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Report On

FCC Testing of the Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS in accordance with FCC 47 CFR Part 27 and FCC 47 CFR Part 2 (LTE FDD 17)

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00235

Document 75933620 Report 13 Issue 1 **May 2016**

Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

REPORT ON

FCC Testing of the Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS in accordance with FCC 47 CFR Part 27 and FCC 47 CFR Part 2 (LTE FDD 17)

Document 75933620 Report 13 Issue 1

May 2016

PREPARED FOR

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PREPARED BY

Natalie Bennett
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APPROVED BY

Stephen Milliken
Authorised Signatory

DATED 16 May 2016

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 limited compliance with FCC 47 CFR Part 27 and FCC 47 CFR Part 2. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

M Russell T Guy

UKAS TESTING 0141

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 27 and FCC 47 CFR Part 2 (LTE FDD 17)

Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS to the requirements of FCC 47 CFR Part 27 and FCC 47 CFR Part 2.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Sharp Corporation
Serial Number(s)	IMEI 004401115744563 IMEI 004401115744076
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 27 (2015) FCC 47 CFR Part 2 (2015)
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	10792 16 March 2016
Start of Test	20 April 2016
Finish of Test	27 April 2016
Name of Engineer(s)	M Russell T Guy
Related Document(s)	ANSI C63.4 (2014) ANSI TIA-603-C (2004)

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 27 and FCC 47 CFR Part 2 is shown below.

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 27	Part 2			
LTE FDD17					
2.1	27.50	2.1046	Maximum Conducted Output Power	Pass	
2.2	27.53	2.1049	Emission Limitations	Pass	
2.3	27.53	2.1051	Spurious Emissions at Antenna Terminals	Pass	
2.4	27.53 (h)	2.1051	Spurious Emissions at Band Edge	Pass	
2.5	27.53 (h)(3)	2.1051	26 dB Bandwidth	Pass	
2.6	27.54	2.1055	Frequency Stability	Pass	
2.7	-	2.1047 (d)	Modulation Characteristics	Pass	

Product Service

1.3 PRODUCT TECHNICAL DESCRIPTION

Refer to Model Description APYHRO00235 Rev 4.0 document.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS. A full technical description can be found in the manufacturer's documentation.

1.5 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.

The EUT was powered from a 4.0 V DC supply.

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

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard were made during testing.

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 27 and FCC 47 CFR Part 2 (LTE FDD 17)

Product Service

2.1 MAXIMUM CONDUCTED OUTPUT POWER

2.1.1 Specification Reference

FCC 47 CFR Part 27, Clause 27.50
FCC 47 CFR Part 2, Clause 2.1046

2.1.2 Equipment Under Test and Modification State

S/N: IMEI 004401115744563 - Modification State 0

2.1.3 Date of Test

21 April 2016

2.1.4 Test Equipment Used

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

2.1.5 Test Procedure

Carrier power measurements were performed in accordance with KDB 971168 D01 v02r02, Clause 5.2.1

Peak to average ratio measurements were performed in accordance with KDB 971168 D01 v02r02, Clause 5.7.1

Remarks

The antenna gain was declared by the manufacturer as 2.0 dBi. As per KDB 412172 D01 v01r01 carrier power results are recorded in ERP therefore reported results are calculated as per the following calculation:

ERP = Pout (dBm) + ANT Gain (dBi) - 2.15 (dB).

2.1.6 Environmental Conditions

Ambient Temperature	25.0°C
Relative Humidity	28.5%

Product Service

2.1.7 Test Results

4.0 V DC Supply

LTE FDD17, Maximum Average Conducted Output Power Results
5.0 MHz Bandwidth - QPSK

Resource Block Allocation	Resource Block Offset	Carrier Power – ERP (dBm)		
		706.5 MHz	710.0 MHz	713.5 MHz
1	Low	23.03	23.24	22.87
1	Mid	23.53	23.11	23.24
1	High	22.70	22.85	22.95
12	Low	21.91	22.00	22.04
12	Mid	21.83	22.00	22.01
12	High	22.00	22.08	21.95
25	-	21.89	21.97	21.99

5.0 MHz Bandwidth - 16-QAM

Resource Block Allocation	Resource Block Offset	Carrier Power – ERP (dBm)		
		706.5 MHz	710.0 MHz	713.5 MHz
1	Low	21.89	21.56	21.41
1	Mid	21.93	22.00	22.11
1	High	21.21	21.30	21.43
12	Low	21.05	20.62	20.74
12	Mid	21.12	20.83	20.49
12	High	21.11	20.74	20.67
25	-	20.98	20.97	20.75

10.0 MHz Bandwidth - QPSK

Resource Block Allocation	Resource Block Offset	Carrier Power – ERP (dBm)		
		709.0 MHz	710.0 MHz	711.0 MHz
1	Low	23.18	22.71	22.81
1	Mid	22.92	22.92	22.65
1	High	22.90	22.95	22.98
25	Low	22.01	21.95	22.06
25	Mid	22.01	21.92	22.10
25	High	21.81	21.85	22.05
50	-	21.99	22.01	21.81

10.0 MHz Bandwidth - 16-QAM

Resource Block Allocation	Resource Block Offset	Carrier Power – ERP (dBm)		
		709.0 MHz	710.0 MHz	711.0 MHz
1	Low	21.68	21.38	21.73
1	Mid	22.05	21.60	21.96
1	High	22.17	21.10	21.88
25	Low	21.06	20.82	21.00
25	Mid	20.78	20.89	20.78
25	High	20.93	20.81	20.94
50	-	20.92	20.68	20.76

FCC 47 CFR Part 27, Limit Clause 27.50 (c)(3)

Fixed, Mobile and Portable Stations: <3 W

Product Service

2.2 EMISSION LIMITATIONS

2.2.1 Specification Reference

FCC 47 CFR Part 27, Clause 27.53
FCC 47 CFR Part 2, Clause 2.1049

2.2.2 Equipment Under Test and Modification State

S/N: IMEI 004401115744076 - Modification State 0

2.2.3 Date of Test w

23 April 2016

2.2.4 Test Equipment Used

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

2.2.5 Test Procedure

The test procedure was performed in accordance with ANSI 63.26.

Remarks

The EUT charger was supplied with 110 V 60 Hz to maintain battery charge during testing. EUT height below 1 GHz was 80 cm, above 1 GHz was 150 cm.

2.2.6 Environmental Conditions

Ambient Temperature	19.5°C
Relative Humidity	32.5%

Product Service

2.2.7 Test Results

4.0 V DC Supply

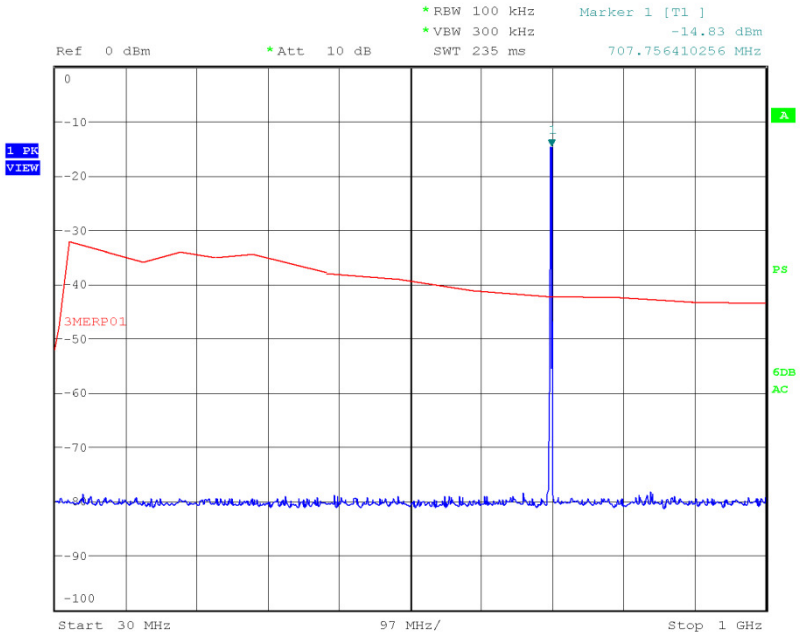
LTE FDD17, Radiated Spurious Emisisons Results

5.0 MHz Bandwidth – QPSK

706.5 MHz

1 Resource Block - Mid

30 MHz to 1 GHz



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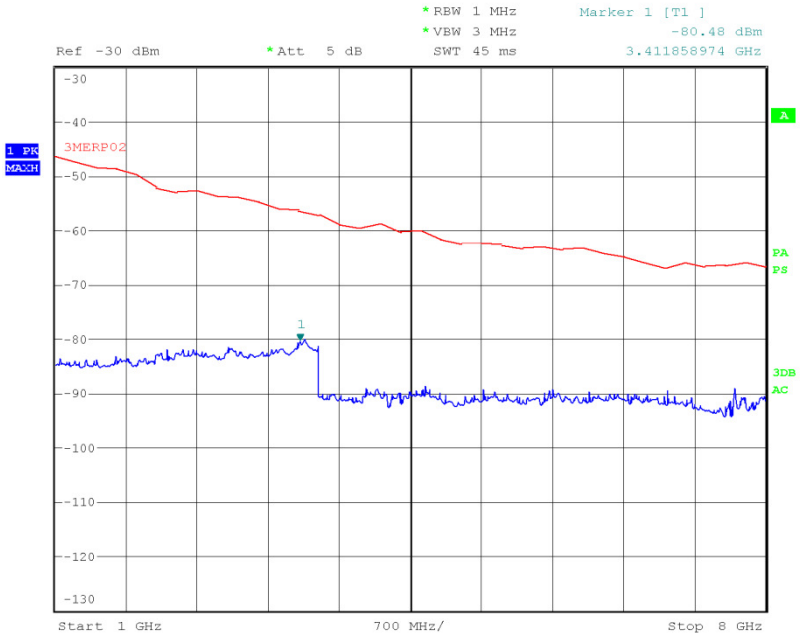
Product Service

1 GHz to 8 GHz



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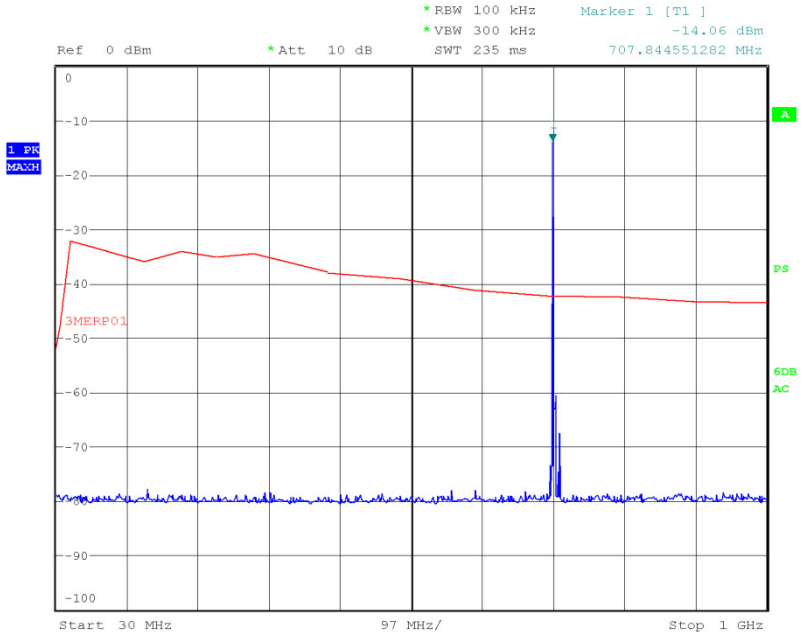
710.0 MHz

1 Resource Block – Low

30 MHz to 1 GHz



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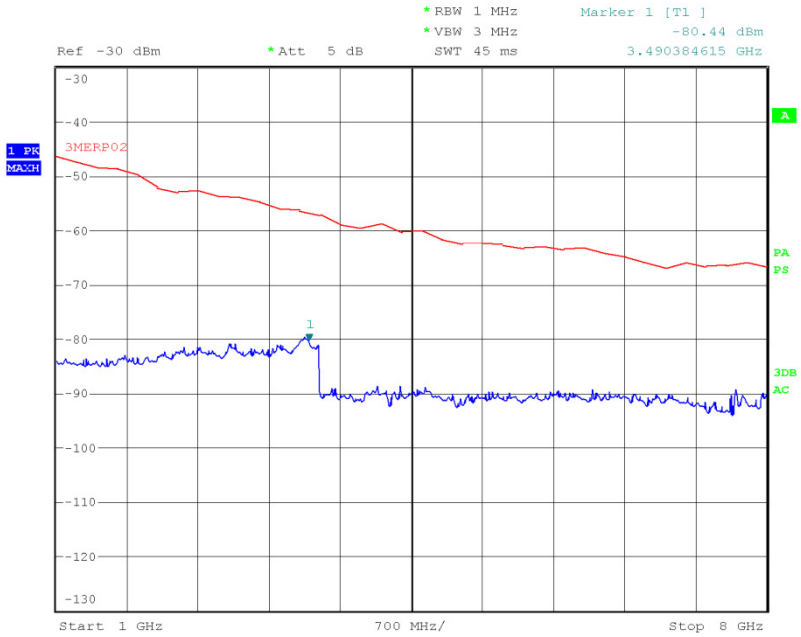
1 GHz to 8 GHz



