HPA-901B High Power Amplifier
(Tested in SAT-906B System)
FCC Type Certification Report
FCC ID: AJK8222577

Exhibit F

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Exhibit F.1 RF Power Output

1.1 FCC Requirements

The discussion and test results shown in this section address and meet the requirements of the following FCC requirements:

Section 2.1046 (a)

For transmissions other than simple sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the value of current and voltage on circuit elements specified in 2.1033 (c) (8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

Section 2.1033 (c)(8)

The dc voltages applied to and dc currents into the several elements of the final radio frequency amplifying device for normal operation over the power range.

Section 87.131 Notes (1), (ii), (8)

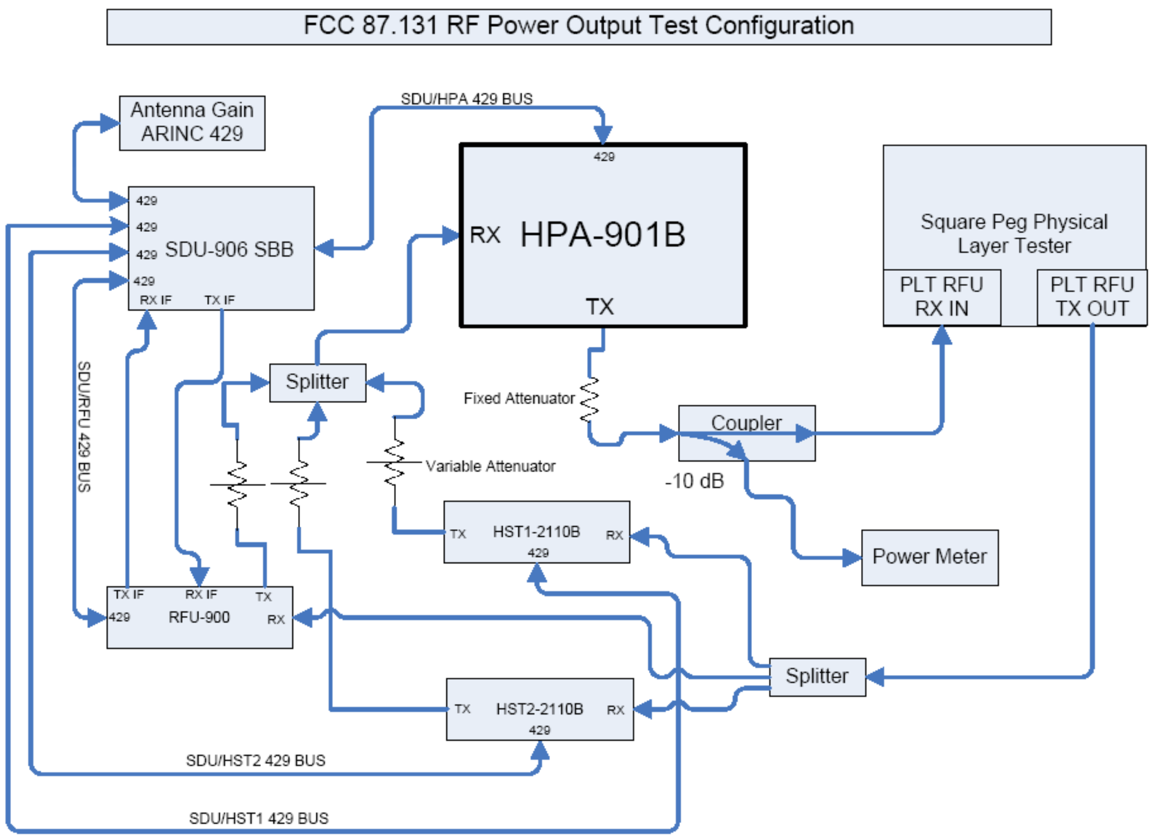
(1) The power is measured at the transmitter output terminals and the type of power is determined according to the emission designator as follows:

(ii) Peak Envelope power (pX) for all emissions designators other than those referred to in paragraph (l) of this note.

(8) Power may not exceed 60 watts per carrier. The maximum EIRP may not exceed 2000 watts per carrier.

1.2 Test Procedures

The following test configuration was used to perform the Classic Aero / Swift64 and Classic Aero / SwiftBroadband RF Power Output Measurements.



1.2.1 Test Equipment

Item	Manufacturer	PN	SN	Notes
HPA-901B	Rockwell Collins	822-2577-001	080731	AC Powered
HST-2110 B	Rockwell Collins	270-2885-010		AC Powered
HST-2110 B	Rockwell Collins	270-2885-010		AC Powered
SDU-906 SBB	Rockwell Collins	822-0314-102	L4FF	AC Powered
RFU-900	Rockwell Collins	622-8849-100	E12	AC Powered
Physical Layer Tester	Square Peg Communications, Inc.	EM-907532C-04	PLTH_080	
Physical Layer Tester Radio Frequency Unit	Square Peg Communications, Inc.	EM-907516C-01	23	
Power Meter	HP	438A	22A05518	
Variable Attenuator	Weinschel	910-20-11	7936	
Fixed Attenuator (30dB)	Weinschel	58-30-34-LIM	PF562	
Fixed Attenuator (10dB)	Weinschel	2	BN0739	
Directional Coupler	Narda	3002-10	70612	
Splitter	Mini-circuits	ZAPD-2	460-0206-551	

1.2.2 RF Power Output – Classic Aero/SwiftBroadband

FCC Requirements detailed in sections 87.131 (RF Power Output) and 87.187(q) (Priority and Preemption) were tested with a combined procedure in which Classic Aero voice services were exercised in concert with SwiftBroadband services. During the test procedure the output EIRP of the Classic Aero voice services and Swift Broadband data services was varied along with antenna gain in order to demonstrate accurate power control and, when necessary, the preemption of lower priority services in order to maintain output EIRP for higher priority services. Table 1 below documents the various conditions and records the predicted, measured and reported RF power output in order to demonstrate compliance.

1.2.3 RF Power Output – Classic Aero/Swift64

FCC Requirements detailed in sections 87.131 (RF Power Output) and 87.187(q) (Priority and Preemption) were tested with a combined procedure in which Classic Aero voice services were exercised in concert with Swift64 services. During the test procedure the output EIRP of the Classic Aero voice services and Swift64 data services were varied along with antenna gain in order to demonstrate accurate power control and, when necessary, the preemption of lower priority services in order to maintain output EIRP for higher priority services. Table 2 below documents the various conditions and records the predicted, measured and reported RF power output in order to demonstrate compliance.

Table 1 RF Power Output – Classic Aero/SwiftBroadband

HPA -> ANT Cable Loss (dB)	2.00
Data Reservation (dBW)	10.50

		High Priority	Low Priority	Public Priority										
	Ant Gain (dBi)	Aero Call 1 (dBW EIRP)	Aero Call 2 (dBW EIRP)	HST Allocated EIRP (dBW)	HST Reported EIRP (dBW)	Calculated HPA Output (dBm)	Reported HPA Output (dBm)	Measured HPA Output (dBm)	Power Accuracy Results (P/F)	Calculated HPA Output (Watts)	Measured HPA Output (Watts)	Available HPA Output (Watts)	Margin	Preemption Results (P/F)
	18.00	18.50	18.50	20.00	20.00	37.83	37.50	38.02	PASS	6.07	6.34	59.72	53.38	PASS
	17.00	18.50	17.50	20.00	20.00	38.56	38.00	38.60	PASS	7.18	7.24	59.65	52.40	PASS
	16.00	18.50	16.50	20.00	20.00	37.60	38.50	39.39	PASS	5.76	8.69	59.55	50.86	PASS
	15.00	18.50	15.50	20.00	20.00	40.14	39.50	40.11	PASS	10.34	10.26	59.44	49.18	PASS
	14.00	18.50	14.50	20.00	20.00	40.99	40.00	40.91	PASS	12.55	12.33	59.29	46.96	PASS
	13.00	18.50	13.50	20.00	20.00	41.86	41.00	41.77	PASS	15.34	15.03	59.11	44.08	PASS
	12.00	17.50	12.50	20.00	20.00	42.41	41.50	42.38	PASS	17.40	17.30	58.88	41.58	PASS
	11.00	16.50	11.50	20.00	20.00	43.01	42.00	42.95	PASS	19.99	19.72	58.59	38.86	PASS
	10.00	15.50	10.50	20.00	20.00	43.66	43.00	43.56	PASS	23.25	22.70	58.22	35.52	PASS
	9.00	14.50	10.50	20.00	20.00	44.44	45.00	45.64	PASS	27.81	36.64	57.76	21.12	PASS
	8.00	13.50	10.50	20.00	20.00	45.26	46.00	46.50	PASS	33.56	44.67	57.18	12.51	PASS
	7.00	12.50	10.50	20.00	20.00	46.11	46.00	46.73	PASS	40.79	47.10	56.45	9.35	PASS
HST Preempted	7.00	12.50	11.50	0.00	0.00	40.17	39.50	40.20	PASS	10.41	10.47	56.45	45.98	PASS
HST Preempted	7.00	16.50	18.50	0.00	0.00	45.66	45.00	45.57	PASS	36.83	36.06	56.45	20.39	PASS
HST Preempted	7.00	17.50	18.50	0.00	0.00	46.07	45.51	46.40	PASS	40.49	43.65	56.45	12.80	PASS
Low Priority Call Preempted	7.00	21.50	0.00	0.00	0.00	46.56	46.50	46.67	PASS	45.30	46.45	56.45	10.00	PASS

HPA -> ANT Cable Loss (dB)	2.00
Data Reservation (dBW)	10.50

		High Priority	Low Priority	Public Priority										
	Ant Gain (dBi)	Aero Call 1 (dBW EIRP)	Aero Call 2 (dBW EIRP)	HST Allocated EIRP (dBW)	HST Reported EIRP (dBW)	Calculated HPA Output (dBm)	Reported HPA Output (dBm)	Measured HPA Output (dBm)	Power Accuracy Results (P/F)	Calculated HPA Output (Watts)	Measured HPA Output (Watts)	Available HPA Output (Watts)	Margin	Preemption Results (P/F)
HST Preempted	7.00	17.50	18.50	0.00	0.00	46.07	46.60	46.61	PASS	40.49	45.81	56.45	10.64	PASS
HST Preempted	8.00	0.00	21.50	0.00	0.00	45.56	45.00	45.35	PASS	35.98	34.28	57.18	22.90	PASS
	9.00	0.00	18.50	20.00	20.00	45.35	44.50	45.50	PASS	34.28	35.48	57.76	22.28	PASS
	10.00	0.00	12.50	20.00	20.00	42.75	42.00	42.86	PASS	18.83	19.32	58.22	38.90	PASS
	11.00	0.00	12.50	20.00	20.00	41.75	41.50	42.01	PASS	14.95	15.89	58.59	42.70	PASS
	12.00	0.00	12.50	20.00	20.00	40.75	40.50	40.90	PASS	11.88	12.30	58.88	46.58	PASS
	13.00	0.00	12.50	20.00	20.00	39.75	39.50	39.88	PASS	9.44	9.73	59.11	49.38	PASS
	14.00	0.00	12.50	20.00	20.00	38.75	38.50	38.93	PASS	7.49	7.82	59.29	51.48	PASS
	15.00	0.00	12.50	20.00	20.00	37.75	37.50	38.02	PASS	5.95	6.34	59.44	53.10	PASS
	16.00	0.00	12.50	20.00	20.00	36.75	36.50	37.02	PASS	4.73	5.04	59.55	54.52	PASS
	17.00	0.00	12.50	20.00	20.00	35.75	35.50	35.04	PASS	3.76	3.19	59.65	56.45	PASS
	18.00	0.00	12.50	20.00	20.00	34.75	34.50	36.08	PASS	2.98	4.06	59.72	55.66	PASS

Table 2 RF Power Output – Classic Aero/ Swift 64

Max HPA Out (W)	**60**
Max HPA Out (dBW)	**17.78**
Ant to HPA Loss (dB)	**2**
RFU to HPA Attn (dB)	**23.5**
HST1 to HPA Attn (dB)	**19**
HST2 to HPA Attn (dB)	**19**

								Dual HST Cont Wave				
Ant Gain	**Total EIRP**	**Data**	**EIRP**	**EIRP**	**Avail EIRP**	**HST1 EIRP**	**HST2 EIRP**	**Calculated HPA Out**	**Measured HPA Out**	**Computed HPA at output Trace**	**error**	**Pass/Fail**
dB	**dBW**	**dBW**	**Call 1**	**Call 2**	**dBW**	**dBW**	**dBW**	**dBm**	**dBm**	**dBm**	**dB**	**(+2.5/- 1.0 dB)**
12	26.53	10.50	-100	-100	26.42	**22.5**	**19.5**	44.26	**44.64**	**44.00**	-0.26	**PASS**
12	26.53	10.50	-100	-100	26.42	**20.5**	**17.5**	42.26	**42.65**	**42.00**	-0.26	**PASS**
12	26.53	10.50	-100	-100	26.42	**18.5**	**15.5**	40.26	**40.65**	**40.00**	-0.26	**PASS**
12	26.53	10.50	**12.5**	-100	26.24	18.5	**15.5**	40.94	**42.20**	**41.50**	0.56	**PASS**
12	26.53	10.50	**11.5**	-100	26.28	18.5	**15.5**	40.81	**42.20**	**41.50**	0.69	**PASS**
12	26.53	10.50	**10.5**	-100	26.31	18.5	**15.5**	40.70	**42.18**	**41.50**	0.80	**PASS**
12	26.53	10.50	10.5	**12.5**	26.13	18.5	**15.5**	41.31	**42.21**	**41.50**	0.19	**PASS**
12	26.53	10.50	10.5	**11.5**	26.16	18.5	**15.5**	41.19	**42.20**	**41.50**	0.31	**PASS**
12	26.53	10.50	10.5	**10.5**	26.19	18.5	**15.5**	41.10	**41.19**	**41.50**	0.40	**PASS**
13	27.53	10.50	10.5	10.5	27.27	18.5	**15.5**	40.10	**41.20**	**40.50**	0.40	**PASS**
14	28.53	10.50	10.5	10.5	28.32	18.5	**15.5**	39.10	**40.20**	**39.50**	0.40	**PASS**
15	29.53	10.50	10.5	10.5	29.37	18.5	**15.5**	38.10	**39.22**	**38.50**	0.40	**PASS**
16	30.53	10.50	10.5	10.5	30.40	18.5	**15.5**	37.10	**38.11**	**37.50**	0.40	**PASS**
11	25.53	10.50	10.5	10.5	25.10	18.5	**15.5**	42.10	**43.18**	**42.50**	0.40	**PASS**
10	24.53	10.50	10.5	10.5	23.98	18.5	**15.5**	43.10	**43.29**	**42.50**	-0.60	**PASS**
9	23.53	10.50	10.5	10.5	22.83	18.5	**15.5**	44.10	**45.17**	**44.00**	-0.10	**PASS**
8	22.53	10.50	10.5	10.5	21.63	18.5	**15.5**	45.10	**46.11**	**45.00**	-0.10	**PASS**
7	21.53	10.50	10.5	10.5	20.36	18.5	**15.5**	46.10	**47.05**	**46.00**	-0.10	**PASS**
6	HST Preempted											**n/a**

1.3 RF Power Output Results

The SAT-906B System output power to the antenna is equal to the power output from the High Power Amplifier (HPA-901B), less the losses between the HPA and the antenna. These losses include cable loss, LAN/Diplexer loss, and other interconnection losses. They are installation dependent and are specified below:

Cable Loss = 1.70 dB maximum
LNA/Diplexer Loss = 0.8 dB maximum
Total HPA to Antenna Loss = 2.50dB maximum

Typical values for these losses measured are:

Cable Loss = 1.1 to 1.7 dB
LNA/Diplexer Loss = 0.5 to 0.8 dB
Total HPA to Antenna Loss = 1.6 to 2.5 dB

The HPA-901B rated output power is 60 watts total average power for multiple carriers. In the SAT-906B system information about the output power of the HPA-901B and the antenna gain is provided to the SDU-906 SBB to be used for computing radiated power on an individual carrier and composite basis. System power control software limits HPA power output to a maximum of 60 Watts for all carriers, and limits each carrier to a maximum per carrier EIRP of 2 kW.

The DC supply voltages and typical DC current values for the HPA-901B are listed in the table below.

Table 3 Voltages and Currents

DC Supply Voltage	Maximum DC Supply Current	Typical Measured DC Supply Current
+32 VDC	11.0 Amps	8. 5 Amps
+9 VDC	1.5 Amps	0.8 Amps
+5 VDC	1.5 Amps	1.3 Amps

Exhibit F.2 Modulation Characteristics

The SAT-906B system uses digital modulation to efficiently utilize the satellite power and bandwidth. All modulation characteristics and emission types are governed by the SDU-906 SBB for Classic Aero and the HST-2110B for Swift64 and SwiftBroadband. The SDU-906 SBB uses the same hardware and software to generate the Classic Aero modulated signals as the SDU-906. Please refer to the SDU-906 Application(s) for Type Acceptance (FCC IDs: AJKPN822-0309/ AJKPN822-0310/ AJKPN822-0311/ AJKPN822-0312/ AJKPN822-0313/ AJKPN822-0314), which was granted type acceptance on March 07, 1994 for Classic Aero modulation characteristics and emission types. For Swift64 and SwiftBroadband modulation characteristics and emission types, refer to the HST-2110B Application for Type Acceptance (FCC ID: AJK8222232), which was granted type acceptance on July 29, 2008.

Exhibit F.3 Occupied Bandwidth

3.1 FCC Requirements

The discussion and test results shown in this section address and meet the requirements of the following FCC requirements:

Section 2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable.

Section 2.1049 (h)

Transmitters employing digital modulation techniques – when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are operational at the discretion of the user.

Section 87.135 (a), (b), (c)

(a) - Occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are equal to 0.5 percent of the total mean power of a given emission.

(b) - The authorized bandwidth is the maximum occupied bandwidth authorized to be used by a station.

(c) - The necessary bandwidth for a given class of emission is the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.

Section 87.137 (a)

The class of emissions, corresponding emission designators and authorized bandwidths for use by Aircraft Earth Stations are as follows:

Table 4 Emissions Classes

Class of Emission	Emission Designator	Authorized Bandwidth (kilohertz)
G1D[1]	21K0G1D	25
G1E[1]	21K0G1E	25
G1W[1]	21K0G1W	25

[1]Lower values of necessary and authorized bandwidths are permitted.

3.2 Test Procedure

The following test configuration was used to perform the Occupied Bandwidth measurements.

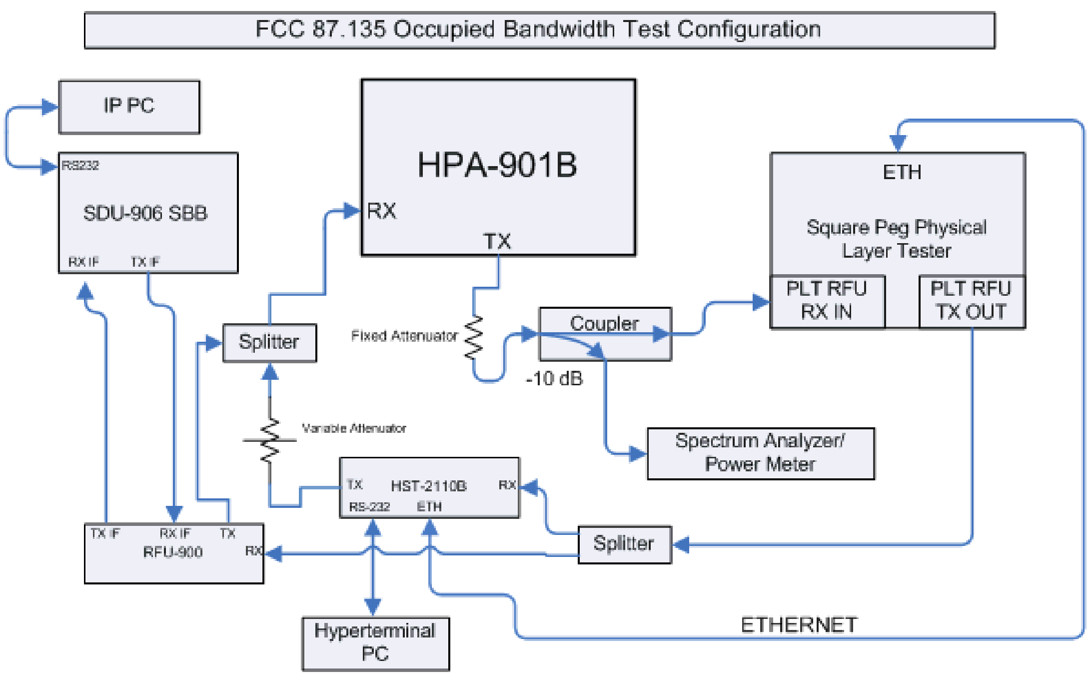


Figure 1 Occupied Bandwidth Test Configuration

3.2.1 Test Equipment

Item	Manufacturer	PN	SN	Notes
HPA-901B	Rockwell Collins	822-2577-001	080731	AC Powered
HST-2110B	Rockwell Collins	270-2885-010	648	AC Powered
RFU-900	Rockwell Collins	622-8849-100	E12	AC Powered
SDU-906 SBB	Rockwell Collins	822-0314-102	L4FF	AC Powered
Physical Layer Tester	Square Peg Communications, Inc.	EM-9075326C-04	PLTH_080	
Physical Layer Tester Radio Frequency Unit	Square Peg Communications, Inc.	EM-907516001	023	
Desktop	Dell	DCTA	CRL02030	
Desktop	Dell	DCTA	CRL02029	
Power Meter	Agilent	E4416A	MY45101590	
Spectrum Analyzer	Agilent	E4440A	MY48250105	
Variable Attenuator	Weinschel	910-20-11	7936	
Fixed Attenuator (20dB)	Weinschel	12-B1-09	460-0144-161	
Directional Coupler	Narda	3002-10	70612	

3.2.2 Occupied Bandwidth – Classic Aero

1. Connect the test equipment as shown in Figure 1.
2. Apply power to the SAT-906B.
3. Place the SDU-906 SBB into maintenance mode.
4. Using the IP application, configure the SDU-906SBB to radiate the following signals at 47.2 dBm using the modulation, bit rate and center frequency specified in the table below:

SAT-906B Occupied Bandwidth Test Conditions for Classic Aero			
Condition	**Modulation**	**Bit Rate (bps)**	**Frequency (MHz)**
1	A-BPSK	600	1626.50
2	A-BPSK	600	1643.50
3	A-BPSK	600	1660.50
4	A-BPSK	1,200	1626.50

5	A-BPSK	1,200	1643.50
6	A-BPSK	1,200	1660.50
7	A-QPSK	8,400	1626.50
8	A-QPSK	8,400	1643.50
9	A-QPSK	8,400	1660.50
10	A-QPSK	10,500	1626.50
11	A-QPSK	10,500	1643.50
12	A-QPSK	10,500	1660.50
13	A-QPSK	21,000	1626.50
14	A-QPSK	21,000	1643.50
15	A-QPSK	21,000	1660.50

5. Configure the spectrum analyzer to take occupied bandwidth measurements.
6. Use the spectrum analyzer to take measurements using the settings detailed below for each of the conditions listed.

SAT-906B Occupied Bandwidth Measurement Configuration for Classic Aero				
Condition	**Freq. Span (KHz)**	**Resolution Bandwidth (Hz)**	**Occupied BW % Power**	**Trace Format**
1, 2, 3	75	300	99.00 %	Max Hold (10 sweeps minimum)
4, 5, 6	75	300	99.00 %	Max Hold (10 sweeps minimum)
7, 8, 9	75	300	99.00 %	Max Hold (10 sweeps minimum)
10, 11, 12	75	300	99.00 %	Max Hold (10 sweeps minimum)
13, 14, 15	75	300	99.00 %	Max Hold (10 sweeps minimum)

3.2.3 Occupied Bandwidth – Swift 64

1. Connect the test equipment as shown in Figure 1.
2. Apply power to the SAT-906B.
3. Place the SDU-906 SBB into maintenance mode.
4. Using the Hyper Terminal maintenance interface on the HST-2110B, power up the channel card and configure the HST to radiate the following signals with zero dB of channel card back off. Verify that the HPA-901B output is at 47.2dBm:

SAT-906B Occupied Bandwidth Test Conditions for Swift 64			
Condition	**Modulation**	**Bit Rate (bps)**	**Frequency (MHz)**
1	BPSK	3,000	1626.50
2	BPSK	3,000	1643.50
3	BPSK	3,000	1660.50
4	16-QAM	134,400	1626.50
5	16-QAM	134,400	1643.50
6	16-QAM	134,400	1660.50

5. Configure the spectrum analyzer to take occupied bandwidth measurements.
6. Use the spectrum analyzer to take measurements using the settings detailed below for each of the conditions listed.

SAT-906B Occupied Bandwidth Measurement Configuration for Swift 64				
Condition	**Freq. Span (KHz)**	**Resolution Bandwidth (Hz)**	**Occupied BW % Power**	**Trace Format**
1, 2, 3	100	300	99.00 %	Max Hold (10 sweeps minimum)
4, 5, 6	1000	3,000	99.00 %	Max Hold (10 sweeps minimum)

3.2.4 Occupied Bandwidth – Swift Broadband

1. Connect the test equipment as shown in Figure 1.
2. Apply power to the SAT-906B.
3. Place the SDU-906 SBB into maintenance mode.
4. Using the Hyper Terminal maintenance interface on the HST-2110B, force the power up of the HST-2110Bs Channel Card.
5. Once the HSTs Channel Card is powered and connected via Ethernet to the Square Peg PLT, use the WinTerm application to place the Channel Card into MTR Test Mode.
6. Start the BPLT application on the Square Peg PLT and run MTR test script MTR14a.scx.
7. Using the interface provided by the test script configure the HST to radiate the following signals and verify that the HPA-901B output is at 46.5 dBm:

SAT-906B Occupied Bandwidth Test Conditions for SBB			
Condition	**Modulation**	**Bit Rate (bps)**	**Frequency (MHz)**
1	π/4-QPSK	33,600	1626.50
2	π/4-QPSK	33,600	1643.50
3	π/4-QPSK	33,600	1660.50

4	π/4-QPSK	67,200	1626.50
5	π/4-QPSK	67,200	1643.50
6	π/4-QPSK	67,200	1660.50
7	π/4-QPSK	134,400	1626.50
8	π/4-QPSK	134,400	1643.50
9	π/4-QPSK	134,400	1660.50
10	π/4-QPSK	302,400	1626.50
11	π/4-QPSK	302,400	1643.50
12	π/4-QPSK	302,400	1660.50
13	16-QAM	134,400	1626.50
14	16-QAM	134,400	1643.50
15	16-QAM	134,400	1660.50
16	16-QAM	268,800	1626.50
17	16-QAM	268,800	1643.50
18	16-QAM	268,800	1660.50
19	16-QAM	604,800	1626.50
20	16-QAM	604,800	1643.50
21	16-QAM	604,800	1660.50

8. Configure the spectrum analyzer to take occupied bandwidth measurements.
9. Use the spectrum analyzer to take measurements using the settings detailed below for each of the conditions listed.

SAT-906B Occupied Bandwidth Measurement Configuration for SBB				
Condition	**Freq. Span (KHz)**	**Resolution Bandwidth (Hz)**	**Occupied BW % Power**	**Trace Format**
1, 2, 3	1,000	3,000	99.00 %	Max Hold (10 sweeps minimum)
4, 5, 6	1,000	3,000	99.00 %	Max Hold (10 sweeps minimum)
7, 8, 9	1,000	3,000	99.00 %	Max Hold (10 sweeps minimum)
10, 11, 12	1,000	3,000	99.00 %	Max Hold (10 sweeps minimum)
13, 14, 15	1,000	3,000	99.00 %	Max Hold (10 sweeps minimum)
16, 17, 18	1,000	3,000	99.00 %	Max Hold

				(10 sweeps minimum)
19, 20, 21	1,000	3,000	99.00 %	Max Hold (10 sweeps minimum)

3.3 Occupied Bandwidth Results

In all cases, the measured bandwidth falls within the 25 kHz limit authorized bandwidth specified in Section 87.137 for Classic Aero operation.

A waiver for Swift 64 operation has previously been granted for 40K0D1D, 40K0D1E and 40K0D1W emission designators authorizing a bandwidth of 45 kHz. In all cases, the measured bandwidth falls within this 45 kHz limit.

A waiver for SwiftBroadband operation to accommodate the higher data rate emission type utilized by the INMARSAT Swift Broadband service and the associated occupied bandwidth has been granted by the FCC on June 05, 2008. (FCC IDs: AJK8222232)

The following table lists each of the test conditions and corresponding figure number of each measurement.

Occupied Bandwidth
List of Figures

Figure Number	Operational Mode	Condition Number	Modulation Type	Bit Rate (bps)	SDU/HST used	HPA used
2 – 4	Classic Aero	1 – 3	A-BPSK	600	SDU-906 SBB AC	HPA-901B
5 – 7	Classic Aero	4 – 6	A-BPSK	1200	SDU-906 SBB AC	HPA-901B
8 – 10	Classic Aero	7 - 9	A-QPSK	8400	SDU-906 SBB AC	HPA-901B
11 – 13	Classic Aero	10 - 12	A-QPSK	10,500	SDU-906 SBB AC	HPA-901B
14 – 16	Classic Aero	13 - 15	A-QPSK	21,000	SDU-906 SBB AC	HPA-901B
17 – 19	Swift64	1 – 3	BPSK	3000	HST-2110B AC	HPA-901B
20 – 22	Swift64	4 – 6	16-QAM	134,400	HST-2110B AC	HPA-901B
23 – 25	Swift Broadband	1 – 3	π/4-QPSK	33,600	HST-2110B AC	HPA-901B
26 – 28	Swift	4 – 6	π/4-QPSK	67,200	HST-2110B AC	HPA-901B

	Broadband					
29 – 31	Swift Broadband	7 - 9	π/4-QPSK	134,400	HST-2110B AC	HPA-901B
32 – 34	Swift Broadband	10 - 12	π/4-QPSK	302,400	HST-2110B AC	HPA-901B
35 – 37	Swift Broadband	13 - 15	16-QAM	134,400	HST-2110B AC	HPA-901B
38 – 40	Swift Broadband	16 - 18	16-QAM	268,800	HST-2110B AC	HPA-901B
41 – 43	Swift Broadband	19 - 21	16-QAM	604,800	HST-2110B AC	HPA-901B

Carrier Frequencies: Low Band: 1626.5 MHz, Mid Band: 1643.5 MHz, High Band: 1660.5 MHz

