

Radio Test report – Radio 2212 B66A

334171-1TRFWL-R1

Applicant:

Ericsson Canada

Product:

Radio 2212

Models:

Radio 2212 B66A

Part numbers:

KRC 161 630/1, KRC 161 630/3

FCC ID:

TA8AKRC161630-3

ISED Reg. Number


287AB-AS1616303

HVIN:

AS1616303

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: | Tom Tidwell |
| Date of issue: | July 27, 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 2212 B66A with model numbers KRC 161 630/1, KRC 161 630/3.

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

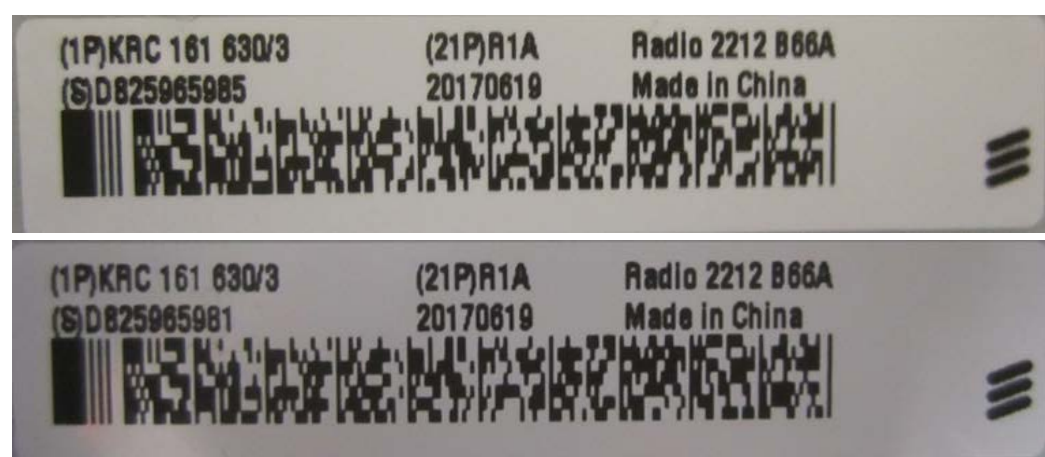
| | |
|------------------------|---------------|
| Receipt date | July 10, 2017 |
| Nemko sample ID number | None |

3.2 EUT information

| | |
|---|---|
| Product name | Radio 2212 |
| Model | Radio 2212 B66A |
| Part number | KRC 161 630/3 |
| Revision | R1A/A |
| Serial number | D825965985 (Conducted) D825965981 (Radiated) |
| Antenna ports | 2 TX/RX Ports |
| RF BW / IBW | RF BW: 70 MHz / IBW: 50, 60 and 70 MHz |
| FDD | 400 MHz |
| Frequency | TX (DL): 2110–2180 MHz RX (UL): 1710–1780 MHz |
| Operating Frequencies: | 2112.5–2177.5 MHz (5 MHz channel), 2115.0–2175.0 MHz (10 MHz channel) 2117.5–2172.5 MHz (15 MHz channel), 2120.0–2170.0 MHz (20 MHz channel) |
| Nominal O/P per antenna port Up to 20 MHz Carrier BW | Single Carrier: 1 × 80 W (49 dBm) Multi-Carrier: 2 × 40 W (49 dBm) |
| Accuracy (nominal) | ±0.1 ppm |
| Nominal voltage | –48 V _{DC} @ 20 A |
| RAT | LTE: SC, MC |
| Modulation | LTE: QPSK, 16 QAM, 64 QAM, 256QAM |
| Channel bandwidth | LTE: 5, 10, 15, 20 MHz |
| Maximum combined OBW per port | 40 MHz |
| CPRI | 10 Gbps |
| Channel raster | LTE: 100 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 50E |
| Emission Designator: | 5M00W7D, 10M0W7D, 15M0W7D, 20M0W7D |
| Multi-carrier | Single Antenna, TX Diversity, MIMO (2 Carrier Limit / port), Carrier Aggregation |
| Operating temperature | –40 °C to +55 °C |
| Total Power based on IBW | 2 × 80 W |
| Supported carrier / port | LTE BW: 5 (1-2), 10 (1-2), 15 (1-2), 20 (1-2) |
| Optional Fan Tray | NTB: 101 879/1 (BVK 106 208/1, SKX 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 | <p>The Radio 2212 B66A (KRC 161 630/1/1, KRC 161 630/3) is a multi-standard remote radio forming part of the Ericsson RBS (Radio Base Station) equipment. The Radio 2212 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 2212 product is convection cooled and shall be mounted vertically.</p> <p>The KRC 161 630/3 is physically and electrically identical to KRC 161 630/1. The KRC 161 630/3 product is subject to additional product integrity testing qualified against NEBS.</p> <p>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).</p> <p>Output RF Power is rated at 2 × 80 W.</p> <p>Altitude during operation: Below 3000 m</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|------------------------|----------|-----------------------|--|------------------------|---|------------------------|----------|-------------|------------------|---------------------------------|---------------------|-------|------------------------------------|------------------------------|--------------------------|----------------|--------------------------|----------|---------------------|------------------|------------------------|-----|--------|------------------|---|------------------|-----|-----|-----------------|--|-----------------|--|--|---------------|-----|---------------|-----|----|--------------------|-----|--------------------|-----|--|---------------|-----|---------------|-----|-------|-------------------|-----|-------------------|-----|-----------------------|----------------|--|----------------|--|--|------------------|-------|------------------|-------|-----------|
| Port description | <table border="1"> <thead> <tr> <th>Port</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>ANT A</td> <td>RF Out A</td> </tr> <tr> <td>ANT B</td> <td>RF Out B</td> </tr> <tr> <td>RET</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> </tbody> </table> | | | | | Port | Description | ANT A | RF Out A | ANT B | RF Out B | RET | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Port | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ANT A | RF Out A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ANT B | RF Out B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RET | 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 | <table border="1"> <tbody> <tr> <td>Dimensions</td> <td colspan="4">420 × 342 × 149 mm (H × W × D) [420 × 342 × 160 mm with fan unit]</td> </tr> <tr> <td>Weight</td> <td colspan="4">17.0 kg [18.5 kg with fan unit]</td> </tr> <tr> <td>Operating Temperature</td> <td colspan="4">-40 to +55 °C</td> </tr> <tr> <td>Mounting</td> <td colspan="4">Pole, Wall Mount</td> </tr> <tr> <td>Cooling</td> <td colspan="4">Convection (optional fan tray - forced air)</td> </tr> </tbody> </table> | | | | | Dimensions | 420 × 342 × 149 mm (H × W × D) [420 × 342 × 160 mm with fan unit] | | | | Weight | 17.0 kg [18.5 kg with fan unit] | | | | Operating Temperature | -40 to +55 °C | | | | Mounting | Pole, Wall Mount | | | | Cooling | Convection (optional fan tray - forced air) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimensions | 420 × 342 × 149 mm (H × W × D) [420 × 342 × 160 mm with fan unit] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weight | 17.0 kg [18.5 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-R66GN02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Radio 2212 B66A (R1A/A) Hardware Configuration | <table border="1"> <thead> <tr> <th>Product: KRC 161 630/1</th> <th>Revision</th> <th>Product: KRC 161 630/3</th> <th>Revision</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>ROA 128 6280/66A</td> <td>R1B</td> <td>ROA 128 6280/66A</td> <td>R1B</td> <td>DRX</td> </tr> <tr> <td>ROA 128 6021/1</td> <td>R1C</td> <td>ROA 128 6021/1</td> <td>R1C</td> <td>PSB</td> </tr> <tr> <td>Alt: ROA 128 6021/2</td> <td></td> <td>Alt: ROA 128 6021/2</td> <td></td> <td></td> </tr> <tr> <td>ROA 128 6290/66A</td> <td>R1B</td> <td>ROA 128 6290/66A</td> <td>R1B</td> <td>TPA</td> </tr> <tr> <td>ROA 128 6290/01</td> <td></td> <td>ROA 128 6290/01</td> <td></td> <td></td> </tr> <tr> <td>KRF 901 271/1</td> <td>R1A</td> <td>KRF 901 271/1</td> <td>R1A</td> <td>FU</td> </tr> <tr> <td>Alt: KRF 901 271/2</td> <td>R1B</td> <td>Alt: KRF 901 271/2</td> <td>R1B</td> <td></td> </tr> <tr> <td>NTB 101 495/1</td> <td>R1D</td> <td>NTB 101 495/1</td> <td>R1D</td> <td>Parts</td> </tr> <tr> <td>...SDD 513 0968/3</td> <td>R1C</td> <td>...SDD 513 0968/3</td> <td>R1C</td> <td>FLT Cover (Enclosure)</td> </tr> <tr> <td>SXK 125 2692/2</td> <td></td> <td>SXK 125 2692/2</td> <td></td> <td></td> </tr> <tr> <td>...SEB 104 331/3</td> <td>R1C/A</td> <td>...SEB 104 331/3</td> <td>R1C/A</td> <td>Enclosure</td> </tr> </tbody> </table> | | | | | Product: KRC 161 630/1 | Revision | Product: KRC 161 630/3 | Revision | Description | ROA 128 6280/66A | R1B | ROA 128 6280/66A | R1B | DRX | ROA 128 6021/1 | R1C | ROA 128 6021/1 | R1C | PSB | Alt: ROA 128 6021/2 | | Alt: ROA 128 6021/2 | | | ROA 128 6290/66A | R1B | ROA 128 6290/66A | R1B | TPA | ROA 128 6290/01 | | ROA 128 6290/01 | | | KRF 901 271/1 | R1A | KRF 901 271/1 | R1A | FU | Alt: KRF 901 271/2 | R1B | Alt: KRF 901 271/2 | R1B | | NTB 101 495/1 | R1D | NTB 101 495/1 | R1D | Parts | ...SDD 513 0968/3 | R1C | ...SDD 513 0968/3 | R1C | FLT Cover (Enclosure) | SXK 125 2692/2 | | SXK 125 2692/2 | | | ...SEB 104 331/3 | R1C/A | ...SEB 104 331/3 | R1C/A | Enclosure |
| Product: KRC 161 630/1 | Revision | Product: KRC 161 630/3 | Revision | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ROA 128 6280/66A | R1B | ROA 128 6280/66A | R1B | DRX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ROA 128 6021/1 | R1C | ROA 128 6021/1 | R1C | PSB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alt: ROA 128 6021/2 | | Alt: ROA 128 6021/2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ROA 128 6290/66A | R1B | ROA 128 6290/66A | R1B | TPA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ROA 128 6290/01 | | ROA 128 6290/01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| KRF 901 271/1 | R1A | KRF 901 271/1 | R1A | FU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alt: KRF 901 271/2 | R1B | Alt: KRF 901 271/2 | R1B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NTB 101 495/1 | R1D | NTB 101 495/1 | R1D | Parts | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ...SDD 513 0968/3 | R1C | ...SDD 513 0968/3 | R1C | FLT Cover (Enclosure) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SXK 125 2692/2 | | SXK 125 2692/2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ...SEB 104 331/3 | R1C/A | ...SEB 104 331/3 | R1C/A | Enclosure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Product Identification Label KRC 161 630/1 KRC 161 630/3 |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

3.4 EUT test details

EUT setup/configuration rationale:

| Down link | RAT | Modulation | Performance Requirement | Test Model / Configuration |
|-----------|-----|------------|-------------------------|----------------------------|
| | LTE | QPSK | N/A | E-TM1.1 |

| Up link | RAT | Modulation | Performance Requirement | Input Signal | Test Model / Configuration |
|---------|-----|------------|-------------------------|--------------|----------------------------|
| | LTE | QPSK | N/A | | E-UTRA-UL |

Carrier Configurations:

Single carrier

| 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 |

Multiple-Carriers (2x) for spurious emissions

IBW: 50 MHz

| Bandwidth, MHz | Transmit / DL, MHz | | | | | | | | | | | |
|----------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | B1 | EARFCN | B2 | EARFCN | M1 | EARFCN | M2 | EARFCN | T1 | EARFCN | T2 | EARFCN |
| 5 | 2112.5 | 66461 | 2157.5 | 66911 | 2122.5 | 66561 | 2167.5 | 67011 | 2132.5 | 66661 | 2177.5 | 67111 |
| 10 | 2115.0 | 66486 | 2155.0 | 66886 | 2125.0 | 66586 | 2165.0 | 66986 | 2135.0 | 66686 | 2175.0 | 67086 |
| 15 | 2117.5 | 66511 | 2152.5 | 66861 | 2127.5 | 66611 | 2162.5 | 66961 | 2137.5 | 66711 | 2172.5 | 67061 |
| 20 | 2120.0 | 66536 | 2150.0 | 66836 | 2130.0 | 66636 | 2160.0 | 66936 | 2140.0 | 66736 | 2170.0 | 67036 |

| Bandwidth, MHz | Receive / UL, MHz | | | | | | | | | | | |
|----------------|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | B1 | EARFCN | B2 | EARFCN | M1 | EARFCN | M2 | EARFCN | T1 | EARFCN | T2 | EARFCN |
| 5 | 1712.5 | 131997 | 1757.5 | 132447 | 1722.5 | 132097 | 1767.5 | 132547 | 1732.5 | 132197 | 1777.5 | 132647 |
| 10 | 1715.0 | 132022 | 1755.0 | 132422 | 1725.0 | 132122 | 1765.0 | 132522 | 1735.0 | 132222 | 1775.0 | 132622 |
| 15 | 1717.5 | 132047 | 1752.5 | 132397 | 1727.5 | 132147 | 1762.5 | 132497 | 1737.5 | 132247 | 1772.5 | 132597 |
| 20 | 1720.0 | 132072 | 1750.0 | 132372 | 1730.0 | 132172 | 1760.0 | 132472 | 1740.0 | 132272 | 1770.0 | 132572 |

