
REPORT ON

Limited FCC CFR 47: Parts 2, 15 and 87 and
Industry Canada RSS-141 and RSS-Gen Testing
of a Park Air Systems Limited 6525 MDR Transceiver

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FCC ID: C8LB6525MDR
Industry Canada ID: 2137A-B6525MDR

Report No RO615642/01 Issue 5

July 2007



Product Service





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MDR Transceiver

FCC ID: C8LB6525MDR
Industry Canada ID: 2137A-B6525MDR

Report No RO615642/01 Issue 5

July 2007

PREPARED FOR

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DATED

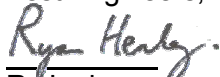
27th July 2007

This report has been up-issued to Issue 5 to correct typographical errors.

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 CFR 47: Parts 2, 15 and 87. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;



R Henley





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Product Service

SECTION 1

REPORT SUMMARY

Limited FCC CFR 47: Parts 2, 15 and 87 and
Industry Canada RSS-141 and RSS-Gen Testing
of a Park Air Systems Limited 6525 MDR Transceiver



Product Service

1.1 STATUS

Equipment Under Test	6525 MDR Transceiver
Objective	To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification.
Name and Address of Client	Park Air Systems Limited Northfields Market Deeping Peterborough PE6 8UE England
Type Number	6525 MDR Transceiver
Serial Number	DEV003
Software Version	582V00D06, 583V00D06, 568V00D06, 587V00D08
Test Specification/Issue/Date	FCC CFR 47: Part 2, 2001 FCC CFR 47: Part 15, Subparts B and C, 2006 FCC CFR 47: Part 87, 2005 Industry Canada RSS-141: Issue 1 Revision 1, February 2004 Industry Canada RSS-Gen: Issue 1, September 2005
Test Plan/Issue/Date	TP-M21923-051v0.1 / 3 rd October 2006
Number of Items Tested	One
Security Classification of EUT	Commercial-in-Confidence
Disposal	Held pending disposal
Reference Number	Not Applicable
Date	Not Applicable
Order Number	112956
Date	20 th October 2006
Start of Test	9 th November 2006
Finish of Test	7 th June 2007
Related Documents	ANSI C63.4: 2001 FCC DA 00-705: 2000



Product Service

1.2 INTRODUCTION

The information contained within this report is intended to show limited verification of compliance of the Park Air Systems Limited 6525 MDR Transceiver to the requirements of FCC Specification Parts 2, 15 and 87 and Industry Canada RSS-141 and RSS-Gen.

Testing has been performed under the following site accreditations

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC4270 Octagon House, Fareham Test Laboratory

1.2.1 Declaration of Build Status

MAIN EUT	
MANUFACTURING DESCRIPTION	VHF Multimode digital radio
MANUFACTURER	Park Air Systems Limited
TYPE	6526 MDR
PART NUMBER	B6525
SERIAL NUMBER	DEV003
HARDWARE VERSION	1
SOFTWARE VERSION	582V00D06, 583V00D06, 568V00D06, 587V00D08
TRANSMITTER OPERATING RANGE	118.000 MHz – 136.975 MHz
RECEIVER OPERATING RANGE	118.000 MHz – 136.975 MHz
COUNTRY OF ORIGIN	UK
INTERMEDIATE FREQUENCIES	21.4 MHz, 450 kHz
ITU DESIGNATION OF EMISSION	6k0A3E, 13k0A2D, 14k0G1D
HIGHEST INTERNALLY GENERATED FREQUENCY	158.375 MHz
OUTPUT POWER (W or dBm)	25W, +44 dBm
FCC ID	C8LB6525MDR
INDUSTRY CANADA ID	2137A-B6525MDR
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Ground to air VHF transceiver for operating in both analogue voice and digital data transmissions
BATTERY/POWER SUPPLY	
MANUFACTURING DESCRIPTION	Not Applicable
MANUFACTURER	
VOLTAGE	

Signature

Date

7th November 2007

D of B S Serial No

OS615642

TUV Product Service Limited formally certifies that the manufacturer's declaration as reproduced in this report is a true and accurate record of the original received from the applicant.



1.3 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out is shown below.

Section	Spec Clause		Test Description	Result	Comments
	FCC	Industry Canada			
2.1	2.1047(a), 87.141(a)	-	Modulation Characteristics	Pass	Mode 1 AM
2.2	2.1047(b), 87.141(a)	-	Modulation Characteristics	Pass	Mode 1 AM
2.3	2.1055(a + b), 2.1055(d), 87.133(a)	RSS-141 Clause 4.2, 6.1 RSS-Gen Clause 4.5	Frequency Stability	Pass	Mode 1 AM
2.4	2.1046(a), 87.131	RSS-141 Clause 4.3, RSS-Gen Clause 4.6	Transmitter Output Power	Pass	Mode 1 AM
				Pass	Mode 1 ACARS
				Pass	Mode 2
2.5	2.1051, 2.1057, 87.139(c)(3)	RSS-141 Clause 4.5, 6.2	Transmitter Spurious Emissions Antenna Port	Pass	Mode 1 AM
				Pass	Mode 1 ACARS
				Pass	Mode 2
2.6	2.1049c, 87.135, 87.137	RSS-141 Clause 3.2(h), 6.1	Occupied Bandwidth	Pass	Mode 1 AM
				Pass	Mode 1 ACARS
	2.1049c, 87.135, 87.137	RSS-141 Clause 3.2(h), 6.2	Occupied Bandwidth	Pass	Mode 2
2.7	87.139(k)	-	Adjacent Channel Power	Pass	Mode 2

N/T* Not Tested as covered under Part 15.109



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The 6525 MDR is a VHF AM digital ground station operating in the band 118 MHz to 136.975 MHz with 25 kHz / 8.33 kHz channel spacing. The radio will be set to 25 kHz channelling at the factory.

1.4.2 Modes of Operation

Modes of operation of the EUT during testing were as follows:

Mode 1

AM Mode:

In AM mode the radio provides ground to air communication for the aeronautical mobile service operating in the VHF band. It employs amplitude modulation with 25 kHz channel spacing (6K0A3E) and/or 8.33kHz (5K00A3E) channel spacing.

ACARS Mode:

ACARS is a low speed data communication service operating at 2400 baud using AM MSK. It utilises two tones at 1200 Hz and 2400 Hz and uses 25 kHz channel spacing with emission designator 13K0A2D. Data communication is provided from the ACARS network via a modem or through the ETHERNET connector to an internal modem.

Mode 2

VDL Mode 2 uses Carrier Sense Multiple Access (CSMA) differentially encoded 8-phase shift keying (D8PSK), using a raised cosine filter with $\alpha=0.6$ (nominal value).

Mode 2 provides a high speed data communication service operating at 31.5 kbit/s with emission designator 14K0G1D.



Product Service

1.5 TEST CONDITIONS

The EUT was set-up simulating a typical user installation on an Alternative Open Field Test Site or suitable test site under FCC Registration Number: 90987 and Industry Canada Identification Number: IC4270, and tested in accordance with the applicable specification.

For all tests, the Park Air Systems Limited 6525 MDR Transceiver was powered by 120V 60Hz supply.

1.6 DEVIATIONS FROM THE STANDARD

Not Applicable

1.7 MODIFICATION RECORD

Not Applicable



Product Service

SECTION 2

TEST DETAILS

Limited FCC CFR 47: Parts 2, 15 and 87 and
Industry Canada RSS-141 and RSS-Gen Testing
of a Park Air Systems Limited 6525 MDR Transceiver



Product Service

2.1 MODULATION

2.1.1 Specification Reference

FCC CFR 47: Parts 2.1047(a), 87.141(a)

2.1.2 Equipment Under Test

6525 MDR Transceiver

2.1.3 Date of Test

10th November 2006

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

The EUT was connected to the modulation analyser via a 30dB attenuator. The modulation analyser was set to measure AM. Using an audio analyser, an audio tone of 2500Hz was input into the EUT and the amplitude was adjusted to give a modulation depth of 80%. The demodulation audio from the modulation analyser was fed back into the measuring section of the audio analyser, which was adjusted to measure rms voltage. The audio analyser output frequency was then adjusted between 100Hz and 5000Hz and the demodulation audio from the modulation analyser was measured and recorded. The test was performed on the centre channel at the maximum power output level.

The results are shown in the table below.



Product Service

2.1 MODULATION

2.1.6 Test Results

Middle Channel 127.5MHz

Modulation Frequency (Hz)	Demodulation Audio Voltage (V)
100	0.0003
200	0.166
300	0.167
400	0.326
500	0.367
1000	0.618
1500	0.502
2000	0.417
2500	0.356
3000	0.281
3500	0.178
4000	0.0003
4500	0.0003
5000	0.0003



Product Service

2.2 MODULATION

2.2.1 Specification Reference

FCC CFR 47: Parts 2.1047(b), 87.141(a)

2.2.2 Equipment Under Test

6525 MDR Transceiver

2.2.3 Date of Test

10th November 2006

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

Part 2.1047(b)

The EUT was connected to the modulation analyser via a 30dB attenuator. The modulation analyser was set to measure AM. The demodulated audio output from the modulation analyser was connected to the audio analyser input. A range of test voltages was established to show the limiting characteristics of the EUT's modulating circuitry. With the voltage range determined, the modulation frequency to the EUT from the audio analyser was varied over the frequency range 300Hz to 5kHz. The EUT was tested on the centre channel at its maximum output power level.

Part 87.141(a)

The EUT was connected to the modulation analyser via a 30dB attenuator. The modulation analyser was set to measure AM. The frequency for which a constant given input yielded the highest depth of modulation as determined in 2.1049(C). This frequency was 380Hz. The input level to the EUT was increased and the depth of modulation was monitored.

The results are shown in the table below.



Product Service

2.2 MODULATION

2.2.6 Test Results

Middle Channel 127.5MHz

350Hz

Audio Input Voltage (mV)	Demodulation Audio Voltage (V)
800	0.391
900	0.440
1000	0.490
1100	0.539
1200	0.589
1500	0.641
2000	0.644
3000	0.529

600Hz

Audio Input Voltage (mV)	Demodulation Audio Voltage (V)
800	0.360
900	0.406
1000	0.451
1100	0.496
1200	0.542
1500	0.603
2000	0.614
3000	0.522

1000Hz

Audio Input Voltage (mV)	Demodulation Audio Voltage (V)
800	0.369
900	0.416
1000	0.462
1100	0.509
1200	0.556
1500	0.618
2000	0.624
3000	0.575



2.2 MODULATION

2.2.6 Test Results

Middle Channel 127.5MHz

2000Hz

Audio Input Voltage (mV)	Demodulation Audio Voltage (V)
800	0.358
900	0.404
1000	0.448
1100	0.493
1200	0.539
1500	0.599
2000	0.603
3000	0.613

3000Hz

Audio Input Voltage (mV)	Demodulation Audio Voltage (V)
800	0.274
900	0.306
1000	0.341
1100	0.375
1200	0.409
1500	0.511
2000	0.543
3000	0.551

4000Hz

Audio Input Voltage (mV)	Demodulation Audio Voltage (V)
800	2.508
900	2.503
1000	2.492
1100	2.492
1200	2.477
1500	2.483
2000	2.489
3000	2.500



Product Service

2.2 MODULATION

2.2.6 Test Results

Middle Channel 127.5MHz

5000Hz

Audio Input Voltage (mV)	Demodulation Audio Voltage (V)
800	2.450
900	2.433
1000	2.431
1100	2.429
1200	2.428
1500	2.415
2000	2.419
3000	2.426

87.141(a)

Modulation Frequency (Hz)	Modulation Depth (%)
380	97.2

Limit for Maximum Modulation Depth	<100%
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Product Service

2.3 FREQUENCY STABILITY

2.3.1 Specification Reference

FCC CFR 47: Parts 2 and 87 Subpart E, Section 2.1055(a + b), 2.1055(d) and 87.133(a)
RSS-141 Clause 4.2, 6.1, RSS-Gen Clause 4.5

2.3.2 Equipment Under Test

6525 MDR Transceiver

2.3.3 Date of Test

28th November 2006

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 EUT was set to transmit without modulation and the frequency error was measured using a modulation analyse. The measurement was repeated at minimum and maximum voltage extremes and at minimum and maximum temperature extremes.

2.3.6 Test Results

VHF Channels

Test Conditions		Frequency Drift (Hz)		
Temperature Interval(°C)	Supply Voltage	118 MHz	127.5MHz	136.975MHz
- 30	V _{nom} (120 V AC)	+625	+557	+597
- 20	V _{nom} (120 V AC)	+287	+285	+331
- 10	V _{nom} (120 V AC)	+269	+308	+277
0	V _{nom} (120 V AC)	+180	+200	+238
+ 10	V _{nom} (120 V AC)	+210	+242	+272
T _{nom} (+ 20)	V _{nom} (120 V AC)	+290	+303	+347
	V _{nom} (102 V AC)	+298	+318	+354
	V _{nom} (138 V AC)	+322	+333	+370
+ 30	V _{nom} (120 V AC)	+384	+396	+413
+ 40	V _{nom} (120 V AC)	+398	+423	+461
+ 50	V _{nom} (120 V AC)	+438	+455	+466
+ 55	V _{nom} (120 V AC)	+439	+451	+512



Product Service

2.3 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.3.6 Test Results

TCXO

Test Conditions		Frequency Drift (Hz)		
Temperature Interval(°C)	Supply Voltage	118 MHz	127.5MHz	136.975MHz
- 30	V _{nom} (120 V AC)	+13	+24	+22
- 20	V _{nom} (120 V AC)	-9	-12	-8
- 10	V _{nom} (120 V AC)	-12	-9	-16
0	V _{nom} (120 V AC)	-28	-28	-29
+ 10	V _{nom} (120 V AC)	-20	-16	-18
T _{nom} (+ 20)	V _{nom} (120 V AC)	-7	-8	-5
	V _{nom} (102 V AC)	-7	-5	-4
	V _{nom} (138 V AC)	-1	-3	+1
+ 30	V _{nom} (120 V AC)	+7	+6	+4
+ 40	V _{nom} (120 V AC)	+9	+9	+9
+ 50	V _{nom} (120 V AC)	+14	+10	+9
+ 55	V _{nom} (120 V AC)	+12	+13	+13

Limit	±20ppm
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Remarks

EUT complies with Parts 2 and 87 Subpart E, Section 2.1055(a + b), 2.1055(d) and 87.133(a) and RSS-141 Clause 4.2, 6.1, RSS-Gen Clause 4.5.



Product Service

2.4 TRANSMITTER OUTPUT POWER

2.4.1 Specification Reference

FCC CFR 47: Parts 2 and 87 Subpart E, Section 2.1046(a), 87.131
RSS-141 Clause 4.3, RSS-Gen Clause 4.6

2.4.2 Equipment Under Test

6525 MDR Transceiver

2.4.3 Date of Test

9th November 2006 (Mode 1 AM)
24th May 2007 (Mode 2)
7th June 2007 (Mode 1 ACARS)

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 EUT was connected to a spectrum analyser via 30dB of attenuation. The EUT was set to transmit an unmodulated carrier and a power meter was used to measure the mean power. Both Mode 1 and Mode 2 were tested.

2.4.6 Test Results

Test Mode	Test Conditions	Supply Voltage	Transmitter Output Power (dBm)		
	Temperature Interval(°C)		118 MHz	127.5MHz	136.975MHz
Mode 1 AM	T _{nom} (+ 20)	V _{nom} (120 V AC)	43.65	43.80	44.15
Mode 1 ACARS	T _{nom} (+ 20)	V _{nom} (120 V AC)	44.18	44.17	44.35
Mode 2	T _{nom} (+ 20)	V _{nom} (120 V AC)	43.66	43.78	43.92

Limit	≤ 200W, 53dBm
-------	---------------

Test Equipment

The major items of test equipment used for the above tests are shown within the Test Equipment Used table in Section 3.1.

Remarks

EUT complies with CFR 47 Parts 2.1046(a), 87.131, RSS-141 Clause 4.3 and RSS-Gen Clause 4.6.



Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.1 Specification Reference

FCC CFR 47: Parts 2.1051, 2.1057 and 87.139(c) (3)
RSS-141 Clauses 4.5, 6.2

2.5.2 Equipment Under Test

6525 MDR Transceiver

2.5.3 Date of Test

13th and 22nd November 2006 (Mode 1 AM)
1st June 2007 (Mode 1 ACARS)
23rd and 24th May 2007 (Mode 2)

2.5.4 Test Equipment Used

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

2.5.5 Test Procedure

The transmitter output power was reduced using an attenuator and the frequency spectrum investigated from 9kHz to 1.6GHz. The EUT was set to transmit on full power in Modes 1 and then Mode 2. The audio frequency which gave the maximum modulation depth was established. At this frequency, the audio input signal level was adjusted to produce 50% modulation. The input signal to provide 50% modulation was then increased by 16dB for the whole test. The resolution and video bandwidths were set to 30Hz for inband measurements. This was the minimum possible bandwidth that could be set as close to 1% of the emission bandwidth of 7kHz. All other out of band measurements were made with a 3kHz resolution band width. The video bandwidth was set to at least 3 times the resolution bandwidth for all measurements. The spectrum analyser detector was set to "maxhold".

2.5.6 Test Results

Remarks

EUT complies with CFR 47 FCC CFR 47: Parts 2.1051, 2.1057, 87.139(c) (3) and RSS-141 Clauses 4.5, 6.2

Test Equipment

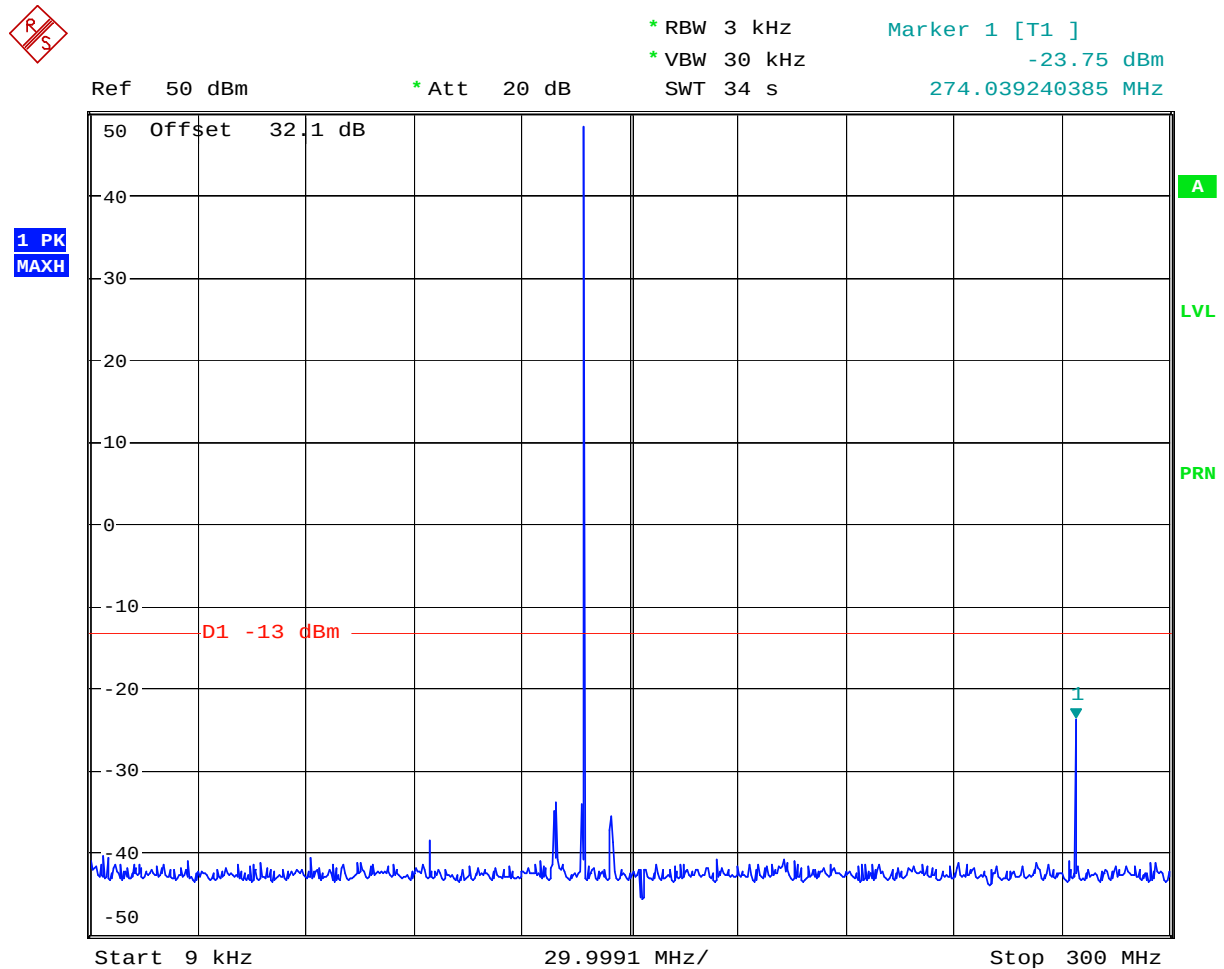
The major items of test equipment used for the above tests are shown within the Test Equipment Used table in Section 3.1.



Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.6 Test Results

Mode 1

Date: 13.NOV.2006 13:20:09

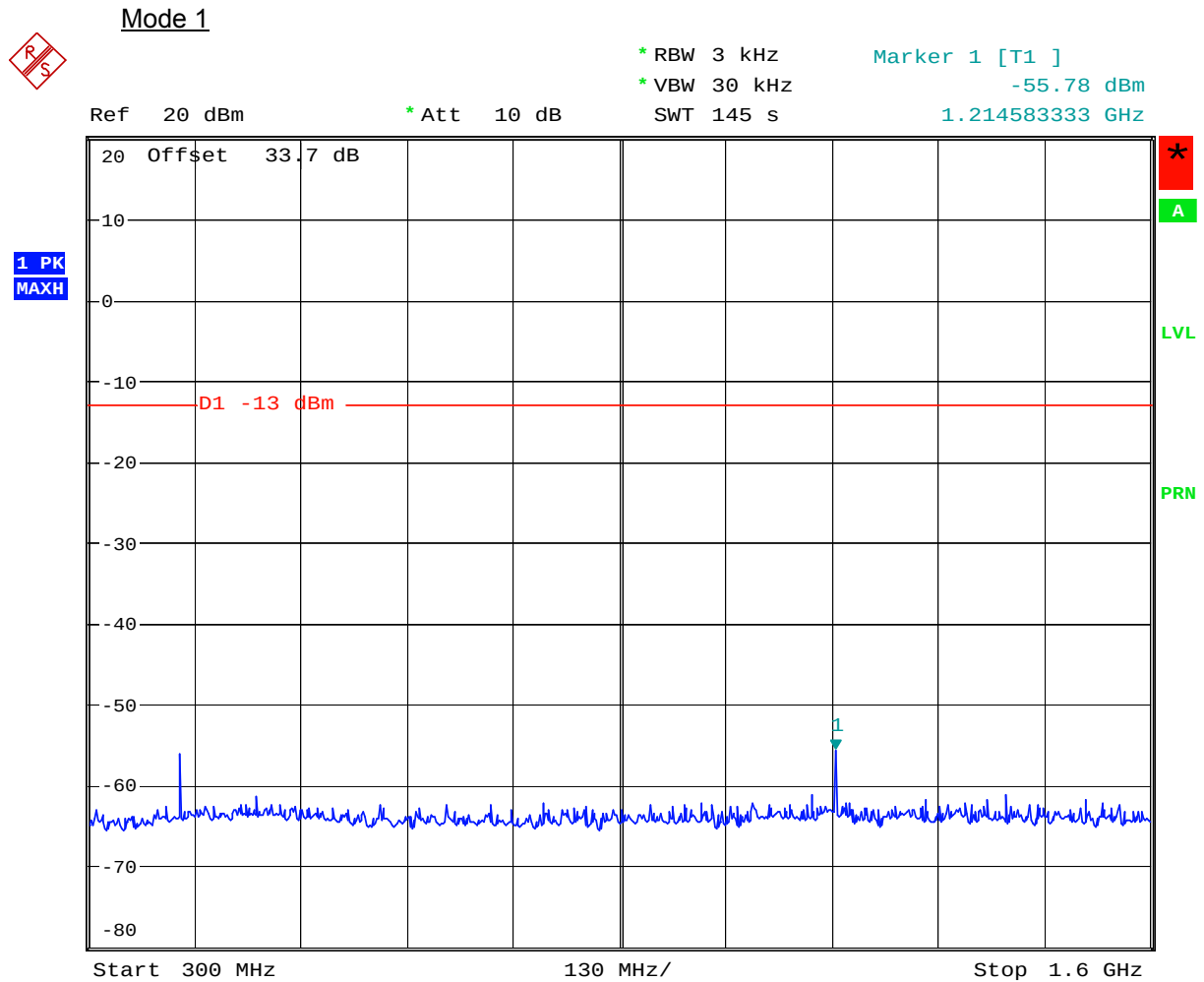
9kHz to 300MHz Top



Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.6 Test Results



Date: 22.NOV.2006 11:36:30

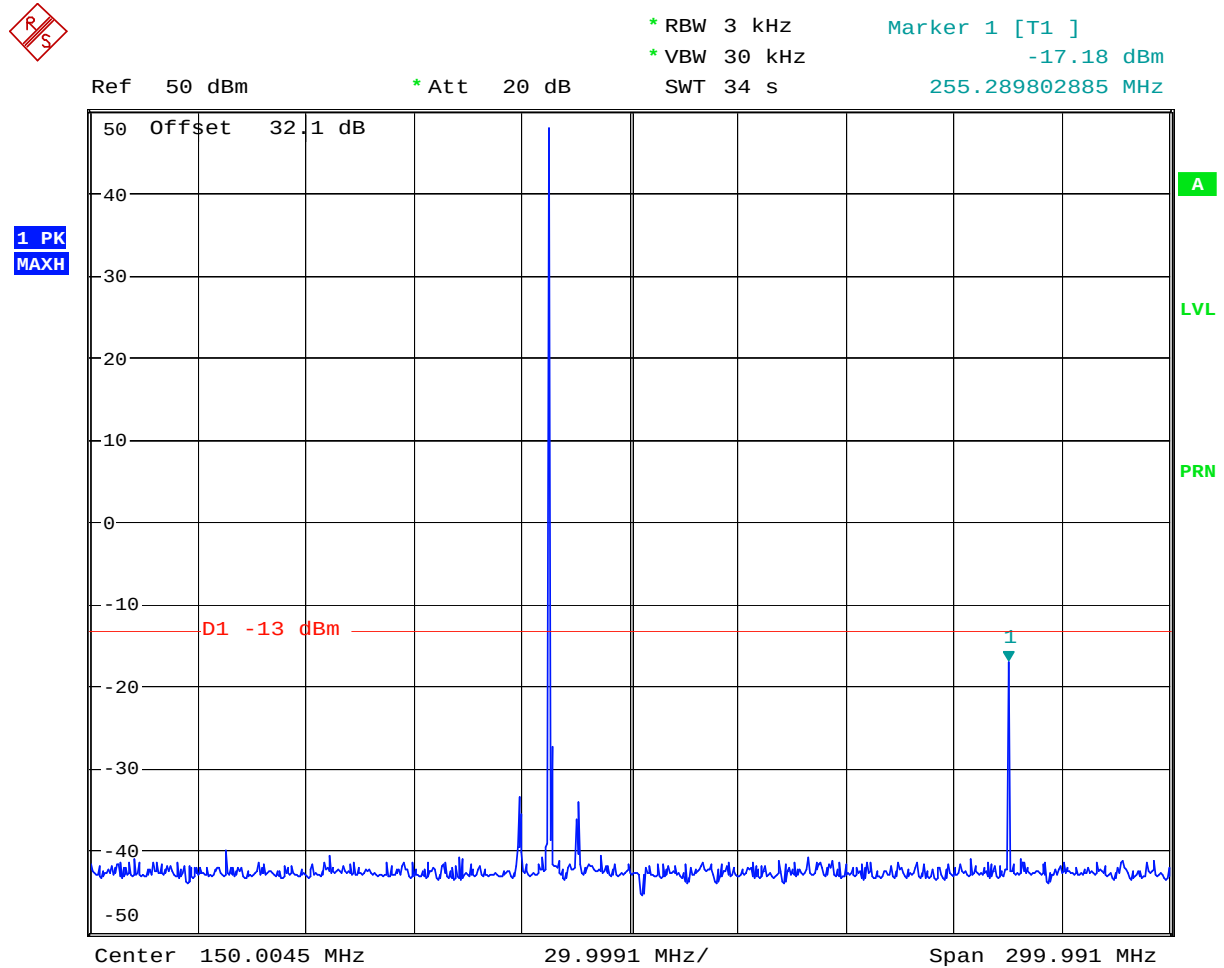
300MHz to 1.6GHz Top



2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.6 Test Results

Mode 1



Date: 13.NOV.2006 12:01:26

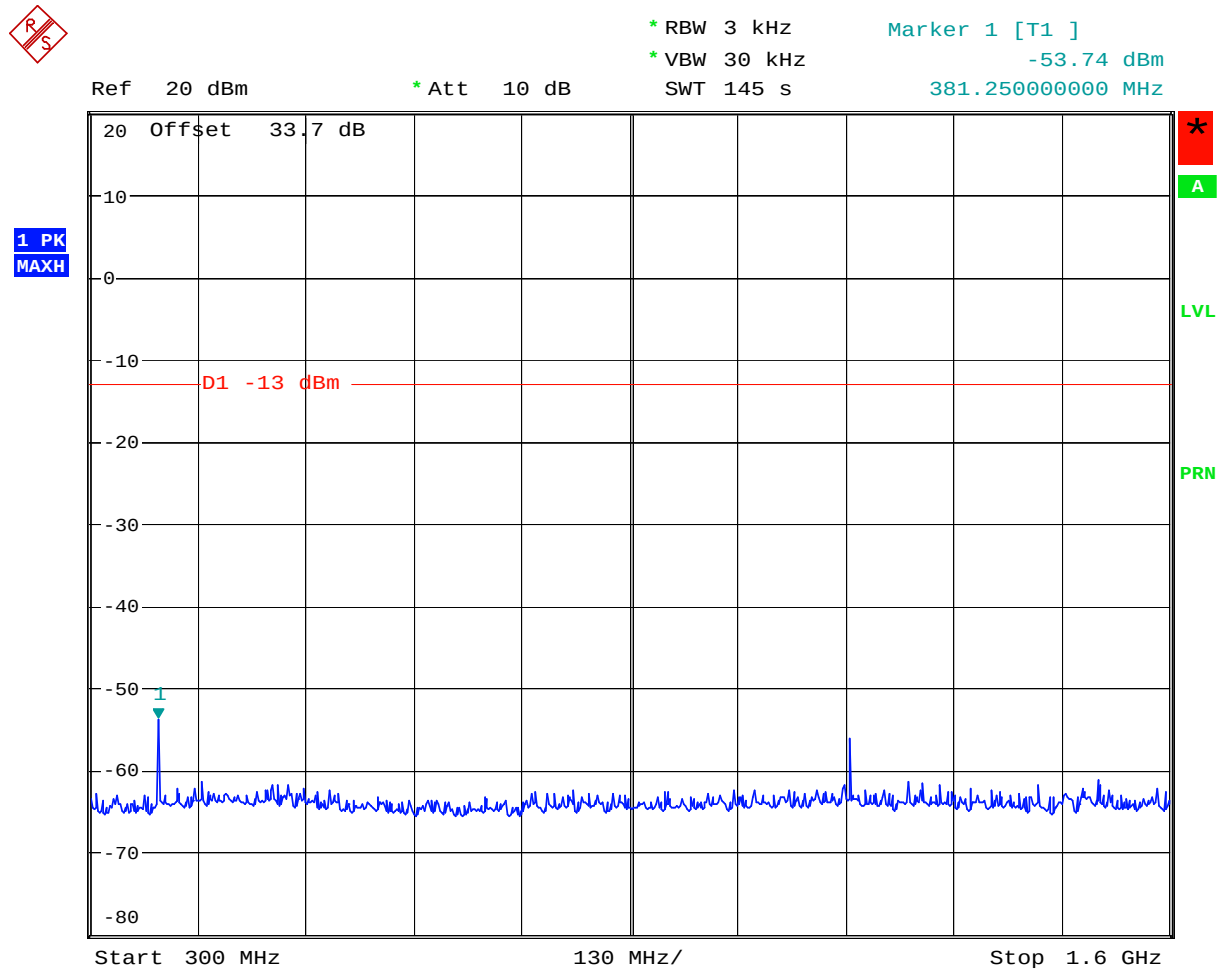
9kHz to 300MHz Middle



Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.6 Test Results

Mode 1

Date: 22.NOV.2006 11:32:30

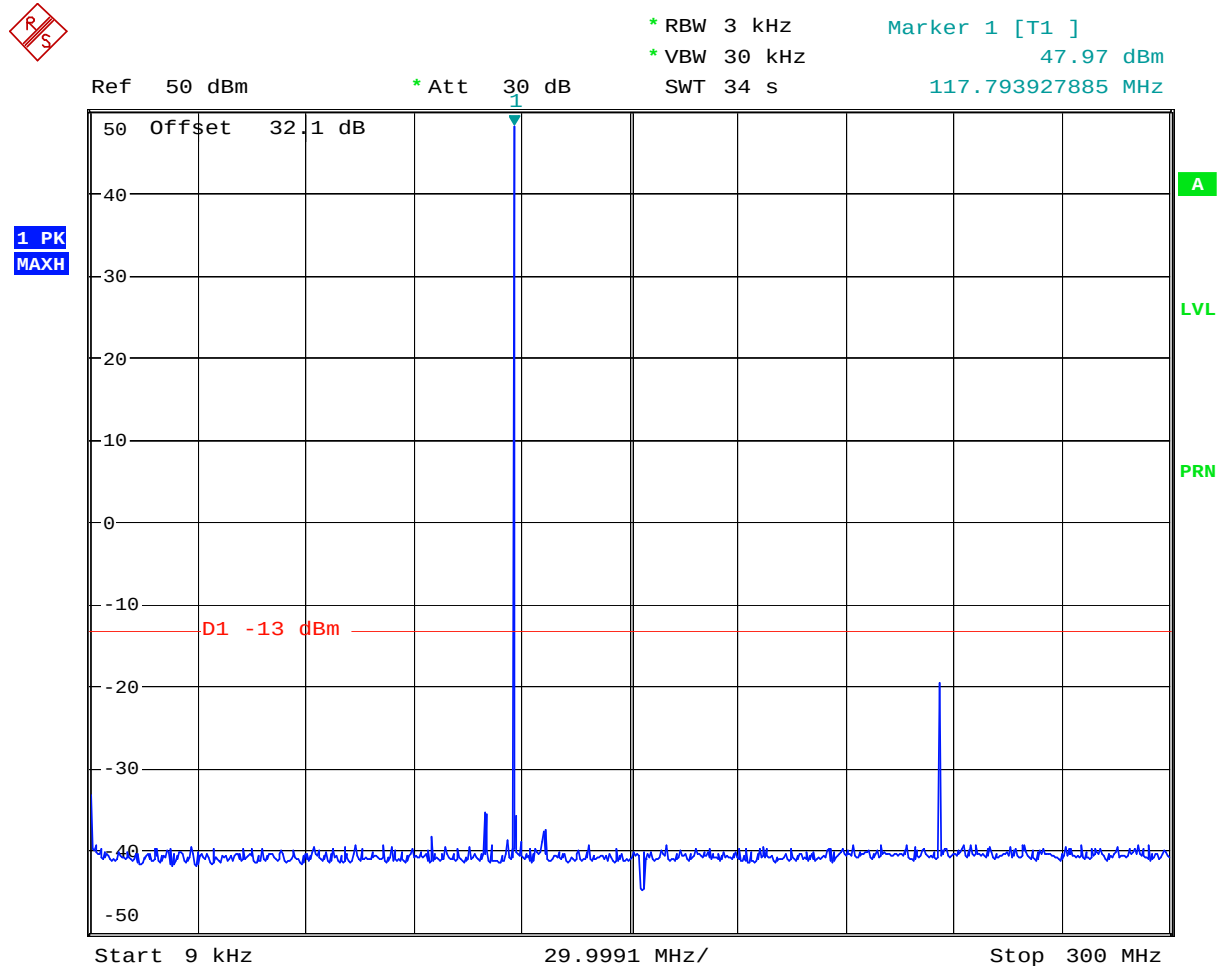
300MHz to 1.6GHz Middle



Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.6 Test Results

Mode 1

Date: 13.NOV.2006 14:02:27

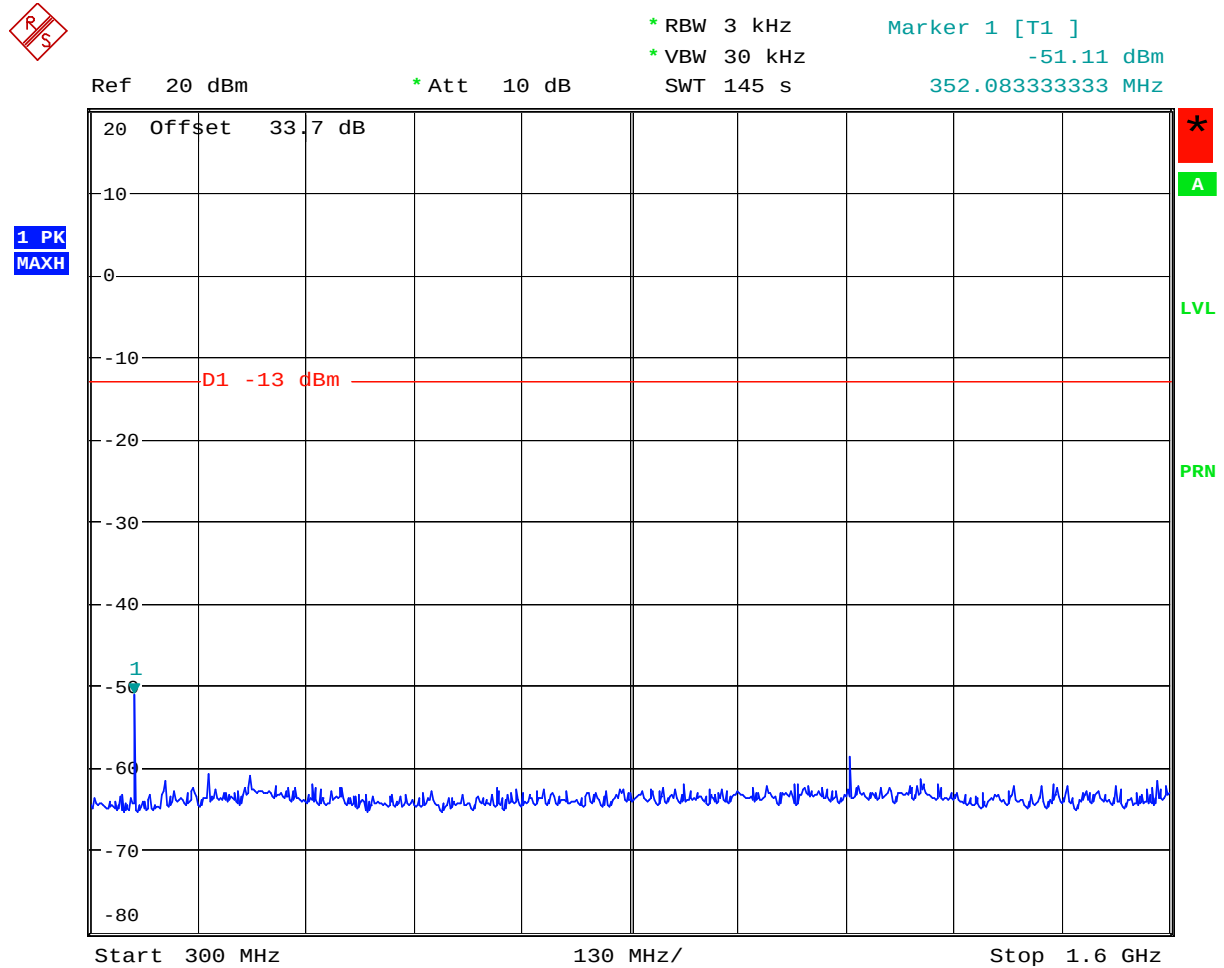
9kHz to 300MHz Bottom



Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.6 Test Results

Mode 1

Date: 22.NOV.2006 11:28:32

300MHz to 1.6GHz Bottom



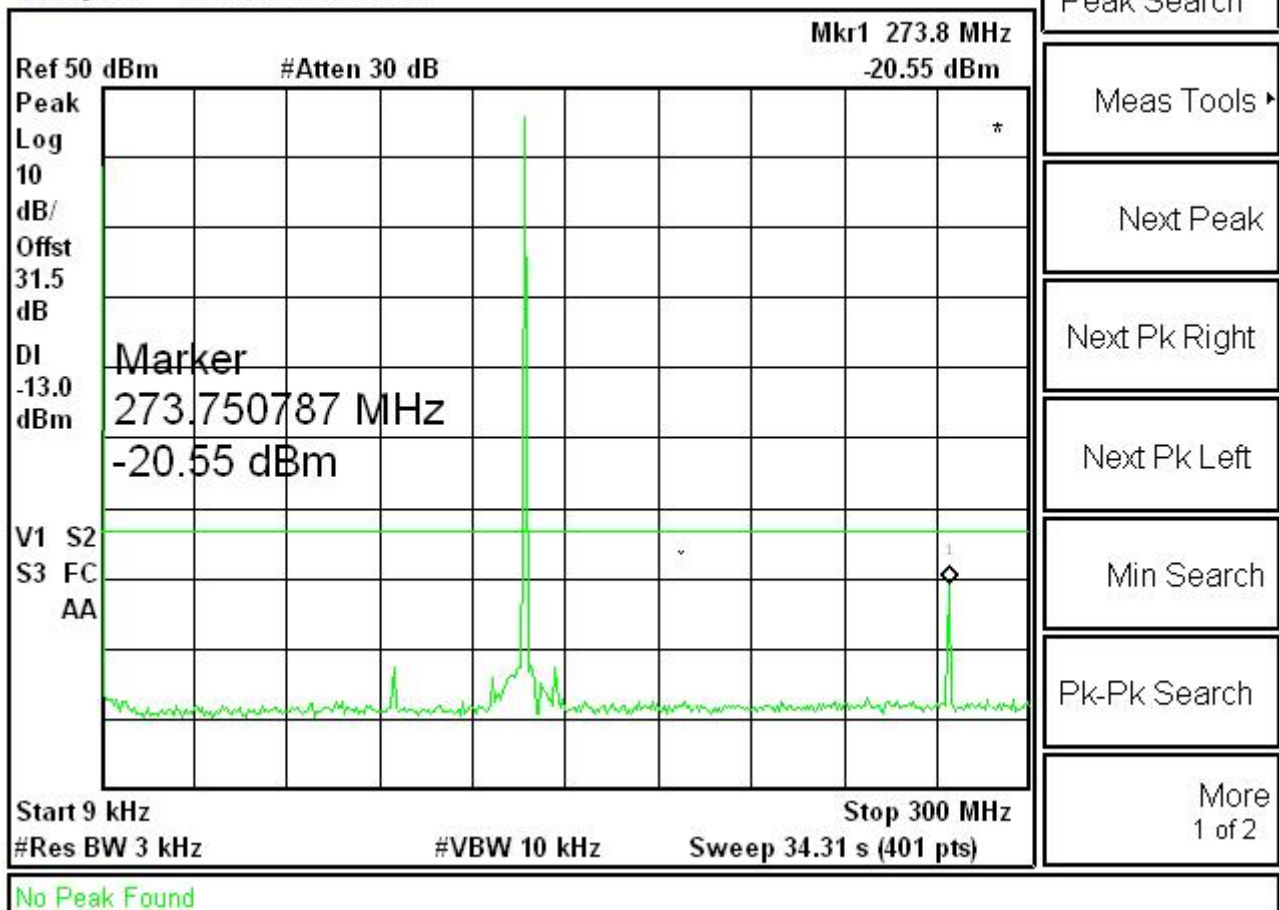
Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.7 Test Results

Mode 1 ACARS

* Agilent 11:35:07 Jun 1, 2007

9kHz to 300MHz Top



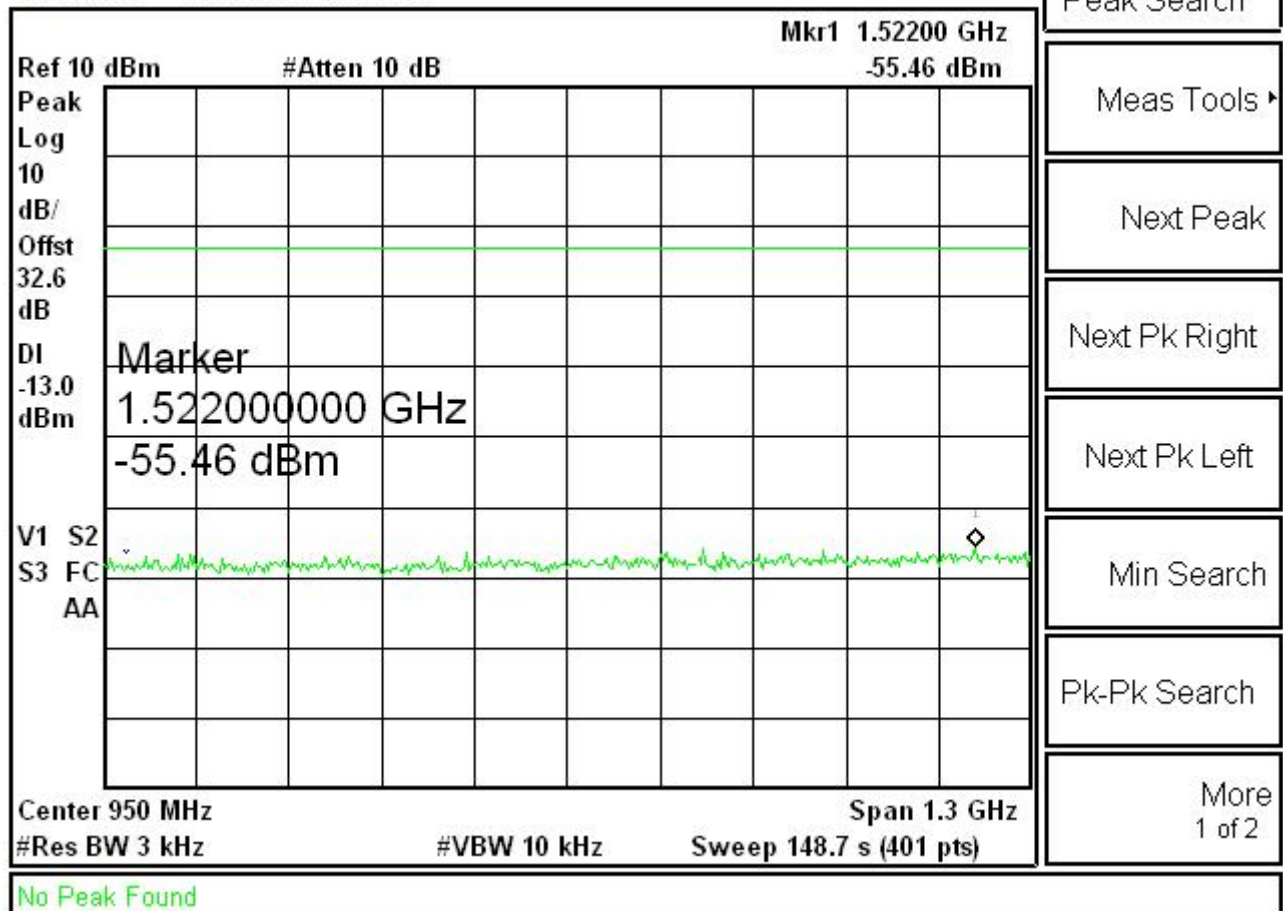
Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.7 Test Results

Mode 1 ACARS

Agilent 12:16:13 Jun 1, 2007



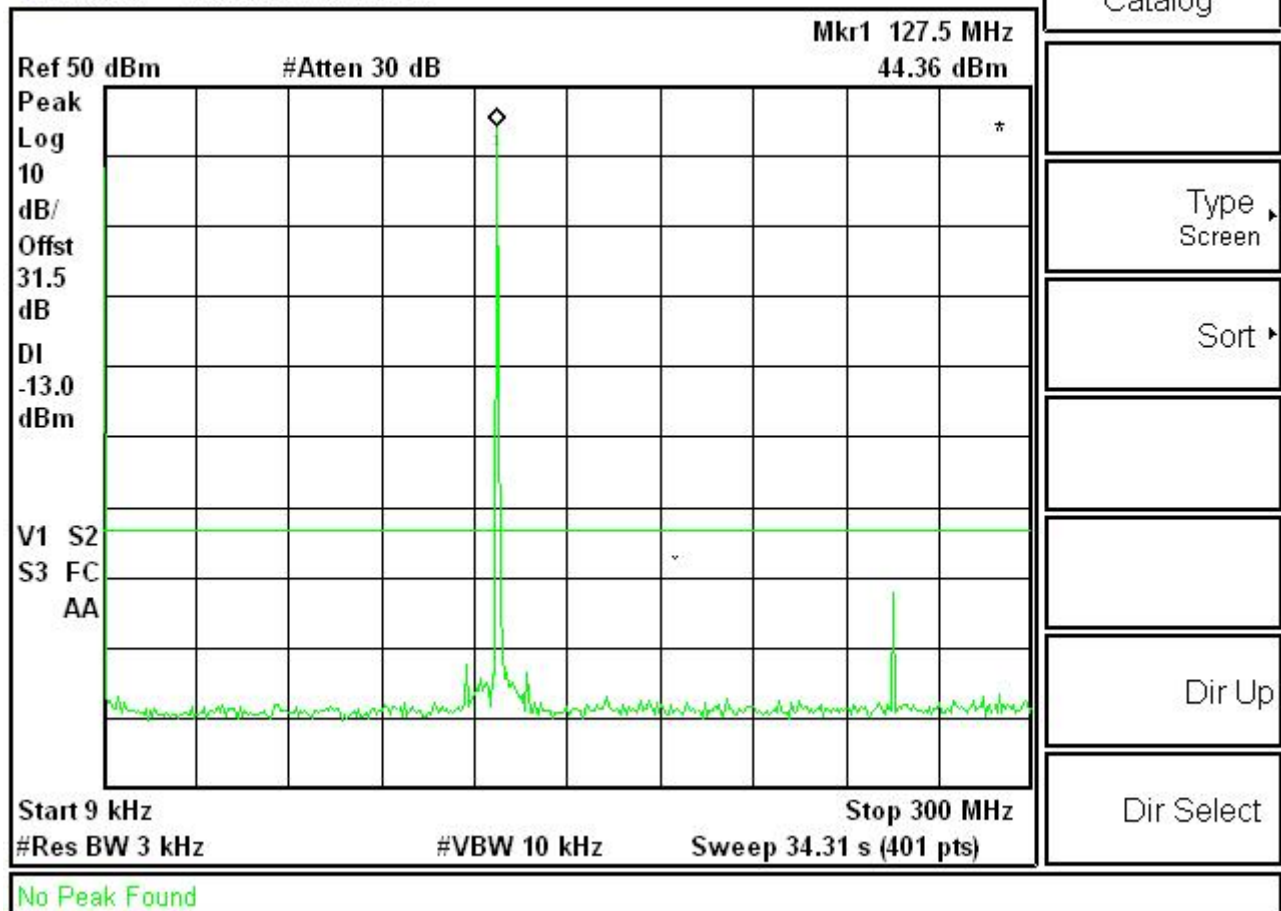
300MHz to 1.6GHz Top



Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT**2.5.7 Test Results**Mode 1 ACARS

* Agilent 11:25:30 Jun 1, 2007

9kHz to 300MHz Middle



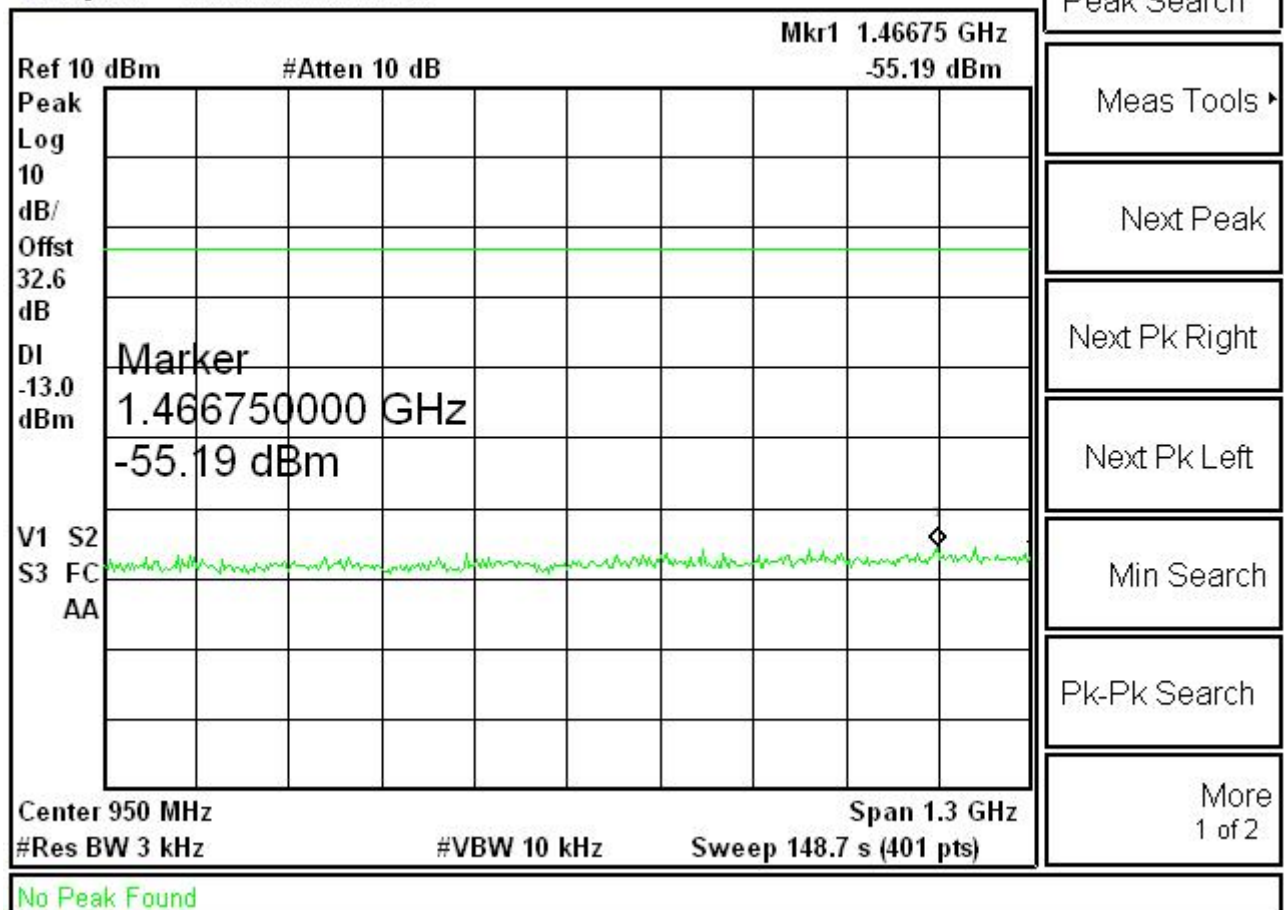
Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.7 Test Results

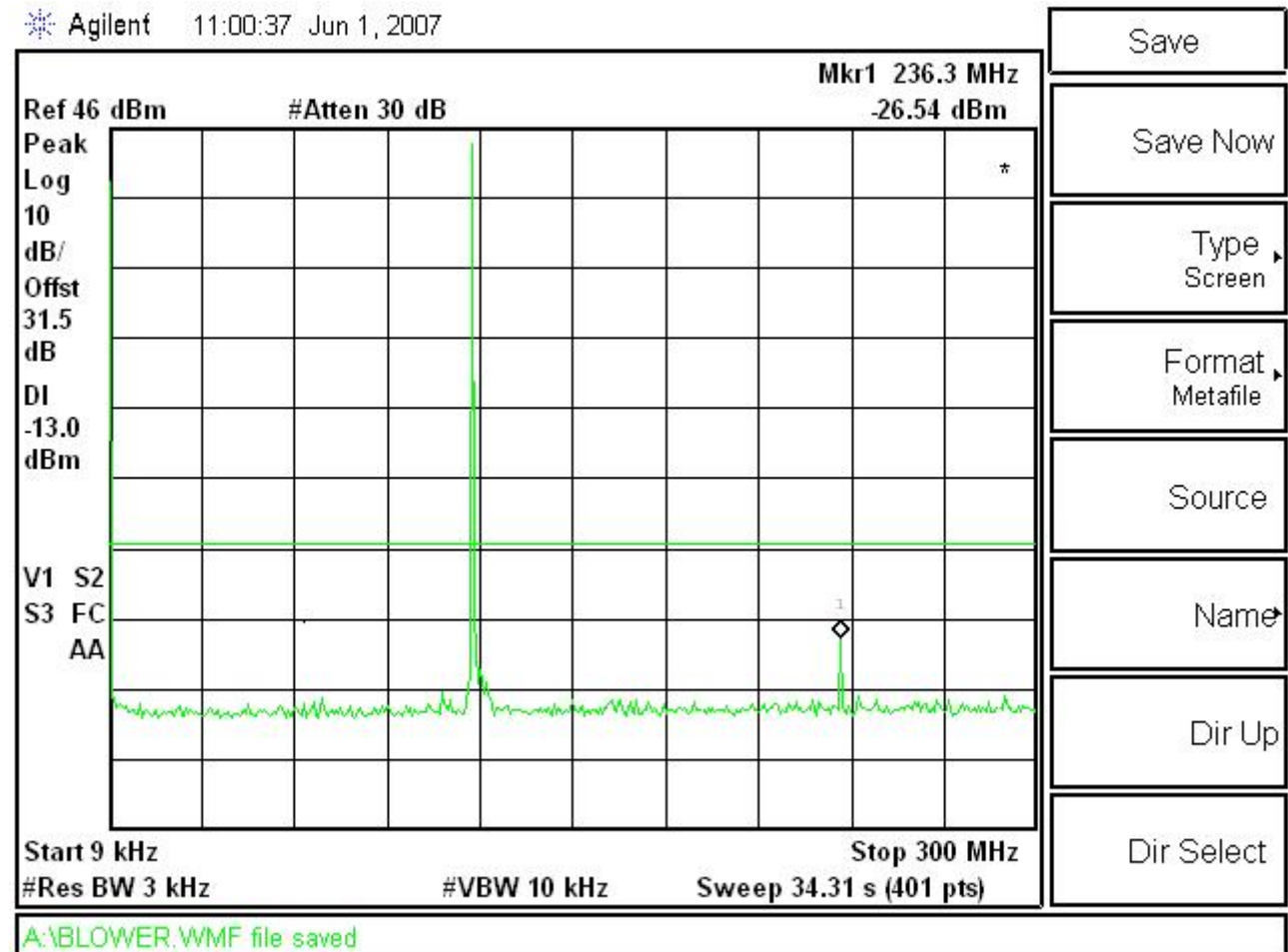
Mode 1 ACARS

Agilent 12:19:42 Jun 1, 2007

300MHz to 1.6GHz Middle



Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT**2.5.7 Test Results**Mode 1 ACARS9kHz to 300MHz Bottom



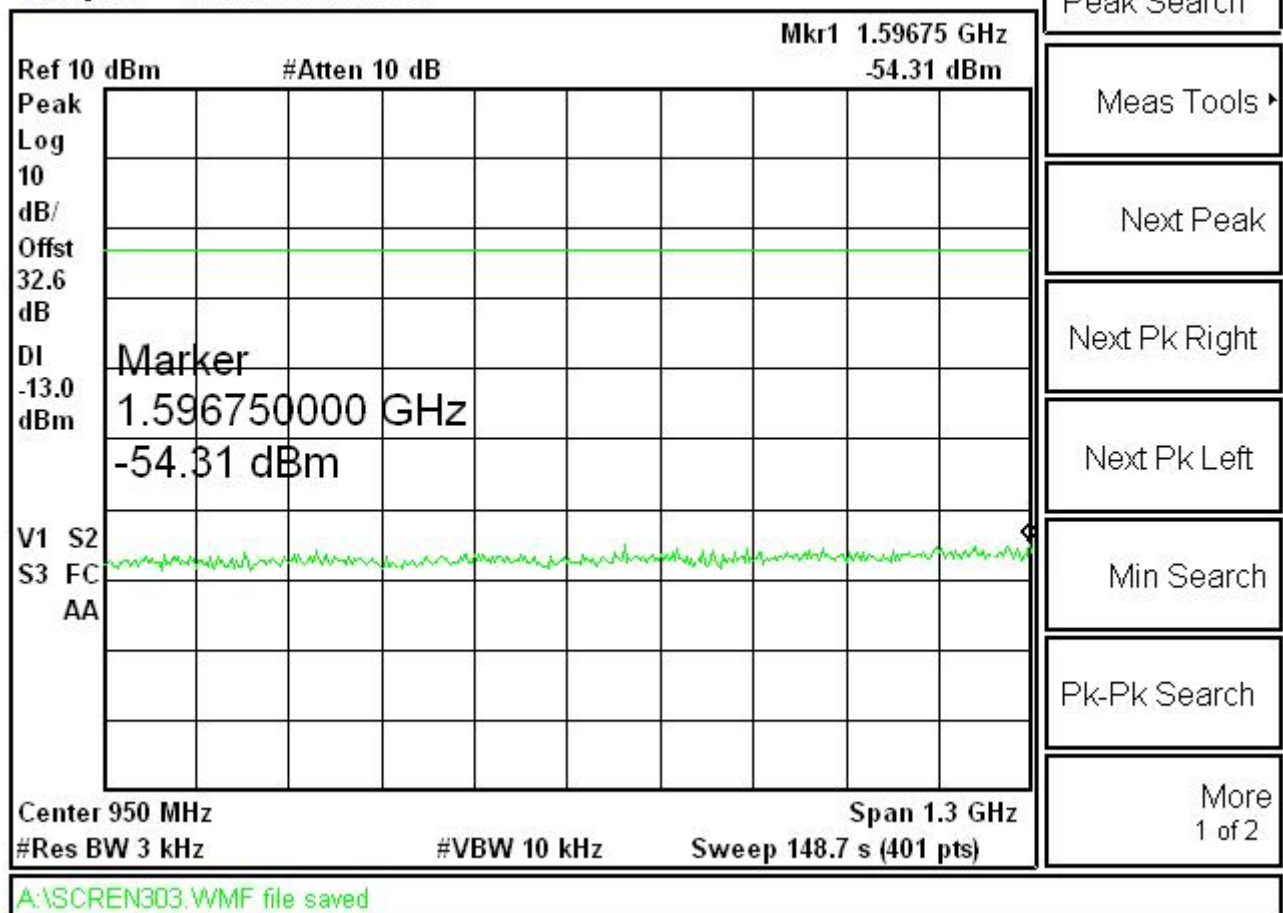
Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT

2.5.7 Test Results

Mode 1 ACARS

Agilent 12:25:38 Jun 1, 2007

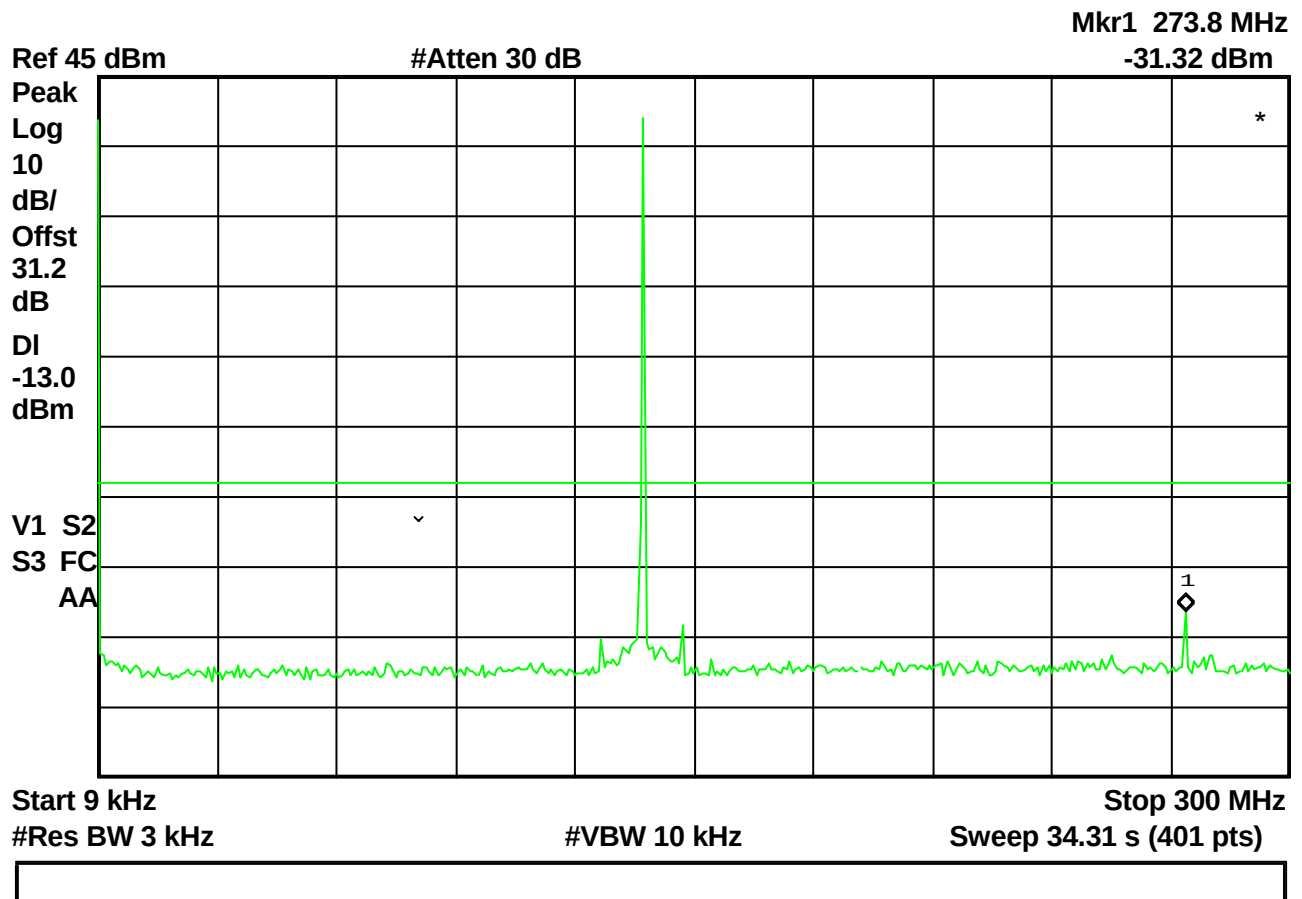
300MHz to 1.6GHz Bottom



Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT**2.5.8 Test Results**Mode 2

* Agilent 13:12:13 May 23, 2007

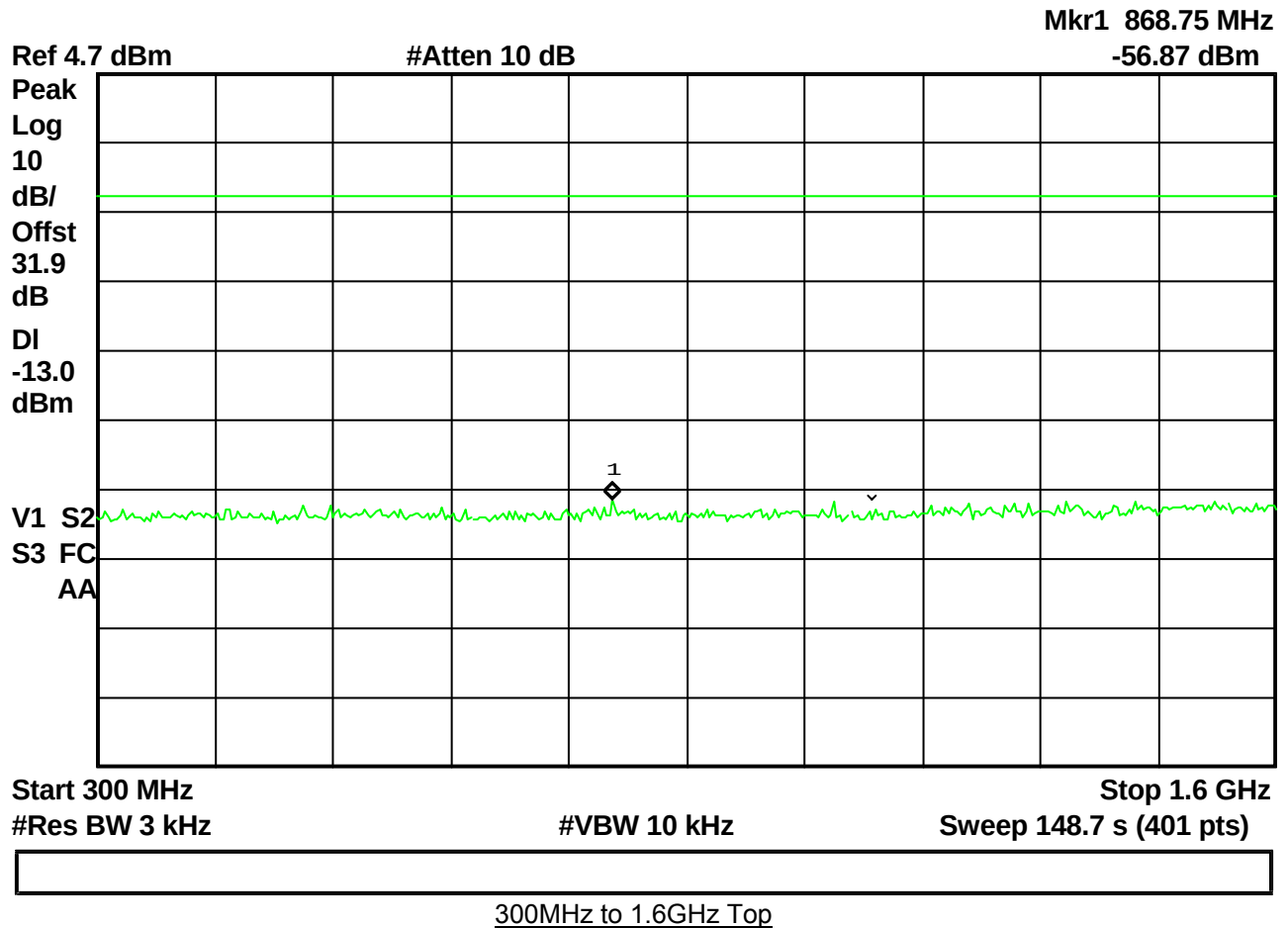
9kHz to 300MHz Top



Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT**2.5.8 Test Results**Mode 2

❄ Agilent 13:40:45 May 23, 2007

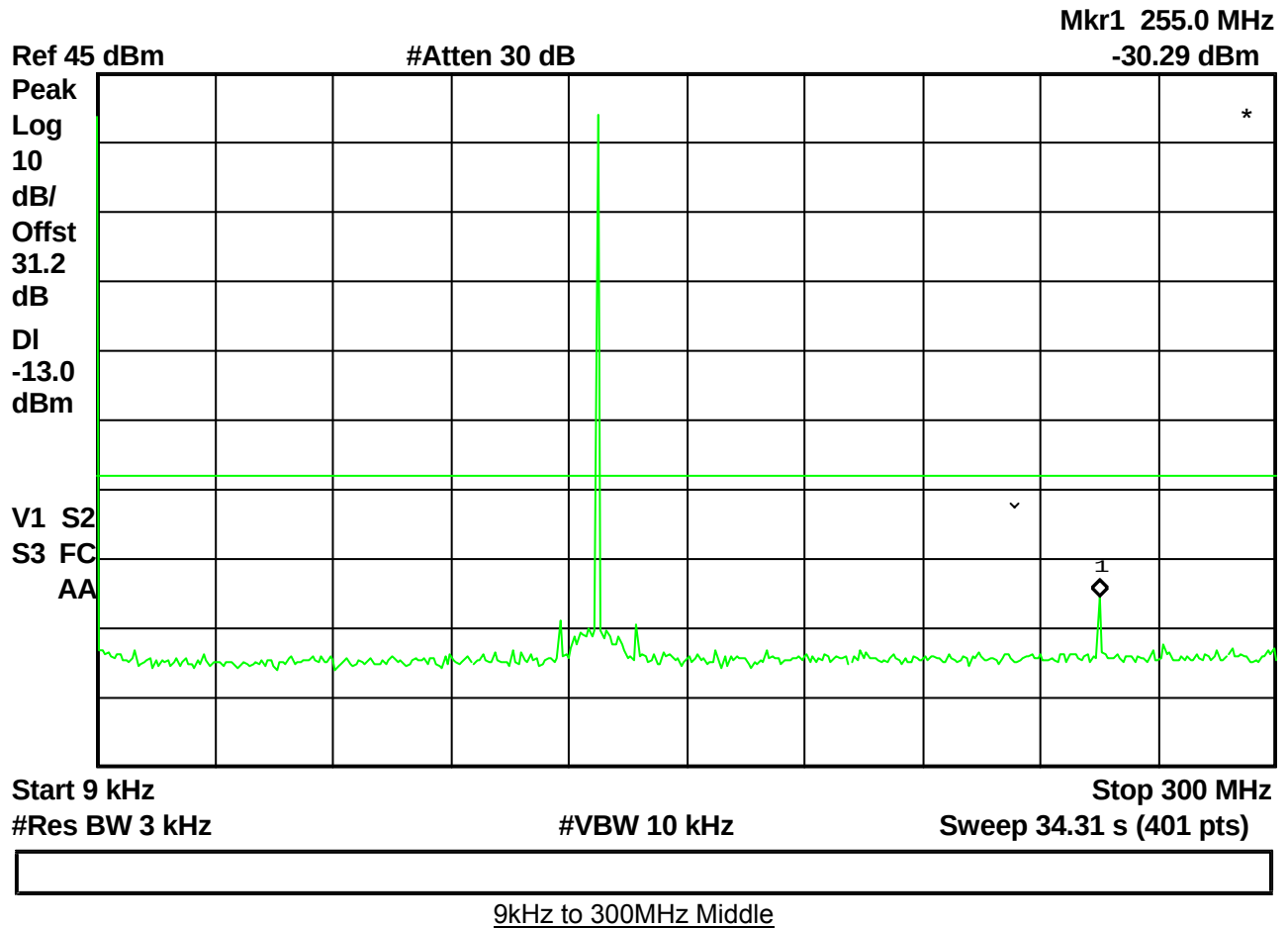




Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT**2.5.8 Test Results**Mode 2

