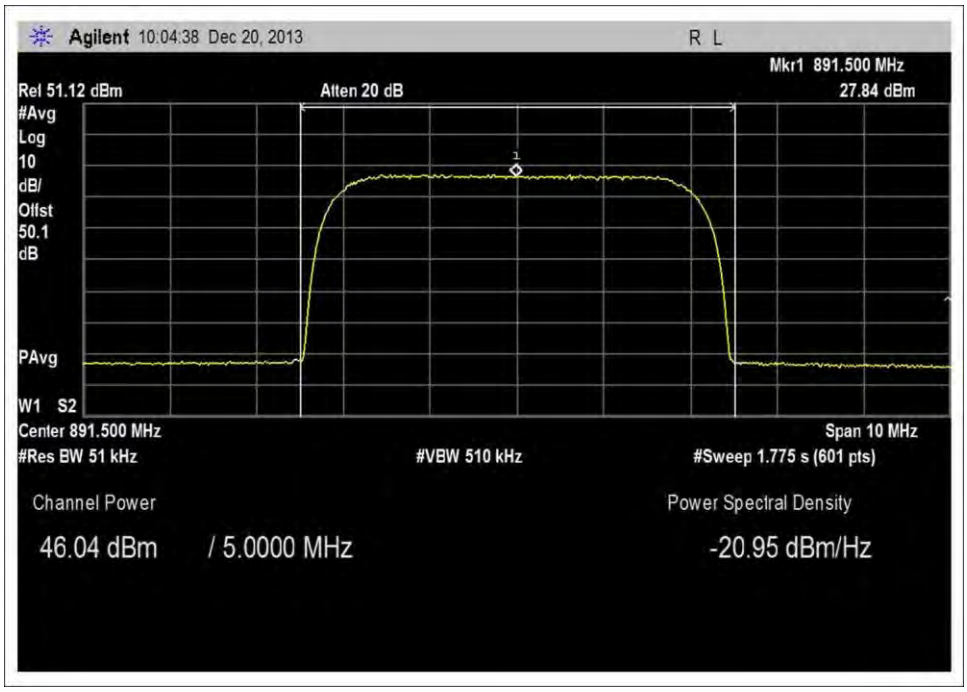
High Channel, CDMA IS95A 40W



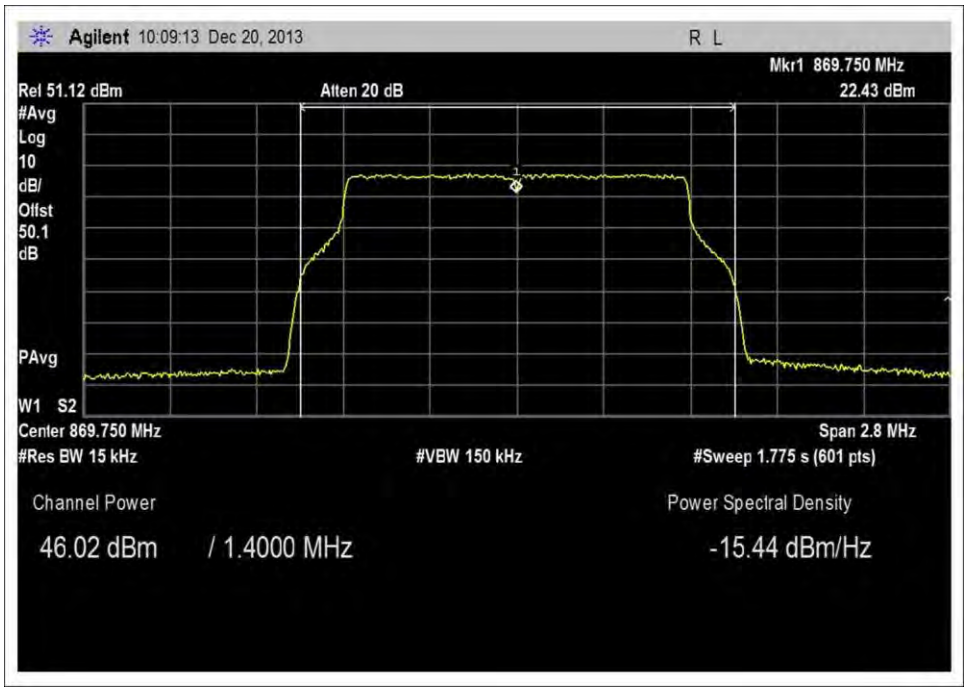
Low Channel, UMTS WCMDA 3GPP 40W



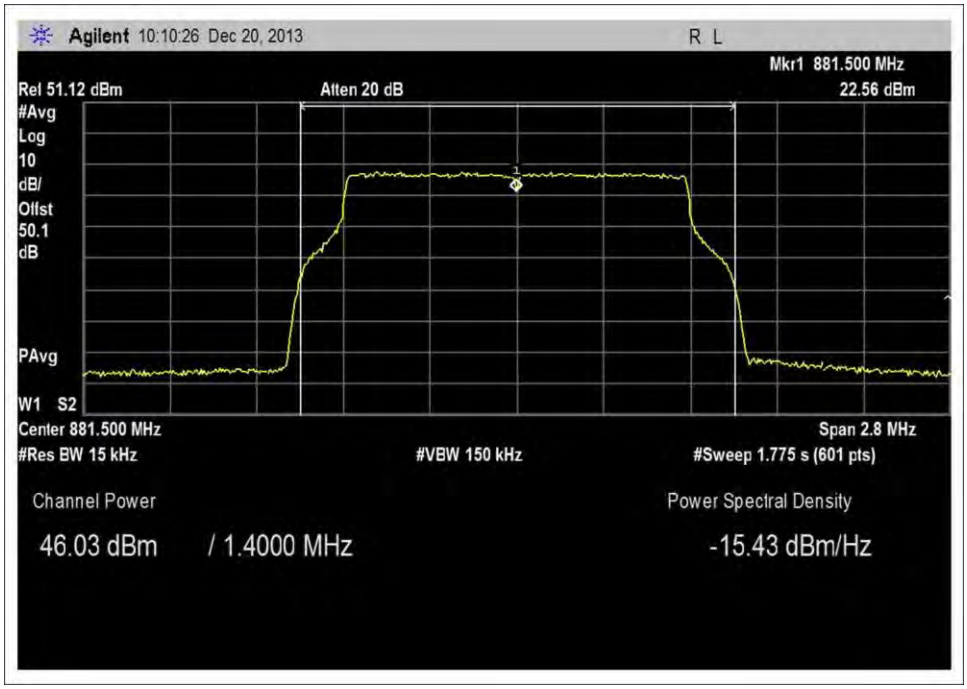
Middle Channel, UMTS WCMDA 3GPP 40W



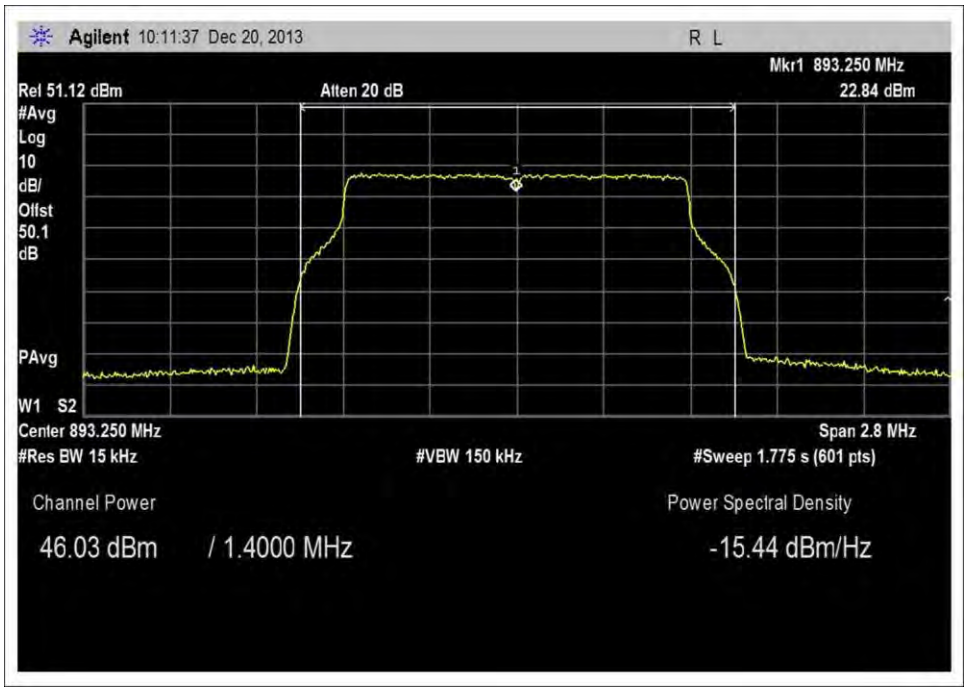
High Channel, UMTS WCMDA 3GPP 40W



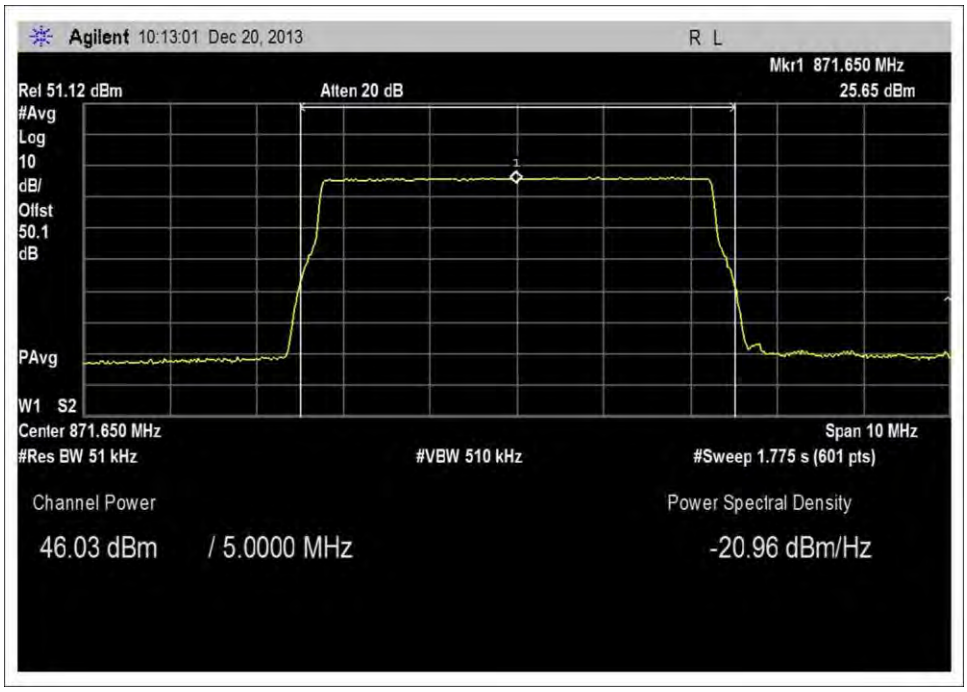
Low Channel, LTE 1.4MHz 40W



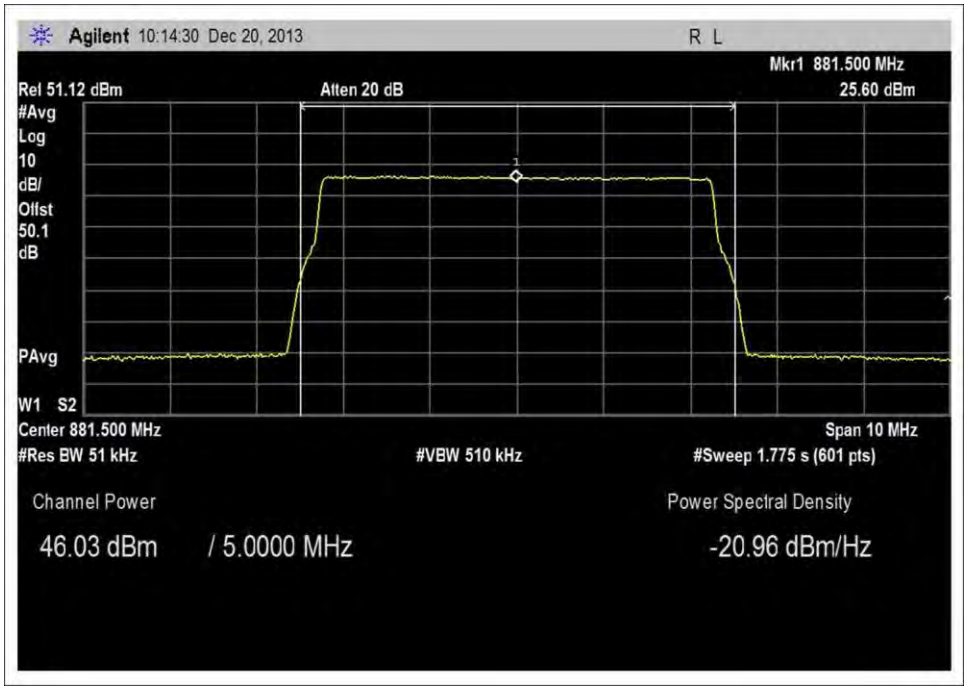
Middle Channel, LTE 1.4MHz 40W



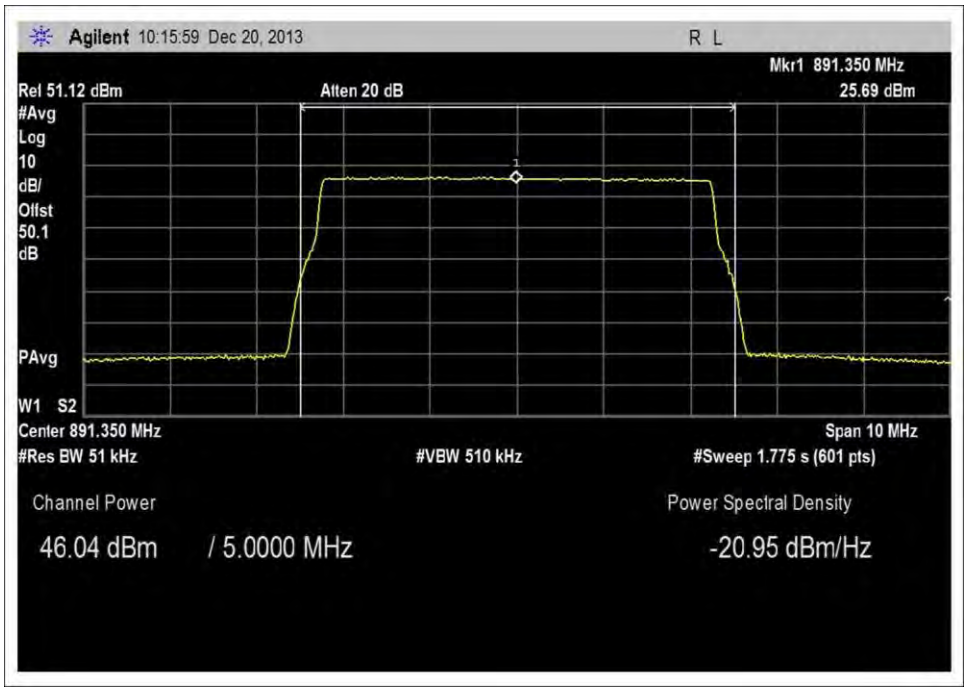
High Channel, LTE 1.4MHz 40W



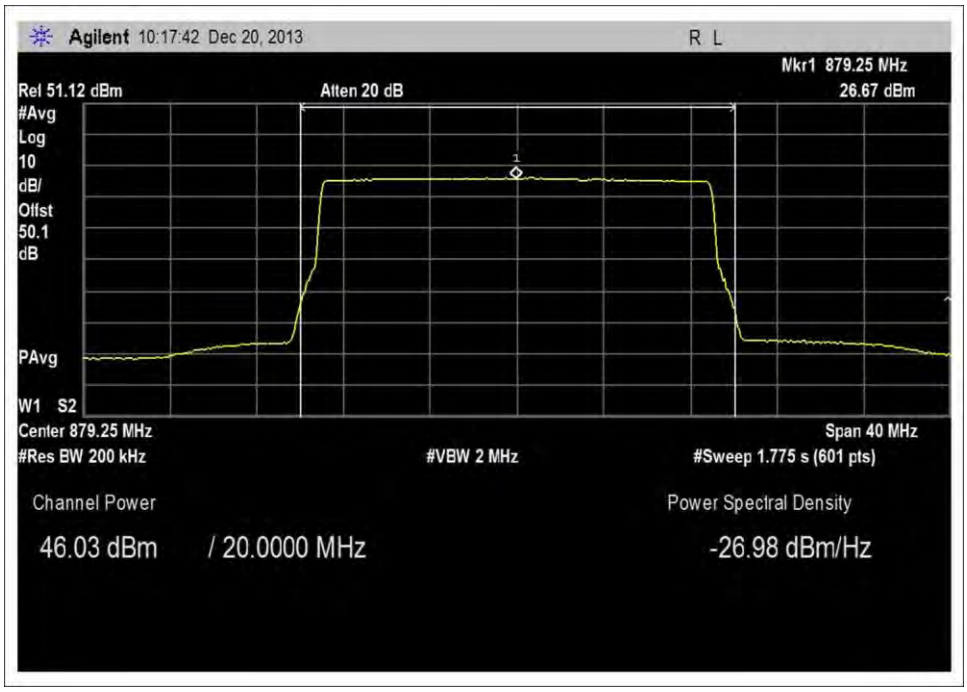
Low Channel, LTE 5MHz 40W



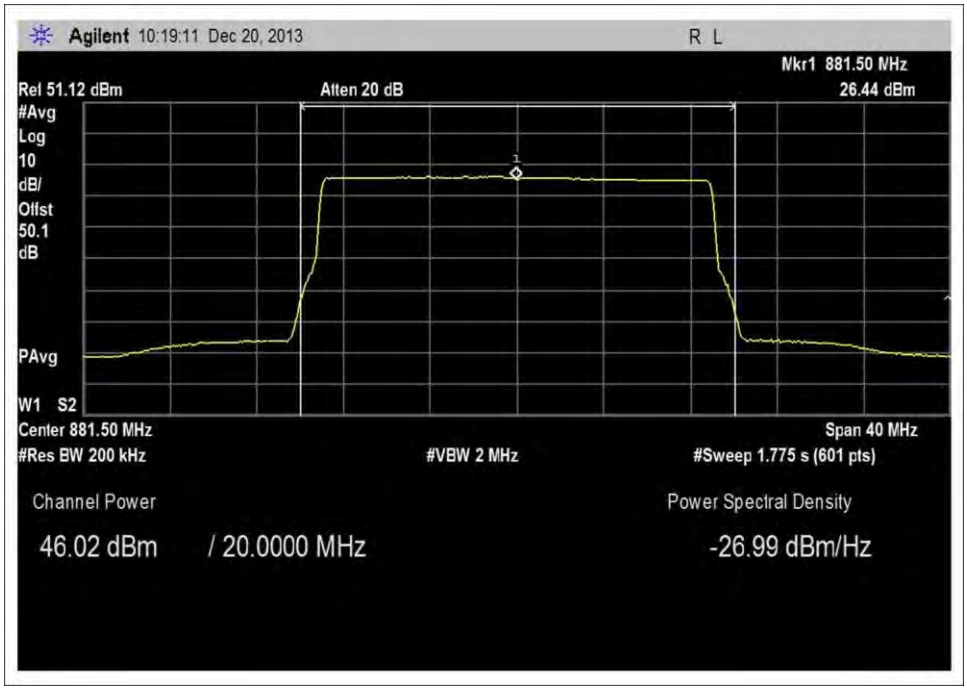
Middle Channel, LTE 5MHz 40W



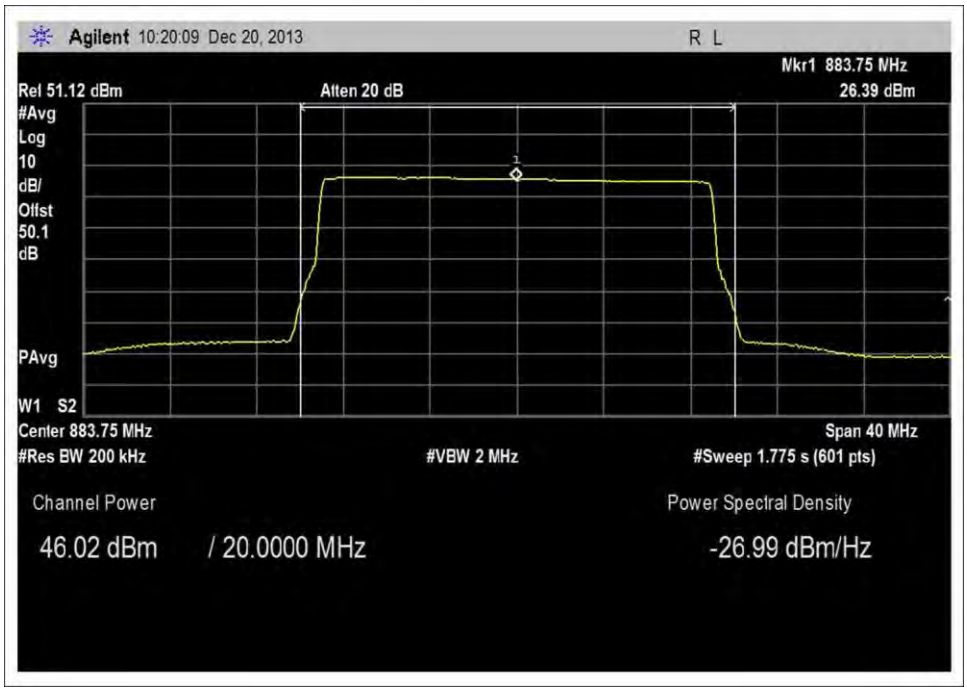
High Channel, LTE 5MHz 40W



Low Channel, LTE 20MHz 40W



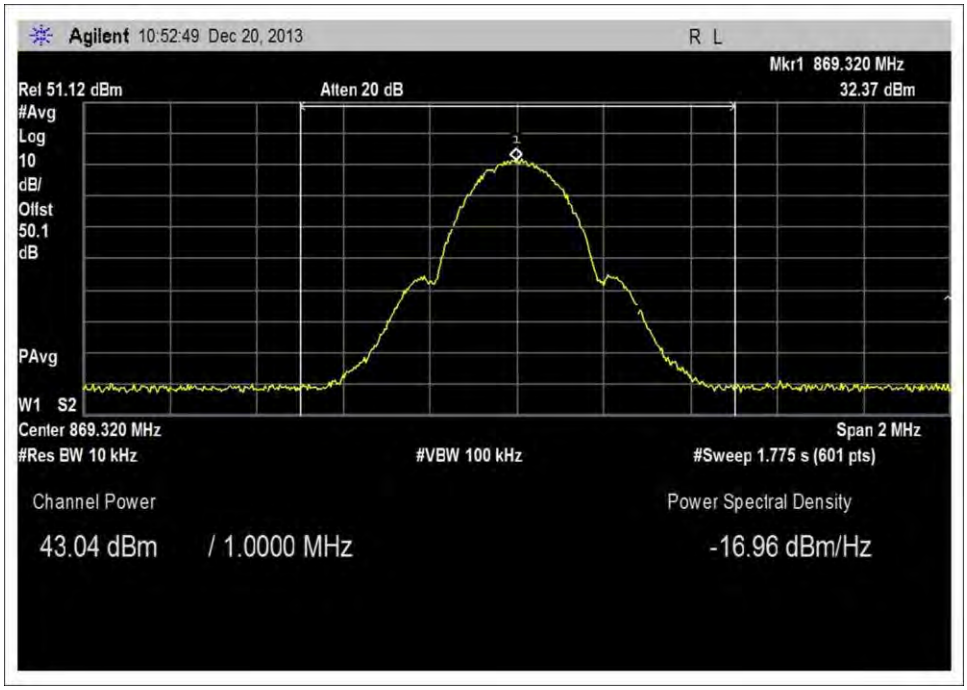
Middle Channel, LTE 20MHz 40W



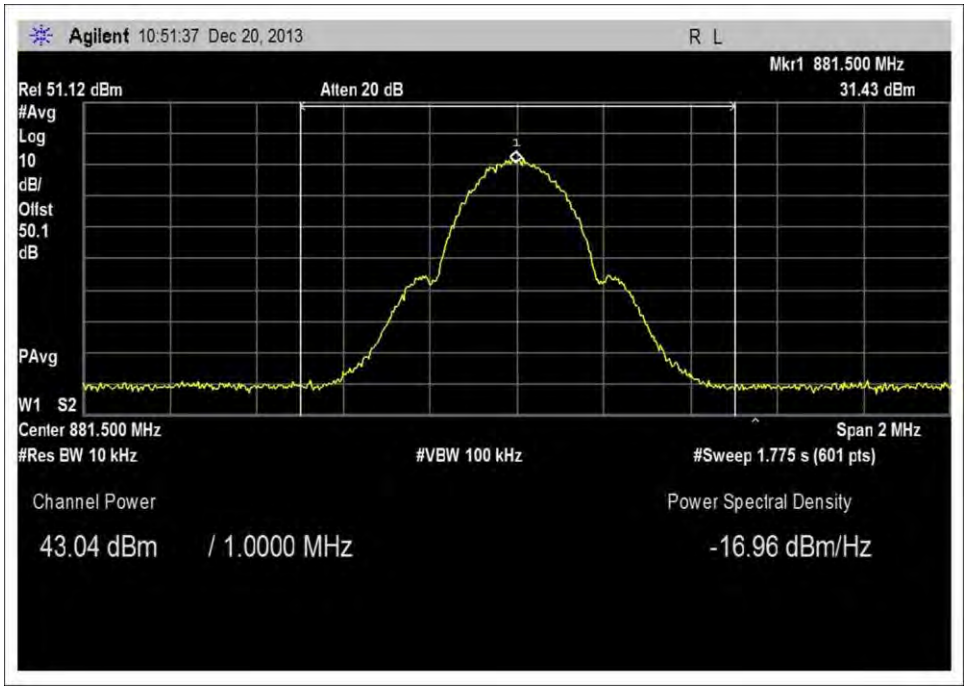
High Channel, LTE 20MHz 40W

20W

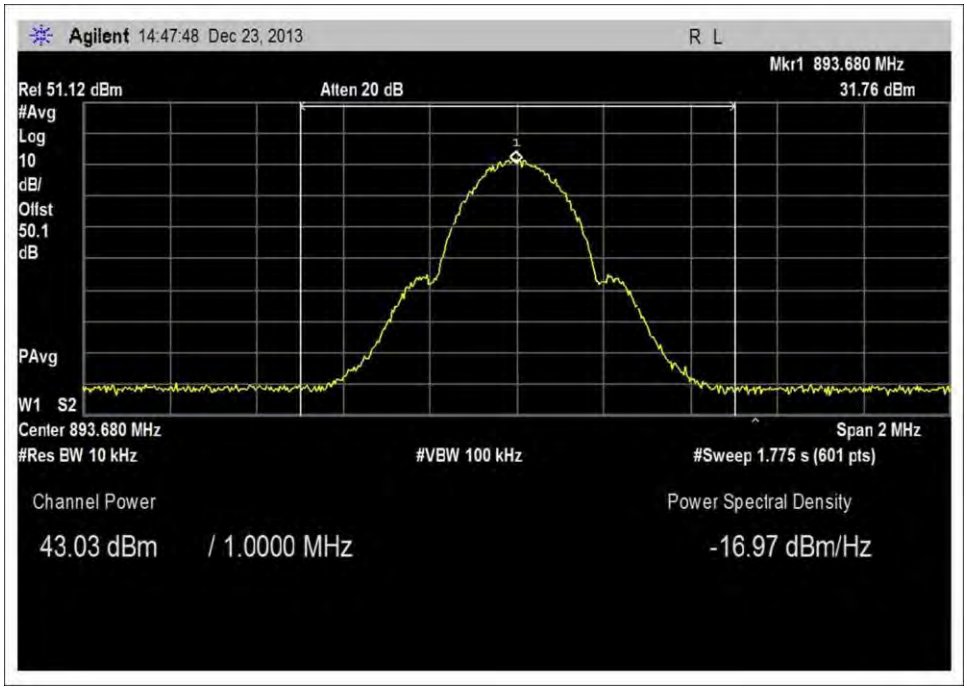
Modulation	Signal Generator Output Power (dbm)	Cable Loss (db)	Input Power (dbm)	Measured Output Power (dbm)	Measured Output Power (W)
GSM					
869.32MHz	-4.12	0.8	-4.92	43.04	20.1372425
881.5MHz	-4.74	0.8	-5.54	43.04	20.1372425
893.68MHz	-4.12	0.8	-4.92	43.03	20.09092813
EDGE					
869.3MHz	-4	0.8	-4.8	43.05	20.18366364
881.5MHz	-4.54	0.8	-5.34	43.03	20.09092813
893.7MHz	-3.16	0.8	-3.96	43.02	20.04472027
CDMA (IS95A)					
869.76MHz	-4.1	0.8	-4.9	43.02	20.04472027
881.5MHz	-4.68	0.8	-5.48	43.04	20.1372425
893.24MHz	-3.34	0.8	-4.14	43.03	20.09092813
UMTS (WCMDA 3GPP)					
871.5MHz	-4.42	0.8	-5.22	43.03	20.09092813
881.5MHz	-4.74	0.8	-5.54	43.04	20.1372425
891.5MHz	-3.64	0.8	-4.44	43.04	20.1372425
LTE 1.4MHz					
869.75MHz	-4.16	0.8	-4.96	43.03	20.09092813
881.5MHz	-4.66	0.8	-5.46	43.03	20.09092813
893.25MHz	-3.42	0.8	-4.22	43.03	20.09092813
LTE 5MHz					
871.65MHz	-4.54	0.8	-5.34	43.03	20.09092813
881.5MHz	-4.78	0.8	-5.58	43.03	20.09092813
891.35MHz	-3.76	0.8	-4.56	43.04	20.1372425
LTE 20MHz					
879.25MHz	-4.74	0.8	-5.54	43.02	20.04472027
881.5MHz	-4.68	0.8	-5.48	43.02	20.04472027
883.75MHz	-4.56	0.8	-5.36	43.03	20.09092813



