Product Service

Choose certainty.
Add value.

UKAS TESTING
0141

Report On

FCC and IC Testing of the 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
Maggie Whiting Key Account Manager	Steve Scarfe Authorised Signatory	01 June 2017

Document 75936624 Report 04 Issue 1 June 2017

Product Service

CONTENTS

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	BFL 901 009/1 using KRC 161 652/1
Non-Test Variant	BFL 901 009/1 using KRC 161 652/2
IC Model Name	287AB-AS161652
Serial Number(s)	D825389492
Software Version	CXP 901 7316/7, R64HE
Hardware Version	R2A
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2016 FCC CFR 47 Part 22: 2016 Industry Canada RSS-GEN: Issue 4: 2014 Industry Canada RSS-132: Issue 6: 2013
Start of Test	10 May 2017
Finish of Test	24 May 2017
Name of Engineer(s)	Ashok Kumar
Related Document(s)	KDB 971168 D01 v02r02

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) and 22.905(a)(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, KRC 161 652/2 supports 1 to 4 Carrier operation from either a single or dual port configuration. Pre-test results were used 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 also carried out on all antenna ports to confirm that each output was electrically identical.

This Report includes additional testing for Radio 2212 B5, KRC 161 652/2 supporting Single RAT GSM carriers in the 824 to 849 MHz frequency bands. Testing for SR WCDMA, LTE, and MR WCDMA +LTE, WCDMA + GSM and GSM + LTE can be found in 75936624 Report 01 Issue 2.

Test Models as defined in 3GPP TS 25.141 and TS 36.141 were used to represent the required modulation for test.

TX test cases: 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. All RF ports were tested for RF Carrier Power and results recorded using the Measure and Sum approach to account for MIMO operation. The test limits shown are representative of the worst case. All testing was performed with the EUT transmitting at maximum RF output power unless otherwise stated.

The EUT was powered by -48VDC.

Channel Configurations

GSM B5 (869 MHz – 894 MHz)

Configuration	RAT	No. of Carriers	Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
				Bottom (BRFBW)	Middle (MRFBW)	Top (TRFBW)
A	G	1	0.2	869.2	881.6	893.8
B	G	2	0.2	869.2+888.8	871.8+891.2	874.2+893.8
C	G	4	0.2	869.2+869.4+888.6+ 888.8	871.8+872.0+891.0+ 891.2	874.2+874.4+893.6+ 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 (without TX monitor), KRC 161 652/2 (with Tx monitor), KRC 161 652/3 (Identical with /1)	
SERIAL NUMBER	D824847243	
HARDWARE VERSION	R1A	
SOFTWARE VERSION	CXP 901 7316/7, R64HE	
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	B5, TX DL: 869-894 MHz	
RECEIVER FREQUENCY OPERATING RANGE (MHz)	B5, RX UL: 824- 849 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: 4 SR/SC: G max carriers: 4 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 V DC	
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	**ISED** **GSM:** 246KGXW, 249KG7W
DHSS/FHSS/COMBINED OR OTHER		

Signature Björn Utermöhl **Date 2017-05-12**

Signature 

Date 15 May 2017

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

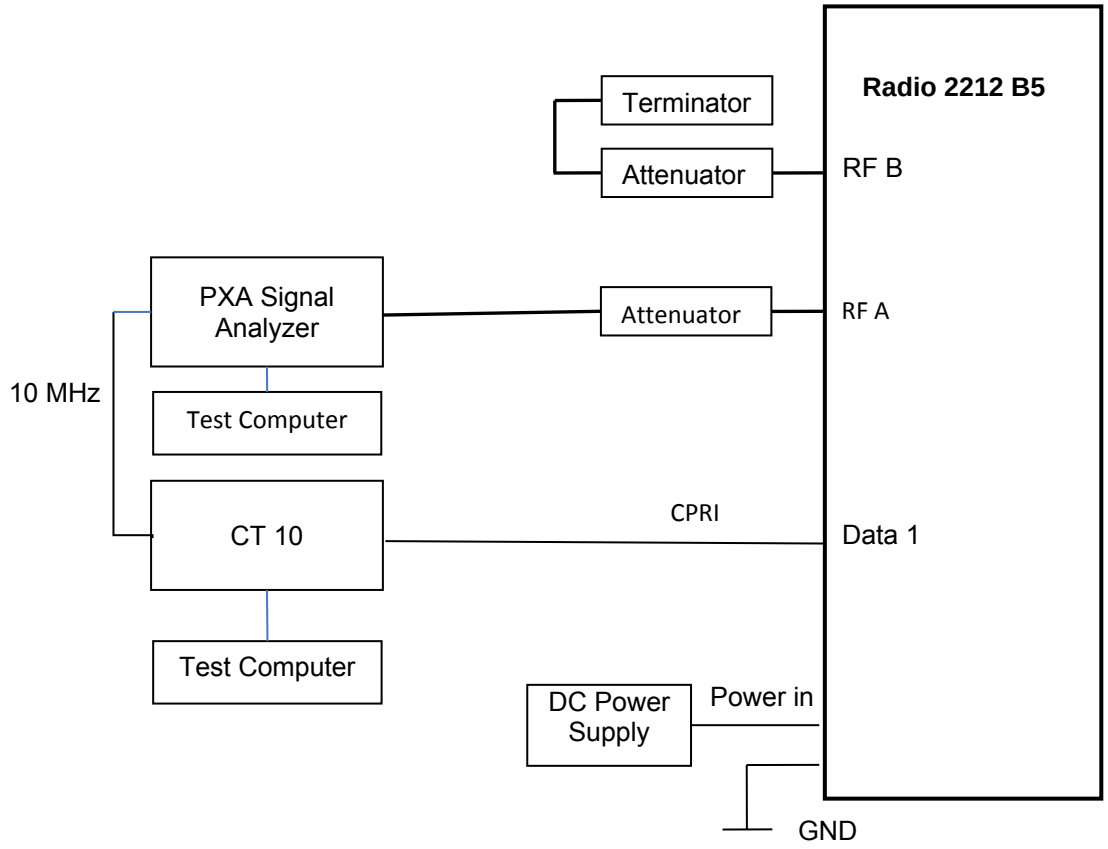
1.5 PRODUCT INFORMATION

1.5.1 Technical Description

The Equipment Under Test RBS 6601 using Radio 2212 B5 as Remote Radio Unit KRC 161 652/1 and 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 KRC 161 652/1 and KRC 161 652/2 operates from a -48V DC supply.

1.6 TEST SETUP

1.1 Test setup – block diagram (Room temperature, NON-NB_IoT)



Block diagram of Radio 2212 B5 with cables and auxiliary equipment

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

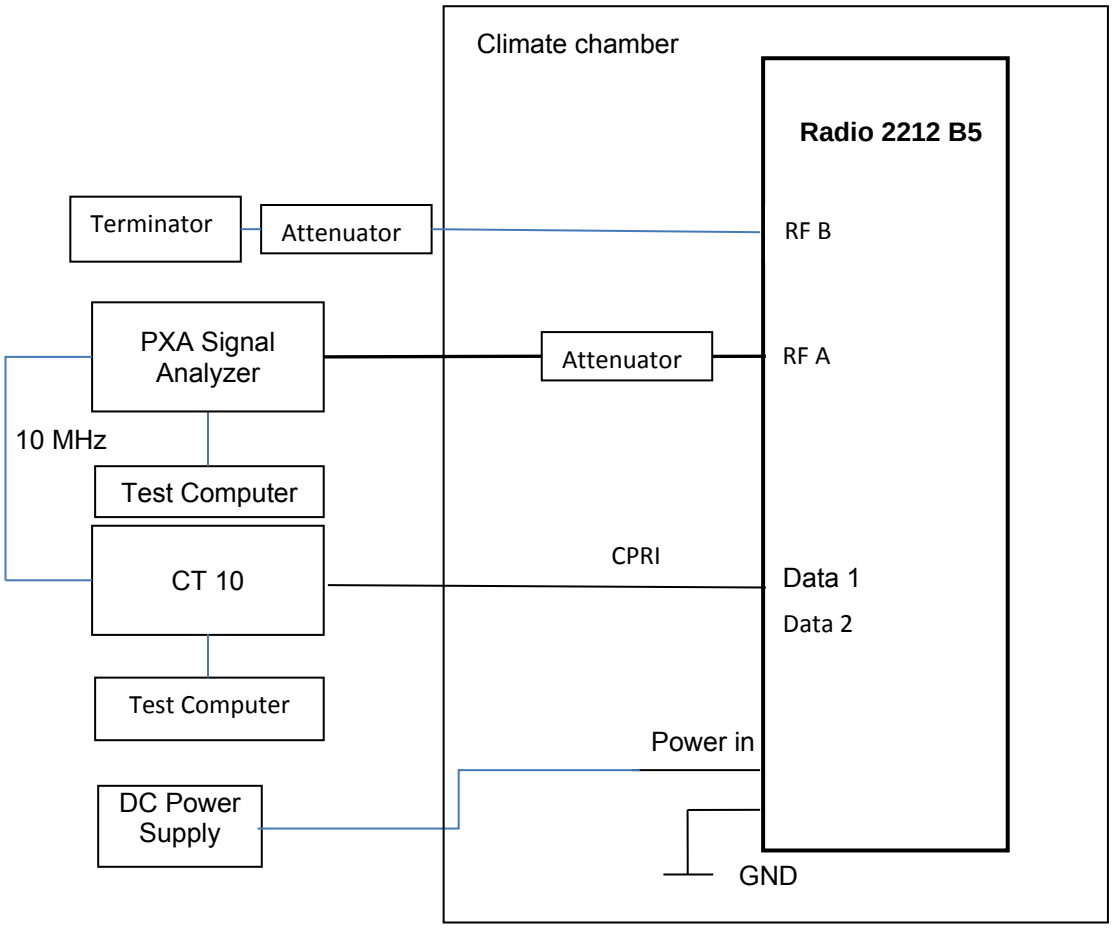


Figure 2, Block diagram of Radio 2212 B5 with cables and auxiliary equipment

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 was performed in the presence of Mr. Henry Liu at Ericsson AB, Kista Sweden.

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

22 May 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 22.6°C
Relative Humidity 27.9%

2.1.5 Test Method

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

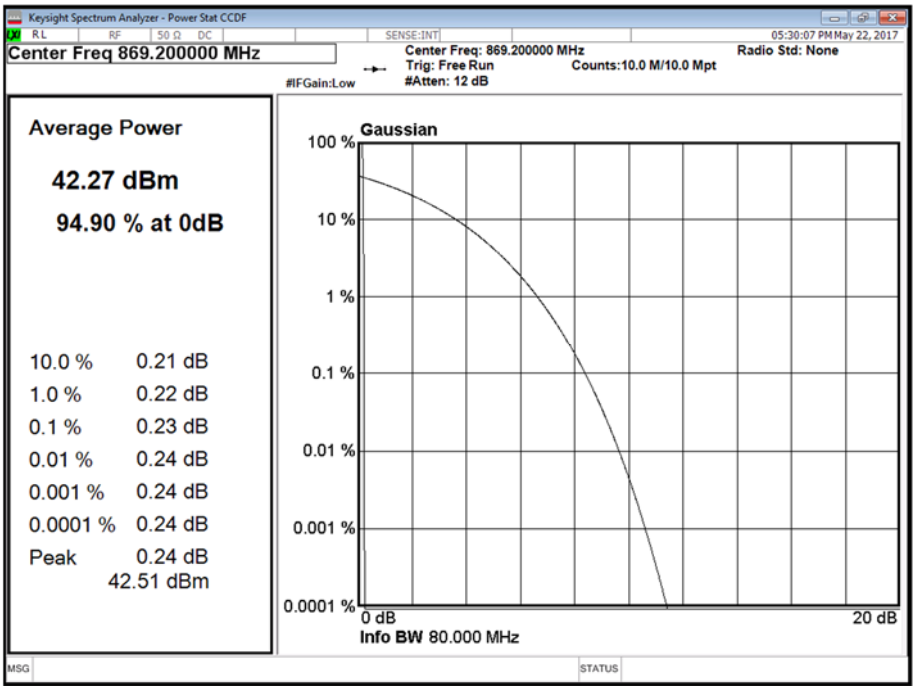
2.1.6 Test Results

Configuration A

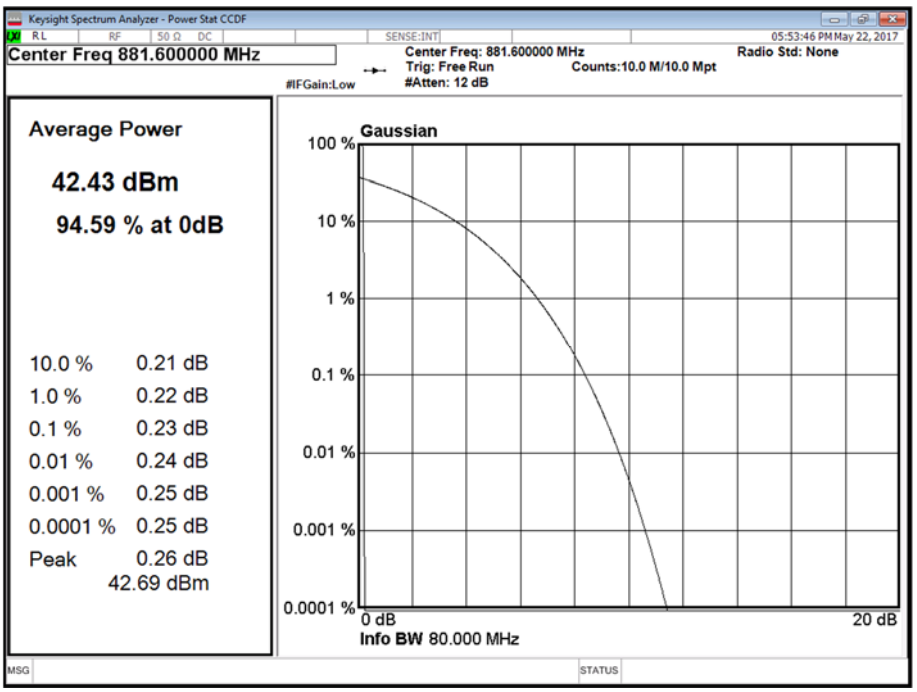
Maximum Output Power 43 dBm

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
GMSK	0.2	A	0.23	42.33	42.41	0.23	42.43	42.47	0.25	41.86	41.98
AQPSK	0.2	A	3.59	42.25	42.51	3.54	42.43	42.76	3.56	42.00	42.39
8PSK	0.2	A	3.39	42.20	42.47	3.39	42.36	42.66	3.41	41.83	42.20
GMSK	0.2	B	0.23	42.20	42.27	0.21	42.44	42.53	0.26	41.84	42.00
AQPSK	0.2	B	3.56	42.20	42.45	3.59	42.53	42.77	3.51	41.94	42.18
8PSK	0.2	B	3.42	42.20	42.48	3.40	42.52	42.81	3.40	41.86	42.20

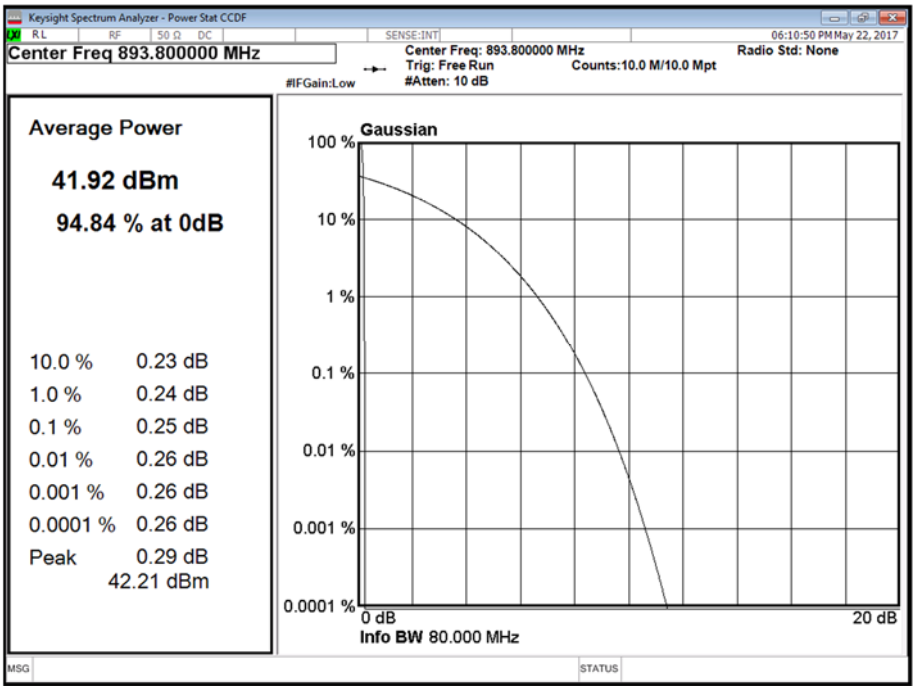
Antenna A - Channel Position B - Bandwidth 0.2 MHz - Modulation GMSK



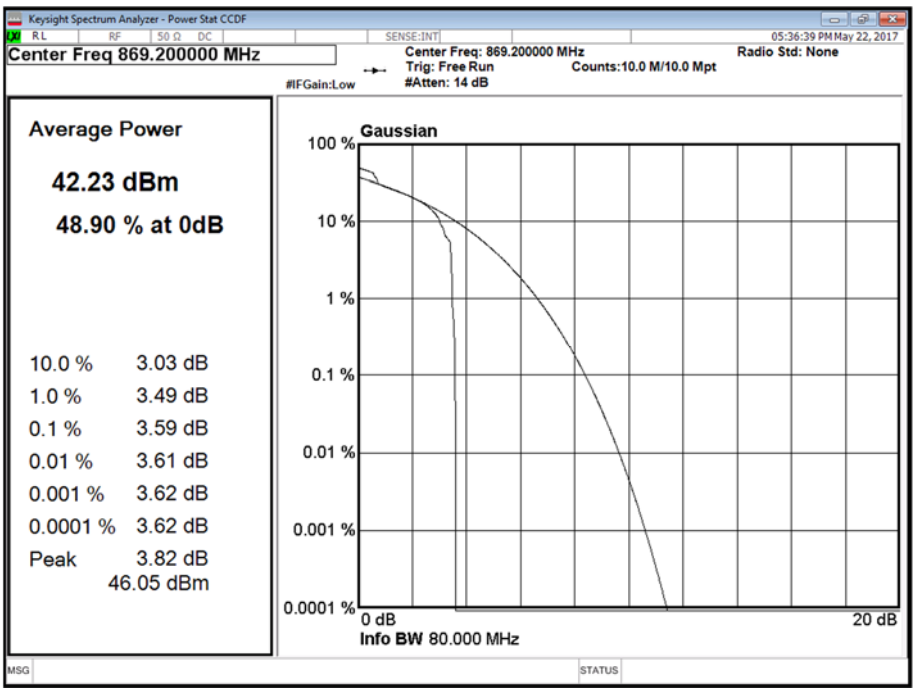
Antenna A - Channel Position M - Bandwidth 0.2 MHz - Modulation GMSK



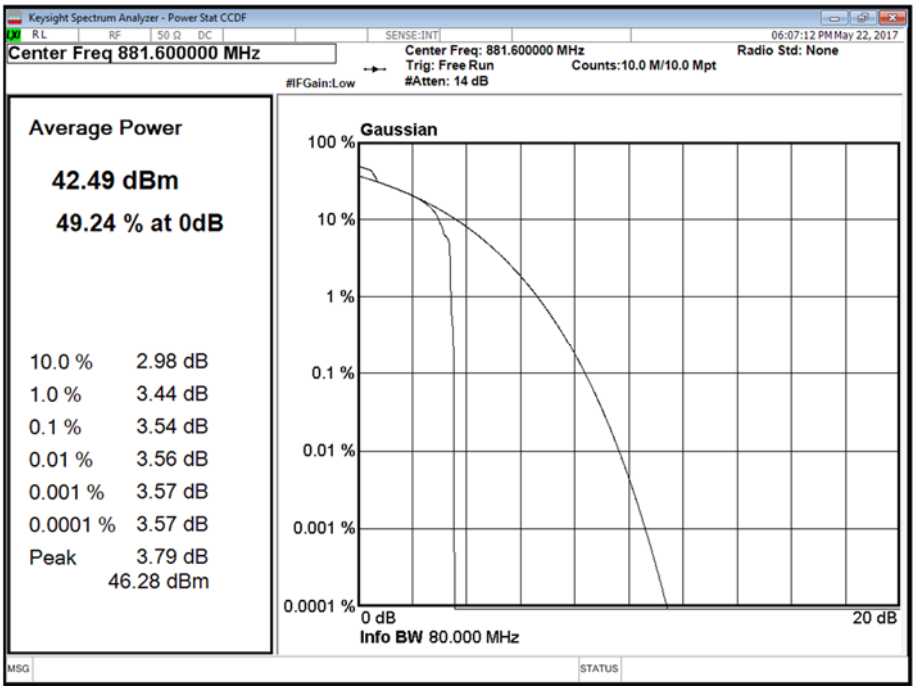
Antenna A - Channel Position T - Bandwidth 0.2 MHz - Modulation GMSK



