

Choose certainty. Add value.

# Report On

FCC Testing of the FW-300i Intelligent LTE Base Station in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 96 COMMERCIAL-IN-CONFIDENCE

FCC ID: ROR0000005

PREPARED BY

Drysdale

Scott Drysdale Test Personnel

APPROVED BY

Abderrahmane Ferhat Authorised Signatory DATED

Nov 7, 2018



# CONTENTS

#### Section

# Page No

1	REPORT INFORMATION	2
1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9	Report Details Brief Summary of Results Configuration Description Product Information Test Setup Test Conditions Deviation From The Standard Modification Record Alternative Test Site.	3 4 5 6 7 8 8 8
2	TEST DETAILS	9
2.1 2.2 2.3 2.4 2.5	Peak Output Power and Peak to Average Ratio - Conducted Occupied Bandwidth Band Edge Transmitter Spurious Emissions Frequency Stability	10 31 50 64 171
3	TEST EQUIPMENT USED	173
3.1 3.2	Test Equipment Used Measurement Uncertainty	174 176
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT	177
4.1	Accreditation, Disclaimers and Copyright	178
ANNEX	A Module Lists	.A.2



**SECTION 1** 

**REPORT INFORMATION** 



## 1.1 REPORT DETAILS

Manufacturer	Bling Networks
Address	140 Renfrew Drive, Suite 205, Markham ON
Product Name	FW-300i Intelligent LTE Base Station
Serial Number(s)	A180814008
Software Version	1.2.2
Hardware Version	A01
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2017 FCC CFR 47 Part 96: 2017
Product Name	FW-300i B48
Start of Test	Aug 22, 2018
Finish of Test	Sept 15, 2018
Name of Engineer(s)	Scott Drysdale
Report issue / Revisions	<ul> <li>Issue 000 – October 29, 2018</li> <li>Issue 001 – Nov 7, 2018 – Minor revisions as per request kept on file</li> <li>Issue 002 – Nov 8, 2018 – Removed accidently reference to 4 port Mimo when 2 port is employed.</li> <li>Issue 003 – Nov 15, minor revisions as per TCB request</li> </ul>
Related Document(s)	KDB 971168 D01 v03r01 KDB 662911 D01 v02r01 KDB 940660 D01 Part 96 CBRS Eqpt v01 ANSI C63.26:2015

# ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate compliance with FCC CFR 47 Part 96. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

Drysdale

S Drysdale



## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 96 is shown below.

	Specificat	ion Clause		
Section	FCC CFR 47 Part	FCC CFR 47 Part	Test Description	Result
	2	96		
2.1	2.1046	96.41 (b)(c)(g)	Peak Output Power and Peak to Average Ratio – Conducted, PSD	Pass
2.2	2.1049	96.41 (e)(3)	Occupied Bandwidth	Pass
2.3	2.1051	96.41 (e)(3)	Band Edge	Pass
2.4	2.1051	96.41 (e)(1)	Transmitter Spurious Emissions	Pass
2.5	2.1055		Frequency Stability	Pass

Note: Compliance to power line conducted emissions and radiated spurious emissions as per 15.107 and 15.109 is documented in a separate test report covering FCC Part 15 Subpart B.



# 1.3 CONFIGURATION DESCRIPTION

#### **1.3 CONFIGURATION DESCRIPTION**

The FW-300i B48 supports Single Carrier operation from a dual port configuration.

TX test cases: Maximum Conducted Output Power, Maximum Power Spectral Density, Spurious Emissions at Antenna Terminals (±1MHz) and Conducted Spurious Emissions, measurements were performed on both RF Ports of the B48 radios using a test limit accounting for MIMO operation with 2 ports. All RF ports were tested for RF Carrier Power and results recorded using the Measure and Sum approach to account for MIMO operation. The test limits shown are representative of the worst case. All testing was performed with the EUT transmitting at maximum RF power unless otherwise stated.

The EUT was powered by an AC adapter power supply.

#### LTE B48 (3550 MHz – 3700 MHz) Channel Configurations

RAT	No. of	Carrier	Carrie	r Frequency Configuration	(MHz)
	Carrier Bandwidth (MHz) Carriers	Bandwidth (MHz)	Bottom (BRFBW)	Middle (MRFBW)	Top (TRFBW)
LTE	1	10	3555.0	3625	3695.0
LTE	1	20	3565.0	3625	3685.0



# 1.4 PRODUCT INFORMATION

#### 1.4.1 Summary

Power rated: EIRP 49.02 dBm at 20 MHz setting, 46.31 dBm at 10 MHz setting Antenna Sectors: 3 sectors, non-overlapping. Antenna gain: 17 dBi MIMO: 2 ports in MIMO Frequency band of operation: 3550-3700 MHz Bandwidth(S): 10 MHz and 20 MHz. CBSD Category: B (EIRP limit of 47 dBm / 10 MHz)

## 1.4.2 Technical Description

**Technical Description** 

The BLiNQ FW-300i system operates in the sub 6 GHz licensed frequency bands and incorporates advanced Physical Layer (PHY) and Media Access Control (MAC) layer algorithms and techniques. BLiNQ Networks includes enhanced beamforming techniques in its solutions to increase capacity and reliability beyond that of ordinary Small Cell solutions. Mitigating interference and enhancing signal reliability maximizes system performance. The FW-300i packs up to three (3), 2x2 Multiple Input Multiple Output (MIMO) carrier radios in one compact form factor.