Section 3:

Equipment under test (EUT) details



Multiple-Carriers (2x) for spurious emissions

IBW: 60 MHz

| Bandwidth, MHz | Transmit / DL, MHz | | | | | | | | | | | |
|-------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | B1 | EARFCN | B2 | EARFCN | M1 | EARFCN | M2 | EARFCN | T1 | EARFCN | T2 | EARFCN |
| 5 | 2112.5 | 66461 | 2167.5 | 67011 | 2117.5 | 66511 | 2172.5 | 67061 | 2122.5 | 66561 | 2177.5 | 67111 |
| 10 | 2115.0 | 66486 | 2165.0 | 66986 | 2120.0 | 66536 | 2170.0 | 67036 | 2125.0 | 66586 | 2175.0 | 67086 |
| 15 | 2117.5 | 66511 | 2162.5 | 66961 | 2122.5 | 66561 | 2167.5 | 67011 | 2127.5 | 66611 | 2172.5 | 67061 |
| 20 | 2120.0 | 66536 | 2160.0 | 66936 | 2125.0 | 66586 | 2165.0 | 66986 | 2130.0 | 66636 | 2170.0 | 67036 |

| Bandwidth, MHz | Receive / UL, MHz | | | | | | | | | | | |
|-------------------|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | B1 | EARFCN | B2 | EARFCN | M1 | EARFCN | M2 | EARFCN | T1 | EARFCN | T2 | EARFCN |
| 5 | 1712.5 | 131997 | 1767.5 | 132547 | 1717.5 | 132047 | 1772.5 | 132597 | 1722.5 | 132097 | 1777.5 | 132647 |
| 10 | 1715.0 | 132022 | 1765.0 | 132522 | 1720.0 | 132072 | 1770.0 | 132572 | 1725.0 | 132122 | 1775.0 | 132622 |
| 15 | 1717.5 | 132047 | 1762.5 | 132497 | 1722.5 | 132097 | 1767.5 | 132547 | 1727.5 | 132147 | 1772.5 | 132597 |
| 20 | 1720.0 | 132072 | 1760.0 | 132472 | 1725.0 | 132122 | 1765.0 | 132522 | 1730.0 | 132172 | 1770.0 | 132572 |

Multiple-Carriers (2x) for spurious emissions

IBW: 70 MHz

| Bandwidth, MHz | Transmit / DL, MHz | | | | | | | | | | | |
|-------------------|--------------------|--------------|--------|--------------|--------|--------------|--------|--------------|--------|--------------|--------|--------------|
| | B1 | EARFCN | B2 | EARFCN | M1 | EARFCN | M2 | EARFCN | T1 | EARFCN | T2 | EARFCN |
| 5 | 2112.5 | 66461 | 2177.5 | 67111 | 2112.5 | 66461 | 2177.5 | 67111 | 2112.5 | 66461 | 2177.5 | 67111 |
| 10 | 2115.0 | 66486 | 2175.0 | 67086 | 2115.0 | 66486 | 2175.0 | 67086 | 2115.0 | 66486 | 2175.0 | 67086 |
| 15 | 2117.5 | 66511 | 2172.5 | 67061 | 2117.5 | 66511 | 2172.5 | 67061 | 2117.5 | 66511 | 2172.5 | 67061 |
| 20 | 2120.0 | 66536 | 2170.0 | 67036 | 2120.0 | 66536 | 2170.0 | 67036 | 2120.0 | 66536 | 2170.0 | 67036 |

| Bandwidth, MHz | Receive / UL, MHz | | | | | | | | | | | |
|-------------------|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | B1 | EARFCN | B2 | EARFCN | M1 | EARFCN | M2 | EARFCN | T1 | EARFCN | T2 | EARFCN |
| 5 | 1712.5 | 131997 | 1777.5 | 132647 | 1712.5 | 131997 | 1777.5 | 132647 | 1712.5 | 131997 | 1777.5 | 132647 |
| 10 | 1715.0 | 132022 | 1775.0 | 132622 | 1715.0 | 132022 | 1775.0 | 132622 | 1715.0 | 132022 | 1775.0 | 132622 |
| 15 | 1717.5 | 132047 | 1772.5 | 132597 | 1717.5 | 132047 | 1772.5 | 132597 | 1717.5 | 132047 | 1772.5 | 132597 |
| 20 | 1720.0 | 132072 | 1770.0 | 132572 | 1720.0 | 132072 | 1770.0 | 132572 | 1720.0 | 132072 | 1770.0 | 132572 |

EUT Monitoring Method / Equipment:

| | |
|-------------------|---|
| Support equipment | <p>Node EMC Test System</p> <ul style="list-style-type: none"> - Anritsu MS 2691 VSA/Sig Gen - HP Laptop - Timing and Synchronization box (GPS) - Ethernet Switch - Isolation Transformer <p>RBS 6601, BFM 901 009/1:</p> <ul style="list-style-type: none"> - DUS 4101 KDU 137 624/ 11, R4G, S/N: T48X68357 - DUS SW: CXP102051/27-R18A179 - Input Voltage: -48 V_{DC} |
|-------------------|---|

3.5 EUT setup diagram

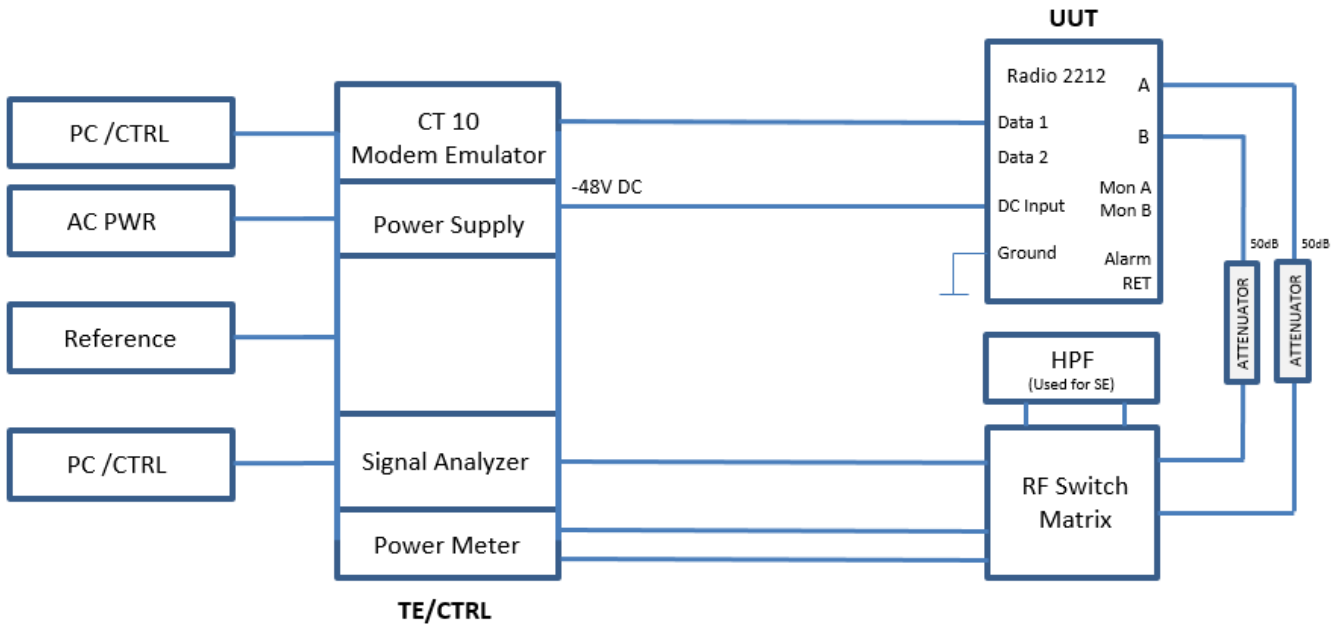


Figure 3.5-1: Setup diagram – Radio Compliance

3.6 Setup photographs

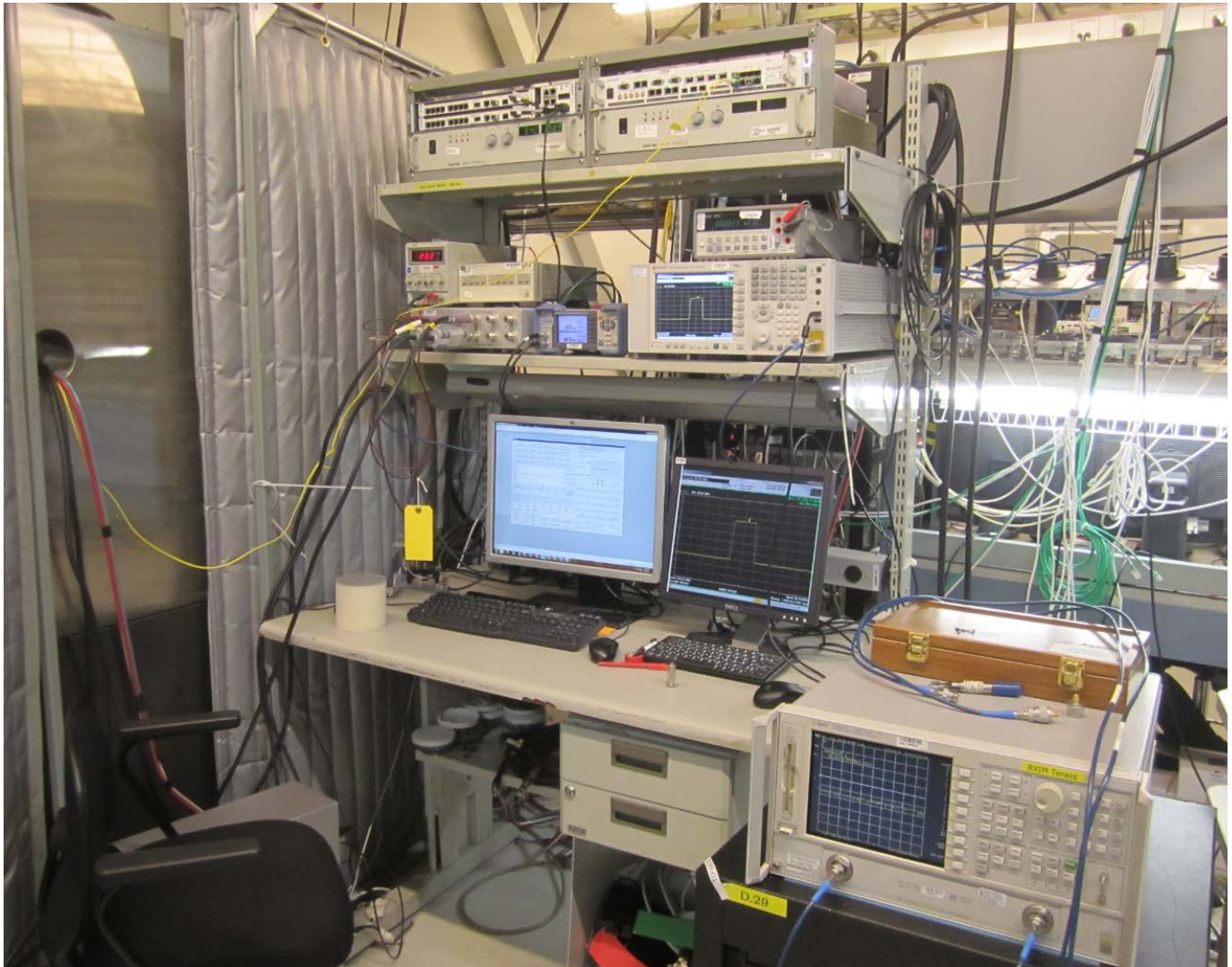


Figure 3.6-1: Test / Measurement Equipment - Set up for Radio Compliance Testing



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



Figure 3.6-3: EUT Set-up for Radiated 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

The KRC 161 630/3 is physically and electrically identical to KRC 161 630/1. The KRC 161 630/3 product is subject to additional product integrity testing qualified against NEBS.

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 10, 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 – $10 \times \text{Log}_{10} (5 / 1)$ [dB];

(For 10 MHz channel) Maximum power – $10 \times \text{Log}_{10} (10 / 1)$ [dB], (For 15 MHz channel) Maximum power – $10 \times \text{Log}_{10} (15 / 1)$ [dB], (For 20 MHz channel)

Maximum power – $10 \times \text{Log}_{10} (20 / 1)$ [dB].

