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Report On

Ericsson Radio Unit GSM, WCDMA and LTE KRC 161 652/1 and KRC 161 652/2, Radio 2212 B5 (850 MHz), Base Station In accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 22, Industry Canada RSS-GEN and Industry Canada RSS-132.

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRC161652
IC: 287AB-AS161652

PREPARED BY	APPROVED BY	DATED
Nic Forsyth Senior Engineer	Steve Scarfe Authorised Signatory	21 March 2017

Document 75936624 Report 01 Issue 1 **March 2017**

Product Service

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Product Service

SECTION 1

REPORT INFORMATION

1.1 REPORT DETAILS

Manufacturer	Ericsson
Address	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
Product Name	Radio 2212 B5
Product Number	KRC 161 652/1 and KRC 161 652/2
FCC ID	TA8AKRC161652
IC Model Name	287AB-AS161652
Serial Number(s)	D824847243
Software Version	CXP 901 7316/7, R64HE
Hardware Version	R1A
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2015 FCC CFR 47 Part 22: 2015 Industry Canada RSS-GEN: Issue 4: 2014 Industry Canada RSS-132: Issue 6: 2013
Start of Test	01 February 2017
Finish of Test	08 March 2017
Name of Engineer(s)	Raj Kumar Kallem
Related Document(s)	KDB 971168 D01

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 22, Industry Canada RSS-GEN and Industry Canada RSS-132 is shown below.

Section	Specification Clause				Test Description	Result
	FCC CFR 47 Part 2	FCC CFR 47 Part 22	RSS-GEN	RSS-132		
2.1	2.1046	22.913(a)	-	5.4	Maximum Peak Output Power and Peak to Average Ratio - Conducted	Pass
2.2	2.1049	22.917(b)	6.6	-	Occupied Bandwidth	Pass
2.3	2.1051	22.917(b	-	5.5	Band Edge	Pass
2.4	2.1051	22.917(a) (b)	-	5.5	Transmitter Spurious Emissions	Pass
2.5	2.1055	22.355	-	5.3	Frequency Stability	Pass

1.3 CONFIGURATION DESCRIPTION

The Radio 2212 B5 supports single and up to six carriers operation from either a single or dual port configuration. A pre-test was performed to establish the worst case configuration of the EUT in the above mentioned operating modes. The reported results represent testing in the worst case modes of operation. Testing was carried out on all test ports to confirm that each antenna output was electrically identical.

The following test models were used as defined in 3GPP TS 36.141. Test Model E-TM1.1 was used to represent QPSK modulation only, Test Model E-TM3.2 was used to represent 16QAM modulation, and Test Model E-TM3.1 was used to represent 64QAM modulation.

The settings below were found to be representative for all traffic scenarios when several settings with the different modulations, channel bandwidths were tested to find the worst case setting. These settings were used for all measurements unless otherwise noted:

LTE: Test Model E-TM1.1 in channel bandwidth 1.4, 3, 5 and 10 MHz.

For TX test cases: Maximum Conducted Output Power, Spurious Emissions at Antenna Terminals (±1MHz) and Conducted Spurious Emissions, measurements were performed on all RF ports using a test limit accounting for MIMO operation with 2 ports. For Carrier Power, all results were recorded using the Measure and Sum approach to account for MIMO operation. All testing was performed with the EUT transmitting at maximum RF power unless otherwise stated.

The EUT was powered by a -48V DC Power supply.

LTE

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
A	LTE	1	1.4 MHz	869.7	881.5	893.3
	LTE	1	3.0 MHz	870.5	881.5	892.5
	LTE	1	5 MHz	871.5	881.5	891.5
	LTE	1	10 MHz	874.0	881.5	889.0
B	LTE	2	1.4 MHz	869.7 + 893.3	-	-
	LTE	2	3.0 MHz	870.5 + 892.5	-	-
	LTE	2	5 MHz	871.5 + 891.5	-	-
	LTE	2	10 MHz	874.0 + 889.0	-	-
C	LTE	6	1.4 MHz	869.7 + 871.1 + 872.5 + 890.5 + 891,9 + 893.3	-	-
	LTE	6	3.0 MHz	870.5 + 873.5 + 876.5 + 886.5 + 889.5 + 892.5	-	-
	LTE	5	5 MHz	871.5 + 876.5 + 881.5 + 886.5 + 891.5	-	-

NBIOT LTE

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
D	LTE	1	5 MHz	871.5	881.5	891.5
	LTE	1	10 MHz	874.0	881.5	889.0

WCDMA

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
E	WCDMA	1	5 MHz	871.4	881.6	891.6
F	WCDMA	2	5 MHz	871.4 + 891.6	-	-
G	WCDMA	5	5 MHz	871.4 + 876.4 + 881.4 + 886.6 + 891.6	-	-

WCDMA +LTE

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
H	W+L	2	5MHz and 3MHz	871.4 (W) + 892.5 (L)	-	-
I	W+L	6	5MHz and 3MHz	871.4 (W) + 876.4 (W) + 881.4 (W) +886.5 (L) + 889.5 (L) + 892.5 (L)	-	-

GSM +LTE

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
J	G+L	2	0.2 MHz and 3MHz	869.2 (G) + 892.5 (L)	-	-
K	G+L	6	0.2 MHz and 3MHz	869.2 (G) + 869.4 (G) + 880.0 (L) + 883.0 (L) + 893.6 (G) + 893.8 (G)	-	-

GSM +WCDMA

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
L	G+W	2	0.2 MHz and 5MHz	869.2 (G) + 891.6 (W)	-	-
M	G+W	6	0.2 MHz and 5MHz	869.2 (G) + 869.4 (G) + 879.1 (W) + 884.1 (W) + 893.6 (G) + 893.8 (G)	-	-

GSM

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
N	GSM	1	0.2 MHz	869.2	881.6	893.8

1.4 DECLARATION OF BUILD STATUS

MANUFACTURING DESCRIPTION	Radio Unit
MANUFACTURER	Ericsson AB
TYPE	Radio 2212 B5
PART NUMBER	KRC 161 652/1, KRC 161 652/2
SERIAL NUMBER	D824847243
HARDWARE VERSION	R1A
SOFTWARE VERSION	CXP 901 7316/7, R64HE
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	B5, TX DL: 824-849 MHz
RECEIVER FREQUENCY OPERATING RANGE (MHz)	B5, RX UL: 869-894 MHz
COUNTRY OF ORIGIN	Sweden
INTERMEDIATE FREQUENCIES	--
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	See below
MODULATION TYPES: (i.e. phase mod, amplitude mod or comb thereof…)	Combination of phase and amplitude modulation
HIGHEST INTERNALLY GENERATED FREQUENCY	Carrier frequency 894 MHz CPRI 9.8 Gbps
OUTPUT POWER (W or dBm)	2 ports, total max 80 W (49 dBm) per port, Max total carriers per port UL: 12 Max total carriers per port DL: 6 SR/SC: L max carriers: 6 W max carriers: 5 G max carriers: 4 L>3 MHz, W: 80 W (49 dBm) per port L 1.4 and 3 MHz: 40 W (46 dBm) per port G: 20 W (43 dBm) per port MR/MC: L max carriers: 5 W max carriers: 4 G max carriers: 4 L, W, G+W, G+L, W+L: 80 W (49 dBm) per port L 1.4 and 3 MHz: 40 W (46 dBm) per port G: 20 W (43 dBm) per port
FCC ID	See below
INDUSTRY CANADA ID	See below
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	See below
BATTERY/POWER SUPPLY	
MANUFACTURING DESCRIPTION	
MANUFACTURER	
TYPE	
PART NUMBER	
VOLTAGE	-48 VDC
COUNTRY OF ORIGIN	

MODULES (if applicable)		
MANUFACTURING DESCRIPTION	Radio Unit	
MANUFACTURER	Ericsson AB	
TYPE	Radio 2212 B5	
POWER	48 VDC	
FCC ID	TA8AKRC161652	
COUNTRY OF ORIGIN	Sweden	
INDUSTRY CANADA ID	287AB-AS161652	
EMISSION DESIGNATORs	**FCC** **GSM:** 250KGXW, 250KG7W **WCDMA:** 5MHz 5M00F9W LTE: 1.4MHz 1M40W7D 3MHz 3M00W7D 5MHz 5M00W7D 10MHz 10M0W7D	**ISED** **GSM:** 246KGXW, 249KG7W **WCDMA:** 5MHz 4M18F9W **LTE:** 1.4MHz 1M10W7D 3MHz 2M69 W7D 5MHz 4M50 W7D 10MHz 8M96 W7D
DHSS/FHSS/COMBINED OR OTHER		

Signature Lars Wallin Date 2017-03-21

No responsibility will be accepted by TÜV SÜD Product Service UK Limited as to the accuracy of the information declared in this document by the manufacturer.

1.5 PRODUCT INFORMATION

1.5.1 Technical Description

The Equipment Under Test (EUT) Radio 2212 B5 - KRC 161 652/2 is an Ericsson AB Radio Unit working in the public mobile service (Band) band which provides communication connections to (Band) network. The Radio 2212 B5 - KRC 161 652/2 operates from a -48V DC supply.

A full technical description can be found in the Manufacturer's documentation.

1.6 TEST SETUP– BLOCK DIAGRAM (ROOM TEMPERATURE, NON-NB_IOT)

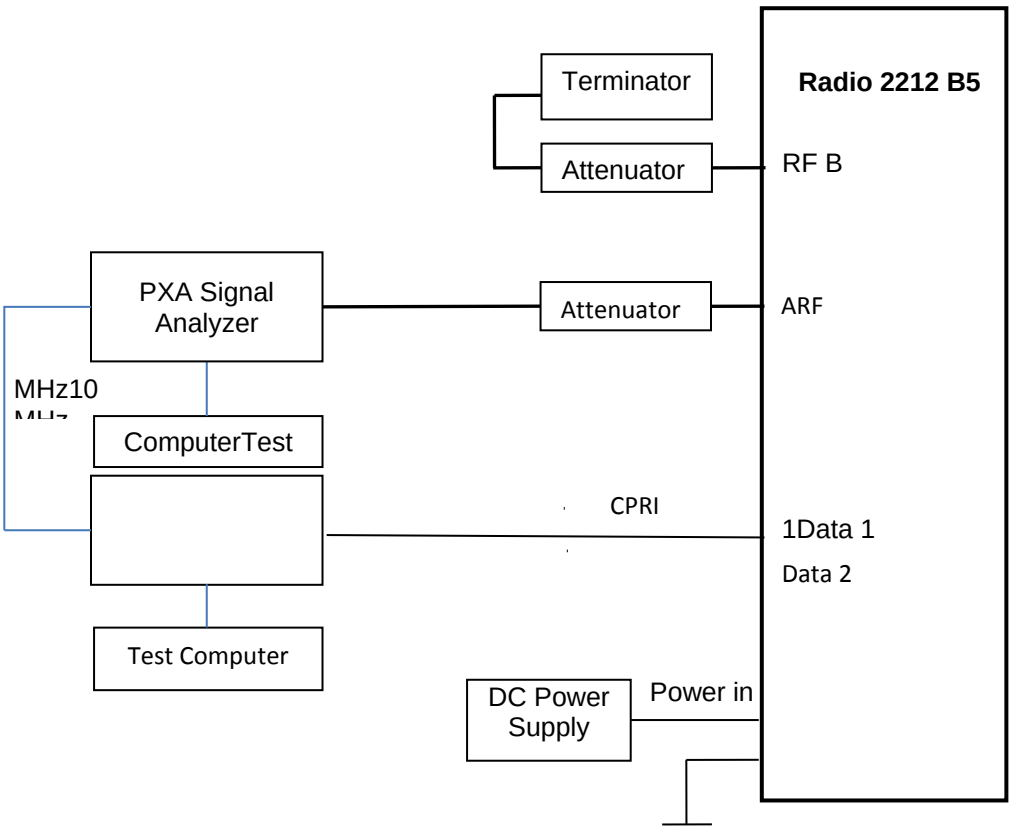


Figure 1, Block diagram of Radio 2212 B5 with cables and auxiliary equipment

Test setup – block diagram (climate chamber NON-NB_IoT)

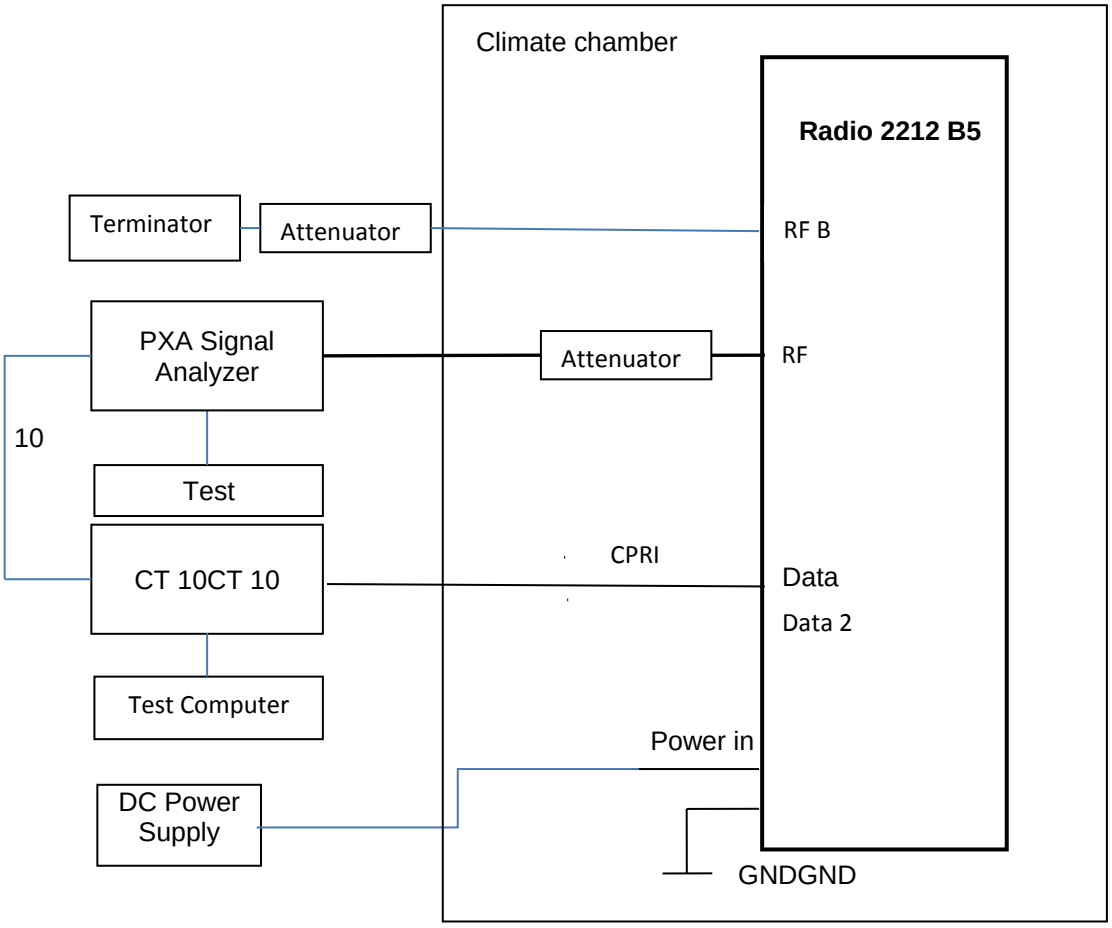


Figure 2, Block diagram of Radio 2212 B5 with cables and auxiliary equipment

Test setup – block diagram (Room temperature, NB_IoT)

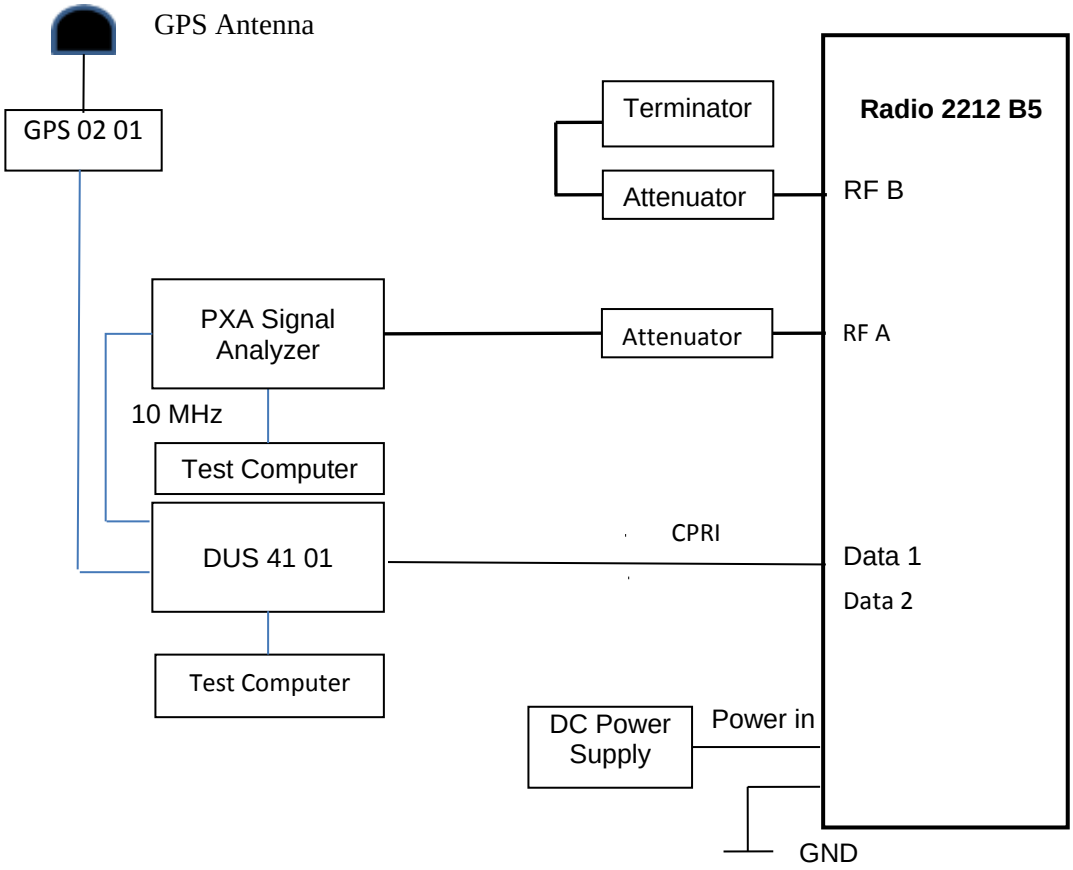


Figure 3, Block diagram of Radio 2212 B5 with cables and auxiliary equipment

Test setup – block diagram (Climate chamber, NB_IoT)

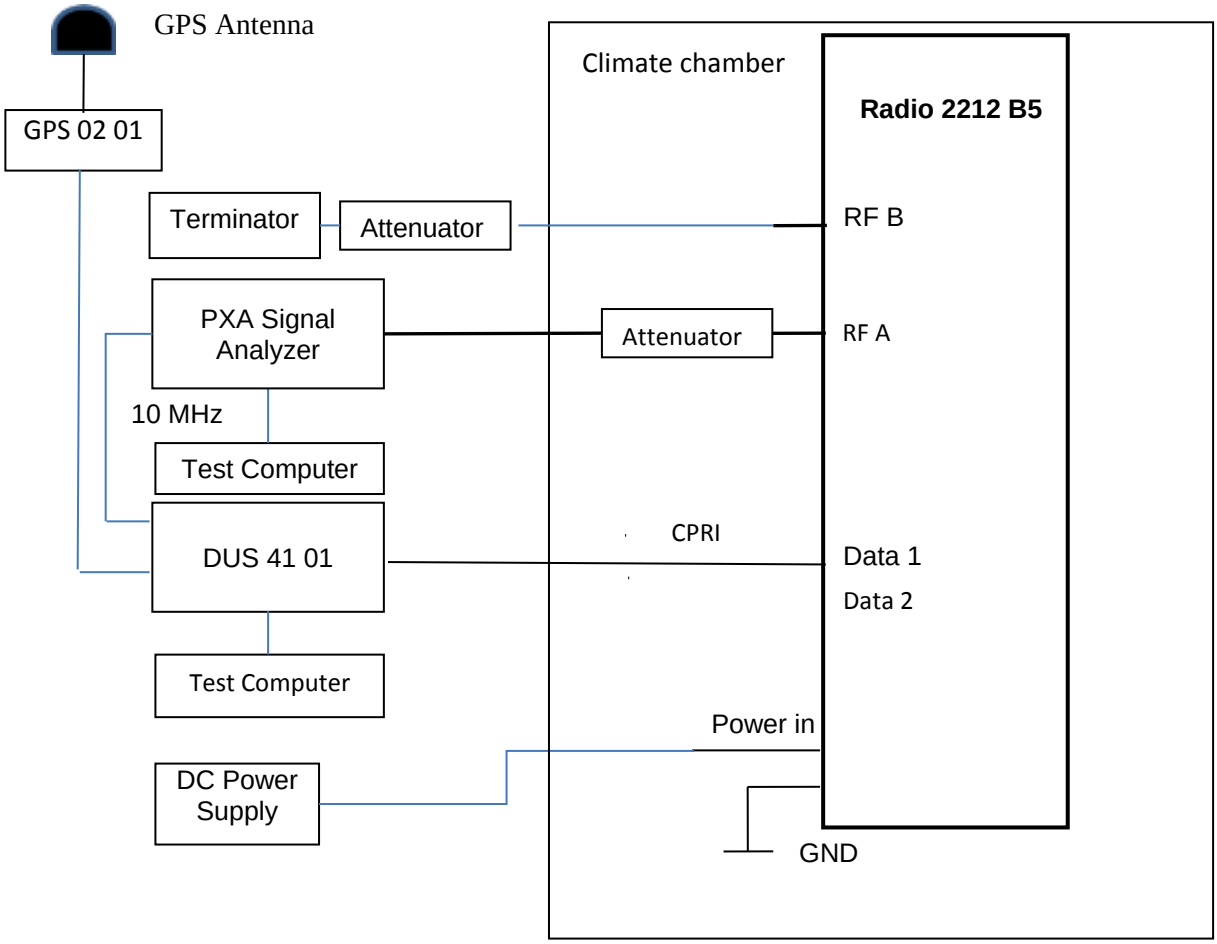


Figure 4, Block diagram of Radio 2212 B5 with cables and auxiliary equipment

1.7 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or a chamber as appropriate.

The EUT was powered from a -48V DC supply.

1.8 DEVIATION FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.9 MODIFICATION RECORD

No modifications were made to the EUT during testing.

1.10 ALTERNATIVE TEST SITE

Under our group UKAS Accreditation, TÜV SÜD Product Service conducted the tests at Ericsson in Kista, Sweden.

1.11 ADDITIONAL INFORMATION

Testing to show compliance of the RBS 6601 using Radio 2212 B5 with and without monitor port KRC 161 652/1 and KRC 161 652/2. Ericsson declare that the Radio 2212 B5 with monitor port KRC 161 652/1 is equivalent in Radio performance terms and as such no extra testing is required to prove conformity.

SECTION 2

TEST DETAILS

2.1 MAXIMUM PEAK OUTPUT POWER AND PEAK TO AVERAGE RATIO - CONDUCTED

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
FCC CFR 47 Part 22, Clause 22.913(a)
Industry Canada RSS-132, Clause 5.4

2.1.2 Date of Test and Modification State

01, 02, 03, 06, 07, 10 and 14 February 2017 - Modification State 0

2.1.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.4 Environmental Conditions

Ambient Temperature	22.5 - 23.7°C
Relative Humidity	11.7 - 18.7%

2.1.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01 and summed in accordance with FCC KDB 662911 D01.

