



Nemko Test Report: 25965RUS2

Applicant: Alcatel USA
3400 West Plano Parkway
Plano, TX 75075
USA

**Equipment Under Test:
(E.U.T.)** MPT-HL Packet Terminal

In Accordance With: **FCC Part 15, Subpart C, 15.247 and
Industry Canada RSS-210, Issue 7**
Digital Transmission System Transmitter

Tested By: Nemko USA, Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

TESTED BY: 

David Light, Senior Wireless Engineer **DATE:** 27 July 2009

APPROVED BY: 

Tom Tidwell, Telecom Direct **DATE:** 15 September 2009

Number of Pages: 61

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Section 1. Summary of Test Results

Manufacturer: Alcatel USA

Model No.: MPT-HL

Serial No.: CA119076

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with CFR 47 Part 15, Subpart C, Paragraph 15.247 and Industry Canada RSS-210, Issue 7 for Digital Transmission Systems. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and Industry Canada.

- | | | | |
|-------------------------------------|----------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | New Submission | <input checked="" type="checkbox"/> | Production Unit |
| <input type="checkbox"/> | Class II Permissive Change | <input type="checkbox"/> | Pre-Production Unit |

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See " Summary of Test Data".



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Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a) / RSS-Gen 7.2.2	Complies
Minimum 6 dB Bandwidth	15.247(a)(2) / RSS-210 A8.2	Complies
Maximum Peak Power Output	15.247(b)(3) / RSS-210 A8.4	Complies
Spurious Emissions (Antenna Conducted)	15.247(d) / A8.5	Complies
Spurious Emissions (Radiated)	15.247(d)/15.209(a) / RSS-210 A8.5	Complies
Peak Power Spectral Density	15.247(e) / RSS-210 A8.5	Complies
Receiver Spurious Emissions	RSS-Gen 7.2.3	Complies

Footnotes:

The EUT was tested at all modulations. Data presented is for 32 QAM as it was determined that this was the highest power and the highest power density. There was no difference on occupied bandwidth measurements.

Section 2. Equipment Under Test (E.U.T.)

General Equipment Information

Frequency Band (MHz):	902-928	2400-2483.5	5725-5850
	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Operating Frequency of Test Sample: 5730 to 5845 MHz

Supply Voltage; 20 to 60 Vdc

Output Power (rated): 1 watt max

Bandwidth: 5, 10 or 30 MHz

Modulation: 32 QAM, 128 QAM or 256 QAM*

User Frequency Adjustment: Software controlled

Section 3. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(2) / A8.2(a)
TESTED BY: David Light	DATE: 16 July 2009

Test Results: Complies.

Measurement Data: See 6 dB BW plot
Measured 6 dB bandwidth: 4.41 MHz
8.78 MHz
26.43 MHz

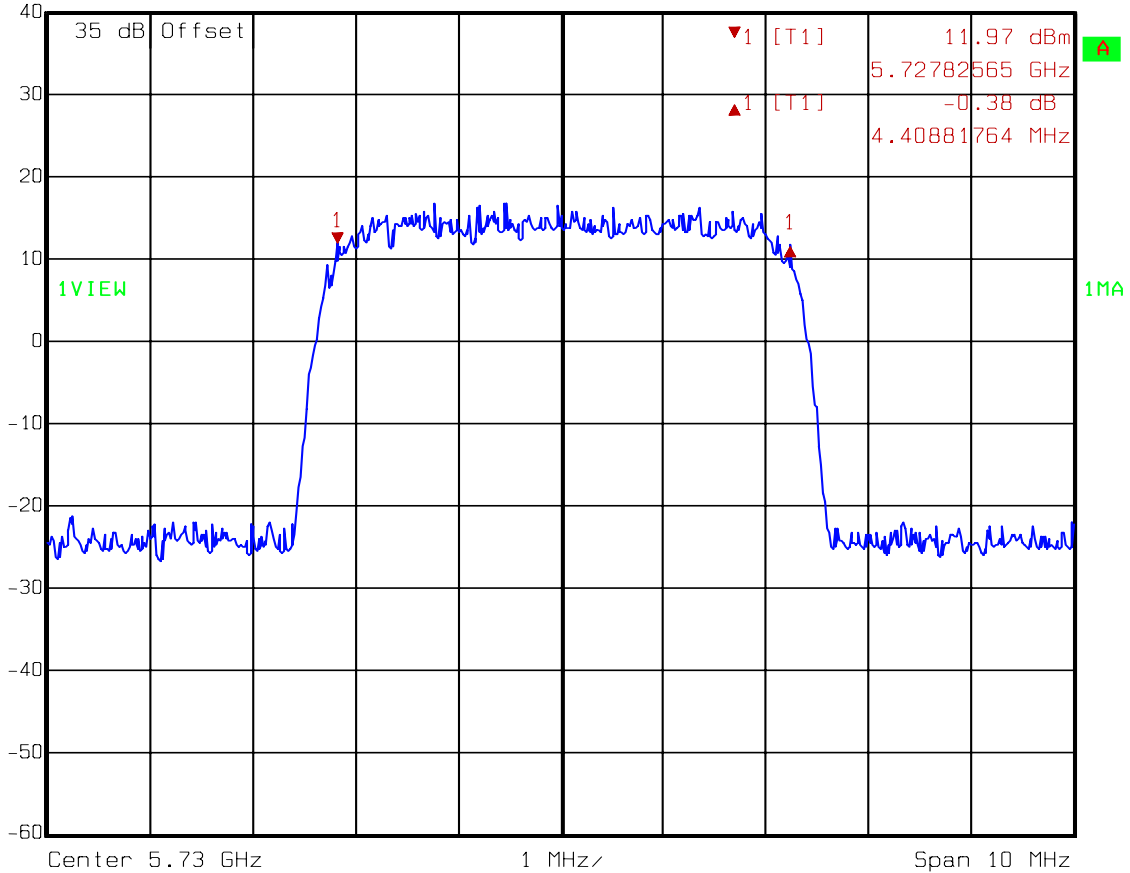
Test Conditions: 35 %RH
22 °C

Measurement Uncertainty: +/-1x10⁻⁷ ppm

Test Equipment Used: 1036-1082-1064-1064

Test Data – Occupied Bandwidth

 Delta 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl -0.38 dB VBW 100 kHz
40 dBm 4.40881764 MHz SWT 5 ms Unit dBm

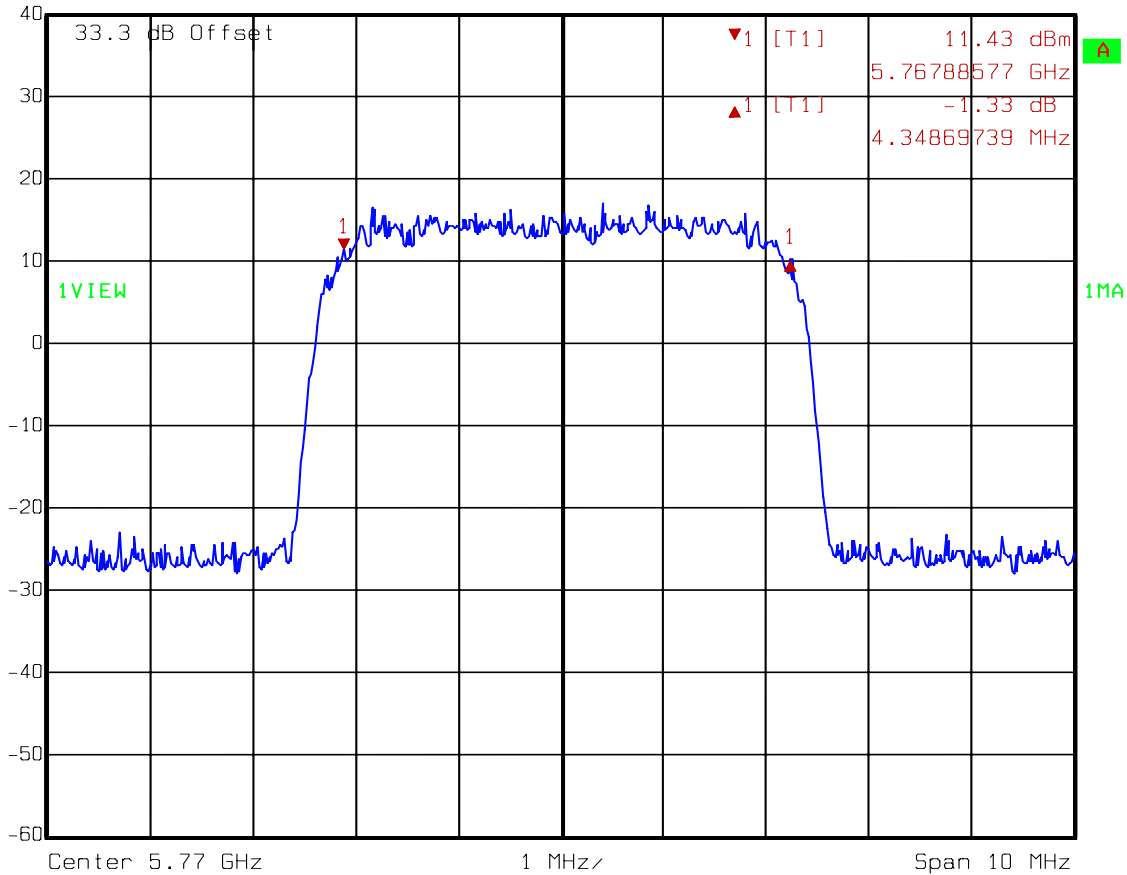


Date: 16.JUL.2009 09:26:18

Test Data – Occupied Bandwidth



Delta 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl -1.33 dB VBW 100 kHz
40 dBm 4.34869739 MHz SWT 5 ms Unit dBm

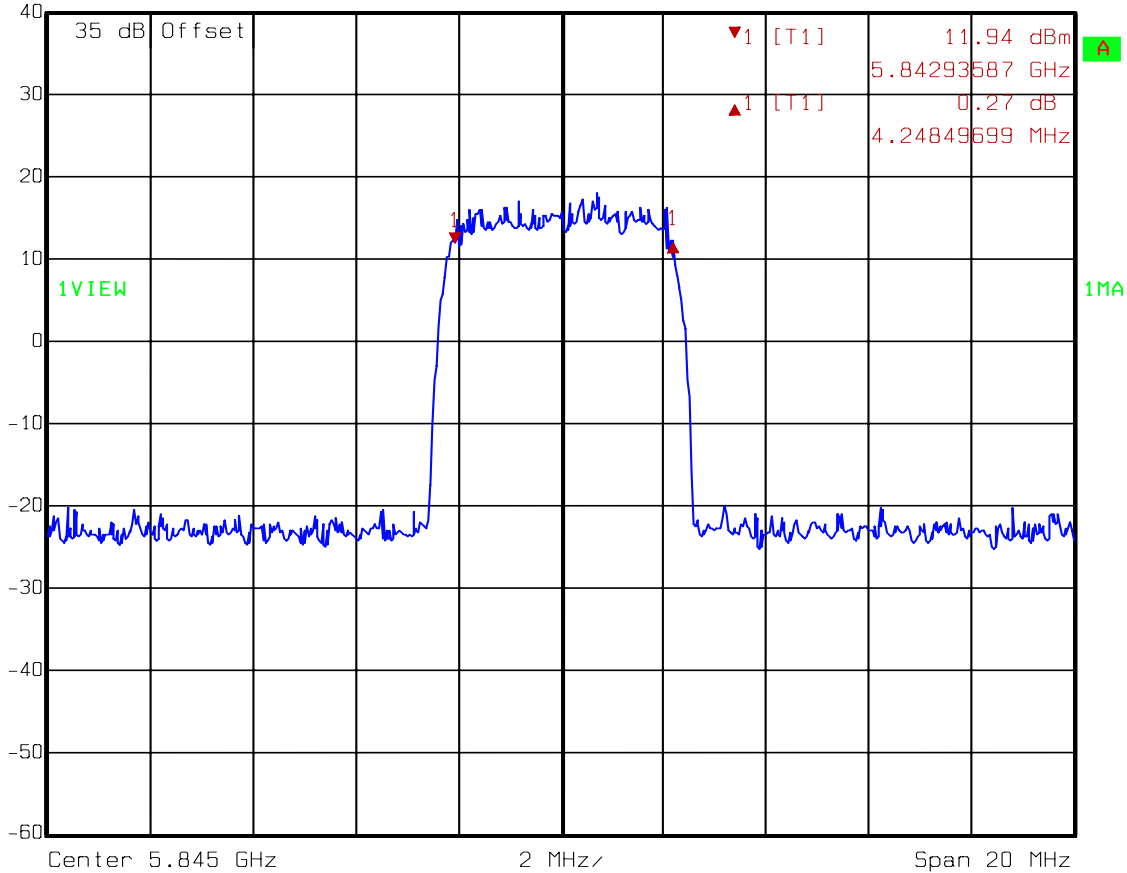


Date: 15.JUL.2009 12:52:09

Test Data – Occupied Bandwidth



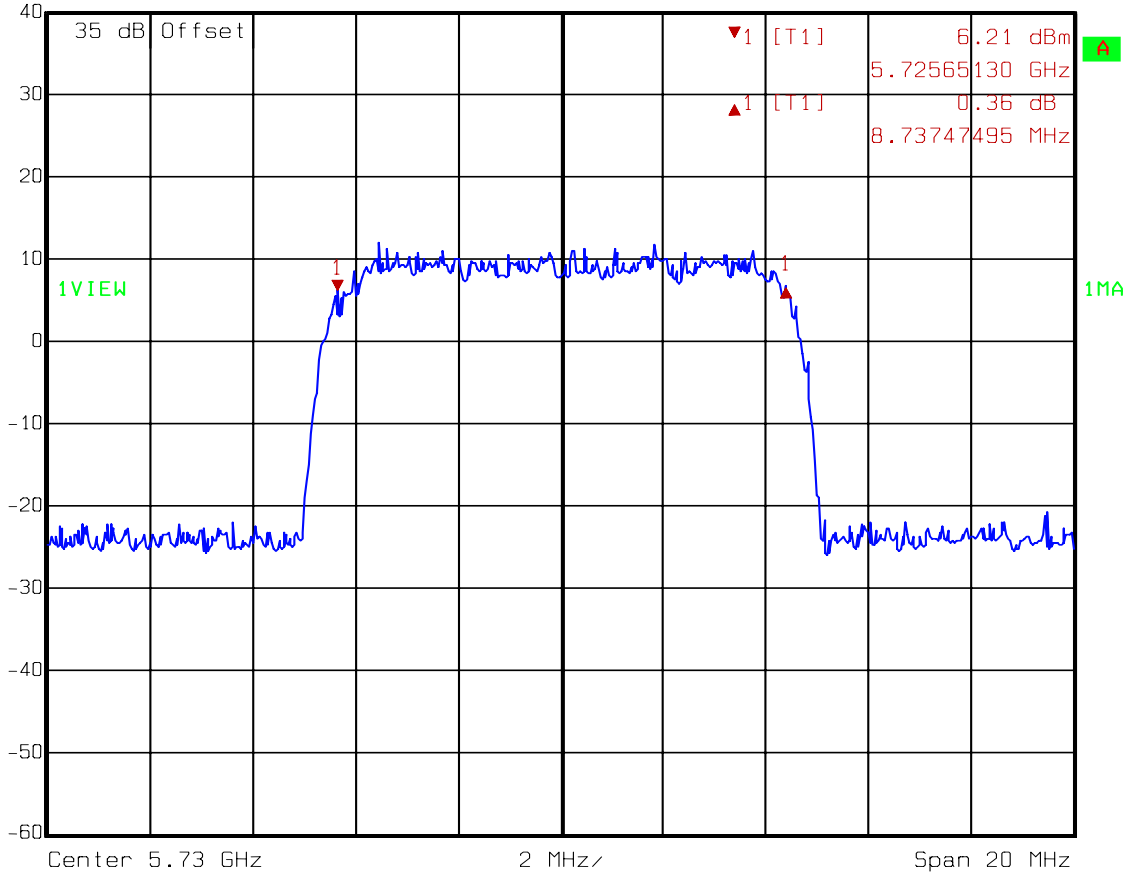
Delta 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl 0.27 dB VBW 100 kHz
40 dBm 4.24849699 MHz SWT 5 ms Unit dBm



Date: 15.JUL.2009 14:00:51

Test Data – Occupied Bandwidth

 Delta 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl 0.36 dB VBW 100 kHz
40 dBm 8.73747495 MHz SWT 5 ms Unit dBm