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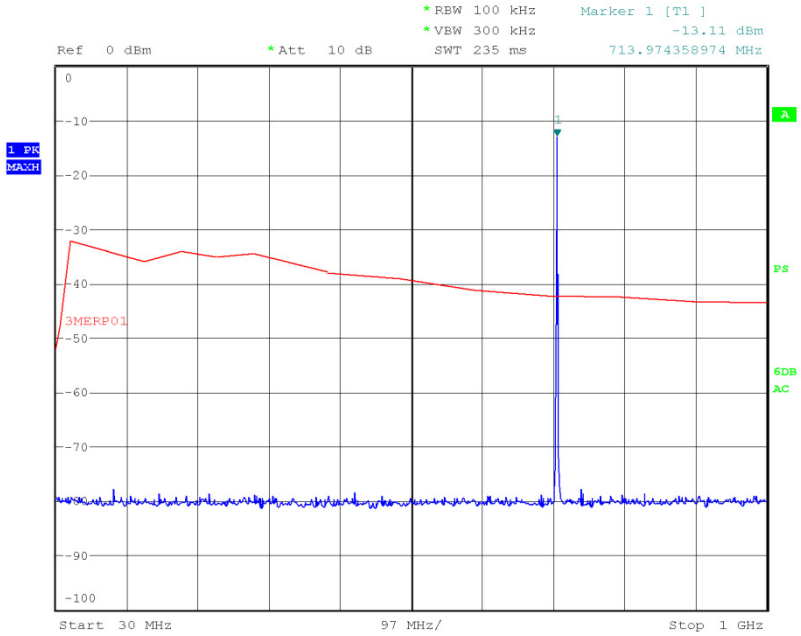
713.5 MHz

1 Resource Block – Mid

30 MHz to 1 GHz



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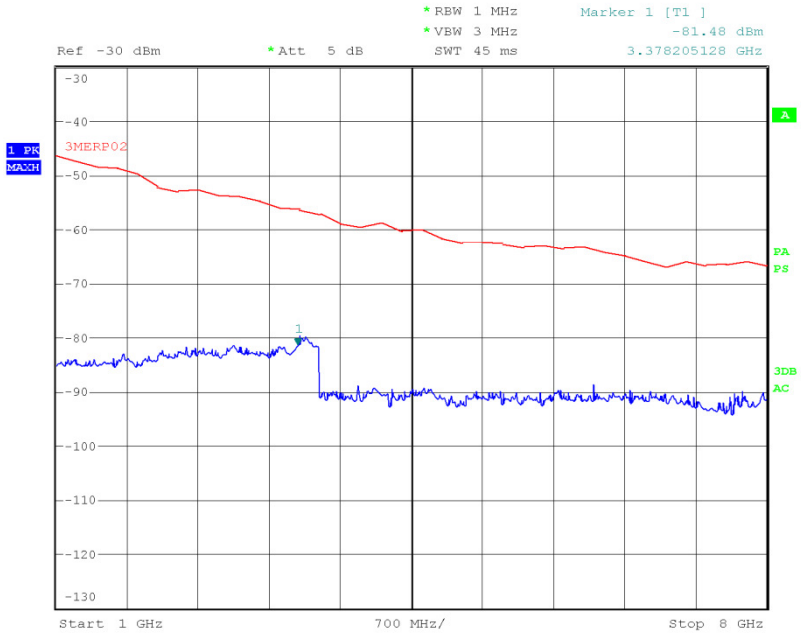
1 GHz to 8 GHz



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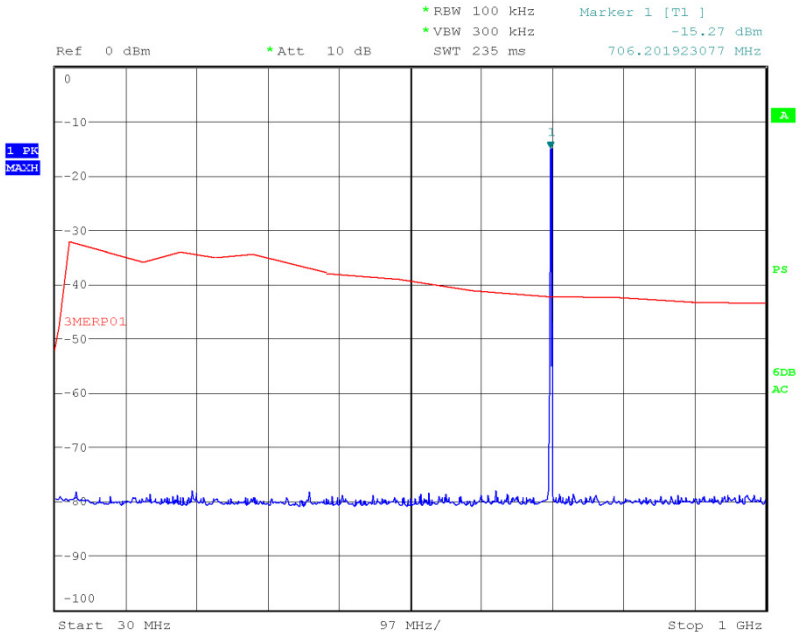
Product Service

5.0 MHz Bandwidth – 16QAM

706.5 MHz

1 Resource Block – Mid

30 MHz to 1 GHz



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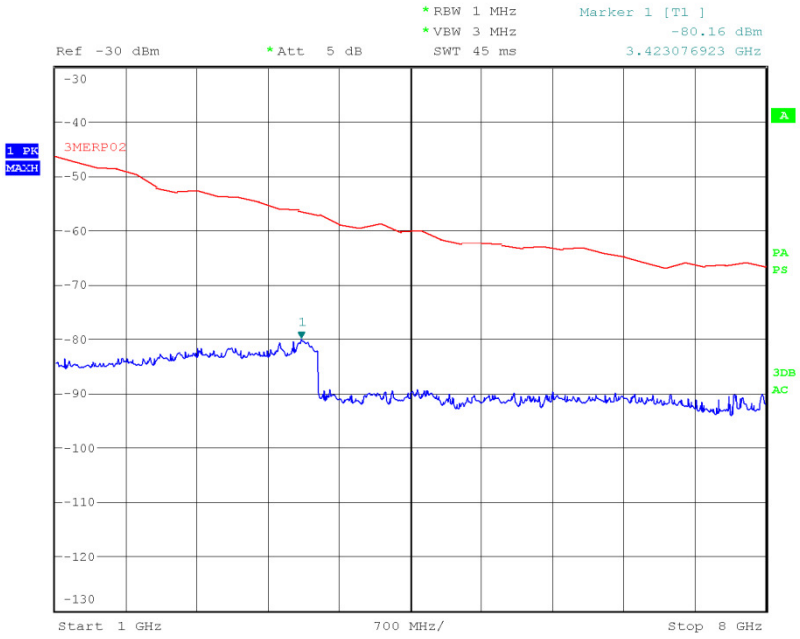
Product Service

1 GHz to 8 GHz



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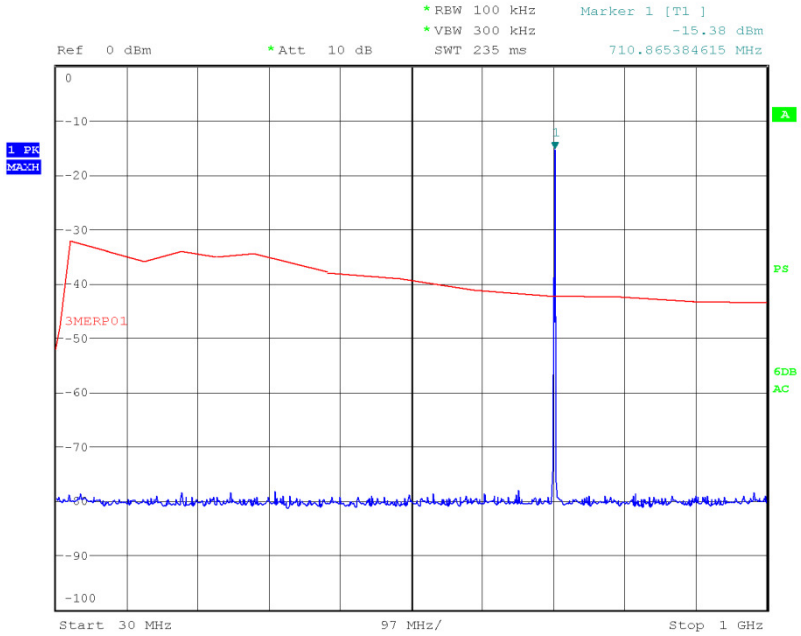
710.0 MHz

1 Resource Block – Mid

30 MHz to 1 GHz



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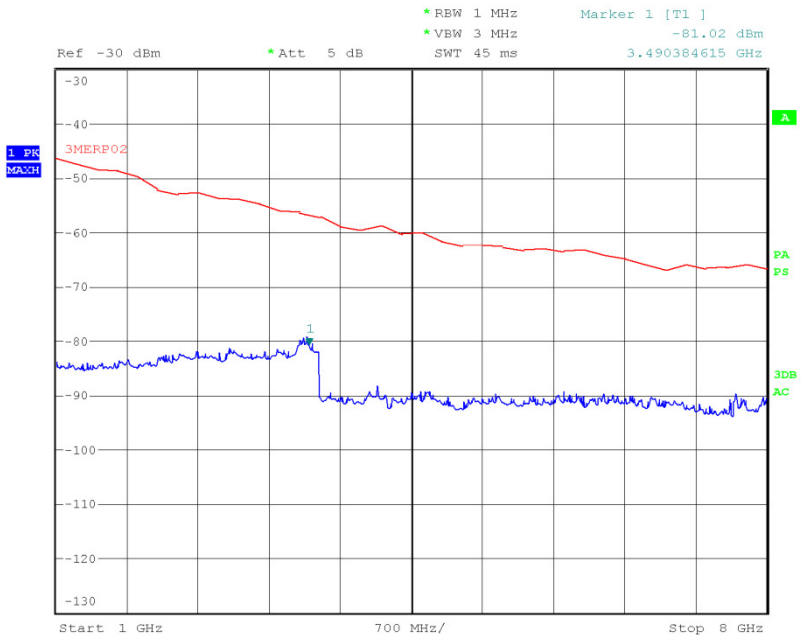
1 GHz to 8 GHz



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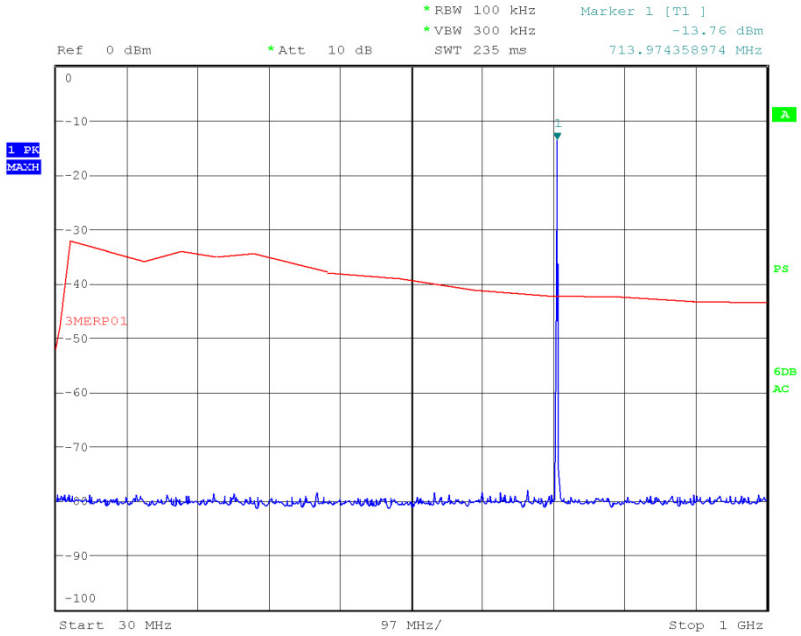
Product Service

