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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: APYHRO00243

Document 75935599 Report 16 Issue 1

September 2016





Product Service

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COMMERCIAL-IN-CONFIDENCE

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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 75935599 Report 16 Issue 1

September 2016

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DATED

23 September 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);


G Lawler


D Ralley




M Russell

**CONTENTS**

Section		Page No
1	REPORT SUMMARY	3
1.1	Introduction	4
1.2	Brief Summary of Results.....	5
1.3	Product Technical Description.....	6
1.4	Product Information.....	6
1.5	Test Conditions	6
1.6	Deviations from the Standard	6
1.7	Modification Record	6
2	TEST DETAILS.....	7
2.1	Maximum Conducted Output Power.....	8
2.2	Emission Limitations	13
2.3	Spurious Emissions at Antenna Terminals	27
2.4	Spurious Emissions at Band Edge	41
2.5	26 dB Bandwidth	54
2.6	Frequency Stability.....	71
2.7	Modulation Characteristics	73
3	TEST EQUIPMENT USED	80
3.1	Test Equipment Used.....	81
3.2	Measurement Uncertainty	84
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT	85
4.1	Accreditation, Disclaimers and Copyright.....	86



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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 004401115905172 IMEI 004401115905313
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 27 (2015) FCC 47 CFR Part 2 (2015)
Disposal	Held Pending Disposal
Reference Number	Not Applicable
Date	Not Applicable
Order Number	10879
Date	18 July 2016
Start of Test	10 August 2016
Finish of Test	6 September 2016
Name of Engineer(s)	G Lawler D Ralley M Russell
Related Document(s)	ANSI C63.4 (2014) ANSI C63.26 (2015) ANSI TIA-603-C (2004) KDB 971168 D01 v02r02



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 APYHRO00243 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.



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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 004401115905172 - Modification State 0

2.1.3 Date of Test

16 August 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	21.8°C
Relative Humidity	59.1%



2.1.7 Test Results

LTE FDD 17, Maximum Average Conducted Output Power Results

5.0 MHz Bandwidth - QPSK

Resource Block Allocation	Resource Block Offset	Carrier Power (dBm)		
		706.5 MHz	710.0 MHz	713.5 MHz
1	Low	22.63	22.40	22.57
1	Mid	23.21	22.53	22.85
1	High	22.48	22.77	22.67
12	Low	21.54	21.66	21.65
12	Mid	21.67	21.53	21.55
12	High	21.62	21.70	21.60
25	-	21.80	21.59	21.64

5.0 MHz Bandwidth - 16-QAM

Resource Block Allocation	Resource Block Offset	Carrier Power (dBm)		
		706.5 MHz	710.0 MHz	713.5 MHz
1	Low	21.65	21.65	21.60
1	Mid	21.75	21.71	21.62
1	High	21.41	21.58	20.96
12	Low	20.45	20.58	20.49
12	Mid	20.50	20.37	20.39
12	High	20.61	20.64	20.68
25	-	20.84	20.69	20.71

10.0 MHz Bandwidth - QPSK

Resource Block Allocation	Resource Block Offset	Carrier Power (dBm)		
		709.0 MHz	710.0 MHz	711.0 MHz
1	Low	22.54	22.64	22.96
1	Mid	22.78	22.69	22.66
1	High	22.67	22.63	22.41
25	Low	21.82	21.83	21.77
25	Mid	21.72	21.81	21.76
25	High	21.83	21.62	21.66
50	-	21.77	21.78	21.66

10.0 MHz Bandwidth - 16-QAM

Resource Block Allocation	Resource Block Offset	Carrier Power (dBm)		
		709.0 MHz	710.0 MHz	711.0 MHz
1	Low	21.94	21.37	21.80
1	Mid	22.66	21.22	21.78
1	High	22.09	20.98	21.54
25	Low	21.04	20.69	20.72
25	Mid	20.71	20.74	20.67
25	High	20.59	20.85	20.77
50	-	20.82	20.79	20.65

5.0 MHz Bandwidth - QPSK

Resource Block Allocation	Resource Block Offset	Peak to Average Ratio (dB)		
		706.5 MHz	710.0 MHz	713.5 MHz
1	Low	4.51	4.61	4.23
1	Mid	4.41	4.48	3.74
1	High	4.65	4.09	3.84
12	Low	5.04	5.01	4.53
12	Mid	4.96	4.80	4.34
12	High	5.09	4.73	4.29
25	-	5.40	5.19	4.74

5.0 MHz Bandwidth - 16-QAM

Resource Block Allocation	Resource Block Offset	Peak to Average Ratio (dB)		
		706.5 MHz	710.0 MHz	713.5 MHz
1	Low	5.46	5.38	5.11
1	Mid	5.33	5.14	4.78
1	High	5.50	4.94	4.93
12	Low	5.97	5.91	5.55
12	Mid	5.88	5.74	5.30
12	High	6.02	5.70	5.31
25	-	6.18	6.00	5.67

10.0 MHz Bandwidth - QPSK

Resource Block Allocation	Resource Block Offset	Peak to Average Ratio (dB)		
		709.0 MHz	710.0 MHz	711.0 MHz
1	Low	4.43	4.48	4.53
1	Mid	4.50	4.41	4.22
1	High	3.90	3.84	3.82
25	Low	5.17	5.14	5.11
25	Mid	4.94	4.88	4.75
25	High	4.93	4.75	4.62
50	-	5.19	5.12	5.09



Product Service

10.0 MHz Bandwidth – 16-QAM

Resource Block Allocation	Resource Block Offset	Peak to Average Ratio (dB)		
		709.0 MHz	710.0 MHz	711.0 MHz
1	Low	4.43	4.48	4.53
1	Mid	4.50	4.41	4.22
1	High	3.90	3.84	3.82
25	Low	5.17	5.14	5.11
25	Mid	4.94	4.88	4.75
25	High	4.93	4.75	4.62
50	-	5.19	5.12	5.09

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

Fixed, Mobile and Portable Stations: <3 W



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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 004401115905313 - Modification State 0

2.2.3 Date of Test

31 August 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

Testing was performed in accordance with ANSI C63.26, clause 5.5.

2.2.6 Environmental Conditions

Ambient Temperature	20.8°C
Relative Humidity	65.0%



2.2.7 Test Results

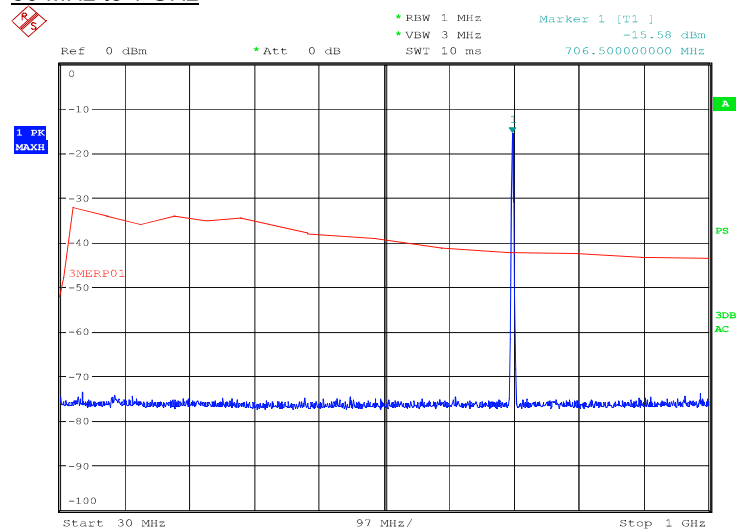
LTE FDD 17, Radiated Spurious Emissions Results

