



Product Service

**Choose certainty.
Add value.**



Report On

FCC Testing of the
Ericsson Remote Radio Unit LTE KRC 161 711/1 Radio 2208 B48
(3550-3700) MHz in accordance with FCC CFR 47 Part 2, FCC CFR 47
Part 96

COMMERCIAL-IN-CONFIDENCE
FCC ID: TA8AKRC161711-1

PREPARED BY

A handwritten signature in grey ink, appearing to read 'Neil Rousell'.

Neil Rousell
Senior Engineer
(Wireless)

APPROVED BY

A handwritten signature in grey ink, appearing to read 'Simon Bennett'.

Simon Bennett
Authorised Signatory

DATED

20 September 2018

Document 75941015 Report 01 Issue 3

September 2018



Product Service

CONTENTS

Section	Page No
1	REPORT INFORMATION 2
1.1	Report Details 3
1.2	Brief Summary of Results 4
1.3	Configuration Description 5
1.4	Declaration of Build Status 6
1.5	Product Information 7
1.6	Test Setup 8
1.7	Test Conditions 9
1.8	Deviation From The Standard 9
1.9	Modification Record 9
1.10	Additional Information 9
2	TEST DETAILS 10
2.1	Output Power and Peak to Average Ratio - Conducted 11
2.2	Occupied Bandwidth 44
2.3	Band Edge 54
2.4	Transmitter Spurious Emissions 74
2.5	Frequency Stability 338
2.6	Radiated Emissions 340
3	TEST EQUIPMENT USED 358
3.1	Test Equipment Used 359
3.2	Measurement Uncertainty 361
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT 362
4.1	Accreditation, Disclaimers and Copyright 363
ANNEX A	Module Lists A.2



Product Service

SECTION 1

REPORT INFORMATION



Product Service

1.1 REPORT DETAILS

Manufacturer	Ericsson
Address	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
Product Name	Radio 2208 B48
Product Number	KRC 161 711/1
Serial Number(s)	D827120517
Software Version	CXP9034711/2_R1C04
Hardware Version	R1B
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2017 FCC CFR 47 Part 96: 2017
Start of Test	09 April 2018
Finish of Test	26 June 2018
Name of Engineer(s)	Neil Rousell Jack Tuckwell Simon Bennett Nicolas Salguero Camarena
Related Document(s)	KDB 971168 D01 v03r01 KDB 662911 D01 v02r01 KDB 940660 D01 Part 96 CBRS Eqpt v01 ANSI C63.26:2015

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 96. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

N Rousell

J Tuckwell

S Bennett

N Salguero Camarena

This Report has been up issued to Issue 3 and should be read in place of Issue 2. This Report has been up issued to Issue 3 to add an EIRP description in Section 2.1.



Product Service

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 96, and is shown below.

Section	Specification Clause		Test Description	Result
	FCC CFR 47 Part 2	FCC CFR 47 Part 96		
2.1	2.1046	96.41 (b)(c)(g)	Power Limits EIRP, Power Management, Peak-average Power Ratio (PAPR), PSD	Pass
2.2	2.1049	96.41 (e)(3)	Occupied Bandwidth	Pass
2.3	2.1051	96.41 (e)(1)	Band Edge	Pass
2.4	2.1051	96.41 (e)(1)(2)	Spurious Emissions at Antenna Terminals	Pass
2.5	2.1055	-	Frequency Stability	Pass
2.6	2.1053	96.41 (e)(1)(2)	Field Strength of Spurious Radiation	Pass

1.3 CONFIGURATION DESCRIPTION

A1 - Single carrier			
Bandwidth (MHz)	Bottom (MHz)	Middle (MHz)	Top (MHz)
5	3552.5	3625	3697.5
10	3555	3625	3695
20	3560	3625	3690
A2 - 2 Carriers – All tests except Band Edge – Carrier Configuration 1			
Bandwidth (MHz)	Bottom (MHz)	Middle (MHz)	Top (MHz)
5	3552.5 + 3607.5	3597.5 + 3652.5	3642.5 + 3697.5
10	3555 + 3605	3600 + 3650	3645 + 3695
20	3560 + 3600	3605 + 3645	3650 + 3690
A2 - 2 Carriers – Band Edge – Carrier Configuration 2			
Bandwidth (MHz)	Bottom (MHz)	Middle (MHz)	Top (MHz)
5	3552.5 + 3557.5	3622.5 + 3627.5	3692.5 + 3697.5
10	3555 + 3565	3620 + 3630	3685 + 3695
20	3560 + 3580	3615 + 3635	3670 + 3690
A3 - 3 Carriers – All tests except Band Edge – Carrier Configuration 1			
Bandwidth (MHz)	Bottom (MHz)	Middle (MHz)	Top (MHz)
5	3552.5 + 3557.5 + 3607.5	3597.5 + 3602.5 + 3652.5	3642.5 + 3647.5 + 3697.5
10	3555 + 3565 + 3605	3600 + 3610 + 3650	3645 + 3655 + 3695
20	3560 + 3580 + 3600	3605 + 3625 + 3645	3650 + 3670 + 3690
A3 - 3 Carriers – Band Edge – Carrier Configuration 2			
Bandwidth (MHz)	Bottom (MHz)	Middle (MHz)	Top (MHz)
5	3552.5 + 3557.5 + 3562.5	3620 + 3625 + 3630	3687.5 + 3692.5 + 3697.5
10	3555 + 3565 + 3575	3615 + 3625 + 3635	3675 + 3685 + 3695
20	3560 + 3580 + 3600	3605 + 3625 + 3645	3650 + 3670 + 3690



Product Service

1.4 DECLARATION OF BUILD STATUS

MANUFACTURING DESCRIPTION	Remote Radio Unit
MANUFACTURER	Ericsson AB
PRODUCT NAME	Radio 2208 B48
PRODUCT NUMBER	KRC 161 711/1
TRANSMITTER OPERATING RANGE	TX/RX: 3550 - 3700 MHz
MODULATIONS	LTE: QPSK, 16QAM, 64QAM, 256QAM
ITU DESIGNATION OF EMISSION	LTE: 5M00F9W, 10M0F9W, 20M0F9W
NUMBER OF CARRIERS	Maximum 3 carriers
SUPPORTED CHANNEL BANDWIDTH CONFIGURATION	LTE: 5MHz, 10MHz and 20MHz
OUTPUT POWER without Integrated Antenna	Maximum: 40.0dBm (10W) per port Minimum: 30.0dBm (1W) per port
OUTPUT POWER with Integrated Antenna	Maximum per port: Single carrier: 26.9 dBm (0.49 W) for 5MHz BW; 29.9 dBm (0.98 W) for 10MHz BW; 32.9 dBm (1.95 W) for 20MHz BW Two carriers: 29.9 dBm (0.98 W) for 5MHz BW; 32.9 dBm (1.95 W) for 10MHz BW; 35.9 dBm (3.89 W) for 20MHz BW Three Carriers: 31.6 dBm (1.45 W) for 5MHz BW; 34.6 dBm (2.88 W) for 10MHz BW; 37.7 dBm (5.89 W) for 20MHz BW
OUTPUT POWER TOLERANCE	+0.6/-2.0 dB
INSTANTANEOUS BANDWIDTH	60MHz
NUMBER OF ANTENNA PORTS	2 TX/RX ports
Integrated Antenna name	Antenna 6550
Integrated Antenna product number	KRE 101 2251/2
Integrated Antenna Gain	11.5 ± 0.5dBi
FCC ID	TA8AKRC161711-1
Power source	36V DC
TECHNICAL DESCRIPTION	The equipment is the Remote Radio Part of TDD LTE Base Station.
(a brief description of the intended use and operation)	

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

1.5 PRODUCT INFORMATION

1.5.1 Technical Description

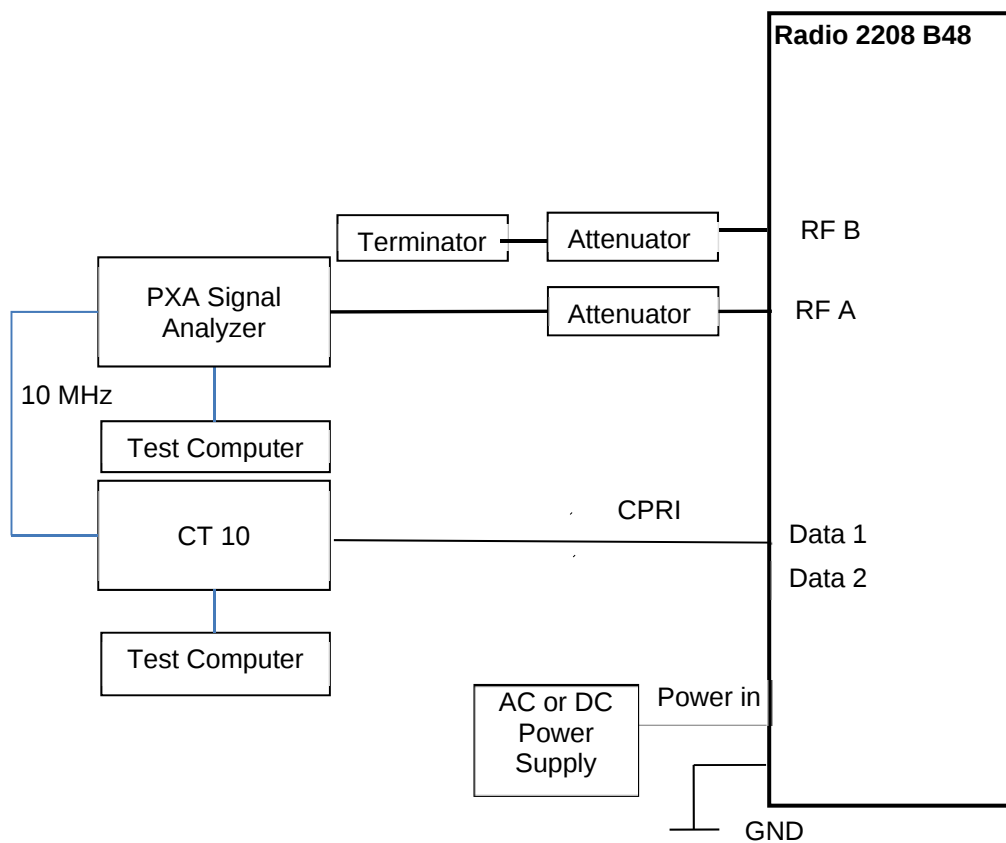
The Equipment Under Test (EUT) KRC 161 711/1 is an Ericsson AB Radio Unit working in the public mobile service 3550-3700 MHz band which provides communication connections to 3550-3700 MHz network. The KRC 161 711/1 operates from a -48V DC or a 120V AC power supply.

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





Product Service

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 120V (60Hz) AC supply. The EUT can also operate from a -48 V DC power supply. Frequency Stability measurements were made at extreme voltage conditions with both power supply options.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

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 ADDITIONAL INFORMATION

This testing was performed in accordance with Part 96 PAG, as submitted to the FCC Tracking Number 425580.

Initial pre-testing was carried out to determine the worst case modulation scheme by measuring the output power from QPSK, 16QAM, 64QAM and 256QAM on the middle channel of one antenna port. From these tests, it was determined that 64QAM was the worst case and was used for all testing.

Initial pre-testing was carried out to determine the worst case bandwidth from 5MHz, 10MHz and 20MHz on the middle channel of one antenna port. From these tests, it was determined that 20MHz was the worst case and was used where detailed by the FCC Part 96 PAG document.



Product Service

2.1 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 96, Clause 96.41 (b)(c)(g)

2.1.2 Date of Test and Modification State

11, 13, 18, 24 April and 26 June 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	20.8 - 24.8°C
Relative Humidity	41.1 - 50.7%

2.1.5 Test Method

Measurements were performed with a Spectrum Analyser using the Band Power measurement function. The detector was set to RMS with an RBW of at least 1 % of the carrier bandwidth and a VBW of at least 3 times the RBW. The integration bandwidth was configured to be 10 MHz as defined in 96.41(b). Where the carrier width was greater than 10 MHz, the integration bandwidth was moved to the region with the highest PSD.

For PSD measurements in a 1 MHz bandwidth, measurements were made in accordance with ANSI C63.26 Clause 5.7.2(a). A resolution bandwidth of at least 1 % of the emission bandwidth was chosen in conjunction with an Integration Bandwidth of 1 MHz. An RMS detector was used with a single slow sweep utilised. The highest PSD was established over the entire emission bandwidth and the result recorded.

The measured results were summed in accordance with FCC KDB 662911 to account for 2 port MIMO operation.

CCDF measurements were carried out in accordance with ANSI C63.26 Clause 5.2.3.4.



Product Service

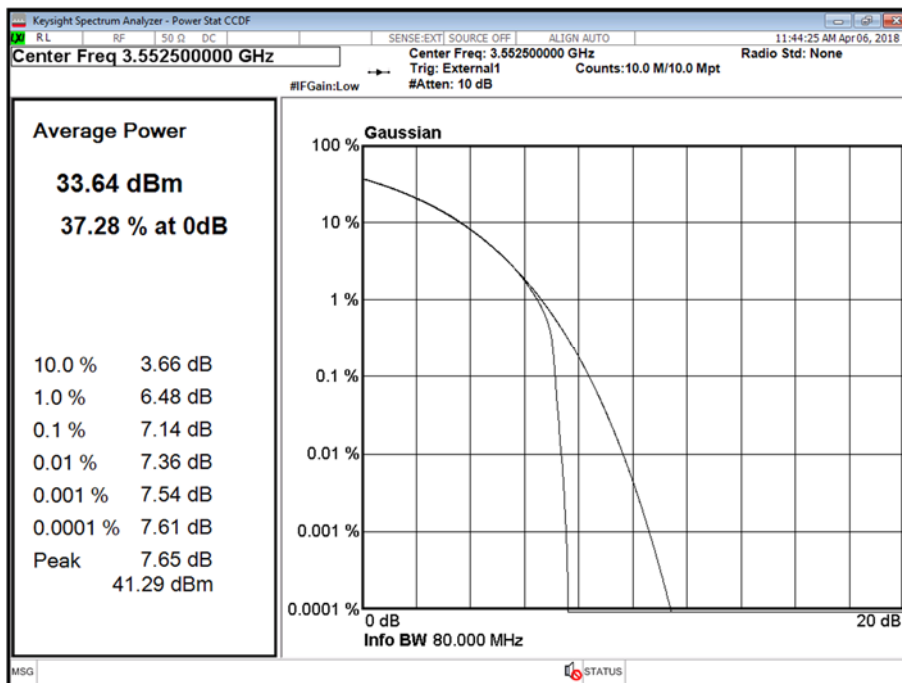
2.1.6 Test Results

Configuration A1 Maximum Power

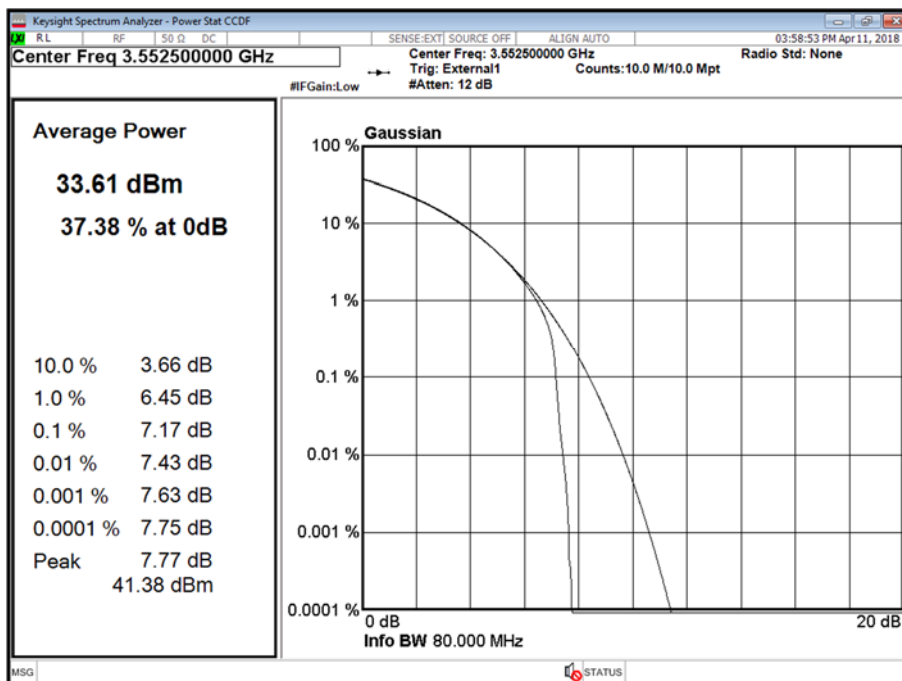
Maximum Output Power 40 dBm (5 MHz, 34 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			PAR (dB)	Channel Position B	
				Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	7.14	33.74	28.16
B	64QAM	5.0 MHz	7.17	33.77	28.26
Total			-	36.77	31.22
A	64QAM	10.0 MHz	7.28	39.41	31.00
B	64QAM	10.0 MHz	7.26	39.40	30.94
Total			-	42.42	33.98
A	64QAM	20.0 MHz	7.26	39.25	27.80
B	64QAM	20.0 MHz	7.25	39.33	28.12
Total			-	42.30	30.97