Figure 2 – Occupied BW - Classic 600 bps A-BPSK - Low Band

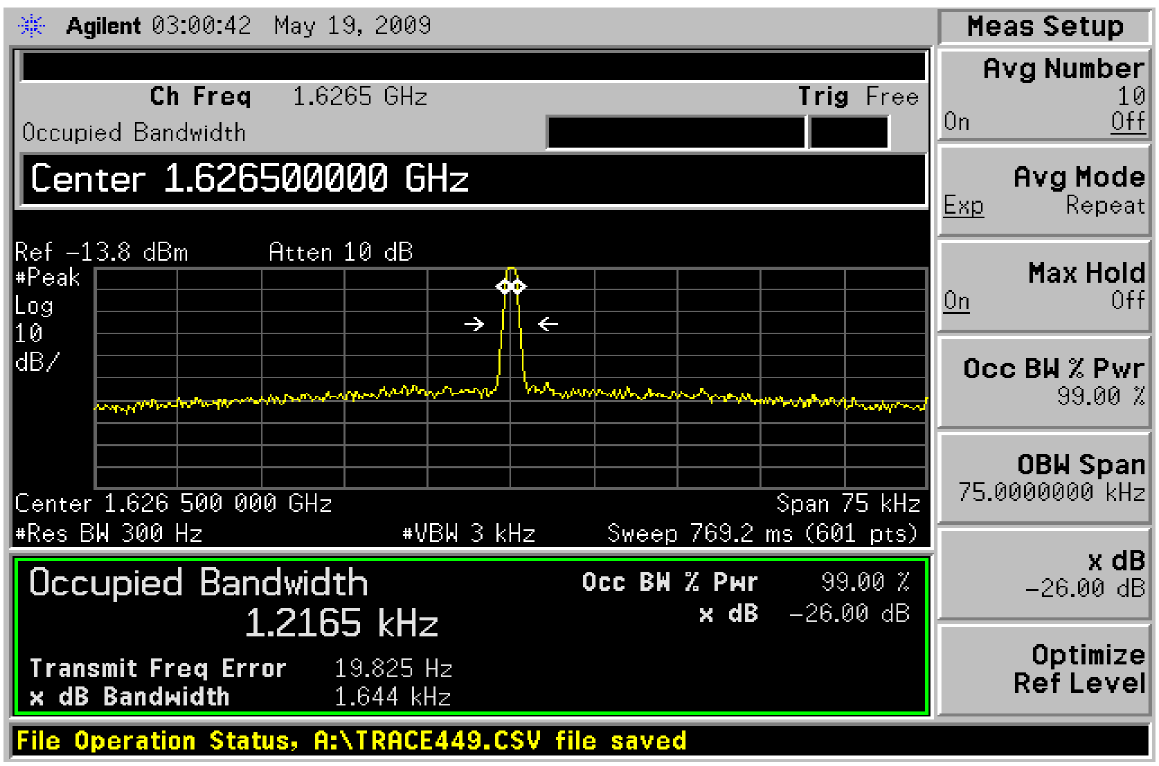


Figure 3 – Occupied BW - Classic 600 bps A-BPSK - Mid Band

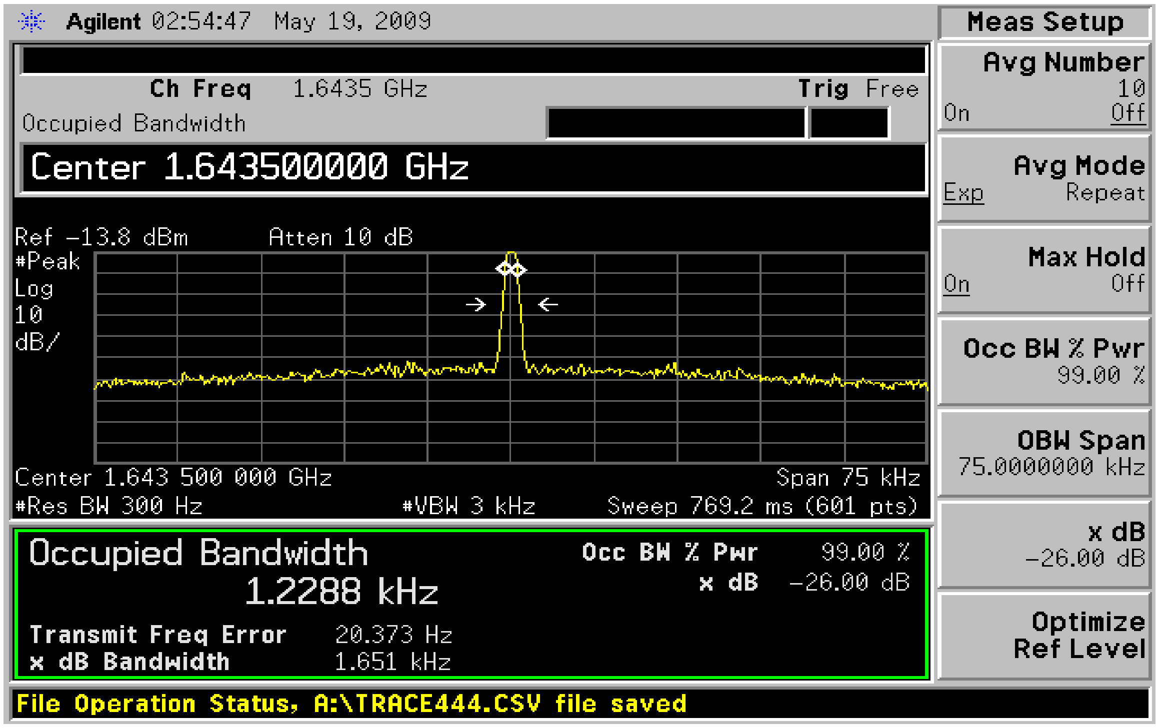


Figure 4 – Occupied BW - Classic 600 bps A-BPSK - High Band

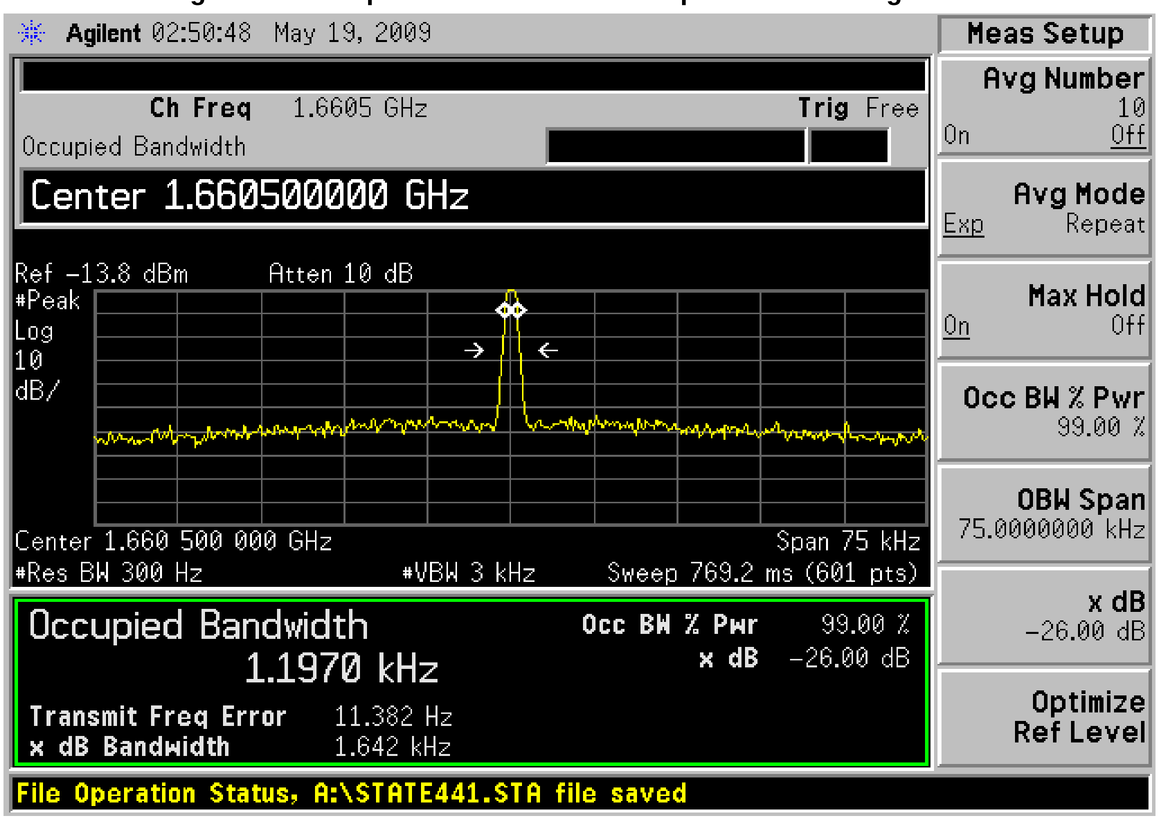


Figure 5– Occupied BW - Classic 1200 bps A-BPSK - Low Band

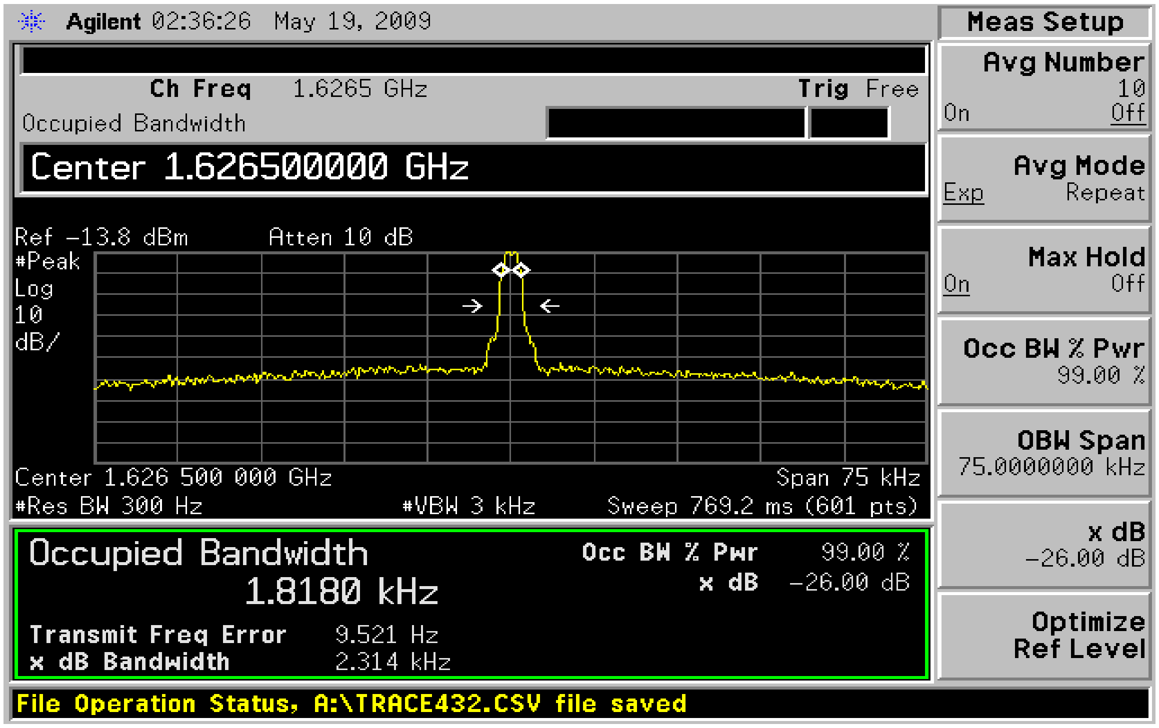


Figure 6 – Occupied BW - Classic 1200 bps A-BPSK - Mid Band

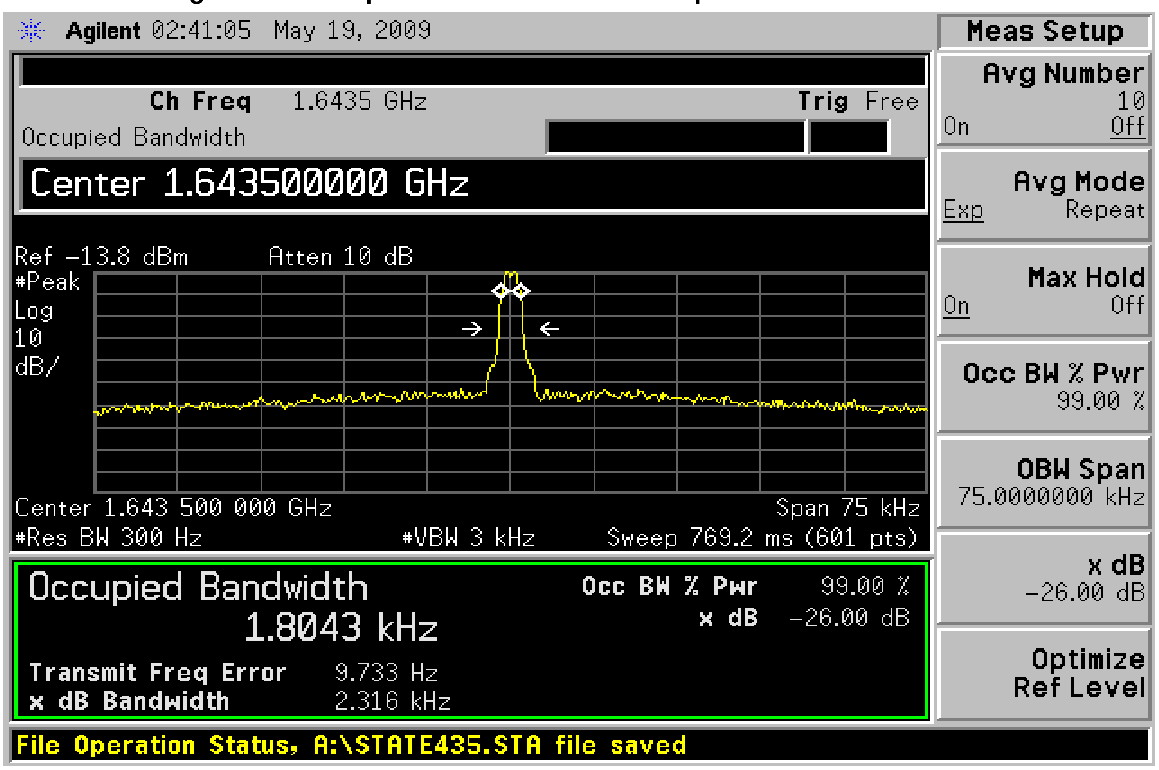


Figure 7 – Occupied BW - Classic 1200 bps A-BPSK - High Band

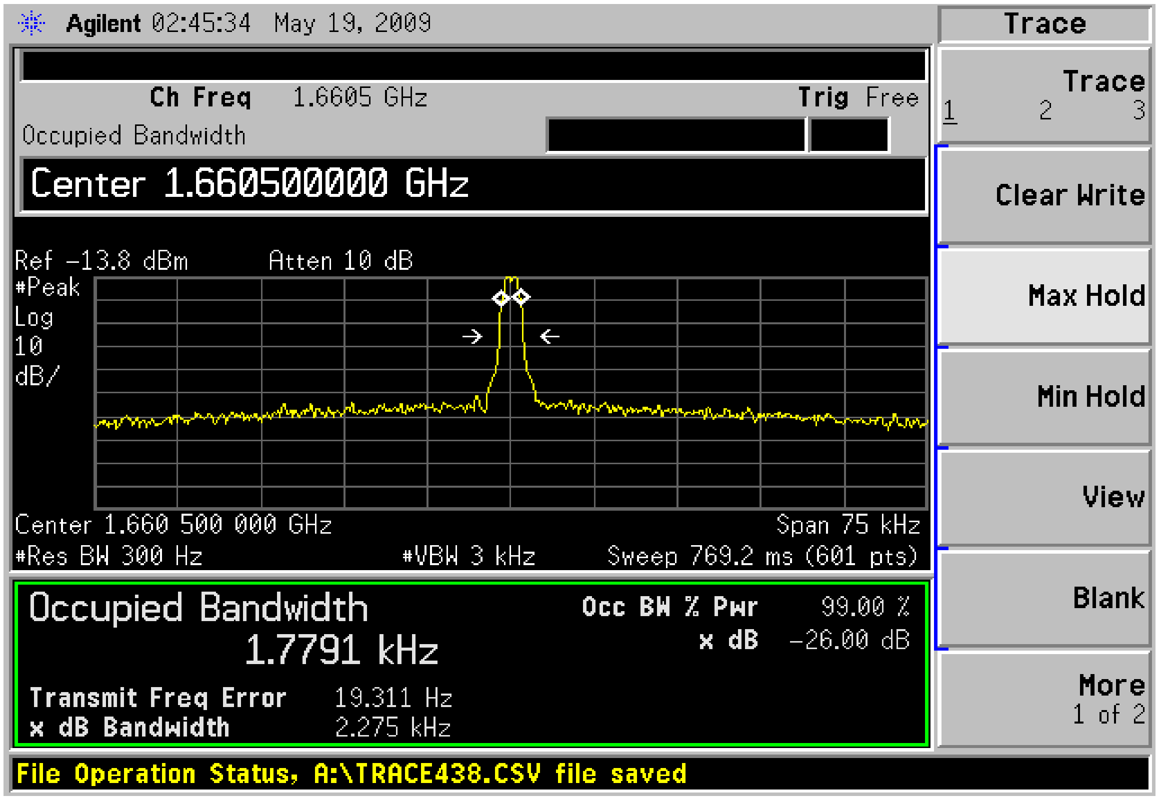


Figure 8 – Occupied BW - Classic 8400 bps A-QPSK - Low Band

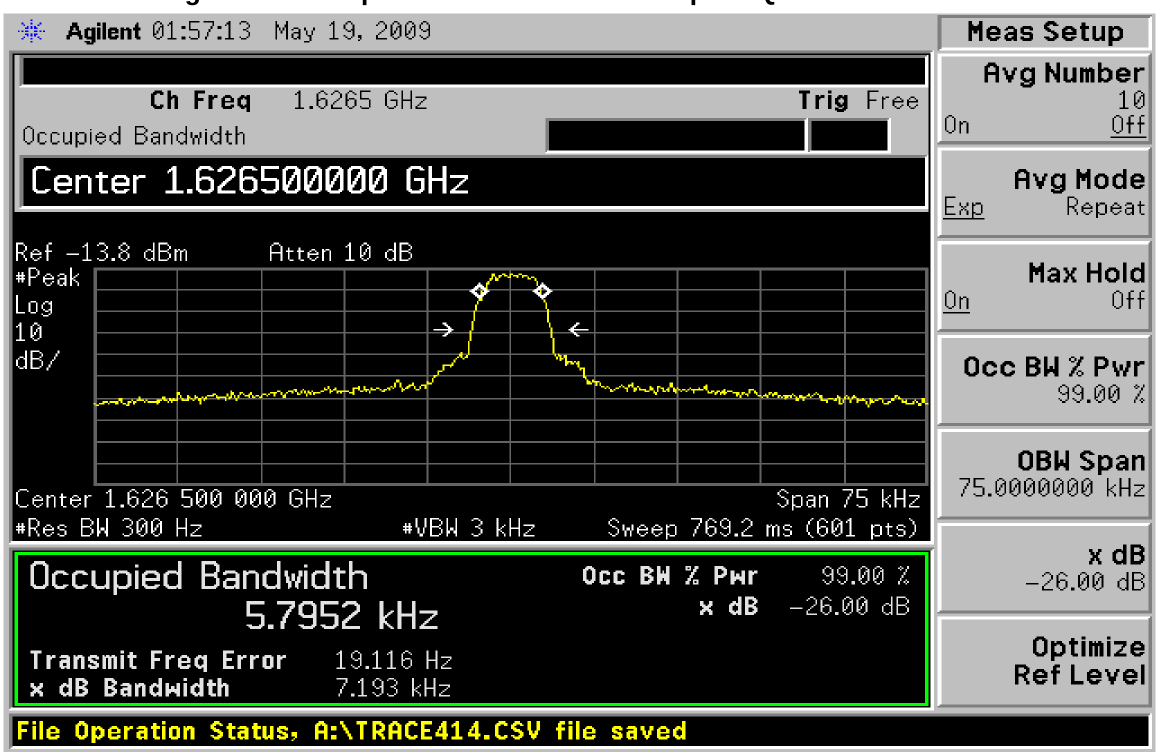


Figure 9 – Occupied BW - Classic 8400 bps A-QPSK - Mid Band

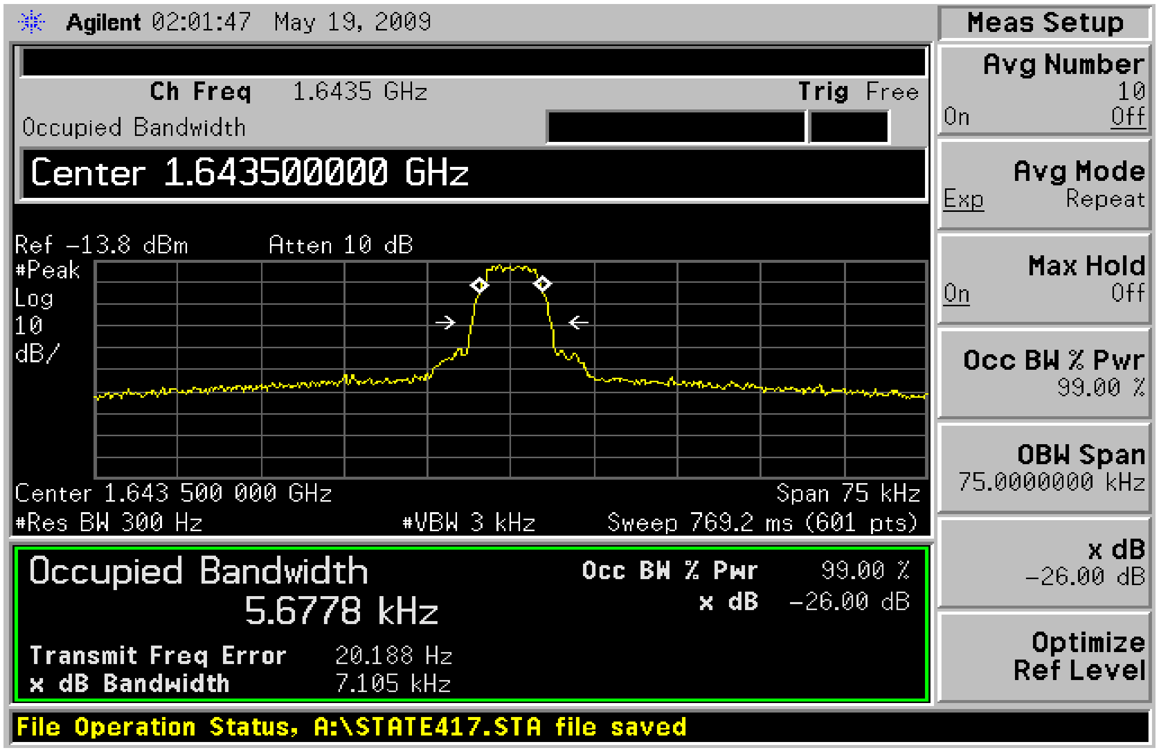


Figure 10 – Occupied BW - Classic 8400 bps A-QPSK - High Band

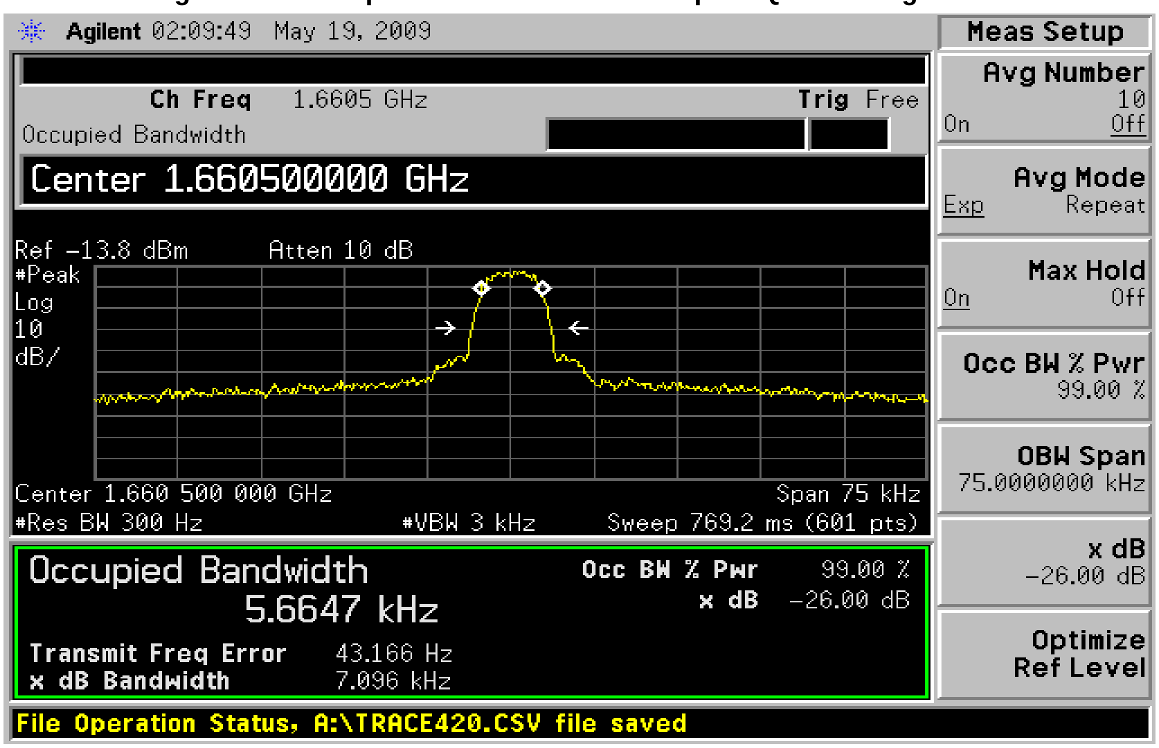


Figure 11 – Occupied BW - Classic 10,500 bps A-QPSK - Low Band

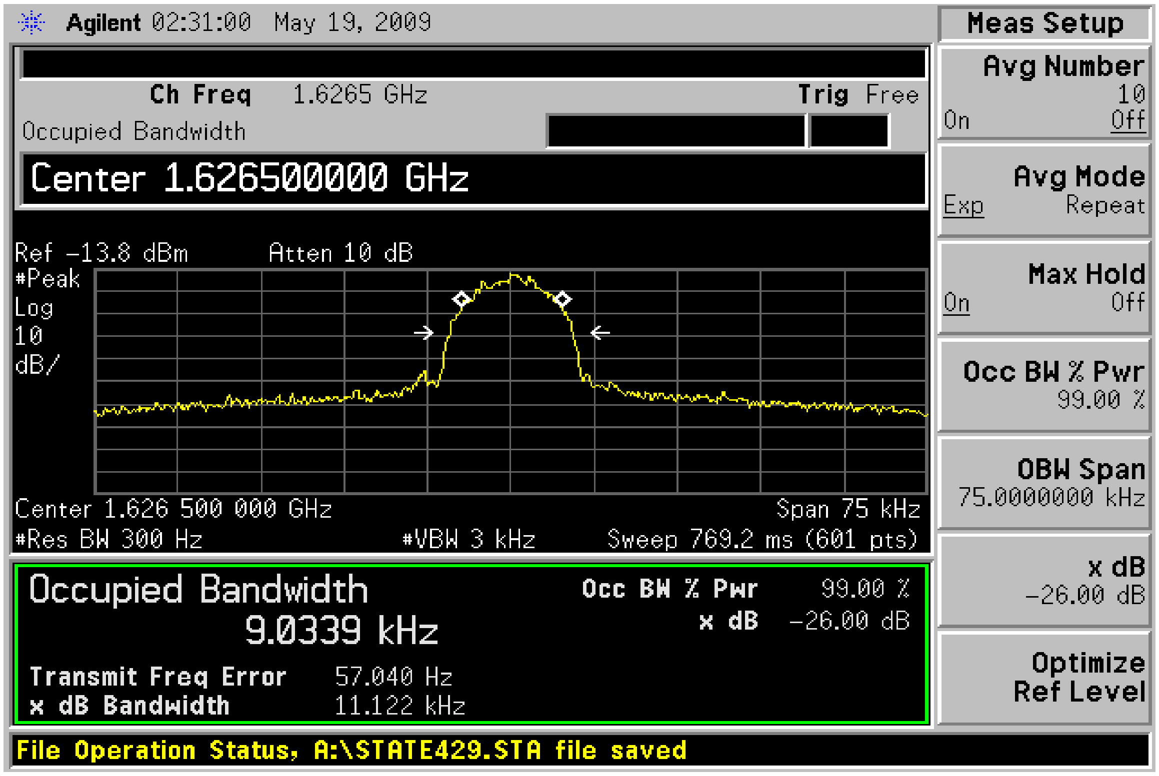


Figure 12 – Occupied BW - Classic 10,500 bps A-QPSK - Mid Band

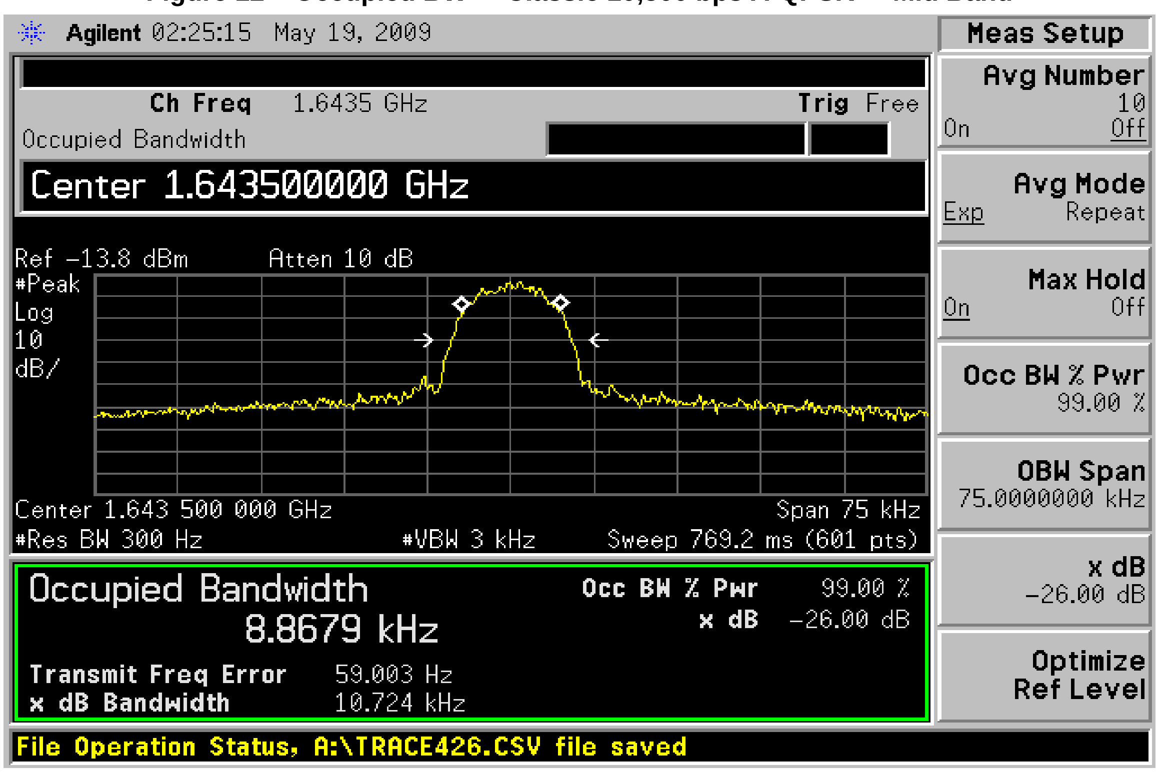


Figure 13 – Occupied BW - Classic 10,500 bps A-QPSK - High Band

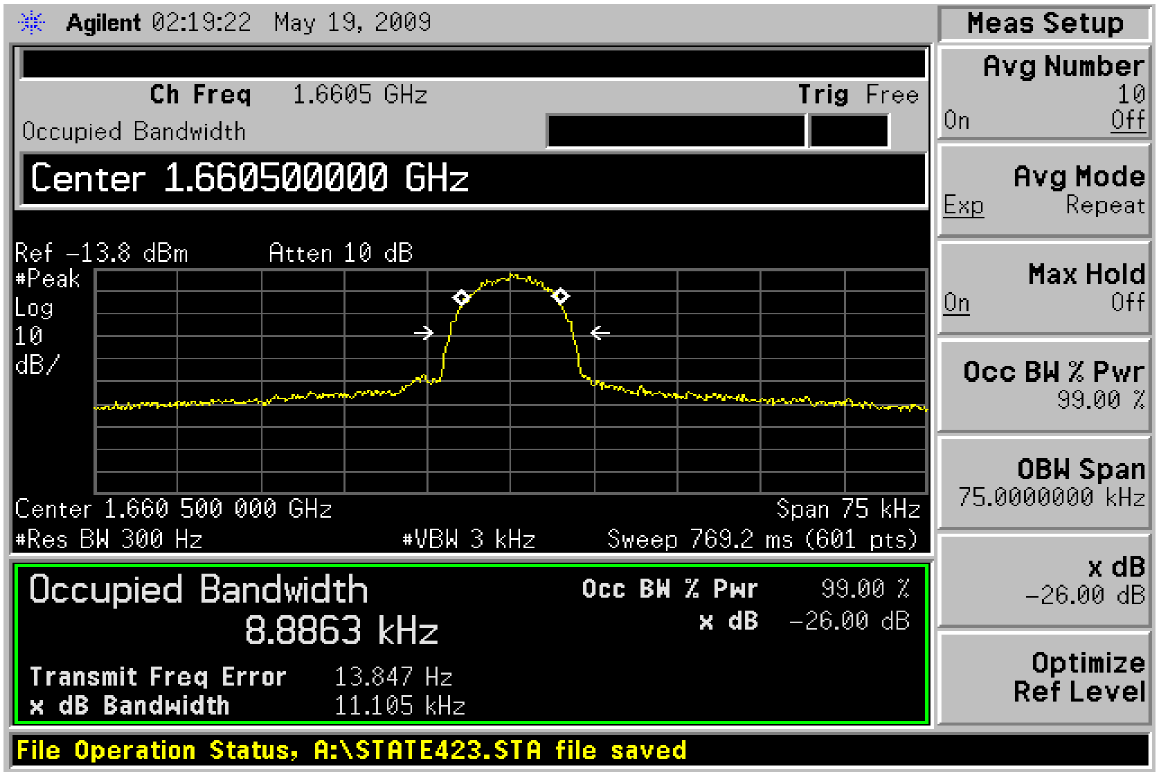


Figure 14 – Occupied BW - Classic 21,000 bps A-QPSK - Low Band

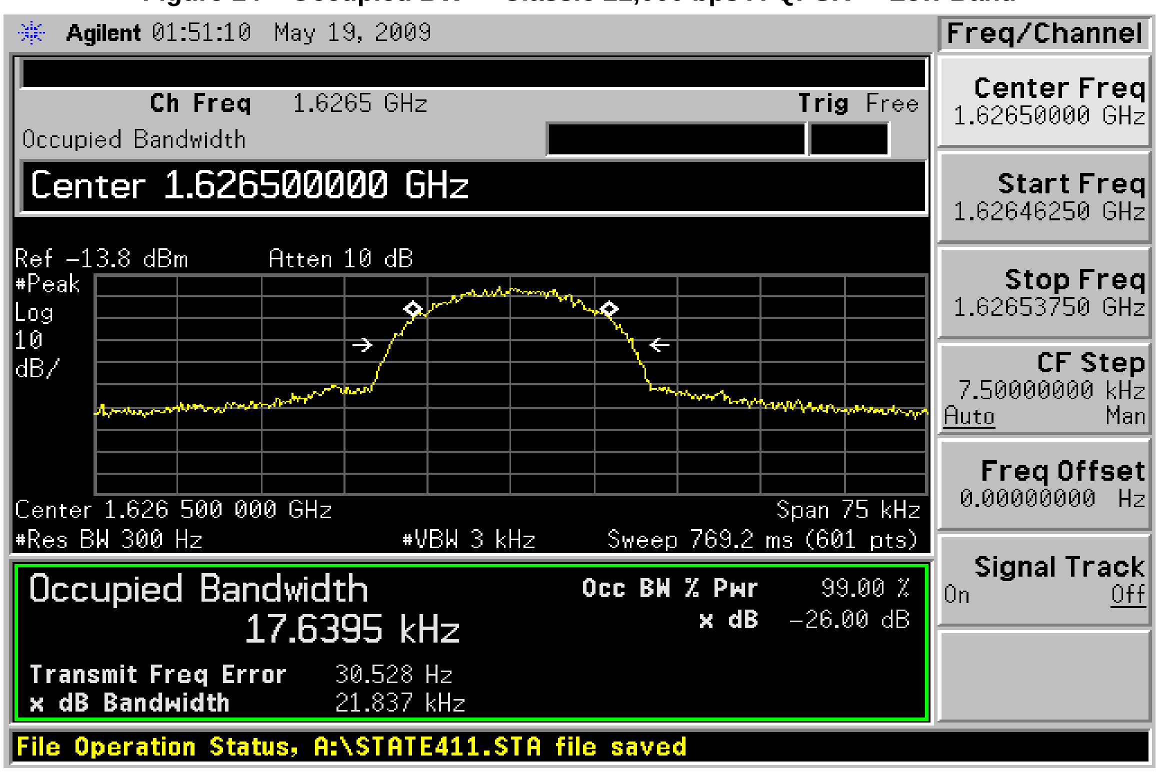


Figure 15 – Occupied BW - Classic 21,000 bps A-QPSK - Mid Band

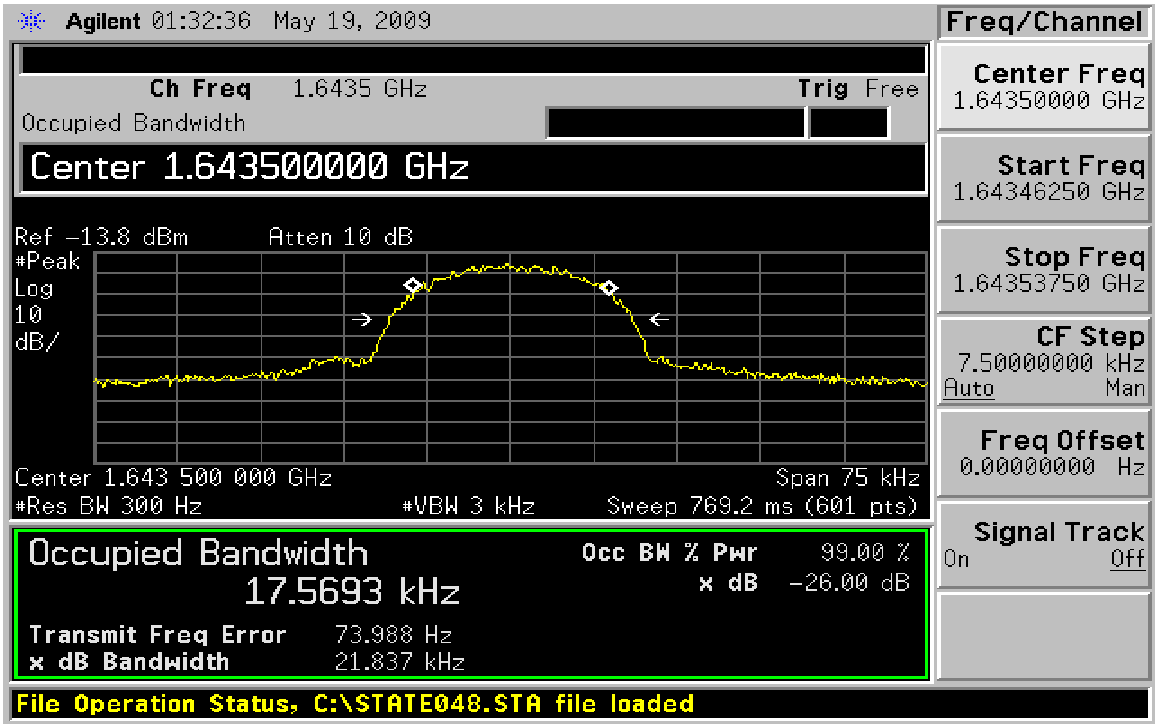


Figure 16 – Occupied BW - Classic 21,000 bps A-QPSK - High Band

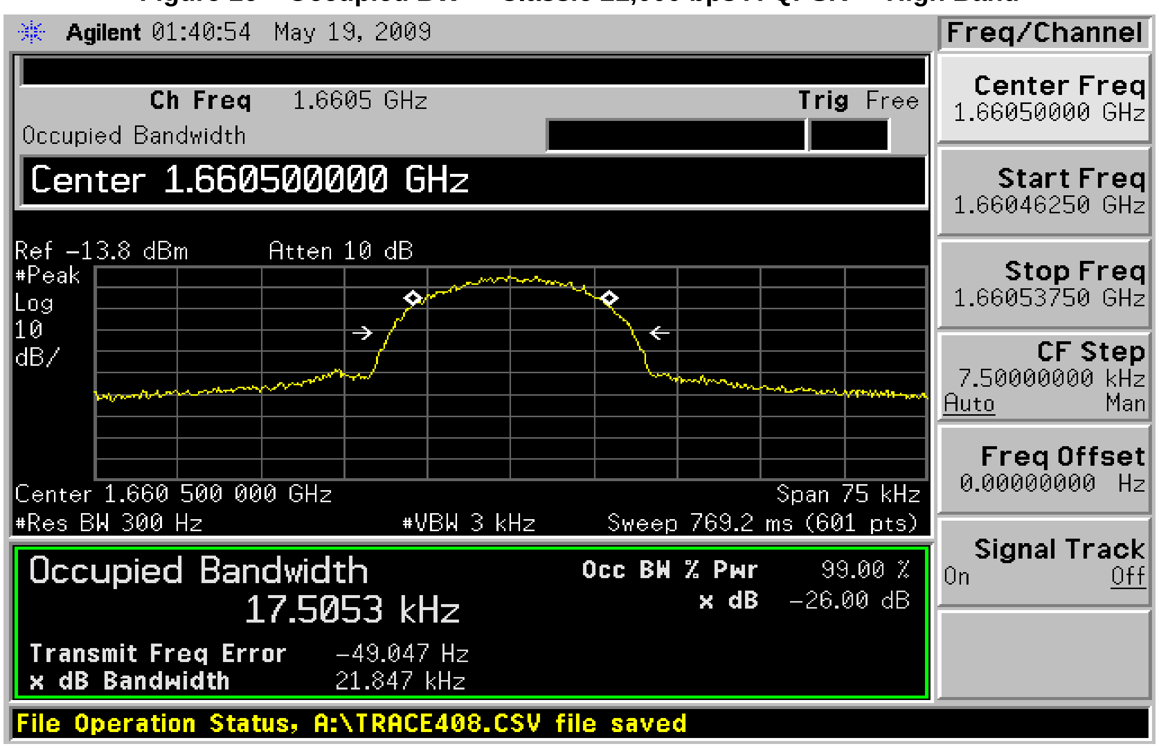


Figure 17 – Occupied BW - Swift64 3000 bps BPSK - Low Band

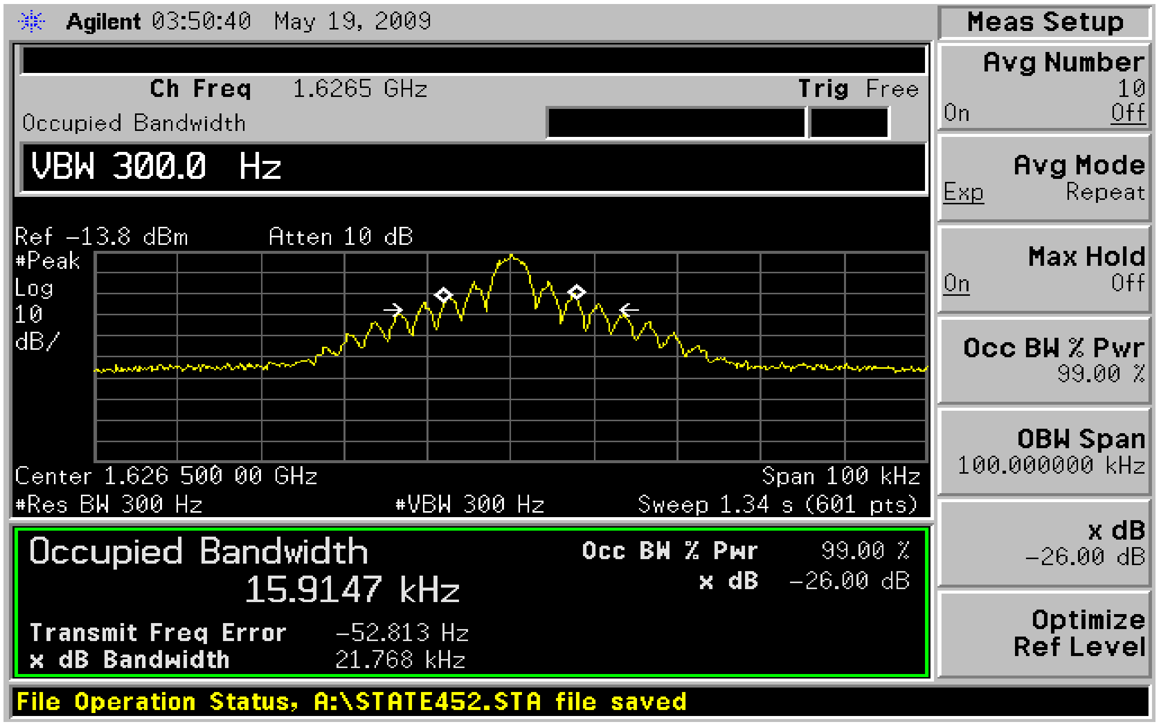


Figure 18 – Occupied BW - Swift64 3000 bps BPSK - Mid Band

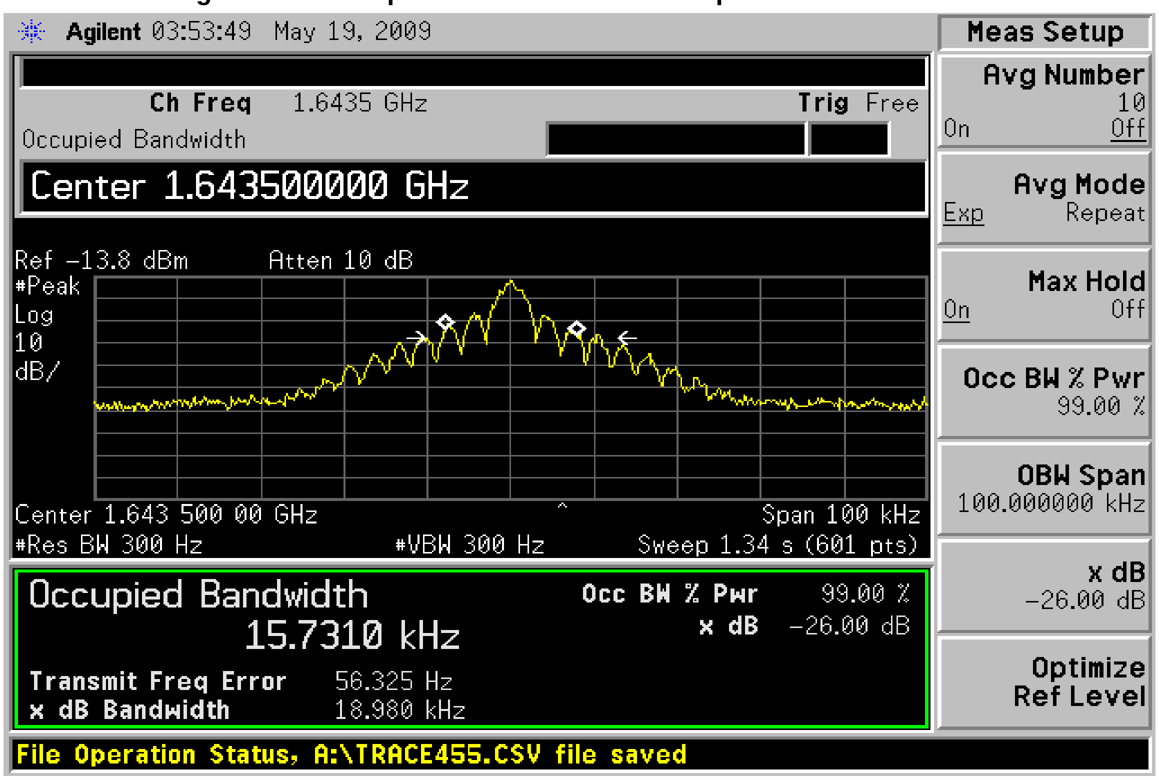


Figure 19 – Occupied BW - Swift64 3000 bps BPSK - High Band

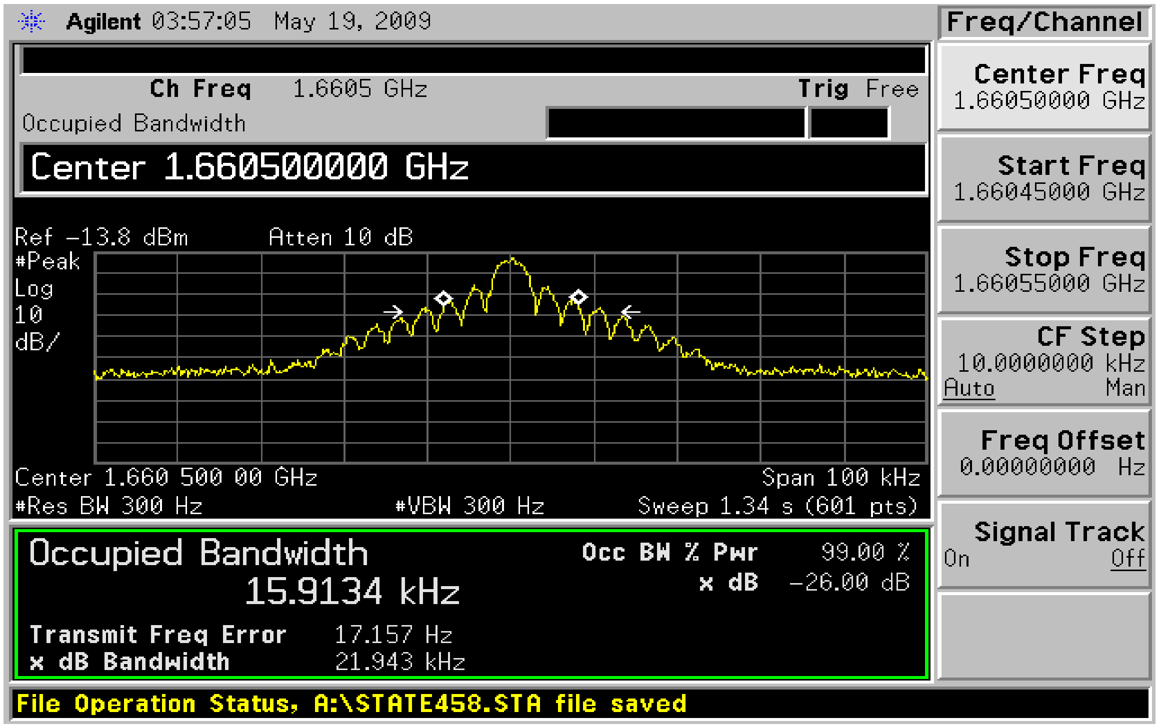


Figure 20 – Occupied BW - Swift64 134,400 bps 16-QAM - Low Band

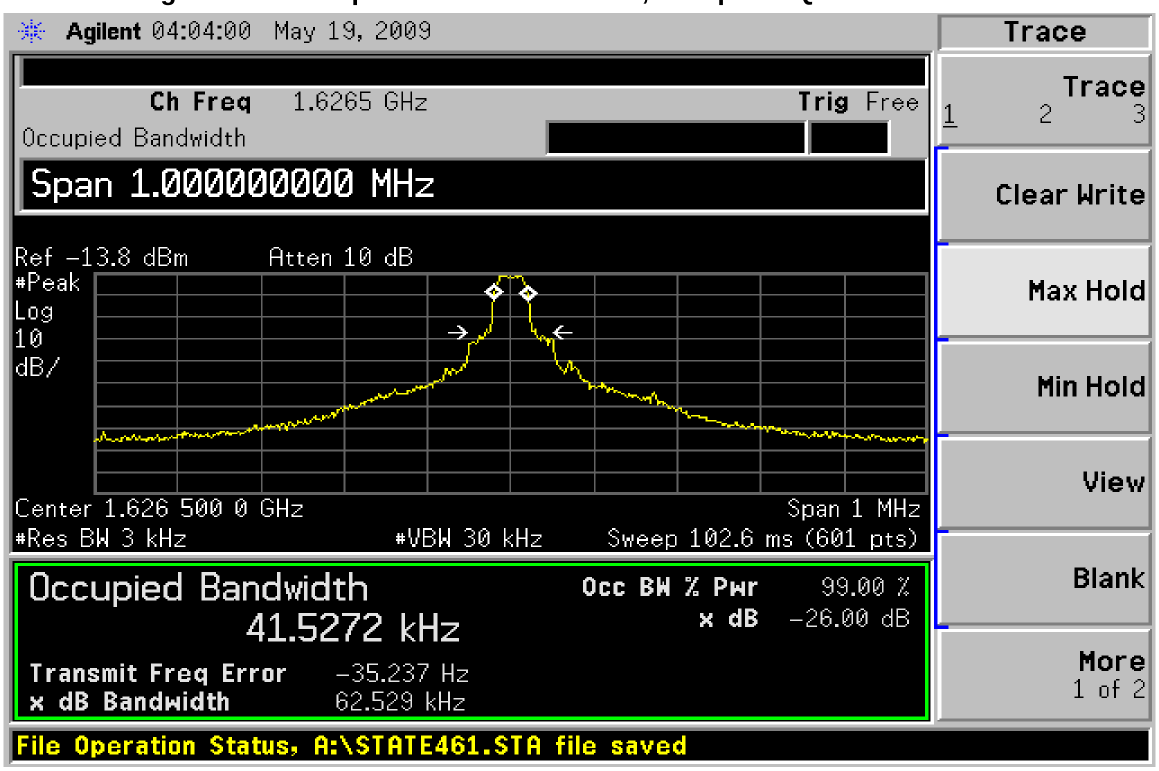


Figure 21 – Occupied BW - Swift64 134,400 bps 16-QAM - Mid Band

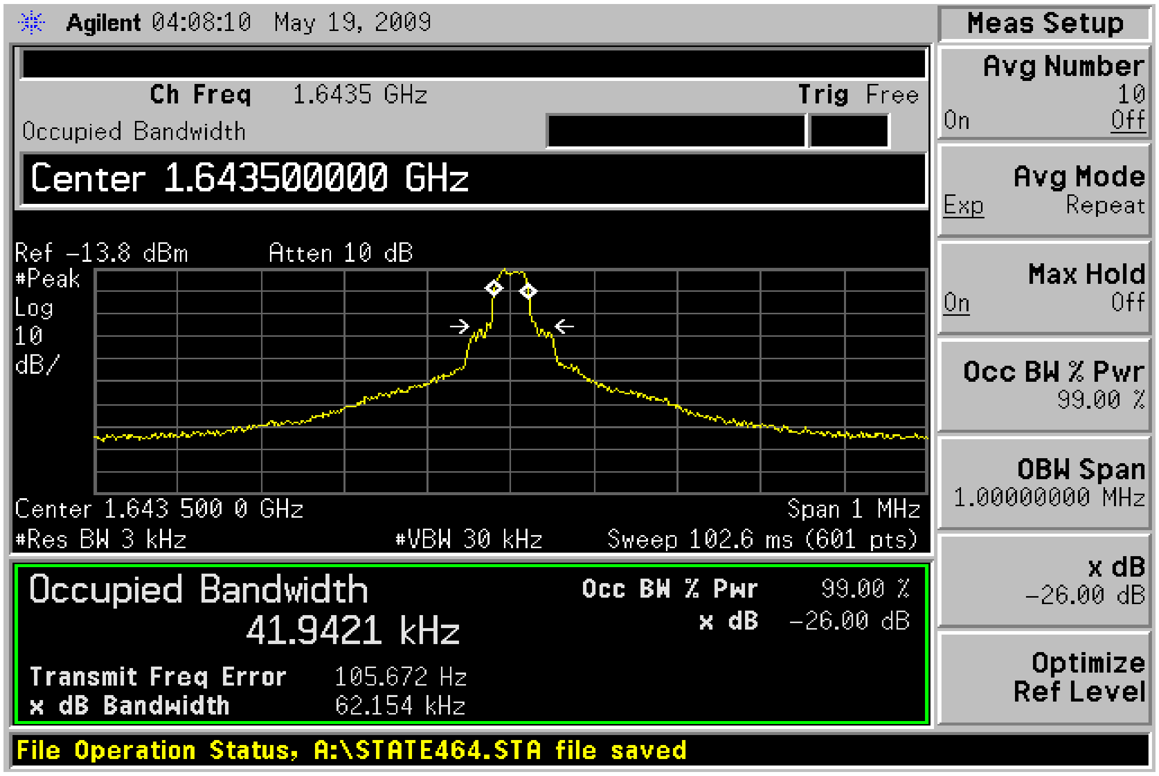


Figure 22 – Occupied BW - Swift64 134,400 bps 16-QAM - High Band

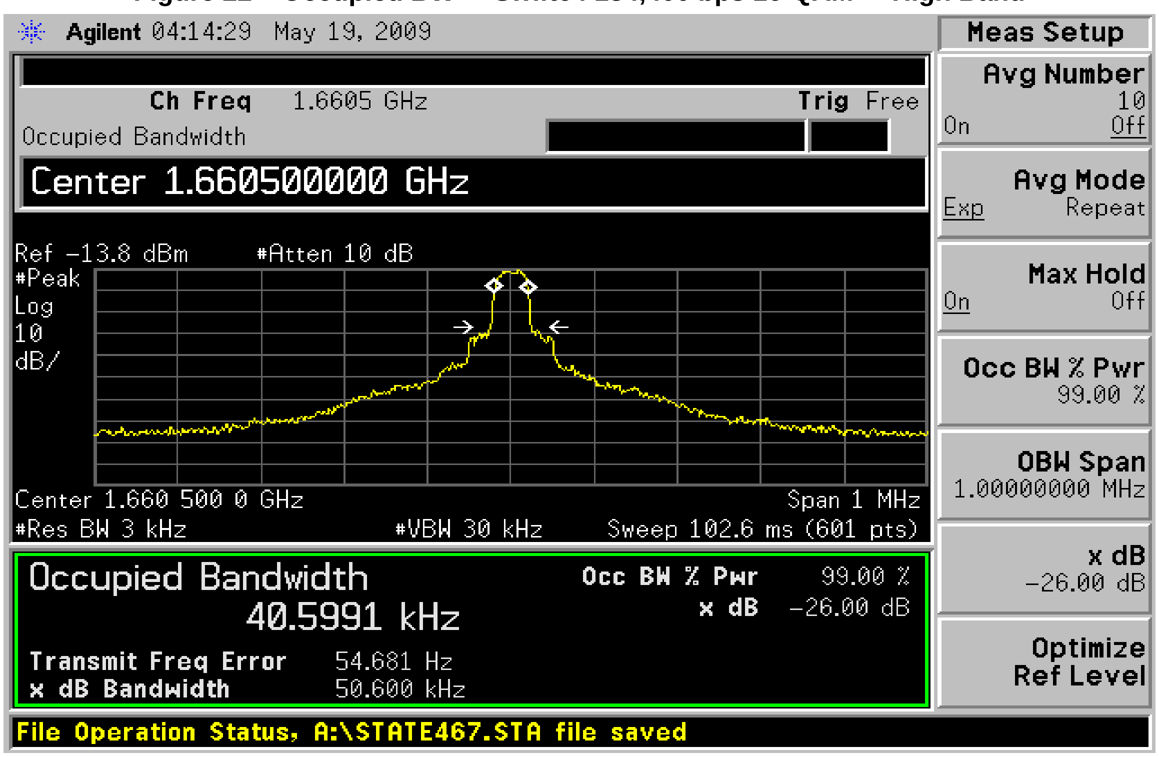


Figure 23 – Occupied BW - Swift Broadband 33,600 bps π/4-QPSK - Low Band

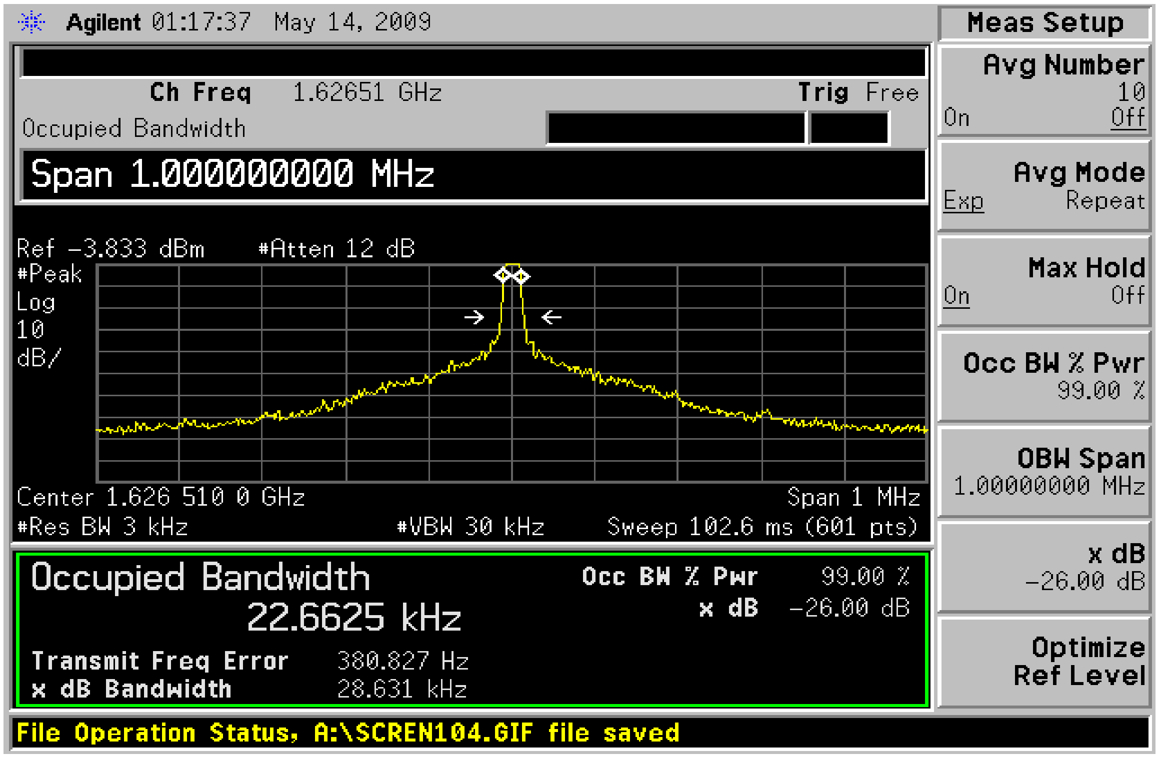


Figure 24 – Occupied BW - Swift Broadband 33,600 bps π/4-QPSK - Mid Band

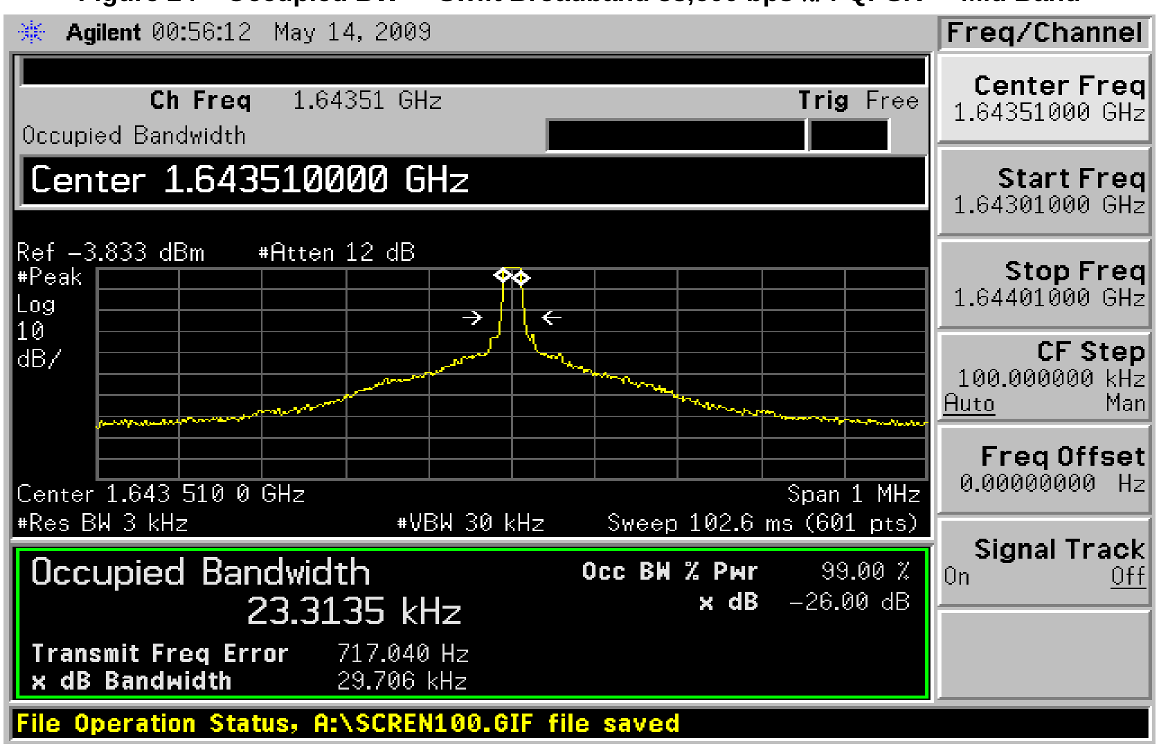


Figure 25 – Occupied BW - Swift Broadband 33,600 bps π/4-QPSK - High Band

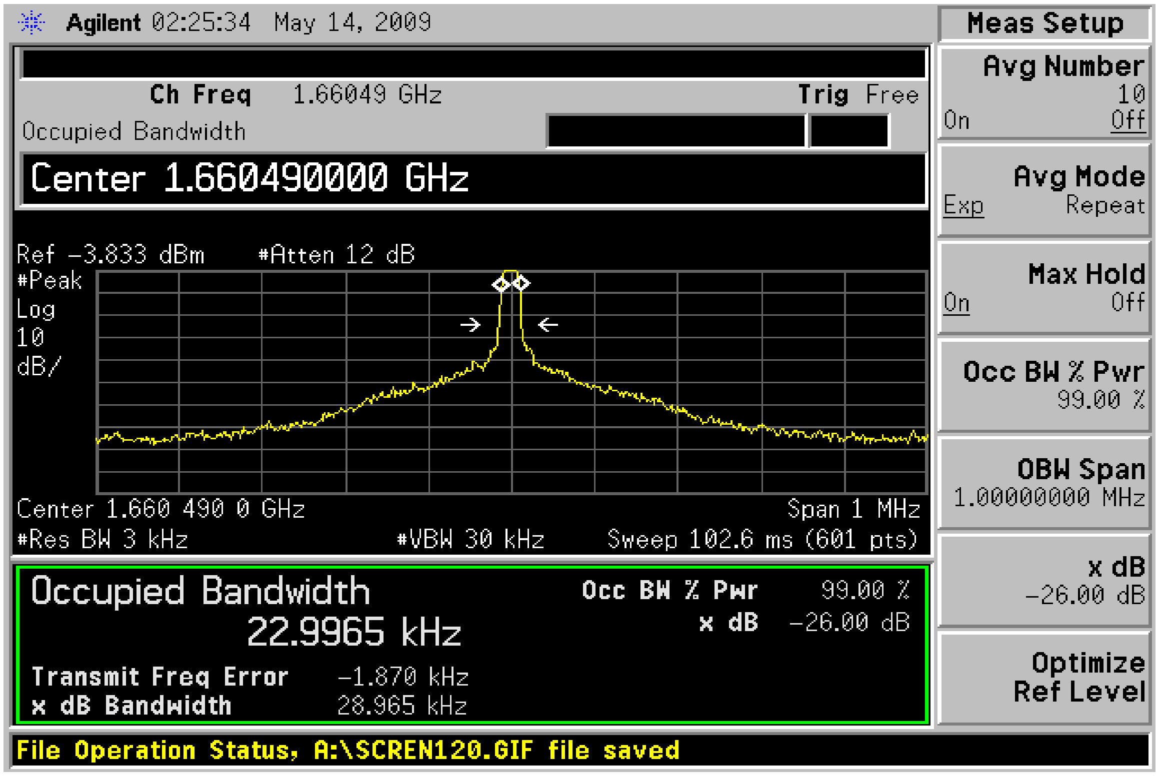


Figure 26 – Occupied BW - Swift Broadband 67,200 bps π/4-QPSK - Low Band

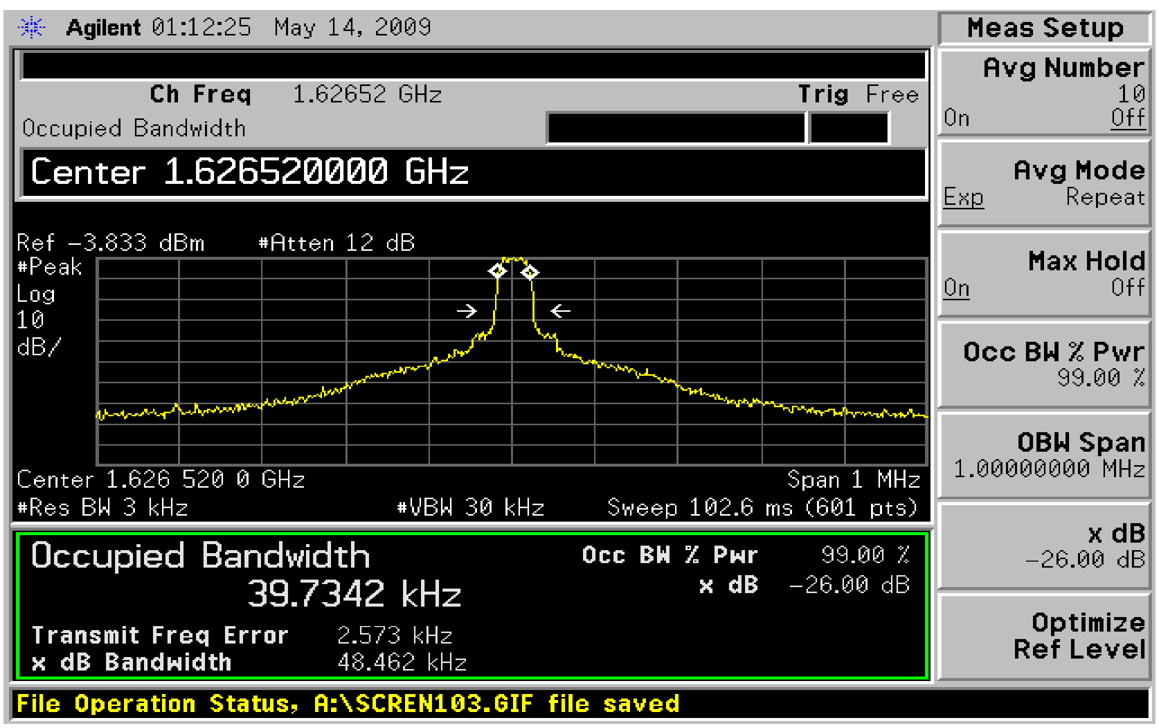


Figure 27 – Occupied BW - Swift Broadband 67,200 bps π/4-QPSK - Mid Band

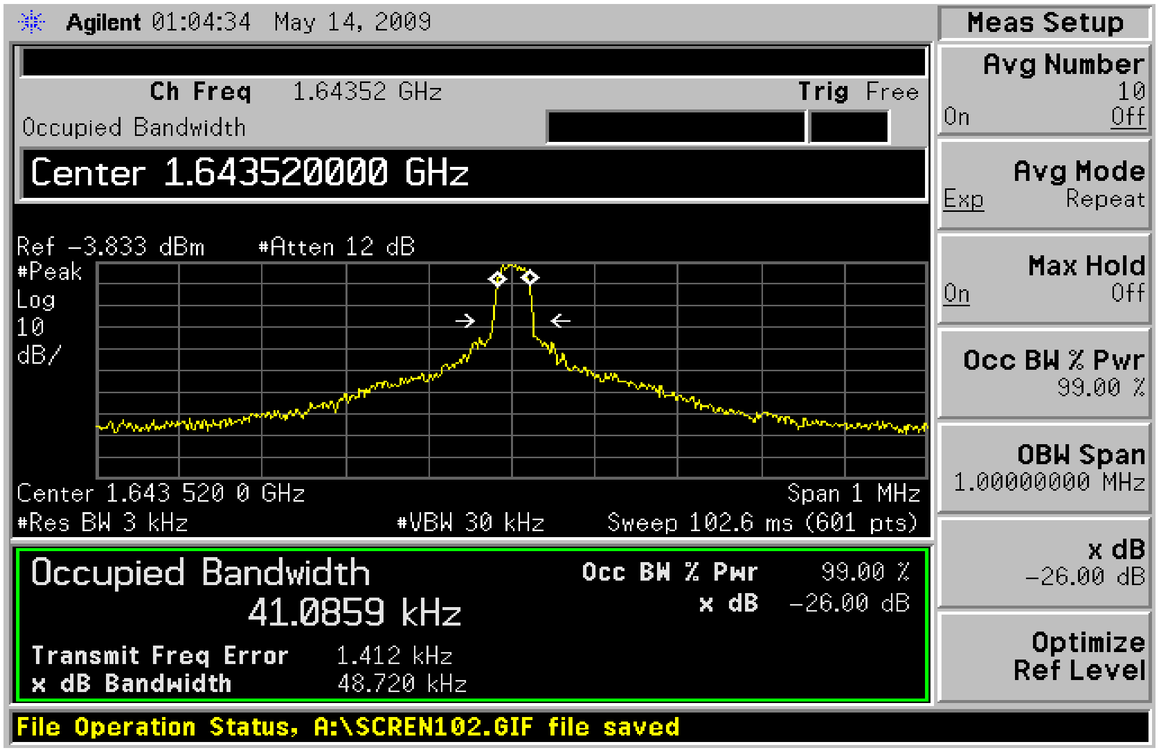


Figure 28 – Occupied BW - Swift Broadband 67,200 bps π/4-QPSK - High Band

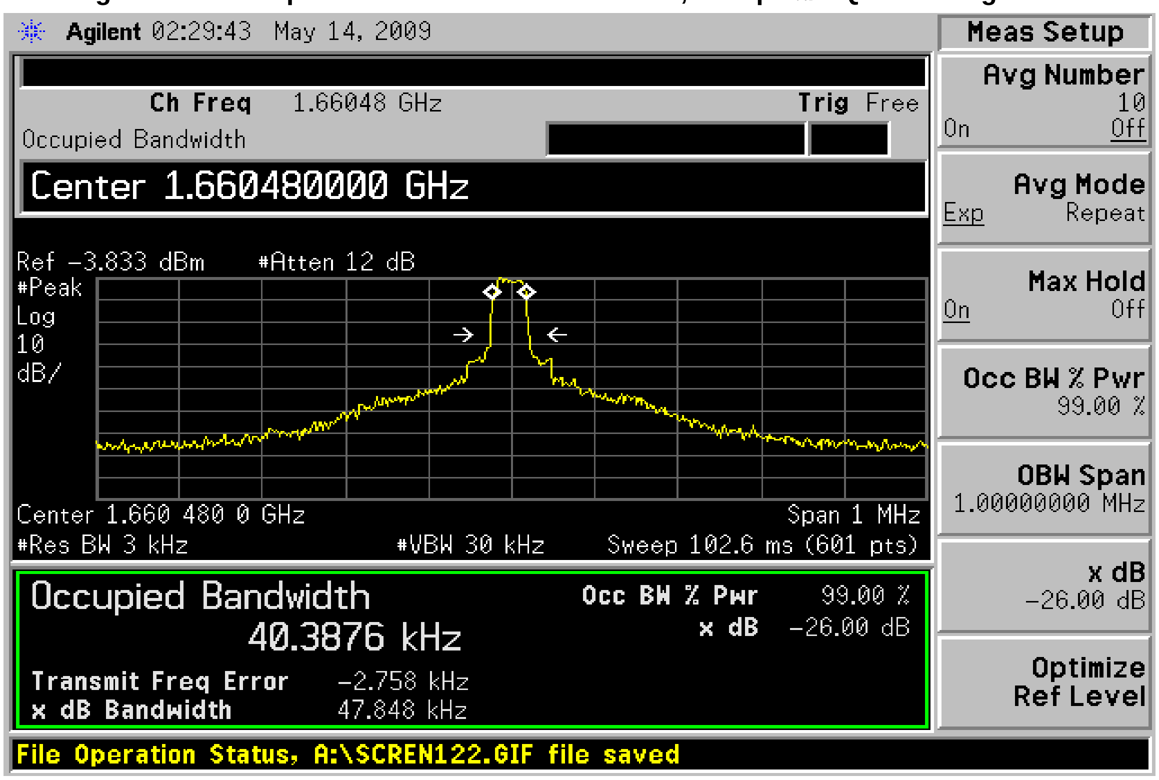


Figure 29 – Occupied BW - Swift Broadband 134,400 bps π/4-QPSK - Low Band

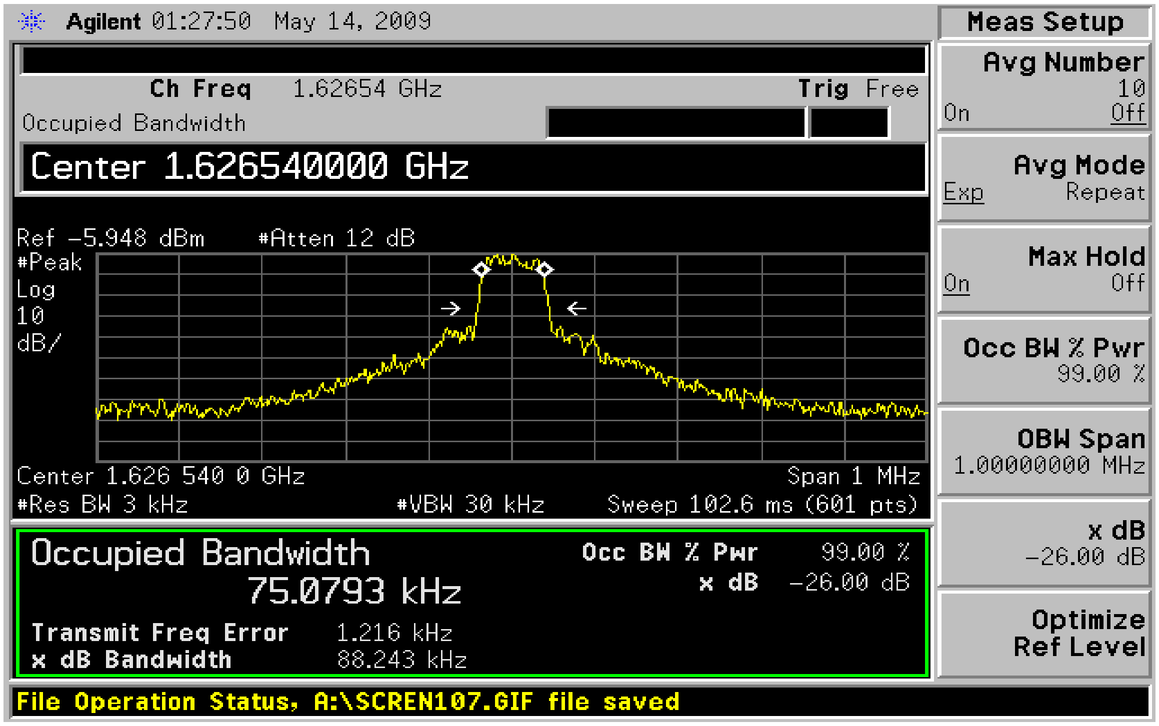


Figure 30 – Occupied BW - Swift Broadband 134,400 bps π/4-QPSK - Mid Band

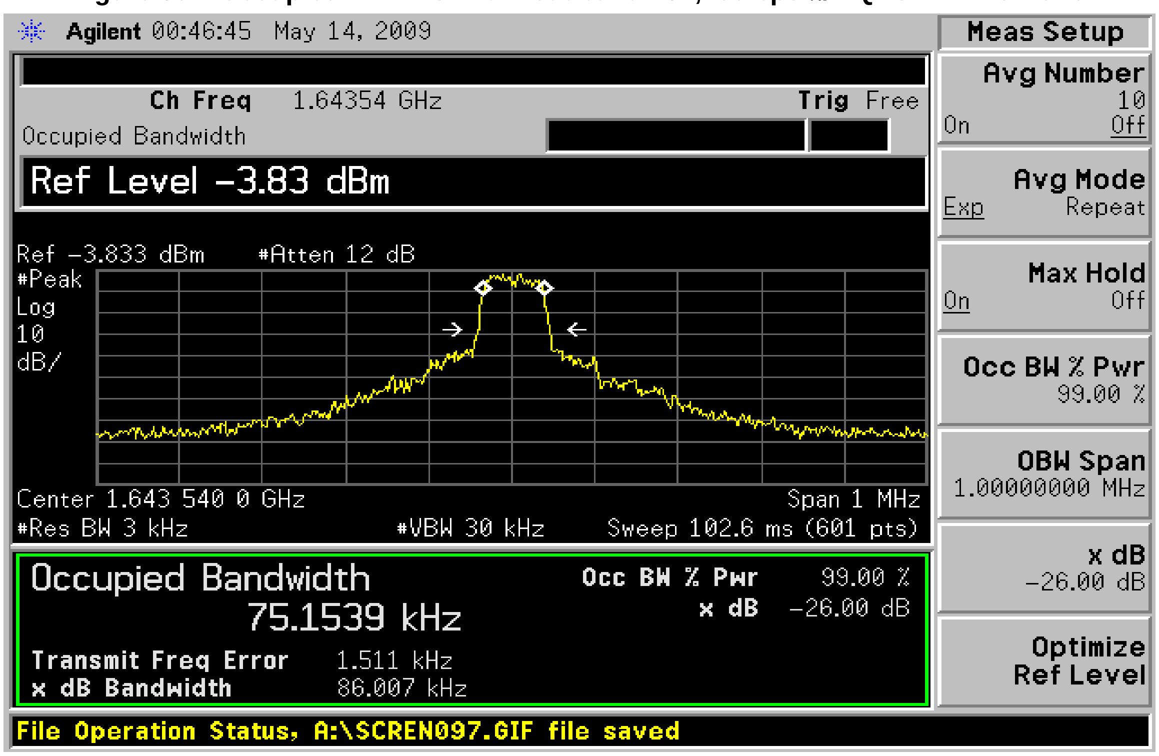


Figure 31 – Occupied BW - Swift Broadband 134,400 bps π/4-QPSK - High Band

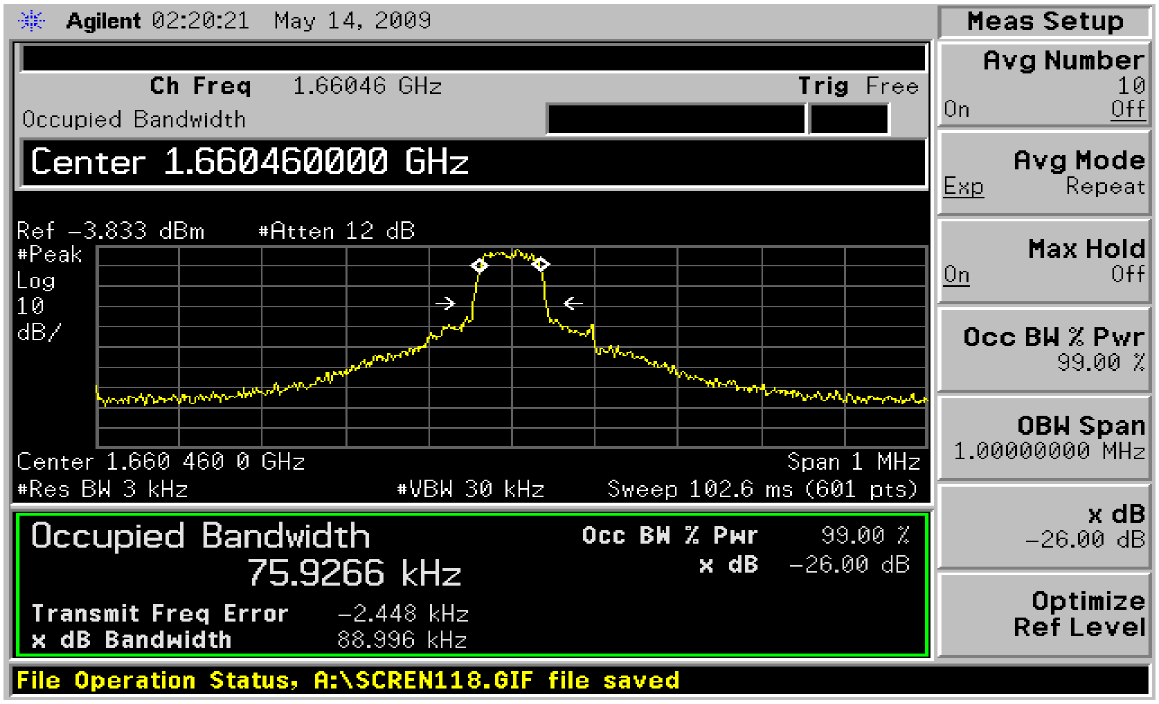


Figure 32 – Occupied BW - Swift Broadband 302,400 bps π/4-QPSK - Low Band

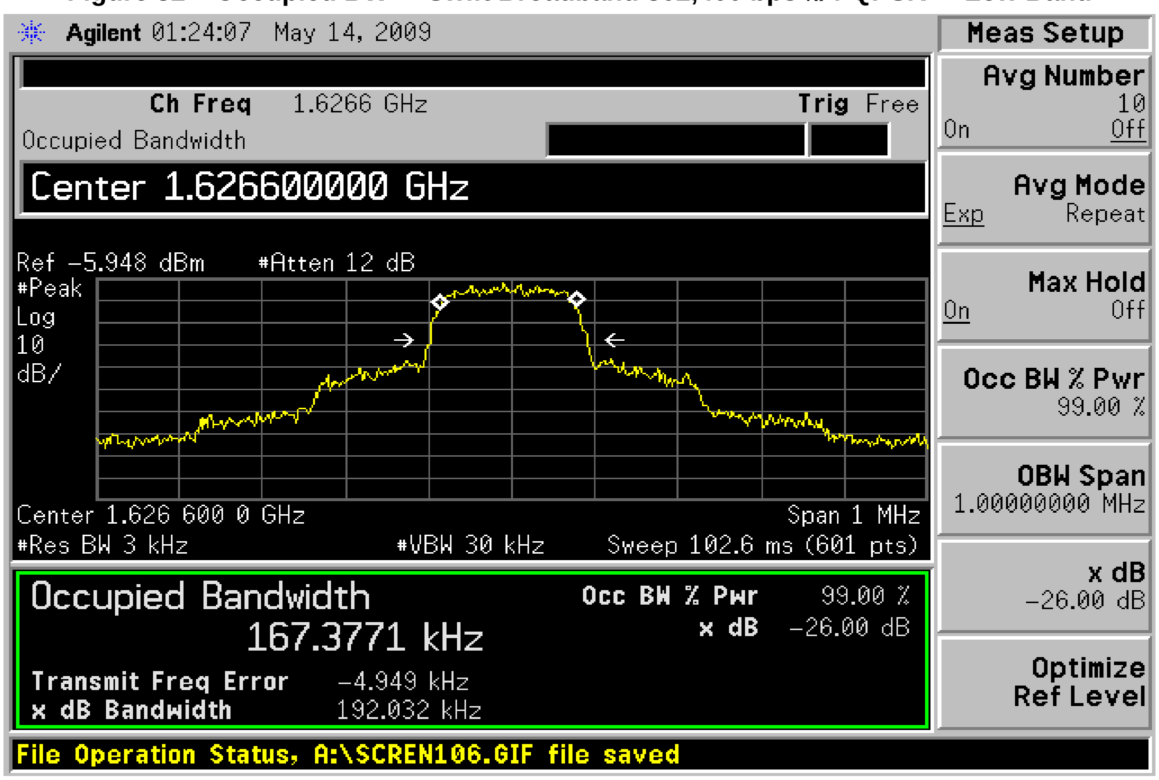


Figure 33 – Occupied BW - Swift Broadband 302,400 bps π/4-QPSK - Mid Band

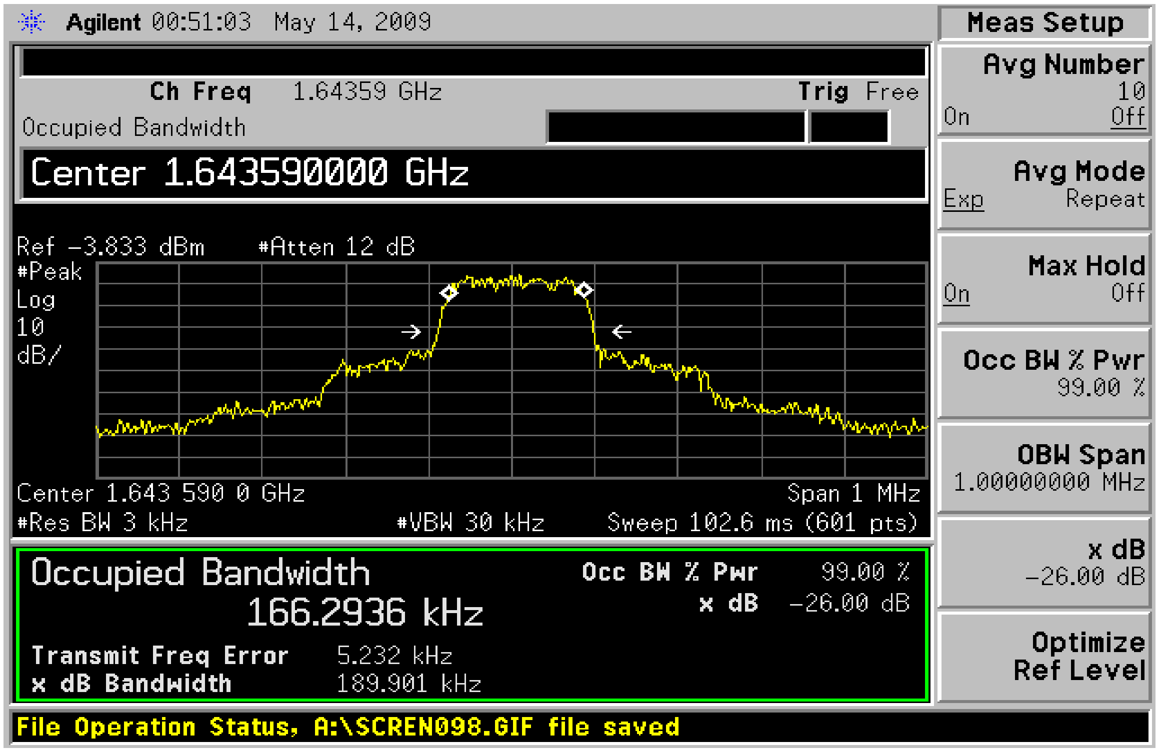


Figure 34 – Occupied BW - Swift Broadband 302,400 bps π/4-QPSK - High Band

Figure 35 – Occupied BW - Swift Broadband 134,400 bps 16-QAM - Low Band

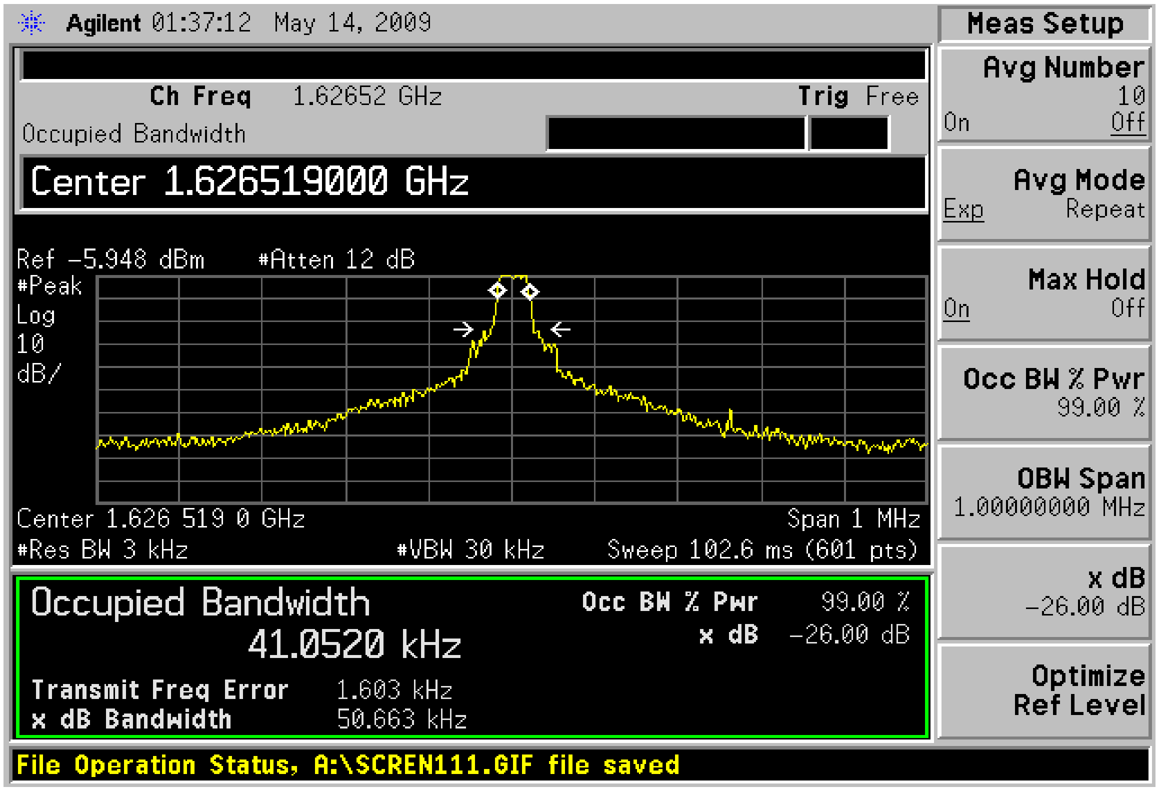


Figure 36 – Occupied BW - Swift Broadband 134,400 bps 16-QAM - Mid Band

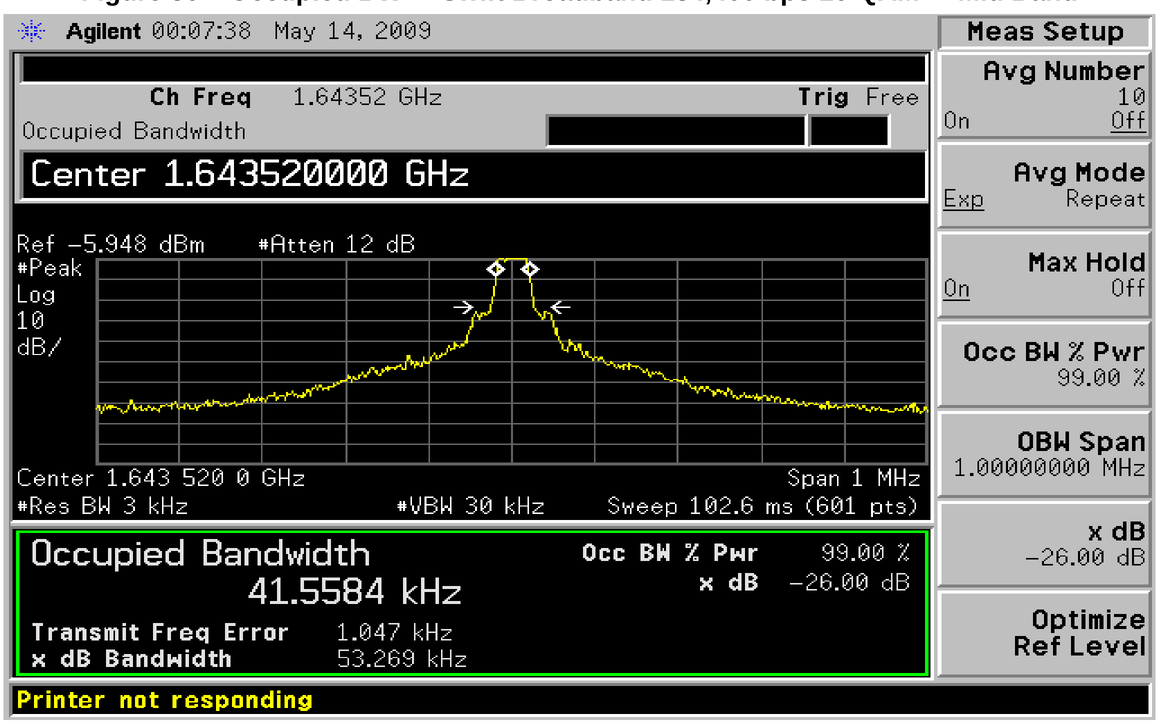


Figure 37 – Occupied BW - Swift Broadband 134,400 bps 16-QAM - High Band

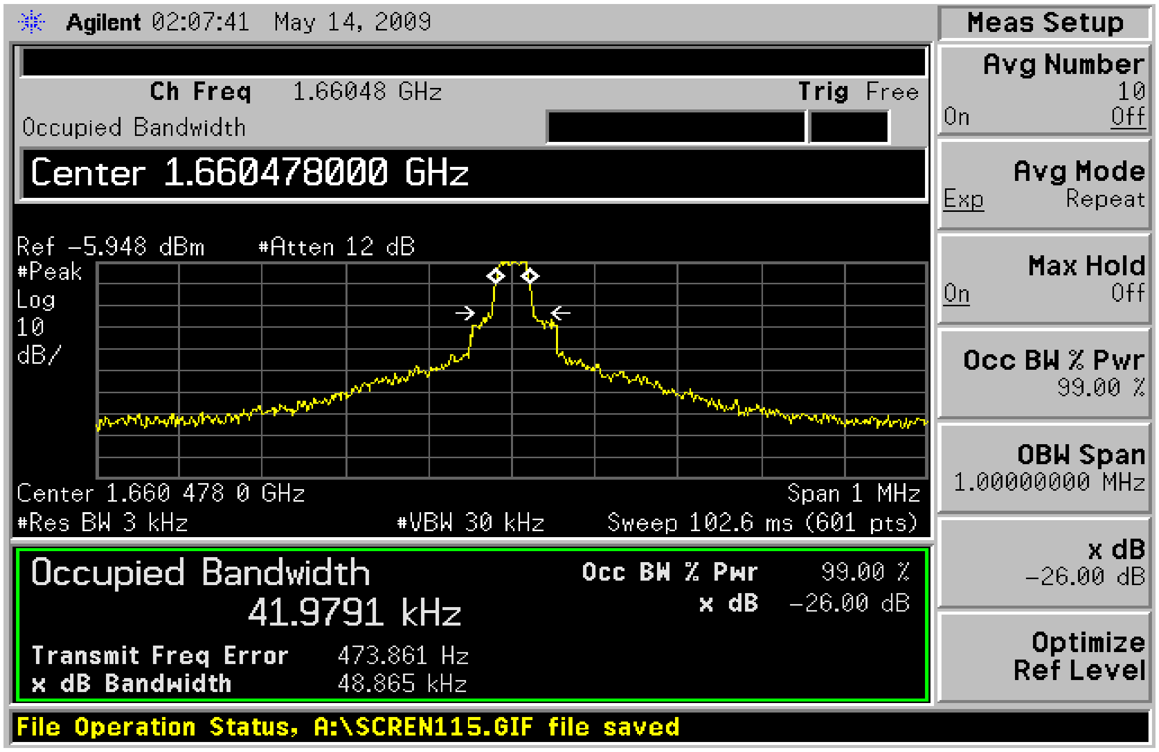


Figure 38 – Occupied BW - Swift Broadband 268,800 bps 16-QAM - Low Band

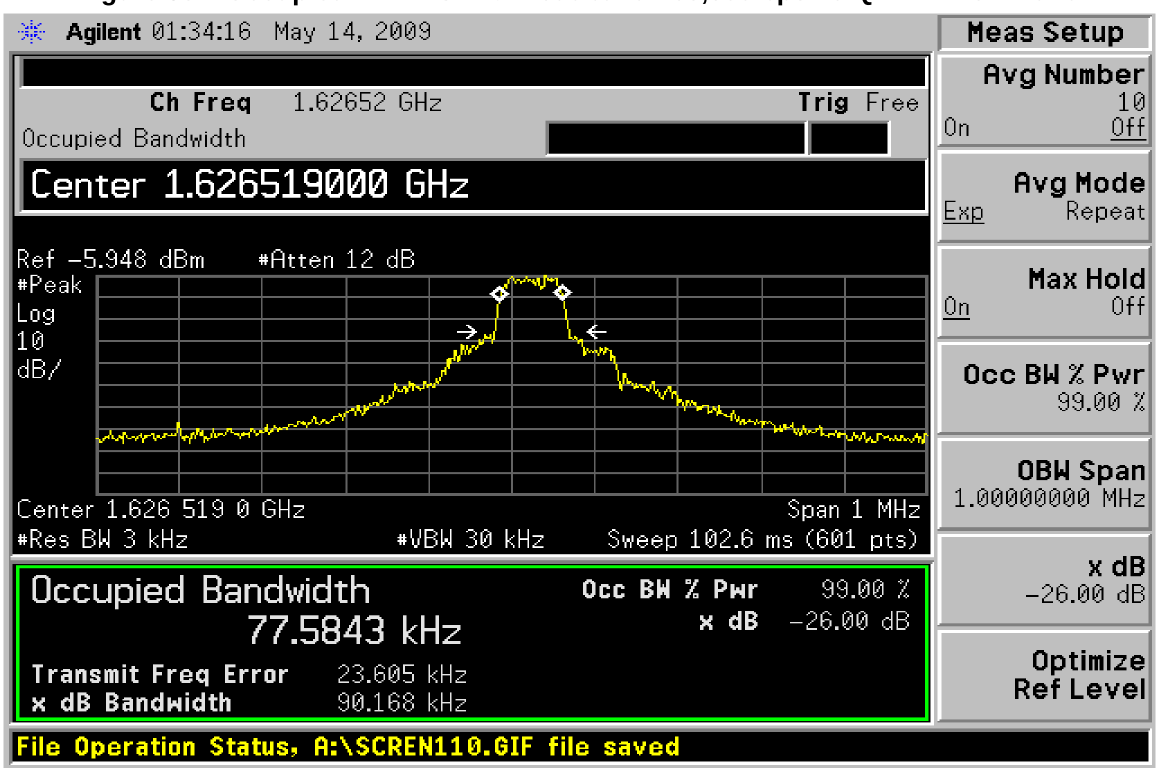


Figure 39 – Occupied BW - Swift Broadband 268,800 bps 16-QAM - Mid Band

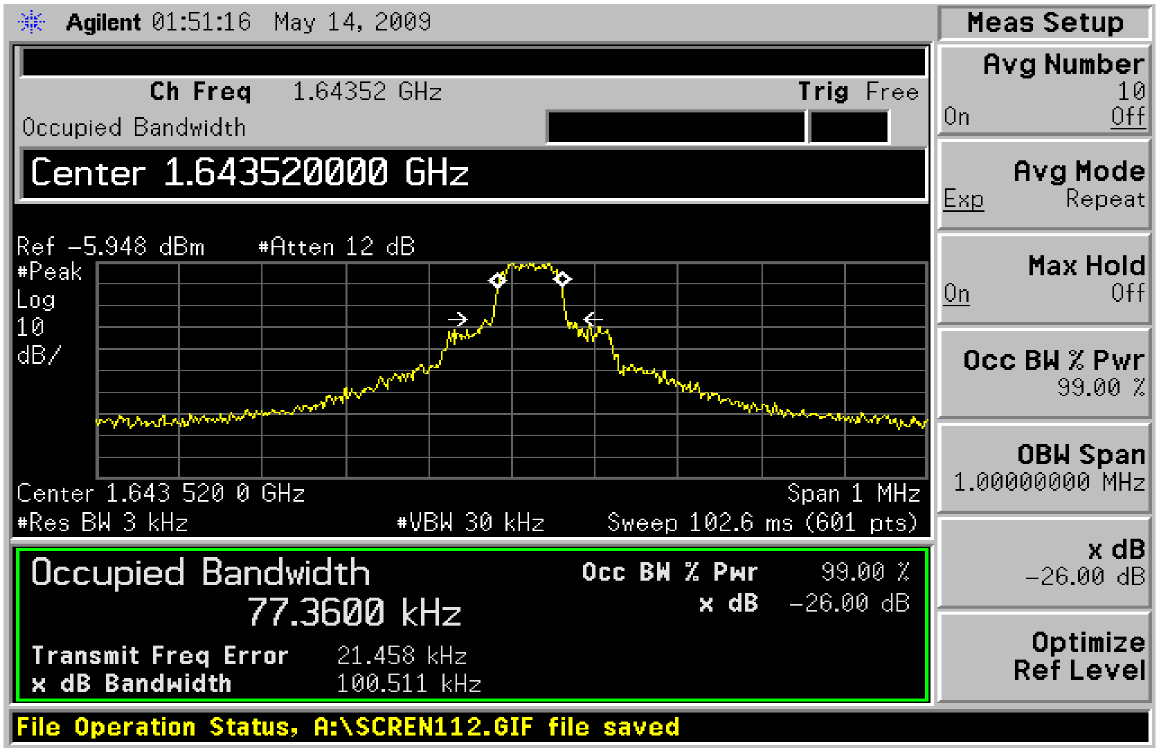


Figure 40 – Occupied BW - Swift Broadband 268,800 bps 16-QAM - High Band

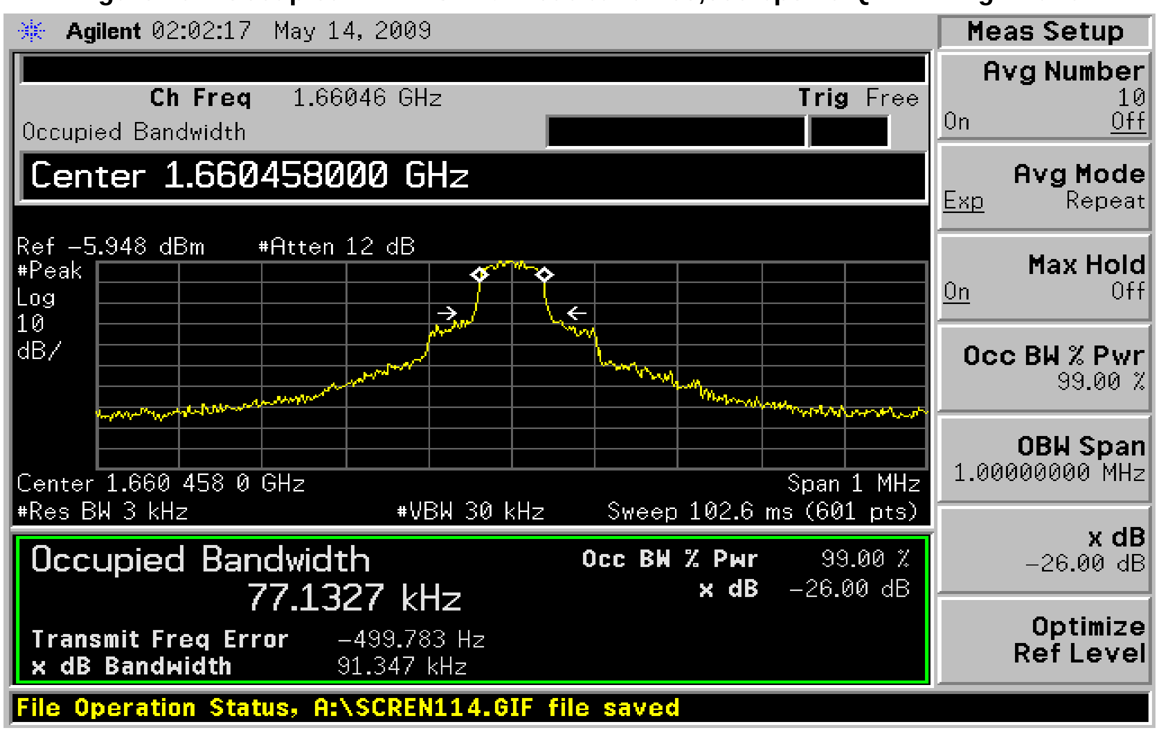


Figure 41 – Occupied BW - Swift Broadband 604,800 bps 16-QAM - Low Band

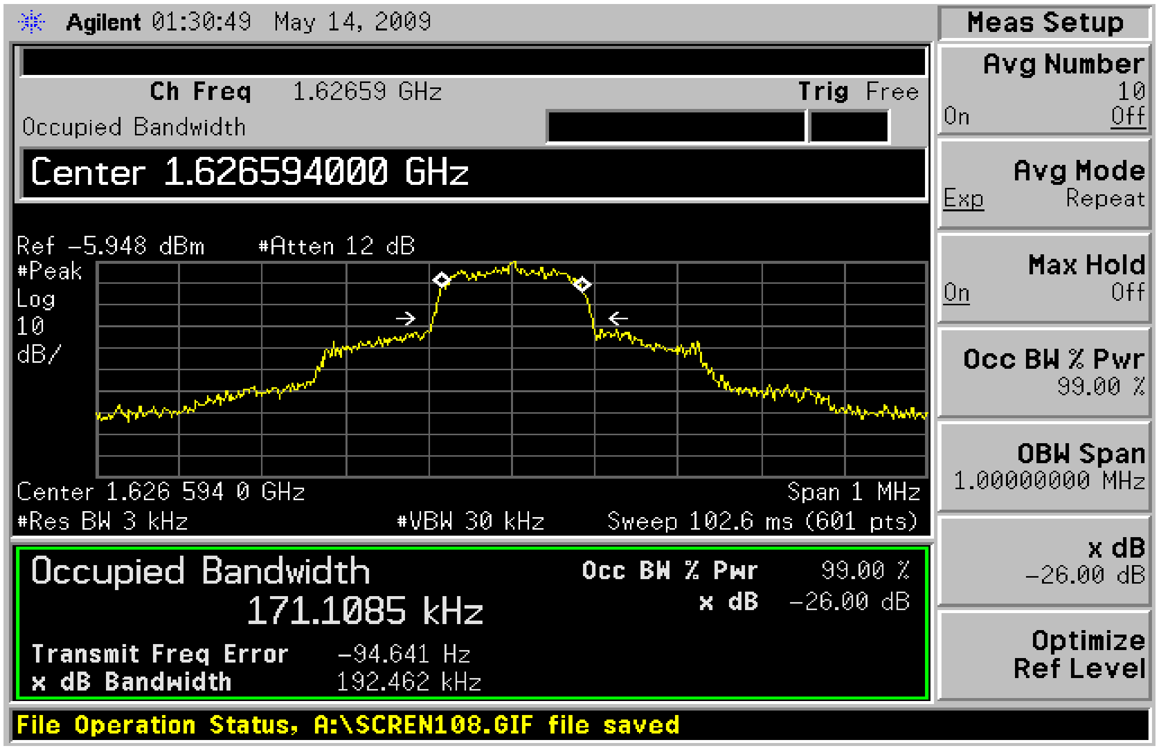


Figure 42 – Occupied BW - Swift Broadband 604,800 bps 16-QAM - Mid Band

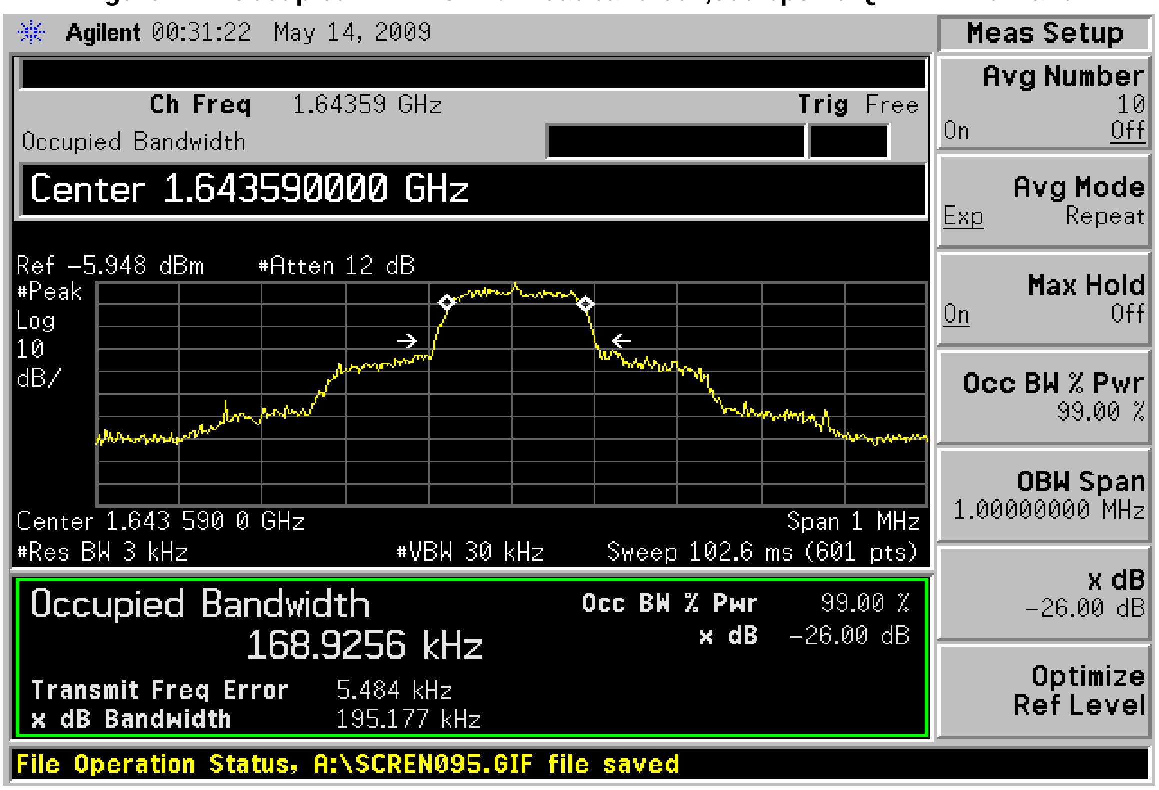


Figure 43 – Occupied BW - Swift Broadband 604,800 bps 16-QAM - High Band

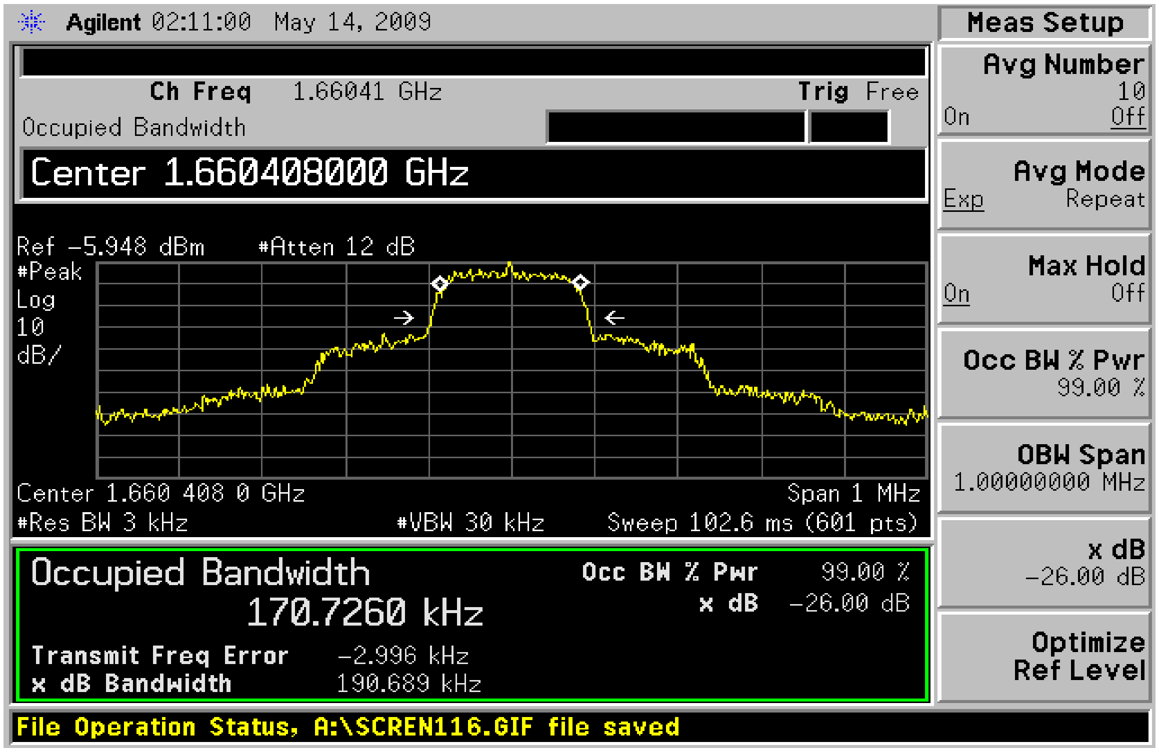


Exhibit F.4 Spurious Emissions at Antenna Terminals and Frequency Spectrum

4.1 FCC Requirements

The discussion and test results show in this section address and meet the requirements of the following FCC requirements.

Section 2.1051

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emissions that can be detected when the equipment is operated under the conditions specified in Section 2.1049 (old 2.989) as appropriate. The magnitude of spurious emissions attenuated more than 20 dB below the permissible values need not be specified.

Section 2.1057 (a) (1)

In all of the measurements set forth in Section 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to:

At least the tenth harmonic of the highest fundamental frequency or to 50 GHz, whatever is lower (if the equipment operates below 10 GHz).

Section 87.139 (i)(1), (2), (3), (4)

(i) – In case of conflict with other provisions of Section 87.139, the provisions of this paragraph shall govern for aircraft earth stations. When using G1D, G1E, or G1W emissions in the 1646.5 – 1660.5 MHz frequency band, the emissions must be attenuated as shown below.

(1) - At rated output power, while transmitting a modulated single carrier, the composite spurious and noise output shall be attenuated below the mean power of the transmitter, pY, by at least:

Frequency (MHz)	Attenuation (dB)[1]
.005 – 1559	83 or (65 + $10\log_{10}$(pY)), whichever is greater
1559 – 18000	55 or (37 + $10\log_{10}$(pY))[2], whichever is greater

[1] these values are expressed in dB below the carrier referenced to a 4 kHz bandwidth and relative to the maximum emission envelope level.

[2] excluding the frequency band of +/- 35 kHz or +/- 4.00 x Symbol Rate, about the carrier frequency, whichever is the greater exclusion.

(2) – The intermodulation requirements have been removed.