713.5 MHz

1 Resource Block – Mid

30 MHz to 1 GHz



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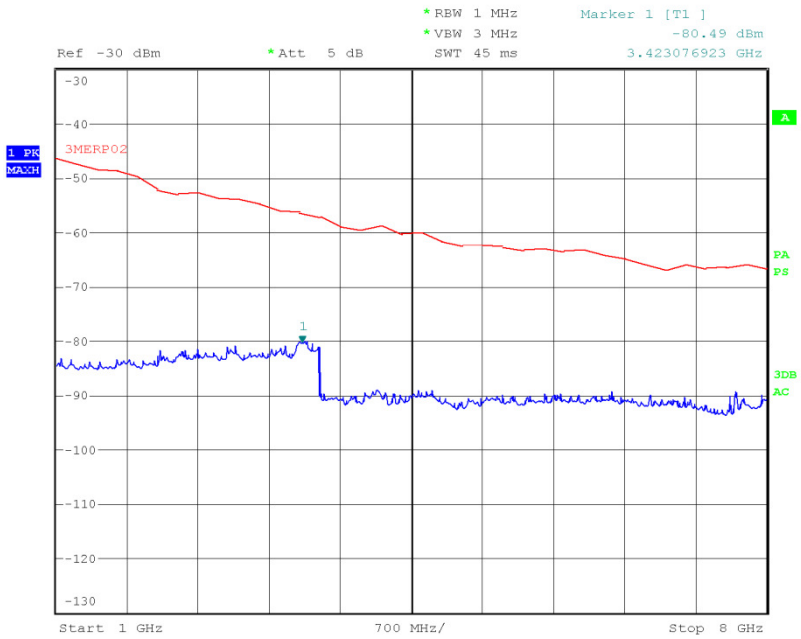
1 GHz to 8 GHz



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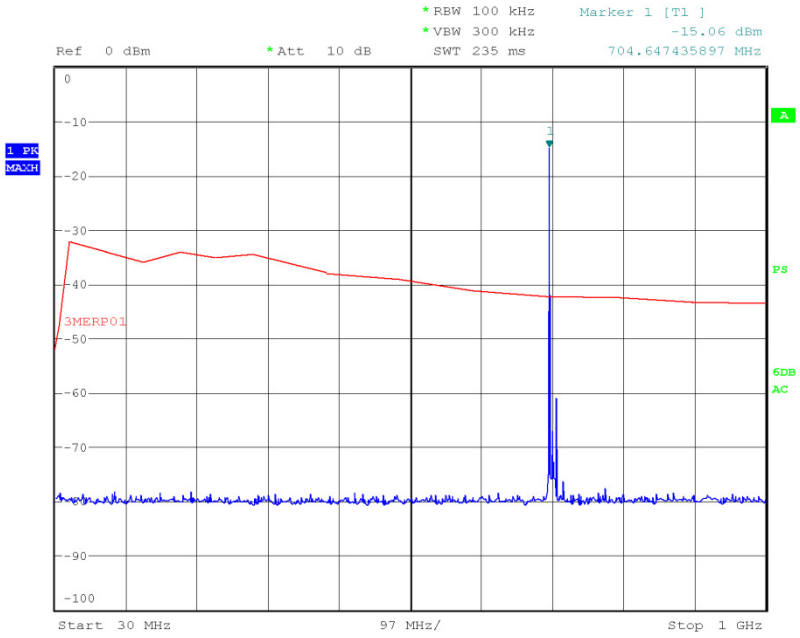
Product Service

10.0 MHz Bandwidth – QPSK

709.0 MHz

1 Resource Block – Low

30 MHz to 1 GHz



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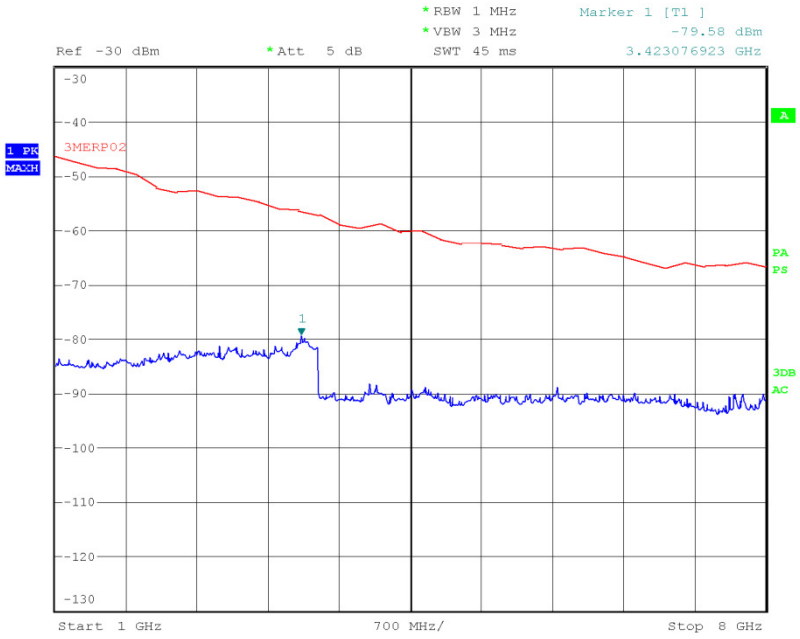
Product Service

1 GHz to 8 GHz



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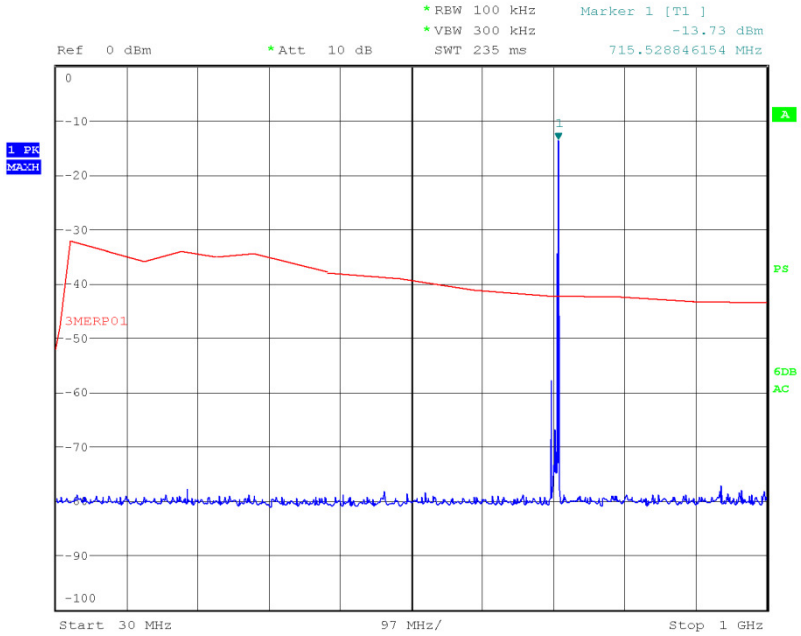
710.0 MHz

1 Resource Block – High

30 MHz to 1 GHz



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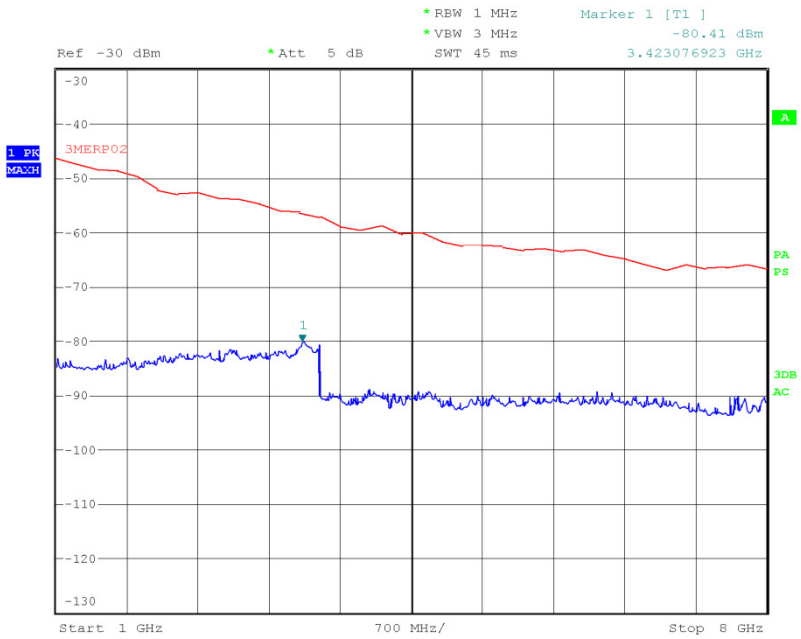
1 GHz to 8 GHz



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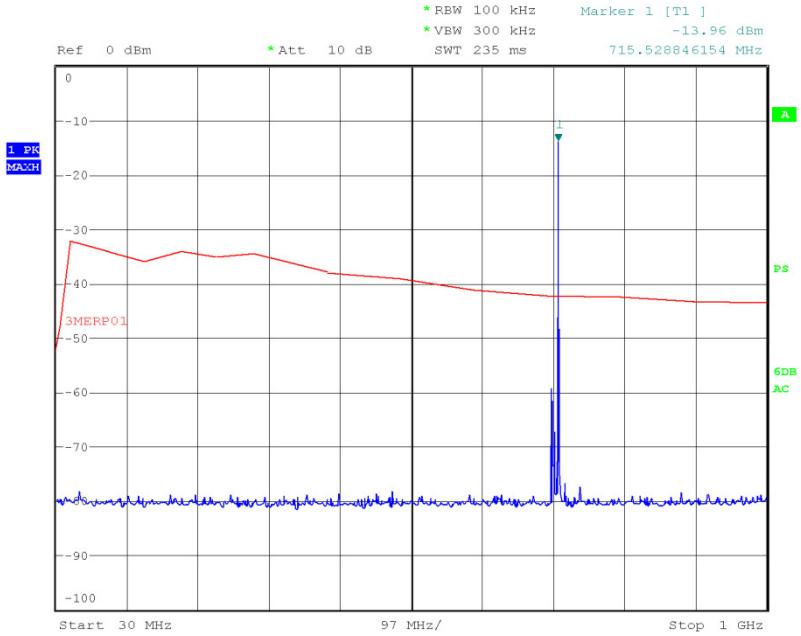
711.0 MHz

1 Resource Block – High

30 MHz to 1 GHz



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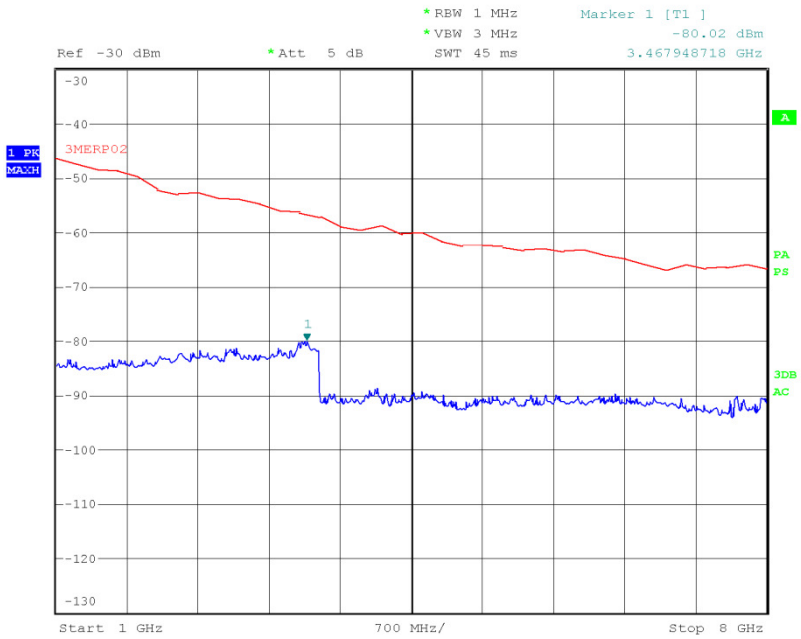
1 GHz to 8 GHz



