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Radio Test report – Radio 4415 B66A

341175-1TRFWL-R1

Applicant:

Ericsson Canada

Product:

Radio 4415

Model:

Radio 4415 B66A

Part numbers:

KRC 161 644/1 and KRC 161 644/3

FCC ID:	ISED Reg. Number	HVIN:
TA8AKRC161644-3	287AB-AS1616443	AS1616443

Requirements/Summary:

Standard	Environmental phenomenon	Compliance
FCC 47 CFR Part 27	Miscellaneous wireless communications services	Yes
RSS-139 Issue 3, July 16, 2015	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710–1780 MHz and 2110–2180 MHz	Yes

Tested by:	Andrey Adelberg, Senior EMC/Wireless Specialist and Predrag Golic, EMC Specialist
Reviewed by:	David Duchesne, Senior EMC/Wireless Specialist
Date of issue:	November 16, 2017
Reviewer signature	

Test location

Company name	Nemko Canada Inc.	
Address	303 River Road	349 Terry Fox
City	Ottawa	Ottawa
Province	Ontario	Ontario
Postal code	K1V 1H2	K2K 2V6
Country	Canada	Canada
Telephone	+1 613 737 9680	+1 613 963 8000
Facsimile	+1 613 737 9691	
Toll free	+1 800 563 6336	
Website	www.nemko.com	
Site number	FCC test site registration number: CA2040, IC: 2040A-4 (3 m semi anechoic chamber)	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

Table of contents

Section 1. Report summary

1.1 Applicant and manufacturer

Company name	Ericsson Canada Inc.
Address	349 Terry Fox Drive
City	Ottawa
Province/State	Ontario
Postal/Zip code	K2K 2V6
Country	Canada

1.2 Test specifications

FCC 47 CFR Part 27	Miscellaneous wireless communications services
FCC 47 CFR Part 2	Frequency Allocations and Radio Treaty Maters; General Rules and Regulations
RSS-139 Issue 3, July 16, 2015	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710–1780 MHz and 2110–2180 MHz
RSS-Gen Issue 4, November 2014	General Requirements for Compliance of Radio Apparatus

1.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested.

This report applies to the Radio 4415 B66A with model numbers KRC 161 644/1, KRC 161 644/3.

See “Summary of test results” for full details.

1.4 Exclusions

None

1.5 Test report revision history

Revision #	Details of changes made to test report
TRF	Original report issued

Section 2. Summary of test results

2.1 FCC Part 27 test results

Part	Test description	Verdict
§27.50(b)	Maximum output power at RF antenna connector	Pass
§27.53	Spurious emissions at RF antenna connector	Pass
§27.53	Radiated spurious emissions	Pass
§27.54	Frequency stability	Pass
§2.1049	Occupied bandwidth	Pass

Notes: None

2.2 RSS-139 test results

Part	Test description	Verdict
4.1	Transmitter output power and Equivalent Isotropic Radiated Power (e.i.r.p.)	Pass
4.2	Spurious emissions at RF antenna connector	Pass
4.2	Radiated spurious emissions	Pass
6.4	Transmitter frequency stability	Pass
RSS-Gen, 6.6	Occupied bandwidth	Pass
RSS-Gen, 7.1.3	Receiver conducted limits	Pass

Notes: None

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	November 6, 2017
Nemko sample ID number	None

3.2 EUT information

Product name	Radio 4415
Model	Radio 4415 B66A
Part numbers	KRC 161 644/1 and KRC 161 644/3
Revision	R1B
Serial number	D16X226289 (Conducted) D16X226293 (Radiated)
Antenna ports	4 TX/RX Ports
RF BW / IBW	LTE: 70 MHz; WCDMA: 45 MHz
FDD	400 MHz
Frequency	LTE TX (DL): 2110–2180 MHz LTE RX (UL): 1710–1780 MHz WCDMA TX (DL): 2110–2155 MHz WCDMA RX (UL): 1710–1755 MHz
Operating Frequencies:	LTE 2112.5–2177.5 MHz (5 MHz channel), LTE 2115.0–2175.0 MHz (10 MHz channel) LTE 2117.5–2172.5 MHz (15 MHz channel), LTE 2120.0–2170.0 MHz (20 MHz channel) WCDMA 2112.5–2152.5 MHz (5 MHz channel)
Nominal O/P per antenna port Up to 20 MHz Carrier BW	Single Carrier: 1 × 40 W (46 dBm) Multi-Carrier: 2 × 20 W (46 dBm) MRO: W + L (MC) 40 W (46 dBm)
Accuracy (nominal)	±0.1 ppm
Nominal voltage	−48 V_{DC} @ 20 A
RAT	LTE: SC, MC WCDMA: SC, MC MSR: W + L (MC)
Modulation	LTE: QPSK, 16 QAM, 64 QAM, 256QAM; WCDMA: QPSK, 16 QAM, 64 QAM
Channel bandwidth	LTE: 5, 10, 15, 20 MHz; WCDMA: 5 MHz
Maximum combined OBW per port	70 MHz
CPRI	10 Gbps
Channel raster	LTE: 100 kHz; WCDMA: 200 kHz
Regulatory requirements	Radio: FCC Part 2, 27, RSS-Gen, RSS-139
	EMC: FCC Part 15, ICES-003
	Safety: IEC/EN 62368-1, UL/CSA 62368-1 IEC/EN 60950-22, UL/CSA 60950-22, UL 50E
Emission Designator	LTE: 5M00W7D, 10M0W7D, 15M0W7D, 20M0W7D; WCDMA: 5M00F9W
Supported configurations	SC, MC, Single Antenna, TX Diversity, MIMO, Carrier Aggregation
Operating temperature	−40 °C to +55 °C
Total Power based on IBW	4 × 40 W
Supported carrier / port	LTE BW: 5 (1-3), 10 (1-3), 15 (1-3), 20 (1-2) WCDMA BW: 5 (1-6) MM: 1–6 Carriers
Optional Fan Tray	NTB: 101 879/1 (BKV 106 208/1, SXK 125 3359/1)

3.3 Product description and theory of operation

EUT description of the methods used to exercise the EUT and all relevant ports:

Description/theory of operation

The Radio 4415 B66A (KRC 161 644/1, KRC 161 644/3) is a multi-standard remote radio forming part of the Ericsson RBS (Radio Base Station) equipment. The Radio 4415 provides radio access for mobile and fixed devices and is designed for the outdoor environment. Radio unit installation is designed for pole, wall or mast mount options intended for co-location near the antenna. A fiber optic interface provides the RRU/RBS control and digital interface between the Radio and the RBS. The Radio 4415 product is convection cooled and shall be mounted vertically. The KRC 161 644/3 is physically and electrically identical to KRC 161 644/1. The difference between the two products is related to additional testing on the KRC 161 644/3 product which has been subjected to additional product integrity testing against NEBS.

Horizontal mounting is supported with forced air cooling with an optional fan tray assembly NTB 101 879/1 consisting of BKV 106 208/1 (Fan Assembly) and SXK 125 3359/1 (Cover Assembly).

Output RF Power is rated at 4 × 40 W.

Altitude during operation: Below 3000 m

Port description

Port	Description
ANT A	RF Out A
ANT B	RF Out B
ANT C	RF Out C
ANT D	RF Out D
ALD	Antenna Line Device
Alarm	Alarm and DC for Optional Fan Tray
Data 1	Optical Interface Data 1
Data 2	Optical Interface Data 2
DC Input	−48 V_{DC}
MMI	Display - Radio Status
GND	Ground

Physical

Dimensions	420 × 342 × 149 mm (H × W × D) [D = 160 mm with fan unit]
Weight	20 kg [21.5 kg with fan unit]
Operating Temperature	−40 to +55 °C
Mounting	Pole, Wall Mount
Cooling	Convection (optional fan tray - forced air)

Software details

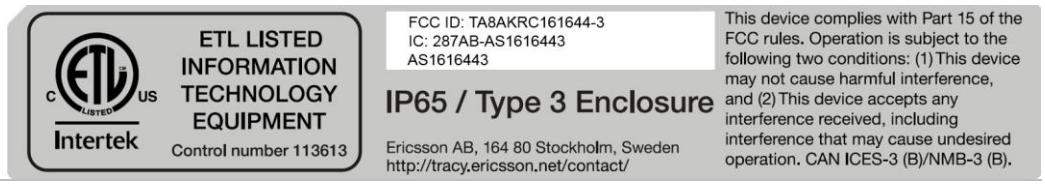
CXP9013268/15-R67JB

Radio 4415 B66A Hardware Configuration

Product: KRC 161 644/1	Revision	Product: KRC 161 644/3	Revision	Description
ROA 128 6280/66A1	R1D	ROA 128 6280/66A1	R1D	TRX
ROA 128 6021/2 Alt: ROA 128 6021/1	R1B R1C	ROA 128 6021/2 Alt: ROA 128 6021/1	R1B R1C	PSB
ROA 128 6291/66A	R1C	ROA 128 6291/66A	R1C	PA
KRF 901 271/1	R1A	KRF 901 271/1	R1A	FU
NTB 101 0053/1	R1A	NTB 101 0053/1	R1A	Parts
..SDD 513 0968/5	R1C	..SDD 513 0968/5	R1C	FLT Cover (Enclosure)
..SXK 125 2746/3 ....SEB 104 330/3	R1A R1A	..SXK 125 2746/3 ....SEB 104 330/3	R1A R1A	Enclosure

Product Identification Label KRC 161 644/1, KRC 161 644/3

Overlay - Legal Markings



3.4 EUT test details

EUT setup/configuration rationale:

Down link	**RAT**	**Modulation**	**Performance Requirement**		**Test Model / Configuration**
	LTE WCDMA		N/A		E-TM1.1, E-TM3.1, ETM3.1a, E-TM3.2 TM1, TM4, TM5, TM6
Up link	**RAT**	**Modulation**	**Performance Requirement**	**Input Signal**	**Test Model / Configuration**
	LTE WCDMA		N/A		E-UTRA-UL UTRA-UL

Carrier Configurations:

Single carrier LTE:

Bandwidth, MHz	Transmit / DL, MHz					
	B	**EARFCN**	**M**	**EARFCN**	**T**	**EARFCN**
5	2112.5	*66461*	2145.0	*66786*	2177.5	*67111*
10	2115.0	*66486*	2145.0	*66786*	2175.0	*67086*
15	2117.5	*66511*	2145.0	*66786*	2172.5	*67061*
20	2120.0	*66536*	2145.0	*66786*	2170.0	*67036*

Bandwidth, MHz	Receive / UL, MHz					
	B	**EARFCN**	**M**	**EARFCN**	**T**	**EARFCN**
5	1712.5	*131997*	1745.0	*132322*	1777.5	*132647*
10	1715.0	*132022*	1745.0	*132322*	1775.0	*132622*
15	1717.5	*132047*	1745.0	*132322*	1772.5	*132597*
20	1720.0	*132072*	1745.0	*132322*	1770.0	*132572*

Single Carrier WCDMA:

Bandwidth, MHz	Transmit / DL, MHz					
	B	**EARFCN**	**M**	**EARFCN**	**T**	**EARFCN**
5	2112.4	*1537*	2132.6	*1638*	2152.6	*1738*

Bandwidth, MHz	Receive / UL, MHz					
	B	**EARFCN**	**M**	**EARFCN**	**T**	**EARFCN**
5	1712.4	*1312*	1732.6	*1413*	1752.6	*1513*

Multiple-Carriers, LTE, (2×) for spurious emissions IBW: 45 MHz

Bandwidth, MHz	Transmit / DL, MHz											
	B1	**EARFCN**	**B2**	**EARFCN**	**B3**	**EARFCN**	**B4**	**EARFCN**	**T1**	**EARFCN**	**T2**	**EARFCN**
5	2112.5	*66461*	2117.5	66511	2122.5	66561	2127.5	66611	2172.5	67061	2177.5	*67111*
10	2115.0	*66486*	2125.0	66586	2135.0	66686	2145.0	66786	2165.0	66986	2175.0	*67086*
15	2117.5	*66511*	2132.5	66661	2147.5	66811	2162.5	66961	2157.5	66911	2172.5	*67061*
20	2120.0	*66536*	2140.0	66736	2160.0	66936	2180.0	67136	2150.0	66836	2170.0	*67036*

Bandwidth, MHz	Receive / UL, MHz											
	B1	**EARFCN**	**B2**	**EARFCN**	**B3**	**EARFCN**	**B4**	**EARFCN**	**T1**	**EARFCN**	**T2**	**EARFCN**
5	1712.5	*131997*	1717.5	132047	1722.5	132097	1727.5	132147	1772.5	132597	1777.5	*132647*
10	1715.0	*132022*	1725.0	132122	1735.0	132222	1745.0	132322	1765.0	132522	1775.0	*132622*
15	1717.5	*132047*	1732.5	132197	1747.5	132347	1762.5	132497	1757.5	132447	1772.5	*132597*
20	1720.0	*132072*	1740.0	132272	1760.0	132472	1780.0	132672	1750.0	132372	1770.0	*132572*

Multiple-Carriers, WCDMA, (2x) for spurious emissions IBW: 45 MHz

Bandwidth, MHz	Transmit / DL, MHz											
	B1	EARFCN	B2	EARFCN	B3	EARFCN	B4	EARFCN	T1	EARFCN	T2	EARFCN
5	2112.4	1537	2117.4	1562	2122.4	1587	2127.4	1612	2147.6	1713	2152.6	*1738*

Bandwidth, MHz	Receive / UL, MHz											
	B1	EARFCN	B2	EARFCN	B3	EARFCN	B4	EARFCN	T1	EARFCN	T2	EARFCN
5	1712.4	*1312*	1752.4	1512	1712.6	1313	1752.6	1513	1712.6	1313	1752.6	*1513*

EUT Monitoring Method / Equipment:

Support equipment	**Node EMC Test System** - Anritsu MS 2691 VSA/Sig Gen - HP Laptop - Timing and Synchronization box (GPS) - Ethernet Switch - Isolation Transformer - eRNC (WCDMA Radio Node Controller) **RBS 6601, BFM 901 009/1:** - DUS 4102 KDU 137 624/11, R4G, S/N: T48X68357 - DUS SW: CXP102051/27-R12E12 - DUW 4101 KDU 127 174/4, R4G, S/N: TU8XP26336 - DUW SW: CXP9023291/6-R4BA03 - Input Voltage: −48 V_{DC}

3.5 EUT setup diagram

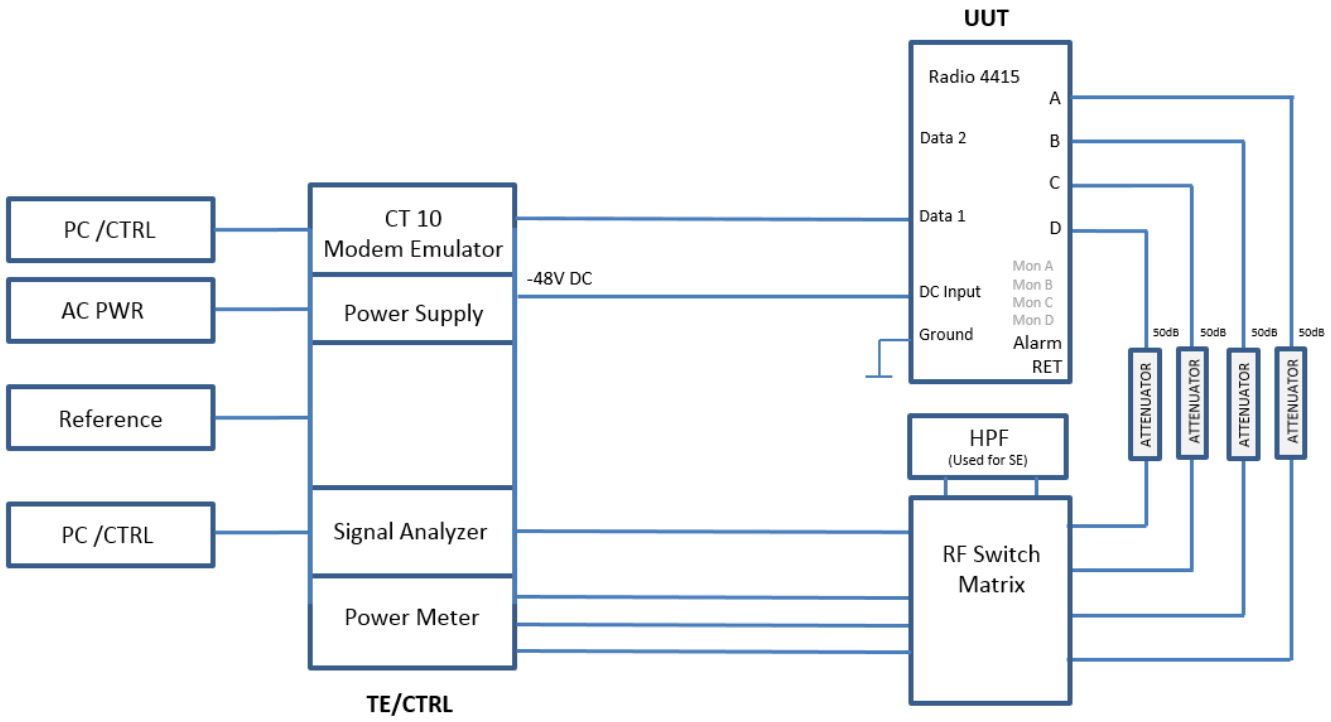


Figure 3.5-1: *Setup diagram – Radio Compliance, conducted tests*

3.6 Setup photographs

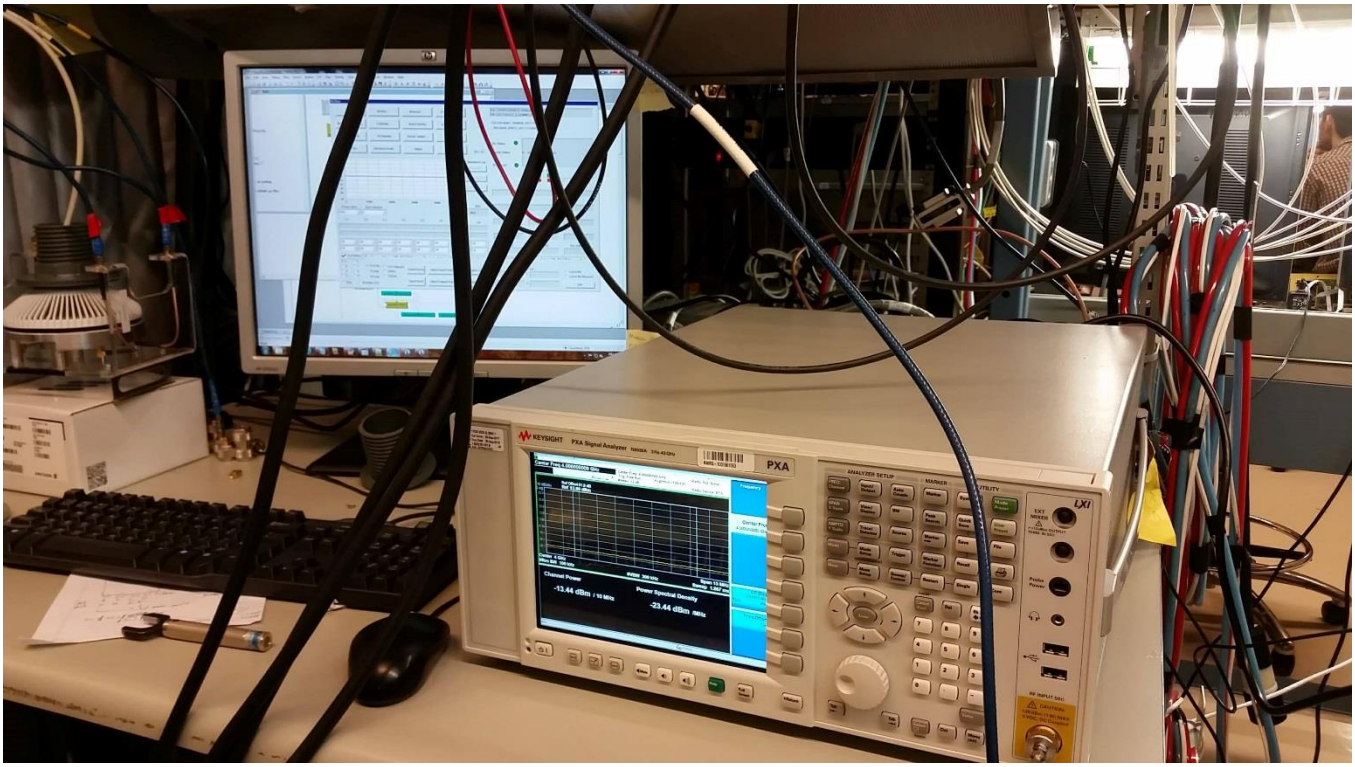


Figure 3.6-1: *Test / Measurement Equipment - Set up for Radio Compliance Testing*

Figure 3.6-2: *EUT Set-up for Radio Compliance Testing*

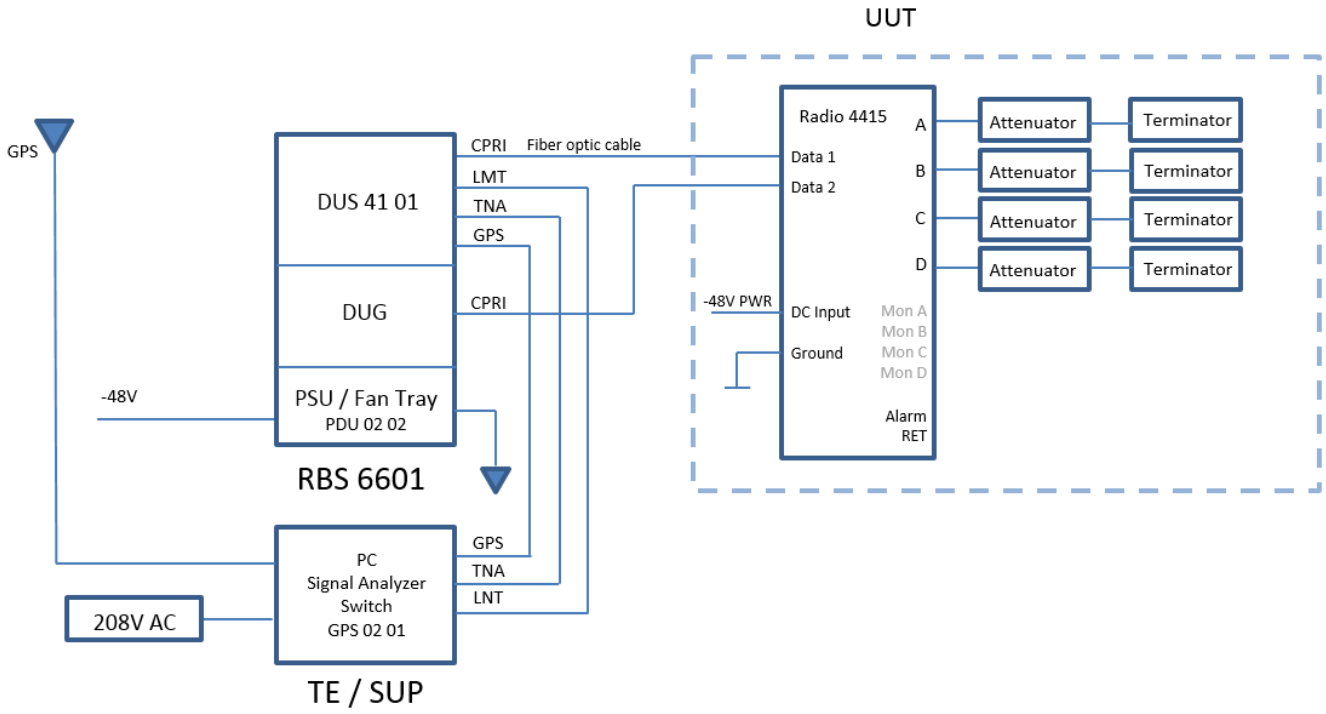


Figure 3.6-3: *EUT Set-up for Radiated Emissions Compliance Testing*

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

This report applies to the Radio 4415 B66A with part numbers KRC 161 644/1 and KRC 161 644/3. Both Radio Products are physically and electrically identical. The difference is related to marketing where the KRC 161 644/3 product has been subjected to additional product integrity testing against Telcordia/NEBS.

