FCC REPORT

Applicant:	Baicells Technologies Co., Ltd.
Address of Applicant:	3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist., Beijing, China

Equipment Under Test (EUT)

Product Name:	LTE-TDD Base Station
Model No.:	BRU3501
Trade mark:	BaiCells
FCC ID:	2AG32BRU3501
Applicable standards:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part 90 Subpart Z
Date of sample receipt:	27 Sep., 2018
Date of Test:	27 Sep., to 29 Oct., 2018
Date of report issued:	01 Nov., 2018
Test Result:	PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2. Version

Version No.	Date	Description
00	*01 Nov., 2018*	*Original*

Tested by:  ***Date:*** *01 Nov., 2018*

Test Engineer

Reviewed by:  ***Date:*** *01 Nov., 2018*

Project Engineer

3. Contents

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4. Test Summary

Test Item	Section in CFR 47	Result
	FCC	
RF Output Power	Part 2.1046 Part 90.1321	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 90.209	Pass
Emission Mask	Part 90.210(b)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 90.1323	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 90.1323	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b) Part 90.213(a)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2) Part 90.213(a)	Pass

Pass: The EUT complies with the essential requirements in the standard.

5. General Information

5.1 Client Information

Applicant:	Baicells Technologies Co., Ltd.
Address:	3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist., Beijing, China
Manufacturer	Baicells Technologies Co., Ltd.
Address:	3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist., Beijing, China

5.2 General Description of E.U.T.

Product Name:	LTE-TDD Base Station
Model No.:	BRU3501
Operation Frequency range:	Band43: 3650MHz~3700MHz
Modulation type:	QPSK, 16QAM, 64QAM
Antenna type:	External antenna (“N” type)
Antenna gain:	LTE Band 43: 17.0dBi
AC adapter:	Model No: EUV-300S048ST Input : 100-240VAC, 50/60Hz Output:48vdc, 0-6.25A

Test Channel:

Band43

10MHz		20MHz	
Channel:	Frequency (MHz)	Channel:	Frequency (MHz)
Lowest	3655.0	Lowest	3660.0
Middle	3675.0	Middle	3675.0
Highest	3695.0	Highest	3690.0

5.3 Test modes

Data mode (QPSK)	Keep the EUT in data communicating mode (QPSK). *(10MHz, 20MHz)*
Data mode (64QAM)	Keep the EUT in data communicating mode (64QAM). *(10MHz, 20MHz)*

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
/	/	/	/	/

5.5 Related Submittal(s) / Grant (s)

FCC: This submittal(s) (test report) is filing to comply with Section Part 90 subpart Z of the FCC CFR 47 Rules.

5.6 Test Methodology

FCC: Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

5.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in out files. Registration 817957, February 27, 2012.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No.B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282
Fax: +86-755-23116366
Email: info@ccis-cb.com

5.9 Test Instruments list

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	07-22-2017	07-21-2020
BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	02-25-2018	02-24-2019
Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	02-25-2018	02-24-2019
Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	02-25-2018	02-24-2019
Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	02-25-2018	02-24-2019
Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	02-25-2018	02-24-2019
Horn Antenna	ETS-LINDGREN	3160	GTS217	02-25-2018	02-24-2019
Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	02-25-2018	02-24-2019
Spectrum Analyzer 20Hz-26.5GHz	Agilent	N9020A	MY50510123	02-25-2018	02-24-2019
EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	02-25-2018	02-24-2019
Loop antenna	Laplace instrument	RF300	EMC0701	02-25-2018	02-24-2019
Coaxial Cable	CCIS	N/A	CCIS0016	02-25-2018	02-24-2019
Coaxial Cable	CCIS	N/A	CCIS0017	02-25-2018	02-24-2019
Coaxial cable	CCIS	N/A	CCIS0018	02-25-2018	02-24-2019
Coaxial Cable	CCIS	N/A	CCIS0019	02-25-2018	02-24-2019
Coaxial Cable	CCIS	N/A	CCIS0087	02-25-2018	02-24-2019
Signal Generator	Rohde & Schwarz	SMR 20	CCIS0024	02-25-2018	02-24-2019
Signal Generator	Rohde & Schwarz	SMX	CCIS0064	02-25-2018	02-24-2019
Signal Analyzer	Rohde & Schwarz	FSIQ3	CCIS0088	02-25-2018	02-24-2019

6. System test configuration

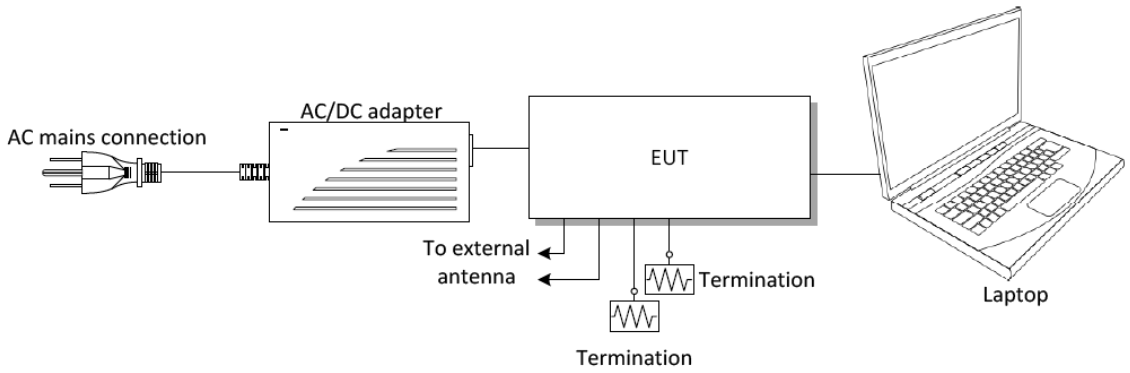
6.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

6.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.

6.3 Configuration of Tested System



6.4 Description of Test Modes

The EUT has been tested under operating condition.
EUT staying in continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.
The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for three modes with power adaptor, earphone and Data cable. The worst-case H mode.

6.5 Transmit Output Power and PSD

Test Requirement:	FCC part90.1321(a)
Test Method:	FCC part2.1046 and C63.26-2015
Limit:	**FCC:** (a) Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP powerdensity shall not exceed 1 Watt in any one-megahertz slice of spectrum. (b) In addition to the provisions in paragraph (a) of this section, transmitters operating in the 3650-3700 MHz band that emit multipledirectional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided theemissions comply with the following: (1) Different information must be transmitted to each receiver. (2) If the transmitter employs an antenna system that emits multiple directional beams but does not emit multiple directional beamssimultaneously, the total output power conducted to the array or arrays that comprise the device, *i.e.*, the sum of the power supplied to allantennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph(a) of this section, as applicable. The directional antenna gain shall be computed as follows: (i) The directional gain, in dBi, shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain, in dBi,of the individual element or stave having the highest gain. (ii) A lower value for the directional gain than that calculated in paragraph (b)(2)(i) of this section will be accepted if sufficient evidence ispresented, *e.g.*, due to shading of the array or coherence loss in the beam-forming. (3) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequencychannels and if transmitted beams overlap, the power shall be reduced to ensure that the aggregate power from the overlapping beams does notexceed the limit specified in paragraph (b)(2) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall notexceed the limit specified in paragraph (b)(2) of this section by more than 8 dB. (4) Transmitters that emit a single directional beam shall operate under the provisions of paragraph (b)(2) of this section.
Test Procedure:	RBW=1MHz, VBW=3MHz, Detector mode= RMS , Trace mode: Power averaging over 100 sweeps
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data (Power):

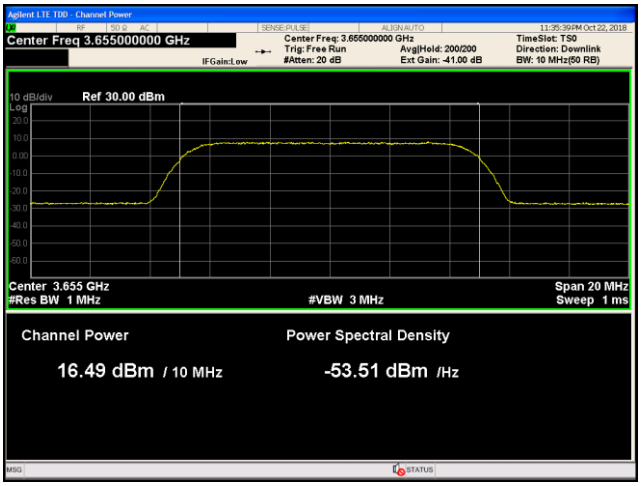
Modulation	Frequency (MHz)	ANT. Port	Output Power (dBm/10MHz)	Total Power (dBm/10MHz)	Directional gain (dBi)	EIRP (dBm)	Limit (dBm)
QPSK (10MHz)	3655.00	ANT 1	16.49	19.45	20	39.45	40.02
		ANT 2	16.39				
	3675.00	ANT 1	16.52	19.46	20	39.46	
		ANT 2	16.37				
	3695.00	ANT 1	16.63	19.53	20	39.53	
		ANT 2	16.41				
64QAM (10MHz)	3655.00	ANT 1	16.17	19.25	20	39.25	
		ANT 2	16.31				
	3675.00	ANT 1	16.76	19.62	20	39.62	
		ANT 2	16.45				
	3695.00	ANT 1	16.47	19.37	20	39.37	
		ANT 2	16.24				
QPSK (20MHz)	3660.00	ANT 1	16.69	19.34	20	39.34	43.03
		ANT 2	15.94				
	3675.00	ANT 1	16.66	19.55	20	39.55	
		ANT 2	16.42				
	3690.00	ANT 1	16.61	19.64	20	39.64	
		ANT 2	16.65				
64QAM (20MHz)	3660.00	ANT 1	16.67	19.41	20	39.41	
		ANT 2	16.12				
	3675.00	ANT 1	16.51	19.44	20	39.44	
		ANT 2	16.34				
	3690.00	ANT 1	16.58	19.61	20	39.61	
		ANT 2	16.61				

Note:
Limit=44dBm+10log(bandwidth/25MHz)
Directional gain = GANT + 10 log(NANT) dBi = 17 + 10 log(2) dBi = 20dBi.