In the following measurement results “bottom” is for lower 50 MHz of the operational band and “top” for the upper 50 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 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 | 72.778 | 48.62 | 41.63 | 62.15 | 20.52 |
| 16QAM, 5 MHz, Ant A | 2112.5 | 71.945 | 48.57 | 41.58 | 62.15 | 20.57 |
| 64QAM, 5 MHz, Ant A | 2112.5 | 70.958 | 48.51 | 41.52 | 62.15 | 20.63 |
| 256QAM, 5 MHz, Ant A | 2112.5 | 70.795 | 48.50 | 41.51 | 62.15 | 20.64 |
| QPSK, 5 MHz, Ant A | 2145.0 | 68.077 | 48.33 | 41.34 | 62.15 | 20.81 |
| QPSK, 5 MHz, Ant A | 2177.5 | 67.608 | 48.30 | 41.31 | 62.15 | 20.84 |
| QPSK, 5 MHz, Ant B | 2112.5 | 73.621 | 48.67 | 41.67 | 62.15 | 20.48 |
| 16QAM, 5 MHz, Ant B | 2112.5 | 73.114 | 48.64 | 41.65 | 62.15 | 20.50 |
| 64QAM, 5 MHz, Ant B | 2112.5 | 72.444 | 48.60 | 41.61 | 62.15 | 20.54 |
| 256QAM, 5 MHz, Ant B | 2112.5 | 73.114 | 48.64 | 41.65 | 62.15 | 20.50 |
| QPSK, 5 MHz, Ant B | 2145.0 | 74.645 | 48.73 | 41.74 | 62.15 | 20.41 |
| QPSK, 5 MHz, Ant B | 2177.5 | 70.632 | 48.49 | 41.50 | 62.15 | 20.65 |
| QPSK, 10 MHz, Ant A | 2115.0 | 71.614 | 48.55 | 38.55 | 62.15 | 23.60 |
| QPSK, 10 MHz, Ant A | 2145.0 | 69.984 | 48.45 | 38.45 | 62.15 | 23.70 |
| QPSK, 10 MHz, Ant A | 2175.0 | 67.764 | 48.31 | 38.31 | 62.15 | 23.84 |
| QPSK, 10 MHz, Ant B | 2115.0 | 74.645 | 48.73 | 38.73 | 62.15 | 23.42 |
| QPSK, 10 MHz, Ant B | 2145.0 | 76.560 | 48.84 | 38.84 | 62.15 | 23.31 |
| QPSK, 10 MHz, Ant B | 2175.0 | 71.945 | 48.57 | 38.57 | 62.15 | 23.58 |
| QPSK, 15 MHz, Ant A | 2117.5 | 71.121 | 48.52 | 36.76 | 62.15 | 25.39 |
| QPSK, 15 MHz, Ant A | 2145.0 | 70.307 | 48.47 | 36.70 | 62.15 | 25.45 |
| QPSK, 15 MHz, Ant A | 2172.5 | 67.143 | 48.27 | 36.51 | 62.15 | 25.64 |
| QPSK, 15 MHz, Ant B | 2117.5 | 75.683 | 48.79 | 37.03 | 62.15 | 25.12 |
| QPSK, 15 MHz, Ant B | 2145.0 | 74.645 | 48.73 | 36.97 | 62.15 | 25.18 |
| QPSK, 15 MHz, Ant B | 2172.5 | 73.790 | 48.68 | 36.92 | 62.15 | 25.23 |
| QPSK, 20 MHz, Ant A | 2120.0 | 71.121 | 48.52 | 35.51 | 62.15 | 26.64 |
| QPSK, 20 MHz, Ant A | 2145.0 | 69.343 | 48.41 | 35.40 | 62.15 | 26.75 |
| QPSK, 20 MHz, Ant A | 2170.0 | 68.865 | 48.38 | 35.37 | 62.15 | 26.78 |
| QPSK, 20 MHz, Ant B | 2120.0 | 75.858 | 48.80 | 35.79 | 62.15 | 26.36 |
| QPSK, 20 MHz, Ant B | 2145.0 | 76.208 | 48.82 | 35.81 | 62.15 | 26.34 |
| QPSK, 20 MHz, Ant B | 2170.0 | 74.131 | 48.70 | 35.69 | 62.15 | 26.46 |

Note: lowest margin is 20.41 dB.



Table 8.1-3: Output power measurement results for SISO two-carrier operation for IBW 50 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 2157.5 | 64.417 | 48.09 | 31.10 | 62.15 | 31.05 |
| Ch1: 5 MHz, Ch2: 10 MHz, Ant A, bottom | 2112.5 and 2155.0 | 66.681 | 48.24 | 31.25 | 62.15 | 30.90 |
| Ch1: 5 MHz, Ch2: 15 MHz, Ant A, bottom | 2112.5 and 2152.5 | 66.681 | 48.24 | 31.25 | 62.15 | 30.90 |
| Ch1: 5 MHz, Ch2: 20 MHz, Ant A, bottom | 2112.5 and 2150.0 | 65.766 | 48.18 | 31.19 | 62.15 | 30.96 |
| Ch1: 5 MHz, Ch2: 5 MHz, Ant B, bottom | 2112.5 and 2157.5 | 70.958 | 48.51 | 31.52 | 62.15 | 30.63 |
| Ch1: 5 MHz, Ch2: 10 MHz, Ant B, bottom | 2112.5 and 2155.0 | 72.277 | 48.59 | 31.60 | 62.15 | 30.55 |
| Ch1: 5 MHz, Ch2: 15 MHz, Ant B, bottom | 2112.5 and 2152.5 | 71.121 | 48.52 | 31.53 | 62.15 | 30.62 |
| Ch1: 5 MHz, Ch2: 20 MHz, Ant B, bottom | 2112.5 and 2150.0 | 71.285 | 48.53 | 31.54 | 62.15 | 30.61 |
| Ch1: 5 MHz, Ch2: 5 MHz, Ant A, top | 2132.5 and 2177.5 | 66.069 | 48.20 | 31.21 | 62.15 | 30.94 |
| Ch1: 10 MHz, Ch2: 5 MHz, Ant A, top | 2135.0 and 2177.5 | 65.766 | 48.18 | 31.19 | 62.15 | 30.96 |
| Ch1: 15 MHz, Ch2: 5 MHz, Ant A, top | 2137.5 and 2177.5 | 65.615 | 48.17 | 31.18 | 62.15 | 30.97 |
| Ch1: 20 MHz, Ch2: 5 MHz, Ant A, top | 2140.0 and 2177.5 | 65.615 | 48.17 | 31.18 | 62.15 | 30.97 |
| Ch1: 5 MHz, Ch2: 5 MHz, Ant B, top | 2132.5 and 2177.5 | 71.614 | 48.55 | 31.56 | 62.15 | 30.59 |
| Ch1: 10 MHz, Ch2: 5 MHz, Ant B, top | 2135.0 and 2177.5 | 71.285 | 48.53 | 31.54 | 62.15 | 30.61 |
| Ch1: 15 MHz, Ch2: 5 MHz, Ant B, top | 2137.5 and 2177.5 | 71.450 | 48.54 | 31.55 | 62.15 | 30.60 |
| Ch1: 20 MHz, Ch2: 5 MHz, Ant B, top | 2140.0 and 2177.5 | 71.121 | 48.52 | 31.53 | 62.15 | 30.62 |
| Ch1: 10 MHz, Ch2: 10 MHz, Ant A, bottom | 2115.0 and 2155.0 | 65.766 | 48.18 | 31.20 | 62.15 | 30.95 |
| Ch1: 10 MHz, Ch2: 15 MHz, Ant A, bottom | 2115.0 and 2152.5 | 66.222 | 48.21 | 31.22 | 62.15 | 30.93 |
| Ch1: 10 MHz, Ch2: 20 MHz, Ant A, bottom | 2115.0 and 2150.0 | 67.608 | 48.30 | 31.31 | 62.15 | 30.84 |
| Ch1: 10 MHz, Ch2: 10 MHz, Ant B, bottom | 2115.0 and 2155.0 | 71.614 | 48.55 | 31.57 | 62.15 | 30.58 |
| Ch1: 10 MHz, Ch2: 15 MHz, Ant B, bottom | 2115.0 and 2152.5 | 72.611 | 48.61 | 31.62 | 62.15 | 30.53 |
| Ch1: 10 MHz, Ch2: 20 MHz, Ant B, bottom | 2115.0 and 2150.0 | 71.614 | 48.55 | 31.56 | 62.15 | 30.59 |
| Ch1: 10 MHz, Ch2: 10 MHz, Ant A, top | 2135.0 and 2175.0 | 67.608 | 48.30 | 31.31 | 62.15 | 30.84 |
| Ch1: 15 MHz, Ch2: 10 MHz, Ant A, top | 2137.5 and 2175.0 | 67.764 | 48.31 | 31.32 | 62.15 | 30.83 |
| Ch1: 20 MHz, Ch2: 10 MHz, Ant A, top | 2140.0 and 2175.0 | 58.076 | 47.64 | 30.65 | 62.15 | 31.50 |
| Ch1: 10 MHz, Ch2: 10 MHz, Ant B, top | 2135.0 and 2175.0 | 73.790 | 48.68 | 31.69 | 62.15 | 30.46 |
| Ch1: 15 MHz, Ch2: 10 MHz, Ant B, top | 2137.5 and 2175.0 | 73.282 | 48.65 | 31.66 | 62.15 | 30.49 |
| Ch1: 20 MHz, Ch2: 10 MHz, Ant B, top | 2140.0 and 2175.0 | 63.826 | 48.05 | 31.06 | 62.15 | 31.09 |
| Ch1: 15 MHz, Ch2: 15 MHz, Ant A, bottom | 2117.5 and 2152.5 | 56.624 | 47.53 | 30.54 | 62.15 | 31.61 |
| Ch1: 15 MHz, Ch2: 20 MHz, Ant A, bottom | 2117.5 and 2150.0 | 57.280 | 47.58 | 30.59 | 62.15 | 31.56 |
| Ch1: 15 MHz, Ch2: 15 MHz, Ant B, bottom | 2117.5 and 2152.5 | 61.376 | 47.88 | 30.89 | 62.15 | 31.26 |
| Ch1: 15 MHz, Ch2: 20 MHz, Ant B, bottom | 2117.5 and 2150.0 | 62.806 | 47.98 | 30.99 | 62.15 | 31.16 |
| Ch1: 15 MHz, Ch2: 15 MHz, Ant A, top | 2137.5 and 2172.5 | 58.076 | 47.64 | 30.65 | 62.15 | 31.50 |
| Ch1: 20 MHz, Ch2: 15 MHz, Ant A, top | 2140.0 and 2172.5 | 58.479 | 47.67 | 30.69 | 62.15 | 31.46 |
| Ch1: 15 MHz, Ch2: 15 MHz, Ant B, top | 2137.5 and 2172.5 | 63.826 | 48.05 | 31.06 | 62.15 | 31.09 |
| Ch1: 20 MHz, Ch2: 15 MHz, Ant B, top | 2140.0 and 2172.5 | 63.533 | 48.03 | 31.04 | 62.15 | 31.11 |
| Ch1: 20 MHz, Ch2: 20 MHz, Ant A, bottom | 2120.0 and 2150.0 | 50.119 | 47.00 | 30.01 | 62.15 | 32.14 |
| Ch1: 20 MHz, Ch2: 20 MHz, Ant B, bottom | 2120.0 and 2150.0 | 51.761 | 47.14 | 30.15 | 62.15 | 32.00 |
| Ch1: 20 MHz, Ch2: 20 MHz, Ant A, top | 2140.0 and 2170.0 | 54.576 | 47.37 | 30.38 | 62.15 | 31.77 |
| Ch1: 20 MHz, Ch2: 20 MHz, Ant B, top | 2140.0 and 2170.0 | 55.719 | 47.46 | 30.47 | 62.15 | 31.68 |

Note: lowest margin is 30.46 dB.



Table 8.1-4: Output power measurement results for MIMO single carrier operation

| Remarks | Frequency, MHz | RF output power port A, dBm | RF output power port B, dBm | Total RF output power dBm | RF output power, dBm/MHz | EIRP limit, dBm/MHz | Margin, dB |
|---------------|----------------|-----------------------------|-----------------------------|---------------------------|--------------------------|---------------------|------------|
| QPSK, 5 MHz | 2112.5 | 48.62 | 48.67 | 51.66 | 44.67 | 62.15 | 17.48 |
| 16QAM, 5 MHz | 2112.5 | 48.57 | 48.64 | 51.62 | 44.63 | 62.15 | 17.52 |
| 64QAM, 5 MHz | 2112.5 | 48.51 | 48.60 | 51.57 | 44.58 | 62.15 | 17.57 |
| 256QAM, 5 MHz | 2112.5 | 48.50 | 48.64 | 51.58 | 44.59 | 62.15 | 17.56 |
| QPSK, 5 MHz | 2145.0 | 48.33 | 48.73 | 51.54 | 44.56 | 62.15 | 17.59 |
| QPSK, 5 MHz | 2177.5 | 48.30 | 48.49 | 51.41 | 44.42 | 62.15 | 17.73 |
| QPSK, 10 MHz | 2115.0 | 48.55 | 48.73 | 51.65 | 41.65 | 62.15 | 20.50 |
| QPSK, 10 MHz | 2145.0 | 48.45 | 48.84 | 51.66 | 41.66 | 62.15 | 20.49 |
| QPSK, 10 MHz | 2175.0 | 48.31 | 48.57 | 51.45 | 41.45 | 62.15 | 20.70 |
| QPSK, 15 MHz | 2117.5 | 48.52 | 48.79 | 51.67 | 39.91 | 62.15 | 22.24 |
| QPSK, 15 MHz | 2145.0 | 48.47 | 48.73 | 51.61 | 39.85 | 62.15 | 22.30 |
| QPSK, 15 MHz | 2172.5 | 48.27 | 48.68 | 51.49 | 39.73 | 62.15 | 22.42 |
| QPSK, 20 MHz | 2120.0 | 48.52 | 48.80 | 51.67 | 38.66 | 62.15 | 23.49 |
| QPSK, 20 MHz | 2145.0 | 48.41 | 48.82 | 51.63 | 38.62 | 62.15 | 23.53 |
| QPSK, 20 MHz | 2170.0 | 48.38 | 48.70 | 51.55 | 38.54 | 62.15 | 23.61 |

Note: lowest margin is 17.48 dB.

