BTI Wireless

TEST REPORT FOR

700MHz 40W Transmitting Remote Unit
Model: mBSC0700U-040-RUSF01

Tested To The Following Standards:

FCC Part 27C

Report No.: 95155-4

Date of issue: December 16, 2013

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.

Testing the Future
CKC LABORATORIES, INC.

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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: 9913648

REPORT PREPARED BY:

Morgan Tramontin
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 95155

DATE OF EQUIPMENT RECEIPT: November 27, 2013
DATE(S) OF TESTING: November 27 – December 4, 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 27C

Description	Test Procedure/Method	Results
RF Power Output	FCC 2.1033(c)(14)/2.1046/27.50(c)(3)	Pass
Occupied Bandwidth	FCC 2.1033(c)(14)/2.1049(I)	Pass
Spurious Emissions at Antenna Terminal	FCC 2.1033(c)(14)/2.1051/27.53(g)	Pass
Field Strength of Spurious Radiation	FCC 2.1033(c)(14)/2.1053/27.53(g)	Pass
Band Edge		Pass
Intermodulation		Pass
Out of Band Rejection	2-11-04/EAB/RF	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)

The following model was tested by CKC Laboratories:
700MHz 40W Transmitting Remote Unit, mBSC0700U-040-RUSF01

The manufacturer states that the following additional model is identical electrically to the one which was tested, or any differences between them does not affect their EMC characteristics, and therefore It meets the level of testing equivalent to the tested model:
700MHz 40W Transmitting Remote Unit, mBSC0700U-040-RU

EQUIPMENT UNDER TEST

700MHz 40W Transmitting Remote Unit
Manuf: BTI Wireless
Model: mBSC0700U-040-RUSF01
Serial: 10935702007113100001

PERIPHERAL DEVICES

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

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

Cable
Manuf: Pasternack
Model: RG223/U
Serial: #10

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

Step Attenuator 110dB pad
Manuf: HP
Model: 8496B
Serial: 1350A01241

50 ohm Load
Manuf: Generic
Model: NA
Serial: NA

FCC PART 27C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) requirements for licensed devices.

FCC 2.1033(c)(14)/2.1046/27C - RF Power Output

Test Data

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

Customer:	**BTI Wireless**		
Specification:	**RF Output Power**		
Work Order #:	**95155**	Date:	11/20/2013
Test Type:	**Conducted Emissions**	Time:	13:36:38
Equipment:	**700MHz 40W Transmitting Remote Unit**	Sequence#:	4
Manufacturer:	BTI Wireless	Tested By:	Don Nguyen
Model:	mBSC0700U-040-RUSF01		110V 60Hz
S/N:	10935702007113100001		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T2	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015

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

Function	Manufacturer	Model #	S/N
700MHz 40W Transmitting Remote Unit*	BTI Wireless	mBSC0700U-040-RUSF01	10935702007113100001

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Cable	Huber & Suhner	Sucoflex 104A	12237/4A
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA

Test Conditions / Notes:

The EUT is placed on the test bench. Tx In is connected to an ESG Signal generator via cable Sucoflex 104A. ANT port is connected to 30db attenuator and 110db step attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-29094K-24TC. RX out port is terminated to 50 ohm load.

The evaluation is performed at the antenna port using Channel power function of the spectrum analyzer.

Freq: 746-757MHz
Signal protocol: LTE-TM1.1 1.4MHz, 5MHz. 10MHz

The RF output power was measured with signal generator output power as listed in the result table for RF Output power of 40 W, 20W, 10W

21°C, 45% Relative Humidity

The EUT is a RF amplifier operating the 746-757MHz band under part 27. The manufacture does not provide an antenna for sale with the product; hence EIRP is not measured nor calculated.
The end user of this product is to exercise proper engineering judgment to select the appropriate antenna to comply with the EIRP limitation set forth

27.50
(b) The following power and antenna height limits apply to transmitters operating in the 746-763 MHz, 775-793 MHz and 805-806 MHz bands:
(4) Fixed and base stations transmitting a signal in the 746-757 MHz, 758-763 MHz, 776-787 MHz, and 788-793 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP accordance with Table 3 of this section.

40W

Modulation	Signal Generator Output Power (dbm)	Cable Loss (db)	Input Power (dbm)	Measured Output Power (dbm)	Measured Output Power (W)
LTE 1.4MHz					
746.82MHz	-9.34	0.8	-10.14	45.97	39.53666201
751.5MHz	-9.47	0.8	-10.27	45.99	39.71915495
756.18MHz	-9.31	0.8	-10.11	45.69	37.06807218
LTE 5MHz					
748.65MHz	-9.5	0.8	-10.3	46.02	39.99447498
751.5MHz	-9.44	0.8	-10.24	46.04	40.17908108
754.35MHz	-9.12	0.8	-9.92	46.02	39.99447498
LTE 10MHz					
751.2MHz	-9.52	0.8	-10.32	45.99	39.71915495
751.5MHz	-9.52	0.8	-10.32	46	39.81071706
751.8MHz	-9.42	0.8	-10.22	45.97	39.53666201

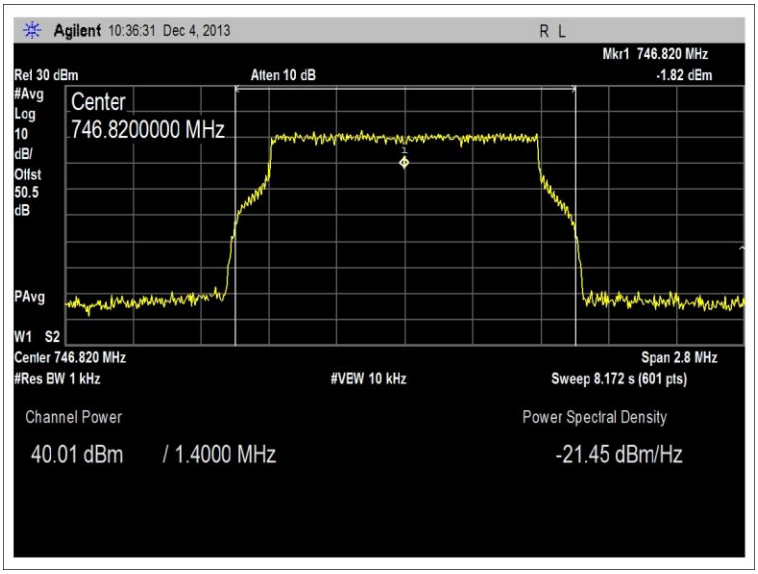
20W

Modulation	Signal Generator Output Power (dbm)	Cable Loss (db)	Input Power (dbm)	Measured Output Power (dbm)	Measured Output Power (W)
LTE 1.4MHz					
746.82MHz	-12.38	0.8	-13.18	43.01	19.9986187
751.5MHz	-12.44	0.8	-13.24	42.99	19.90673339
756.18MHz	-11.92	0.8	-12.72	42.94	19.6788629
LTE 5MHz					
748.65MHz	-12.54	0.8	-13.34	42.98	19.86094917
751.5MHz	-12.54	0.8	-13.34	42.99	19.90673339
754.35MHz	-12.26	0.8	-13.06	42.99	19.90673339
LTE 10MHz					
751.2MHz	-12.4	0.8	-13.2	43.02	20.04472027
751.5MHz	-12.4	0.8	-13.2	42.99	19.90673339
751.8MHz	-12.4	0.8	-13.2	43.03	20.09092813

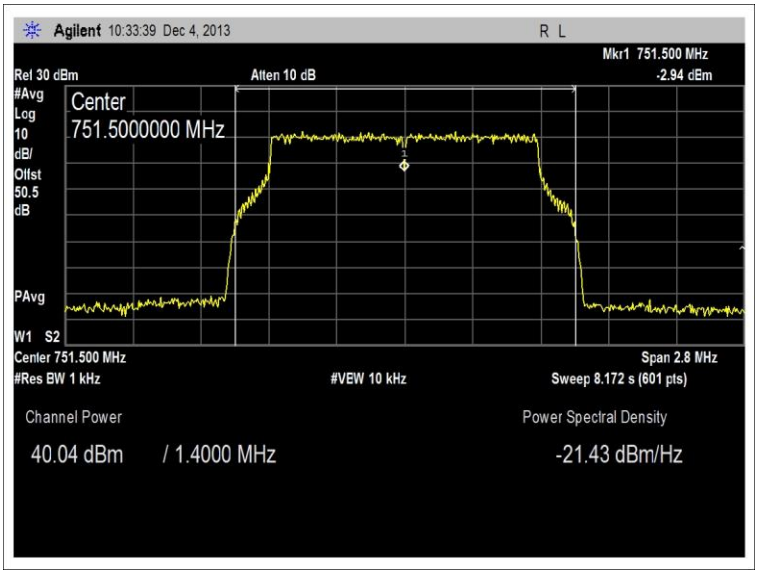
10W

Modulation	Signal Generator Output Power (dbm)	Cable Loss (db)	Input Power (dbm)	Measured Output Power (dbm)	Measured Output Power (W)
LTE 1.4MHz					
746.82MHz	-15.42	0.8	-16.22	40.01	10.02305238
751.5MHz	-15.64	0.8	-16.44	40.04	10.09252886
756.18MHz	-14.76	0.8	-15.56	40.08	10.18591388
LTE 5MHz					
748.65MHz	-15.64	0.8	-16.44	40	10
751.5MHz	-15.56	0.8	-16.36	40.02	10.0461579
754.35MHz	-15.22	0.8	-16.02	40.03	10.06931669
LTE 10MHz					
751.2MHz	-15.52	0.8	-16.32	40.04	10.09252886
751.5MHz	-15.52	0.8	-16.32	40.06	10.13911386
751.8MHz	-15.52	0.8	-16.32	40.02	10.0461579

