

Radio Test report – Radio 2217 B66A

335941-1TRFWL-R1

Applicant:

Ericsson Canada

Product:

Radio 2217

Models:

Radio 2217 B66A

Part numbers:

KRC 161 703/1

FCC ID:

TA8AKRC161703-1

ISED Reg. Number

287AB-AS1617031

HVIN:

AS1617031

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

Reviewed by: Kevin Rose, Wireless/EMC Specialist

Date of issue: August 18, 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.

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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 Matters; 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 2217 B66A with model numbers KRC 161 703/1.

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	July 10, 2017
Nemko sample ID number	None

3.2 EUT information

Product name	Radio 2217
Model	Radio 2217 B66A
Part number	KRC 161 703/1
Revision	R1A
Serial number	D16W812745 (Conducted) D16W790017 (Radiated)
Antenna ports	2 TX/RX Ports
RF BW	LTE: 70 MHz / WCDMA: 45 MHz
IBW	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	45 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: 5M00-F9W
Multi-carrier	Single Antenna, TX Diversity, MIMO, Carrier Aggregation
Operating temperature	–40 °C to +55 °C
Total Power based on IBW	2 × 40 W
Supported carrier / port	LTE BW: 5 (1-3), 10 (1-3), 15 (1-3), 20 (1-2) WCDMA BW: 5 (1-8) MM: 1-8 Carriers
Optional Fan Tray	NTB: 101 689/1 (BKV 106 137/1, SXK 125 2820/1)

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 2217 B66A (KRC 161 703/1) is a multi-standard remote radio forming part of the Ericsson RBS (Radio Base Station) equipment. The Radio 2217 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 2217 product is convection cooled and shall be mounted vertically. Horizontal mounting is supported with forced air cooling with an optional fan tray assembly NTB 101 689/1 consisting of BKV 106 137/1 (Fan Assembly) and SXK 125 2820/1 (Cover Assembly). Output RF Power is rated at 2 × 40 W. Altitude during operation: Below 3000 m																												
Port description	<table><tr><th>Port</th><th>Description</th></tr><tr><td>ANT A</td><td>RF Out A</td></tr><tr><td>ANT B</td><td>RF Out B</td></tr><tr><td>ALD</td><td>Antenna Line Device</td></tr><tr><td>Alarm</td><td>Alarm and DC for Optional Fan Tray</td></tr><tr><td>Data 1</td><td>Optical Interface Data 1</td></tr><tr><td>Data 2</td><td>Optical Interface Data 2</td></tr><tr><td>DC Input</td><td>–48 V_{DC}</td></tr><tr><td>MMI</td><td>Display - Radio Status</td></tr><tr><td>GND</td><td>Ground</td></tr></table>	Port	Description	ANT A	RF Out A	ANT B	RF Out B	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								
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Software details	CXP9013268/15- R66GL																												
Radio 2212 B66A (R1A/A) Hardware Configuration	<table><tr><th>Product: KRC 161 703/1</th><th>Revision</th><th>Description</th></tr><tr><td>ROA 128 5850/66A</td><td>R1B</td><td>TRX</td></tr><tr><td>ROA 128 5885/1</td><td>R1G</td><td>PSB</td></tr><tr><td>ROA 128 5869/1</td><td>R1E</td><td>PA</td></tr><tr><td>KRF 901 334/1</td><td>R1B</td><td>FU</td></tr><tr><td>NTB 101 0185/2</td><td>R1A</td><td>Parts</td></tr><tr><td>..SDD 513 0856/15</td><td>R1C</td><td>FLT Cover (Enclosure)</td></tr><tr><td>..SXK 125 2503/1</td><td>R1J</td><td rowspan="2">Enclosure</td></tr><tr><td>....SEB 104 317/20</td><td>R1D</td></tr></table>	Product: KRC 161 703/1	Revision	Description	ROA 128 5850/66A	R1B	TRX	ROA 128 5885/1	R1G	PSB	ROA 128 5869/1	R1E	PA	KRF 901 334/1	R1B	FU	NTB 101 0185/2	R1A	Parts	..SDD 513 0856/15	R1C	FLT Cover (Enclosure)	..SXK 125 2503/1	R1J	Enclosure	SEB 104 317/20	R1D		
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ROA 128 5869/1	R1E	PA																											
KRF 901 334/1	R1B	FU																											
NTB 101 0185/2	R1A	Parts																											
..SDD 513 0856/15	R1C	FLT Cover (Enclosure)																											
..SXK 125 2503/1	R1J	Enclosure																											
....SEB 104 317/20	R1D																												
Product Identification Label KRC 161 703/1	(1P)KRC 161 703/1 (S)D16W812745  (21P)R1A 20170616  Radio 2217 B66A Made in Estonia  (1P)KRC 161 703/1 (S)D16W790017  (21P)R1A 20170612  Radio 2217 B66A Made in Estonia 																												

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, (2x) for spurious emissions IBW: 45 MHz

Bandwidth, MHz	Transmit / DL, MHz											
	B1	EARFCN	B2	EARFCN	M1	EARFCN	M2	EARFCN	T1	EARFCN	T2	EARFCN
5	2112.5	66461	2152.5	66861	2125.0	66586	2165.0	66986	2137.5	66711	2177.5	67111
10	2115.0	66486	2150.0	66836	2127.5	66611	2162.5	66961	2140.0	66736	2175.0	67086
15	2117.5	66511	2147.5	66811	2130.0	66636	2160.0	66936	2142.5	66761	2172.5	67061
20	2120.0	66536	2145.0	66786	2132.5	66661	2157.5	66911	2145.0	66786	2170.0	67036

Bandwidth, MHz	Receive / UL, MHz											
	B1	EARFCN	B2	EARFCN	M1	EARFCN	M2	EARFCN	T1	EARFCN	T2	EARFCN
5	1712.5	131997	1752.5	132397	1725.0	132122	1765.0	132522	1737.5	132247	1777.5	132647
10	1715.0	132022	1750.0	132372	1727.5	132147	1762.5	132497	1740.0	132272	1775.0	132622
15	1717.5	132047	1747.5	132347	1730.0	132172	1760.0	132472	1742.5	132297	1772.5	132597
20	1720.0	132072	1745.0	132322	1732.5	132197	1757.5	132447	1745.0	132322	1770.0	132572

Multiple-Carriers, WCDMA, (2x) for spurious emissions

IBW: 45 MHz

Bandwidth, MHz	Transmit / DL, MHz											
	B1	EARFCN	B2	EARFCN	M1	EARFCN	M2	EARFCN	T1	EARFCN	T2	EARFCN
5	2112.4	1537	2152.6	1738	2112.4	1537	2152.6	1738	2112.4	1537	2152.6	1738

Bandwidth, MHz	Receive / UL, MHz											
	B1	EARFCN	B2	EARFCN	M1	EARFCN	M2	EARFCN	T1	EARFCN	T2	EARFCN
5	1712.4	1312	1752.6	1513	1712.4	1312	1752.6	1513	1712.4	1312	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 - Mobile eRNC #1 RBS 6601, BFM 901 009/1: - DUS 4101 KDU 137 624/ 1, R7B, S/N: CD3B327641 - DUS SW: CXP102051/27-R18A179 - DUW 4101 KDU 127 174/4, R2E, TU8XP27761 - DUW SW: CXP9023291/4_R4XA05 - Input Voltage: -48 V_{DC}
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3.5 EUT setup diagram