Table 8.1-5: Output power measurement results for 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 2157.5 | 31.10 | 31.52 | 34.33 | 62.15 | 27.82 |
| Ch1: 5 MHz, Ch2: 10 MHz, bottom | 2112.5 and 2155.0 | 31.25 | 31.60 | 34.44 | 62.15 | 27.71 |
| Ch1: 5 MHz, Ch2: 15 MHz, bottom | 2112.5 and 2152.5 | 31.25 | 31.53 | 34.40 | 62.15 | 27.75 |
| Ch1: 5 MHz, Ch2: 20 MHz, bottom | 2112.5 and 2150.0 | 31.19 | 31.54 | 34.38 | 62.15 | 27.77 |
| Ch1: 5 MHz, Ch2: 5 MHz, top | 2132.5 and 2177.5 | 31.21 | 31.56 | 34.40 | 62.15 | 27.75 |
| Ch1: 10 MHz, Ch2: 5 MHz, top | 2135.0 and 2177.5 | 31.19 | 31.54 | 34.38 | 62.15 | 27.77 |
| Ch1: 15 MHz, Ch2: 5 MHz, top | 2137.5 and 2177.5 | 31.18 | 31.55 | 34.38 | 62.15 | 27.77 |
| Ch1: 20 MHz, Ch2: 5 MHz, top | 2140.0 and 2177.5 | 31.18 | 31.53 | 34.37 | 62.15 | 27.78 |
| Ch1: 10 MHz, Ch2: 10 MHz, bottom | 2115.0 and 2155.0 | 31.20 | 31.57 | 34.40 | 62.15 | 27.75 |
| Ch1: 10 MHz, Ch2: 15 MHz, bottom | 2115.0 and 2152.5 | 31.22 | 31.62 | 34.43 | 62.15 | 27.72 |
| Ch1: 10 MHz, Ch2: 20 MHz, bottom | 2115.0 and 2150.0 | 31.31 | 31.56 | 34.45 | 62.15 | 27.70 |
| Ch1: 10 MHz, Ch2: 10 MHz, top | 2135.0 and 2175.0 | 31.31 | 31.69 | 34.51 | 62.15 | 27.64 |
| Ch1: 15 MHz, Ch2: 10 MHz, top | 2137.5 and 2175.0 | 31.32 | 31.66 | 34.50 | 62.15 | 27.65 |
| Ch1: 20 MHz, Ch2: 10 MHz, top | 2140.0 and 2175.0 | 30.65 | 31.06 | 33.87 | 62.15 | 28.28 |
| Ch1: 15 MHz, Ch2: 15 MHz, bottom | 2117.5 and 2152.5 | 30.54 | 30.89 | 33.73 | 62.15 | 28.42 |
| Ch1: 15 MHz, Ch2: 20 MHz, bottom | 2117.5 and 2150.0 | 30.59 | 30.99 | 33.80 | 62.15 | 28.35 |
| Ch1: 15 MHz, Ch2: 15 MHz, top | 2137.5 and 2172.5 | 30.65 | 31.06 | 33.87 | 62.15 | 28.28 |
| Ch1: 20 MHz, Ch2: 15 MHz, top | 2140.0 and 2172.5 | 30.69 | 31.04 | 33.88 | 62.15 | 28.27 |
| Ch1: 20 MHz, Ch2: 20 MHz, bottom | 2120.0 and 2150.0 | 30.01 | 30.38 | 33.21 | 62.15 | 28.94 |
| Ch1: 20 MHz, Ch2: 20 MHz, top | 2140.0 and 2170.0 | 30.15 | 30.47 | 33.32 | 62.15 | 28.83 |

Note: lowest margin is 27.67 dB.

