

BTI Wireless

TEST REPORT FOR

**2100MHz 80W Transmitting Remote Unit
Model: mBSC2100-080-RUMF01**

Tested To The Following Standards:

FCC Part 27L

Report No.: 95158-5

Date of issue: December 23, 2013



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: 9913651

DATE OF EQUIPMENT RECEIPT:

DATE(S) OF TESTING:

REPORT PREPARED BY:

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

Project Number: 95158

November 25, 2013

November 25-27, 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 A	US0060	SL2-IN-E-1146R	3082D-1	90473	A-0147

SUMMARY OF RESULTS

Standard / Specification: FCC Part 27L

Description	Test Procedure/Method	Results
RF Power Output	FCC Part 27L § 27.50(C)(3) / 2.1046	Pass
Occupied Bandwidth	FCC Part 27L / 2.1049(l)	Pass
Conducted Spurious Emissions	FCC Part 27L § 27.53(g) / 2.1051	Pass
Radiated Spurious Emissions	FCC Part 27L § 27.53(h) / 2.1053	Pass
Bandedge	FCC Part 27L	Pass
Intermodulation	FCC Part 27L / TIA/EIA 603	Pass
Out of Band Rejection	FCC Part 27L / RSS 131 4.2	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: **mBSC2100-080-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 models. **mBSC2100-080-RU**

2100MHz 80W Transmitting Remote Unit

Manuf: BTI Wireless

Model: mBSC2100-080-RUMF01

Serial: 10102708000113100003

PERIPHERAL DEVICES

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

ESG Vector Signal Generator

Manuf: Agilent

Model: 4438C

Serial: MY45091601

Step Attenuator 110dB pad

Manuf: HP

Model: 8496B

Serial: 1350A01241

Cable

Manuf: Pasternack

Model: Sucoflex 104A

Serial: 12237/4A

Attenuator 30db Pad

Manuf: Weinschel

Model: 49-30-43

Serial: KW075

50 ohm Load (2)

Manuf: Generic

Model: NA

Serial: NA

RF to Fiber Optic Converter

Manuf: BTI Wireless

Model: mBSC9351-HU

Serial: mBSC9351HU-11021029

FCC 27L

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR Part 27L.

27.50(c)(3) / 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 #: **95158** Date: 11/27/2013
 Test Type: **Conducted Emissions** Time: 10:46:12
 Equipment: **2100MHz 80W Transmitting Remote Unit** Sequence#: 5

Manufacturer: BTI Wireless Tested By: Don Nguyen
 Model: mBSC2100-080-RUMF01 110V 60Hz
 S/N: 10102708000113100003

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
2100MHz 80W Transmitting Remote Unit*	BTI Wireless	mBSC2100-080-RUMF01	10102708000113100003

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA
Cable	Pasternack	Sucoflex 104A	12237/4A
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
50 ohm Load	Generic	NA	NA

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 110db step 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 the manufacturer, the output frequency is independent of the components used in optical converter.

The evaluation is performed at the antenna port.

Freq: 2110-2155MHz

Signal protocol: WCDMA_3GPP, LTE-TM1.1 1.4MHz, 5MHz, 20MHz

Power Output: 80W

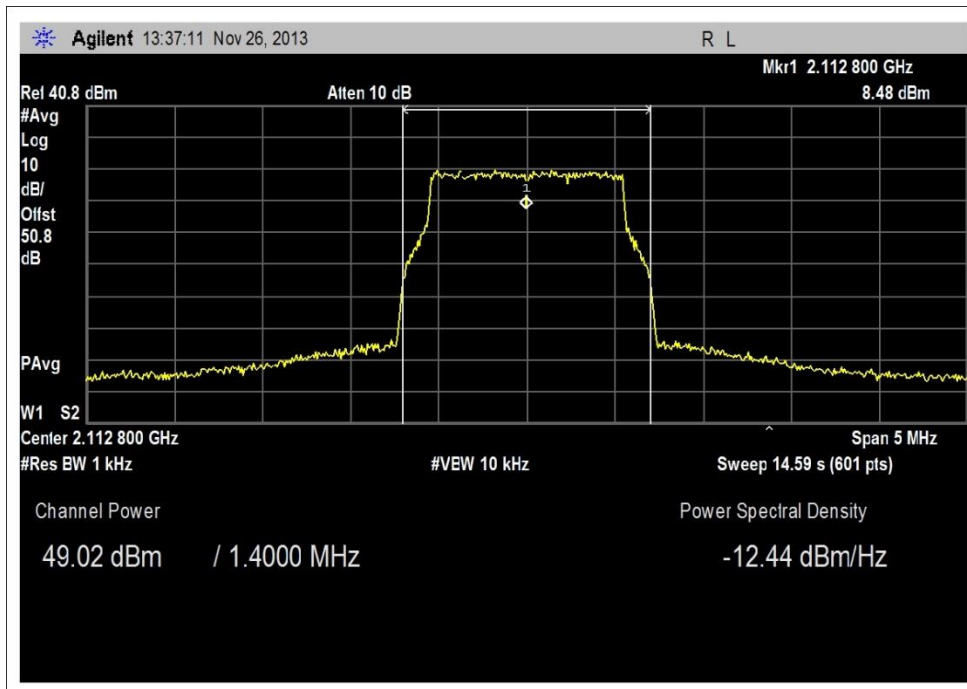
20°C, 31% Relative Humidity

Site A

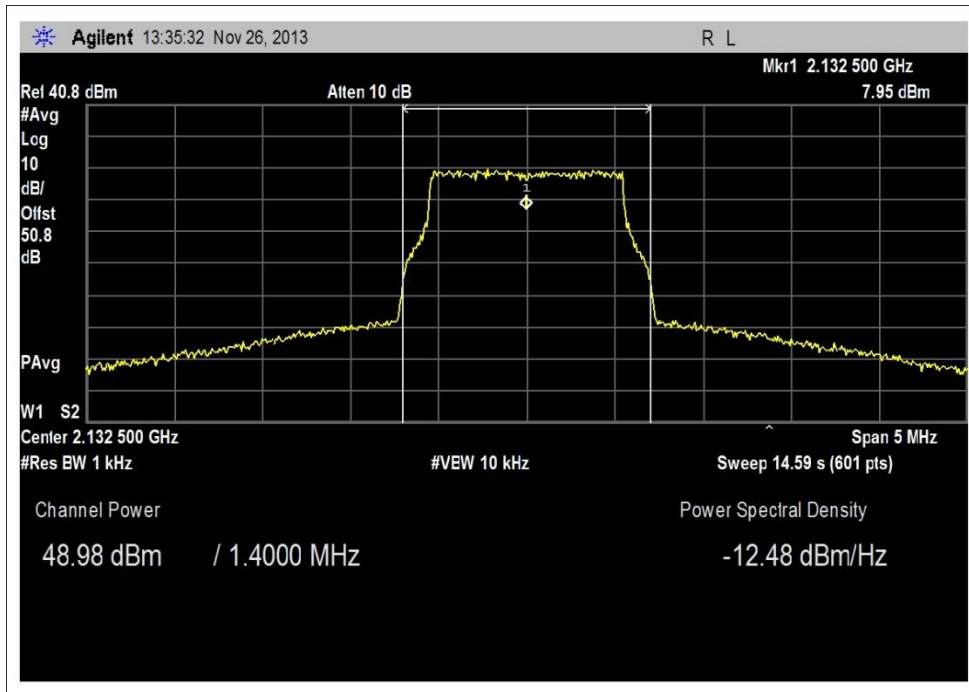
§27.50-Power limits and duty cycle.

(d)(3) A licensee operating a base or fixed station in the 2110-2155 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must coordinate such operations in advance with all Government and non-Government satellite entities in the 2025-2110 MHz band. Operations with power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with the following licensees authorized to operate within 120 kilometers (75 miles) of the base or fixed station operating in this band: all Broadband Radio Service (BRS) licensees authorized under part 27 in the 2155-2160 MHz band and all advanced wireless services (AWS) licensees authorized to operate on adjacent frequency blocks in the 2110-2155 MHz band.

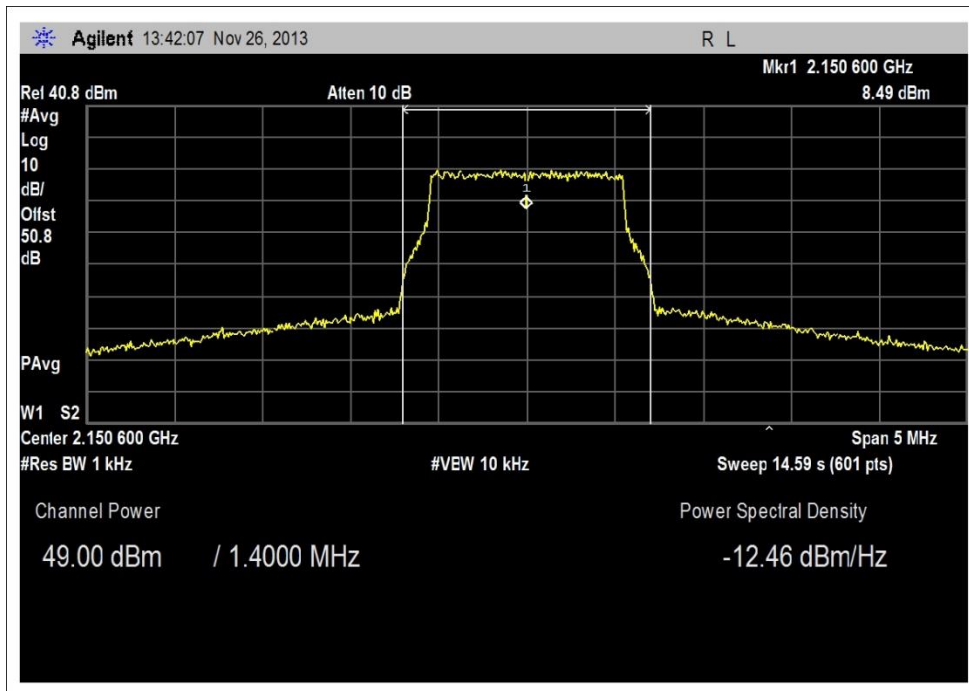
Test Data



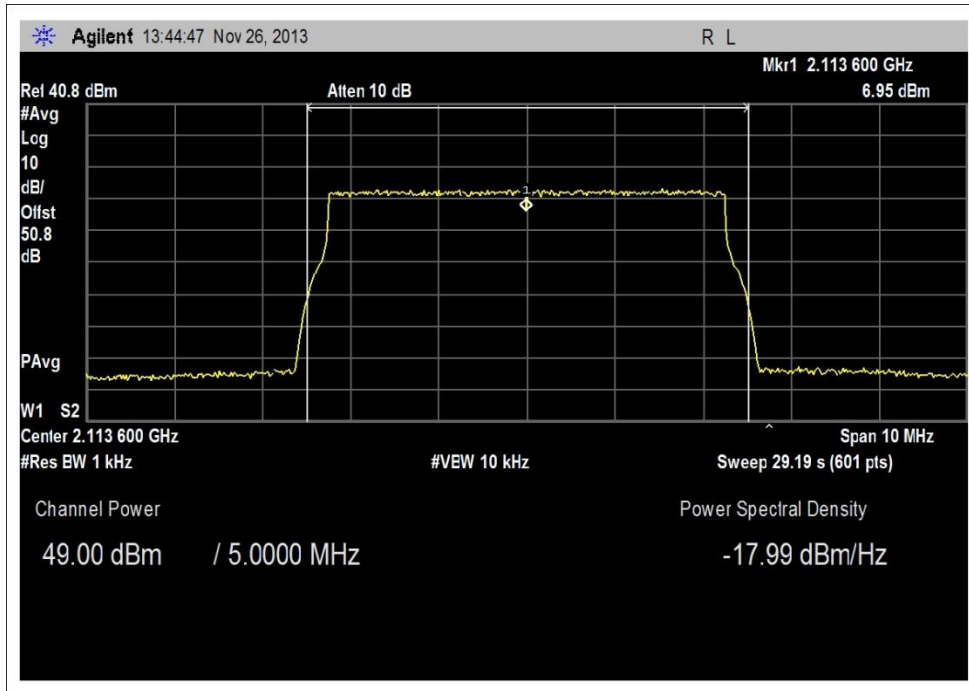
Band Power 80W LTE 1.4MHz, Low Channel



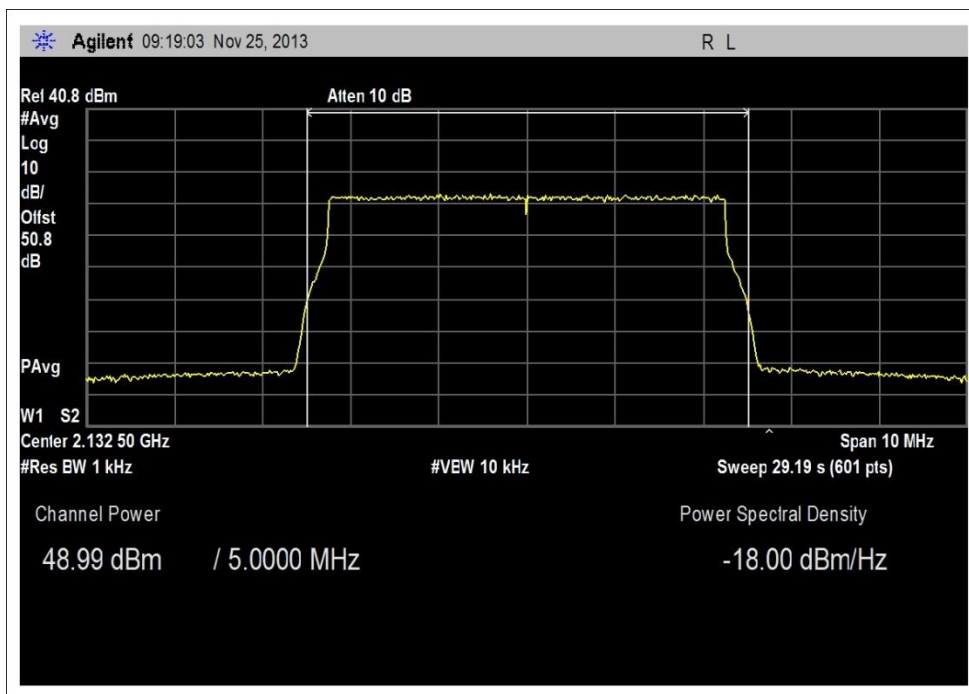
Band Power 80W LTE 1.4MHz, Middle Channel