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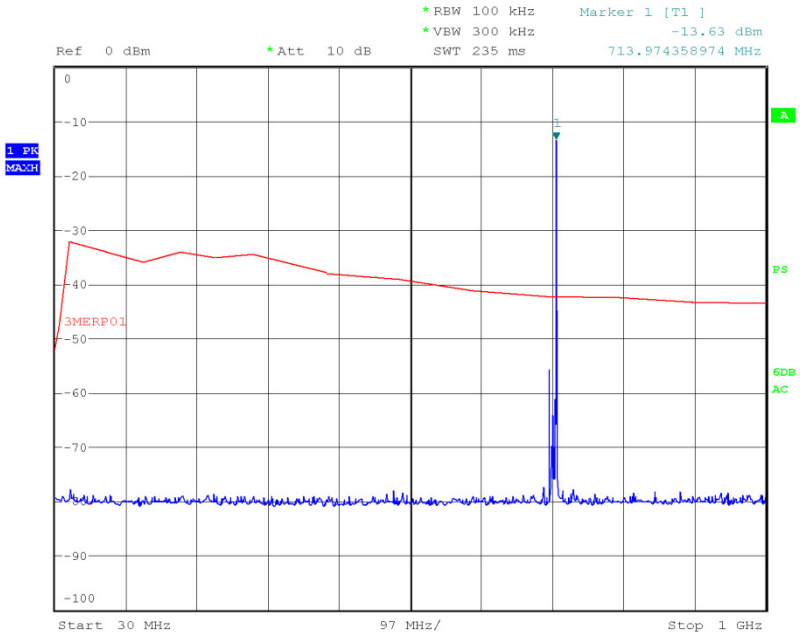
10.0 MHz Bandwidth – 16QAM

709.0 MHz

1 Resource Block – High

30 MHz to 1 GHz



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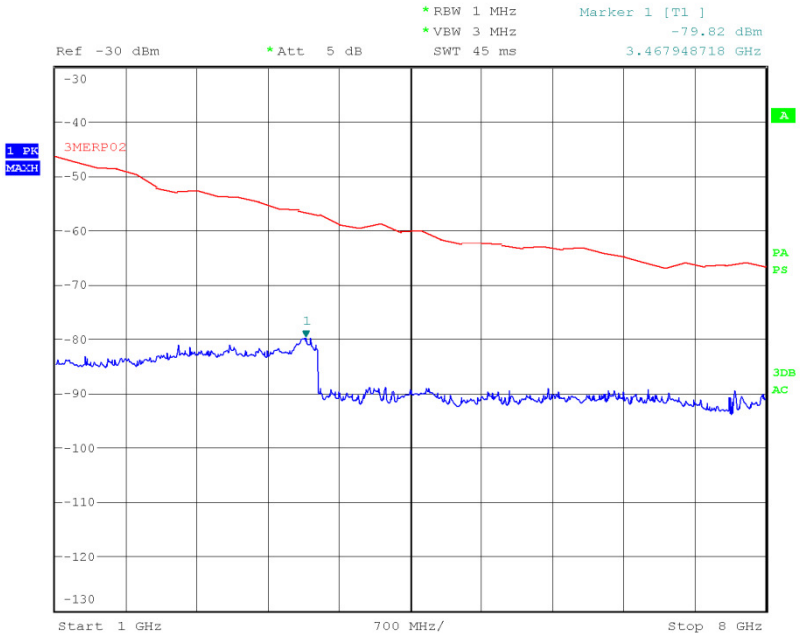
Product Service

1 GHz to 8 GHz



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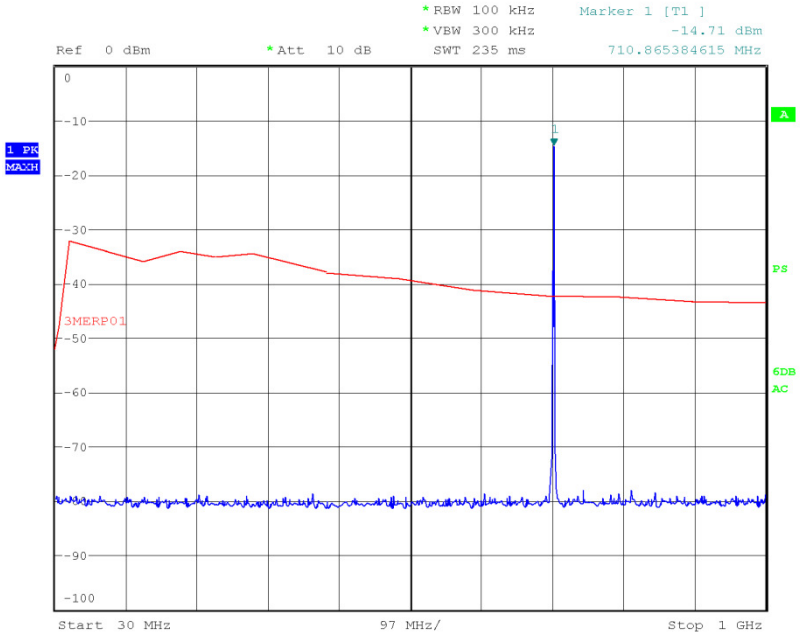
710.0 MHz

1 Resource Block – Mid

30 MHz to 1 GHz



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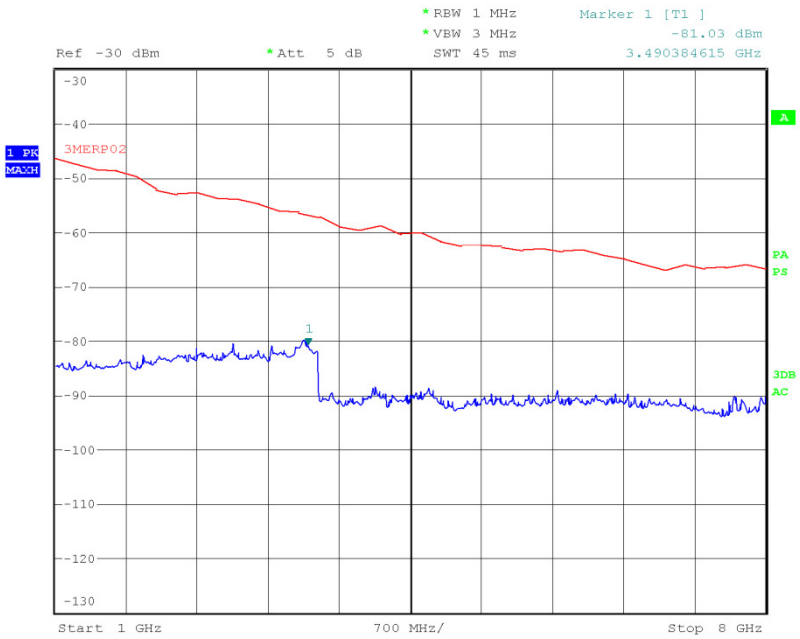
1 GHz to 8 GHz



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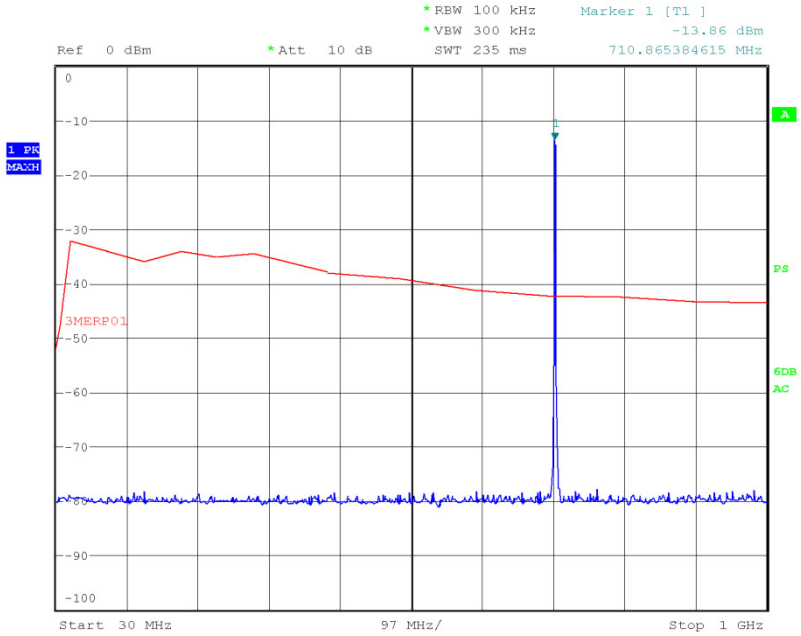
711.0 MHz

1 Resource Block – Mid

30 MHz to 1 GHz



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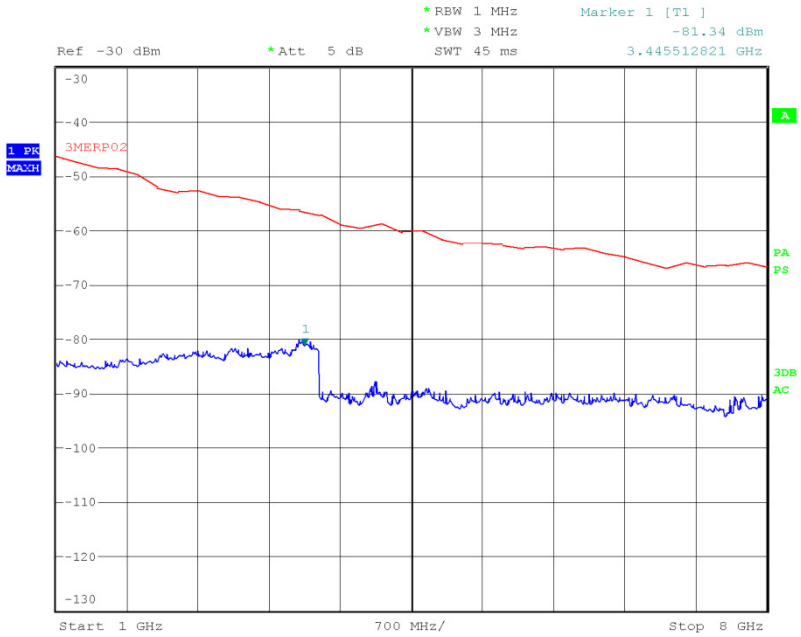
1 GHz to 8 GHz



Date: 23.APR.2016 22:21:28

FCC 47 CFR Part 27, Limit Clause 27.53 (g)

-13 dBm

Product Service

2.3 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

2.3.1 Specification Reference

FCC 47 CFR Part 27, Clause 27.53
FCC 47 CFR Part 2, Clause 2.1051

2.3.2 Equipment Under Test and Modification State

S/N: IMEI 004401115744563 - Modification State 0

2.3.3 Date of Test

23 April 2016

2.3.4 Test Equipment Used

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

2.3.5 Test Procedure

The test was performed in accordance with KDB 971168 D01 v02r02, Clause 6.

Remarks

Testing was only performed in the resource block configuration resulting in the highest conducted output power for each channel, bandwidth and modulation.