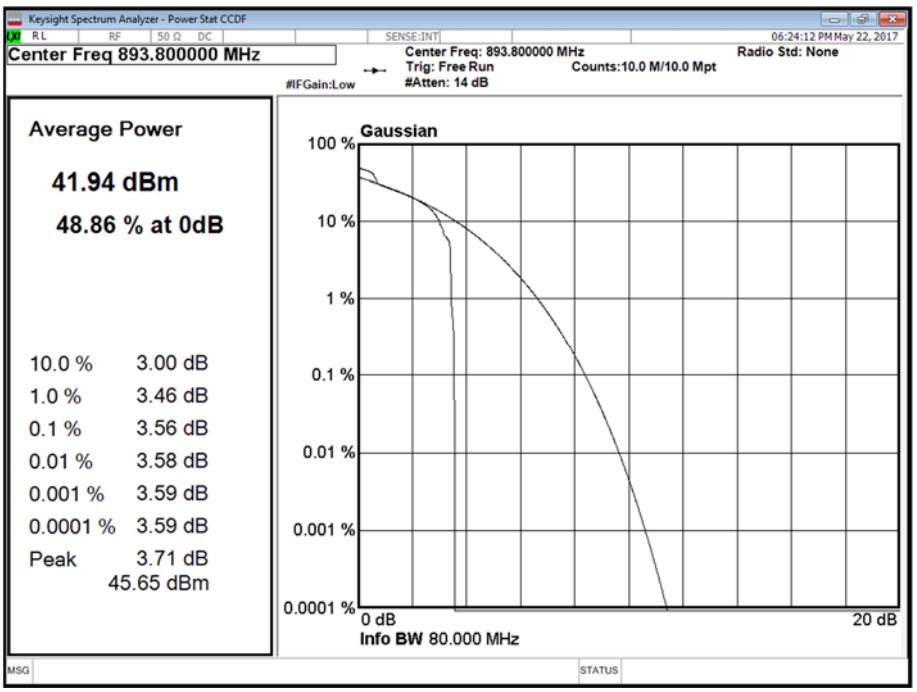
Antenna A - Channel Position B - Bandwidth 0.2 MHz - Modulation AQPSK



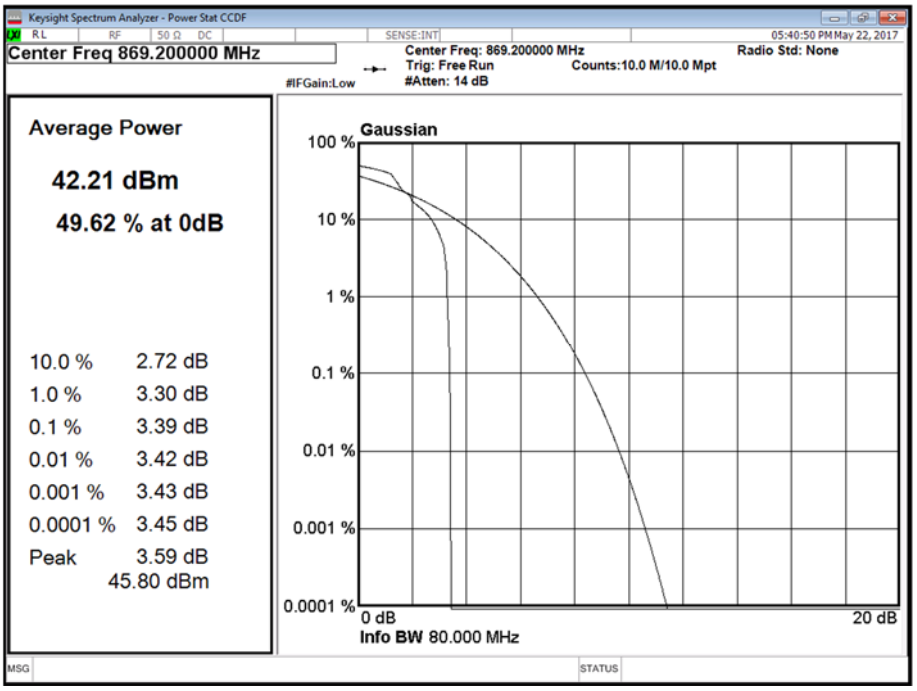
Antenna A - Channel Position M - Bandwidth 0.2 MHz - Modulation AQPSK



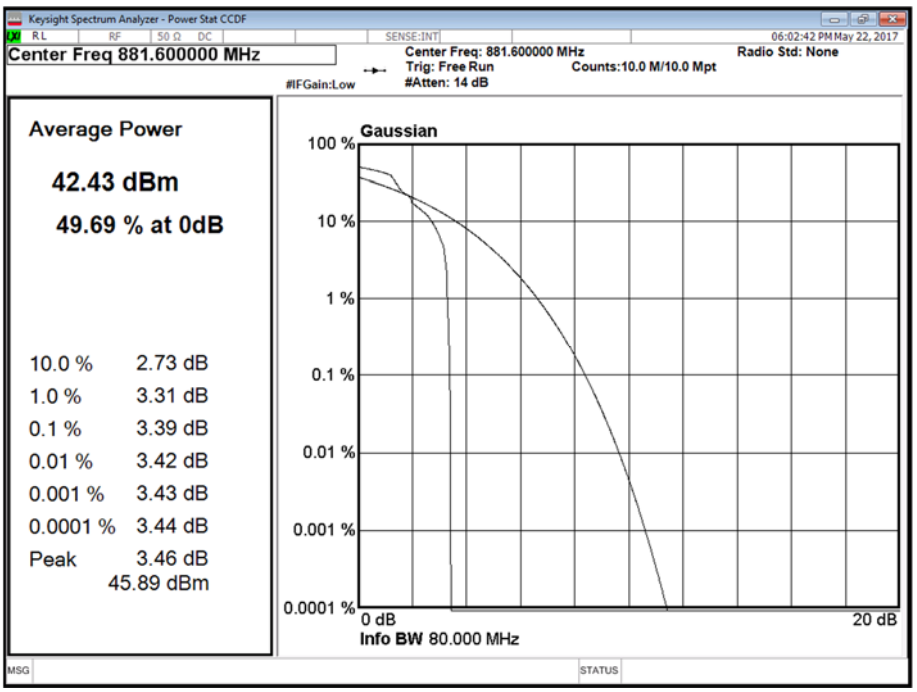
Antenna A - Channel Position T - Bandwidth 0.2 MHz - Modulation AQPSK



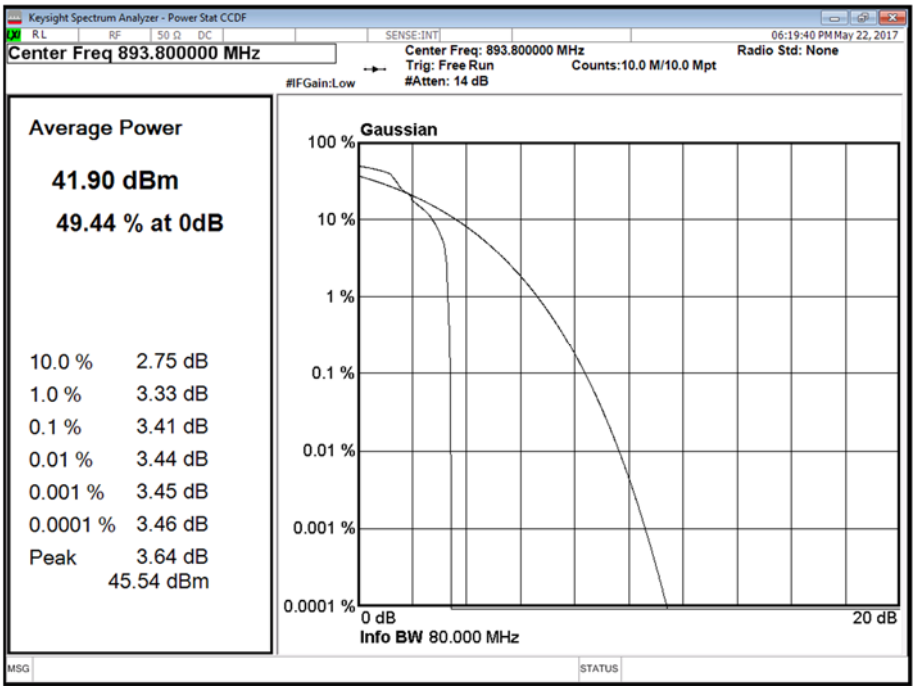
Antenna A - Channel Position B - Bandwidth 0.2 MHz - Modulation 8PSK



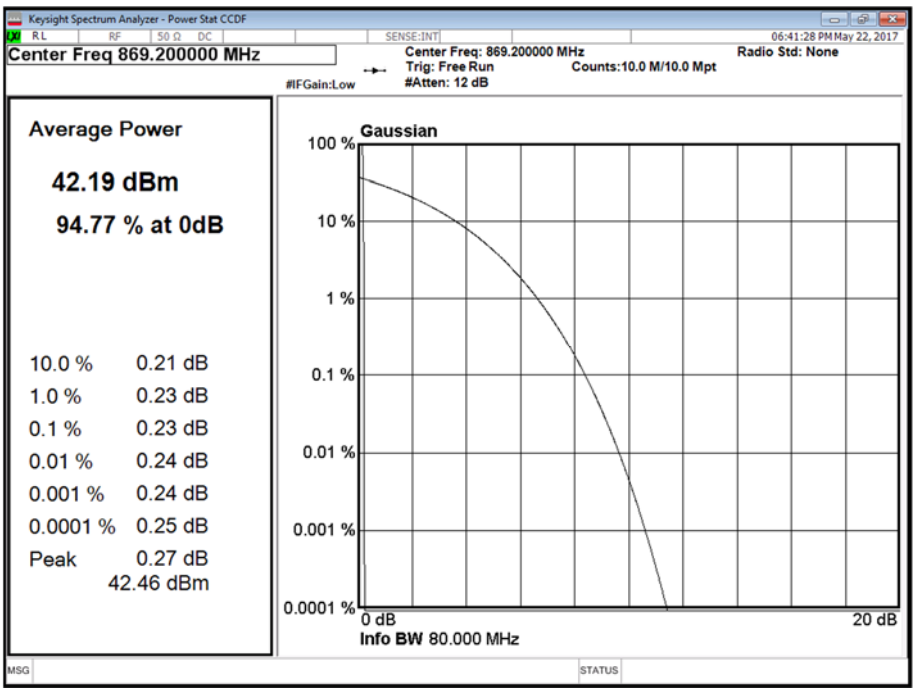
Antenna A - Channel Position M - Bandwidth 0.2 MHz - Modulation 8PSK



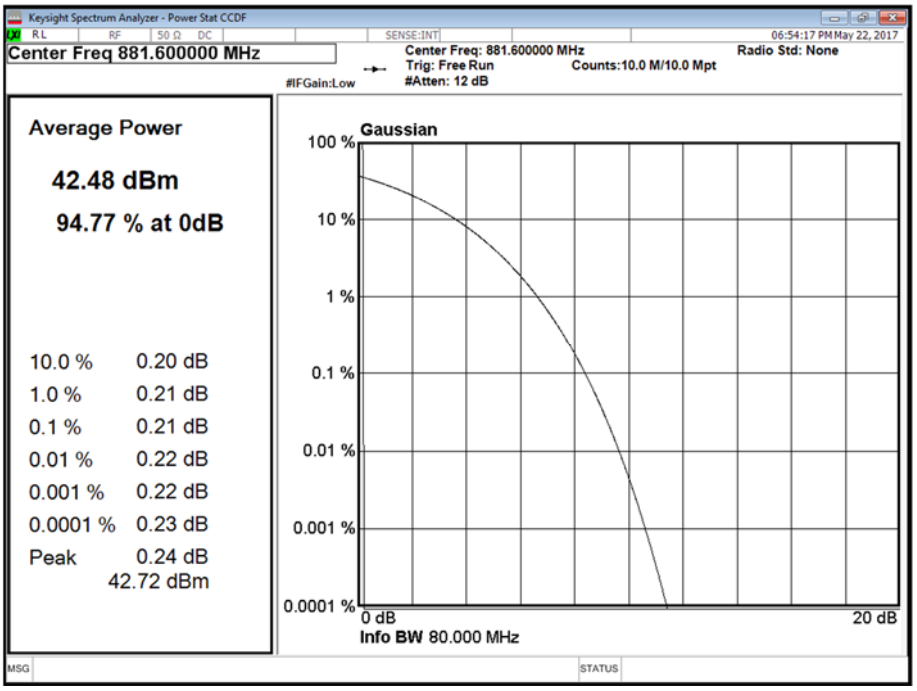
Antenna A - Channel Position T - Bandwidth 0.2 MHz - Modulation 8PSK



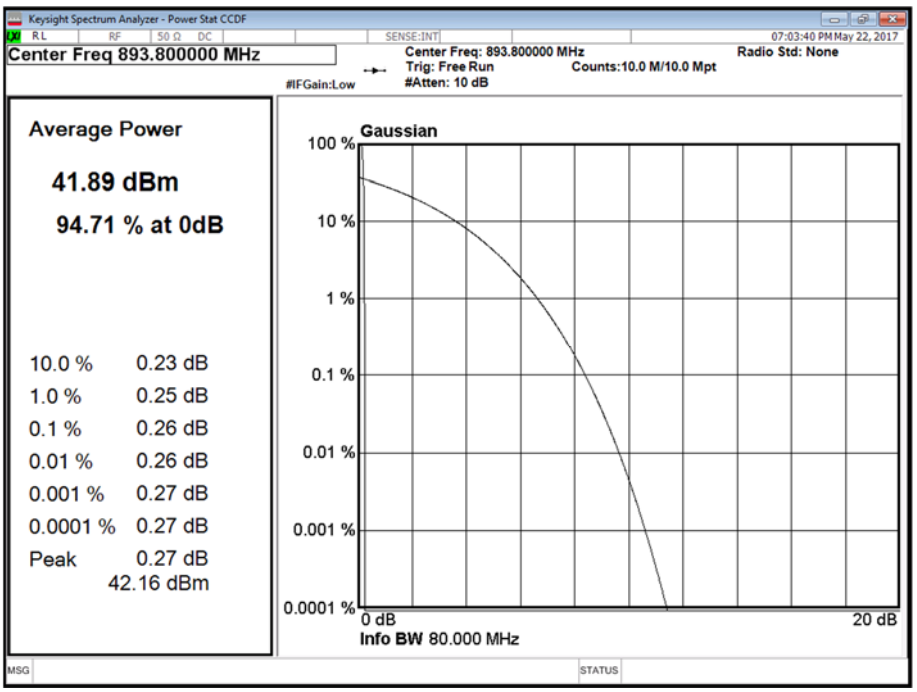
Antenna B - Channel Position B - Bandwidth 0.2 MHz - Modulation GMSK



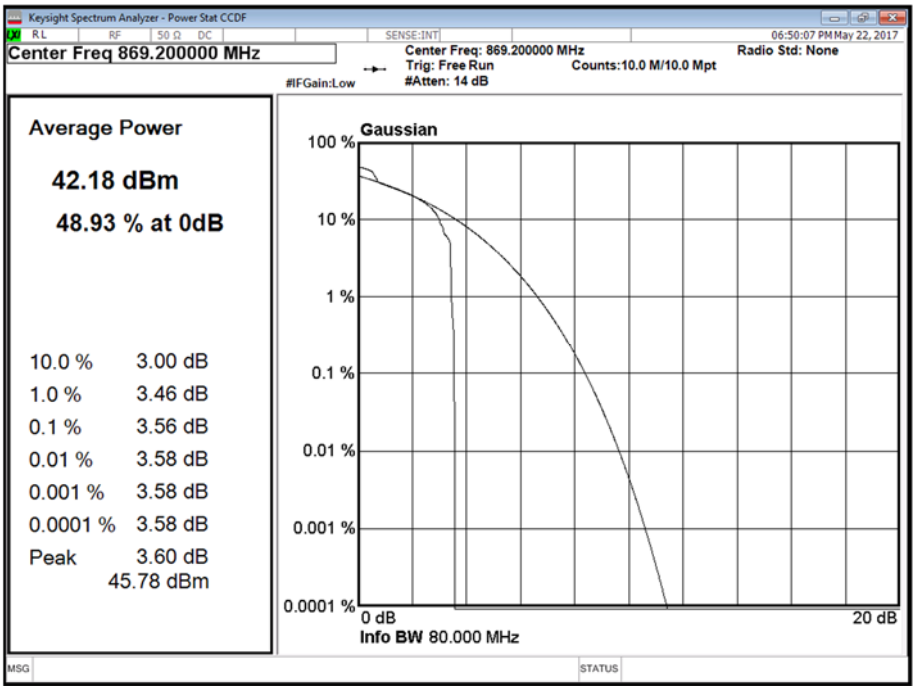
Antenna B - Channel Position M - Bandwidth 0.2 MHz - Modulation GMSK



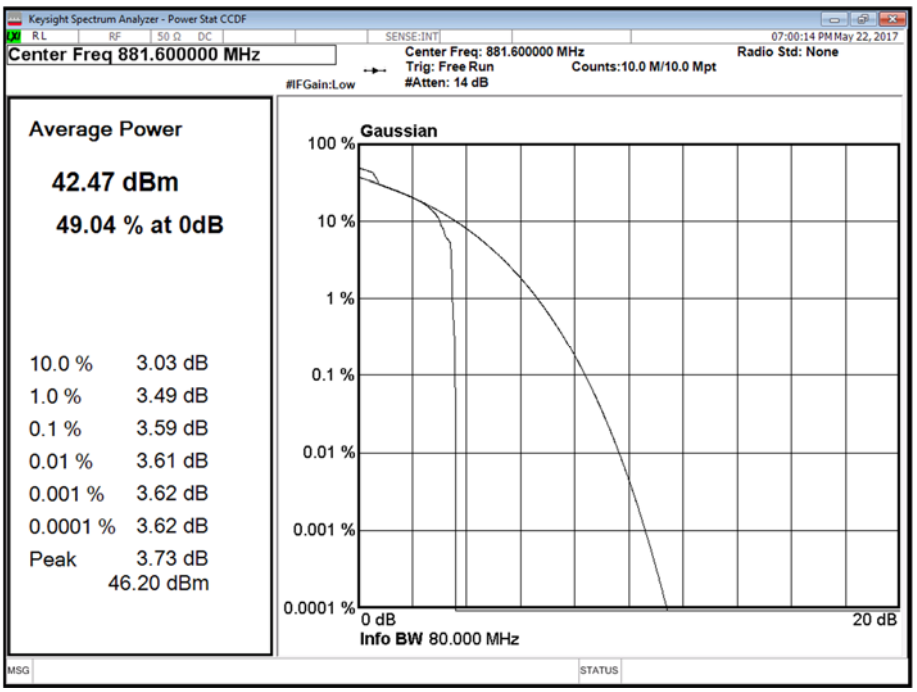
Antenna B - Channel Position T - Bandwidth 0.2 MHz - Modulation GMSK