5.0 MHz Bandwidth – QPSK

706.5 MHz

1 Resource Block - Mid

30 MHz to 1 GHz

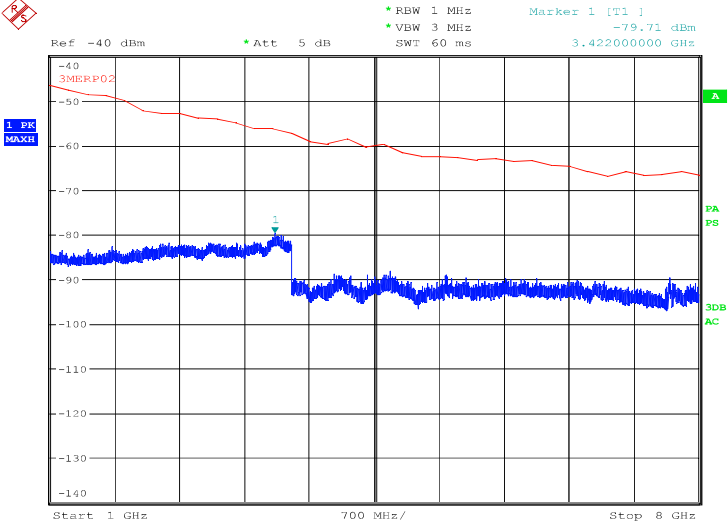


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Product Service

1 GHz to 8 GHz

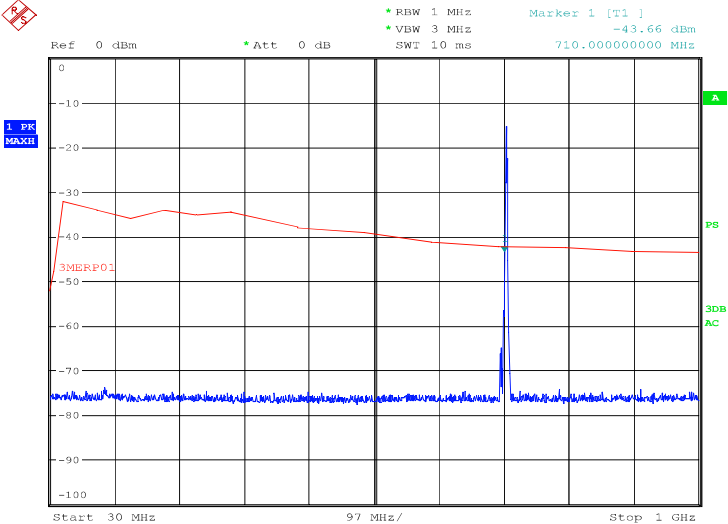


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710.0 MHz

1 Resource Block – High

30 MHz to 1 GHz

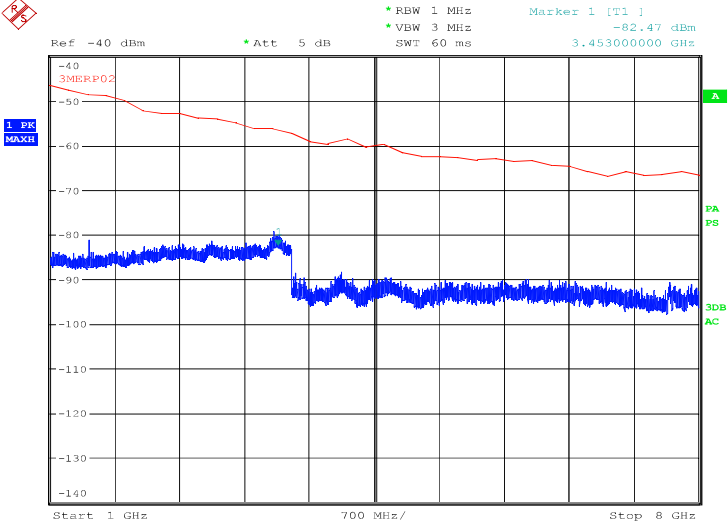


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Product Service

1 GHz to 8 GHz

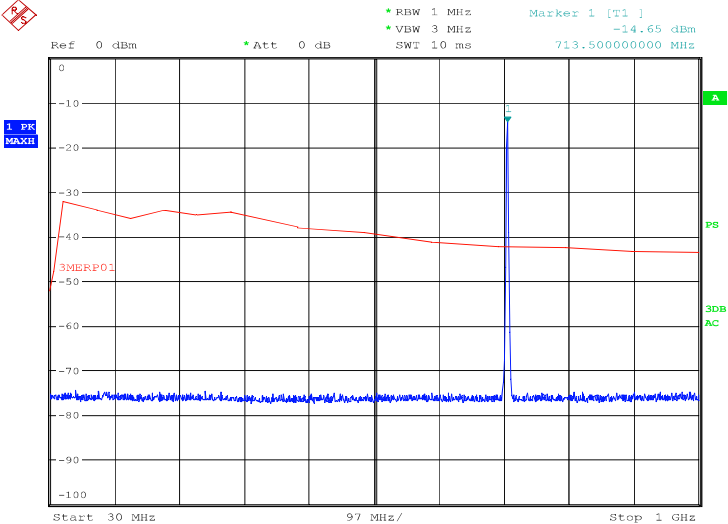


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713.5 MHz

1 Resource Block – Mid

30 MHz to 1 GHz

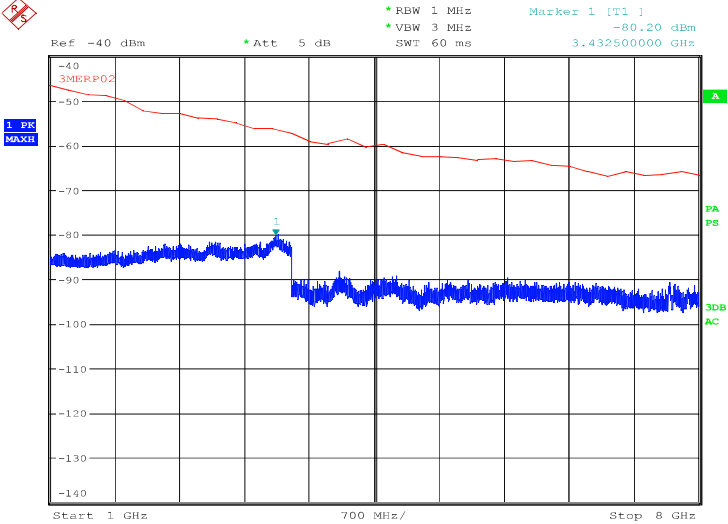


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Product Service

1 GHz to 8 GHz



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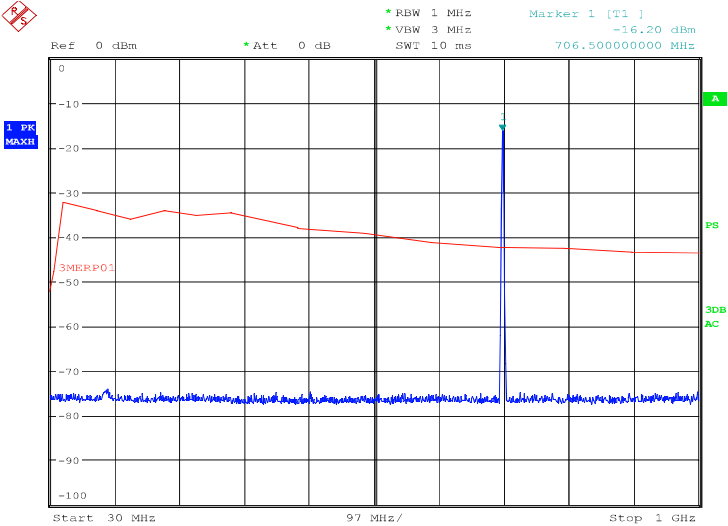
Product Service

