Nemko Test Report: 10220773RUS1rev2

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

Equipment Under Test: (E.U.T.) 9558HC

FCC ID.: JF6-9558HC
IC: 6933B-9558HC

In Accordance With: **FCC Part 15, Subpart C, 15.247 and Industry Canada RSS-210, Issue 8**
Digital Transmission Systems

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

TESTED BY: _____ **DATE:** **06 August 2012**
David Light, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** **06 August 2012**
Mike Cantwell

Number of Pages: 110

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Alcatel USA

Model No.: 9558HC

Serial No.: None

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 Part 15, Subpart C, Paragraph 15.247 and Industry Canada RSS-210, Issue 8 for Digital Transmission Systems. Radiated tests were conducted is accordance with ANSI C63.4-2003. Conducted tests were made in accordance with FCC OET Bulletin 558074 D01 v01. 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.

☒ New Submission ☒ Production Unit

☐ Class II Permissive Change ☐ 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".

NVLAP Lab Code 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a) / RSS-Gen 7.2.4	Complies
Minimum 6 dB Bandwidth	15.247(a)(2) / RSS-210 A8.2(a)	Complies
Maximum Peak Power Output	15.247(b)(3) / RSS-210 A8.4(4)	Complies
Spurious Emissions (Antenna Conducted)	15.247(d) / RSS-210 A8.5	Complies
Spurious Emissions (Restricted Bands)	15.247(d)/15.209(a) / RSS-Gen 7.2.2	Complies
Peak Power Spectral Density	15.247(e) / RSS-210 A8.2(b)	Complies

Footnotes:

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

General Equipment Information

Frequency Band (MHz):	902-928	2400-2483.5	5725-5850
	☐	☐	☒

Operating Frequency of Test Sample: 5730.5 to 5844.5 MHz

Channel Spacing: 5, 10 or 30 MHz

User Frequency Adjustment: Software controlled

Description of EUT

5 GHz point to point transmitter.

Section 3. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(2) RSS-210 A8.2(a)
TESTED BY: David Light	DATE: 04 May 2012

Test Results: Complies.

