

PCTEST ENGINEERING LABORATORY, INC.

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# **MEASUREMENT REPORT**

LTE

### Applicant Name:

Tecore Networks 7030 Hi Tech Drive Hanover, MD 21076 USA

### Date of Testing: 2/5-2/22/2018 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1801290011-01.QLJ

## FCC ID:

## QLJ4GRFN-041

APPLICANT:

# **Tecore Networks**

Application Type: Model: EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification CoreCell-E RRH Remote Radio Head Licensed Non-Broadcast Station Transmitter (TNB) §2 §27 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



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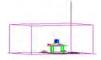


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# MEASUREMENT REPORT FCC Part 27



			AN	JT1	AN	IT2	MI	MO			
Band	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)	ANT1 Emission Designator	ANT2 Emission Designator	Modulation
LTE Band 41	27	2498.5 - 2687.5	21.04	43.23	21.63	43.35	42.28	46.26	4M53G7D	4M52G7D	QPSK
LTE Band 41	27	2498.5 - 2687.5	21.78	43.38	21.73	43.37	42.77	46.31	4M53W7D	4M52W7D	16QAM
LTE Band 41	27	2498.5 - 2687.5	21.83	43.39	21.93	43.41	43.75	46.41	4M53W7D	4M54W7D	64QAM
LTE Band 41	27	2498.5 - 2687.5	21.78	43.38	21.43	43.31	42.57	46.29	4M54W7D	4M53W7D	256QAM
LTE Band 41	27	2501 - 2685	20.56	43.13	22.13	43.45	42.69	46.30	9M03G7D	9M03G7D	QPSK
LTE Band 41	27	2501 - 2685	20.99	43.22	21.43	43.31	43.02	46.34	9M04W7D	9M02W7D	16QAM
LTE Band 41	27	2501 - 2685	20.75	43.17	22.03	43.43	43.04	46.34	9M00W7D	9M01W7D	64QAM
LTE Band 41	27	2501 - 2685	20.61	43.14	22.39	43.50	41.43	46.17	9M02W7D	9M04W7D	256QAM
LTE Band 41	27	2503.5 - 2682.5	21.63	43.35	21.48	43.32	42.90	46.33	13M5G7D	13M6G7D	QPSK
LTE Band 41	27	2503.5 - 2682.5	20.99	43.22	21.13	43.25	41.93	46.23	13M5W7D	13M5W7D	16QAM
LTE Band 41	27	2503.5 - 2682.5	21.88	43.40	21.58	43.34	42.48	46.28	13M5W7D	13M5W7D	64QAM
LTE Band 41	27	2503.5 - 2682.5	22.23	43.47	21.73	43.37	43.96	46.43	13M5W7D	13M5W7D	256QAM
LTE Band 41	27	2506 - 2680	20.46	43.11	22.39	43.50	42.85	46.32	18M0G7D	18M0G7D	QPSK
LTE Band 41	27	2506 - 2680	20.99	43.22	22.03	43.43	42.44	46.28	18M0W7D	18M0W7D	16QAM
LTE Band 41	27	2506 - 2680	21.18	43.26	22.13	43.45	43.16	46.35	18M0W7D	18M0W7D	64QAM
LTE Band 41	27	2506 - 2680	21.33	43.29	21.23	43.27	41.99	46.23	18M0W7D	18M0W7D	256QAM

**EUT Overview** 

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## **1.0 INTRODUCTION**

## 1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

## 1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

### 1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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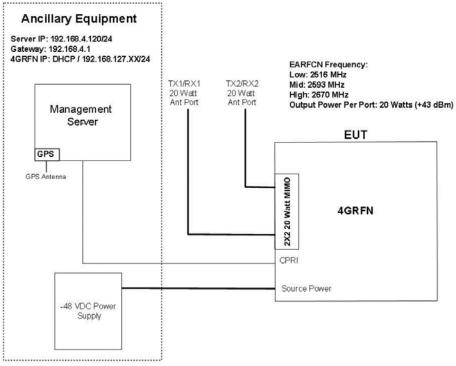


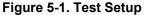
## 2.0 PRODUCT INFORMATION

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Tecore Networks Remote Radio Head FCC ID: QLJ4GRFN-041**. The test data contained in this report pertains only to the emissions due to the EUT's LTE B41 function. The Remote Radio Head generates band LTE B41 MIMO signal using QPSK, 16-QAM, 64-QAM, and 256-QAM modulations. The signal output level is set to 20 Watts from each antenna port and it is fed via a low loss cable to the input of a spectrum analyzer or a  $50\Omega$  load, depending on the type of testing performed. EUT was set up to operate as shown below with a -48VDC power supply. Server equipment was used to control the RF functions of the EUT.

#### Test Device Serial No.: 17500001





## 2.2 Device Capabilities

This device contains the following capability: LTE B41 MIMO.

## 2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015 and KDB 971168 D01 v03. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

## 2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

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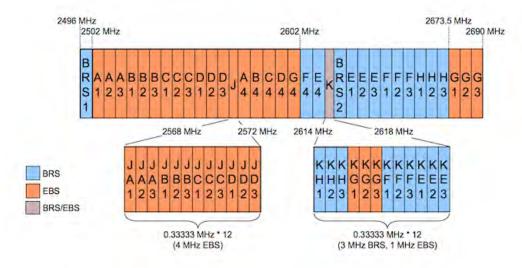


# 3.0 DESCRIPTION OF TESTS

### 3.1 Measurement Procedure

The measurement procedures described in the document titled "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services" (ANSI C63.26-2015) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03) were used in the measurement of the EUT.

### 3.2 BRS/EBS Frequency Block



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## 3.3 Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

Where,  $P_d$  is the dipole equivalent power,  $P_g$  is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to  $P_{g [dBm]}$  – cable loss [dB].

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10log<sub>10</sub>(Power [Watts]).

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# 4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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# 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9020A	MXA Signal Analyzer	12/28/2016	Annual	12/28/2017	US46470561
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128337
Huber+Suhner	Sucoflex 102A	40GHz Radiated Cable	5/19/2017	Annual	5/19/2018	251425001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	4/19/2017	Annual	4/19/2018	100342
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102135
Rohde & Schwarz	TS-PR8	Preamplifier-Antenna SYS; 30MHz-8GHz	10/19/2017	Annual	10/19/2018	102324
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/11/2017	Annual	5/11/2018	100040
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 5-1. Test Equipment

#### Note:

Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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# 6.0 SAMPLE CALCULATIONS

#### **Emission Designator**

#### **QPSK Modulation**

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz G = Phase Modulation 7 = Quantized/Digital Info D = Data transmission, telemetry, telecommand

#### **QAM Modulation**

#### Emission Designator = 8M45W7D

LTE BW = 8.45 MHz W = Amplitude/Angle Modulated 7 = Quantized/Digital Info D = Data transmission, telemetry, telecommand

### Spurious Radiated Emission – LTE Band

#### Example: Middle Channel LTE Mode 2<sup>nd</sup> Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analzyer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

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# 7.0 TEST RESULTS

# 7.1 Summary

Company Name:	Tecore Networks
FCC ID:	QLJ4GRFN-041
FCC Classification:	Licensed Non-Broadcast Station Transmitter (TNB)

Mode(s):

<u>LTE</u>

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046	Conducted Power	N/A		PASS	Section 7.2
2.1049	Occupied Bandwidth	N/A		PASS	Section 7.3
2.1051 27.53(m)	Out of Band Emissions in the Spurious Domain and at the Band Edge	Undesirable emissions must meet the limits detailed in 27.53(m)	CONDUCTED	PASS	Section7.4, 7.5
N/A	Peak-Average Ratio	N/A		PASS	Section 7.6
2.1055 27.54	Frequency Stability	Fundamental emissions stay within authorized frequency block (Part 27)		PASS	Section 7.9

Table 7-1. Summary of Conducted Test Results

FCC ID: QLJ4GRFN-041	CTEST MEASUREMENT R (CERTIFICATIO	EPORT LACOTA	<b>Approved by:</b> Quality Manager		
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FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1053 27.53(m)	Undesirable Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)	RADIATED	PASS	Section 7.7 Section 7.8

Table 7-2. Summary of Radiated Test Results

#### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots (Sections 7.3, 7.4, 7.5, 7.6) were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 4.8.
- 5) For the Radiated Emissions test, the EUT was tested for case radiated spurious emissions with both antenna ports terminated in 50ohms while the EUT was set to transmit from both antenna ports at maximum power.

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#### 7.2 Conducted Power §2.1046

#### Test Overview

The EUT was set to transmit in all four available modulations of LTE B41 mode at 43.01dBm through a management server. An output power level of 43.01dBm was used to ensure that the amplifier would operate in its linear region. The output terminal of the EUT was connected through a calibrated cable and 30dB of external attenuation to a signal analyzer. The signal analyzers' "Channel Power" function was used to measure the conducted output powers in accordance to the guidance of KDB 971168 D01 v03.

#### **Test Procedures Used**

KDB 971168 D01 v03 - Section 5.2.1

ANSI C63.26-2015 Section 6.4.3.1

#### Test Settings

- 1. Power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. Span = 2 3 times the OBW
- 3. RBW = 1 5% of the expected OBW
- 4. VBW  $\geq$  3 x RBW
- 5. No. of sweep points  $\geq$  2 x span / RBW
- 6. Sweep time = auto-couple
- 7. Detector = RMS
- 8. Trigger is set to "free run" for signals with continuous operation.
- 9. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 10. Trace mode = trace averaging (RMS) over 100 sweeps
- 11. The trace was allowed to stabilize

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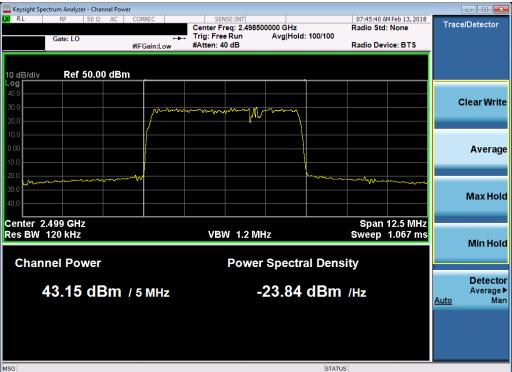
# **Antenna 1 Conducted Power Measurements**

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Conducted Power [dBm]	Conducted Power [Watts]	Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Conducted Power [dBm]	Conducted Power [Watts]
2498.50	5	QPSK	43.15	20.65	2503.50	15	QPSK	43.31	21.43
2593.00	5	QPSK	43.23	21.04	2593.00	15	QPSK	43.35	21.63
2687.50	5	QPSK	43.06	20.23	2682.50	15	QPSK	43.20	20.89
2498.50	5	16-QAM	43.31	21.43	2503.50	15	16-QAM	43.22	20.99
2593.00	5	16-QAM	43.23	21.04	2593.00	15	16-QAM	43.18	20.80
2687.50	5	16-QAM	43.38	21.78	2682.50	15	16-QAM	43.14	20.61
2498.50	5	64-QAM	43.39	21.83	2503.50	15	64-QAM	43.40	21.88
2593.00	5	64-QAM	43.19	20.84	2593.00	15	64-QAM	43.11	20.46
2687.50	5	64-QAM	43.05	20.18	2682.50	15	64-QAM	43.11	20.46
2498.50	5	256-QAM	43.25	21.13	2503.50	15	256-QAM	43.12	20.51
2593.00	5	256-QAM	43.38	21.78	2593.00	15	256-QAM	43.47	22.23
2687.50	5	256-QAM	43.07	20.28	2682.50	15	256-QAM	43.14	20.61
2501.00	10	QPSK	43.13	20.56	2506.00	20	QPSK	43.11	20.46
2593.00	10	QPSK	43.11	20.46	2593.00	20	QPSK	43.04	20.14
2685.00	10	QPSK	43.11	20.46	2680.00	20	QPSK	43.10	20.42
2501.00	10	16-QAM	43.22	20.99	2506.00	20	16-QAM	43.22	20.99
2593.00	10	16-QAM	43.09	20.37	2593.00	20	16-QAM	43.06	20.23
2685.00	10	16-QAM	43.05	20.18	2680.00	20	16-QAM	43.10	20.42
2501.00	10	64-QAM	43.15	20.65	2506.00	20	64-QAM	43.07	20.28
2593.00	10	64-QAM	43.05	20.18	2593.00	20	64-QAM	43.26	21.18
2685.00	10	64-QAM	43.17	20.75	2680.00	20	64-QAM	43.12	20.51
2501.00	10	256-QAM	43.02	20.04	2503.50	15	256-QAM	43.07	20.28
2593.00	10	256-QAM	43.01	20.00	2593.00	15	256-QAM	43.29	21.33
2685.00	10	256-QAM	43.14	20.61	2682.50	15	256-QAM	43.04	20.14