5.0 MHz Bandwidth – 16-QAM

706.5 MHz

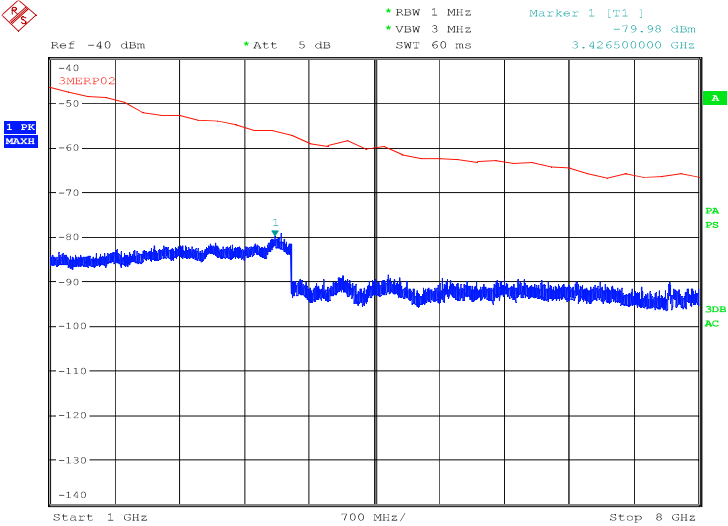
1 Resource Block – Mid

30 MHz to 1 GHz



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1 GHz to 8 GHz



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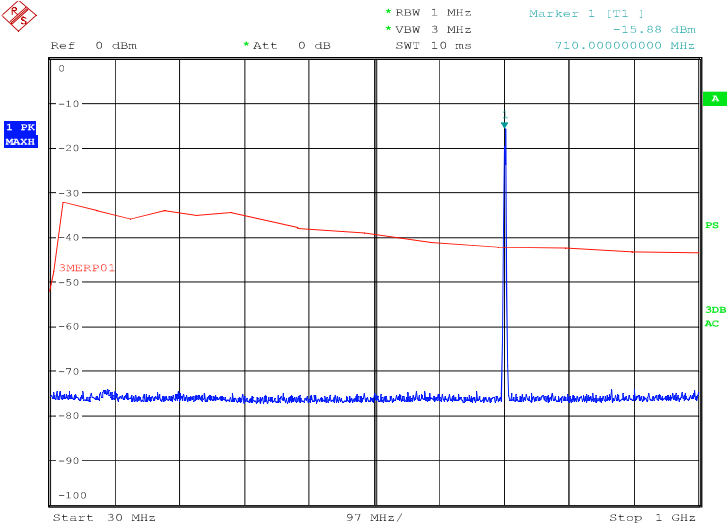


Product Service

710.0 MHz

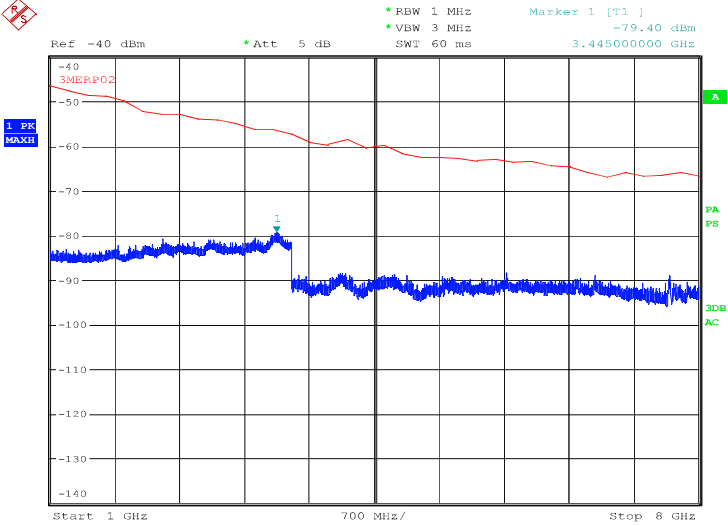
1 Resource Block – Mid

30 MHz to 1 GHz



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1 GHz to 8 GHz



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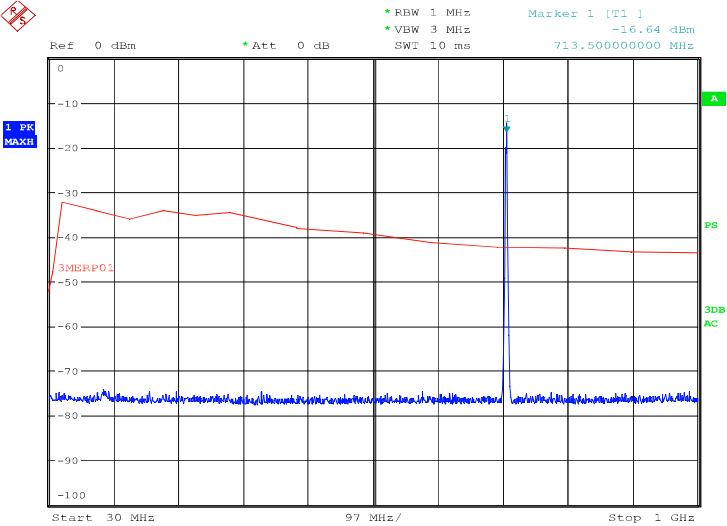