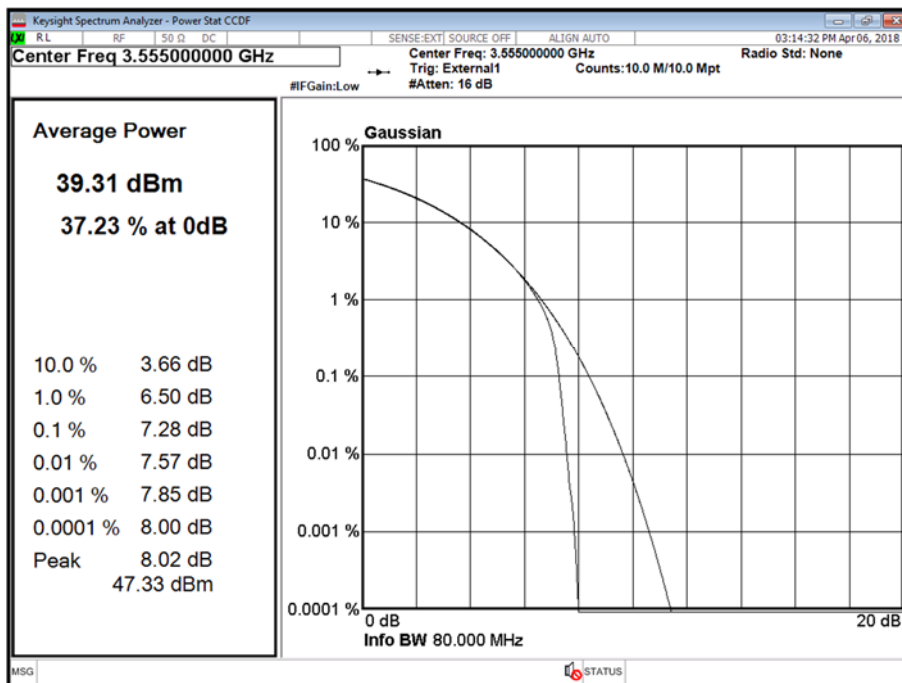
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



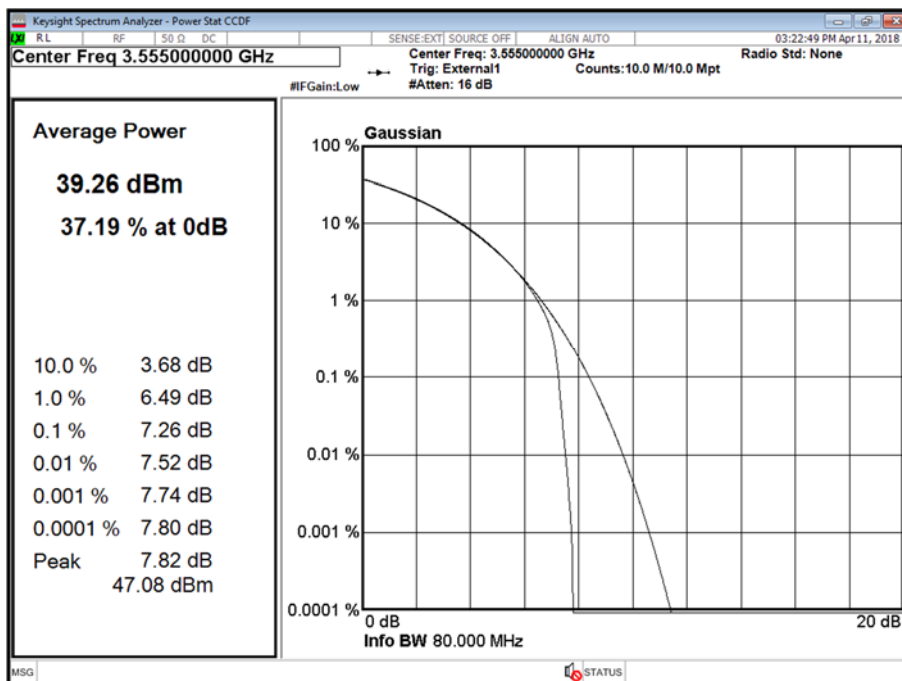
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



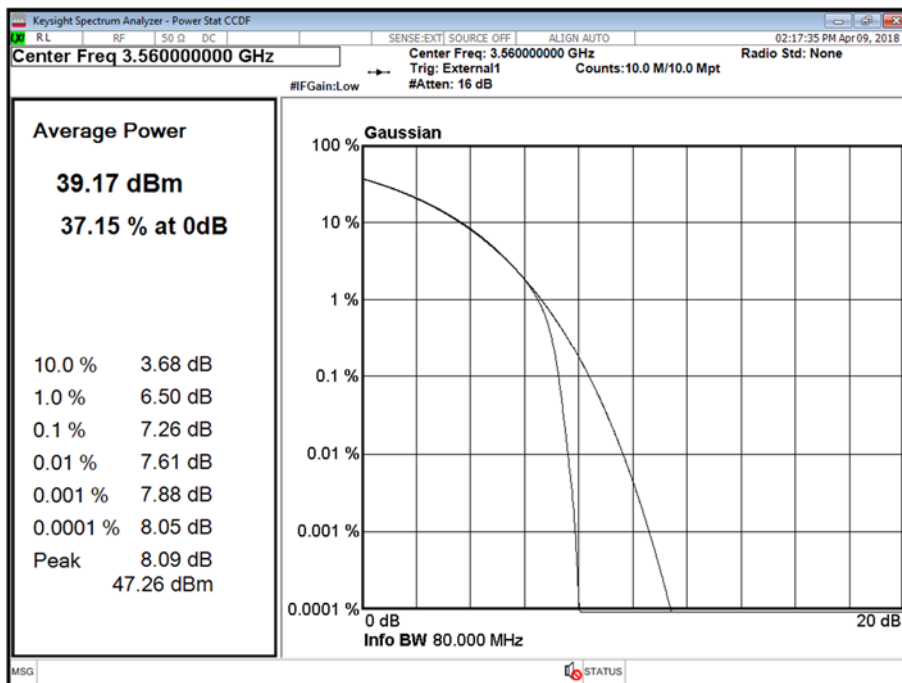
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position B



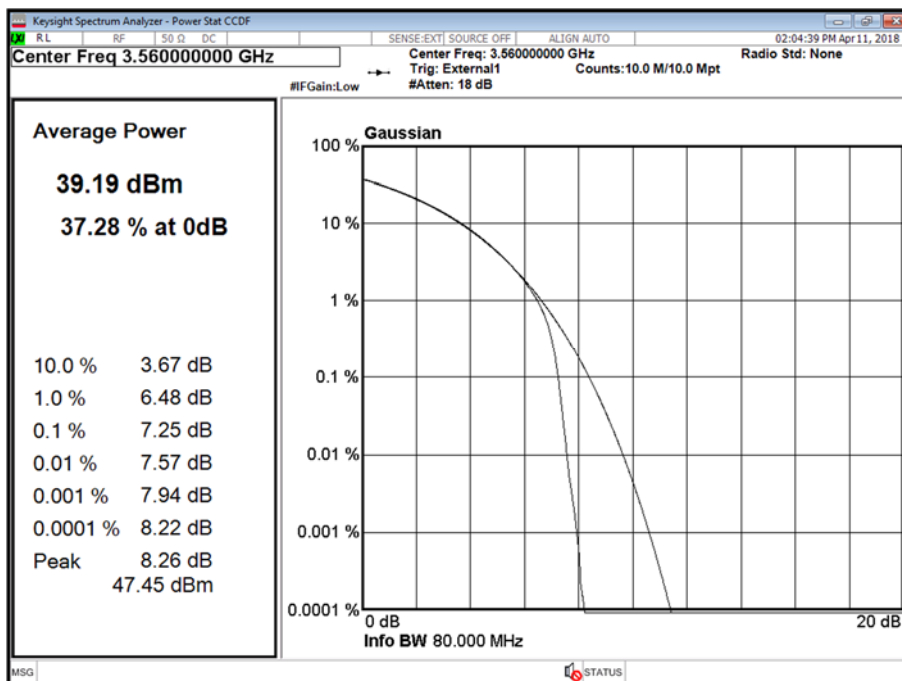
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position B



Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position B



Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position B





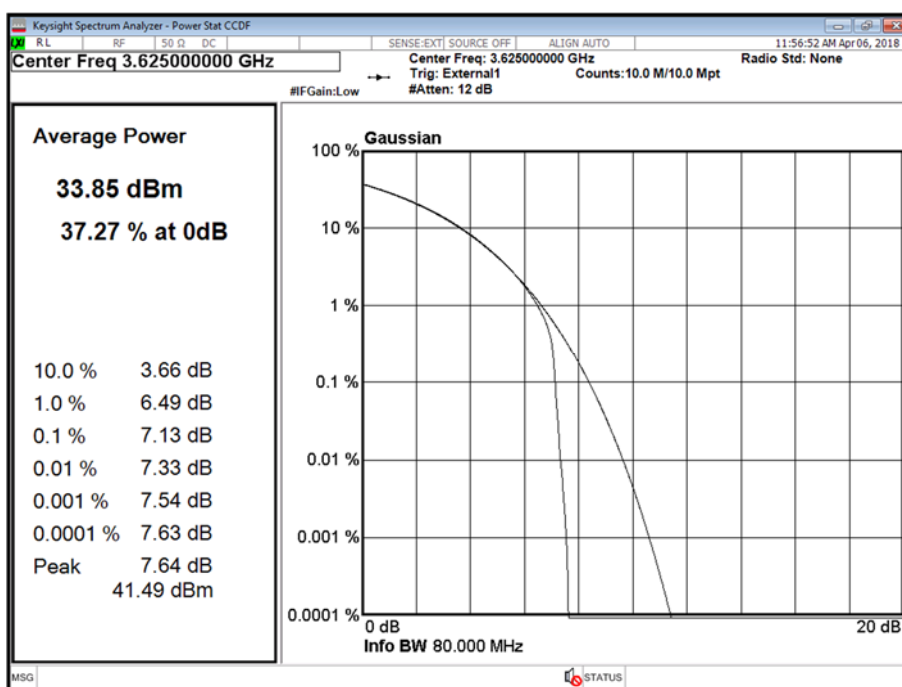
Product Service

Configuration A1 Maximum Power

Maximum Output Power 40 dBm (5 MHz, 34 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	64QAM	5.0 MHz	7.13	33.91	28.27
B	64QAM	5.0 MHz	7.16	33.79	28.11
Total			-	36.86	31.20
A	64QAM	10.0 MHz	7.15	39.58	30.97
B	64QAM	10.0 MHz	7.14	39.50	30.88
Total			-	42.55	33.94
A	64QAM	20.0 MHz	7.21	39.38	27.88
B	64QAM	20.0 MHz	7.23	39.39	27.79
Total			-	42.40	30.85

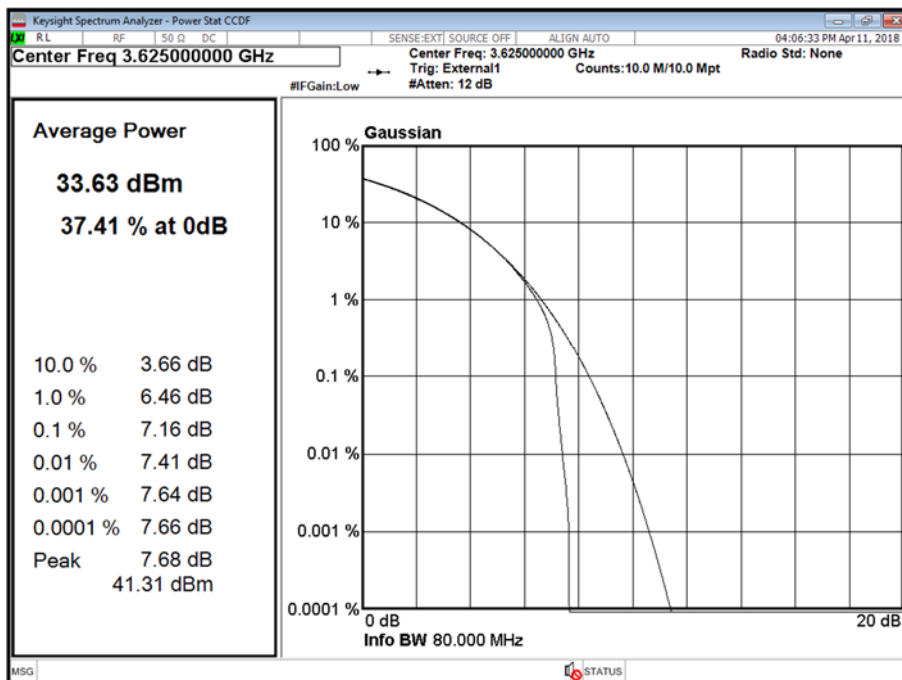
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