The FW-300i system operates in licensed Long Term Evolution (LTE) bands 42 and 43 plus Citizens Broadband Radio Service (CBRS) band 48 including 3.4 — 3.70 GHz bands in Point-to-Multipoint (PMP) configurations.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.





# 1.5 TEST SETUP





#### 1.6 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or a chamber as appropriate.

The EUT was powered from an external AC supply.

FCC Measurement Facility Accreditation Designation Number: CA6845 TUV SUD Canada (Laval)

## 1.7 DEVIATION FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

## 1.8 MODIFICATION RECORD

No modifications were made to the EUT during testing.

#### 1.9 ALTERNATIVE TEST SITE

Under our Accreditation, TÜV SÜD Canada, Laval conducted the following tests at TUV SUD Canada in Laval and under Laval's scope of accreditation at TUV SUD Canada in Ottawa at 1280 Teron Rd, Ottawa, On.

Test Name	Name of Engineer(s)
Peak Output Power and Peak to Average Ratio – Conducted, PSD	Scott Drysdale
Occupied Bandwidth	Scott Drysdale
Band Edge	Scott Drysdale
Transmitter Spurious Emissions	Scott Drysdale
Frequency Stability	Scott Drysdale



**SECTION 2** 

**TEST DETAILS** 



# 2.1 PEAK OUTPUT POWER AND PEAK TO AVERAGE RATIO - CONDUCTED

#### 2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046 FCC CFR 47 Part 96, Clause 96.41 (b)(c)(g)

## 2.1.2 Date of Test and Modification State

August 22 to September 10,2018

No modifications.

#### 2.1.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

#### 2.1.4 Environmental Conditions

Ambient Temperature23°CRelative Humidity35%

#### 2.1.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, clause 5.2.1 and summed in accordance with FCC KDB 662911 D01. EIRP values were calculated by adding the antenna gain of 17 dBi and a mimo value of 3 dB for 2 port operaiton

# 2.1.6 Test Results



			Pe	ak to Average	Ratio (PAR) / Ou	itput Power	/PSD	
				C	hannel Position	В		
Antenna	LTE Modulation	LTE Carrier Bandwidth	PAR (dB)	Conducted /	Average Power	(+1 +3 dB	EIRP .7 dBi) (MIMO)	EIRP
				dBm (Note 1)	dBm/MHz	dBm (Note 2)	dBm/MHz	dBm/10 MHz (See note 3)
А	QPSK	10.0 MHz	8.30	25.54	16.30	45.54	36.3	45.54
В	QPSK	10.0 MHz	8.39	26.31	17.18	46.31	36.8 (Note 4)	46.31
С	QPSK	10.0 MHz	8.24	25.75	16.44	45.75	36.44	45.75
D	QPSK	10.0 MHz	8.33	25.76	16.40	45.76	36.4	45.76
E	QPSK	10.0 MHz	8.14	26.00	16.48	46	36.48	46
F	QPSK	10.0 MHz	8.28	26.15	16.96	46.15	36.96	46.15
А	QPSK	20.0 MHz	7.97	26.01	16.33	49.02	36.33	46.01
В	QPSK	20.0 MHz	8.03	24.7	15.05	47.71	35.05	44.7
С	QPSK	20.0 MHz	8.15	25.61	15.93	48.62	35.93	45.61
D	QPSK	20.0 MHz	8.26	25.66	16.04	48.67	36.04	45.66
E	QPSK	20.0 MHz	8.07	25.91	16.13	48.92	36.13	45.91
F	QPSK	20.0 MHz	8.25	25.15	15.5	48.16	35.5	45.15

Note 1: Measured in 10 MHz span.

Note 2: For 20 MHz value, a worst case value of 3 dB based on 10log(10MHz/20MHz) is added for the EIRP value.

Note 3: 3 dB added for worst case two port mimo. 17 dBi added for antenna gain.

Note 4: The sum of port A (42.7 mW) and Port B (52.2 mW) is added for a total dBm/MHz of 94.9 mW. This is 19.8 dBm/MHz for MIMO operation. A 17 dBi antenna gain is added to obtain the EIRP of 36.8 dBm/MHz.

Note 5: Other modulation modes were scanned and the QPSK mode was found to be worst case, i.e. highest bandwidth and highest power and highest out of band emissions. QPSK is documented as representative of all other modulations scanned.

Note 6: Maximum Output power 26.3dBm (10MHz) and 29.0dBm (20MHz)





# Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B









Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B









Antenna E - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B









Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position B









Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position B









Antenna E - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position B









## Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M









Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M









Antenna E - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M









Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position M









Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position M









Antenna E - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position M









# Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T

Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T







Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T









Antenna E - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T









Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position T









Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position T









Antenna E - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position T







Limit	
Maximum EIRP	Category B CBSD Maximum EIRP: 47 dBm/10 MHz Maximum PSD: 37 dBm/MHz
Peak to Average Ratio	13 dB
Minimum EIRP	CBSDs and End User Devices shall limit their operating power to the minimum necessary for successful operations.