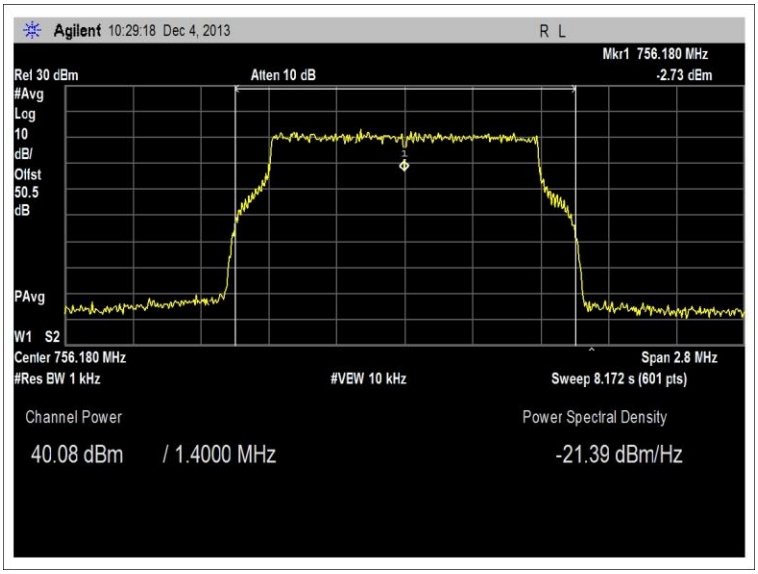
Test Plots



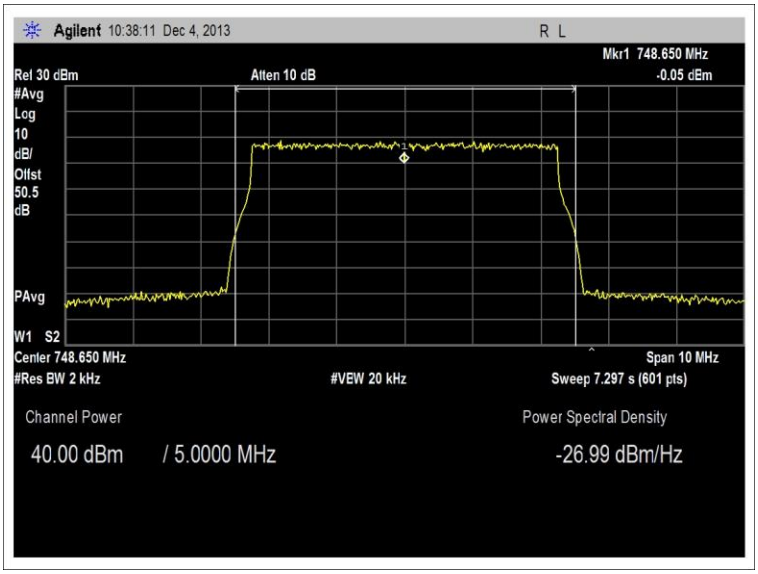
10W, LTE 1.4MHz - Low



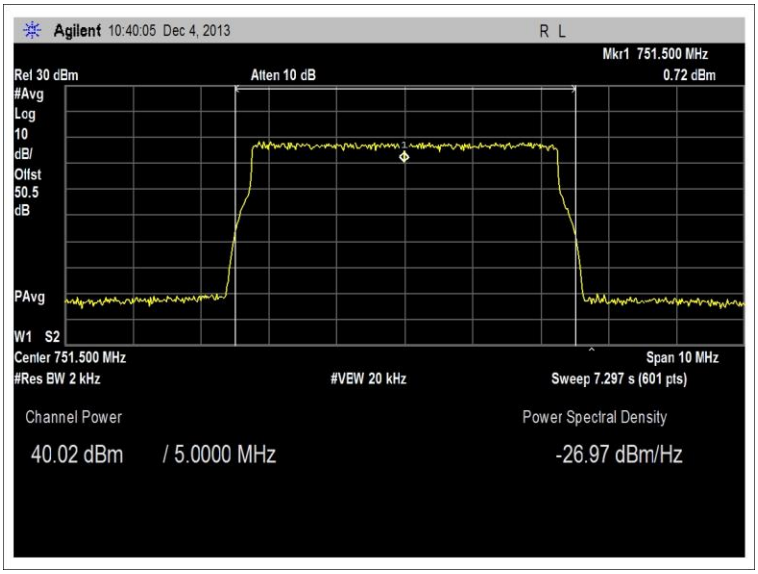
10W, LTE 1.4MHz – Middle



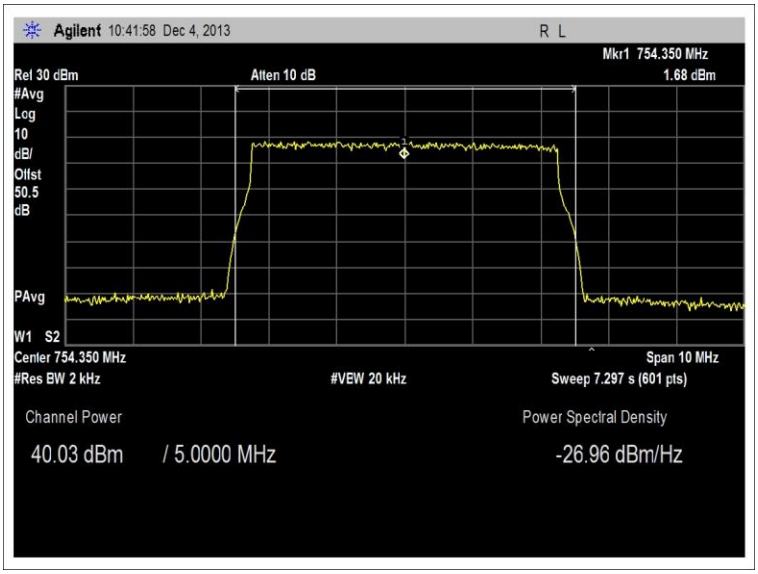
10W, LTE 1.4MHz – High



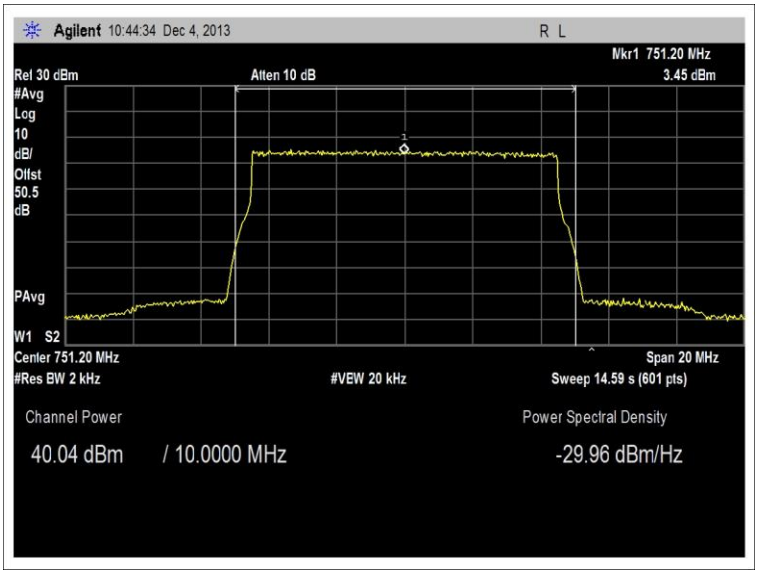
10W, LTE 5MHz – Low



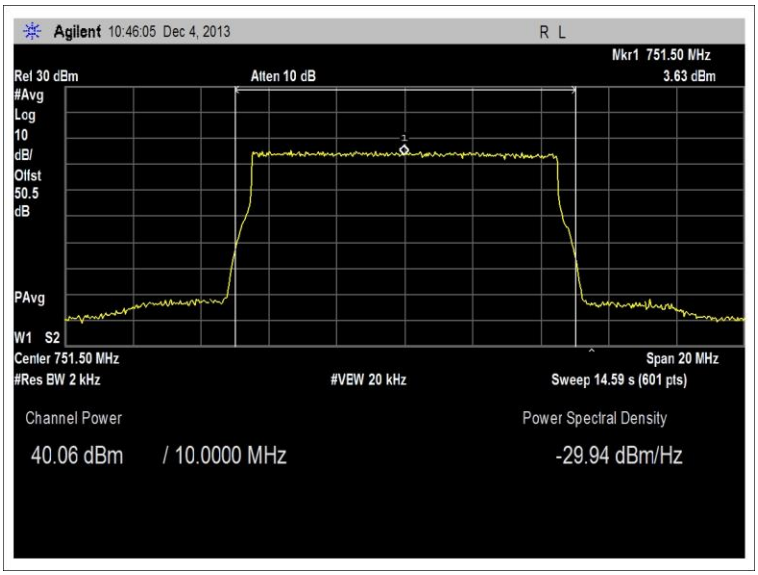
10W, LTE 5MHz – Middle



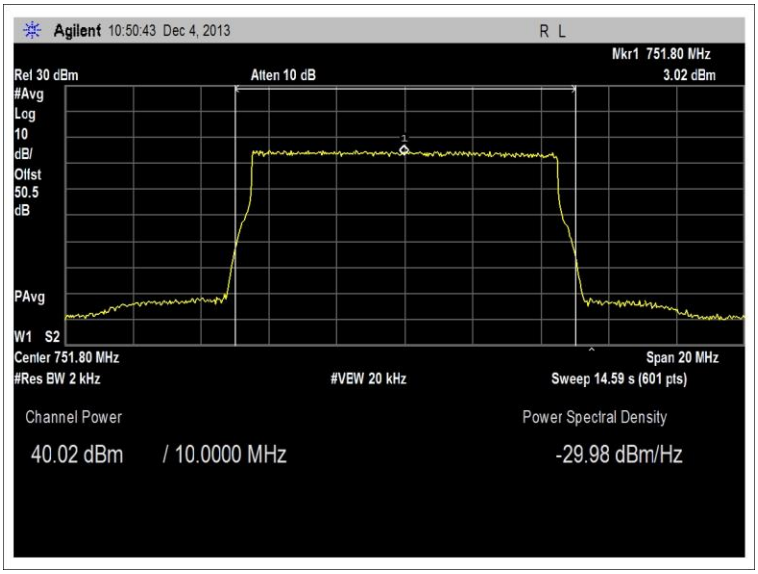
10W, LTE 5MHz – High



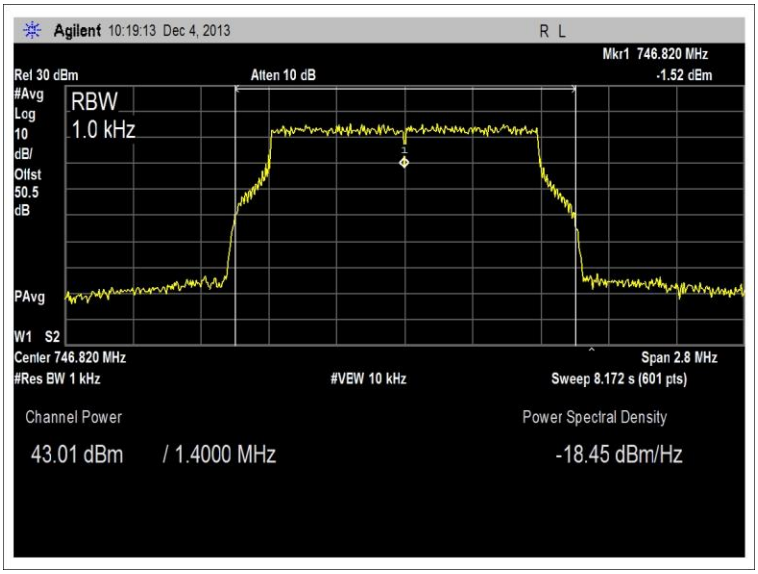
10W, LTE 10MHz – Low



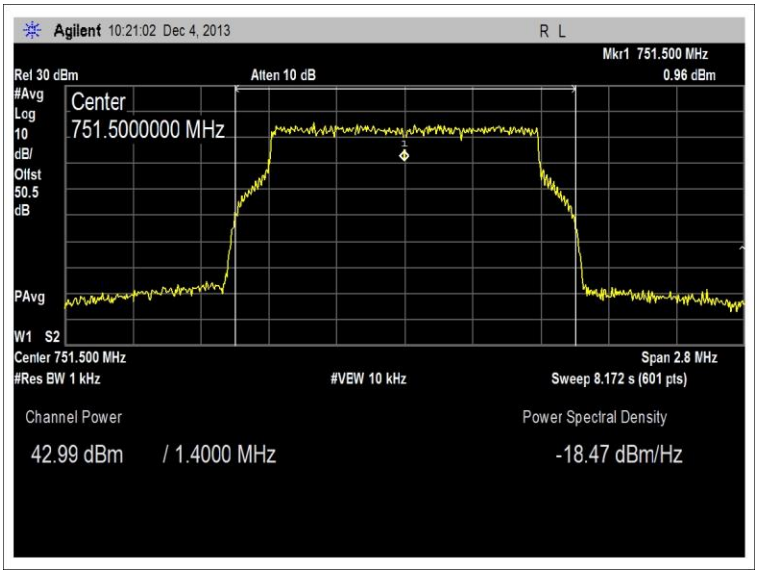
10W, LTE 10MHz – Middle



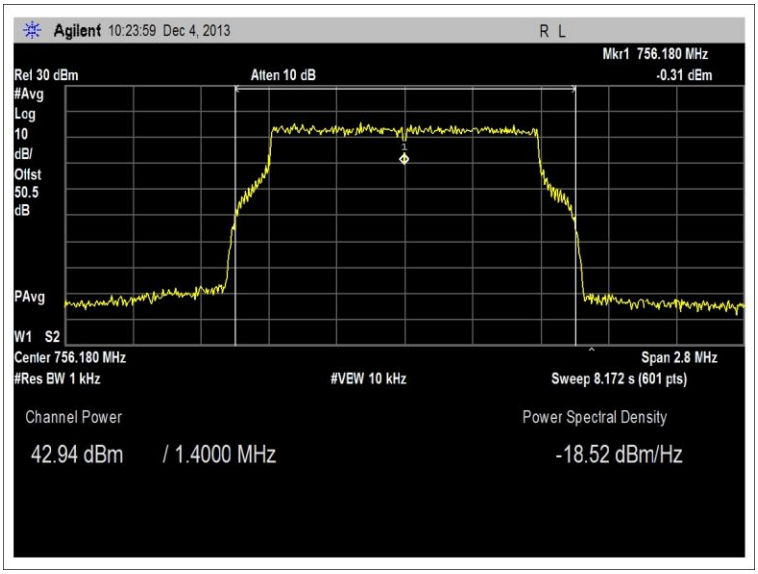
10W, LTE 10MHz – High



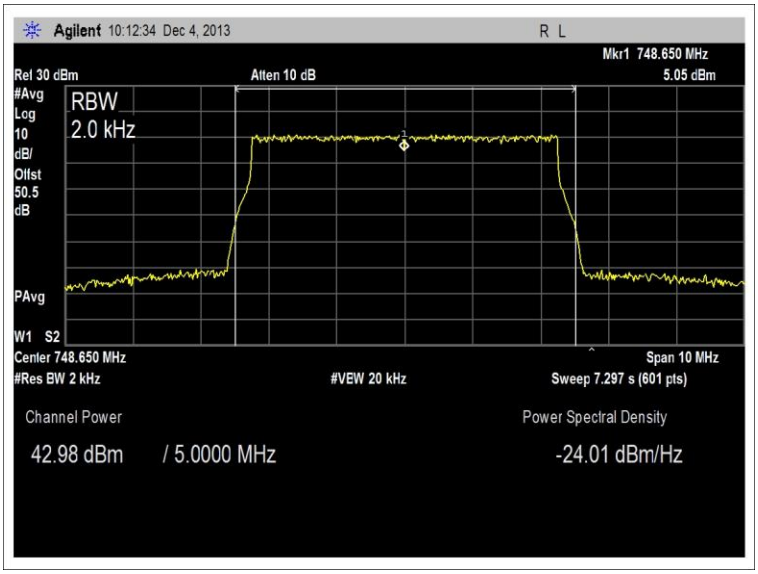
20W, LTE 1.4MHz – Low



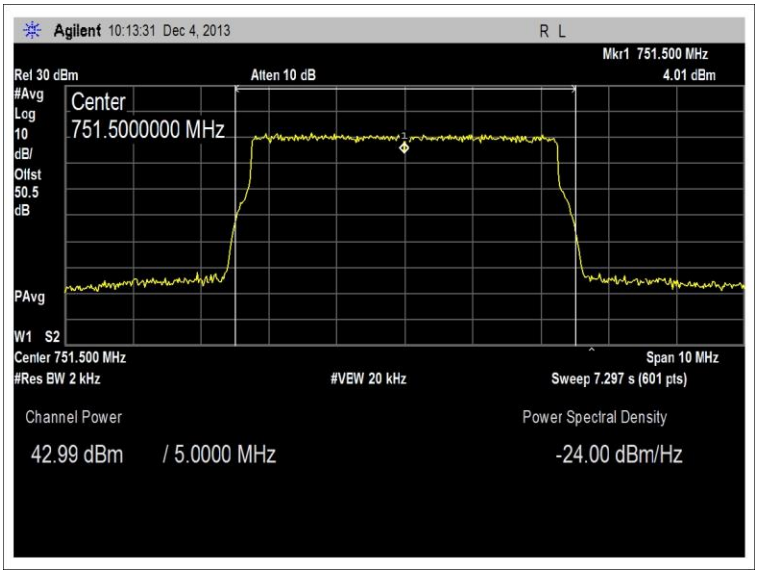
20W, LTE 1.4MHz – Middle



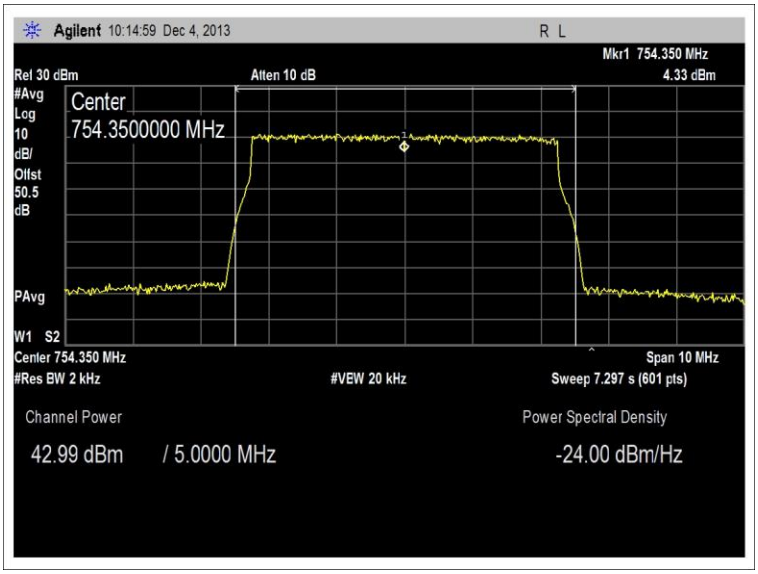
20W, LTE 1.4MHz – High



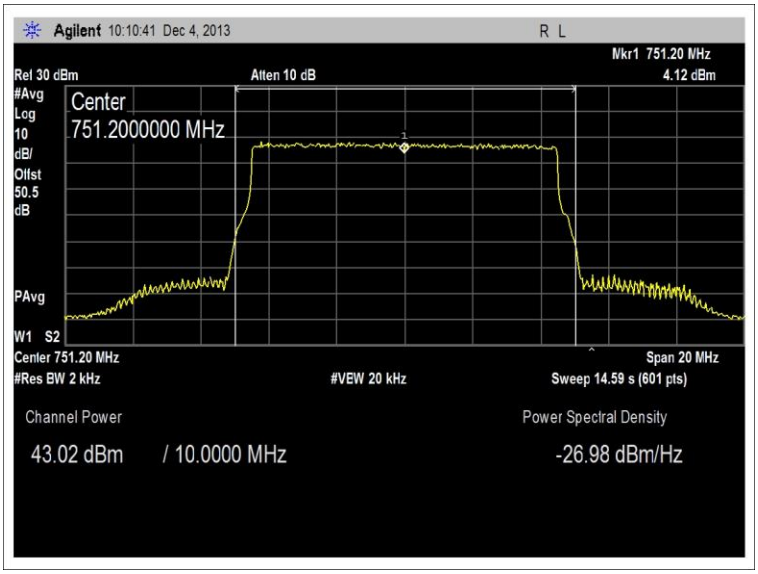
20W, LTE 5MHz – Low



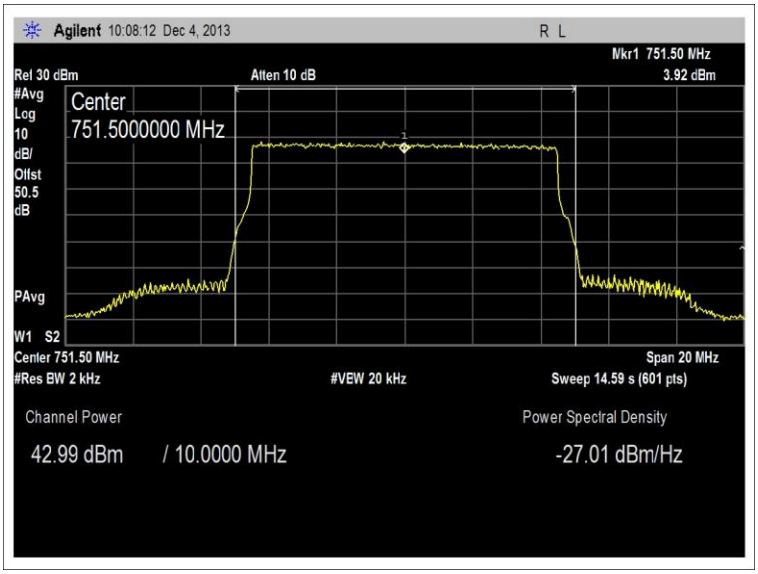
20W, LTE 5MHz – Middle



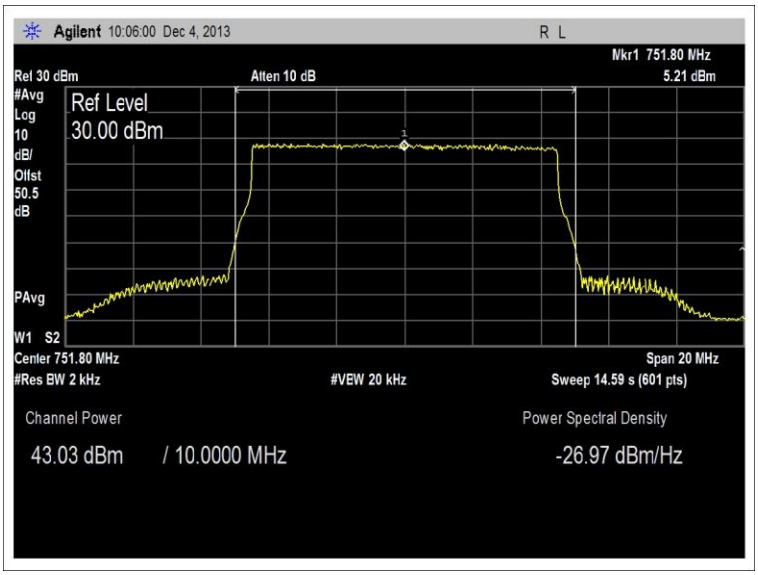
20W, LTE 5MHz – High



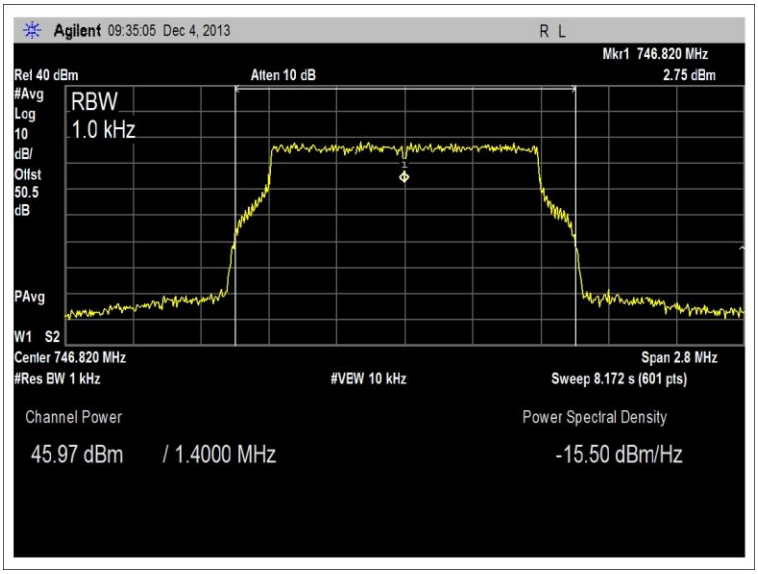
20W, LTE 10MHz – Low



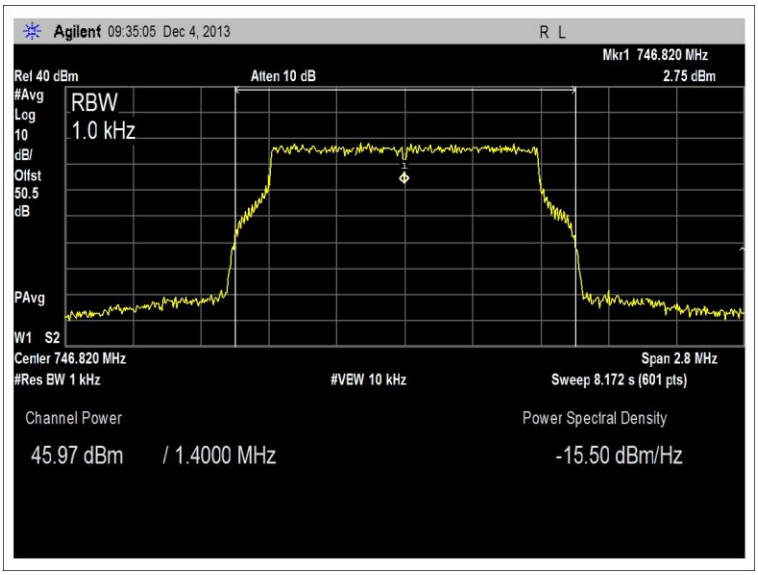
20W, LTE 10MHz – Middle



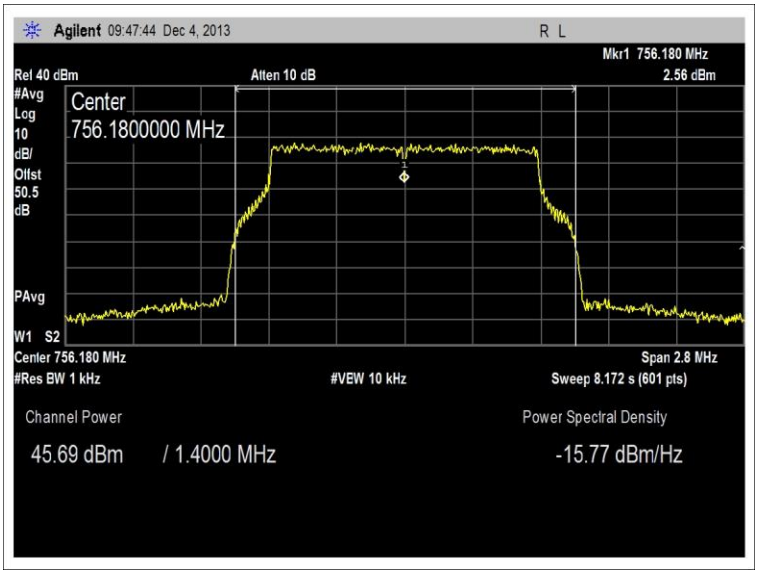
20W, LTE 10MHz – High



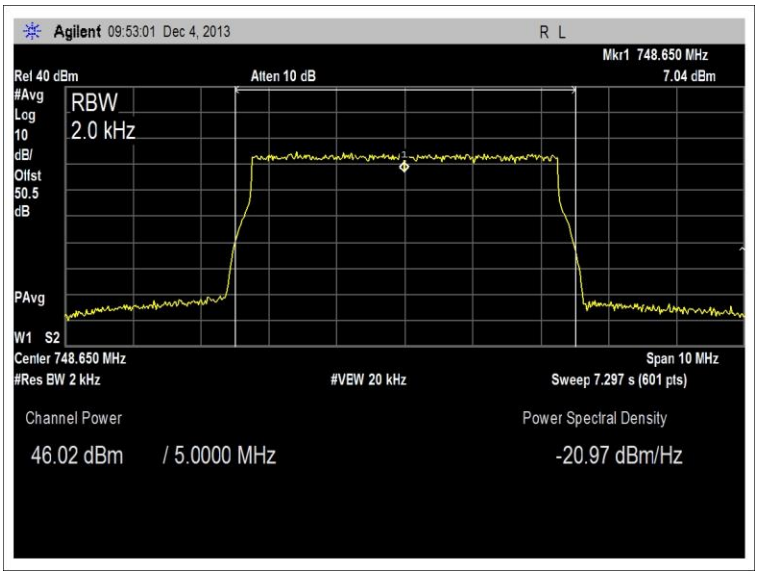
40W, LTE 1.4MHz – Low



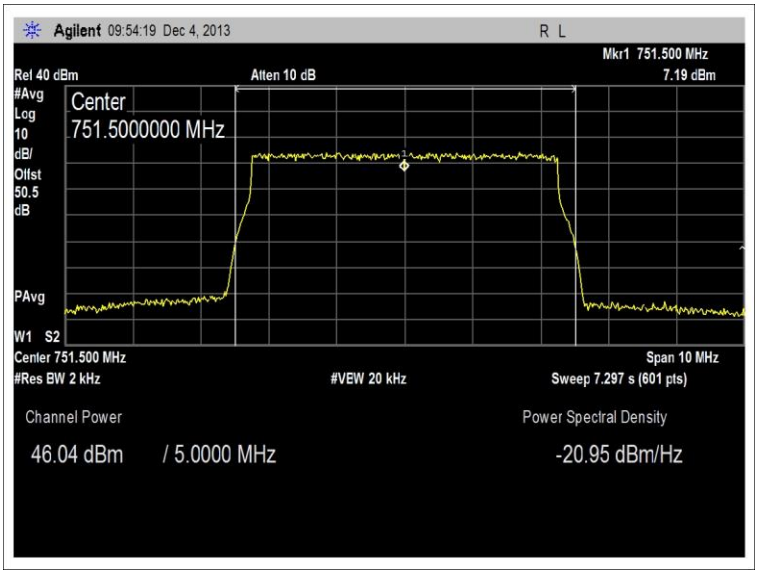
40W, LTE 1.4MHz – Middle



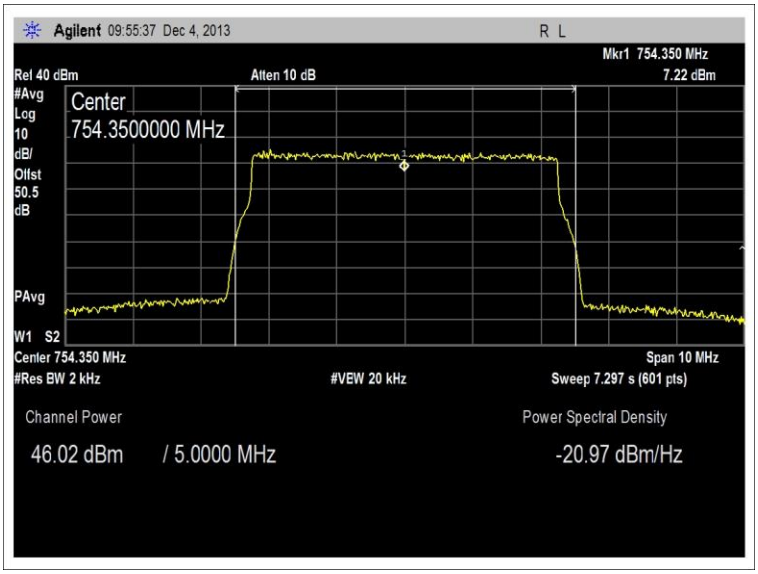
40W, LTE 1.4MHz – High