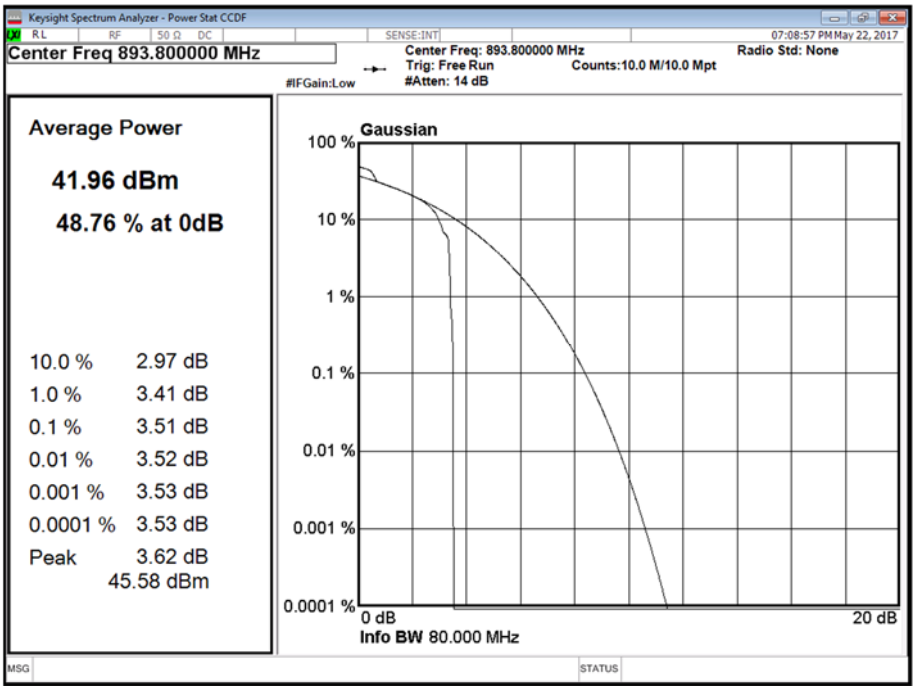
Antenna B - Channel Position B - Bandwidth 0.2 MHz - Modulation AQPSK



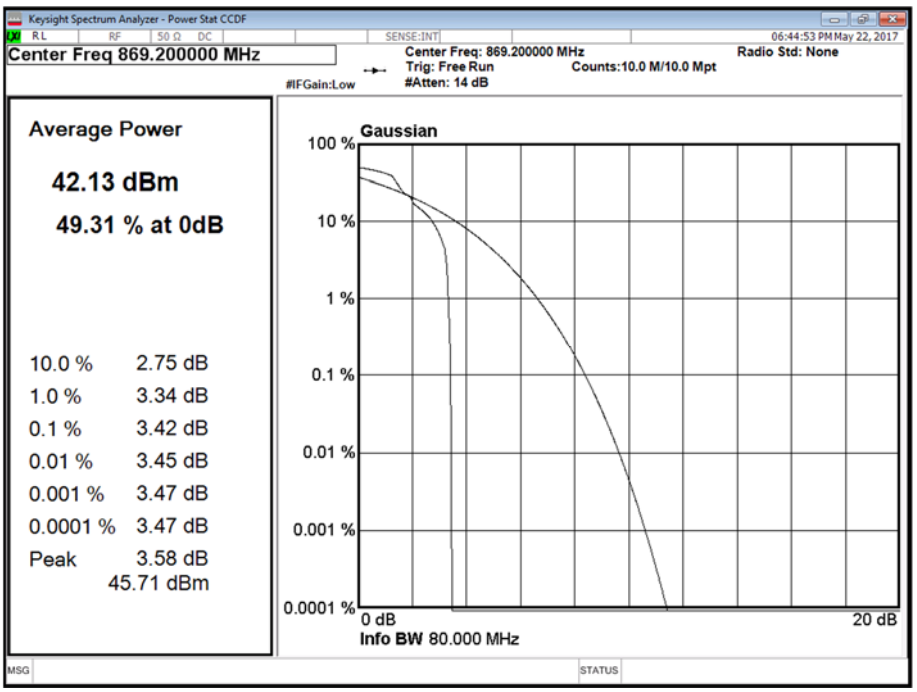
Antenna B - Channel Position M - Bandwidth 0.2 MHz - Modulation AQPSK



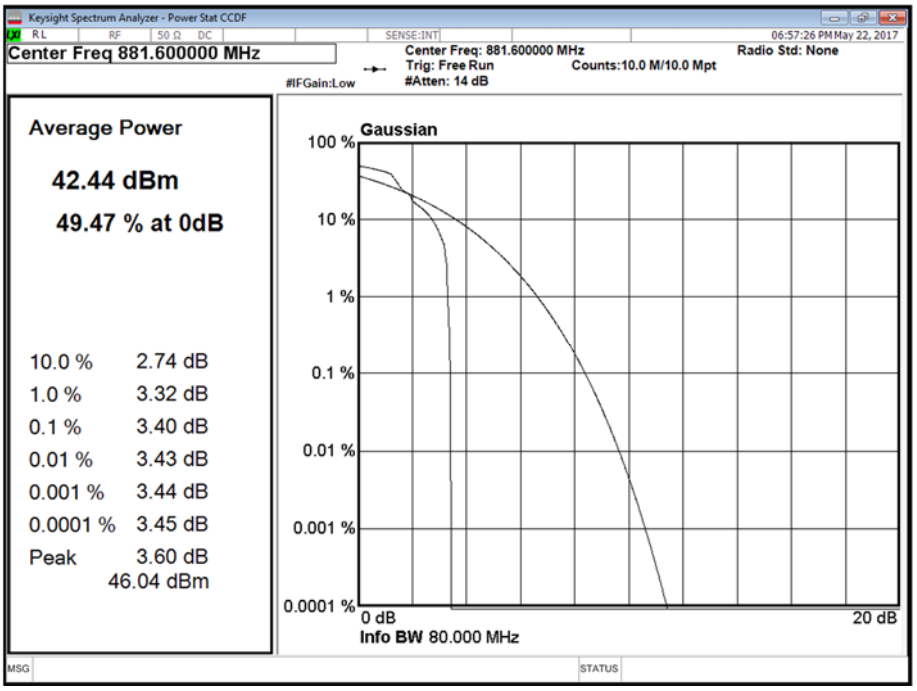
Antenna B - Channel Position T - Bandwidth 0.2 MHz - Modulation AQPSK



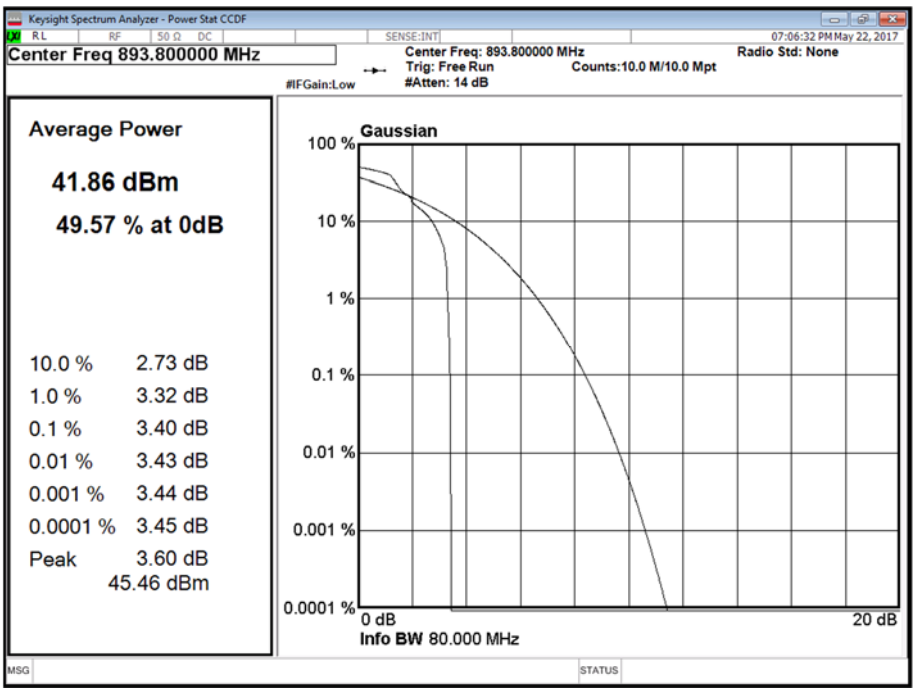
Antenna B - Channel Position B - Bandwidth 0.2 MHz - Modulation 8PSK



Antenna B - Channel Position M - Bandwidth 0.2 MHz - Modulation 8PSK



Antenna B - Channel Position T - Bandwidth 0.2 MHz - Modulation 8PSK



Configuration B

Maximum Output Power 43 dBm

Modulation	Carrier 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	0.2	A	0.23	42.33	42.41	0.23	42.43	42.47	0.25	41.86	41.98
AQPSK	0.2	A	3.59	42.25	42.51	3.54	42.43	42.76	3.56	42.00	42.39
8PSK	0.2	A	3.39	42.20	42.47	3.39	42.36	42.66	3.41	41.83	42.20

Configuration C

Maximum Output Power 43 dBm

Modulation	Carrier 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	0.2	A	0.23	42.33	42.41	0.23	42.43	42.47	0.25	41.86	41.98
AQPSK	0.2	A	3.59	42.25	42.51	3.54	42.43	42.76	3.56	42.00	42.39
8PSK	0.2	A	3.39	42.20	42.47	3.39	42.36	42.66	3.41	41.83	42.20

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 5.6

2.2.2 Date of Test and Modification State

22 May 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	22.6°C
Relative Humidity	27.9%

2.2.5 Test Method

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

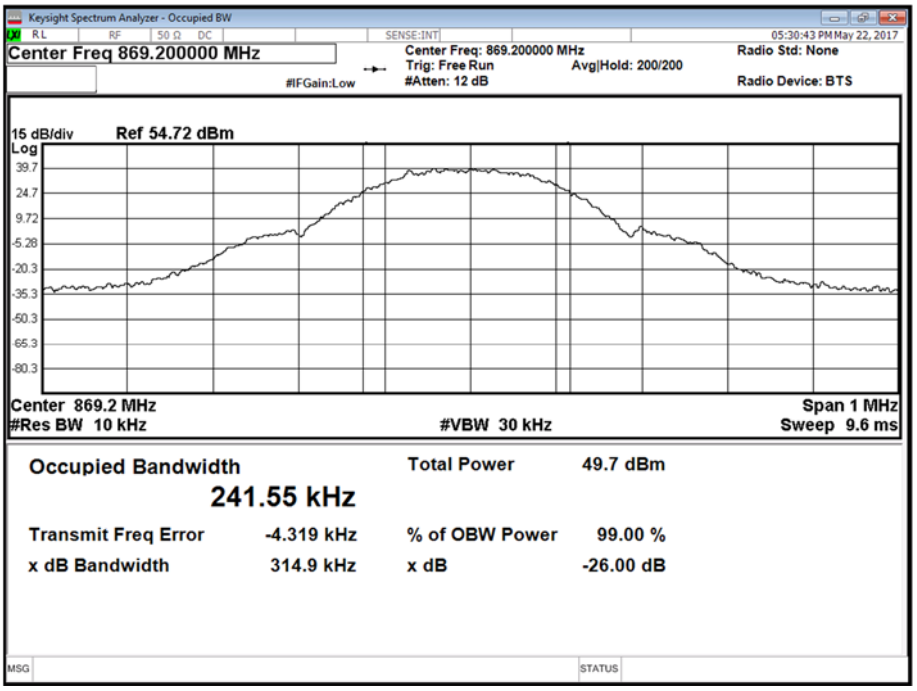
2.2.6 Test Results

Configuration A

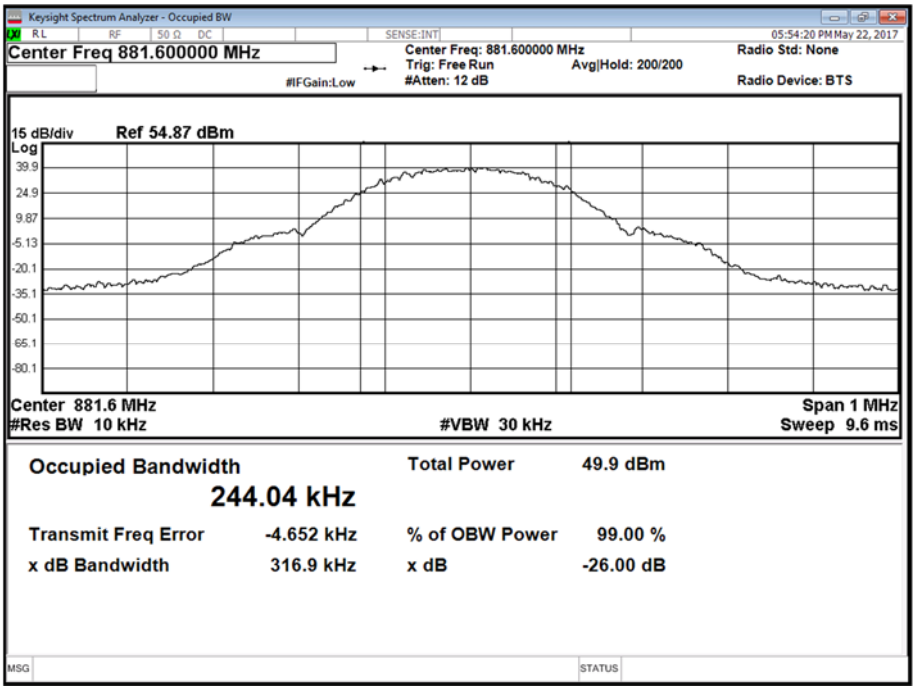
Maximum Output Power 43 dBm

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	241.55	314.91	244.04	316.95	242.07	316.92
AQPSK	246.71	312.43	246.02	319.26	244.64	311.33
8PSK	250.80	322.42	244.42	317.10	245.17	313.58

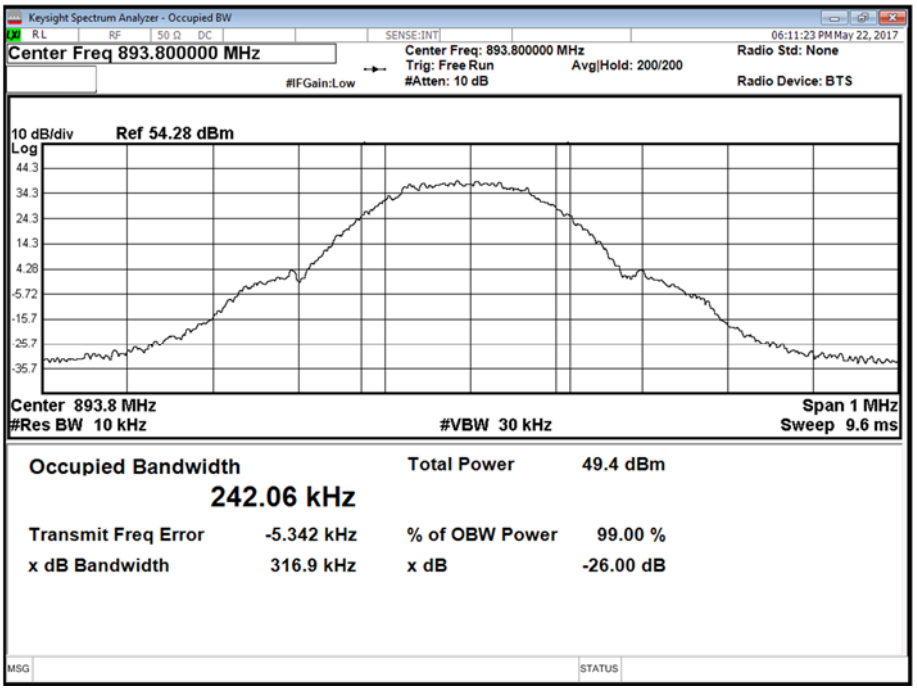
Antenna A - Channel Position B - Modulation GMSK



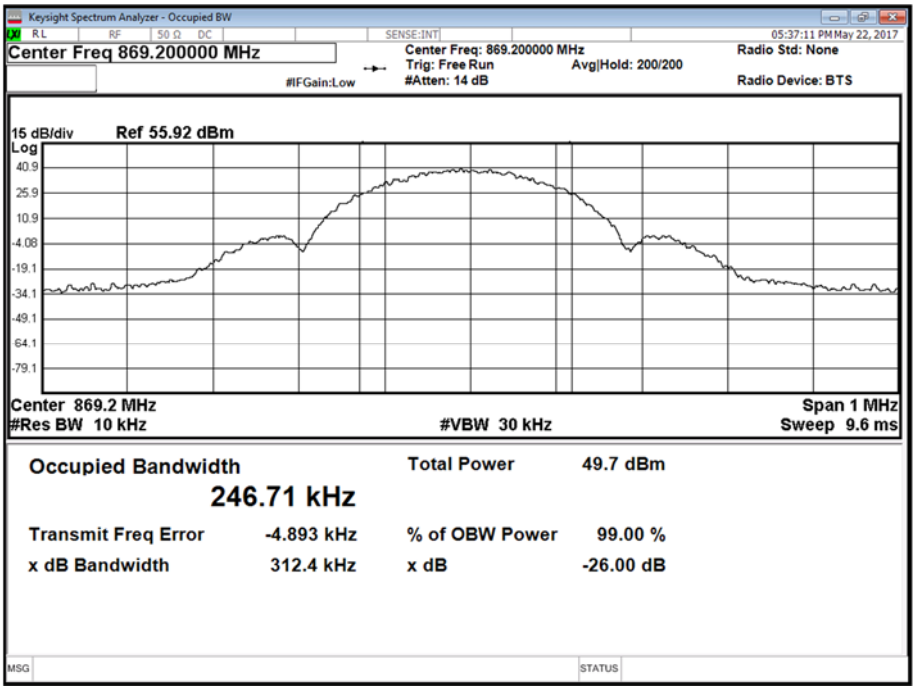
Antenna A - Channel Position M - Modulation GMSK



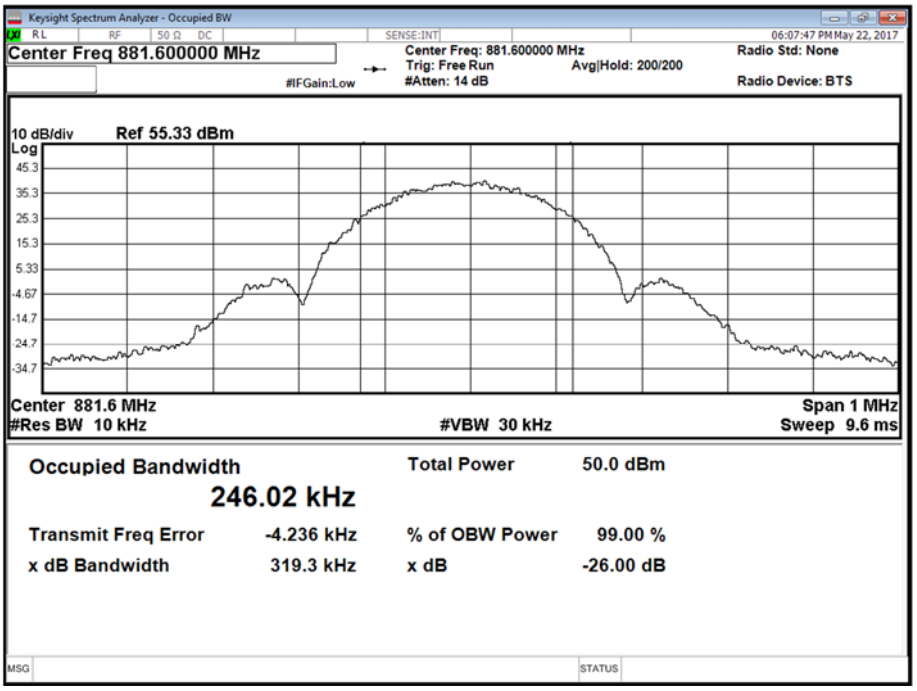
Antenna A - Channel Position T - Modulation GMSK



