Product Service

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Report On

FCC and IC Testing of the
Ericsson LTE KRY 901 407/1 RD 4442 B30 (2300 MHz) Base Station
in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 27

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRY901407-1

PREPARED BY	APPROVED BY	DATED
Scott Drysdale		Dec 12, 2018
Scott Drysdale Test Personnel	Abderrahmane Ferhat Authorised Signatory	

Product Service

CONTENTS

Section **Page No**

SECTION 1

REPORT INFORMATION

1.1 REPORT DETAILS

Manufacturer	Ericsson
Address	349 Terry Fox Drive Ottawa Ontario K2K 2V6 Canada
Product Name & Product Number	RD 4442 B30
IC Model Name	AS9014071
Serial Number(s)	TD3T601990
Software Version	CXP 901 3268/14 Revision: R71HG
Hardware Version	R1A
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2017 FCC CFR 47 Part 27: 2017
Start of Test	30 October 2018
Finish of Test	30 October 2018
Name of Engineer(s)	Scott Drysdale
Related Document(s)	KDB 971168 D01 v02r02 KDB 662911 D01 v02r01
Test report revision history	0000 - Issue 1. Initial release 0001 – Issue 2. Minor edits to section 1.5.1 as per customer request kept on file.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate compliance with FCC CFR 47 Part 27. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

Scott Drysdale

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 27, is shown below.

Section	Specification Clause		Test Description	Result
	FCC CFR 47 Part 2	FCC CFR 47 Part 27		
2.1	2.1046	27.50	Maximum Peak Output Power and Peak to Average Ratio - Conducted	Pass
2.2	2.1049	27.53	Occupied Bandwidth	Pass
2.3	2.1051	27.53 (h)	Band Edge	Pass
2.4	2.1051	27.53 (h)	Transmitter Spurious Emissions	Pass
2.5	2.1055	27.54	Frequency Stability	Pass

Measurement Uncertainty Decision Statement

Determination of conformity with the specification limits is based on the results of the compliance measurement and does not take into account measurement instrumentation uncertainty as defined in ANSI C63.26:2015 Clause 1.3.

1.3 CONFIGURATION DESCRIPTION

The RD 4442 B30 / KRY 901 407/1 supports Single Carrier in Single Mode operation (LTE) from either a single or dual port configuration.

The RD 4442 B30 supports LTE Test Models E-TM1.1, E-TM3.1, E-TM3.1a E-TM3.2 Band 30 (2350 MHz – 2360 MHz). The LTE Test Models (as defined in 3GPP TS 36.141) E-TM1.1, E-TM3.1, E-TM3.1a and E-TM3.2 were used to represent QPSK, 64QAM, 256QAM and 16QAM modulation respectively.

The RD 4442 B30 has been tested and authorized for LTE Single Carrier transmission. The Test Model used, unless otherwise stated, for LTE was E-TM1.1.

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 4 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 power unless otherwise stated.

The EUT was powered via POE (Power Over Ethernet) from the IRU 2242 using a -48V DC Power supply.

Bandwidth (MHz)	Transmit / DL (MHz)						Receive / UL (MHz)					
	B		M		T		B		M		T	
	EARFCN	Frequency	EARFCN	Frequency	EARFCN	Frequency	EARFCN	Frequency	EARFCN	Frequency	EARFCN	Frequency
5	9795	2352.5	9820	2355	9845	2357.5	27685	2307.5	27710	2310.0	27735	2312.5
10	9820	2355.0	9820	2355	9820	2355.0	27710	2310.0	27710	2310.0	27710	2310.0

1.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Dot
MANUFACTURER	Ericsson
TYPE	Remote Radio Base Station
PART NUMBER	RD 4442 B30: KRY 901 407/1
SERIAL NUMBER	TD3T601990
HARDWARE VERSION	R1A
SOFTWARE VERSION	R71HG
TRANSMITTER OPERATING RANGE	B30 2350 – 2360 MHz
RECEIVER OPERATING RANGE	B30 2305 – 2315 MHz
COUNTRY OF ORIGIN	China
INTERMEDIATE FREQUENCIES	DL: 110 – 150MHz, UL: 40 – 80MHz
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	LTE 5M00 W7D 10M0 W7D
MODULATION TYPES: (i.e. GMSK, QPSK)	LTE: QPSK, 16QAM, 64QAM, 256QAM
HIGHEST INTERNALLY GENERATED FREQUENCY	2.3 GHz
OUTPUT POWER (W or dBm)	4x 0.05 W (17dBm)
FCC ID	Tested EUT: TA8AKRY901407-1
INDUSTRY CANADA ID	NA
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The RD 4442 B30 (KRY 901 407/1) is a single band Remote Radio Unit forming part of the Ericsson Radio Base Station (RBS) equipment. The RD provides radio access for mobile and fixed devices and is intended for the indoor environment. The radio operates over 4 Transmit ports in SRO; Single Carrie and MIMO transmission with a maximum rated RF Output of 0.050W per port over an operational temperature of 5°C to +40°C. The unit is designed to be ceiling mounted.

Signature:

……

Denis Lalonde

Date: 12 Dec, 2018

Declaration of Build Status Serial Number: TD3T601990

1.5 PRODUCT INFORMATION

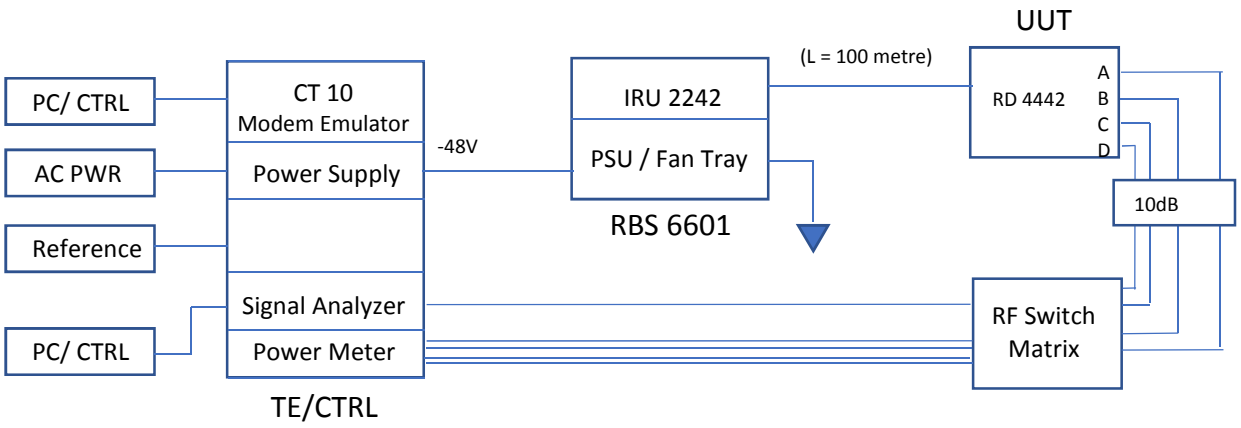
1.5.1 Technical Description

The Equipment Under Test (EUT) RD 4442 B30 is an Ericsson AB Radio Unit working in the public mobile service 2300 MHz band which provides communication connections to 2300 MHz network. The EUT operates via POE (Power Over Ethernet) from the IRU 2242 using a -48V DC Power supply.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.

Equipment Under Test

1.6 TEST SETUP



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 via POE (Power Over Ethernet) from the IRU 2242 using a -48V DC Power supply.

FCC Measurement Facility Accreditation Designation Number: CA6845
TUV SUD Canada (Laval)

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 Accreditation, TÜV SÜD Canada, Laval conducted the following tests at Ericsson in Ottawa.

Test Name	Name of Engineer(s)
Maximum Peak Output Power and Peak to Average Ratio - Conducted	Scott Drysdale
Occupied Bandwidth	Scott Drysdale
Band Edge	Scott Drysdale
Transmitter Spurious Emissions	Scott Drysdale
Frequency Stability	Scott Drysdale

1.11 ADDITIONAL INFORMATION

Testing performed with Gavin Gan of Ericsson - Ottawa.

The RD 4442 B30 (KRY 901 407/1) is a single band Remote Radio Unit forming part of the Ericsson Radio Base Station (RBS) equipment. The RD provides radio access for mobile and fixed devices and is intended for the indoor environment. The radio operates over 4 Transmit ports in SRO, Single Carrier, and MIMO transmission with a maximum rated RF Output of 0.050W per port over an operational temperature of 5°C to +40°C. The unit is designed to be ceiling mounted.

MODULE LIST

Configuration			
Product	Product No	R-State	Serial No
CT10	LPC102487/1	R1C	T01F311639
SUP 6601	1/BFL 901 009/1	R3B	BR81278870
IRU 2242 (RF1)	KRC 161 444/2	R2A	C829960698
IRU 2242 (RF2)	KRC 161 444/2	R2A	C829960688
RD 4442 B30	KRY 901 407/1	R1A	TD3T601990
Software Version:	CXP 901 3268/14	Revision:	R71HG

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 27, Clause 27.50

2.1.2 Date of Test and Modification State

30 October 2018 - 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	23°C
Relative Humidity	35%

2.1.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, clause 5.2.1 and summed in accordance with FCC KDB 662911 D01.

2.1.6 Test Results

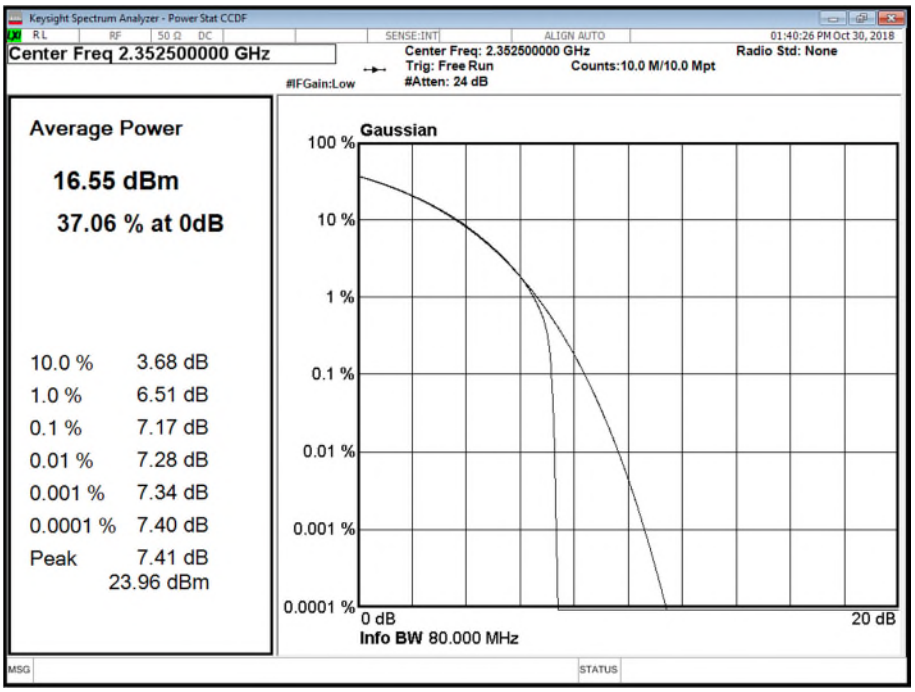
Configuration A – Bottom 5 MHz

Maximum Output Power 24 dBm

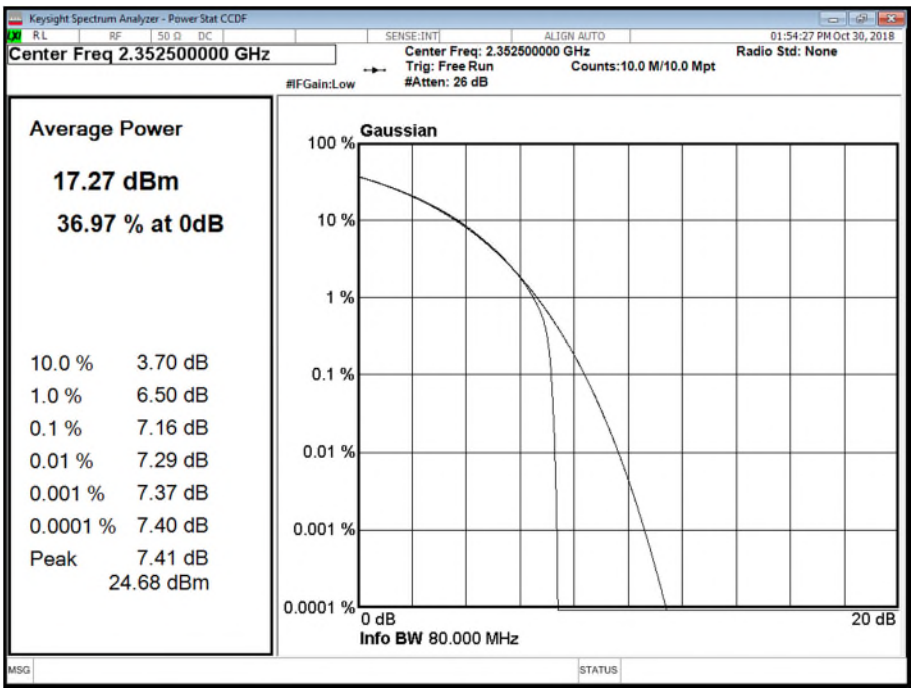
Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position M		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	QPSK	5.0 MHz	7.17	16.57	10.58
B	QPSK	5.0 MHz	7.16	17.24	11.36
C	QPSK	5.0 MHz	7.20	16.25	10.41
D	QPSK	5.0 MHz	7.20	16.98	11.08
Total			-	22.80	16.89

Note: Due to bandwidth of band and bandwidth of carrier the 10 MHz had a middle channel only.

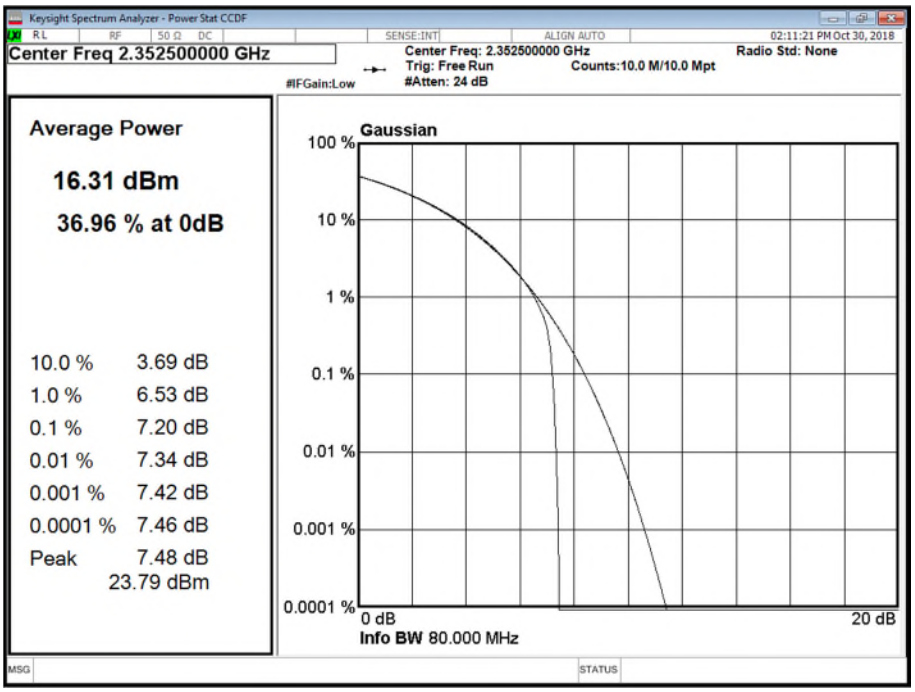
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



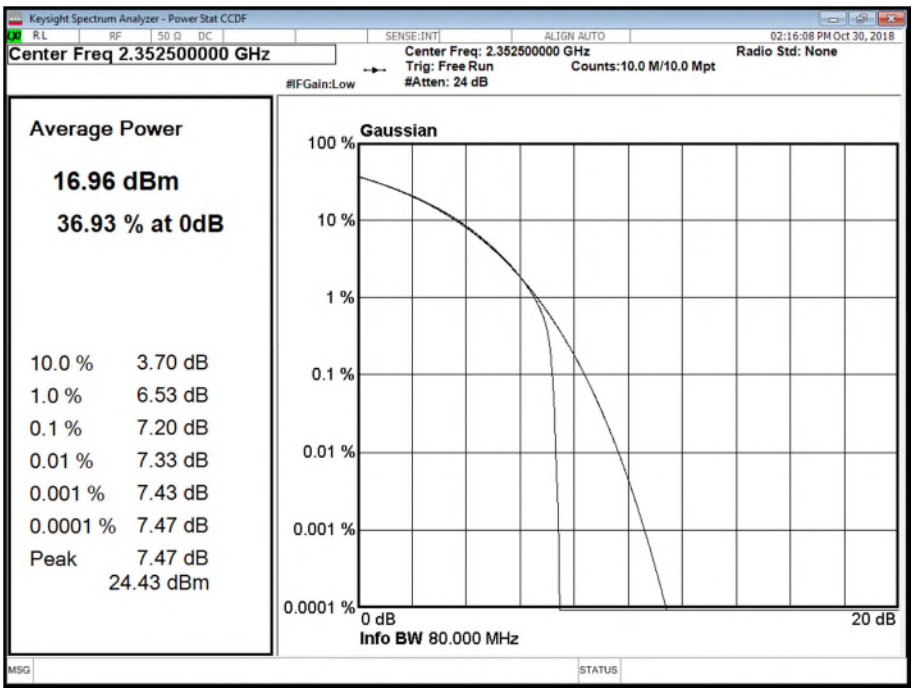
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



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



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

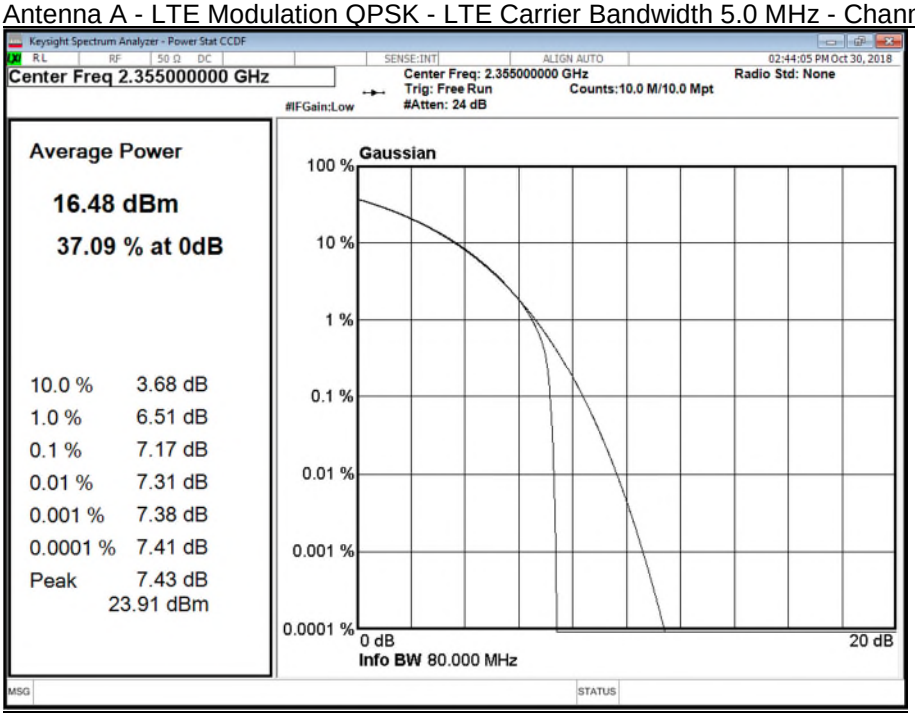


Configuration A – Middle Channel

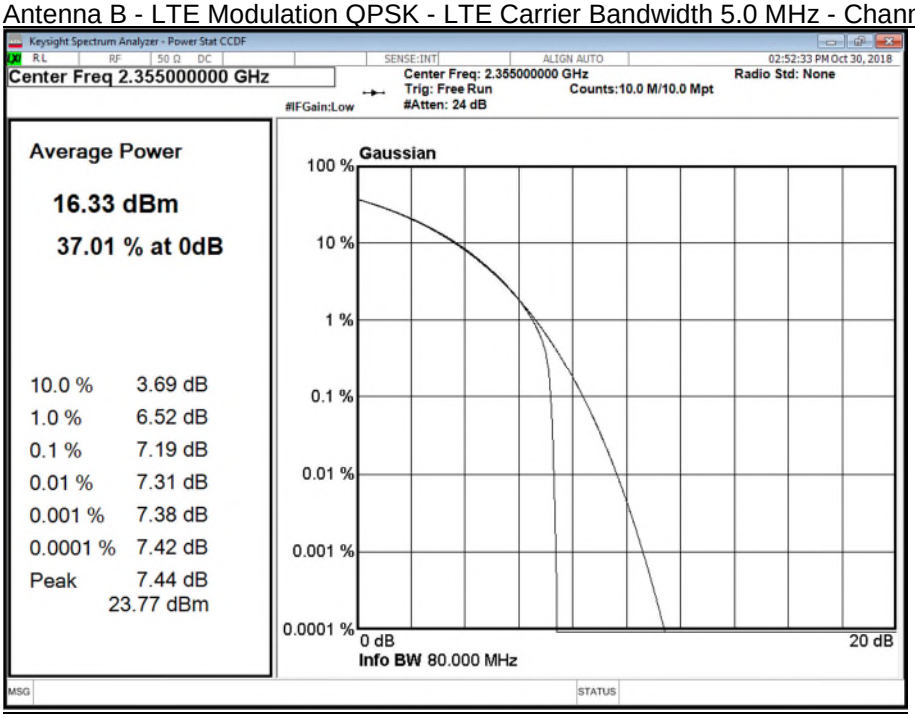
Maximum Output Power 24 dBm

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position M		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	QPSK	5.0 MHz	7.15	16.44	10.73
B	QPSK	5.0 MHz	7.18	15.84	10.04
C	QPSK	5.0 MHz	7.18	16.10	10.22
D	QPSK	5.0 MHz	7.19	16.12	10.20
Total			-	22.15	16.33
A	QPSK	10.0 MHz	7.22	16.45	8.032
B	QPSK	10.0 MHz	7.19	16.59	7.965
C	QPSK	10.0 MHz	7.25	16.13	7.764
D	QPSK	10.0 MHz	7.21	16.54	7.952
Total			-	22.45	13.95

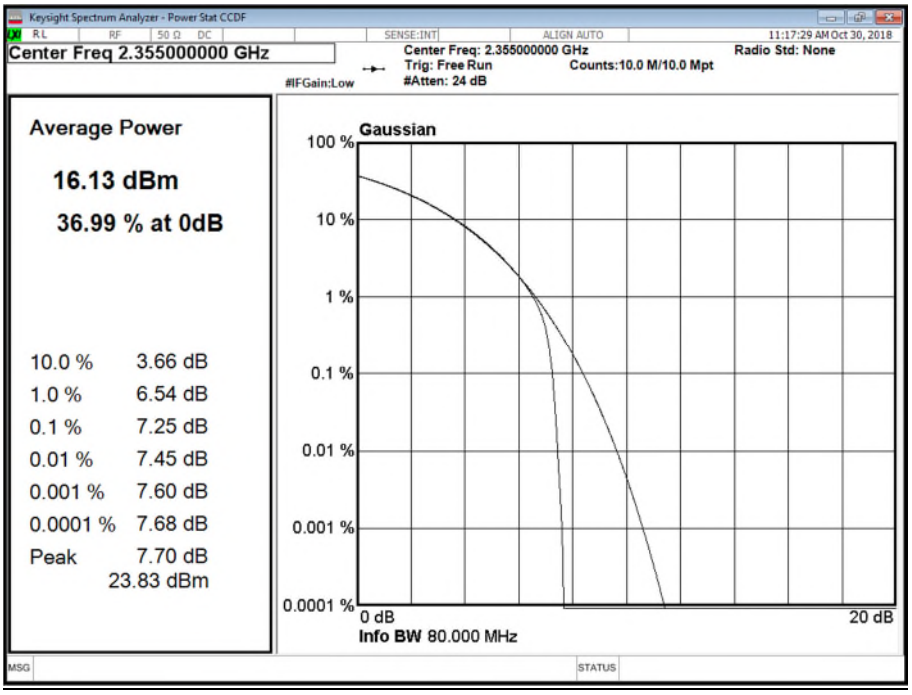
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



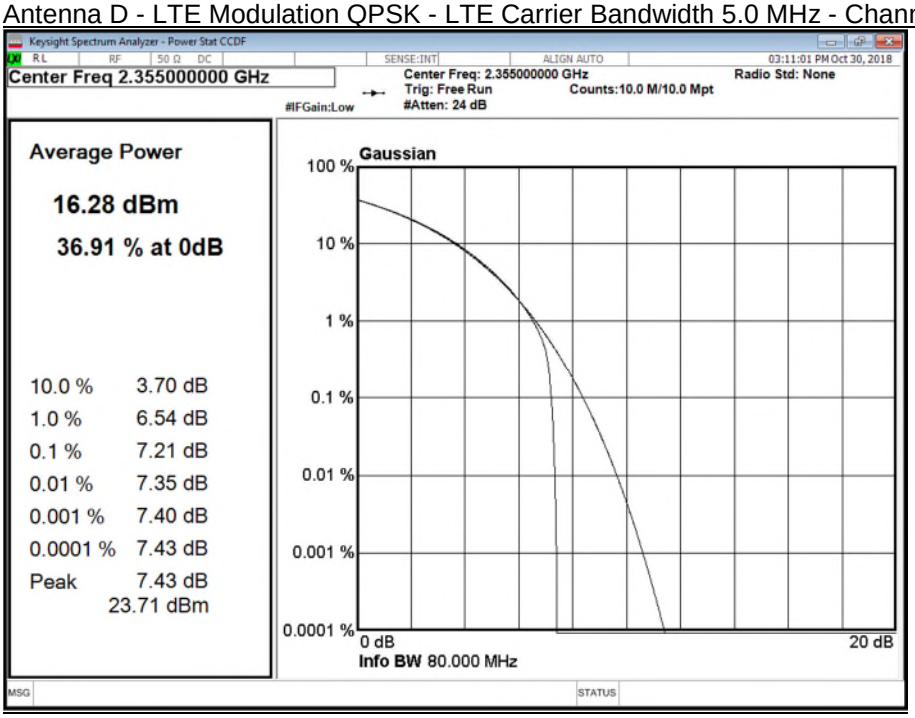
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