❄ Agilent 13:06:26 May 23, 2007

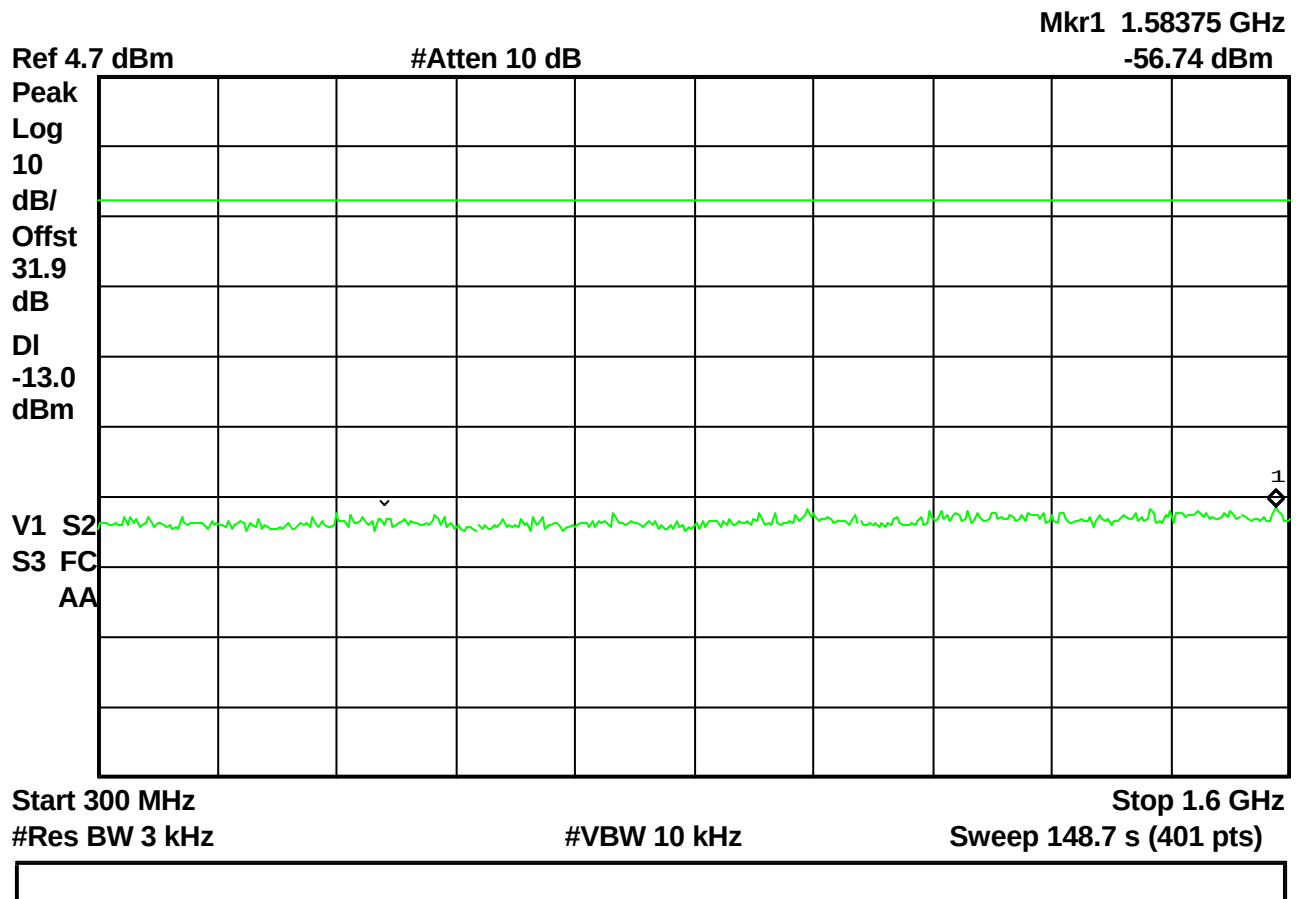




Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT**2.5.8 Test Results**Mode 2

* Agilent 13:51:06 May 23, 2007

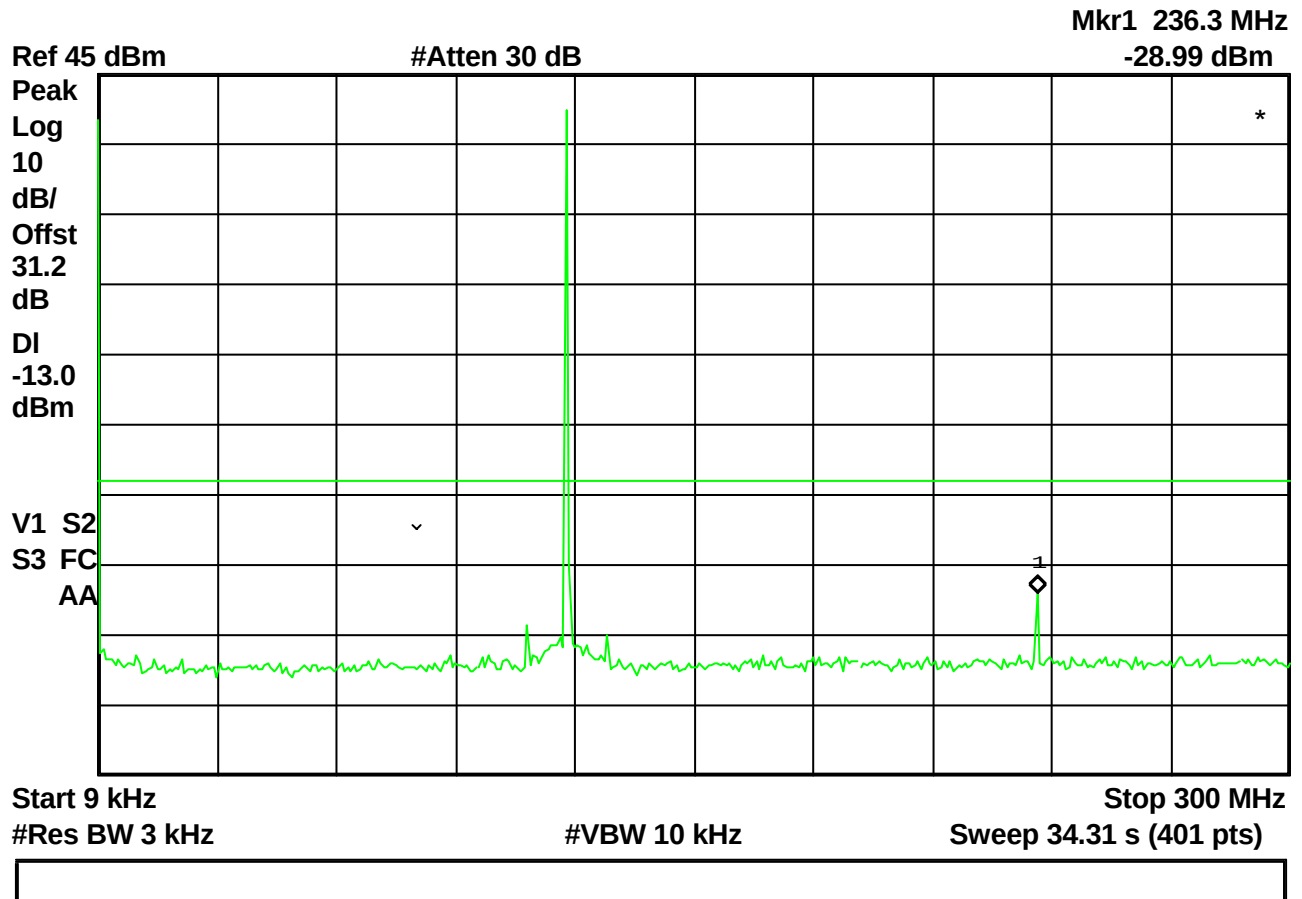




Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT**2.5.8 Test Results**Mode 2

* Agilent 12:56:47 May 23, 2007

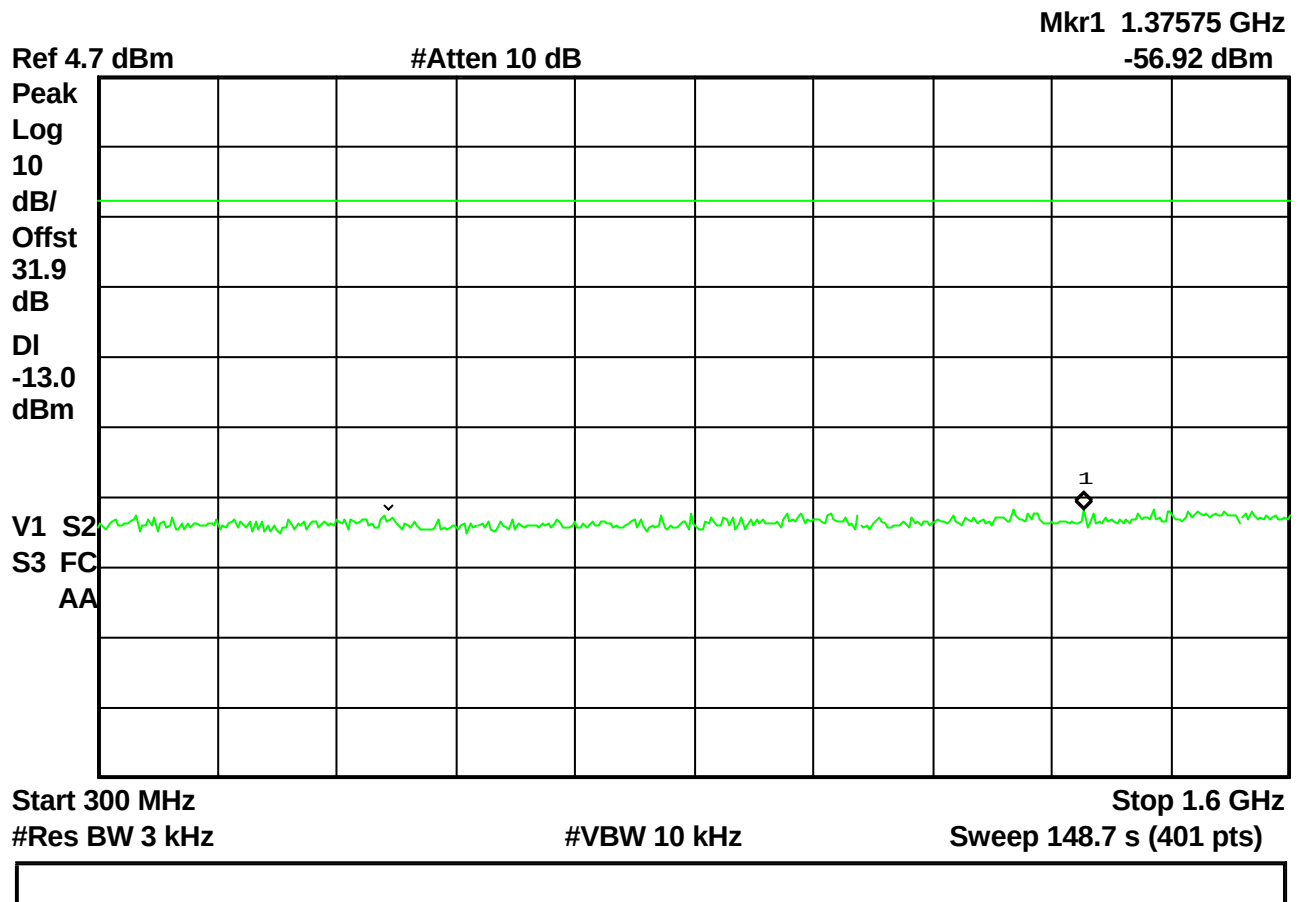




Product Service

2.5 TRANSMITTER SPURIOUS EMISSIONS ANTENNA PORT**2.5.8 Test Results**Mode 2

* Agilent 13:59:09 May 23, 2007





Product Service

2.6 OCCUPIED BANDWIDTH**2.6.1 Specification Reference**

FCC CFR 47: Parts 2.1049(c) and 87.135, 87.137
RSS-141 Clause, 3.2(h), 6.1, 6.2

2.6.2 Equipment Under Test

6525 MDR Transceiver

2.6.3 Date of Test

10th to 24th November 2006

2.6.4 Test Equipment Used

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

2.6.5 Test Procedure

The declared class of emissions of the EUT and the resultant authorised bandwidth derived from 87.137(a) is shown in the table below.

Mode	Class of Emission	Emission Designator	Authorised Bandwidth (kHz)
1 – AM	6K0A3E	A3E	25
1 – ACARS	13K0A2D	A2D	25*
2	14K0G1D	G1D	25

Initially, the EUT was connected via a 30dB attenuator to a modulation analyser, which was set to measure modulation depth. The EUT was set to transmit and the audio input frequency to the EUT was varied between 300Hz and 5kHz. The modulation depth was monitored and the frequency which yielded the highest level of deviation was 680Hz. The level which produced a modulation depth of 50% was established. Then, the audio analyser was set to supply the EUT with an audio tone of 2500Hz at an amplitude 16 dB higher than the established input level which produced a modulation depth of 50%.

The modulation analyser was then replaced with a spectrum analyser and the 99% bandwidth was measured. The measurements were performed on the bottom, middle and top channels.

The plots below show the resultant display from the Spectrum Analyser.

2.6.6 Test Results

Mode	Frequency (MHz)	Power Level (W)	Result (kHz)	Authorised Bandwidth (kHz)
1 AM	118.000	25	5.528846154	25
	127.500	25	5.528846154	25
	136.975	25	5.528846154	25
1 ACARS	118.000	25	0.689102564	25*
	127.500	25	0.681089743	25*
	136.975	25	0.681089743	25*
2	118.000	25	12.179487179	25
	127.500	25	12.179487179	25
	136.975	25	12.099358974	25

Note: * the Authorized Bandwidth for the FCC requirements (FCC pt 87.137(a)) is 50kHz and 25kHz for Industry Canada (RSS 141 Cl. 6.1)

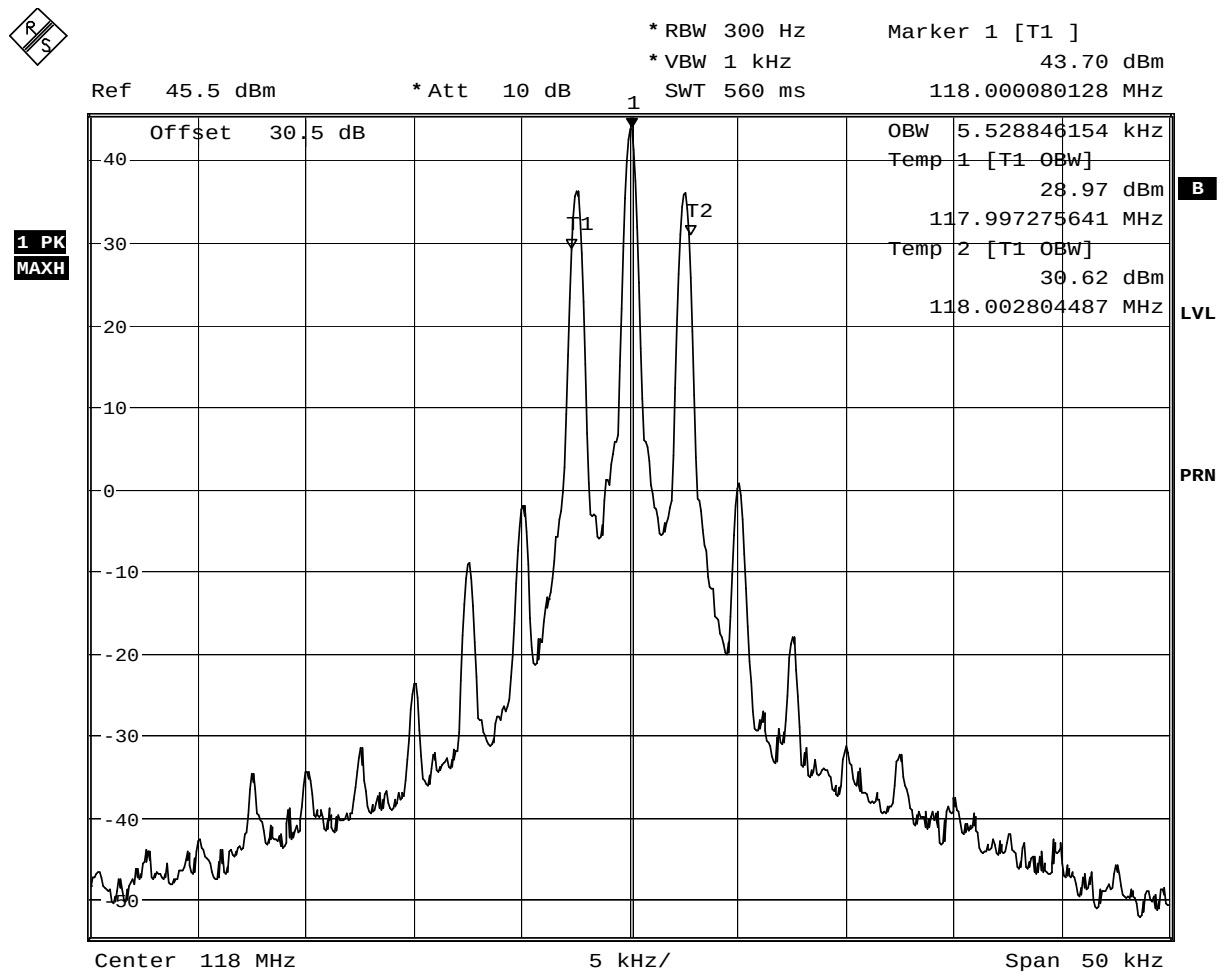


Product Service

2.6 OCCUPIED BANDWIDTH

2.6.6 Test Results - Continued

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 10.NOV.2006 15:34:39

Maximum Power – 118MHz Mode 1 Amplitude Modulation

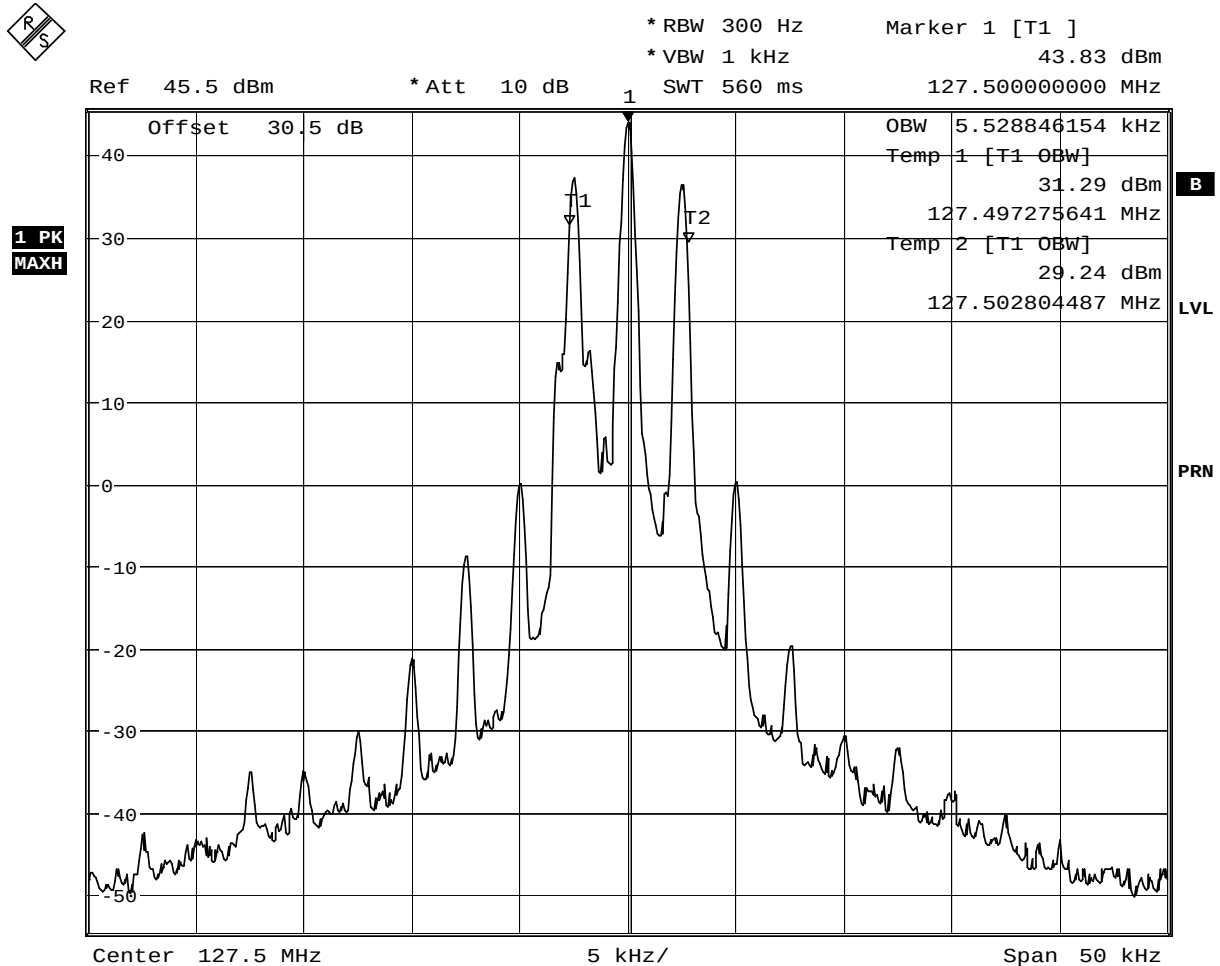


Product Service

2.6 OCCUPIED BANDWIDTH

2.6.6 Test Results - Continued

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 10.NOV.2006 15:38:00

Maximum Power – 127.5MHz Mode 1 Amplitude Modulation

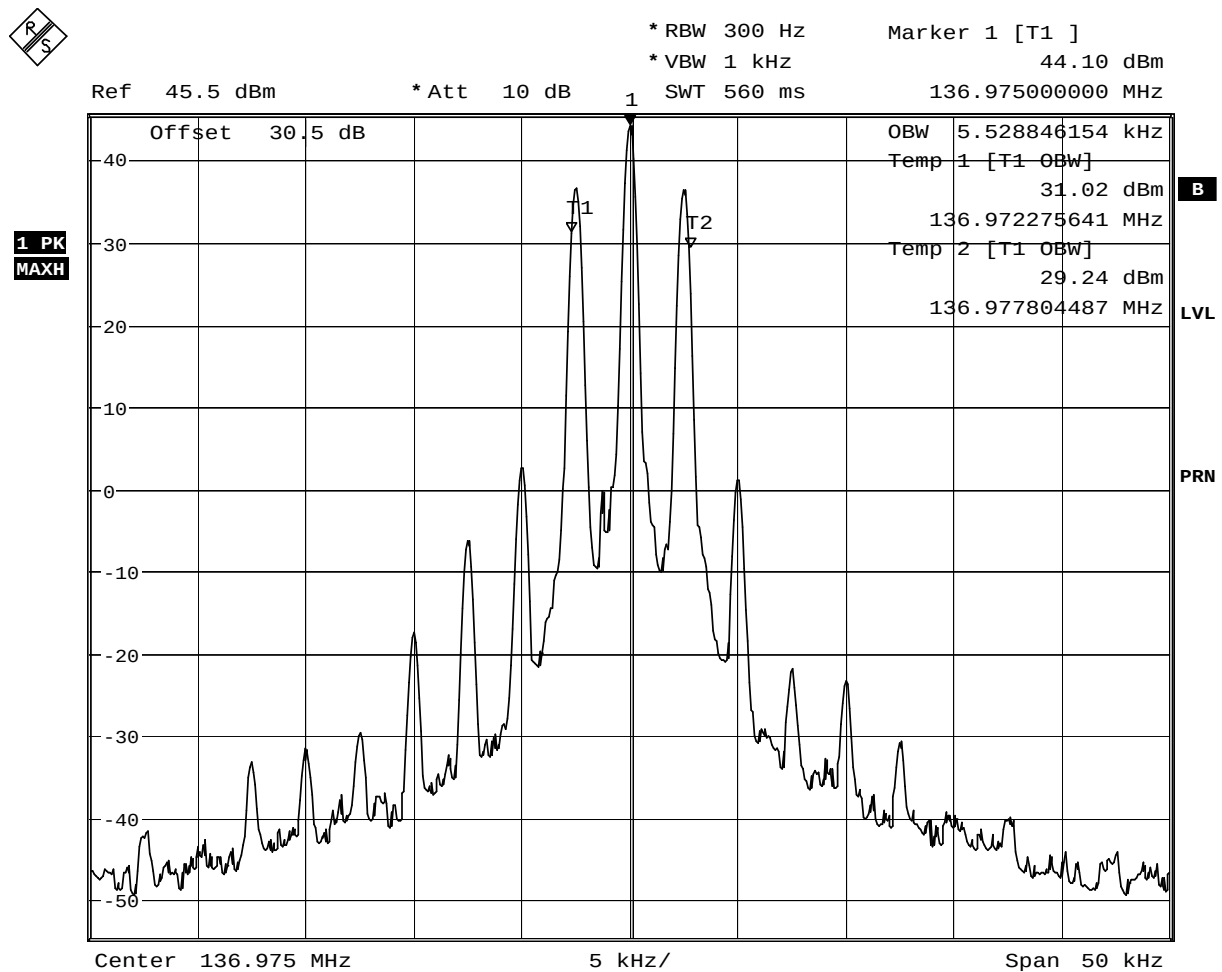


Product Service

2.6 OCCUPIED BANDWIDTH

2.6.6 Test Results - Continued

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 10.NOV.2006 15:44:28

Maximum Power – 136.975MHz Mode 1 Amplitude Modulation

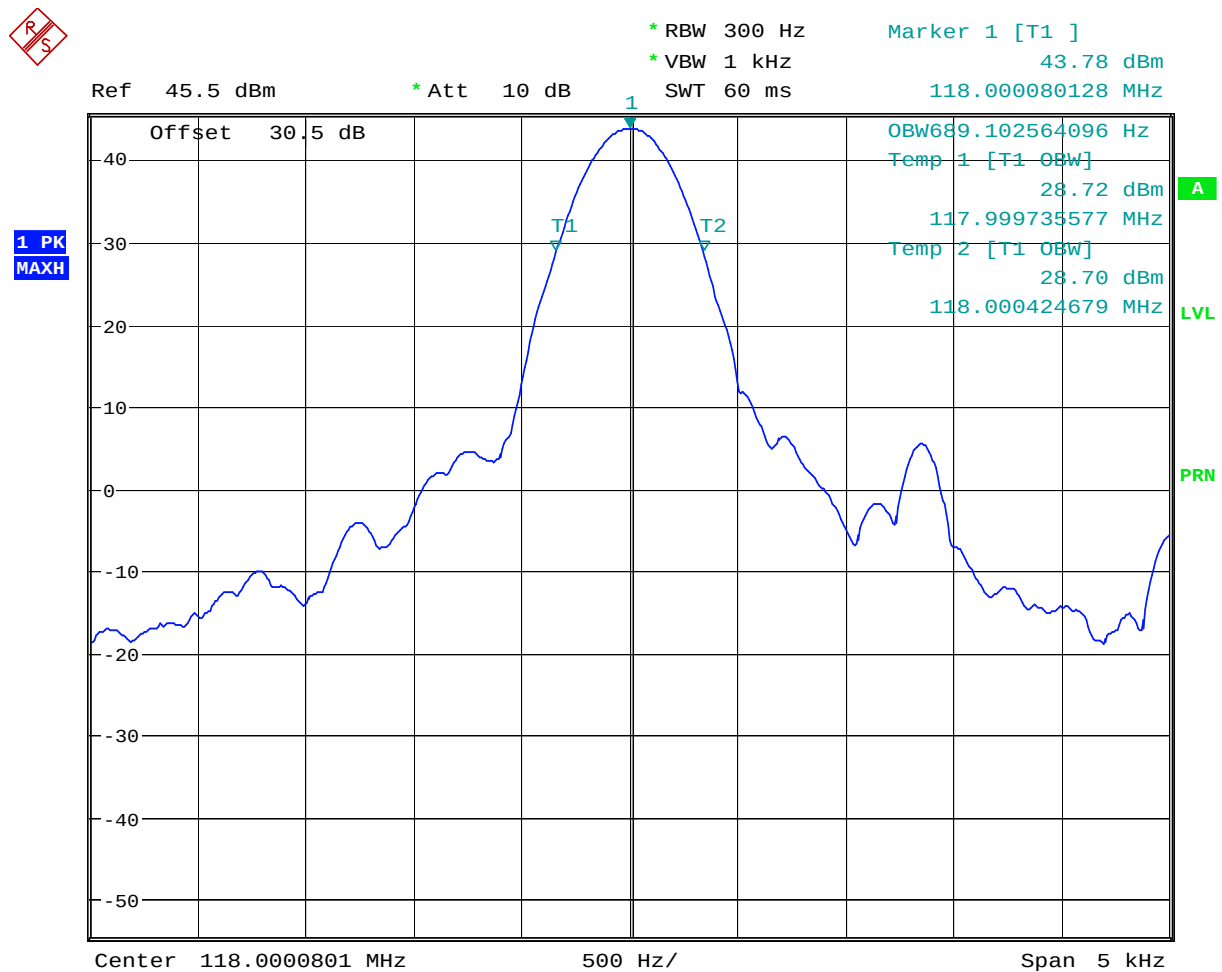


Product Service

2.6 OCCUPIED BANDWIDTH

2.6.5 Test Results - Continued

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 24.NOV.2006 17:23:06

Maximum Power – 118.0MHz Mode 1 ACARS

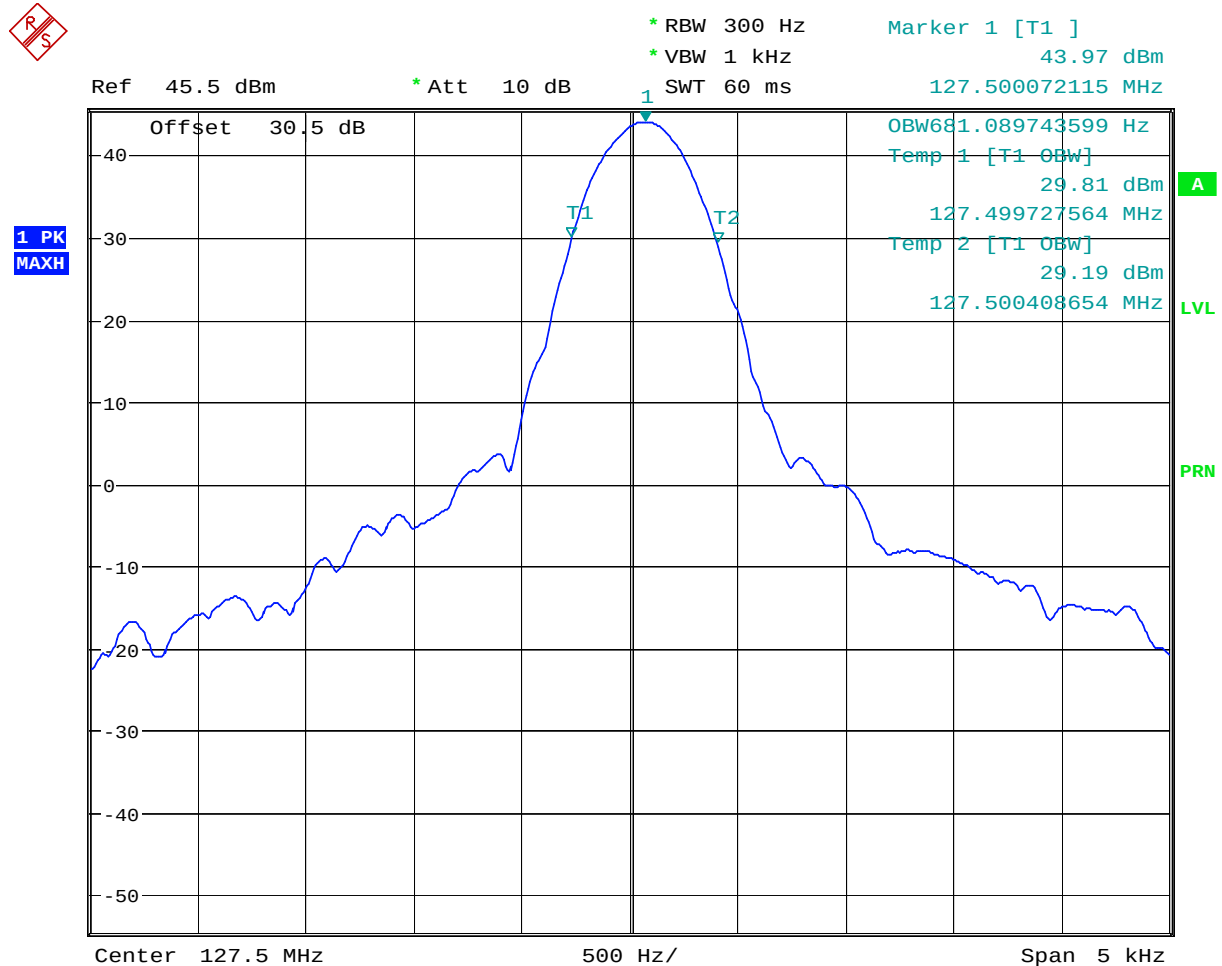


Product Service

2.6 OCCUPIED BANDWIDTH

2.6.6 Test Results - Continued

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 24.NOV.2006 17:41:02
Maximum Power – 127.5MHz Mode 1 ACARS