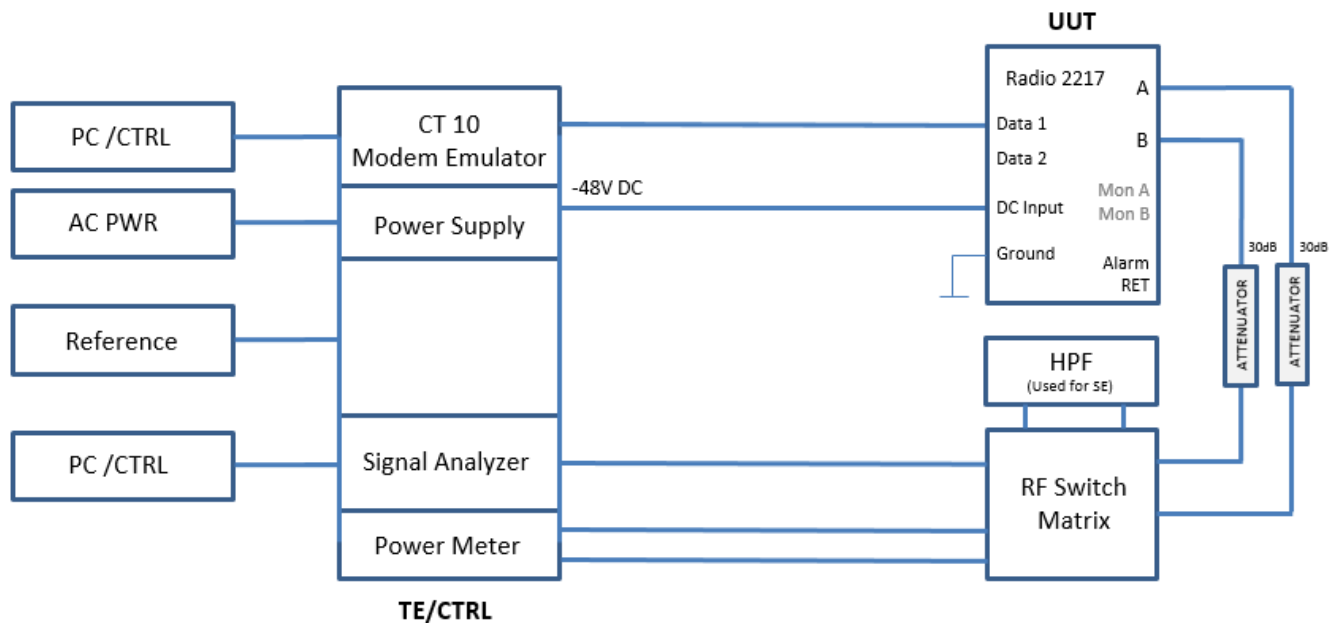


Figure 3.5-1: Setup diagram – Radio Compliance, conducted tests

3.6 Setup photographs

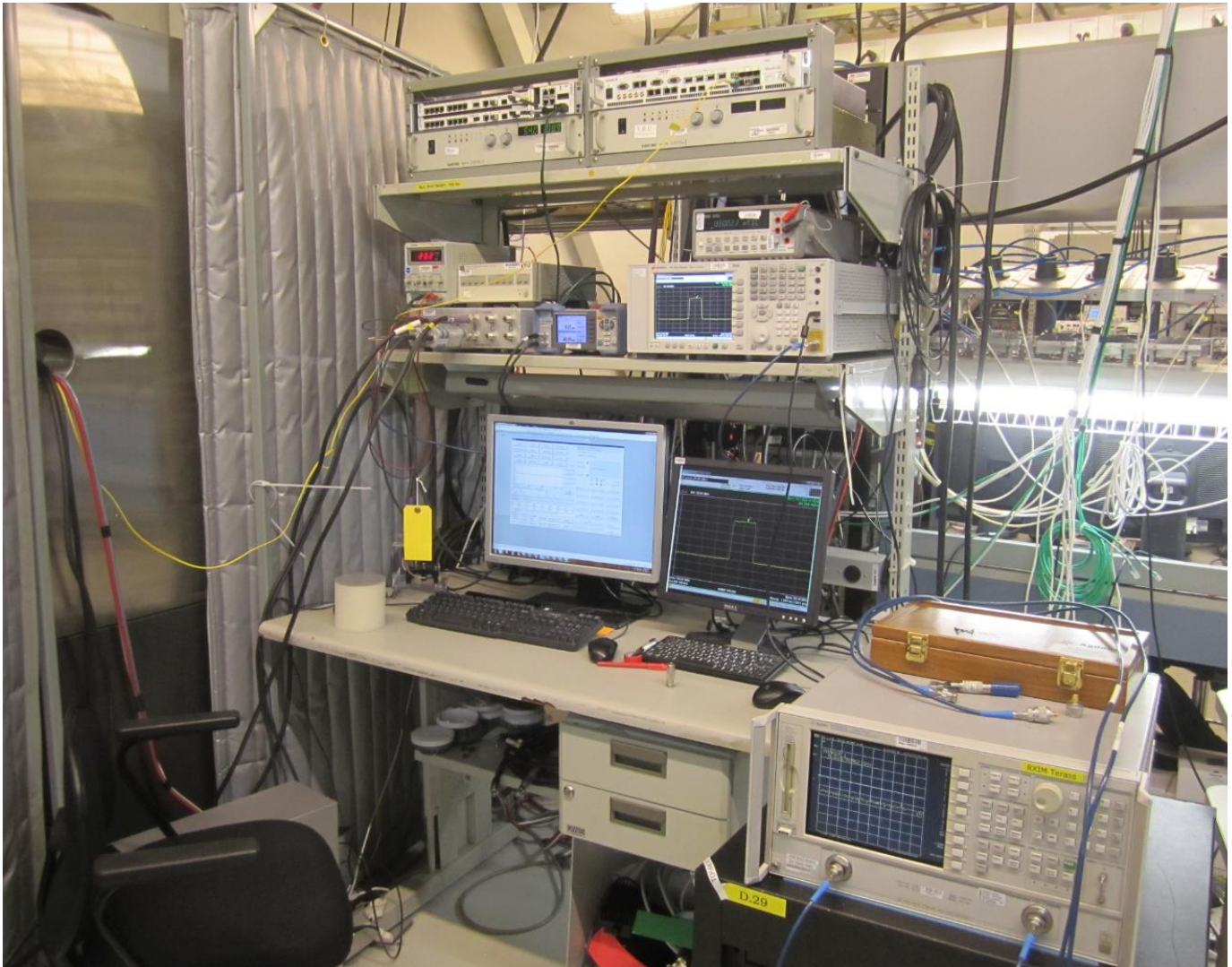


Figure 3.6-1: Test / Measurement Equipment - Set up for Radio Compliance Testing



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

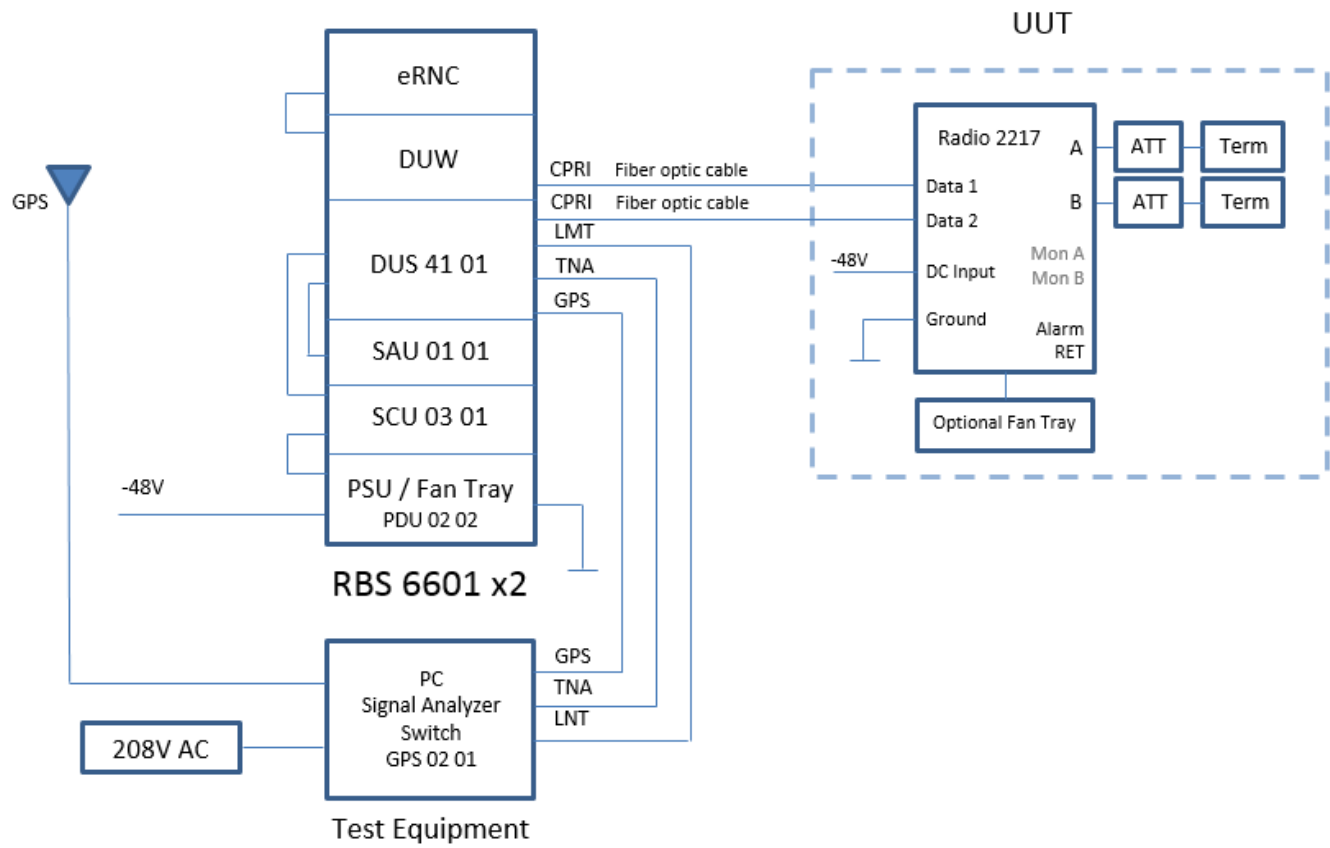


Figure 3.6-3: EUT Set-up for Radiated Emissions Compliance Testing

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

None

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 $\pm 5\%$, 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.
DMM	Digital Multimeter	34401A	US36048294	1 year	NCR
Spectrum Analyser	Keysight	PXA N9030A	MY55410202	1 year	31 May-18
Network Analyser	Agilent	8722ES	US39175389	1 year	31-May-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 (10dB)	Weinschel	WA-48-10-43-LIM	A1991	NCR	NCR
Attenuator (10dB)	Weinschel	WA-48-10-43-LIM	A1994	NCR	NCR
Attenuator (40db)	Weinschel	73-40-33	LR715	NCR	NCR
Attenuator	MCE/Weinschel	57-40-43	MX198	NCR	NCR
RF Swtich	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	FA002289	1 year	Sep. 8/18
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
Biconical antenna (30–300 MHz)	Sunol	BC2	FA002078	1 year	May. 8/18
Log periodic antenna (200–5000 MHz)	Sunol	LP5	FA002077	1 year	May. 8/18
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

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

8.1.2 Test summary

Test date	July 12, 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 – $10 \times \log_{10} (5 / 1)$ [dB];

(For 10 MHz channel) Maximum power – $10 \times \log_{10} (10 / 1)$ [dB], (For 15 MHz channel) Maximum power – $10 \times \log_{10} (15 / 1)$ [dB], (For 20 MHz channel) Maximum power – $10 \times \log_{10} (20 / 1)$ [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	51 kHz
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

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	2112.5	41.69	46.20	39.21	62.15	22.94
16QAM, 5 MHz, Ant A	2112.5	41.40	46.17	39.18	62.15	22.97
64QAM, 5 MHz, Ant A	2112.5	42.27	46.26	39.27	62.15	22.88
256QAM, 5 MHz, Ant A	2112.5	41.88	46.22	39.23	62.15	22.92
QPSK, 5 MHz, Ant A	2145.0	41.98	46.23	39.24	62.15	22.91
QPSK, 5 MHz, Ant A	2177.5	42.07	46.24	39.25	62.15	22.90
QPSK, 5 MHz, Ant B	2112.5	40.83	46.11	39.12	62.15	23.03
16QAM, 5 MHz, Ant B	2112.5	40.55	46.08	39.09	62.15	23.06
64QAM, 5 MHz, Ant B	2112.5	41.40	46.17	39.18	62.15	22.97
256QAM, 5 MHz, Ant B	2112.5	41.11	46.14	39.15	62.15	23.00
QPSK, 5 MHz, Ant B	2145.0	42.07	46.24	39.25	62.15	22.90
QPSK, 5 MHz, Ant B	2177.5	40.36	46.06	39.07	62.15	23.08
QPSK, 10 MHz, Ant A	2115.0	42.17	46.25	36.25	62.15	25.90
QPSK, 10 MHz, Ant A	2145.0	42.27	46.26	36.26	62.15	25.89
QPSK, 10 MHz, Ant A	2175.0	42.17	46.25	36.25	62.15	25.90
QPSK, 10 MHz, Ant B	2115.0	41.69	46.20	36.20	62.15	25.95
QPSK, 10 MHz, Ant B	2145.0	42.27	46.26	36.26	62.15	25.89
QPSK, 10 MHz, Ant B	2175.0	40.74	46.10	36.10	62.15	26.05
QPSK, 15 MHz, Ant A	2117.5	41.98	46.23	34.47	62.15	27.68
QPSK, 15 MHz, Ant A	2145.0	42.56	46.29	34.53	62.15	27.62
QPSK, 15 MHz, Ant A	2172.5	42.27	46.26	34.50	62.15	27.65
QPSK, 15 MHz, Ant B	2117.5	41.78	46.21	34.45	62.15	27.70
QPSK, 15 MHz, Ant B	2145.0	42.27	46.26	34.50	62.15	27.65
QPSK, 15 MHz, Ant B	2172.5	40.74	46.10	34.34	62.15	27.81
QPSK, 20 MHz, Ant A	2120.0	42.36	46.27	33.26	62.15	28.89
QPSK, 20 MHz, Ant A	2145.0	42.27	46.26	33.25	62.15	28.90
QPSK, 20 MHz, Ant A	2170.0	42.27	46.26	33.25	62.15	28.90
QPSK, 20 MHz, Ant B	2120.0	41.98	46.23	33.22	62.15	28.93
QPSK, 20 MHz, Ant B	2145.0	41.50	46.18	33.17	62.15	28.98
QPSK, 20 MHz, Ant B	2170.0	41.40	46.17	33.16	62.15	28.99

Note: lowest margin is 22.88 dB.

Table 8.1-3: Output power measurement results for LTE SISO two-carrier operation for IBW 45 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, bottom	2112.5 and 2152.5	42.27	46.26	29.72	62.15	32.43
Ch1: 5 MHz, Ch2: 10 MHz, Ant A, bottom	2112.5 and 2150.0	41.78	46.21	29.68	62.15	32.47
Ch1: 5 MHz, Ch2: 15 MHz, Ant A, bottom	2112.5 and 2147.5	42.36	46.27	29.74	62.15	32.41
Ch1: 5 MHz, Ch2: 20 MHz, Ant A, bottom	2112.5 and 2145.0	42.17	46.25	29.72	62.15	32.43
Ch1: 5 MHz, Ch2: 5 MHz, Ant B, bottom	2112.5 and 2152.5	41.02	46.13	29.60	62.15	32.55
Ch1: 5 MHz, Ch2: 10 MHz, Ant B, bottom	2112.5 and 2150.0	41.78	46.21	29.68	62.15	32.47
Ch1: 5 MHz, Ch2: 15 MHz, Ant B, bottom	2112.5 and 2147.5	41.50	46.18	29.65	62.15	32.50
Ch1: 5 MHz, Ch2: 20 MHz, Ant B, bottom	2112.5 and 2145.0	41.88	46.22	29.69	62.15	32.46
Ch1: 5 MHz, Ch2: 5 MHz, Ant A, top	2137.5 and 2177.5	42.56	46.29	29.74	62.15	32.41
Ch1: 10 MHz, Ch2: 5 MHz, Ant A, top	2140.0 and 2177.5	42.27	46.26	29.73	62.15	32.42
Ch1: 15 MHz, Ch2: 5 MHz, Ant A, top	2142.5 and 2177.5	42.17	46.25	29.72	62.15	32.43
Ch1: 20 MHz, Ch2: 5 MHz, Ant A, top	2145.0 and 2177.5	42.17	46.25	29.72	62.15	32.43
Ch1: 5 MHz, Ch2: 5 MHz, Ant B, top	2137.5 and 2177.5	41.69	46.20	29.67	62.15	32.48
Ch1: 10 MHz, Ch2: 5 MHz, Ant B, top	2140.0 and 2177.5	41.50	46.18	29.65	62.15	32.50
Ch1: 15 MHz, Ch2: 5 MHz, Ant B, top	2142.5 and 2177.5	41.40	46.17	29.64	62.15	32.51
Ch1: 20 MHz, Ch2: 5 MHz, Ant B, top	2145.0 and 2177.5	41.59	46.19	29.65	62.15	32.50
Ch1: 10 MHz, Ch2: 10 MHz, Ant A, bottom	2115.0 and 2150.0	42.17	46.25	29.72	62.15	32.43
Ch1: 10 MHz, Ch2: 15 MHz, Ant A, bottom	2115.0 and 2147.5	41.50	46.18	29.65	62.15	32.50
Ch1: 10 MHz, Ch2: 20 MHz, Ant A, bottom	2115.0 and 2145.0	41.98	46.23	29.70	62.15	32.45
Ch1: 10 MHz, Ch2: 10 MHz, Ant B, bottom	2115.0 and 2150.0	41.59	46.19	29.66	62.15	32.49
Ch1: 10 MHz, Ch2: 15 MHz, Ant B, bottom	2115.0 and 2147.5	41.78	46.21	29.68	62.15	32.47
Ch1: 10 MHz, Ch2: 20 MHz, Ant B, bottom	2115.0 and 2145.0	41.78	46.21	29.68	62.15	32.47
Ch1: 10 MHz, Ch2: 10 MHz, Ant A, top	2140.0 and 2175.0	42.07	46.24	29.71	62.15	32.44
Ch1: 15 MHz, Ch2: 10 MHz, Ant A, top	2142.5 and 2175.0	42.36	46.27	29.74	62.15	32.41
Ch1: 20 MHz, Ch2: 10 MHz, Ant A, top	2145.0 and 2175.0	42.76	46.31	29.78	62.15	32.37
Ch1: 10 MHz, Ch2: 10 MHz, Ant B, top	2140.0 and 2175.0	41.98	46.23	29.70	62.15	32.45
Ch1: 15 MHz, Ch2: 10 MHz, Ant B, top	2142.5 and 2175.0	42.17	46.25	29.72	62.15	32.43
Ch1: 20 MHz, Ch2: 10 MHz, Ant B, top	2145.0 and 2175.0	41.78	46.21	29.68	62.15	32.47
Ch1: 15 MHz, Ch2: 15 MHz, Ant A, bottom	2117.5 and 2147.5	42.07	46.24	29.71	62.15	32.44
Ch1: 15 MHz, Ch2: 20 MHz, Ant A, bottom	2117.5 and 2145.0	41.98	46.23	29.70	62.15	32.45
Ch1: 15 MHz, Ch2: 15 MHz, Ant B, bottom	2117.5 and 2147.5	41.40	46.17	29.63	62.15	32.52
Ch1: 15 MHz, Ch2: 20 MHz, Ant B, bottom	2117.5 and 2145.0	41.78	46.21	29.68	62.15	32.47
Ch1: 15 MHz, Ch2: 15 MHz, Ant A, top	2142.5 and 2172.5	42.56	46.29	29.76	62.15	32.39
Ch1: 20 MHz, Ch2: 15 MHz, Ant A, top	2145.0 and 2172.5	42.76	46.31	29.78	62.15	32.37
Ch1: 15 MHz, Ch2: 15 MHz, Ant B, top	2142.5 and 2172.5	41.98	46.23	29.70	62.15	32.45
Ch1: 20 MHz, Ch2: 15 MHz, Ant B, top	2145.0 and 2172.5	41.69	46.20	29.67	62.15	32.48
Ch1: 20 MHz, Ch2: 20 MHz, Ant A, bottom	2120.0 and 2145.0	42.85	46.32	29.79	62.15	32.36
Ch1: 20 MHz, Ch2: 20 MHz, Ant B, bottom	2120.0 and 2145.0	43.05	46.34	29.81	62.15	32.34
Ch1: 20 MHz, Ch2: 20 MHz, Ant A, top	2145.0 and 2170.0	42.56	46.29	29.76	62.15	32.39
Ch1: 20 MHz, Ch2: 20 MHz, Ant B, top	2145.0 and 2170.0	42.27	46.26	29.73	62.15	32.42

Note: lowest margin is 32.34 dB.

Table 8.1-4: Output power (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	Total RF output power dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 5 MHz	2112.5	39.21	39.12	42.18	62.15	19.97
16QAM, 5 MHz	2112.5	39.18	39.09	42.15	62.15	20.00
64QAM, 5 MHz	2112.5	39.27	39.18	42.24	62.15	19.91
256QAM, 5 MHz	2112.5	39.23	39.15	42.20	62.15	19.95
QPSK, 5 MHz	2145.0	39.24	39.25	42.26	62.15	19.89
QPSK, 5 MHz	2177.5	39.25	39.07	42.17	62.15	19.98
QPSK, 10 MHz	2115.0	36.25	36.20	39.24	62.15	22.91
QPSK, 10 MHz	2145.0	36.26	36.26	39.27	62.15	22.88
QPSK, 10 MHz	2175.0	36.25	36.10	39.19	62.15	22.96
QPSK, 15 MHz	2117.5	34.47	34.45	37.47	62.15	24.68
QPSK, 15 MHz	2145.0	34.53	34.50	37.53	62.15	24.62
QPSK, 15 MHz	2172.5	34.50	34.34	37.43	62.15	24.72
QPSK, 20 MHz	2120.0	33.26	33.22	36.25	62.15	25.90
QPSK, 20 MHz	2145.0	33.25	33.17	36.22	62.15	25.93
QPSK, 20 MHz	2170.0	33.25	33.16	36.22	62.15	25.93

Note: lowest margin is 19.89 dB.