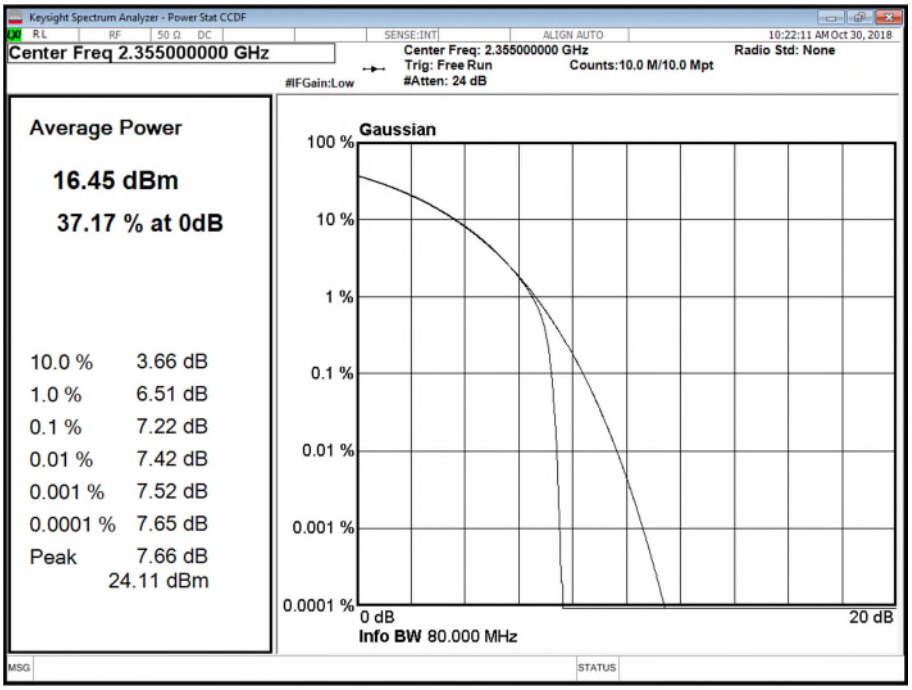
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



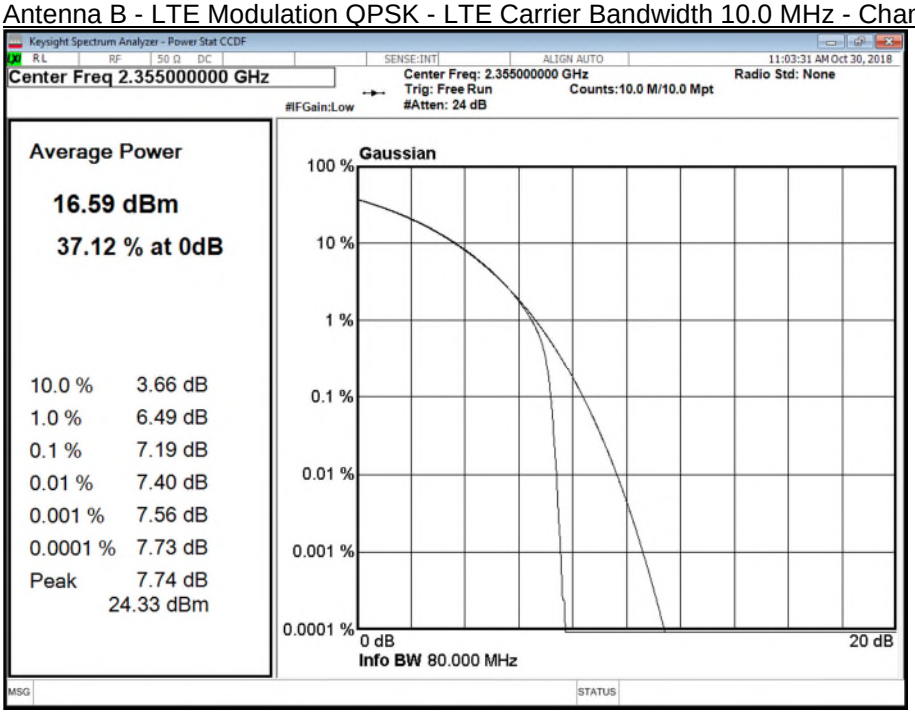
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



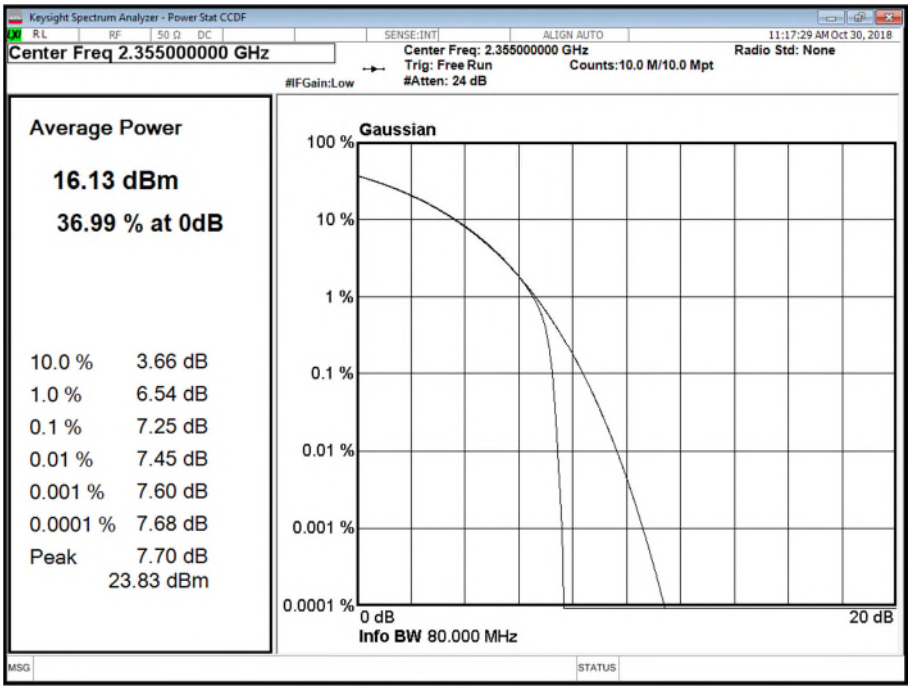
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



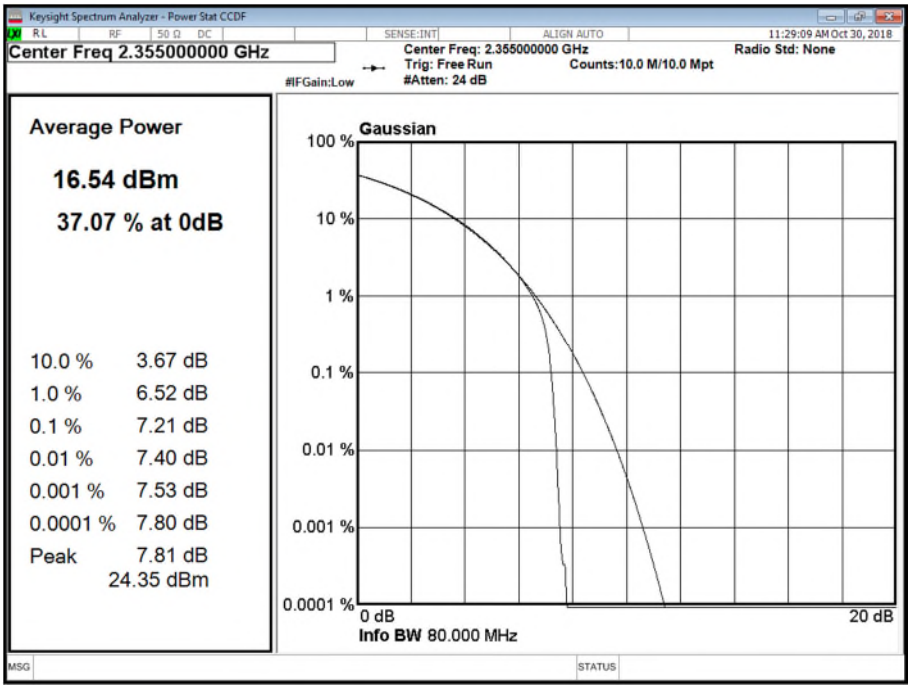
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M

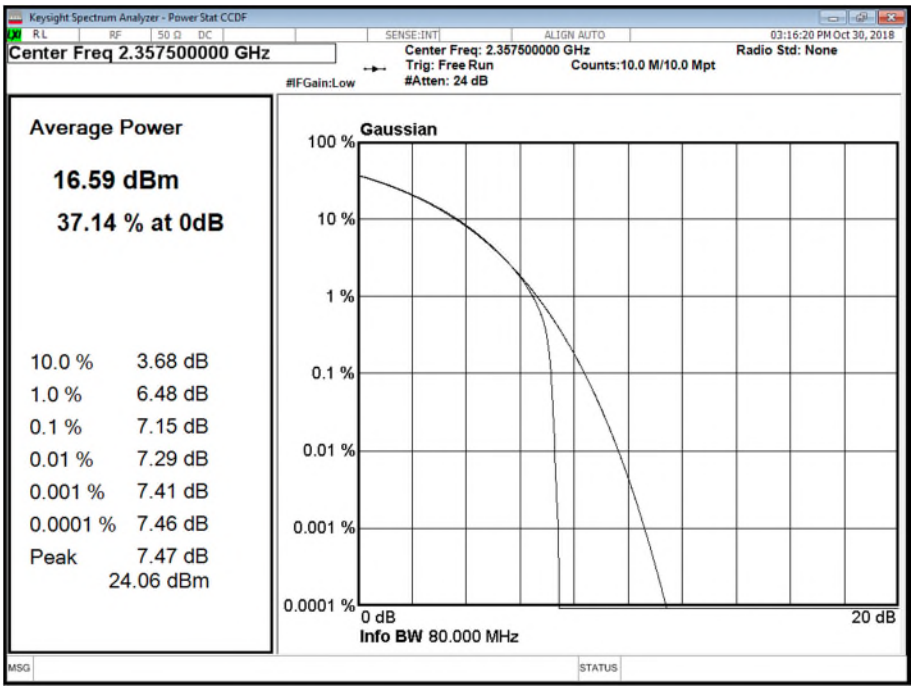


Configuration A – Top Channel

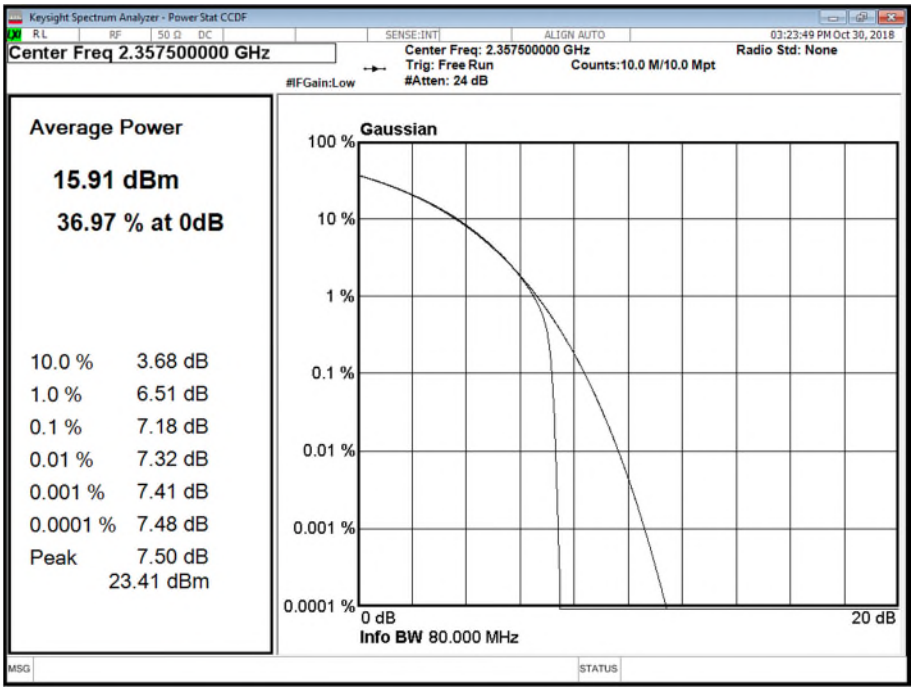
Maximum Output Power 24 dBm

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position T		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	QPSK	5.0 MHz	7.15	16.59	10.730
B	QPSK	5.0 MHz	7.18	15.91	10.041
C	QPSK	5.0 MHz	7.18	16.16	11.079
D	QPSK	5.0 MHz	7.19	16.13	10.730
Total				22.22	16.68

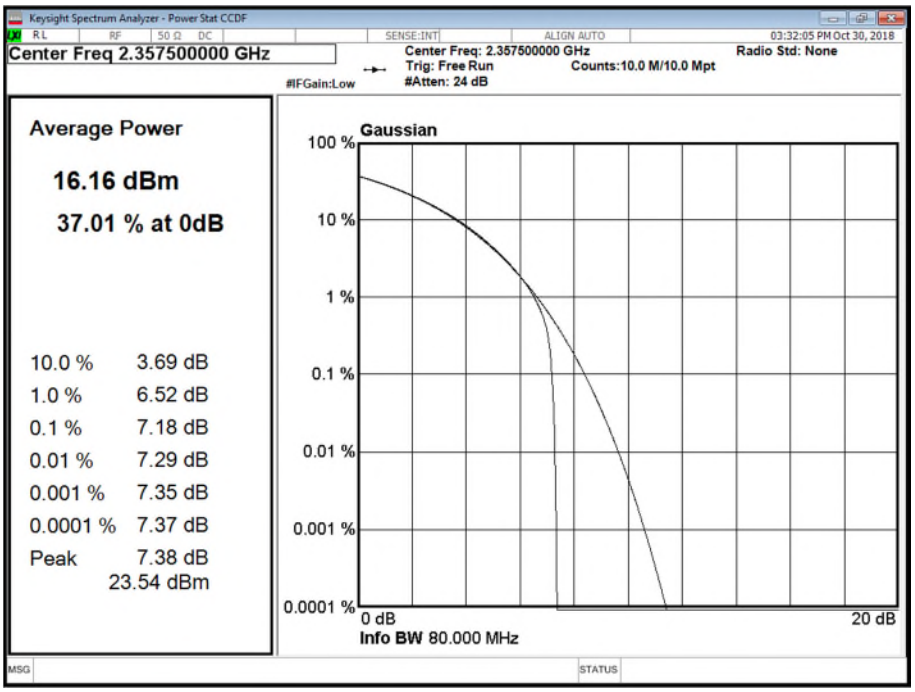
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



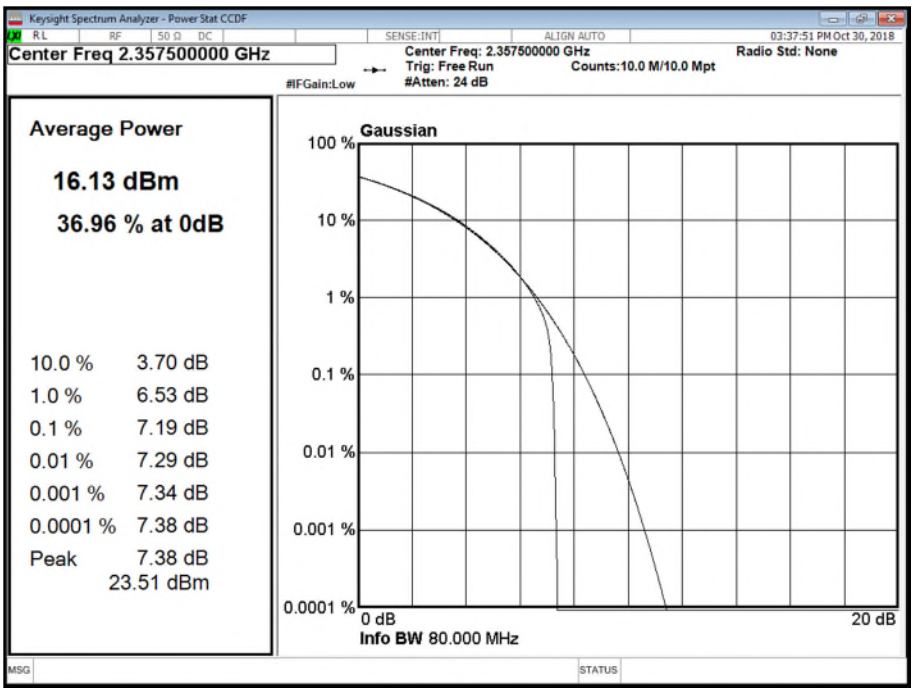
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



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 27, Clause 27.53

2.2.2 Date of Test and Modification State

30 October 2018 - 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	23°C
Relative Humidity	35%

2.2.5 Test Method

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

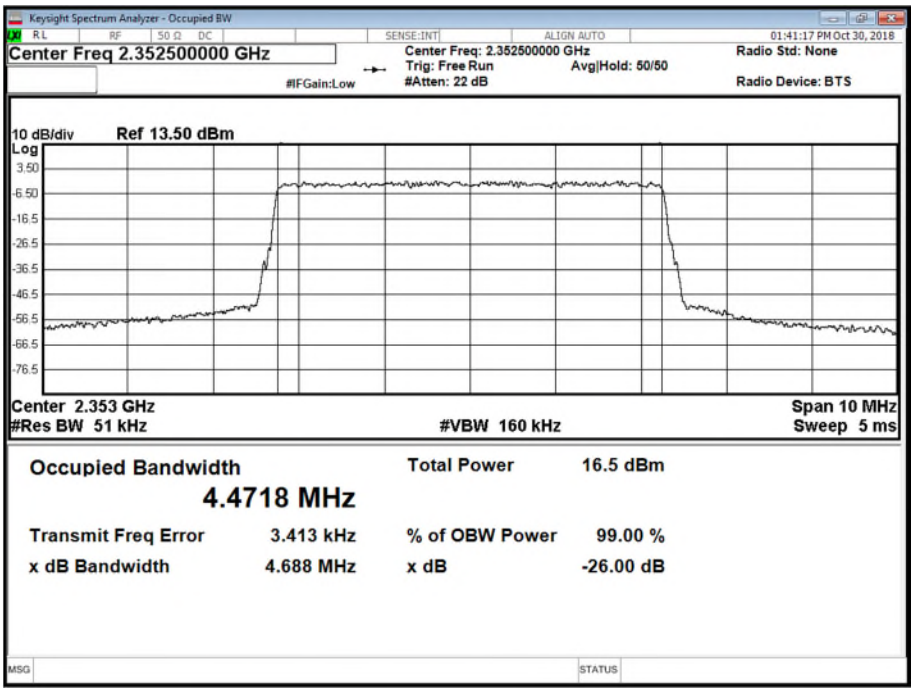
2.2.6 Test Results

Configuration A

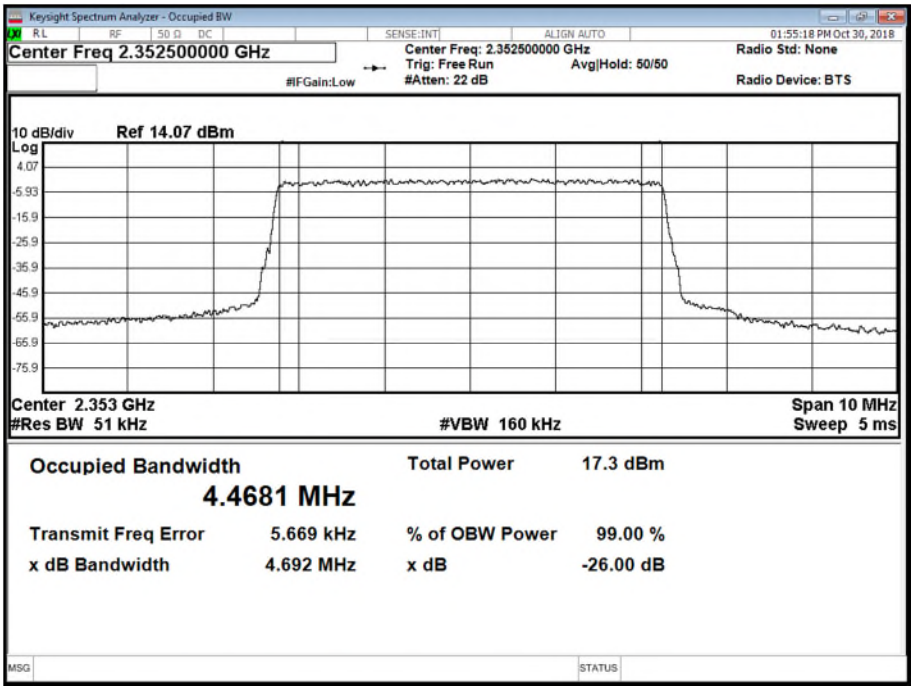
Antenna	LTE Modulation	LTE Carrier Bandwidth	Result (KHz)					
			Channel Position B		Channel Position M		Channel Position T	
			Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
A	QPSK	5.0 MHz	4,471.84	4,687.96	4,466.52	4,697.53	4,465.40	4,700.53
B	QPSK	5.0 MHz	4,468.06	4,691.87	4,466.92	4,701.62	4,471.34	4,698.72
C	QPSK	5.0 MHz	4,467.64	4,737.75	4,466.65	4,685.92	4,471.62	4,715.79
D	QPSK	5.0 MHz	4,467.33	4,697.86	4,465.75	4,700.88	4,464.53	4,692.52
A	QPSK	10.0 MHz			8,925.95	9,338.96		
B	QPSK	10.0 MHz			8,924.91	9,353.87		
C	QPSK	10.0 MHz			8,933.88	9,352.90		
D	QPSK	10.0 MHz			8,919.28	9,315.02		

Note: 10 MHz did not have a bottom or top channel, as only one frequency applies. The maximum recorded bandwidths are shown in the table above.

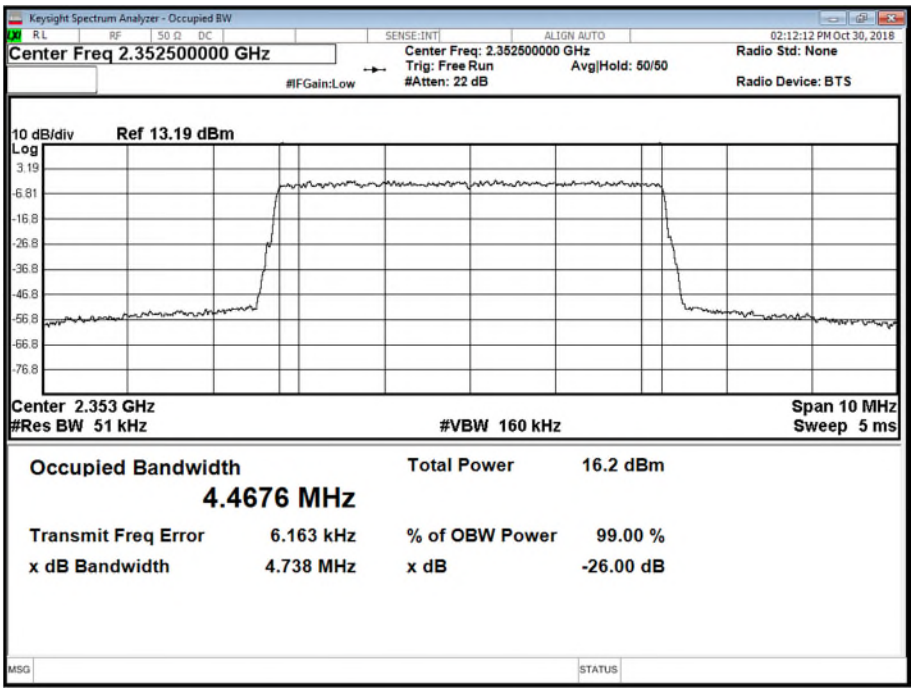
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



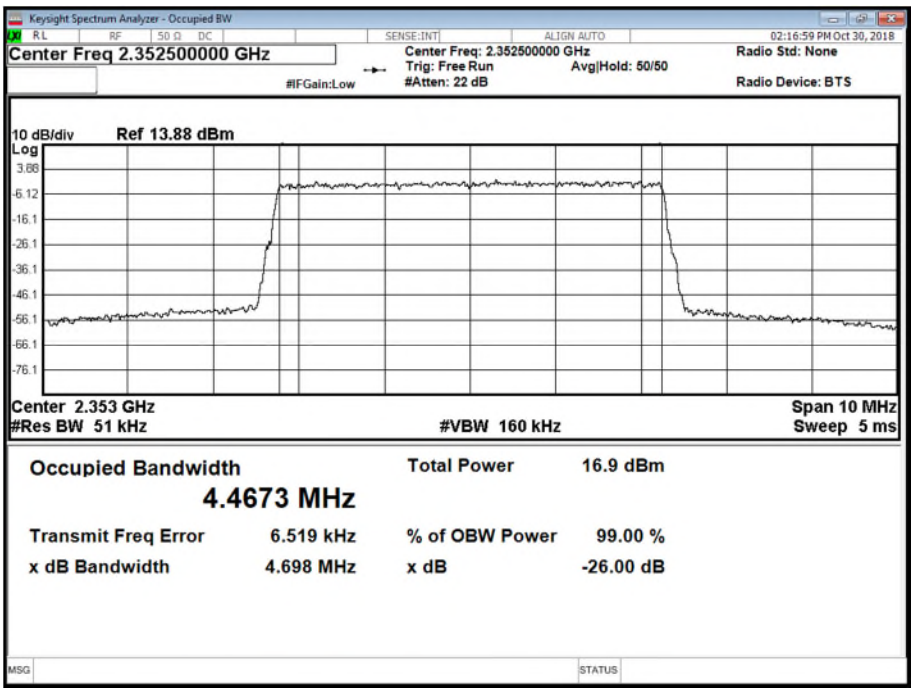
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



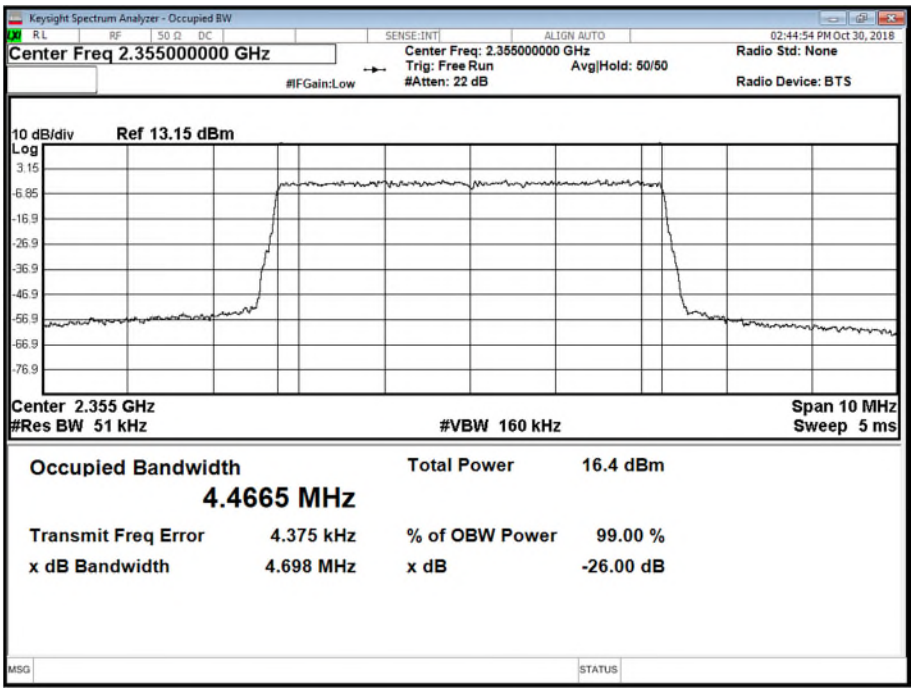
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