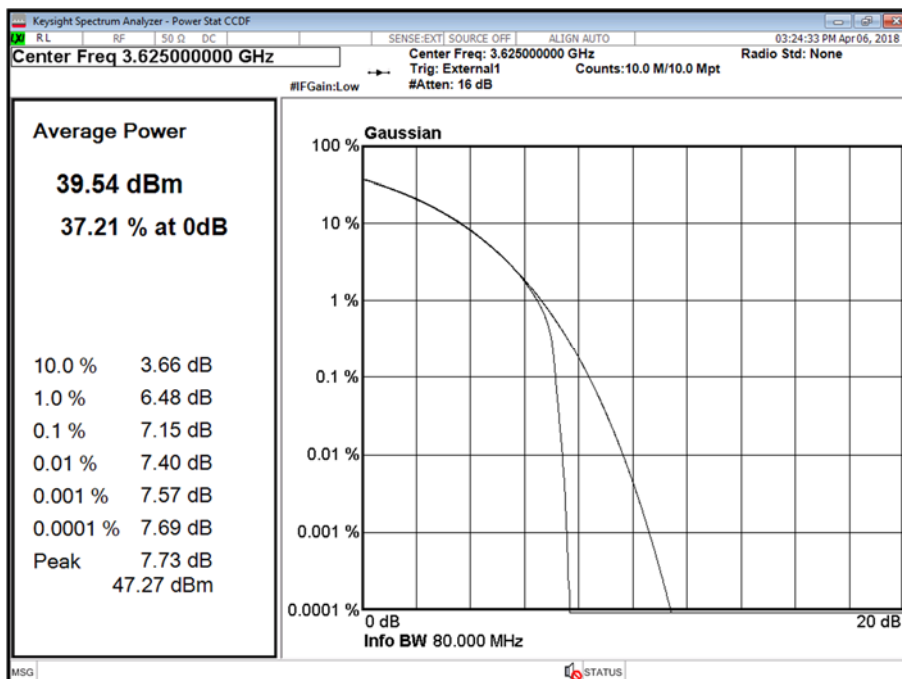


Product Service

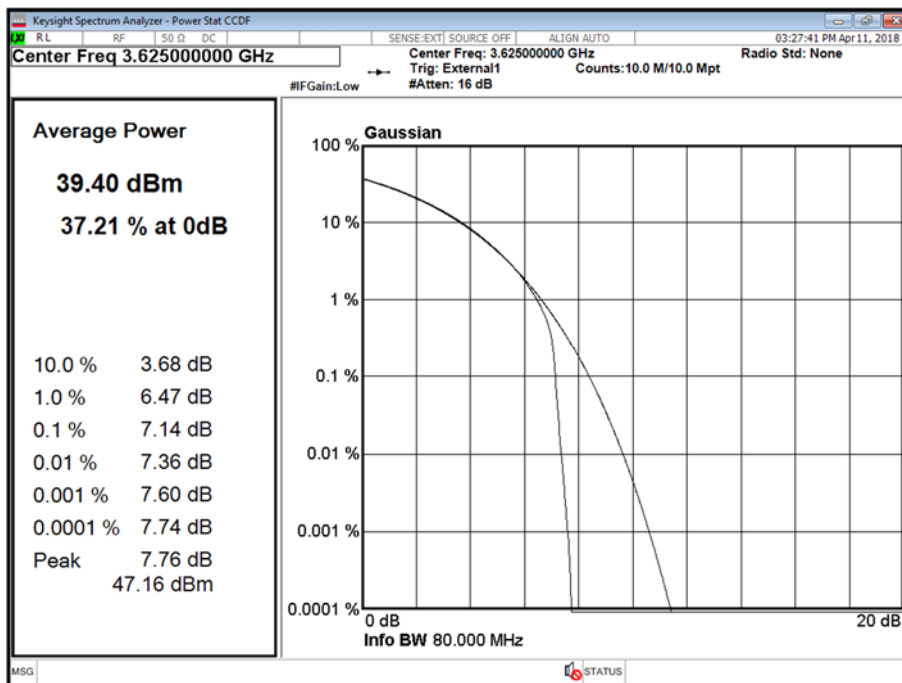
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



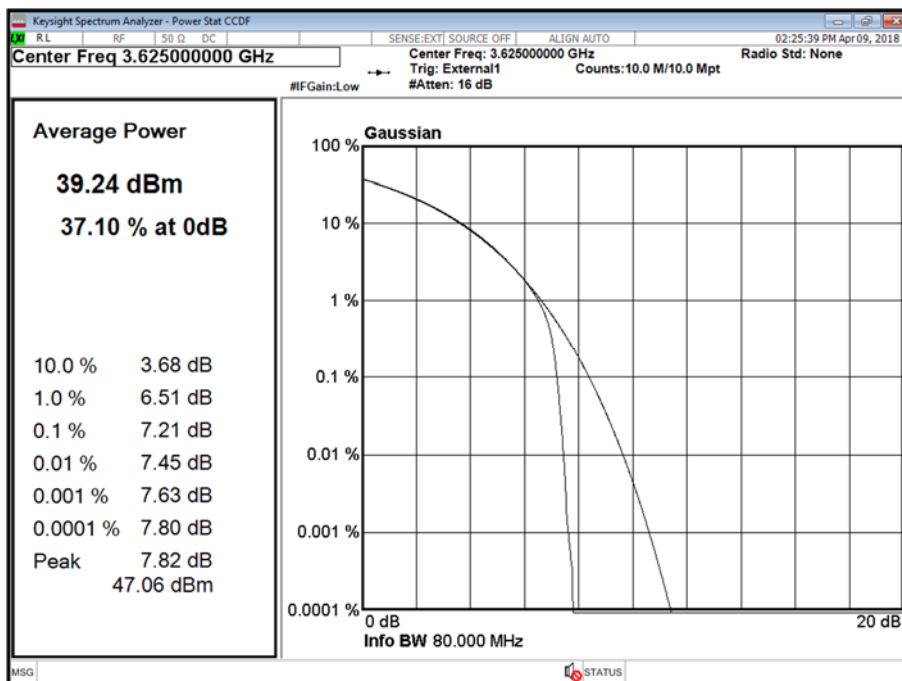
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



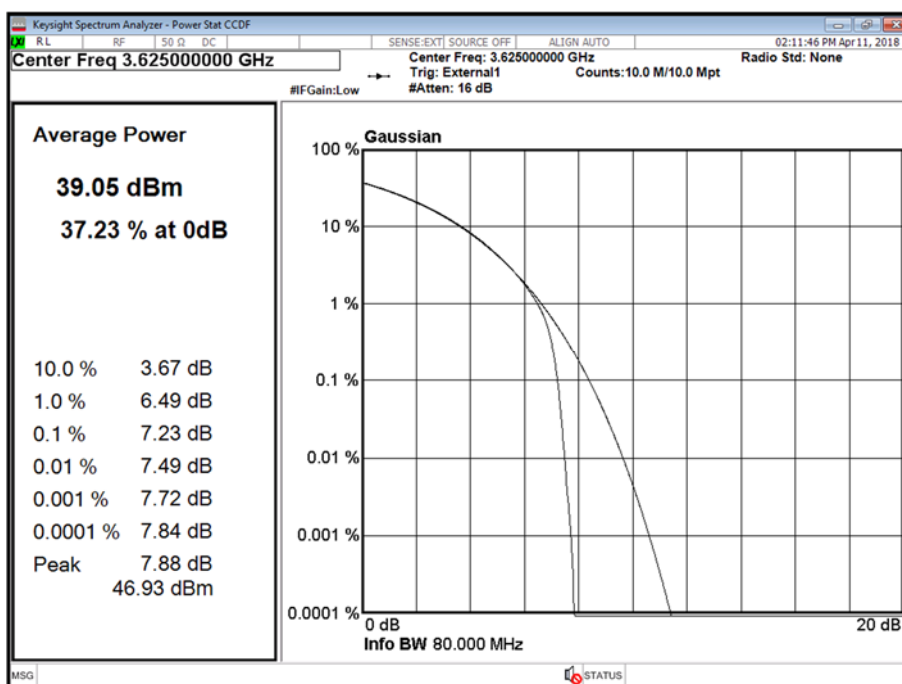
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position M



Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position M

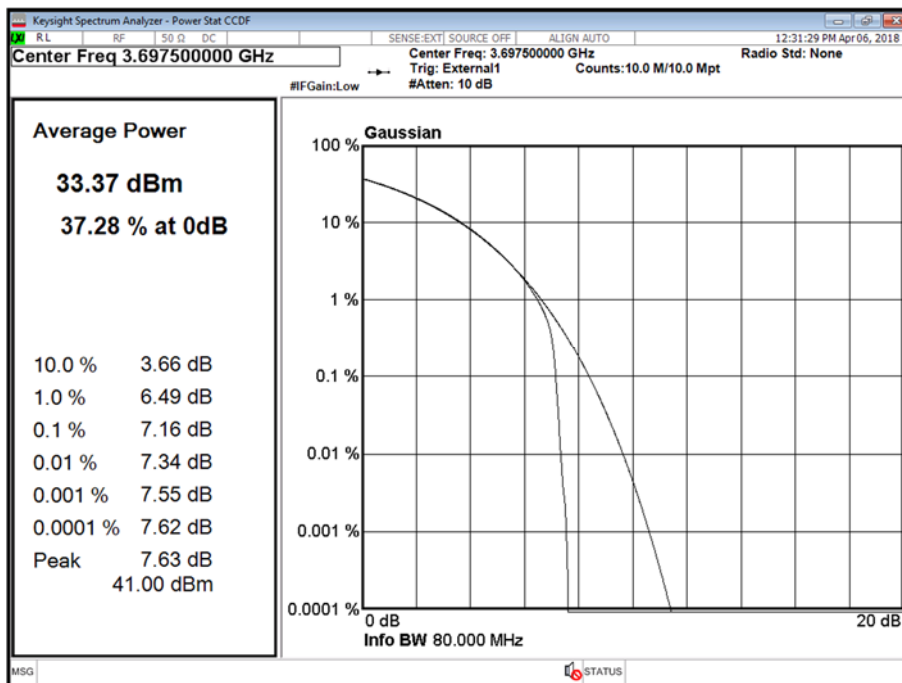


Configuration A1 Maximum Power

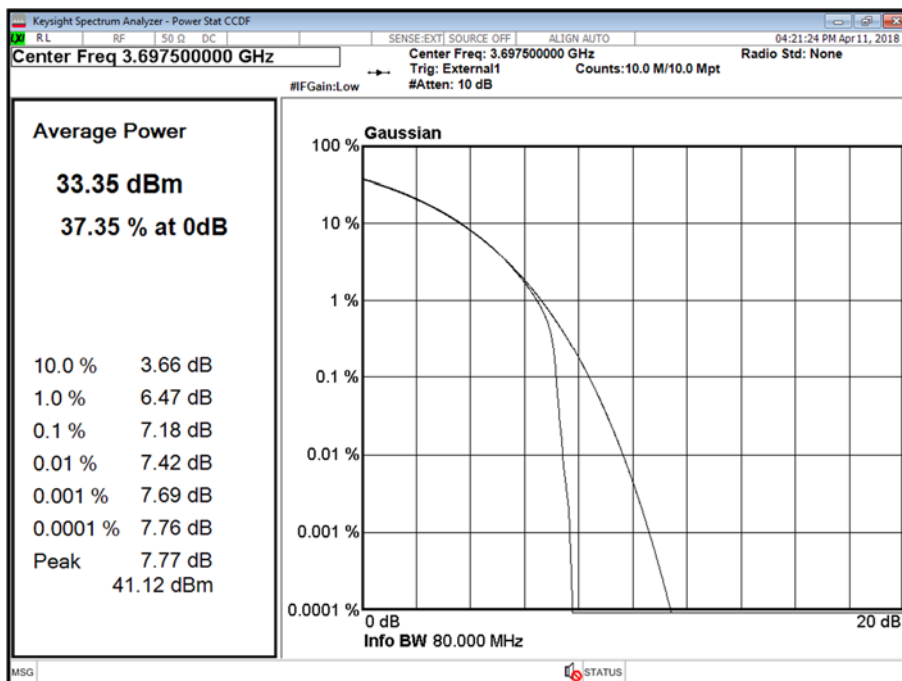
Maximum Output Power 40 dBm (5 MHz, 34 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position T		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	7.16	33.50	27.89
B	64QAM	5.0 MHz	7.18	33.47	27.82
Total			-	36.50	30.87
A	64QAM	10.0 MHz	7.29	39.10	30.59
B	64QAM	10.0 MHz	7.28	39.15	30.64
Total			-	42.14	33.63
A	64QAM	20.0 MHz	7.29	39.22	27.83
B	64QAM	20.0 MHz	7.30	39.21	27.75
Total			-	42.23	30.80

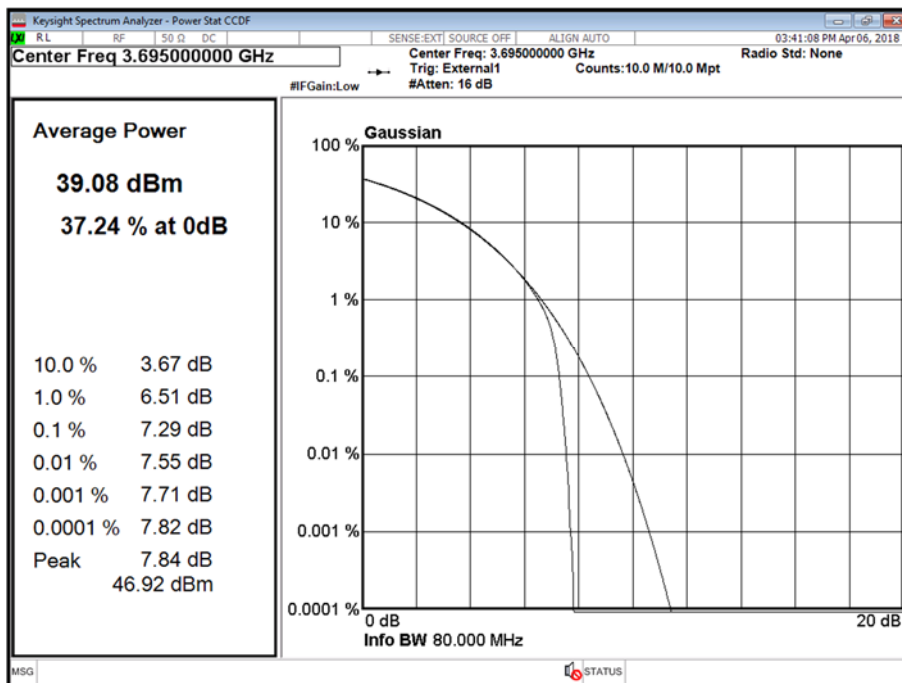
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



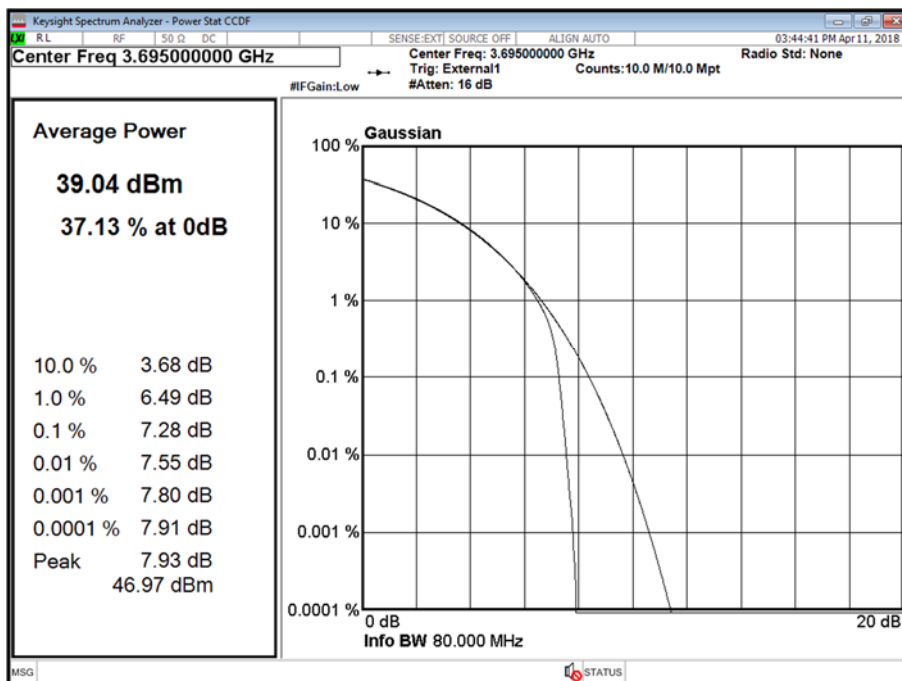
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