Table 8.1-5: Output power measurement results for LTE MIMO two-carrier operation for IBW 50 MHz

Remarks	Frequency, MHz	RF output power port A, dBm/MHz	RF output power port B, dBm/MHz	Total RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
Ch1: 5 MHz, Ch2: 5 MHz, bottom	2112.5 and 2152.5	29.72	29.60	32.67	62.15	29.48
Ch1: 5 MHz, Ch2: 10 MHz, bottom	2112.5 and 2150.0	29.68	29.68	32.69	62.15	29.46
Ch1: 5 MHz, Ch2: 15 MHz, bottom	2112.5 and 2147.5	29.74	29.65	32.71	62.15	29.44
Ch1: 5 MHz, Ch2: 20 MHz, bottom	2112.5 and 2145.0	29.72	29.69	32.72	62.15	29.43
Ch1: 5 MHz, Ch2: 5 MHz, top	2137.5 and 2177.5	29.74	29.67	32.72	62.15	29.43
Ch1: 10 MHz, Ch2: 5 MHz, top	2140.0 and 2177.5	29.73	29.65	32.70	62.15	29.45
Ch1: 15 MHz, Ch2: 5 MHz, top	2142.5 and 2177.5	29.72	29.64	32.69	62.15	29.46
Ch1: 20 MHz, Ch2: 5 MHz, top	2145.0 and 2177.5	29.72	29.65	32.70	62.15	29.45
Ch1: 10 MHz, Ch2: 10 MHz, bottom	2115.0 and 2150.0	29.72	29.66	32.70	62.15	29.45
Ch1: 10 MHz, Ch2: 15 MHz, bottom	2115.0 and 2147.5	29.65	29.68	32.68	62.15	29.47
Ch1: 10 MHz, Ch2: 20 MHz, bottom	2115.0 and 2145.0	29.70	29.68	32.70	62.15	29.45
Ch1: 10 MHz, Ch2: 10 MHz, top	2140.0 and 2175.0	29.71	29.70	32.72	62.15	29.43
Ch1: 15 MHz, Ch2: 10 MHz, top	2142.5 and 2175.0	29.74	29.72	32.74	62.15	29.41
Ch1: 20 MHz, Ch2: 10 MHz, top	2145.0 and 2175.0	29.78	29.68	32.74	62.15	29.41
Ch1: 15 MHz, Ch2: 15 MHz, bottom	2117.5 and 2147.5	29.71	29.63	32.68	62.15	29.47
Ch1: 15 MHz, Ch2: 20 MHz, bottom	2117.5 and 2145.0	29.70	29.68	32.70	62.15	29.45
Ch1: 15 MHz, Ch2: 15 MHz, top	2142.5 and 2172.5	29.76	29.70	32.74	62.15	29.41
Ch1: 20 MHz, Ch2: 15 MHz, top	2145.0 and 2172.5	29.78	29.67	32.74	62.15	29.41
Ch1: 20 MHz, Ch2: 20 MHz, bottom	2120.0 and 2145.0	29.79	29.81	32.81	62.15	29.34
Ch1: 20 MHz, Ch2: 20 MHz, top	2145.0 and 2170.0	29.76	29.73	32.76	62.15	29.39

Note: lowest margin is 29.34 dB.

Table 8.1-6: 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	2112.5	41.02	46.13	39.14	62.15	23.01
16QAM, 5 MHz, Ant A	2112.5	41.02	46.13	39.14	62.15	23.01
64QAM, 5 MHz, Ant A	2112.5	40.55	46.08	39.09	62.15	23.06
QPSK, 5 MHz, Ant A	2132.5	40.74	46.10	39.11	62.15	23.04
QPSK, 5 MHz, Ant A	2152.5	40.36	46.06	39.07	62.15	23.08
QPSK, 5 MHz, Ant B	2112.5	40.74	46.10	39.11	62.15	23.04
16QAM, 5 MHz, Ant B	2112.5	40.55	46.08	39.09	62.15	23.06
64QAM, 5 MHz, Ant B	2112.5	40.55	46.08	39.09	62.15	23.06
QPSK, 5 MHz, Ant B	2132.5	40.74	46.10	39.11	62.15	23.04
QPSK, 5 MHz, Ant B	2152.5	40.74	46.10	39.11	62.15	23.04

Note: lowest margin is 23.01 dB.

Table 8.1-7: Output power measurement results for WCDMA SISO two-carrier operation for IBW 45 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	2112.4 and 2152.6	41.40	46.17	29.63	62.15	32.52
Ch1: 5 MHz, Ch2: 5 MHz, Ant B	2112.4 and 2152.6	41.40	46.17	29.64	62.15	32.51

Note: lowest margin is 32.51 dB.

Table 8.1-8: Output power (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	Combined RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 5 MHz	2112.5	39.14	39.11	42.14	62.15	20.01
16QAM, 5 MHz	2112.5	39.14	39.09	42.13	62.15	20.02
64QAM, 5 MHz	2112.5	39.09	39.09	42.10	62.15	20.05
QPSK, 5 MHz	2132.5	39.11	39.11	42.12	62.15	20.03
QPSK, 5 MHz	2152.5	39.07	39.11	42.10	62.15	20.05

Note: lowest margin is 20.01 dB.

Table 8.1-9: Output power (dBm/MHz) measurement results for WCDMA MIMO two-carrier operation for IBW 45 MHz

Remarks	Frequency, MHz	RF output power port A, dBm/MHz	RF output power port B, dBm/MHz	Combined RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
Ch1: 5 MHz, Ch2: 5 MHz	2112.4 and 2152.6	29.63	29.64	32.65	62.15	29.50

Table 8.1-10: 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 4 × 5 MHz, LTE 4 × 5 MHz, Ant A	38.19	45.82	29.80	62.15	32.35
WCDMA 4 × 5 MHz, LTE 4 × 5 MHz, Ant B	38.37	45.84	29.82	62.15	32.33
WCDMA 1 × 5 MHz, LTE 1 × 5 MHz, Ant A	40.27	46.05	29.51	62.15	32.64
WCDMA 1 × 5 MHz, LTE 1 × 5 MHz, Ant B	39.26	45.94	29.41	62.15	32.74
WCDMA 1 × 5 MHz, LTE 1 × 20 MHz, Ant A	40.46	46.07	29.54	62.15	32.61
WCDMA 1 × 5 MHz, LTE 1 × 20 MHz, Ant B	39.99	46.02	29.49	62.15	32.66

Note: lowest margin is 32.33 dB.

Table 8.1-11: Output power (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	Combined RF output power, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
WCDMA 4 × 5 MHz, LTE 4 × 5 MHz	29.80	29.41	32.62	62.15	29.53
WCDMA 4 × 5 MHz, LTE 4 × 5 MHz	29.82	29.54	32.69	62.15	29.46
WCDMA 1 × 5 MHz, LTE 1 × 20 MHz	29.51	29.49	32.51	62.15	29.64

Note: lowest margin is 29.46 dB.

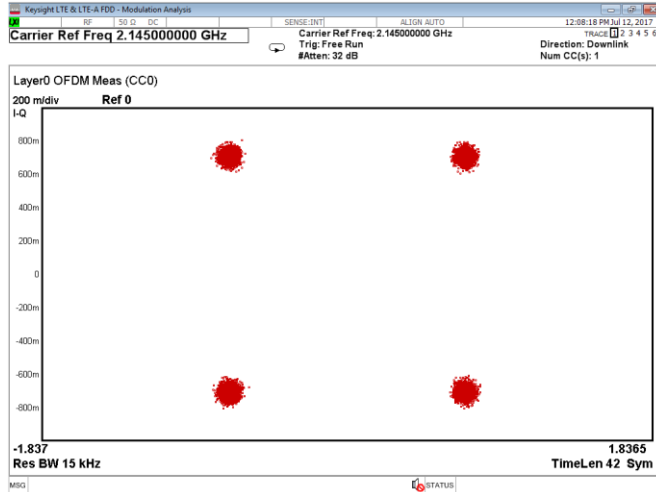


Figure 8.1-1: Modulation characteristics, QPSK

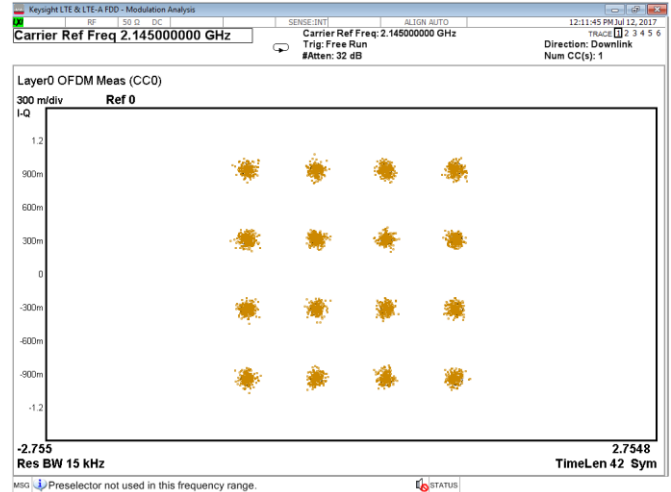


Figure 8.1-2: Modulation characteristics, 16QAM

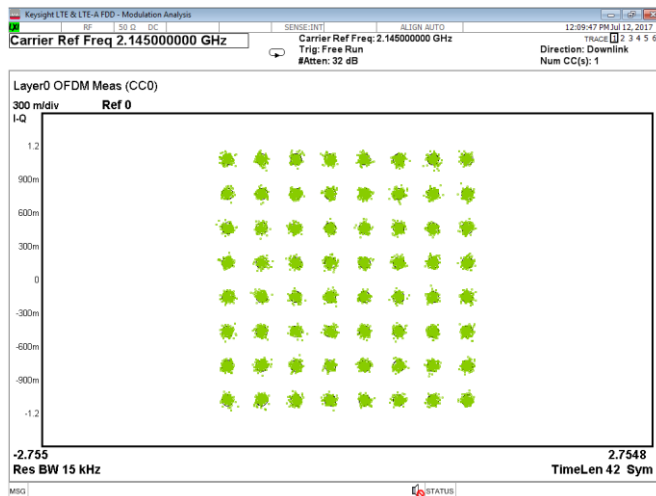


Figure 8.1-3: Modulation characteristics, 64QAM

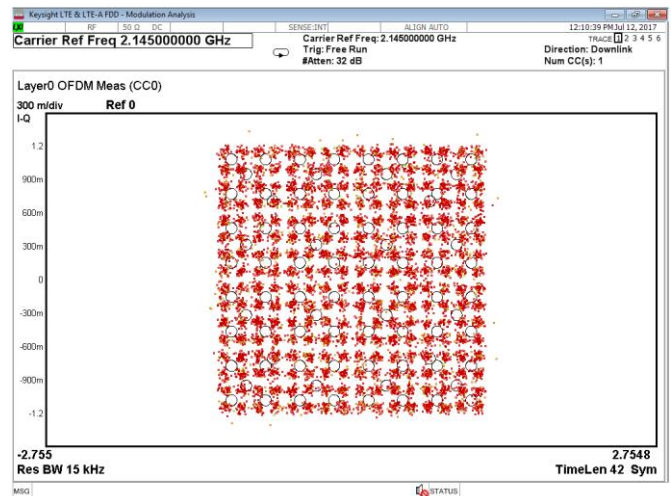


Figure 8.1-4: Modulation characteristics, 256QAM

Section 8
Test name
Specification

Testing data
 FCC 27.50(b) and RSS-139, 4.1 Maximum output power at RF antenna connector
 FCC Part 27 and RSS-139, Issue 3