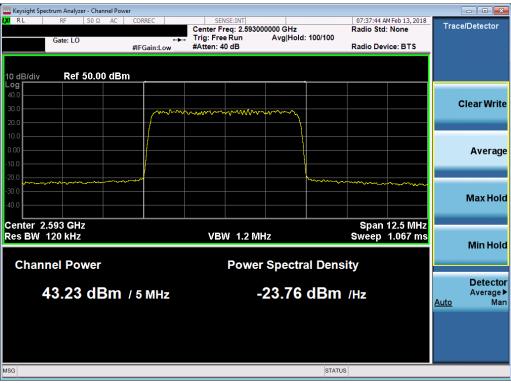
Table 7-2. Maximum Average Conducted Power

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Degs 14 of 101	
1M1801290011-01.QLJ	2/5-2/22/2018	Remote Radio Head		Page 14 of 191	
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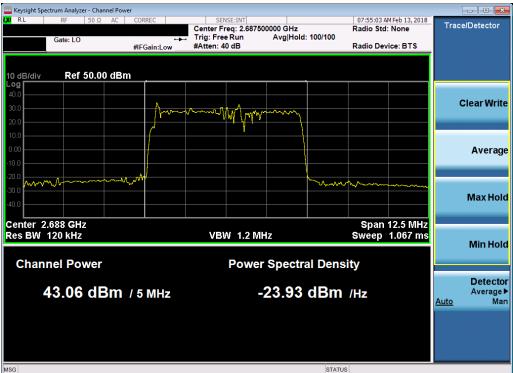
Plot 7-1. Maximum Conducted Power (Band 41 - 5.0MHz QPSK – Low Channel)



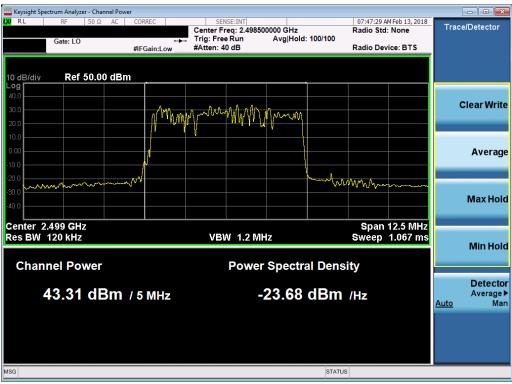
Plot 7-2. Maximum Conducted Power (Band 41 - 5.0MHz QPSK – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 15 of 101
1M1801290011-01.QLJ	2/5-2/22/2018	Remote Radio Head		Page 15 of 191
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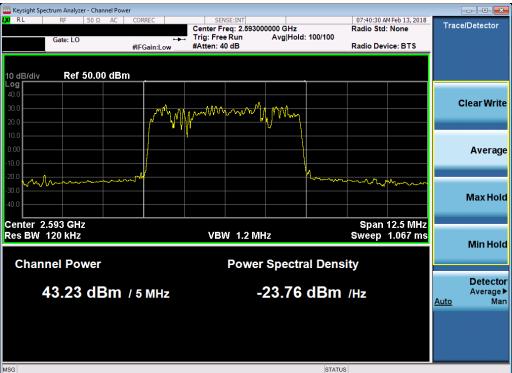
Plot 7-3. Maximum Conducted Power (Band 41 - 5.0MHz QPSK – High Channel)



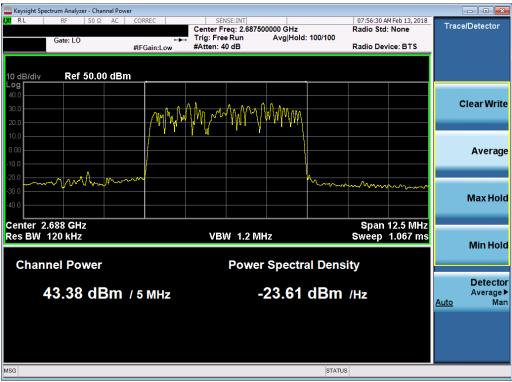
Plot 7-4. Maximum Conducted Power (Band 41 - 5.0MHz 16-QAM – Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 16 of 101
1M1801290011-01.QLJ	2/5-2/22/2018	Remote Radio Head		Page 16 of 191
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Plot 7-5. Maximum Conducted Power (Band 41 - 5.0MHz 16-QAM – Mid Channel)



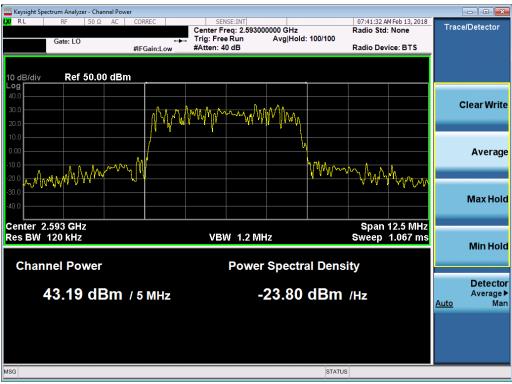
Plot 7-6. Maximum Conducted Power (Band 41 - 5.0MHz 16-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 17 of 101
1M1801290011-01.QLJ	2/5-2/22/2018	Remote Radio Head		Page 17 of 191
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www.www.com.com.com.com.com.com.com.com.com.com			
XX RL RF 50 Ω AC CORREC	SENSE:INT Center Freq: 2.498500000 GHz	07:49:42 AM Feb 13, 201 Radio Std: None	Trace/Detector
Gate: LO	Trig: Free Run Avg Hold:	100/100	
#IFGain:L	ow #Atten: 40 dB	Radio Device: BTS	=
10 dB/div Ref 50.00 dBm			
40.0			
30.0	A ALA AMANA A SHI AA A SAMA		Clear Write
20.0	MAMAAAAA		
10.0			
0.00			Average
-10.0			Ĵ
-20.0		MMMmmmm	
-20.0 -30.0			
-40.0			Max Hold
Center 2.499 GHz Res BW 120 kHz	VBW 1.2 MHz	Span 12.5 MH Sweep 1.067 m	
	V DVV 1.2 10112	Gweep 1.007 m	Min Hold
Channel Power	Power Spectra	Doneity	
	Power Spectra	Density	
42.20 dBm / 5 M			Detector Average ►
43.39 dBm / 5 мн	z -23.60	dBm /нz	Average Man
MSG		STATUS	

Plot 7-7. Maximum Conducted Power (Band 41 - 5.0MHz 64-QAM – Low Channel)



Plot 7-8. Maximum Conducted Power (Band 41 - 5.0MHz 64-QAM – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 19 of 101
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	ght Spectrum	n Analyz	er - Chai	nnel Power										-
L <mark>XI</mark> RL		RF	50 Ω	AC	CORREC			NSE:INT reg: 2.68750	0000 GH-		07:57:49	AM Feb 13, 2018	Trac	e/Detector
	Ga	ate: LO					Trig: Fre	e Run	Avg Hold:	: 100/100	Raulo Sto	. None		
					#IFGai	n:Low	#Atten: 4	0 dB			Radio De	vice: BTS		
10 dB	/div	Ref	50.00	0 dBm										
Log 40.0														
							ñ o						(	Clear Write
30.0						ANM	MINANLA	101/1/1	willin.					
20.0					1		1.84.11	N I F						
10.0					1									
0.00									h					Average
-10.0										l				
-20.0	Mm	and	n. J	WIMM	~~ <sup>1</sup>						m			
-30.0	~~~~	1	<b>V</b> 1	- 10							$\sim$	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Mayellald
-40.0														Max Hold
	er 2.68 3W 120						VP	₩ 1.2 MI	17			12.5 MHz 1.067 ms		
Rest	500 120						VD		12		Sweep	1.007 1115		Min Hold
								-	•		• 4			
Cr	nanne	1 20	wer					Power	Spectra	al Dens	ity			
														Detector
	43	.05	dE	3m /	5 M	IHz		_	23.94	dBm	/Hz		A	Average ►
													<u>Auto</u>	Man
MSG										STATUS				

Plot 7-9. Maximum Conducted Power (Band 41 - 5.0MHz 64-QAM – High Channel)



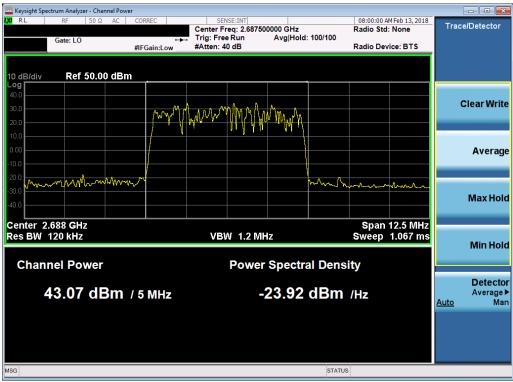
Plot 7-10. Maximum Conducted Power (Band 41 - 5.0MHz 256-QAM - Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	e	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 10 of 101
1M1801290011-01.QLJ	2/5-2/22/2018	Remote Radio Head		Page 19 of 191
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wer Keysight Spectrum Analyzer - Channel Power			
XI RL RF 50 Ω AC CORREC	SENSE:INT Center Freq: 2.593000000 GHz	07:42:59 AM F Radio Std: N	
Gate: LO	Trig: Free Run Avg Hold:		lone
#IFGain:Lo	w #Atten: 40 dB	Radio Device	e: BTS
10 dB/div Ref 50.00 dBm			
40.0			
			Clear Write
30.0			
10.0			
0.00			Average
-10.0			
-20.0 Ammana		Mummum	hon. 600
-30.0			Max Hold
-40.0			
		<b>0</b>	
Center 2.593 GHz Res BW 120 kHz	VBW 1.2 MHz	Span 12 Sweep 1.	
Res BW 120 RHZ		амеер і.	Min Hold
Ob	D 0	1 D	
Channel Power	Power Spectra	al Density	
			Detector
43.38 dBm / 5 мна	z -23.61	dBm /нz	Average► Auto Man
			<u>Auto</u> Man
MSG		STATUS	

Plot 7-11. Maximum Conducted Power (Band 41 - 5.0MHz 256-QAM - Mid Channel)



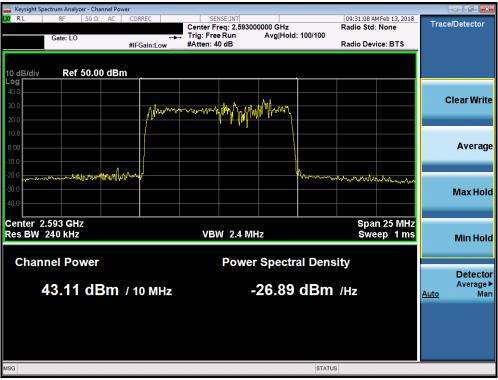
Plot 7-12. Maximum Conducted Power (Band 41 - 5.0MHz 256-QAM - High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 20 of 191
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🔤 Keysight Spectrum Analyzer - Channel Pov	/er			- <i>•</i>
LX/RL RF 50Ω AC	CORREC	SENSE:INT	09:33:03 AM Feb 13, 201 Radio Std: None	Trace/Detector
Gate: LO	#IFGain:Low	→ Trig: Free Run Avg Hold #Atten: 40 dB	Radio Device: BTS	
10 dB/div Ref 60.00 dBn	n			
50.0				
40.0				Clear Write
30.0	Julian	my MAMMAMM		
20.0		Mart Andriktla. I		
10.0				Average
-10.0				
	, N			Max Hold
-20.0 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	·V-AF		mar have have here have here have here here have here here here here here here here he	Max Hold
			0	
Center 2.501 GHz Res BW 240 kHz		VBW 2.4 MHz	Span 25 MH Sweep 1 m	
				Mill Hold
Channel Power		Power Spectr	al Density	
				Detector Average ►
43.13 dBm	/ 10 MHz	-26.87	dBm /Hz	Auto Man
MSG			STATUS	