(3) - The transmitter emission limit is a function of the modulation type and the Symbol Rate (SR). Symbol Rate is expressed in symbols per second.

(4) - While transmitting a single modulated signal at the rated output power of the transmitter, the emissions must be attenuated below the maximum emission level by at least:

Frequency Offset (normalized to SR)	Attenuation (dB)
+/- 0.75 x SR	0
+/- 1.40 x SR	20
+/- 2.80 x SR	40
+/- 4.00 x SR or +/- 35 kHz Which ever is greater.	F_m

Where:

F_m = 55 or (37 + $10\log_{10}$(pY)), whichever is greater

SR = Symbol Rate

SR = 1 x channel rate for BPSK

SR = 0.5 x channel rate for QPSK

The mask shall be defined by drawing straight lines through the above points.

4.2 Spurious Emissions at Antenna Terminals Test Procedure

The following test configuration was used to perform the Spurious Emissions at Antenna Terminals measurements.

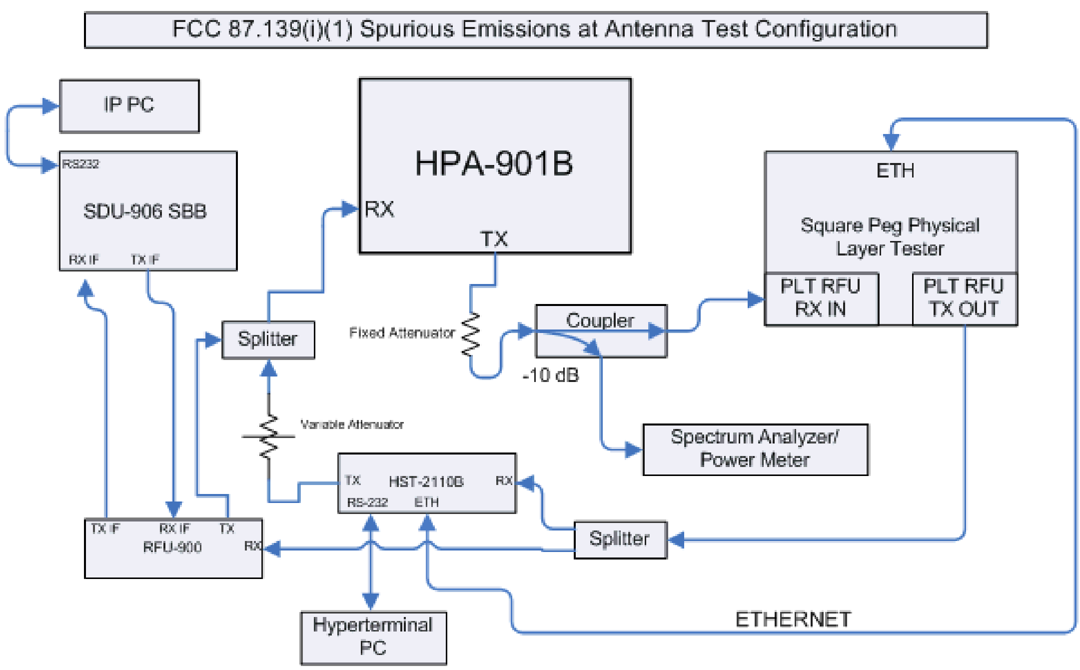


Figure 44 Spurious Emissions at Antenna Terminals Test Configuration

4.2.1 Spurious Emissions Test Equipment

Item	Manufacturer	PN	SN	Notes
HPA-901B	Rockwell Collins	822-2577-001	080731	AC Powered
HST-2110B	Rockwell Collins	270-2885-010	648	AC Powered
SDU-906 SBB	Rockwell Collins	822-0314-102	L4FF	AC Powered
RFU-900	Rockwell Collins	622-8849-100	E12	AC Powered
Physical Layer Tester	Square Peg Communications, Inc.	EM-907532C-04	PLTH_080	
Physical Layer Tester Radio Frequency Unit	Square Peg Communications, Inc.	EM-907516C-01	23	
Spectrum Analyzer	Agilent	E4440	MY46185575	
Variable Attenuator	Weinschel	910-20-11	7936	
Fixed Attenuator (30dB)	Weinschel	58-30-34-LIM	PF562	
Fixed Attenuator (10dB)	Weinschel	2	BN0739	
Directional Coupler	Narda	3002-10	70612	
Splitter	Mini-circuits	ZAPD-2	460-0206-551	

4.2.2 Spurious Emissions at Antenna Terminals – Classic Aero

1. Connect the test equipment as shown in Figure 44.
2. Apply power to the SAT-906B.
3. Place the SDU-906SBB into maintenance mode.
4. Using the IP application, configure the HPA-901B to radiate the following signals at 47.2 dBm using the modulation, bit rate and center frequency specified in the table below:

SAT-906B Spurious Emissions at Antenna Terminals Test Conditions			
Condition	**Modulation**	**Bit Rate (bps)**	**Frequency (MHz)**
1	A-BPSK	600	1643.50
2	A-BPSK	1,200	1643.50
3	A-QPSK	8,400	1643.50
4	A-QPSK	10,500	1643.50
5	A-QPSK	21,000	1643.50

5. Use the spectrum analyzer to take measurements using the settings detailed below for each of the conditions listed above.

SAT-906B Spurious Emissions at Antenna Terminals Measurement Configuration		
Start Freq. (MHz)	**Stop Freq. (MHz)**	**Resolution BW (Hz)**
0.01	1525.00	3,000

SAT-906B Spurious Emissions at Antenna Terminals Measurement Configuration		
Start Freq. (MHz)	**Stop Freq. (MHz)**	**Resolution BW (Hz)**
1525.00	1559.00	3,000
1559.00	1585.00	1,000,0000
1585.00	1605.00	1,000,0000
1610.00	1610.60	1,000,0000
1610.60	1613.80	1,000,0000
1613.80	1614.00	1,000,0000
1614.00	1626.50	3,000
1626.50	1660.00	3,000
1660.00	1670.00	20,000
1670.00	1735.00	3,000
1735.00	12000.00	3,000
12000.00	18000.00	3,000

The spectrum analyzer measures signal power in a particular “resolution bandwidth” as it sweeps across the selected frequency band and plots the data.

If a wider bandwidth is used, more power is in that band and the point plotted is higher in amplitude. Section 87.139 (i) (1) footnote 1 states that “these values are expressed in dB below the carrier referenced to a 4 kHz bandwidth and relative to the maximum emission envelope level.” Since some scans in the table above are taken with a 3 kHz resolution bandwidth, they contain 75% of the power that a 4kHz bandwidth measurement would have. Therefore, the correction factor in dB is:

$$10\log10(4/3) = 1.25 \text{ dB.}$$

4.2.3 Spurious Emissions at Antenna Terminals – Swift64

1. Connect the test equipment as shown in Figure 44.
2. Apply power to the SAT-906B.
3. Place the SDU-906 SBB into maintenance mode.
4. Using the Hyper Terminal maintenance interface on the HST-2110B, power up the channel card and configure the HST to radiate the following signals with zero dB of channel card back off:

SAT-906B Spurious Emissions at Antenna Terminals Test Conditions			
Condition	**Modulation**	**Bit Rate (bps)**	**Frequency (MHz)**
1	BPSK	3,000	1643.50
2	16-QAM	134,400	1643.50

5. Adjust the Variable Attenuator to obtain 47.2dBm of output power from the HPA-901B.
6. Use the spectrum analyzer to take measurements using the settings detailed below for each of the conditions listed above.

SAT-906B Spurious Emissions at Antenna Terminals Measurement Configuration		
Start Freq. (MHz)	**Stop Freq. (MHz)**	**Resolution BW (Hz)**
0.01	1525.00	3,000
1525.00	1559.00	3,000
1559.00	1585.00	1,000,0000
1585.00	1605.00	1,000,0000
1610.00	1610.60	1,000,0000
1610.60	1613.80	1,000,0000
1613.80	1614.00	1,000,0000
1614.00	1626.50	3,000
1626.50	1660.00	3,000
1660.00	1670.00	20,000
1670.00	1735.00	3,000
1735.00	12000.00	3,000
12000.00	18000.00	3,000

4.2.4 Spurious Emissions at Antenna Terminals – Swift Broadband

1. Connect the test equipment as shown in Figure 44.
2. Apply power to the SAT-906B.
3. Place the SDU-906 SBB into maintenance mode.
4. Using the Hyper Terminal maintenance interface on the HST-2110B, force the power up of the HSTs Channel Card.
5. Once the HSTs Channel Card is powered and connected via Ethernet to the Square Peg PLT, use the WinTerm application to place the Channel Card into MTR Test Mode.
6. Start the BPLT application on the Square Peg PLT and run MTR test script MTR16.scx.
7. Using the interface provided by the test script, configure the HST to radiate the following signal:

SAT-906B Spurious Emissions at Antenna Terminals Test Conditions			
Condition	**Modulation**	**Bit Rate (bps)**	**Frequency (MHz)**
1	16-QAM	604,800	1643.50

7. Adjust the Variable Attenuator to obtain 46.5dBm of output power from the HPA-901B.
8. Use the spectrum analyzer to take measurements using the settings detailed below for each of the conditions listed above.

SAT-906B Spurious Emissions at Antenna Terminals Measurement Configuration		
Start Freq. (MHz)	**Stop Freq. (MHz)**	**Resolution BW (Hz)**
0.01	1525.00	3,000
1525.00	1559.00	3,000
1559.00	1585.00	1,000,0000
1585.00	1605.00	1,000,0000
1610.00	1610.60	1,000,0000
1610.60	1613.80	1,000,0000
1613.80	1614.00	1,000,0000
1614.00	1626.50	3,000
1626.50	1660.00	3,000
1660.00	1670.00	20,000
1670.00	1735.00	3,000
1735.00	12000.00	3,000
12000.00	18000.00	3,000

4.3 Frequency Spectrum Test Procedure

The following test configuration was used to perform the Frequency Spectrum measurements.