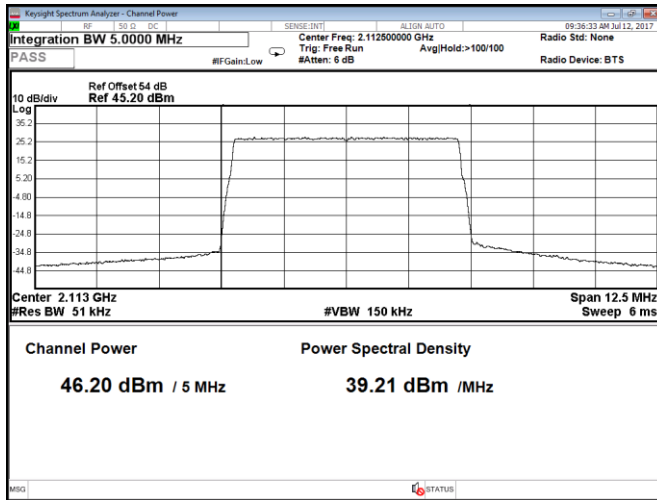


Figure 8.1-5: Output power at low channel, QPSK, 5 MHz, LTE, Port A

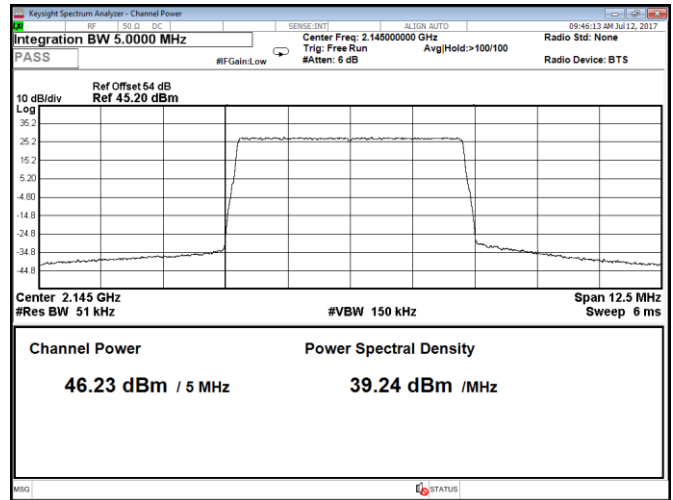


Figure 8.1-6: Output power at mid channel, QPSK, 5 MHz, LTE, Port A

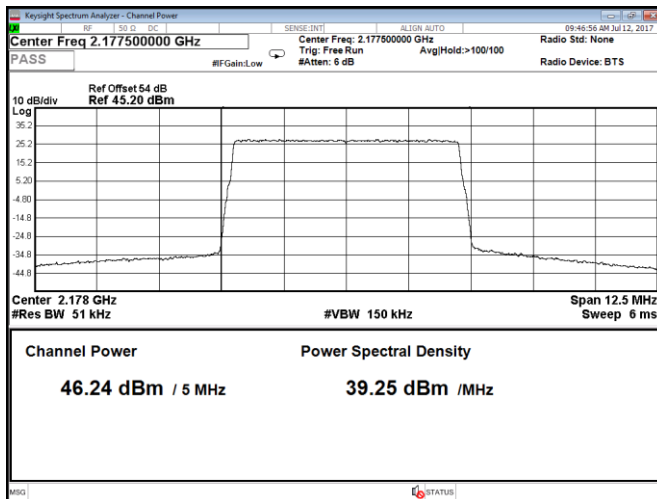


Figure 8.1-7: Output power at high channel, QPSK, 5 MHz, LTE, Port A

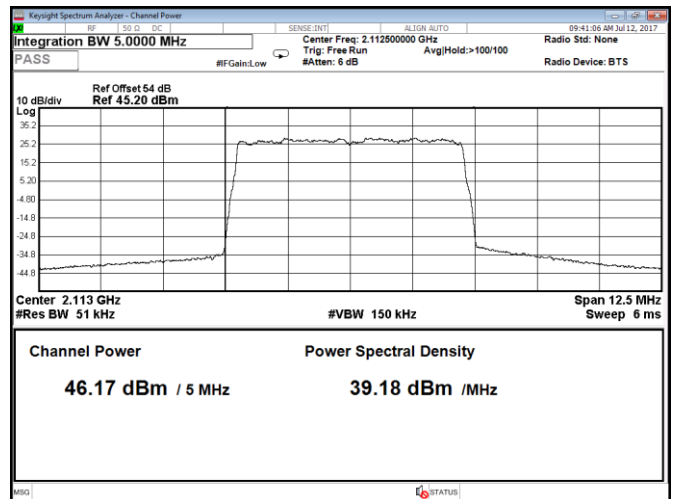


Figure 8.1-8: Output power at low channel, 16QAM, 5 MHz, LTE, Port A

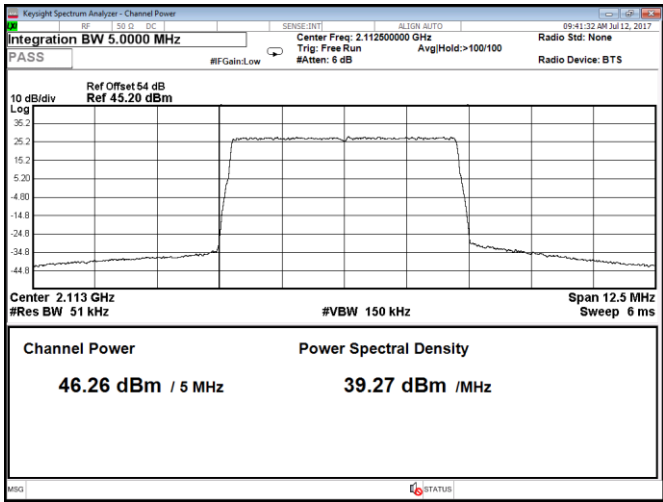


Figure 8.1-9: Output power at low channel, 64QAM, 5 MHz, LTE, Port A

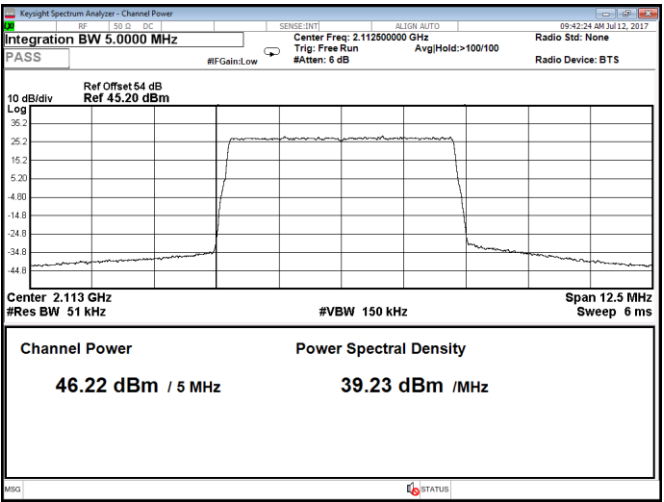


Figure 8.1-10: Output power at low channel, 256QAM, 5 MHz, LTE, Port A

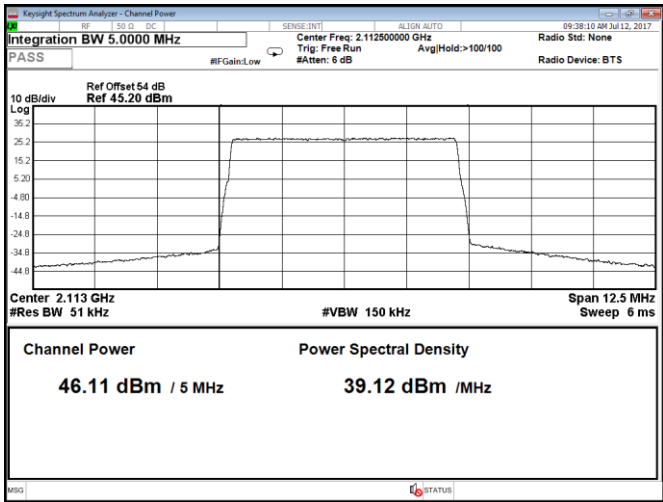


Figure 8.1-11: Output power at low channel, QPSK, 5 MHz, LTE, Port B

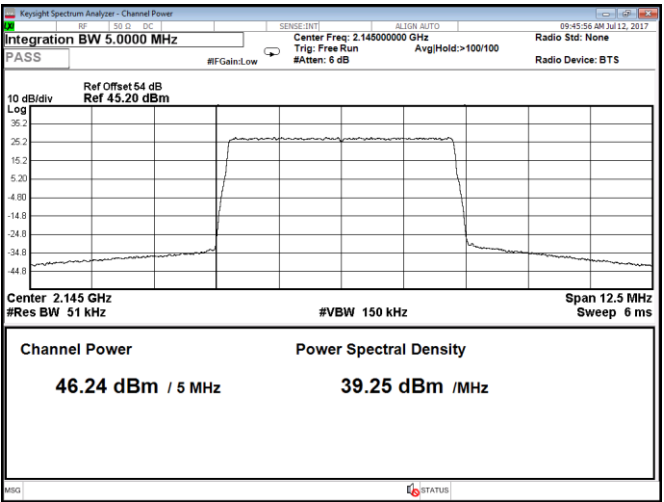


Figure 8.1-12: Output power at mid channel, QPSK, 5 MHz, LTE, Port B

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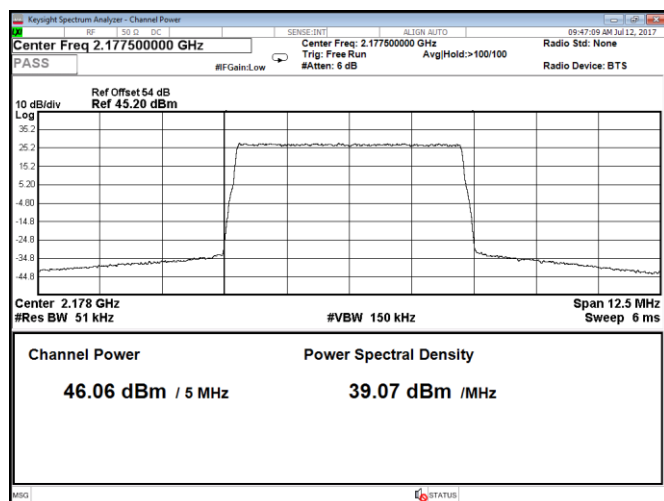


Figure 8.1-13: Output power at high channel, QPSK, 5 MHz, LTE, Port B

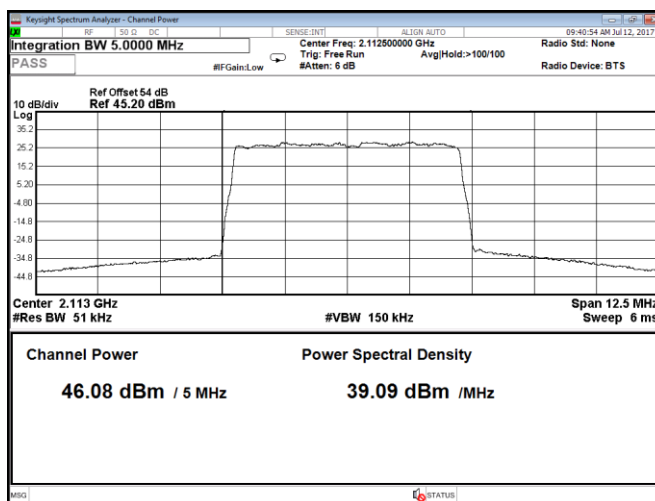


Figure 8.1-14: Output power at low channel, 16QAM, 5 MHz, LTE, Port B

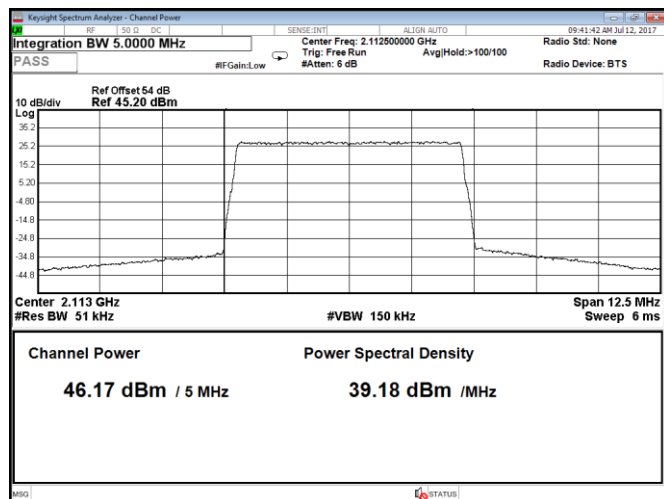


Figure 8.1-15: Output power at low channel, 64QAM, 5 MHz, LTE, Port B

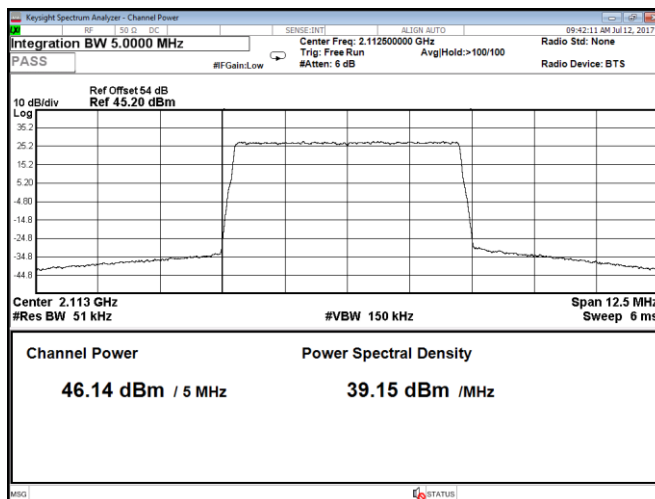


Figure 8.1-16: Output power at low channel, 256QAM, 5 MHz, LTE, Port B

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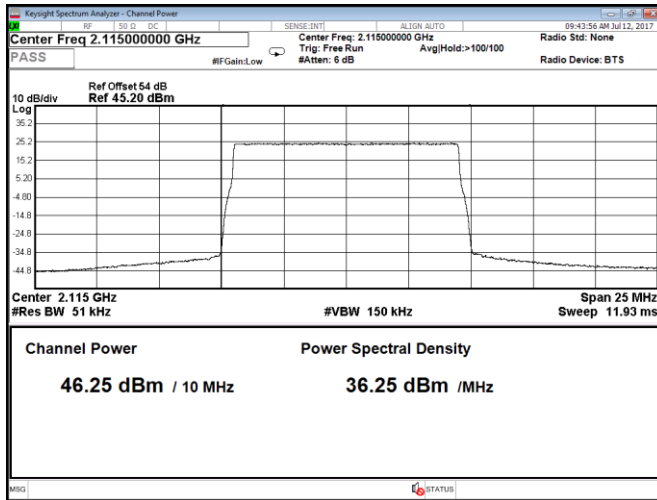


Figure 8.1-17: Output power at low channel, QPSK, 10 MHz, LTE, Port A

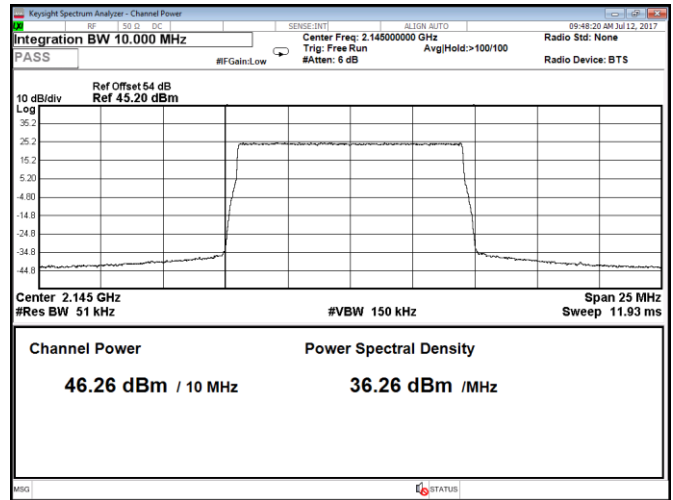


Figure 8.1-18: Output power at mid channel, QPSK, 10 MHz, LTE, Port A

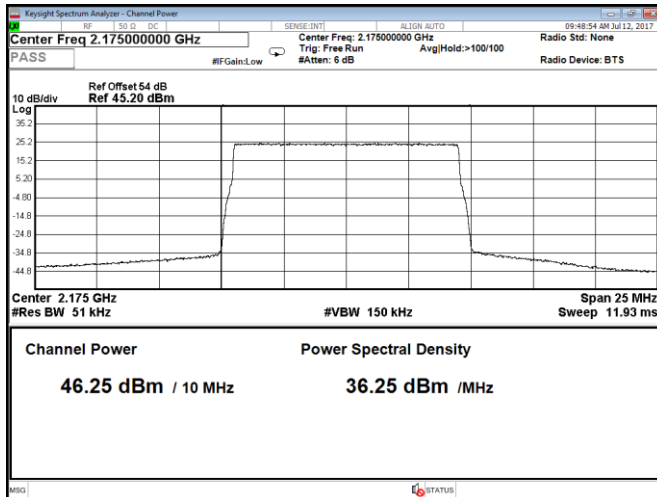


Figure 8.1-19: Output power at high channel, QPSK, 10 MHz, LTE, Port A

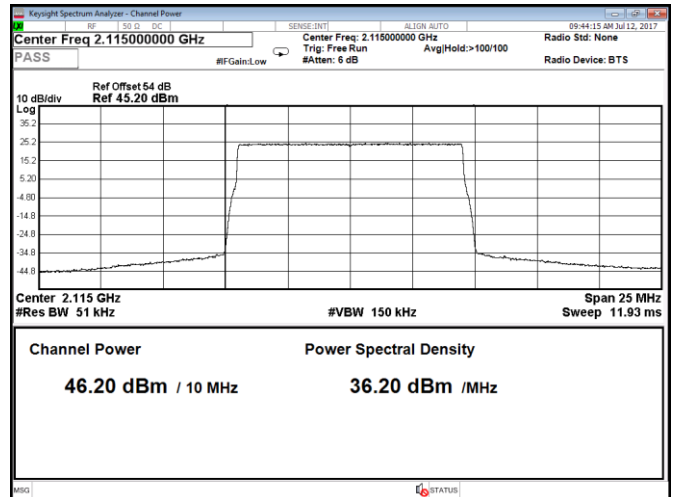


Figure 8.1-20: Output power at low channel, QPSK, 10 MHz, LTE, Port B

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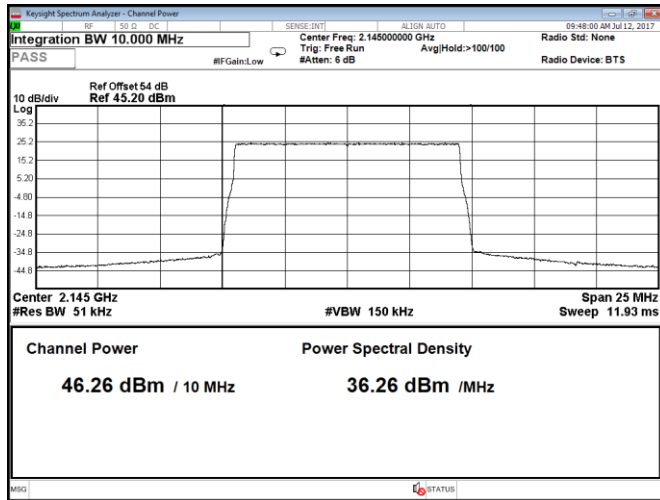


