

Radio Test report – Radio 4449 B5 B13

341574-2TRFWL-R1

Applicant:

Ericsson Canada

Product:

Radio 4449

Model:

Radio 4449 B5 B13

Part number:

KRC 161 749/1

FCC ID:

TA8AKRC161749-1

Requirements/Summary:

Standard	Environmental phenomenon	Compliance
FCC 47 CFR Part 27	Miscellaneous wireless communications services	Yes
FCC 47 CFR Part 22	Public mobile services	Yes

Tested by: Andrey Adelberg, Senior EMC/Wireless Specialist

Reviewed by: Kevin Rose, Wireless/EMC Specialist

Date of issue: January 24, 2018

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 (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
FCC 47 CFR Part 27	Public mobile services

1.3 Test method

ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
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1.4 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 4449 B5 B13 with model numbers KRC 161 749/1.

This report is a C2PC report adding extra carrier BW's and MC configurations. Original report number 341574-1TRFWL-R1.

See "Summary of test results" for full details.

1.5 Exclusions

None

1.6 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	Reported
§27.53	Spurious emissions at RF antenna connector	Pass
§27.53	Radiated spurious emissions	Pass
§27.53(f)	Radiated spurious emissions within 1559–1610 MHz band	Pass
§27.54	Frequency stability	Not applicable
§2.1049	Occupied bandwidth	Pass

Notes: None

2.2 FCC Part 22 test results

Part	Test description	Verdict
§22.913	Effective radiated power limits	Reported
§22.917(a)	Emission limitations for cellular equipment	Pass
§22.917(b)	Emission bandwidth	Pass
§22.355	Frequency tolerance	Not applicable

Notes: None

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	January 4, 2018
Nemko sample ID number	None

3.2 EUT information

Product name	Radio 4449
Model	Radio 4449 B5 B13
Part number	KRC 161 749/1
Revision	R1C
Serial number	Radio: B440794218 EMC: B440835088
Antenna ports	4 TX/RX Ports
RF BW / IBW	B5: 25 MHz B13: 10 MHz
FDD	B5: 45 MHz B13: 31 MHz
B5 Frequency range	TX (DL): 869–894 MHz RX (UL): 824–849 MHz
B13 Frequency range	TX (DL): 746–756 MHz RX (UL): 777–787 MHz
Nominal O/P per antenna port	Config 1: B5: Single Carrier, Ports A through D: 1 × 40 W (46 dBm) Config 1: B13: Single Carrier, Ports A through D: 1 × 40 W (46 dBm) Config 2: B5: Single Carrier, Ports A and D: 1 × 60 W (47.78 dBm) Config 2: B13: Single Carrier, Ports A and D: 1 × 60 W (47.78 dBm) Config 3: B5: Single Carrier, Ports A through D: 1 × 40 W (46 dBm) Config 3: B13: Single Carrier, Ports A and D: 1 × 60 W (47.78 dBm)
Accuracy (nominal)	±0.1 ppm
Nominal voltage	2 × -48 V _{DC} @ 20 A
RAT	LTE: SC, MIMO
Modulation	LTE: QPSK, 16 QAM, 64 QAM, 256QAM
Channel bandwidth	LTE: 5 MHz, 10 MHz
Maximum combined OBW per port	B5: 25 MHz, B13: 10 MHz
CPRI	10 Gbps
Channel raster	LTE: 100 kHz
Regulatory requirements	Radio: FCC: Part 2, 22, 27, IC: RSS-130, RSS-132, RSS-Gen EMC: FCC Part 15, ICES-003 Safety: IEC/EN 62368-1, UL/CSA 62368-1 IEC/EN 60950-22, IEC/EN 60529, UL 50E
Emission Designator:	B5: 5M00W7D, 10M0W7D; B13: 5M00W7D, 10M0W7D
Supported Configuration	SC, MC, Single Antenna, TX Diversity, MIMO, Carrier Aggregation
Operating temperature	-40 °C to +55 °C
Total Power based on IBW	Config 1: 4 × 40 W (B5) + 4 × 40 W (B13) 80 W/Port (A,B,C,D) Config 2: 2 × 60 W (B5) + 2 × 60 W (B13) 120 W/Port (A,D)
Supported carrier / port	LTE BW, B5: 5 (1-3), 10 (1-2); LTE BW, B13: 5 (2), 10 (1)
Optional Fan Tray	N/A

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 4449 B5 B13 (KRC 161 749/1) is a multi-standard remote radio forming part of the Ericsson RBS (Radio Base Station) equipment. The Radio 4449 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 4449 product is convection cooled and shall be mounted vertically Horizontal mounting is not supported on this product. Output RF Power is rated at 4 × 80 W (config 1) and 2 × 120 W (config 2). 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>ANT C</td><td>RF Out C</td></tr><tr><td>ANT D</td><td>RF Out D</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>2 × −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	ANT C	RF Out C	ANT D	RF Out D	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	2 × −48 V _{DC}	MMI	Display - Radio Status	GND	Ground																															
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Software details	CXP9013268/15-R69AJ11																																																											
Radio 2212 B13 (R1C) Hardware Configuration	<table><tr><th>Product: KRC 161 749/1</th><th>Revision</th><th>Description</th><th></th><th></th></tr><tr><td>KRF 901 349/1</td><td></td><td>FU</td><td></td><td></td></tr><tr><td>ROA 128 6579/1</td><td>R1A</td><td>AIB</td><td></td><td></td></tr><tr><td>ROA 128 6611/49</td><td>P1A</td><td>AIB SW</td><td></td><td></td></tr><tr><td>NTB 101 0202/1</td><td>P1B</td><td>Parts</td><td></td><td></td></tr><tr><td>KRY 901 400/491</td><td>R1A</td><td>Radio B5</td><td></td><td></td></tr><tr><td>ROA 128 6610/491</td><td>R1A</td><td>Radio Board B5</td><td></td><td></td></tr><tr><td>NTB 101 171/491</td><td>P1C</td><td>Parts B5</td><td></td><td></td></tr><tr><td>KRY 901 400/492</td><td>R1A</td><td>Radio B13</td><td></td><td></td></tr><tr><td>ROA 128 6610/492</td><td>R1A</td><td>Radio Board B13</td><td></td><td></td></tr><tr><td>NTB 101 171/492</td><td>P1C</td><td>Parts B13</td><td></td><td></td></tr></table>					Product: KRC 161 749/1	Revision	Description			KRF 901 349/1		FU			ROA 128 6579/1	R1A	AIB			ROA 128 6611/49	P1A	AIB SW			NTB 101 0202/1	P1B	Parts			KRY 901 400/491	R1A	Radio B5			ROA 128 6610/491	R1A	Radio Board B5			NTB 101 171/491	P1C	Parts B5			KRY 901 400/492	R1A	Radio B13			ROA 128 6610/492	R1A	Radio Board B13			NTB 101 171/492	P1C	Parts B13		
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Product Identification Label KRC 161 749/1	(1P)KRY 901 400/491 (S)8440794218 (21P)R1C 20171201 ACCESSORIES Made in Estonia (1P)KRC 161 749/1 (S)8440835088 (21P)R1C/A 20171211 Radio 4449 B5 B13 Made in Estonia																																																											
Legal Overlay / Label	FCC ID: TA8AKRC161749-1 IC: 287AB-AS1617491 AS1617491 ETL LISTED INFORMATION TECHNOLOGY EQUIPMENT Intertek Control number 113813 This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation. CAN ICES-3 (B)/NMB-3(B) IP65/Type 3 Enclosure Ericsson AB 164 80 Stockholm, Sweden http://tracy.ericsson.net/contact																																																											

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 B13

Bandwidth, MHz	Transmit / DL, MHz					
	B	EARFCN	M	EARFCN	T	EARFCN
5	748.5	5205	751.0	5230	753.5	5255
10	751.0	5230	751.0	5230	751.0	5230
Bandwidth, MHz	Receive / UL, MHz					
	B	EARFCN	M	EARFCN	T	EARFCN
5	778.5	23195	781.0	23220	783.5	23245
10	782.0	23230	782.0	23230	782.0	23230

Single carrier B5

Bandwidth, MHz	Transmit / DL, MHz					
	B	EARFCN	M	EARFCN	T	EARFCN
5	871.5	2425	881.5	2525	891.5	2625
10	874.0	2450	881.5	2525	889.0	2600
Bandwidth, MHz	Receive / UL, MHz					
	B	EARFCN	M	EARFCN	T	EARFCN
5	826.5	20425	836.5	20525	846.5	20625
10	829.0	20450	836.5	20525	844.0	20600

Multi-Carrier B5

Bandwidth, MHz	Transmit / DL, MHz											
	B1	EARFCN	B2	EARFCN	M1	EARFCN	M2	EARFCN	T1	EARFCN	T2	EARFCN
5	871.5	2425	876.5	2475	871.5	2425	891.5	2625	886.5	2575	891.5	2625
10	874.0	2450	884.0	2550	874.0	2450	889.0	2600	879.0	2500	889.0	2600
Bandwidth, MHz	Receive / UL, MHz											
	B1	EARFCN	B2	EARFCN	M1	EARFCN	M2	EARFCN	T1	EARFCN	T2	EARFCN
5	826.5	20425	831.5	20475	826.5	20425	846.5	20625	841.5	20575	846.5	20625
10	829.0	20450	839.0	20550	829.0	20450	844.0	20600	834.0	20500	844.0	20600

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 - RBS 6601, BFM 901 009/1: - DUS 4101 KDU 137 624/1, R7B, S/N: CD3B327591 - DUS SW: CXP102051/25-R26DM - Input Voltage: -48 V_{DC}
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3.5 EUT setup diagram