#### 2.2 OCCUPIED BANDWIDTH

#### 2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 FCC CFR 47 Part 96, Clause 96.41 (e)(3)

## 2.2.2 Date of Test and Modification State

September 6 to 10, 2018 - Modification State 0

#### 2.2.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

## 2.2.4 Environmental Conditions

Ambient Temperature23°CRelative Humidity35%

#### 2.2.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01.

## 2.2.6 Test Results

Maximum Output Power 17 dBm

					Result	(KHz)		
Antenna	LTE	LTE Carrier	Channel I	Position B	Channel F	Position M	Channel	Position T
/ intorine	Modulation	Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
A	QPSK	10.0 MHz	8929.64	9482.57	8936.83	9359.74	8921.94	9314.00
В	QPSK	10.0 MHz	8934.86	9429.22	8943.06	9292.36	8930.65	9342.26
С	QPSK	10.0 MHz	8930.41	9420.54	8926.26	9360.97	8925.69	9310.00
D	QPSK	10.0 MHz	8932.52	9386.67	8943.15	9353.91	8922.82	9385.26
E	QPSK	10.0 MHz	8940.61	9491.10	8934.84	9356.14	8934.18	9418.61
F	QPSK	10.0 MHz	8941.33	9303.88	8932.78	9412.04	8935.20	9274.65
А	QPSK	20.0 MHz	17875.08	18589.99	17863.96	18669.70	17808.27	18557.34
В	QPSK	20.0 MHz	17863.57	18544.59	17826.05	18684.88	17842.58	18798.26
С	QPSK	20.0 MHz	17873.05	18655.71	17862.17	18531.97	17843.85	18623.72
D	QPSK	20.0 MHz	17859.28	18535.75	17837.24	18795.18	17872.83	18505.75
E	QPSK	20.0 MHz	17846.74	18665.50	17853.08	18721.77	17859.04	18557.09
F	QPSK	20.0 MHz	17848.16	18730.32	17838.73	18508.03	17845.16	18624.15



|--|

RL RF 50.0 AC		SENSE:INT		06:18:12 AM Aun 22.
nter Freq 3.555000000	GHz #IFGain:Low	Center Freq: 3.555000000 ( Trig: Free Run #Atten: 30 dB	GHz Avg Hold: 50/50	Radio Std: None Radio Device: BTS
dB/div Ref 22.27 dBm	1			
3				
7	mannam		monor	
3				
7			- N	
7	- F			
1 may marken warman	~~		w	monorman
7				
7				
7				
nter 3.555 GHz				Span 20 M
es BW 100 KHZ		#VBW 300 KHZ		Sweep 2.533
Occupied Bandwidt	h	<b>Total Power</b>	25.6 dBm	
8.9	9296 MHz			
Fransmit Freq Error	3.129 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	9.483 MHz	x dB	-26.00 dB	

Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B

Keysight Spectrum Analyzer - Occupie	ed BW			- 0 ×
RL RF 50Ω A		SENSE:INT	0.04*	06:52:08 AM Aug 22, 2018
Center Freq 3.5550000	UU GHZ	_ Trig: Free Run	Avg Hold: 50/50	Radio Std: None
	#IFGain:Low	#Atten: 30 dB		Radio Device: BTS
10 dB/div Ref 23.46 d	Bm			
Log				
13.5	manufactor			
3,46				
-6.54				
-16.5	N			
-26.5	mand		1/2	man hours
-36,5				an marker work
-46.5				
-56.5				
.66.5				
Center 3.555 GHz				Span 20 MHz
#Res BW 100 kHz		#VBW 300 kH	Z	Sweep 2.533 ms
Occupied Bandwi	dth	Total Power	26.3 dBm	
Occupied Bandwi		rotarr onor	2010 4211	
	8.9349 MHZ			
Transmit Freg Error	588 Hz	% of OBW Powe	r 99.00 %	
v dB Bandwidth	0 420 MH-	v dB	26.00 dB	
	9.429 WITZ	XUD	-20.00 uB	
MSG			STATUS	



|--|

Keysight Spectrum Analyzer - Occupied BW	1	enter the		- P
enter Freq 3.555000000	GHz #IFGain:Low	Center Freq: 3.555000000 ( Trig: Free Run #Atten: 30 dB	GHz Avg Hold: 50/50	Radio Device: BTS
dB/div Ref 22.61 dBm	۱			
.6		-	womany	
9				
4	M		- V	
1 - bank management	Januar Land			and the second and the second
1				
				Snon 20 N
es BW 100 kHz		#VBW 300 kHz		Sweep 2.533
Occupied Bandwidt	h	Total Power	25.7 dBm	
8.	9304 MHz			
Fransmit Freq Error	12.421 kHz	% of OBW Power	99.00 %	
k dB Bandwidth	9.421 MHz	x dB	-26.00 dB	
			STATUS	

Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B

Keysight Spectr	um Analyzer - Occupied BW				- 0 <b>-</b>
Center Fre	RF 50 Ω AC	GH7	SENSE:INT Center Freg: 3.5550000	00 GHz	05:49:00 AM Sep 04, 2018 Radio Std: None
	q 3.33500000	#IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold: 50/50	Radio Device: BTS
10 dB/div	Ref 22.68 dBm				
12.7					
2.60		manon	mann	mannen	
7.90					
17.2					
27.2		M		h	
27,3		ww		1	
17.3 June					- man manner
47.3					
57.3					
57.3					
Center 3.5	55 GHz		#\/B\M_ 200 kl		Span 20 MH
Resolvi			#VBVV JOOKI	12	Sweep 2.555 m
Occupi	ed Bandwidt	h	Total Power	25.8 dBm	
	8.9	9325 MHz			
Transmi	t Freq Error	678 Hz	% of OBW Powe	er 99.00 %	
x dB Bar	ndwidth	9.387 MHz	x dB	-26.00 dB	
50				STATIS	