EUT: KRC 161 644/3 was formally tested as the representative.

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Test name	Measurement uncertainty, dB
All antenna port measurements	0.55
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78
AC power line conducted emissions	3.55

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: *Equipment list*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	Dec. 1/17
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	Jan. 31/18
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	June 27/18
Horn with Preamp	ETS-Lindgren	3117-PA	FA002840	1 year	Nov. 11/17
50 Ω coax cable	C.C.A.	None	FA002555	1 year	May 2/18
50 Ω coax cable	Huber + Suhner	None	FA002074	1 year	May 12/18
50 Ω coax cable	Huber + Suhner	None	FA002830	1 year	May 12/18
DMM	Digital Multimeter	34401A	US36048294	NCR	NCR
Spectrum Analyser	Keysight	PXA N9030A	MY55410202	1 year	Sep 30/18
Network Analyser	Agilent Technologies	N5230C	MY49001286	1 year	May 31/18
Power Meter	Rohde & Schwarz	NRP2	1144.1374K02-101123-ea	NCR	NCR
Power Sensor	Rohde & Schwarz	NRP-Z51	1138.0005.02-102838-bR	NCR	NCR
Power Sensor	Rohde & Schwarz	NRP-Z51	1138.0005.02.102476-Fg	NCR	NCR
PSU (DC)	Xantrex	XKW60-50	1001425551	NCR	NCR
Attenuator (10 dB)	Weinschel	WA-48-10-43-LIM	A1991	NCR	NCR
Attenuator (10 dB)	Weinschel	WA-48-10-43-LIM	A1994	NCR	NCR
Attenuator (10 dB)	Weinschel	WA-48-10-43-LIM	A1993	NCR	NCR
Attenuator (10 dB)	Weinschel	WA-48-10-43-LIM	A1992	NCR	NCR
Attenuator (30 dB)	Weinschel	WA-48-30-33-LIM	A1998	NCR	NCR
Attenuator (30 dB)	Weinschel	WA-48-30-33-LIM	A1995	NCR	NCR
Attenuator (30 dB)	Weinschel	WA-48-30-33-LIM	A1997	NCR	NCR
Attenuator (30 dB)	Weinschel	48-30-43	BJ6051	NCR	NCR
Attenuator	MCE/Weinschel	57-40-43	MX198	NCR	NCR
RF Switch	Ericsson	RARFSW4X1	1	NCR	NCR
Switch Driver	Hewlett Packard	11713A	3748A06076	NCR	NCR
PSU (DC)	Leader	730-3D	9801135	NCR	NCR
CT10	Ericsson	Testing Equipment	T01F311639	NCR	NCR
Thermometer	Fluke	52 K/J Thermocouple	FA002290	1 year	Sep. 13/18

Note: NCR - no calibration required

Section 8. Testing data

8.1 FCC 27.50(d) and RSS-139, 4.1 Maximum output power at RF antenna connector

8.1.1 Definitions and limits

§ 27.50(d) Operation within the bands: 2110–2155 MHz and 2155–2180 MHz.

(1) The power of each fixed or base station transmitting in the 1995–2000 MHz, 2110–2155 MHz, 2155–2180 MHz or 2180–2200 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to:

(i) An equivalent isotropically radiated power (EIRP) of 3280 watts when transmitting with an emission bandwidth of 1 MHz or less;

(ii) An EIRP of 3280 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

(2) The power of each fixed or base station transmitting in the 1995–2000 MHz, the 2110–2155 MHz 2155–2180 MHz band, or 2180–2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:

(i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;

(ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

(3) A licensee operating a base or fixed station in the 2110–2155 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must coordinate such operations in advance with all Government and non-Government satellite entities in the 2025–2110 MHz band. A licensee operating a base or fixed station in the 2110–2180 MHz band utilizing power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with the following licensees authorized to operate within 120 kilometers (75 miles) of the base or fixed station operating in this band: All Broadband Radio Service (BRS) licensees authorized under this part in the 2155–2160 MHz band and all advanced wireless services (AWS) licensees authorized to operate on adjacent frequency blocks in the 2110–2180 MHz band.

(5) Equipment employed must be authorized in accordance with the provisions of §24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

(6) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

RSS-139, Section 4.1

The transmitter power shall be measured in terms of a root-mean-square (RMS) average value.

RSS-139, Section 6.5

Consult SRSP-513 for e.i.r.p. limits on fixed and base stations operating in the band 2110–2180 MHz.

In addition, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.

SRSP-513, Section 5.1

5.1.1 Fixed and base stations

5.1.1.1 For fixed and base stations operating within the frequency range 2110–2180 MHz with a channel bandwidth equal to or less than 1 MHz, the maximum permissible equivalent isotropically radiated power (e.i.r.p.) is 1640 watts with an antenna height above average terrain (HAAT) up to 300 metres.

5.1.1.2 For fixed and base stations operating within the frequency range 2110–2180 MHz with a channel bandwidth greater than 1 MHz, the maximum permissible e.i.r.p. is 1640 watts/MHz e.i.r.p. (i.e. no more than 1640 watts e.i.r.p. in any 1 MHz band segment) with an antenna height above average terrain (HAAT) up to 300 metres.

5.1.1.3 Fixed and base stations located in geographic areas at a distance greater than 26 km from large or medium population centres, and transmitting within the frequency range 2110–2180 MHz, may increase their e.i.r.p. up to a maximum of 3280 watts/MHz (i.e. no more than 3280 watts e.i.r.p. in any 1 MHz band segment), with an antenna HAAT up to 300 metres.

Within 26 km of any large or medium population centre, fixed and base stations may operate at increased e.i.r.p. if more than 50% of the population within a particular sector's coverage is located outside these large and medium population centres.

Fixed and base stations with increased e.i.r.p. must not be used to provide coverage to large and medium population centres. However, some incidental coverage of these large and medium population centres by stations with increased e.i.r.p. is permitted.

This provision also applies for fixed and base stations with a channel bandwidth equal to or less than 1 MHz (i.e. the e.i.r.p. may be increased up to a maximum of 3280 watts).

5.1.1.4 Fixed and base station antenna heights above average terrain may exceed 300 metres with a reduction in e.i.r.p. The maximum permissible e.i.r.p. for installations with antenna HAAT in excess of 300 metres is given in the following table:

Table 8.1-1: *Reduction to Maximum Allowable E.I.R.P. for HAAT > 300 m*

HAAT (m)	Maximum EIRP, W/MHz
HAAT ≤ 300	1640 (or 3280[1])
300 < HAAT ≤ 500	1070
500 < HAAT ≤ 1000	490
1000 < HAAT ≤ 1500	270
1500 < HAAT ≤ 2000	160

Note: [1]for fixed and base stations with a channel bandwidth equal to or less than 1 MHz

8.1.2 Test summary

Test date	November 6, 2017	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1009 mbar
Verdict	Pass	Relative humidity	33 %

8.1.3 Observations, settings and special notes

Note: EIRP limit is 1640 W/MHz (62.1484 dBm/MHz)
Power density was calculated using the following formula: (For 5 MHz channel) Maximum power – 10 × Log_{10} (5 / 1) [dB];
(For 10 MHz channel) Maximum power – 10 × Log_{10} (10 / 1) [dB], (For 15 MHz channel) Maximum power – 10 × Log_{10} (15 / 1) [dB], (For 20 MHz channel) Maximum power – 10 × Log_{10} (20 / 1) [dB].
In the following measurement results "bottom" is for lower 45 MHz of the operational band and "top" for the upper 45 MHz of operational band.
Based on the RF margins noted in this report, considerations pertaining to the maximum allowed EIRP and antenna type should be considered for each installation.
Test receiver settings:

Detector mode	RMS
Resolution bandwidth	>EBW
Video bandwidth	>RBW
Measurement mode	Power over emission bandwidth
Trace mode	Averaging
Measurement time	Auto

8.1.4 Test data

Table 8.1-2: *Output power measurement results for LTE SISO single carrier operation for 5 MHz channel*

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 5 MHz, Ant A, low channel	2112.5	40.179	46.04	39.06	62.15	23.09
16QAM, 5 MHz, Ant A, low channel	2112.5	40.551	46.08	39.09	62.15	23.06
64QAM, 5 MHz, Ant A, low channel	2112.5	40.832	46.11	39.12	62.15	23.03
256QAM, 5 MHz, Ant A, low channel	2112.5	40.644	46.09	39.10	62.15	23.05
QPSK, 5 MHz, Ant A, mid channel	2145.0	40.272	46.05	39.06	62.15	23.09
QPSK, 5 MHz, Ant A, high channel	2177.5	40.087	46.03	39.04	62.15	23.11
QPSK, 5 MHz, Ant B, low channel	2112.5	41.305	46.16	39.17	62.15	22.98
16QAM, 5 MHz, Ant B, low channel	2112.5	40.644	46.09	39.10	62.15	23.05
64QAM, 5 MHz, Ant B, low channel	2112.5	40.644	46.09	39.10	62.15	23.05
256QAM, 5 MHz, Ant B, low channel	2112.5	40.551	46.08	39.09	62.15	23.06
QPSK, 5 MHz, Ant B, mid channel	2145.0	40.365	46.06	39.07	62.15	23.08
QPSK, 5 MHz, Ant B, high channel	2177.5	39.994	46.02	39.03	62.15	23.12
QPSK, 5 MHz, Ant C, low channel	2112.5	39.719	45.99	39.00	62.15	23.15
16QAM, 5 MHz, Ant C, low channel	2112.5	40.458	46.07	39.08	62.15	23.07
64QAM, 5 MHz, Ant C, low channel	2112.5	40.087	46.03	39.04	62.15	23.11
256QAM, 5 MHz, Ant C, low channel	2112.5	40.087	46.03	39.04	62.15	23.11
QPSK, 5 MHz, Ant C, mid channel	2145.0	40.458	46.07	39.08	62.15	23.07
QPSK, 5 MHz, Ant C, high channel	2177.5	40.551	46.08	39.09	62.15	23.06
QPSK, 5 MHz, Ant D, low channel	2112.5	40.365	46.06	39.07	62.15	23.08
16QAM, 5 MHz, Ant D, low channel	2112.5	40.738	46.10	39.11	62.15	23.04
64QAM, 5 MHz, Ant D, low channel	2112.5	40.738	46.10	39.12	62.15	23.03
256QAM, 5 MHz, Ant D, low channel	2112.5	40.551	46.08	39.09	62.15	23.06
QPSK, 5 MHz, Ant D, mid channel	2145.0	41.020	46.13	39.14	62.15	23.01
QPSK, 5 MHz, Ant D, high channel	2177.5	40.272	46.05	39.06	62.15	23.09

Table 8.1-3: *Output power measurement results for LTE SISO single carrier operation for 10, 15 and 20 MHz channels*

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 10 MHz, Ant A, low channel	2115.0	40.926	46.12	36.12	62.15	26.03
QPSK, 10 MHz, Ant A, mid channel	2145.0	40.458	46.07	36.07	62.15	26.08
QPSK, 10 MHz, Ant A, high channel	2175.0	40.644	46.09	36.09	62.15	26.06
QPSK, 10 MHz, Ant B, low channel	2115.0	40.458	46.07	36.07	62.15	26.08
QPSK, 10 MHz, Ant B, mid channel	2145.0	40.551	46.08	36.08	62.15	26.07
QPSK, 10 MHz, Ant B, high channel	2175.0	40.644	46.09	36.09	62.15	26.06
QPSK, 10 MHz, Ant C, low channel	2115.0	40.365	46.06	36.06	62.15	26.09
QPSK, 10 MHz, Ant C, mid channel	2145.0	41.210	46.15	36.15	62.15	26.00
QPSK, 10 MHz, Ant C, high channel	2175.0	40.272	46.05	36.05	62.15	26.10
QPSK, 10 MHz, Ant D, low channel	2115.0	41.020	46.13	36.13	62.15	26.02
QPSK, 10 MHz, Ant D, mid channel	2145.0	41.210	46.15	36.15	62.15	26.00
QPSK, 10 MHz, Ant D, high channel	2175.0	41.210	46.15	36.15	62.15	26.00
QPSK, 15 MHz, Ant A, low channel	2117.5	41.020	46.13	34.37	62.15	27.78
QPSK, 15 MHz, Ant A, mid channel	2145.0	40.644	46.09	34.33	62.15	27.82
QPSK, 15 MHz, Ant A, high channel	2172.5	40.087	46.03	34.27	62.15	27.88
QPSK, 15 MHz, Ant B, low channel	2117.5	40.087	46.03	34.27	62.15	27.88
QPSK, 15 MHz, Ant B, mid channel	2145.0	40.272	46.05	34.28	62.15	27.87
QPSK, 15 MHz, Ant B, high channel	2172.5	40.272	46.05	34.29	62.15	27.86
QPSK, 15 MHz, Ant C, low channel	2117.5	40.179	46.04	34.27	62.15	27.88
QPSK, 15 MHz, Ant C, mid channel	2145.0	40.087	46.03	34.27	62.15	27.88
QPSK, 15 MHz, Ant C, high channel	2172.5	39.994	46.02	34.26	62.15	27.89
QPSK, 15 MHz, Ant D, low channel	2117.5	40.644	46.09	34.33	62.15	27.82
QPSK, 15 MHz, Ant D, mid channel	2145.0	40.365	46.06	34.30	62.15	27.85
QPSK, 15 MHz, Ant D, high channel	2172.5	40.644	46.09	34.33	62.15	27.82
QPSK, 20 MHz, Ant A, low channel	2120.0	39.994	46.02	33.01	62.15	29.14
QPSK, 20 MHz, Ant A, mid channel	2145.0	40.644	46.09	33.08	62.15	29.07
QPSK, 20 MHz, Ant A, high channel	2170.0	40.272	46.05	33.04	62.15	29.11
QPSK, 20 MHz, Ant B, low channel	2120.0	42.658	46.30	33.02	62.15	29.13
QPSK, 20 MHz, Ant B, mid channel	2145.0	40.458	46.07	33.06	62.15	29.09
QPSK, 20 MHz, Ant B, high channel	2170.0	40.458	46.07	33.06	62.15	29.09
QPSK, 20 MHz, Ant C, low channel	2120.0	40.365	46.06	33.05	62.15	29.10
QPSK, 20 MHz, Ant C, mid channel	2145.0	40.365	46.06	33.05	62.15	29.10
QPSK, 20 MHz, Ant C, high channel	2170.0	40.272	46.05	33.04	62.15	29.11
QPSK, 20 MHz, Ant D, low channel	2120.0	40.832	46.11	33.10	62.15	29.05
QPSK, 20 MHz, Ant D, mid channel	2145.0	40.365	46.06	33.05	62.15	29.10
QPSK, 20 MHz, Ant D, high channel	2170.0	40.272	46.05	33.04	62.15	29.11

Table 8.1-4: *Output power measurement results for LTE SISO two-carrier operation for IBW 70 MHz with low channel (Ch1) 5 and 10 MHz*

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
Ch1: 5 MHz, Ch2: 5 MHz, Ant A	2112.5 and 2177.5	37.584	45.75	27.30	62.15	34.85
Ch1: 5 MHz, Ch2: 10 MHz, Ant A	2112.5 and 2175.0	37.931	45.79	27.34	62.15	34.81
Ch1: 5 MHz, Ch2: 15 MHz, Ant A	2112.5 and 2172.5	37.931	45.79	27.34	62.15	34.81
Ch1: 5 MHz, Ch2: 20 MHz, Ant A	2112.5 and 2170.0	38.107	45.81	27.36	62.15	34.79
Ch1: 5 MHz, Ch2: 5 MHz, Ant B	2112.5 and 2177.5	36.983	45.68	27.23	62.15	34.92
Ch1: 5 MHz, Ch2: 10 MHz, Ant B	2112.5 and 2175.0	37.670	45.76	27.31	62.15	34.84
Ch1: 5 MHz, Ch2: 15 MHz, Ant B	2112.5 and 2172.5	38.019	45.80	27.35	62.15	34.80
Ch1: 5 MHz, Ch2: 20 MHz, Ant B	2112.5 and 2170.0	37.844	45.78	27.33	62.15	34.82
Ch1: 5 MHz, Ch2: 5 MHz, Ant C	2112.5 and 2177.5	36.644	45.64	27.19	62.15	34.96
Ch1: 5 MHz, Ch2: 10 MHz, Ant C	2112.5 and 2175.0	37.154	45.70	27.25	62.15	34.90
Ch1: 5 MHz, Ch2: 15 MHz, Ant C	2112.5 and 2172.5	36.983	45.68	27.23	62.15	34.92
Ch1: 5 MHz, Ch2: 20 MHz, Ant C	2112.5 and 2170.0	36.983	45.68	27.22	62.15	34.93
Ch1: 5 MHz, Ch2: 5 MHz, Ant D	2112.5 and 2177.5	37.325	45.72	27.26	62.15	34.89
Ch1: 5 MHz, Ch2: 10 MHz, Ant D	2112.5 and 2175.0	38.282	45.83	27.38	62.15	34.77
Ch1: 5 MHz, Ch2: 15 MHz, Ant D	2112.5 and 2172.5	37.239	45.71	27.26	62.15	34.89
Ch1: 5 MHz, Ch2: 20 MHz, Ant D	2112.5 and 2170.0	38.194	45.82	27.37	62.15	34.78
Ch1: 10 MHz, Ch2: 5 MHz, Ant A	2115.0 and 2177.5	37.757	45.77	27.32	62.15	34.83
Ch1: 10 MHz, Ch2: 10 MHz, Ant A	2115.0 and 2175.0	38.905	45.90	27.44	62.15	34.71
Ch1: 10 MHz, Ch2: 15 MHz, Ant A	2115.0 and 2172.5	38.815	45.89	27.44	62.15	34.71
Ch1: 10 MHz, Ch2: 20 MHz, Ant A	2115.0 and 2170.0	38.994	45.91	27.46	62.15	34.69
Ch1: 10 MHz, Ch2: 5 MHz, Ant B	2115.0 and 2177.5	37.239	45.71	27.25	62.15	34.90
Ch1: 10 MHz, Ch2: 10 MHz, Ant B	2115.0 and 2175.0	38.637	45.87	27.42	62.15	34.73
Ch1: 10 MHz, Ch2: 15 MHz, Ant B	2115.0 and 2172.5	38.371	45.84	27.39	62.15	34.76
Ch1: 10 MHz, Ch2: 20 MHz, Ant B	2115.0 and 2170.0	38.637	45.87	27.42	62.15	34.73
Ch1: 10 MHz, Ch2: 5 MHz, Ant C	2115.0 and 2177.5	36.983	45.68	27.23	62.15	34.92
Ch1: 10 MHz, Ch2: 10 MHz, Ant C	2115.0 and 2175.0	37.670	45.76	27.31	62.15	34.84
Ch1: 10 MHz, Ch2: 15 MHz, Ant C	2115.0 and 2172.5	37.931	45.79	27.34	62.15	34.81
Ch1: 10 MHz, Ch2: 20 MHz, Ant C	2115.0 and 2170.0	38.282	45.83	27.38	62.15	34.77
Ch1: 10 MHz, Ch2: 5 MHz, Ant D	2115.0 and 2177.5	37.584	45.75	27.29	62.15	34.86
Ch1: 10 MHz, Ch2: 10 MHz, Ant D	2115.0 and 2175.0	38.371	45.84	27.39	62.15	34.76
Ch1: 10 MHz, Ch2: 15 MHz, Ant D	2115.0 and 2172.5	38.459	45.85	27.40	62.15	34.75
Ch1: 10 MHz, Ch2: 20 MHz, Ant D	2115.0 and 2170.0	39.355	45.95	27.50	62.15	34.65

Table 8.1-5: *Output power measurement results for LTE SISO two-carrier operation for IBW 70 MHz with low channel (Ch1) 15 and 20 MHz*