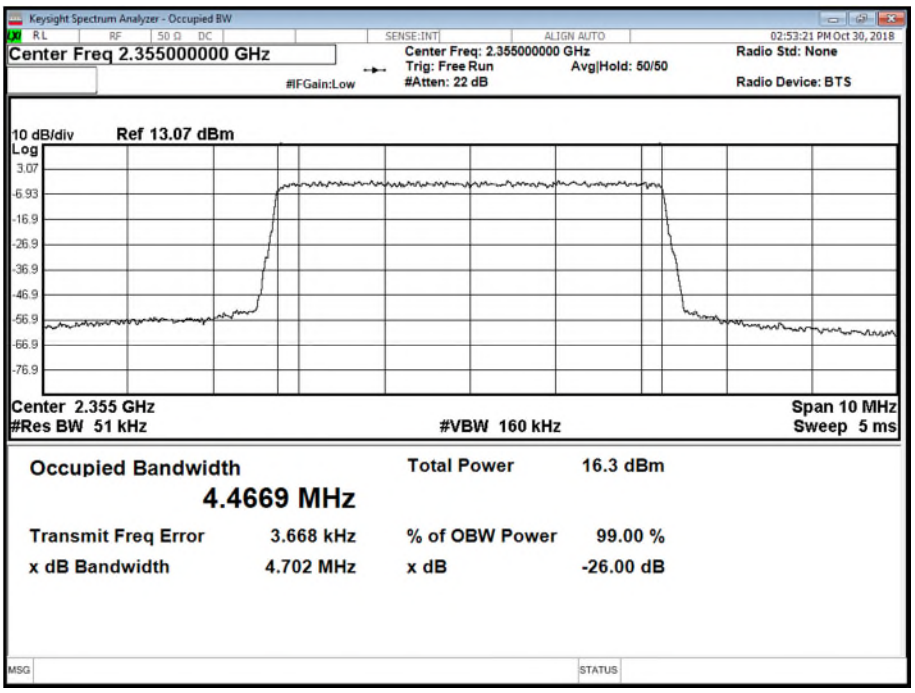
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



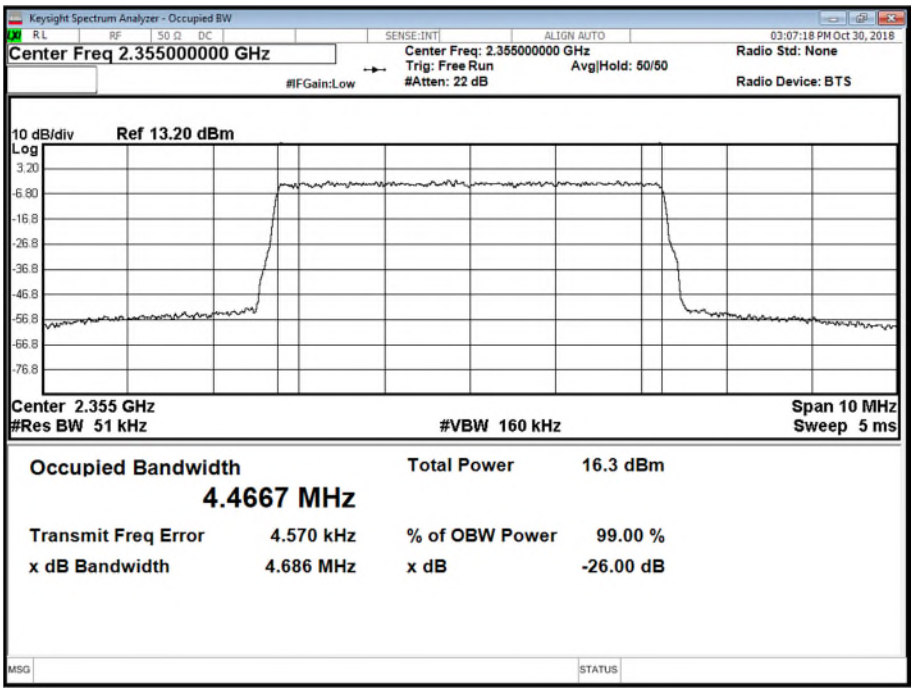
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



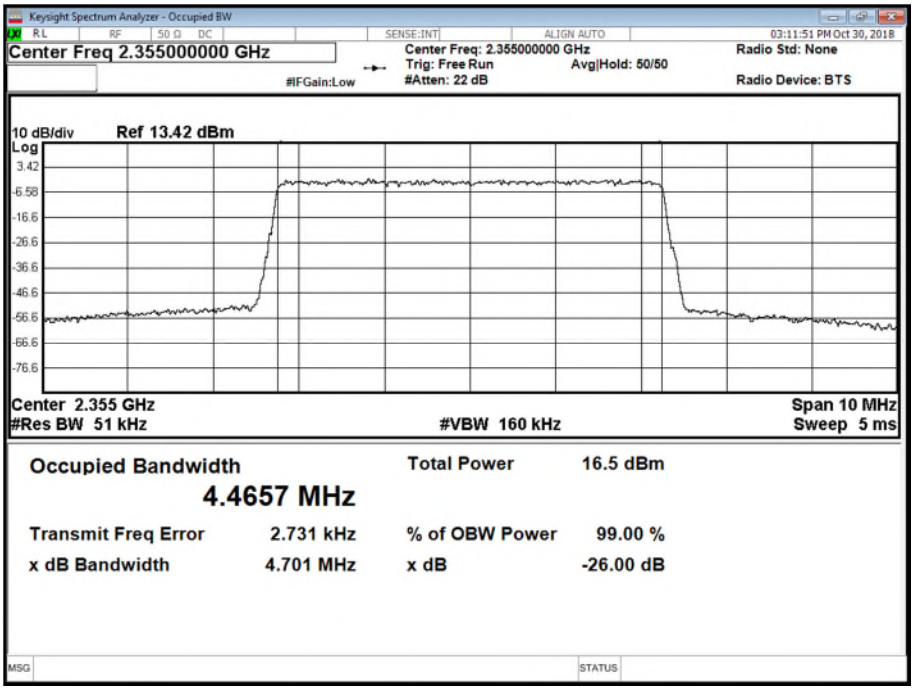
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



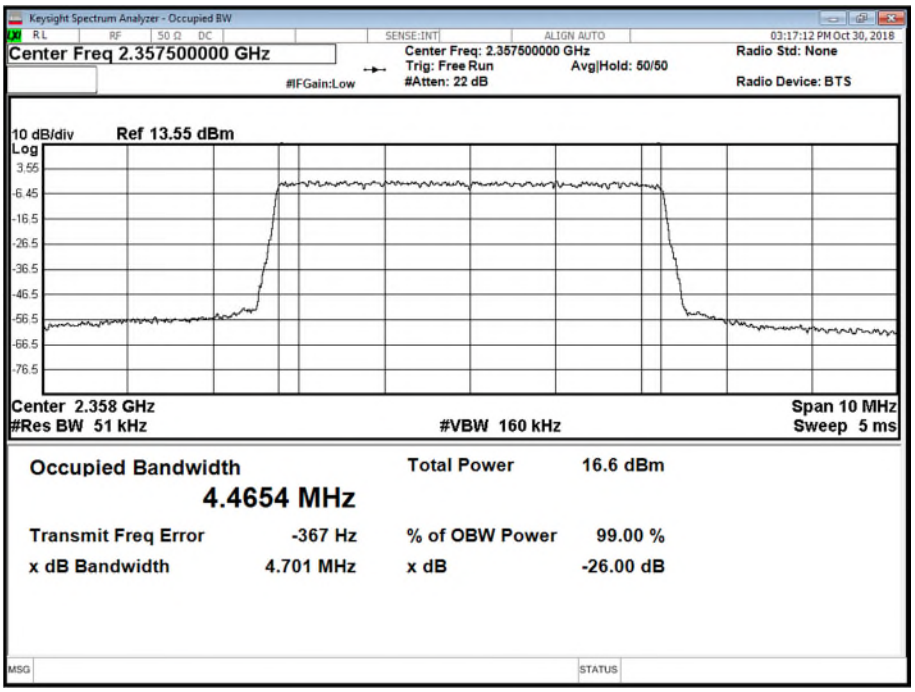
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



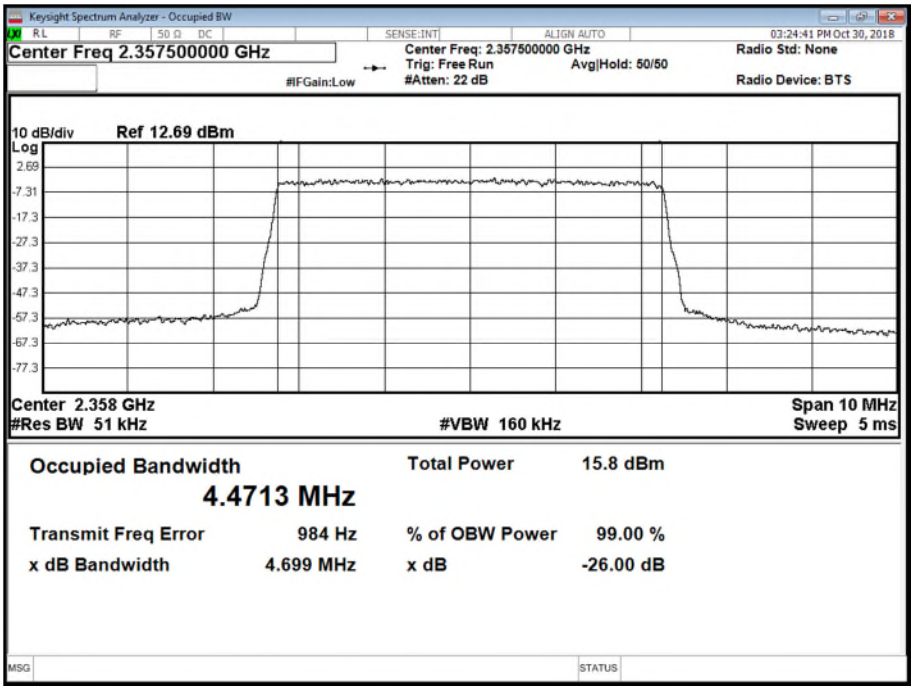
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



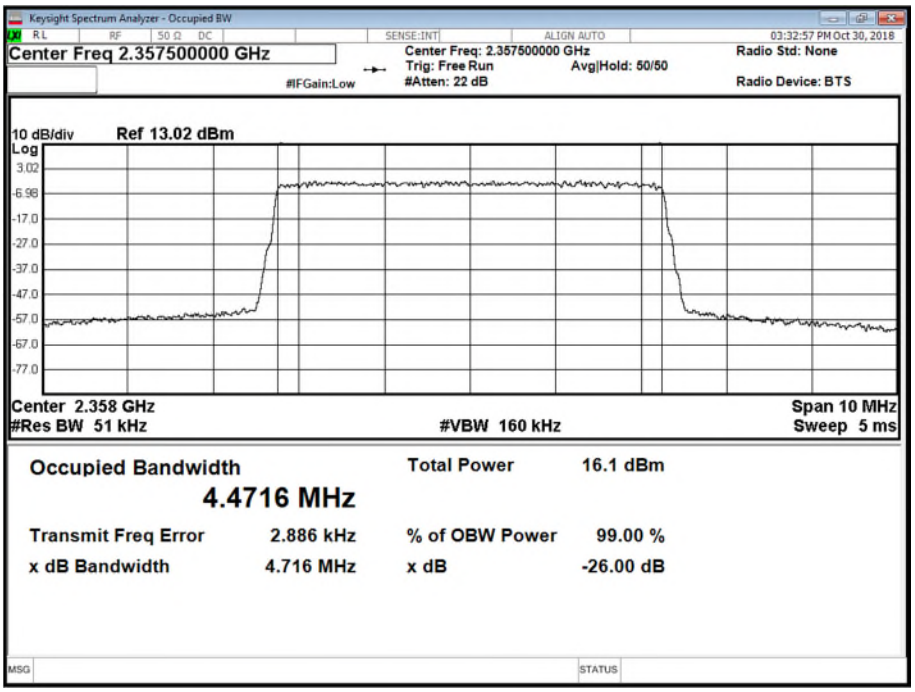
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



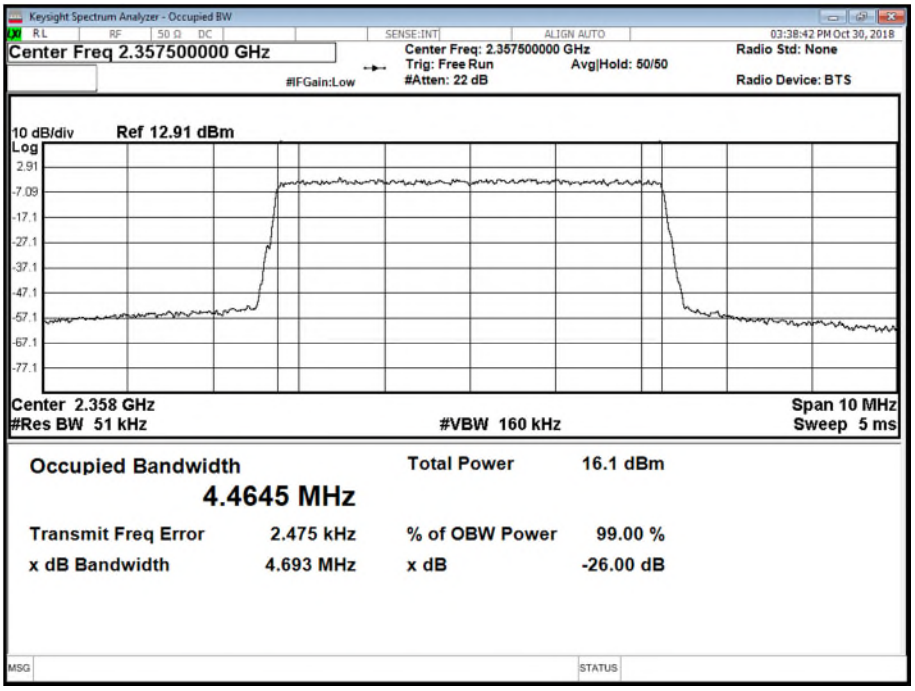
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



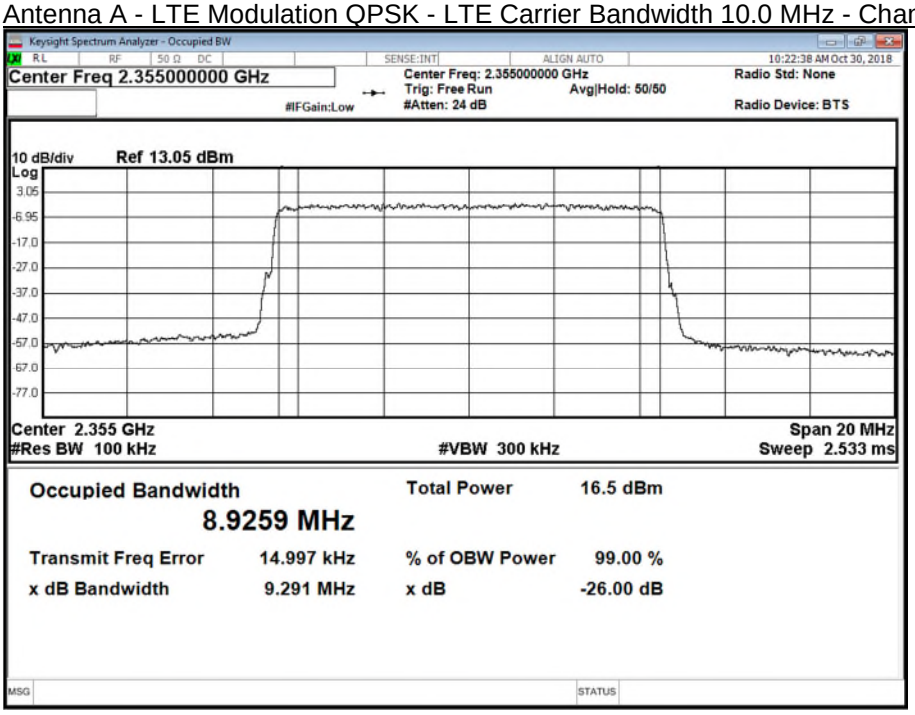
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



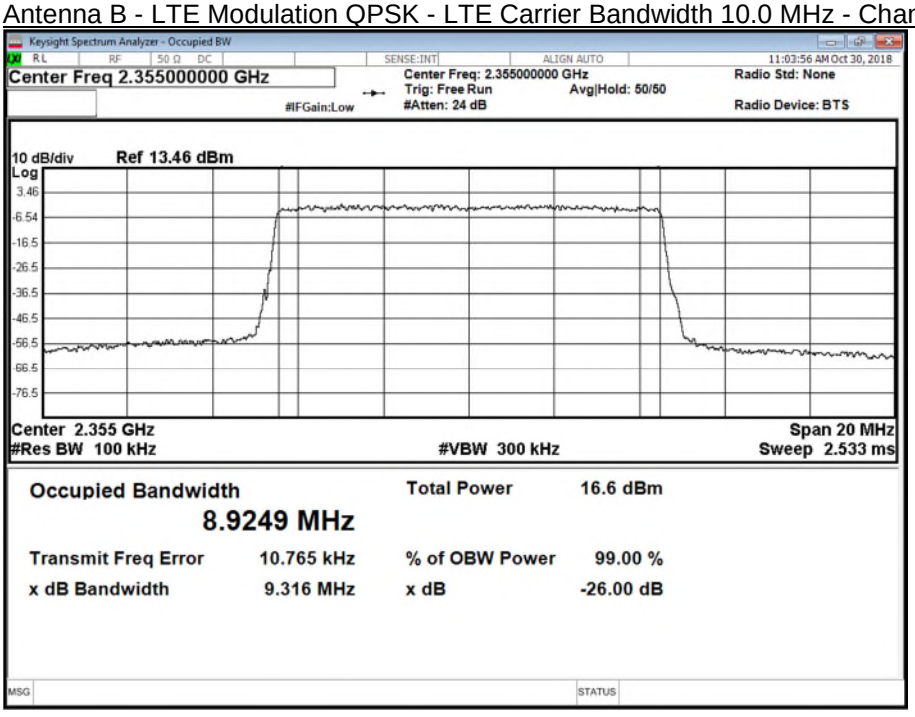
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



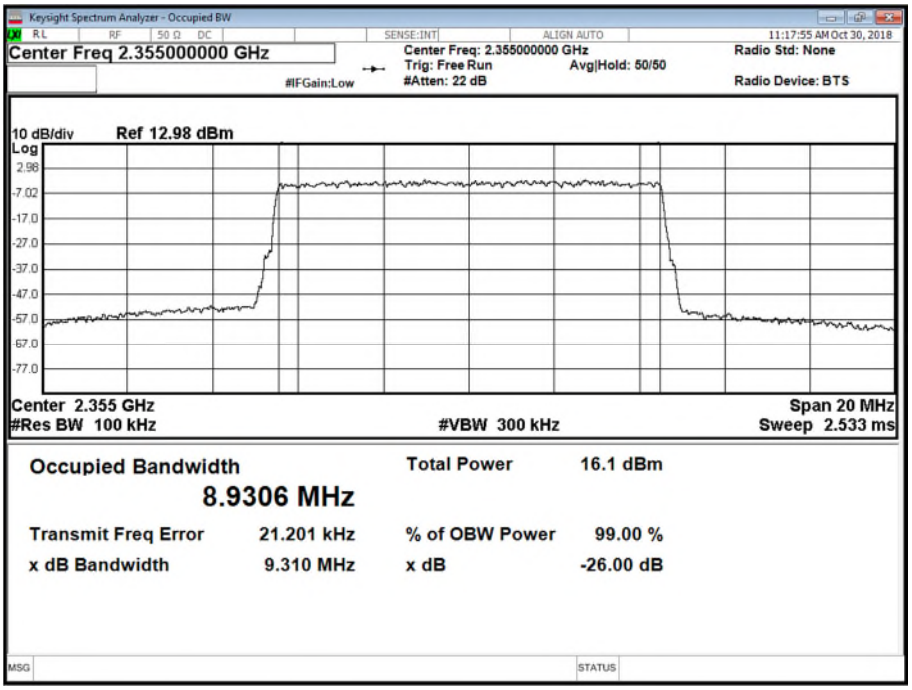
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



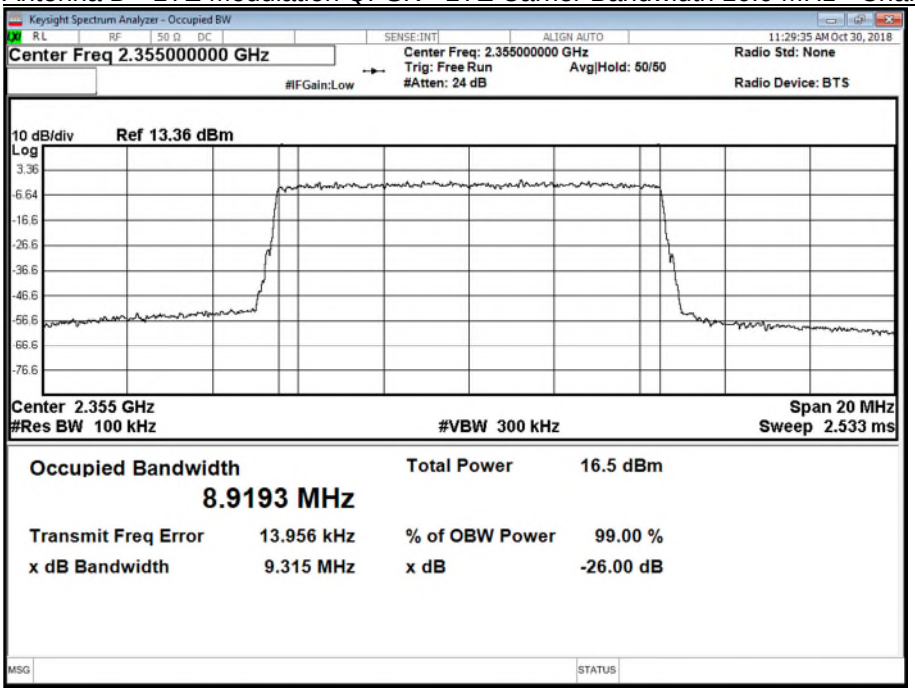
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



2.3 BAND EDGE

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 27, Clause 27.53 (h)

2.3.2 Date of Test and Modification State

30 October 2018 - 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°C
Relative Humidity	35%

2.3.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01 Clause 6.

The EUT was connected to a Spectrum Analyser via an attenuator and switching box. The path loss between the EUT and the Spectrum Analyser was measured using a Network Analyser. The measured path loss was entered as a Reference Level Offset in the Spectrum Analyser.

The Spectrum Analyser RBW was adjusted to be at least 1% of the measured 26dB Bandwidth. Using an RMS detector, the frequency spectrum up to 1MHz away from the Band Edge was investigated. The 30 EUT has 4 transmit ports, therefore, the test limits used were calculated on a worst-case basis accounting for an effective 4 port MIMO configuration.

Testing was performed on each port with a test limit of

43 + 10log (P) dB – 10log(4) = -19 dBm between 2305 and 2320 MHz and between 2345 and 2360 MHz, when outside the licensed band(s) of operation
75 + 10 log(P) dB – 10log(4) = -51 dBm between 2320 and 2345 MHz
43 + 10 log (P) dB – 10log(4) = -19 dBm between 2300 and 2305 MHz
70 + 10 log (P) dB – 10log(4) = -45 dBm between 2287.5 and 2300 MHz
72 + 10 log (P) dB – 10log(4) = -47 dBm between 2285 and 2287.5 MHz
75 + 10 log (P) dB – 10log(4) = -51 dBm below 2285 MHz,
43 + 10 log (P) dB – 10log(4) = -19 dBm between 2360 and 2362.5 MHz,
55 + 10 log (P) dB – 10log(4) = -31 dBm between 2362.5 and 2365 MHz
70 + 10 log (P) dB – 10log(4) = -46 dBm between 2365 and 2367.5 MHz,
72 + 10 log (P) dB – 10log(4) = -48 dBm between 2367.5 and 2370 MHz
75 + 10log (P) dB – 10log(4) = -51 dBm above 2370 MHz.

Compliance is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the

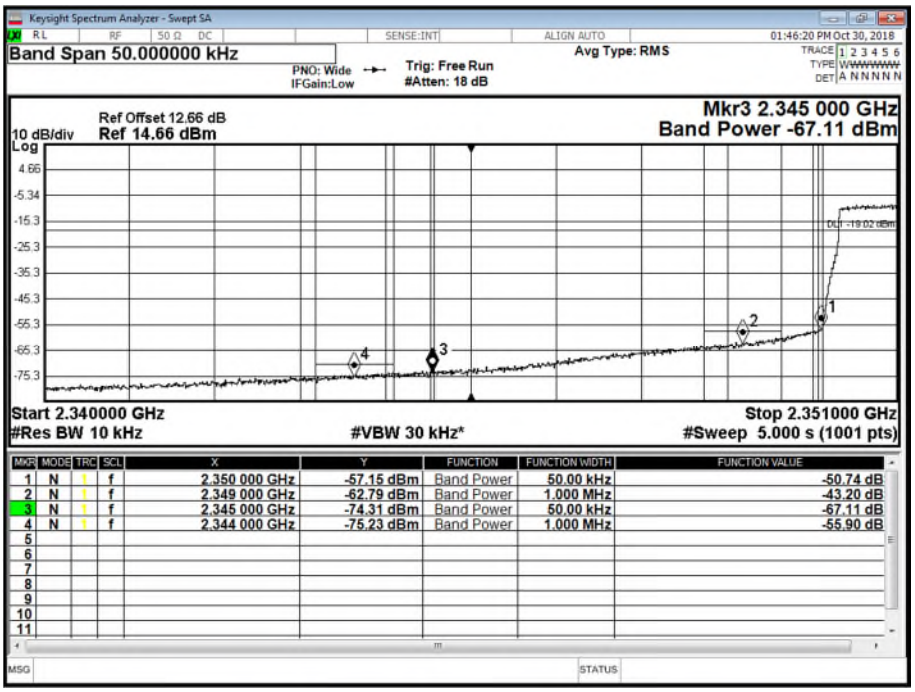
transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e., 1 MHz).