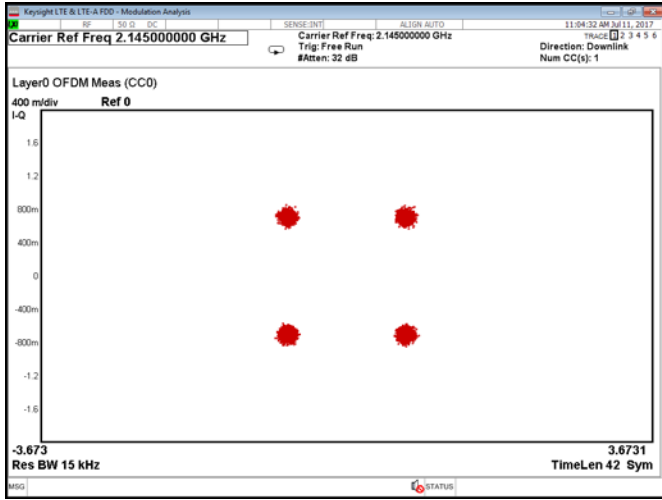


Figure 8.1-1: Modulation characteristics, QPSK

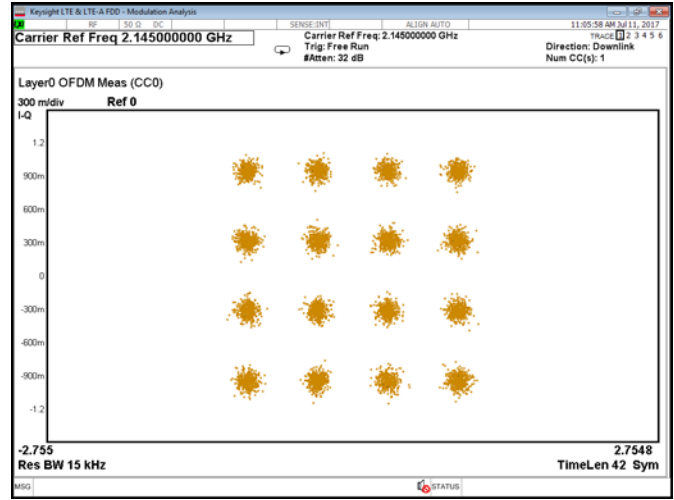


Figure 8.1-2: Modulation characteristics, 16QAM

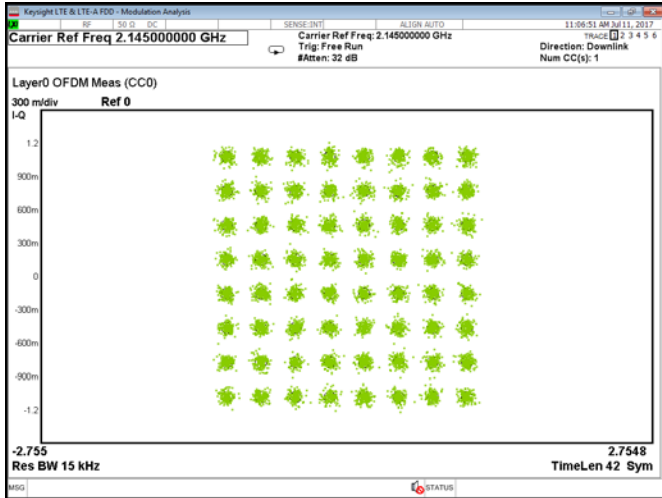


Figure 8.1-3: Modulation characteristics, 64QAM

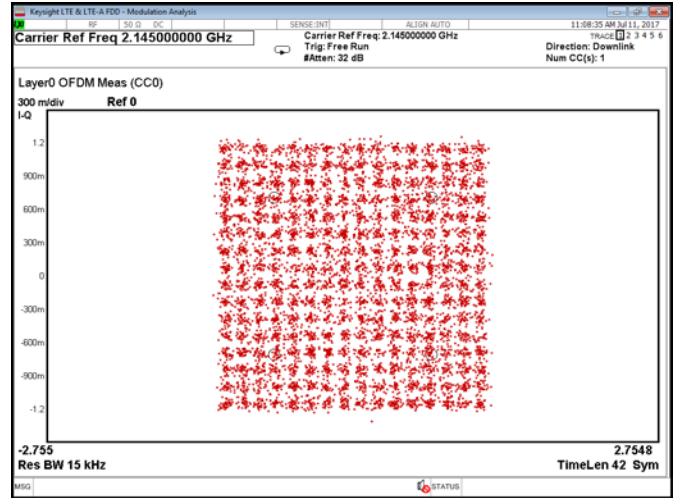


Figure 8.1-4: Modulation characteristics, 256QAM

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

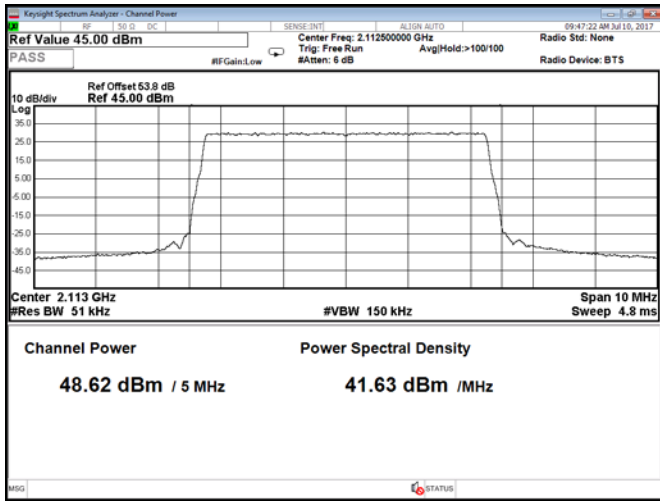


Figure 8.1-5: Output power at low channel, QPSK, 5 MHz, Port A

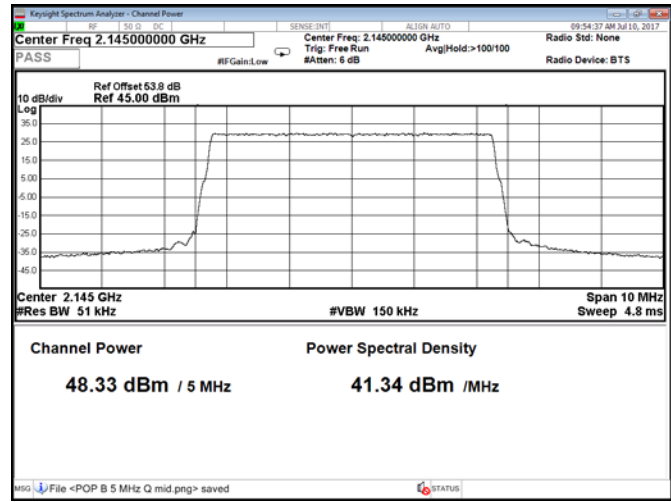


Figure 8.1-6: Output power at mid channel, QPSK, 5 MHz, Port A

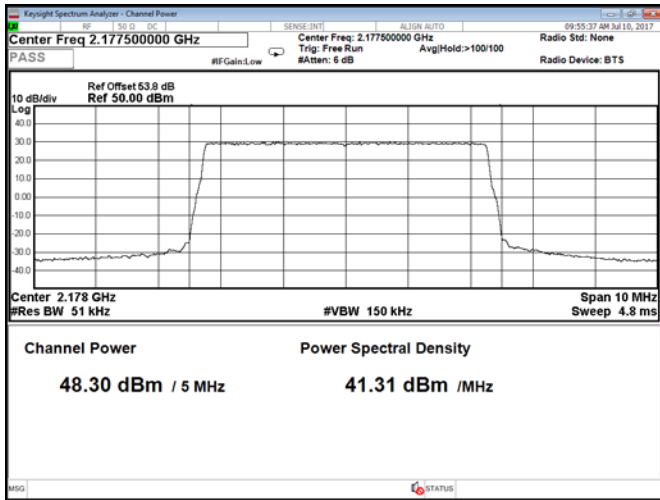


Figure 8.1-7: Output power at high channel, QPSK, 5 MHz, Port A

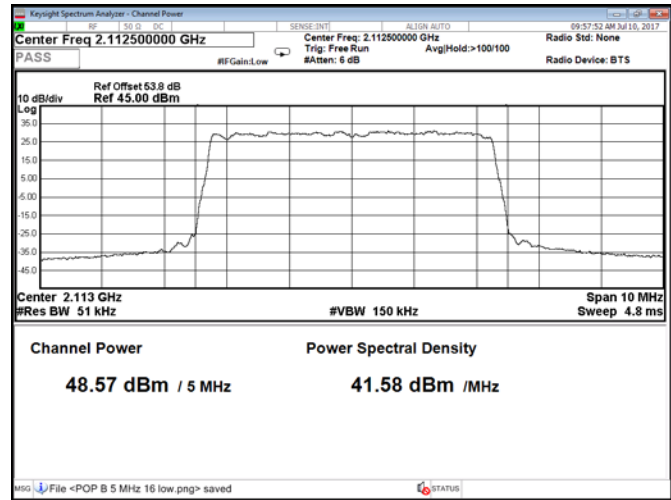


Figure 8.1-8: Output power at low channel, 16QAM, 5 MHz, Port A

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

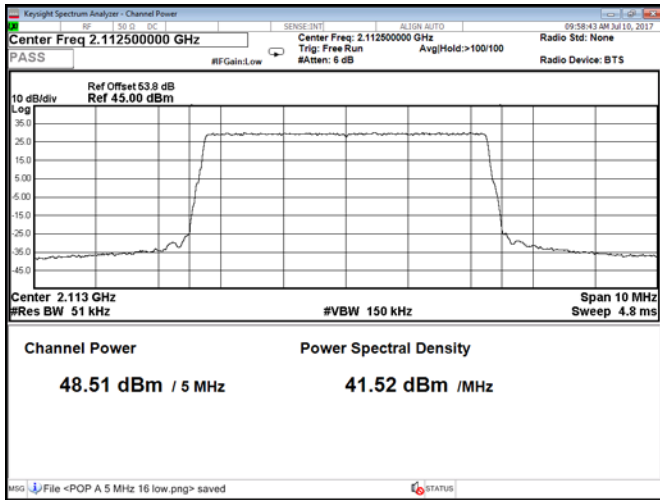


Figure 8.1-9: Output power at low channel, 6qQAM, 5 MHz, Port A

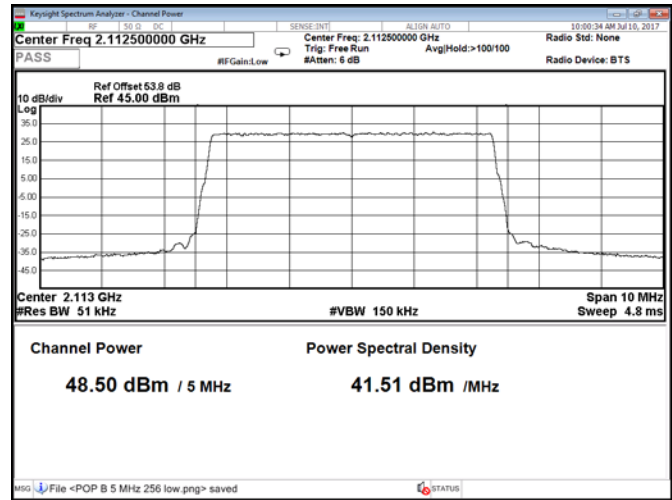


Figure 8.1-10: Output power at low channel, 256QAM, 5 MHz, Port A

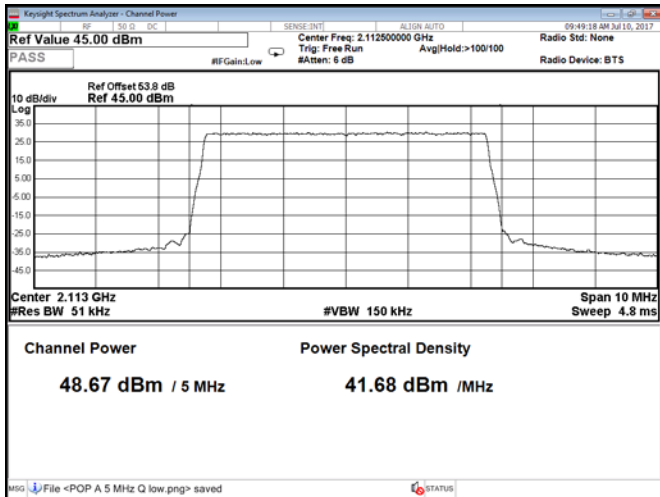


Figure 8.1-11: Output power at low channel, QPSK, 5 MHz, Port B

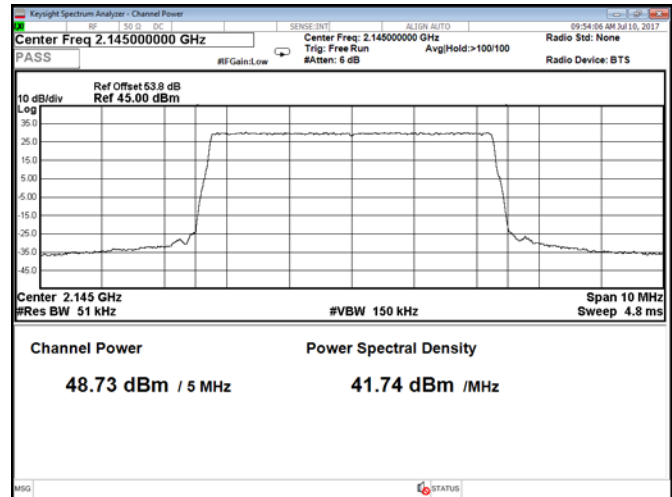


Figure 8.1-12: Output power at mid channel, QPSK, 5 MHz, Port B

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

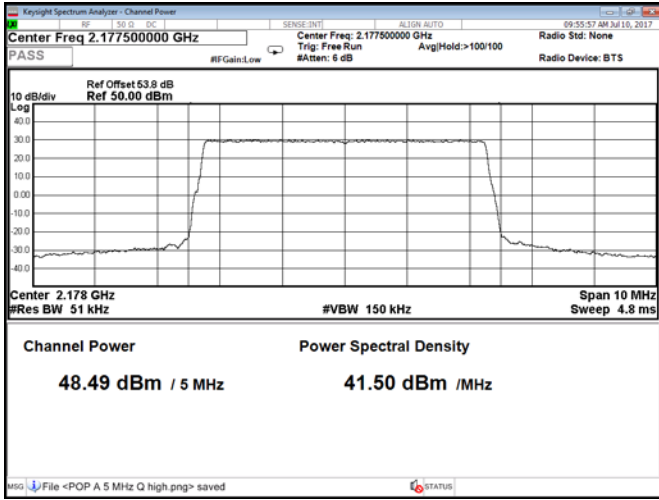


Figure 8.1-13: Output power at high channel, QPSK, 5 MHz, Port B

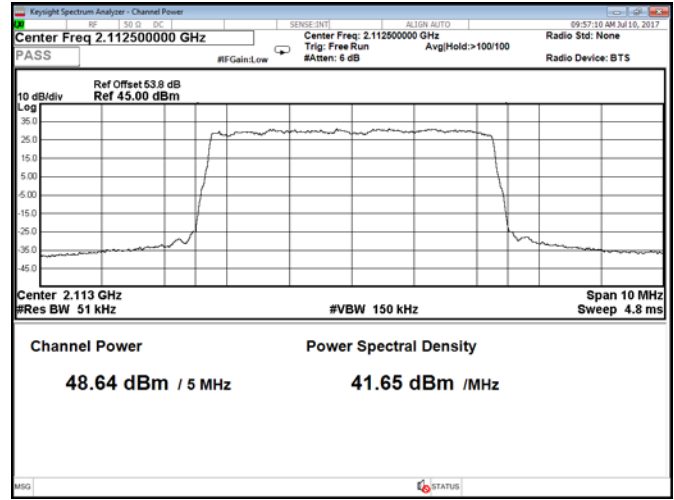


Figure 8.1-14: Output power at low channel, 16QAM, 5 MHz, Port B

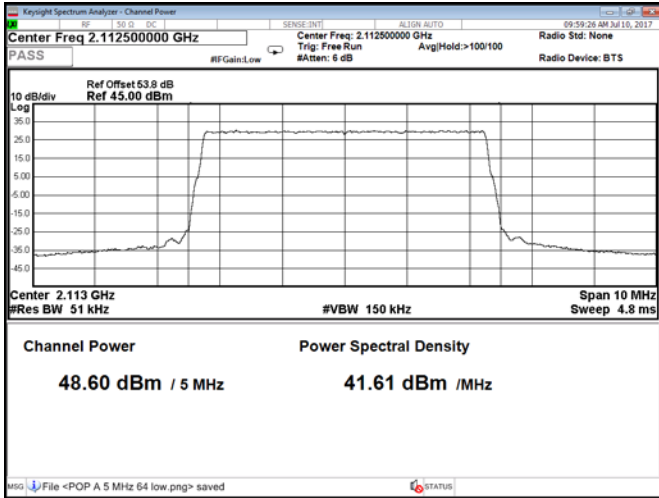


Figure 8.1-15: Output power at low channel, 64QAM, 5 MHz, Port B

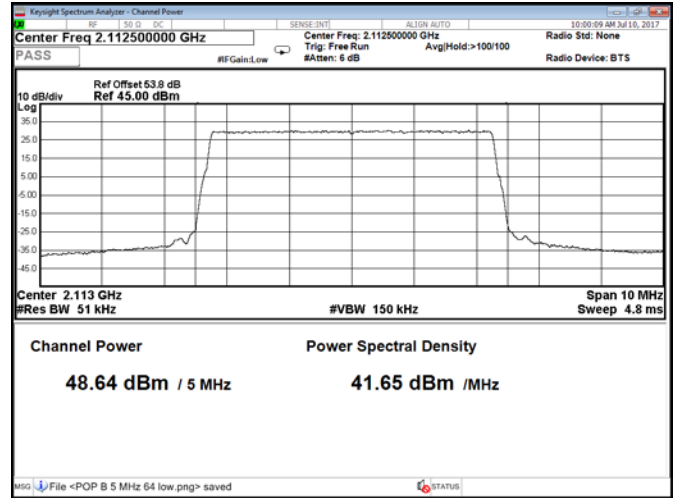


Figure 8.1-16: Output power at low channel, 256QAM, 5 MHz, Port B

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

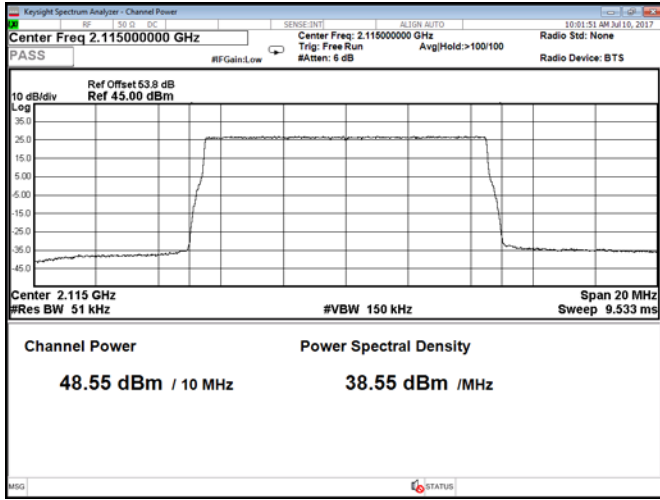


Figure 8.1-17: Output power at low channel, QPSK, 10 MHz, Port A

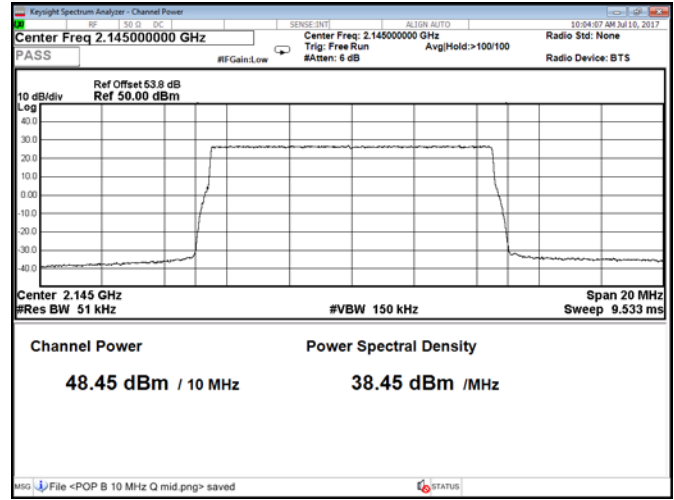


Figure 8.1-18: Output power at mid channel, QPSK, 10 MHz, Port A

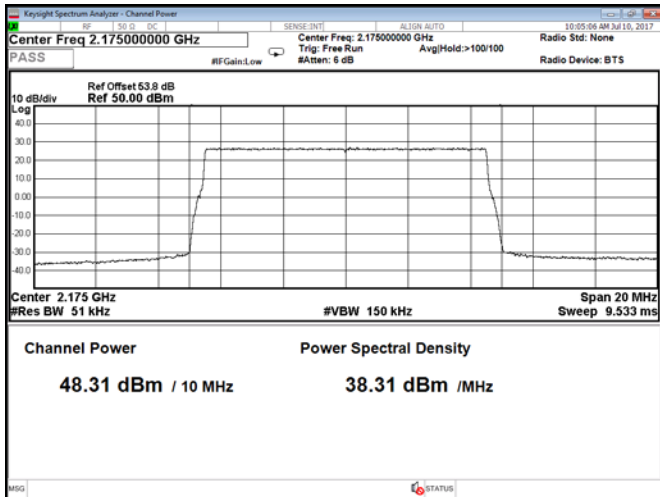


Figure 8.1-19: Output power at high channel, QPSK, 10 MHz, Port A

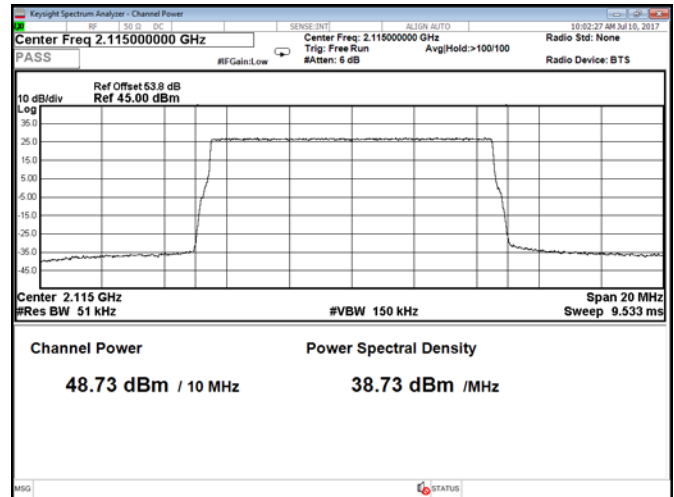


Figure 8.1-20: Output power at low channel, QPSK, 10 MHz, Port B

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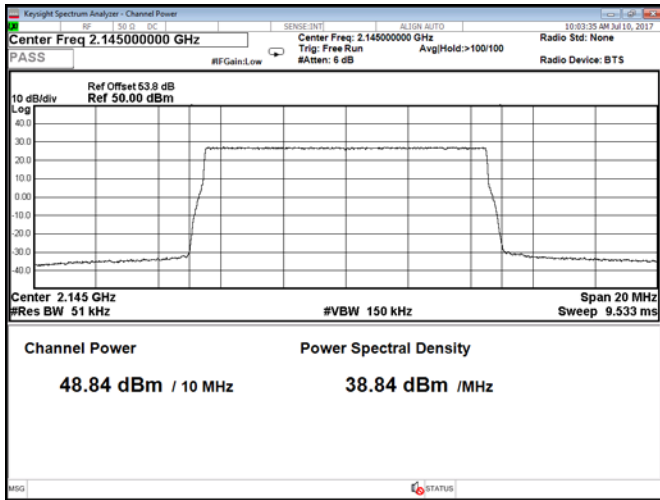