Measurement Data: See attached plots

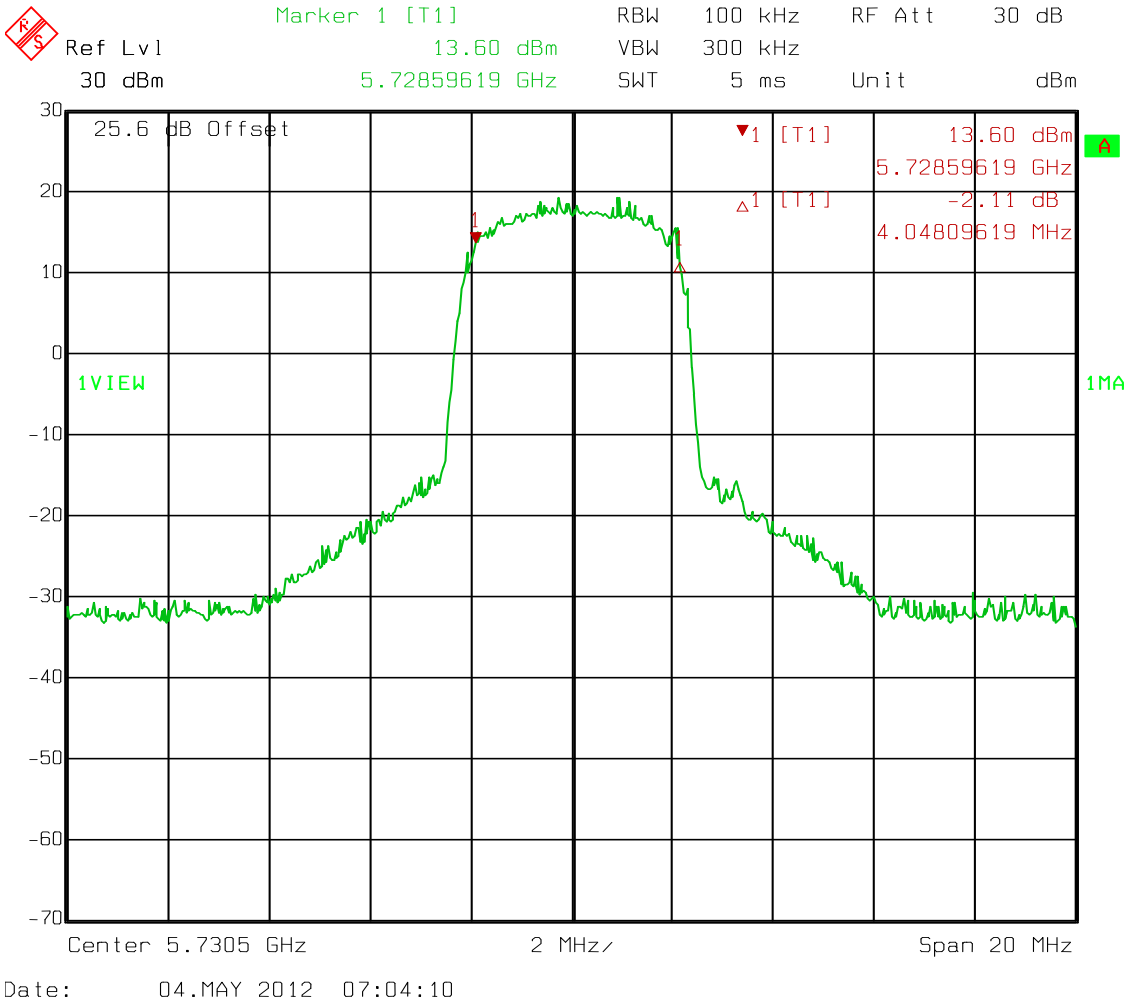
Test Conditions: 54 %RH
22 °C

Measurement Uncertainty: +/-1x10^{-7} ppm

Test Equipment Used: 1036-1082-1472

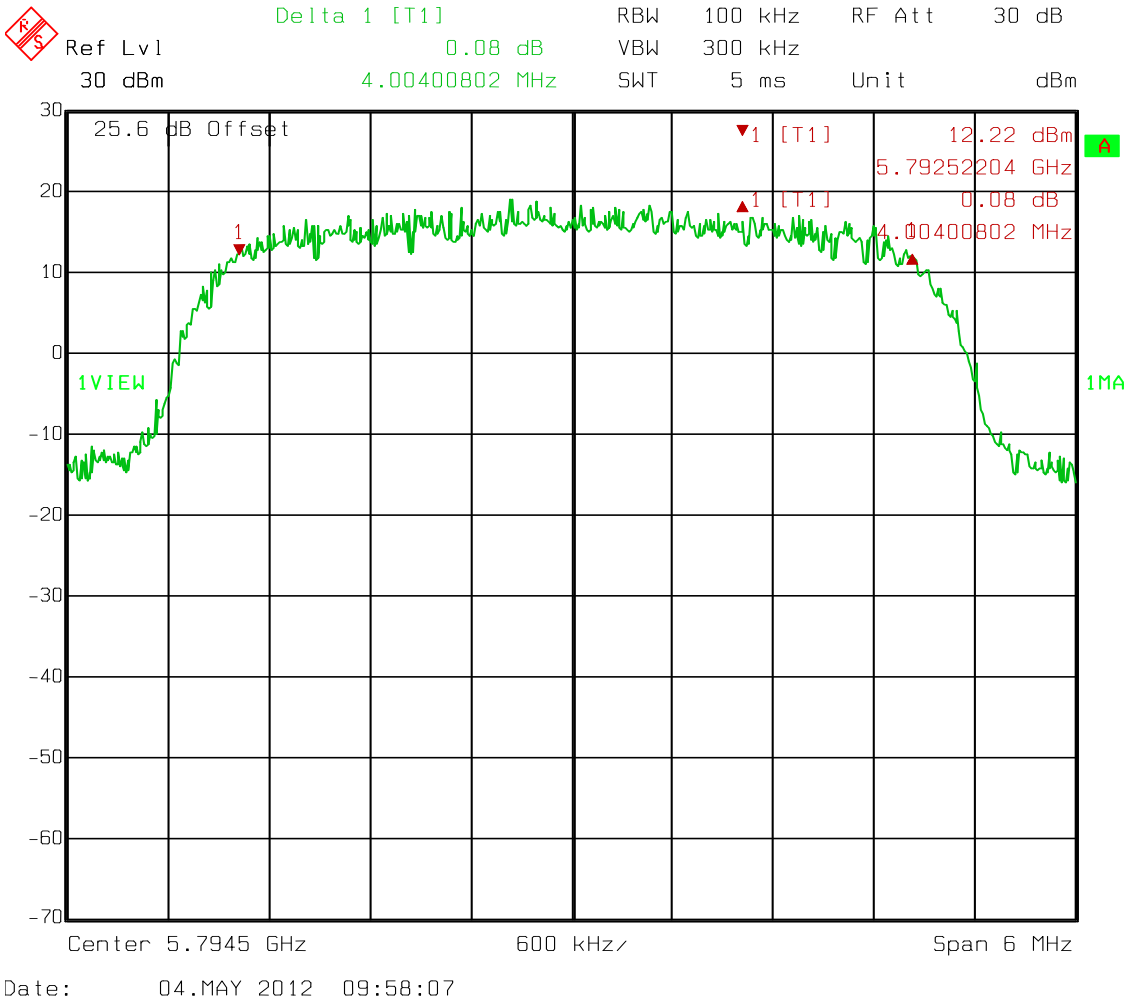
Test Data – Occupied Bandwidth

4QAM
5 MHz Channel
Low Channel



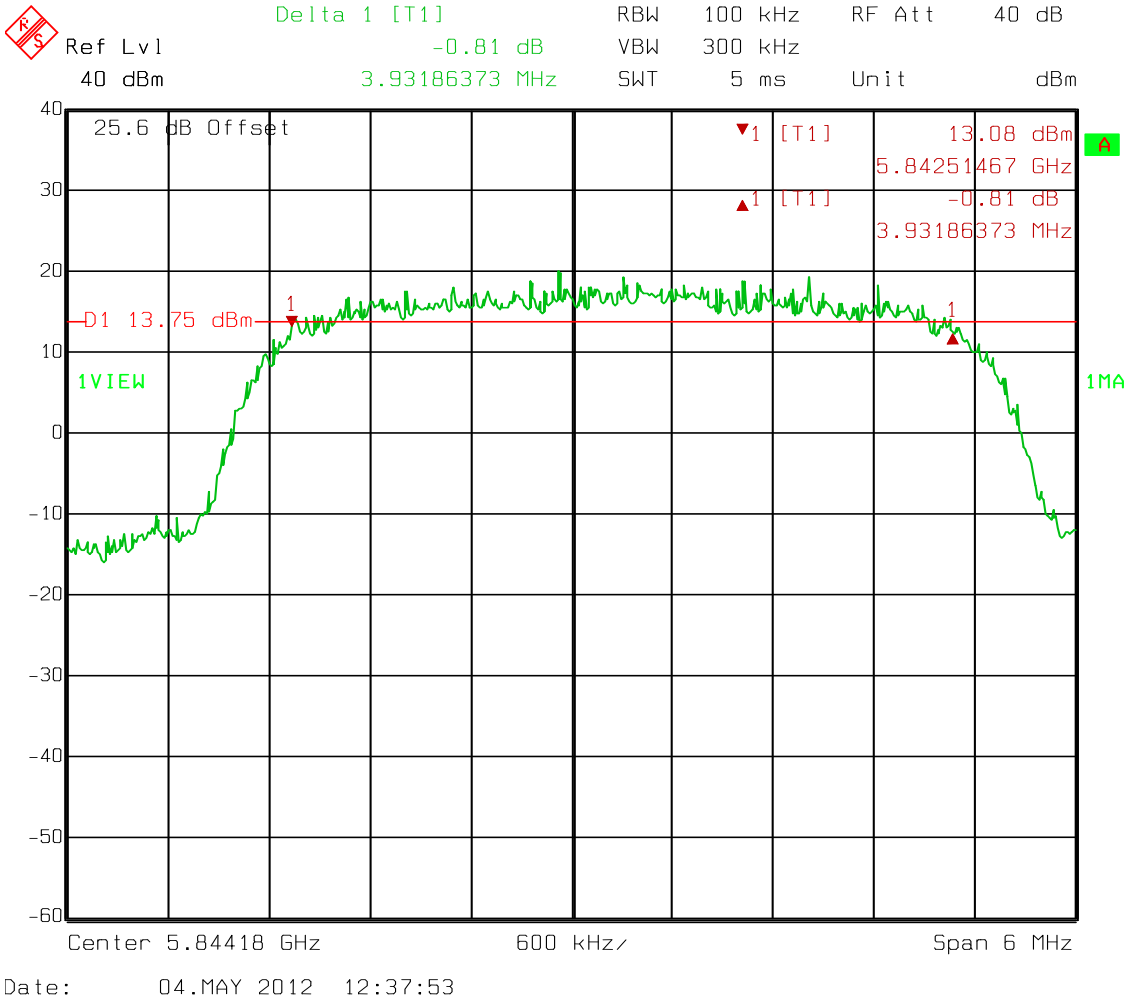
Test Data – Occupied Bandwidth

5 MHz Channel
4QAM
Mid Channel



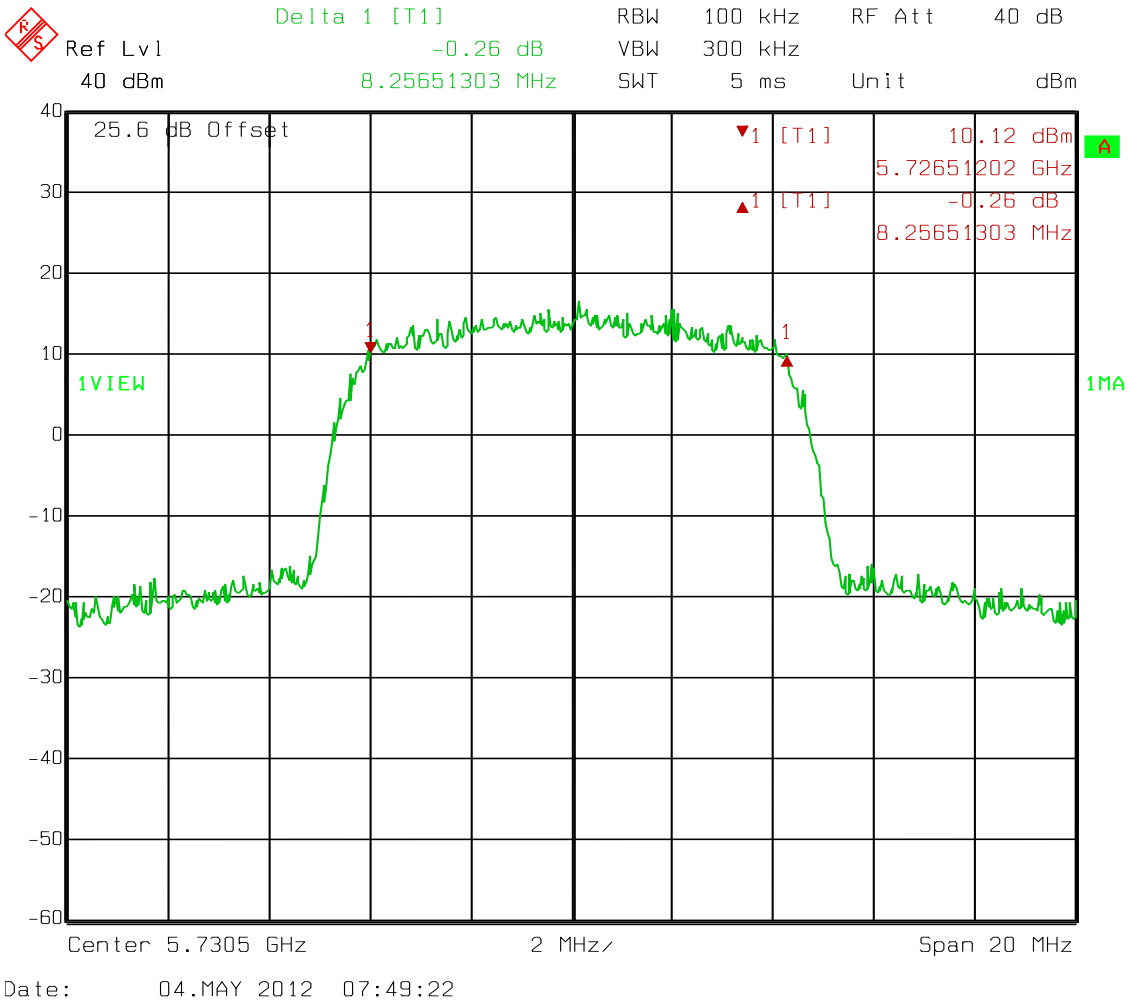
Test Data – Occupied Bandwidth

High Channel
4QAM
5 MHz Channel
6 dB Bandwidth



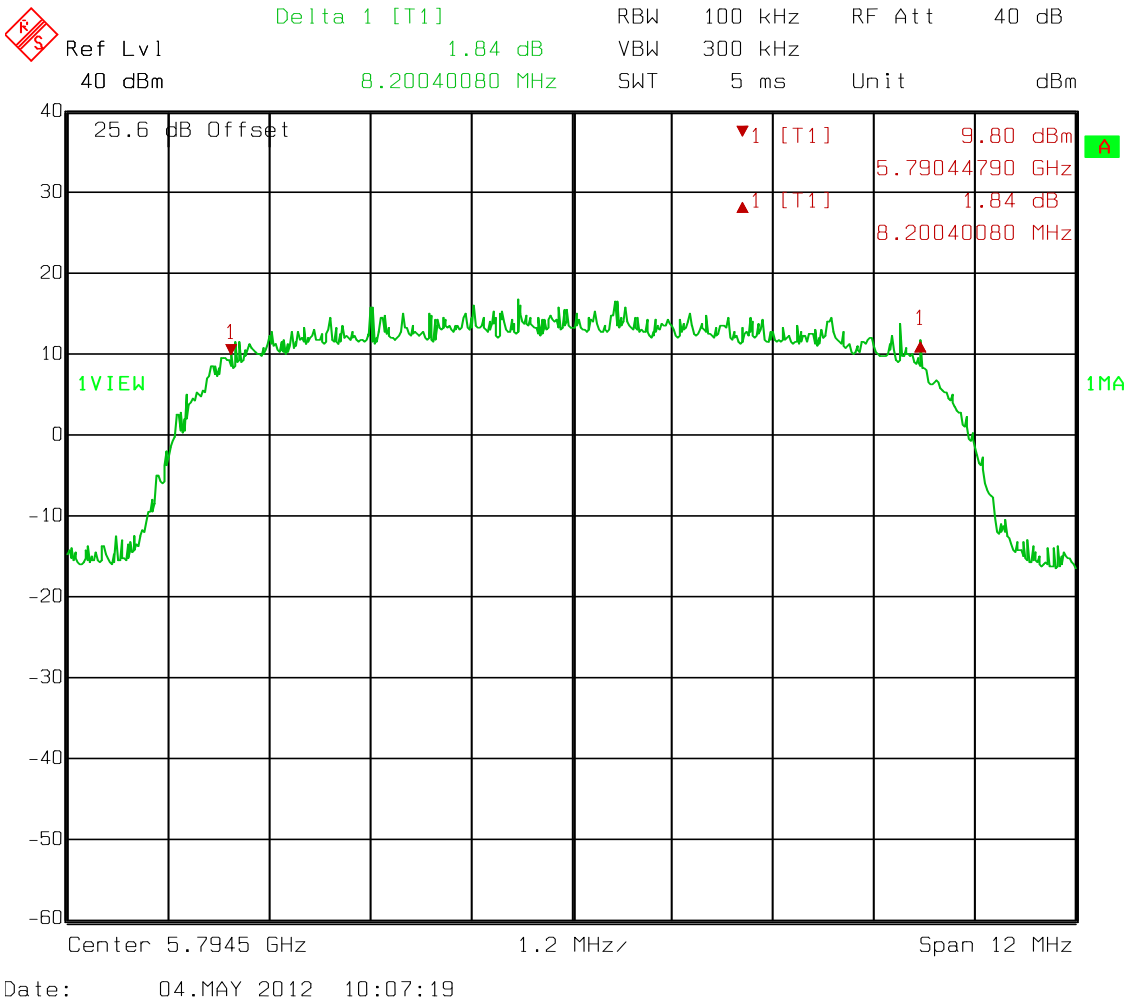
Test Data – Occupied Bandwidth

Lowest Channel
6 dB Bandwidth
10 MHz Channel
4QAM



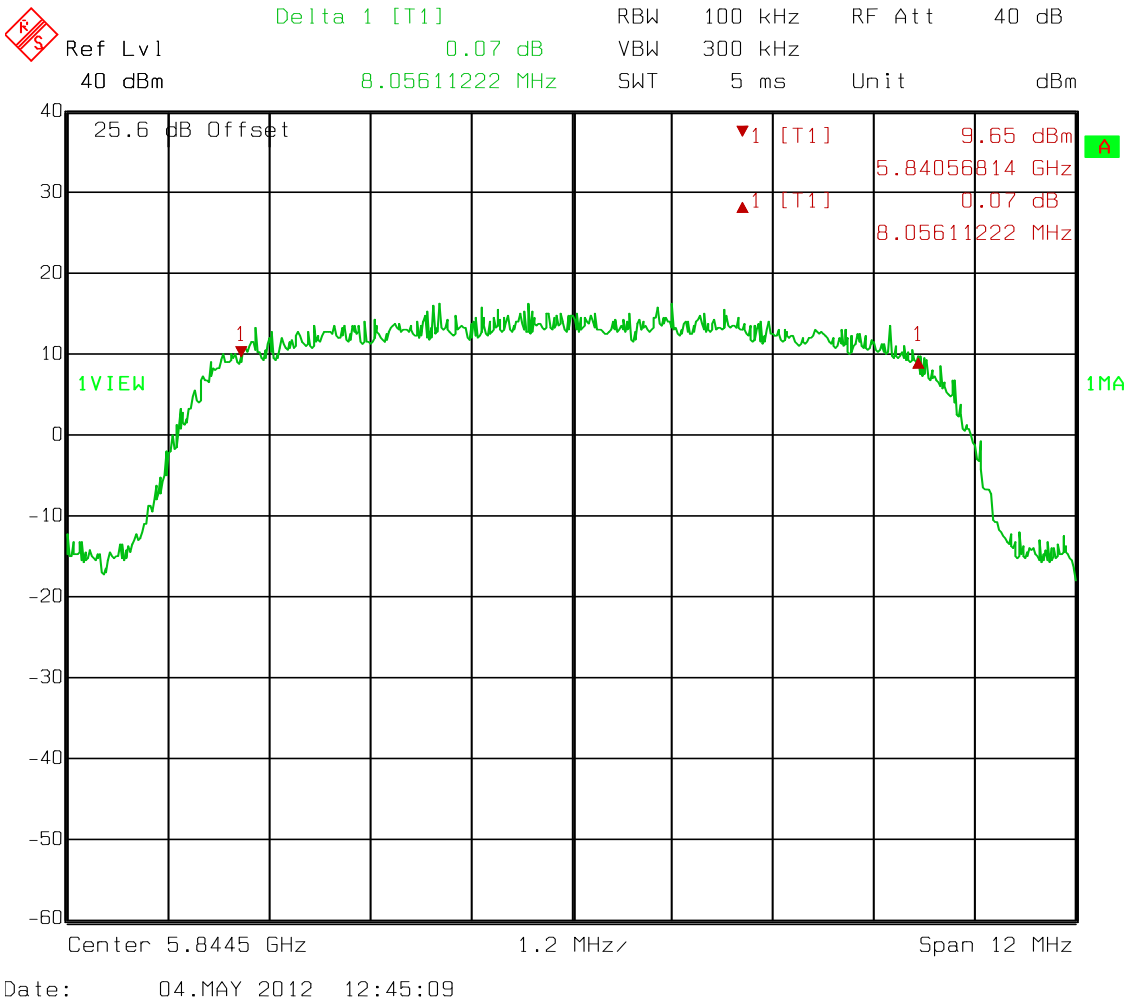
Test Data – Occupied Bandwidth

Mid Channel
10 MHz Channel
4QAM
6 dB Bandwidth



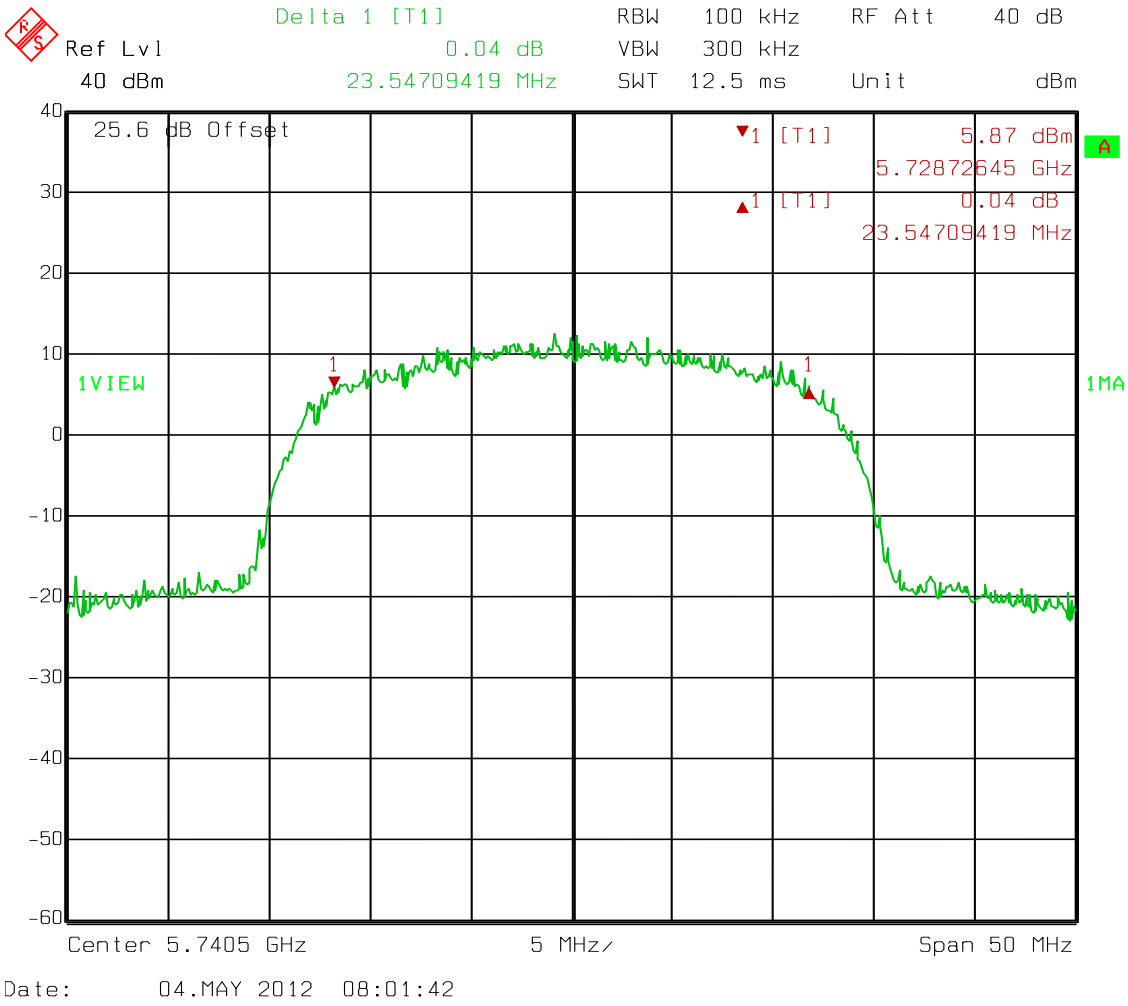
Test Data – Occupied Bandwidth

High Channel
4QAM
10 MHz Channel
6 dB Bandwidth



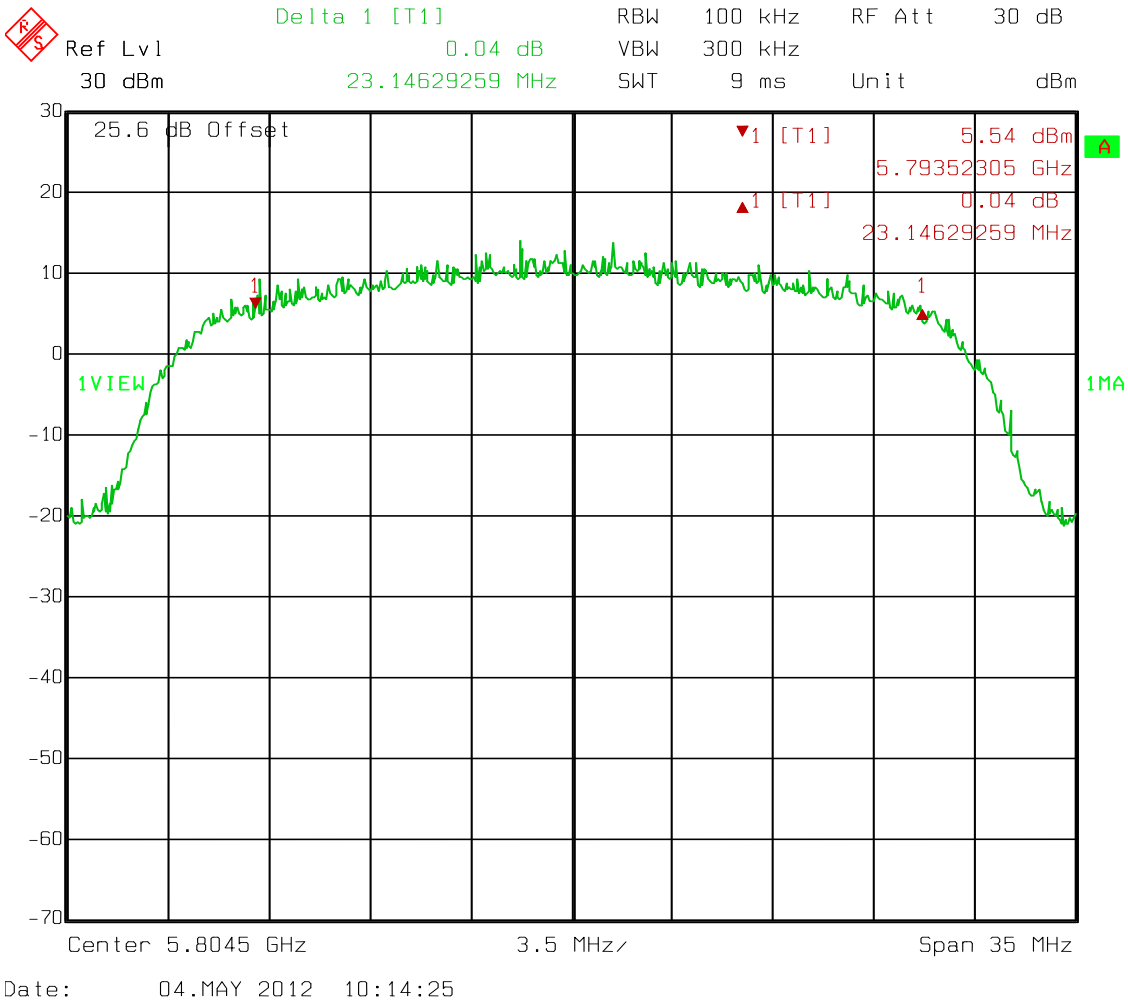
Test Data – Occupied Bandwidth

Lowest Channel
6 dB Bandwidth
30 MHz Channel
4QAM



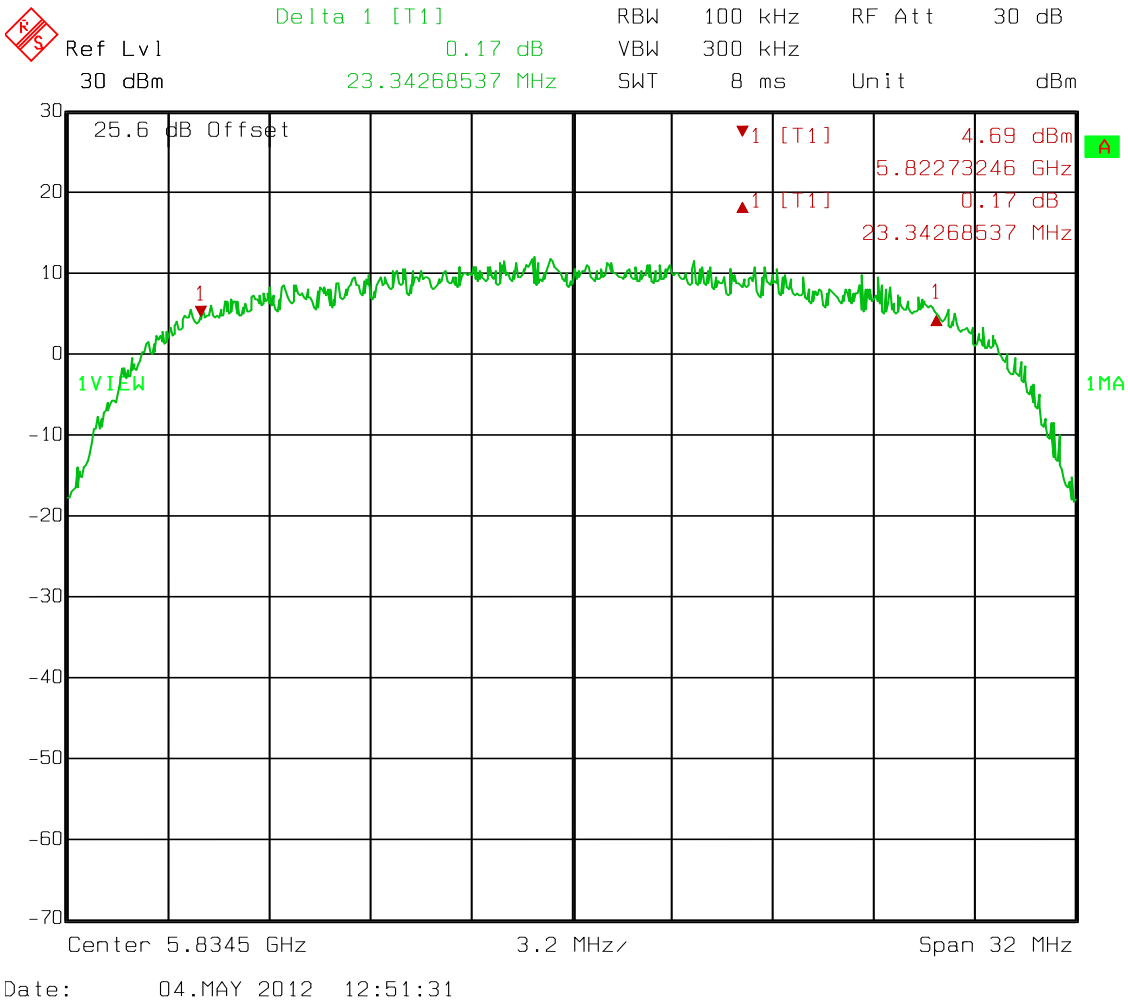
Test Data – Occupied Bandwidth

Mid Channel
4QAM
30 MHz Channel
6 dB Bandwidth



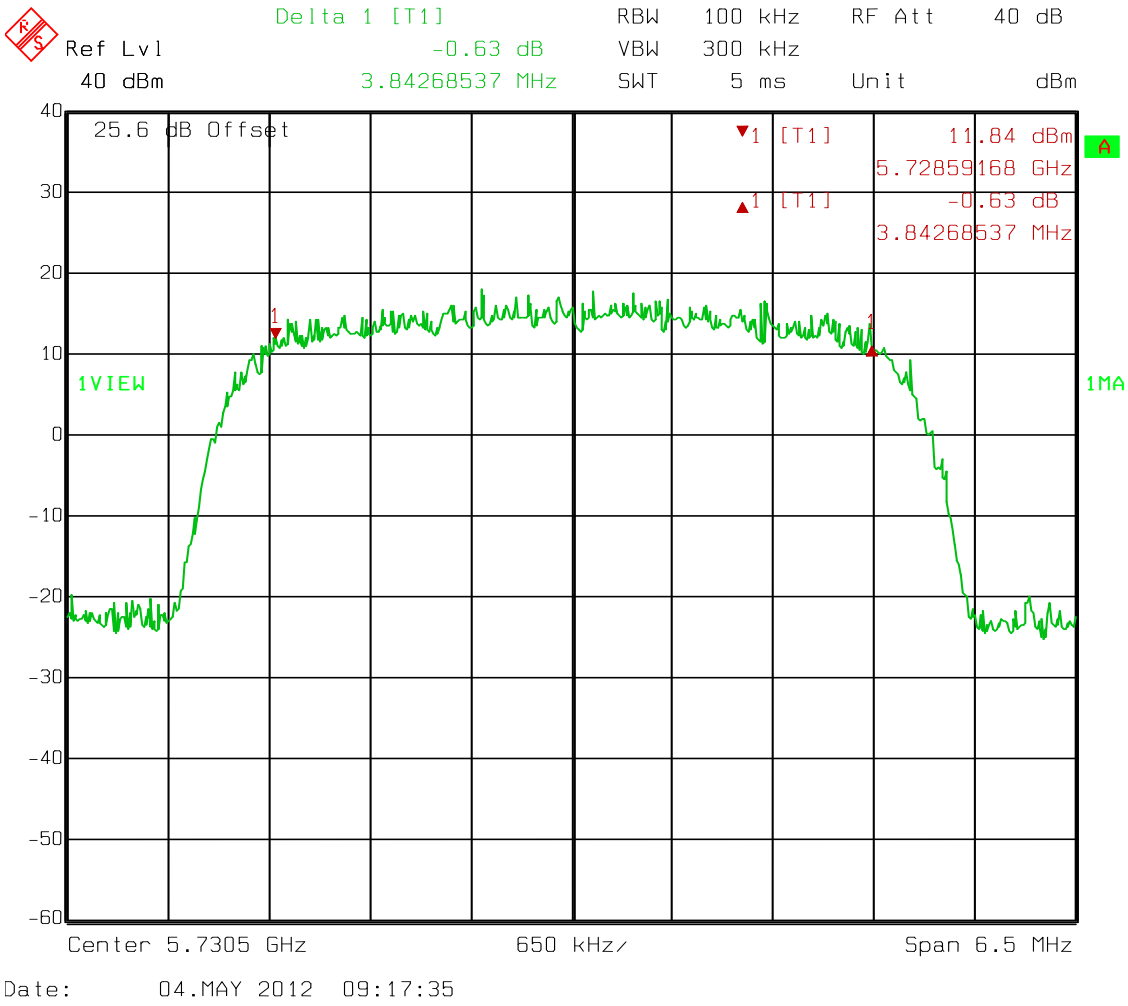
Test Data – Occupied Bandwidth

High Channel
4QAM
30 MHz Channel
6 dB Bandwidth



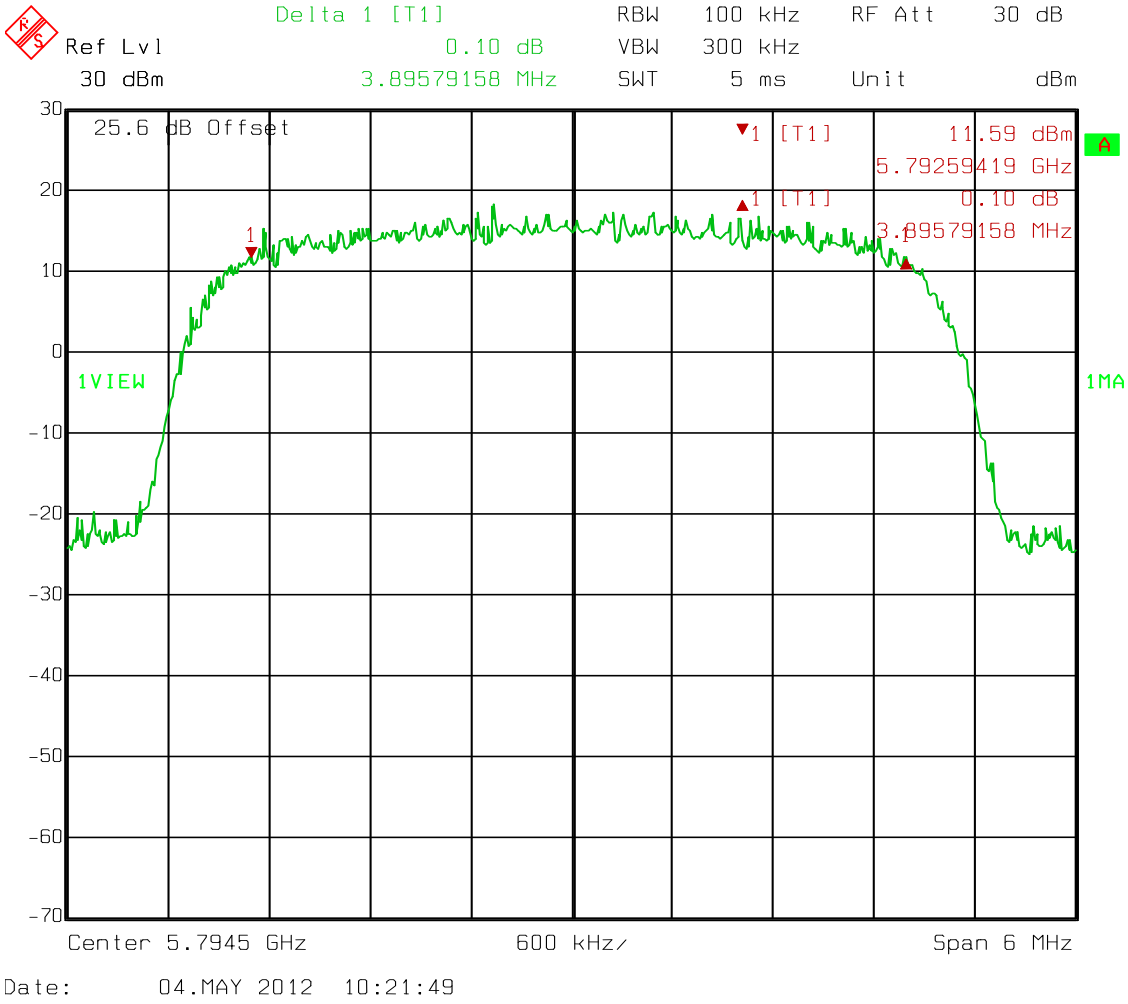
Test Data – Occupied Bandwidth

Low Channel
5 MHz
128QAM
6 dB Bandwidth



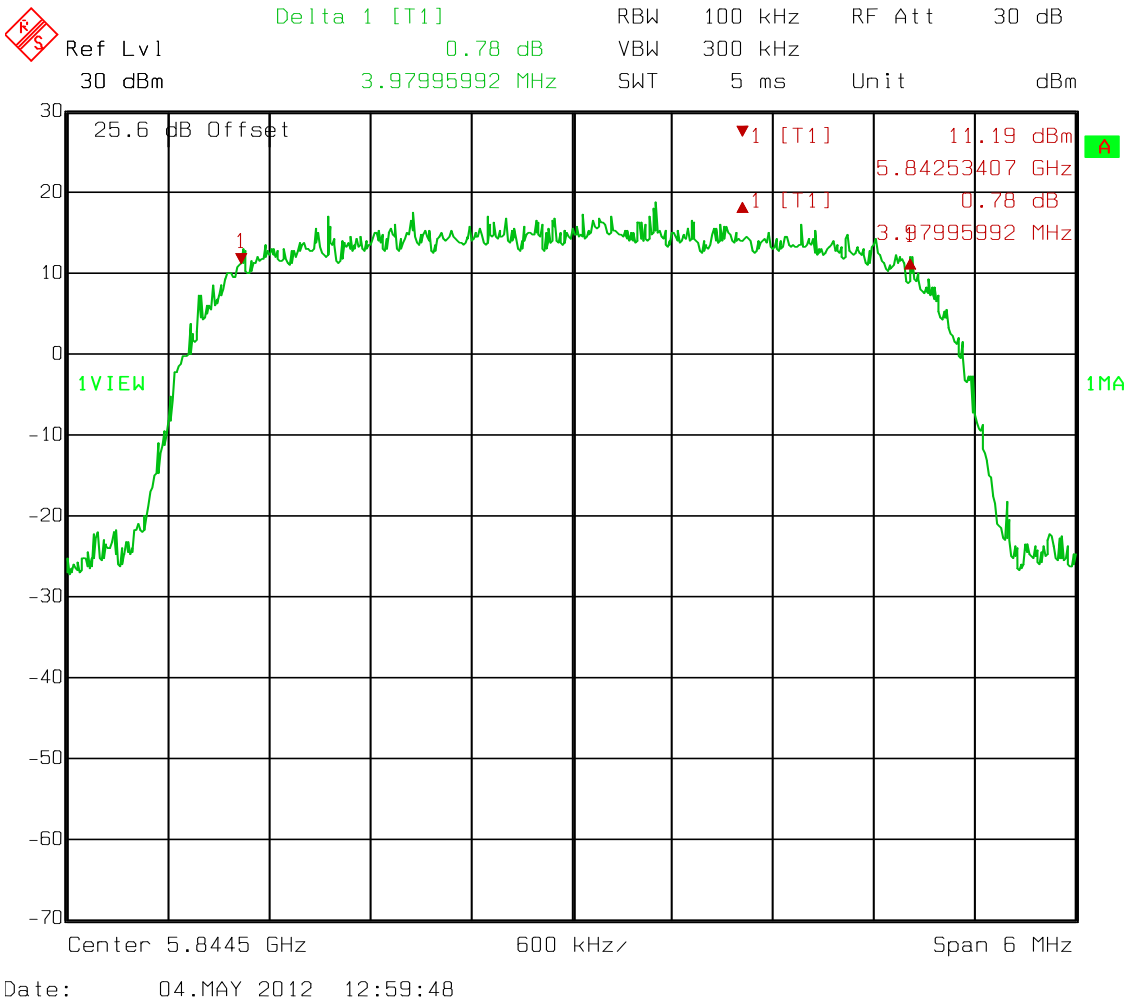
Test Data – Occupied Bandwidth

Mid Channel
128 QAM
5 MHz Channel
6 dB Bandwidth



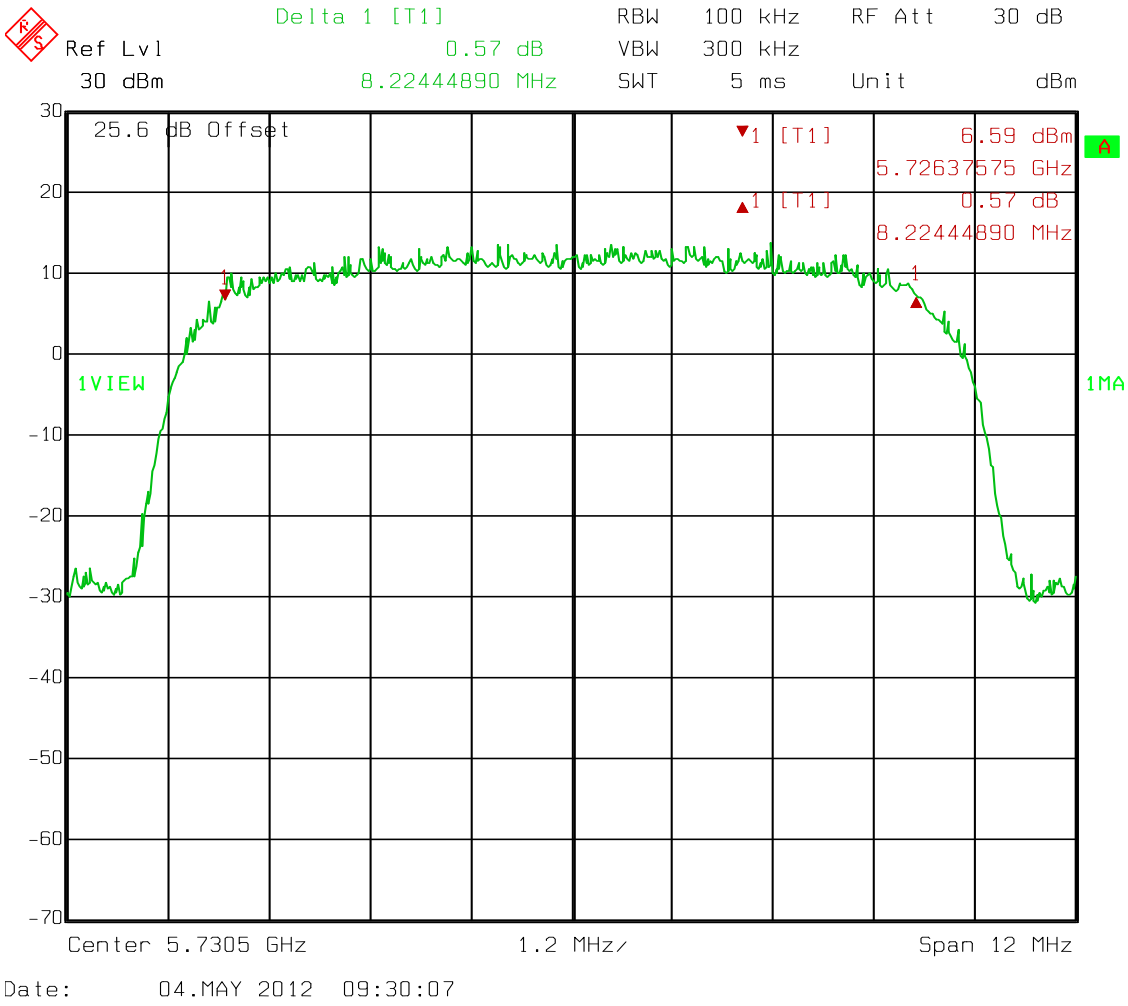
Test Data – Occupied Bandwidth

High Channel
128QAM
5 MHz Channel
6 dB Bandwidth



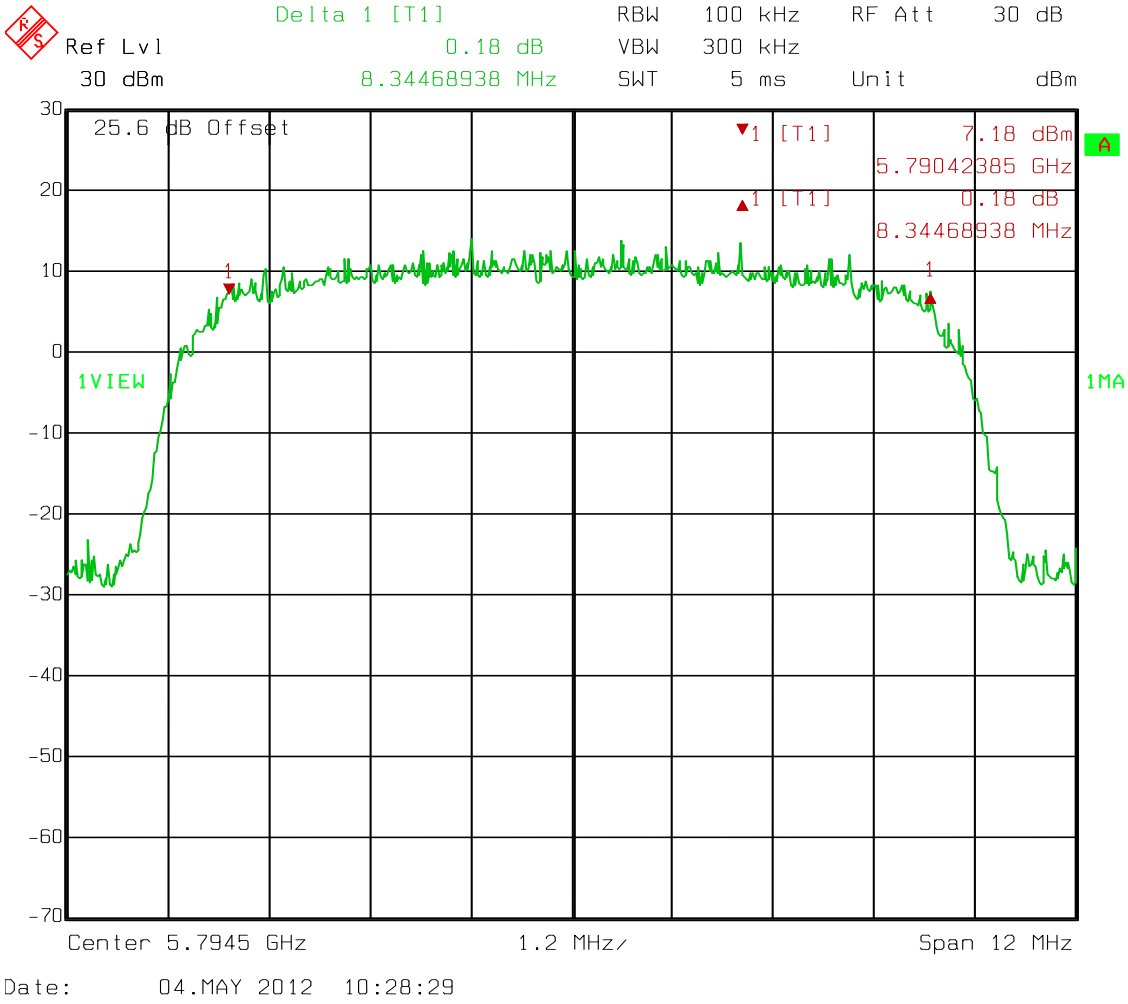
Test Data – Occupied Bandwidth

Low Channel
256QAM
10 MHz Channel
6 dB Bandwidth



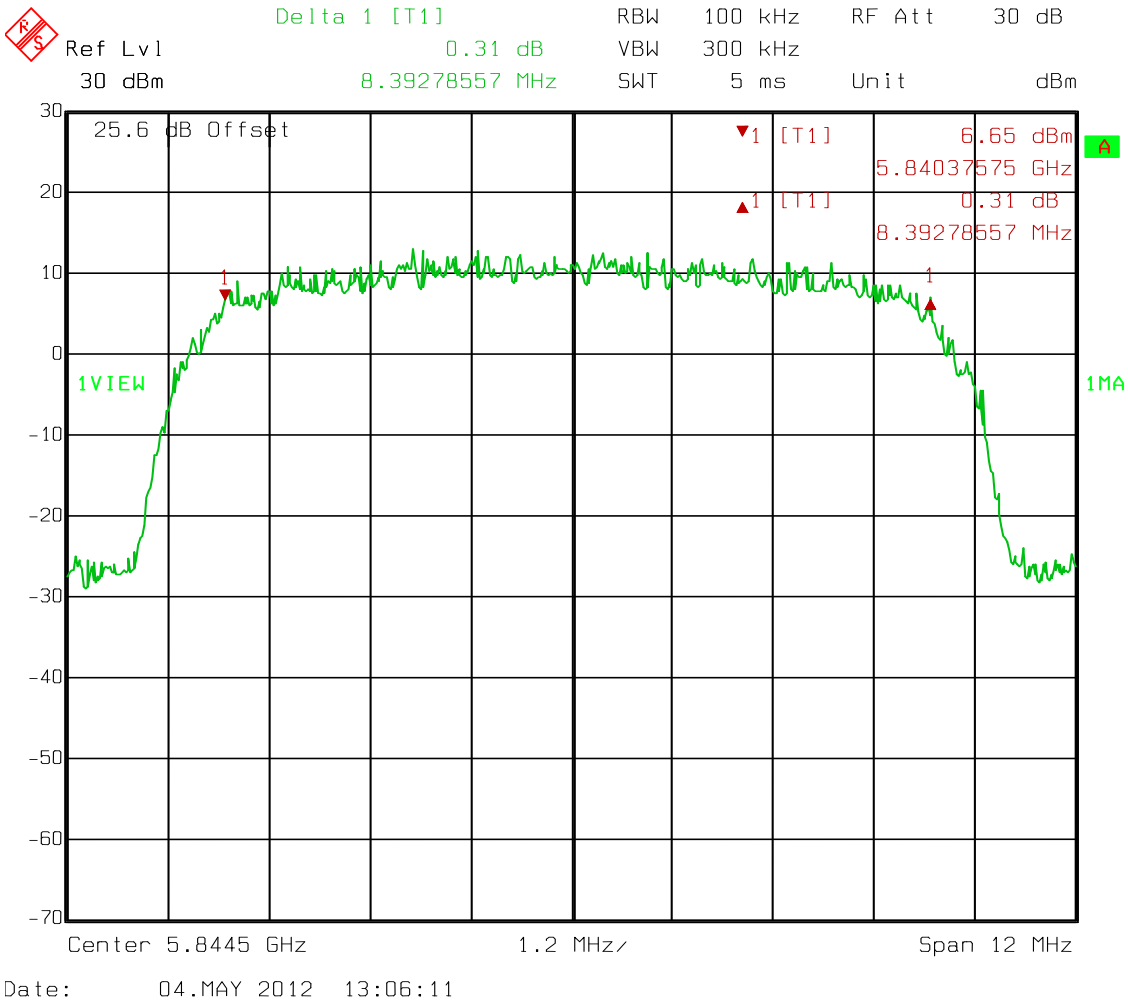
Test Data – Occupied Bandwidth

Mid Channel
256 QAM
10 MHz Channel