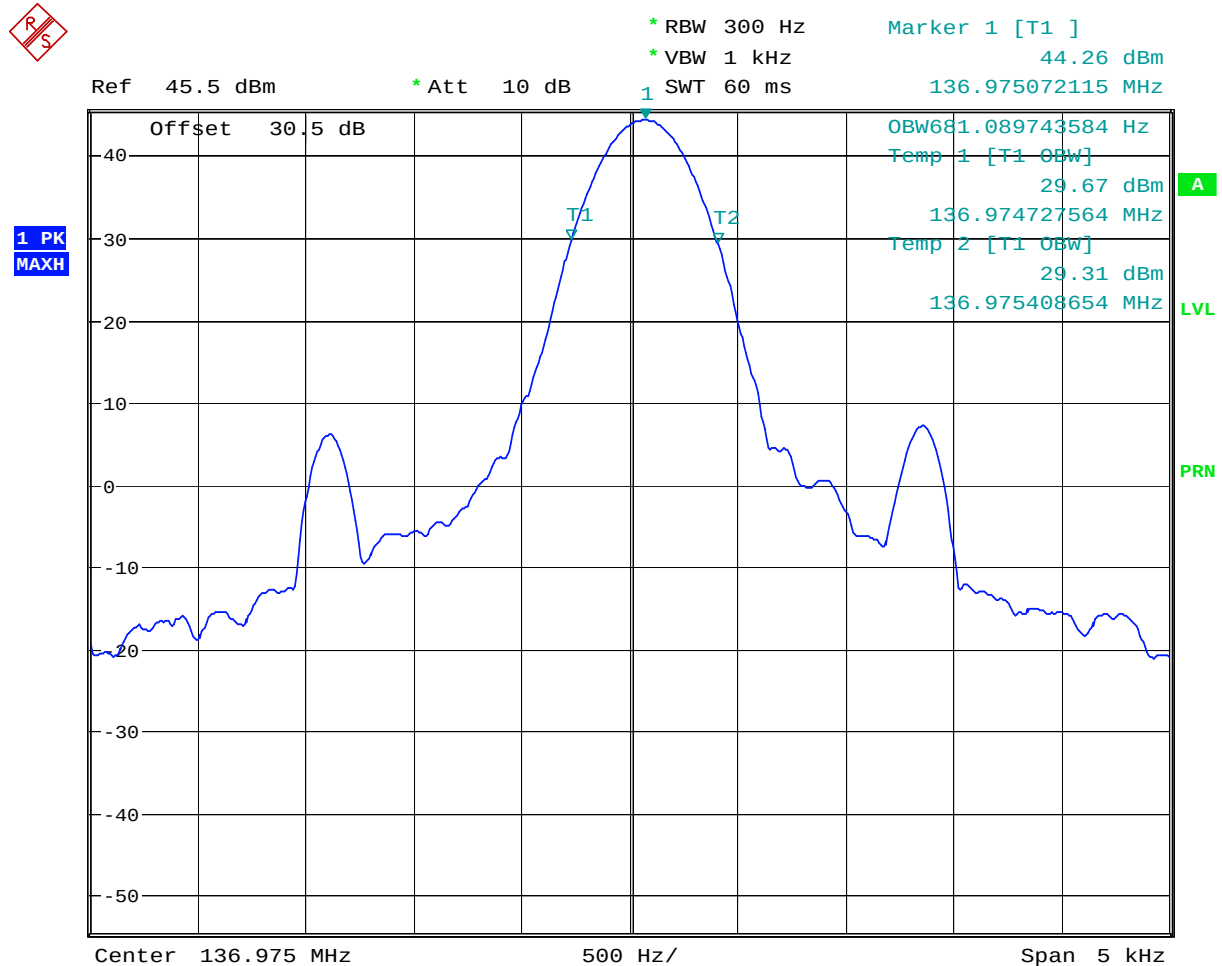


Product Service

2.6 OCCUPIED BANDWIDTH

2.6.6 Test Results - Continued

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 24.NOV.2006 17:42:22

Maximum Power – 136.975MHz Mode 1 ACARS

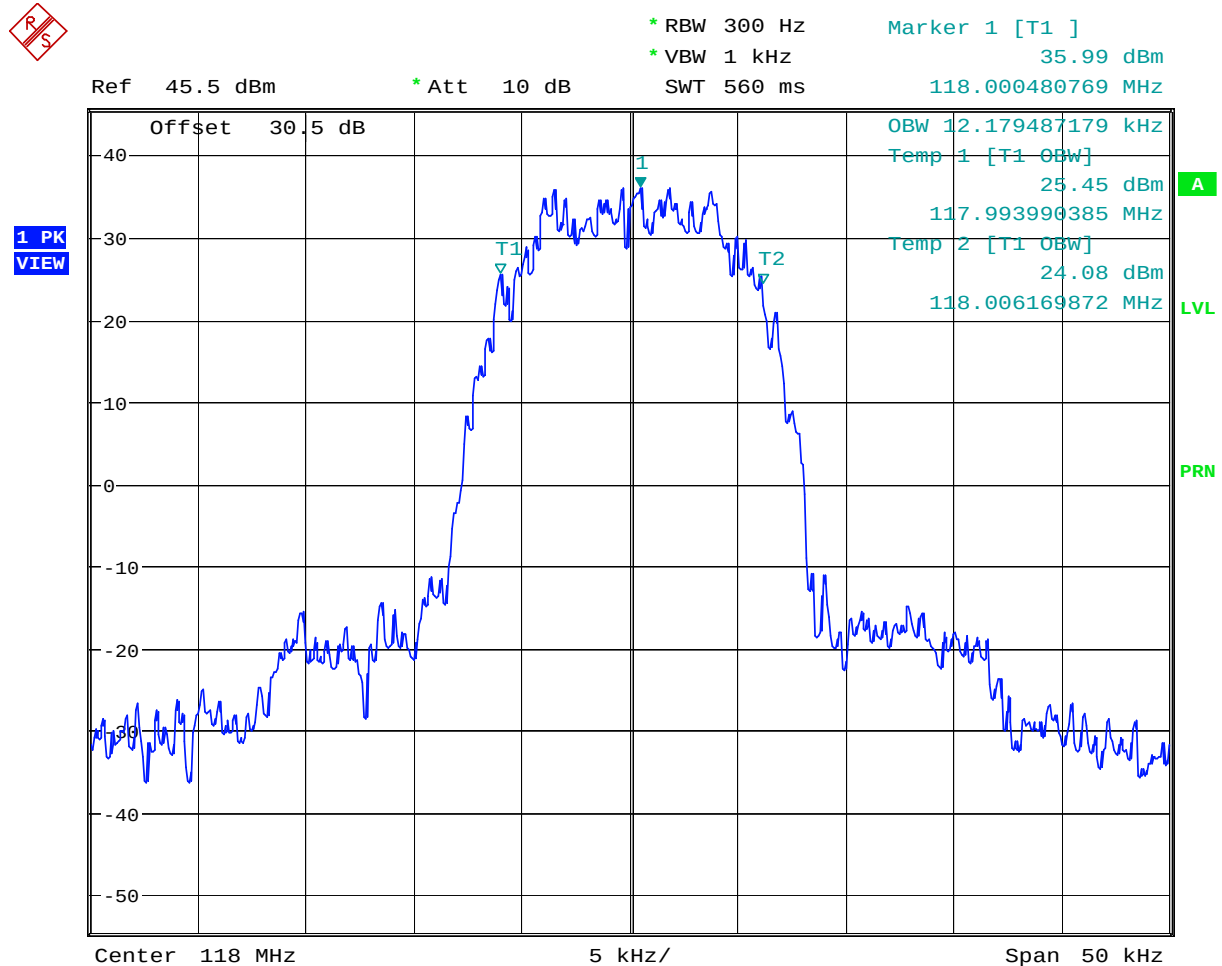


Product Service

2.6 OCCUPIED BANDWIDTH

2.6.6 Test Results - Continued

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 22.NOV.2006 15:11:54

Maximum Power – 118.0MHz Mode 2

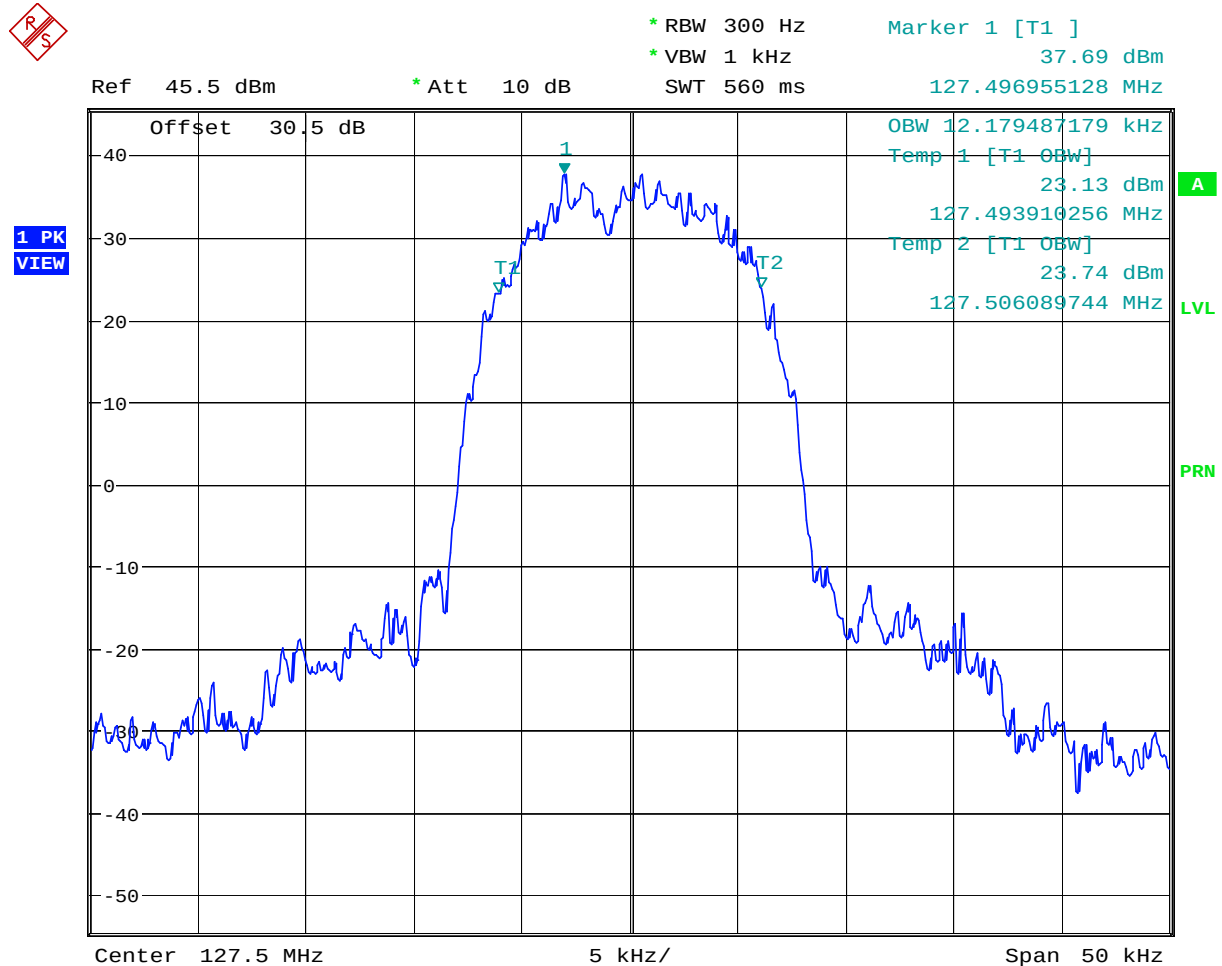


Product Service

2.6 OCCUPIED BANDWIDTH

2.6.6 Test Results - Continued

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 22.NOV.2006 15:14:36

Maximum Power – 127.5MHz Mode 2

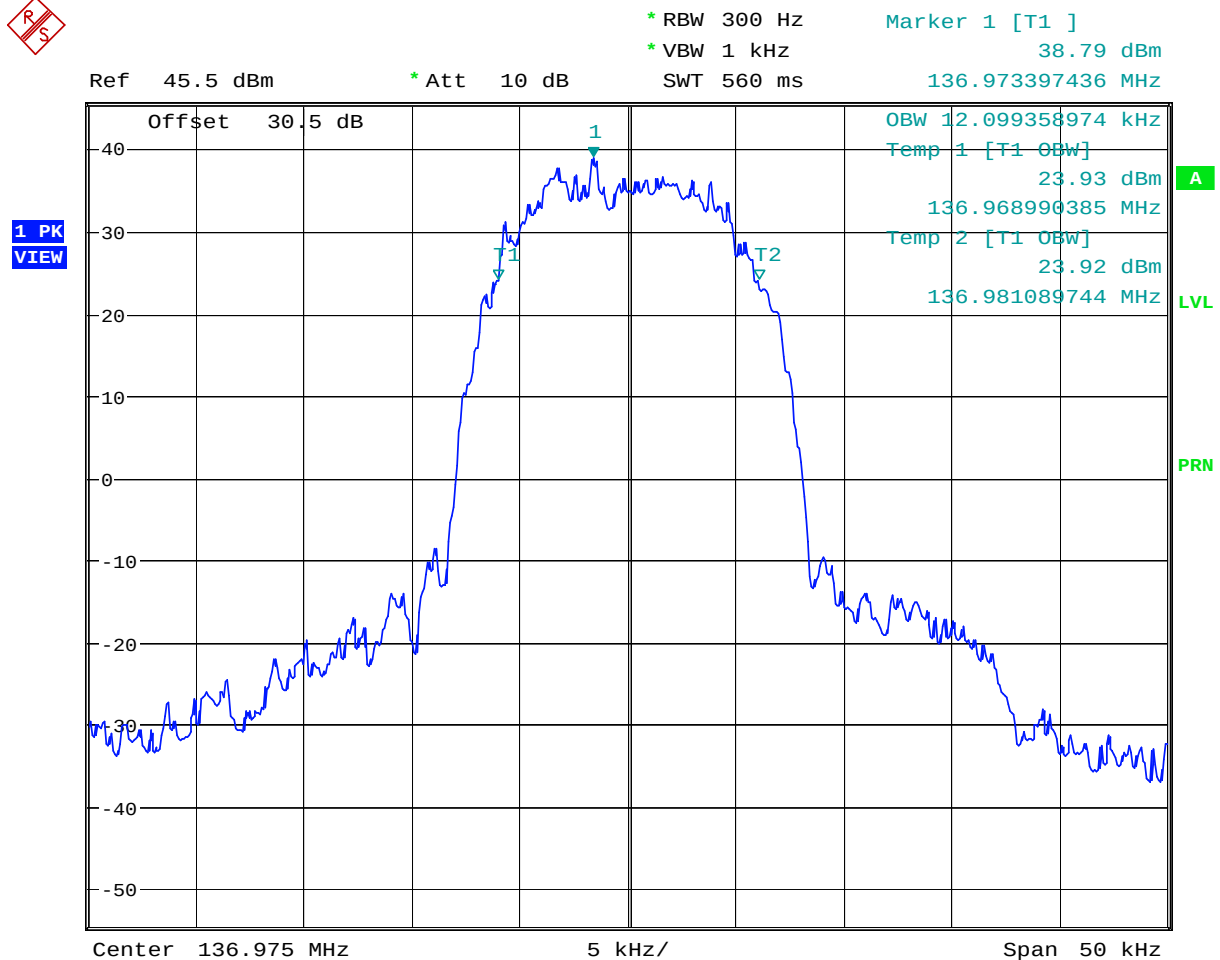


Product Service

2.6 OCCUPIED BANDWIDTH

2.6.6 Test Results - Continued

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 22.NOV.2006 15:23:57

Maximum Power – 136.975MHz Mode 2



Product Service

2.7 ADJACENT CHANNEL POWER

2.7.1 Specification Reference

FCC CFR 47: Part 87.139(k)

2.7.2 Equipment Under Test

6525 MDR Transceiver

2.7.3 Date of Test

16th January 2007

2.7.4 Test Equipment Used

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

2.7.5 Test Procedure

The EUT was connected to a spectrum analyser via 40dB of attenuation, a combiner and a 127.5MHz crystal filter. The crystal filter was being used as a narrow band pass filter centred on the frequency on the middle channel of the EUT.

The other side of the combiner was connected to the external trigger (gate input) of the spectrum analyser via a crystal detector. This was used so that each sweep on the analyser was completed during only the transmit time of the EUT to ensure a correct reading of adjacent channel power.

The frequency of the EUT was changed to the adjacent channel and each adjacent channel thereafter to the 32nd adjacent channel. A plot of the adjacent channel power at each frequency was taken. This was repeated for the upper adjacent channels. The measurement was performed with the spectrum analyser set to RMS detector and trace to average with a gated trigger.



Product Service

2.7 ADJACENT CHANNEL POWER**2.7.6 Test Results**Channel 127.5MHz (Mode 2)

Adjacent Channel (Lower MHz)	Result (dBm)	Adjacent Channel (Higher MHz)	Result (dBm)
127.475	-12.06	127.525	-18.37
127.450	-35.01	127.550	-35.93
127.425	-35.05	127.575	-41.30
127.400	-45.000	127.600	-45.60
127.375	-40.80	127.625	-43.49
127.350	-48.59	127.650	-49.04
127.325	-49.37	127.675	-49.26
127.300	-50.58	127.700	-49.84
127.275	-51.49	127.725	-50.59
127.250	-50.78	127.750	-50.54
127.225	-52.53	127.775	-51.97
127.200	-52.89	127.800	-52.15
127.175	-54.00	127.825	-53.24
127.150	-54.46	127.850	-53.75
127.125	-54.34	127.875	-53.30
127.100	-55.15	127.900	-54.41
127.025	-55.38	127.925	-54.79
1270.50	-55.50	127.950	-49.25
127.025	-55.94	127.975	-55.16
127.000	-54.19	128.000	-53.39
126.975	-56.19	128.025	-55.47
126.950	-56.37	128.050	-55.56
126.925	-56.41	128.075	-55.65
126.900	-56.28	128.100	-55.53
126.875	-56.19	128.125	-55.57
126.850	-56.51	128.150	-55.69
126.825	-56.49	128.175	-55.85
126.800	-56.80	128.200	-56.03
126.775	-56.62	128.225	-55.82
126.750	-56.22	128.250	-55.83
126.725	-56.73	128.275	-56.11
12.7000	-56.65	128.300	-56.08

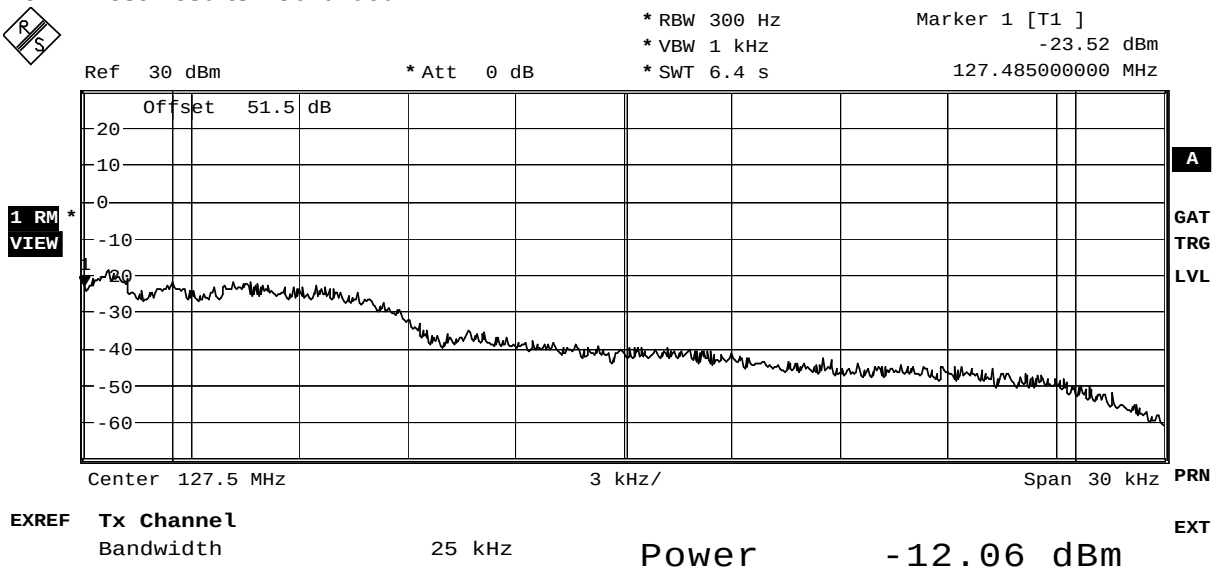
The measurement plots are shown on the following pages.



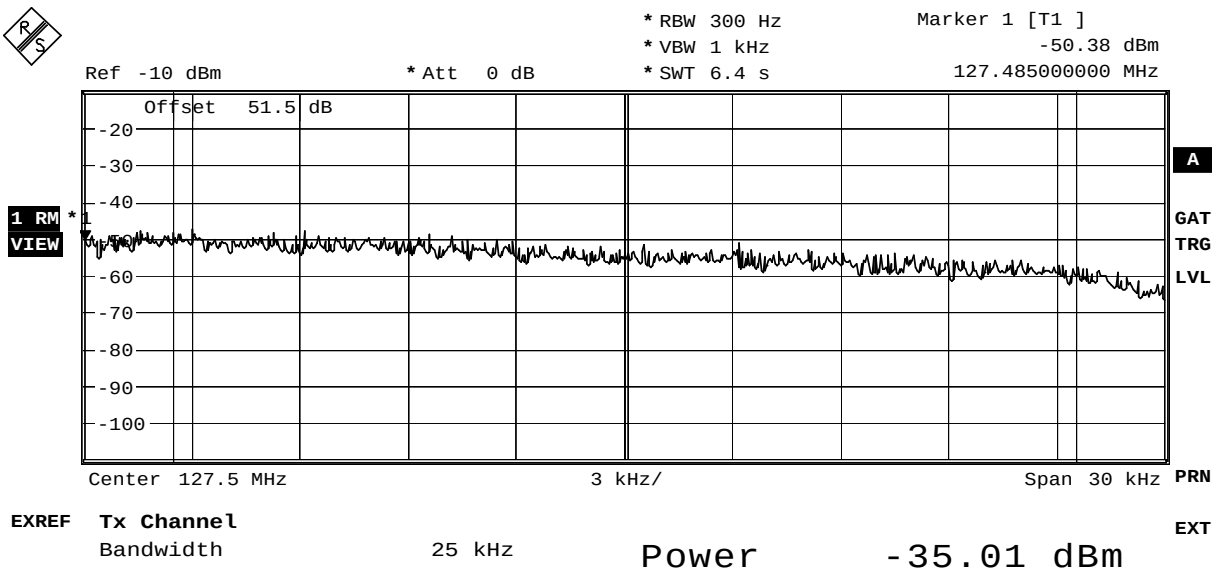
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 127.475MHz – Mode 2



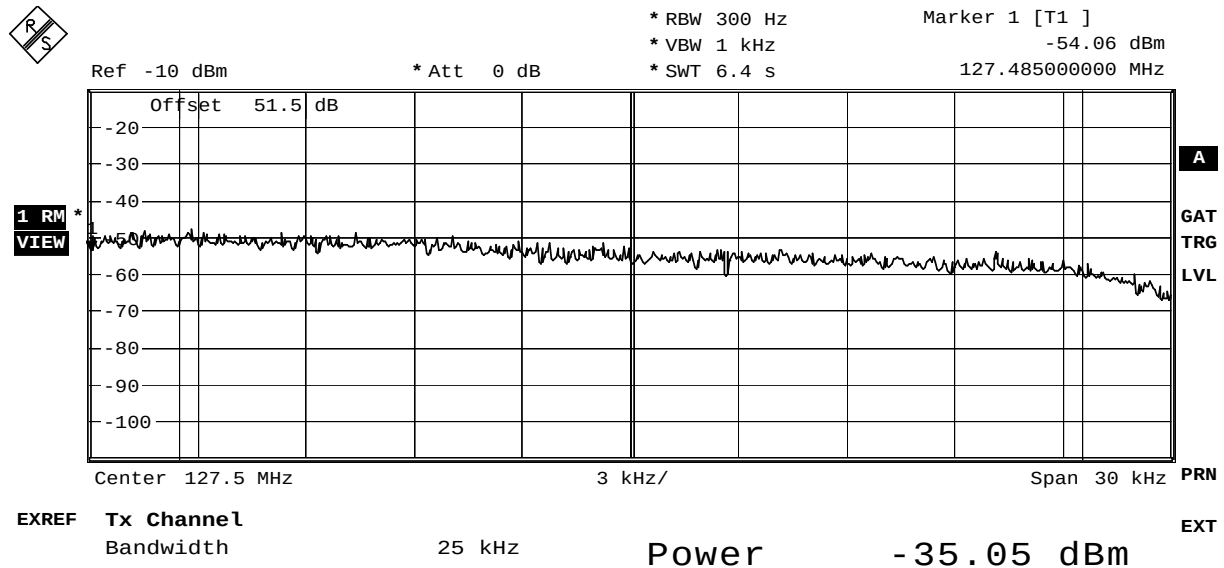
Adjacent Channel (Lower) 127.450MHz – Mode 2



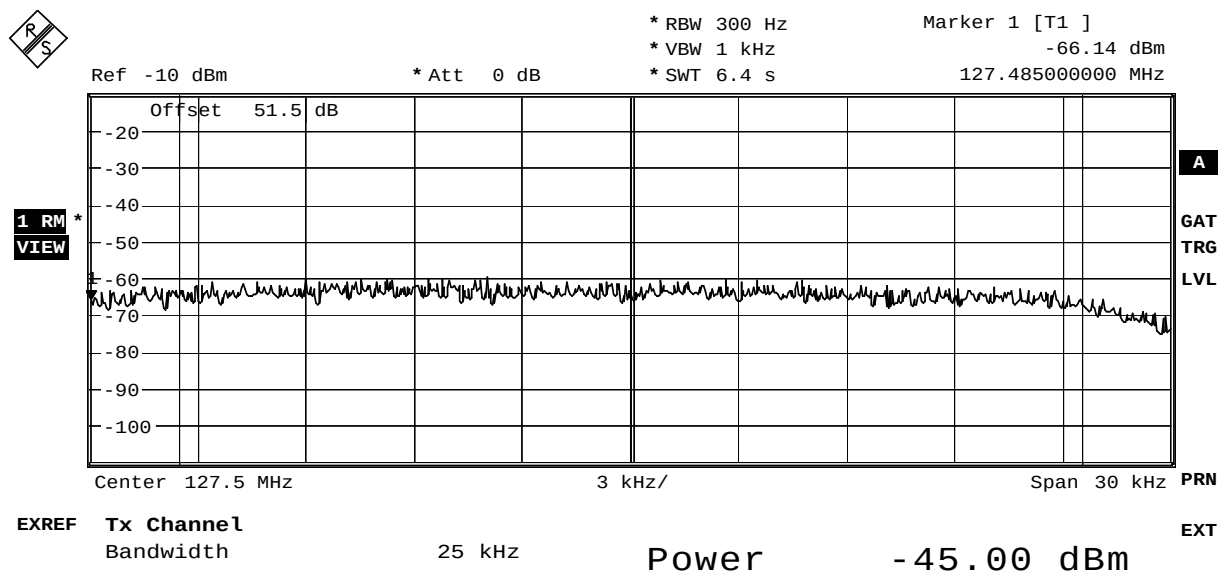
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 127.425MHz – Mode 2



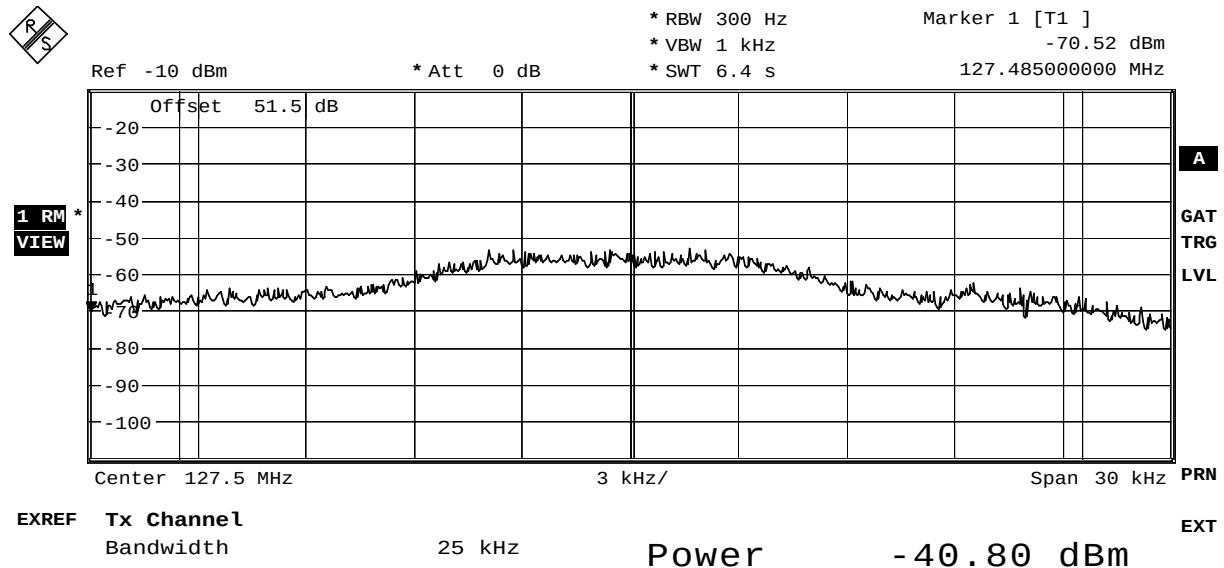
Adjacent Channel (Lower) 127.400MHz – Mode 2



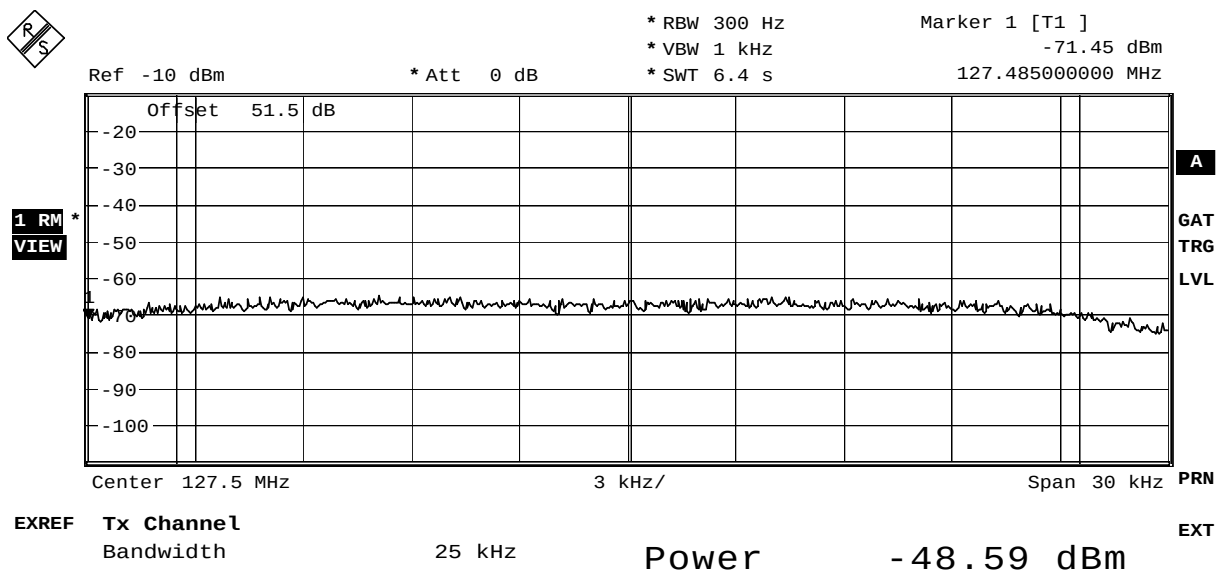
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 127.375MHz – Mode 2



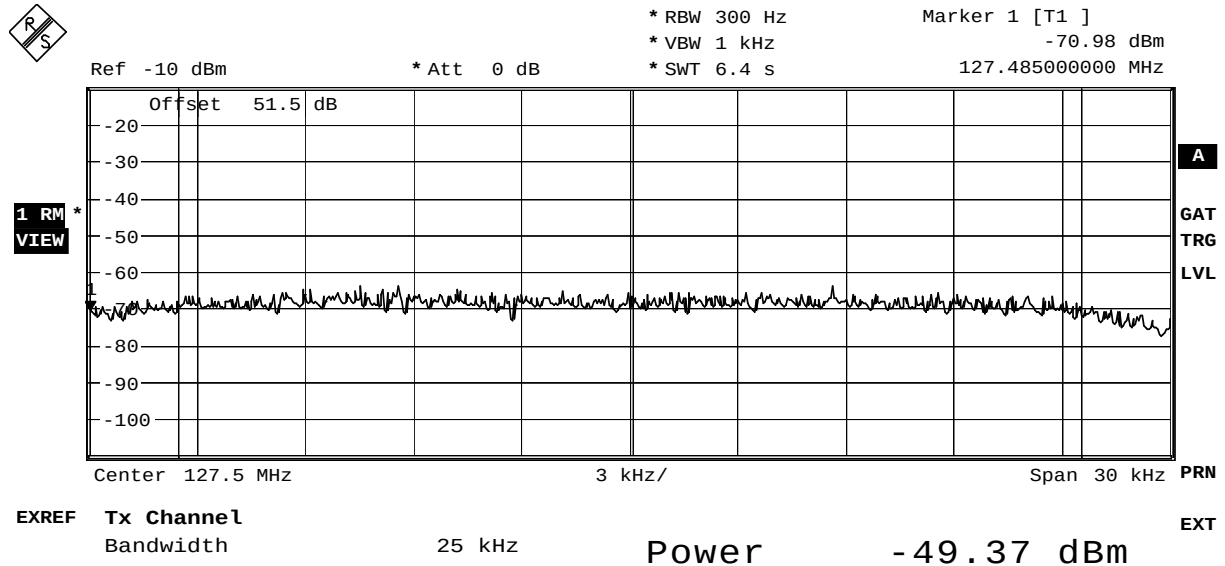
Adjacent Channel (Lower) 127.350MHz – Mode 2



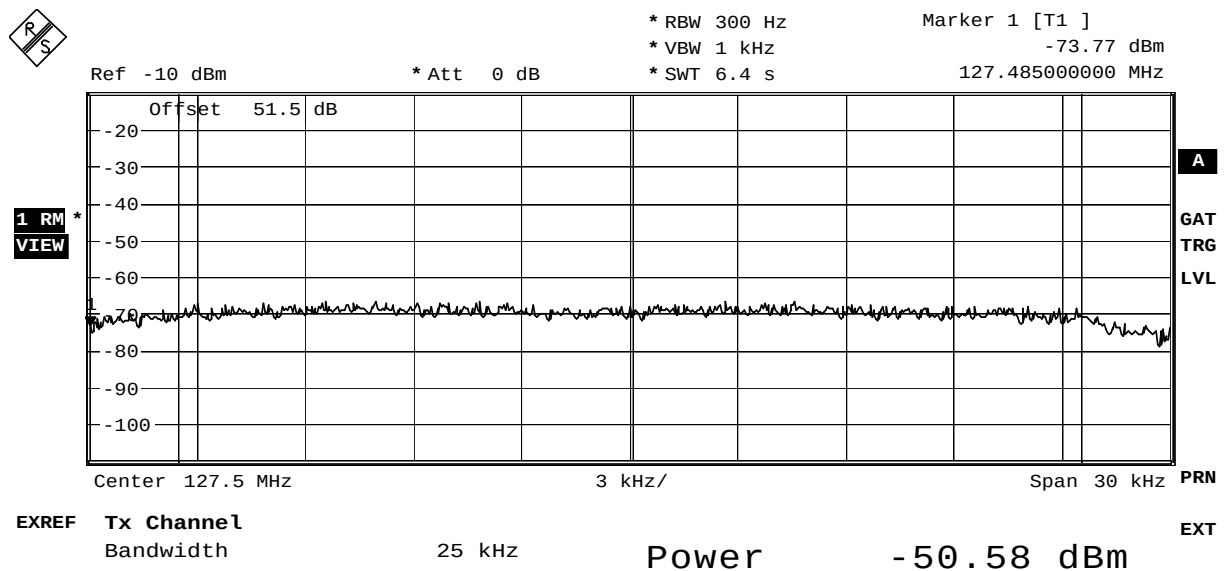
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 127.325MHz – Mode 2



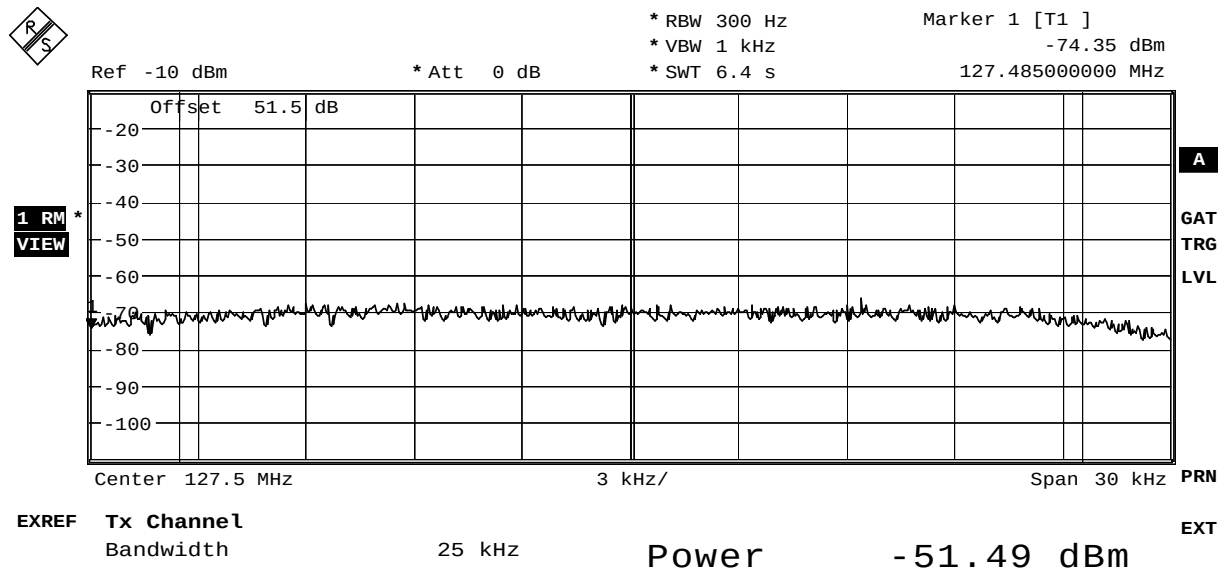
Adjacent Channel (Lower) 127.300MHz – Mode 2



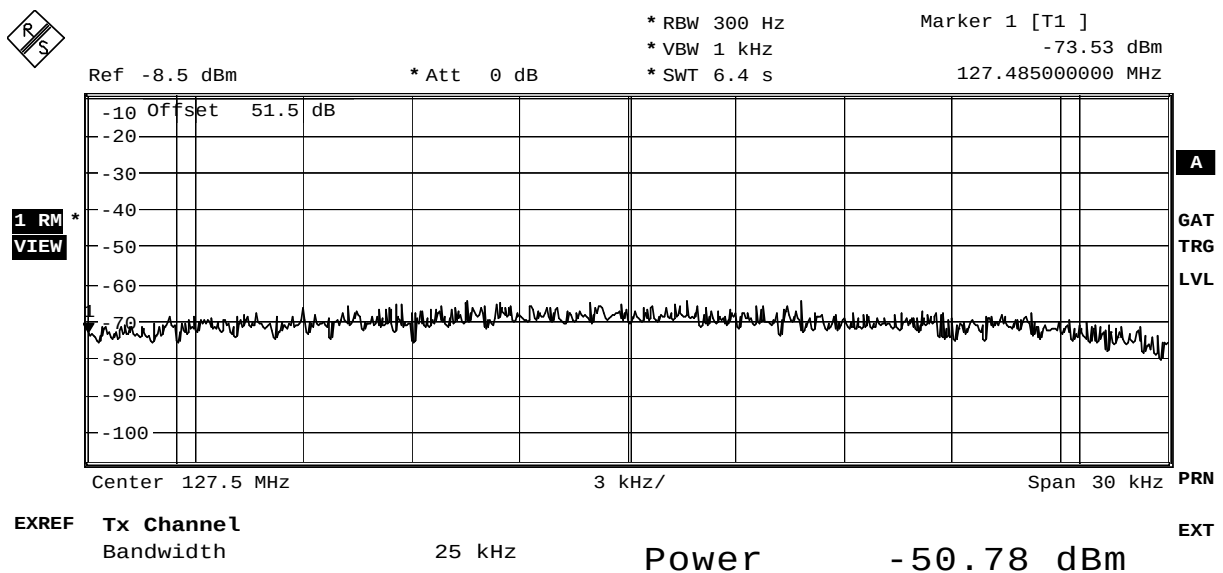
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 127.275MHz – Mode 2



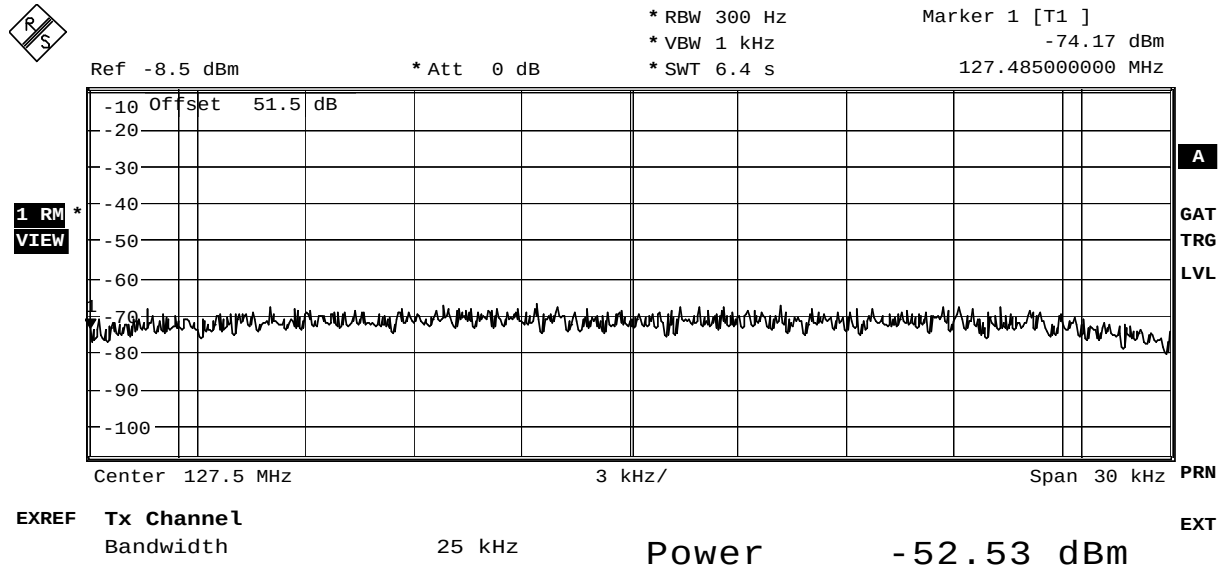
Adjacent Channel (Lower) 127.250MHz – Mode 2