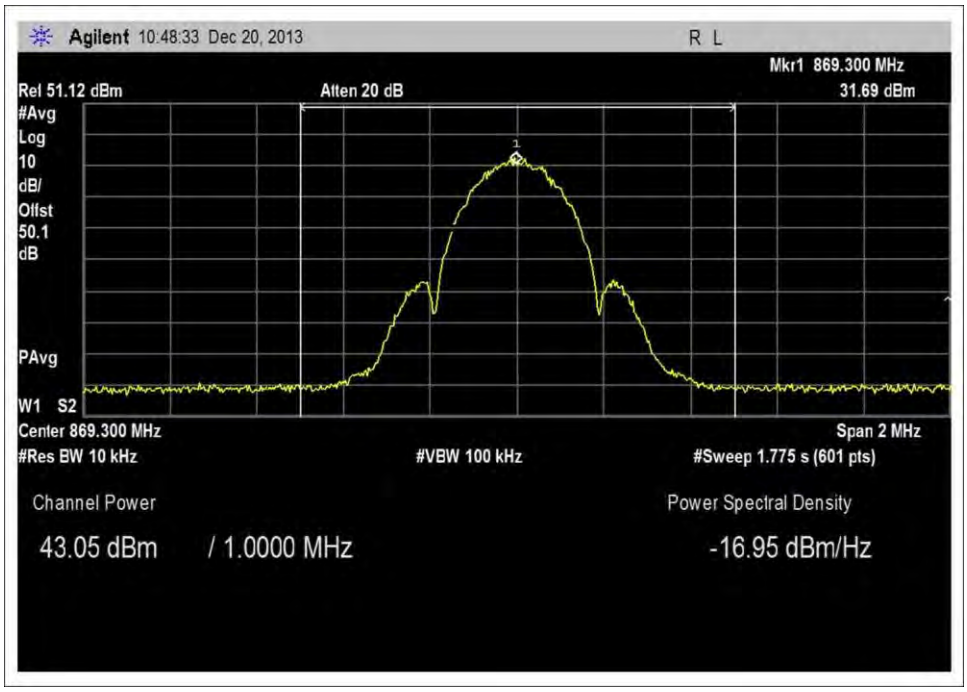
Low Channel, GSM 20W



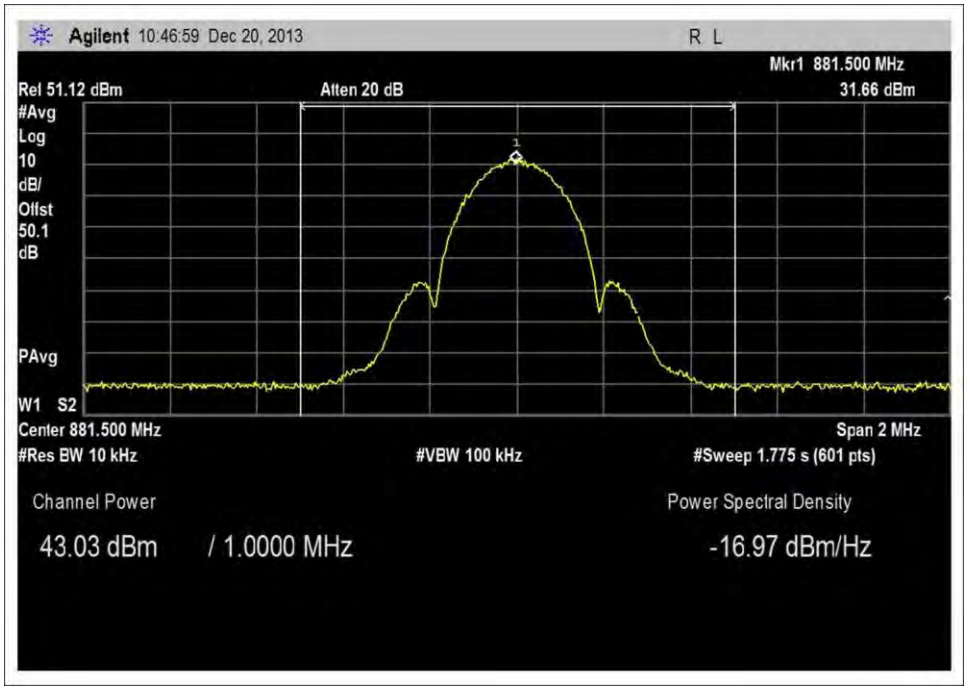
Middle Channel, GSM 20W



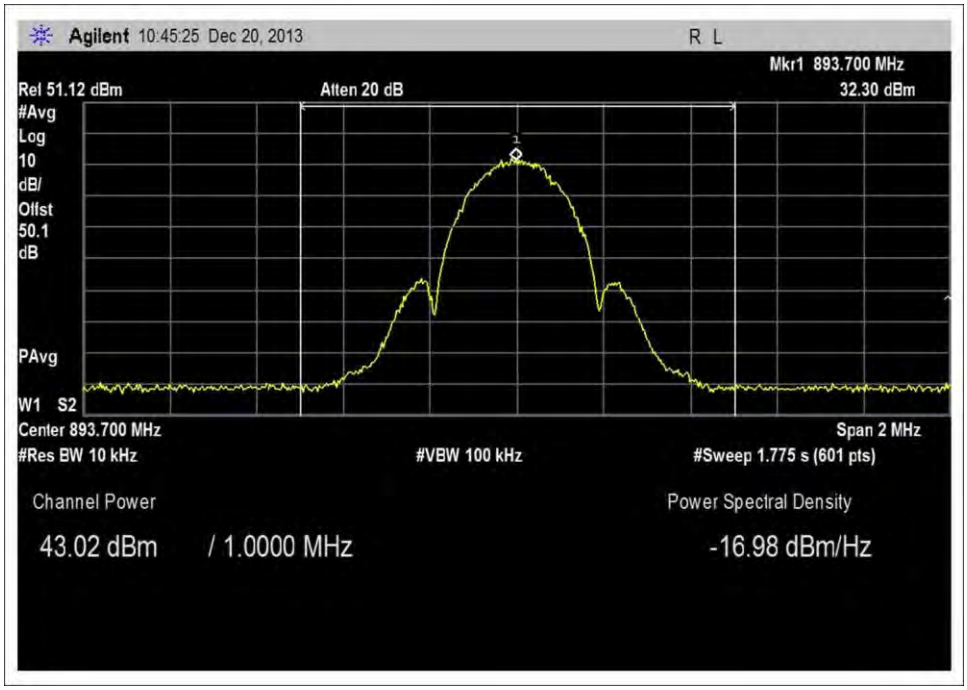
High Channel, GSM 20W



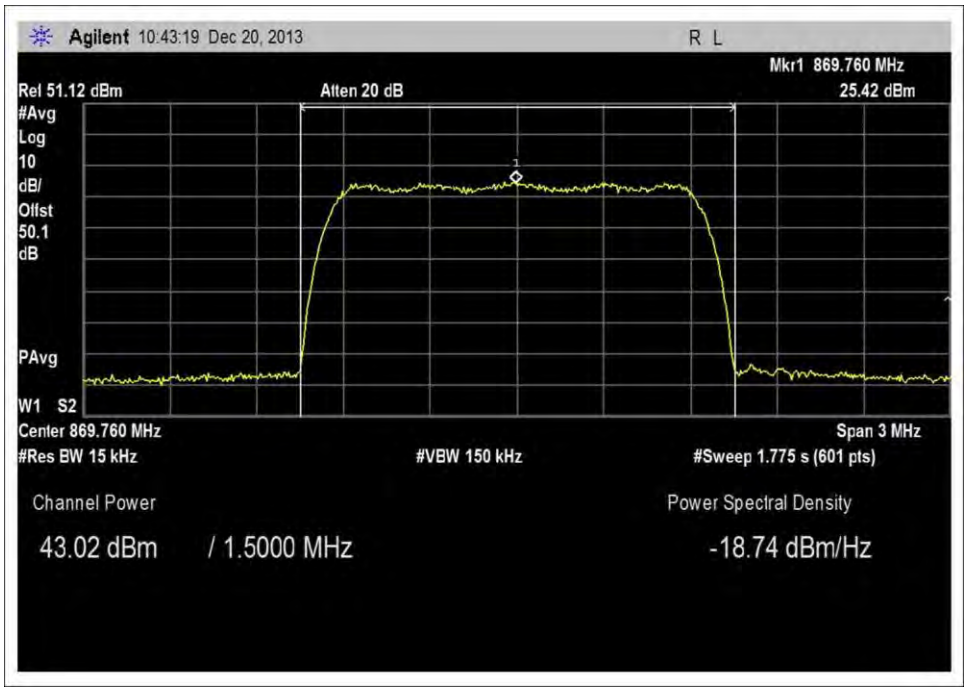
Low Channel, EDGE 20W



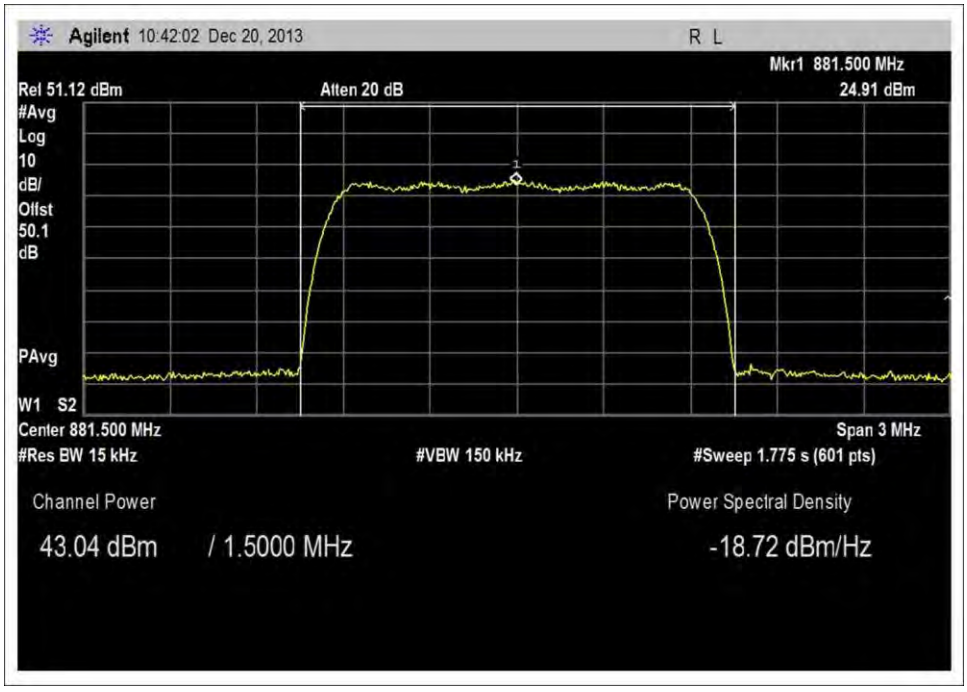
Middle Channel, EDGE 20W



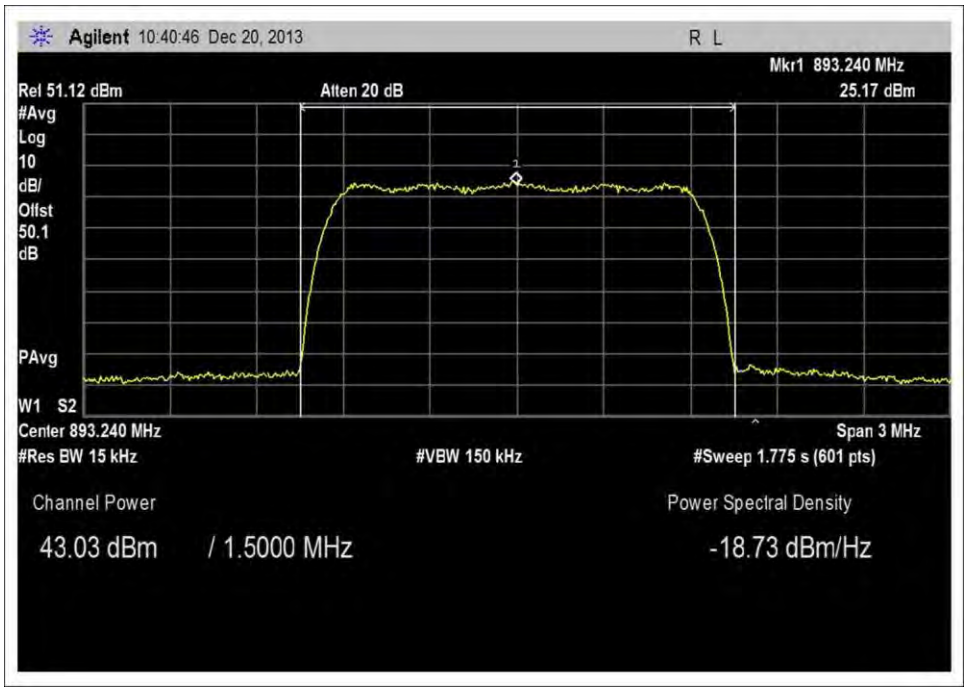
High Channel, EDGE 20W



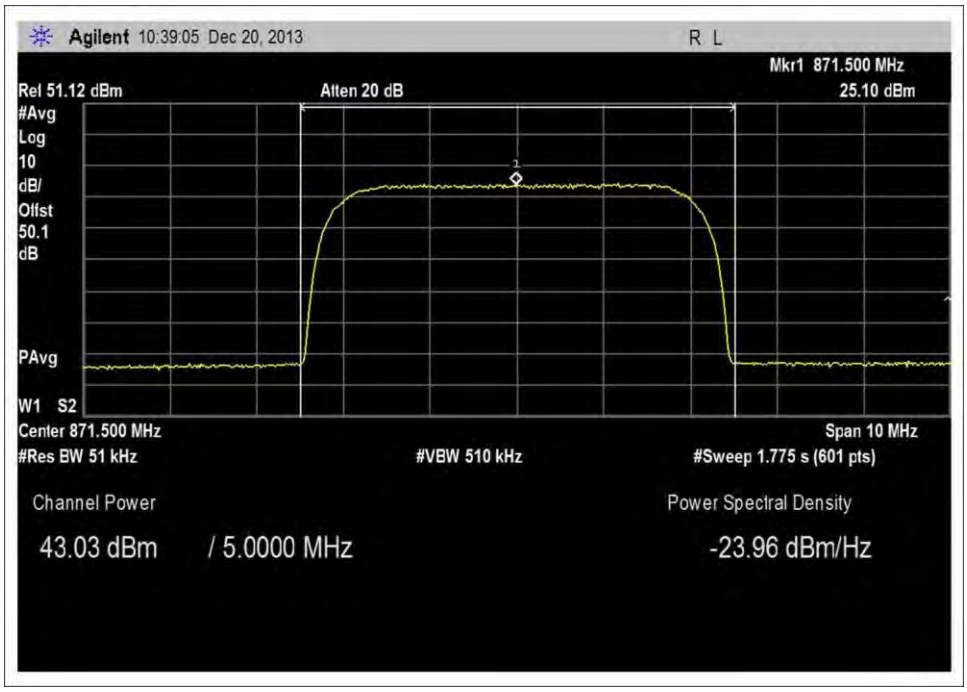
Low Channel, CDMA IS95A 20W



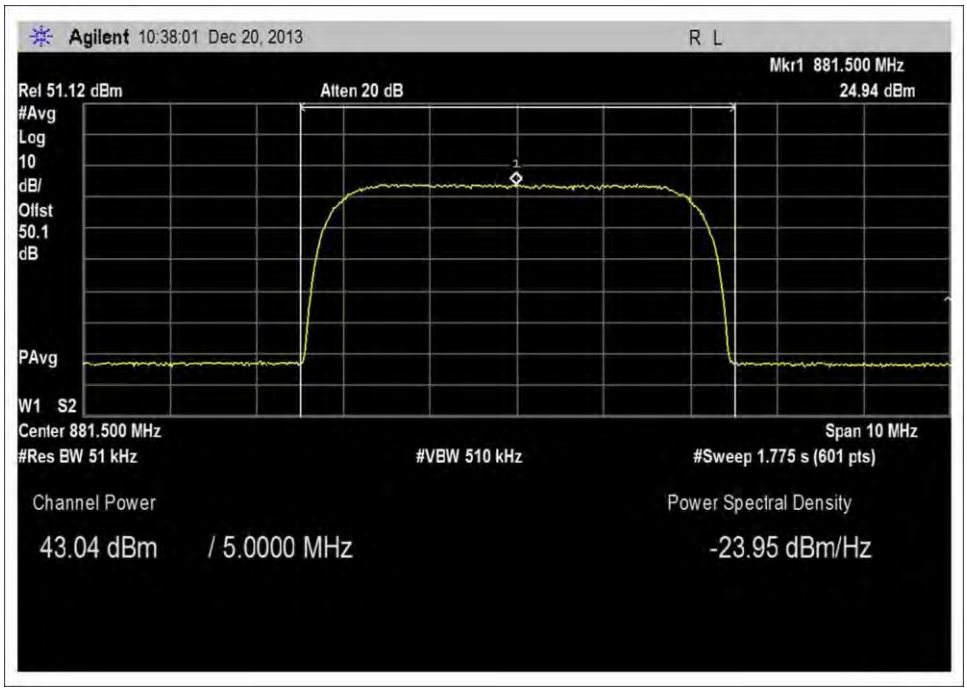
Middle Channel, CDMA IS95A 20W



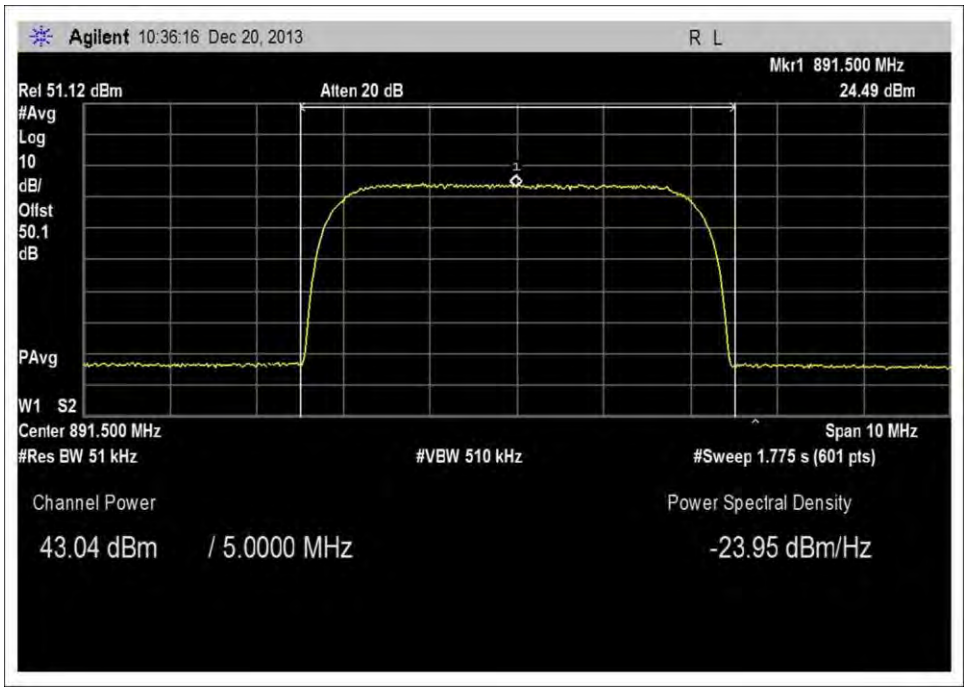
High Channel, CDMA IS95A 20W



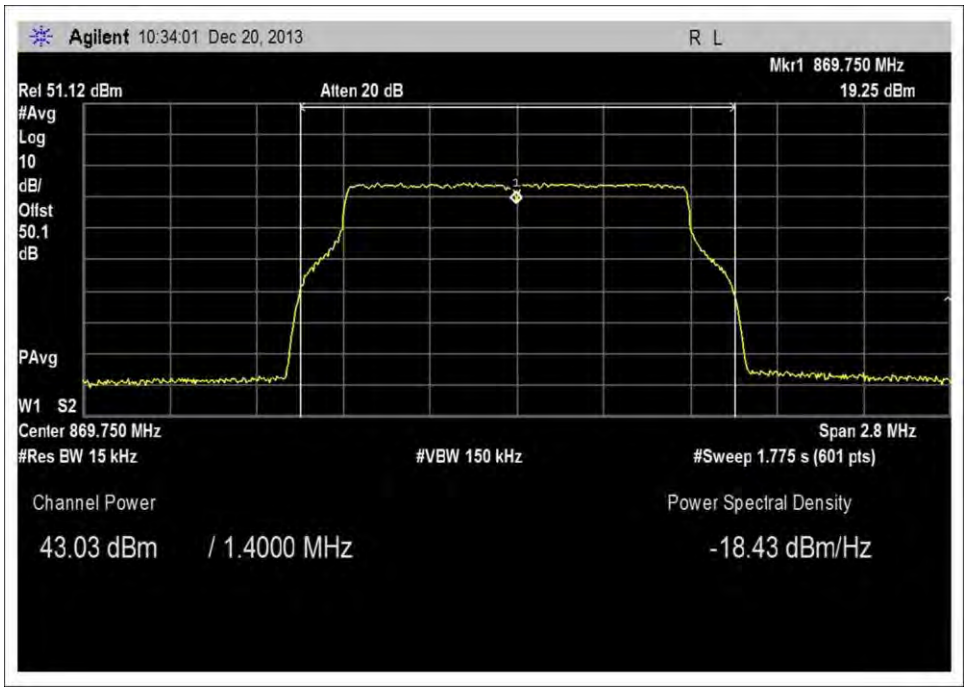
Low Channel, UMTS WCMDA 3GPP 20W



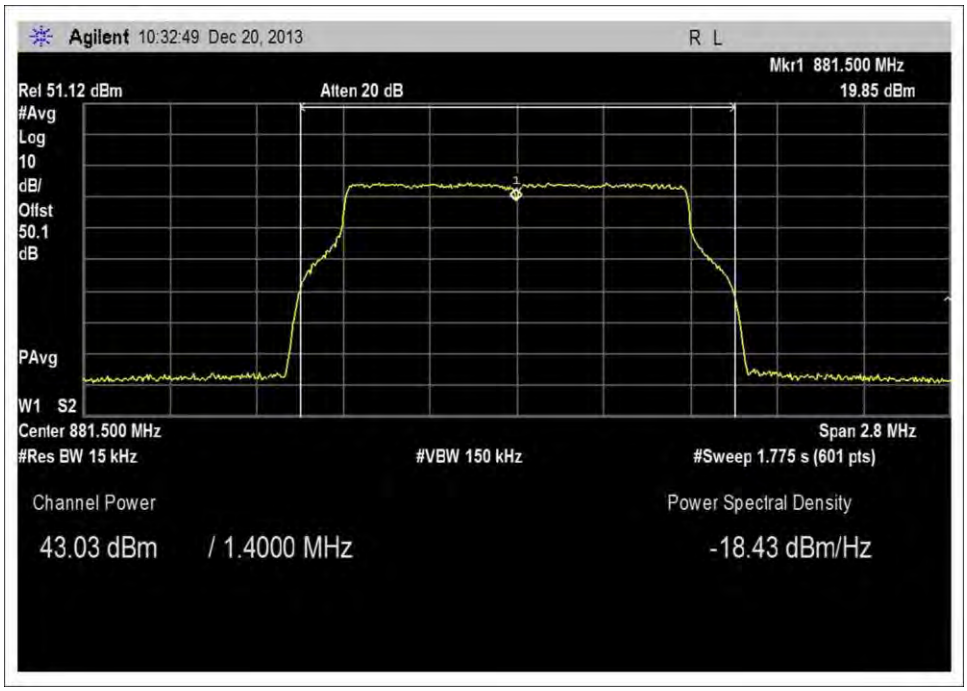
Middle Channel, UMTS WCMDA 3GPP 20W



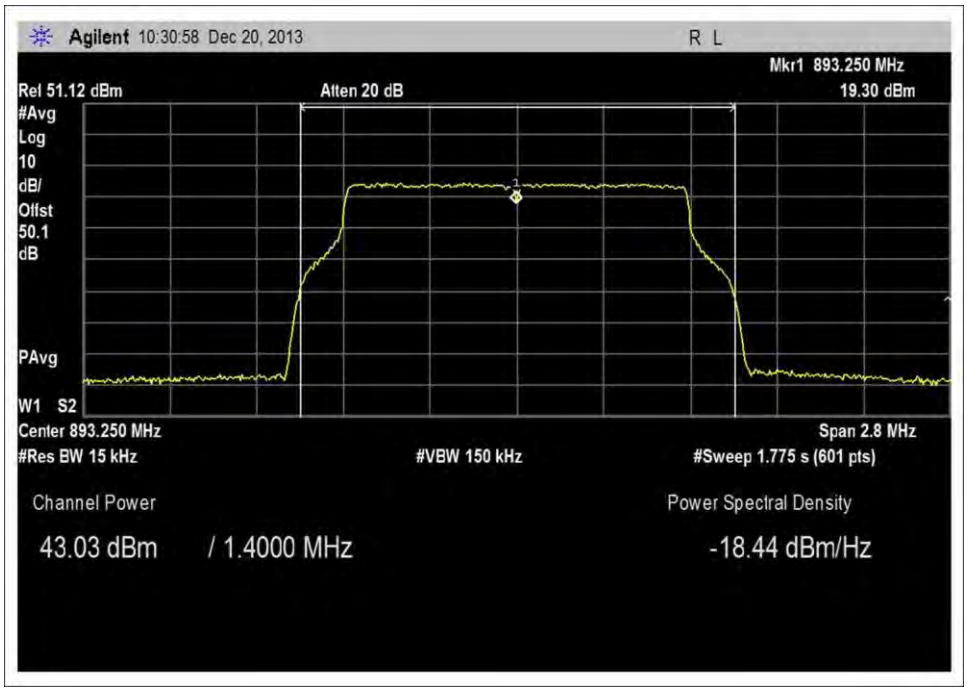
High Channel, UMTS WCMDA 3GPP 20W



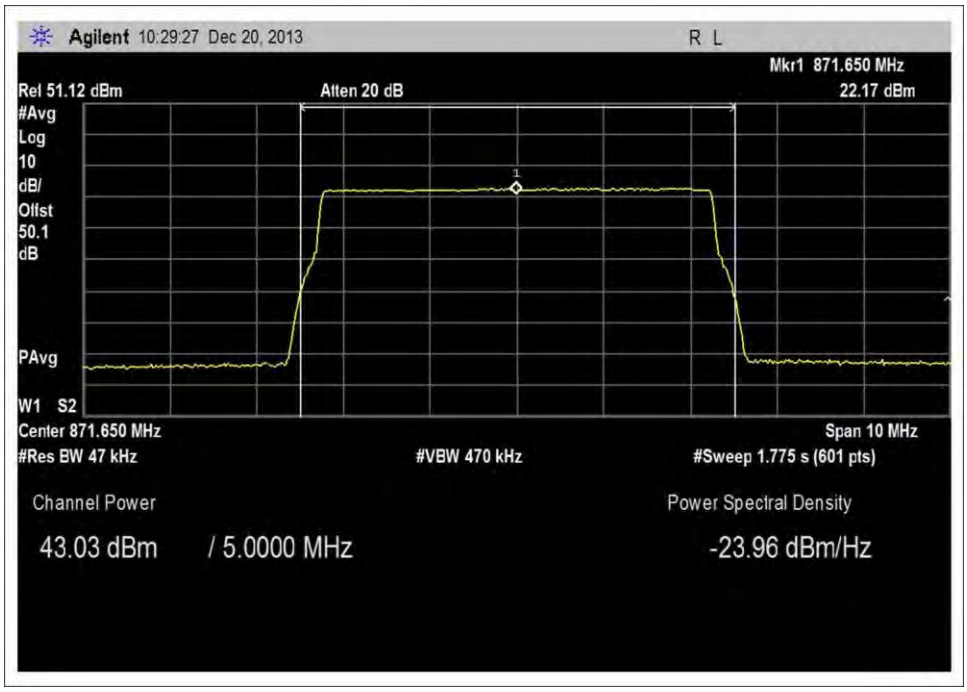
Low Channel, LTE 1.4MHz 20W



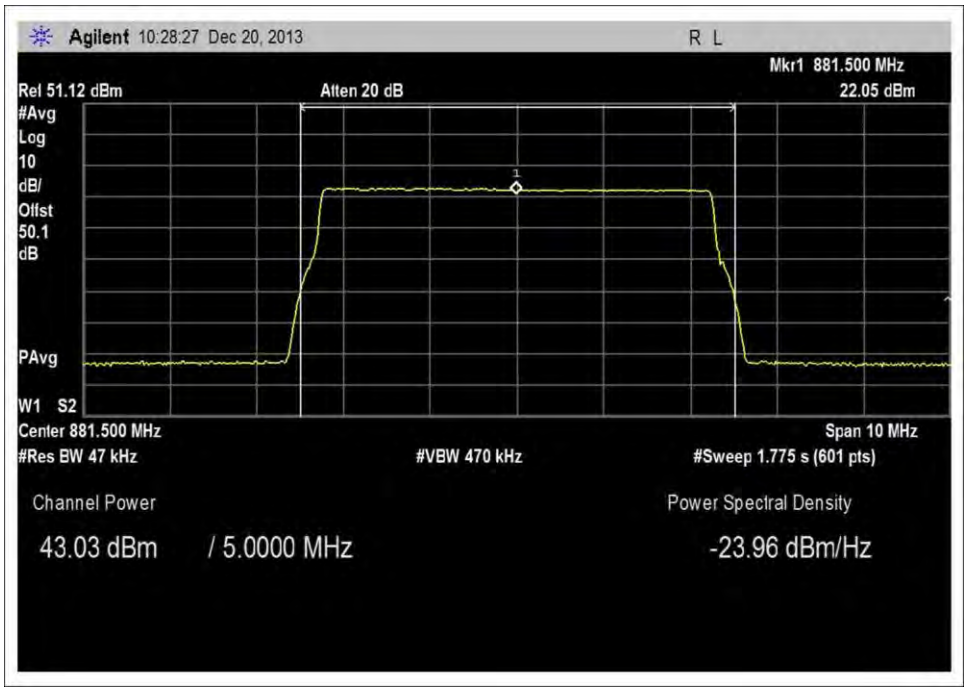
Middle Channel, LTE 1.4MHz 20W



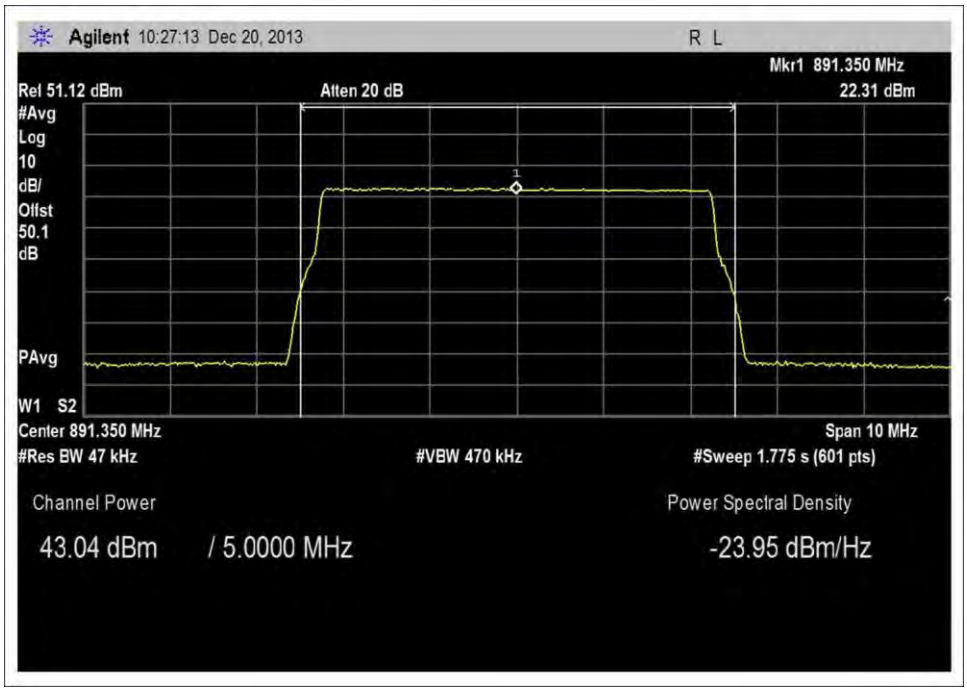
High Channel, LTE 1.4MHz 20W



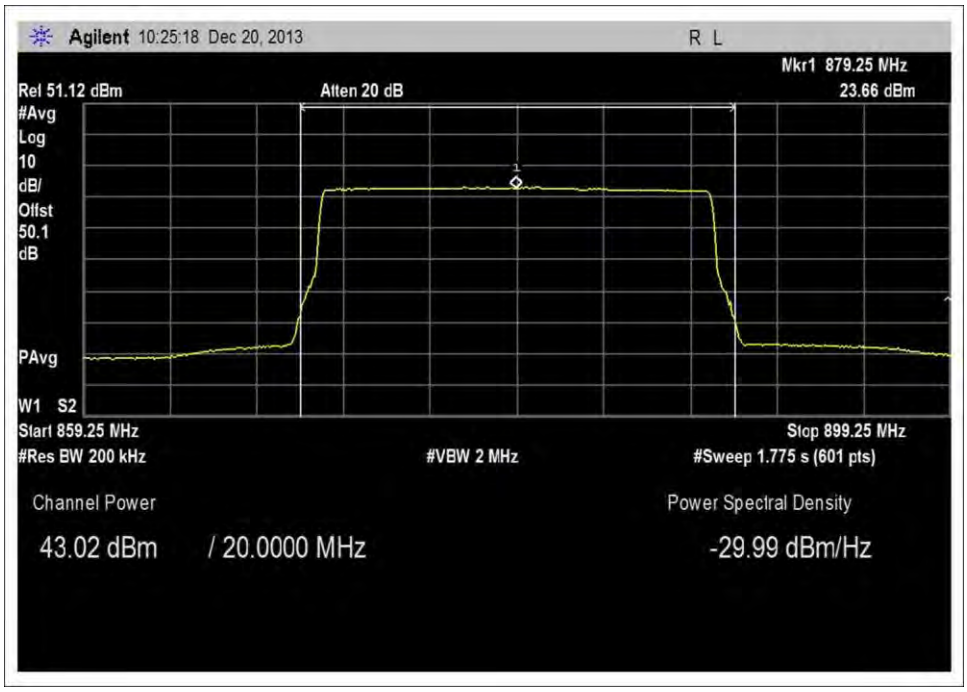
Low Channel, LTE 5MHz 20W



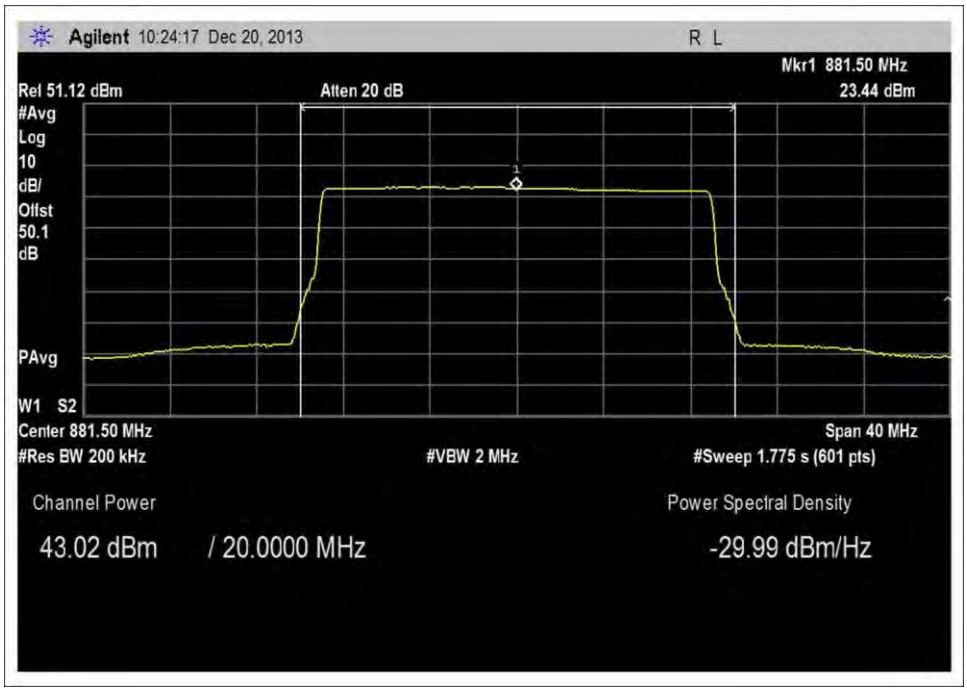
Middle Channel, LTE 5MHz 20W



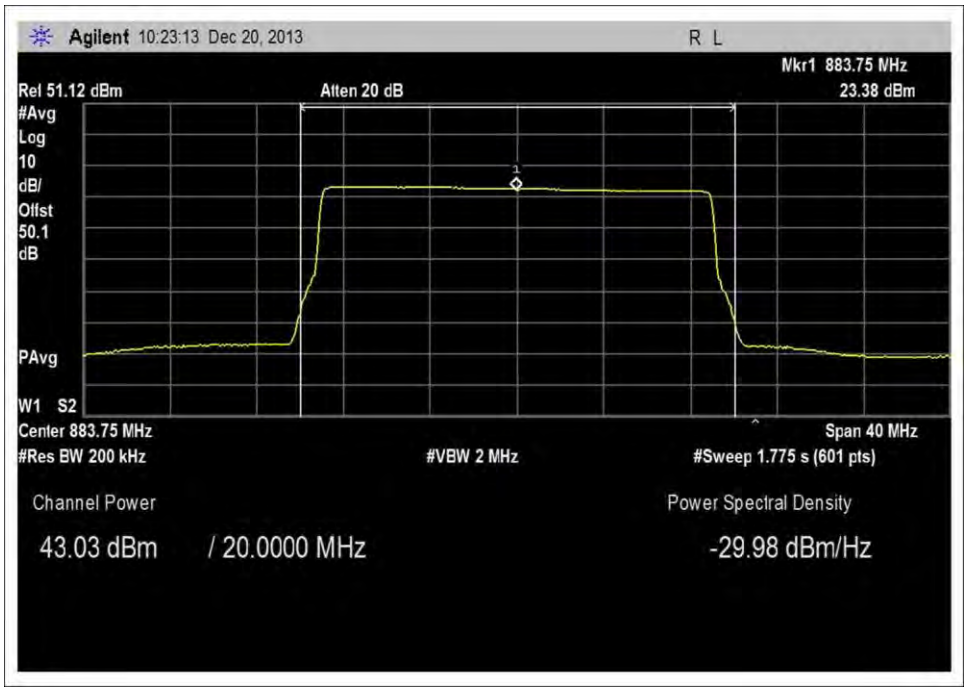
High Channel, LTE 5MHz 20W



Low Channel, LTE 20MHz 20W



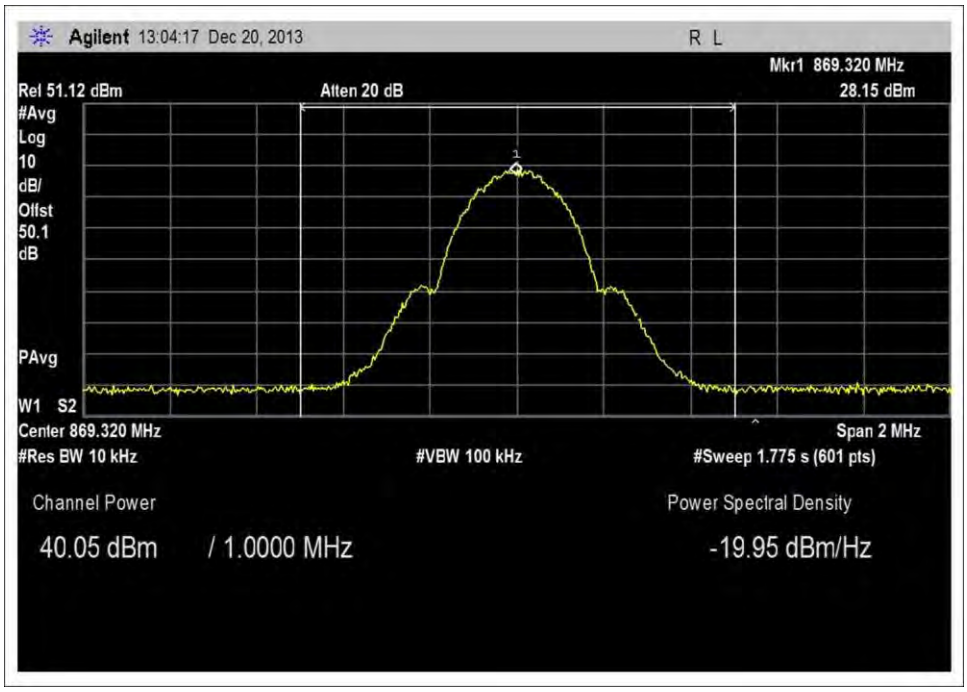
Middle Channel, LTE 20MHz 20W



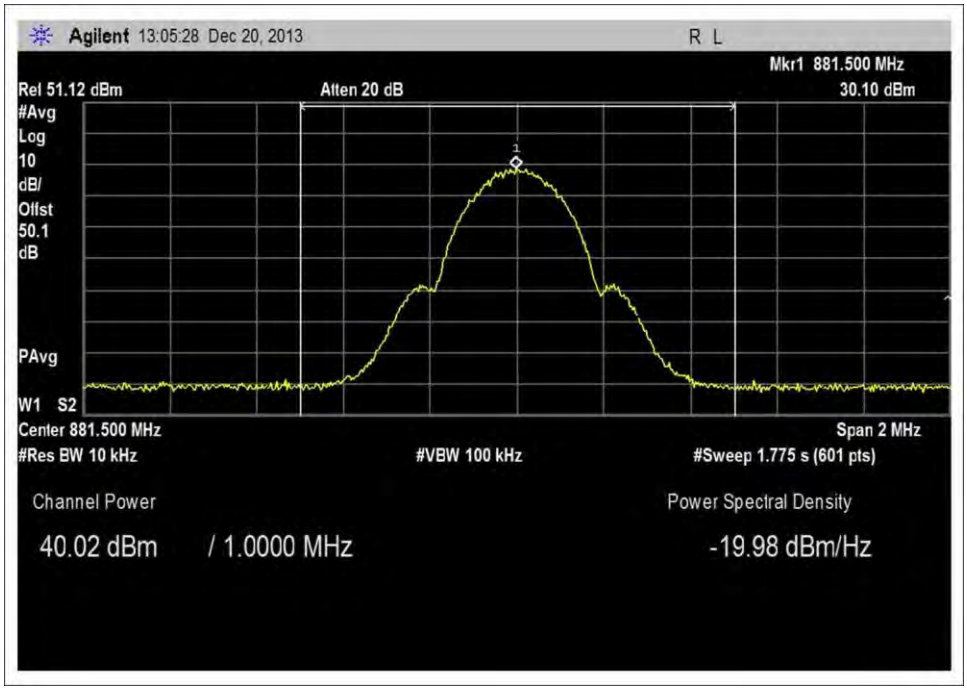
High Channel, LTE 20MHz 20W

10W

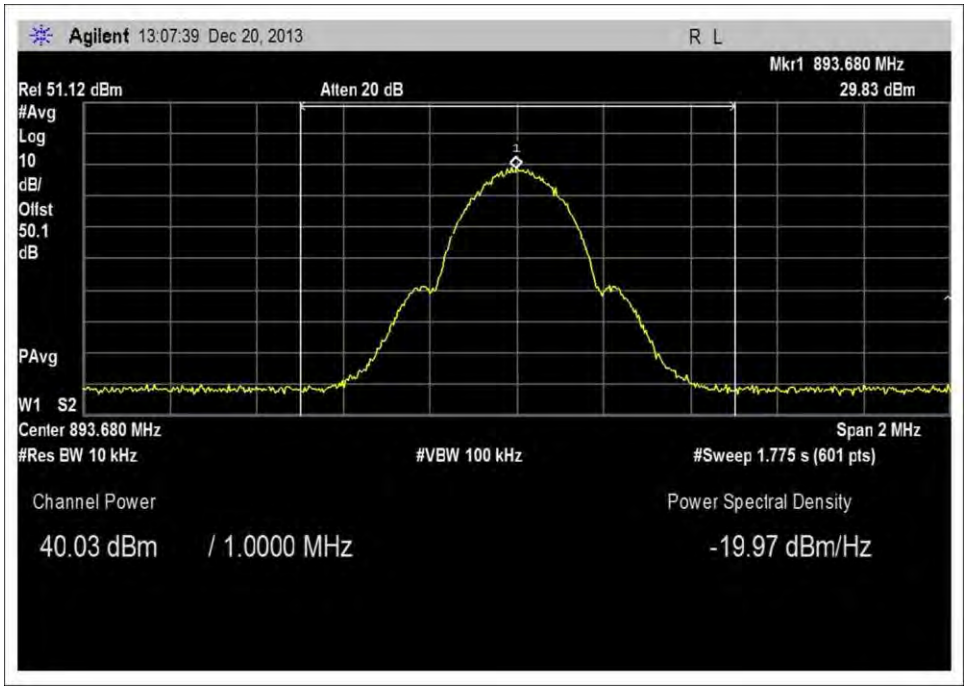
Modulation	Signal Generator Output Power (dbm)	Cable Loss (db)	Input Power (dbm)	Measured Output Power (dbm)	Measured Output Power (W)
GSM					
869.32MHz	-6.78	0.8	-7.58	40.05	10.11579454
881.5MHz	-7.44	0.8	-8.24	40.02	10.0461579
893.68MHz	-5.82	0.8	-6.62	40.03	10.06931669
EDGE					
869.3MHz	-6.36	0.8	-7.16	40.03	10.06931669
881.5MHz	-7.02	0.8	-7.82	40.03	10.06931669
893.7MHz	-5.72	0.8	-6.52	40.01	10.02305238
CDMA (IS95A)					
869.76MHz	-6.48	0.8	-7.28	40.04	10.09252886
881.5MHz	-7.08	0.8	-7.88	40.04	10.09252886
893.24MHz	-5.8	0.8	-6.6	40.04	10.09252886
UMTS (WCMDA 3GPP)					
871.5MHz	-6.82	0.8	-7.62	40.03	10.06931669
881.5MHz	-7.12	0.8	-7.92	40.02	10.0461579
891.5MHz	-6.08	0.8	-6.88	40.04	10.09252886
LTE 1.4MHz					
869.75MHz	-6.66	0.8	-7.46	40.03	10.06931669
881.5MHz	-7.2	0.8	-8	40.03	10.06931669
893.25MHz	-5.94	0.8	-6.74	40.03	10.06931669
LTE 5MHz					
871.65MHz	-7.04	0.8	-7.84	40.02	10.0461579
881.5MHz	-7.32	0.8	-8.12	40.02	10.0461579
891.35MHz	-6.28	0.8	-7.08	40.02	10.0461579
LTE 20MHz					
879.25MHz	-7.2	0.8	-8	40.02	10.0461579
881.5MHz	-7.14	0.8	-7.94	40.02	10.0461579
883.75MHz	-7.02	0.8	-7.82	40.02	10.0461579