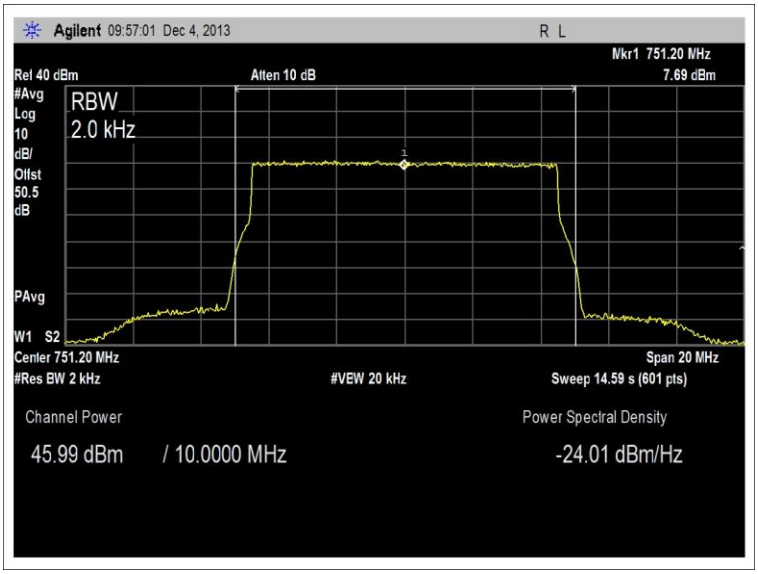
40W, LTE 5MHz – Low



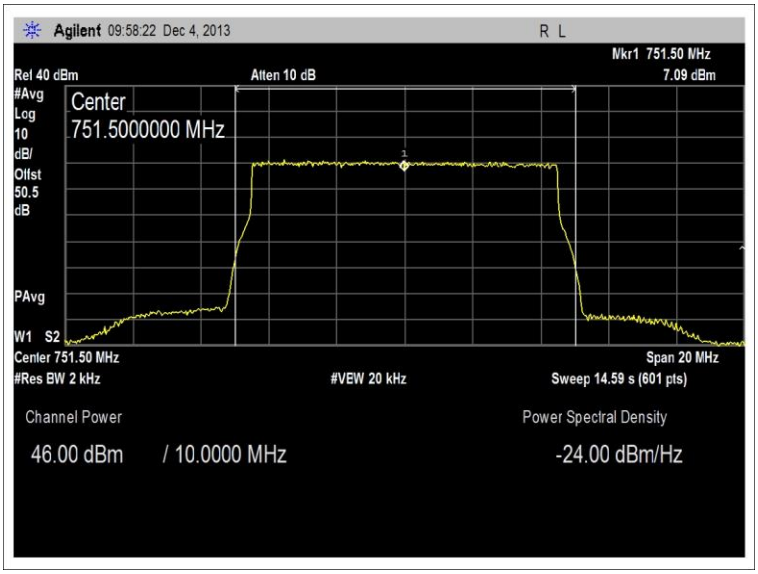
40W, LTE 5MHz – Middle



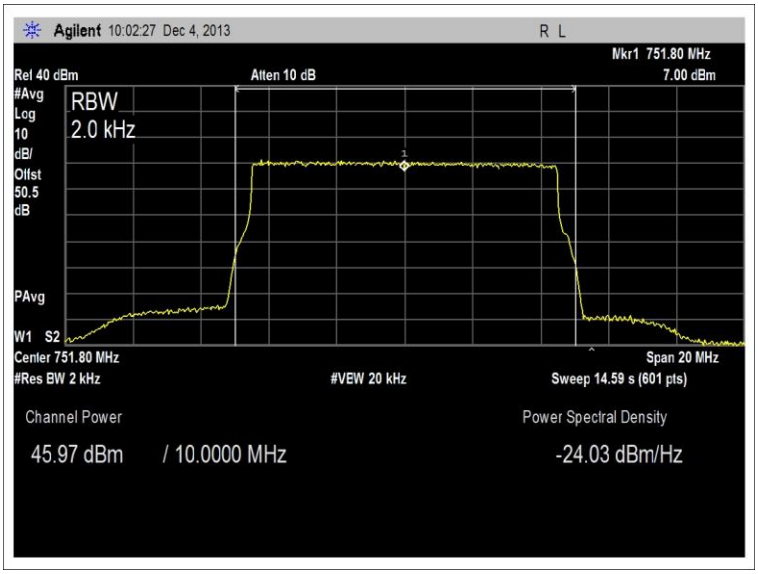
40W, LTE 5MHz – High



40W, LTE 10MHz – Low



40W, LTE 10MHz – Middle



40W, LTE 10MHz – High

Test Setup Photos

Overall Test Setup

FCC 2.1033(c)(14)/2.1049 - Occupied Bandwidth

Test Data Sheets

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 #: **95155** Date: 11/20/2013
Test Type: **Conducted Emissions** Time: 13:36:38
Equipment: **700MHz 40W Transmitting Remote Unit** Sequence#: 4
Manufacturer: BTI Wireless Tested By: Don Nguyen
Model: mBSC0700U-040-RUSF01 110V 60Hz
S/N: 10935702007113100001

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T2	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015

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

Function	Manufacturer	Model #	S/N
700MHz 40W Transmitting Remote Unit*	BTI Wireless	mBSC0700U-040-RUSF01	10935702007113100001

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Cable	Huber & Suhner	Sucoflex 104A	12237/4A
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA

Test Conditions / Notes:

The EUT is placed on the test bench. Tx In is connected to an ESG Signal generator via cable Sucoflex 104A. ANT port is connected to 30db attenuator and 110db step attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-29094K-24TC. RX out port is terminated to 50 ohm load.