2.3.6 Test Results

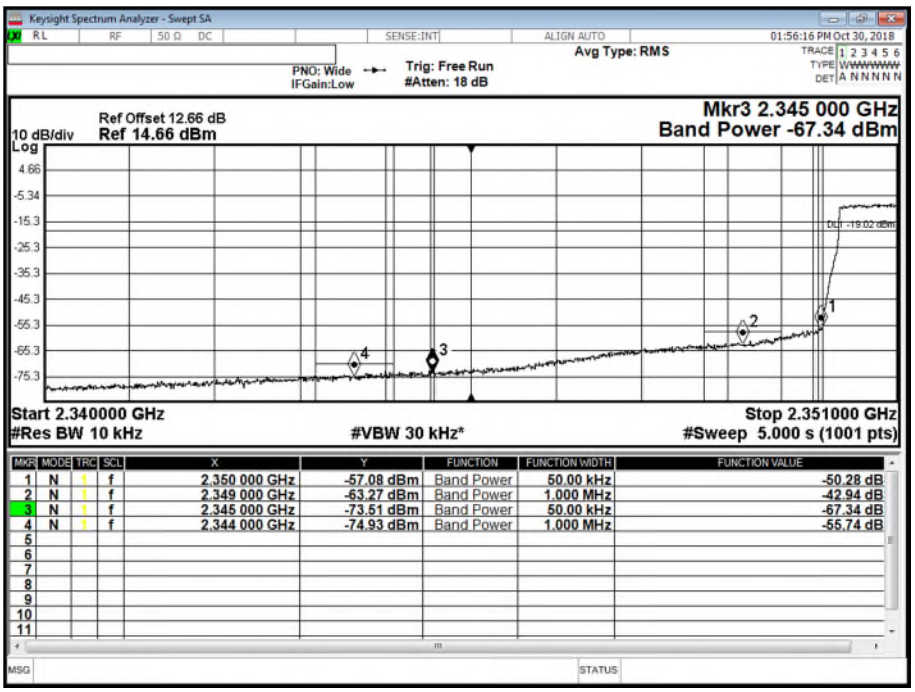
Configuration A

Antenna	LTE Modulation	LTE Carrier Bandwidth	Band Edge (MHz)	
			Channel Position B	Channel Position T
A	QPSK	5.0 MHz	2,352.5	2,357.5
B	QPSK	5.0 MHz	2,352.5	2,357.5
C	QPSK	5.0 MHz	2,352.5	2,357.5
D	QPSK	5.0 MHz	2,352.5	2,357.5
A	QPSK	10.0 MHz	2,355.0	2,355.0
B	QPSK	10.0 MHz	2,355.0	2,355.0
C	QPSK	10.0 MHz	2,355.0	2,355.0
D	QPSK	10.0 MHz	2,355.0	2,355.0

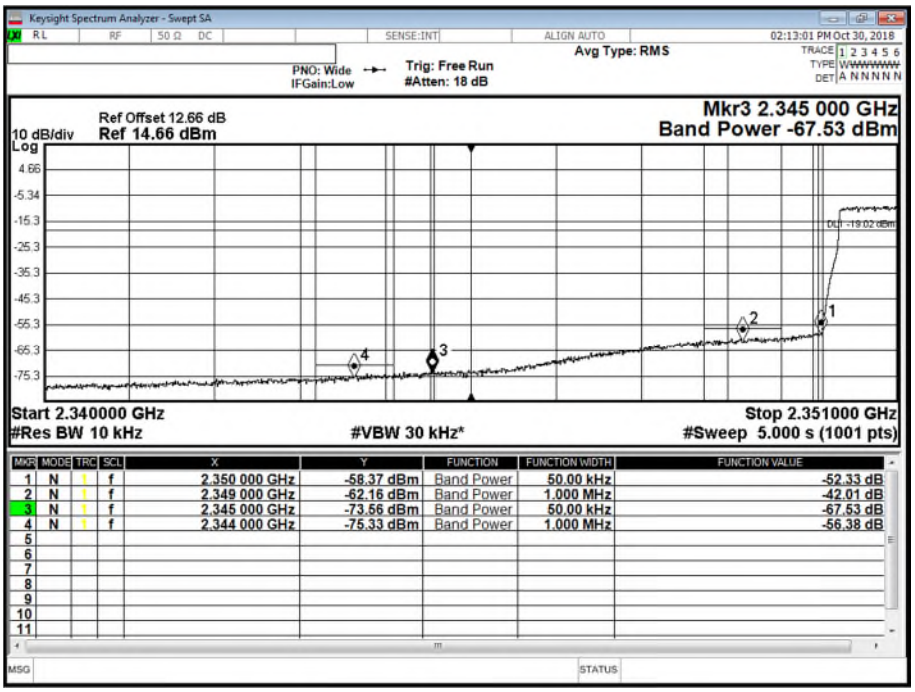
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



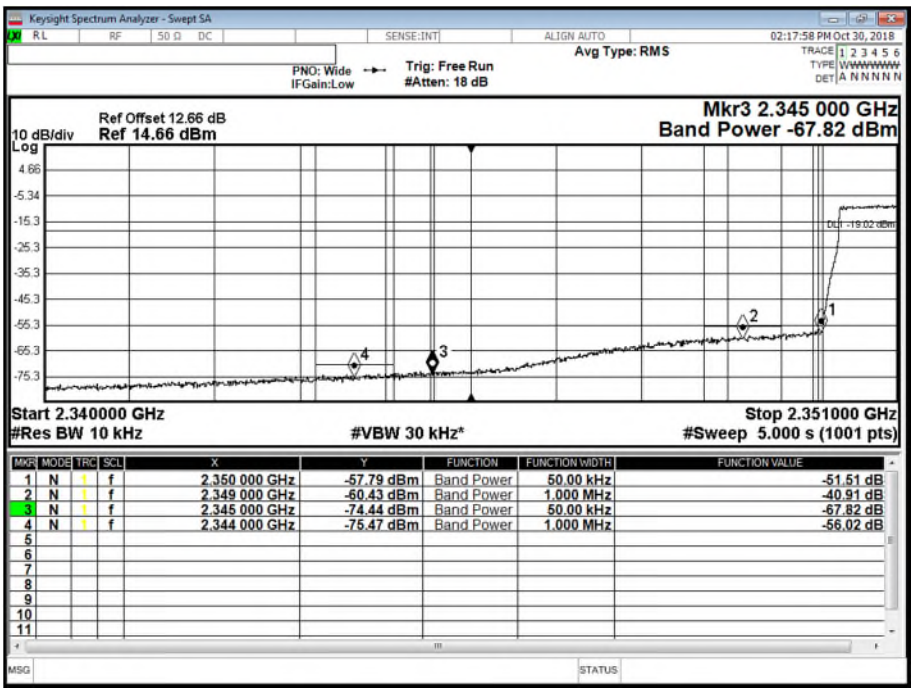
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



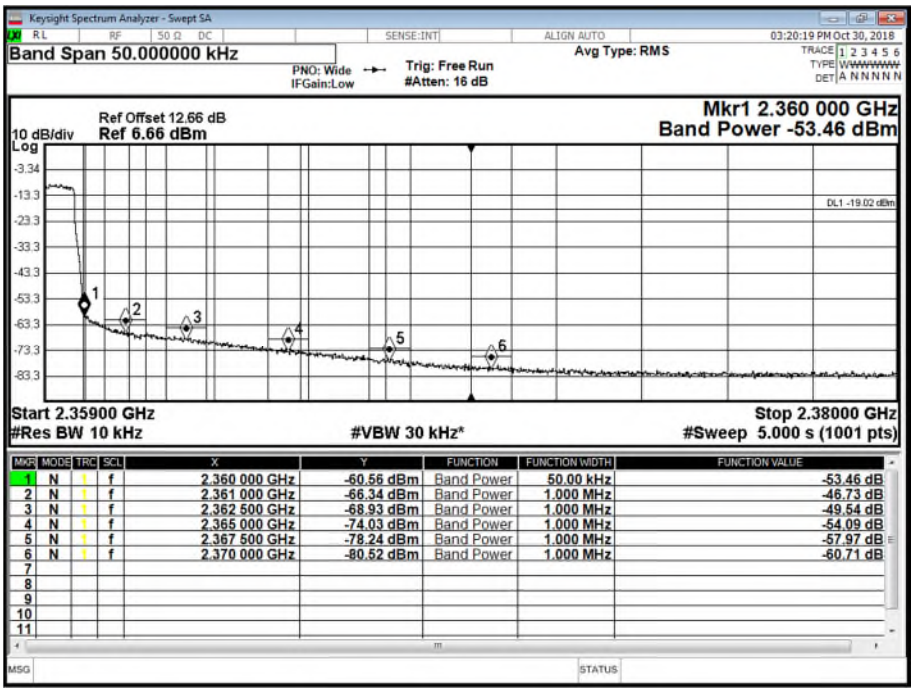
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



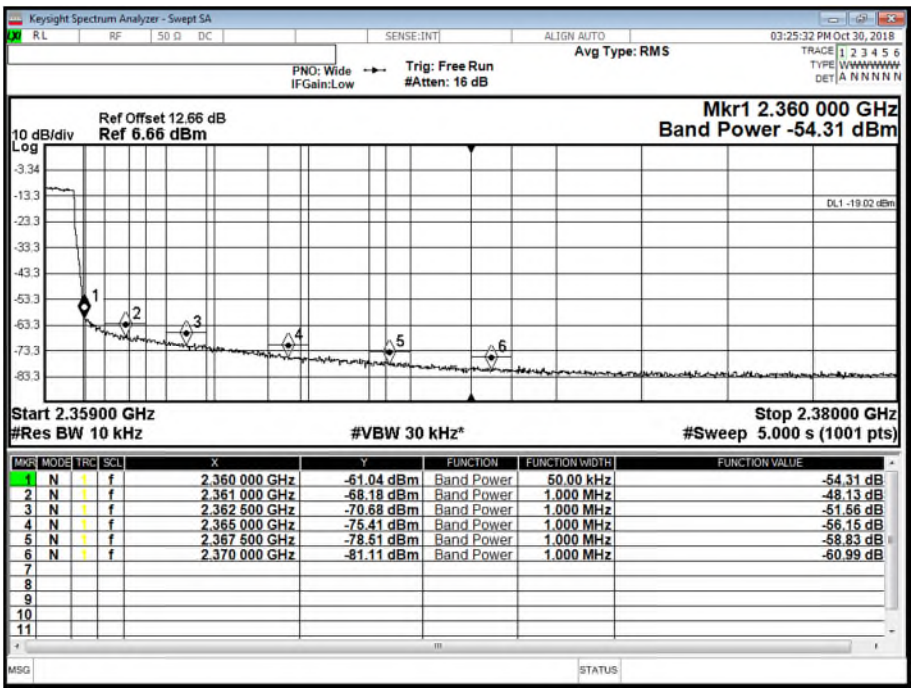
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



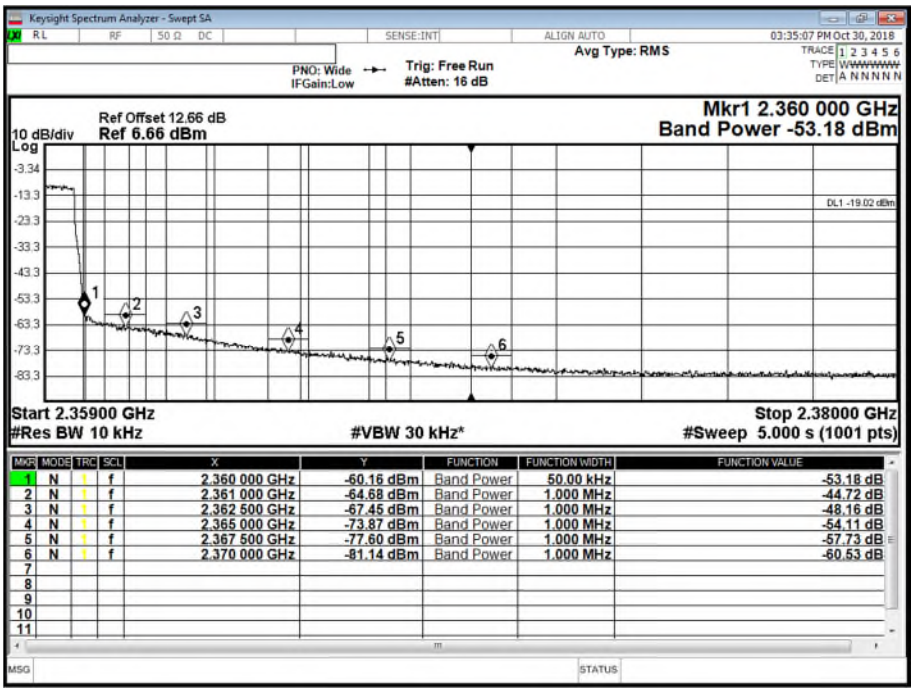
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



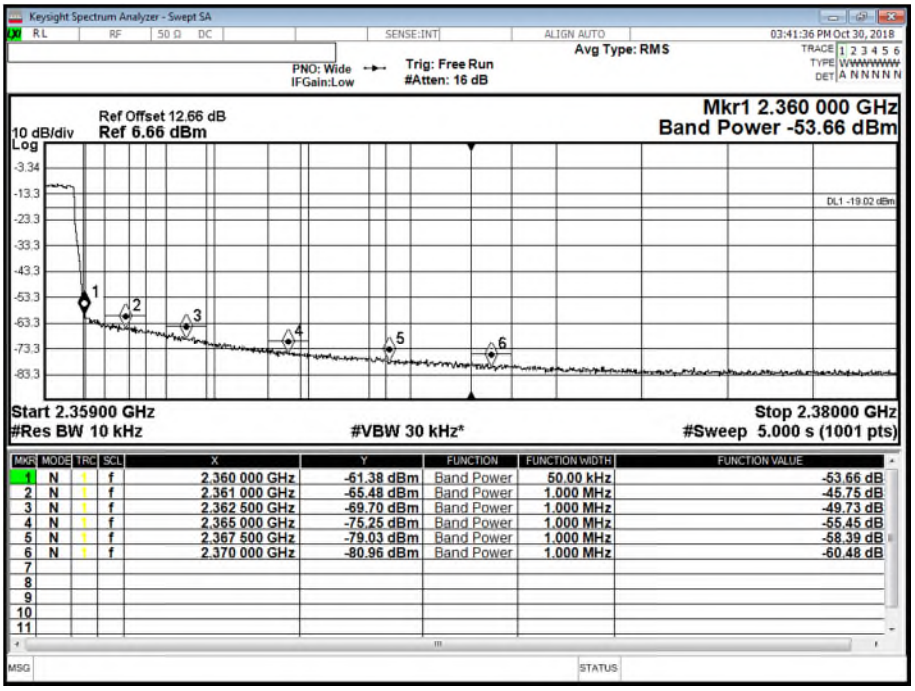
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



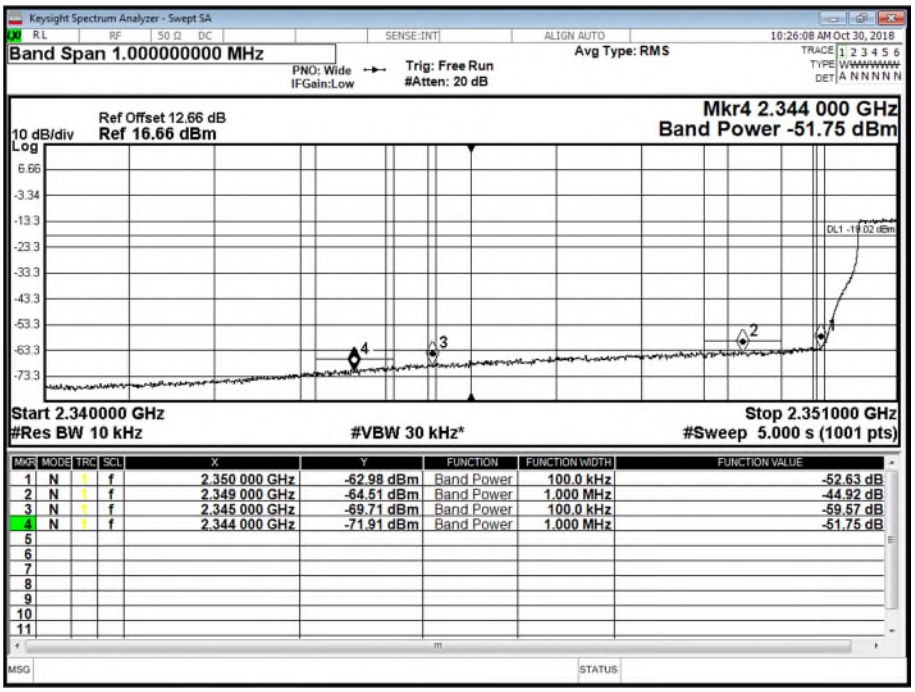
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



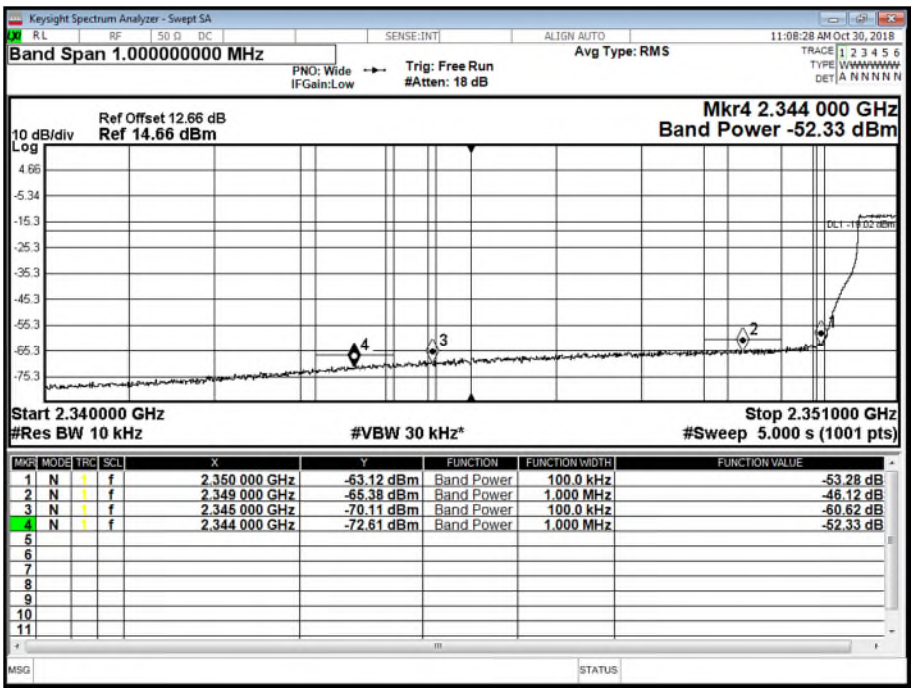
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



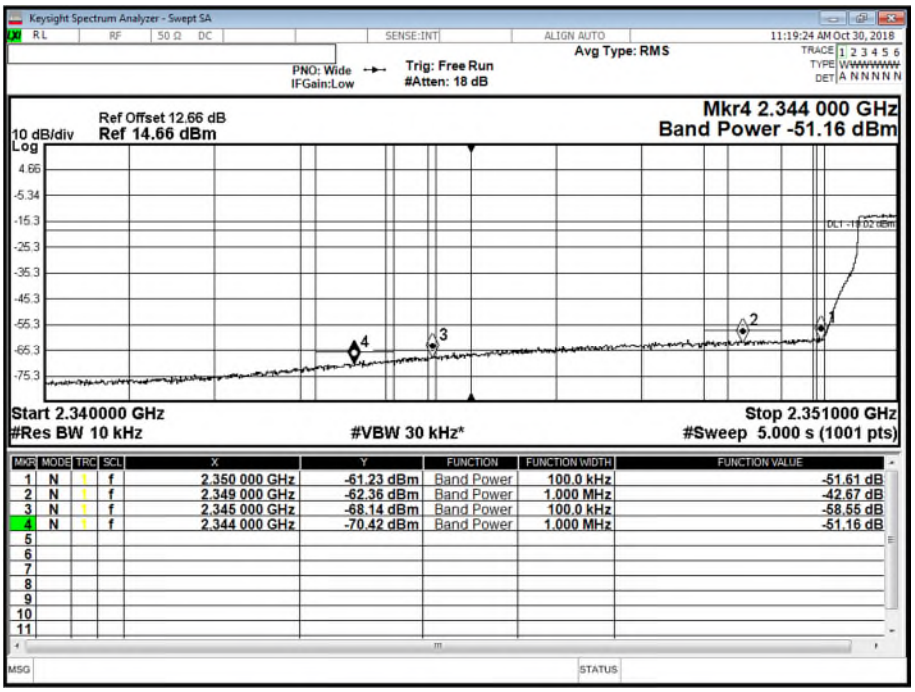
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B



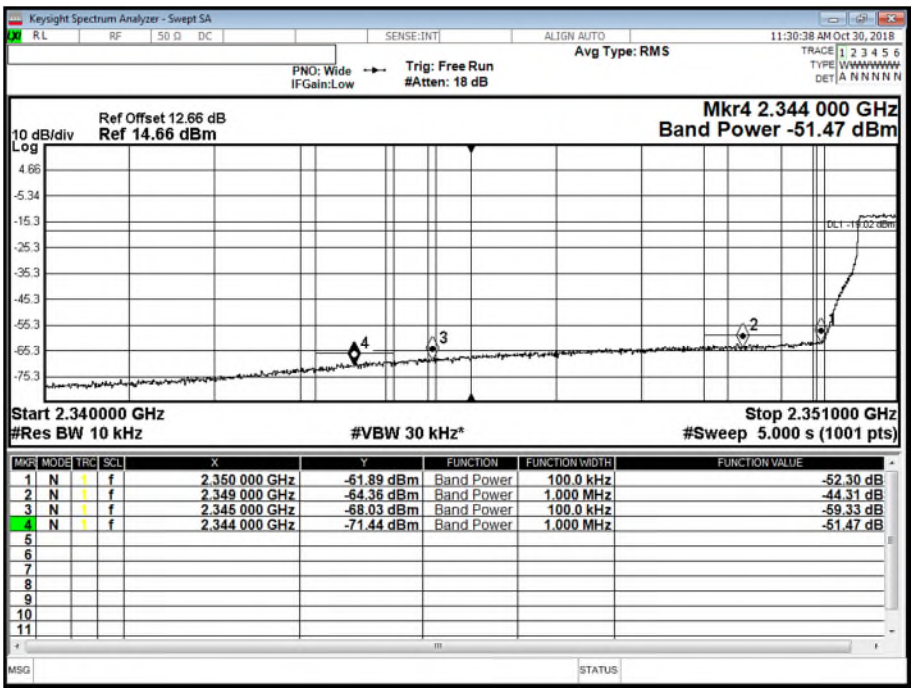
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B



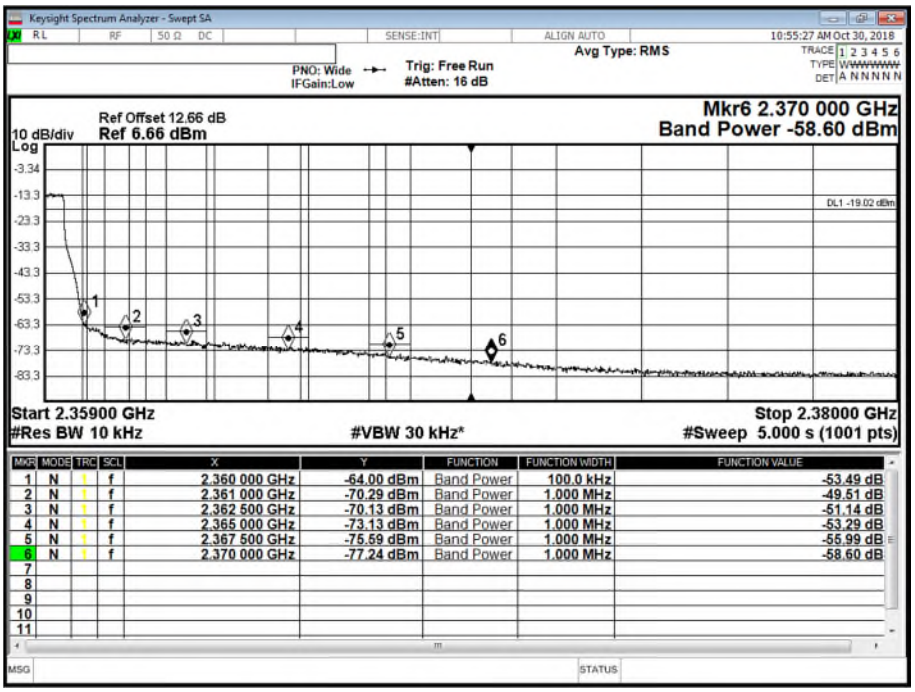
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B



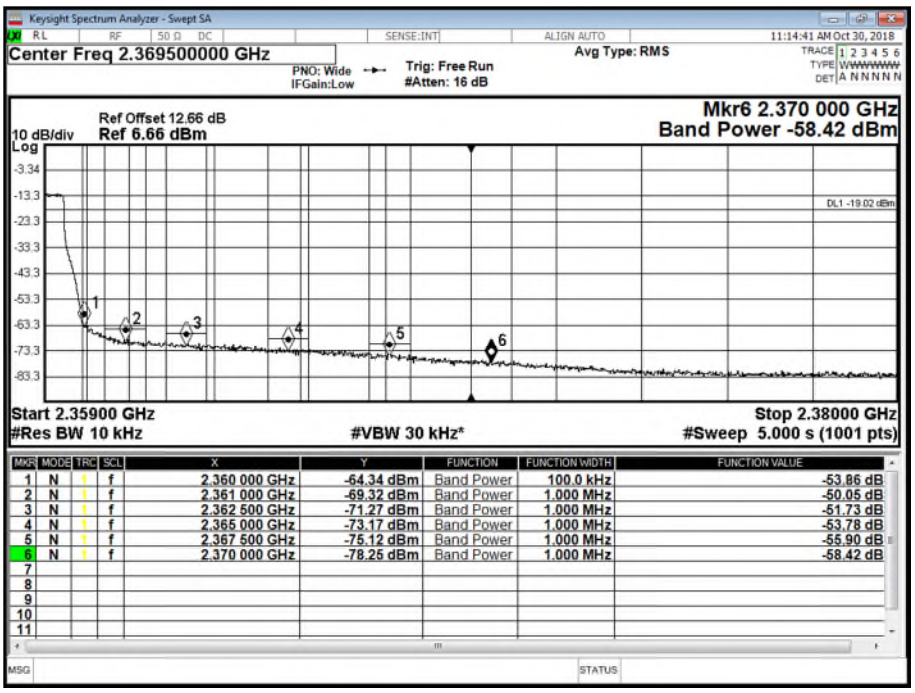
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position B