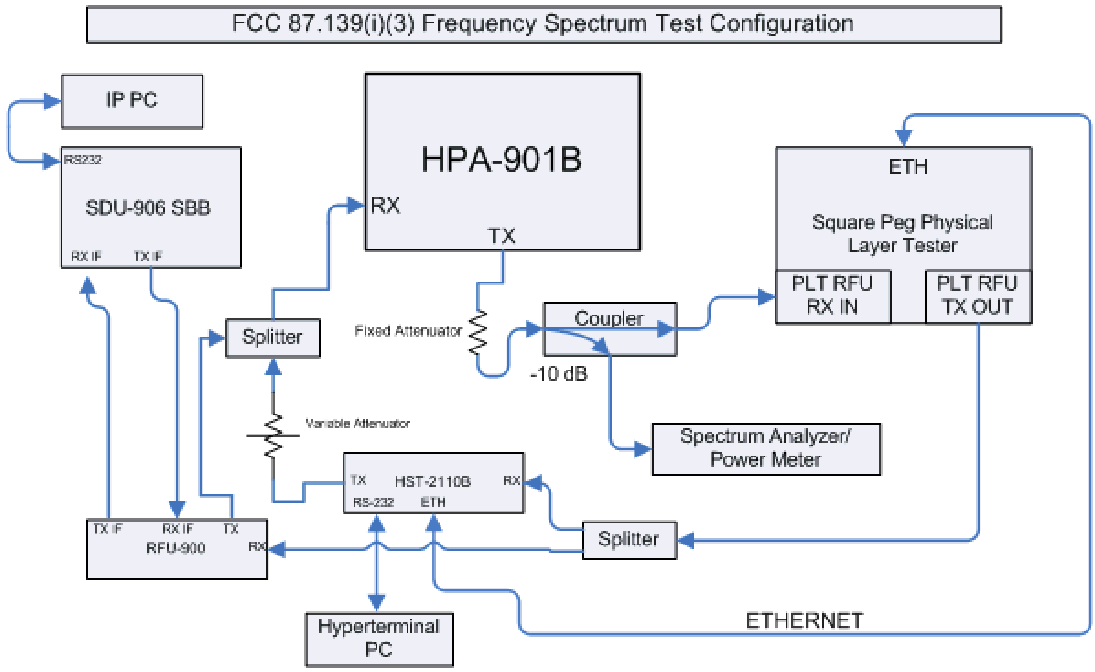


Figure 45 Frequency Spectrum Test Configuration

4.3.1 Frequency Spectrum Test Equipment

Item	Manufacturer	PN	SN	Notes
HPA-901B	Rockwell Collins	822-2577-001	080731	AC Powered
HST-2110B	Rockwell Collins	270-2885-010	648	AC Powered
SDU-906 SBB	Rockwell Collins	822-0314-102	L4FF	AC Powered
RFU-900	Rockwell Collins	622-8849-100	E12	AC Powered
Physical Layer Tester	Square Peg Communications, Inc.	EM-907532C-04	PLTH_080	
Physical Layer Tester Radio Frequency Unit	Square Peg Communications, Inc.	EM-907516C-01	23	
Spectrum Analyzer	Agilent	E4440	MY46185575	
Variable Attenuator	Weinschel	910-20-11	7936	
Fixed Attenuator (30dB)	Weinschel	58-30-34-LIM	PF562	
Fixed Attenuator (10dB)	Weinschel	2	BN0739	
Directional Coupler	Narda	3002-10	70612	

Splitter	Mini-circuits	ZAPD-2	460-0206-551	

4.3.2 Frequency Spectrum – Classic Aero

1. Connect the test equipment as shown in Figure 45.
2. Apply power to the SAT-906B.
3. Place the SDU-906 SBB into maintenance mode.
4. Using the IP application, configure the HPA-901B to radiate an unmodulated carrier at 47.2 dBm with a center frequency of 1643.50 MHz.
5. Set the spectrum analyzer to measure the carrier with a resolution bandwidth of 100 Hz.
6. Set the power reference level of the spectrum analyzer to the peak of the measured carrier and use that reference for the remainder of the testing.
7. Using the IP application, configure the HPA-901B to radiate the following signals at 47.2 dBm using the modulation, symbol rate and center frequency specified in the table below:

SAT-906B Frequency Spectrum Test Conditions			
Condition	**Modulation**	**Symbol Rate (Sym/S)**	**Frequency (MHz)**
1	A-BPSK	600	1643.50
2	A-BPSK	1,200	1643.50
3	A-QPSK	4,200	1643.50
4	A-QPSK	5,250	1643.50
5	A-QPSK	10,500	1643.50

8. Use the spectrum analyzer to take measurements using the settings detailed below for each of the conditions listed.

SAT-906B Frequency Spectrum Measurement Configuration			
Condition	**Freq. Span (Hz)** **2.95 * 4 * (Symbol Rate)**	**Number of Averages**	**Resolution Bandwidth (Hz)**
1	7,080	20	100
2	14,160	20	100
3	49,560	20	100
4	61,950	20	100
5	123,900	20	100

4.3.3 Frequency Spectrum – Swift64

1. Connect the test equipment as shown in Figure 45.
2. Apply power to the SAT-906B.

3. Place the SDU-906 SBB into maintenance mode.
4. Using the IP application, configure the SDU-906 SBB to radiate an unmodulated carrier at 47.2 dBm with a center frequency of 1643.50 MHz.
5. Set the spectrum analyzer to measure the carrier with a resolution bandwidth of 100 Hz.
6. Set the power reference level of the spectrum analyzer to the peak of the measured carrier and use that reference for the remainder of the testing.
7. Using the Hyper Terminal maintenance interface on the HST, power up the channel card and configure the HST to radiate the following signals with zero dB of channel card back off:

SAT-906B Frequency Spectrum Test Conditions For Swift64			
Condition	**Modulation**	**Symbol Rate (Sym/S)**	**Frequency (MHz)**
1	BPSK	3,000	1643.50
2	16-QAM	33,600	1643.50

8. Adjust the Variable Attenuator to obtain 47.2dBm of output power from the HPA-901B.
9. Use the spectrum analyzer to take measurements using the settings detailed below for each of the conditions listed.

SAT-906B Frequency Spectrum Measurement Configuration			
Condition	**Freq. Span (Hz)** **2.95 * 4 * (Symbol Rate)**	**Number of Averages**	**Resolution Bandwidth (Hz)**
1	35,400	20	100
2	396,480	20	100

4.3.4 Frequency Spectrum – Swift Broadband

1. Connect the test equipment as shown in Figure 45.
2. Apply power to the SAT-906B~~.~~
3. Place the SDU-906 SBB into maintenance mode.
4. Set the spectrum analyzer to measure the carrier with a resolution bandwidth of 100 Hz.
5. Set the power reference level of the spectrum analyzer to the peak of the measured carrier and use that reference for the remainder of the testing.
6. Using the Hyper Terminal maintenance interface on the HST-2110B, force the power up of the HSTs Channel Card.
7. Once the HSTs Channel Card is powered and connected via Ethernet to the Square Peg PLT, use the WinTerm application to place the Channel Card into MTR Test Mode.
8. Start the BPLT application on the Square Peg PLT and run MTR test script MTR14a.scx.
9. Using the interface provided by the test script, configure the HST to radiate the following signals:

SAT-906B Frequency Spectrum Test Conditions for SBB			
Condition	**Modulation**	**Symbol Rate (Sym/S)**	**Frequency (MHz)**
1	π/4-QPSK	16,800	1643.50
2	π/4-QPSK	33,600	1643.50
3	π/4-QPSK	67,200	1643.50
4	π/4-QPSK	151,200	1643.50
5	16-QAM	33,600	1643.50
6	16-QAM	67,200	1643.50
7	16-QAM	151,200	1643.50

10. Adjust the Variable Attenuator to obtain 46.5dBm of output power from the HPA-901B.
11. Use the spectrum analyzer to take measurements using the settings detailed below for each of the conditions listed.

SAT-906B Frequency Spectrum Measurement Configuration			
Condition	**Freq. Span (Hz) 2.95 * 4 * (Symbol Rate)**	**Number of Averages**	**Resolution Bandwidth (Hz)**
1	198,240	20	100
2	396,480	20	100
3	792,960	20	100
4	1,784,160	20	100
5	396,480	20	100
6	792,960	20	100
7	1,784,160	20	100

4.3.5 Spurious Emissions at Antenna Terminals Results

No spurious or harmonic emissions were found to be out of the specifications. See attached plots.

Spurious Emissions at Antenna Terminals
List of Figures

Figure Number	Operational Mode	Modulation Type	Bit Rate (bps)	Symbol Rate (sym/s)	SDU/HST used	HPA used
46 – 59	Classic Aero	A-QPSK	21,000	10,500	SDU-906 SBB AC	HPA-901B
60 - 73	Swift64	16-QAM	134,400	33,600	HST-2110B-AC	HPA-901BC
74 - 87	Swift Broadband	16-QAM	604,800	151,200	HST-2110B-AC	HPA-901BC

Test Range: 10 kHz to 18 GHz
Carrier Frequency: 1643.5 MHz

Figure 46 - 0.01 to 1525 MHz (Classic Aero)

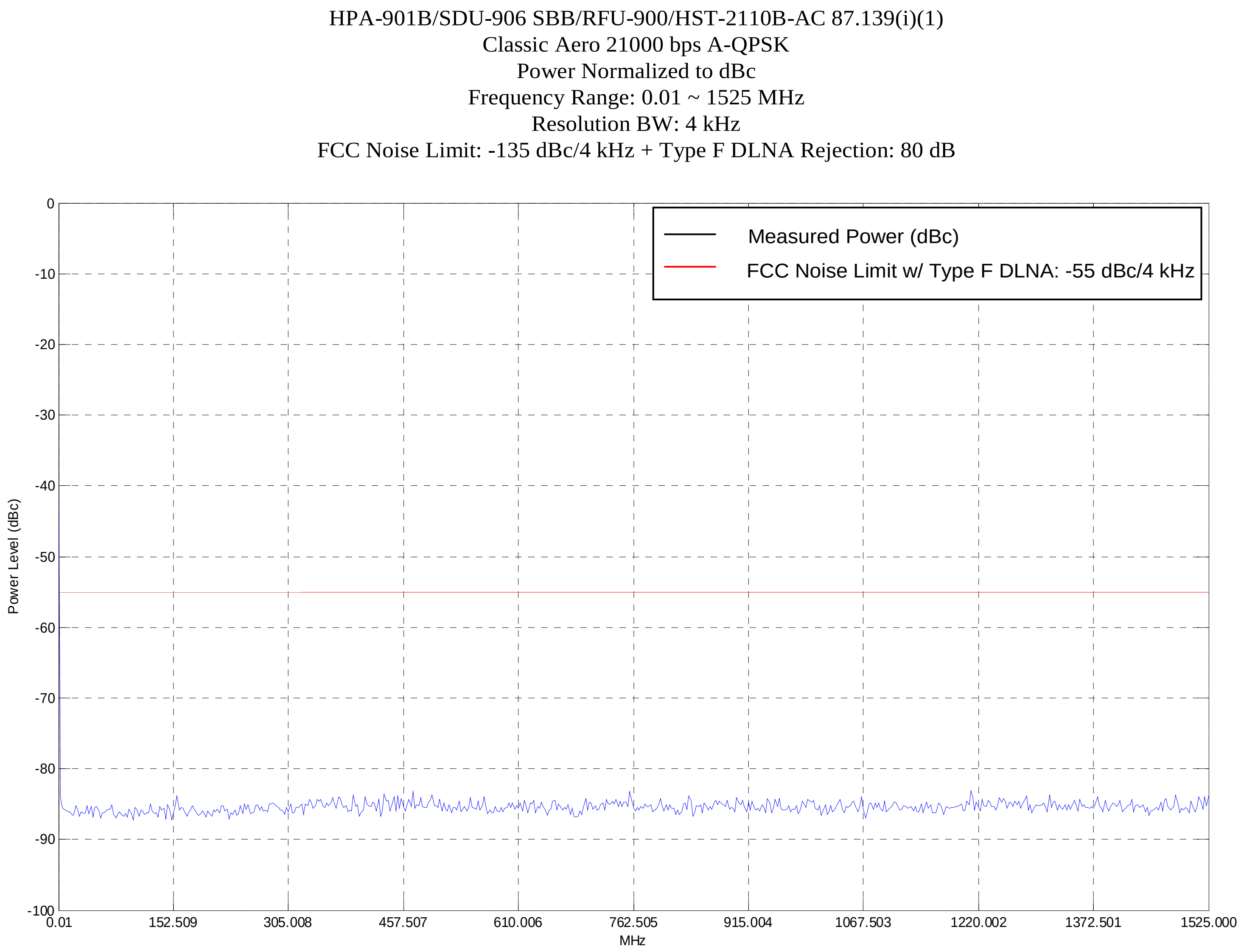


Figure 47 – 1525 to 1559 MHz (Classic Aero)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC 87.139(i)(1)
Classic Aero 21000 bps A-QPSK
Power Normalized to dBc
Frequency Range: 1525 ~ 1559 MHz
Resolution BW: 4 kHz
FCC Noise Limit: -203 dBc/4 kHz + Type F DLNA Rejection: 120 dB

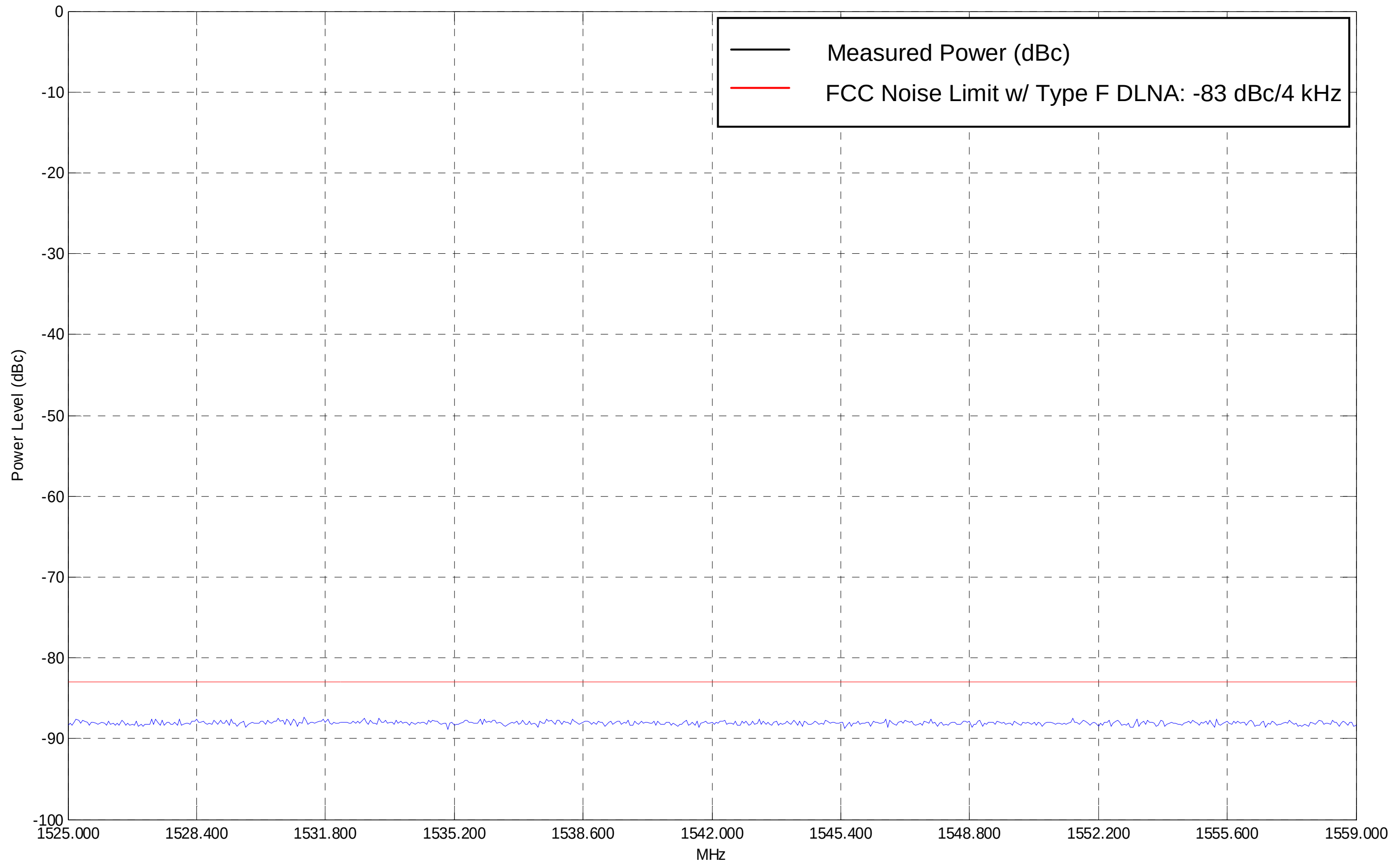


Figure 48 – 1559 to 1585 MHz (Classic Aero)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC 87.139(i)(1)
Classic Aero 21000 bps A-QPSK
Power Normalized to dBc
Frequency Range: 1559 ~ 1585 MHz
Resolution BW: 1000 kHz
FCC Noise Limit: -155 dBc/1000 kHz + Type F DLNA Rejection: 111 dB

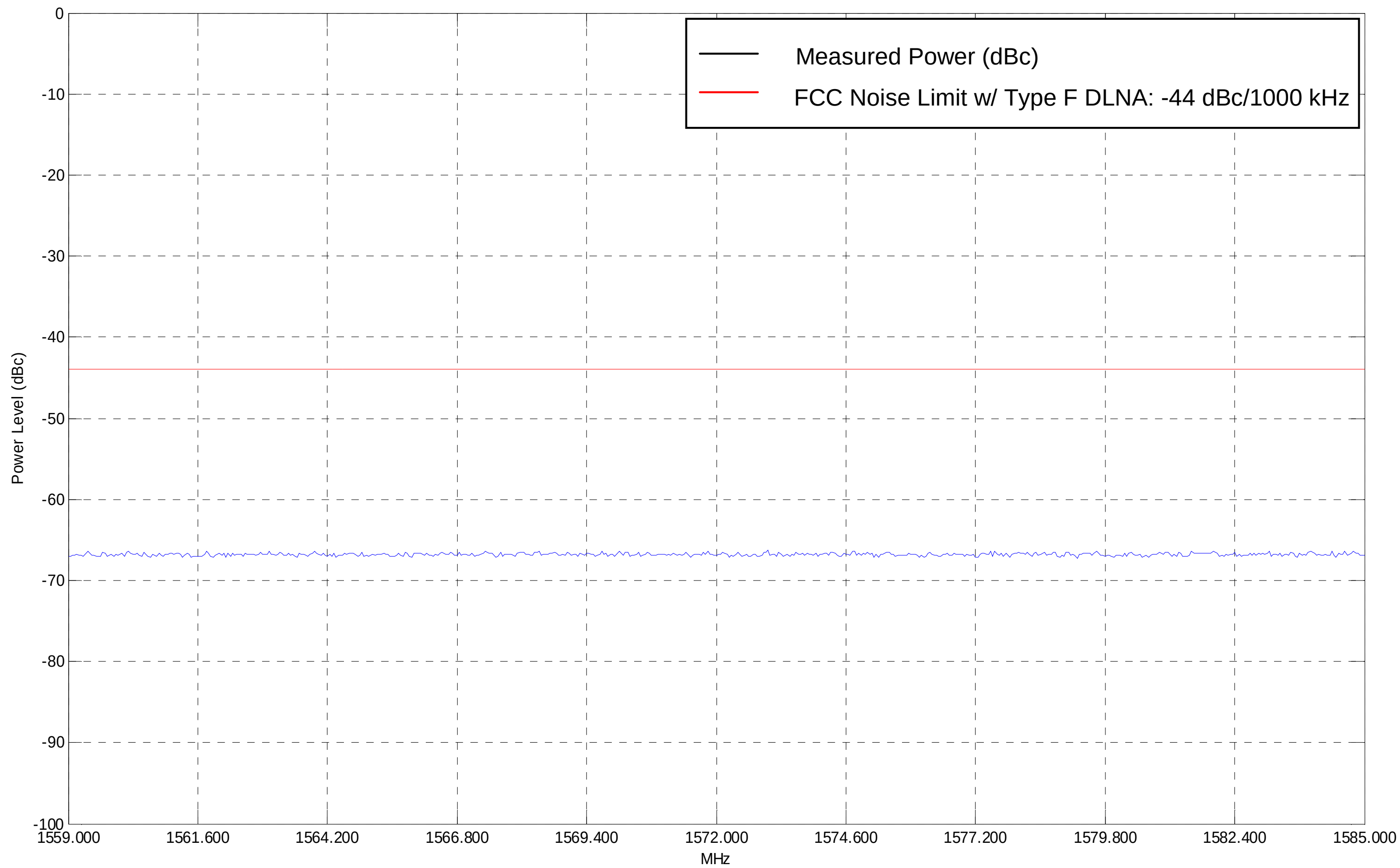


Figure 49 – 1585 to 1605 MHz (Classic Aero)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC 87.139(i)(1)
Classic Aero 21000 bps A-QPSK
Power Normalized to dBc
Frequency Range: 1585 ~ 1605 MHz
Resolution BW: 1000 kHz
FCC Noise Limit: -143 dBc/1000 kHz + Type F DLNA Rejection: 95 dB

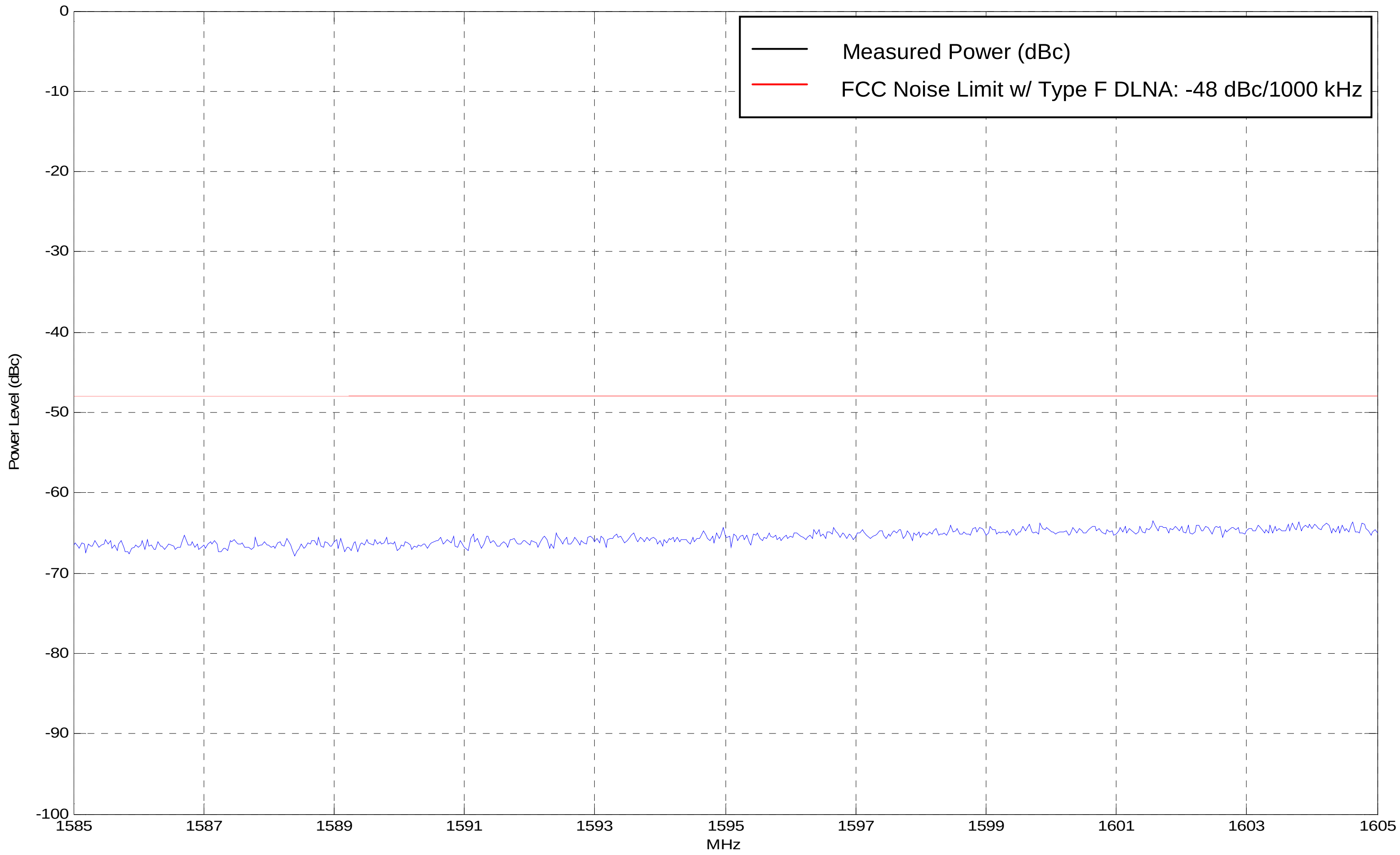


Figure 50 - 1605 to 1610 MHz (Classic Aero)

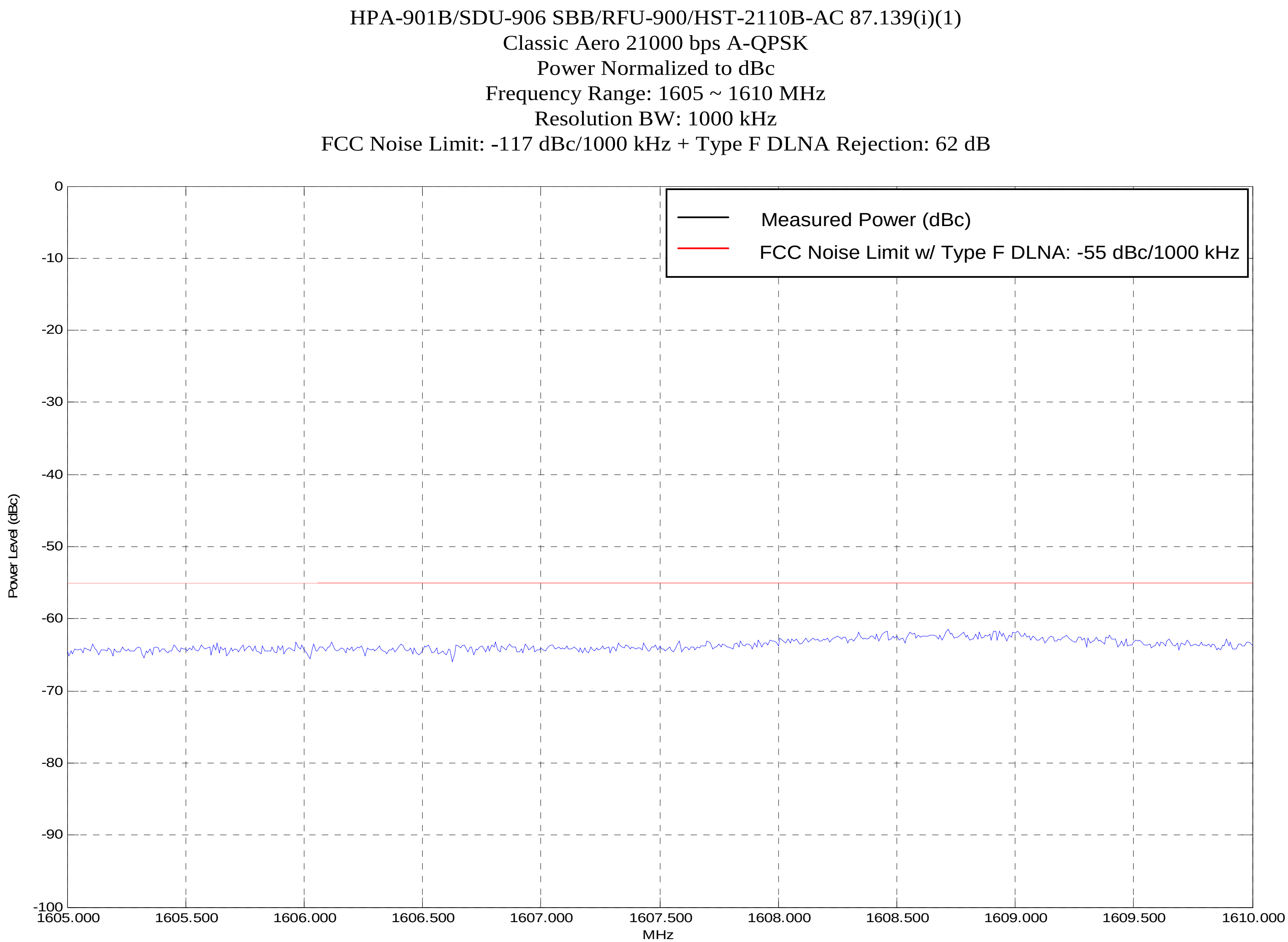


Figure 51 – 1610 to 1610.6 MHz (Classic Aero)

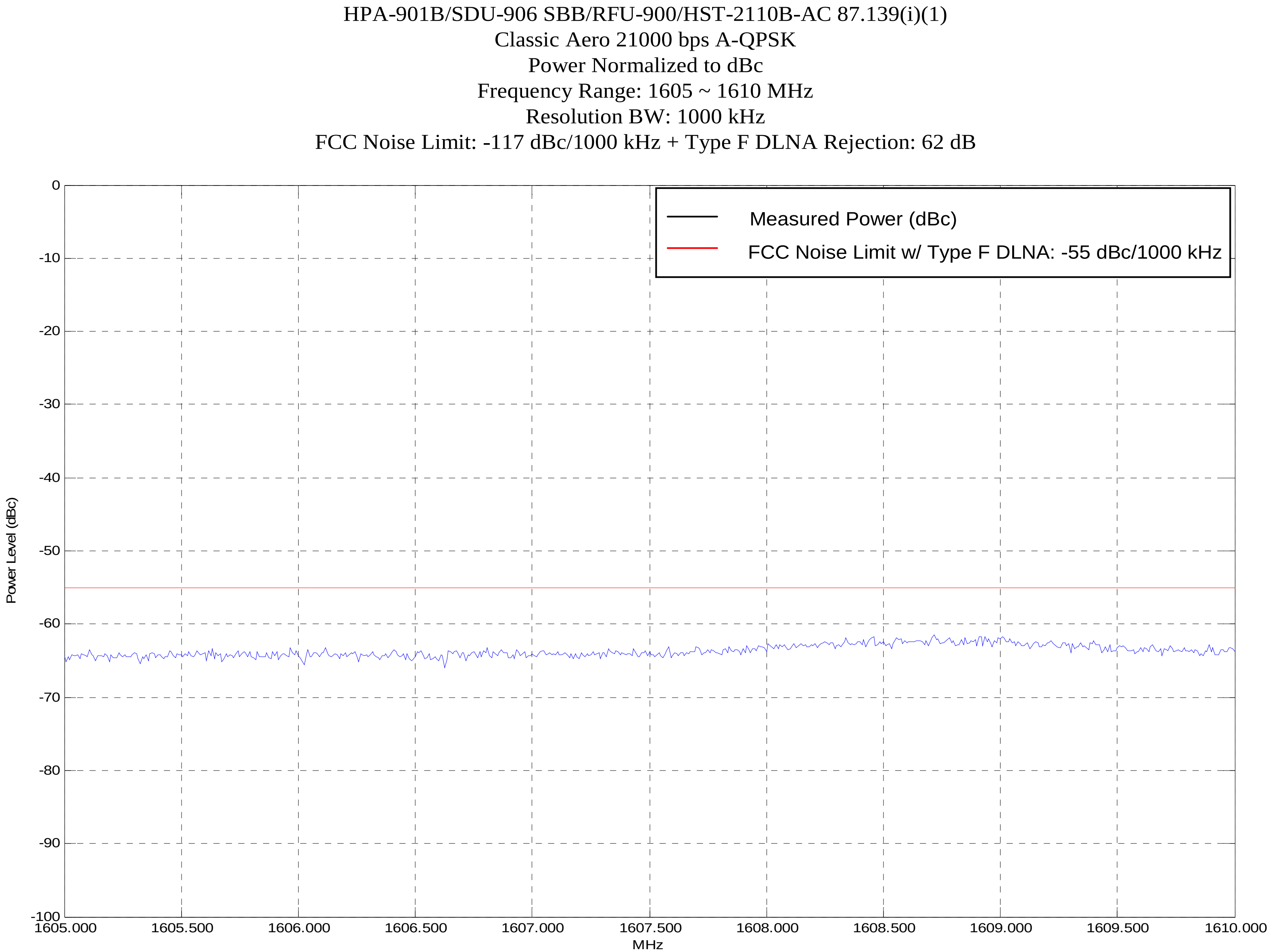


Figure 52 – 1610.6 to 1613.8 MHz (Classic Aero)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC 87.139(i)(1)
Classic Aero 21000 bps A-QPSK
Power Normalized to dBc
Frequency Range: 1610.6 ~ 1613.8 MHz
Resolution BW: 1000 kHz
FCC Noise Limit: -80 dBc/1000 kHz + Type F DLNA Rejection: 40 dB

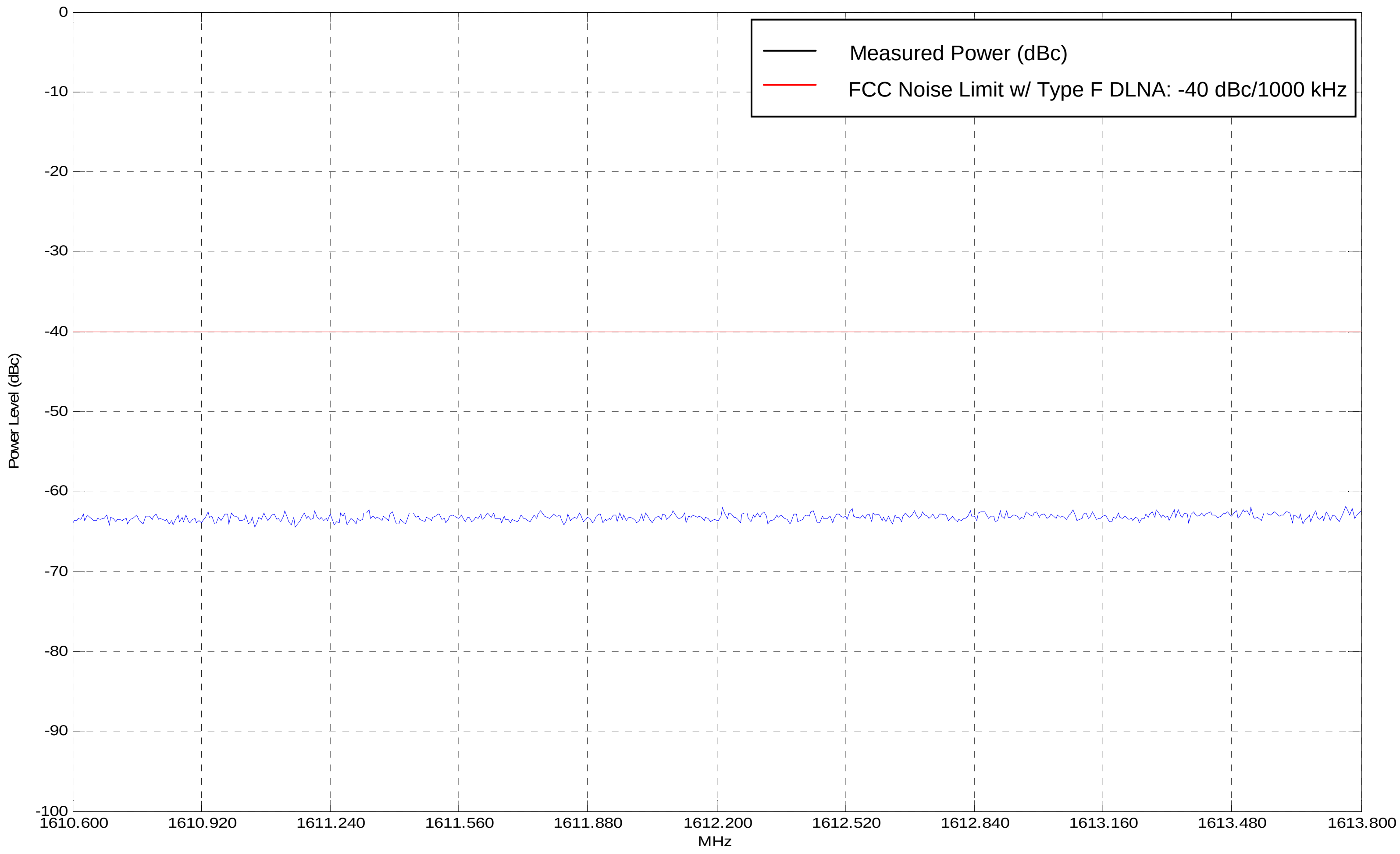


Figure 53 – 1613.8 to 1614 MHz (Classic Aero)

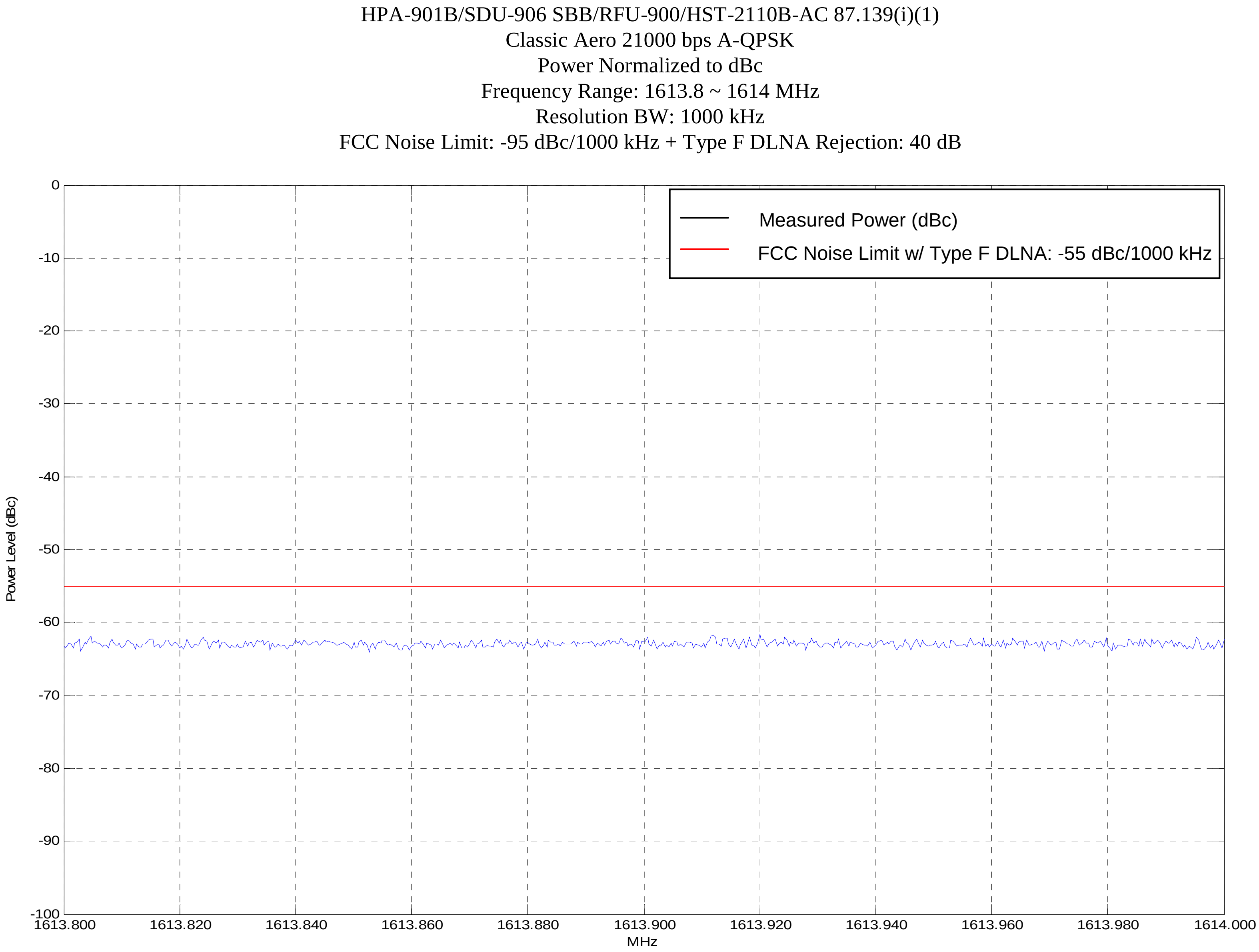


Figure 54 – 1614 to 1626.5 MHz (Classic Aero)

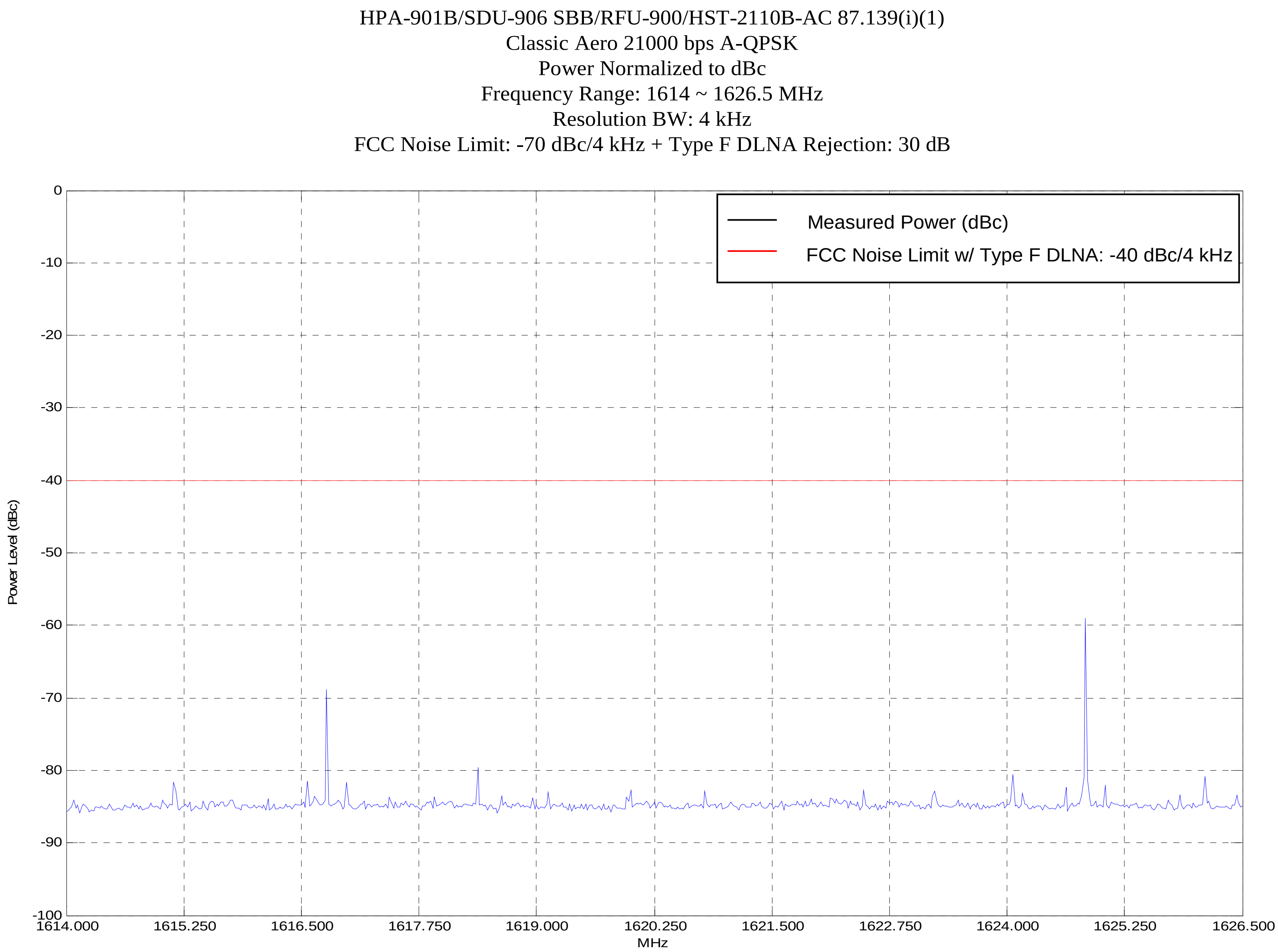


Figure 55 – 1626.5 to 1660 MHz (Classic Aero)

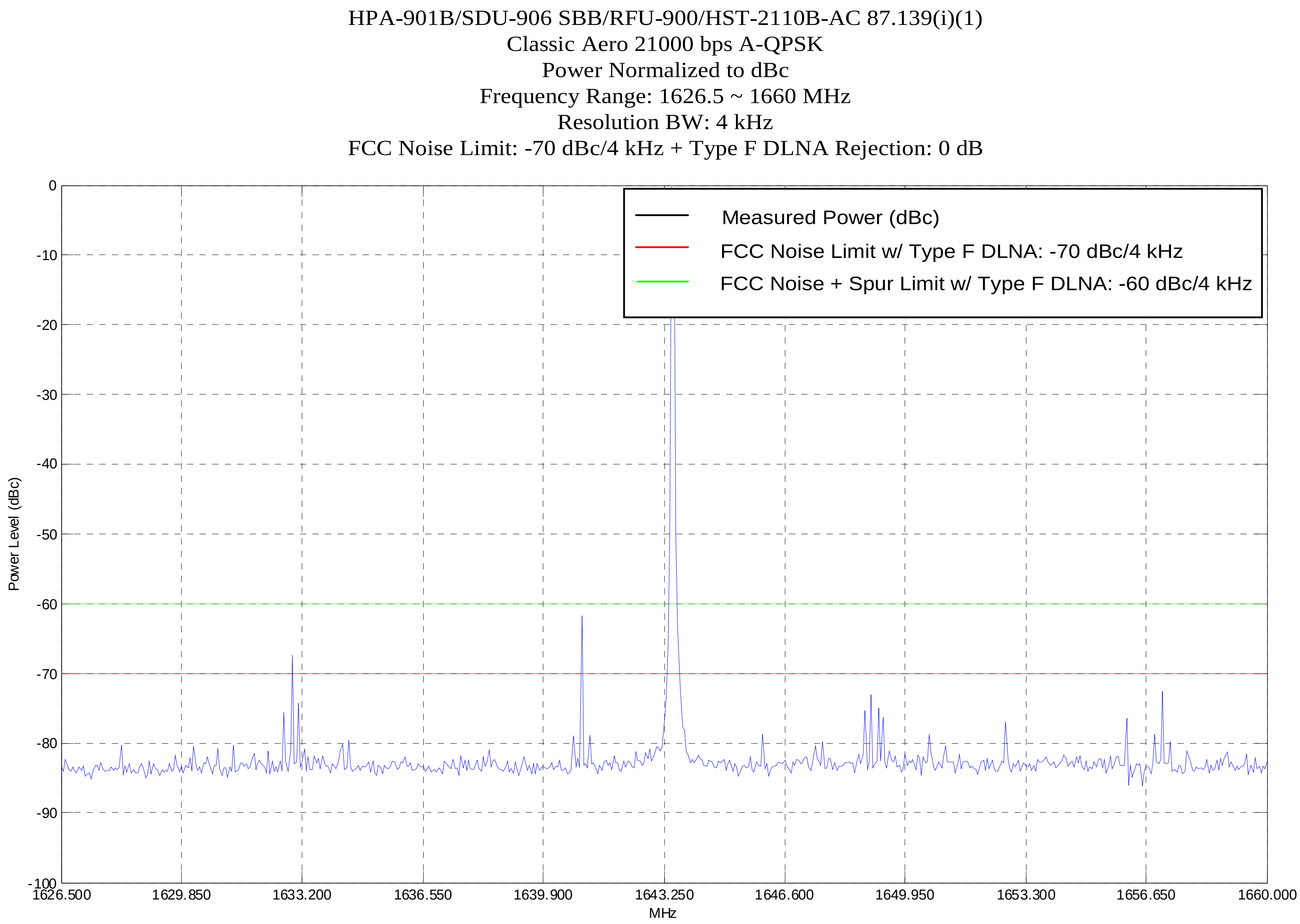


Figure 56 – 1660 to 1670 MHz (Classic Aero)

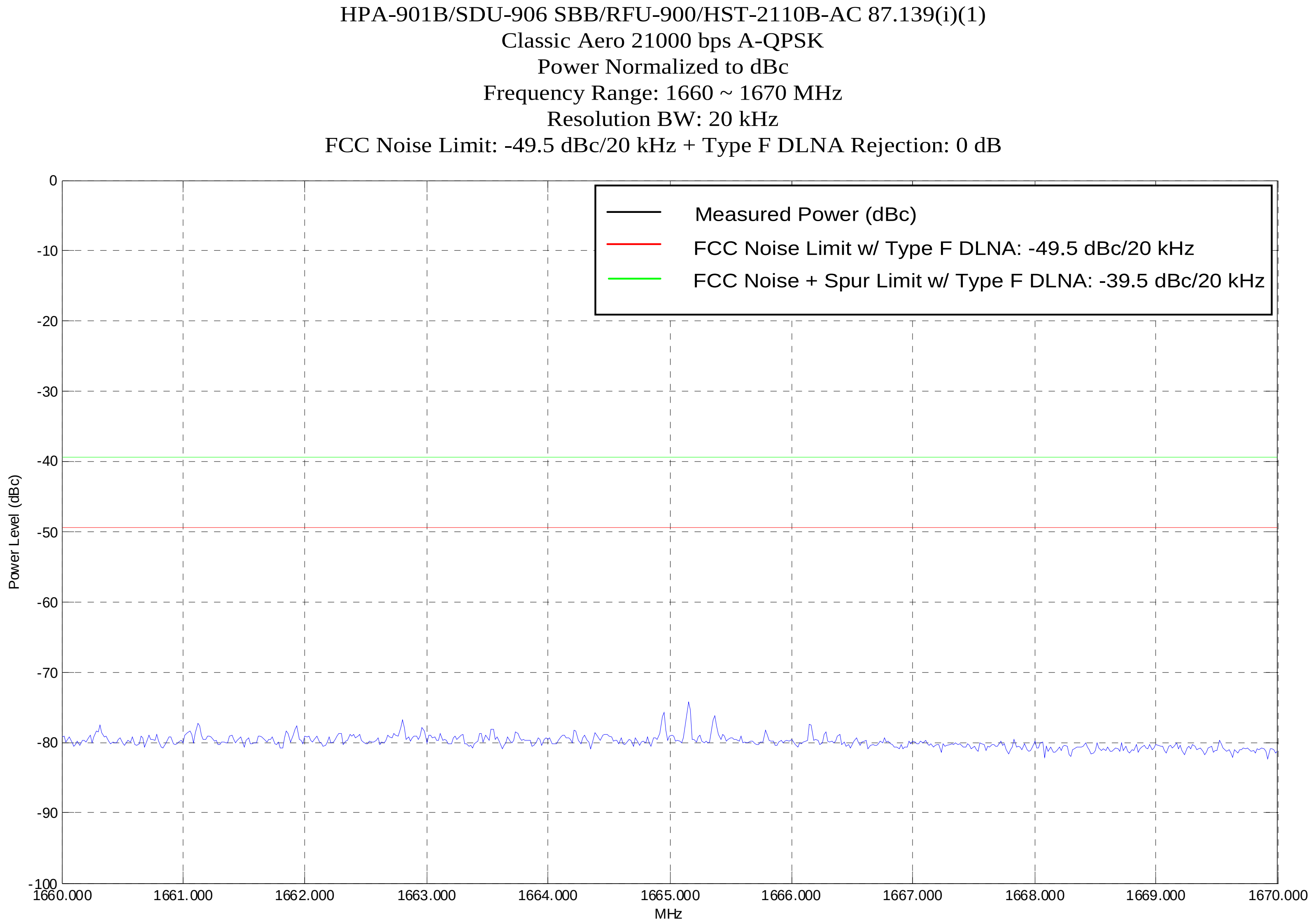


Figure 57 – 1670 to 1735 MHz (Classic Aero)