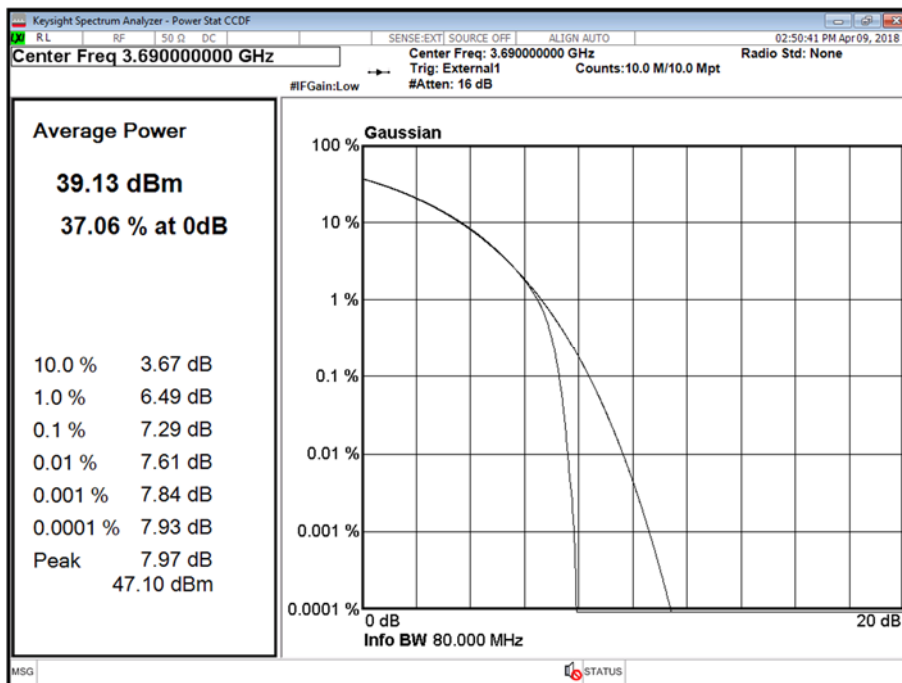
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position T



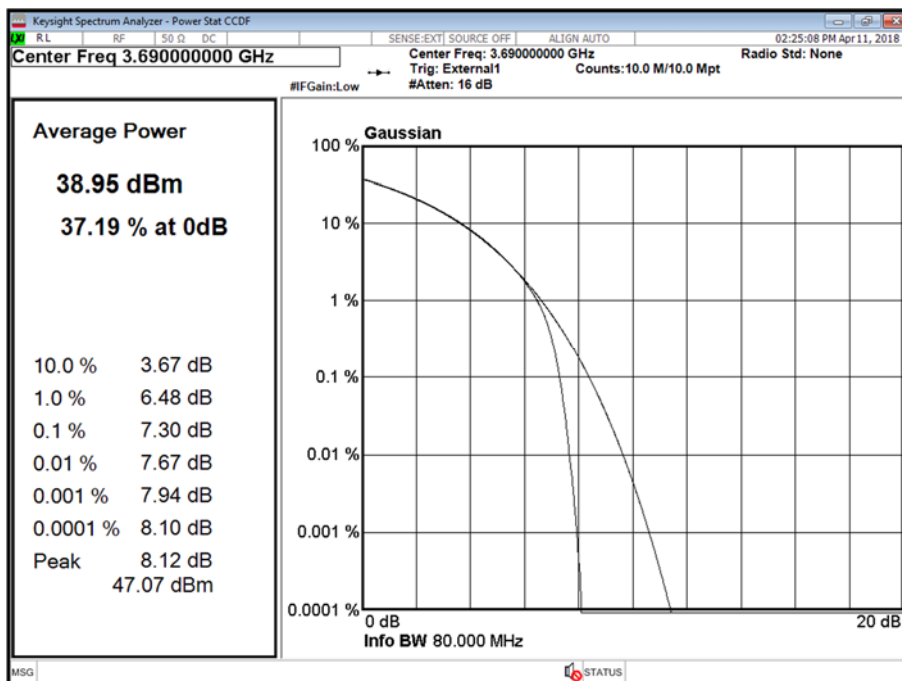
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position T



Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position T



Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position T





Product Service

Configuration A2 Maximum Power

Maximum Output Power 40 dBm (5 MHz, 34 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position B		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	-	33.95	25.30
B	64QAM	5.0 MHz	-	33.93	25.40
Total			-	36.95	28.36
A	64QAM	10.0 MHz	-	38.54	26.85
B	64QAM	10.0 MHz	-	38.50	27.09
Total			-	41.53	29.98
A	64QAM	20.0 MHz	-	39.52	25.72
B	64QAM	20.0 MHz	-	39.57	25.14
Total			-	42.56	28.45

Configuration A2 Maximum Power

Maximum Output Power 40 dBm (5 MHz, 34 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	64QAM	5.0 MHz	-	33.74	25.13
B	64QAM	5.0 MHz	-	33.75	24.96
Total			-	36.76	28.06
A	64QAM	10.0 MHz	-	38.32	26.59
B	64QAM	10.0 MHz	-	38.34	26.97
Total			-	41.34	29.79
A	64QAM	20.0 MHz	-	39.32	25.07
B	64QAM	20.0 MHz	-	39.27	24.71
Total			-	42.31	27.90



Product Service

Configuration A2 Maximum Power

Maximum Output Power 40 dBm (5 MHz, 34 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	64QAM	5.0 MHz	-	33.65	25.39
B	64QAM	5.0 MHz	-	33.67	24.82
Total			-	36.67	28.12
A	64QAM	10.0 MHz	-	38.23	26.71
B	64QAM	10.0 MHz	-	38.35	27.12
Total			-	41.30	29.93
A	64QAM	20.0 MHz	-	39.26	24.80
B	64QAM	20.0 MHz	-	39.20	24.97
Total			-	42.24	27.90

Configuration A3 Maximum Power

Maximum Output Power 40 dBm (5 MHz, 34 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position B		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	-	33.92	23.50
B	64QAM	5.0 MHz	-	33.87	24.26
Total			-	36.91	26.91
A	64QAM	10.0 MHz	-	39.06	25.84
B	64QAM	10.0 MHz	-	39.01	26.42
Total			-	42.05	29.15
A	64QAM	20.0 MHz	-	39.47	23.78
B	64QAM	20.0 MHz	-	39.49	24.01
Total			-	42.49	26.91



Product Service

Configuration A3 Maximum Power

Maximum Output Power 40 dBm (5 MHz, 34 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	64QAM	5.0 MHz	-	33.83	23.10
B	64QAM	5.0 MHz	-	33.75	24.28
Total			-	36.80	26.74
A	64QAM	10.0 MHz	-	39.22	25.86
B	64QAM	10.0 MHz	-	38.94	26.58
Total			-	42.09	29.25
A	64QAM	20.0 MHz	-	39.29	23.34
B	64QAM	20.0 MHz	-	39.34	23.94
Total			-	42.33	26.66

Configuration A3 Maximum Power

Maximum Output Power 40 dBm (5 MHz, 34 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	64QAM	5.0 MHz	-	33.57	23.36
B	64QAM	5.0 MHz	-	33.65	24.54
Total			-	36.62	27.00
A	64QAM	10.0 MHz	-	39.09	25.98
B	64QAM	10.0 MHz	-	38.84	26.29
Total			-	41.98	29.15
A	64QAM	20.0 MHz	-	39.20	23.21
B	64QAM	20.0 MHz	-	39.28	24.05
Total			-	42.25	26.66

EIRP Compliance

The radio unit has an optional integrated antenna, it can also support external antennas. If the customer wants to use a different antenna, the maximum allowable antenna gain + cable loss cannot exceed the values in the table below when the radio operating at the maximum output power in order to be compliant with the EIRP requirements in Part 96.41.

RF exposure compliance for the external antenna shall be addressed at the time of licensing, as required by the responsible FCC Bureau(s), including antenna co-location requirements of Part 1.1307(b)(3).



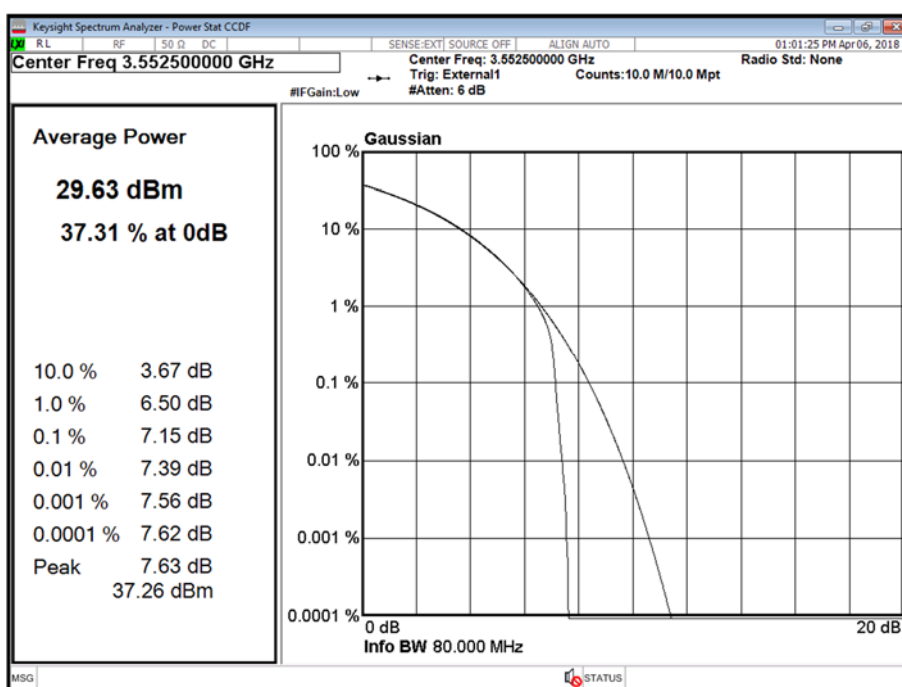
Product Service

LTE Carrier Bandwidth MHz	Maximum Total output power dBm	Maximum Antenna gain + cable loss dBi	EIRP dBm/10MHz	EIRP per Bandwidth dBm	EIRP per Bandwidth W
5	37	7	44	44	25
10	43	4	47	47	50
20	43	7	47	50	100

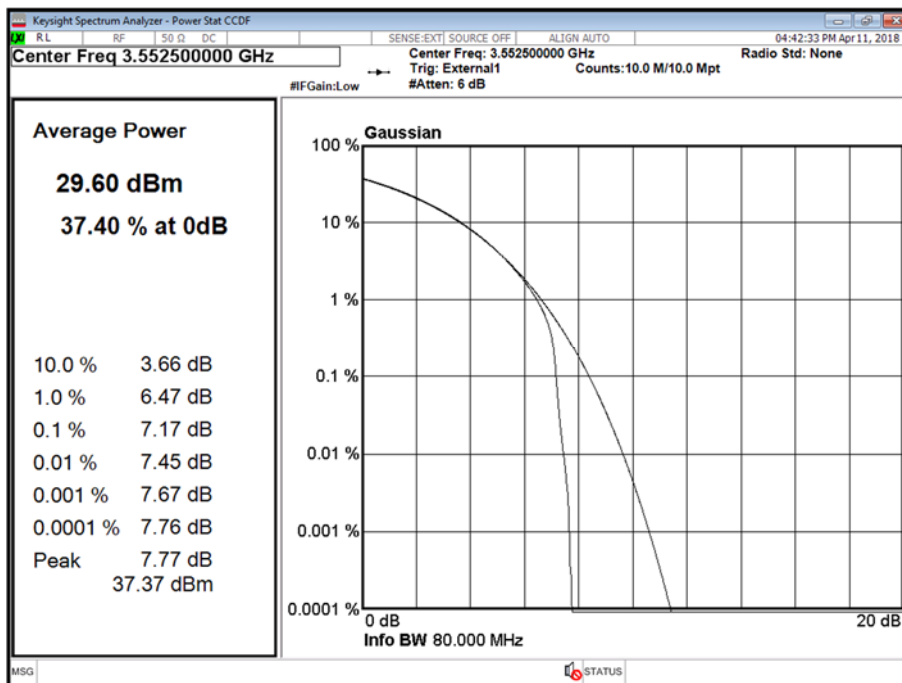
Configuration A1 Minimum Power

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position B		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	7.15	29.72	-
B	64QAM	5.0 MHz	7.17	29.77	-
Total			-	32.76	-
A	64QAM	10.0 MHz	7.20	29.69	-
B	64QAM	10.0 MHz	7.17	29.69	-
Total			-	32.70	-
A	64QAM	20.0 MHz	7.26	29.63	-
B	64QAM	20.0 MHz	7.24	29.77	-
Total			-	32.71	-

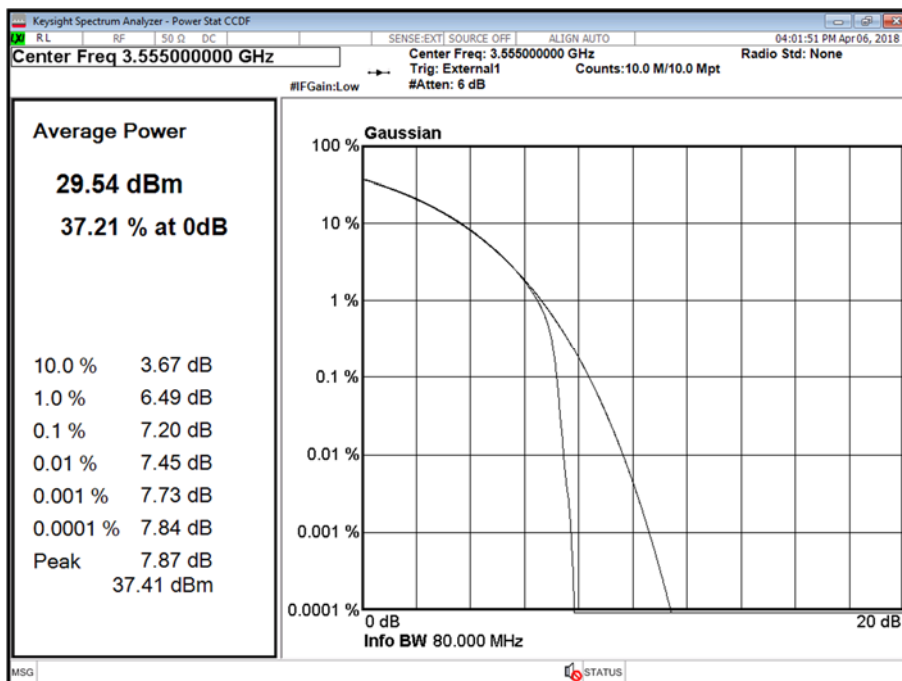
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