Test plot as below:

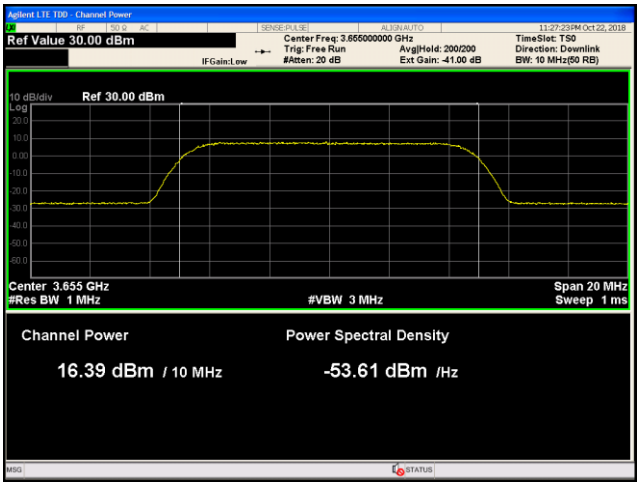
Bandwidth=10MHz – QPSK

ANT 1



Lowest channel

ANT 2



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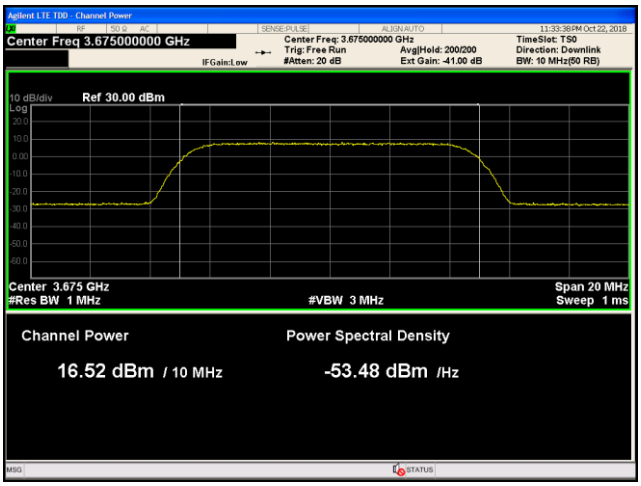
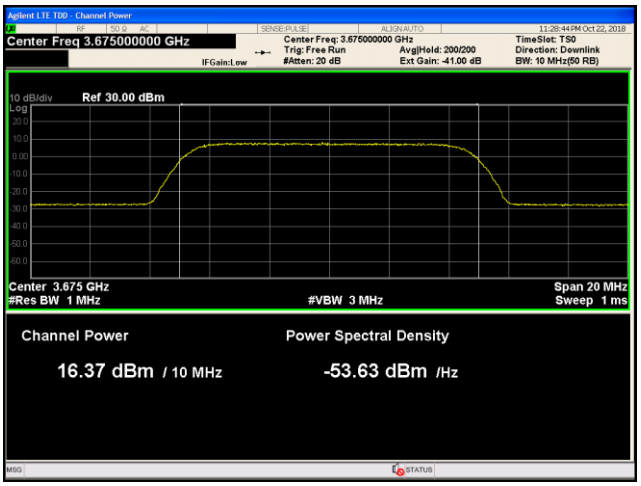


Middle channel



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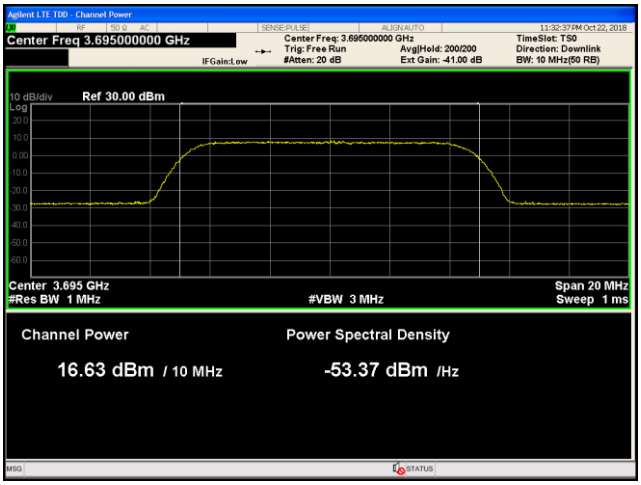
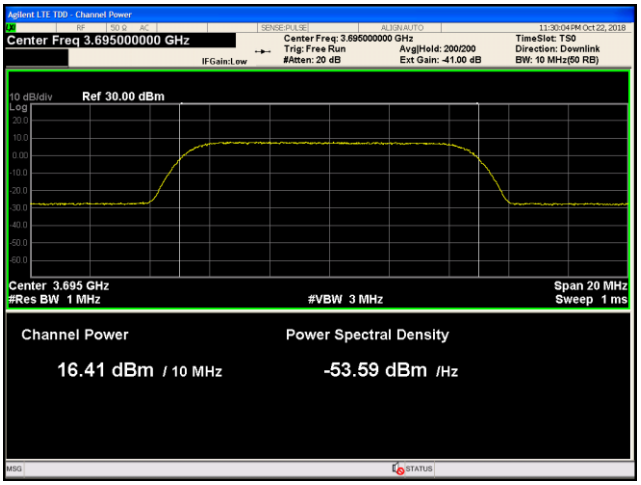