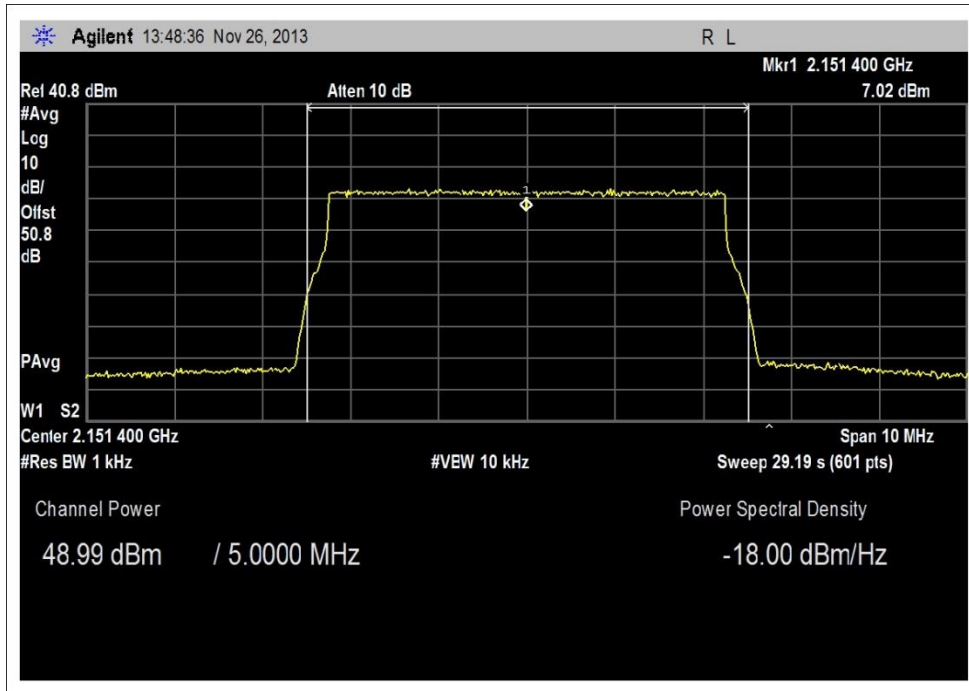
Band Power 80W LTE 1.4MHz, High Channel



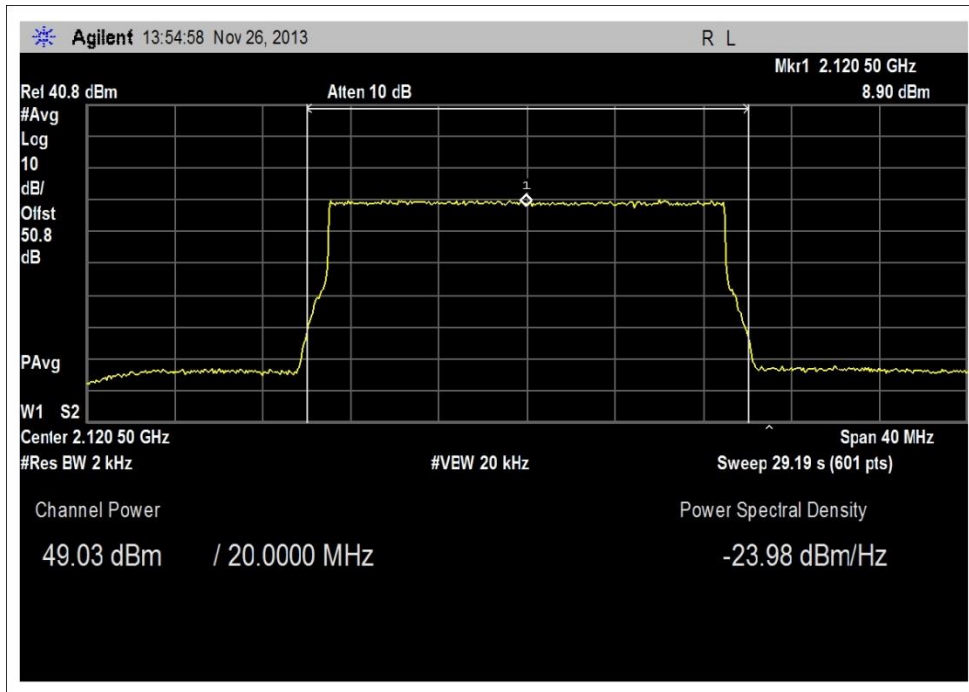
Band Power 80W LTE 5MHz, Low Channel



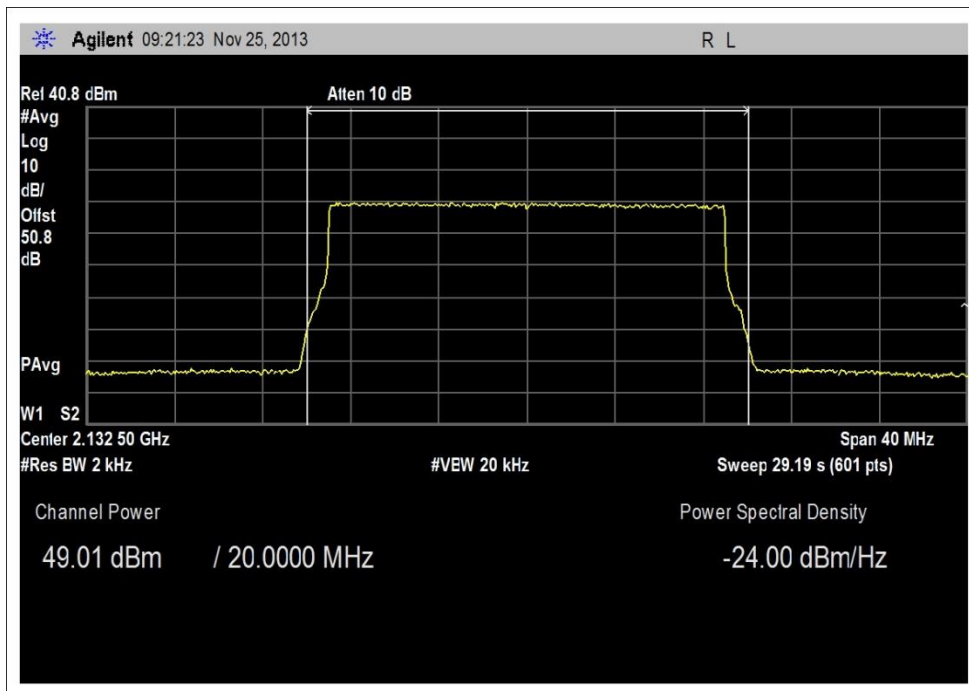
Band Power 80W LTE 5MHz, Middle Channel



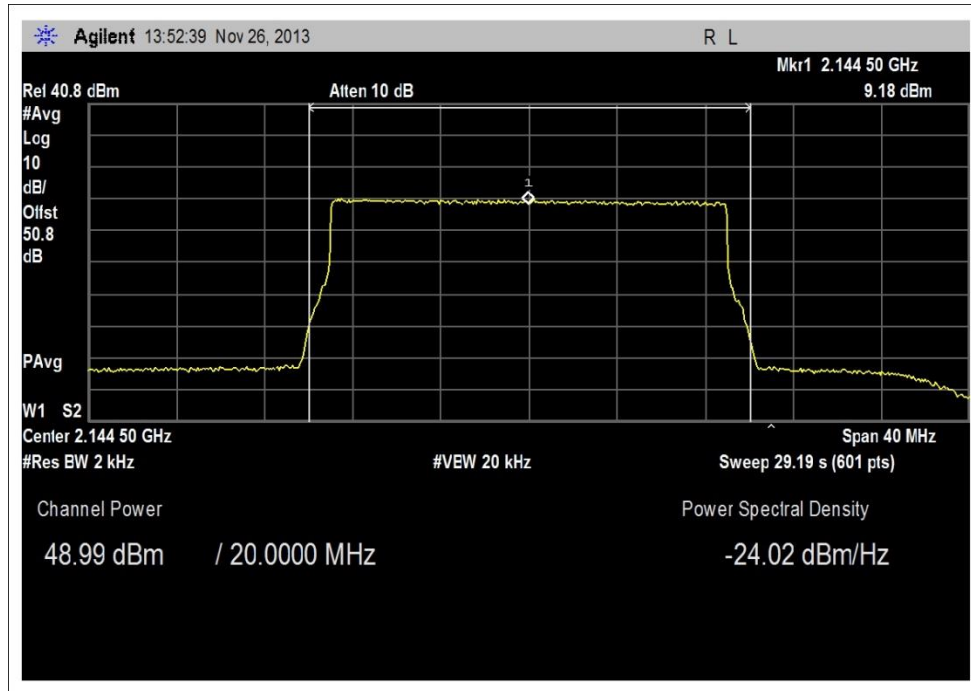
Band Power 80W LTE 5MHz, High Channel



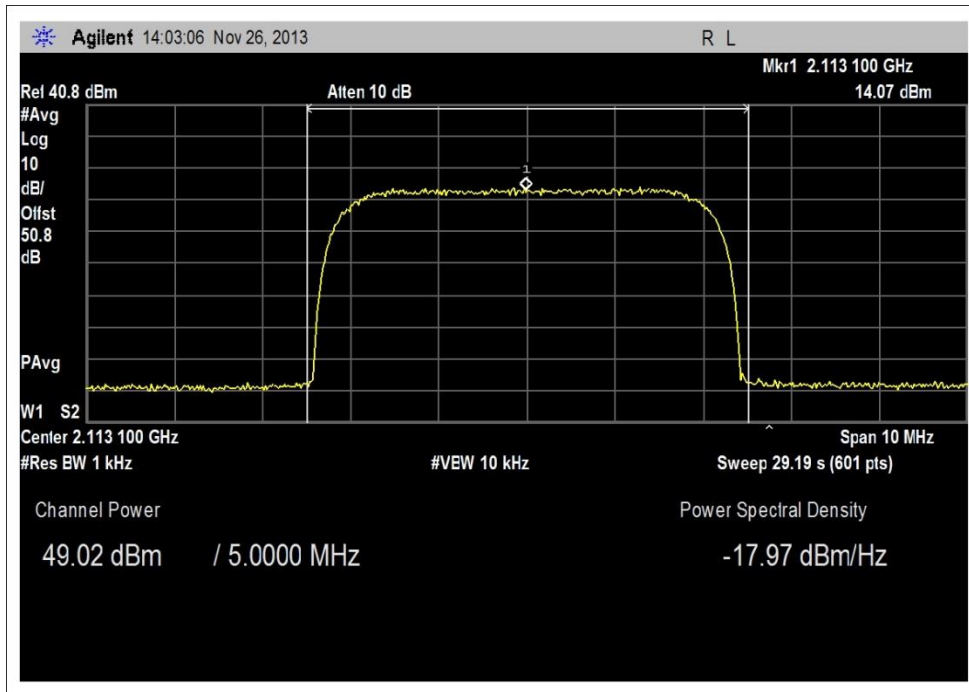
Band Power 80W LTE 20MHz, Low Channel



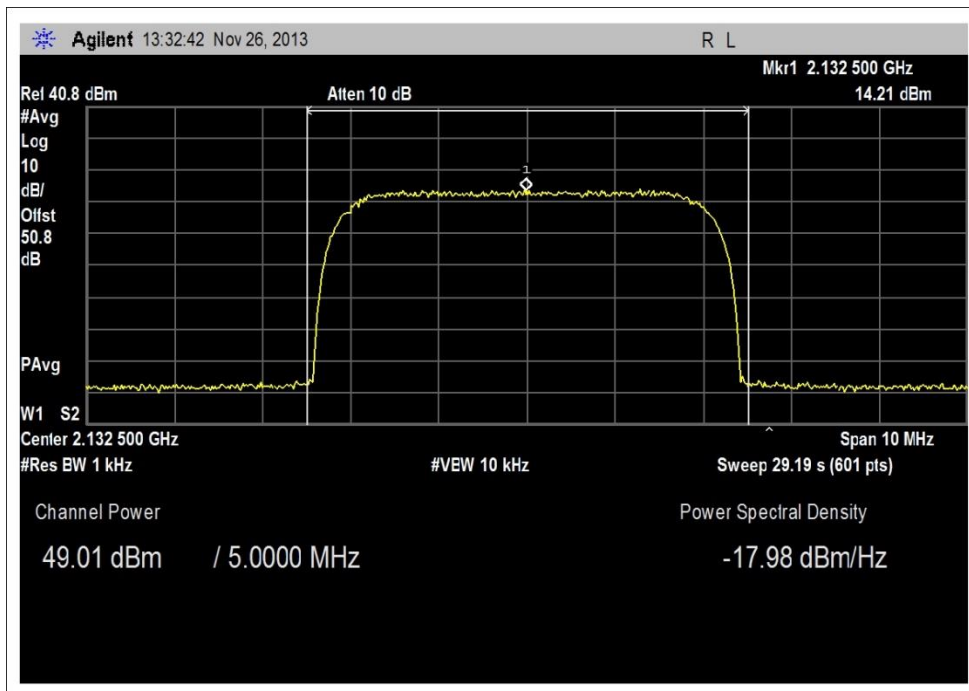
Band Power 80W LTE 20MHz, Middle Channel



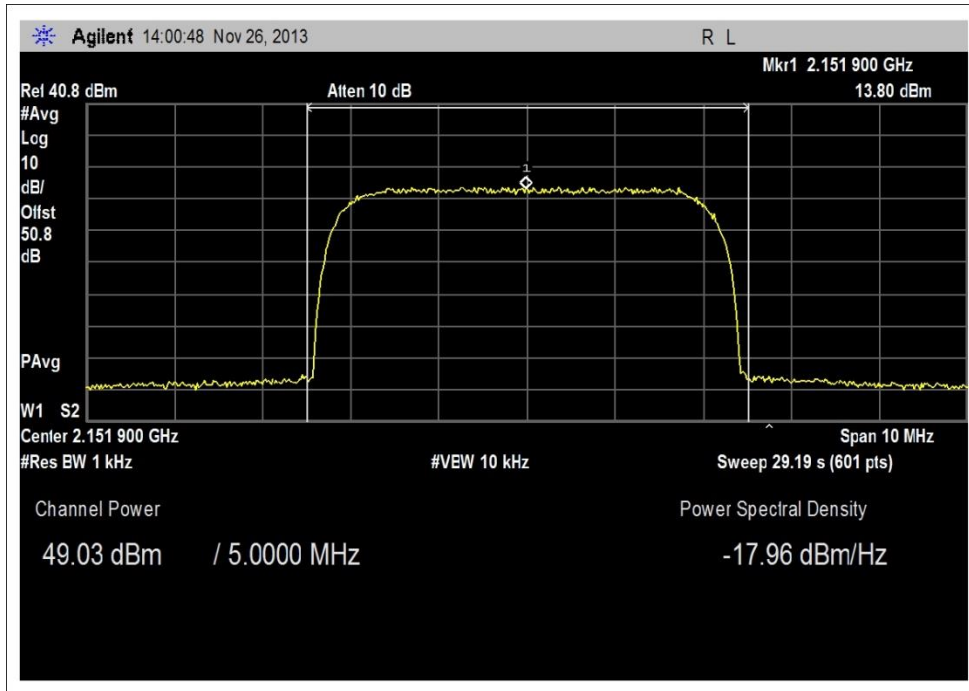
Band Power 80W LTE 20MHz, High Channel



Band Power 80W UMTS WCDMA 3GPP, Low Channel



Band Power 80W UMTS WCDMA 3GPP, Middle Channel



Band Power 80W UMTS WCDMA 3GPP, High Channel

Test Setup Photo



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 #:	95158	Date:	11/27/2013
Test Type:	Conducted Emissions	Time:	10:46:12
Equipment:	2100MHz 80W Transmitting Remote Unit	Sequence#:	5
Manufacturer:	BTI Wireless	Tested By:	Don Nguyen
Model:	mBSC2100-080-RUMF01		110V 60Hz
S/N:	10102708000113100003		

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
2100MHz 80W Transmitting Remote Unit*	BTI Wireless	mBSC2100-080-RUMF01	10102708000113100003

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA
Cable	Pasternack	Sucoflex 104A	12237/4A
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
50 ohm Load	Generic	NA	NA

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 110db step 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 the manufacturer, the output frequency is independent of the components used in optical converter.

The evaluation is performed at the antenna port.

Freq: 2110-2155MHz

Signal protocol: WCDMA_3GPP, LTE-TM1.1 1.4MHz, 5MHz, 20MHz

80W

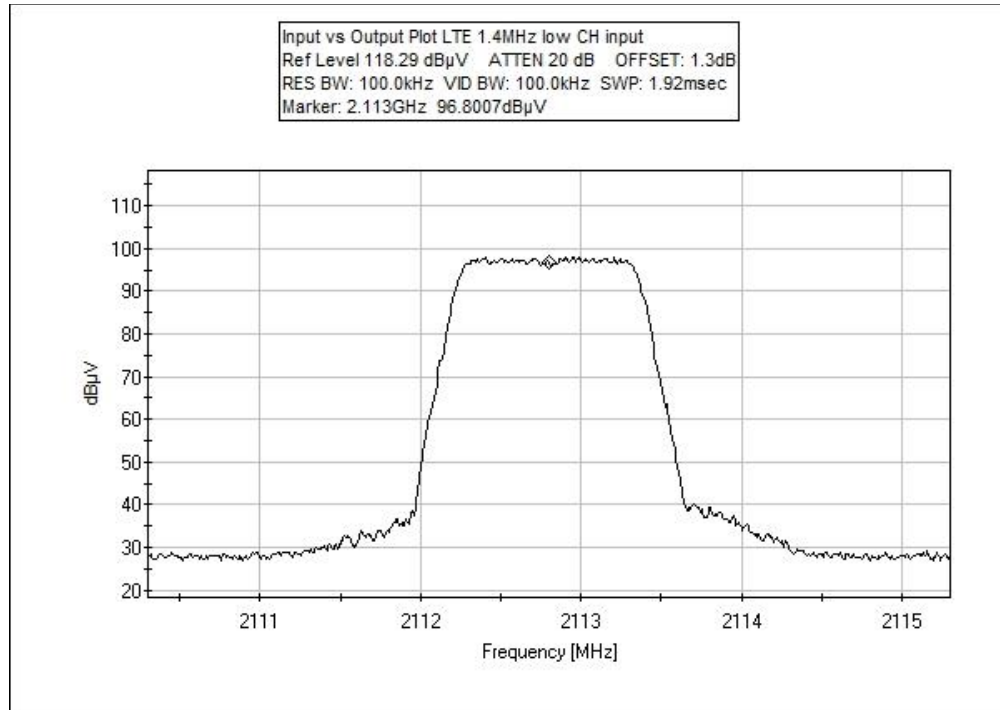
Modulation	Input Power (dbm)
UMTS (WCMDA 3GPP)	
2113.1MHz	-0.3
2132.5MHz	-0.61
2151.9MHz	0.82
LTE 1.4MHz	
2112.8MHz	-0.56
2132.5MHz	-0.46
2150.6MHz	0.28
LTE 5MHz	
2113.6MHz	-0.76
2132.5MHz	-0.94
2151.4MHz	0.32
LTE 20MHz	
2120.5MHz	-0.62
2132.5MHz	-0.84
2144.5MHz	-0.06

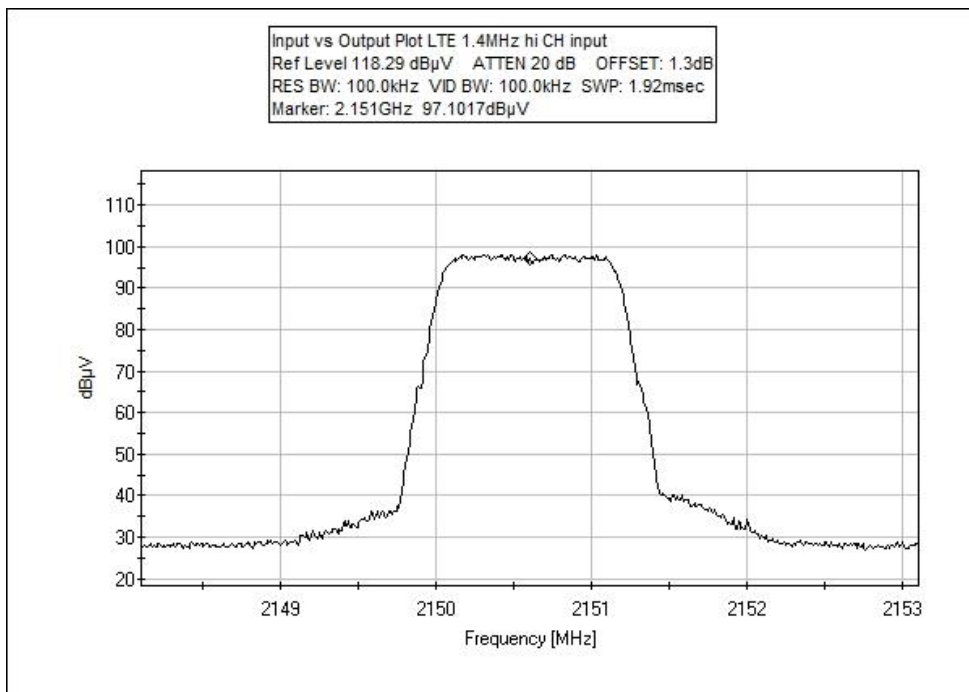
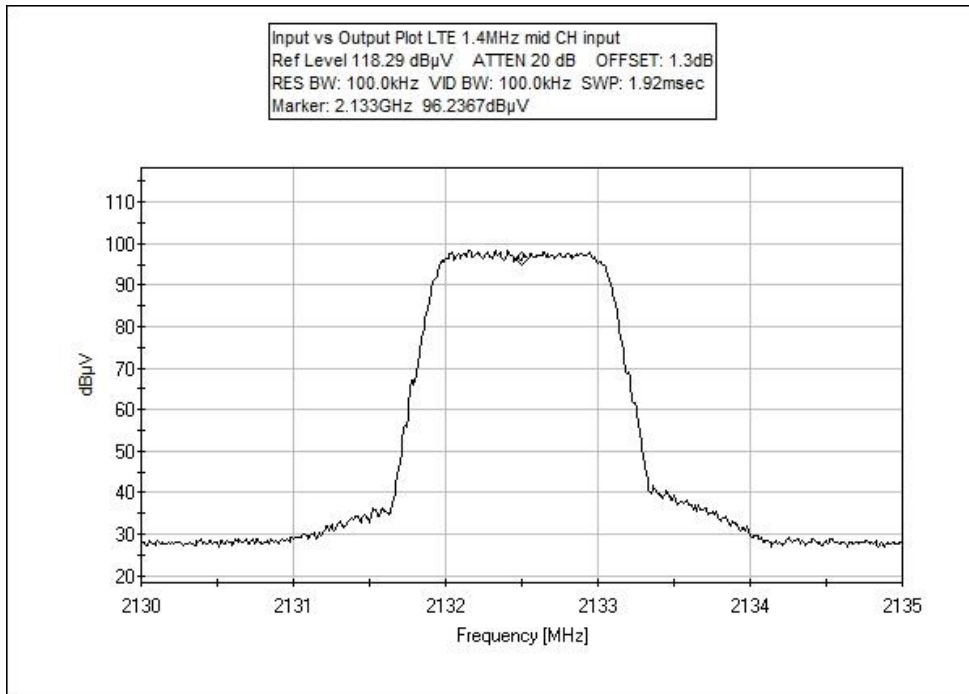
20°C, 31% Relative Humidity

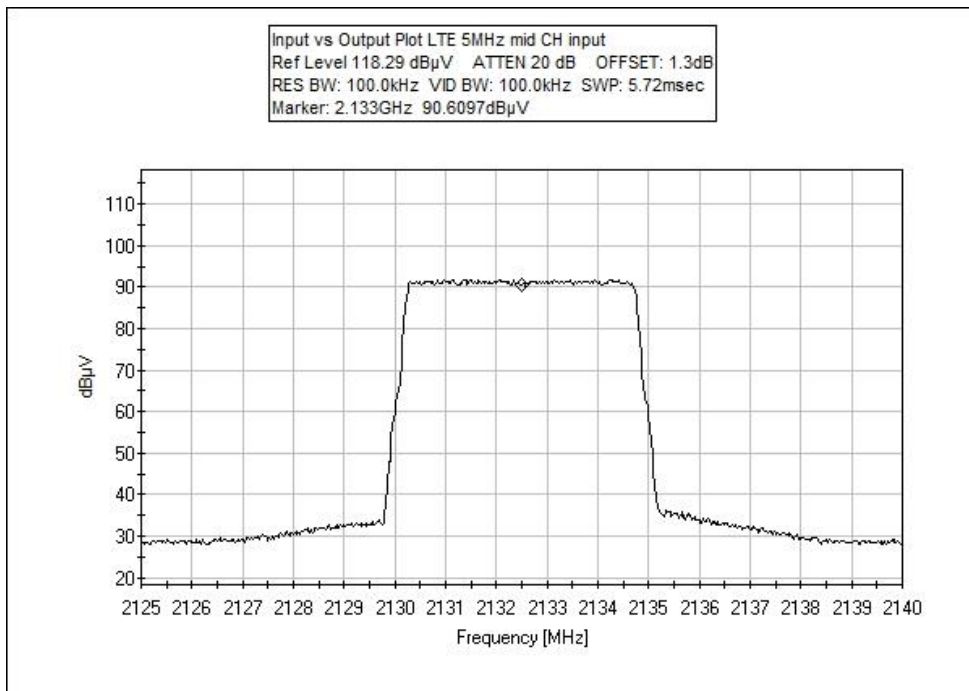
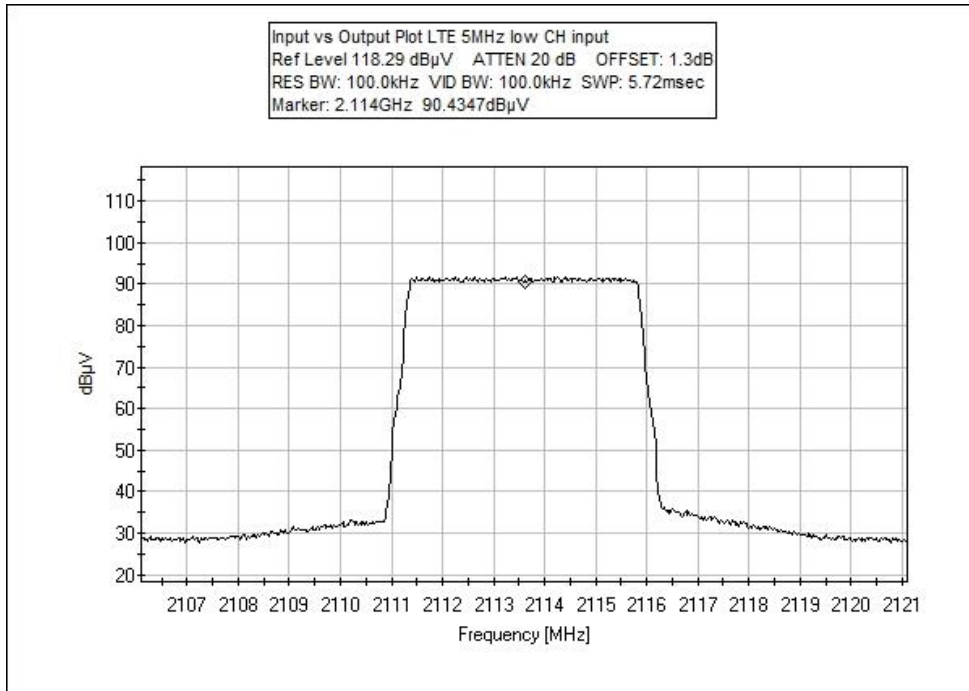
Site A