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
Ch1: 15 MHz, Ch2: 5 MHz, Ant A	2117.5 and 2177.5	38.905	45.90	27.45	62.15	34.70
Ch1: 15 MHz, Ch2: 10 MHz, Ant A	2117.5 and 2175.0	39.355	45.95	27.50	62.15	34.65
Ch1: 15 MHz, Ch2: 15 MHz, Ant A	2117.5 and 2172.5	39.084	45.92	27.47	62.15	34.68
Ch1: 15 MHz, Ch2: 20 MHz, Ant A	2117.5 and 2170.0	39.355	45.95	27.50	62.15	34.65
Ch1: 15 MHz, Ch2: 5 MHz, Ant B	2117.5 and 2177.5	37.757	45.77	27.32	62.15	34.83
Ch1: 15 MHz, Ch2: 10 MHz, Ant B	2117.5 and 2175.0	38.994	45.91	27.46	62.15	34.69
Ch1: 15 MHz, Ch2: 15 MHz, Ant B	2117.5 and 2172.5	38.905	45.90	27.45	62.15	34.70
Ch1: 15 MHz, Ch2: 20 MHz, Ant B	2117.5 and 2170.0	39.264	45.94	27.49	62.15	34.66
Ch1: 15 MHz, Ch2: 5 MHz, Ant C	2117.5 and 2177.5	37.757	45.77	27.32	62.15	34.83
Ch1: 15 MHz, Ch2: 10 MHz, Ant C	2117.5 and 2175.0	38.815	45.89	27.44	62.15	34.71
Ch1: 15 MHz, Ch2: 15 MHz, Ant C	2117.5 and 2172.5	38.637	45.87	27.42	62.15	34.73
Ch1: 15 MHz, Ch2: 20 MHz, Ant C	2117.5 and 2170.0	38.459	45.85	27.40	62.15	34.75
Ch1: 15 MHz, Ch2: 5 MHz, Ant D	2117.5 and 2177.5	38.282	45.83	27.38	62.15	34.77
Ch1: 15 MHz, Ch2: 10 MHz, Ant D	2117.5 and 2175.0	39.537	45.97	27.52	62.15	34.63
Ch1: 15 MHz, Ch2: 15 MHz, Ant D	2117.5 and 2172.5	38.637	45.87	27.42	62.15	34.73
Ch1: 15 MHz, Ch2: 20 MHz, Ant D	2117.5 and 2170.0	38.815	45.89	27.44	62.15	34.71
Ch1: 20 MHz, Ch2: 5 MHz, Ant A	2120.0 and 2177.5	38.459	45.85	27.40	62.15	34.75
Ch1: 20 MHz, Ch2: 10 MHz, Ant A	2120.0 and 2175.0	39.811	46.00	27.55	62.15	34.60
Ch1: 20 MHz, Ch2: 15 MHz, Ant A	2120.0 and 2172.5	39.537	45.97	27.52	62.15	34.63
Ch1: 20 MHz, Ch2: 20 MHz, Ant A	2120.0 and 2170.0	39.994	46.02	27.57	62.15	34.58
Ch1: 20 MHz, Ch2: 5 MHz, Ant B	2120.0 and 2177.5	37.931	45.79	27.34	62.15	34.81
Ch1: 20 MHz, Ch2: 10 MHz, Ant B	2120.0 and 2175.0	39.084	45.92	27.47	62.15	34.68
Ch1: 20 MHz, Ch2: 15 MHz, Ant B	2120.0 and 2172.5	39.446	45.96	27.51	62.15	34.64
Ch1: 20 MHz, Ch2: 20 MHz, Ant B	2120.0 and 2170.0	39.446	45.96	27.50	62.15	34.65
Ch1: 20 MHz, Ch2: 5 MHz, Ant C	2120.0 and 2177.5	37.584	45.75	27.29	62.15	34.86
Ch1: 20 MHz, Ch2: 10 MHz, Ant C	2120.0 and 2175.0	38.726	45.88	27.43	62.15	34.72
Ch1: 20 MHz, Ch2: 15 MHz, Ant C	2120.0 and 2172.5	38.548	45.86	27.41	62.15	34.74
Ch1: 20 MHz, Ch2: 20 MHz, Ant C	2120.0 and 2170.0	38.637	45.87	27.42	62.15	34.73
Ch1: 20 MHz, Ch2: 5 MHz, Ant D	2120.0 and 2177.5	39.084	45.92	27.47	62.15	34.68
Ch1: 20 MHz, Ch2: 10 MHz, Ant D	2120.0 and 2175.0	39.446	45.96	27.51	62.15	34.64
Ch1: 20 MHz, Ch2: 15 MHz, Ant D	2120.0 and 2172.5	39.628	45.98	27.53	62.15	34.62
Ch1: 20 MHz, Ch2: 20 MHz, Ant D	2120.0 and 2170.0	39.355	45.95	27.50	62.15	34.65

Table 8.1-6: *Output power density (dBm/MHz) measurement results for LTE MIMO single carrier operation*

Remarks	Frequency, MHz	RF output power port A, dBm/MHz	RF output power port B, dBm/MHz	RF output power port C, dBm/MHz	RF output power port D, dBm/MHz	Total RF output power dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 5 MHz, low channel	2112.5	39.06	39.17	39.00	39.07	45.10	62.15	17.05
16QAM, 5 MHz, low channel	2112.5	39.09	39.10	39.08	39.11	45.12	62.15	17.03
64QAM, 5 MHz, low channel	2112.5	39.12	39.10	39.04	39.12	45.12	62.15	17.03
256QAM, 5 MHz, low channel	2112.5	39.10	39.09	39.04	39.09	45.10	62.15	17.05
QPSK, 5 MHz, mid channel	2145.0	39.06	39.07	39.08	39.14	45.11	62.15	17.04
QPSK, 5 MHz, high channel	2177.5	39.04	39.03	39.09	39.06	45.08	62.15	17.07
QPSK, 10 MHz, low channel	2115.0	36.12	36.07	36.06	36.13	42.12	62.15	20.03
QPSK, 10 MHz, mid channel	2145.0	36.07	36.08	36.15	36.15	42.13	62.15	20.02
QPSK, 10 MHz, high channel	2175.0	36.09	36.09	36.05	36.15	42.12	62.15	20.03
QPSK, 15 MHz, low channel	2117.5	34.37	34.27	34.27	34.33	40.33	62.15	21.82
QPSK, 15 MHz, mid channel	2145.0	34.33	34.28	34.27	34.30	40.32	62.15	21.83
QPSK, 15 MHz, high channel	2172.5	34.27	34.29	34.26	34.33	40.31	62.15	21.84
QPSK, 20 MHz, low channel	2120.0	33.01	33.02	33.05	33.10	39.07	62.15	23.08
QPSK, 20 MHz, mid channel	2145.0	33.08	33.06	33.05	33.05	39.08	62.15	23.07
QPSK, 20 MHz, high channel	2170.0	33.04	33.06	33.04	33.04	39.07	62.15	23.08

Table 8.1-7: *Output power density measurement results for LTE MIMO two-carrier operation for IBW 70 MHz*

Remarks	Frequency, MHz	RF output power port A, dBm/MHz	RF output power port B, dBm/MHz	RF output power port C, dBm/MHz	RF output power port D, dBm/MHz	Total RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
Ch1: 5 MHz, Ch2: 5 MHz,	2112.5 and 2177.5	27.30	27.23	27.19	27.26	33.27	62.15	28.88
Ch1: 5 MHz, Ch2: 10 MHz	2112.5 and 2175.0	27.34	27.31	27.25	27.38	33.34	62.15	28.81
Ch1: 5 MHz, Ch2: 15 MHz	2112.5 and 2172.5	27.34	27.35	27.23	27.26	33.32	62.15	28.83
Ch1: 5 MHz, Ch2: 20 MHz	2112.5 and 2170.0	27.36	27.33	27.22	27.37	33.34	62.15	28.81
Ch1: 10 MHz, Ch2: 5 MHz	2115.0 and 2177.5	27.32	27.25	27.23	27.29	33.29	62.15	28.86
Ch1: 10 MHz, Ch2: 10 MHz	2115.0 and 2175.0	27.44	27.42	27.31	27.39	33.41	62.15	28.74
Ch1: 10 MHz, Ch2: 15 MHz	2115.0 and 2172.5	27.44	27.39	27.34	27.40	33.41	62.15	28.74
Ch1: 10 MHz, Ch2: 20 MHz	2115.0 and 2170.0	27.46	27.42	27.38	27.50	33.46	62.15	28.69
Ch1: 15 MHz, Ch2: 5 MHz	2117.5 and 2177.5	27.45	27.32	27.32	27.38	33.39	62.15	28.76
Ch1: 15 MHz, Ch2: 10 MHz	2117.5 and 2175.0	27.50	27.46	27.44	27.52	33.50	62.15	28.65
Ch1: 15 MHz, Ch2: 15 MHz	2117.5 and 2172.5	27.47	27.45	27.42	27.42	33.46	62.15	28.69
Ch1: 15 MHz, Ch2: 20 MHz	2117.5 and 2170.0	27.50	27.49	27.40	27.44	33.48	62.15	28.67
Ch1: 20 MHz, Ch2: 5 MHz	2120.0 and 2177.5	27.40	27.34	27.29	27.47	33.40	62.15	28.75
Ch1: 20 MHz, Ch2: 10 MHz	2120.0 and 2175.0	27.55	27.47	27.43	27.51	33.51	62.15	28.64
Ch1: 20 MHz, Ch2: 15 MHz	2120.0 and 2172.5	27.52	27.51	27.41	27.53	33.51	62.15	28.64
Ch1: 20 MHz, Ch2: 20 MHz	2120.0 and 2170.0	27.57	27.50	27.42	27.50	33.52	62.15	28.63

Table 8.1-8: *Output power measurement results for WCDMA SISO single carrier operation*

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 5 MHz, Ant A, low channel	2112.4	40.551	46.08	39.09	62.15	23.06
16QAM, 5 MHz, Ant A, low channel	2112.4	40.179	46.04	39.06	62.15	23.09
64QAM, 5 MHz, Ant A, low channel	2112.4	40.644	46.09	39.10	62.15	23.05
QPSK, 5 MHz, Ant A, mid channel	2132.6	40.458	46.07	39.08	62.15	23.07
QPSK, 5 MHz, Ant A, high channel	2152.6	40.087	46.03	39.04	62.15	23.11
QPSK, 5 MHz, Ant B, low channel	2112.4	39.994	46.02	39.03	62.15	23.12
16QAM, 5 MHz, Ant B, low channel	2112.4	39.719	45.99	39.00	62.15	23.15
64QAM, 5 MHz, Ant B, low channel	2112.4	40.272	46.05	39.06	62.15	23.09
QPSK, 5 MHz, Ant B, mid channel	2132.6	40.272	46.05	39.06	62.15	23.09
QPSK, 5 MHz, Ant B, high channel	2152.6	40.272	46.05	39.06	62.15	23.09
QPSK, 5 MHz, Ant C, low channel	2112.4	40.365	46.06	39.07	62.15	23.08
16QAM, 5 MHz, Ant C, low channel	2112.4	40.644	46.09	39.10	62.15	23.05
64QAM, 5 MHz, Ant C, low channel	2112.4	40.179	46.04	39.05	62.15	23.10
QPSK, 5 MHz, Ant C, mid channel	2132.6	40.365	46.06	39.07	62.15	23.08
QPSK, 5 MHz, Ant C, high channel	2152.6	40.551	46.08	39.09	62.15	23.06
QPSK, 5 MHz, Ant D, low channel	2112.4	39.994	46.02	39.03	62.15	23.12
16QAM, 5 MHz, Ant D, low channel	2112.4	41.115	46.14	39.15	62.15	23.00
64QAM, 5 MHz, Ant D, low channel	2112.4	40.087	46.03	39.04	62.15	23.11
QPSK, 5 MHz, Ant D, mid channel	2132.6	40.458	46.07	39.08	62.15	23.07
QPSK, 5 MHz, Ant D, high channel	2152.6	39.994	46.02	39.03	62.15	23.12

Table 8.1-9: *Output power measurement results for WCDMA SISO two-carrier operation for IBW 45 MHz*

Remarks	RF output power, W	RF output power, dBm	RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
Ant A, bottom of band	39.355	45.95	29.42	62.15	32.73
Ant B, bottom of band	39.719	45.99	29.46	62.15	32.69
Ant C, bottom of band	39.537	45.97	29.44	62.15	32.71
Ant D, bottom of band	39.355	45.95	29.42	62.15	32.73
Ant A, top of band	39.628	45.98	29.45	62.15	32.70
Ant B, top of band	39.628	45.98	29.45	62.15	32.70
Ant C, top of band	39.628	45.98	29.45	62.15	32.70
Ant D, top of band	39.537	45.97	29.43	62.15	32.72

Table 8.1-10: *Output power density (dBm/MHz) measurement results for WCDMA MIMO single carrier operation*

Remarks	Frequency, MHz	RF output power port A, dBm/MHz	RF output power port B, dBm/MHz	RF output power port C, dBm/MHz	RF output power port D, dBm/MHz	Combined RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 5 MHz, low channel	2112.4	39.09	39.03	39.07	39.03	45.08	62.15	17.07
16QAM, 5 MHz, low channel	2112.4	39.06	39.00	39.10	39.15	45.10	62.15	17.05
64QAM, 5 MHz, low channel	2112.4	39.10	39.06	39.05	39.04	45.08	62.15	17.07
QPSK, 5 MHz, mid channel	2132.6	39.08	39.06	39.07	39.08	45.09	62.15	17.06
QPSK, 5 MHz, high channel	2152.6	39.04	39.06	39.09	39.03	45.08	62.15	17.07

Table 8.1-11: *Output power (dBm/MHz) measurement results for WCDMA MIMO two-carrier operation for IBW 45 MHz*

Remarks	RF output power port A, dBm/MHz	RF output power port B, dBm/MHz	RF output power port C, dBm/MHz	RF output power port D, dBm/MHz	Combined RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
Bottom of band	29.42	29.46	29.44	29.42	35.46	62.15	26.69
Top of band	29.45	29.45	29.45	29.43	35.47	62.15	26.68

Table 8.1-12: *Output power measurement results for LTE and WCDMA mixed mode SISO operation for IBW 45 MHz*

Remarks	RF output power, W	RF output power, dBm	RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
WCDMA 1 × 5 MHz, LTE 1 × 5 MHz, Ant A	40.832	46.11	27.66	62.15	34.49
WCDMA 1 × 5 MHz, LTE 1 × 5 MHz, Ant B	38.815	45.89	27.44	62.15	34.71
WCDMA 1 × 5 MHz, LTE 1 × 5 MHz, Ant C	39.446	45.96	27.51	62.15	34.64
WCDMA 1 × 5 MHz, LTE 1 × 5 MHz, Ant D	39.719	45.99	27.54	62.15	34.61
WCDMA 1 × 5 MHz, LTE 1 × 20 MHz, Ant A	39.994	46.02	27.57	62.15	34.58
WCDMA 1 × 5 MHz, LTE 1 × 20 MHz, Ant B	38.994	45.91	27.46	62.15	34.69
WCDMA 1 × 5 MHz, LTE 1 × 20 MHz, Ant C	39.628	45.98	27.53	62.15	34.62
WCDMA 1 × 5 MHz, LTE 1 × 20 MHz, Ant D	40.179	46.04	27.59	62.15	34.56
WCDMA 4 × 5 MHz, LTE 1 × 20 MHz, Ant A	39.994	46.02	27.57	62.15	34.58
WCDMA 4 × 5 MHz, LTE 1 × 20 MHz, Ant B	38.726	45.88	27.43	62.15	34.72
WCDMA 4 × 5 MHz, LTE 1 × 20 MHz, Ant C	38.994	45.91	27.46	62.15	34.69
WCDMA 4 × 5 MHz, LTE 1 × 20 MHz, Ant D	40.087	46.03	27.57	62.15	34.58

Table 8.1-13: *Output power density (dBm/MHz) measurement results for LTE and WCDMA mixed mode MIMO operation for IBW 45 MHz*

Remarks	RF output power port A, dBm/MHz	RF output power port B, dBm/MHz	RF output power port C, dBm/MHz	RF output power port D, dBm/MHz	Combined RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
WCDMA 1 × 5 MHz, LTE 1 × 5 MHz	27.66	27.44	27.51	27.54	33.56	62.15	28.59
WCDMA 1 × 5 MHz, LTE 1 × 20 MHz	27.57	27.46	27.53	27.59	33.56	62.15	28.59
WCDMA 4 × 5 MHz, LTE 1 × 20 MHz	27.57	27.43	27.46	27.57	33.53	62.15	28.62