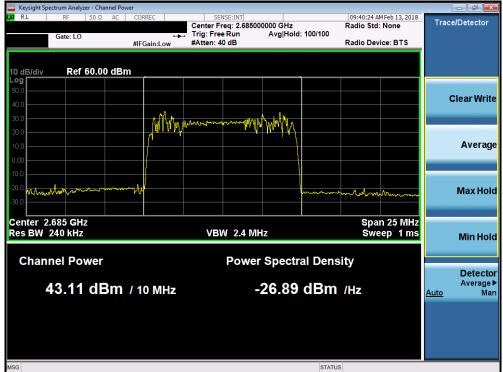
Plot 7-13. Maximum Conducted Power (Band 41 - 10.0MHz QPSK - Low Channel)



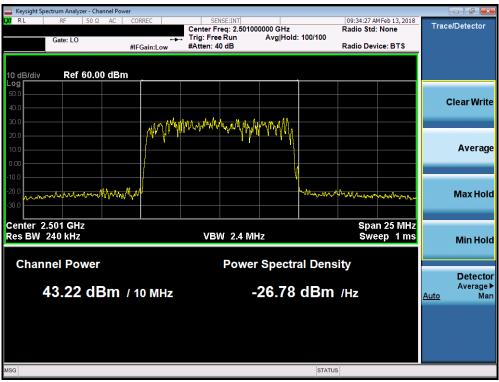
Plot 7-14. Maximum Conducted Power (Band 41 - 10.0MHz QPSK – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 01 of 101
1M1801290011-01.QLJ	2/5-2/22/2018	Remote Radio Head		Page 21 of 191
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Plot 7-15. Maximum Conducted Power (Band 41 - 10.0MHz QPSK – High Channel)



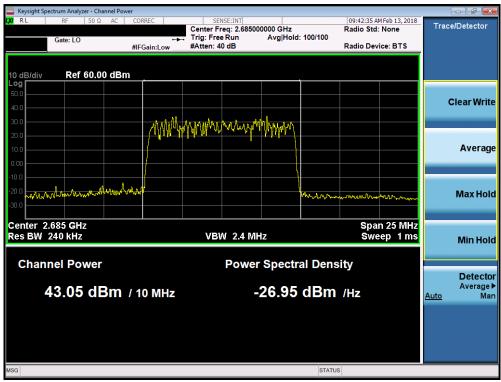
Plot 7-16. Maximum Conducted Power (Band 41 - 10.0MHz 16-QAM – Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 22 of 101	
1M1801290011-01.QLJ	2/5-2/22/2018	Remote Radio Head		Page 22 of 191	
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🔤 Keysight Spectrum Analyzer - 0	Channel Power			
KM RL RF 50 Gate: LO		SENSE:INT Center Freq: 2.593000000 GHz Trig: Free Run Avg Hold #Atten: 40 dB	09:27:43 AM Feb 13, 2018 Radio Std: None 100/100 Radio Device: BTS	Trace/Detector
	00 dBm			
40.0 30.0 20.0	portment	MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM		Clear Write
10.0 0.00 -10.0				Average
-20.0 -30.0 -40.0	Munn		Harri Alabar Arosed Ulan A lamon a rate	Max Hold
Center 2.593 GHz Res BW 240 kHz		VBW 2.4 MHz	Span 25 MHz Sweep 1 ms	Min Hold
Channel Powe 43.09 d	ег  Вт / 10 мнz	Power Spectr	dBm u	<mark>Detector</mark> Average▶ <u>Auto</u> Man
MSG			STATUS	

Plot 7-17. Maximum Conducted Power (Band 41 - 10.0MHz 16-QAM - Mid Channel)



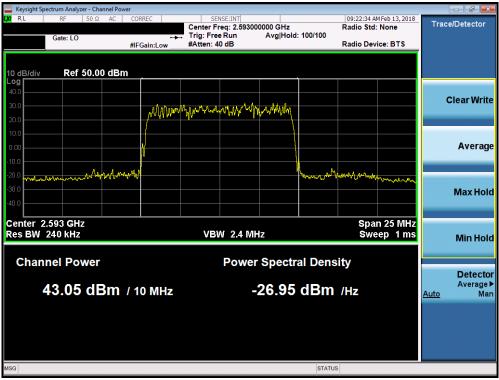
Plot 7-18. Maximum Conducted Power (Band 41 - 10.0MHz 16-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 22 of 101
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🔤 Keysight Spectrum Analyzer - Channe	el Power			- # <b>*</b>
L <mark>X/</mark> RL RF 50ΩA	AC CORREC	SENSE:INT Center Freg: 2.501000000 GH	09:35:50 AM Feb 13, 201 Z Radio Std: None	Trace/Detector
Gate: LO	++		old: 100/100	
	#IFGain:Low	#Atten: 40 dB	Radio Device: BTS	-
10 dB/div Ref 60.00 d	JBm			
50.0				
40.0				Clear Write
30.0	MUM	Whith the transformed the second s		
20.0				
10.0				Average
-10.0				
-20.0 whith the market of the second	Infly March		Muhan Mahardan Markan	Mauliald
-30.0	And a new		and make used (Leven or non-self (V. ) fold #Ou	Max Hold
Center 2.501 GHz Res BW 240 kHz		VBW 2.4 MHz	Span 25 MH Sweep 1 m	
				Mill Hold
Channel Power		Power Spec	tral Density	
				Detector Average ►
43.15 dBr	n / 10 MHz	-26.8	5 dBm /Hz	Auto Man
MSG			STATUS	

Plot 7-19. Maximum Conducted Power (Band 41 - 10.0MHz 64-QAM - Low Channel)



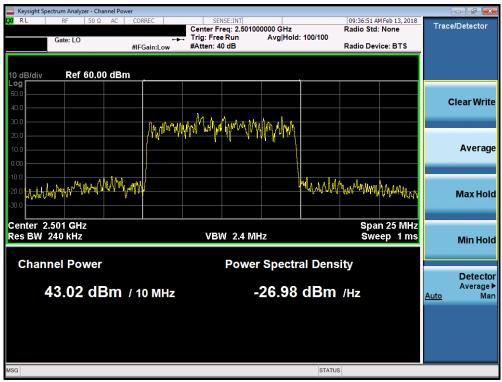
Plot 7-20. Maximum Conducted Power (Band 41 - 10.0MHz 64-QAM – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 24 of 101
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🔤 Keysight Spectrum Analyzer - Channel Power					
LX RL RF 50Ω AC CC		NSE:INT reg: 2.685000000 GHz	09:44:27 Al Radio Std:	4 Feb 13, 2018 None	Trace/Detector
Gate: LO	Gain:Low #Atten: 4		: 100/100 Radio Dev	ice: BTS	
#11	-Gain:Low #Atten: 4		Radio Dev	ice. DT3	
10 dB/div Ref 60.00 dBm					
Log 50.0					
40.0					Clear Write
30.0	M MWWWW	MA NA MARA MALANNA			
20.0		RISS AND BUILDE			
10.0		1			Average
0.00					
-10.0	li				
-20.0 www.www.Wyllhyman.Ingthill	¶		mounterman	mann	Max Hold
-30.0					
Center 2.685 GHz	VD		Spa	n 25 MHz	
Res BW 240 kHz	VBI	N 2.4 MHz	Swe	ep 1 ms	Min Hold
Channel Power		Power Spectra	al Density		
		i onei opeetti	ar benony		Detector
43.17 dBm / 1	I0 MHz	-26.83	dBm /Hz		Average ► Auto Man
MSG			STATUS		

Plot 7-21. Maximum Conducted Power (Band 41 - 10.0MHz 64-QAM - High Channel)



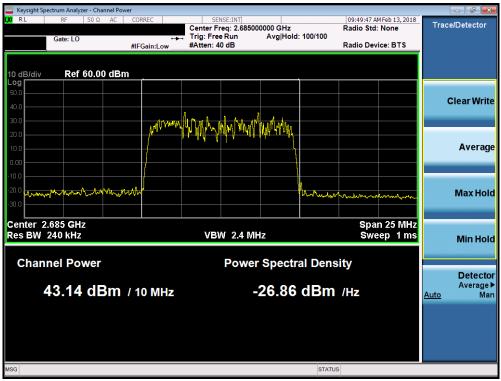
Plot 7-22. Maximum Conducted Power (Band 41 - 10.0MHz 256-QAM – Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 25 of 101
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🔤 Keysight Spectrum Analyzer - Chani							×
LXI RF 50 Ω	AC CORREC	SENSE:INT Center Freg: 2.59300	0000 GHz	09:21:28 AM Radio Std:	Feb 13, 2018 None	Trace/Detect	or
Gate: LO	₩FGain:Low	Trig: Free Run #Atten: 40 dB	Avg Hold: 100	)/100 Radio Devi	ce: BTS		
	#IFGalli:Low	#Atten: 40 ab		Rudio Derri			
10 dB/div Ref 50.00	dBm						
40.0							
30.0		Walker	1 10 100			Clear W	Irite
20.0	Land a state of the state of th	MAN AND AND A AND AND A	NUT AND				
10.0							
0.00						Aver	rage
-10.0							
-20.0 minhout al Martin	mannerthe			Mullimmation	mm		
-30.0						MaxH	lold
							-
Center 2.593 GHz Res BW 240 kHz		VBW 2.4 MH	-	Spar	n 25 MHz ep 1 ms		
Res DW 240 KHZ			2	SWE	ep i ins	Min F	lold
Channel Power		Power	Spectral	Density			
				,		Dete	
43.01 dB	m / 10 MHz	-	26.99 d	Bm /Hz		Avera Auto	age ▶ Man
MSG				STATUS			_

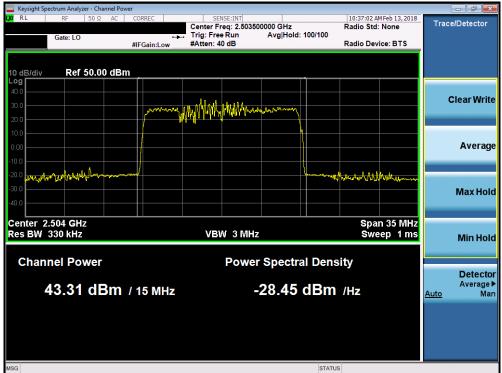
Plot 7-23. Maximum Conducted Power (Band 41 - 10.0MHz 256-QAM - Mid Channel)



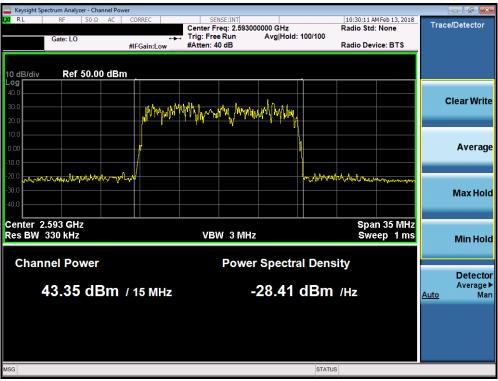
Plot 7-24. Maximum Conducted Power (Band 41 - 10.0MHz 256-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 26 of 191
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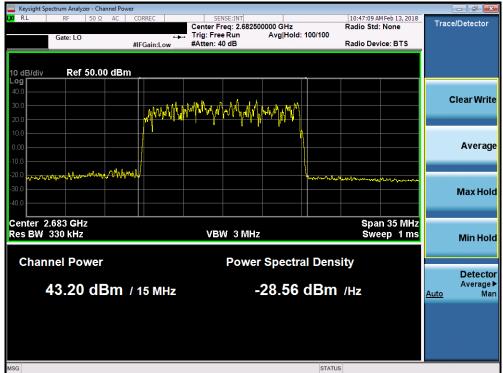
Plot 7-25. Maximum Conducted Power (Band 41 - 15.0MHz QPSK - Low Channel)