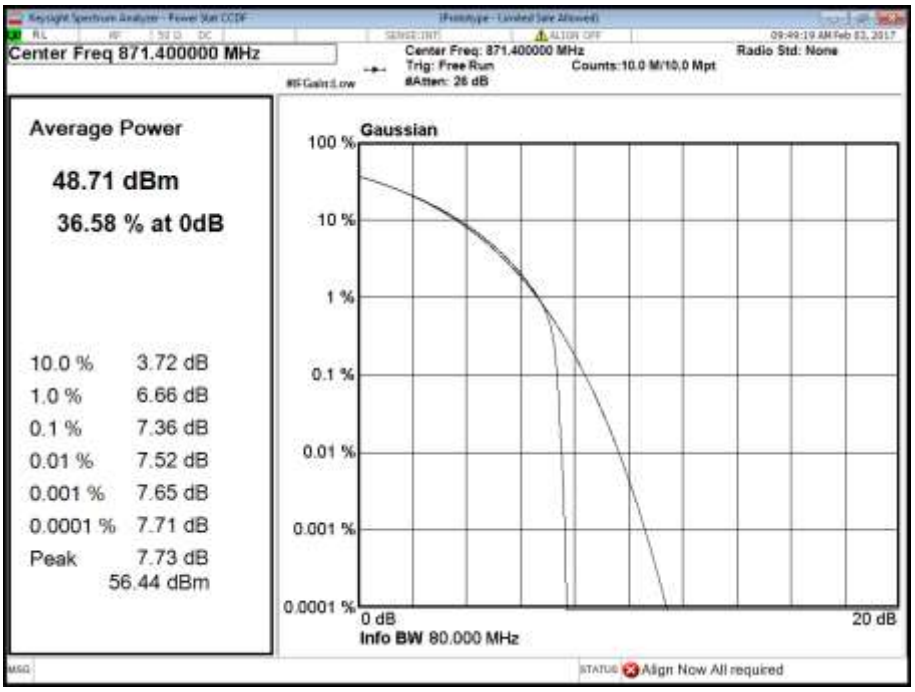
2.1.6 Test Results

Configuration E

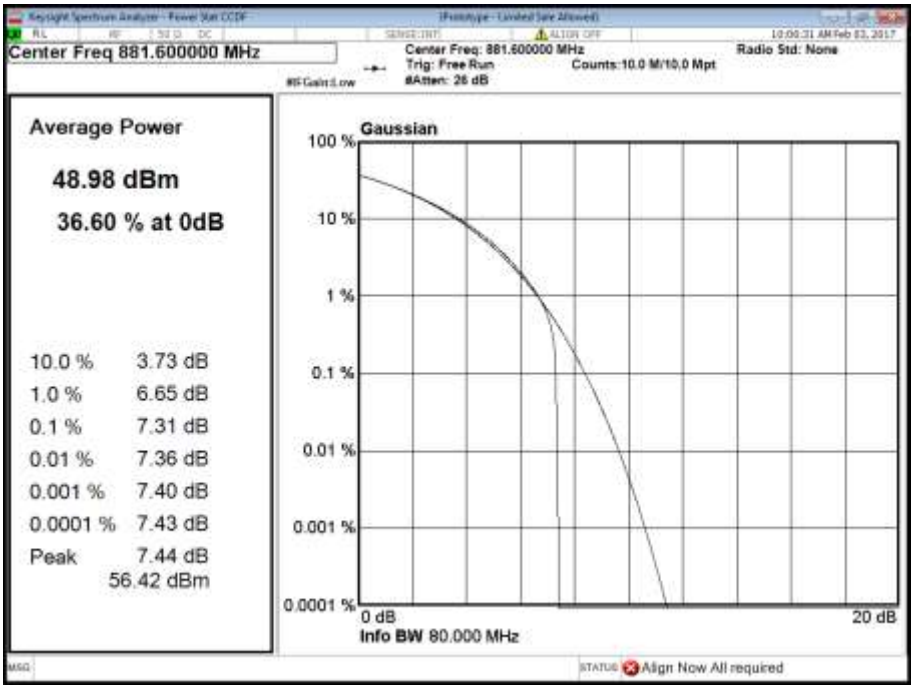
Maximum Output Power 49 dBm

Modulation	Carrier Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position B			Channel Position M			Channel Position T		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	5.0	A	7.36	47.63	42.44	7.31	47.95	42.63	7.39	47.39	42.13
	5.0	B	7.35	47.69	42.45	7.29	48.04	42.74	7.38	47.56	42.30
Total			-	50.67	45.46	-	51.01	45.70	-	50.49	45.23

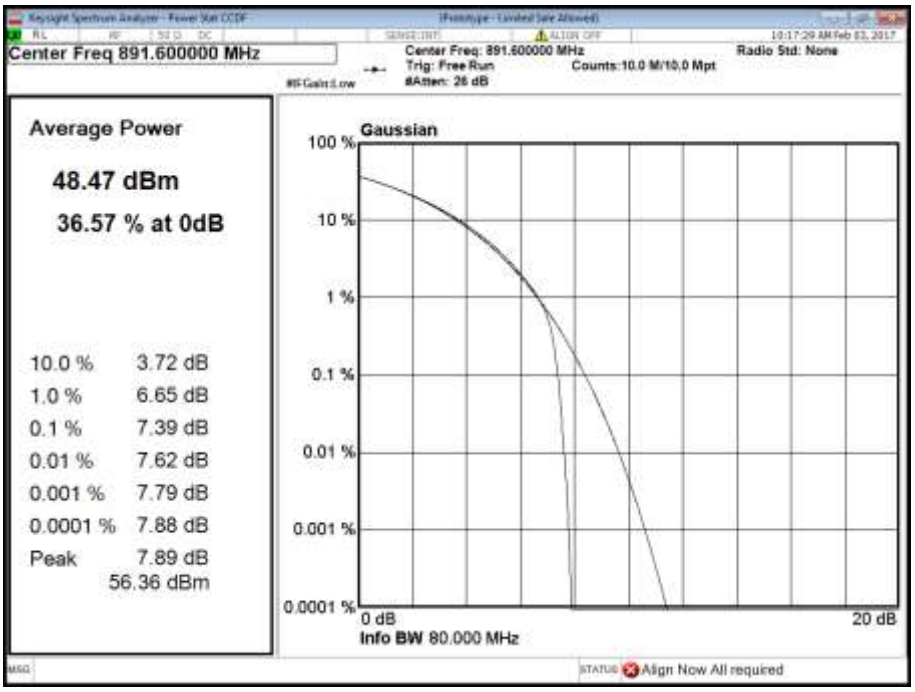
Antenna A - Channel Position B - Bandwidth 5.0 MHz - Modulation QPSK



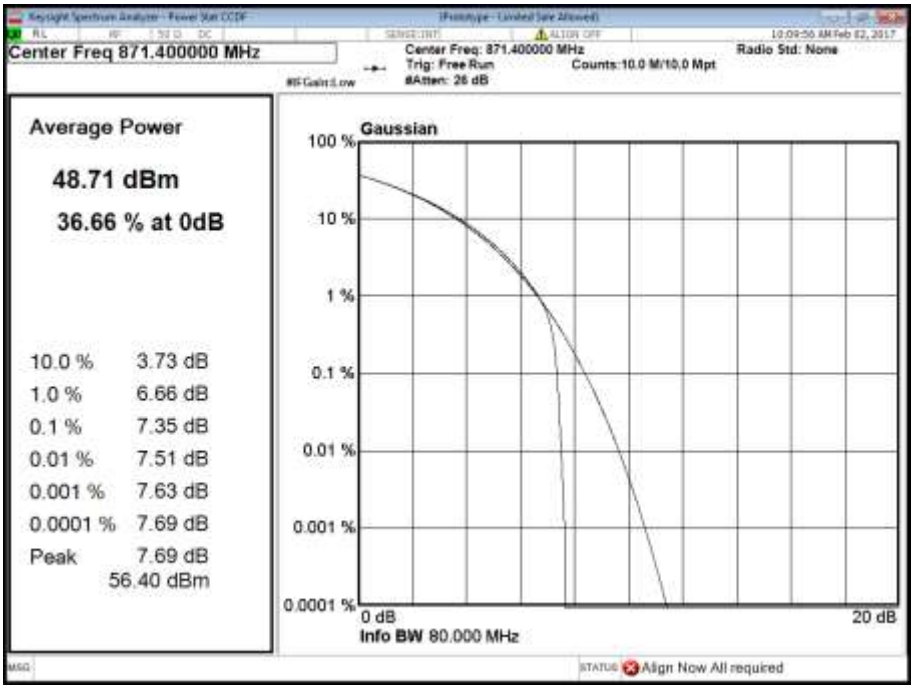
Antenna A - Channel Position M - Bandwidth 5.0 MHz - Modulation QPSK



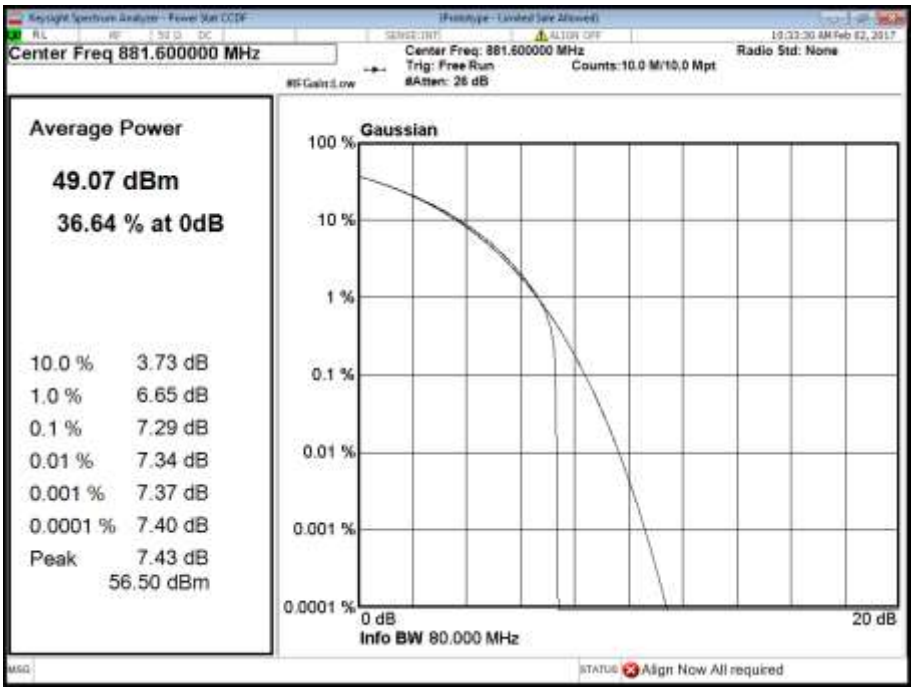
Antenna A - Channel Position T - Bandwidth 5.0 MHz - Modulation QPSK



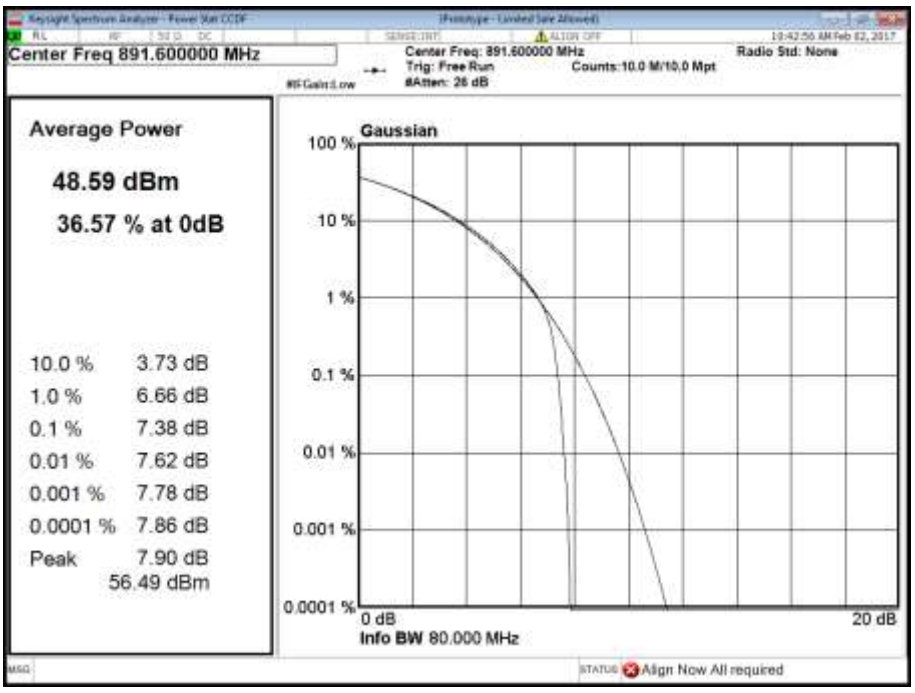
Antenna B - Channel Position B - Bandwidth 5.0 MHz - Modulation QPSK



Antenna B - Channel Position M - Bandwidth 5.0 MHz - Modulation QPSK



Antenna B - Channel Position T - Bandwidth 5.0 MHz - Modulation QPSK



Configuration F

Maximum Output Power 49 dBm

Modulation	Carrier Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position B			Channel Position M			Channel Position T		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	5.0	A	-	47.58	39.69	-	-	-	-	-	-
	5.0	B	-	47.67	39.78	-	-	-	-	-	-
Total			-	50.64	42.75	-	-	-	-	-	-

Configuration G

Maximum Output Power 49 dBm

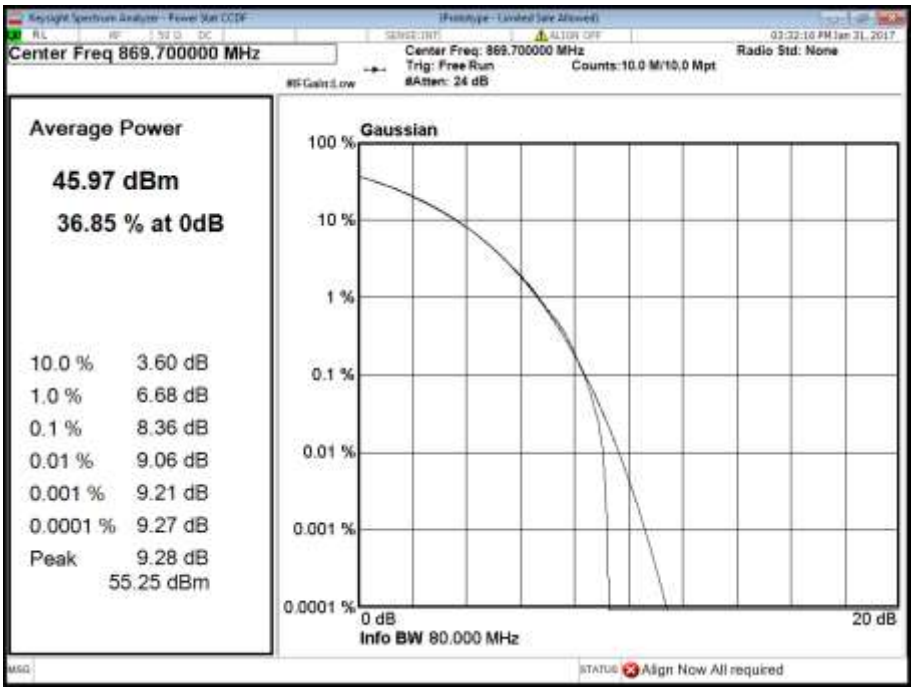
Modulation	Carrier Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position B			Channel Position M			Channel Position T		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	5.0	A	-	47.82	36.07	-	-	-	-	-	-
	5.0	B	-	47.93	35.99	-	-	-	-	-	-
Total			-	50.89	39.04	-	-	-	-	-	-

Configuration A

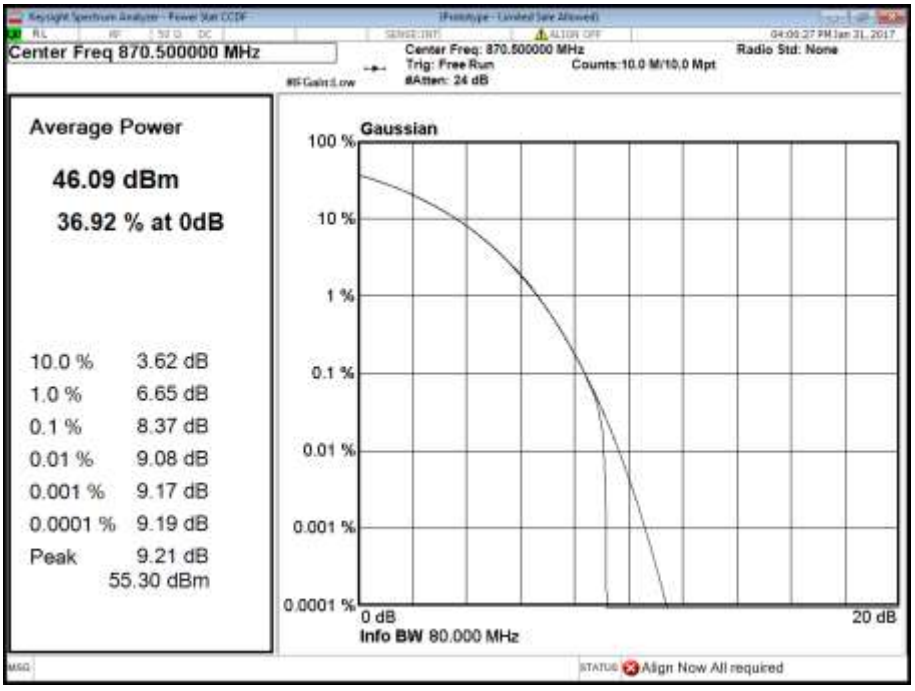
Maximum Output Power 49 dBm

Modulation	Carrier Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position B			Channel Position M			Channel Position T		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	1.4	A	8.36	44.86	44.36	8.38	44.83	44.34	8.38	44.46	44.01
QPSK	3.0	A	8.37	45.05	41.31	8.34	44.94	41.19	8.37	44.80	41.22
QPSK	5.0	A	7.32	47.68	41.70	7.28	47.98	41.89	7.36	47.47	41.60
	5.0	B	7.31	47.59	41.67	7.27	48.05	42.08	7.33	47.57	41.69
Total			-	50.65	44.70	-	51.03	45.00	-	50.53	44.66
QPSK	10.0	A	7.38	47.87	39.21	7.26	47.97	39.20	7.43	47.78	39.30

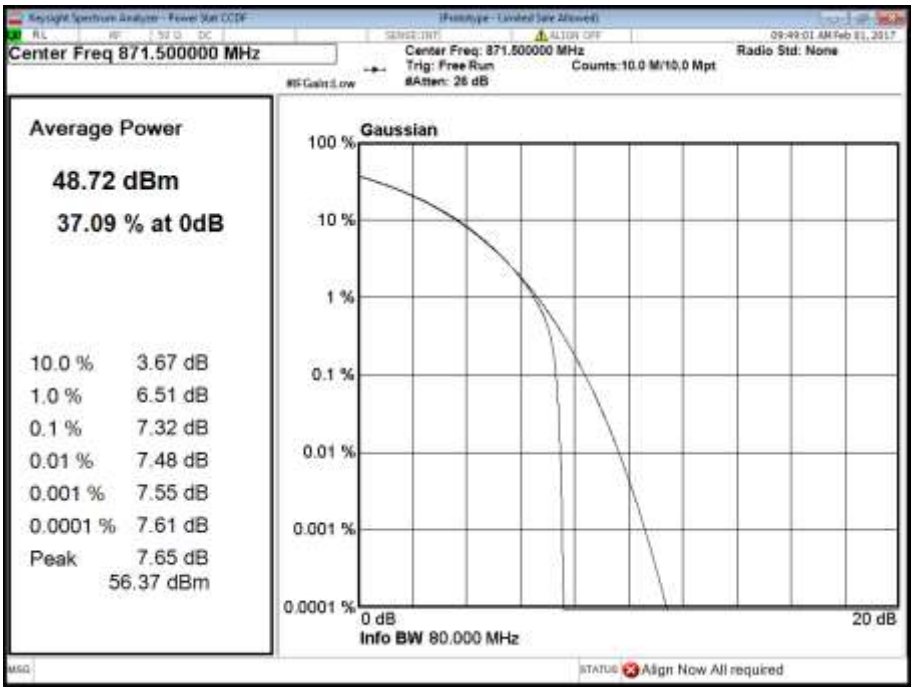
Antenna A - Channel Position B - Bandwidth 1.4 MHz - Modulation QPSK



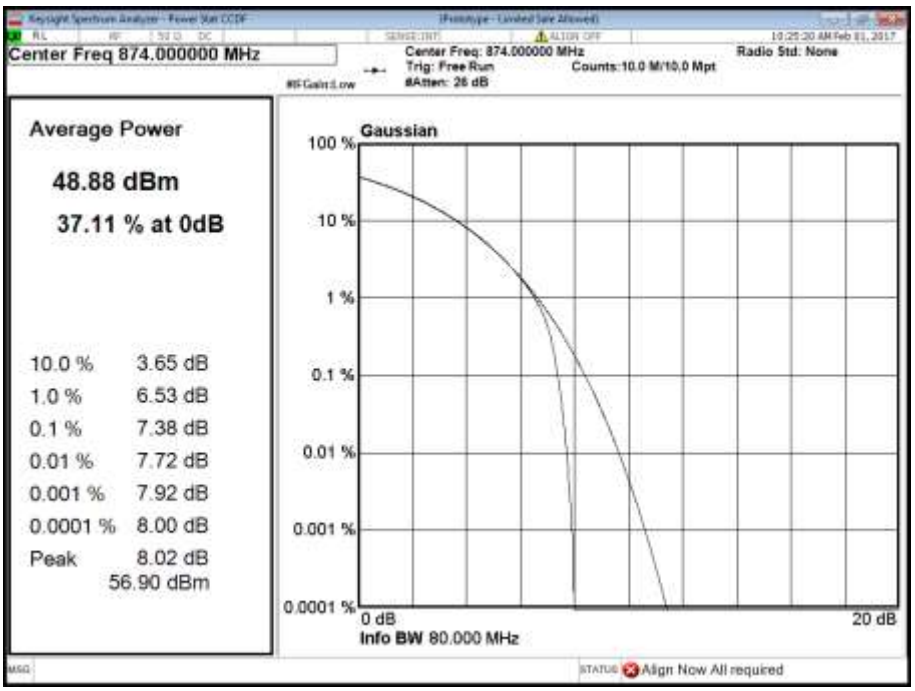
Antenna A - Channel Position B - Bandwidth 3.0 MHz - Modulation QPSK



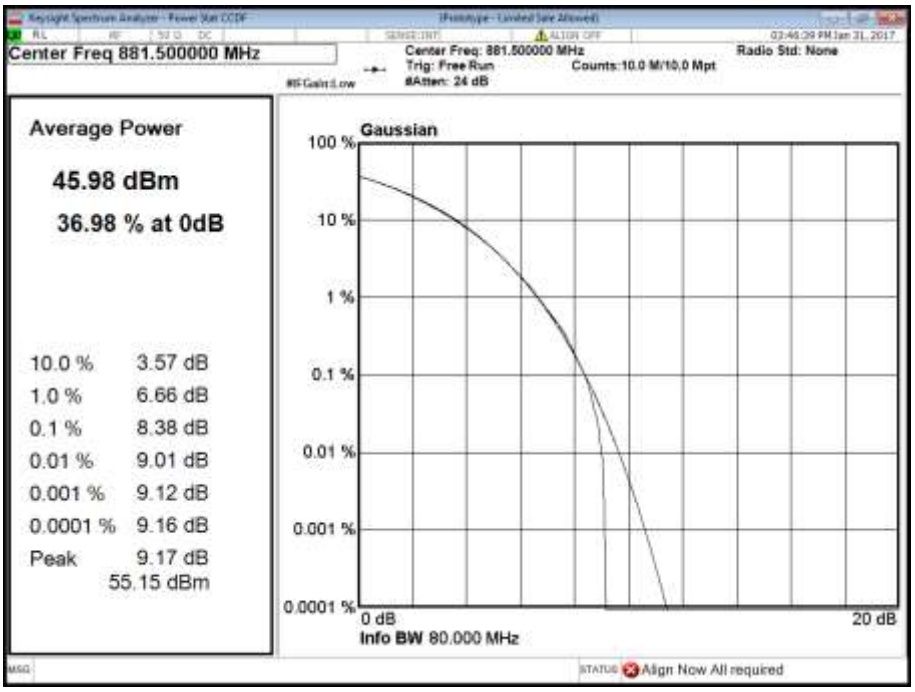
Antenna A - Channel Position B - Bandwidth 5.0 MHz - Modulation QPSK



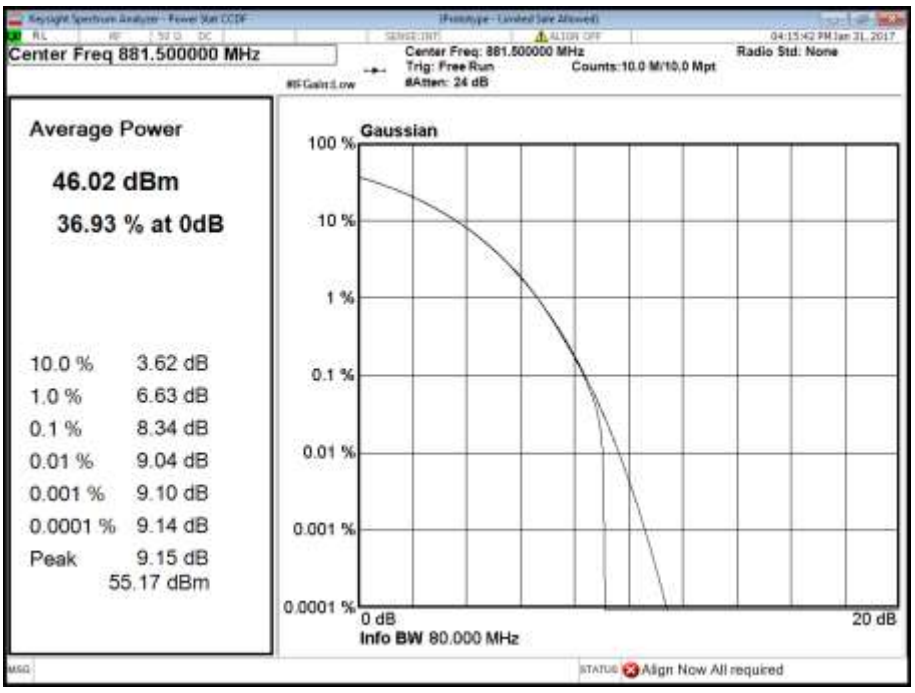
Antenna A - Channel Position B - Bandwidth 10.0 MHz - Modulation QPSK



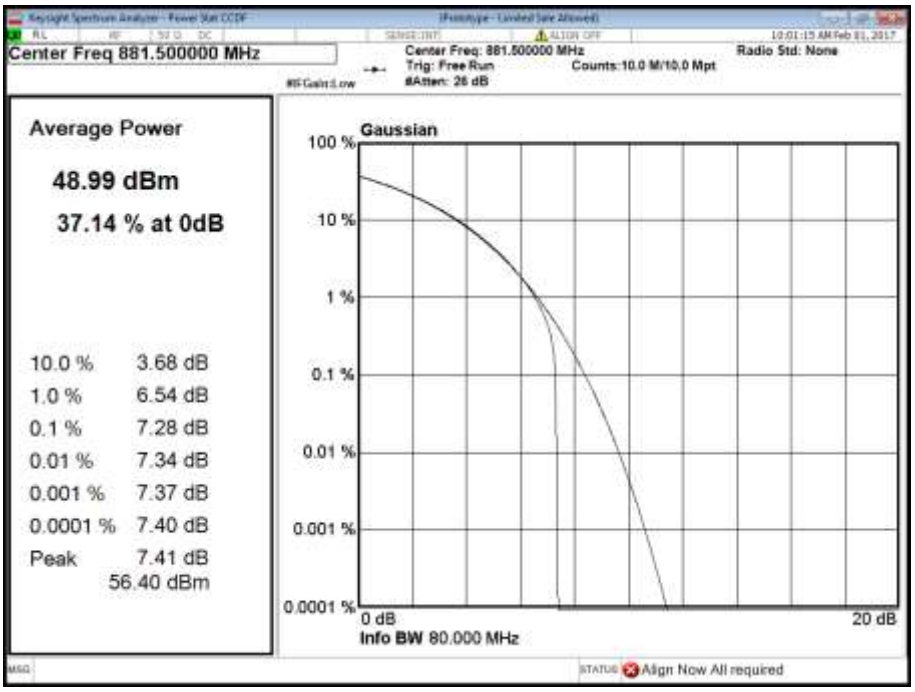
Antenna A - Channel Position M - Bandwidth 1.4 MHz - Modulation QPSK



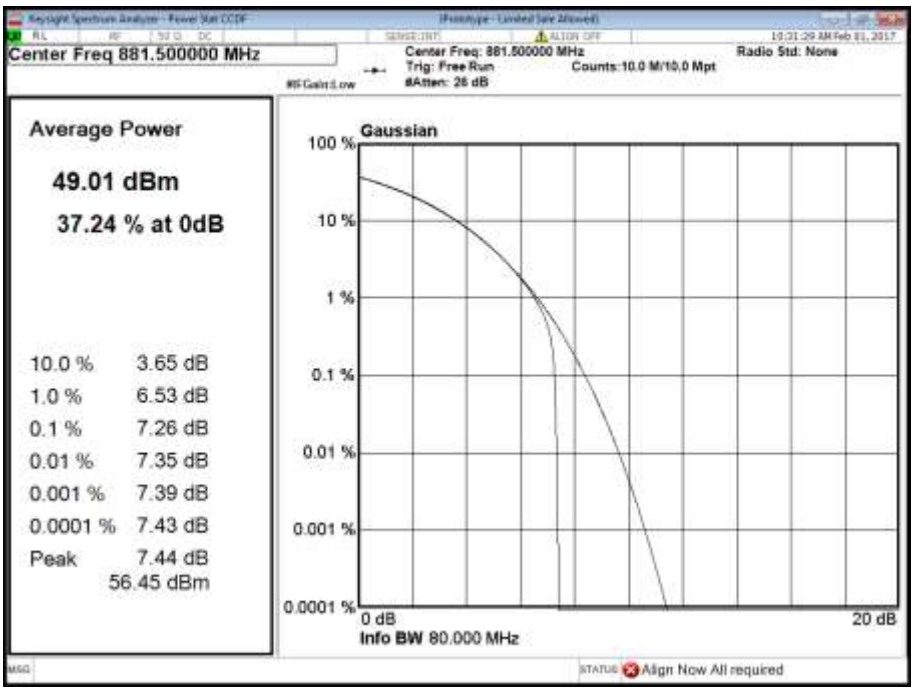
Antenna A - Channel Position M - Bandwidth 3.0 MHz - Modulation QPSK