6 dB Bandwidth



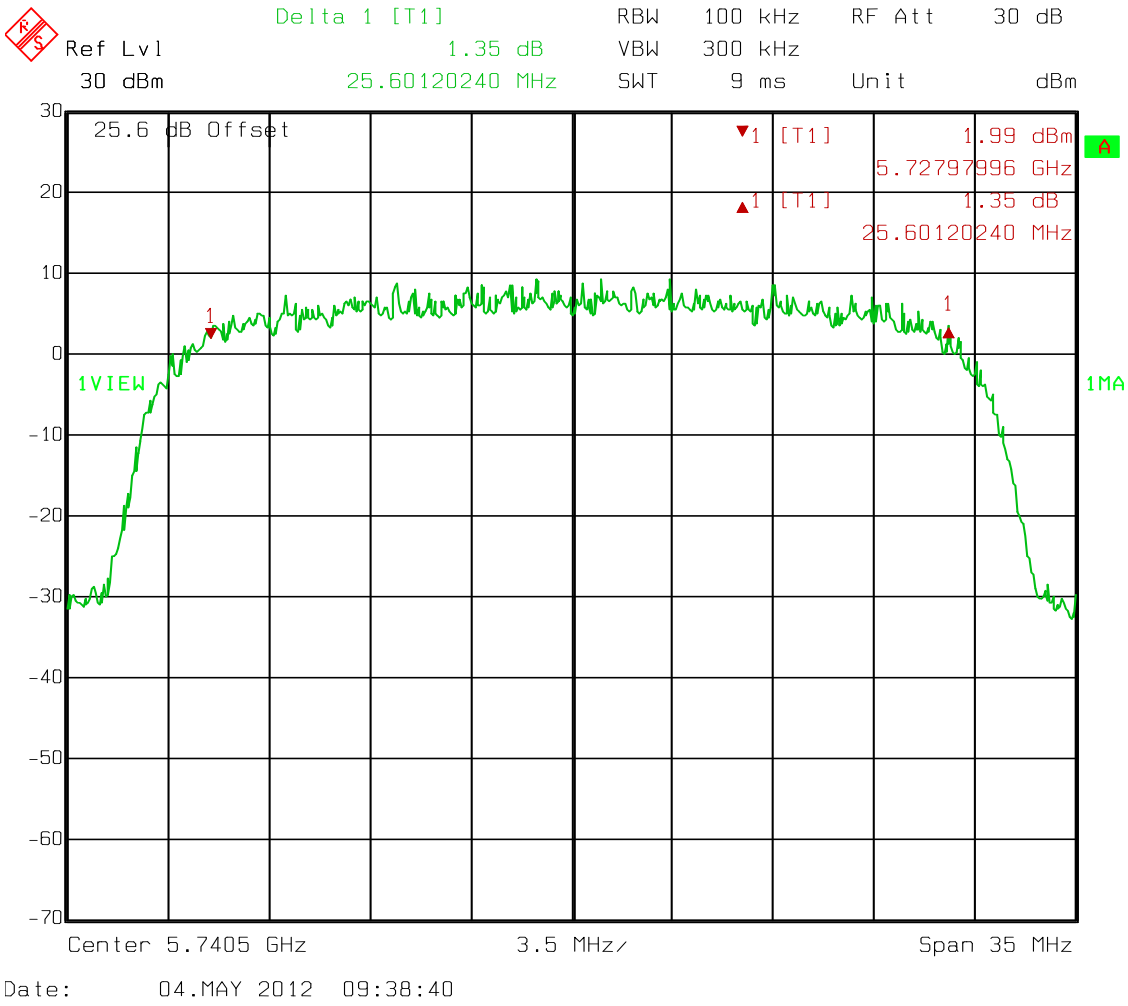
Test Data – Occupied Bandwidth

High Channel
256QAM
10 MHz Channel
6 dB Bandwidth



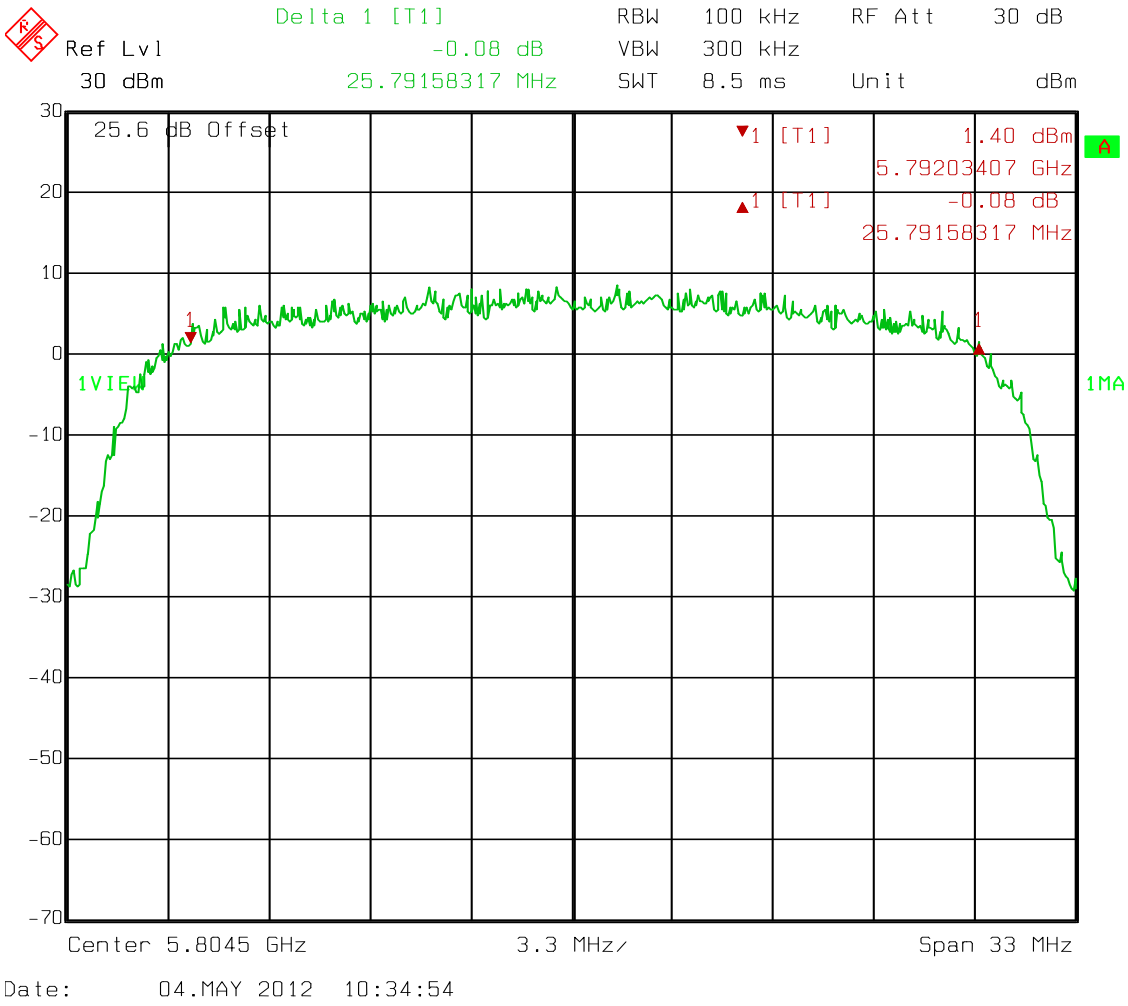
Test Data – Occupied Bandwidth

Low Channel
256QAM
30 MHz Channel
6 dB Bandwidth



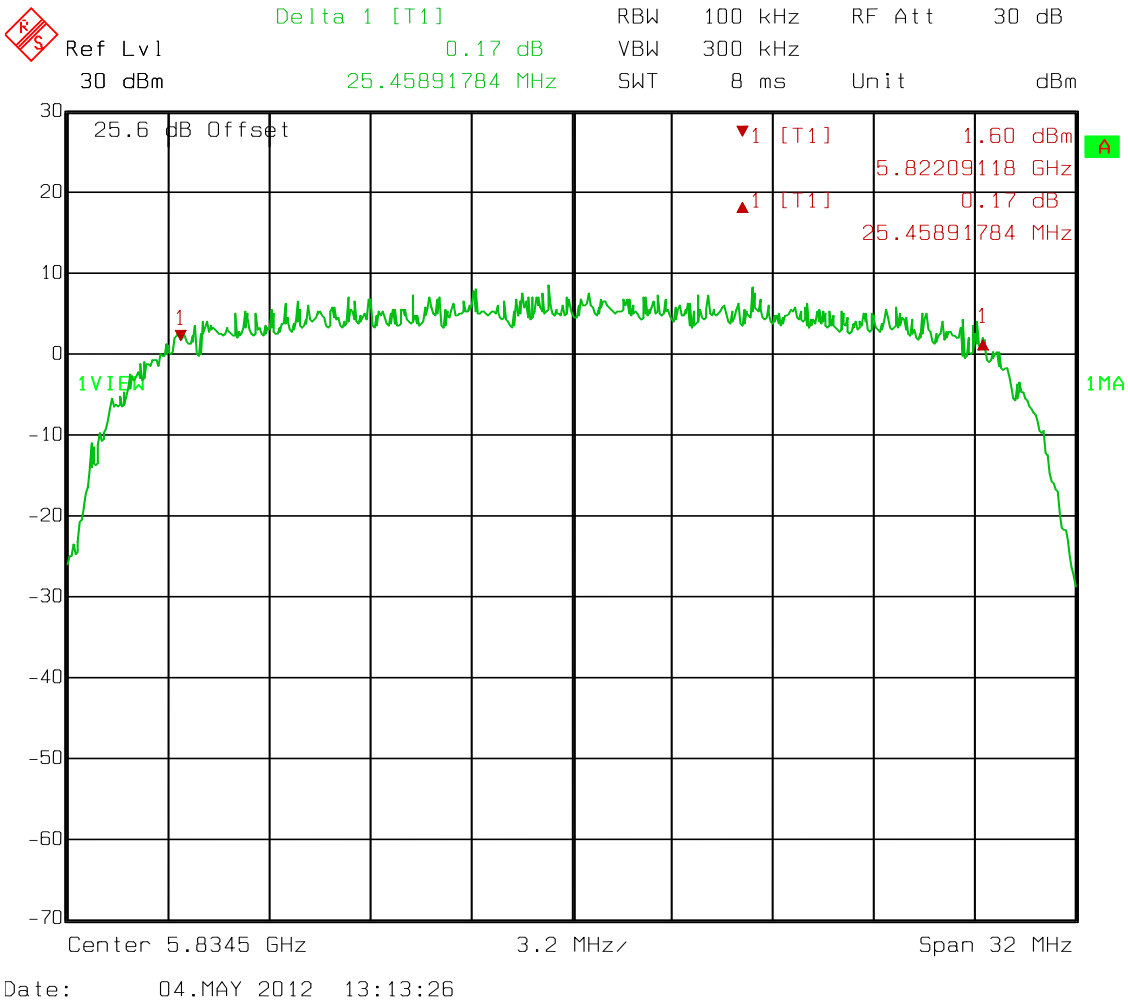
Test Data – Occupied Bandwidth

Mid Channel
256QAM
30 MHz Channel
6 dB Bandwidth



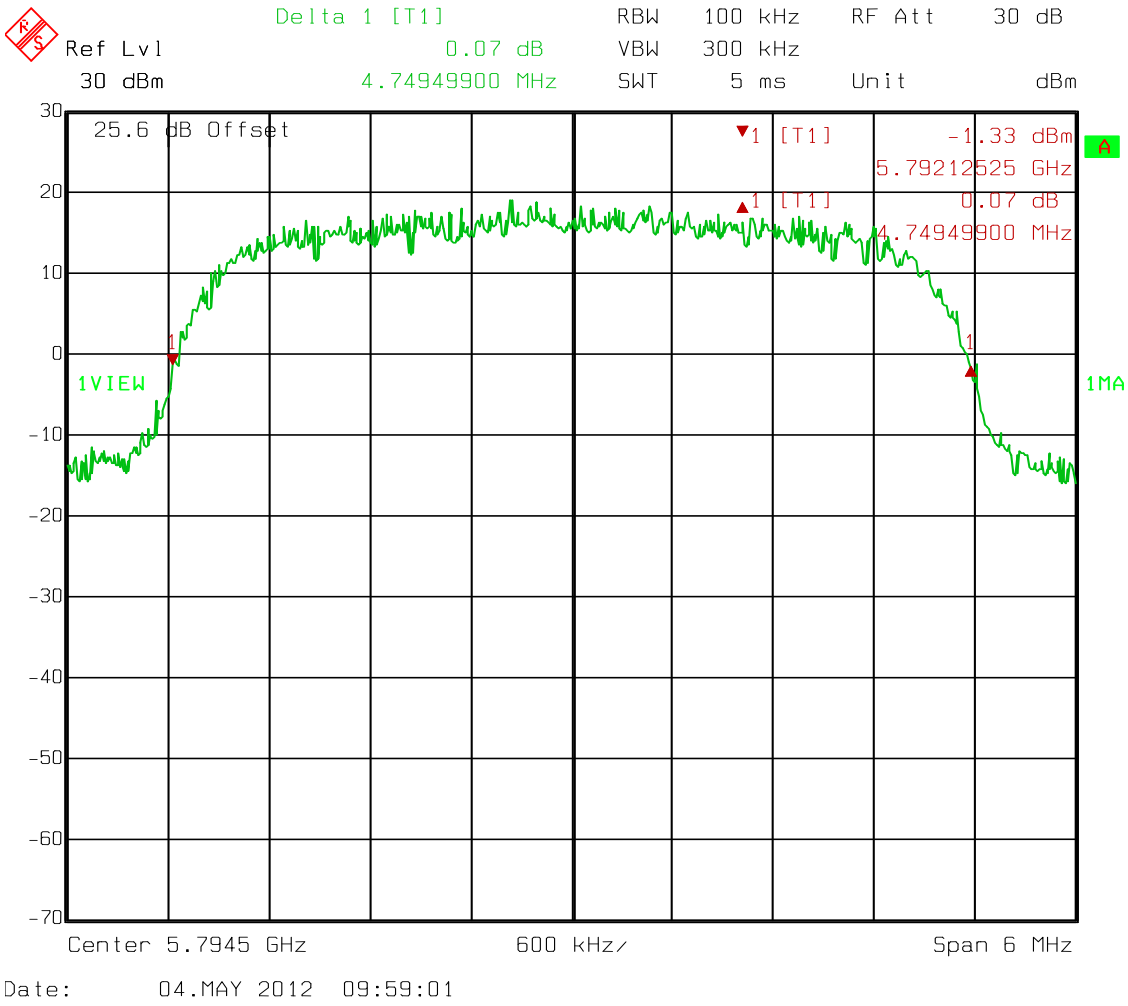
Test Data – Occupied Bandwidth

High Channel
256QAM
30 MHz Channel
6 dB Bandwidth



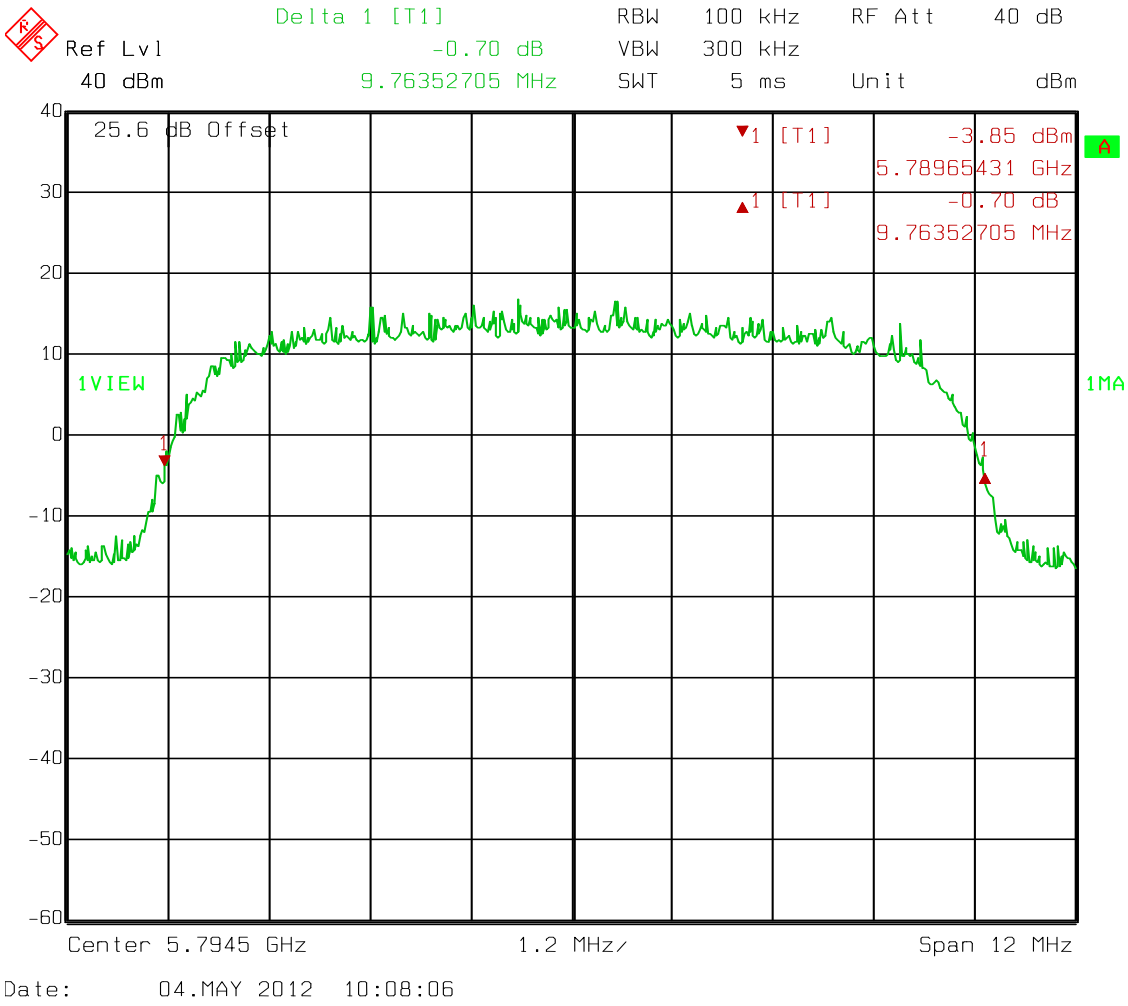
Test Data – Occupied Bandwidth

Mid Channel
5 MHz Channel
4QAM
20 dB Bandwidth



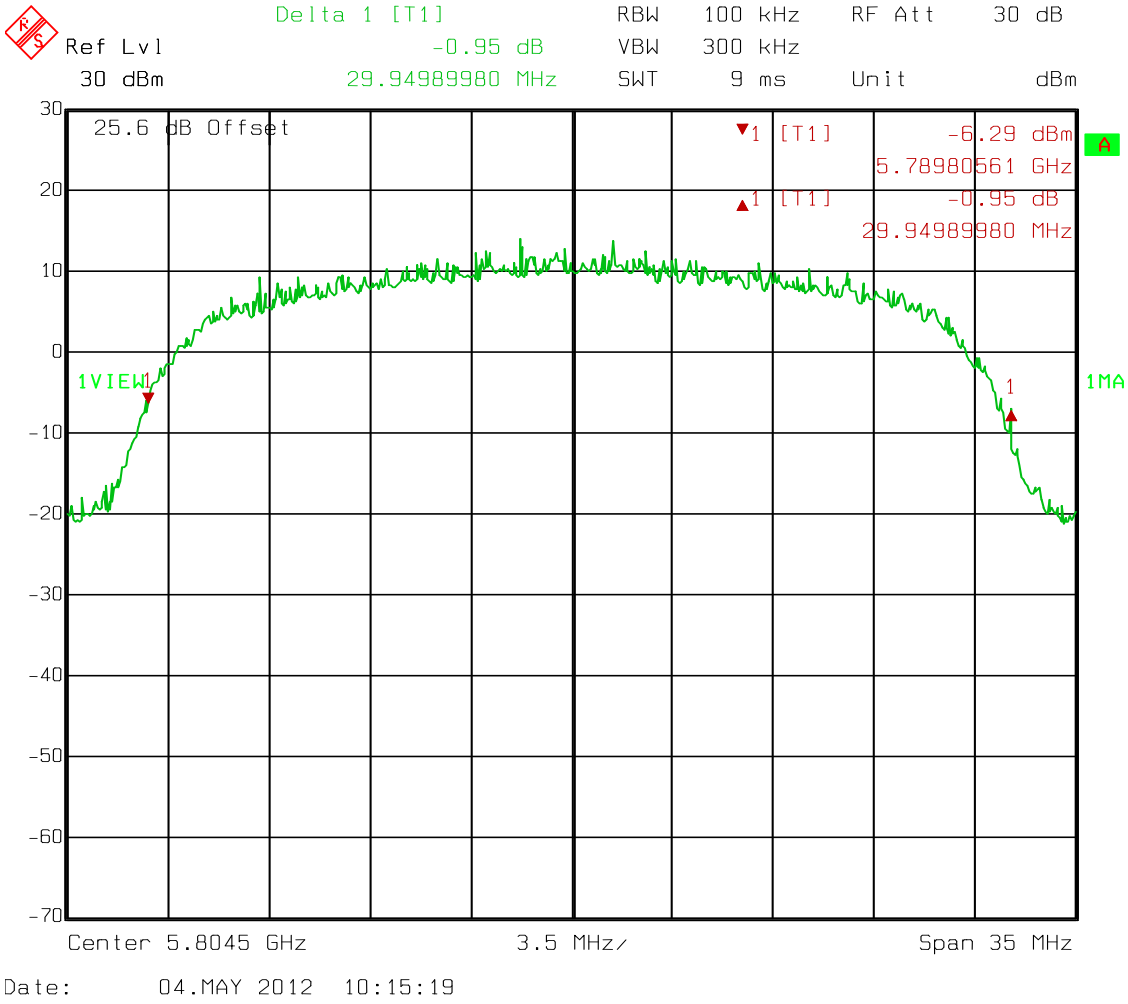
Test Data – Occupied Bandwidth

Mid Channel
10 MHz Channel
4QAM
20 dB Bandwidth



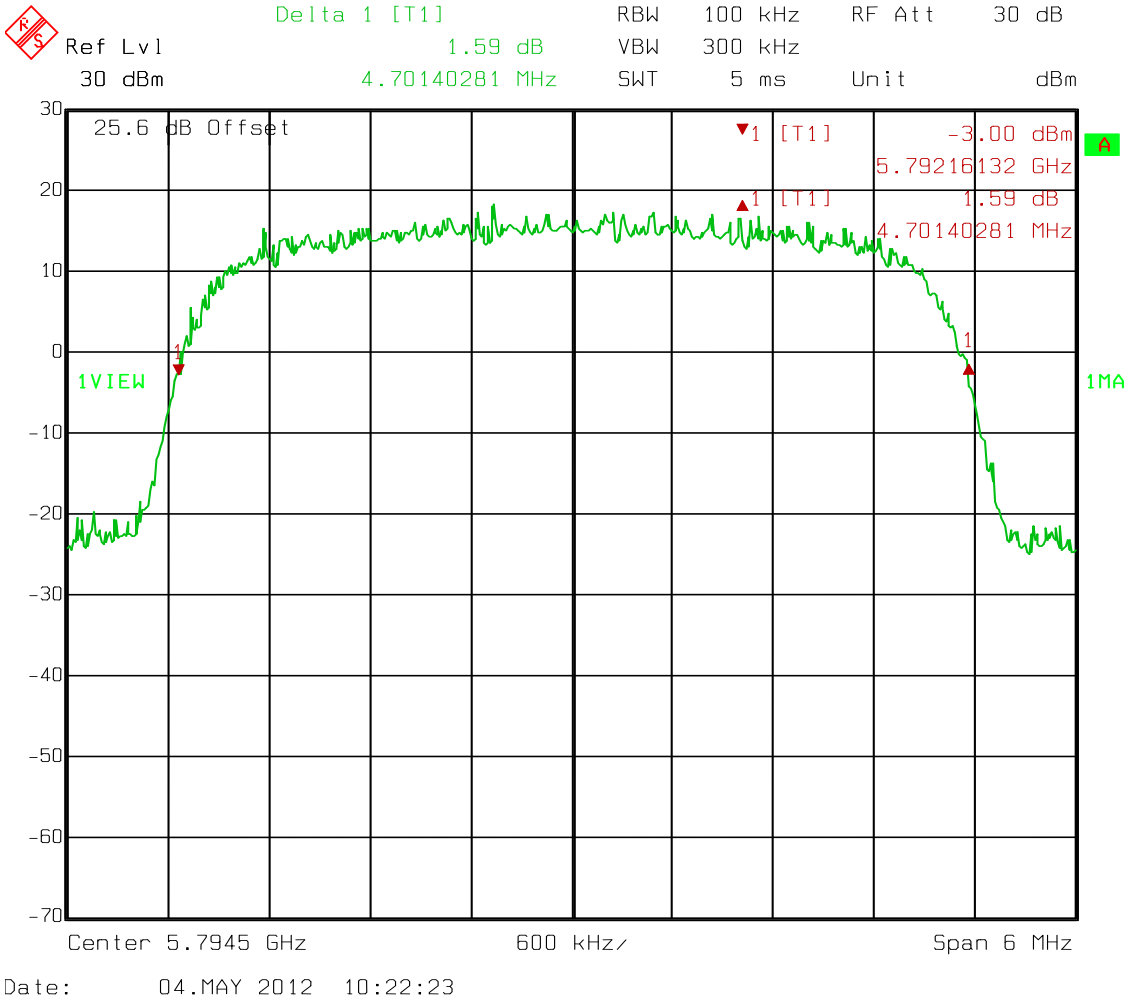
Test Data – Occupied Bandwidth

Mid Channel
4QAM
30 MHz Channel
20 dB Bandwidth



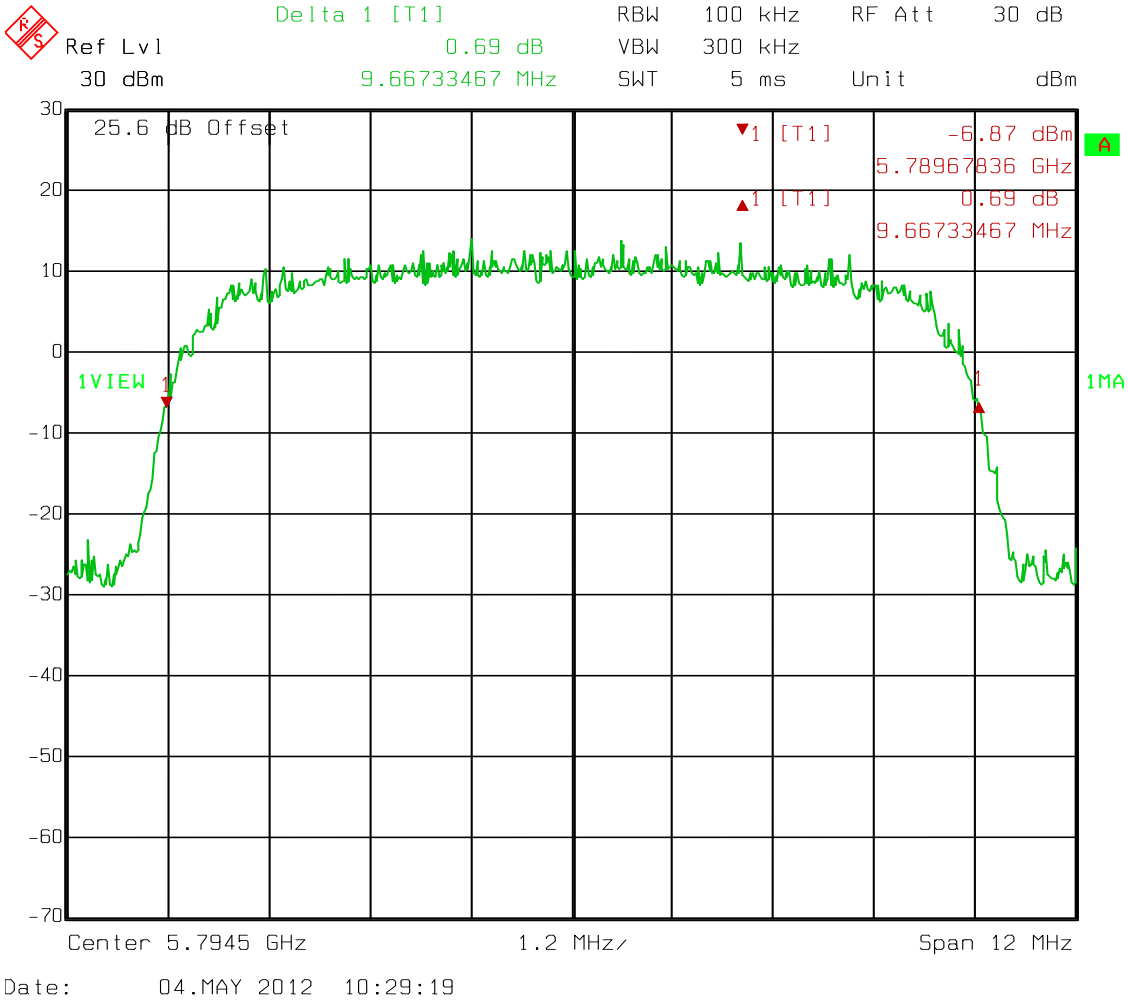
Test Data – Occupied Bandwidth

Mid Channel
128 QAM
5 MHz Channel
20 dB Bandwidth



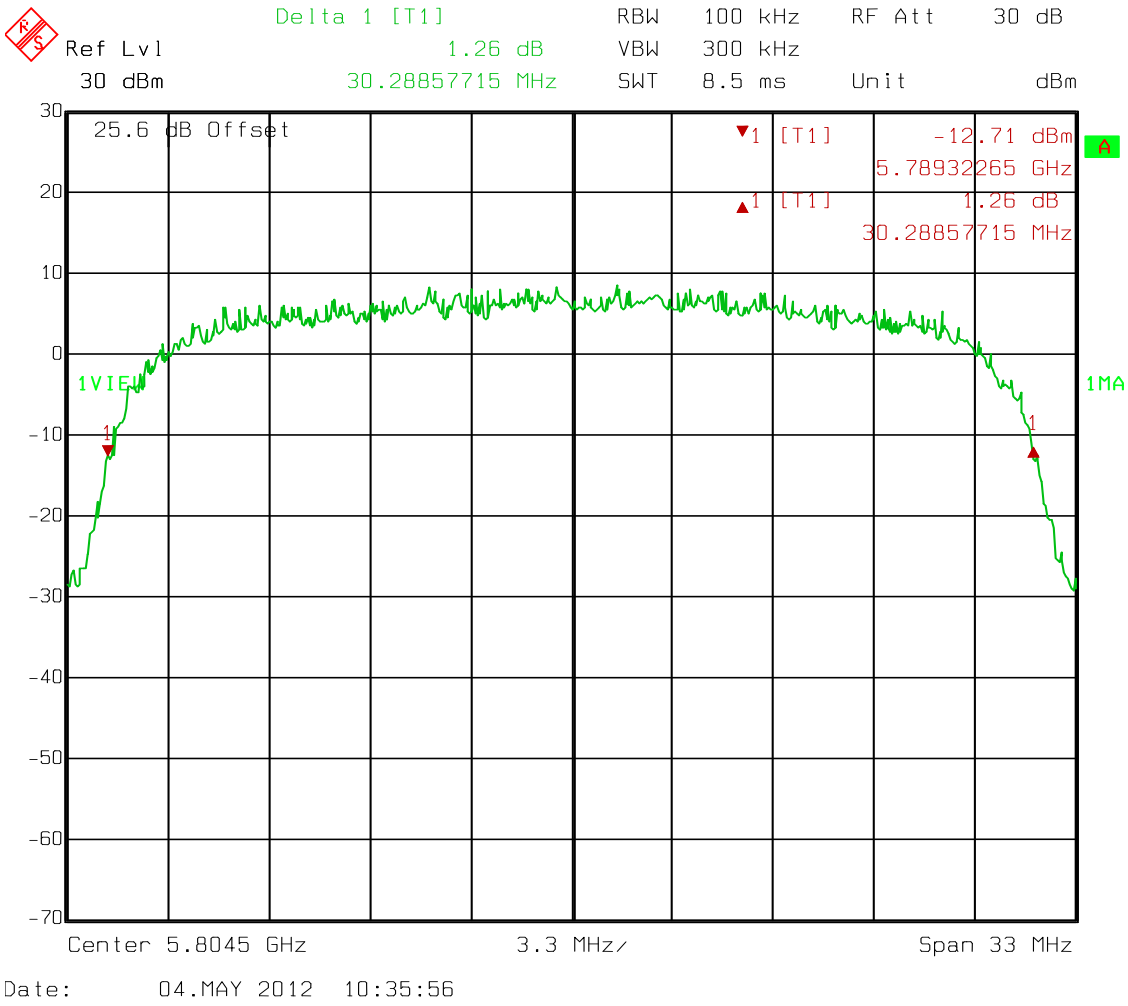
Test Data – Occupied Bandwidth

Mid Channel
256 QAM
10 MHz Channel
20 dB Bandwidth



Test Data – Occupied Bandwidth

Mid Channel
256QAM
30 MHz Channel
20 dB Bandwidth



Section 4. Maximum Peak Output Power

NAME OF TEST: Maximum Peak Output power	PARA. NO.: 15.247(b)(3) RSS-210 A8.4(4)
TESTED BY: David Light	DATE: 04 May 2012

Test Results: Complies.

Measurement Data: Refer to attached data

Test Conditions: 54 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1036-1082-1472

☒ This device was tested at +/- 15% input power per 15.31(e), with no variation in output power.

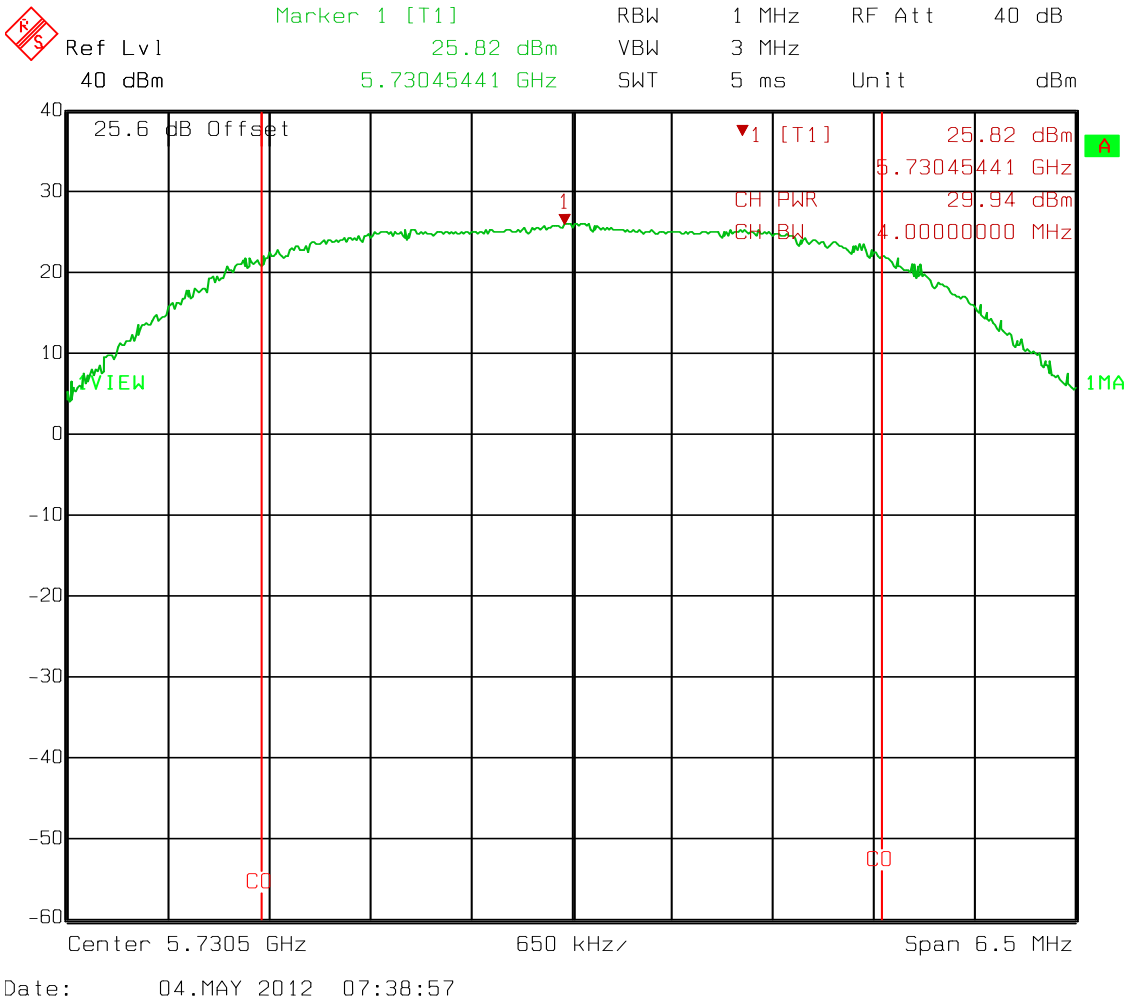
☐ For battery powered equipment, the device was tested with a fresh battery per 15.31(e).

☒ The device was tested on three channels per 15.31(l).

☐ This test was performed radiated.