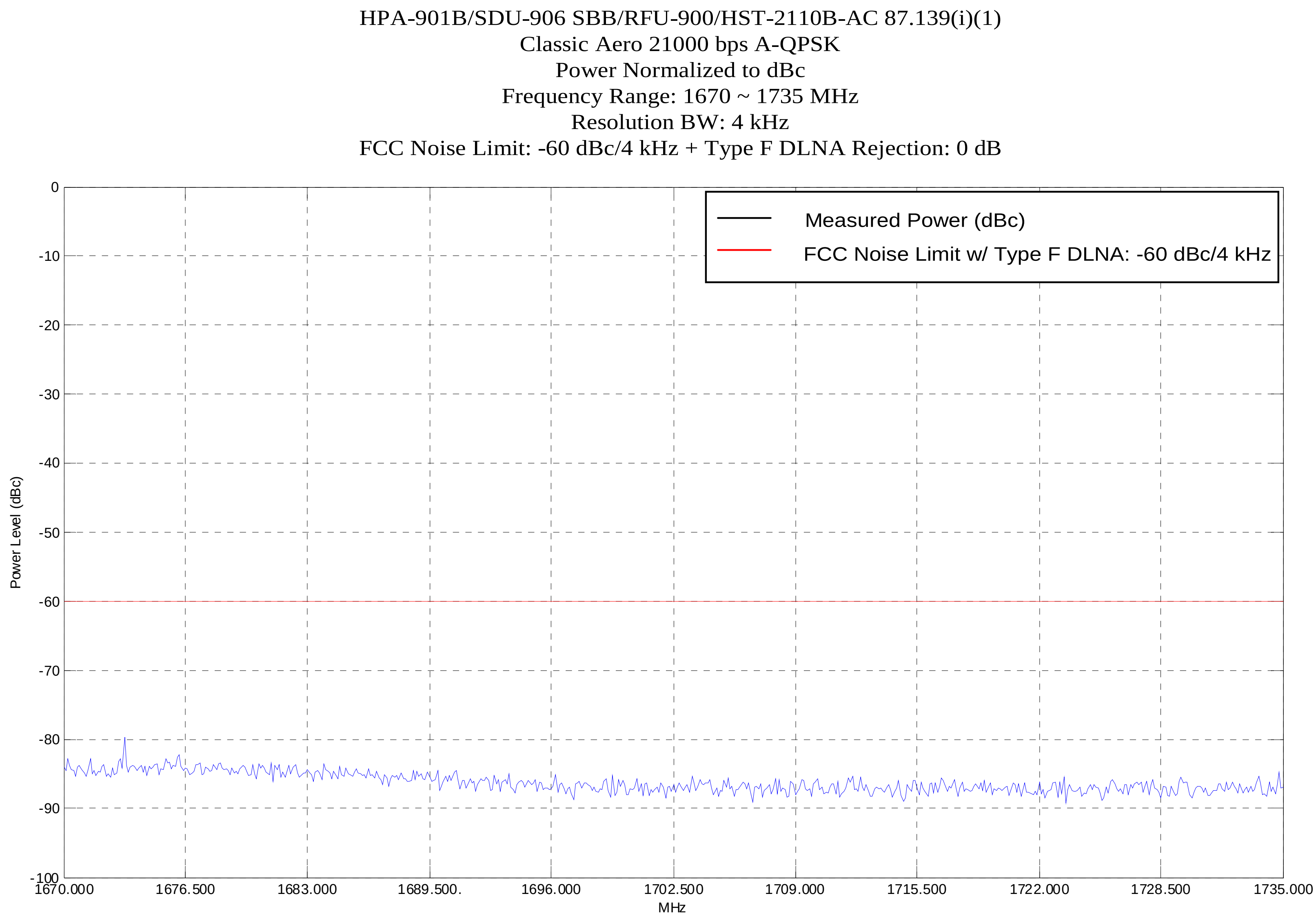


Figure 58 – 1735 to 12000 MHz (Classic Aero)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC 87.139(i)(1)
Classic Aero 21000 bps A-QPSK
Power Normalized to dBc
Frequency Range: 1735 ~ 12000 MHz
Resolution BW: 4 kHz
FCC Noise Limit: -105 dBc/4 kHz + Type F DLNA Rejection: 50 dB

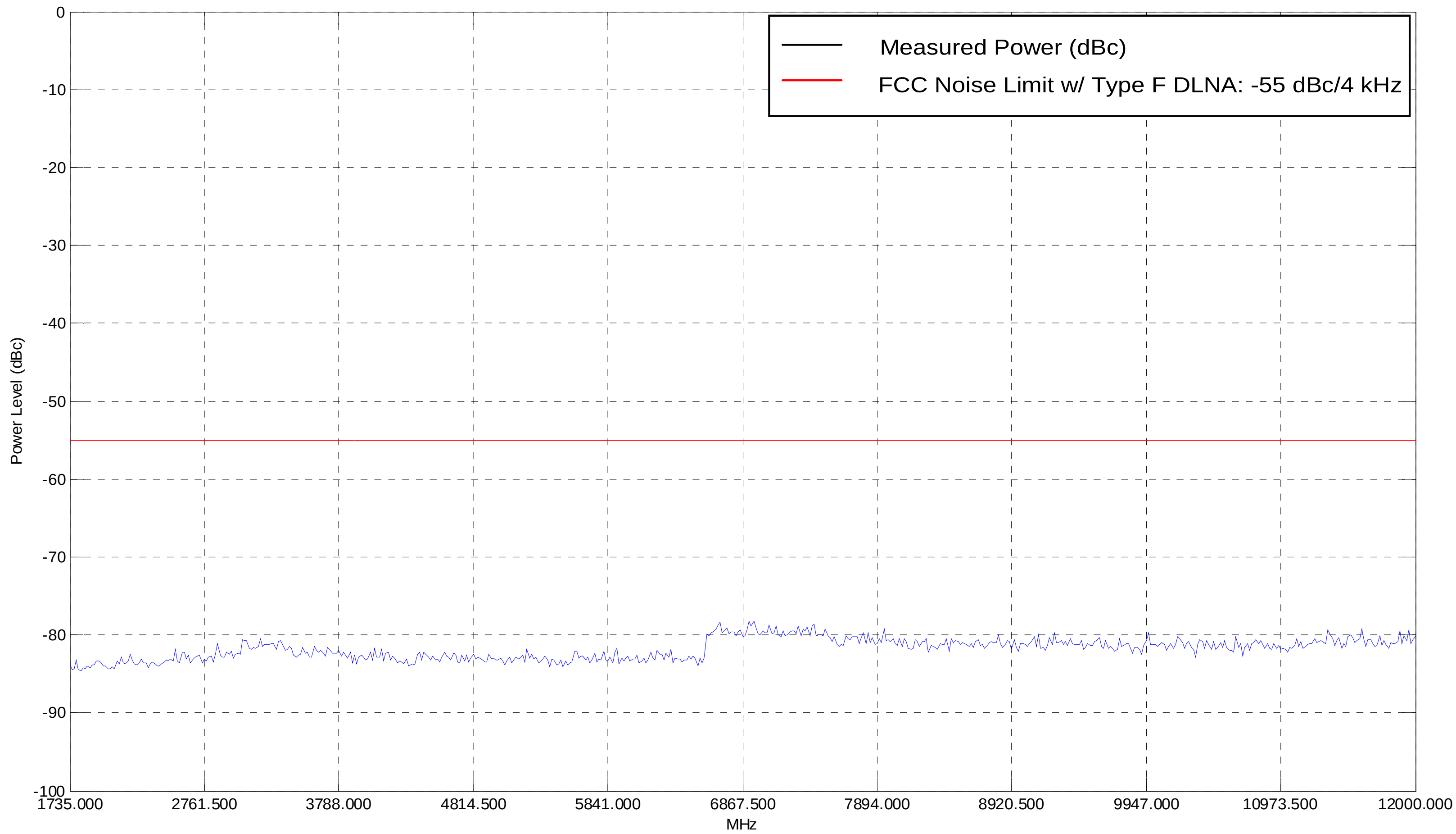


Figure 59 – 12000 to 18000 MHz (Classic Aero)

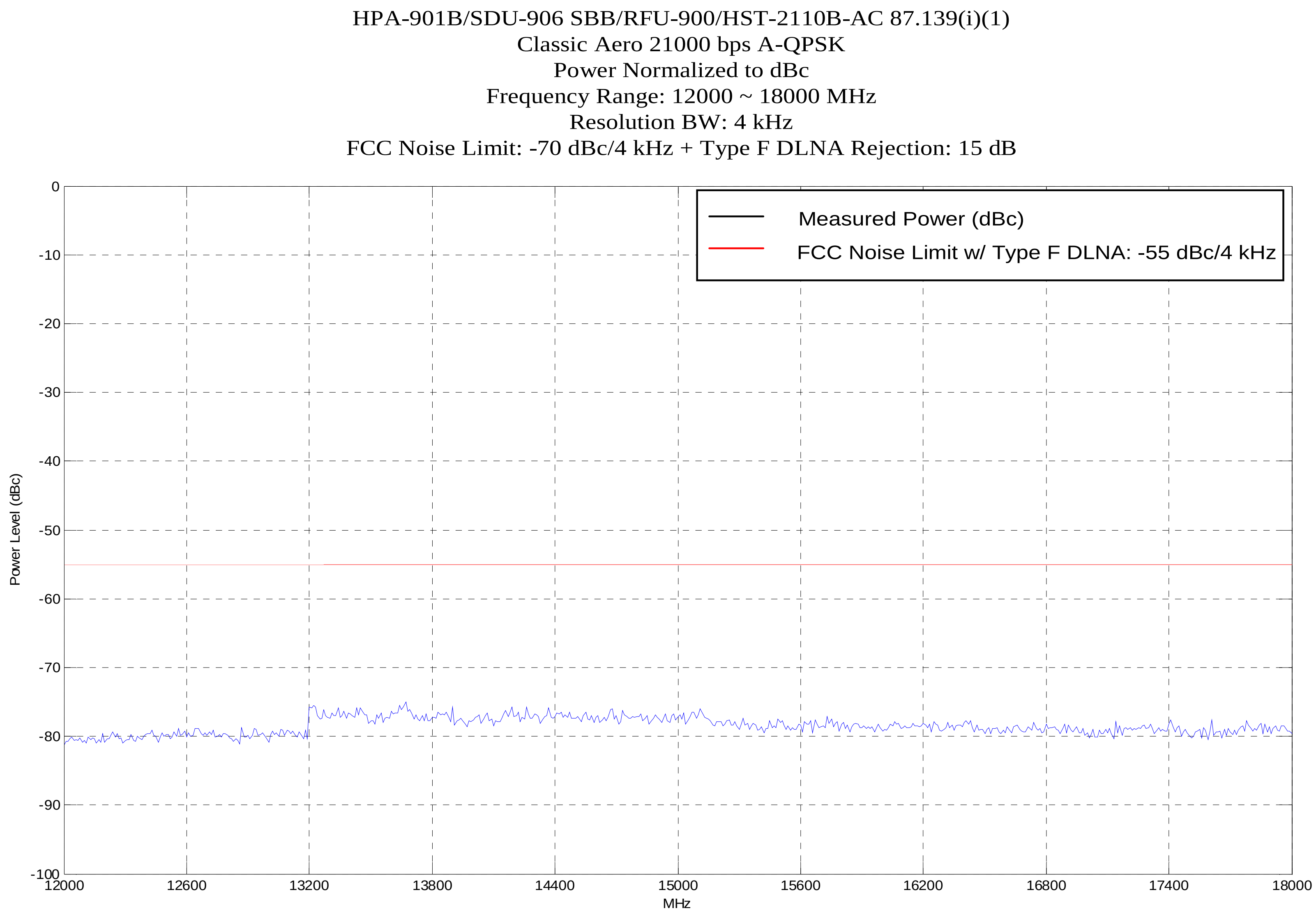


Figure 60 - 0.01 to 1525 MHz (Swift64)

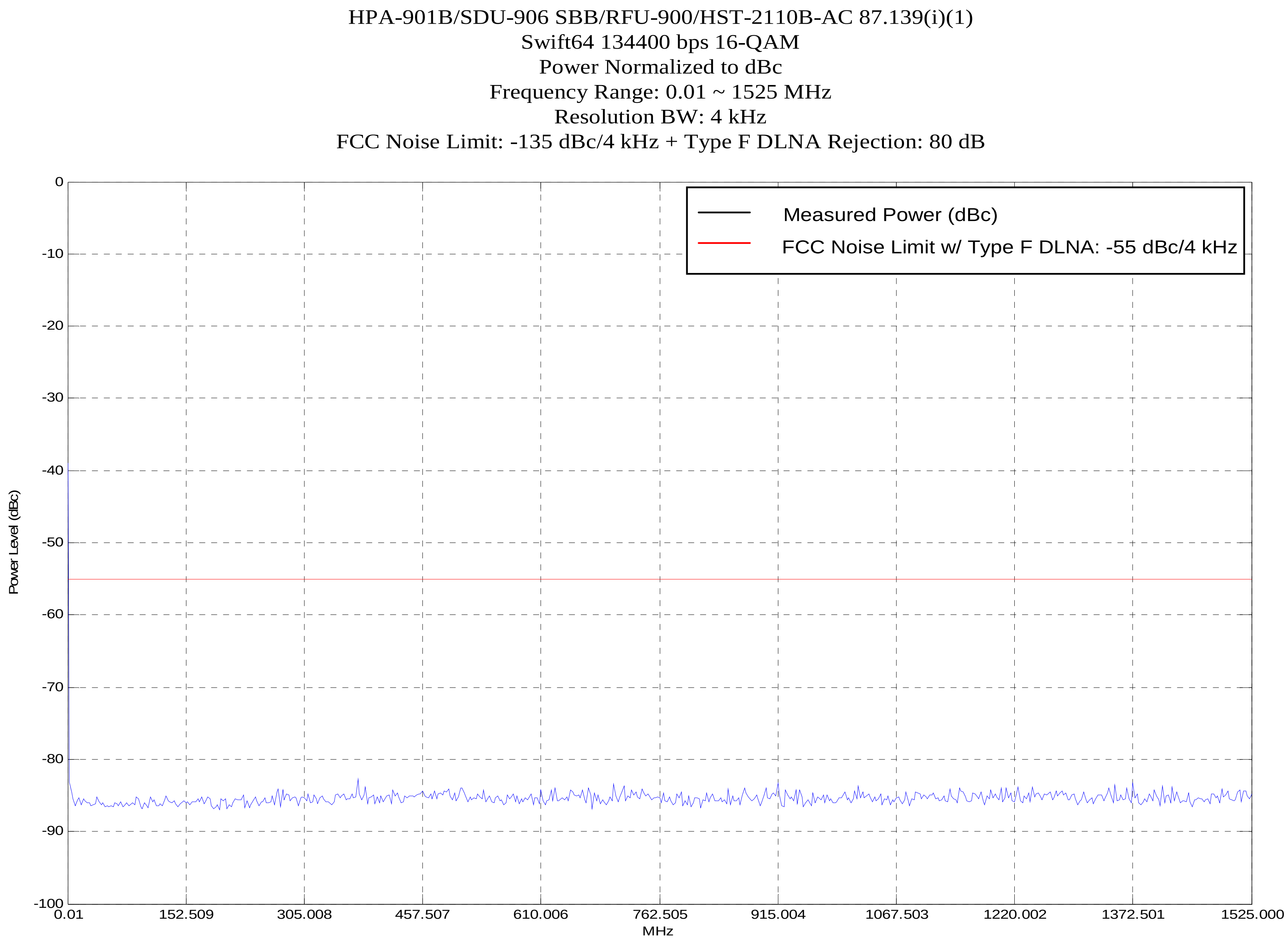


Figure 61 – 1525 to 1559 MHz (Swift64)

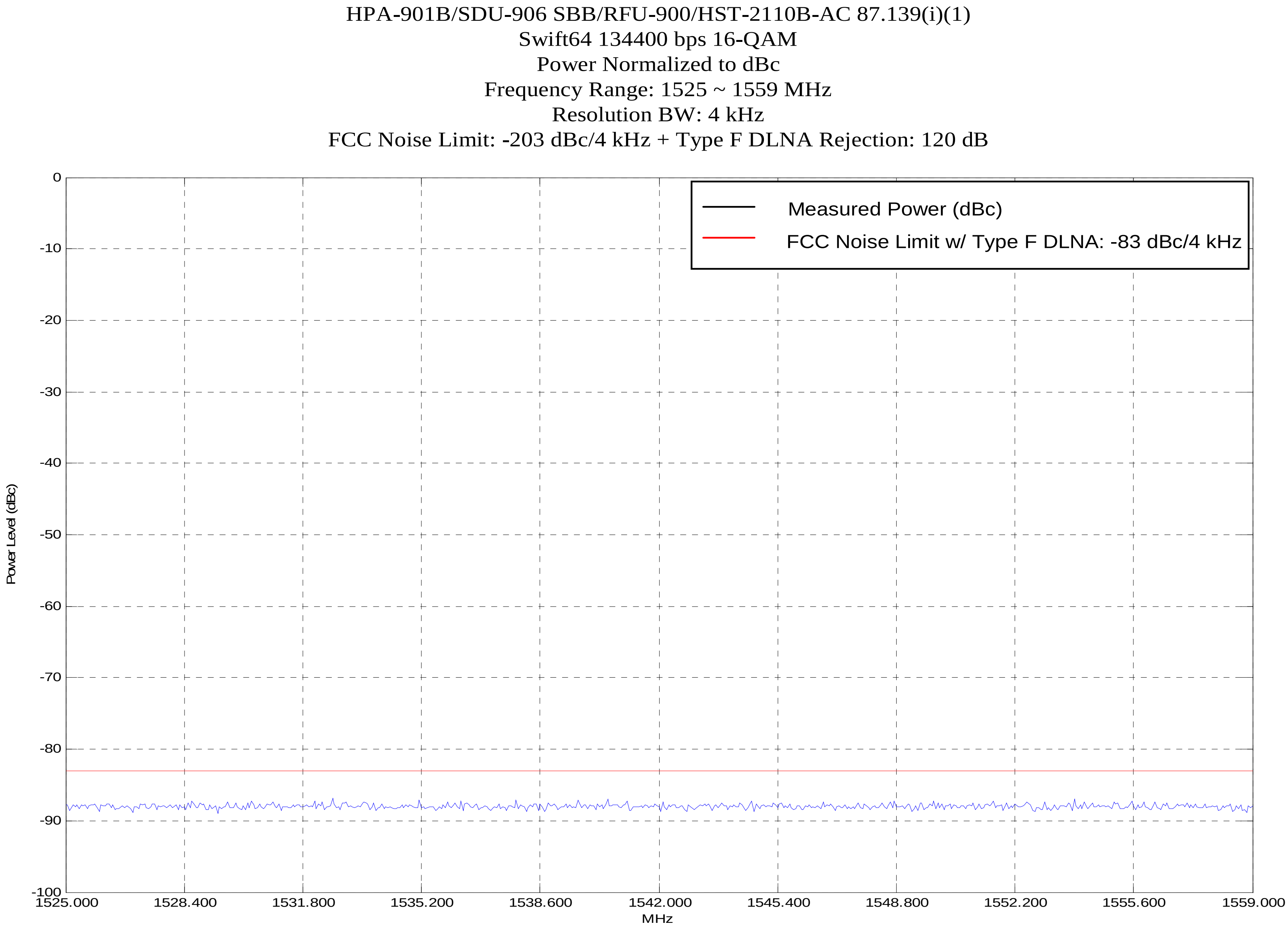


Figure 62 – 1559 to 1585 MHz (Swift64)

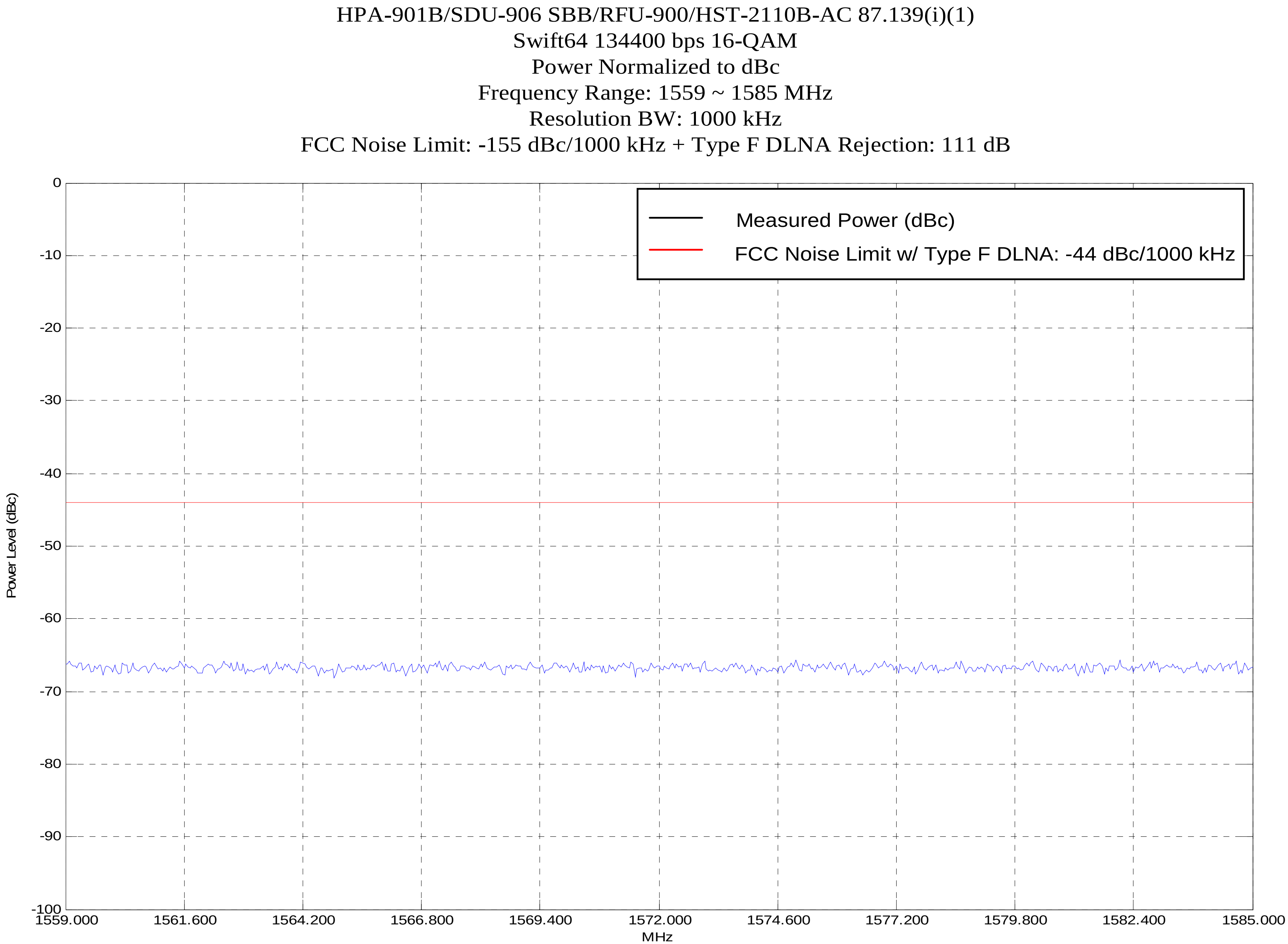


Figure 63 – 1585 to 1605 MHz (Swift64)

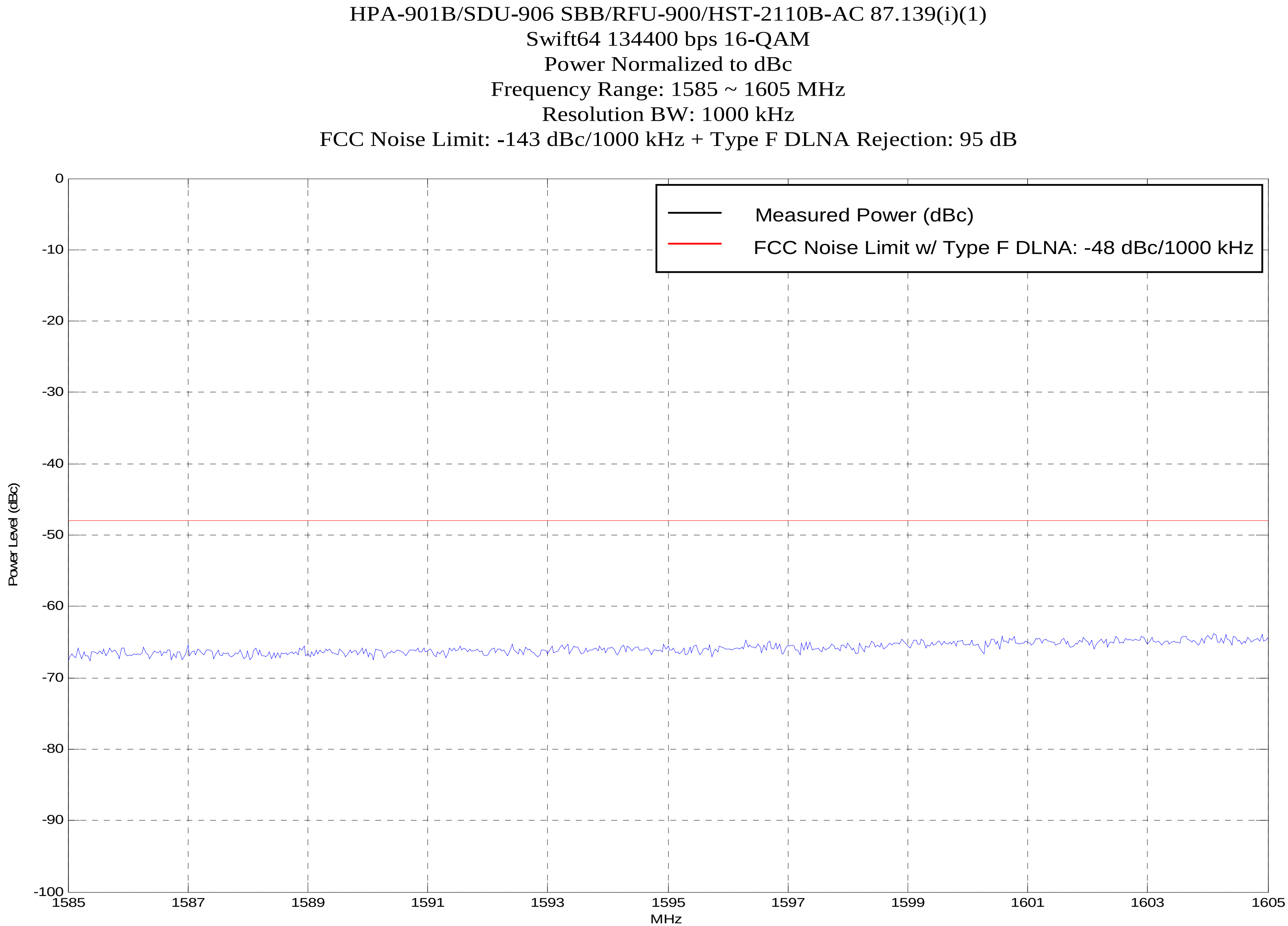


Figure 64 - 1605 to 1610 MHz (Swift64)

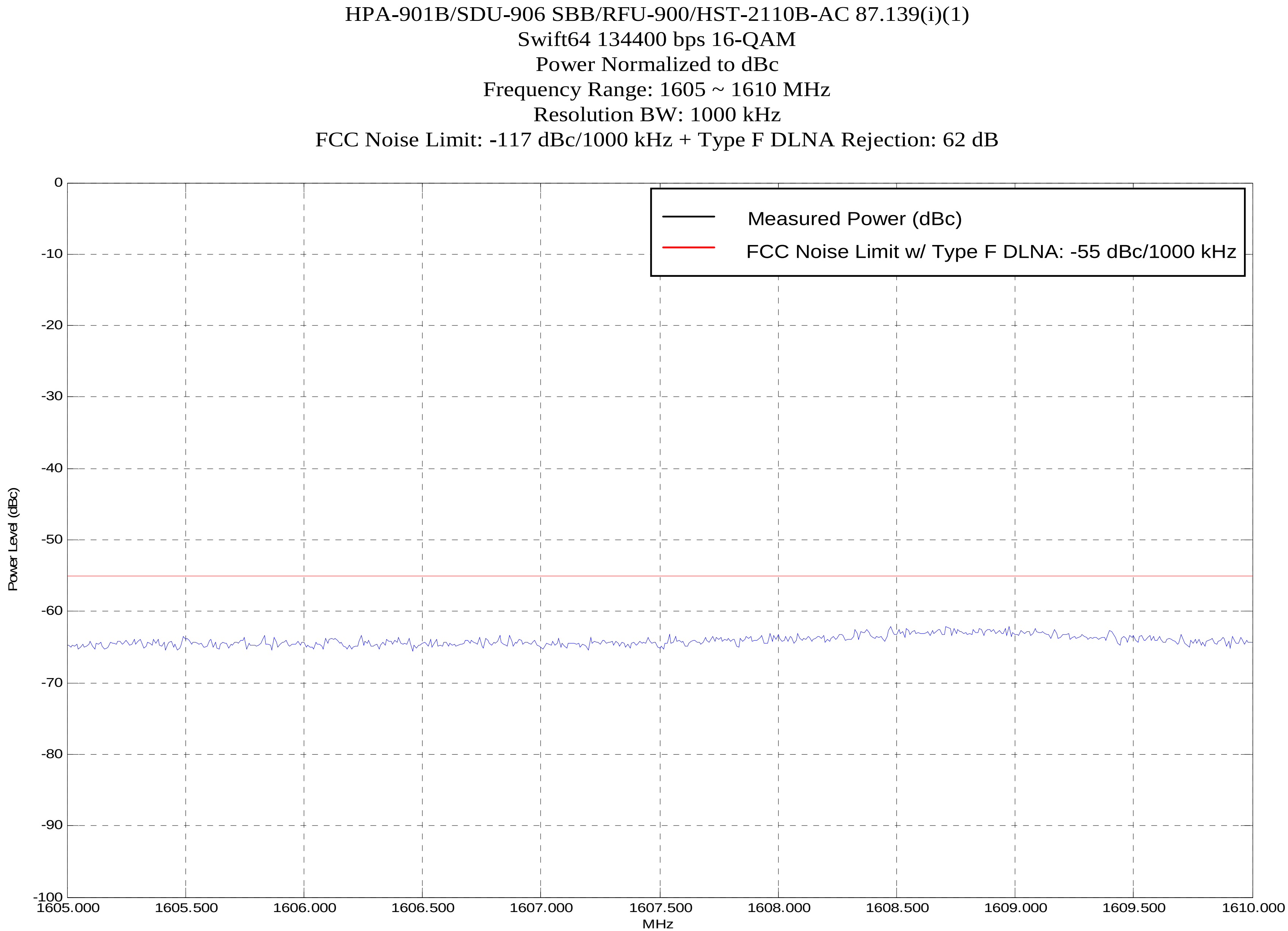


Figure 65 – 1610 to 1610.6 MHz (Swift64)

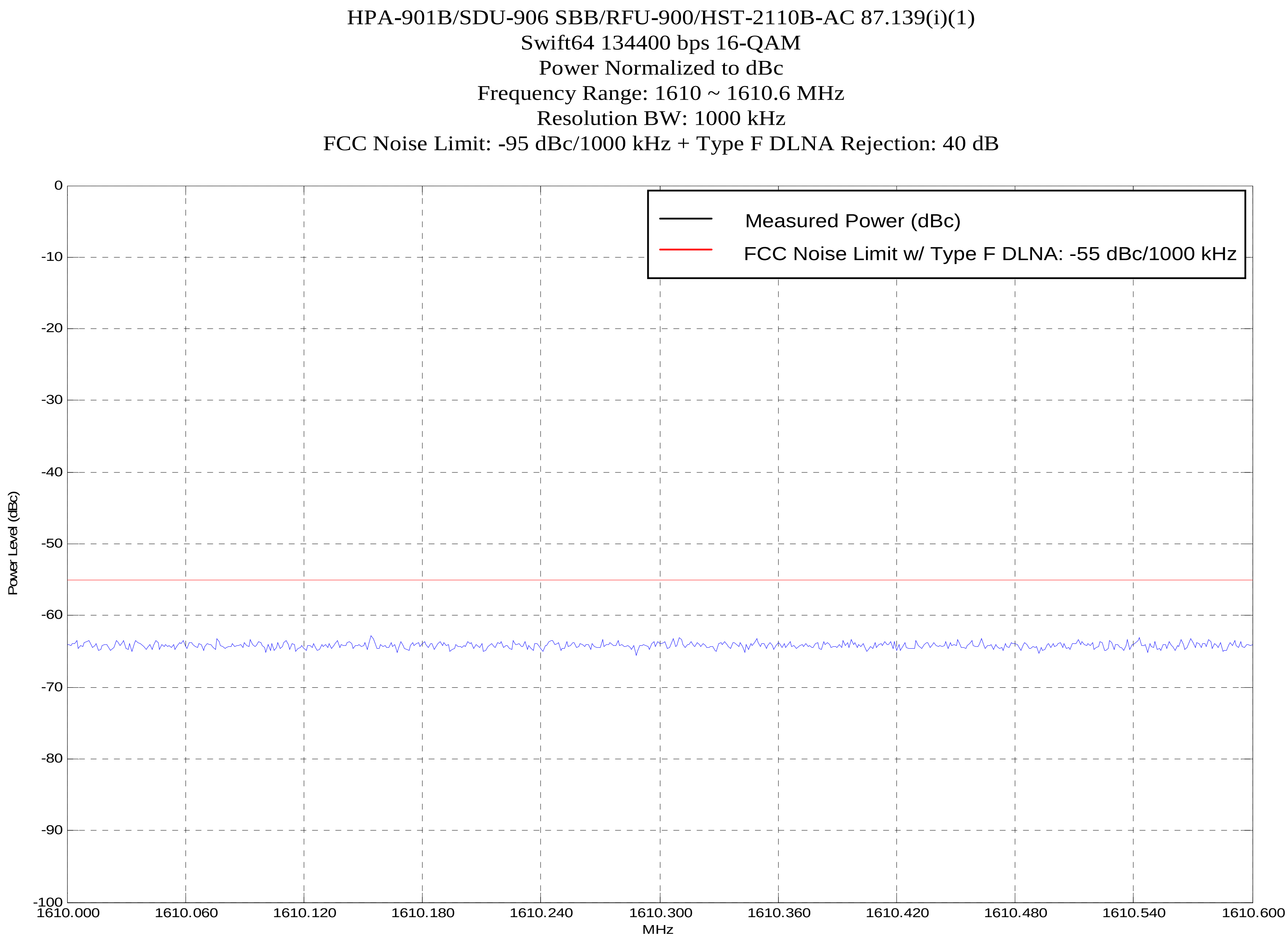


Figure 66 – 1610.6 to 1613.8 MHz (Swift64)

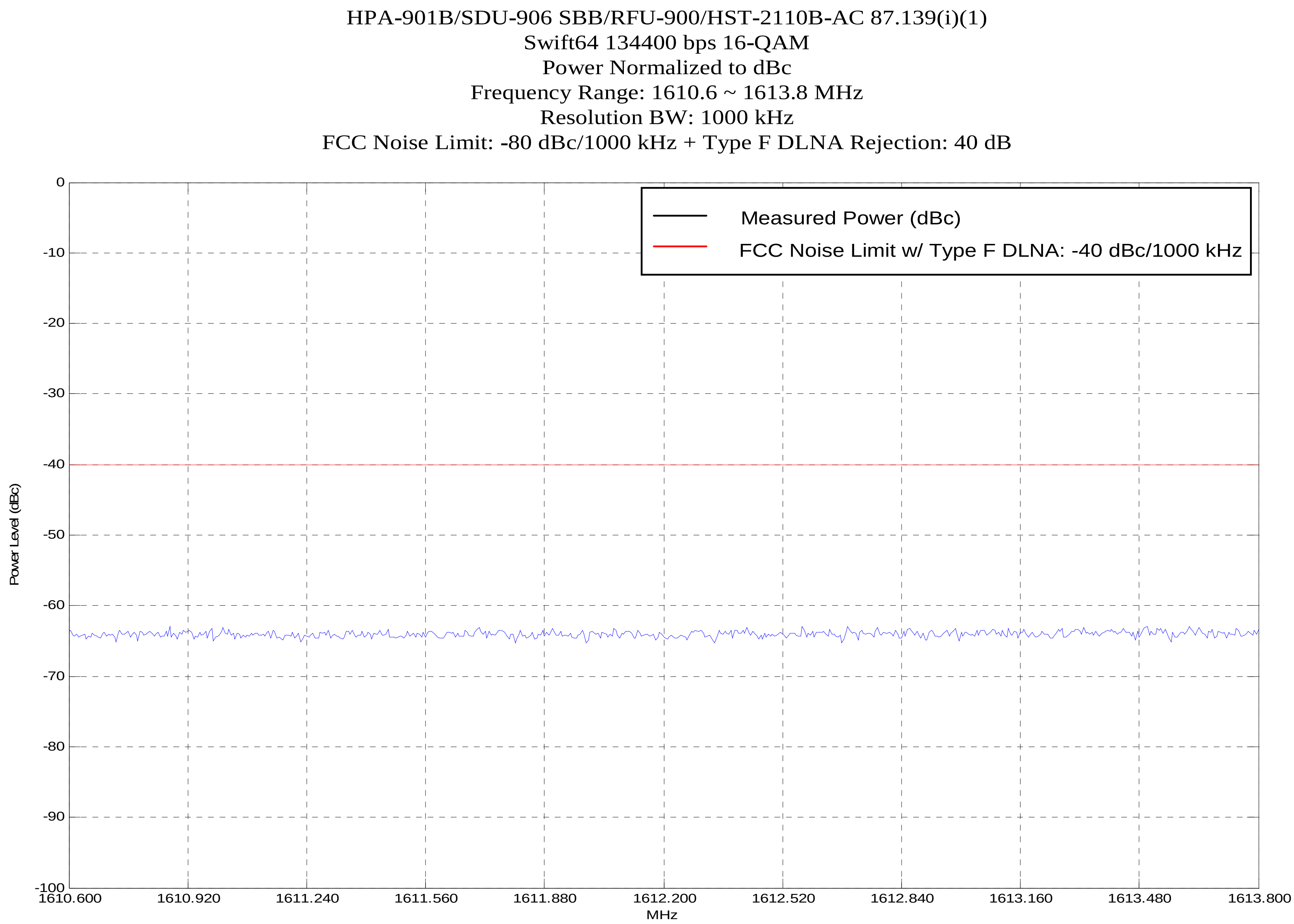


Figure 67 – 1613.8 to 1614 MHz (Swift64)

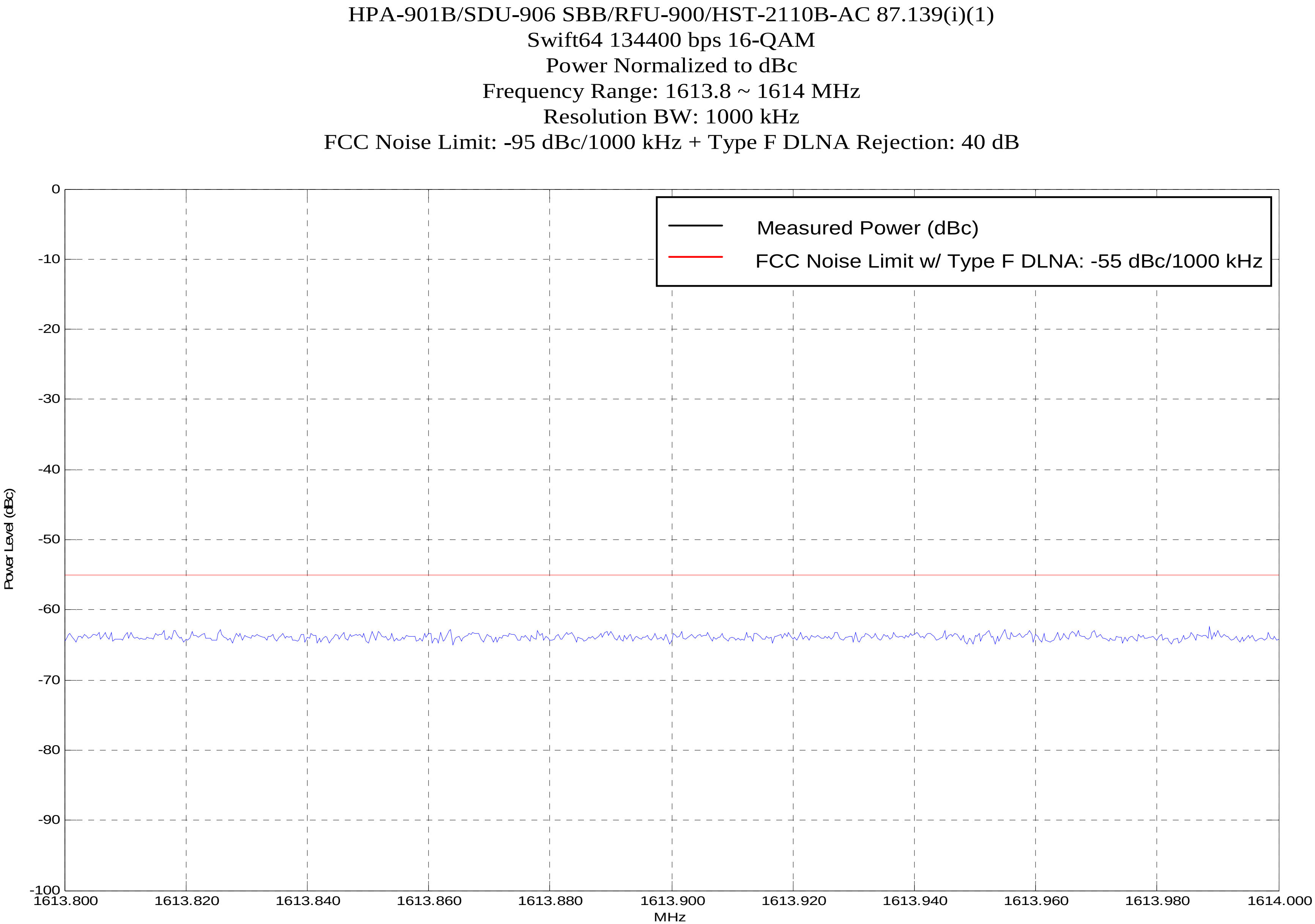


Figure 68 – 1614 to 1626.5 MHz (Swift64)

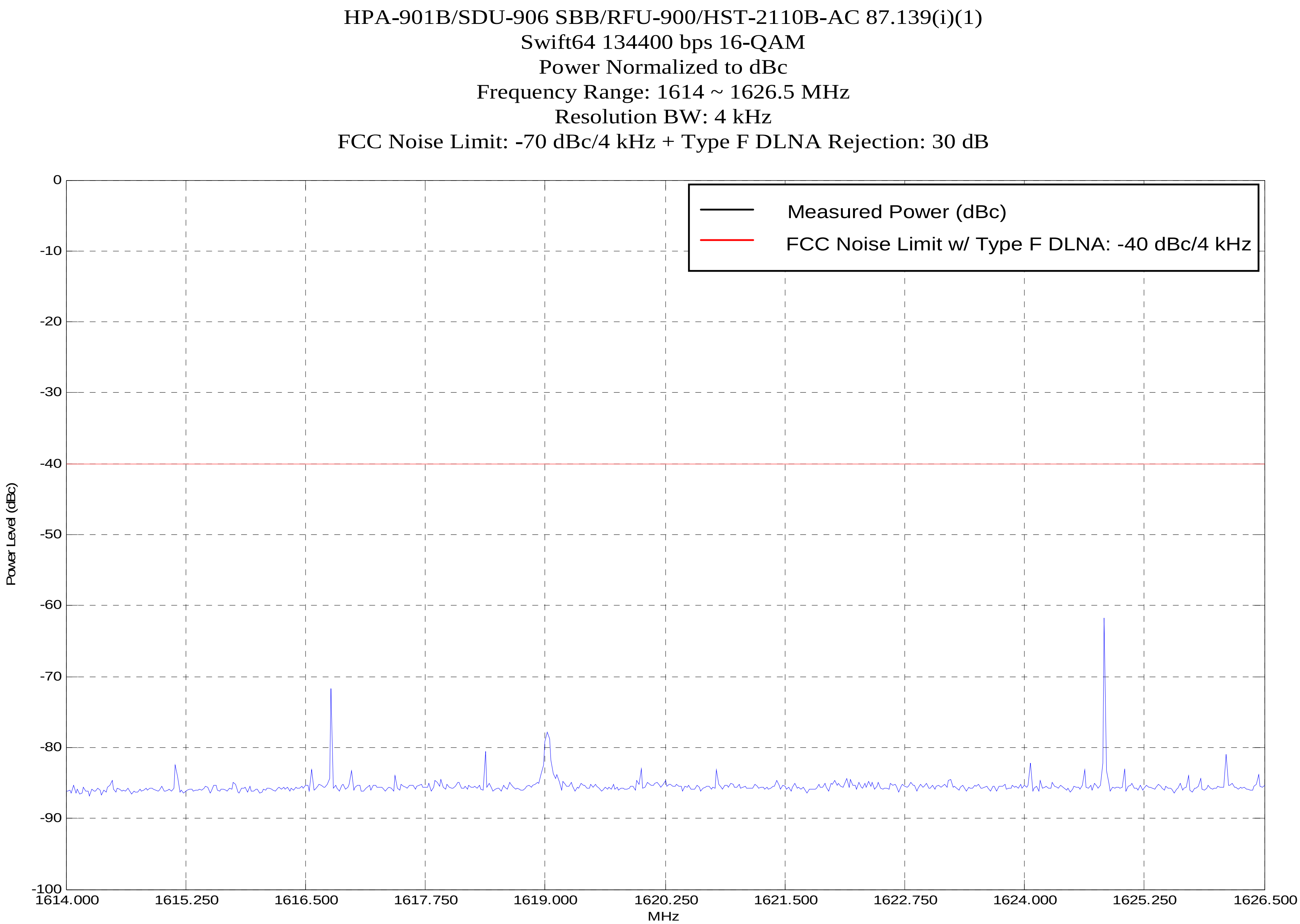


Figure 69 – 1626.5 to 1660 MHz (Swift64)

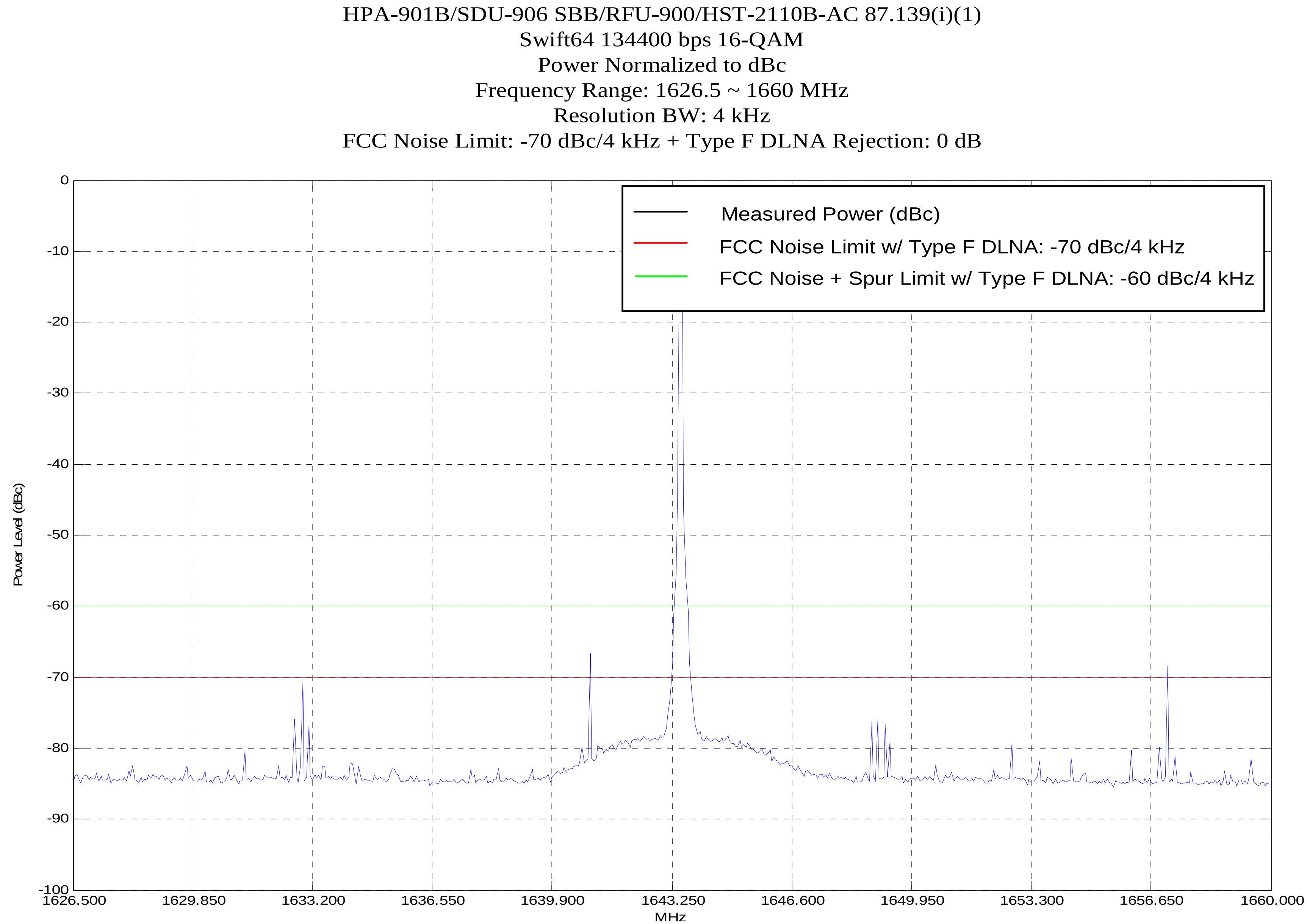


Figure 70 – 1660 to 1670 MHz (Swift64)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC 87.139(i)(1)
Swift64 134400 bps 16-QAM
Power Normalized to dBc
Frequency Range: 1660 ~ 1670 MHz
Resolution BW: 20 kHz
FCC Noise Limit: -49.5 dBc/20 kHz + Type F DLNA Rejection: 0 dB

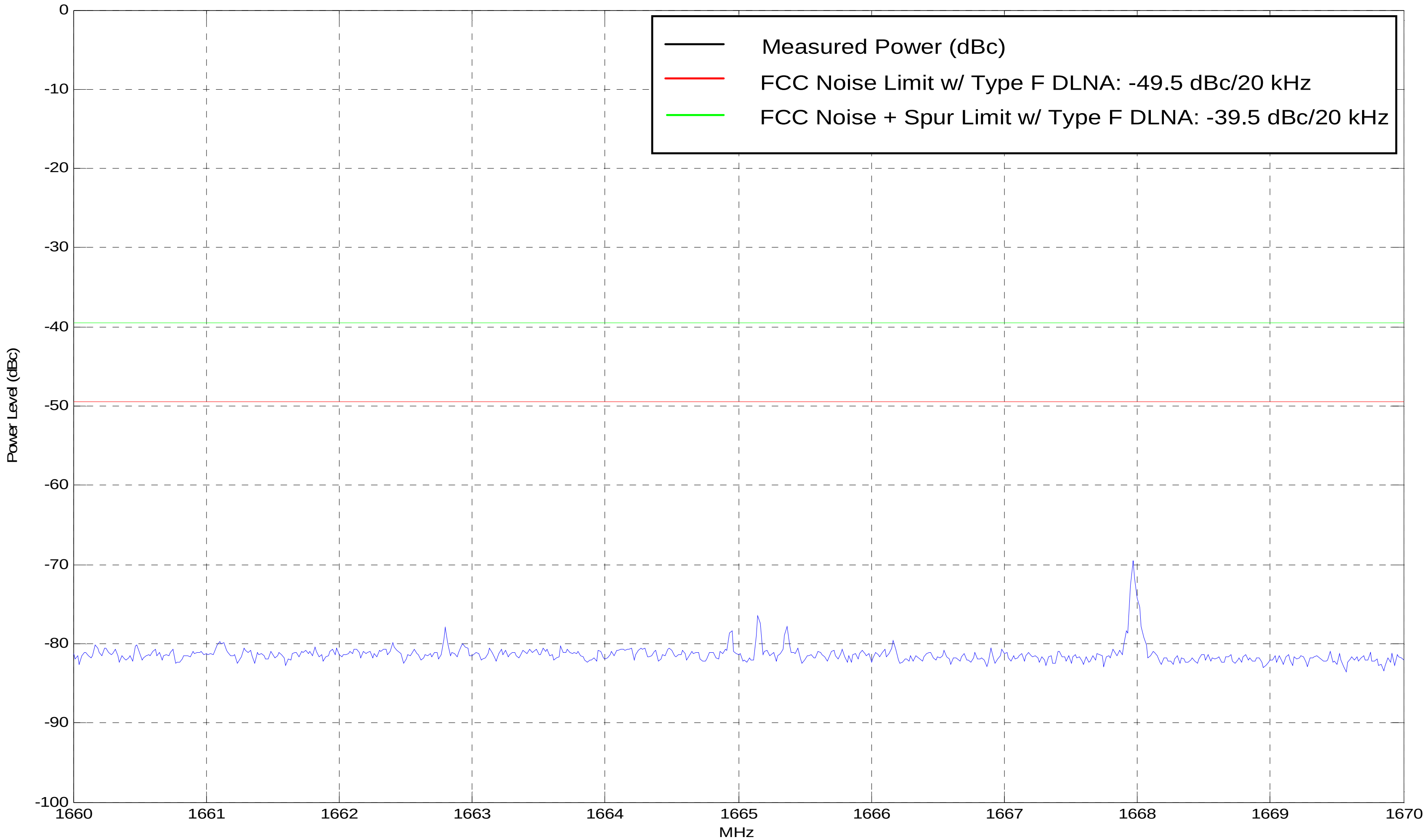


Figure 71 – 1670 to 1735 MHz (Swift64)