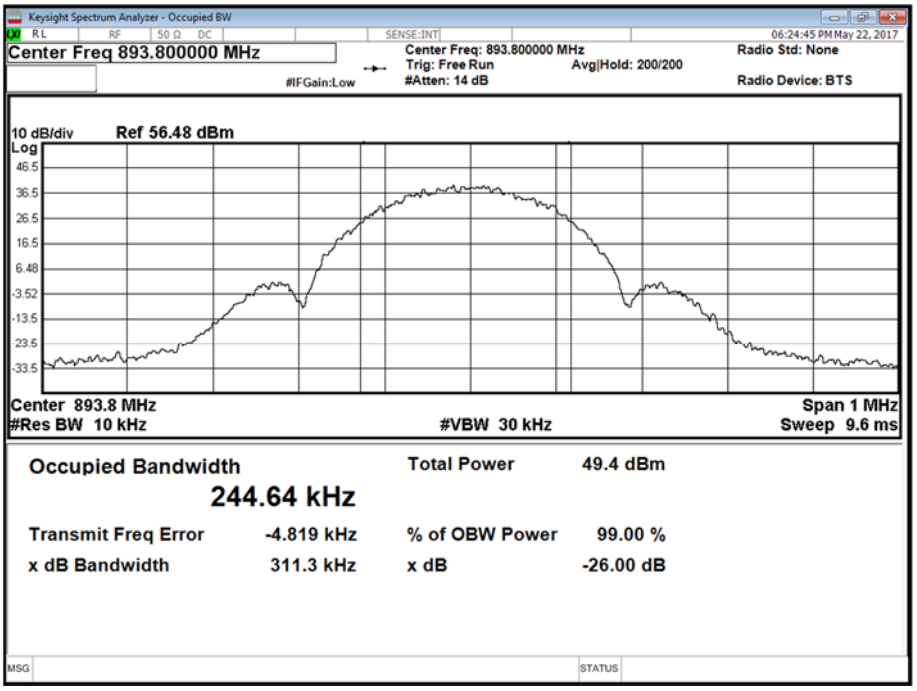
Antenna A - Channel Position B - Modulation AQPSK



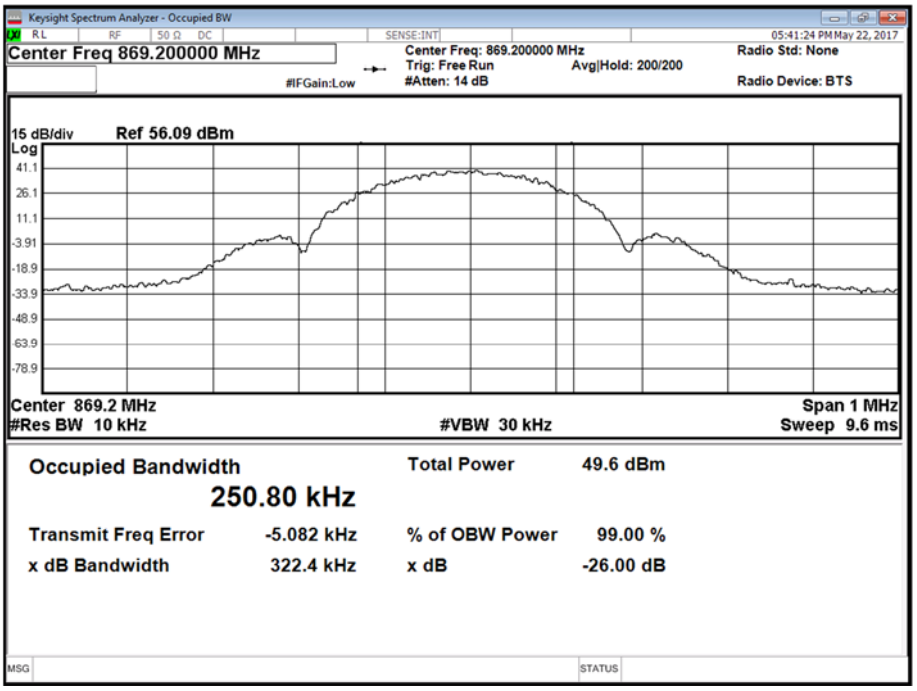
Antenna A - Channel Position M - Modulation AQPSK



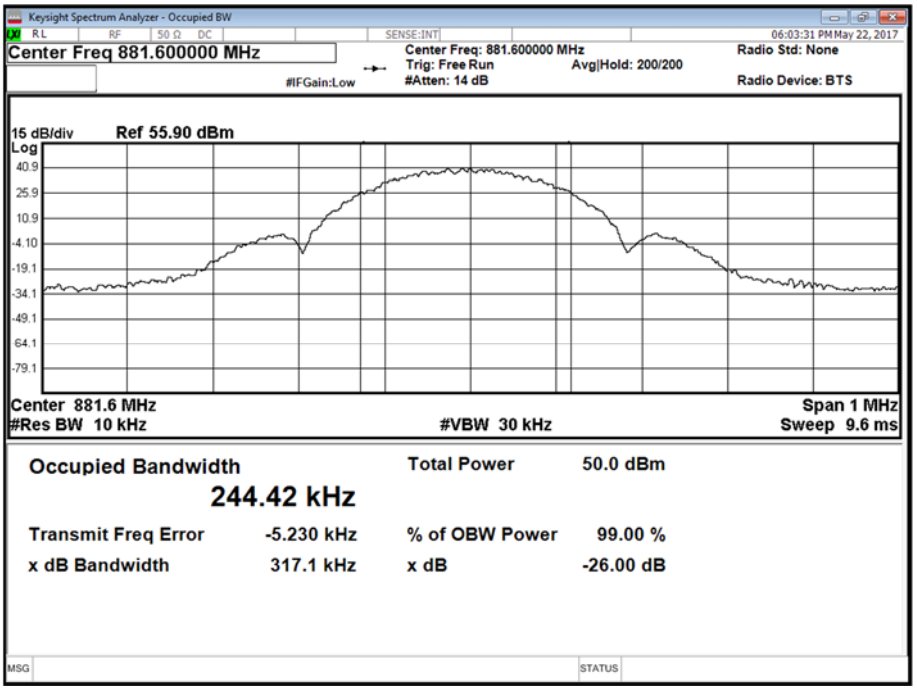
Antenna A - Channel Position T - Modulation AQPSK



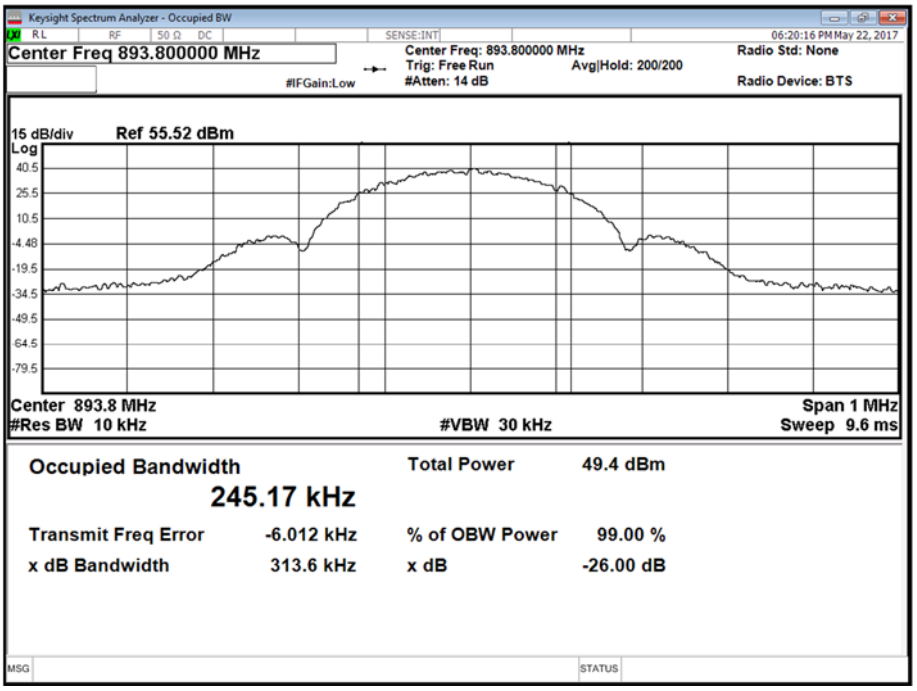
Antenna A - Channel Position B - Modulation 8PSK



Antenna A - Channel Position M - Modulation 8PSK



Antenna A - Channel Position T - Modulation 8PSK

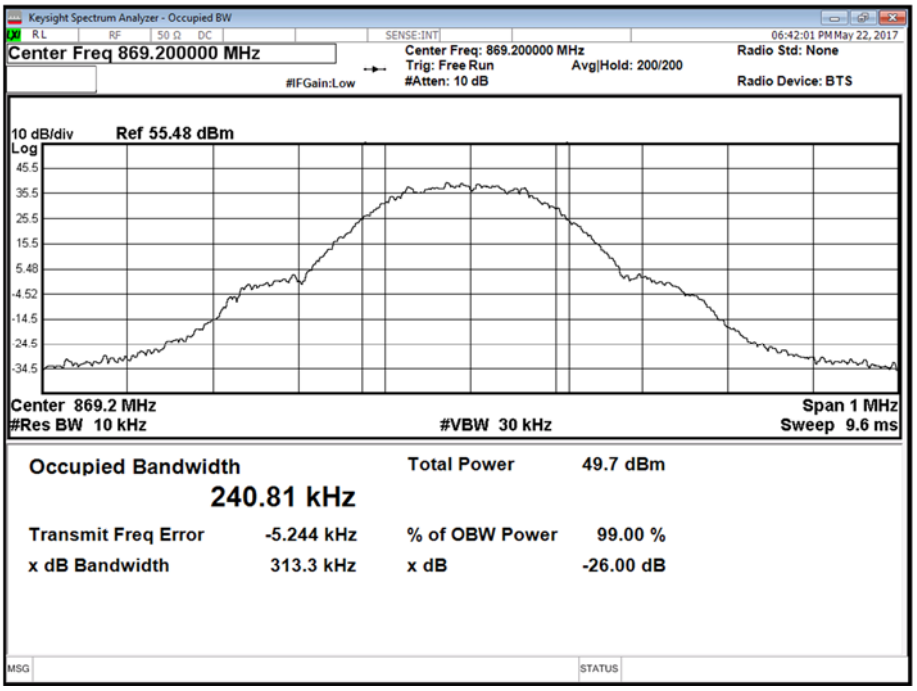


Configuration A

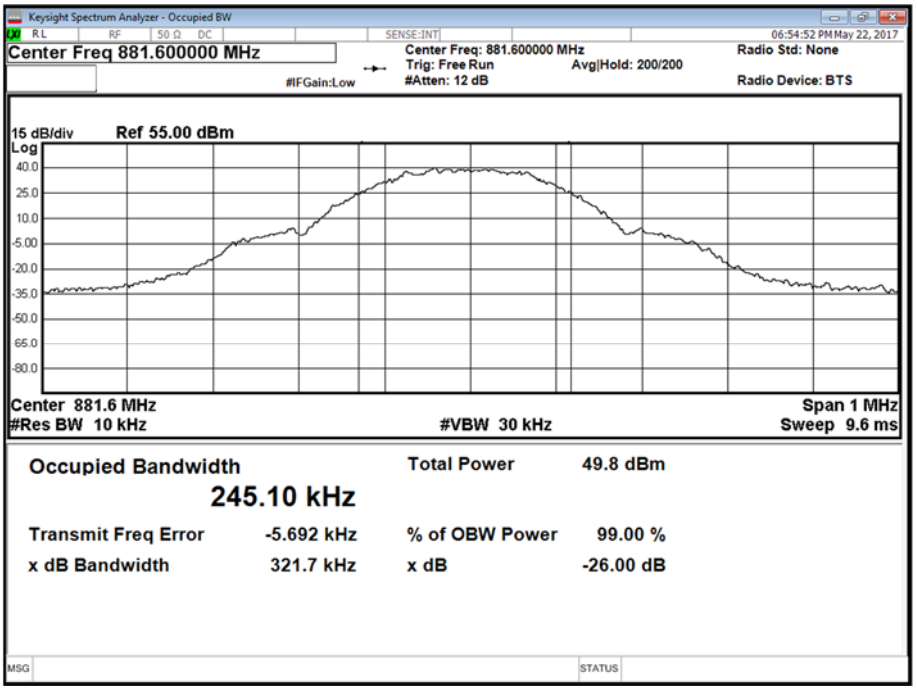
Maximum Output Power 43 dBm

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	240.82	313.33	245.10	321.65	244.13	319.41
AQPSK	242.73	309.23	245.42	307.63	245.51	319.48
8PSK	243.28	302.73	246.90	319.02	249.06	316.36

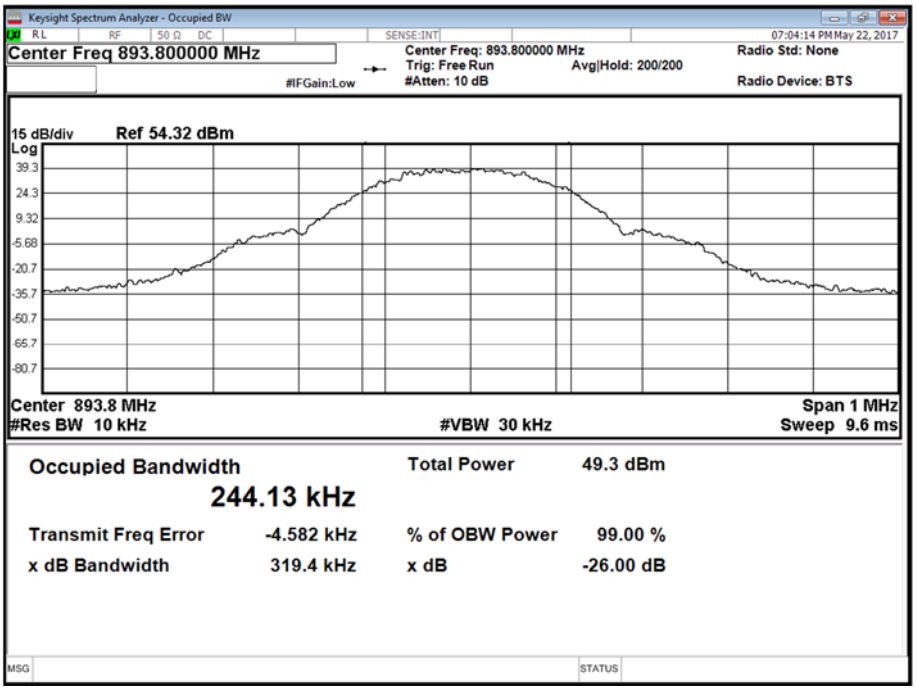
Antenna B - Channel Position B - Modulation GMSK



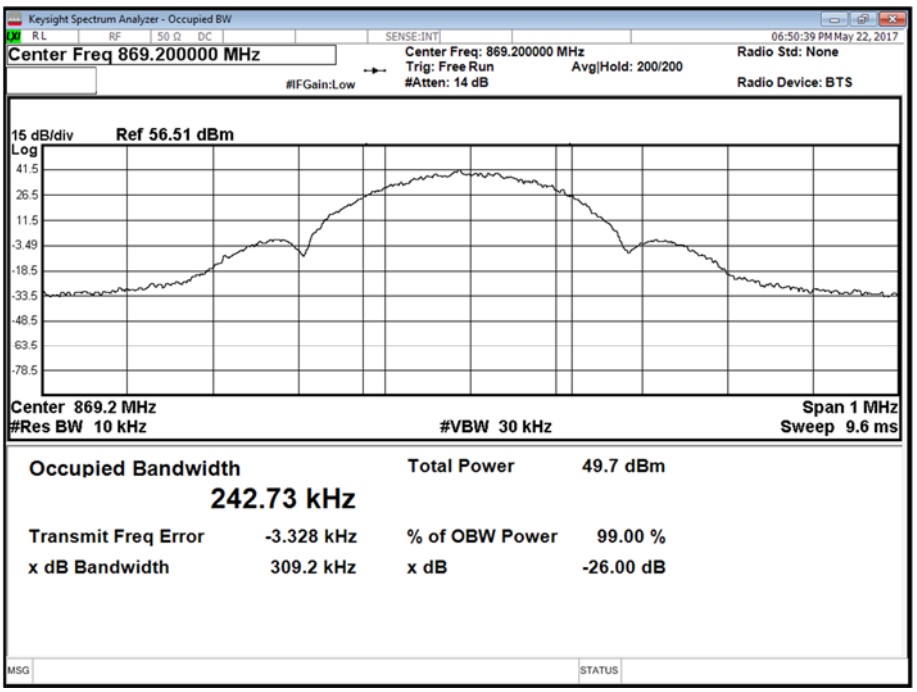
Antenna B - Channel Position M - Modulation GMSK



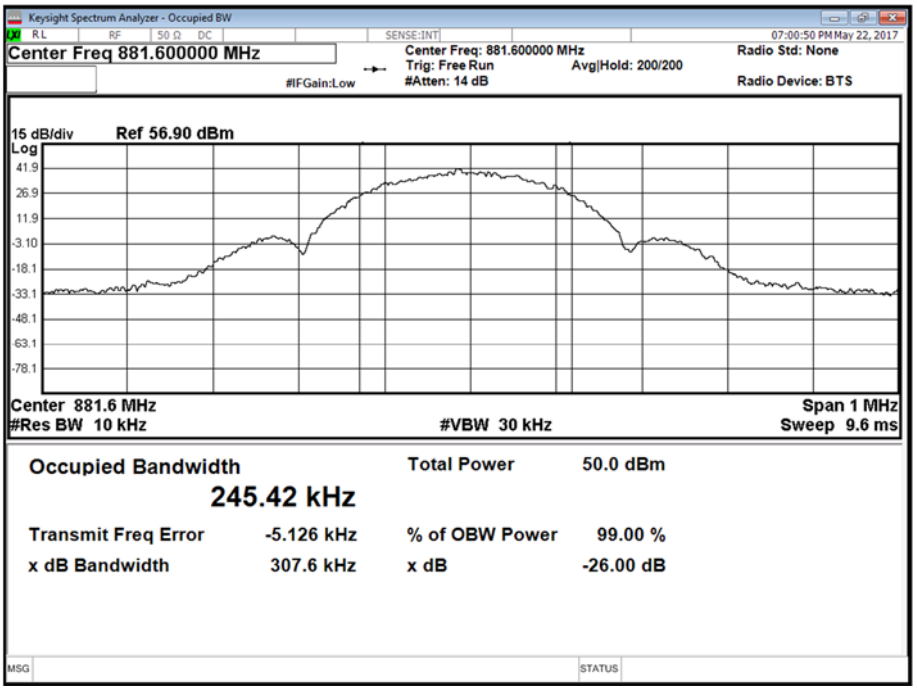
Antenna B - Channel Position T - Modulation GMSK



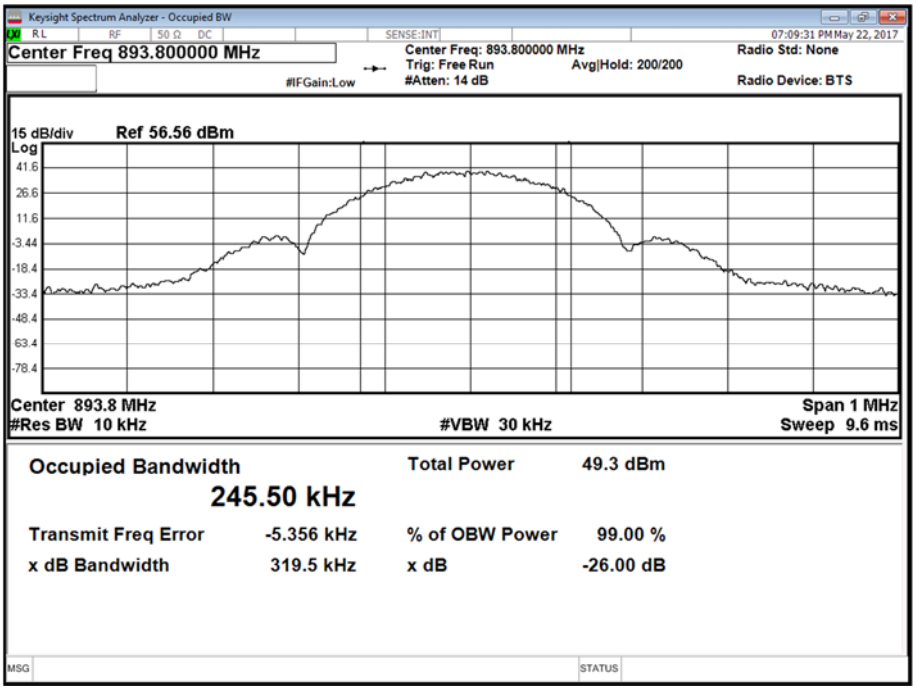
Antenna B - Channel Position B - Modulation AQPSK