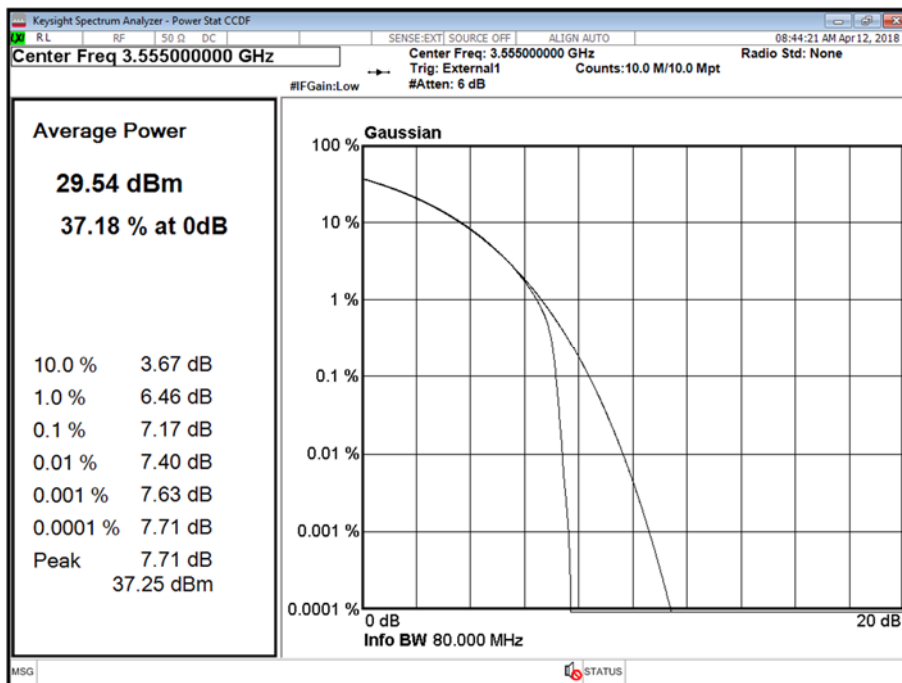
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



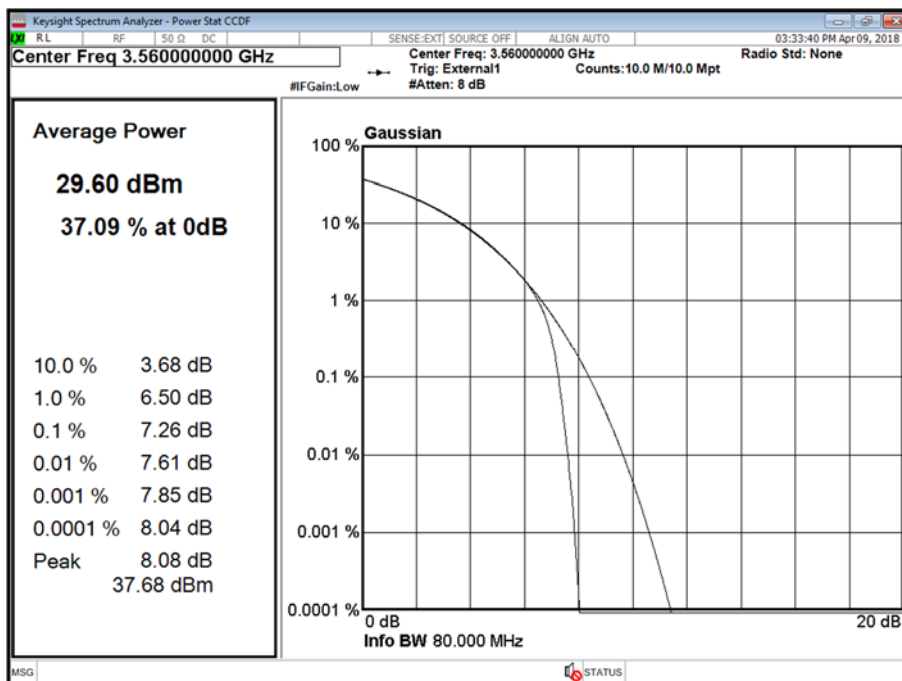
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position B



Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position B



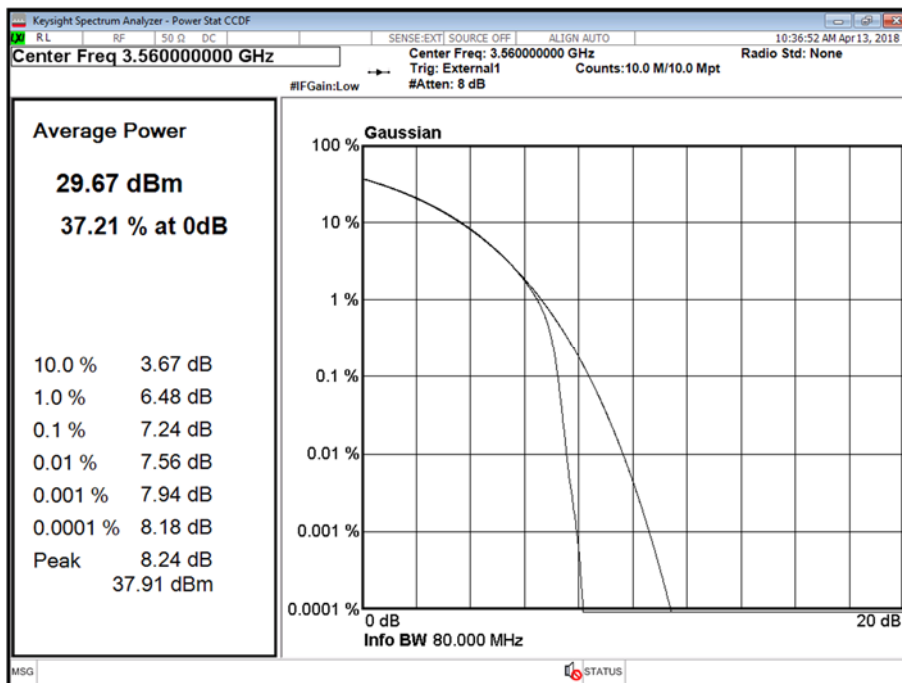
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position B





Product Service

Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position B



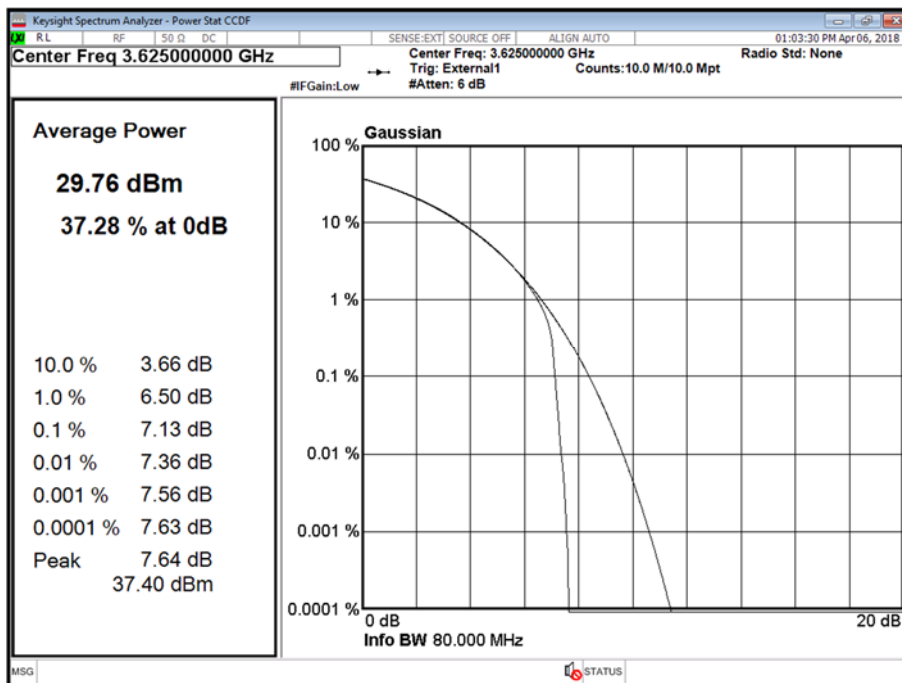
Configuration A1 Minimum Power

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position M		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	7.13	29.81	-
B	64QAM	5.0 MHz	7.18	29.85	-
Total			-	32.84	-
A	64QAM	10.0 MHz	7.16	29.76	-
B	64QAM	10.0 MHz	7.14	29.62	-
Total			-	32.70	-
A	64QAM	20.0 MHz	7.21	29.68	-
B	64QAM	20.0 MHz	7.21	29.75	-
Total			-	32.73	-

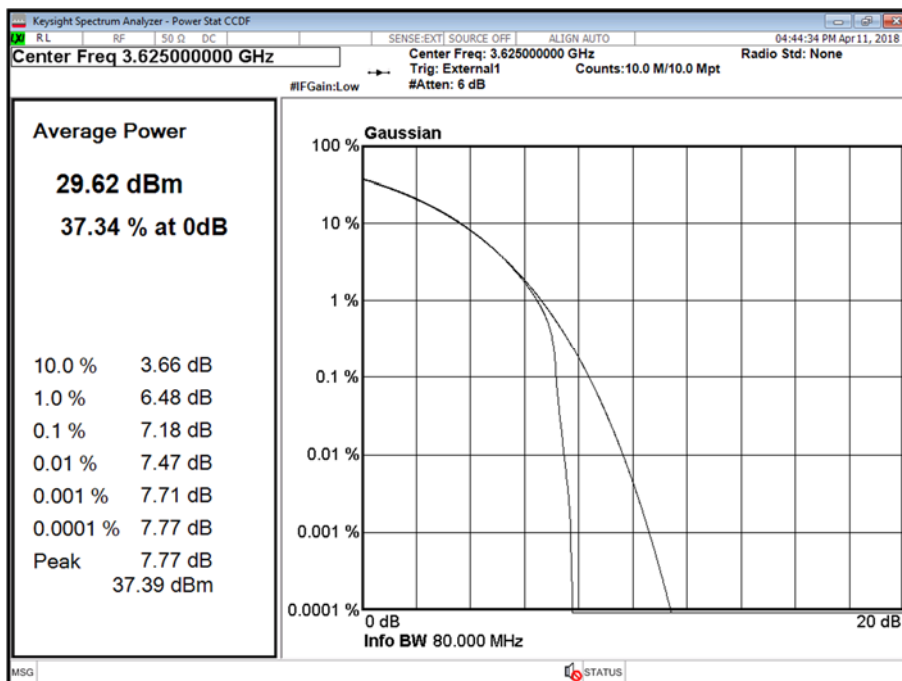


Product Service

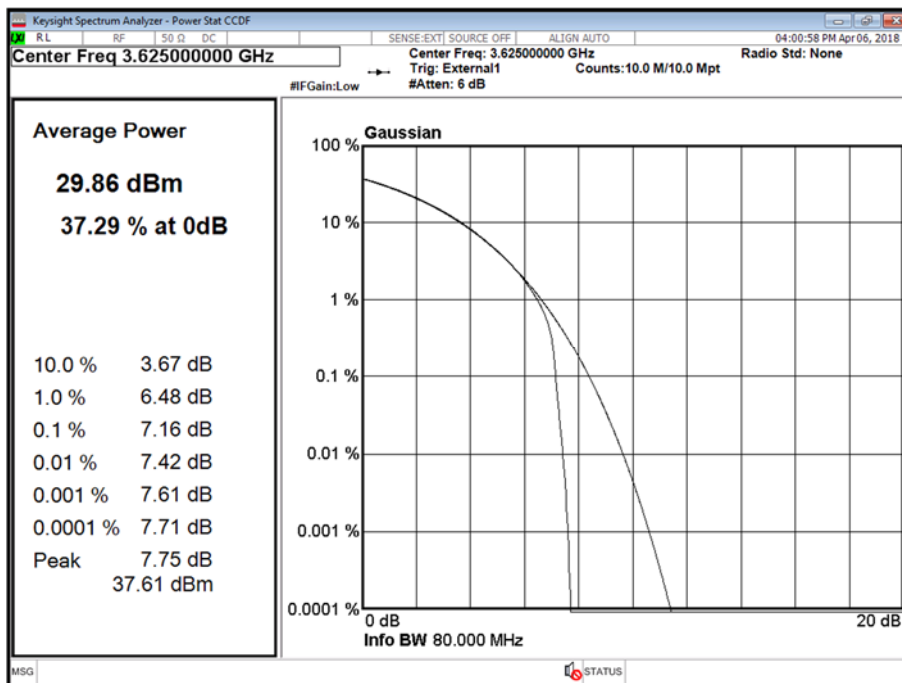
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



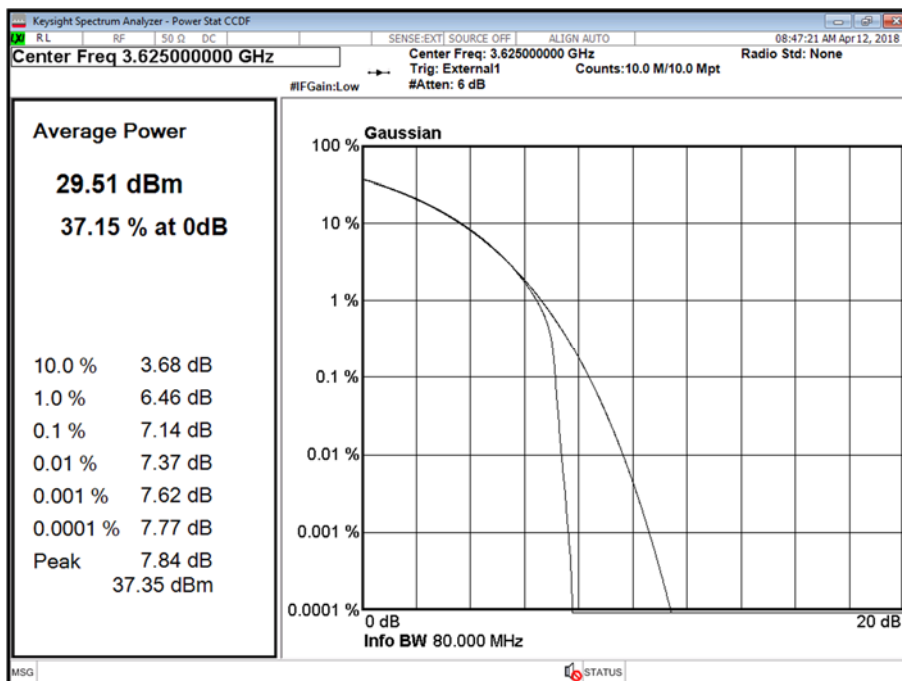
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



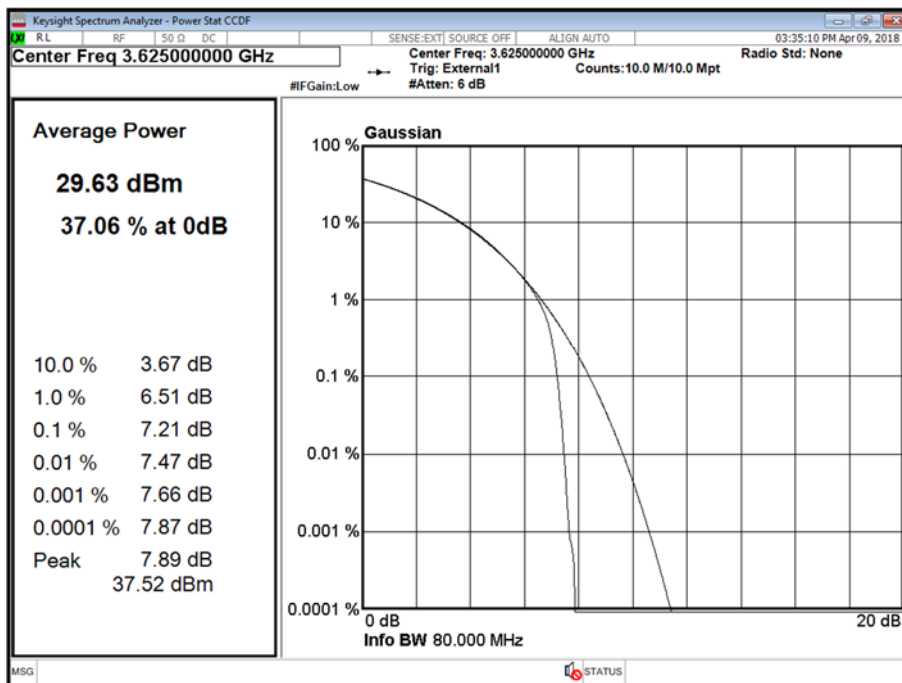
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