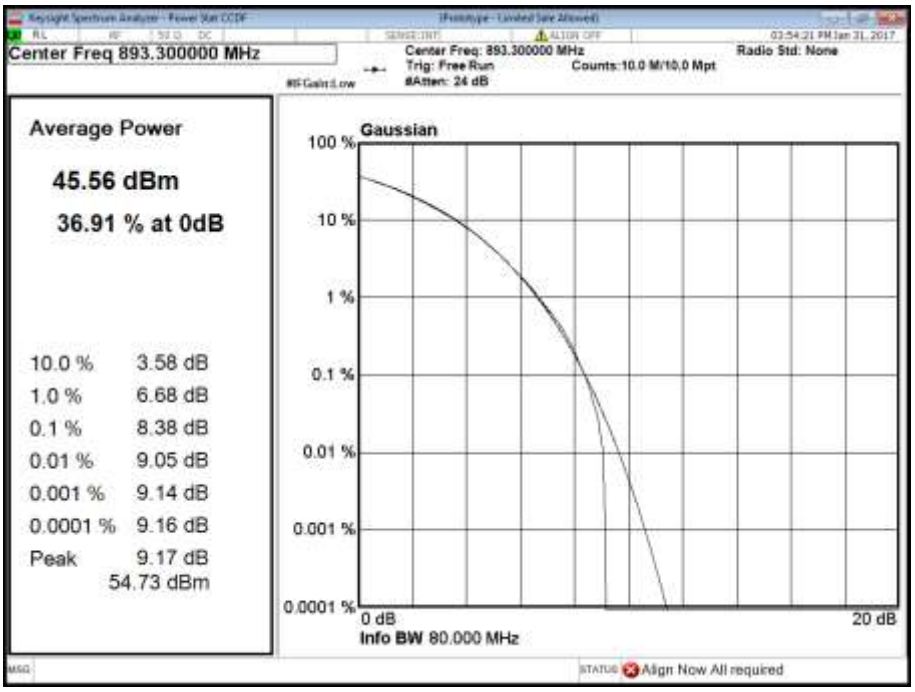
Antenna A - Channel Position M - Bandwidth 5.0 MHz - Modulation QPSK



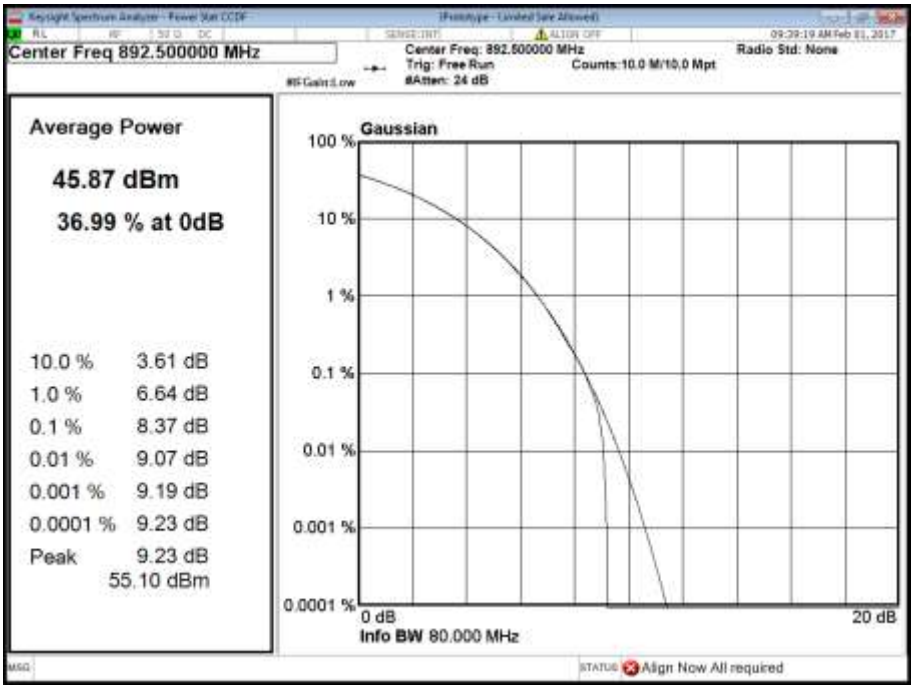
Antenna A - Channel Position M - Bandwidth 10.0 MHz - Modulation QPSK



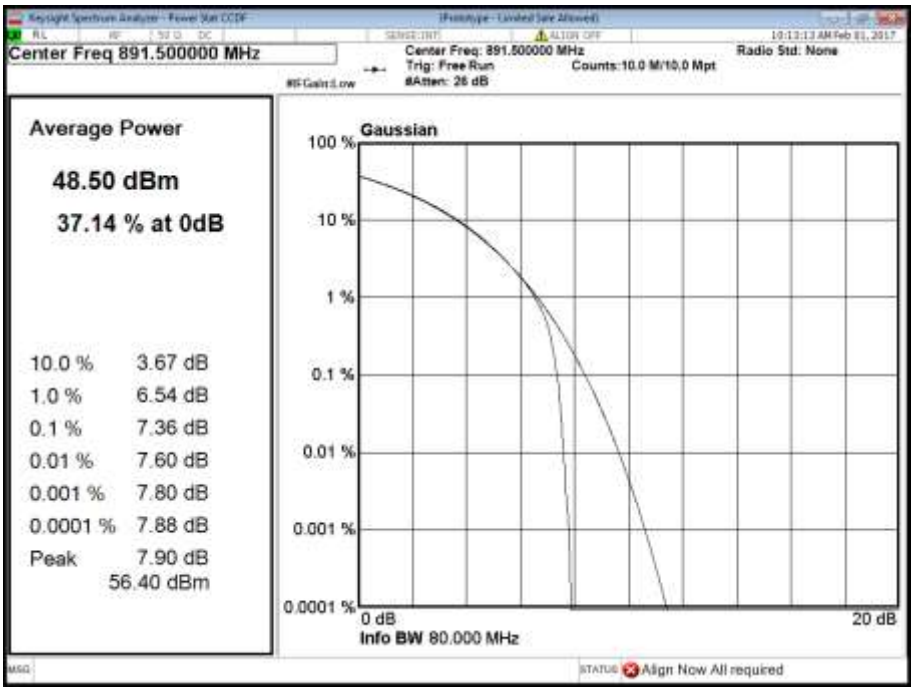
Antenna A - Channel Position T - Bandwidth 1.4 MHz - Modulation QPSK



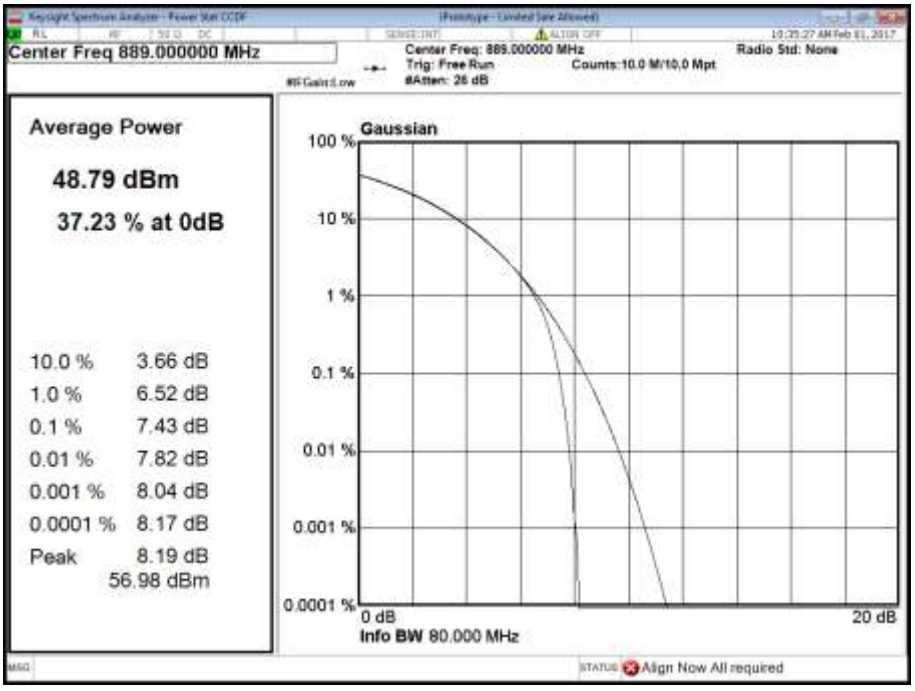
Antenna A - Channel Position T - Bandwidth 3.0 MHz - Modulation QPSK



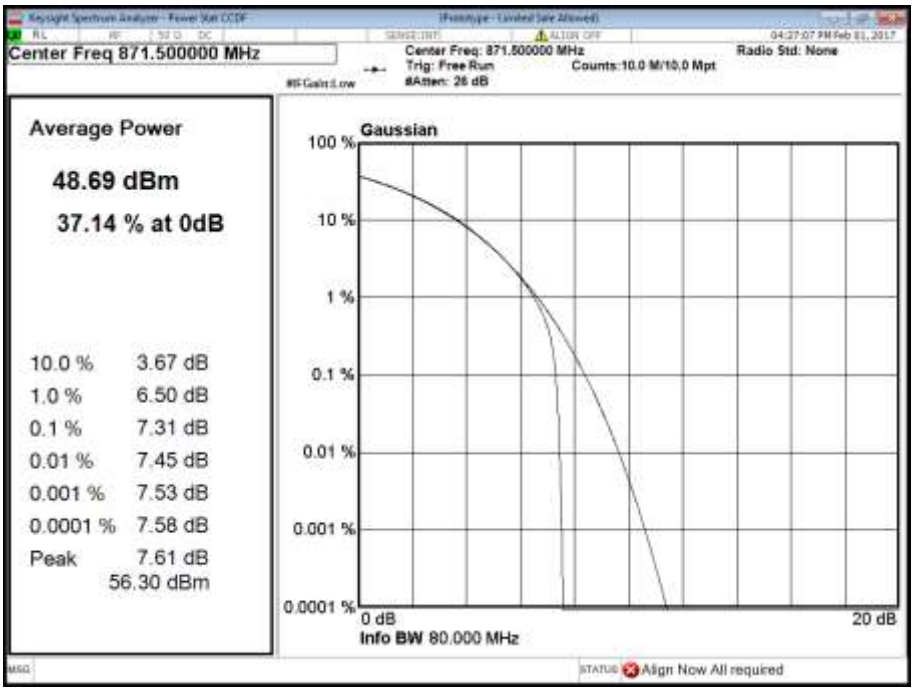
Antenna A - Channel Position T - Bandwidth 5.0 MHz - Modulation QPSK



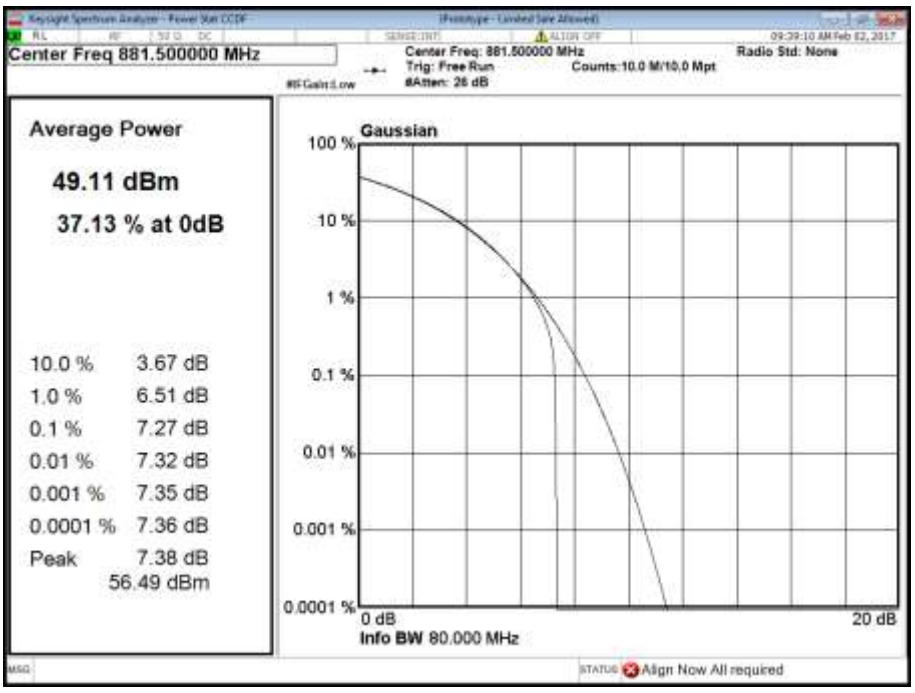
Antenna A - Channel Position T - Bandwidth 10.0 MHz - Modulation QPSK



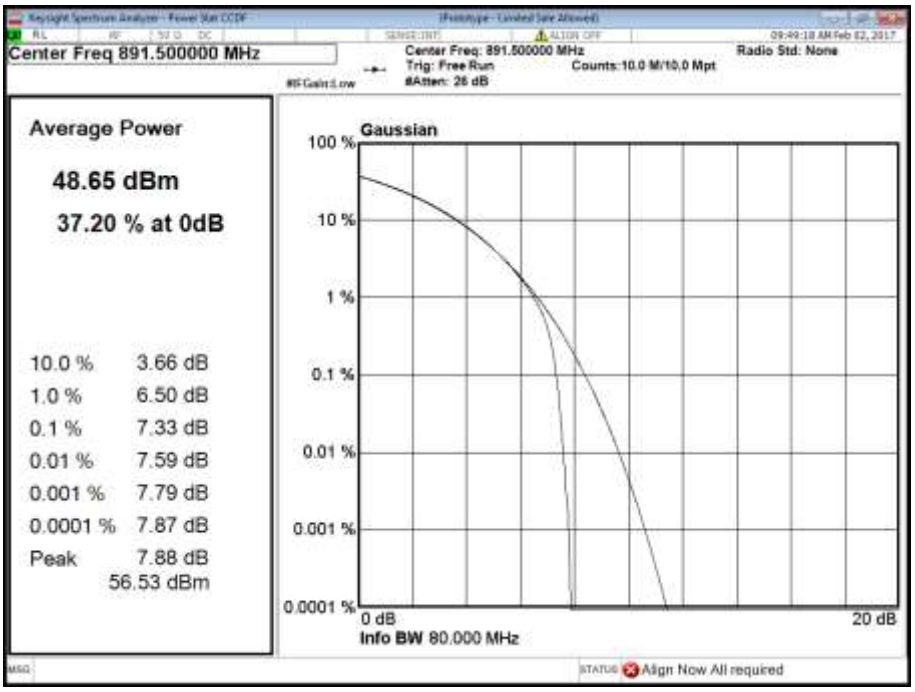
Antenna B - Channel Position B - Bandwidth 5.0 MHz - Modulation QPSK



Antenna B - Channel Position M - Bandwidth 5.0 MHz - Modulation QPSK



Antenna B - Channel Position T - Bandwidth 5.0 MHz - Modulation QPSK



Configuration B

Maximum Output Power 49 dBm

Modulation	Carrier Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position B			Channel Position M			Channel Position T		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	1.4	A	-	44.67	40.75	-	44.65	40.84	-	44.45	41.06
QPSK	3.0	A	-	44.76	38.11	-	44.73	38.17	-	44.64	38.40
QPSK	5.0	A	-	47.63	39.18	-	-	-	-	-	-
QPSK	10.0	A	-	47.80	36.18	-	-	-	-	-	-

Configuration C

Maximum Output Power 49 dBm

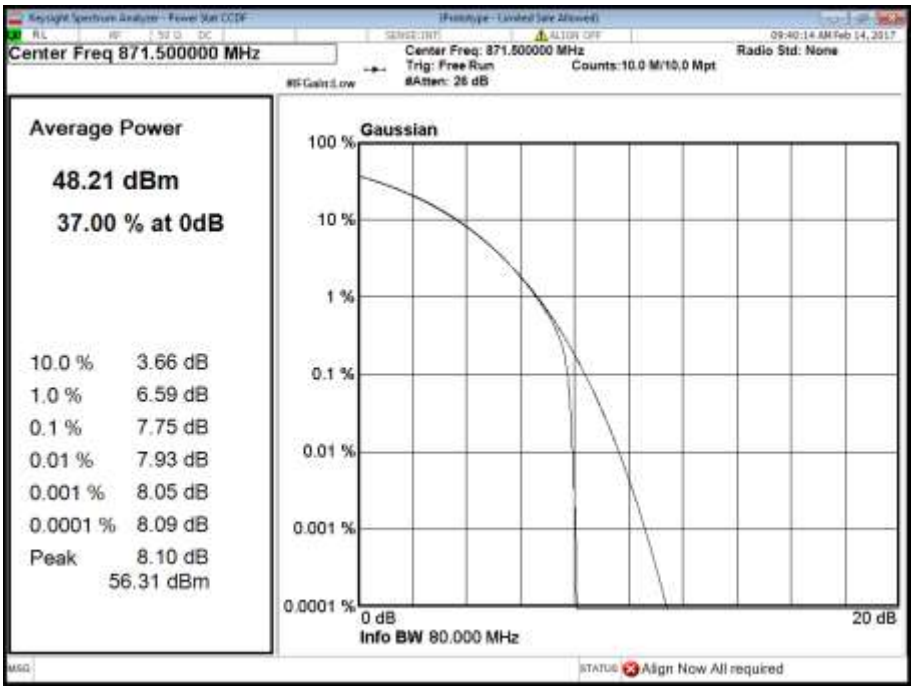
Modulation	Carrier Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position B			Channel Position M			Channel Position T		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	1.4	A	-	44.57	36.43	-	44.55	36.59	-	44.47	36.74
QPSK	3.0	A	-	44.96	33.57	-	44.93	33.54	-	44.88	33.64
QPSK	5.0	A	-	47.75	35.07	-	-	-	-	-	-

Configuration D

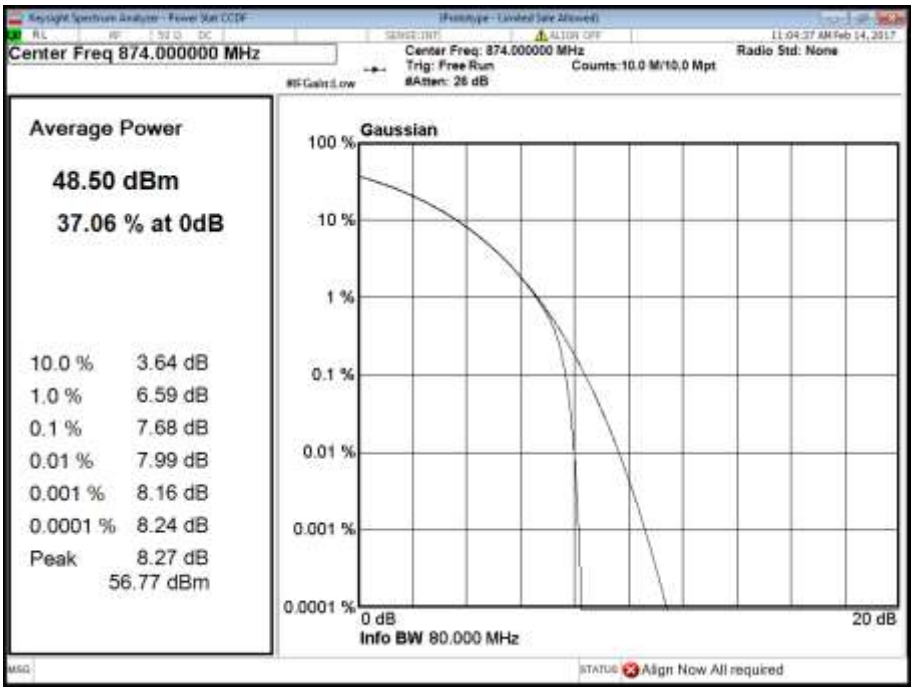
Maximum Output Power 46 dBm

Modulation	Carrier Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position B			Channel Position M			Channel Position T		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	5.0	A	7.75	47.09	41.53	7.73	47.37	41.75	7.76	46.82	41.13
	5.0	B	7.74	47.92	42.35	7.72	48.29	42.64	7.74	47.77	42.07
Total			-	50.54	44.97	-	50.86	45.23	-	50.33	44.64
QPSK	10.0	A	7.68	47.44	39.01	7.62	47.56	39.16	7.70	48.13	39.90

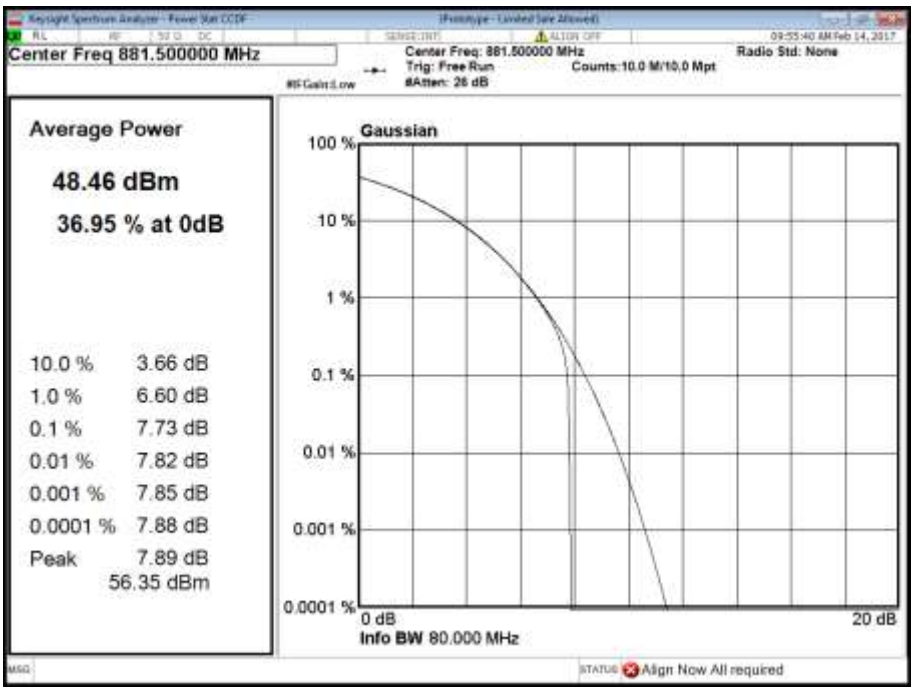
Antenna A - Channel Position B - Bandwidth 5.0 MHz - Modulation QPSK



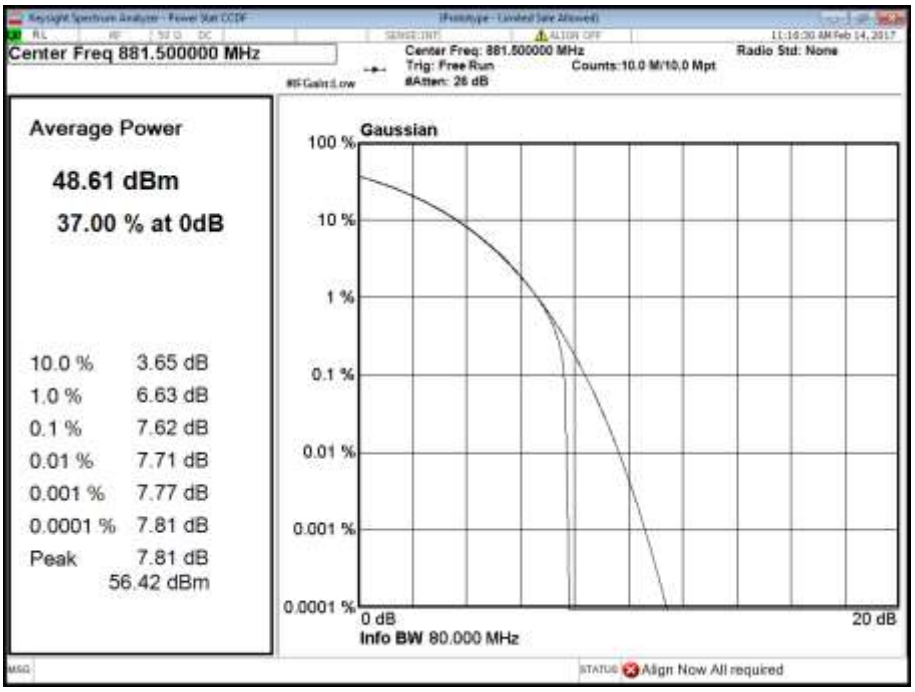
Antenna A - Channel Position B - Bandwidth 10.0 MHz - Modulation QPSK



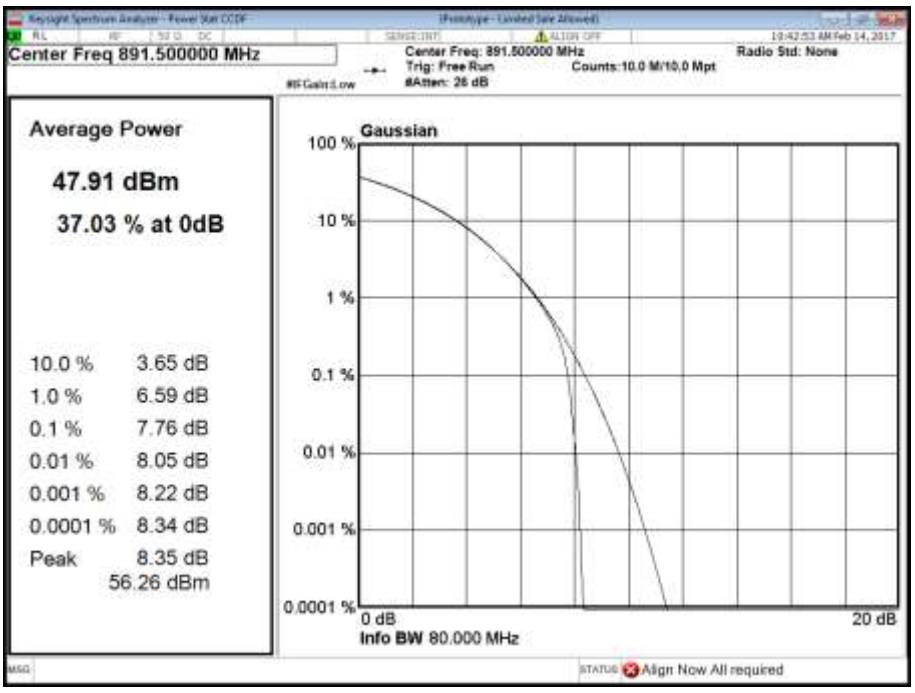
Antenna A - Channel Position M - Bandwidth 5.0 MHz - Modulation QPSK



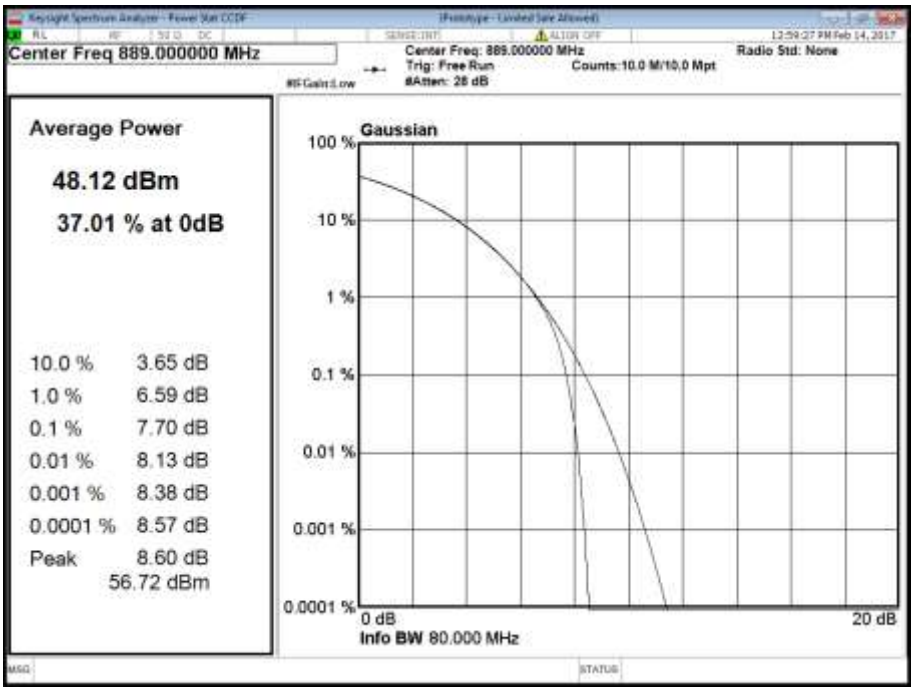
Antenna A - Channel Position M - Bandwidth 10.0 MHz - Modulation QPSK