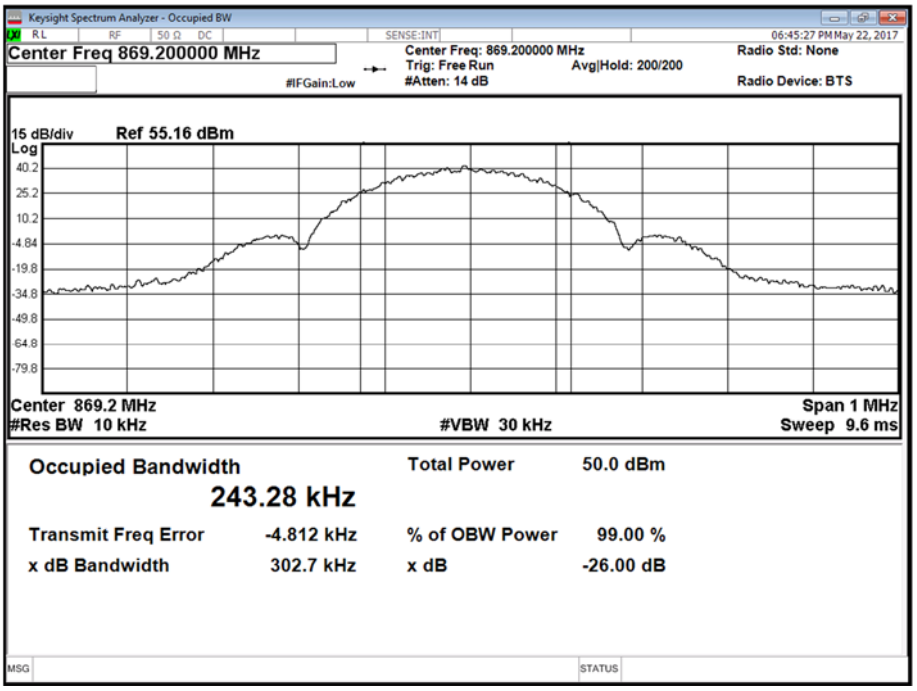
Antenna B - Channel Position M - Modulation AQPSK



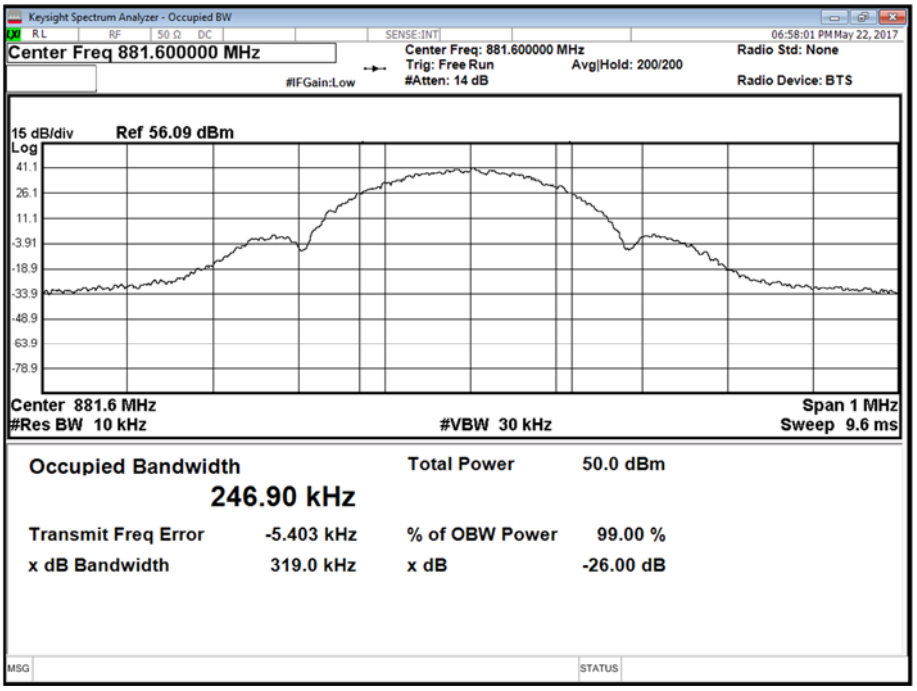
Antenna B - Channel Position T - Modulation AQPSK



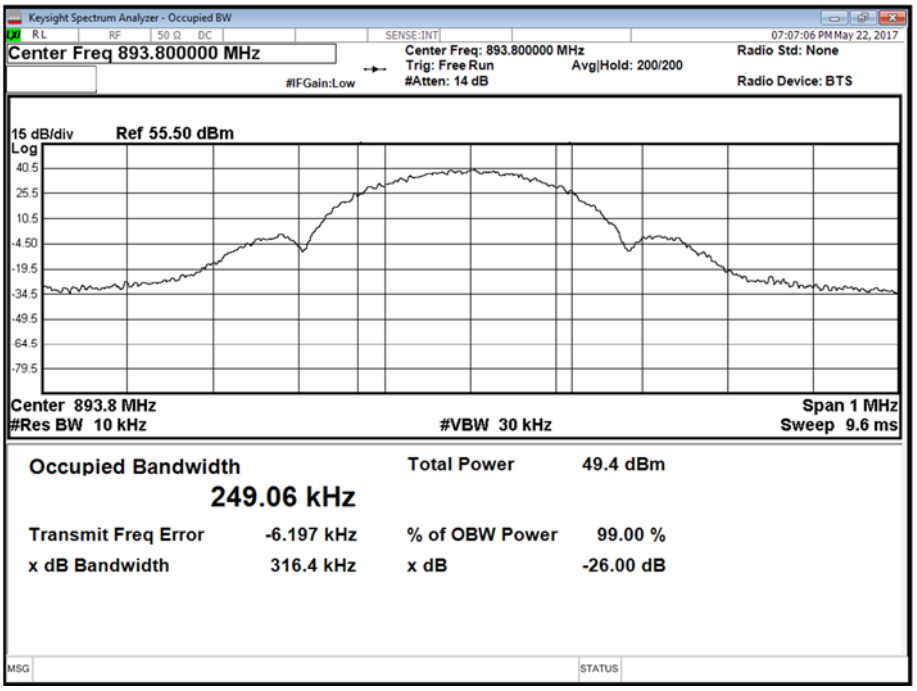
Antenna B - Channel Position B - Modulation 8PSK



Antenna B - Channel Position M - Modulation 8PSK



Antenna B - Channel Position T - Modulation 8PSK



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), 22.905 (a) (b)
Industry Canada RSS-132, Clause 5.5

2.3.2 Date of Test and Modification State

23 May 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	23.6°C
Relative Humidity	28.9%

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.

For Dual Tx, the limit was calculated as being -13 dBm - 10 * Log (2) = -16 dBm.

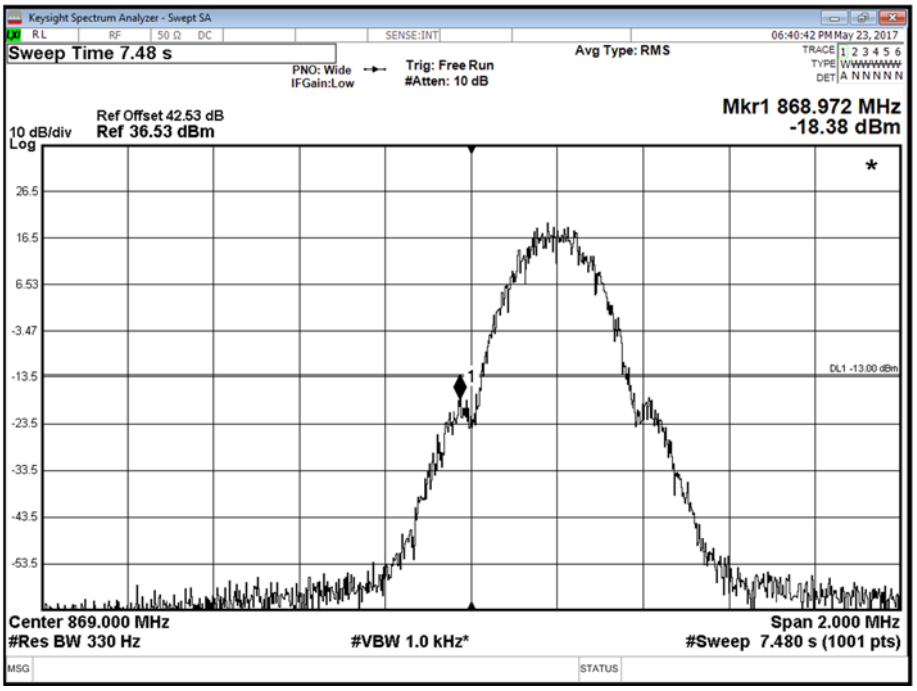
2.3.6 Test Results

Configuration A

Maximum Output Power 43 dBm

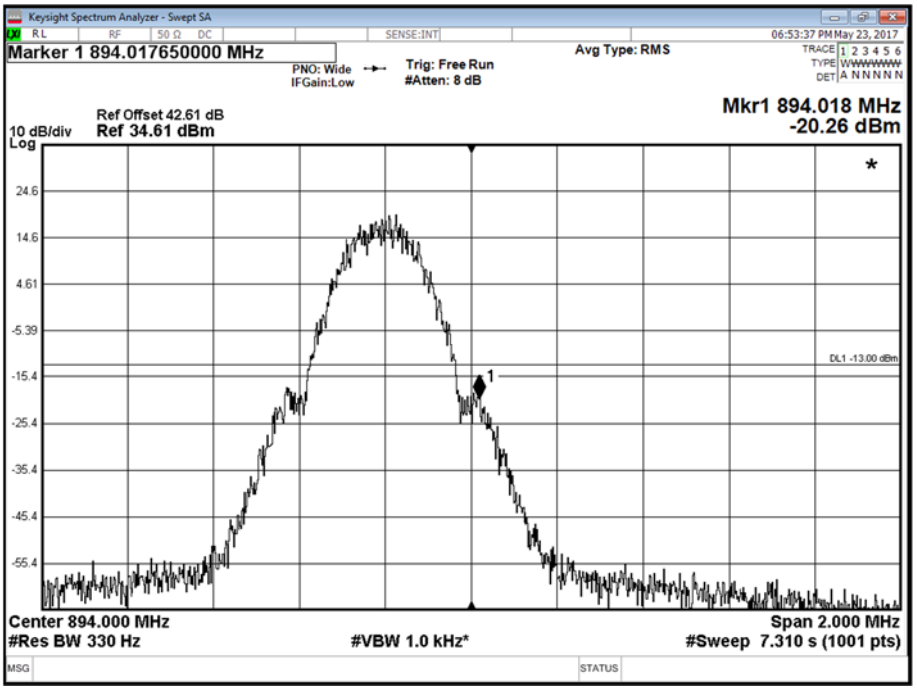
Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position B	Channel Position T
0.2 MHz	GMSK	869.2	893.8

Antenna A - Channel Position BRFBW - Carrier Bandwidth 0.2 MHz - Modulation GMSK



Remarks: Limit for Dual Tx is -16dBm.

Antenna A - Channel Position TRFBW - Carrier Bandwidth 0.2 MHz - Modulation GMSK



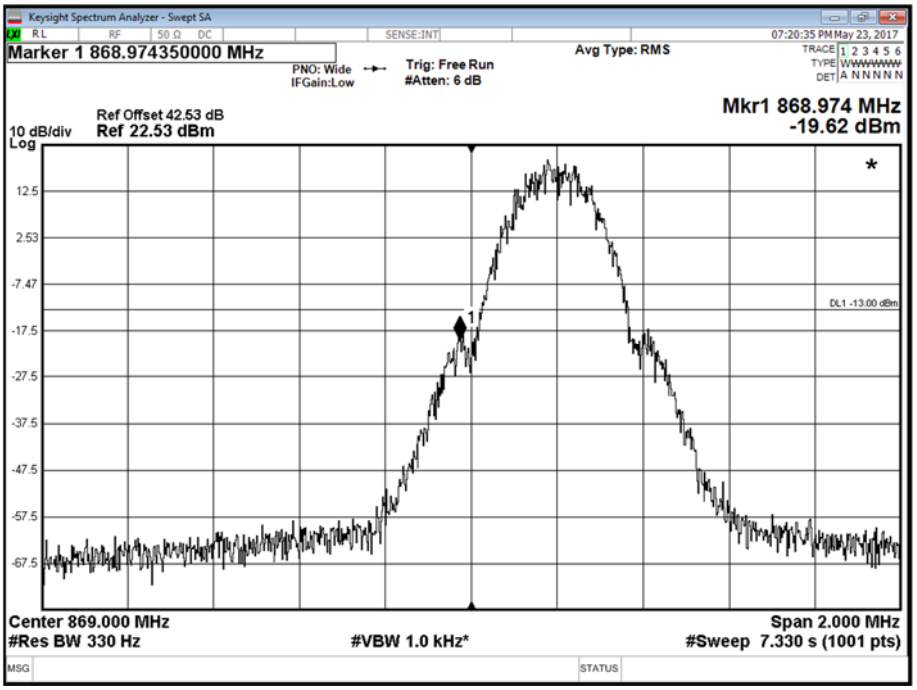
Remarks: Limit for Dual Tx is -16dBm.

Configuration A

Maximum Output Power 43 dBm

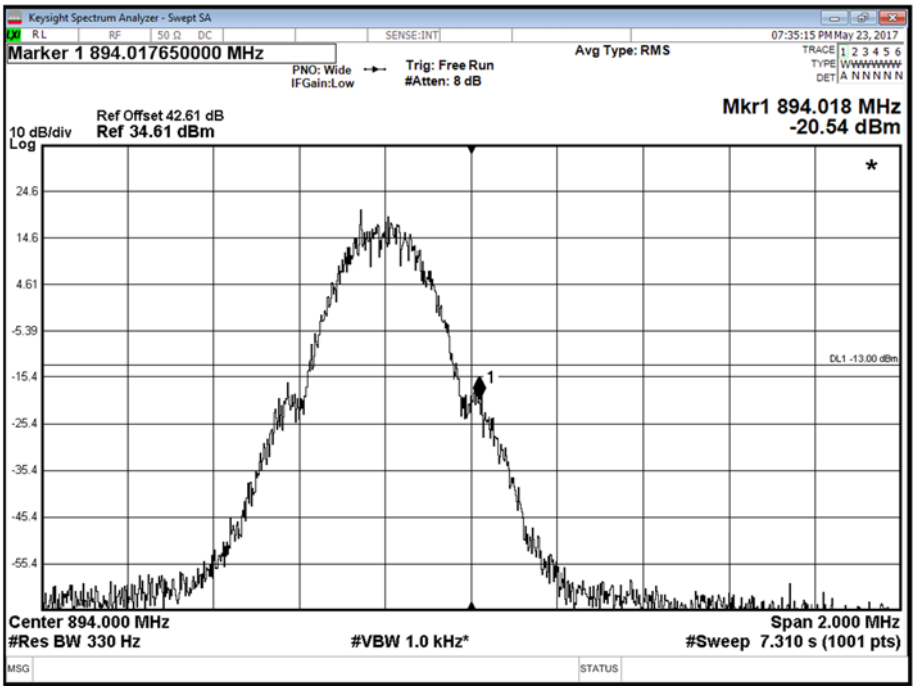
Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position B	Channel Position T
0.2 MHz	GMSK	869.2	893.8

Antenna B - Channel Position BRFBW - Carrier Bandwidth 0.2 MHz - Modulation GMSK



Remarks: Limit for Dual Tx is -16dBm.

Antenna B - Channel Position T - Carrier Bandwidth 0.2 MHz - Modulation GMSK



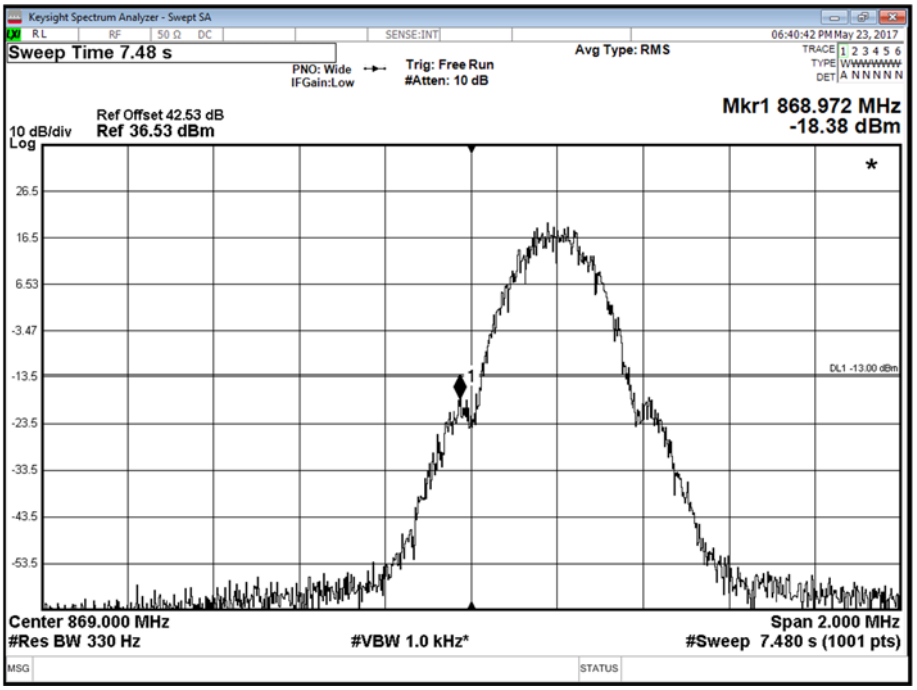
Remarks: Limit for Dual Tx is -16dBm.

Configuration B

Maximum Output Power 43 dBm

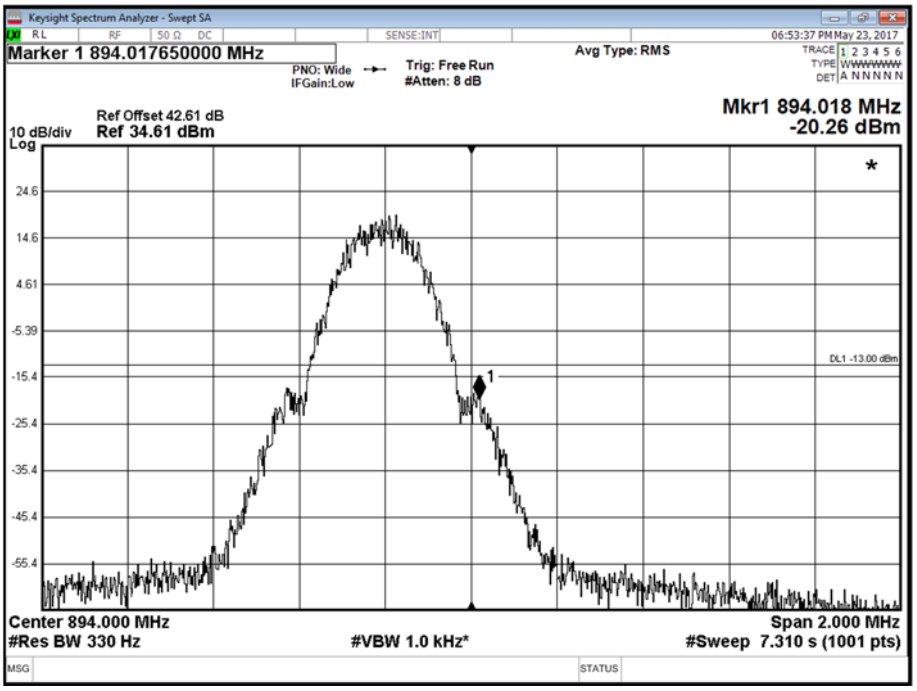
Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position B_{RFBW}	Channel Position T_{RFBW}
0.2 MHz	GMSK	869.2	893.8

Antenna A - Channel Position BRFBW - Carrier Bandwidth 0.2 MHz - Modulation GMSK



Remarks: Limit for Dual Tx is -16dBm.