Keysight Spectrum Analyzer - Occupied BW				- Ø
RL RF 50 Ω AC		SENSE:INT	GN OFF	10:13:21 AM Sep 06,
nter Freq 3.555000000	GHZ #FGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold: 50/50	Radio Std: None Radio Device: BTS
dB/div Ref 22.91 dBm				
9				
9				
1				
3				
			\\	
			N I	
	~			
munition				and man was a server
1				
nter 3.555 GHz		#1/DW 000 HIL-		Span 20 M
es BW 100 KHZ		#VBW 300 KHZ		Sweep 2.533
Occupied Bandwidth	n	<b>Total Power</b>	26.0 dBm	
8.9	406 MHz			
Fransmit Freq Error	4.145 kHz	% of OBW Power	99.00 %	
k dB Bandwidth	9.491 MHz	x dB	-26.00 dB	
				All as surface of

Antenna E - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B

# Antenna F - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B

Keysight Spe	ctrum Analyzer - Occupied BV	V			- 0 ×
RL	RF 50 Ω AC		SENSE:INT ALI	GN OFF	10:22:53 AM Sep 06, 2018
Center Fr	eq 3.555000000	GHZ	. Trig: Free Run	Avg Hold: 50/50	Radio Std: None
		#IFGain:Low	#Atten: 30 dB		Radio Device: BTS
10 dB/div	Ref 23.07 dBn	n			
Log					
13.1		manna	monomena	mannan	
3.07					
-6.93					
-16.9		N			
-26.9		1		M	
-36.9	mannam	~~		~	the stranger of the state of the
-46.9					A where
-56.9					
-66.9					
Center 3.	555 GHz				Span 20 MHz
#Res BW	100 KHZ		#VBW 300 KHz		Sweep 2.533 ms
Occur	ied Bandwidt	h	Total Power	26.2 dBm	
Occur		0440 MIL-			
	8.	9413 MHZ			
Transn	nit Freg Error	-11.793 kHz	% of OBW Power	99.00 %	
	andwidth	0 204 MH-	v dD	26 00 dB	
X UD D	anuwium	9.304 WITZ	хuв	-20.00 UB	
MSG				STATUS 🔀 Align Now	All required



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M

Keysight Spectrum Analyzer - Occupied BV	N			- @ ×
		SENSE:INT	244	08:14:48 AM Aug 22, 2018
Center Freq 3.62500000	GHZ →	_ Trig: Free Run	Avg Hold: 50/50	Radio Std. None
	#IFGain:Low	#Atten: 30 dB		Radio Device: BTS
10 dB/div Ref 23.03 dBn	n			
Log				
13.0	minin	manyman	mon	
3.03				
-6.97				
-17.0				
-27.0	N			
-37.0	~		h	and the second s
-47.0				
-57.0				
67.0				
-07.0				
Center 3.625 GHz				Span 20 MHz
#Res BW 100 kHz		#VBW 300 kHz		Sweep 2.533 ms
Occupied Dendurids	-	Total Bower	26.1 dBm	
Occupied Bandwidt		Totarrower	20.1 0.011	
8.	9368 MHz			
Transmit Freq Error	-1.174 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	9.360 MHz	x dB	-26 00 dB	
	0.000 11112	A GD	20.00 42	
MSG			STATUS	

Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M

Keysight Spec	trum Analyzer - Occupied BW				- 0 ×
RL	RF 50 Q AC		SENSE:INT		07:48:28 AM Aug 22, 2018
Center Fr	eq 3.625000000	GHZ	Trig: Free Run	Avg Hold: 50/50	Radio Std: None
		#IFGain:Low	#Atten: 30 dB		Radio Device: BTS
10 dB/div	Ref 23.07 dBm				
Log					
13.1		mannen	mmmmmm	man	
3.07		1			
-6.93					
-16.9		1		h	
-26.9	a muhamman m	mat			
-36.9	munder and the				
-46.9					
-56.9					
9.23					
00.0					
Center 3.0	625 GHz				Span 20 MHz
#Res BW	100 kHz		#VBW 300 kHz		Sweep 2.533 ms
Occur	ind Randwidt	•	Total Power	26.4 dBm	
				20.4 0011	
	8.9	9431 MHZ			
Transm	nit Freg Error	1.067 kHz	% of OBW Power	99.00 %	
	and a state	0.000 MU			
хавва	andwidth	9.292 WHZ	X dB	-26.00 dB	
MSG				STATUS	



|--|

Keysight Spectrur	m Analyzer - Occupied BW	l							- @ E
Center Fred	RF 50 Ω AC 3.625000000	GHz #IFG	iain:Low	Center Fre Trig: Free #Atten: 30	q: 3.625000000 Run dB	GN OFF GHz Avg Hold: 50/8	50	Radio Std: Radio Devi	31 AM Sep 06, 2018 None ce: BTS
10 dB/div	Ref 23.06 dBm	1							
Log									
3.06		m	manym	munning	man	many	-		
6.94							1		
16.0		/					l		
-10.5		N					η.		
20.5		~~N					The		
AE D WINNING	······								mount
-40,9									
-56.9									
-00.9									
Center 3.62 #Res BW 10	5 GHz 00 kHz			#VE	300 kHz			S Swee	pan 20 MH p 2.533 m
Occupie	ed Bandwidt	h		Total P	ower	26.4 dBr	n		
	8.9	9263 N	/Hz						
Transmit	Freq Error	4.31	0 kHz	% of O	BW Power	99.00 %	6		
x dB Ban	dwidth	9.361	MHz	x dB		-26.00 dl	в		
MSG						STATUS			

Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M

Keysight Spectrum Analyzer - Occupied BW	1			- 0 <b>-</b>
Center Freq 3.625000000	GHz	Center Freq: 3.62500000 Trig: Free Run	ALIGN OFF O GHz Avg Hold: 50/50	06:11:32 AM Sep 06, 2018 Radio Std: None
10 dB/div Ref 22.95 dBm	#IFGain:Low	#Atten: 30 db		Radio Device. B 13
Log 13.0				
2.95	hanner		municipal	
7.05			1	
-27.1	put			
-37.1 whether a state of the st	~~			
-47.1				
-67.1				
Center 3.625 GHz #Res BW 100 kHz		#VBW 300 kH	z	Span 20 MHz Sweep 2.533 ms
Occupied Bandwidt	h	Total Power	26.1 dBm	
8.9	9341 MHz			
Transmit Freq Error	-2.012 kHz	% of OBW Powe	r 99.00 %	
x dB Bandwidth	9.354 MHz	x dB	-26.00 dB	
MSG			STATUS	



|--|

Keysight Spectrum Analyzer - Occupied BW		cence.net	CN 005	10.57.53 40.510 6 20
enter Freq 3.625000000	GHz	Center Freq: 3.625000000	GHZ Avg Hold: 50/50	Radio Std: None
	#IFGain:Low	#Atten: 30 dB		Radio Device: BTS
dBidiu Def 23.06 dBm				
og	· · · · · · · · · · · · · · · · · · ·			
3.1	mmmm		mann	
00	1		l l	
19				
.9	Ň		V.	
9	-		1	www.www.www.www.www.www.www.www.www.ww
.9				
.9				
5.9				
enter 3.625 GHz				Span 20 Mi
Res BW 100 kHz		#VBW 300 kHz		Sweep 2.533 r
Occupied Bandwidt	h	<b>Total Power</b>	26.1 dBm	
8.9	9348 MHz			
Transmit Freq Error	-1.719 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	9.356 MHz	x dB	-26.00 dB	
3			STATUS	

Antenna F - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M

Keysight Spe	ctrum Analyzer - Occupied BW				- 0 ×
Contor 5	RF 50 Q AC	CHa	SENSE:INT ALI	GN OFF	10:45:51 AM Sep 06, 2018 Radio Std: None
Center Fr	eq 3.625000000	GHZ -+	Trig: Free Run	Avg Hold: 50/50	Radio atu, None
		#IFGain:Low	#Atten: 30 dB		Radio Device: BTS
10 dB/div	Ref 23.36 dBm				
13.4					
2.30		mon		mmmmm	
3,36					
-6.64					
-16.6		A		1	
-26.6		JV I		n	
-36.6	many many manual			14	man and a second a
-46.6					
-55.6					
-66.6					
Center 3	625 CH7				Spap 20 MHz
#Res BW	100 kHz		#VBW 300 kHz		Sweep 2.533 ms
0	i a d. Dan du dadi		Total Bower	26.6.dBm	
Occup	bled Bandwidti	n 	Total Fower	20.0 0011	
	8.9	9328 MHz			
Transn	nit Freg Error	-200 Hz	% of OBW Power	99.00 %	
v dB B	andwidth	0 412 MHz	x dB	-26 00 dB	
A GD D		3.412 MITZ	A GD	-20.00 00	
MSG				STATUS STATUS Align Now	All required



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T

Mark     Ref     So Canter Freq 3.69500000 GHz     Radio Std: None       Center Freq 3.69500000 GHz     Radio Std: None       #FGaint.ow     #FGaint.ow       Mark     Radio Std: None       Radio Device: BTS       Item 100       Item 100       Radio Std: None       Radio Std: None       Radio Device: BTS       Item 100       Item 100       Radio Std: None       Radio Std: None       Radio Device: BTS       Item 100       Item 100       Radio Std: None       Radio Device: BTS       Item 100       Radio Std: None       Radio Device: BTS       Strep 2 <t< th=""><th>Keysight Spe</th><th>ctrum Analyzer - Occupied BV</th><th>v</th><th></th><th></th><th>- @ ×</th></t<>	Keysight Spe	ctrum Analyzer - Occupied BV	v			- @ ×
In control         Interview         <	Center Fr	req 3.695000000	GHz →	Center Freq: 3.695000000 ( Trig: Free Run #Atten: 30 dB	GHz Avg Hold: 50/50	05:10:47 AM Sep 04, 2018 Radio Std: None Radio Device: BTS
Log       Image: Content of the second	10 dB/div	Ref 22.71 dBn	n .			
2.3       3.6       3	12.7			monte	mmmmm	
173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         173       173       173         174       174       173         175       174       174         175       174       174         175       174       174         175       174       174         175       174       174         175       174       174         175       174       174         175       174       174         175       174       174         176       174       1	-7.29					
37.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.3     47.3       47.4     47.4 <t< td=""><td>-17.3</td><td></td><td>M</td><td></td><td>h</td><td></td></t<>	-17.3		M		h	
67.3	-37.3					
Center 3.695 GHz Span 20 W #Res BW 100 kHz #VBW 300 kHz Sweep 2.533 Occupied Bandwidth Total Power 25.7 dBm 8.9219 MHz Transmit Freq Error -13.445 kHz % of OBW Power 99.00 % x dB Bandwidth 9.314 MHz x dB -26.00 dB	-67.3					
Occupied Bandwidth 8.9219 MHzTotal Power25.7 dBmTransmit Freq Error-13.445 kHz% of OBW Power99.00 %x dB Bandwidth9.314 MHzx dB-26.00 dB	Center 3. #Res BW	695 GHz 100 kHz		#VBW 300 kHz		Span 20 MHz Sweep 2.533 ms
Transmit Freq Error -13.445 kHz % of OBW Power 99.00 % x dB Bandwidth 9.314 MHz x dB -26.00 dB	Occup	bied Bandwidt 8.	<sup>h</sup> 9219 MHz	Total Power	25.7 dBm	
x dB Bandwidth 9.314 MHz x dB -26.00 dB	Transn	nit Freq Error	-13.445 kHz	% of OBW Power	99.00 %	
	x dB B	andwidth	9.314 MHz	x dB	-26.00 dB	
	MSC				STATIC	

Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T

Keysight Spectrum Analyzer - Occupied BW		cruce (b/r)	1	- 9
enter Freq 3.695000000	GHz #IFGain:Low	Center Freq: 3.695000000 ( Trig: Free Run #Atten: 30 dB	GHz Avg Hold: 50/50	Radio Device: BTS
D dB/div Ref 23.25 dBm	1			
0g 33				
25	money	mmmmmm	manne	
75	1			
8				
8	N		M	
8				when when when we want when when when when when when when when
в				
8				
enter 3.695 GHz		#VBW 300 kHz		Span 20 M
Occupied Bandwidt		Total Power	26.0 dBm	04000 2.000
8.	9306 MHz			
Transmit Freq Error	-8.513 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	9.342 MHz	x dB	-26.00 dB	
			STATUS	



NSE:INT ALIGN OFF Center Freq: 3.695000000 GHz Trig: Free Run Avg|Hold: 50/50 #Atten: 30 dB 09:28:40 AM Sep 06, 2018 Radio Std: None Center Freq 3.695000000 GHz ----Radio Device: BTS #IFGain:Low Ref 22.83 dBm 10 dB/div og 12.8 2.83 7.17 17.2 -27.2 37.2 47.2 57.2 -67.2 Center 3.695 GHz #Res BW 100 kHz Span 20 MHz Sweep 2.533 ms #VBW 300 kHz 25.8 dBm **Total Power Occupied Bandwidth** 8.9257 MHz **Transmit Freq Error** -5.419 kHz % of OBW Power 99.00 % x dB Bandwidth 9.310 MHz x dB -26.00 dB STATUS 🔀 Align Now All required

# Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T

# Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T

Keysight Spectrum Analyzer - Occupied BW			CN OFF	00:40:28 AM Sec 05 201
Center Freq 3.695000000	GHz +	Center Freq: 3.695000000 Trig: Free Run #Atten: 30 dB	GHz Avg Hold: 50/50	Radio Std: None Radio Device: BTS
10 dB/div Ref 23.15 dBm	1 []		11	
13.2	mann	musingener	www.	
5.85			1	
6.9	P			
6.9	~		- In	
5.9 www.www.www.www.				and a second and a s
5.9				
6.9				
enter 3.695 GHz Res BW 100 kHz		#VBW 300 kHz		Span 20 Mi Sweep 2.533 r
Occupied Bandwidt	h	Total Power	26.4 dBm	
8.9	9228 MHz			
Transmit Freq Error	-239 Hz	% of OBW Power	99.00 %	
x dB Bandwidth	9.385 MHz	x dB	-26.00 dB	
G			STATUS 🔀 Align Now	All required



Keysight Spectrum Analyzer - Occupied BI	N			- Ø
RL RF 50 Q AC		SENSE:INT AL	IGN OFF	11:03:10 AM Sep 06, 2
enter Freq 3.69500000	#IFGain:Low	Trig: Free Run #Atten: 32 dB	Avg Hold: 50/50	Radio Device: BTS
dB/div Ref 23.74 dBr	n			
pg g				
3.7				
74	and the second of the second o	man man man and a second	mannent	
86				
3				
	N		n	
3			4	
3 mountain and a second	Lang.			man man man man
3				
3				
.3				
enter 3.695 GHz ≀es BW 100 kHz		#VBW 300 kHz		Span 20 M Sweep 2.533
Occupied Bandwid	th	Total Power	26.5 dBm	
8.	9342 MHz			
Transmit Freg Error	-13.730 kHz	% of OBW Power	99.00 %	
v dB Bandwidth	0.440 MH-	x dB	26.00 dB	
	9.4 19 WIFIZ	A 00	-20.00 00	

# Antenna E - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T

# Antenna F - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T

RL RF 50 Q AC	N	SENSE:INT	GN OFF	11:21:11 AM Sep 06.2
enter Freq 3.69500000	) GHz	Center Freq: 3.695000000	GHz	Radio Std: None
	#IFGain:Low	#Atten: 30 dB	Avginola, soloo	Radio Device: BTS
dB/div Ref 22.97 dBr	n			
9				
7	manan	mennin	monumper	
			1	
	1			
	1		N,	
	and			
mound of the				and an an an an and
)				
)				
nter 3.695 GHz				Span 20 N
es BW 100 kHz		#VBW 300 kHz		Sweep 2.533
Occupied Bandwid	th	Total Power	26.0 dBm	
8.	9352 MHz			
Fransmit Freq Error	-3.862 kHz	% of OBW Power	99.00 %	
k dB Bandwidth	9.275 MHz	x dB	-26.00 dB	
			071710	