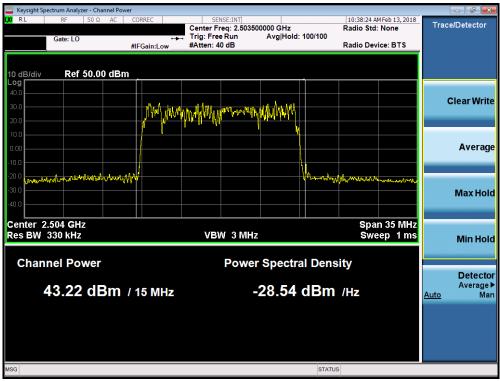
Plot 7-26. Maximum Conducted Power (Band 41 - 15.0MHz QPSK – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	vorks	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 27 of 191
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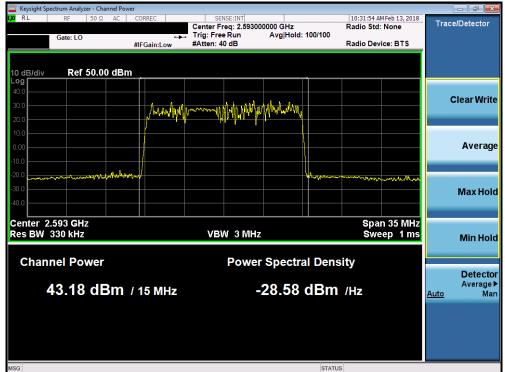
Plot 7-27. Maximum Conducted Power (Band 41 - 15.0MHz QPSK – High Channel)



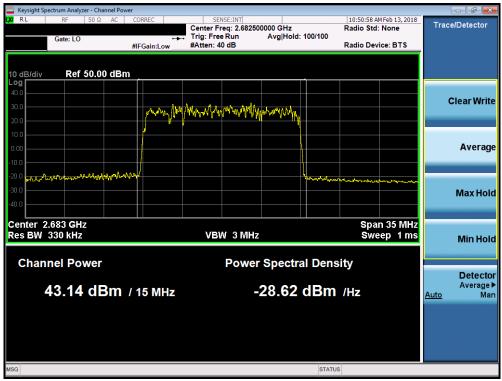
Plot 7-28. Maximum Conducted Power (Band 41 - 15.0MHz 16-QAM – Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 29 of 101	
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Plot 7-29. Maximum Conducted Power (Band 41 - 15.0MHz 16-QAM - Mid Channel)



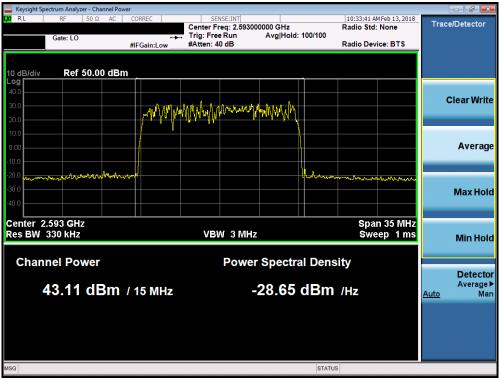
Plot 7-30. Maximum Conducted Power (Band 41 - 15.0MHz 16-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 29 of 191
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🔤 Keysight Spectrum Analyzer - Chann	nel Power			- 5 🔀
LX RL RF 50 Ω Gate: LO	AC CORREC	SENSE:INT Center Freq: 2.503500000 GHz Trig: Free Run Avg Hold #Atten: 40 dB	10:39:50 AM Feb 13, 2018 Radio Std: None d: 100/100 Radio Device: BTS	Trace/Detector
10 dB/div Ref 50.00	dBm			
40.0 30.0 20.0	Mund Mark	un Marran A. M. M. M. Martin and M. polow react	4	Clear Write
10.0			with hidda there are a	Average
-0.0 -20.0 MANAMAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA			MANA MANAMANANA MANA	Max Hold
Center 2.504 GHz Res BW 330 kHz		VBW 3 MHz	Span 35 MHz Sweep 1 ms	Min Hold
Channel Power		Power Spect	ral Density	Detector
43.40 dB	M / 15 MHz	-28.36	dBm /Hz	Average► <u>Auto</u> Man
MSG			STATUS	

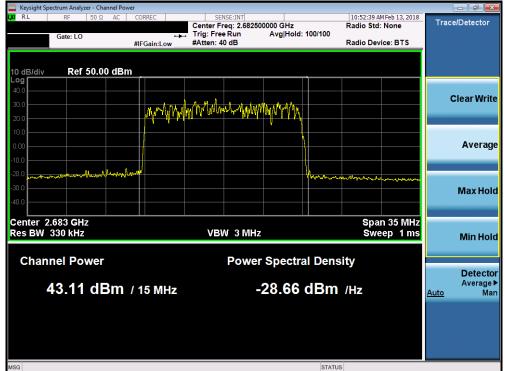
Plot 7-31. Maximum Conducted Power (Band 41 - 15.0MHz 64-QAM - Low Channel)



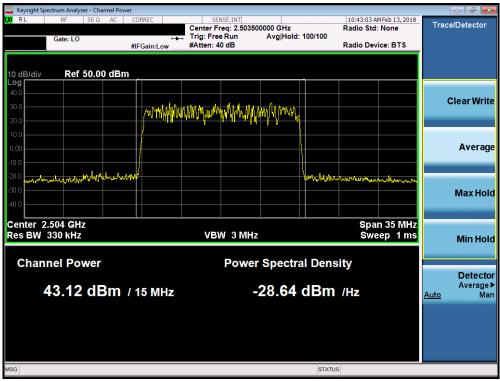
Plot 7-32. Maximum Conducted Power (Band 41 - 15.0MHz 64-QAM - Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	0	Approved by: Quality Manager
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Plot 7-33. Maximum Conducted Power (Band 41 - 15.0MHz 64-QAM - High Channel)



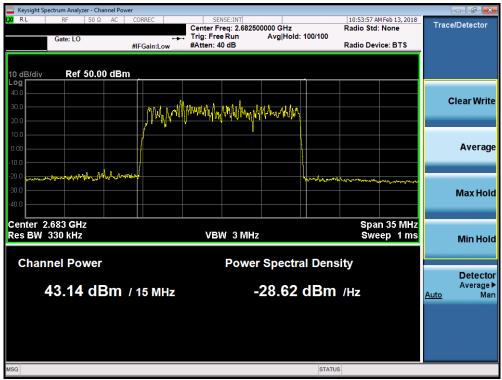
Plot 7-34. Maximum Conducted Power (Band 41 - 15.0MHz 256-QAM – Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
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🤤 Keysight Spectrum Analyzer - Channel Po	ower				
LX RL RF 50Ω AC	CORREC	SENSE:INT	GHz	10:44:23 AM Feb 13, 2018 Radio Std: None	Trace/Detector
Gate: LO		ig:FreeRun Av Atten:40 dB	g Hold: 100/100	Radio Device: BTS	
	#IFGain:Low #A	Atten: 40 dB		Radio Device. B13	
10 dB/div Ref 50.00 dB	m				
40.0					
30.0	ለሌቀላለ ቢ	W. Adaptatate And Mar	Nh .Nh		Clear Write
20.0		<u>h . A' ana talante e sin</u> ba			
10.0					
0.00					Average
-10.0 -20.0 workwork have been here here	1- W		م الدين عام الأل	Margandere	
-20.0 Manual Manual Contraction			. the technology hitses	Mar Marchinka where	
-30.0					Max Hold
Center 2.593 GHz Res BW 330 kHz		VBW 3 MHz		Span 35 MHz Sweep 1 ms	
Res DW 330 KHZ				Sweep This	Min Hold
Channel Power		Power Sp	ectral Densi	tv	
		i onoi op		- ,	Detector
43.47 dBm	/ 15 MHz	-28	.29 dBm	/Hz	Average ► Auto Man
					<u>Auto</u> man
MSG			STATUS		

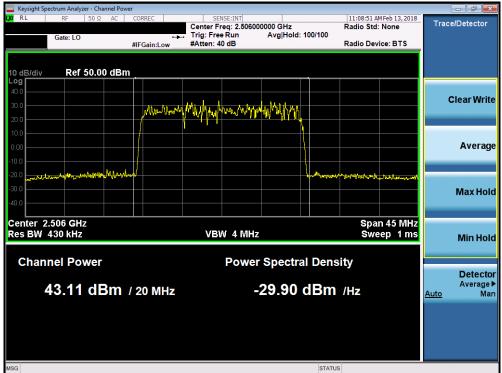
Plot 7-35. Maximum Conducted Power (Band 41 - 15.0MHz 256-QAM - Mid Channel)



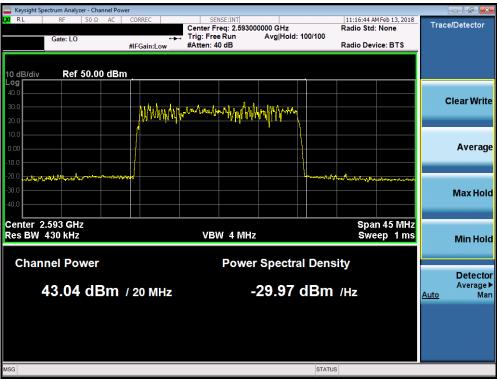
Plot 7-36. Maximum Conducted Power (Band 41 - 15.0MHz 256-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 22 of 101
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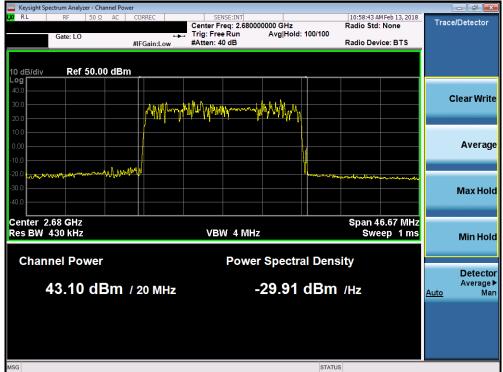
Plot 7-37. Maximum Conducted Power (Band 41 - 20.0MHz QPSK - Low Channel)



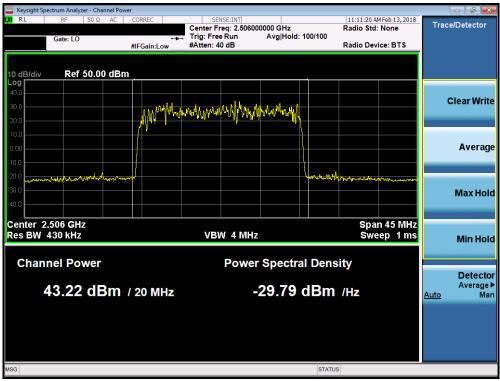
Plot 7-38. Maximum Conducted Power (Band 41 - 20.0MHz QPSK – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	eks	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 101
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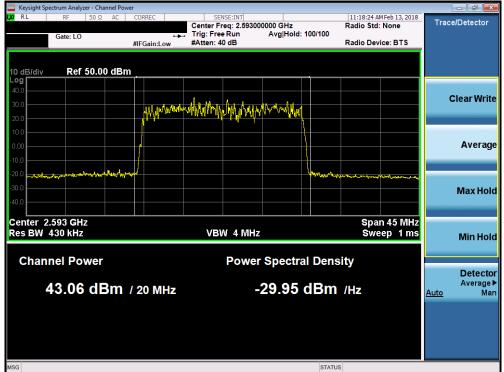
Plot 7-39. Maximum Conducted Power (Band 41 - 20.0MHz QPSK – High Channel)