Figure 8.1-21: Output power at mid channel, QPSK, 10 MHz, Port B

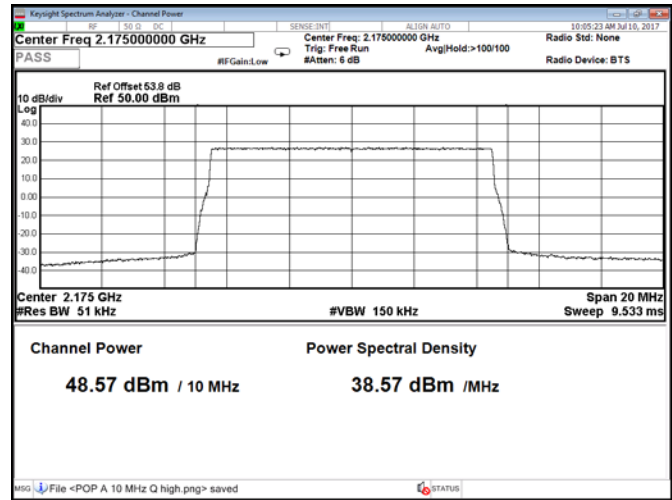


Figure 8.1-22: Output power at high channel, QPSK, 10 MHz, Port B

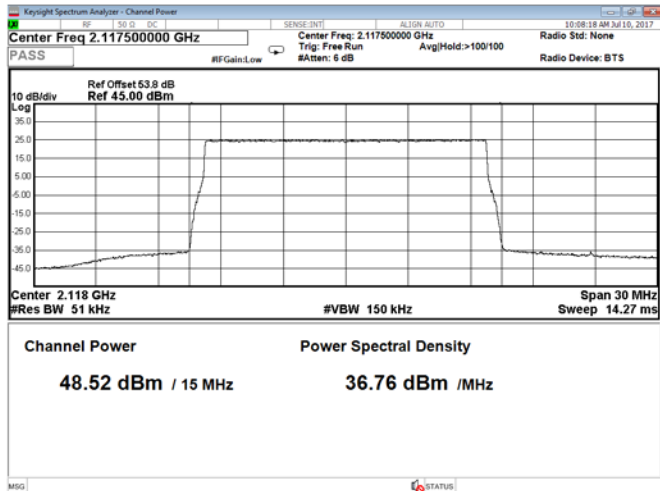


Figure 8.1-23: Output power at low channel, QPSK, 15 MHz, Port A

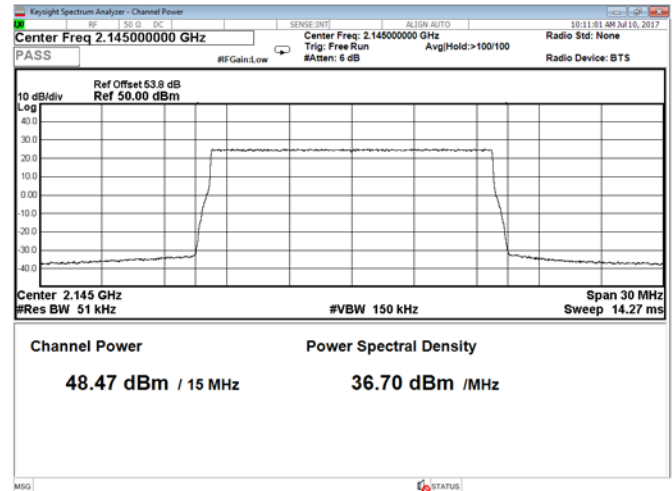


Figure 8.1-24: Output power at mid channel, QPSK, 15 MHz, Port A

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

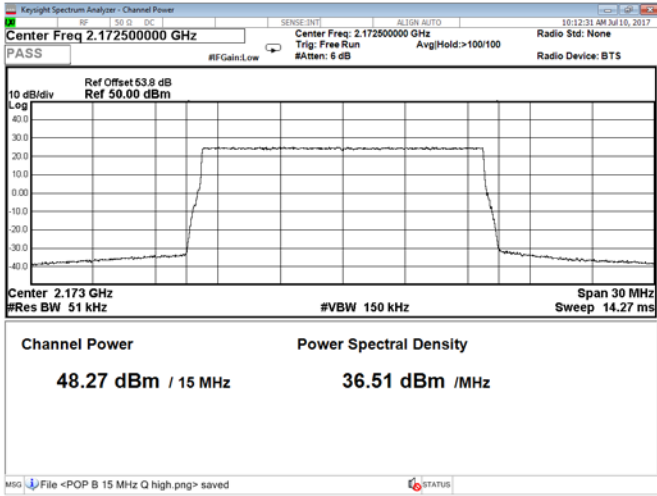


Figure 8.1-25: Output power at high channel, QPSK, 15 MHz, Port A

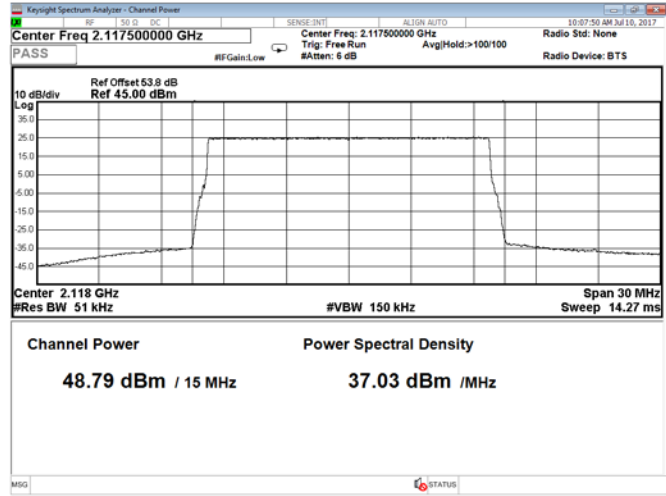


Figure 8.1-26: Output power at low channel, QPSK, 15 MHz, Port B

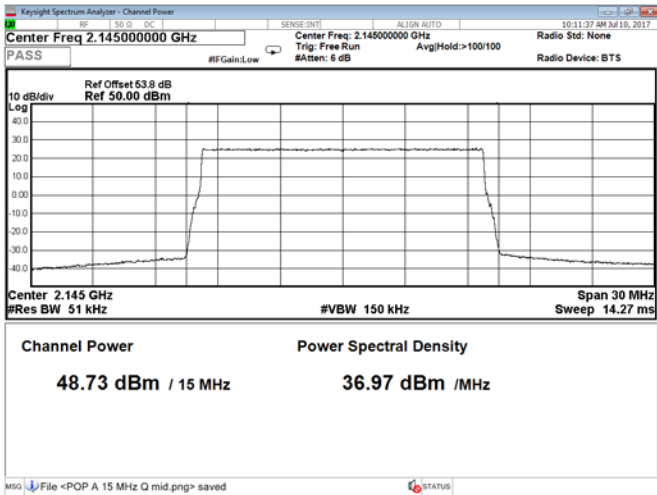


Figure 8.1-27: Output power at mid channel, QPSK, 15 MHz, Port B

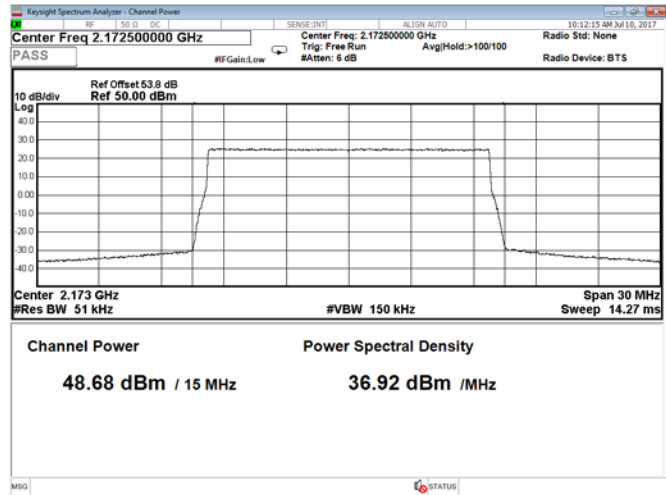


Figure 8.1-28: Output power at high channel, QPSK, 15 MHz, Port B

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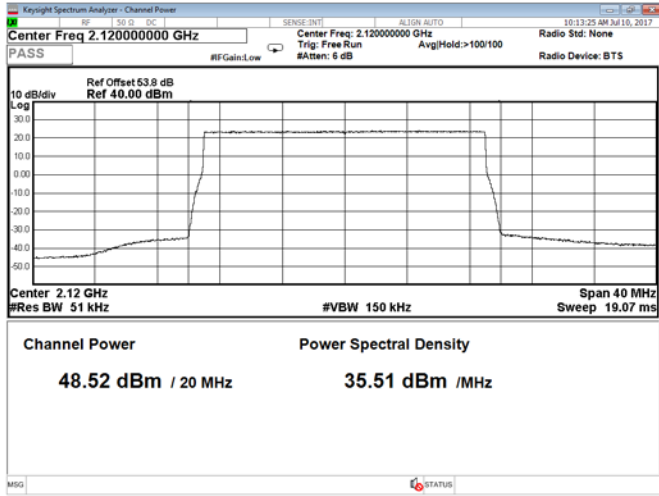