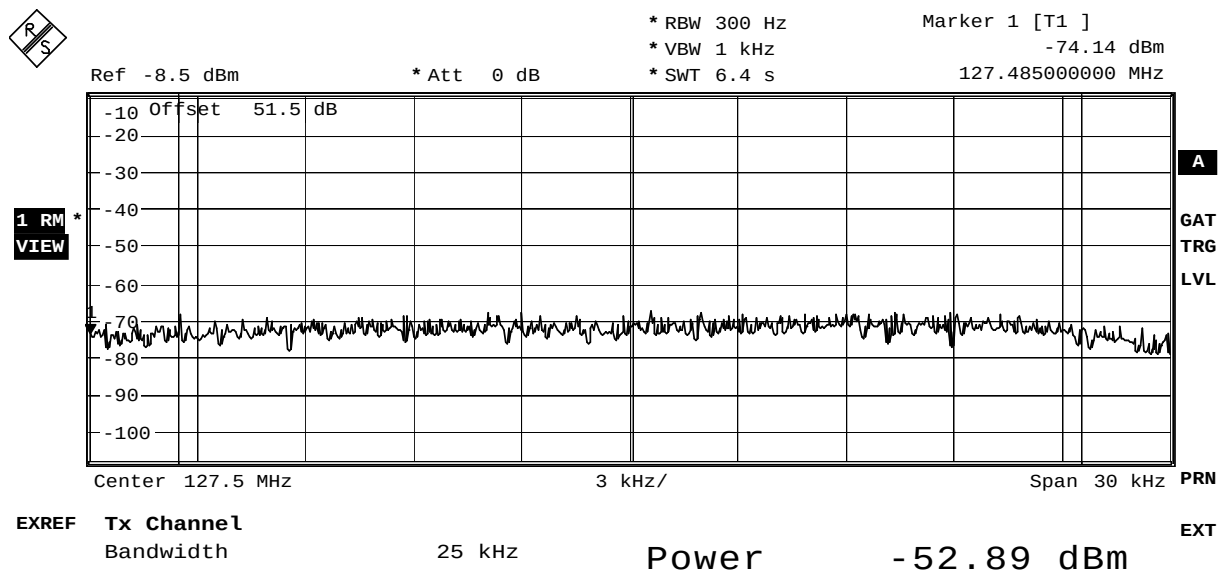
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 127.225MHz - Mode 2



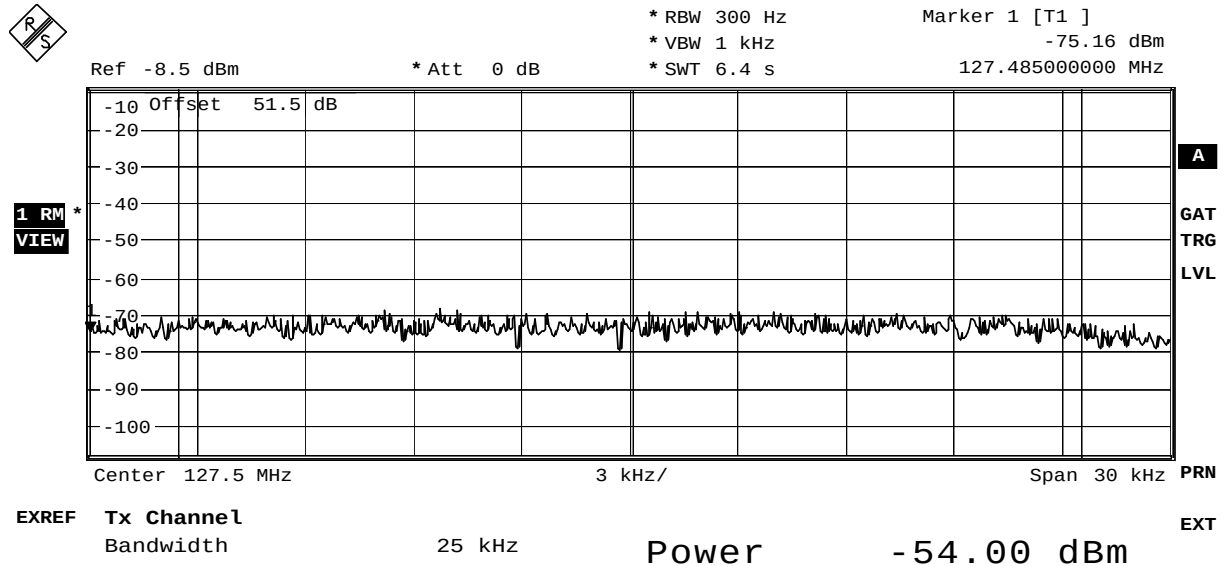
Adjacent Channel (Lower) 127.200MHz - Mode 2



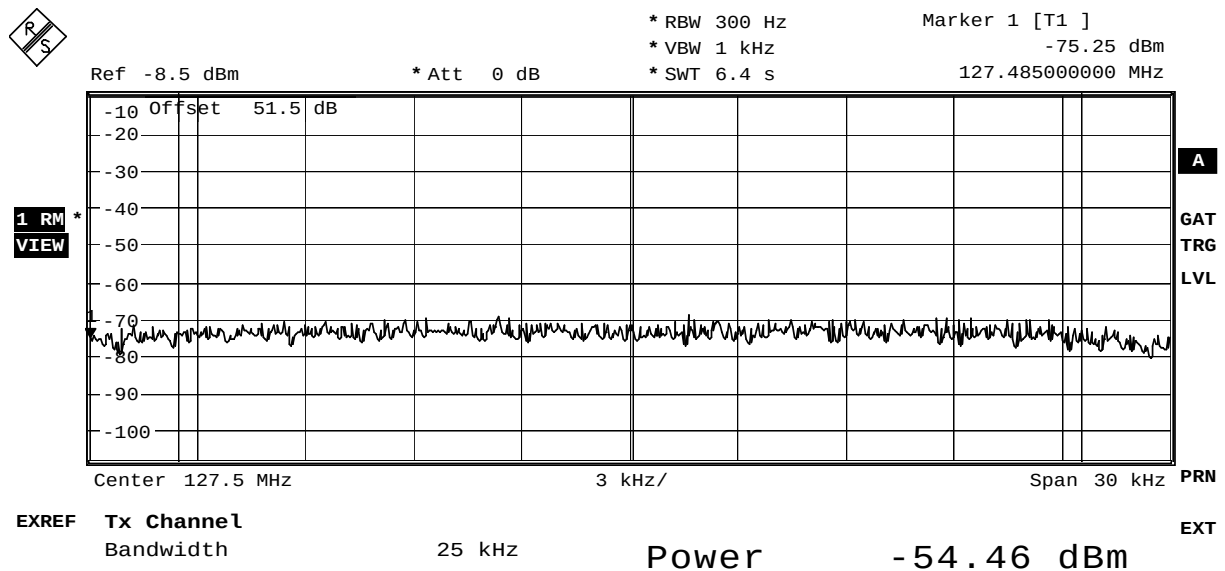
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 127.175MHz - Mode 2



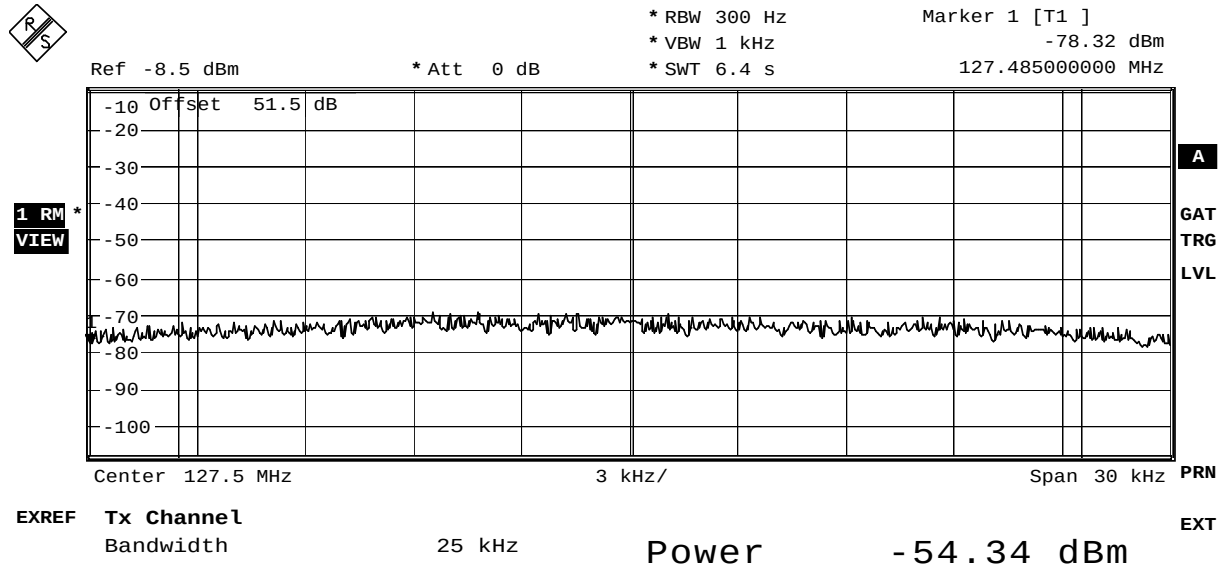
Adjacent Channel (Lower) 127.150MHz - Mode 2



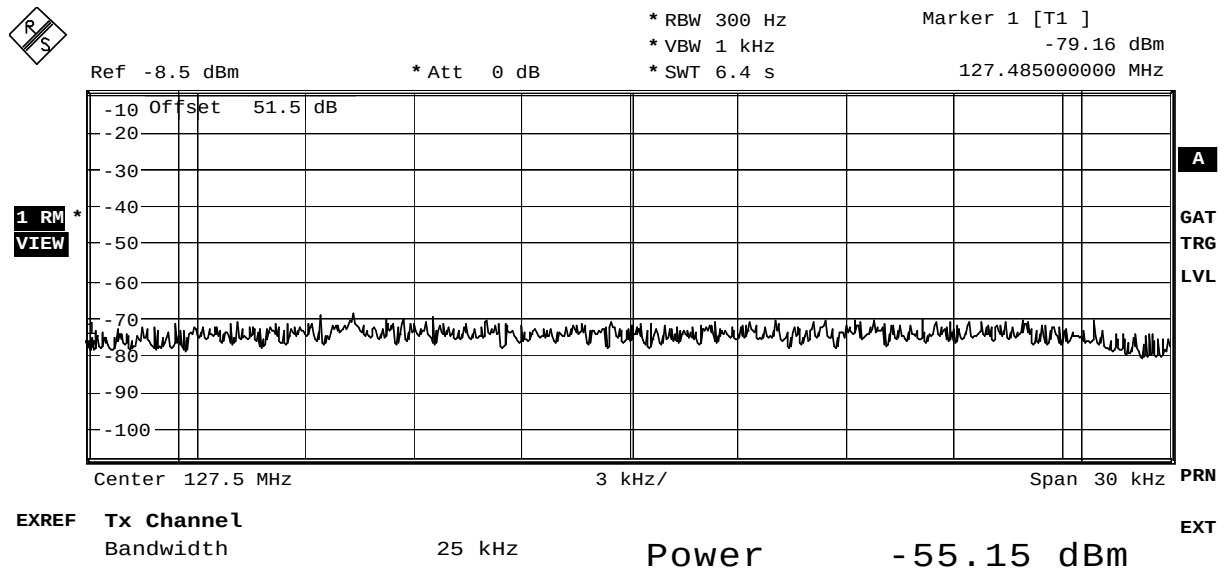
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 127.125MHz - Mode 2



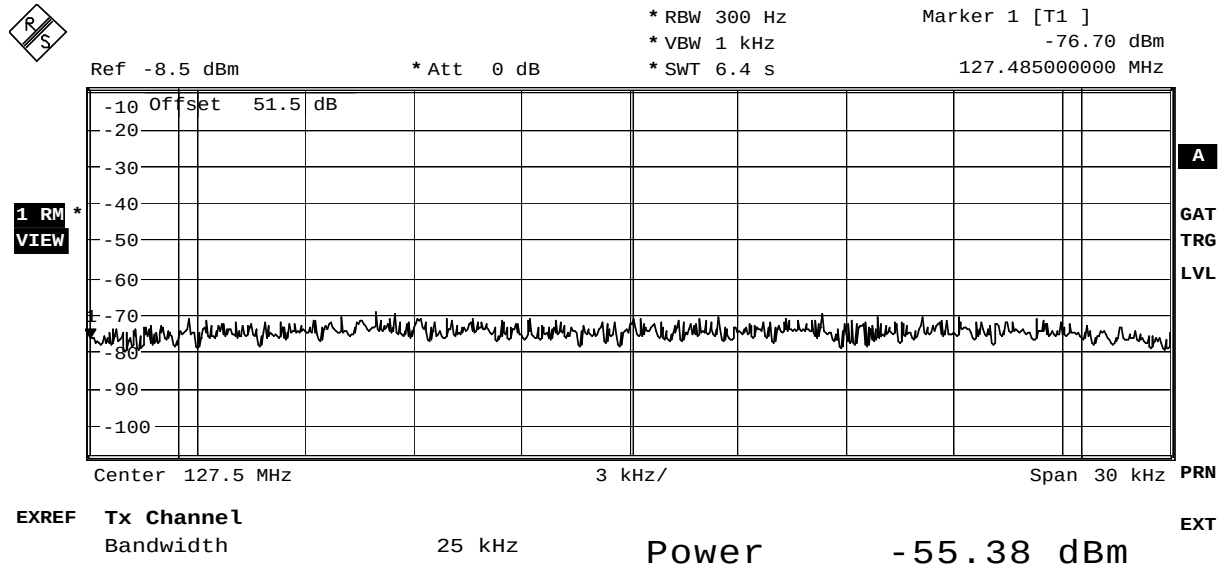
Adjacent Channel (Lower) 127.100MHz - Mode 2



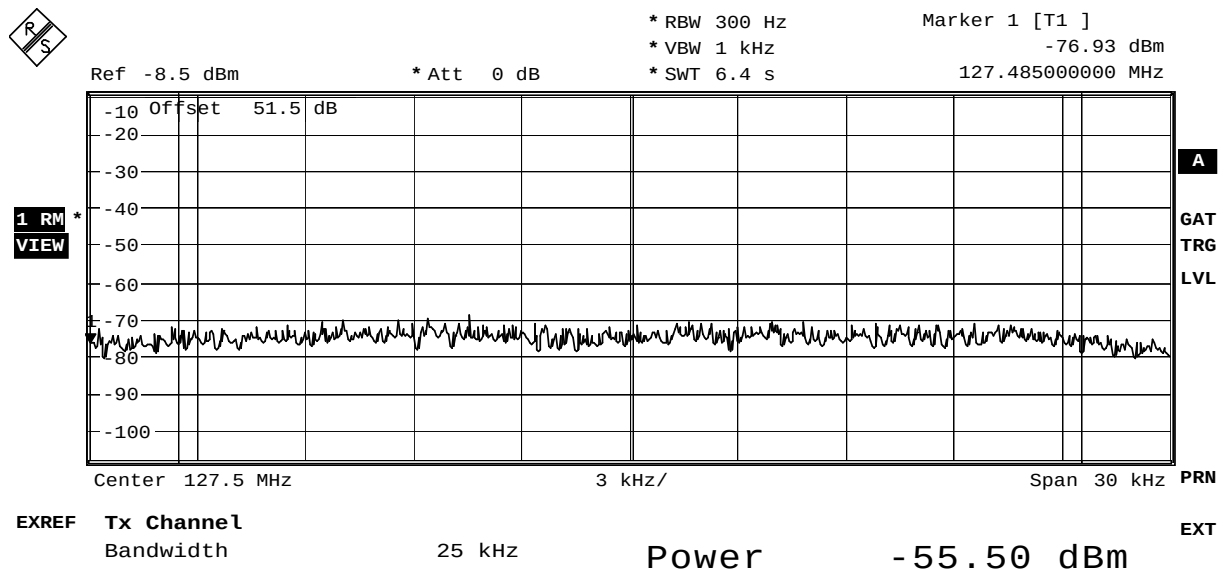
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 127.075MHz – Mode 2



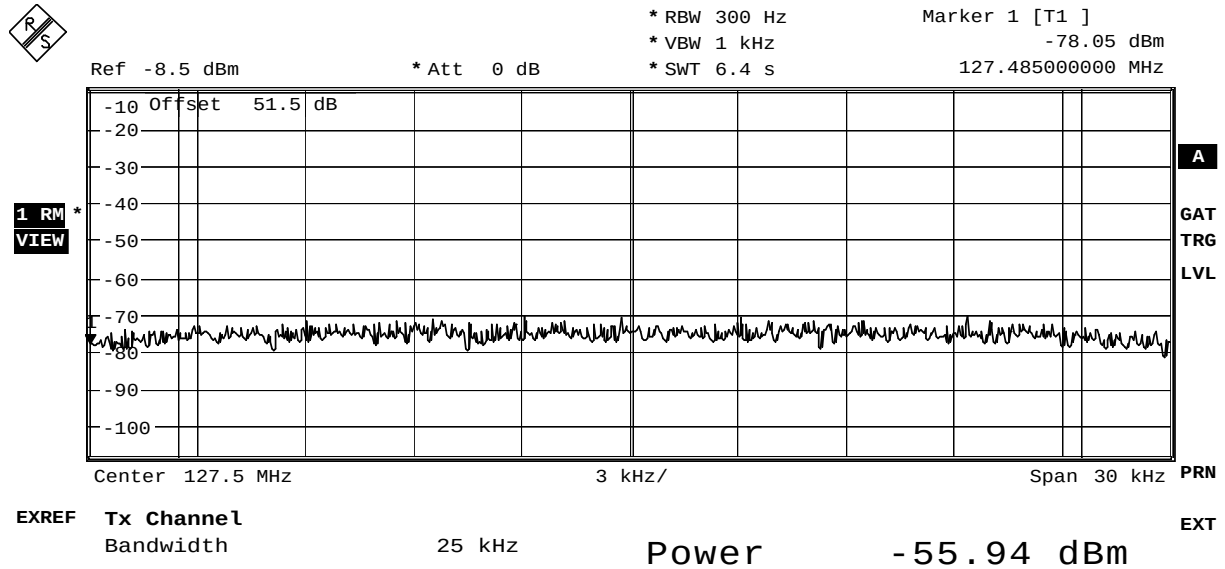
Adjacent Channel (Lower) 127.050MHz – Mode 2



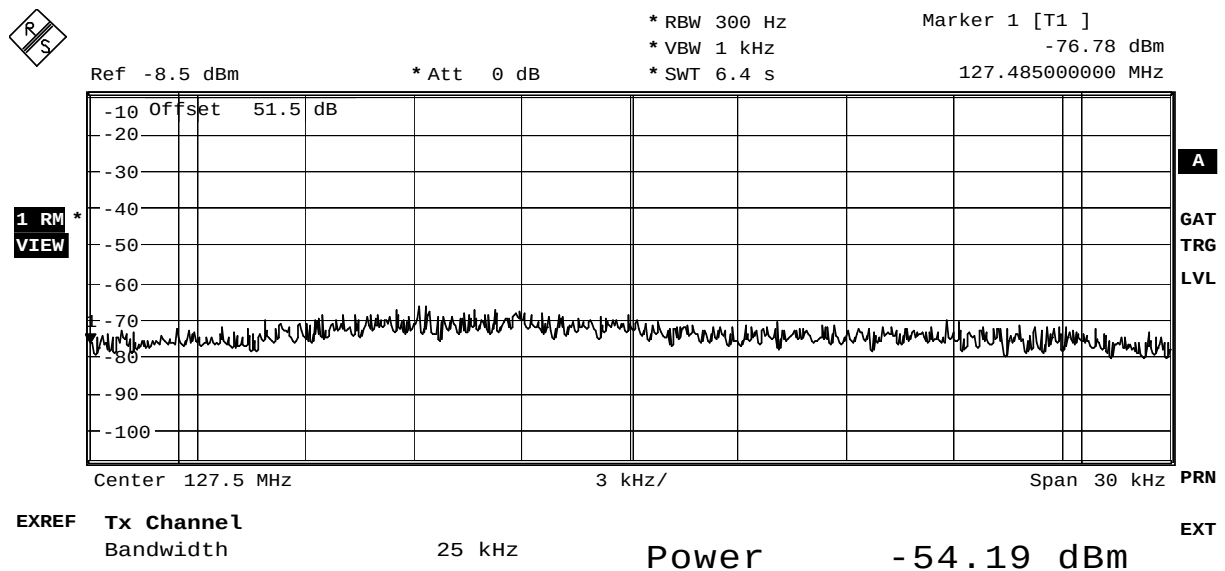
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 127.025MHz – Mode 2



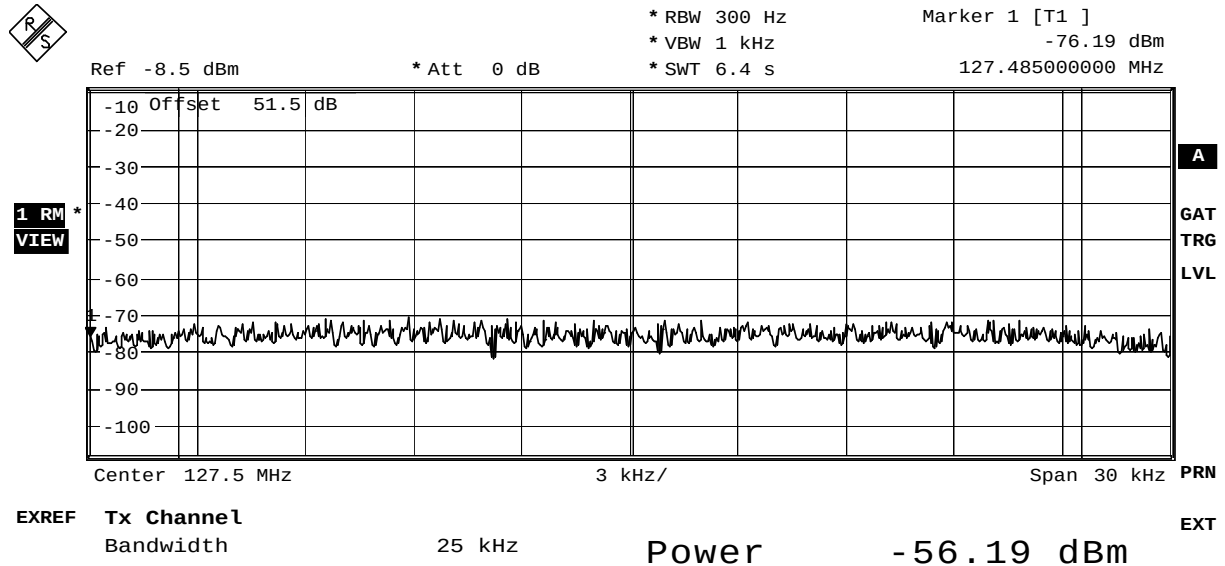
Adjacent Channel (Lower) 128.000MHz – Mode 2



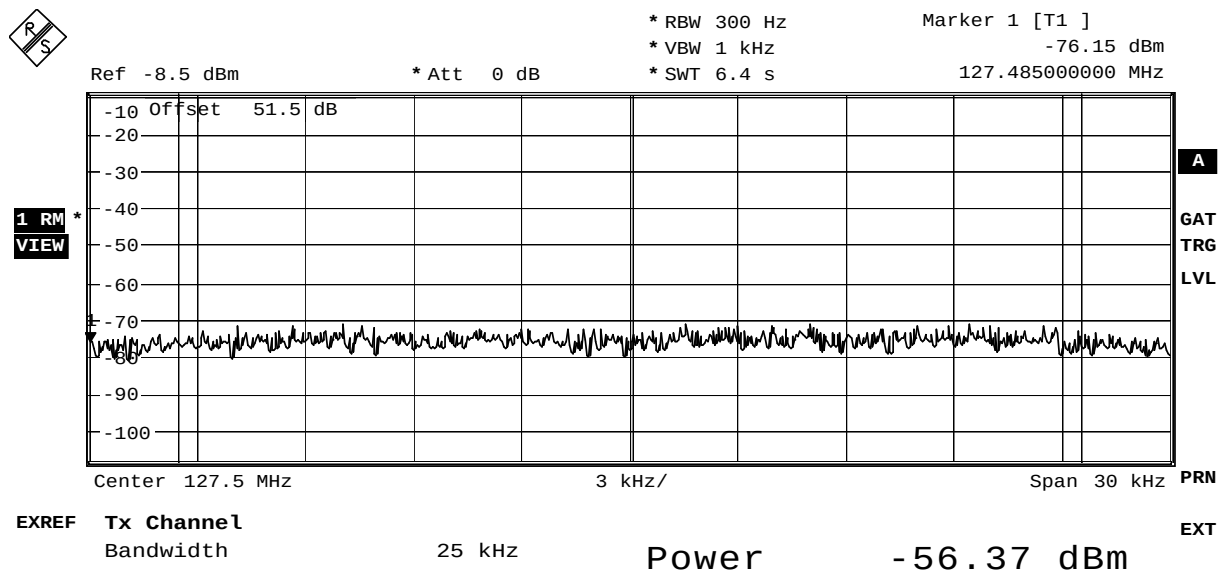
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 126.975MHz – Mode 2



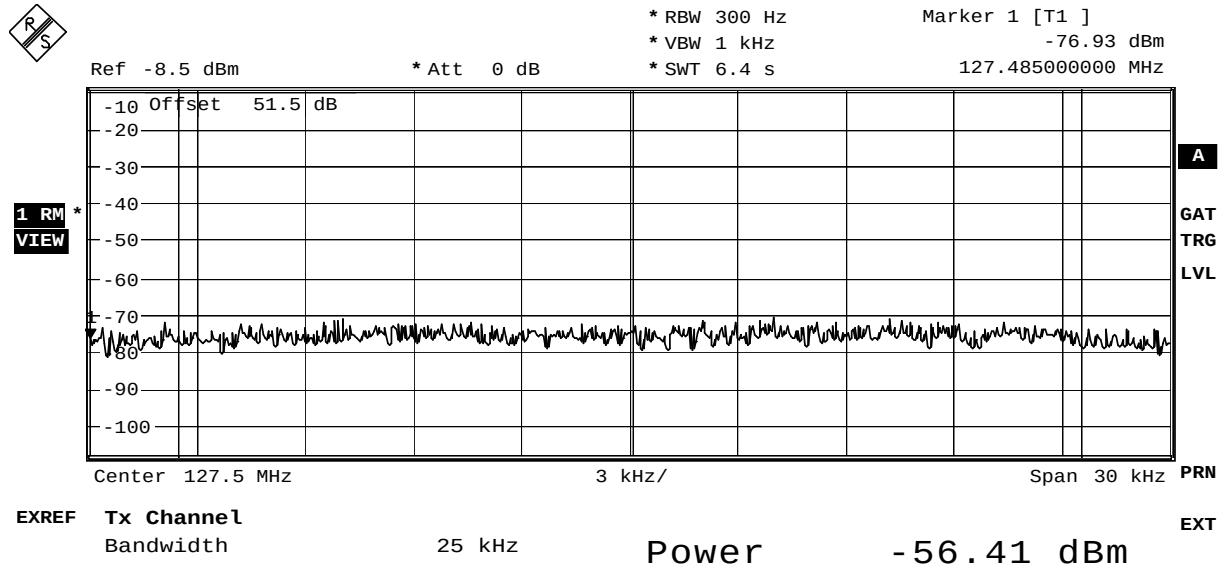
Adjacent Channel (Lower) 126.950MHz – Mode 2



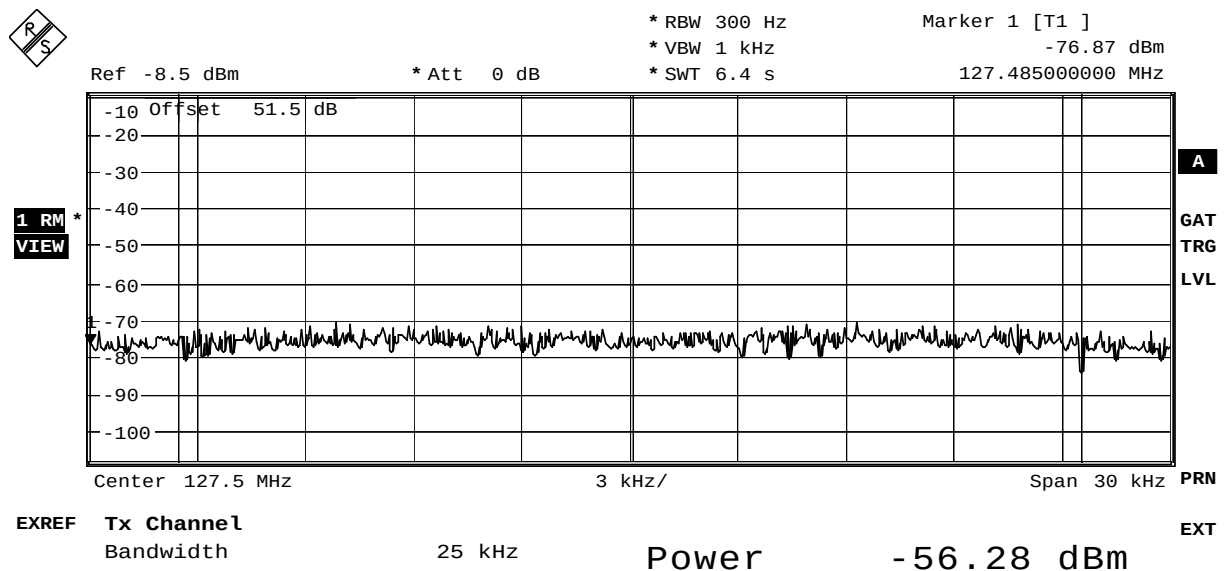
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 126.925MHz – Mode 2



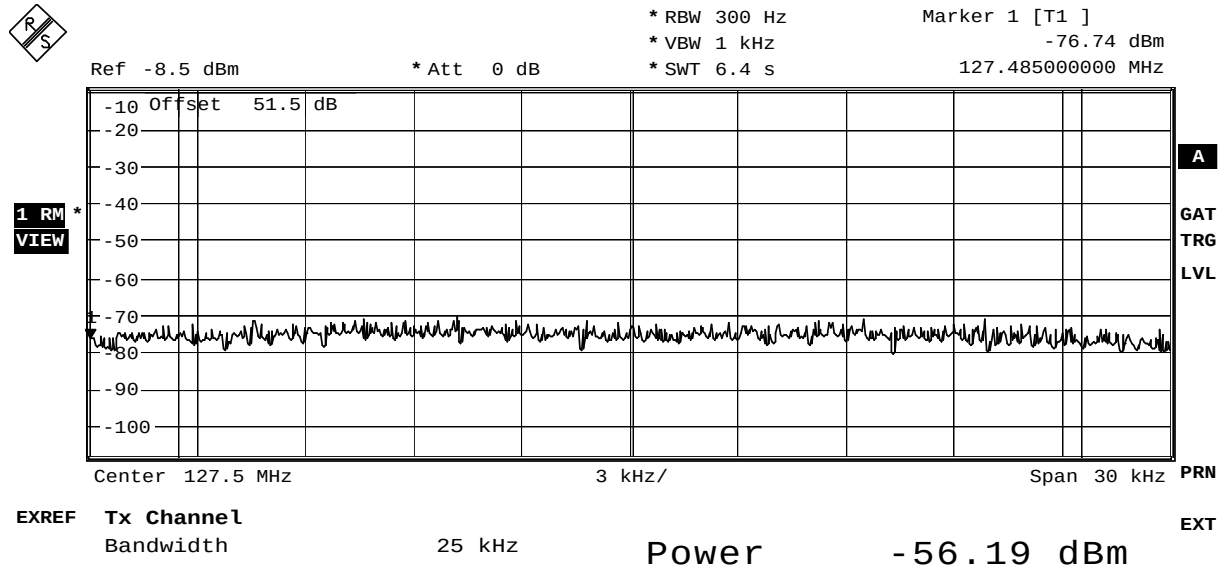
Adjacent Channel (Lower) 126.900MHz – Mode 2



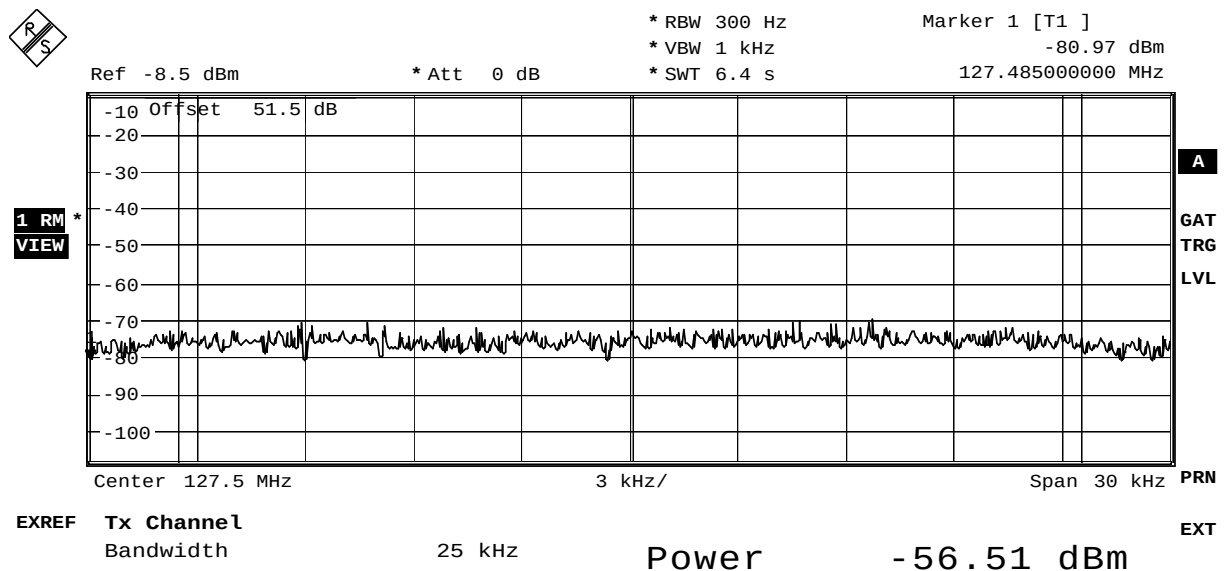
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 126.875MHz - Mode 2



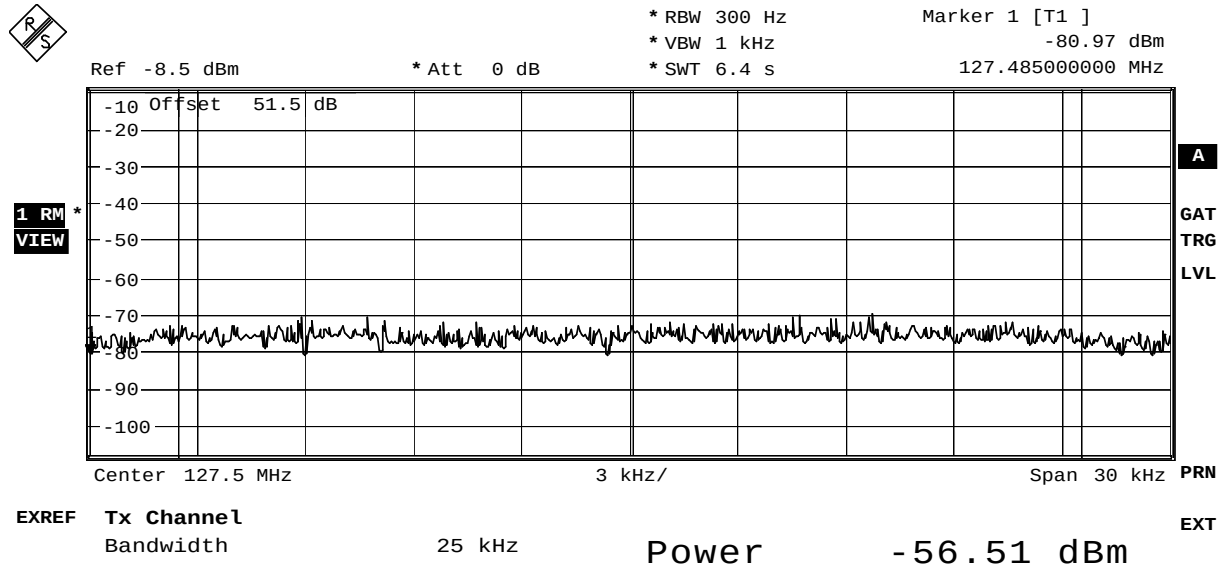
Adjacent Channel (Lower) 126.850MHz - Mode 2



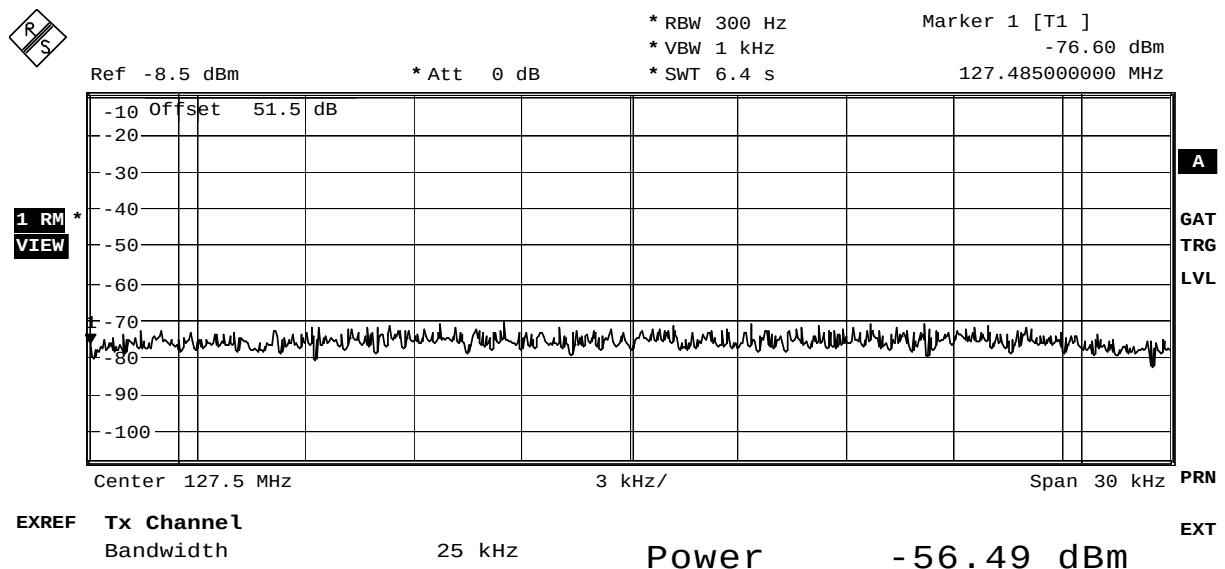
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 126.825MHz - Mode 2