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position B

Keysight Spectrum Ar	nalyzer - Occupied BW				- @ ×
Center Freq 3	50 Ω AC	GHz	Center Freq: 3.565000000	GHz Avg Hold: 50/50	05:32:08 AM Sep 07, 2018 Radio Std: None
10 dB/div R	ef 25.50 dBm	#IFGain:Low	WALLEN, 50 GD		Radio Device. D 13
15.5		manne	www.www.www.www.www.www.www.www.www.ww	man	
-4.50					
-24.5				- Source	a mar and a mar and a mar and a mar and a mar
-44.5					
-64.5					
Center 3.565 C #Res BW 200	GHz kHz		#VBW 620 kHz		Span 40 MHz Sweep 1.267 ms
Occupied	Bandwidt 17	<sup>h</sup> .875 MHz	Total Power	28.5 dBm	
Transmit F	req Error	11.444 kHz	% of OBW Power	99.00 %	
x dB Bandv	width	18.59 MHz	x dB	-26.00 dB	
MSG				STATUS	

Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position B

Keysight Spe	ctrum Analyzer - Occupied BW				
RL	RF 50 Ω AC	Clie	SENSE:INT	CH*	04:54:31 AM Sep 07, 2018
Center Fr	eq 3.565000000	GHZ #IFGain:Low	Trig: Free Run #Atten: 28 dB	Avg Hold: 50/50	Radio Device: BTS
	Def 24 40 dBm				
Log	Rel 24.10 ubii	· · · · · · · · · · · · · · · · · · ·			
14.1					
4.10		mon	Mary mary and a second	mannen	
-5 90		1			
-15.9					
25.0		A		1	
-20,9	- man	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		"mm	mannannan
-35.9	and the second s				
-45.9					
-55.9					
-65.9					
Center 3	565 CHz				Span 40 MHz
#Res BW	200 kHz		#VBW 620 kHz		Sweep 1.267 ms
Occur	oied Bandwidt	h	Total Power	27.2 dBm	
	17	.864 MHz			
Transn	nit Freq Error	5.549 kHz	% of OBW Power	99.00 %	
x dB B	andwidth	18.54 MHz	x dB	-26.00 dB	
MSG				STATUS 🔀 Align Now	All required



Antonna o Ere modalation al ort Ere oantor Banamatri eolo inne onannor ooldon B
---

Keysight Spectrum Analyzer - Occupied BW		CENCE-INT		01:30:28 Mi San 10 3
enter Freq 3.565000000	GHz #IFGain:Low	Center Freq: 3.565000000 ( Trig: Free Run #Atten: 30 dB	GHz Avg Hold: 50/50	Radio Device: BTS
dB/div Ref 24.95 dBm	1			
0				
6	man	monter	manne	
5	1			
	1			
			M	
mannen				and the search was made and
1				
nter 3.565 GHz		#VBW 620 kHz		Span 40 N Sween 1 267
Occupied Bandwidt	h	Total Power	27.8 dBm	
17	.873 MHz			
Fransmit Freq Error	13.974 kHz	% of OBW Power	99.00 %	
k dB Bandwidth	18.66 MHz	x dB	-26.00 dB	
			STATUS	

Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position B

Keysight Spectrum Analyzer - Oc	cupied BW			- 5 🛪
Center Freq 3.56500	AC 00000 GHz	Center Freq: 3.565000000	GHz	02:50:45 AM Sep 10, 2018 Radio Std: None
	#IFGain:Low	#Atten: 30 dB	Avginola. Suisu	Radio Device: BTS
10 dB(div Ref 25.0	1 dBm			
Log				
15.0	manner	man man man man man	manning	
5.01				
-15.0				
-25.0	N <sup>p<sup>2</sup></sup>		M	
-35.0	M. manan		- Un	mon man man and a man
-45.0				
-55.0				
-65.0				
Center 3.565 GHz		#2 (DWL 000 L1)		Span 40 MHz
#Res BW 200 KHZ		#VBW 620 KH2	2	Sweep 1.267 ms
Occupied Band	lwidth	Total Power	28.0 dBm	
	17.859 MHz			
Transmit Freq Er	ror 14.866 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	18.54 MHz	x dB	-26.00 dB	
ISG			STATUS	



|--|

Keysight Spectrum Analyzer - Occupied BV	v			- @ <b>*</b>
Center Freq 3.565000000	GHz →	Center Freq: 3.565000000 ( Trig: Free Run #Atten: 30 dB	GHz Avg Hold: 50/50	07:03:27 AM Sep 10, 2018 Radio Std: None Radio Device: BTS
10 dB/div Ref 25.18 dBn	n .			
15.2	manna	an manage and a second and as second and a	munn	
4.82				
-24.8	mill		hu	n manna hanna
-44.8				
-64.8				
Center 3.565 GHz #Res BW 200 kHz		#VBW 620 kHz		Span 40 MHz Sweep 1.267 ms
Occupied Bandwidt 17	<sup>h</sup> 7.847 MHz	Total Power	28.3 dBm	
Transmit Freq Error	25.247 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	18.67 MHz	x dB	-26.00 dB	
MSG			STATUS	