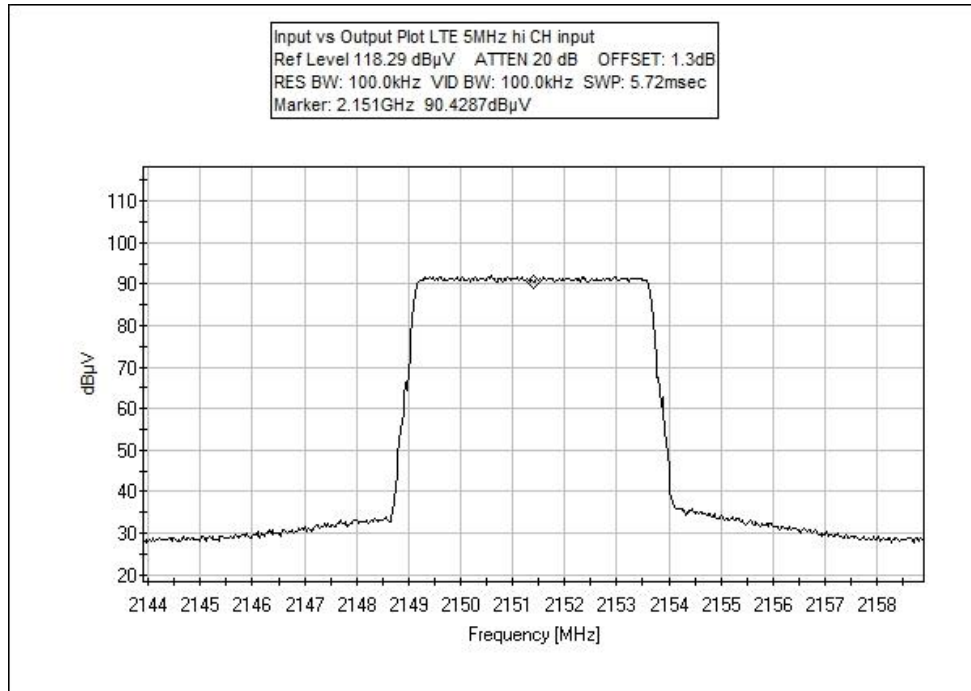
Test Data

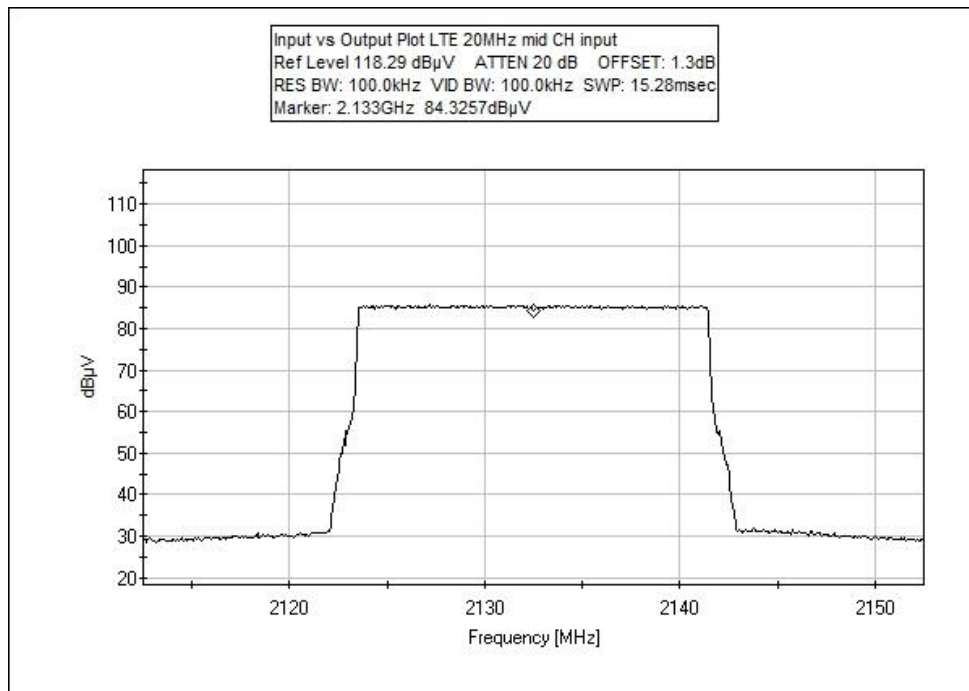
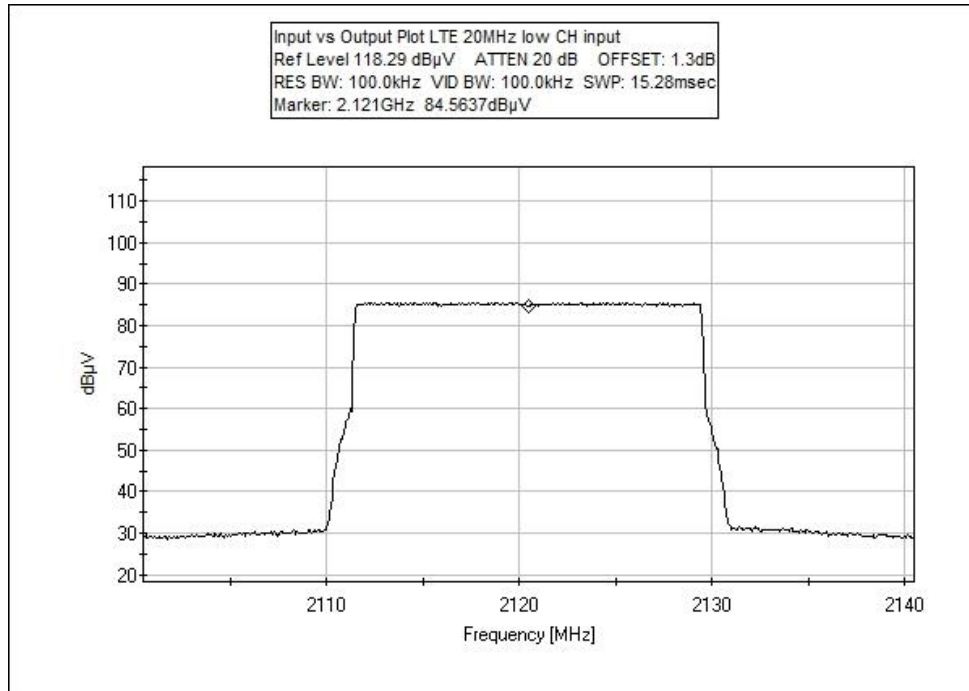
INPUT PLOTS

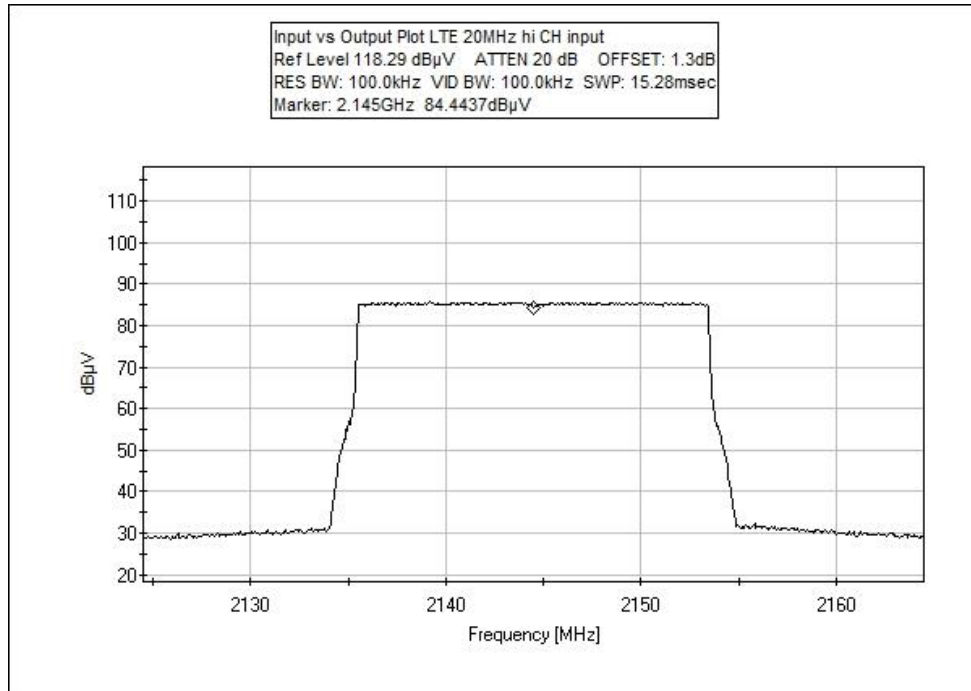


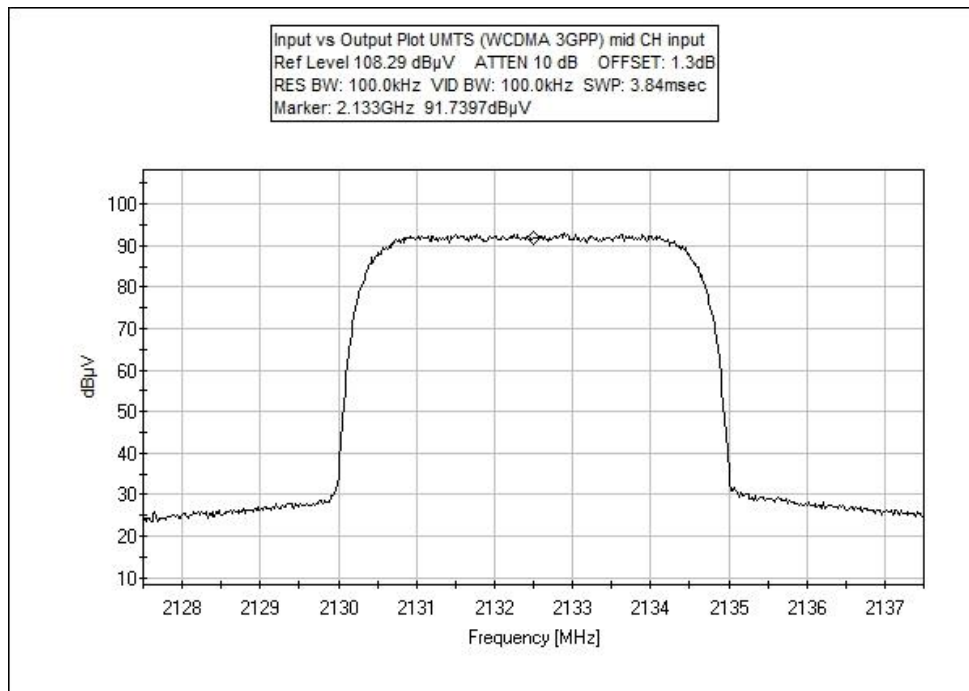
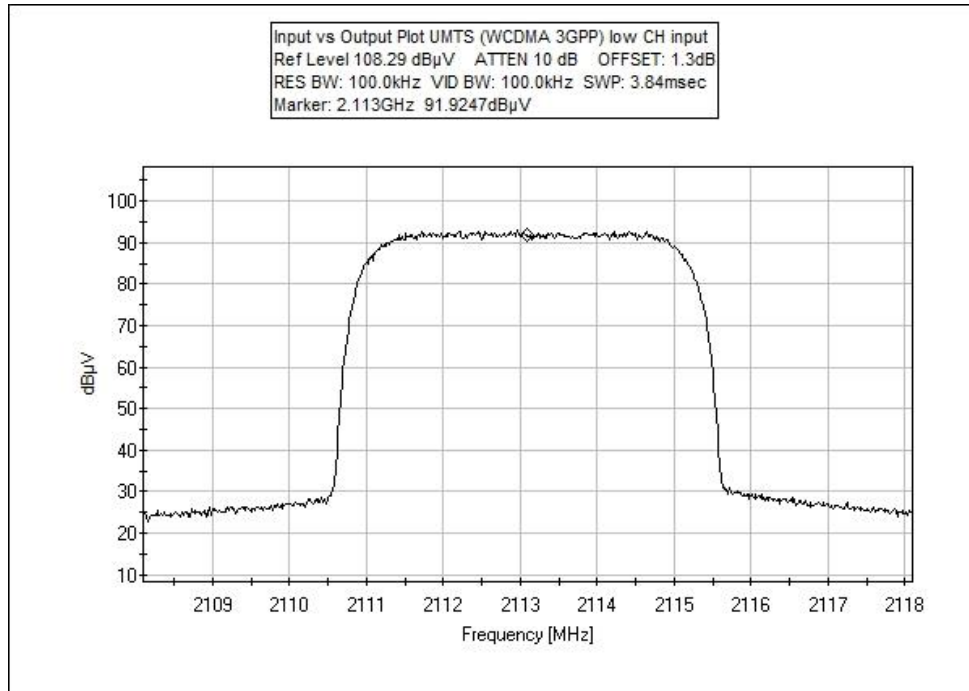


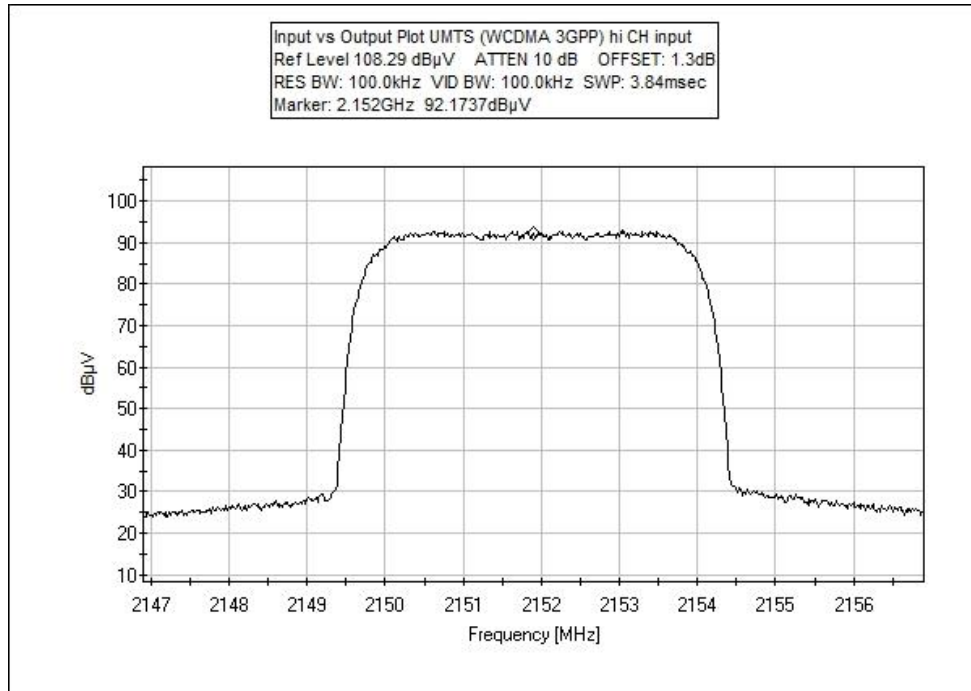




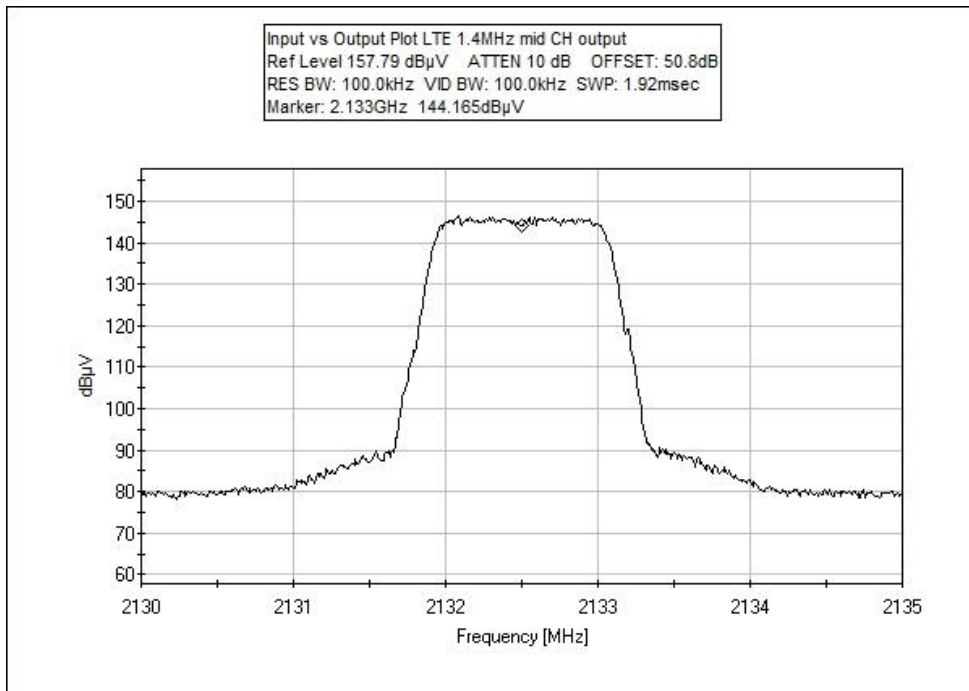
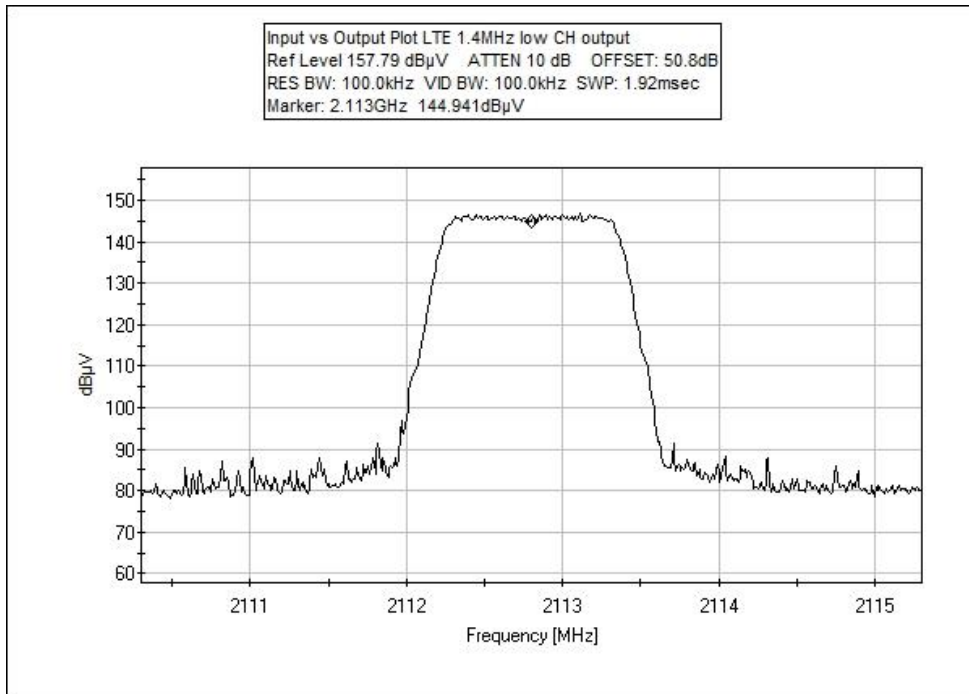