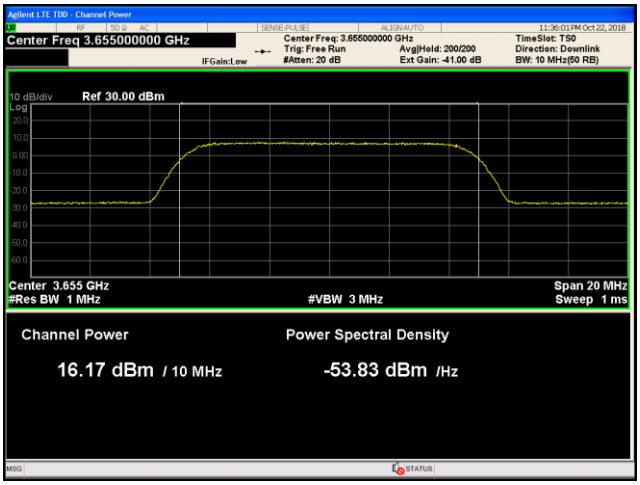
Highest channel



Highest channel

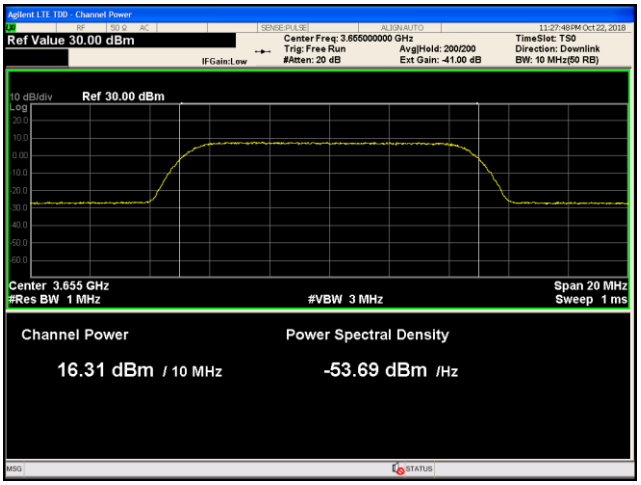
Bandwidth=10MHz – 64QAM

ANT 1

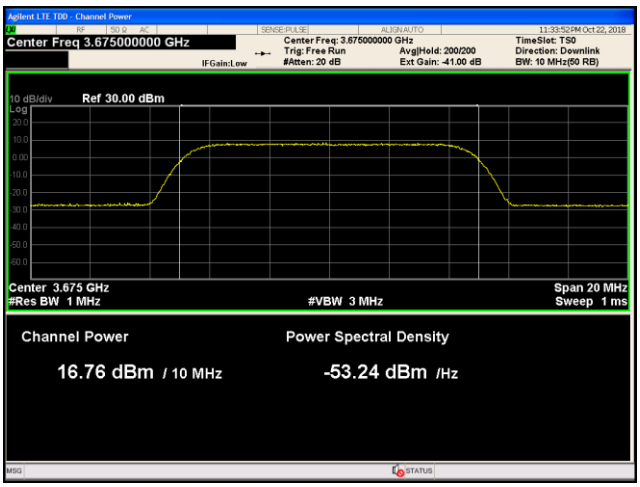


Lowest channel

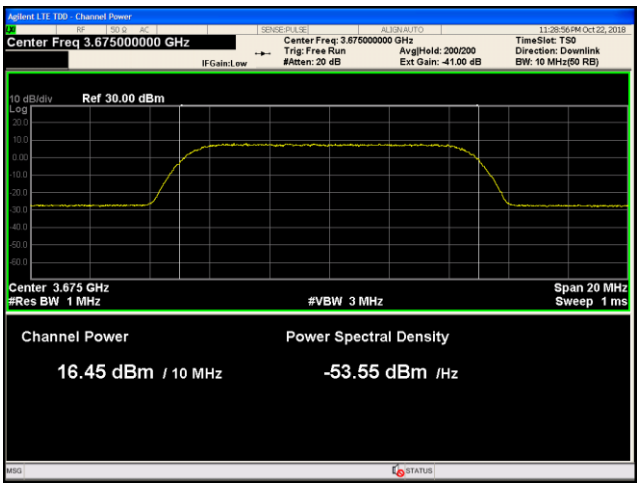
ANT 2



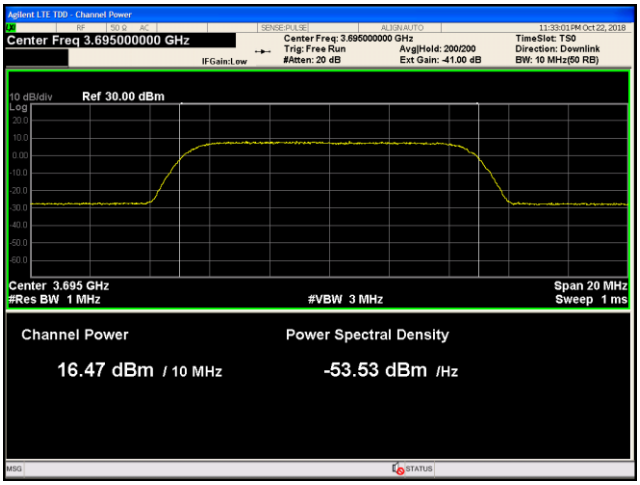
Lowest channel



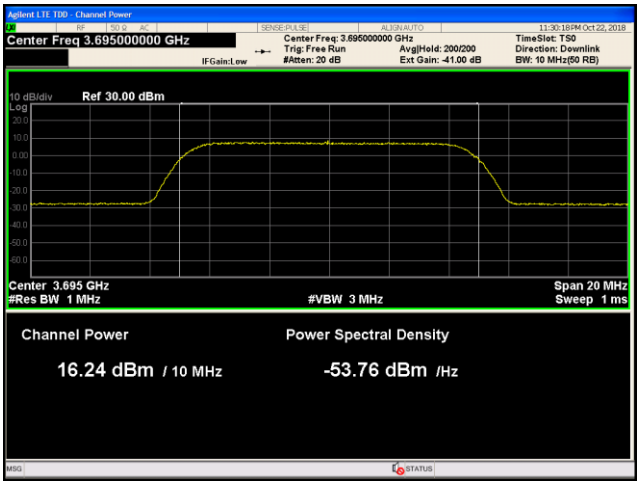
Middle channel



Middle channel



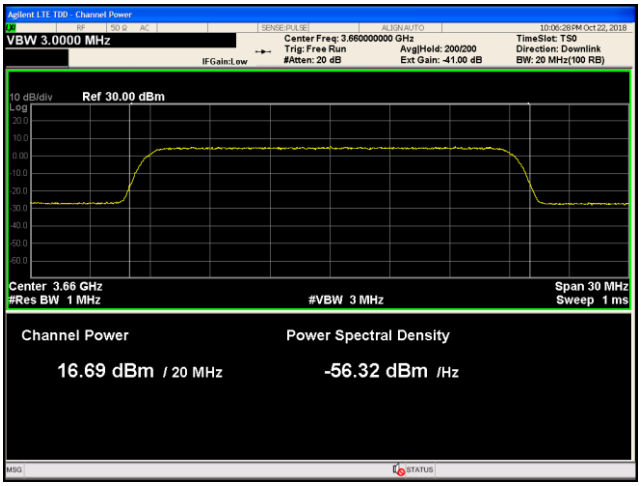
Highest channel



Highest channel

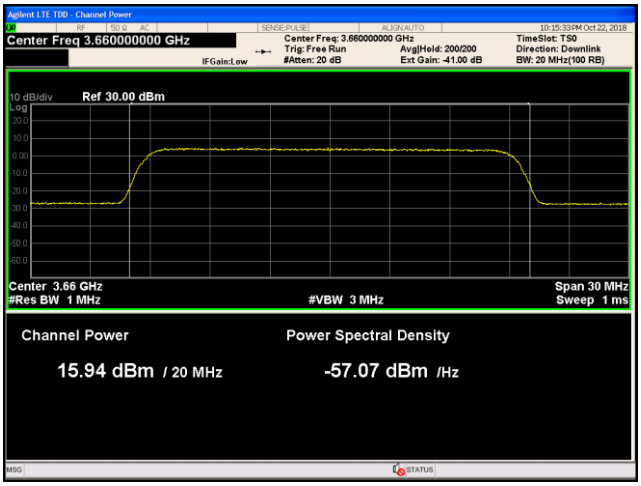
Bandwidth=20MHz – QPSK

ANT 1



Lowest channel

ANT 2



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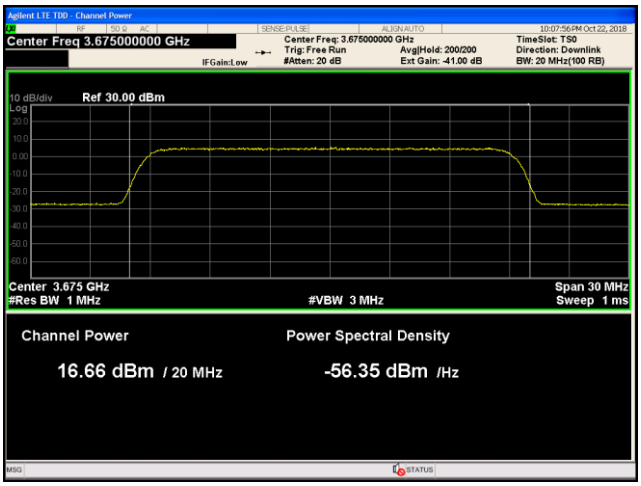

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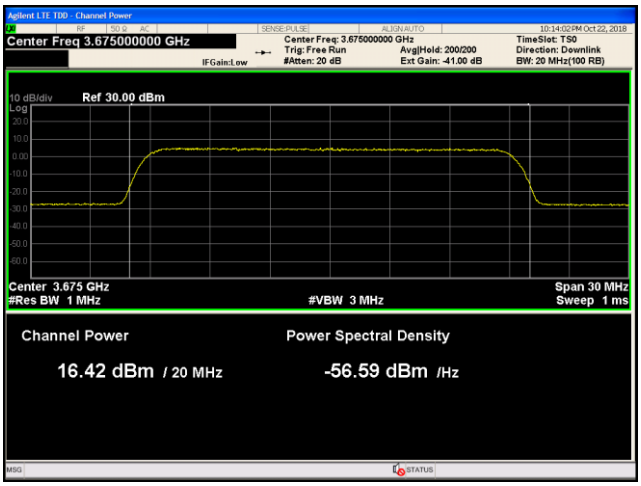

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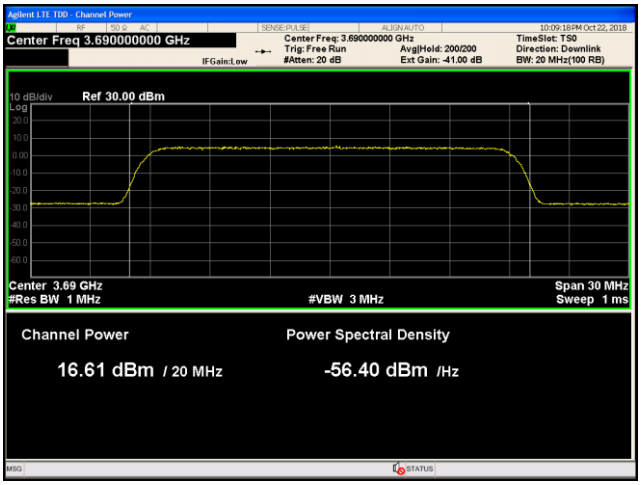

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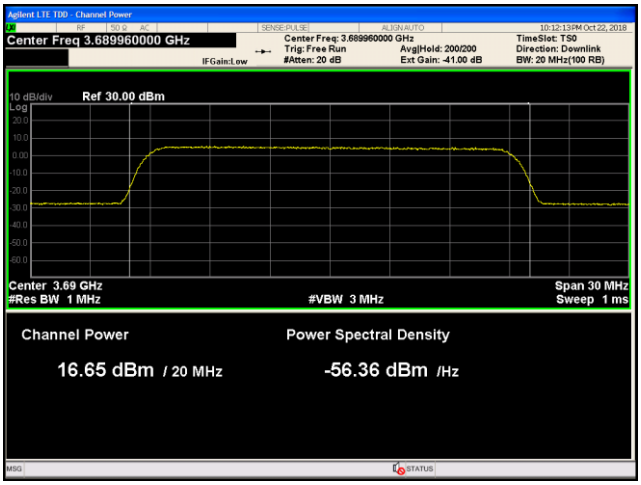
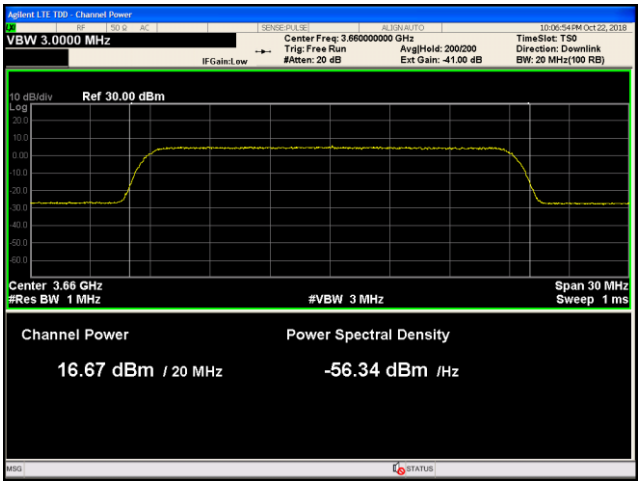


Highest channel

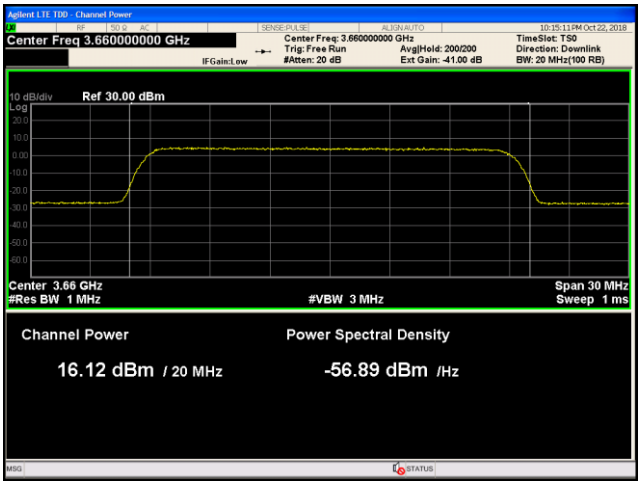
Bandwidth=20MHz – 64QAM

ANT 1



Lowest channel

ANT 2



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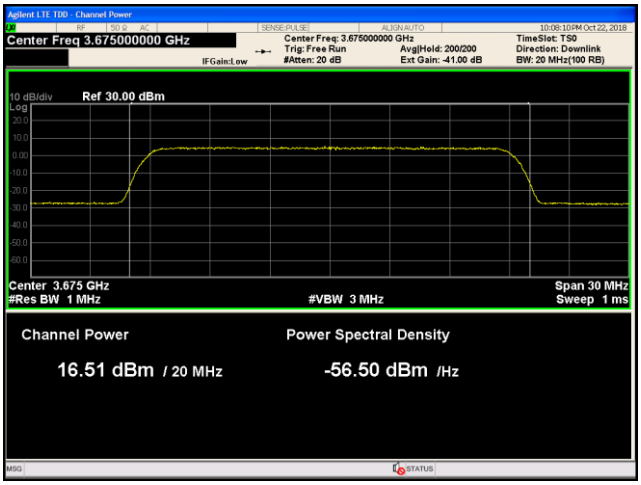

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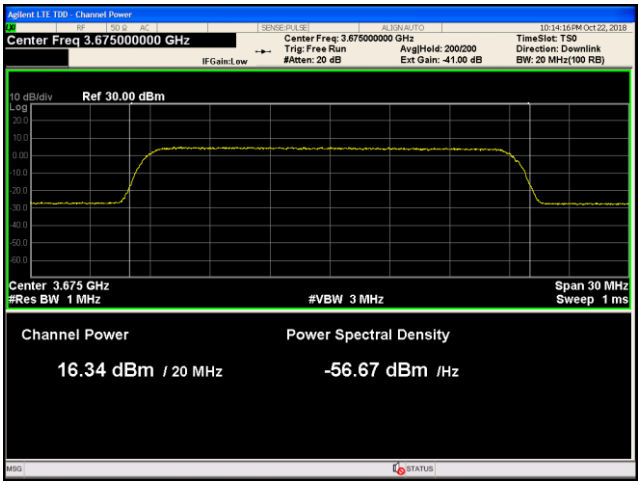

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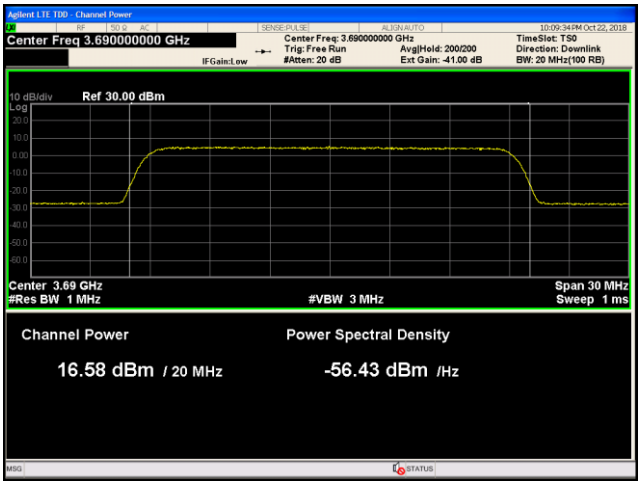