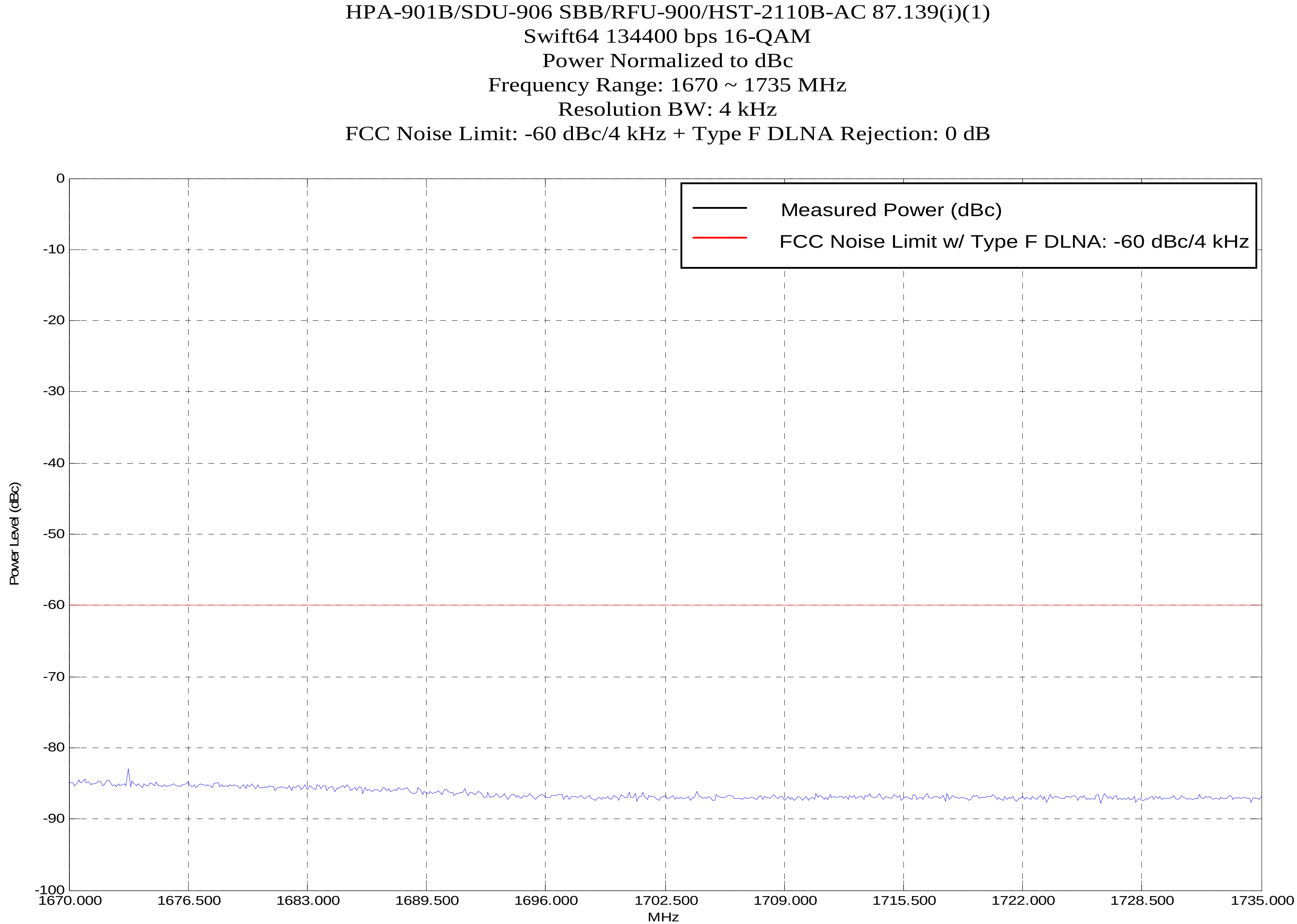


Figure 72 – 1735 to 12000 MHz (Swift64)

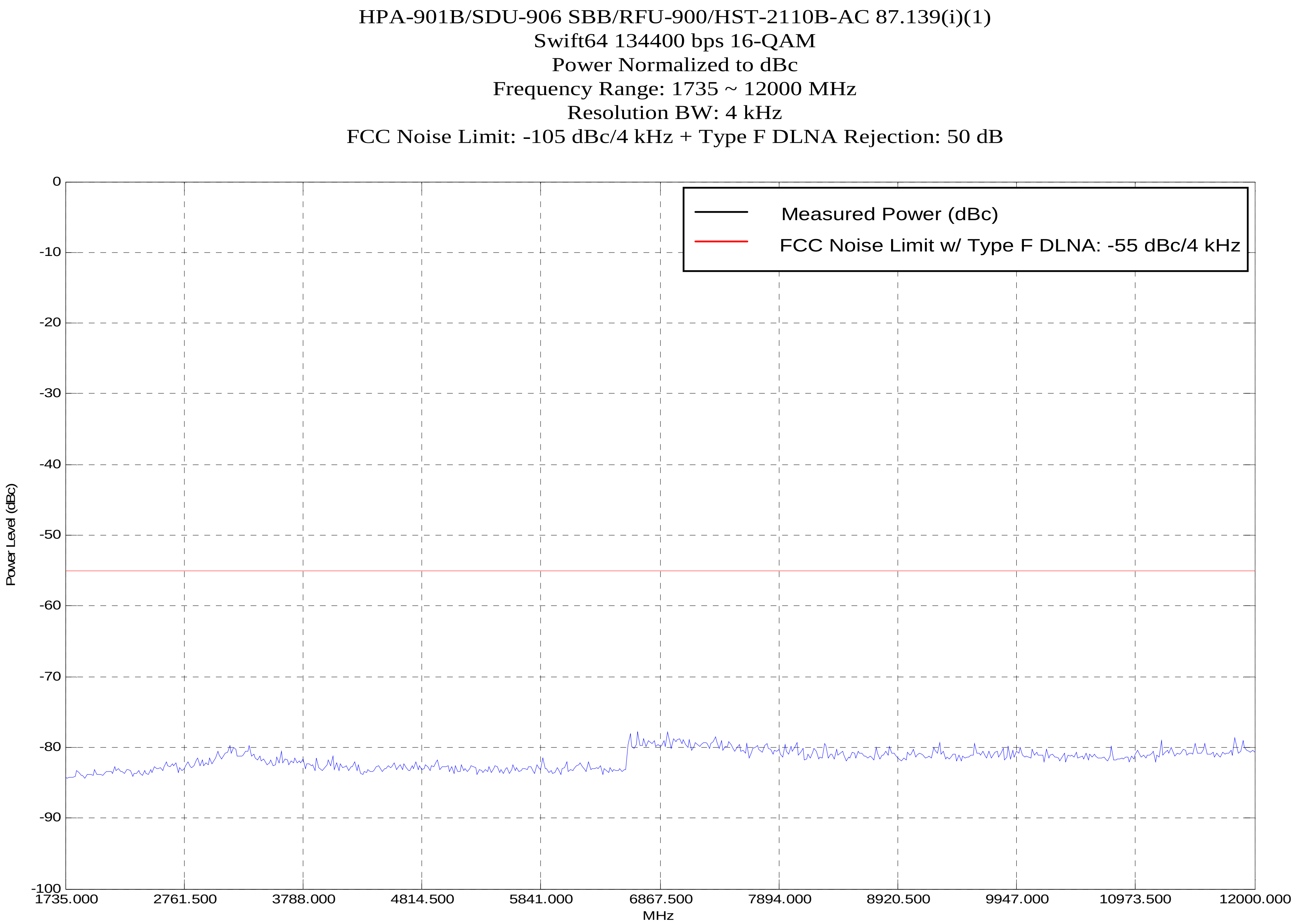


Figure 73 – 12000 to 18000 MHz (Swift64)

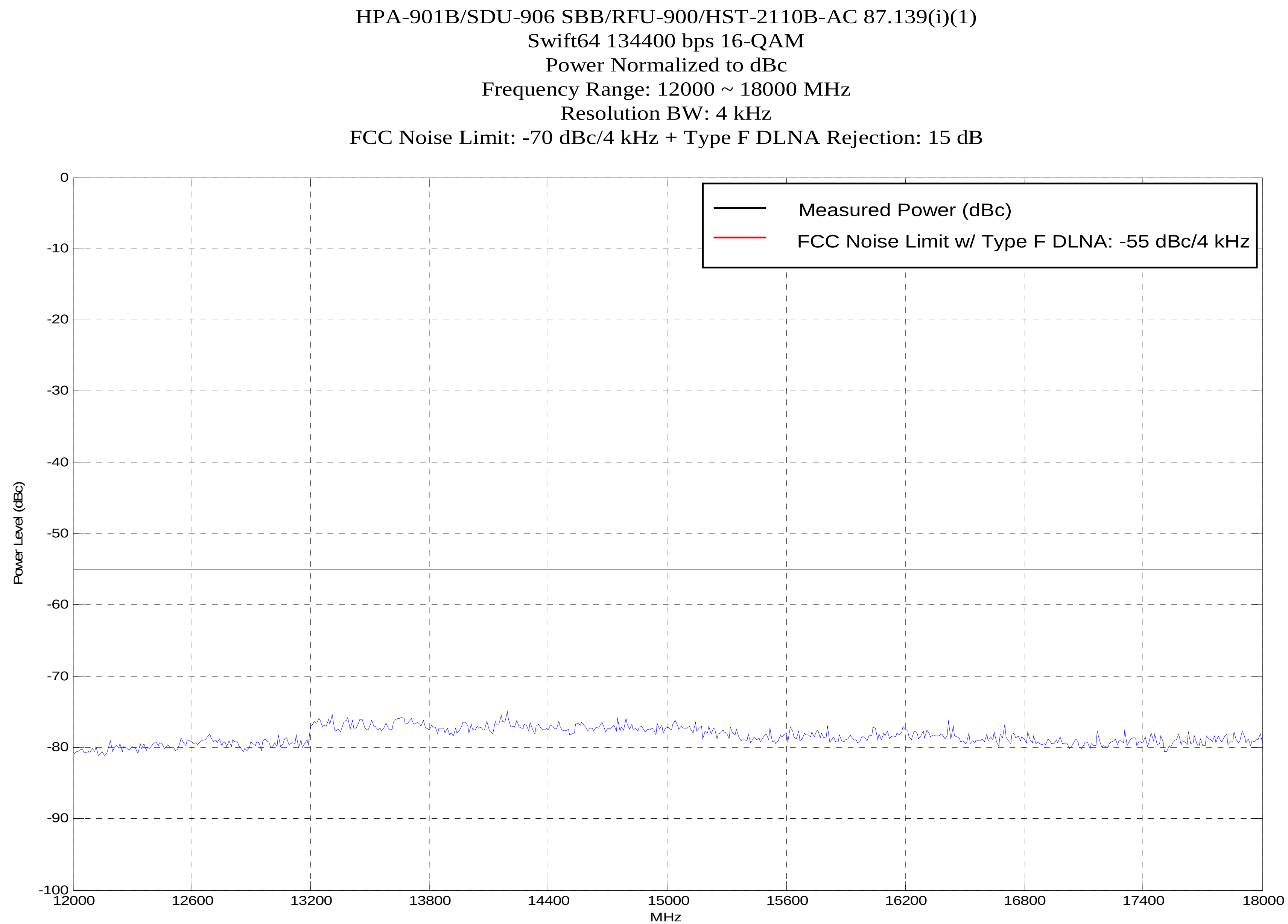


Figure 74 – 0.01 to 1525 MHz (SBB)

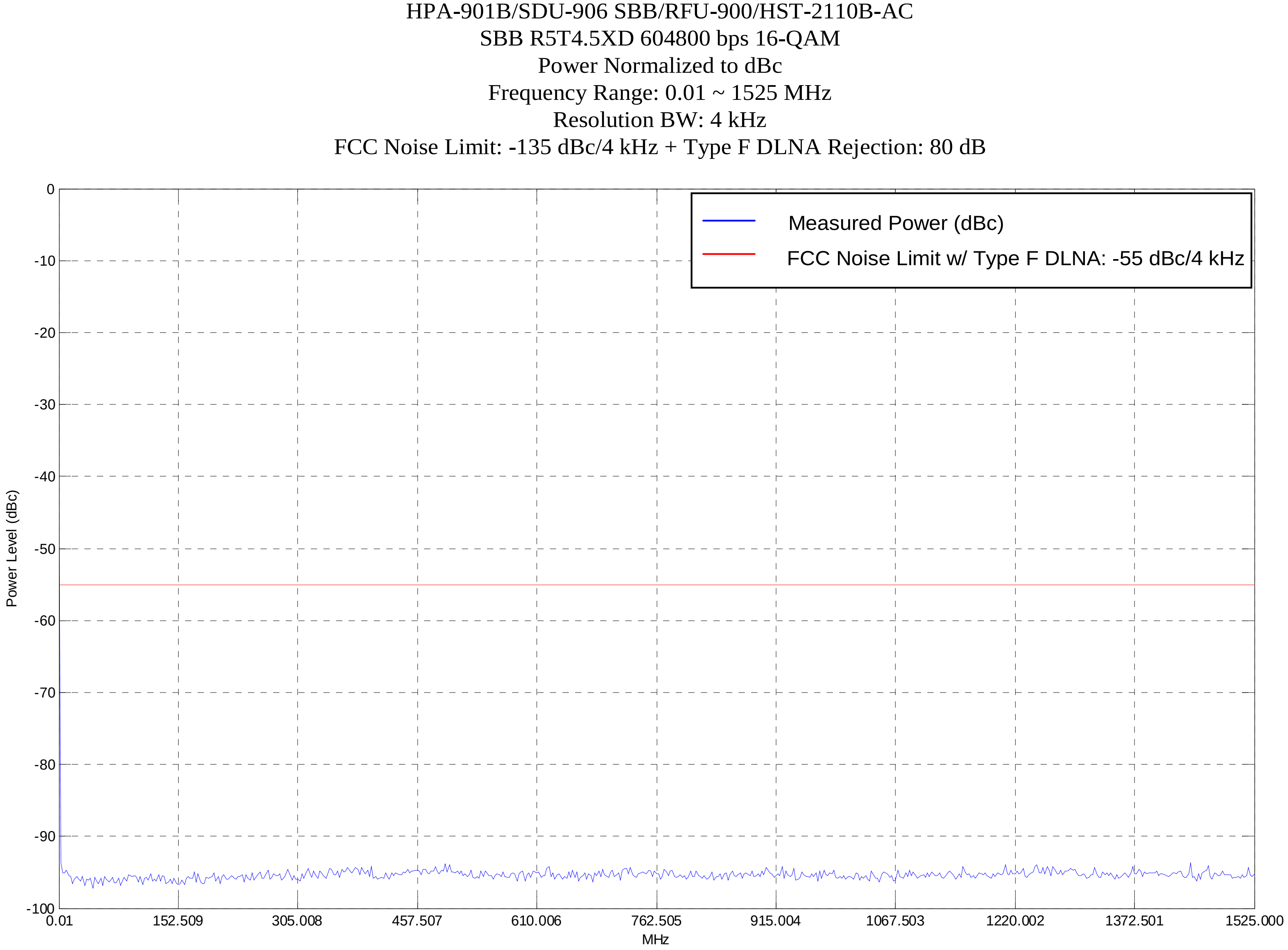


Figure 75 – 1525 to 1559 MHz (SBB)

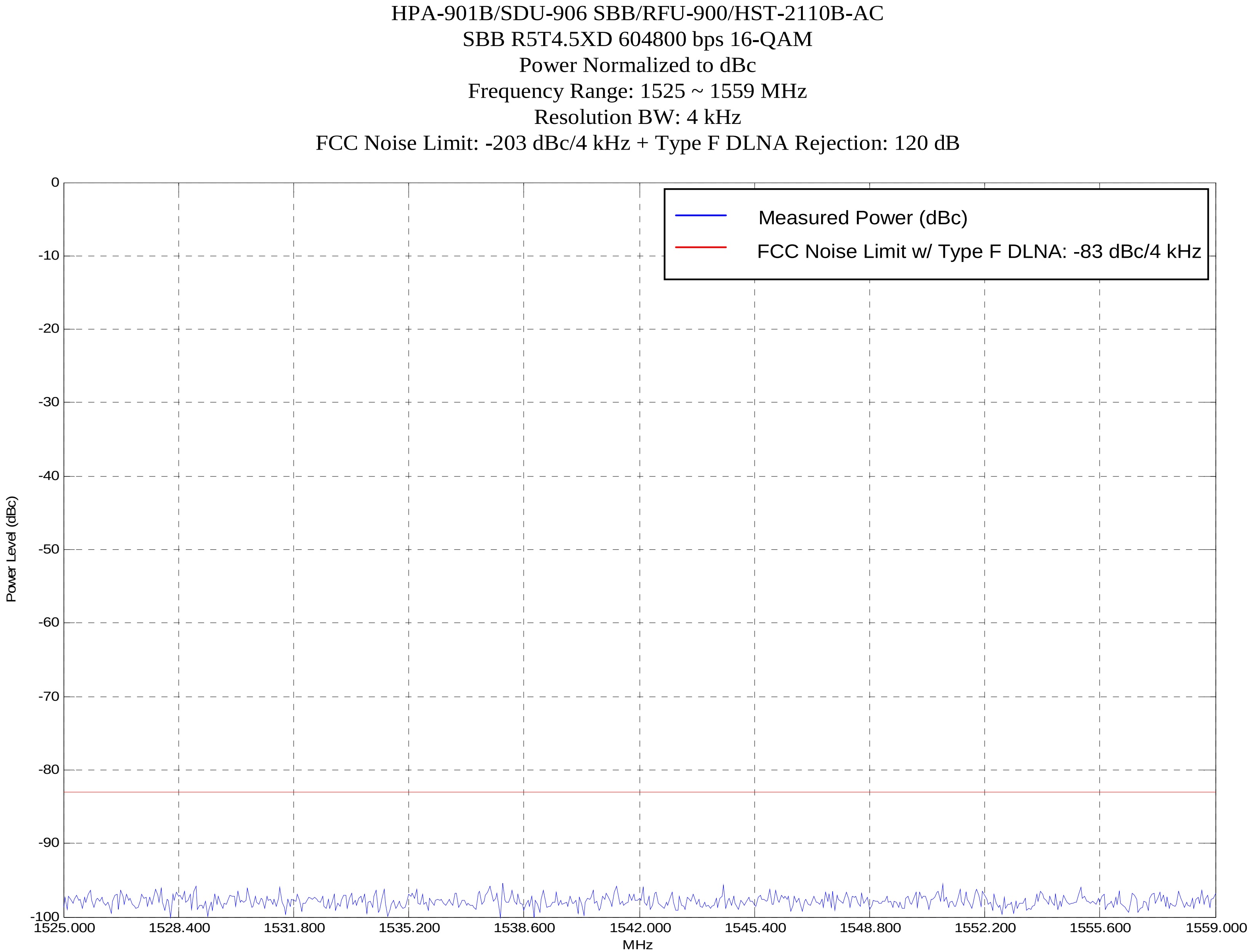


Figure 76 – 1559 to 1585 MHz (SBB)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC
SBB R5T4.5XD 604800 bps 16-QAM
Power Normalized to dBc
Frequency Range: 1559 ~ 1585 MHz
Resolution BW: 1000 kHz
FCC Noise Limit: -155 dBc/1000 kHz + Type F DLNA Rejection: 111 dB

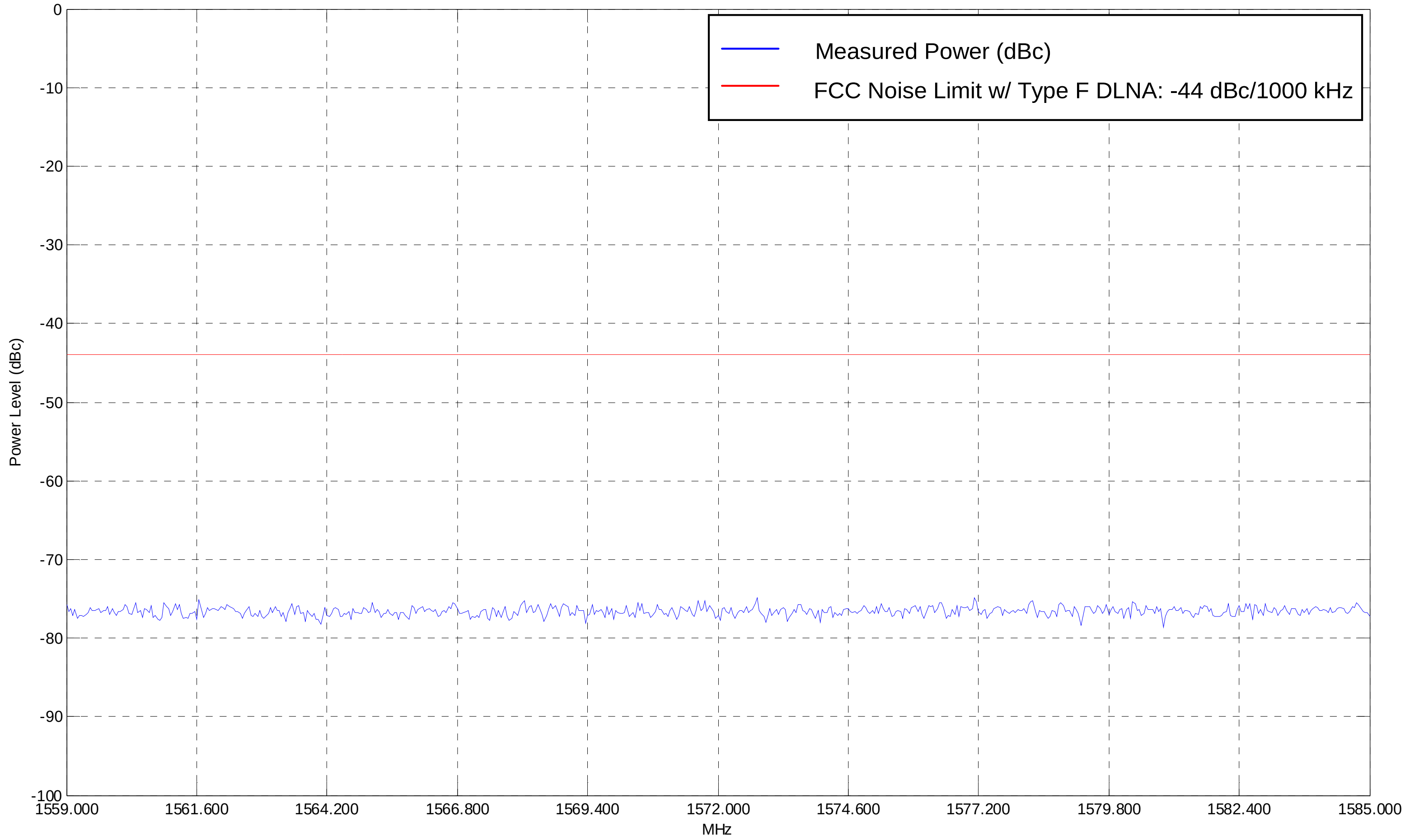


Figure 77 – 1585 to 1605 MHz (SBB)

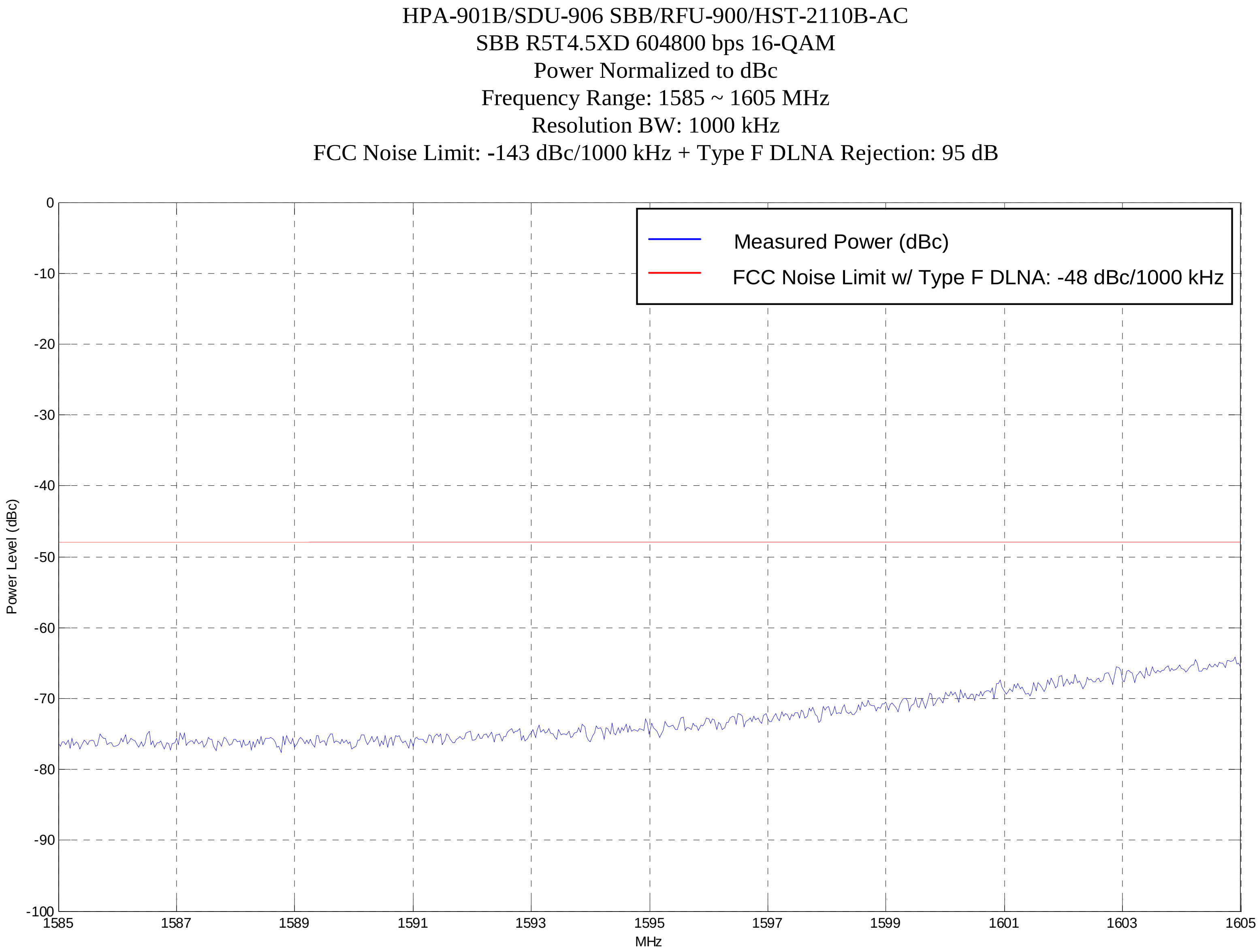


Figure 78 - 1605 to 1610 MHz (SBB)

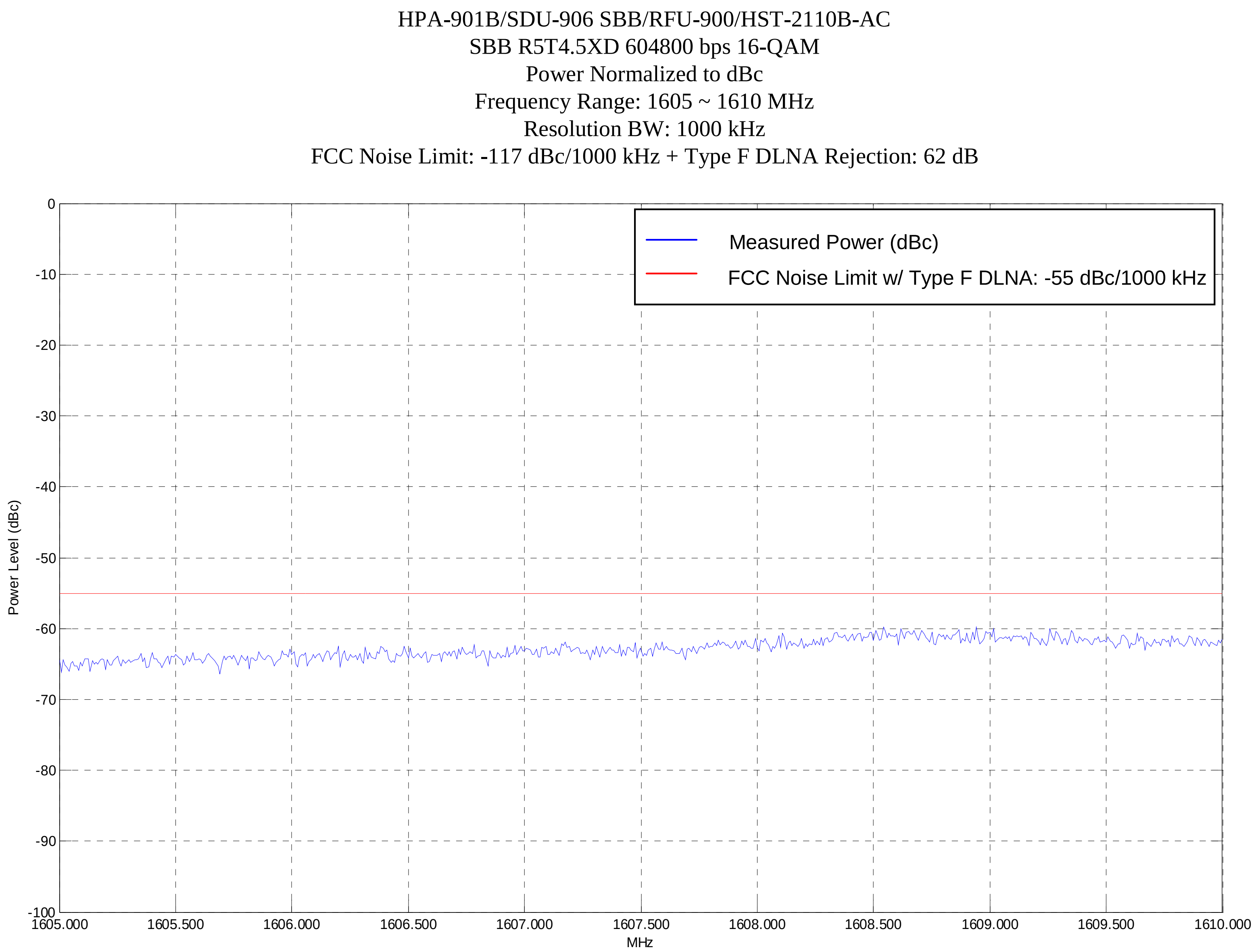


Figure 79 – 1610 to 1610.6 MHz (SBB)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC
SBB R5T4.5XD 604800 bps 16-QAM
Power Normalized to dBc
Frequency Range: 1610 ~ 1610.6 MHz
Resolution BW: 1000 kHz
FCC Noise Limit: -95 dBc/1000 kHz + Type F DLNA Rejection: 40 dB

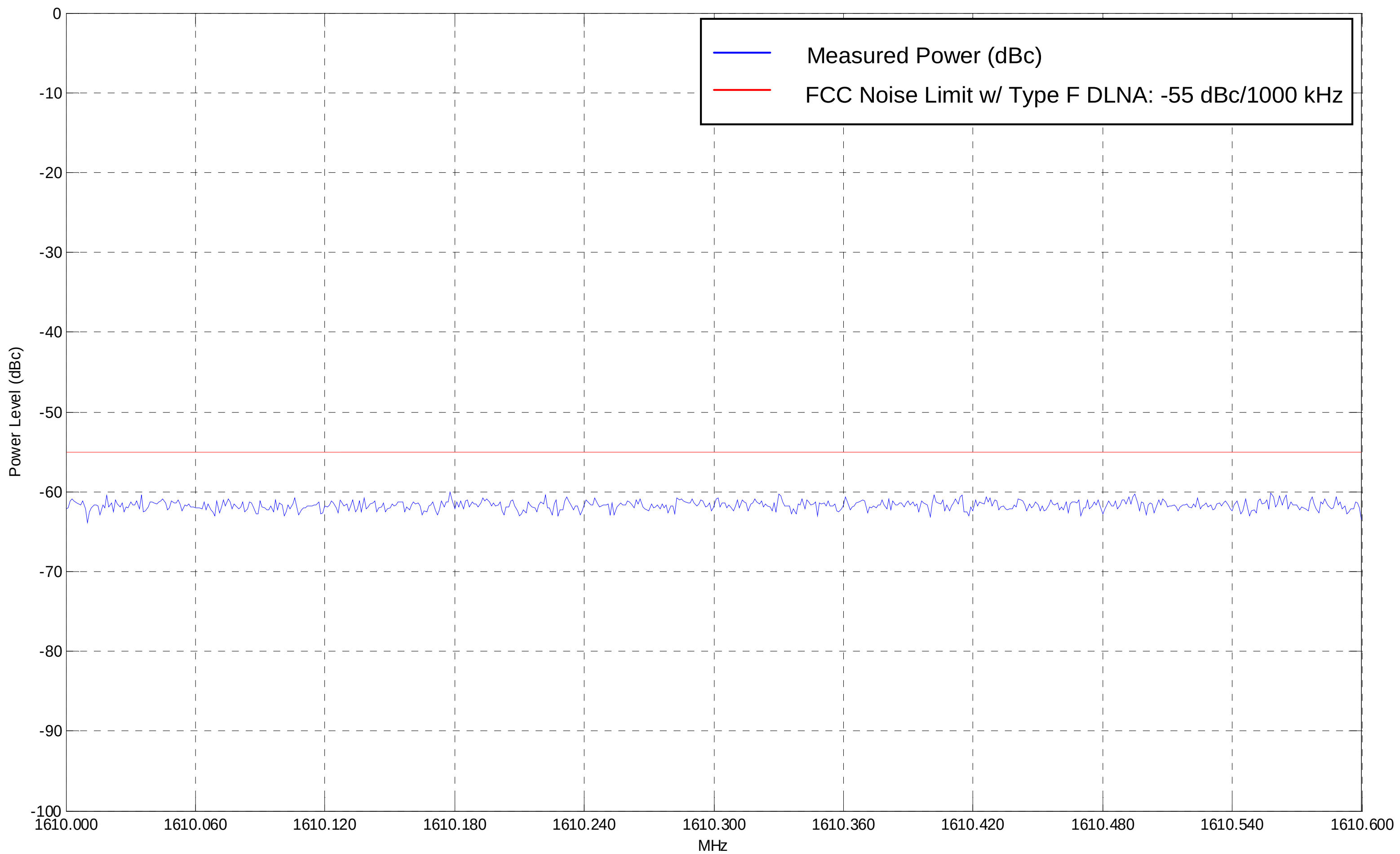


Figure 80 – 1610.6 to 1613.8 MHz (SBB)

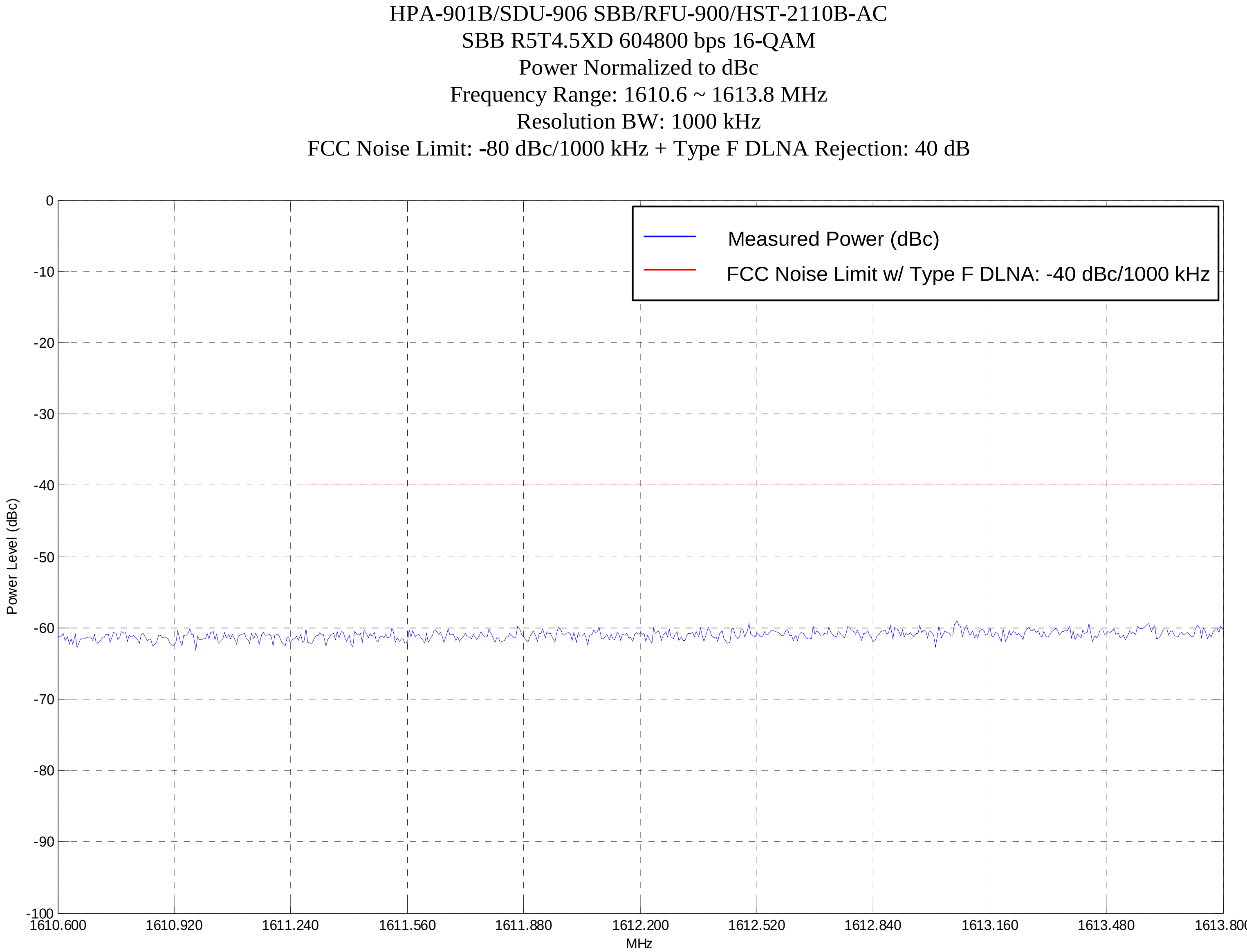


Figure 81 – 1613.8 to 1614 MHz (SBB)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC
SBB R5T4.5XD 604800 bps 16-QAM
Power Normalized to dBc
Frequency Range: 1613.8 ~ 1614 MHz
Resolution BW: 1000 kHz
FCC Noise Limit: -95 dBc/1000 kHz + Type F DLNA Rejection: 40 dB

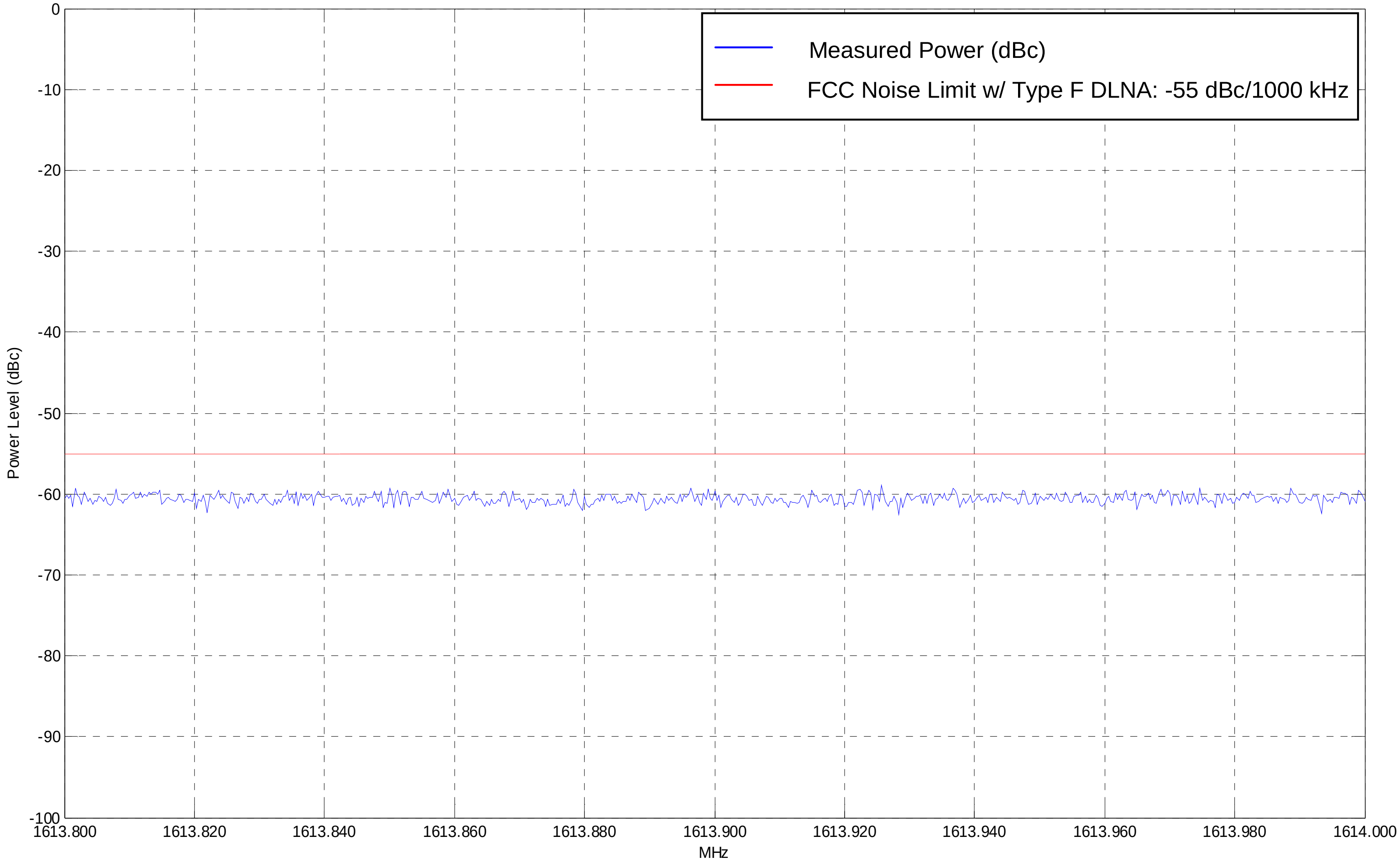


Figure 82 – 1614 to 1626.5 MHz (SBB)

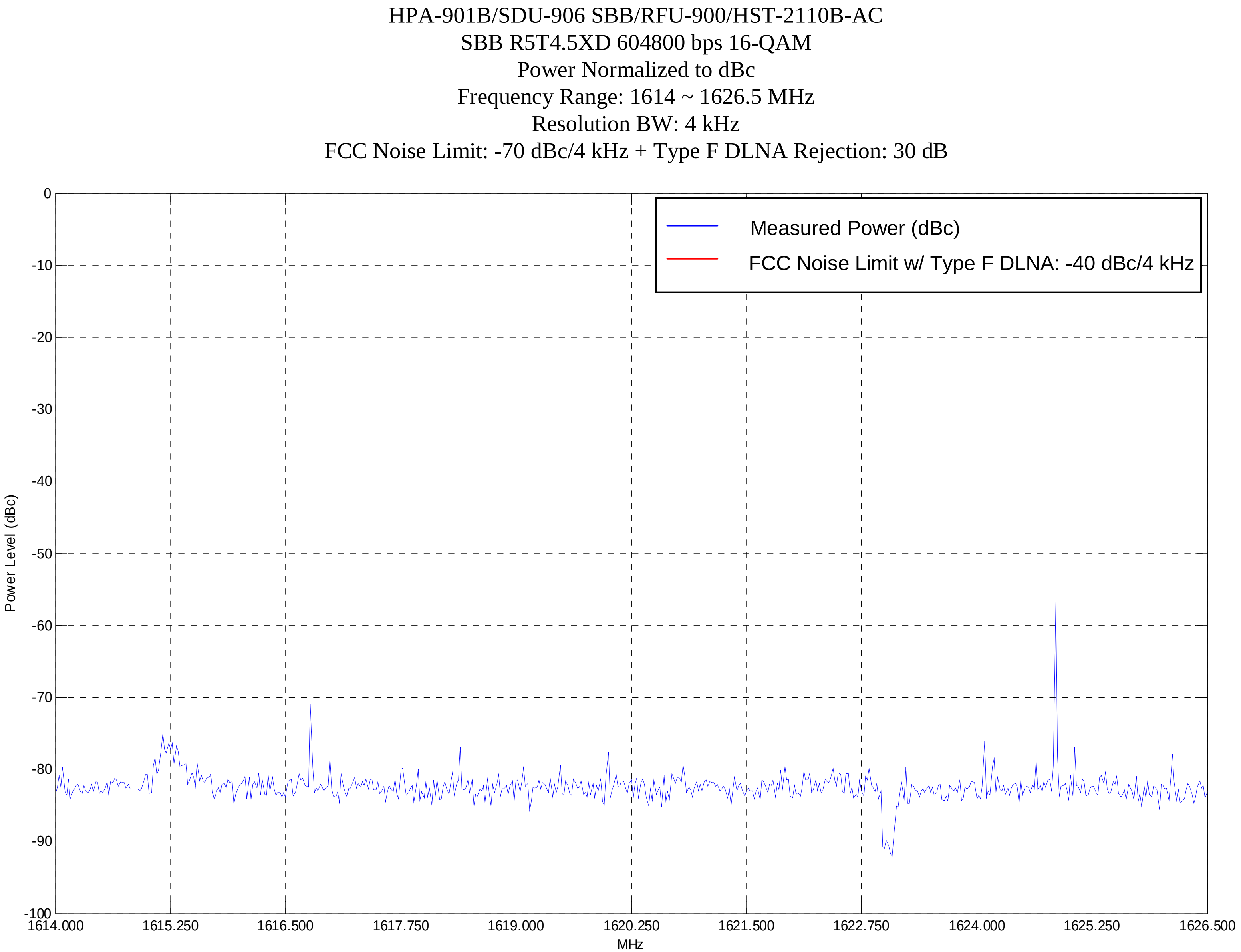


Figure 83 – 1626.5 to 1660 MHz (SBB)

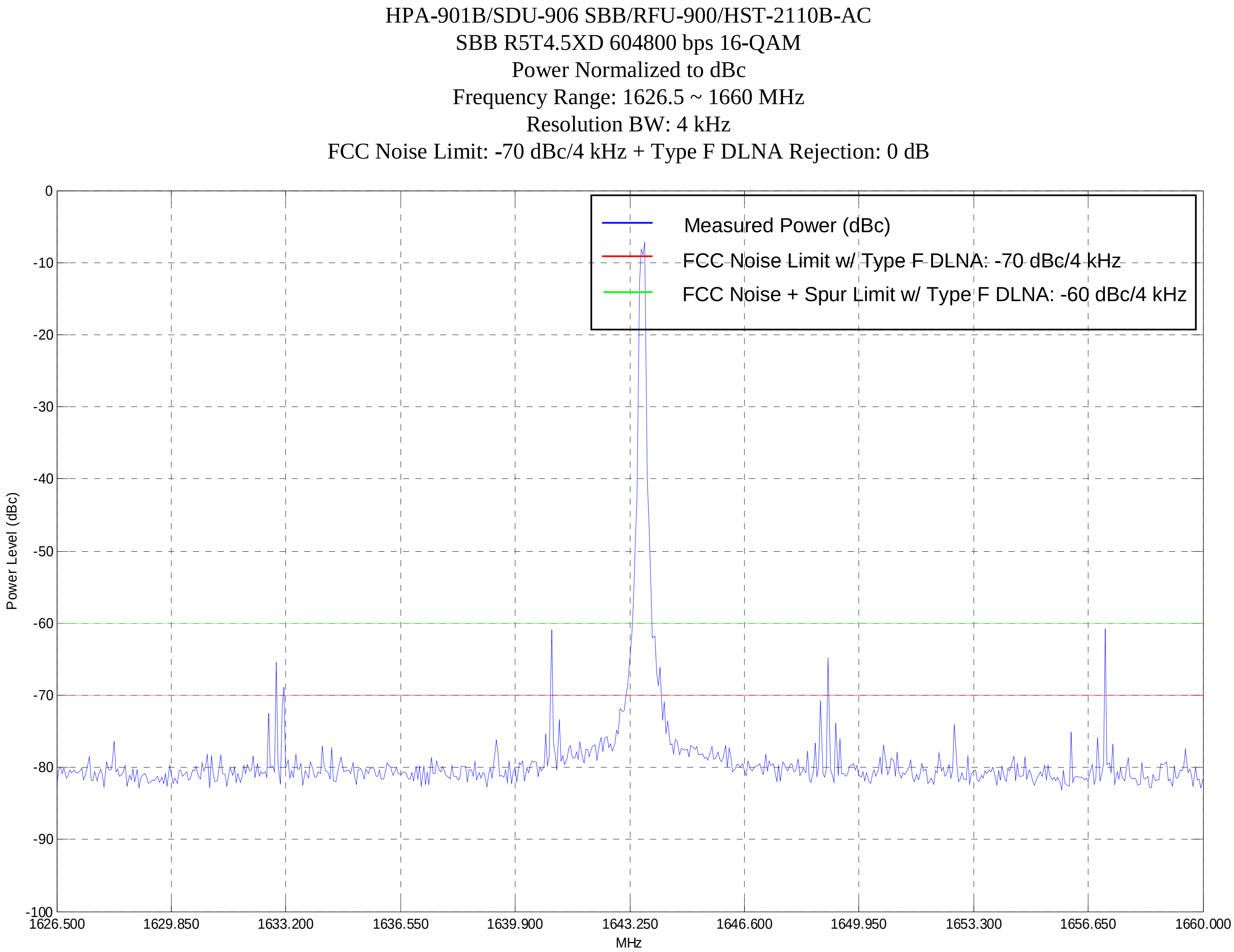


Figure 84 – 1660 to 1670 MHz (SBB)

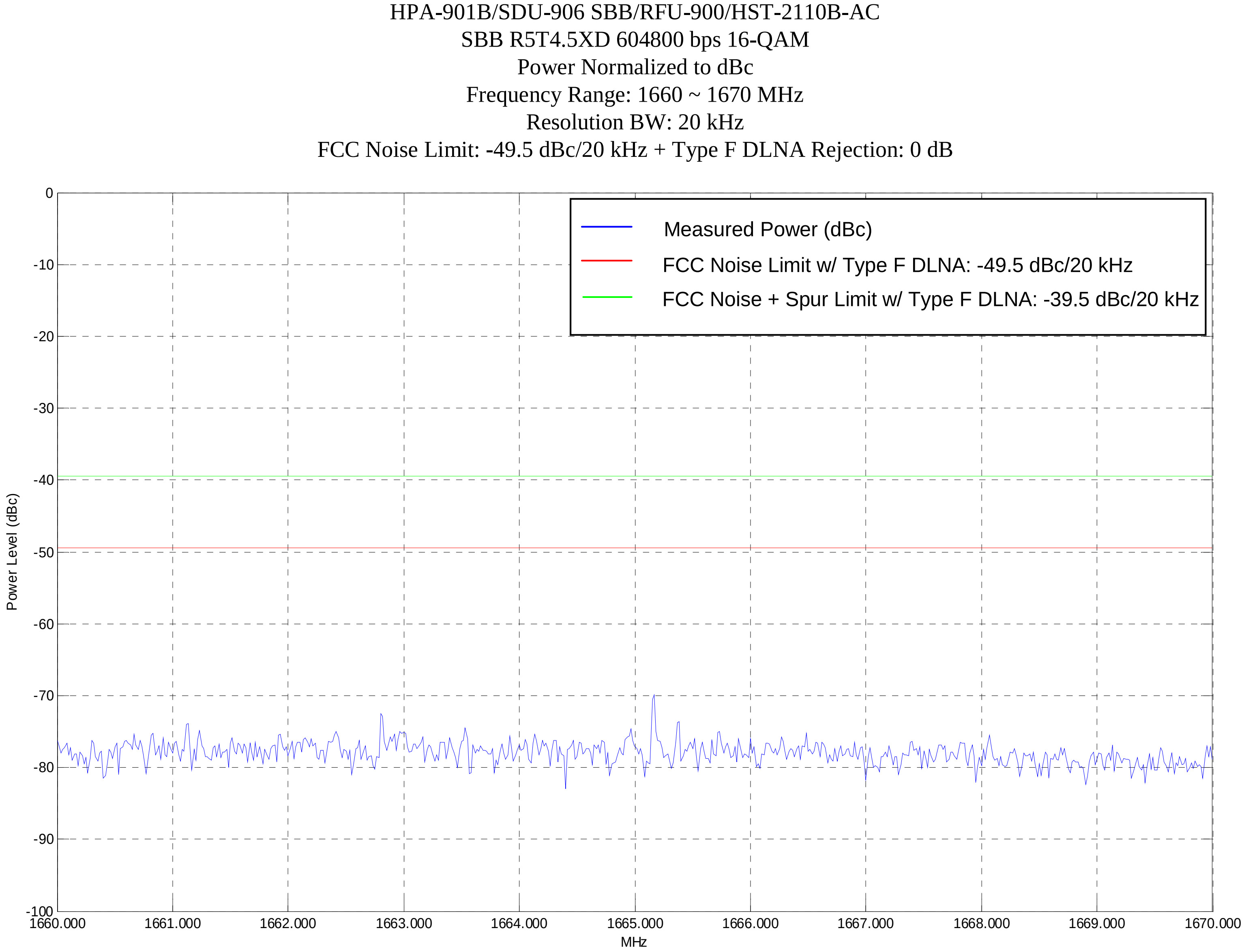


Figure 85 – 1670 to 1735 MHz (SBB)