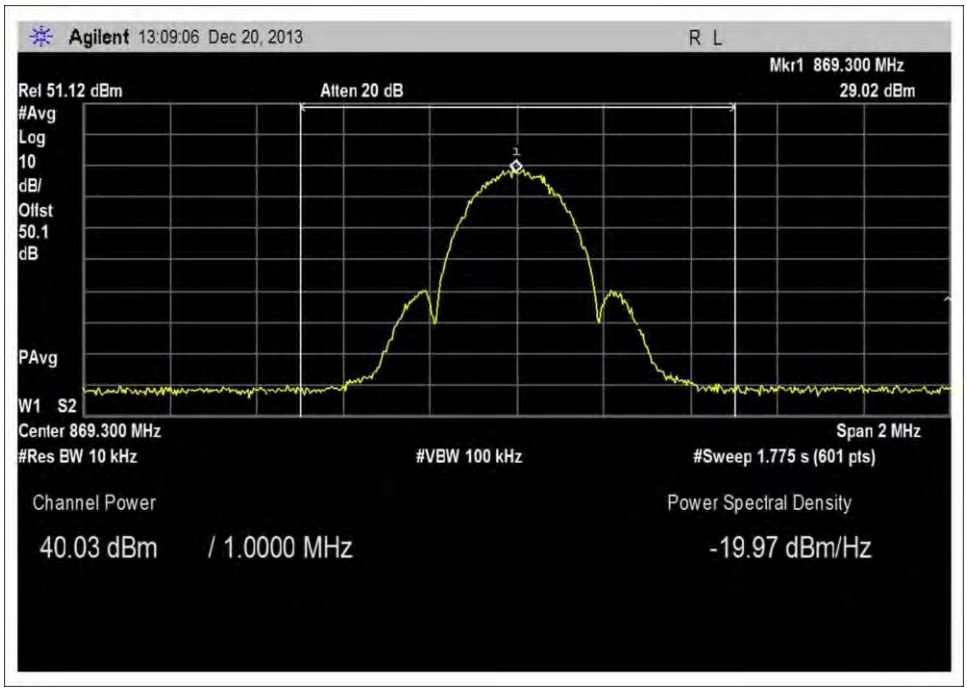
Low Channel, GSM 10W



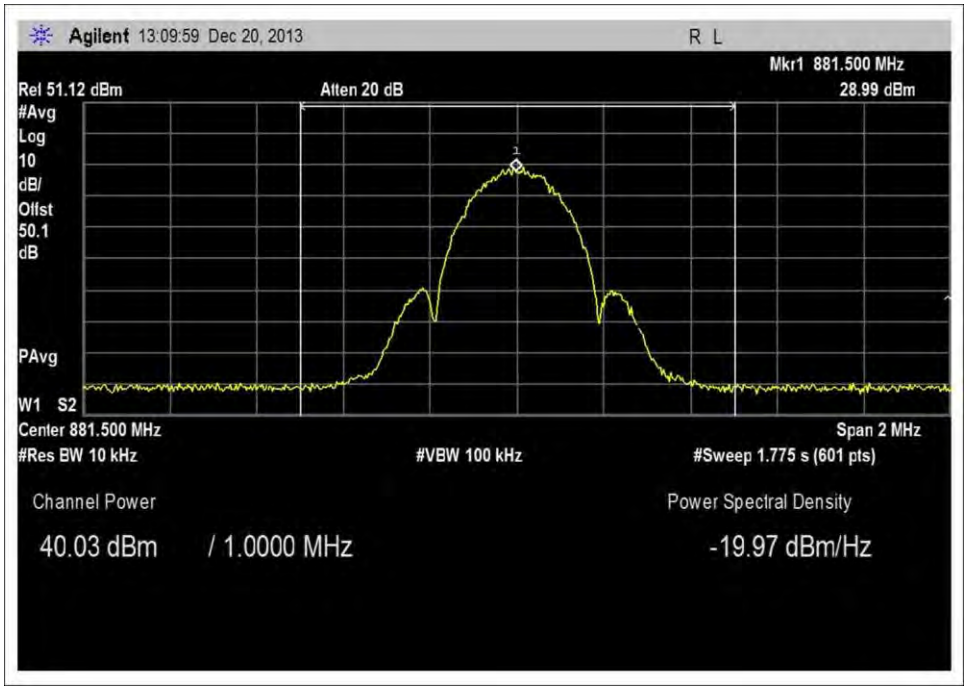
Middle Channel, GSM 10W



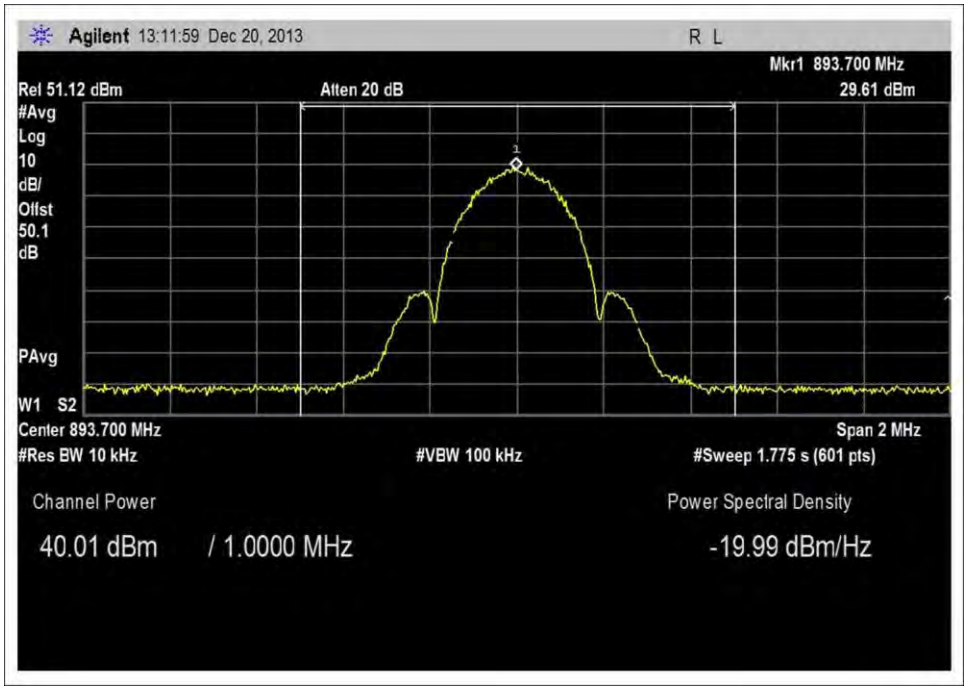
High Channel, GSM 10W



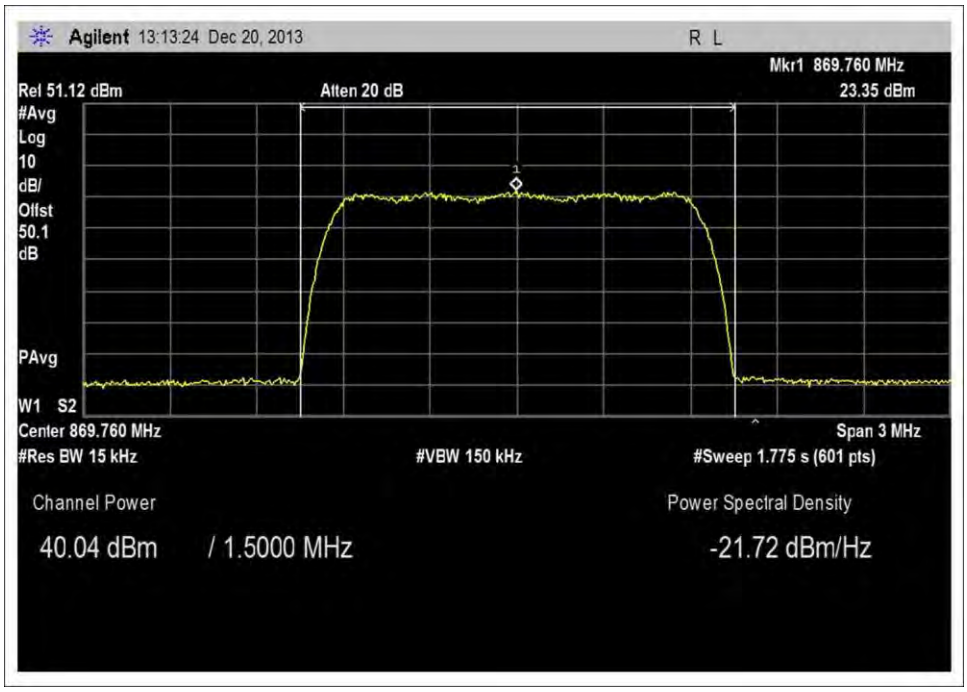
Low Channel, EDGE 10W



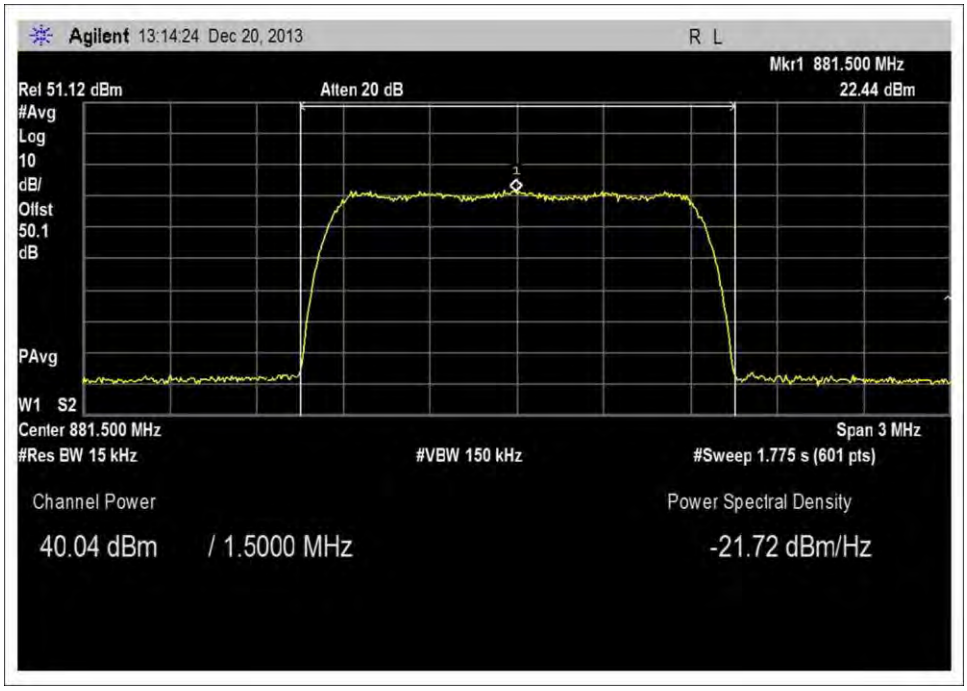
Middle Channel, EDGE 10W



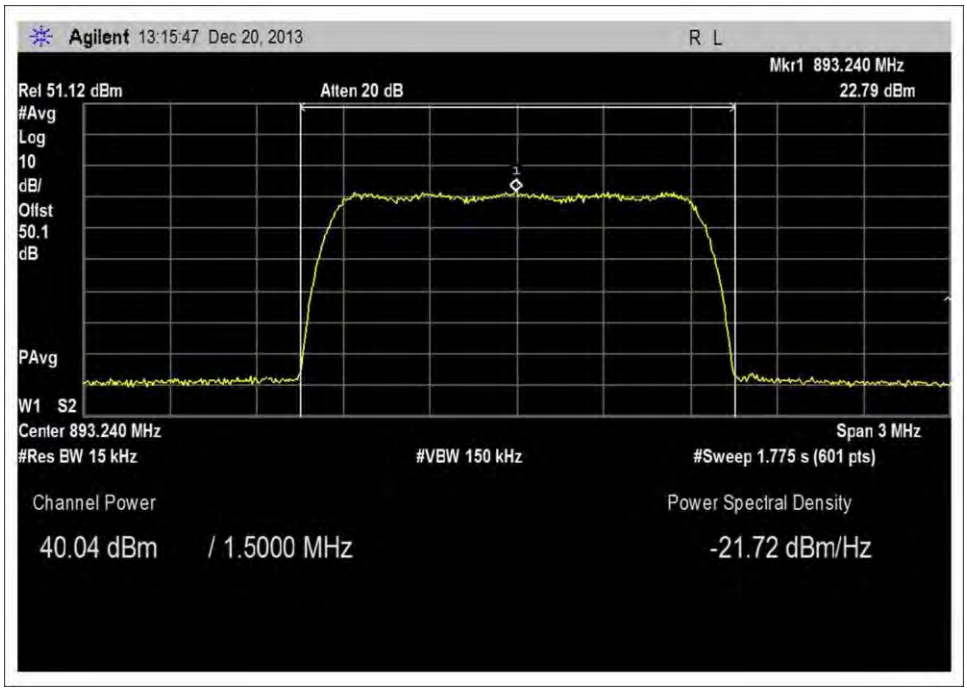
High Channel, EDGE 10W



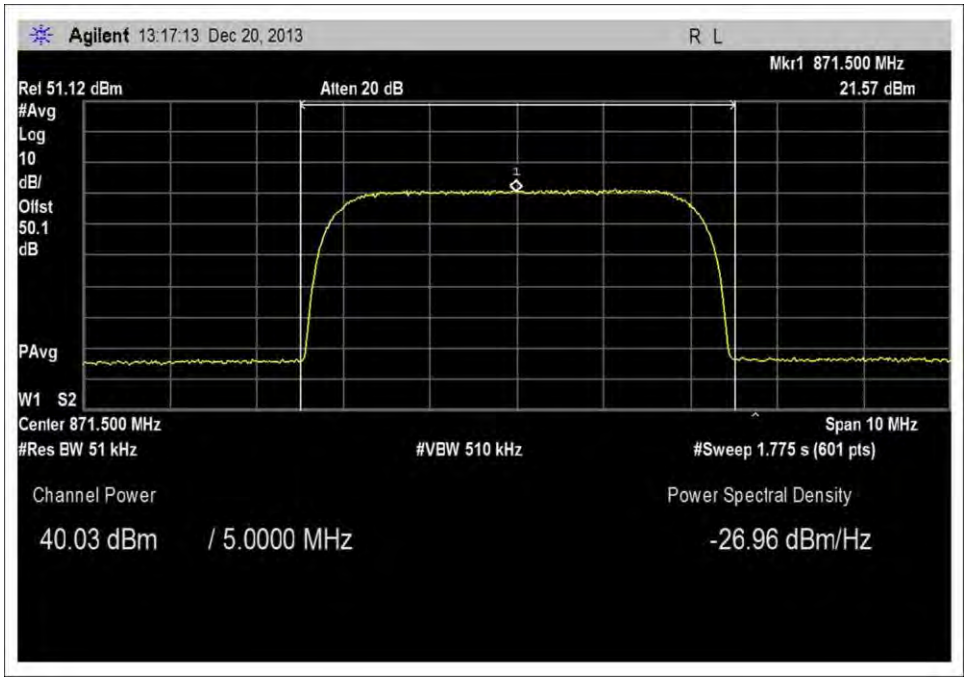
Low Channel, CDMA IS95A 10W



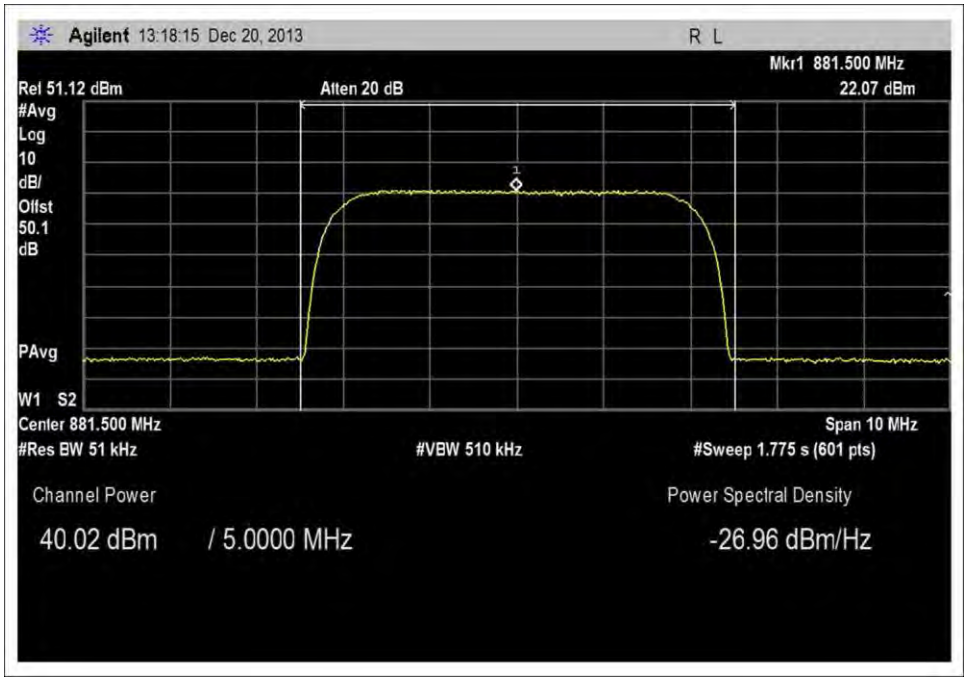
Middle Channel, CDMA IS95A 10W



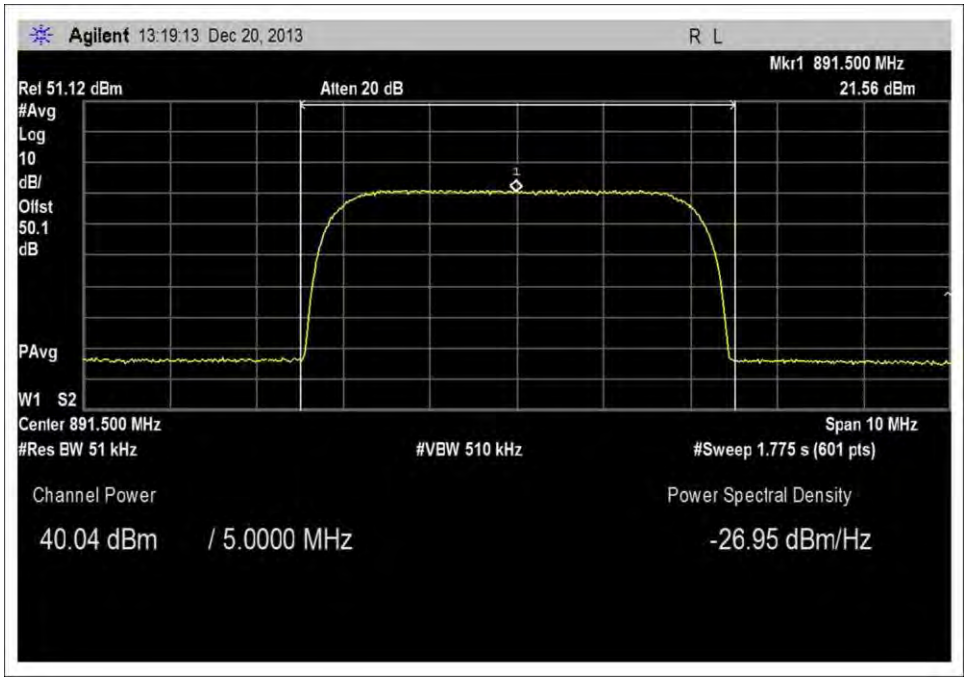
High Channel, CDMA IS95A 10W



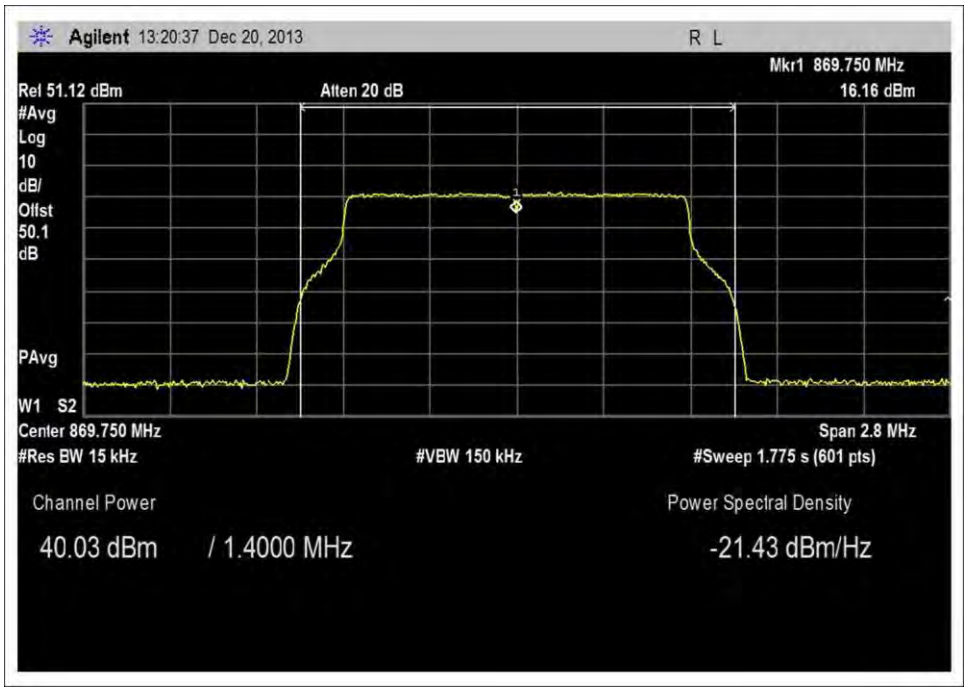
Low Channel, UMTS WCMDA 3GPP 10W



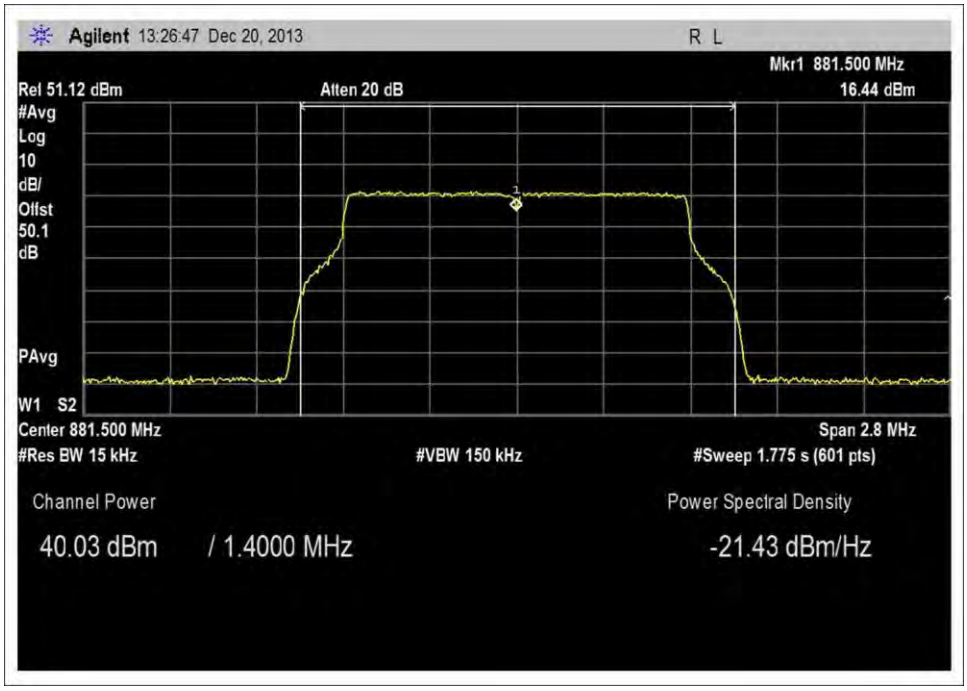
Middle Channel, UMTS WCMDA 3GPP 10W



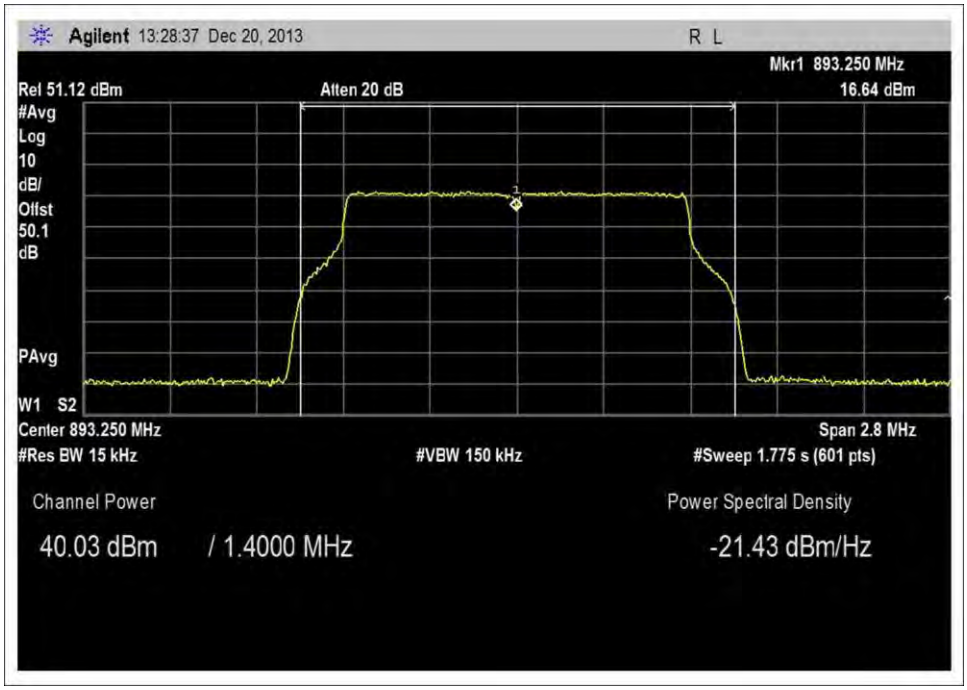
High Channel, UMTS WCMDA 3GPP 10W



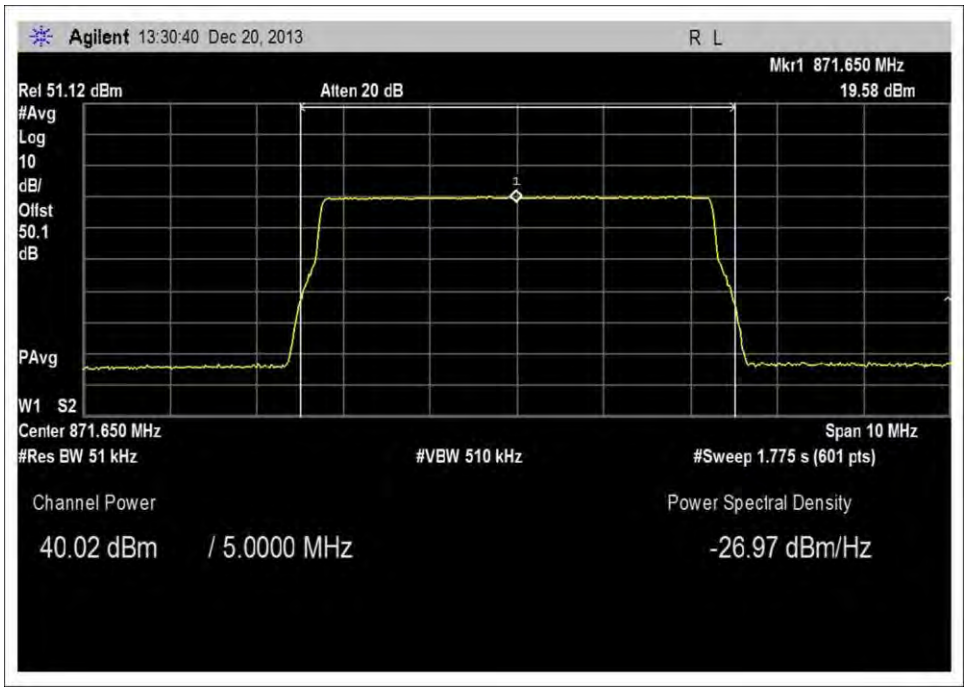
Low Channel, LTE 1.4MHz 10W



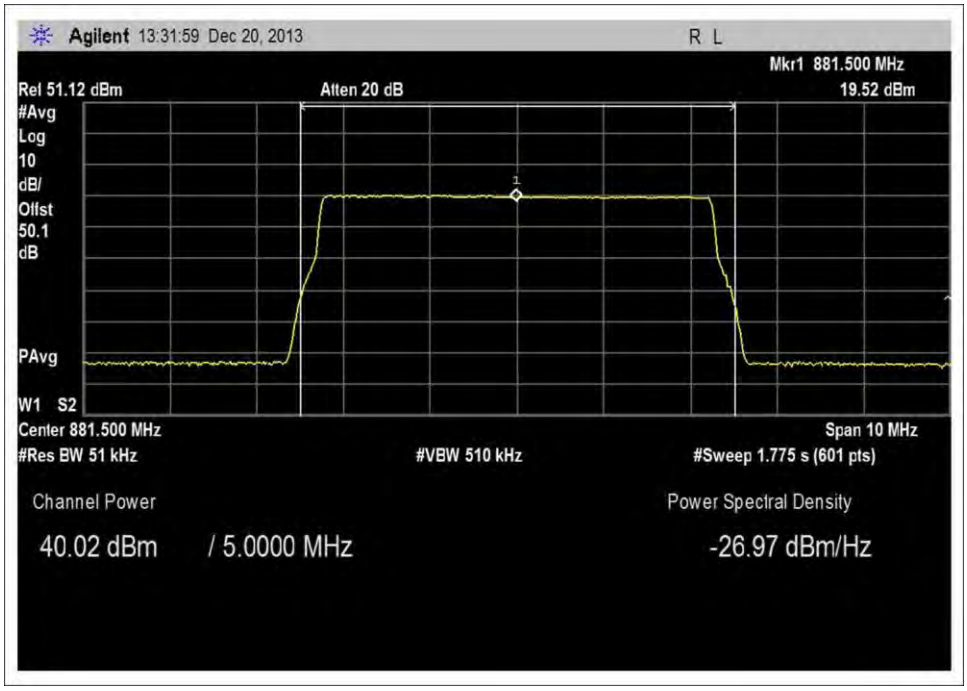
Middle Channel, LTE 1.4MHz 10W



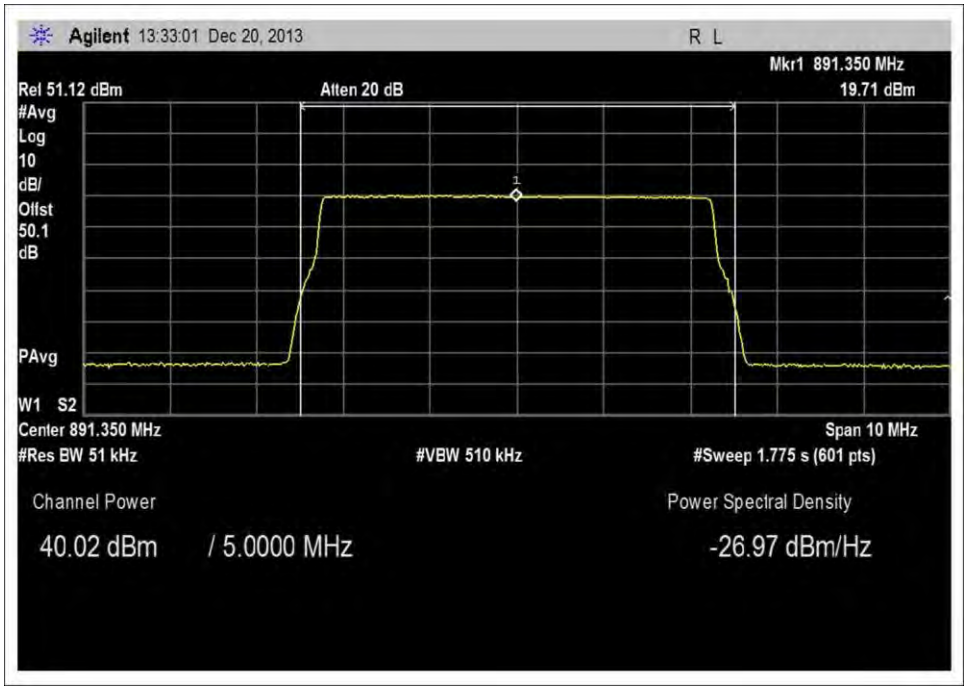
High Channel, LTE 1.4MHz 10W



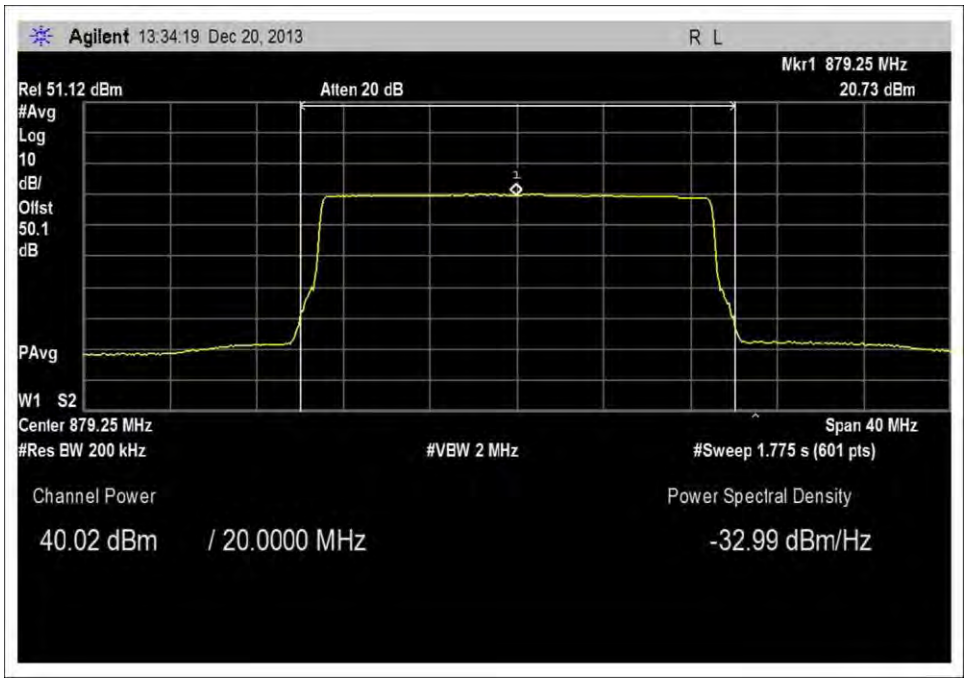
Low Channel, LTE 5MHz 10W



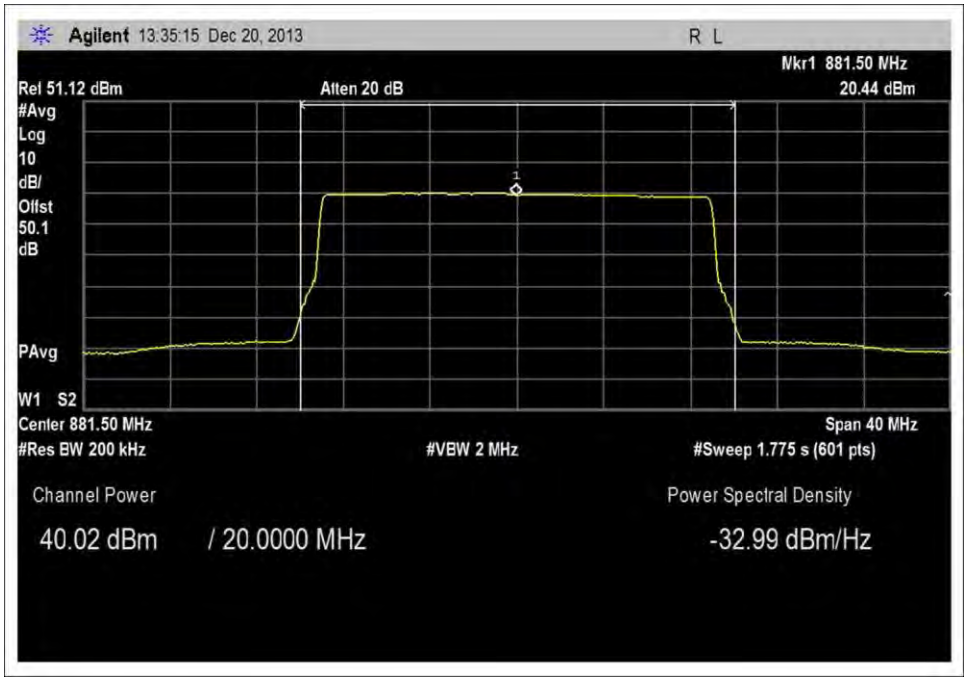
Middle Channel, LTE 5MHz 10W



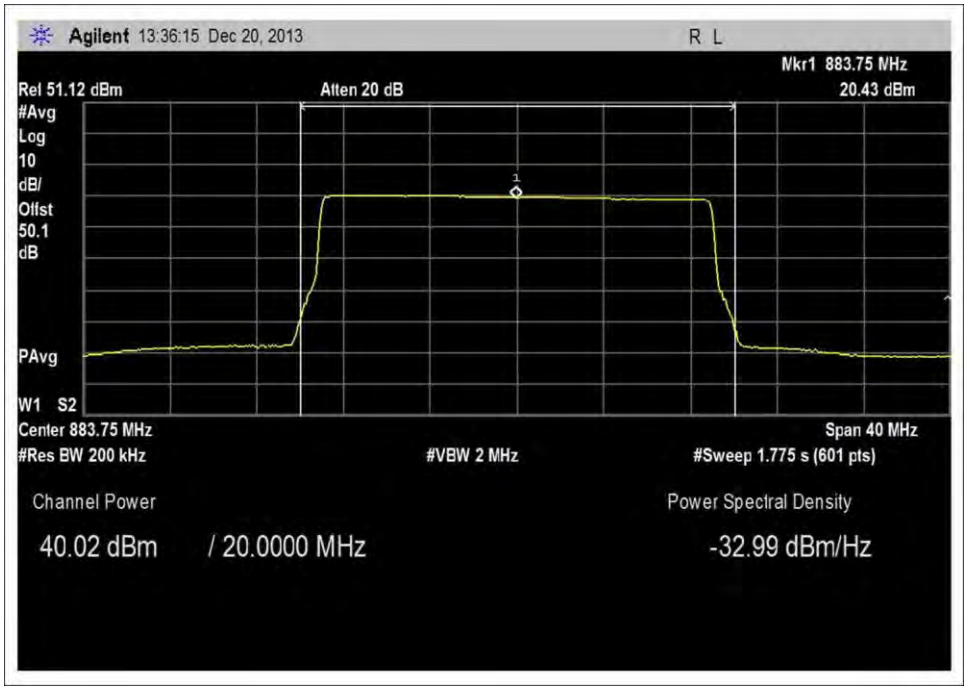
High Channel, LTE 5MHz 10W



Low Channel, LTE 20MHz 10W

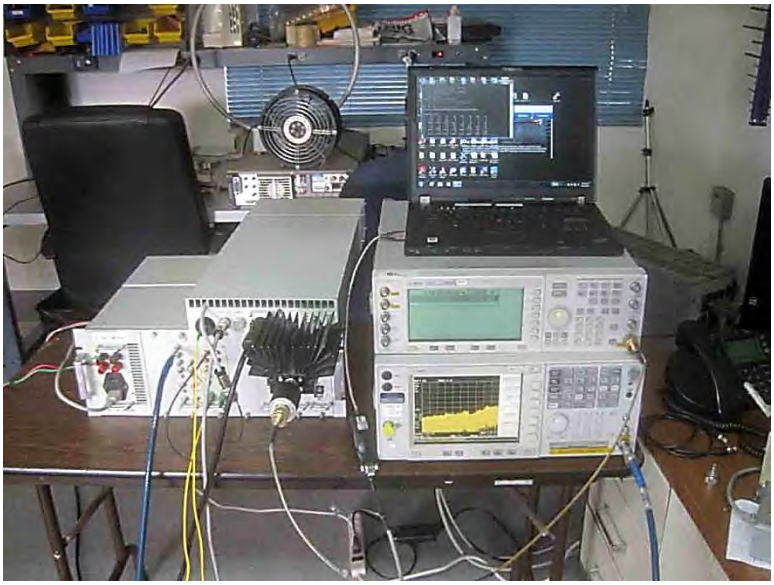


Middle Channel, LTE 20MHz 10W



High Channel, LTE 20MHz 10W

Test Setup Photo



22.915 / 2.1049(I) Occupied Bandwidth

Test Conditions / Setup

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer:	**BTI Wireless**		
Specification:	**Input vs Output Plots**		
Work Order #:	**95179**	Date:	12/20/2013
Test Type:	**Conducted Emissions**	Time:	15:17:27
Equipment:	**850MHz 40W Remote Transmitting Unit**	Sequence#:	0
Manufacturer:	BTI Wireless	Tested By:	Don Nguyen
Model:	mBSC0850-040-RUMF01		110V 60Hz
S/N:	MBSC0850040RUMF01-11010002		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T2	AN02945	Cable	32022-2-2909K-36TC	10/30/2013	10/30/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
850MHz 40W Remote Transmitting Unit*	BTI Wireless	mBSC0850-040-RUMF01	MBSC0850040RUMF01-11010002

Support Devices:

Function	Manufacturer	Model #	S/N
Attenuator 30db Pad	Weinschel	49-30-43	KW075
50 ohm Load	Generic	NA	NA
50 ohm Load	Generic	NA	NA
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
Cable	Pasternack	Sucoflex 104A	12237/4A
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 20db Pad	Weinschel	33-20-24	BJ7479

Test Conditions / Notes:

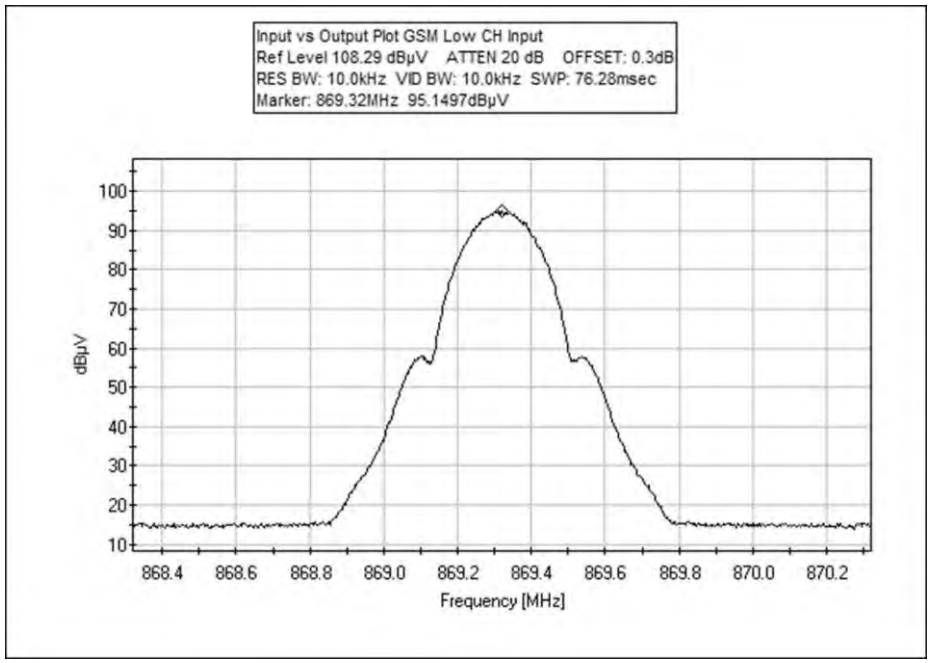
The EUT is placed on the test bench. RF to Fiber Optic Converter Tx1 In is connected to an ESG Signal generator via cable Sucoflex 104A. Fiber-1 port from the converter is connected to fiber port of EUT. ANT port of the EUT is connected to 30db attenuator and 20db attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-2909K-36TC. TX out and RX in port are terminated to 50 ohm loads.
Per manufacturer, the output frequency is independent of the components used in optical converter.
EUT is a Fixed Gain Amplifier with fixed output power as set by ALC (Auto Level Control) Threshold level of 1±0.5dB higher than maximum rated output power.
The evaluation is performed at the antenna port.

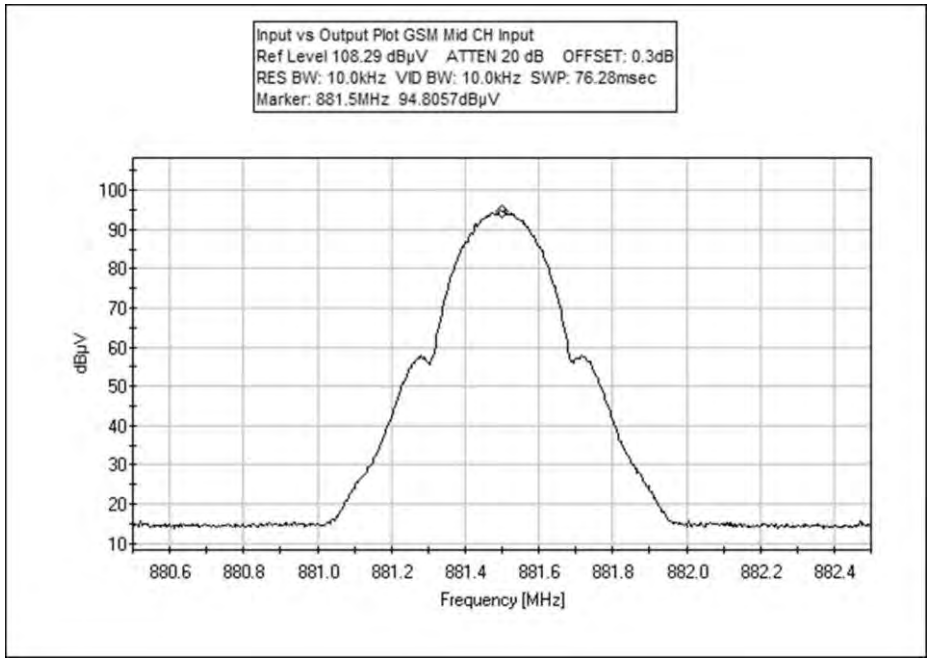
Freq: 869-894MHz
Signal protocol: GSM, EDGE, CDMA, UMTS WCDMA 3GPP, LTE 1.4MHz, LTE 5MHz, LTE 20MHz
Max Ouput Power : 40 W

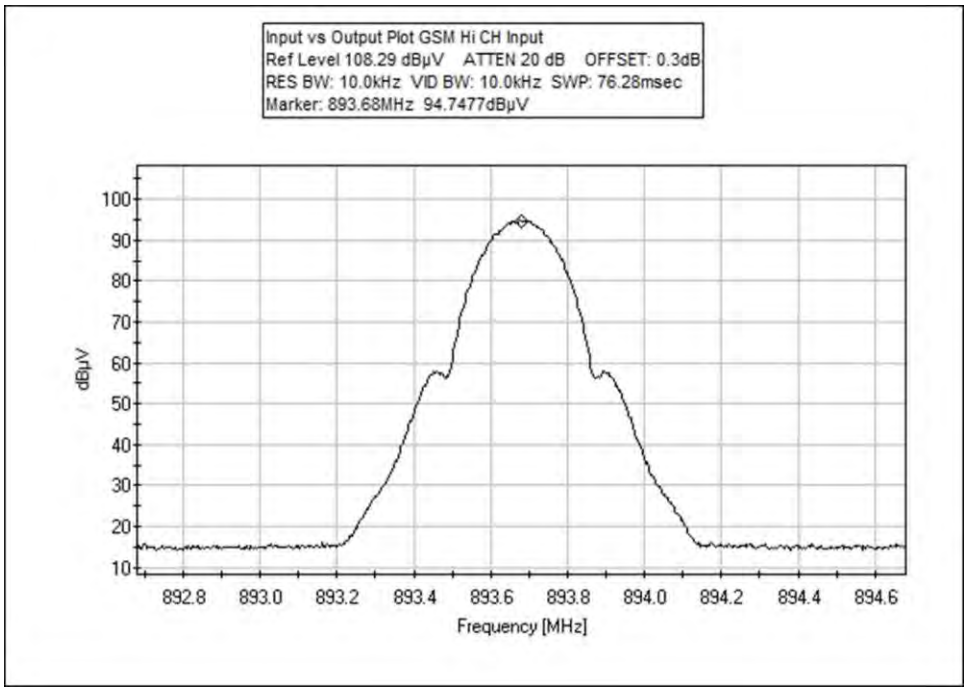
Modulation	Input Power (dbm)
GSM	
869.32MHz	-1.98
881.5MHz	-2.64
893.68MHz	-1.14
EDGE	
869.3MHz	-1.96
881.5MHz	-2.5
893.7MHz	-1
CDMA (IS95A)	
869.76MHz	-2.1
881.5MHz	-2.66
893.24MHz	-1.28
UMTS (WCMDA 3GPP)	
871.5MHz	-2.4
881.5MHz	-2.7
891.5MHz	-1.54
LTE 1.4MHz	
869.75MHz	-2.04
881.5MHz	-2.6
893.25MHz	-1.22
LTE 5MHz	
871.65MHz	-2.42
881.5MHz	-2.72
891.35MHz	-1.56
LTE 20MHz	
879.25MHz	-2.62
881.5MHz	-2.56
883.75MHz	-2.44

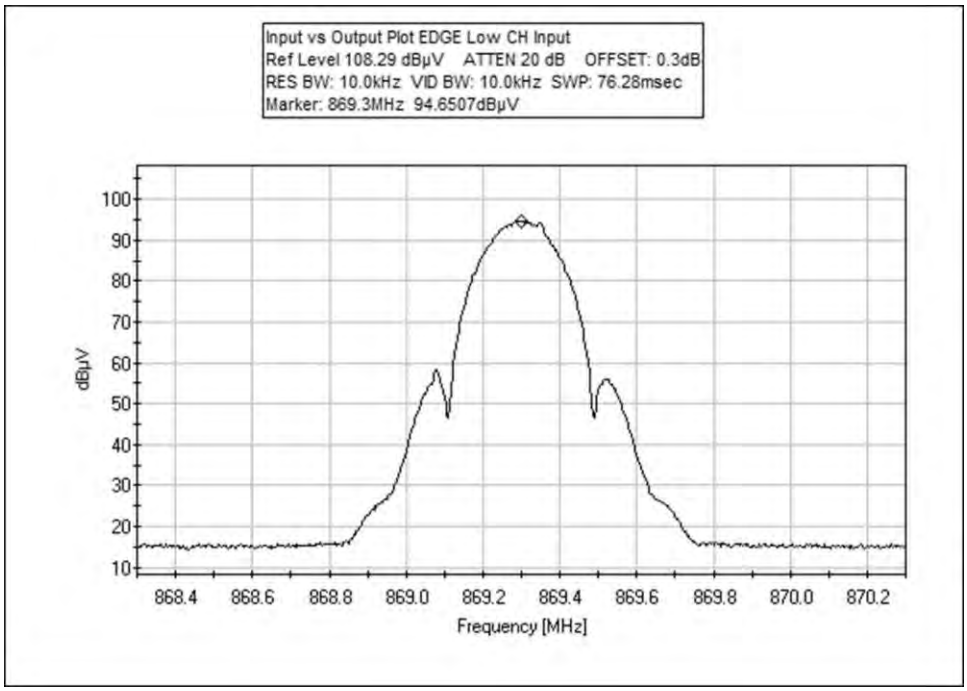
19°C, 63% Relative Humidity
Site D

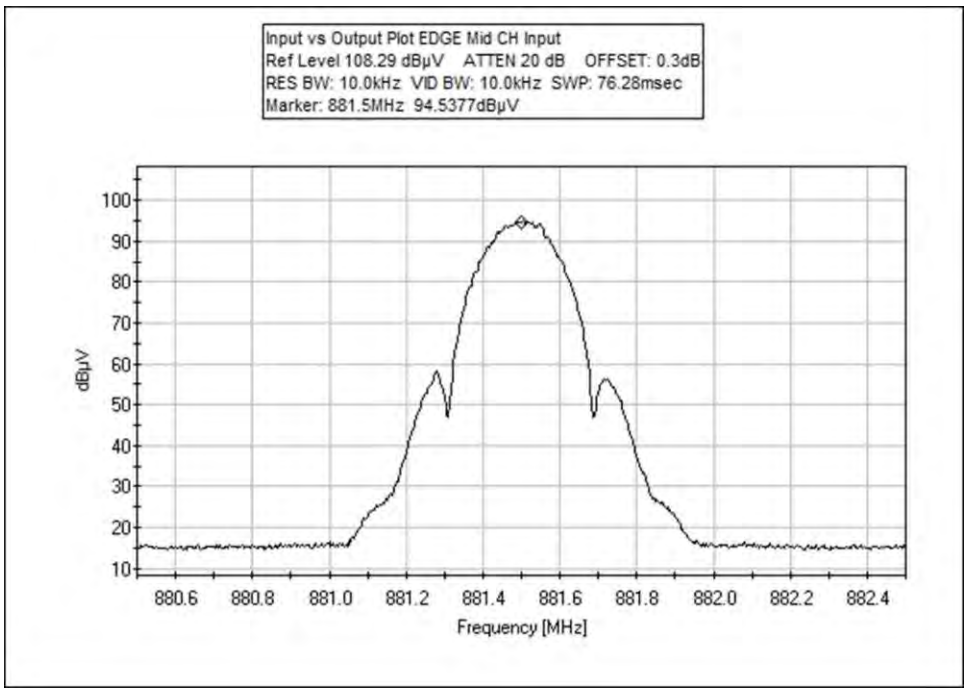
Test Data- Input

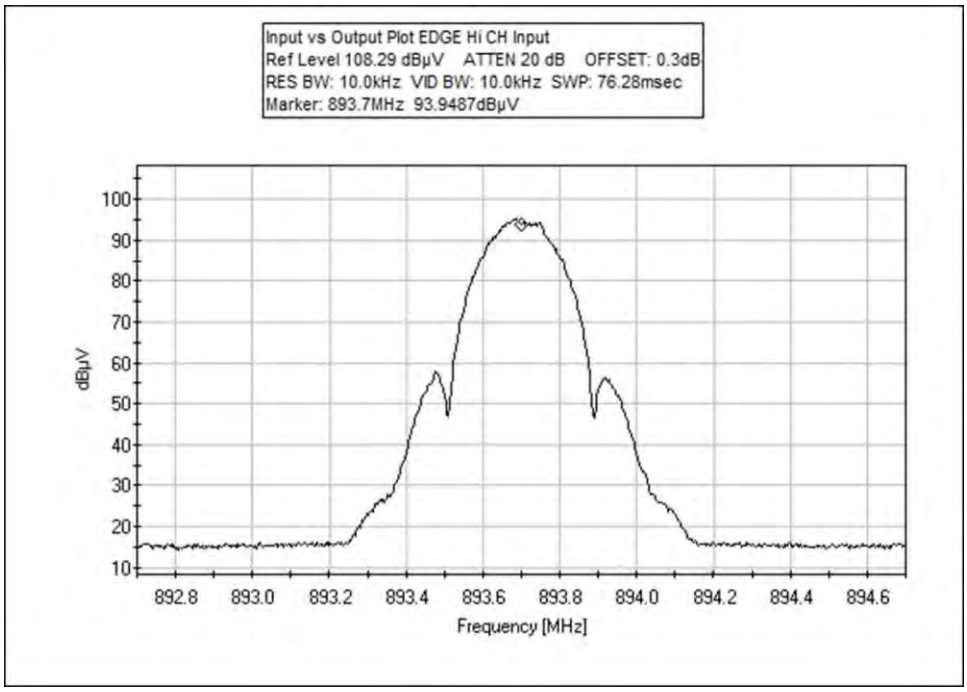


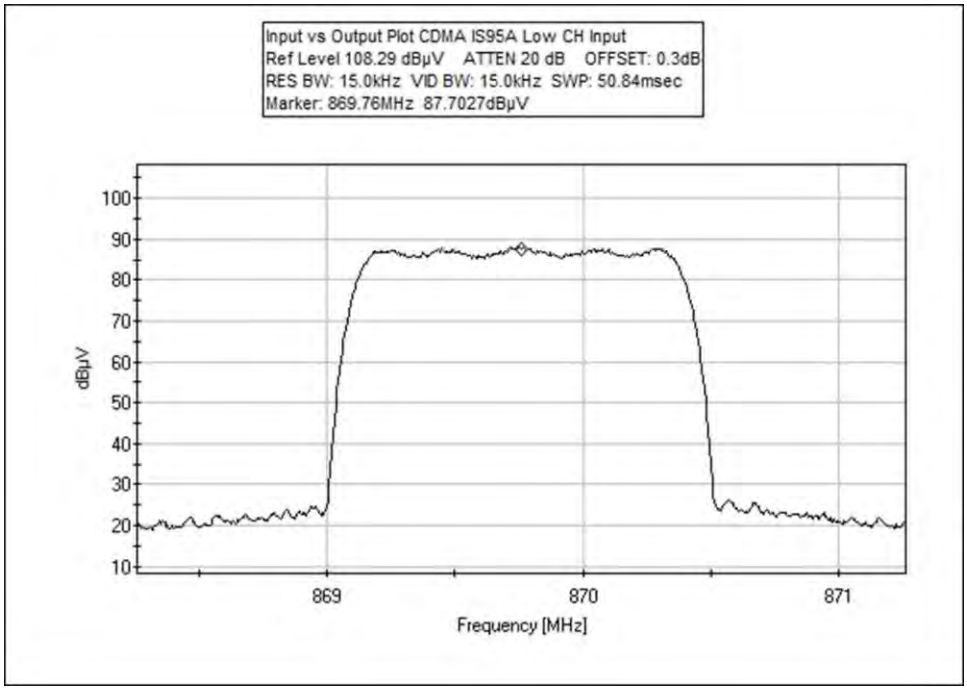


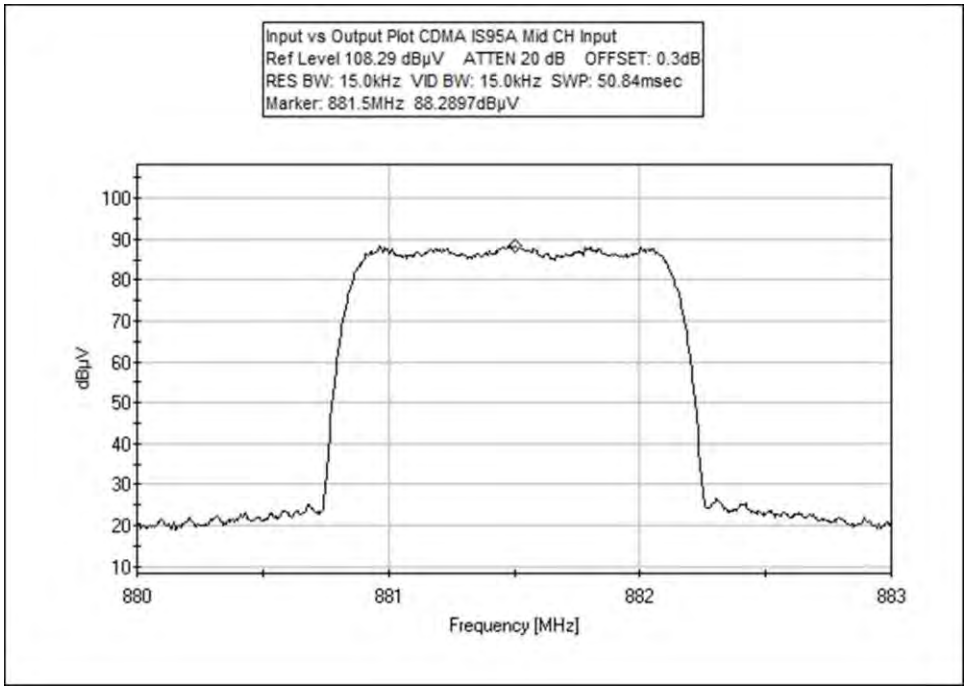

Input vs Output Plot GSM Hi CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 10.0kHz VID BW: 10.0kHz SWP: 76.28msec
Marker: 893.68MHz 94.7477dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
892.8
893.0
893.2
893.4
893.6
893.8
894.0
894.2
894.4
894.6
Frequency [MHz]