2.3.6 Environmental Conditions

Ambient Temperature	24.8°C
Relative Humidity	26.9%

Product Service

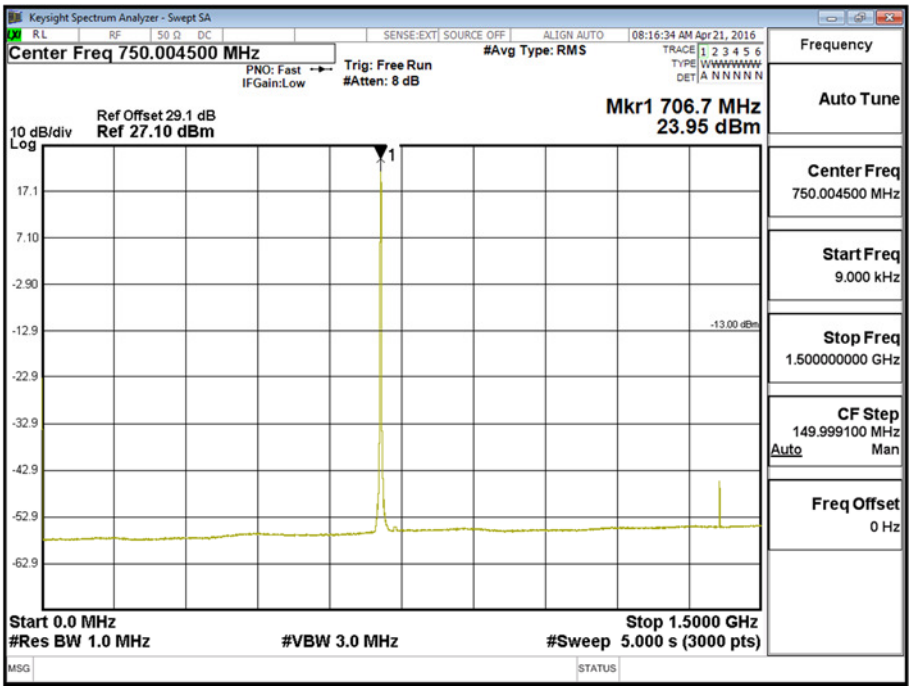
2.3.7 Test Results

4.0 V DC Supply

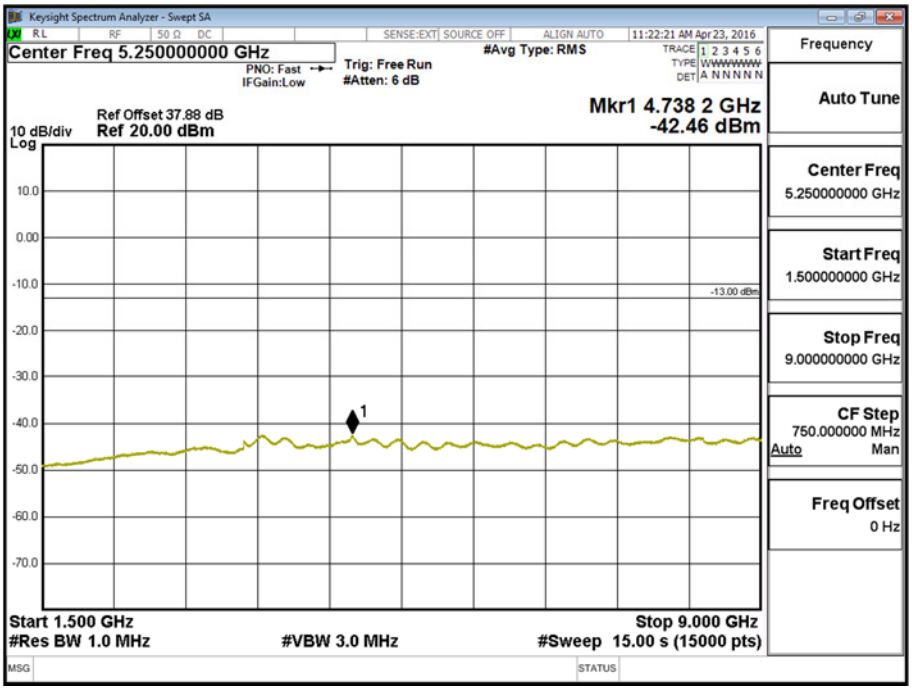
LTE FDD17, Spurious Emissions at Antenna Terminals Results

5.0 MHz Bandwidth - QPSK

706.5 MHz - 1 Resource Block – Mid – 9 kHz to 1.5 GHz



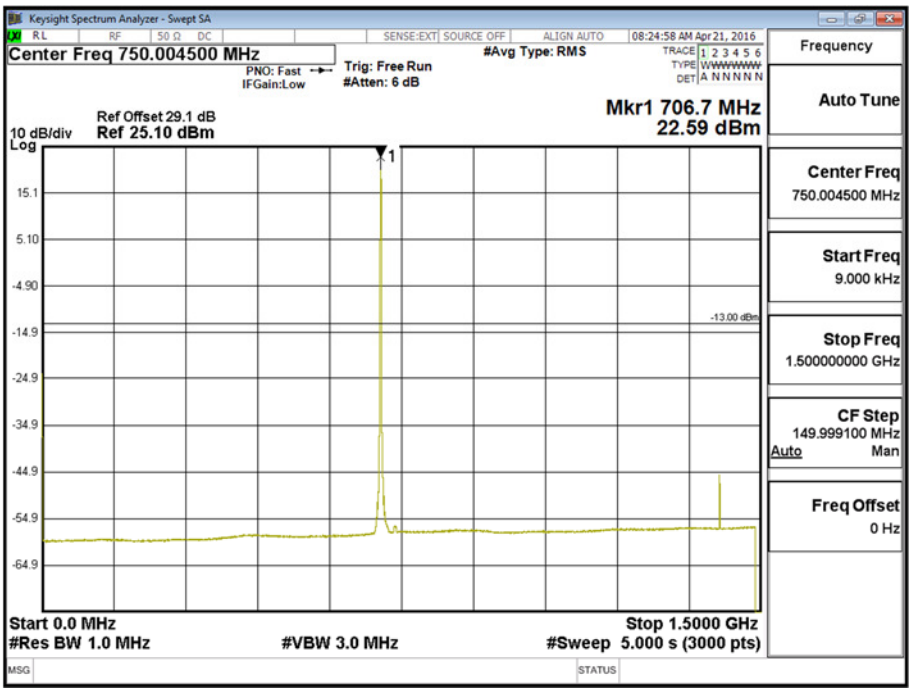
706.5 MHz - 1 Resource Block – Mid – 1.5 GHz to 9.0 GHz



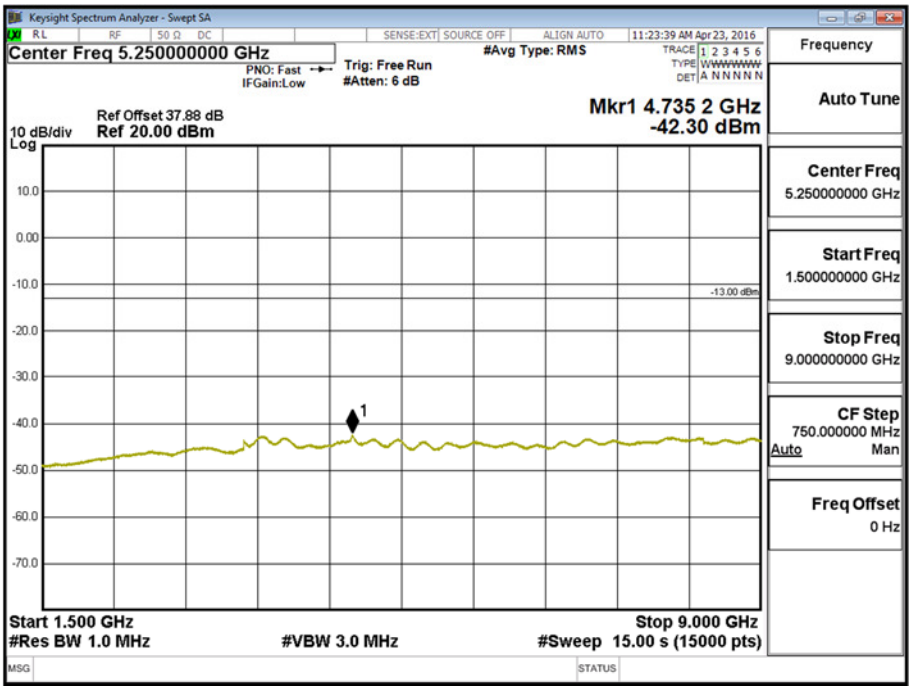
Product Service

5.0 MHz Bandwidth - 16QAM

706.5 MHz - 1 Resource Block – Mid – 9 kHz to 1.5 GHz



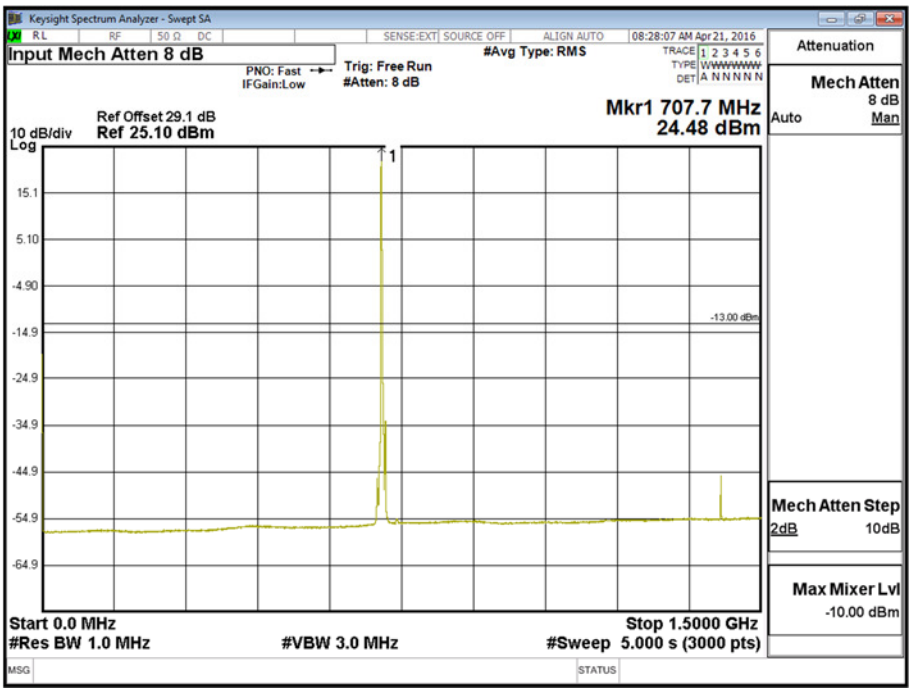
706.5 MHz - 1 Resource Block – Mid – 1.5 GHz to 9.0 GHz



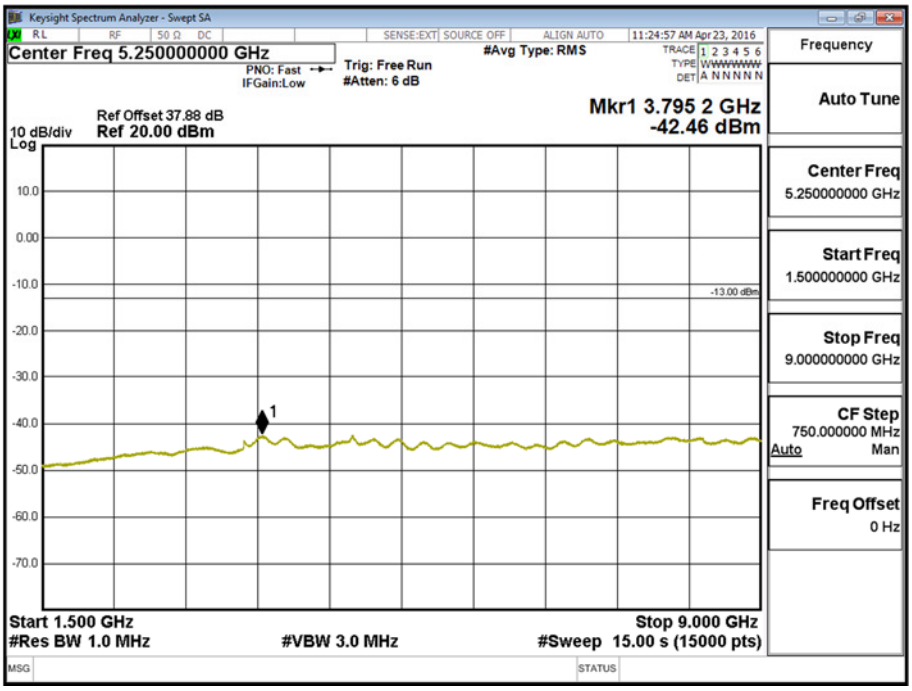
Product Service

5.0 MHz Bandwidth - QPSK

710.0 MHz - 1 Resource Block - Low – 9 kHz to 1.5 GHz



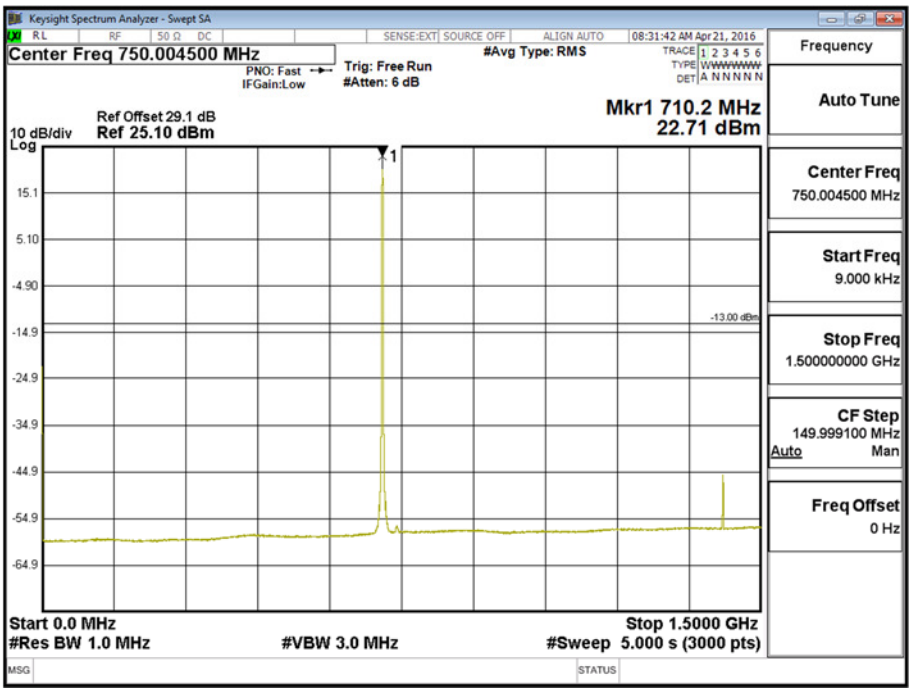
710.0 MHz - 1 Resource Block - Low – 1.5 GHz to 9.0 GHz