Antenna F - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position B

Keysight Spect	trum Analyzer - Occupied BW				- 0 <del>X</del>
RL Contor Er	RF 50 Q AC	CH-	SENSE:INT Center Freq: 3.565000000	GHz	08:01:51 AM Sep 10, 2018 Radio Std: None
Center Pro	] ]	#IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold: 50/50	Radio Device: BTS
10 dB/div	Ref 24.72 dBm				
Log					
14.7		www.www.	mmmenmm	many	
4.72					
-5.28					
-15.3		A.			
-25.3		~		1 the	7.2
-35.3	man and the second				a mention walks when a
-45.3					
-55.3					
-65.3					
Center 3.5 #Res BW	65 GHz 200 kHz		#VBW 620 kHz		Span 40 MHz Sweep 1.267 ms
Occup	ied Bandwidt	1	Total Power	27.7 dBm	
	17	.848 MHz			
Transm	it Freq Error	-5.342 kHz	% of OBW Power	99.00 %	
x dB Ba	ndwidth	18.73 MHz	x dB	-26.00 dB	
M5G				STATUS	



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position M

Keysight Spec	trum Analyzer - Occupied BW				- @ <mark>*</mark>
RL Constan En	RF 50 Q AC	CHa	SENSE:INT ALIGN A	NUTO LIGHT	05:51:48 AM Sep 07, 2018 Padio Std: None
Center Fr	eq 3.625000000	HFGain:Low ↔	Trig: Free Run #Atten: 28 dB	Radio Std: None Radio Device: BTS	
10 dB/div	Ref 24.66 dBm	1			
Log					
19.0		man	monorman	mann	
4,66		1			
-5.34					
-15.3		p\$			
-25.3	- man	www		ma	Marine .
-35.3					a www.www.www.www.
-45,3					
-55.3					
-65.3					
Center 3.0	625 GHz				Span 40 MHz
#Res BW	200 kHz		#VBW 620 kHz		Sweep 1.267 ms
Occup	ied Bandwidt	h	Total Power	28.0 dBm	
	17	.864 MHz			
Transm	nit Freq Error	5.857 kHz	% of OBW Power	99.00 %	
x dB Ba	andwidth	18.67 MHz	x dB	-26.00 dB	
MSG				STATUS	

Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position M

Keysight Spectrum	Analyzer - Occupied BV	v									@ X
Center Freq	F 50 Ω AC 3.625000000	GHz		S	Center Fre	ALIGN eq: 3.625000000 Run	AUTO LIGHT	50/50	Radio	6:10:12 AM Sep Std: None	07,2018
			#IFGain:Lov	v	#Atten: 30	dB	Birrorer		Radio	Device: BTS	
10 dB/div	Ref 25.18 dBn	n									
Log 15.2											
5.18			man	m	mm	mmm	man	~			
4.82		1									
-14.8											
.74.8		N						1			
348								~~~~	mon	monor	m
-44.8											
-54.8											
-64.8											
Center 3.625 #Res BW 200	GHZ 0 kHz				#VE	3W 620 kHz	2		S	Span 40 weep 1.2	0 MHz 67 ms
Occupied	d Bandwidt	:h			Total F	ower	28.2 d	Bm			
	17	7.82	6 MHz	2							
Transmit I	Freq Error	-12	.082 kH	z	% of O	BW Power	99.0	0 %			
x dB Band	lwidth	18	8.68 MH	z	x dB		-26.00	dB			
MSG							STATUS				



Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position M

Keysight Spectrum Ana	alyzer - Occupied BW		and the second s		- @ <del>*</del>
Center Freq 3.	625000000 G	Hz →	Center Freq: 3.625000000 Trig: Free Run #Atten: 30 dB	GHz Avg Hold: 50/50	Radio Std: None
10 dB/div Re	ef 24.99 dBm	an cumeon			
15.0		mmmm		maning	
-5.01					
-25.0		N		h	
-45.0					
-65.0					
Center 3.625 G #Res BW 200 k	Hz (Hz		#VBW 620 kHz		Span 40 MHz Sweep 1.267 ms
Occupied	Bandwidth 17.8	362 MHz	Total Power	28.1 dBm	
Transmit Fr	eq Error	-1.502 kHz	% of OBW Power	99.00 %	
x dB Bandw	ridth	18.53 MHz	x dB	-26.00 dB	
MSG				STATUS	

Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 20.0 MHz - Channel Position M

Keysight Spectrum	Analyzer - Occupied BW				- Ø 🗙
Canada a Francis	50 Ω AC		SENSE:INT	OD GH*	03:00:23 AM Sep 10, 2018
Center Freq	3.625000000	#IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold: 50/50	Radio Device: BTS
10 dB/div	Ref 25.28 dBm				
15.3					
5.28		month	mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	manning	
4.75		1			
-4.72					
-14,7		1			
-24.7		~"		1	man a
-34.7 marsha					1 mar many water
-44.7					
-64.7					
-64.7					
Center 3.625	GHz			-	Span 40 MHz
#Res BW 200	) kHz		#VBW 620 kH	lz	Sweep 1.267 ms
Occupied	d Bandwidth	ı	Total Power	28.6 dBm	
	17	.837 MHz			
Transmit I	Freq Error	-7.418 kHz	% of OBW Powe	er 99.00 %	
x dB Band	width	18.80 MHz	x dB	-26.00 dB	
MSG				STATUS	