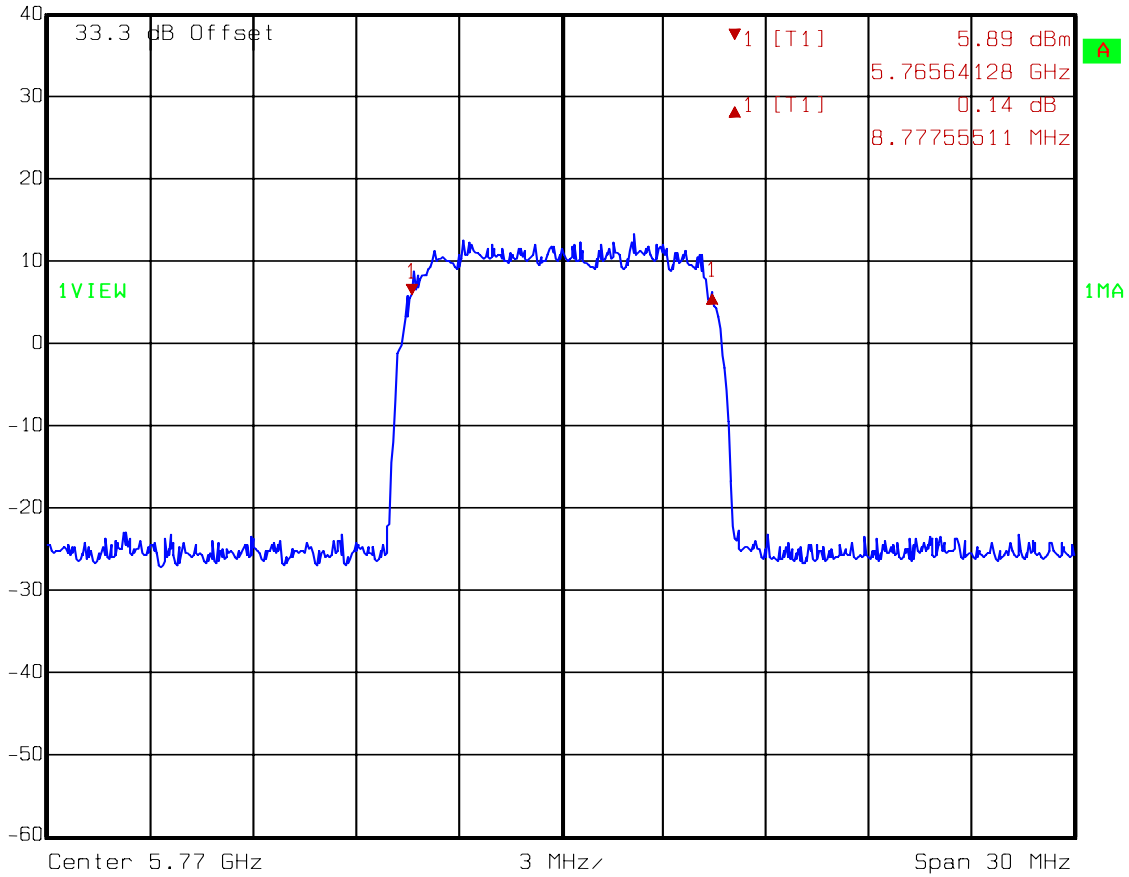


Date: 16.JUL.2009 10:04:01

Test Data – Occupied Bandwidth



	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	0.14 dB	VBW	100 kHz		
40 dBm	8.77755511 MHz	SWT	7.5 ms	Unit	dBm

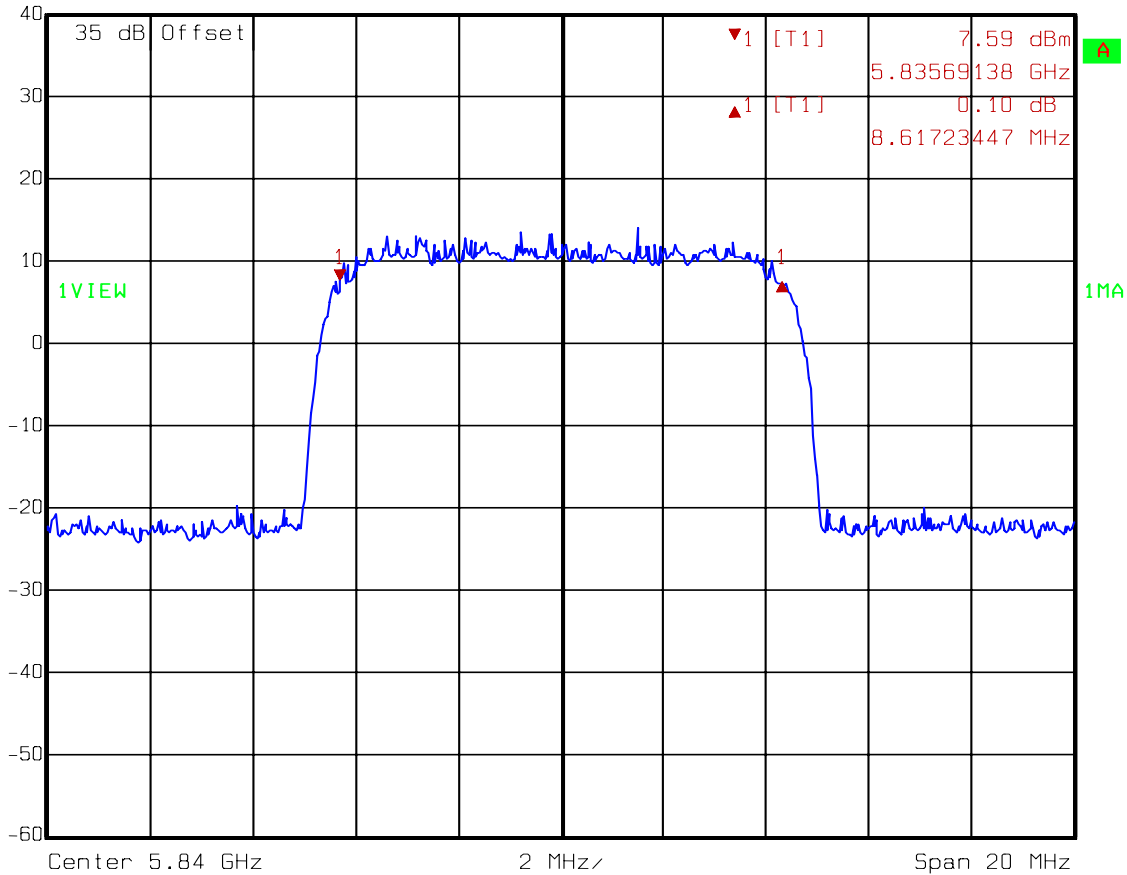


Date: 15.JUL.2009 09:21:52

Test Data – Occupied Bandwidth



Delta 1 [T1] RBW 100 kHz RF Att 30 dB
 Ref Lvl 0.10 dB VBW 100 kHz
 40 dBm 8.61723447 MHz SWT 5 ms Unit dBm

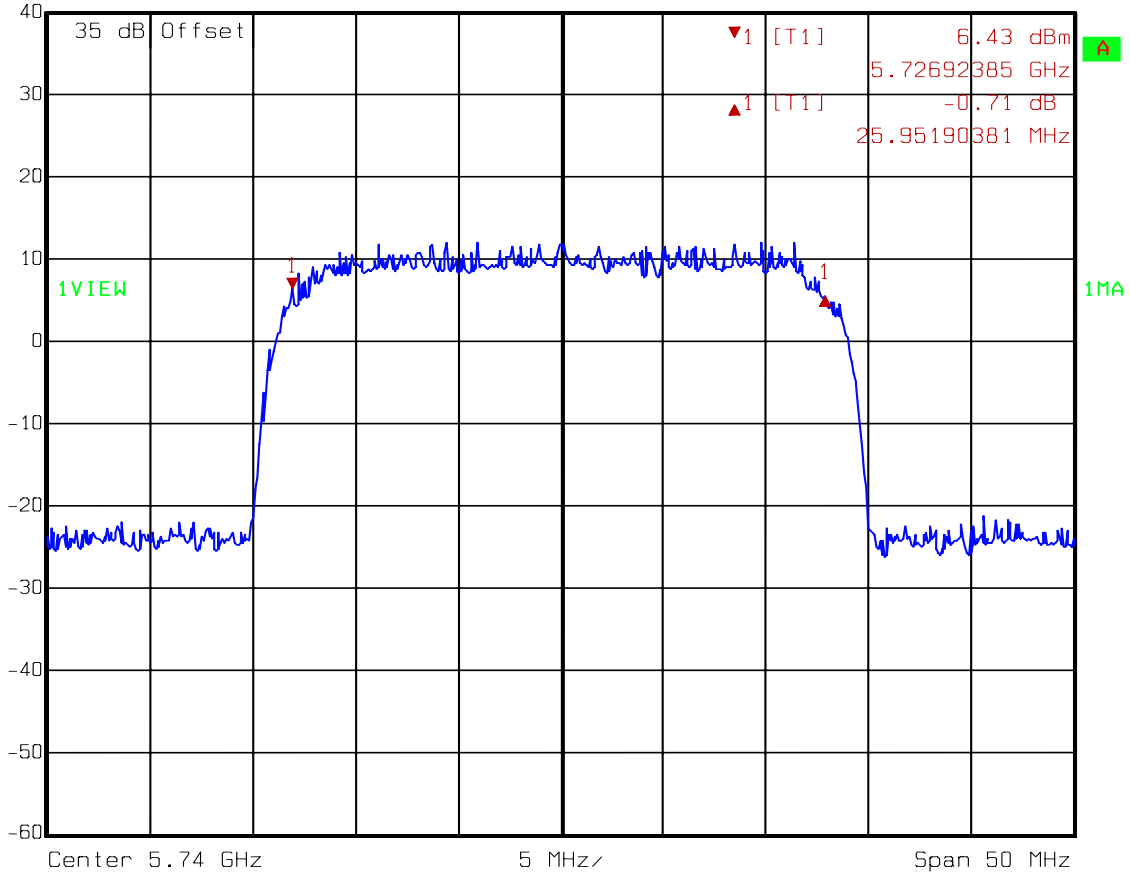


Date: 15.JUL.2009 14:39:09

Test Data – Occupied Bandwidth



Delta 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl -0.71 dB VBW 100 kHz
40 dBm 25.95190381 MHz SWT 12.5 ms Unit dBm

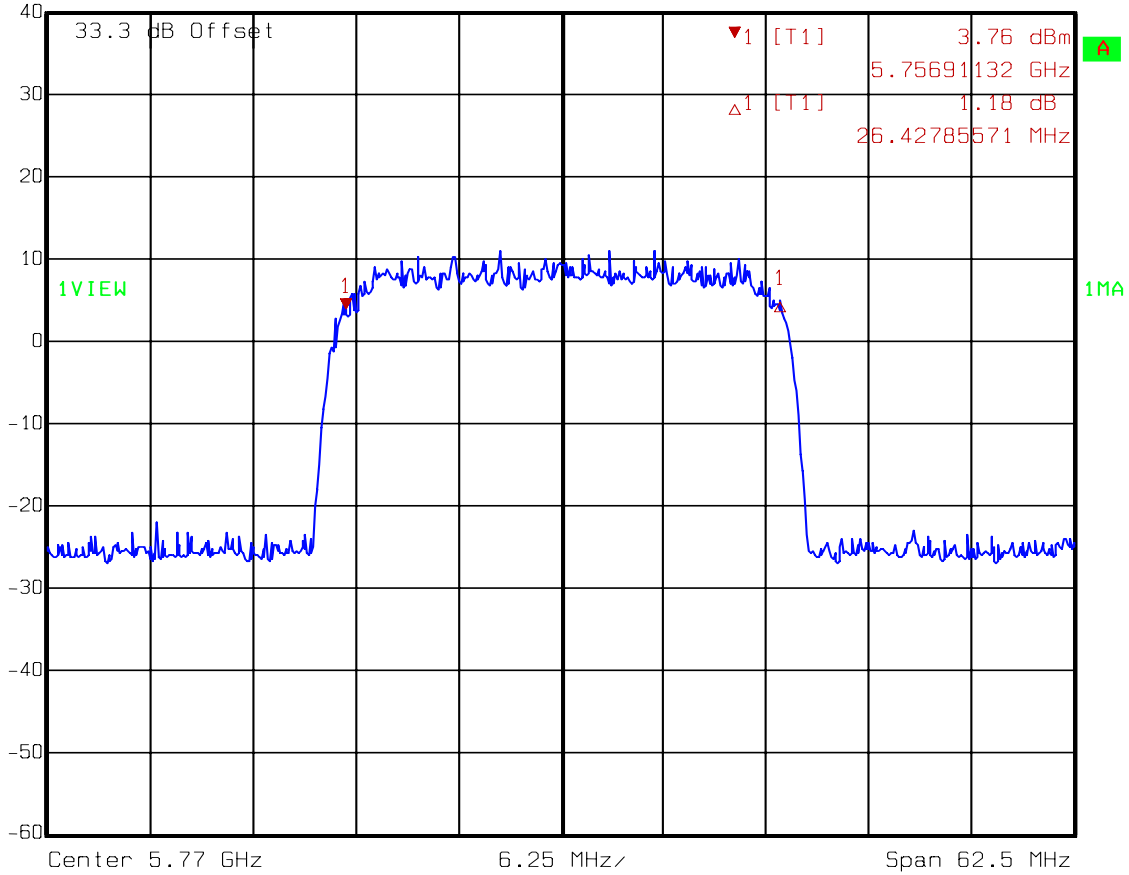


Date: 16.JUL.2009 10:58:29

Test Data – Occupied Bandwidth



Ref Lvl 40 dBm
Marker 1 [T1] 3.76 dBm
5.75691132 GHz
RBW 100 kHz RF Att 30 dB
VBW 100 kHz
SWT 16 ms Unit dBm

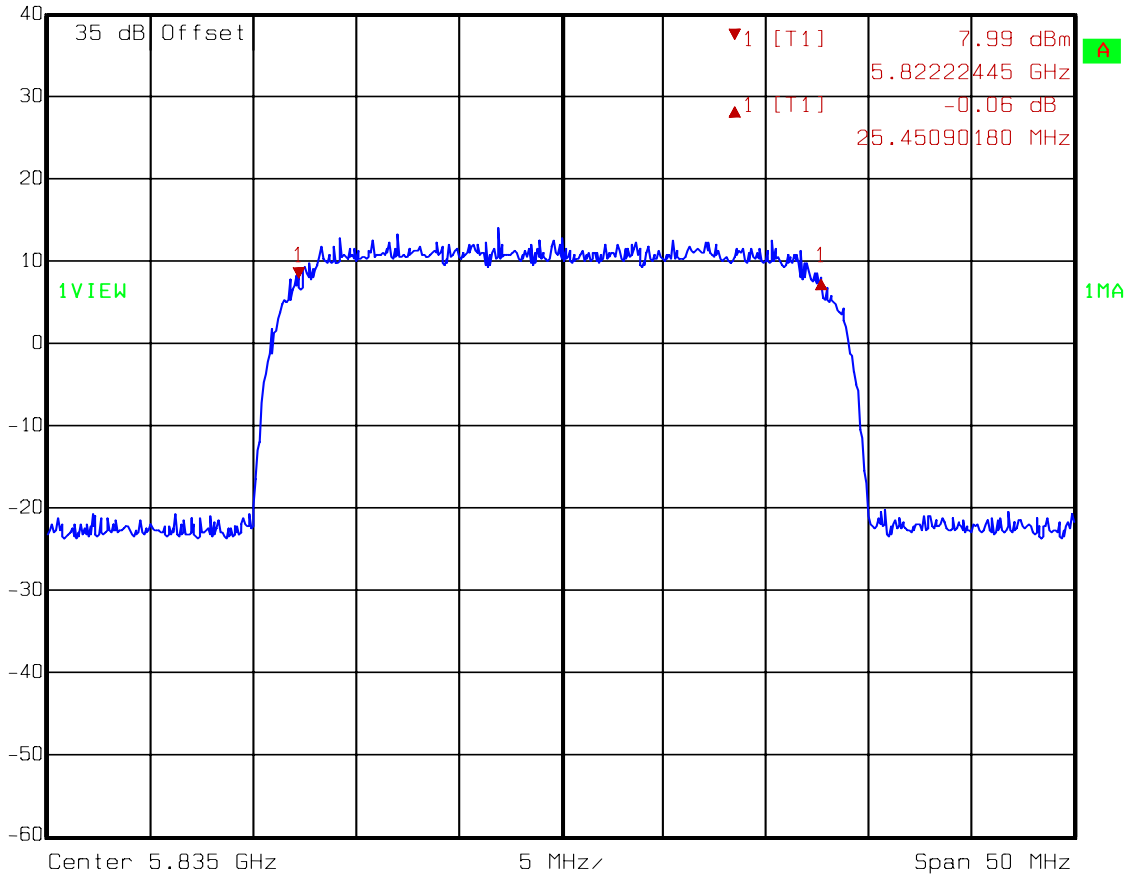


Date: 14.JUL.2009 13:47:19

Test Data – Occupied Bandwidth



	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-0.06 dB	VBW	100 kHz		
40 dBm	25.45090180 MHz	SWT	12.5 ms	Unit	dBm



Date: 16.JUL.2009 08:04:05

Section 4. Maximum Peak Output Power

NAME OF TEST: Maximum Peak Output power	PARA. NO.: 15.247(b)(3)/A8.4(4)
TESTED BY: David Light	DATE: 16 July 2009

Test Results: Complies.

Test Data: See table below

- This device was tested at +/- 15% input power per 15.31(e), with no variation in output power.
- For battery powered equipment, the device was tested with a fresh battery per 15.31(e).
- The device was tested on three channels per 15.31(l).
- This test was performed radiated.

Equipment Used: 1036-1082-1064-1065

Measurement Uncertainty: 1.7 dB

Temperature: 35 °C

Relative Humidity: 22 %

Test Data – Peak Power

Measurement Data: Detachable antenna? Yes No
 If yes, state the type of non-standard connector used: type N*
 *The EUT is professionally installed.

Frequency (MHz)	Bandwidth (MHz)	Modulation	Peak Power (dBm)	Peak Power (mW)
5730	5	32 QAM	29.85	966
5770	5	32 QAM	29.80	955
5845	5	32 QAM	29.84	964
5730	10	32 QAM	29.84	964
5770	10	32 QAM	30.00	1000
5840	10	32 QAM	30.00	1000
5740	30	32 QAM	29.63	918
5770	30	32 QAM	29.99	998
5835	30	32 QAM	29.89	975
Maximum EIRP (dBm): 64.89		Maximum EIRP (kW): 3.1		

Antennas used: RFS model MA0528-28AN flat panel. Gain 28 dBi. Beamwidth 4.5°
 RFS model SPF4-52CN parabol. Gain 34.9 dBi. Beamwidth 3.0°

Analyzer Settings:

5 MHz carrier: RBW/VBW = 5 MHz, Peak detector
 10 MHz carrier: RBW/VBW = 10 MHz, Peak detector
 30 MHz Carrier: RBW/VBW = 1 MHz, Peak detector. This measurement was integrated across the 30 MHz bandwidth of the carrier using the power integration function of the spectrum analyzer.