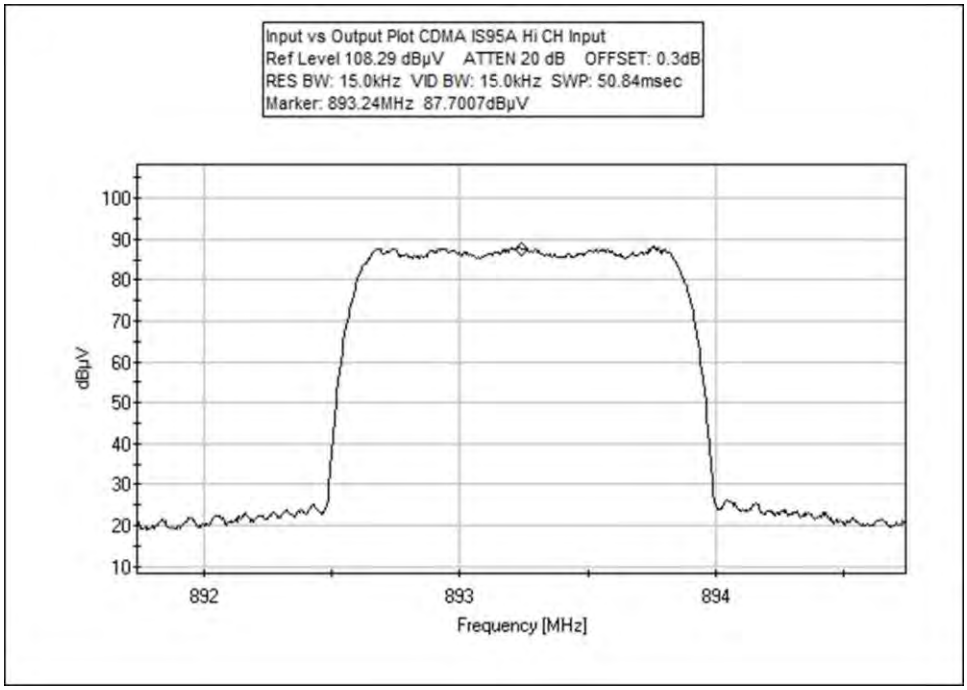

Input vs Output Plot EDGE Low CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 10.0kHz VID BW: 10.0kHz SWP: 76.28msec
Marker: 869.3MHz 94.6507dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
868.4
868.6
868.8
869.0
869.2
869.4
869.6
869.8
870.0
870.2
Frequency [MHz]

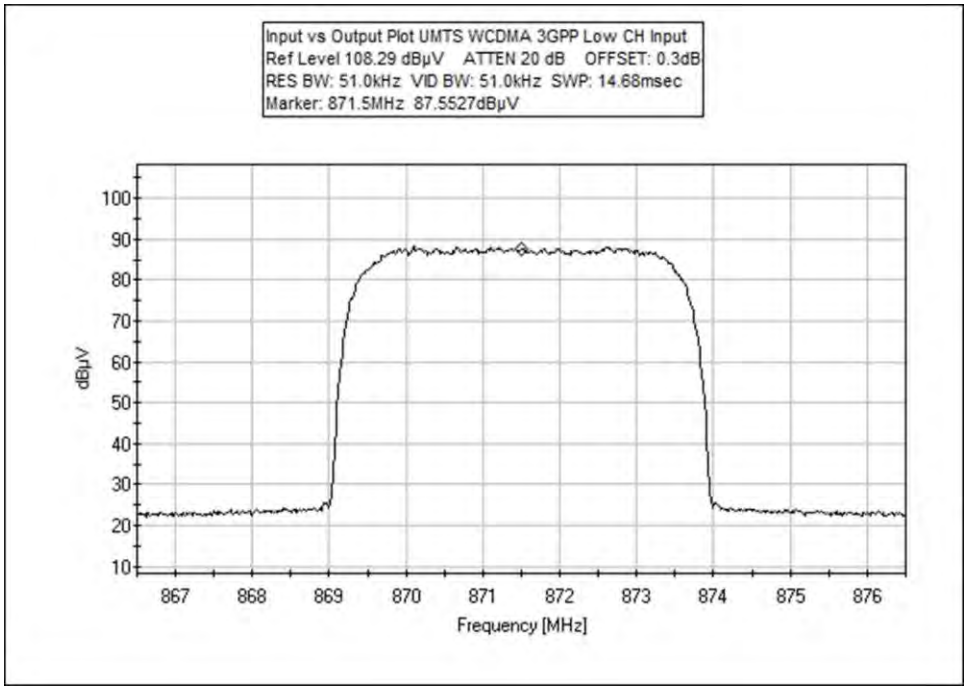

Input vs Output Plot EDGE Mid CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 10.0kHz VID BW: 10.0kHz SWP: 76.28msec
Marker: 881.5MHz 94.5377dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
880.6
880.8
881.0
881.2
881.4
881.6
881.8
882.0
882.2
882.4
Frequency [MHz]

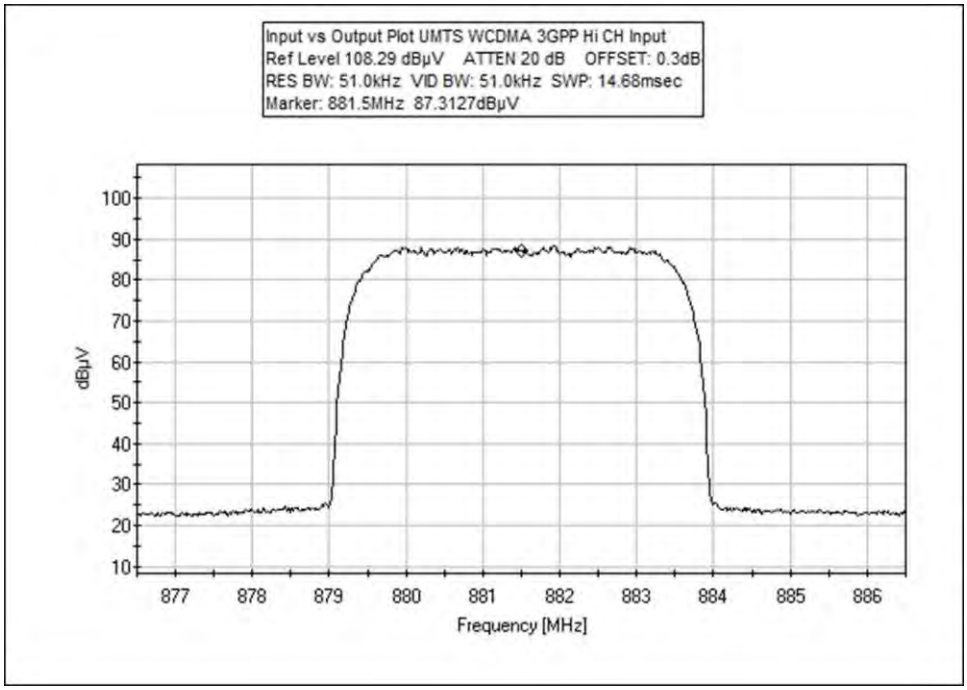

Input vs Output Plot EDGE Hi CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 10.0kHz VID BW: 10.0kHz SWP: 76.28msec
Marker: 893.7MHz 93.9487dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
892.8
893.0
893.2
893.4
893.6
893.8
894.0
894.2
894.4
894.6
Frequency [MHz]

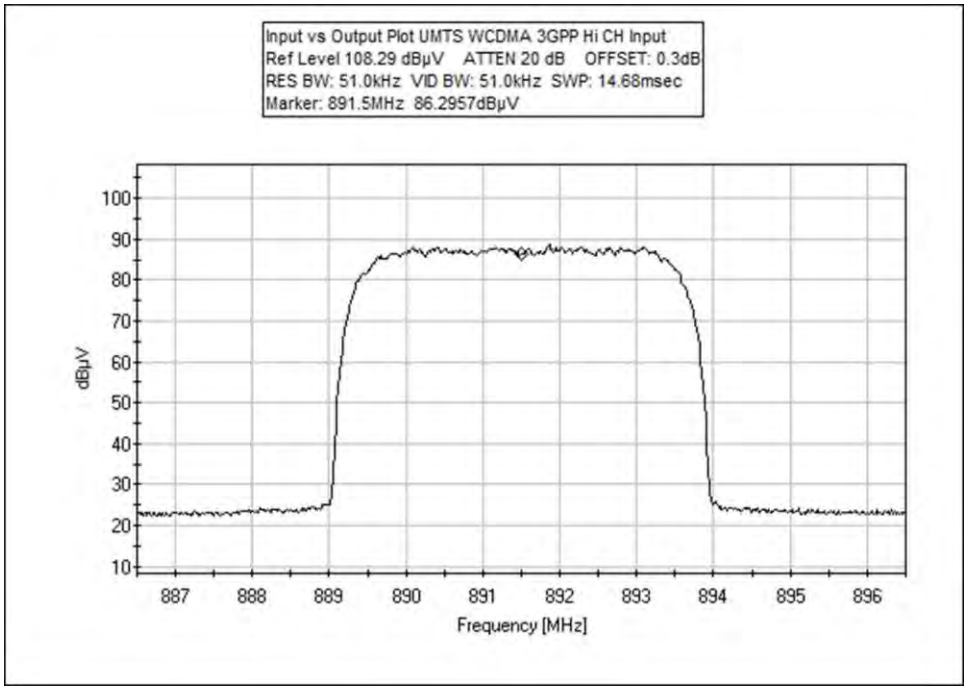

Input vs Output Plot CDMA IS95A Low CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 869.76MHz 87.7027dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
869
870
871
Frequency [MHz]

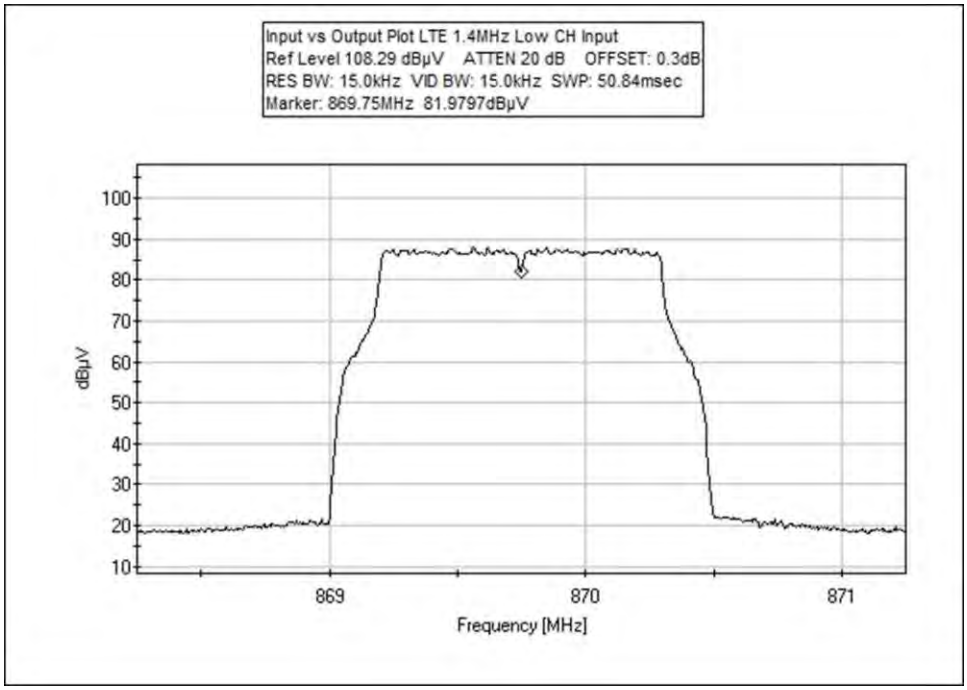

Input vs Output Plot CDMA IS95A Mid CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 881.5MHz 88.2897dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
880
881
882
883
Frequency [MHz]

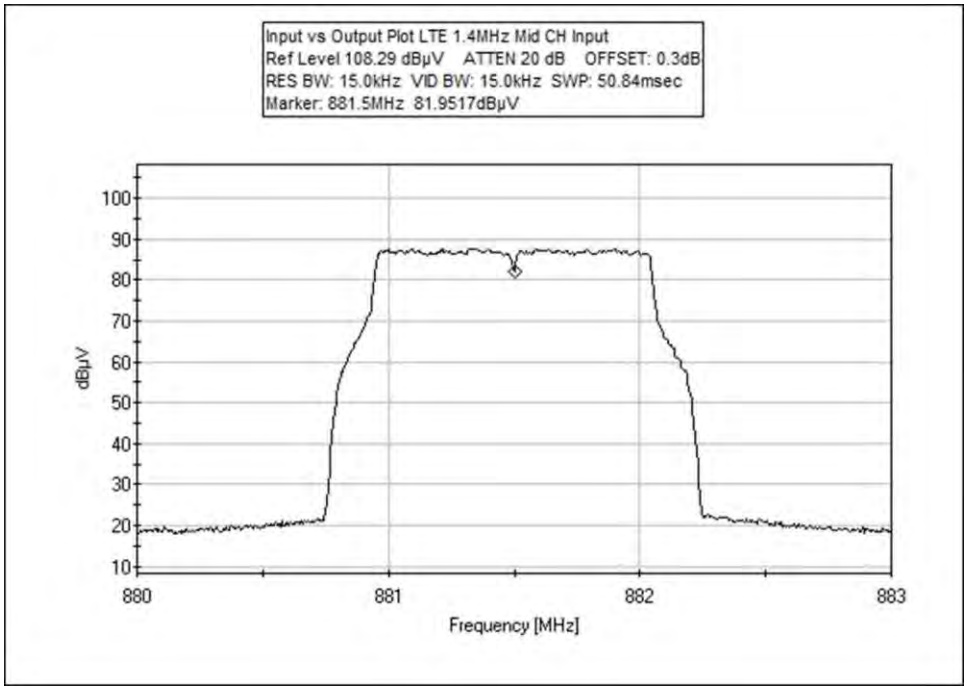

Input vs Output Plot CDMA IS95A Hi CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 893.24MHz 87.7007dBµV
100
90
80
70
60
50
40
30
20
10
dBµV
892
893
894
Frequency [MHz]

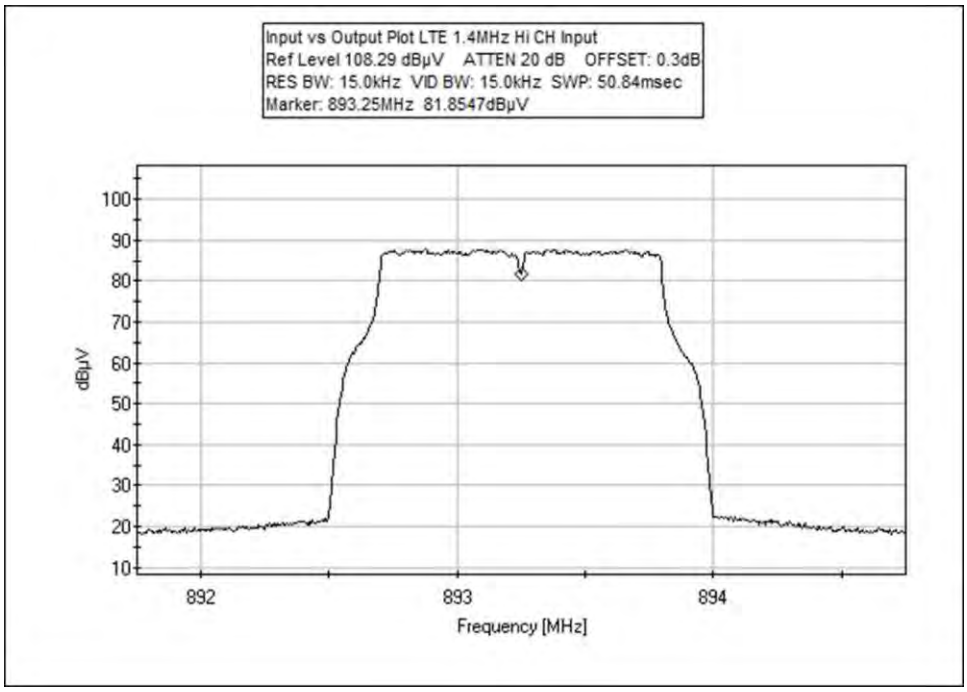

Input vs Output Plot UMTS WCDMA 3GPP Low CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 871.5MHz 87.5527dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
867
868
869
870
871
872
873
874
875
876
Frequency [MHz]

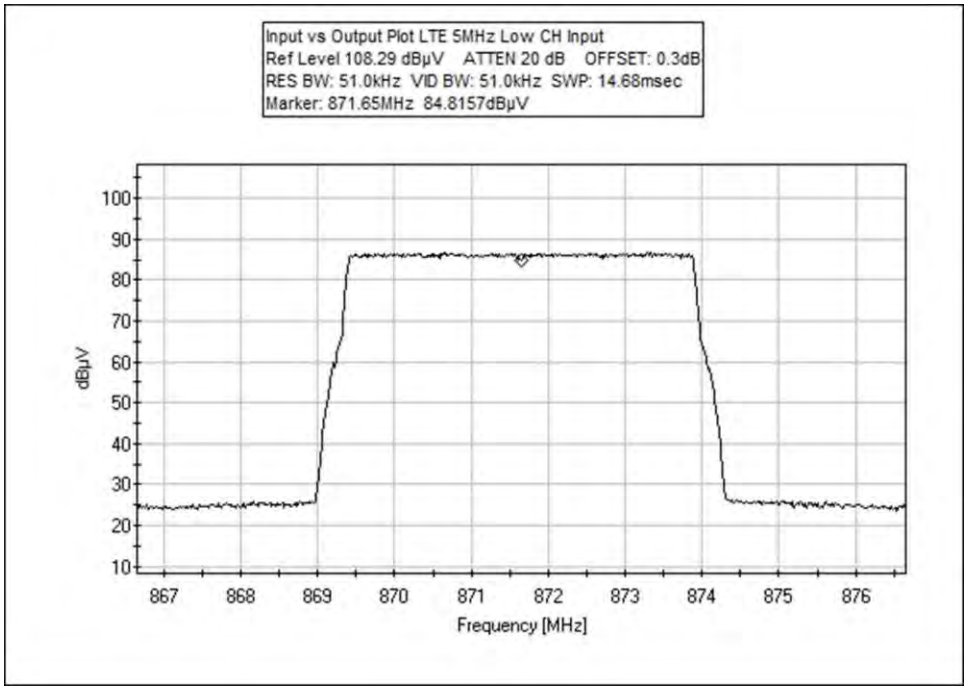

Input vs Output Plot UMTS WCDMA 3GPP Hi CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 881.5MHz 87.3127dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
877
878
879
880
881
882
883
884
885
886
Frequency [MHz]

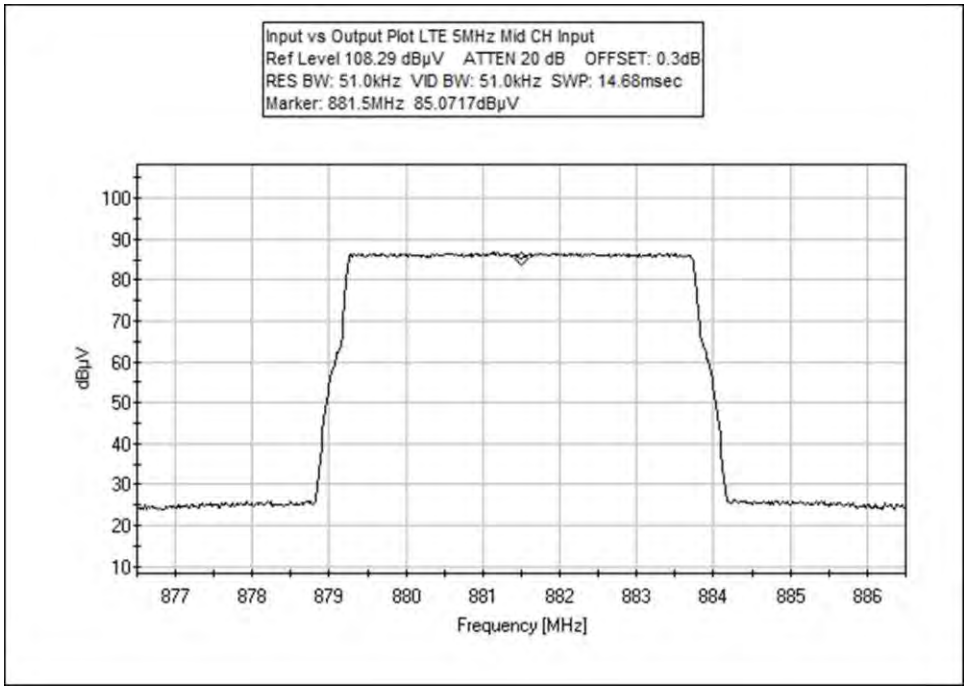

Input vs Output Plot UMTS WCDMA 3GPP Hi CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 891.5MHz 86.2957dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
887
888
889
890
891
892
893
894
895
896
Frequency [MHz]

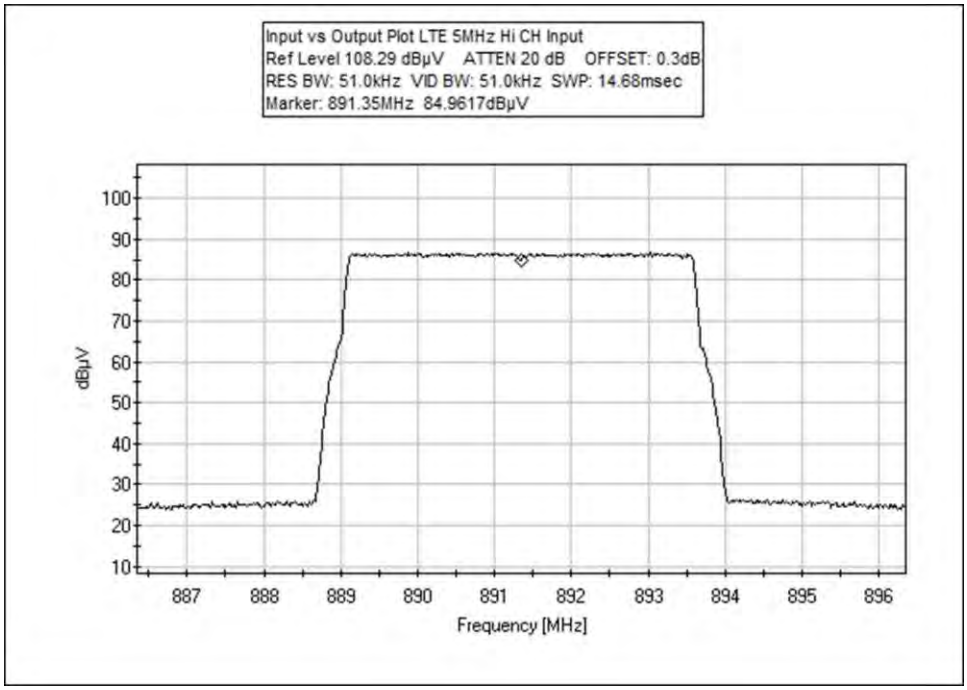

Input vs Output Plot LTE 1.4MHz Low CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 869.75MHz 81.9797dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
869
870
871
Frequency [MHz]

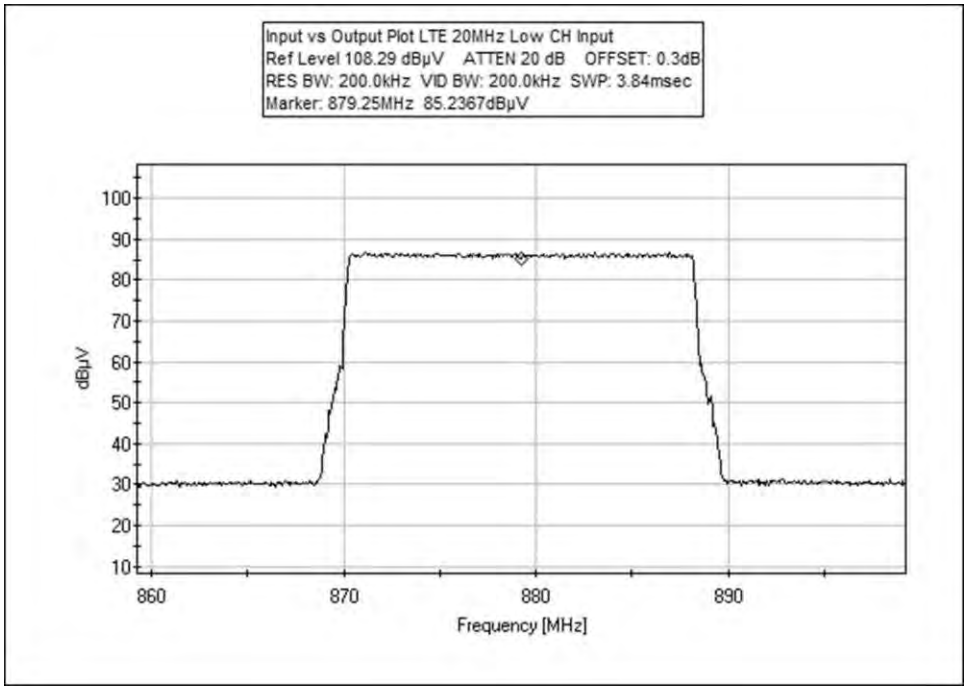

Input vs Output Plot LTE 1.4MHz Mid CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 881.5MHz 81.9517dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
880
881
882
883
Frequency [MHz]

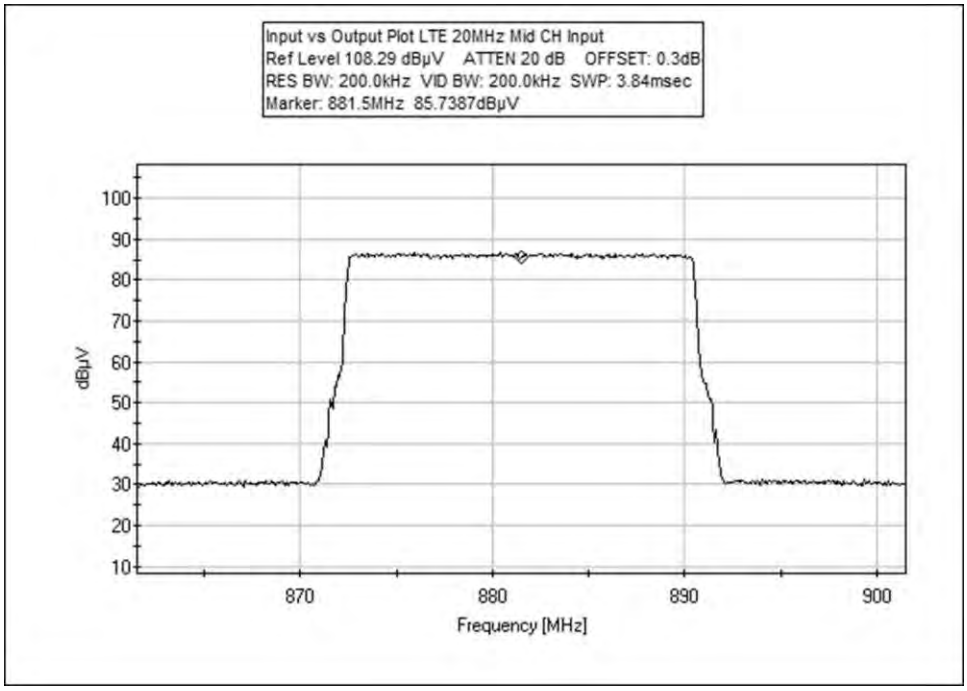

Input vs Output Plot LTE 1.4MHz Hi CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 893.25MHz 81.8547dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
892
893
894
Frequency [MHz]

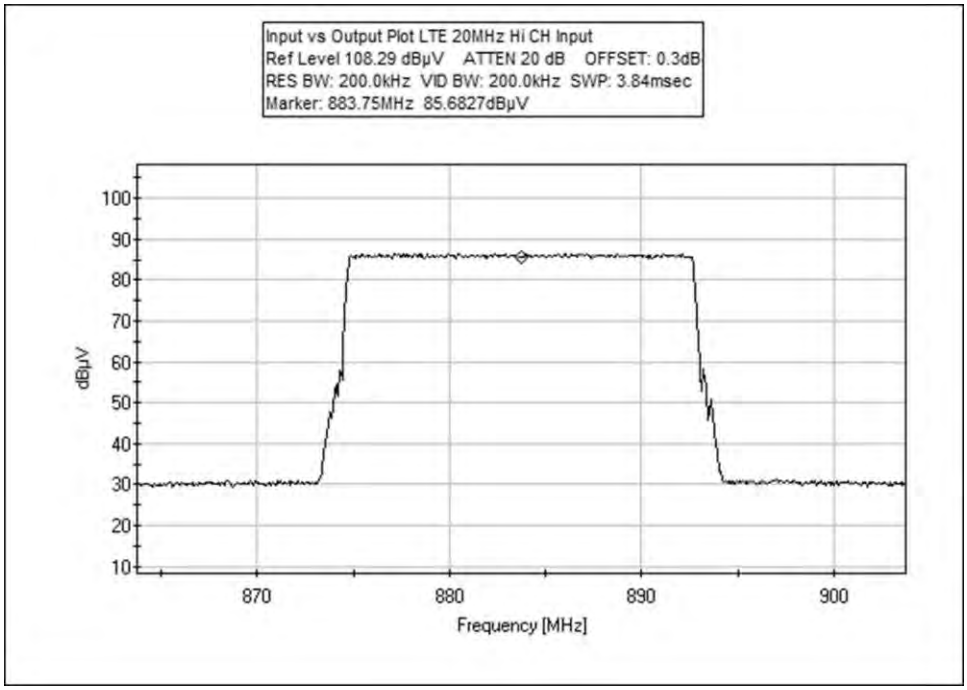

Input vs Output Plot LTE 5MHz Low CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 871.65MHz 84.8157dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
867
868
869
870
871
872
873
874
875
876
Frequency [MHz]


Input vs Output Plot LTE 5MHz Mid CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 881.5MHz 85.0717dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
877
878
879
880
881
882
883
884
885
886
Frequency [MHz]

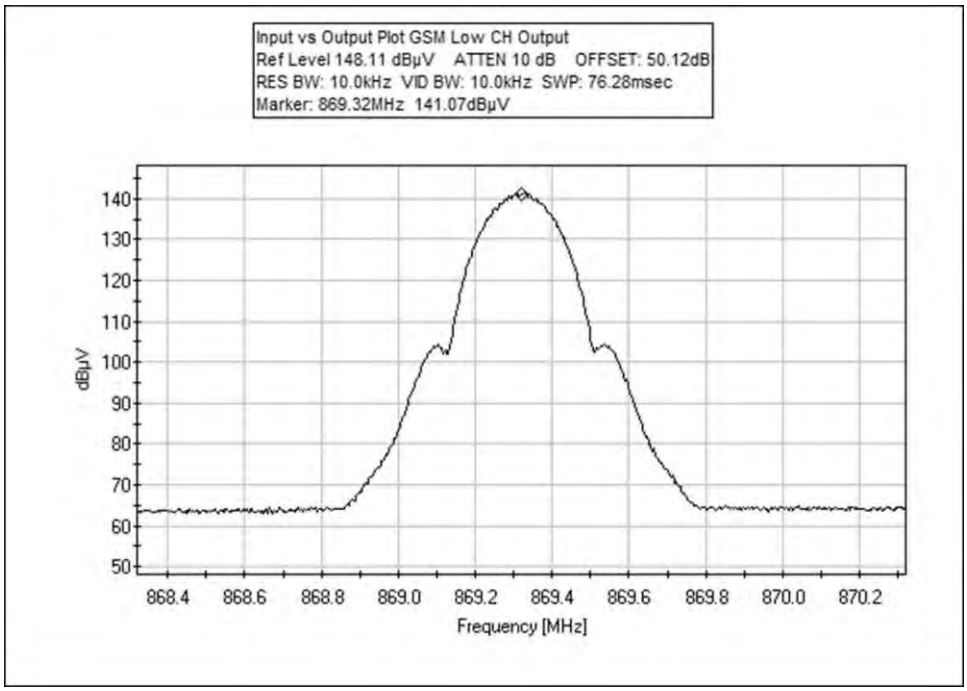

Input vs Output Plot LTE 5MHz Hi CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 891.35MHz 84.9617dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
887
888
889
890
891
892
893
894
895
896
Frequency [MHz]

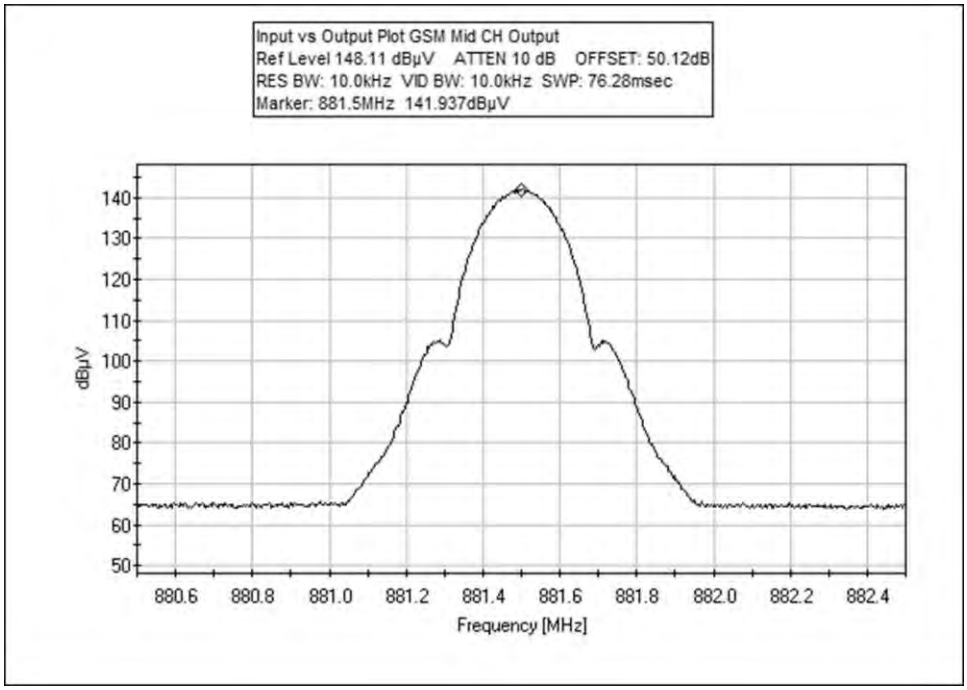

Input vs Output Plot LTE 20MHz Low CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 200.0kHz VID BW: 200.0kHz SWP: 3.84msec
Marker: 879.25MHz 85.2367dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
860
870
880
890
Frequency [MHz]

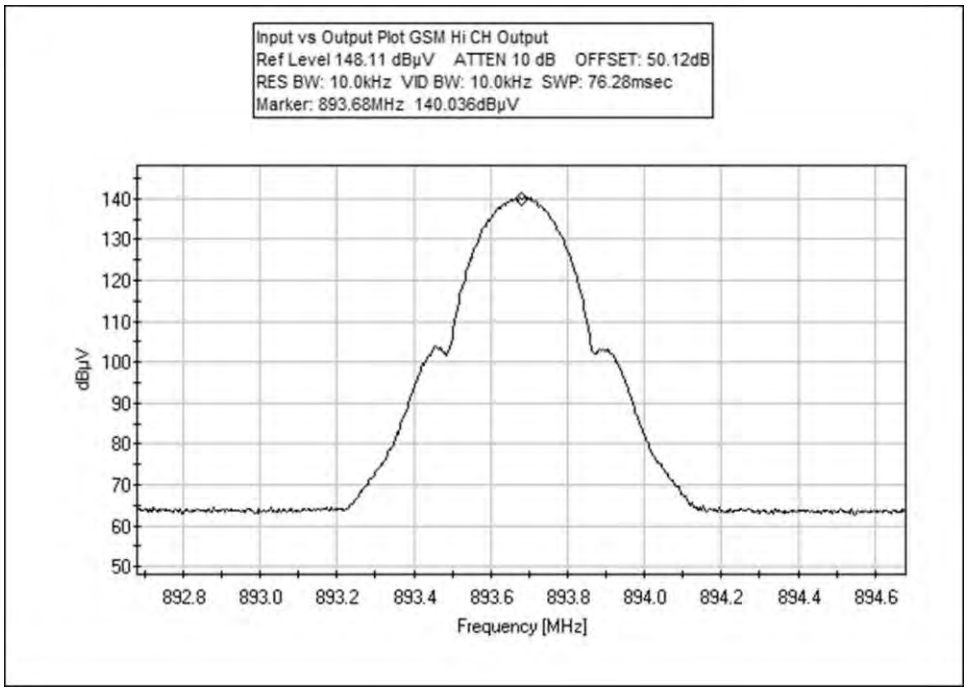

Input vs Output Plot LTE 20MHz Mid CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 200.0kHz VID BW: 200.0kHz SWP: 3.84msec
Marker: 881.5MHz 85.7387dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
870
880
890
900
Frequency [MHz]

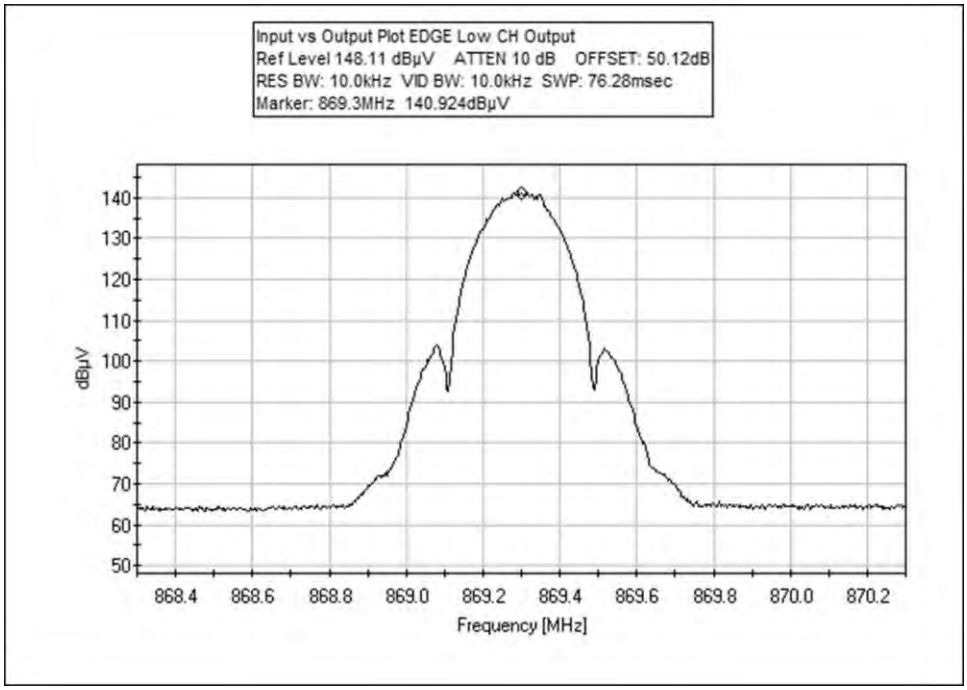

Input vs Output Plot LTE 20MHz Hi CH Input
Ref Level 108.29 dBµV ATTEN 20 dB OFFSET: 0.3dB
RES BW: 200.0kHz VID BW: 200.0kHz SWP: 3.84msec
Marker: 883.75MHz 85.6827dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
870
880
890
900
Frequency [MHz]