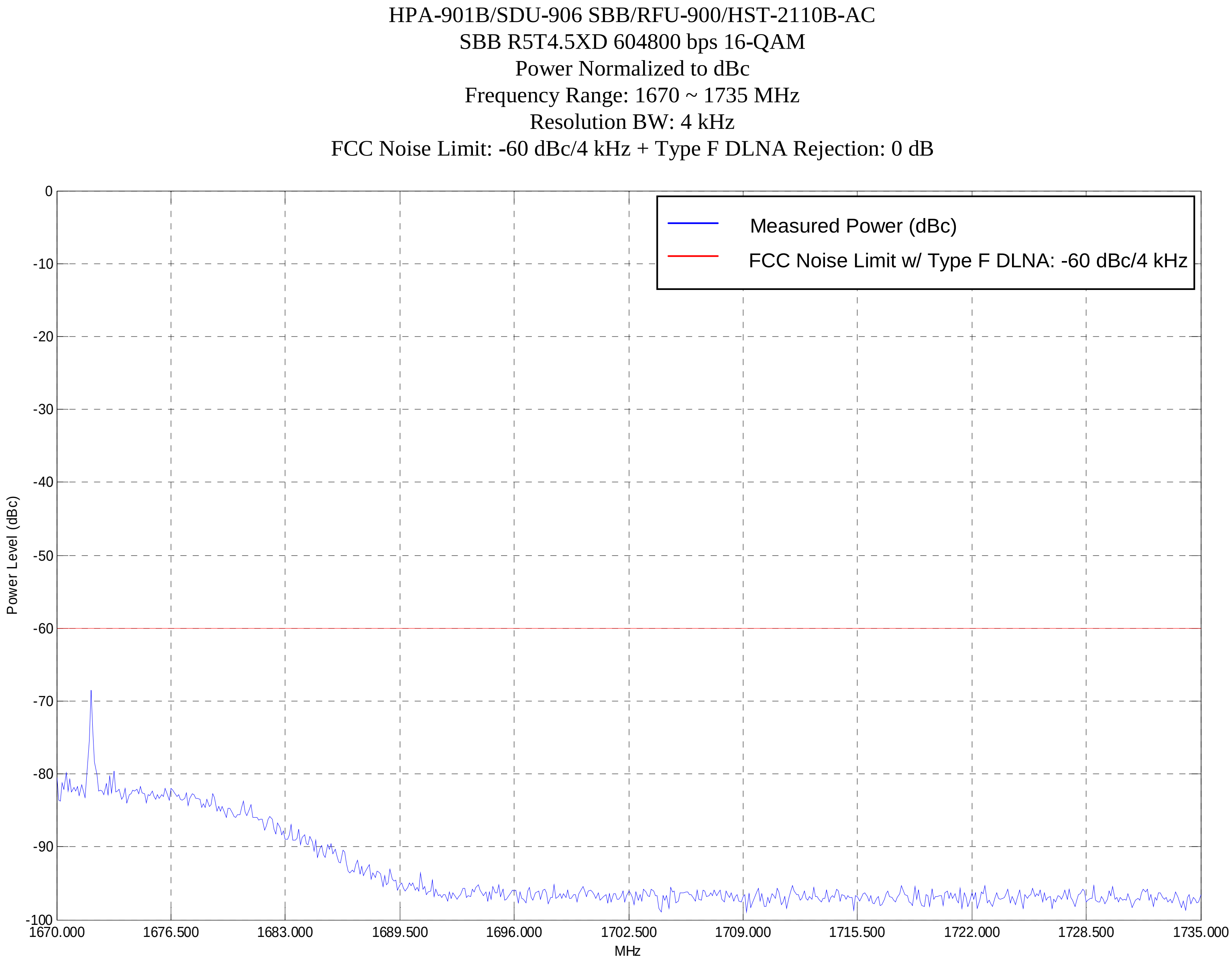


Figure 86 – 1735 to 12000 MHz (SBB)

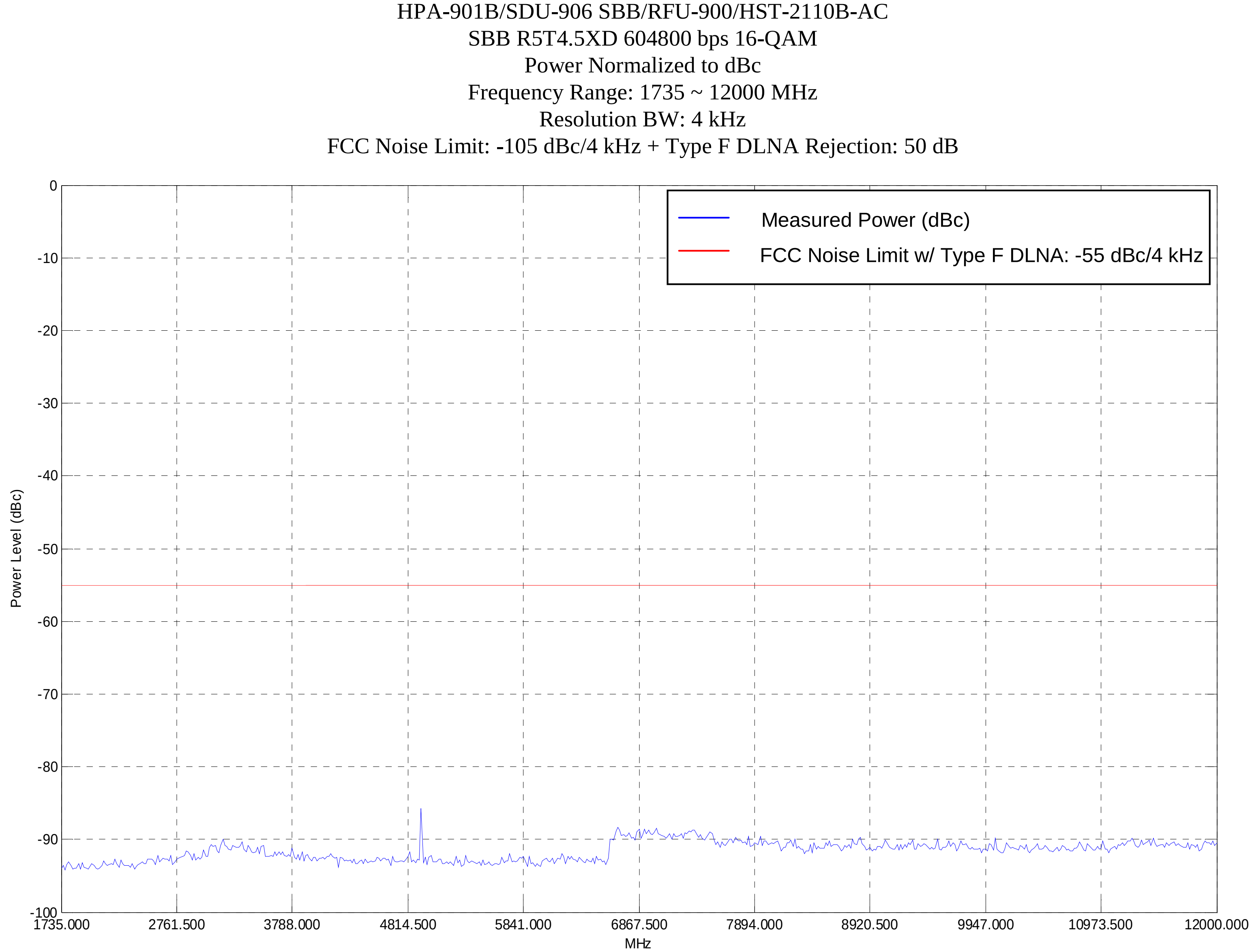
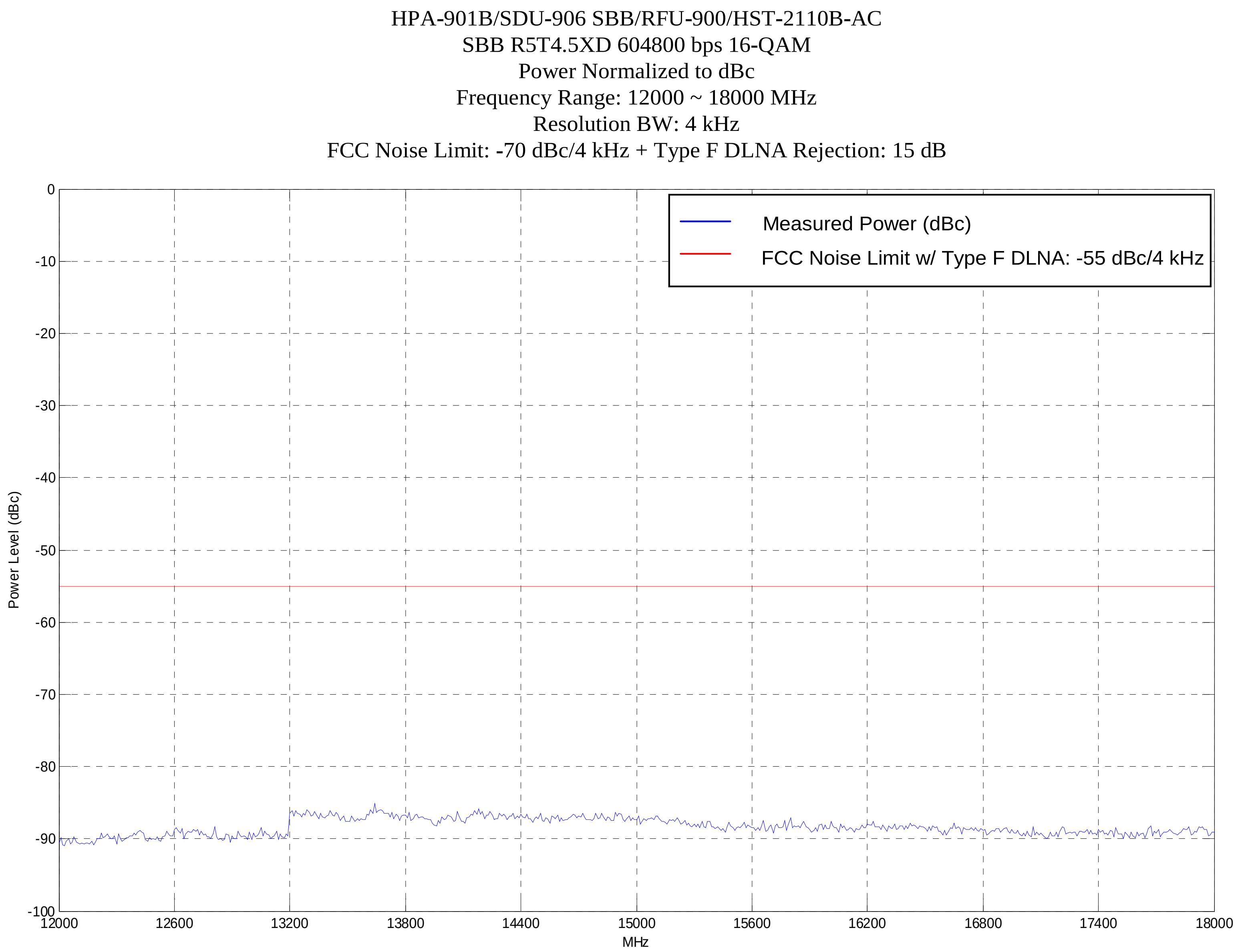


Figure 87 – 12000 to 18000 MHz (SBB)



4.3.6 Frequency Spectrum Results

All signals were within the specifications for Frequency Spectrum. See attached plots.

Frequency Spectrum

List of Figures

Figure Number	Operational Mode	Modulation Type	Bit Rate (bps)	Symbol Rate (sym/s)	Frequency Span (Hz)	HST used
88	Classic Aero	A-BPSK	600	600	7080	none
89	Classic Aero	A-BPSK	1200	1200	14,160	none
90	Classic Aero	A-QPSK	8400	4200	49,560	none
90	Classic Aero	A-QPSK	10,500	5250	61,950	none
92	Classic Aero	A-QPSK	21,000	10,500	123,900	none
93	Swift64	BPSK	3000	3000	160,000[1]	HST-2110B AC
94	Swift64	16-QAM	134,400	33,600	396,480	HST-2110B AC
95	Swift Broadband	π/4-QPSK	33,600	16,800	198,240	HST-2110B AC
96	Swift Broadband	π/4-QPSK	67,200	33,600	396,480	HST-2110B AC
97	Swift Broadband	π/4-QPSK	134,400	67,200	792,960	HST-2110B AC
98	Swift Broadband	π/4-QPSK	302,400	151,200	1,784,160	HST-2110B AC
99	Swift Broadband	16-QAM	134,400	33,600	396,480	HST-2110B AC
100	Swift Broadband	16-QAM	268,800	67,200	792,960	HST-2110B AC
101	Swift Broadband	16-QAM	604,800	151,200	1,784,160	HST-2110B AC

SDU-906 SBB AC and **HPA-901B are used.**

Carrier Frequency: 1643.50 MHz with carrier power = 46.5 dBm for Swift Broadband, and 47.2 dBm for Classic Aero and Swift64

Spectrum analyzer resolution bandwidth: 100 Hz

[1] Inmarsat Swift64 specifications require the use of "unfiltered" BPSK that does not meet the FCC frequency mask formula. A waiver was previously granted for the discrepancy.

Figure 88 – Frequency Spectrum (Classic Aero)

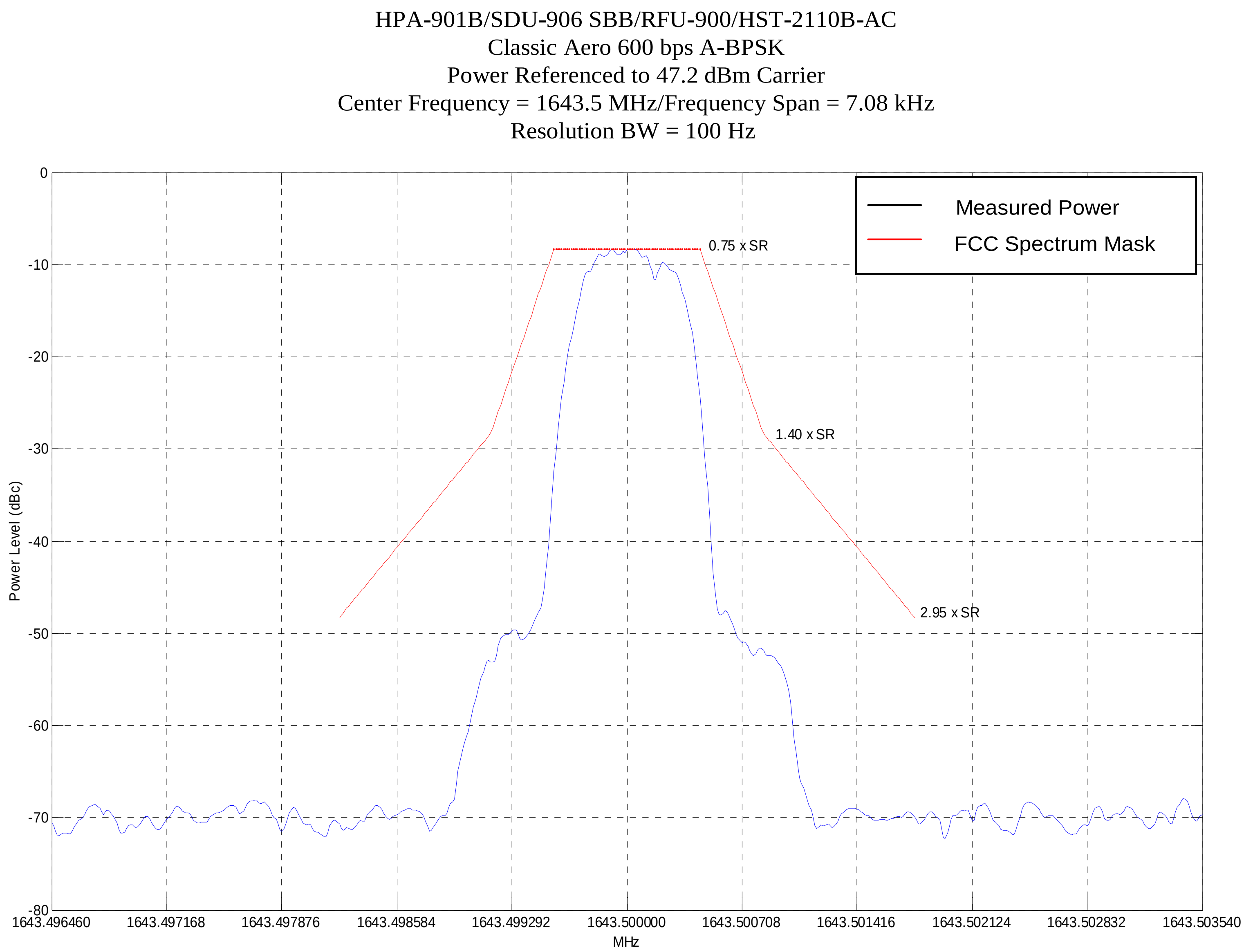


Figure 89 – Frequency Spectrum (Classic Aero)

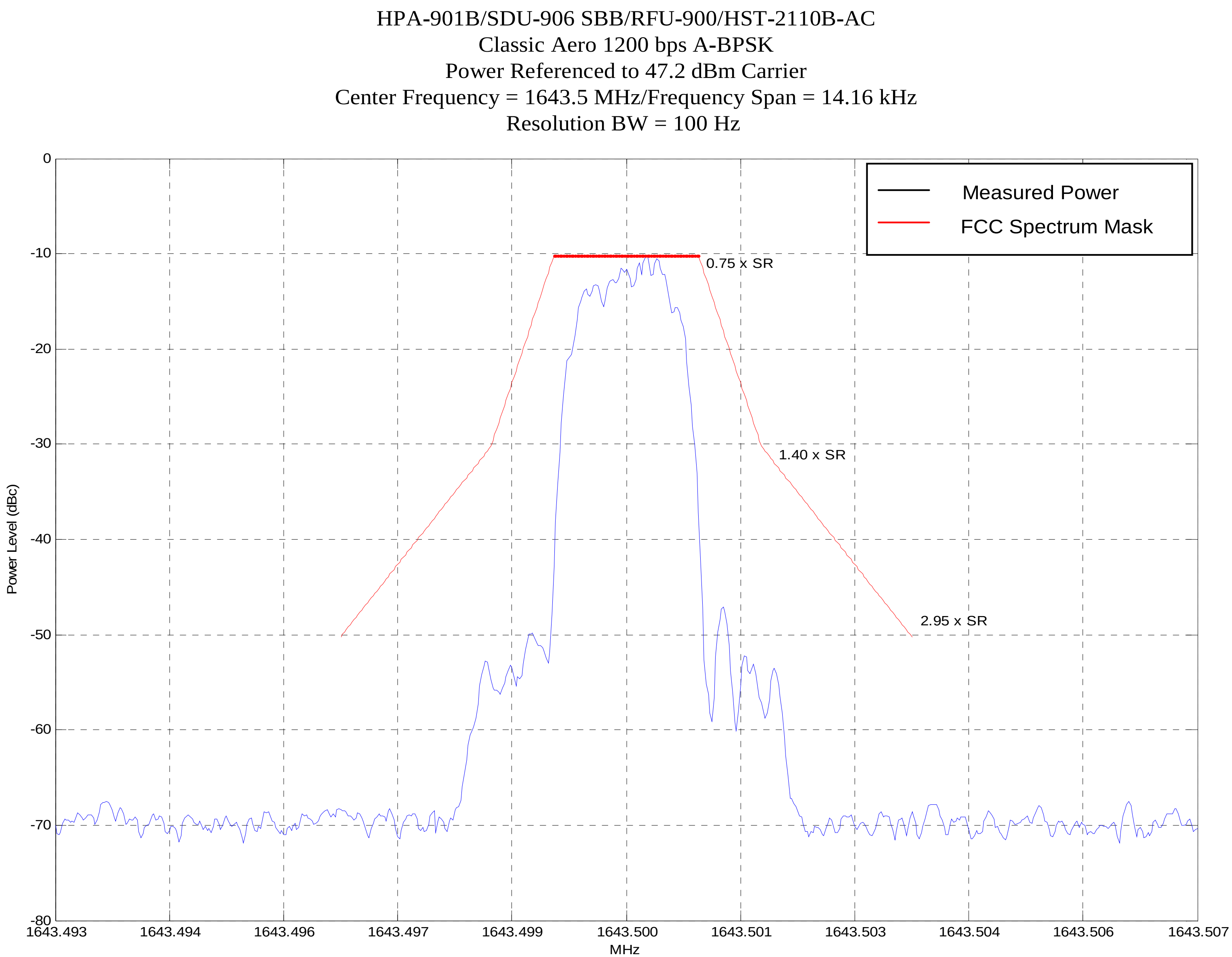


Figure 90 – Frequency Spectrum (Classic Aero)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC
Classic Aero 8400 bps A-QPSK
Power Referenced to 47.2 dBm Carrier
Center Frequency = 1643.5 MHz/Frequency Span = 49.56 kHz
Resolution BW = 100 Hz

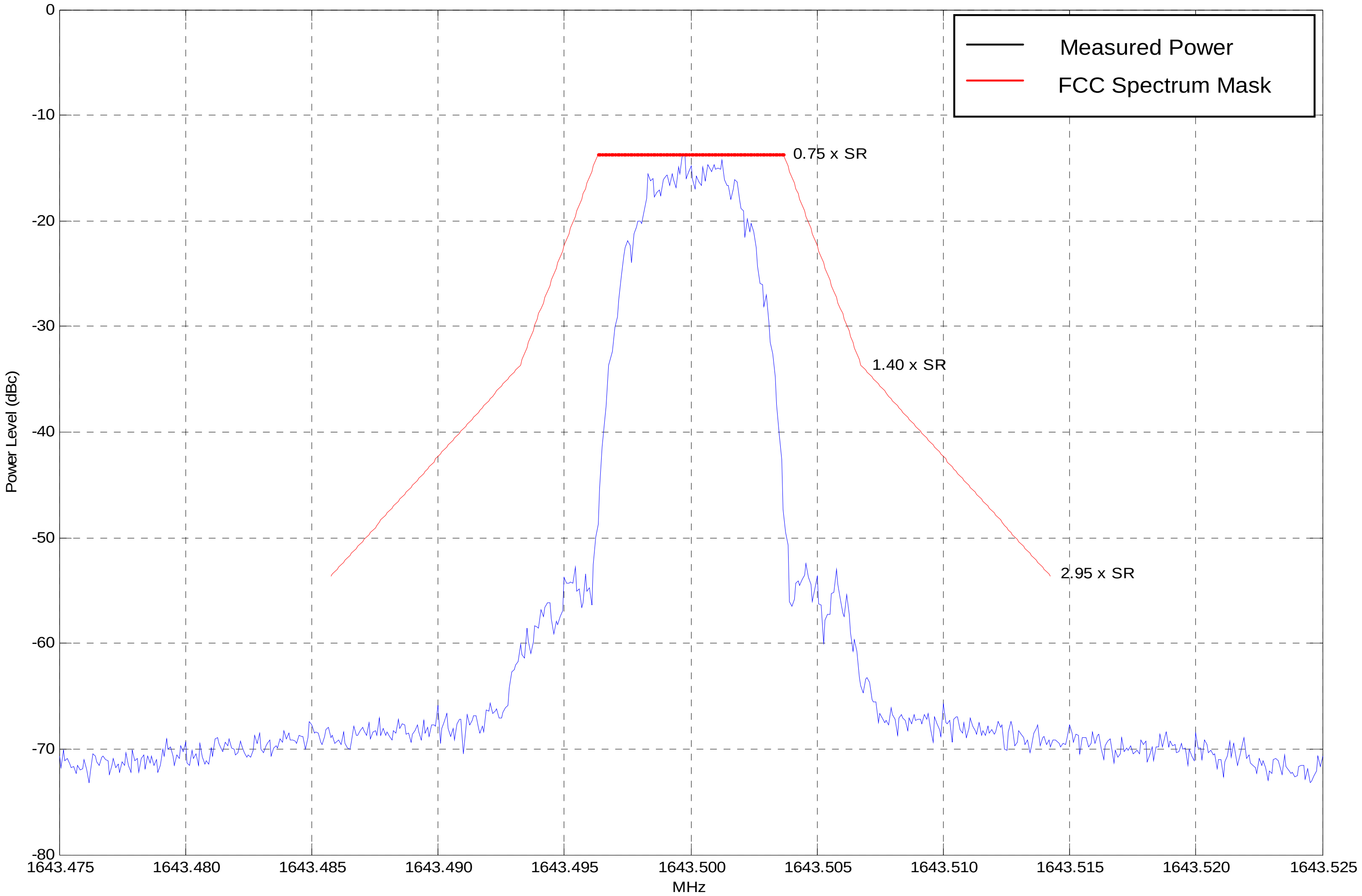


Figure 91 – Frequency Spectrum (Classic Aero)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC
Classic Aero 10500 bps A-QPSK
Power Referenced to 47.2 dBm Carrier
Center Frequency = 1643.5 MHz/Frequency Span = 61.95 kHz
Resolution BW = 100 Hz

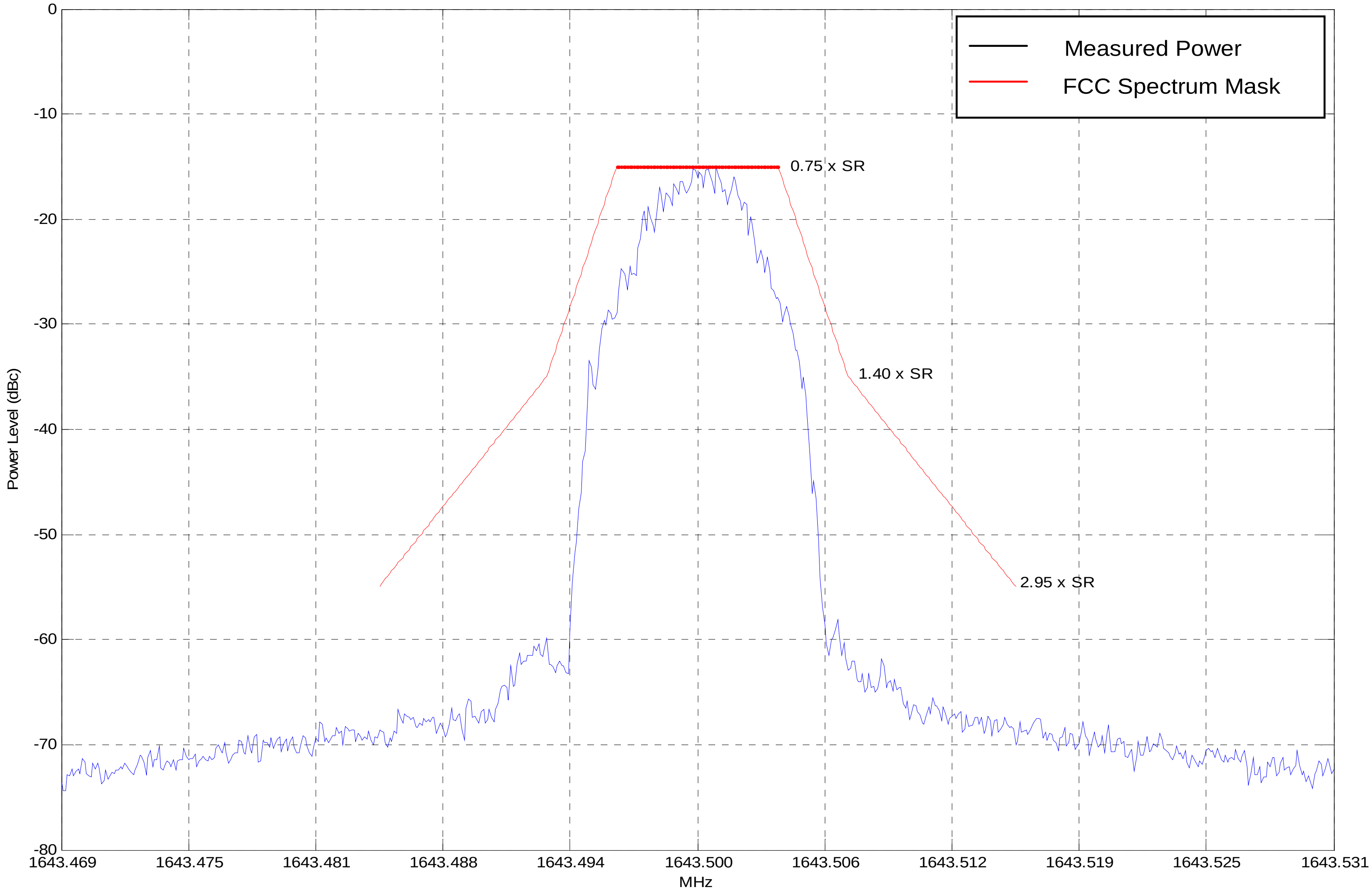


Figure 92 – Frequency Spectrum (Classic Aero)

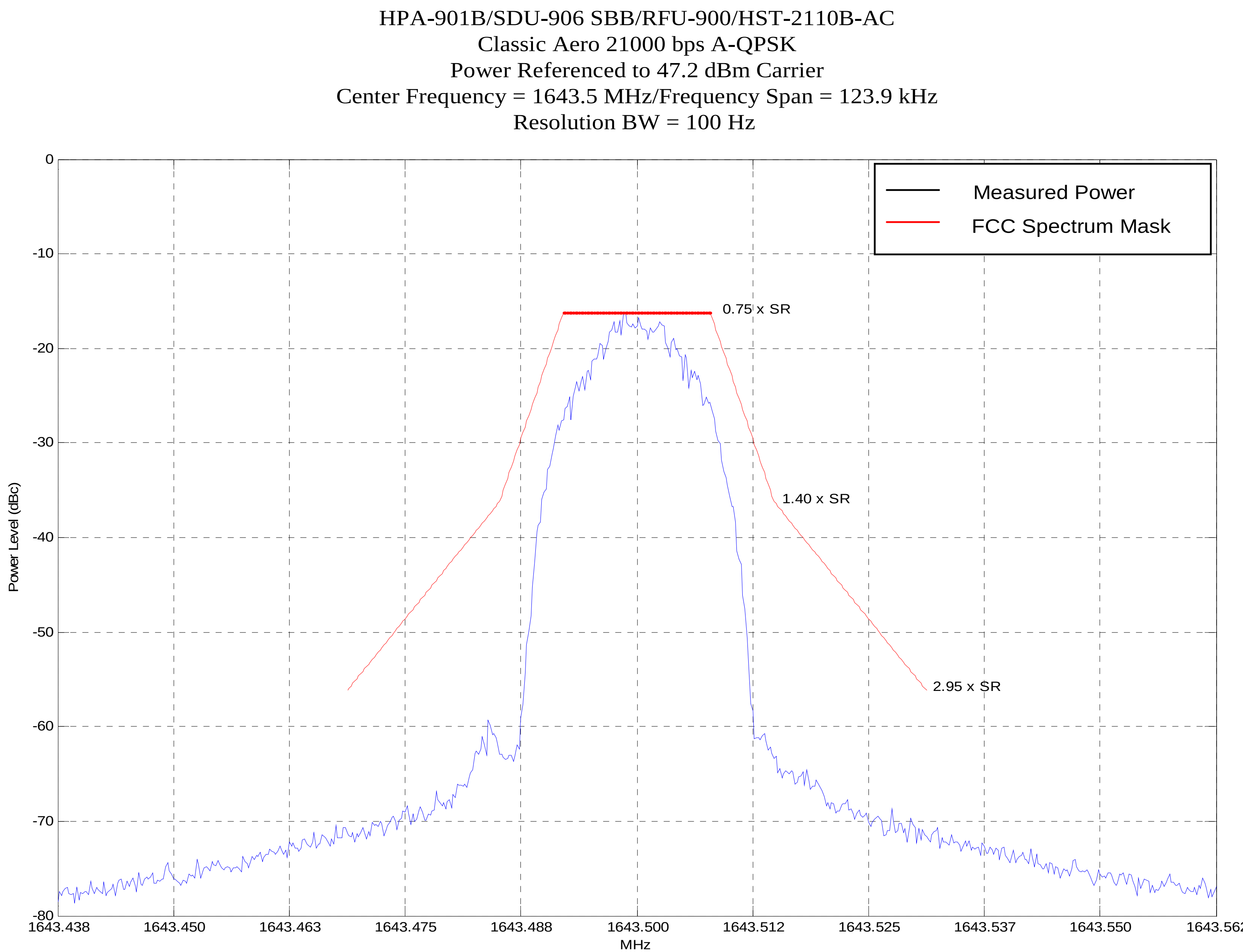


Figure 93 – Frequency Spectrum (Swift 64)

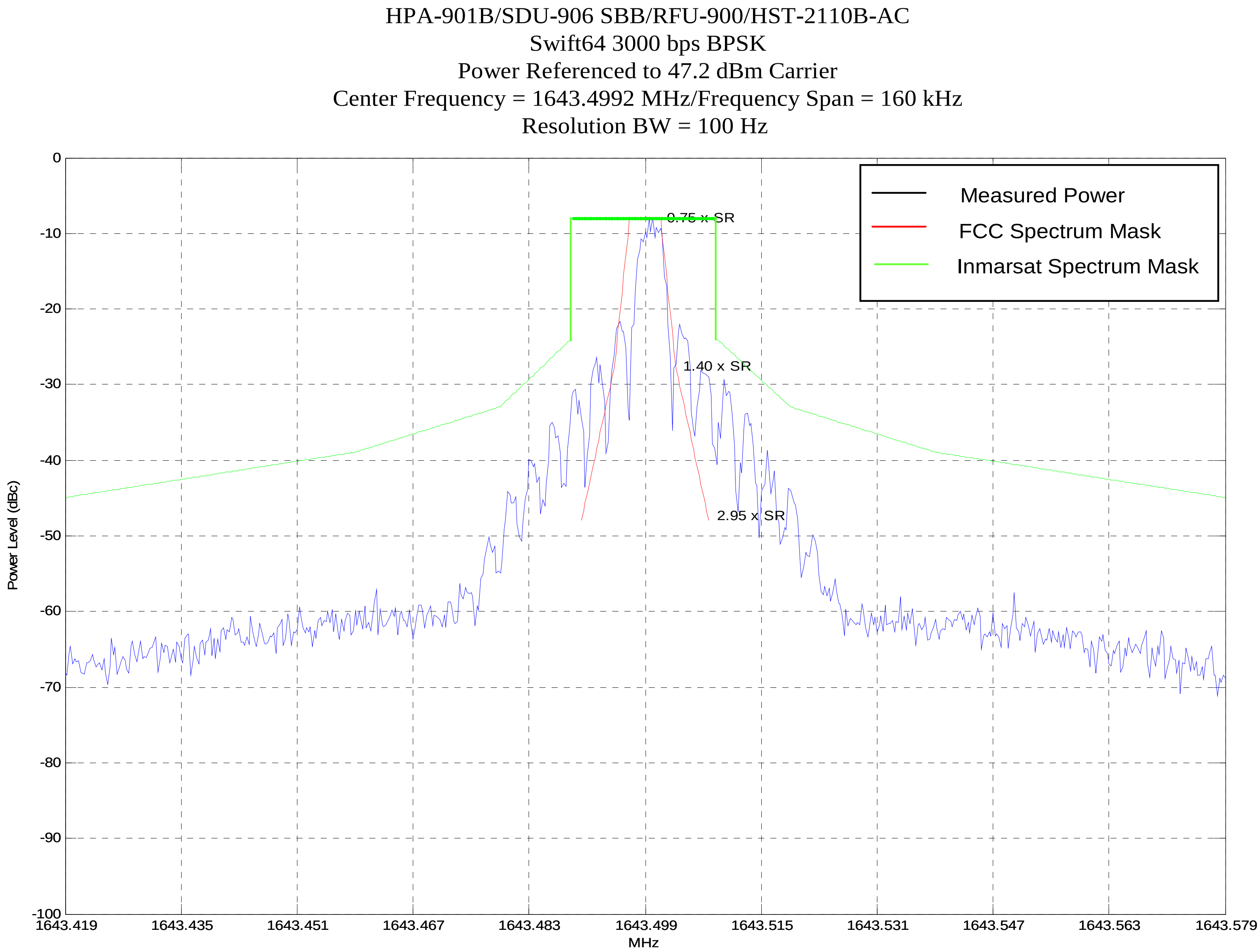


Figure 94 – Frequency Spectrum (Swift 64)

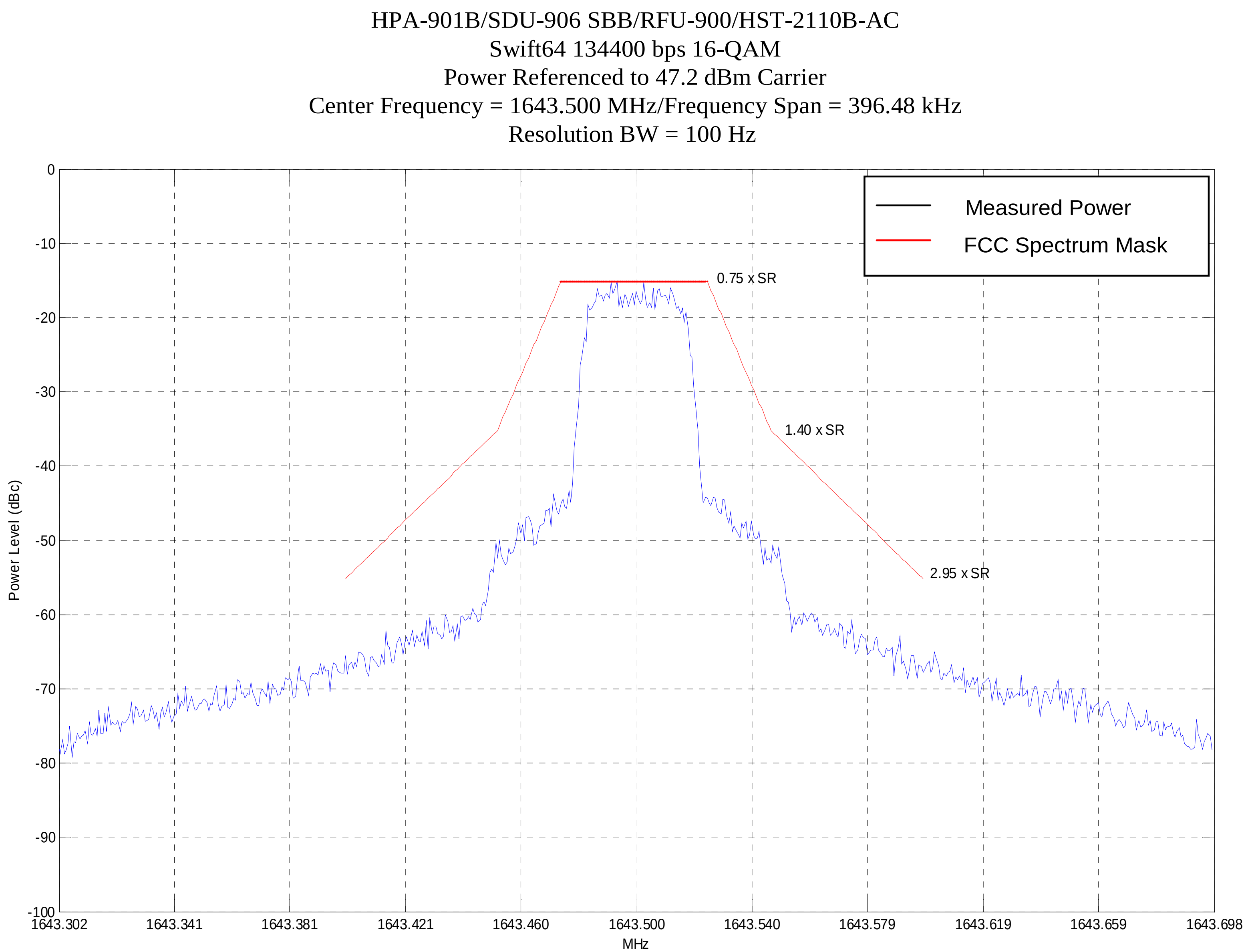


Figure 95 – Frequency Spectrum (SBB)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC
SwiftBroadband R20T0.5QD 33600 bps π/4-QPSK
Power Referenced to 46.5 dBm Carrier
Center Frequency = 1643.5113 MHz/Frequency Span = 198.24 kHz
Resolution BW = 100 Hz

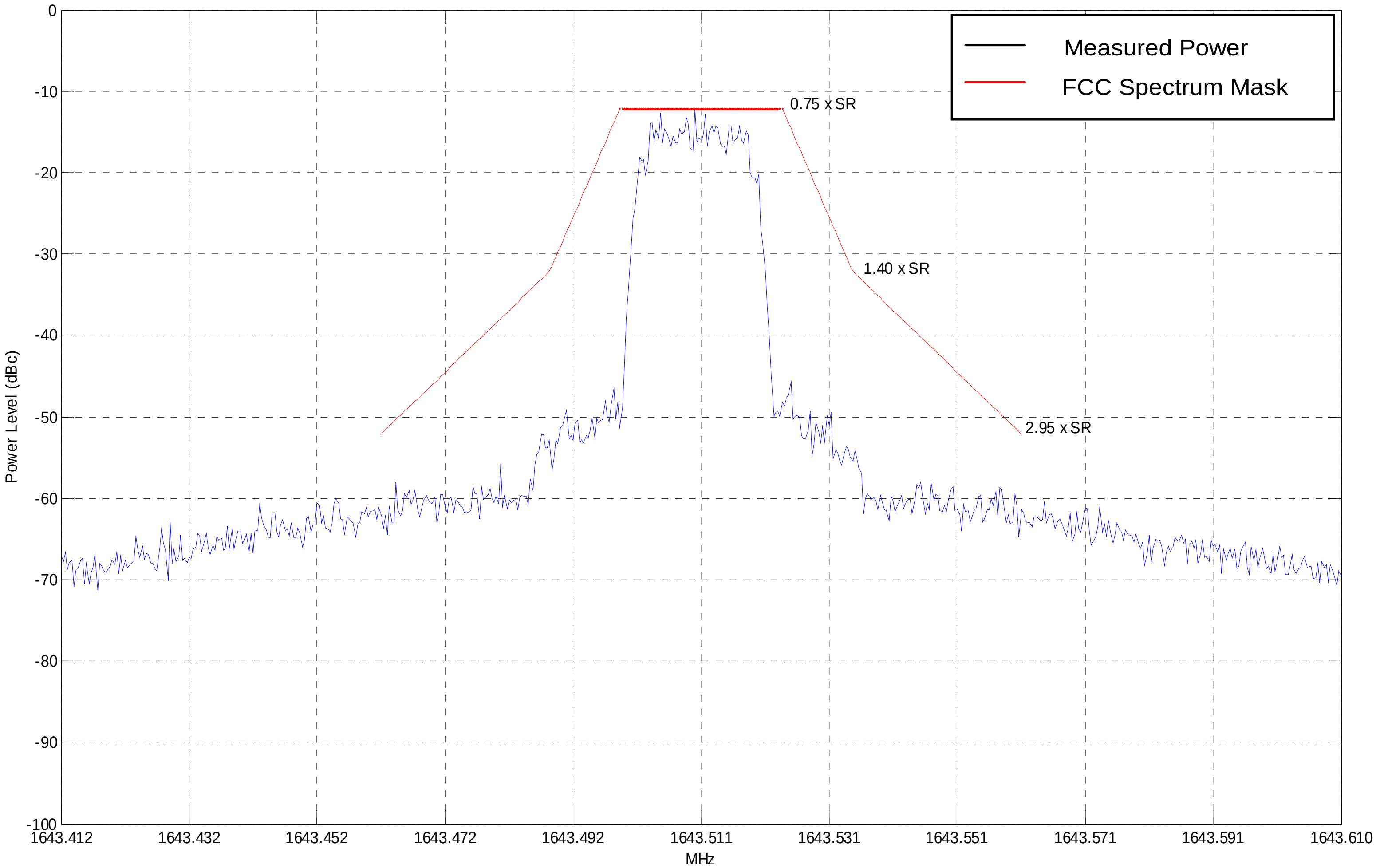


Figure 96 – Frequency Spectrum (SBB)

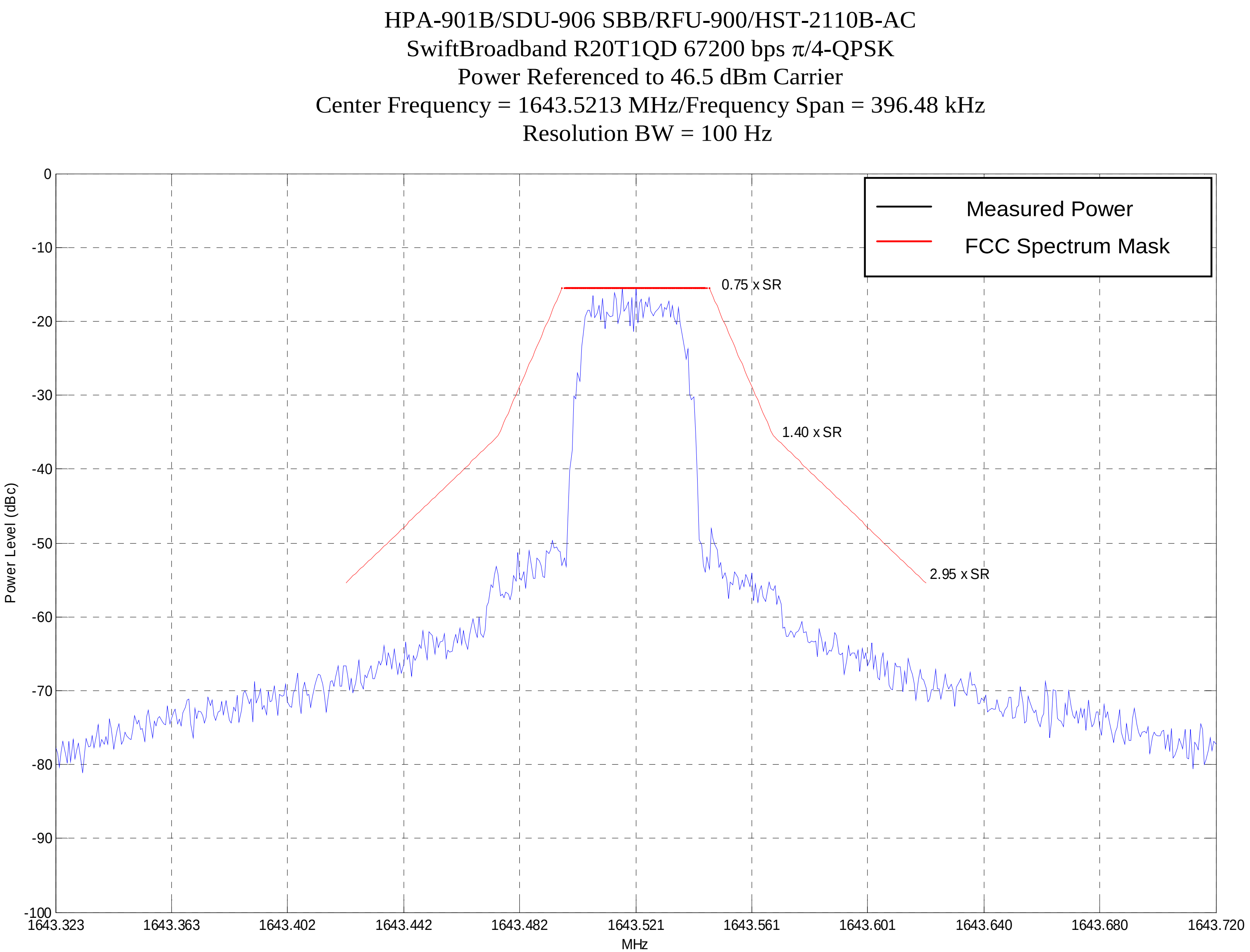


Figure 97 – Frequency Spectrum (SBB)

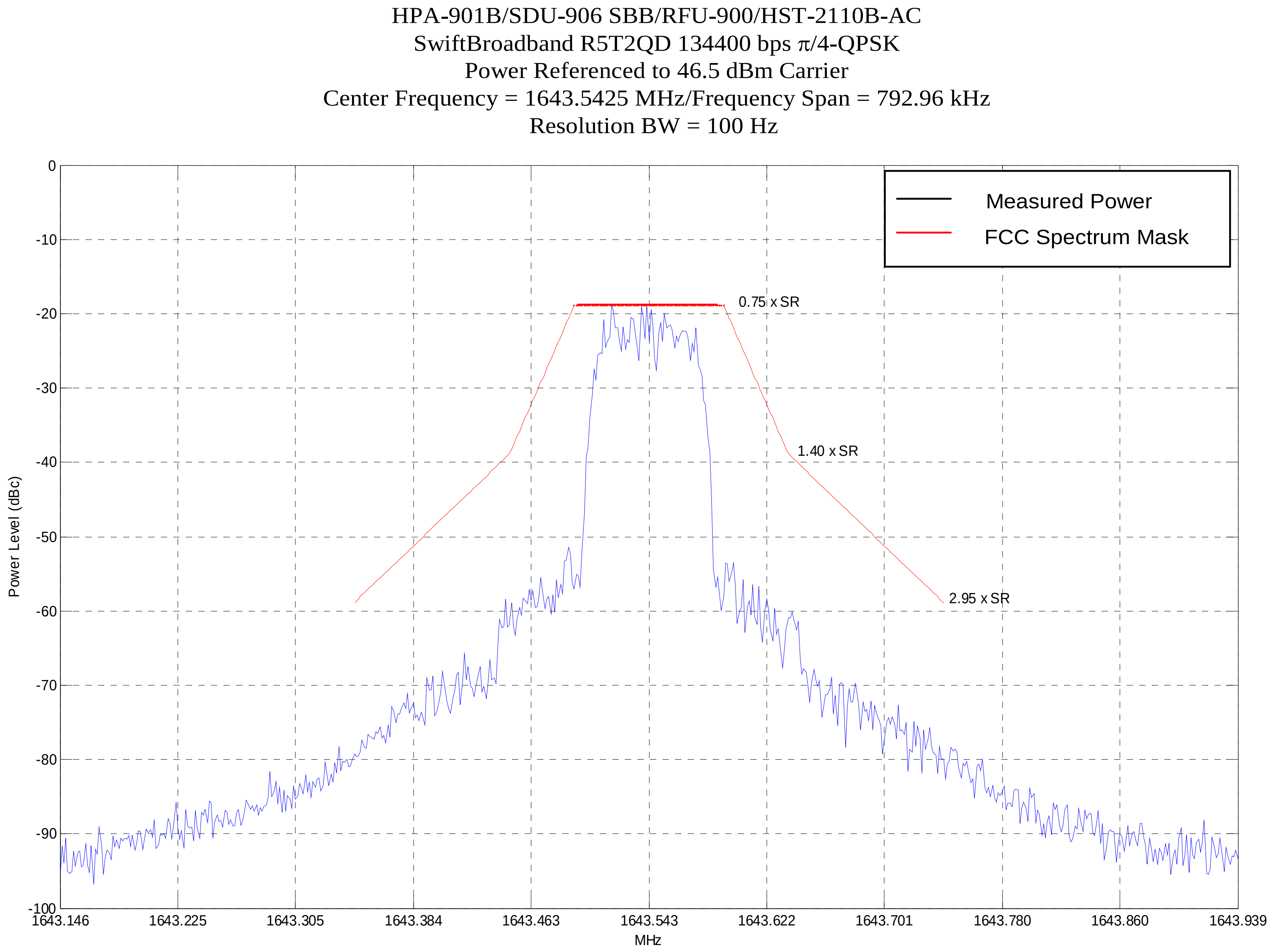


Figure 98 – Frequency Spectrum (SBB)

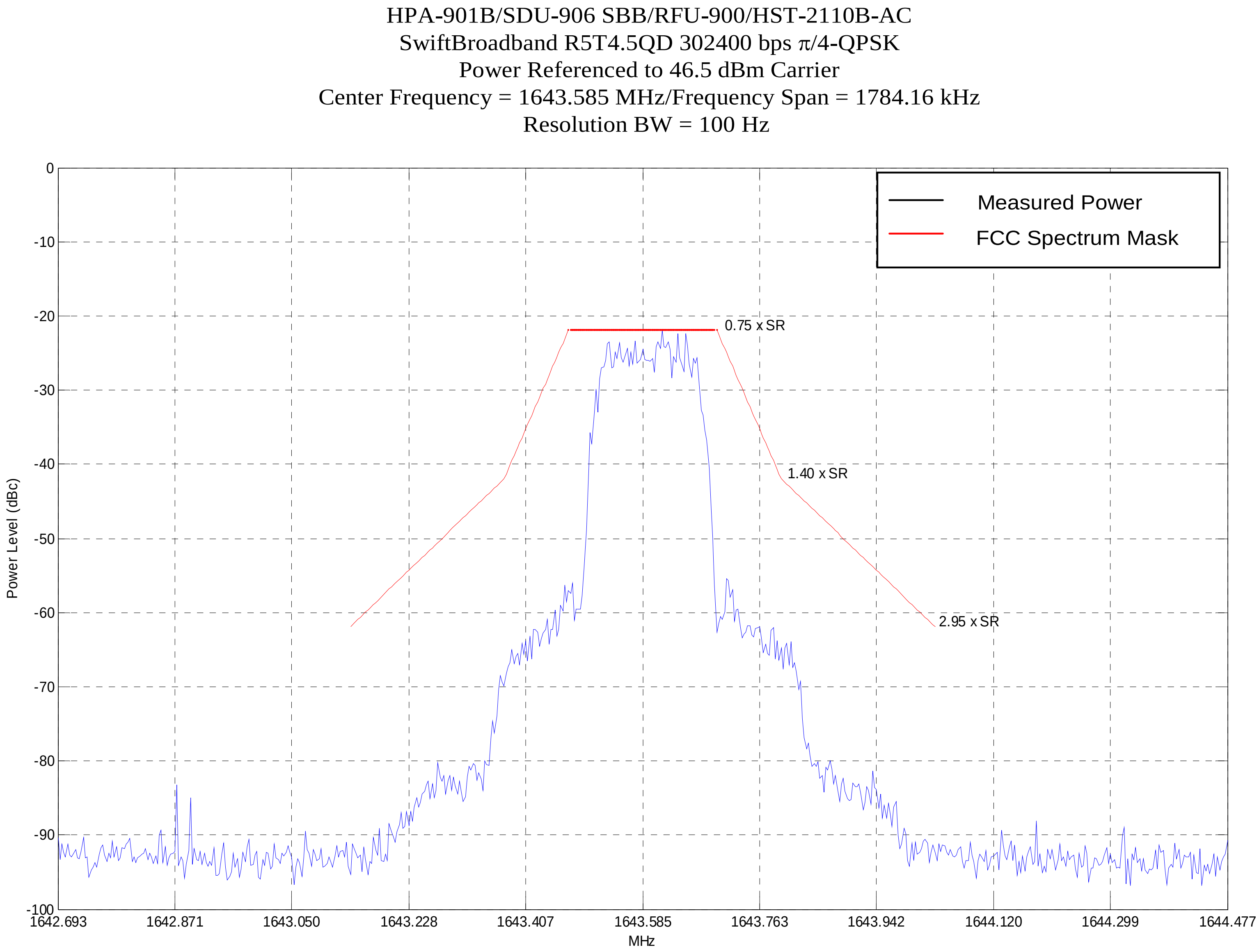


Figure 99 – Frequency Spectrum (SBB)