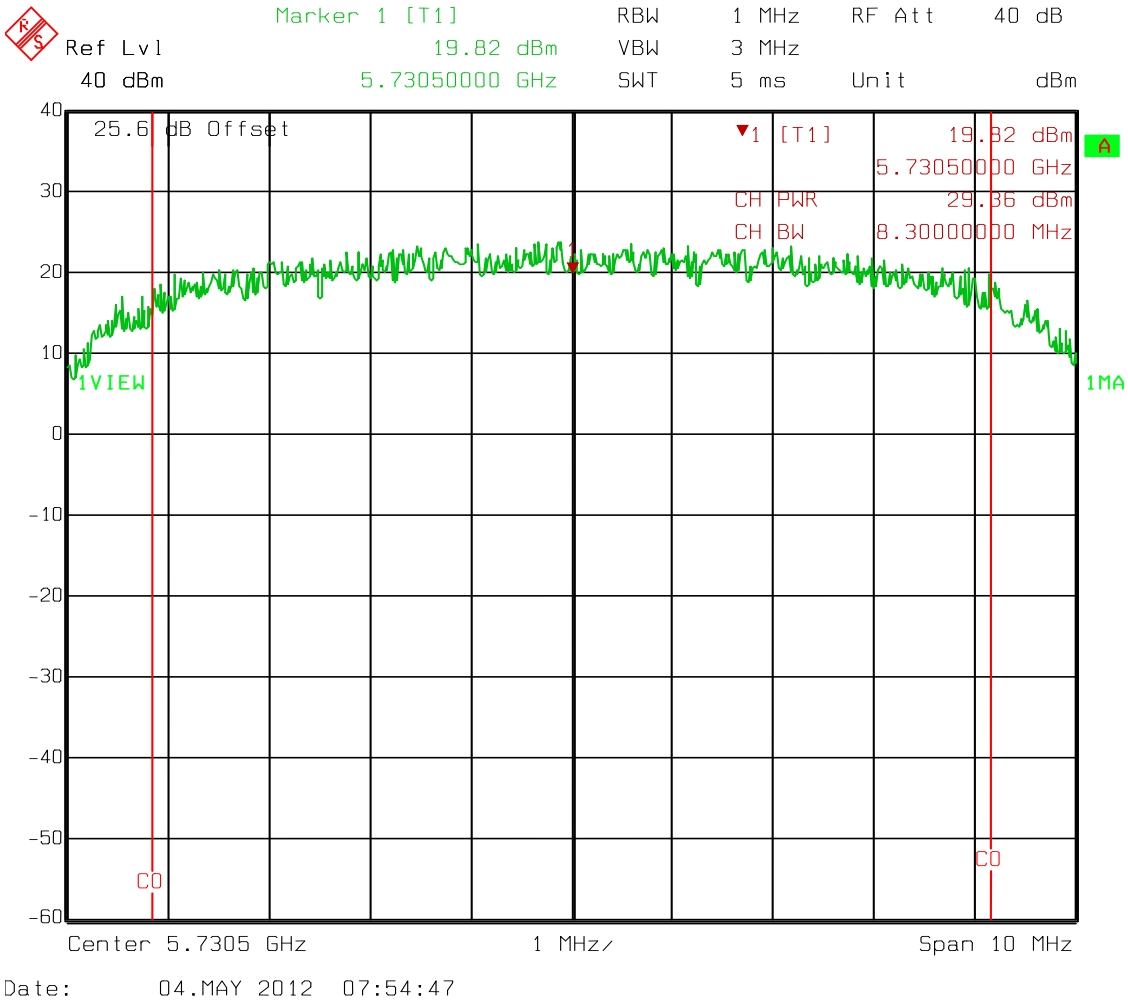
Test Data – Peak Power

Power
5 MHz Channel
4QAM



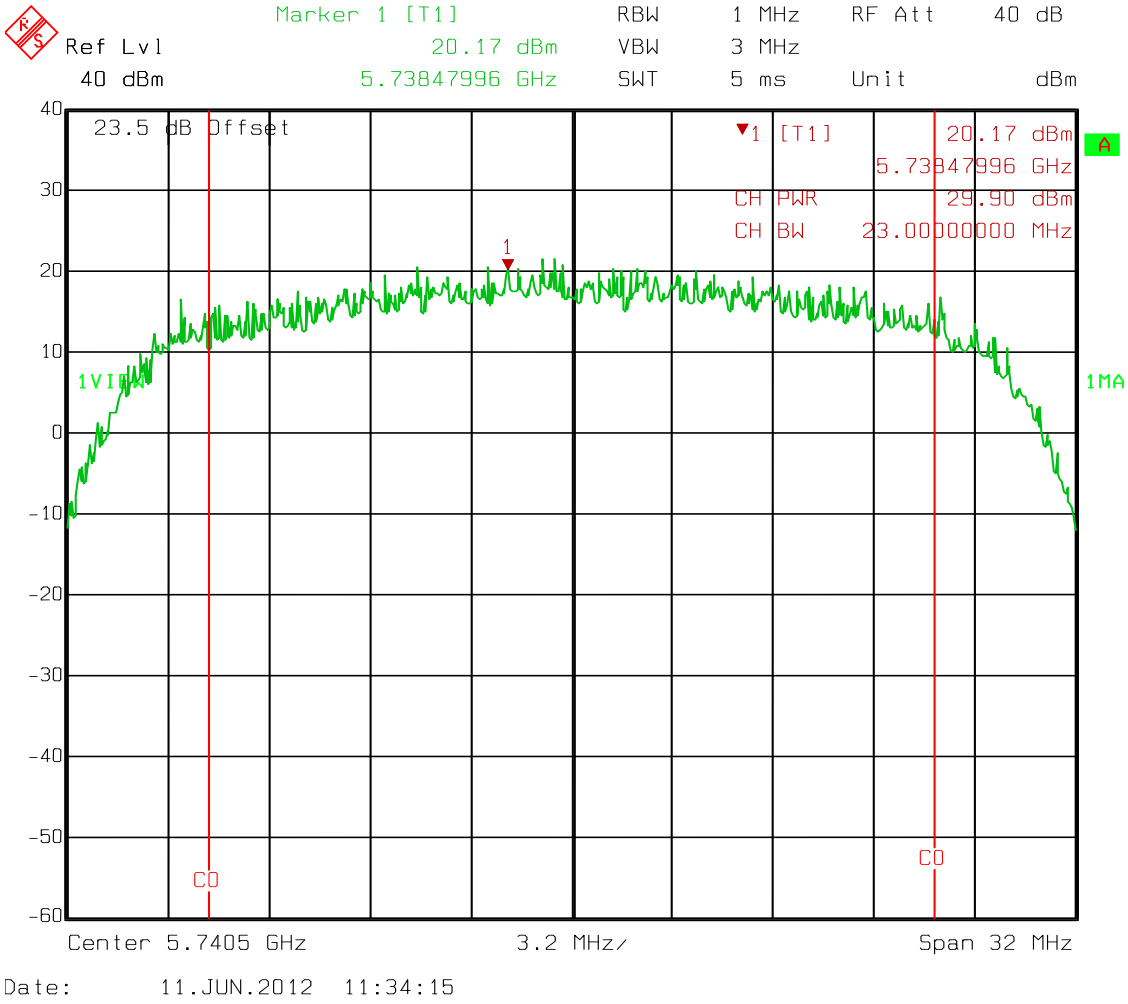
Test Data – Peak Power

Peak Power
10 MHz Channel
4QAM



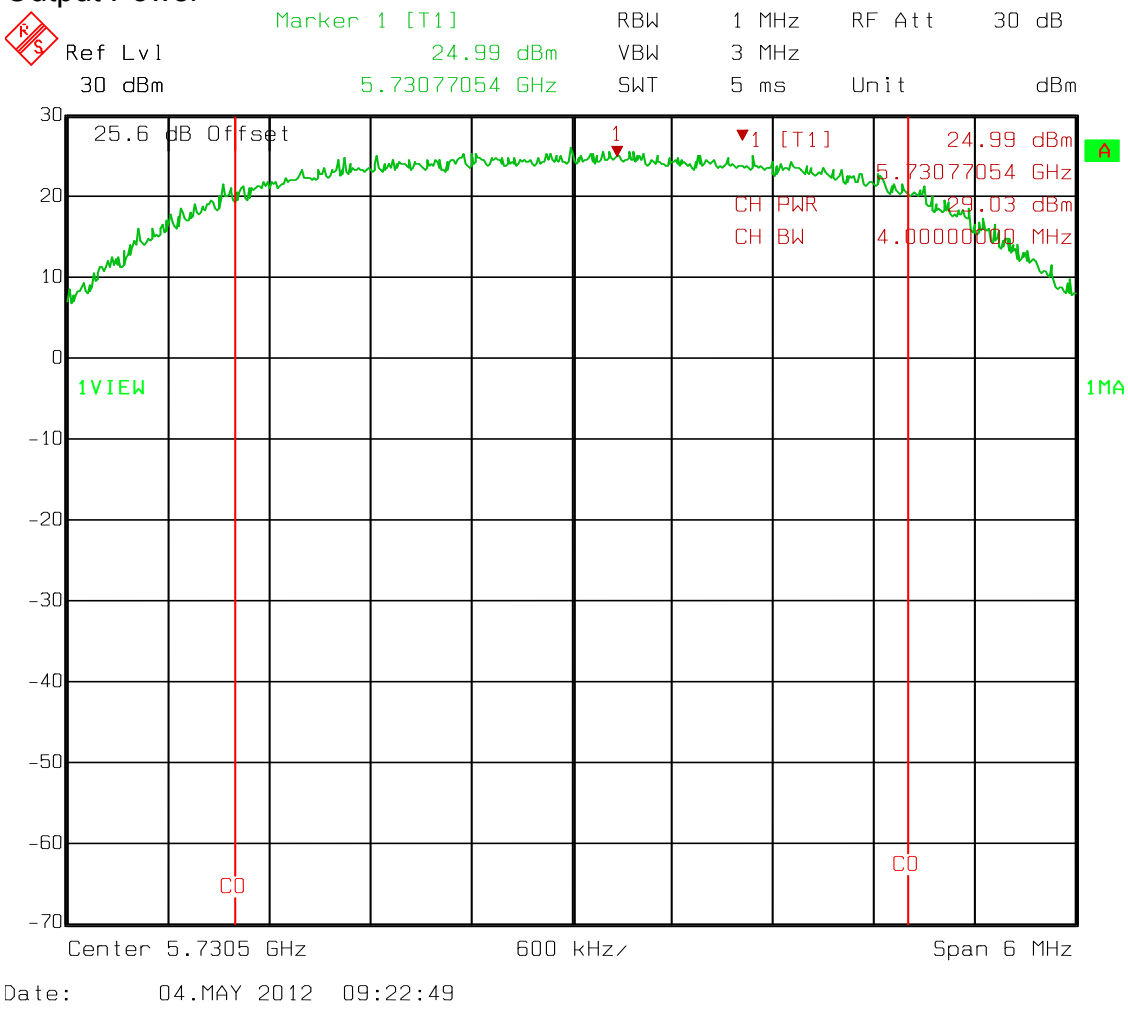
Test Data – Peak Power

Lowest Channel
Output Power
30 MHz Channel
4QAM



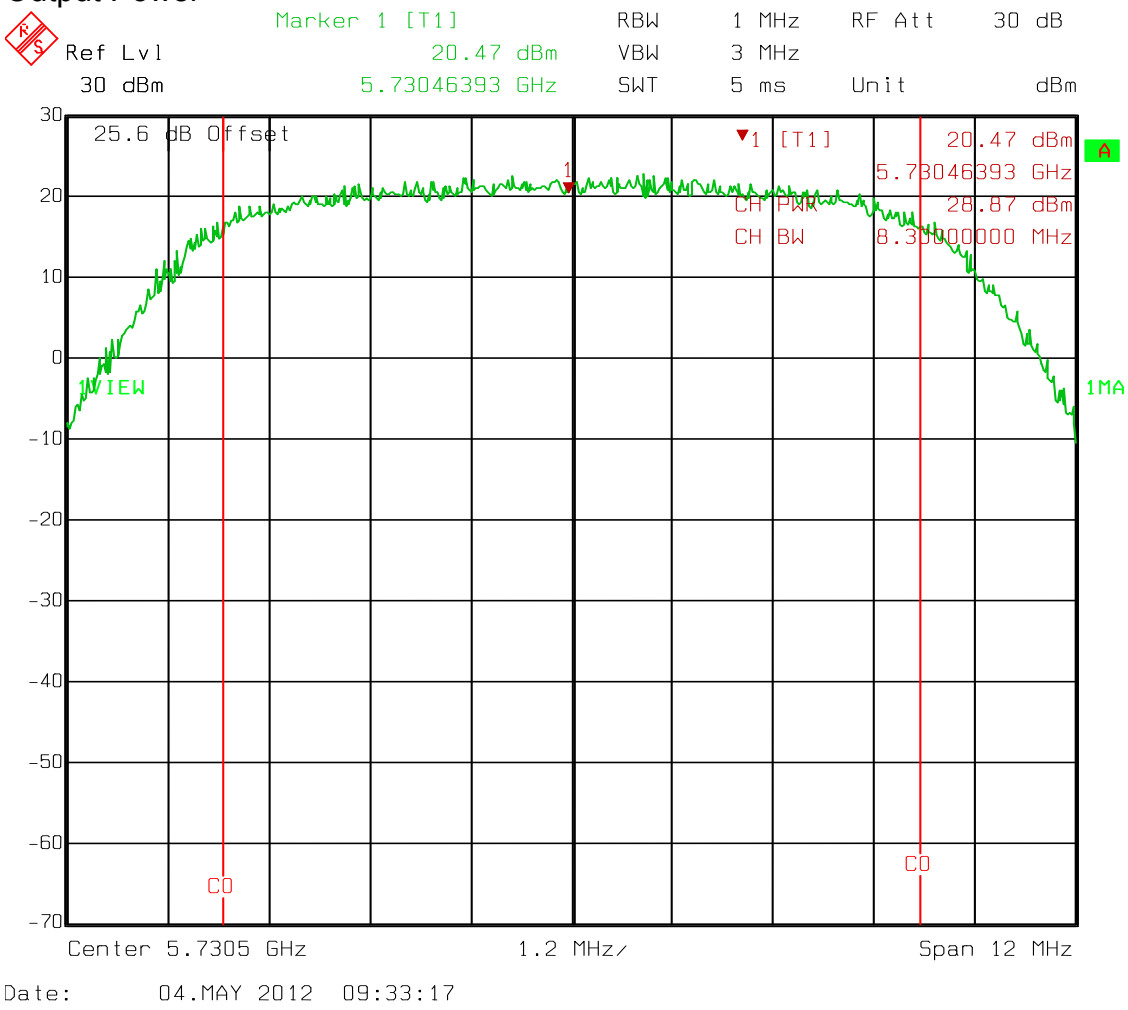
Test Data – Peak Power

Low Channel
128 QAM
5 MHz Channel
Output Power



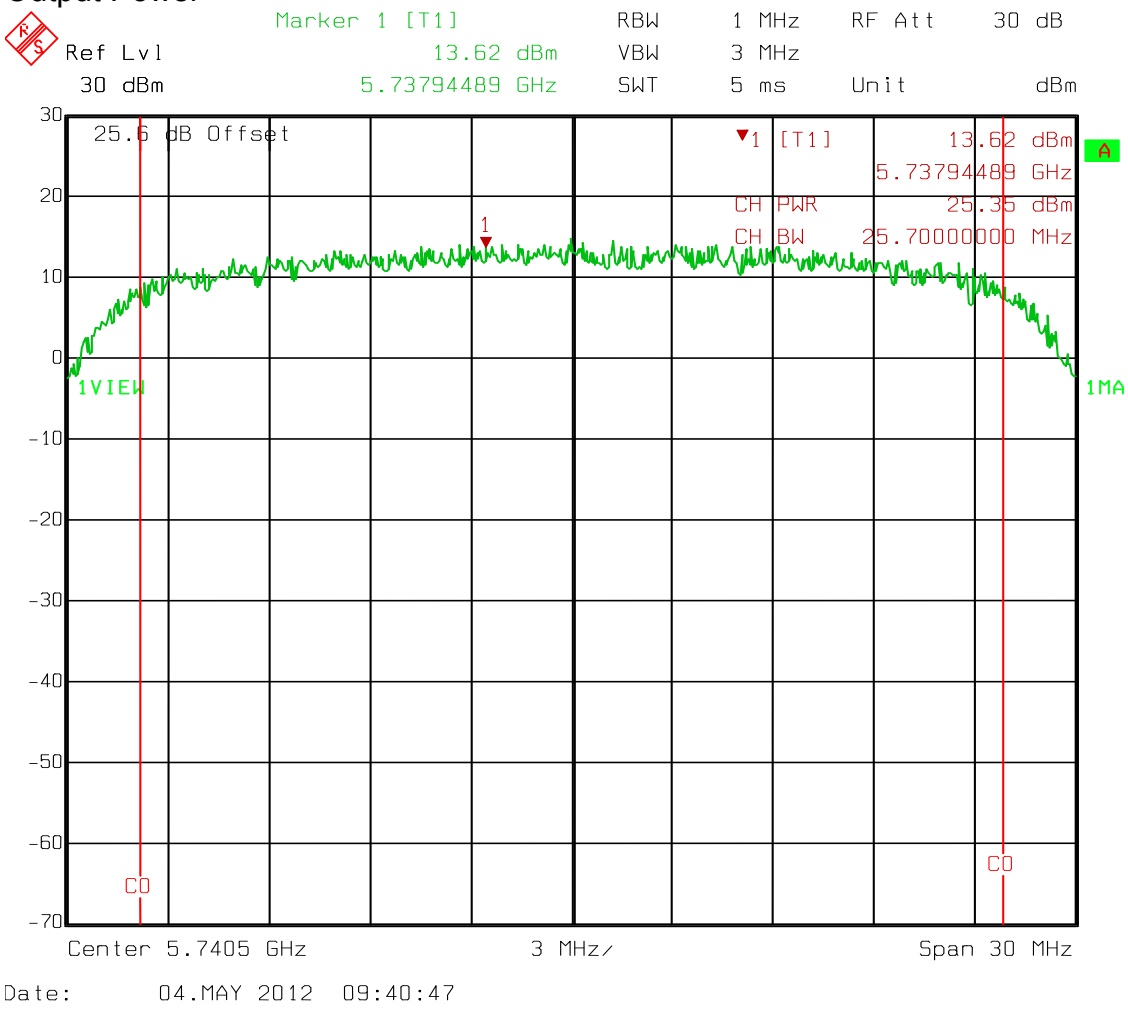
Test Data – Peak Power

Low Channel
256QAM
10 MHz Channel
Output Power



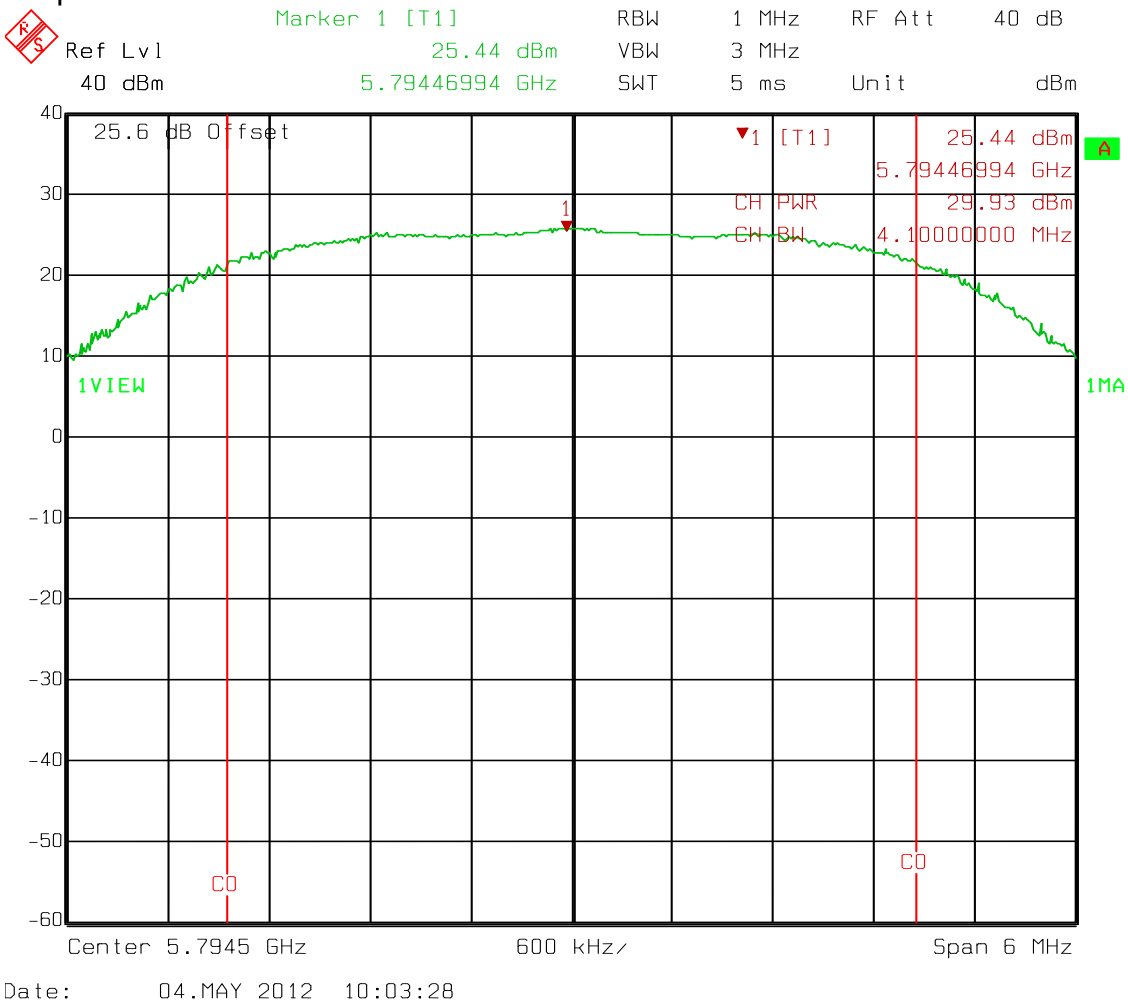
Test Data – Peak Power

Low Channel
256QAM
30 MHz Channel
Output Power



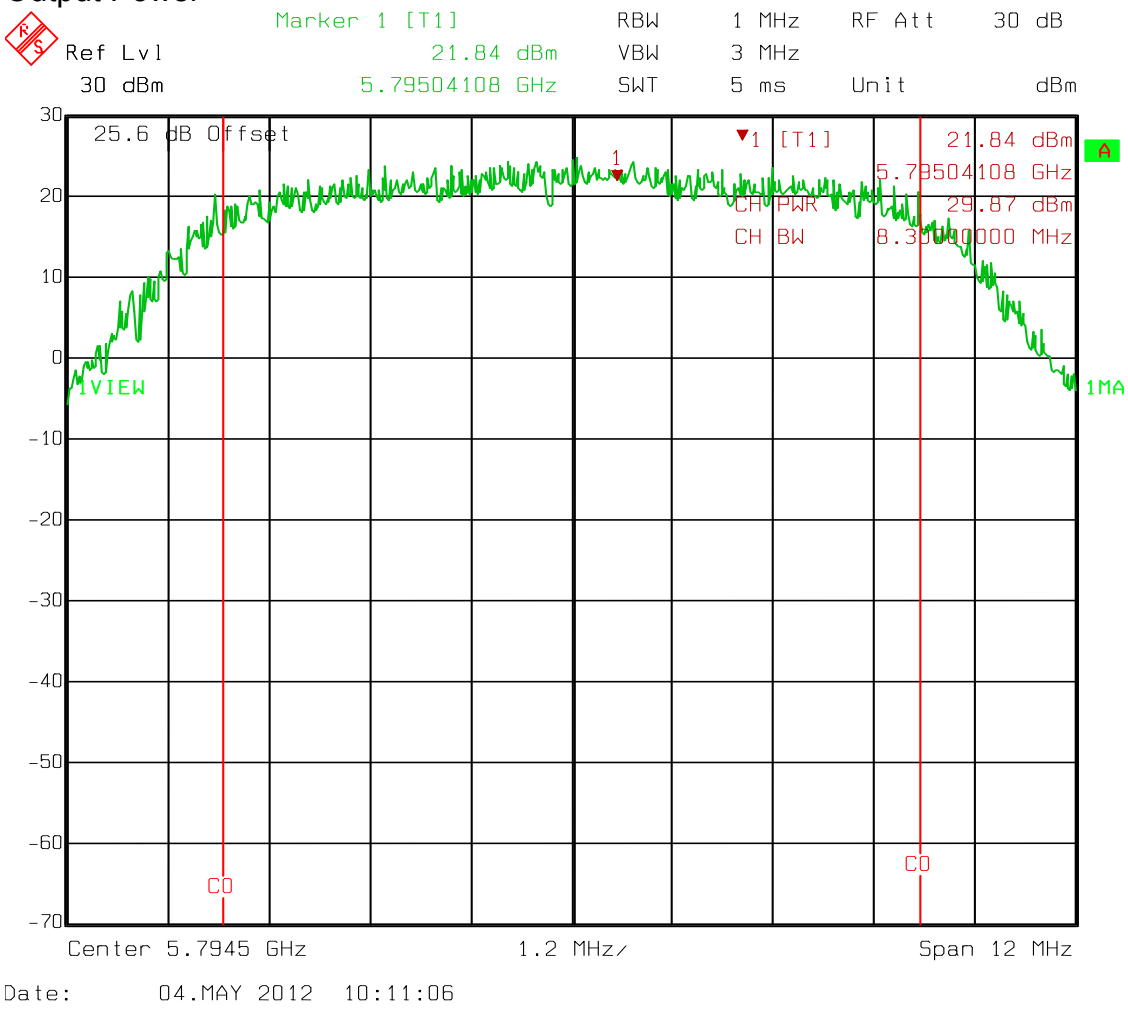
Test Data – Peak Power

Mid Channel
4QAM
5 MHz Channel
Output Power



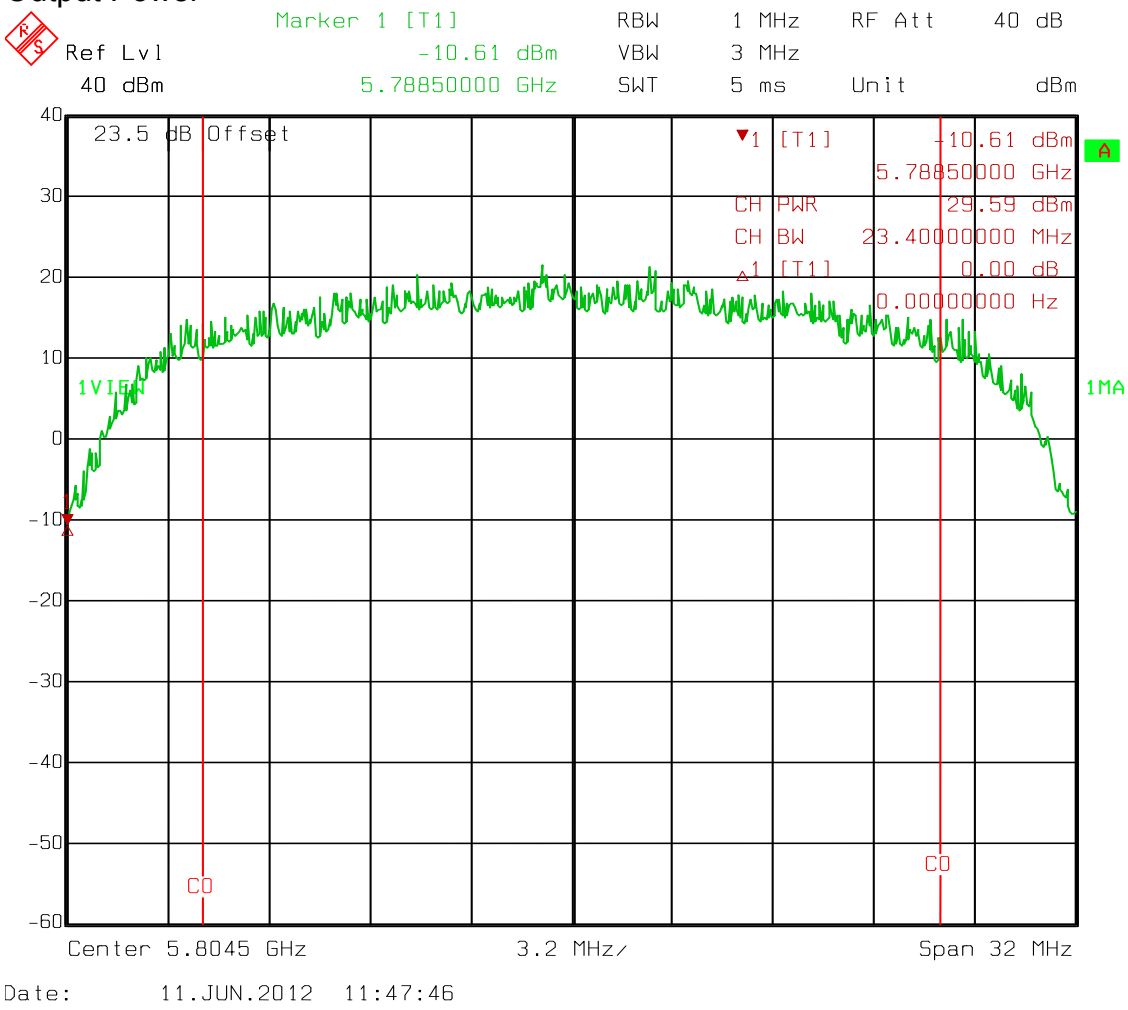
Test Data – Peak Power

Mid Channel
10 MHz Channel
4QAM
Output Power



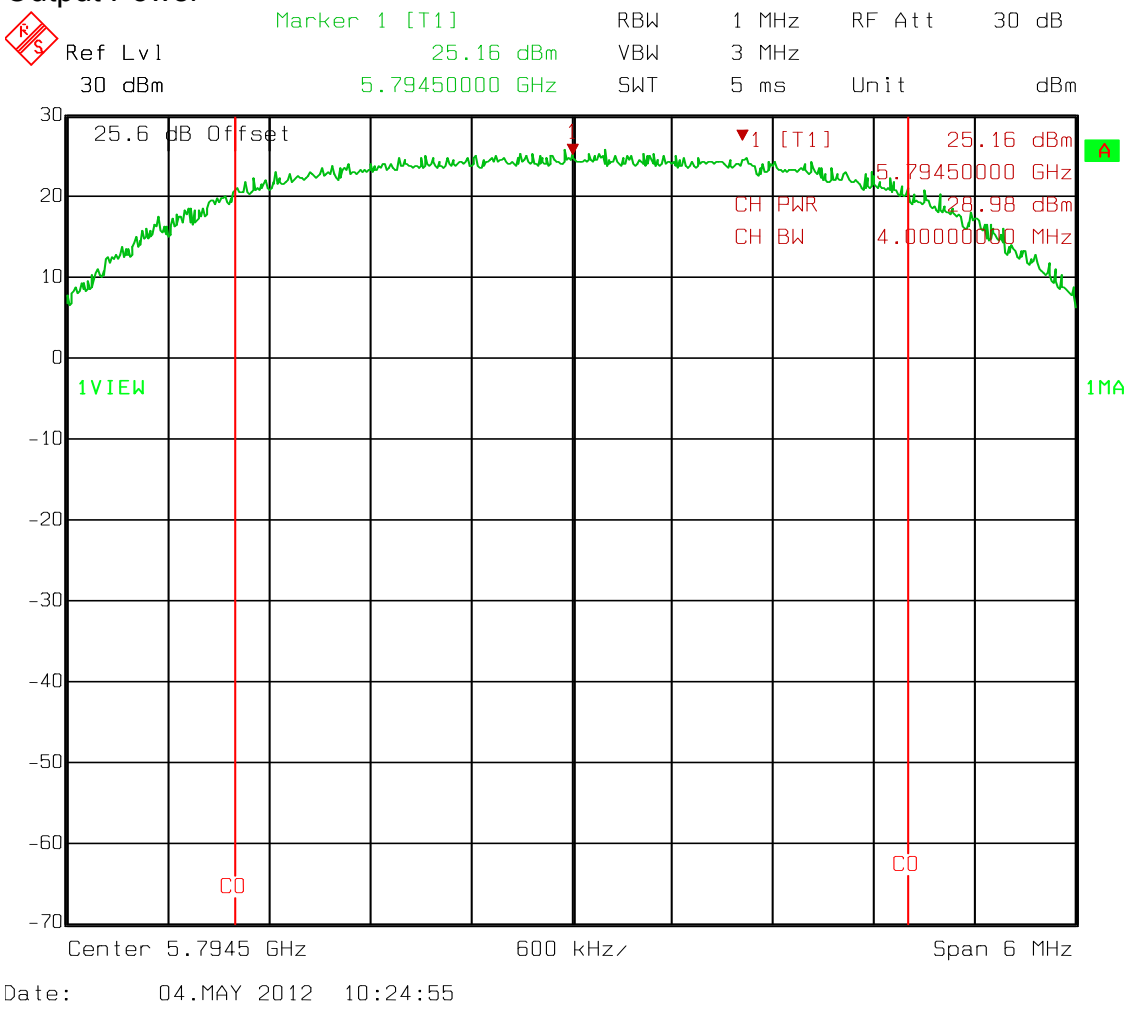
Test Data – Peak Power

Mid Channel
4QAM
30 MHz Channel
Output Power



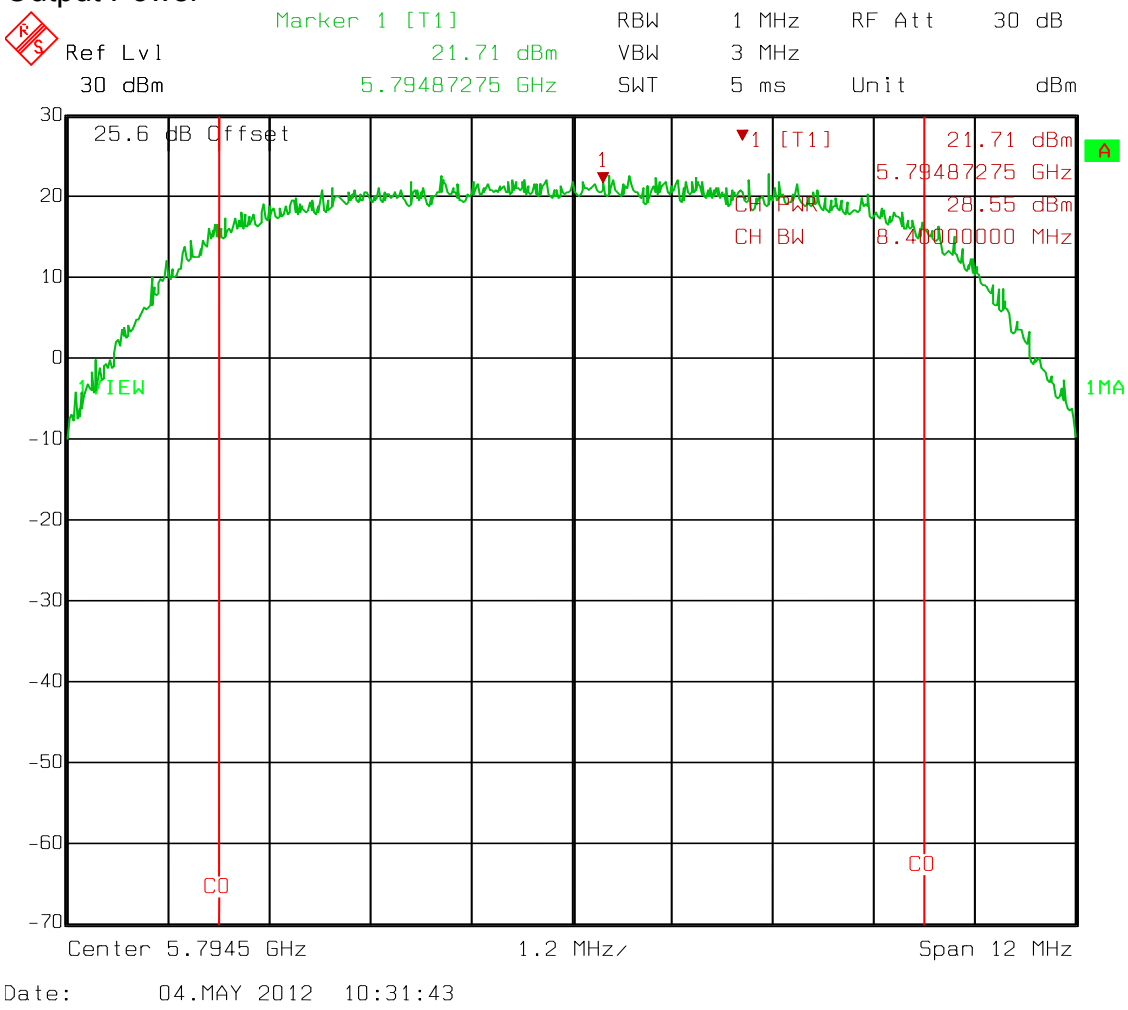
Test Data – Peak Power

Mid Channel
128 QAM
5 MHz Channel
Output Power



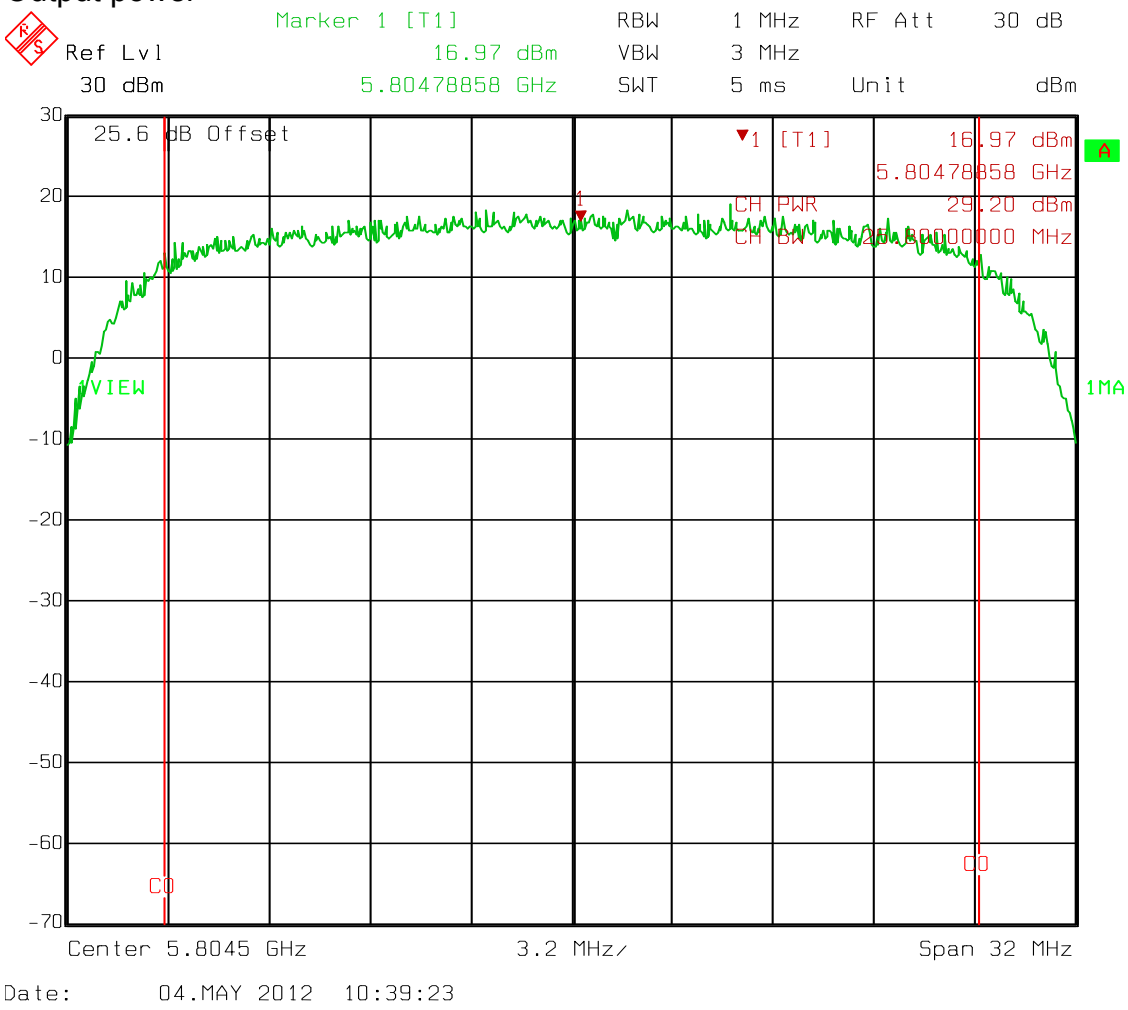
Test Data – Peak Power

Mid Channel
256 QAM
10 MHz Channel
Output Power



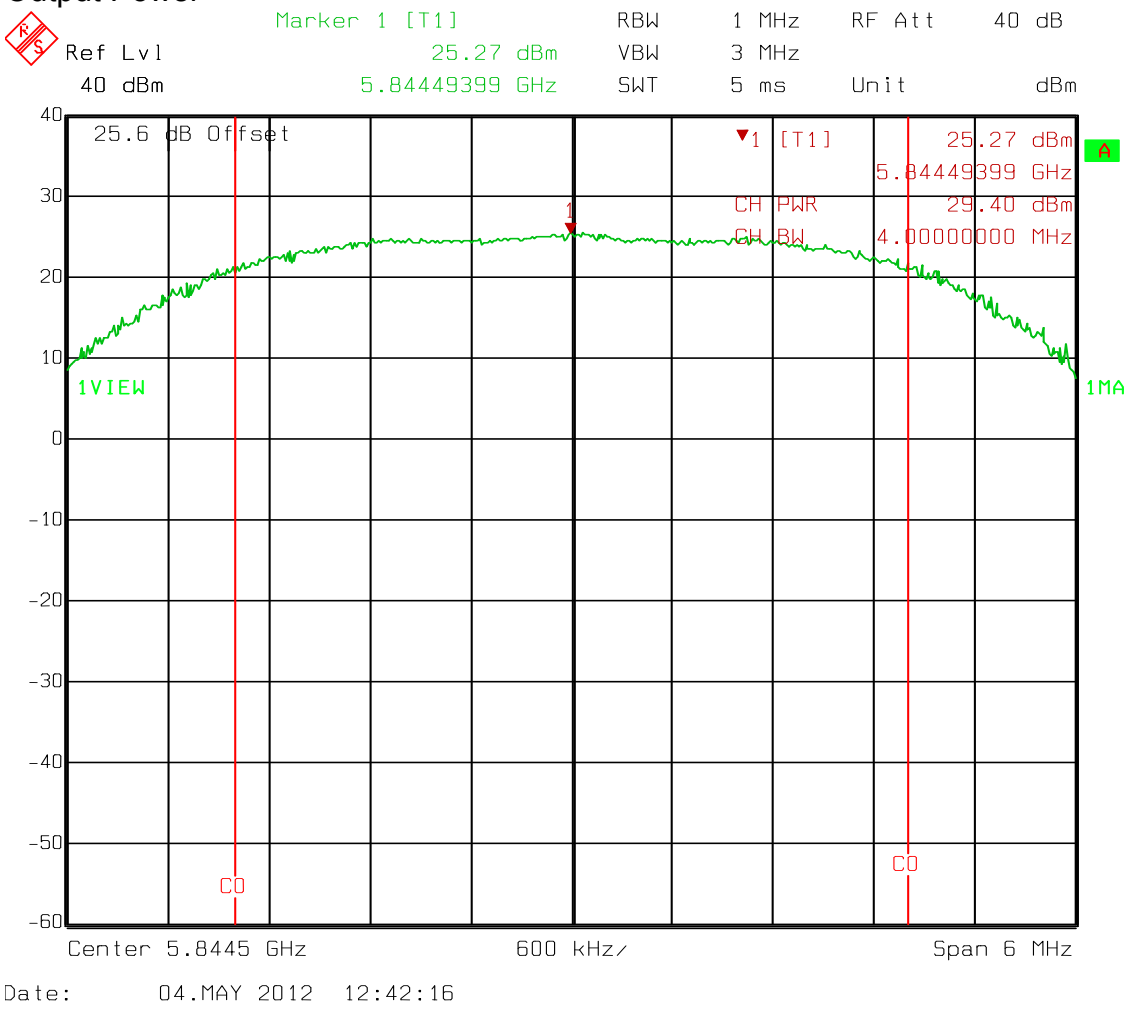
Test Data – Peak Power

Mid Channel
256QAM
30 MHz Channel
Output power



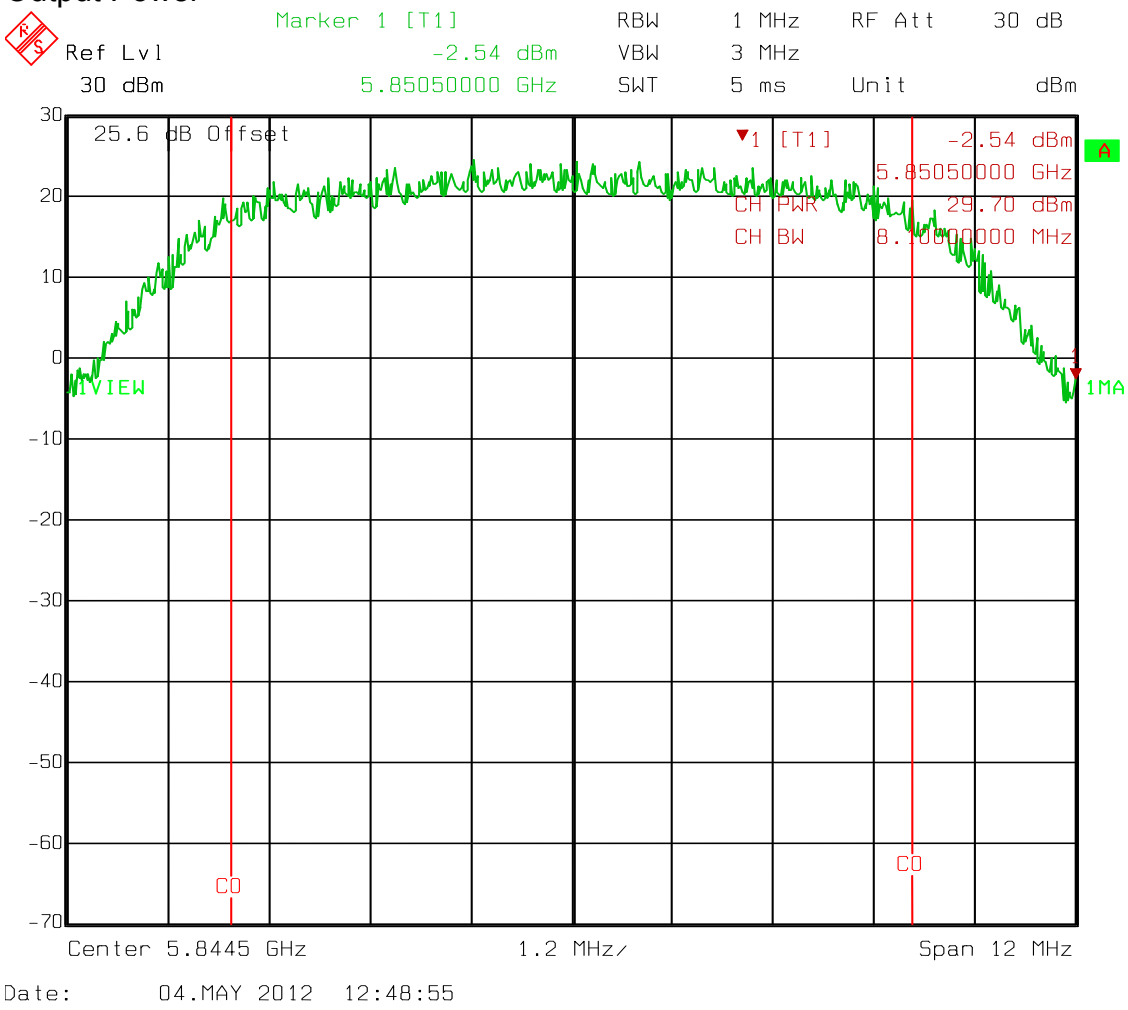
Test Data – Peak Power

High Channel
4QAM
5 MHz Channel
Output Power



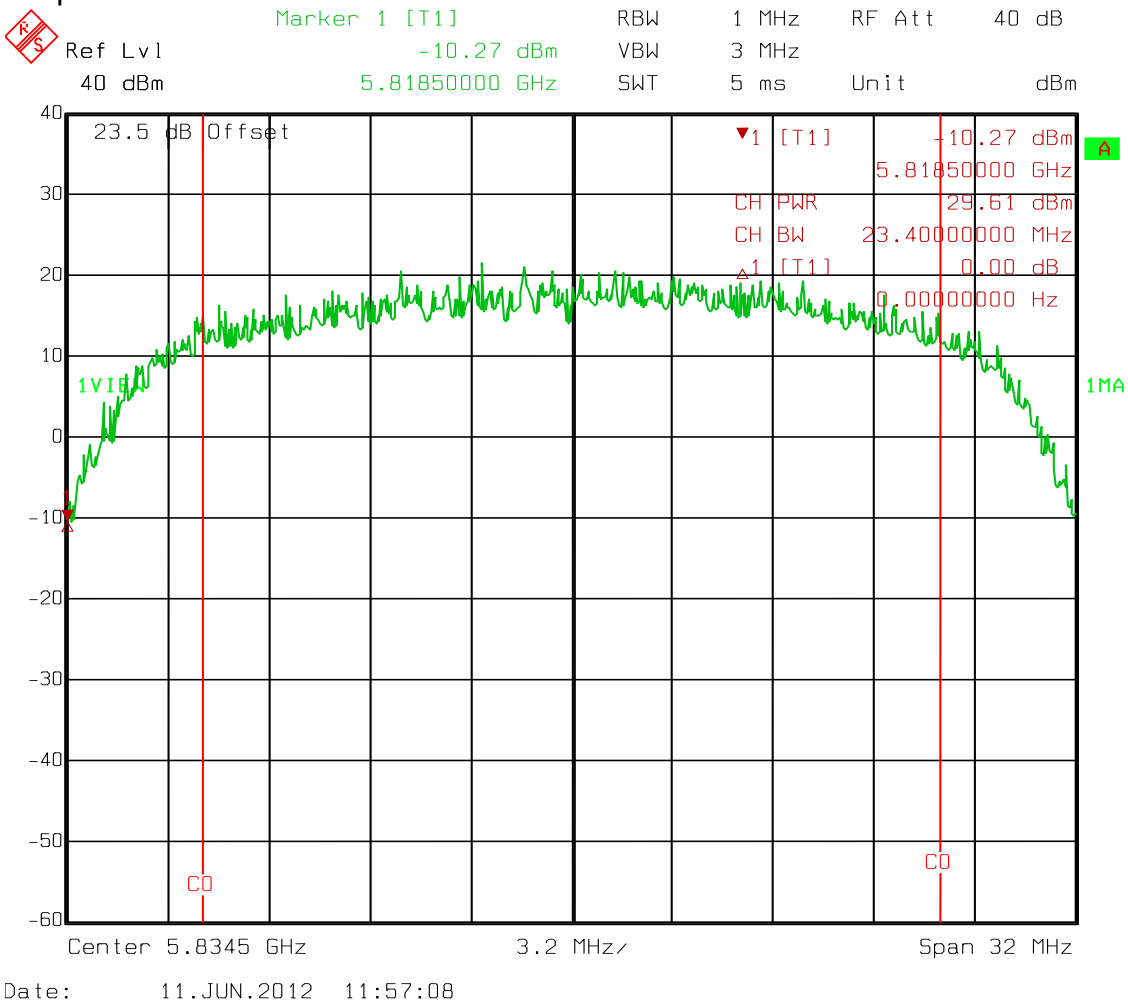
Test Data – Peak Power

High Channel
4QAM
10 MHz Channel
Output Power



Test Data – Peak Power

High Channel
4QAM
30 MHz Channel
Output Power



Section 5 Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions at Antenna Terminals	PARA. NO.: 15.247 (d) RSS-210 AA8.5
TESTED BY: David Light	DATE: 04 May 2012

Test Results: Complies.

Measurement Data: See attached plots.

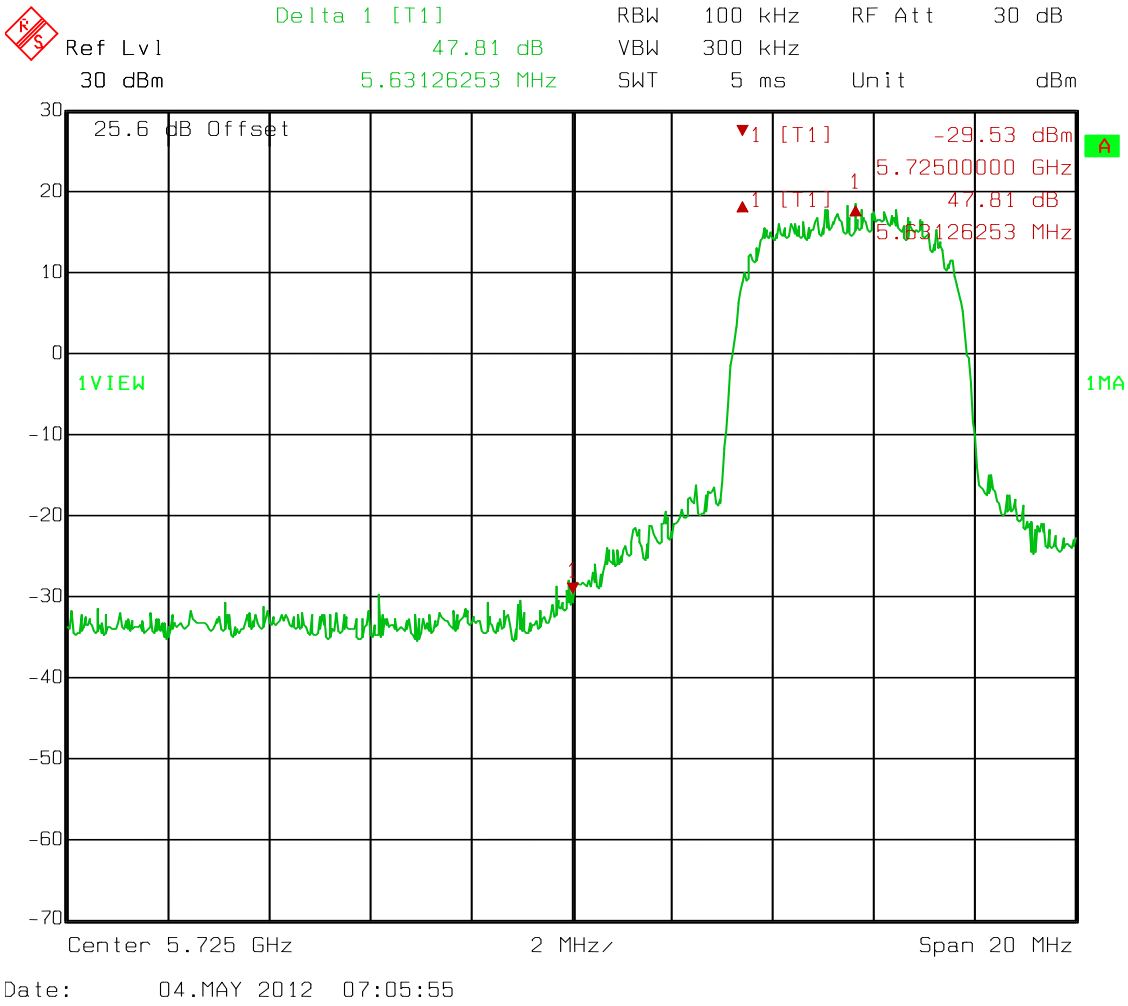
Test Conditions: 54 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1036-1082-1472

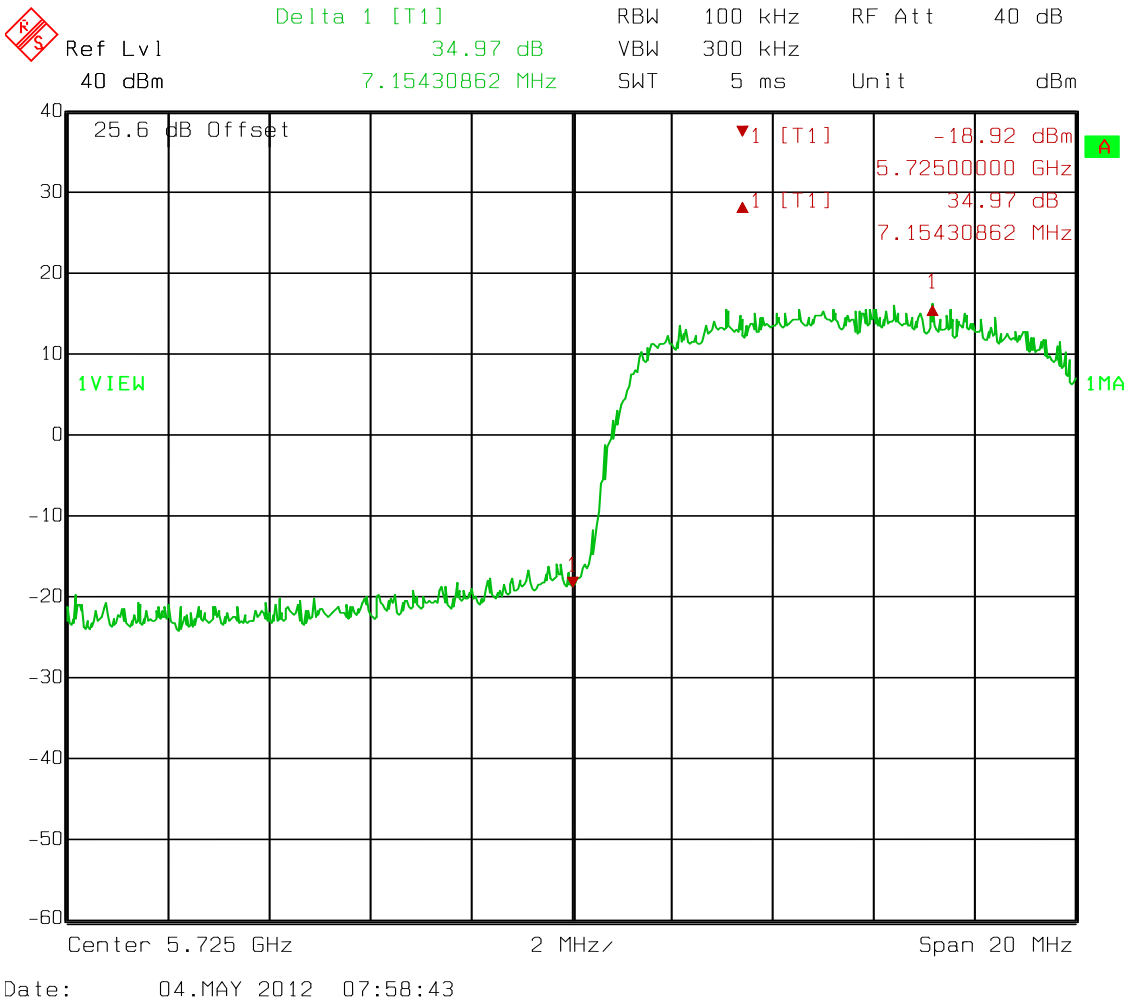
Test Data – Spurious Emissions at Antenna Terminals

Low Band Edge
5 MHz Channel
4 QAM



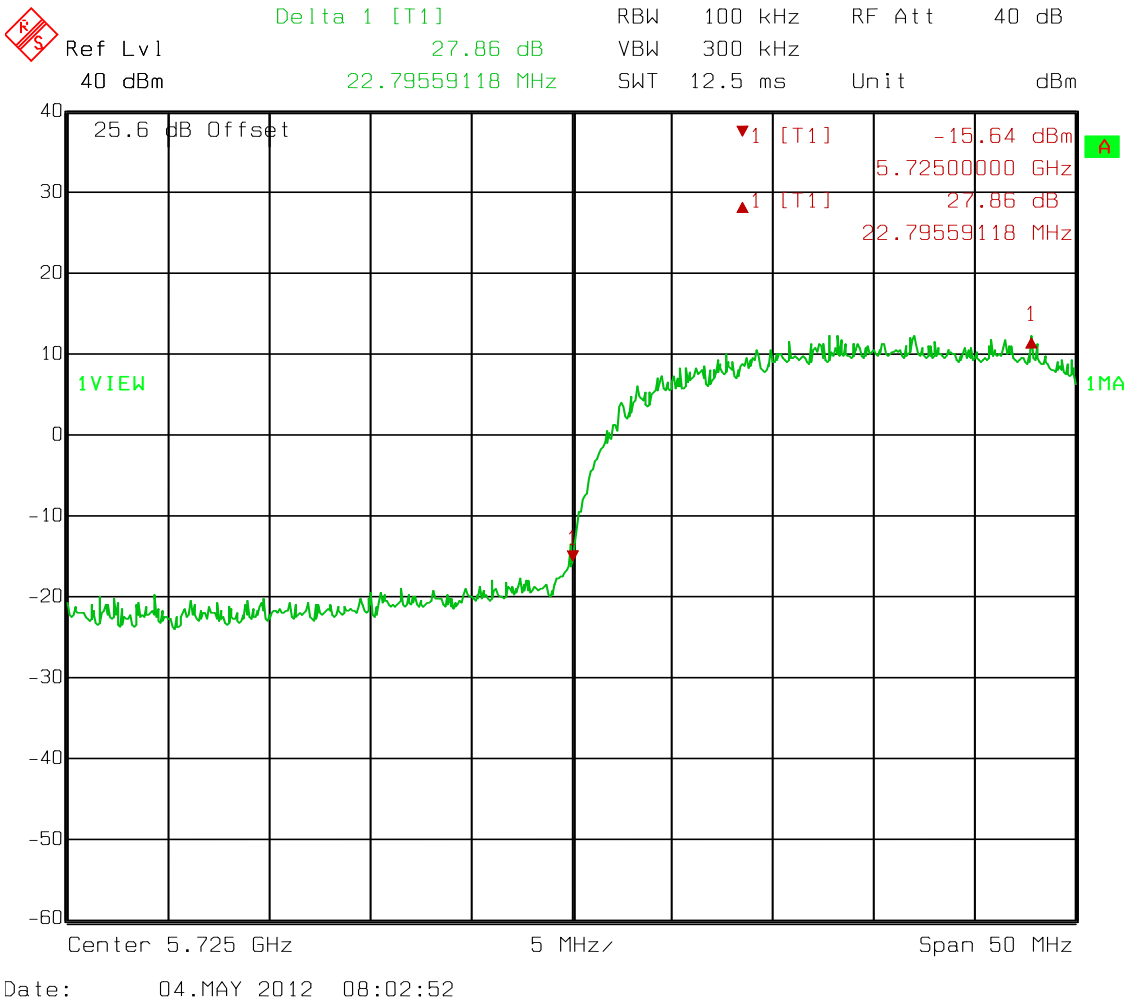
Test Data – Spurious Emissions at Antenna Terminals

Lowest Channel
Lower Band Edge
10 MHz Channel
4QAM



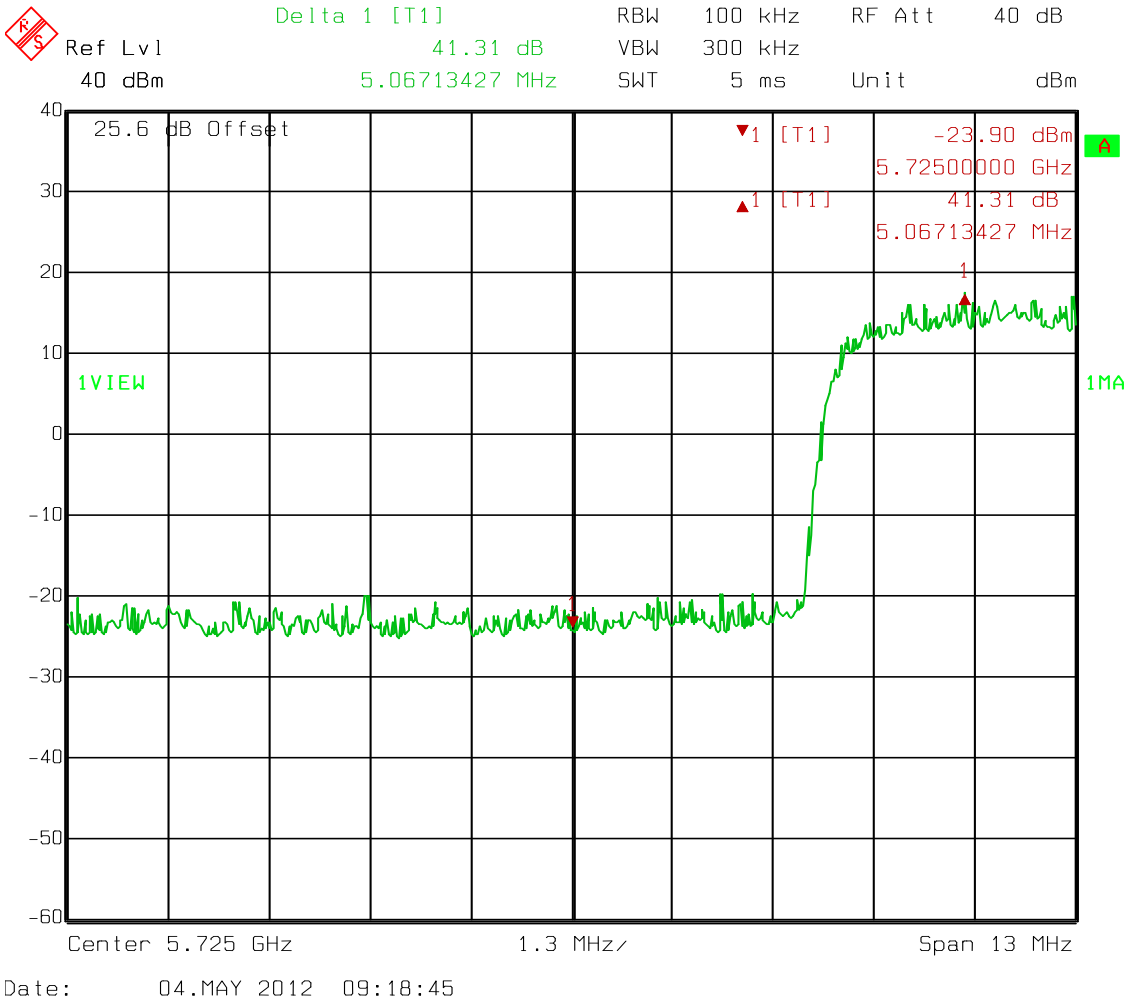
Test Data – Spurious Emissions at Antenna Terminals