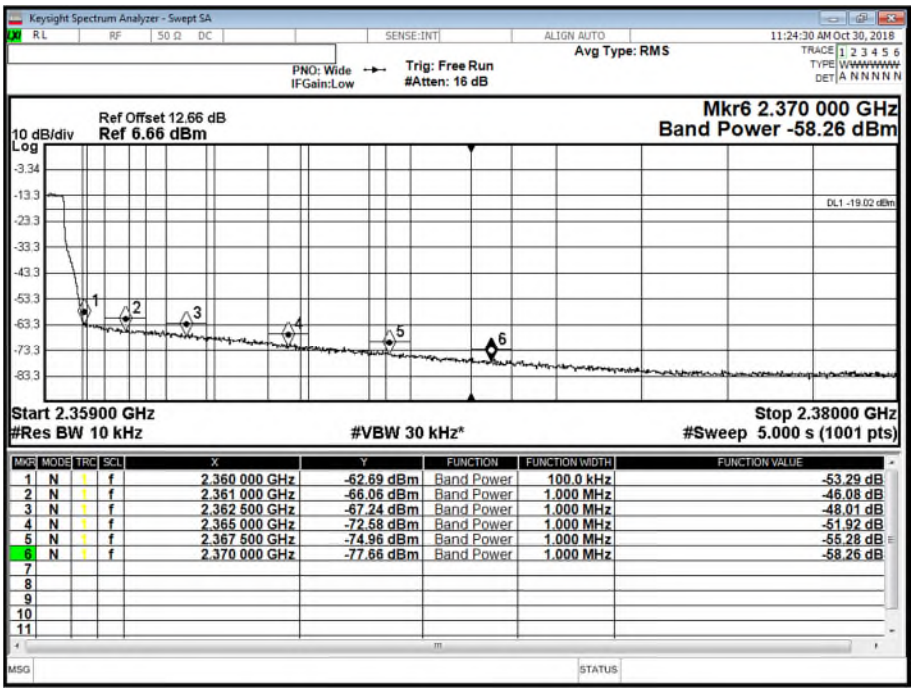
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T



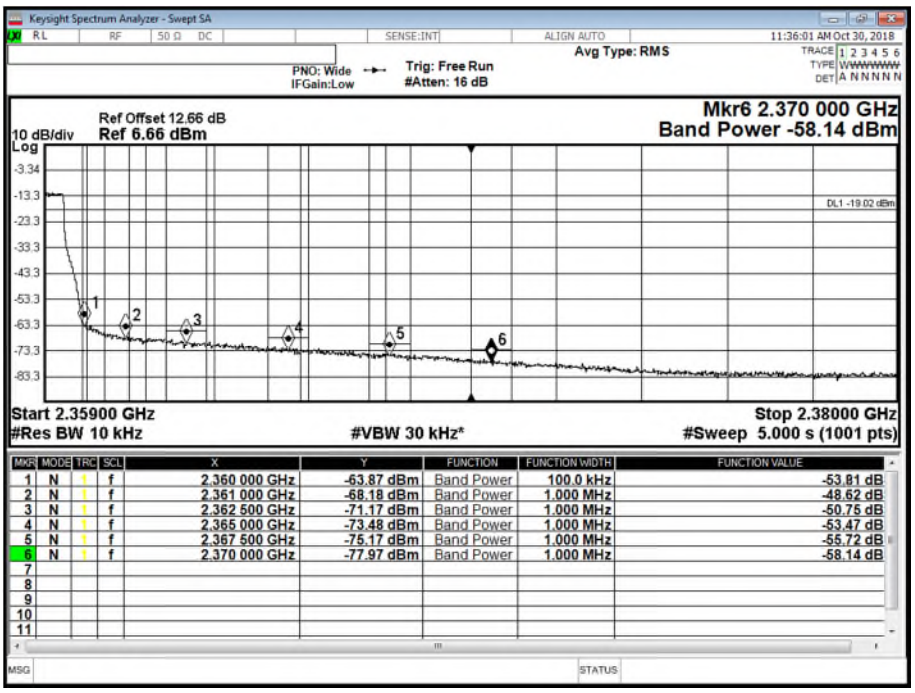
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T



Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T



Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position T



Limit	43 + 10log (P) dB – 10log(4) = -19 dBm between 2305 and 2320 MHz and between 2345 and 2360 MHz, when outside the licensed band(s) of operation 75 + 10 log(P) dB – 10log(4) = -51 dBm between 2320 and 2345 MHz 43 + 10 log (P) dB – 10log(4) = -19 dBm between 2300 and 2305 MHz 70 + 10 log (P) dB – 10log(4) = -45 dBm between 2287.5 and 2300 MHz 72 + 10 log (P) dB – 10log(4) = -47 dBm between 2285 and 2287.5 MHz 75 + 10 log (P) dB – 10log(4) = -51 dBm below 2285 MHz, 43 + 10 log (P) dB – 10log(4) = -19 dBm between 2360 and 2362.5 MHz, 55 + 10 log (P) dB – 10log(4) = -31 dBm between 2362.5 and 2365 MHz 70 + 10 log (P) dB – 10log(4) = -46 dBm between 2365 and 2367.5 MHz, 72 + 10 log (P) dB – 10log(4) = -48 dBm between 2367.5 and 2370 MHz 75 + 10log (P) dB – 10log(4) = -51 dBm above 2370 MHz.

2.4 TRANSMITTER SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 27, Clause 27.53 (h)

2.4.2 Date of Test and Modification State

30 October 2018 - 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°C
Relative Humidity	35%

2.4.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01 Clause 6.

The EUT was connected to a Spectrum Analyser via an attenuator and switching box. The path loss between the EUT and the Spectrum Analyser was measured using a Network Analyser. The measured path loss was entered as a Reference Level Offset in the Spectrum Analyser.

The Spectrum Analyser RBW was adjusted to be at least 1% of the measured 26dB Bandwidth. Using an RMS detector, the frequency spectrum up to 1MHz away from the Band Edge was investigated. The 30 EUT has 4 transmit ports, therefore, the test limits used were calculated on a worst-case basis accounting for an effective 4 port MIMO configuration.

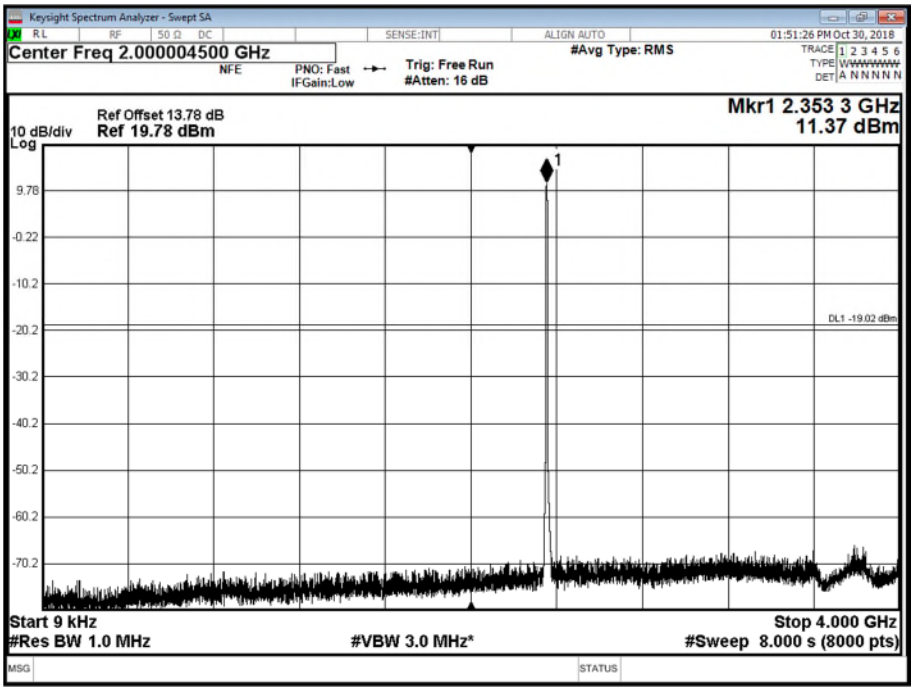
Testing was performed on each port with a test limit of
75+10log(P) - 10log(4) = -51 dBm.

2.4.6 Test Results

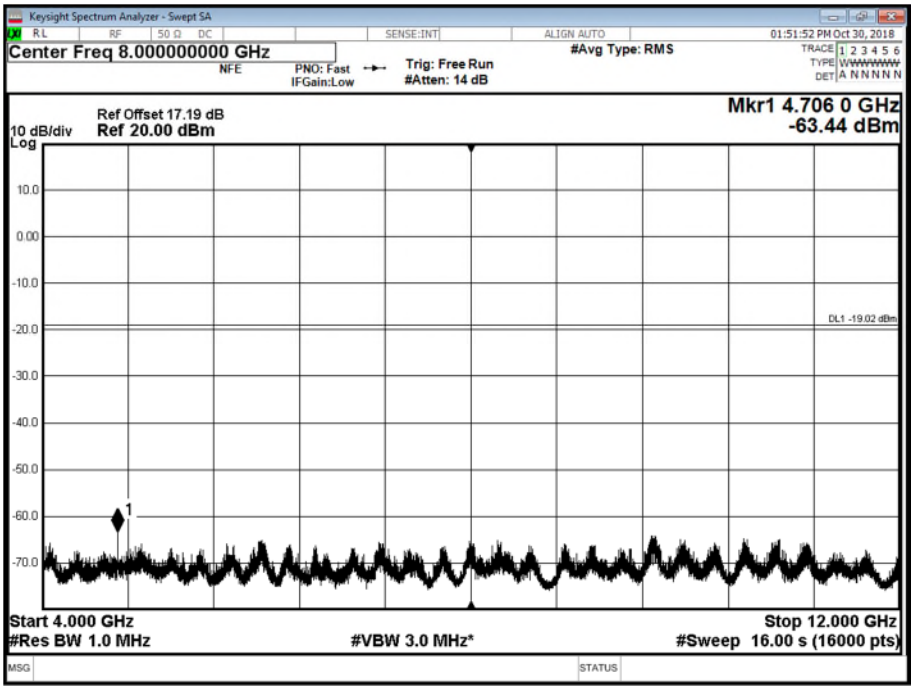
Configuration A

Maximum Output Power 17 dBm

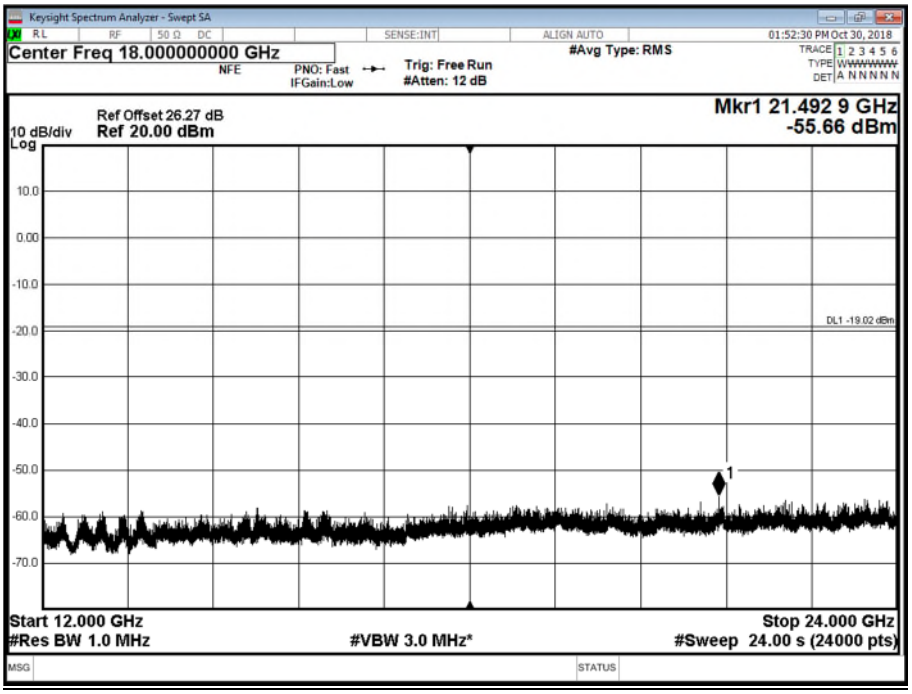
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 1 - Range 0.009 to 4000 MHz



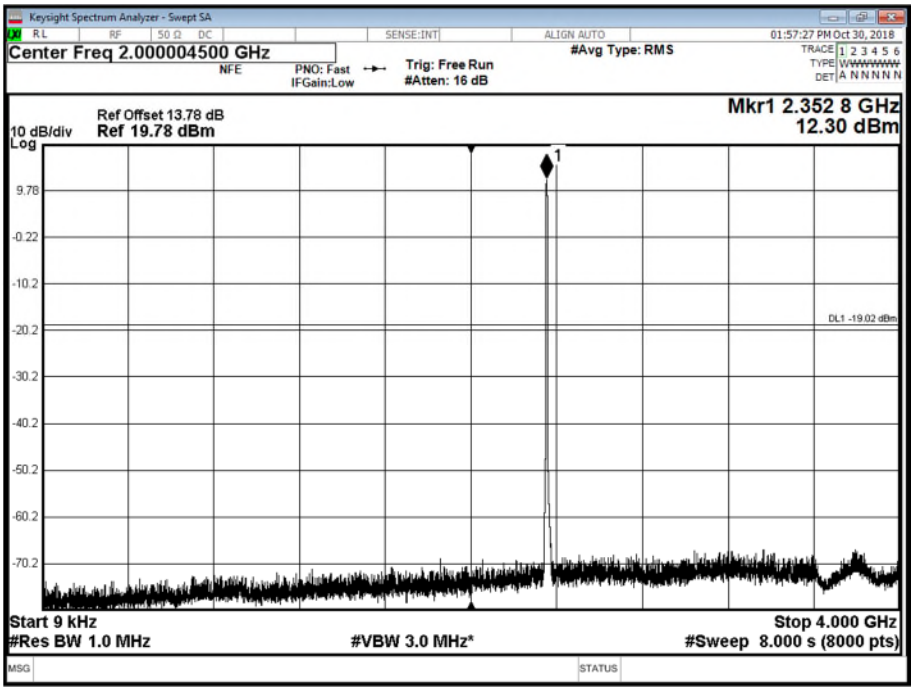
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 2 - Range 4000 to 12000 MHz



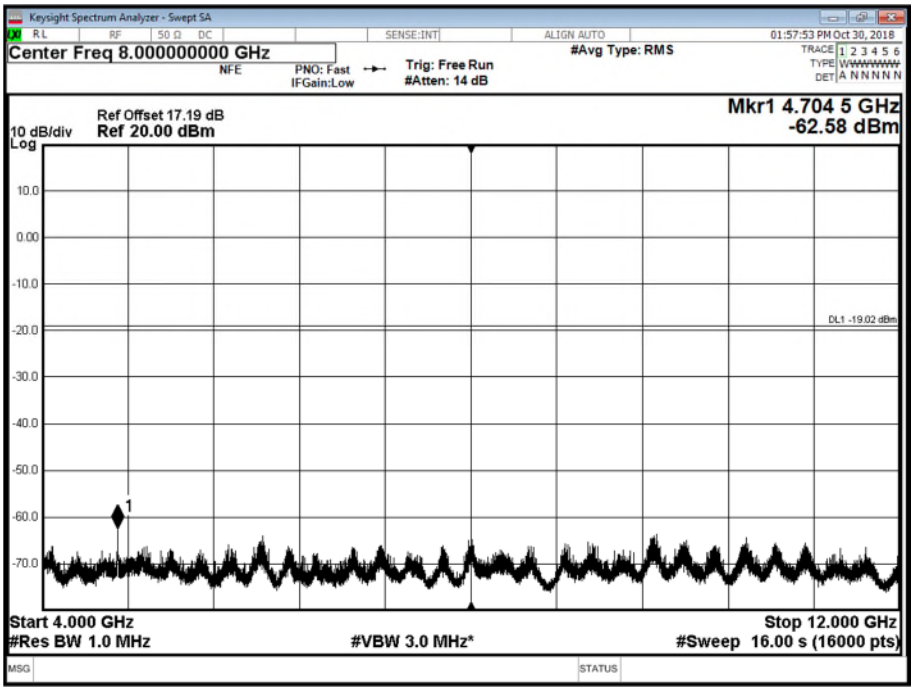
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 3 - Range 12000 to 24000 MHz



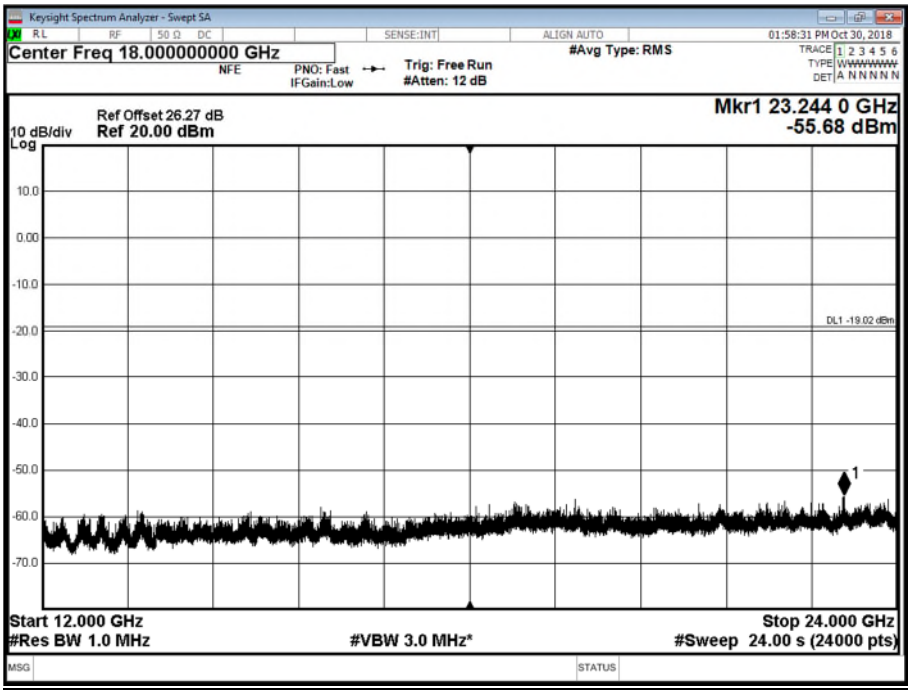
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 1 - Range 0.009 to 4000 MHz



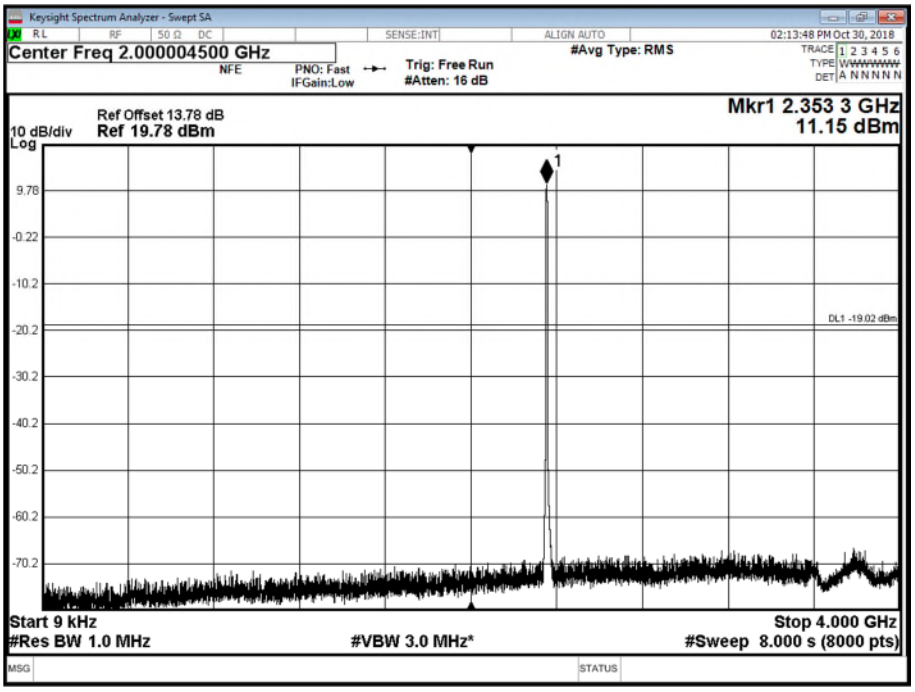
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 2 - Range 4000 to 12000 MHz



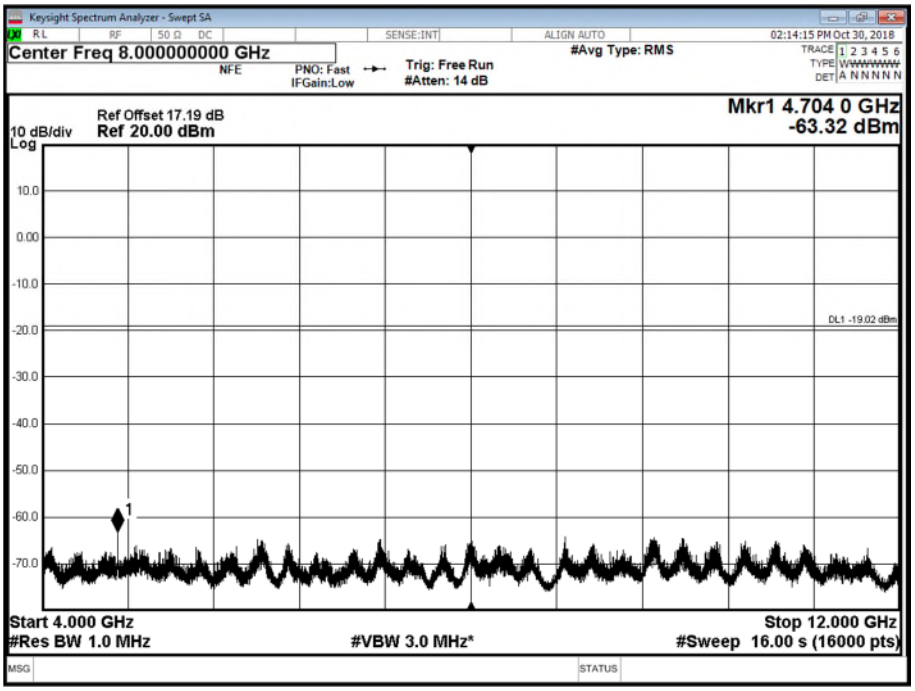
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 3 - Range 12000 to 24000 MHz



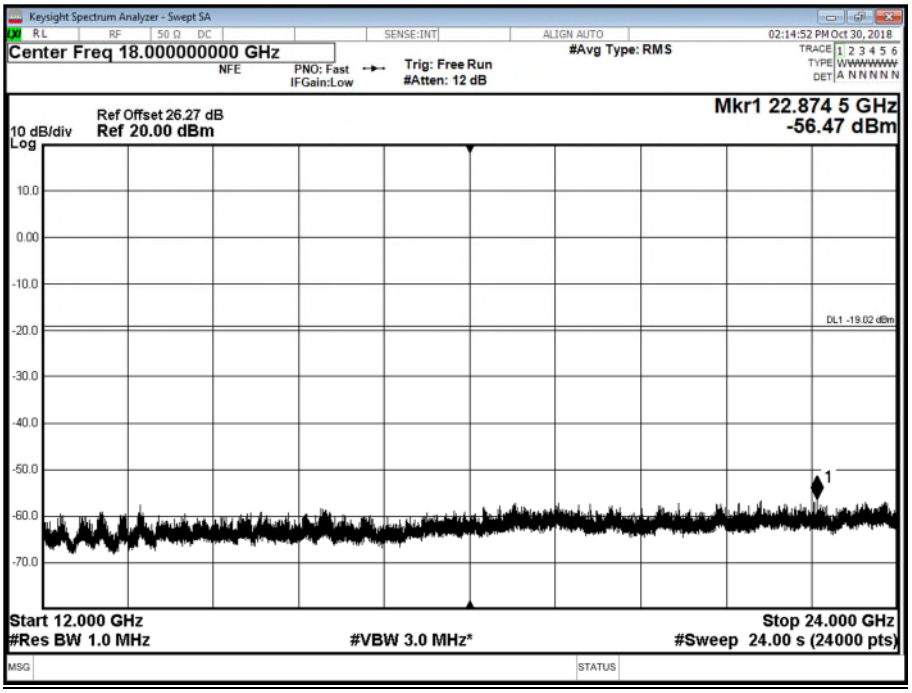
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 1 - Range 0.009 to 4000 MHz



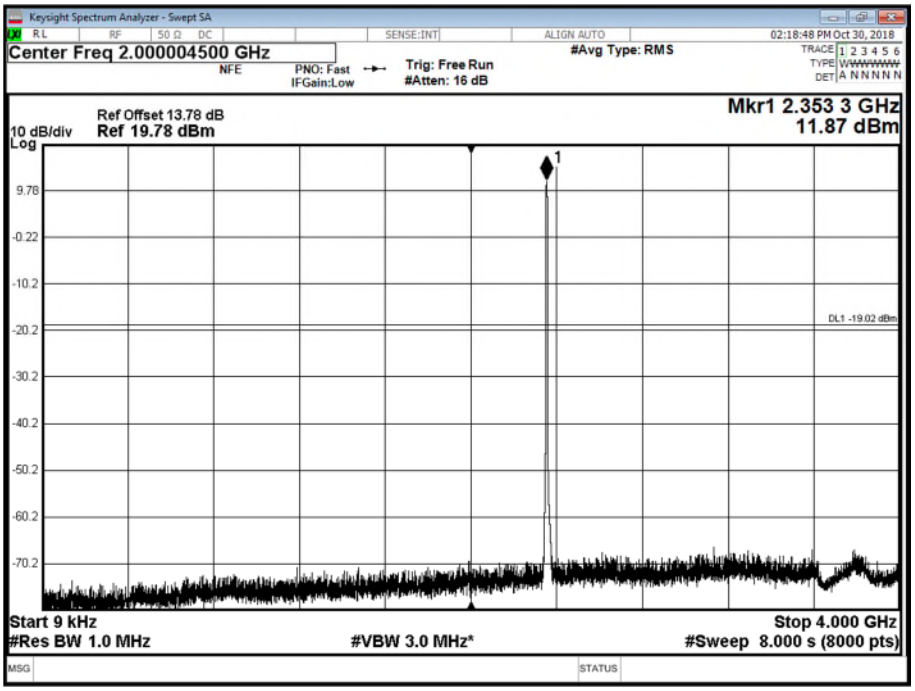
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 2 - Range 4000 to 12000 MHz