Figure 8.1-21: Output power at mid channel, QPSK, 10 MHz, LTE, Port B

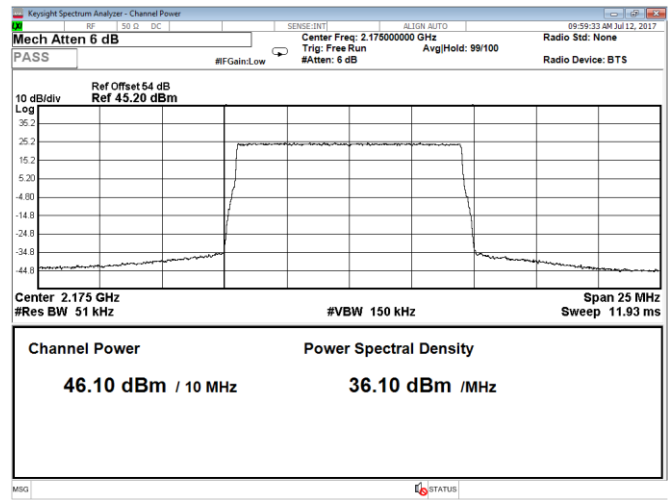


Figure 8.1-22: Output power at high channel, QPSK, 10 MHz, LTE, Port B

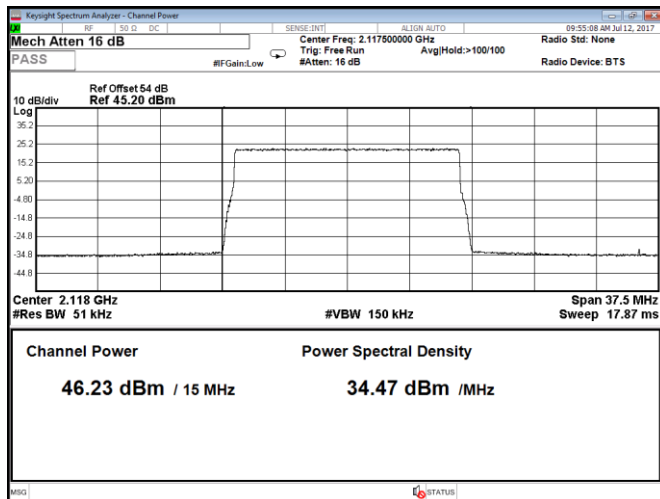


Figure 8.1-23: Output power at low channel, QPSK, 15 MHz, LTE, Port A

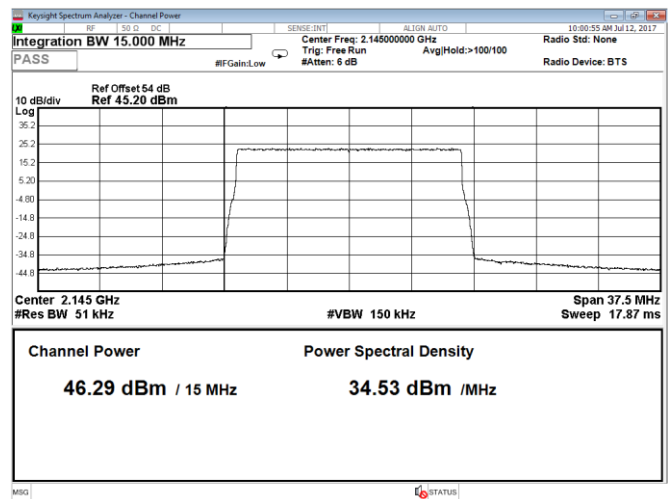


Figure 8.1-24: Output power at mid channel, QPSK, 15 MHz, LTE, Port A

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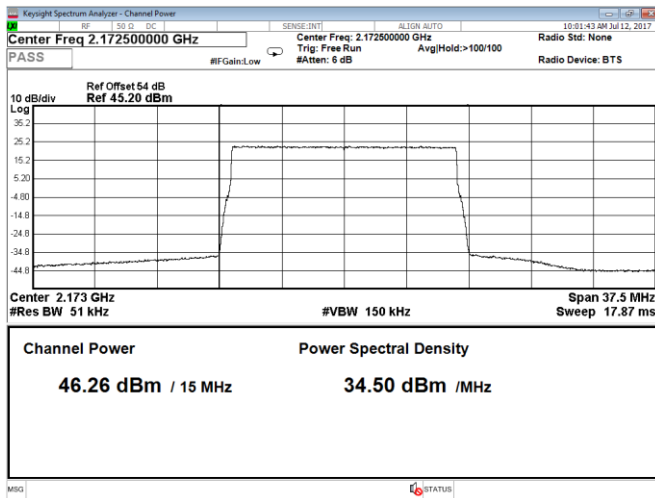


Figure 8.1-25: Output power at high channel, QPSK, 15 MHz, LTE, Port A

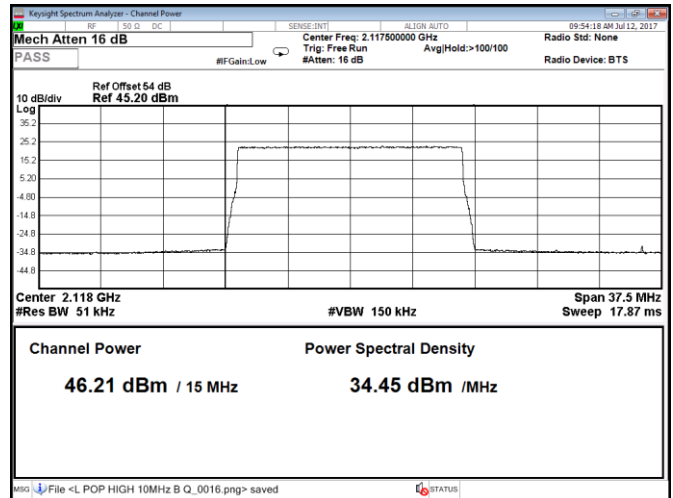


Figure 8.1-26: Output power at low channel, QPSK, 15 MHz, LTE, Port B

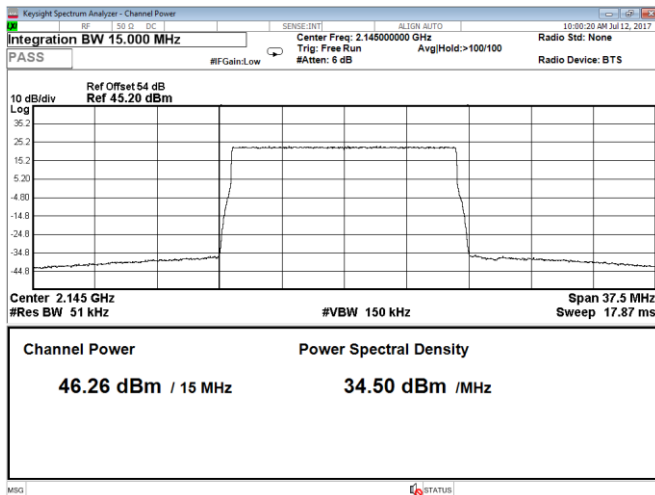


Figure 8.1-27: Output power at mid channel, QPSK, 15 MHz, LTE, Port B

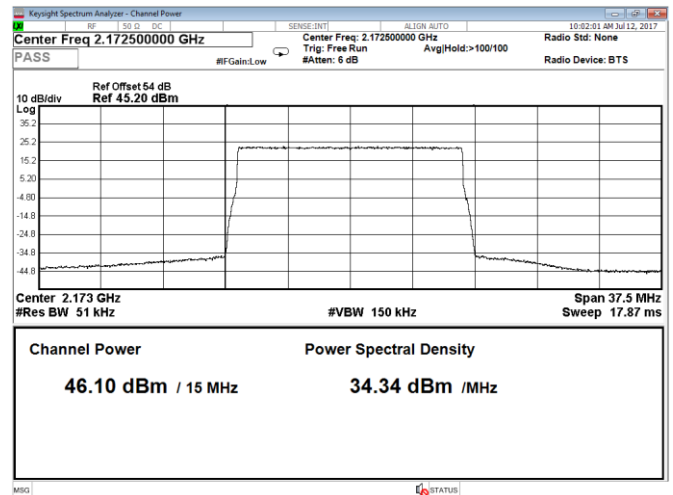


Figure 8.1-28: Output power at high channel, QPSK, 15 MHz, LTE, Port B

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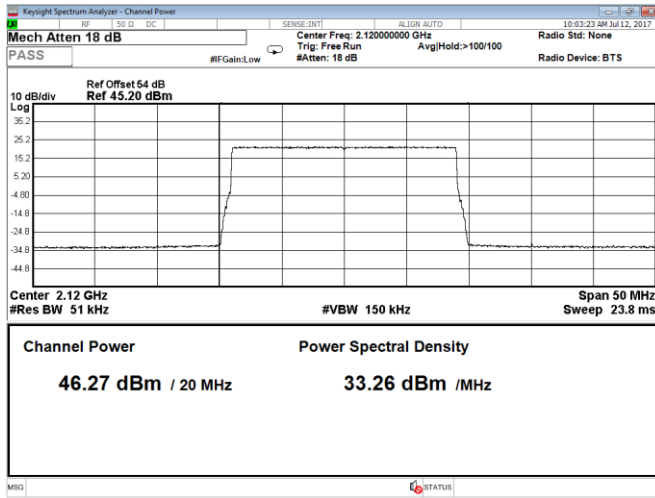


Figure 8.1-29: Output power at low channel, QPSK, 20 MHz, LTE, Port A

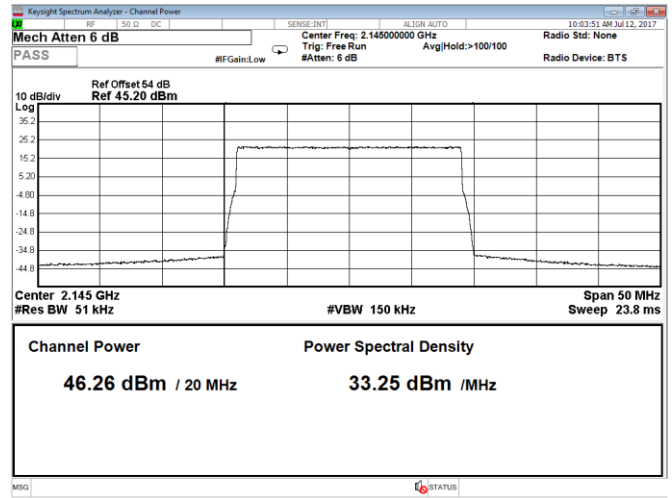


Figure 8.1-30: Output power at mid channel, QPSK, 20 MHz, LTE, Port A

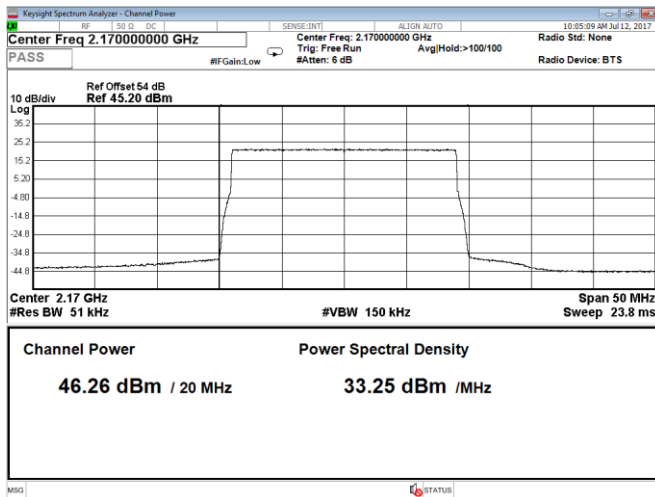


Figure 8.1-31: Output power at high channel, QPSK, 20 MHz, LTE, Port A

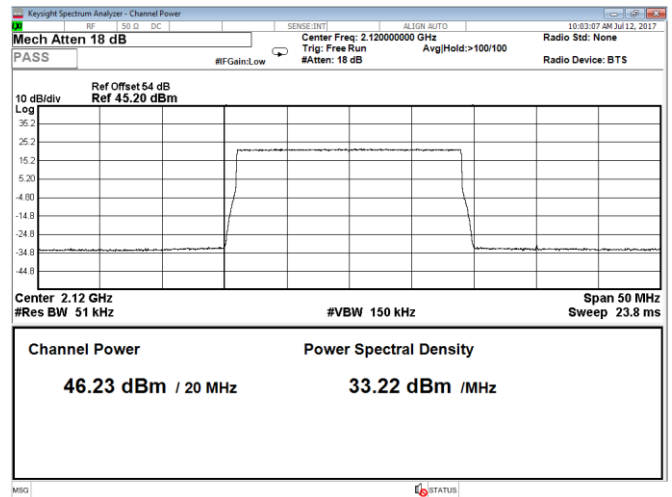


Figure 8.1-32: Output power at low channel, QPSK, 20 MHz, LTE, Port B

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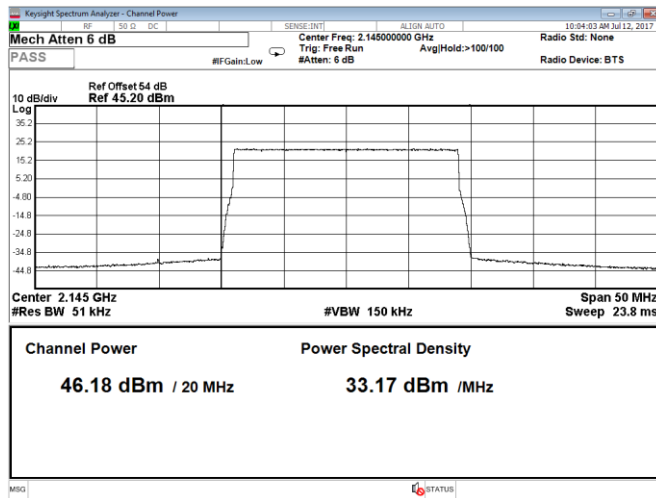


Figure 8.1-33: Output power at mid channel, QPSK, 20 MHz, LTE, Port B

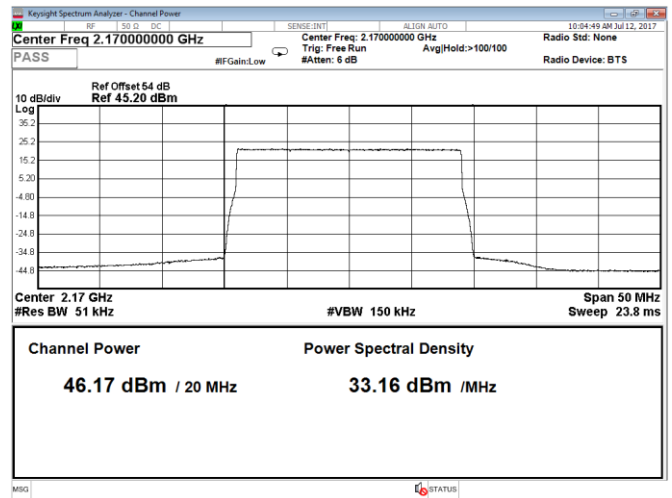


Figure 8.1-34: Output power at high channel, QPSK, 20 MHz, LTE, Port B

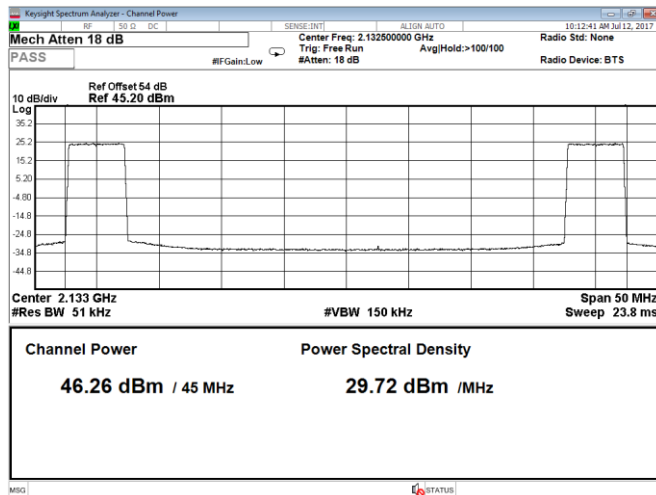


Figure 8.1-35: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, LTE, Port A, bottom range