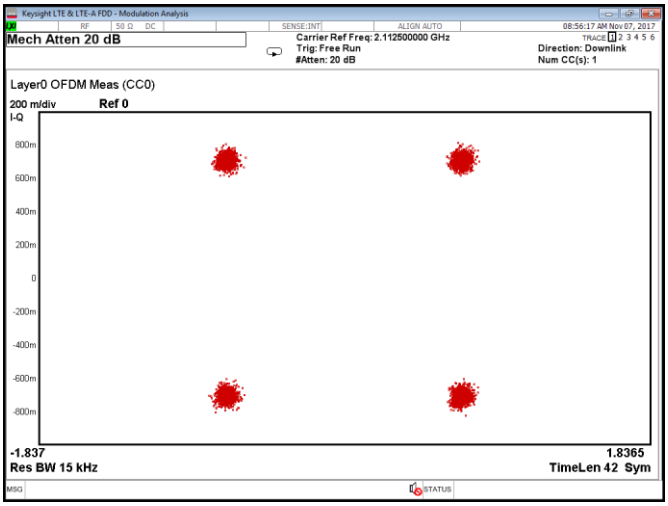


Figure 8.1-1: *Modulation characteristics, QPSK*

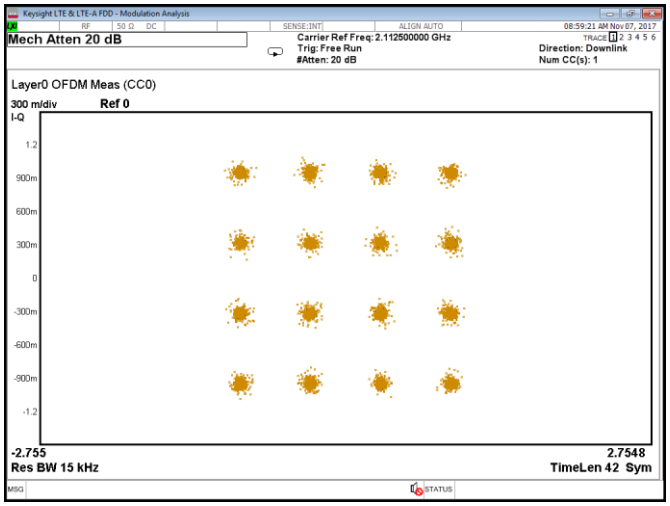


Figure 8.1-2: *Modulation characteristics, 16QAM*

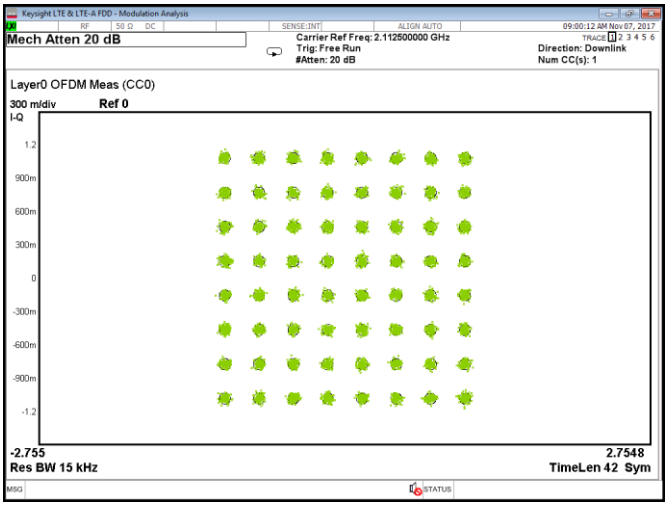


Figure 8.1-3: *Modulation characteristics, 64QAM*

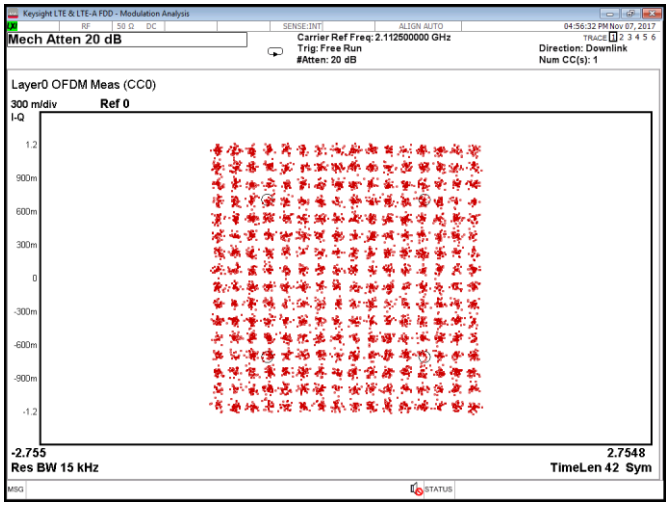


Figure 8.1-4: *Modulation characteristics, 256QAM*

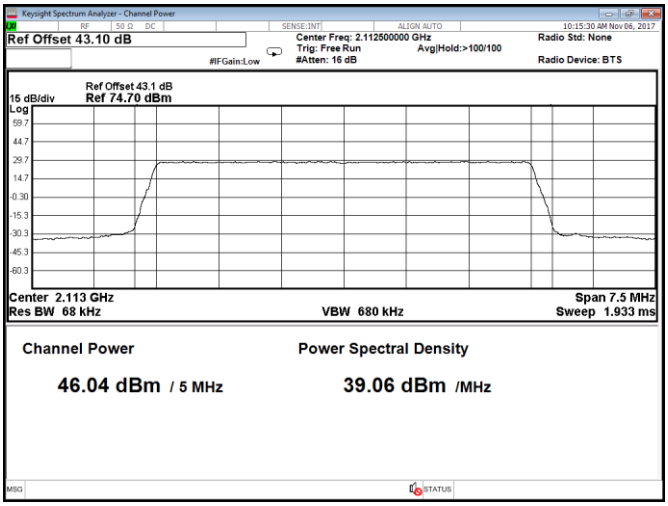


Figure 8.1-5: *Output power at low channel, QPSK, 5 MHz, LTE, Port A*

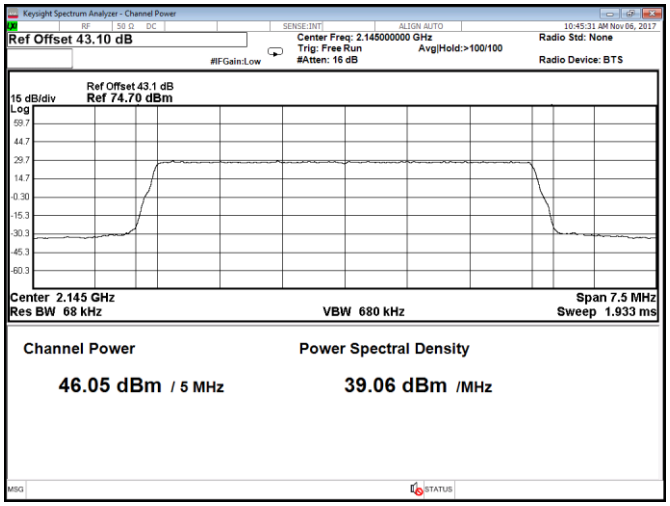


Figure 8.1-6: *Output power at mid channel, QPSK, 5 MHz, LTE, Port A*

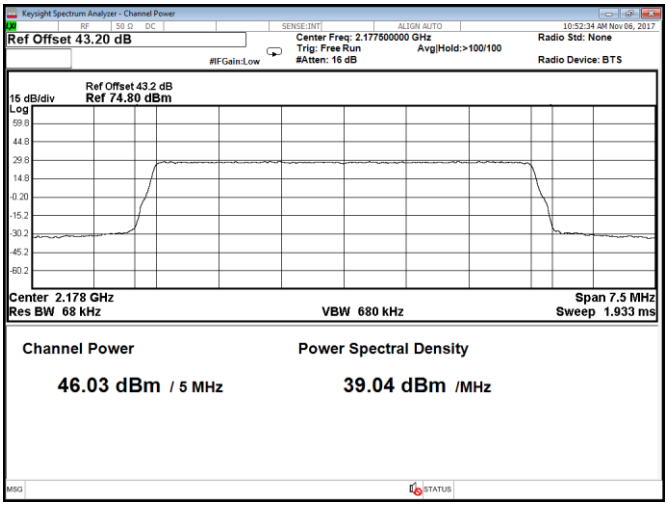


Figure 8.1-7: *Output power at high channel, QPSK, 5 MHz, LTE, Port A*

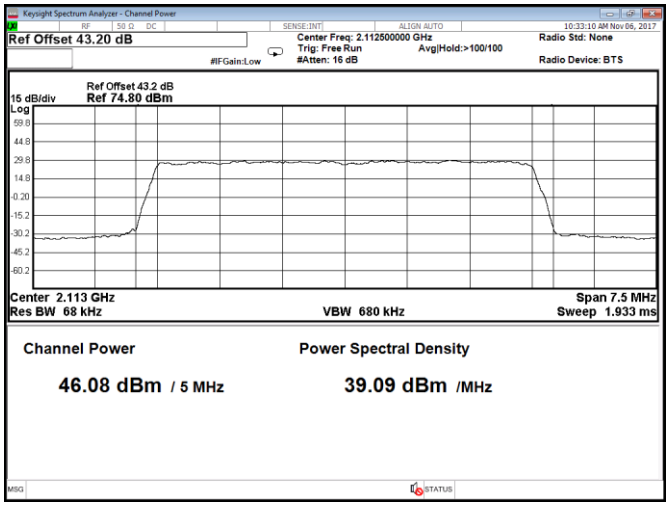


Figure 8.1-8: *Output power at low channel, 16QAM, 5 MHz, LTE, Port A*

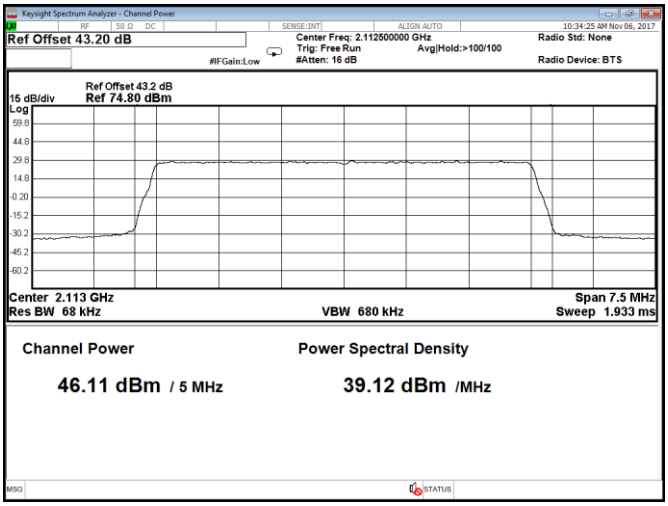


Figure 8.1-9: *Output power at low channel, 64QAM, 5 MHz, LTE, Port A*

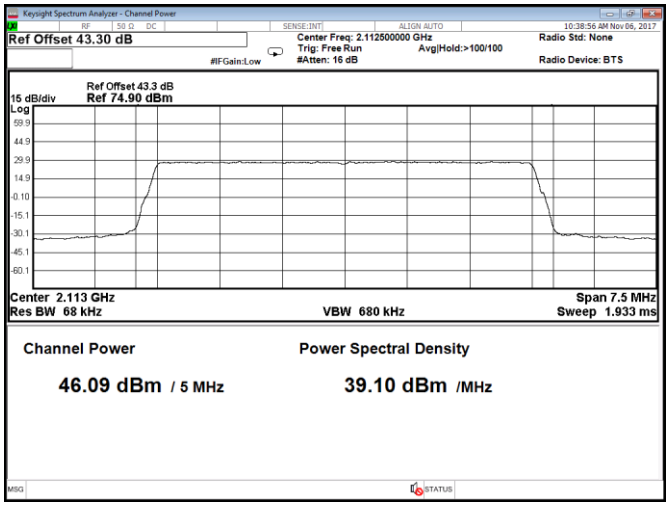


Figure 8.1-10: *Output power at low channel, 256QAM, 5 MHz, LTE, Port A*

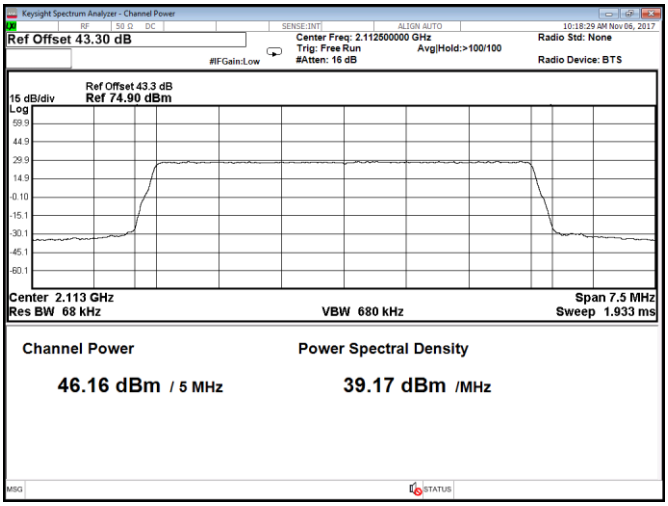


Figure 8.1-11: *Output power at low channel, QPSK, 5 MHz, LTE, Port B*

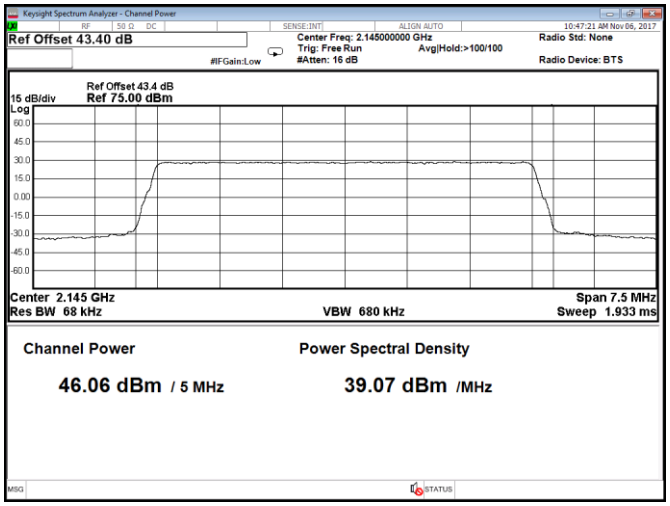


Figure 8.1-12: *Output power at mid channel, QPSK, 5 MHz, LTE, Port B*

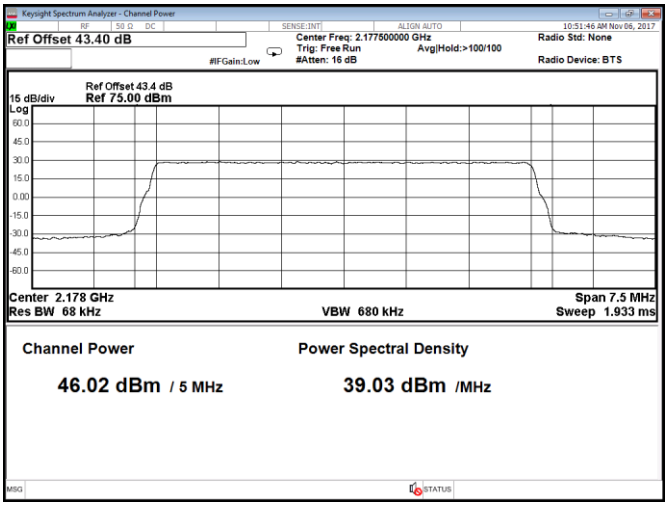


Figure 8.1-13: *Output power at high channel, QPSK, 5 MHz, LTE, Port B*

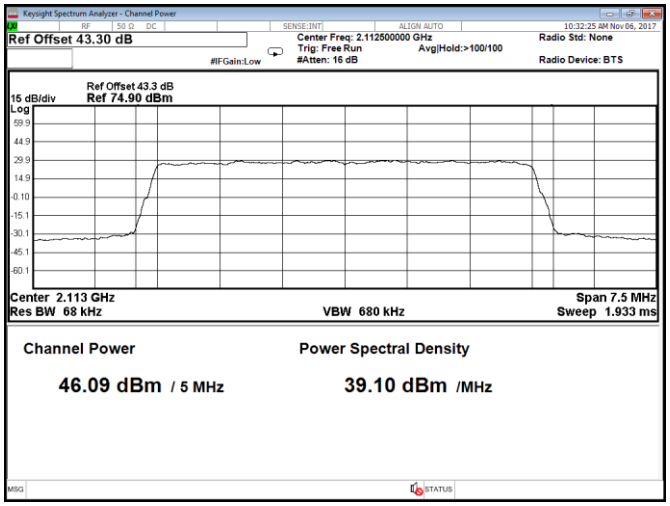


Figure 8.1-14: *Output power at low channel, 16QAM, 5 MHz, LTE, Port B*

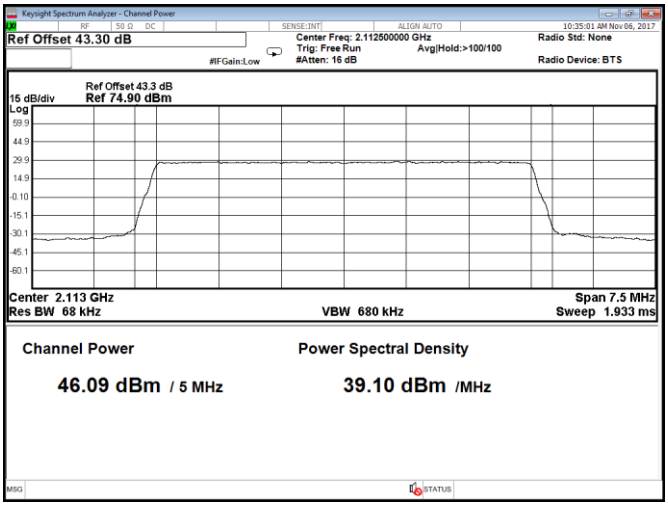


Figure 8.1-15: *Output power at low channel, 64QAM, 5 MHz, LTE, Port B*

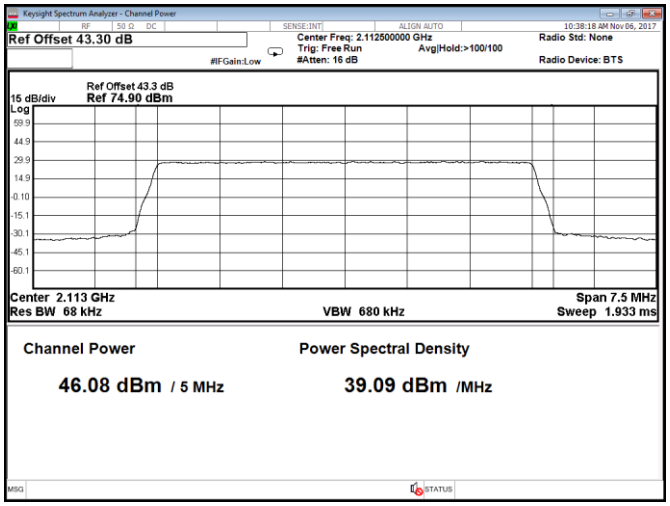


Figure 8.1-16: *Output power at low channel, 256QAM, 5 MHz, LTE, Port B*

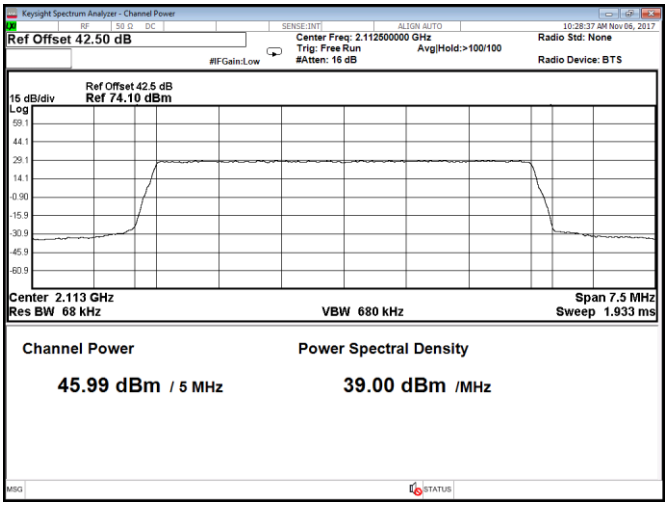


Figure 8.1-17: *Output power at low channel, QPSK, 5 MHz, LTE, Port C*

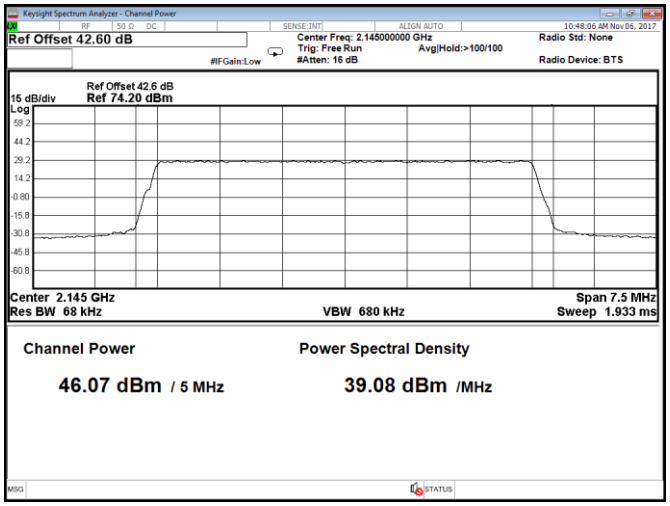


Figure 8.1-18: *Output power at mid channel, QPSK, 5 MHz, LTE, Port C*

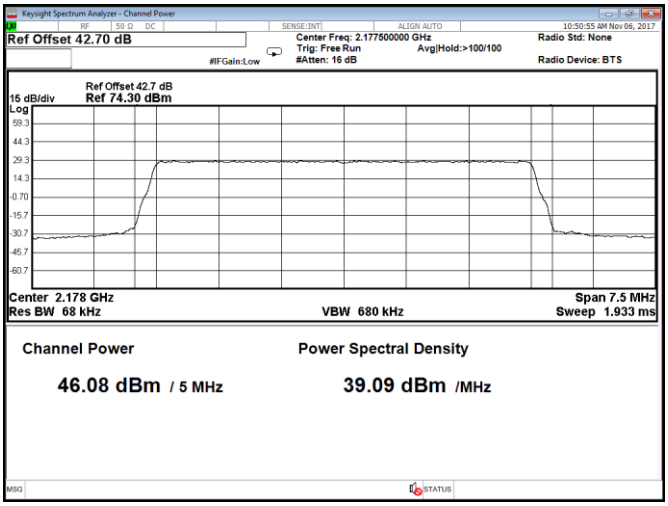


Figure 8.1-19: *Output power at high channel, QPSK, 5 MHz, LTE, Port C*

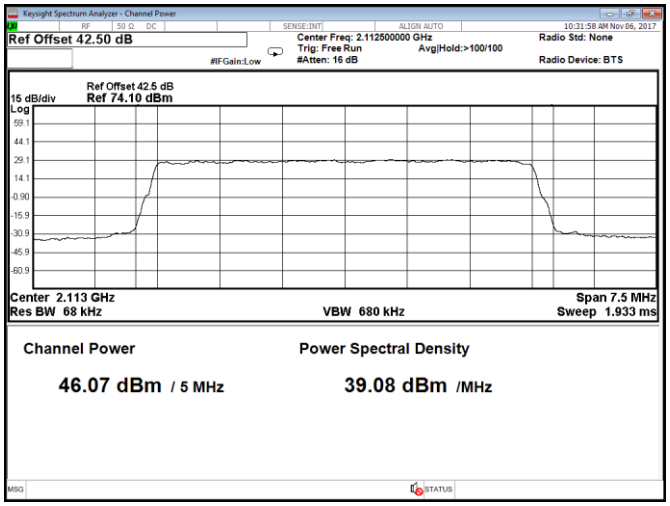


Figure 8.1-20: *Output power at low channel, 16QAM, 5 MHz, LTE, Port C*

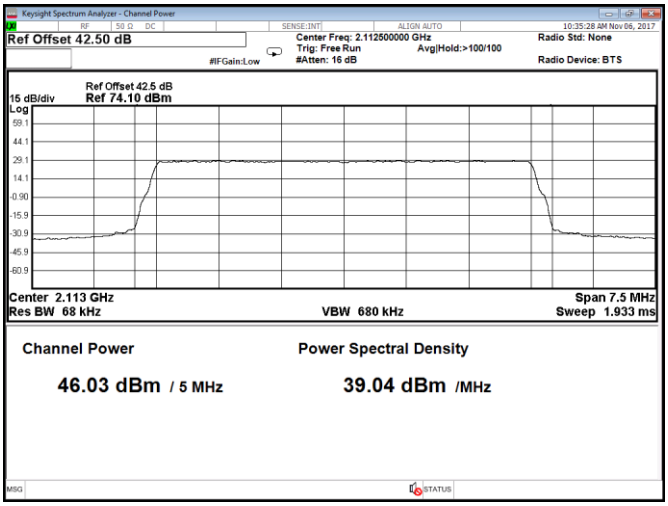