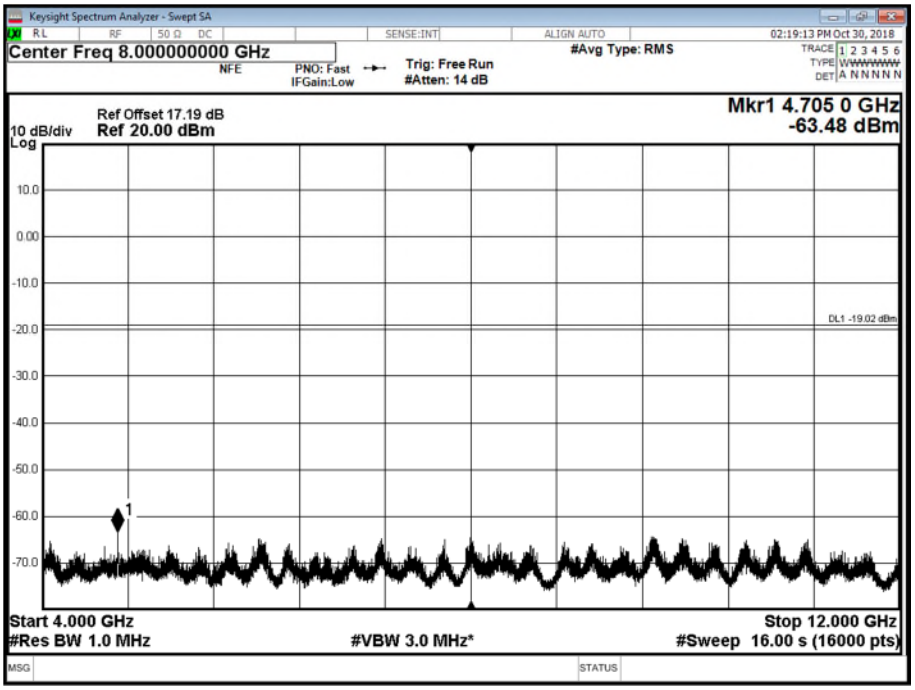
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 3 - Range 12000 to 24000 MHz



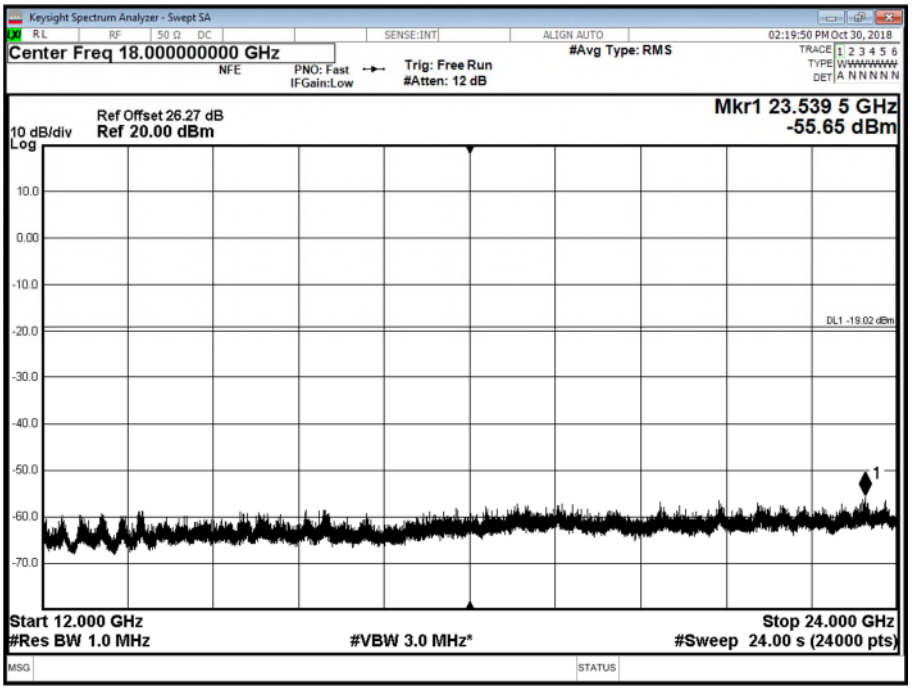
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 1 - Range 0.009 to 4000 MHz



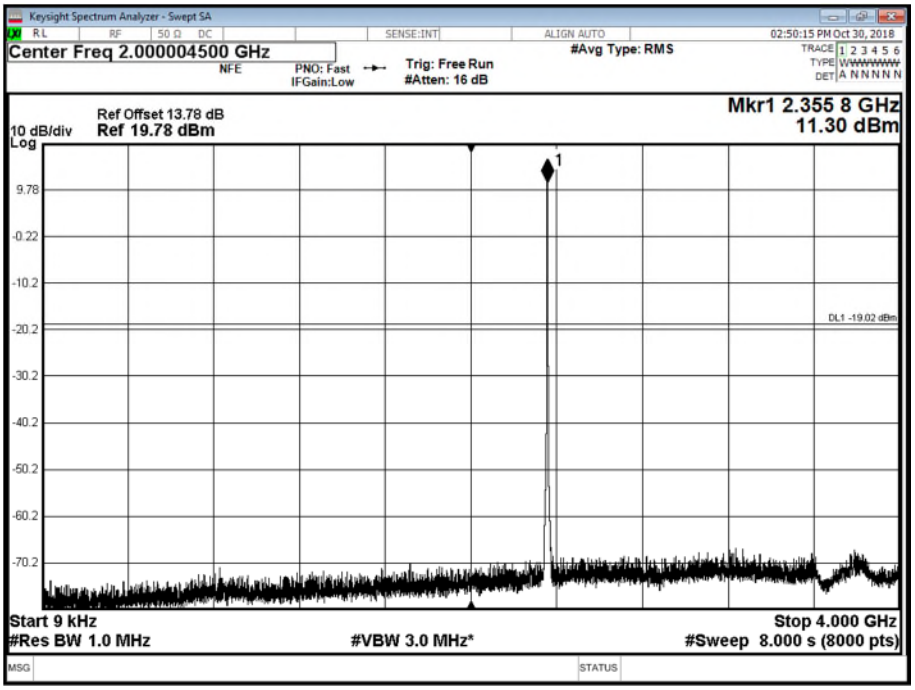
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 2 - Range 4000 to 12000 MHz



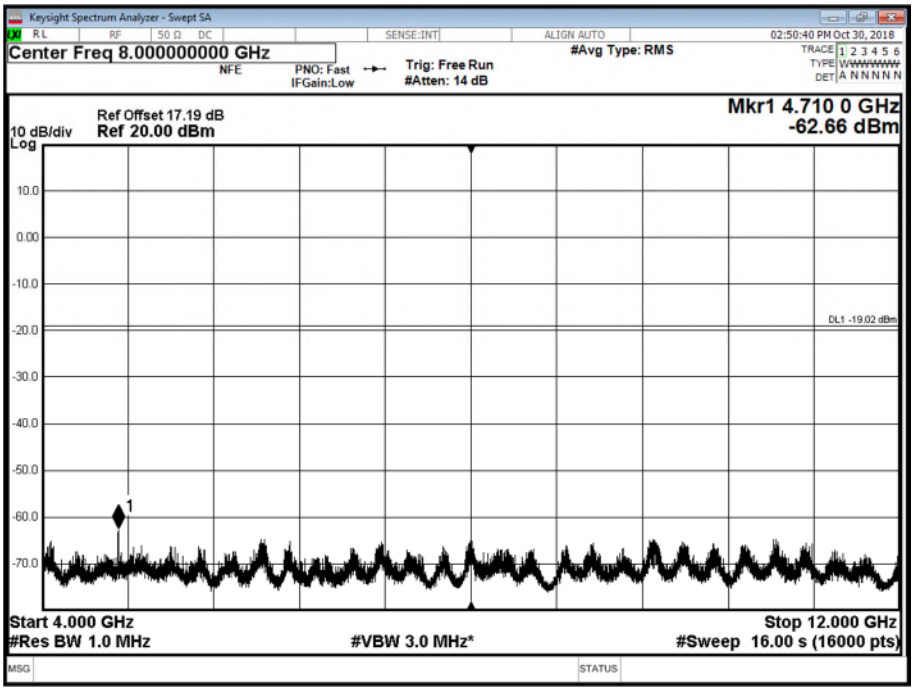
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B - Band 3 - Range 12000 to 24000 MHz



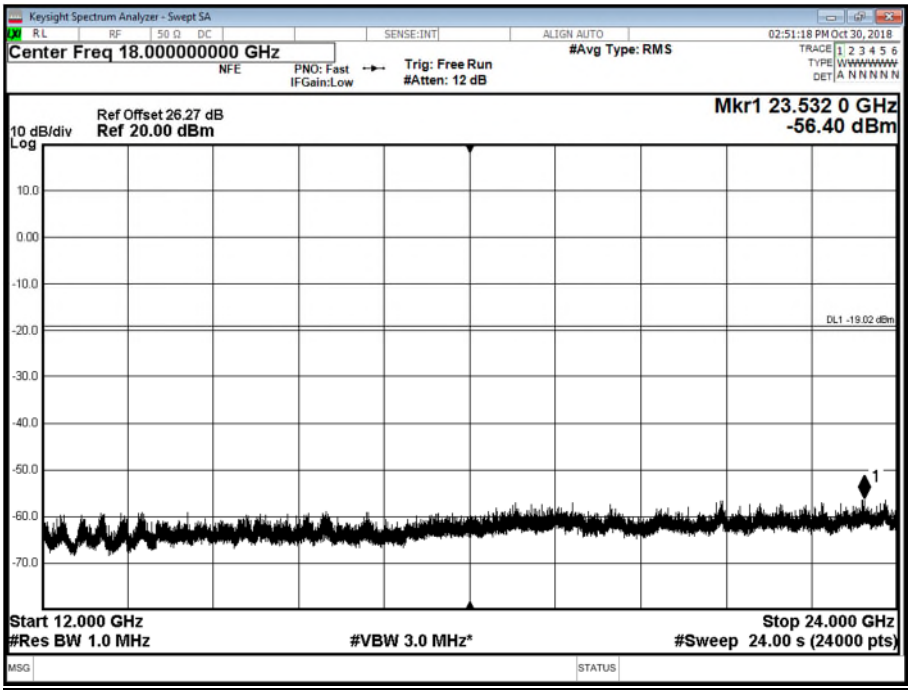
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 1 - Range 0.009 to 4000 MHz



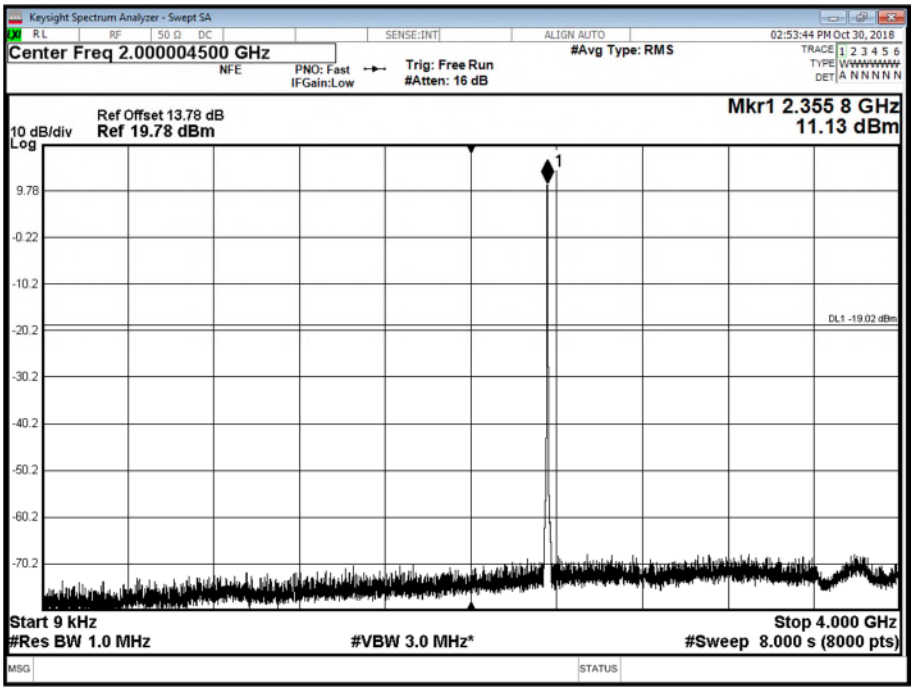
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 2 - Range 4000 to 12000 MHz



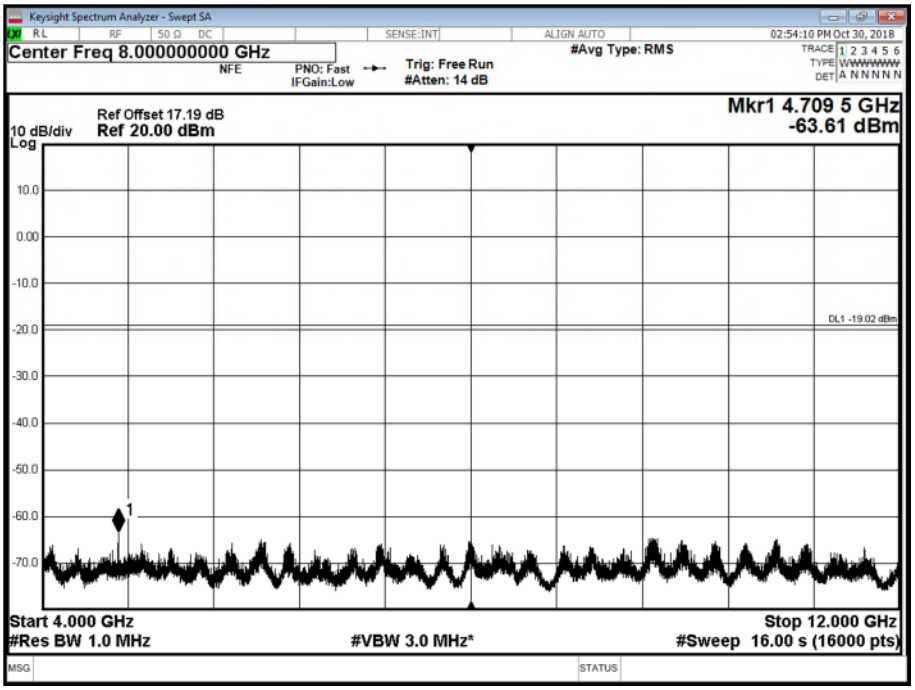
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 3 - Range 12000 to 24000 MHz



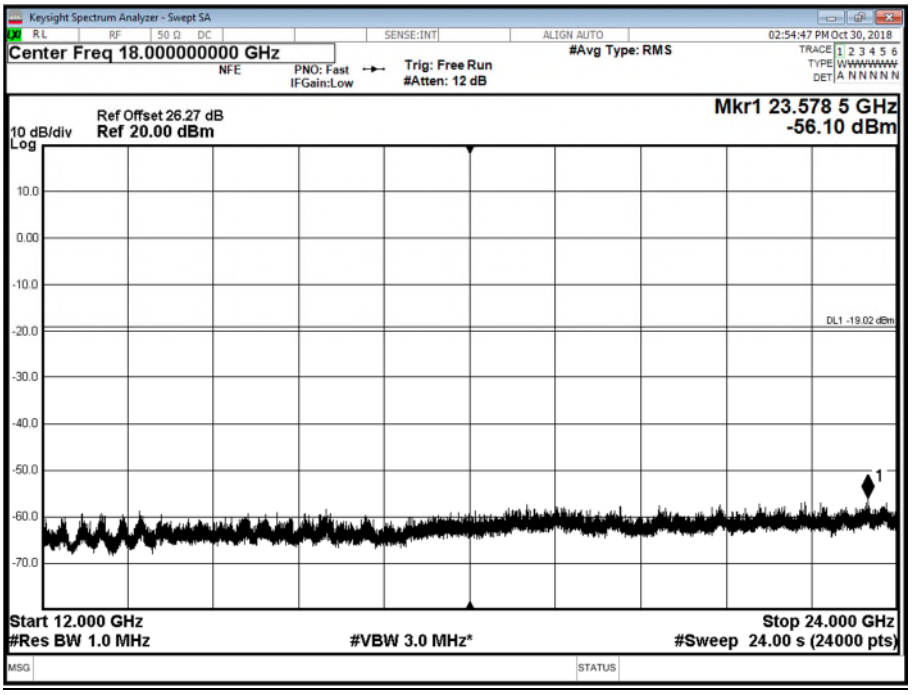
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 1 - Range 0.009 to 4000 MHz



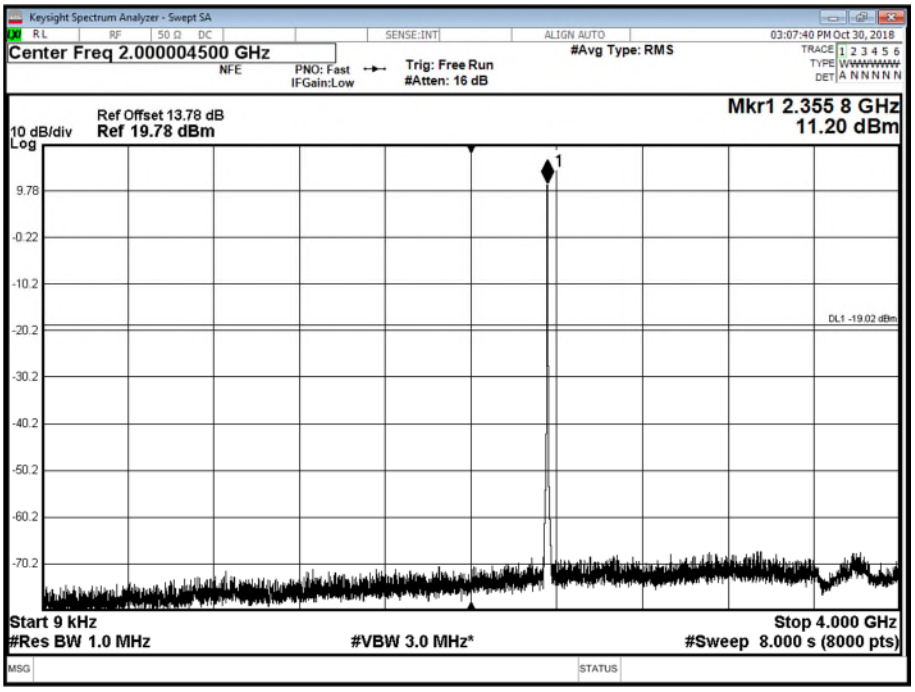
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 2 - Range 4000 to 12000 MHz



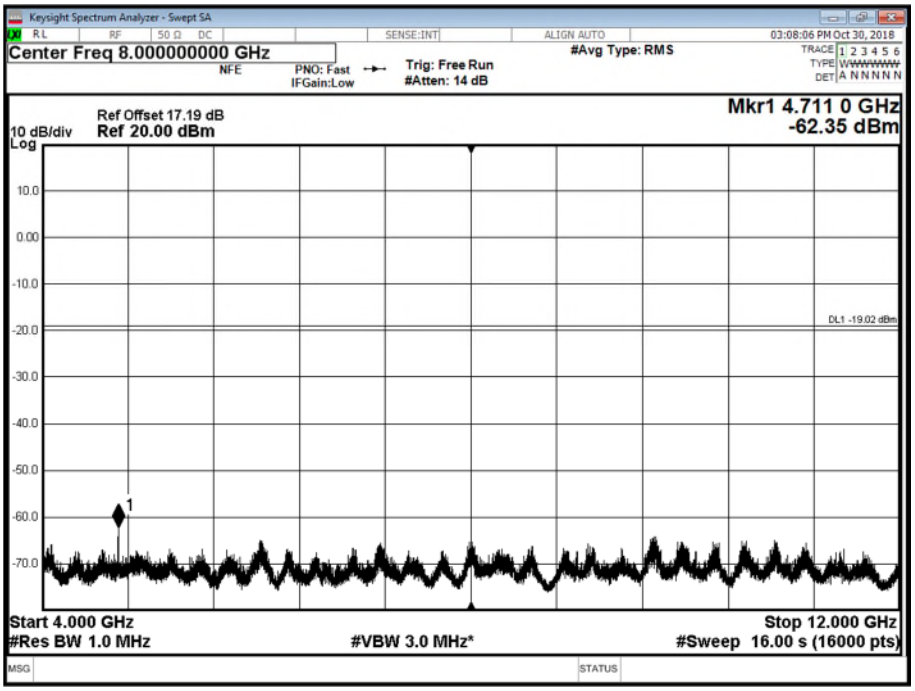
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 3 - Range 12000 to 24000 MHz



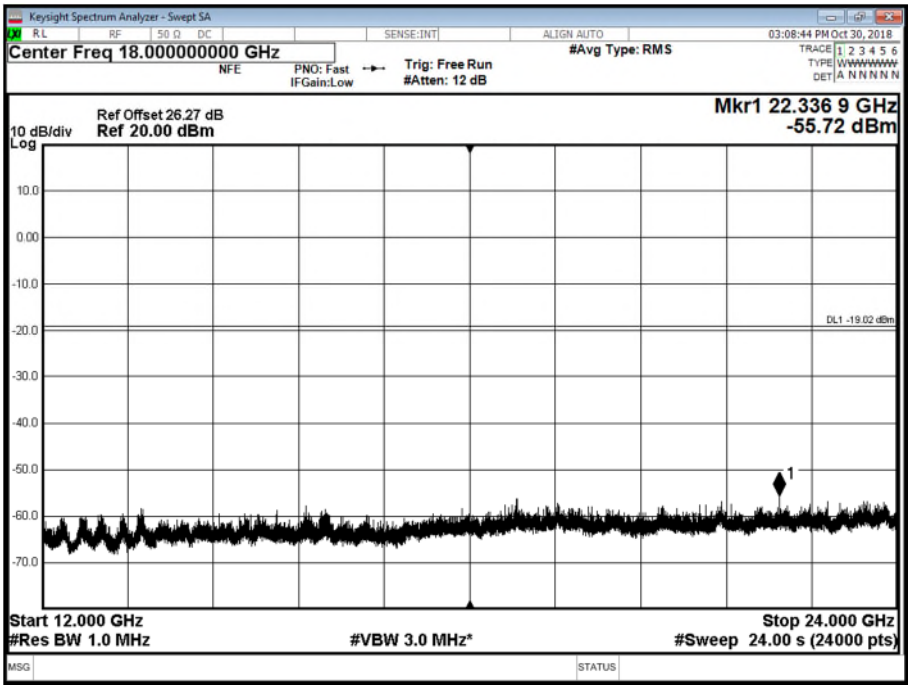
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 1 - Range 0.009 to 4000 MHz



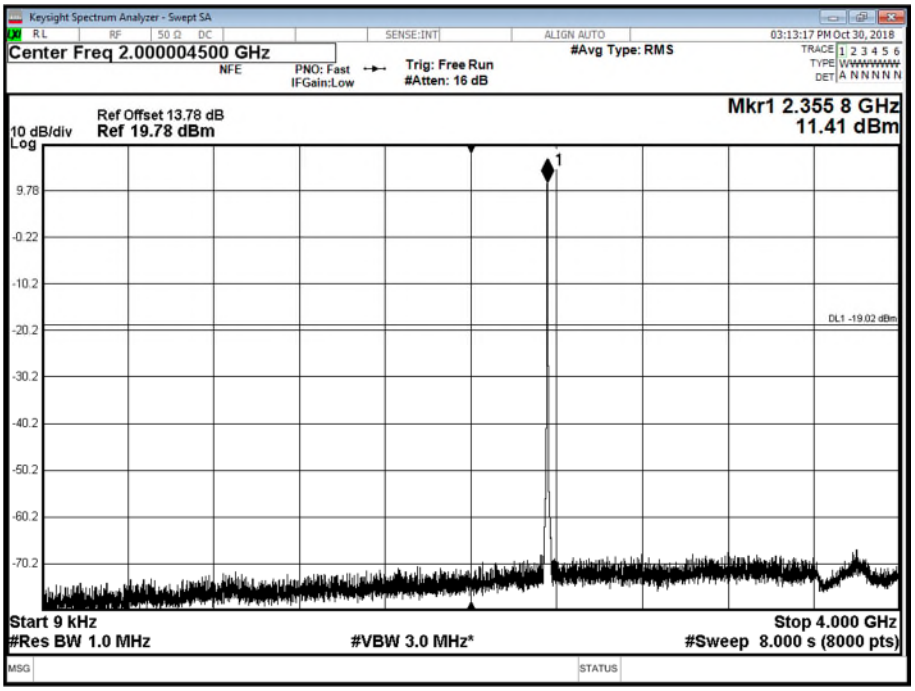
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 2 - Range 4000 to 12000 MHz



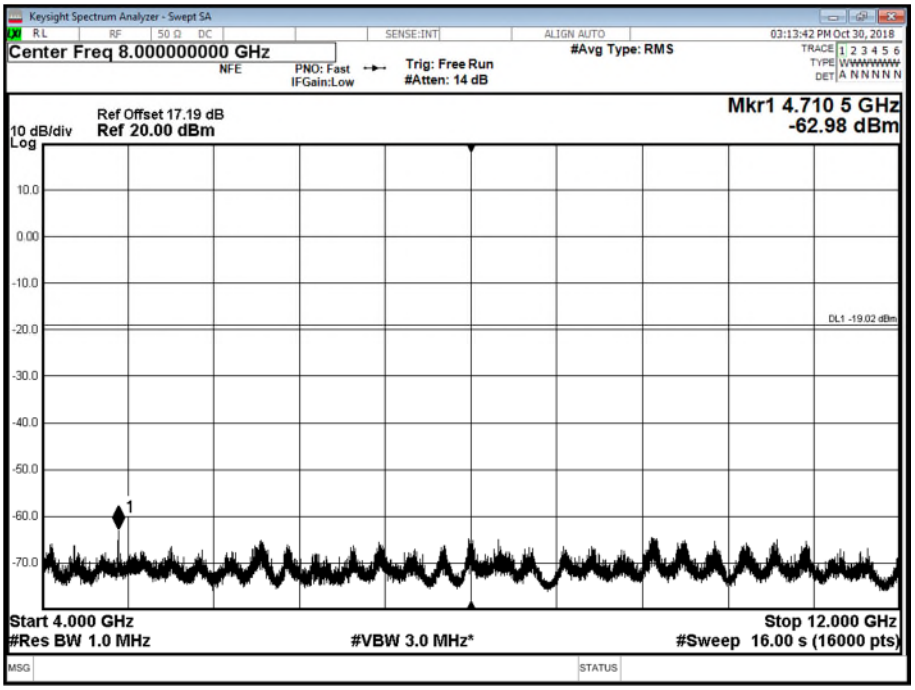
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 3 - Range 12000 to 24000 MHz