Product Service

713.5 MHz

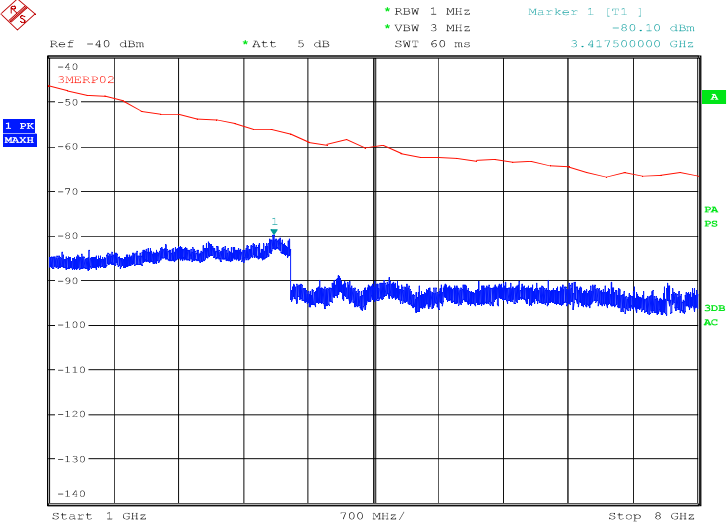
1 Resource Block – Mid

30 MHz to 1 GHz



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1 GHz to 8 GHz



Date: 31.AUG.2016 20:25:07



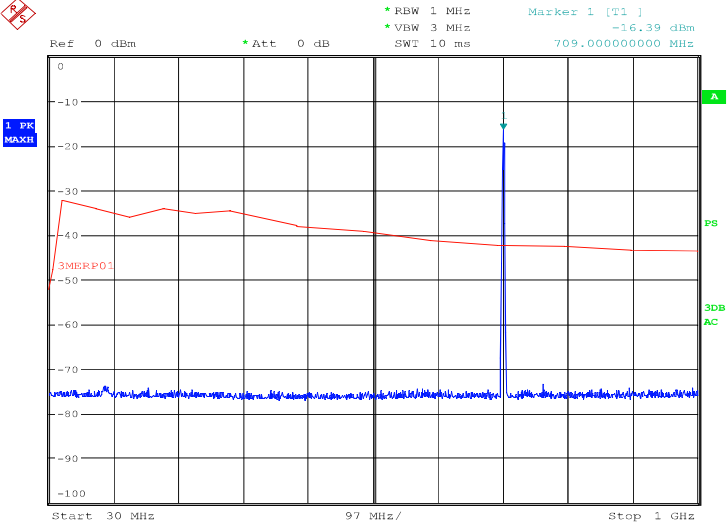
Product Service

10.0 MHz Bandwidth – QPSK

709.0 MHz

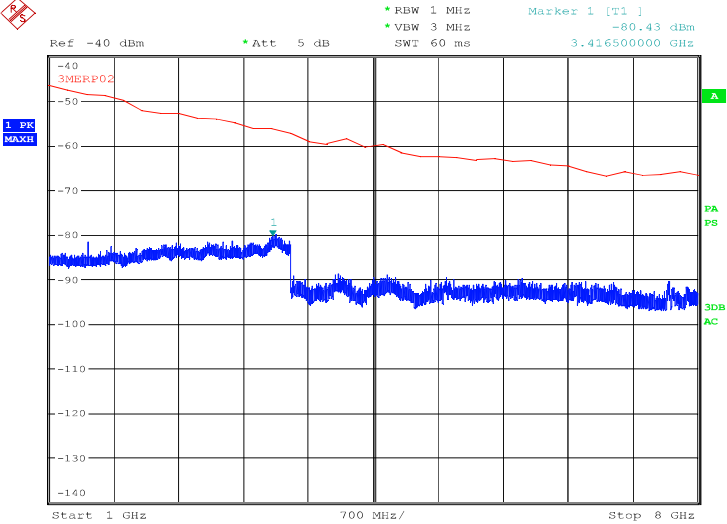
1 Resource Block – Mid

30 MHz to 1 GHz



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1 GHz to 8 GHz



Date: 31.AUG.2016 20:55:55

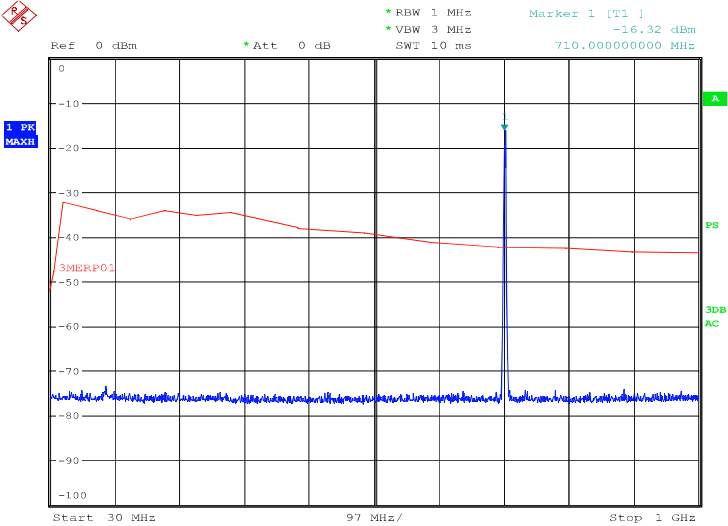


Product Service

710.0 MHz

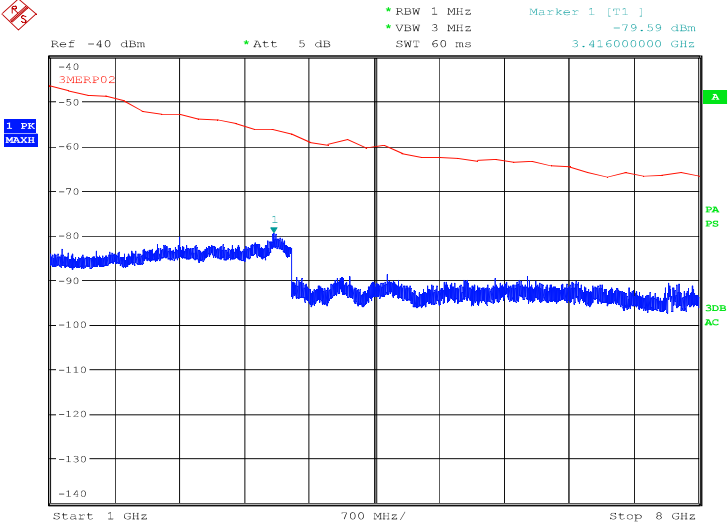
1 Resource Block – Mid

30 MHz to 1 GHz



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1 GHz to 8 GHz



Date: 31.AUG.2016 21:02:20

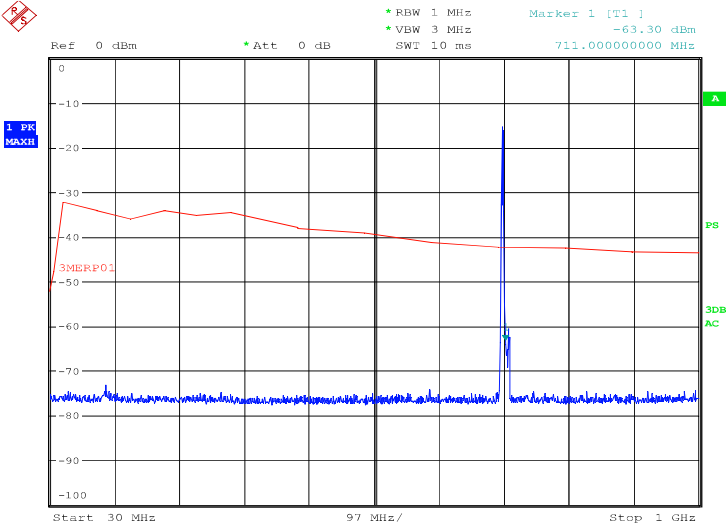


Product Service

711.0 MHz

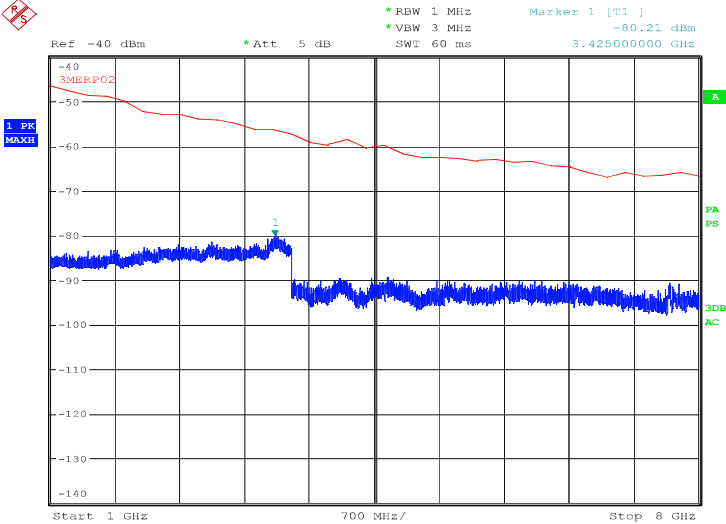
1 Resource Block – Low

30 MHz to 1 GHz



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1 GHz to 8 GHz



Date: 31.AUG.2016 21:07:36



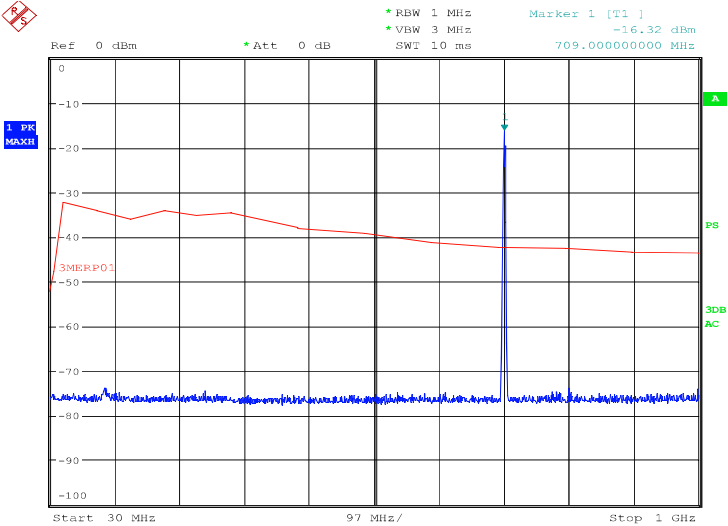