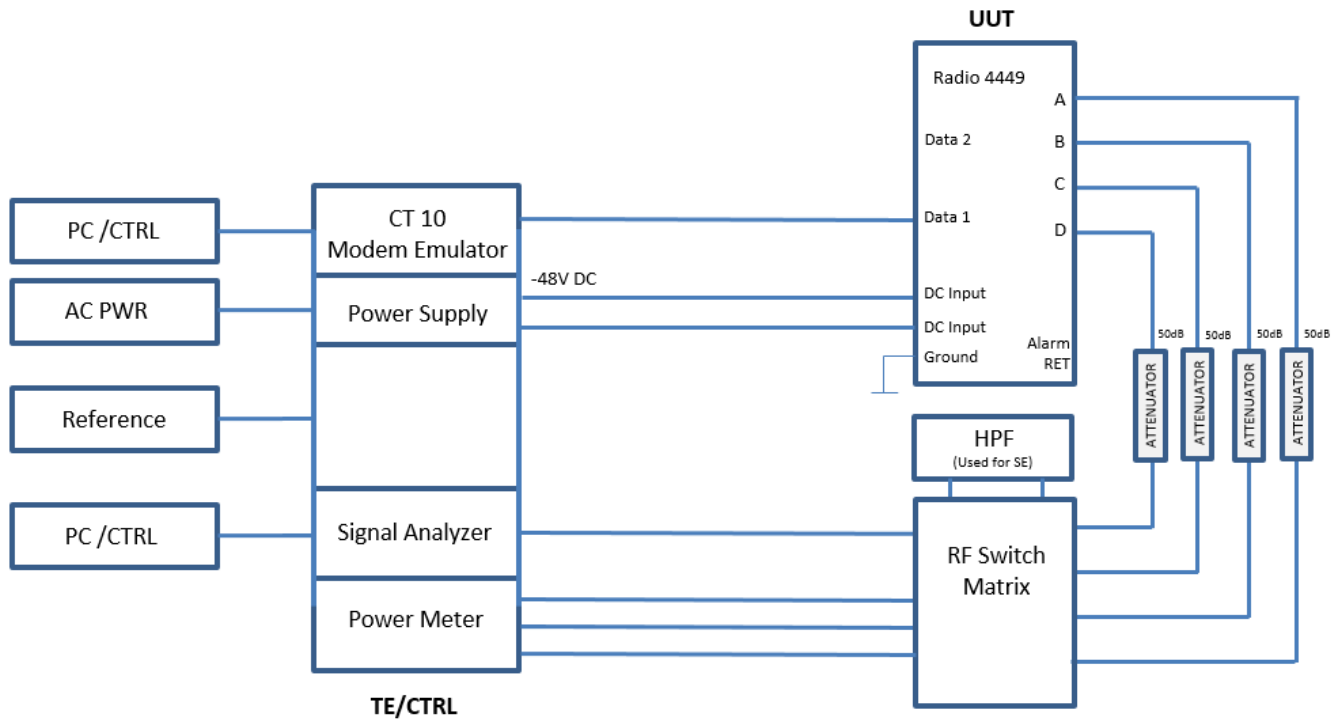


Figure 3.5-1: Setup diagram, conducted

3.6 Setup photographs

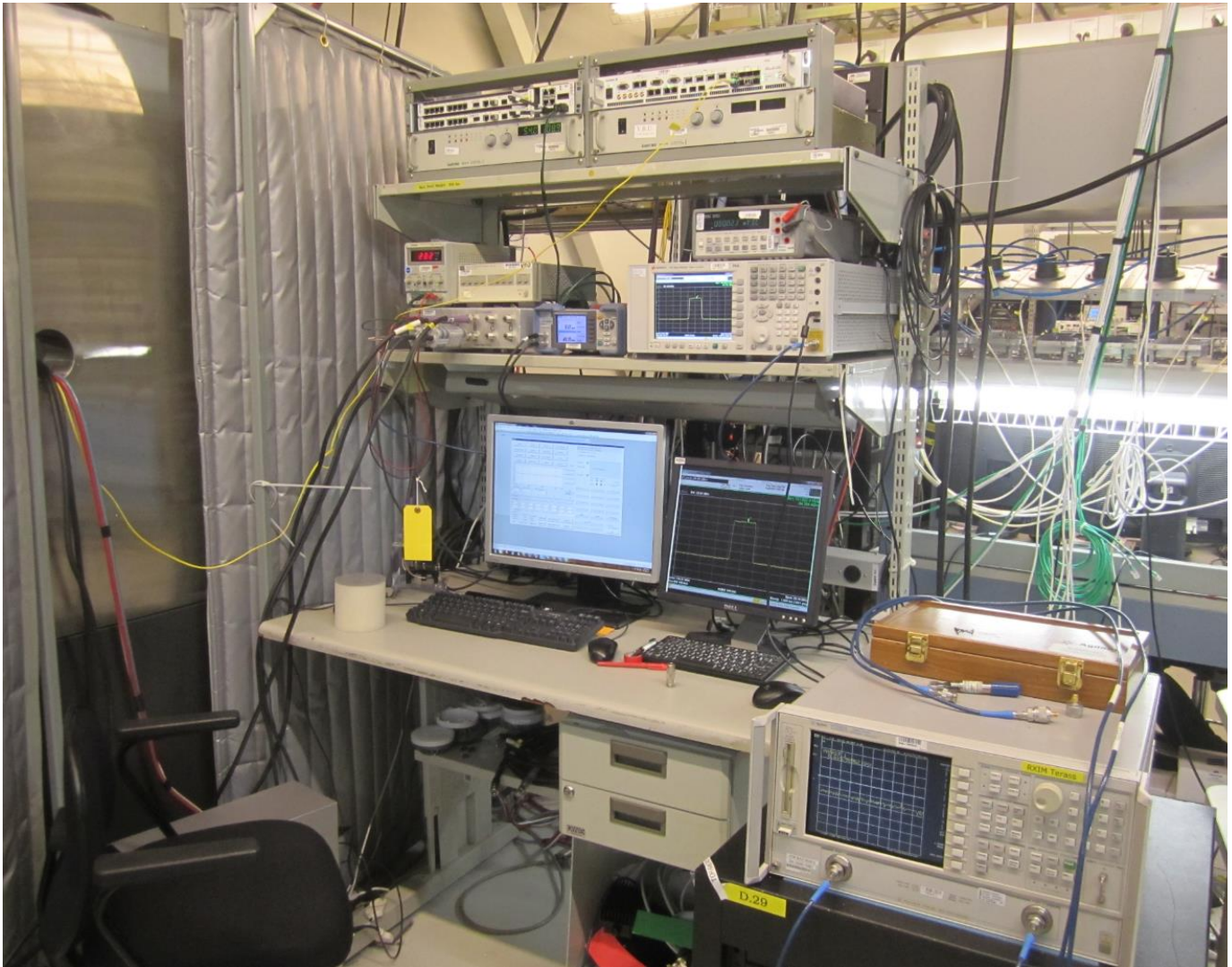


Figure 3.6-1: Test / Measurement Equipment - Set up for Radio Compliance Testing



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

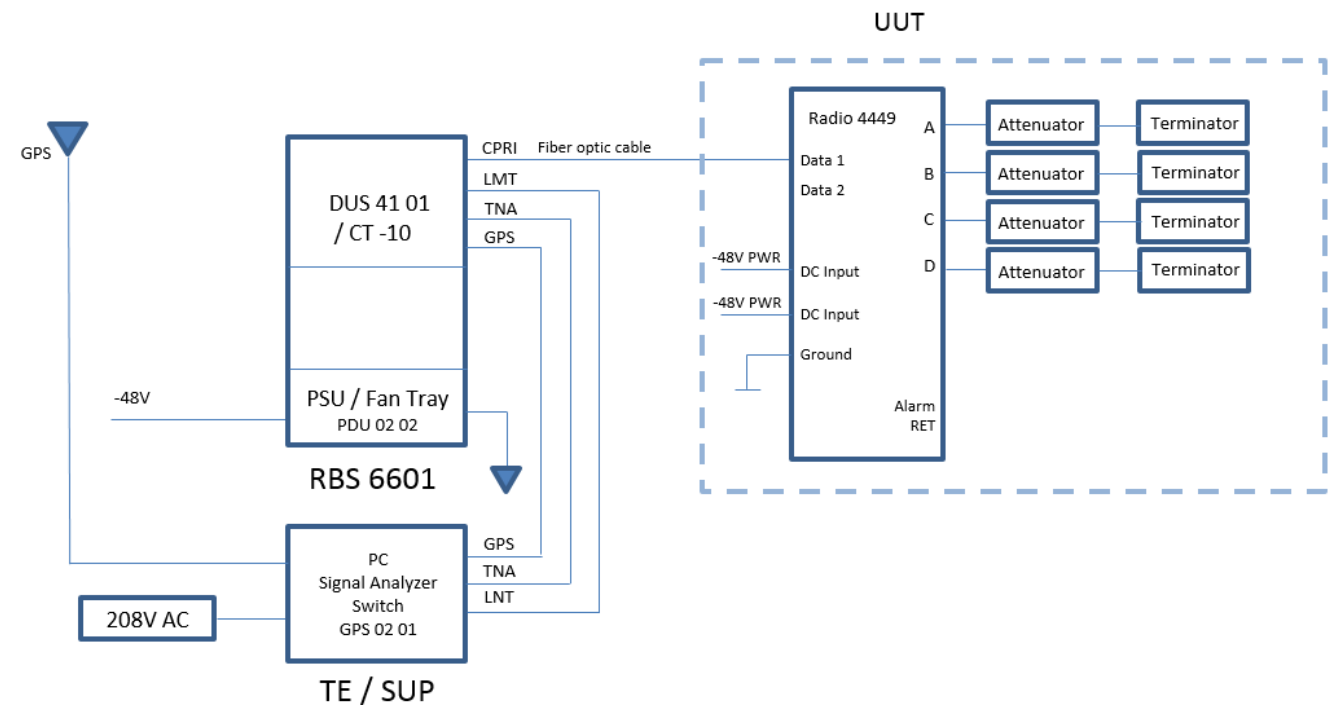


Figure 3.6-3: EUT Set-up diagram for Radiated Compliance Testing



Figure 3.6-4: 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

This report is a C2PC to demonstrate additional compliance with respect to the initial Nemko Test Report Number: 341574-1TRFWL-R1.

This C2PC demonstrates compliance for the following inclusions:

- addition of 5 MHz channel to Band 13
- addition of 10 MHz channel to Band 5
- enabling two-carrier operation for Band 13
- enabling two-carrier operation for Band 5
- enabling three-carrier operation for Band 5

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	Apr. 30/18
Spectrum Analyzer	Keysight	PXA N9030A	MY55410202	1-year	Sep. 30/18
Network Analyzer	Agilent	8722ES	US39175389	1-year	May 31/18
Power Meter	Rohde & Schwarz	NRP2	1144.1374K02-101123-ea	NCR	NCR
Power Sensor	Rohde & Schwarz	NRP-Z51	1138.0005.02-102838-bR	2-year	Aug. 23/18
Power Sensor	Rohde & Schwarz	NRP-Z51	1138.0005.02.102476-Fg	2-year	May 11/19
Power Sensor	Rohde & Schwarz	NRP-8S	1419.0006K02-101657-As	2-year	Feb. 11/18
Power Sensor	Rohde & Schwarz	NRP-8S	1419.0006K02-101651-Cw	2-year	Feb. 10/18
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 (10dB)	Weinschel	WA-48-10-43-LIM	A1993	NCR	NCR
Attenuator (10dB)	Weinschel	WA-48-10-43-LIM	A1992	NCR	NCR
Attenuator (30dB)	Weinschel	WA-48-30-33-LIM	A1998	NCR	NCR
Attenuator (30dB)	Weinschel	WA-48-30-33-LIM	A1995	NCR	NCR
Attenuator (30dB)	Weinschel	WA-48-30-33-LIM	A1997	NCR	NCR
Attenuator (30dB)	Weinschel	48-30-43	BJ6051	NCR	NCR
Attenuator	MCE/Weinschel	57-40-43	MX198	NCR	NCR
RF Switch	Ericsson	RARFSW4X1	1	NCR	NCR
Switch Driver	Hewlett Packard	11713A	3748A06076	NCR	NCR
PSU (DC)	Leader	730-3D	9801135	NCR	NCR
CT10	Ericsson	Testing Equipment	T01F311639	NCR	NCR
Thermometer	Fluke	52 K/J Thermocouple	4815167	1-year	Sep 13/18
3 m EMI test chamber	TDK	SAC-3	FA002047	1-year	Dec. 09/18
Flush mount turntable	Sunol	FM2022	FA002082	NCR	NCR
Controller	Sunol	SC104V	FA002060	NCR	NCR
Antenna mast	Sunol	TLT2	FA002061	NCR	NCR
AC Power source	Chenwa	2700M-10k	FA002716	NCR	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1-year	Jan. 31/18
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1-year	Jun. 27/18
Horn antenna (1–18 GHz)	EMCO	3115	FA000825	1-year	Jun. 21/18
Preamp (1–18 GHz)	ETS-Lindgren	124334	FA002877	1-year	Nov. 14/18

Note: NCR - no calibration required

Section 8. Testing data

8.1 FCC 27.50(b) Maximum output power at RF antenna connector

8.1.1 Definitions and limits

- (1) Fixed and base stations transmitting a signal in the 757–758 and 775–776 MHz bands must not exceed an effective radiated power (ERP) of 1000 watts and an antenna height of 305 m height above average terrain (HAAT), except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts ERP in accordance with Table 1 of this section.
- (4) Fixed and base stations transmitting a signal in the 746–757 MHz, 758–763 MHz, 776–787 MHz, and 788–793 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP accordance with Table 3 of this section.
- (11) For transmissions in the 757–758, 775–776, 787–788, and 805–806 MHz bands, maximum composite transmit power shall be measured over any interval of continuous transmission using instrumentation calibrated in terms of 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, etc., so as to obtain a true maximum composite measurement for the emission in question over the full bandwidth of the channel.
- (12) For transmissions in the 746–757, 758–763, 776–787, and 788–793 MHz bands, licensees may employ equipment operating in compliance with either the measurement techniques described in paragraph (b)(11) of this section or a Commission-approved average power technique. In both instances, equipment employed must be authorized in accordance with the provisions of §27.51

8.1.2 Test summary

Test date	January 4, 2018
Test engineer	Andrey Adelberg
Verdict	Pass

8.1.3 Observations, settings and special notes

Based on the maximum RF power listed in this report, considerations pertaining to the maximum allowed EIRP (or ERP) and antenna type should be considered for each installation.

Measurements were performed for SC and MC configurations using an RMS power meter. Measurements were recorded per Band as follows:
Configuration 1: Port A with 40 W power, Port B with 40 W power, Port C with 40 W power, Port D with 40 W power.
Configuration 2: Port A with 60 W power, Port D with 60 W power.

8.1.4 Test data

Table 8.1-1: Output power and power spectral density measurement results for SISO operation (Configuration 1, B13, 5 MHz channel)

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF power density, dBm/MHz
Antenna A, QPSK, low channel	748.5	41.687	46.20	40.62
Antenna B, QPSK, low channel	748.5	39.084	45.92	40.89
Antenna C, QPSK, low channel	748.5	40.365	46.06	40.58
Antenna D, QPSK, low channel	748.5	38.459	45.85	40.73
Antenna A, 16QAM, low channel	748.5	41.591	46.19	40.88
Antenna B, 16QAM, low channel	748.5	39.355	45.95	41.17
Antenna C, 16QAM, low channel	748.5	40.272	46.05	40.80
Antenna D, 16QAM, low channel	748.5	38.548	45.86	40.95
Antenna A, 64QAM, low channel	748.5	41.687	46.20	40.44
Antenna B, 64QAM, low channel	748.5	39.084	45.92	40.90
Antenna C, 64QAM, low channel	748.5	40.551	46.08	40.41
Antenna D, 64QAM, low channel	748.5	38.726	45.88	40.79
Antenna A, 256QAM, low channel	748.5	41.400	46.17	40.71
Antenna B, 256QAM, low channel	748.5	39.355	45.95	40.72
Antenna C, 256QAM, low channel	748.5	40.644	46.09	40.59
Antenna D, 256QAM, low channel	748.5	37.757	45.77	40.69
Antenna A, QPSK, high channel	753.5	40.644	46.09	40.45
Antenna B, QPSK, high channel	753.5	39.902	46.01	40.86
Antenna C, QPSK, high channel	753.5	38.019	45.80	40.37
Antenna D, QPSK, high channel	753.5	38.637	45.87	40.91

Table 8.1-2: Output power measurement results for MIMO operation (Configuration 1, B13, 5 MHz channel)

Remarks	Frequency, MHz	RF output power port A, dBm	RF output power port B, dBm	RF output power port C, dBm	RF output power port D, dBm	Total output power, dBm
QPSK, low channel	748.5	46.20	45.92	46.06	45.85	52.03
16QAM, low channel	748.5	46.19	45.95	46.05	45.86	52.03
64QAM, low channel	748.5	46.20	45.92	46.08	45.88	52.04
256QAM, low channel	748.5	46.17	45.95	46.09	45.77	52.02
QPSK, high channel	753.5	46.09	46.01	45.80	45.87	51.96

Table 8.1-3: Power spectral density measurement results for MIMO operation (Configuration 1, B13, 5 MHz channel)

Remarks	Frequency, MHz	RF power density port A, dBm/MHz	RF power density port B, dBm/MHz	RF power density port C, dBm/MHz	RF power density port D, dBm/MHz
QPSK, low channel	748.5	40.62	40.89	40.58	40.73
16QAM, low channel	748.5	40.88	41.17	40.80	40.95
64QAM, low channel	748.5	40.44	40.90	40.41	40.79
256QAM, low channel	748.5	40.71	40.72	40.59	40.69
QPSK, high channel	753.5	40.45	40.86	40.37	40.91

Table 8.1-4: Output power and power spectral density measurement results for SISO 2-carrier operation (Configuration 1, B13, 5 MHz channel)

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF power density, dBm/MHz
Antenna A, QPSK	748.5 and 753.5	40.832	46.11	37.60
Antenna B, QPSK	748.5 and 753.5	39.174	45.93	37.91
Antenna C, QPSK	748.5 and 753.5	40.926	46.12	37.71
Antenna D, QPSK	748.5 and 753.5	39.628	45.98	38.05

Table 8.1-5: Output power measurement results for multi-band operation (Configuration 1)

Remarks	RF output power port A, dBm	RF output power port B, dBm	RF output power port C, dBm	RF output power port D, dBm	Total output power, dBm
B13 low channel + B5 low channel	48.88	48.82	48.95	48.68	54.85
B13 high channel + B5 high channel	48.87	48.83	48.62	48.91	54.83
B13 two carriers + B5 two carriers	48.74	48.69	48.56	48.64	54.68
B13 two carriers + B5 three carriers	48.79	48.75	48.61	48.70	54.73

Table 8.1-6: Power spectral density measurement results for multi-band operation (Configuration 1)

Remarks	RF power density port A, dBm/MHz	RF power density port B, dBm/MHz	RF power density port C, dBm/MHz	RF power density port D, dBm/MHz
B13 low channel + B5 low channel	40.23	40.56	40.66	40.72
B13 high channel + B5 high channel	40.29	41.04	40.34	40.71
B13 two carriers + B5 two carriers	37.39	37.73	37.45	37.89
B13 two carriers + B5 three carriers	37.28	37.79	37.45	37.83

Table 8.1-7: Output power and power spectral density measurement results for SISO operation (Configuration 2, B13, 5 MHz channel)

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF power density, dBm/MHz
Antenna A, QPSK, low channel	748.5	59.841	47.77	41.94
Antenna D, QPSK, low channel	748.5	56.754	47.54	42.19
Antenna A, 16QAM, low channel	748.5	60.117	47.79	42.42
Antenna D, 16QAM, low channel	748.5	56.885	47.55	42.61
Antenna A, 64QAM, low channel	748.5	60.256	47.80	42.01
Antenna D, 64QAM, low channel	748.5	57.148	47.57	42.24
Antenna A, 256QAM, low channel	748.5	59.979	47.78	42.05
Antenna D, 256QAM, low channel	748.5	57.016	47.56	42.44
Antenna A, QPSK, high channel	753.5	61.944	47.92	42.11
Antenna D, QPSK, high channel	753.5	58.345	47.66	42.32

Table 8.1-8: Output power and power spectral density measurement results for SISO 2-carrier operation (Configuration 2, B13, 5 MHz channel)

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF power density, dBm/MHz
Antenna A, QPSK	748.5 and 753.5	61.38	47.88	39.21
Antenna D, QPSK	748.5 and 753.5	58.88	47.70	39.74

Table 8.1-9: Output power measurement results for MIMO operation (Configuration 2, B13, 5 MHz channel)

Remarks	Frequency, MHz	RF output power port A, dBm	RF output power port D, dBm	Total output power, dBm
QPSK, low channel	748.5	47.77	47.54	50.67
16QAM, low channel	748.5	47.79	47.55	50.68
64QAM, low channel	748.5	47.80	47.57	50.70
256QAM, low channel	748.5	47.78	47.56	50.68
QPSK, high channel	753.5	47.92	47.66	50.80

Table 8.1-10: Power spectral density measurement results for MIMO operation (Configuration 2, B13, 5 MHz channel)

Remarks	Frequency, MHz	RF power density port A, dBm/MHz	RF power density port D, dBm/MHz
QPSK, low channel	748.5	41.94	42.19
16QAM, low channel	748.5	42.42	42.61
64QAM, low channel	748.5	42.01	42.24
256QAM, low channel	748.5	42.05	42.44
QPSK, high channel	753.5	42.11	42.32

Table 8.1-11: Output power measurement results for multi-band operation (Configuration 2, B13, 5 MHz channel)

Remarks	RF output power port A, dBm	RF output power port D, dBm	Total output power, dBm
B13 low channel + B5 low channel	50.62	50.49	53.57
B13 high channel + B5 high channel	50.72	50.44	53.59
B13 two carriers + B5 two carriers	50.68	50.52	53.61
B13 two carriers + B5 three carriers	50.70	50.51	53.62

Table 8.1-12: Power spectral density measurement results for multi-band operation (Configuration 2, B13, 5 MHz channel)

Remarks	RF power density port A, dBm/MHz	RF power density port D, dBm/MHz
B13 low channel + B5 low channel	41.95	42.29
B13 high channel + B5 high channel	42.22	42.57
B13 two carriers + B5 two carriers	38.94	39.51
B13 two carriers + B5 three carriers	39.02	39.26