Figure 8.1-29: Output power at low channel, QPSK, 20 MHz, Port A

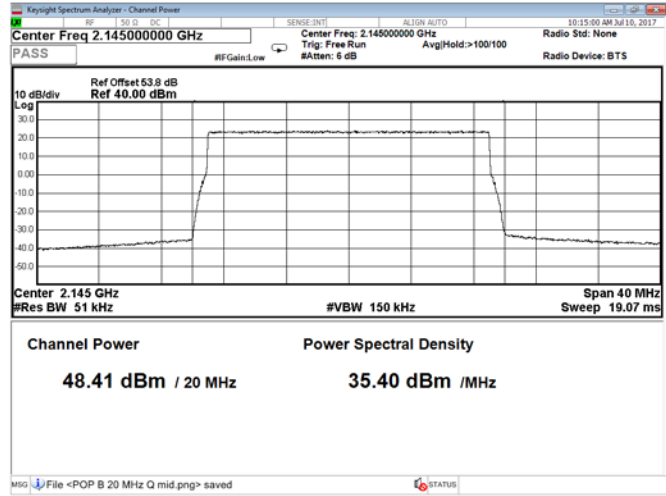


Figure 8.1-30: Output power at mid channel, QPSK, 20 MHz, Port A

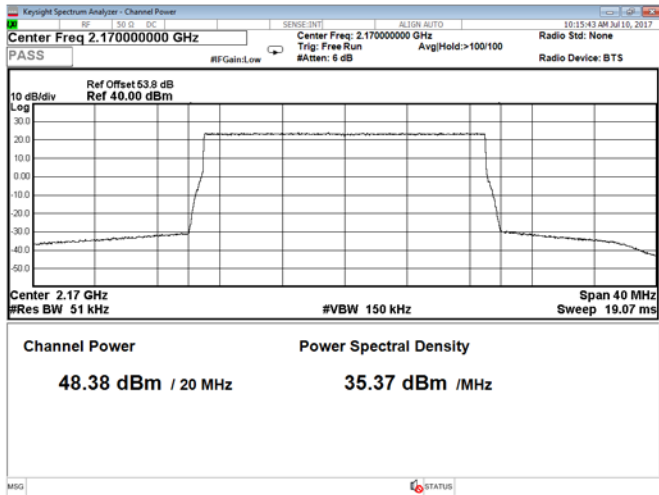


Figure 8.1-31: Output power at high channel, QPSK, 20 MHz, Port A

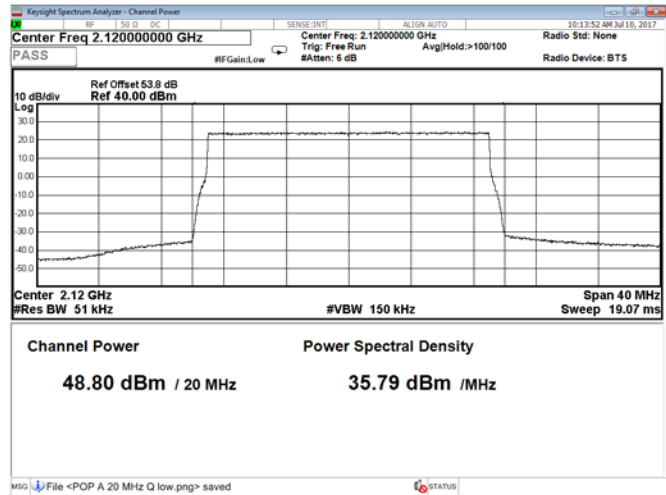


Figure 8.1-32: Output power at low channel, QPSK, 20 MHz, Port B

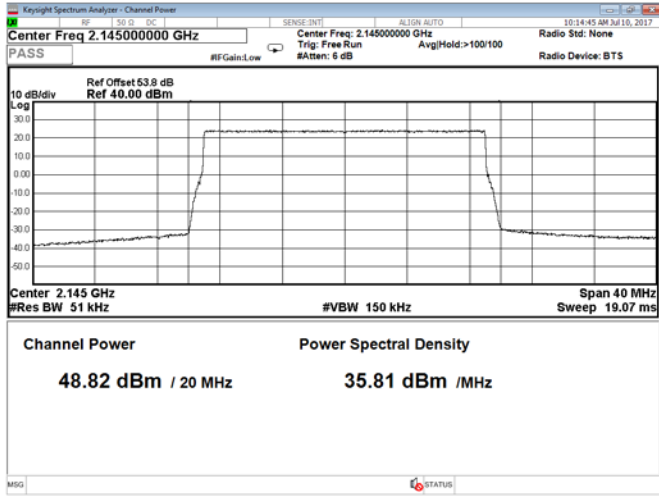


Figure 8.1-33: Output power at mid channel, QPSK, 20 MHz, Port B

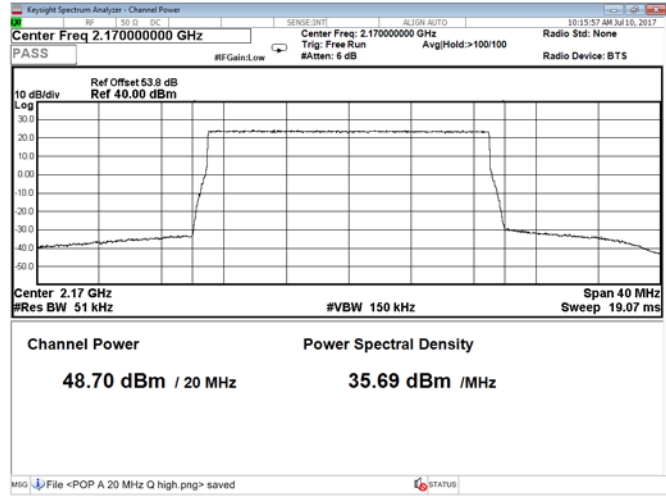


Figure 8.1-34: Output power at high channel, QPSK, 20 MHz, Port B

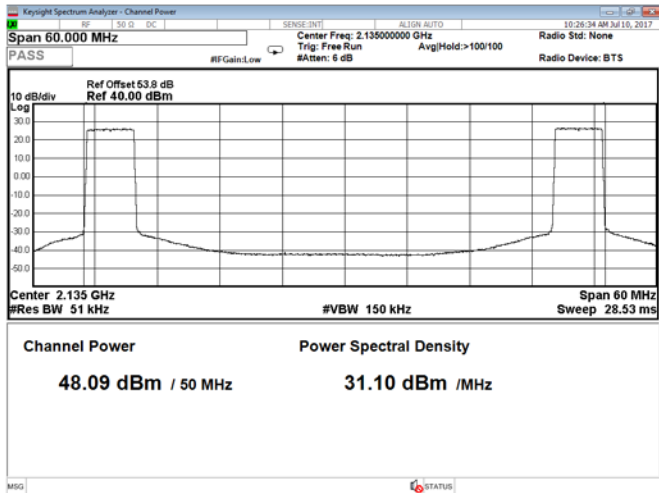


Figure 8.1-35: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, Port A, bottom range

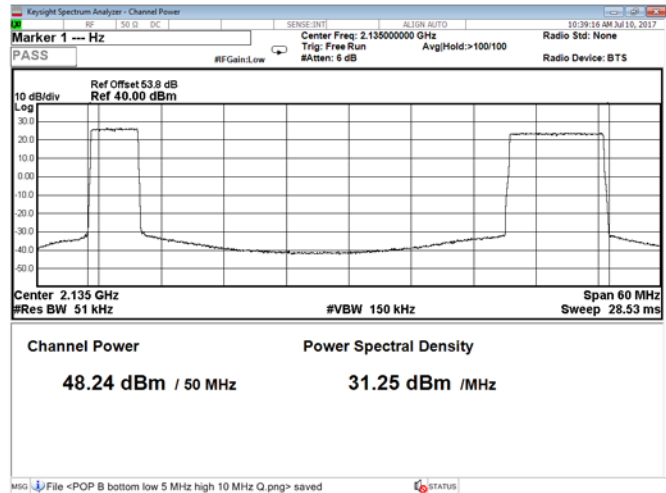


Figure 8.1-36: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 10 MHz, Port A, bottom range

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

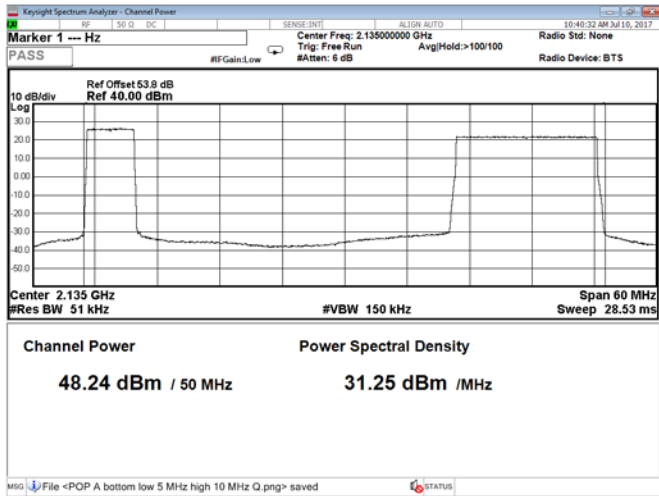


Figure 8.1-37: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 15 MHz, Port A, bottom range

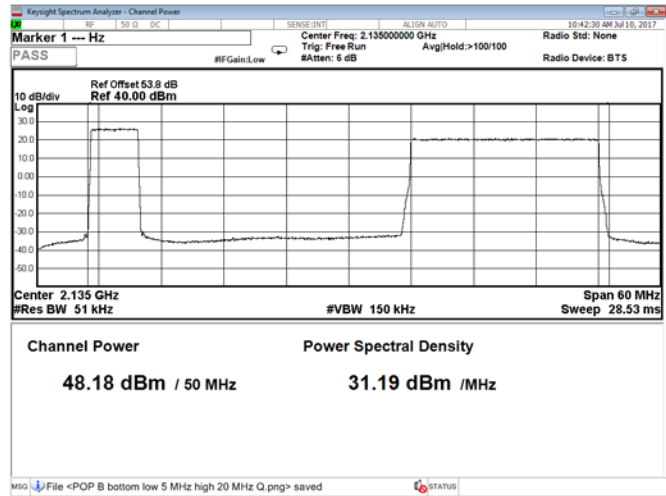


Figure 8.1-38: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 20 MHz, Port A, bottom range

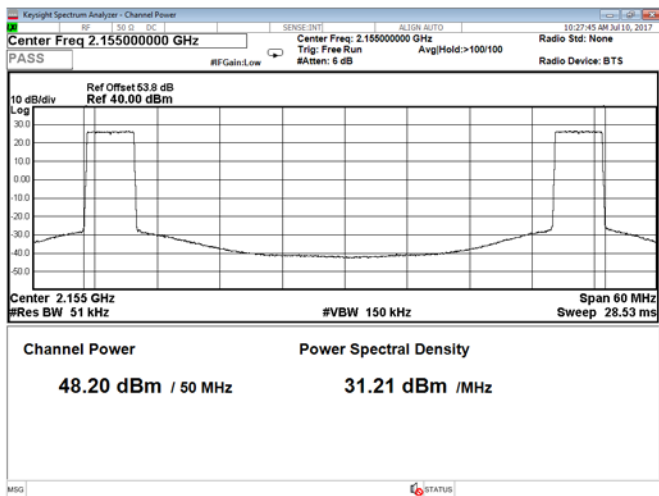


Figure 8.1-39: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, Port A, top range

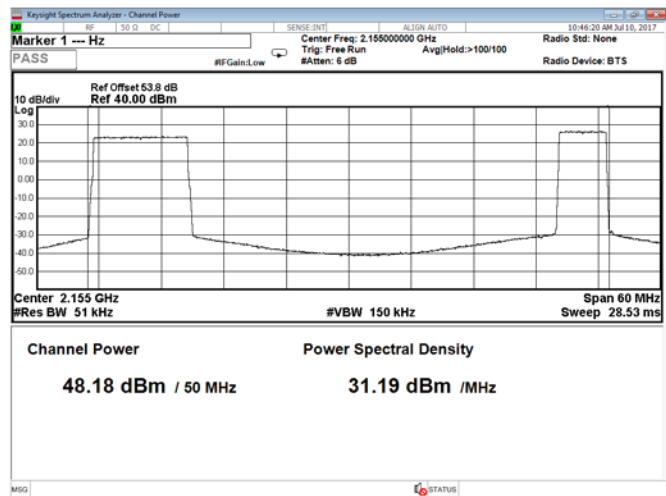


Figure 8.1-40: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 5 MHz, Port A, top range

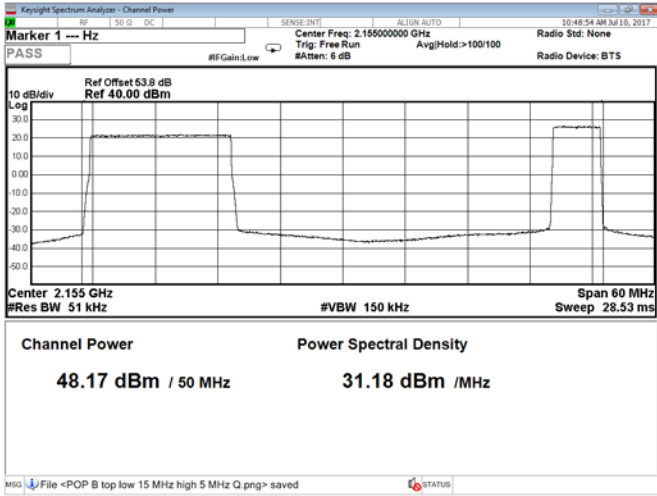


Figure 8.1-41: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 5 MHz, Port A, top range

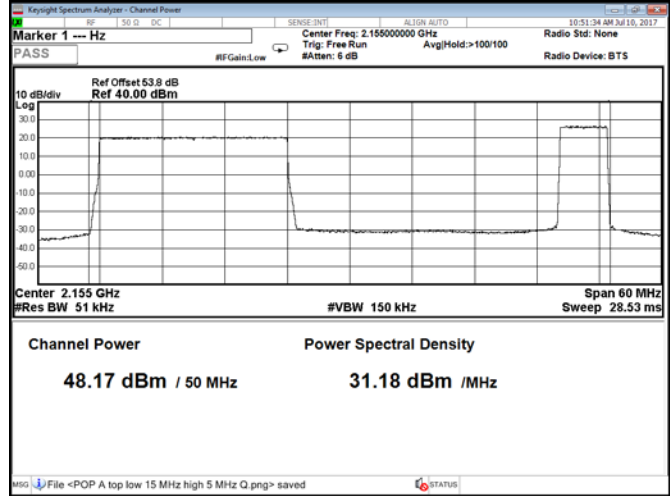


Figure 8.1-42: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 5 MHz, Port A, top range

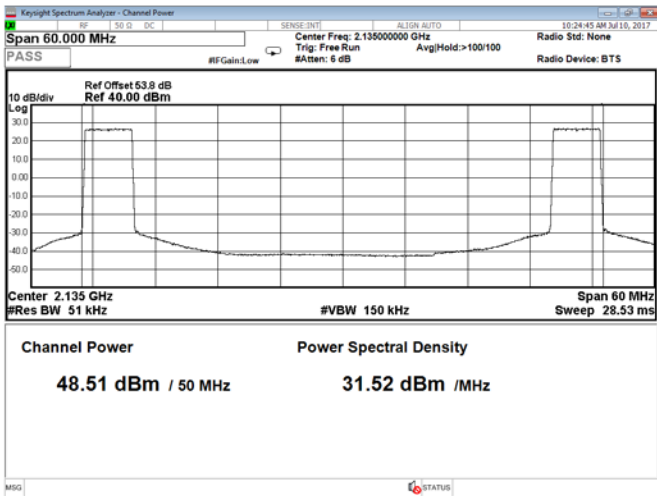


Figure 8.1-43: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, Port B, bottom range

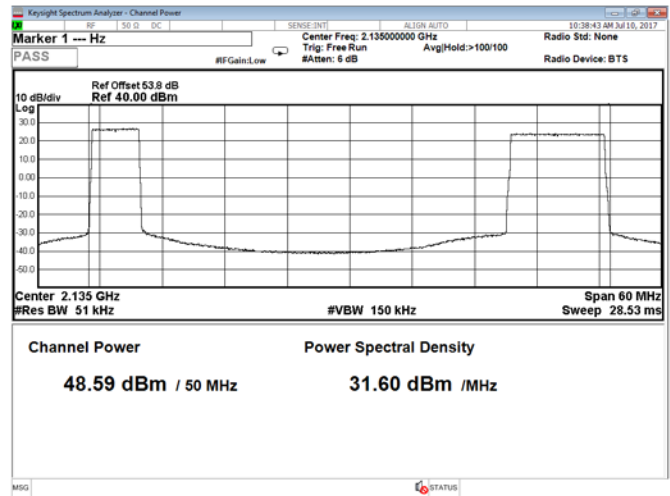


Figure 8.1-44: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 10 MHz, Port B, bottom range