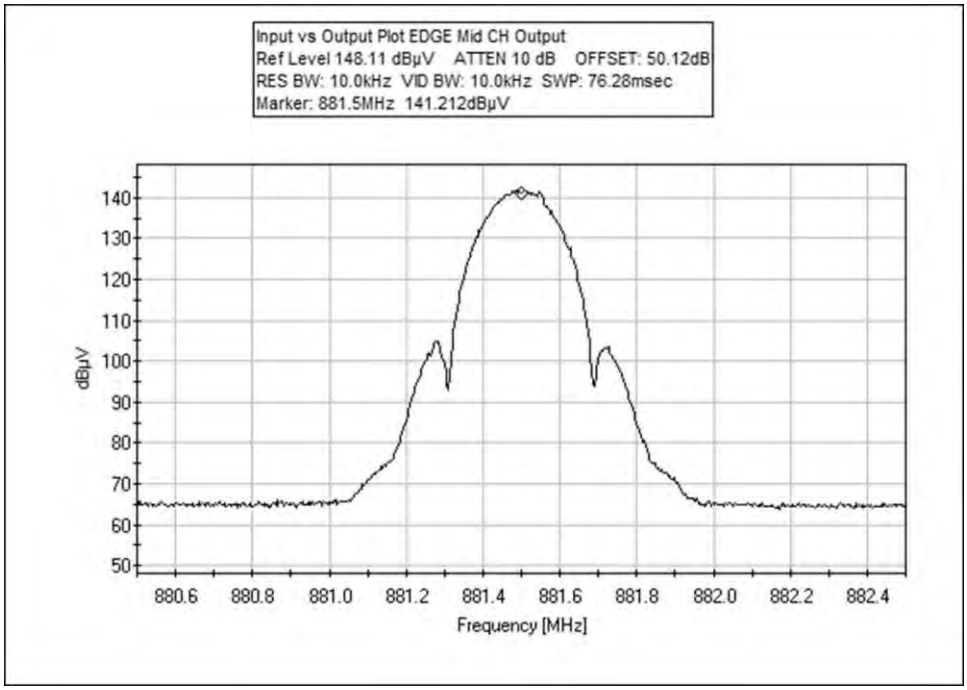
Test Data - Output

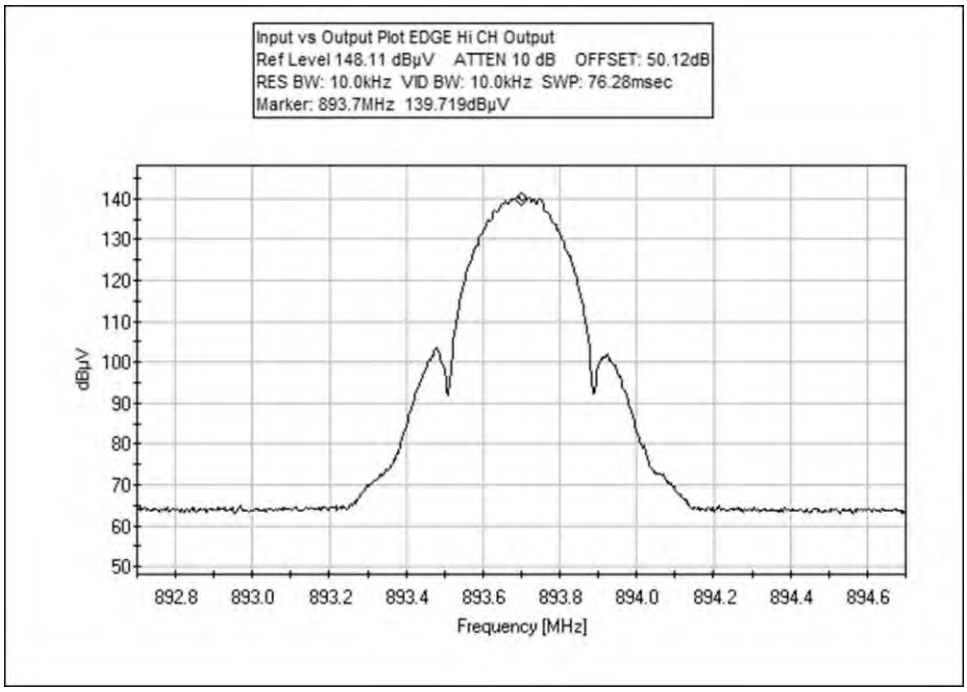


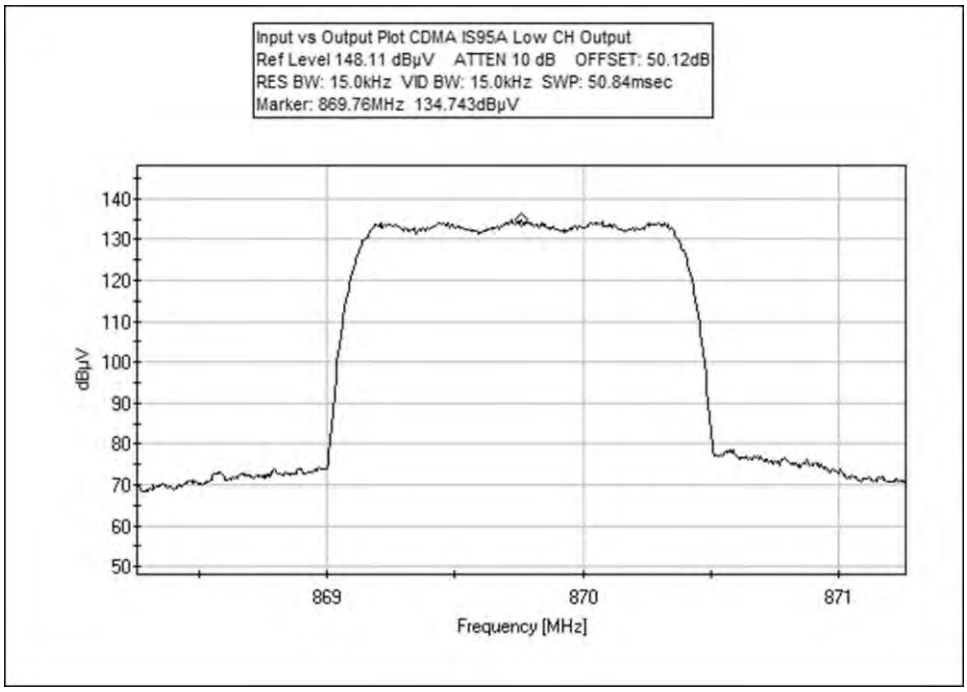


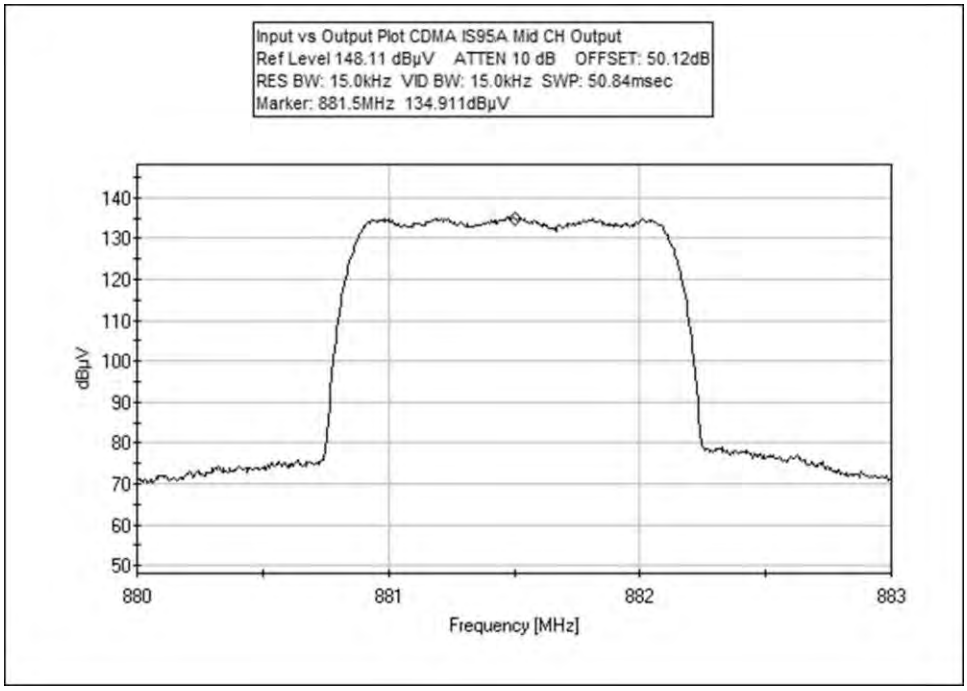

Input vs Output Plot GSM Hi CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 10.0kHz VID BW: 10.0kHz SWP: 76.28msec
Marker: 893.68MHz 140.036dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
892.8
893.0
893.2
893.4
893.6
893.8
894.0
894.2
894.4
894.6
Frequency [MHz]

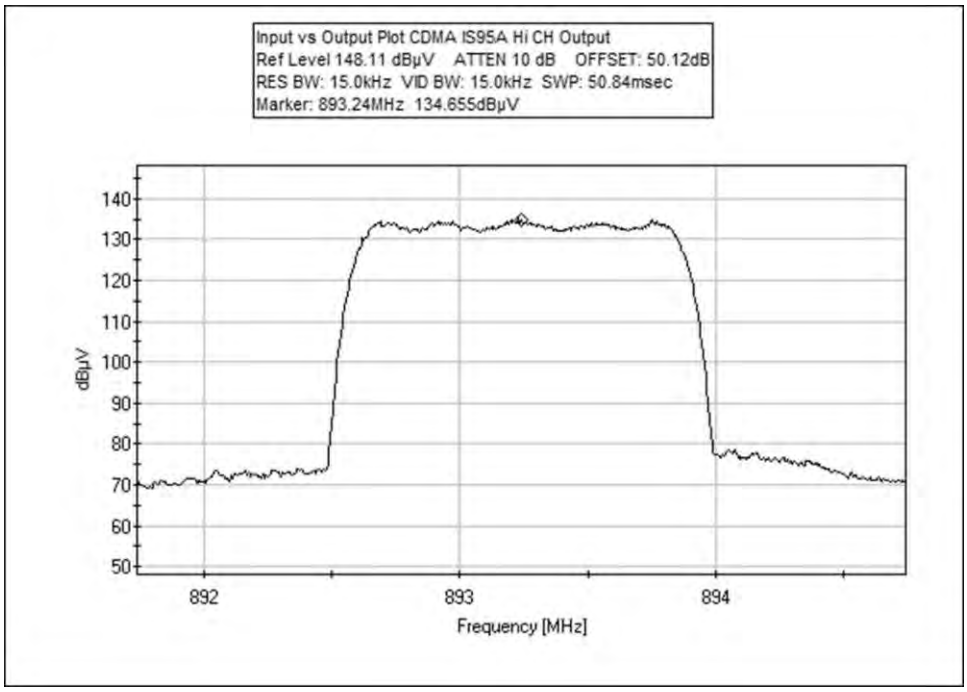

Input vs Output Plot EDGE Low CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 10.0kHz VID BW: 10.0kHz SWP: 76.28msec
Marker: 869.3MHz 140.924dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
868.4
868.6
868.8
869.0
869.2
869.4
869.6
869.8
870.0
870.2
Frequency [MHz]

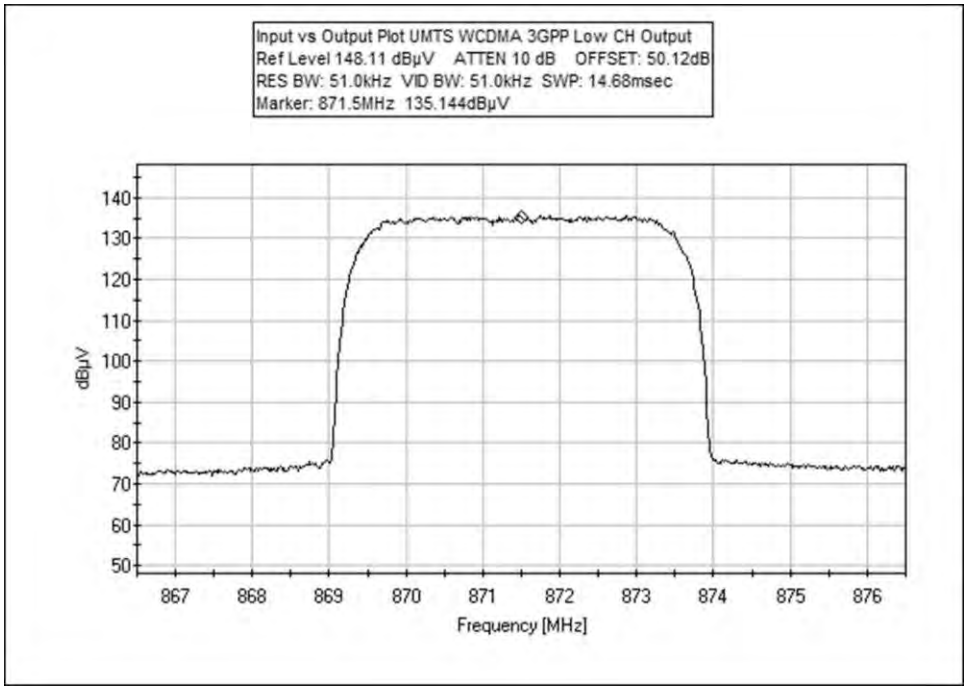

Input vs Output Plot EDGE Mid CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 10.0kHz VID BW: 10.0kHz SWP: 76.28msec
Marker: 881.5MHz 141.212dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
880.6
880.8
881.0
881.2
881.4
881.6
881.8
882.0
882.2
882.4
Frequency [MHz]

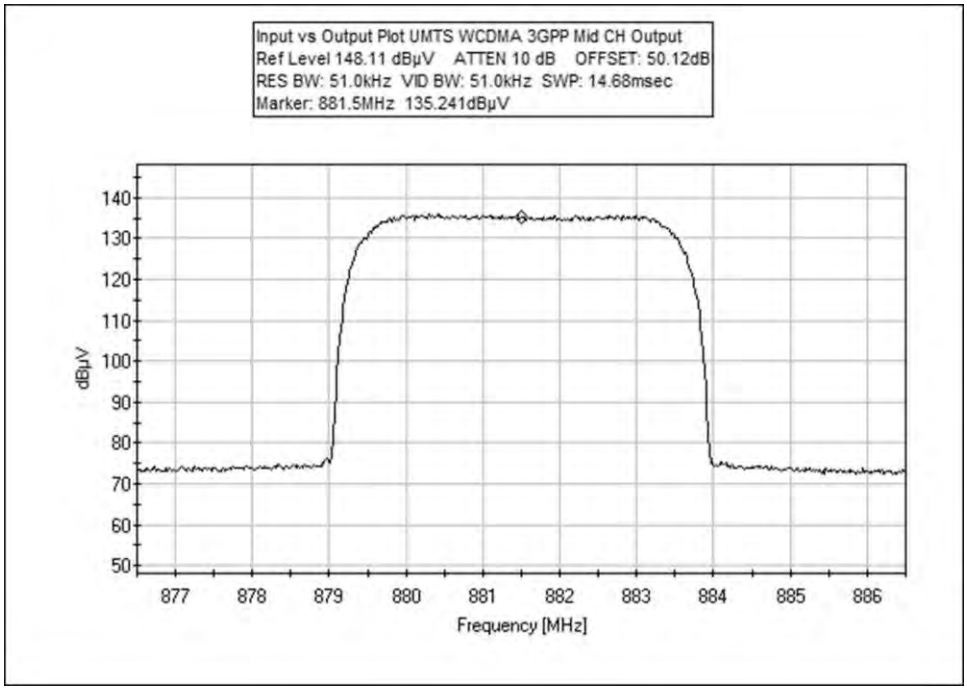

Input vs Output Plot EDGE Hi CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 10.0kHz VID BW: 10.0kHz SWP: 76.28msec
Marker: 893.7MHz 139.719dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
892.8
893.0
893.2
893.4
893.6
893.8
894.0
894.2
894.4
894.6
Frequency [MHz]

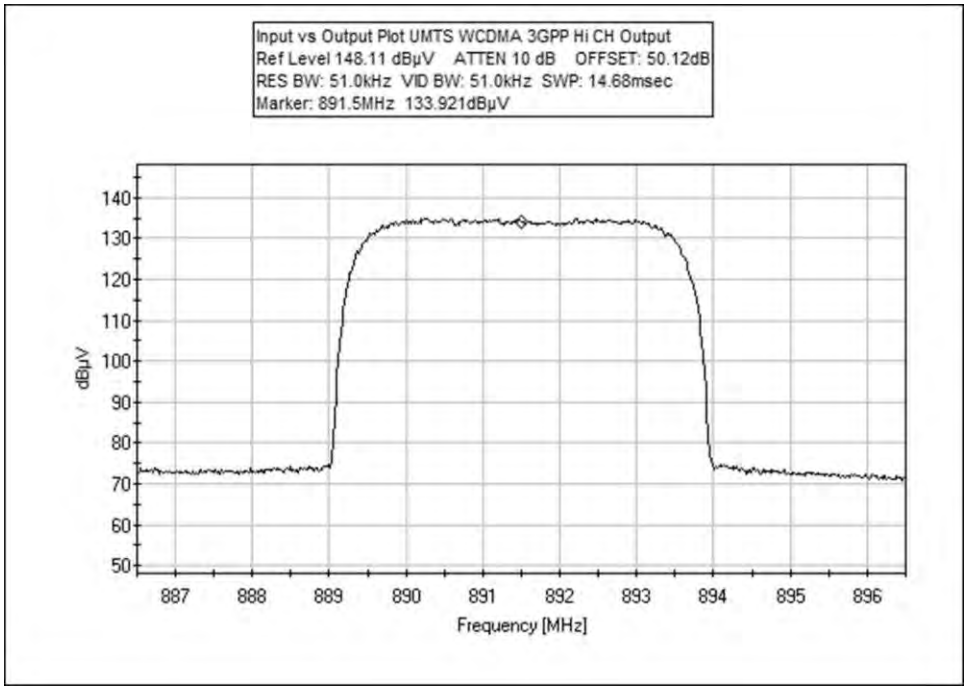

Input vs Output Plot CDMA IS95A Low CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 869.76MHz 134.743dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
869
870
871
Frequency [MHz]

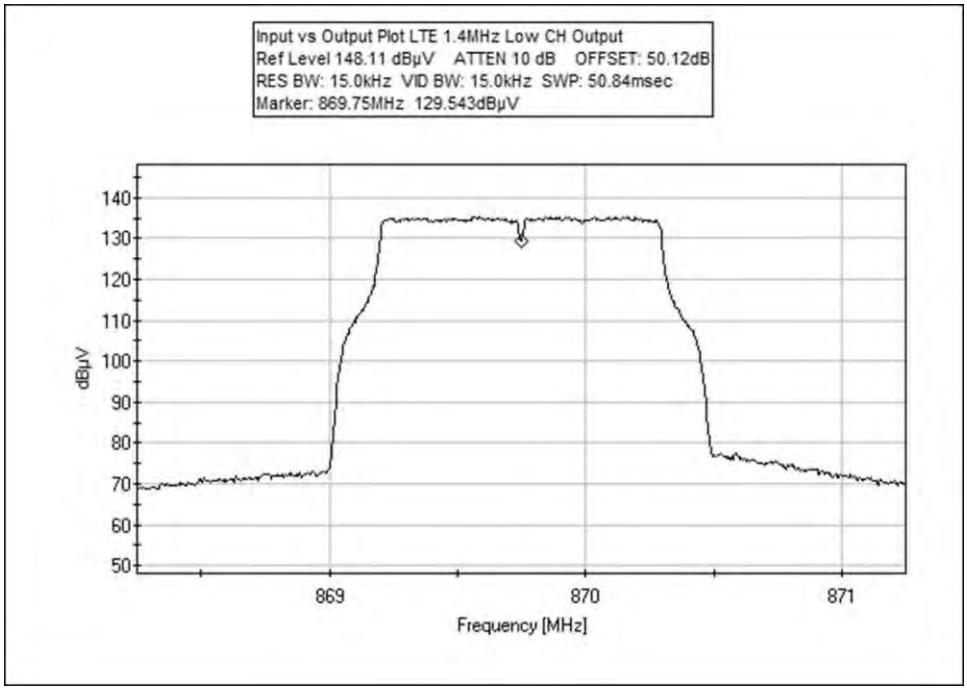

Input vs Output Plot CDMA IS95A Mid CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 881.5MHz 134.911dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
880
881
882
883
Frequency [MHz]

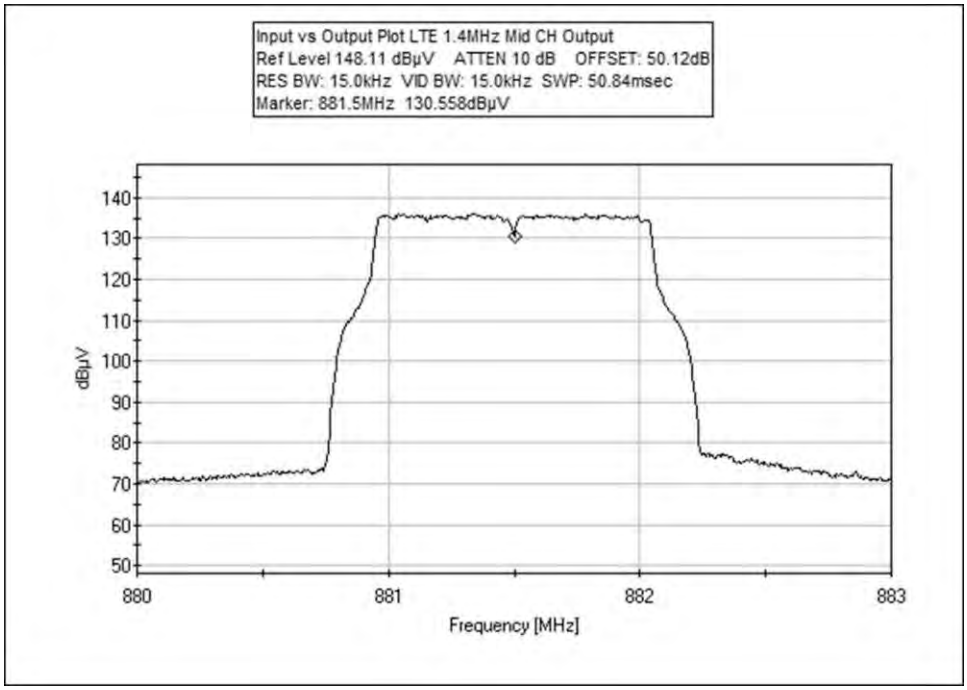

Input vs Output Plot CDMA IS95A Hi CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 893.24MHz 134.655dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
892
893
894
Frequency [MHz]

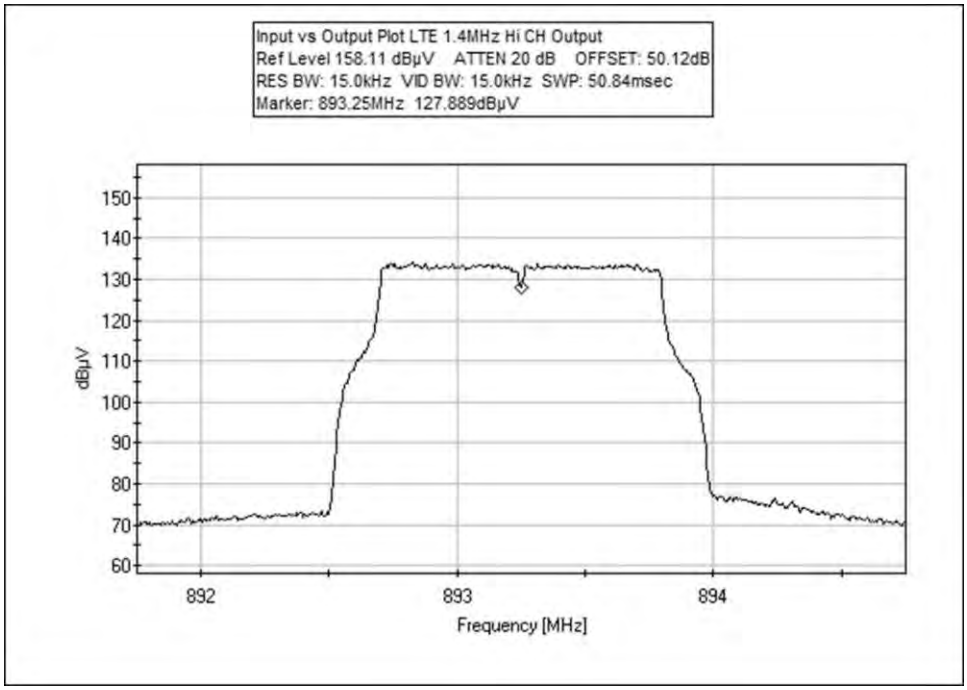

Input vs Output Plot UMTS WCDMA 3GPP Low CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 871.5MHz 135.144dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
867
868
869
870
871
872
873
874
875
876
Frequency [MHz]

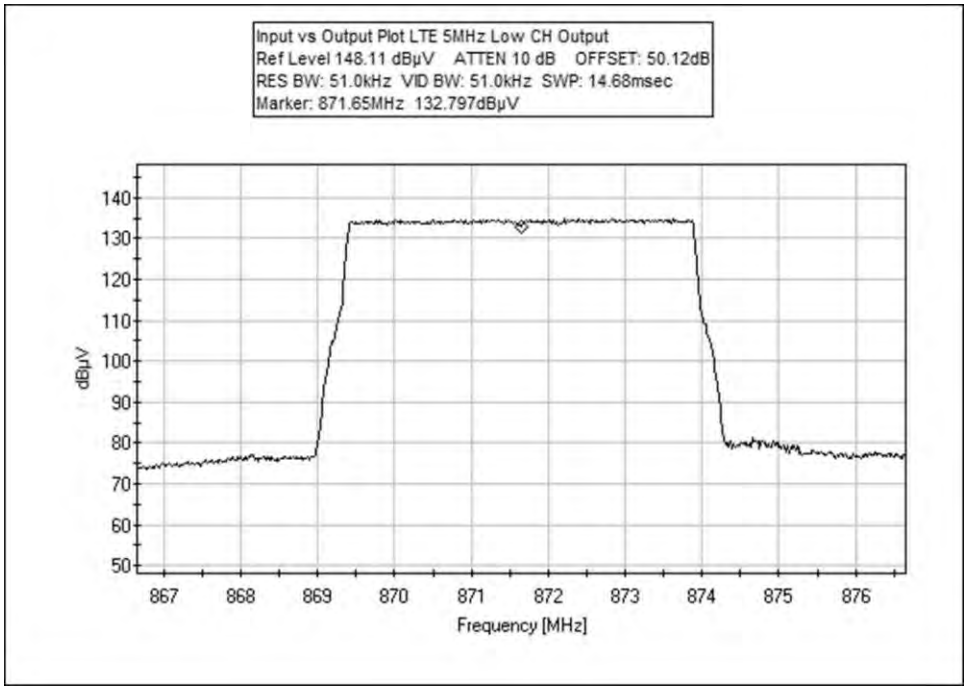

Input vs Output Plot UMTS WCDMA 3GPP Mid CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 881.5MHz 135.241dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
877
878
879
880
881
882
883
884
885
886
Frequency [MHz]

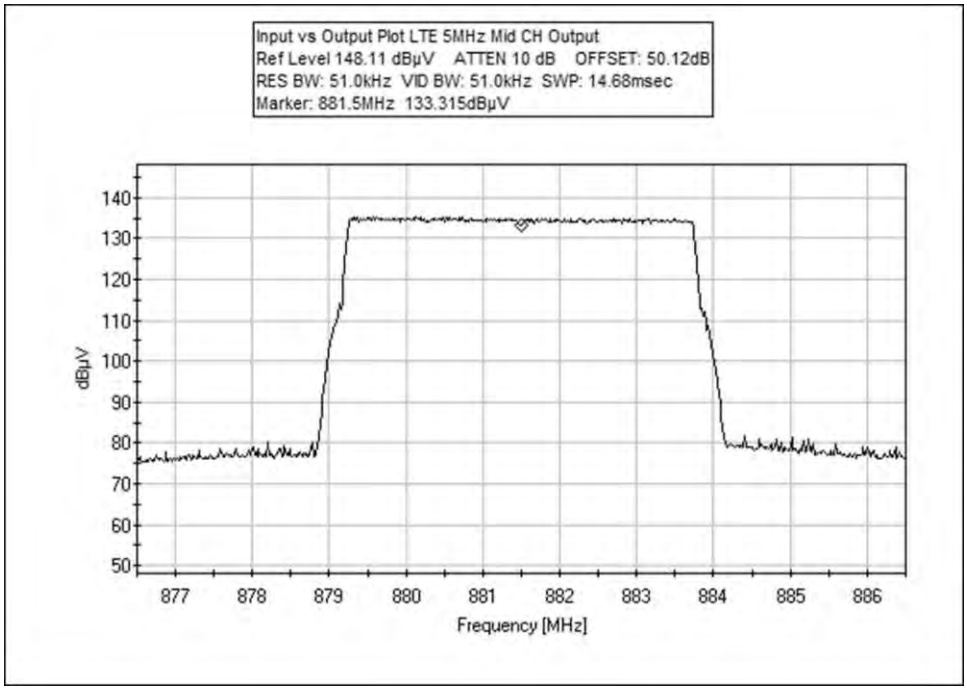

Input vs Output Plot UMTS WCDMA 3GPP Hi CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 891.5MHz 133.921dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
887
888
889
890
891
892
893
894
895
896
Frequency [MHz]

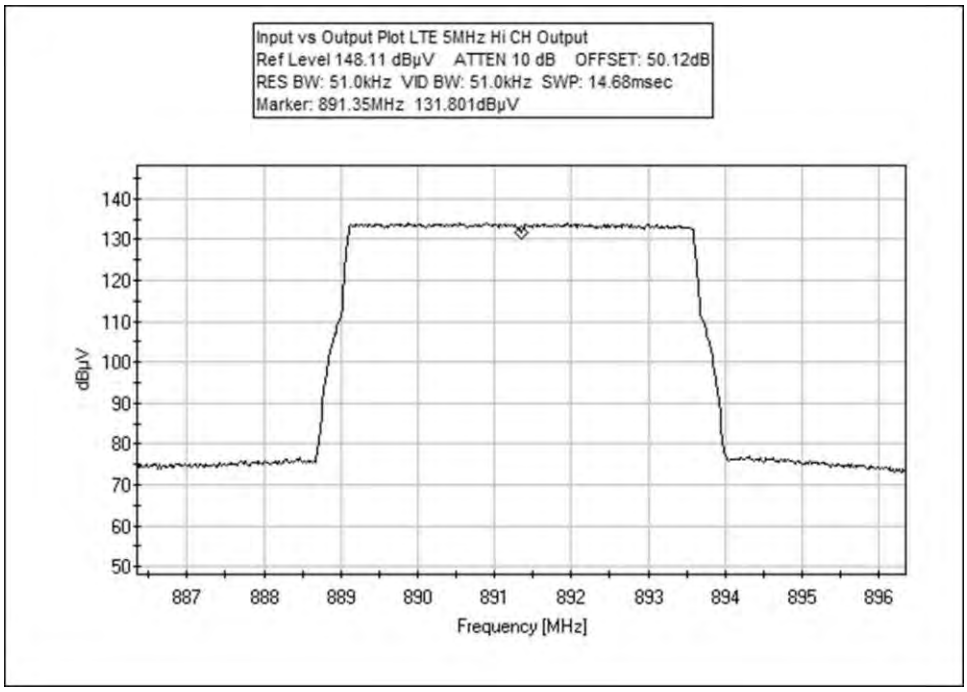

Input vs Output Plot LTE 1.4MHz Low CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 869.75MHz 129.543dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
869
870
871
Frequency [MHz]

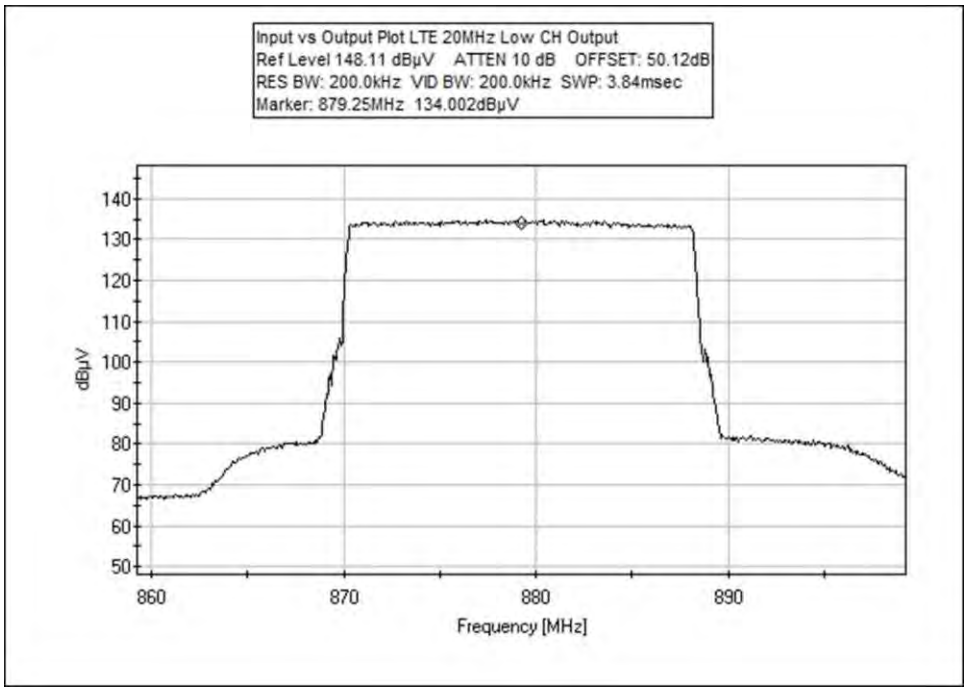

Input vs Output Plot LTE 1.4MHz Mid CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 881.5MHz 130.558dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
880
881
882
883
Frequency [MHz]

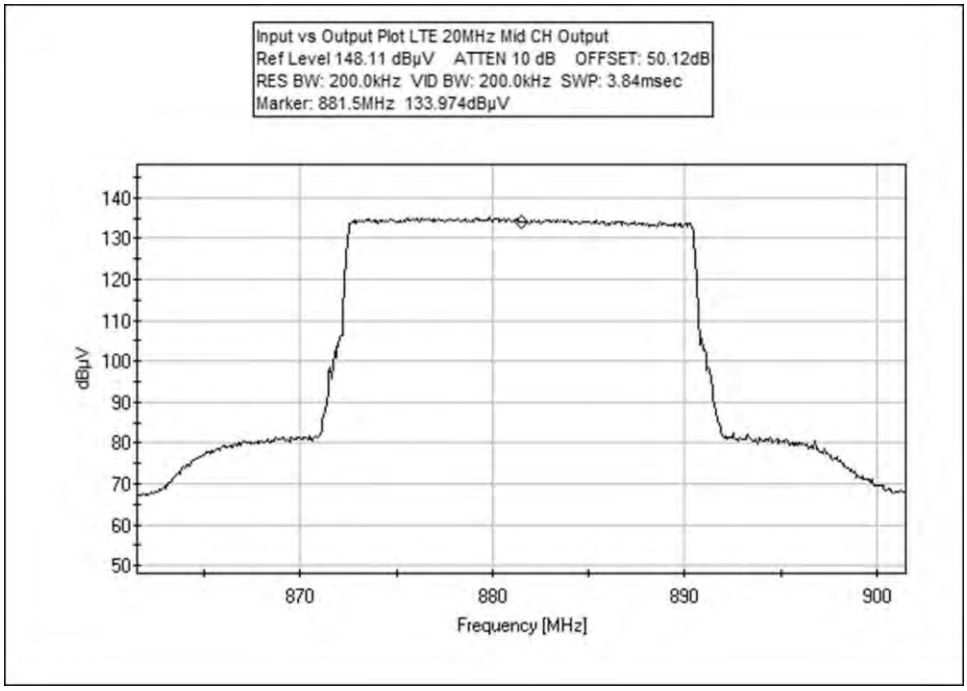

Input vs Output Plot LTE 1.4MHz Hi CH Output
Ref Level 158.11 dBµV ATTEN 20 dB OFFSET: 50.12dB
RES BW: 15.0kHz VID BW: 15.0kHz SWP: 50.84msec
Marker: 893.25MHz 127.889dBµV
dBµV
150
140
130
120
110
100
90
80
70
60
892
893
894
Frequency [MHz]

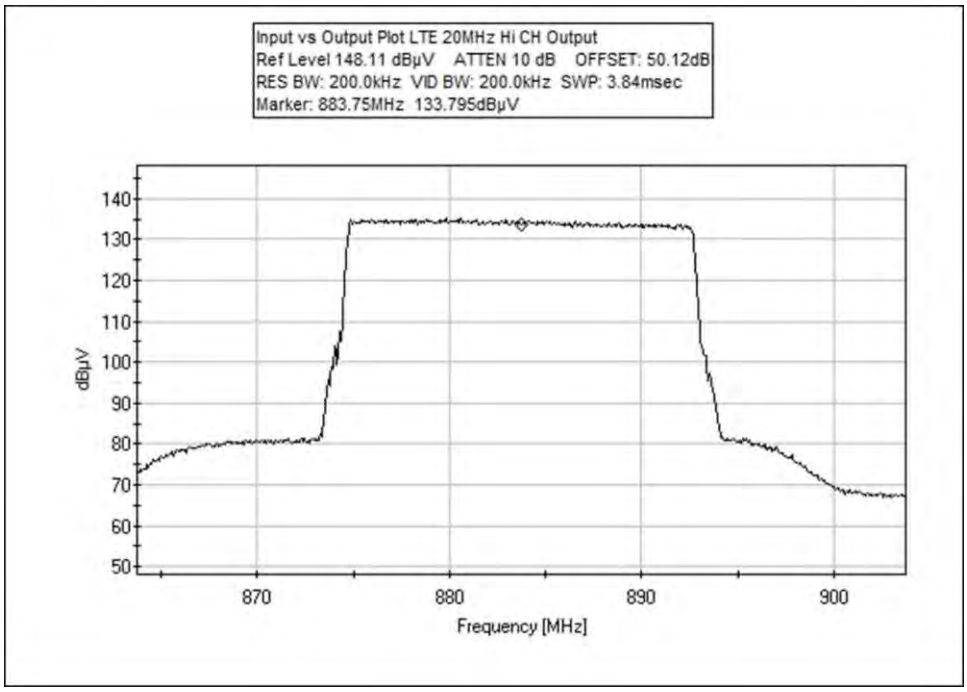

Input vs Output Plot LTE 5MHz Low CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 871.65MHz 132.797dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
867
868
869
870
871
872
873
874
875
876
Frequency [MHz]


Input vs Output Plot LTE 5MHz Mid CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 881.5MHz 133.315dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
877
878
879
880
881
882
883
884
885
886
Frequency [MHz]

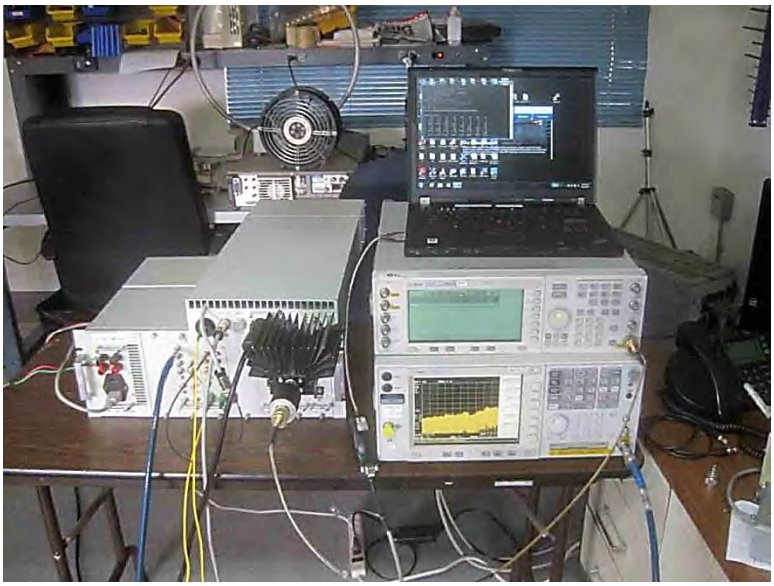

Input vs Output Plot LTE 5MHz Hi CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 51.0kHz VID BW: 51.0kHz SWP: 14.68msec
Marker: 891.35MHz 131.801dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
887
888
889
890
891
892
893
894
895
896
Frequency [MHz]


Input vs Output Plot LTE 20MHz Low CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 200.0kHz VID BW: 200.0kHz SWP: 3.84msec
Marker: 879.25MHz 134.002dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
860
870
880
890
Frequency [MHz]


Input vs Output Plot LTE 20MHz Mid CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 200.0kHz VID BW: 200.0kHz SWP: 3.84msec
Marker: 881.5MHz 133.974dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
870
880
890
900
Frequency [MHz]


Input vs Output Plot LTE 20MHz Hi CH Output
Ref Level 148.11 dBµV ATTEN 10 dB OFFSET: 50.12dB
RES BW: 200.0kHz VID BW: 200.0kHz SWP: 3.84msec
Marker: 883.75MHz 133.795dBµV
dBµV
140
130
120
110
100
90
80
70
60
50
870
880
890
900
Frequency [MHz]

Test Setup Photos



22.917(a) / 2.1051 Antenna Conducted Emissions

Test Data Sheet

Test Location: CKC Laboratories, Inc. • 110 North Olinda Place • Brea, CA 92823• 714-993-6112

Customer:	**BTI Wireless**		
Specification:	**FCC Part 22.917(a) Conducted Spurious Emission**		
Work Order #:	**95179**	Date:	12/20/2013
Test Type:	**Conducted Emissions**	Time:	15:17:27
Equipment:	**850MHz 40W Remote Transmitting Unit**	Sequence#:	0
Manufacturer:	BTI Wireless	Tested By:	Don Nguyen
Model:	mBSC0850-040-RUMF01		110V 60Hz
S/N:	MBSC0850040RUMF01-11010002		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T2	AN02945	Cable	32022-2-2909K-36TC	10/30/2013	10/30/2015
	AN03169	High Pass Filter	HM1155-11SS	7/30/2013	7/30/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
850MHz 40W Remote Transmitting Unit*	BTI Wireless	mBSC0850-040-RUMF01	MBSC0850040RUMF01-11010002

Support Devices:

Function	Manufacturer	Model #	S/N
Attenuator 30db Pad	Weinschel	49-30-43	KW075
50 ohm Load	Generic	NA	NA
50 ohm Load	Generic	NA	NA
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
Cable	Pasternack	Sucoflex 104A	12237/4A
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 20db Pad	Weinschel	33-20-24	BJ7479

Test Conditions / Notes:

The EUT is placed on the test bench. RF to Fiber Optic Converter Tx1 In is connected to an ESG Signal generator via cable Sucoflex 104A. Fiber-1 port from the converter is connected to fiber port of EUT. ANT port of the EUT is connected to 30db attenuator and 20db attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-29094K-24TC. TX out and RX in port are terminated to 50 ohm loads.
Per manufacturer, the output frequency is independent of the components used in optical converter.
EUT is a Fixed Gain Amplifier with fixed output power as set by ALC (Auto Level Control) Threshold level of 1Â±0.5dB higher than maximum rated output power.
The evaluation is performed at the antenna port.

Freq: 869-894MHz
Signal protocol: GSM, EDGE, CDMA, UMTS WCDMA 3GPP, LTE 1.4MHz, LTE 5MHz, LTE 20MHz

Max Ouput Power : 40 W

Modulation	Input Power (dbm)
GSM	
869.32MHz	-1.98
881.5MHz	-2.64
893.68MHz	-1.14
EDGE	
869.3MHz	-1.96
881.5MHz	-2.5
893.7MHz	-1
CDMA (IS95A)	
869.76MHz	-2.1
881.5MHz	-2.66
893.24MHz	-1.28
UMTS (WCMDA 3GPP)	
871.5MHz	-2.4
881.5MHz	-2.7
891.5MHz	-1.54
LTE 1.4MHz	
869.75MHz	-2.04
881.5MHz	-2.6
893.25MHz	-1.22
LTE 5MHz	
871.65MHz	-2.42
881.5MHz	-2.72
891.35MHz	-1.56
LTE 20MHz	
879.25MHz	-2.62
881.5MHz	-2.56
883.75MHz	-2.44

Frequency range of measurement = 9 kHz- 9GHz.
9kHz -150 kHz; RBW=200 Hz, VBW=200 Hz; 150kHz-30 MHz; RBW=9kHz, VBW=9 kHz; 30MHz-1000 MHz; RBW=120kHz, VBW=120 kHz, 1000 MHz-9000 MHz; RBW=1 MHz, VBW=1MHz.

19°C, 63% Relative Humidity
Site D

PK= RMS detector. Ave =Trace average 100 traces.