Section 5 Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions at Antenna Terminals	PARA. NO.: 15.247 (d)
TESTED BY: David Light	DATE: 16 July 2009

Test Results: Complies.

Measurement Data: See attached plots.

Test Conditions: 35 %RH
 22 °C

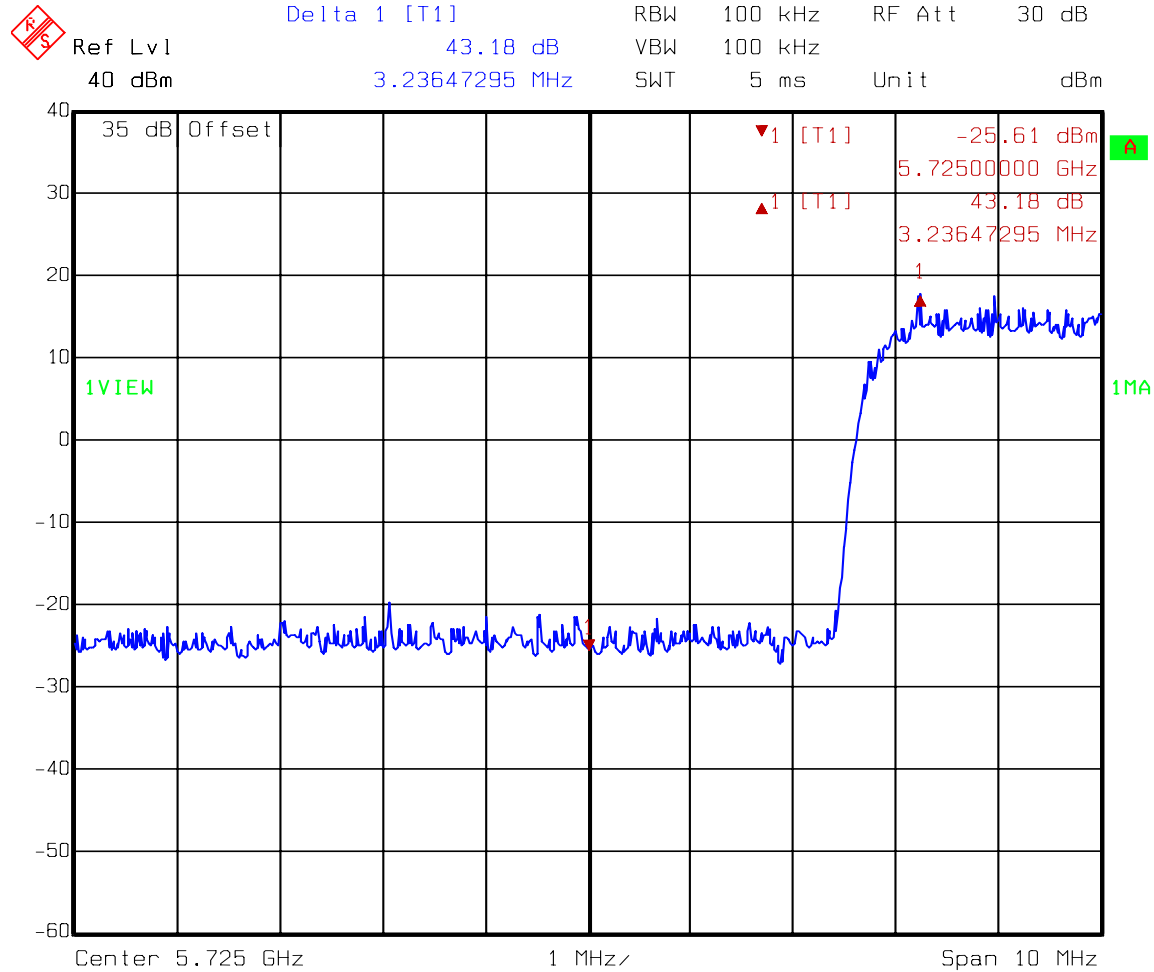
Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1036-1082-1064-1065

Test Data – Spurious Emissions at Antenna Terminals

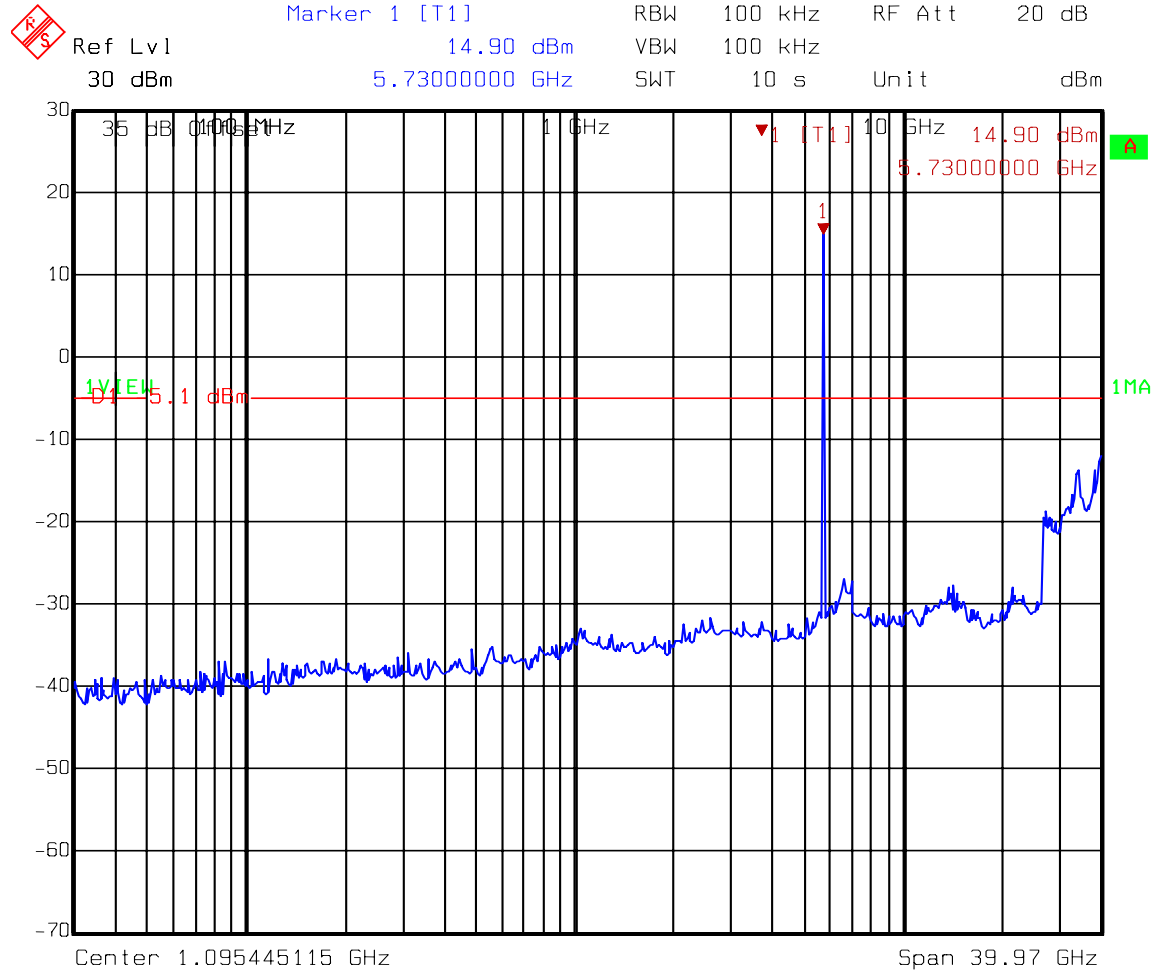
Lower Band Edge

5 MHz carrier



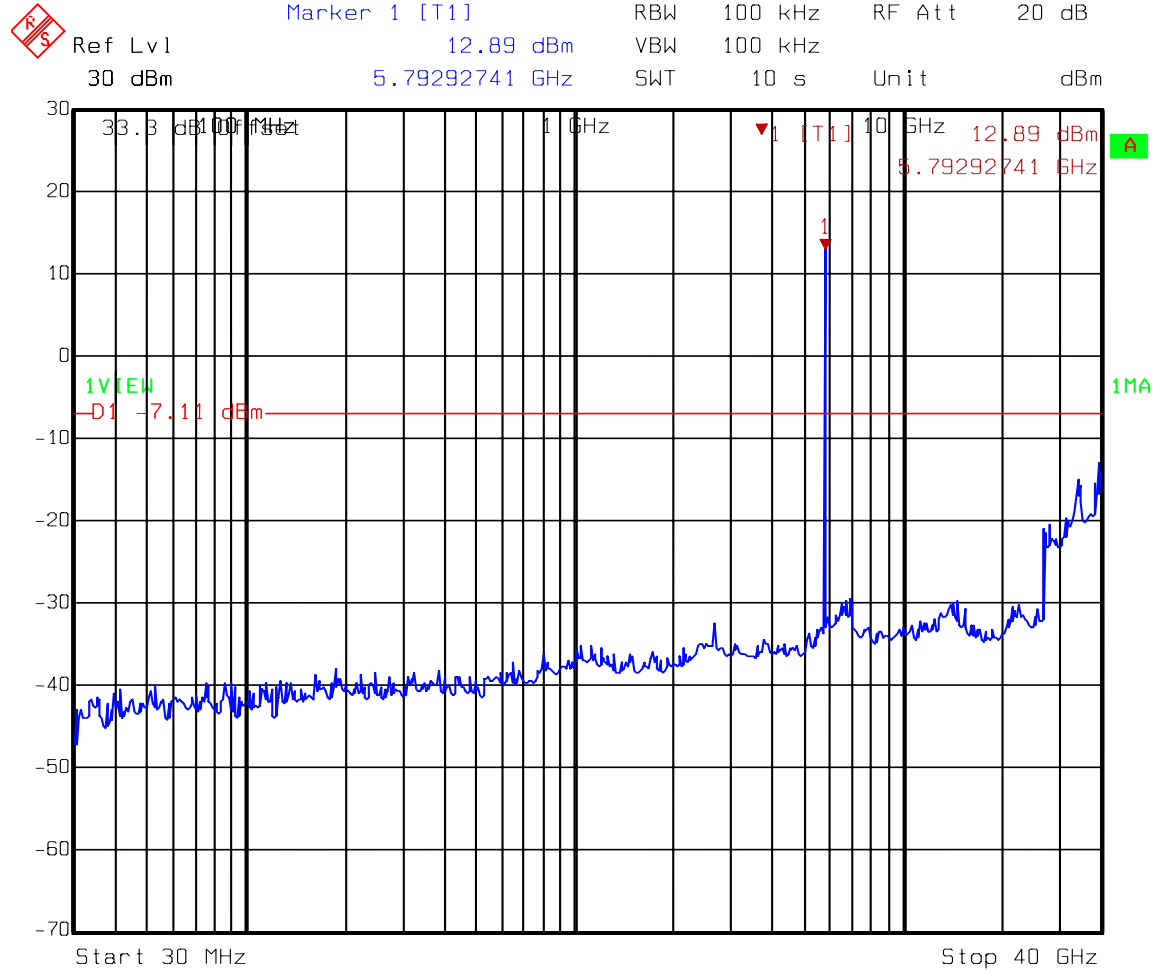
Date: 16.JUL.2009 09:25:30

Test Data – Spurious Emissions at Antenna Terminals



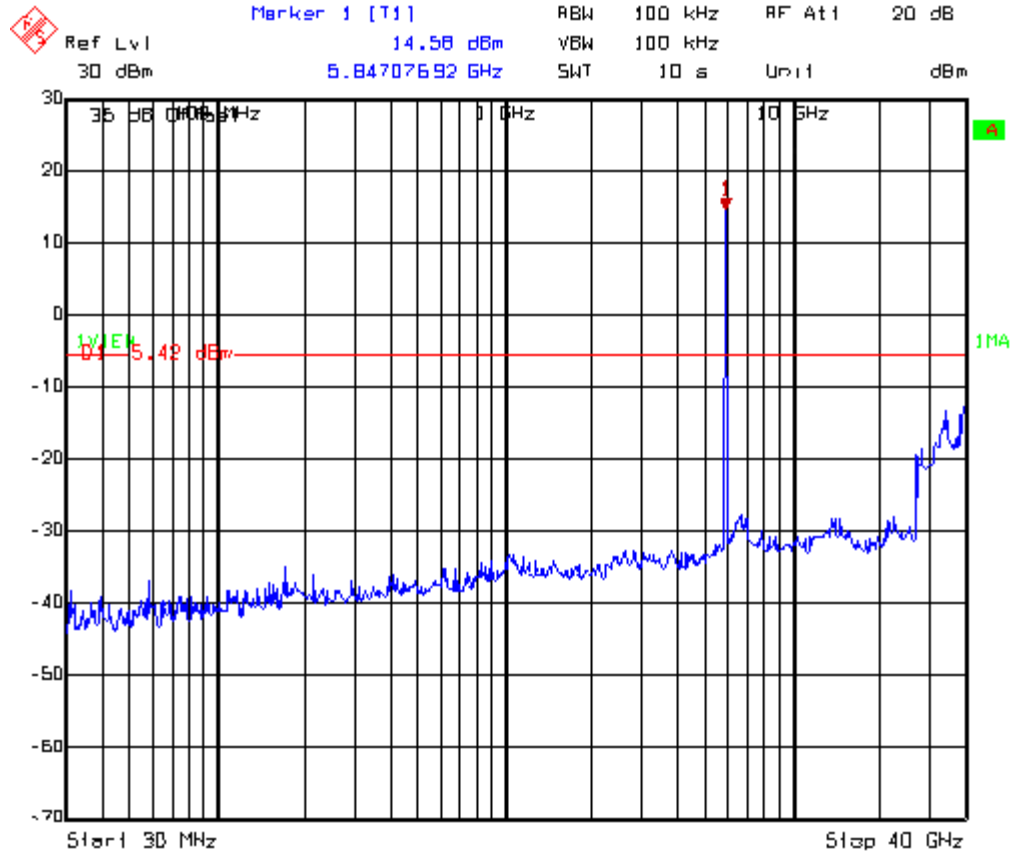
Date: 16.JUL.2009 09:28:00

Test Data – Spurious Emissions at Antenna Terminals



Date: 15.JUL.2009 12:54:05

Test Data – Spurious Emissions at Antenna Terminals

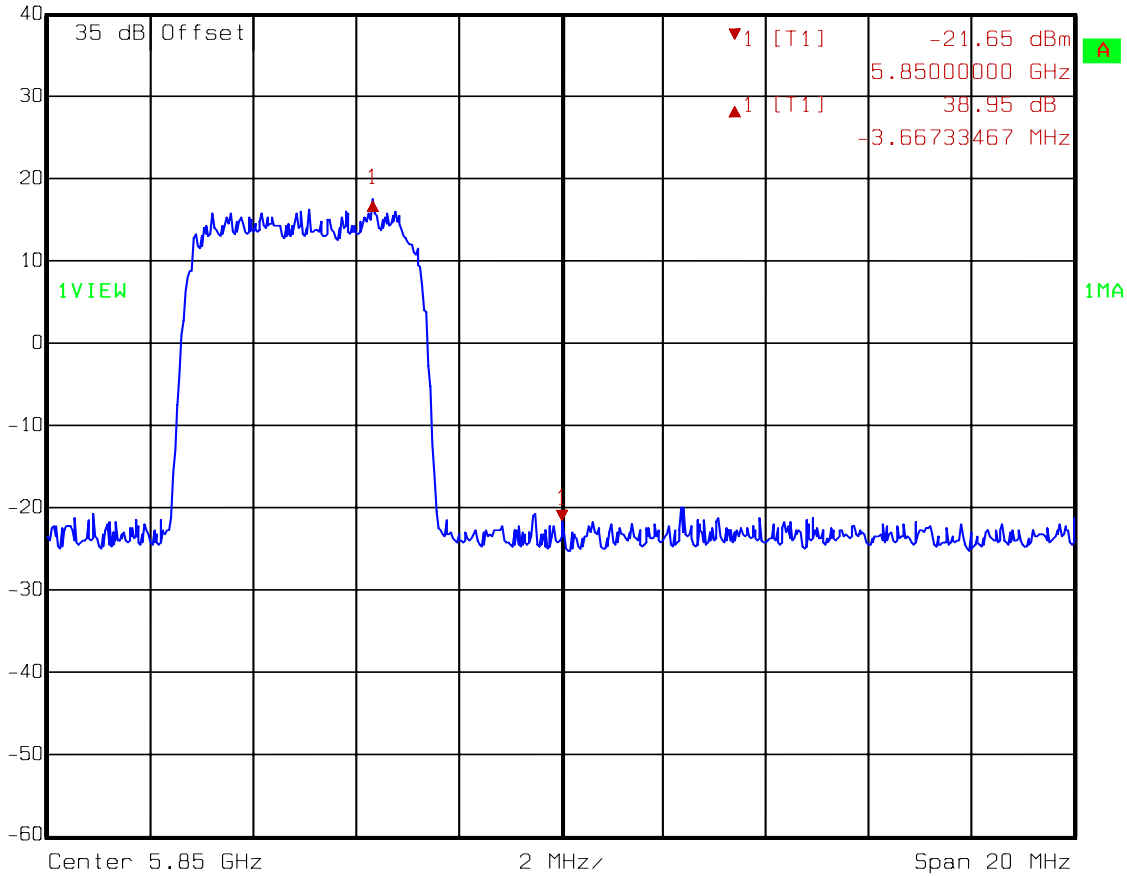


Date: 15.JUL.2009 14:03:04

Test Data – Spurious Emissions at Antenna Terminals

Upper Band Edge

Ref Lvl 40 dBm
Delta 1 [T1] 38.95 dB
-3.66733467 MHz
RBW 100 kHz
RF Att 30 dB
VBW 100 kHz
SWT 5 ms
Unit dBm