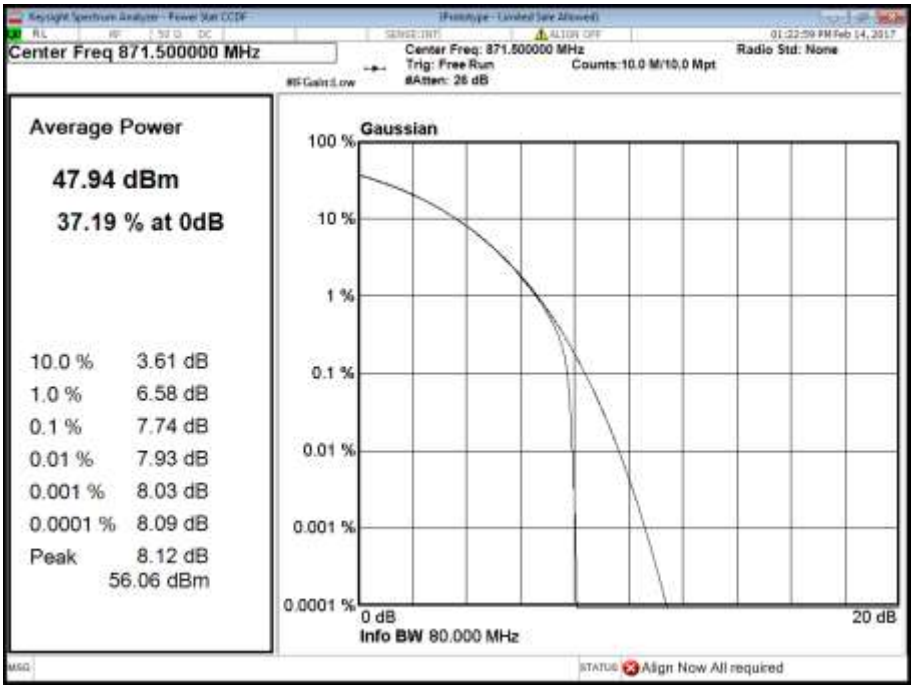
Antenna A - Channel Position T - Bandwidth 5.0 MHz - Modulation QPSK



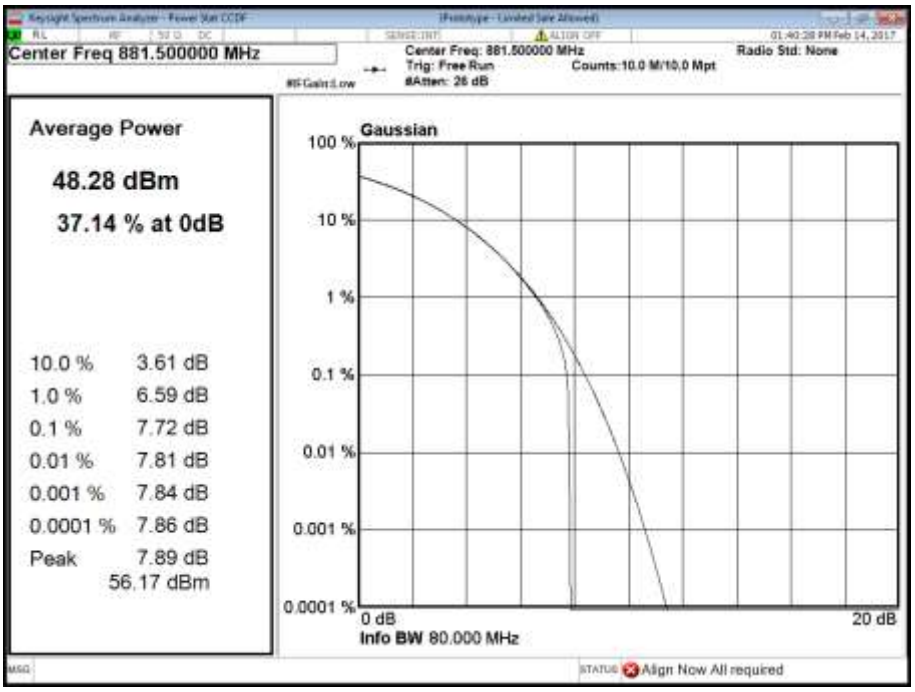
Antenna A - Channel Position T - Bandwidth 10.0 MHz - Modulation QPSK



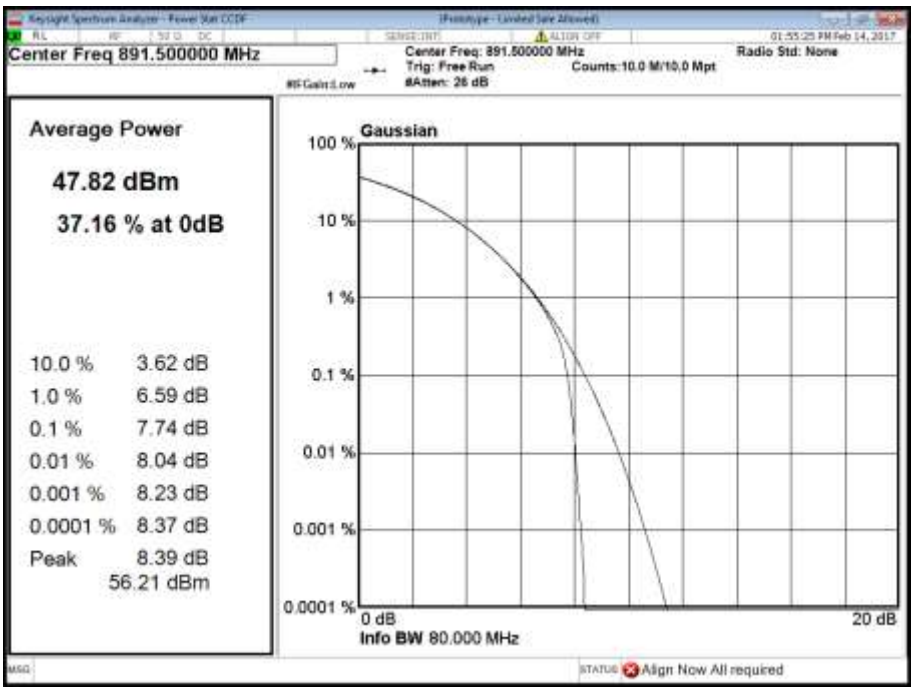
Antenna B - Channel Position B - Bandwidth 5.0 MHz - Modulation QPSK



Antenna B - Channel Position M - Bandwidth 5.0 MHz - Modulation QPSK



Antenna B - Channel Position T - Bandwidth 5.0 MHz - Modulation QPSK



Configuration L

Maximum Output Power 49 dBm

GSM Modulation	WCDMA Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position BRFBW			Channel Position MRFBW			Channel Position TRFBW		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
GMSK	5.0	A	-	47.27	41.48	-	-	-	-	-	-
	5.0	B	-	47.33	41.72	-	-	-	-	-	-
Total			-	50.31	44.61	-	-	-	-	-	-

Configuration M

Maximum Output Power 49 dBm

GSM Modulation	LTE Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position BRFBW			Channel Position MRFBW			Channel Position TRFBW		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
GMSK	3.0	A	-	47.08	42.31	-	-	-	-	-	-
	3.0	B	-	47.16	42.42	-	-	-	-	-	-
Total			-	50.13	45.38	-	-	-	-	-	-

Configuration J

Maximum Output Power 49 dBm

GSM Modulation	LTE Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position BRFBW			Channel Position MRFBW			Channel Position TRFBW		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
GMSK	3.0	A	-	46.43	41.33	-	46.35	41.88	-	46.13	41.88
	3.0	B	-	46.44	41.56	-	46.38	41.81	-	46.26	41.98
Total			-	49.45	44.46	-	49.38	44.86	-	49.21	44.94

Configuration K

Maximum Output Power 49dBm

GSM Modulation	LTE Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position BRFBW			Channel Position MRFBW			Channel Position TRFBW		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
GMSK	3.0	A	-	45.88	39.70	-	45.85	40.23	-	45.73	40.26
	3.0	B	-	45.96	39.92	-	45.96	40.11	-	45.90	40.25
Total			-	48.93	42.82	-	48.92	43.18	-	48.83	43.27

Configuration H

Maximum Output Power 49 dBm

WCDMA Modulation	LTE Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position BRFBW			Channel Position MRFBW			Channel Position TRFBW		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	3.0	A	-	47.48	40.43	-	-	-	-	-	-
	3.0	B	-	47.61	40.65	-	-	-	-	-	-
Total			-	50.56	43.55	-	-	-	-	-	-

Configuration I

Maximum Output Power 49 dBm

WCDMA Modulation	LTE Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position BRFBW			Channel Position MRFBW			Channel Position TRFBW		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	3.0	A	-	47.37	35.77	-	-	-	-	-	-
	3.0	B	-	47.50	36.06	-	-	-	-	-	-
Total			-	50.45	38.93	-	-	-	-	-	-

Configuration H

Maximum Output Power 49 dBm

WCDMA Modulation	LTE Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position BRFBW			Channel Position MRFBW			Channel Position TRFBW		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	3.0	A	-	47.48	40.43	-	-	-	-	-	-
	3.0	B	-	47.61	40.65	-	-	-	-	-	-
Total			-	50.56	43.55	-	-	-	-	-	-

Configuration I

Maximum Output Power 49 dBm

WCDMA Modulation	LTE Bandwidth (MHz)	Antenna	Peak to Average Ratio (PAR) / Output Power								
			Channel Position BRFBW			Channel Position MRFBW			Channel Position TRFBW		
			PAR (dB)	Average Power		PAR (dB)	Average Power		PAR (dB)	Average Power	
				dBm	dBm/MHz		dBm	dBm/MHz		dBm	dBm/MHz
QPSK	3.0	A	-	47.37	35.77	-	-	-	-	-	-
	3.0	B	-	47.50	36.06	-	-	-	-	-	-
Total			-	50.45	38.93	-	-	-	-	-	-

Limit	
Peak Power	≤500 W or ≤+57 dBm
Peak to Average Ratio	13 dB

2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049
FCC CFR 47 Part 22, Clause 22.917(b)
Industry Canada RSS-GEN, Clause 6.6

2.2.2 Date of Test and Modification State

01, 02, 03, 14 February and 03 March 2017 - Modification State 0

2.2.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.4 Environmental Conditions

Ambient Temperature	22.5 - 23.6°C
Relative Humidity	11.7 - 24.9%

2.2.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01.

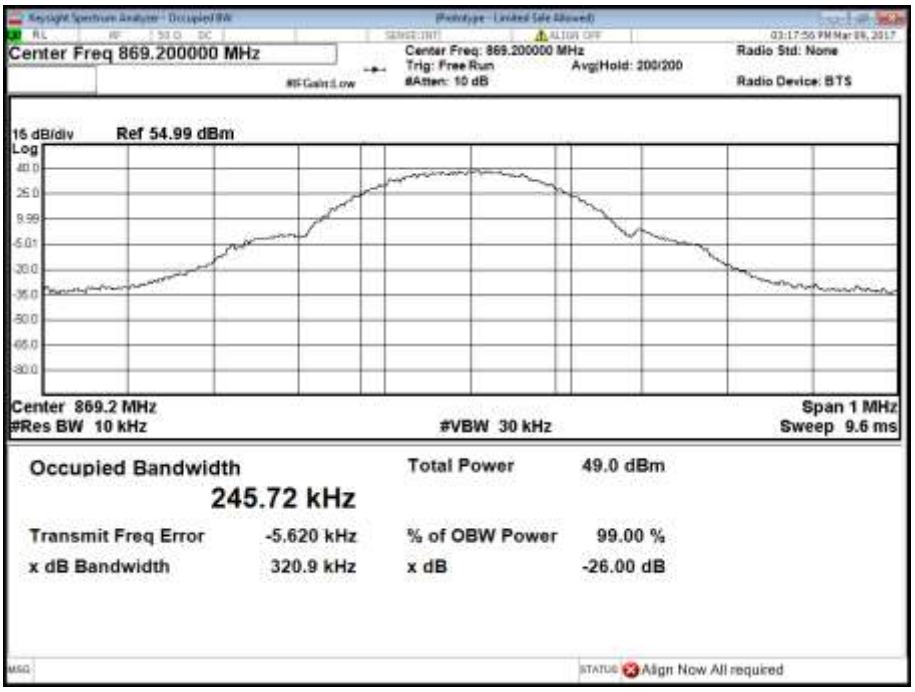
2.2.6 Test Results

Configuration N

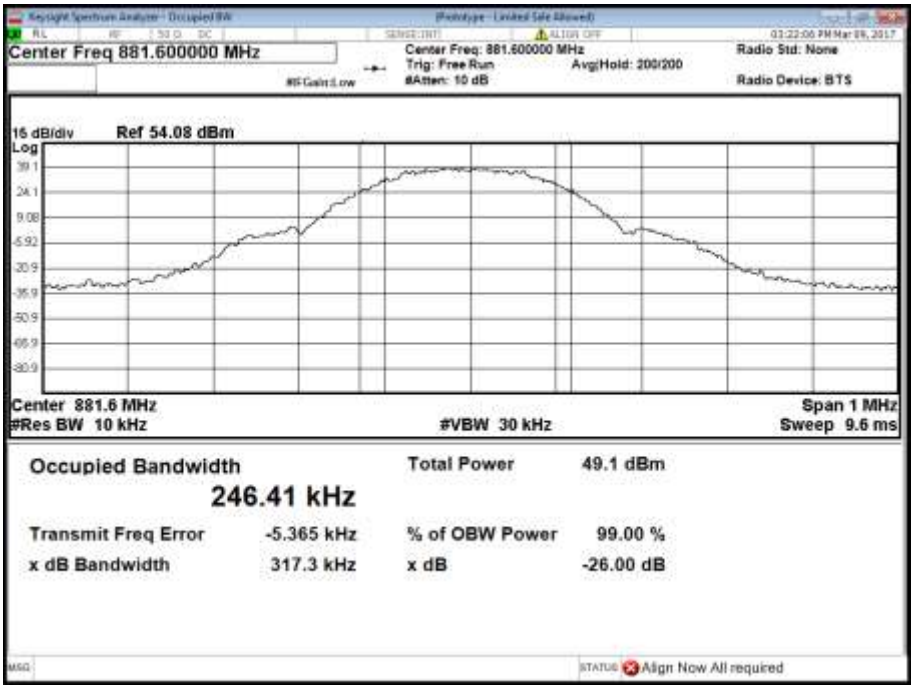
Maximum Output Power 43 dBm

Modulation	Result (KHz)					
	Channel Position B		Channel Position M		Channel Position T	
	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
GMSK	245.72	320.94	246.42	317.33	245.60	318.19
8PSK	247.58	321.02	249.03	311.15	245.16	314.29

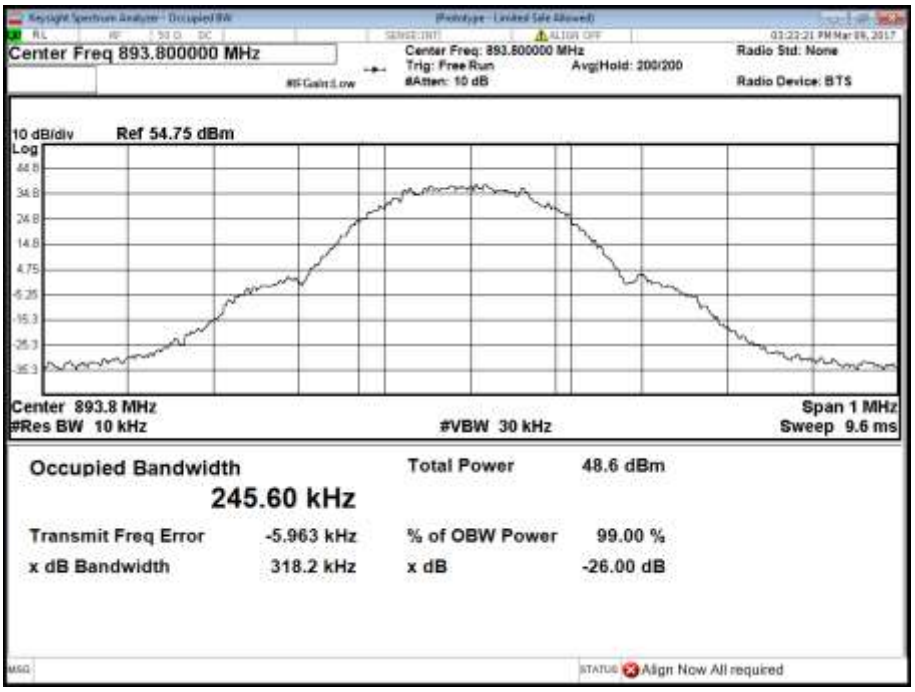
Antenna A - Channel Position B - Modulation GMSK



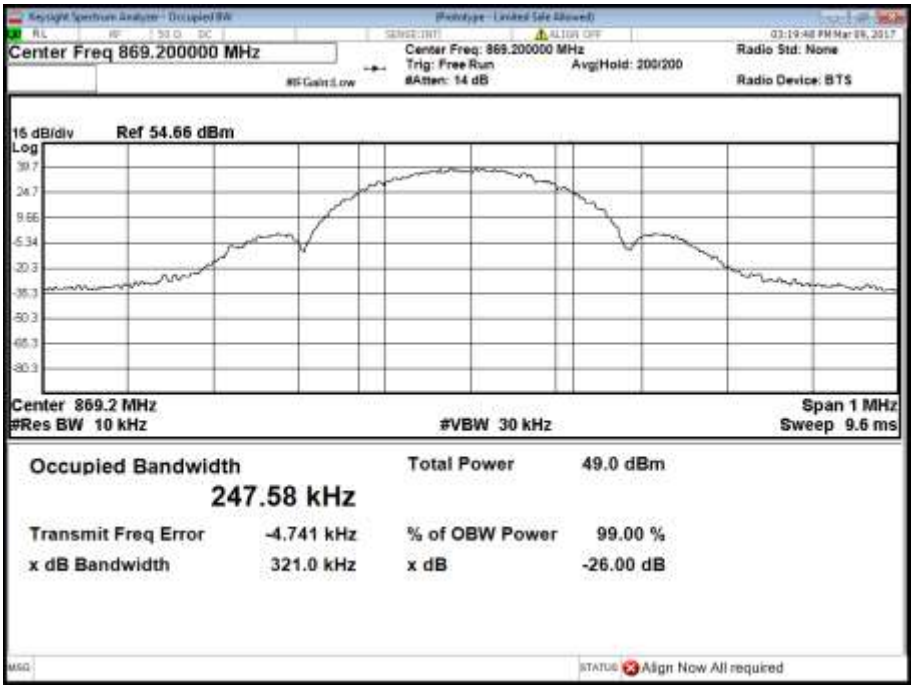
Antenna A - Channel Position M - Modulation GMSK



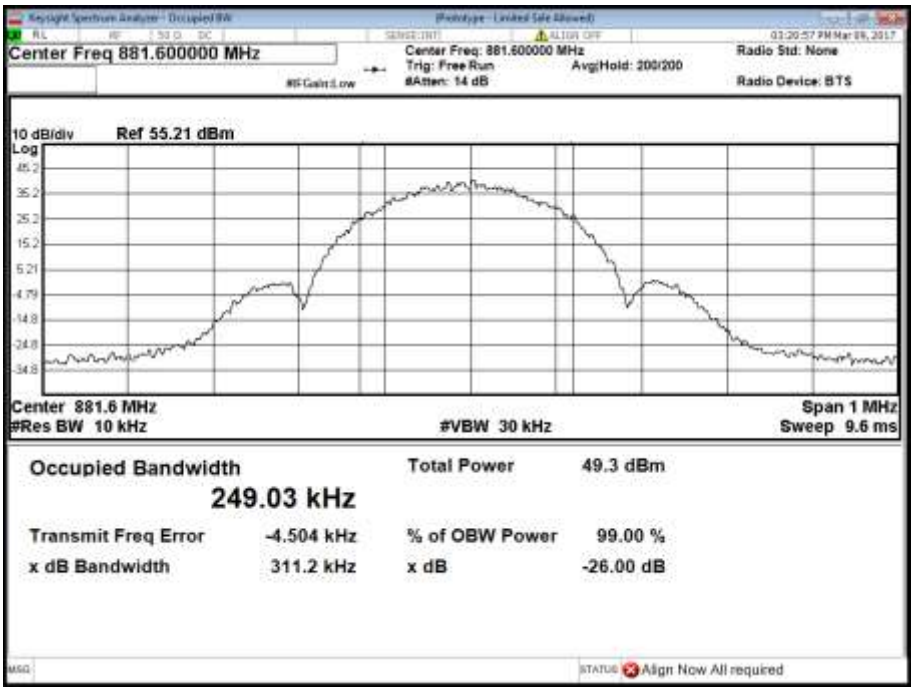
Antenna A - Channel Position T - Modulation GMSK



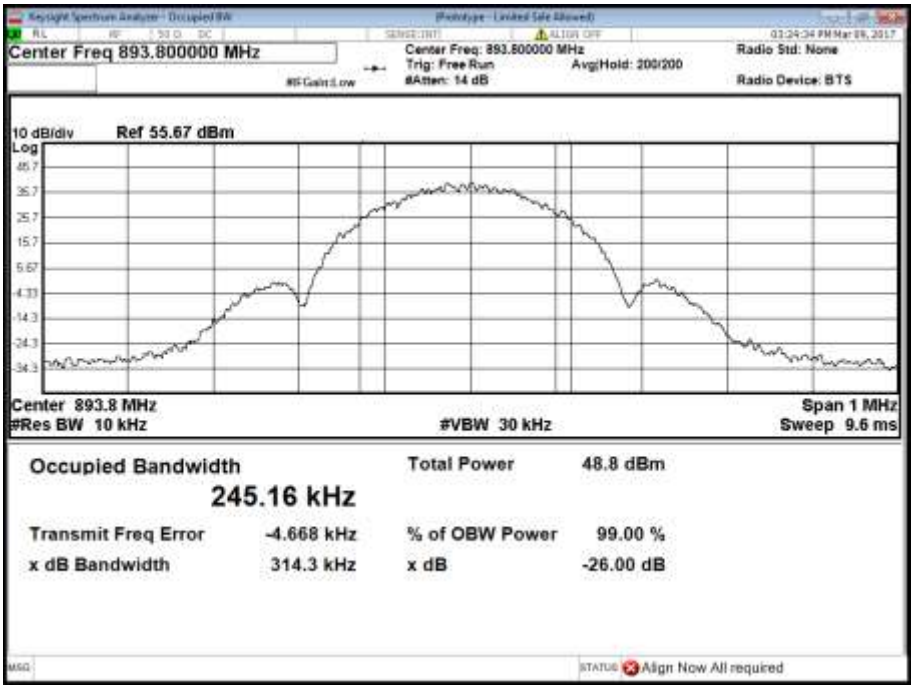
Antenna A - Channel Position B - Modulation 8PSK



Antenna A - Channel Position M - Modulation 8PSK



Antenna A - Channel Position T - Modulation 8PSK

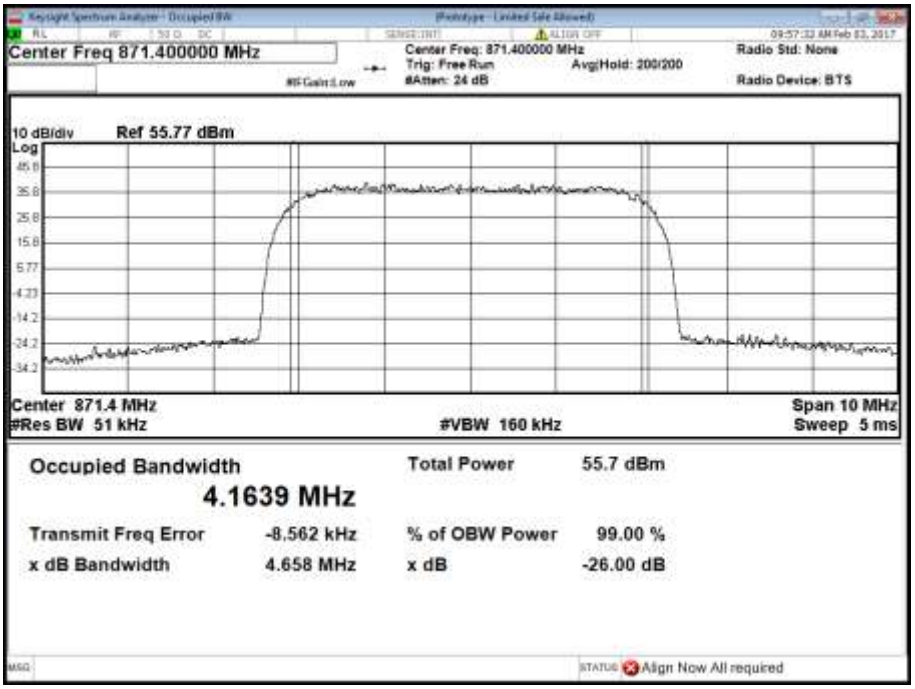


Configuration E

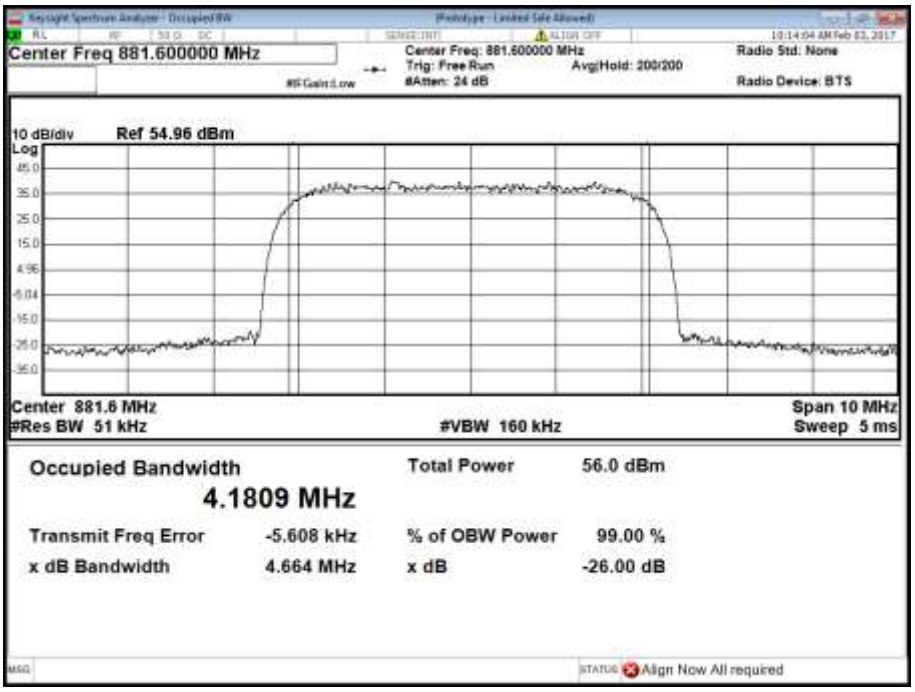
Maximum Output Power 49 dBm

Carrier Bandwidth / Modulation	Result (KHz)					
	Channel Position B		Channel Position M		Channel Position T	
	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
5.0 MHz / QPSK	4,163.90	4,657.55	4,180.92	4,663.71	4,161.71	4,647.22