Lowest Channel
Low Band Edge
30 MHz Channel
4QAM



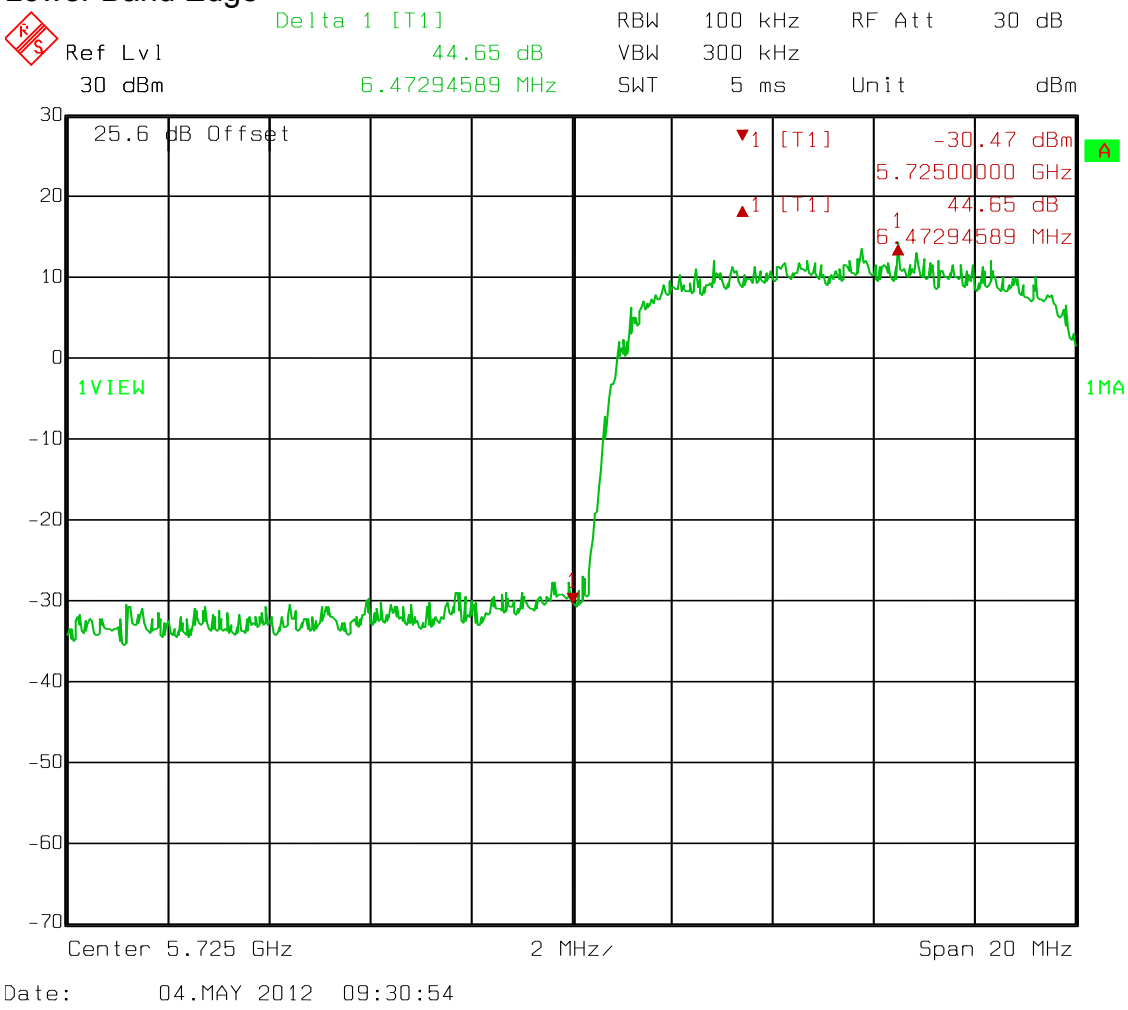
Test Data – Spurious Emissions at Antenna Terminals

Low Band Edge
128 QAM
5 MHz Channel



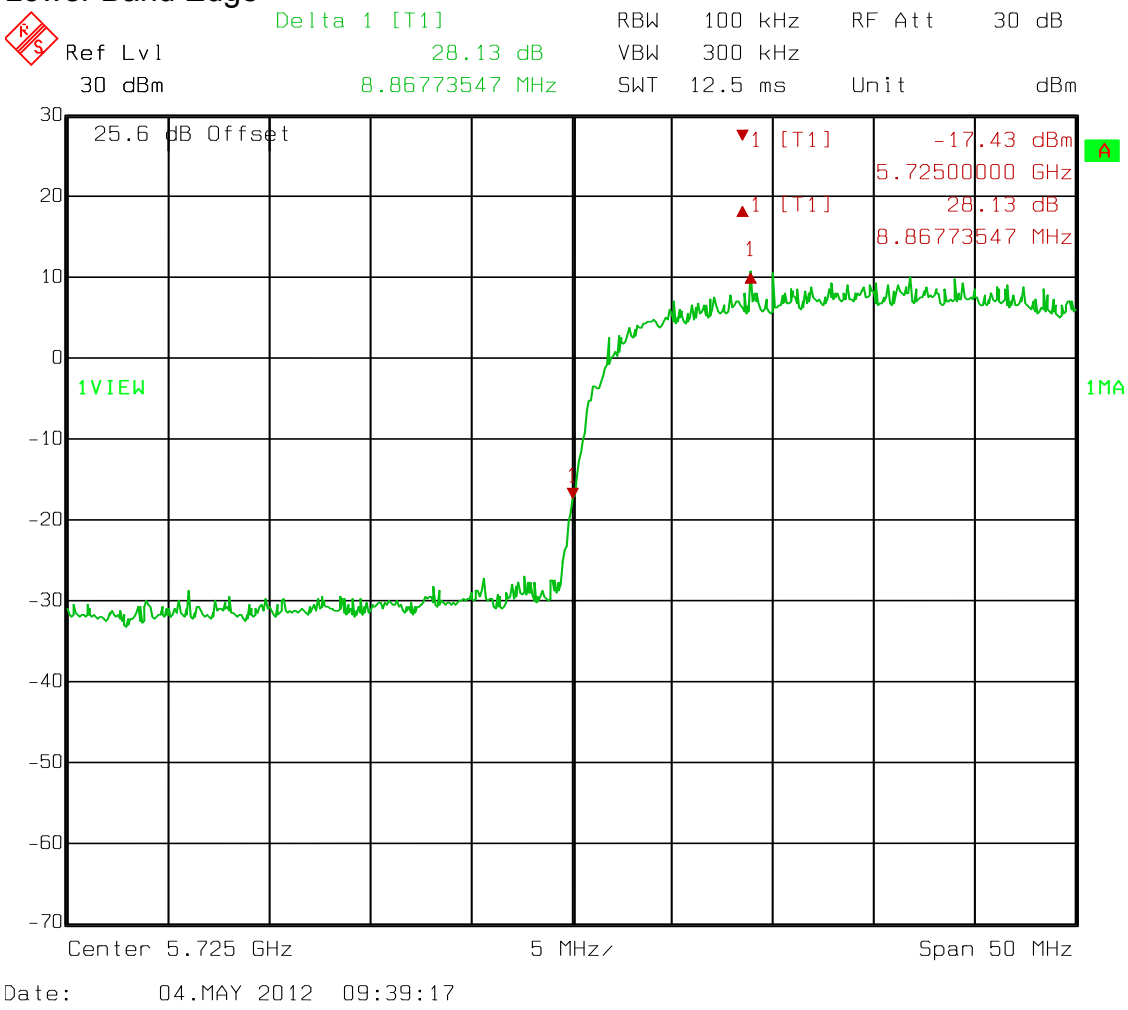
Test Data – Spurious Emissions at Antenna Terminals

Low Channel
256QAM
10 MHz Channel
Lower Band Edge



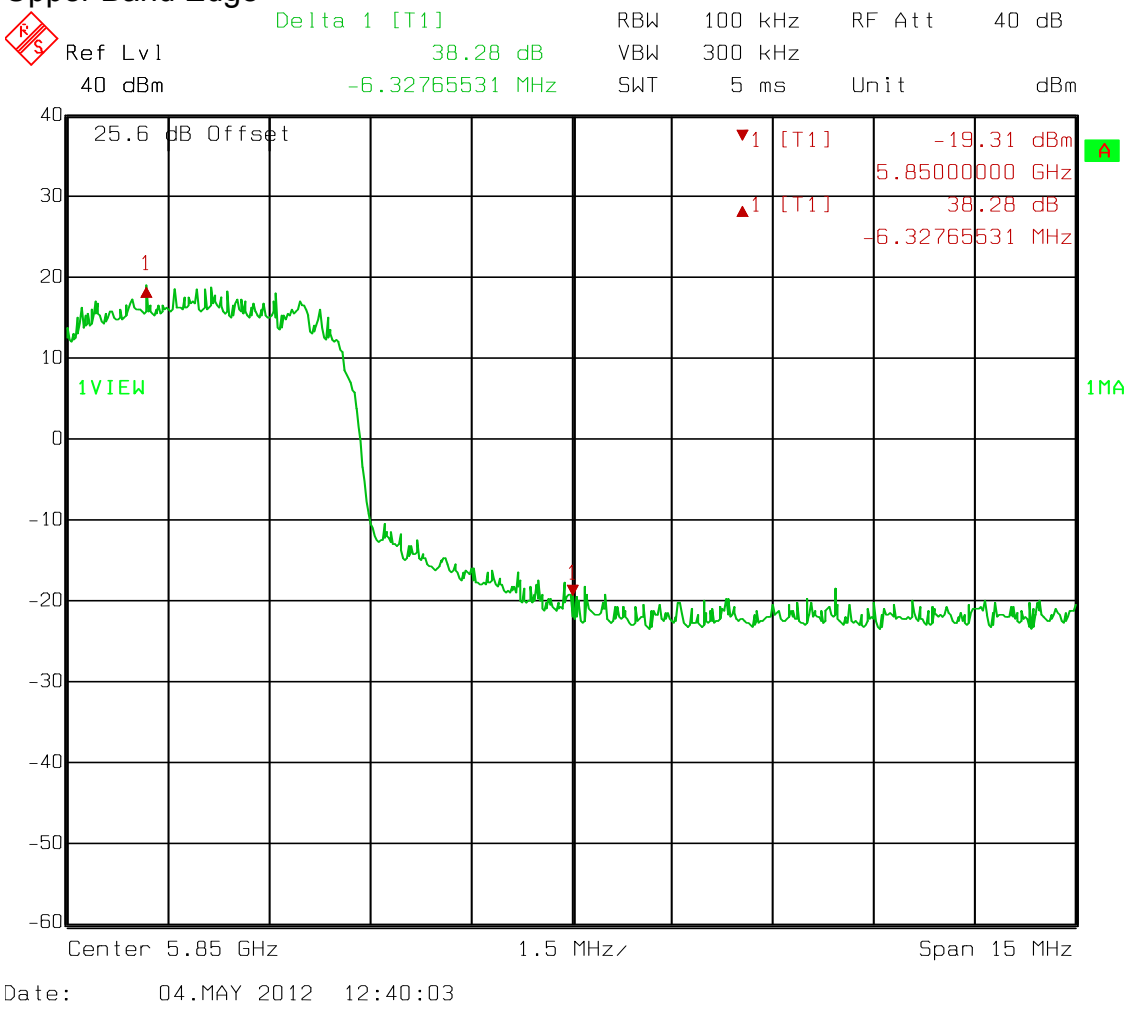
Test Data – Spurious Emissions at Antenna Terminals

Low Channel
256QAM
30 MHz Channel
Lower Band Edge



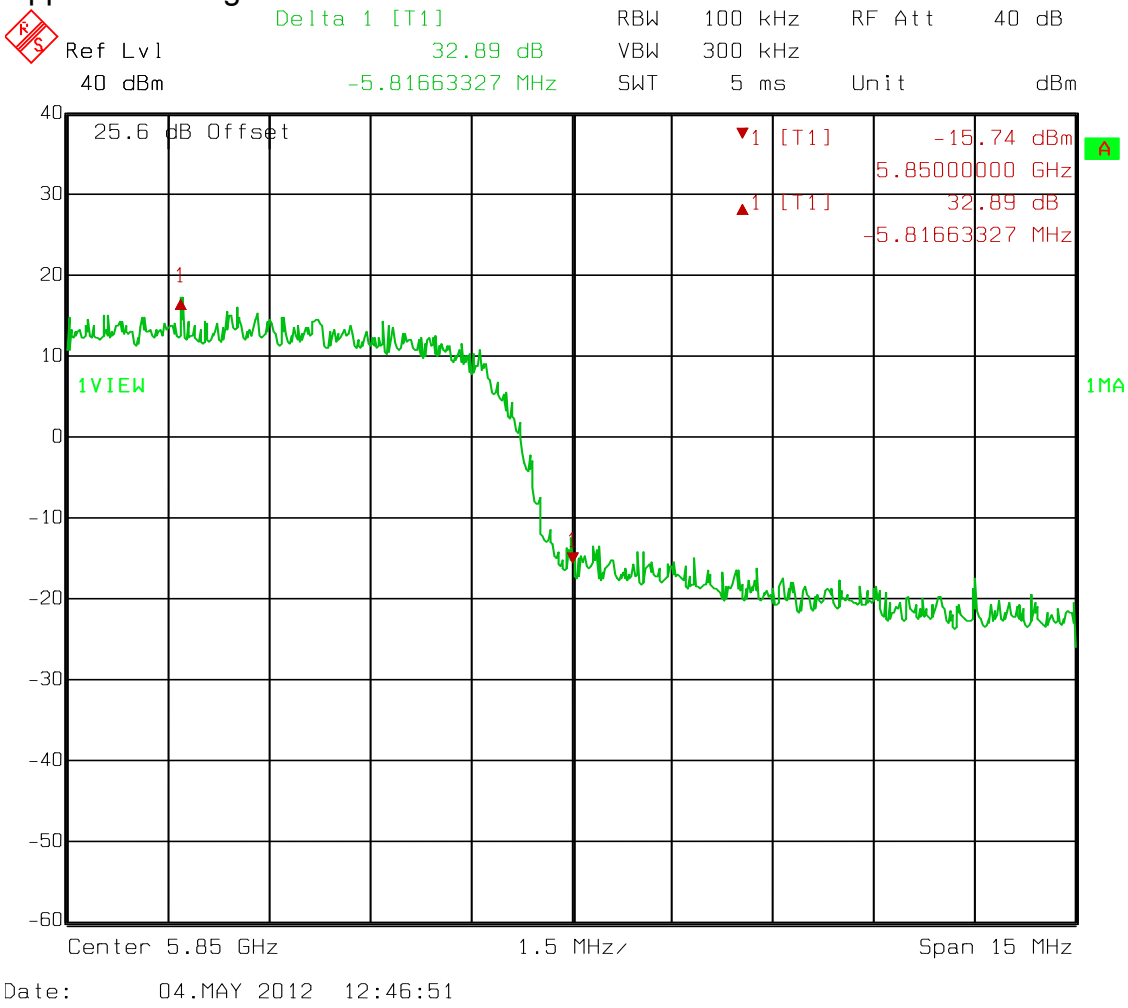
Test Data – Spurious Emissions at Antenna Terminals

High Channel
4QAM
5 MHz Channel
Upper Band Edge



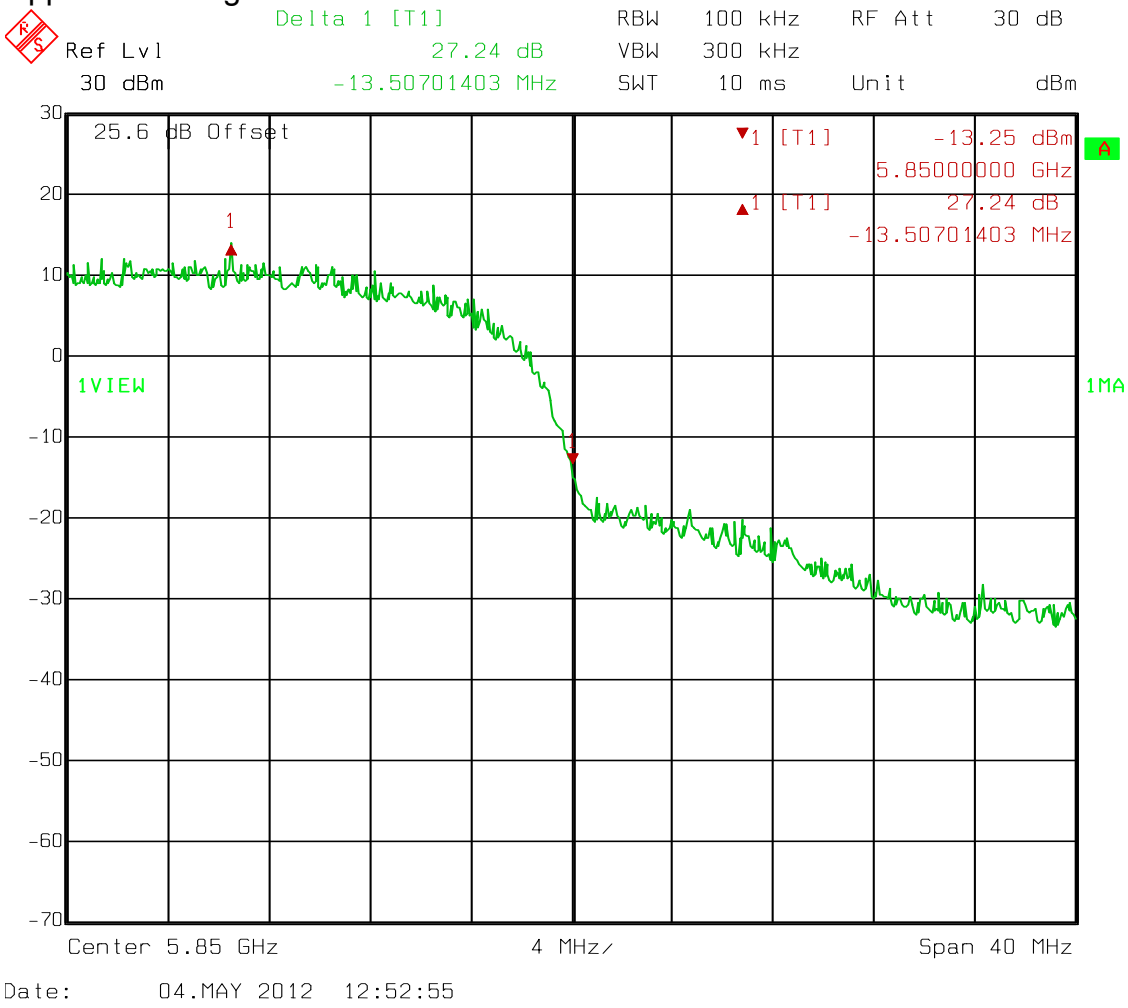
Test Data – Spurious Emissions at Antenna Terminals

High Channel
4QAM
10 MHz Channel
Upper Band Edge



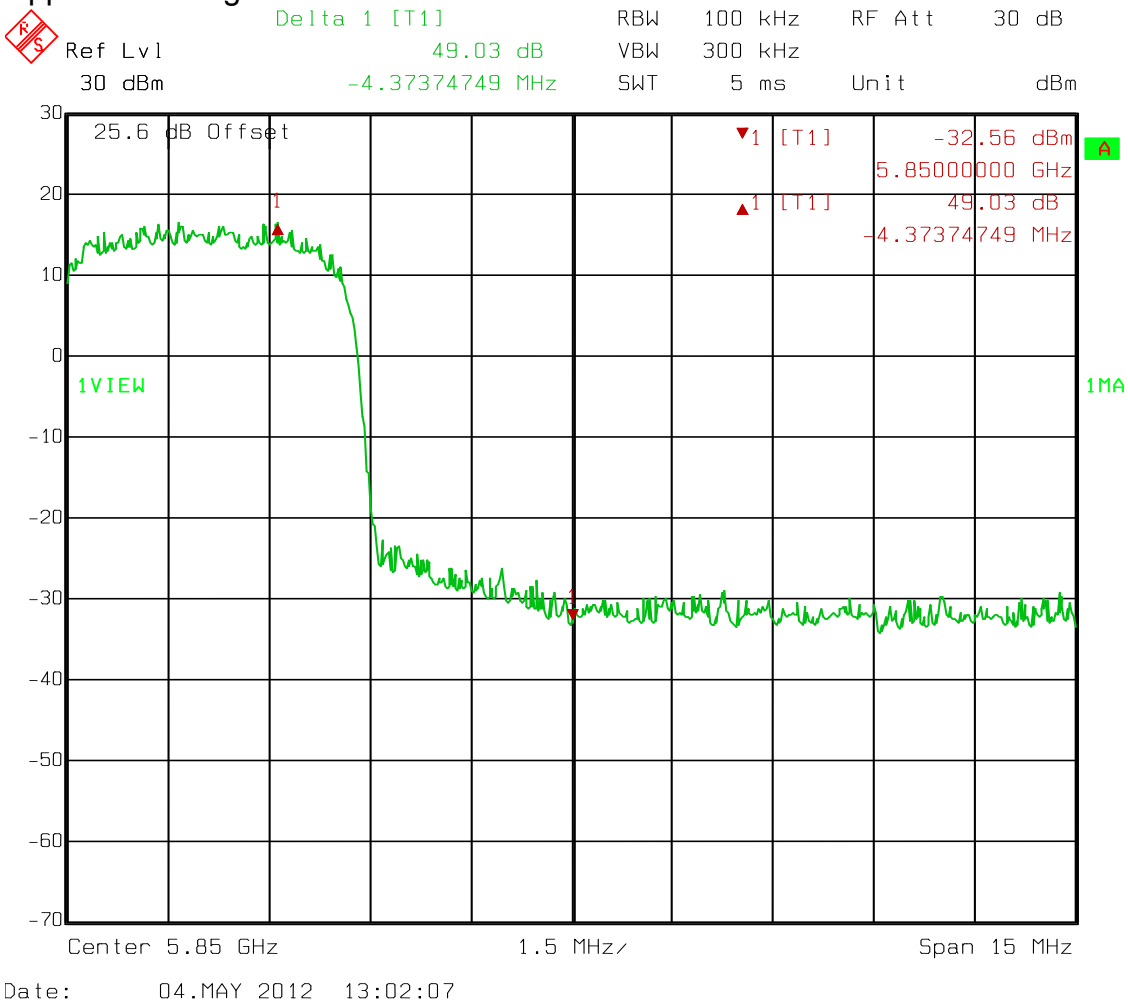
Test Data – Spurious Emissions at Antenna Terminals

High Channel
4QAM
30 MHz Channel
Upper Band Edge



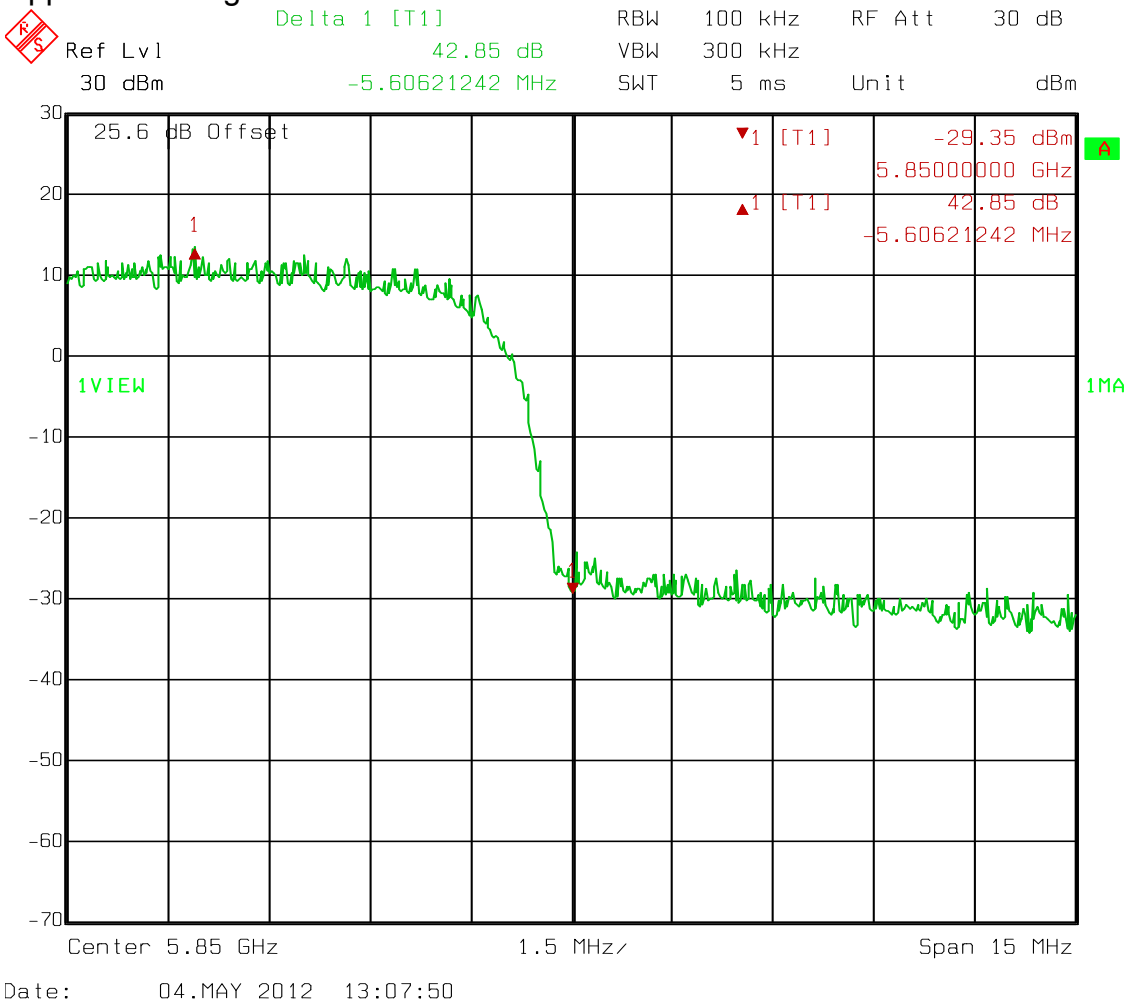
Test Data – Spurious Emissions at Antenna Terminals

High Channel
128QAM
5 MHz Channel
Upper Band Edge



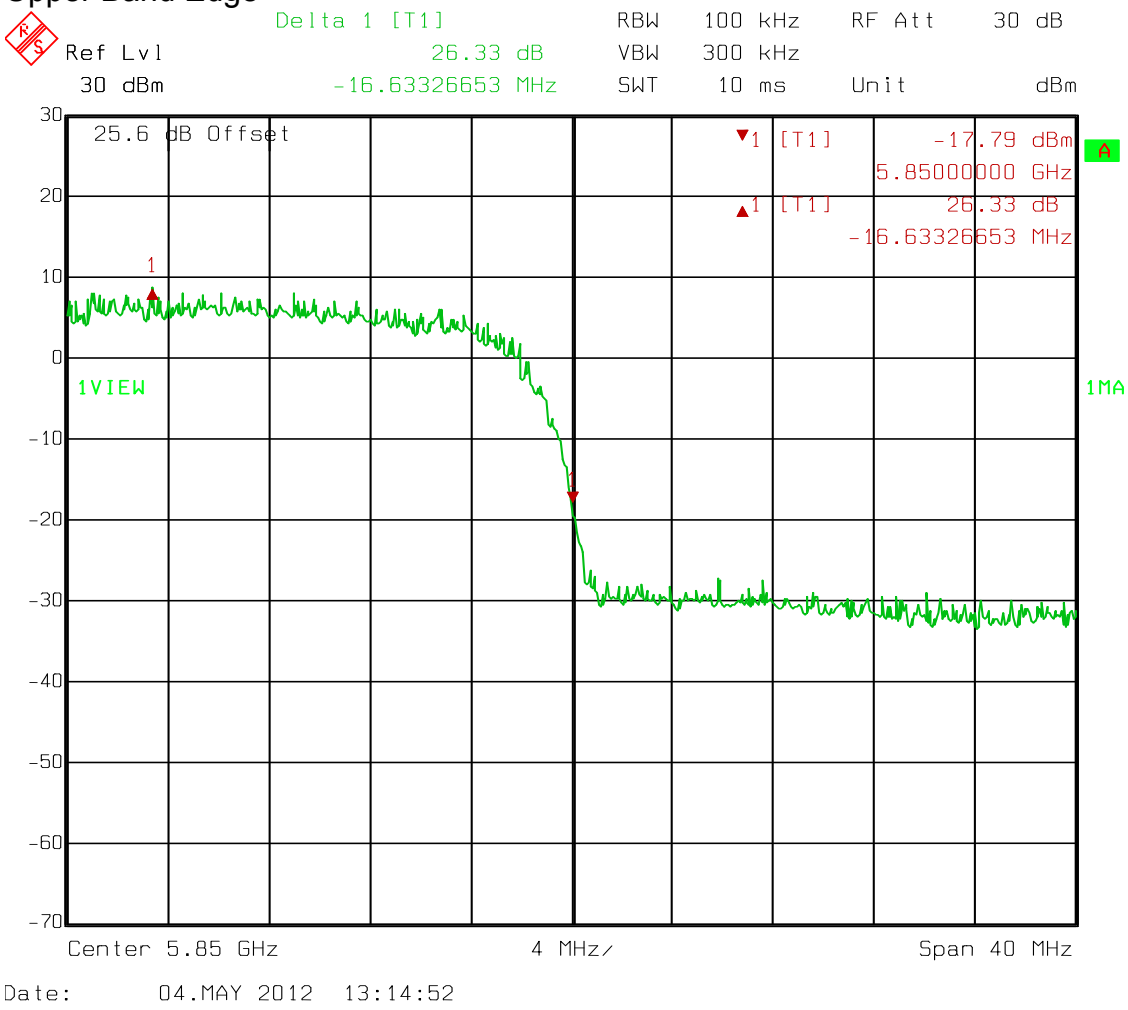
Test Data – Spurious Emissions at Antenna Terminals

High Channel
256QAM
10 MHz Channel
Upper Band Edge



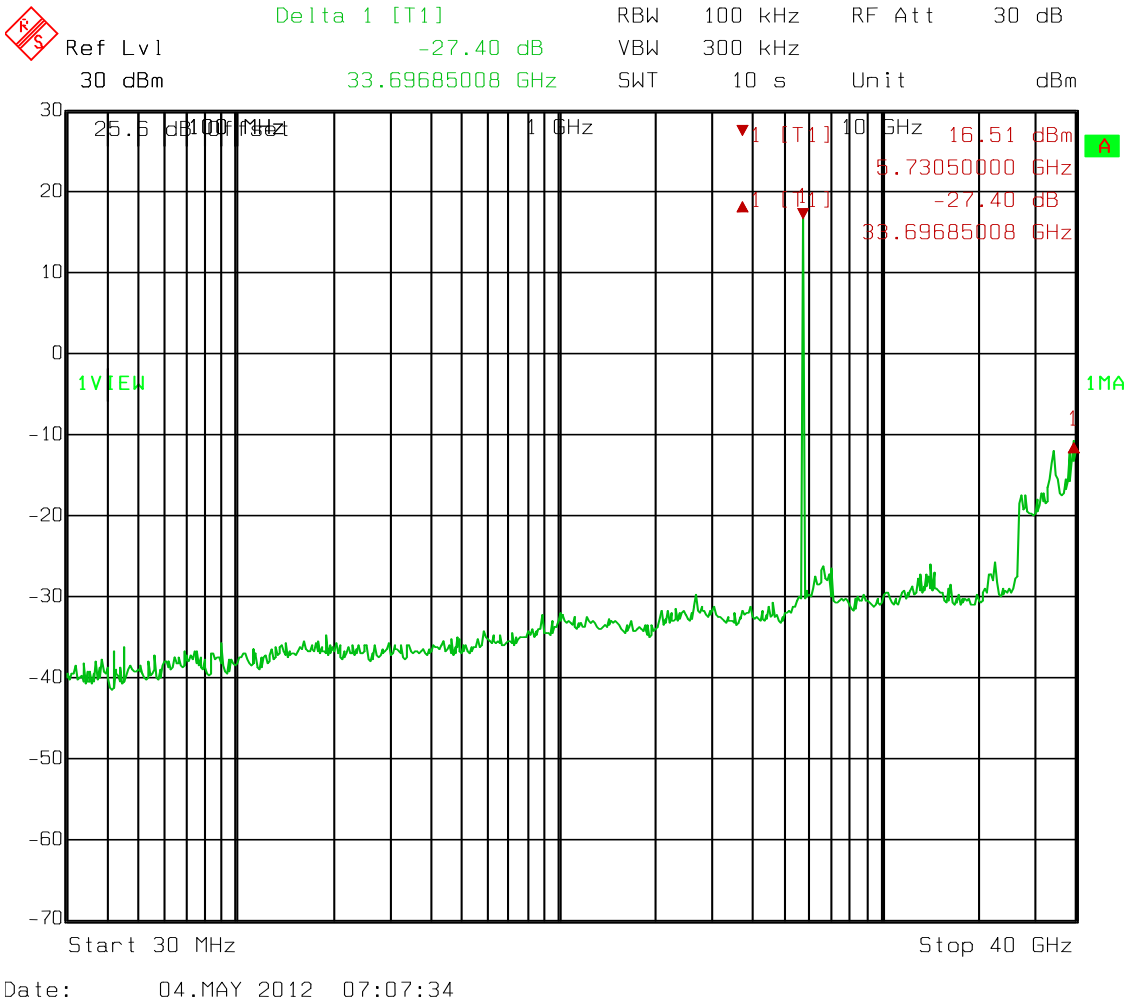
Test Data – Spurious Emissions at Antenna Terminals

High Channel
256QAM
30 MHz Channel
Upper Band Edge



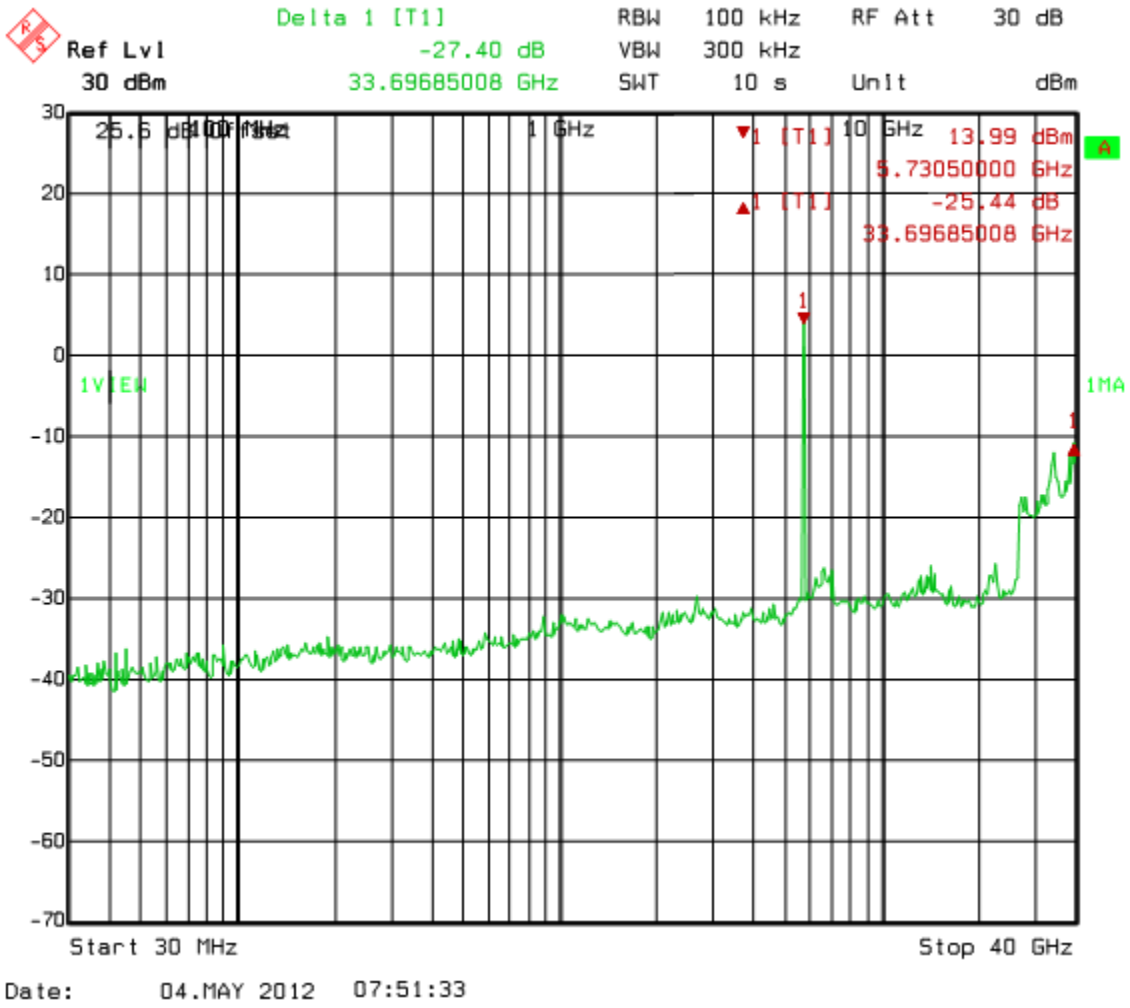
Test Data – Spurious Emissions at Antenna Terminals

Spurious Emissions
5 MHz Channel
4QAM



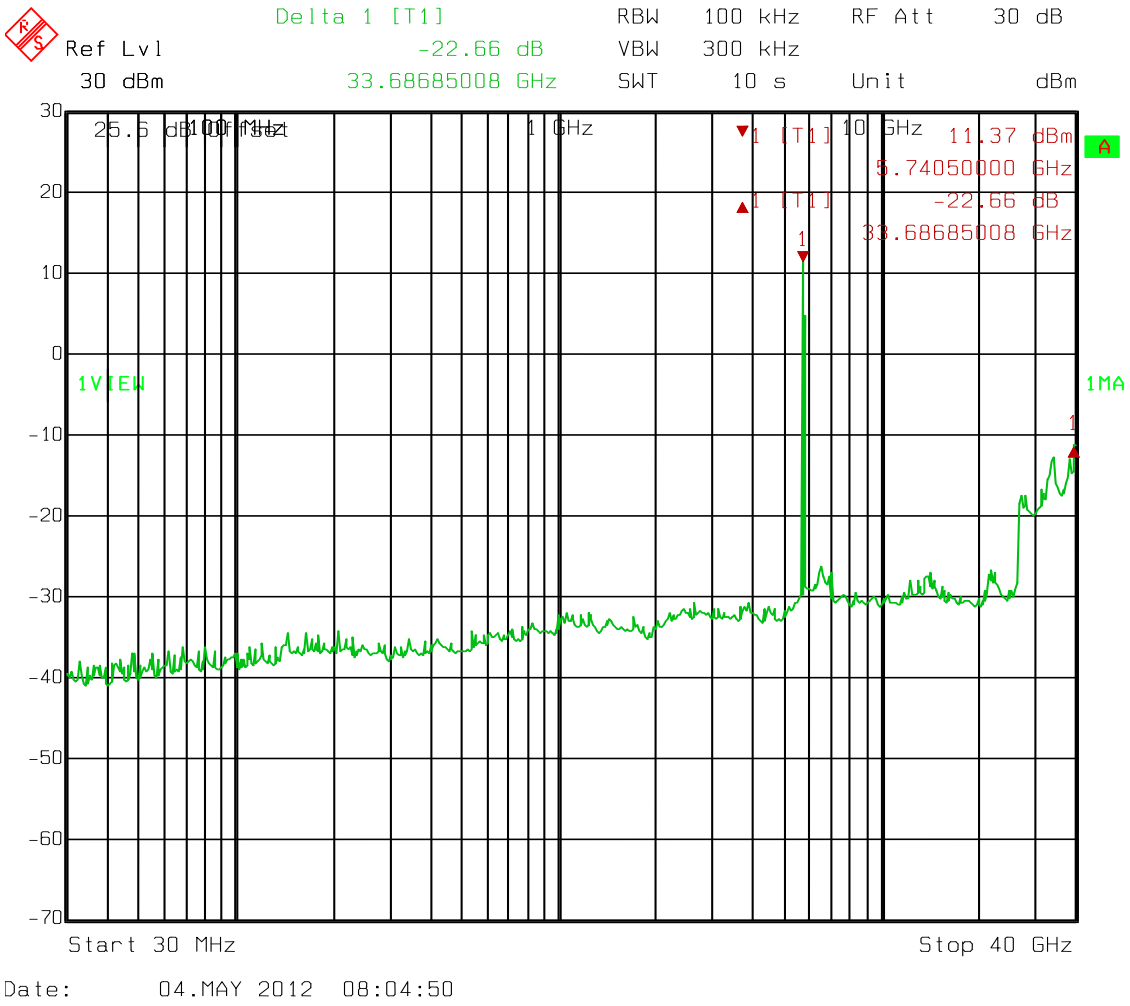
Test Data – Spurious Emissions at Antenna Terminals