Figure 8.1-21: *Output power at low channel, 64QAM, 5 MHz, LTE, Port C*

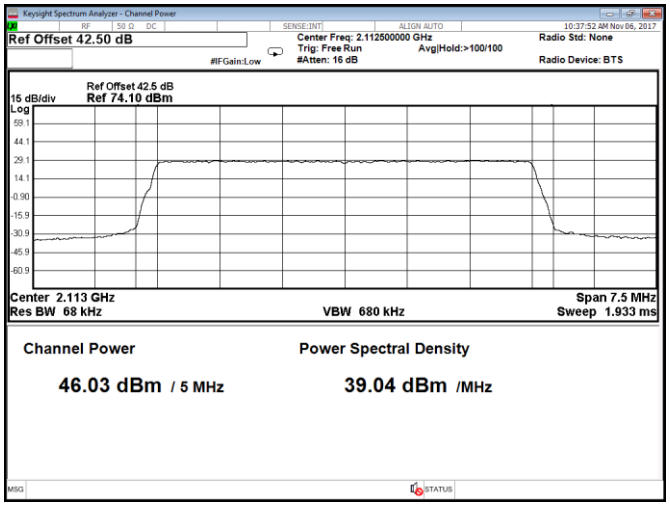


Figure 8.1-22: *Output power at low channel, 256QAM, 5 MHz, LTE, Port C*

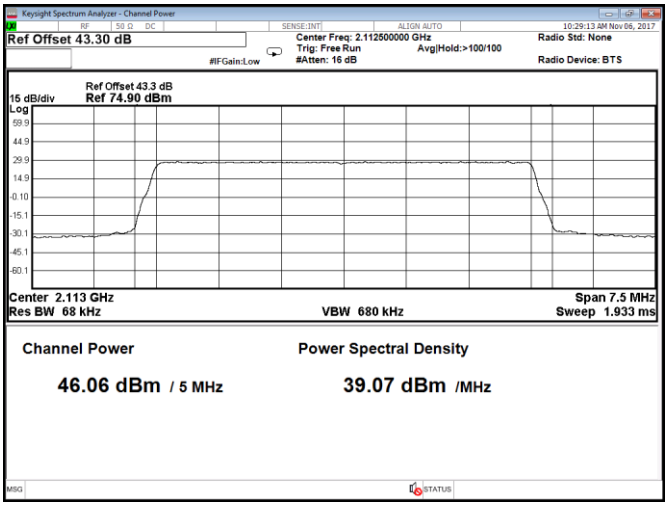


Figure 8.1-23: *Output power at low channel, QPSK, 5 MHz, LTE, Port D*

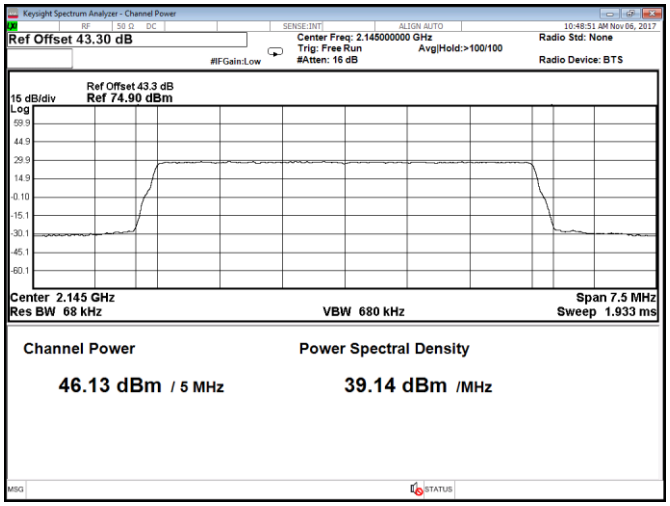


Figure 8.1-24: *Output power at mid channel, QPSK, 5 MHz, LTE, Port D*

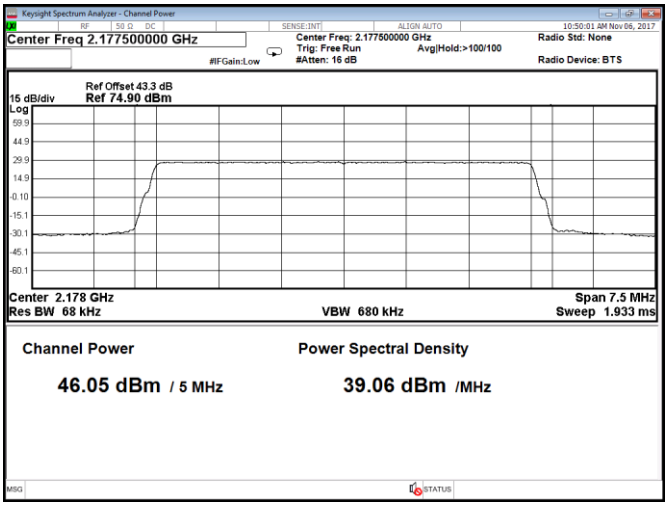


Figure 8.1-25: *Output power at high channel, QPSK, 5 MHz, LTE, Port D*

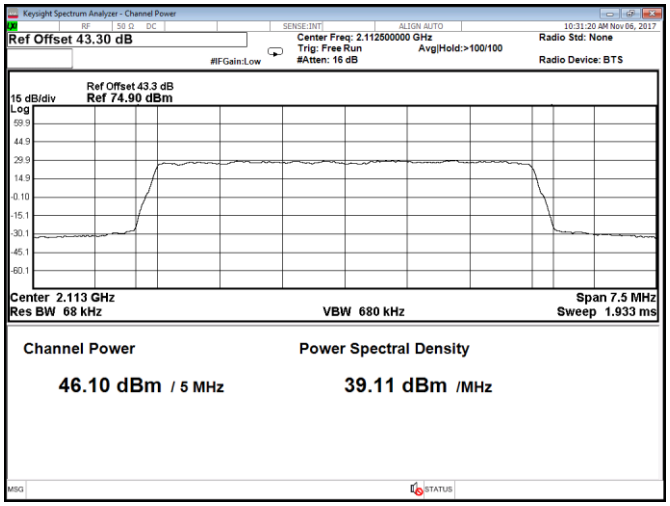


Figure 8.1-26: *Output power at low channel, 16QAM, 5 MHz, LTE, Port D*

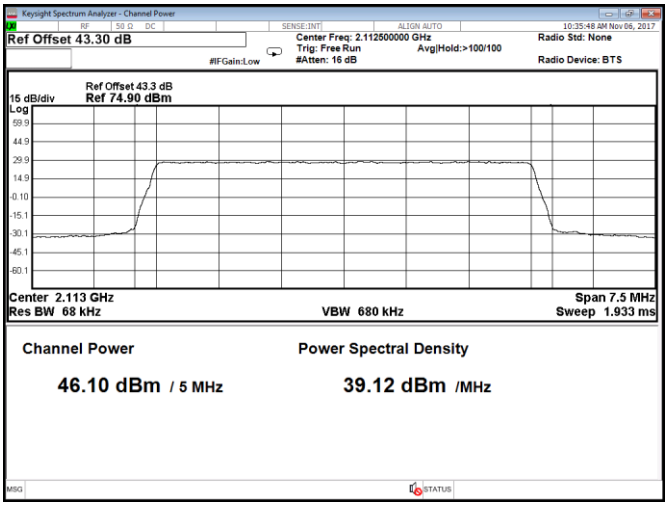


Figure 8.1-27: *Output power at low channel, 64QAM, 5 MHz, LTE, Port D*

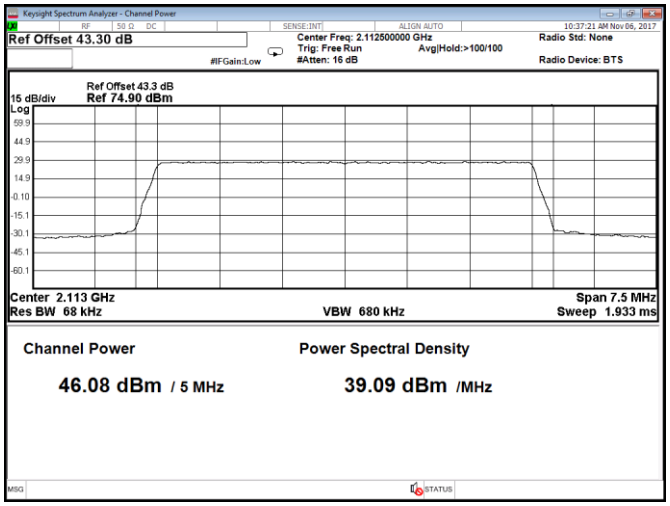


Figure 8.1-28: *Output power at low channel, 256QAM, 5 MHz, LTE, Port D*

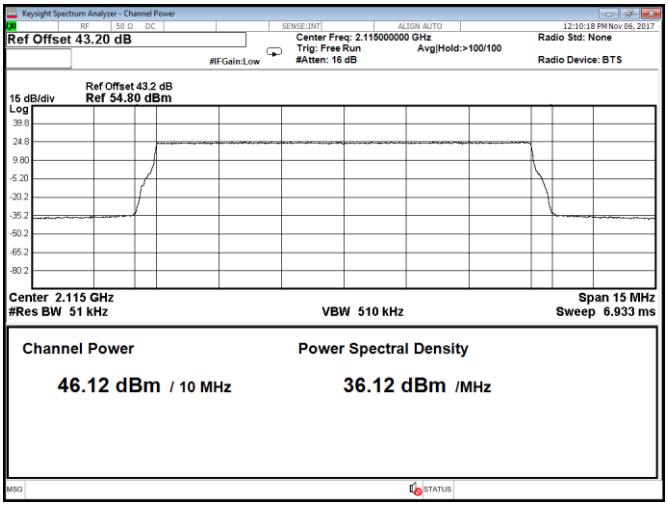


Figure 8.1-29: *Output power at low channel, QPSK, 10 MHz, LTE, Port A*

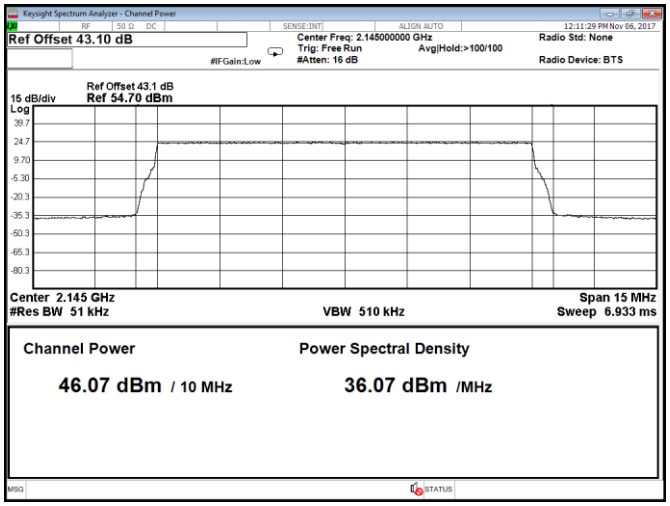


Figure 8.1-30: *Output power at mid channel, QPSK, 10 MHz, LTE, Port A*

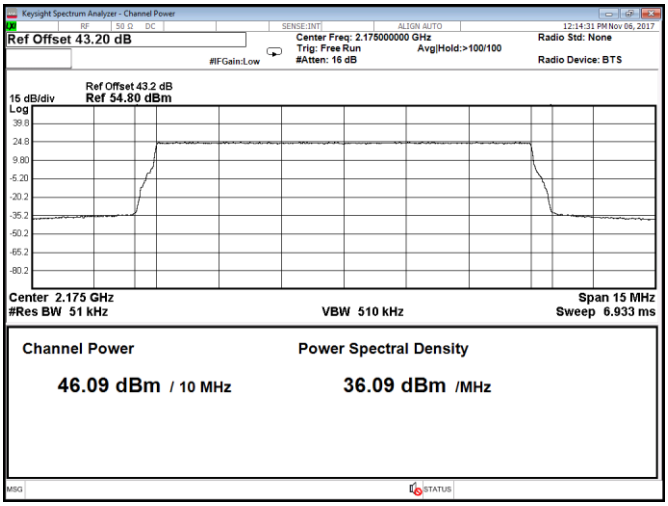


Figure 8.1-31: *Output power at high channel, QPSK, 10 MHz, LTE, Port A*

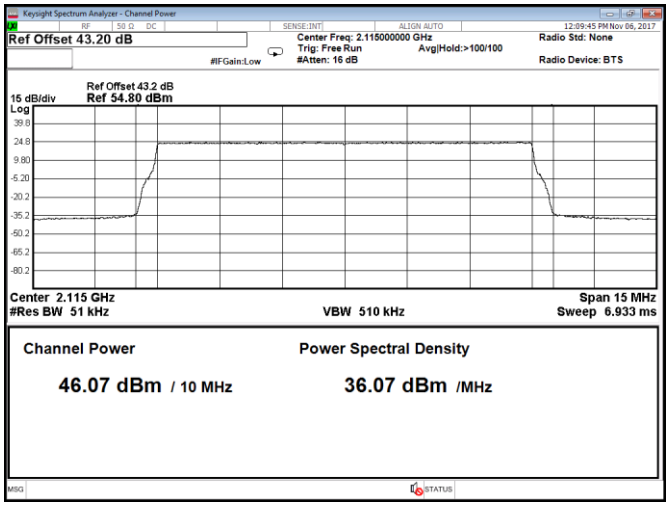


Figure 8.1-32: *Output power at low channel, QPSK, 10 MHz, LTE, Port B*

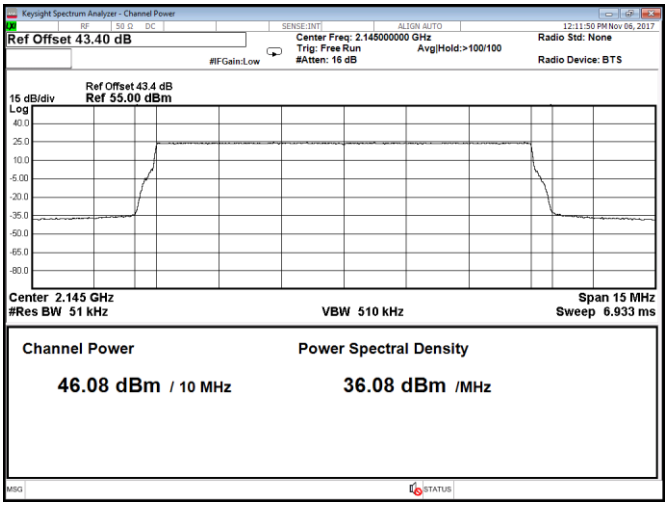


Figure 8.1-33: *Output power at mid channel, QPSK, 10 MHz, LTE, Port B*

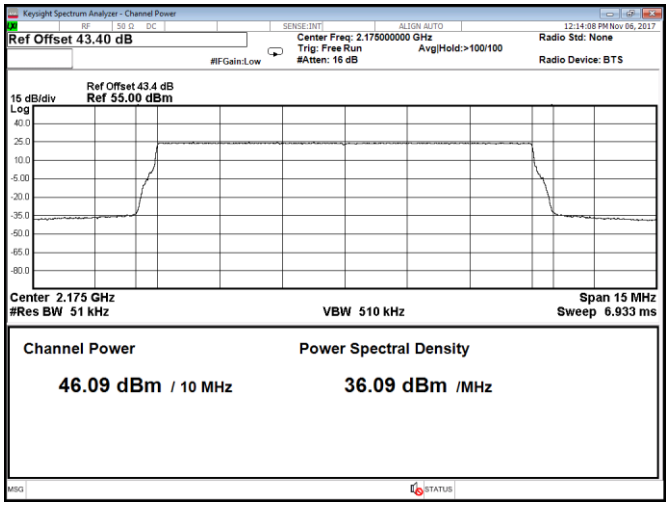


Figure 8.1-34: *Output power at high channel, QPSK, 10 MHz, LTE, Port B*

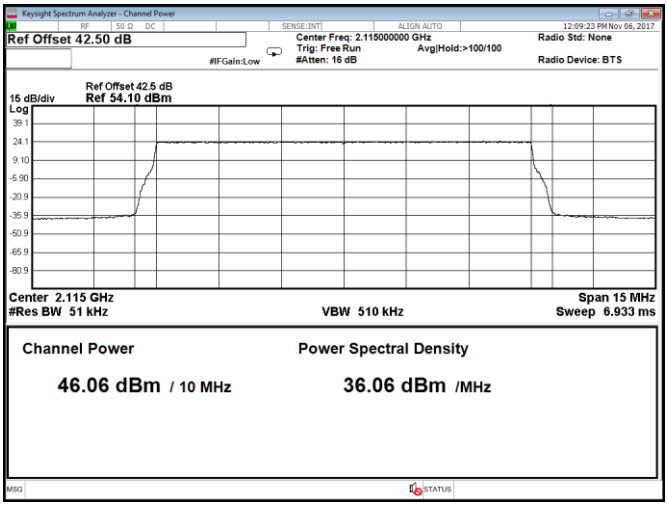


Figure 8.1-35: *Output power at low channel, QPSK, 10 MHz, LTE, Port C*

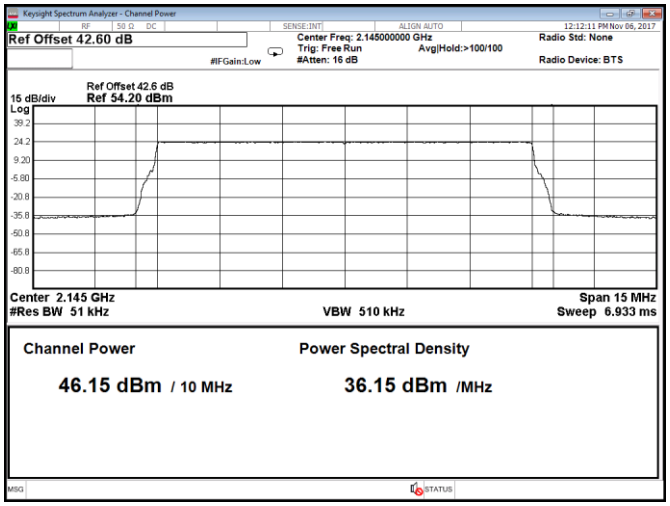


Figure 8.1-36: *Output power at mid channel, QPSK, 10 MHz, LTE, Port C*

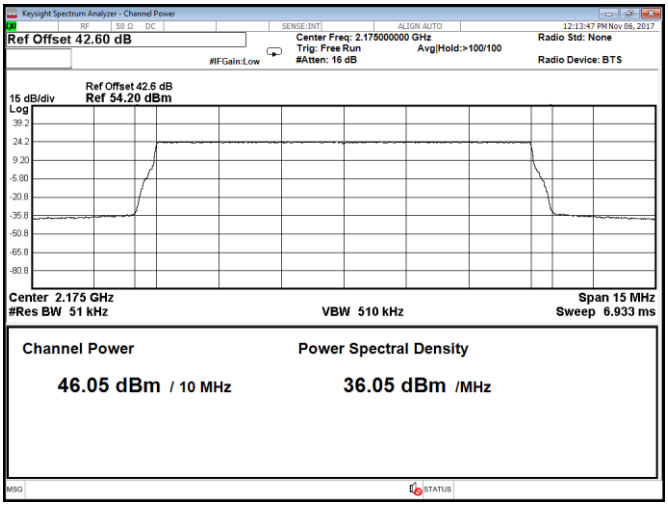


Figure 8.1-37: *Output power at high channel, QPSK, 10 MHz, LTE, Port C*

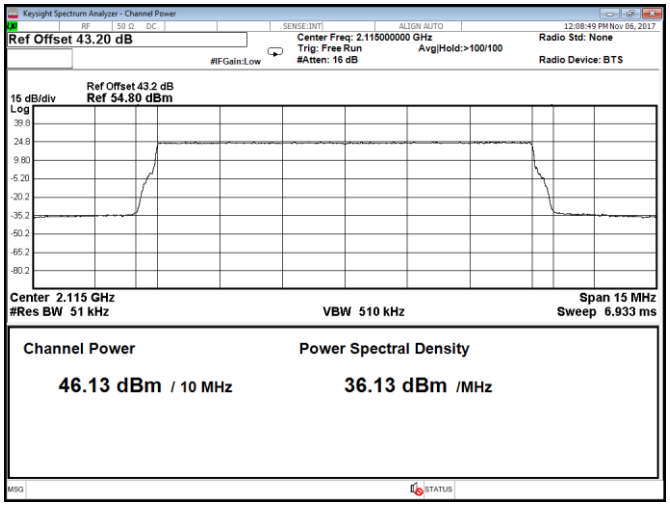


Figure 8.1-38: *Output power at low channel, QPSK, 10 MHz, LTE, Port D*

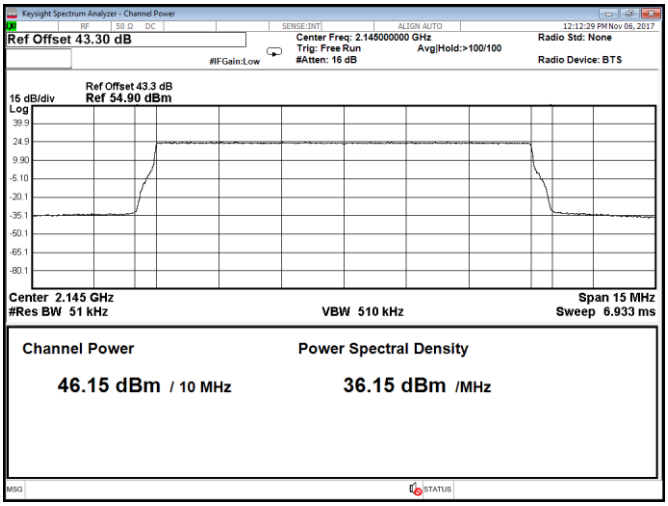


Figure 8.1-39: *Output power at mid channel, QPSK, 10 MHz, LTE, Port D*

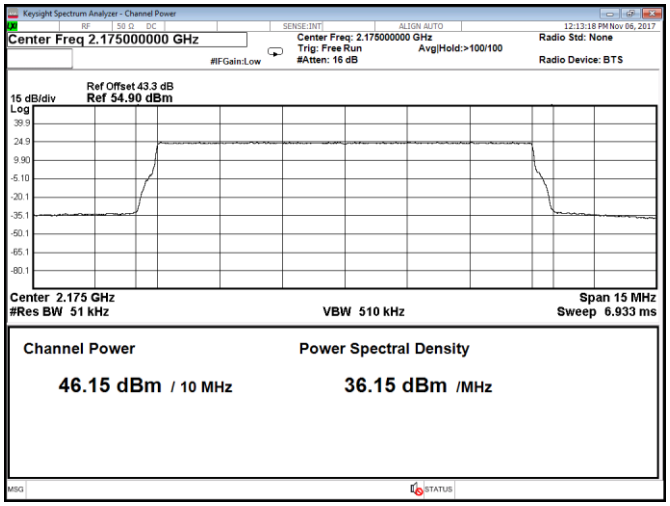


Figure 8.1-40: *Output power at high channel, QPSK, 10 MHz, LTE, Port D*