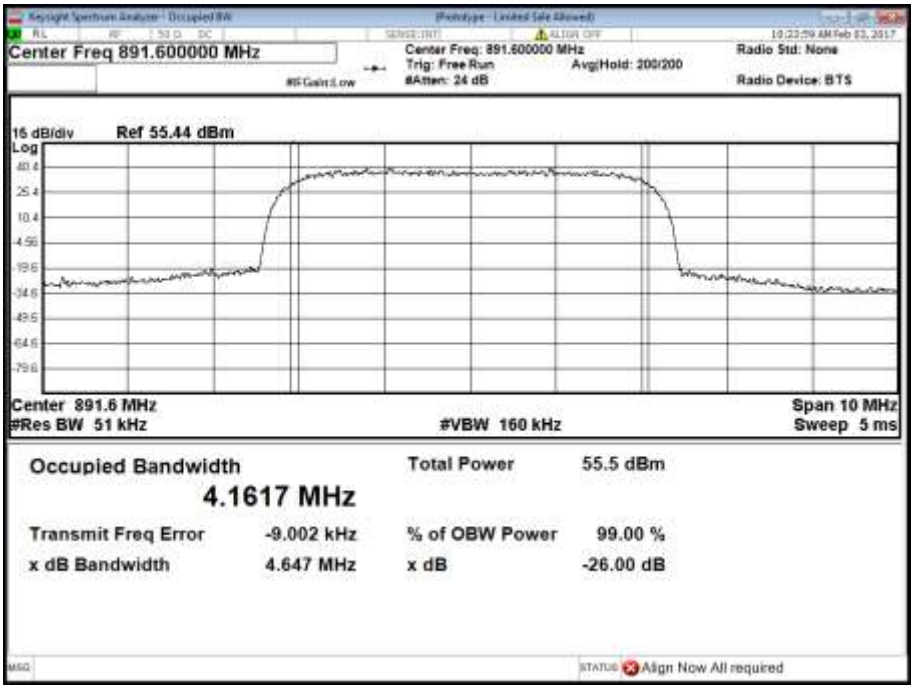
Antenna A - Channel Position B - Bandwidth / Mod 5.0 MHz / QPSK



Antenna A - Channel Position M - Bandwidth / Mod 5.0 MHz / QPSK



Antenna A - Channel Position T - Bandwidth / Mod 5.0 MHz / QPSK

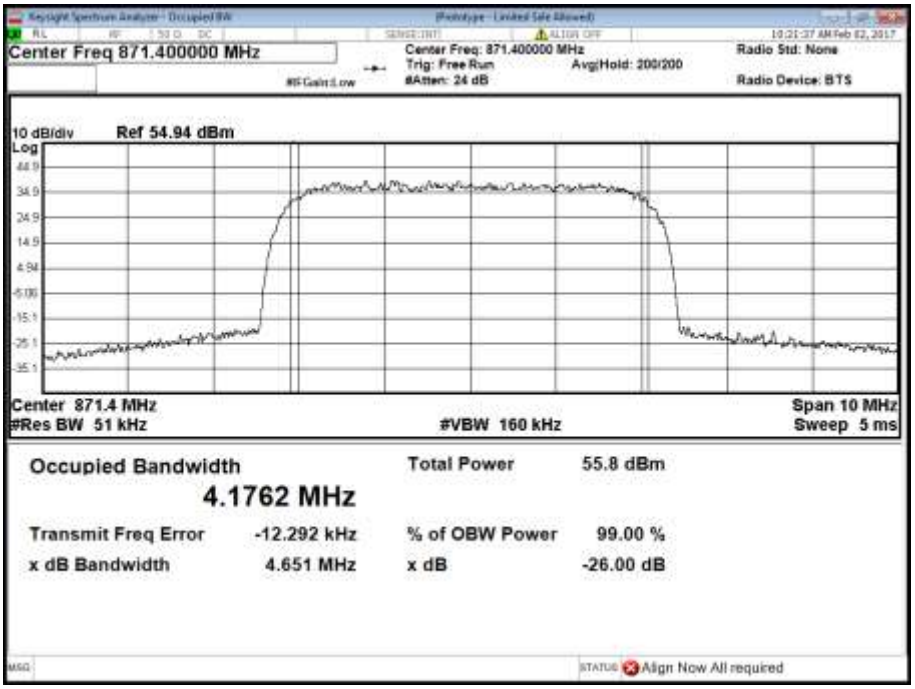


Configuration E

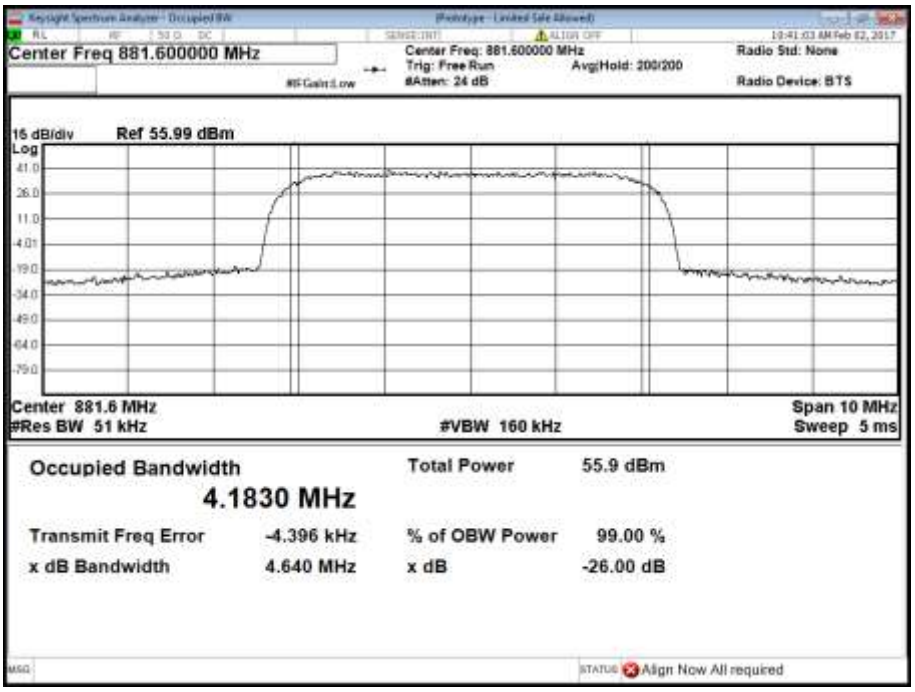
Maximum Output Power 49 dBm

Carrier Bandwidth / Modulation	Result (KHz)					
	Channel Position B		Channel Position M		Channel Position T	
	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
5.0 MHz / QPSK	4,176.20	4,651.09	4,182.99	4,639.56	4,162.91	4,643.01

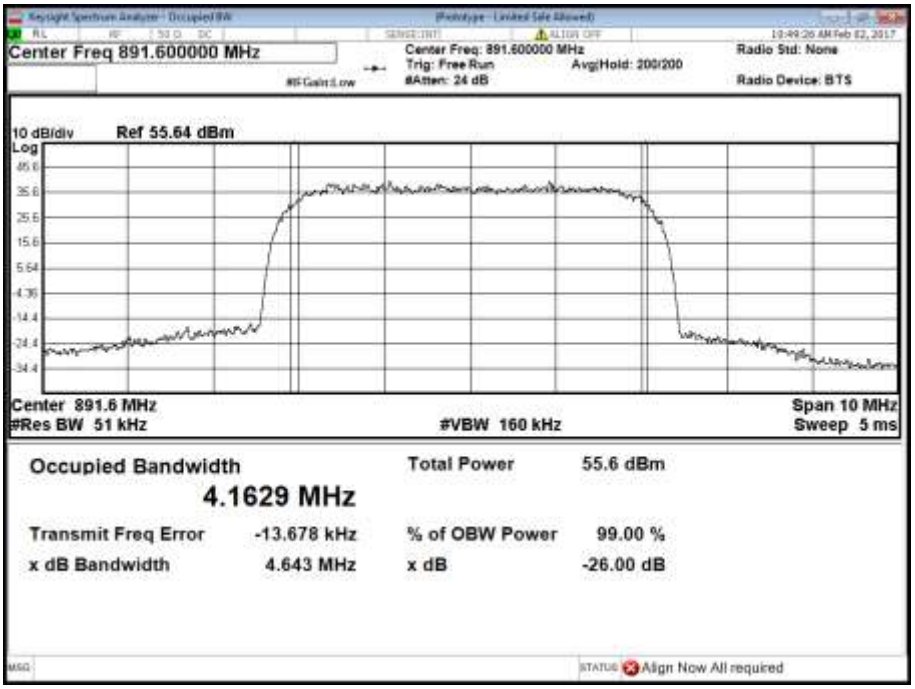
Antenna B - Channel Position B - Bandwidth / Mod 5.0 MHz / QPSK



Antenna B - Channel Position M - Bandwidth / Mod 5.0 MHz / QPSK



Antenna B - Channel Position T - Bandwidth / Mod 5.0 MHz / QPSK

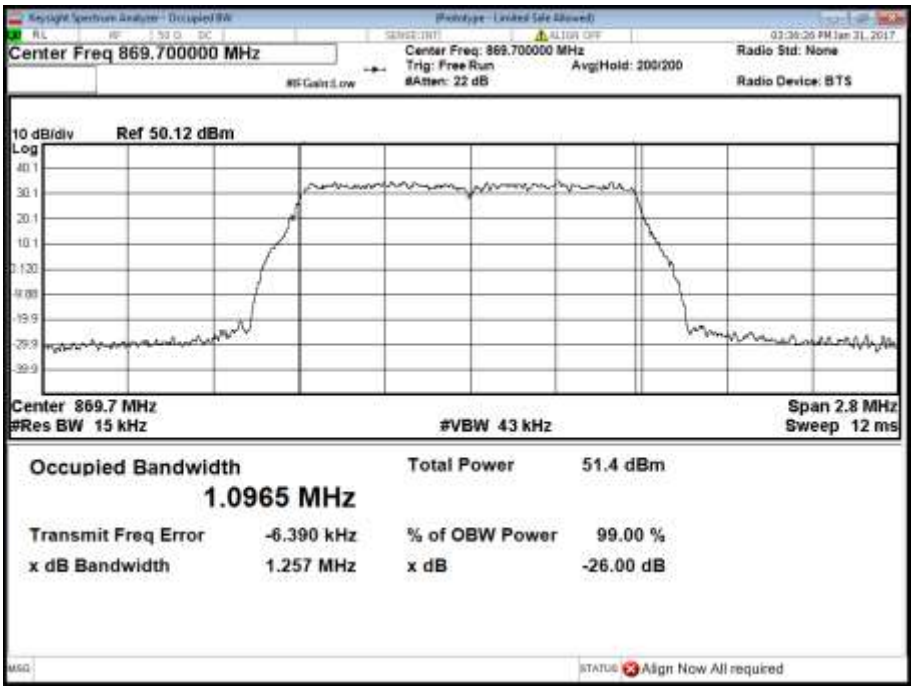


Configuration A

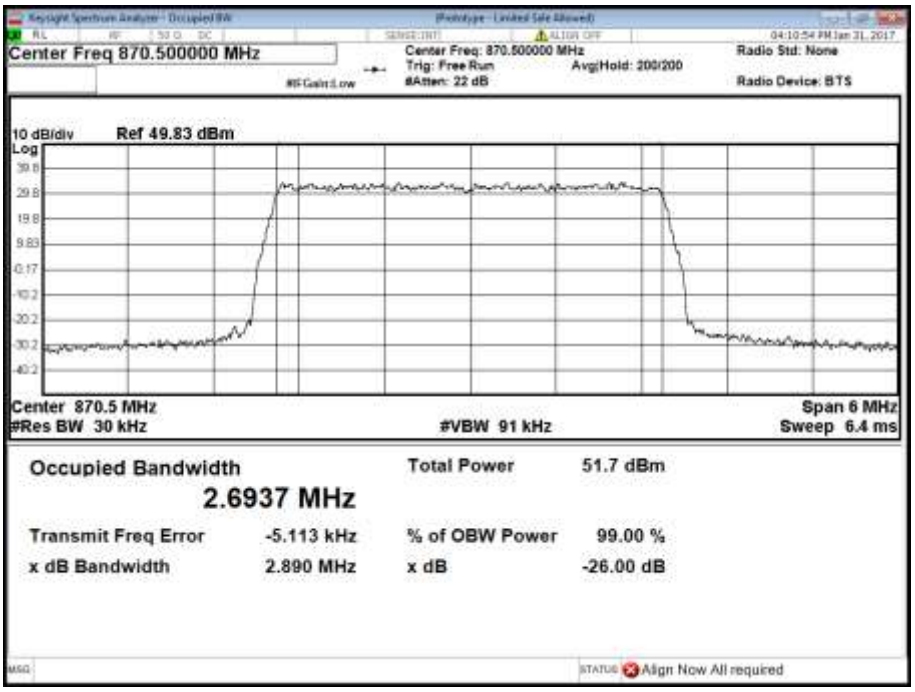
Maximum Output Power 49 dBm

Carrier Bandwidth / Modulation	Result (KHz)					
	Channel Position B		Channel Position M		Channel Position T	
	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
1.4 MHz / QPSK	1,096.49	1,257.46	1,096.18	1,272.10	1,097.58	1,269.69
3.0 MHz / QPSK	2,693.74	2,890.34	2,694.34	2,900.38	2,691.00	2,903.66
5.0 MHz / QPSK	4,480.66	4,780.04	4,479.64	4,819.83	4,477.44	4,785.03
10.0 MHz / QPSK	8,933.80	9,383.62	8,942.52	9,393.55	8,931.81	9,364.08

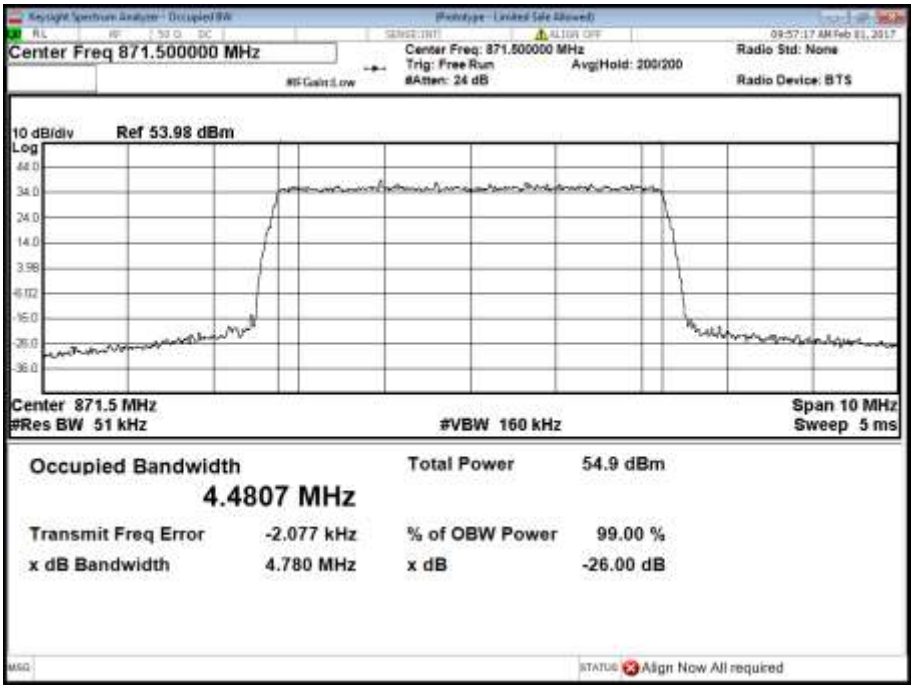
Antenna A - Channel Position B - Bandwidth / Mod 1.4 MHz / QPSK



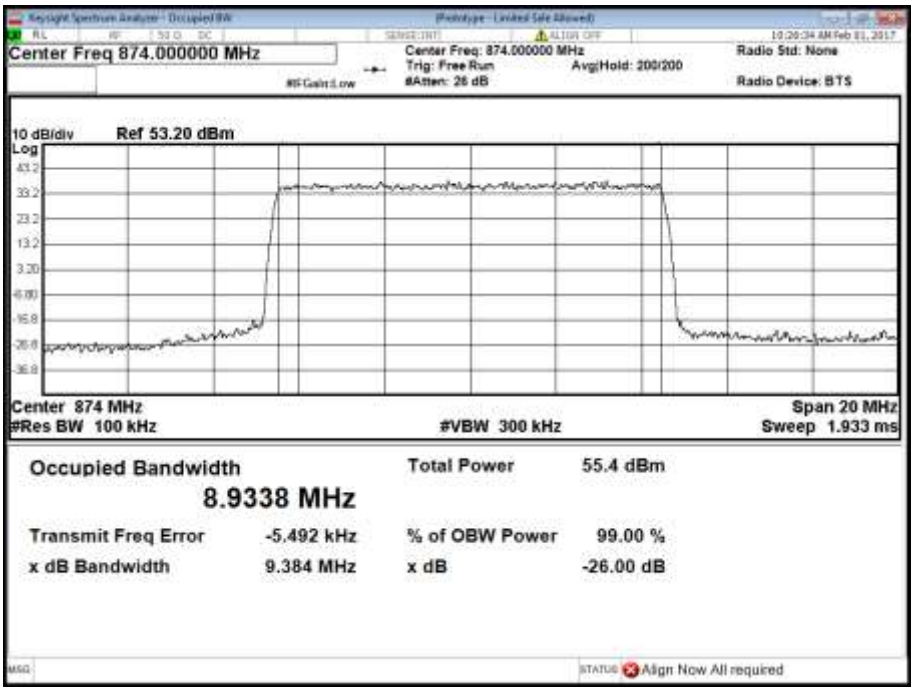
Antenna A - Channel Position B - Bandwidth / Mod 3.0 MHz / QPSK



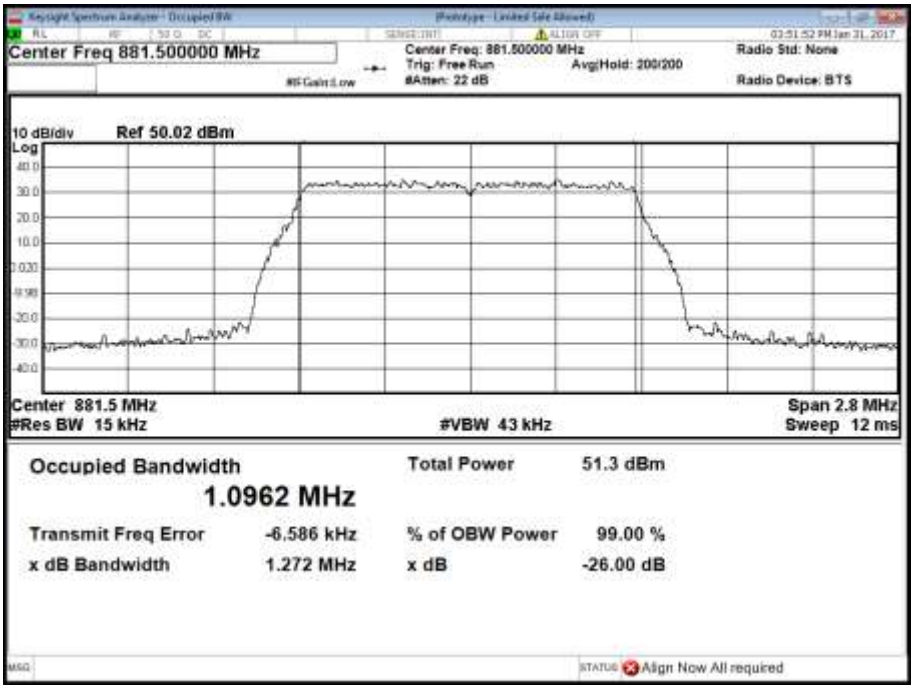
Antenna A - Channel Position B - Bandwidth / Mod 5.0 MHz / QPSK



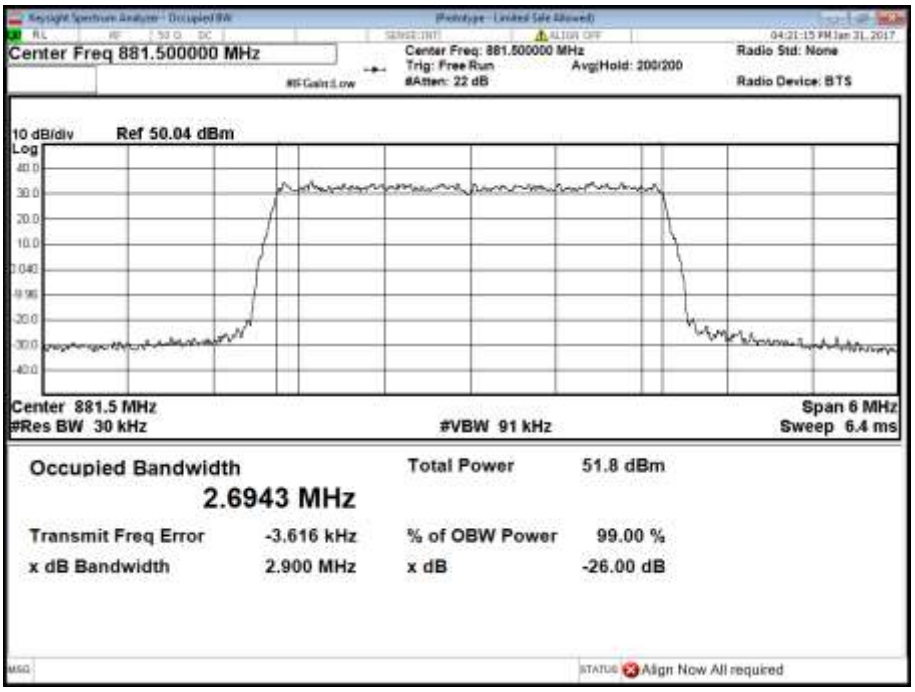
Antenna A - Channel Position B - Bandwidth / Mod 10.0 MHz / QPSK



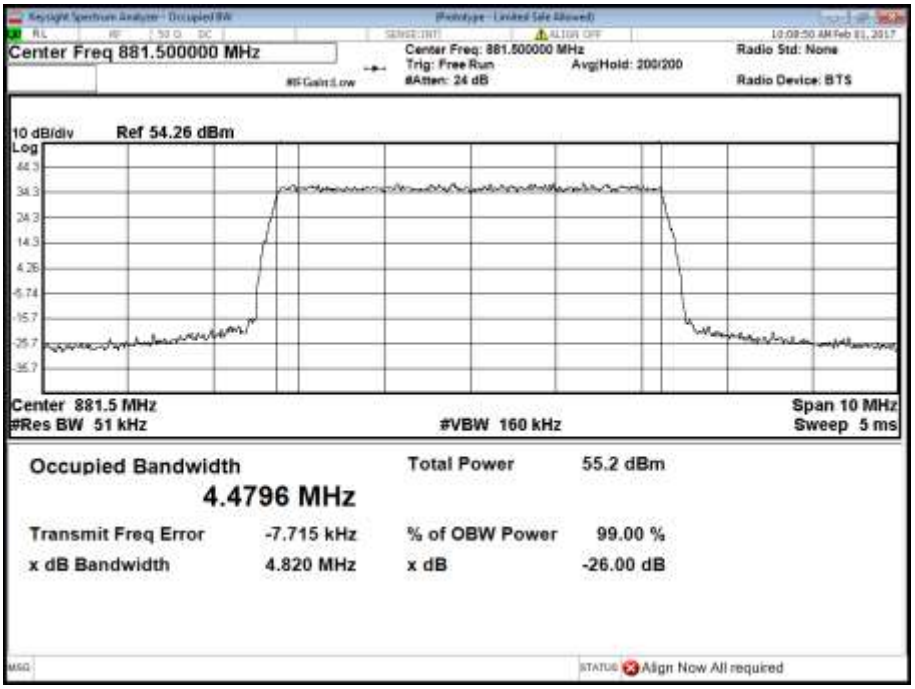
Antenna A - Channel Position M - Bandwidth / Mod 1.4 MHz / QPSK



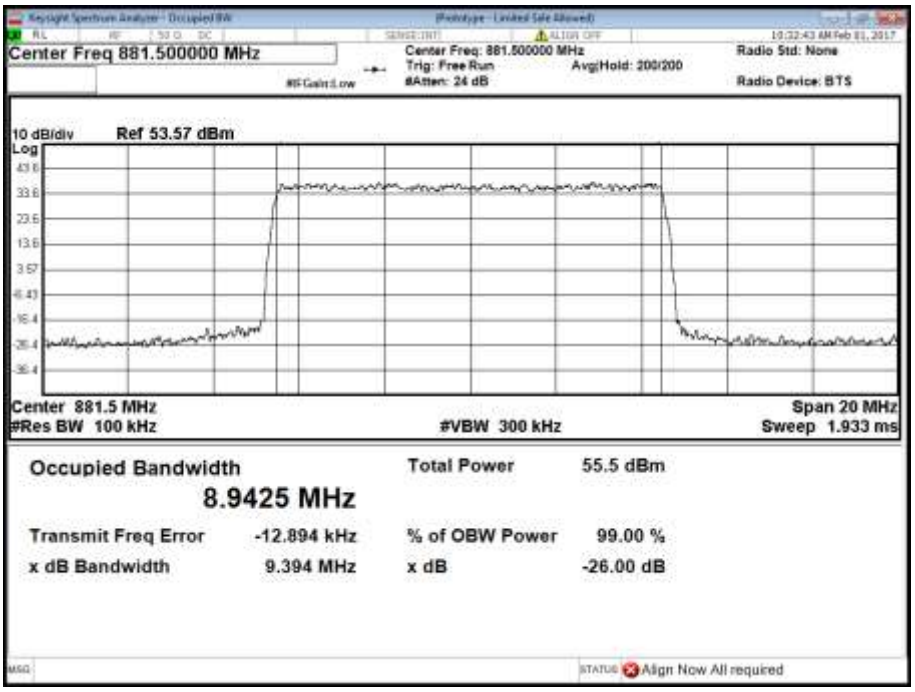
Antenna A - Channel Position M - Bandwidth / Mod 3.0 MHz / QPSK



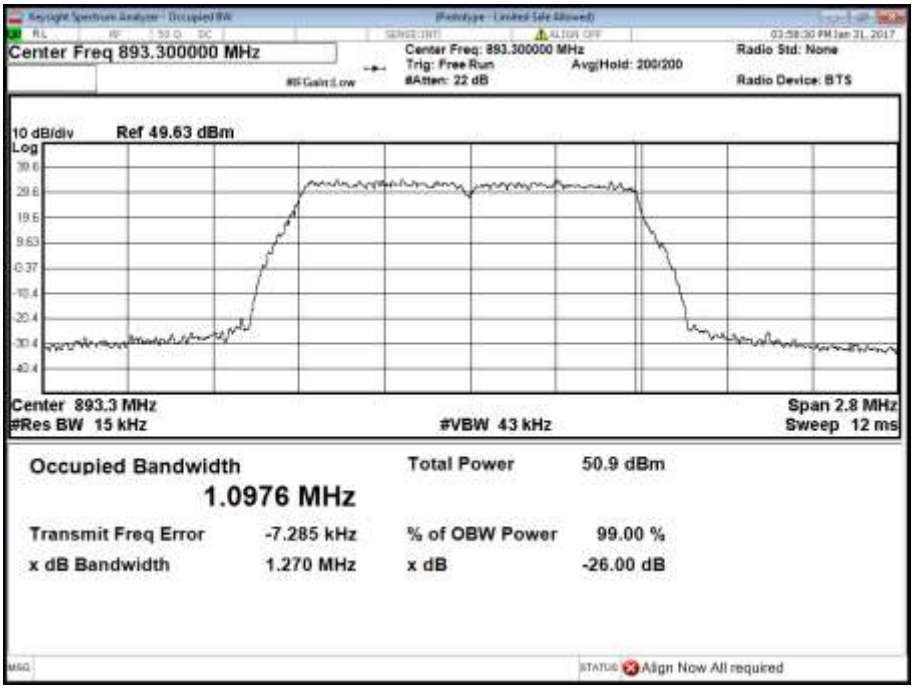
Antenna A - Channel Position M - Bandwidth / Mod 5.0 MHz / QPSK