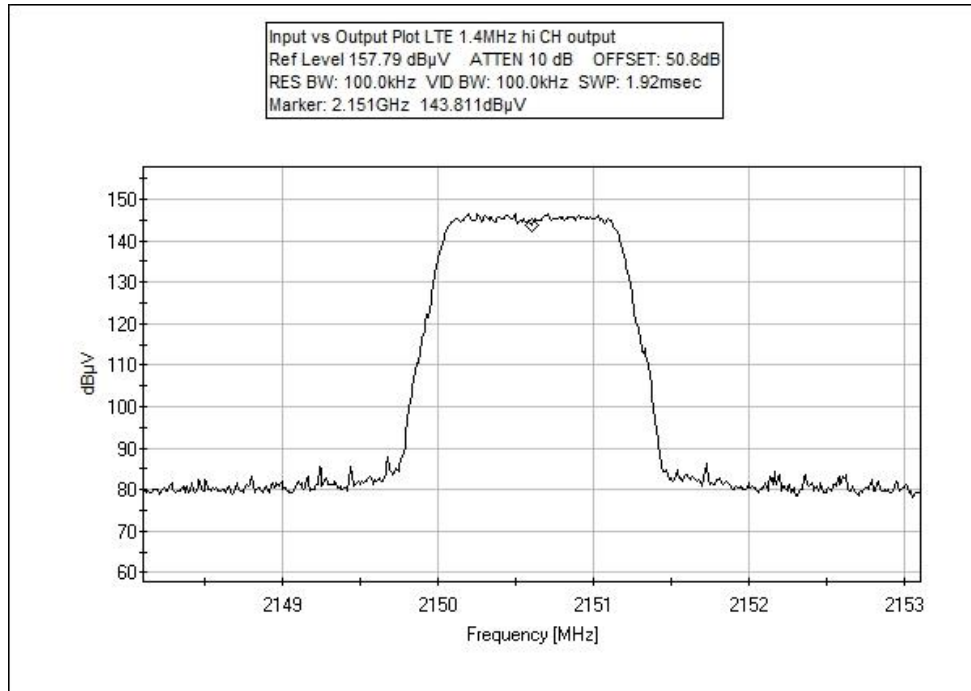


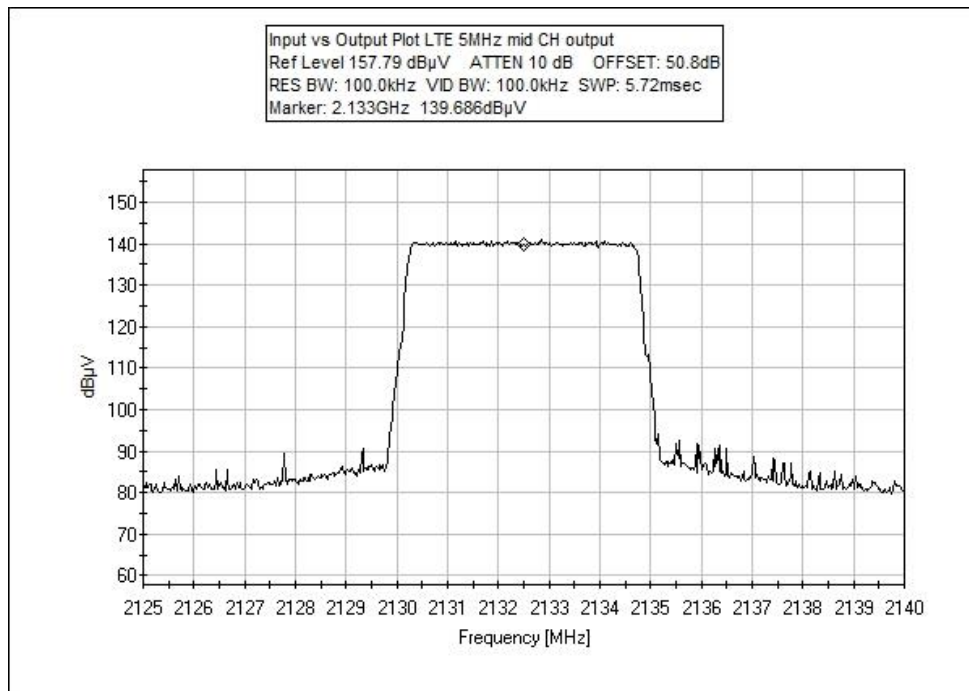
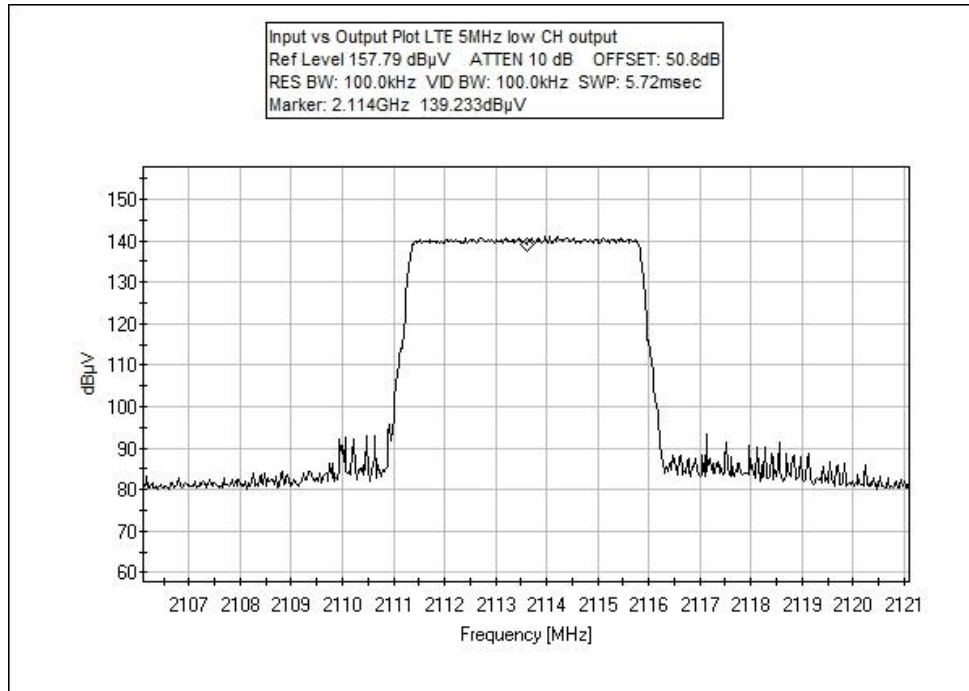


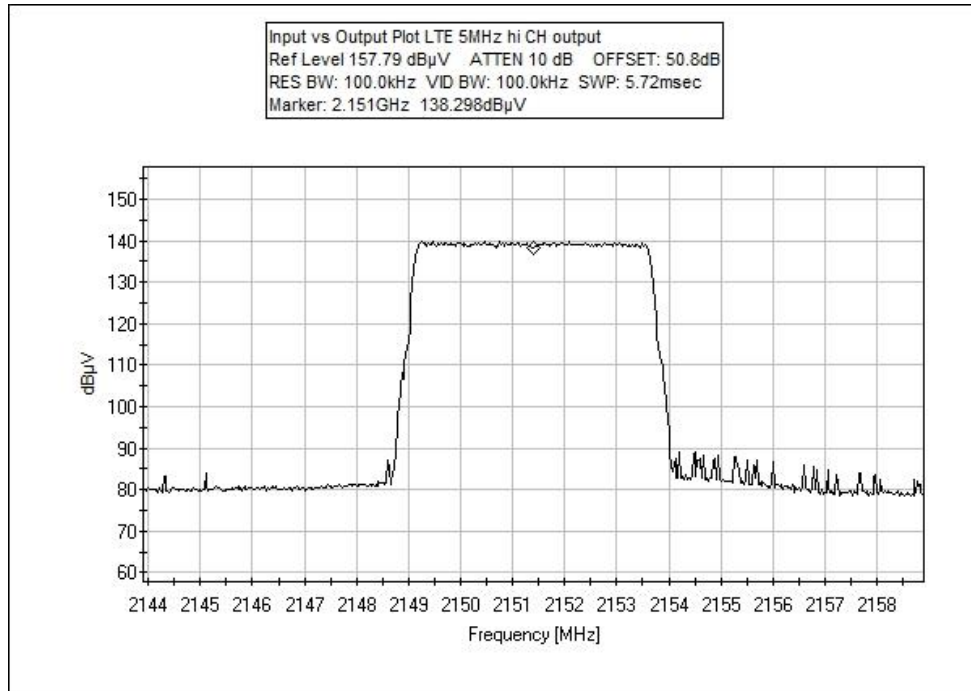


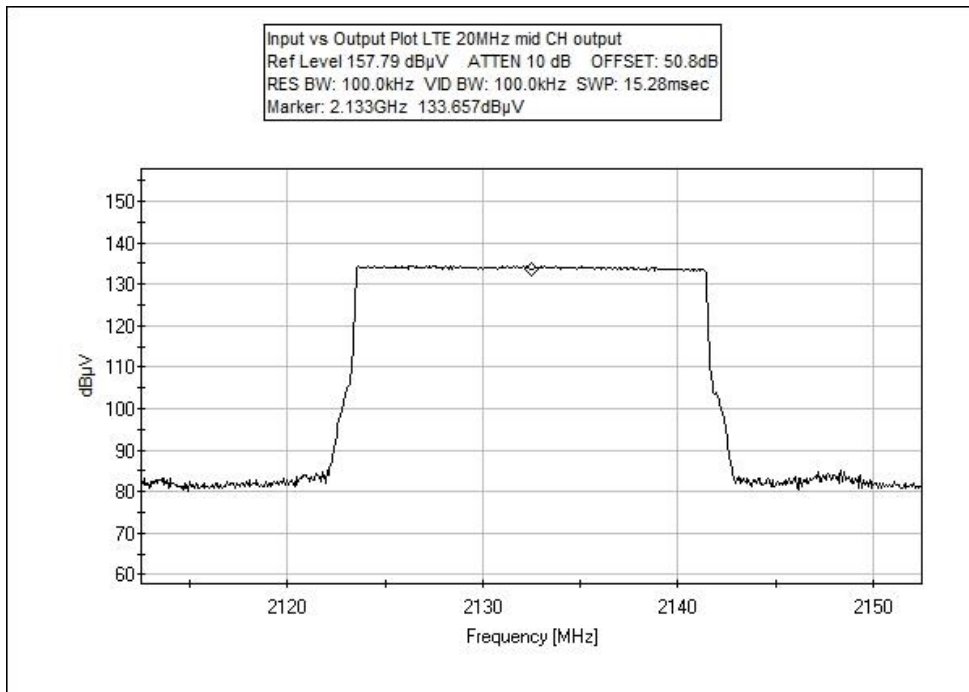
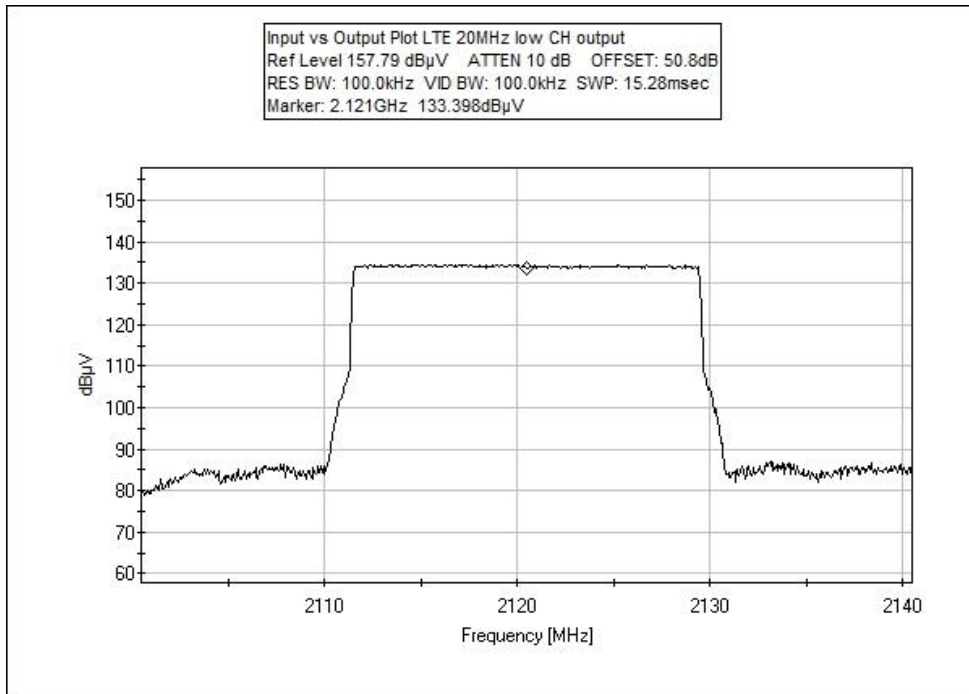
OUTPUT PLOTS

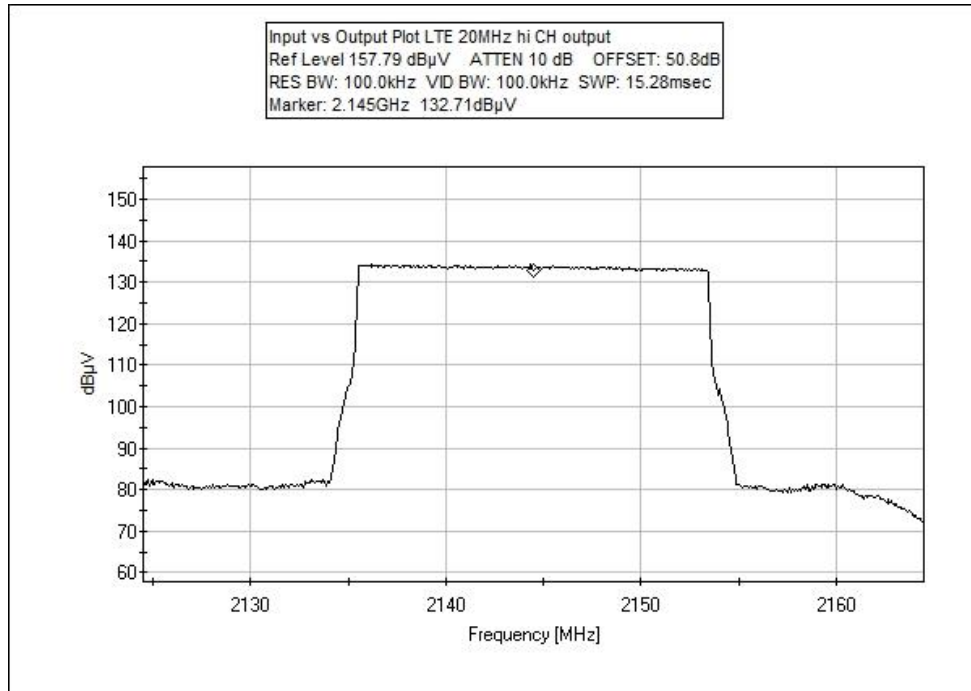


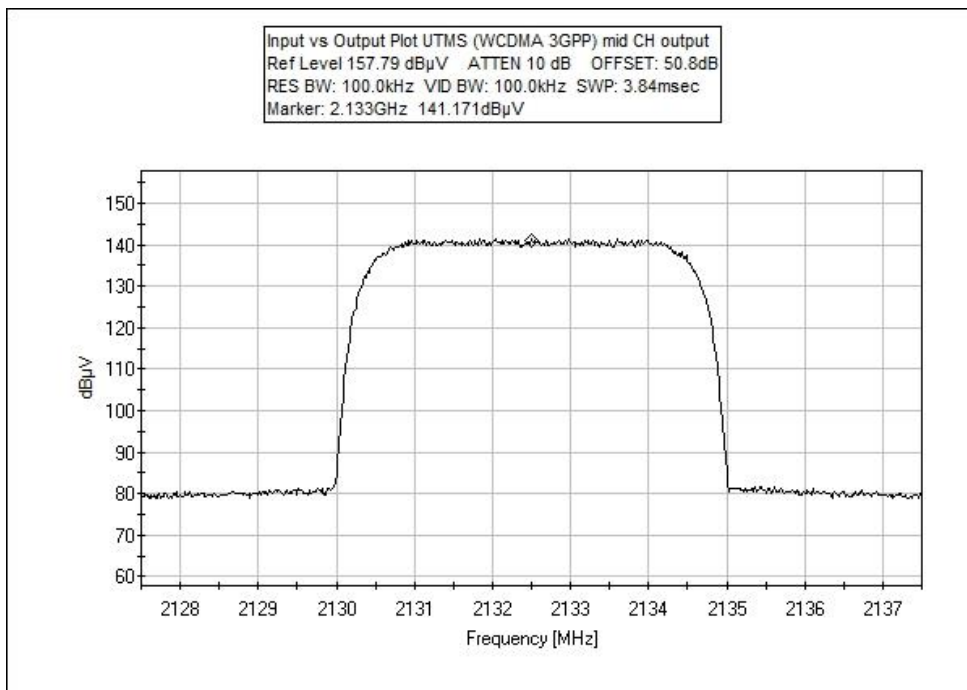
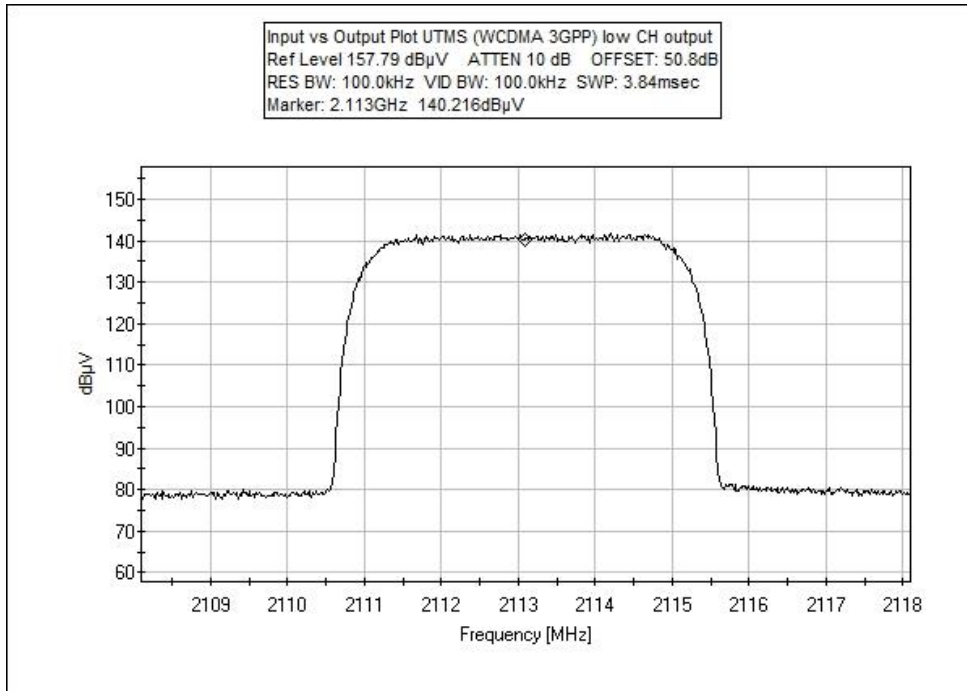


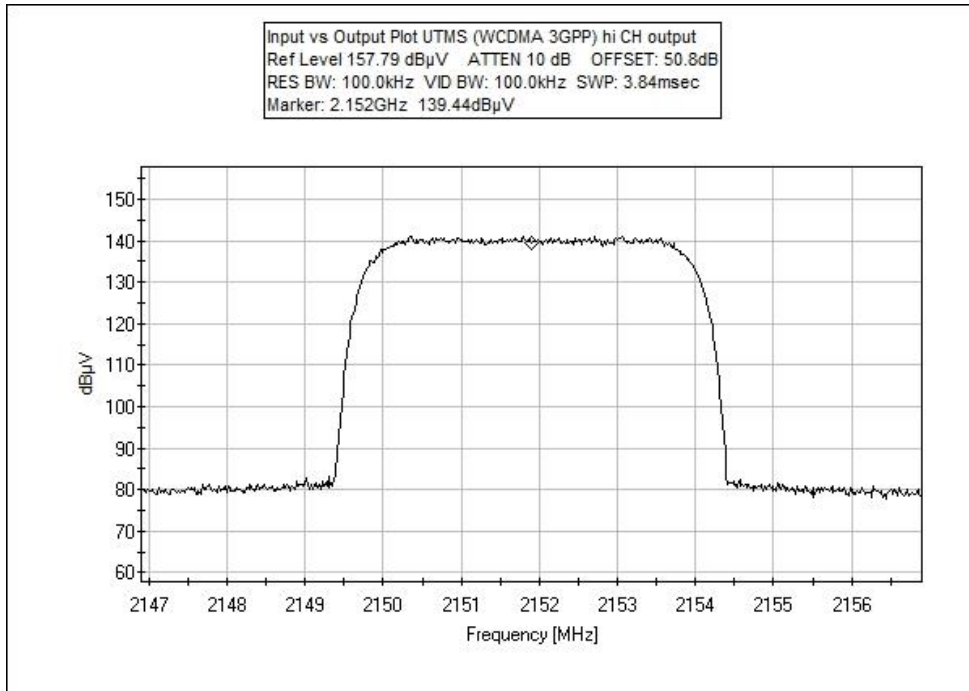












Test Setup Photos



27.53(g) / 2.1051 Conducted Spurious Emissions

Test Data

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

Customer: **BTI Wireless**

Specification: **FCC Part 27.53(h) Conducted Spurious Emission**

Work Order #: **95158** Date: 11/27/2013

Test Type: **Conducted Emissions** Time: 10:46:12

Equipment: **2100MHz 80W Transmitting Remote Unit** Sequence#: 5

Manufacturer: BTI Wireless Tested By: Don Nguyen

Model: mBSC2100-080-RUMF01 110V 60Hz

S/N: 10102708000113100003

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015
	AN03385	High Pass Filter	11SH10-3000/T10000-O/O	6/5/2013	6/5/2015
	AN02755	High Pass Filter	11SH10-6000/T18000-O/O	4/16/2012	4/16/2014
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
2100MHz 80W Transmitting Remote Unit*	BTI Wireless	mBSC2100-080-RUMF01	10102708000113100003

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA
Cable	Pasternack	Sucoflex 104A	12237/4A
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
50 ohm Load	Generic	NA	NA

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 110db step 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.