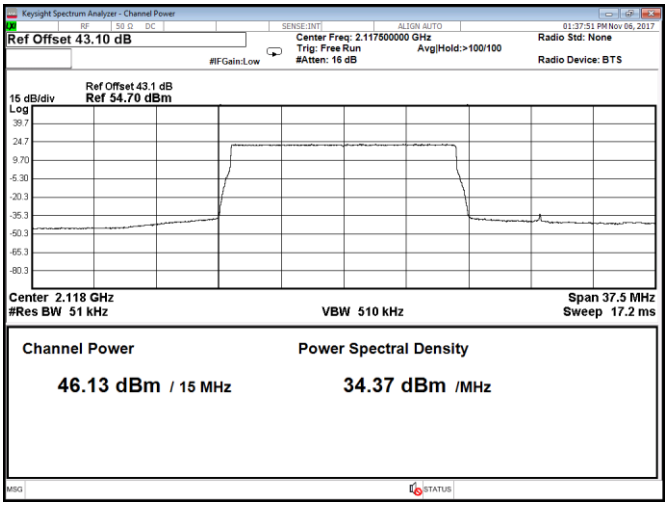


Figure 8.1-41: *Output power at low channel, QPSK, 15 MHz, LTE, Port A*

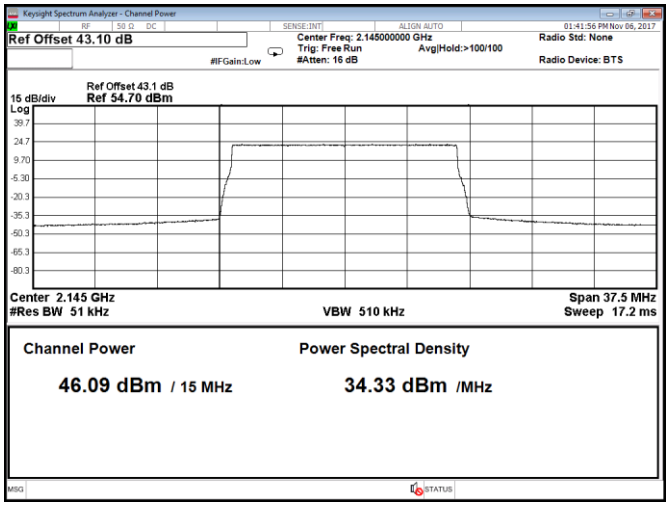


Figure 8.1-42: *Output power at mid channel, QPSK, 15 MHz, LTE, Port A*

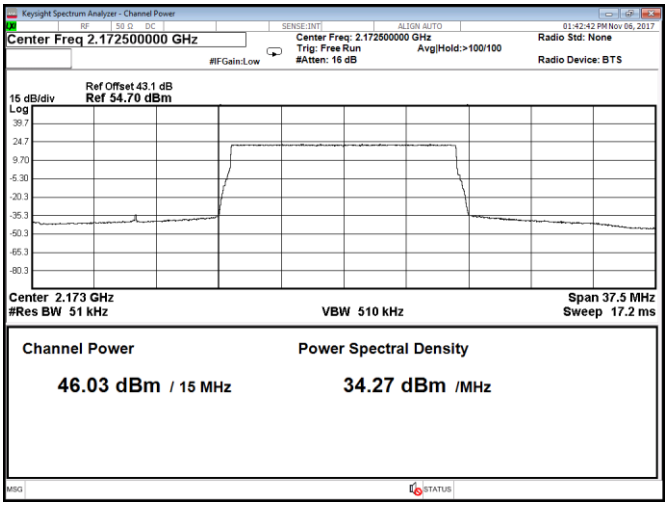


Figure 8.1-43: *Output power at high channel, QPSK, 15 MHz, LTE, Port A*

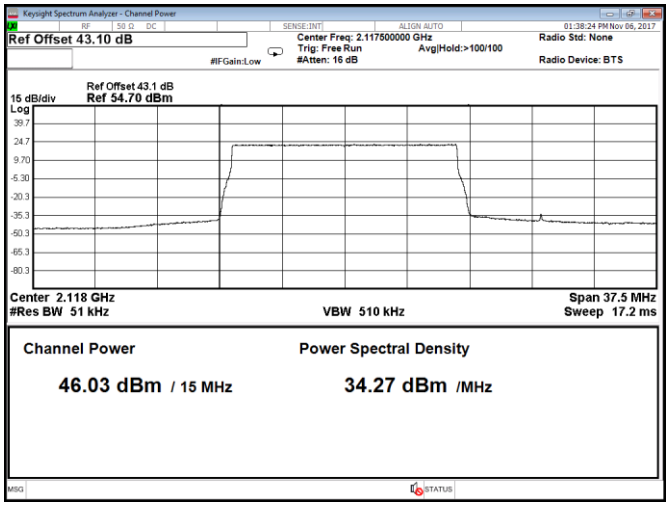


Figure 8.1-44: *Output power at low channel, QPSK, 15 MHz, LTE, Port B*

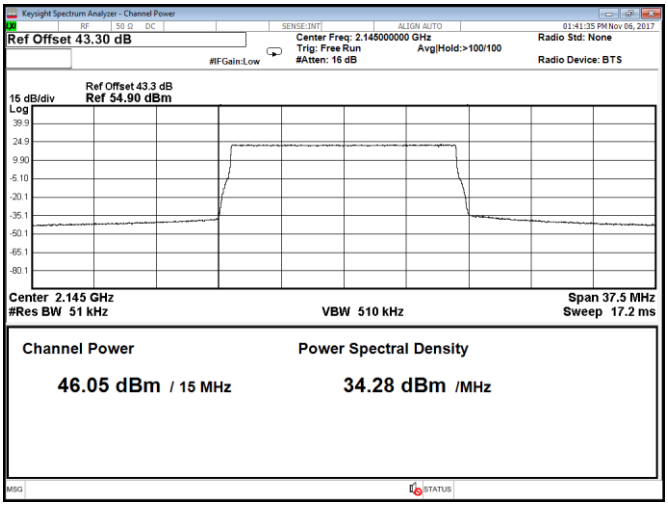


Figure 8.1-45: *Output power at mid channel, QPSK, 15 MHz, LTE, Port B*

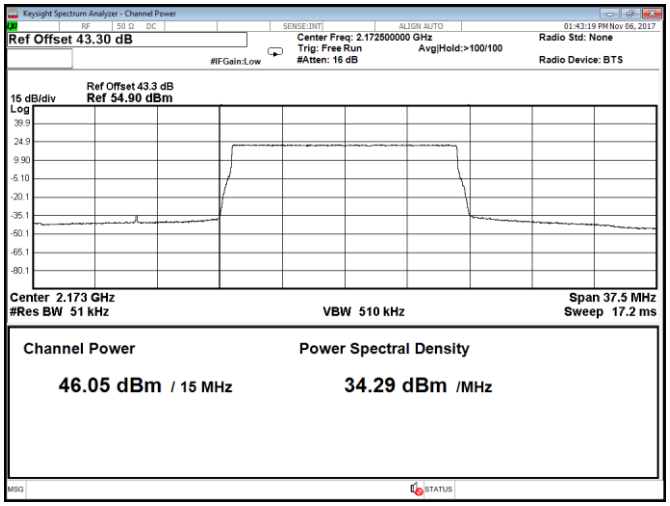


Figure 8.1-46: *Output power at high channel, QPSK, 15 MHz, LTE, Port B*

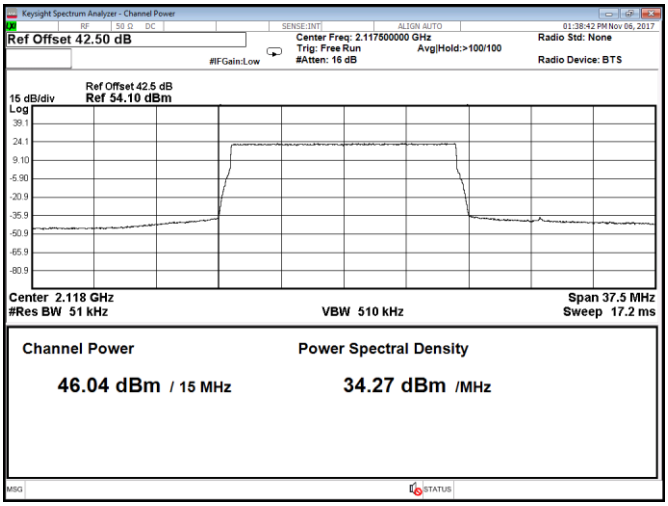


Figure 8.1-47: *Output power at low channel, QPSK, 15 MHz, LTE, Port C*

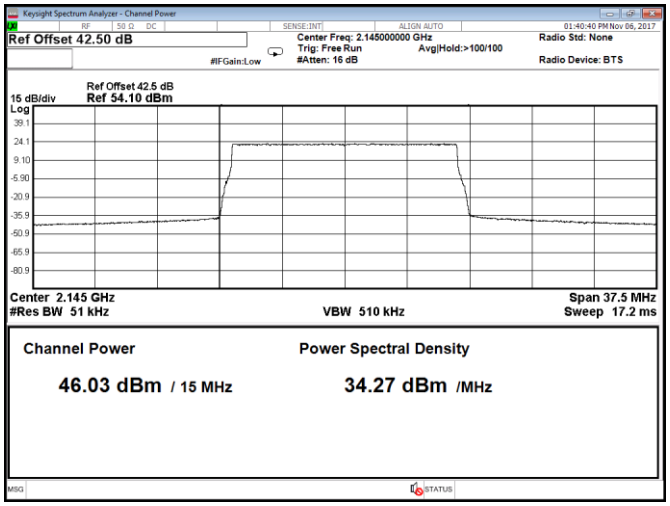


Figure 8.1-48: *Output power at mid channel, QPSK, 15 MHz, LTE, Port C*

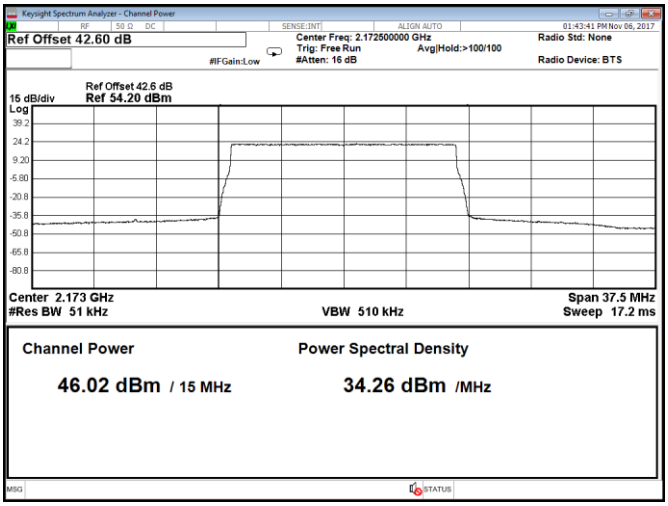


Figure 8.1-49: *Output power at high channel, QPSK, 15 MHz, LTE, Port C*

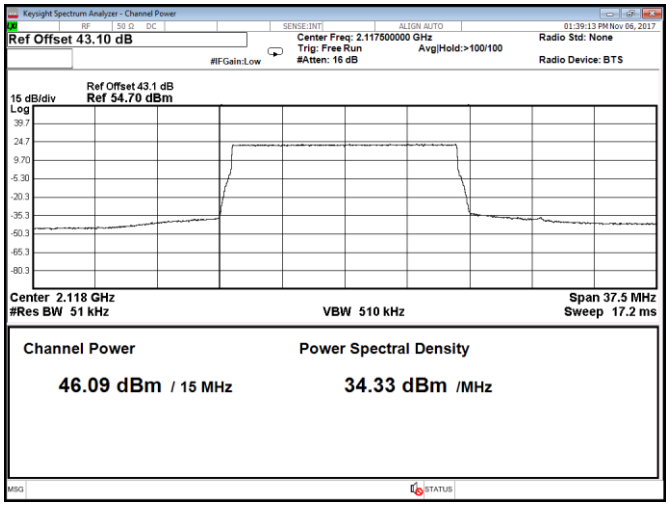


Figure 8.1-50: *Output power at low channel, QPSK, 15 MHz, LTE, Port D*

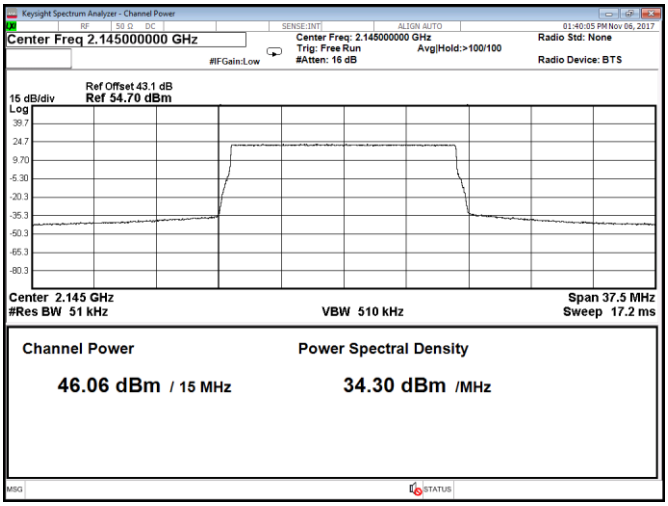


Figure 8.1-51: *Output power at mid channel, QPSK, 15 MHz, LTE, Port D*

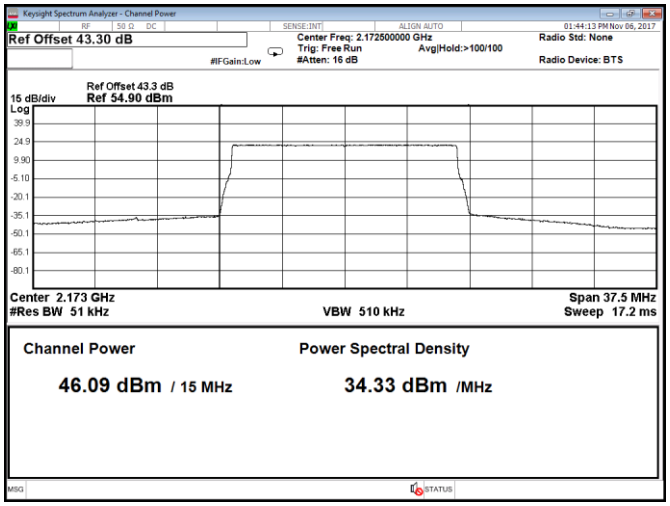


Figure 8.1-52: *Output power at high channel, QPSK, 15 MHz, LTE, Port D*

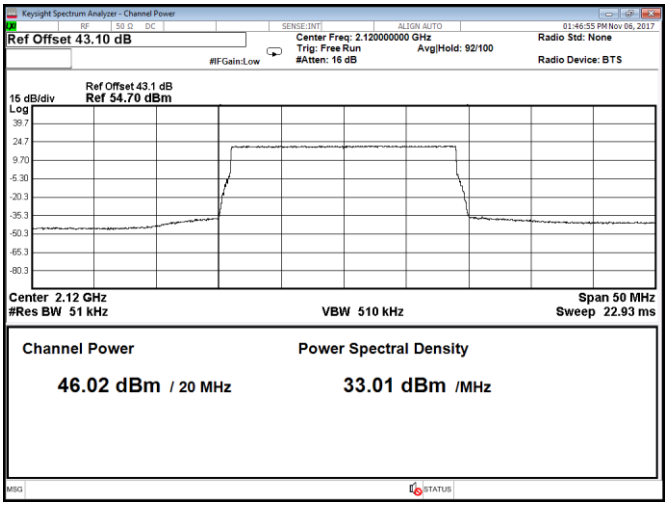


Figure 8.1-53: *Output power at low channel, QPSK, 20 MHz, LTE, Port A*

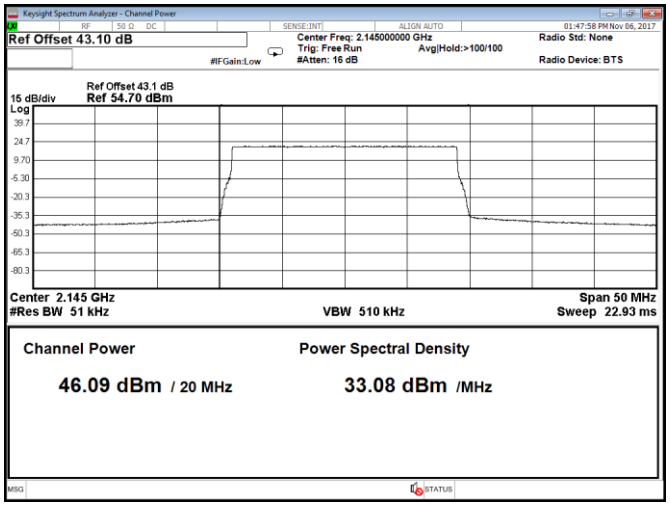


Figure 8.1-54: *Output power at mid channel, QPSK, 20 MHz, LTE, Port A*

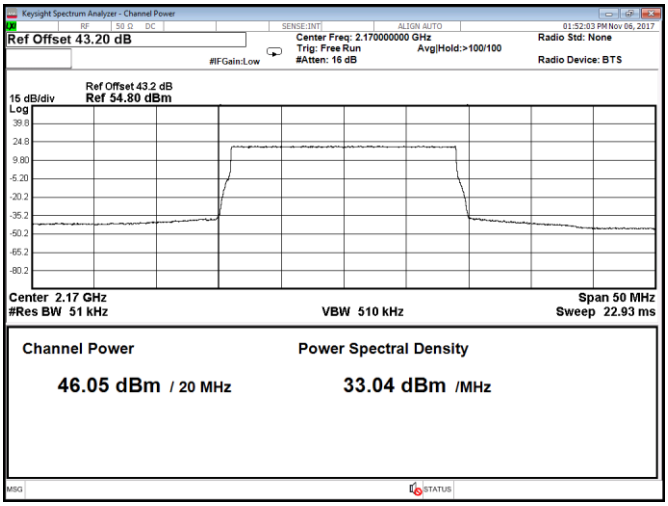


Figure 8.1-55: *Output power at high channel, QPSK, 20 MHz, LTE, Port A*

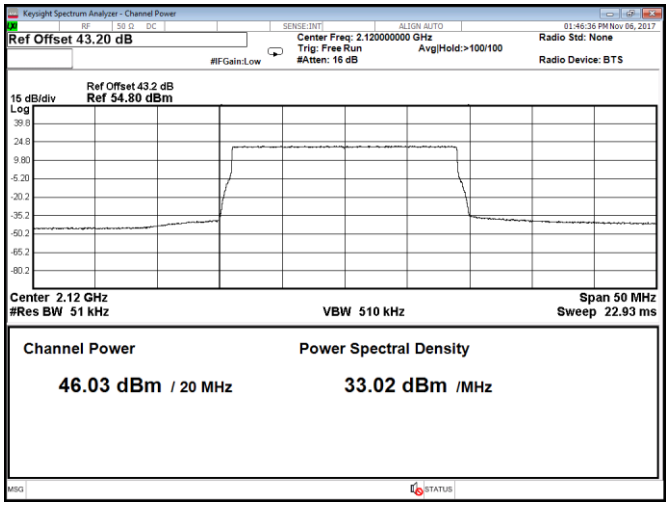


Figure 8.1-56: *Output power at low channel, QPSK, 20 MHz, LTE, Port B*

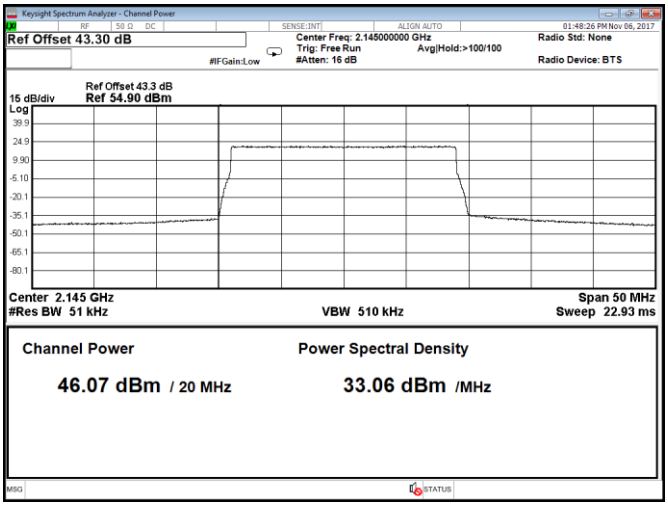


Figure 8.1-57: *Output power at mid channel, QPSK, 20 MHz, LTE, Port B*

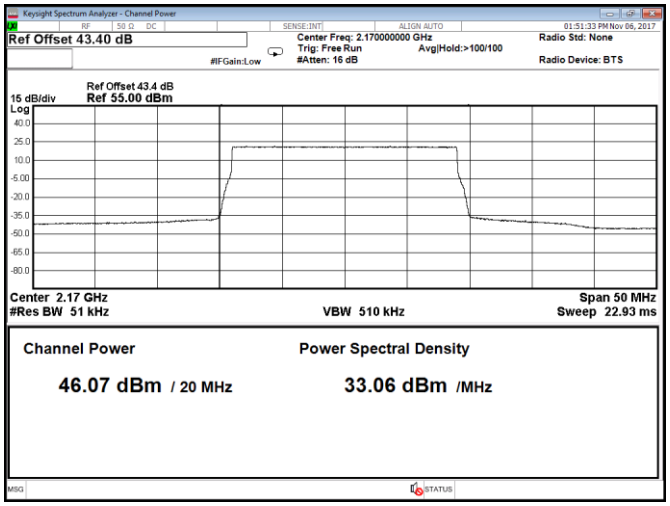


Figure 8.1-58: *Output power at high channel, QPSK, 20 MHz, LTE, Port B*

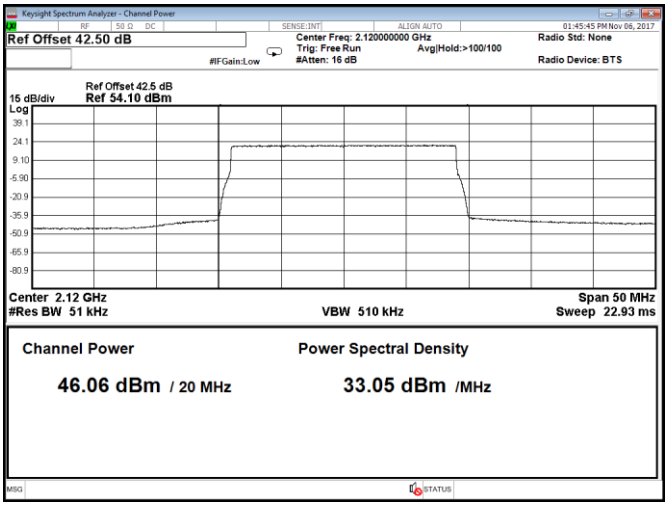


Figure 8.1-59: *Output power at low channel, QPSK, 20 MHz, LTE, Port C*

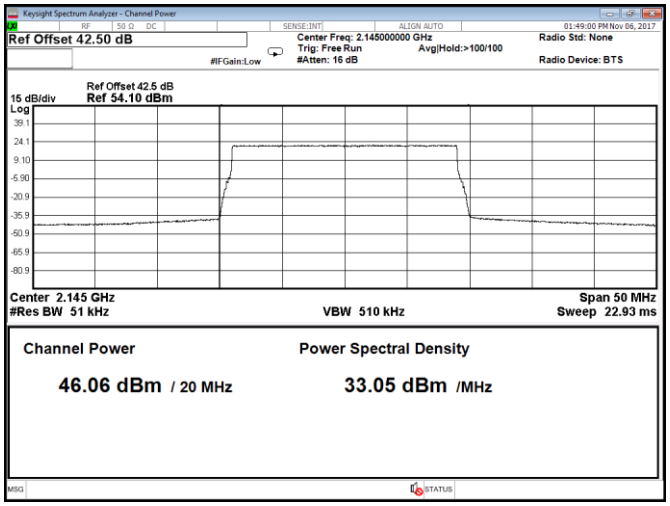