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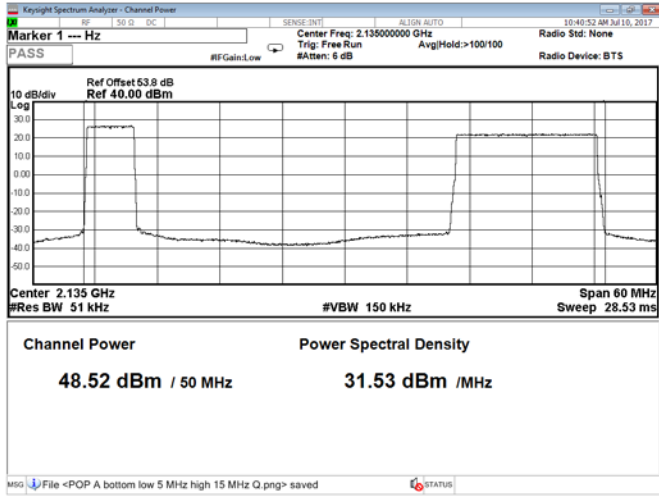


Figure 8.1-45: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 15 MHz, Port B, bottom range

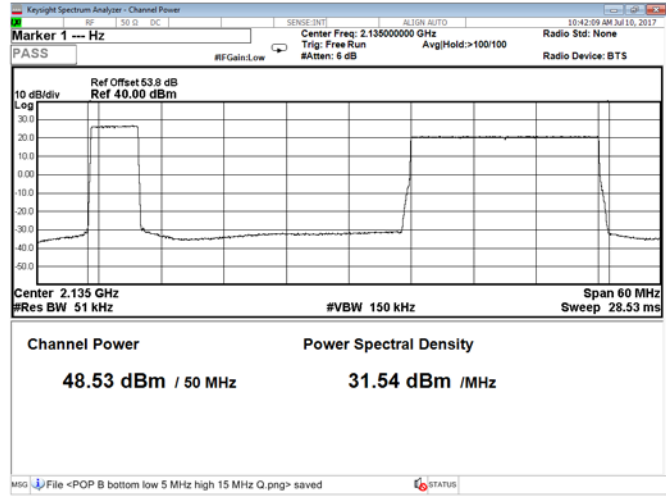


Figure 8.1-46: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 20 MHz, Port B, bottom range

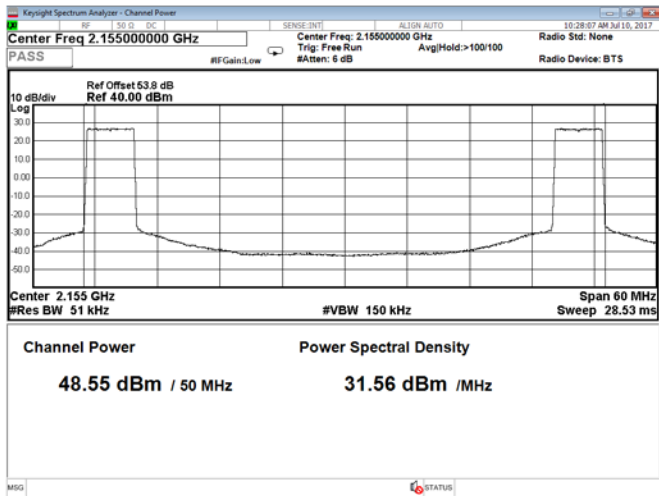


Figure 8.1-47: Output power 2 carriers, QPSK, carrier 1: 5 MHz, carrier 2: 5 MHz, Port B, top range

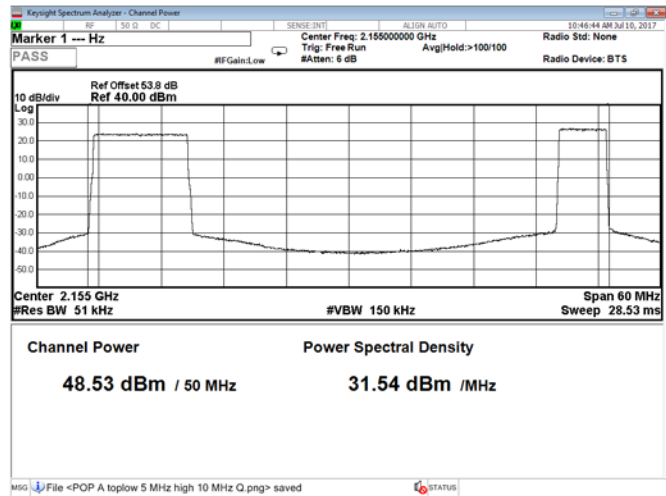


Figure 8.1-48: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 5 MHz, Port B, top range

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

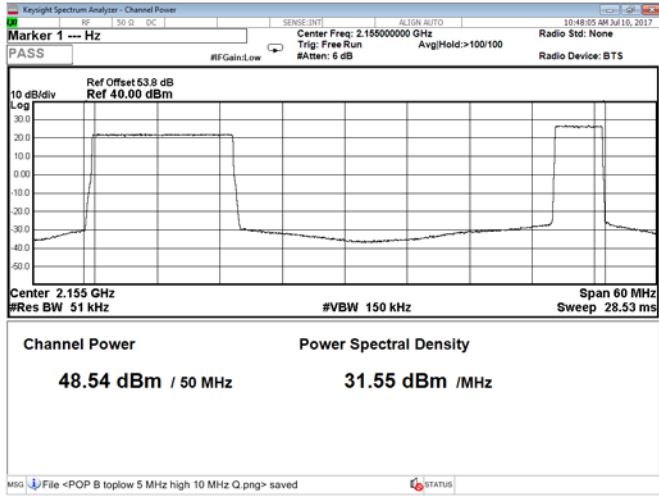


Figure 8.1-49: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 5 MHz, Port B, top range

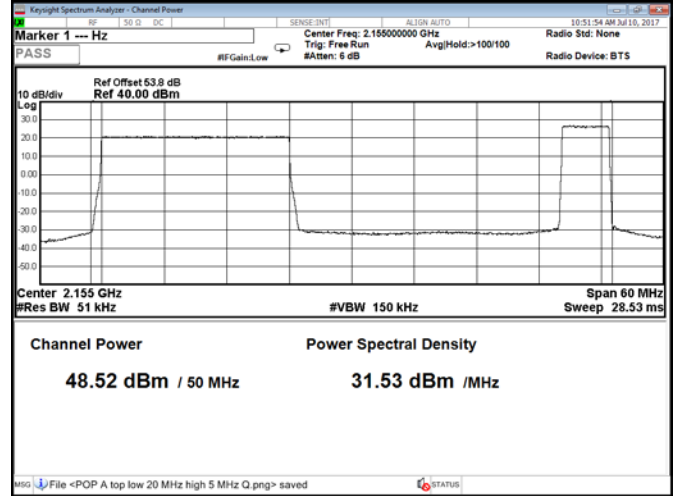


Figure 8.1-50: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 5 MHz, Port B, top range

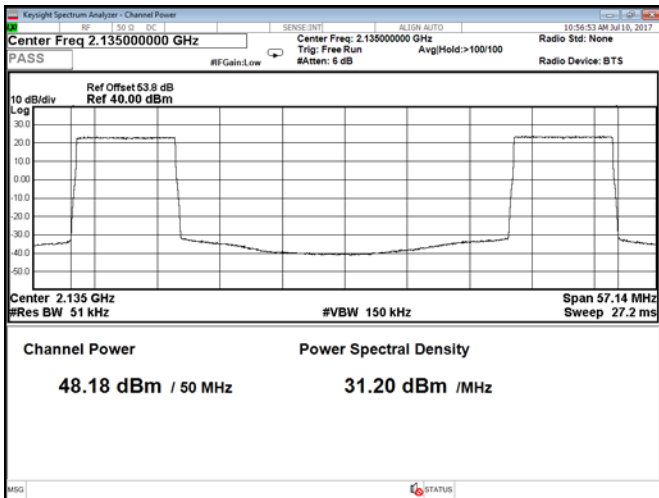


Figure 8.1-51: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 10 MHz, Port A, bottom range

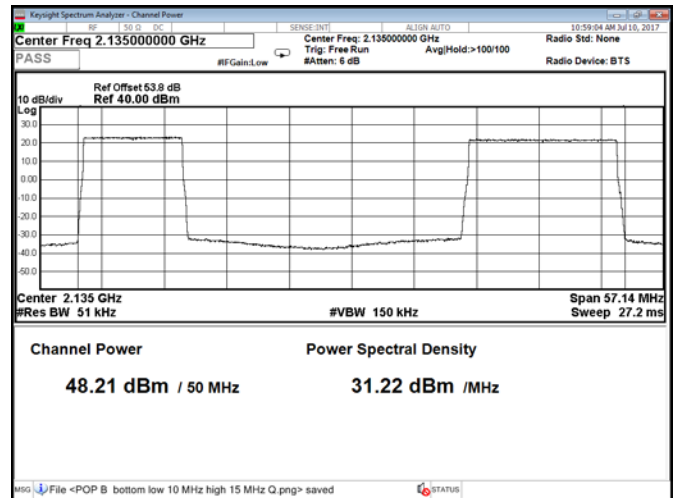


Figure 8.1-52: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 15 MHz, Port A, bottom range

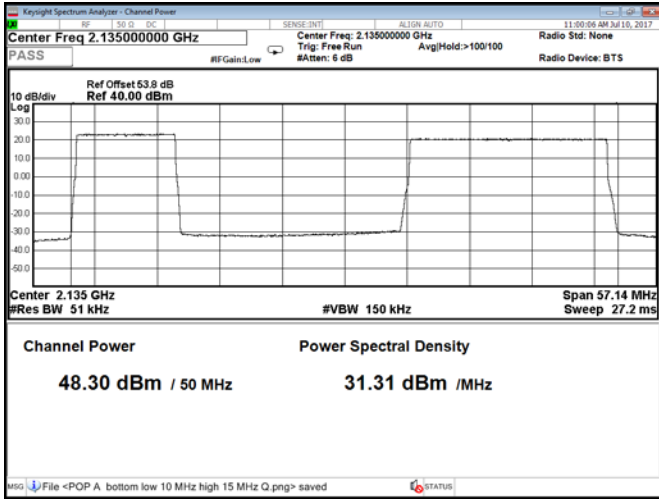


Figure 8.1-53: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 20 MHz, Port A, bottom range

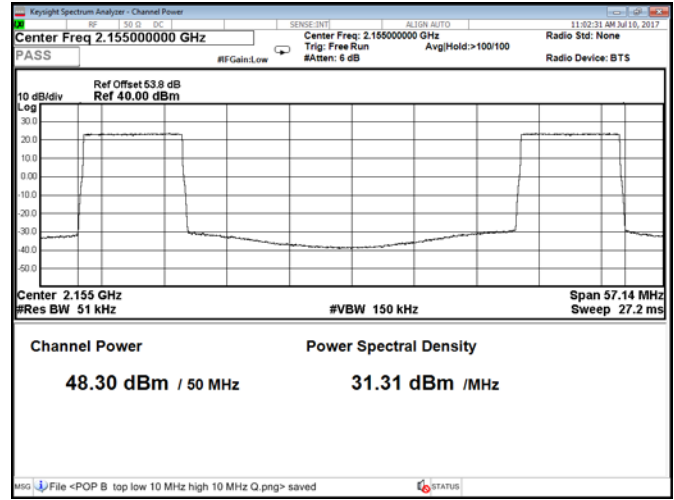


Figure 8.1-54: Output power 2 carriers, QPSK, carrier 1: 10 MHz, carrier 2: 10 MHz, Port A, top range

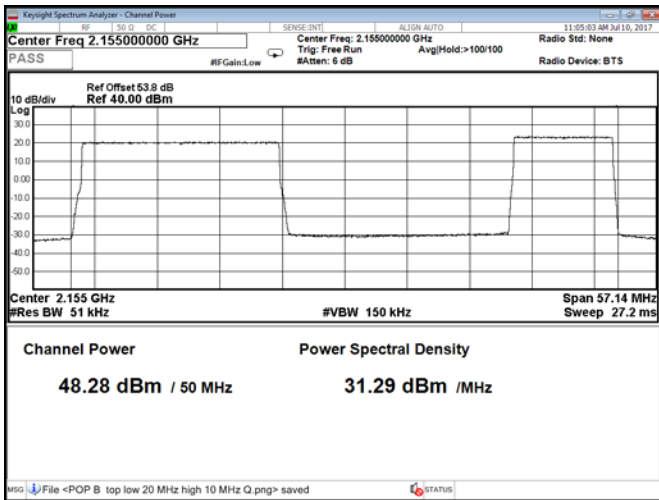


Figure 8.1-55: Output power 2 carriers, QPSK, carrier 1: 15 MHz, carrier 2: 10 MHz, Port A, top range

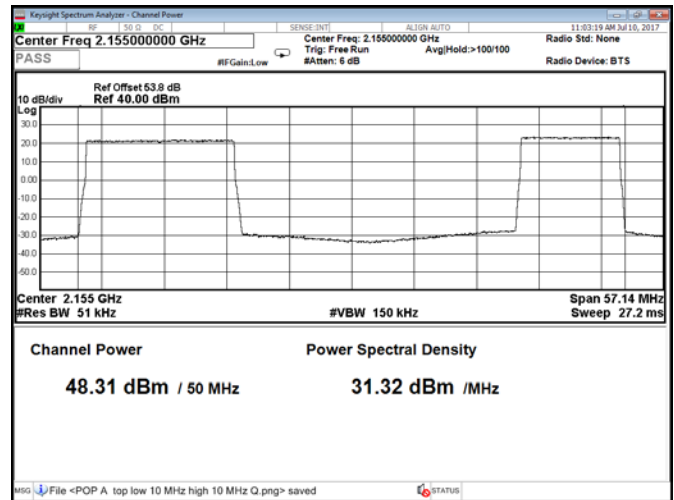


Figure 8.1-56: Output power 2 carriers, QPSK, carrier 1: 20 MHz, carrier 2: 10 MHz, Port A, top range