Product Service

10.0 MHz Bandwidth – 16-QAM

709.0 MHz

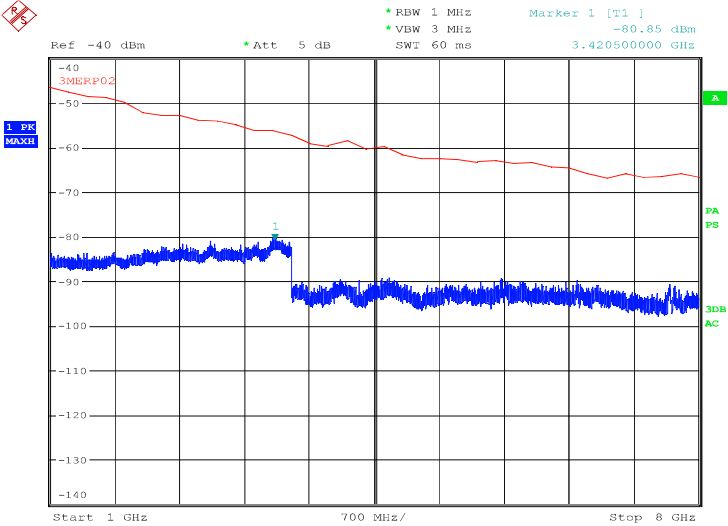
1 Resource Block – Mid

30 MHz to 1 GHz



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1 GHz to 8 GHz



Date: 31.AUG.2016 21:18:05

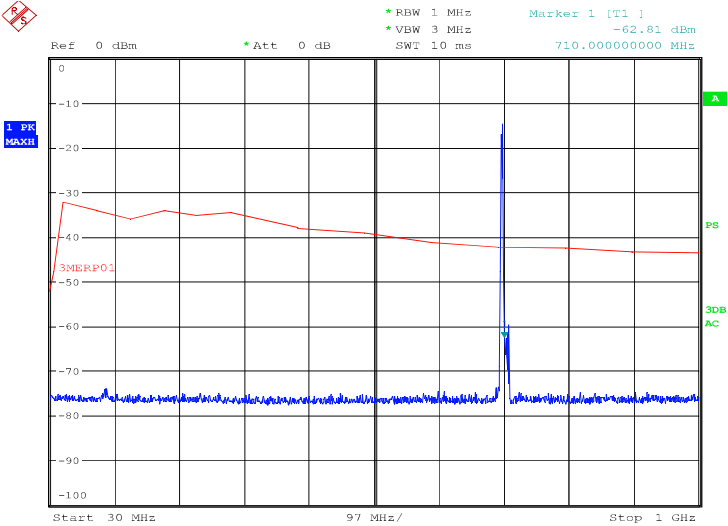


Product Service

710.0 MHz

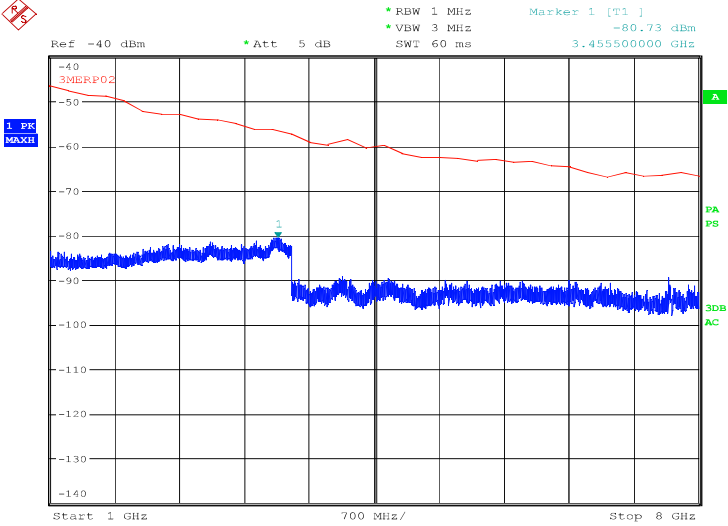
1 Resource Block – Low

30 MHz to 1 GHz



Date: 30.AUG.2016 18:54:27

1 GHz to 8 GHz



Date: 31.AUG.2016 21:23:10

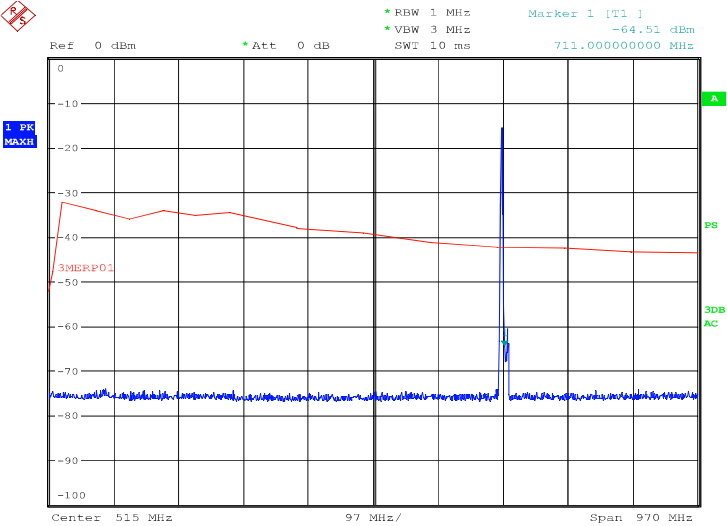


Product Service

711.0 MHz

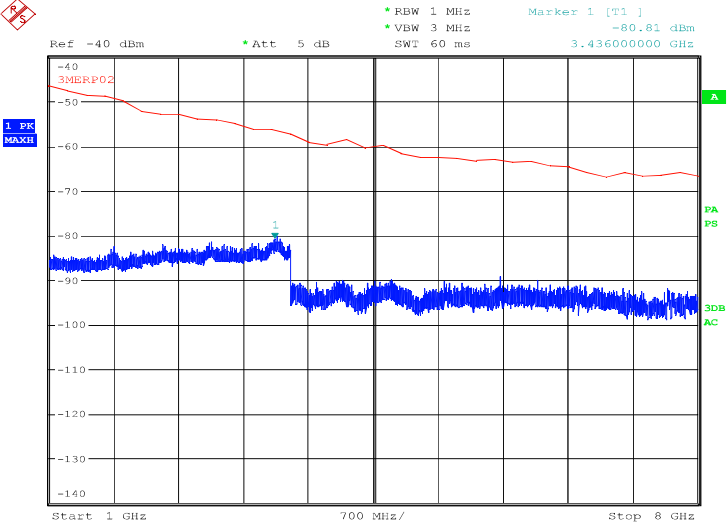
1 Resource Block – Low

30 MHz to 1 GHz



Date: 30.AUG.2016 19:04:00

1 GHz to 8 GHz



Date: 31.AUG.2016 21:27:33

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

-13 dBm



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 004401115905172 - Modification State 0

2.3.3 Date of Test

16 August 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

This test was performed in accordance with KDB 971168 D01 v02r02, clause 6.