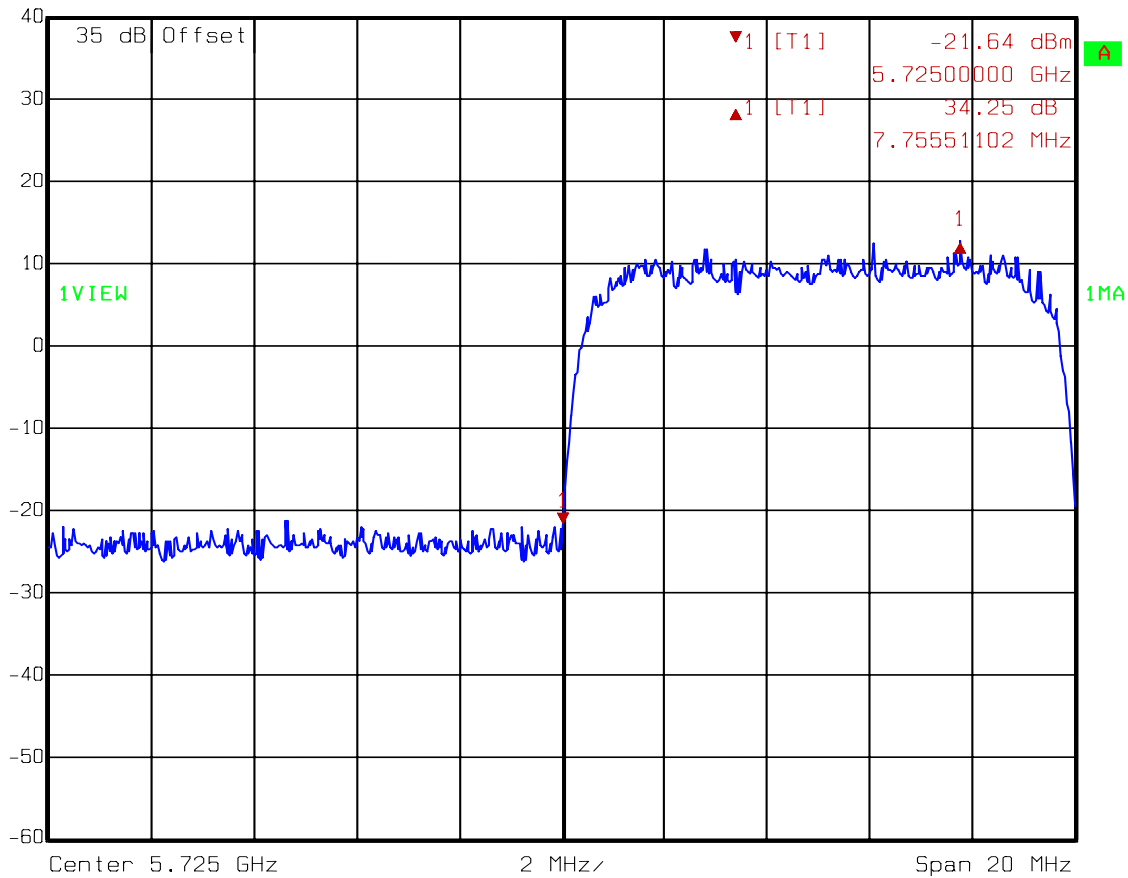
Date: 15.JUL.2009 13:59:32

Test Data – Spurious Emissions at Antenna Terminals

Lower Band Edge

10 MHz carrier

Ref Lvl 40 dBm
Delta 1 [T1] 34.25 dB
7.75551102 MHz
RBW 100 kHz
RF Att 30 dB
VBW 100 kHz
SWT 5 ms
Unit dBm

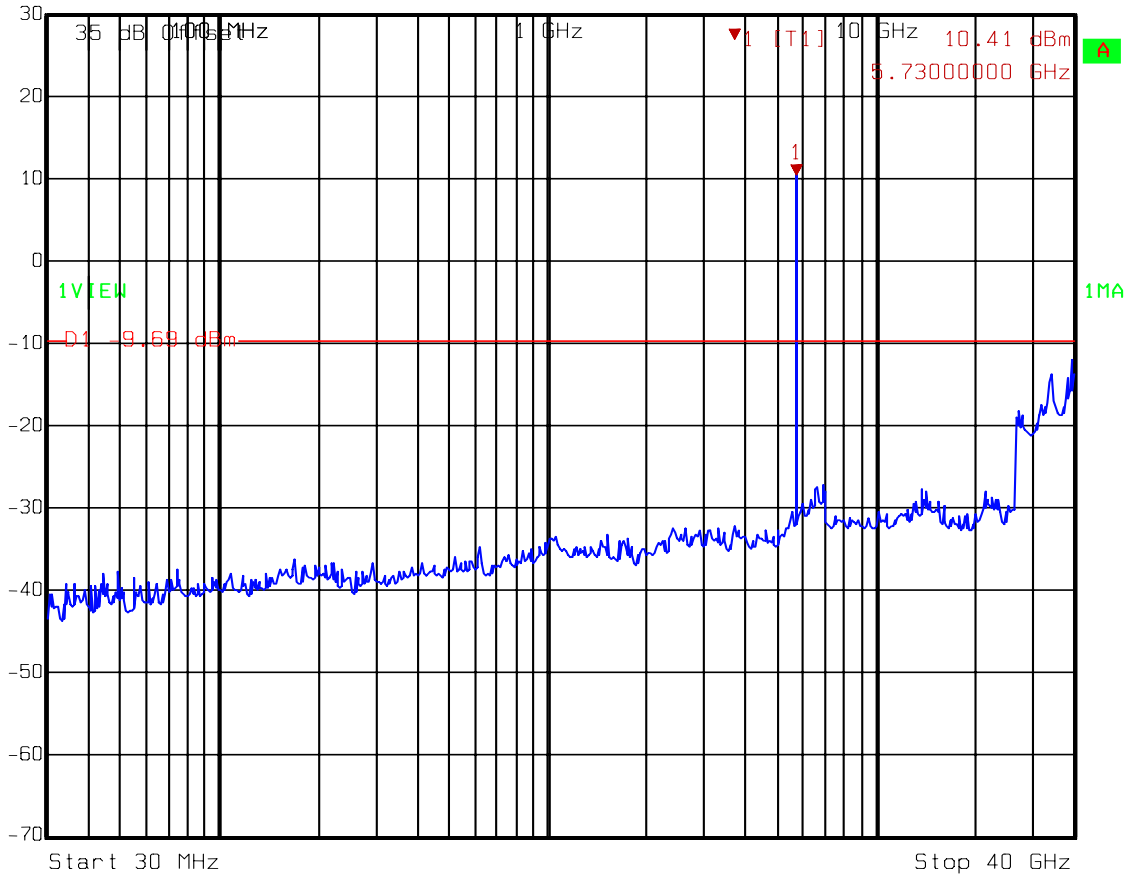


Date: 16.JUL.2009 10:02:39

Test Data – Spurious Emissions at Antenna Terminals



Marker 1 [T1] RBW 100 kHz RF Att 20 dB
Ref Lvl 10.41 dBm VBW 100 kHz
30 dBm 5.73000000 GHz SWT 10 s Unit dBm

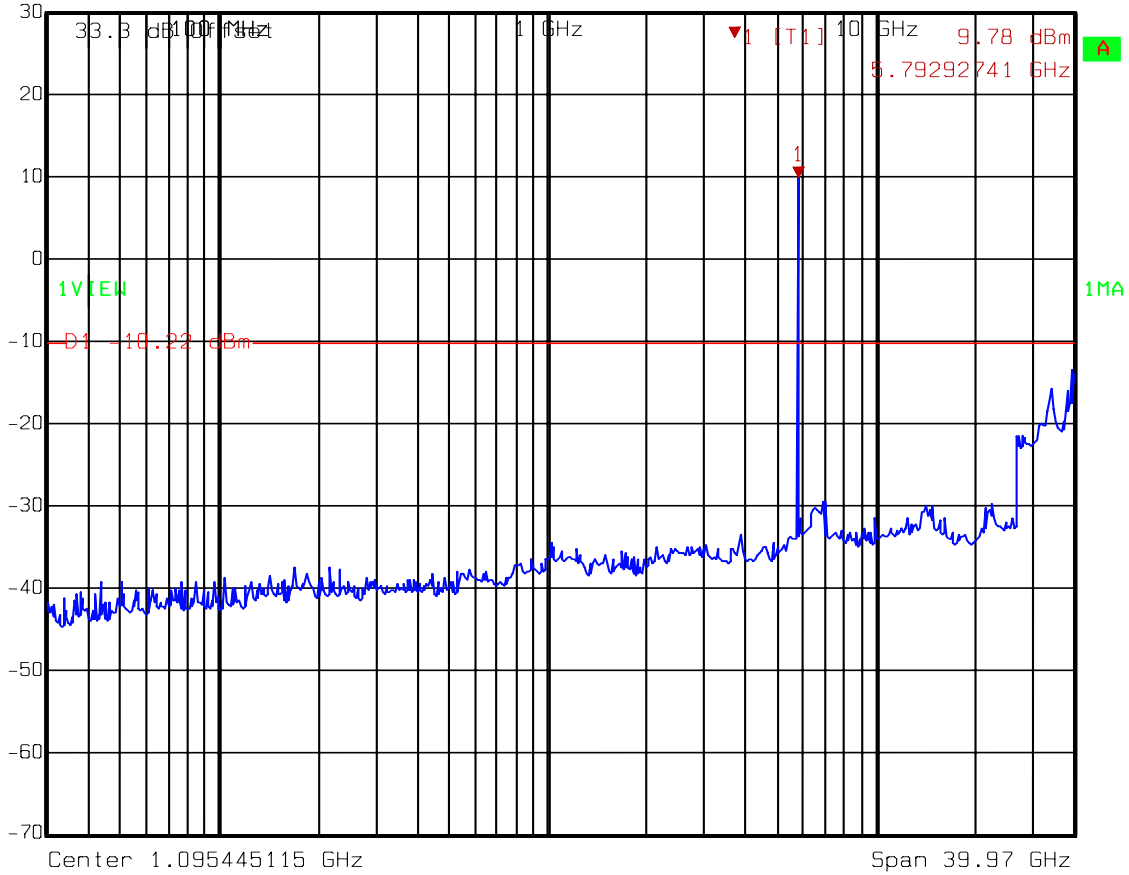


Date: 16.JUL.2009 10:05:15

Test Data – Spurious Emissions at Antenna Terminals

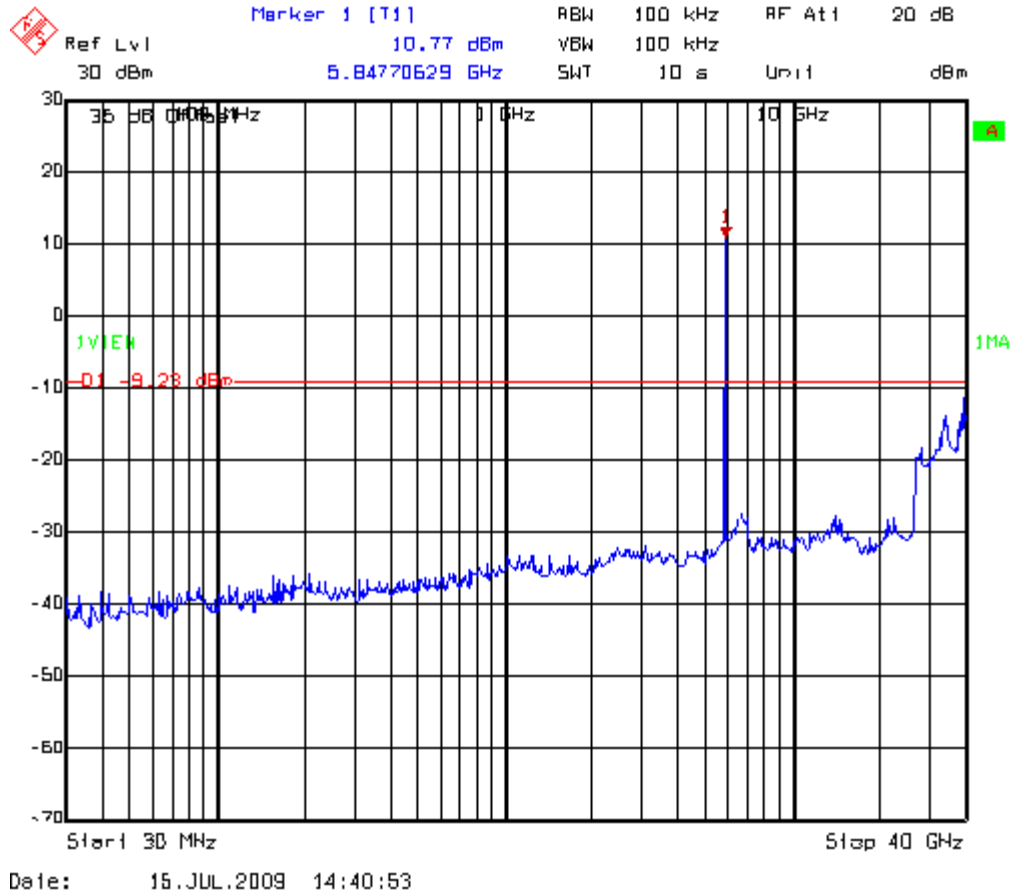


Marker 1 [T1] RBW 100 kHz RF Att 20 dB
Ref Lvl 9.78 dBm VBW 100 kHz
30 dBm 5.79292741 GHz SWT 10 s Unit dBm



Date: 15.JUL.2009 09:23:26

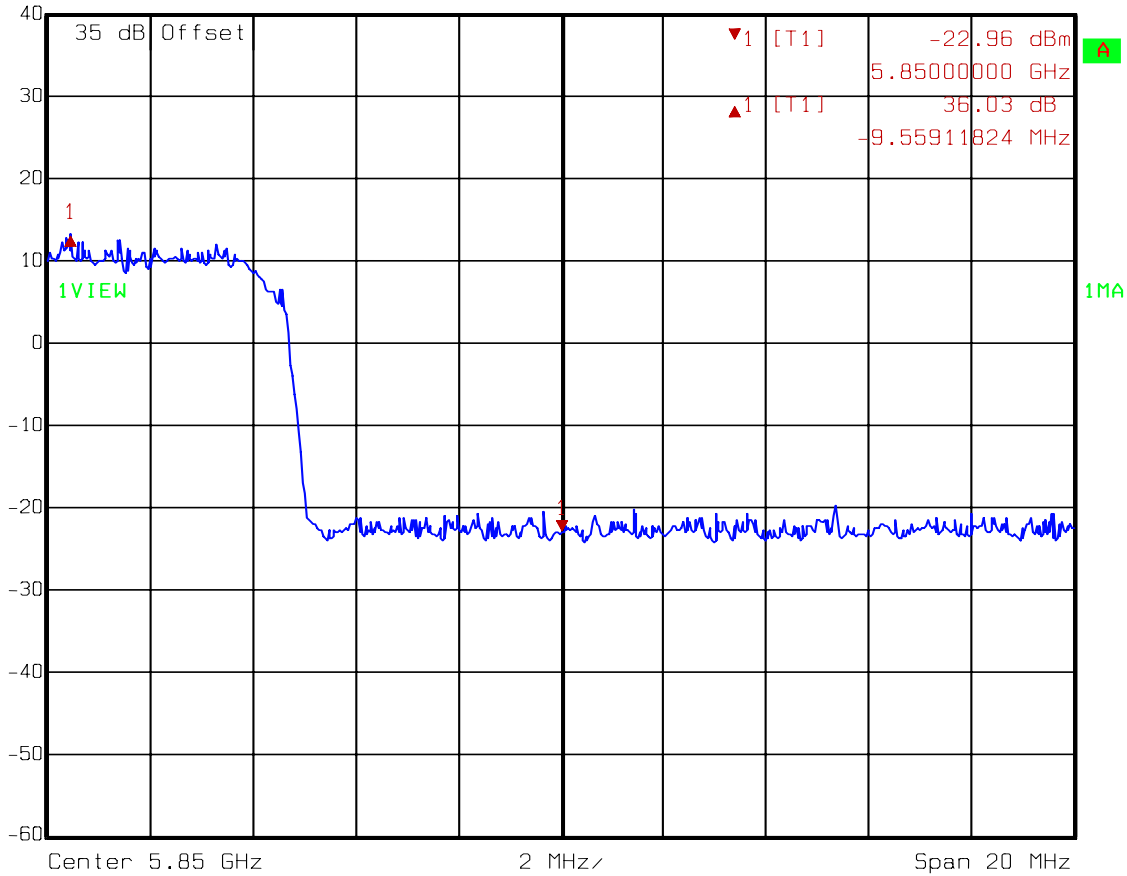
Test Data – Spurious Emissions at Antenna Terminals



Test Data – Spurious Emissions at Antenna Terminals

Upper Band Edge

Ref Lvl 40 dBm
Delta 1 [T1] 36.03 dB
-9.55911824 MHz
RBW 100 kHz
RF Att 30 dB
VBW 100 kHz
SWT 5 ms
Unit dBm