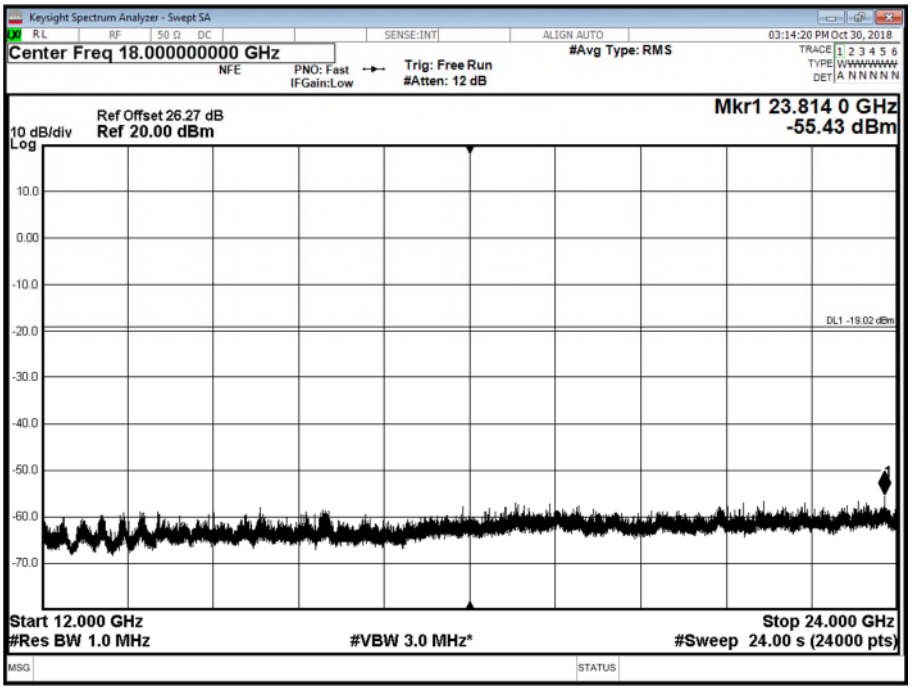
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 1 - Range 0.009 to 4000 MHz



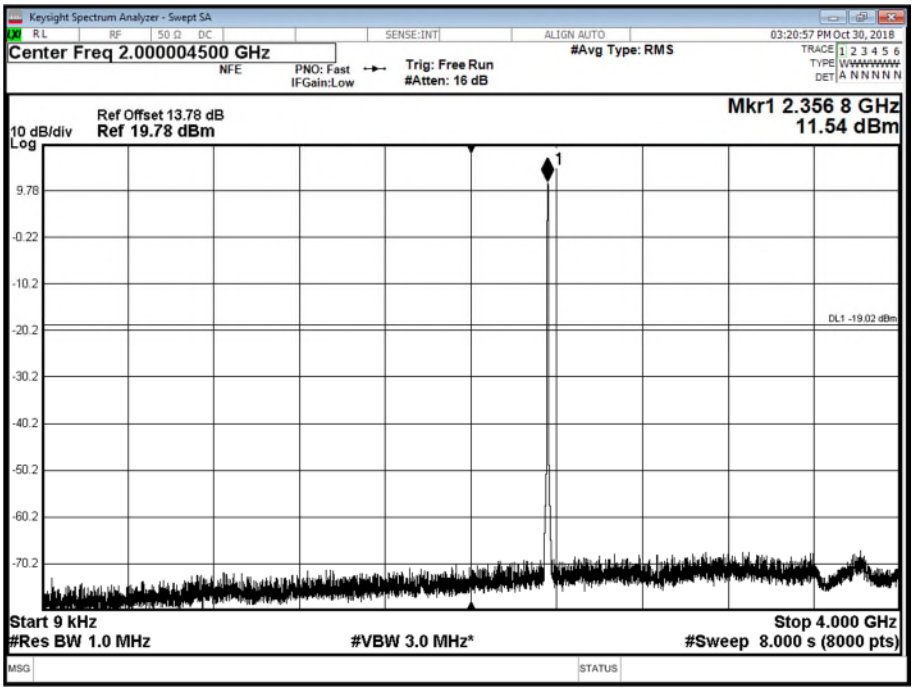
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 2 - Range 4000 to 12000 MHz



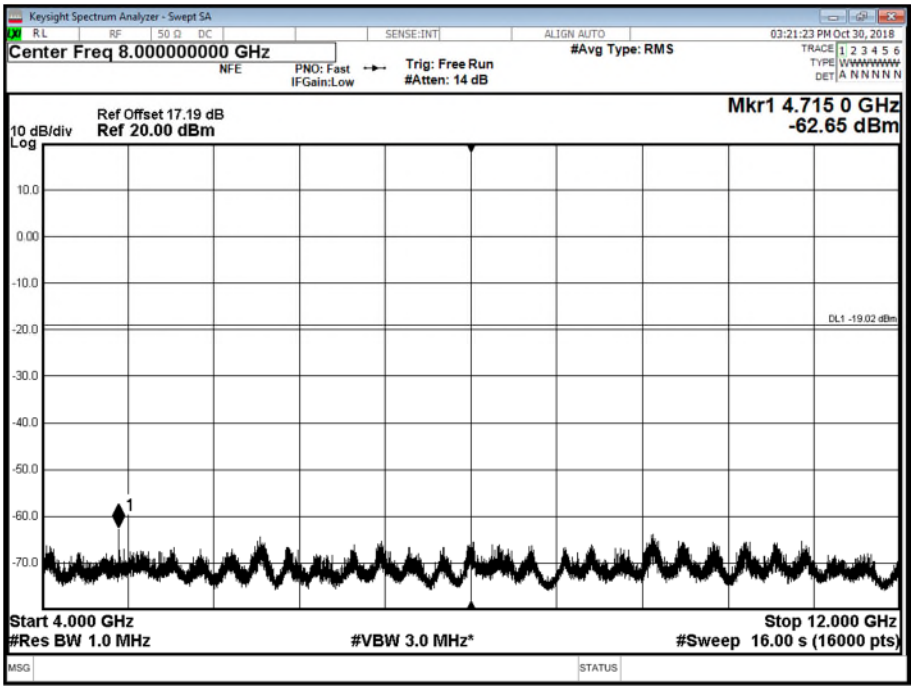
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M - Band 3 - Range 12000 to 24000 MHz



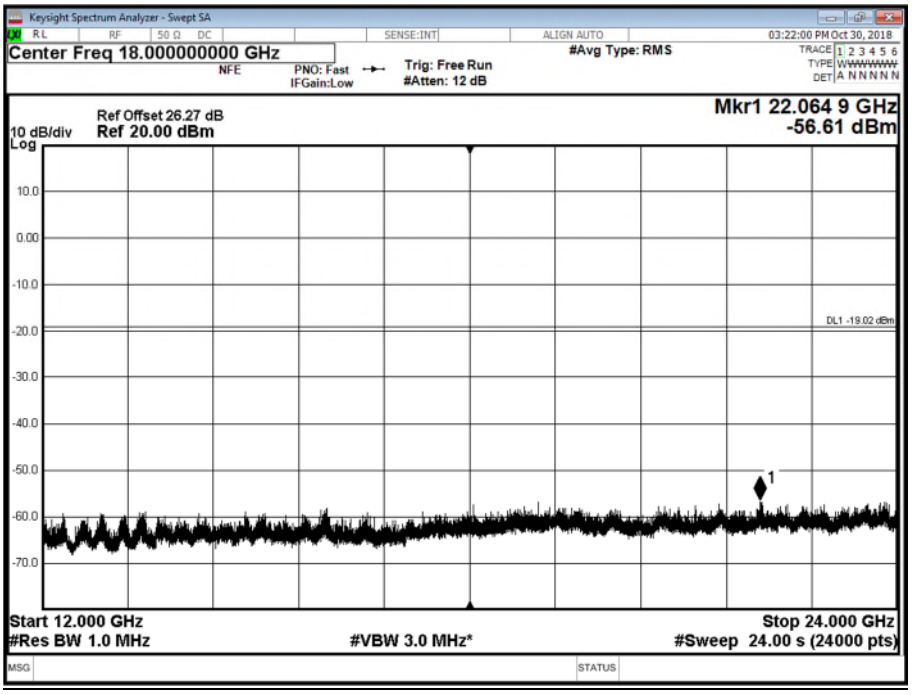
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 1 - Range 0.009 to 4000 MHz



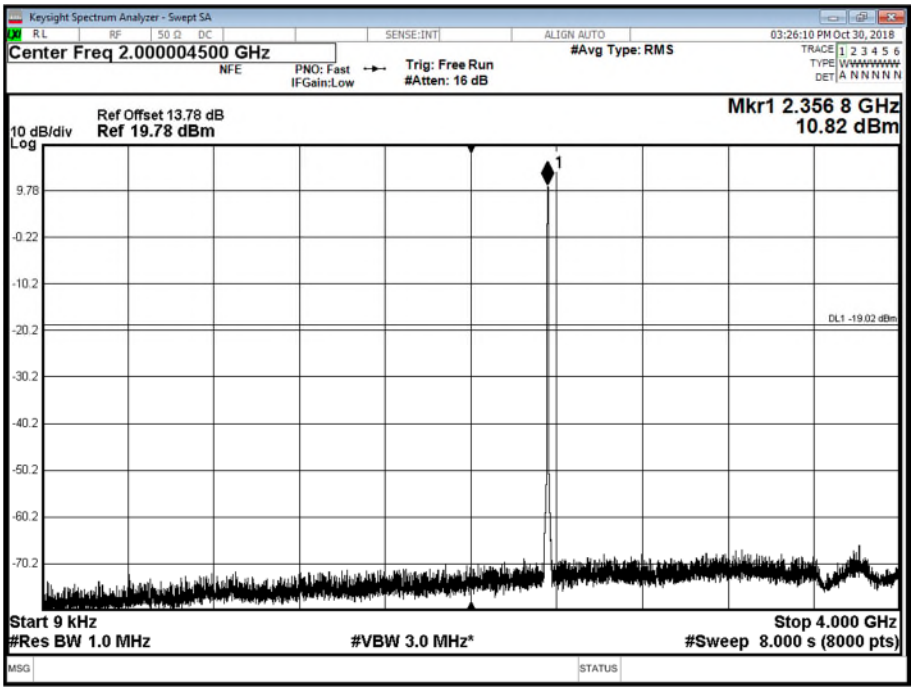
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 2 - Range 4000 to 12000 MHz



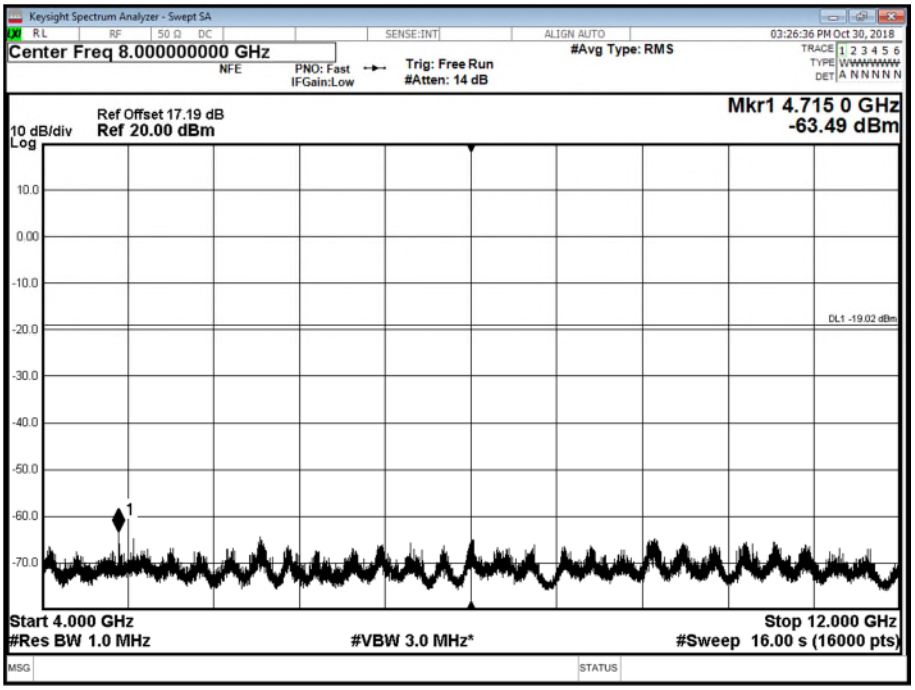
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 3 - Range 12000 to 24000 MHz



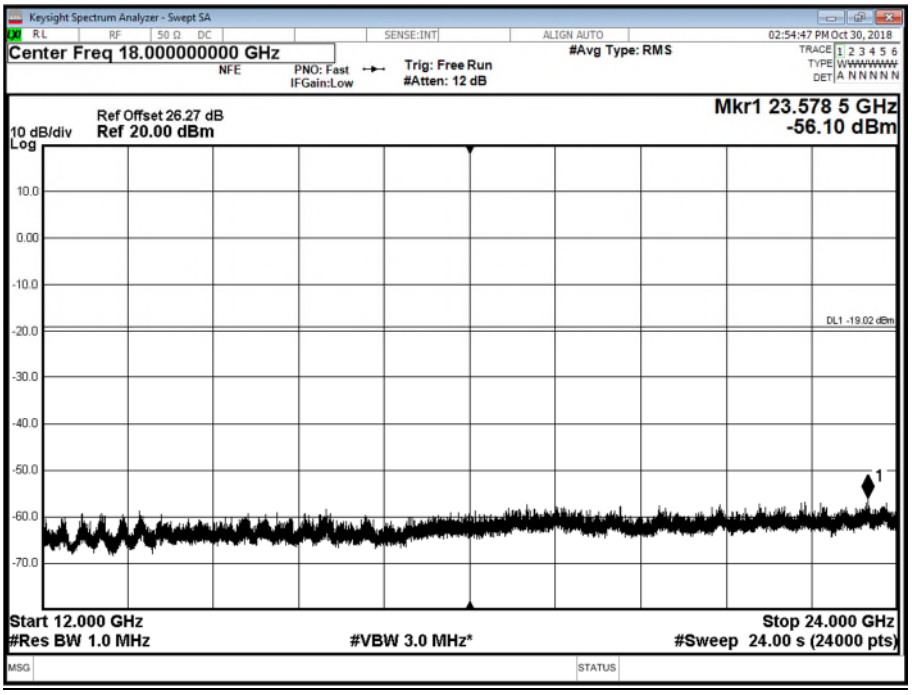
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 1 - Range 0.009 to 4000 MHz



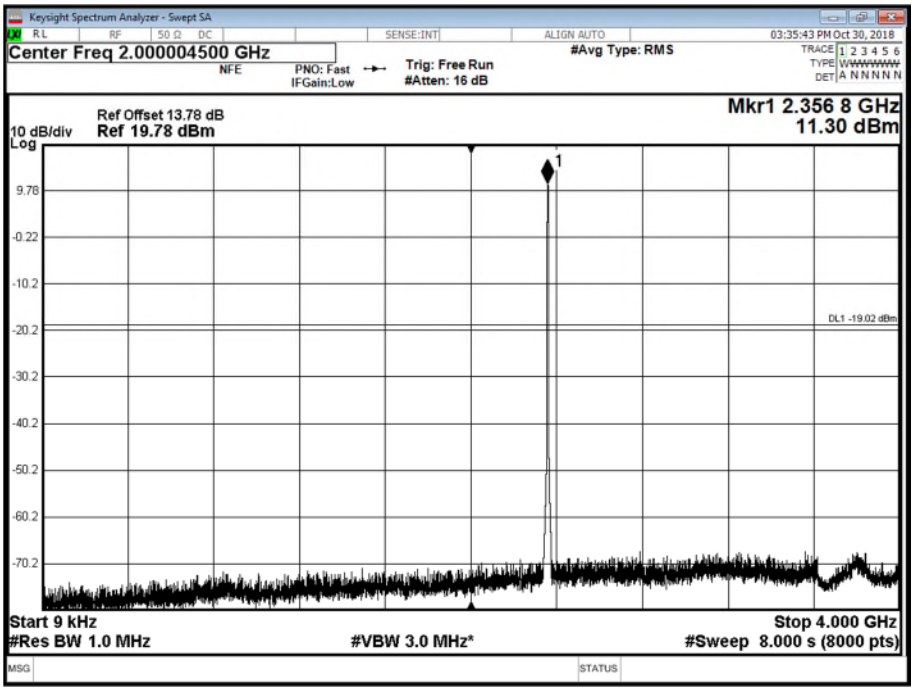
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 2 - Range 4000 to 12000 MHz



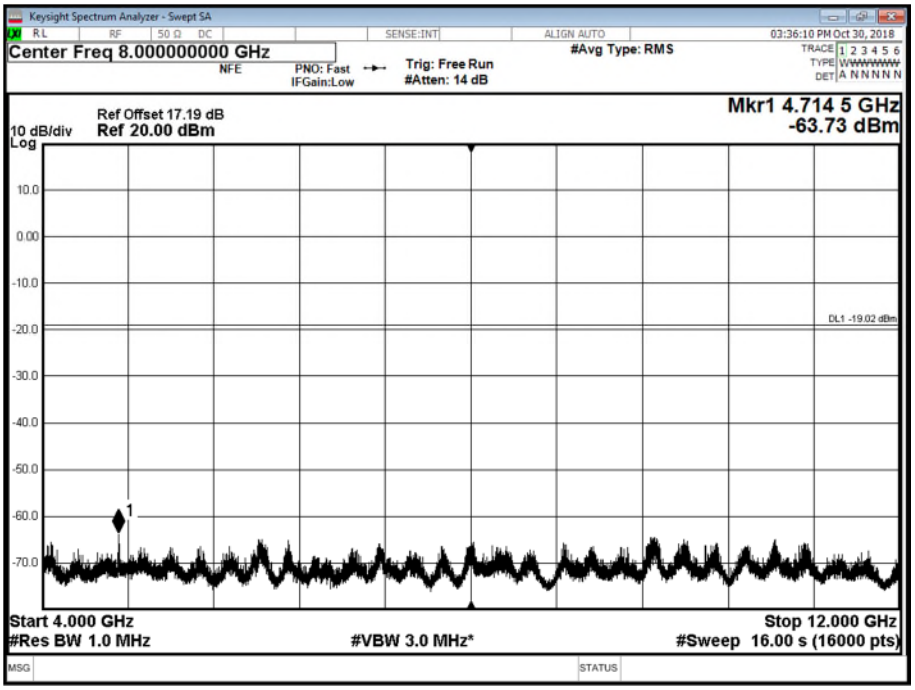
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 3 - Range 12000 to 24000 MHz



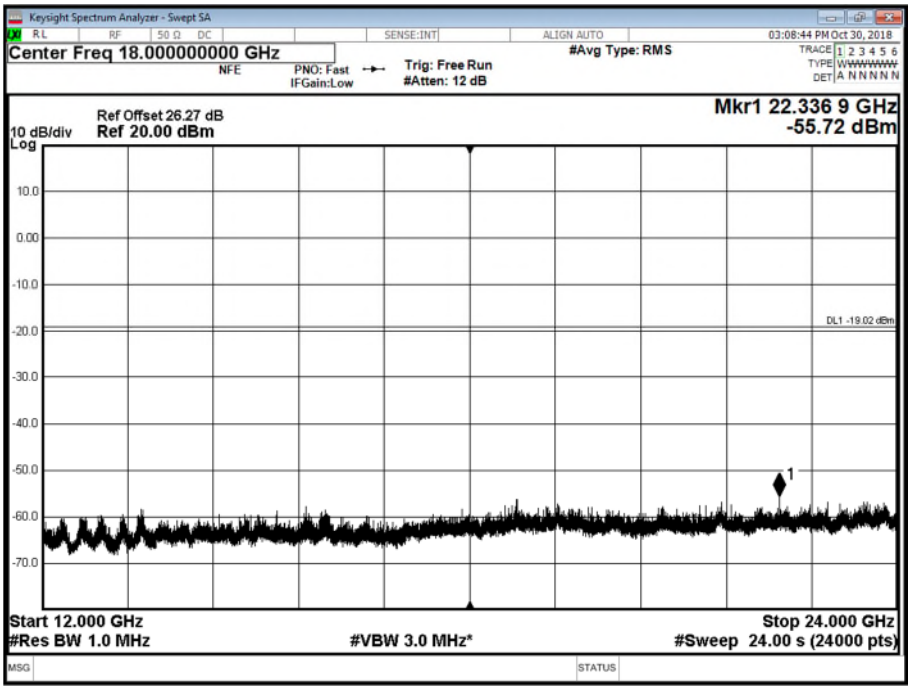
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 1 - Range 0.009 to 4000 MHz



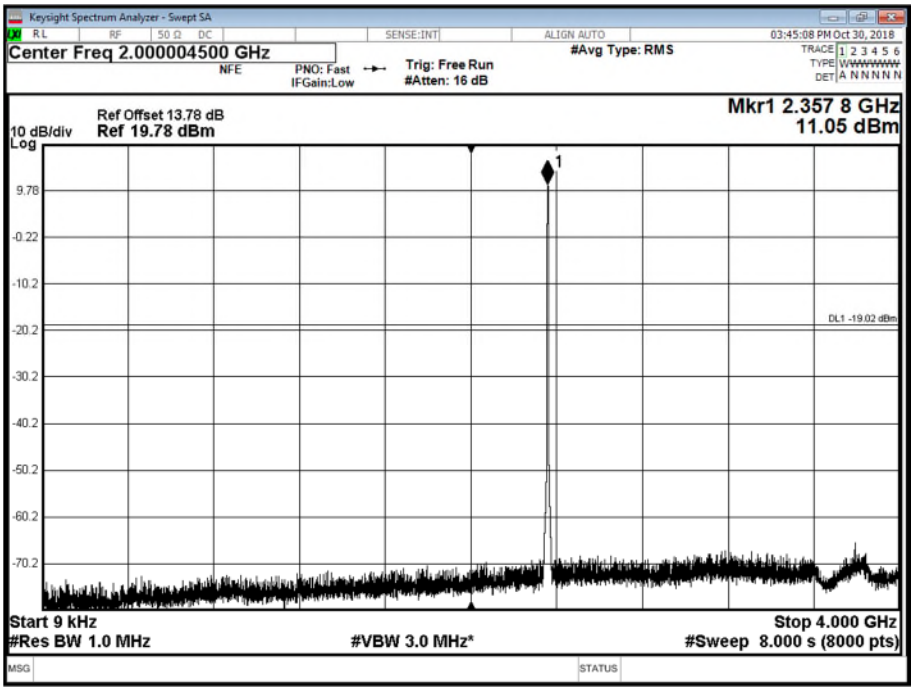
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 2 - Range 4000 to 12000 MHz



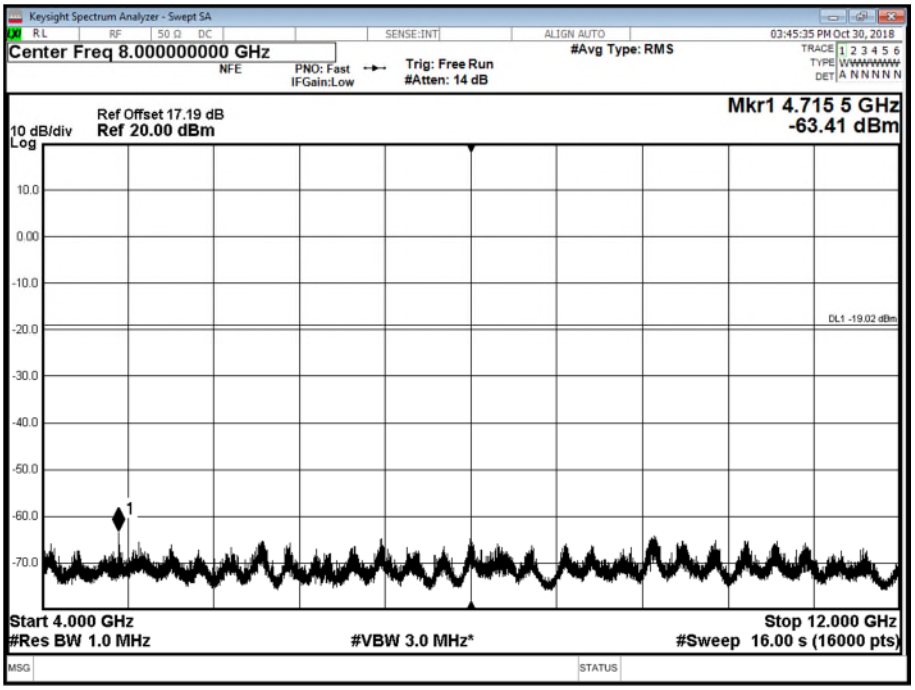
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 3 - Range 12000 to 24000 MHz



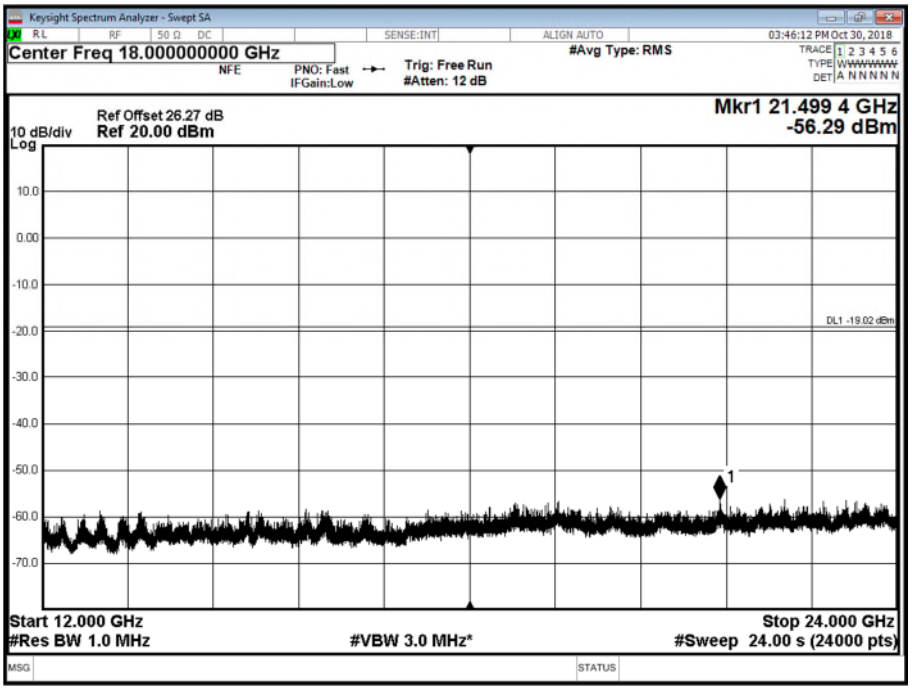
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 1 - Range 0.009 to 4000 MHz