The evaluation is performed at the antenna port.

Freq: 746-757MHz
Signal protocol: LTE-TM1.1 1.4MHz, 5MHz. 10MHz

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

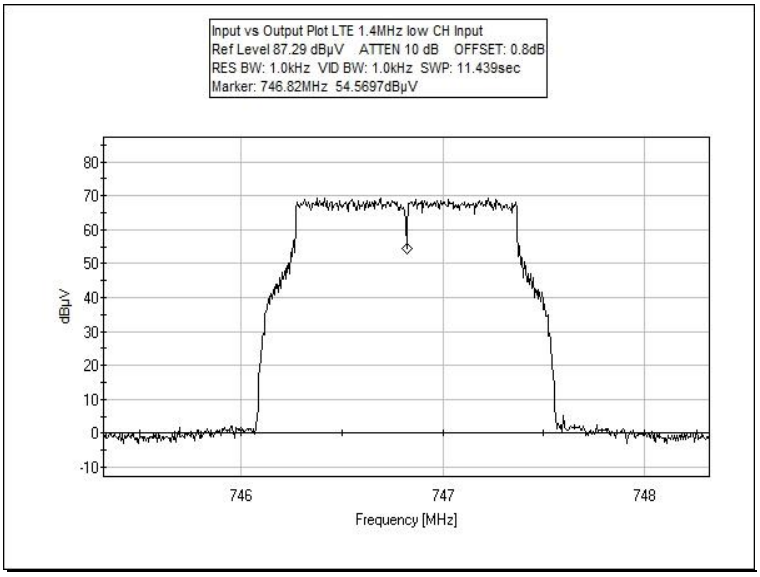
40W

Modulation	Input Power (dbm)
LTE 1.4MHz	
746.82MHz	-10.14
751.5MHz	-10.27
756.18MHz	-10.11
LTE 5MHz	
748.65MHz	-10.3
751.5MHz	-10.24
754.35MHz	-9.92
LTE 10MHz	
751.2MHz	-10.32
751.5MHz	-10.32
751.8MHz	-10.22

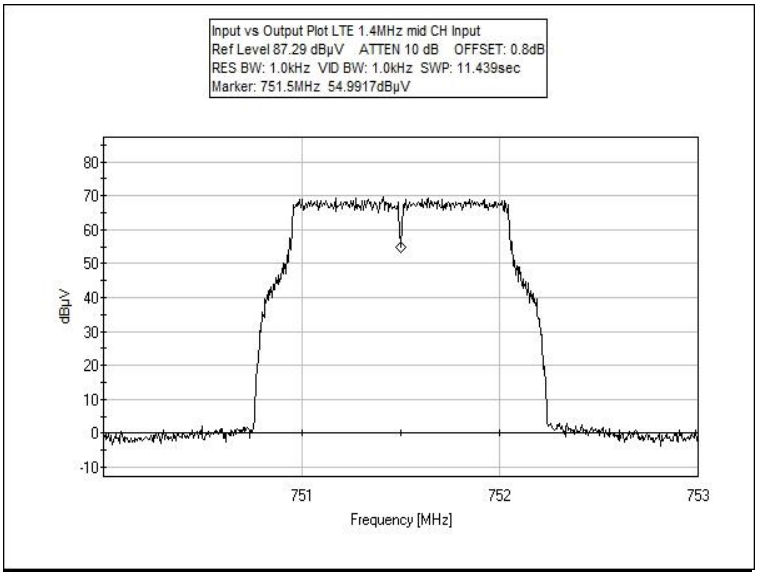
21°C, 45% Relative Humidity.

Site A

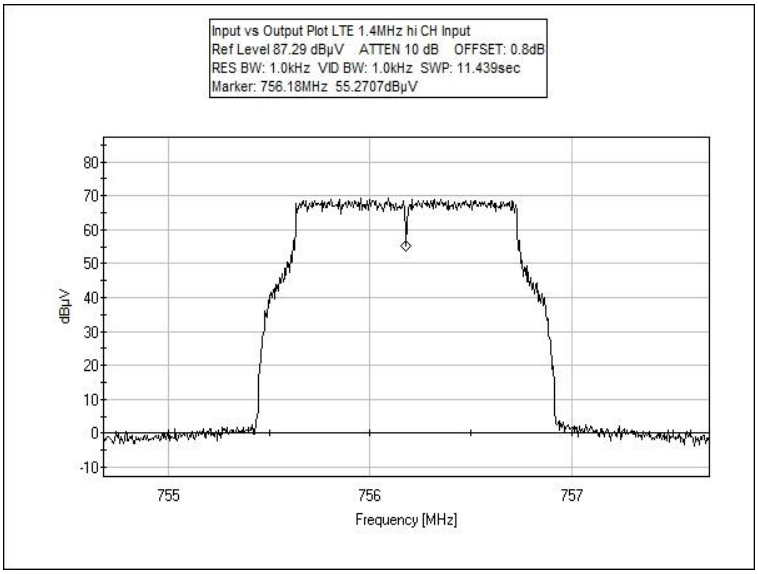
Test Plots



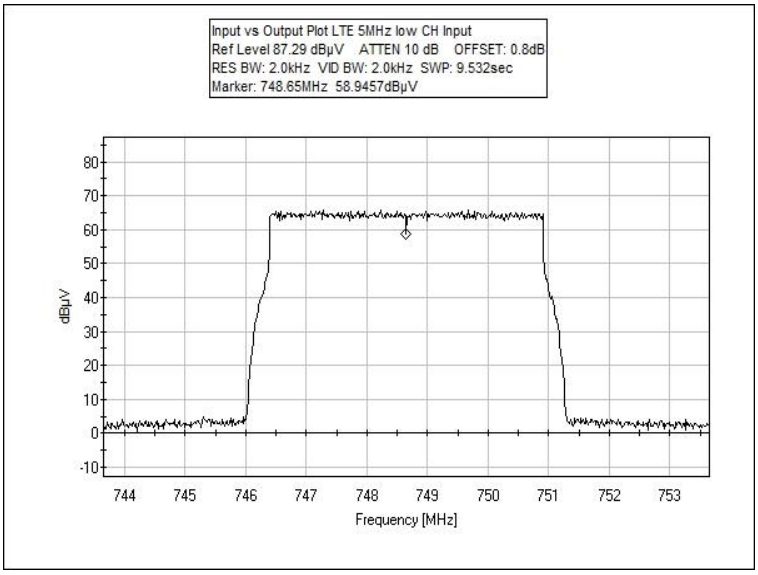
Low



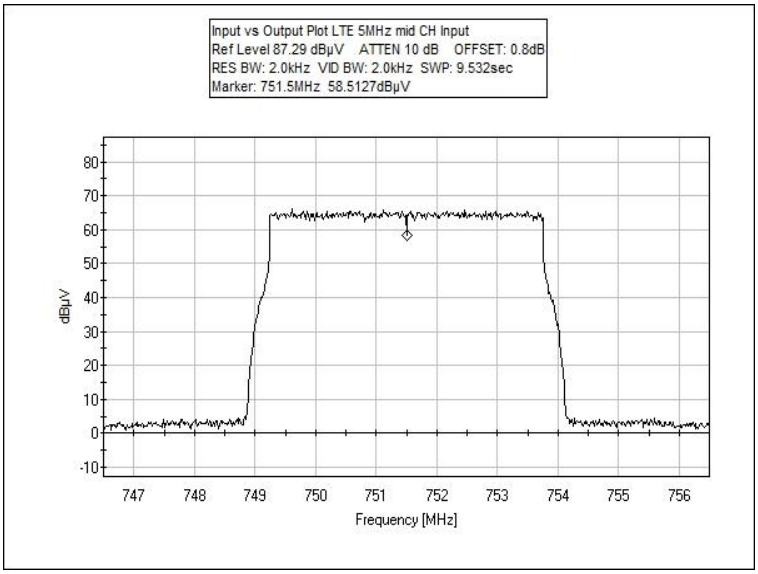
Middle


Input vs Output Plot LTE 1.4MHz hi CH Input
Ref Level 87.29 dBµV ATTEN 10 dB OFFSET: 0.8dB
RES BW: 1.0kHz VID BW: 1.0kHz SWP: 11.439sec
Marker: 756.18MHz 55.2707dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
755
756
757
Frequency [MHz]

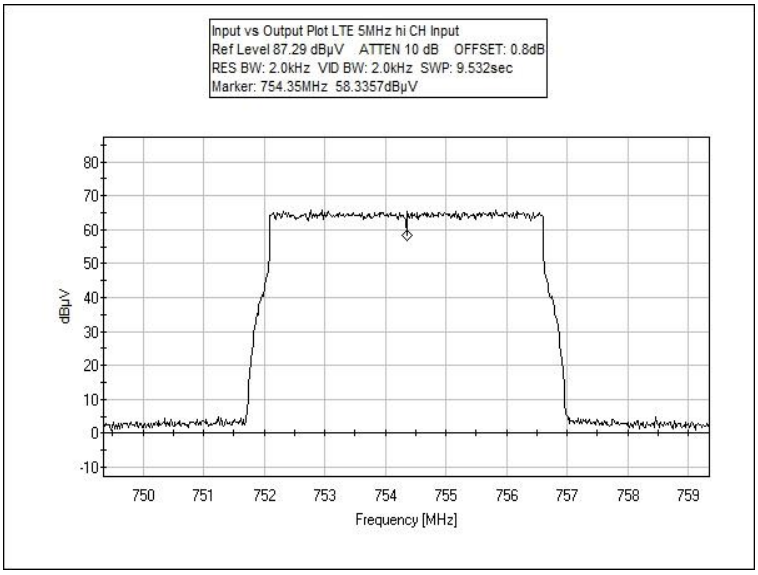
High


Input vs Output Plot LTE 5MHz low CH Input
Ref Level 87.29 dBµV ATTEN 10 dB OFFSET: 0.8dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 9.532sec
Marker: 748.65MHz 58.9457dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
744
745
746
747
748
749
750
751
752
753
Frequency [MHz]

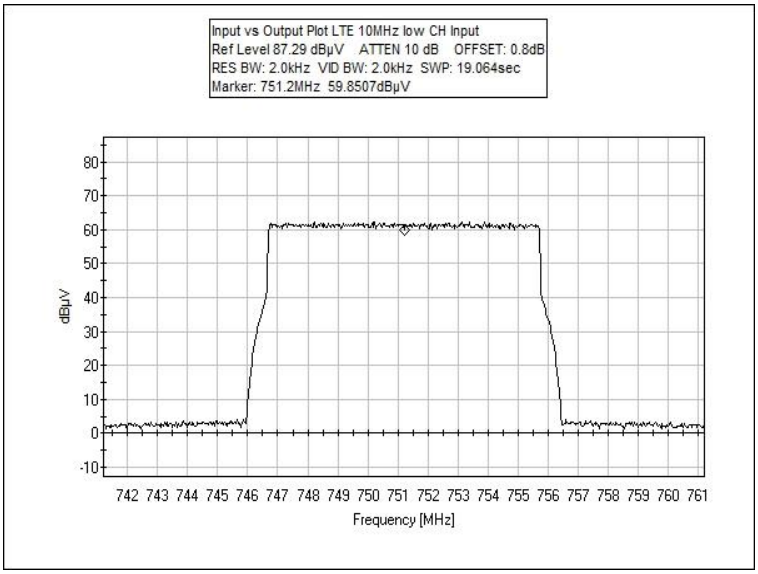
Low


Input vs Output Plot LTE 5MHz mid CH Input
Ref Level 87.29 dBµV ATTEN 10 dB OFFSET: 0.8dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 9.532sec
Marker: 751.5MHz 58.5127dBµV
dBµV
Frequency [MHz]

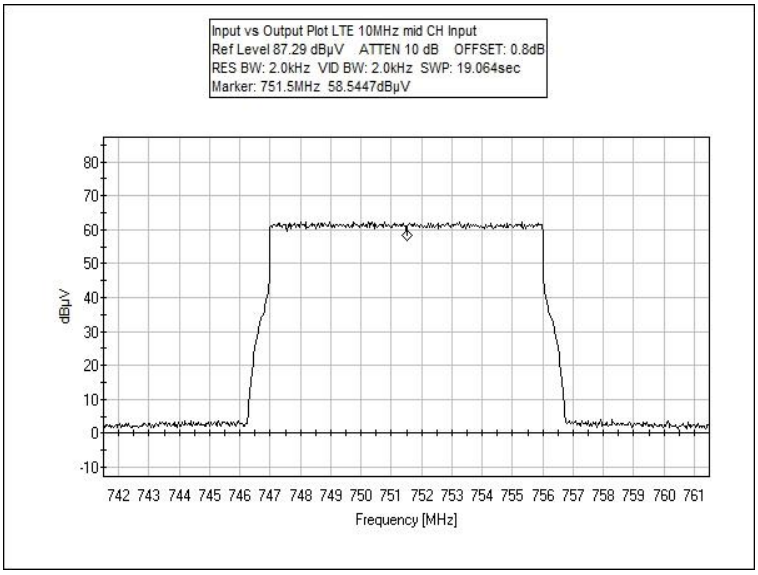
Middle


Input vs Output Plot LTE 5MHz hi CH Input
Ref Level 87.29 dBµV ATTEN 10 dB OFFSET: 0.8dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 9.532sec
Marker: 754.35MHz 58.3357dBµV
dBµV
Frequency [MHz]

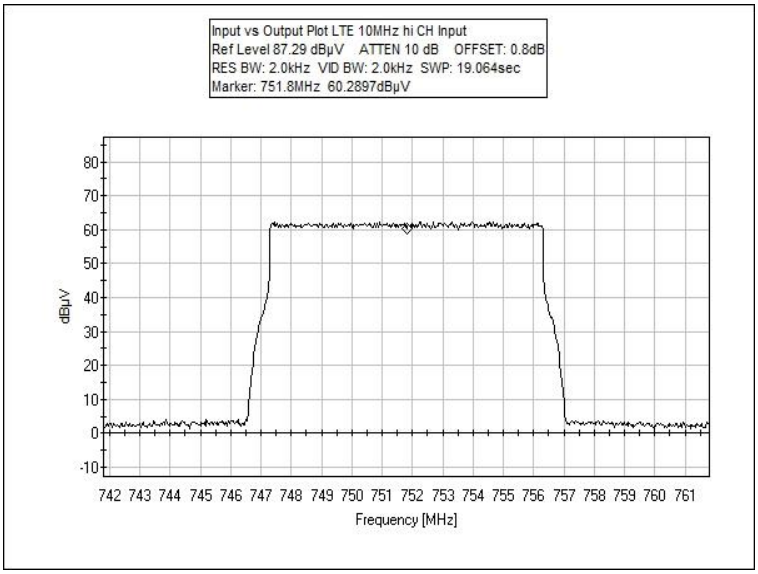
High


Input vs Output Plot LTE 10MHz low CH Input
Ref Level 87.29 dBµV ATTEN 10 dB OFFSET: 0.8dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 19.064sec
Marker: 751.2MHz 59.8507dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761
Frequency [MHz]