Low Channel
Spurious Emissions
10 MHz Channel
4 QAM



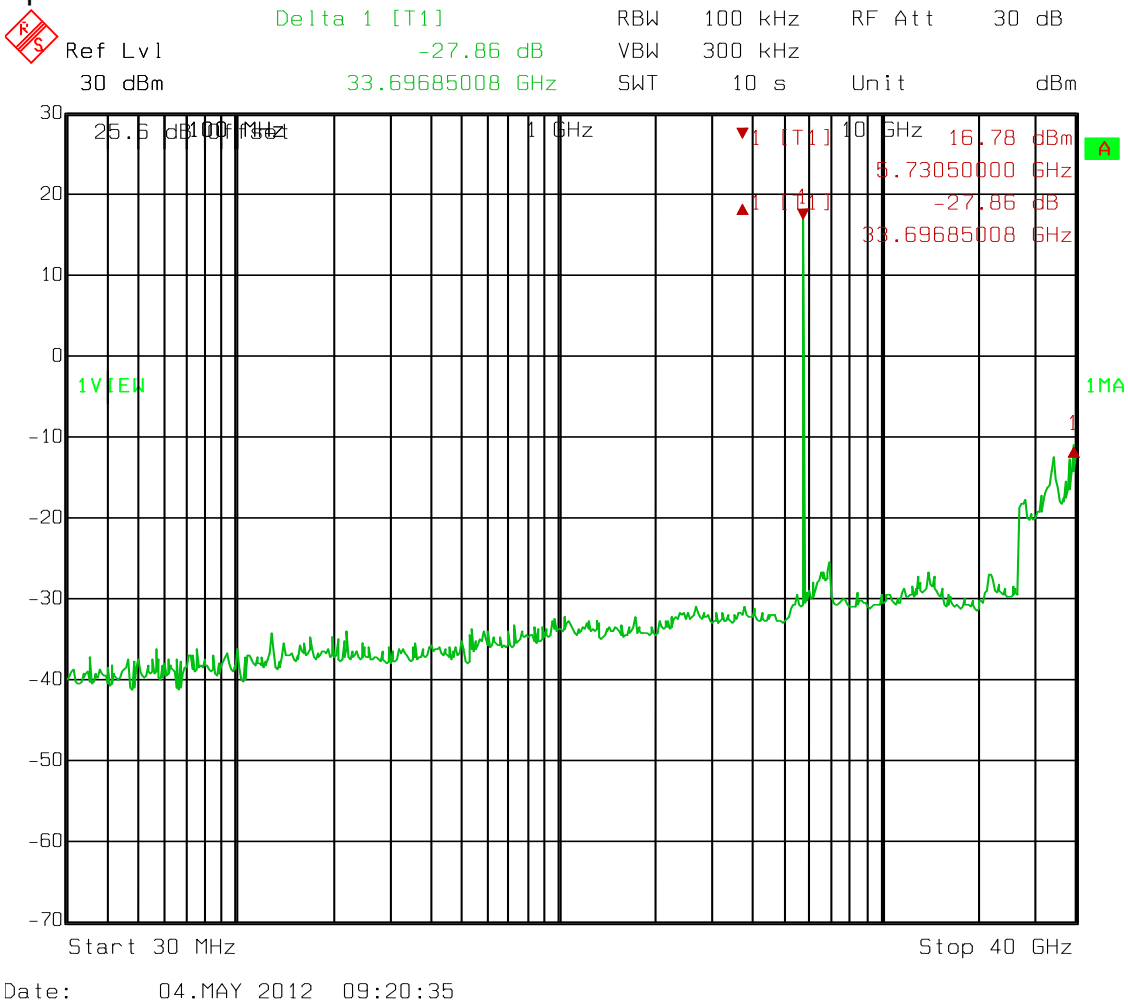
Test Data – Spurious Emissions at Antenna Terminals

Lowest Channel
Spurious Emissions
30 MHz Channel
4QAM



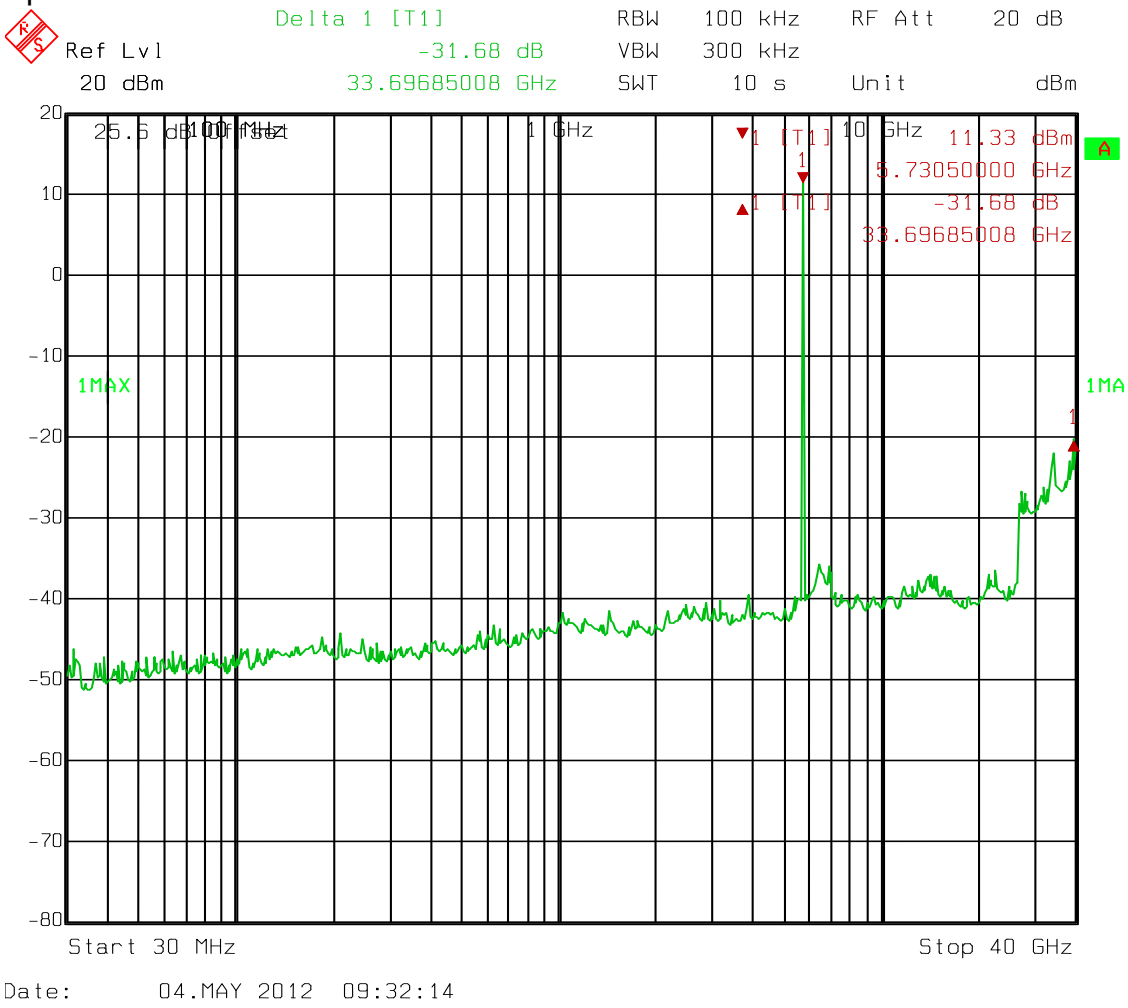
Test Data – Spurious Emissions at Antenna Terminals

Low Channel
128 QAM
5 MHz Channel
Spurious Emissions



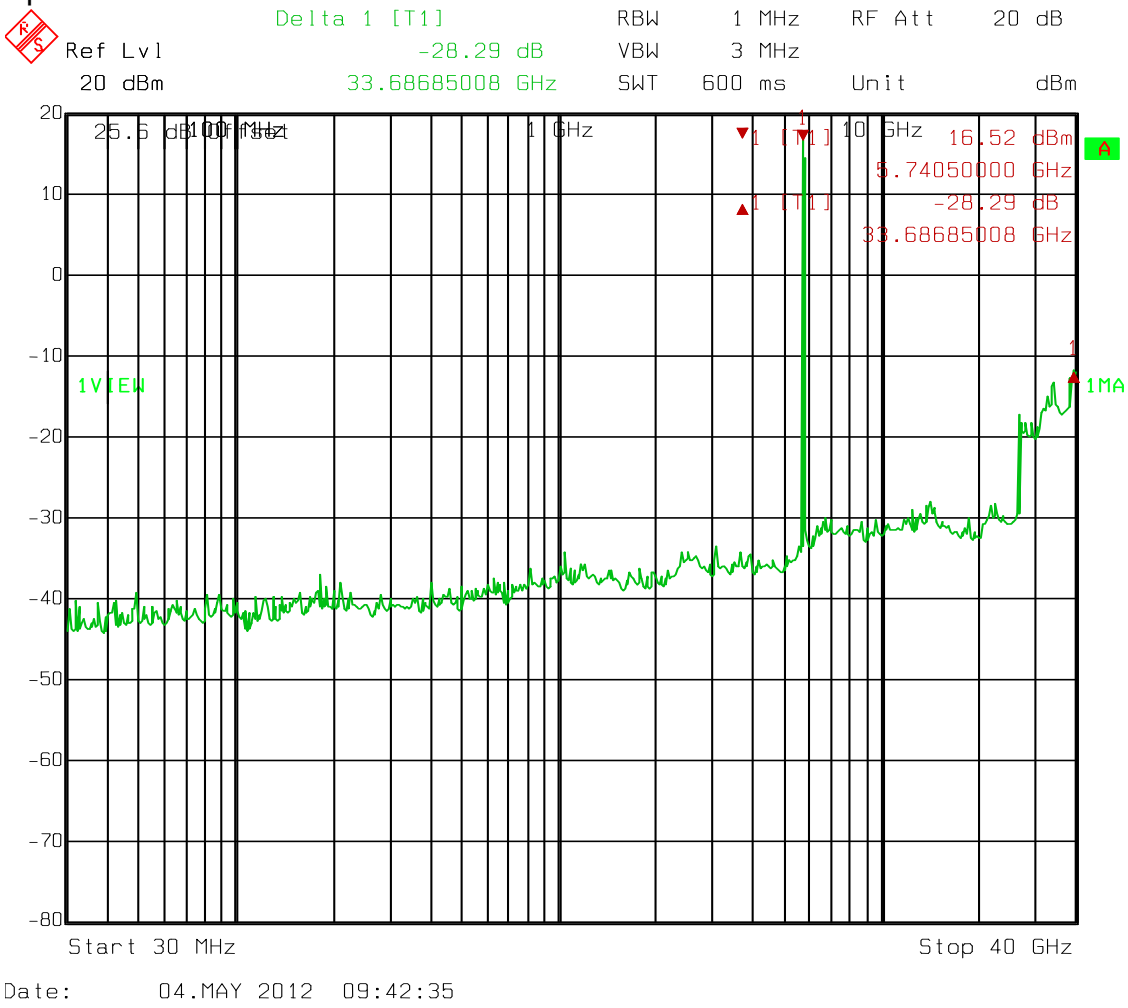
Test Data – Spurious Emissions at Antenna Terminals

Low Channel
256QAM
10 MHz Channel
Spurious Emissions



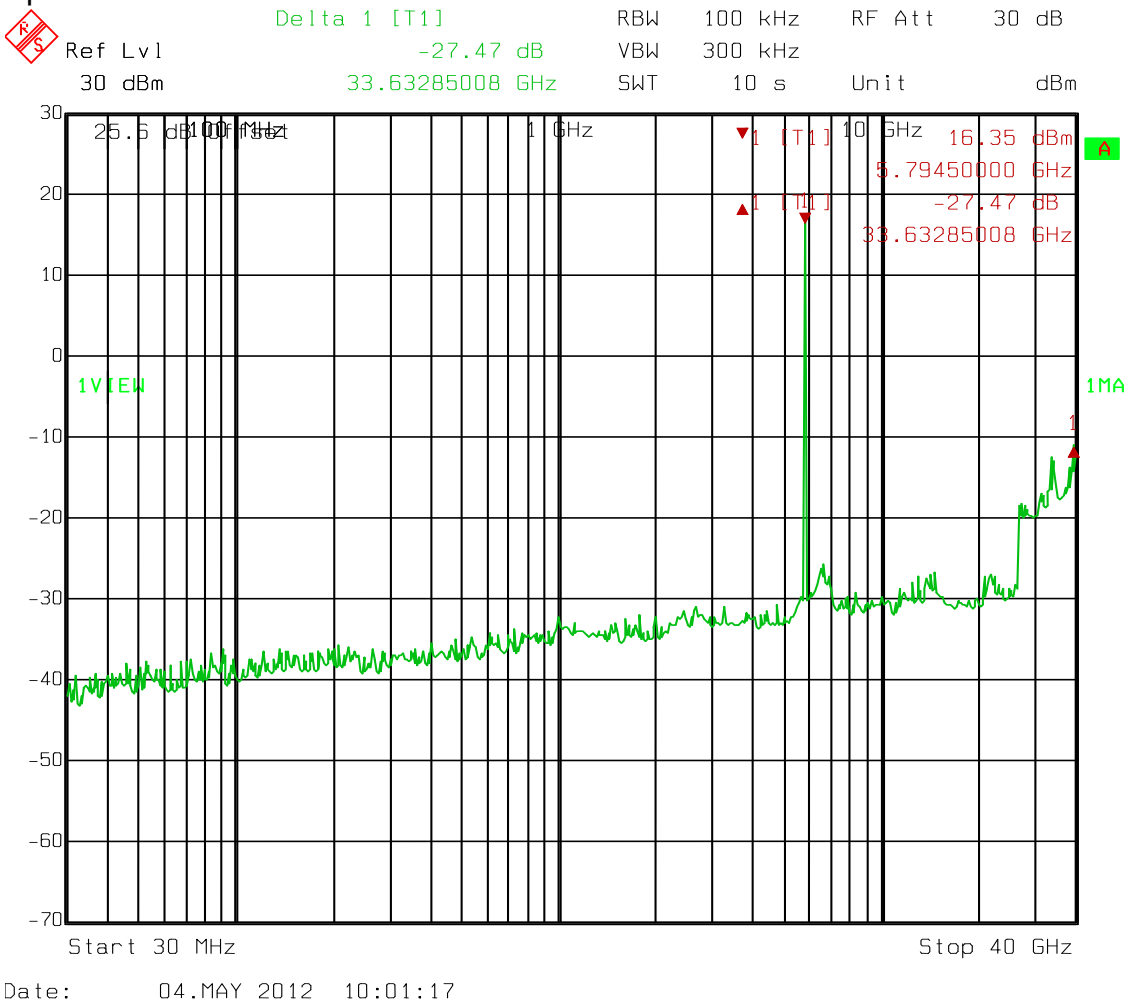
Test Data – Spurious Emissions at Antenna Terminals

Low Channel
256QAM
30 MHz Channel
Spurious Emissions



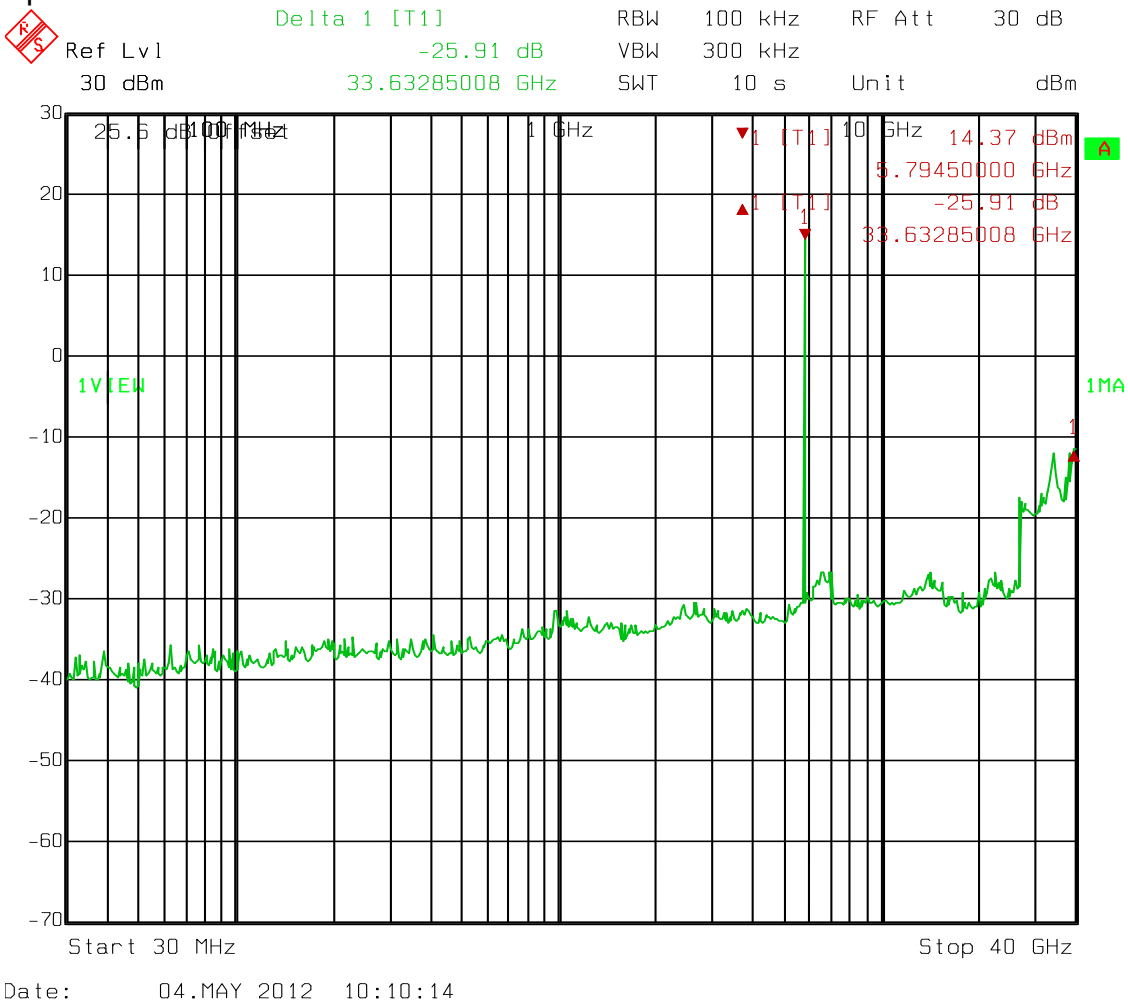
Test Data – Spurious Emissions at Antenna Terminals

Mid Channel
5 MHz Channel
4QAM
Spurious Emissions



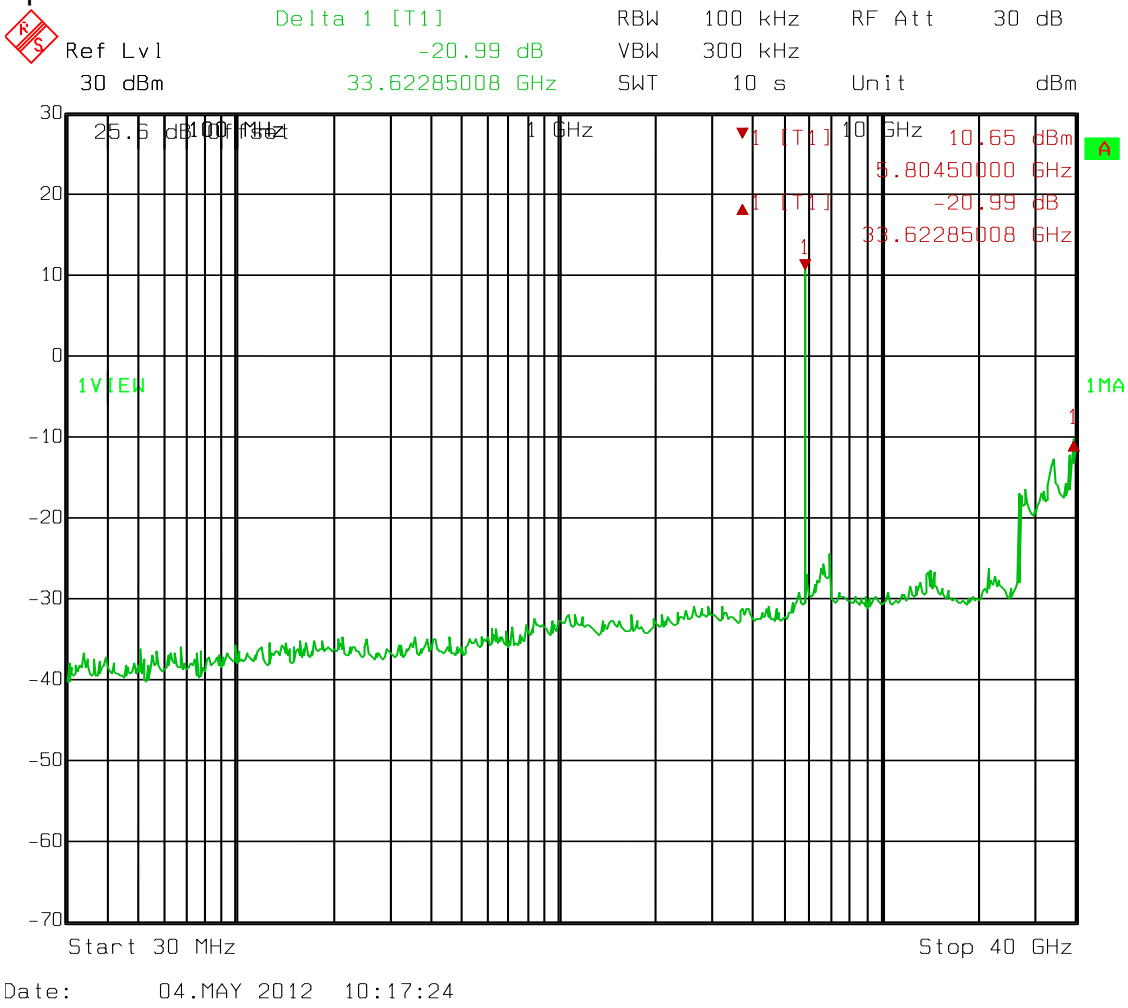
Test Data – Spurious Emissions at Antenna Terminals

Mid Channel
10 MHz Channel
4QAM
Spurious Emissions



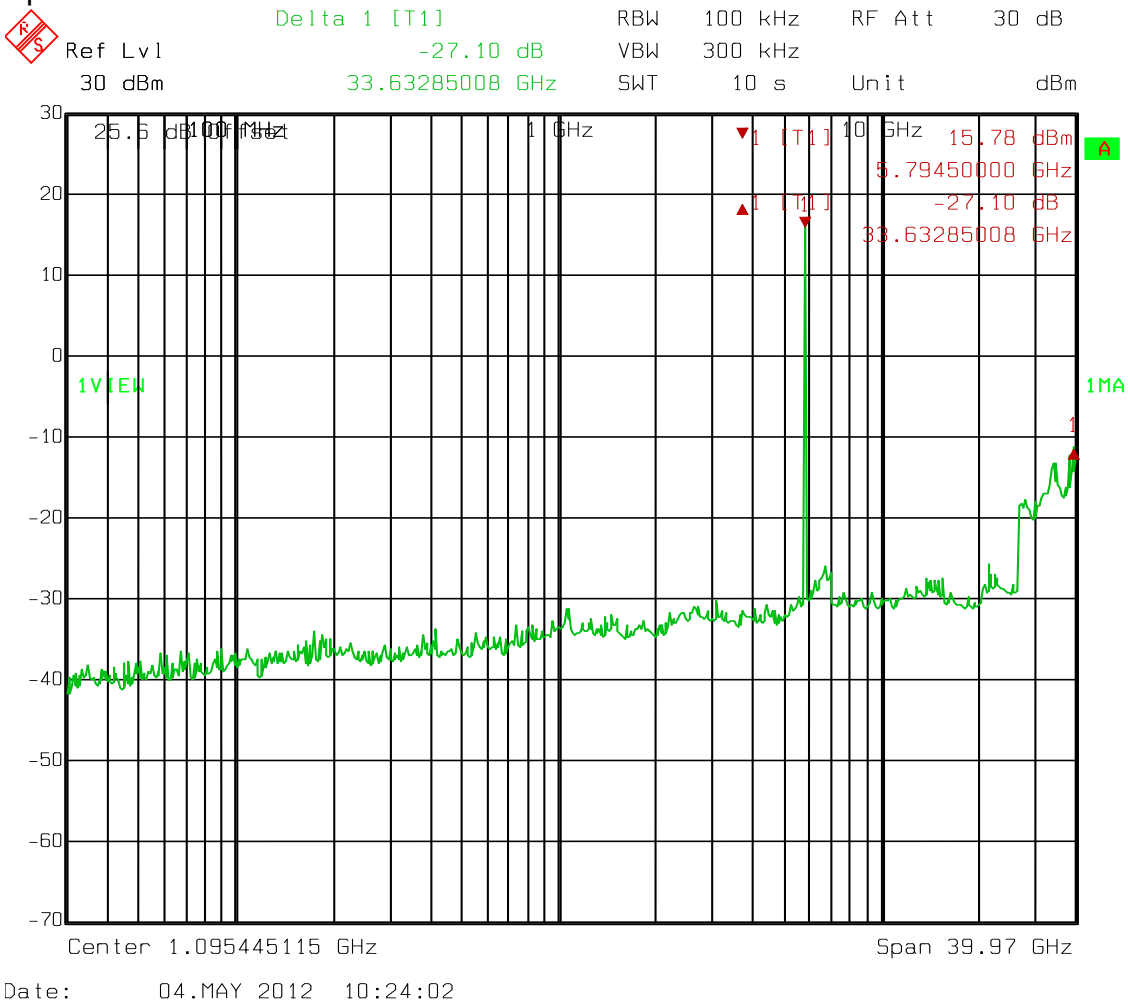
Test Data – Spurious Emissions at Antenna Terminals

Mid Channel
4QAM
30 MHz Channel
Spurious Emissions



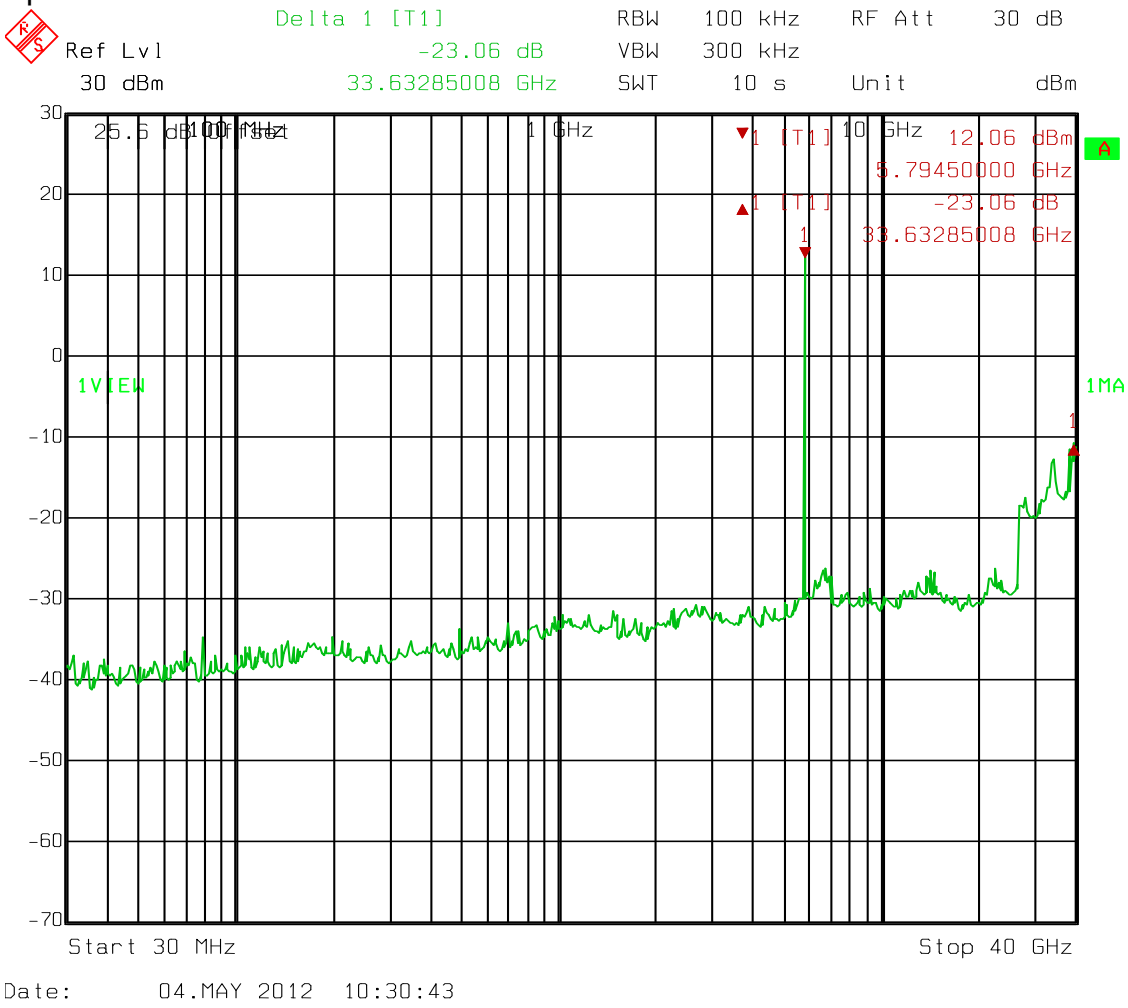
Test Data – Spurious Emissions at Antenna Terminals

Mid Channel
128 QAM
5 MHz Channel
Spurious Emissions



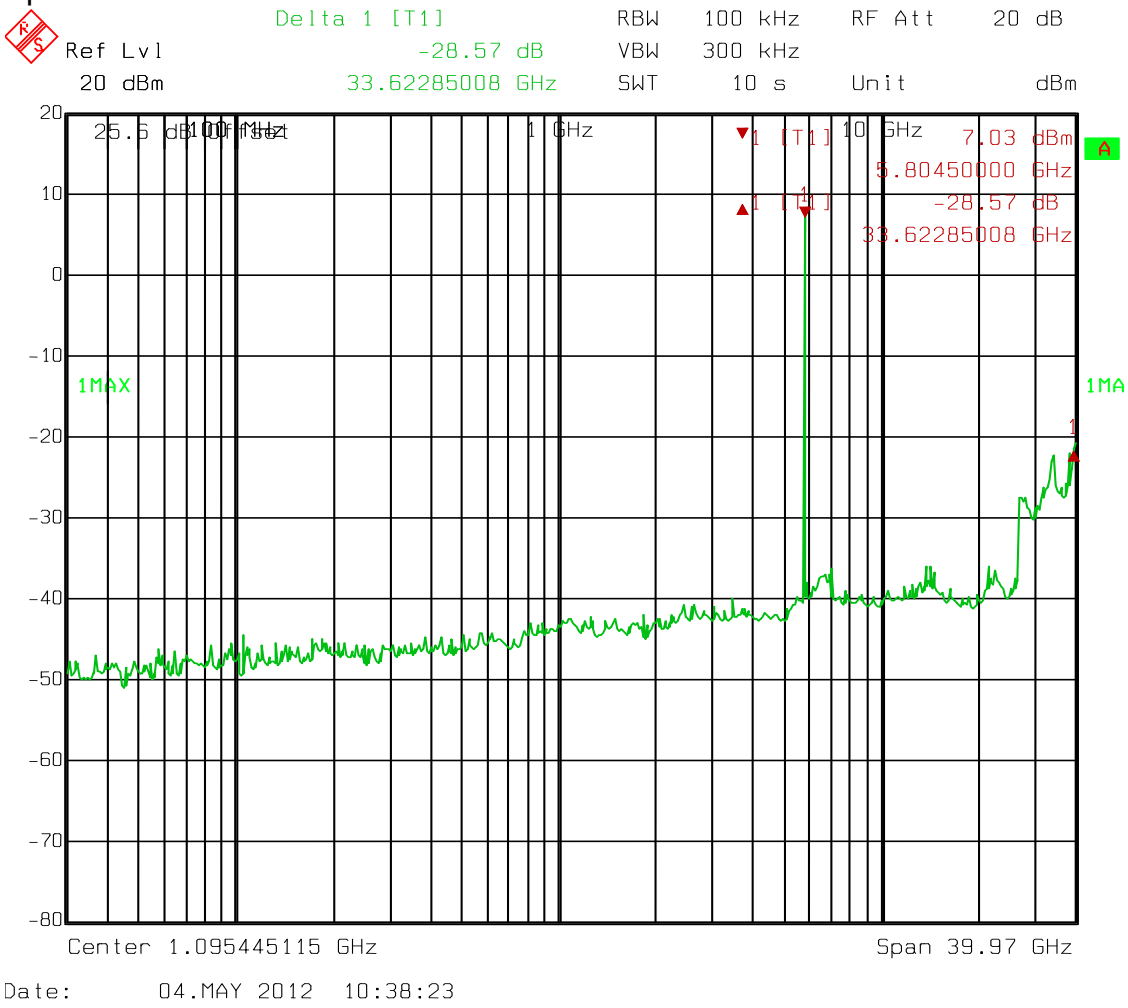
Test Data – Spurious Emissions at Antenna Terminals

Mid Channel
256 QAM
10 MHz Channel
Spurious Emissions



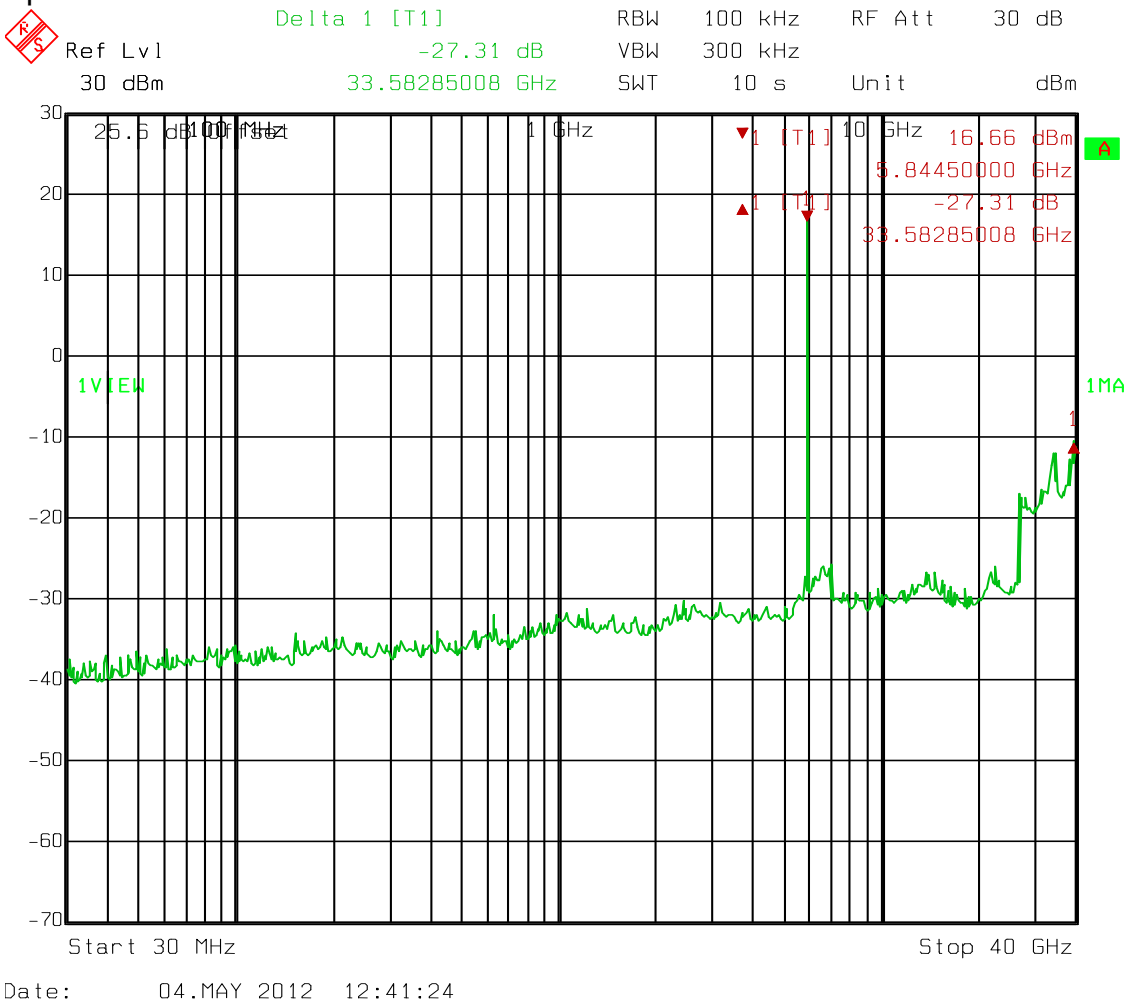
Test Data – Spurious Emissions at Antenna Terminals