The evaluation is performed at the antenna port. Freq: 2110-2155MHz
 Signal protocol: WCDMA_3GPP, LTE-TM1.1 1.4MHz, 5MHz, 20MHz
 The RF output power was measured with the following power settings:

80W

Modulation Input Power (dbm)

UMTS (WCDMA 3GPP)

2113.1MHz -0.3
 2132.5MHz -0.61
 2151.9MHz 0.82

LTE 1.4MHz

2112.8MHz -0.56
 2132.5MHz -0.46
 2150.6MHz 0.28

LTE 5MHz

2113.6MHz -0.76
 2132.5MHz -0.94
 2151.4MHz 0.32

LTE 20MHz

2120.5MHz -0.62
 2132.5MHz -0.84
 2144.5MHz -0.06

Frequency range of measurement = 9kHz- 22GHz.

9kHz-150kHz; RBW=200Hz, VBW=200Hz; 150kHz-30MHz; RBW=9kHz, VBW=9kHz; 30MHz-1000 MHz;
 RBW=120 kHz, VBW=120 kHz, 1000 MHz-22000MHz; RBW=1 MHz, VBW=1 MHz.

20°C, 31%Relative Humidity

Site A

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

Ext Attn: 0 dB

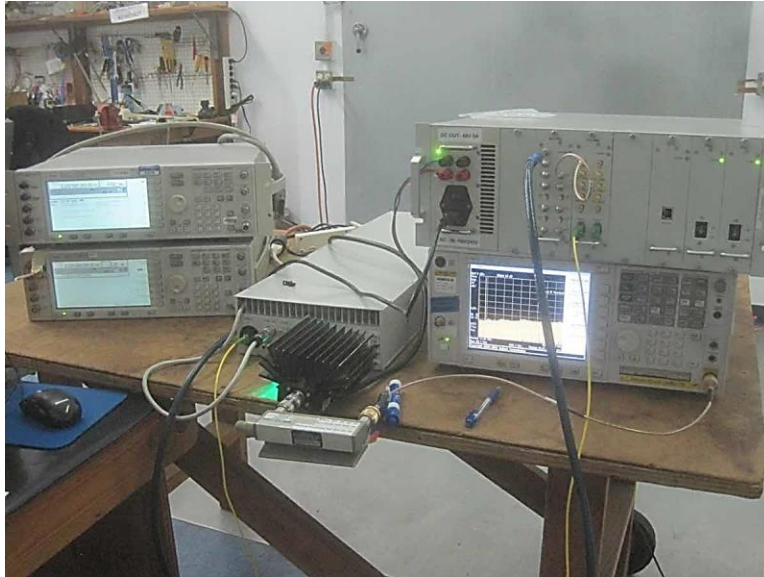
Measurement Data:

Reading listed by margin.

Test Lead: Ant Port

#	Freq MHz	Rdng dBμV	T1 dB	Reading listed by margin.			Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	101.020k Ave	74.8	+0.0				+0.0	74.8	94.0	-19.2	Ant P
									80W, UMTS WCDMA 3GPP, hi CH, input power=0.82dbm		
2	150.720k Ave	22.5	+0.0				+0.0	22.5	94.0	-71.5	Ant P
									80W, UMTS WCDMA 3GPP, hi CH, input power=0.82dbm		

Test Setup Photos



27.53(h) / 2.1053 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 27.53(h) Radiated Spurious Emission**

Work Order #: **95158** Date: 11/27/2013

Test Type: **Maximized Emissions** Time: 14:22:09

Equipment: **2100MHz 80W Transmitting Remote Unit** Sequence#: 6

Manufacturer: BTI Wireless Tested By: Don Nguyen

Model: mBSC2100-080-RUMF01

S/N: 10102708000113100003

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014
T2	AN00309	Preamp	8447D	3/29/2012	3/29/2014
T3	AN01995	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T4	ANP05050	Cable	RG223/U	1/21/2013	1/21/2015
T5	ANP05198	Cable-Amplitude 15 to 45degC (dB)	8268	12/11/2012	12/11/2014
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
	AN00787	Preamp	83017A	5/31/2013	5/31/2015
	AN00849	Horn Antenna	3115	4/13/2012	4/13/2014
	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015
	ANP05421	Cable	Sucoflex 104A	2/8/2012	2/8/2014
	ANP05988	Cable	LDF1-50	3/12/2012	3/12/2014
	AN01413	Horn Antenna-ANSI C63.5 (dB/m)	84125-80008	11/9/2012	11/9/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
2100MHz 80W Transmitting Remote Unit*	BTI Wireless	mBSC2100-080-RUMF01	10102708000113100003

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
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 110db step 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: 2110-2155MHz

Signal protocol: WCDMA_3GPP, LTE-TM1.1 1.4MHz, 5MHz, 20MHz

The RF output power was measured with the following power settings:

80W

Modulation	Input Power (dbm)
------------	-------------------

UMTS (WCDMA_3GPP)

2113.1MHz	-0.30
-----------	-------

2132.5MHz	-0.61
-----------	-------

2151.9MHz	0.82
-----------	------

LTE 1.4MHz

2112.8MHz	-0.56
-----------	-------

2132.5MHz	-0.46
-----------	-------

2150.6MHz	0.28
-----------	------

LTE 5MHz

2113.6MHz	-0.76
-----------	-------

2132.5MHz	-0.94
-----------	-------

2151.4MHz	0.32
-----------	------

LTE 20MHz

2120.5MHz	-0.62
-----------	-------

2132.5MHz	-0.84
-----------	-------

2144.5MHz	-0.06
-----------	-------

Frequency range of measurement = 9kHz- 22GHz.

9kHz -150kHz; RBW=200Hz, VBW=200 Hz; 150 kHz-30MHz; RBW=9kHz, VBW=9 kHz; 30MHz-1000 MHz;

RBW=120 kHz, VBW=120 kHz, 1000 MHz-22000MHz; RBW=1 MHz, VBW=1 MHz.

22°C, 28%Relative Humidity

Site A

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

Test Data

Operating Frequency: 2110-2155MHz
 Channels: WCDMA_3GPP
 Highest Measured Output
 Power: 49.00 (dBm)= 80 (Watts)
 Distance: 3 meters
 Limit: $43+10\text{Log}(P)=$ 62.03 dBc

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
0.39	-23.03089987	Perpendicular	72.03
0.39	-39.03089987	Parallel	88.03
21.67	-36.83089987	Perpendicular	85.83
21.67	-56.03089987	Parallel	105.03
21.79	-29.23089987	Perpendicular	78.23
21.79	-42.63089987	Parallel	91.63
70.42	-42.53089987	Vertical	91.53
70.42	-52.73089987	Horizontal	101.73
106.72	-38.33089987	Vertical	87.33
106.72	-42.63089987	Horizontal	91.63

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 #: **95158** Date: 11/27/2013
 Test Type: **Conducted Emissions** Time: 10:46:12
 Equipment: **2100MHz 80W Transmitting Remote Unit** Sequence#: 5
 Manufacturer: BTI Wireless Tested By: Don Nguyen
 Model: mBSC2100-080-RUMF01 110V 60Hz
 S/N: 10102708000113100003

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
2100MHz 80W Transmitting Remote Unit*	BTI Wireless	mBSC2100-080-RUMF01	10102708000113100003

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA
Cable	Pasternack	Sucoflex 104A	12237/4A
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
50 ohm Load	Generic	NA	NA

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 110db step 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.

The evaluation is performed at the antenna port.