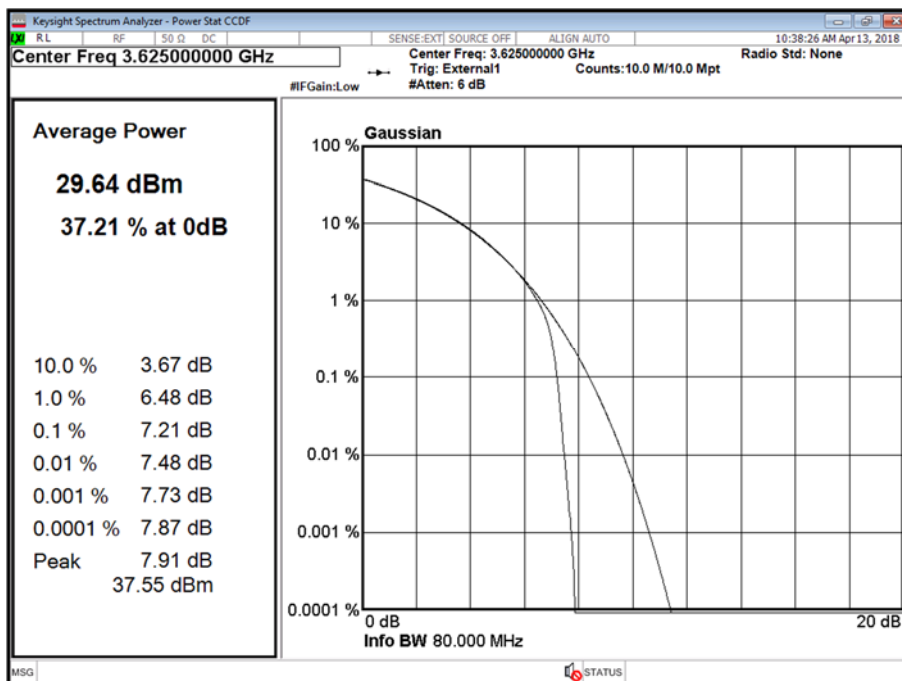
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position M



Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position M



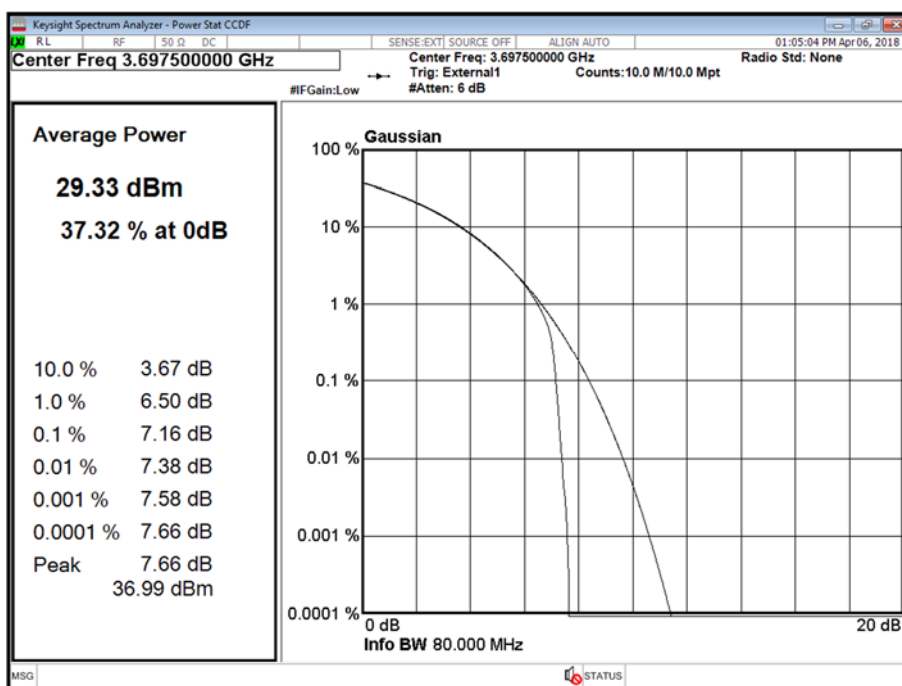


Product Service

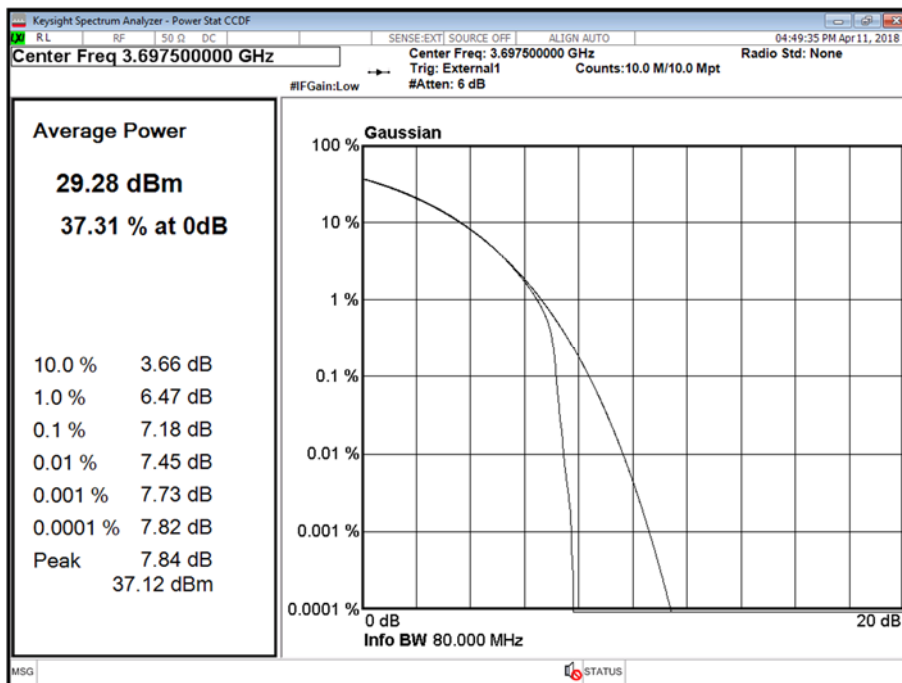
Configuration A1 Minimum Power

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position T		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	7.16	29.46	-
B	64QAM	5.0 MHz	7.18	29.38	-
Total			-	32.43	-
A	64QAM	10.0 MHz	6.79	29.34	-
B	64QAM	10.0 MHz	7.19	29.31	-
Total			-	32.34	-
A	64QAM	20.0 MHz	7.31	29.48	-
B	64QAM	20.0 MHz	7.28	29.66	-
Total			-	32.58	-

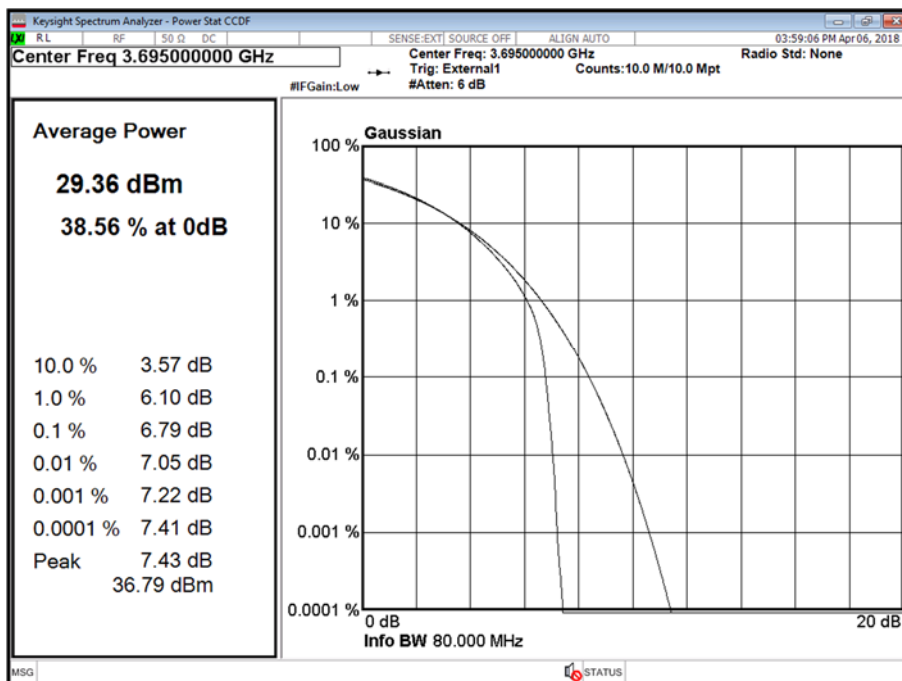
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



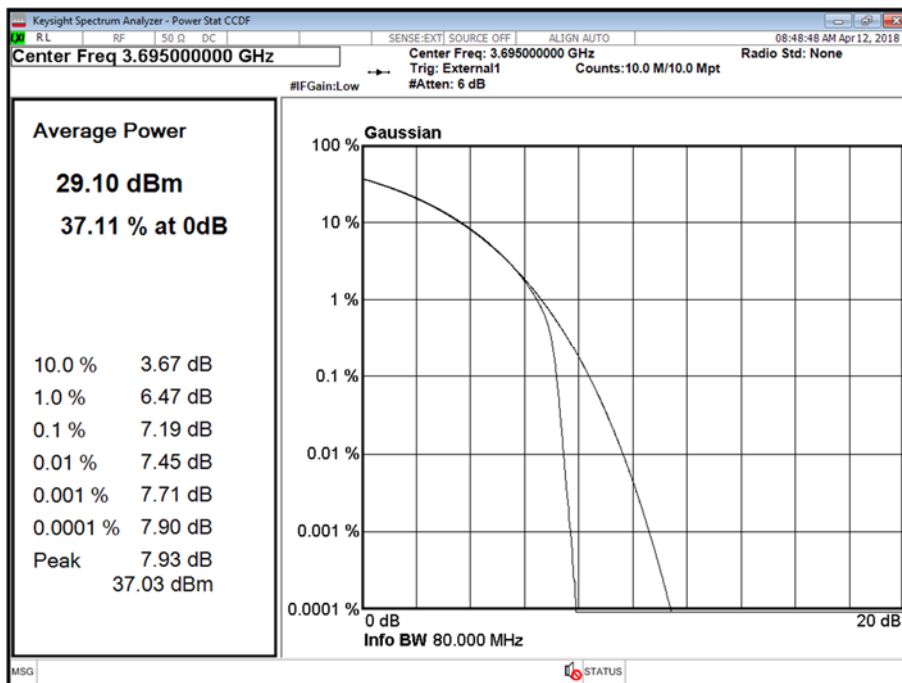
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



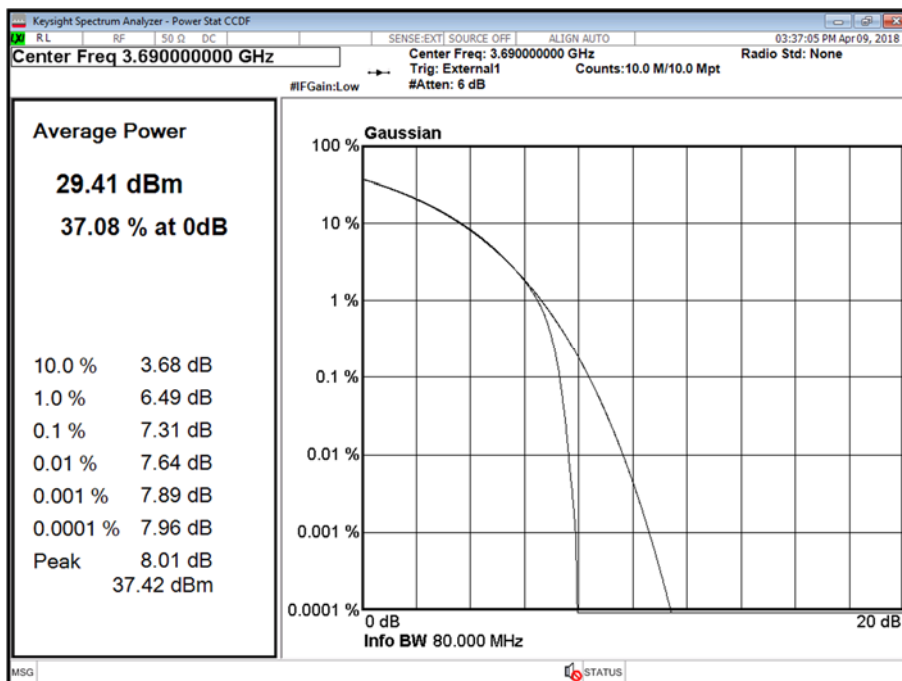
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position T



Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position T



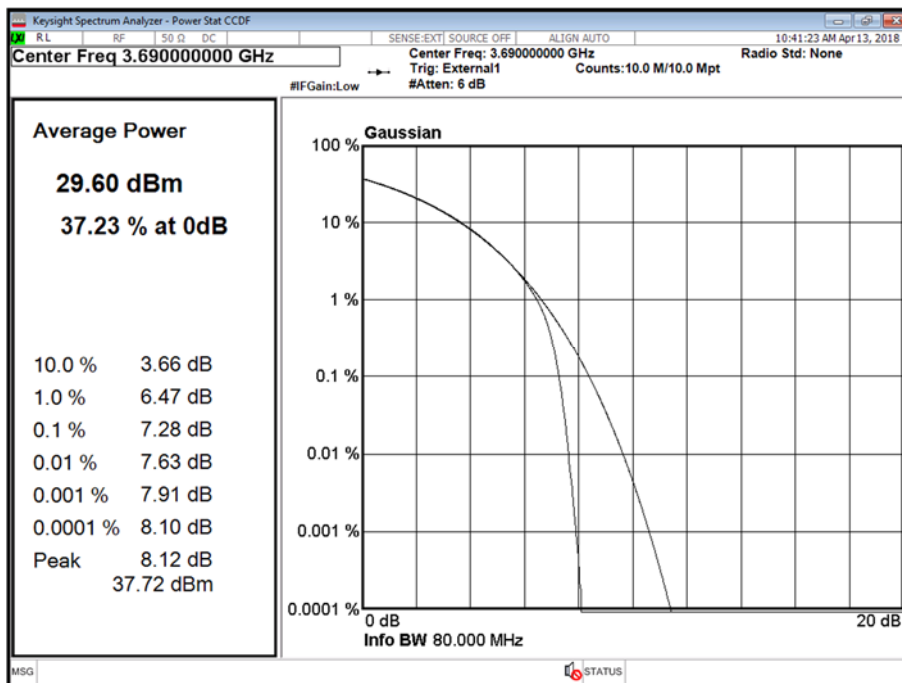
Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position T