2.3.6 Environmental Conditions

Ambient Temperature	21.8°C
Relative Humidity	59.1%



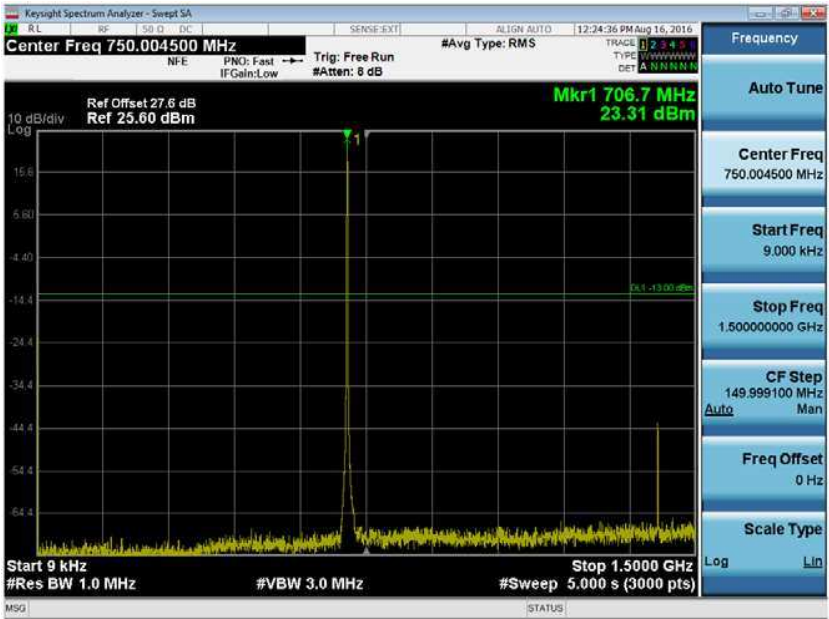
Product Service

2.3.7 Test Results

LTE FDD 17, Spurious Emissions at Antenna Terminals Results

5.0 MHz Bandwidth - QPSK

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





Product Service

706.5 MHz - 1 Resource Block – Mid – 1.5 GHz to 8.0 GHz

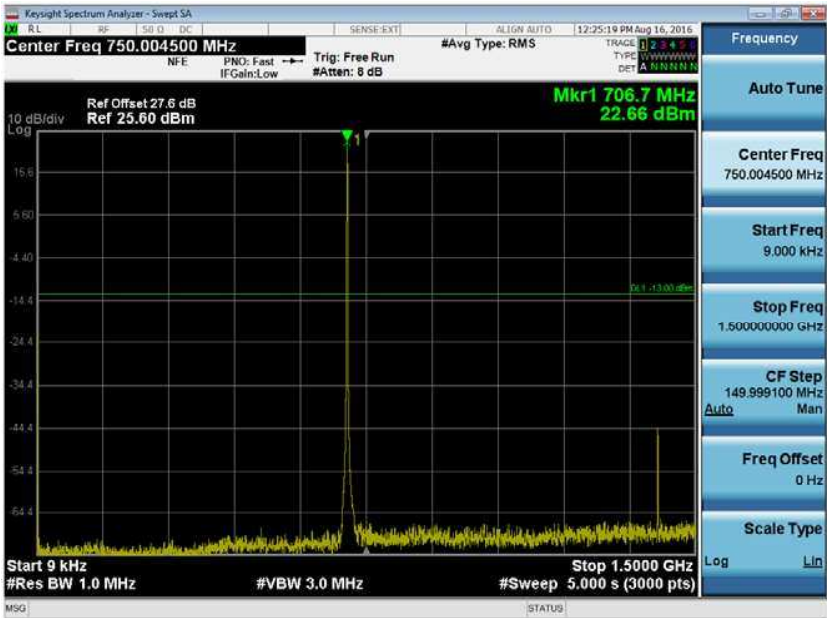




Product Service

5.0 MHz Bandwidth - 16-QAM

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



706.5 MHz - 1 Resource Block – Mid – 1.5 GHz to 8.0 GHz

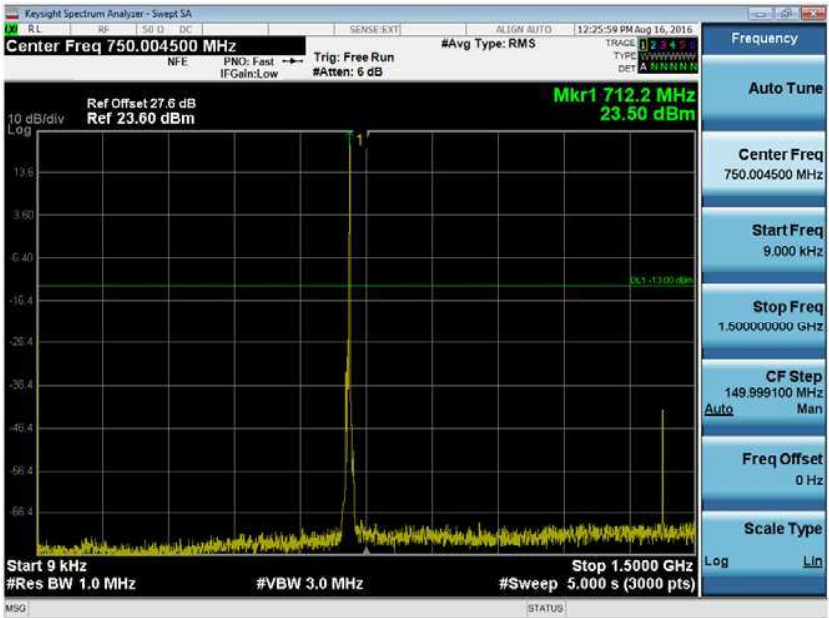




Product Service

5.0 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 GHz to 8.0 GHz