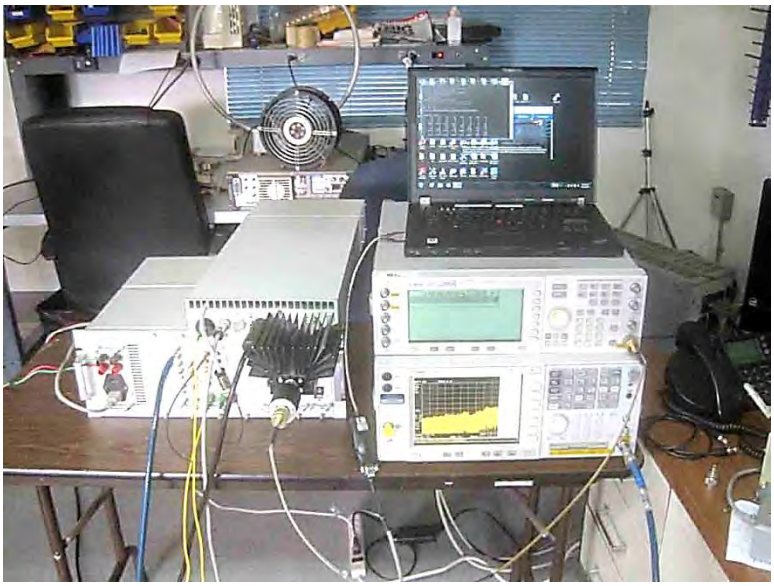
No emission found above 1GHz. Data represents the worst case power settings.

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: Ant Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	20.650k Ave	33.9	+0.0	+0.0			+0.0	33.9	94.0 40W, EDGE, Hi CH, input power= -1.0dbm	-60.1	Ant P
2	134.900k Ave	31.6	+0.0	+0.0			+0.0	31.6	94.0 40W, EDGE, Hi CH, input power= -1.0dbm	-62.4	Ant P
3	639.400k Ave	24.7	+0.0	+0.0			+0.0	24.7	94.0 40W, EDGE, Hi CH, input power= -1.0dbm	-69.3	Ant P

Test Setup Photos



22.917(a) / 2.1053 Field Strength of Radiated Spurious Emissions

Test Conditions / Setup

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **BTI Wireless**
Specification: **FCC Part 22.917(a) Radiated Spurious Emission**
Work Order #: **95179** Date: 12/23/2013
Test Type: **Maximized Emissions** Time: 09:16:27
Equipment: **850MHz 40W Remote Transmitting Unit** Sequence#: 6
Manufacturer: BTI Wireless Tested By: Don Nguyen
Model: mBSC0850-040-RUMF01
S/N: MBSC0850040RUMF01-11010002

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014
T1	AN00010	Preamp	8447D	3/29/2012	3/29/2014
T2	AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
T4	ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
T5	ANP05569	Cable	RG-214/U	6/19/2012	6/19/2014
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
	AN02945	Cable	32022-2-2909K-36TC	10/30/2013	10/30/2015
	AN00787	Preamp	83017A	5/31/2013	5/31/2015
	AN01646	Horn Antenna	3115	4/13/2012	4/13/2014
	ANP06360	Cable	L1-PNMNM-48	8/29/2012	8/29/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
850MHz 40W Remote Transmitting Unit*	BTI Wireless	mBSC0850-040-RUMF01	MBSC0850040RUMF01-11010002

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Attenuator 20db Pad	Weinschel	33-20-24	BJ7479
50 ohm Load	Generic	NA	NA
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
50 ohm Load	Generic	NA	NA
Power Sensor	Agilent	E4412A	MY41502826
Power Meter	HP	EPM-441A	GB37170458

Test Conditions / Notes:

The EUT is mounted on metal stand. RF to Fiber Optic Converter Tx1 In is connected to an ESG Signal generator located remotely. Fiber-1 port from the converter is connected to fiber port of EUT. ANT port of the EUT is connected to support power meter via 30db attenuator and 20db attenuator. TX out and RX in port are terminated to 50 ohm loads. Power meter is used to verify output power at antenna port.

Freq: 869-894MHz
Signal protocol: GSM, EDGE, CDMA, UMTS WCDMA 3GPP, LTE 1.4MHz, LTE 5MHz, LTE 20MHz

Highest rating power : 40 W
Frequency range of measurement = 9 kHz- 9GHz.
9kHz -150kHz; RBW=200Hz, VBW=200 Hz; 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz; 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,1000 MHz-9000 MHz; RBW=1 MHz, VBW=1MHz.

19°C, 63% Relative Humidity

Site D

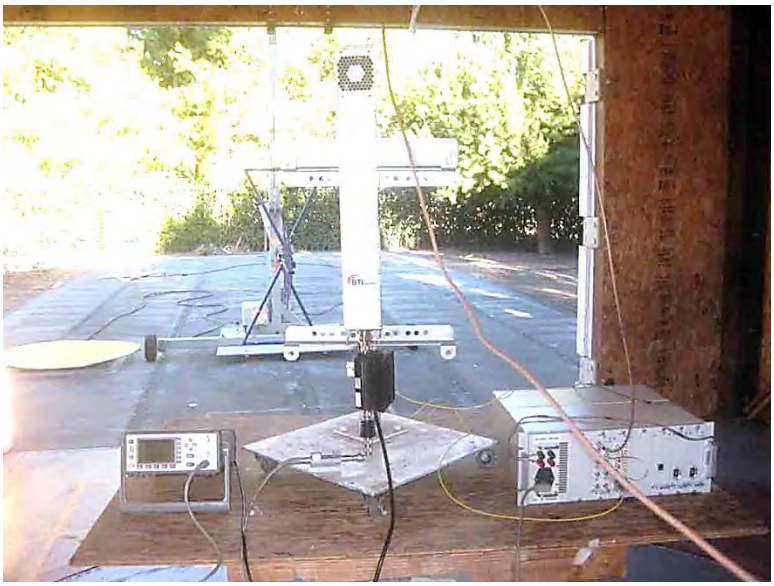
No emission found above 1GHz. Data is presented in the worst case scenario.

Test Data

Operating Frequency:	869-894MHz			
Channels:	EDGE, Hi CH			
Highest Measured Output Power:	46.00	(dBm)=	40	(Watts)
Distance:	3	meters		
Limit:	43+10Log(P)=	59.02	dBc	

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
167.78	-71.32059991	Vert	117.32
167.78	-66.92059991	Horiz	112.92
170.28	-62.52059991	Vert	108.52
170.28	-65.02059991	Vert	111.02
192.68	-67.92059991	Horiz	113.92
192.68	-67.32059991	Vert	113.32
208.28	-67.72059991	Horiz	113.72
208.28	-67.72059991	Vert	113.72

Test Setup Photos



Bandedge

Test Conditions / Setup

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **BTI Wireless**
Specification: **Band Edge Plots**
Work Order #: **95179** Date: 12/20/2013
Test Type: **Conducted Emissions** Time: 15:17:27
Equipment: **850MHz 40W Remote Transmitting Unit** Sequence#: 0
Manufacturer: BTI Wireless Tested By: Don Nguyen
Model: mBSC0850-040-RUMF01 110V 60Hz
S/N: MBSC0850040RUMF01-11010002

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T2	AN02945	Cable	32022-2-2909K-36TC	10/30/2013	10/30/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
850MHz 40W Remote Transmitting Unit*	BTI Wireless	mBSC0850-040-RUMF01	MBSC0850040RUMF01-11010002

Support Devices:

Function	Manufacturer	Model #	S/N
Attenuator 30db Pad	Weinschel	49-30-43	KW075
50 ohm Load	Generic	NA	NA
50 ohm Load	Generic	NA	NA
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
Cable	Pasternack	Sucoflex 104A	12237/4A
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 20db Pad	Weinschel	33-20-24	BJ7479

Test Conditions / Notes:

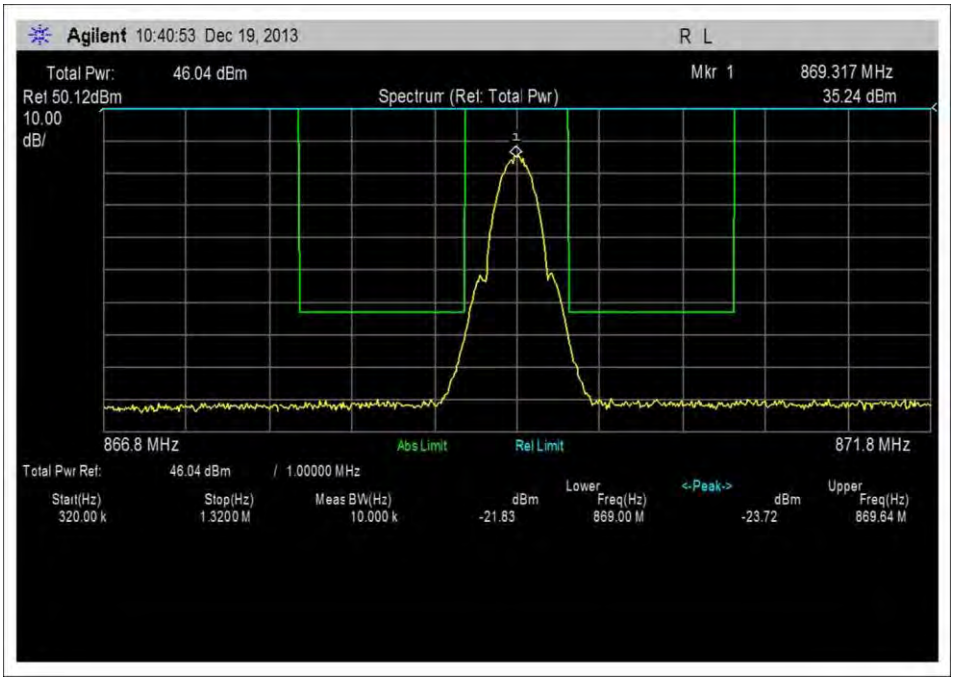
The EUT is placed on the test bench. RF to Fiber Optic Converter Tx1 In is connected to an ESG Signal generator via cable Sucoflex 104A. Fiber-1 port from the converter is connected to fiber port of EUT. ANT port of the EUT is connected to 30db attenuator and 20db attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-2909K-36TC. TX out and RX in port are terminated to 50 ohm loads.
Per manufacturer, the output frequency is independent of the components used in optical converter.
EUT is a Fixed Gain Amplifier with fixed output power as set by ALC (Auto Level Control) Threshold level of 1±0.5dB higher than maximum rated output power.
The evaluation is performed at the antenna port.
Freq: 869-894MHz
Signal protocol: GSM, EDGE, CDMA, UMTS WCDMA 3GPP, LTE 1.4MHz, LTE 5MHz, LTE 20MHz

Max Ouput Power : 40 W

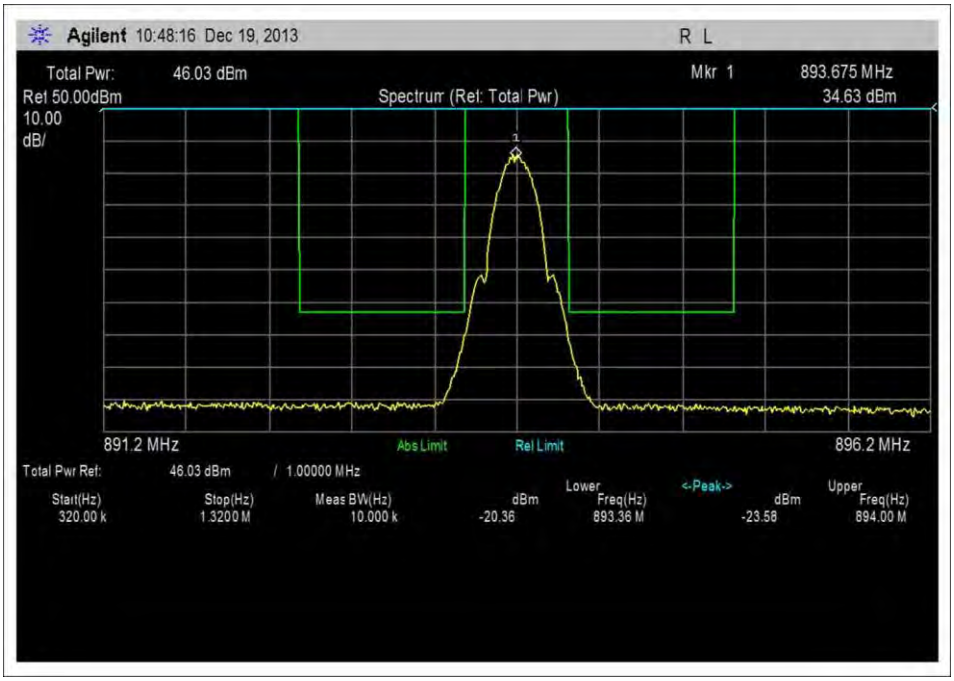
Modulation	Input Power (dbm)
GSM	
869.32MHz	-1.98
881.5MHz	-2.64
893.68MHz	-1.14
EDGE	
869.3MHz	-1.96
881.5MHz	-2.5
893.7MHz	-1
CDMA (IS95A)	
869.76MHz	-2.1
881.5MHz	-2.66
893.24MHz	-1.28
UMTS (WCMDA 3GPP)	
871.5MHz	-2.4
881.5MHz	-2.7
891.5MHz	-1.54
LTE 1.4MHz	
869.75MHz	-2.04
881.5MHz	-2.6
893.25MHz	-1.22
LTE 5MHz	
871.65MHz	-2.42
881.5MHz	-2.72
891.35MHz	-1.56
LTE 20MHz	
879.25MHz	-2.62
881.5MHz	-2.56
883.75MHz	-2.44