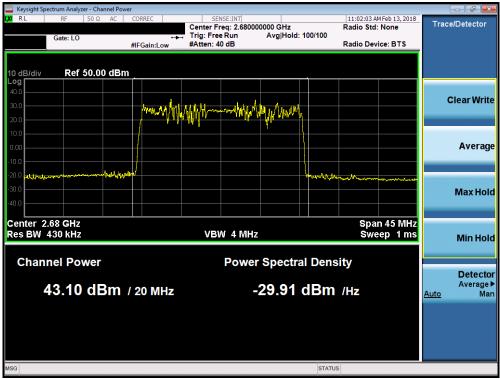
Plot 7-40. Maximum Conducted Power (Band 41 - 20.0MHz 16-QAM – Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 24 of 101
1M1801290011-01.QLJ	2/5-2/22/2018	Remote Radio Head	Page 34 of 191
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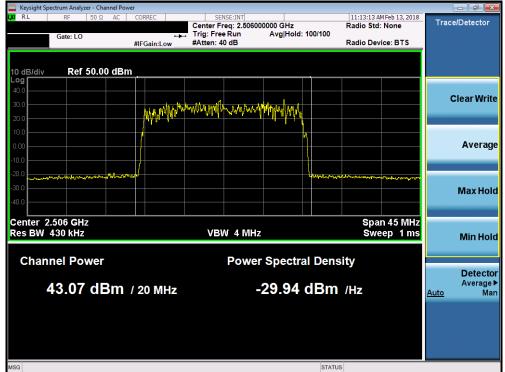
Plot 7-41. Maximum Conducted Power (Band 41 - 20.0MHz 16-QAM - Mid Channel)



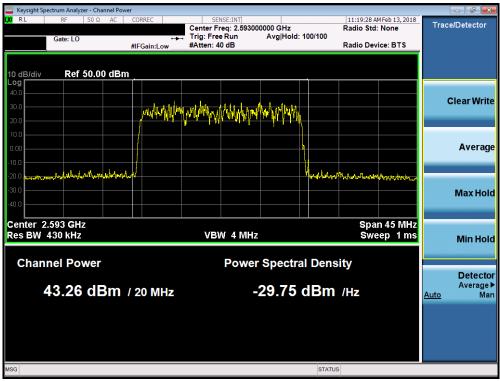
Plot 7-42. Maximum Conducted Power (Band 41 - 20.0MHz 16-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
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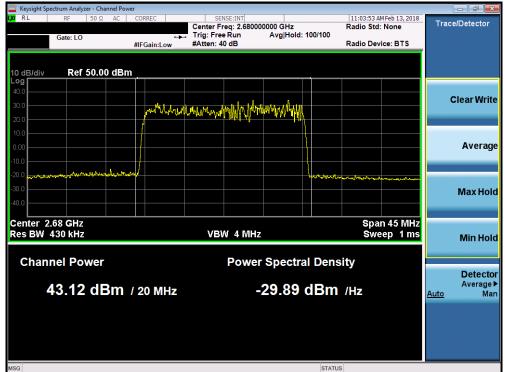
Plot 7-43. Maximum Conducted Power (Band 41 - 20.0MHz 64-QAM - Low Channel)



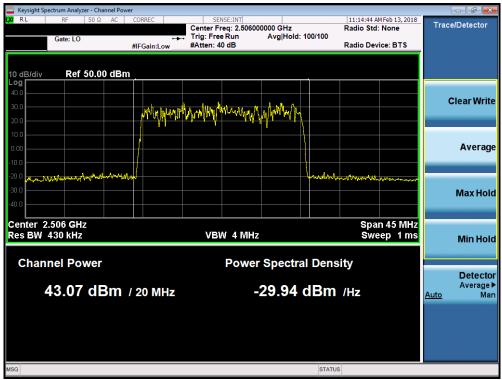
Plot 7-44. Maximum Conducted Power (Band 41 - 20.0MHz 64-QAM – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 36 of 191
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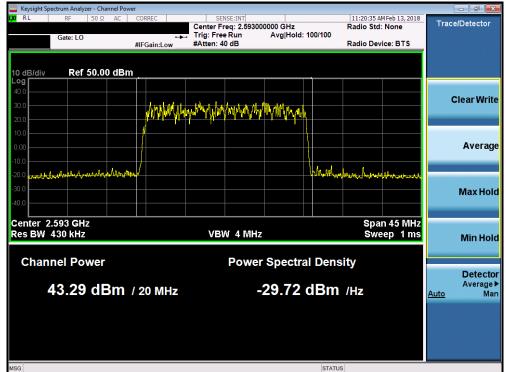
Plot 7-45. Maximum Conducted Power (Band 41 - 20.0MHz 64-QAM - High Channel)



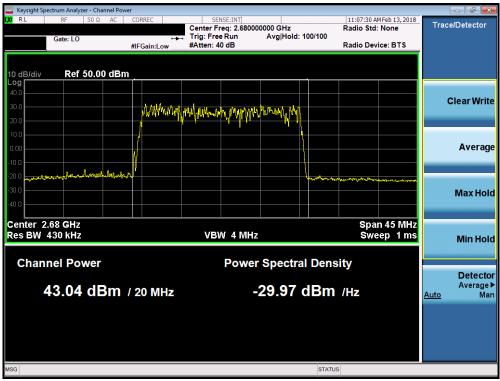
Plot 7-46. Maximum Conducted Power (Band 41 - 20.0MHz 256-QAM – Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 27 of 101	
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Plot 7-47. Maximum Conducted Power (Band 41 - 20.0MHz 256-QAM - Mid Channel)



Plot 7-48. Maximum Conducted Power (Band 41 - 20.0MHz 256-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 28 of 101
1M1801290011-01.QLJ	2/5-2/22/2018	Remote Radio Head		Page 38 of 191
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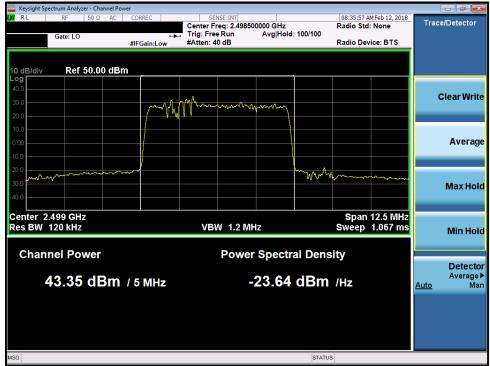
# **Antenna 2 Conducted Power Measurements**

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Conducted Power [dBm]	Conducted Power [Watts]	Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Conducted Power [dBm]	Conducted Power [Watts]
2498.50	5	QPSK	43.35	21.63	2503.50	15	QPSK	43.32	21.48
2593.00	5	QPSK	43.13	20.56	2593.00	15	QPSK	43.02	20.04
2687.50	5	QPSK	43.04	20.14	2682.50	15	QPSK	43.07	20.28
2498.50	5	16-QAM	43.28	21.28	2503.50	15	16-QAM	43.02	20.04
2593.00	5	16-QAM	43.37	21.73	2593.00	15	16-QAM	43.25	21.13
2687.50	5	16-QAM	43.06	20.23	2682.50	15	16-QAM	43.07	20.28
2498.50	5	64-QAM	43.41	21.93	2503.50	15	64-QAM	43.14	20.61
2593.00	5	64-QAM	43.08	20.32	2593.00	15	64-QAM	43.34	21.58
2687.50	5	64-QAM	43.09	20.37	2682.50	15	64-QAM	43.22	20.99
2498.50	5	256-QAM	43.08	20.32	2503.50	15	256-QAM	43.11	20.46
2593.00	5	256-QAM	43.18	20.80	2593.00	15	256-QAM	43.37	21.73
2687.50	5	256-QAM	43.31	21.43	2682.50	15	256-QAM	43.22	20.99
2501.00	10	QPSK	43.45	22.13	2506.00	20	QPSK	43.50	22.39
2593.00	10	QPSK	43.31	21.43	2593.00	20	QPSK	43.45	22.13
2685.00	10	QPSK	43.06	20.23	2680.00	20	QPSK	43.46	22.18
2501.00	10	16-QAM	43.43	22.03	2506.00	20	16-QAM	43.24	21.09
2593.00	10	16-QAM	43.26	21.18	2593.00	20	16-QAM	43.36	21.68
2685.00	10	16-QAM	43.15	20.65	2680.00	20	16-QAM	43.43	22.03
2501.00	10	64-QAM	43.50	22.39	2506.00	20	64-QAM	43.45	22.13
2593.00	10	64-QAM	43.23	21.04	2593.00	20	64-QAM	43.42	21.98
2685.00	10	64-QAM	43.22	20.99	2680.00	20	64-QAM	43.44	22.08
2501.00	10	256-QAM	43.30	21.38	2506.00	20	256-QAM	43.17	20.75
2593.00	10	256-QAM	43.05	20.18	2593.00	20	256-QAM	43.15	20.65
2685.00	10	256-QAM	43.14	20.61	2680.00	20	256-QAM	43.27	21.23

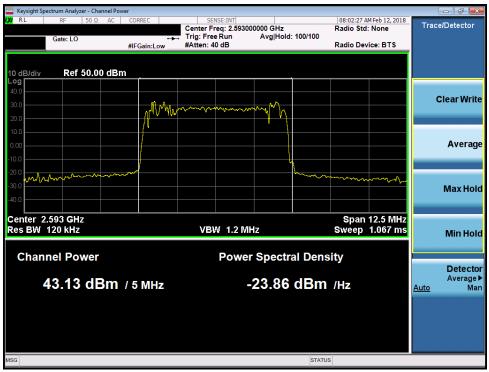
Table 7-2. Maximum Average Conducted Power

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
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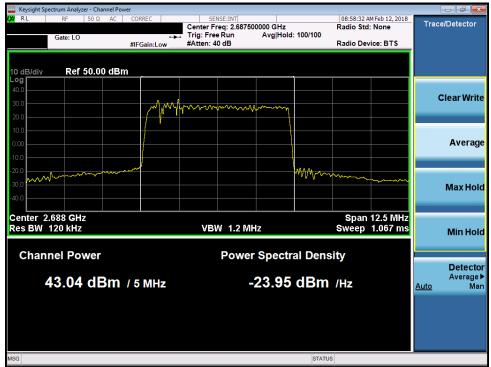
Plot 7-49. Maximum Conducted Power (Band 41 - 5.0MHz QPSK - Low Channel)



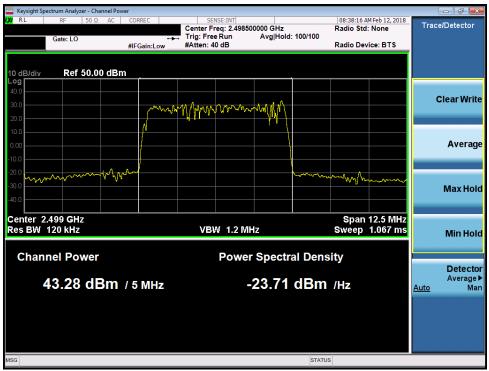
Plot 7-50. Maximum Conducted Power (Band 41 - 5.0MHz QPSK - Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Daga 10 of 101		
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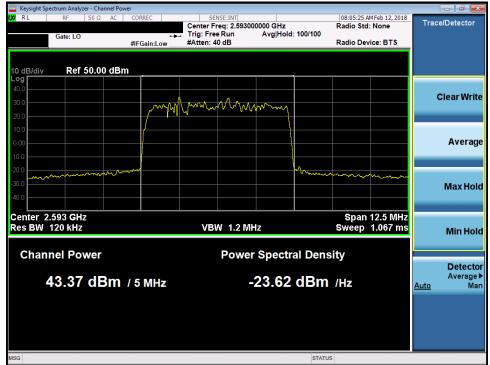
Plot 7-51. Maximum Conducted Power (Band 41 - 5.0MHz QPSK - High Channel)