Mid Channel
256QAM
30 MHz Channel
Spurious Emissions



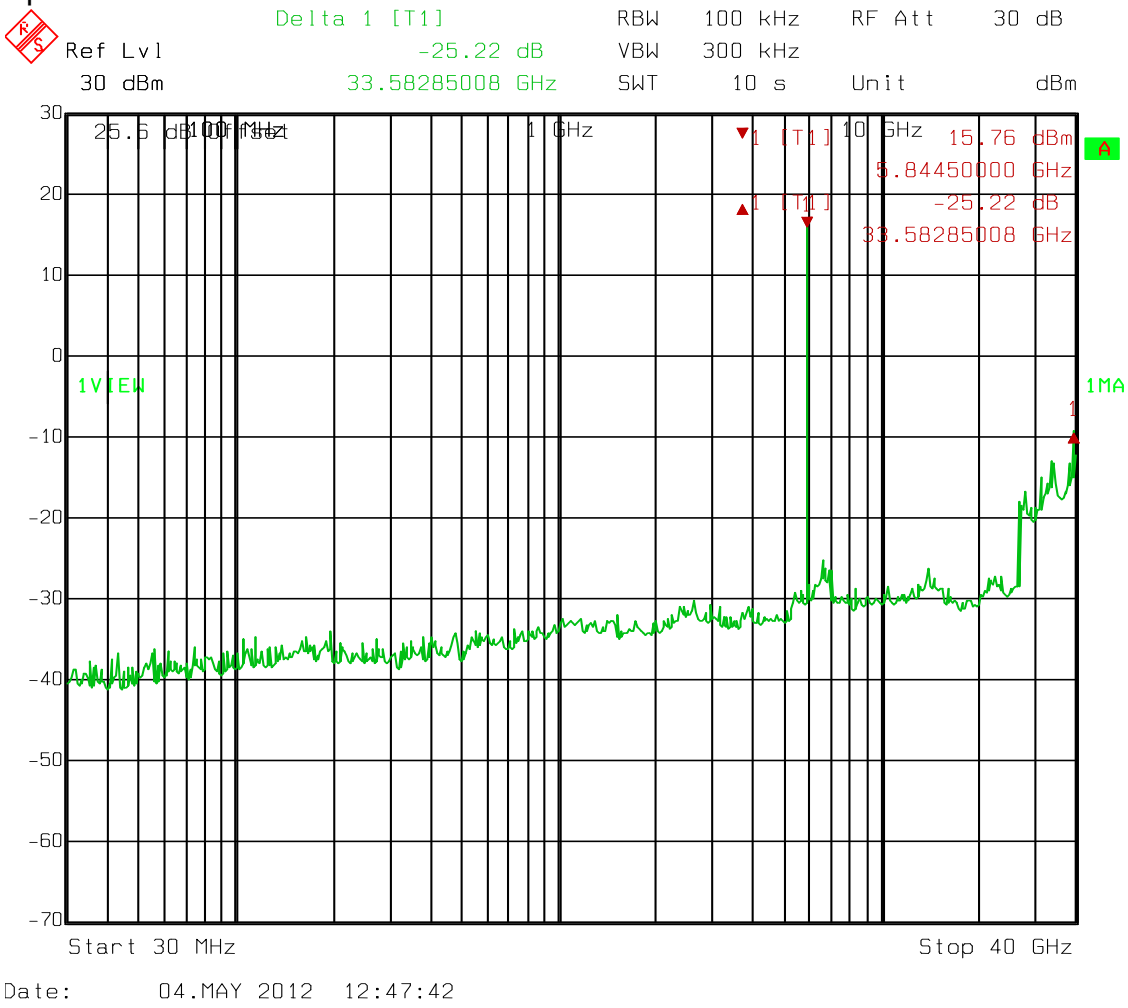
Test Data – Spurious Emissions at Antenna Terminals

High Channel
4QAM
5 MHz Channel
Spurious Emissions



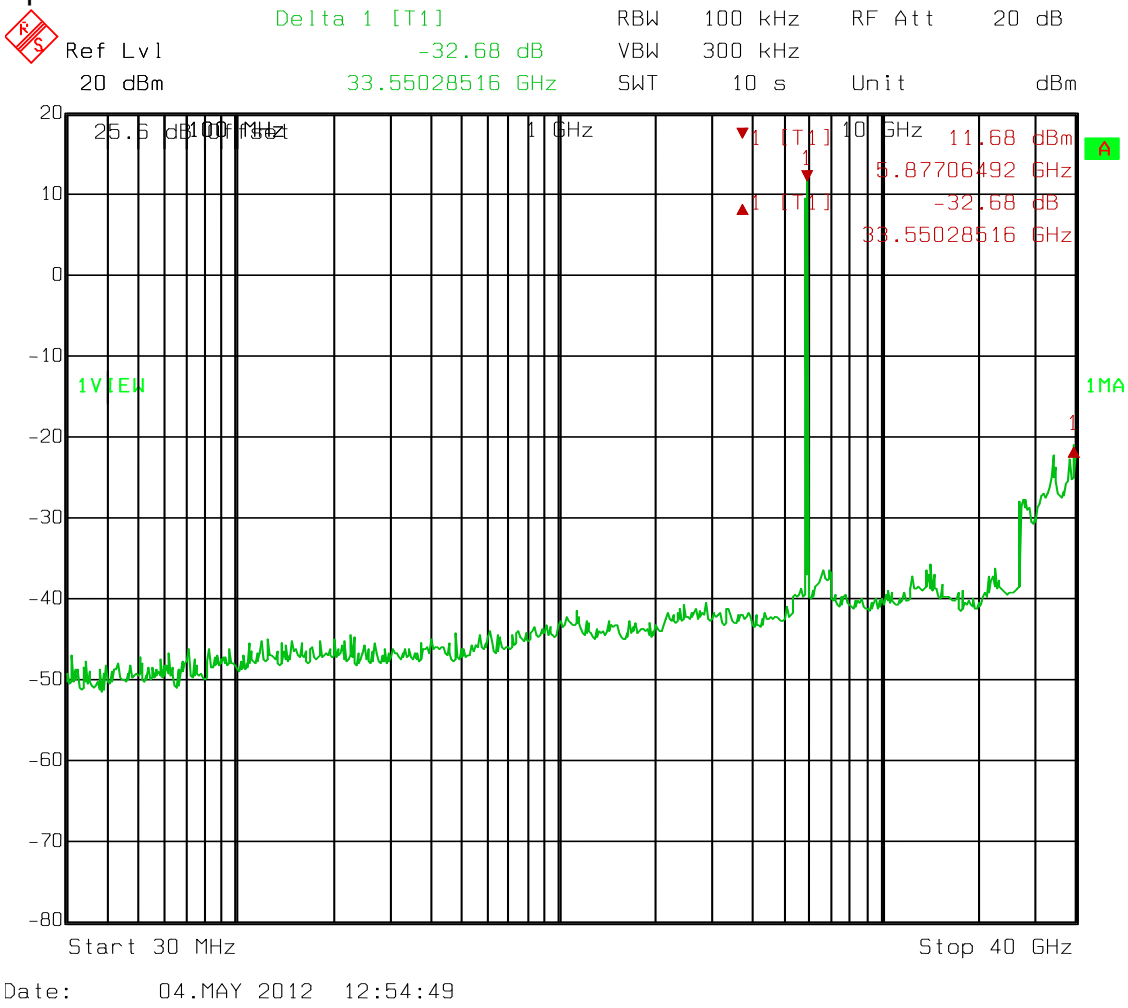
Test Data – Spurious Emissions at Antenna Terminals

High Channel
4QAM
10 MHz Channel
Spurious Emissions



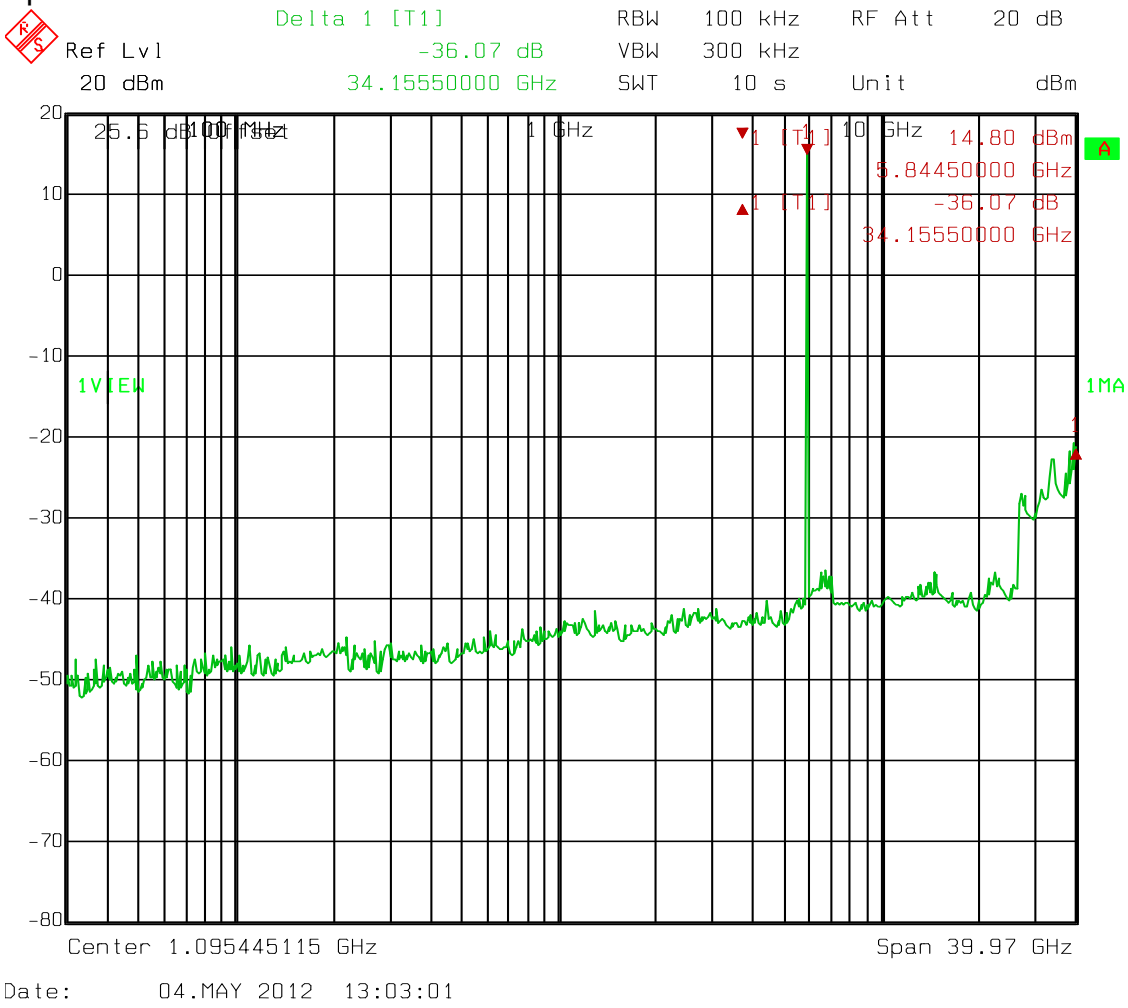
Test Data – Spurious Emissions at Antenna Terminals

High Channel
4QAM
30 MHz Channel
Spurious Emissions



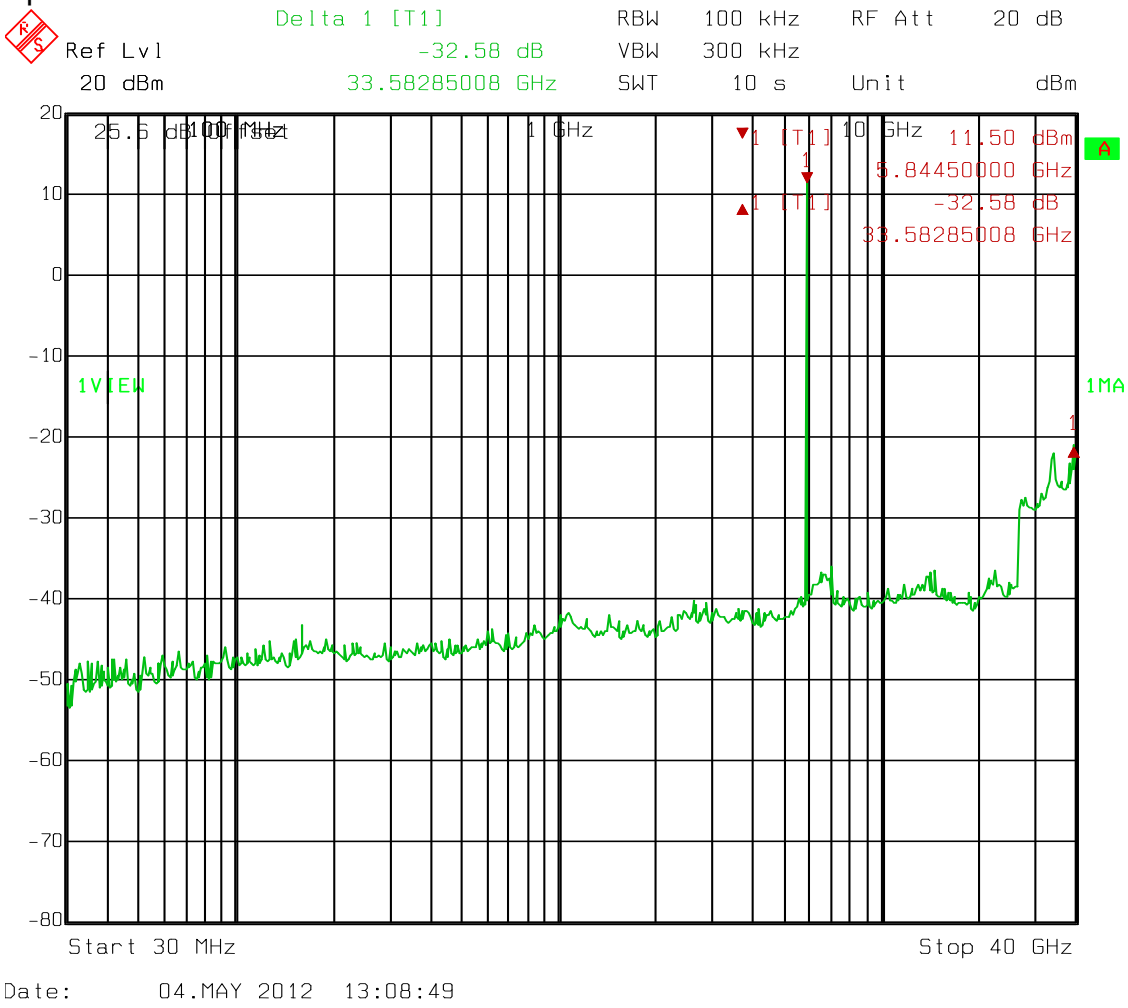
Test Data – Spurious Emissions at Antenna Terminals

High Channel
128QAM
5 MHz Channel
Spurious Emissions



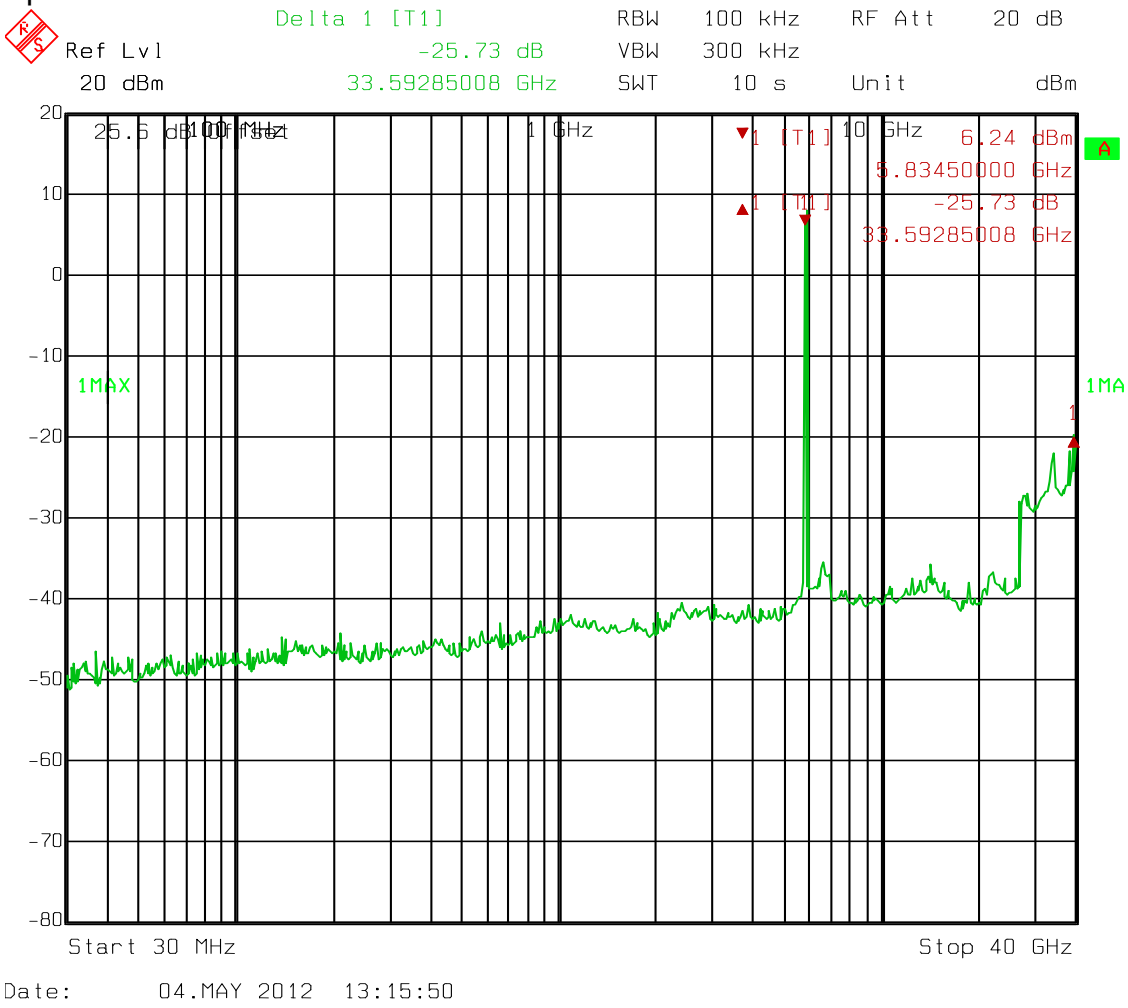
Test Data – Spurious Emissions at Antenna Terminals

High Channel
256QAM
10 MHz Channel
Spurious Emissions



Test Data – Spurious Emissions at Antenna Terminals

High Channel
256QAM
30 MHz Channel
Spurious Emissions



Section 6. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.247 (d) RSS-Gen 7.2.2
TESTED BY: David Light	DATE: 03 May 2012

Test Results: Complies.

Measurement Data: See attached table.

Test Conditions: 54 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1480-993-1036-1016-1783-1767

Notes:

☐ For handheld devices, the EUT was tested on three orthogonal axis'

☒ The device was tested from 30 MHz to the tenth harmonic of the highest fundamental frequency 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)
RBW= 1 MHz VBW=10Hz (Average)

The device was tested on three channels at the highest and lowest data rates.

Section 7. Peak Power Spectral Density

NAME OF TEST: Peak Power Spectral Density	PARA. NO.: 15.247(e) RSS-210 A8.2(b)
TESTED BY: David Light	DATE: 04 May 2012

Test Results: Complies.

Measurement Data: See attached data..

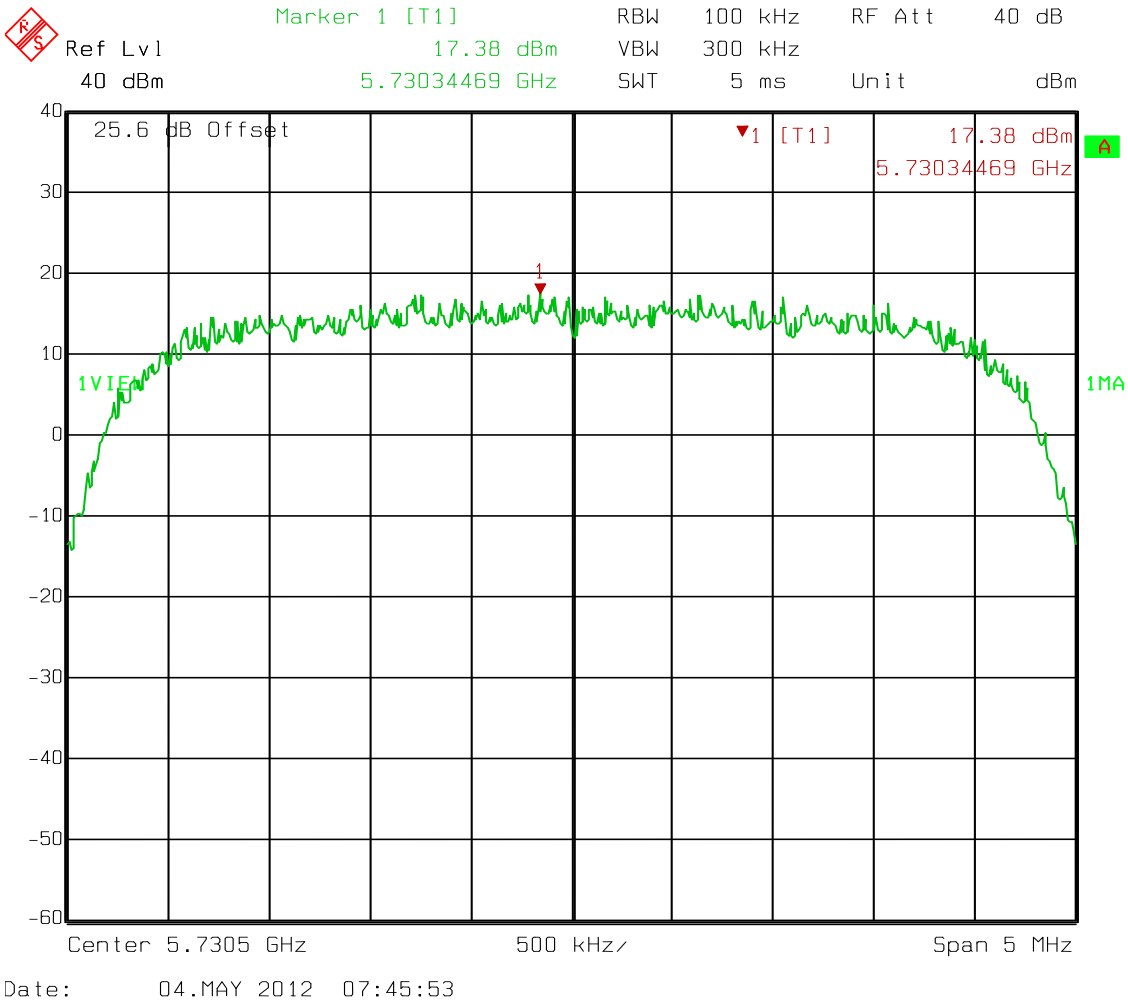
Test Conditions: 51 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1036-1082-1472