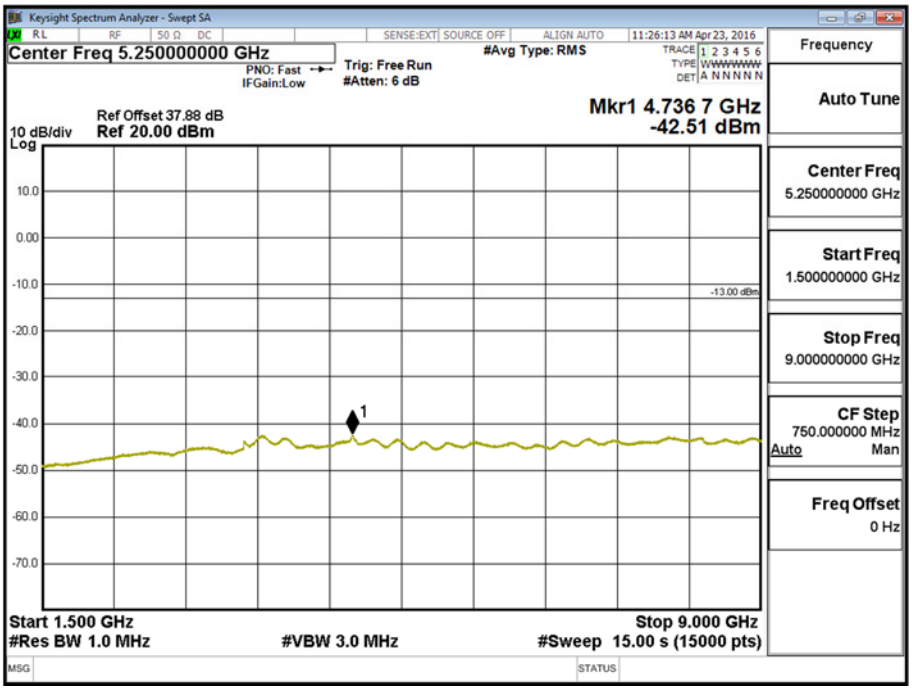
Product Service

5.0 MHz Bandwidth - 16QAM

710.0 MHz - 1 Resource Block - Mid – 9 kHz to 1.5 GHz



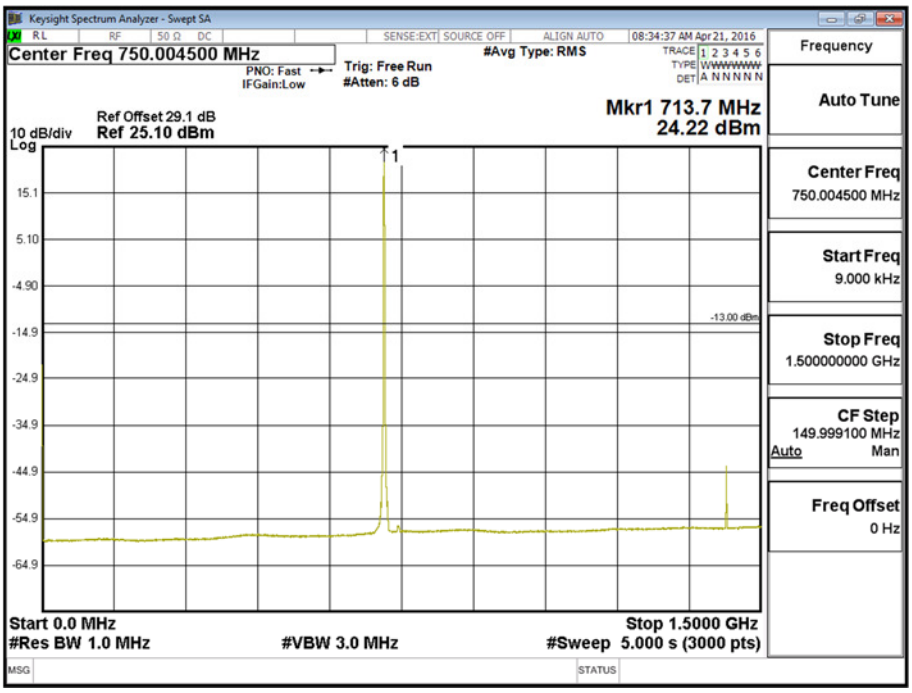
710.0 MHz - 1 Resource Block - Mid – 1.5 GHz to 9.0 GHz



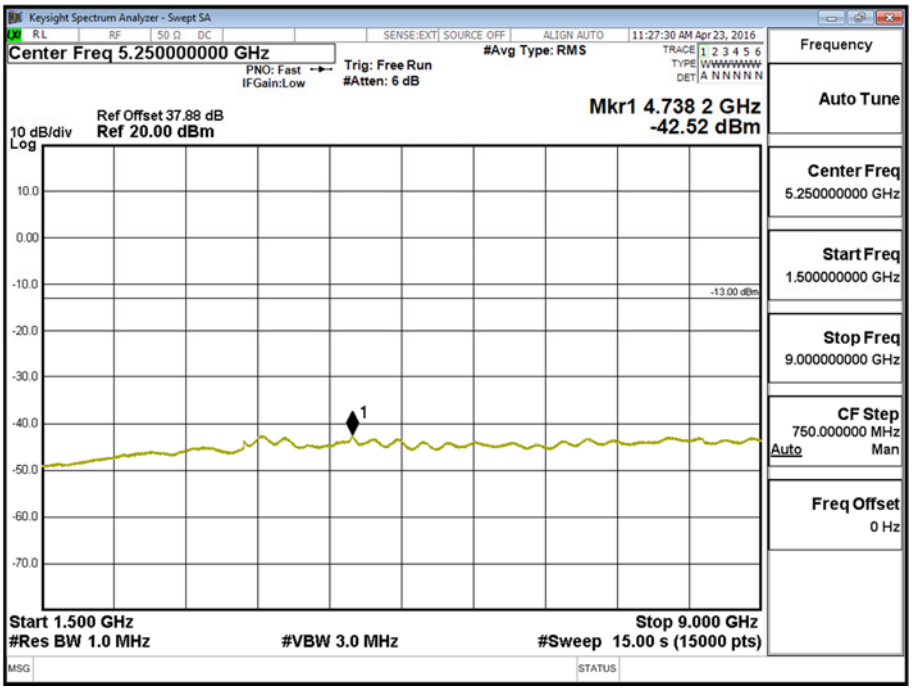
Product Service

5.0 MHz Bandwidth - QPSK

713.5 MHz - 1 Resource Block - Mid – 9 kHz to 1.5 GHz



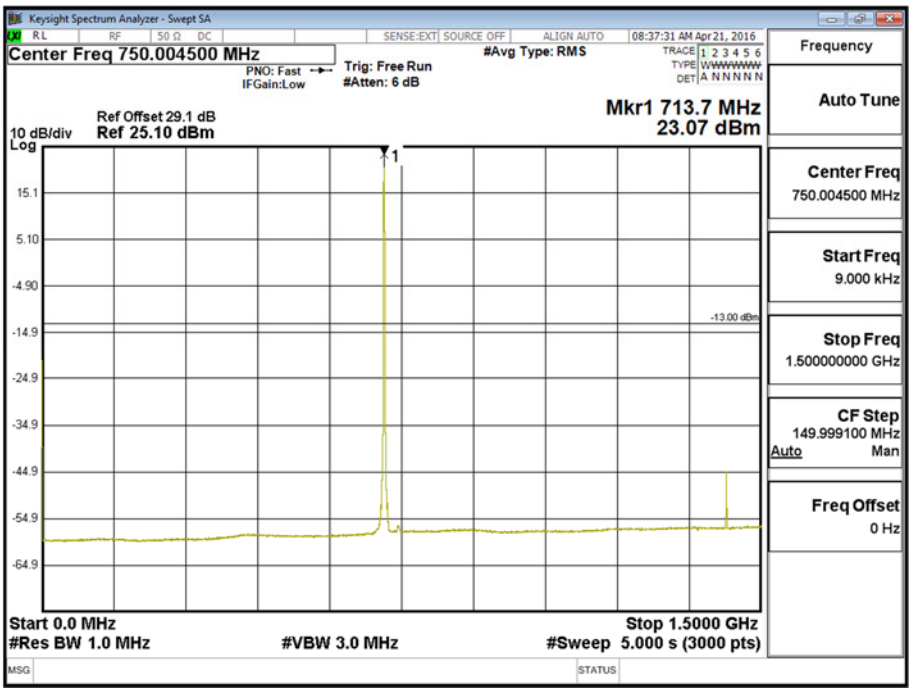
713.5 MHz - 1 Resource Block - Mid – 9 kHz to 1.5 GHz



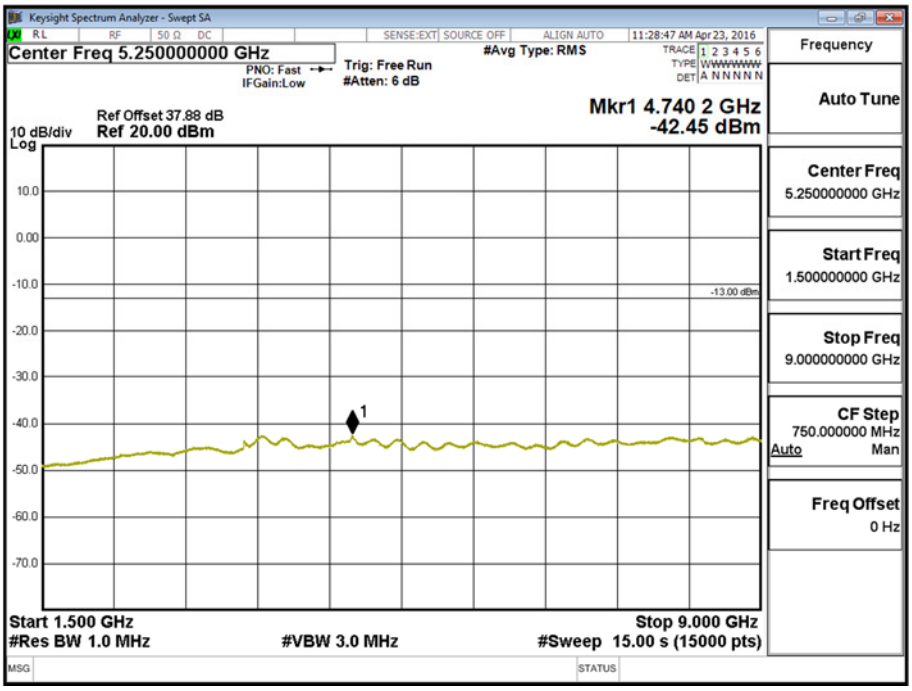
Product Service

5.0 MHz Bandwidth - 16QAM

713.5 MHz - 1 Resource Block - Mid – 9 kHz to 1.5 GHz



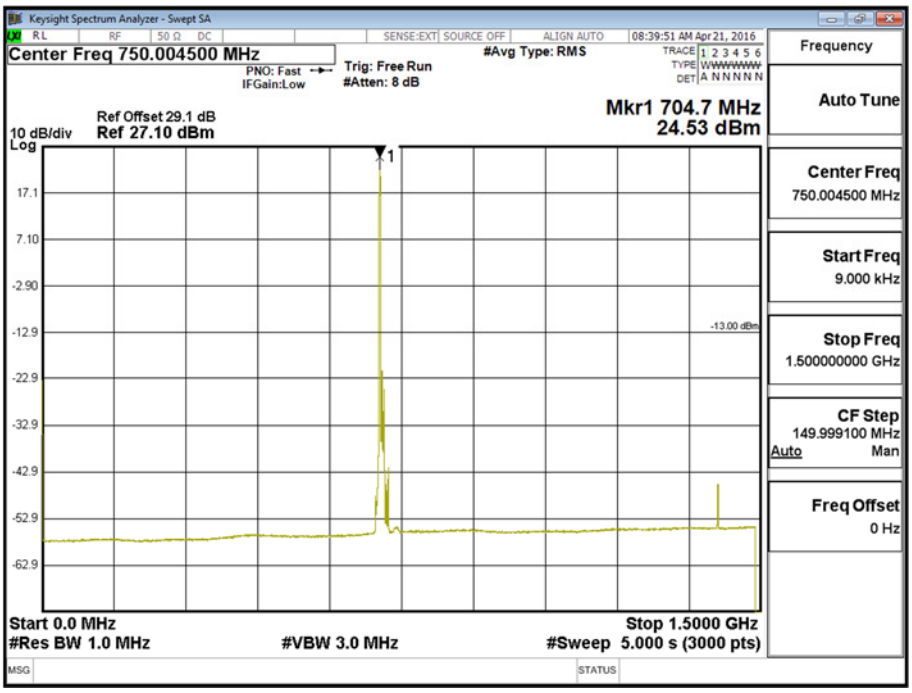
713.5 MHz - 1 Resource Block - Mid – 1.5 GHz to 9.0 GHz