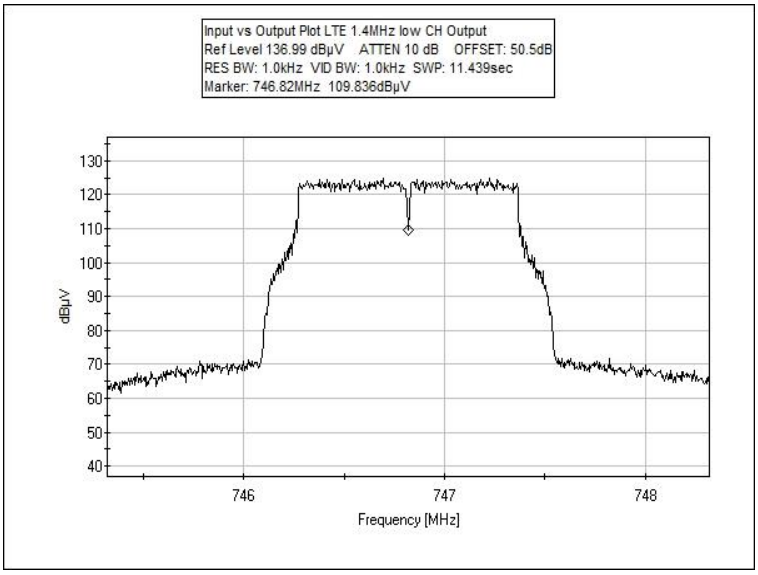
Low


Input vs Output Plot LTE 10MHz mid CH Input
Ref Level 87.29 dBµV ATTEN 10 dB OFFSET: 0.8dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 19.064sec
Marker: 751.5MHz 58.5447dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761
Frequency [MHz]

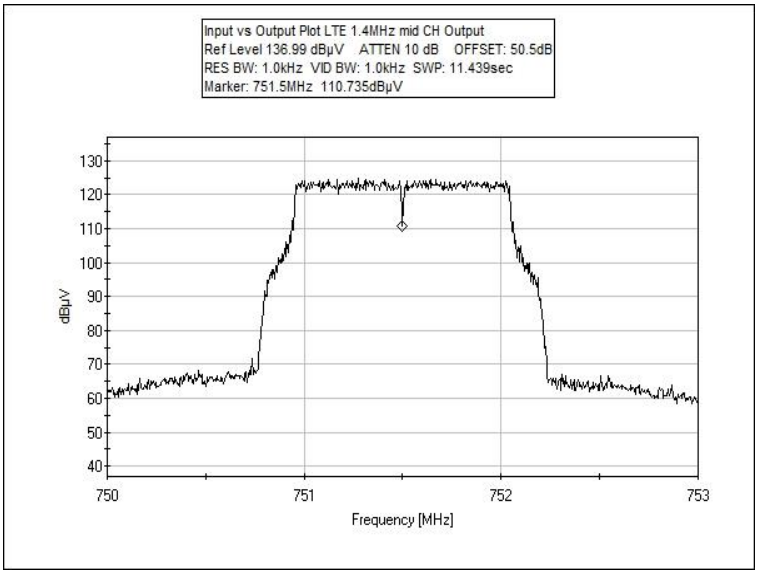
Middle


Input vs Output Plot LTE 10MHz hi CH Input
Ref Level 87.29 dBµV ATTEN 10 dB OFFSET: 0.8dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 19.064sec
Marker: 751.8MHz 60.2897dBµV
dBµV
Frequency [MHz]

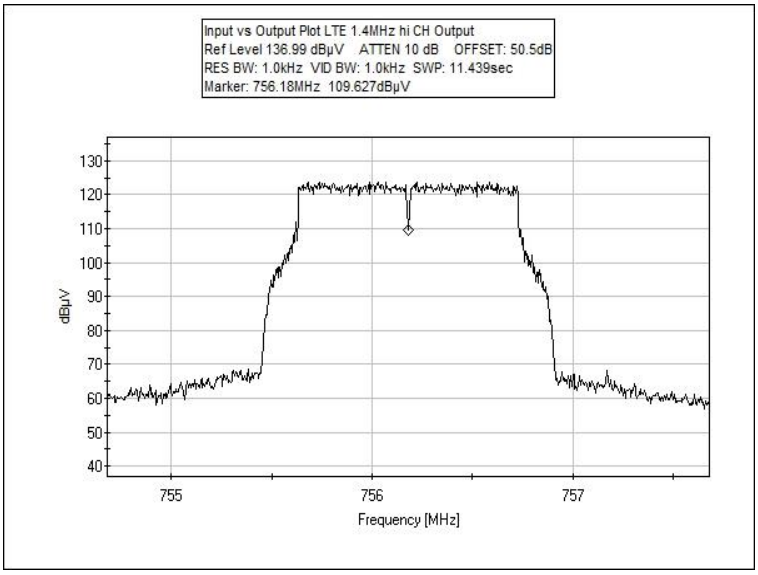
High


Input vs Output Plot LTE 1.4MHz low CH Output
Ref Level 136.99 dBµV ATTEN 10 dB OFFSET: 50.5dB
RES BW: 1.0kHz VID BW: 1.0kHz SWP: 11.439sec
Marker: 746.82MHz 109.836dBµV
dBµV
Frequency [MHz]

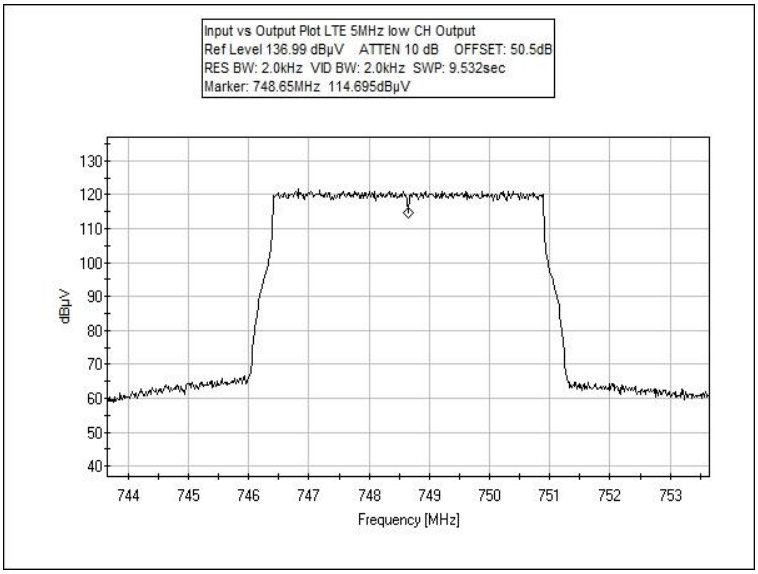
Low


Input vs Output Plot LTE 1.4MHz mid CH Output
Ref Level 136.99 dBµV ATTEN 10 dB OFFSET: 50.5dB
RES BW: 1.0kHz VID BW: 1.0kHz SWP: 11.439sec
Marker: 751.5MHz 110.735dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
750
751
752
753
Frequency [MHz]

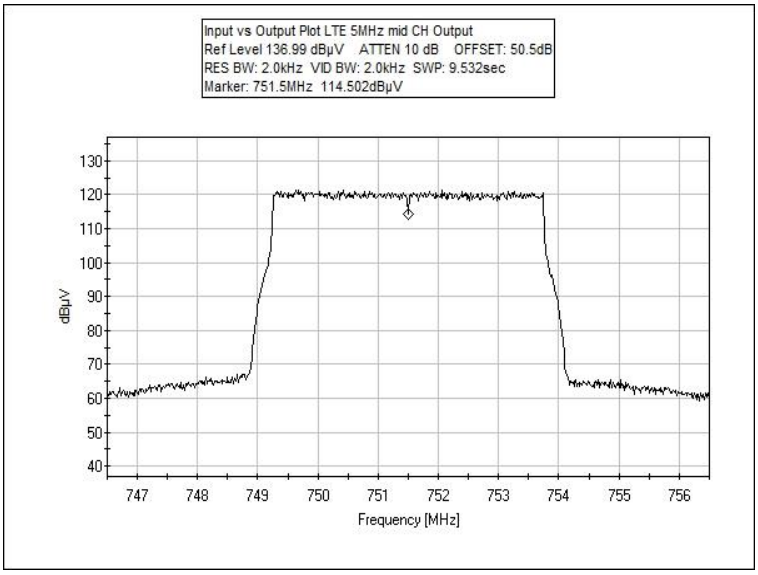
Middle


Input vs Output Plot LTE 1.4MHz hi CH Output
Ref Level 136.99 dBµV ATTEN 10 dB OFFSET: 50.5dB
RES BW: 1.0kHz VID BW: 1.0kHz SWP: 11.439sec
Marker: 756.18MHz 109.627dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
755
756
757
Frequency [MHz]

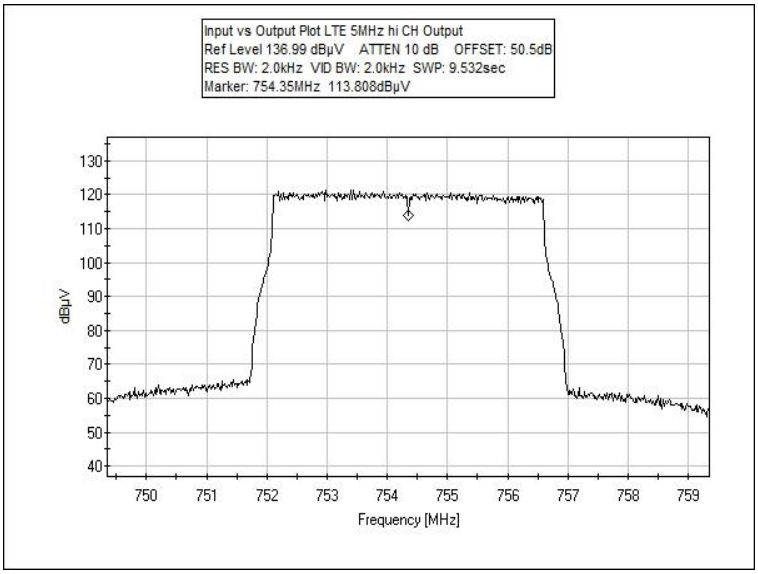
High


Input vs Output Plot LTE 5MHz low CH Output
Ref Level 136.99 dBµV ATTEN 10 dB OFFSET: 50.5dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 9.532sec
Marker: 748.65MHz 114.695dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
744
745
746
747
748
749
750
751
752
753
Frequency [MHz]

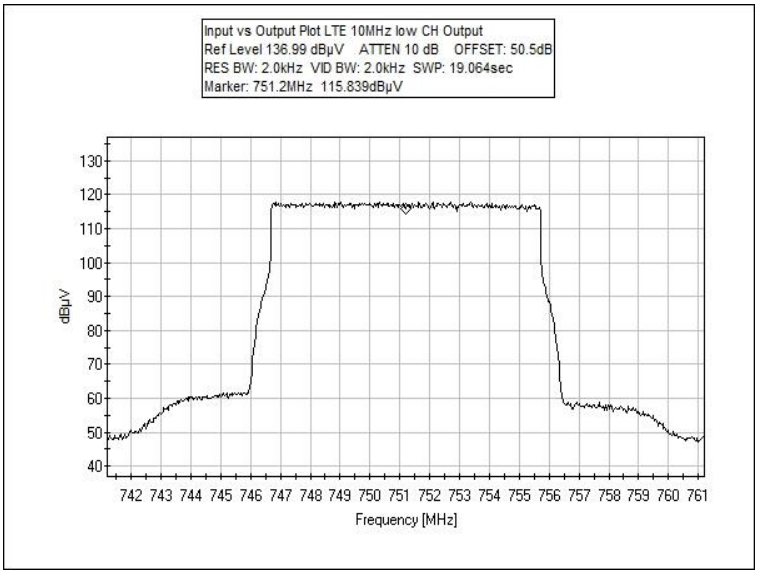
Low


Input vs Output Plot LTE 5MHz mid CH Output
Ref Level 136.99 dBµV ATTEN 10 dB OFFSET: 50.5dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 9.532sec
Marker: 751.5MHz 114.502dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
747
748
749
750
751
752
753
754
755
756
Frequency [MHz]

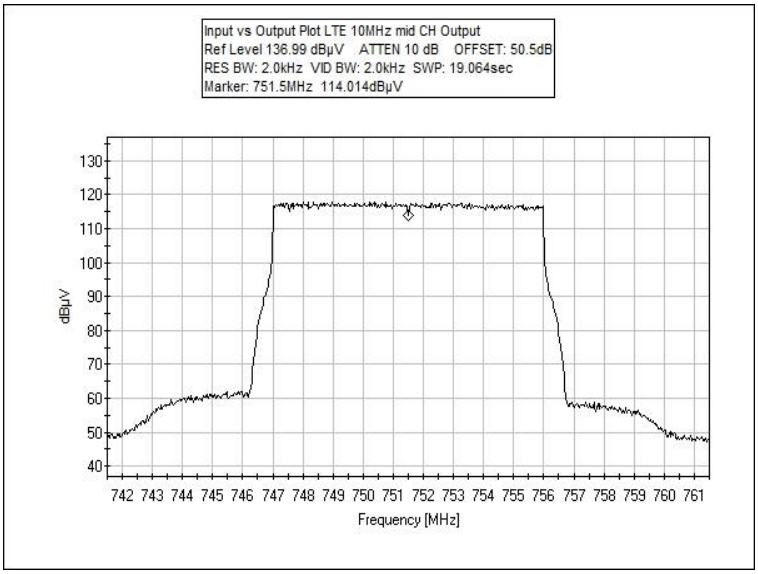
Middle


Input vs Output Plot LTE 5MHz hi CH Output
Ref Level 136.99 dBµV ATTEN 10 dB OFFSET: 50.5dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 9.532sec
Marker: 754.35MHz 113.808dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
750 751 752 753 754 755 756 757 758 759
Frequency [MHz]

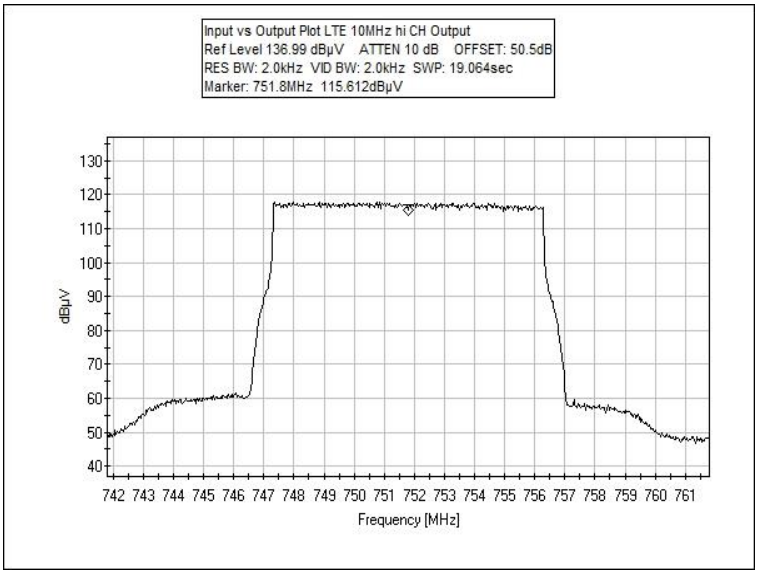
High


Input vs Output Plot LTE 10MHz low CH Output
Ref Level 136.99 dBµV ATTEN 10 dB OFFSET: 50.5dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 19.064sec
Marker: 751.2MHz 115.839dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761
Frequency [MHz]

Low


Input vs Output Plot LTE 10MHz mid CH Output
Ref Level 136.99 dBµV ATTEN 10 dB OFFSET: 50.5dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 19.064sec
Marker: 751.5MHz 114.014dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761
Frequency [MHz]

Mid


Input vs Output Plot LTE 10MHz hi CH Output
Ref Level 136.99 dBµV ATTEN 10 dB OFFSET: 50.5dB
RES BW: 2.0kHz VID BW: 2.0kHz SWP: 19.064sec
Marker: 751.8MHz 115.612dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761
Frequency [MHz]

High

Test Setup Photos

Overall Test Setup

FCC 2.1033(c)(14)/2.1051/27.53(g) - Spurious Emissions at Antenna Terminal

Test Data Sheets

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

Customer:	**BTI Wireless**		
Specification:	**FCC Part 27.53(c)(1)Conducted Spurious Emission**		
Work Order #:	**95155**	Date:	11/27/2013
Test Type:	**Conducted Emissions**	Time:	10:43:18
Equipment:	**700MHz 40W Transmitting Remote Unit**	Sequence#:	4
Manufacturer:	BTI Wireless	Tested By:	Don Nguyen
Model:	mBSC0700U-040-RUSF01		110V 60Hz
S/N:	10935702007113100001		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T2	AN03239	Cable	32022-2-29094K-24TC	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
700MHz 40W Transmitting Remote Unit*	BTI Wireless	mBSC0700U-040-RUSF01	10935702007113100001

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Cable	Pasternack	RG223/U	#10
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA

Test Conditions / Notes:

The EUT is placed on the test bench. Tx In is connected to an ESG Signal generator via cable Sucoflex 104A. ANT port is connected to 30db attenuator and 110db step attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-29094K-24TC. RX out port is terminated to 50 ohm load.