19°C, 63% Relative Humidity
Site D

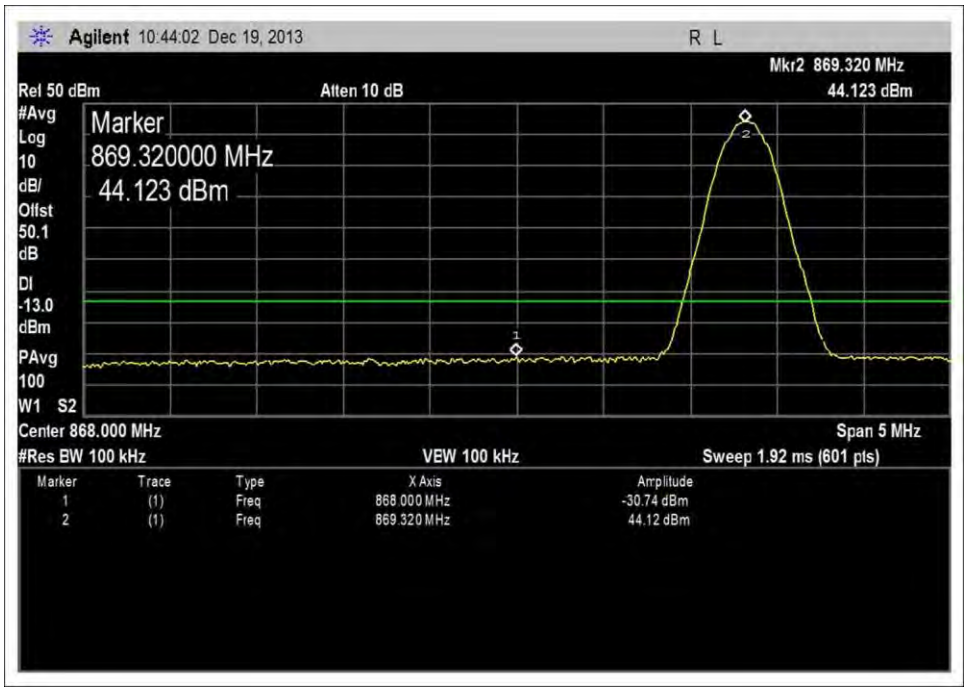
Test Data



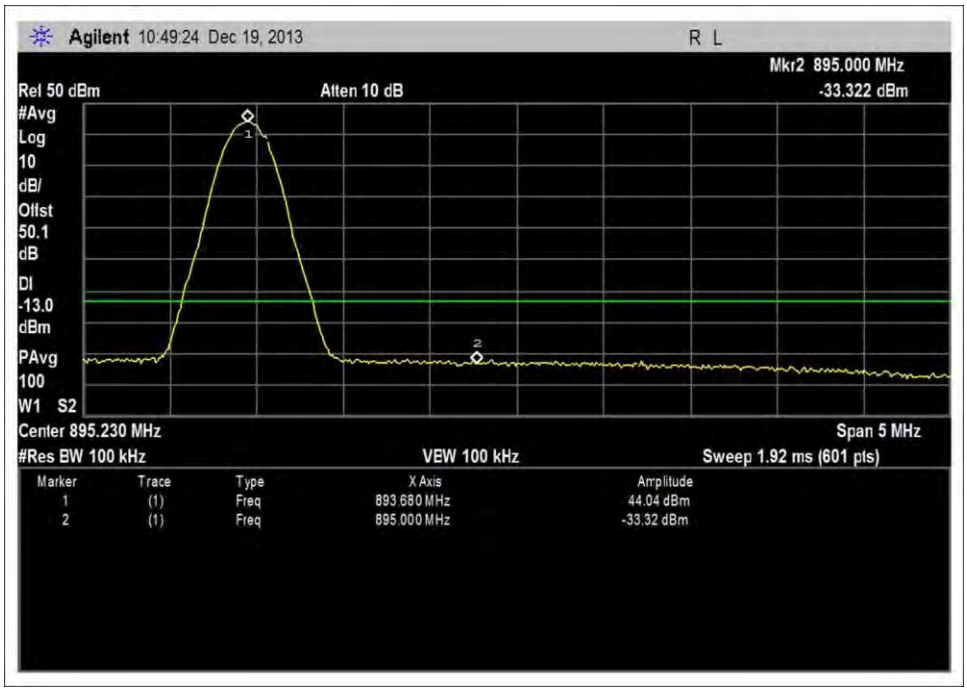
Low Channel, GSM 10kHz



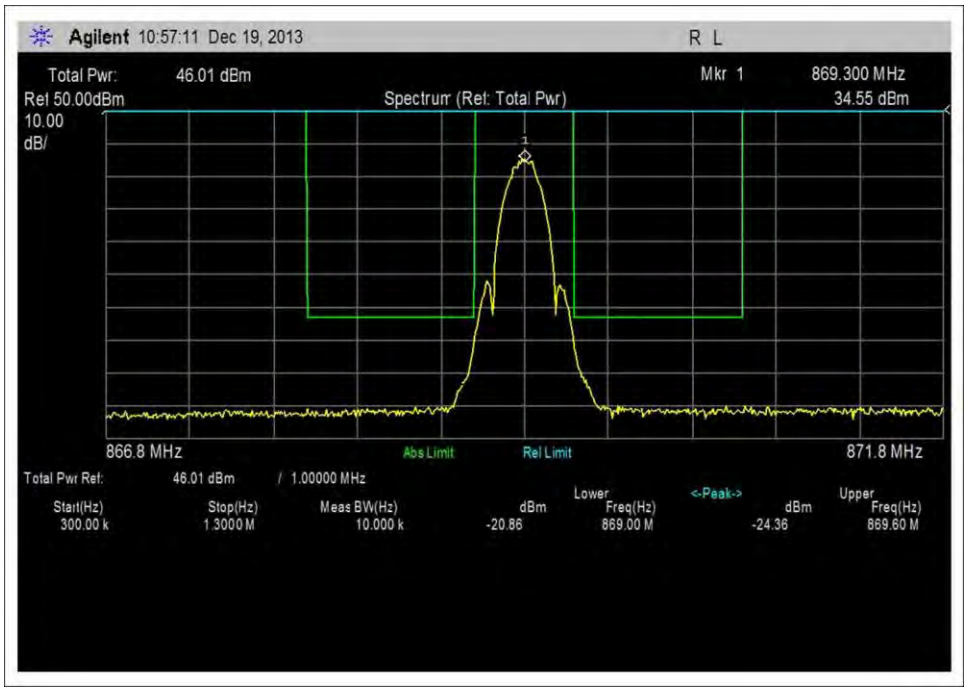
High Channel, GSM 10kHz



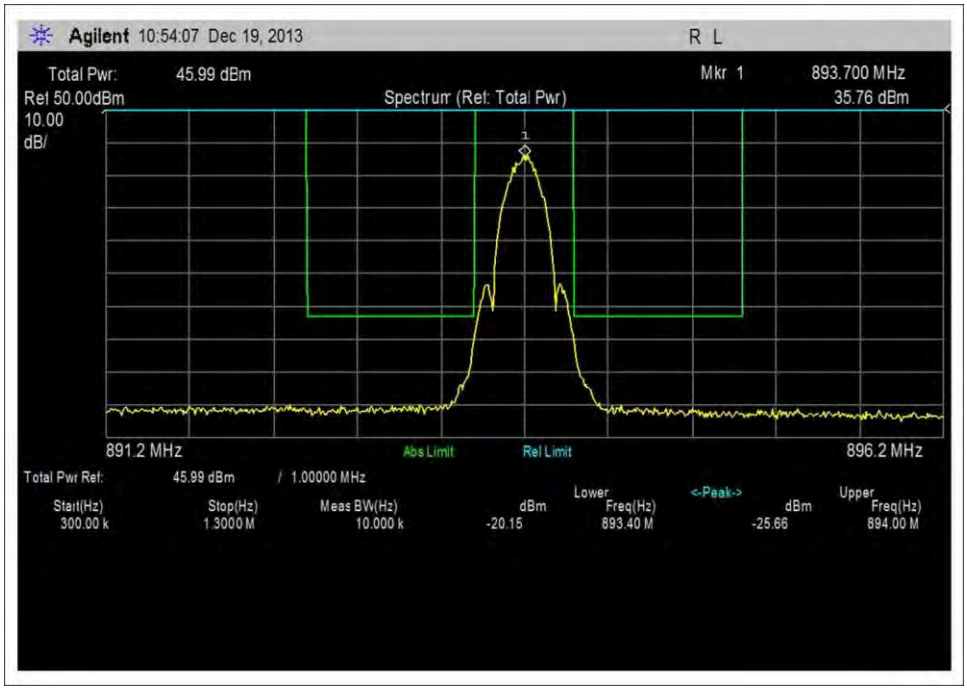
Low Channel, GSM 100kHz



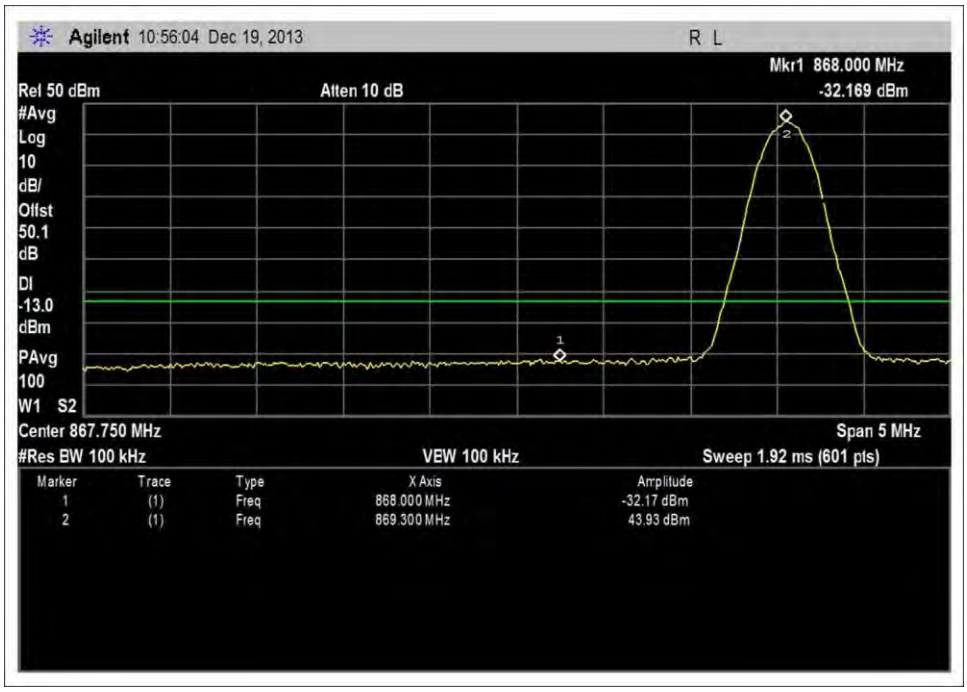
High Channel, GSM 100kHz



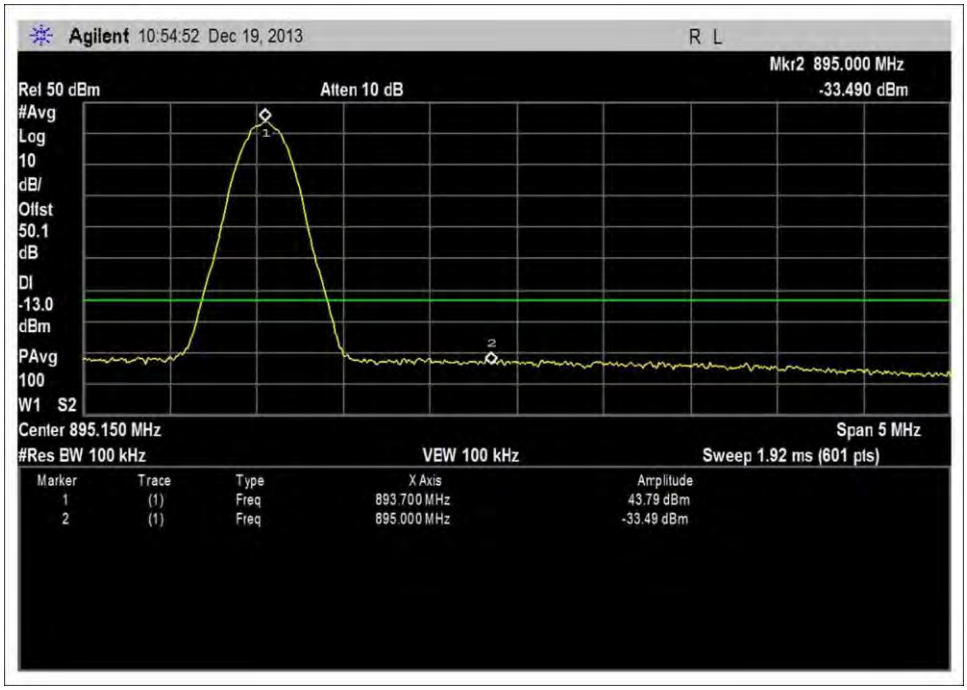
Low Channel, EDGE 10kHz



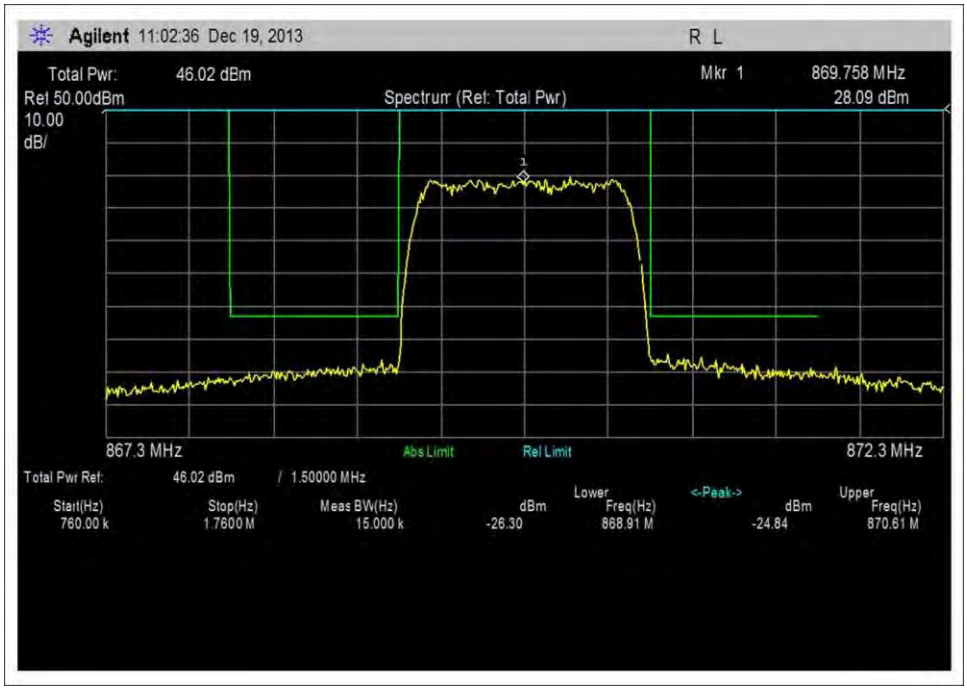
High Channel, EDGE 10kHz



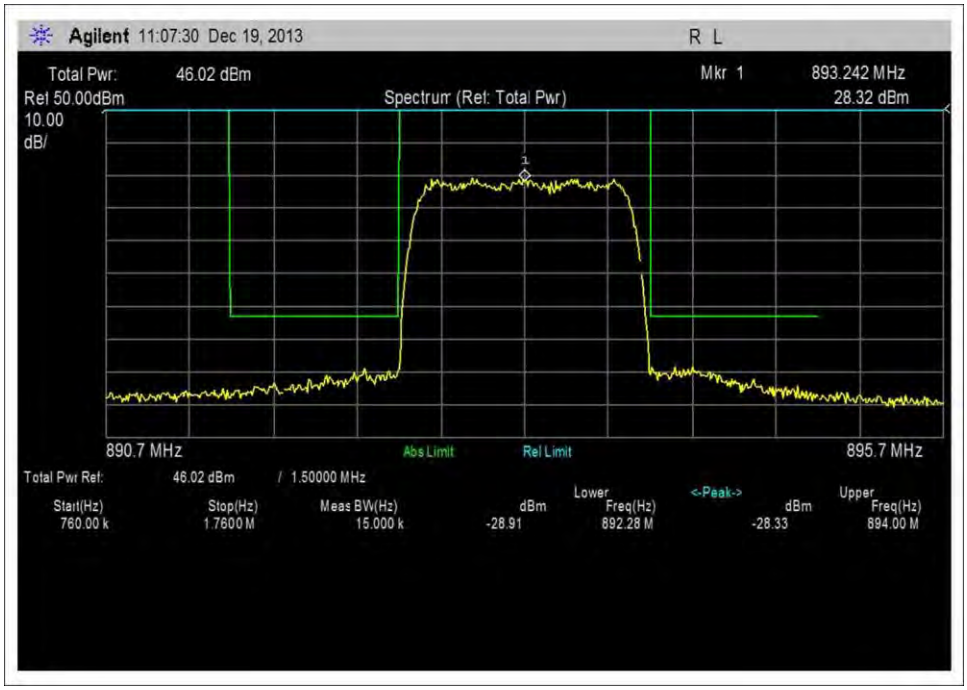
Low Channel, EDGE 100kHz



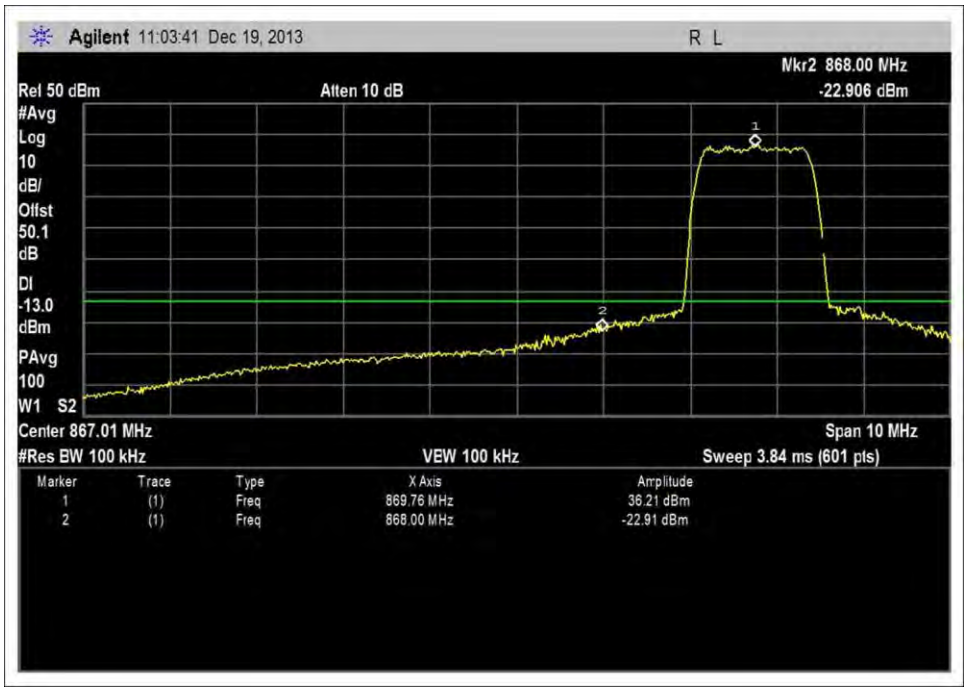
High Channel, EDGE 100kHz



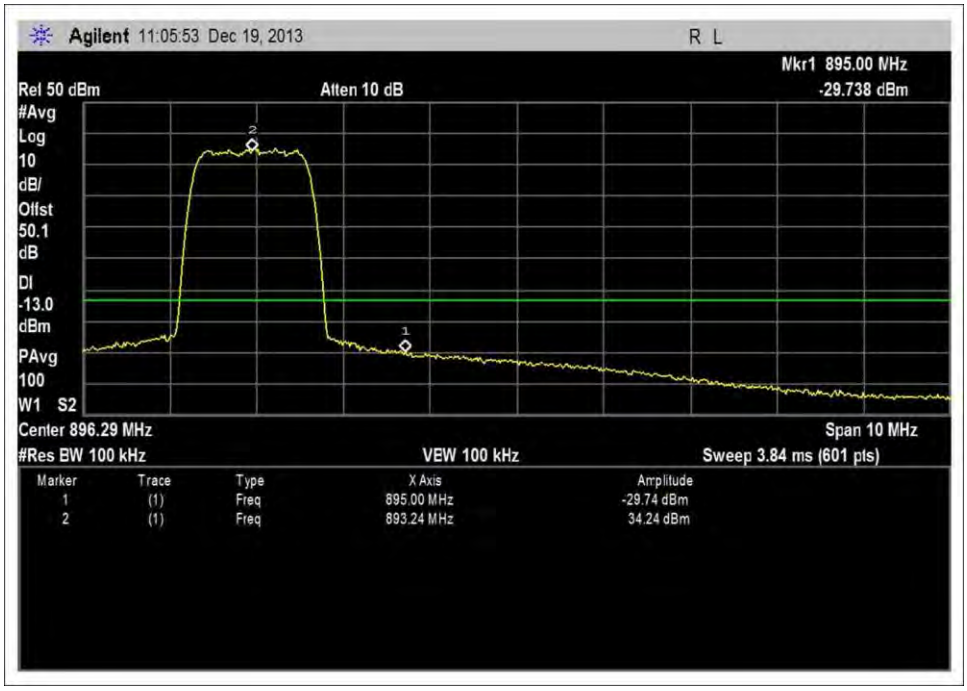
Low Channel, CDMA IS95A 15kHz



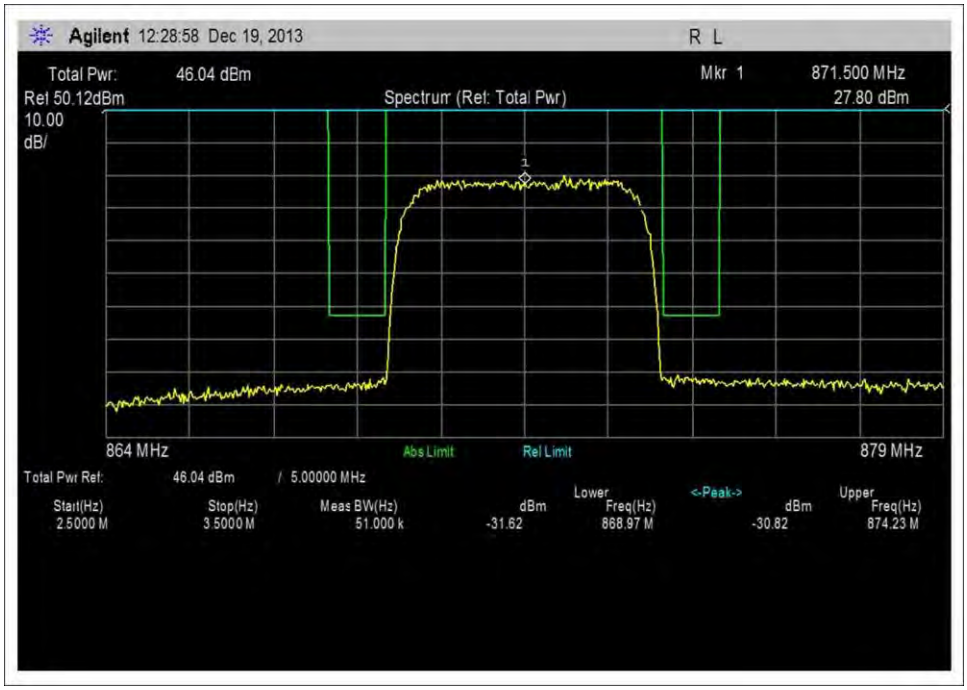
High Channel, CDMA IS95A 15kHz



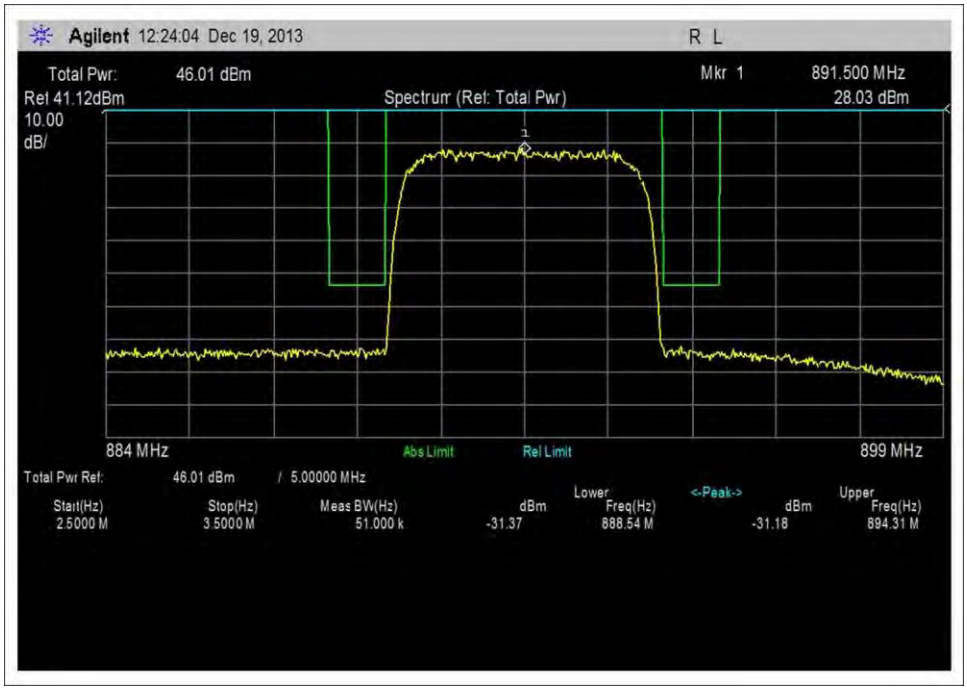
Low Channel, CDMA IS95A 100kHz



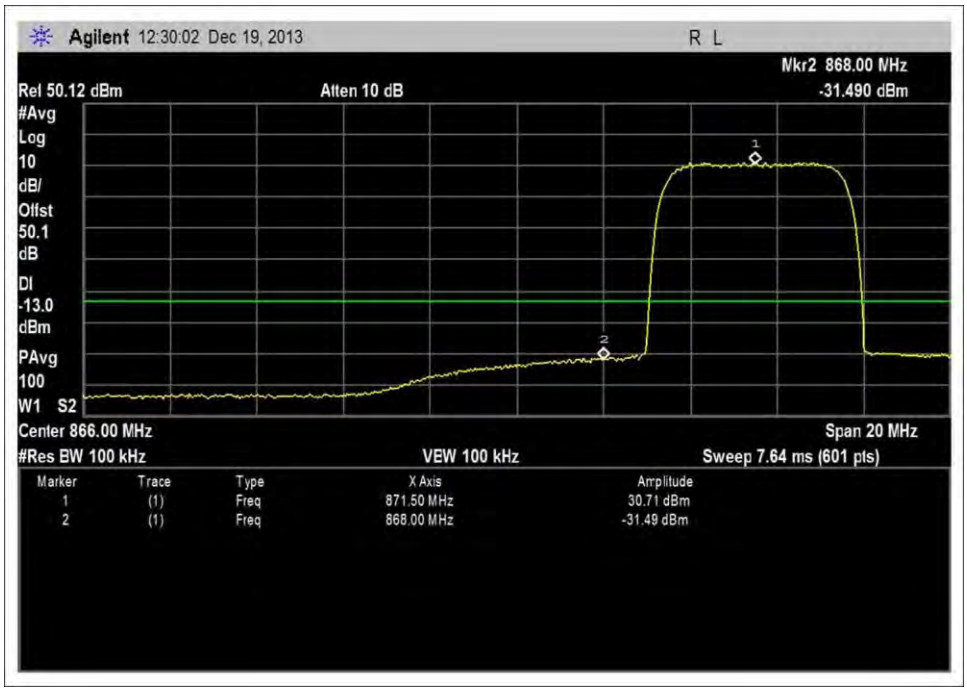
High Channel, CDMA IS95A 100kHz



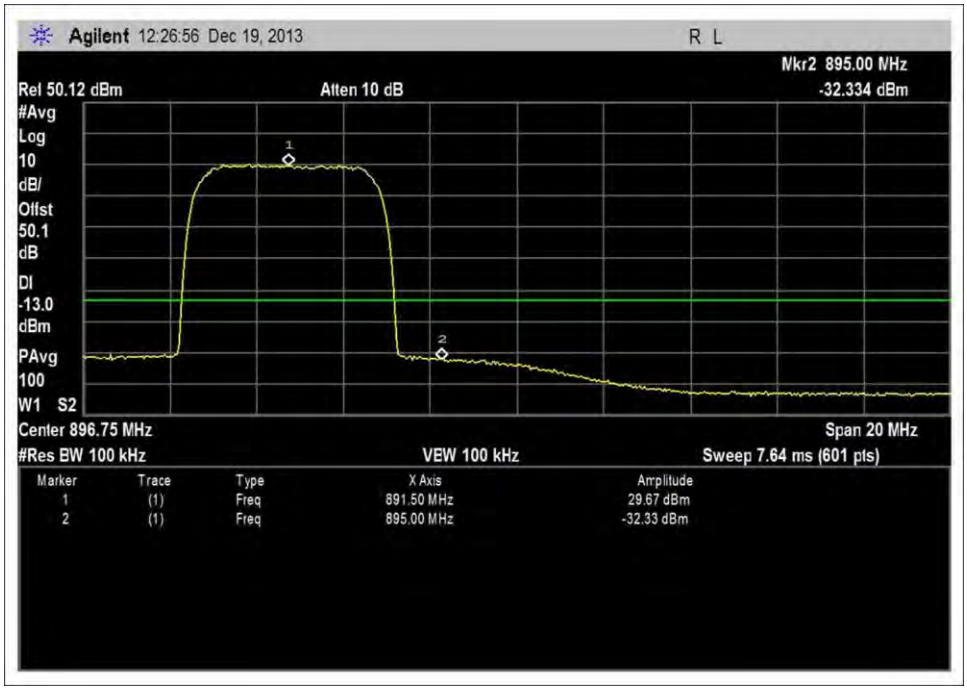
Low Channel, UMTS WCMDA 3GPP 51kHz



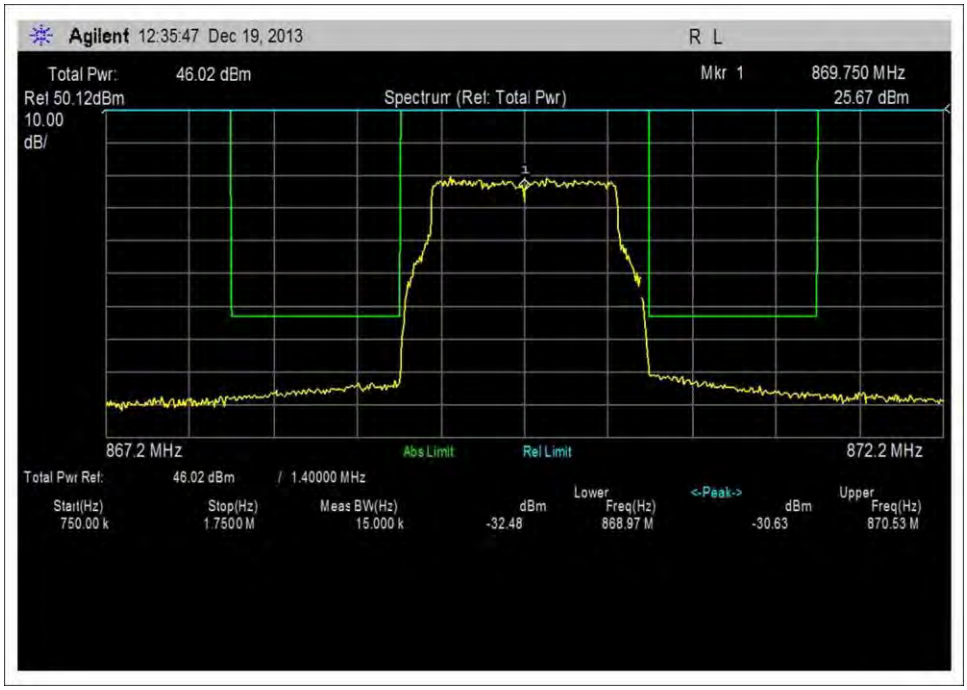
High Channel, UMTS WCMDA 3GPP 51kHz



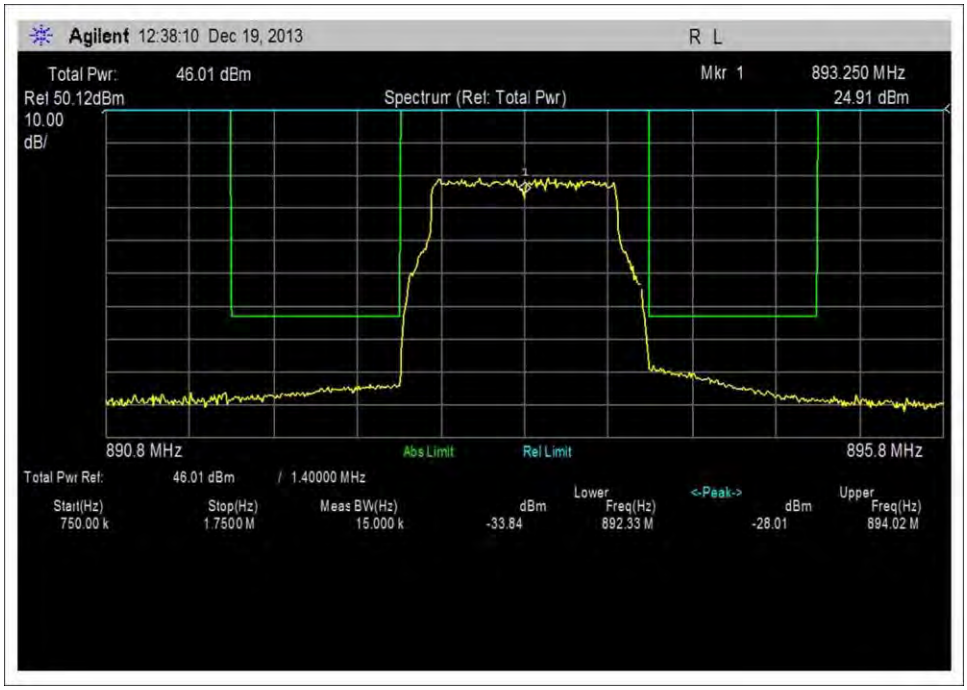
Low Channel, UMTS WCMDA 3GPP 100kHz



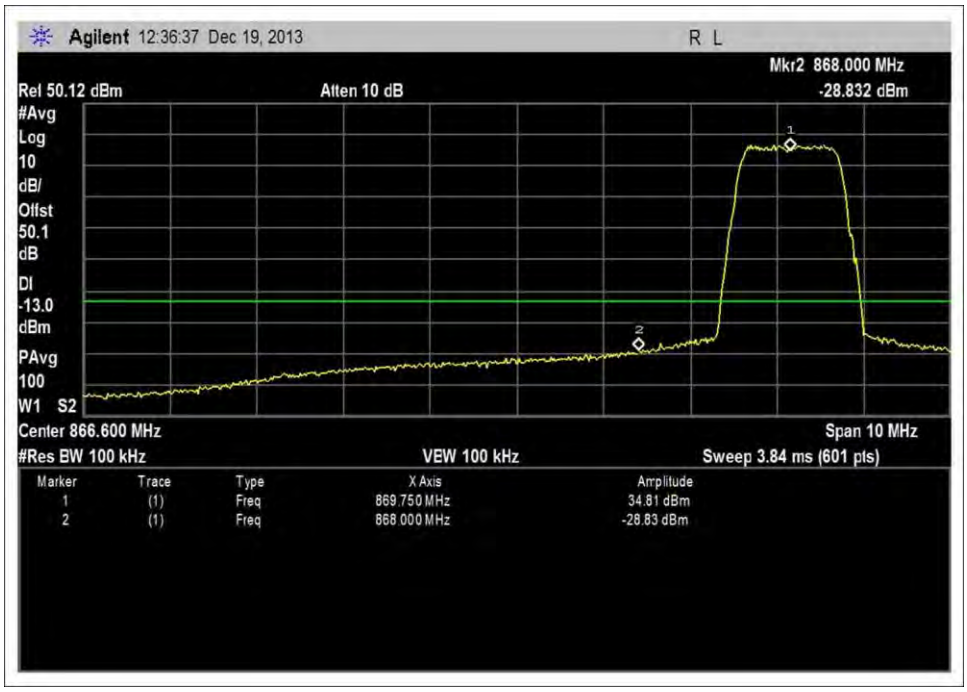
High Channel, UMTS WCMDA 3GPP 100kHz



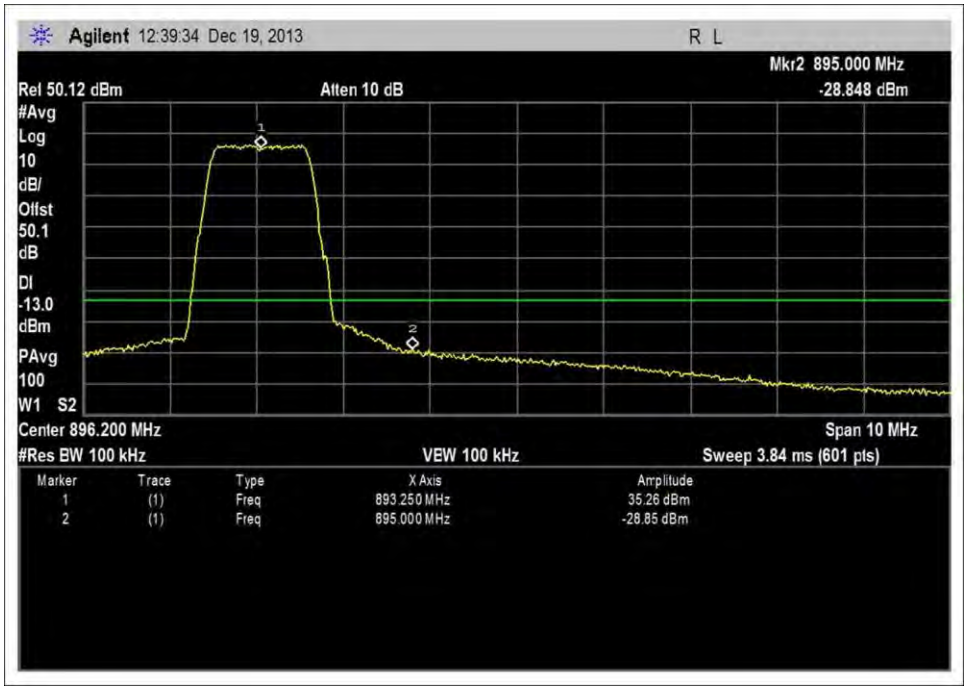
Low Channel, LTE 1.4MHz 15kHz



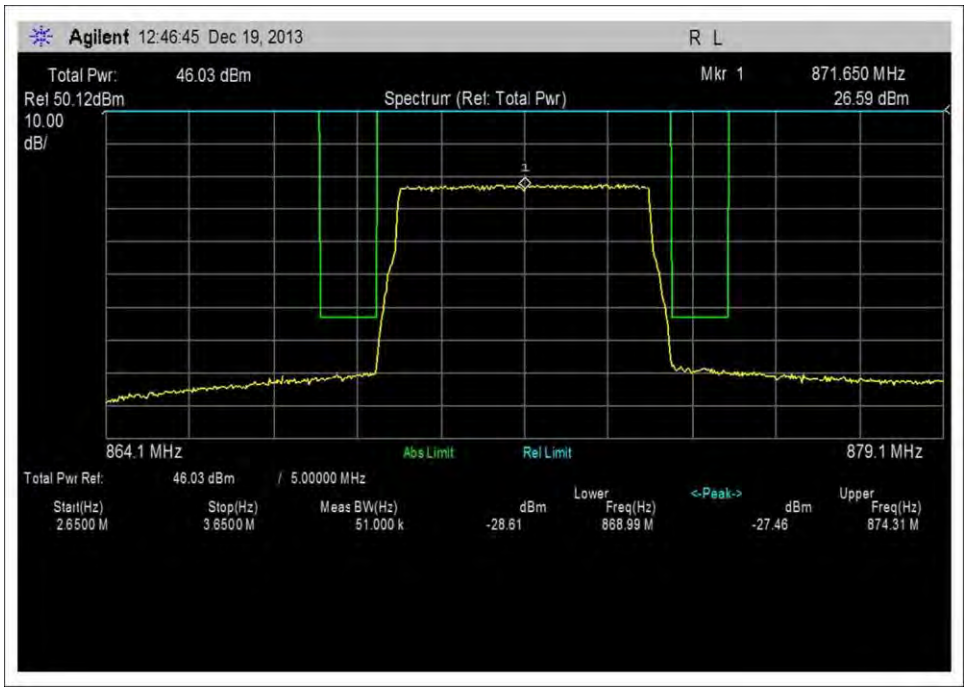
High Channel, LTE 1.4MHz 15kHz



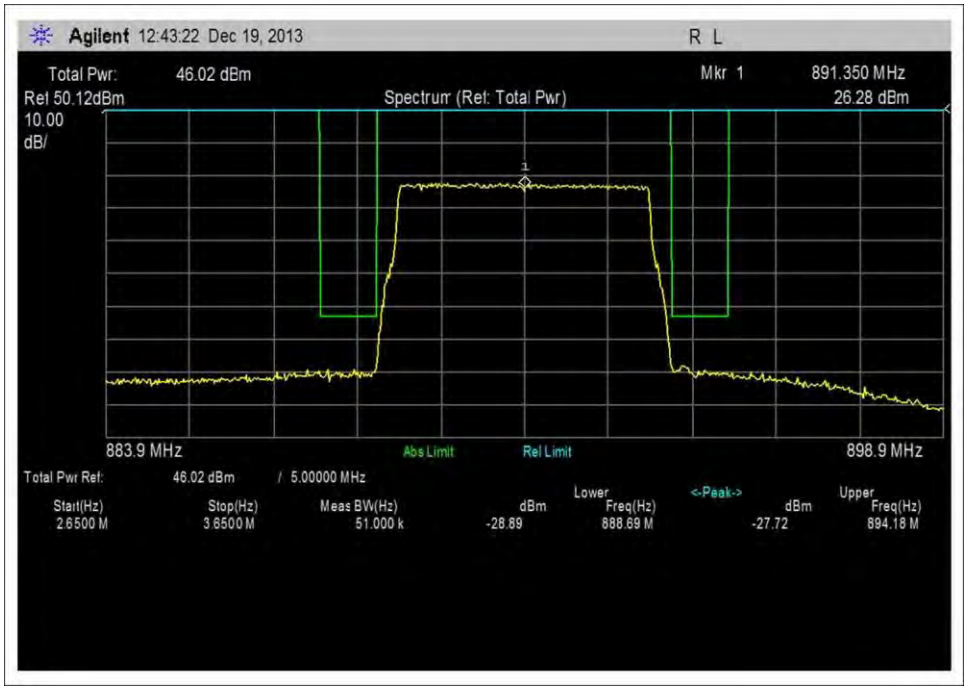
Low Channel, LTE 1.4MHz 100kHz



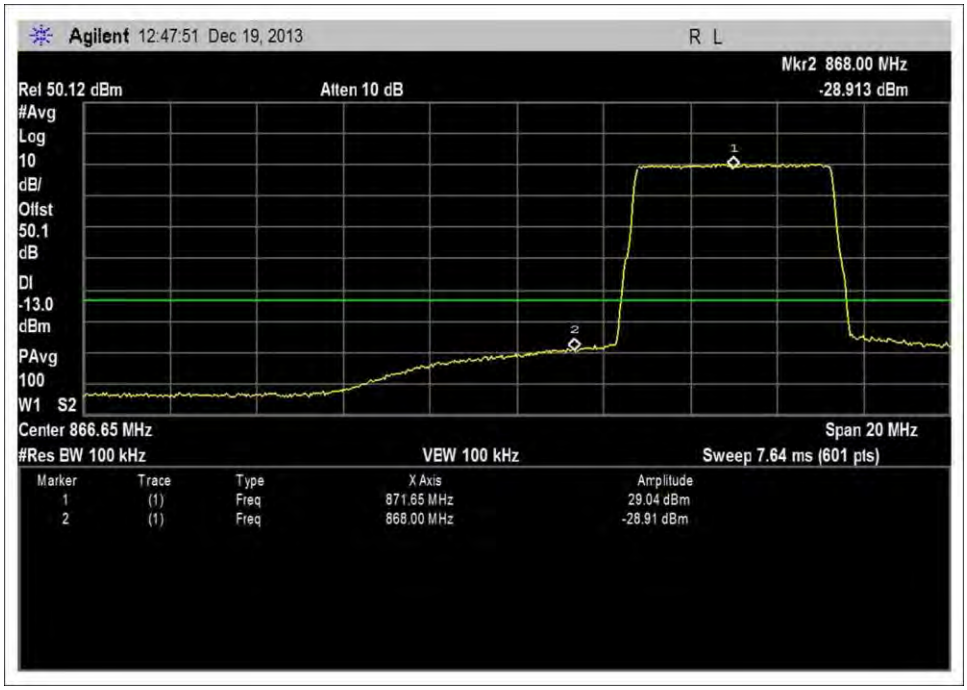
High Channel, LTE 1.4MHz 100kHz



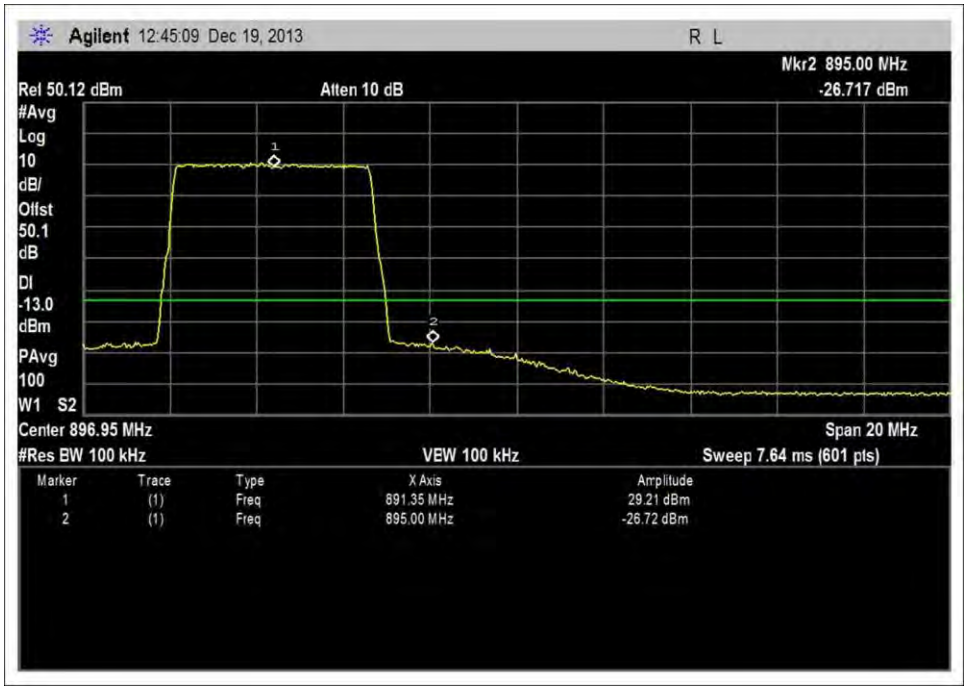
Low Channel, LTE 5MHz 51kHz



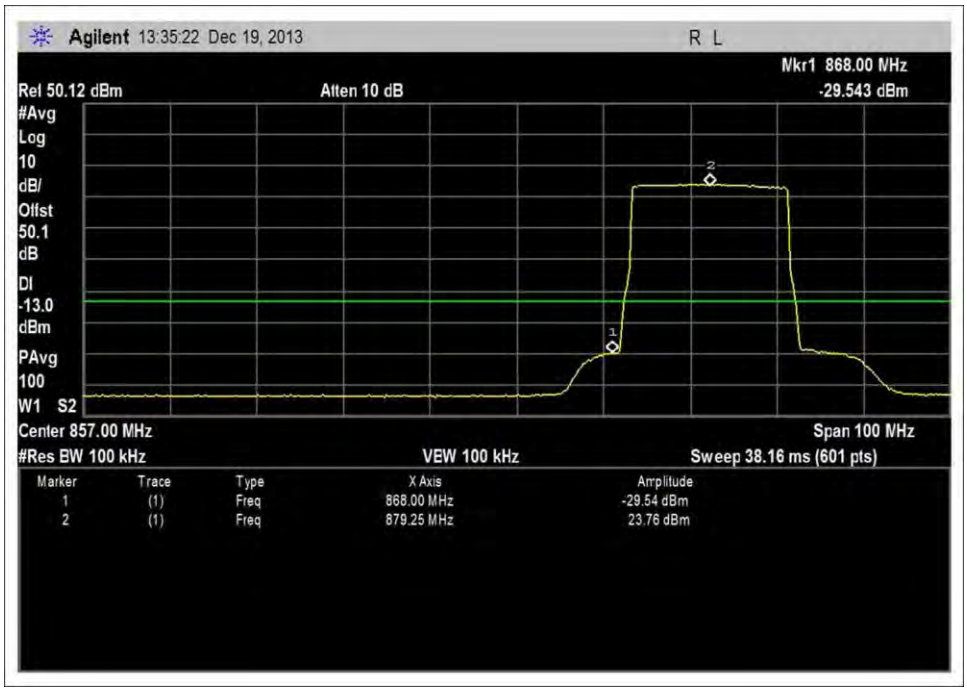
High Channel, LTE 5MHz 51kHz



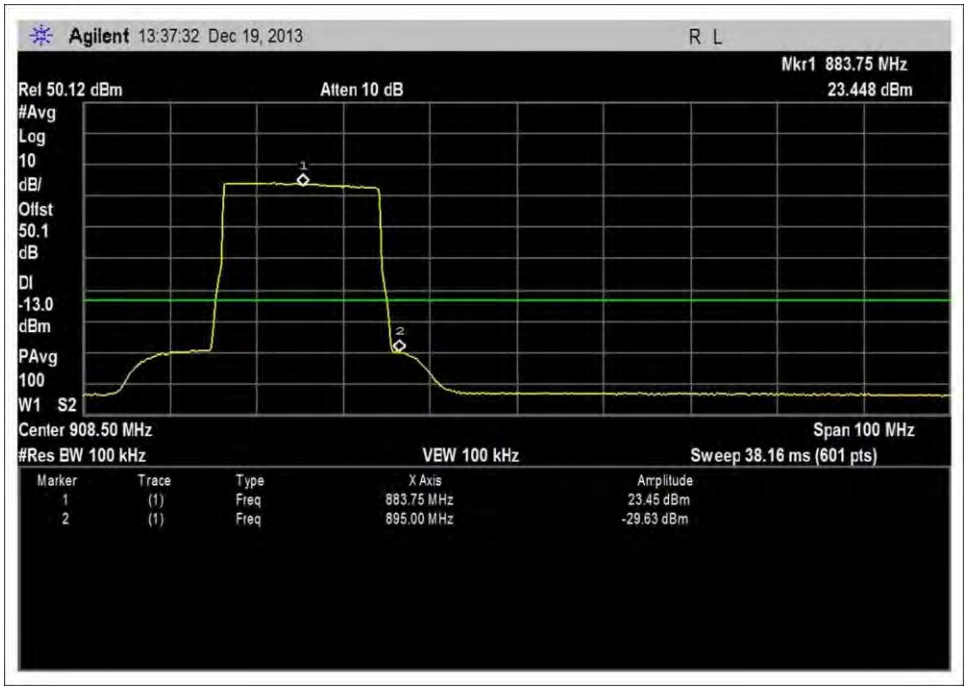
Low Channel, LTE 5MHz 100kHz



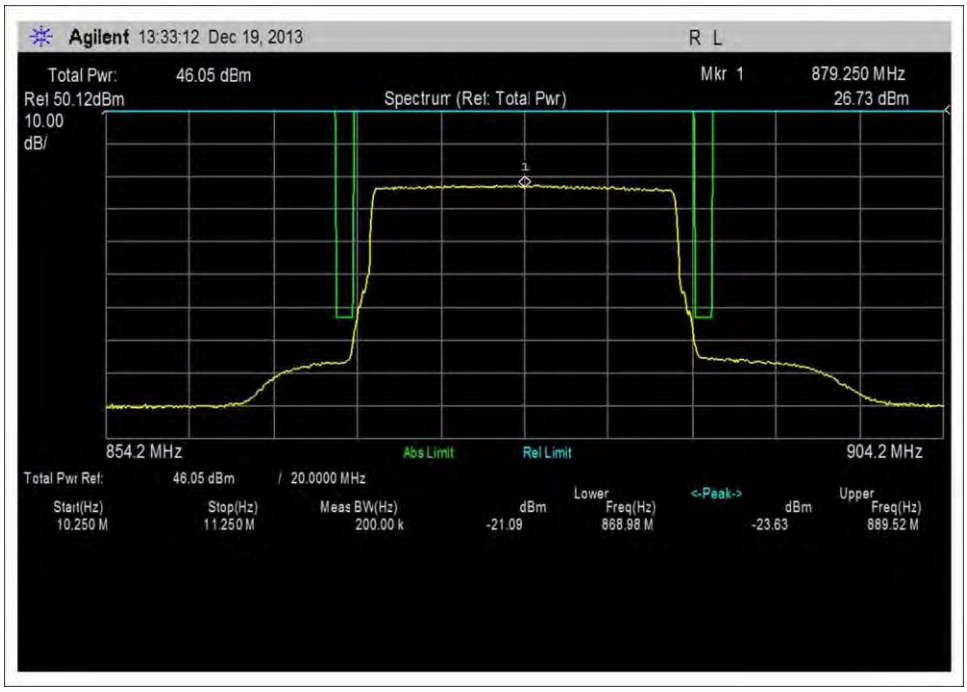
High Channel, LTE 5MHz 100kHz



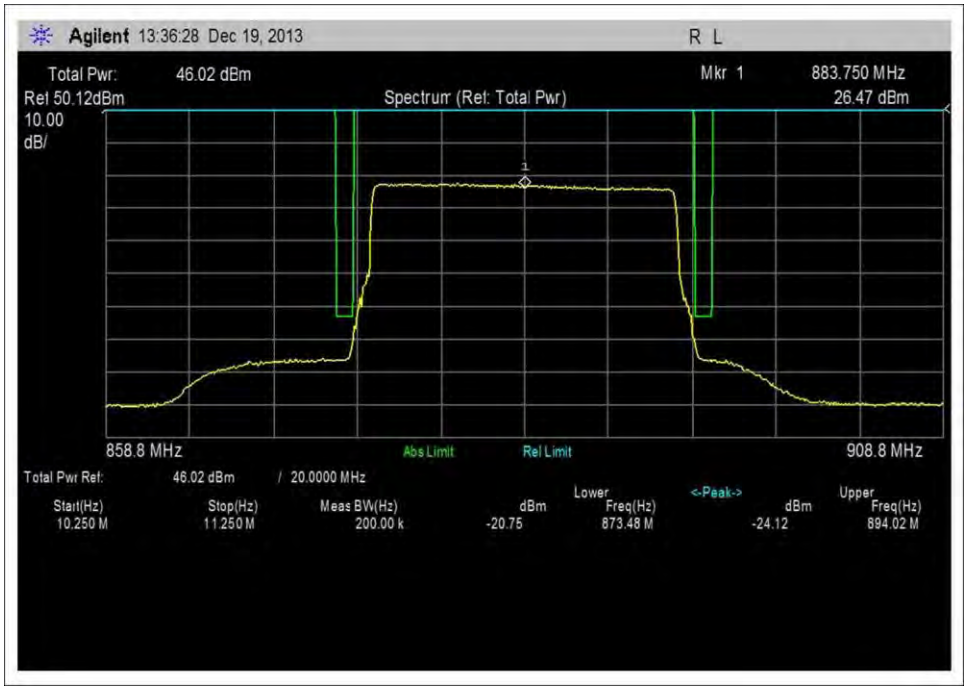
Low Channel, LTE 20MHz 100kHz



High Channel, LTE 20MHz 100kHz

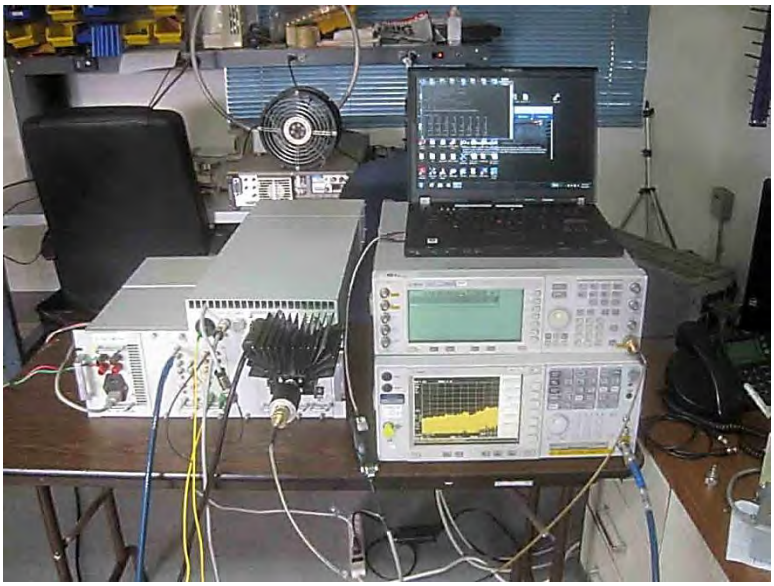


Low Channel, LTE 20MHz 200kHz



High Channel, LTE 20MHz 200kHz

Test Setup Photos



Intermodulation

Test Conditions / Setup

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer:	**BTI Wireless**		
Specification:	**Intermodulation Plots**		
Work Order #:	**95179**	Date:	12/20/2013
Test Type:	**Conducted Emissions**	Time:	15:17:27
Equipment:	**850MHz 40W Remote Transmitting Unit**	Sequence#:	0
Manufacturer:	BTI Wireless	Tested By:	Don Nguyen
Model:	mBSC0850-040-RUMF01		110V 60Hz
S/N:	MBSC0850040RUMF01-11010002		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T2	AN02945	Cable	32022-2-2909K-36TC	10/30/2013	10/30/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
850MHz 40W Remote Transmitting Unit*	BTI Wireless	mBSC0850-040-RUMF01	MBSC0850040RUMF01-11010002

Support Devices:

Function	Manufacturer	Model #	S/N
Attenuator 30db Pad	Weinschel	49-30-43	KW075
50 ohm Load	Generic	NA	NA
50 ohm Load	Generic	NA	NA
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
Cable	Pasternack	Sucoflex 104A	12237/4A
ESG Vector Signal Generator	Agilent	4438C	MY45091601
ESG Vector Signal Generator	Agilent	4438C	MY42082260
Attenuator 20db Pad	Weinschel	33-20-24	BJ7479
Power Divider	Anaren	44000	NA

Test Conditions / Notes:

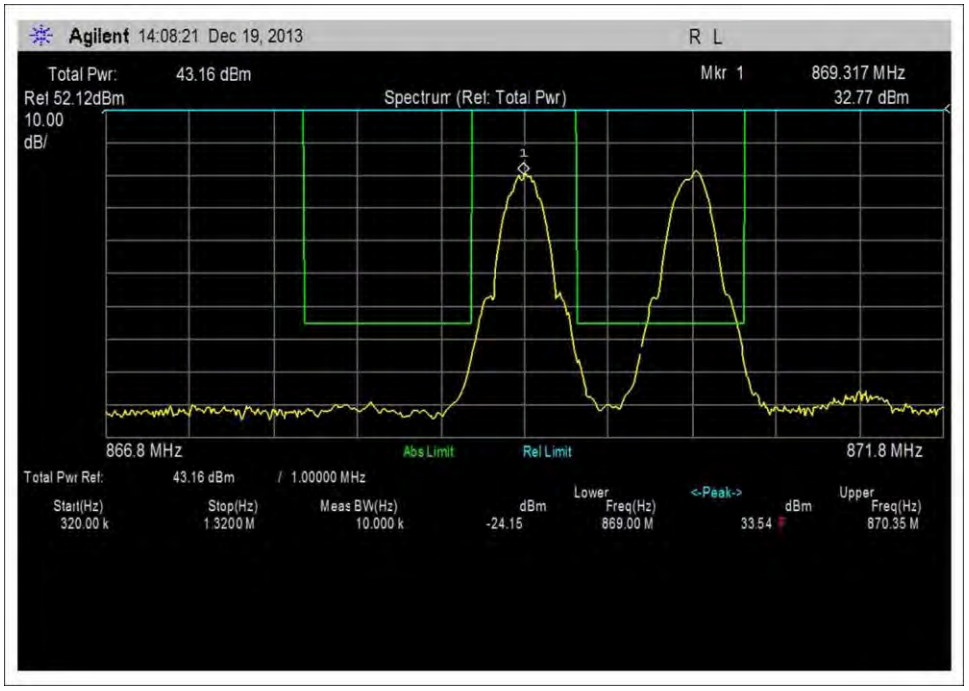
The EUT is placed on the test bench. Tx In of Fiber Optic Converter is connected to two ESGs via a power divider. Fiber-1 port from the converter is connected to fiber port of EUT. ANT port of the EUT is connected to 30db attenuator and 20db attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-2909K-36TC. TX out and RX in port are terminated to 50 ohm loads. Per manufacturer, the output frequency is independent of the components used in optical converter.
EUT is a Fixed Gain Amplifier with fixed output power as set by ALC (Auto Level Control) Threshold level of 1±0.5dB higher than maximum rated output power.

Freq: 869-894MHz
Signal protocol: GSM, EDGE, CDMA, UMTS WCDMA 3GPP, LTE 1.4MHz, LTE 5MHz (Two signals of LTE 20MHz cannot fit inside this frequency band.)
Max Ouput Power : 40 W

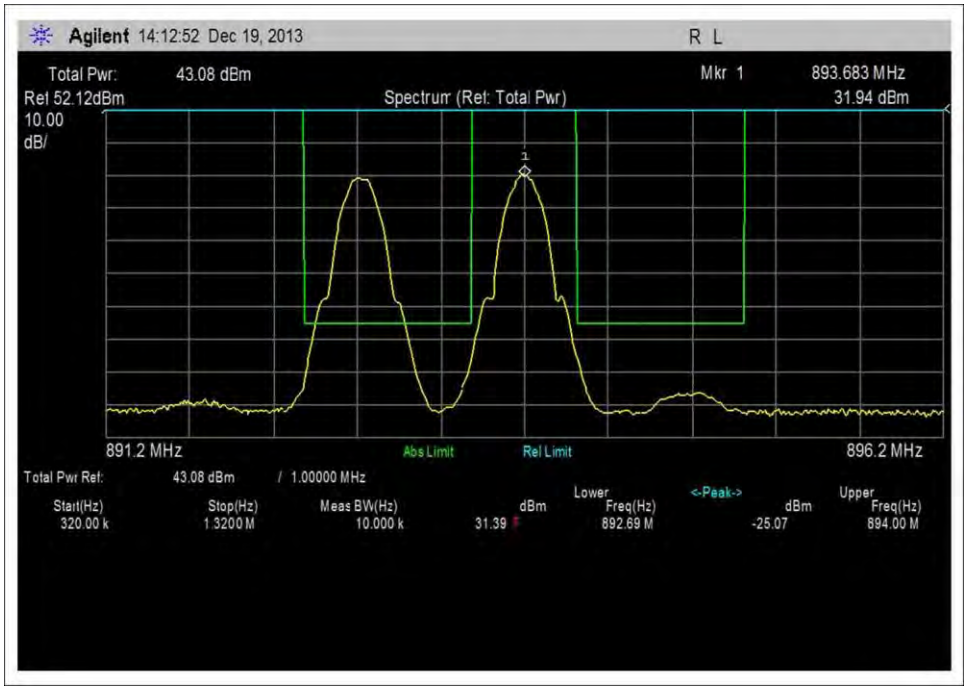
Modulation	Input Power (dbm)
GSM	
869.32MHz	-1.98
881.5MHz	-2.64
893.68MHz	-1.14
EDGE	
869.3MHz	-1.96
881.5MHz	-2.5
893.7MHz	-1
CDMA (IS95A)	
869.76MHz	-2.1
881.5MHz	-2.66
893.24MHz	-1.28
UMTS (WCMDA 3GPP)	
871.5MHz	-2.4
881.5MHz	-2.7
891.5MHz	-1.54
LTE 1.4MHz	
869.75MHz	-2.04
881.5MHz	-2.6
893.25MHz	-1.22
LTE 5MHz	
871.65MHz	-2.42
881.5MHz	-2.72
891.35MHz	-1.56
LTE 20MHz	
879.25MHz	-2.62
881.5MHz	-2.56
883.75MHz	-2.44