Antenna A - Channel Position TRFBW - Carrier Bandwidth 0.2 MHz - Modulation GMSK



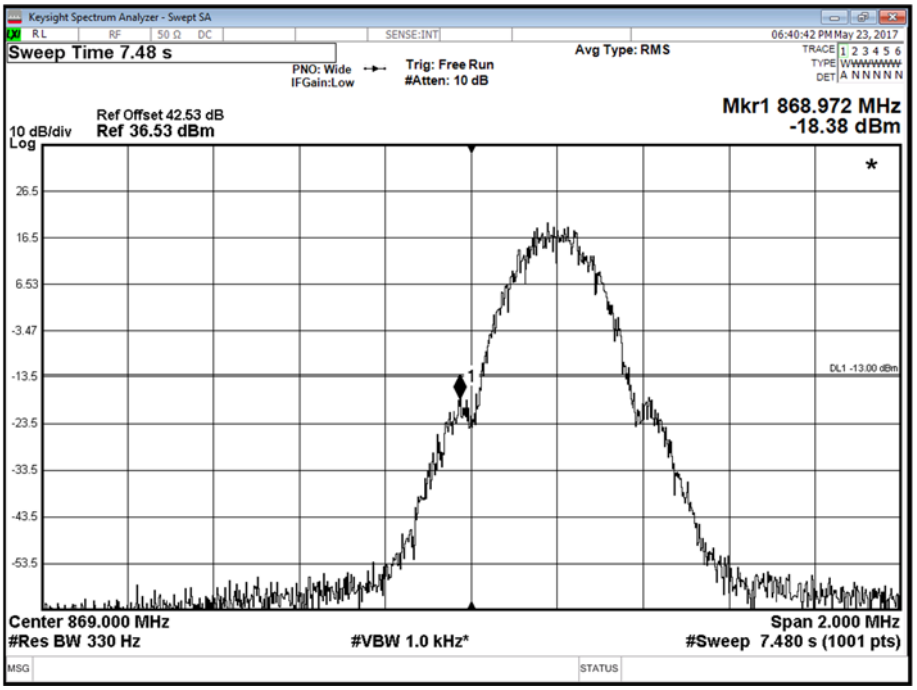
Remarks: Limit for Dual Tx is -16dBm.

Configuration C

Maximum Output Power 43 dBm

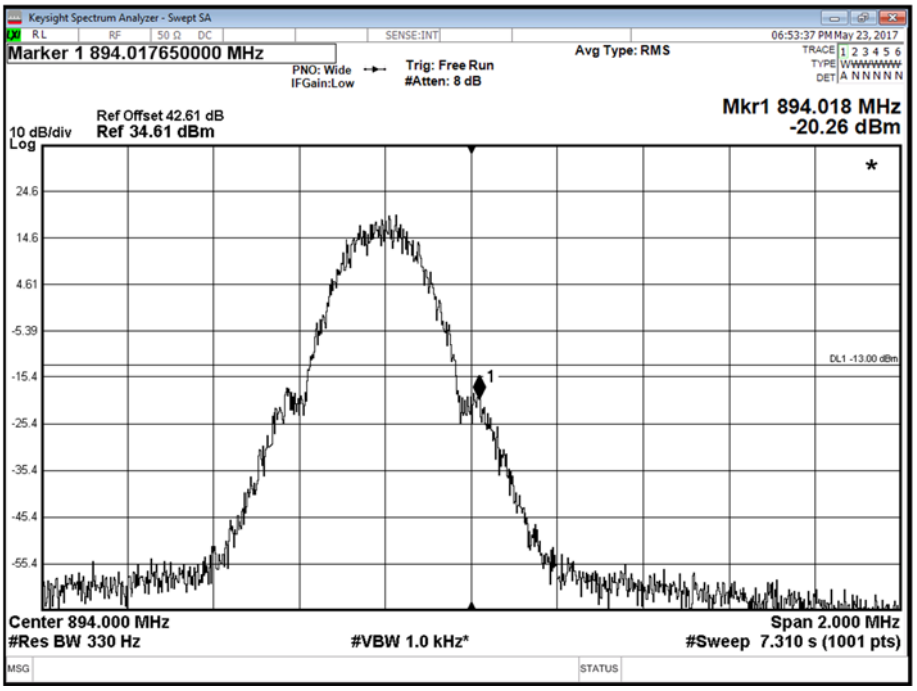
Carrier Bandwidth	Modulation	Band Edge (MHz)	
		Channel Position BRFBW	Channel Position TRFBW
0.2 MHz	GMSK	869.2	893.8

Antenna A - Channel Position BRFBW - Carrier Bandwidth 0.2 MHz - Modulation GMSK



Remarks: Limit for Dual Tx is -16dBm.

Antenna A - Channel Position TRFBW - Carrier Bandwidth 0.2 MHz - Modulation GMSK



Remarks: Limit for Dual Tx is -16dBm

Limit	-16 dBm

2.4 TRANSMITTER SPURIOUS EMISSIONS

2.4.1 Specification Reference

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

2.4.2 Date of Test and Modification State

24 May 2017 - Modification State 0

2.4.3 Test Equipment Used

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

2.4.4 Environmental Conditions

Ambient Temperature	23.6°C
Relative Humidity	28.9%

2.4.5 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.

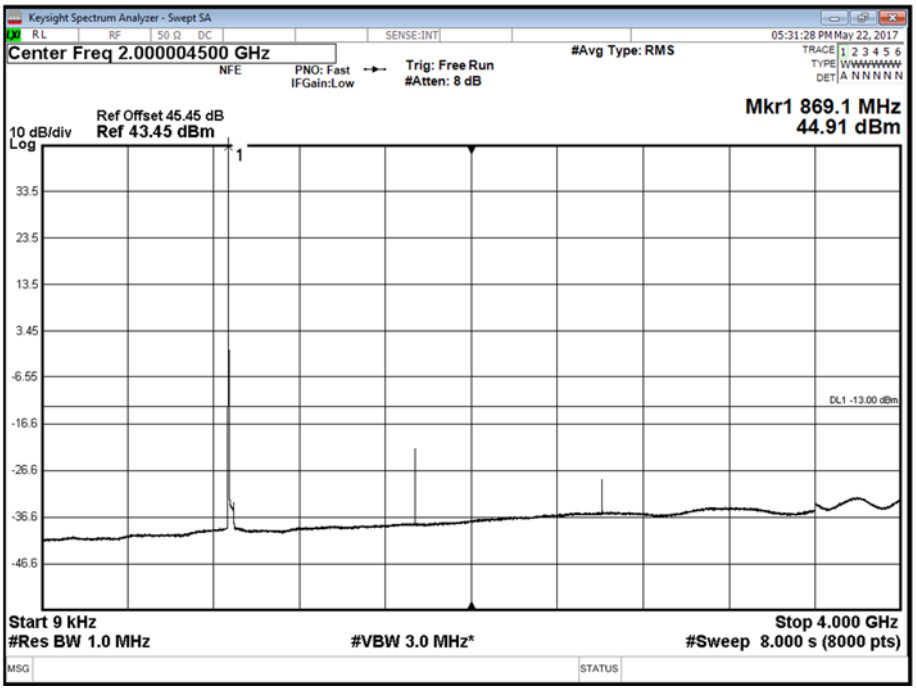
For dual TX, the limit was calculated as being -13 dBm - 10 * Log (2) = -16 dBm.

2.4.6 Test Results

Configuration A

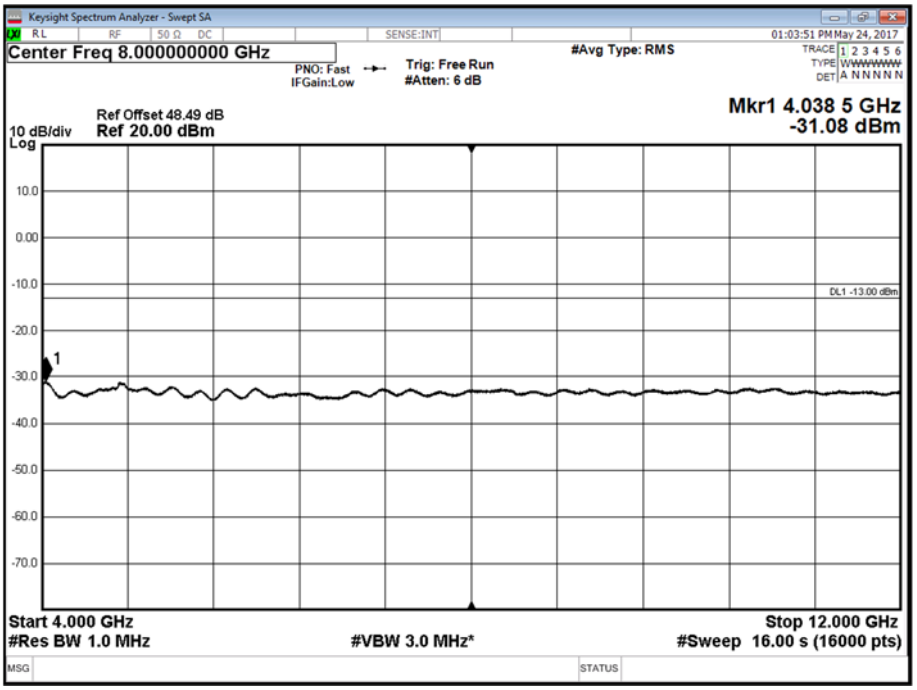
Maximum Output Power 43 dBm

Antenna A - Channel Position B - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



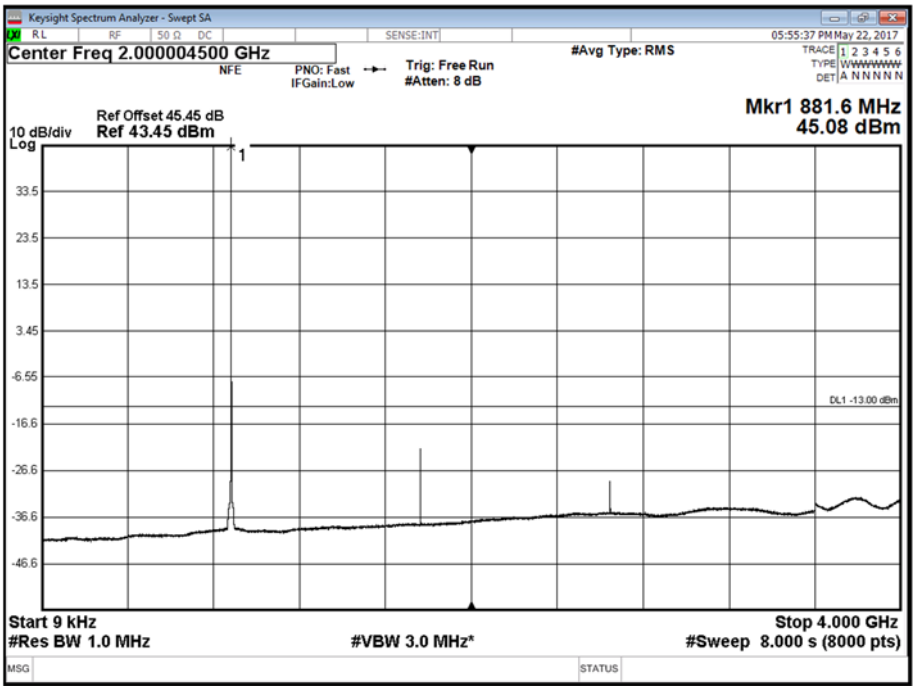
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position B - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz



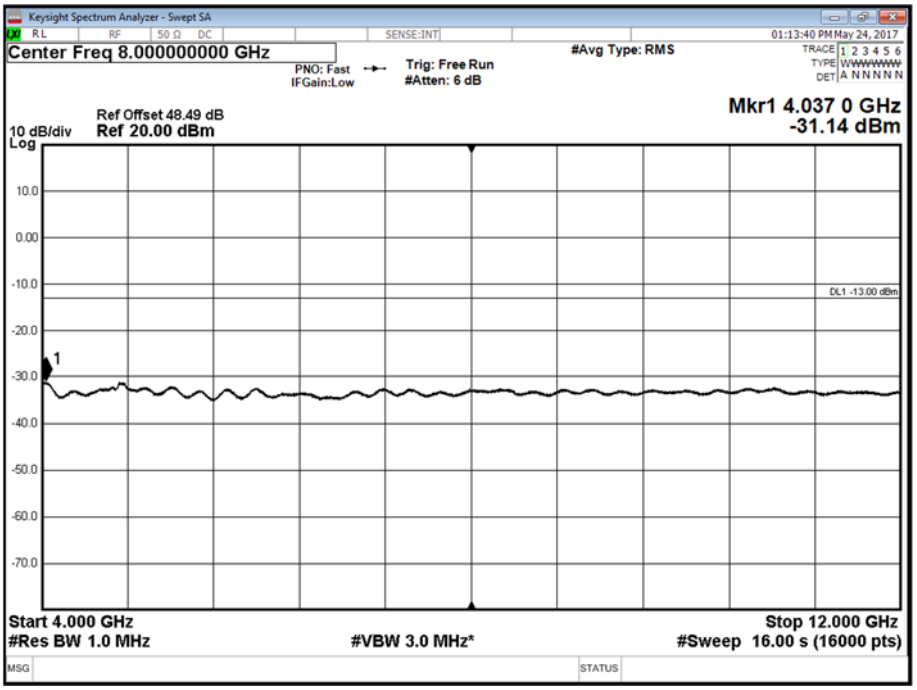
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position M - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



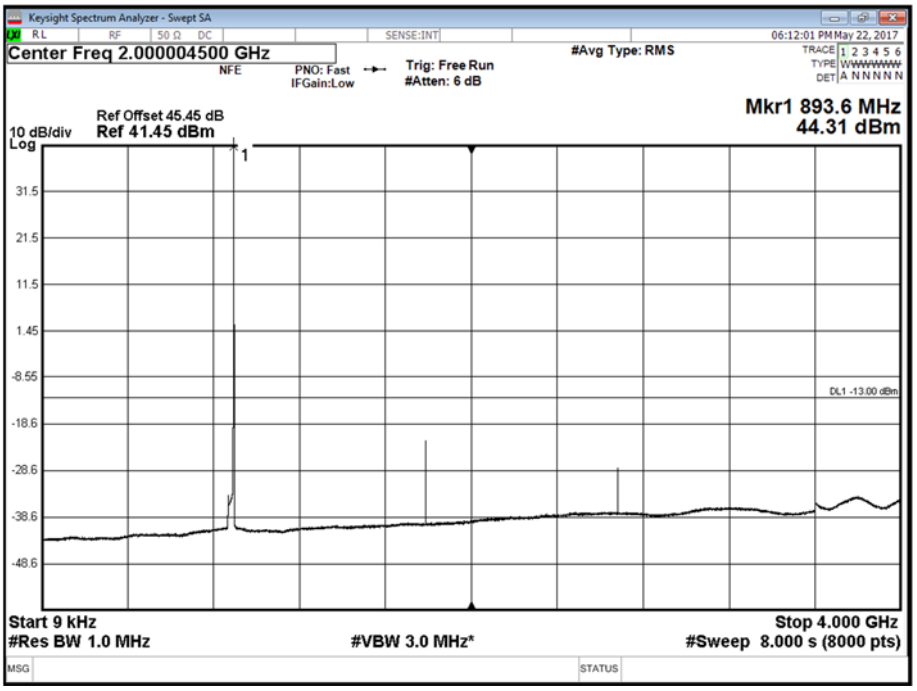
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position M - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz



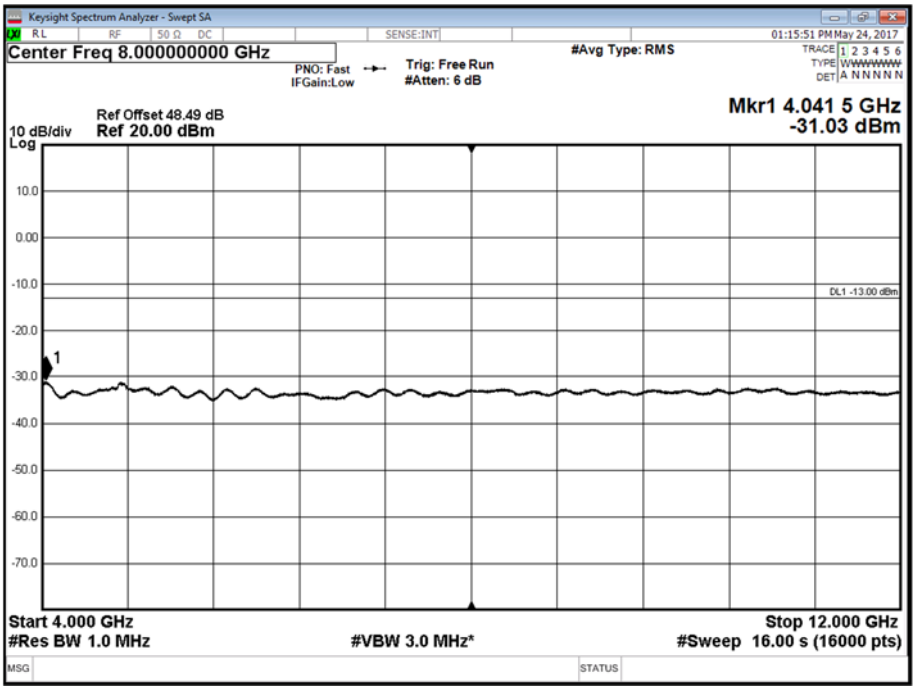
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position T - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



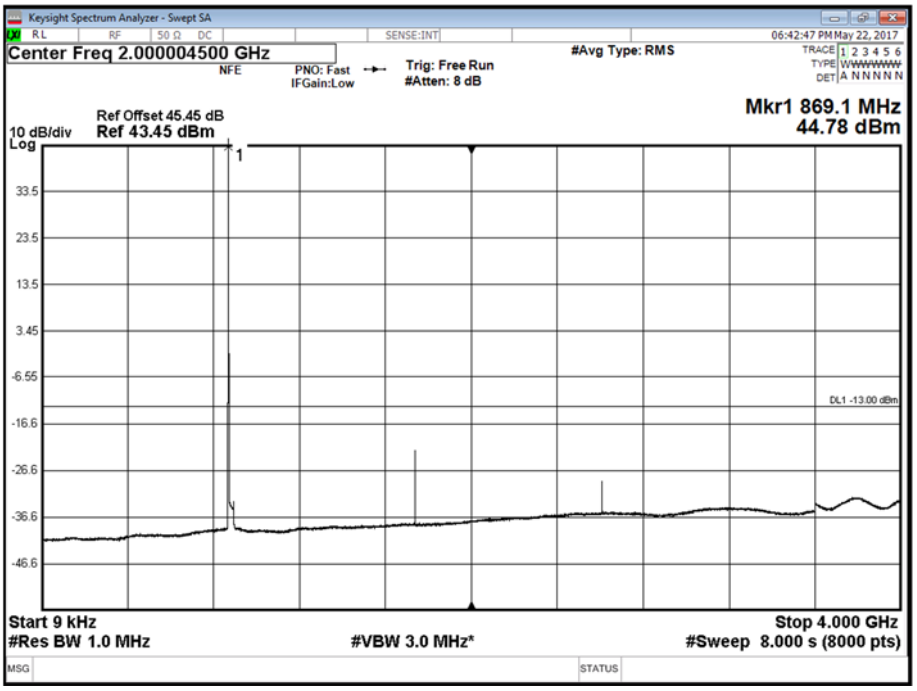
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position T - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz



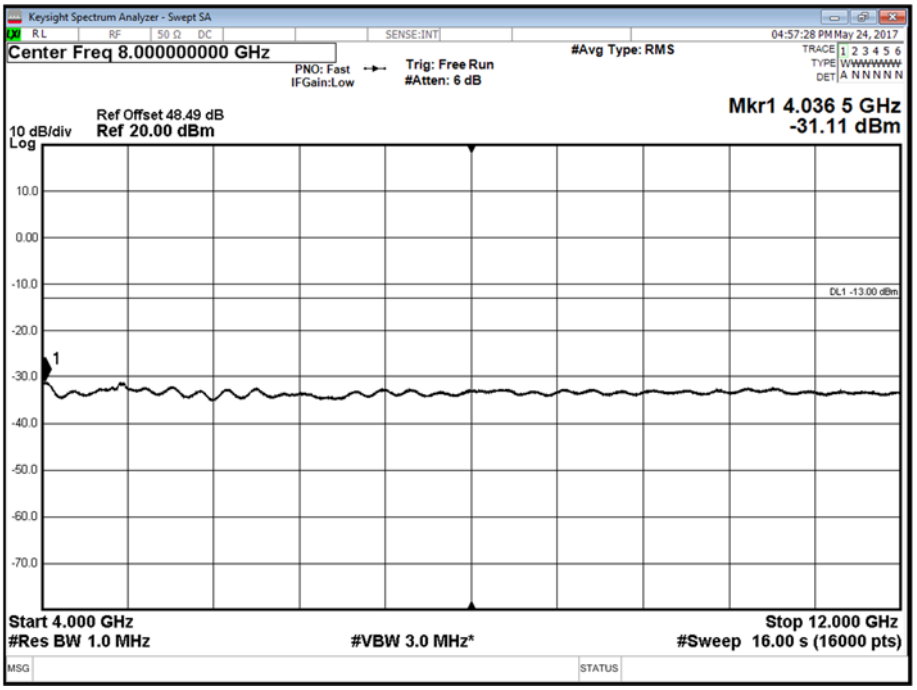
Remarks: Limit for Dual Tx is -16dBm

Antenna B - Channel Position B - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



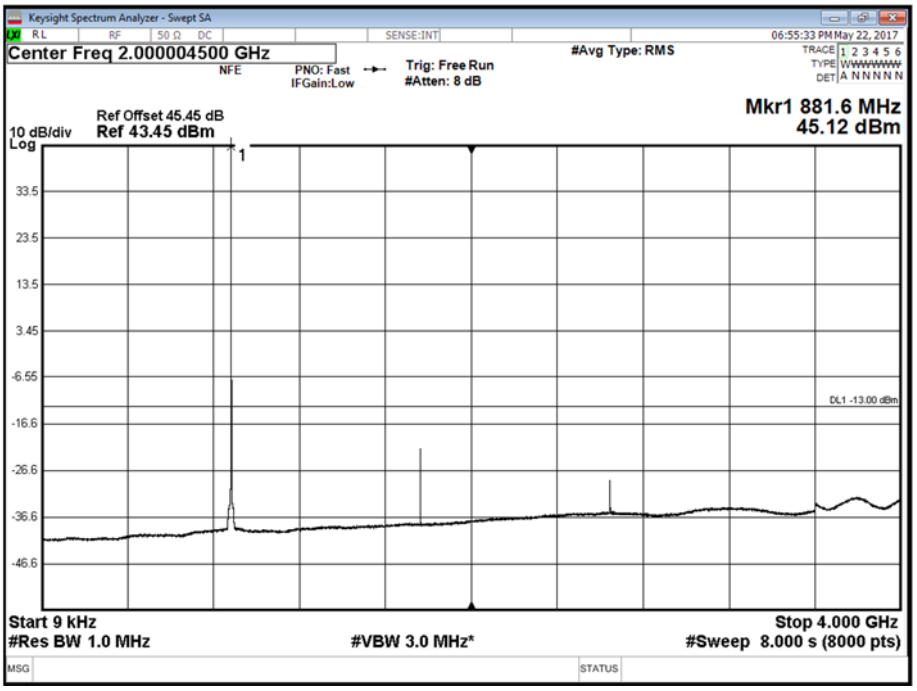
Remarks: Limit for Dual Tx is -16dBm

Antenna B - Channel Position B - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz



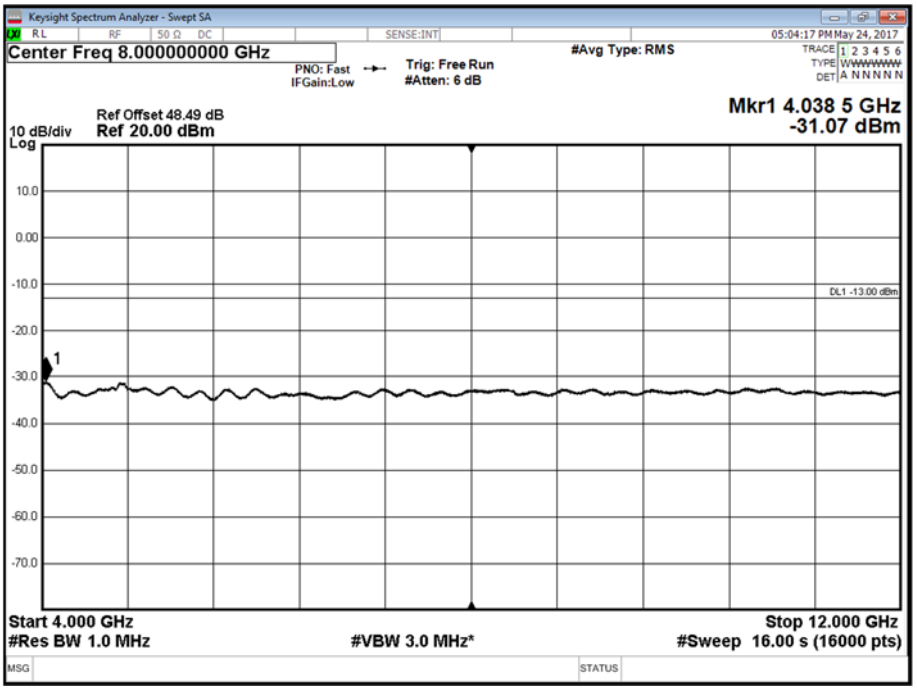
Remarks: Limit for Dual Tx is -16dBm

Antenna B - Channel Position M - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



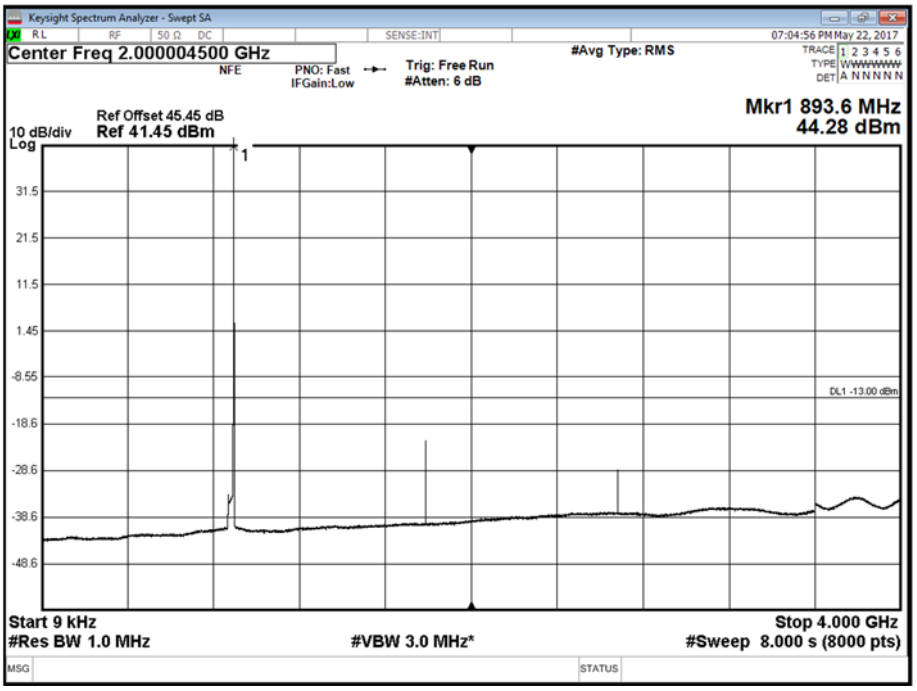
Remarks: Limit for Dual Tx is -16dBm

Antenna B - Channel Position M - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz



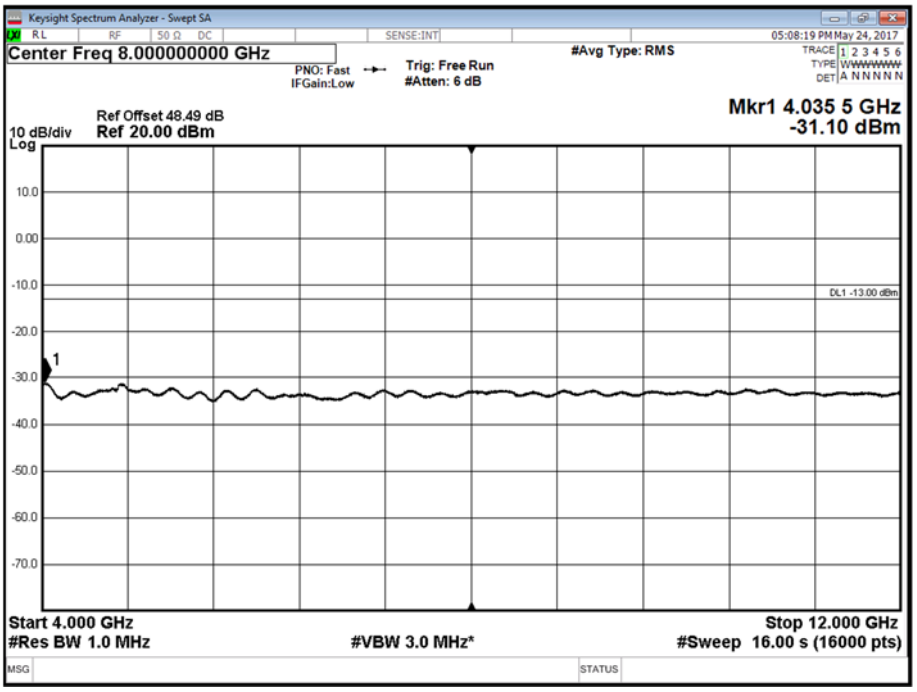
Remarks: Limit for Dual Tx is -16dBm

Antenna B - Channel Position T - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



Remarks: Limit for Dual Tx is -16dBm

Antenna B - Channel Position T - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz

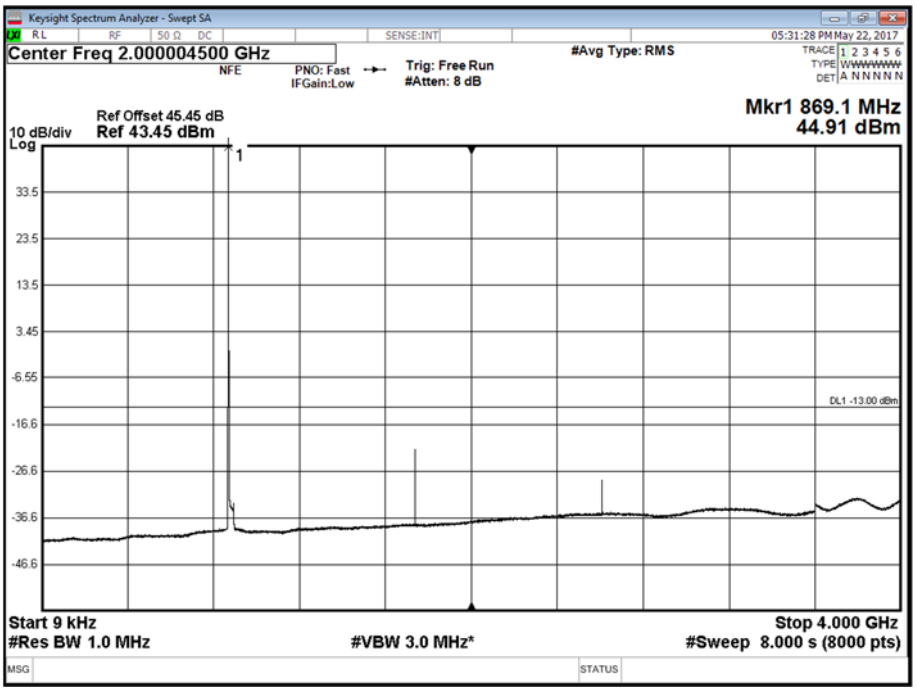


Remarks: Limit for Dual Tx is -16dBm

Configuration B

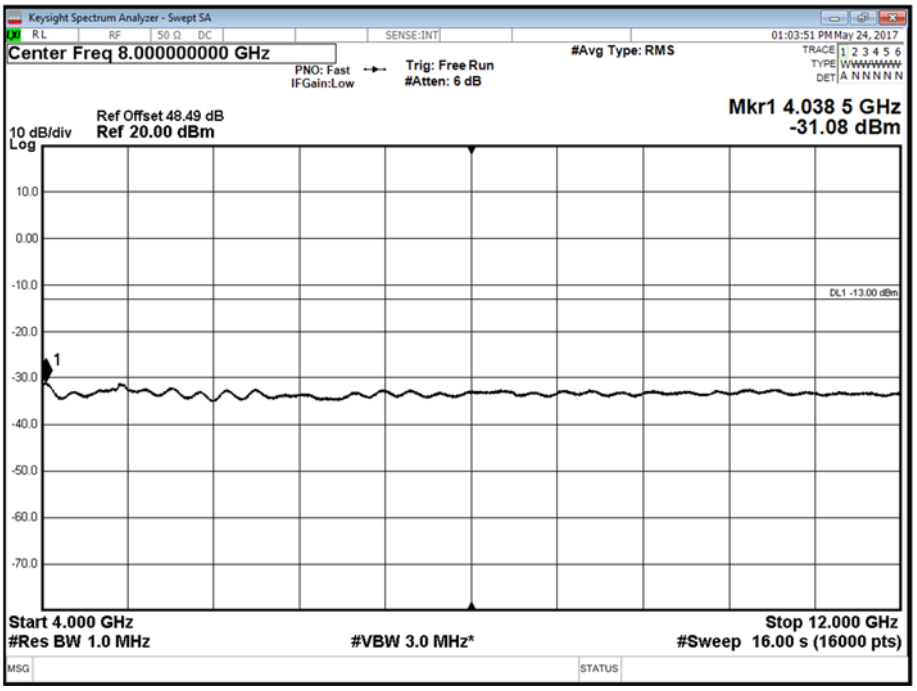
Maximum Output Power 43 dBm

Antenna A - Channel Position BRFBW - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



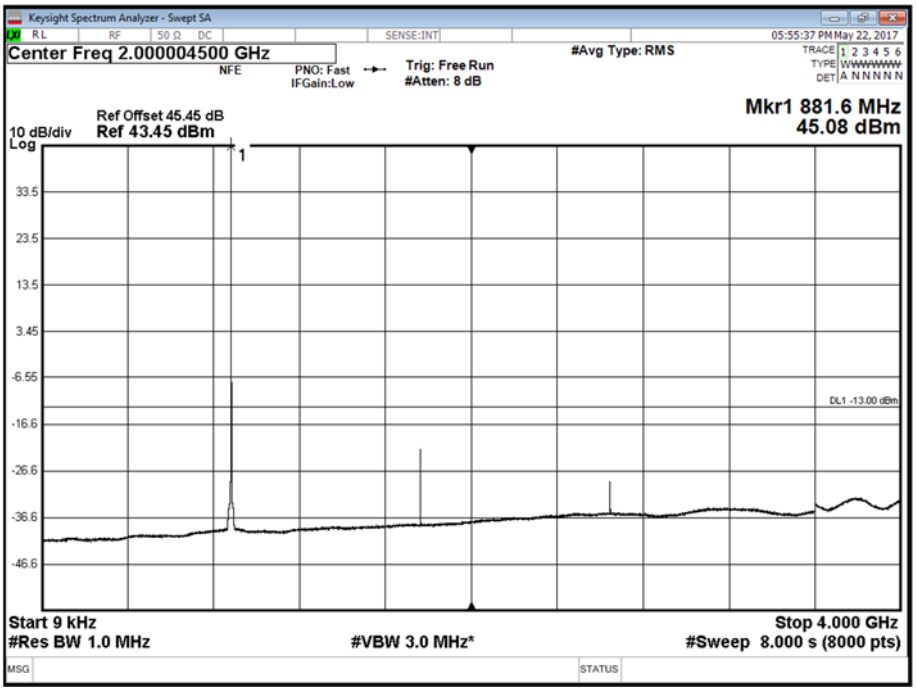
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position BRFBW - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz



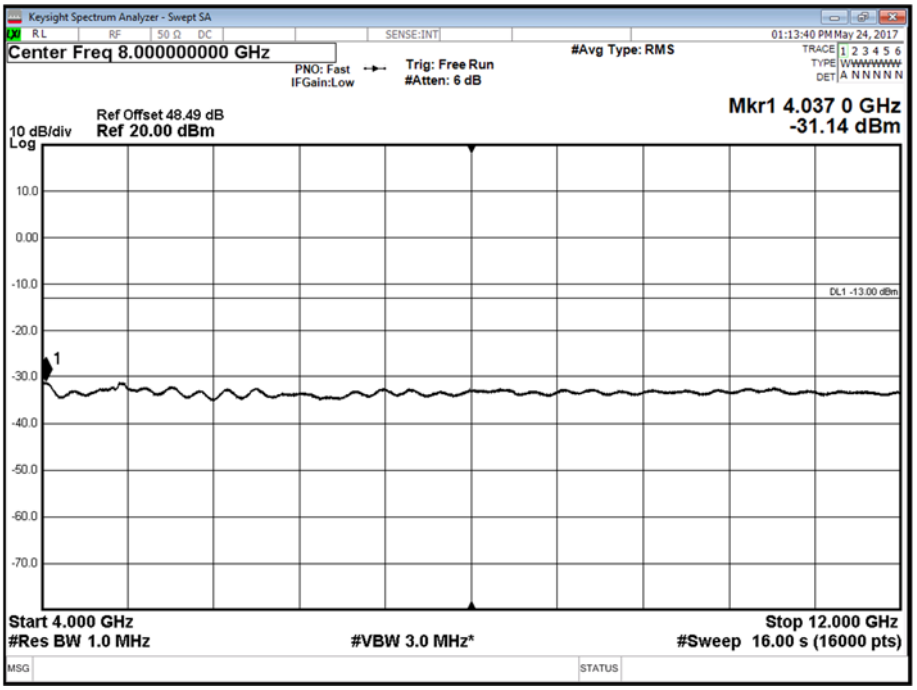
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position MRFBW - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz

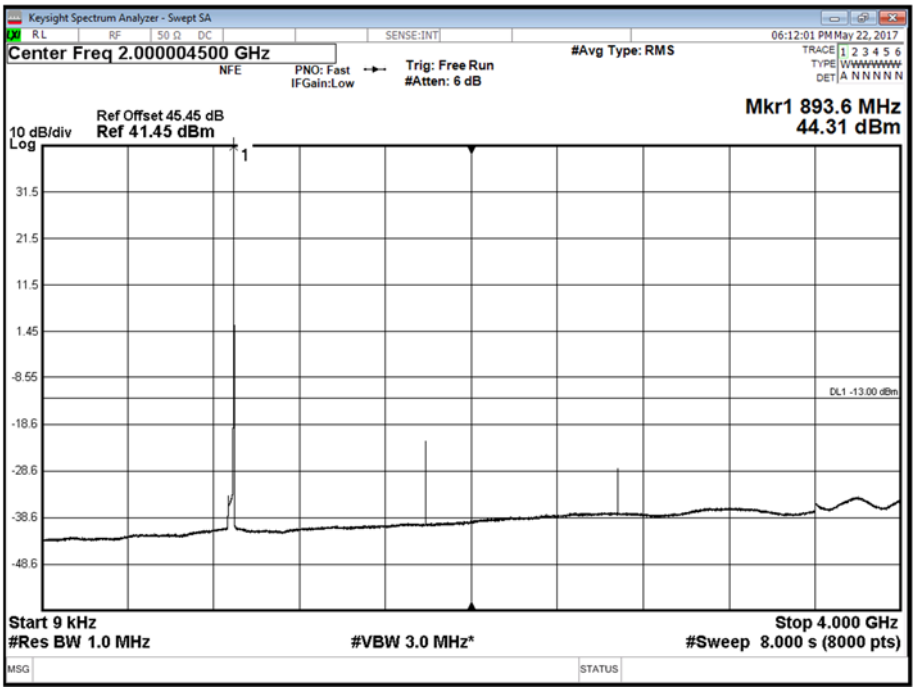


Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position MRFBW - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz

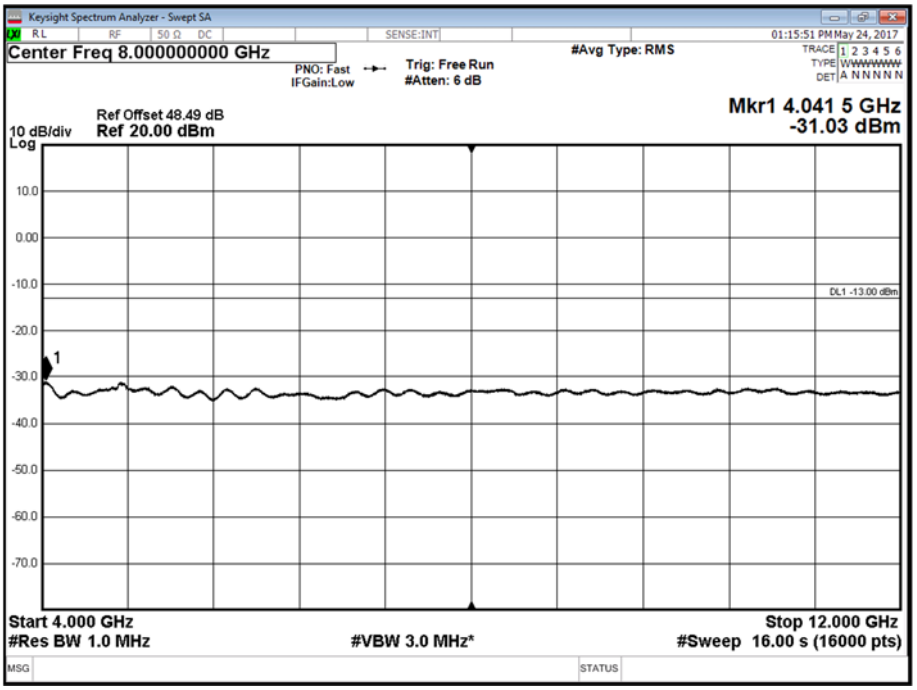


Remarks: Limit for Dual Tx is -16dBm
Antenna A - Channel Position TRFBW - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position TRFBW - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz

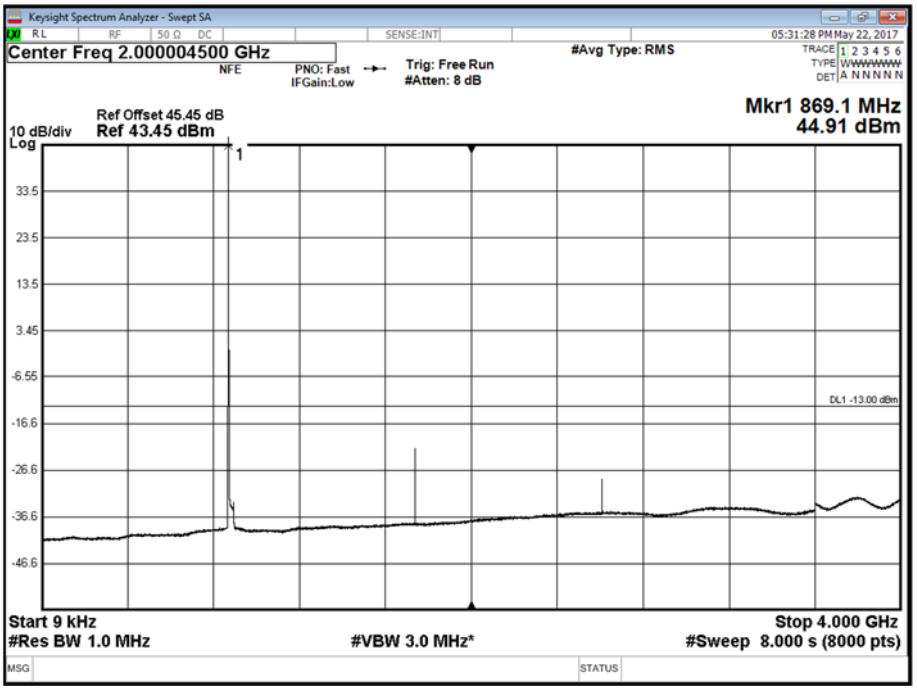


Remarks: Limit for Dual Tx is -16dBm

Configuration C

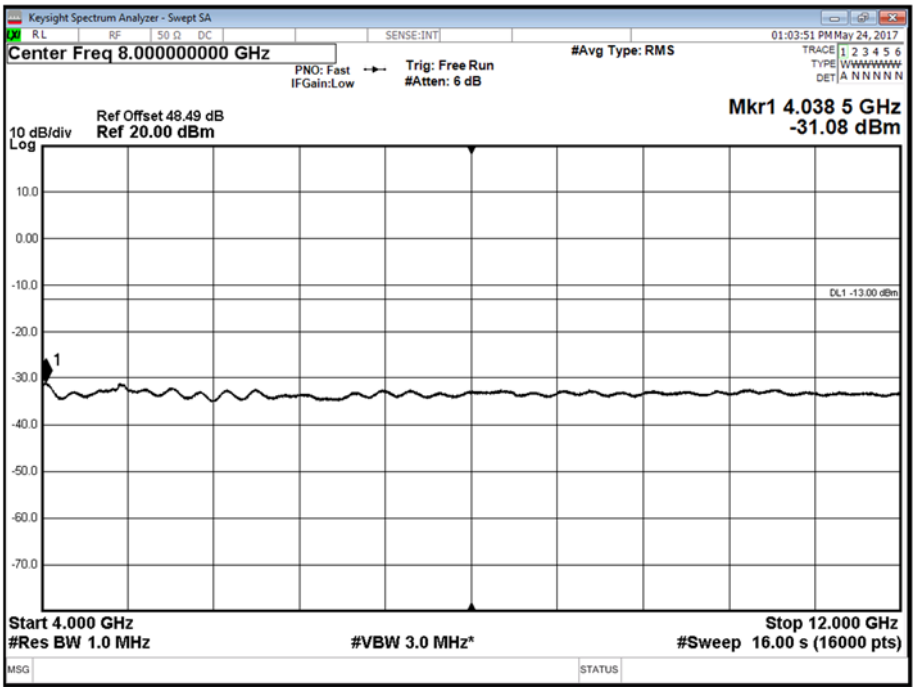
Maximum Output Power 43 dBm

Antenna A - Channel Position BRFBW - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



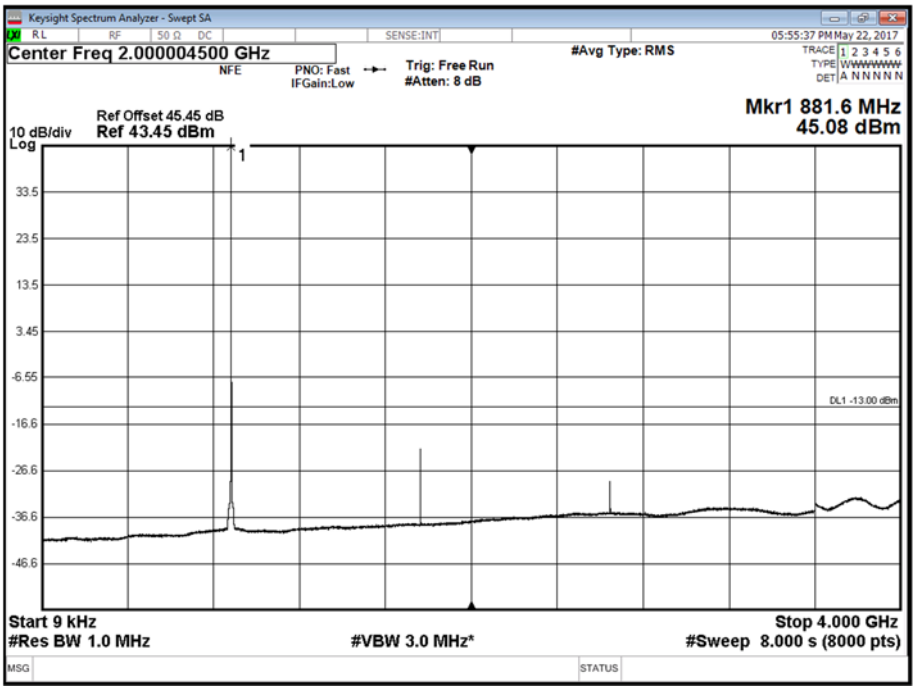
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position BRFBW - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz



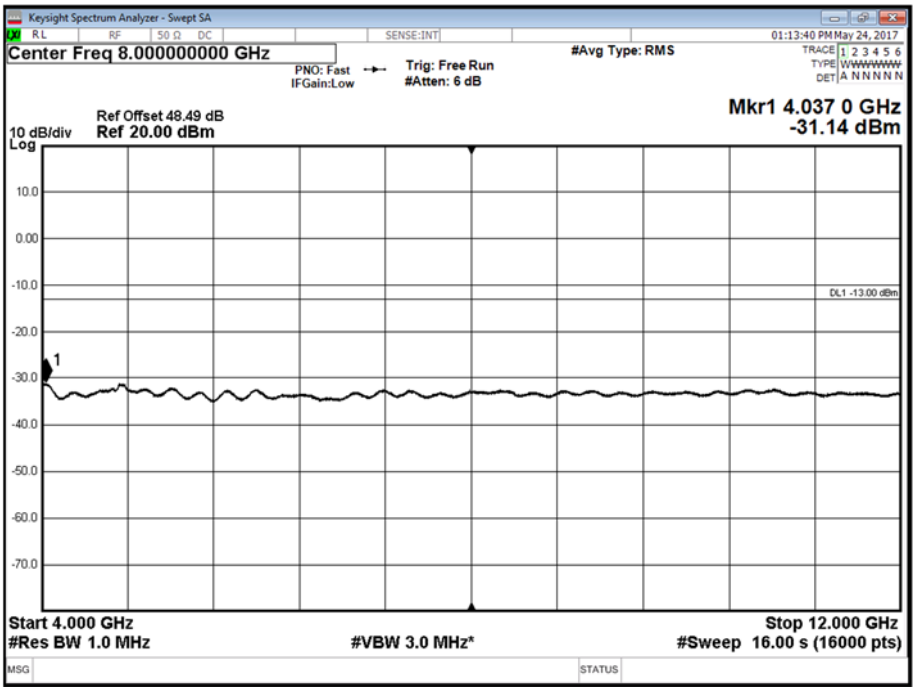
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position MRFBW - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



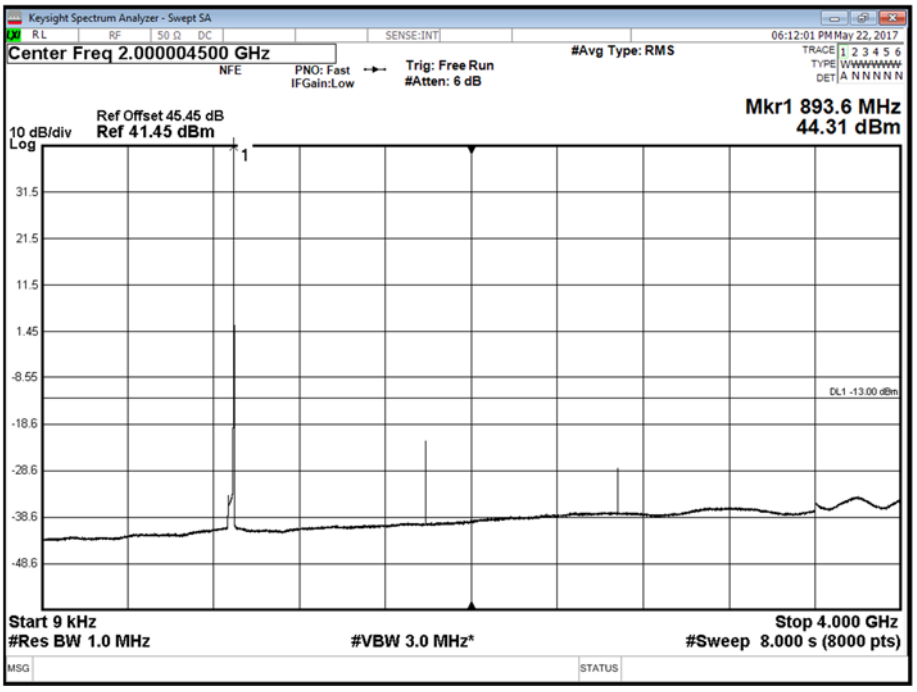
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position MRFBW - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz



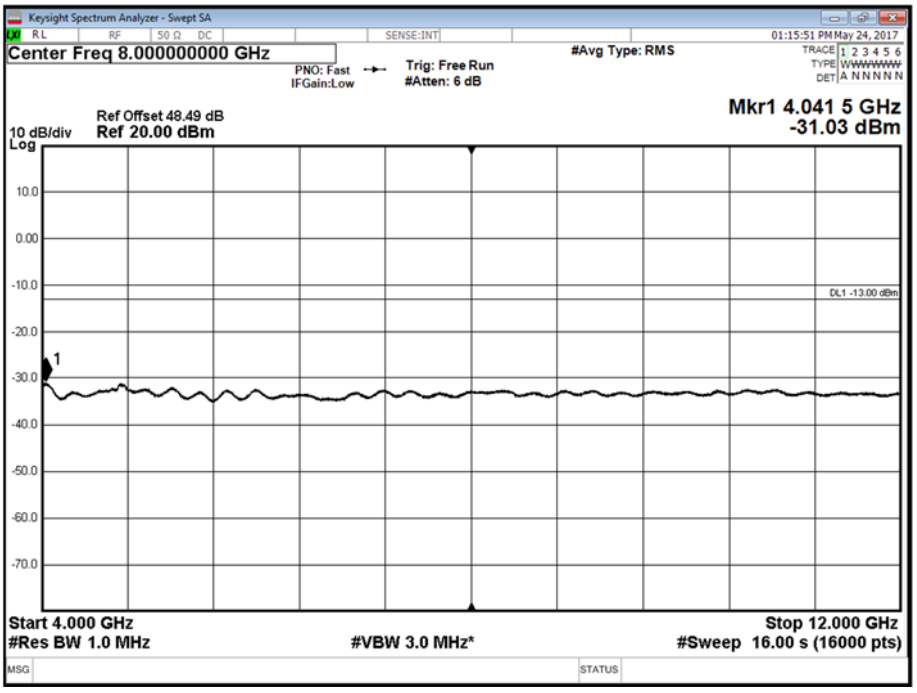
Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position TRFBW - Modulation GMSK - Band 1 - Range 0.009 to 4000 MHz



Remarks: Limit for Dual Tx is -16dBm

Antenna A - Channel Position TRFBW - Modulation GMSK - Band 2 - Range 4000 to 12000 MHz



Limit	-16dBm

2.5 FREQUENCY STABILITY

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 22, Clause 22.355
Industry Canada RSS-132, Clause 5.3

2.5.2 Date of Test and Modification State

10 May 2017 - Modification State 0

2.5.3 Test Equipment Used

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

2.5.4 Environmental Conditions

Ambient Temperature 21.3°C
Relative Humidity 17.3%

2.5.5 Test Method

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

2.5.6 Test Results

Configuration A

Maximum Output Power 43 dBm

Temperature	Frequency Error (Hz)
	Channel Position M
-30°C	10.06
-20°C	8.34
-10°C	10.13
0°C	9.97
+10°C	7.93
+20°C	7.76
+30°C	9.58
+40°C	10.05
+50°C	9.99

Configuration A

Maximum Output Power 43 dBm

Voltage	Frequency Error (Hz)
	Channel Position M
-40.8 V DC	-10.07
-48.0 V DC	7.76
-58.2 V DC	10.49

Limit	±1.5 ppm or ±1.322 kHz

Product Service

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Maximum Peak Output Power and Peak to Average Ratio - Conducted					
Thermohygrometer	R&S	4741	407292	12	26-Jun-2017
Digital Volt Meter	Fluke	411	29096	12	12-Aug-2017
Spectrum Analyser	Keysight	PXA	MY54410231	12	20-Dec-2017
Network Analyser	Agilent	PNA-L	MY5000737	12	09-Sep-2017
Attenuator	Aeroflex	6834-20-11	QC181	-	O/P Mon
Attenuator	Weinschel	Oct-56	T3515	-	O/P Mon
Attenuator	Weinschel	Oct-56	T3520	-	O/P Mon
High Pass Filter	Wainwright	WHNX3.8/26.5G-6SS	1	-	O/P Mon
RF Load	Weinschel	49-40-33	SX815	-	O/P Mon
Attenuator	Weinschel	Oct-56	T4390	-	O/P Mon
Thermometer	Fluke	51	1385	12	13-Oct-2017
Occupied Bandwidth					
Thermohygrometer	R&S	4741	407292	12	26-Jun-2017
Digital Volt Meter	Fluke	411	29096	12	12-Aug-2017
Thermometer	Fluke	51	1385	12	13-Oct-2017
High Pass Filter	Wainwright	WHNX3.8/26.5G-6SS	1	-	O/P Mon
Spectrum Analyser	Keysight	PXA	MY54410231	12	20-Dec-2017
Network Analyser	Agilent	PNA-L	MY5000737	12	09-Sep-2017
Attenuator	Aeroflex	6834-20-11	QC181	-	O/P Mon
Attenuator	Weinschel	Oct-56	T3515	-	O/P Mon
Attenuator	Weinschel	Oct-56	T3520	-	O/P Mon
Band Edge					
Thermohygrometer	R&S	4741	407292	12	26-Jun-2017
Digital Volt Meter	Fluke	411	29096	12	12-Aug-2017
Thermometer	Fluke	51	1385	12	13-Oct-2017
High Pass Filter	Wainwright	WHNX3.8/26.5G-6SS	1	-	O/P Mon
Spectrum Analyser	Keysight	PXA	MY54410231	12	20-Dec-2017
Network Analyser	Agilent	PNA-L	MY5000737	12	09-Sep-2017
Attenuator	Aeroflex	6834-20-11	QC181	-	O/P Mon
Attenuator	Weinschel	Oct-56	T3515	-	O/P Mon
Attenuator	Weinschel	Oct-56	T3520	-	O/P Mon
Transmitter Spurious Emissions					
Thermohygrometer	R&S	4741	407292	12	26-Jun-2017
Digital Volt Meter	Fluke	411	29096	12	12-Aug-2017
Thermometer	Fluke	51	1385	12	13-Oct-2017
High Pass Filter	Wainwright	WHNX3.8/26.5G-6SS	1	-	O/P Mon
Spectrum Analyser	Keysight	PXA	MY54410231	12	20-Dec-2017
Network Analyser	Agilent	PNA-L	MY5000737	12	09-Sep-2017
Attenuator	Aeroflex	6834-20-11	QC181	-	O/P Mon
Attenuator	Weinschel	Oct-56	T3515	-	O/P Mon
Attenuator	Weinschel	Oct-56	T3520	-	O/P Mon

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Frequency Stability					
Thermohygrometer	R&S	4741	407292	12	26-Jun-2017
Digital Volt Meter	Fluke	411	29096	12	12-Aug-2017
Thermometer	Fluke	51	1385	12	13-Oct-2017
Spectrum Analyser	Keysight	PXA	MY54410231	12	20-Dec-2017
Network Analyser	Agilent	PNA-L	MY5000737	12	09-Sep-2017
Attenuator	Aeroflex	6834-20-11	QC181	-	O/P Mon
Attenuator	Weinschel	Oct-56	T3515	-	O/P Mon
Attenuator	Weinschel	Oct-56	T3520	-	O/P Mon
Thermal Power Sensor	R&S	NRPZ51	BAMS-1000782941	12	17-May-2018
Climatic Chamber	Votsch	VC 7060	59566136700010	-	O/P Mon

O/P Mon – Output Monitored with Calibrated Equipment

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Conducted Maximum Peak Output Power	30 MHz to 20 GHz Amplitude	± 0.1 dB
Conducted Emissions	30 MHz to 20 GHz Amplitude	± 2.3 dB
Frequency Stability	30 MHz to 2 GHz	± 5.0 Hz
Occupied Bandwidth	Up to 20 MHz Bandwidth	± 1.1 Hz
Band Edge	30 MHz to 20 GHz Amplitude	± 2.3 dB

SECTION 5

ACCREDITATION, DISCLAIMERS and COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

Product Service

ANNEX A

MODULE LIST

Configuration			
Product	Product No	R-State	Serial No
Testing Equipment CT10	LPC102487/1	R1C	T01F375046
Radio 2212 B5	KRC 161 652/2	R2A	D825389492