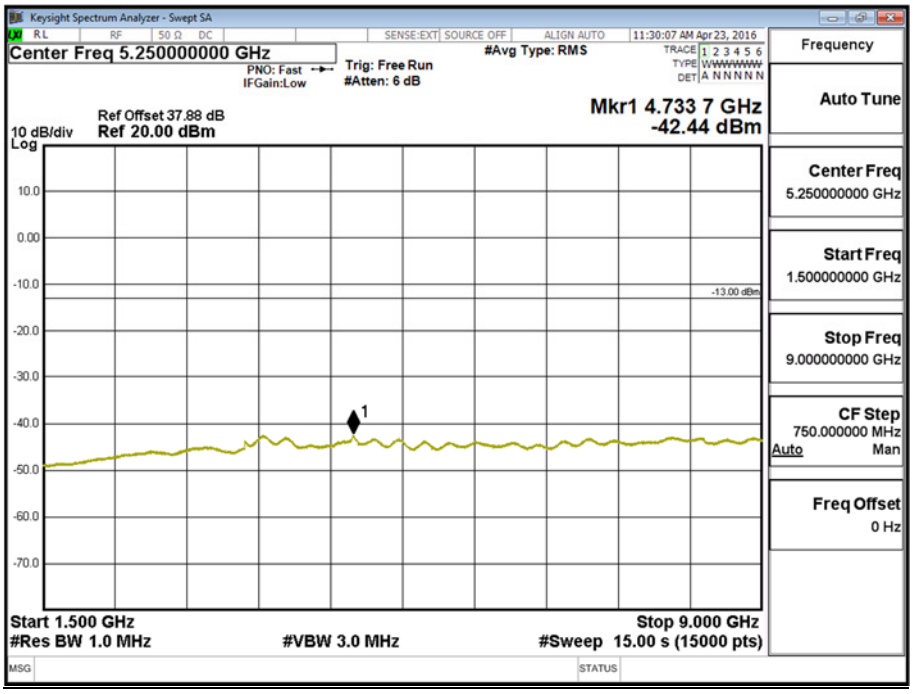
Product Service

10.0 MHz Bandwidth - QPSK

709.0 MHz - 1 Resource Block - Low – 9 kHz to 1.5 GHz



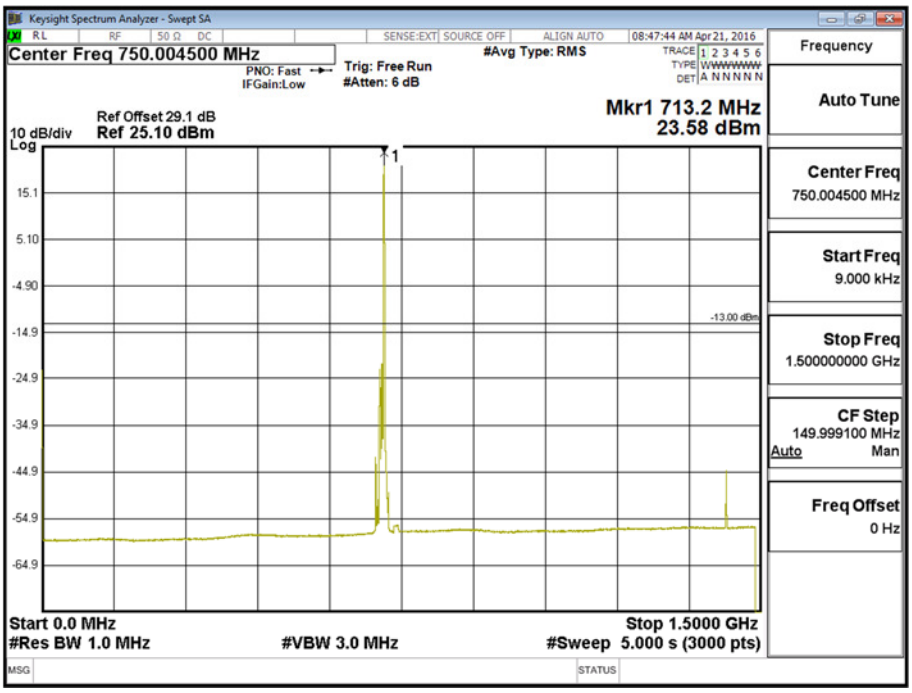
709.0 MHz - 1 Resource Block - Low – 1.5 GHz to 9.0 GHz



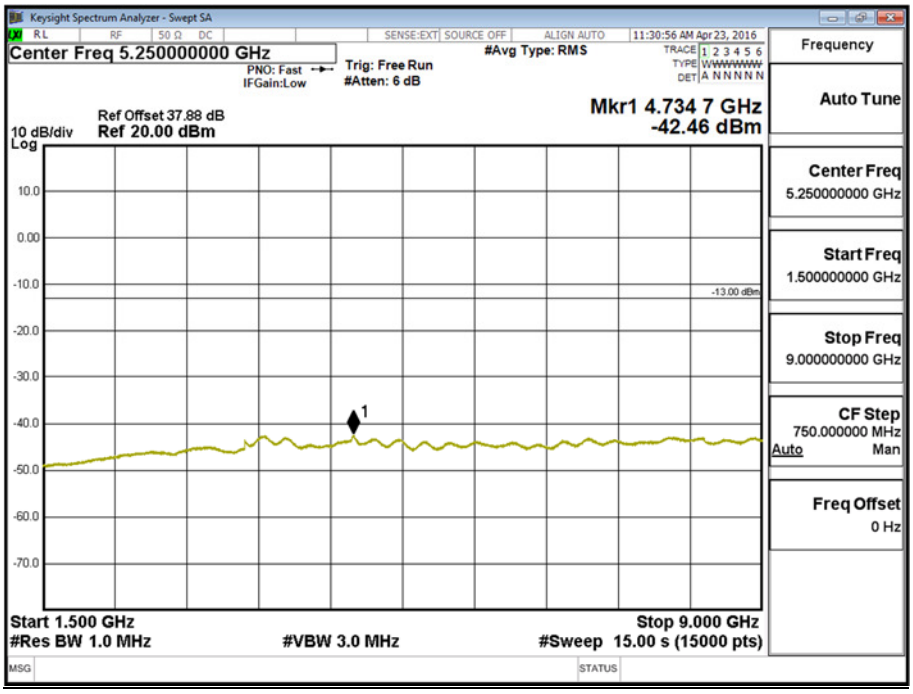
Product Service

10.0 MHz Bandwidth - 16QAM

709 MHz - 1 Resource Block - High – 9 kHz to 1.5 GHz



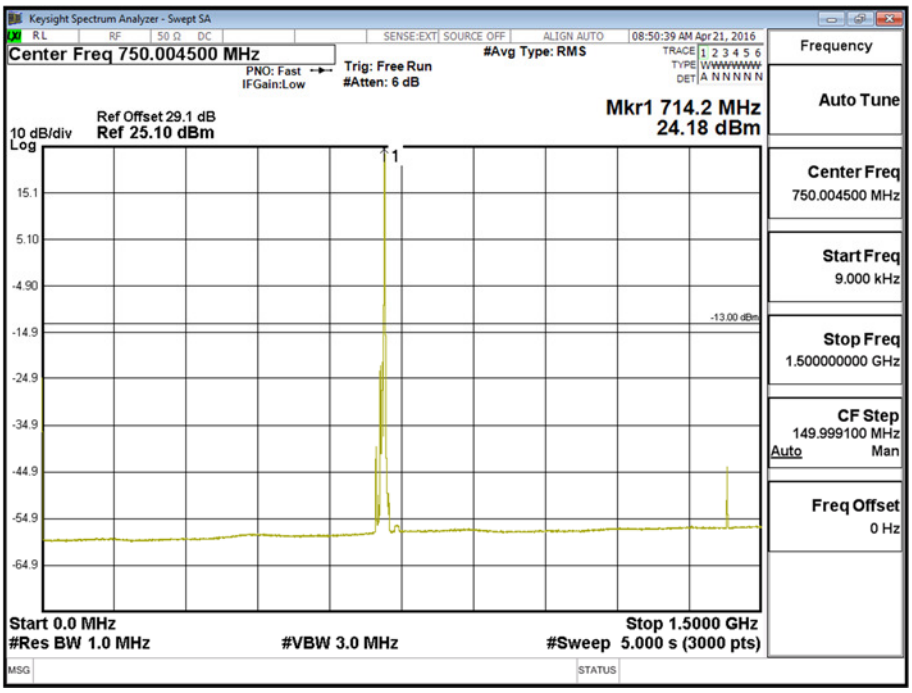
709 MHz - 1 Resource Block – High – 1.5 GHz to 9.0 GHz



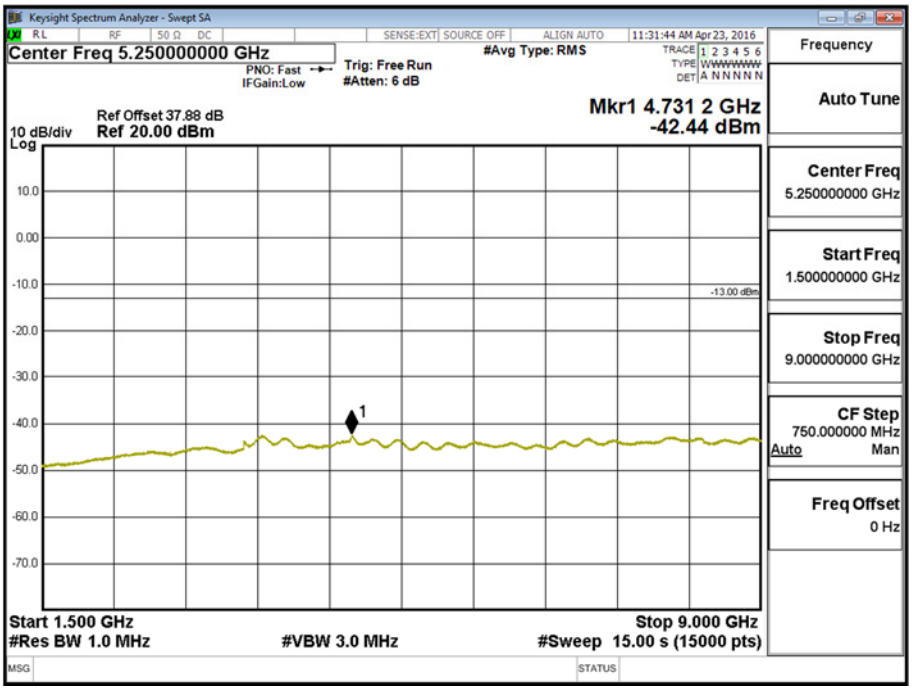
Product Service

10.0 MHz Bandwidth - QPSK

710.0 MHz - 1 Resource Block - High – 9 kHz to 1.5 GHz



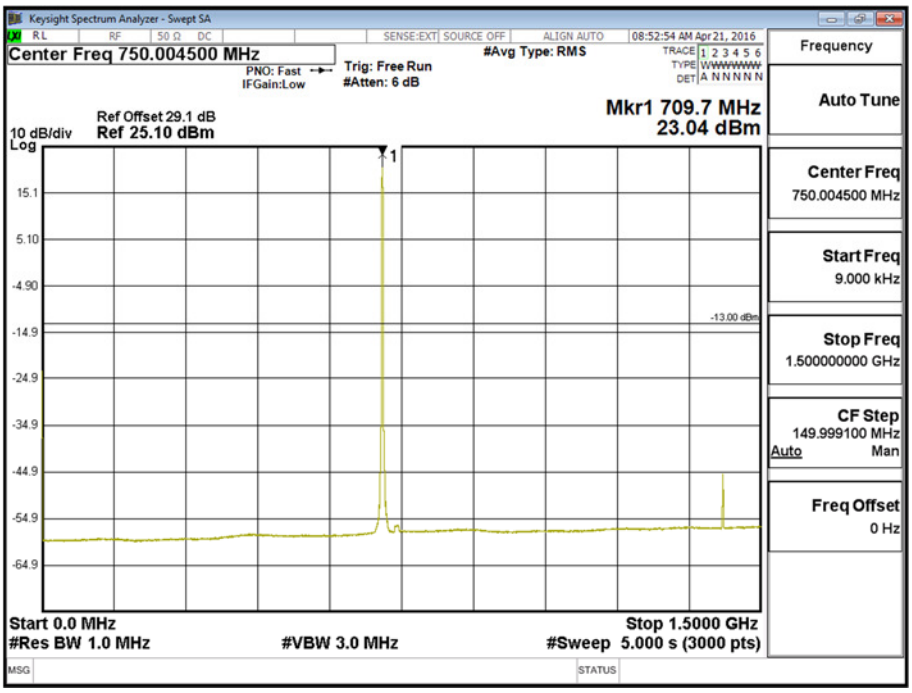
710.0 MHz - 1 Resource Block - High – 1.5 kHz to 9.0 GHz