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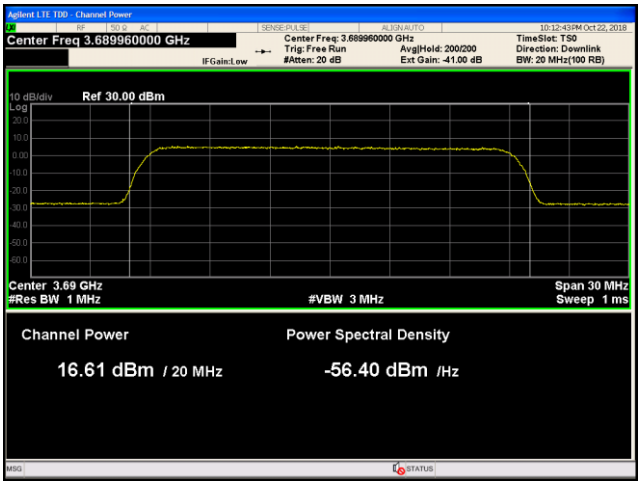


Highest channel

Measurement Data (PSD):

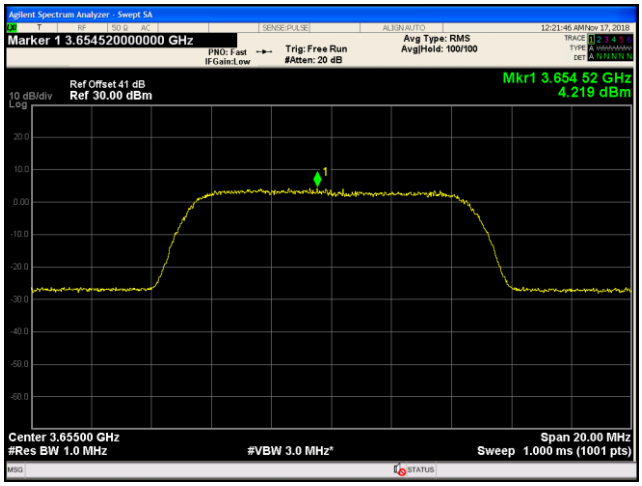
Modulation	Frequency (MHz)	ANT. Port	PSD (dBm/MHz)	Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm)	Limit (dBm)
QPSK (10MHz)	3655.00	ANT 1	4.22	7.14	20	27.14	30
		ANT 2	4.05				
	3675.00	ANT 1	4.13	7.01	20	27.01	
		ANT 2	3.86				
	3695.00	ANT 1	4.44	7.45	20	27.45	
		ANT 2	4.44				
64QAM (10MHz)	3655.00	ANT 1	4.15	6.96	20	26.96	30
		ANT 2	3.74				
	3675.00	ANT 1	4.13	7.08	20	27.08	
		ANT 2	4.01				
	3695.00	ANT 1	4.25	7.40	20	27.40	
		ANT 2	4.51				
QPSK (20MHz)	3660.00	ANT 1	5.08	7.39	20	27.39	30
		ANT 2	3.55				
	3675.00	ANT 1	4.70	7.87	20	27.87	
		ANT 2	5.02				
	3690.00	ANT 1	5.64	8.49	20	28.49	
		ANT 2	5.32				
64QAM (20MHz)	3660.00	ANT 1	5.14	7.89	20	27.89	30
		ANT 2	4.61				
	3675.00	ANT 1	4.69	8.12	20	28.12	
		ANT 2	5.50				
	3690.00	ANT 1	5.02	7.95	20	27.95	
		ANT 2	4.86				

Note:
Directional gain = GANT + 10 log(NANT) dBi = 17 + 10 log(2) dBi = 20dBi.

Test plot as below:

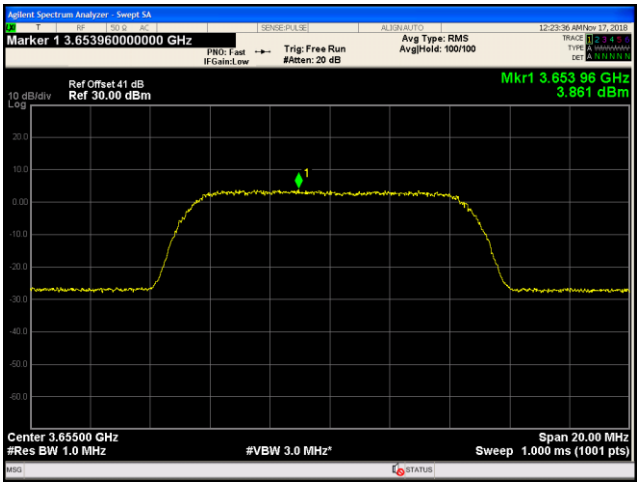
Bandwidth=10MHz – QPSK

ANT 1

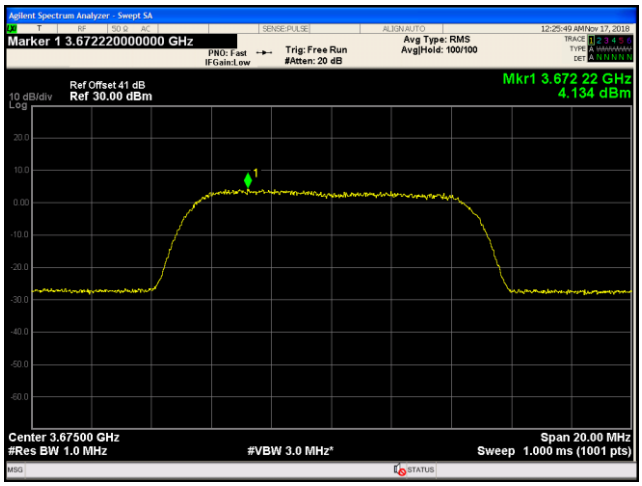


Lowest channel

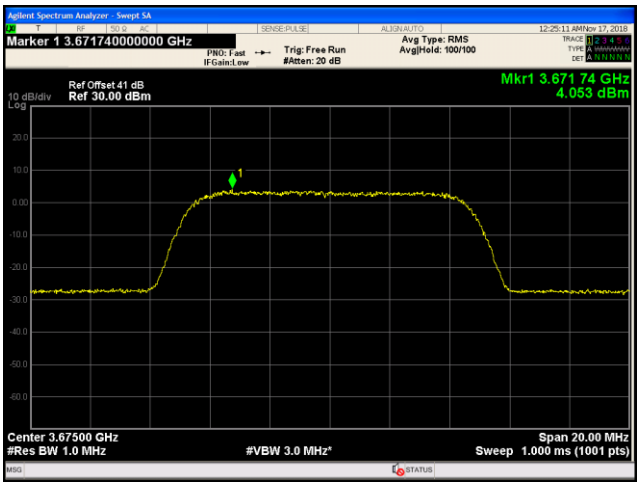
ANT 2



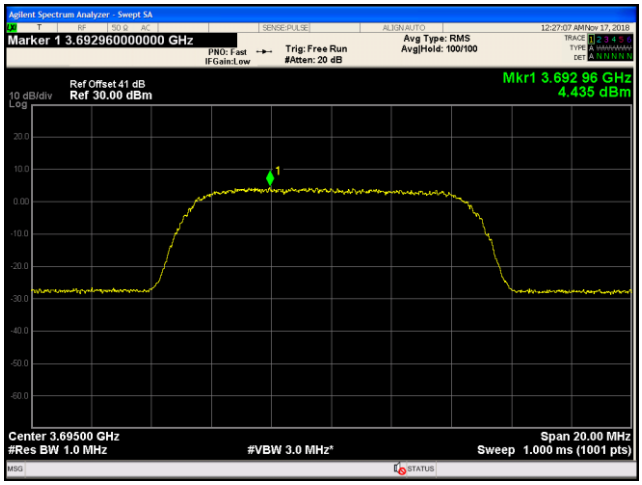
Lowest channel



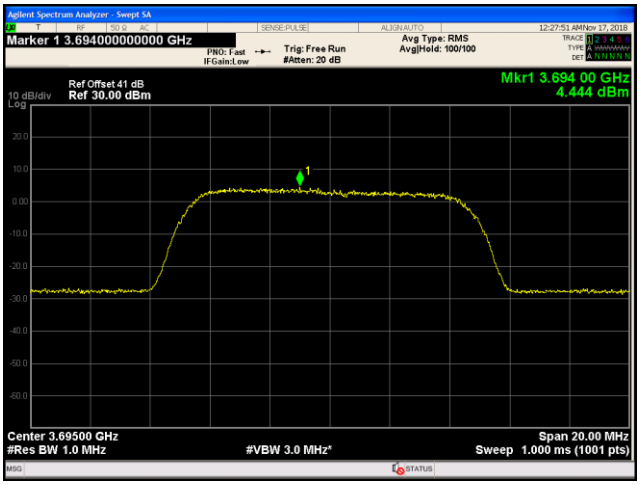
Middle channel



Middle channel



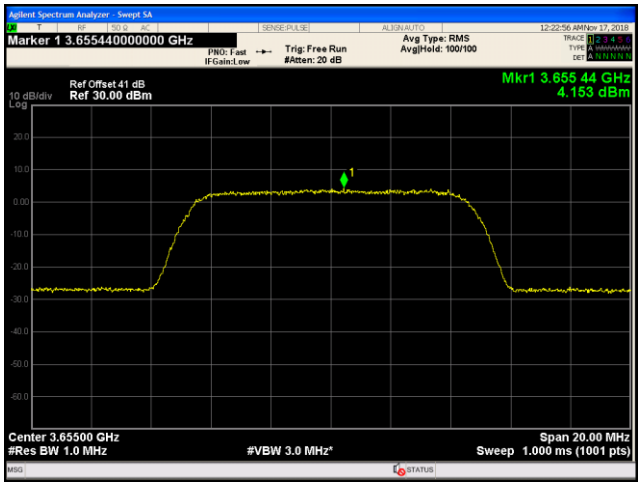
Highest channel



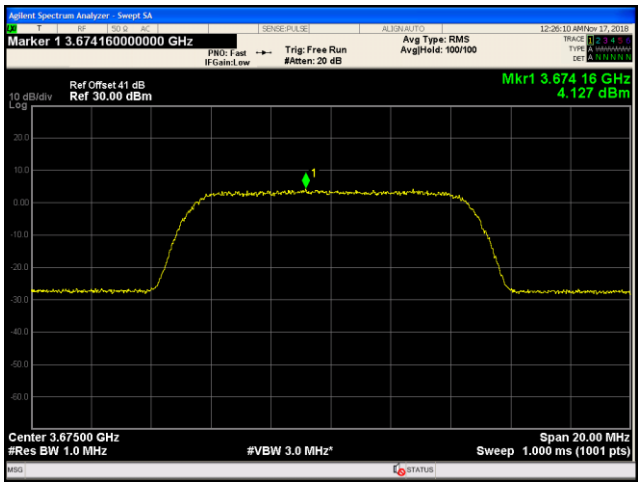
Highest channel

Bandwidth=10MHz – 64QAM

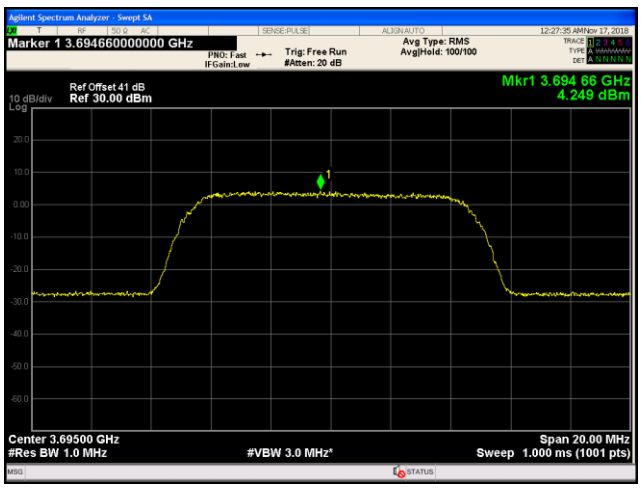
ANT 1



Lowest channel

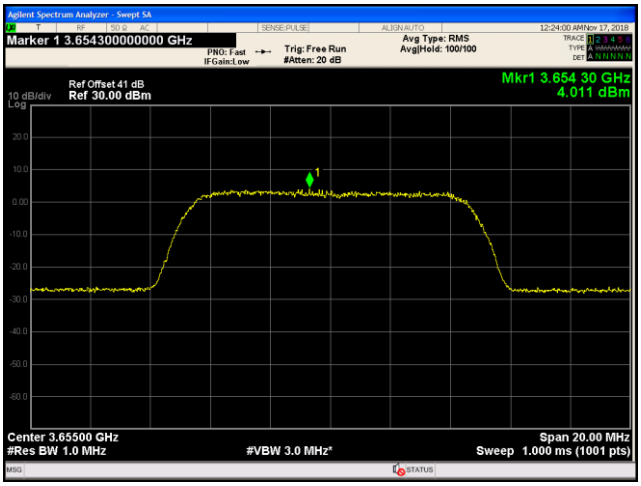


Middle channel

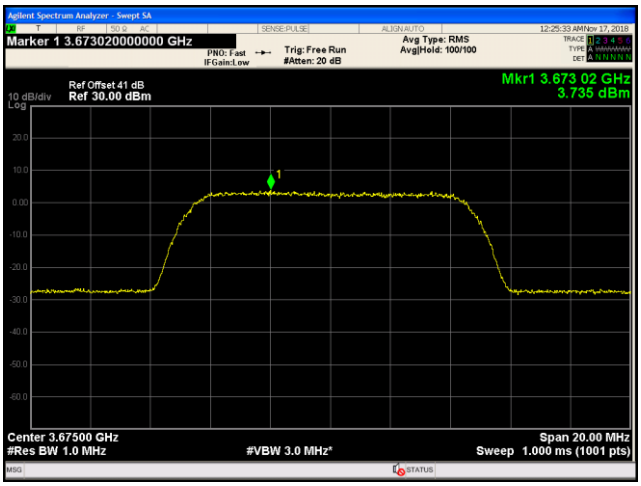


Highest channel

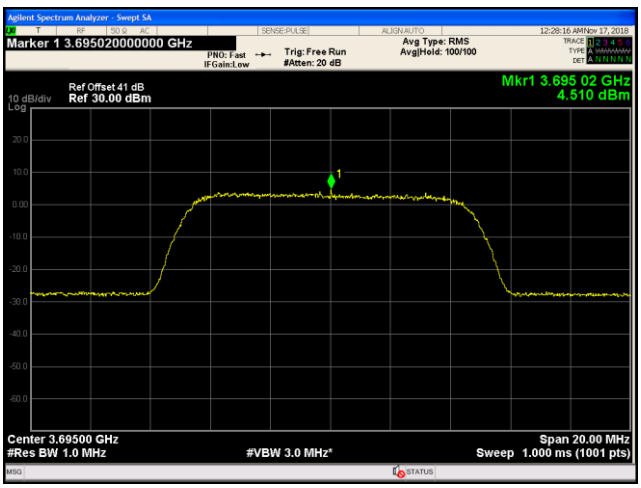
ANT 2



Lowest channel



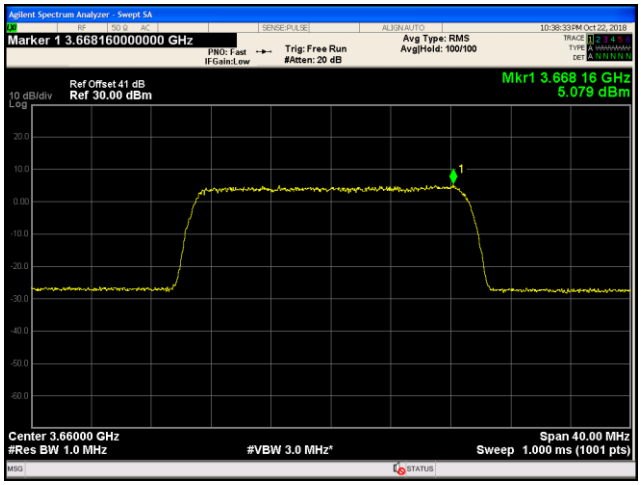
Middle channel



Highest channel

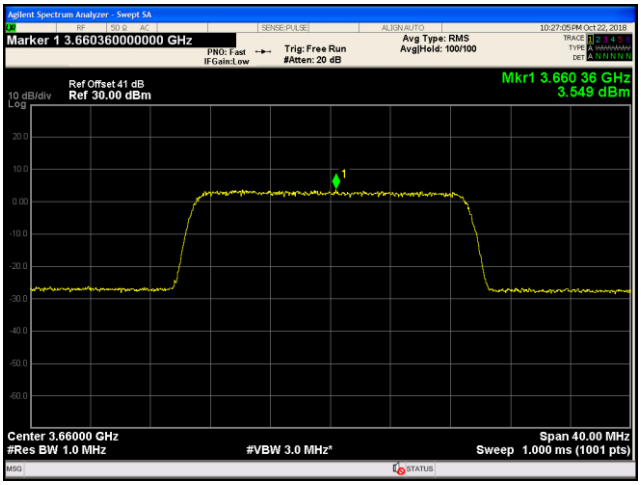
Bandwidth=20MHz – QPSK

ANT 1

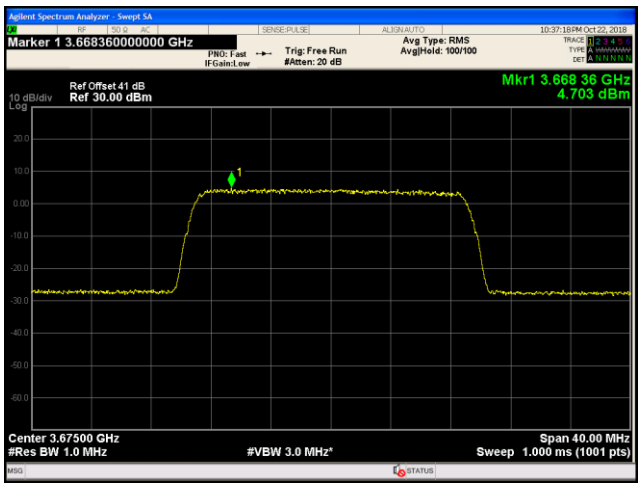


Lowest channel

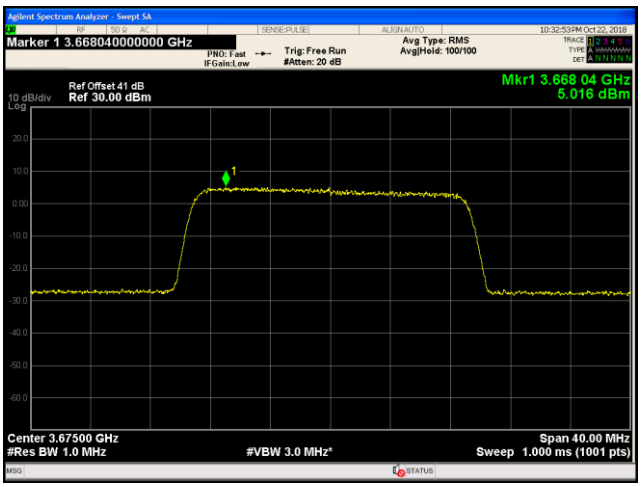
ANT 2



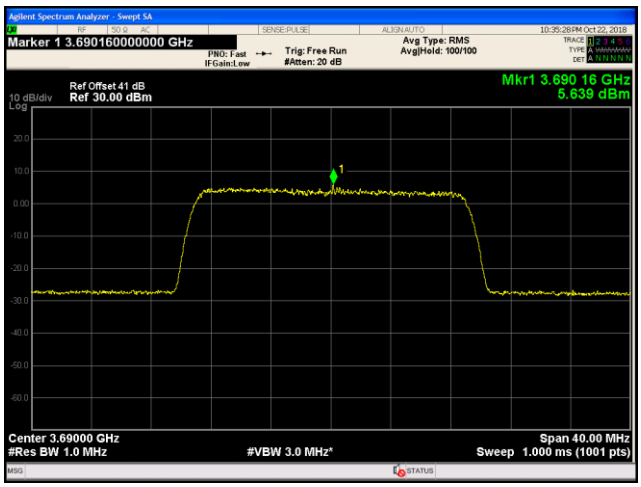
Lowest channel



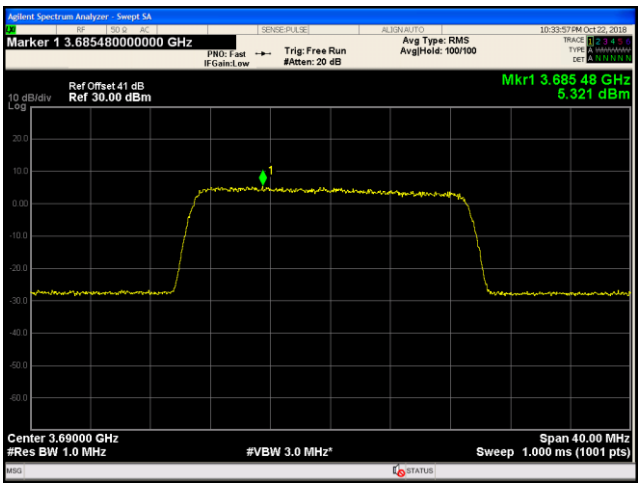
Middle channel



Middle channel



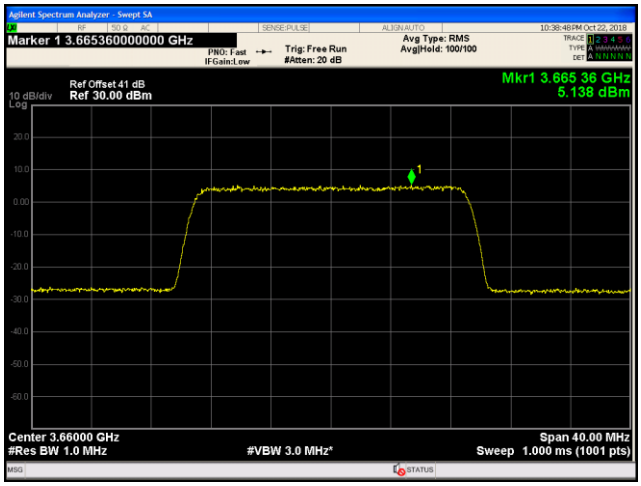
Highest channel



Highest channel

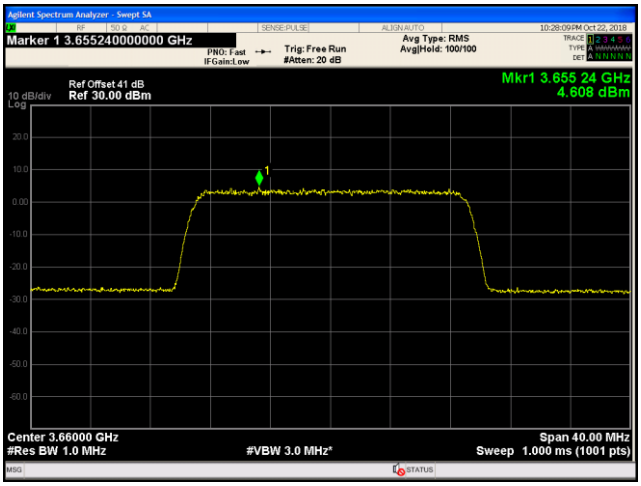
Bandwidth=20MHz – 64QAM

ANT 1

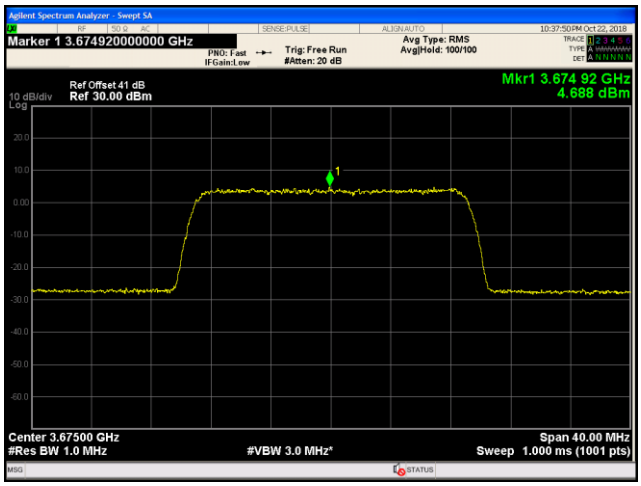


Lowest channel

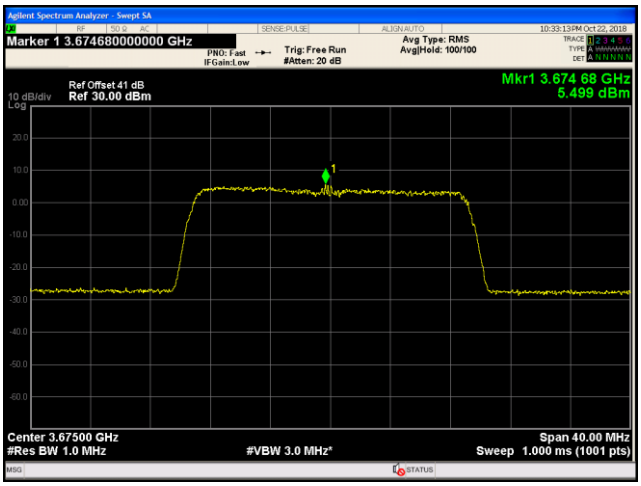
ANT 2



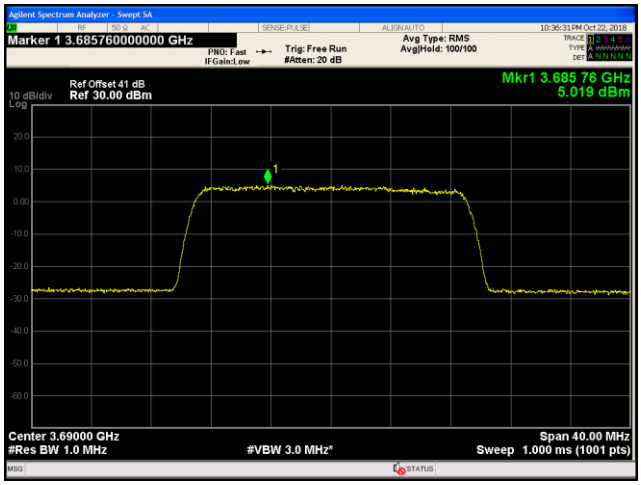
Lowest channel



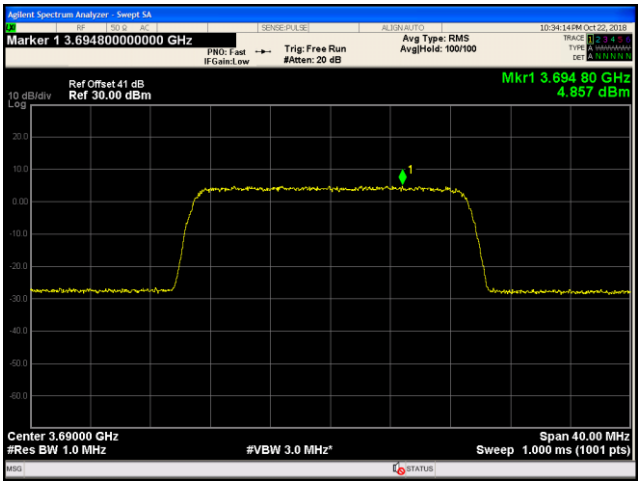