The evaluation is performed at the antenna port .

Freq: 746-757MHz
Signal protocol: LTE-TM1.1 1.4MHz, 5MHz. 10MHz

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

40W

Modulation	Input Power (dbm)
LTE 1.4MHz	
746.82MHz	-10.14
751.5MHz	-10.27
756.18MHz	-10.11
LTE 5MHz	
748.65MHz	-10.3
751.5MHz	-10.24
754.35MHz	-9.92
LTE 10MHz	
751.2MHz	-10.32
751.5MHz	-10.32
751.8MHz	-10.22

20W

Modulation	Input Power (dbm)
LTE 1.4MHz	
746.82MHz	-13.18
751.5MHz	-13.24
756.18MHz	-12.72
LTE 5MHz	
748.65MHz	-13.34
751.5MHz	-13.34
754.35MHz	-13.06
LTE 10MHz	
751.2MHz	-13.2
751.5MHz	-13.2
751.8MHz	-13.2

10W

Modulation	Input Power (dbm)
LTE 1.4MHz	
746.82MHz	-16.22
751.5MHz	-16.44
756.18MHz	-15.56
LTE 5MHz	
748.65MHz	-16.44
751.5MHz	-16.36
754.35MHz	-16.02
LTE 10MHz	
751.2MHz	-16.32
751.5MHz	-16.32
751.8MHz	-16.32

Frequency range of measurement = 9 kHz- 8 GHz.
9 kH -150 kHz;RBW=200 Hz,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=1 MHz.

22°C, 45% Relative Humidity

Site A

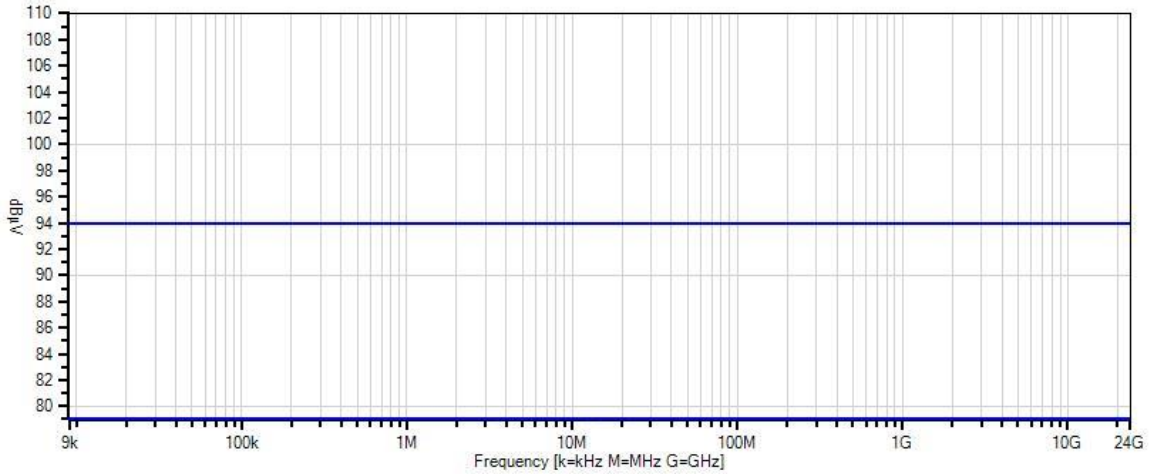
No emission were found above 1GHz. Data represents the worst case power settings.

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	Spec dBµV	Margin dB	Polar Ant
1	3.538M Ave	50.0	+0.0	+0.2			+0.0	50.2	94.0 40W, LTE 5MHz, hi CH, input power= -9.92dbm	-43.8	Ant P
2	21.898M Ave	44.0	+0.0	+0.2			+0.0	44.2	94.0 40W, LTE 5MHz, hi CH, input power= -9.92dbm	-49.8	Ant P
3	12.508M Ave	41.0	+0.0	+0.2			+0.0	41.2	94.0 40W, LTE 5MHz, hi CH, input power= -9.92dbm	-52.8	Ant P
4	14.869M Ave	36.0	+0.0	+0.2			+0.0	36.2	94.0 40W, LTE 5MHz, hi CH, input power= -9.92dbm	-57.8	Ant P

CKC Laboratories Inc. Date: 11/27/2013 Time: 10:43:18 BTI Wireless WO#: 95155
FCC Part 27.53(c)(1)Conducted Spurious Emisison Test Lead: Ant Port 110V 60Hz Sequence#: 4 Ext ATTN: 0 dB



Sweep Data
Readings
Peak Readings
QP Readings
Average Readings
Ambient
1 - FCC Part 27.53(c)(1)Conducted Spurious Emisison

Test Setup Photos

Overall Test Setup

FCC 2.1033(c)(14)/2.1053/27C - Field Strength of Spurious Radiation

Test Data

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

Customer: **BTI Wireless**
Specification: **FCC 27.53 (c)(1) Radiated Spurious Emission**
Work Order #: **95155** Date: 11/20/2013
Test Type: **Maximized Emissions** Time: 13:36:38
Equipment: **700MHz 40W remote transmitting unit** Sequence#: 4
Manufacturer: BTI Wireless Tested By: Don Nguyen
Model: mBSC0700U-040-RUSF01
S/N: 10935702007113100001

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00309	Preamp	8447D	3/29/2012	3/29/2014
	AN01995	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
	ANP05050	Cable	RG223/U	1/21/2013	1/21/2015
	ANP05198	Cable-Amplitude 15 to 45degC (dB)	8268	12/11/2012	12/11/2014
	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014
T1	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T2	AN00787	Preamp	83017A	5/31/2013	5/31/2015
T3	AN00849	Horn Antenna	3115	4/13/2012	4/13/2014
T4	ANP05421	Cable	Sucoflex 104A	2/8/2012	2/8/2014
T5	ANP05988	Cable	LDF1-50	3/12/2012	3/12/2014
T6	ANP06153	Cable	16301	10/27/2011	10/27/2013

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

Function	Manufacturer	Model #	S/N
700MHz 40W Transmitting Remote Unit*	BTI Wireless	mBSC0700U-040-RUSF01	10935702007113100001

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Power Meter	HP	EPM-441A	GB37170458
Power Sensor	Agilent	E4412A	MY41502826

Test Conditions / Notes:

The EUT is installed on an open rack to simulating final installation, and placed on the wooden table. Tx In is connected to a remotely located ESG. ANT port is connected to 30db attenuator and 110db step attenuator and then to a power meter for verification of output power level. RX out port is terminated to 50 ohm load.

Freq: 746-757MHz
Signal protocol:LTE-TM1.1_5MHz
Power : 40 W (Max rated power)

LTE-TM1.1_5MHz 748.65MHz, 751.5MHz, 754.35MHz

Frequency range of measurement = 9 kHz- 8 GHz.
9 kH -150 kHz;RBW=200 Hz,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=1 MHz.

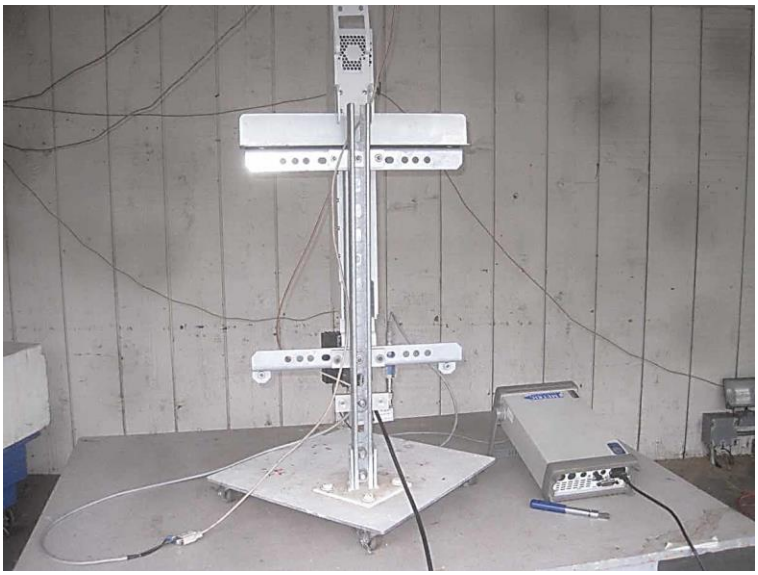
21°C, 47% Relative Humidity

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

Operating Frequency:	746-757MHz			
Channels:	LTE-TM1.1_5MHz			
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
85.30	-50.92059991	Horiz	96.92
144.10	-52.42059991	Horiz	98.42
85.30	-48.42059991	Vert	94.42
144.10	-50.52059991	Vert	96.52

Test Setup Photos



Band Edge

Test Data

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

Customer:	**BTI Wireless**		
Specification:	**Band Edge Plots**		
Work Order #:	**95155**	Date:	11/20/2013
Test Type:	**Conducted Emissions**	Time:	13:36:38
Equipment:	**700MHz 40W Transmitting Remote Unit**	Sequence#:	4
Manufacturer:	BTI Wireless	Tested By:	Don Nguyen
Model:	mBSC0700U-040-RUSF01		110V 60Hz
S/N:	10935702007113100001		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T2	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015

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

Function	Manufacturer	Model #	S/N
700MHz 40W Transmitting Remote Unit*	BTI Wireless	mBSC0700U-040-RUSF01	10935702007113100001

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Cable	Huber & Suhner	Sucoflex 104A	12237/4A
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA

Test Conditions / Notes:

The EUT is placed on the test bench. Tx In is connected to an ESG Signal generator via cable Sucoflex 104A. ANT port is connected to 30db attenuator and 110db step attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-29094K-24TC. RX out port is terminated to 50 ohm load.

The evaluation is performed at the antenna port .

Freq: 746-757MHz
Signal protocol: LTE-TM1.1 1.4MHz, 5MHz. 10MHz

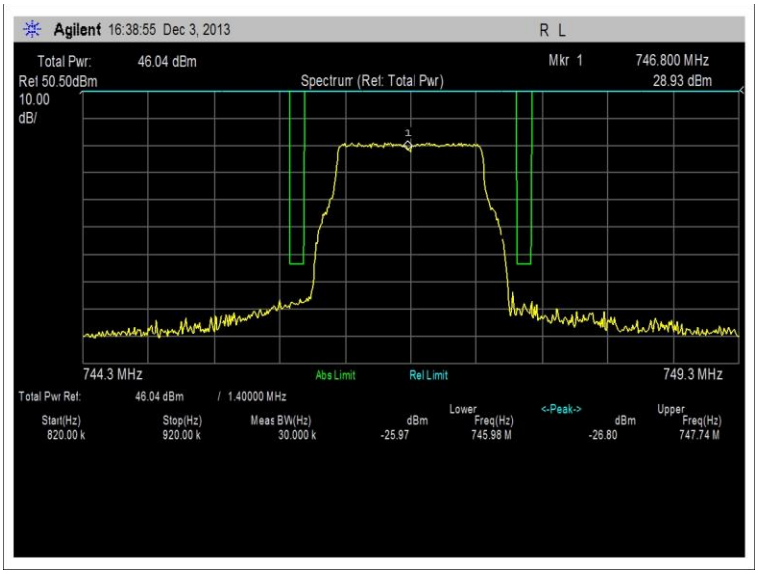
40W

Modulation	Input Power (dbm)
LTE 1.4MHz	
746.82MHz	-10.14
751.5MHz	-10.27
756.18MHz	-10.11
LTE 5MHz	
748.65MHz	-10.3
751.5MHz	-10.24
754.35MHz	-9.92
LTE 10MHz	
751.2MHz	-10.32
751.5MHz	-10.32
751.8MHz	-10.22