Figure 8.1-60: *Output power at mid channel, QPSK, 20 MHz, LTE, Port C*

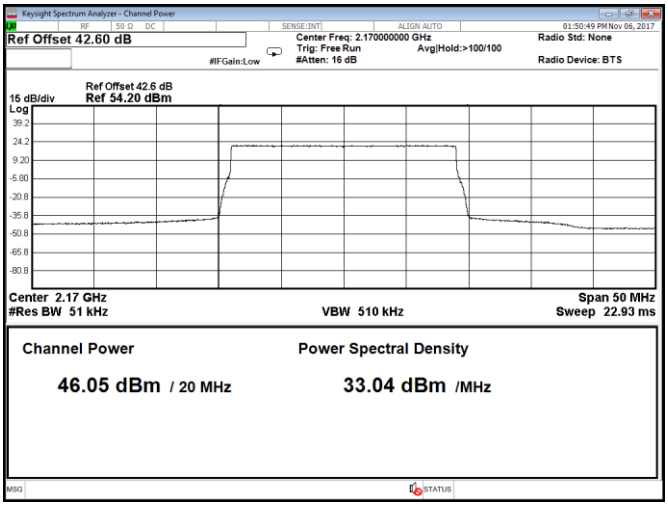


Figure 8.1-61: *Output power at high channel, QPSK, 20 MHz, LTE, Port C*

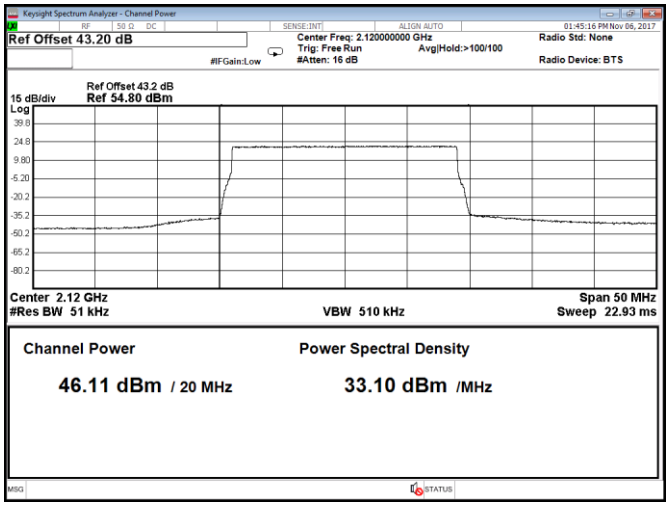


Figure 8.1-62: *Output power at low channel, QPSK, 20 MHz, LTE, Port D*

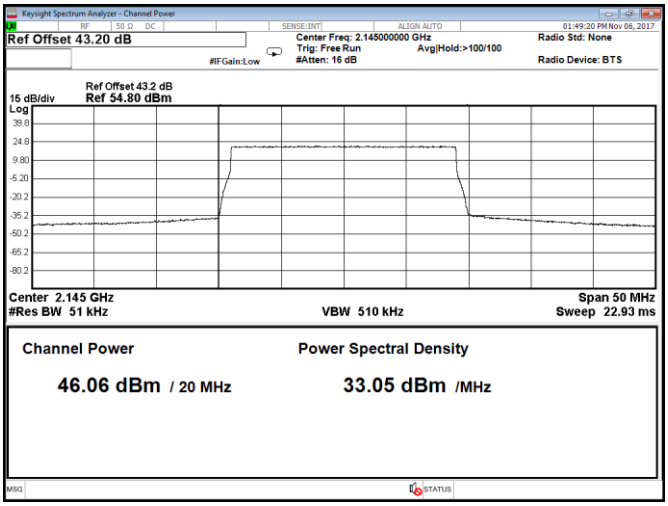


Figure 8.1-63: *Output power at mid channel, QPSK, 20 MHz, LTE, Port D*

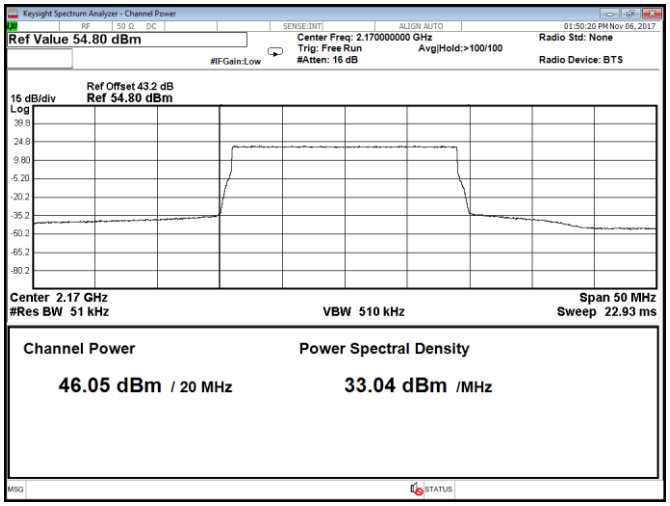


Figure 8.1-64: *Output power at high channel, QPSK, 20 MHz, LTE, Port D*

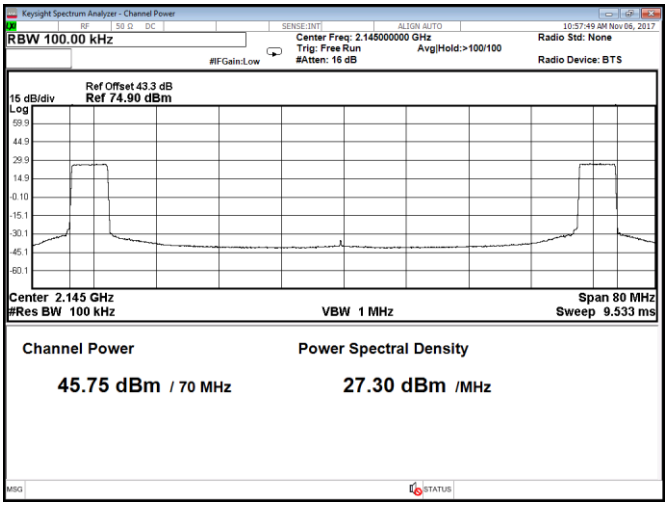


Figure 8.1-65: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, LTE, Port A*

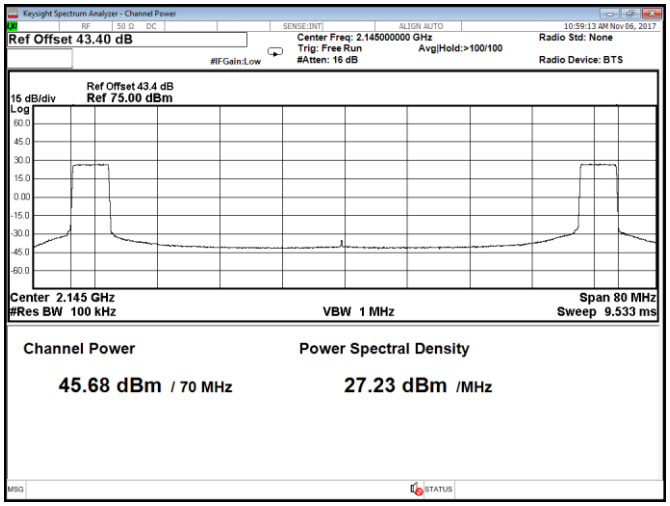


Figure 8.1-66: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, LTE, Port B*

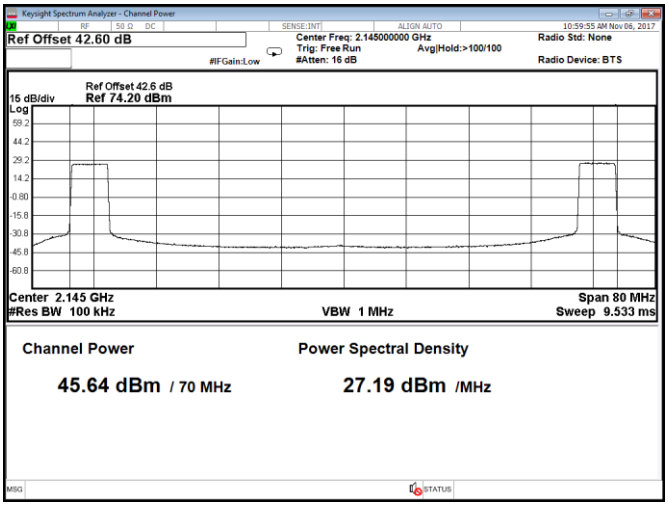


Figure 8.1-67: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, LTE, Port C*

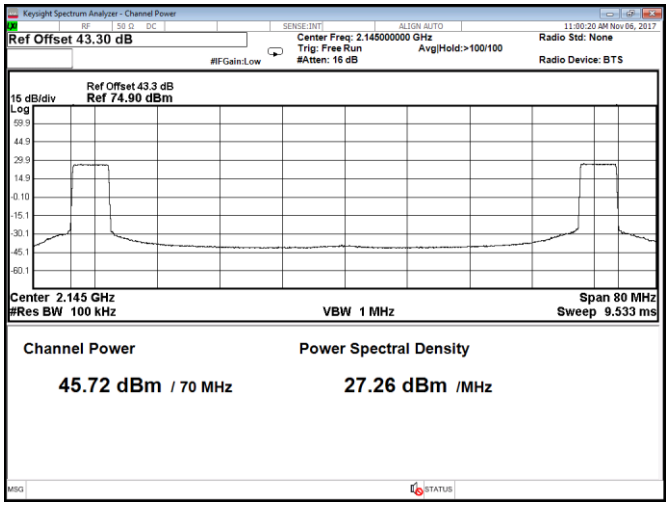


Figure 8.1-68: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, LTE, Port D*

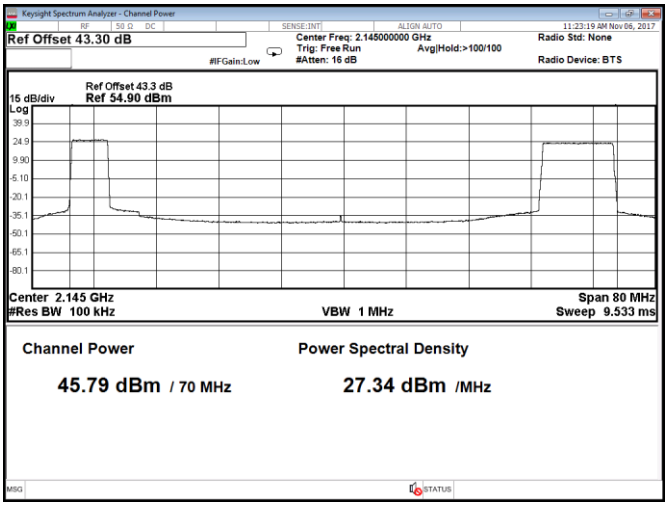


Figure 8.1-69: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 10 MHz, LTE, Port A*

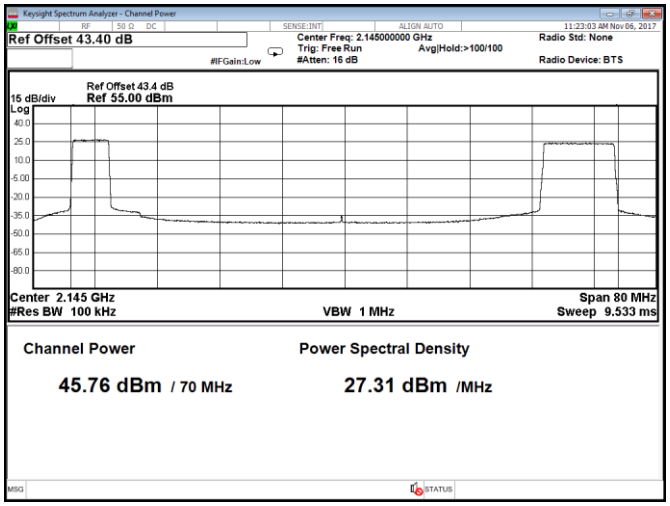


Figure 8.1-70: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 10 MHz, LTE, Port B*

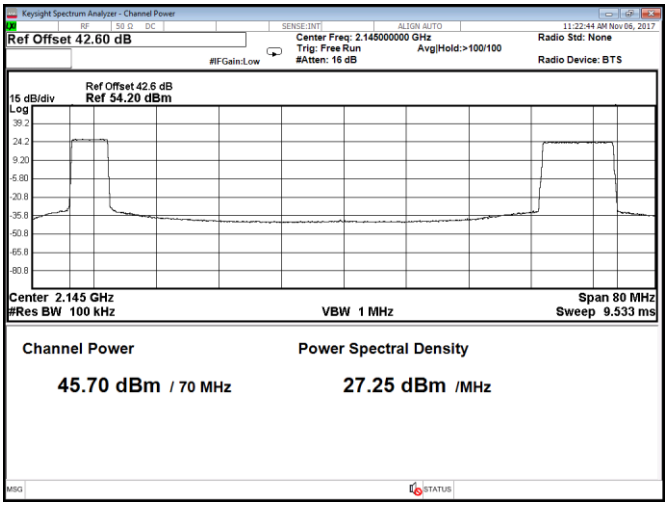


Figure 8.1-71: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 10 MHz, LTE, Port C*

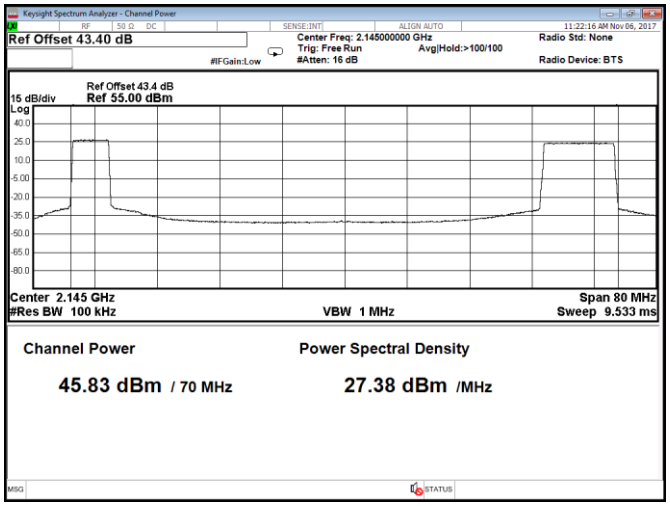


Figure 8.1-72: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 10 MHz, LTE, Port D*

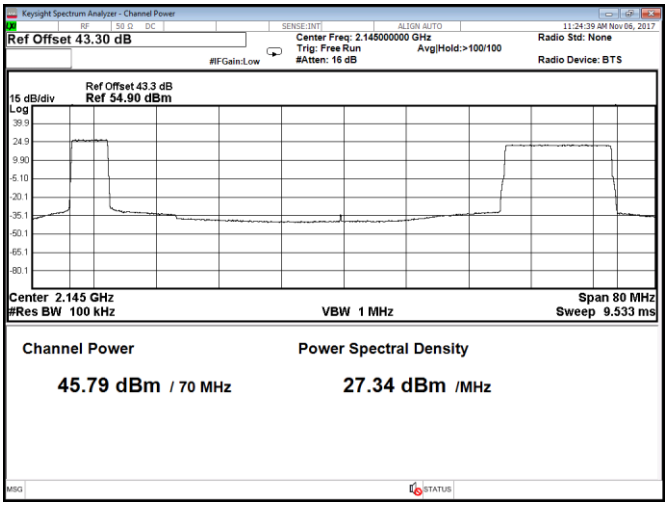


Figure 8.1-73: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 15 MHz, LTE, Port A*

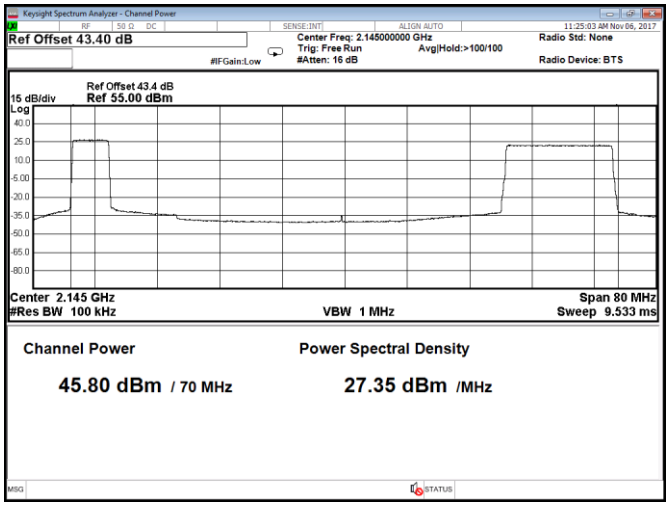


Figure 8.1-74: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 15 MHz, LTE, Port B*

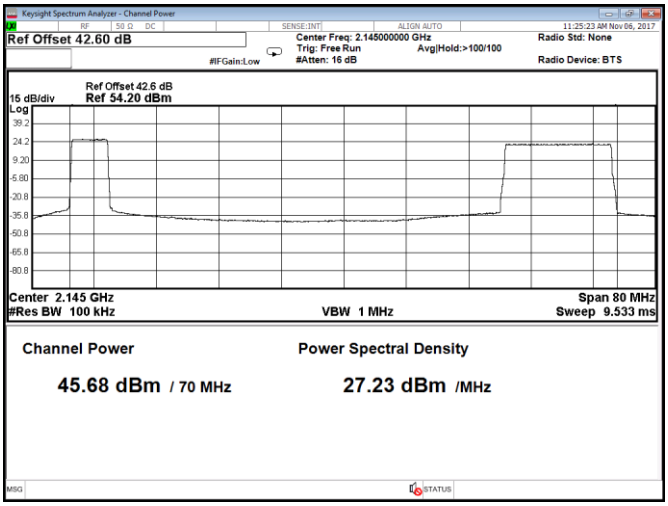


Figure 8.1-75: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 15 MHz, LTE, Port C*

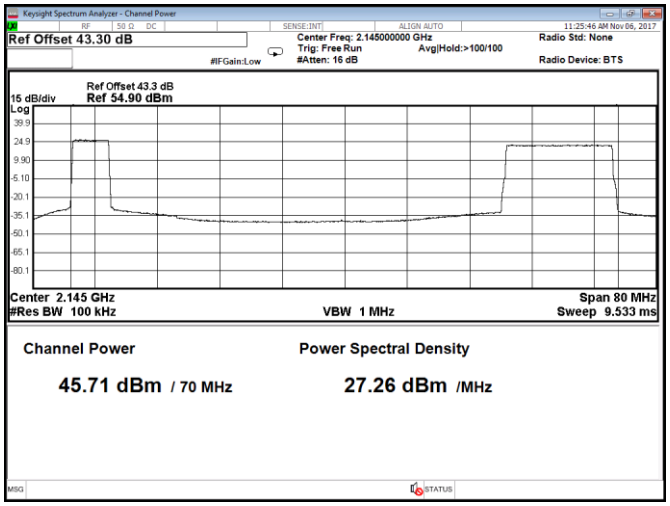


Figure 8.1-76: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 15 MHz, LTE, Port D*

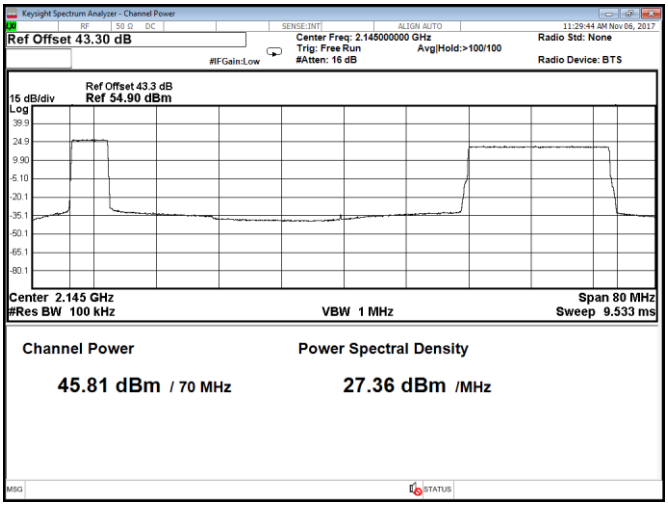


Figure 8.1-77: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 20 MHz, LTE, Port A*