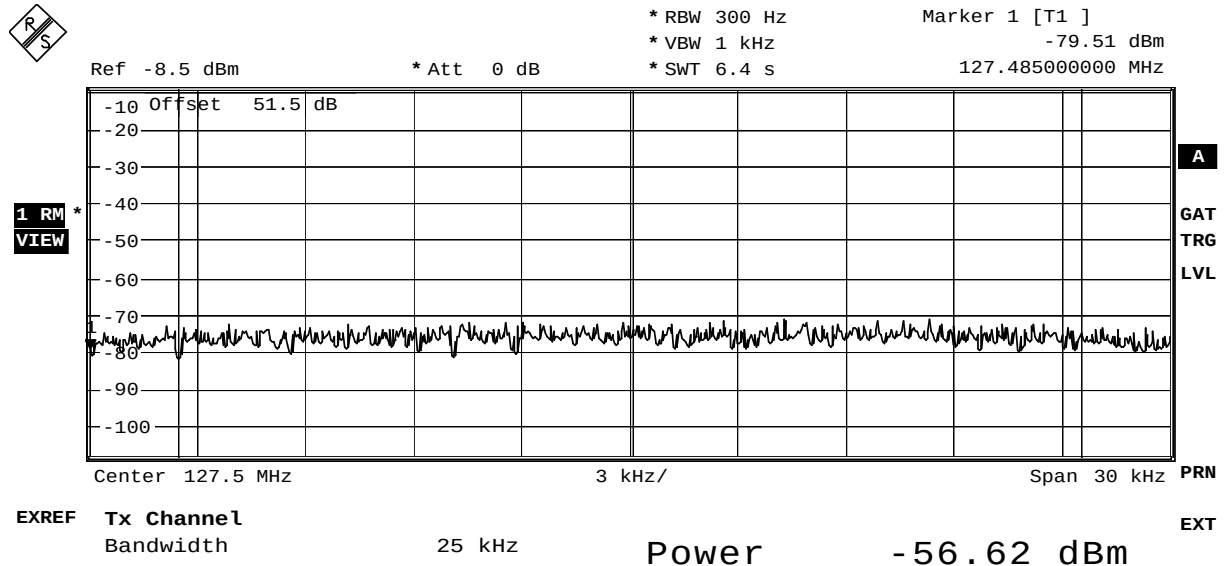
Adjacent Channel (Lower) 126.800MHz - Mode 2



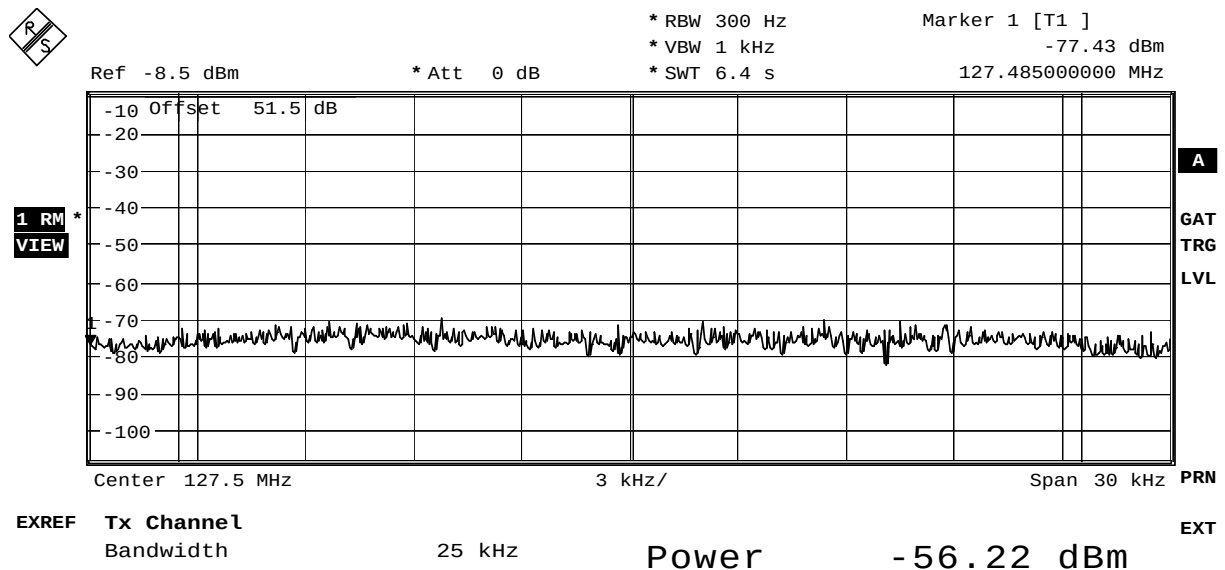
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 126.775MHz – Mode 2



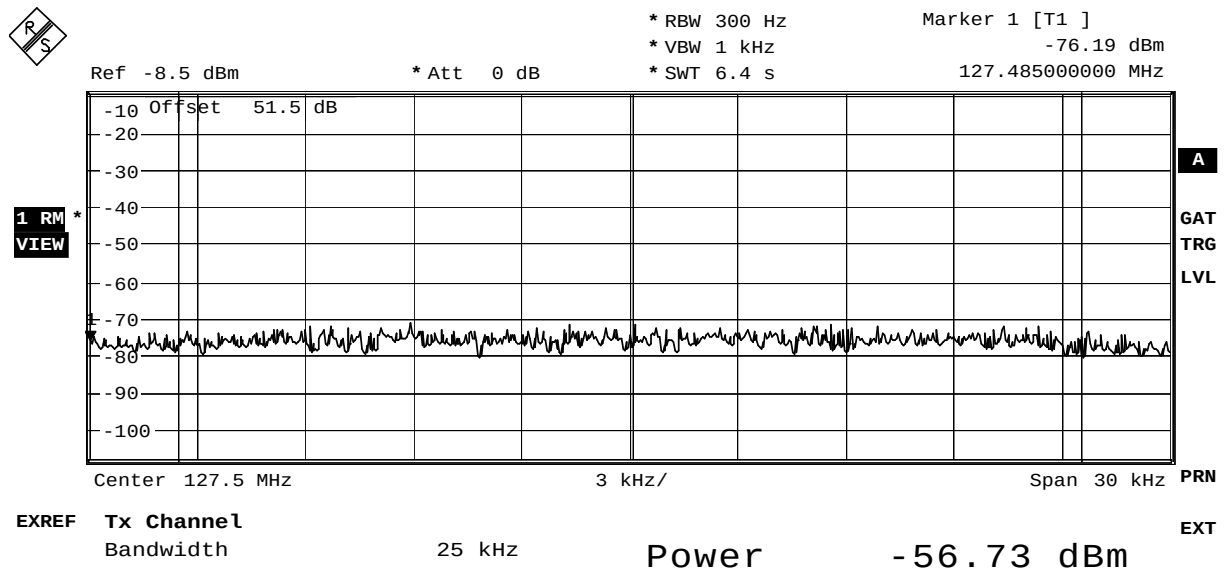
Adjacent Channel (Lower) 126.750MHz – Mode 2



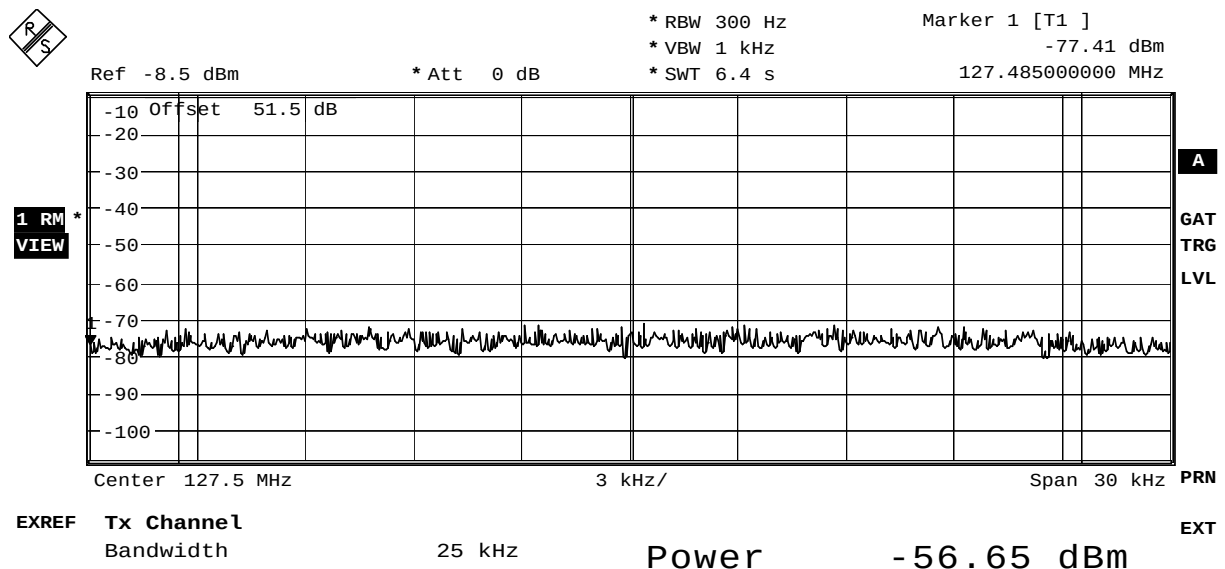
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Lower) 126.725MHz – Mode 2



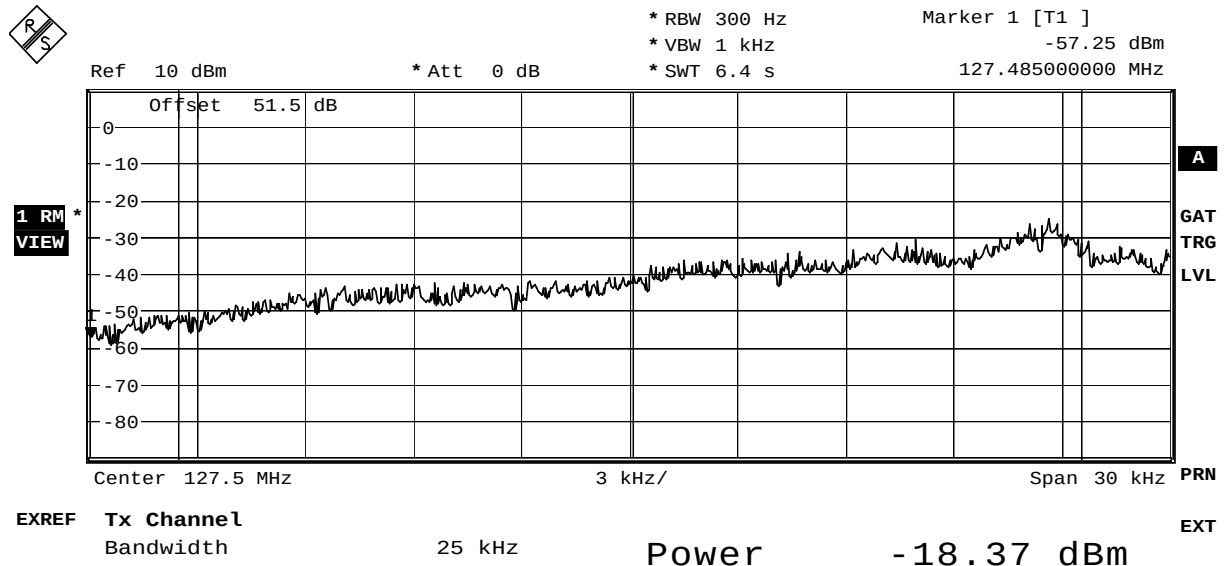
Adjacent Channel (Lower) 126.700MHz – Mode 2



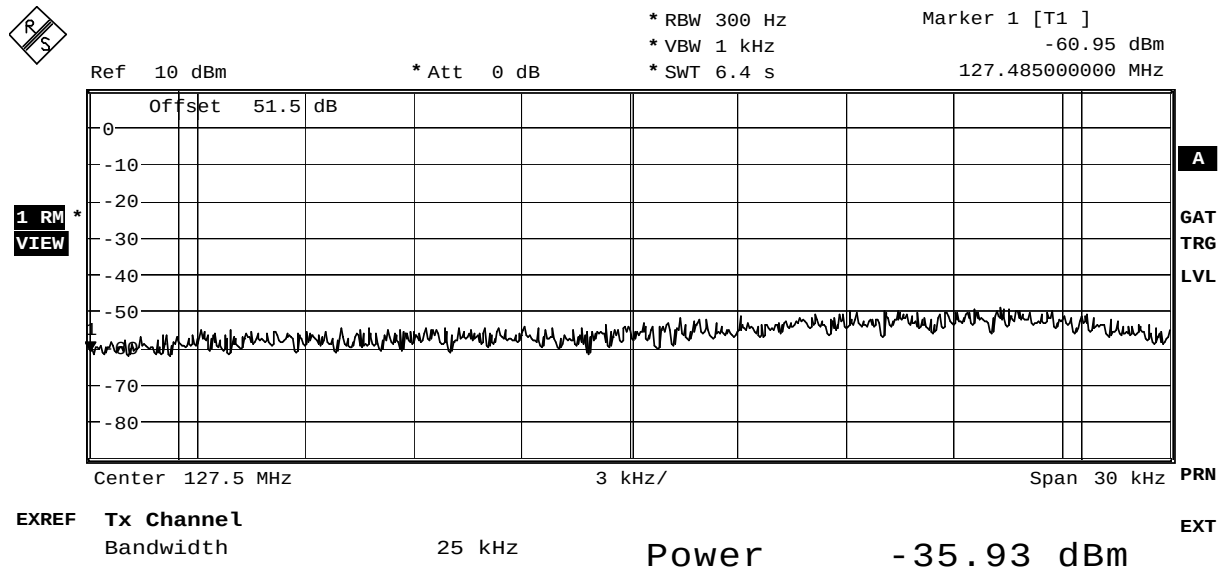
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 127.525MHz – Mode 2



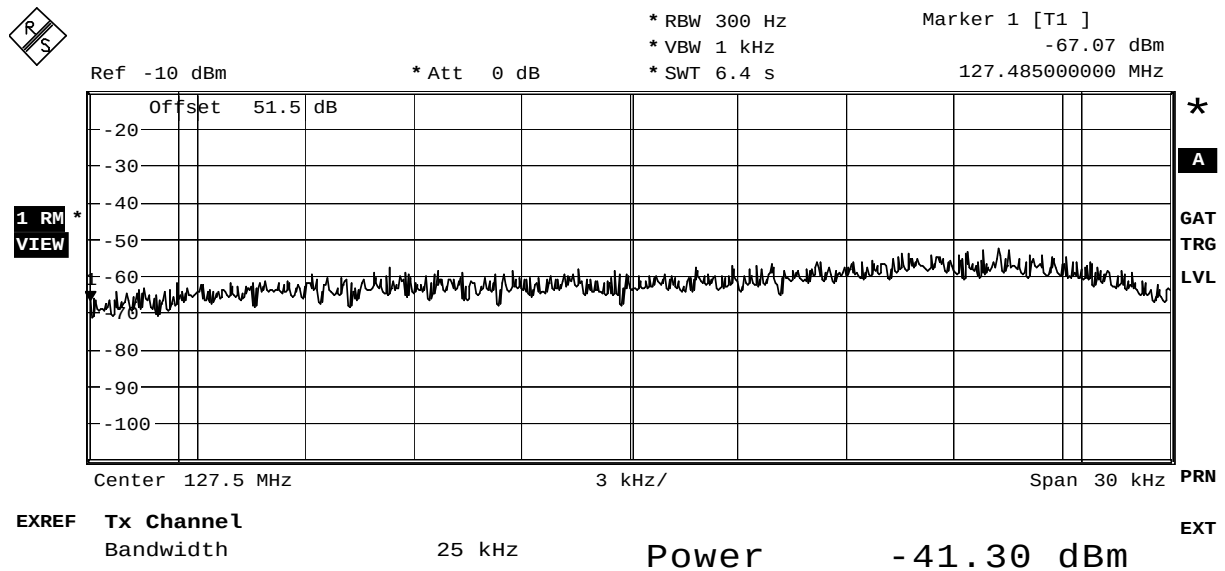
Adjacent Channel (Higher) 127.550MHz – Mode 2



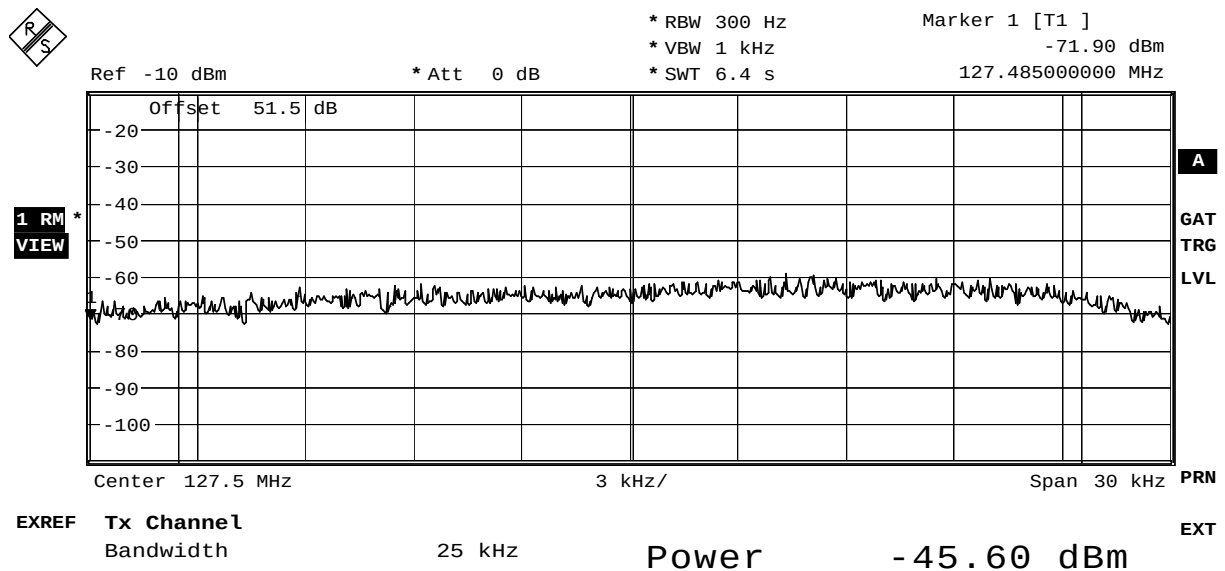
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 127.575MHz – Mode 2



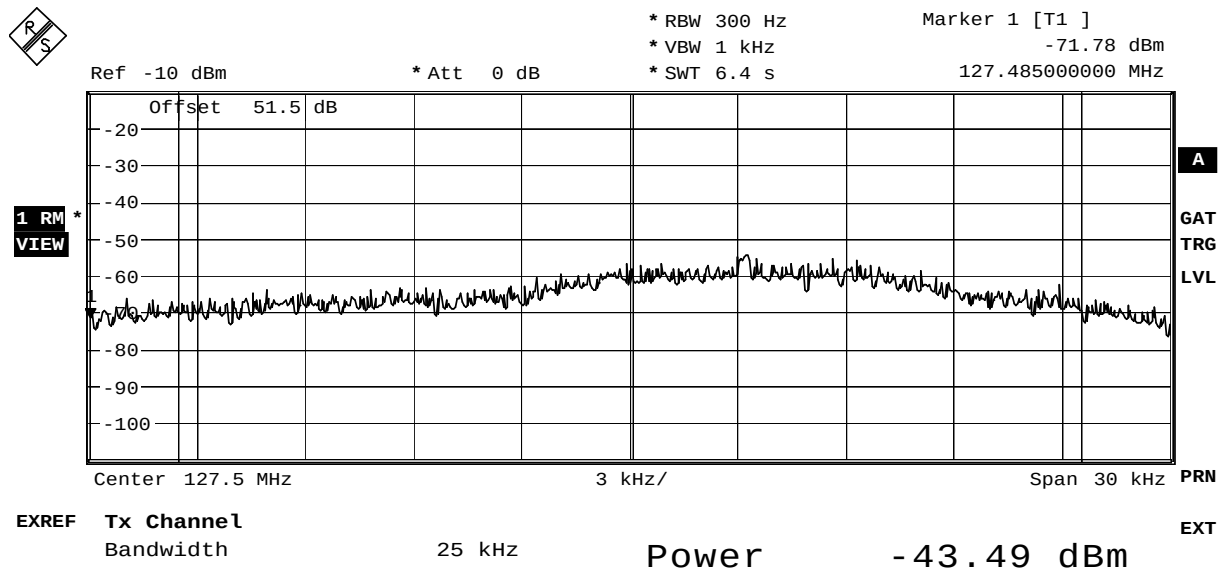
Adjacent Channel (Higher) 127.600MHz – Mode 2



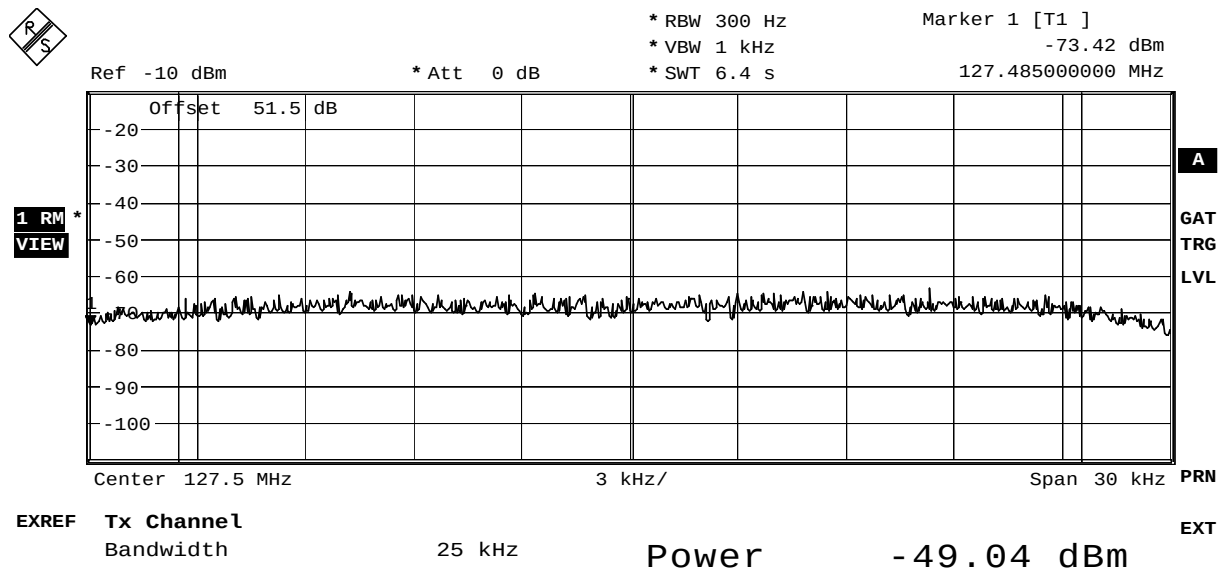
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 127.625MHz – Mode 2



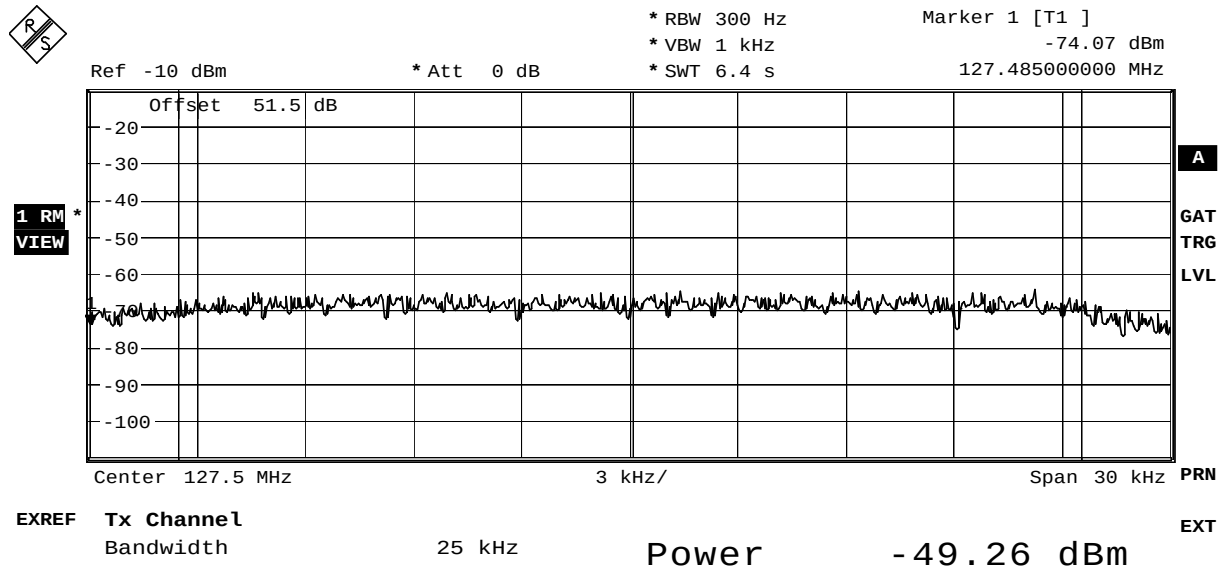
Adjacent Channel (Higher) 127.650MHz – Mode 2



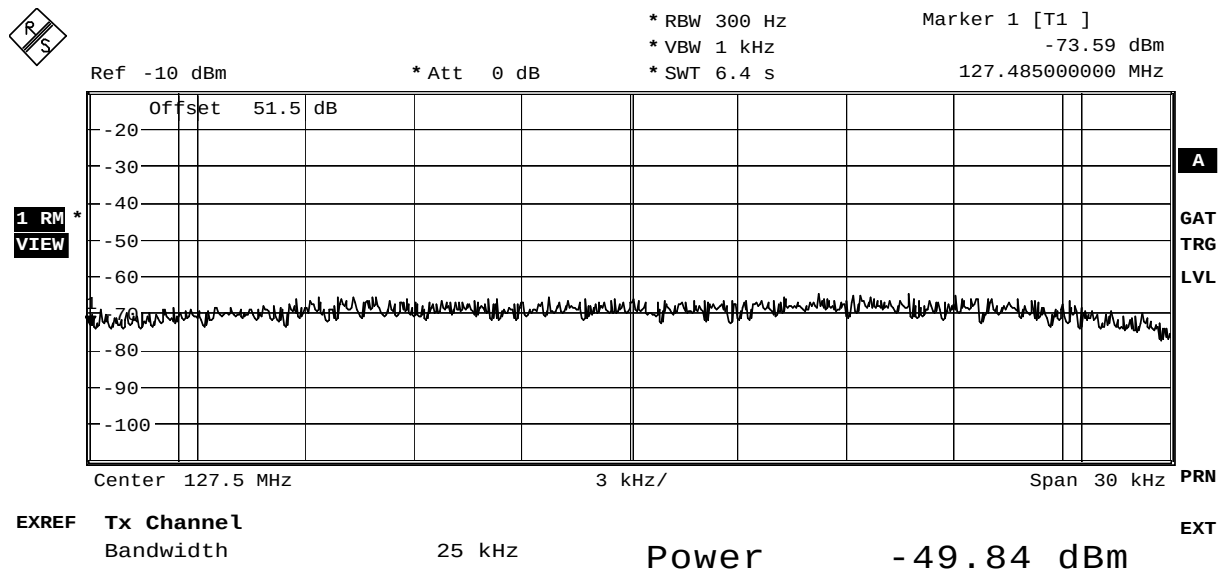
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 127.675MHz – Mode 2



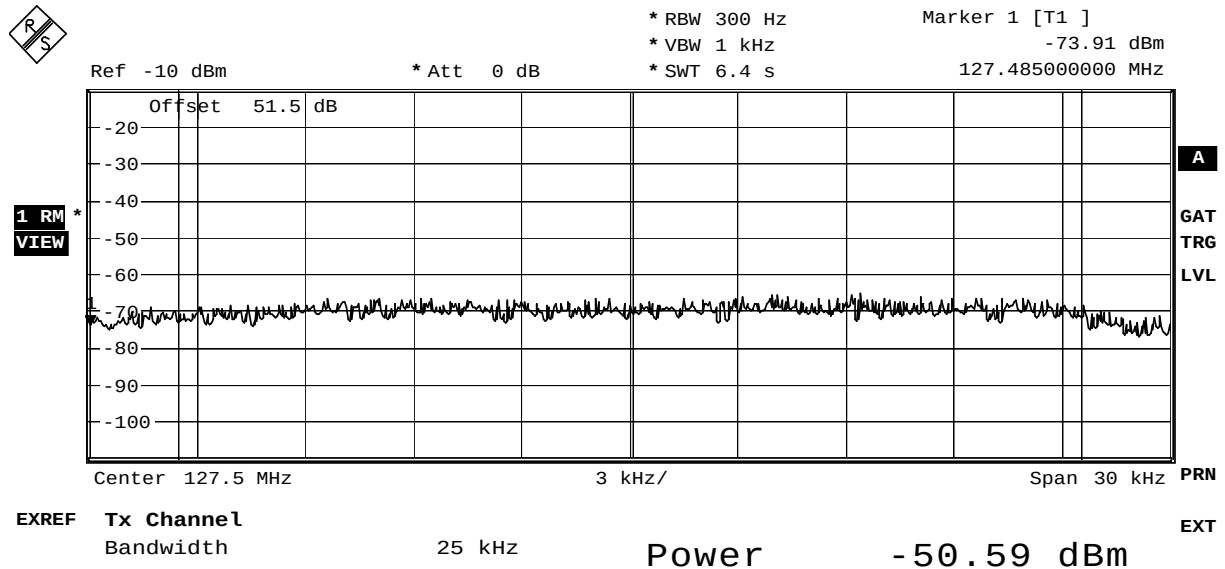
Adjacent Channel (Higher) 127.700MHz – Mode 2



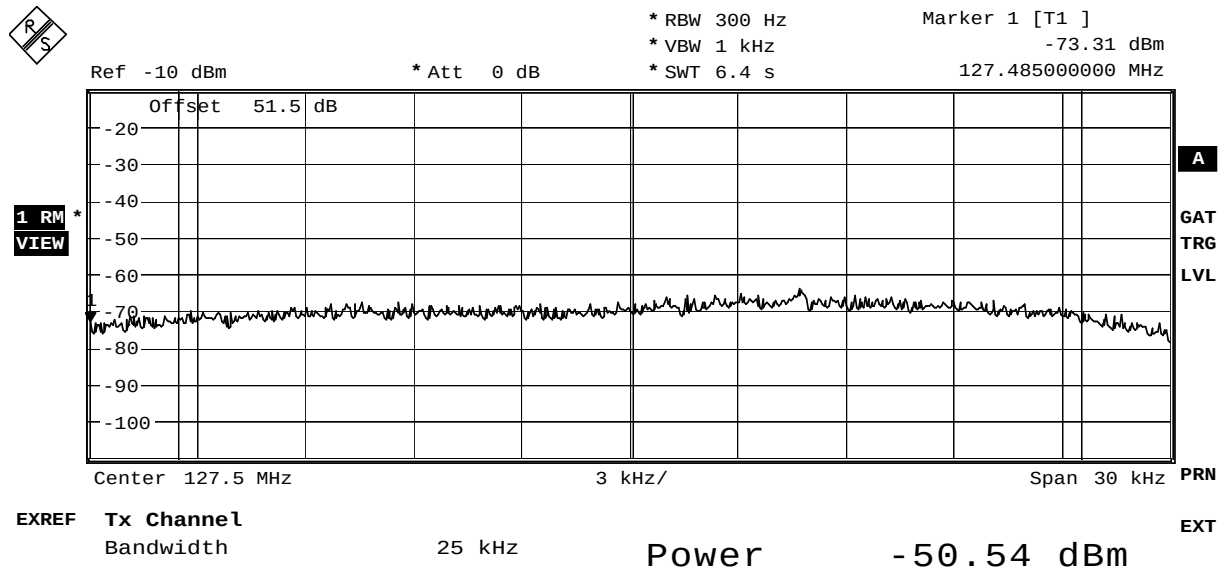
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 127.725MHz – Mode 2



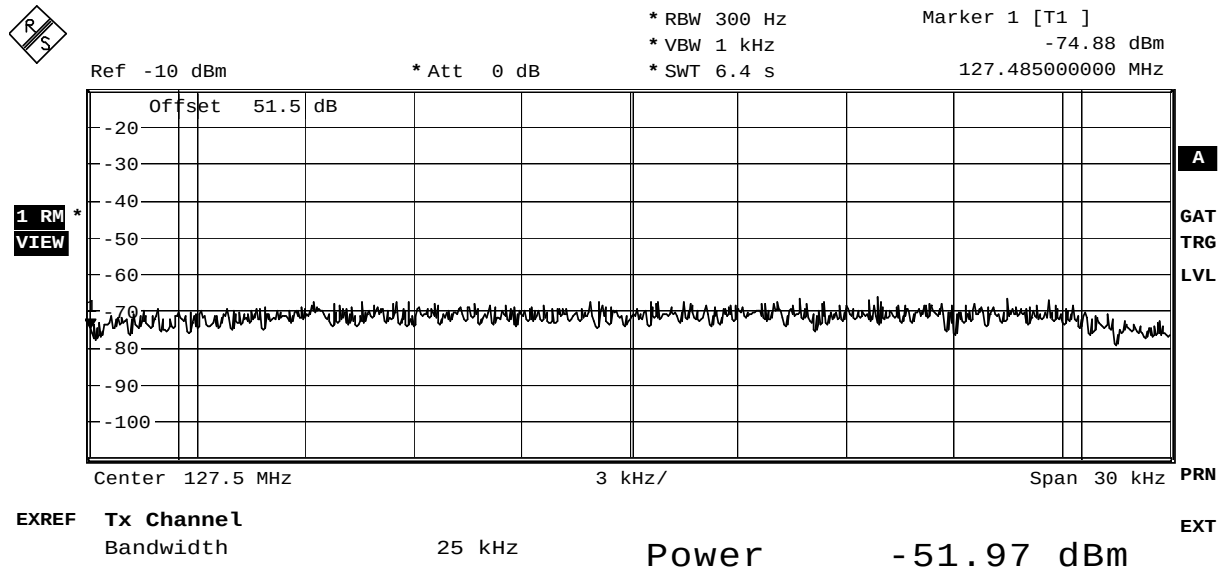
Adjacent Channel (Higher) 127.750MHz – Mode 2



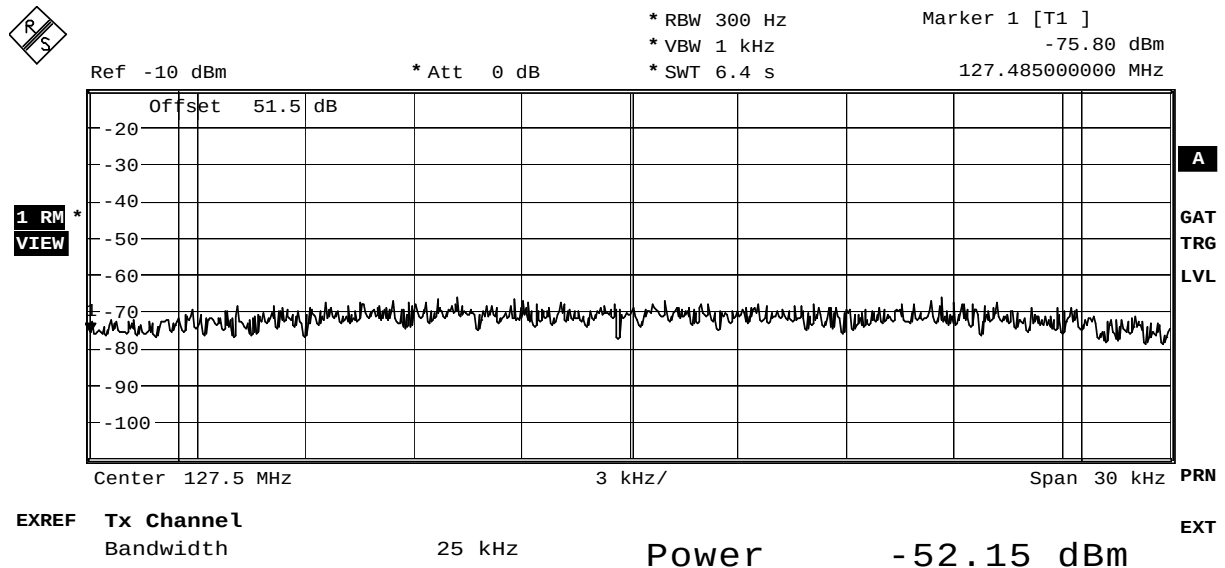
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 127.775MHz – Mode 2



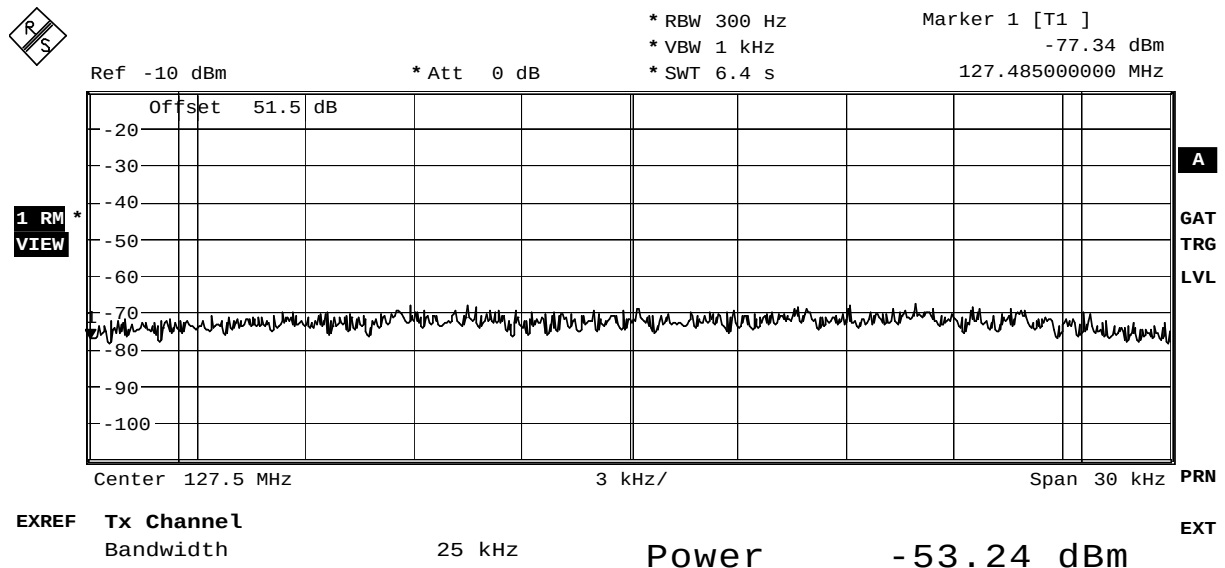
Adjacent Channel (Higher) 127.800MHz – Mode 2