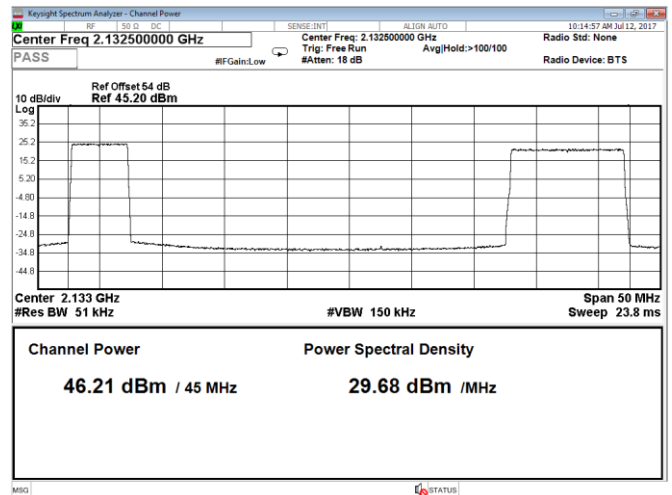


Figure 8.1-36: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 10 MHz, LTE, Port A, bottom range

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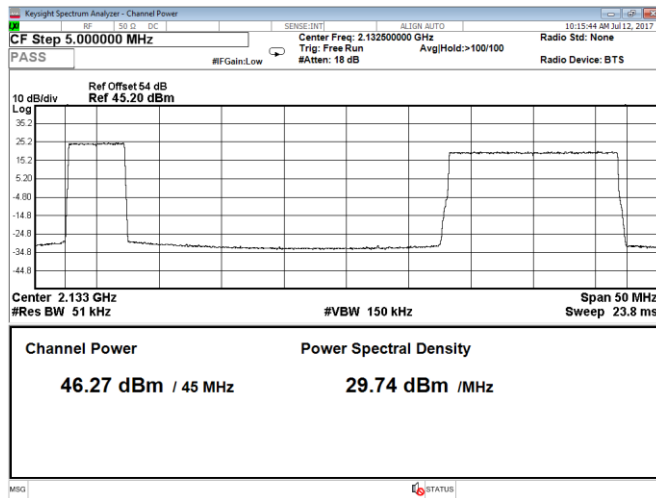


Figure 8.1-37: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 15 MHz, LTE, Port A, bottom range

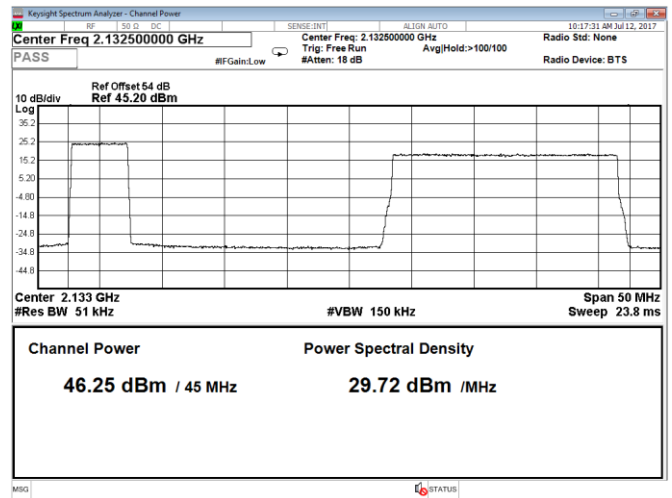


Figure 8.1-38: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 20 MHz, LTE, Port A, bottom range

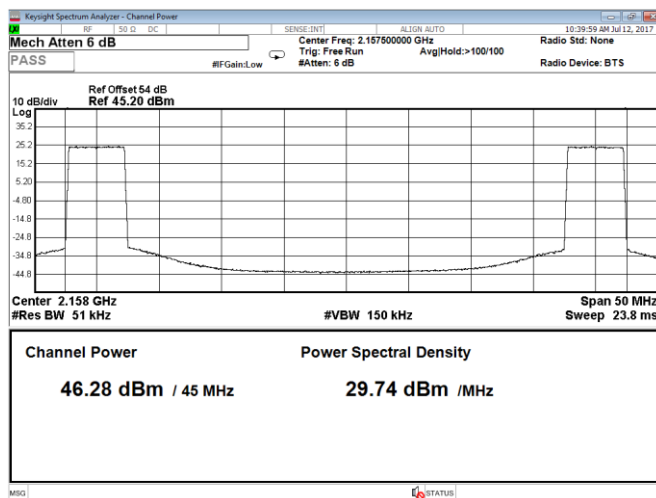


Figure 8.1-39: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, LTE, Port A, top range

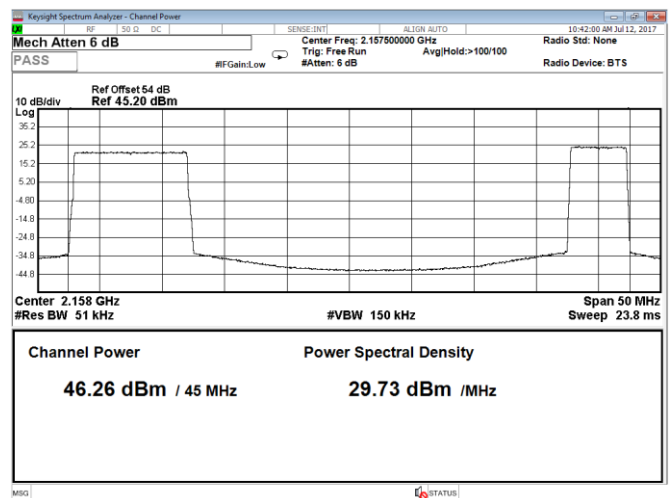


Figure 8.1-40: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 5 MHz, LTE, Port A, top range

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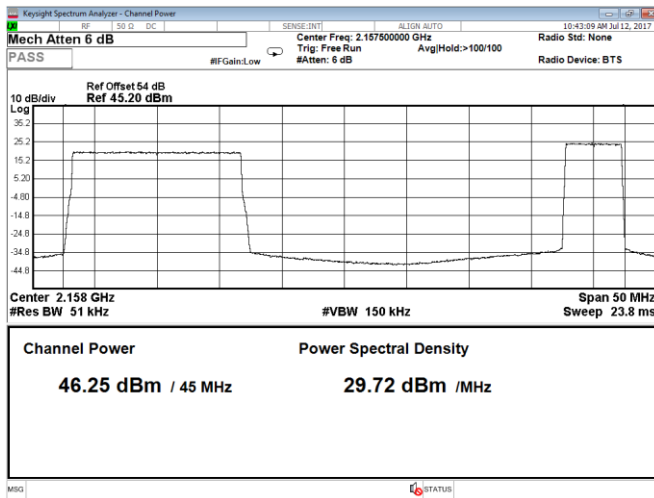


Figure 8.1-41: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 5 MHz, LTE, Port A, top range

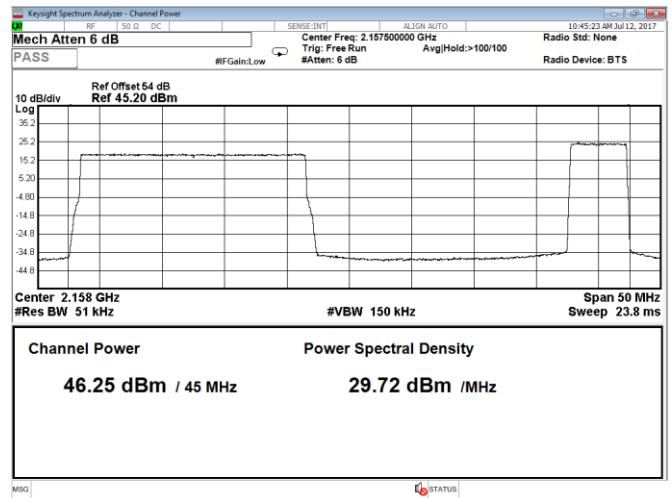


Figure 8.1-42: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 5 MHz, LTE, Port A, top range

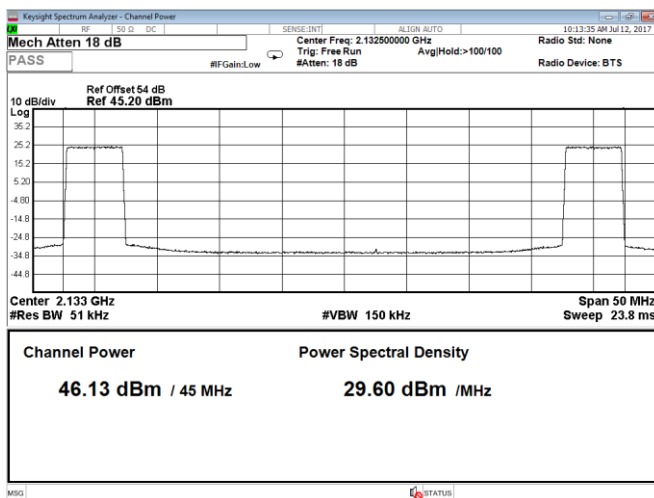


Figure 8.1-43: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, LTE, Port B, bottom range

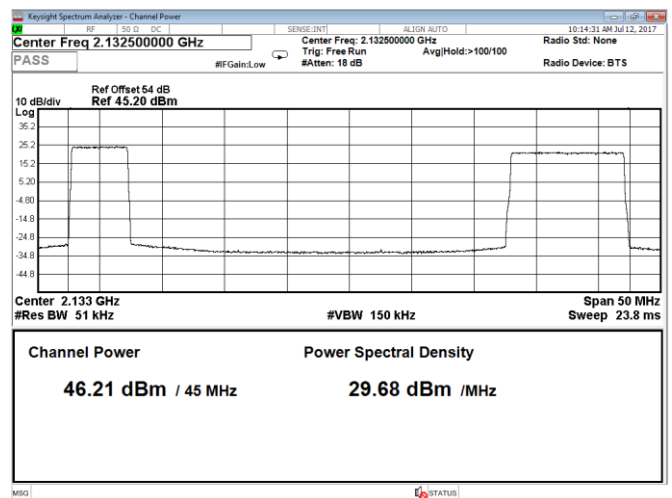


Figure 8.1-44: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 10 MHz, LTE, Port B, bottom range

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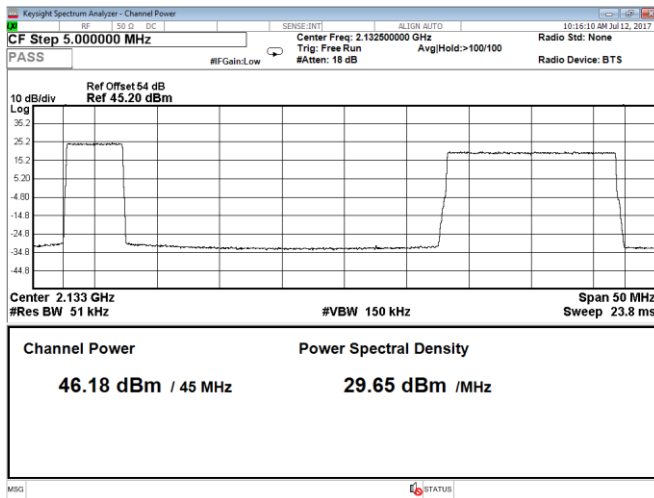


Figure 8.1-45: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 15 MHz, LTE, Port B, bottom range

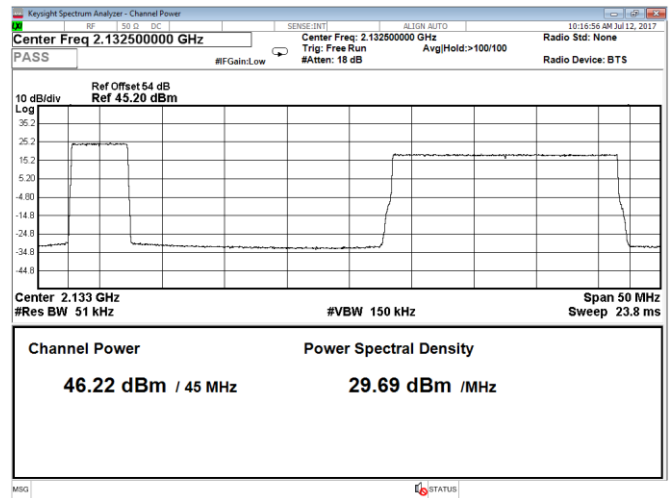


Figure 8.1-46: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 20 MHz, LTE, Port B, bottom range

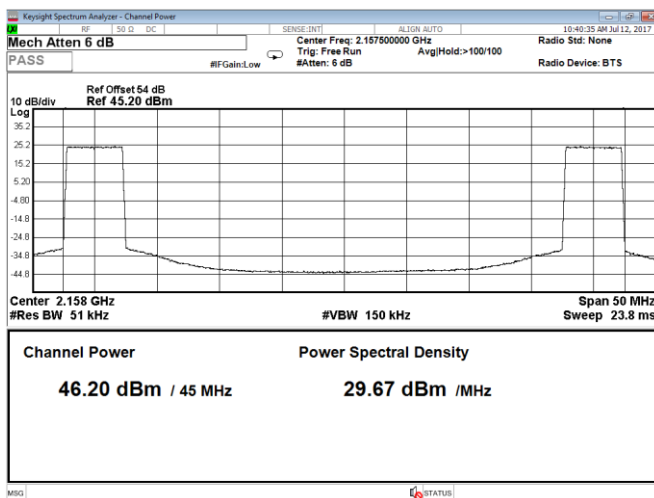


Figure 8.1-47: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, LTE, Port B, top range

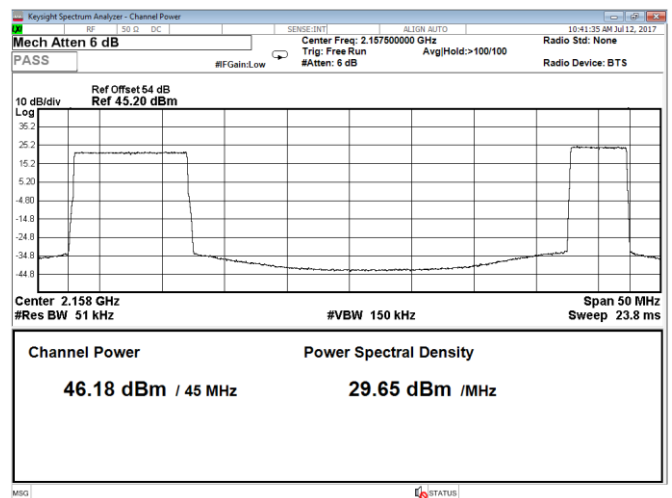


Figure 8.1-48: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 5 MHz, LTE, Port B, top range

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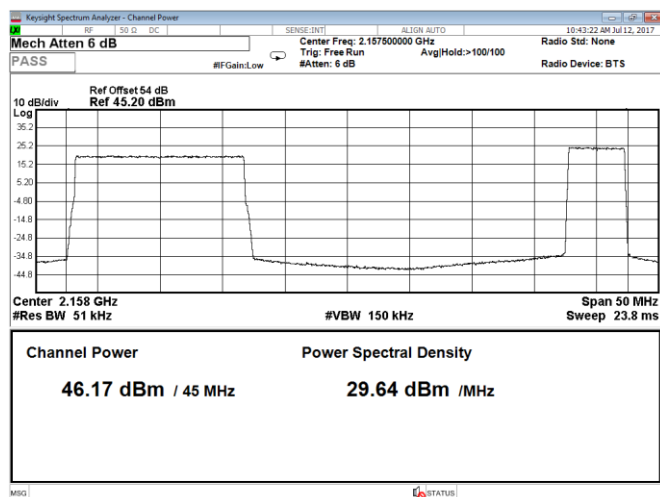