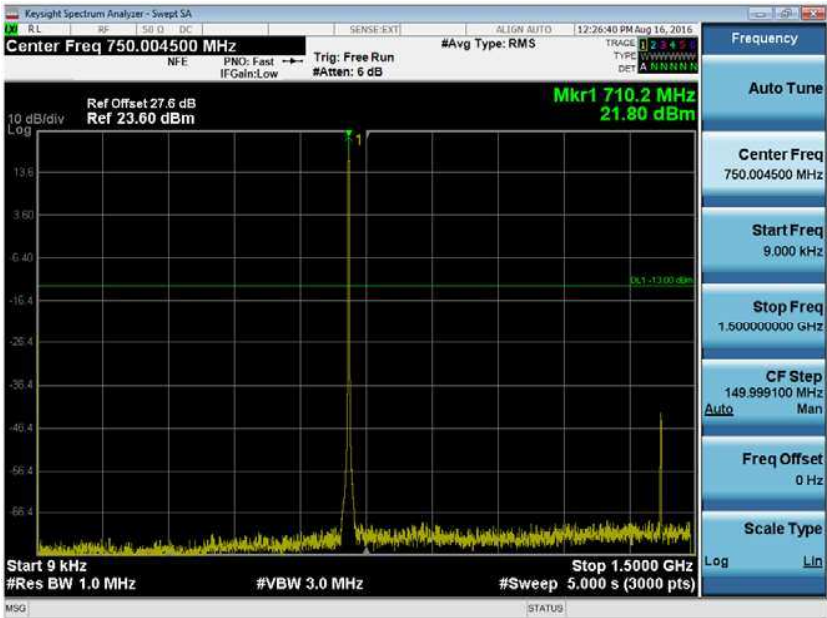




Product Service

5.0 MHz Bandwidth - 16-QAM

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



710.0 MHz - 1 Resource Block - Mid – 1.5 GHz to 8.0 GHz

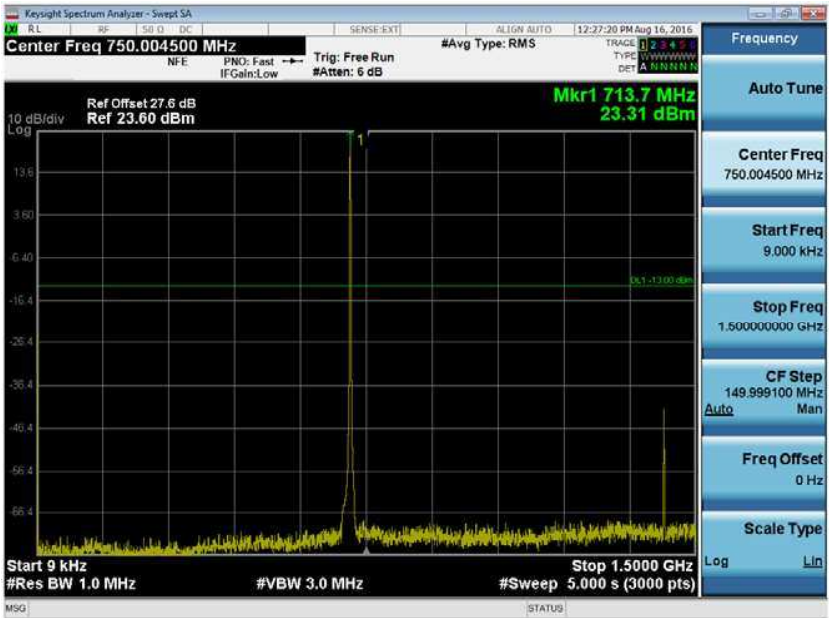




Product Service

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 – 1.5 GHz to 8 GHz

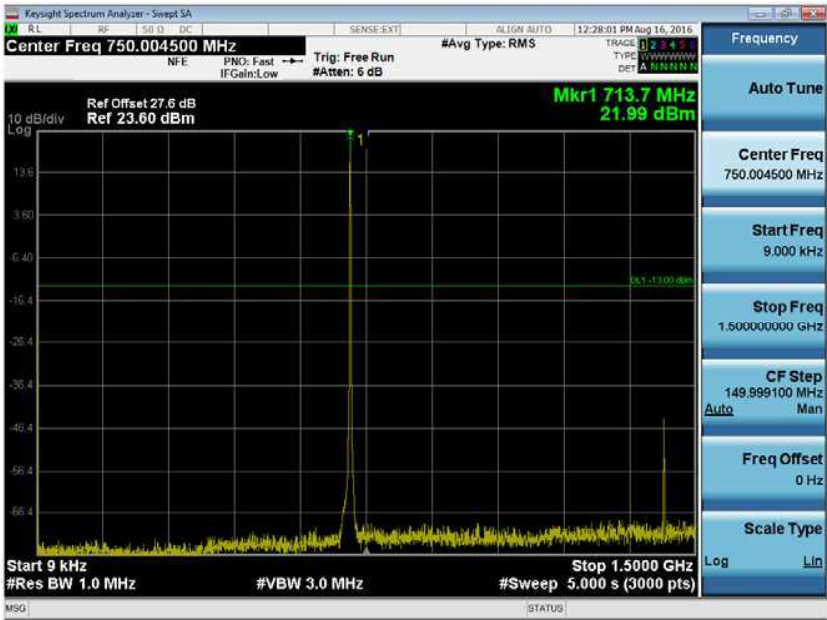




Product Service

5.0 MHz Bandwidth - 16-QAM

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



713.5 MHz - 1 Resource Block - Mid – 1.5 GHz to 8.0 GHz

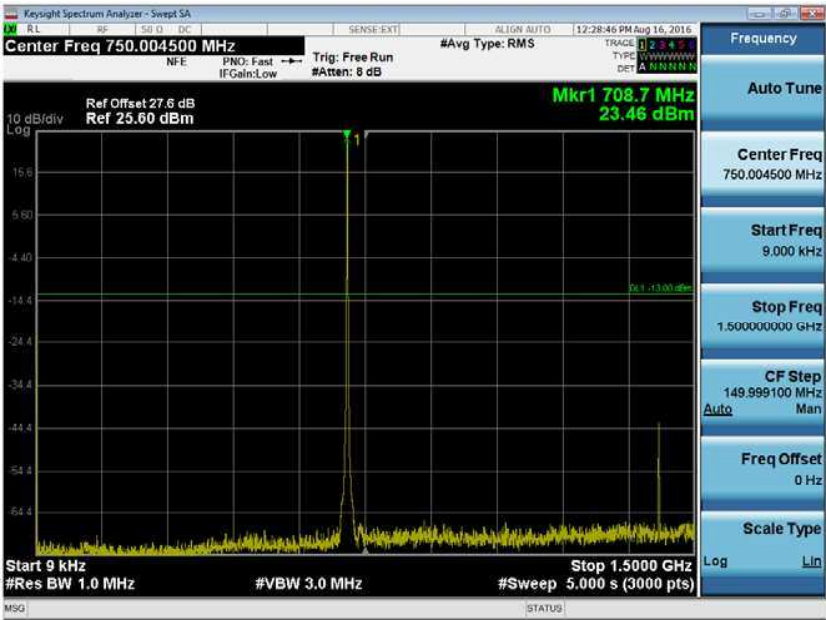




Product Service

10.0 MHz Bandwidth - QPSK

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



709.0 MHz - 1 Resource Block - High – 1.5 GHz to 8.0 GHz