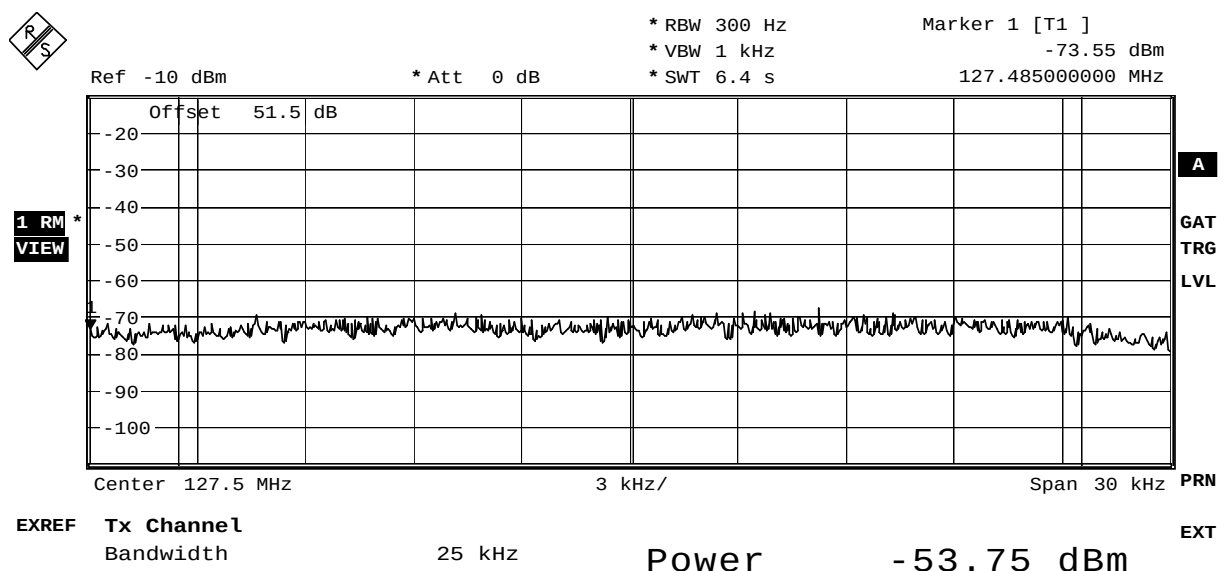
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 127.825MHz – Mode 2



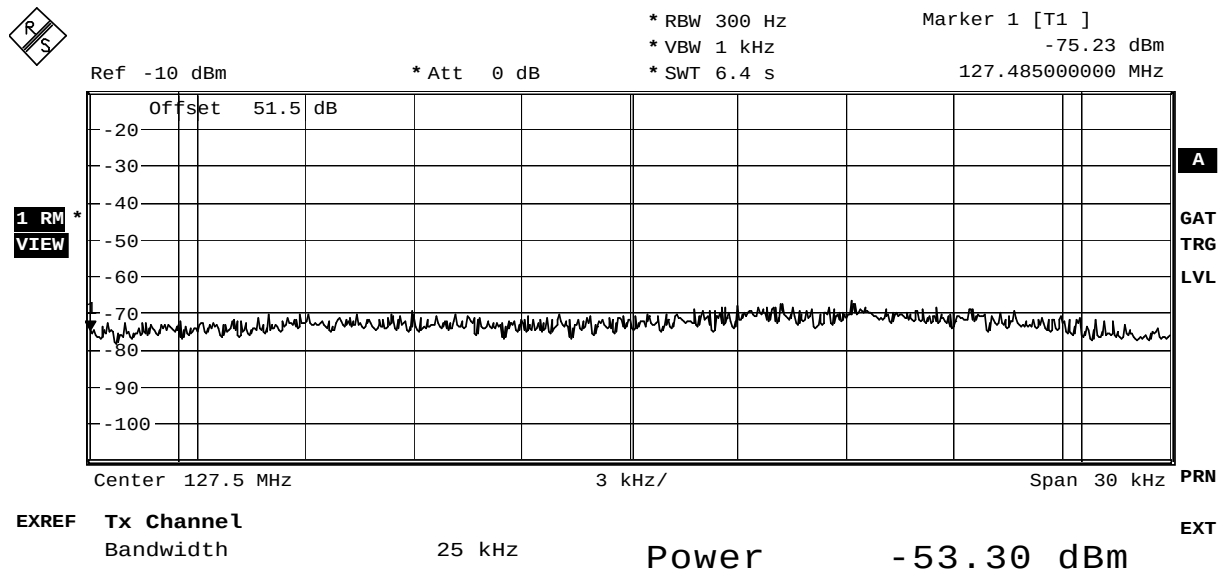
Adjacent Channel (Higher) 127.850MHz – Mode 2



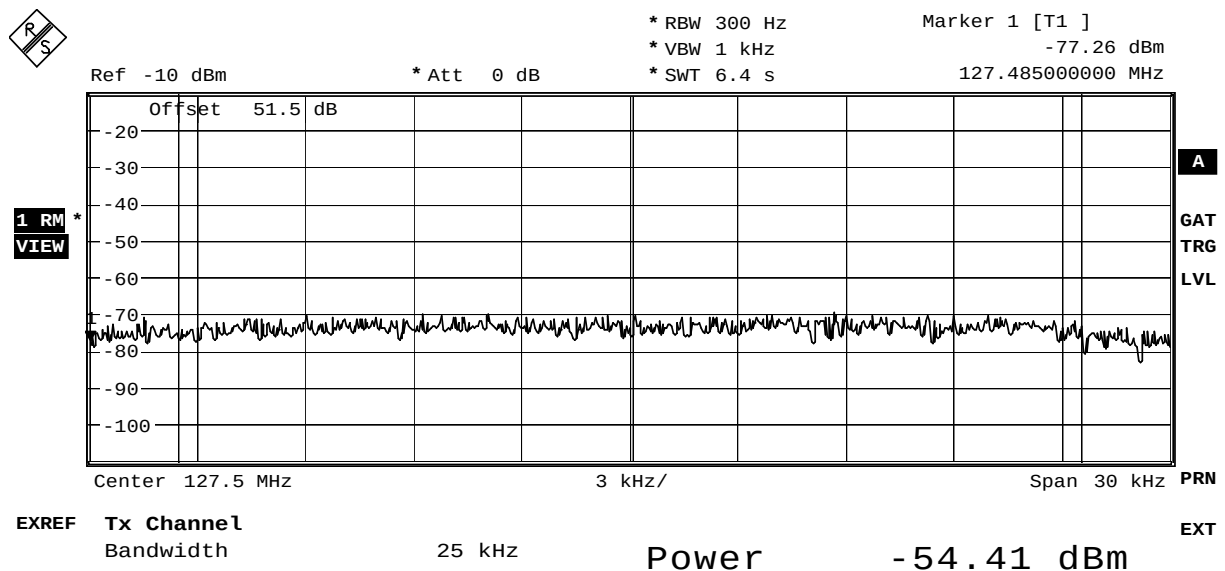
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 127.875MHz – Mode 2



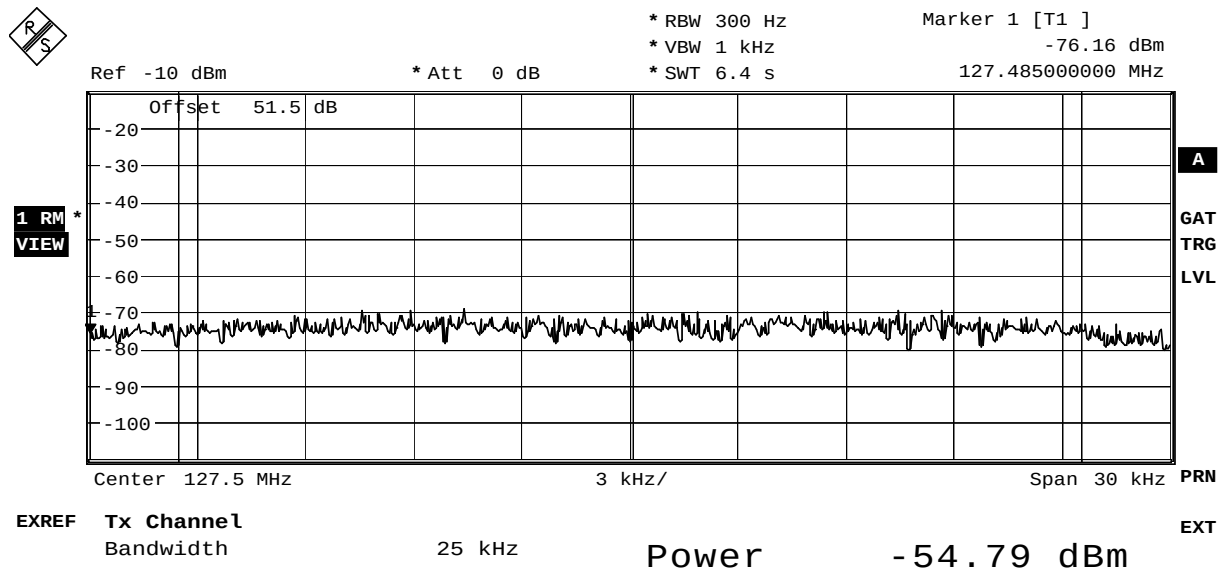
Adjacent Channel (Higher) 127.900MHz – Mode 2



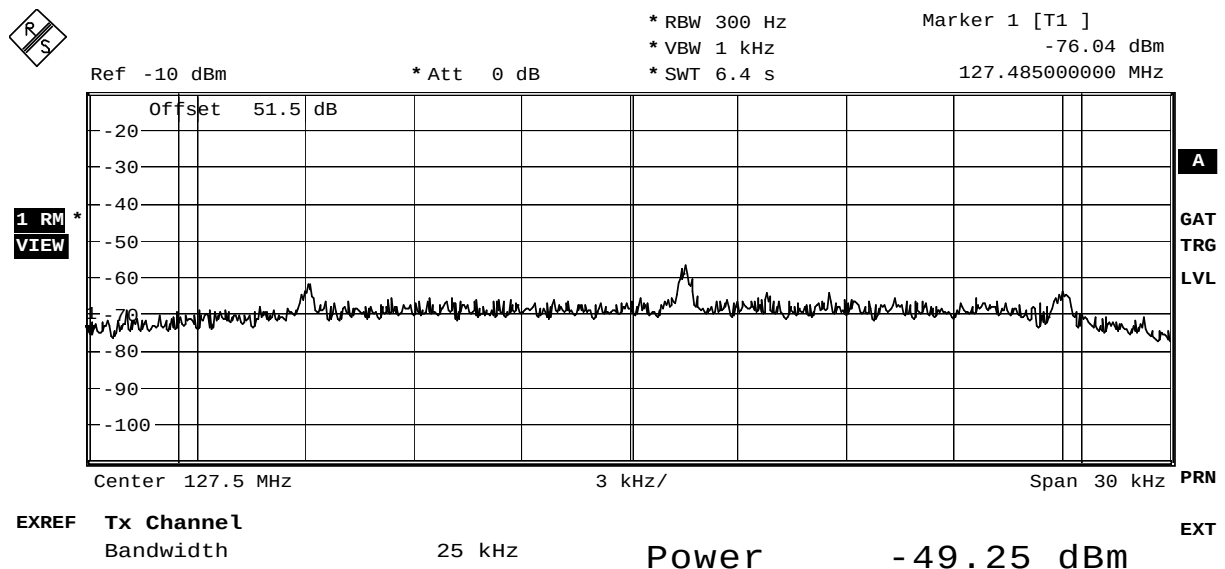
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 127.925MHz – Mode 2



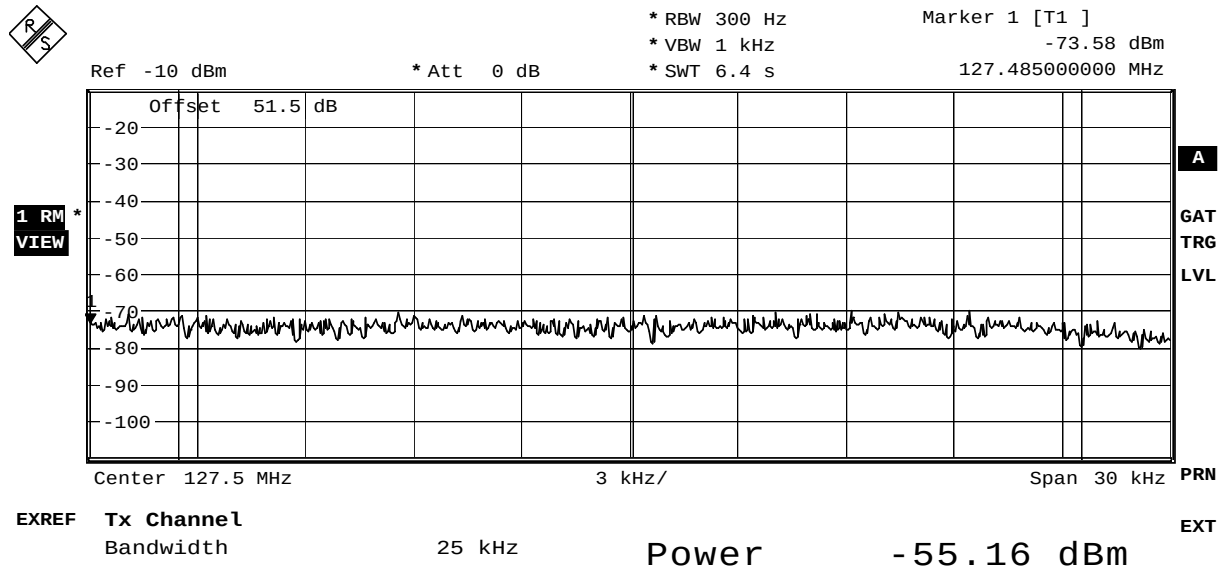
Adjacent Channel (Higher) 127.950MHz – Mode 2



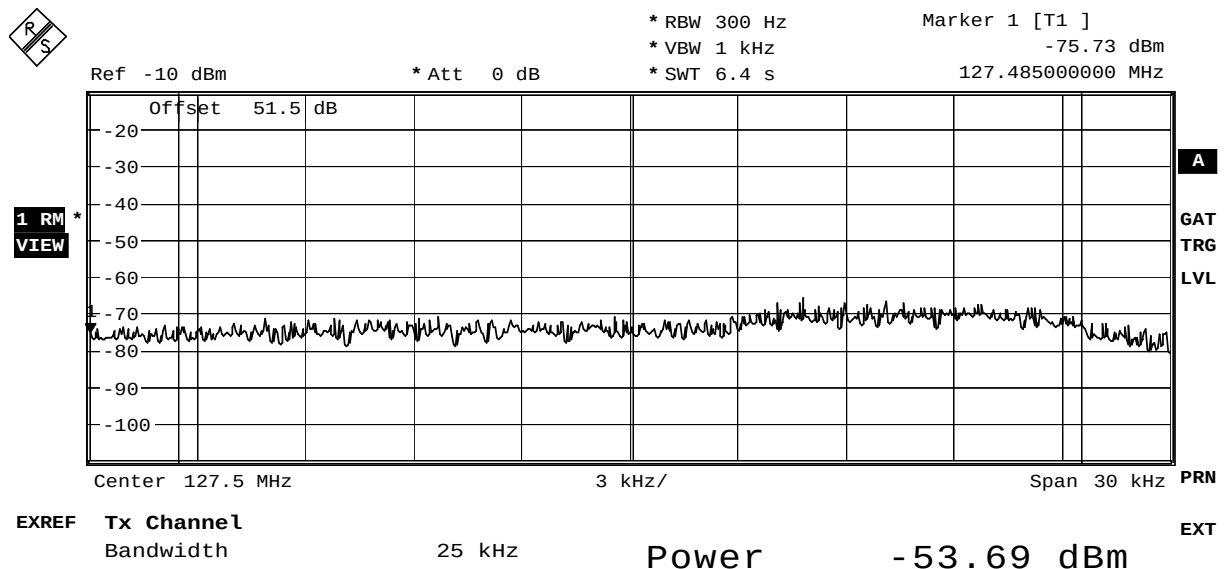
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 127.975MHz – Mode 2



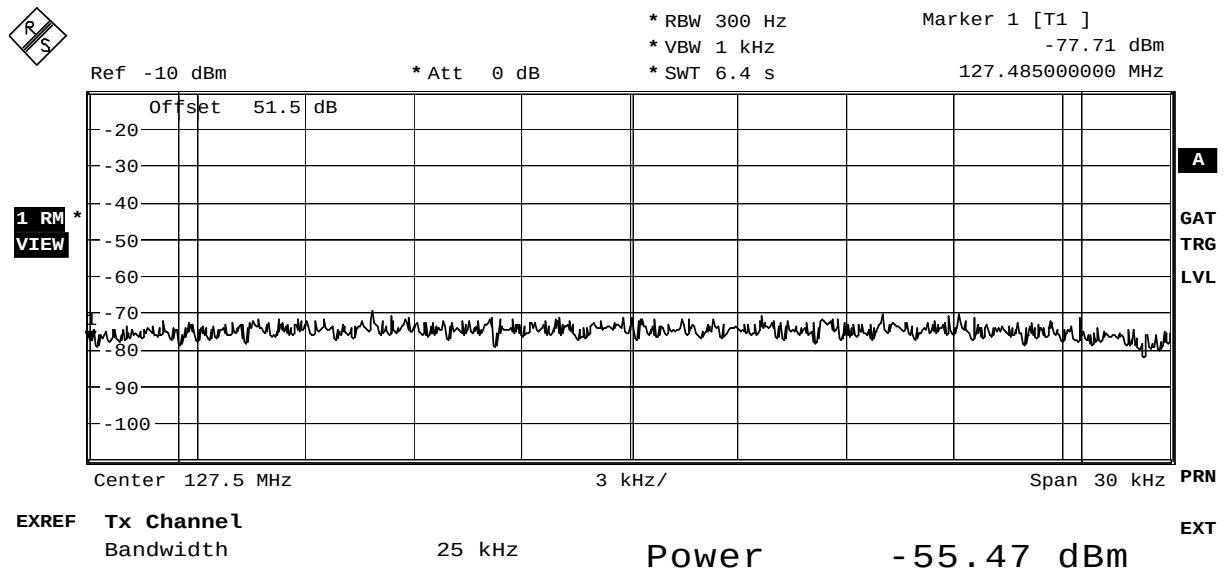
Adjacent Channel (Higher) 128.000MHz – Mode 2



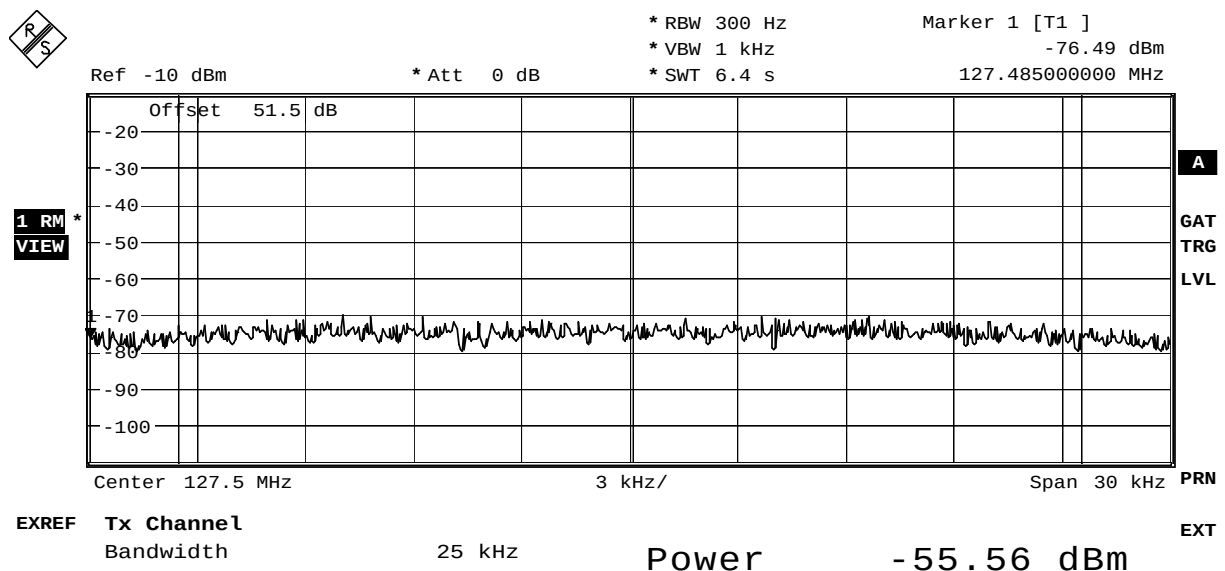
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 128.025MHz – Mode 2



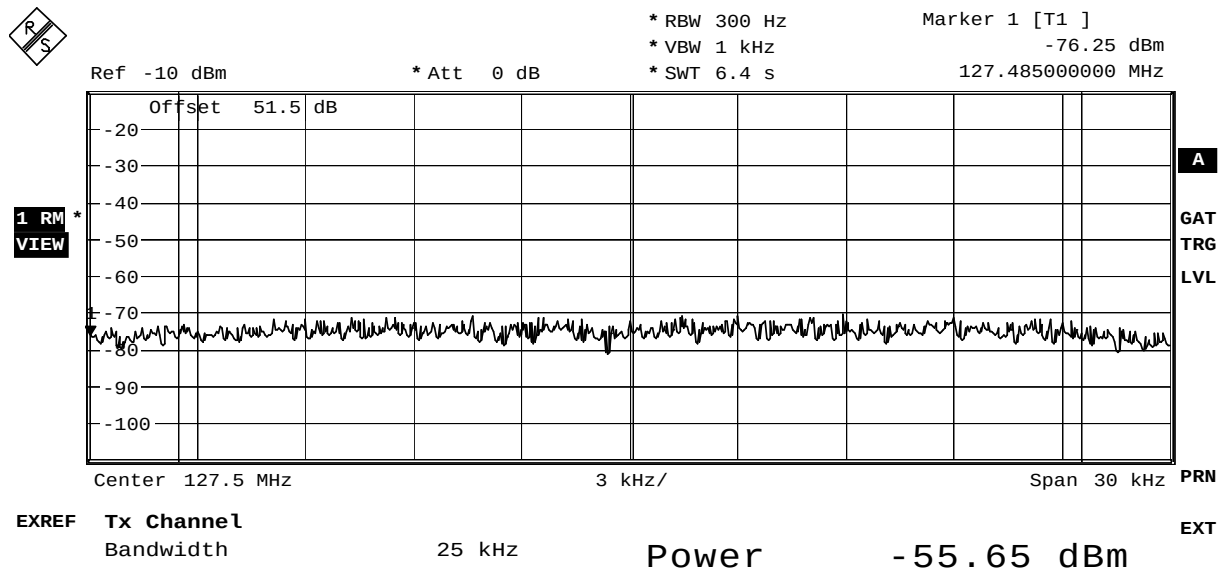
Adjacent Channel (Higher) 128.050MHz – Mode 2



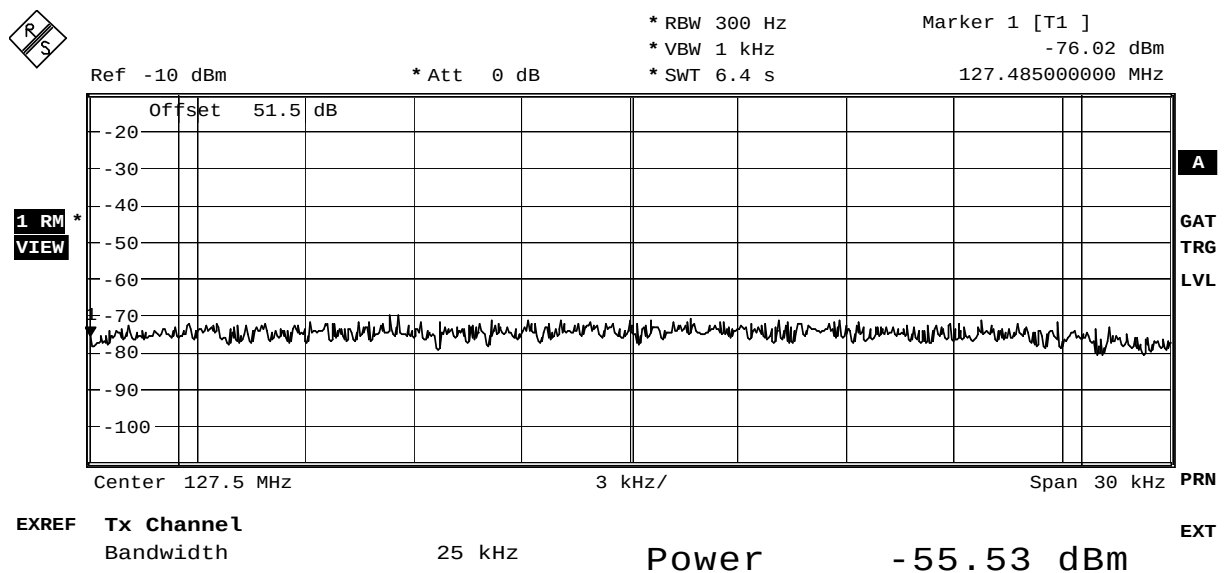
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 128.075MHz – Mode 2



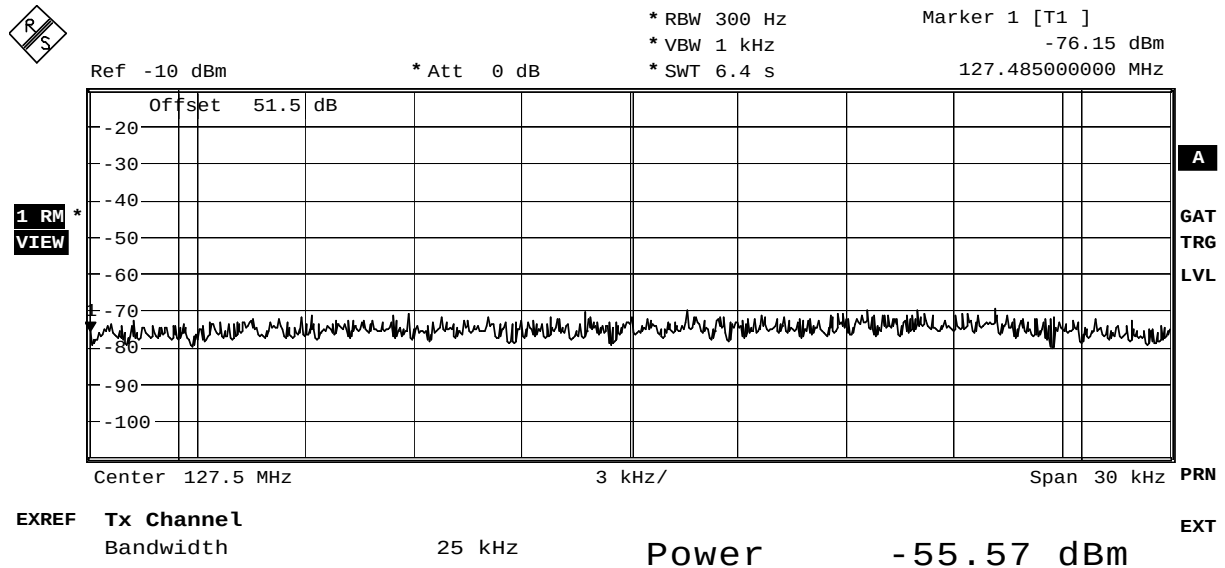
Adjacent Channel (Higher) 128.100MHz – Mode 2



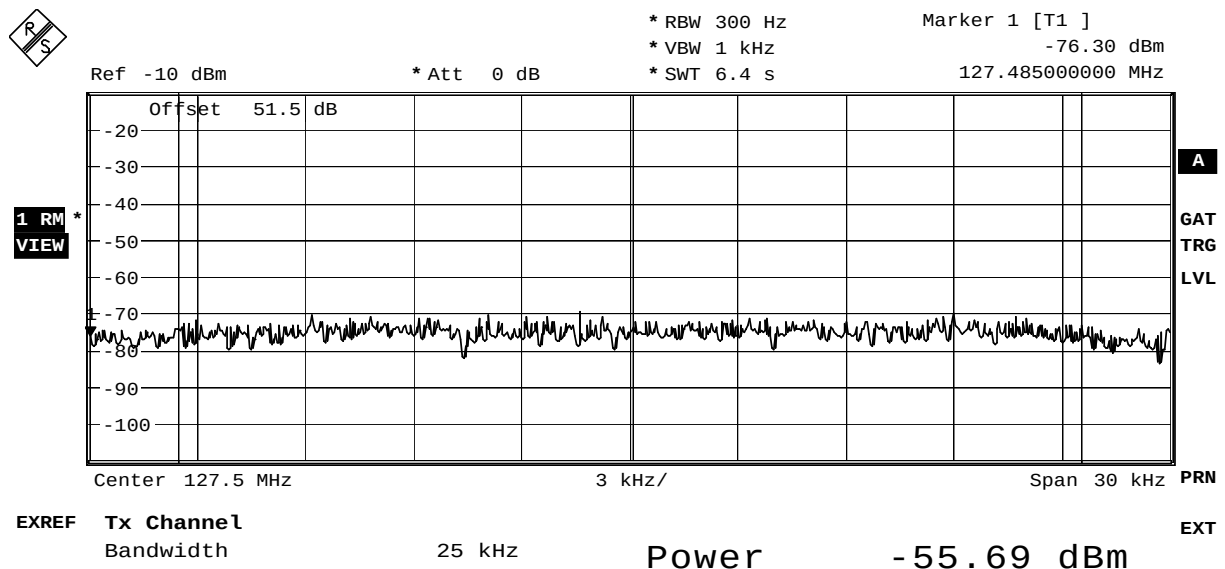
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 128.125MHz – Mode 2



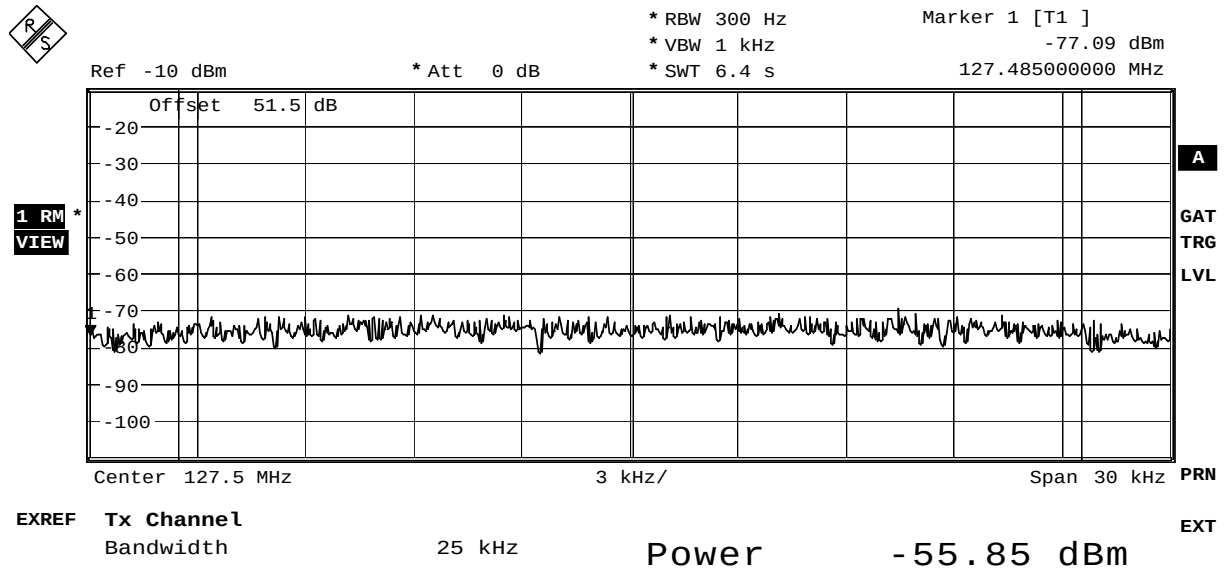
Adjacent Channel (Higher) 128.150MHz – Mode 2



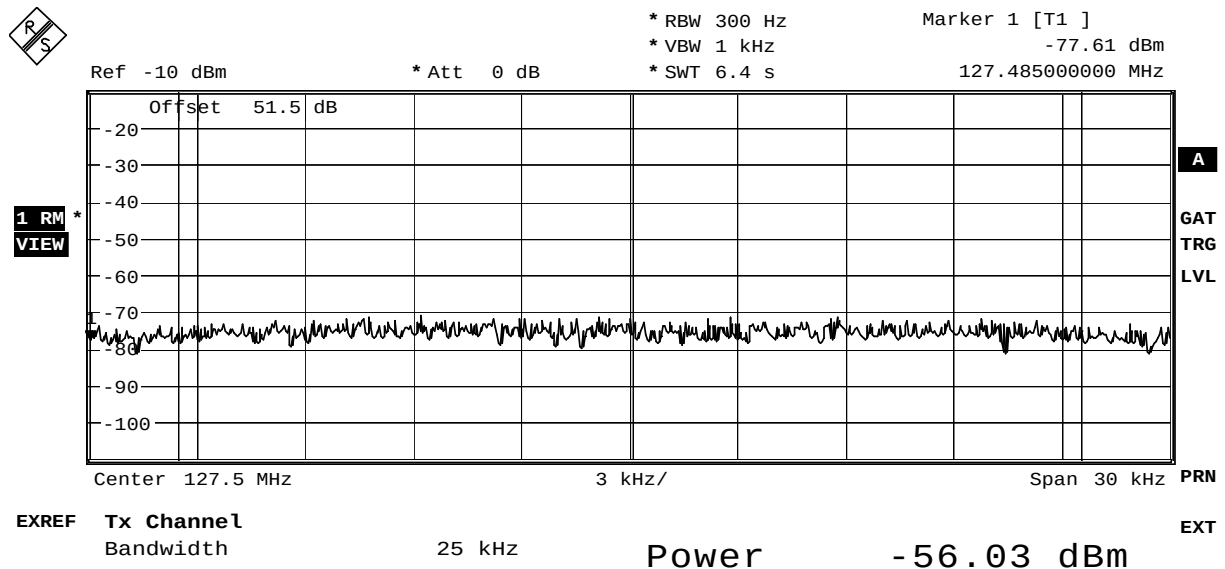
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 128.175MHz – Mode 2



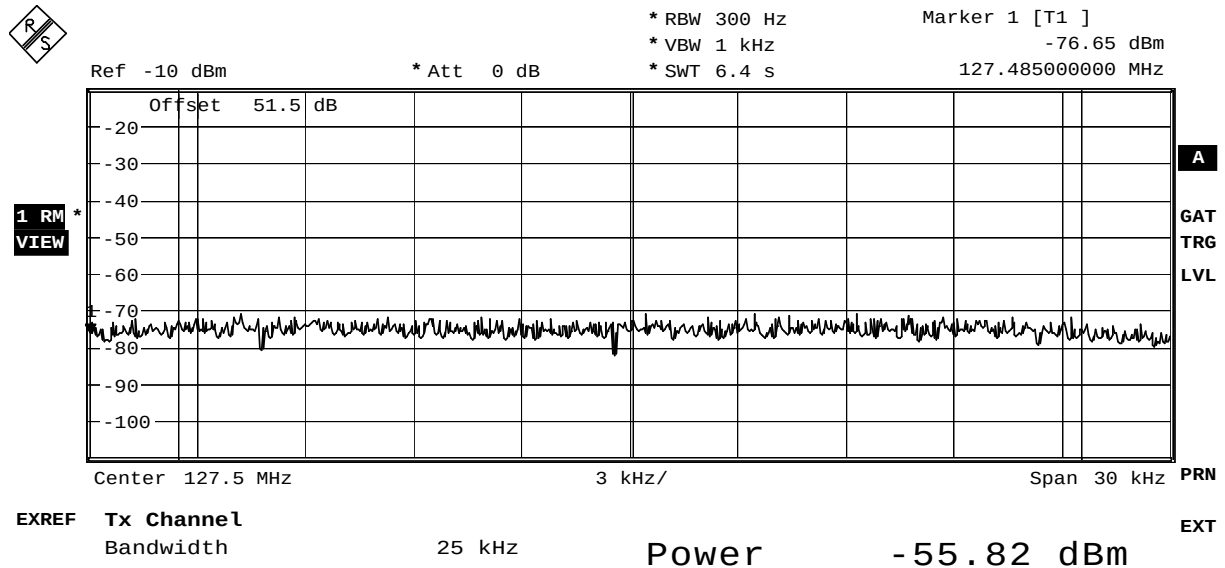
Adjacent Channel (Higher) 128.200MHz – Mode 2