19°C, 63% Relative Humidity
Site D

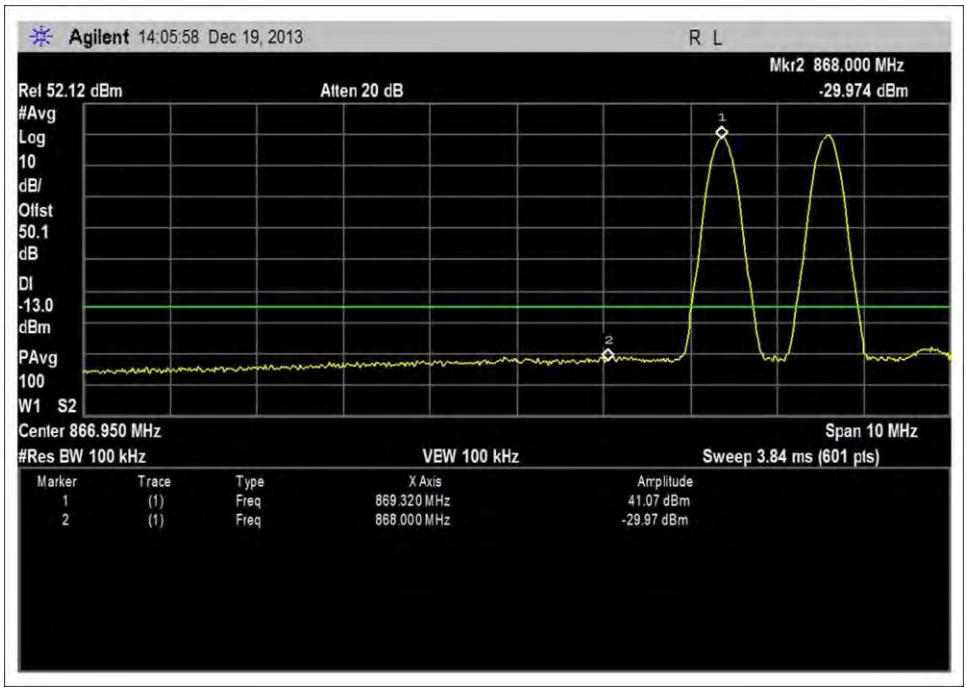
Test Data



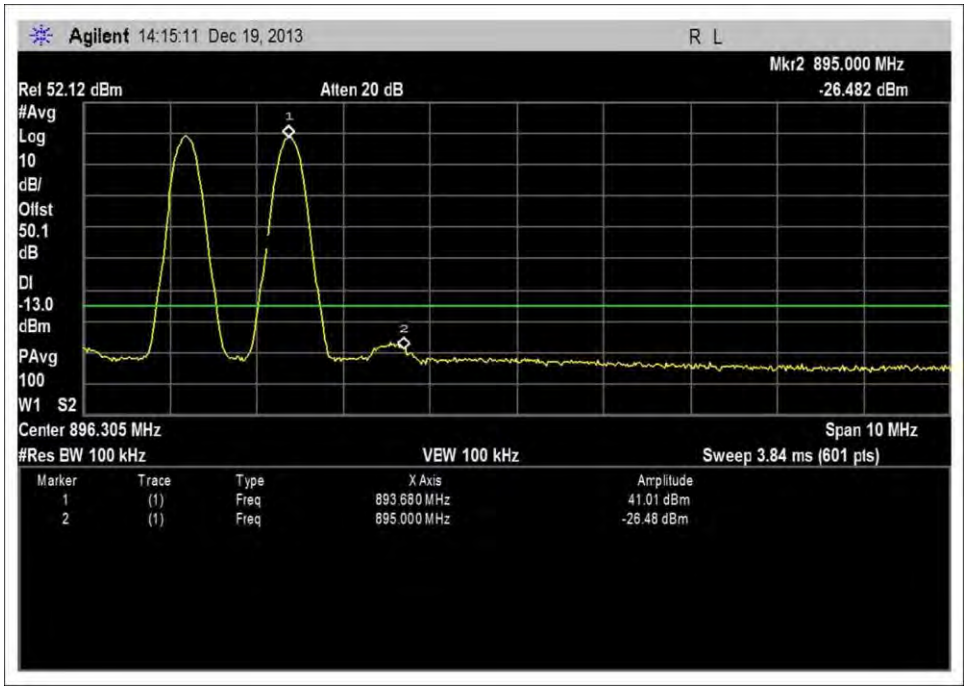
Low Channel, GSM 10kHz



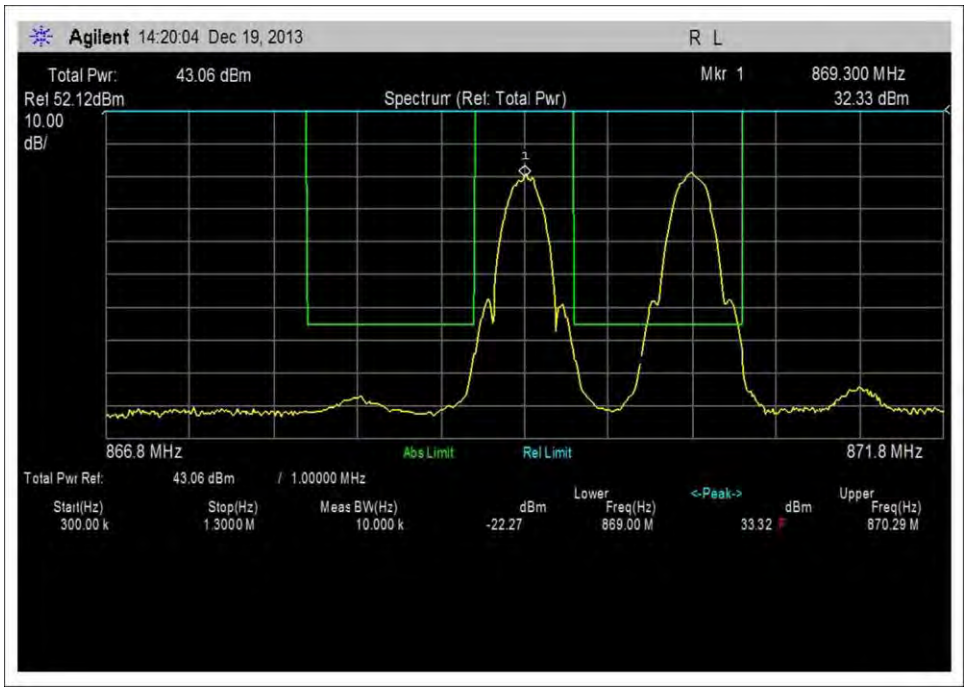
High Channel, GSM 10kHz



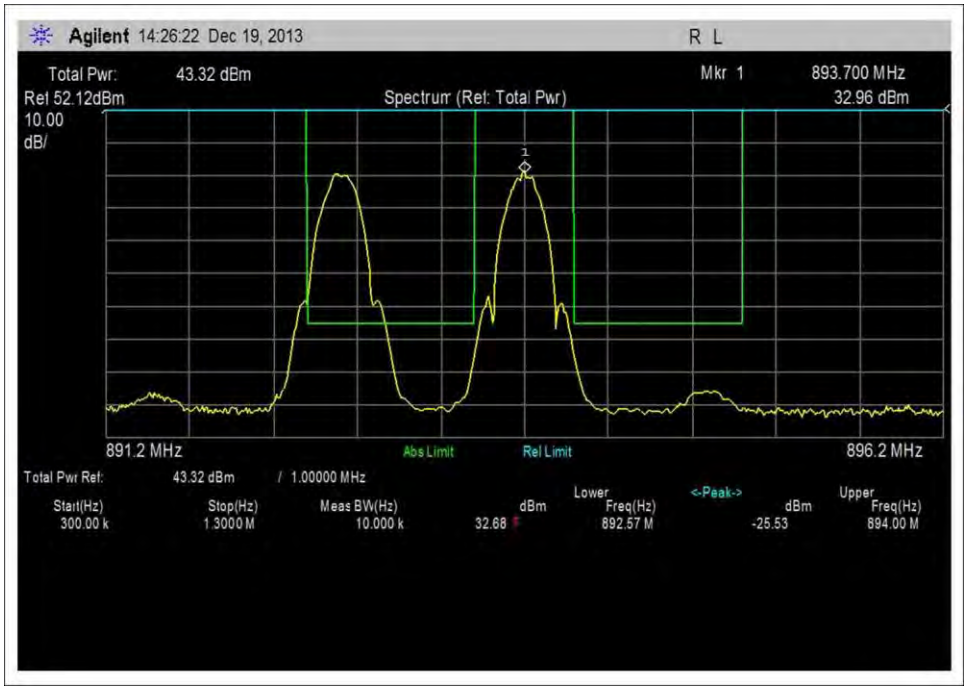
Low Channel, GSM 100kHz



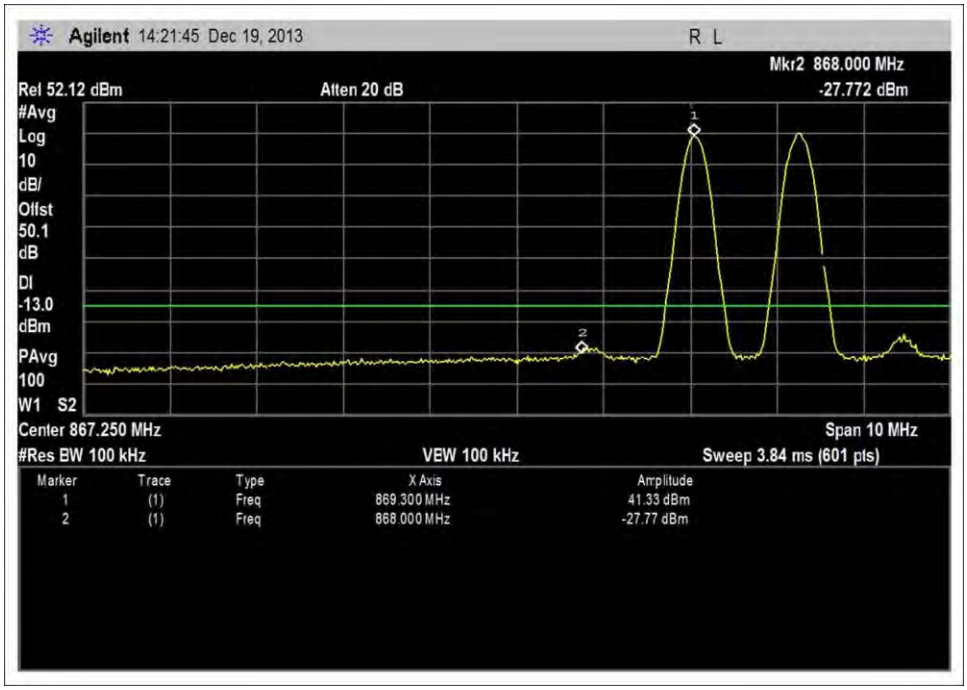
Low Channel, GSM 100kHz



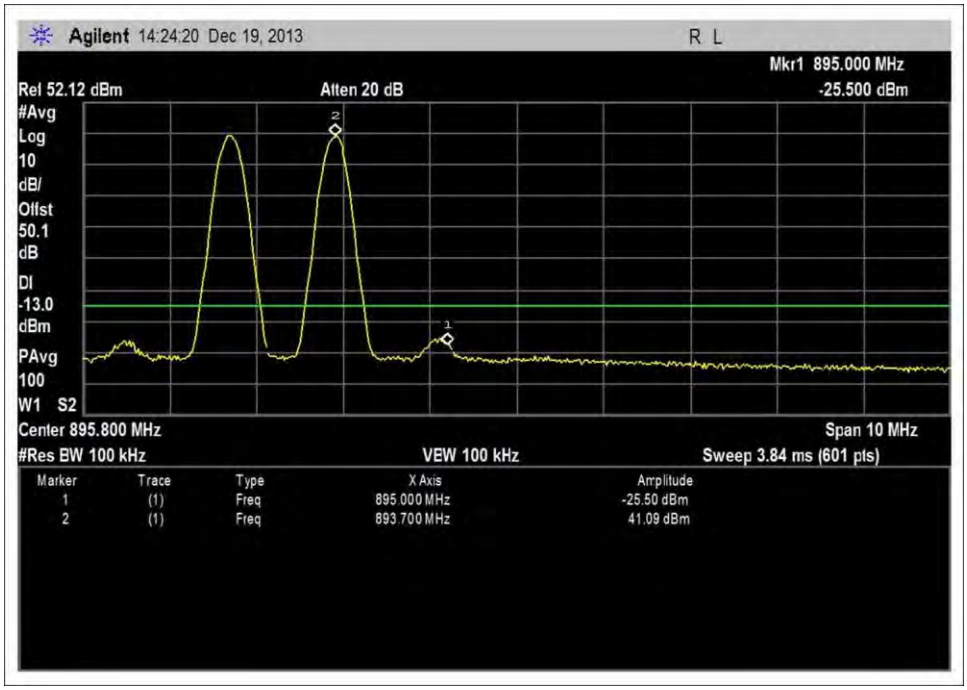
Low Channel, EDGE 10kHz



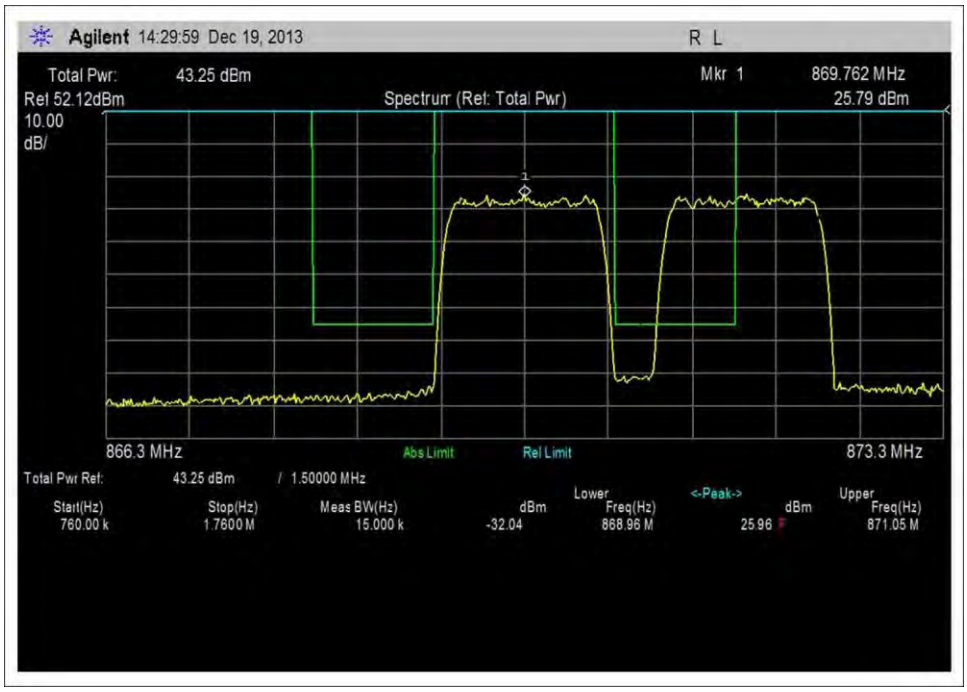
High Channel, EDGE 10kHz



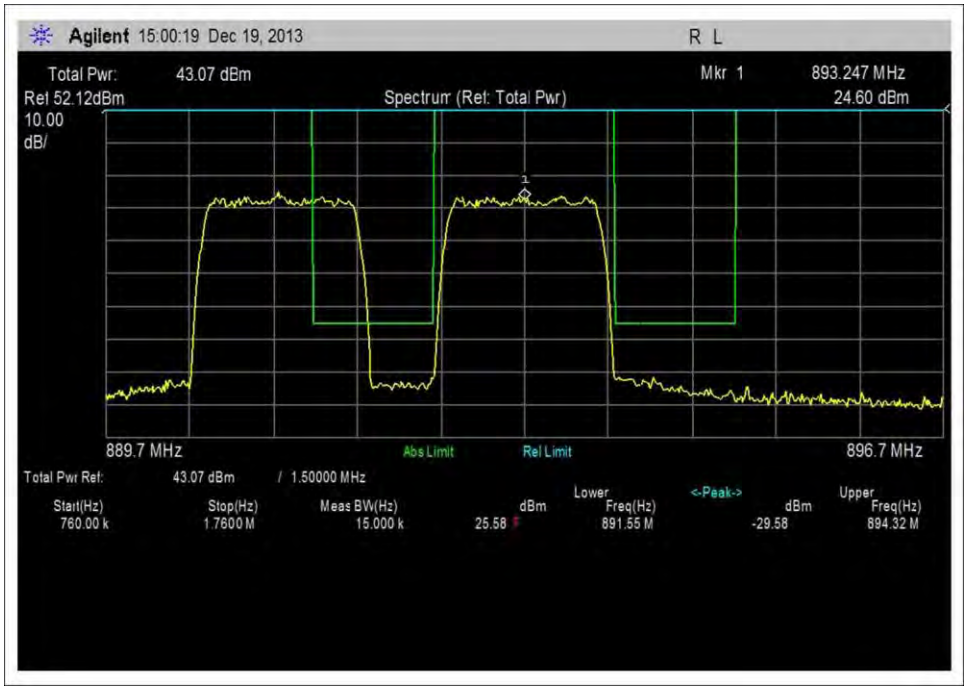
Low Channel, EDGE 100kHz



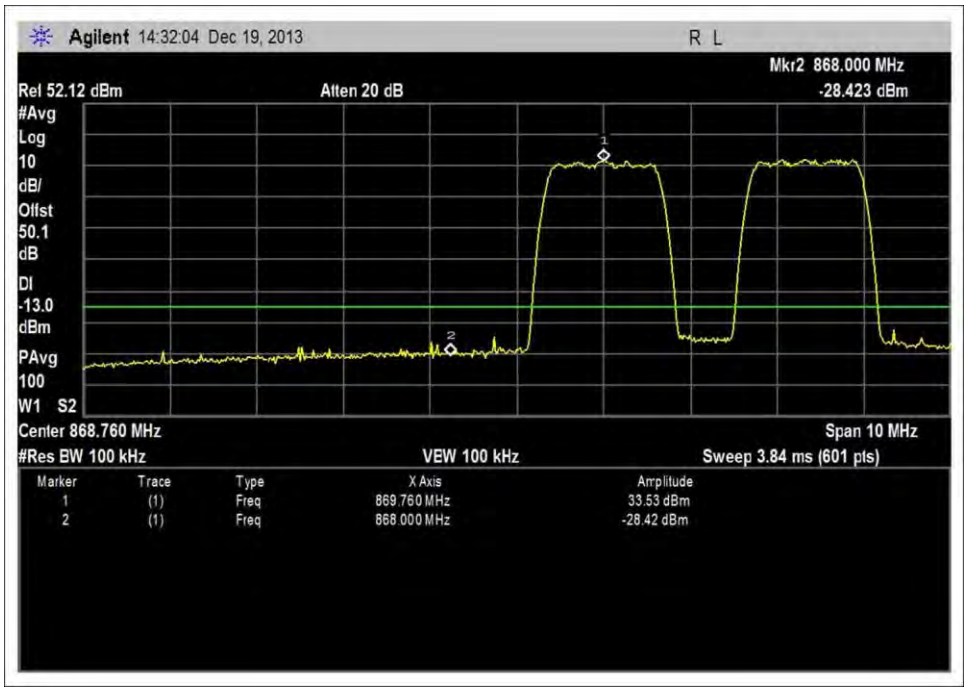
High Channel, EDGE 100kHz



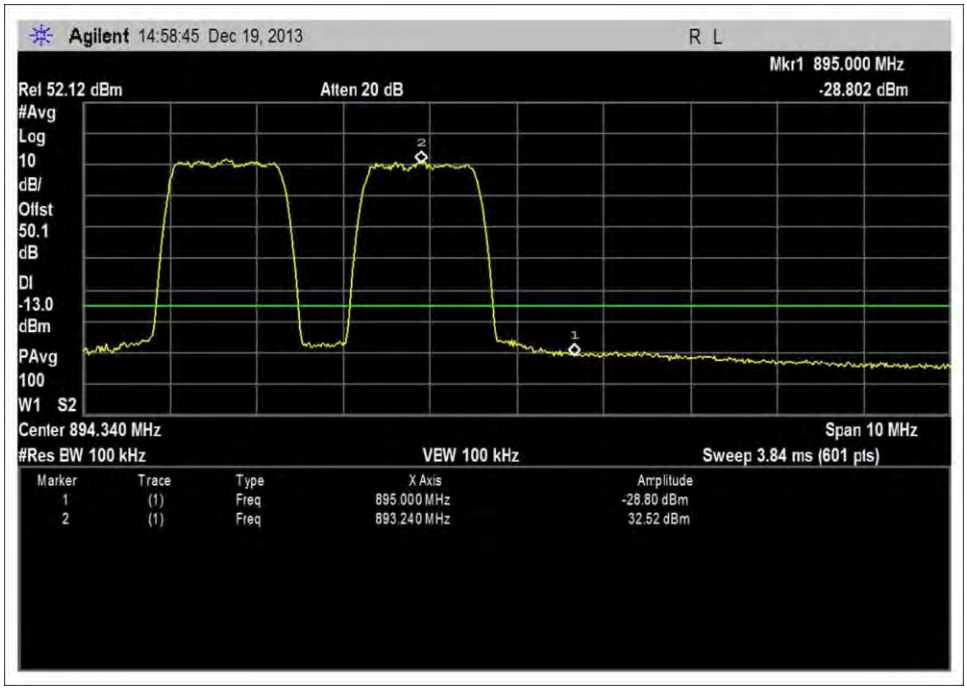
Low Channel, CDMA IS95A 15kHz



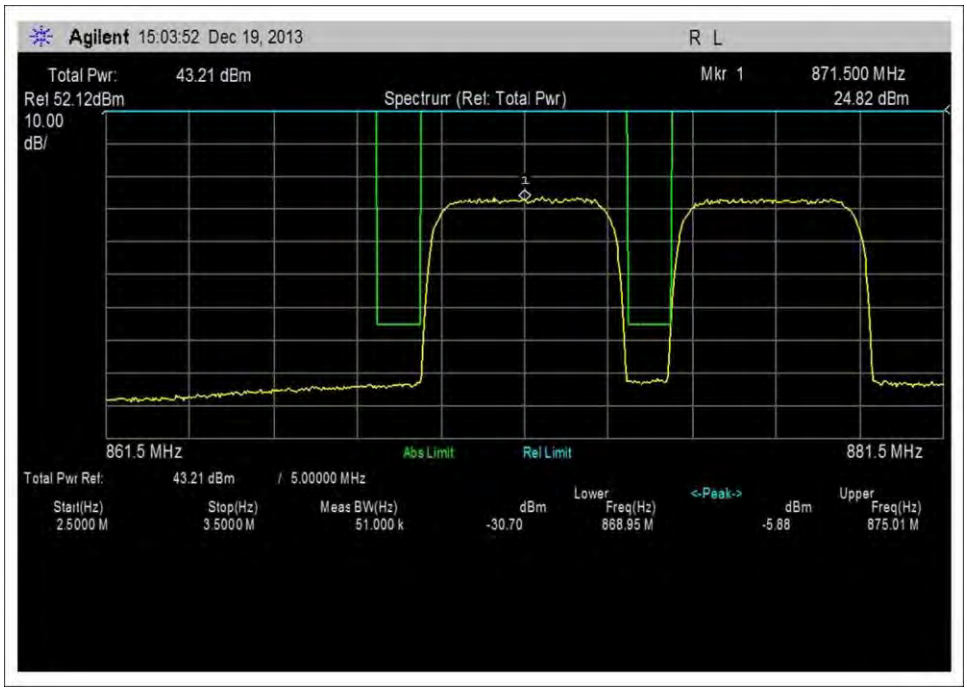
High Channel, CDMA IS95A 15kHz



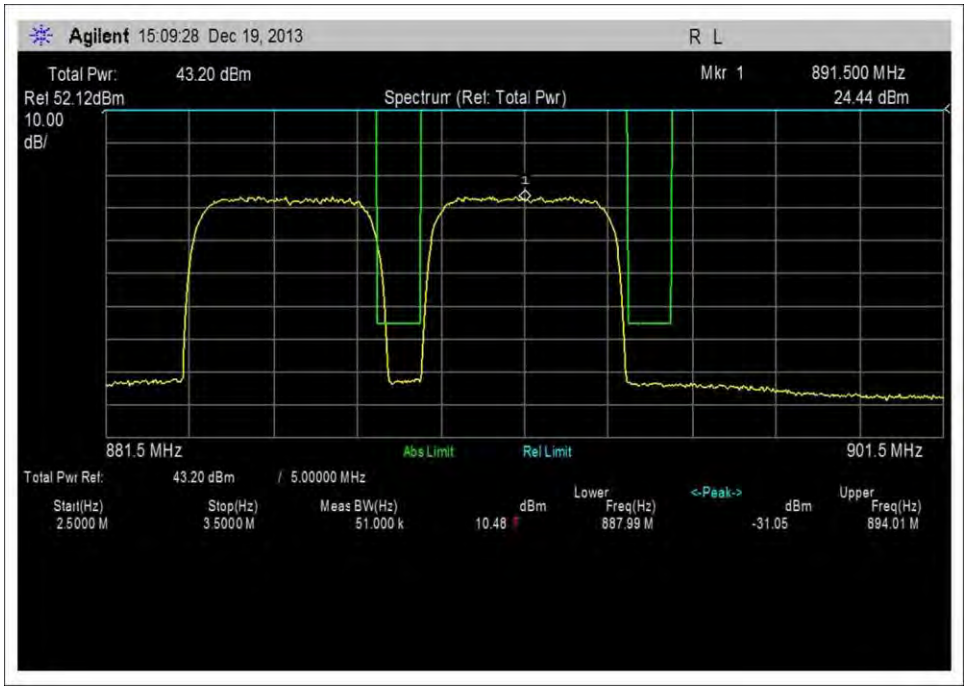
Low Channel, CDMA IS95A 100kHz



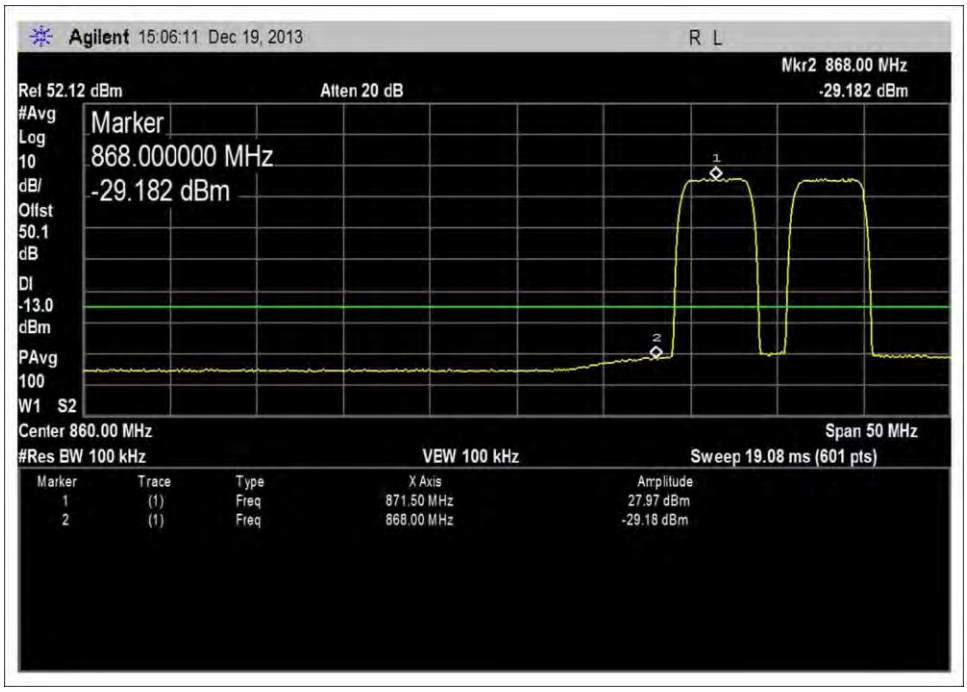
High Channel, CDMA IS95A 100kHz



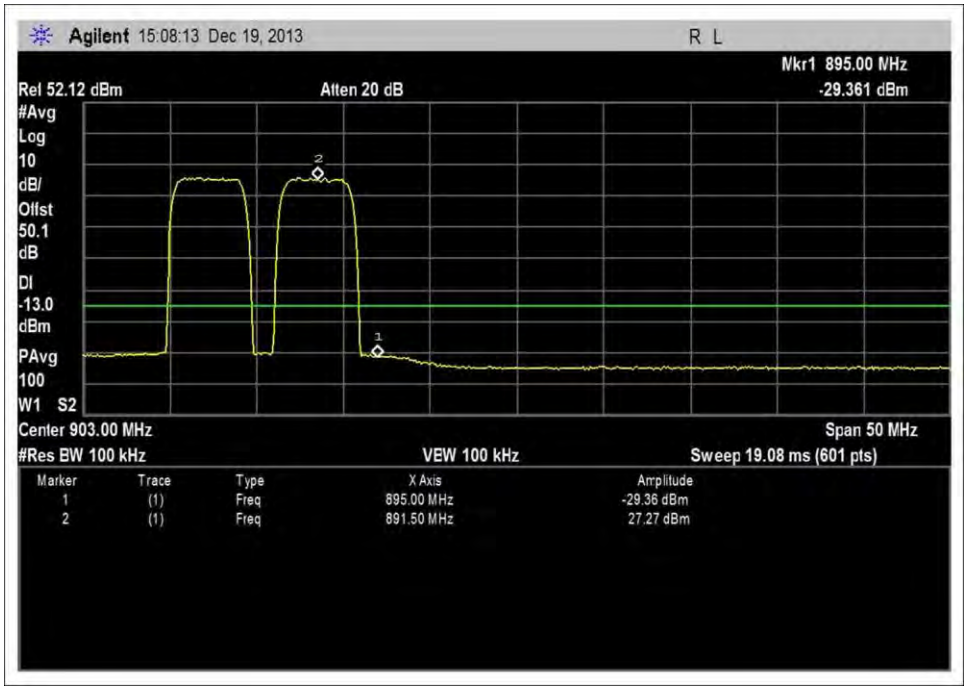
Low Channel, UMTS WCMDA 3GPP 51kHz



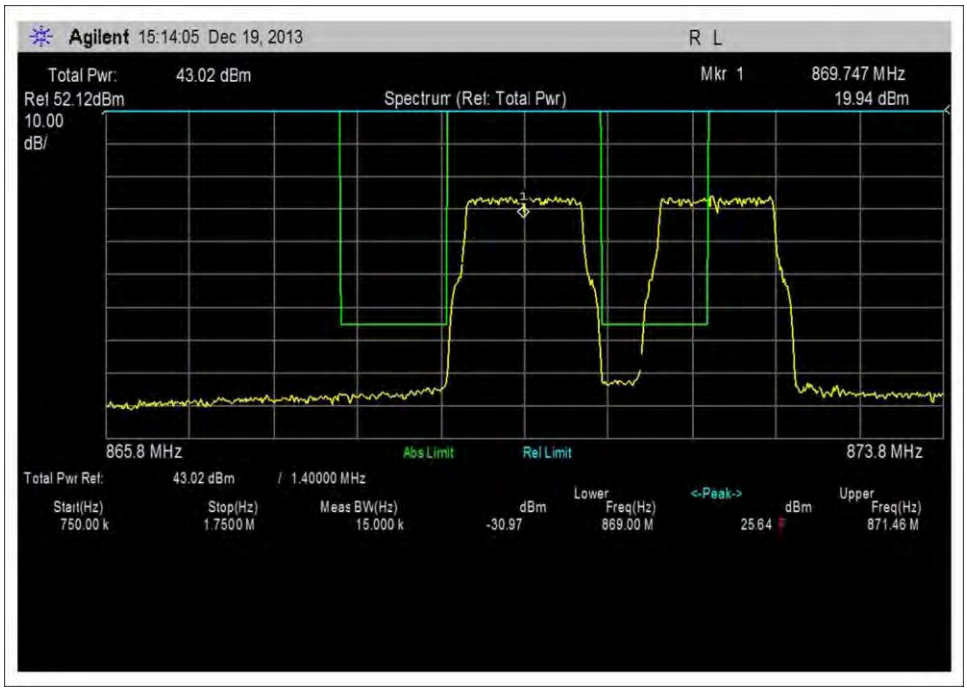
High Channel, UMTS WCMDA 3GPP 51kHz



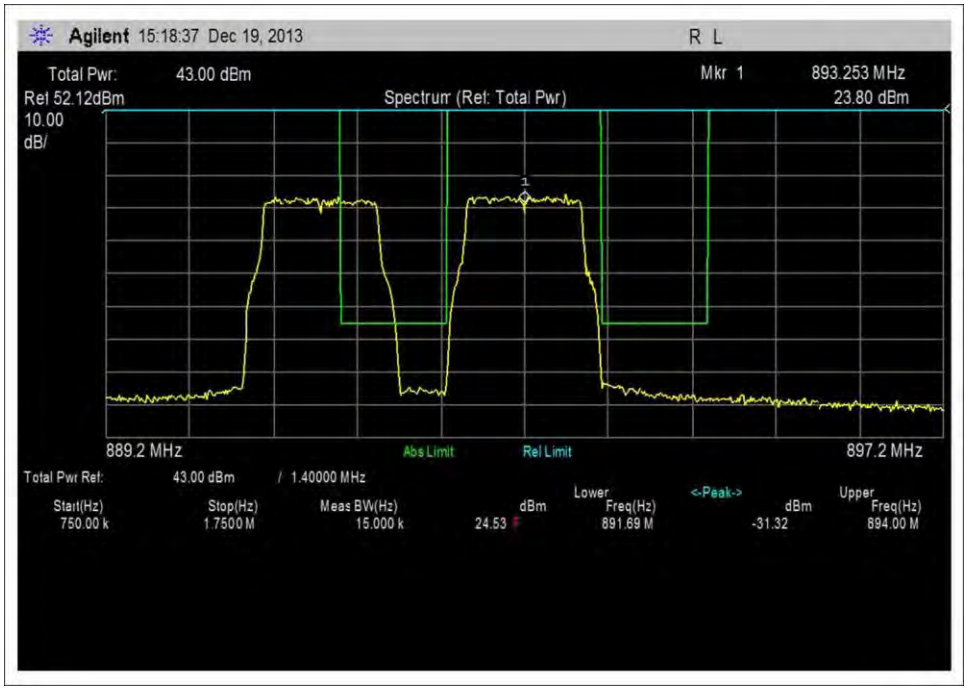
Low Channel, UMTS WCMDA 3GPP 100kHz



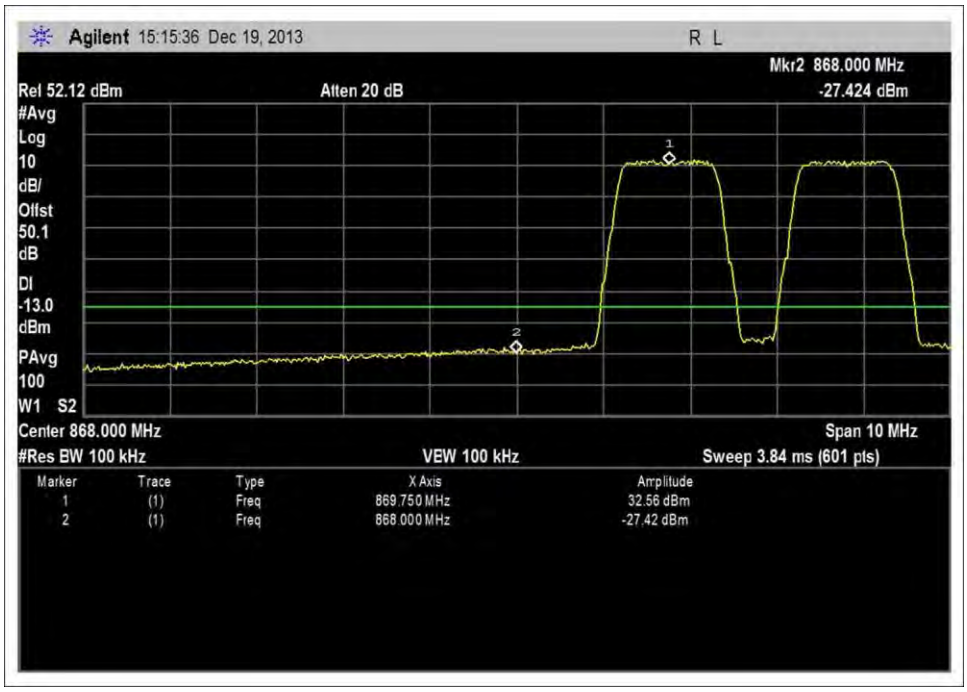
High Channel, UMTS WCMDA 3GPP 100kHz



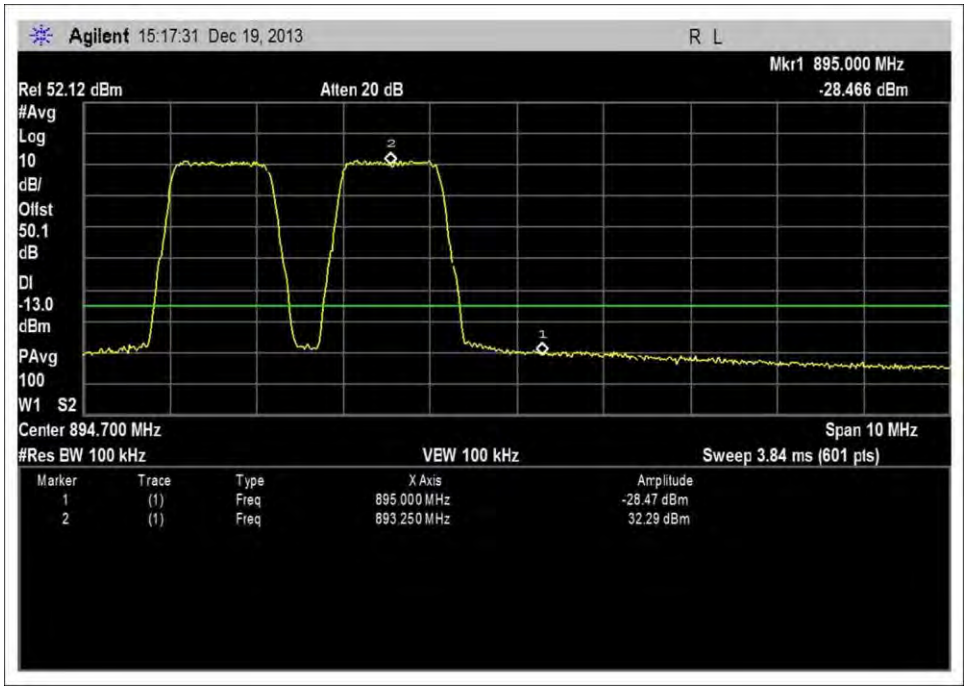
Low Channel, LTE 1.4MHz 15kHz



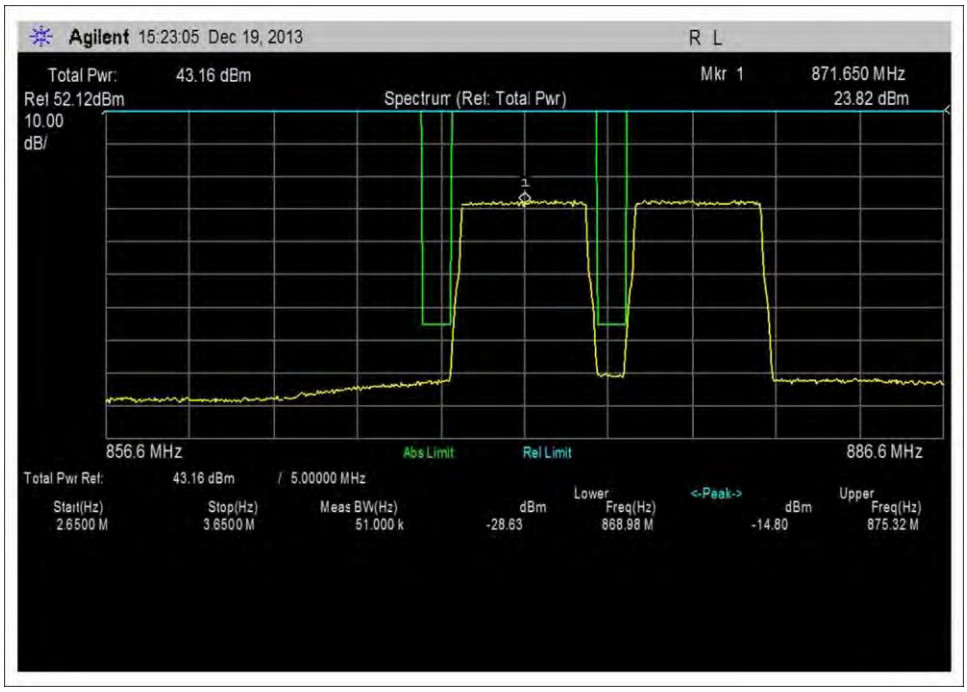
High Channel, LTE 1.4MHz 15kHz



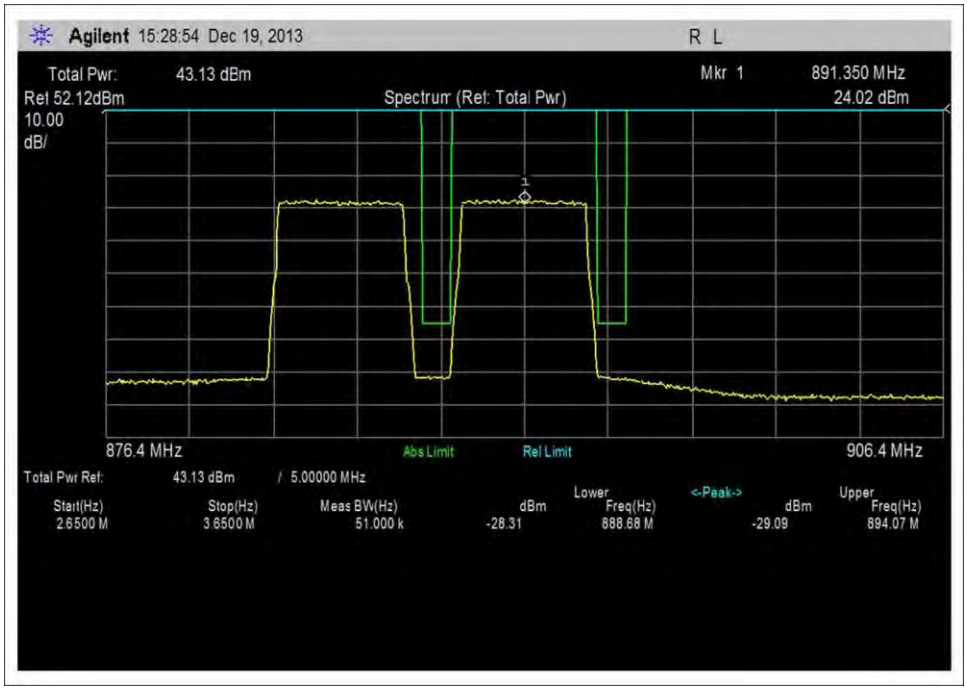
Low Channel, LTE 1.4MHz 100kHz



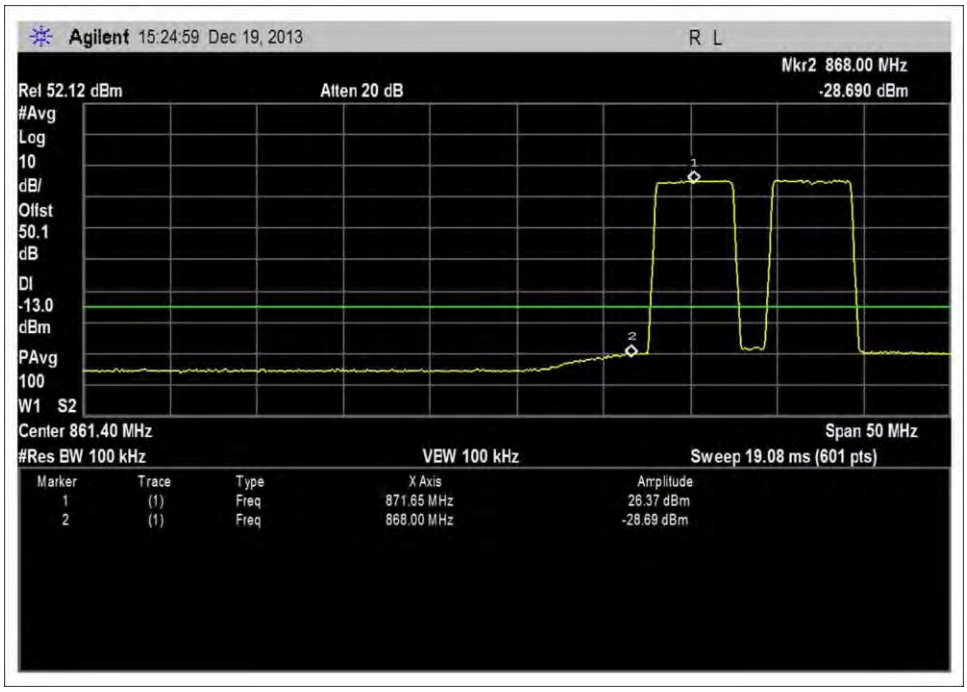
High Channel, LTE 1.4MHz 100kHz



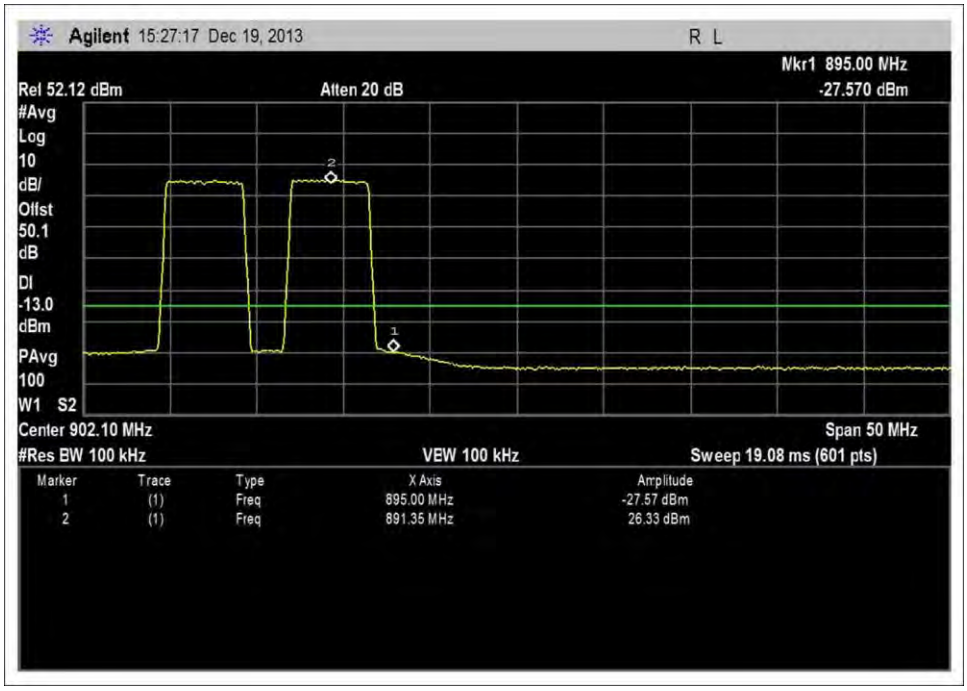
Low Channel, LTE 5MHz 51kHz



High Channel, LTE 5MHz 51kHz

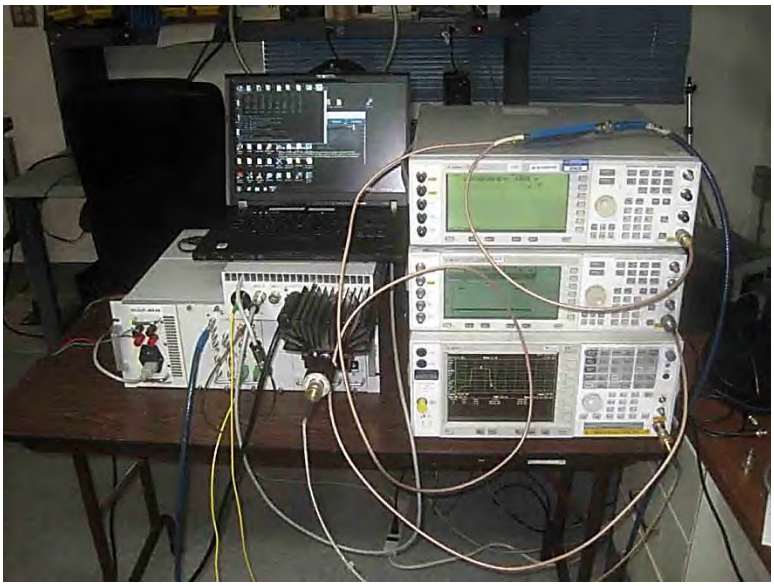


Low Channel, LTE 5MHz 100kHz



High Channel, LTE 5MHz 100kHz

Test Setup Photos



Out of Band Rejection

Test Conditions / Setup

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **BTI Wireless**
Specification: **Out of Band Rejection Plots**
Work Order #: **95179** Date: 12/20/2013
Test Type: **Conducted Emissions** Time: 15:17:27
Equipment: **850MHz 40W Remote Transmitting Unit** Sequence#: 0
Manufacturer: BTI Wireless Tested By: Don Nguyen
Model: mBSC0850-040-RUMF01 110V 60Hz
S/N: MBSC0850040RUMF01-11010002

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T2	AN02945	Cable	32022-2-2909K-36TC	10/30/2013	10/30/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
850MHz 40W Remote Transmitting Unit*	BTI Wireless	mBSC0850-040-RUMF01	MBSC0850040RUMF01-11010002

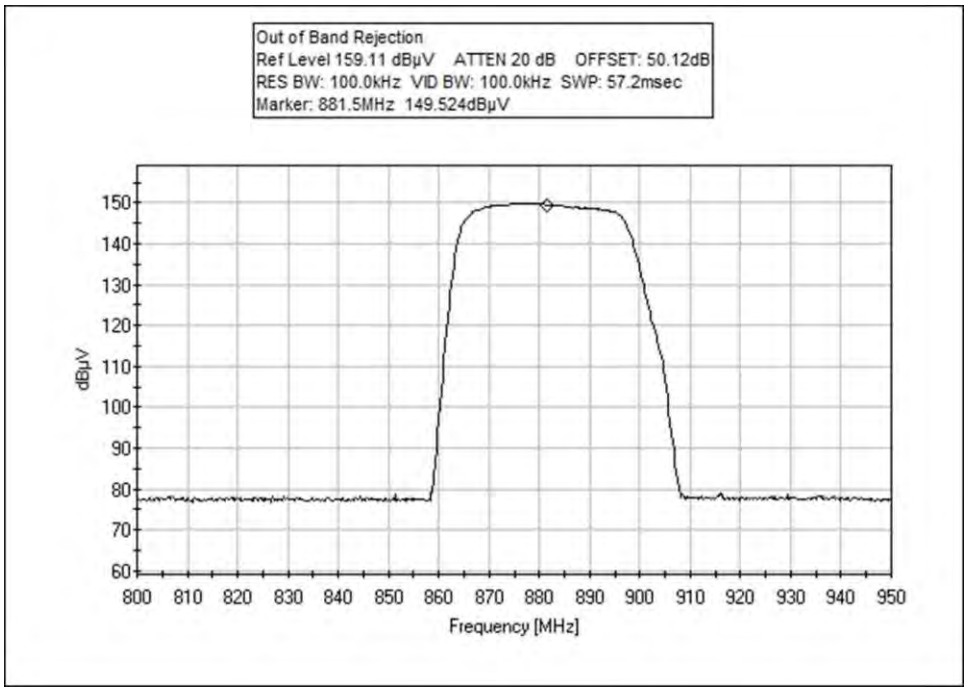
Support Devices:

Function	Manufacturer	Model #	S/N
Attenuator 30db Pad	Weinschel	49-30-43	KW075
50 ohm Load	Generic	NA	NA
50 ohm Load	Generic	NA	NA
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
Cable	Pasternack	Sucoflex 104A	12237/4A
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 20db Pad	Weinschel	33-20-24	BJ7479

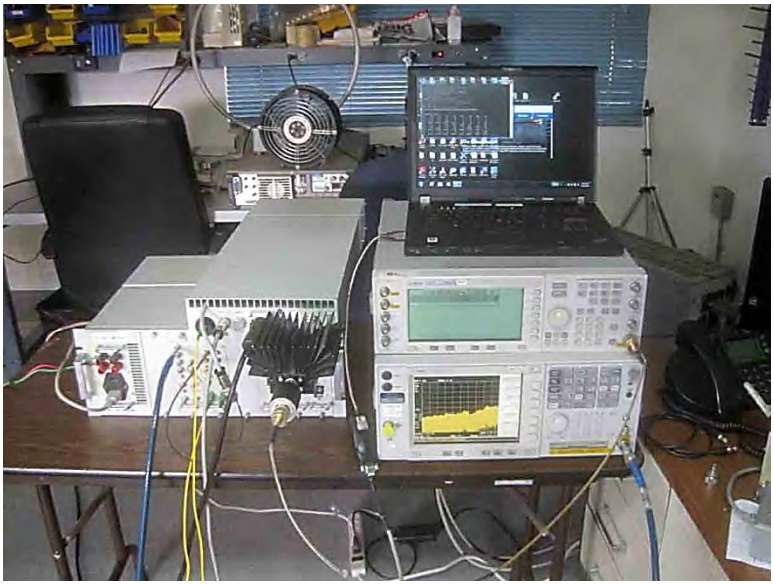
Test Conditions / Notes:

The EUT is placed on the test bench. RF to Fiber Optic Converter Tx1 In is connected to an ESG Signal generator via cable Sucoflex 104A. Fiber-1 port from the converter is connected to fiber port of EUT. ANT port of the EUT is connected to 30db attenuator and 20db attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-2909K-36TC. TX out and RX in port are terminated to 50 ohm loads. Per manufacturer, the output frequency is independent of the components used in optical converter. EUT is a Fixed Gain Amplifier with fixed output power as set by ALC (Auto Level Control) Threshold level of 1±0.5dB higher than maximum rated output power.
The evaluation is performed at the antenna port.
Freq: 869-894MHz
Max Ouput Power : 40 W
Signal generator is set to sweep from 800 – 950 MHz
19°C, 63% Relative Humidity
Site D

Test Data



Test Setup Photos



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.