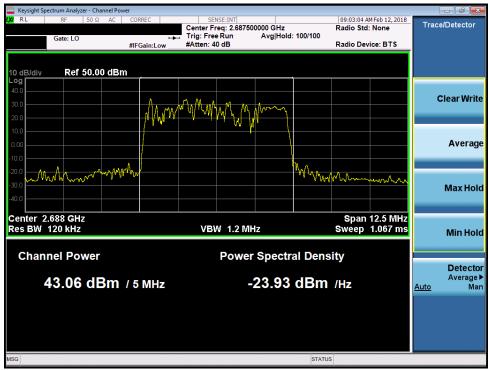
Plot 7-52. Maximum Conducted Power (Band 41 - 5.0MHz 16-QAM - Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 41 of 101		
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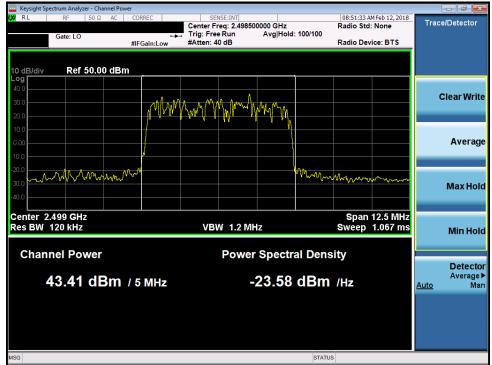
Plot 7-53. Maximum Conducted Power (Band 41 - 5.0MHz 16-QAM - Mid Channel)



Plot 7-54. Maximum Conducted Power (Band 41 - 5.0MHz 16-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Daga 12 of 101		
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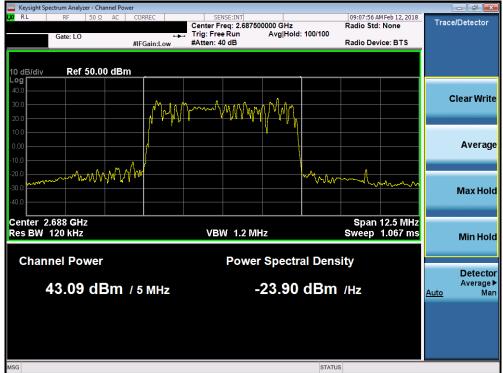
Plot 7-55. Maximum Conducted Power (Band 41 - 5.0MHz 64-QAM - Low Channel)



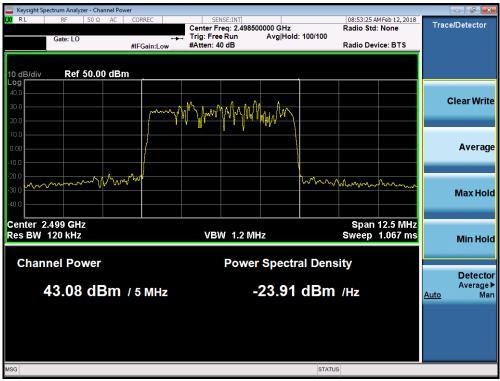
Plot 7-56. Maximum Conducted Power (Band 41 - 5.0MHz 64-QAM – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 42 of 101		
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Plot 7-57. Maximum Conducted Power (Band 41 - 5.0MHz 64-QAM - High Channel)



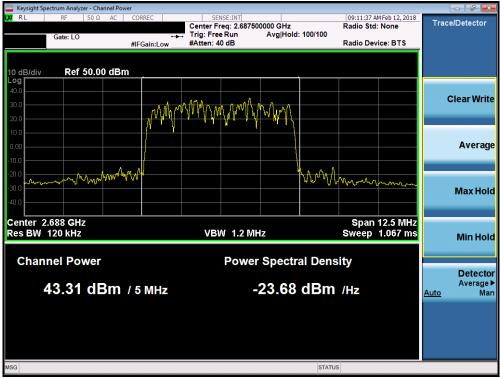
Plot 7-58. Maximum Conducted Power (Band 41 - 5.0MHz 256-QAM - Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Channel Power									
LXX RL RF 50Ω AC COP	RREC		NSE:INT eq: 2.59300	0000 GHz		08:16:28 / Radio Std	M Feb 12, 2018	Trac	e/Detector
Gate: LO	⊶ Gain:Low		e Run	Avg Hold	: 100/100	Radio De	vice: BTS		
#1F0	Jain:Low	#Atten: 4	U UB			Radio De	VICE. B13		
10 dB/div Ref 50.00 dBm									
40.0									
30.0			0 0.1						Clear Write
20.0	WWWW	WAMM	/www.Mi	Mr. Mr.					
10.0	<b>1</b>	1.1		'\					
0.00	*								Average
-10.0									<b>.</b> j.
					A A AN				
-20.0 MMMMMMMMMM					www.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	www		Max Hold
-40.0									Μάλ Ποια
							10.5.8411		
Center 2.593 GHz Res BW 120 kHz		VBV	V 1.2 MH	7			12.5 MHz 1.067 ms		
			1.2 11	2		oncep	1.001 1115		Min Hold
Channel Power			Power	Spectr	al Dens	itv			
				-		,			Detector
43.18 dBm / 5	MHz		_;	23.81	dBm	/Hz		Auto	Average ► Man
								Auto	IN BIN
MSG					STATUS				

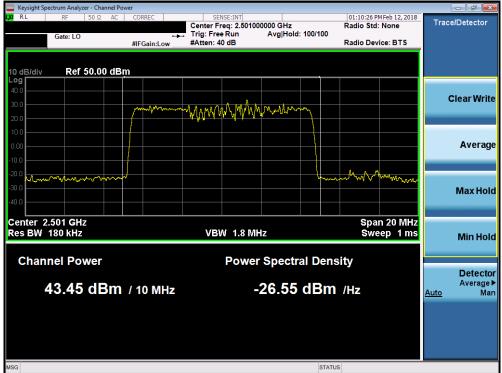
Plot 7-59. Maximum Conducted Power (Band 41 - 5.0MHz 256-QAM - Mid Channel)



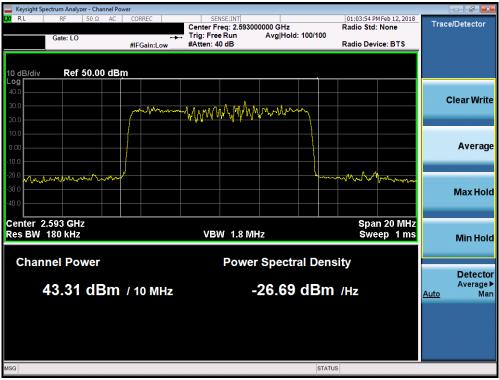
Plot 7-60. Maximum Conducted Power (Band 41 - 5.0MHz 256-QAM - High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
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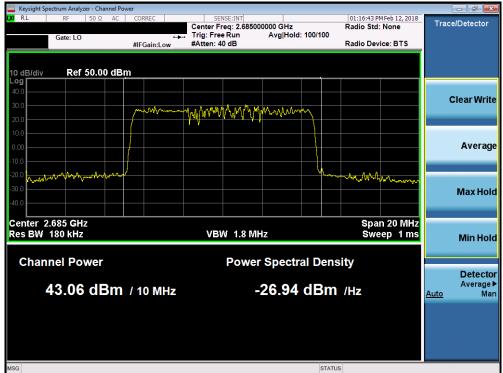
Plot 7-61. Maximum Conducted Power (Band 41 - 10.0MHz QPSK - Low Channel)



Plot 7-62. Maximum Conducted Power (Band 41 - 10.0MHz QPSK – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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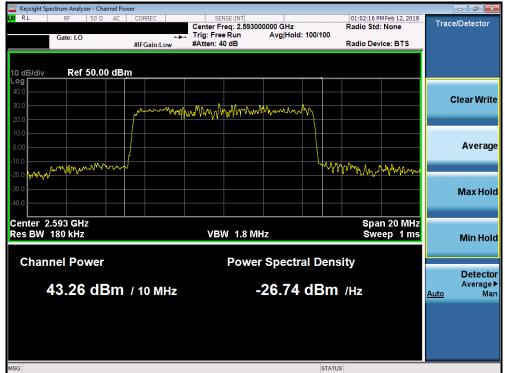
Plot 7-63. Maximum Conducted Power (Band 41 - 10.0MHz QPSK – High Channel)



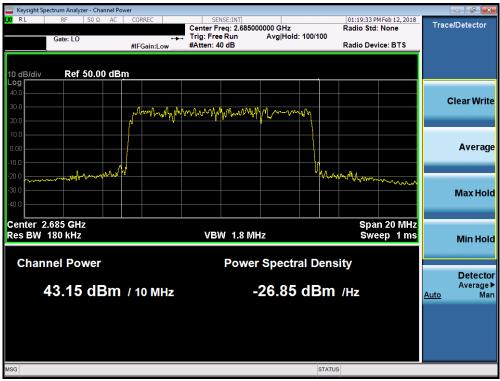
Plot 7-64. Maximum Conducted Power (Band 41 - 10.0MHz 16-QAM - Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 47 of 191
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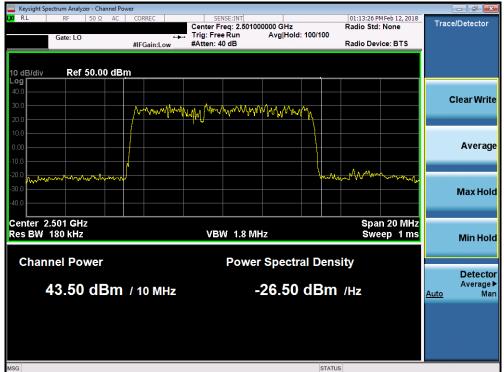
Plot 7-65. Maximum Conducted Power (Band 41 - 10.0MHz 16-QAM - Mid Channel)



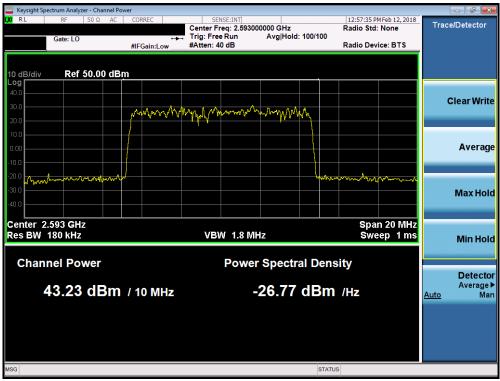
Plot 7-66. Maximum Conducted Power (Band 41 - 10.0MHz 16-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 49 of 101
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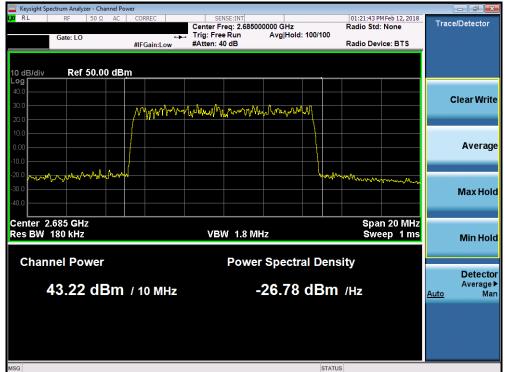
Plot 7-67. Maximum Conducted Power (Band 41 - 10.0MHz 64-QAM - Low Channel)