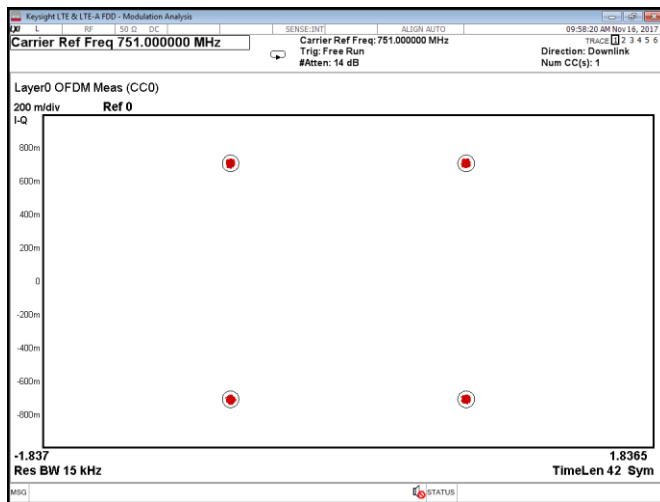


Figure 8.1-1: Modulation characteristics, QPSK

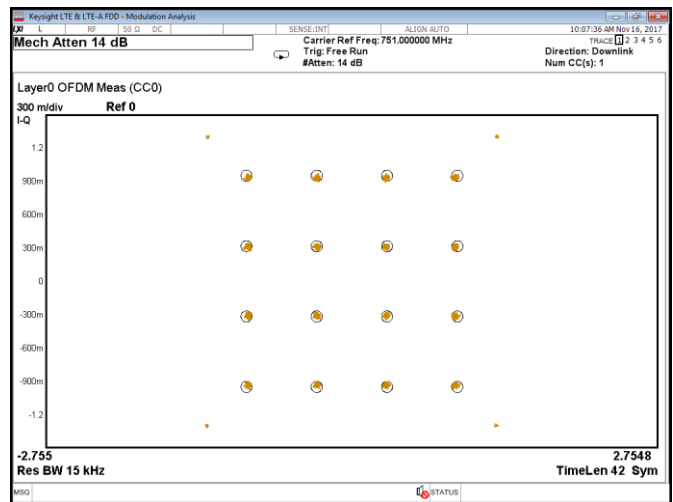


Figure 8.1-2: Modulation characteristics, 16QAM

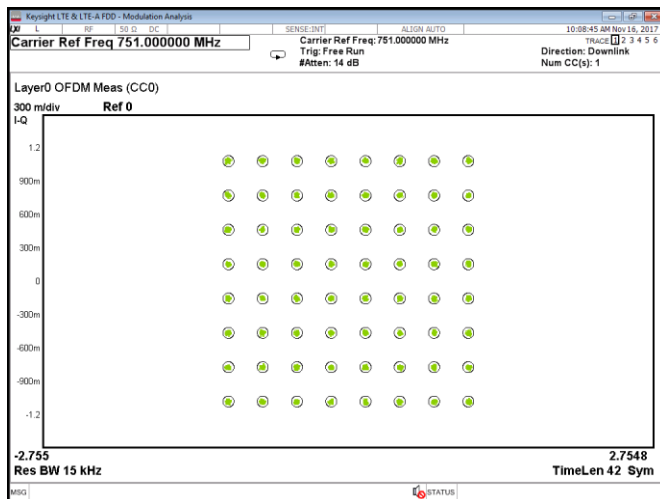


Figure 8.1-3: Modulation characteristics, 64QAM

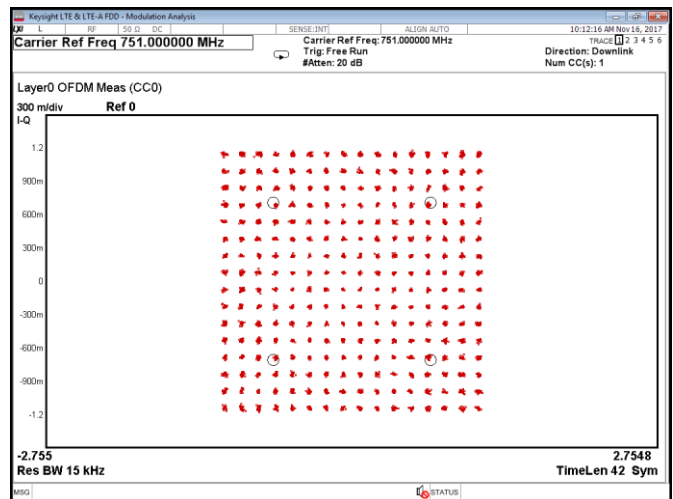


Figure 8.1-4: Modulation characteristics, 256QAM

Table 8.1-13: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results (Configuration 1, B13, 5 MHz channel)

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Antenna A, QPSK, low channel	748.5	7.53	13.00	5.47
Antenna B, QPSK, low channel	748.5	7.53	13.00	5.47
Antenna C, QPSK, low channel	748.5	7.54	13.00	5.46
Antenna D, QPSK, low channel	748.5	7.56	13.00	5.44
Antenna A, 16QAM, low channel	748.5	7.52	13.00	5.48
Antenna B, 16QAM, low channel	748.5	7.53	13.00	5.47
Antenna C, 16QAM, low channel	748.5	7.54	13.00	5.46
Antenna D, 16QAM, low channel	748.5	7.54	13.00	5.46
Antenna A, 64QAM, low channel	748.5	7.53	13.00	5.47
Antenna B, 64QAM, low channel	748.5	7.53	13.00	5.47
Antenna C, 64QAM, low channel	748.5	7.53	13.00	5.47
Antenna D, 64QAM, low channel	748.5	7.55	13.00	5.45
Antenna A, 256QAM, low channel	748.5	7.52	13.00	5.48
Antenna B, 256QAM, low channel	748.5	7.54	13.00	5.46
Antenna C, 256QAM, low channel	748.5	7.53	13.00	5.47
Antenna D, 256QAM, low channel	748.5	7.56	13.00	5.44
Antenna A, QPSK, high channel	753.5	7.52	13.00	5.48
Antenna B, QPSK, high channel	753.5	7.51	13.00	5.49
Antenna C, QPSK, high channel	753.5	7.53	13.00	5.47
Antenna D, QPSK, high channel	753.5	7.54	13.00	5.46

Table 8.1-14: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results (Configuration 2, B13, 5 MHz channel)

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Antenna A, QPSK, low channel	748.5	7.53	13.00	5.47
Antenna D, QPSK, low channel	748.5	7.55	13.00	5.45
Antenna A, 16QAM, low channel	748.5	7.54	13.00	5.46
Antenna D, 16QAM, low channel	748.5	7.54	13.00	5.46
Antenna A, 64QAM, low channel	748.5	7.53	13.00	5.47
Antenna D, 64QAM, low channel	748.5	7.53	13.00	5.47
Antenna A, 256QAM, low channel	748.5	7.55	13.00	5.45
Antenna D, 256QAM, low channel	748.5	7.53	13.00	5.47
Antenna A, QPSK, high channel	753.5	7.51	13.00	5.49
Antenna D, QPSK, high channel	753.5	7.55	13.00	5.45

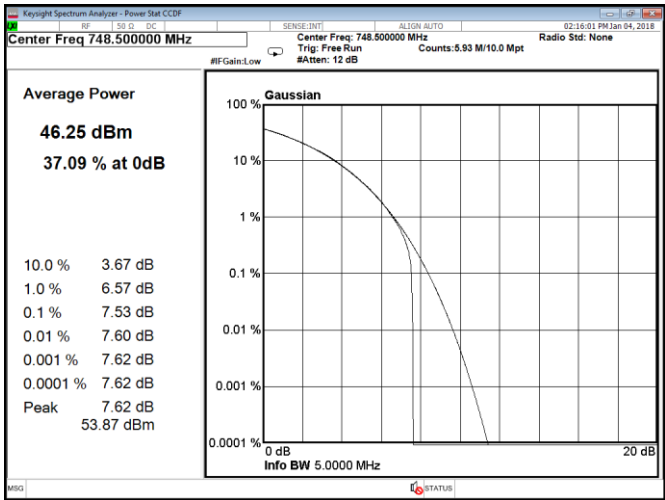


Figure 8.1-5: CCDF, QPSK, Port A, configuration 1, sample plot

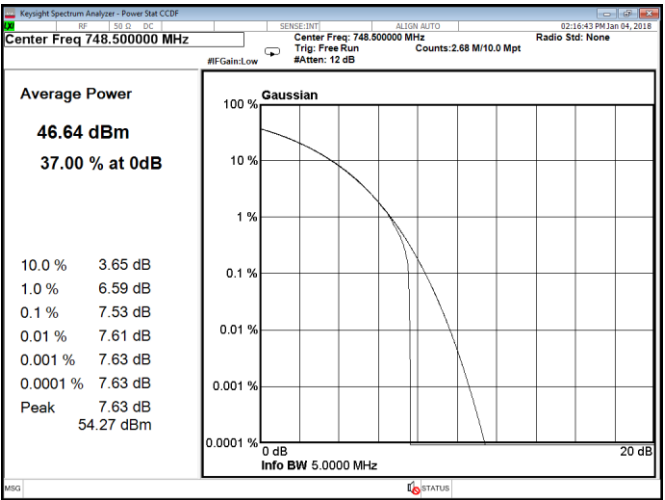


Figure 8.1-6: CCDF, QPSK, Port B, configuration 1, sample plot

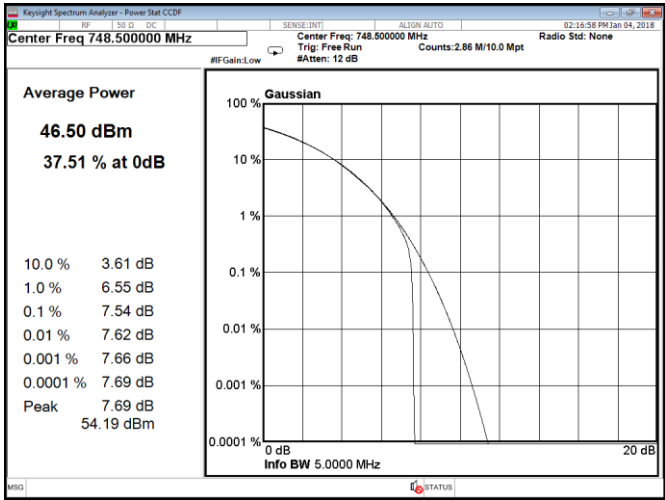


Figure 8.1-7: CCDF, QPSK, Port C, configuration 1, sample plot

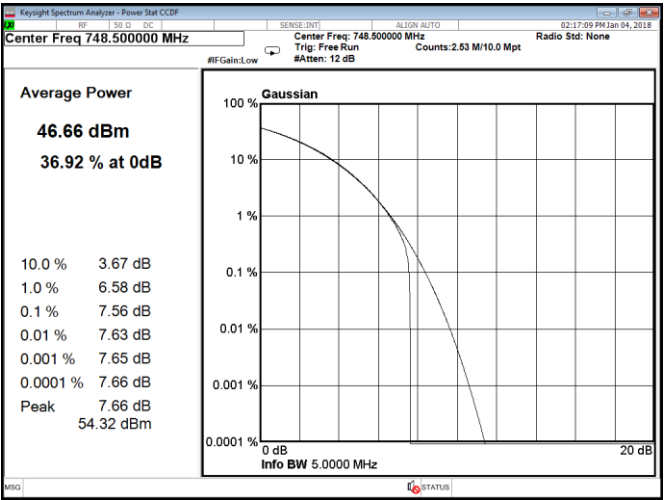


Figure 8.1-8: CCDF, QPSK, Port D, configuration 1, sample plot

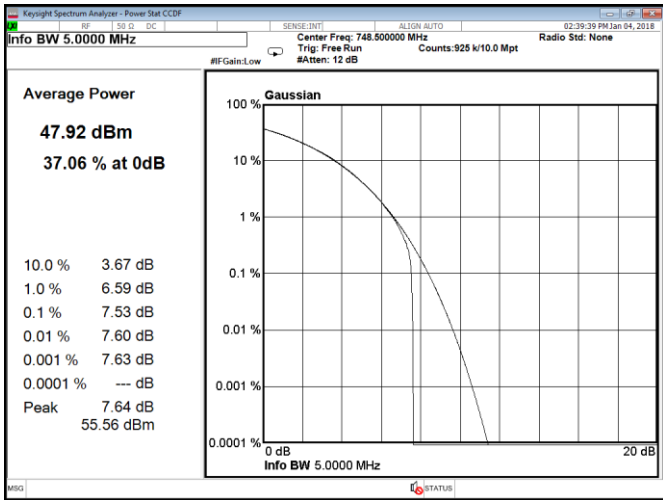


Figure 8.1-9: CCDF, QPSK, Port A, configuration 2, sample plot

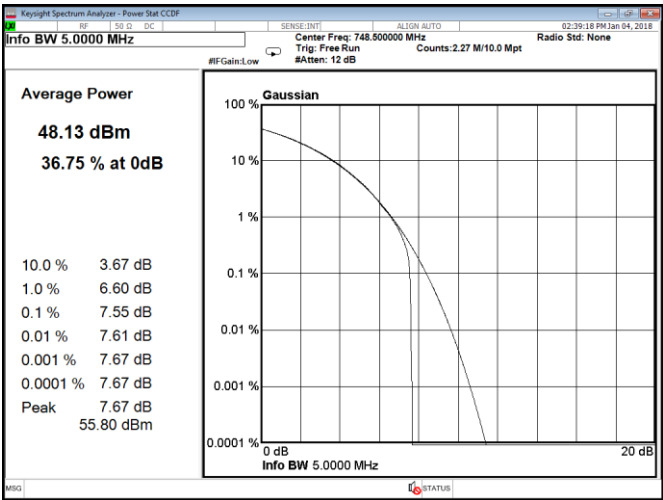


Figure 8.1-10: CCDF, QPSK, Port D, configuration 2, sample plot

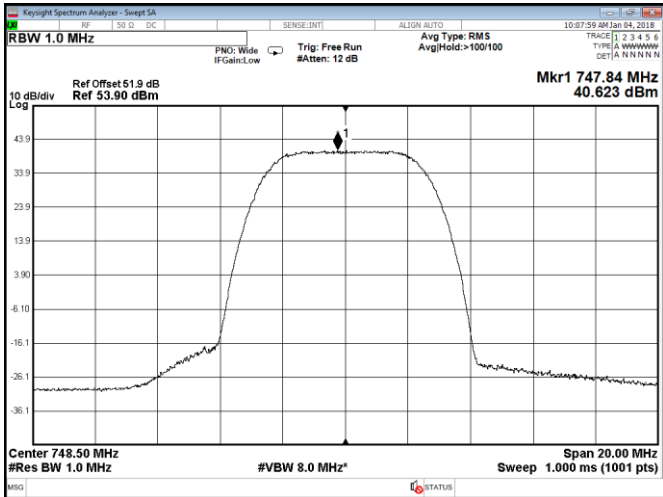


Figure 8.1-11: Power spectral density, QPSK, Port A, configuration 1, sample plot

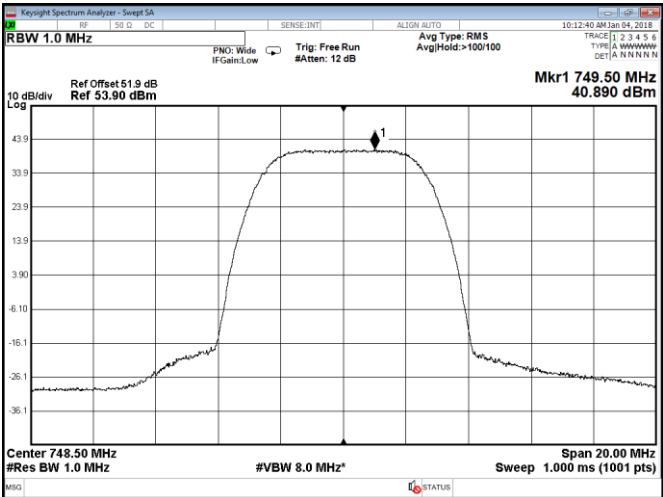


Figure 8.1-12: Power spectral density, QPSK, Port B, configuration 1, sample plot