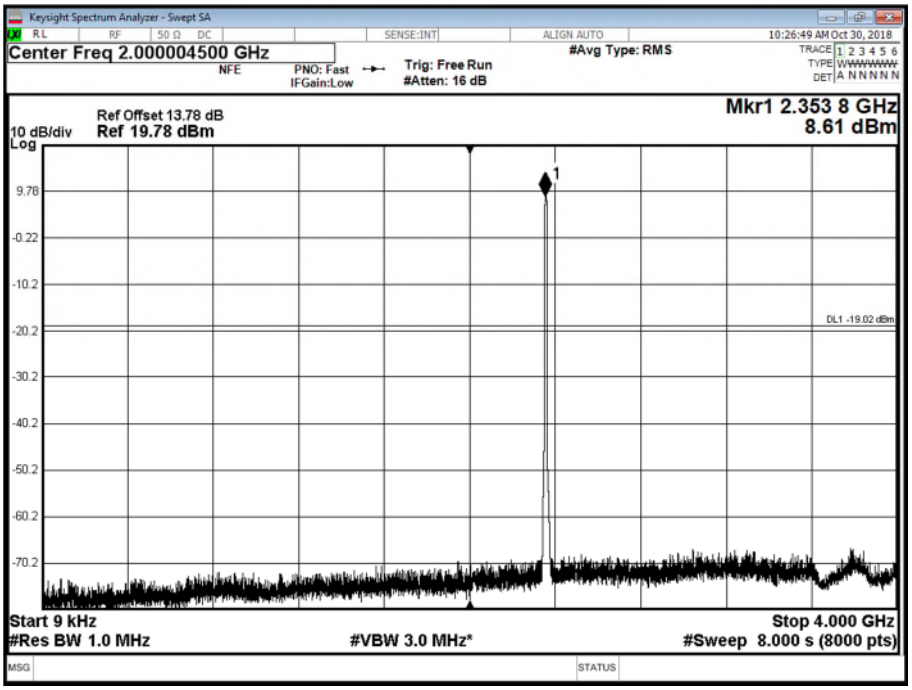
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 2 - Range 4000 to 12000 MHz



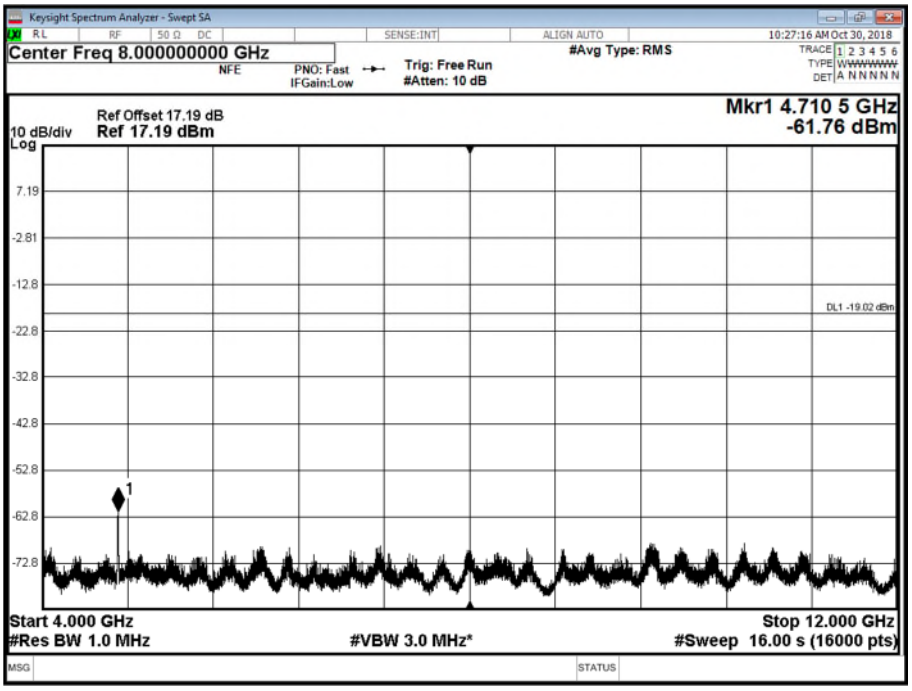
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T - Band 3 - Range 12000 to 24000 MHz



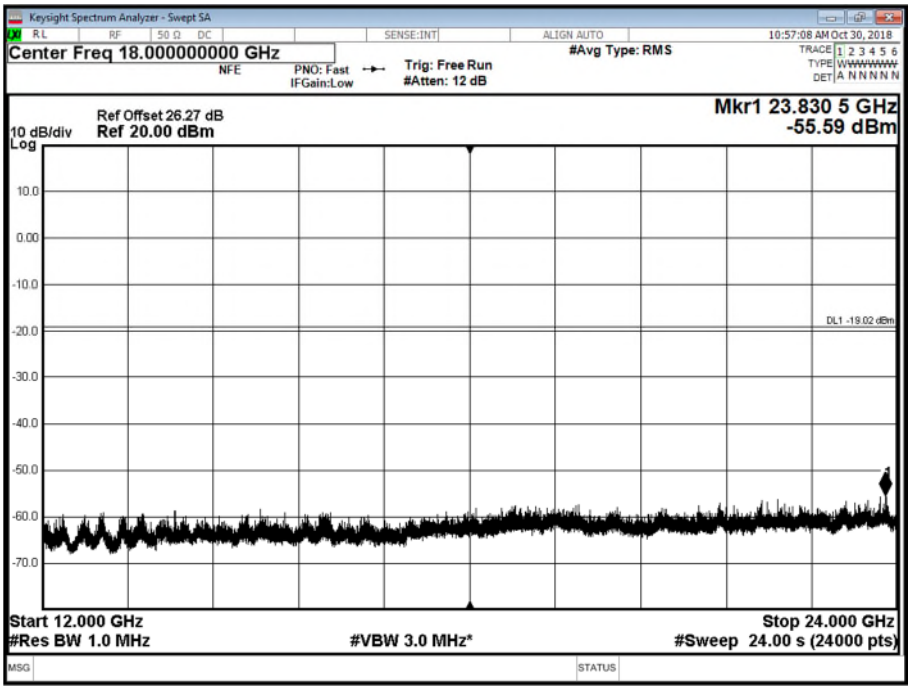
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 1 - Range 0.009 to 4000 MHz



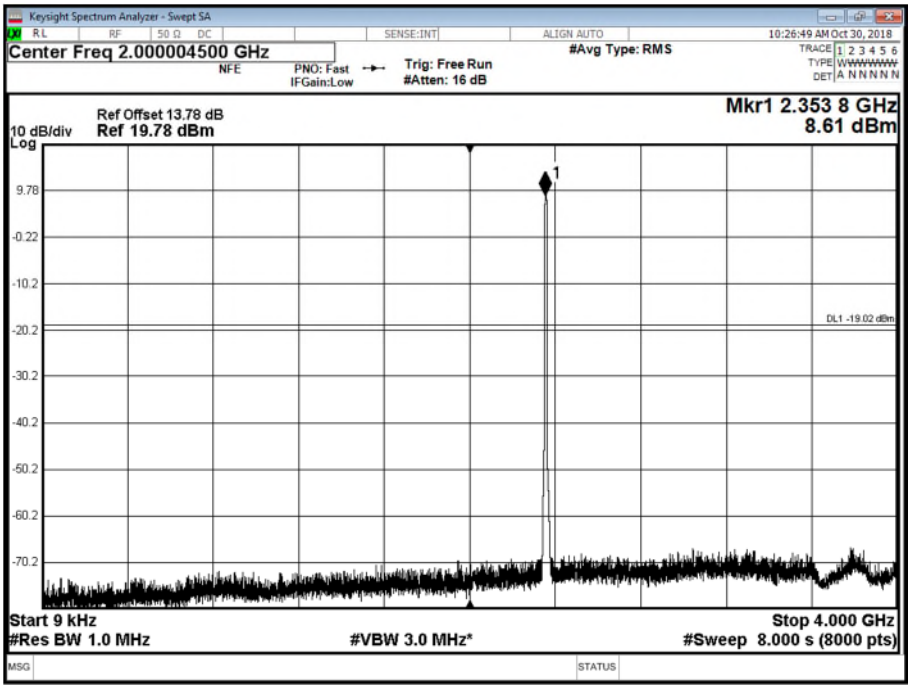
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 2 - Range 4000 to 12000 MHz



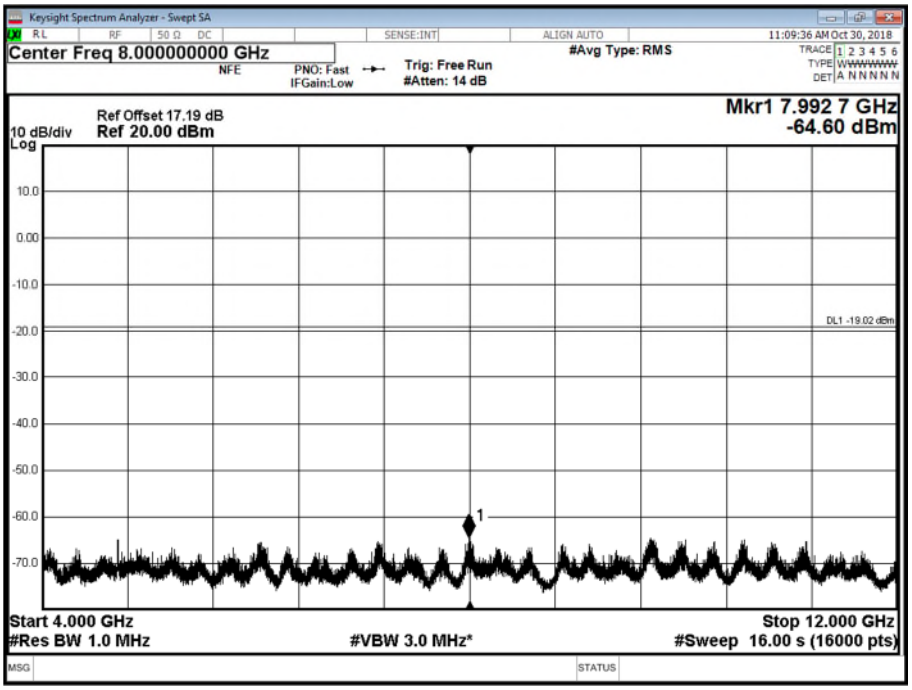
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 3 - Range 12000 to 24000 MHz



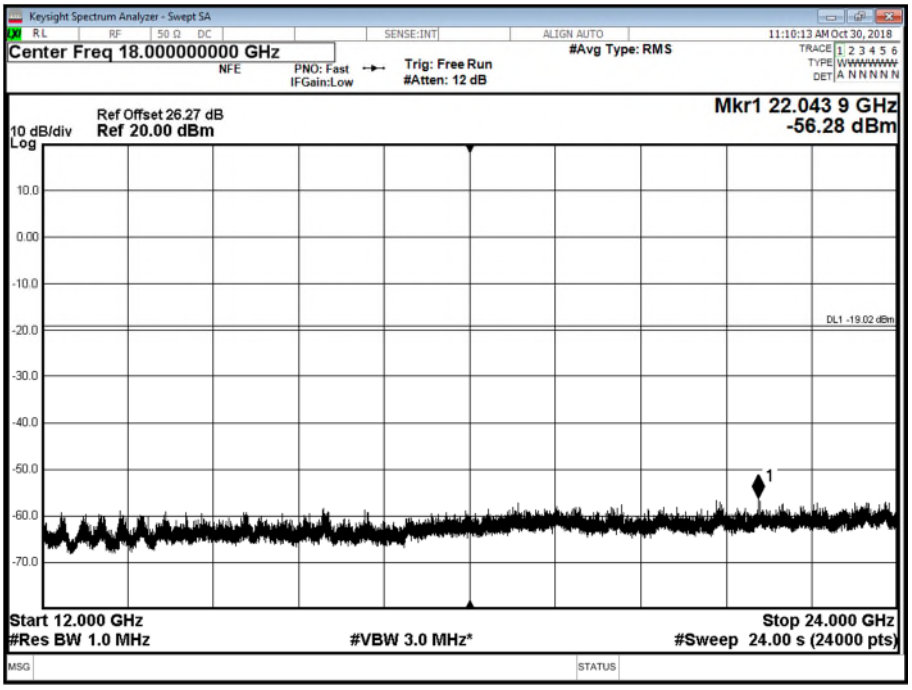
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 1 - Range 0.009 to 4000 MHz



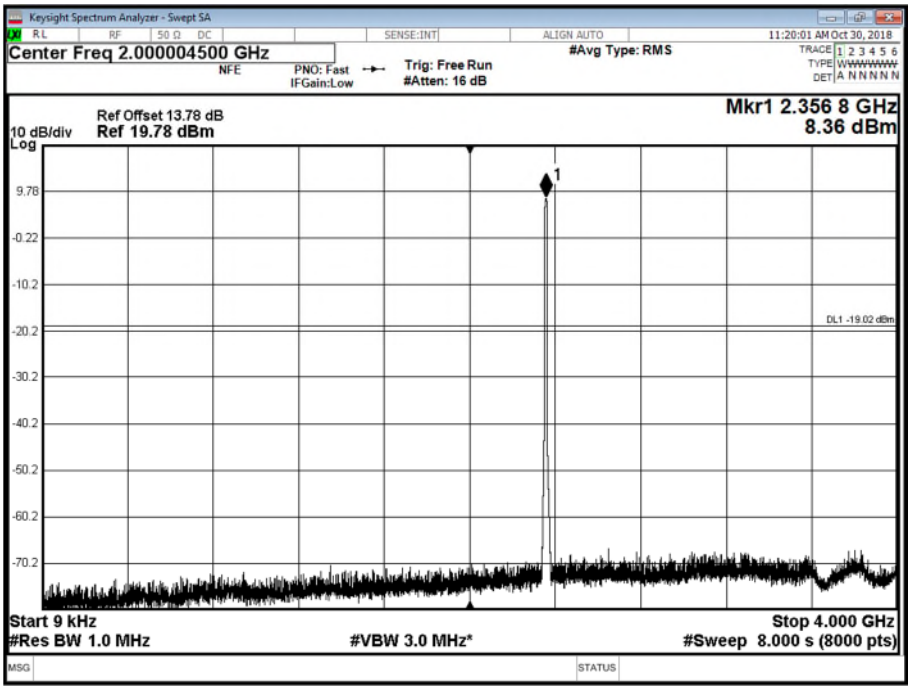
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 2 - Range 4000 to 12000 MHz



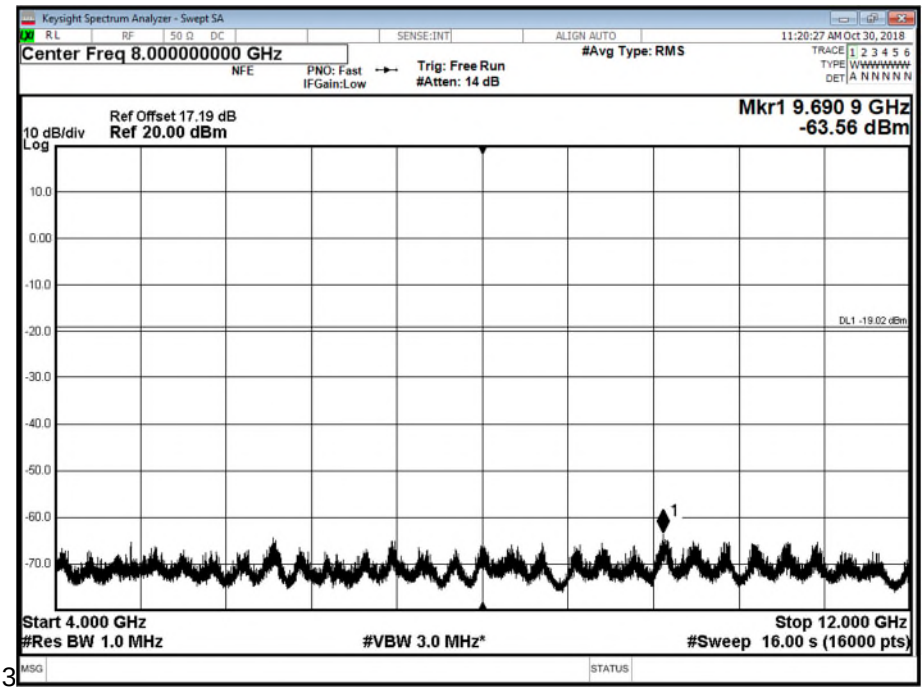
Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 3 - Range 12000 to 24000 MHz



Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 1 - Range 0.009 to 4000 MHz

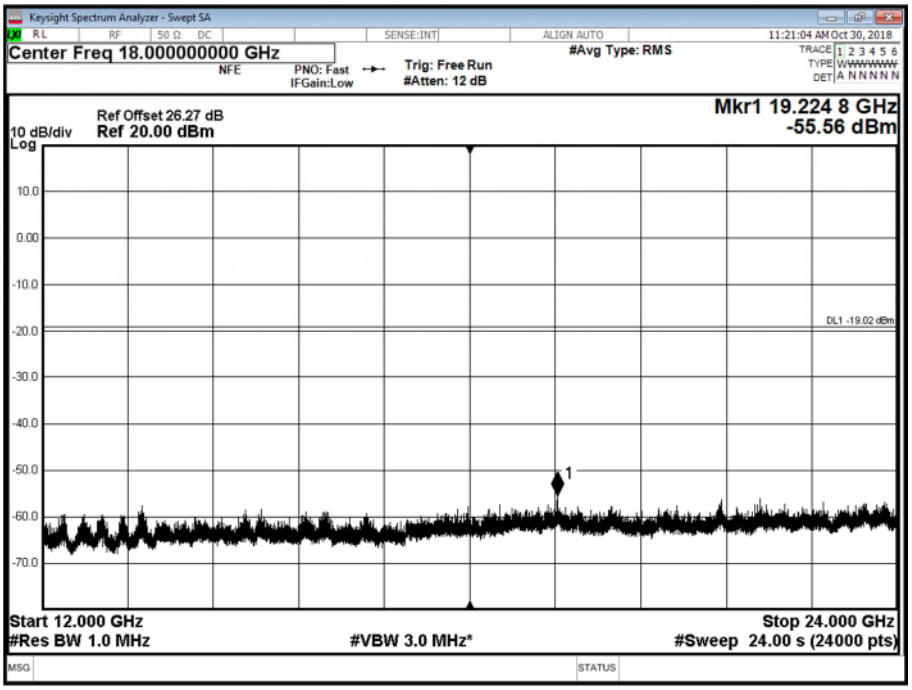


Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 2 - Range 4000 to 12000 MHz

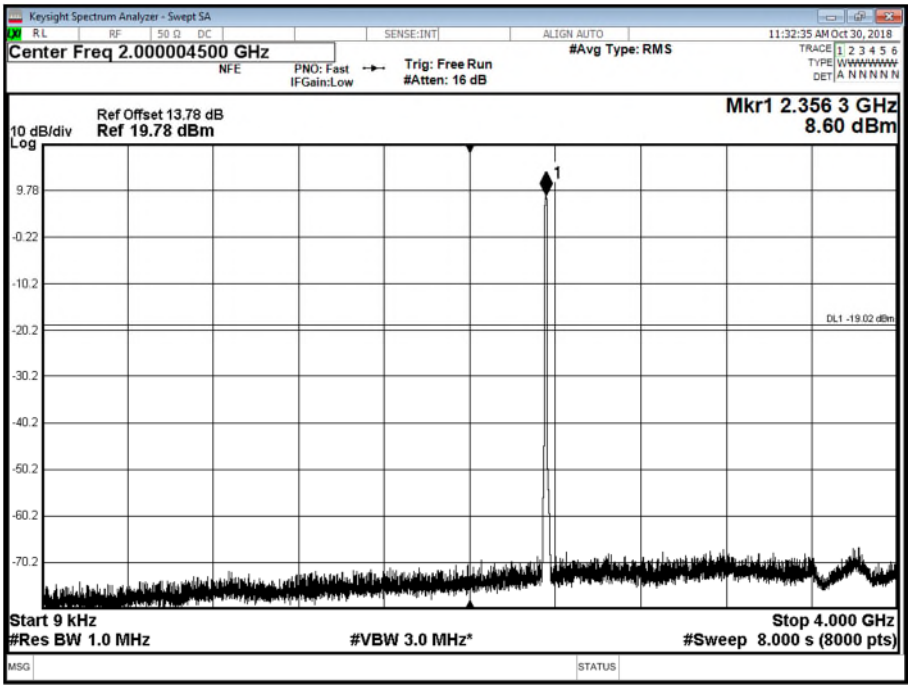


3

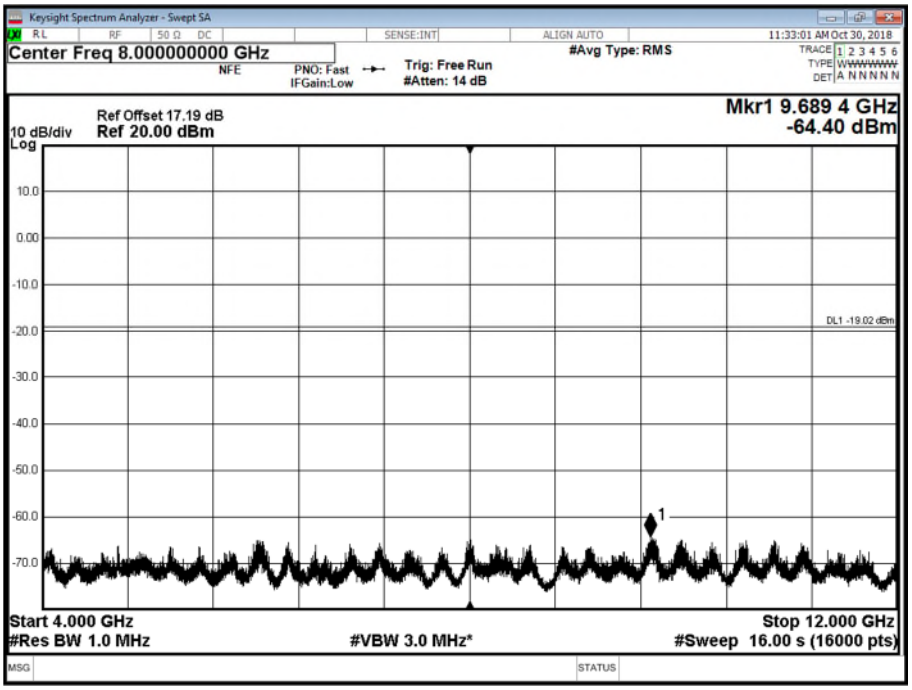
Antenna C - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 3 - Range 12000 to 24000 MHz



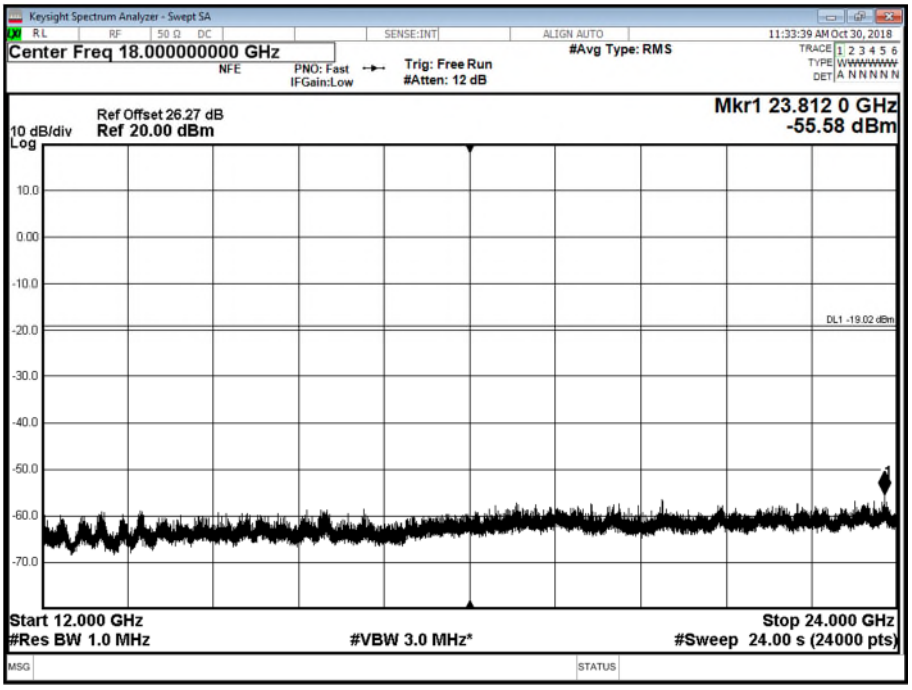
Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 1 - Range 0.009 to 4000 MHz



Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 2 - Range 4000 to 12000 MHz



Antenna D - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M - Band 3 - Range 12000 to 24000 MHz



Limit	-51 dBm Note: Limit is specified as -45 dBm, which is corrected to -51 dBm accounting for 10Log(Ports) where number of ports is 4.

2.5 FREQUENCY STABILITY

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 27, Clause 27.54

2.5.2 Date of Test and Modification State

October 30, 2018 - 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	23°C
Relative Humidity	40 %

2.5.5 Test Method

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

2.5.6 Test Results

Configuration A

Temperature	Voltage	Frequency Error (Hz)
		Channel Position M
-30°C	-48.0 V DC	N/A (no RF present)
-20°C	-48.0 V DC	N/A (no RF present)
-10°C	-48.0 V DC	-5.2
0°C	-48.0 V DC	-3.1
+10°C	-48.0 V DC	5.2
+20°C	-40.5 V DC	-2.1
+20°C	-48.0 V DC	5.1
+20°C	-57.5 V DC	-2.5
+30°C	-48.0 V DC	-3.6
+40°C	-48.0 V DC	3.8
+50°C	-48.0 V DC	3.8

Limit	±1.5 ppm or ±3.45 kHz

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

Instrument	Manufacturer	Model No.	Serial Number	Calibration Due
Spectrum Analyser	Keysight	PXA N9030A	MY55410202	13-Sep-2019
Network Analyser	Agilent	N5234A	MY52241174	22-Mar-2019
PSU	Xantrex	XKW60-50	E00109862	O/P Mon
Attenuator (10dB)	Mini-Circuits	BW-K10-2W44+	-	O/P Mon
RF Switch Unit	Ericsson	RARFSW 4x1	001	O/P Mon
Switching Control Unit	Hewlett Packard	11713A	3748A060876	O/P Mon
PSU	Leader	730-3D	9801135	O/P Mon

N/A – Not Applicable
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 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Testing Laboratory
Certificate #2955.02

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

This report does not imply product endorsement by any government, accreditation agency, or TÜV SÜD Canada Inc.

Opinions or interpretations expressed in this report, if any, are outside the scope of TÜV SÜD Canada Inc. accreditations. Any opinions expressed do not necessarily reflect the opinions of TÜV SÜD Canada Inc., unless otherwise stated.

Product Service

ANNEX A

MODULE LIST

Configuration			
Product	Product No	R-State	Serial No
CT10	LPC102487/1	R1C	T01F311639
SUP 6601	1/BFL 901 009/1	R3B	BR81278870
IRU 2242 (RF1)	KRC 161 444/2	R2A	C829960698
IRU 2242 (RF2)	KRC 161 444/2	R2A	C829960688
RD 4442 B30	KRY 901 407/1	R1A	TD3T601990
Software Version:	CXP 901 3268/14	Revision:	R71HG