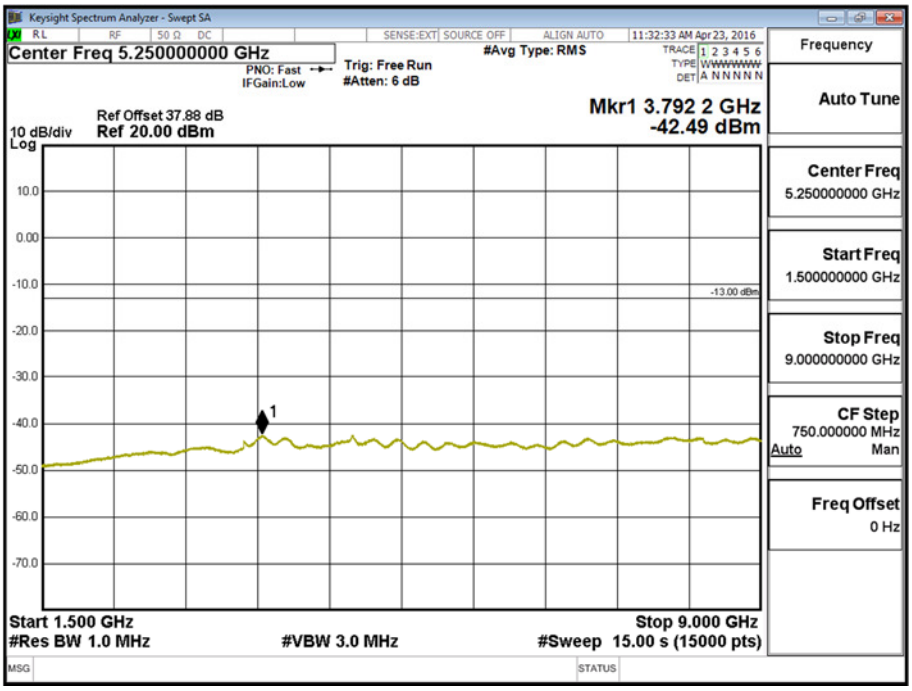
Product Service

10.0 MHz Bandwidth - 16QAM

710.0 MHz - 1 Resource Block - Mid – 9 kHz to 1.5 GHz



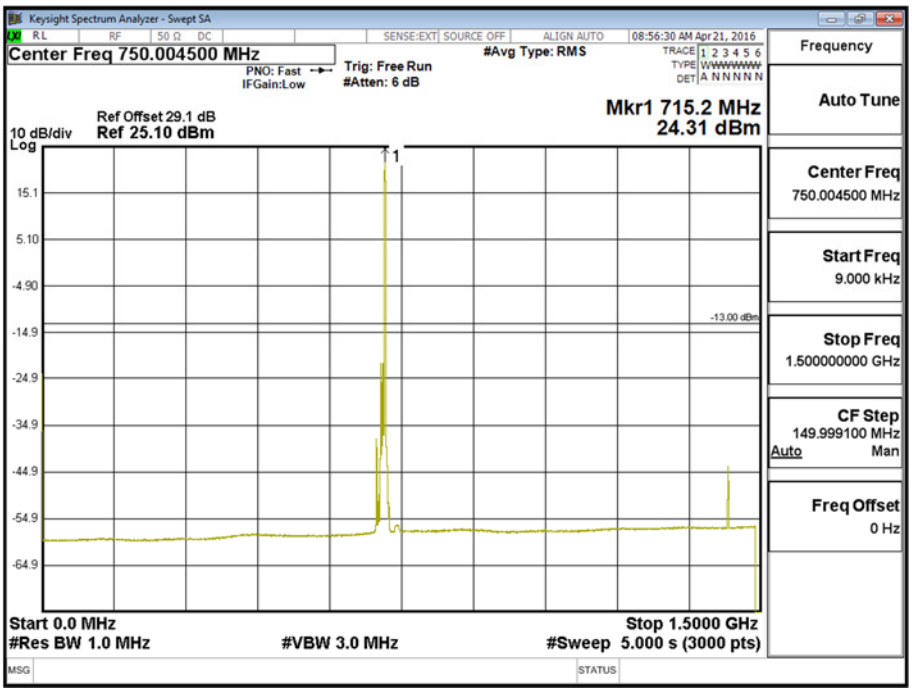
710.0 MHz - 1 Resource Block - Mid – 1.5 GHz to 9.0 GHz



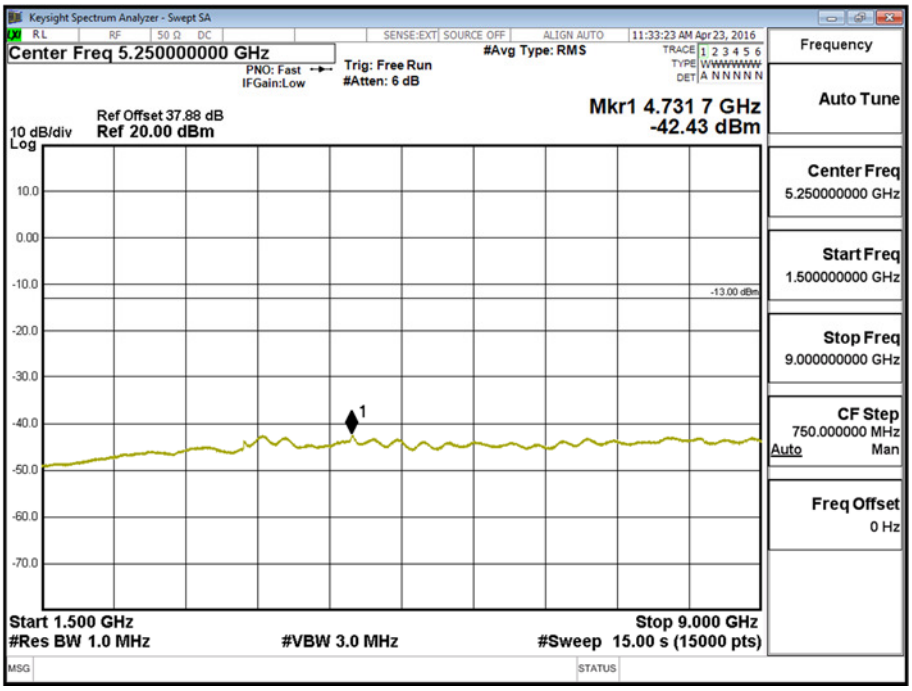
Product Service

10.0 MHz Bandwidth - QPSK

711 MHz - 1 Resource Block - High – 9 kHz to 1.5 GHz



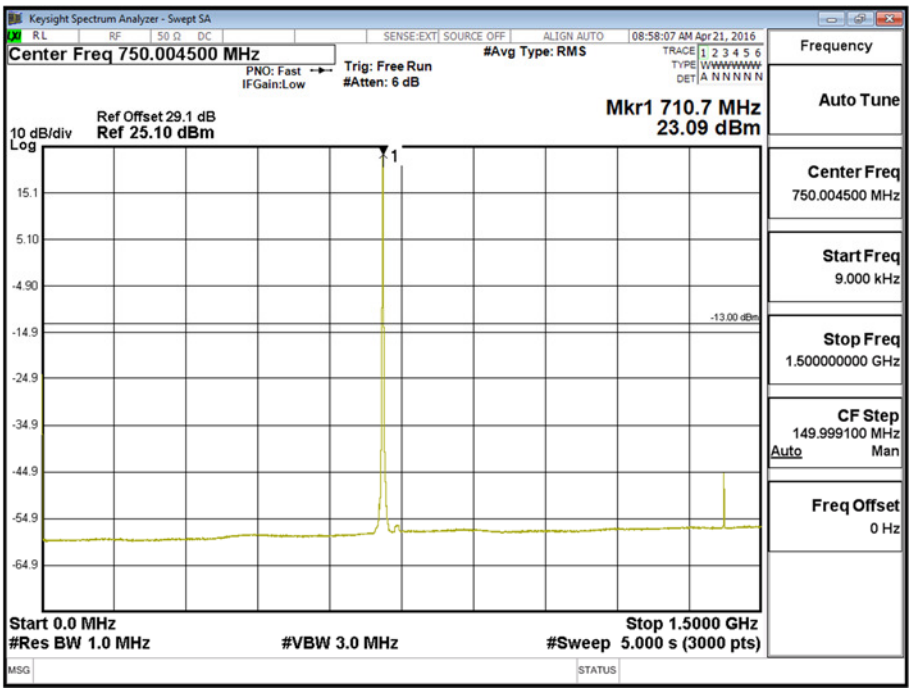
711 MHz - 1 Resource Block - High – 1.5 GHz to 9.0 GHz



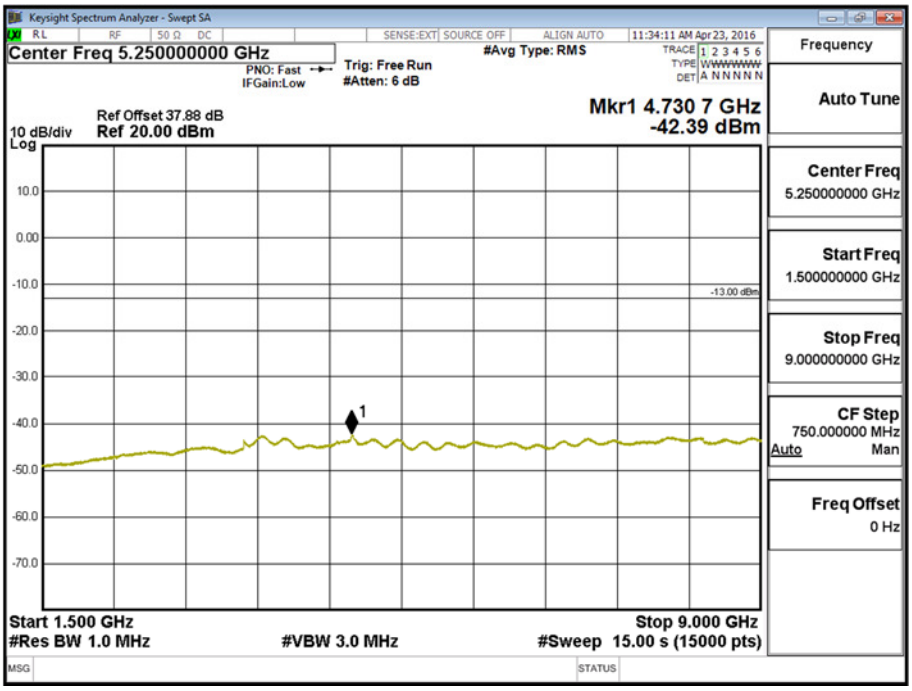
Product Service

10.0 MHz Bandwidth – 16QAM

711.0 MHz - 1 Resource Block - Mid – 9 kHz to 1.5 GHz



711.0 MHz - 1 Resource Block - Mid – 1.5 GHz to 9.0 GHz



FCC 47 CFR Part 27 Limit Clause 27.53 (g)

-13 dBm

Product Service

2.4 SPURIOUS EMISSIONS AT BAND EDGE

2.4.1 Specification Reference

FCC 47 CFR Part 272, Clause 27.53 (h)
FCC 47 CFR Part 2, Clause 2.1051

2.4.2 Equipment Under Test and Modification State

S/N: IMEI 004401115744563 - Modification State 0

2.4.3 Date of Test

20 April 2016

2.4.4 Test Equipment Used

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

2.4.5 Test Procedure

The test was performed in accordance with KDB 971168 D01 v02r02, Clause 6.

Remarks

All measurements were performed using an integration method at the band edge. The RBW setting was set at one tenth of the integration bandwidth. The integration bandwidth was configured to be at least 1% of the 26 dB bandwidth. The integration bandwidth was configured in the position that yielded the highest result on the 1 MHz region immediately outside the band edge.

2.4.6 Environmental Conditions

Ambient Temperature	23.6°C
Relative Humidity	31.1%