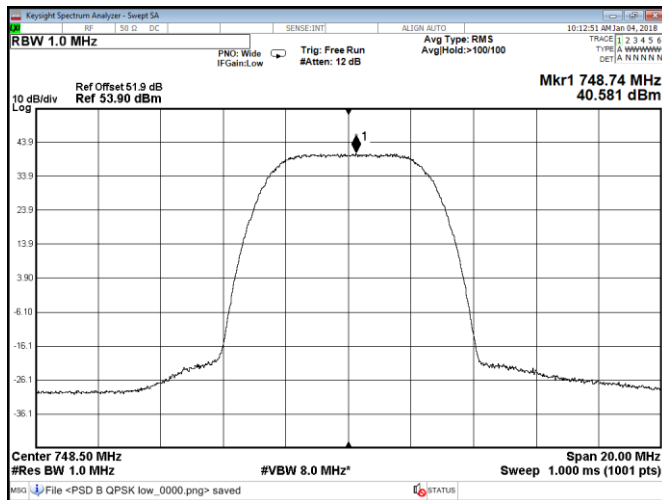


Figure 8.1-13: Power spectral density, QPSK, Port C, configuration 1, sample plot

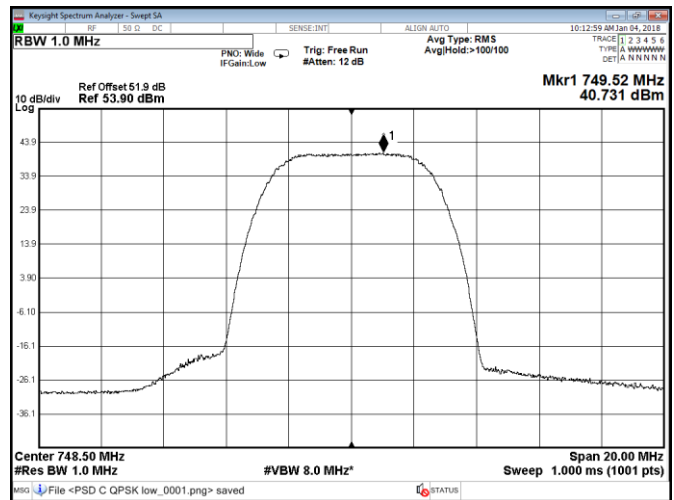


Figure 8.1-14: Power spectral density, QPSK, Port D, configuration 1, sample plot

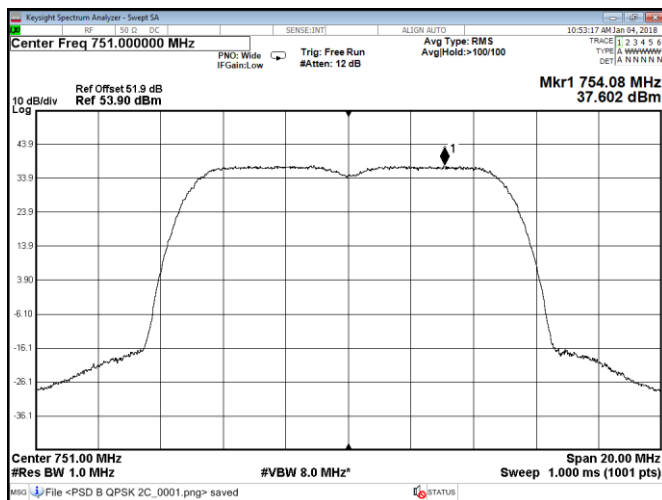


Figure 8.1-15: Power spectral density, QPSK, Port A, 2-carrier operation, configuration 1

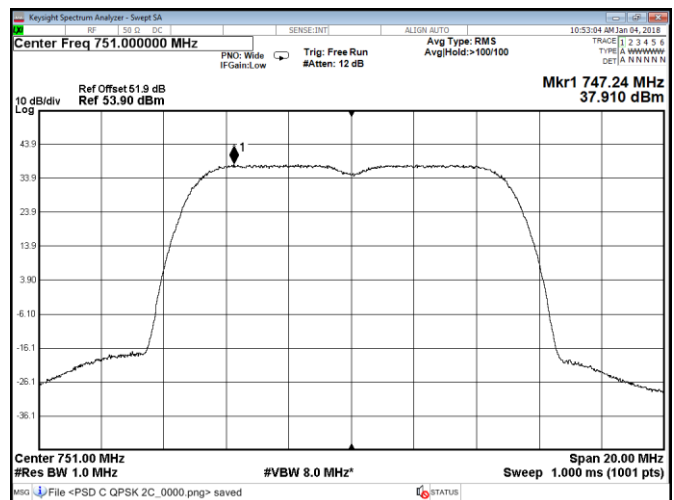
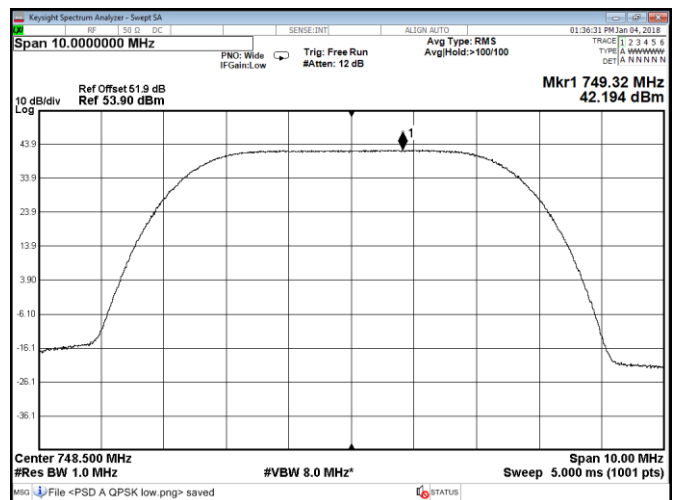
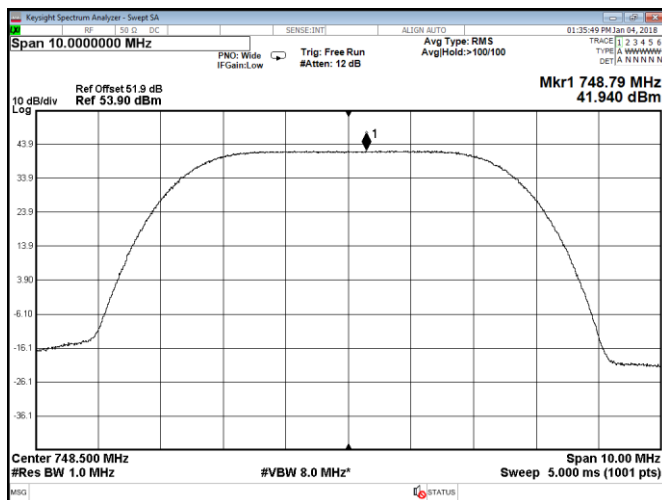
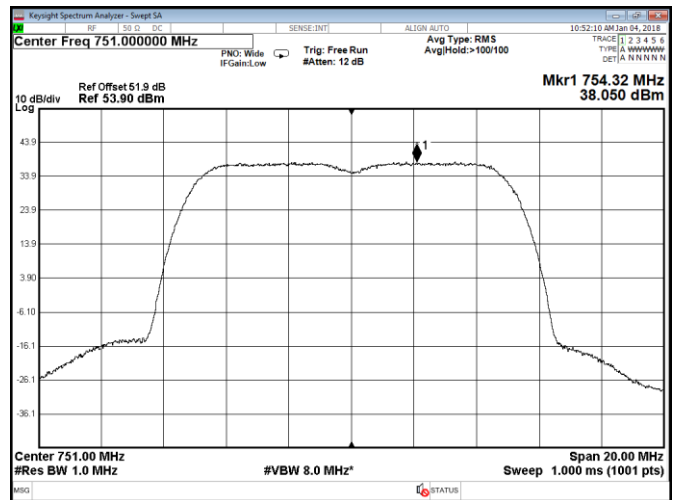
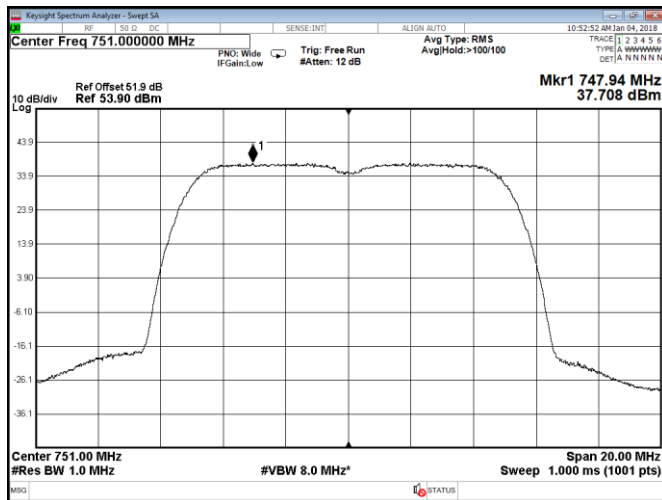


Figure 8.1-16: Power spectral density, QPSK, Port B, 2-carrier operation, configuration 1



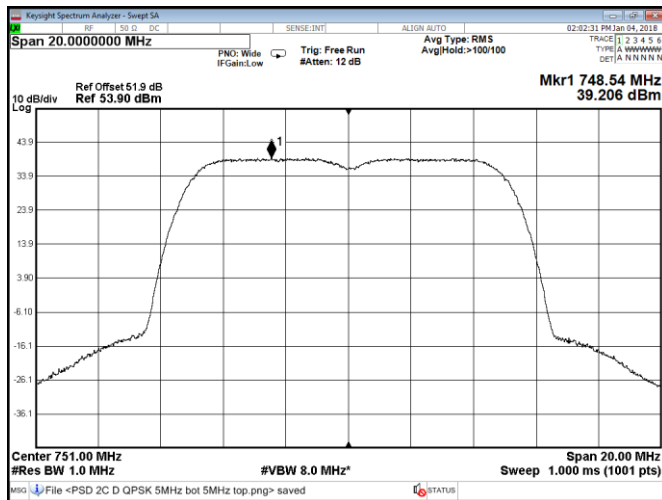


Figure 8.1-21: Power spectral density, QPSK, Port A, 2-carrier operation, configuration 2

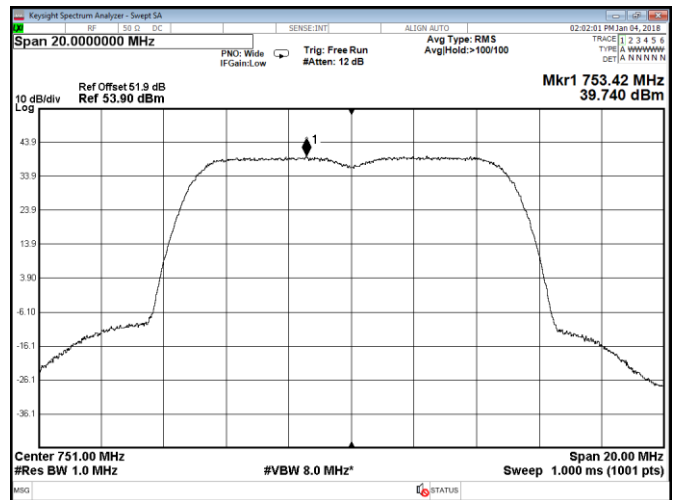


Figure 8.1-22: Power spectral density, QPSK, Port D, 2-carrier operation, configuration 2

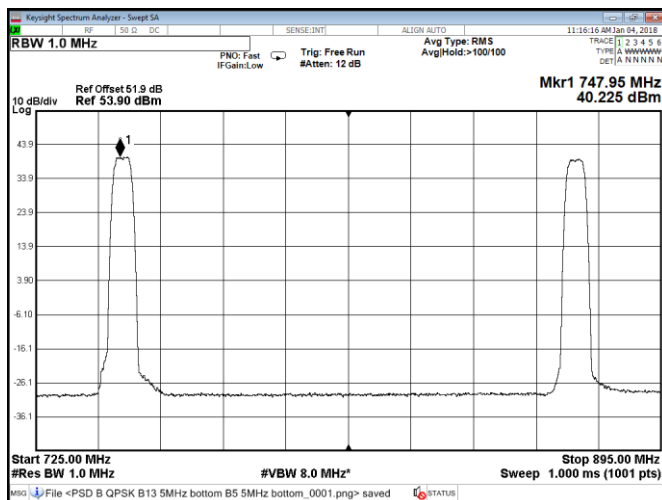


Figure 8.1-23: Power spectral density, QPSK, multi-band operation, B13 low channel, B5 low channel, configuration 1, sample plot

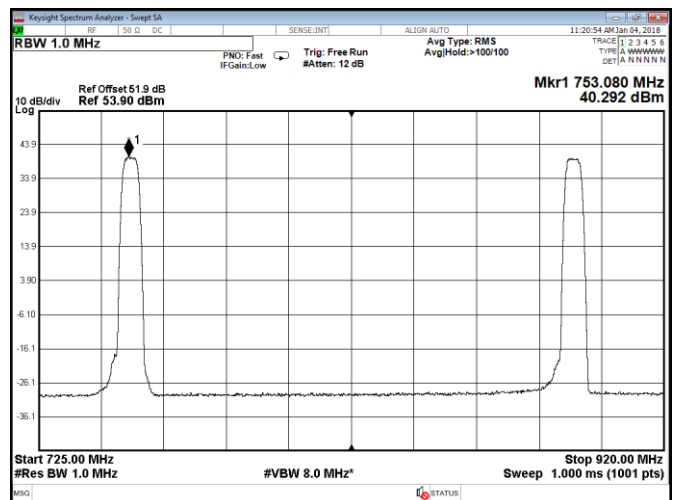


Figure 8.1-24: Power spectral density, QPSK, multi-band operation, B13 high channel, B5 high channel, configuration 1, sample plot

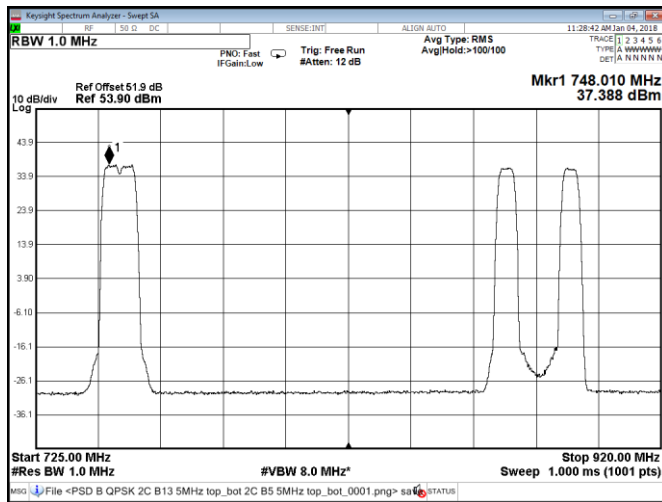


Figure 8.1-25: Power spectral density, QPSK, multi-band and multi-carrier operation, B13 low and high channels, B5 low and high channels, configuration 1, sample plot

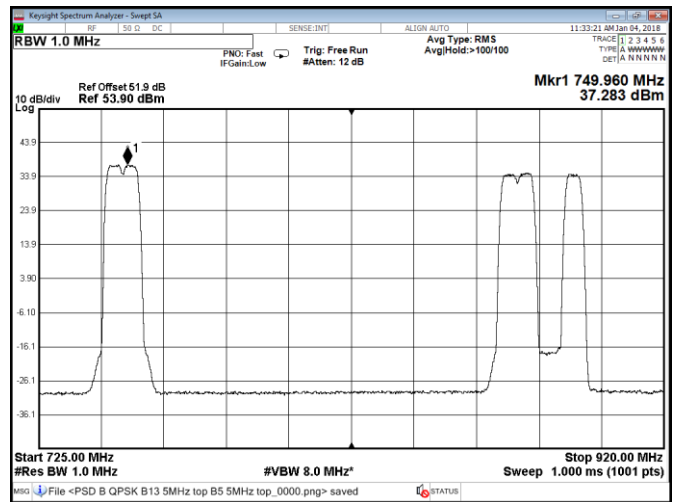


Figure 8.1-26: Power spectral density, QPSK, multi-band and multi-carrier operation, B13 low and high channels, B5 two adjacent low and one high channels, configuration 1, sample plot