Figure 8.1-49: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 5 MHz, LTE, Port B, top range

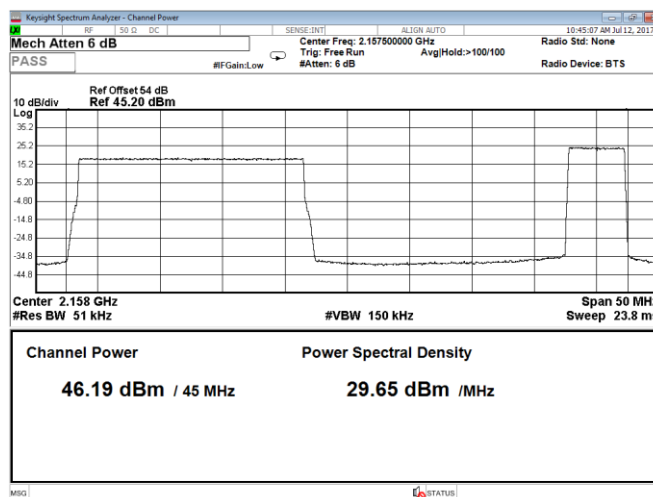


Figure 8.1-50: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 5 MHz, LTE, Port B, top range

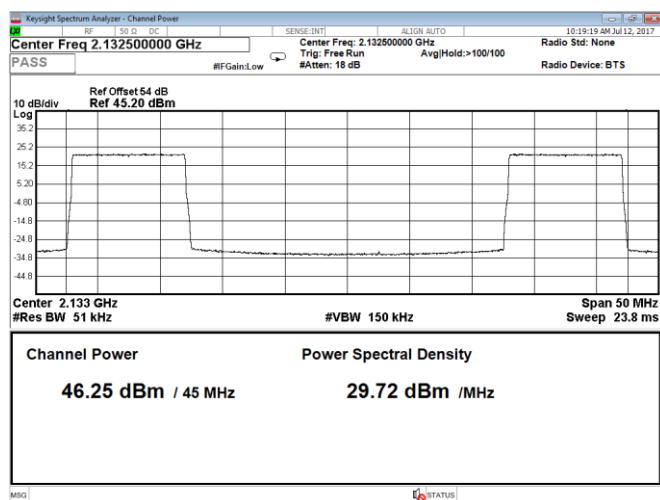


Figure 8.1-51: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 10 MHz, LTE, Port A, bottom range

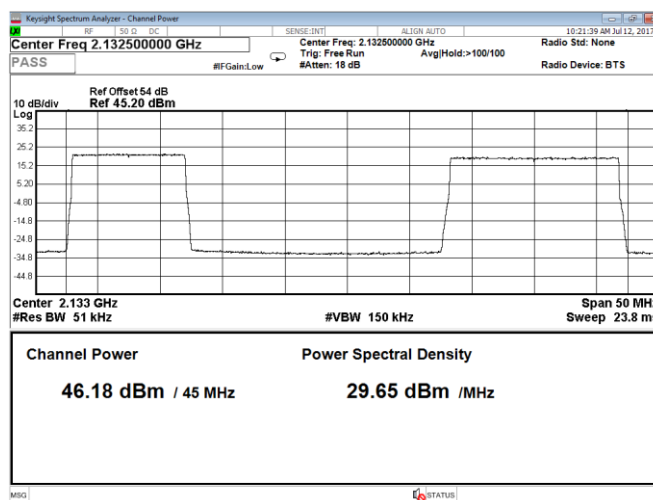


Figure 8.1-52: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 15 MHz, LTE, Port A, bottom range

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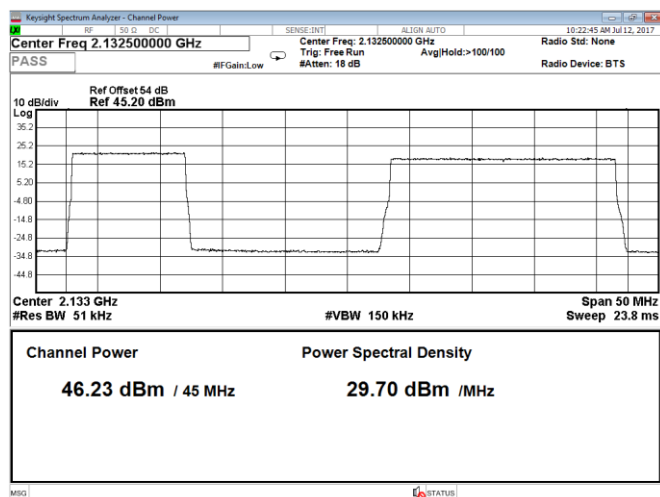


Figure 8.1-53: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 20 MHz, LTE, Port A, bottom range

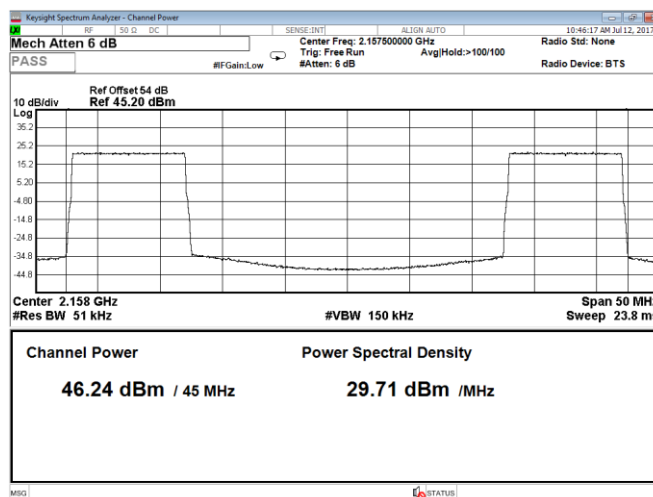


Figure 8.1-54: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 10 MHz, LTE, Port A, top range

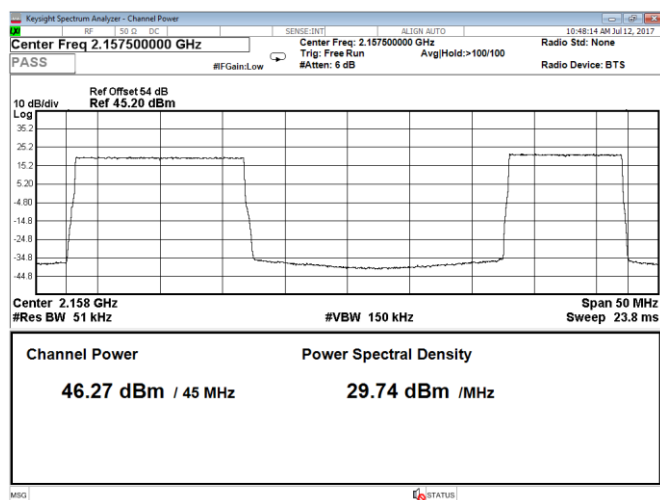


Figure 8.1-55: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 10 MHz, LTE, Port A, top range

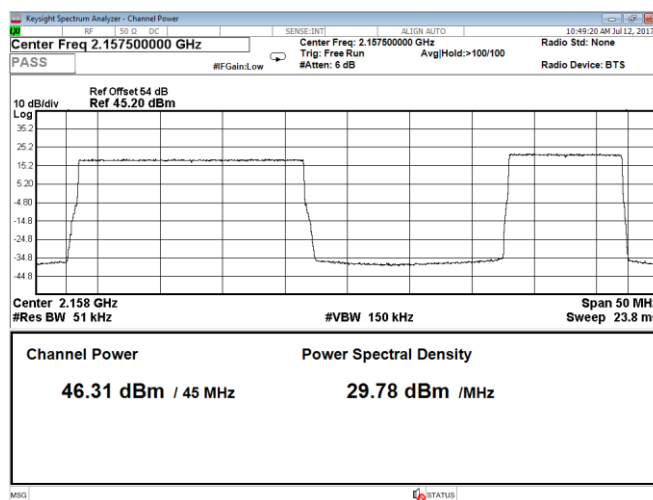


Figure 8.1-56: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 10 MHz, LTE, Port A, top range

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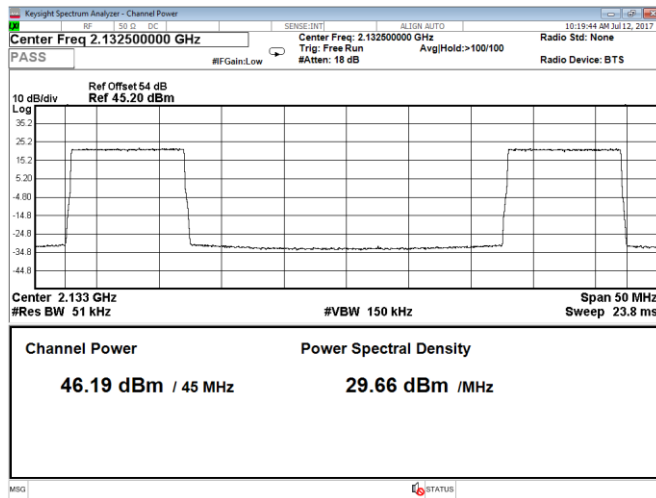


Figure 8.1-57: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 10 MHz, LTE, Port B, bottom range

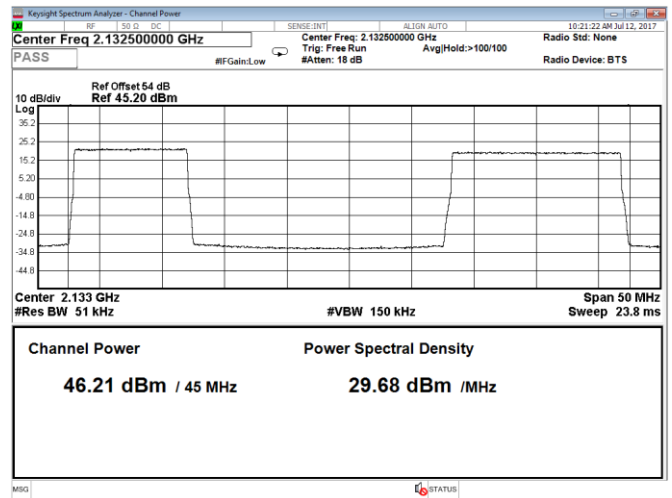


Figure 8.1-58: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 15 MHz, LTE, Port B, bottom range

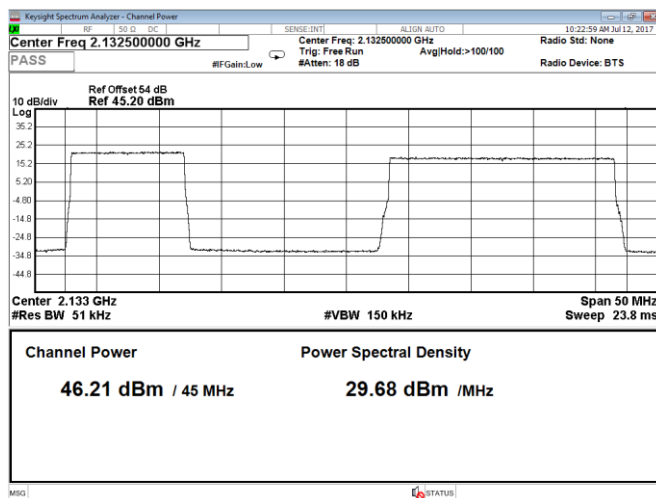


Figure 8.1-59: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 20 MHz, LTE, Port B, bottom range

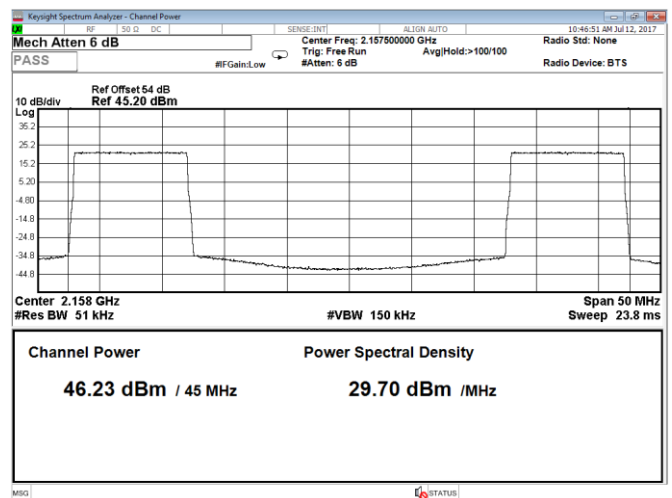


Figure 8.1-60: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 10 MHz, LTE, Port B, top range

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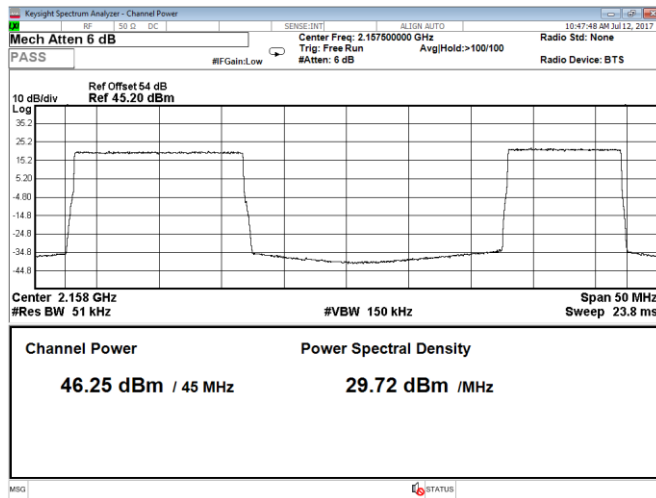


Figure 8.1-61: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 10 MHz, LTE, Port B, top range

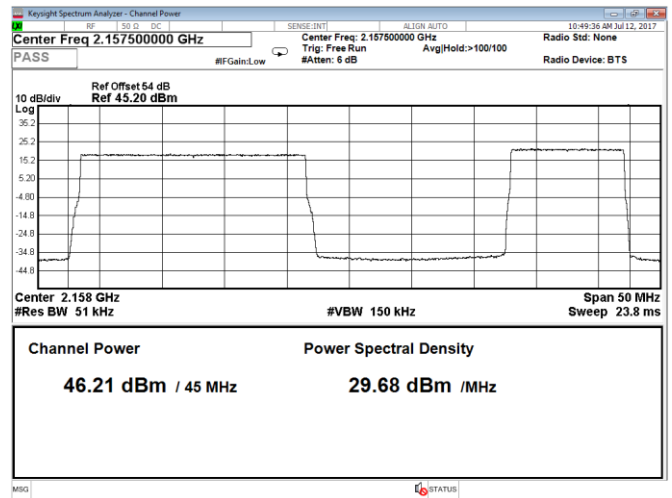


Figure 8.1-62: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 10 MHz, LTE, Port B, top range

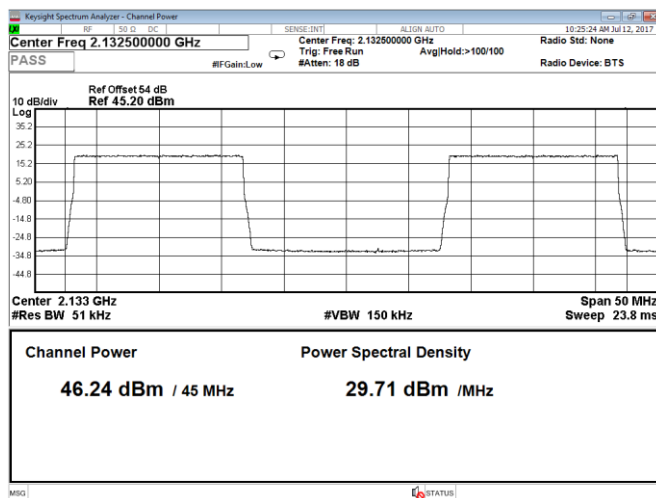


Figure 8.1-63: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 15 MHz, LTE, Port A, bottom range