Freq: 2110-2155MHz

Signal protocol: WCDMA_3GPP, LTE-TM1.1 1.4MHz, 5MHz, 20MHz

80W

Modulation	Input Power (dbm)
------------	-------------------

UMTS (WCDMA 3GPP)	
-------------------	--

2113.1MHz	-0.3
-----------	------

2132.5MHz	-0.61
-----------	-------

2151.9MHz	0.82
-----------	------

LTE 1.4MHz	
------------	--

2112.8MHz	-0.56
-----------	-------

2132.5MHz	-0.46
-----------	-------

2150.6MHz	0.28
-----------	------

LTE 5MHz	
----------	--

2113.6MHz	-0.76
-----------	-------

2132.5MHz	-0.94
-----------	-------

2151.4MHz	0.32
-----------	------

LTE 20MHz	
-----------	--

2120.5MHz	-0.62
-----------	-------

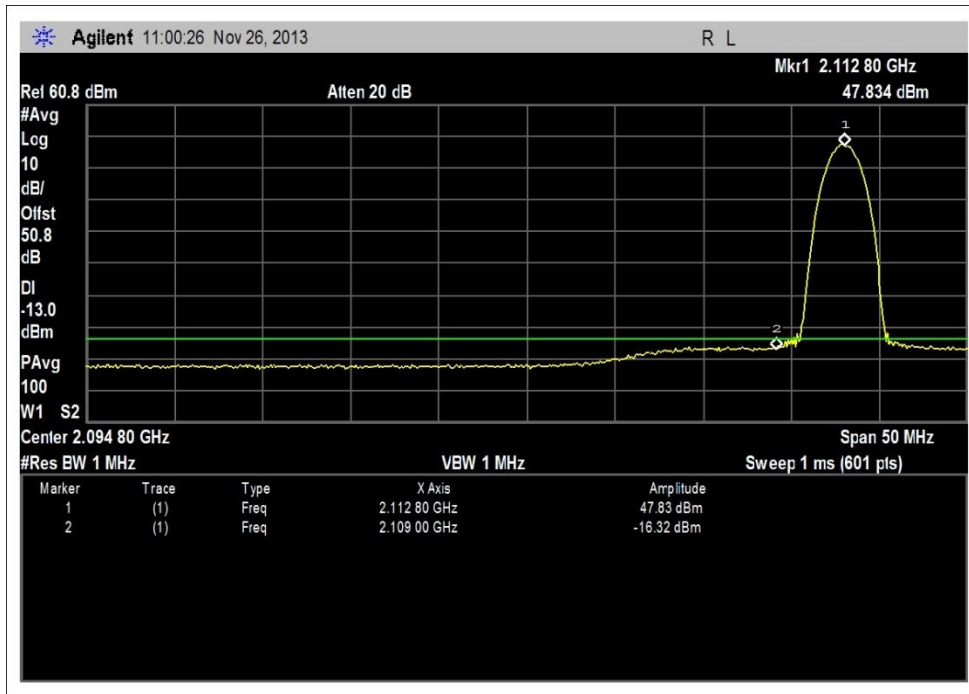
2132.5MHz	-0.84
-----------	-------

2144.5MHz	-0.06
-----------	-------

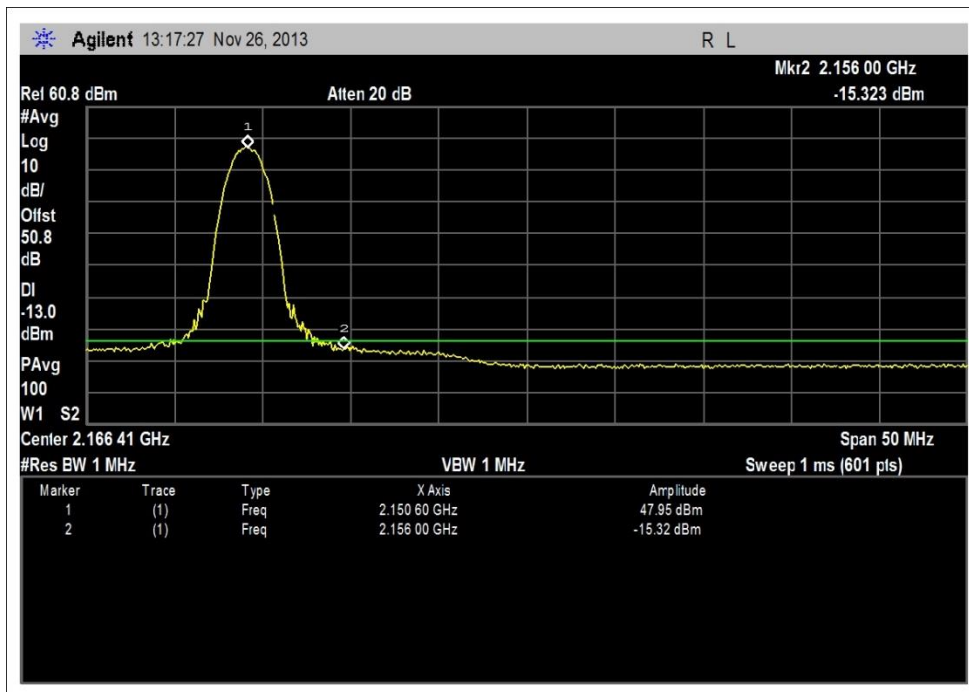
20°C, 31% Relative Humidity

Site A

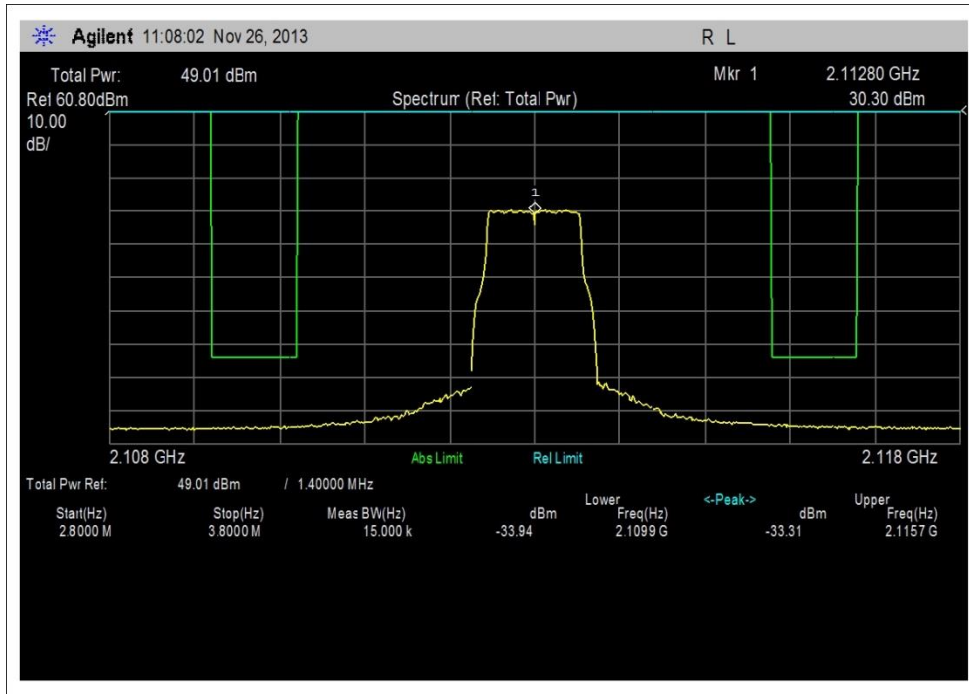
Test Data



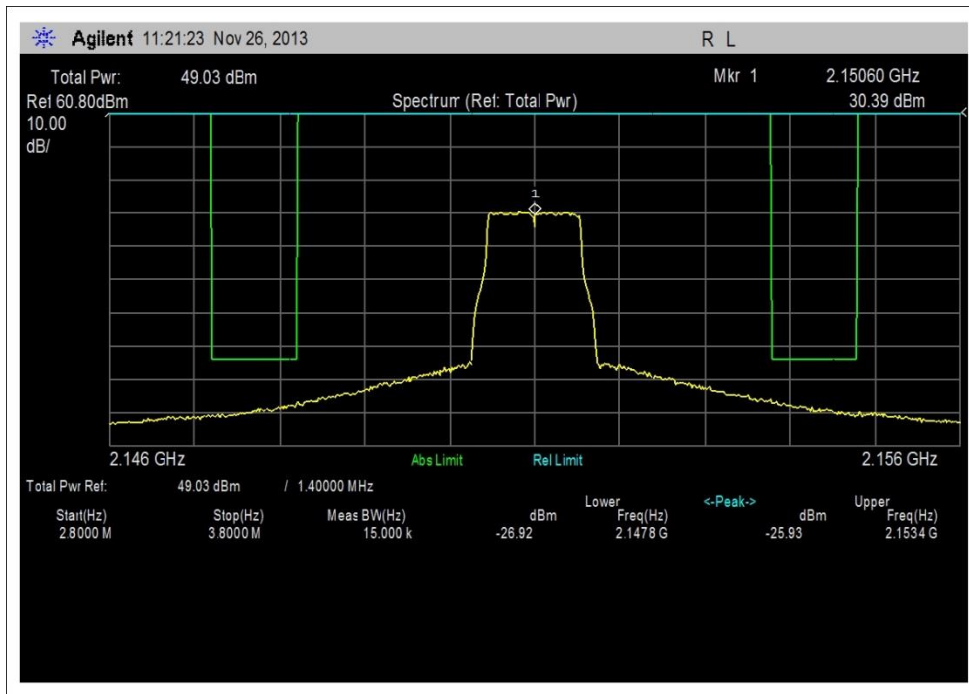
80W LTE 1.4MHz Low Channel, 1MHz RBW



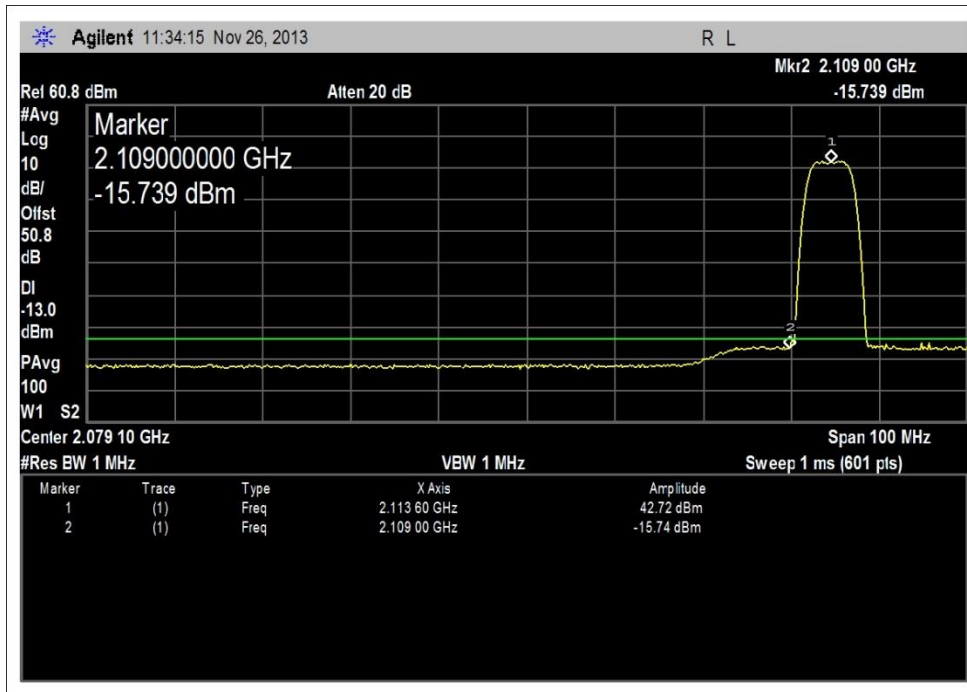
80W LTE 1.4MHz High Channel, 1MHz RBW



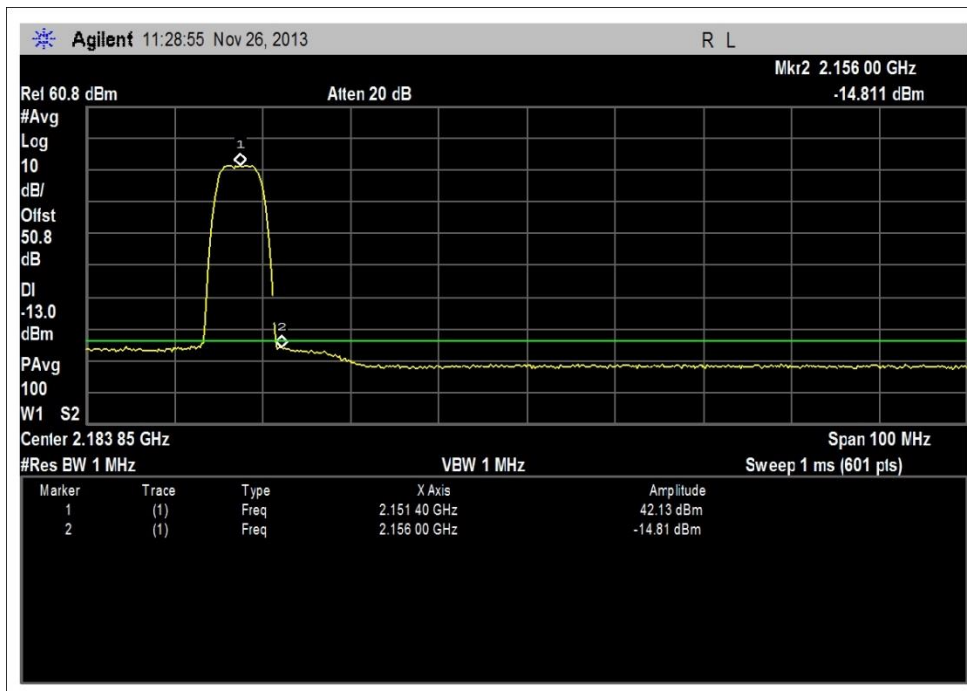
80W LTE 1.4MHz Low Channel, 15kHz RBW



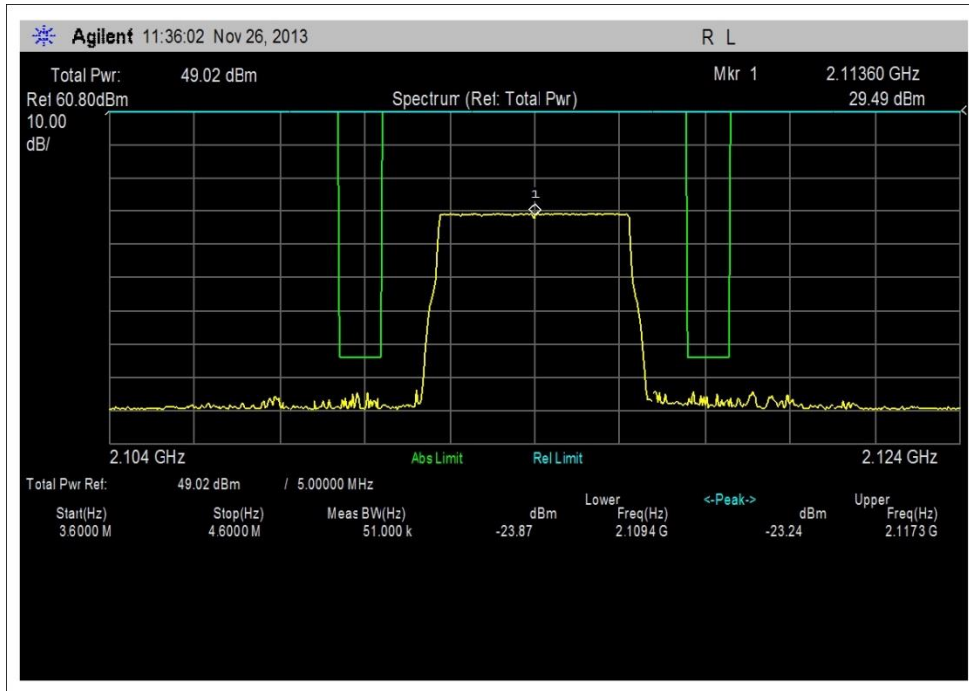
80W LTE 1.4MHz High Channel, 15kHz RBW



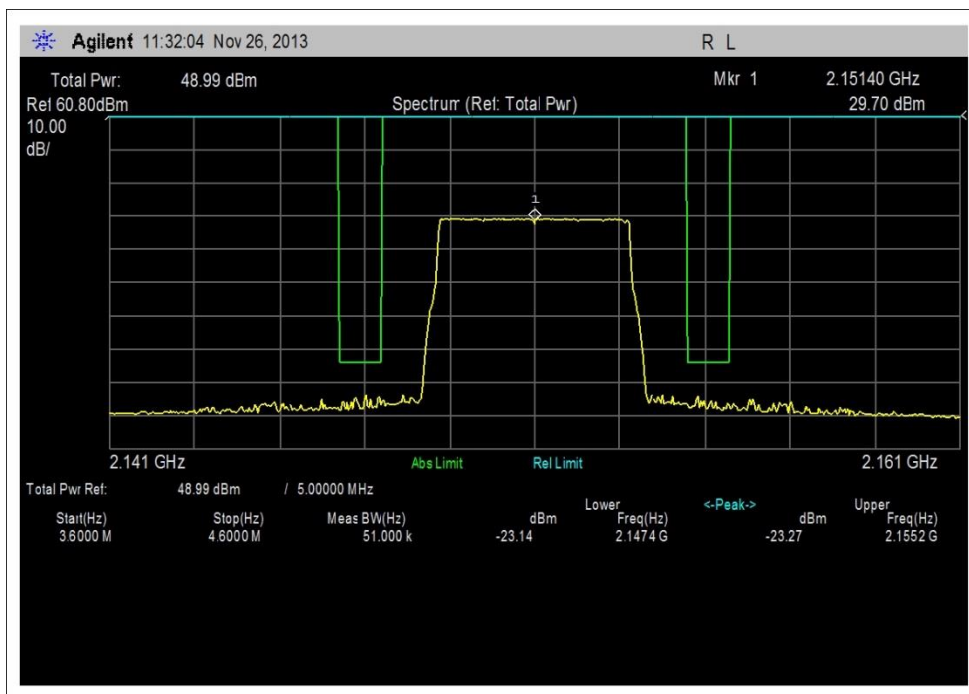
80W LTE 5MHz Low Channel, 1MHz RBW



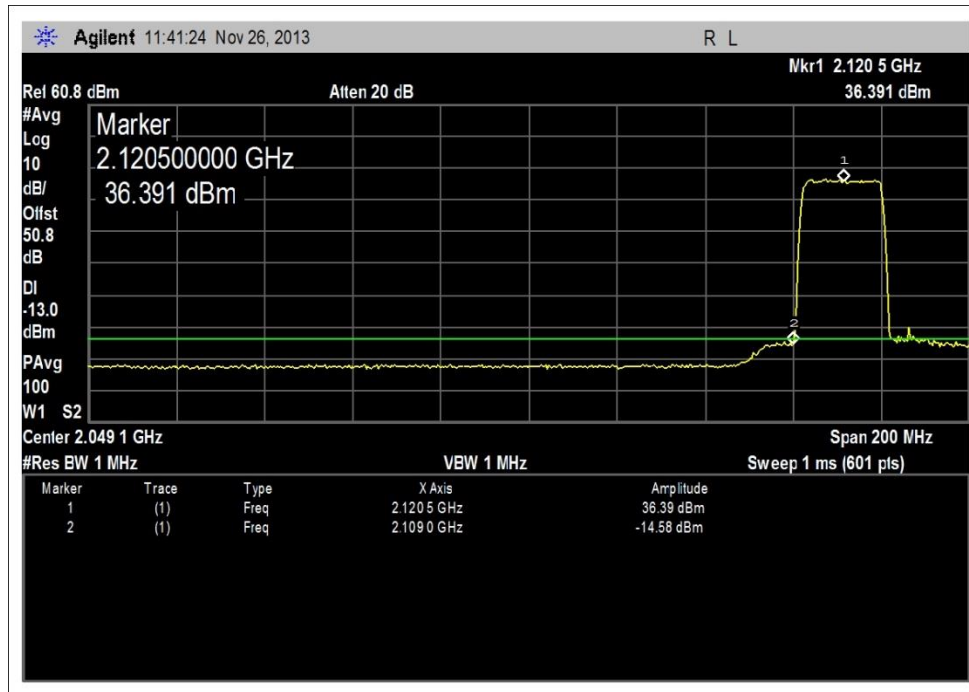
80W LTE 5MHz High Channel, 1MHz RBW



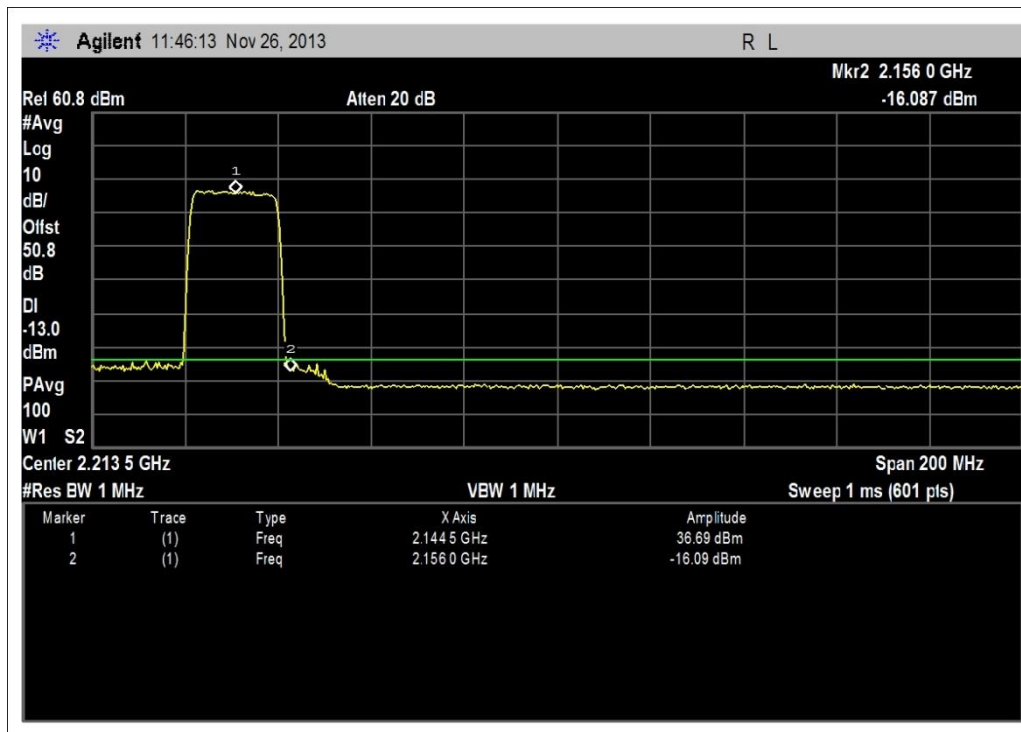
80W LTE 5MHz Low Channel, 51kHz RBW



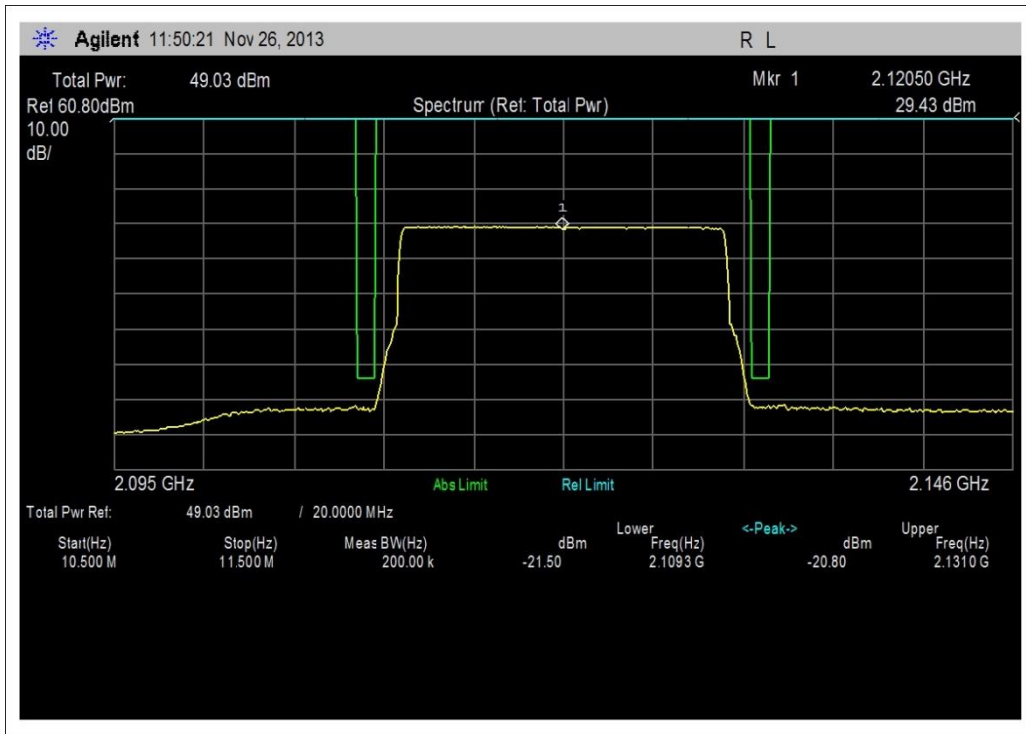
80W LTE 5MHz High Channel, 51kHz RBW



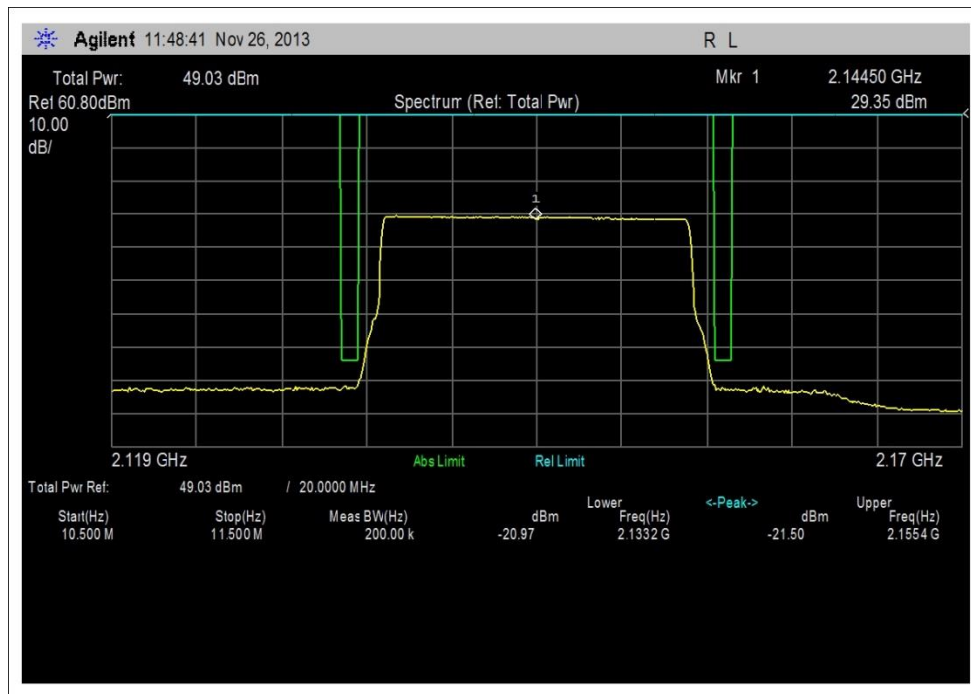
80W LTE 20MHz Low Channel, 1MHz RBW



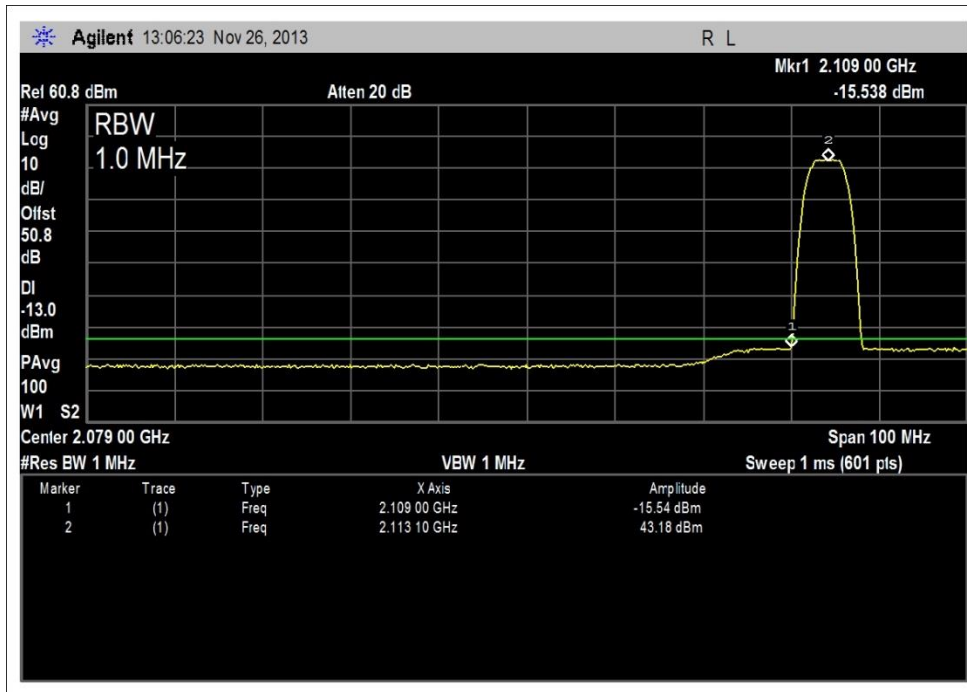
80W LTE 20MHz High Channel, 1MHz RBW



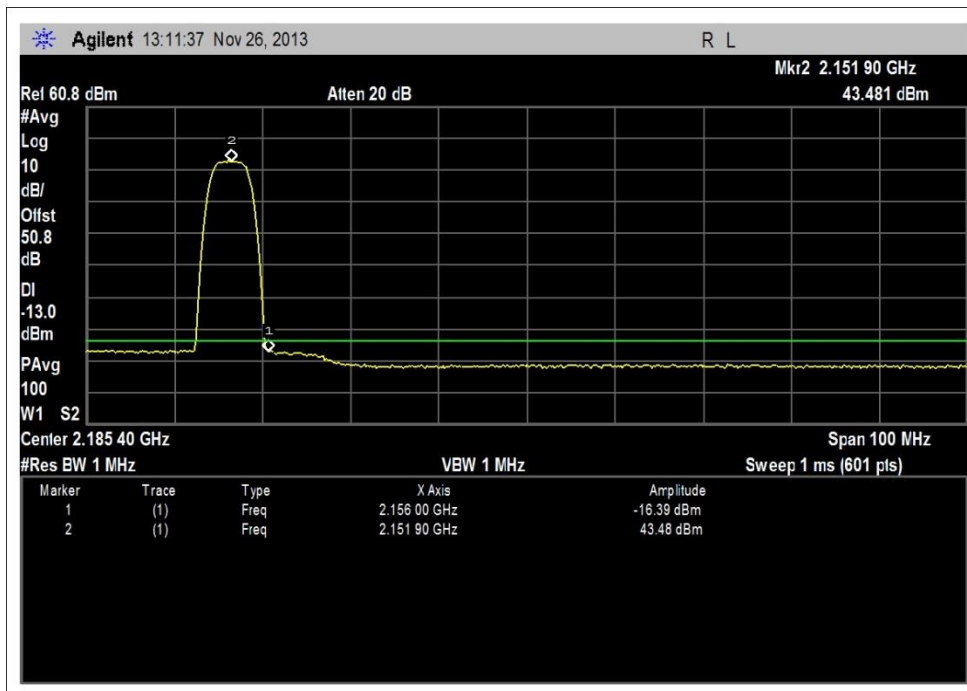
80W LTE 20MHz Low Channel, 200kHz RBW



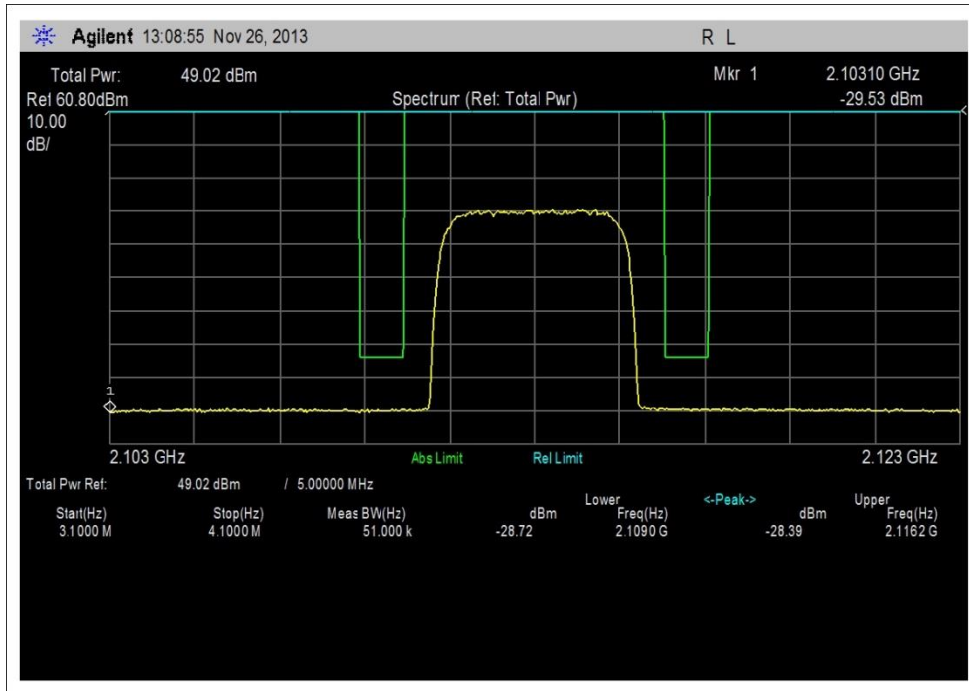
80W LTE 20MHz High Channel, 200kHz RBW



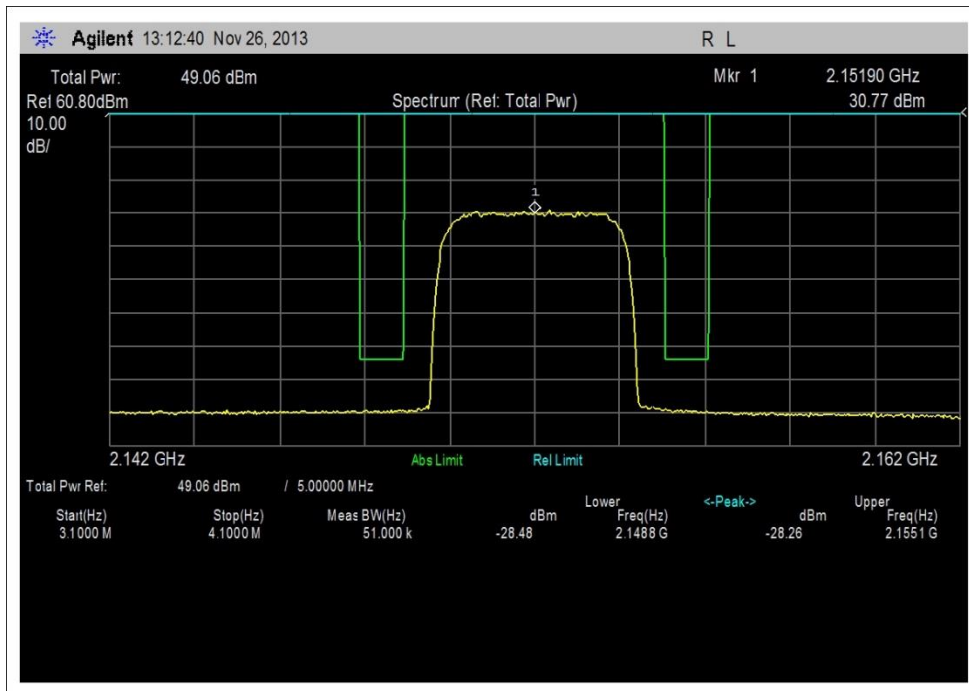
80W UMTS WCDMA 3GPP Low Channel, 1MHz RBW



80W UMTS WCDMA 3GPP High Channel, 1MHz RBW



80W UMTS WCDMA 3GPP Low Channel, 51kHz RBW



80W UMTS WCDMA 3GPP High Channel, 51kHz RBW

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 #: **95158**

Date: 11/27/2013

Test Type: **Conducted Emissions**

Time: 10:46:12

Equipment: **2100MHz 80W Transmitting Remote Unit**

Sequence#: 5

Manufacturer: BTI Wireless

Tested By: Don Nguyen

Model: mBSC2100-080-RUMF01

110V 60Hz

S/N: 10102708000113100003

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
2100MHz 80W Transmitting Remote Unit*	BTI Wireless	mBSC2100-080-RUMF01	10102708000113100003

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA
Cable	Pasternack	Sucoflex 104A	12237/4A
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
50 ohm Load	Generic	NA	NA
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 110db step 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.
The evaluation is performed at the antenna port.