Middle channel



Middle channel



Highest channel



Highest channel

6.6 Occupy Bandwidth

Test Requirement:	FCC part 90.209
Test Method:	FCC part 2.1049 and C63.26-2015
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. The transmitter shall be operated at its maximum carrier powermeasured under normal test conditions. 3. The span of the analyzer shall be set to capture all products of themodulation process, including the emission skirts. 4. The resolution bandwidth (RBW) shall be in the range of 1% to 5% ofthe occupied bandwidth (OBW) and video bandwidth (VBW) shall beapproximately 3x RBW.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

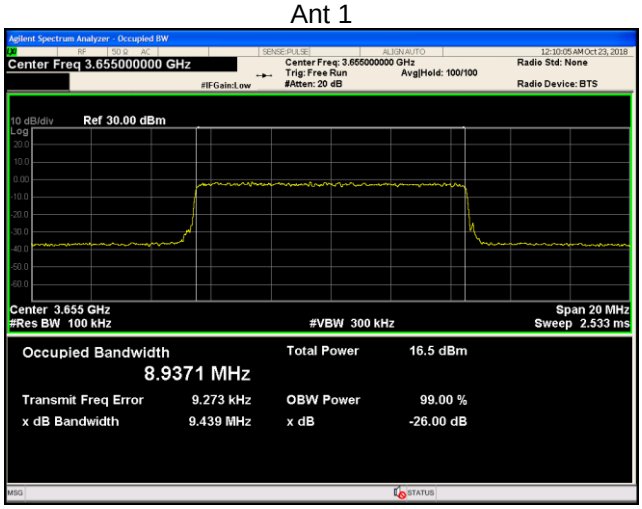
Measurement Data:

Test Channel	Bandwidth (MHz)	Modulation	Ant. Port	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
Lowest	10	QPSK	Ant 1	9.44	8.94
			Ant 2	9.36	8.95
		64QAM	Ant 1	9.35	8.94
			Ant 2	9.35	8.93
Middle	10	QPSK	Ant 1	9.39	8.94
			Ant 2	9.40	8.95
		64QAM	Ant 1	9.34	8.93
			Ant 2	9.38	8.84
Highest	10	QPSK	Ant 1	9.39	8.94
			Ant 2	9.43	8.95
		64QAM	Ant 1	9.44	8.93
			Ant 2	9.48	8.94
Lowest	20	QPSK	Ant 1	18.73	17.87
			Ant 2	18.51	17.85
		64QAM	Ant 1	18.42	17.86
			Ant 2	18.49	17.85
Middle	20	QPSK	Ant 1	18.50	17.86
			Ant 2	18.44	17.85
		64QAM	Ant 1	18.72	17.83
			Ant 2	18.57	17.85
Highest	20	QPSK	Ant 1	18.50	17.85
			Ant 2	18.53	17.85
		64QAM	Ant 1	18.42	17.86
			Ant 2	18.55	17.85

Test plot as follows:

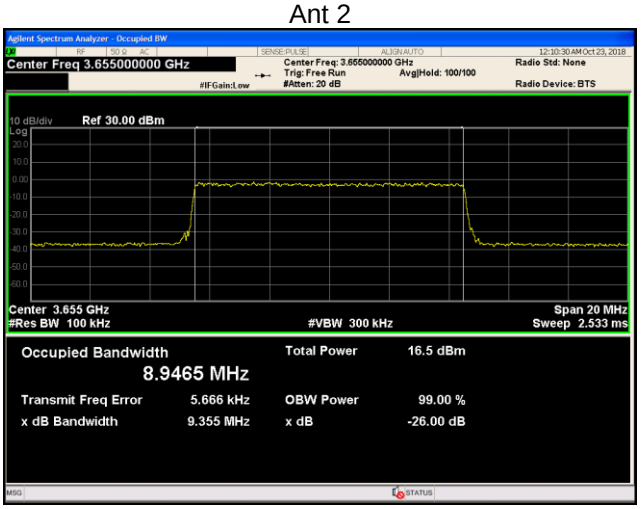
LTE Band 43
BW: 10MHz, QPSK

Ant 1

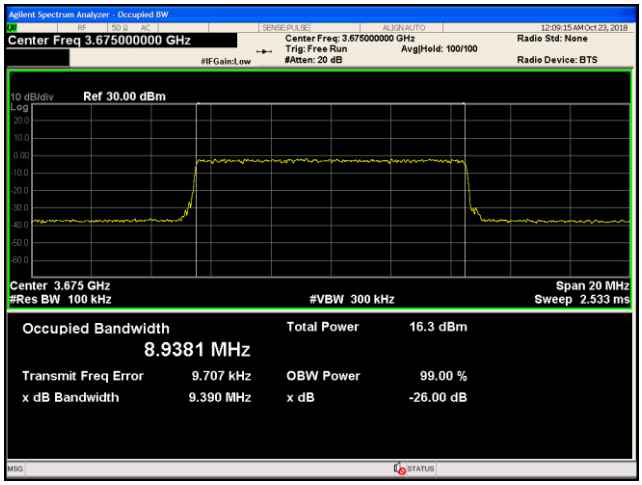


Lowest channel

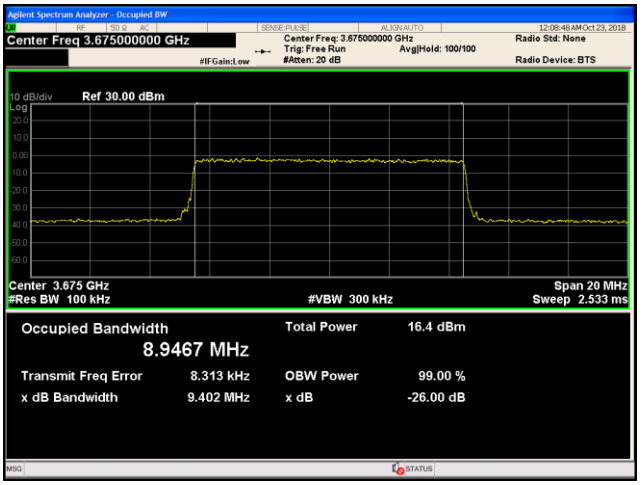
Ant 2



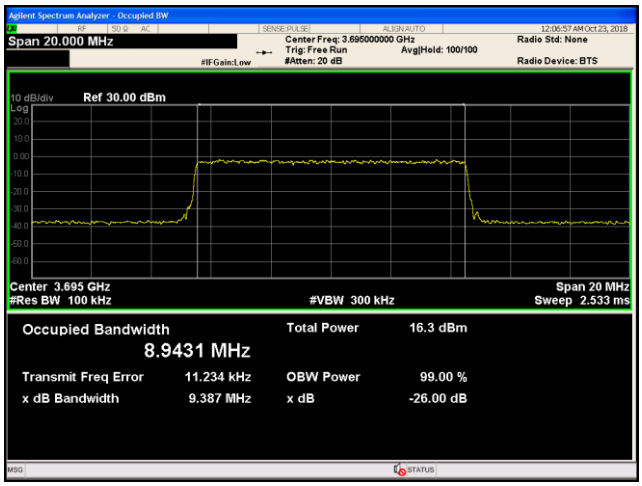
Lowest channel



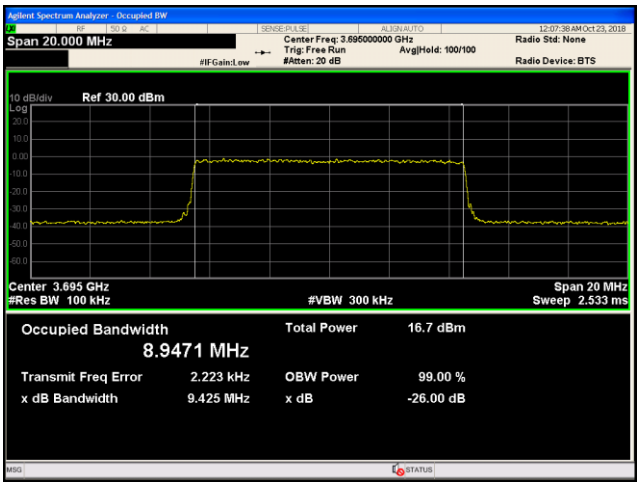
Middle channel



Middle channel



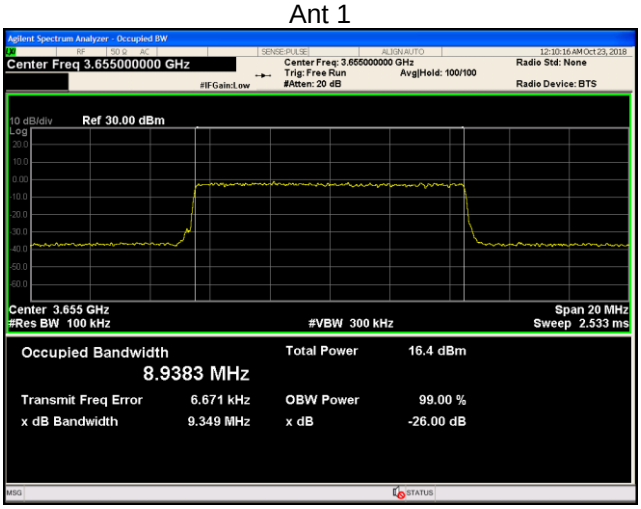
Highest channel



Highest channel

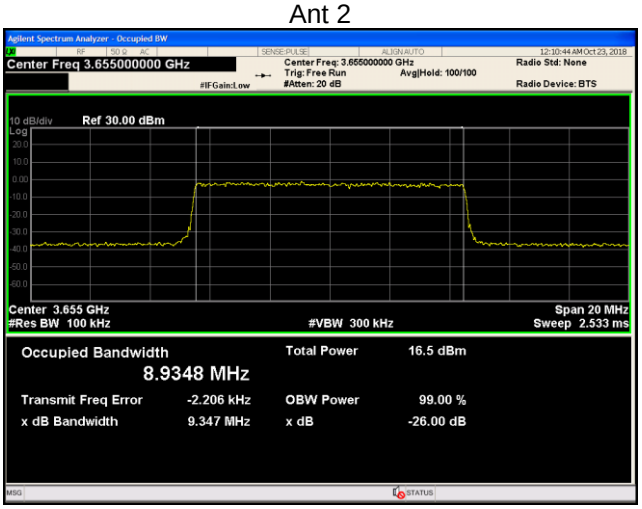
LTE Band 43
BW: 10MHz, 64QAM

Ant 1

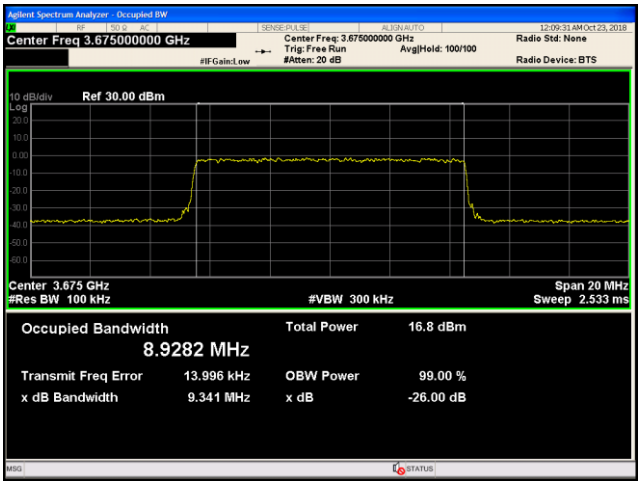


Lowest channel

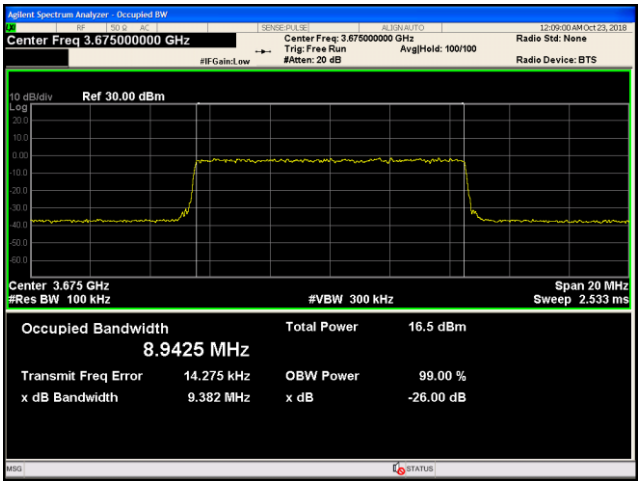
Ant 2



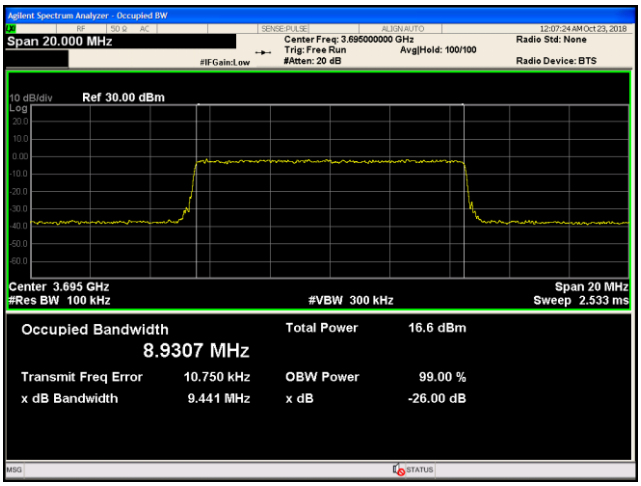
Lowest channel



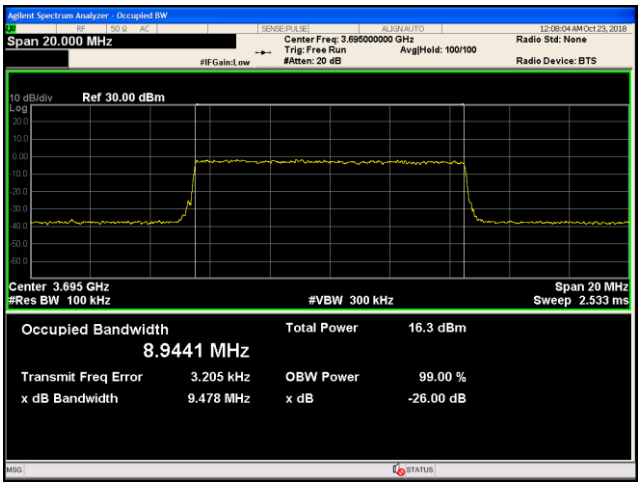
Middle channel



Middle channel



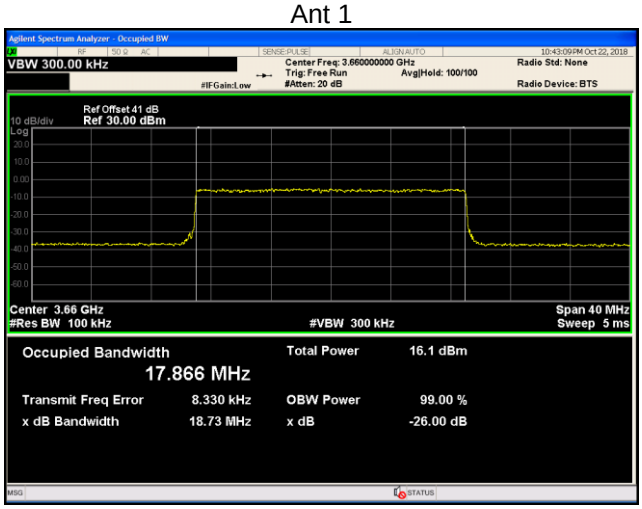
Highest channel