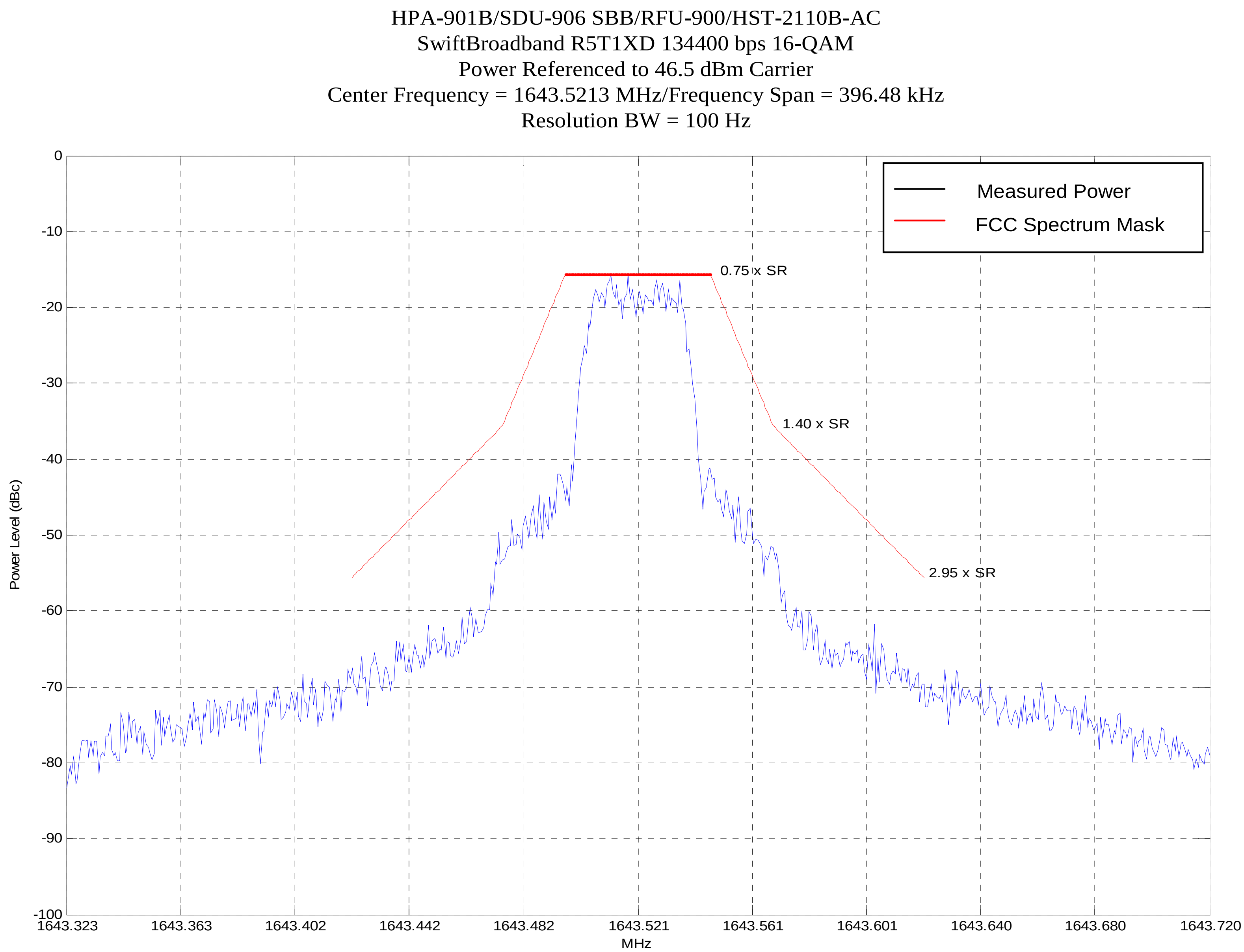


Figure 100 – Frequency Spectrum (SBB)

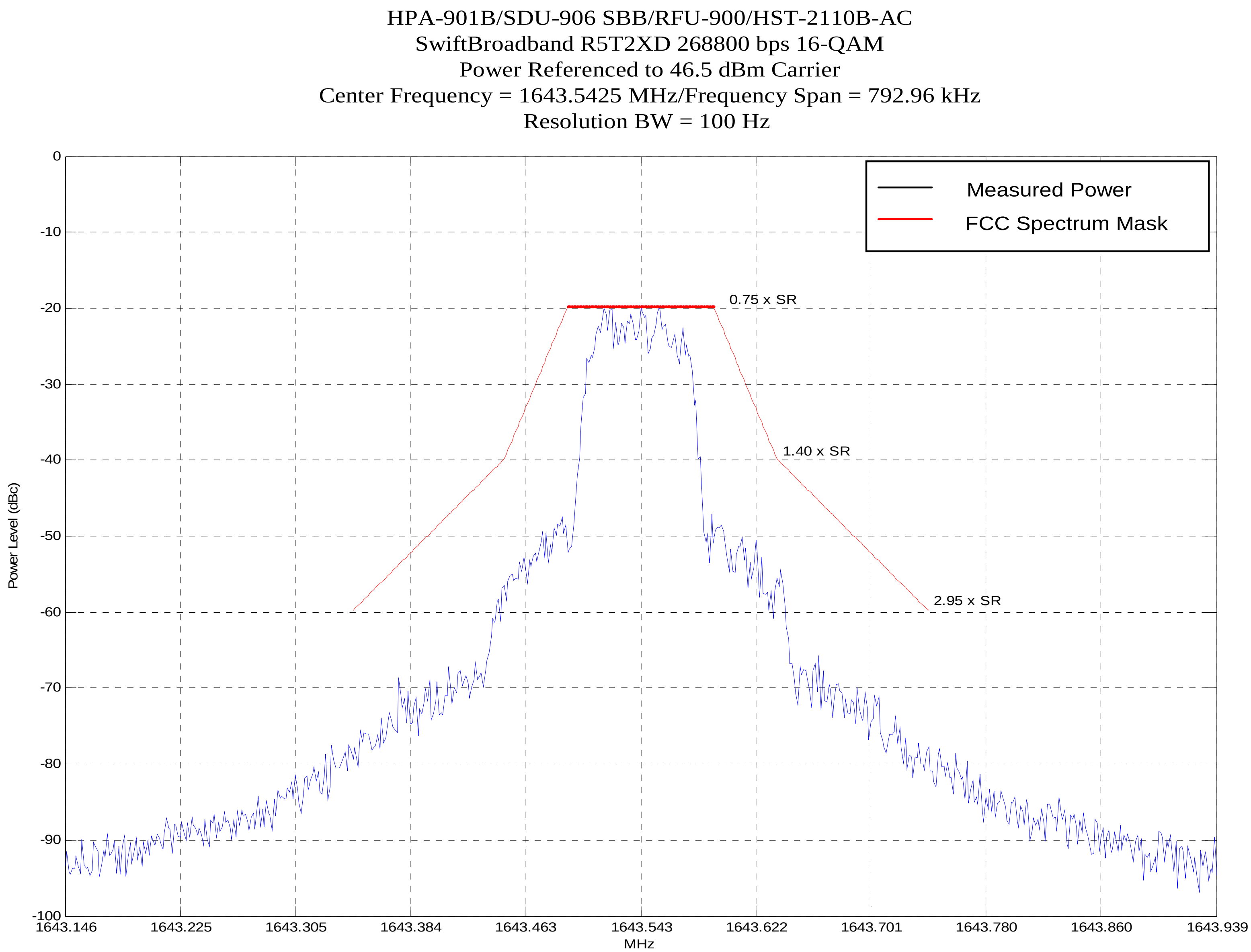


Figure 101 – Frequency Spectrum (SBB)

HPA-901B/SDU-906 SBB/RFU-900/HST-2110B-AC
SwiftBroadband R5T4.5XD 604800 bps 16-QAM
Power Referenced to 46.5 dBm Carrier
Center Frequency = 1643.595 MHz/Frequency Span = 1784.16 kHz
Resolution BW = 100 Hz

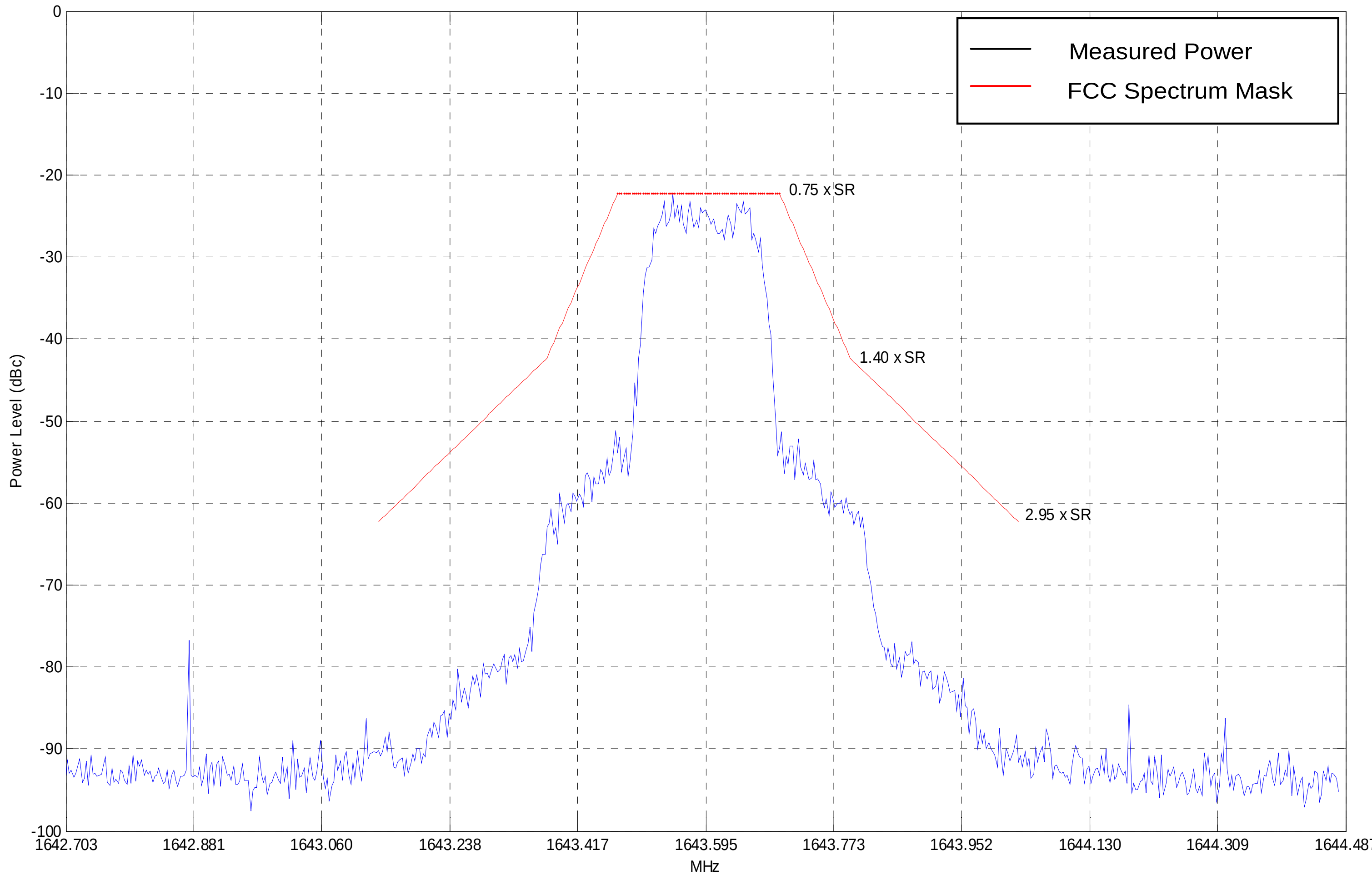


Exhibit F.5 Field Strength of Spurious Radiation

5.1 FCC Requirements

This discussion and test results shown in this section address and meet the requirements of the following FCC requirements.

Section 2.1053 (a) (b) (2) (3)

(a). Measurements shall be made to detect spurious emissions that may be *radiated* directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emissions. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible reflections, which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the radiated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antenna.

(b). The measurements specified in paragraph (a) of this section shall be made for all equipment:

(2). Operating on frequencies higher than 25 MHz

(3). All equipment where the antenna is an integral part of, and attached directly to the transmitter.

Section 87.139 (i)(1)

(i) – In case of conflict with other provisions of Section 87.139, the provisions of this paragraph shall govern for aircraft earth stations. When using G1D, G1E, or G1W emissions in the 1646.5 – 1660.5 MHz frequency band, the emissions must be attenuated as shown below.

(1) - At rated output power, while transmitting a modulated single carrier, the composite spurious and noise output shall be attenuated below the mean power of the transmitter, pY, by at least:

Frequency (MHz)	Attenuation (dB)[1]
.005 – 1559	83 or ($65 + 10\log_{10}(pY)$), whichever is greater
1559 – 18000	55 or ($37 + 10\log_{10}(pY)$)[2], whichever is greater

[1] these values are expressed in dB below the carrier referenced to a 4 kHz bandwidth and relative to the maximum emission envelope level.

[2] excluding the frequency band of +/- 35 kHz or +/- 4.00 x Symbol Rate, about the carrier frequency, whichever is the greater exclusion.

5.2 Test Procedures

The following procedure is derived from DO-160E, Section 21 and adapted for testing the requirements of section 87.139(i) of FCC Part 87. While RTCA DO-160E does not specify testing above 6 GHz, the same setup and methodology were used to measure radiated emissions up to 18 GHz.

5.2.1 Test Equipment

The following test equipment (or equivalent) shall be used to perform this test:

Equipment	Manufacturer and Model Number	Frequency Range (Bandwidth)
Active whip	RVA-30	10 kHz to 30 MHz
Biconical	EMCO 3104C	25 MHz to 200 MHz
Conical Log Spiral	Stoddart 93490-1	200 MHz to 1 GHz
Double Ridged Guide	EMCO 3115	1 GHz to 18 GHz
Calibrated Cable	RG-400, Adams Russell	NA
LISN	Fischer, FCC-LISN-DO-160	100 kHz - 400 MHz
10 μf Capacitor	Solar 6512-106R	N/A
Spectrum Analyzer	Hewlett Packard, 8566B w/OPT 462	100 Hz - 22 GHz
Preselector	HP 85685A	20 Hz - 2 GHz
Printer	HP Laser Jet	NA
Computer	Gateway	NA
Bus Extender	HP 37204	NA

5.2.2 Conditions

1. Set up the radiated emissions test equipment as shown in .
2. Unit operation during radiate emissions measurements will exercise I/O discretes, ARINC 429 buses and the RS-422 antenna bus via loop-back. In addition, all four analog audio circuits and the CEPT-E1 circuit will be tested using loop-backs through individual channel modules. An RF loop-back through a channel module will be performed to check the transmit and receive path, and a CW carrier will be enabled for monitoring.

5.2.3 Measurements

1. Measure and record emissions over the range from 150 kHz to 18,000 MHz using the automated emissions measurement system.
2. Change antennas as required.

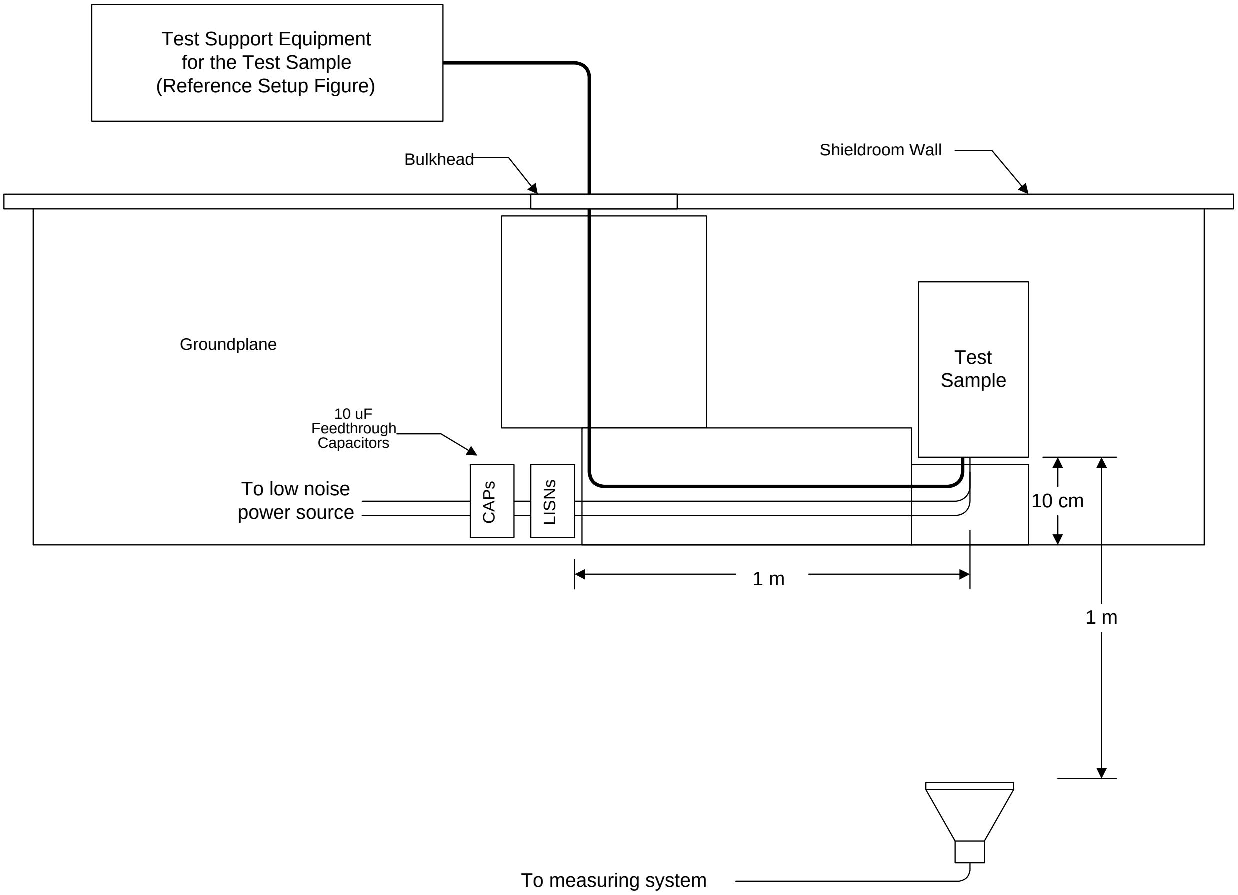


Figure 102 – Typical Test Setup for DO-160E, Paragraph 21.4 Radiated RF Interference

Notes:

1. Terminate all LISN monitor output terminals with 50 ohms.

2. DC Bond resistance between the groundplane and enclosure shall not exceed 2.5 milliohms.

3. The lengths of the power leads from the test sample to the LISNs shall not exceed 1 meter.

4. Excess interconnect cable bundle length will be zigzagged at the back of the test bench, approximately 5 cm above the ground plane. At least 1 meter of EUT cable is to be 10 cm from the front of the test bench and parallel to its front edge.

5.2.4 Reference Field Level Calculations

According to Section 87.139 (I), the radiated spurious emissions are to be attenuated to the same degree as the spurious emissions at the antenna terminals. A reference field level was calculated for comparison with the measured narrow-band data and based on these requirements. The following assumptions were made for these calculations:

1. The intended transmitted signal is radiated through a dipole antenna at 1-meter distance from the point at which the measurements are made.
2. This distance is sufficiently greater than the distance at which the radial component of the E-field is negligible.
3. The peak power available at the dipole antenna is calculated with maximum cable loss at the rated output power. This power would be 17.8 dBW (60 watts) – 2.5 dB (cable loss) = 15.3 dBW (33.88 watts).
4. The duty cycle of the operation is 100%.
5. Section 87.139(i) attenuation requirement is 83 dB.
6. The calculation proceeded as follow:

For a half-wave dipole antenna in free space, in the direction of maximum radiation, the field strength is

$$E = (49.2 * P_t)^{0.5 / R}$$

Where

R = distance in meters

P_t = transmitted power in watts

For a distance of R = 1 meter and the transmitted power of 33.88 watts, the field strength is calculated to be:

$$E = (49.2 * 33.88)^{0.5 / 1} = 40.83 \text{ Volts/meter} = 40.83 * 10^6 \text{ Micro-Volts/meter} = 152.22 \text{ dB}\mu\text{V/meter.}$$

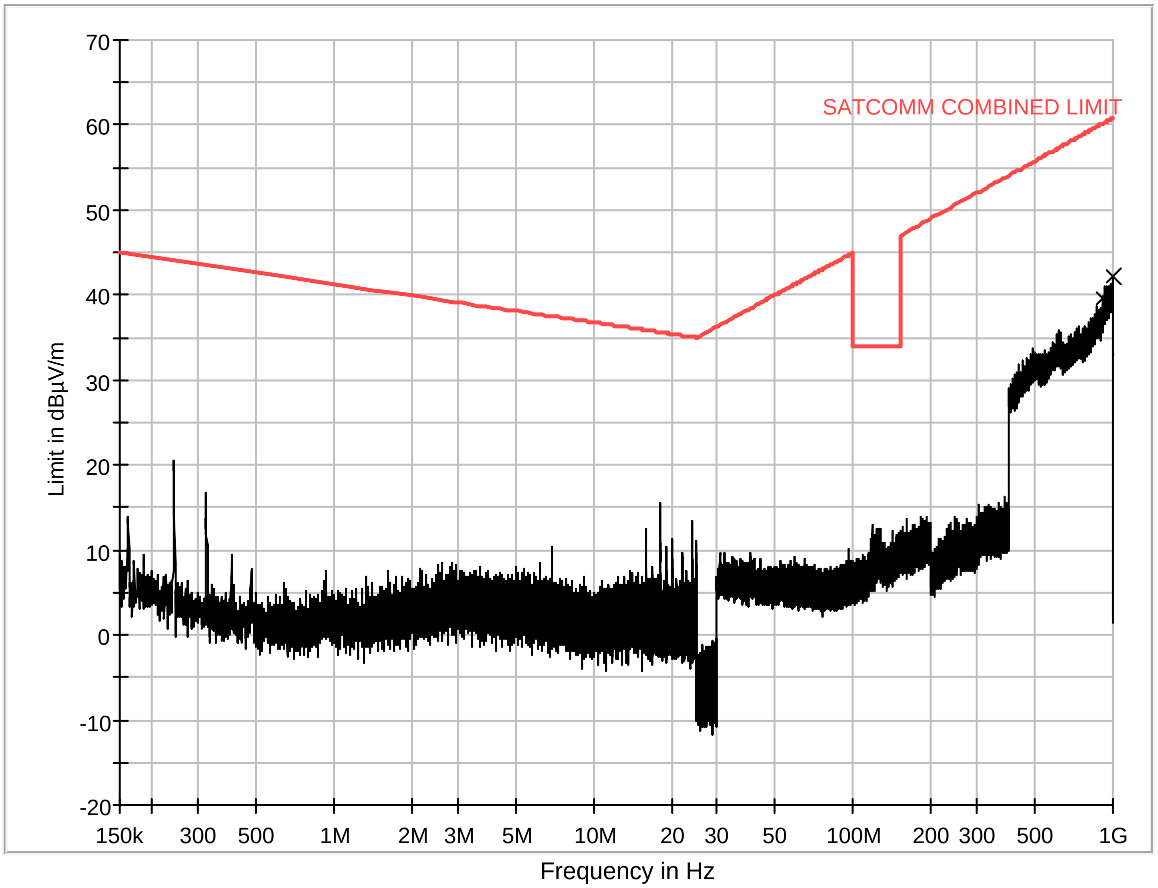
The maximum field strength of the radiated spurious component is then:

152.22 dBµV/M - 83 dB = 69.22 dBµV/M (.005 – 1559 MHz) and 152.22 dBµV/M – 55 dB = 97.22 dBµV/M (1559 – 18000 MHz).

5.3 Field Strength of Spurious Radiation Results

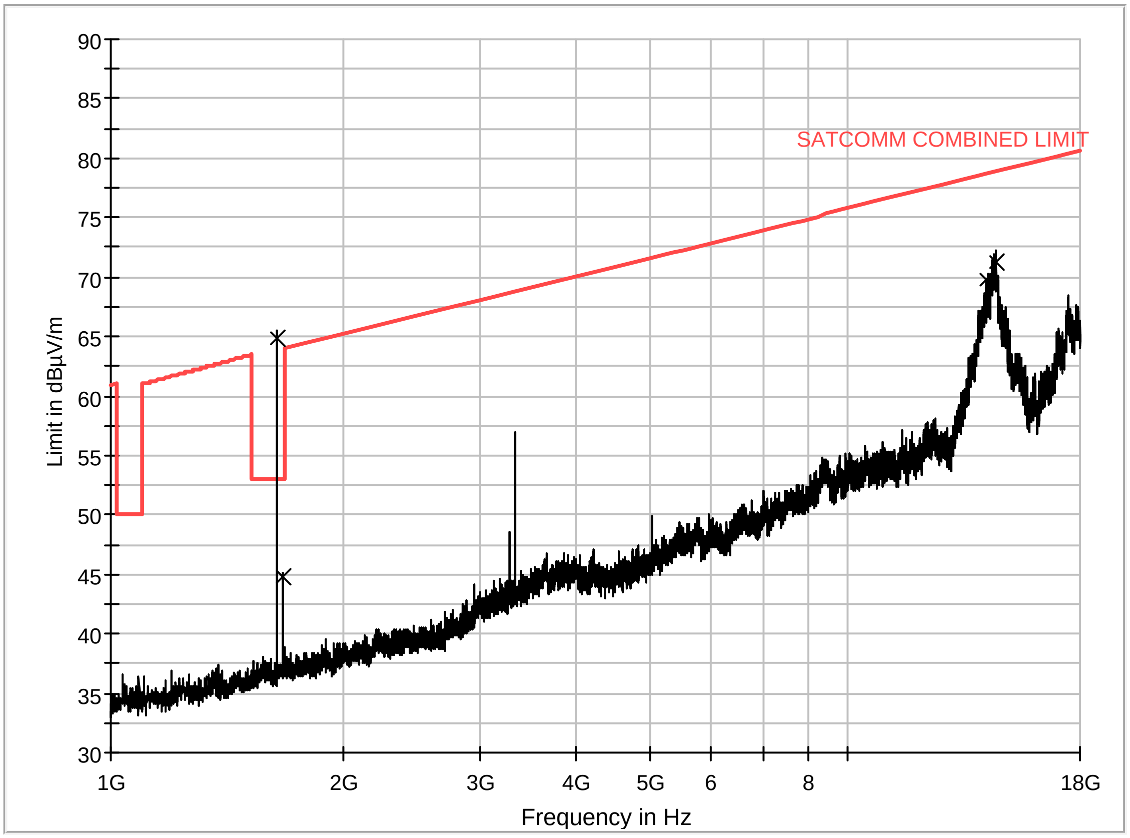
The following data show that all spurious emissions are lower than the limit indicated above. Note that the limit indicated on the plots limits placed in accordance with Boeing D6-16050-4D Section 8.4.2 (which covers RTCA/DO-160E Section 21.0 utilizing Category M) with frequency extension from 6 GHz to 18 GHz and is not the FCC limit. As per the limits above, they are 69.22 dBµV/M (.005 – 1559 MHz and 97.22 dBµV/M (1559 – 18000 MHz).

HPA-901B Field Strength of Spurious Radiation
List of Figures



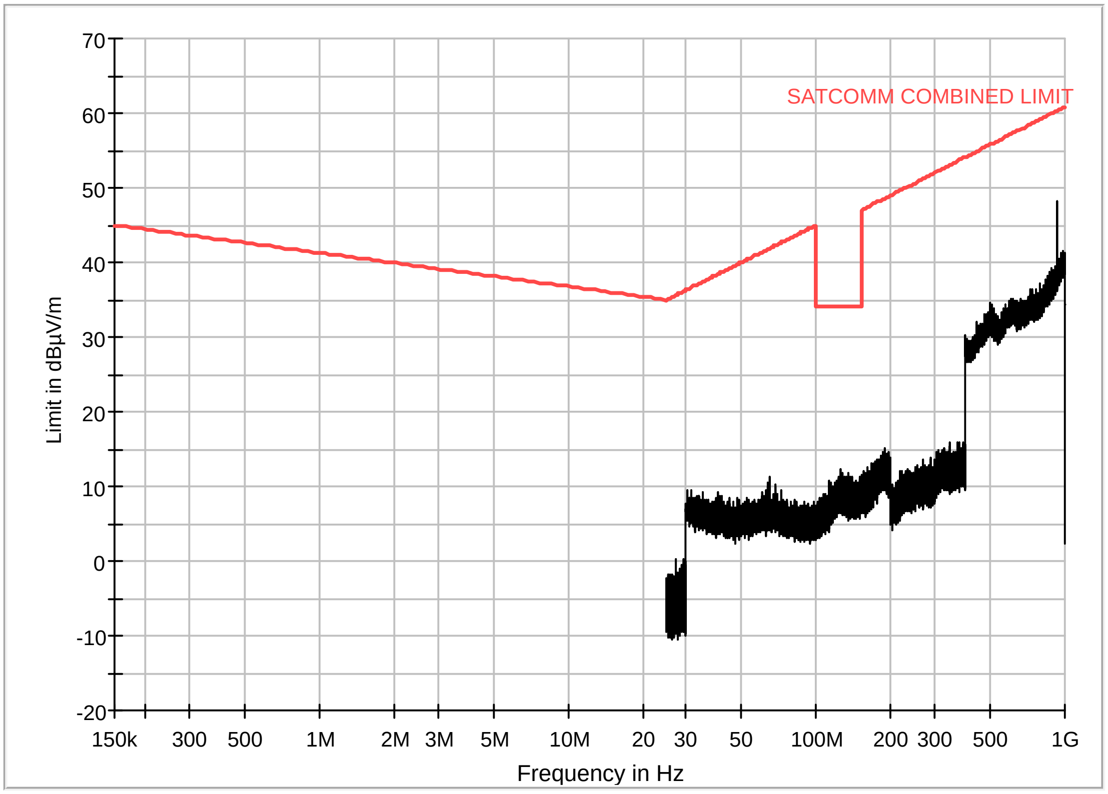
HPA-901B S/N: 080731
FCC Radiated Emissions Vertical Polarization
150kHz - 1GHz
Mode: 1643.5MHz CF 0.2MHz TS - Ref. 2
Date: 01/16/09 - 01/17/09
Result: PASS

Figure 103 - Field Strength of Spurious Radiation
150 kHz to 1 GHz Vertical - HPA-901B



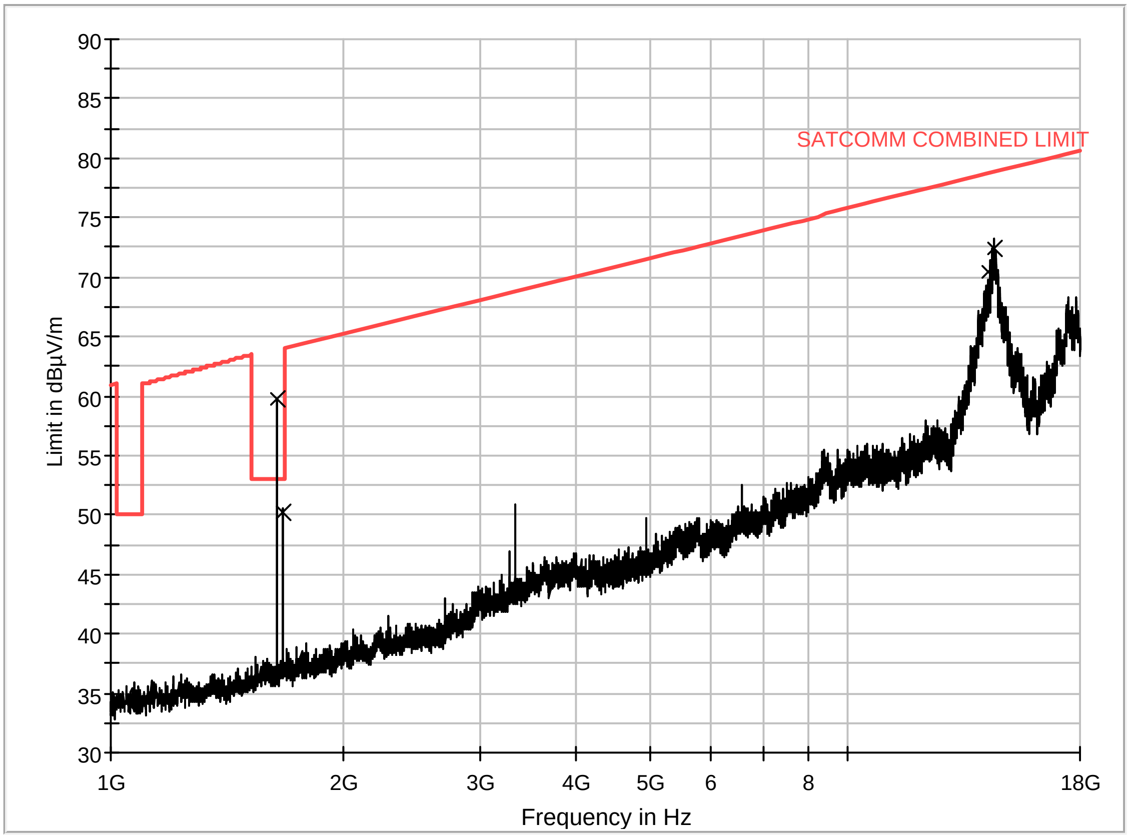
HPA-901B S/N: 080731
FCC Radiated Emissions Vertical Polarization
1 - 18GHz
Mode: 1643.5MHz CF 0.2MHz TS - Ref. 2
Date: 01/16/09 - 01/17/09
Result: PASS

Figure 104 - Field Strength of Spurious Radiation
1 GHz to 18 GHz Vertical - HPA-901B



HPA-901B S/N: 080731
FCC Radiated Emissions Horizontal Polarization
150kHz - 1GHz
Mode: 1643.5MHz CF 0.2MHz TS - Ref. 2
Date: 01/16/09 - 01/17/09
Result: PASS
*No Data taken from 150k-25MHz for Horizontal Polarization

Figure 105 - Field Strength of Spurious Radiation
150 kHz to 1 GHz Horizontal - HPA-901B



HPA-901B S/N: 080731
FCC Radiated Emissions Horizontal Polarization
1 - 18GHz
Mode: 1643.5MHz CF 0.2MHz TS - Ref. 2
Date: 01/16/09 - 01/17/09
Result: PASS

Figure 106 - Field Strength of Spurious Radiation
1 GHz to 18 GHz Horizontal - HPA-901B

Exhibit F.6 Frequency Stability

The frequency stability of the SAT-906B system is governed by the high stability reference (HSR) oscillator and frequency translation circuits in the RFU-900 (FCC ID:AJKPN622-8849), which was granted type acceptance on June 1, 1993 and in the HST-2110B (FCC ID: AJK8222232), which was granted type acceptance on July 29, 2008.

Exhibit F.7 Priority and Preemption

The SAT-906B AES dedicates one of its available channels to a continuous data link capability with the GES to which it is logged on. This data channel continuously monitors the GES P channel signal, and transmits R or T channel messages to the GES. Transmission is based on need to respond to GES requests, to request channel assignments (as may be required to place air to ground calls) or to transmit data from the onboard data link sources. GES to AES call requests are made on the P channel – providing information such as C channel frequency selection and the priority of the call. AES to GES calls are initiated by the AES on the R channel – providing call priority and destination information. In return, when accepted by GES, AES is provided a C channel frequency assignment.

The priority, which is assigned to each call, as it originates, provides the basis for handling of the call within the AES and GES. These priorities are established and the requirements for their use are defined in Inmarsat System Definition Manual. Inmarsat also specifies a number of protocol tests, which must be completed to verify that the AES complies with the priority and preemption requirements. For AES to GES calls, the pilot specifies the nature (priority) of the call as a part of the call set up procedure. If the AES resources are exhausted, the pilot is prompted to select whether to preempt a lower priority call (cabin call), or have the call queued until resources are available. This operation is in “real time” in the sense that the pilot makes the decision at the time that the call is placed. If he elects to queue the call, he can later use the preempt feature if the situation warrants. Selection of the preemption feature will terminate one of cabin calls which is in progress and will make that channel resource available for the call. For GES to AES calls, the pilot involvement is not practical. As an upcoming call request is made to the AES, the SAT-906B system processor examines the status of the channel modules to determine if any channel is available for assignment. The processor also examines the status of the cockpit lines to determine their availability. If the incoming call priority is “Cockpit Safety” or greater and a cockpit line is available and all channel modules are in use, one of the cabin calls will be terminated and that channel module resource will be used to complete the call. If the cockpit line(s) are busy and the incoming call is of greater priority than one of calls currently placed, that call will be terminated and the resources used for the incoming call. In the event that call has the same or lower priority than the cockpit calls already placed, it will be rejected by the AES.

7.1 FCC Requirements

The discussion and test results shown in this section address and meet the requirements of the following FCC requirements:

Section 87.187 (q)

In the frequency bands 1549.500-1558.500 MHz and 1651.000-1660.000 MHz, the Aeronautical Mobile-Satellite requirements that cannot be accommodated in the distress and safety frequency bands 1544.0-1545.0 MHz and 1645-1646.5 MHz shall have priority access with real-time preemptive capability for communications in the Mobile-Satellite Service.

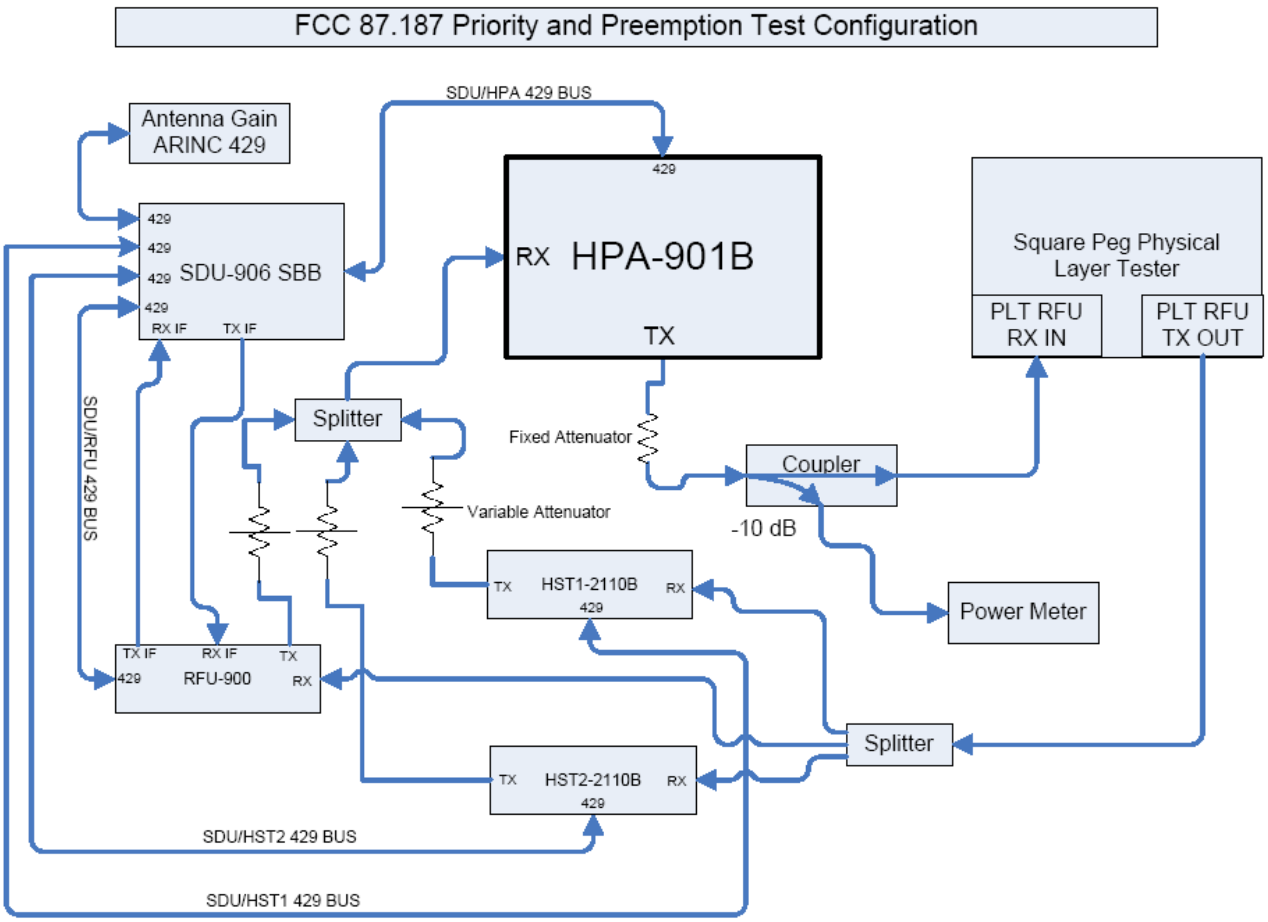
Section 87.189 (e)

Transmission of public correspondence must be suspended when such operation will delay or interfere with message pertaining to safety of life and property or regularity of flight, or when ordered by the captain of the aircraft.

7.2 Test Procedures

The following test configuration was used to perform the Classic Aero/Swift64 and Classic Aero/SwiftBroadband Priority and Preemption Measurements.

7.2.1 Test Equipment



Item	Manufacturer	PN	SN	Notes
HPA-901B	Rockwell Collins	822-2577-001	080731	AC Powered
HST-2110B	Rockwell Collins	270-2885-010		AC Powered
HST-2110B	Rockwell Collins	270-2885-010		AC Powered
SDU-906 SBB	Rockwell Collins	822-0314-102	L4FF	AC Powered
RFU-900	Rockwell Collins	622-8849-100	E12	AC Powered
Physical Layer Tester	Square Peg Communications, Inc.	EM-907532C-04	PLTH_080	

Physical Layer Tester Radio Frequency Unit	Square Peg Communications, Inc.	EM-907516C-01	23	
Desktop	Dell	DCTA	CRL02030	
Desktop	Dell	DCTA	CRL02029	
Power Meter	Agilent	E4416A	MY45101590	
Spectrum Analyzer	Agilent	E4440A	MY48250105	
Variable Attenuator	Weinschel	910-20-11	7936	
Fixed Attenuator (20dB)	Weinschel	12-B1-09	460-0144-161	
Directional Coupler	Narda	3002-10	70612	

7.2.2 Priority and Preemption – Classic Aero/SwiftBroadband

FCC Requirements detailed in sections 87.131 (RF Power Output) and 87.187(q) (Priority and Preemption) were tested with a combined procedure in which Classic Aero voice services were exercised in concert with SwiftBroadband services. During the test procedure the output EIRP of the Classic Aero voice services and Swift Broadband data services were varied along with antenna gain in order to demonstrate accurate power control and, when necessary, the preemption of lower priority services in order to maintain output EIRP for higher priority services. Table 5 below documents the various conditions and records the predicted, measured and reported RF power output in order to demonstrate compliance.

7.2.3 Priority and Preemption – Classic Aero/Swift64

FCC Requirements detailed in sections 87.131 (RF Power Output) and 87.187(q) (Priority and Preemption) were tested with a combined procedure in which Classic Aero voice services were exercised in concert with Swift64 services. During the test procedure the output EIRP of the Classic Aero voice services and Swift 64 data services were varied along with antenna gain in order to demonstrate accurate power control and, when necessary, the preemption of lower priority services in order to maintain output EIRP for higher priority services. Table 6 below documents the various conditions and records the predicted, measured and reported RF power output in order to demonstrate compliance.

7.3 Priority and Preemption Results

In all cases, the priority and preemption test results shown in Table 5 and Table 6 meet the requirements.

Table 5 RF Power Output – Classic Aero/ SwiftBroadband

HPA -> ANT Cable Loss (dB)	2.00
Data Reservation (dBW)	10.50

		High Priority	Low Priority	Public Priority										
	Ant Gain (dBi)	Aero Call 1 (dBW EIRP)	Aero Call 2 (dBW EIRP)	HST Allocated EIRP (dBW)	HST Reported EIRP (dBW)	Calculated HPA Output (dBm)	Reported HPA Output (dBm)	Measured HPA Output (dBm)	Power Accuracy Results (P/F)	Calculated HPA Output (Watts)	Measured HPA Output (Watts)	Available HPA Output (Watts)	Margin	Preemption Results (P/F)
	18.00	18.50	18.50	20.00	20.00	37.83	37.50	38.02	PASS	6.07	6.34	59.72	53.38	PASS
	17.00	18.50	17.50	20.00	20.00	38.56	38.00	38.60	PASS	7.18	7.24	59.65	52.40	PASS
	16.00	18.50	16.50	20.00	20.00	37.60	38.50	39.39	PASS	5.76	8.69	59.55	50.86	PASS
	15.00	18.50	15.50	20.00	20.00	40.14	39.50	40.11	PASS	10.34	10.26	59.44	49.18	PASS
	14.00	18.50	14.50	20.00	20.00	40.99	40.00	40.91	PASS	12.55	12.33	59.29	46.96	PASS
	13.00	18.50	13.50	20.00	20.00	41.86	41.00	41.77	PASS	15.34	15.03	59.11	44.08	PASS
	12.00	17.50	12.50	20.00	20.00	42.41	41.50	42.38	PASS	17.40	17.30	58.88	41.58	PASS
	11.00	16.50	11.50	20.00	20.00	43.01	42.00	42.95	PASS	19.99	19.72	58.59	38.86	PASS
	10.00	15.50	10.50	20.00	20.00	43.66	43.00	43.56	PASS	23.25	22.70	58.22	35.52	PASS
	9.00	14.50	10.50	20.00	20.00	44.44	45.00	45.64	PASS	27.81	36.64	57.76	21.12	PASS
	8.00	13.50	10.50	20.00	20.00	45.26	46.00	46.50	PASS	33.56	44.67	57.18	12.51	PASS
	7.00	12.50	10.50	20.00	20.00	46.11	46.00	46.73	PASS	40.79	47.10	56.45	9.35	PASS
HST Preempted	7.00	12.50	11.50	0.00	0.00	40.17	39.50	40.20	PASS	10.41	10.47	56.45	45.98	PASS
HST Preempted	7.00	16.50	18.50	0.00	0.00	45.66	45.00	45.57	PASS	36.83	36.06	56.45	20.39	PASS
HST Preempted	7.00	17.50	18.50	0.00	0.00	46.07	45.51	46.40	PASS	40.49	43.65	56.45	12.80	PASS

HPA -> ANT Cable Loss (dB)	2.00
Data Reservation (dBW)	10.50

		High Priority	Low Priority	Public Priority											
	Ant Gain (dBi)	Aero Call 1 (dBW EIRP)	Aero Call 2 (dBW EIRP)	HST Allocated EIRP (dBW)	HST Reported EIRP (dBW)	Calculated HPA Output (dBm)	Reported HPA Output (dBm)	Measured HPA Output (dBm)	Power Accuracy Results (P/F)	Calculated HPA Output (Watts)	Measured HPA Output (Watts)	Available HPA Output (Watts)	Margin	Preemption Results (P/F)
Low Priority Call Preempted	7.00	21.50	0.00	0.00	0.00	46.56	46.50	46.67	PASS	45.30	46.45	56.45	10.00	PASS
HST Preempted	7.00	17.50	18.50	0.00	0.00	46.07	46.60	46.61	PASS	40.49	45.81	56.45	10.64	PASS
HST Preempted	8.00	0.00	21.50	0.00	0.00	45.56	45.00	45.35	PASS	35.98	34.28	57.18	22.90	PASS
	9.00	0.00	18.50	20.00	20.00	45.35	44.50	45.50	PASS	34.28	35.48	57.76	22.28	PASS
	10.00	0.00	12.50	20.00	20.00	42.75	42.00	42.86	PASS	18.83	19.32	58.22	38.90	PASS
	11.00	0.00	12.50	20.00	20.00	41.75	41.50	42.01	PASS	14.95	15.89	58.59	42.70	PASS
	12.00	0.00	12.50	20.00	20.00	40.75	40.50	40.90	PASS	11.88	12.30	58.88	46.58	PASS
	13.00	0.00	12.50	20.00	20.00	39.75	39.50	39.88	PASS	9.44	9.73	59.11	49.38	PASS
	14.00	0.00	12.50	20.00	20.00	38.75	38.50	38.93	PASS	7.49	7.82	59.29	51.48	PASS
	15.00	0.00	12.50	20.00	20.00	37.75	37.50	38.02	PASS	5.95	6.34	59.44	53.10	PASS
	16.00	0.00	12.50	20.00	20.00	36.75	36.50	37.02	PASS	4.73	5.04	59.55	54.52	PASS
	17.00	0.00	12.50	20.00	20.00	35.75	35.50	35.04	PASS	3.76	3.19	59.65	56.45	PASS
	18.00	0.00	12.50	20.00	20.00	34.75	34.50	36.08	PASS	2.98	4.06	59.72	55.66	PASS

Table 6 RF Power Output – Classic Aero/Swift64

Max HPA Out (W)	**60**
Max HPA Out (dBW)	**17.78**
Ant to HPA Loss (dB)	**2**
RFU to HPA Attn (dB)	**23.5**
HST1 to HPA Attn (dB)	**19**
HST2 to HPA Attn (dB)	**19**

								Dual HST Cont Wave				
Ant Gain	**Total EIRP**	**Data**	**EIRP**	**EIRP**	**Avail EIRP**	**HST1 EIRP**	**HST2 EIRP**	**Calculated HPA Out**	**Measured HPA Out**	**Computed HPA at output Trace**	**error**	**Pass/Fail**
dB	**dBW**	**dBW**	**Call 1**	**Call 2**	**dBW**	**dBW**	**dBW**	**dBm**	**dBm**	**dBm**	**dB**	**(+2.5/- 1.0 dB)**
12	26.53	10.50	-100	-100	26.42	**22.5**	**19.5**	44.26	**44.64**	**44.00**	-0.26	**PASS**
12	26.53	10.50	-100	-100	26.42	**20.5**	**17.5**	42.26	**42.65**	**42.00**	-0.26	**PASS**
12	26.53	10.50	-100	-100	26.42	**18.5**	**15.5**	40.26	**40.65**	**40.00**	-0.26	**PASS**
12	26.53	10.50	**12.5**	-100	26.24	18.5	**15.5**	40.94	**42.20**	**41.50**	0.56	**PASS**
12	26.53	10.50	**11.5**	-100	26.28	18.5	**15.5**	40.81	**42.20**	**41.50**	0.69	**PASS**
12	26.53	10.50	**10.5**	-100	26.31	18.5	**15.5**	40.70	**42.18**	**41.50**	0.80	**PASS**
12	26.53	10.50	10.5	**12.5**	26.13	18.5	**15.5**	41.31	**42.21**	**41.50**	0.19	**PASS**
12	26.53	10.50	10.5	**11.5**	26.16	18.5	**15.5**	41.19	**42.20**	**41.50**	0.31	**PASS**
12	26.53	10.50	10.5	**10.5**	26.19	18.5	**15.5**	41.10	**41.19**	**41.50**	0.40	**PASS**
13	27.53	10.50	10.5	10.5	27.27	18.5	**15.5**	40.10	**41.20**	**40.50**	0.40	**PASS**
14	28.53	10.50	10.5	10.5	28.32	18.5	**15.5**	39.10	**40.20**	**39.50**	0.40	**PASS**
15	29.53	10.50	10.5	10.5	29.37	18.5	**15.5**	38.10	**39.22**	**38.50**	0.40	**PASS**
16	30.53	10.50	10.5	10.5	30.40	18.5	**15.5**	37.10	**38.11**	**37.50**	0.40	**PASS**
11	25.53	10.50	10.5	10.5	25.10	18.5	**15.5**	42.10	**43.18**	**42.50**	0.40	**PASS**
10	24.53	10.50	10.5	10.5	23.98	18.5	**15.5**	43.10	**43.29**	**42.50**	-0.60	**PASS**
9	23.53	10.50	10.5	10.5	22.83	18.5	**15.5**	44.10	**45.17**	**44.00**	-0.10	**PASS**
8	22.53	10.50	10.5	10.5	21.63	18.5	**15.5**	45.10	**46.11**	**45.00**	-0.10	**PASS**
7	21.53	10.50	10.5	10.5	20.36	18.5	**15.5**	46.10	**47.05**	**46.00**	-0.10	**PASS**
6	HST Preempted											**n/a**