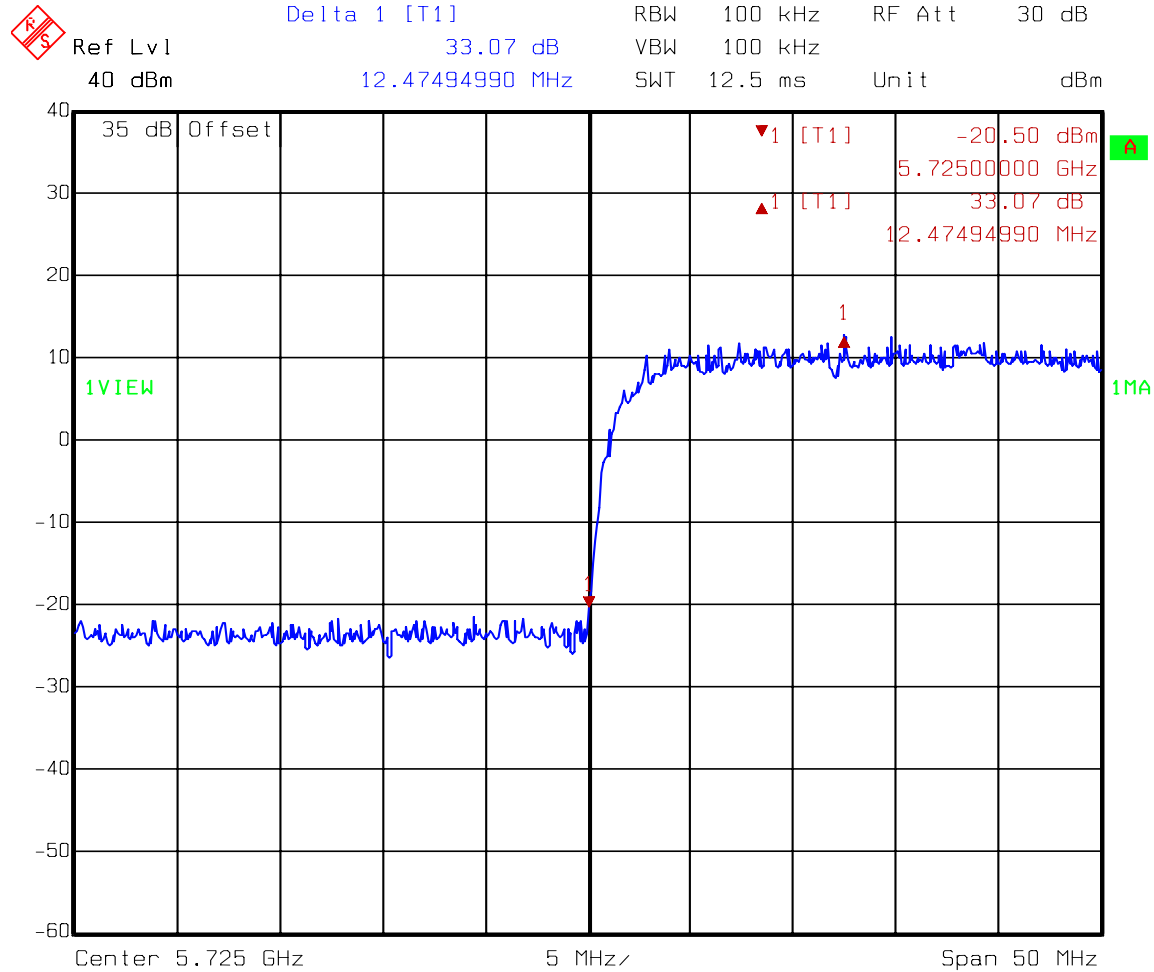


Date: 15.JUL.2009 14:37:53

Test Data – Spurious Emissions at Antenna Terminals

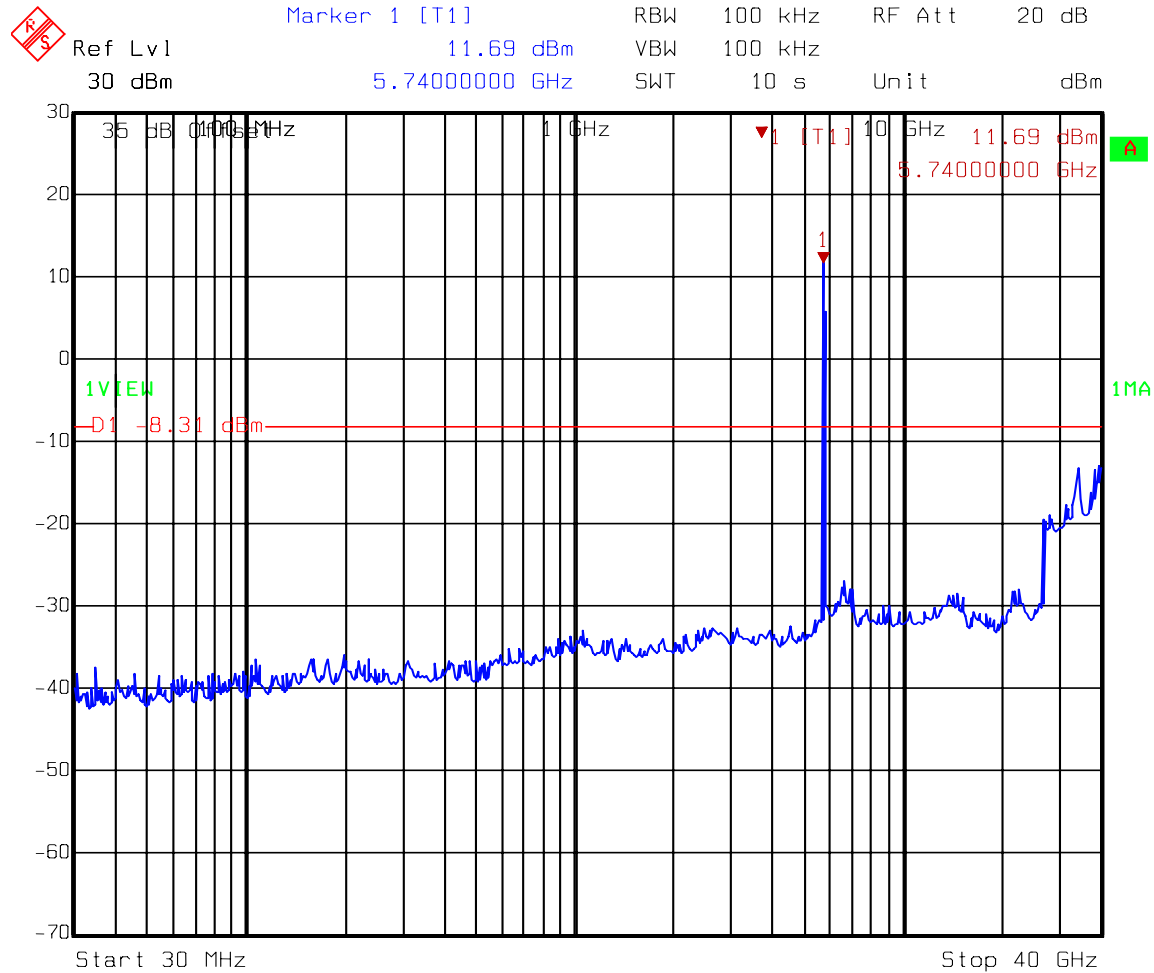
Lower Band Edge

30 MHz carrier



Date: 16.JUL.2009 10:59:13

Test Data – Spurious Emissions at Antenna Terminals

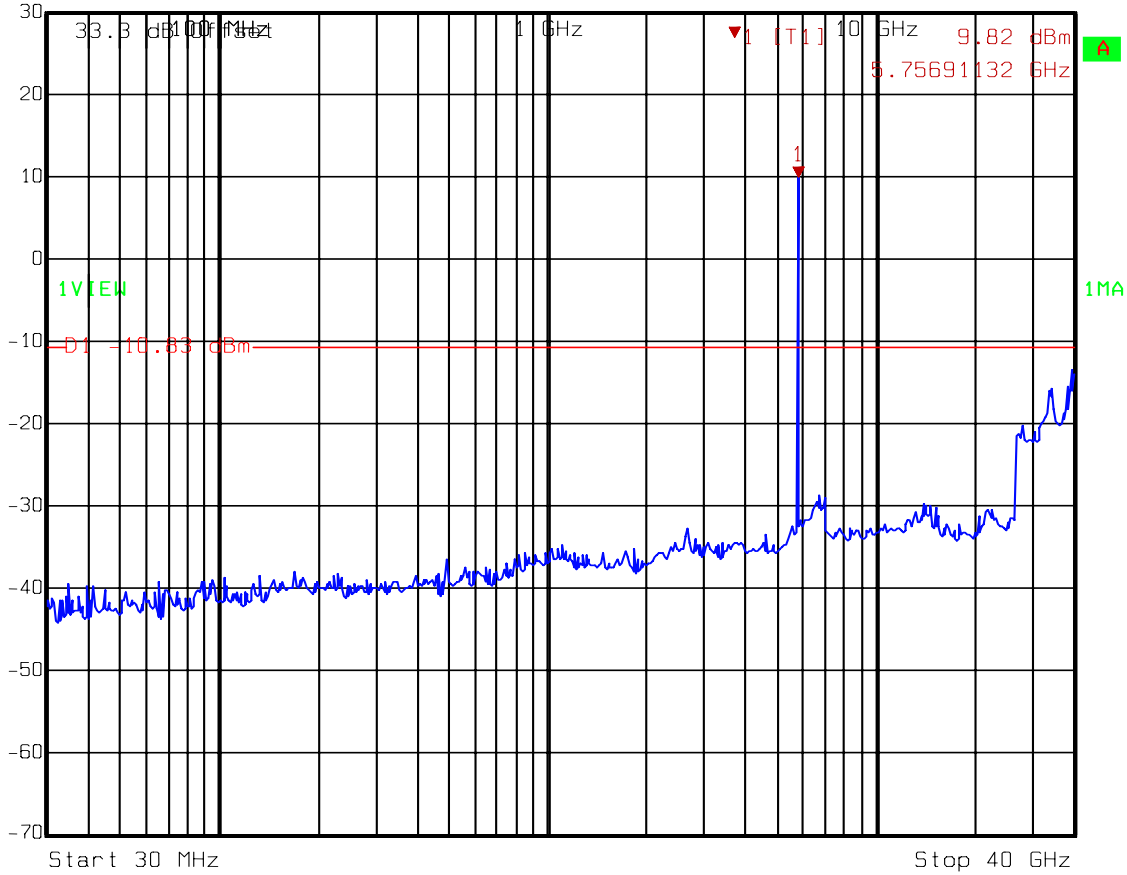


Date: 16.JUL.2009 11:00:38

Test Data – Spurious Emissions at Antenna Terminals



Marker 1 [T1] RBW 100 kHz RF Att 20 dB
Ref Lvl 9.82 dBm VBW 100 kHz
30 dBm 5.75691132 GHz SWT 10 s Unit dBm

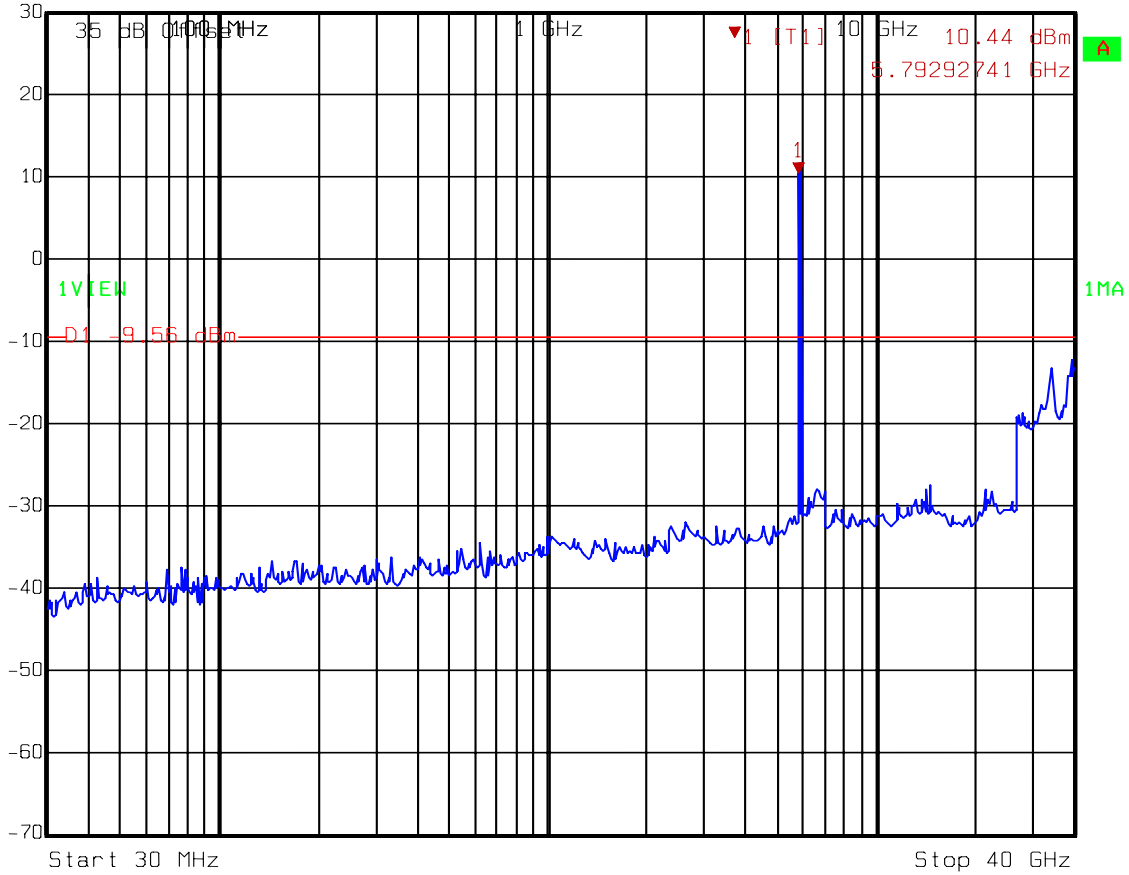


Date: 14.JUL.2009 13:49:01

Test Data – Spurious Emissions at Antenna Terminals



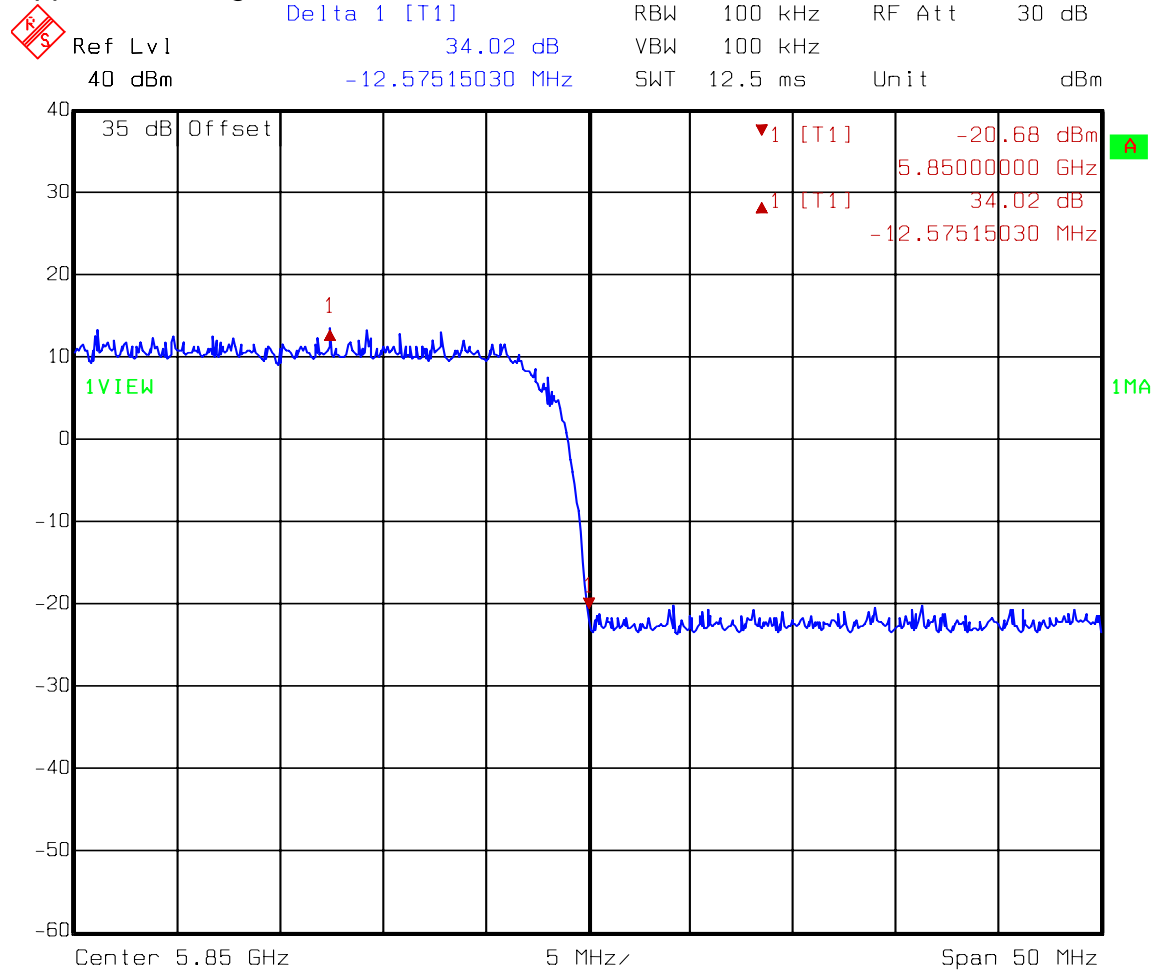
Marker 1 [T1] RBW 100 kHz RF Att 20 dB
Ref Lvl 10.44 dBm VBW 100 kHz
30 dBm 5.79292741 GHz SWT 10 s Unit dBm



Date: 16.JUL.2009 08:07:33

Test Data – Spurious Emissions at Antenna Terminals

Upper Band Edge



Date: 16.JUL.2009 08:02:49

Section 6. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.247 (d)
TESTED BY: David Light	DATE: 16 July 2009

Test Results: Complies.