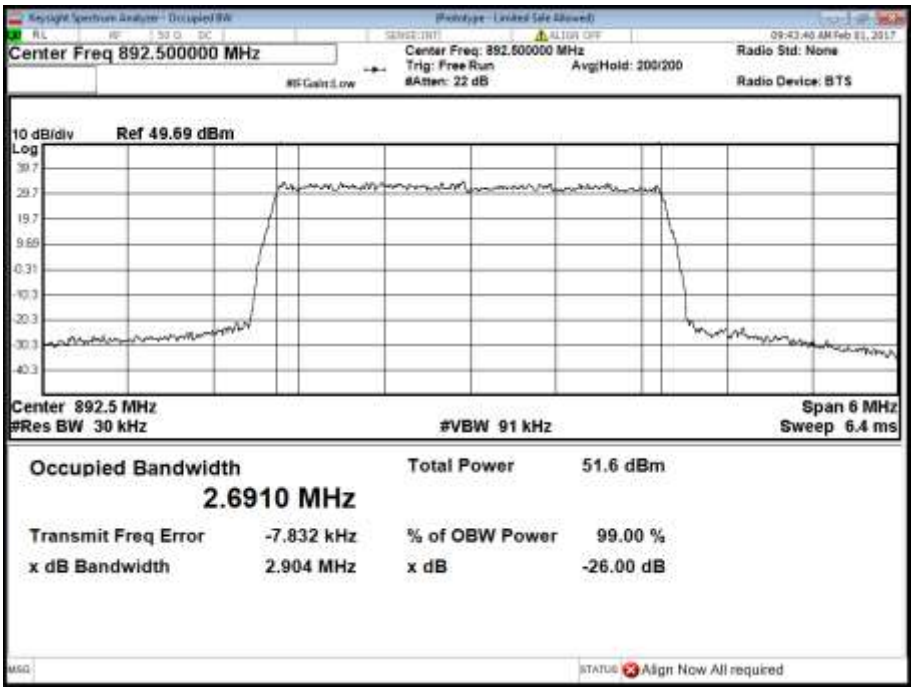
Antenna A - Channel Position M - Bandwidth / Mod 10.0 MHz / QPSK



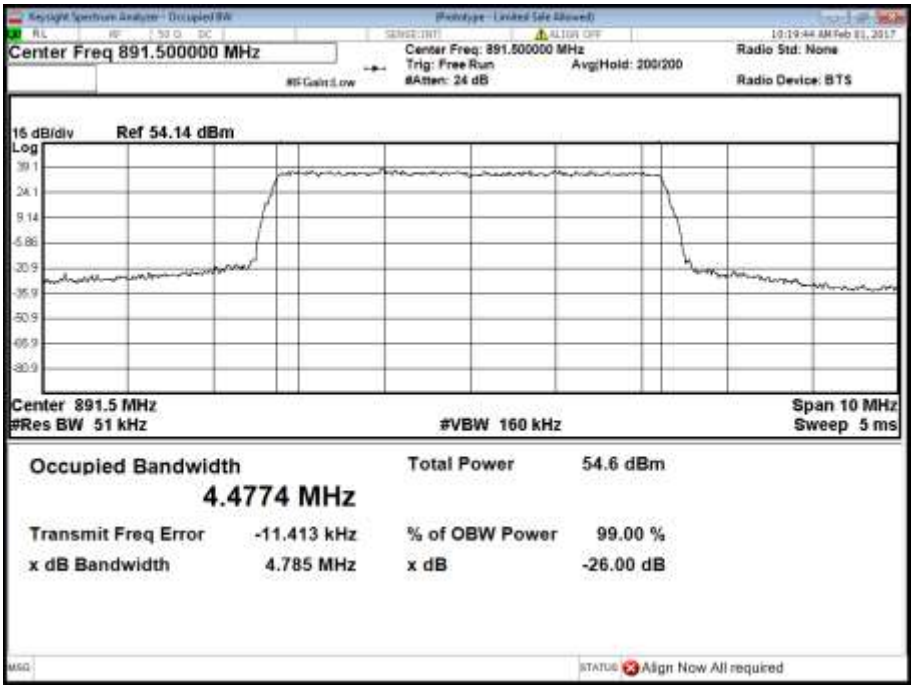
Antenna A - Channel Position T - Bandwidth / Mod 1.4 MHz / QPSK



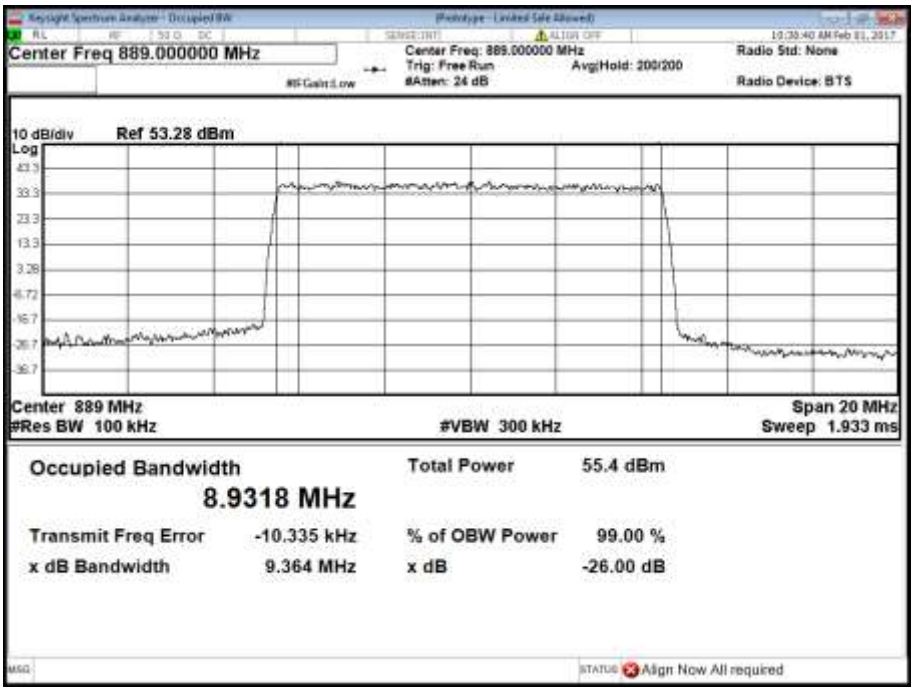
Antenna A - Channel Position T - Bandwidth / Mod 3.0 MHz / QPSK



Antenna A - Channel Position T - Bandwidth / Mod 5.0 MHz / QPSK



Antenna A - Channel Position T - Bandwidth / Mod 10.0 MHz / QPSK

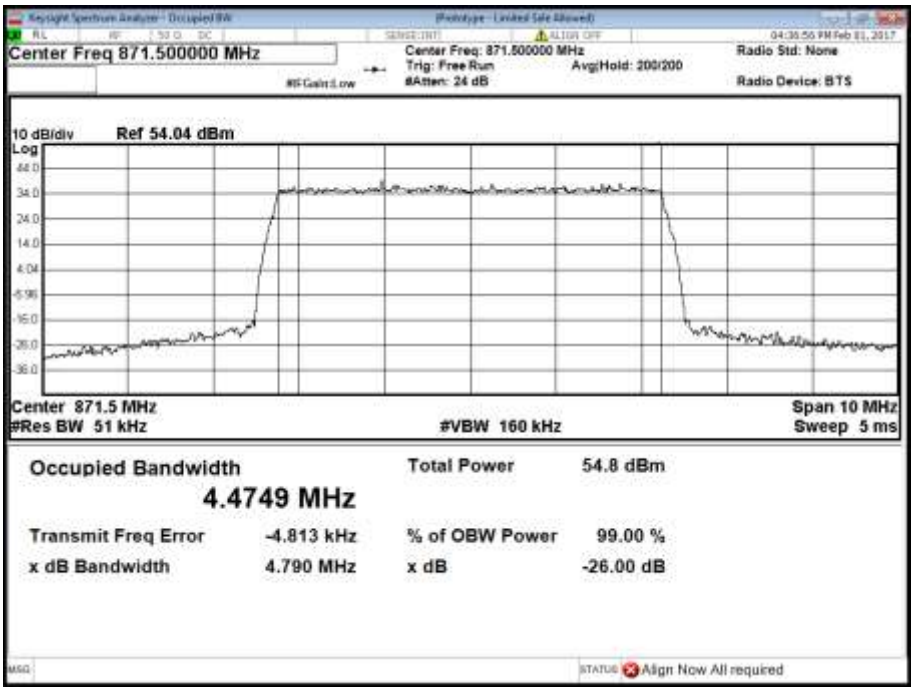


Configuration A

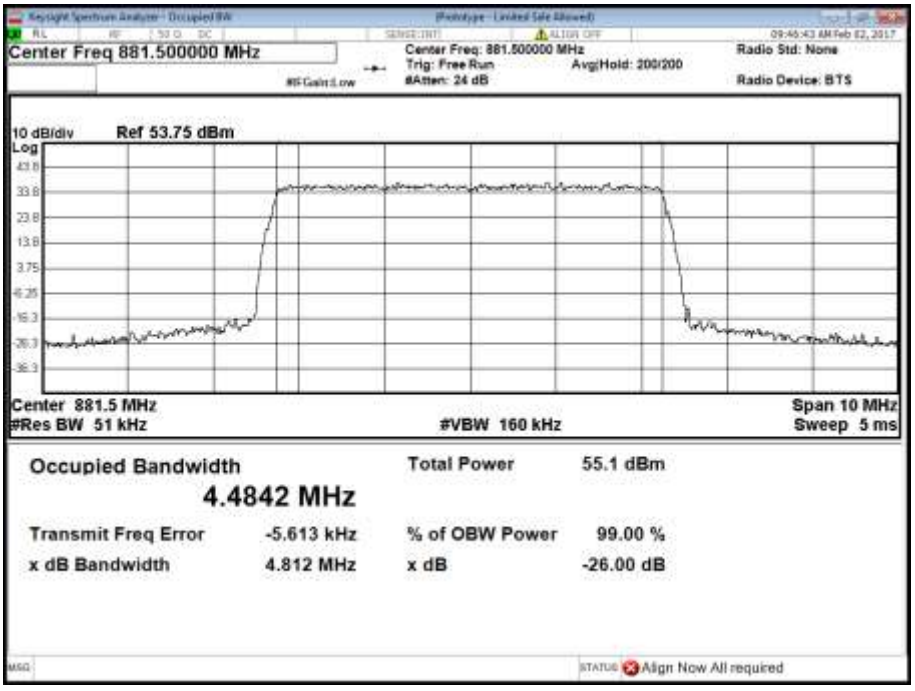
Maximum Output Power 49 dBm

Carrier Bandwidth / Modulation	Result (KHz)					
	Channel Position B		Channel Position M		Channel Position T	
	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
5.0 MHz / QPSK	4,474.93	4,789.81	4,484.21	4,811.85	4,484.13	4,789.75

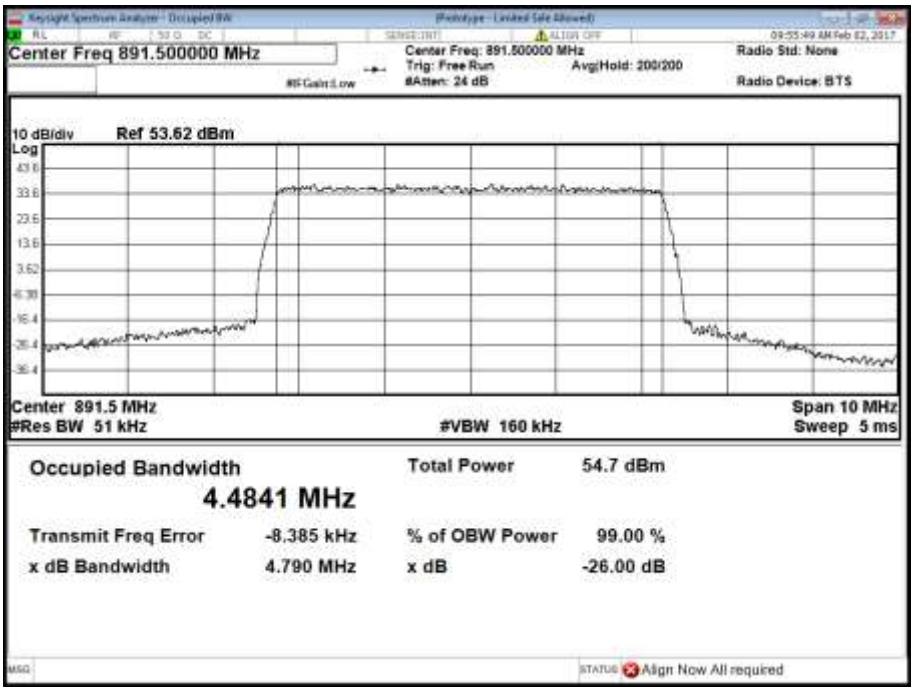
Antenna B - Channel Position B - Bandwidth / Mod 5.0 MHz / QPSK



Antenna B - Channel Position M - Bandwidth / Mod 5.0 MHz / QPSK



Antenna B - Channel Position T - Bandwidth / Mod 5.0 MHz / QPSK

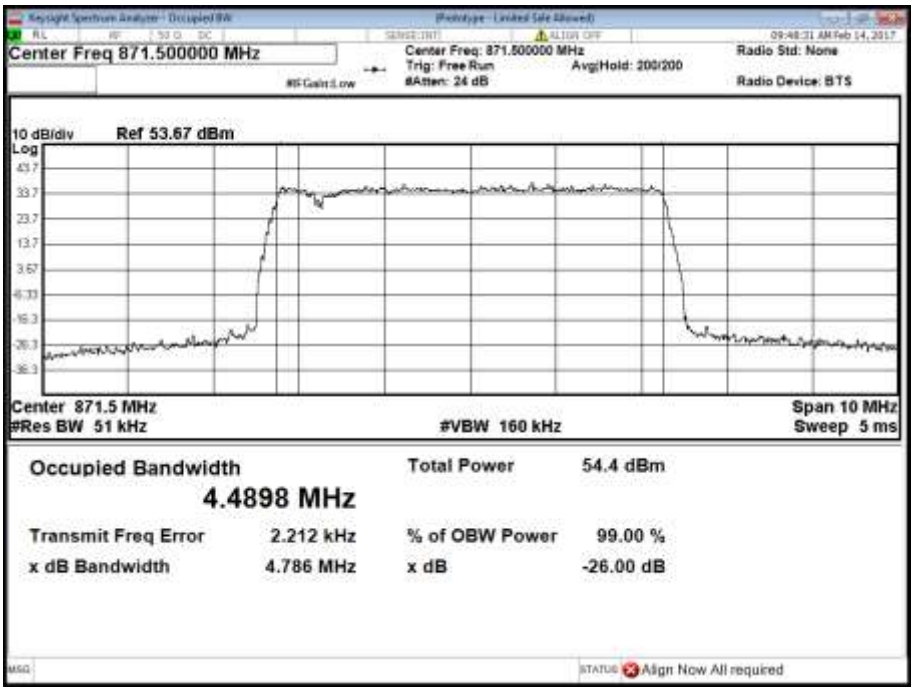


Configuration D

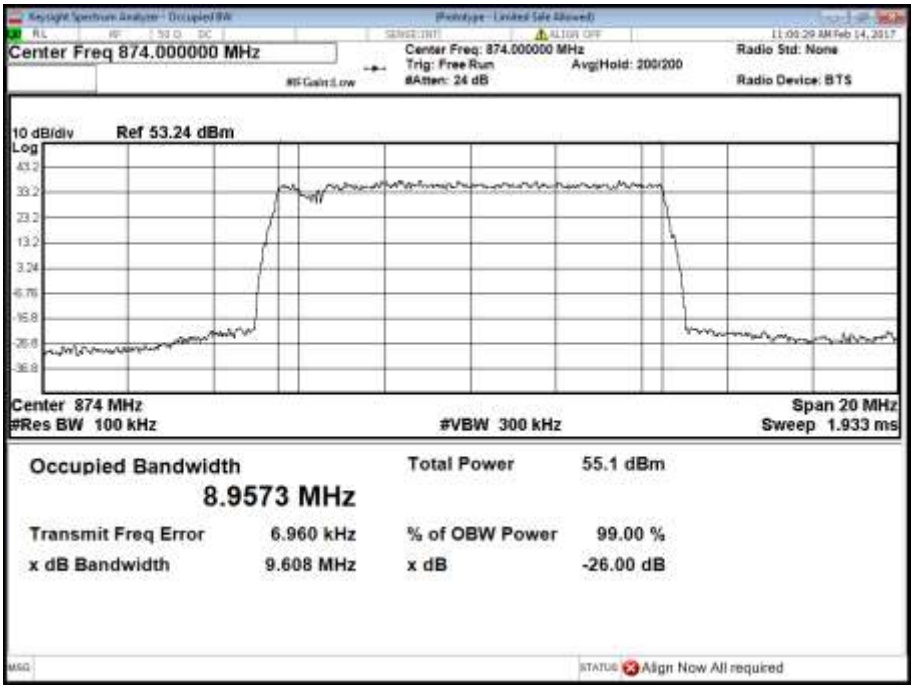
Maximum Output Power 46 dBm

Carrier Bandwidth / Modulation	Result (KHz)					
	Channel Position B		Channel Position M		Channel Position T	
	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
5.0 MHz / QPSK	4,489.77	4,786.45	4,497.17	4,812.55	4,498.73	4,790.85
10.0 MHz / QPSK	8,957.32	9,607.59	8,955.17	9,621.79	8,957.43	9,560.14

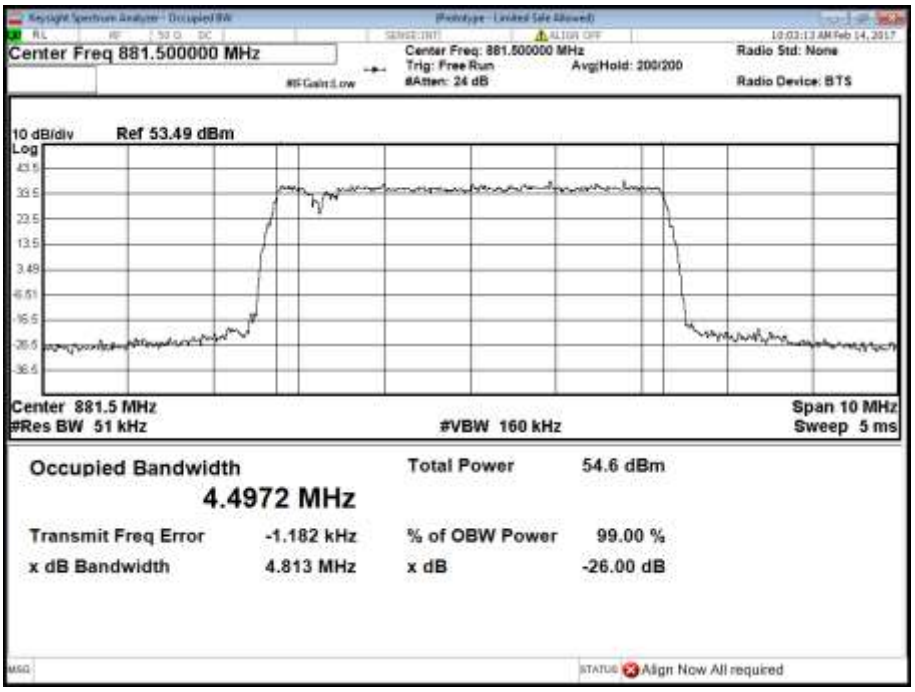
Antenna A - Channel Position B - Bandwidth / Mod 5.0 MHz / QPSK



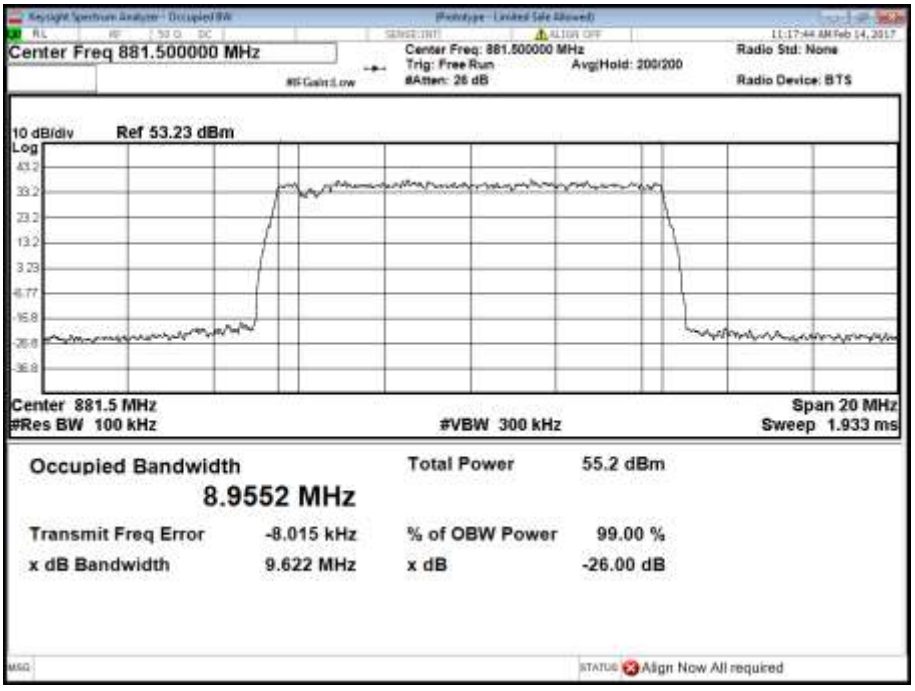
Antenna A - Channel Position B - Bandwidth / Mod 10.0 MHz / QPSK



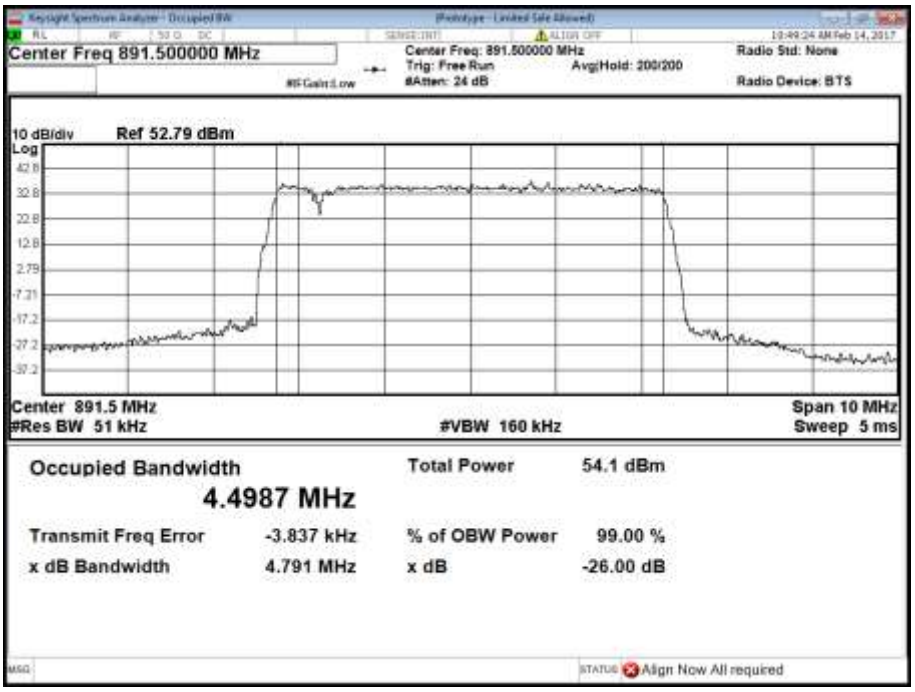
Antenna A - Channel Position M - Bandwidth / Mod 5.0 MHz / QPSK



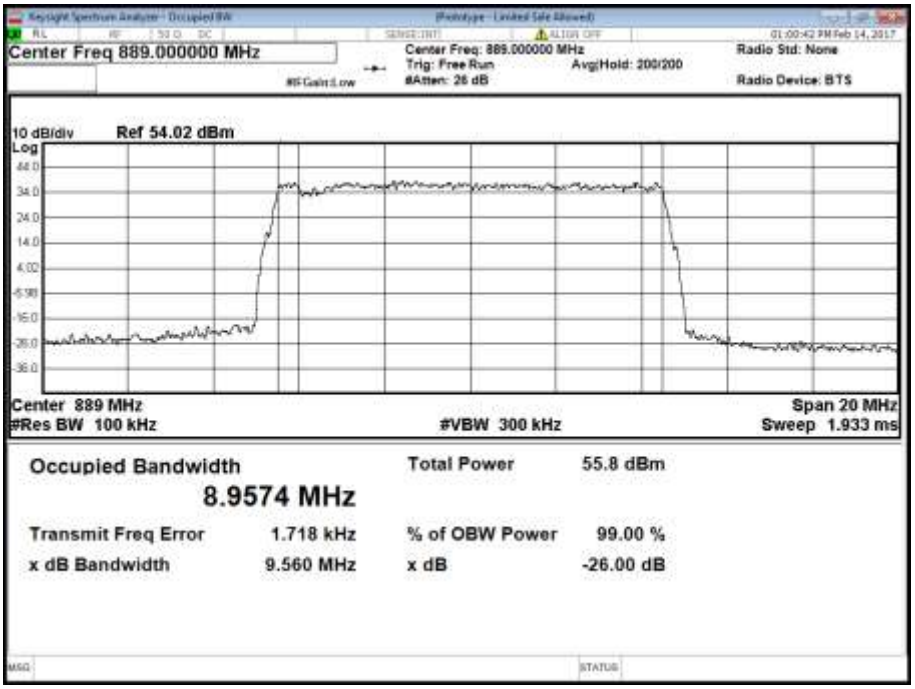
Antenna A - Channel Position M - Bandwidth / Mod 10.0 MHz / QPSK