Highest channel

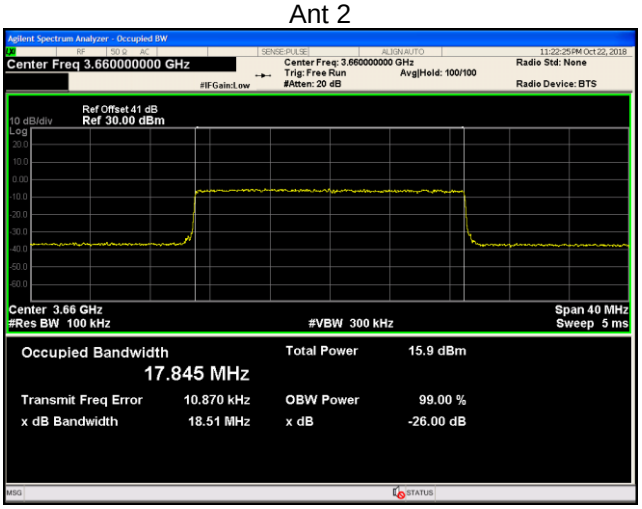
LTE Band 43:
BW: 20MHz QPSK

Ant 1

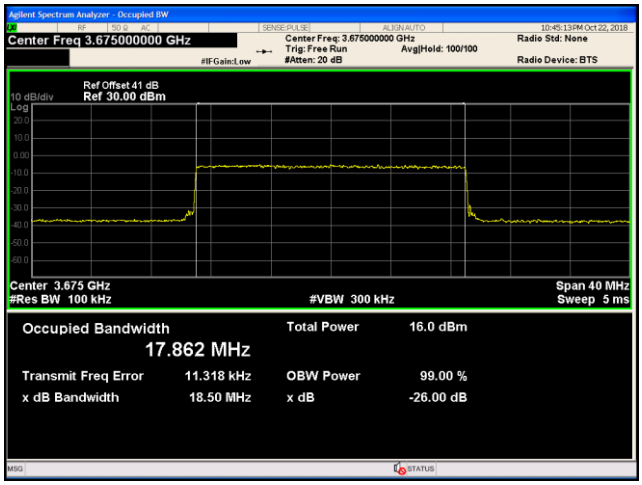


Lowest channel

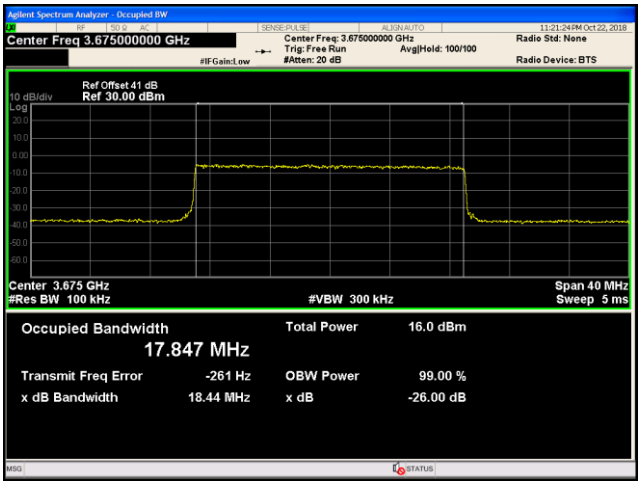
Ant 2



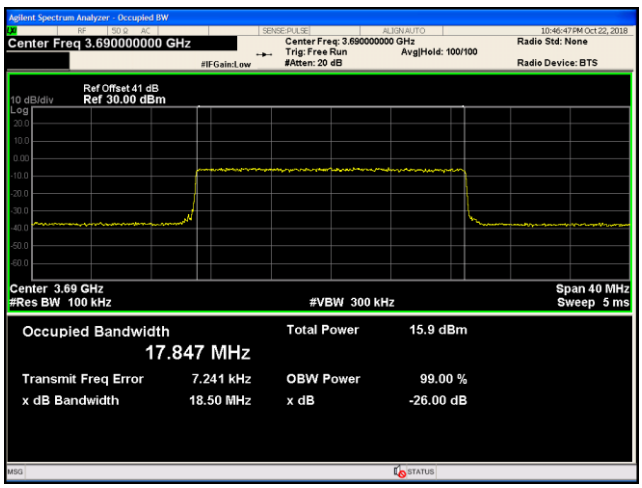
Lowest channel



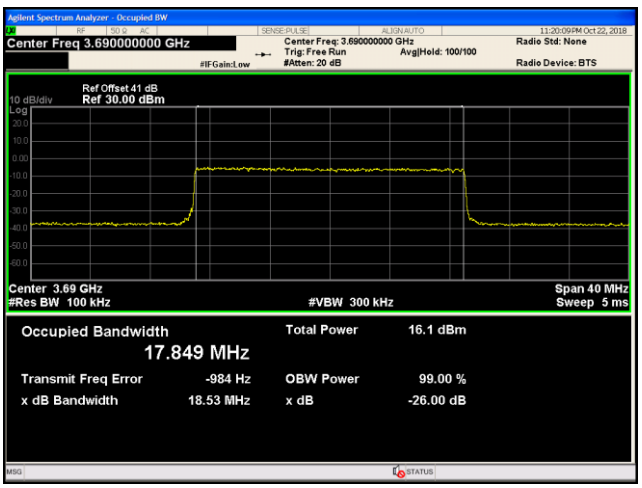
Middle channel



Middle channel



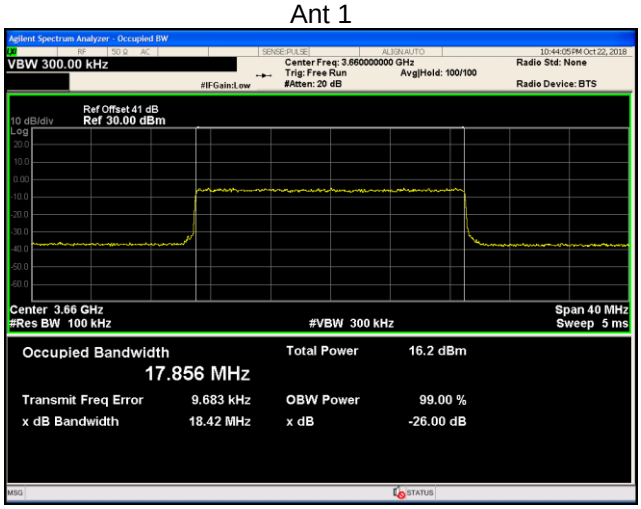
Highest channel



Highest channel

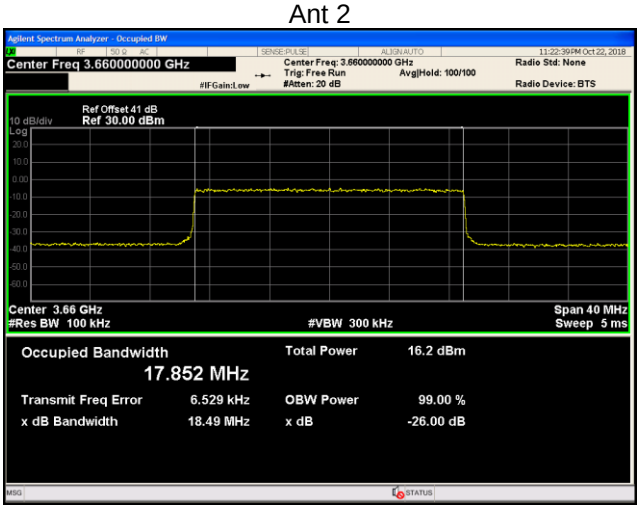
LTE Band 43
BW: 20MHz, 64QAM

Ant 1

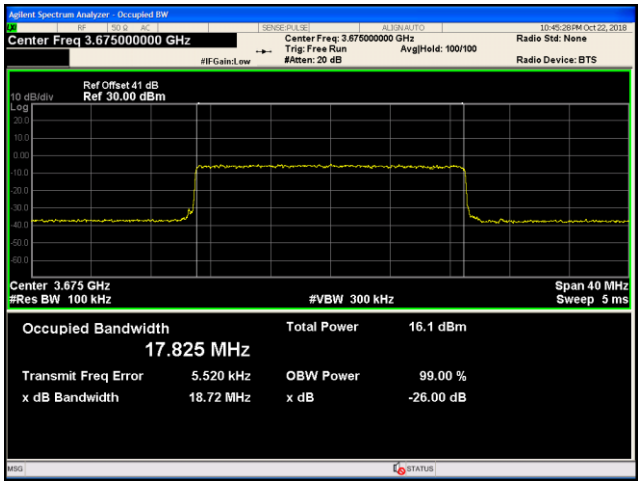


Lowest channel

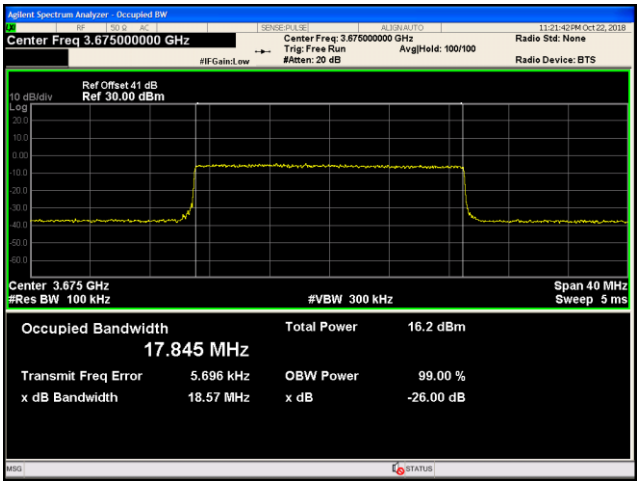
Ant 2



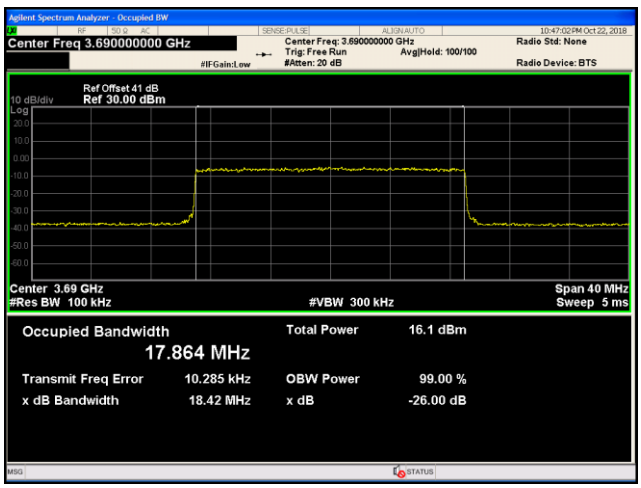
Lowest channel



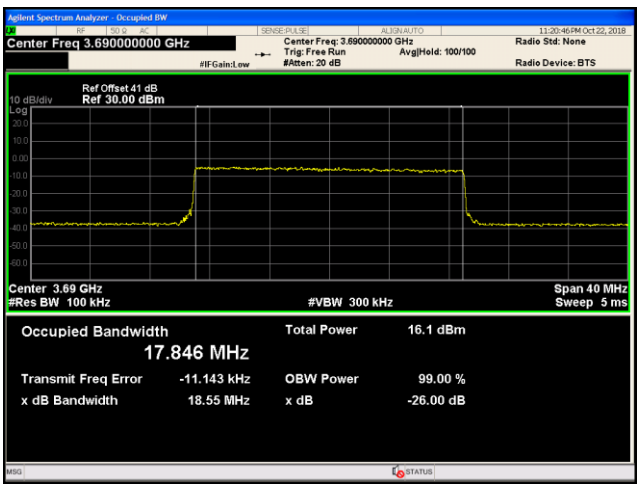
Middle channel



Middle channel



Highest channel



Highest channel