Product Service

Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 20.0 MHz - Channel Position T



Configuration A1 Back-off Power (with Antenna)

Maximum Output Power 5 MHz (26.9 dBm), 10 MHz (29.9 dBm), 20 MHz (32.9 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			PAR (dB)	Channel Position B		
				Average Power		
				EIRP (dBm/10MHz)	dBm/MHz	EIRP per Bandwidth dBm
A	64QAM	5.0 MHz	7.15	38.19	31.91	38.19
B	64QAM	5.0 MHz	7.17	38.37	32.11	38.37
Total			-	41.29	35.02	41.29
A	64QAM	10.0 MHz	7.46	41.35	32.37	41.35
B	64QAM	10.0 MHz	7.17	41.36	32.38	41.36
Total			-	44.37	35.39	44.37
A	64QAM	20.0 MHz	7.26	41.89	32.20	44.89
B	64QAM	20.0 MHz	7.24	42.06	32.18	45.06
Total			-	44.99	35.20	47.99



Product Service

Configuration A1 Back-off Power (with Antenna)

Maximum Output Power 5 MHz (26.9 dBm), 10 MHz (29.9 dBm), 20 MHz (32.9 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			Channel Position M			
			PAR (dB)	Average Power		
				EIRP (dBm/10MHz)	dBm/MHz	EIRP per Bandwidth dBm
A	64QAM	5.0 MHz	7.13	38.52	32.15	38.52
B	64QAM	5.0 MHz	7.15	38.45	31.93	38.45
Total			-	41.50	35.05	41.50
A	64QAM	10.0 MHz	7.17	41.51	32.41	41.51
B	64QAM	10.0 MHz	7.19	41.56	32.28	41.56
Total			-	44.55	35.36	44.55
A	64QAM	20.0 MHz	7.23	42.42	32.94	45.42
B	64QAM	20.0 MHz	7.23	42.29	32.57	45.29
Total			-	45.37	35.77	48.37

Configuration A1 Back-off Power (with Antenna)

Maximum Output Power 5 MHz (26.9 dBm), 10 MHz (29.9 dBm), 20 MHz (32.9 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			Channel Position T			
			PAR (dB)	Average Power		
				EIRP (dBm/10MHz)	dBm/MHz	EIRP per Bandwidth dBm
A	64QAM	5.0 MHz	7.16	38.82	32.48	38.82
B	64QAM	5.0 MHz	7.18	38.51	32.14	38.51
Total			-	41.68	35.32	41.68
A	64QAM	10.0 MHz	7.22	41.59	32.29	41.59
B	64QAM	10.0 MHz	7.20	41.55	32.20	41.55
Total			-	44.58	35.26	44.58
A	64QAM	20.0 MHz	7.31	42.34	32.86	45.34
B	64QAM	20.0 MHz	7.32	42.21	32.77	45.21
Total			-	45.29	35.83	48.29



Product Service

Configuration A2 Minimum Power

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position B		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	-	29.89	-
B	64QAM	5.0 MHz	-	29.90	-
Total			-	32.91	-
A	64QAM	10.0 MHz	-	29.81	-
B	64QAM	10.0 MHz	-	29.84	-
Total			-	32.84	-
A	64QAM	20.0 MHz	-	30.02	-
B	64QAM	20.0 MHz	-	29.92	-
Total			-	32.98	-

Configuration A2 Minimum Power

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position M		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	-	29.77	-
B	64QAM	5.0 MHz	-	29.74	-
Total			-	32.77	-
A	64QAM	10.0 MHz	-	29.74	-
B	64QAM	10.0 MHz	-	29.70	-
Total			-	32.73	-
A	64QAM	20.0 MHz	-	29.86	-
B	64QAM	20.0 MHz	-	29.79	-
Total			-	32.84	-



Product Service

Configuration A2 Minimum Power

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position T		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	-	29.51	-
B	64QAM	5.0 MHz	-	29.62	-
Total			-	32.58	-
A	64QAM	10.0 MHz	-	29.44	-
B	64QAM	10.0 MHz	-	29.66	-
Total			-	32.56	-
A	64QAM	20.0 MHz	-	29.78	-
B	64QAM	20.0 MHz	-	29.65	-
Total			-	32.73	-

Configuration A2 Back-off Power (with Antenna)

Maximum Output Power 5 MHz (29.9 dBm), 10 MHz (32.9 dBm), 20 MHz (35.9 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			Channel Position B			
			PAR (dB)	Average Power		
				EIRP (dBm/10MHz)	dBm/MHz	EIRP per Bandwidth dBm
A	64QAM	5.0 MHz	-	38.39	31.83	38.39
B	64QAM	5.0 MHz	-	38.13	31.64	38.13
Total			-	41.27	34.75	41.27
A	64QAM	10.0 MHz	-	41.61	32.04	41.61
B	64QAM	10.0 MHz	-	41.53	32.23	41.53
Total			-	44.58	35.15	44.58
A	64QAM	20.0 MHz	-	42.22	32.31	45.22
B	64QAM	20.0 MHz	-	42.43	32.42	45.43
Total			-	45.34	35.38	48.34



Product Service

Configuration A2 Back-off Power (with Antenna)

Maximum Output Power 5 MHz (29.9 dBm), 10 MHz (32.9 dBm), 20 MHz (35.9 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			Channel Position M			
			PAR (dB)	Average Power		
				EIRP (dBm/10MHz)	dBm/MHz	EIRP per Bandwidth dBm
A	64QAM	5.0 MHz	-	39.04	32.41	39.04
B	64QAM	5.0 MHz	-	38.97	32.46	38.97
Total			-	42.02	35.45	42.02
A	64QAM	10.0 MHz	-	42.33	32.91	42.33
B	64QAM	10.0 MHz	-	42.32	32.72	42.32
Total			-	45.34	35.83	45.34
A	64QAM	20.0 MHz	-	42.77	32.78	45.77
B	64QAM	20.0 MHz	-	42.97	32.96	45.97
Total			-	45.88	35.88	48.88

Configuration A2 Back-off Power (with Antenna)

Maximum Output Power 5 MHz (29.9 dBm), 10 MHz (32.9 dBm), 20 MHz (35.9 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			Channel Position T			
			PAR (dB)	Average Power		
				EIRP (dBm/10MHz)	dBm/MHz	EIRP per Bandwidth dBm
A	64QAM	5.0 MHz	-	38.79	32.43	38.79
B	64QAM	5.0 MHz	-	38.39	32.19	38.39
Total			-	41.60	35.32	41.60
A	64QAM	10.0 MHz	-	41.90	32.46	41.90
B	64QAM	10.0 MHz	-	41.74	32.40	41.74
Total			-	44.83	35.44	44.83
A	64QAM	20.0 MHz	-	42.67	32.98	45.67
B	64QAM	20.0 MHz	-	42.37	32.73	45.37
Total			-	45.53	35.87	48.53



Product Service

Configuration A3 Minimum Power

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position B		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	-	29.88	-
B	64QAM	5.0 MHz	-	29.94	-
Total			-	32.92	-
A	64QAM	10.0 MHz	-	29.86	-
B	64QAM	10.0 MHz	-	29.97	-
Total			-	32.93	-
A	64QAM	20.0 MHz	-	29.78	-
B	64QAM	20.0 MHz	-	29.86	-
Total			-	32.83	-

Configuration A3 Minimum Power

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position M		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	-	29.74	-
B	64QAM	5.0 MHz	-	29.70	-
Total			-	32.73	-
A	64QAM	10.0 MHz	-	29.88	-
B	64QAM	10.0 MHz	-	29.80	-
Total			-	32.85	-
A	64QAM	20.0 MHz	-	29.60	-
B	64QAM	20.0 MHz	-	29.72	-
Total			-	32.67	-



Product Service

Configuration A3 Minimum Power

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position T		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM	5.0 MHz	-	29.57	-
B	64QAM	5.0 MHz	-	29.63	-
Total			-	32.61	-
A	64QAM	10.0 MHz	-	29.75	-
B	64QAM	10.0 MHz	-	29.67	-
Total			-	32.72	-
A	64QAM	20.0 MHz	-	29.52	-
B	64QAM	20.0 MHz	-	29.63	-
Total			-	32.59	-

Configuration A3 Back-off Power (with Antenna)

Maximum Output Power 5 MHz (31.6 dBm), 10 MHz (34.6 dBm), 20 MHz (37.7 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			Channel Position B			
			PAR (dB)	Average Power		
				EIRP (dBm/10MHz)	dBm/MHz	EIRP per Bandwidth dBm
A	64QAM	5.0 MHz	-	41.21	31.89	38.21
B	64QAM	5.0 MHz	-	41.14	31.94	38.14
Total			-	44.19	34.93	41.19
A	64QAM	10.0 MHz	-	41.59	32.16	41.59
B	64QAM	10.0 MHz	-	41.67	32.11	41.67
Total			-	44.64	35.15	44.64
A	64QAM	20.0 MHz	-	42.36	32.41	45.36
B	64QAM	20.0 MHz	-	42.55	32.57	45.55
Total			-	45.47	35.50	48.47



Product Service

Configuration A3 Back-off Power (with Antenna)

Maximum Output Power 5 MHz (31.6 dBm), 10 MHz (34.6 dBm), 20 MHz (37.7 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			Channel Position M			
			PAR (dB)	Average Power		
				EIRP (dBm/10MHz)	dBm/MHz	EIRP per Bandwidth dBm
A	64QAM	5.0 MHz	-	42.25	32.70	39.25
B	64QAM	5.0 MHz	-	42.20	32.70	39.20
Total			-	45.24	35.71	42.53
A	64QAM	10.0 MHz	-	42.53	33.06	42.53
B	64QAM	10.0 MHz	-	42.32	32.72	42.32
Total			-	45.44	35.90	45.44
A	64QAM	20.0 MHz	-	42.82	32.87	45.82
B	64QAM	20.0 MHz	-	42.97	32.96	45.97
Total			-	45.91	35.93	48.91

Configuration A3 Back-off Power (with Antenna)

Maximum Output Power 5 MHz (31.6 dBm), 10 MHz (34.6 dBm), 20 MHz (37.7 dBm)

Antenna	LTE Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			Channel Position T			
			PAR (dB)	Average Power		
				EIRP (dBm/10MHz)	dBm/MHz	EIRP per Bandwidth dBm
A	64QAM	5.0 MHz	-	41.19	32.76	38.19
B	64QAM	5.0 MHz	-	41.05	32.52	38.05
Total			-	44.13	35.65	41.13
A	64QAM	10.0 MHz	-	42.00	32.58	42.00
B	64QAM	10.0 MHz	-	41.72	32.38	41.72
Total			-	44.87	35.49	44.87
A	64QAM	20.0 MHz	-	42.60	32.94	45.60
B	64QAM	20.0 MHz	-	42.39	32.61	45.39
Total			-	45.51	35.79	48.51

Limit	
Maximum EIRP	<u>Category A CBSD</u> Maximum EIRP: 30 dBm/10 MHz Maximum PSD: 20 dBm/MHz <u>Category B CBSD</u> Maximum EIRP: 47 dBm/10 MHz Maximum PSD: 37 dBm/MHz
Peak to Average Ratio	13 dB



Product Service

2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049
FCC CFR 47 Part 96, Clause 96.41 (e)(3)

2.2.2 Date of Test and Modification State

11 April 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 20.8°C
Relative Humidity 50.7%

2.2.5 Test Method

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

The Spectrum Analyser RBW was configured to be at least 1% of the channel bandwidth of the carrier to be measured.

For 26dB Bandwidth, in accordance with KDB 971168 D01, a peak detector and a trace setting of Max Hold were used. The trace was allowed to stabilise. Using the Spectrum Analyser function, the 26 dB measurement result was obtained.

2.2.6 Test Results

Configuration A1

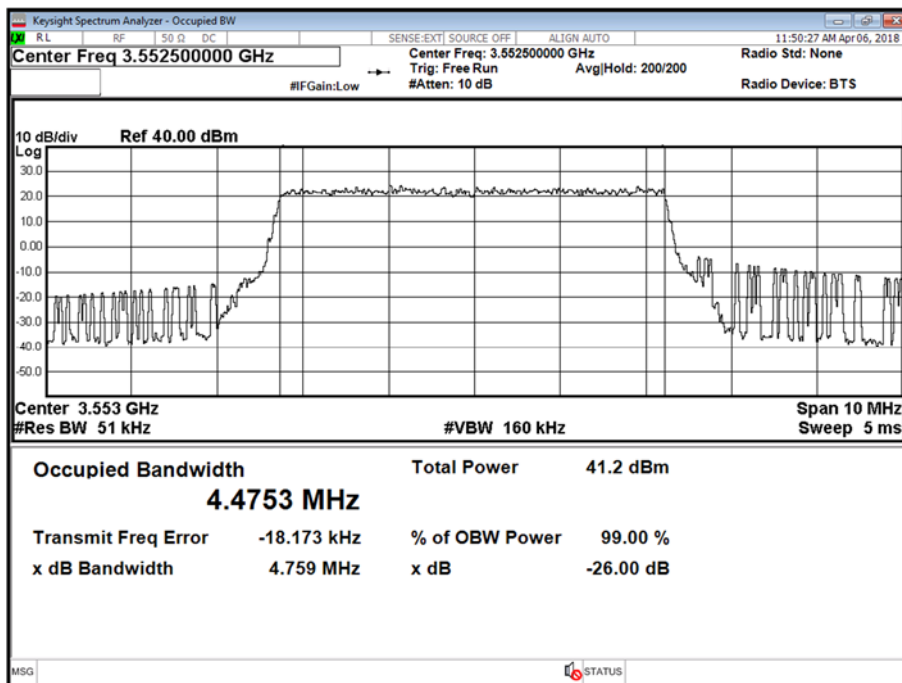
Maximum Output Power 40 dBm (5 MHz, 34 dBm)

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	64QAM	5.0 MHz	4,475.34	4,758.54	4,487.80	4,799.50	4,488.32	4,787.49
B	64QAM	5.0 MHz	4,484.86	4,788.48	4,487.03	4,795.21	4,489.74	4,805.04
A	64QAM	10.0 MHz	8,951.18	9,538.35	8,960.10	9,549.70	8,955.93	9,547.77
B	64QAM	10.0 MHz	8,950.64	9,903.81	8,948.57	9,778.93	8,946.88	9,707.50
A	64QAM	20.0 MHz	17,892.99	19,072.81	17,904.00	19,040.67	17,896.78	19,071.84
B	64QAM	20.0 MHz	17,867.09	18,986.51	17,884.64	19,007.55	17,868.07	19,080.97