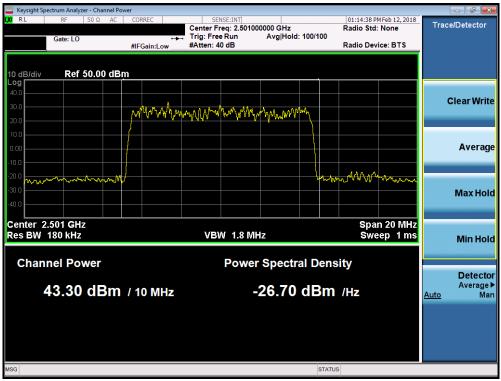
Plot 7-68. Maximum Conducted Power (Band 41 - 10.0MHz 64-QAM – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
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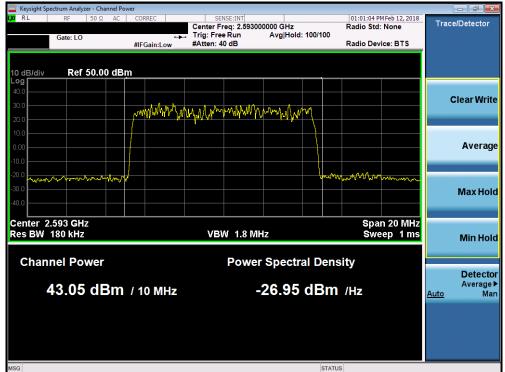
Plot 7-69. Maximum Conducted Power (Band 41 - 10.0MHz 64-QAM - High Channel)



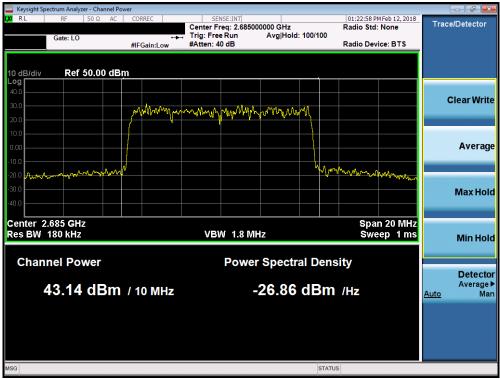
Plot 7-70. Maximum Conducted Power (Band 41 - 10.0MHz 256-QAM - Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 50 of 101
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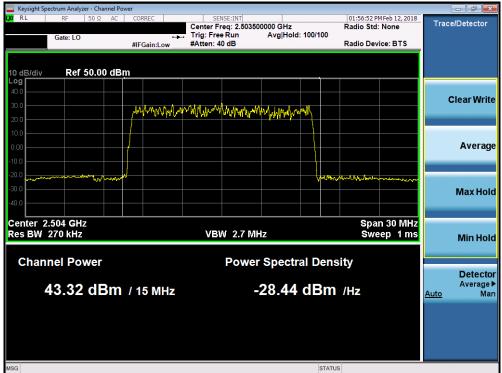
Plot 7-71. Maximum Conducted Power (Band 41 - 10.0MHz 256-QAM - Mid Channel)



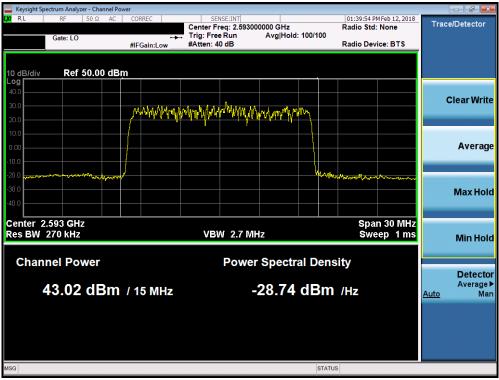
Plot 7-72. Maximum Conducted Power (Band 41 - 10.0MHz 256-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
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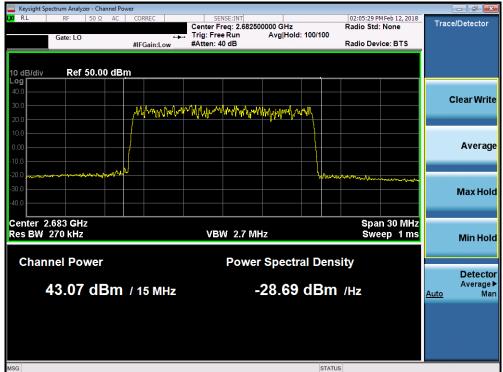
Plot 7-73. Maximum Conducted Power (Band 41 - 15.0MHz QPSK - Low Channel)



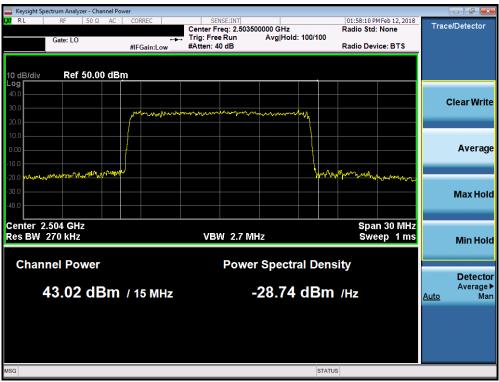
Plot 7-74. Maximum Conducted Power (Band 41 - 15.0MHz QPSK – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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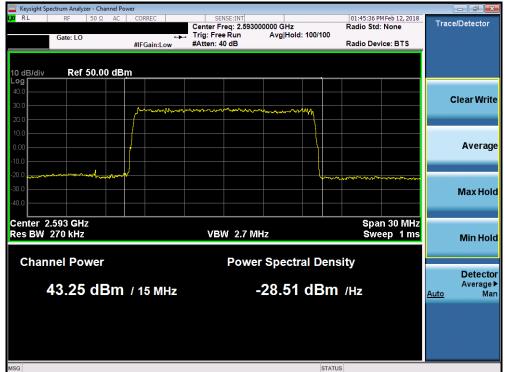
Plot 7-75. Maximum Conducted Power (Band 41 - 15.0MHz QPSK – High Channel)



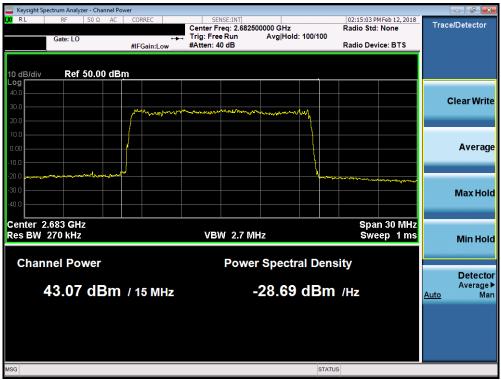
Plot 7-76. Maximum Conducted Power (Band 41 - 15.0MHz 16-QAM - Low Channel)

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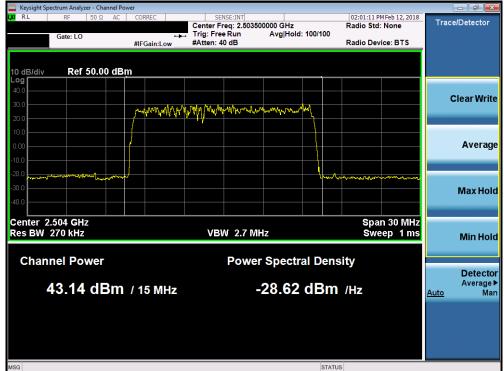
Plot 7-77. Maximum Conducted Power (Band 41 - 15.0MHz 16-QAM - Mid Channel)



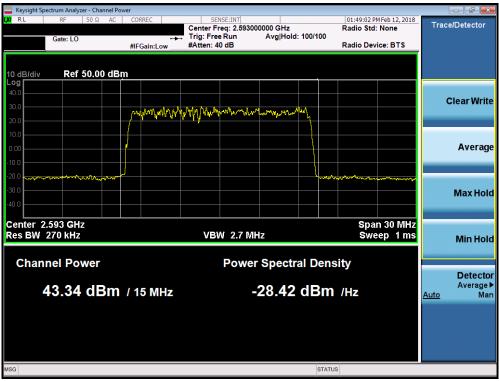
Plot 7-78. Maximum Conducted Power (Band 41 - 15.0MHz 16-QAM – High Channel)

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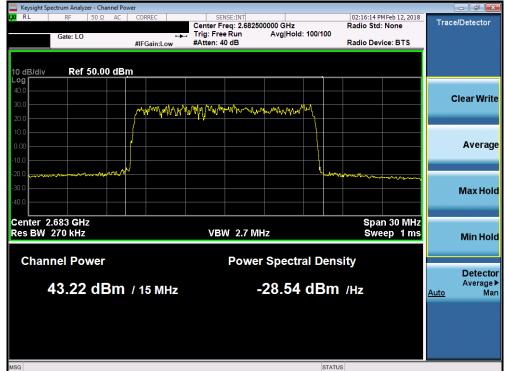
Plot 7-79. Maximum Conducted Power (Band 41 - 15.0MHz 64-QAM - Low Channel)



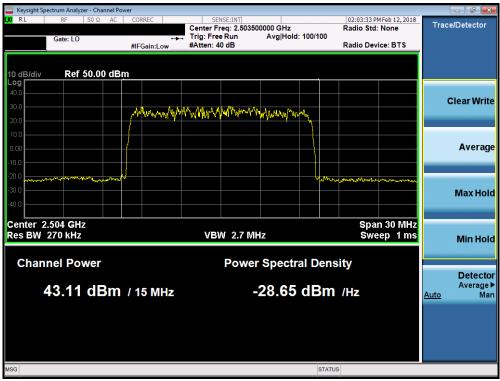
Plot 7-80. Maximum Conducted Power (Band 41 - 15.0MHz 64-QAM – Mid Channel)

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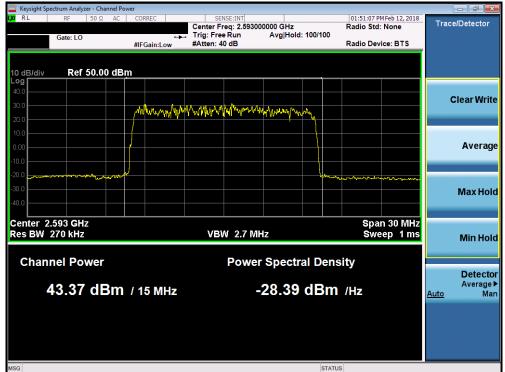
Plot 7-81. Maximum Conducted Power (Band 41 - 15.0MHz 64-QAM - High Channel)



Plot 7-82. Maximum Conducted Power (Band 41 - 15.0MHz 256-QAM - Low Channel)

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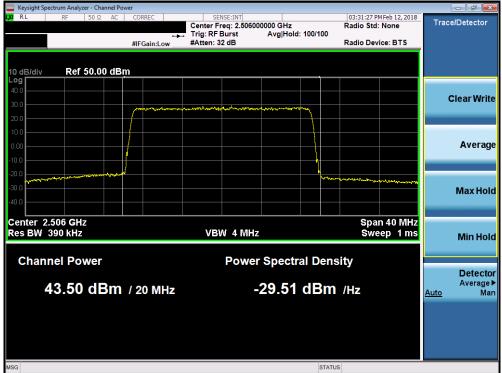
Plot 7-83. Maximum Conducted Power (Band 41 - 15.0MHz 256-QAM - Mid Channel)



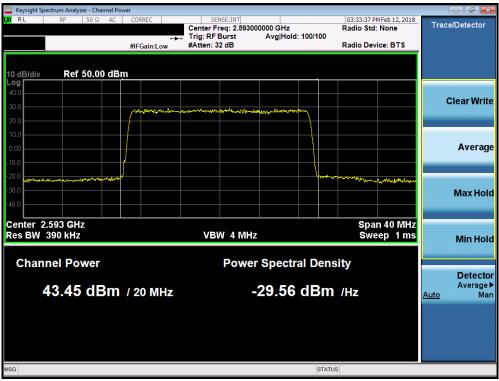
Plot 7-84. Maximum Conducted Power (Band 41 - 15.0MHz 256-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
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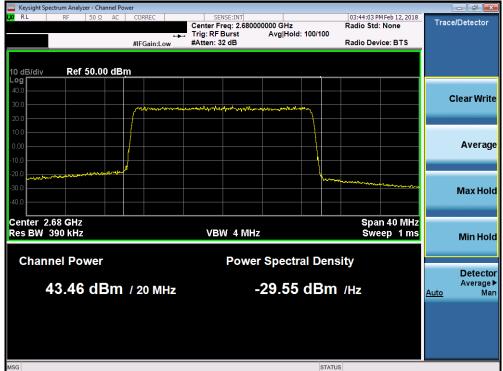
Plot 7-85. Maximum Conducted Power (Band 41 - 20.0MHz QPSK - Low Channel)