Freq: 2110-2155MHz

Signal protocol: WCDMA_3GPP, LTE-TM1.1 1.4MHz, 5MHz, 20MHz

80W

Modulation	Input Power (dbm)
------------	-------------------

UMTS (WCMDA 3GPP)

2113.1MHz	-0.3
-----------	------

2132.5MHz	-0.61
-----------	-------

2151.9MHz	0.82
-----------	------

LTE 1.4MHz

2112.8MHz	-0.56
-----------	-------

2132.5MHz	-0.46
-----------	-------

2150.6MHz	0.28
-----------	------

LTE 5MHz

2113.6MHz	-0.76
-----------	-------

2132.5MHz	-0.94
-----------	-------

2151.4MHz	0.32
-----------	------

LTE 20MHz

2120.5MHz	-0.62
-----------	-------

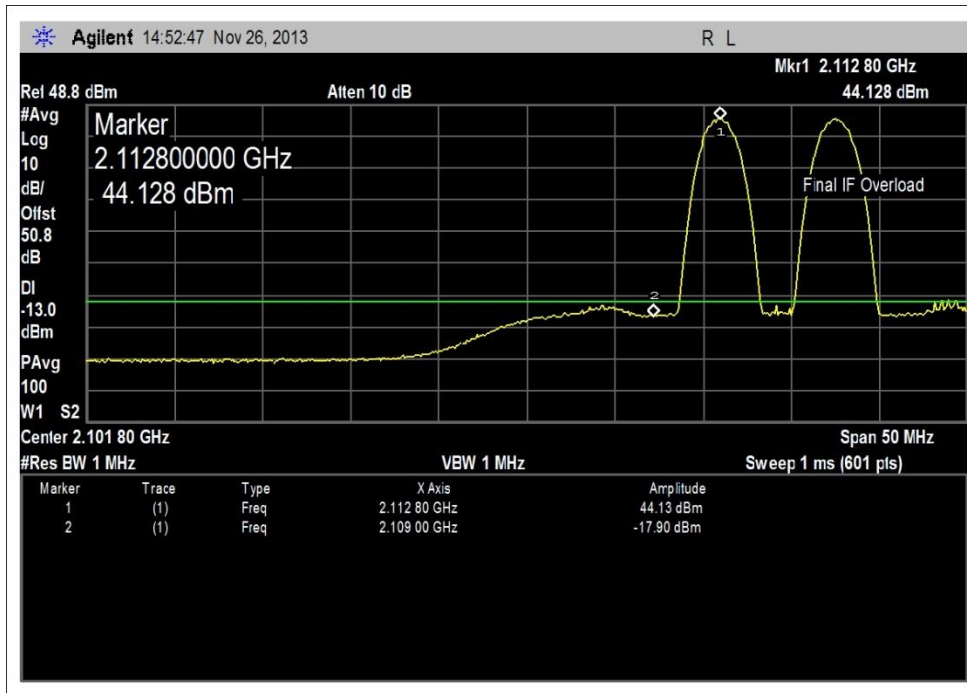
2132.5MHz	-0.84
-----------	-------

2144.5MHz	-0.06
-----------	-------

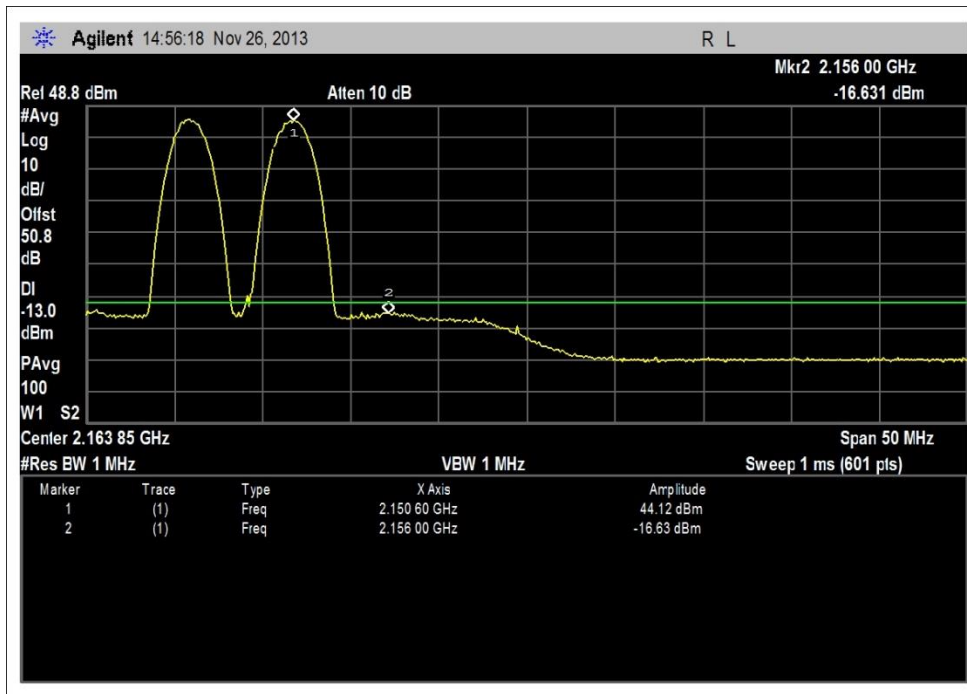
20°C, 31% Relative Humidity

Site A

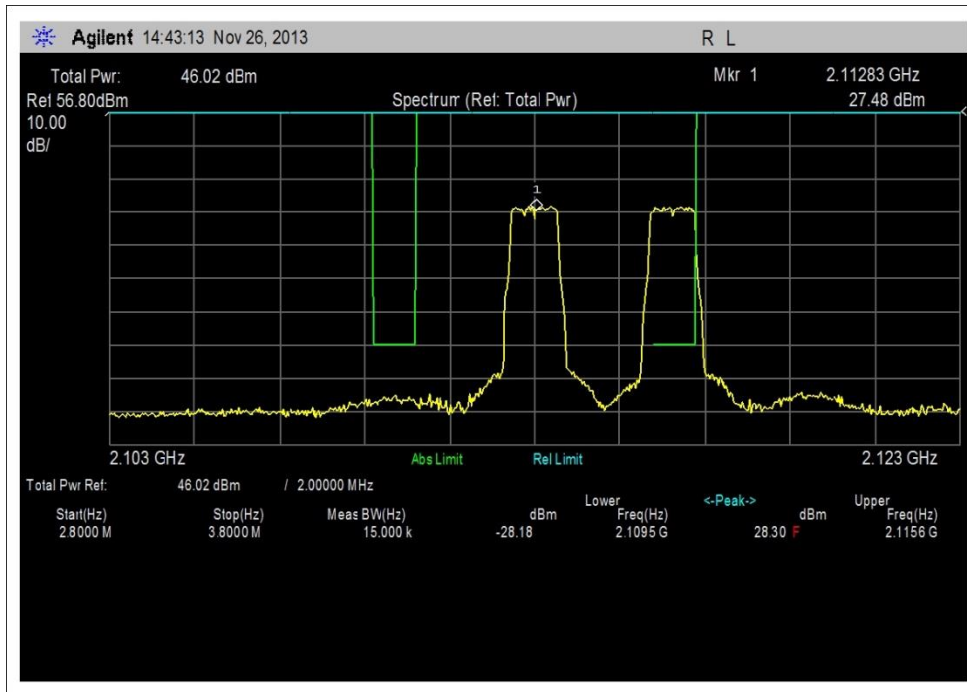
Test Data



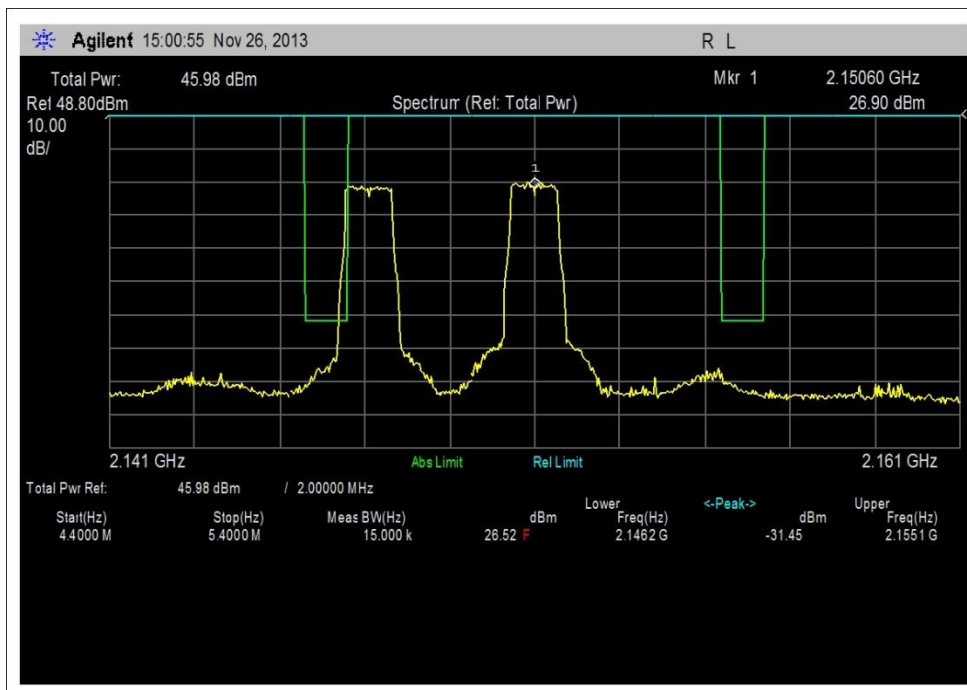
80W LTE 1.4MHz Low Channel, 1MHz RBW



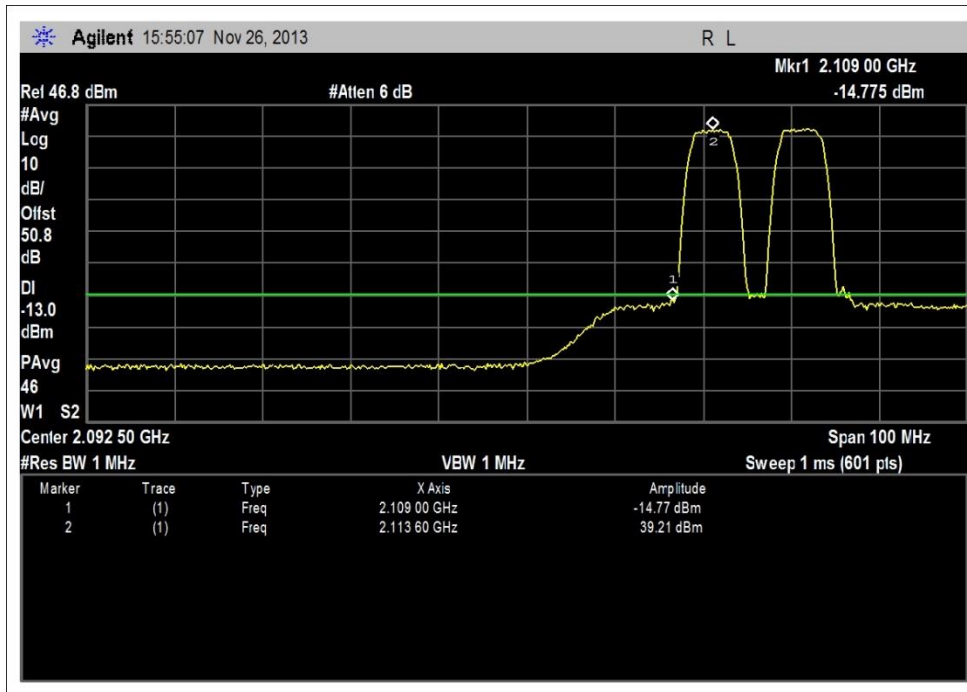
80W LTE 1.4MHz High Channel, 1MHz RBW



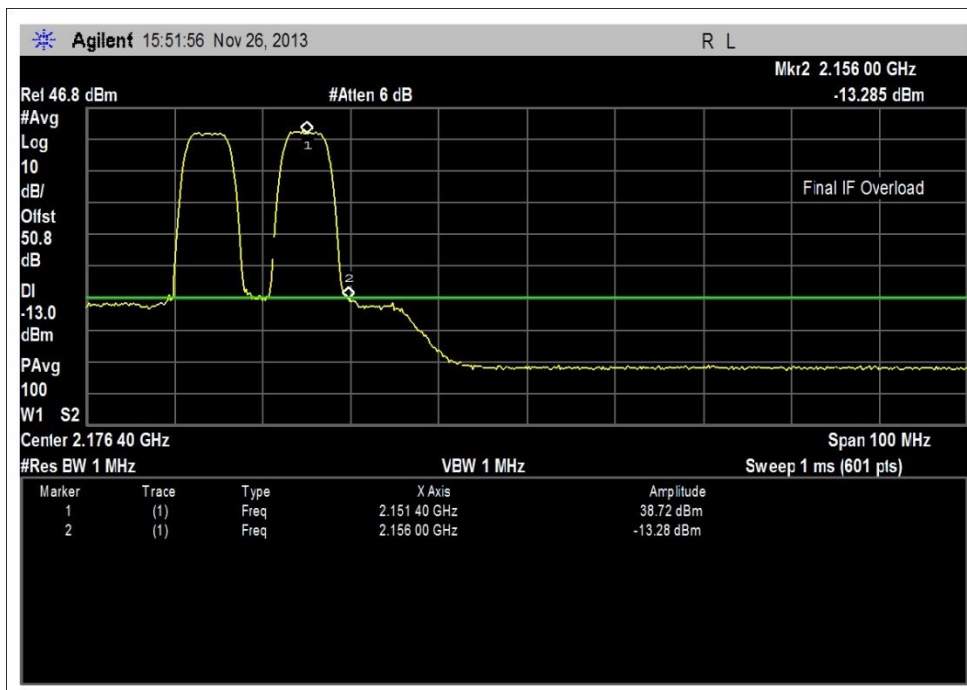
80W LTE 1.4MHz Low Channel, 15kHz RBW



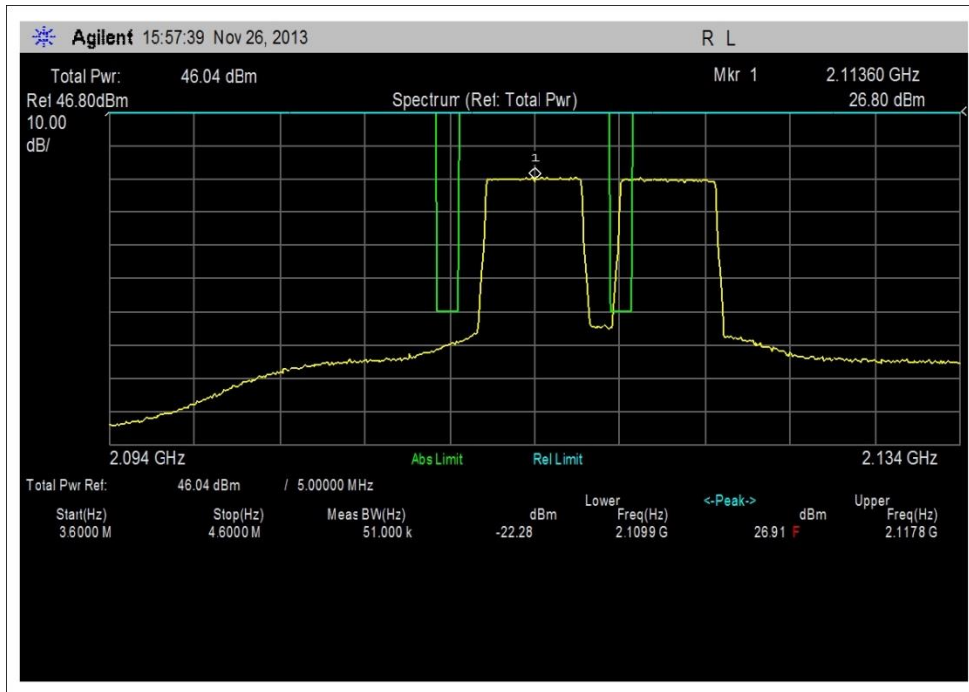
80W LTE 1.4MHz High Channel, 15kHz RBW



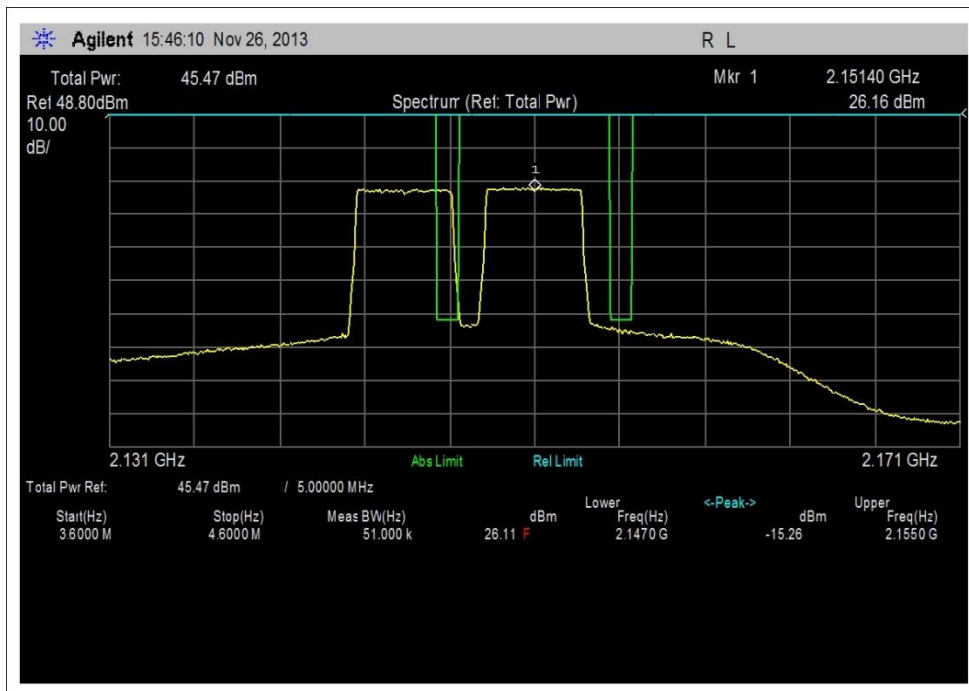
80W LTE 5MHz Low Channel, 1MHz RBW



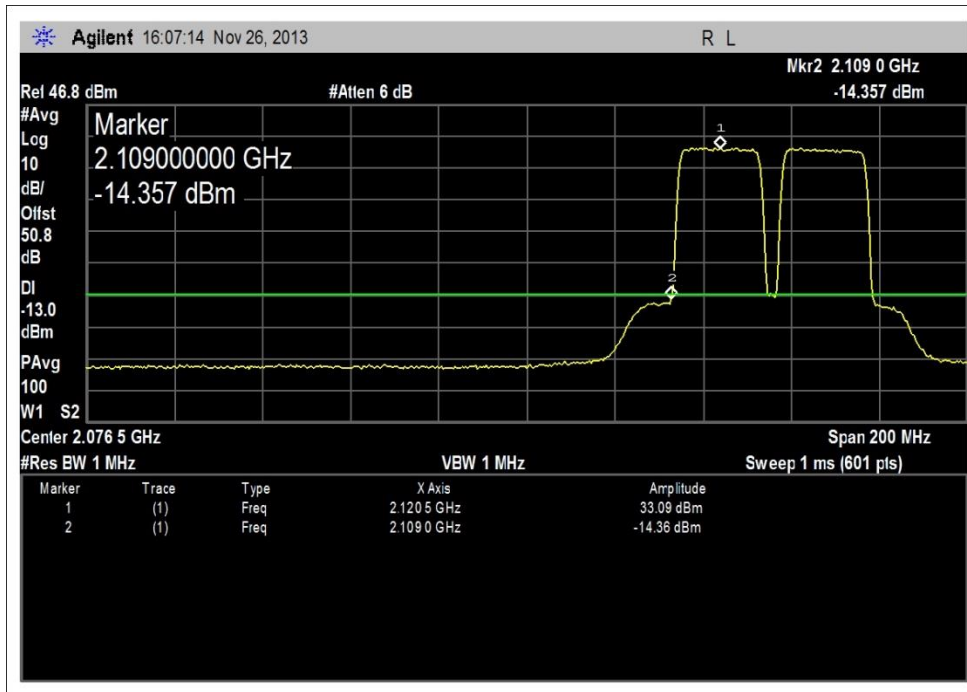
80W LTE 5MHz High Channel, 1MHz RBW



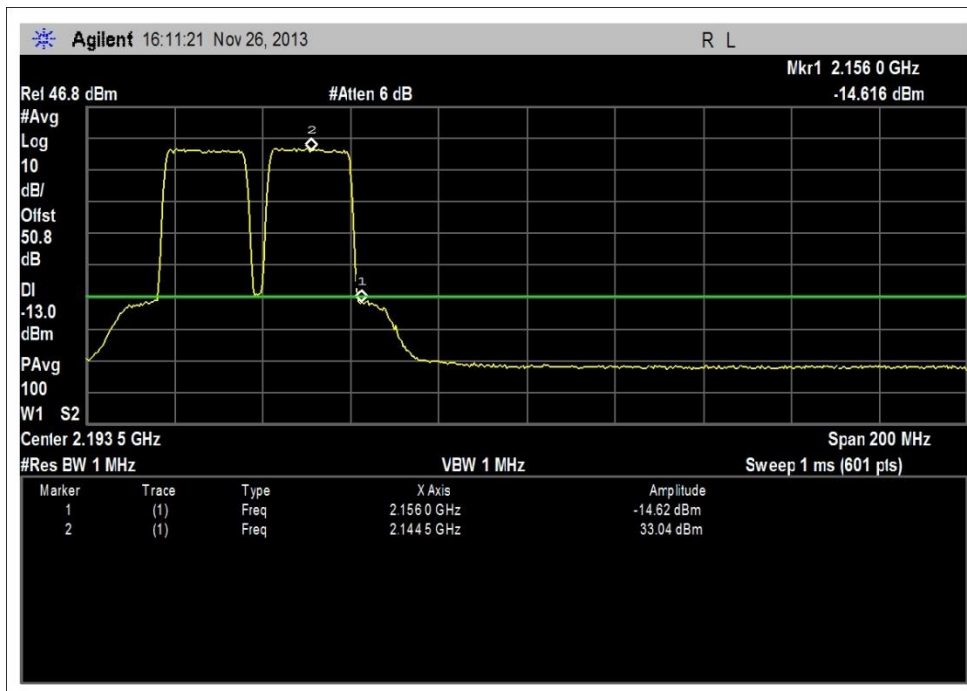
80W LTE 5MHz Low Channel, 51kHz RBW



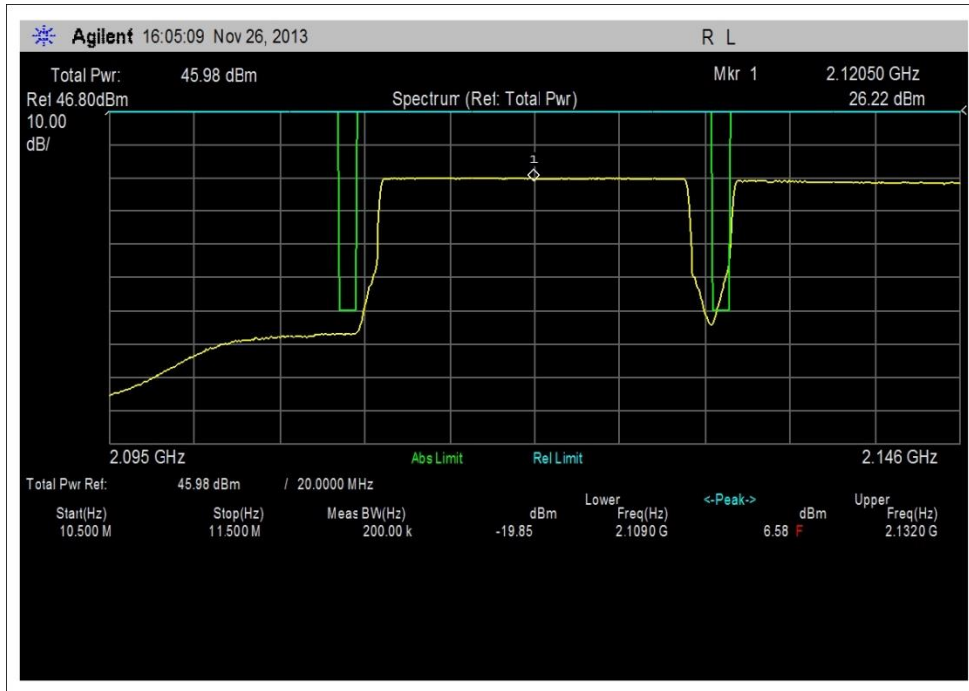
80W LTE 5MHz High Channel, 51kHz RBW



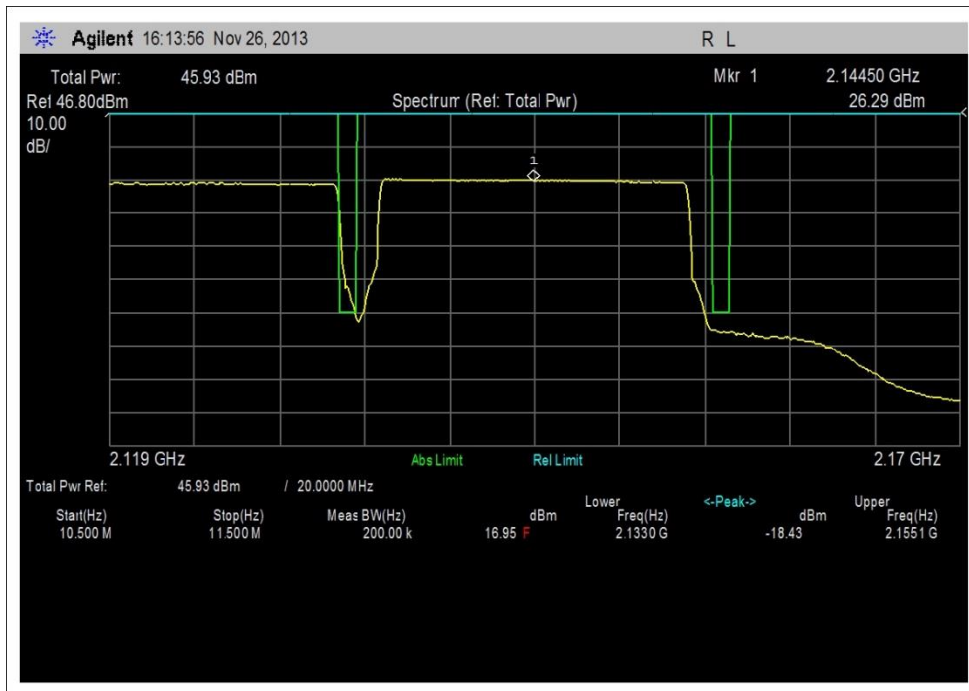
80W LTE 20MHz Low Channel, 1MHz RBW



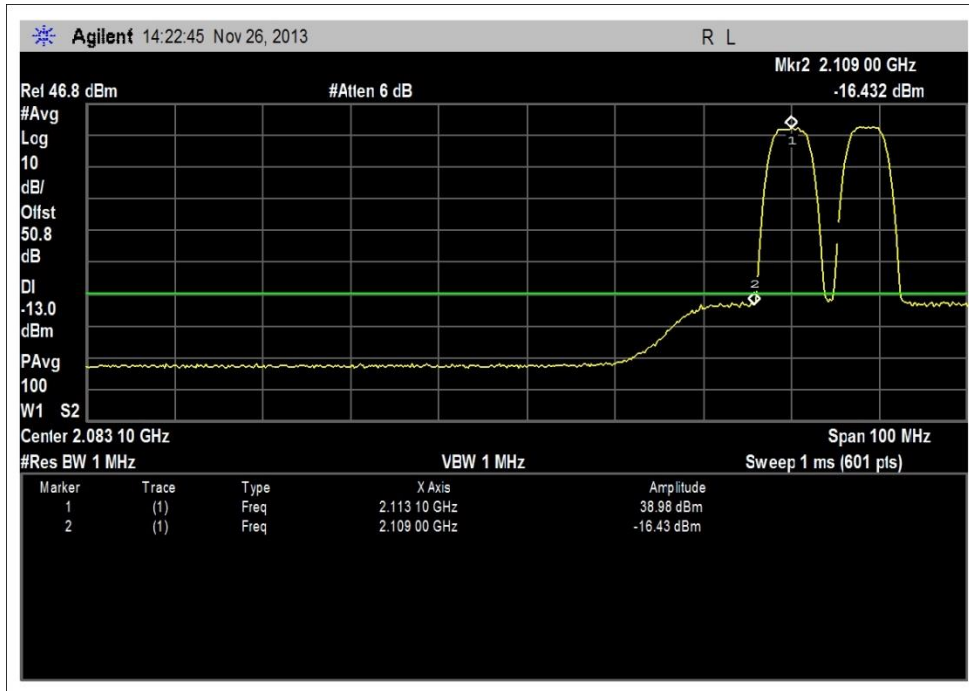
80W LTE 20MHz High Channel, 1MHz RBW



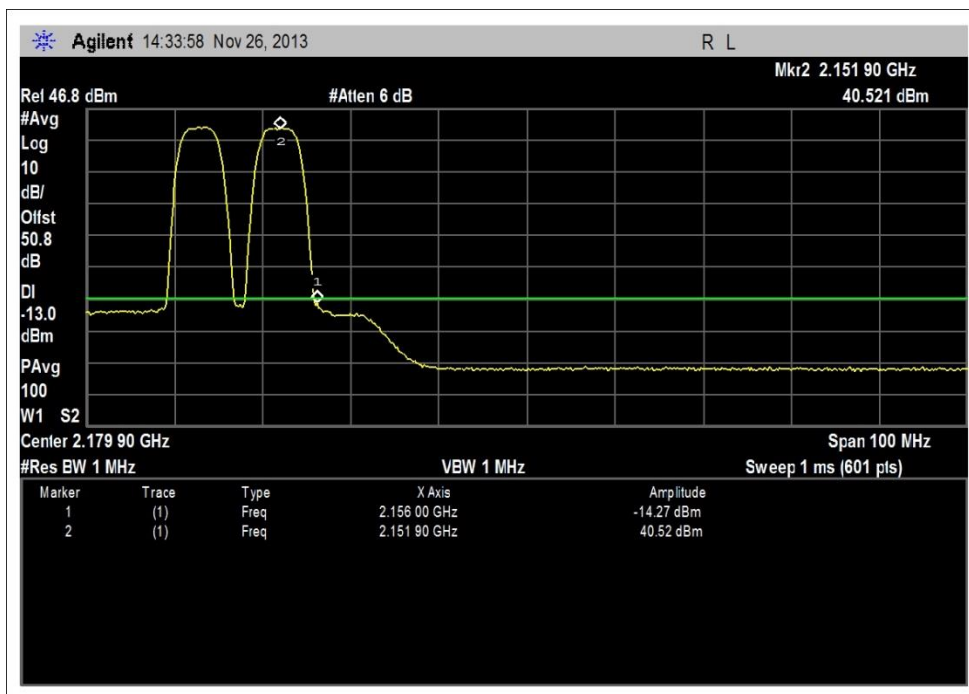