Measurement Data: No emissions were detected within 20 dB of the specification limit therefore none are reported per 15.31(o).

Test Conditions: 35 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1480-1484-1485-1036-1304-791-1016-991-992-

Notes:

- For handheld devices, the EUT was tested on three orthogonal axis'
- The device was tested from 30 MHz to the 40 GHz per 15.33
- The device was tested on three channels per 15.31(l).
- No emissions were detected within 20 dB of the specification limit therefore none are reported per 15.31(o).

RBW=VBW=100 kHz below 1000 MHz
RBW=VBW=1 MHz above 1000 MHz, Peak detector
RBW= 1 MHz VBW=10MHz, Average detector

Measurement distance: 3 meters.*

*Measurements above 18 GHz were made at 1 meter

Section 7. Peak Power Spectral Density

NAME OF TEST: Peak Power Spectral Density	PARA. NO.: 15.247(e)
TESTED BY: David Light	DATE: 16 July 2009

Test Results: Complies.

Measurement Data: See attached data..

Test Conditions: 35 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1036-1082-1065-1064

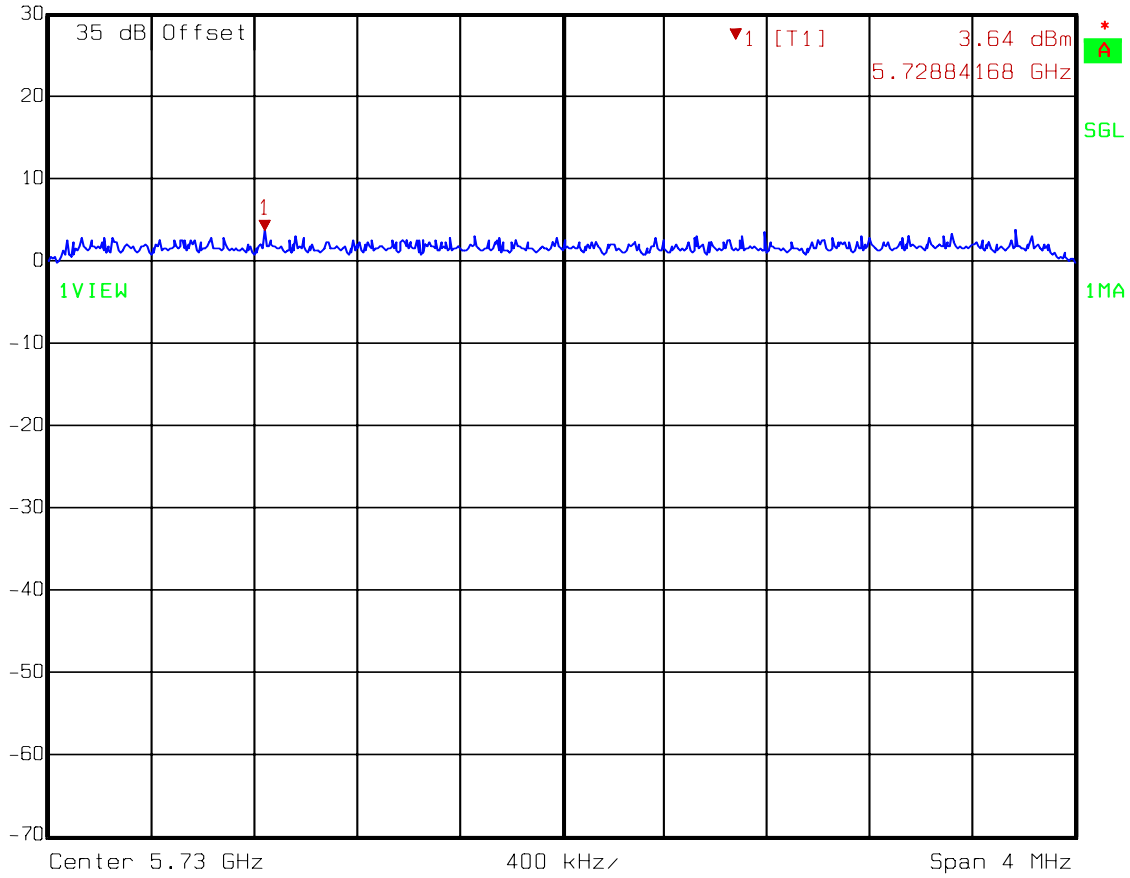
Spectrum analyzer settings:

RBW 3 kHz
VBW 3 kHz
Span 4 MHz
Sweep time 1350 sec.
Detector Max. Peak

Peak Power Spectral Density

5 MHz carrier

 Ref Lvl 30 dBm Marker 1 [T1] 3.64 dBm RBW 3 kHz RF Att 20 dB
35 dB Offset 5.72884168 GHz VBW 3 kHz Unit dBm
SWT 1350 s

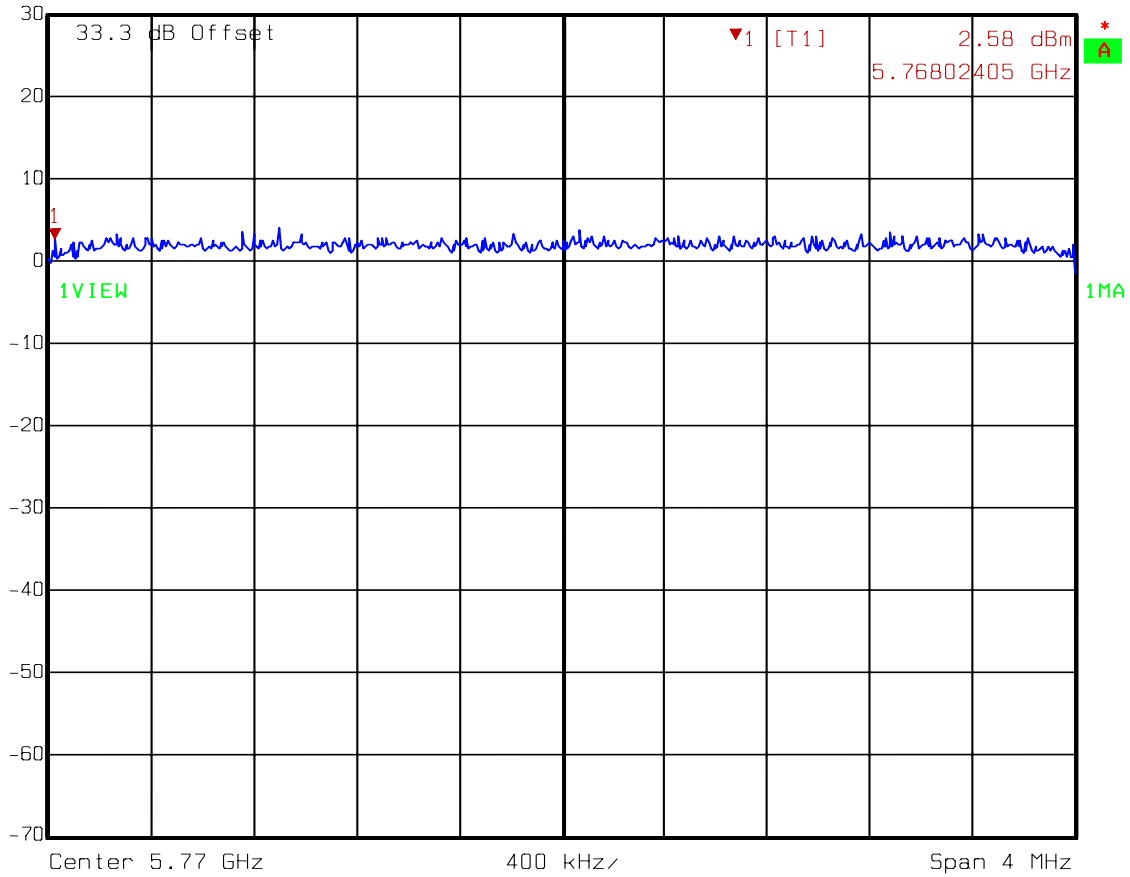


Date: 16.JUL.2009 09:55:37

Peak Power Spectral Density



Ref Lvl 30 dBm
Marker 1 [T1] 2.58 dBm
30 dBm 5.76802405 GHz
RBW 3 kHz RF Att 20 dB
VBW 3 kHz
SWT 1350 s Unit dBm

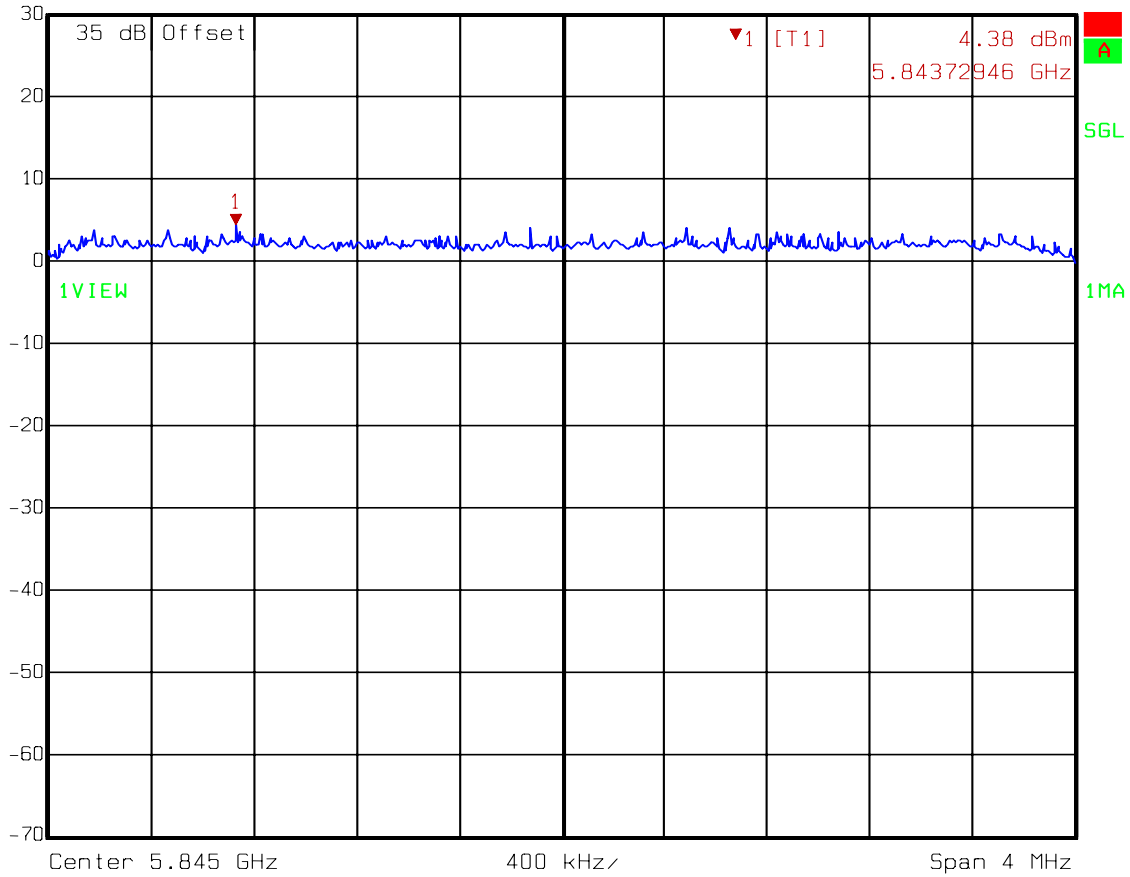


Date: 15.JUL.2009 13:25:39

Peak Power Spectral Density




Ref Lvl 30 dBm
Marker 1 [T1] 4.38 dBm
5.84372946 GHz
RBW 3 kHz RF Att 20 dB
VBW 3 kHz
SWT 1350 s Unit dBm

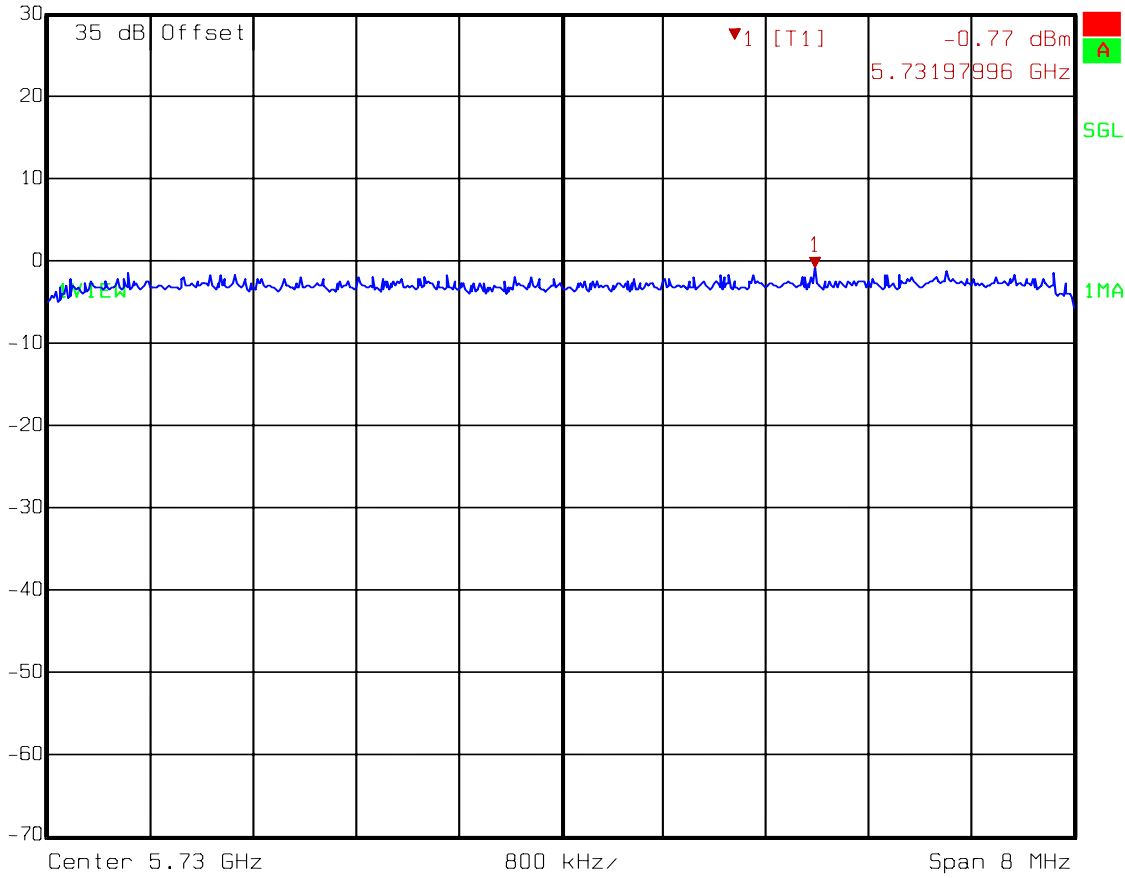


Date: 15.JUL.2009 14:29:48

Peak Power Spectral Density

10 MHz carrier

 Ref Lvl 30 dBm Marker 1 [T1] RBW 3 kHz RF Att 20 dB
-0.77 dBm VBW 3 kHz
5.73197996 GHz SWT 2700 s Unit dBm

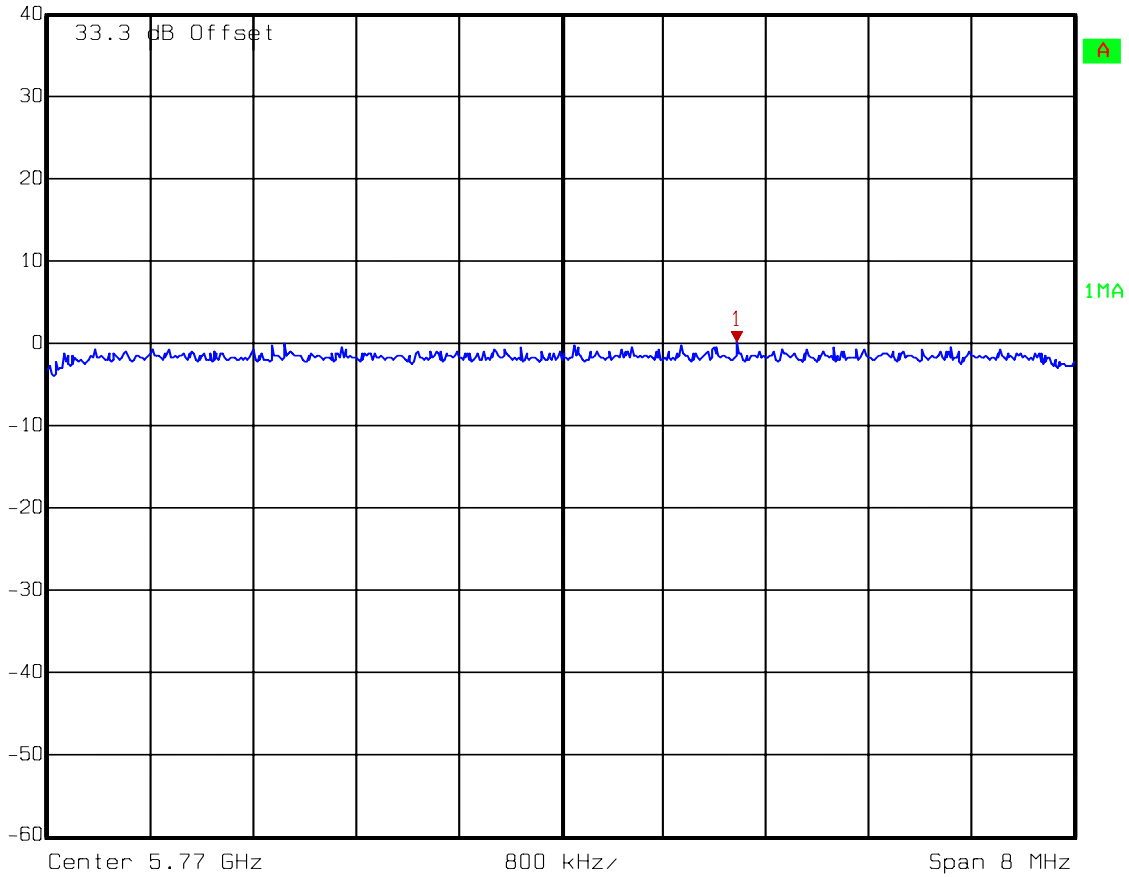


Date: 16.JUL.2009 10:53:21

Peak Power Spectral Density



Ref Lvl 40 dBm
Marker 1 [T1] 0.10 dBm
5.77137074 GHz
RBW 3 kHz
RF Att 30 dB
VBW 3 kHz
SWT 2700 s
Unit dBm