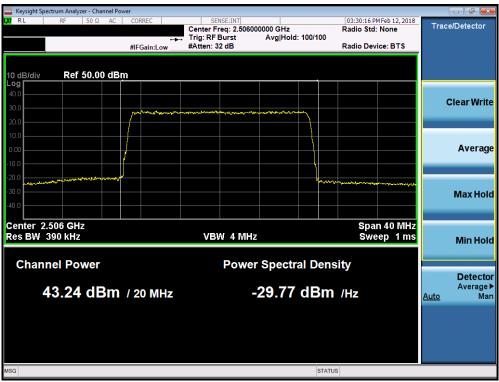
Plot 7-86. Maximum Conducted Power (Band 41 - 20.0MHz QPSK – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager
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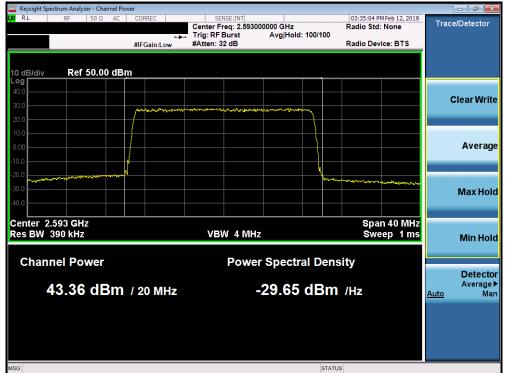
Plot 7-87. Maximum Conducted Power (Band 41 - 20.0MHz QPSK – High Channel)



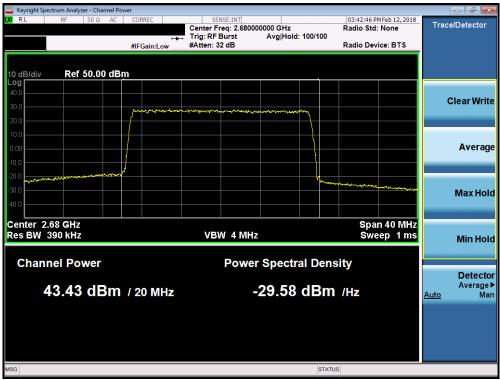
Plot 7-88. Maximum Conducted Power (Band 41 - 20.0MHz 16-QAM - Low Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager	
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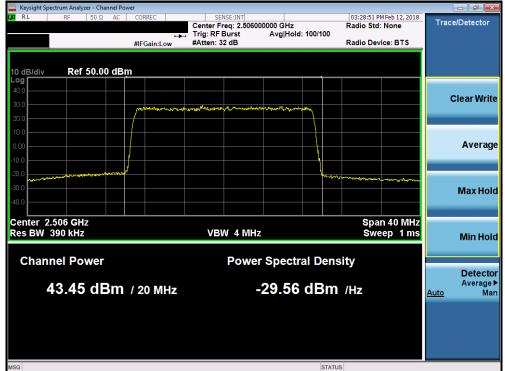
Plot 7-89. Maximum Conducted Power (Band 41 - 20.0MHz 16-QAM - Mid Channel)



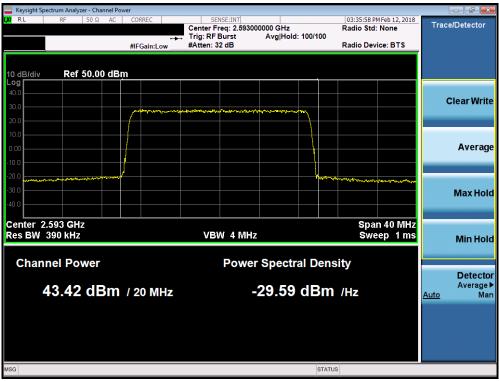
Plot 7-90. Maximum Conducted Power (Band 41 - 20.0MHz 16-QAM – High Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager	
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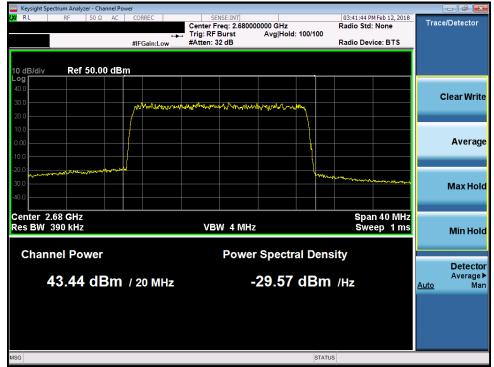
Plot 7-91. Maximum Conducted Power (Band 41 - 20.0MHz 64-QAM - Low Channel)



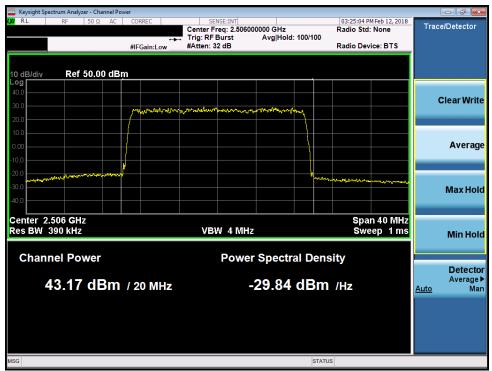
Plot 7-92. Maximum Conducted Power (Band 41 - 20.0MHz 64-QAM – Mid Channel)

FCC ID: QLJ4GRFN-041		MEASUREMENT REPORT (CERTIFICATION)	Tecore	Approved by: Quality Manager	
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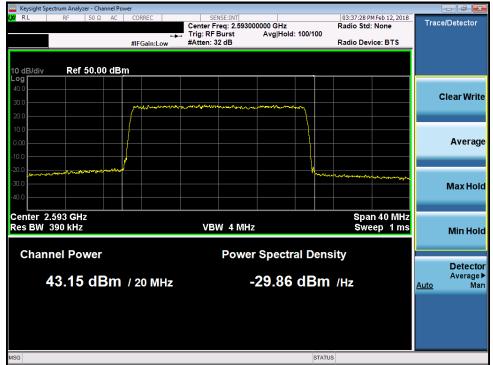
Plot 7-93. Maximum Conducted Power (Band 41 - 20.0MHz 64-QAM - High Channel)



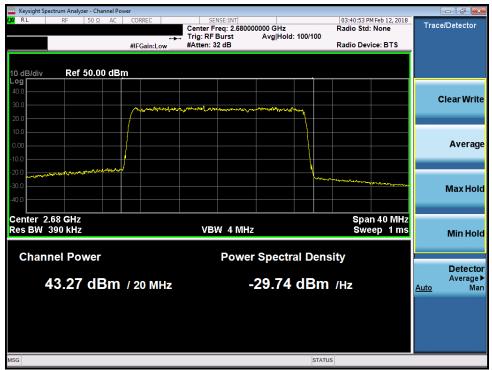
Plot 7-94. Maximum Conducted Power (Band 41 - 20.0MHz 256-QAM - Low Channel)

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Plot 7-95. Maximum Conducted Power (Band 41 - 20.0MHz 256-QAM - Mid Channel)



Plot 7-96. Maximum Conducted Power (Band 41 - 20.0MHz 256-QAM – High Channel)

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## MIMO Conducted Power Measurements

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	ANT 1 Conducted Power [dBm]	ANT 2 Conducted Power [dBm]	MIMO Conducted Power [dBm]	MIMO Conducted Power [Watts]	Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	ANT 1 Conducted Power [dBm]	ANT 2 Conducted Power [dBm]	MIMO Conducted Power [dBm]	MIMO Conducted Power [Watts]
2498.50	5	QPSK	43.15	43.35	46.26	42.28	2503.50	15	QPSK	43.31	43.32	46.33	42.91
2593.00	5	QPSK	43.23	43.13	46.19	41.60	2593.00	15	QPSK	43.35	43.02	46.20	41.67
2687.50	5	QPSK	43.06	43.04	46.06	40.37	2682.50	15	QPSK	43.20	43.07	46.15	41.17
2498.50	5	16-QAM	43.31	43.28	46.31	42.71	2503.50	15	16-QAM	43.22	43.02	46.13	41.03
2593.00	5	16-QAM	43.23	43.37	46.31	42.76	2593.00	15	16-QAM	43.18	43.25	46.23	41.93
2687.50	5	16-QAM	43.38	43.06	46.23	42.01	2682.50	15	16-QAM	43.14	43.07	46.12	40.88
2498.50	5	64-QAM	43.39	43.41	46.41	43.76	2503.50	15	64-QAM	43.40	43.14	46.28	42.48
2593.00	5	64-QAM	43.19	43.08	46.15	41.17	2593.00	15	64-QAM	43.11	43.34	46.24	42.04
2687.50	5	64-QAM	43.05	43.09	46.08	40.55	2682.50	15	64-QAM	43.11	43.22	46.18	41.45
2498.50	5	256-QAM	43.42	43.08	46.26	42.30	2503.50	15	256-QAM	43.12	43.11	46.13	40.98
2593.00	5	256-QAM	43.38	43.18	46.29	42.57	2593.00	15	256-QAM	43.47	43.37	46.43	43.96
2687.50	5	256-QAM	43.07	43.31	46.20	41.71	2682.50	15	256-QAM	43.14	43.22	46.19	41.60
2501.00	10	QPSK	43.13	43.45	46.30	42.69	2506.00	20	QPSK	43.11	43.50	46.32	42.85
2593.00	10	QPSK	43.11	43.31	46.22	41.89	2593.00	20	QPSK	43.04	43.45	46.26	42.27
2685.00	10	QPSK	43.11	43.06	46.10	40.69	2680.00	20	QPSK	43.10	43.46	46.29	42.60
2501.00	10	16-QAM	43.22	43.43	46.34	43.02	2506.00	20	16-QAM	43.22	43.24	46.24	42.08
2593.00	10	16-QAM	43.09	43.26	46.19	41.55	2593.00	20	16-QAM	43.06	43.36	46.22	41.91
2685.00	10	16-QAM	43.05	43.15	46.11	40.84	2680.00	20	16-QAM	43.10	43.43	46.28	42.45
2501.00	10	64-QAM	43.15	43.50	46.34	43.04	2506.00	20	64-QAM	43.07	43.45	46.27	42.41
2593.00	10	64-QAM	43.05	43.23	46.15	41.22	2593.00	20	64-QAM	43.26	43.42	46.35	43.16
2685.00	10	64-QAM	43.17	43.22	46.21	41.74	2680.00	20	64-QAM	43.12	43.44	46.29	42.59
2501.00	10	256-QAM	43.02	43.30	46.17	41.42	2506.00	20	256-QAM	43.07	43.17	46.13	41.03
2593.00	10	256-QAM	43.01	43.05	46.04	40.18	2593.00	20	256-QAM	43.29	43.15	46.23	41.98
2685.00	10	256-QAM	43.14	43.14	46.15	41.21	2680.00	20	256-QAM	43.04	43.27	46.17	41.37

 Table 7-2. Maximum Average Conducted Power

## Note:

Per ANSI C63.10-2015 Section 6.4.3.1 and KDB 662911 v02r01 Section E)1), the conducted powers at Antenna 1 and Antenna 2 were first measured separately during MIMO transmission as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

### Sample MIMO Calculation:

At 2498.5MHz in QPSK modulation, the average conducted output power was measured to be 43.15 dBm for Antenna-1 and 43.35 dBm for Antenna-2.

### Antenna 1 + Antenna 2 = MIMO

(43.15 dBm + 43.35 dBm) = (20.65 mW + 21.63 mW) = 42.28 mW = 46.26 dBm

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