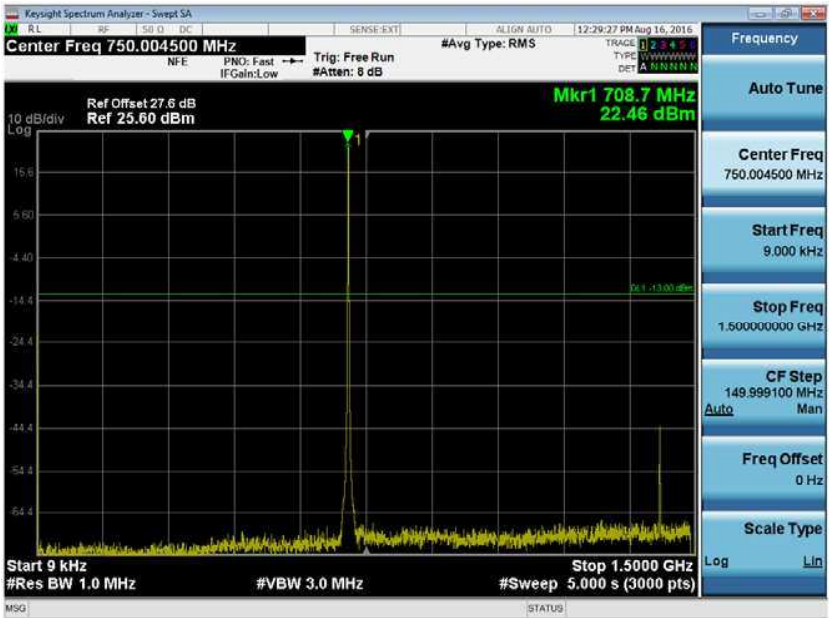




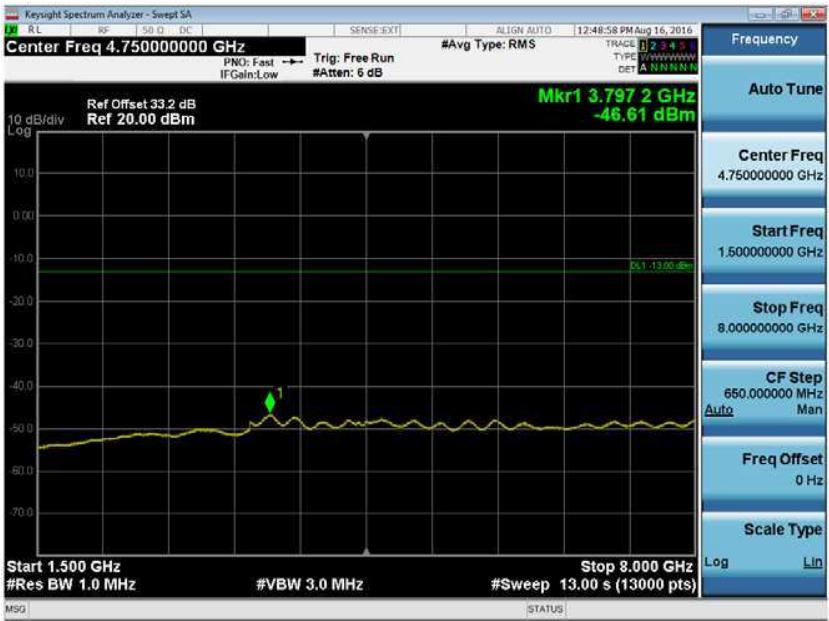
Product Service

10.0 MHz Bandwidth - 16-QAM

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



709 MHz - 1 Resource Block – High – 1.5 GHz to 8.0 GHz





Product Service

10.0 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 kHz to 8.0 GHz

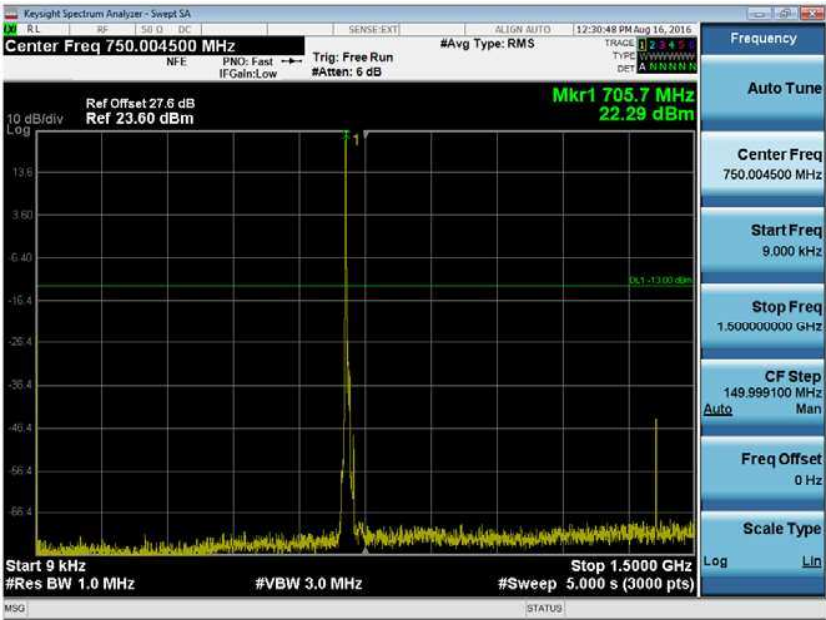




Product Service

10.0 MHz Bandwidth - 16-QAM

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



710.0 MHz - 1 Resource Block - Mid – 1.5 GHz to 8.0 GHz

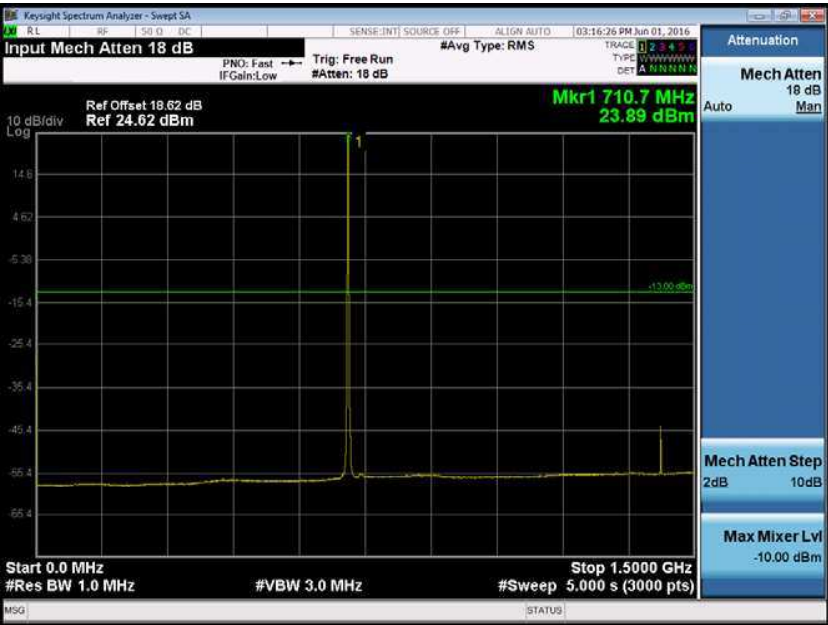




Product Service

10.0 MHz Bandwidth - QPSK

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



711 MHz - 1 Resource Block - Mid – 1.5 GHz to 8.0 GHz