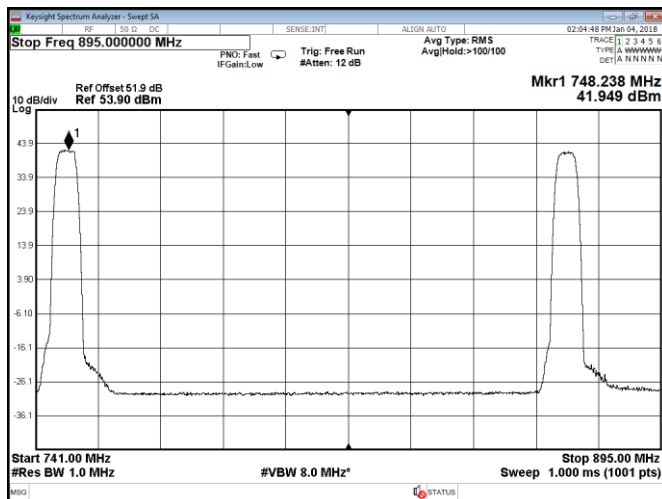


Figure 8.1-27: Power spectral density, QPSK, multi-band operation, B13 low channel, B5 low channel, configuration 2, sample plot

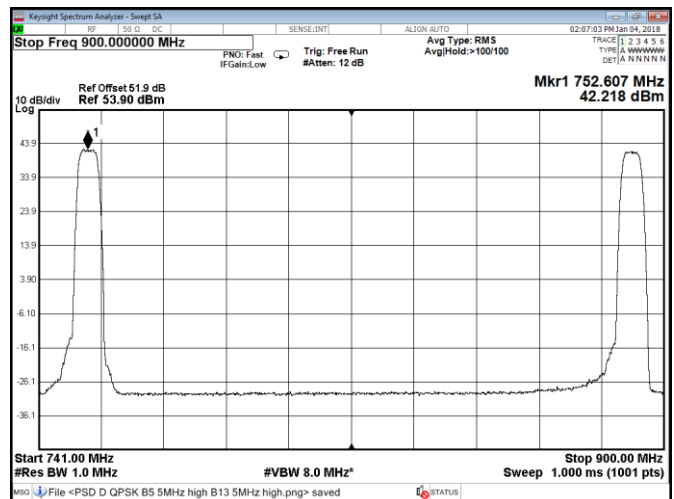


Figure 8.1-28: Power spectral density, QPSK, multi-band operation, B13 high channel, B5 high channel, configuration 2, sample plot

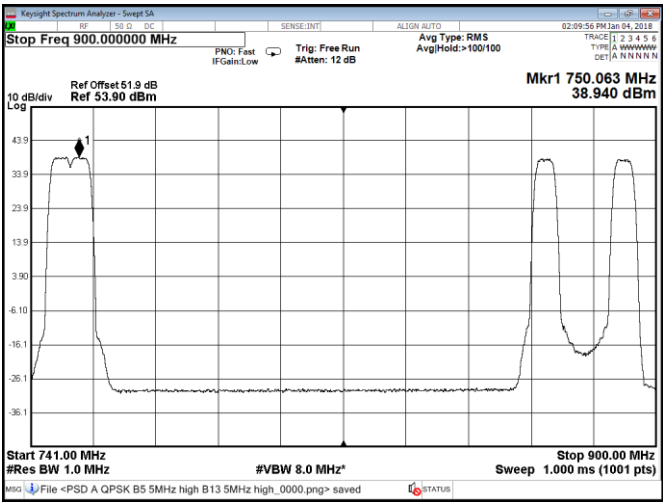


Figure 8.1-29: Power spectral density, QPSK, multi-band and multi-carrier operation, B13 low and high channels, B5 low and high channels, configuration 2, sample plot

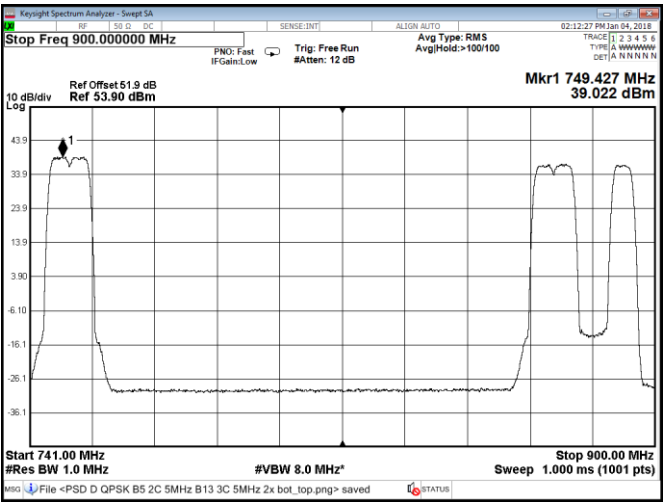


Figure 8.1-30: Power spectral density, QPSK, multi-band and multi-carrier operation, B13 low and high channels, B5 two adjacent low and one high channels, configuration 2, sample plot

8.2 FCC 22.913(a) Maximum ERP

8.2.1 Definitions and limits

Licensees in the Cellular Radiotelephone Service are subject to the effective radiated power (ERP) limits and other requirements in this Section. See also §22.169.

(a) Maximum ERP. The ERP of transmitters in the Cellular Radiotelephone Service must not exceed the limits in this section.

(1) Except as described in paragraphs (a)(2), (3), and (4) of this section, the ERP of base stations and repeaters must not exceed—

(i) 500 watts per emission; or

(ii) 400 watts/MHz (PSD) per sector.

(2) Except as described in paragraphs (a)(3) and (4) of this section, for systems operating in areas more than 72 kilometers (45 miles) from international borders that:

(i) Are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census; or

(ii) Extend coverage into Unserved Area on a secondary basis (see §22.949), the ERP of base transmitters and repeaters must not exceed—

(A) 1000 watts per emission; or

(B) 800 watts/MHz (PSD) per sector.

(3) Provided that they also comply with paragraphs (b) and (c) of this section, licensees are permitted to operate their base transmitters and repeaters with an ERP greater than 400 watts/MHz (PSD) per sector, up to a maximum ERP of 1000 watts/MHz (PSD) per sector unless they meet the conditions in paragraph (a)(4) of this section.

(4) Provided that they also comply with paragraphs (b) and (c) of this section, licensees of systems operating in areas more than 72 kilometers (45 miles) from international borders that:

(i) Are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census; or

(ii) Extend coverage into Unserved Area on a secondary basis (see §22.949), are permitted to operate base transmitters and repeaters with an ERP greater than 800 watts/MHz (PSD) per sector, up to a maximum of 2000 watts/MHz (PSD) per sector.

8.2.2 Test summary

Test date	January 4, 2018
Test engineer	Andrey Adelberg
Verdict	Reported

8.2.3 Observations, settings and special notes

Based on the maximum RF power listed in this report, considerations pertaining to the maximum allowed EIRP and antenna type should be considered for each installation.

Measurement was performed using RMS power meter.

Configuration 1: Port A with 40 W power, Port B with 40 W power, Port C with 40 W power, Port D with 40 W power.

Configuration 2: Port A with 60 W power, Port D with 60 W power.

8.2.4 Test data

Table 8.2-1: Output power and power spectral density measurement results for SISO operation (Configuration 1, B5, 10 MHz channel)

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF power density, dBm/MHz
Antenna A, QPSK, low channel	874.0	36.898	45.67	37.16
Antenna B, QPSK, low channel	874.0	38.107	45.81	37.97
Antenna C, QPSK, low channel	874.0	37.844	45.78	37.38
Antenna D, QPSK, low channel	874.0	36.813	45.66	37.58
Antenna A, 16QAM, low channel	874.0	37.068	45.69	37.71
Antenna B, 16QAM, low channel	874.0	38.726	45.88	38.20
Antenna C, 16QAM, low channel	874.0	38.371	45.84	37.68
Antenna D, 16QAM, low channel	874.0	36.813	45.66	38.13
Antenna A, 64QAM, low channel	874.0	37.068	45.69	37.14
Antenna B, 64QAM, low channel	874.0	38.194	45.82	37.82
Antenna C, 64QAM, low channel	874.0	38.282	45.83	37.37
Antenna D, 64QAM, low channel	874.0	36.308	45.60	37.52
Antenna A, 256QAM, low channel	874.0	37.239	45.71	37.17
Antenna B, 256QAM, low channel	874.0	38.459	45.85	37.85
Antenna C, 256QAM, low channel	874.0	38.107	45.81	37.28
Antenna D, 256QAM, low channel	874.0	36.058	45.57	37.49
Antenna A, QPSK, mid channel	881.5	39.084	45.92	37.38
Antenna B, QPSK, mid channel	881.5	39.994	46.02	38.07
Antenna C, QPSK, mid channel	881.5	36.392	45.61	36.98
Antenna D, QPSK, mid channel	881.5	38.019	45.80	37.60
Antenna A, QPSK, high channel	889.0	38.637	45.87	37.45
Antenna B, QPSK, high channel	889.0	37.844	45.78	37.96
Antenna C, QPSK, high channel	889.0	35.237	45.47	37.14
Antenna D, QPSK, high channel	889.0	38.019	45.80	37.79

Table 8.2-2: Output power measurement results for MIMO operation (Configuration 1, B5, 10 MHz channel)

Remarks	Frequency, MHz	RF output power port A, dBm	RF output power port B, dBm	RF output power port C, dBm	RF output power port D, dBm	Total output power, dBm
QPSK, low channel	874.0	45.67	45.81	45.78	45.66	51.75
16QAM, low channel	874.0	45.69	45.88	45.84	45.66	51.79
64QAM, low channel	874.0	45.69	45.82	45.83	45.60	51.76
256QAM, low channel	874.0	45.71	45.85	45.81	45.57	51.76
QPSK, mid channel	881.5	45.92	46.02	45.61	45.80	51.86
QPSK, high channel	889.0	45.87	45.78	45.47	45.80	51.75

Table 8.2-3: Power spectral density measurement results for MIMO operation (Configuration 1, B5, 10 MHz channel)

Remarks	Frequency, MHz	RF power density port A, dBm/MHz	RF power density port B, dBm/MHz	RF power density port C, dBm/MHz	RF power density port D, dBm/MHz
QPSK, low channel	874.0	37.16	37.97	37.38	37.58
16QAM, low channel	874.0	37.71	38.20	37.68	38.13
64QAM, low channel	874.0	37.14	37.82	37.37	37.52
256QAM, low channel	874.0	37.17	37.85	37.28	37.49
QPSK, mid channel	881.5	37.38	38.07	36.98	37.60
QPSK, high channel	889.0	37.45	37.96	37.14	37.79

Table 8.2-4: Output power measurement results for multi-carrier operation (Configuration 1, B5, 10 MHz channel)

Remarks	RF output power port A, dBm	RF output power port B, dBm	RF output power port C, dBm	RF output power port D, dBm
Low channel and high channel	45.55	45.65	45.41	45.46
Two adjacent low channels and high channel	45.63	45.75	45.48	45.43

Table 8.2-5: Power spectral density measurement results for multi-carrier operation (Configuration 1, B5, 10 MHz channel)

Remarks	RF power density port A, dBm/MHz	RF power density port B, dBm/MHz	RF power density port C, dBm/MHz	RF power density port D, dBm/MHz
Low channel and high channel	36.96	37.57	36.96	37.19
Two adjacent low channels and high channel	35.51	36.08	35.19	35.61

Table 8.2-6: Output power and power spectral density measurement results for SISO operation (Configuration 2, B5, 10 MHz channel)

Remarks	Frequency, MHz	RF output power, W	RF output power, dBm	RF power density, dBm/MHz
Antenna A, QPSK, low channel	874.0	55.719	47.46	39.02
Antenna D, QPSK, low channel	874.0	54.200	47.34	39.30
Antenna A, 16QAM, low channel	874.0	55.976	47.48	39.17
Antenna D, 16QAM, low channel	874.0	53.951	47.32	39.39
Antenna A, 64QAM, low channel	874.0	55.719	47.46	39.99
Antenna D, 64QAM, low channel	874.0	53.951	47.32	39.21
Antenna A, 256QAM, low channel	874.0	55.847	47.47	38.93
Antenna D, 256QAM, low channel	874.0	53.827	47.31	39.32
Antenna A, QPSK, mid channel	881.5	59.156	47.72	38.96
Antenna D, QPSK, mid channel	881.5	56.624	47.53	39.42
Antenna A, QPSK, high channel	889.0	57.943	47.63	39.05
Antenna D, QPSK, high channel	889.0	53.580	47.29	39.33

Table 8.2-7: Output power measurement results for MIMO operation (Configuration 2, B5, 10 MHz channel)

Remarks	Frequency, MHz	RF output power port A, dBm	RF output power port D, dBm	Total output power, dBm
QPSK, low channel	874.0	47.46	47.34	50.41
16QAM, low channel	874.0	47.48	47.32	50.41
64QAM, low channel	874.0	47.46	47.32	50.40
256QAM, low channel	874.0	47.47	47.31	50.40
QPSK, mid channel	881.5	47.72	47.53	50.64
QPSK, high channel	889.0	47.63	47.29	50.47

Table 8.2-8: Power spectral density measurement results for MIMO operation (Configuration 2, B5, 10 MHz channel)

Remarks	Frequency, MHz	RF power density port A, dBm/MHz	RF power density port D, dBm/MHz
QPSK, low channel	874.0	39.02	39.30
16QAM, low channel	874.0	39.17	39.39
64QAM, low channel	874.0	39.99	39.21
256QAM, low channel	874.0	38.93	39.32
QPSK, mid channel	881.5	38.96	39.42
QPSK, high channel	889.0	39.05	39.33