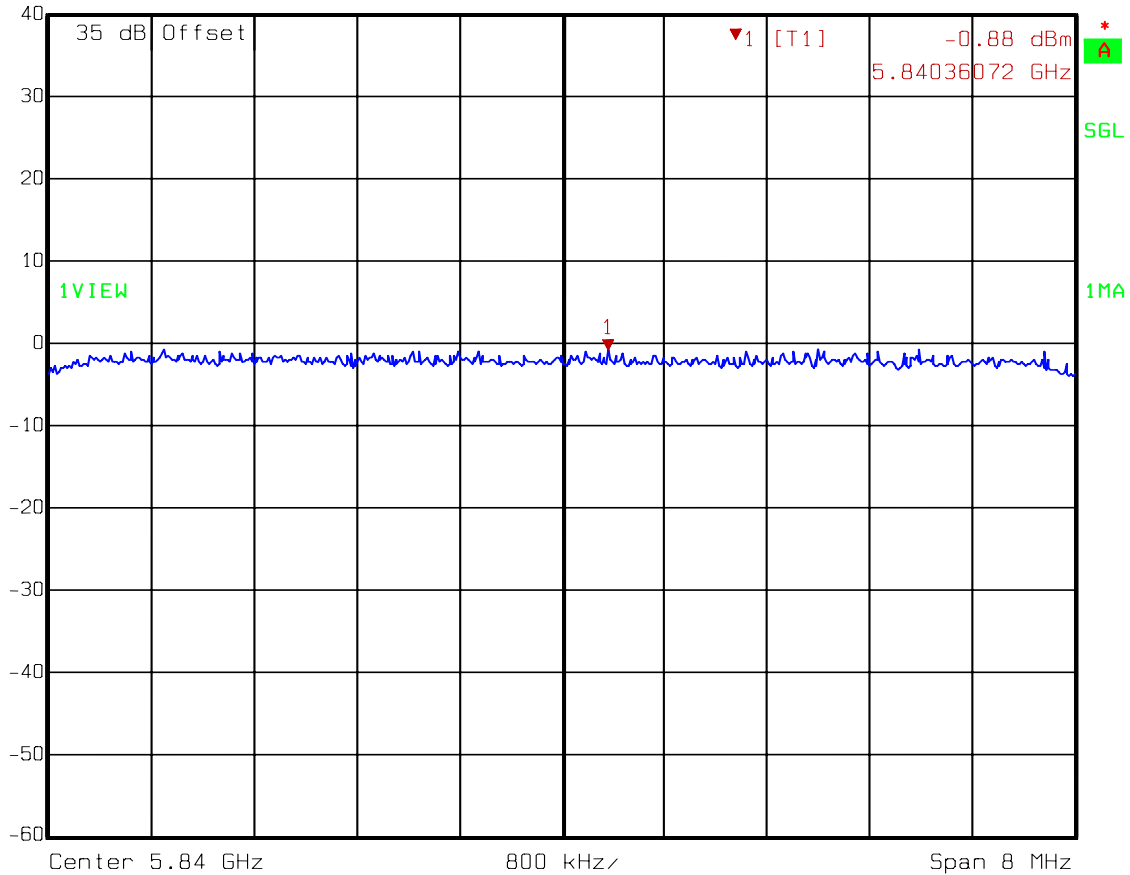


Date: 15.JUL.2009 12:04:54

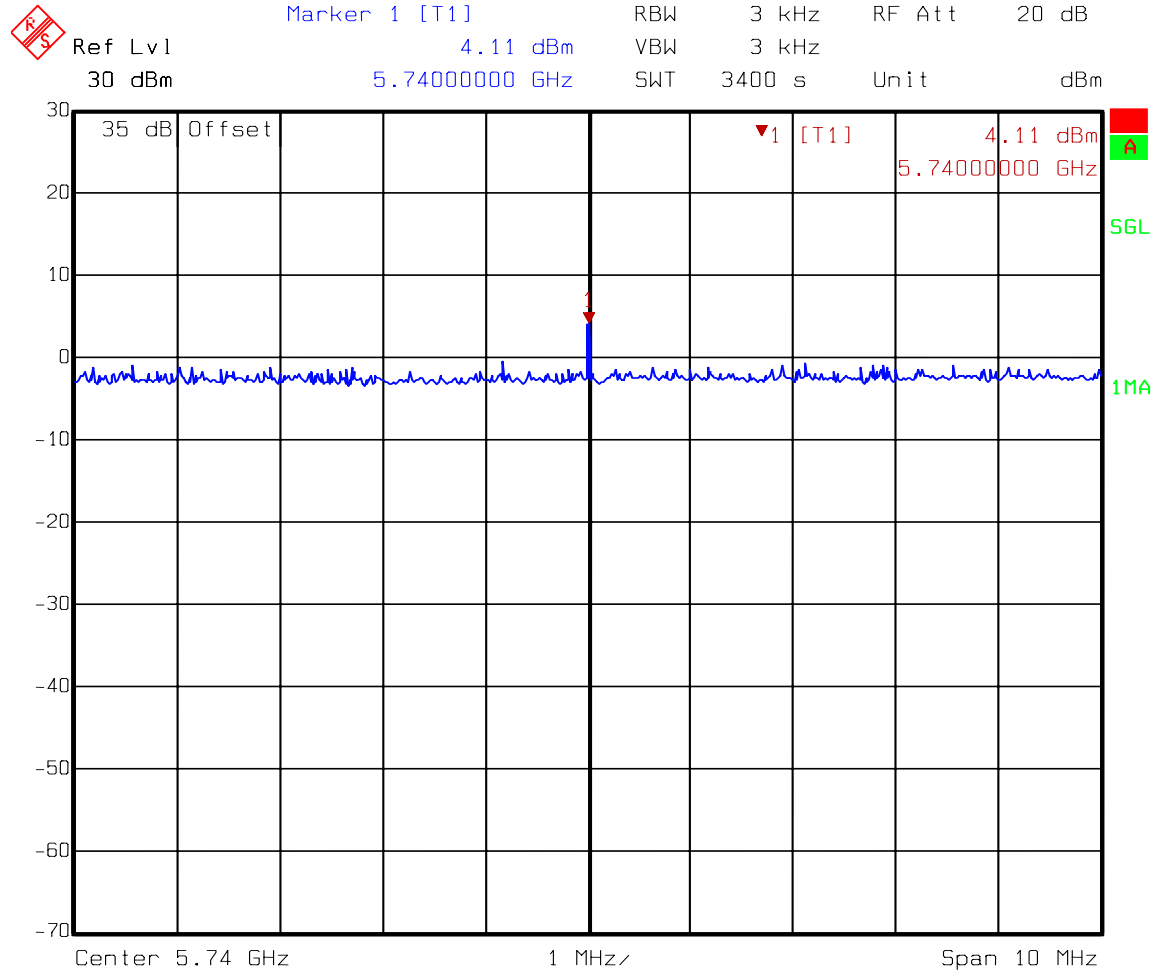
Peak Power Spectral Density



Ref Lvl 40 dBm
Marker 1 [T1] -0.88 dBm
5.84036072 GHz
RBW 3 kHz RF Att 30 dB
VBW 3 kHz
SWT 2700 s Unit dBm



Date: 15.JUL.2009 15:29:10



Date: 16.JUL.2009 12:19:37

Peak

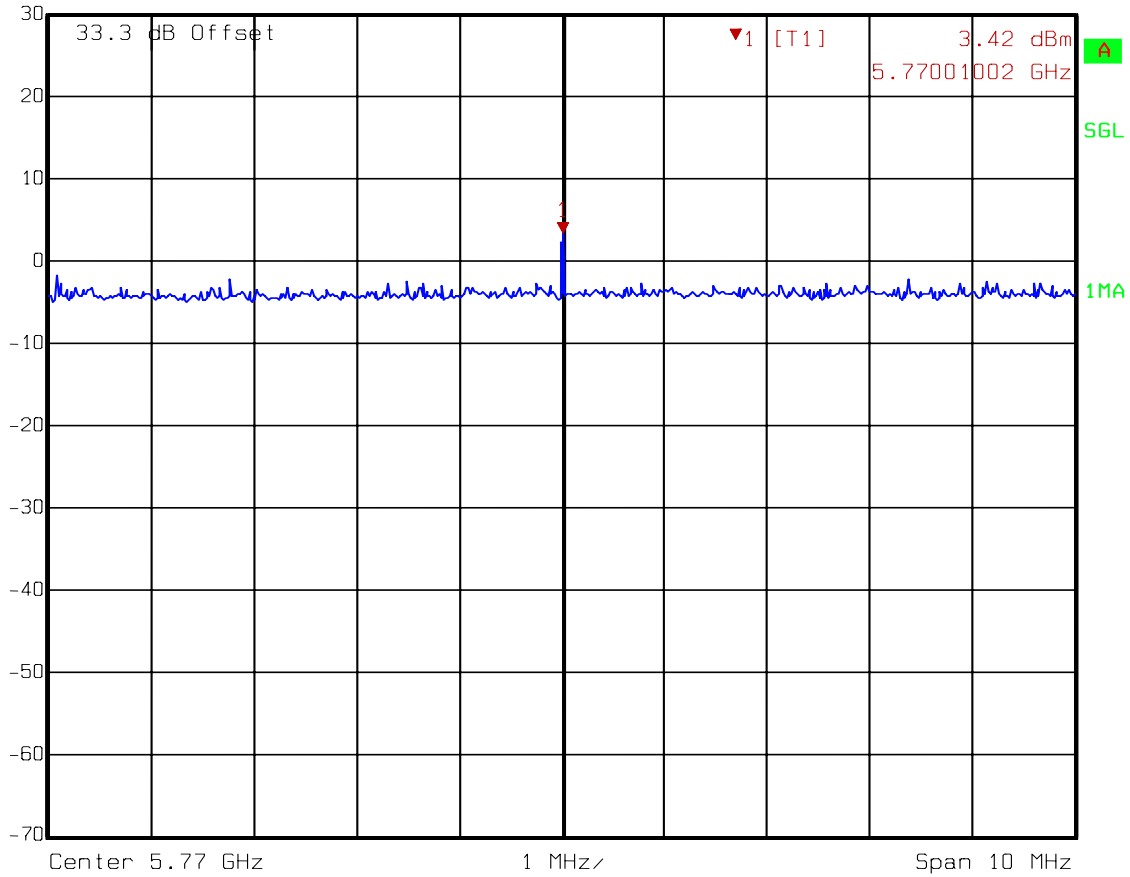
Power Spectral Density

30 MHz carrier

Peak Power Spectral Density



Ref Lvl 30 dBm
33.3 dB Offset
Marker 1 [T1] 3.42 dBm
5.77001002 GHz
RBW 3 kHz
RF Att 20 dB
VBW 3 kHz
SWT 3400 s
Unit dBm

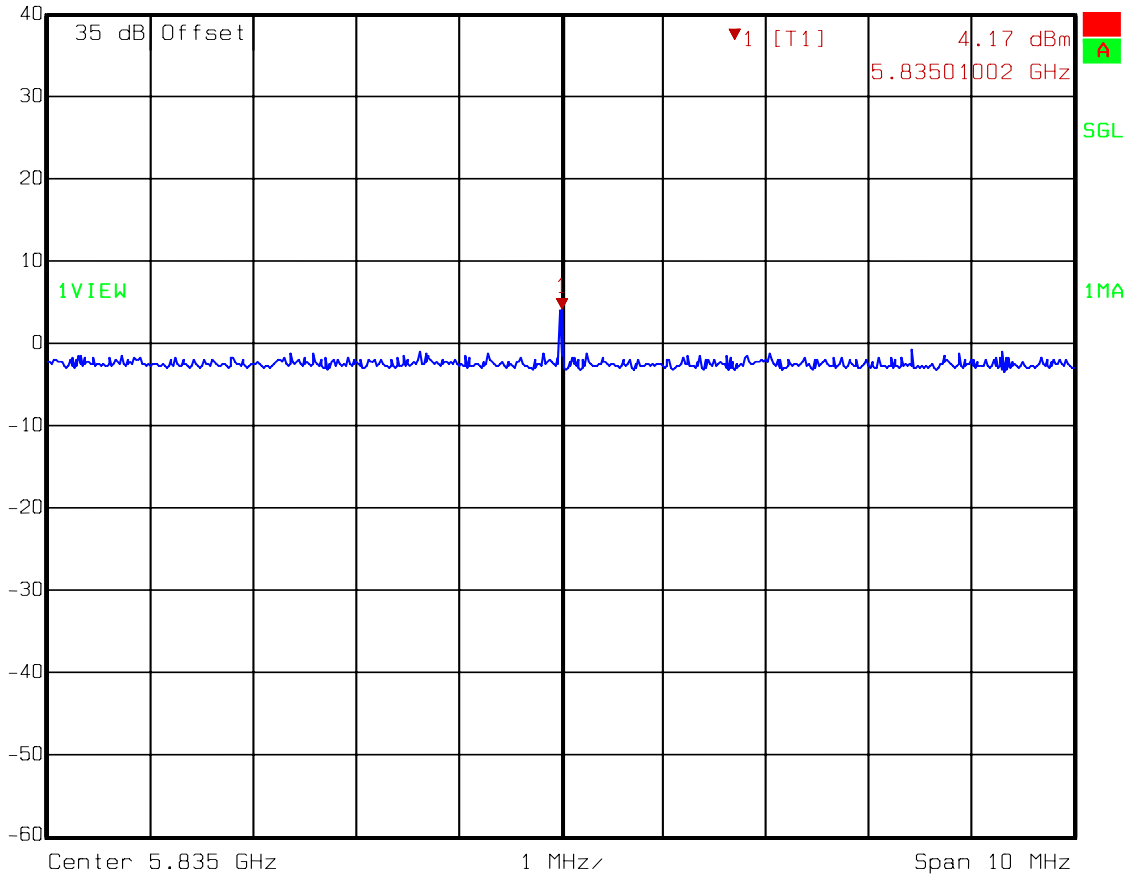


Date: 14.JUL.2009 14:48:23

Peak Power Spectral Density



Ref Lvl 40 dBm
Marker 1 [T1] 5.83501002 GHz
RBW 3 kHz RF Att 30 dB
VBW 3 kHz
SWT 3400 s Unit dBm



Date: 16.JUL.2009 09:10:28

Section 8. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a) / RSS-Gen 7.2.2
TESTED BY: Arturo Ruvalcaba	DATE: 17 July 2009

Test Results: Complies.

Measurement Data: See attached plots.

Measurement Uncertainty: +/- 1.7 dB

Test Equipment: 1258-749-674-1283

Note: The manufacturer does not provide the power supply. The device was tested with an Agilent 6673A dc power supply.

Test Data – Powerline Conducted Emissions

LINE 1 QP / AVG

Operator: Art

02:16:15 PM, Friday, July 17, 2009

Frequency MHz	EN55022 QP LIMIT	EEN55022 AVG LIMIT	EAVG Meas	AVG Margin	QP Meas	QP Margin
0.658	56.0	46.0	50.5	4.5	54.1	-1.9
1.077	56.0	46.0	38.9	-7.1	41.2	-14.8
1.306	56.0	46.0	44.8	-1.2	48.2	-7.8

Nemko
Line 2 QP / AVG

Operator: Art

02:20:48 PM, Friday, July 17, 2009

Company:

Frequency MHz	EN55022 QP Limit	BEN55022 AVG Limit	B Meas	AVG Margin	QP Meas	QP Margin
0.658	56.0	46.0	50.7	4.7	54.7	-1.3
0.817	56.0	46.0	40.9	-5.1	44.0	-12.0
1.306	56.0	46.0	44.2	-1.8	47.1	-8.9

Section 9. Receiver Spurious Emissions

NAME OF TEST: Receiver Spurious Emissions	PARA. NO.: RSS-Gen 7.2.3
TESTED BY: Arturo Ruvalcaba	DATE: 17 July 2009

Test Results: Complies.

Measurement Data: See attached plots.