80W LTE 20MHz Low Channel, 200kHz RBW



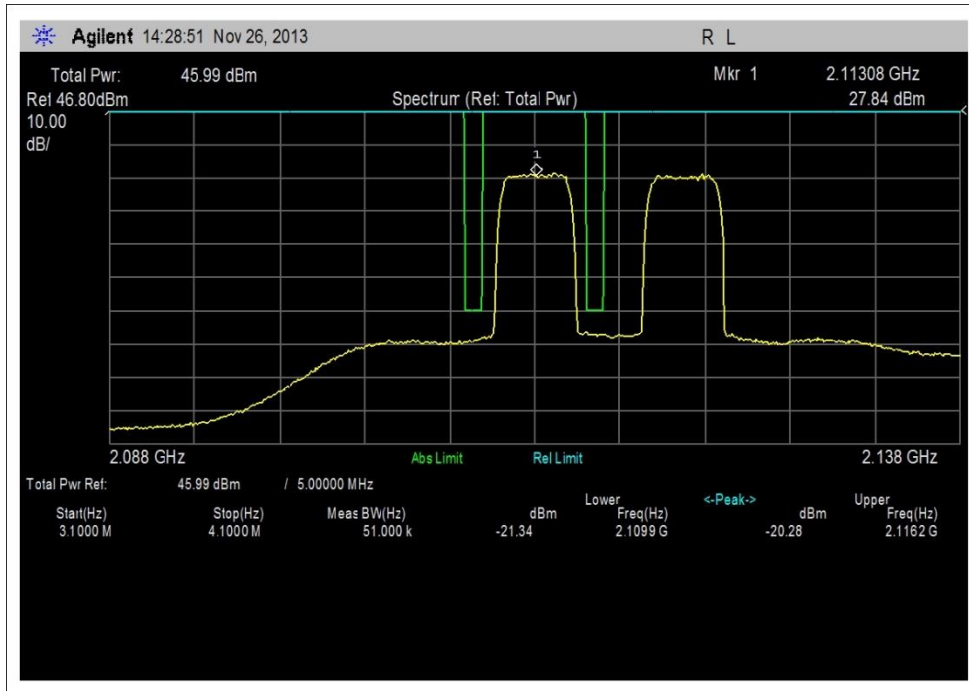
80W LTE 20MHz High Channel, 200kHz RBW



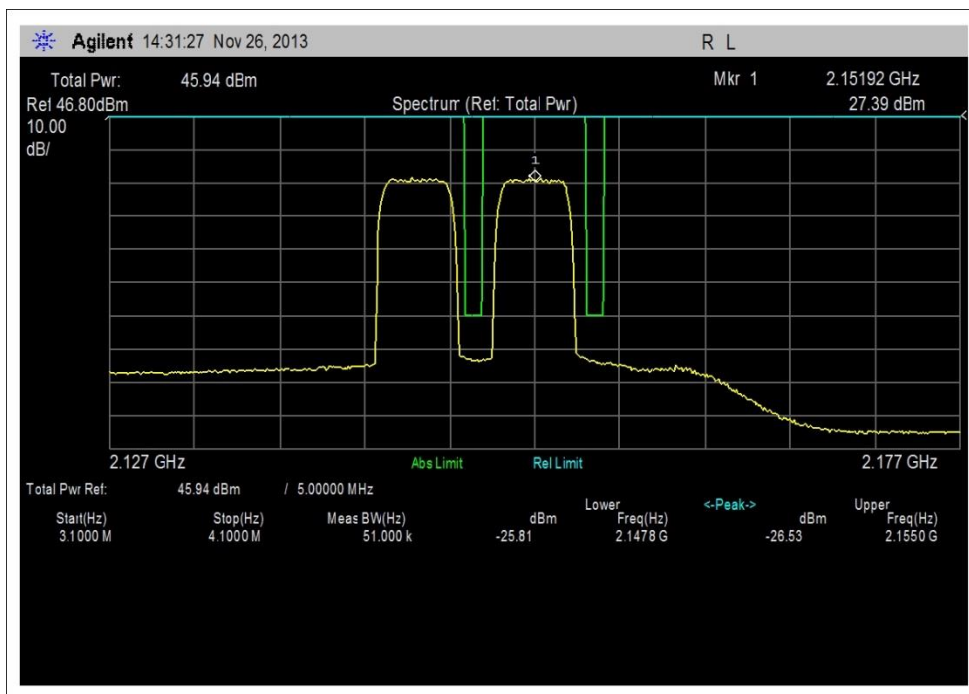
80W UMTS WCDMA 3GPP Low Channel, 1MHz RBW



80W UMTS WCDMA 3GPP High Channel, 1MHz RBW



80W UMTS WCDMA 3GPP Low Channel, 51kHz RBW



80W UMTS WCDMA 3GPP High Channel, 51kHz RBW

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 Plot**

Work Order #: **95158** Date: 11/27/2013

Test Type: **Conducted Emissions** Time: 10:46:12

Equipment: **2100MHz 80W Transmitting Remote Unit** Sequence#: 5

Manufacturer: BTI Wireless Tested By: Don Nguyen

Model: mBSC2100-080-RUMF01 110V 60Hz

S/N: 10102708000113100003

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
2100MHz 80W Transmitting Remote Unit*	BTI Wireless	mBSC2100-080-RUMF01	10102708000113100003

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA
Cable	Pasternack	Sucoflex 104A	12237/4A
RF to Fiber Optic Converter	BTI Wireless	mBSC9351-HU	mBSC9351HU-11021029
50 ohm Load	Generic	NA	NA

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 110db step 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 the manufacturer, the output frequency is independent of the components used in optical converter. The evaluation is performed at the antenna port.

Signal generator is set to sweep from 1980-2270MHz

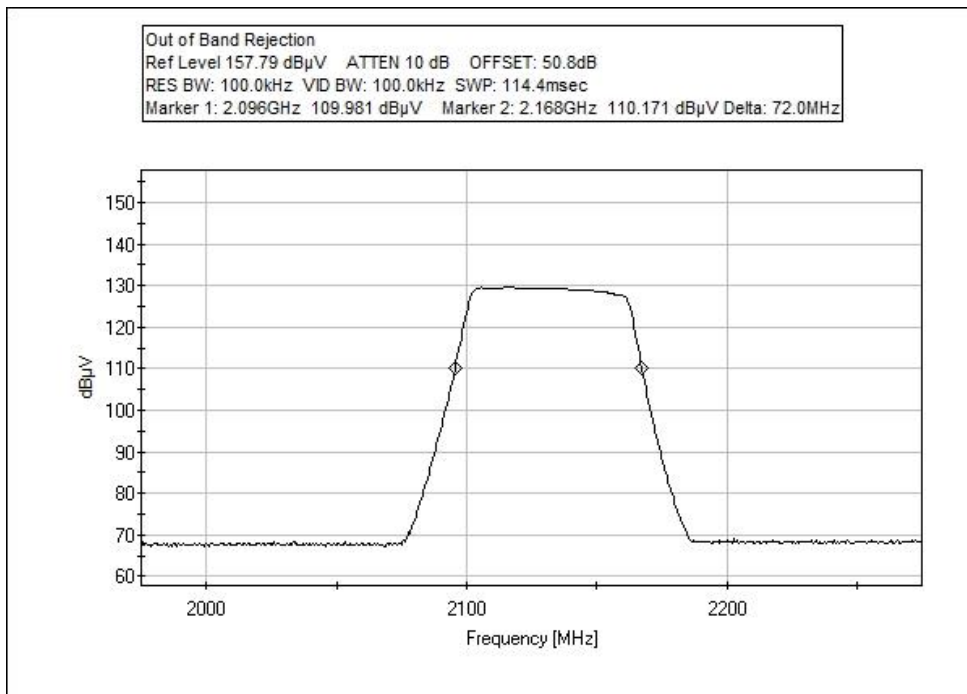
Freq: 2110-2155MHz

Power Output: 80W

20°C, 31% Relative Humidity

Site A

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	(dB μ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB μ V/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.