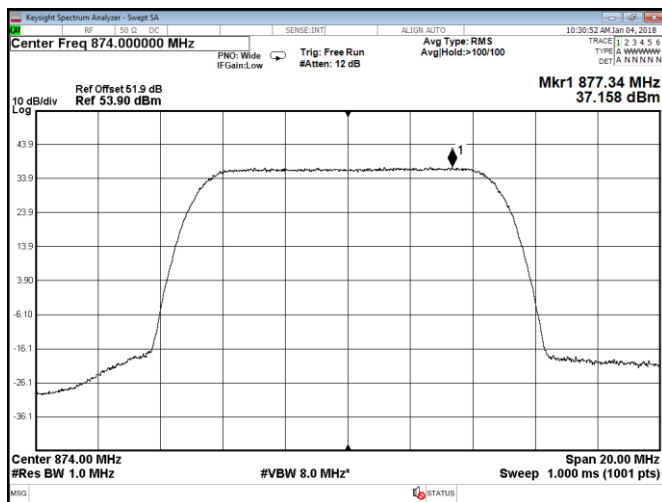


Figure 8.2-1: Power spectral density, Port D, configuration 1, sample plot

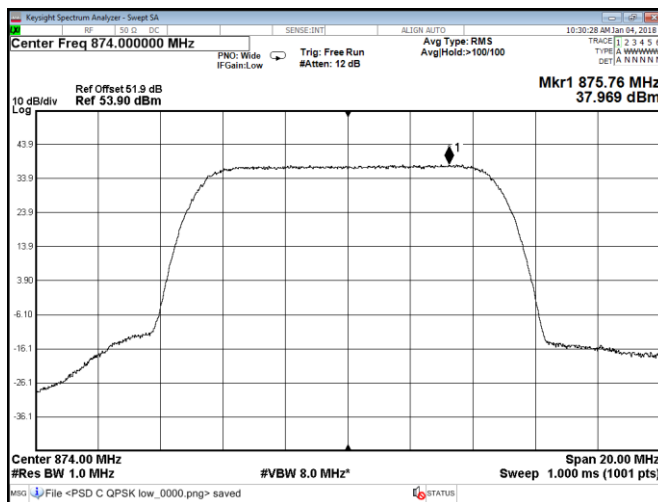


Figure 8.2-2: Power spectral density, Port B, configuration 1, sample plot

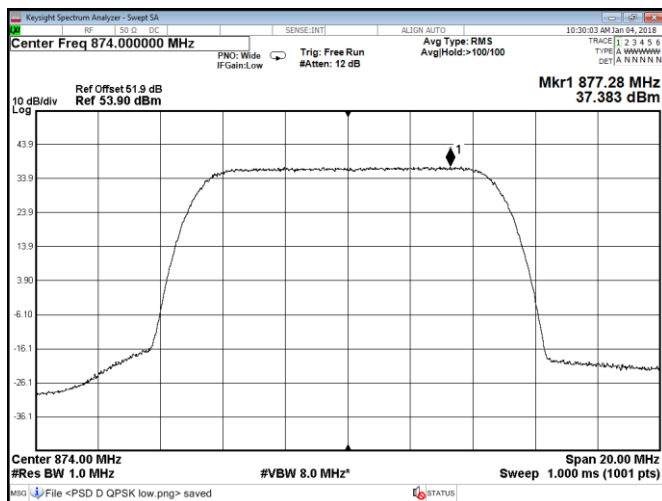


Figure 8.2-3: Power spectral density, Port C, configuration 1, sample plot

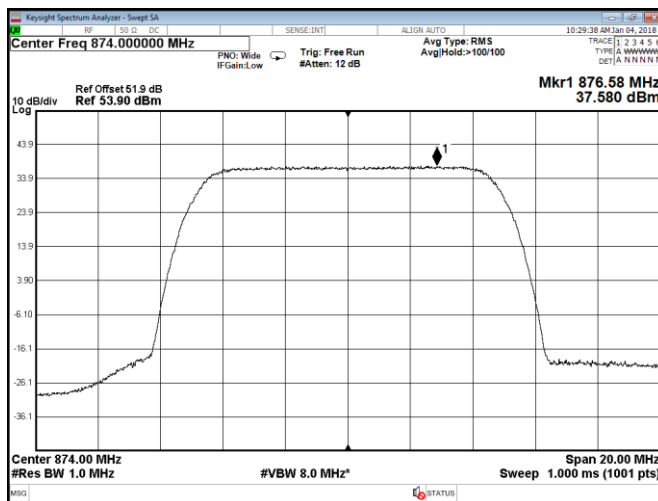


Figure 8.2-4: Power spectral density, Port D, configuration 1, sample plot

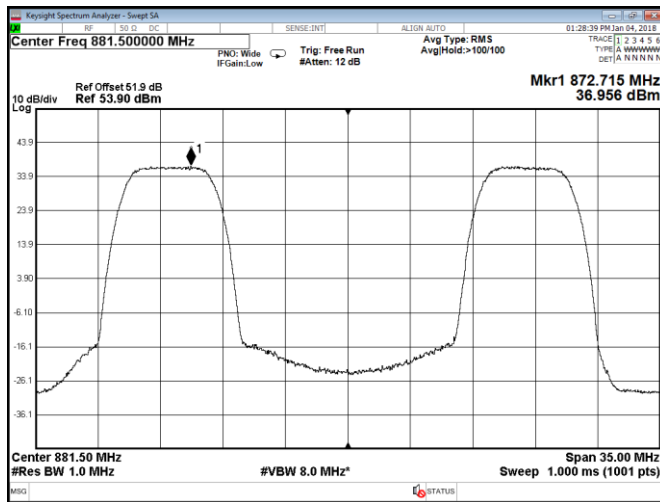


Figure 8.2-5: Power spectral density, Port A, two-channel operation, configuration 1, sample plot

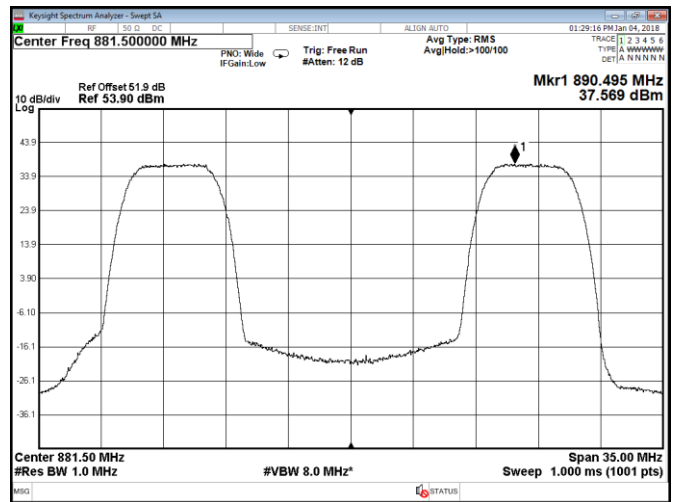


Figure 8.2-6: Power spectral density, Port B, two-channel operation, configuration 1, sample plot

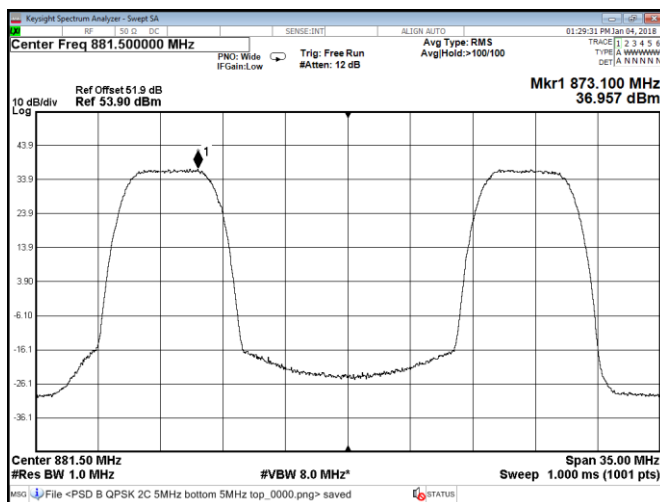


Figure 8.2-7: Power spectral density, Port C, two-channel operation, configuration 1, sample plot

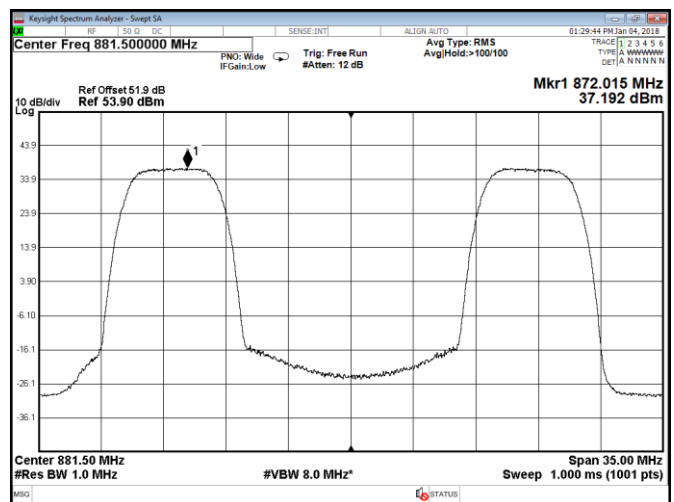


Figure 8.2-8: Power spectral density, Port D, two-channel operation, configuration 1, sample plot

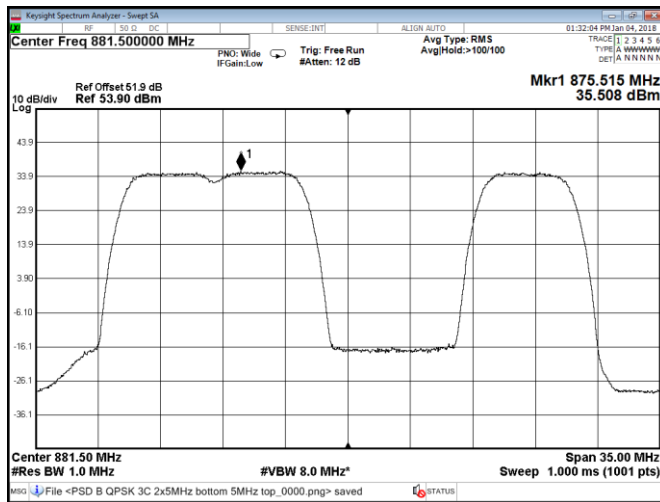


Figure 8.2-9: Power spectral density, Port A, three-channel operation, configuration 1, sample plot

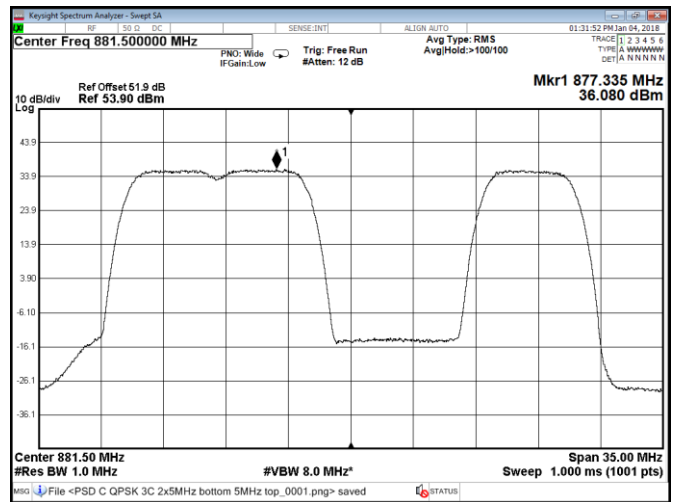


Figure 8.2-10: Power spectral density, Port B, three-channel operation, configuration 1, sample plot

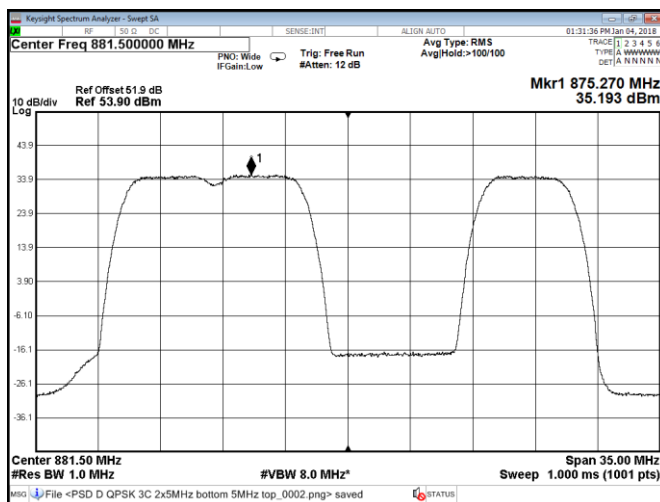


Figure 8.2-11: Power spectral density, Port C, three-channel operation, configuration 1, sample plot

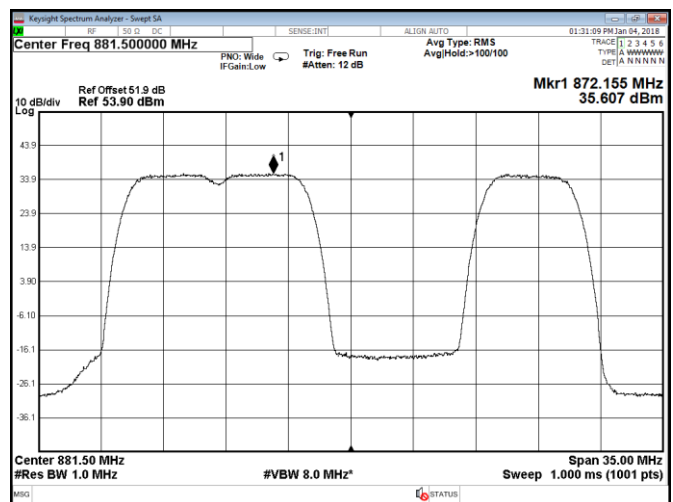


Figure 8.2-12: Power spectral density, Port D, three-channel operation, configuration 1, sample plot

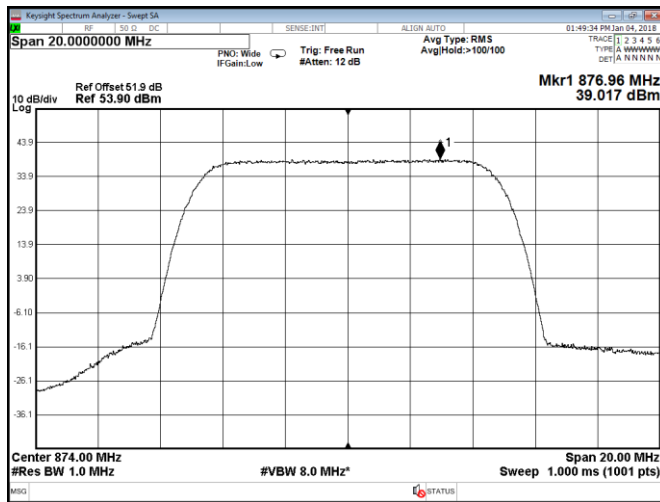


Figure 8.2-13: Power spectral density, Port A, configuration 2, sample plot

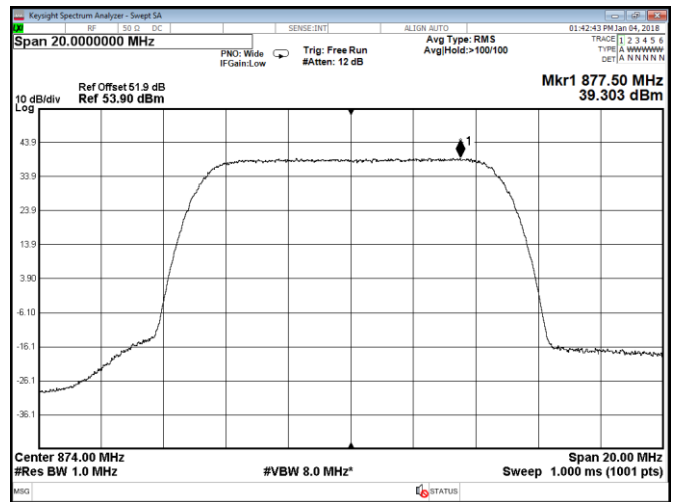


Figure 8.2-14: Power spectral density, Port D, configuration 2, sample plot

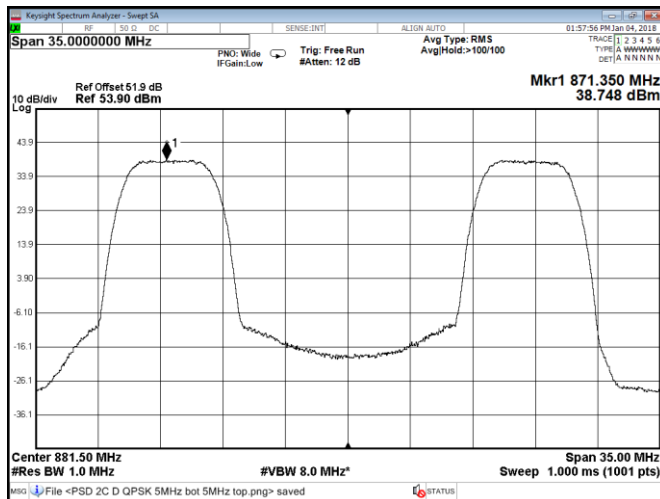


Figure 8.2-15: Power spectral density, Port A, two-channel operation, configuration 1, sample plot

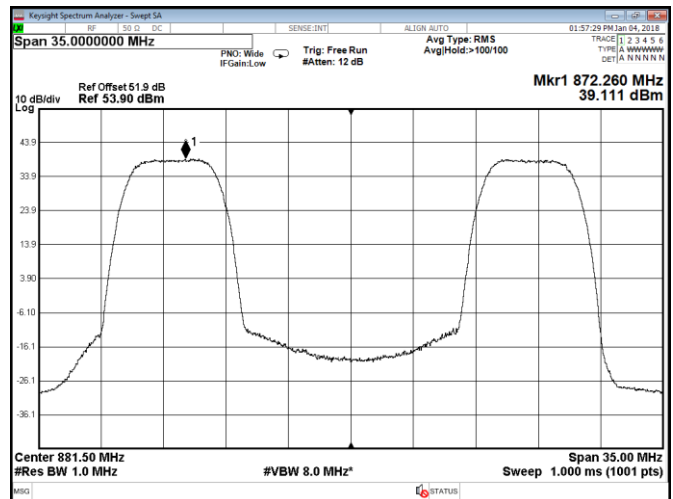


Figure 8.2-16: Power spectral density, Port D, two-channel operation, configuration 1, sample plot