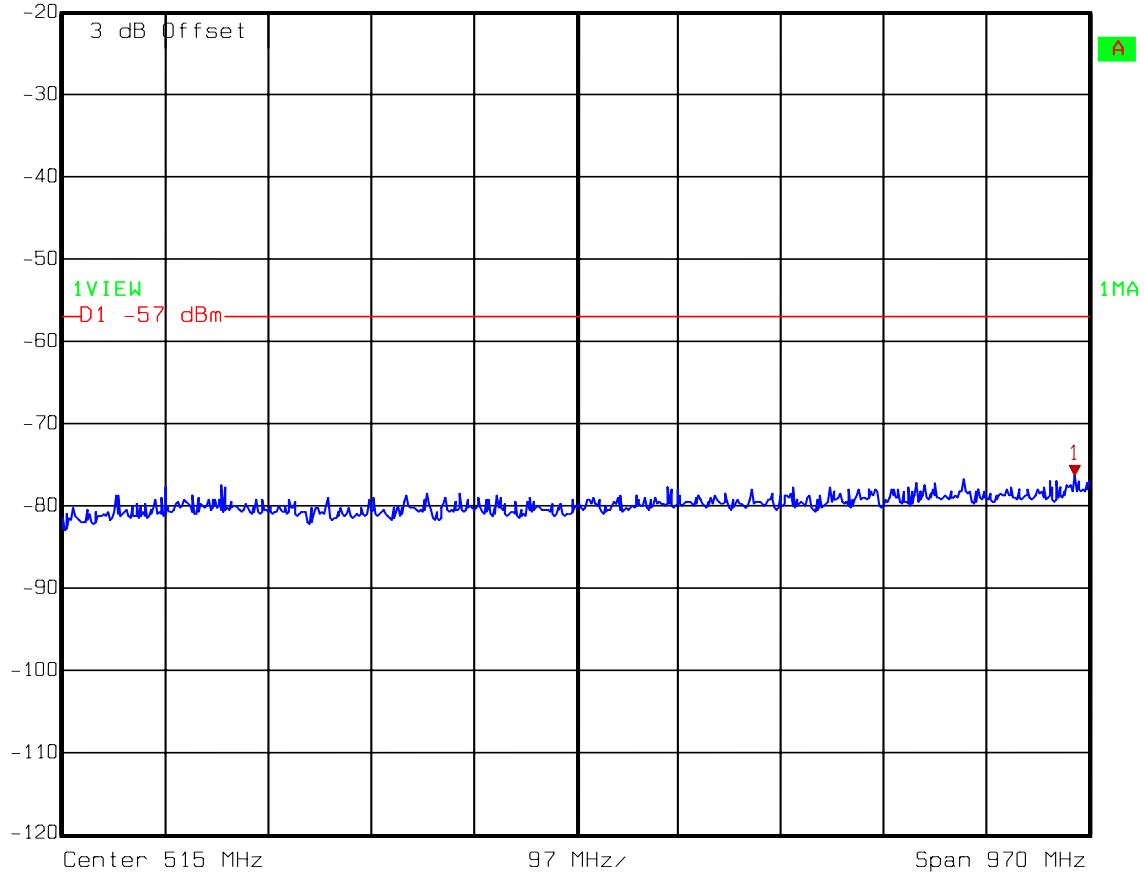
Measurement Uncertainty: +/- 1.7 dB

Test Equipment: 1036-1082

Test Data – Receiver Spurious Emissions



Ref Lvl -20 dBm
Marker 1 [T1] 986.39278557 MHz
RBW 100 kHz
RF Att 10 dB
VBW 100 kHz
SWT 245 ms
Unit dBm

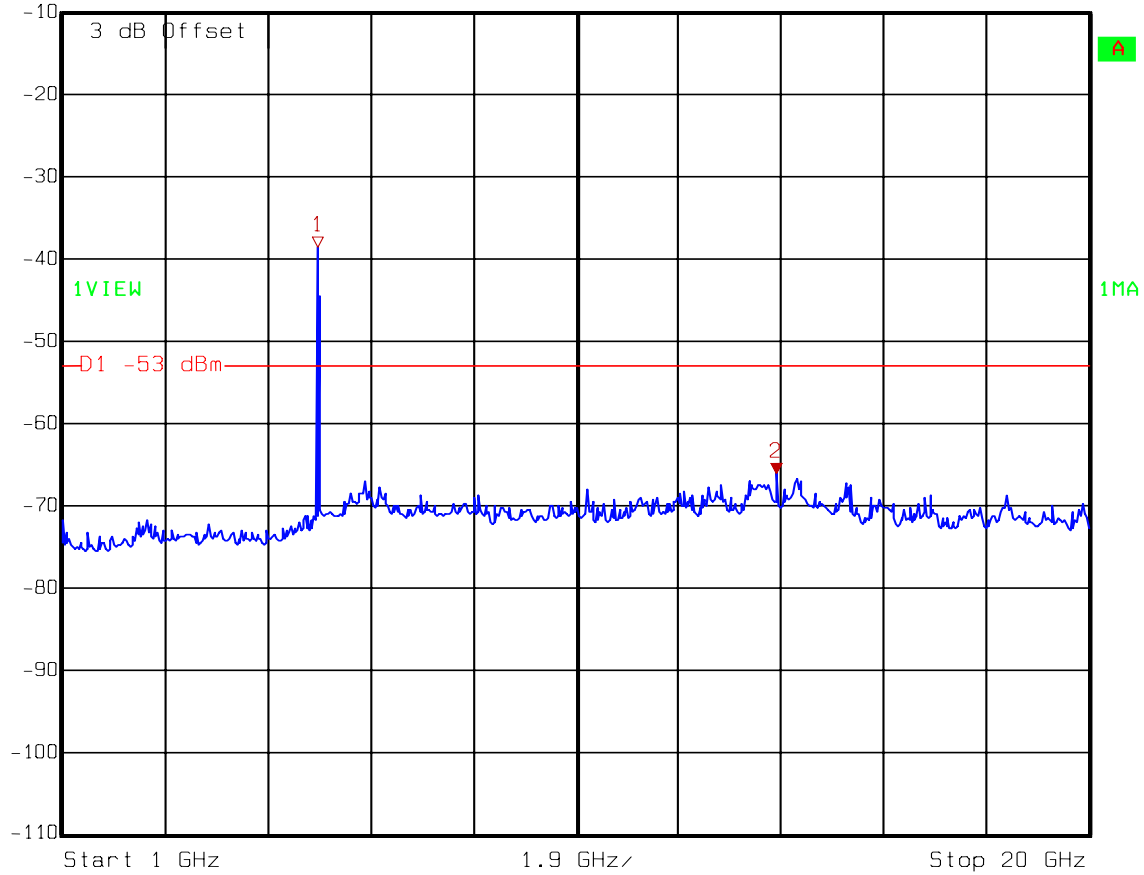


Date: 27.JUL.2009 13:15:19

Test Data – Receiver Spurious Emissions



Ref Lvl -10 dBm
Marker 2 [T1] 14.21242485 GHz
RBW 300 kHz RF Att 10 dB
VBW 300 kHz
SWT 540 ms Unit dBm



Date: 27.JUL.2009 14:25:21

Marker 1 indicates carrier (Notched)
Marker 2 indicates highest emission

Section 10. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	01/19/09	01/20/11
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A
1065	ATTENUATOR	NARDA 776B-10	NONE	CBU	N/A
1480	Bilog Antenna	Schaffner-Chase CBL6111C	2572	10/17/08	10/17/09
1484	Cable	Storm PR90-010-072	N/A	06/23/09	06/23/10
1485	Cable	Storm PR90-010-216	N/A	06/23/09	06/23/10
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/28/09	05/28/10
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	06/23/09	06/23/10
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/09/08	09/10/10
991	Horn antenna	EMCO 3160-10	9704-1049	CNR	N/A
992	Horn antenna	EMCO 3160-09	9705-1079	CNR	N/A
1258	LISN .15mhz-30mhz	EMCO 3825/2	1305	07/22/08	07/22/09
749	CABLE, 4.8m	Nemko USA, Inc. RG223	N/A	06/10/09	06/10/10
674	LIMITER	HP 11947A	3107A02200	CBU	N/A
1283	Spectrum analyzer display	HEWLETT PACKARD 85650A	2521A00769	04/07/09	04/07/10

ANNEX A - TEST DETAILS

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)
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Minimum Standard: §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Conducted Emission (MHz)	Limit (dBmV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 mV within the frequency band 535-1705 kHz, as measured using a 50 mH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as provided in §15.205 and §§15.209, 15.221, 15.223, 15.225 or 15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

Nemko USA, Inc.

FCC PART 15, SUBPART C and Industry Canada RSS-210

Digital Transmission Systems

EQUIPMENT: MPT-HL Packet Terminal

Test Report No.: 25965RUS2

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(2)
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Minimum Standard:

The minimum 6 dB bandwidth shall be at least 500 kHz

NAME OF TEST: Maximum Peak Output Power	PARA. NO.: 15.247(b)(3)
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Minimum Standard: The maximum peak output power shall not exceed 1 watt.

If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point to point operation may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceed 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operation may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Direct Measurement Method For Detachable Antennas:

If the antenna is detachable, a peak power meter is used to measure the power output with the transmitter operating into a 50 ohm load. The dBi gain of the antenna(s) employed shall be reported.

Substitution Antenna Method for Integral Antennas:

The peak field strength of the carrier is measured in a worst-case configuration with a RBW > 5 times the occupied bandwidth of the transmitted waveform. For cases where the RBW of the test instrument is not sufficient, the power is measured using a peak power meter instead of the spectrum analyzer.

The RBW of the spectrum analyzer shall be set to a value greater than the measured 6 dB occupied bandwidth of the E.U.T.

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Occupied Bandwidth

PARA. NO.: 15.247(a)(2)

Minimum Standard:

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Method Of Measurement:

The spectrum analyzer is set as follows:

RBW = VBW = 100 kHz.

Span: Sufficient to display 6 dB bandwidth

LOG dB/div.: 10 dB

Sweep: Auto

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Spurious Emissions(conducted)	PARA. NO.: 15.247(d)
---	----------------------

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

THE SPECTRUM IS SEARCHED TO THE 10th HARMONIC OF THE HIGHEST FREQUENCY GENERATED IN THE EUT.

Method Of Measurement:

30 MHz - 10th harmonic plot

RBW: 100 kHz

VBW: 300 kHz

Sweep: Auto

Display line: -20 dBc

Lower Band Edge

RBW: At least 1% of span/div.

VBW: >RBW

Span: As necessary to display any spurious at band edge.

Sweep: Auto

Center Frequency: 902 MHz, 2400 MHz, or 5725 MHz

Marker: Peak of fundamental emission

Marker Δ : Peak of highest spurious level below center frequency.

Upper Band Edge

RBW: At least 1% of span/div.

VBW: >RBW

Span: As necessary to display any spurious at band edge.

Sweep: Auto

Center Frequency: 928 MHz, 2483.5 MHz, or 5850 MHz

Marker: Peak of fundamental emission

Marker Δ : Peak of highest spurious level above center frequency.

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Radiated Spurious Emissions	PARA. NO.: 15.247(c)
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Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC

15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.125-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41	1718		

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Transmitter Power Density	PARA. NO.: 15.247(d)
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Minimum Standard: The transmitted power density averaged over any 1 second interval shall not be greater than +8 dBm in any 3 kHz bandwidth.

Method Of Measurement: The spectrum analyzer is set as follows:

- RBW: 3 kHz
- VBW: >3 kHz
- Span: => measured 6 dB bandwidth
- Sweep: Span(kHz)/3 (i.e. for a span of 1.5 MHz the sweep rate is 1500/3 = 500 sec.
- LOG dB/div.: 2 dB

Note: For devices with spectrum line spacing ≤ 3 kHz, the RBW of the analyzer is reduced until the spectral lines are resolved. The measurement data is normalized to 3 kHz by summing the power of all the individual spectral lines within a 3 kHz band in linear power units.

For Devices With Integral Antenna:

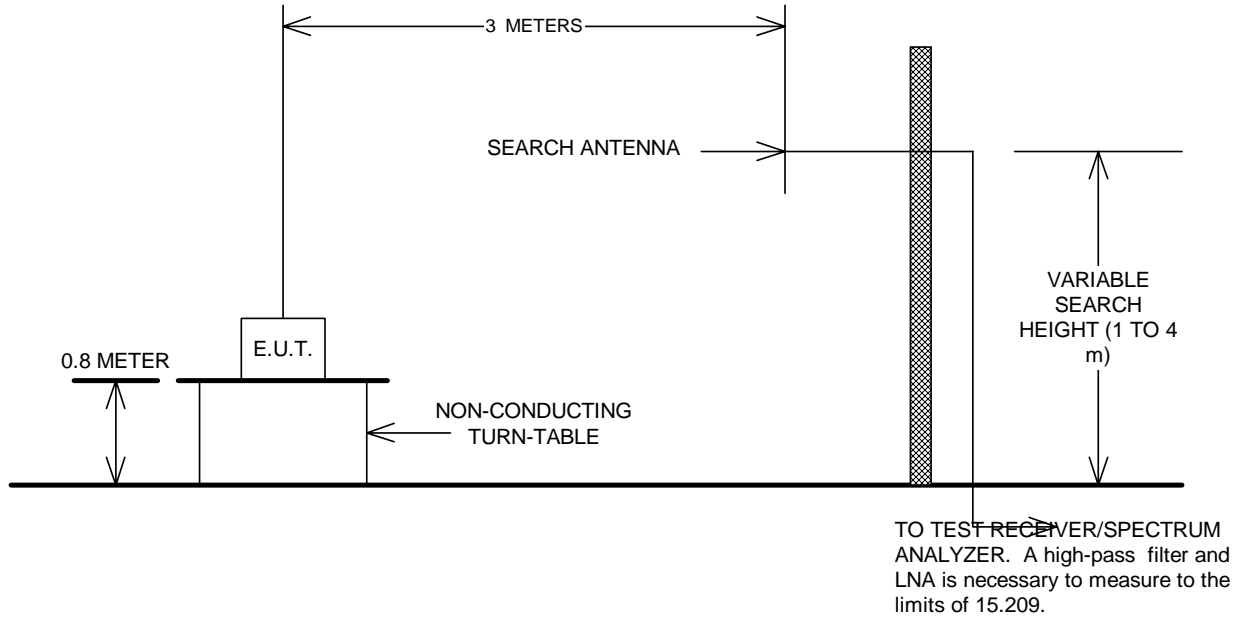
For devices with non-detachable antennas, the received field strength is peaked and the spectrum analyzer is set as above. The peak emission level is then measured and converted to a field strength by adding the appropriate antenna factor and cable loss. This field strength is then converted to an equivalent isotropic radiated power using the same method as described for Peak Power output.

Number of channels tested:

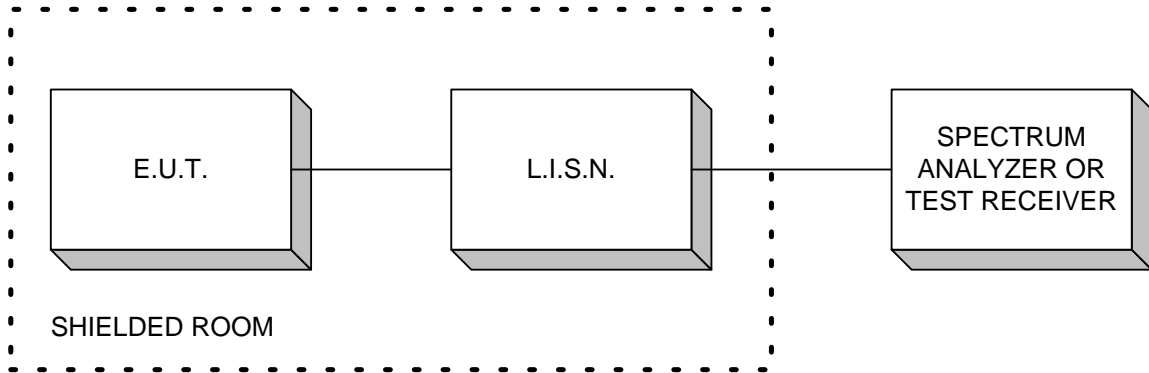
Tuning Range	Number Of Channels Tested	Channel Location In Band
1 MHz or Less	1	Middle
1 to 10 MHz	2	Top And Bottom
More Than 10 MHz	3	Top, Middle, Bottom

ANNEX B - TEST DIAGRAMS

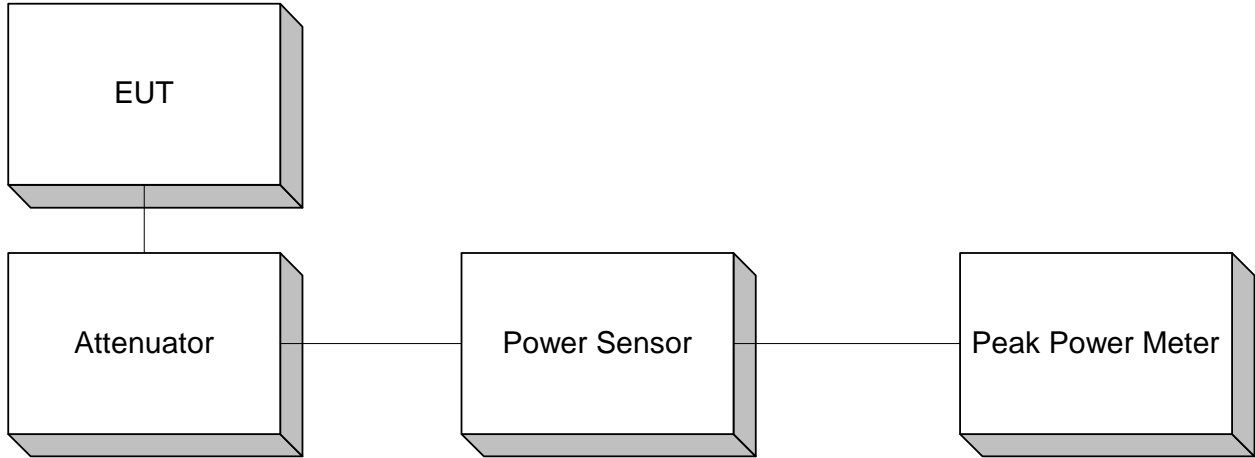
Test Site For Radiated Emissions



Conducted Emissions



Peak Power At Antenna Terminals



Note: A spectrum analyzer may be substituted for Peak Power Meter given that the measurement bandwidth is sufficient to capture the 60 dB bandwidth of the transmitter.

**Minimum 6 dB Bandwidth
Peak Power Spectral Density
Spurious Emissions (conducted)**