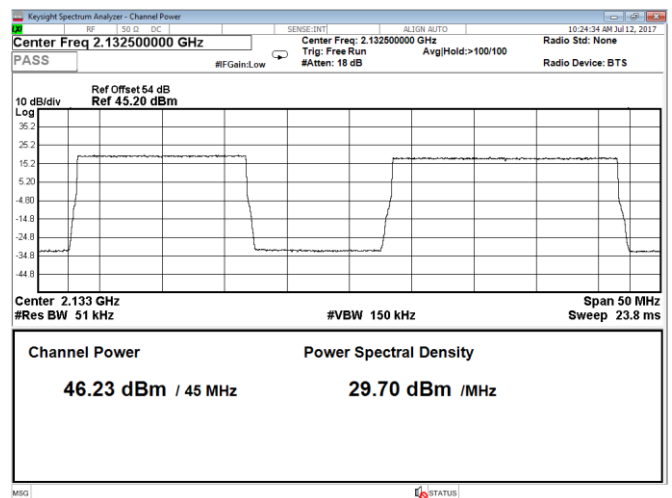


Figure 8.1-64: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 20 MHz, LTE, Port A, bottom range

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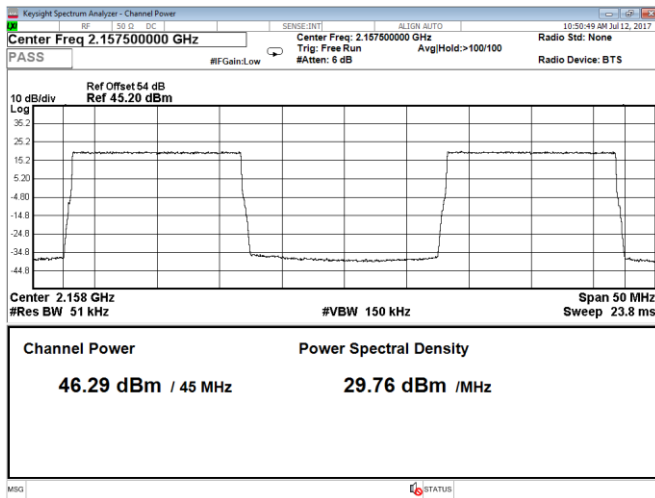


Figure 8.1-65: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 15 MHz, LTE, Port A, top range

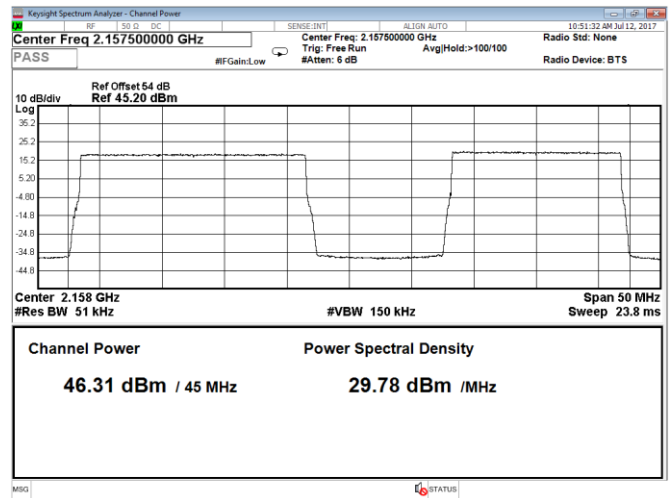


Figure 8.1-66: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 15 MHz, LTE, Port A, top range

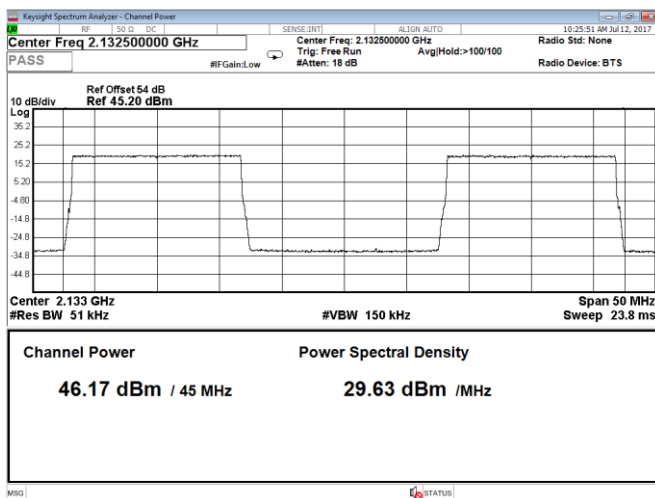


Figure 8.1-67: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 15 MHz, LTE, Port B, bottom range

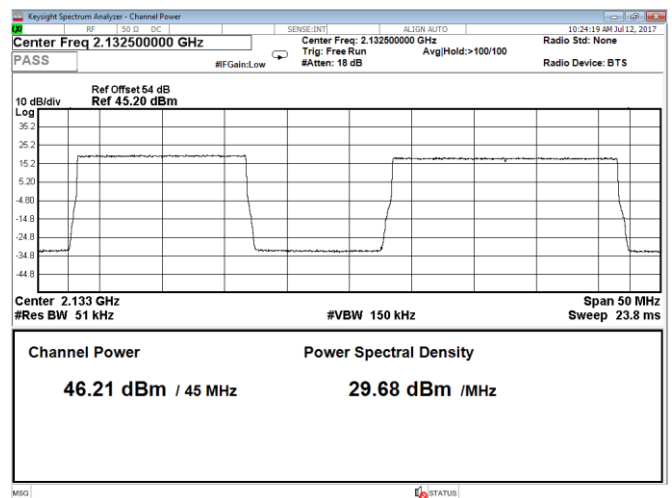


Figure 8.1-68: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 20 MHz, LTE, Port B, bottom range

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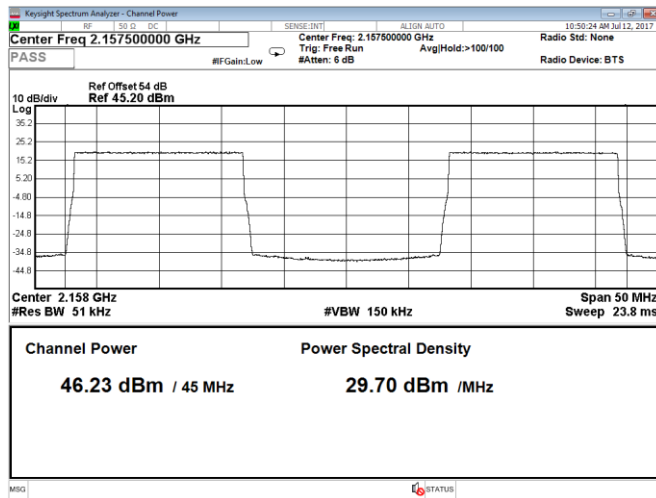


Figure 8.1-69: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 15 MHz, LTE, Port B, top range

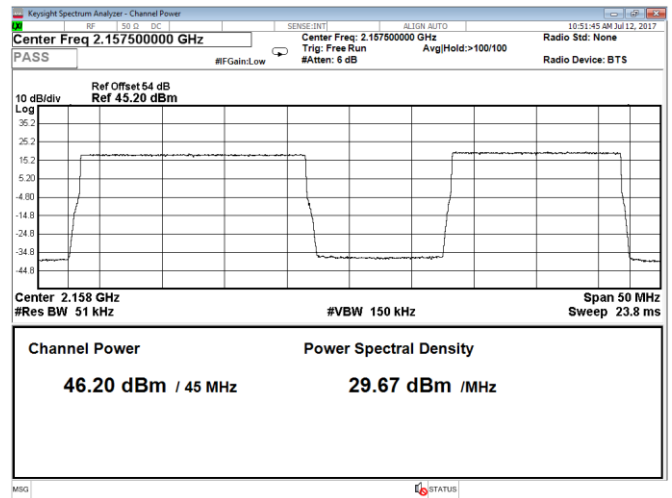


Figure 8.1-70: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 15 MHz, LTE, Port B, top range

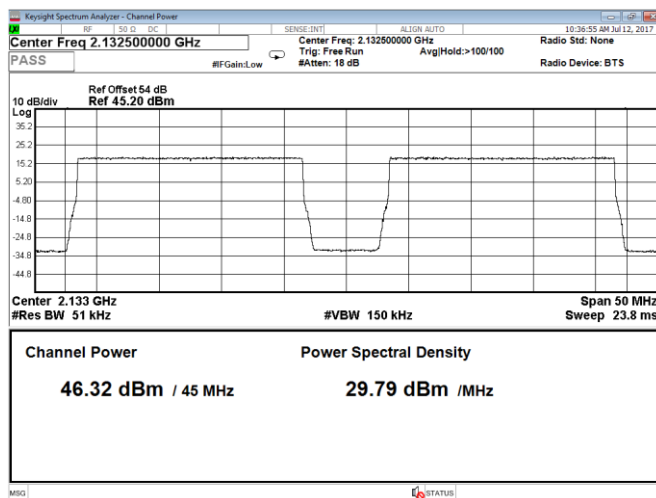


Figure 8.1-71: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 20 MHz, LTE, Port A, bottom range

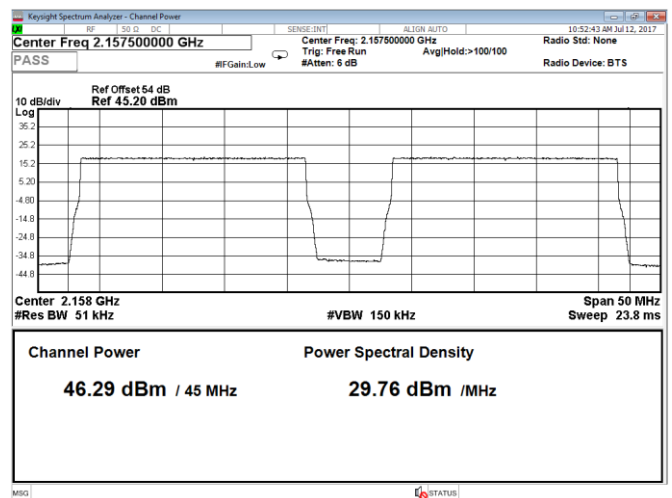


Figure 8.1-72: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 20 MHz, LTE, Port A, top range

Section 8
Test name
Specification

Testing data
 FCC 27.50(b) and RSS-139, 4.1 Maximum output power at RF antenna connector
 FCC Part 27 and RSS-139, Issue 3

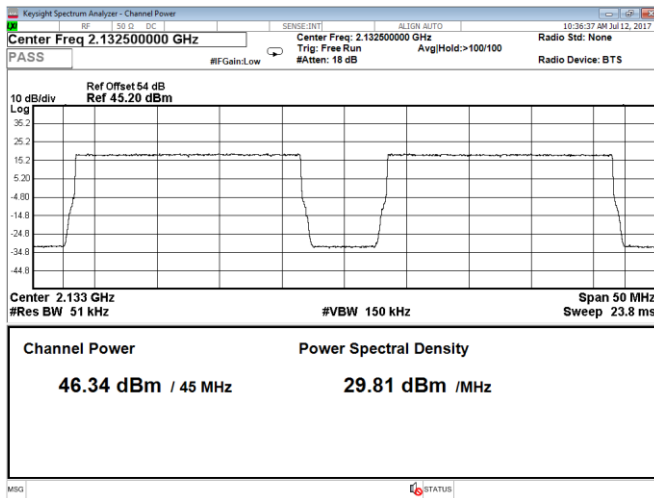


Figure 8.1-73: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 20 MHz, LTE, Port B, bottom range

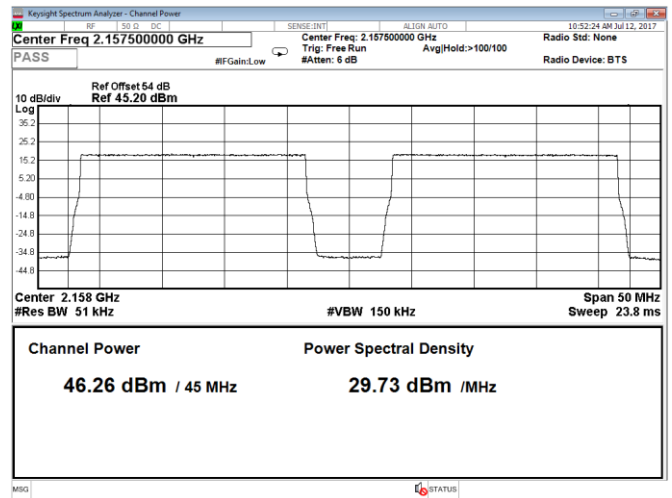


Figure 8.1-74: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 20 MHz, LTE, Port B, top range

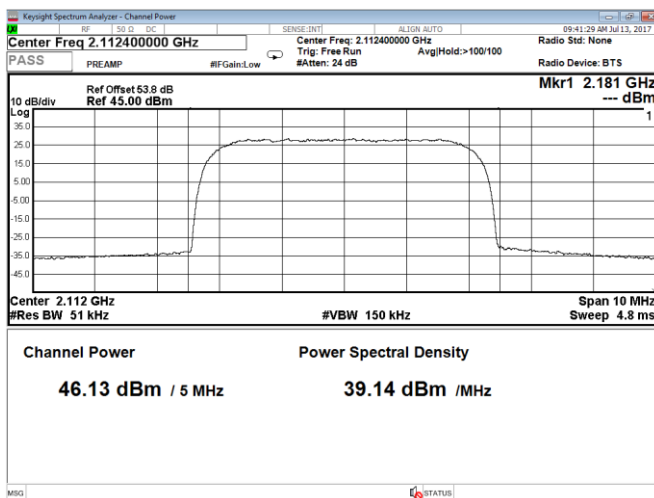


Figure 8.1-75: Output power at low channel, QPSK, 5 MHz, WCDMA, Port A

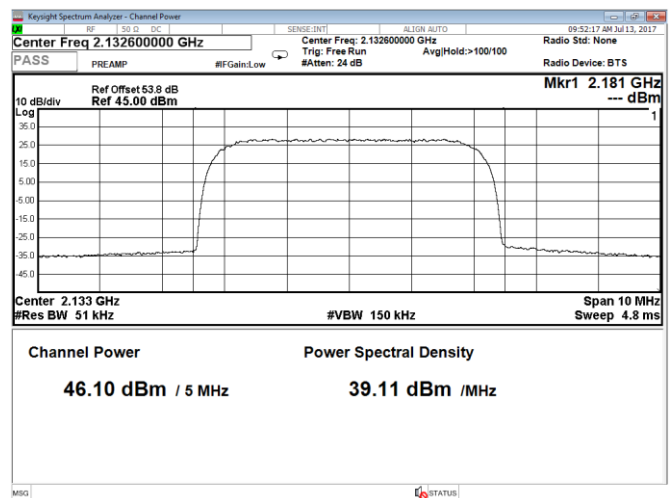


Figure 8.1-76: Output power at mid channel, QPSK, 5 MHz, WCDMA, Port A