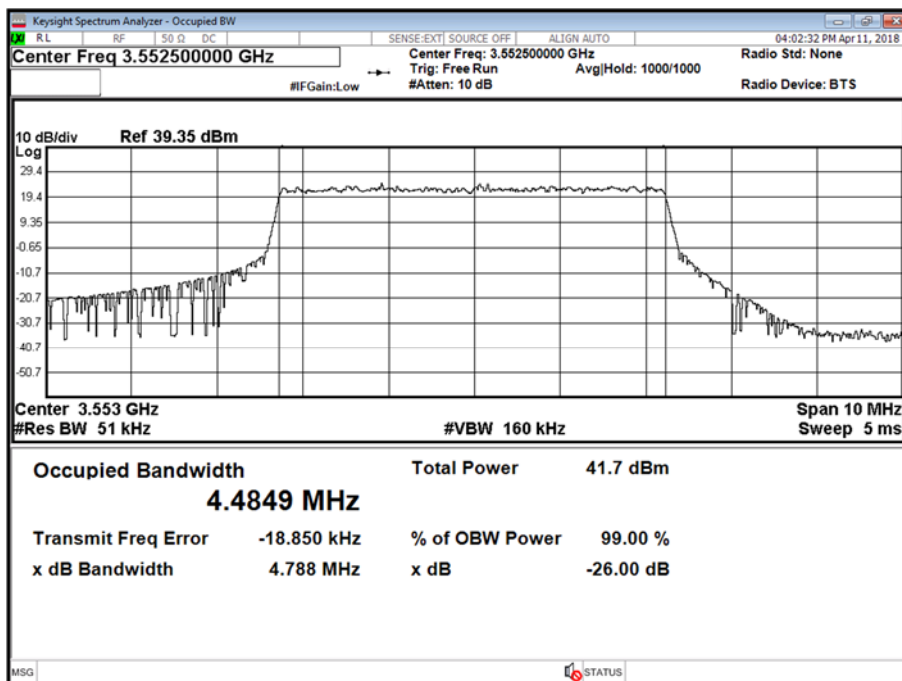


Product Service

Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



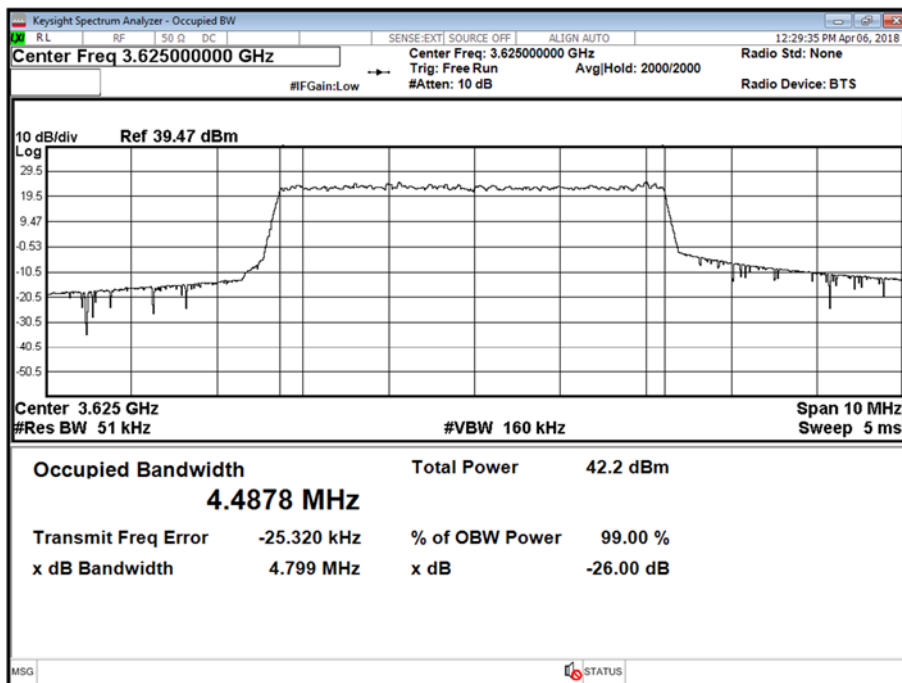
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position B



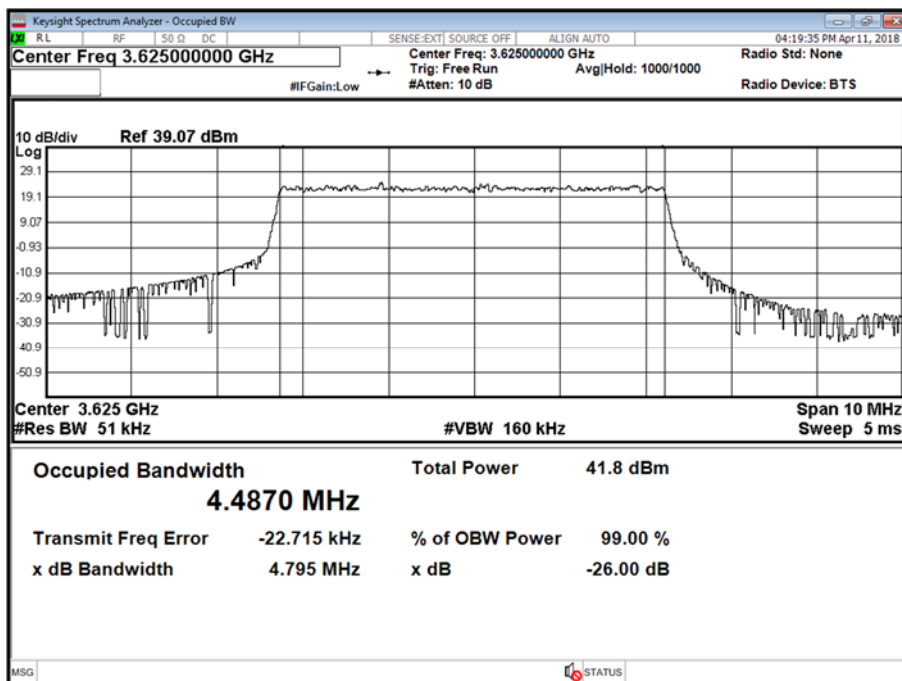


Product Service

Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



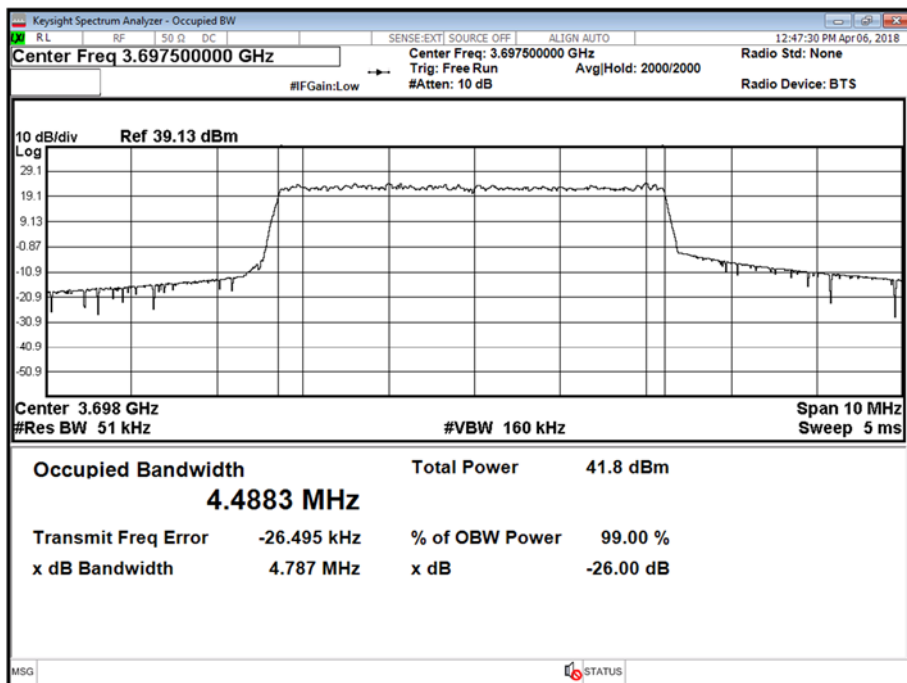
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position M



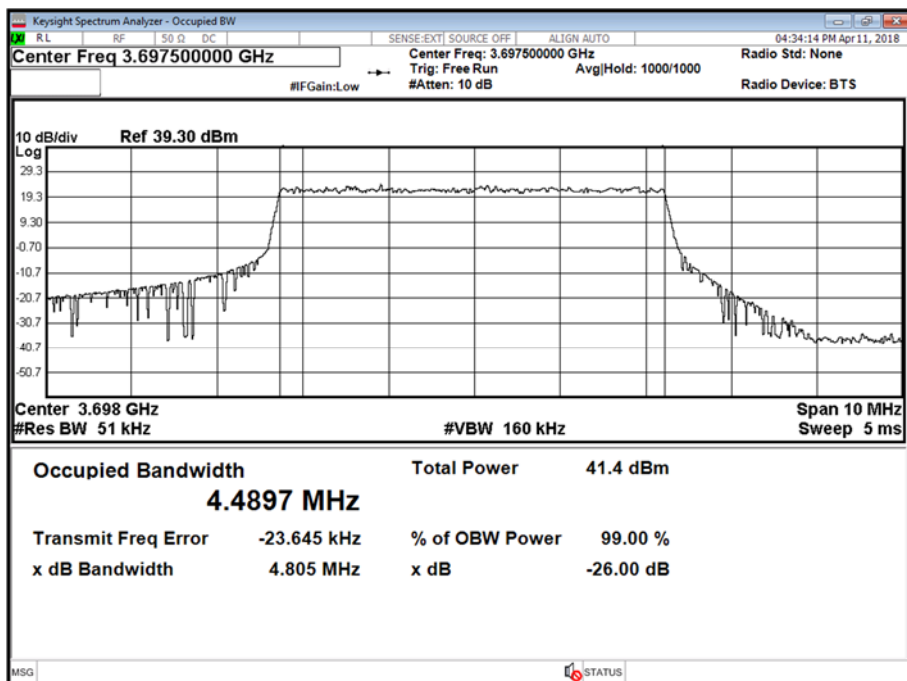


Product Service

Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



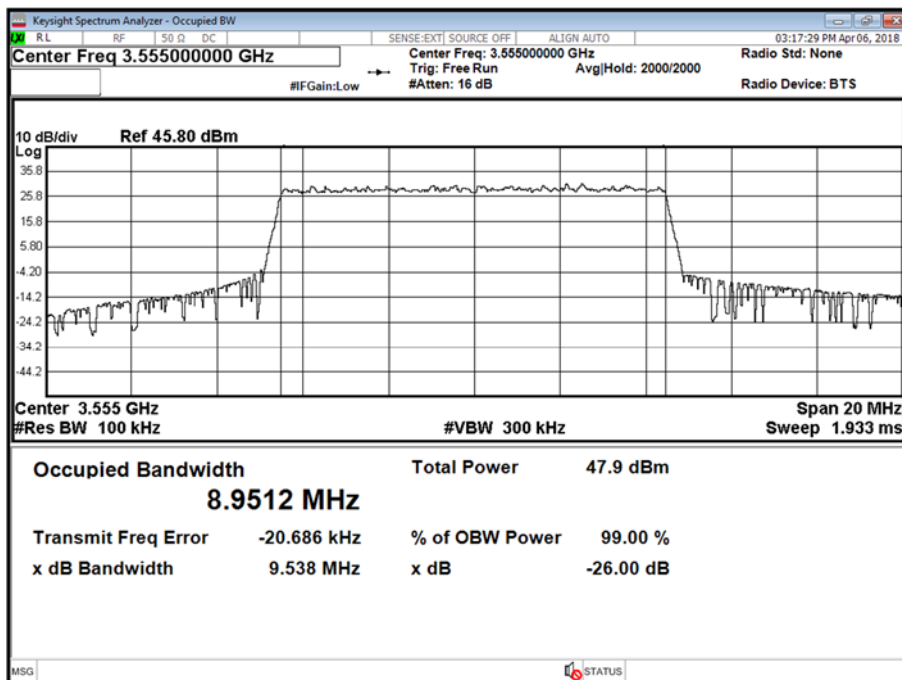
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 5.0 MHz - Channel Position T



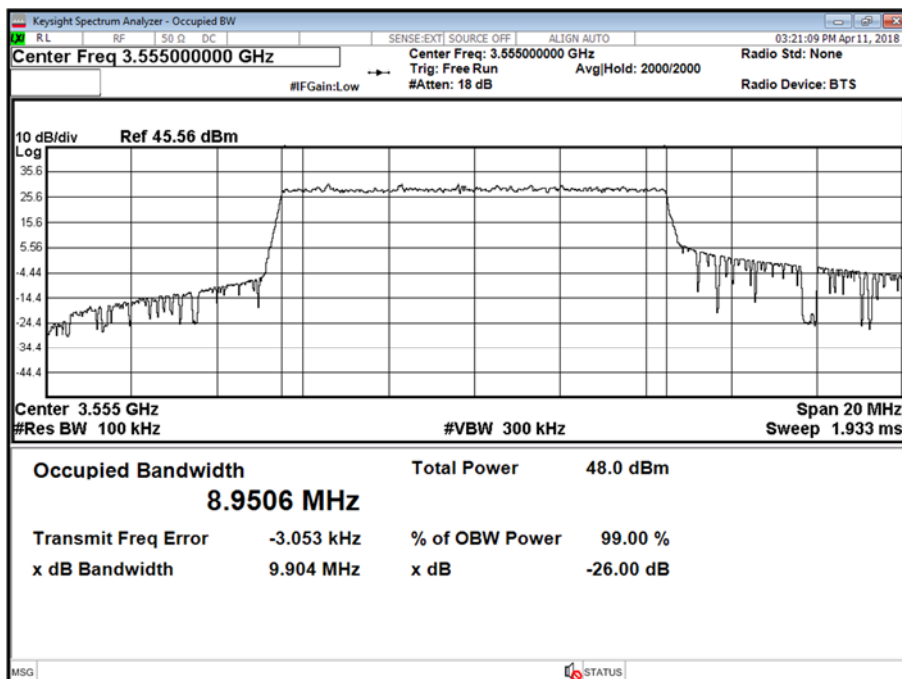


Product Service

Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position B



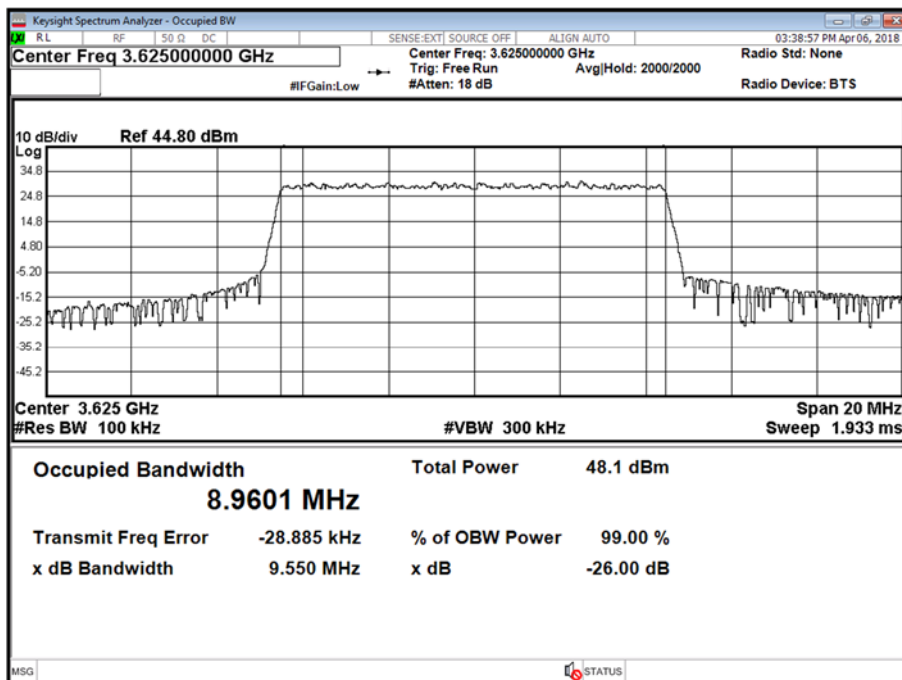
Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position B





Product Service

Antenna A - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position M



Antenna B - LTE Modulation 64QAM - LTE Carrier Bandwidth 10.0 MHz - Channel Position M