Antenna A - Channel Position T - Bandwidth / Mod 5.0 MHz / QPSK



Antenna A - Channel Position T - Bandwidth / Mod 10.0 MHz / QPSK

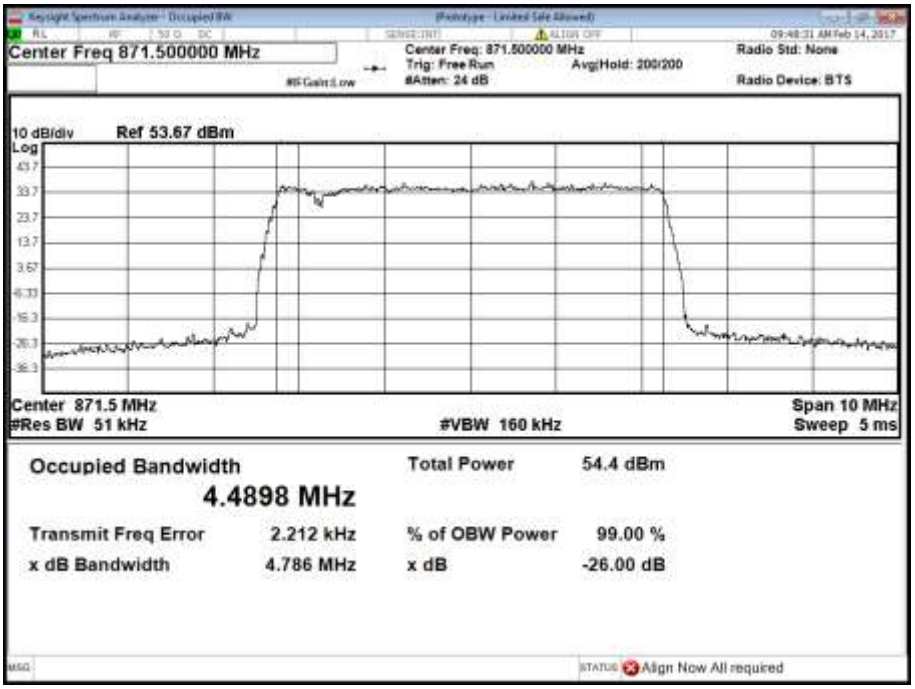


Configuration D

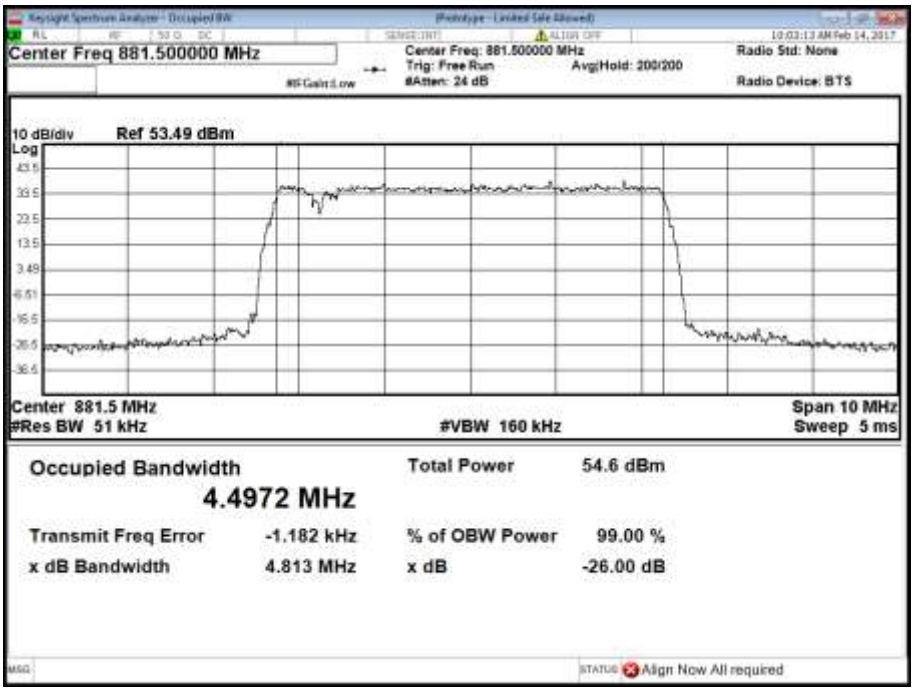
Maximum Output Power 46 dBm

Carrier Bandwidth / Modulation	Result (KHz)					
	Channel Position B		Channel Position M		Channel Position T	
	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
5.0 MHz / QPSK	4,489.77	4,786.45	4,497.17	4,812.55	4,498.73	4,790.85

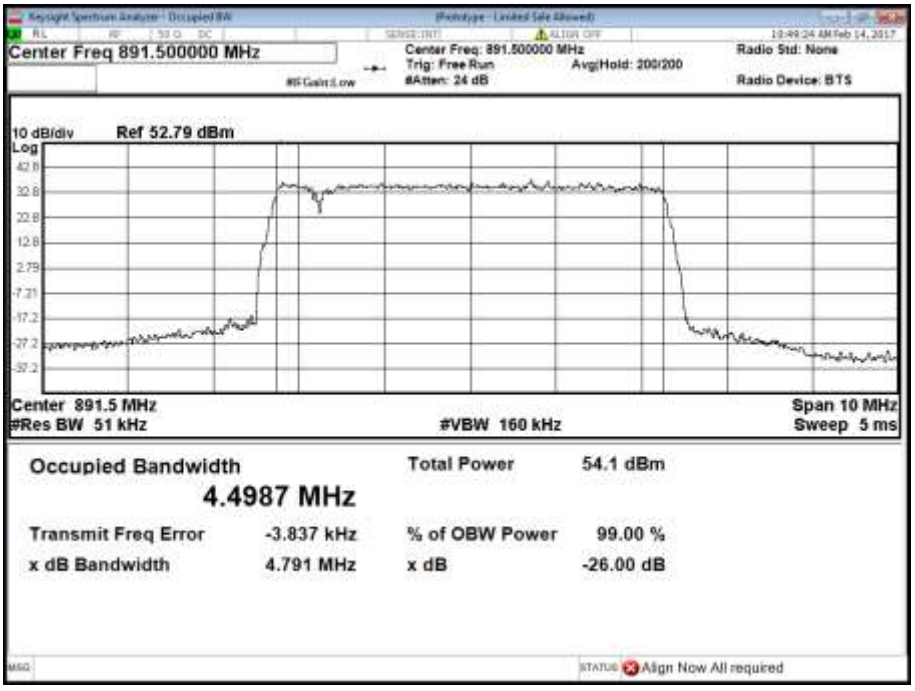
Antenna A - Channel Position B - Bandwidth / Mod 5.0 MHz / QPSK



Antenna A - Channel Position M - Bandwidth / Mod 5.0 MHz / QPSK



Antenna A - Channel Position T - Bandwidth / Mod 5.0 MHz / QPSK



2.3 BAND EDGE

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 22, Clause 22.917(b)
Industry Canada RSS-132, Clause 5.5

2.3.2 Date of Test and Modification State

01, 02, 03, 06, 10, 13, 14 February 2017 - Modification State 0

2.3.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.4 Environmental Conditions

Ambient Temperature	22.5 - 24.5°C
Relative Humidity	11.7 - 18.7%

2.3.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01.

Each antenna port has been declared as being equivalent, therefore measurements were made on one antenna port only. To account for this, the limit was tightened by 10 * Log(N), where N is equal to the number of MIMO antenna ports.

The limit was calculated as being -13 dBm - 10 * Log (2) = -16 dBm.

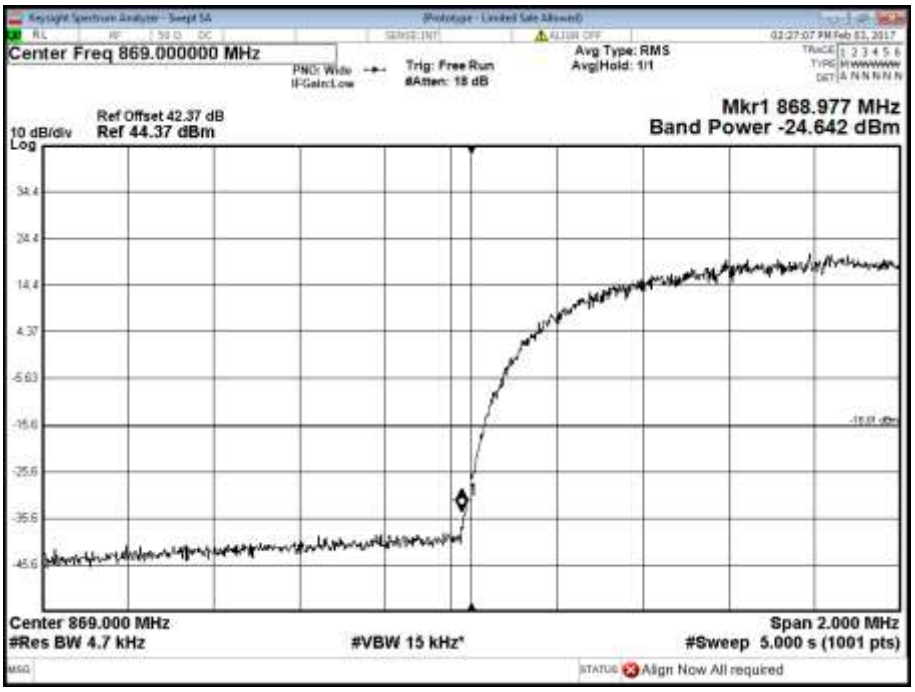
2.3.6 Test Results

Configuration E

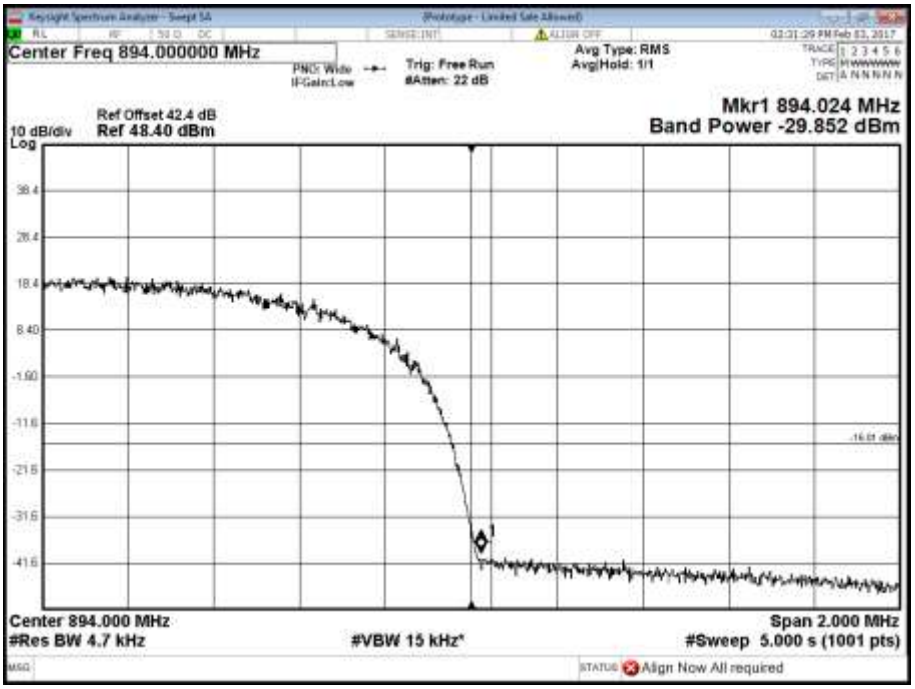
Maximum Output Power 49 dBm

Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position B	Channel Position T
5.0 MHz	QPSK	871.4	891.6

Antenna A - Channel Position B - Carrier Bandwidth 5.0 MHz - Modulation QPSK



Antenna A - Channel Position T - Carrier Bandwidth 5.0 MHz - Modulation QPSK

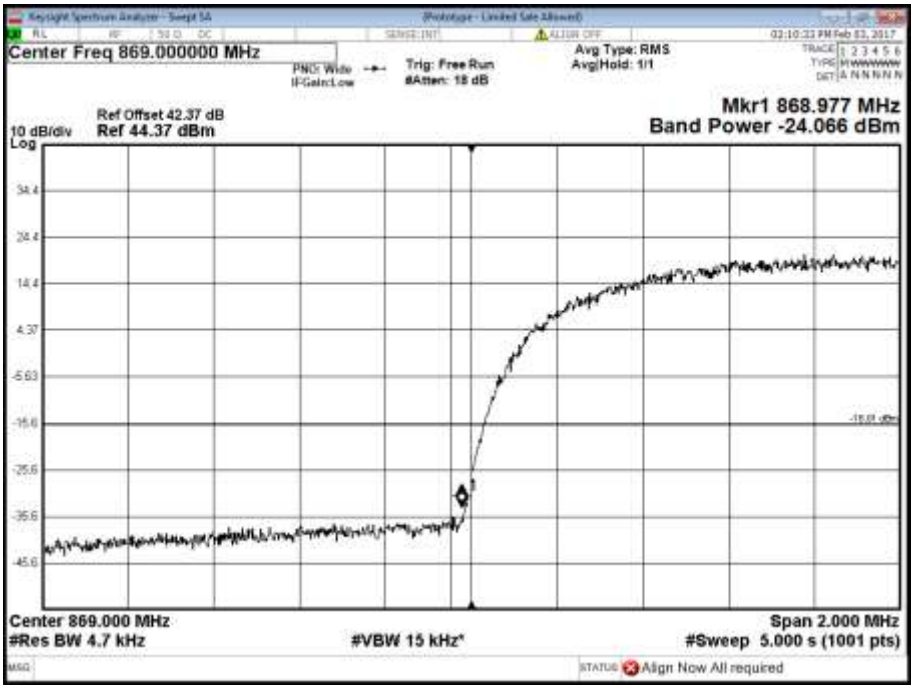


Configuration E

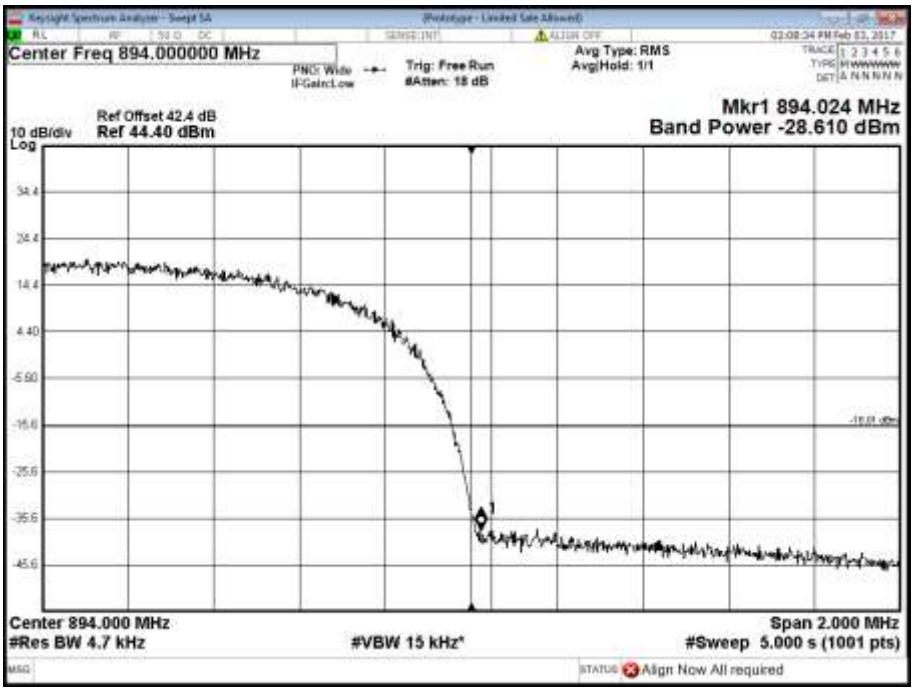
Maximum Output Power 49 dBm

Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position B	Channel Position T
5.0 MHz	QPSK	871.4	891.6

Antenna B - Channel Position B - Carrier Bandwidth 5.0 MHz - Modulation QPSK



Antenna B - Channel Position T - Carrier Bandwidth 5.0 MHz - Modulation QPSK

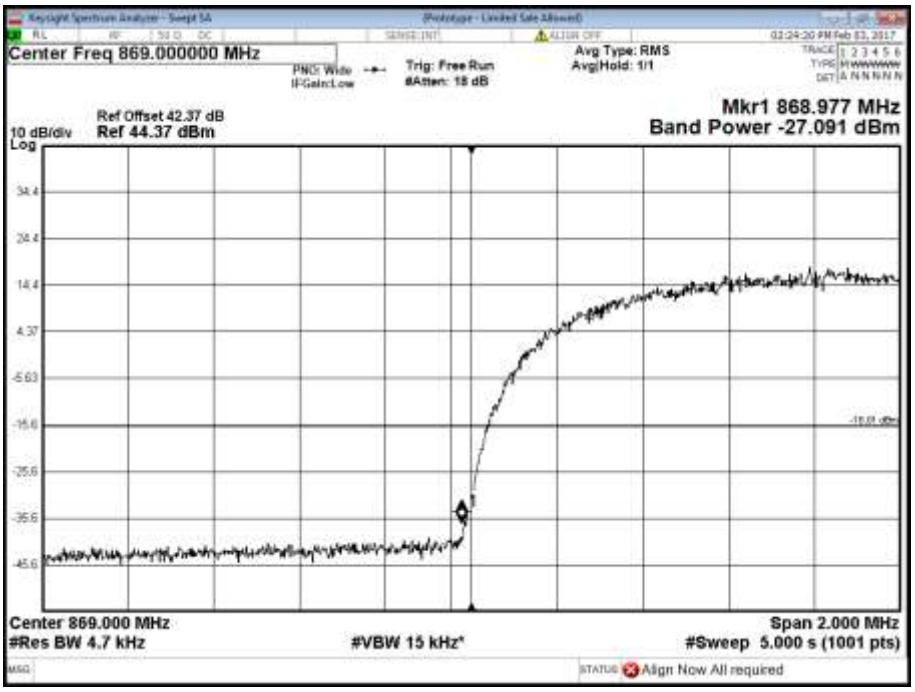


Configuration F

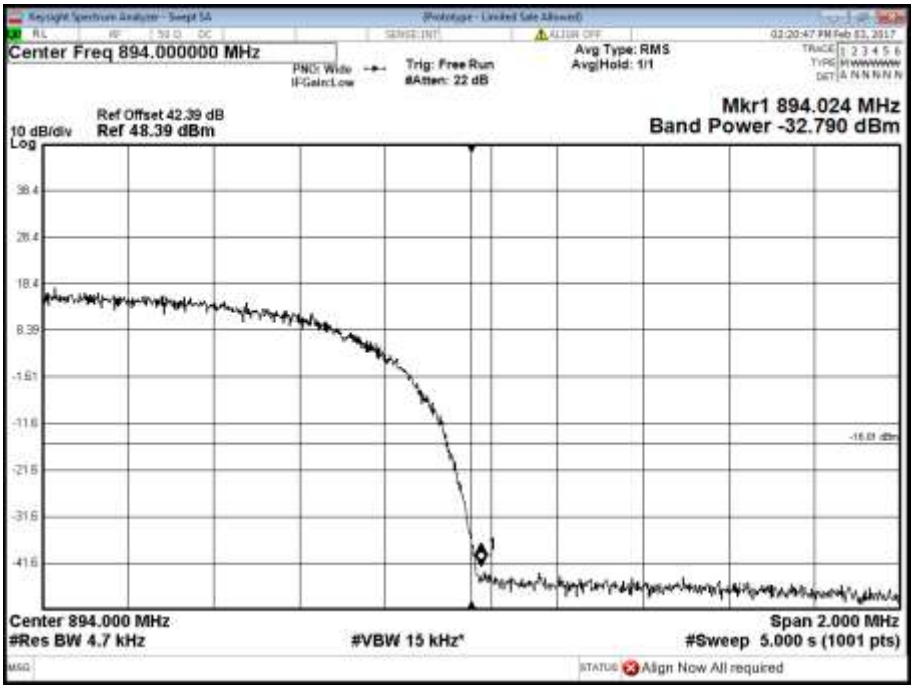
Maximum Output Power 49 dBm

Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position B	Channel Position T
5.0 MHz	QPSK	871.4 + 876.4	886.6 + 891.6

Antenna A - Channel Position B - Carrier Bandwidth 5.0 MHz - Modulation QPSK



Antenna A - Channel Position T - Carrier Bandwidth 5.0 MHz - Modulation QPSK

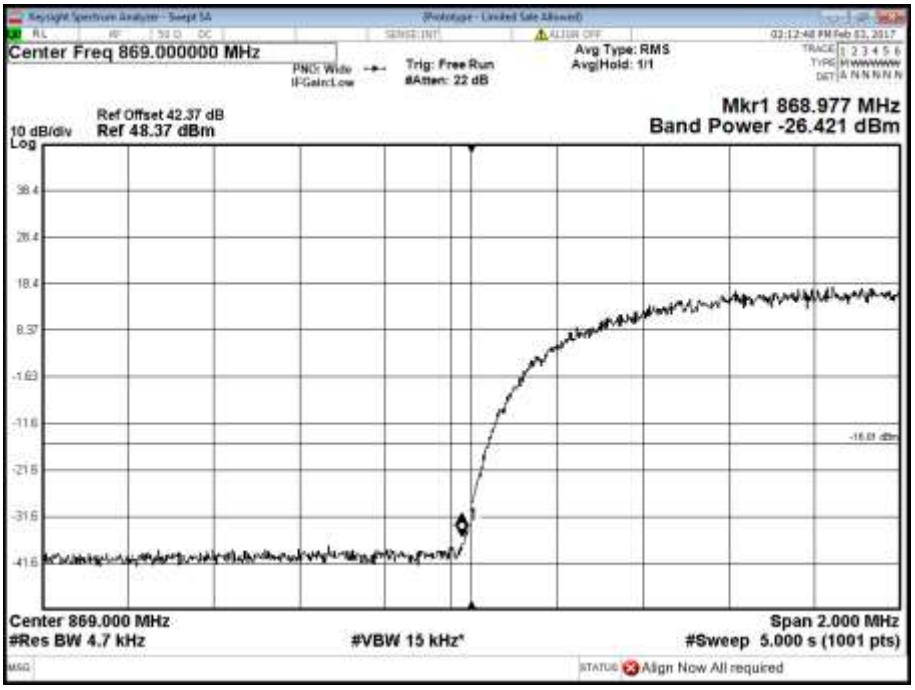


Configuration F

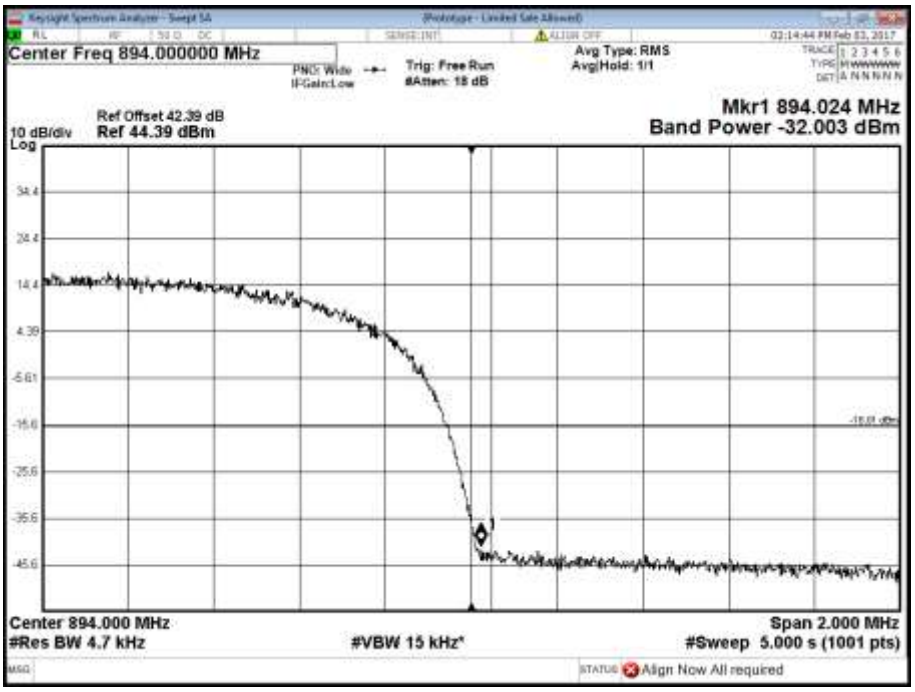
Maximum Output Power 49 dBm

Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position B	Channel Position T
5.0 MHz	QPSK	871.4 + 876.4	886.6 + 891.6

Antenna B - Channel Position B - Carrier Bandwidth 5.0 MHz - Modulation QPSK



Antenna B - Channel Position T - Carrier Bandwidth 5.0 MHz - Modulation QPSK

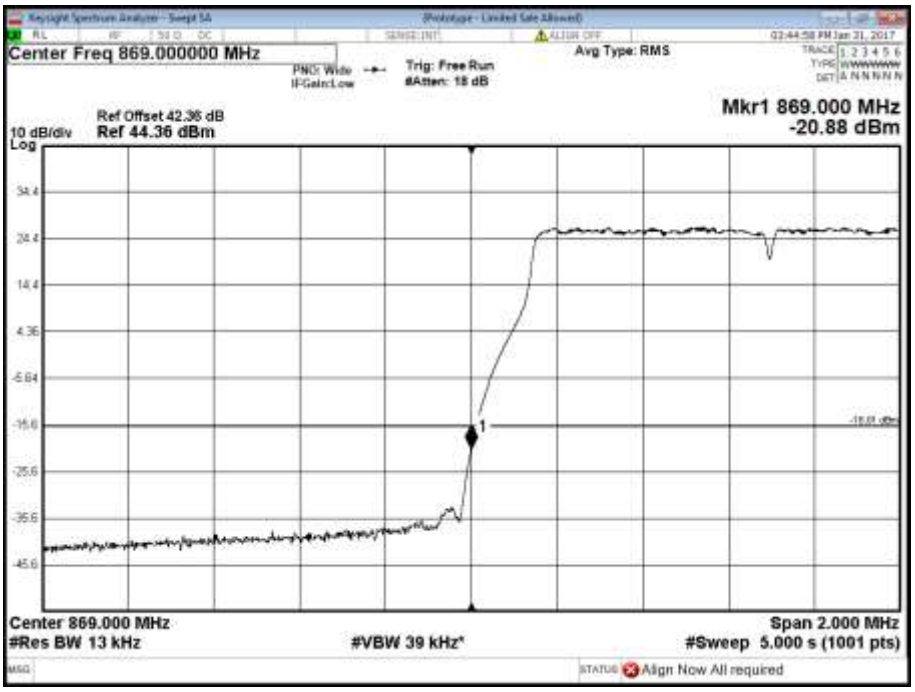


Configuration A

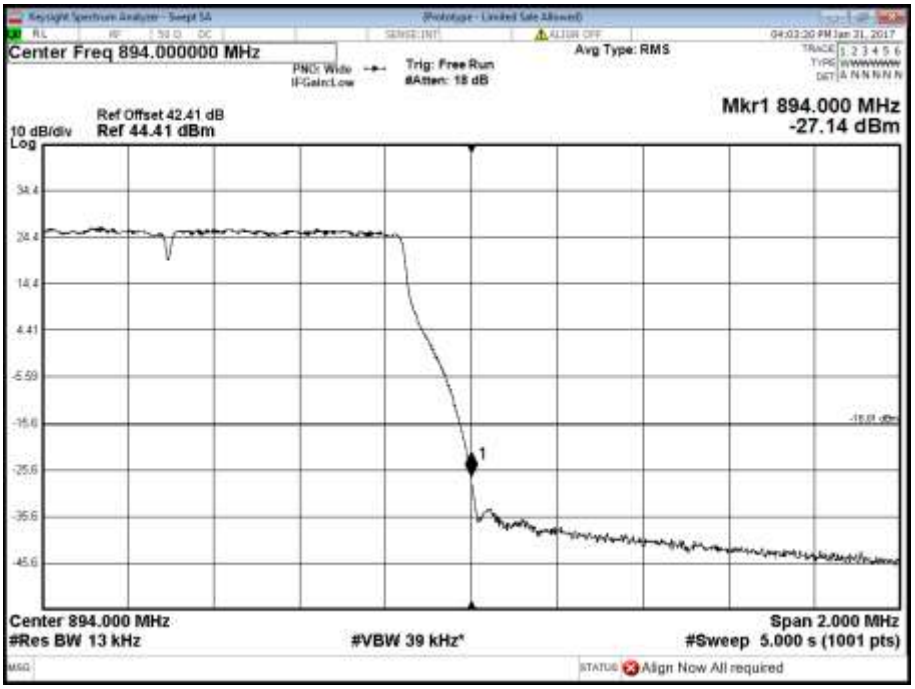
Maximum Output Power 49 dBm

Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position B	Channel Position T
1.4 MHz	QPSK	869.7	893.3
3.0 MHz	QPSK	870.5	892.5
5.0 MHz	QPSK	871.5	891.5
10.0 MHz	QPSK	874.0	889.0