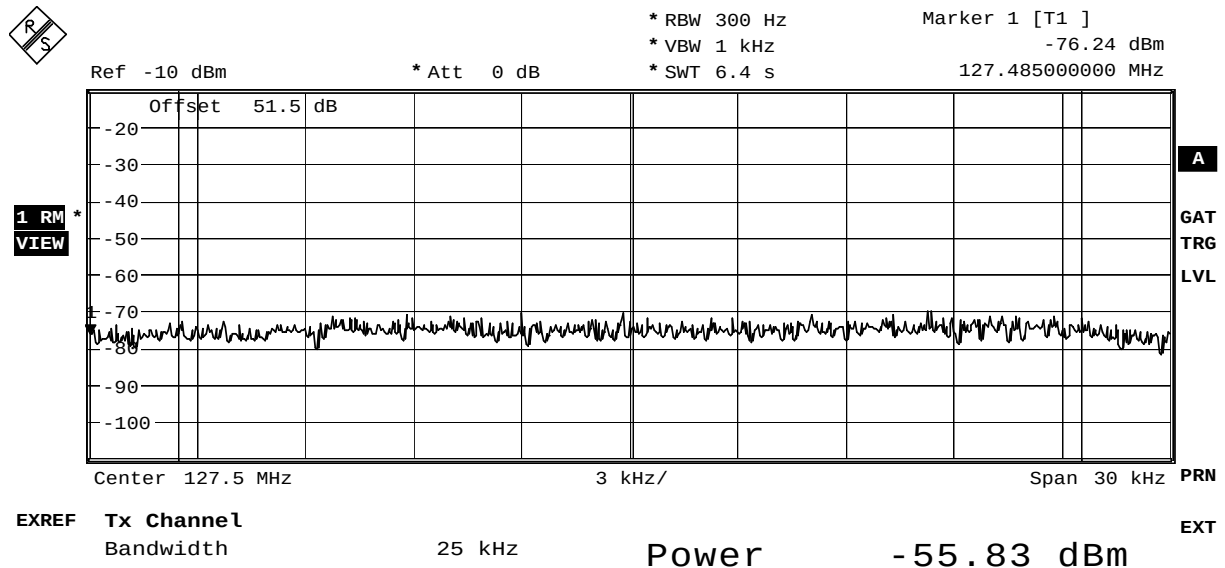
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 128.225MHz – Mode 2



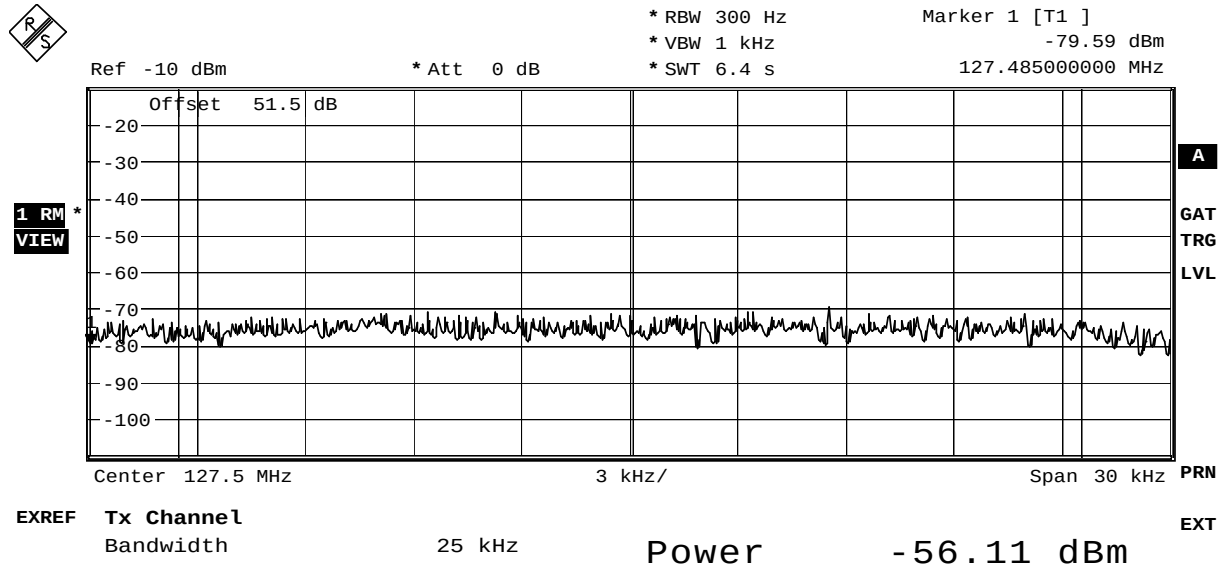
Adjacent Channel (Higher) 128.250MHz – Mode 2



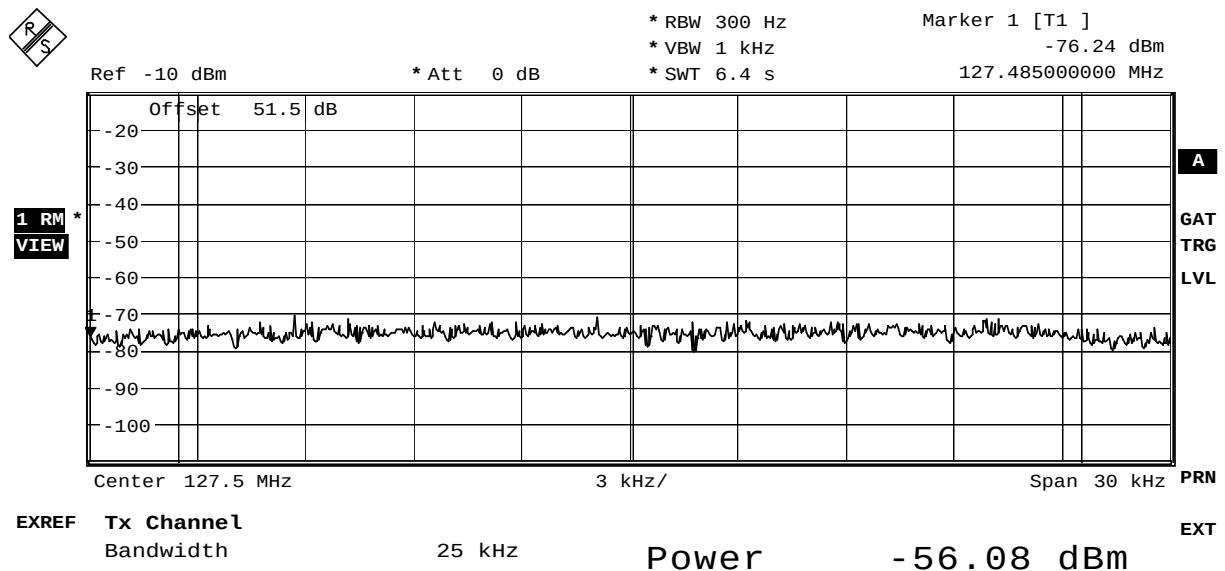
Product Service

2.7 ADJACENT CHANNEL POWER

2.7.6 Test Results - Continued



Adjacent Channel (Higher) 128.275MHz – Mode 2



Adjacent Channel (Higher) 128.300MHz – Mode 2



Product Service

SECTION 3

TEST EQUIPMENT



3.1 TEST EQUIPMENT

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

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.7 Radio (Tx) - Adjacent Channel Power				
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	13/07/2007
Power Splitter	Weinschel	1506A	607	07/09/2007
Crystal detector	Hewlett Packard	8470B	1320	05/04/2007
Power Passport: 50, 60 or 400Hz Power Supply	Behlman Hauppauge	P1350-CE	1434	TU
1m N(m) - N(m) Cable	Reynolds	269-0088-1000	2396	02/08/2007
2m N(m) - N(m) RF Cable	Reynolds	269-0088-2000	2410	27/07/2007
Power Attenuator 30dB	Rohde & Schwarz	RBU	2746	23/11/2007
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	03/02/2007
Hygrometer	Rotronic	I-1000	2891	06/01/2008
Section 2.5 Radio (Tx) - Conducted Spurious Emissions				
Power Meter	Hewlett Packard	436A	83	10/08/2007
Attenuator (30dB, 50W)	Bird	8321	494	06/12/2006
Modulation Analyser	Hewlett Packard	8901B	773	13/01/2007
Power Sensor	Hewlett Packard	8482A	1341	04/10/2007
Audio Analyser	Hewlett Packard	8903B	1350	10/07/2007
Programmable Power Supply	California Inst	2001RP	1898	TU
3m N(m) - N(m) RF Cable	Reynolds	269-0088-3000	2412	27/07/2007
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	03/02/2007
Sensor	Hewlett Packard	11722A	2787	09/08/2007
Hygrometer	Rotronic	I-1000	2891	20/12/2006



3.1 TEST EQUIPMENT

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.3 Radio (Tx) - Frequency Characteristics				
Attenuator (30dB/ 50W)	Bird	8321	46	15/11/2007
Counter	Hewlett Packard	53181A	159	17/08/2007
Modulation Analyser	Hewlett Packard	8901B	773	13/01/2007
Hygromer	Rotronic	A1	1945	07/06/2007
Chamber	Heraeus	HC 4033	2174	O/P Mon
2m N(m) - N(m) RF Cable	Reynolds	269-0088-2000	2410	27/07/2007
Sensor	Hewlett Packard	11722A	2787	09/08/2007
Thermocouple Thermometer	Fluke	51	3173	22/06/2007
Section 2.6 Radio (Tx) - Occupied Bandwidth				
Attenuator (30dB/ 50W)	Bird	8321	46	15/11/2007
Modulation Analyser	Hewlett Packard	8901B	773	13/01/2007
Audio Analyser	Hewlett Packard	8903B	1350	10/07/2007
Power Passport: 50, 60 or 400Hz Power Supply	Behlman Hauppauge	P1350-CE	1434	TU
2m N(m) - N(m) RF Cable	Reynolds	269-0088-2000	2410	27/07/2007
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	03/02/2007
Sensor	Hewlett Packard	11722A	2787	09/08/2007
Hygrometer	Rotronic	I-1000	2891	20/12/2006
Section 2.4 Radio (Tx) - Power Characteristics				
Attenuator (10dB/ 00W)	Spinner	BN 745353	443	15/11/2007
Attenuator (30dB, 50W)	Bird	8321	494	07/12/2007
Modulation Analyser	Hewlett Packard	8901B	555	20/11/2007
Hygromer	Rotronic	A1	970	25/04/2008
Spectrum Analyser	Hewlett Packard	E4407B	1154	30/06/2007
Hygrometer	Rotronic	A1	2760	30/05/2007
20dB/10W Attenuator	Aeroflex / Weinschel	23-20-34	3160	01/06/2007
Sensor Module	Hewlett Packard	11722A	3293	21/11/2007



3.1 TEST EQUIPMENT

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Sections 2.1 and 2.2 Radio (Tx) - Modulation Characteristics				
Attenuator (30dB/ 50W)	Bird	8321	46	15/11/2007
Modulation Analyser	Hewlett Packard	8901B	773	23/01/2008
Audio Analyser	Hewlett Packard	8903B	1350	10/07/2007
Power Passport: 50, 60 or 400Hz Power Supply	Behlman Hauppauge	P1350-CE	1434	TU
2m N(m) - N(m) RF Cable	Reynolds	269-0088-2000	2410	27/07/2007
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	03/02/2007
Sensor	Hewlett Packard	11722A	2787	09/08/2007
Hygrometer	Rotronic	I-1000	2891	06/01/2008

O/P Mon Output Monitored with calibrated equipment

TU Traceability Unscheduled

Relevant test equipment was in calibration at time of use.



3.2 MEASUREMENT UNCERTAINTY

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

IN THE FREQUENCY RANGE 30MHz TO 1000MHz		
TEST	FREQUENCY	AMPLITUDE
For Radiated Emissions, Quasi-Peak Measurements using the ESVP Test Receiver and Bilog Antenna	$\pm 5\text{ppm} + 500\text{Hz}$	$\pm 4.1\text{dB}$
For Radiated Emissions, Quasi-Peak Measurements taken in Zero Span using the Hewlett Packard EMI Receiver and Bilog Antenna	$\pm 2 \times 10^{-7} \times \text{Centre Frequency}$	5.15dB calculated in accordance with CISPR 16-4
For Spurious Conducted Emissions	Not Applicable	$\pm 3.0\text{dB}$
IN THE FREQUENCY RANGE 1GHz TO 20GHz		
TEST	FREQUENCY	AMPLITUDE
For Spurious Radiated Emissions measurements	$\pm 2 \times 10^{-7} \times \text{Centre Frequency}$	$\pm 3.4\text{dB}$



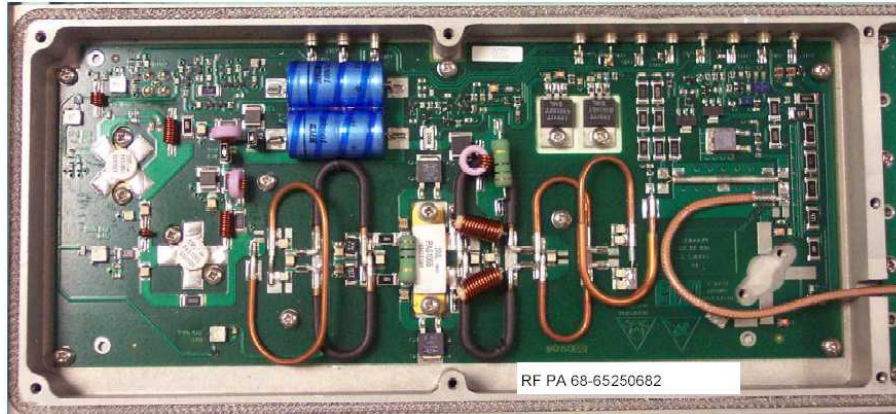
Product Service

SECTION 4

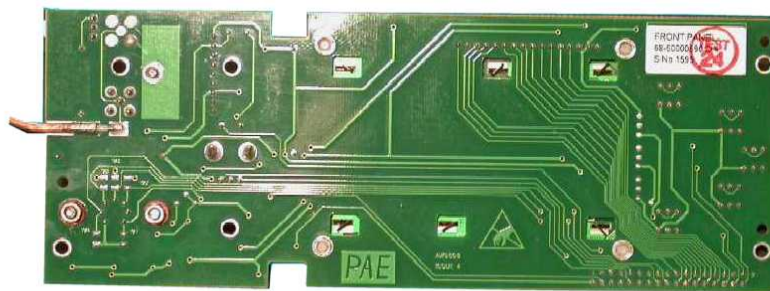
PHOTOGRAPHS



4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Photograph of PA



Front panel 68-60000690

Photograph of Front panel module trackside2



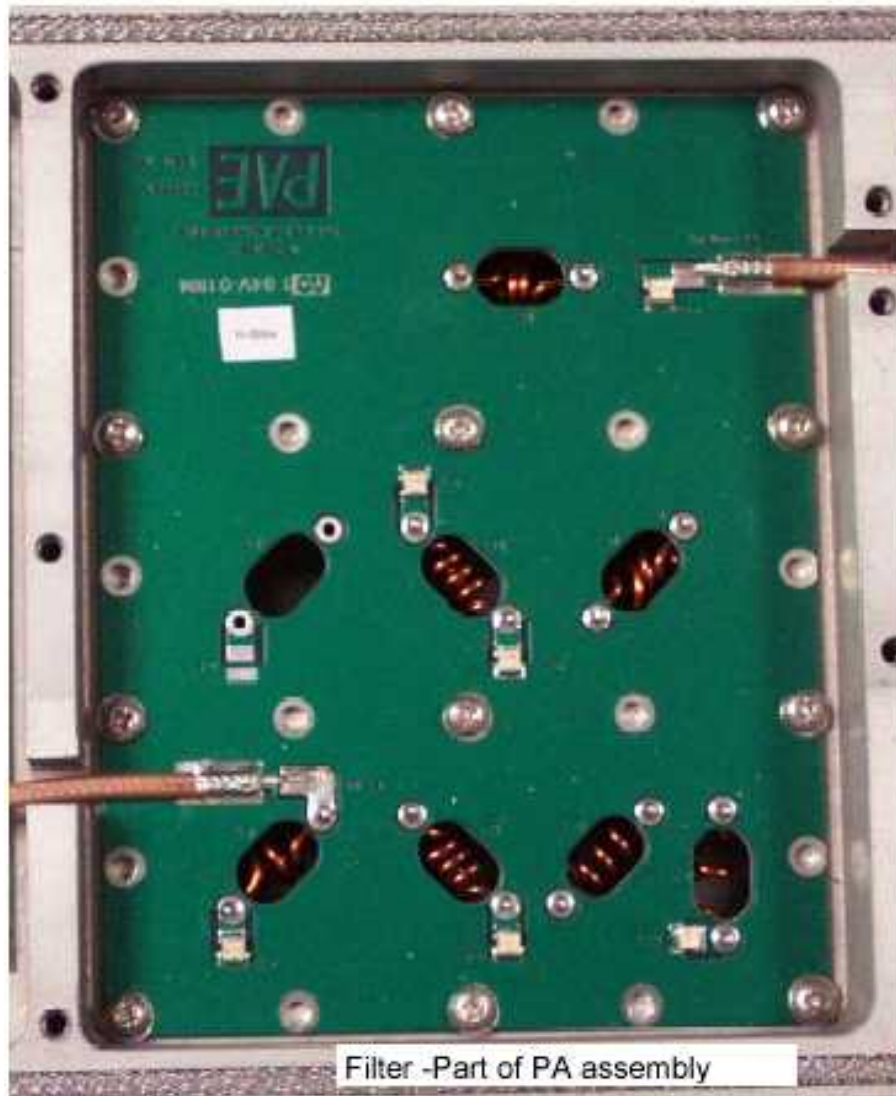
Front panel 68-60000690

Photograph of Front panel module2



Product Service

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

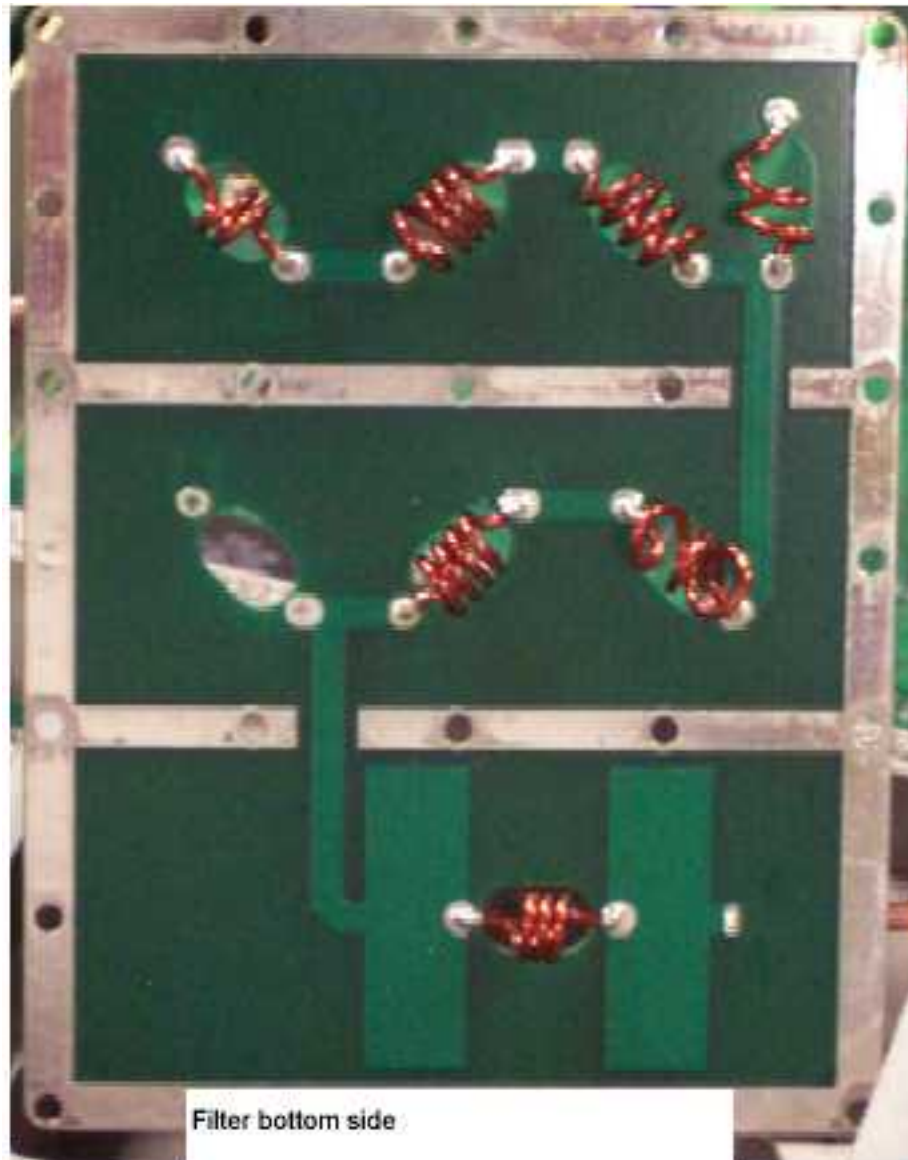


Photograph of Filter



Product Service

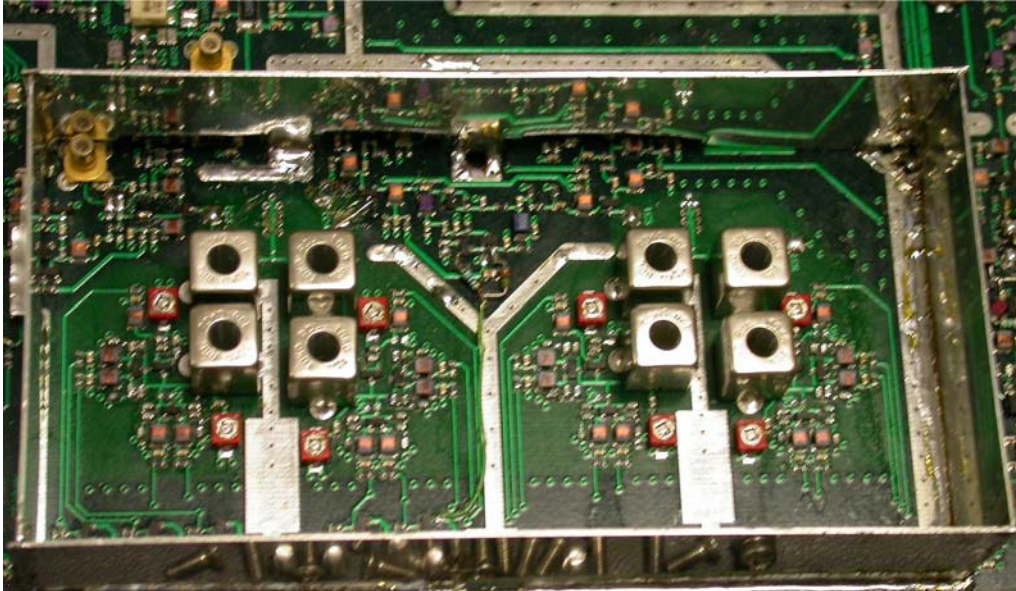
4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



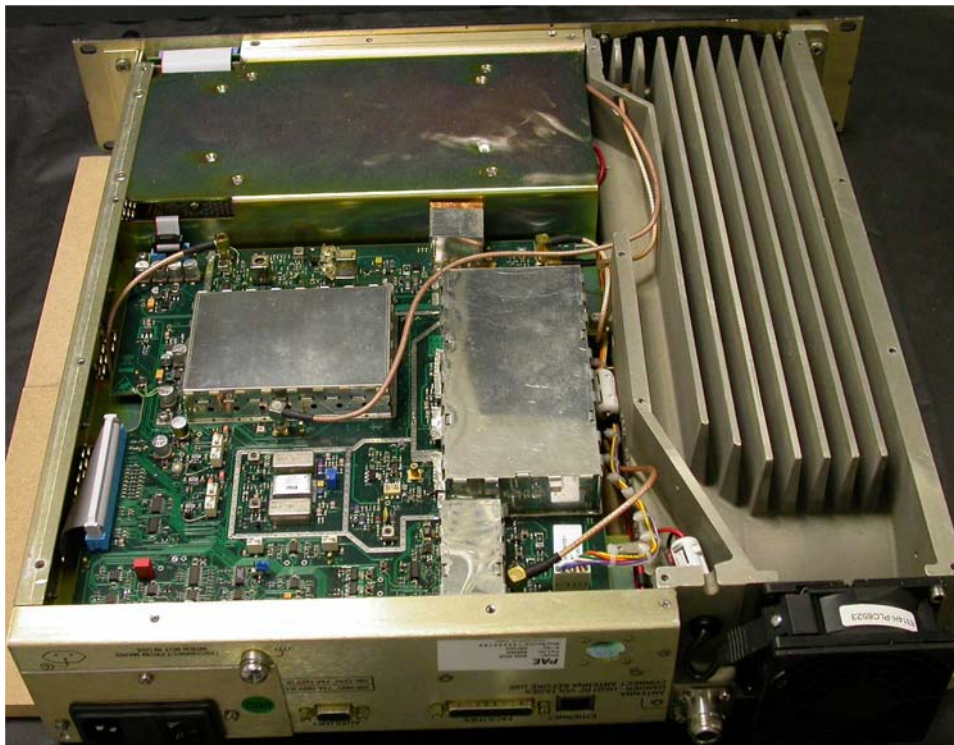
Photograph of Bottom of Filter



4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



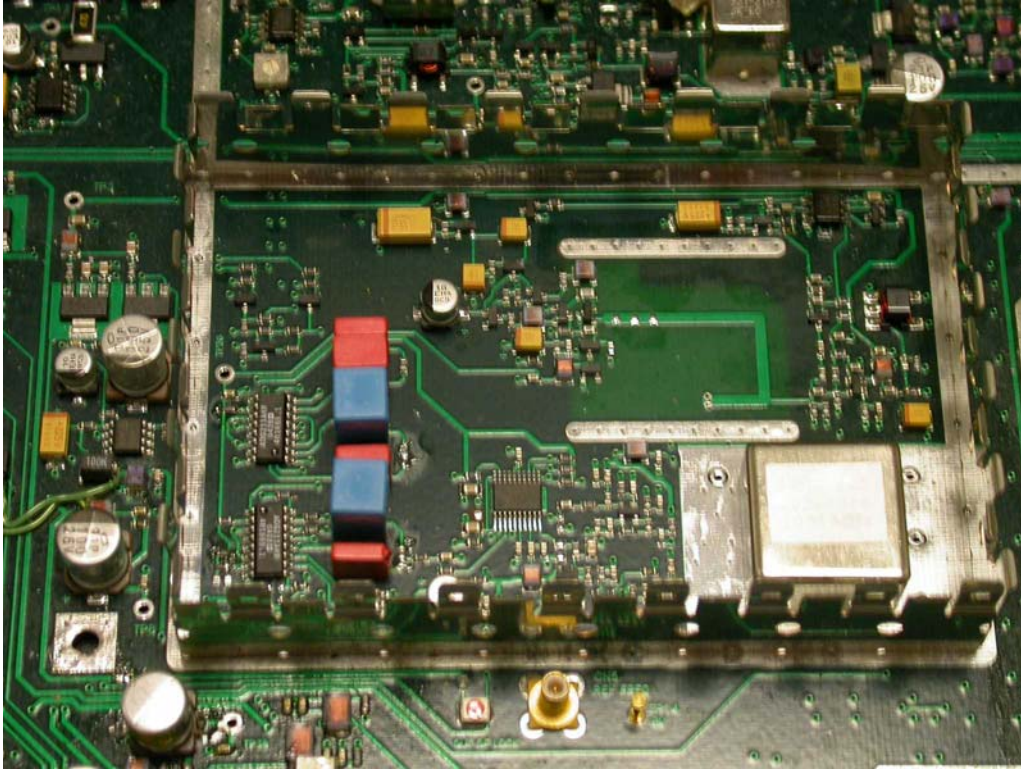
Photograph of digital Filters



Photograph of Internal view Bottom of EUT



4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



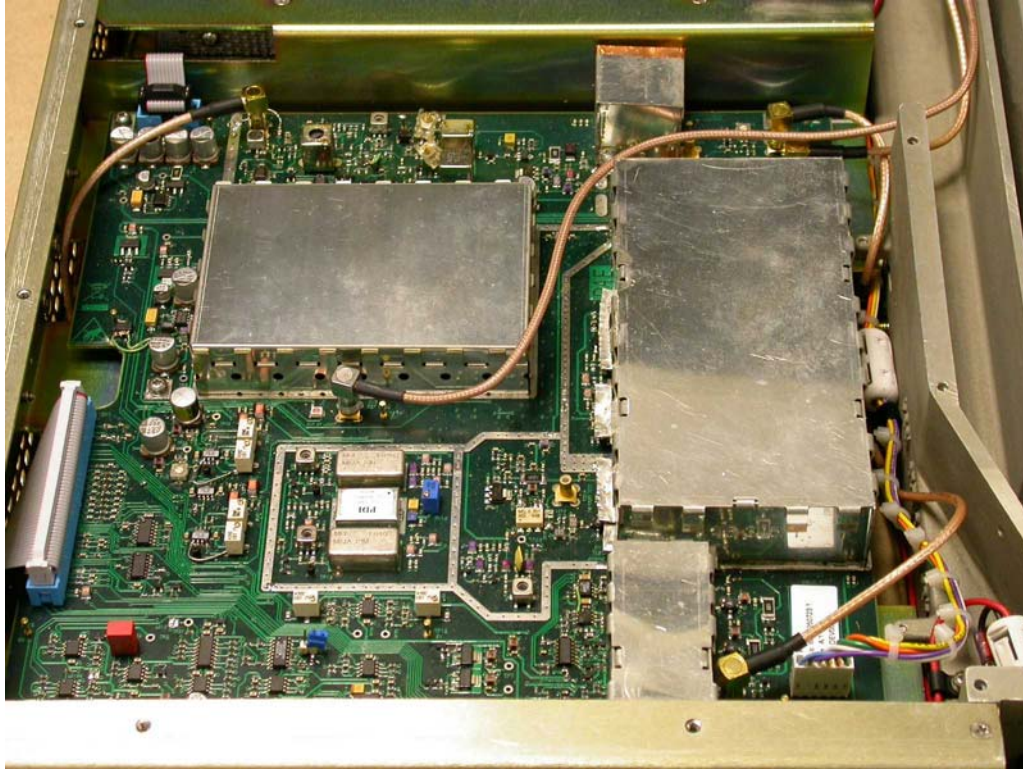
Photograph of vco and ref



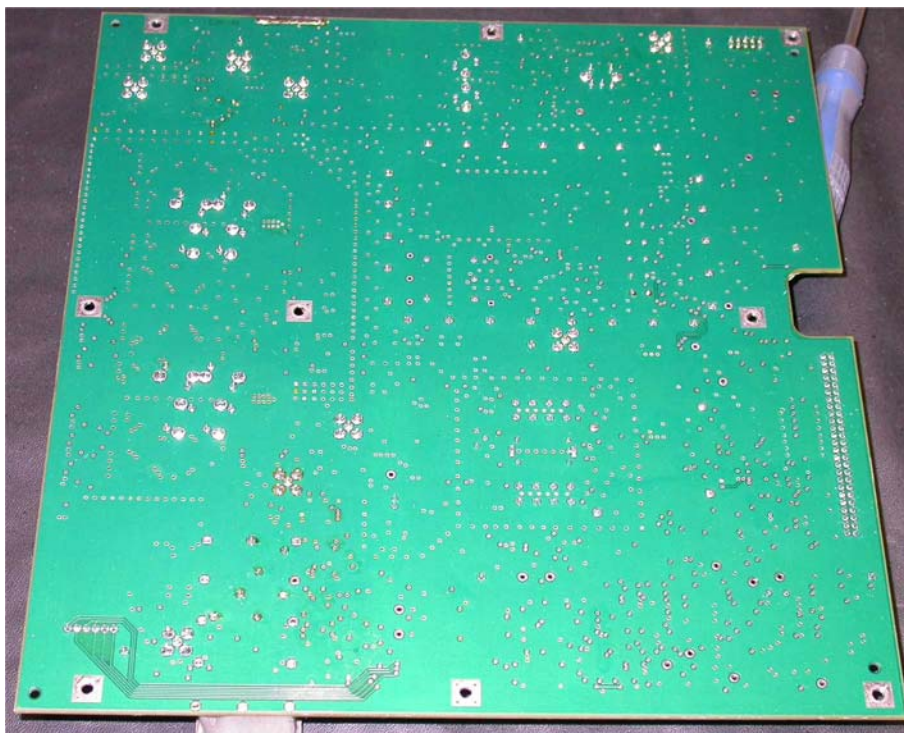
Photograph of Processor Module



4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



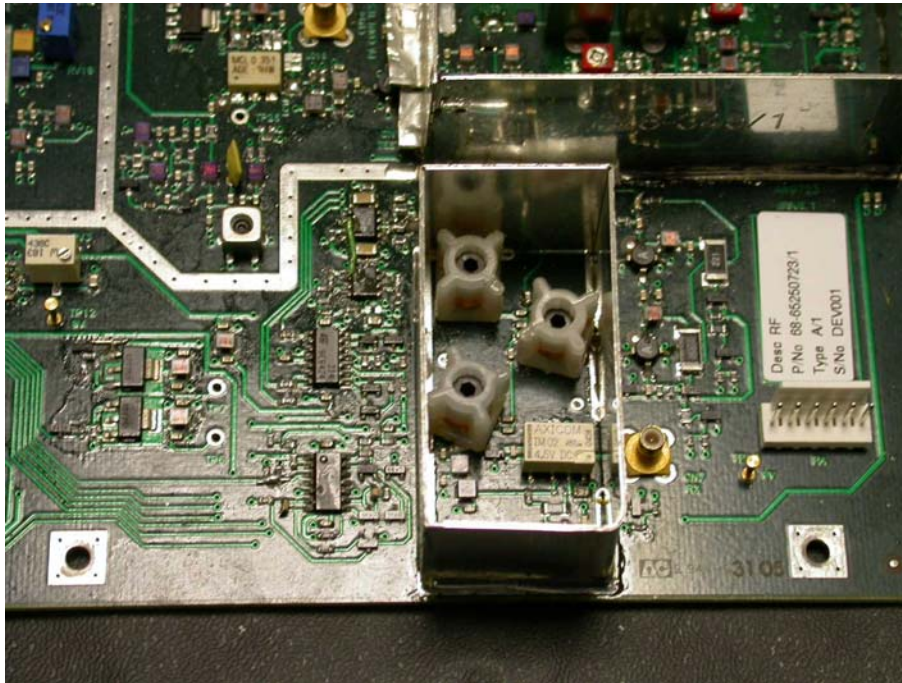
Photograph of RF Module



Photograph of RF Module Underside



4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



RF Input Filter



Photograph of Power Supply Unit Label

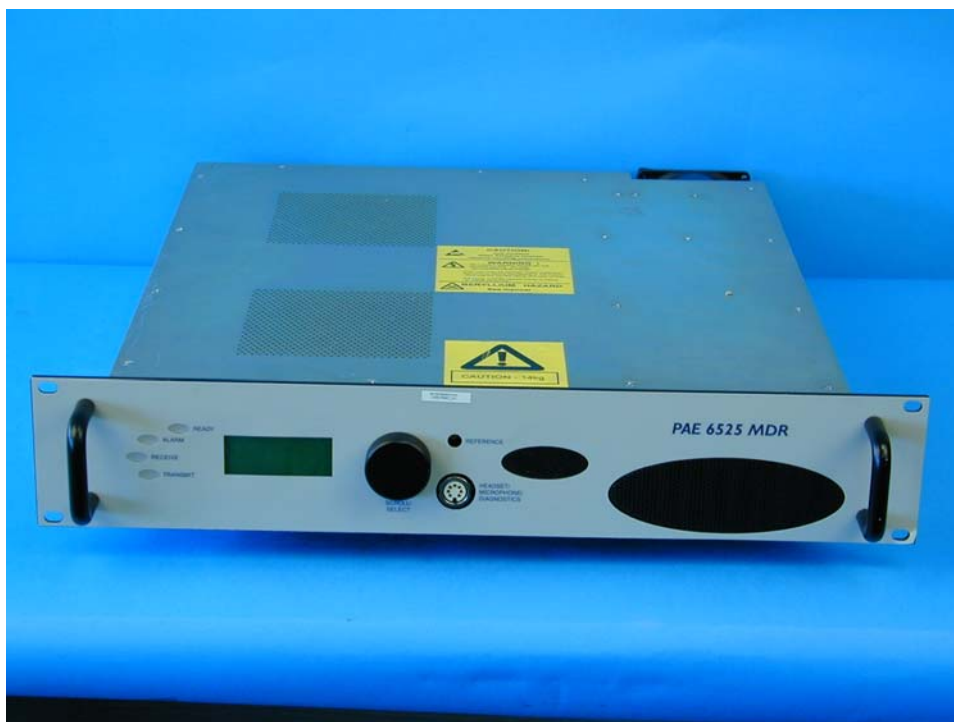


Product Service

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Photograph of Rear of unit



Photograph of Front of Unit



4.2 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Photograph of Top of unit



Photograph of Bottom of Unit



4.3 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Photograph of Left Side of unit

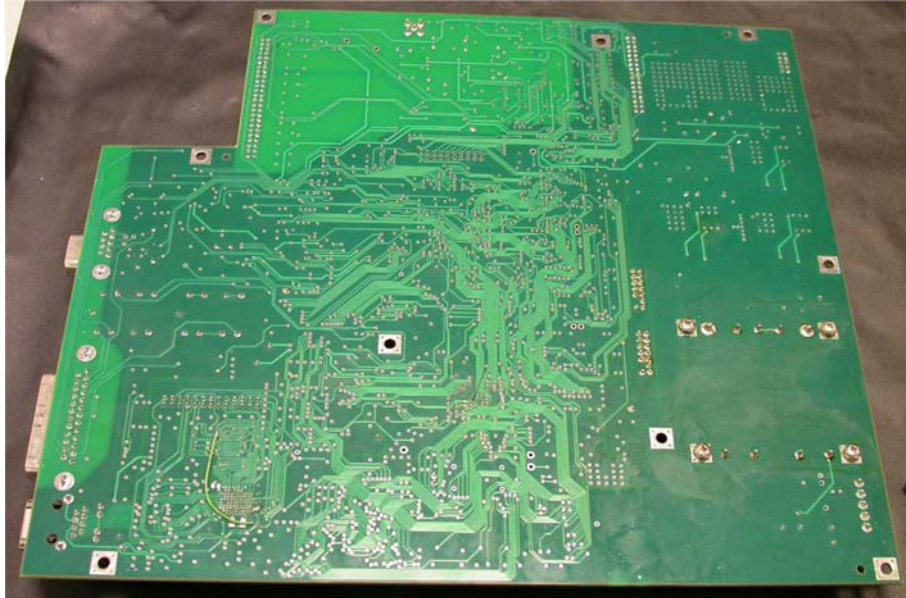


Photograph of Right Side of Unit



Product Service

4.4 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Photograph of processor board bottom



Photograph of Power Supply



Product Service

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Photograph of Power Amplifier



Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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

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

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA
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