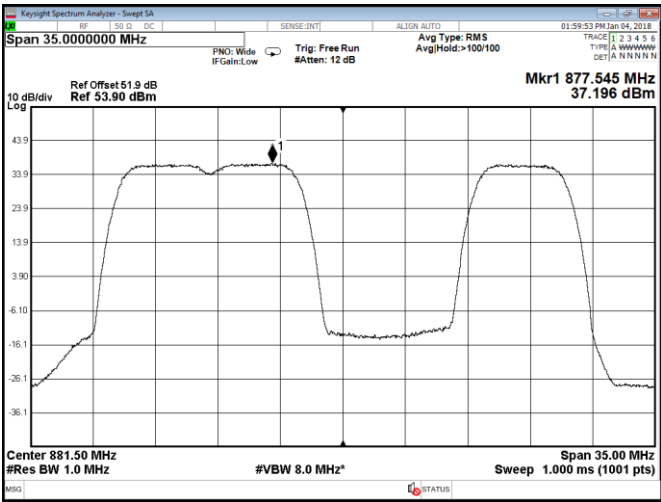


Figure 8.2-17: Power spectral density, Port A, three-channel operation, configuration 1, sample plot

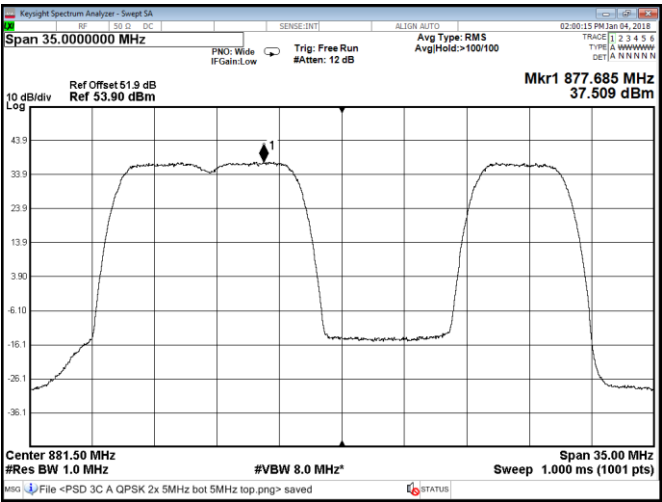


Figure 8.2-18: Power spectral density, Port D, three-channel operation, configuration 1, sample plot

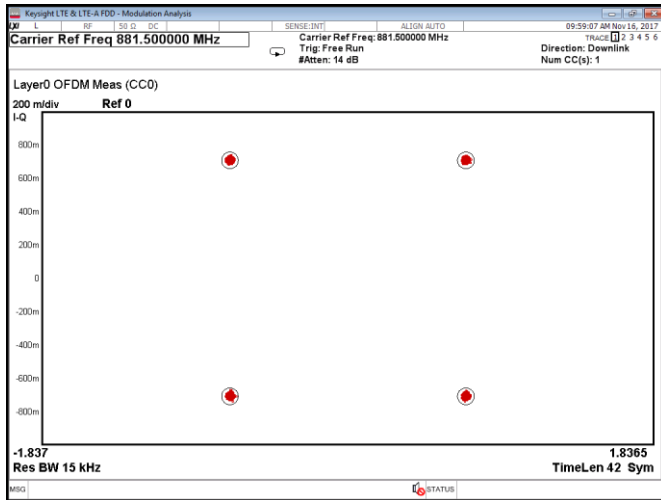


Figure 8.2-19: Modulation characteristics, QPSK

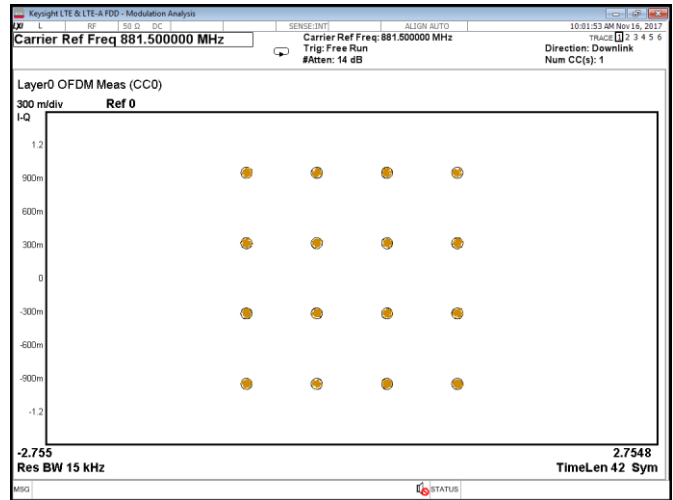


Figure 8.2-20: Modulation characteristics, 16QAM

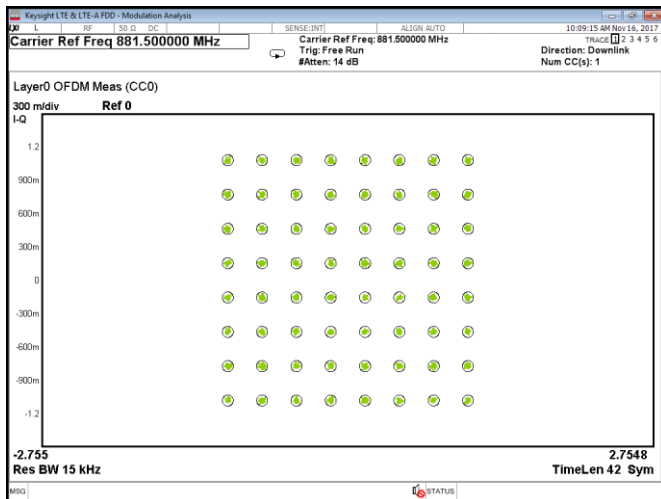


Figure 8.2-21: Modulation characteristics, 64QAM

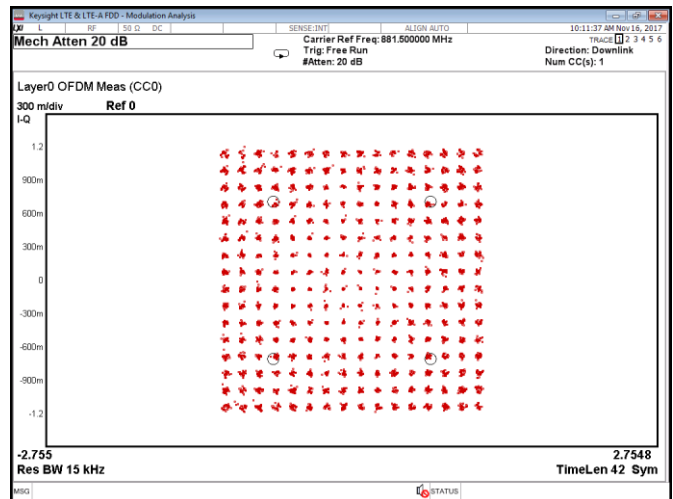


Figure 8.2-22: Modulation characteristics, 256QAM

Table 8.2-9: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results (Configuration 1, B5, 10 MHz channel)

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Antenna A, QPSK, low channel	874.0	7.55	13.00	5.45
Antenna B, QPSK, low channel	874.0	7.58	13.00	5.42
Antenna C, QPSK, low channel	874.0	7.58	13.00	5.42
Antenna D, QPSK, low channel	874.0	7.61	13.00	5.39
Antenna A, 16QAM, low channel	874.0	7.57	13.00	5.43
Antenna B, 16QAM, low channel	874.0	7.54	13.00	5.46
Antenna C, 16QAM, low channel	874.0	7.59	13.00	5.41
Antenna D, 16QAM, low channel	874.0	7.59	13.00	5.41
Antenna A, 64QAM, low channel	874.0	7.60	13.00	5.40
Antenna B, 64QAM, low channel	874.0	7.61	13.00	5.39
Antenna C, 64QAM, low channel	874.0	7.63	13.00	5.37
Antenna D, 64QAM, low channel	874.0	7.55	13.00	5.45
Antenna A, 256QAM, low channel	874.0	7.58	13.00	5.42
Antenna B, 256QAM, low channel	874.0	7.59	13.00	5.41
Antenna C, 256QAM, low channel	874.0	7.59	13.00	5.41
Antenna D, 256QAM, low channel	874.0	7.58	13.00	5.42
Antenna A, QPSK, mid channel	881.5	7.52	13.00	5.48
Antenna B, QPSK, mid channel	881.5	7.53	13.00	5.47
Antenna C, QPSK, mid channel	881.5	7.53	13.00	5.47
Antenna D, QPSK, mid channel	881.5	7.54	13.00	5.46
Antenna A, QPSK, high channel	889.0	7.56	13.00	5.44
Antenna B, QPSK, high channel	889.0	7.58	13.00	5.42
Antenna C, QPSK, high channel	889.0	7.62	13.00	5.38
Antenna D, QPSK, high channel	889.0	7.60	13.00	5.40

Table 8.2-10: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results (Configuration 2, B5, 10 MHz channel)

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Antenna A, QPSK, low channel	874.0	7.54	13.00	5.46
Antenna D, QPSK, low channel	874.0	7.60	13.00	5.40
Antenna A, 16QAM, low channel	874.0	7.56	13.00	5.44
Antenna D, 16QAM, low channel	874.0	7.60	13.00	5.40
Antenna A, 64QAM, low channel	874.0	7.57	13.00	5.43
Antenna D, 64QAM, low channel	874.0	7.56	13.00	5.44
Antenna A, 256QAM, low channel	874.0	7.58	13.00	5.42
Antenna D, 256QAM, low channel	874.0	7.57	13.00	5.43
Antenna A, QPSK, mid channel	881.5	7.53	13.00	5.47
Antenna D, QPSK, mid channel	881.5	7.54	13.00	5.46
Antenna A, QPSK, high channel	889.0	7.59	13.00	5.41
Antenna D, QPSK, high channel	889.0	7.63	13.00	5.37