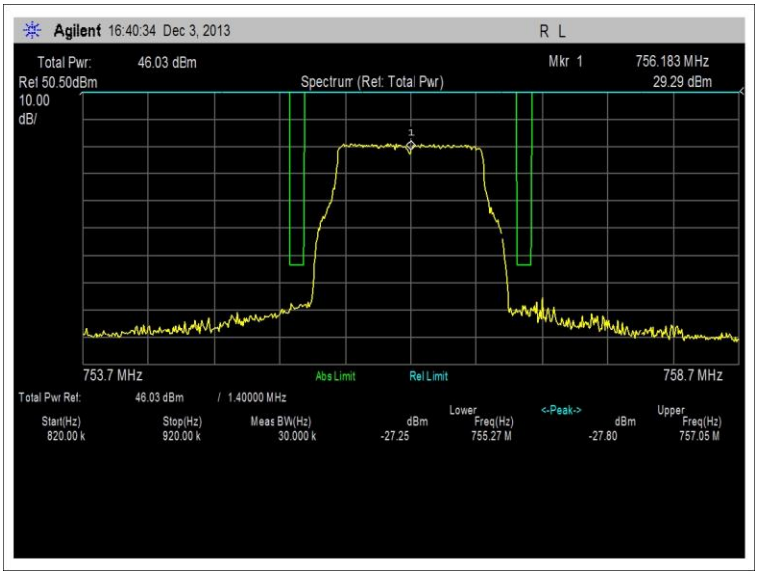
21°C, 45% Relative Humidity

Site A

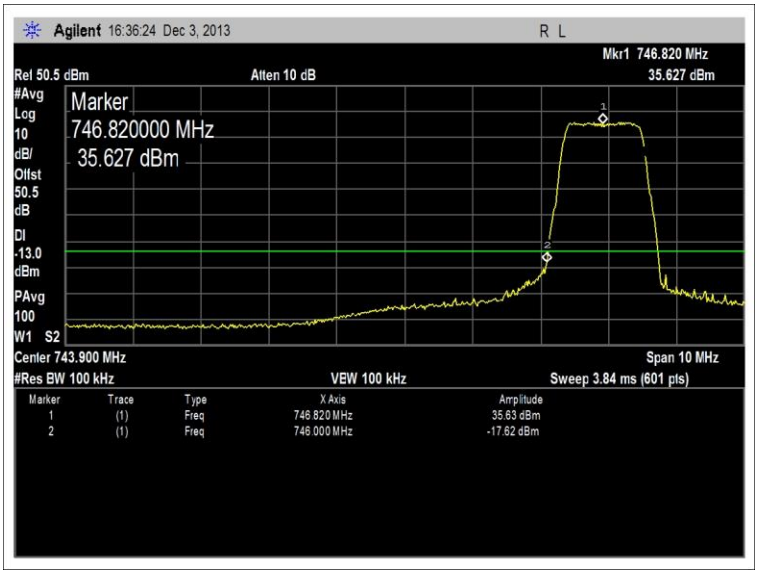
Test Plots



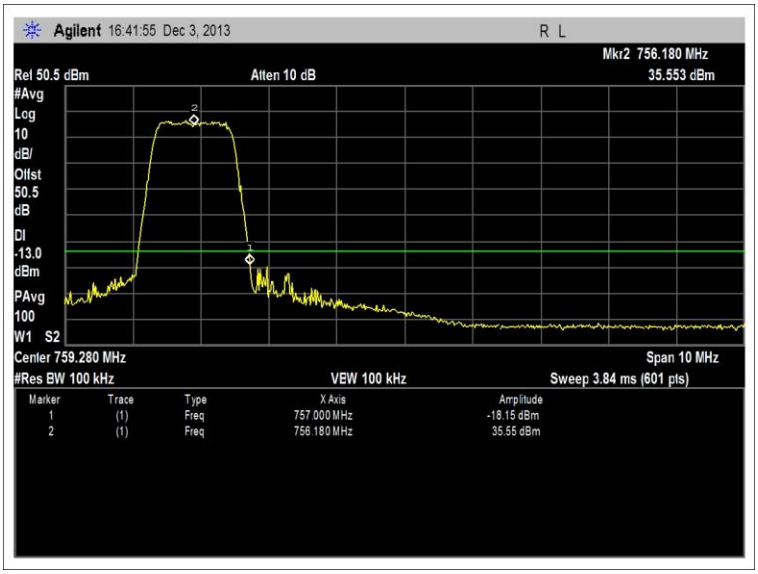
30kHz, LTE 1.4MHz - Low



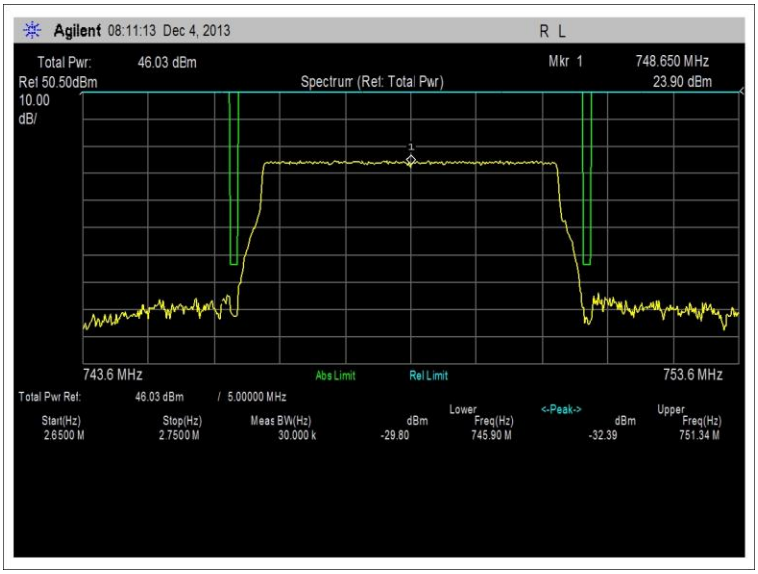
30kHz, LTE 1.4MHz - High



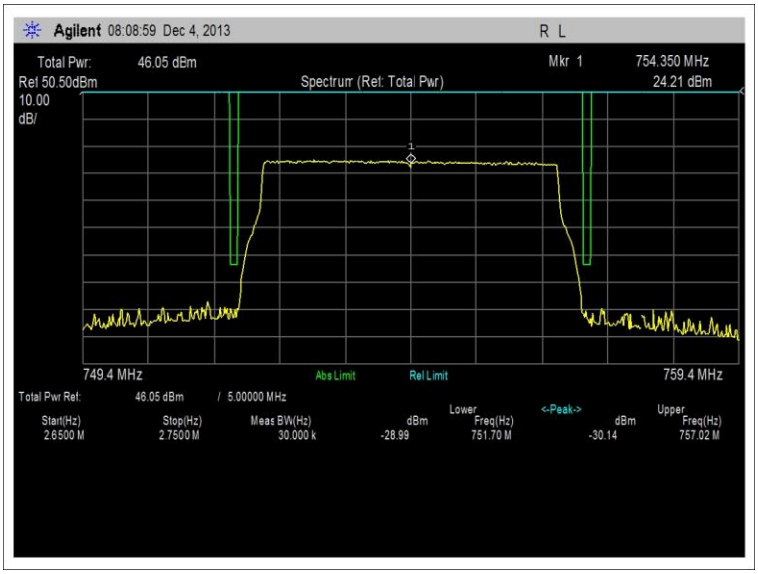
100kHz, LTE 1.4MHz - Low



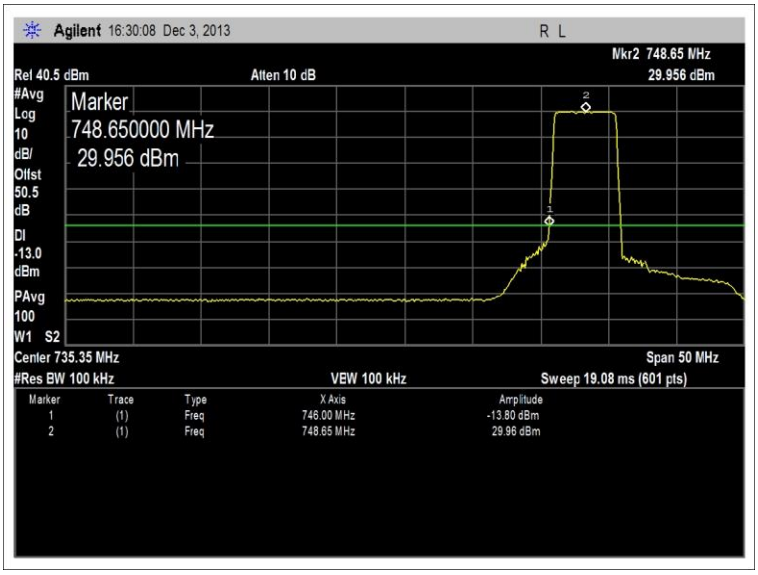
100kHz, LTE 1.4MHz - High



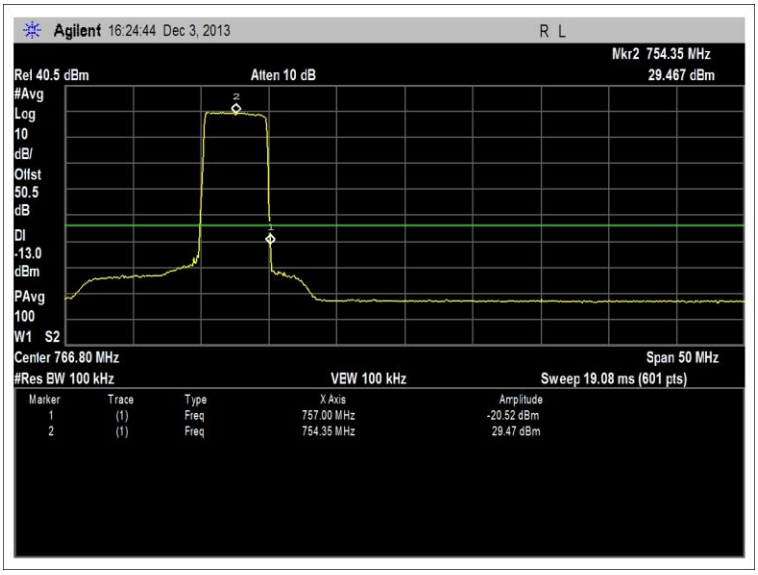
30kHz, LTE 5MHz – Low



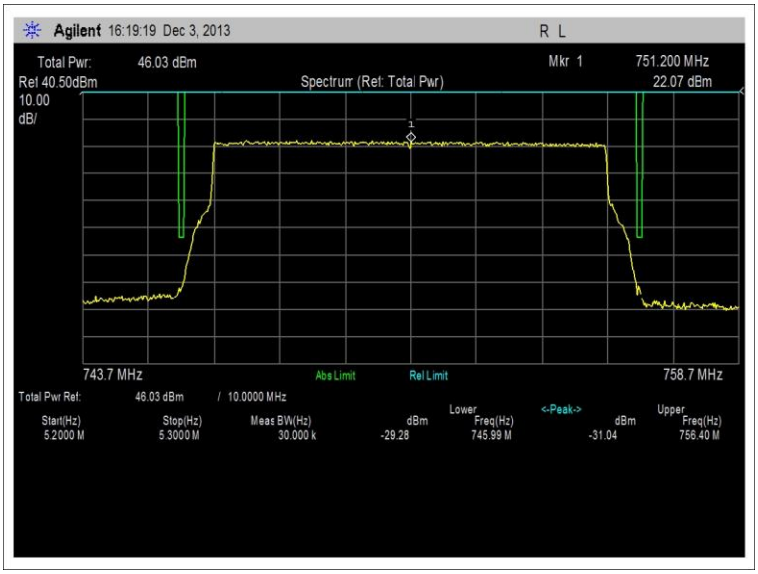
30kHz, LTE 5MHz – High



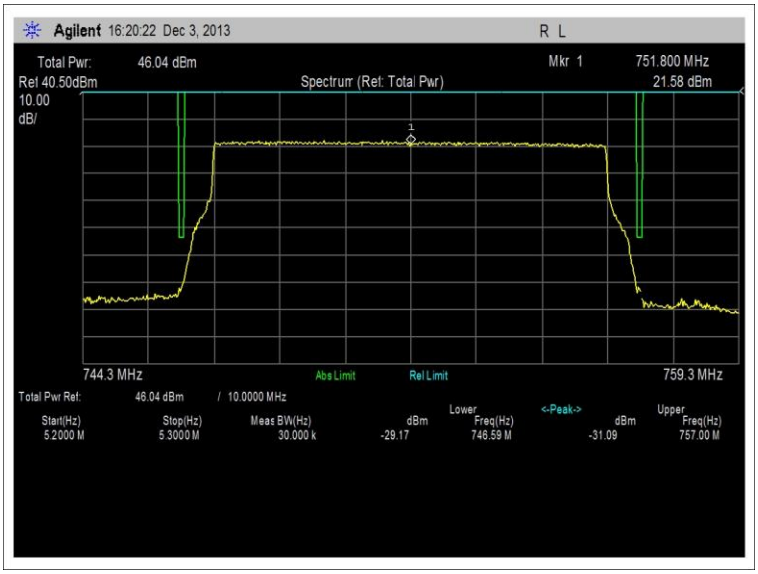
100kHz, LTE 5MHz – Low



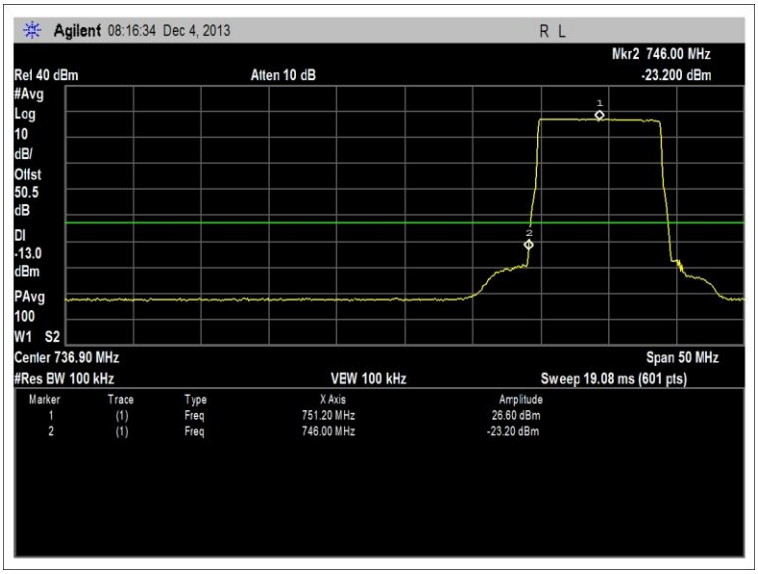
100kHz, LTE 5MHz – High



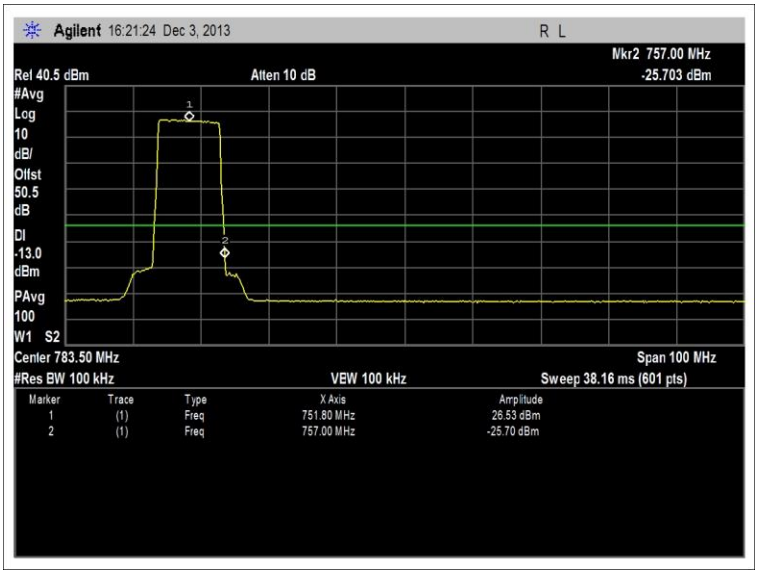
30kHz, LTE 10MHz – Low



30kHz, LTE 10MHz – High



100kHz, LTE 10MHz – Low



100kHz, LTE 10MHz – High

Test Setup Photos

Overall Test Setup

Intermodulation

Test Data

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

Customer:	**BTI Wireless**		
Specification:	**Intermodulation Plots**		
Work Order #:	**95155**	Date:	11/20/2013
Test Type:	**Conducted Emissions**	Time:	13:36:38
Equipment:	**700MHz 40W Transmitting Remote Unit**	Sequence#:	4
Manufacturer:	BTI Wireless	Tested By:	Don Nguyen
Model:	mBSC0700U-040-RUSF01		110V 60Hz
S/N:	10935702007113100001		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T2	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015

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

Function	Manufacturer	Model #	S/N
700MHz 40W Transmitting Remote Unit*	BTI Wireless	mBSC0700U-040-RUSF01	10935702007113100001

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
ESG Vector Signal Generator	Agilent	4438C	MY42082260
Cable	Huber & Suhner	Sucoflex 104A	12237/4A
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA
Power Divider	Anaren	44000	NA

Test Conditions / Notes:

The EUT is placed on the test bench. Tx In is connected to two ESGs via a power divider. ANT is connected to a spectrum analyzer and attenuators. RX out port is terminated to 50 ohm load.

The evaluation is performed at the antenna port.

Freq: 746-757MHz
Signal protocol: LTE-TM1.1 1.4MHz, 5MHz. 10MHz

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

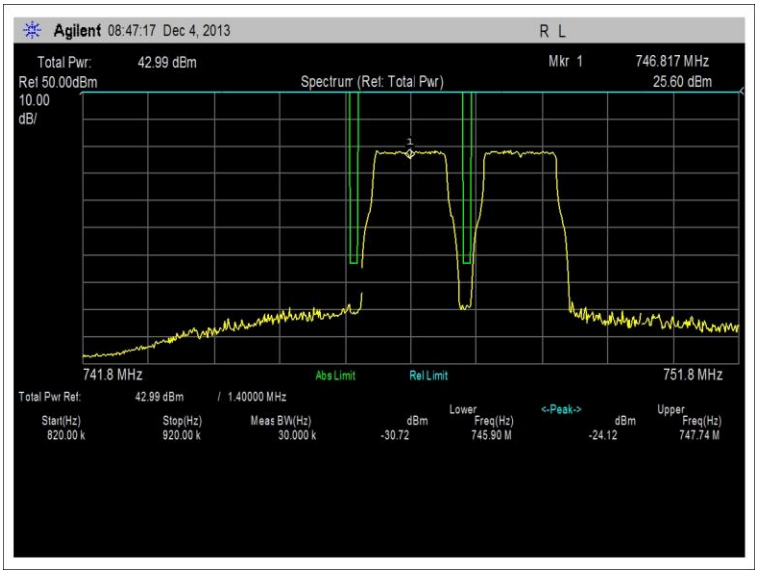
40W

Modulation	Input Power (dbm)
LTE 1.4MHz	
746.82MHz	-10.14
751.5MHz	-10.27
756.18MHz	-10.11
LTE 5MHz	
748.65MHz	-10.3
751.5MHz	-10.24
754.35MHz	-9.92
LTE 10MHz	
751.2MHz	-10.32
751.5MHz	-10.32
751.8MHz	-10.22

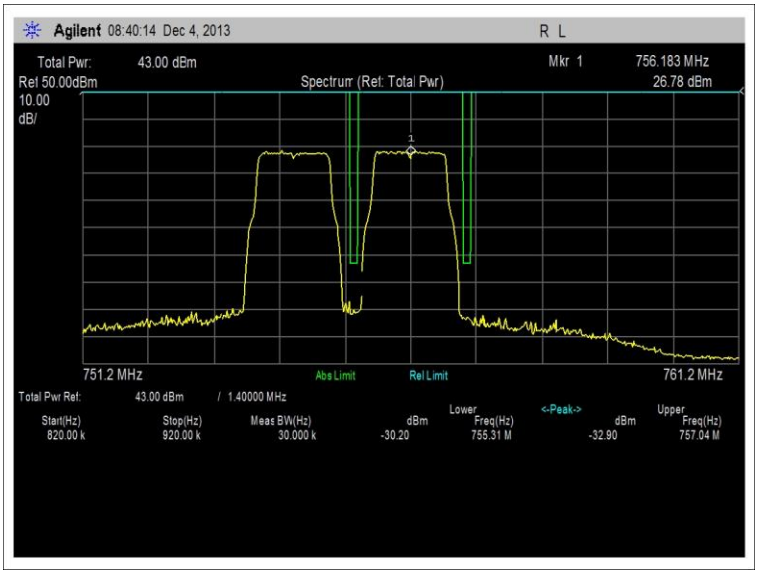
21°C, 45% Relative Humidity

Site A
.
LTE 10MHz is not tested since the frequency band is too small to for two signals at the same time.