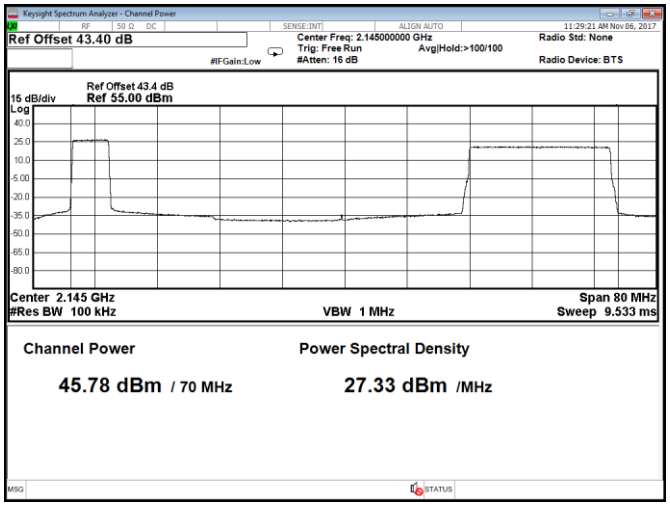


Figure 8.1-78: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 20 MHz, LTE, Port B*

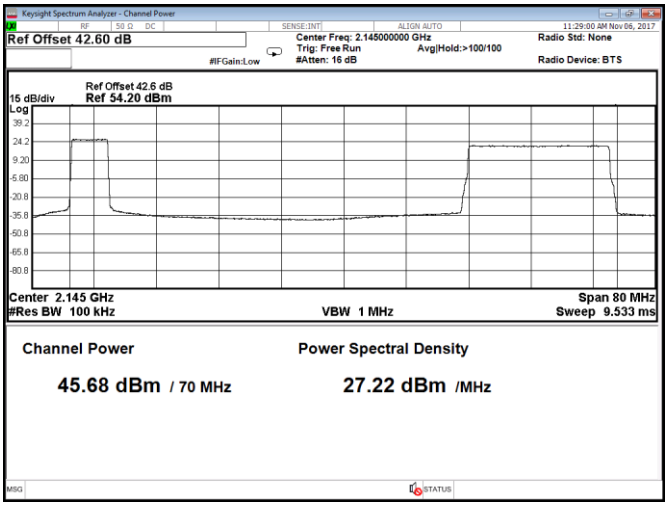


Figure 8.1-79: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 20 MHz, LTE, Port C*

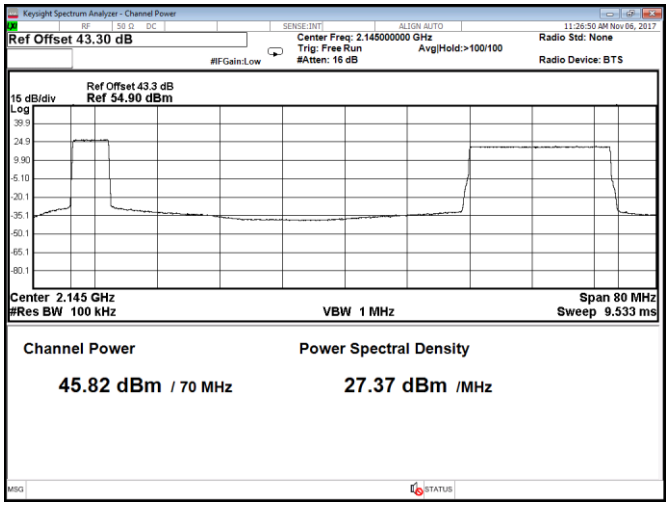


Figure 8.1-80: *Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 20 MHz, LTE, Port D*

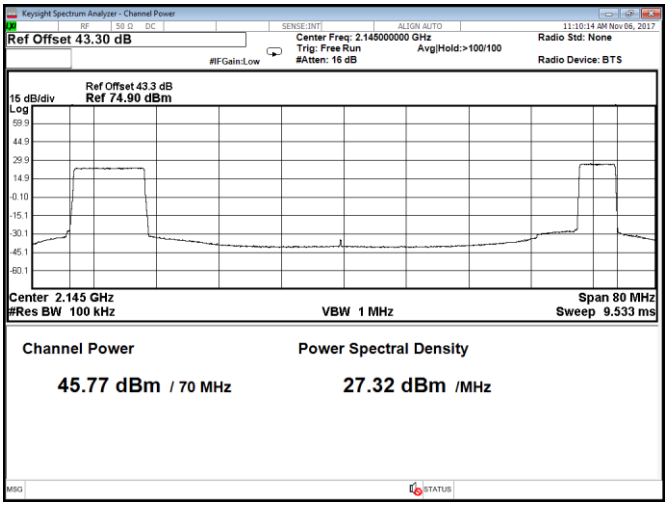


Figure 8.1-81: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 5 MHz, LTE, Port A*

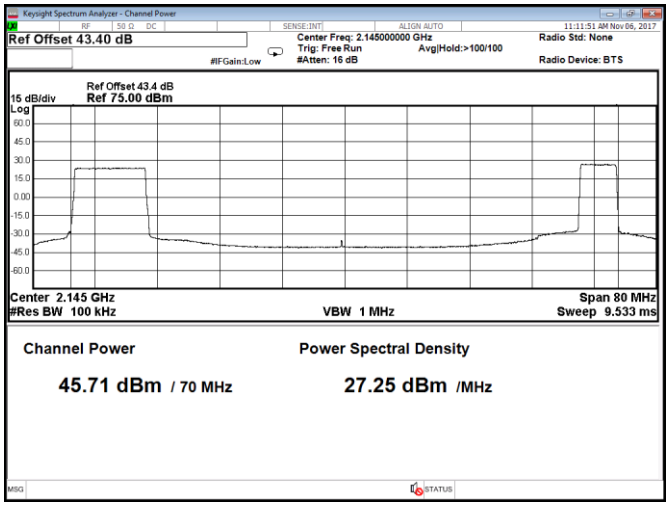


Figure 8.1-82: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 5 MHz, LTE, Port B*

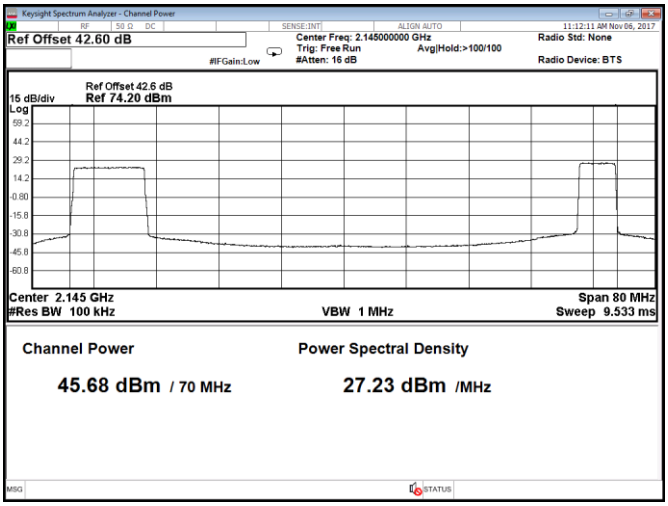


Figure 8.1-83: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 5 MHz, LTE, Port C*

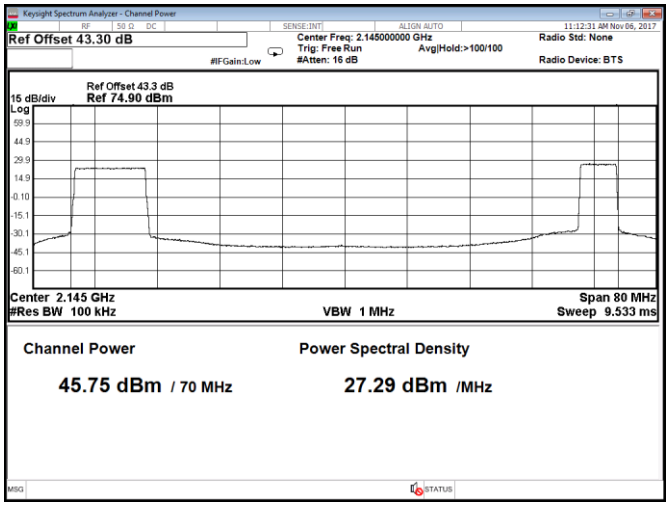


Figure 8.1-84: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 5 MHz, LTE, Port D*

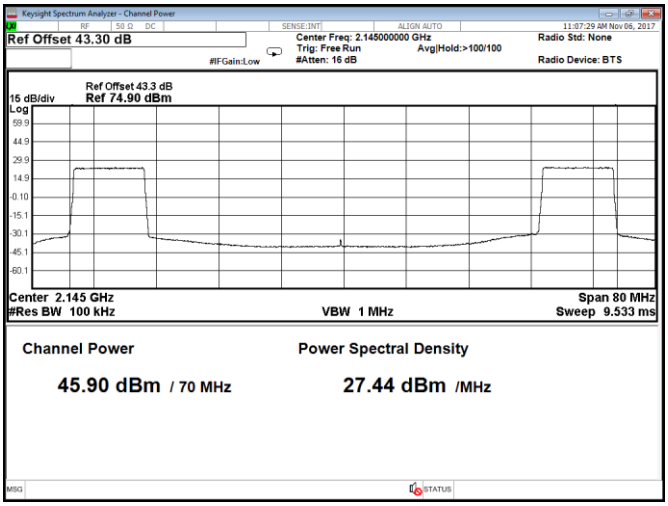


Figure 8.1-85: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 10 MHz, LTE, Port A*

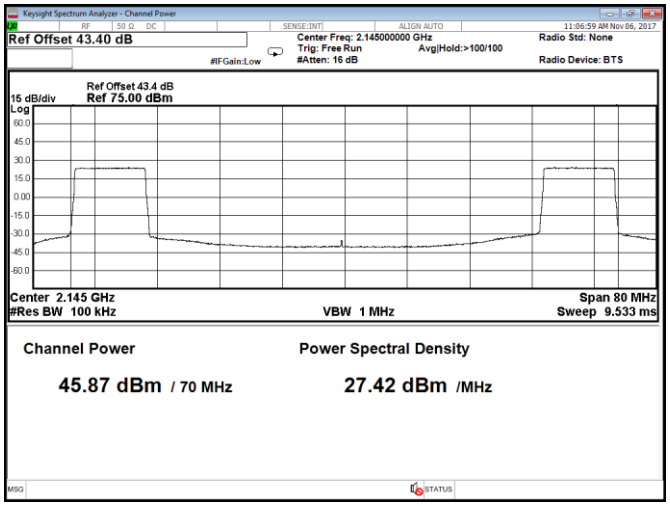


Figure 8.1-86: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 10 MHz, LTE, Port B*

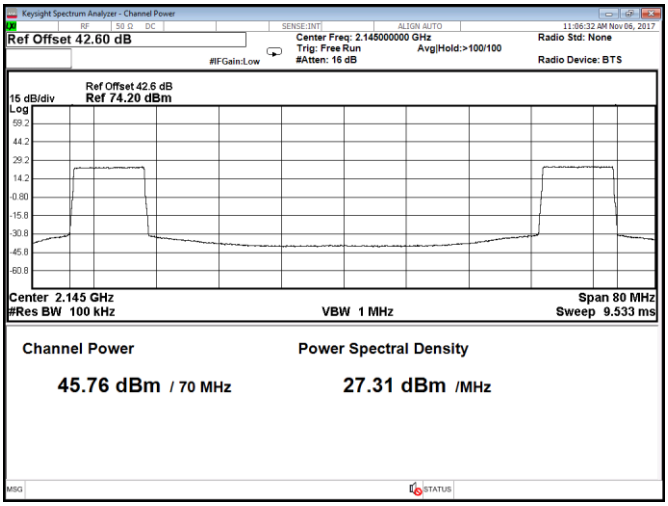


Figure 8.1-87: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 10 MHz, LTE, Port C*

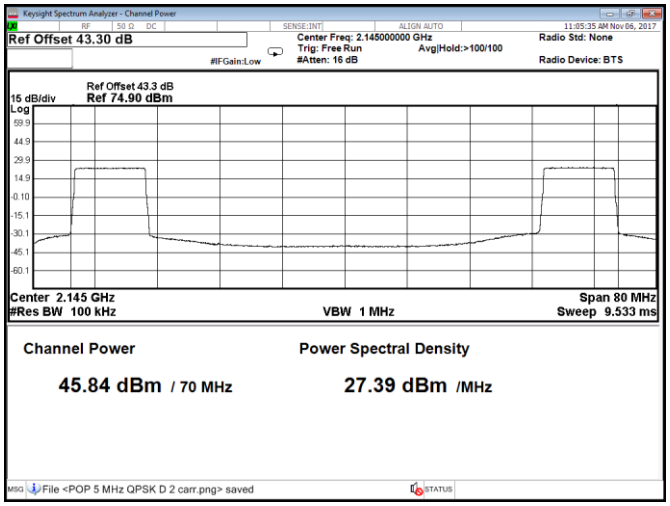


Figure 8.1-88: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 10 MHz, LTE, Port D*

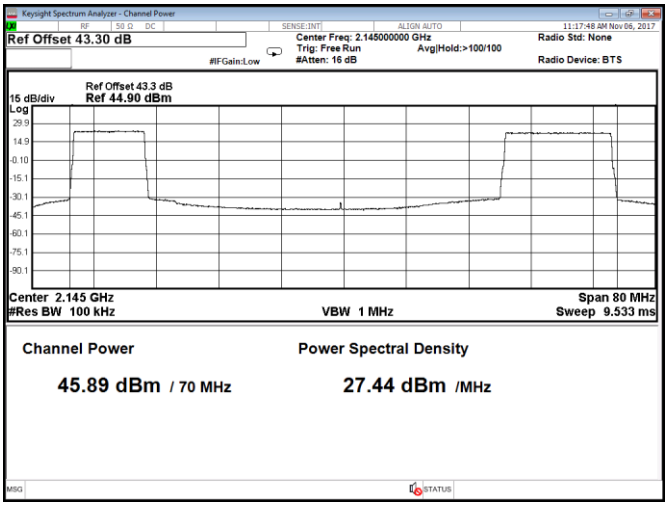


Figure 8.1-89: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 15 MHz, LTE, Port A*

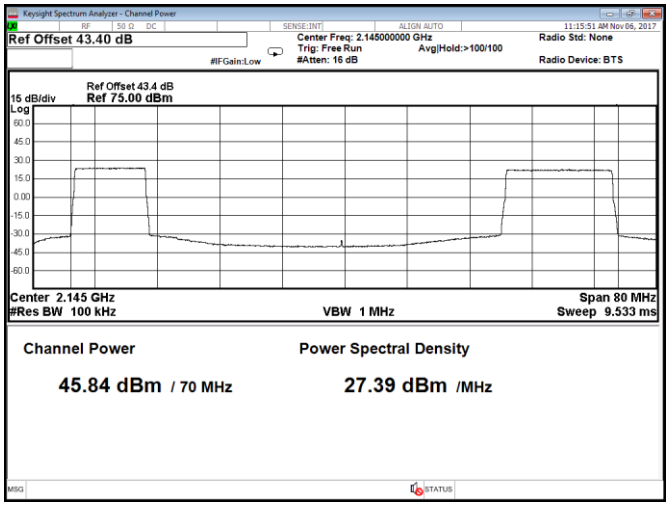


Figure 8.1-90: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 15 MHz, LTE, Port B*

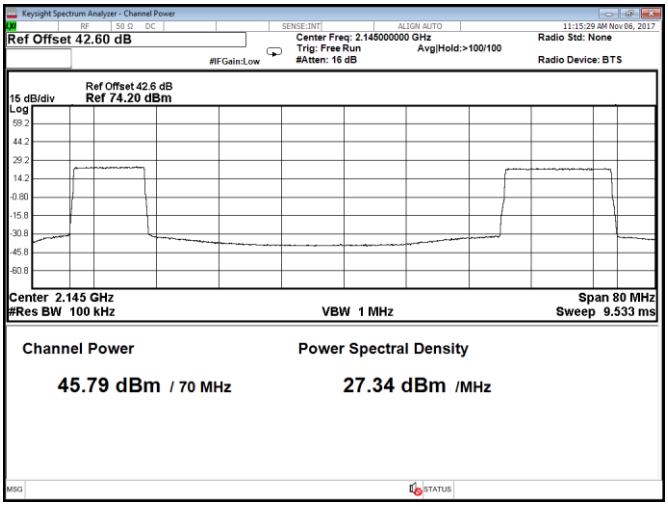


Figure 8.1-91: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 15 MHz, LTE, Port C*

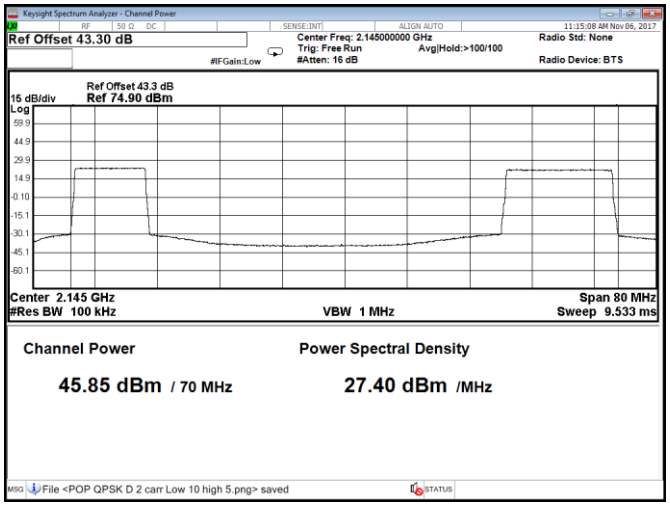


Figure 8.1-92: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 15 MHz, LTE, Port D*

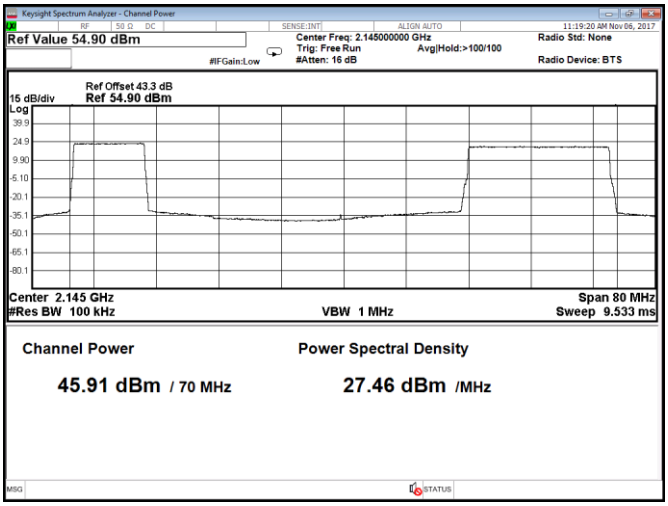


Figure 8.1-93: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 20 MHz, LTE, Port A*

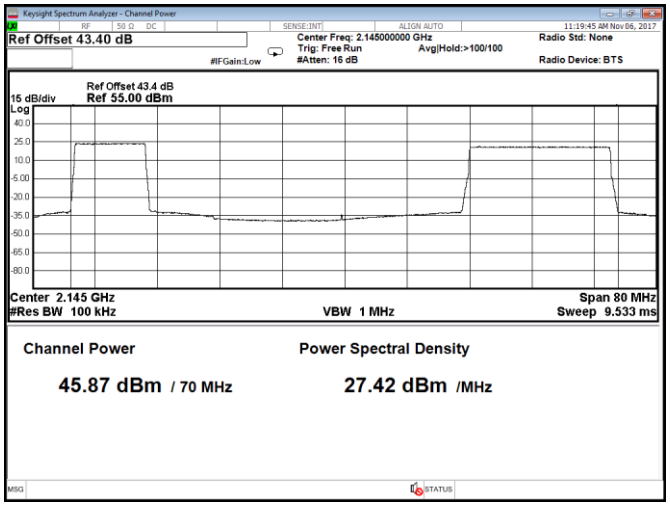


Figure 8.1-94: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 20 MHz, LTE, Port B*

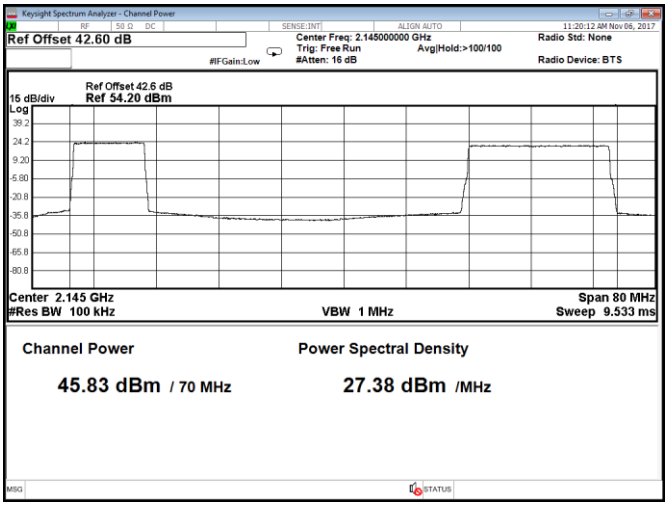


Figure 8.1-95: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 20 MHz, LTE, Port C*

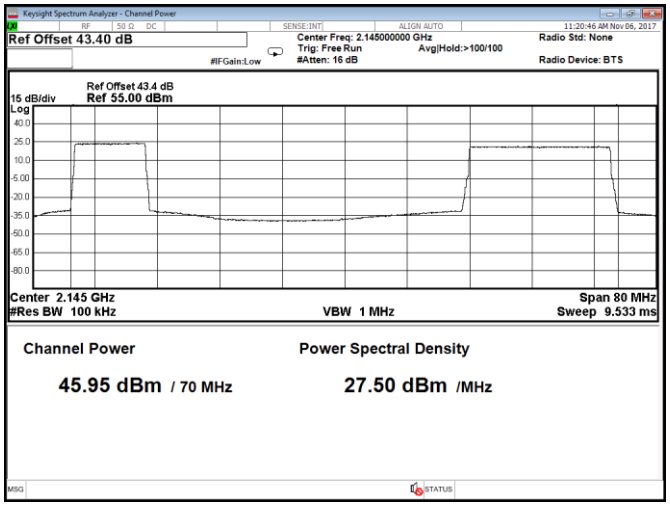


Figure 8.1-96: *Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 20 MHz, LTE, Port D*