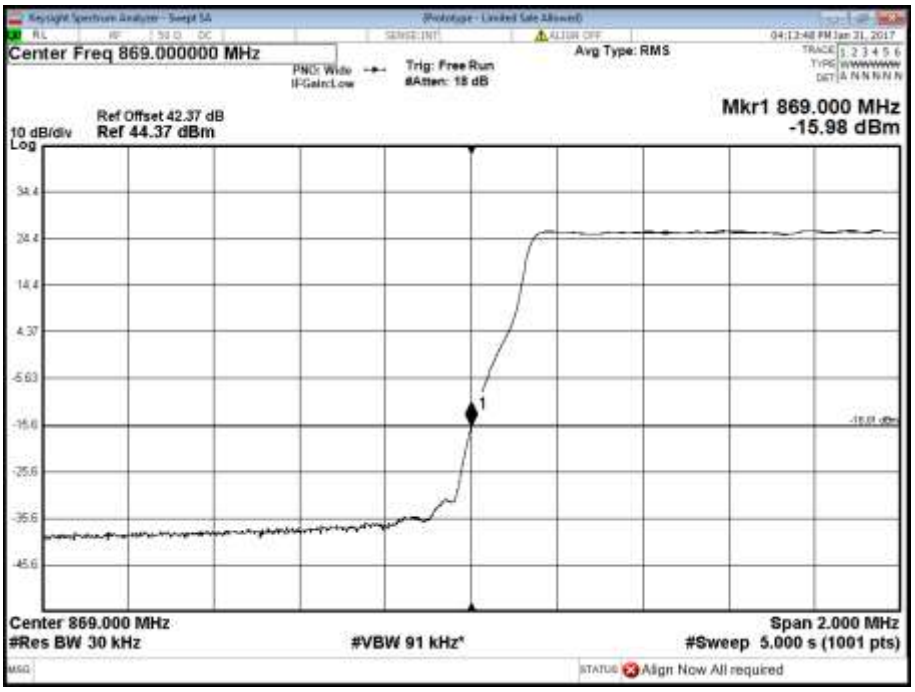
Antenna A - Channel Position B - Carrier Bandwidth 1.4 MHz - Modulation QPSK



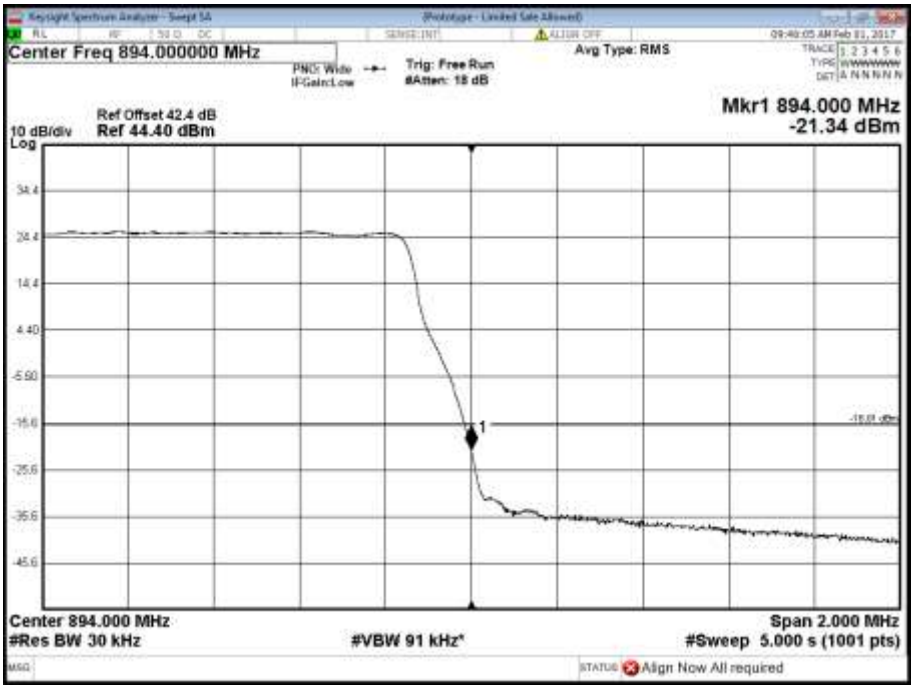
Antenna A - Channel Position T - Carrier Bandwidth 1.4 MHz - Modulation QPSK



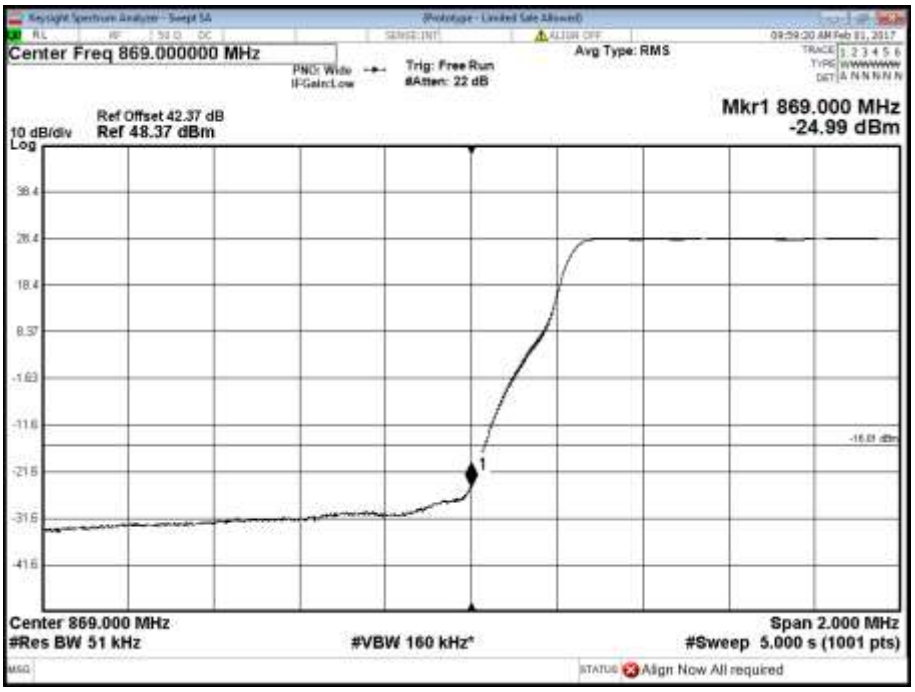
Antenna A - Channel Position B - Carrier Bandwidth 3.0 MHz - Modulation QPSK



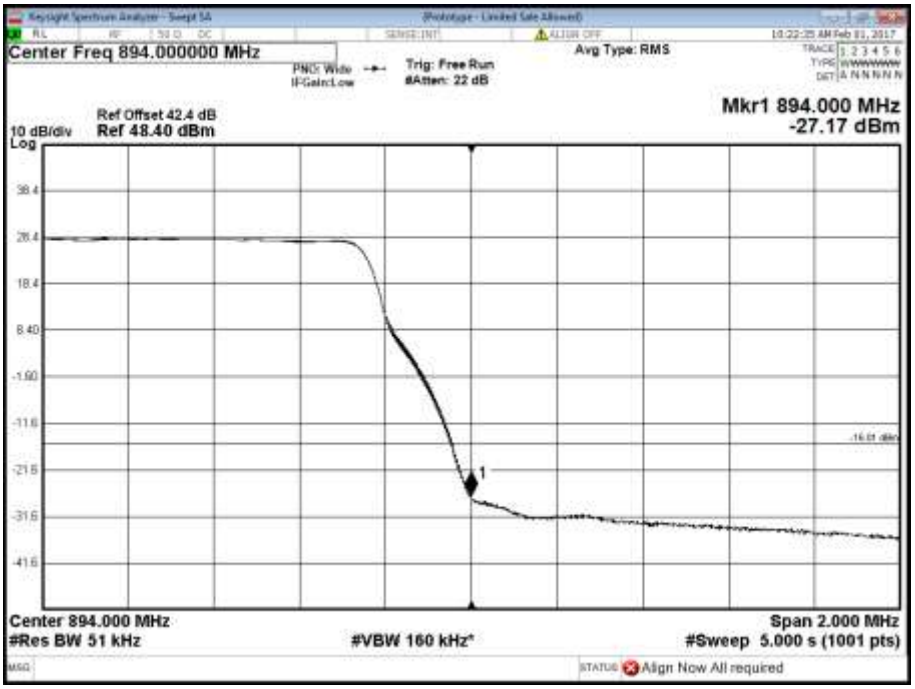
Antenna A - Channel Position T - Carrier Bandwidth 3.0 MHz - Modulation QPSK



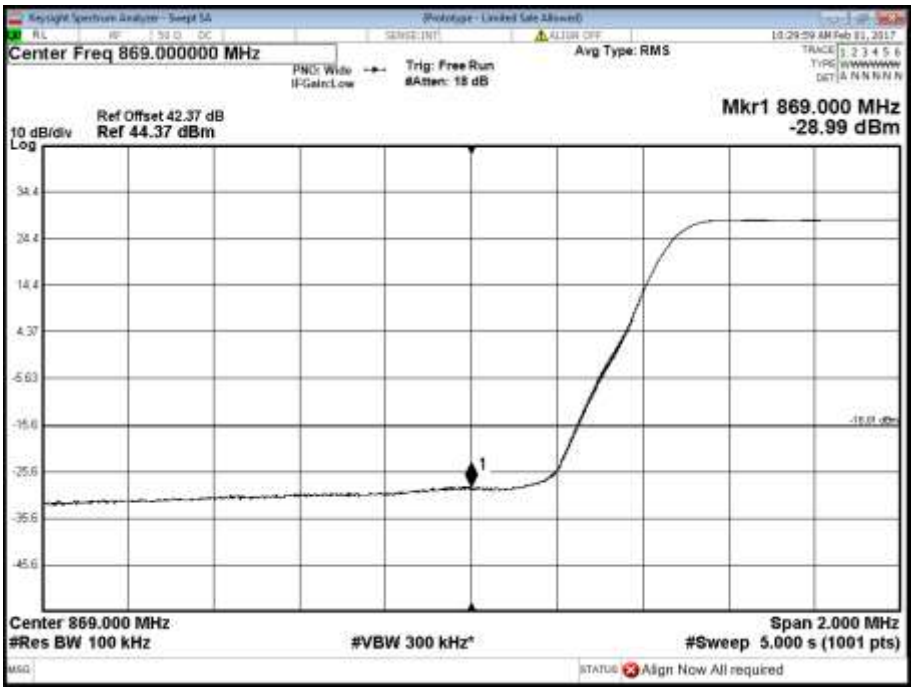
Antenna A - Channel Position B - Carrier Bandwidth 5.0 MHz - Modulation QPSK



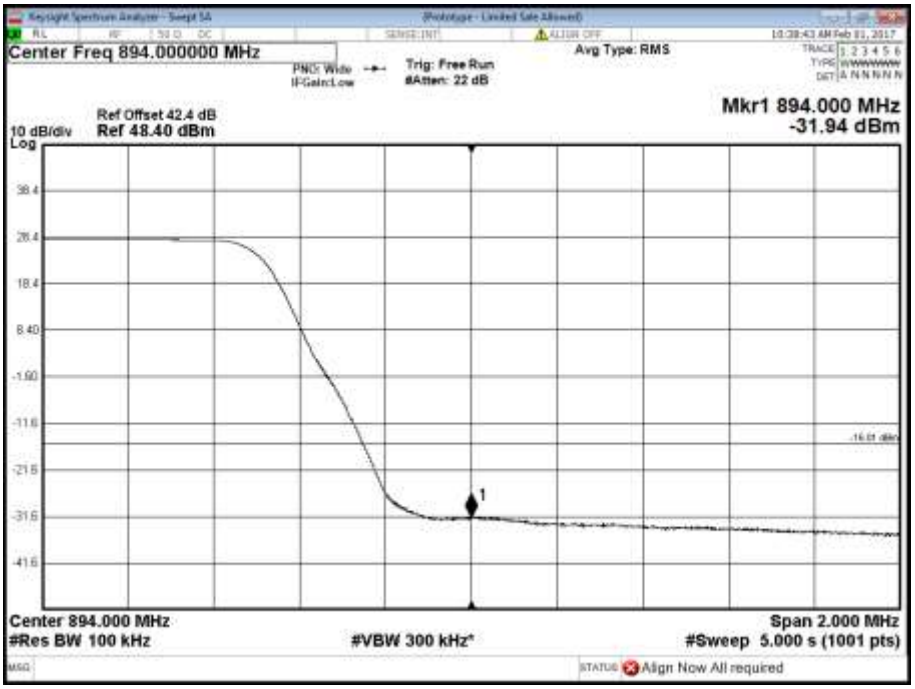
Antenna A - Channel Position T - Carrier Bandwidth 5.0 MHz - Modulation QPSK



Antenna A - Channel Position B - Carrier Bandwidth 10.0 MHz - Modulation QPSK



Antenna A - Channel Position T - Carrier Bandwidth 10.0 MHz - Modulation QPSK

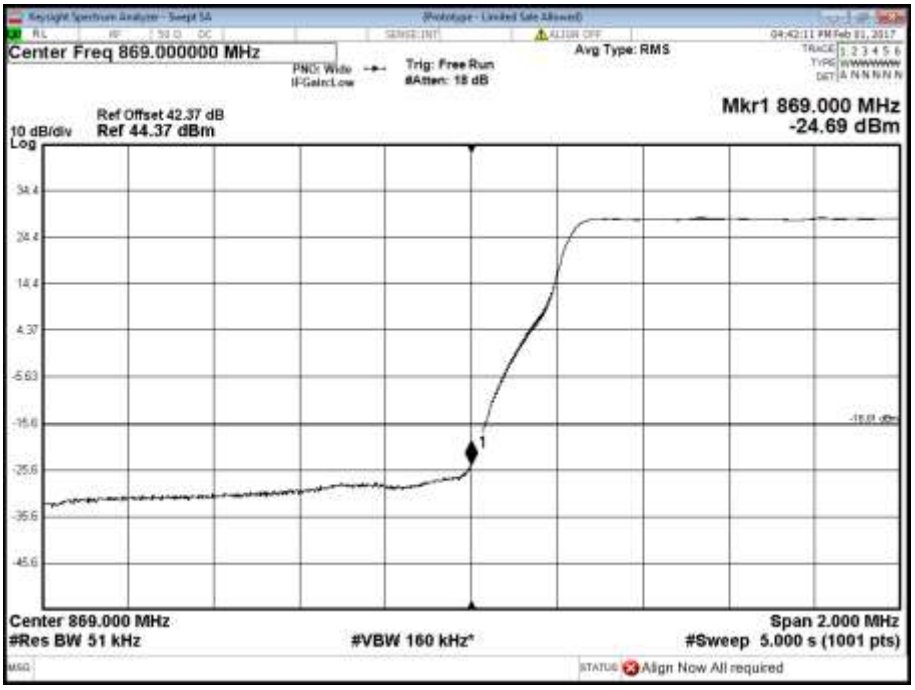


Configuration A

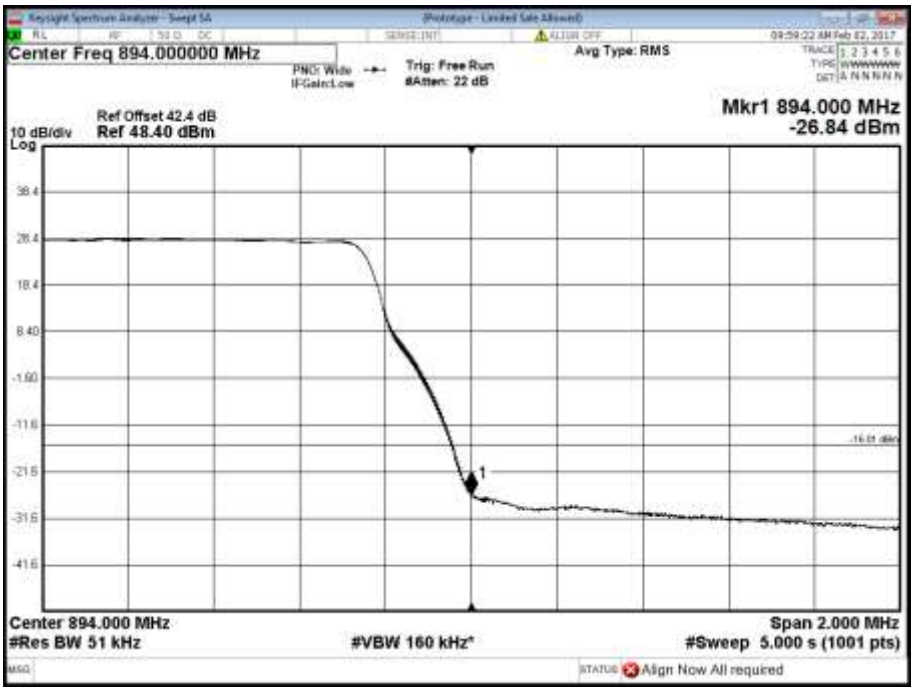
Maximum Output Power 49 dBm

Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position B	Channel Position T
5.0 MHz	QPSK	871.5	891.5

Antenna B - Channel Position B - Carrier Bandwidth 5.0 MHz - Modulation QPSK



Antenna B - Channel Position T - Carrier Bandwidth 5.0 MHz - Modulation QPSK

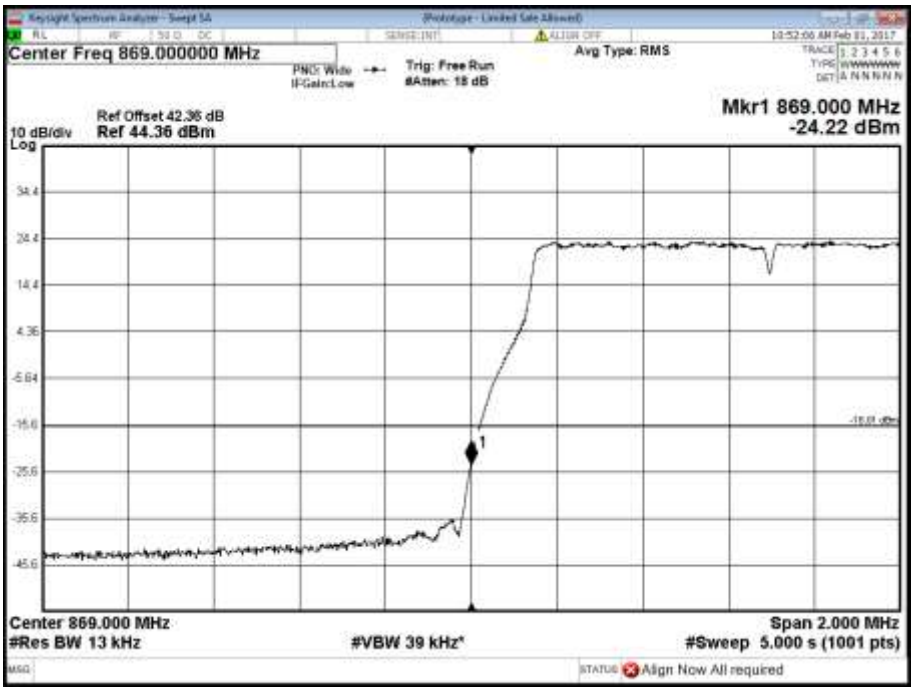


Configuration B

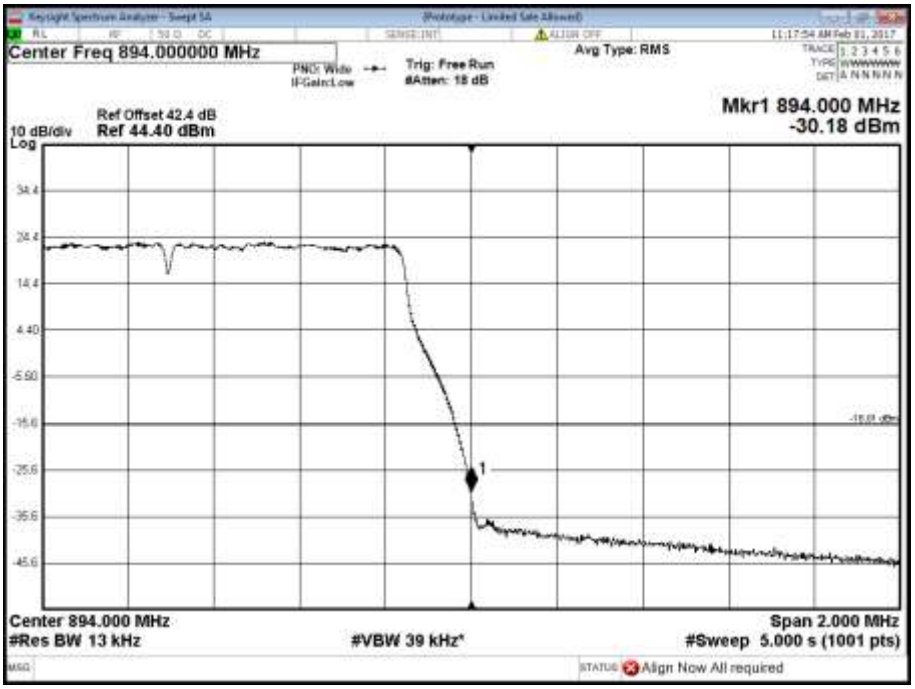
Maximum Output Power 49 dBm

Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position B	Channel Position T
1.4 MHz	QPSK	869.7 + 871.1	891.9 + 893.3
3.0 MHz	QPSK	870.5 + 873.5	889.5 + 892.5
5.0 MHz	QPSK	871.5 + 876.5	886.5 + 891.5
10.0 MHz	QPSK	874 + 884	879 + 889

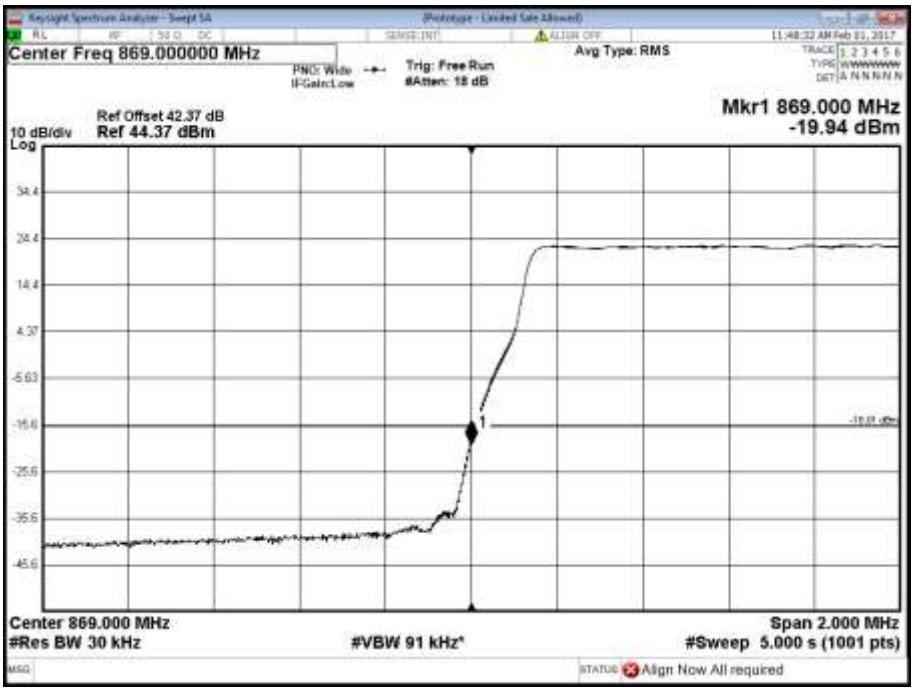
Antenna A - Channel Position B - Carrier Bandwidth 1.4 MHz - Modulation QPSK



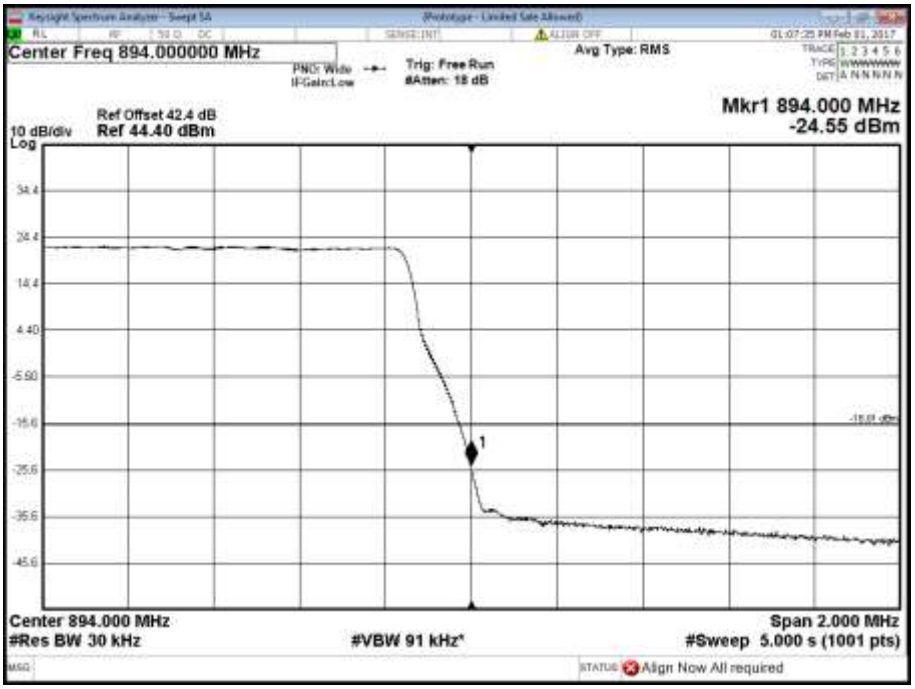
Antenna A - Channel Position T - Carrier Bandwidth 1.4 MHz - Modulation QPSK



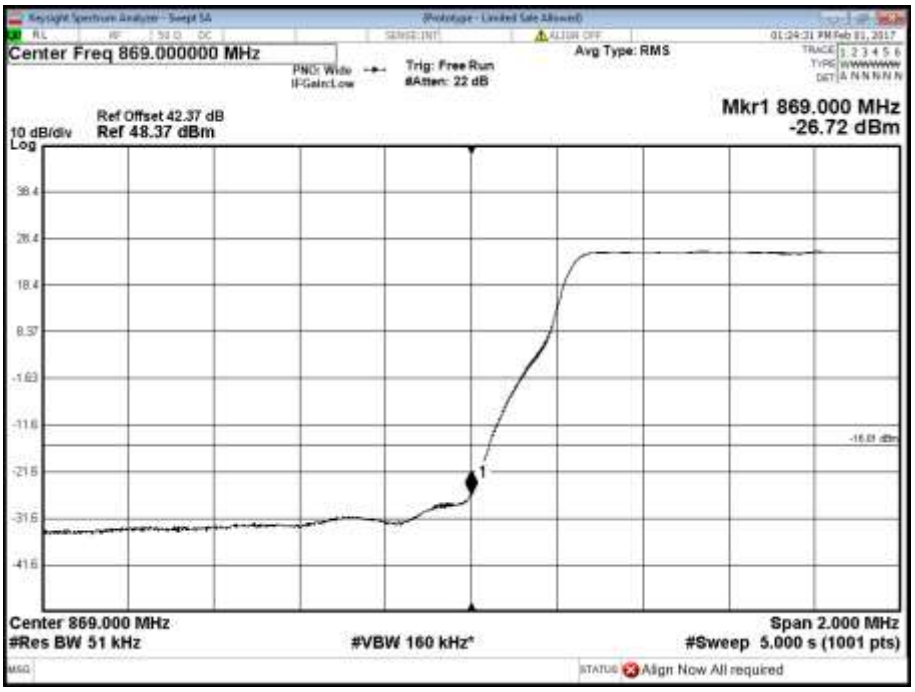
Antenna A - Channel Position B - Carrier Bandwidth 3.0 MHz - Modulation QPSK



Antenna A - Channel Position T - Carrier Bandwidth 3.0 MHz - Modulation QPSK



Antenna A - Channel Position B - Carrier Bandwidth 5.0 MHz - Modulation QPSK



Antenna A - Channel Position T - Carrier Bandwidth 5.0 MHz - Modulation QPSK