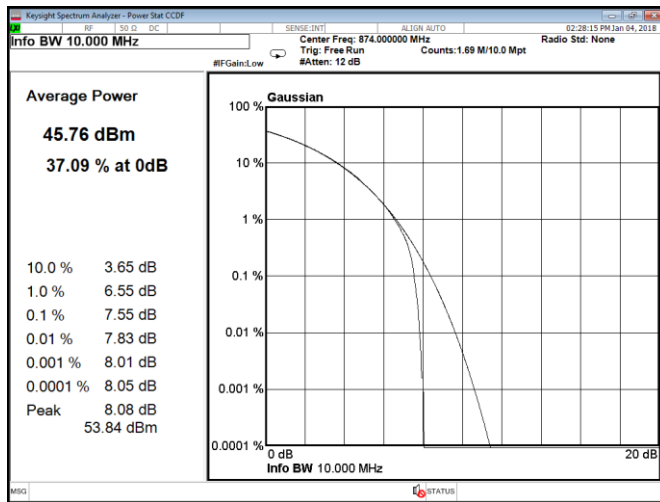


Figure 8.2-23: CCDF, QPSK, Port A, low channel, configuration 1

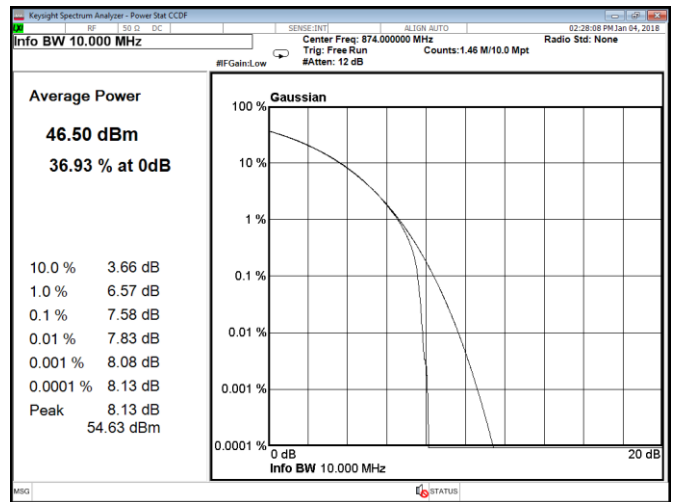


Figure 8.2-24: CCDF, QPSK, Port B, low channel, configuration 1

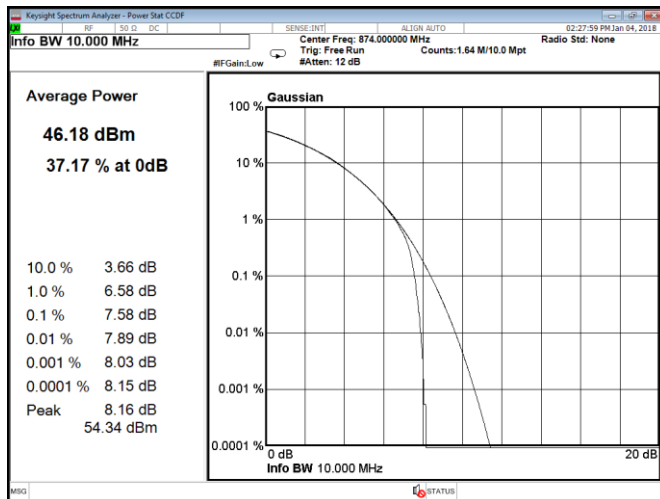


Figure 8.2-25: CCDF, QPSK, Port C, low channel, configuration 1

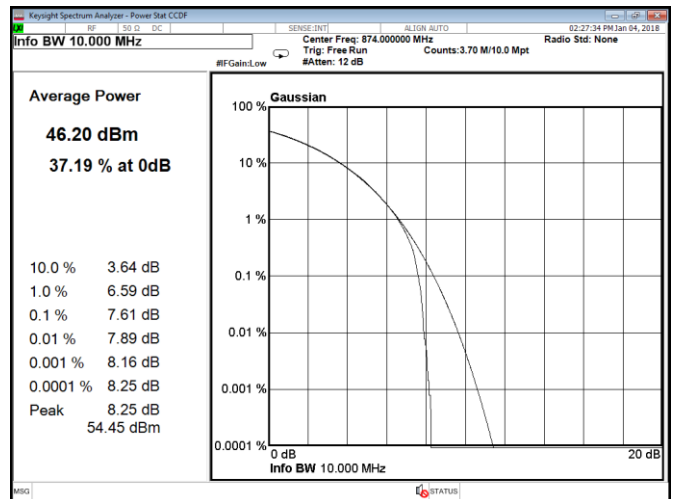


Figure 8.2-26: CCDF, QPSK, Port D, low channel, configuration 1

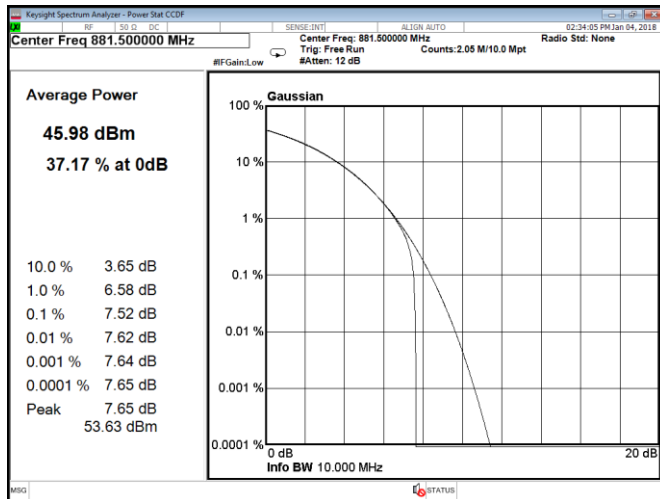


Figure 8.2-27: CCDF, QPSK, Port A, mid channel, configuration 1

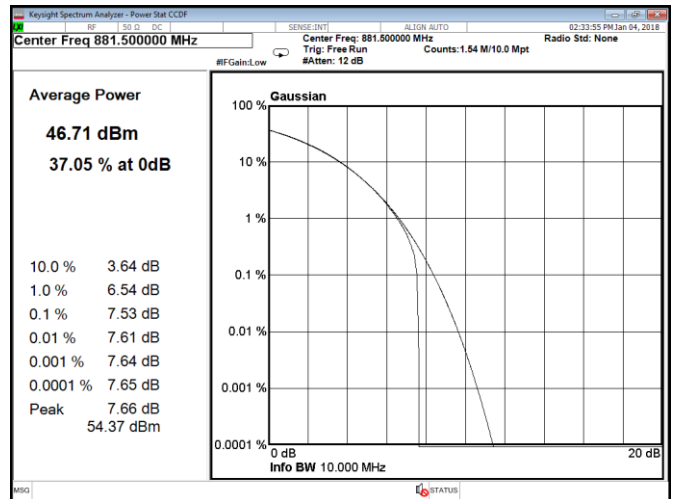


Figure 8.2-28: CCDF, QPSK, Port B, mid channel, configuration 1

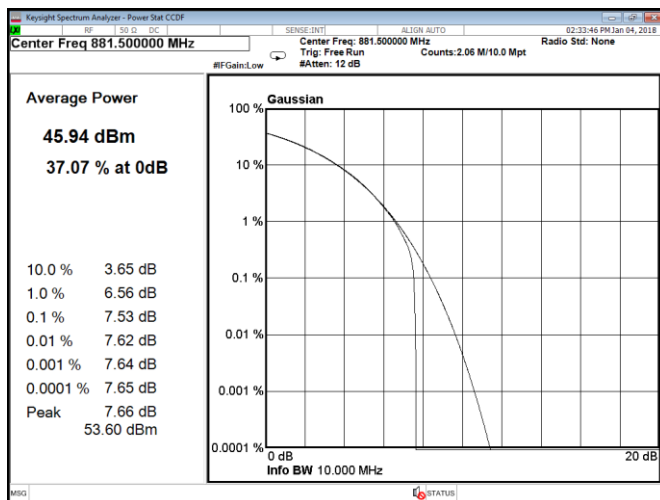


Figure 8.2-29: CCDF, QPSK, Port C, mid channel, configuration 1

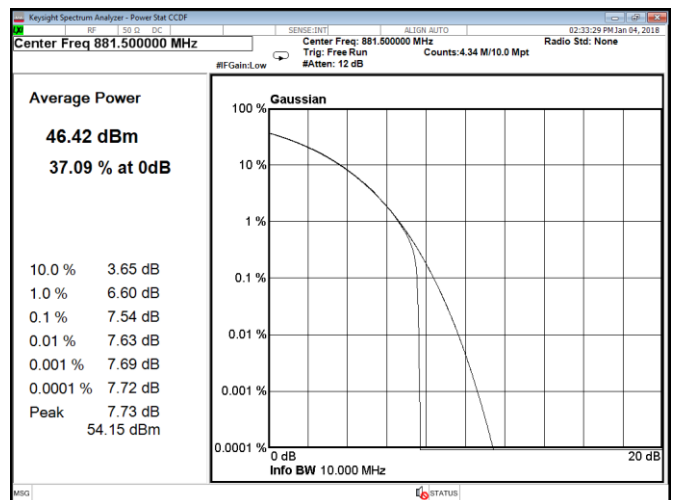


Figure 8.2-30: CCDF, QPSK, Port D, mid channel, configuration 1

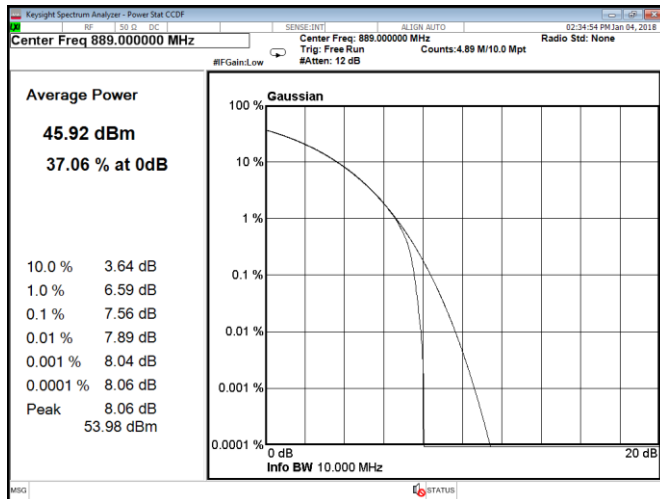


Figure 8.2-31: CCDF, QPSK, Port A, high channel, configuration 1

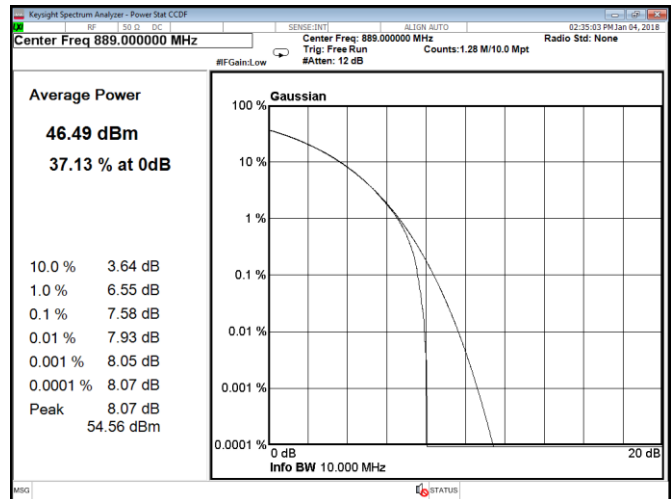


Figure 8.2-32: CCDF, QPSK, Port B, high channel, configuration 1

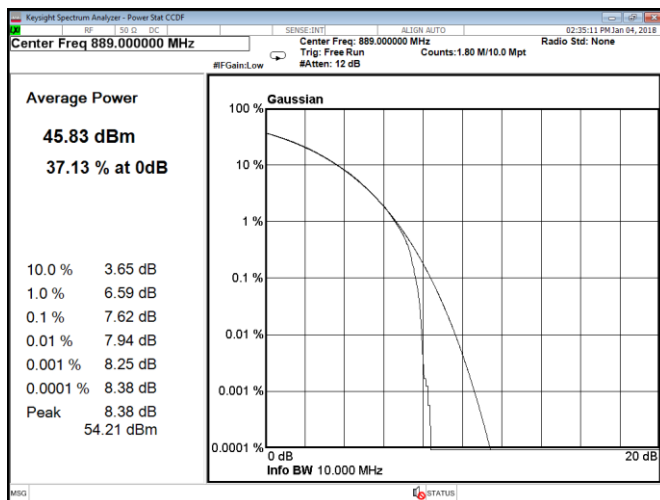


Figure 8.2-33: CCDF, QPSK, Port C, high channel, configuration 1

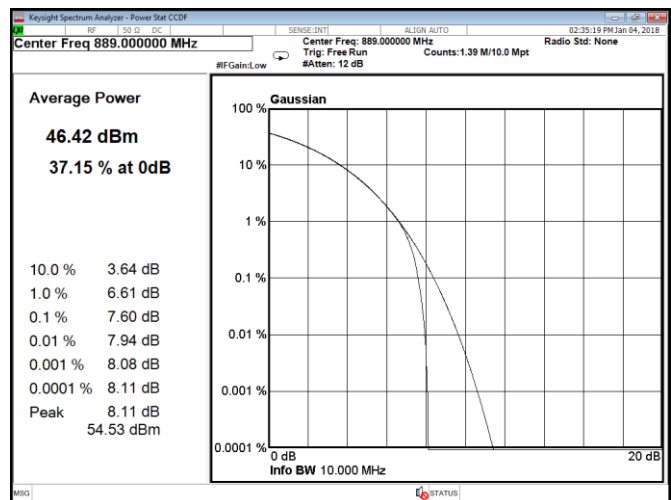


Figure 8.2-34: CCDF, QPSK, Port D, high channel, configuration 1

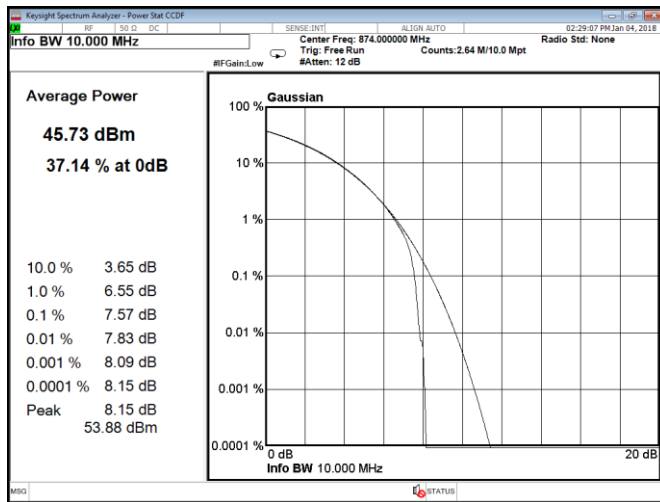


Figure 8.2-35: CCDF, 16QAM, Port A, low channel, configuration 1

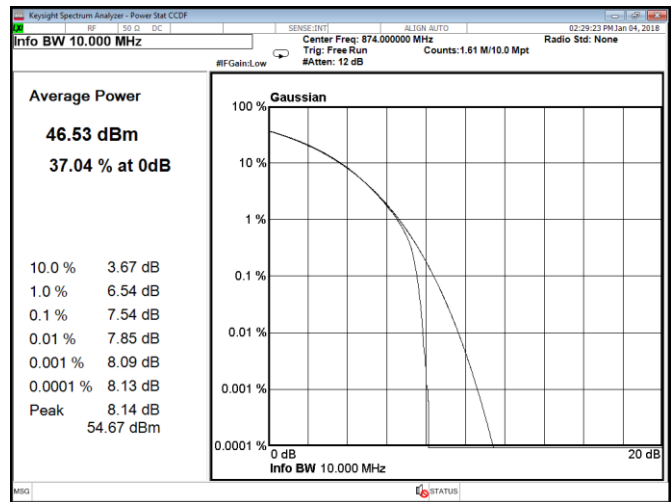


Figure 8.2-36: CCDF, 16QAM, Port B, low channel, configuration 1

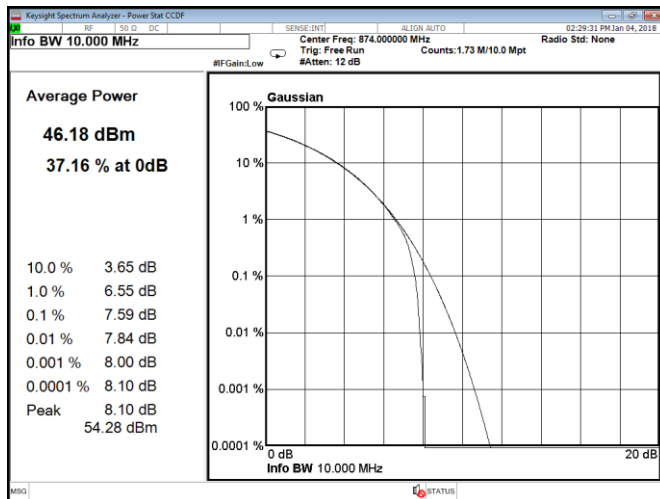


Figure 8.2-37: CCDF, 16QAM, Port C, low channel, configuration 1

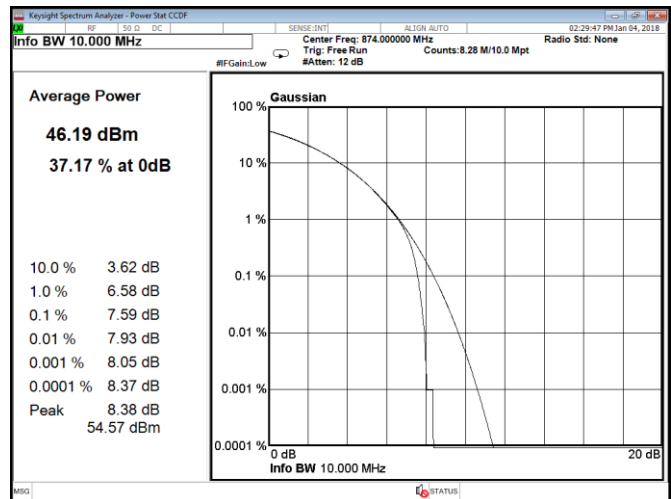


Figure 8.2-38: CCDF, 16QAM, Port D, low channel, configuration 1

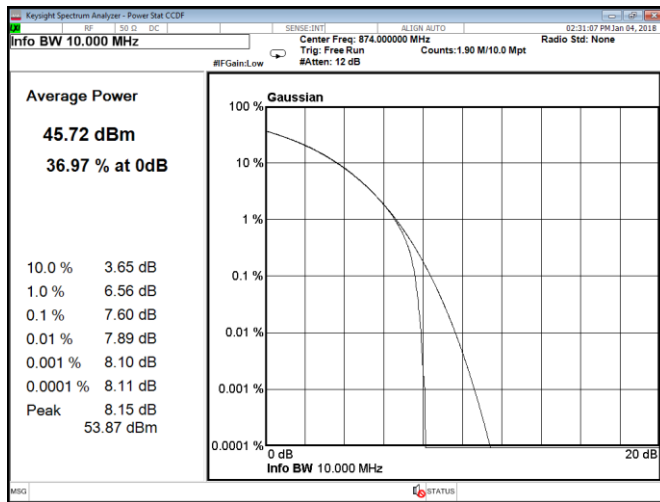


Figure 8.2-39: CCDF, 64QAM, Port A, low channel, configuration 1

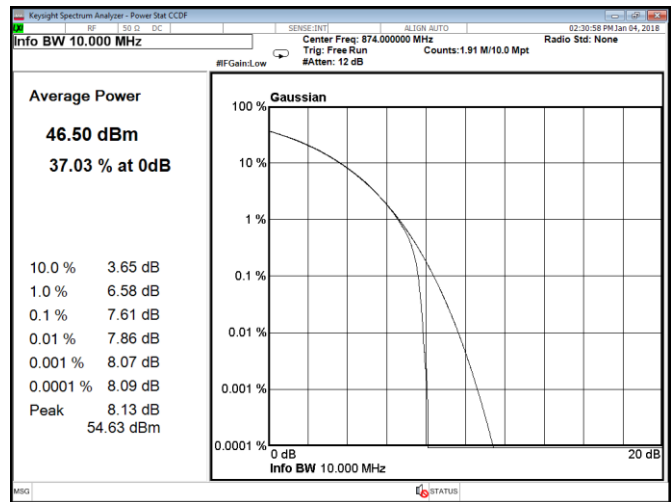


Figure 8.2-40: CCDF, 64QAM, Port B, low channel, configuration 1

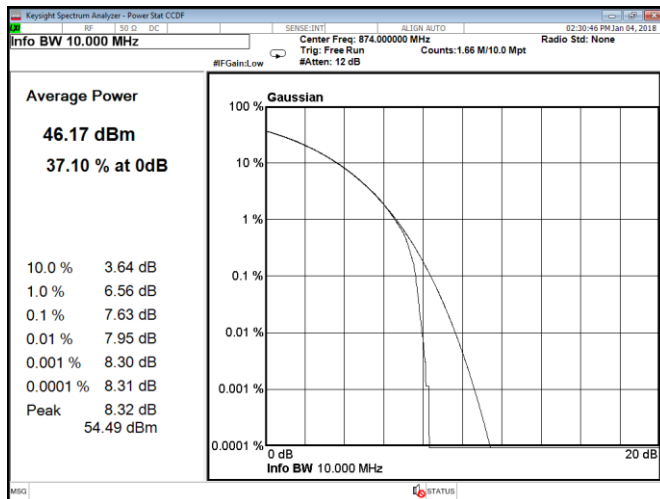


Figure 8.2-41: CCDF, 64QAM, Port C, low channel, configuration 1

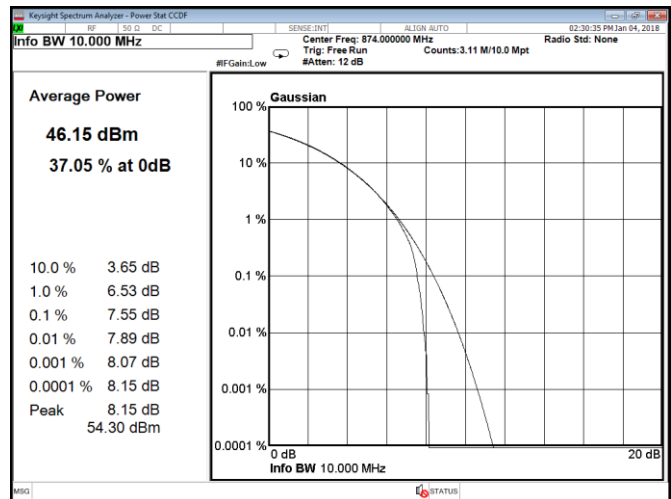


Figure 8.2-42: CCDF, 64QAM, Port D, low channel, configuration 1