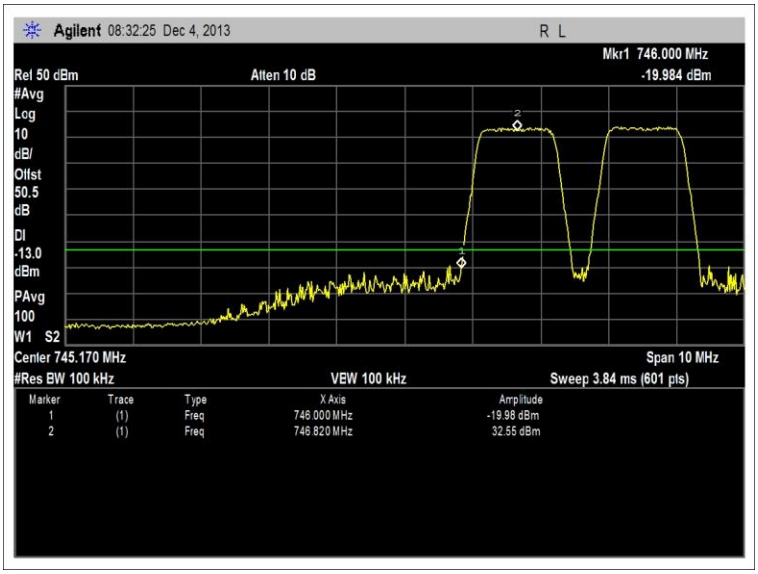
Test Plots



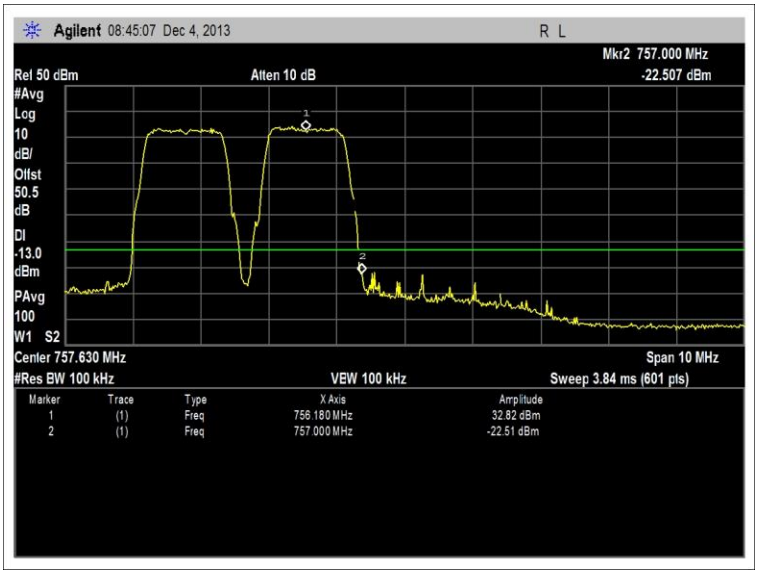
30kHz, LTE 1.4MHz – Low



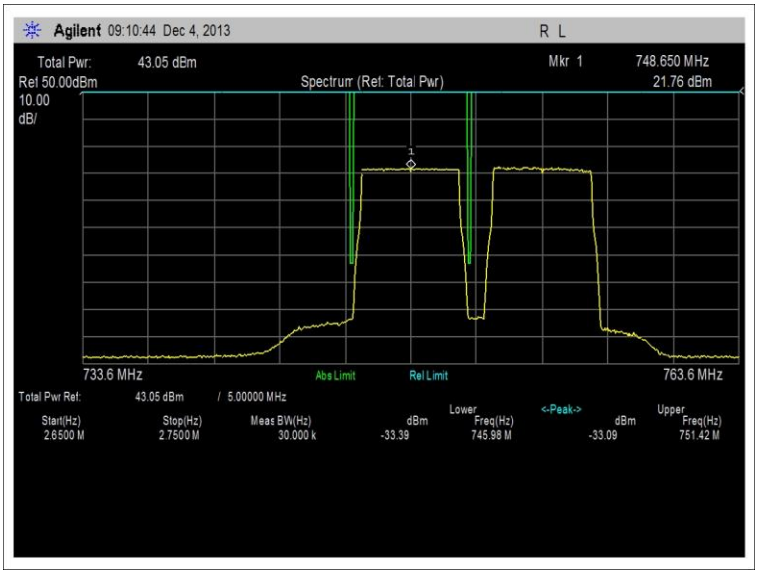
30kHz, LTE 1.4MHz – High



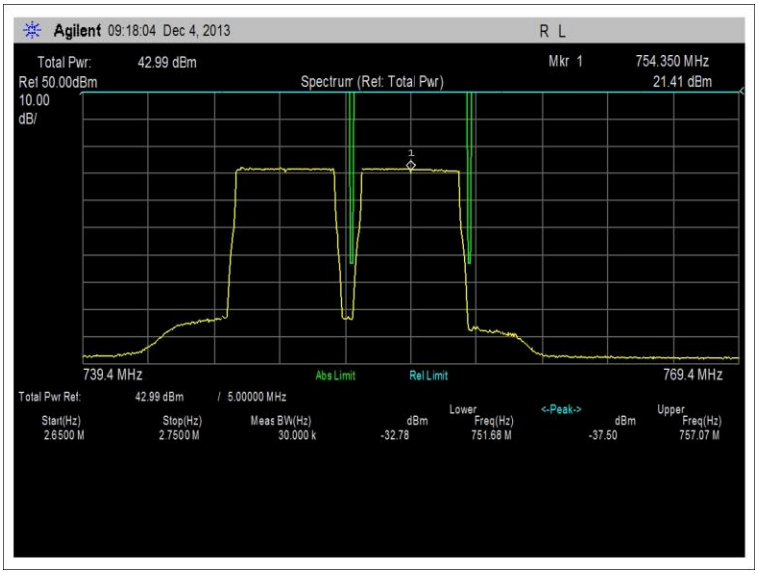
100kHz, LTE 1.4MHz – Low



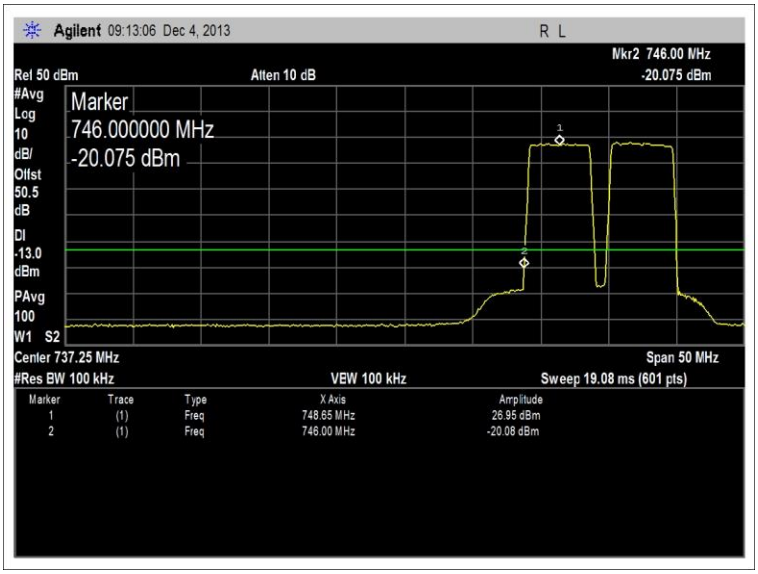
100kHz, LTE 1.4MHz – High



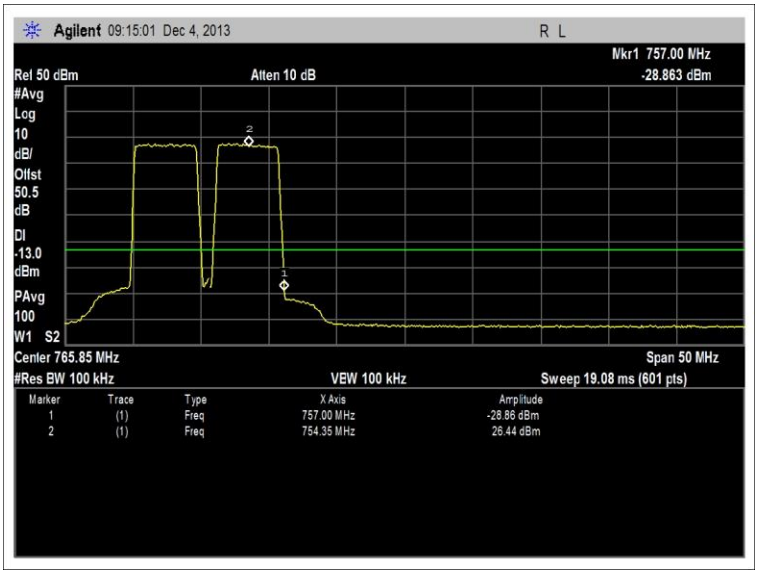
30kHz, LTE 5MHz – Low



30kHz, LTE 5MHz – High



100kHz, LTE 5MHz – Low



100kHz, LTE 5MHz – High

Test Setup Photos

Overall Test Setup

Out of Band Rejection

Test Data

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

Customer:	**BTI Wireless**		
Specification:	**Out of Band Rejection**		
Work Order #:	**95155**	Date:	11/20/2013
Test Type:	**Conducted Emissions**	Time:	13:36:38
Equipment:	**700MHz 40W Transmitting Remote Unit**	Sequence#:	4
Manufacturer:	BTI Wireless	Tested By:	Don Nguyen
Model:	mBSC0700U-040-RUSF01		110V 60Hz
S/N:	10935702007113100001		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T2	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015

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

Function	Manufacturer	Model #	S/N
700MHz 40W Transmitting Remote Unit*	BTI Wireless	mBSC0700U-040-RUSF01	10935702007113100001

Support Devices:

Function	Manufacturer	Model #	S/N
ESG Vector Signal Generator	Agilent	4438C	MY45091601
Cable	Pasternack	RG223/U	#10
Attenuator 30db Pad	Weinschel	49-30-43	KW075
Step Attenuator 110dB pad	HP	8496B	1350A01241
50 ohm Load	Generic	NA	NA

Test Conditions / Notes:

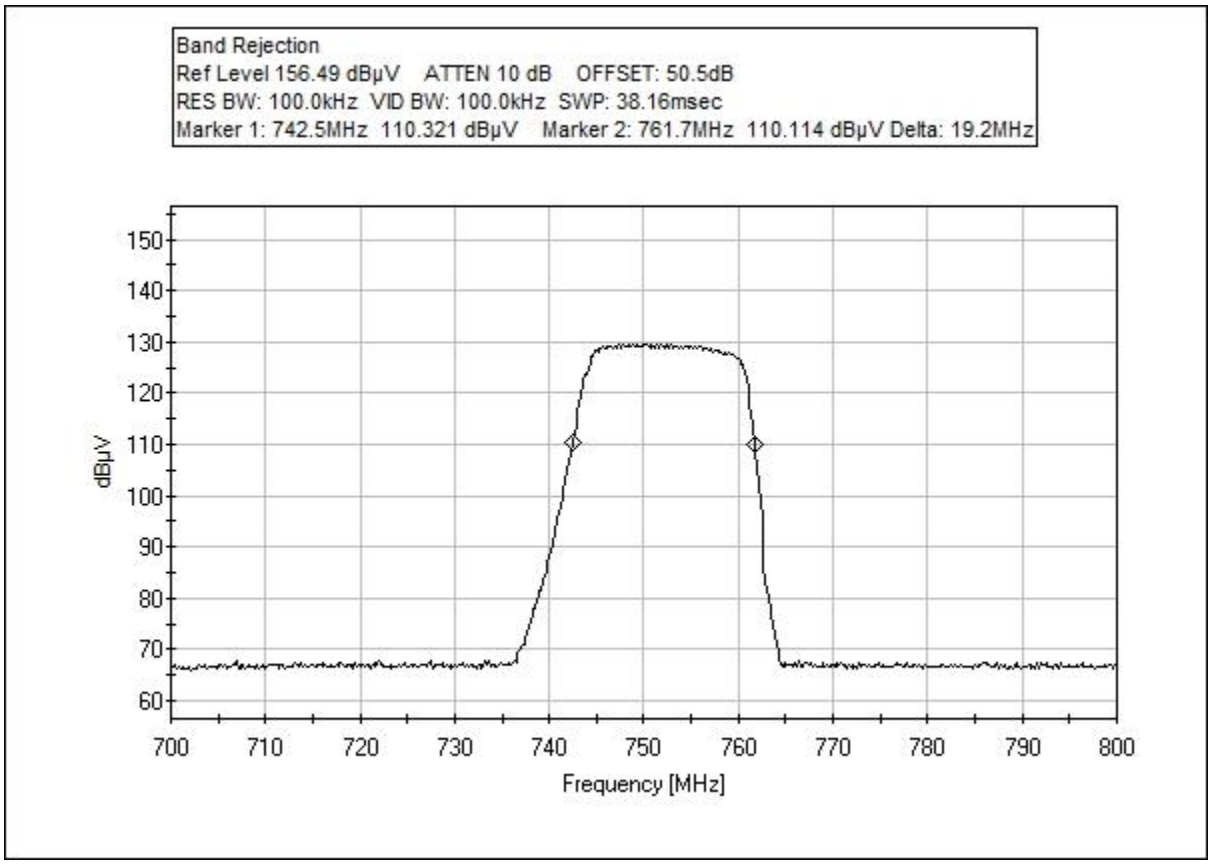
The EUT is placed on the test bench. Tx In is connected to an ESG Signal generator via cable RG223/U. ANT port is connected to 30db attenuator and 110db step attenuator. A spectrum analyzer is connected to attenuators via cable 32022-2-29094K-24TC. RX out port is terminated to 50 ohm load.

The evaluation is performed at the antenna port.

Signal generator is set to sweep from 700 – 800 MHz

EUT power setting: 40W

21°C, 45% Relative Humidity
Site A


Band Rejection
Ref Level 156.49 dBµV ATTEN 10 dB OFFSET: 50.5dB
RES BW: 100.0kHz VID BW: 100.0kHz SWP: 38.16msec
Marker 1: 742.5MHz 110.321 dBµV Marker 2: 761.7MHz 110.114 dBµV Delta: 19.2MHz
dBµV
150
140
130
120
110
100
90
80
70
60
700
710
720
730
740
750
760
770
780
790
800
Frequency [MHz]

Test Setup Photos

Overall Test Setup

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.