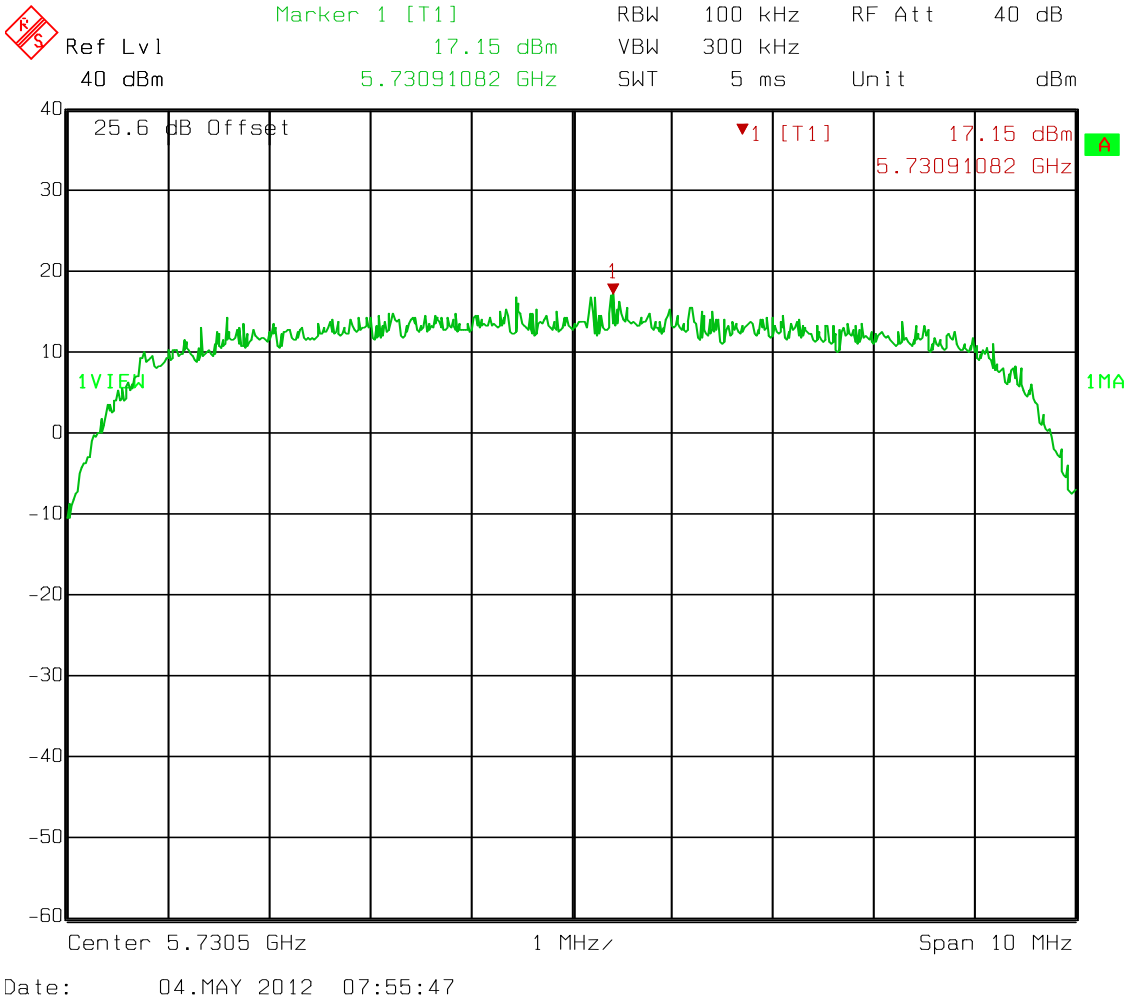
Peak Power Spectral Density

Density
5 MHz Channel
4QAM
17.38-15.2=2.18 dBm



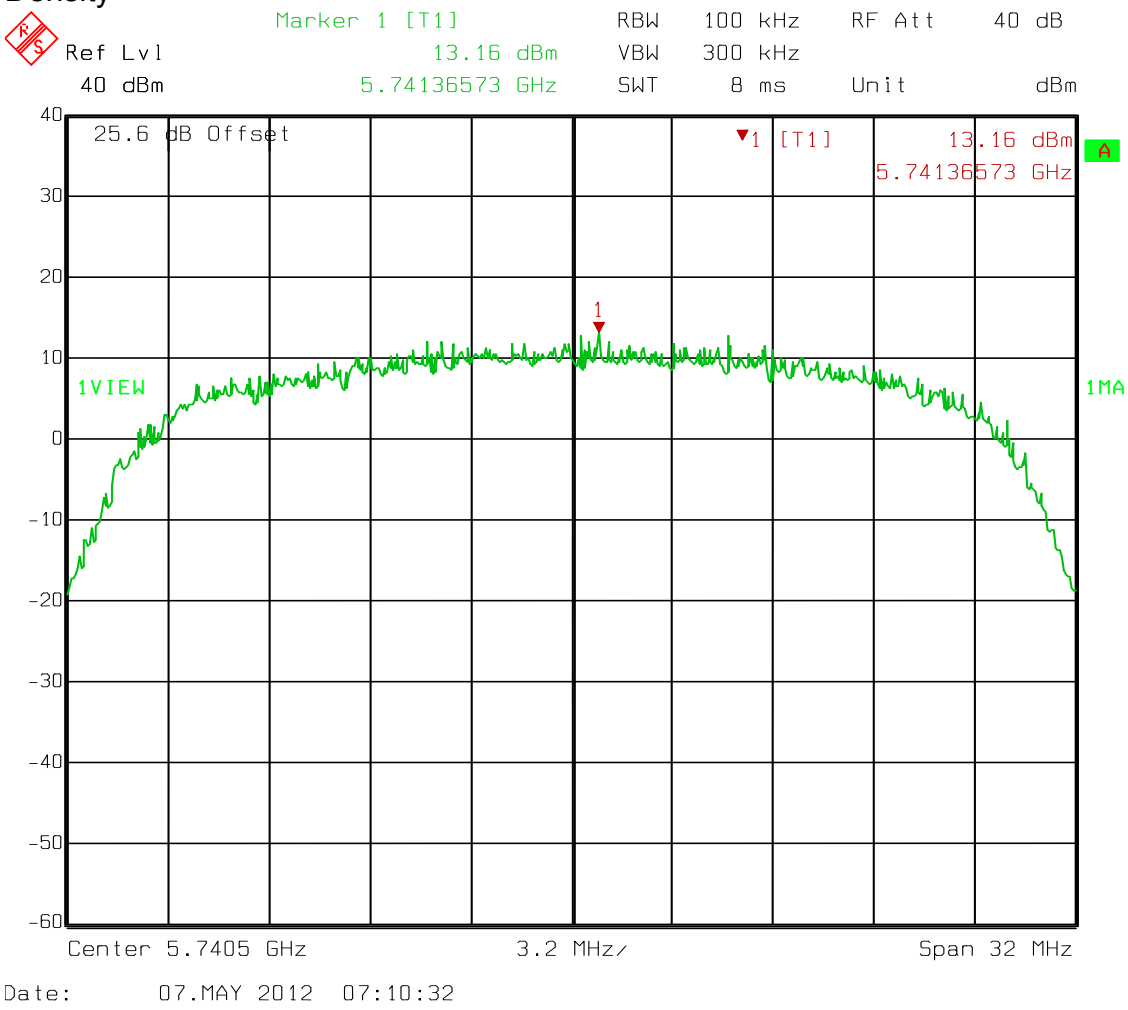
Peak Power Spectral Density

Density
10 MHz Channel
4QAM
17.15-15.2= 1.95 dBm



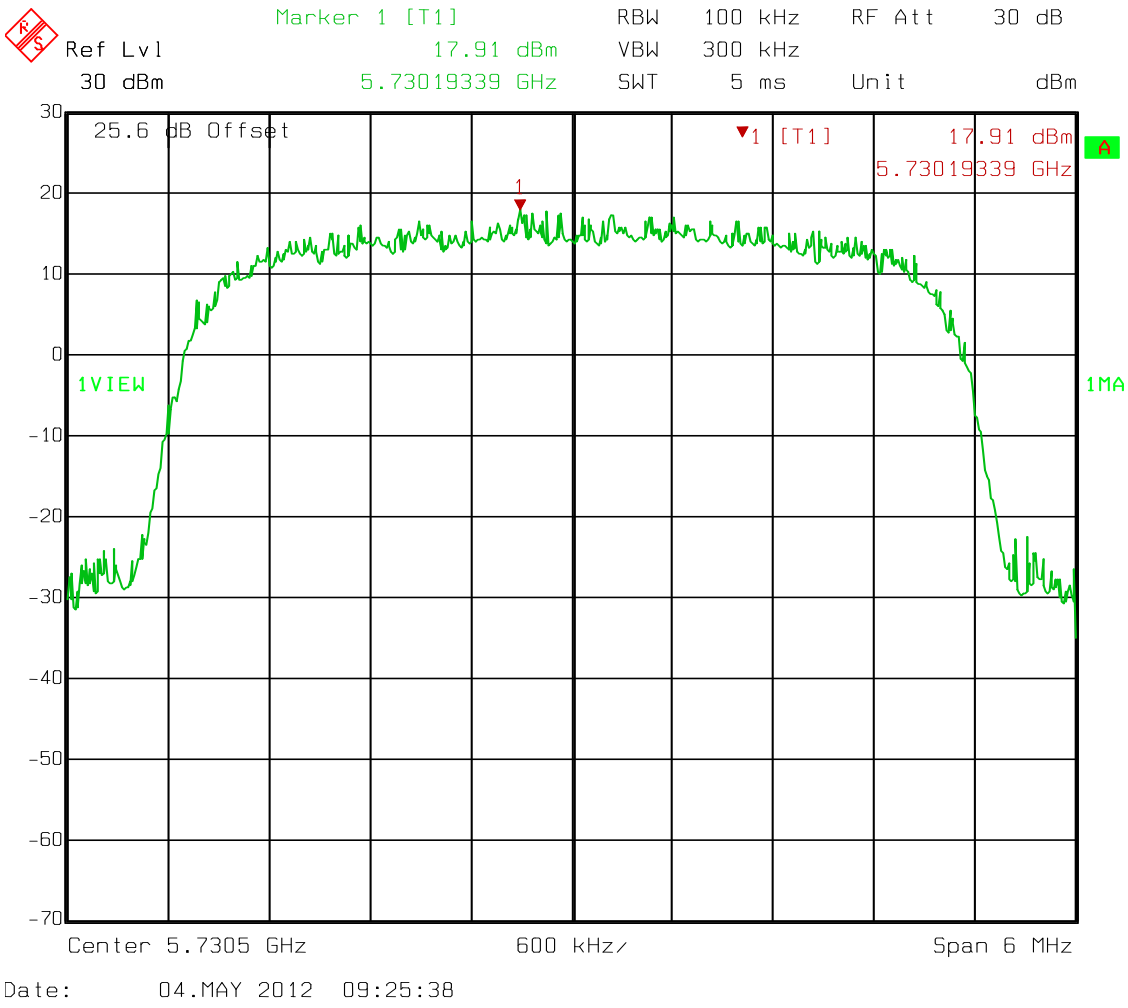
Peak Power Spectral Density

Lowest Channel
30 MHz Channel
4QAM
Density



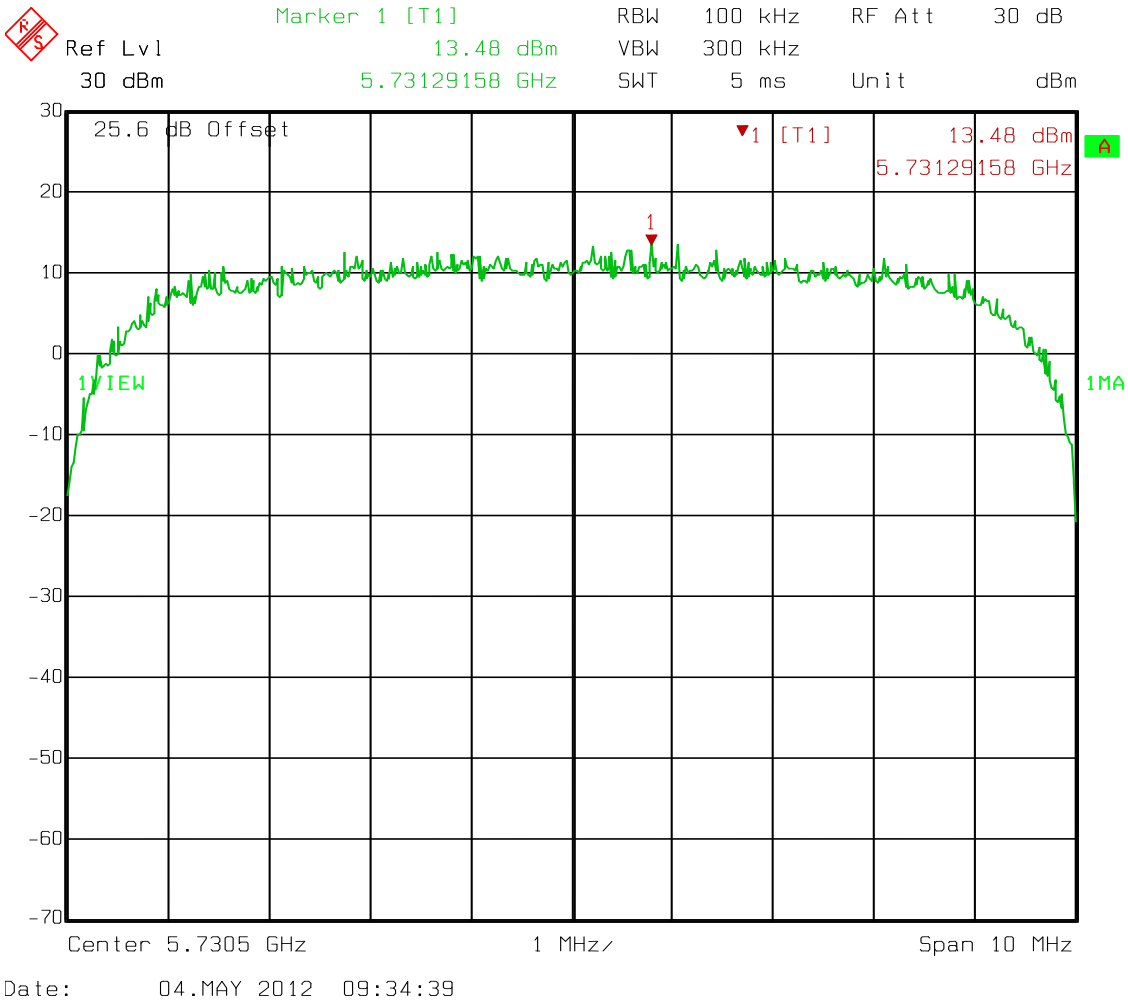
Peak Power Spectral Density

Low Channel
128 QAM
5 MHz Channel
Density
17.91-15.2=2.71 dBm



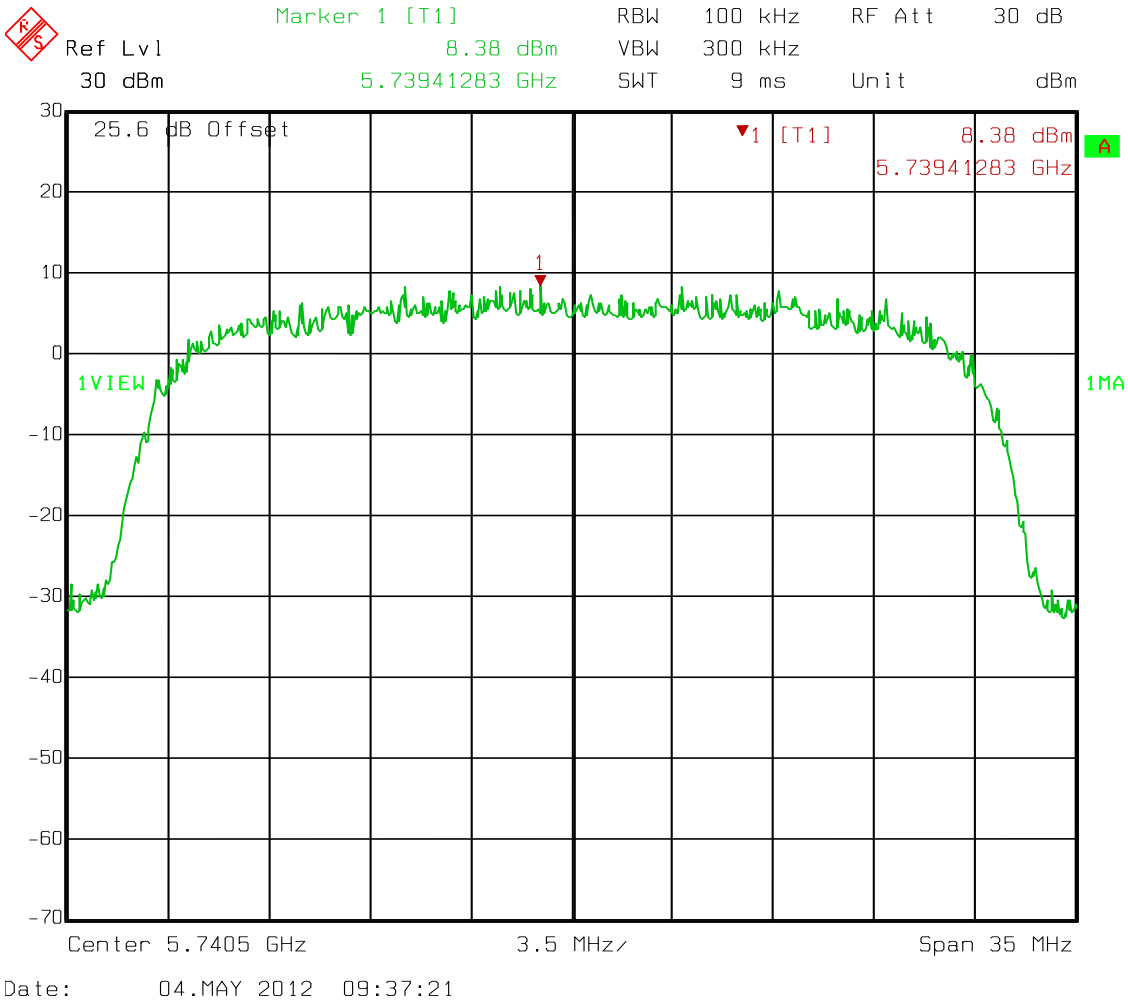
Peak Power Spectral Density

Low Channel
256QAM
10 MHz Channel
Density
13.48-15.2=-1.72 dBm



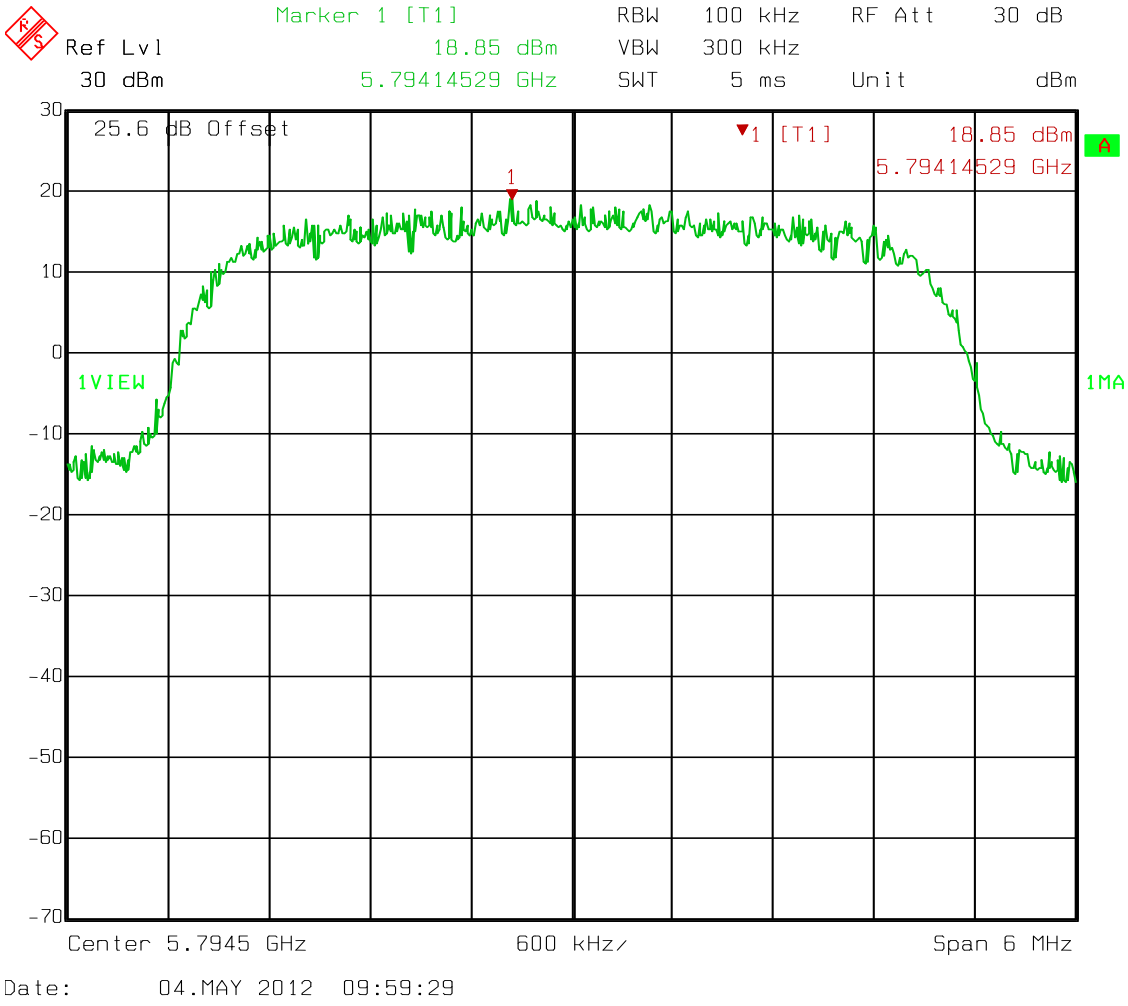
Peak Power Spectral Density

Low Channel
256QAM
30 MHz Channel
Density
8.38-15.2=-6.82 dBm



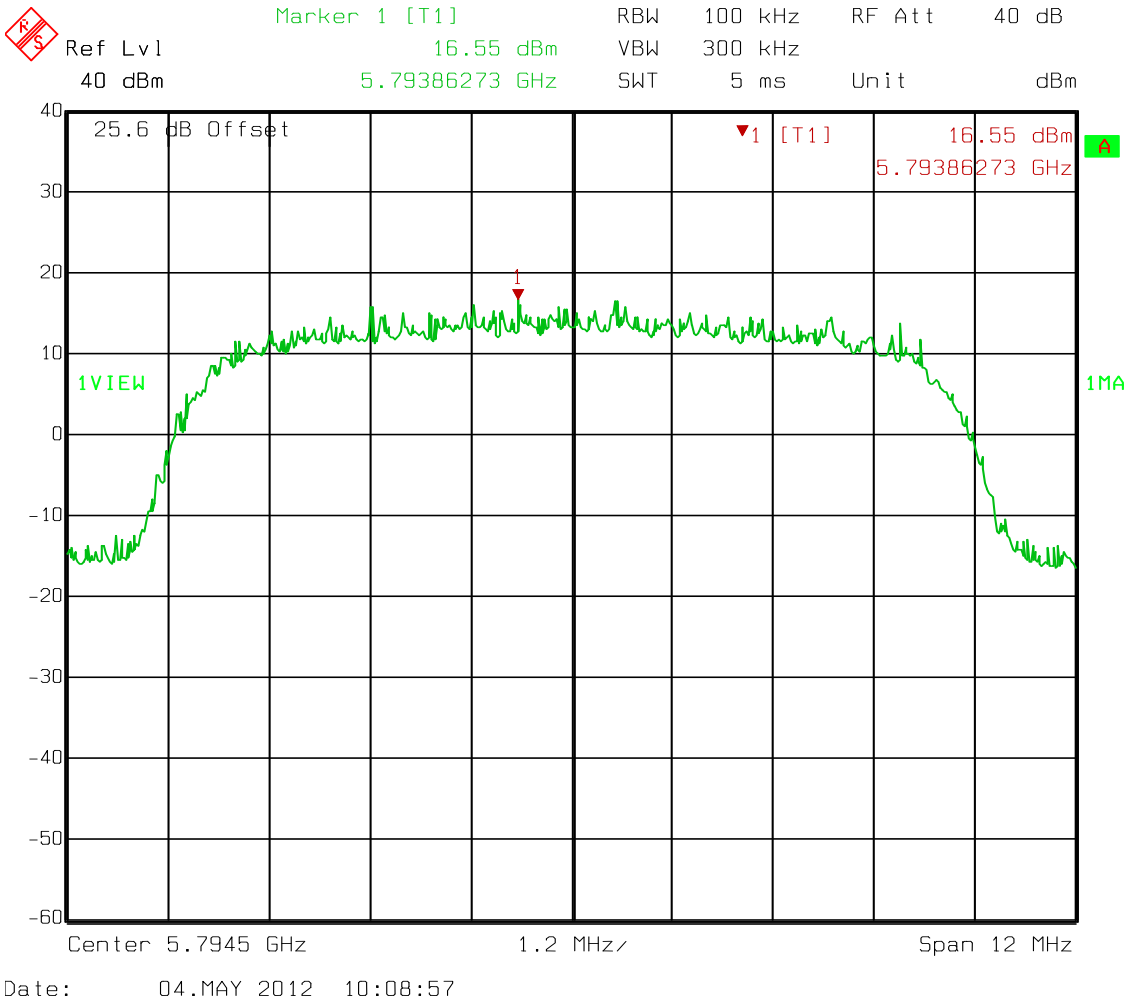
Peak Power Spectral Density

Mid Channel
5 MHz Channel
4QAM
Density
18.85-15.2=3.65 dBm



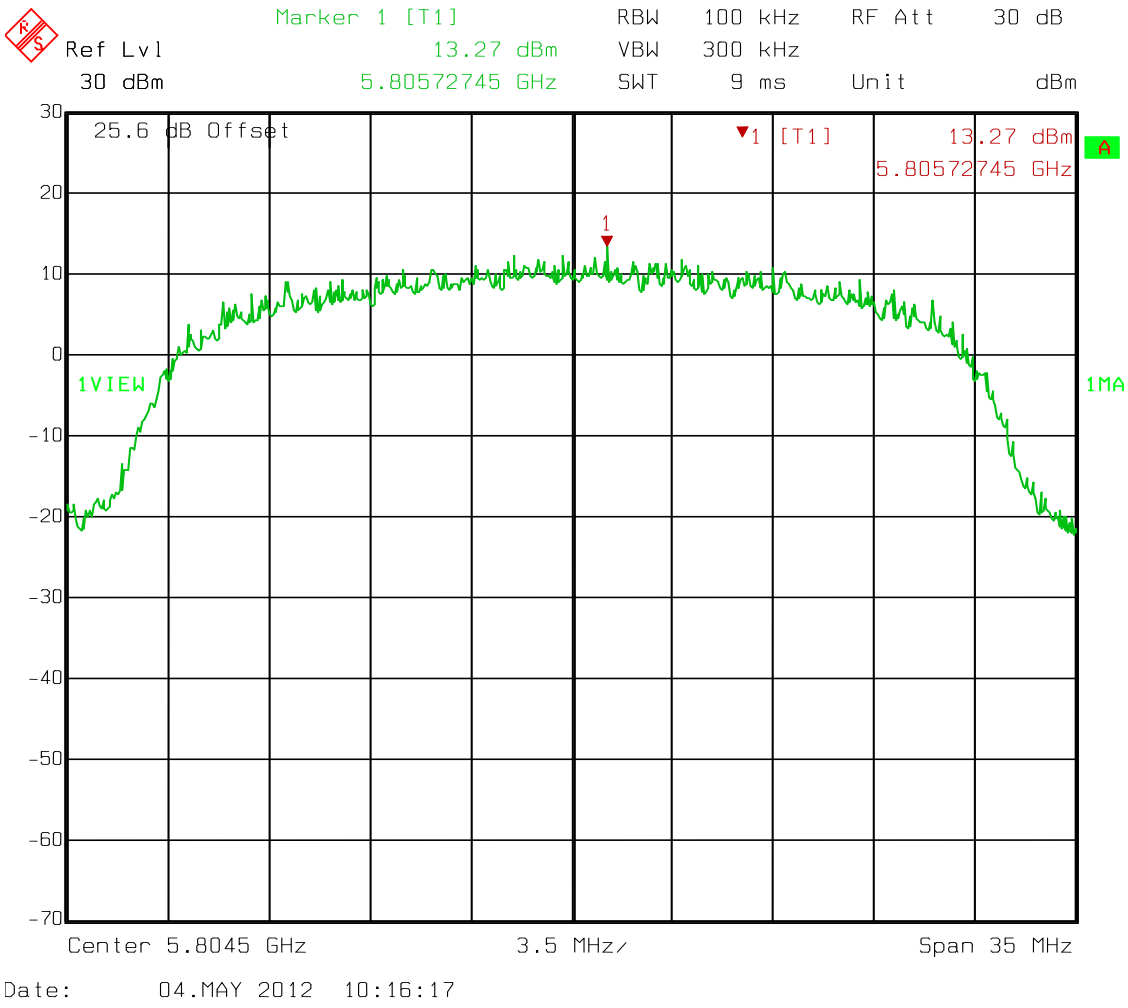
Peak Power Spectral Density

Mid Channel
10 MHz Channel
4QAM
Density
16.55-15.2= 1.35 dBm



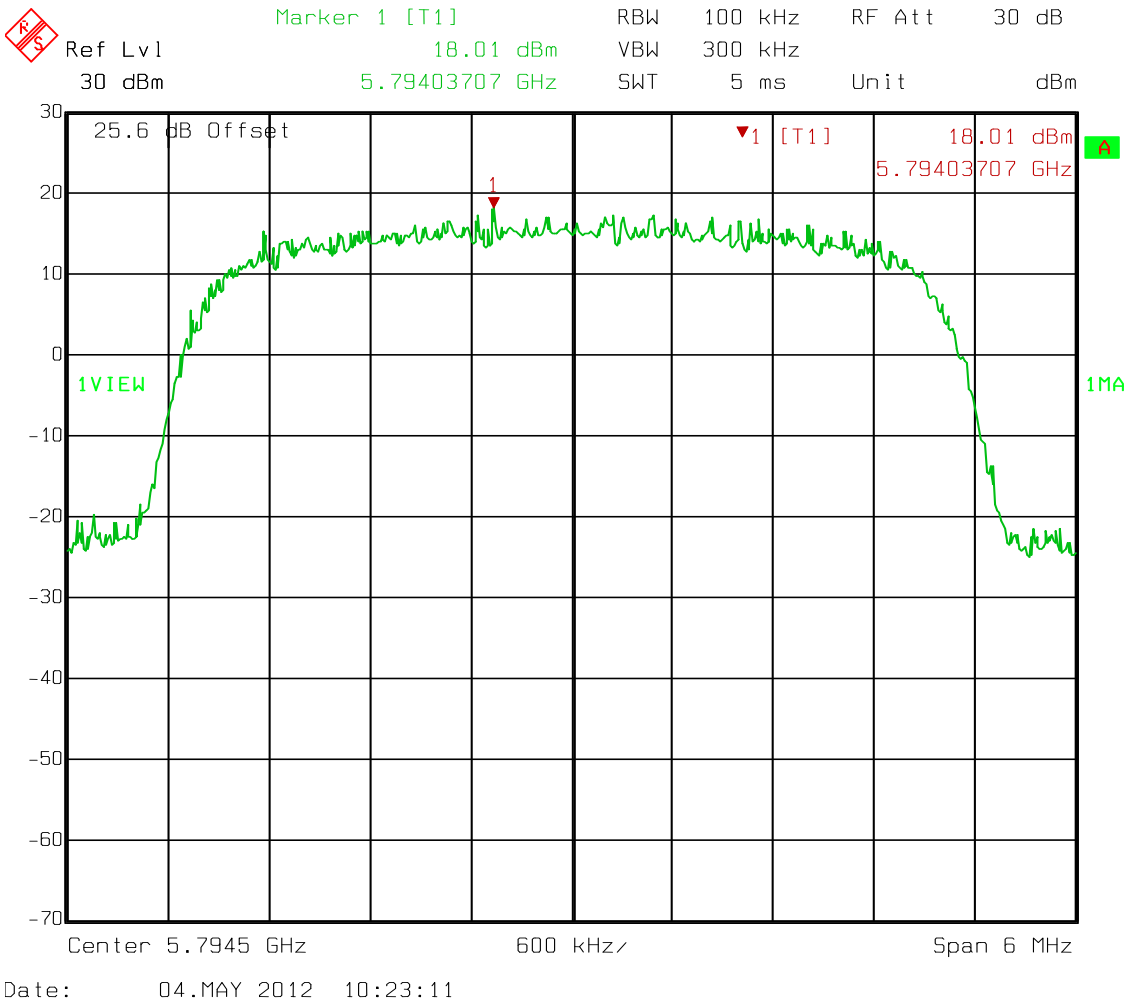
Peak Power Spectral Density

Mid Channel
4QAM
30 MHz Channel
Density
13.27-15.2=-1.93 dBm



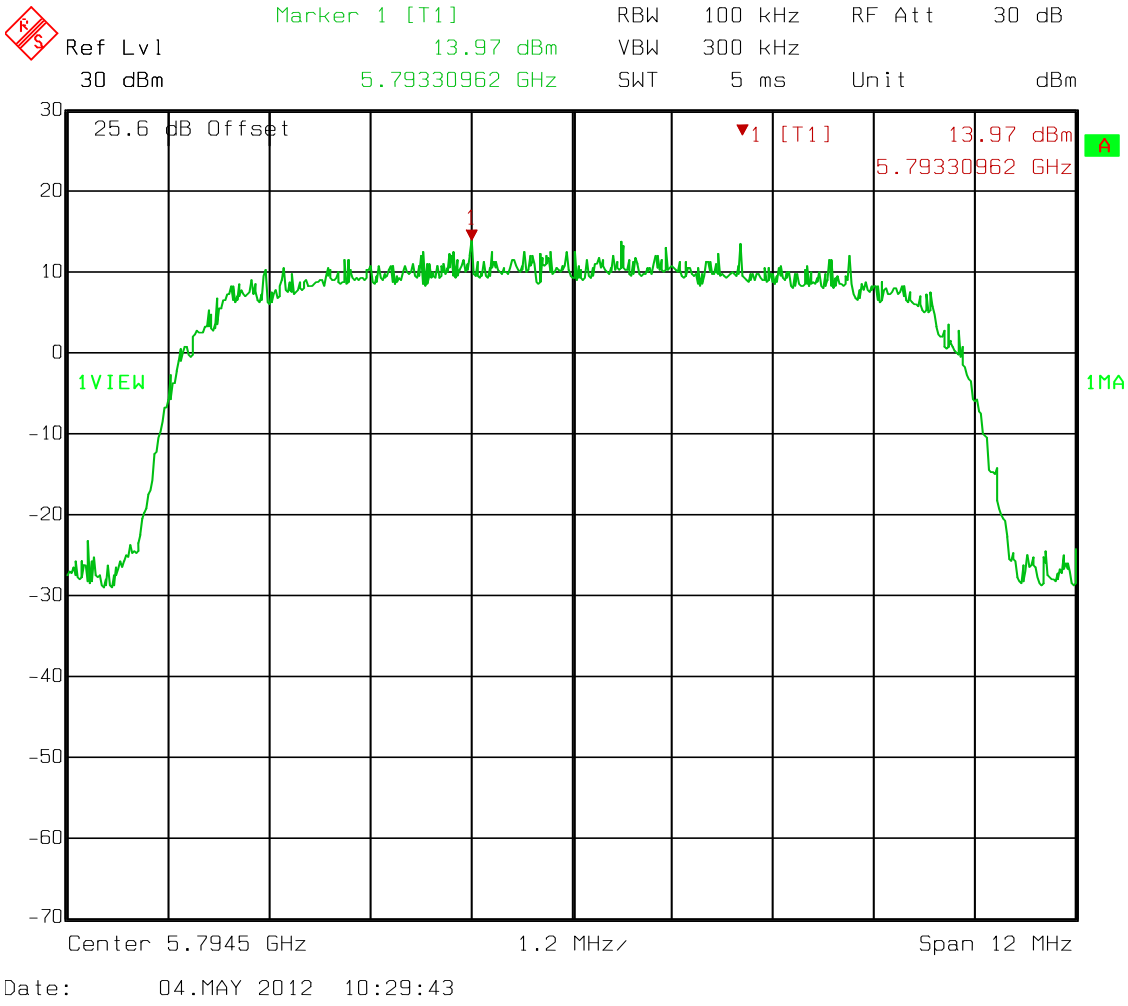
Peak Power Spectral Density

Mid Channel
128 QAM
5 MHz Channel
Density
18.01-15.2=2.81 dBm



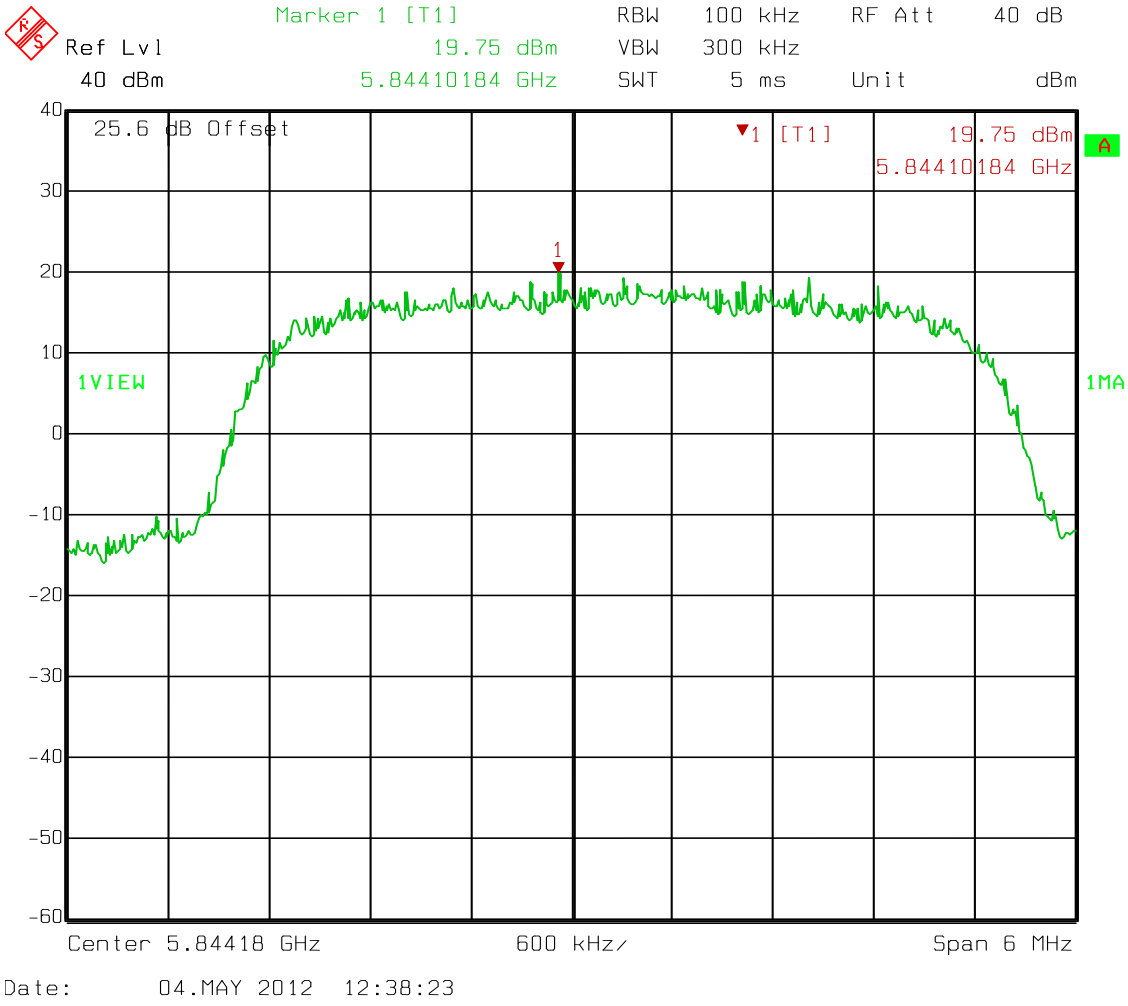
Peak Power Spectral Density

Mid Channel
256 QAM
10 MHz Channel
Density
13.97-15.2=-1.23 dBm



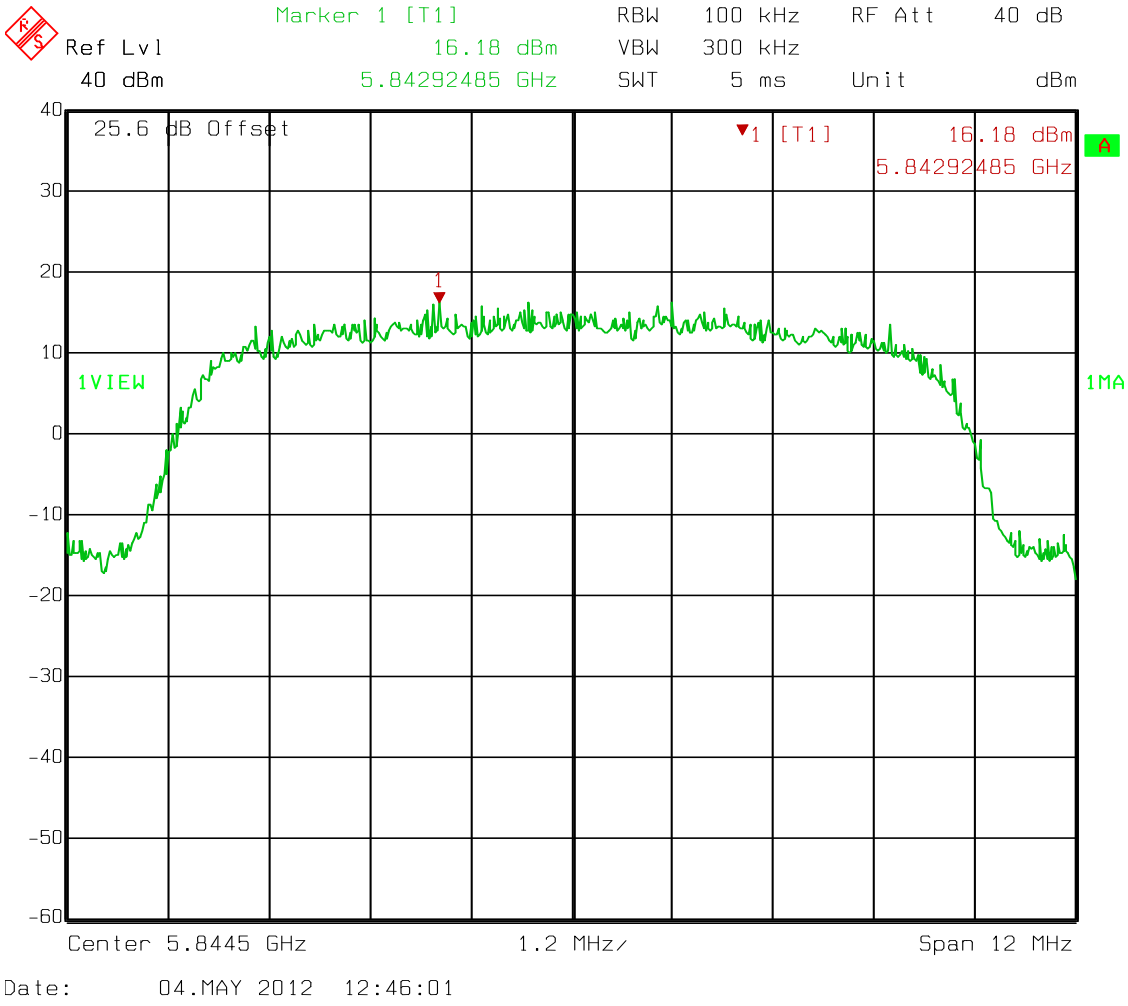
Peak Power Spectral Density

High Channel
4QAM
5 MHz Channel
Density
19.75-15.2=4.55 dBm



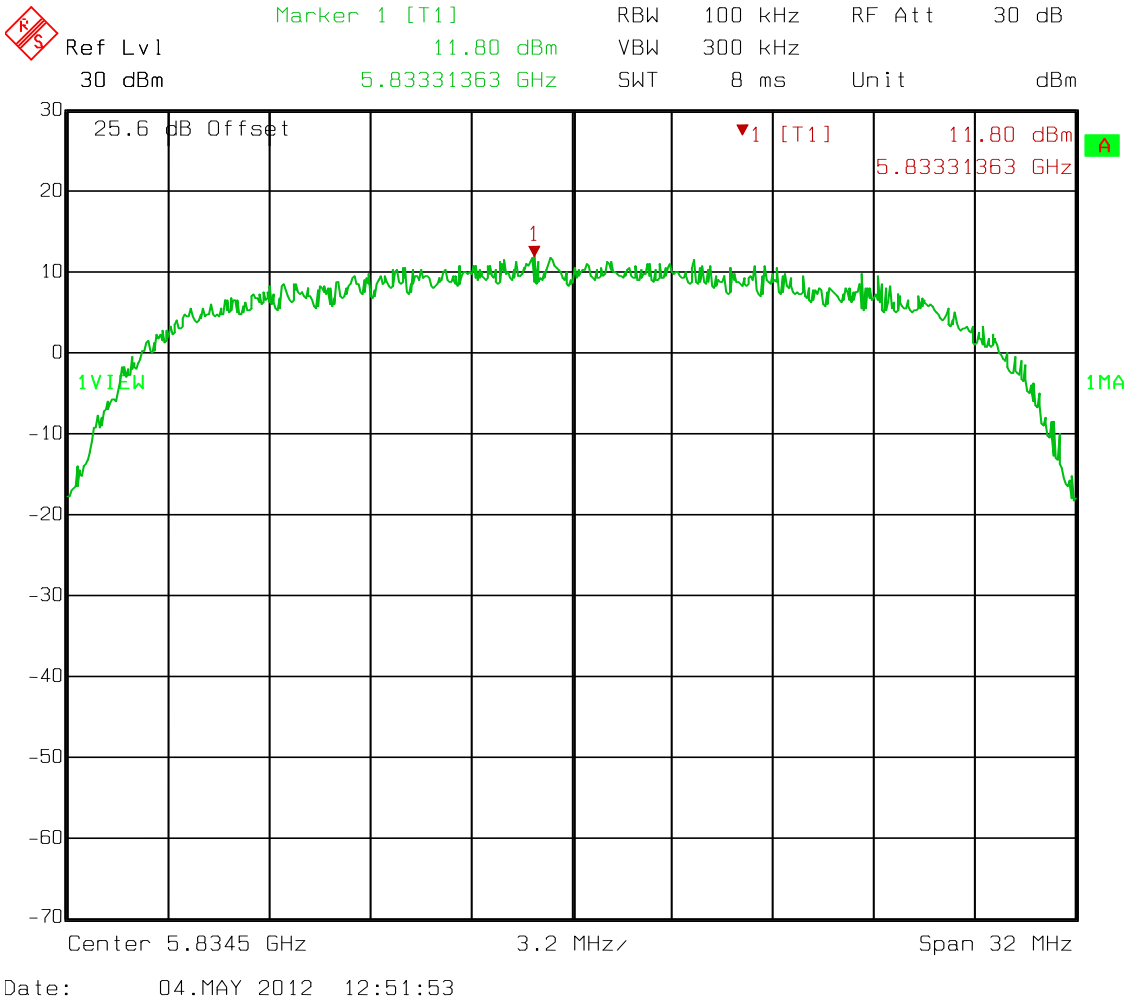
Peak Power Spectral Density

High Channel
4QAM
10 MHz Channel
Density
16.18-15.2=0.98 dBm



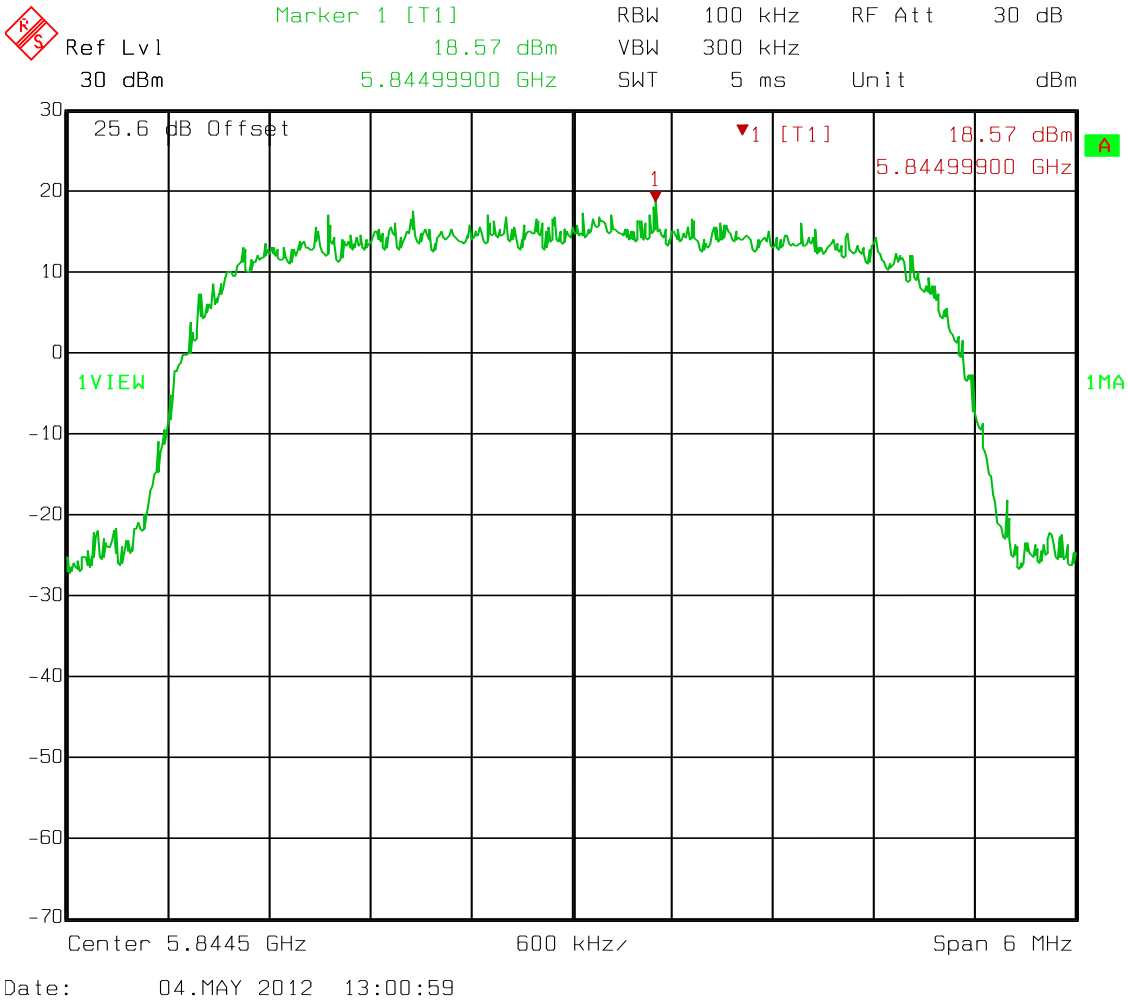
Peak Power Spectral Density

High Channel
4QAM
30 MHz Channel
Density
11.8-15.2=-3.4 dBm



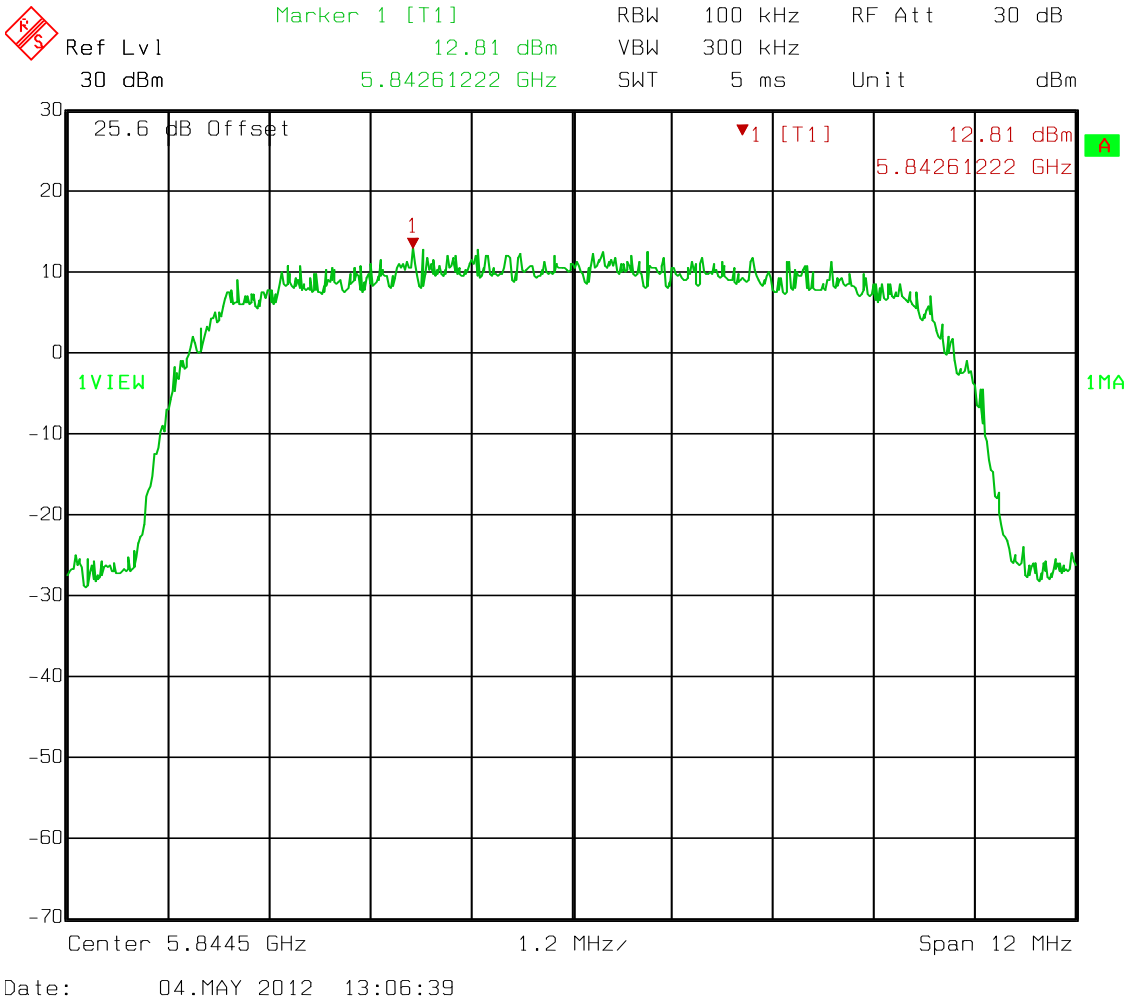
Peak Power Spectral Density

High Channel
128QAM
5 MHz Channel
Density
18.57-15.2=3.37 dBm



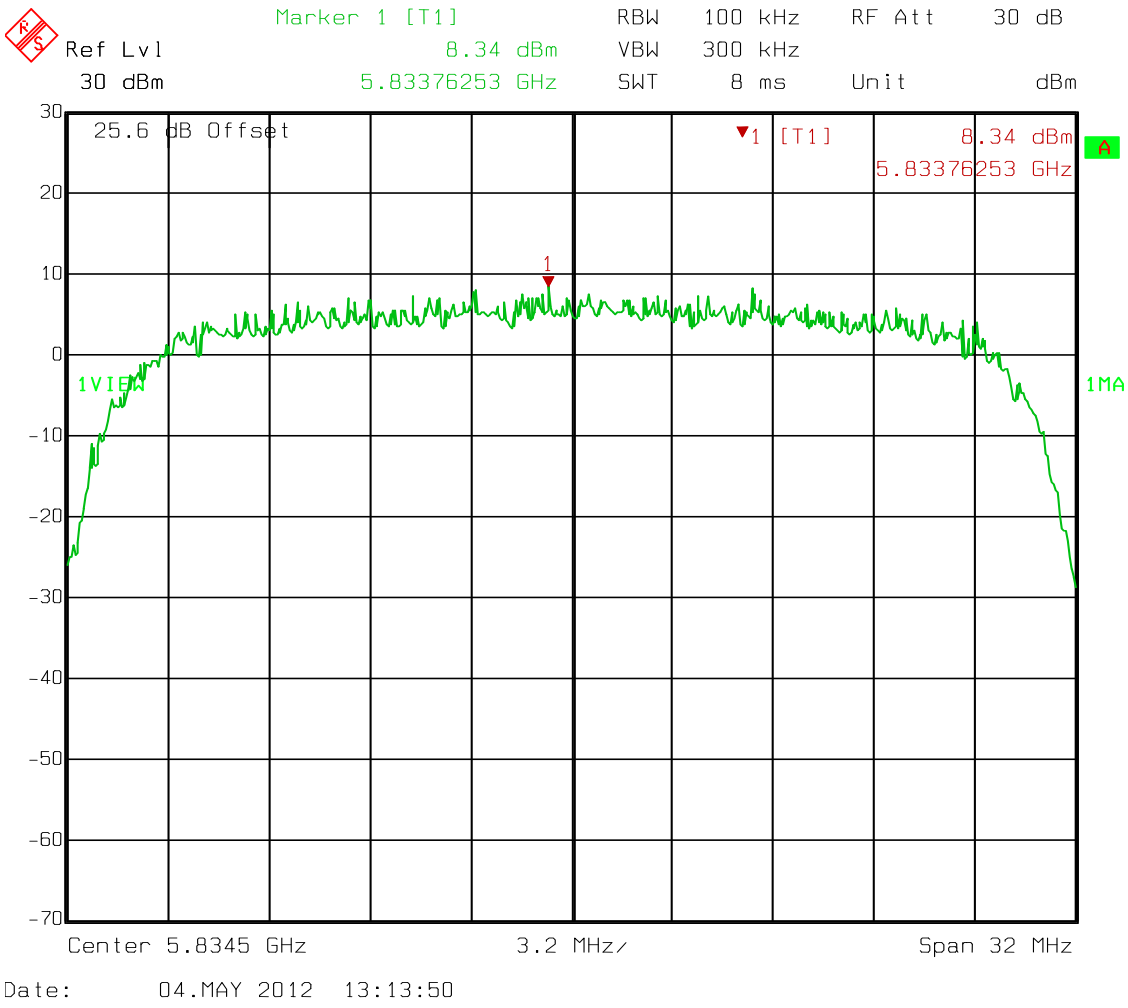
Peak Power Spectral Density

High Channel
256QAM
10 MHz Channel
Density
12.81-15.2=-2.39 dBm



Peak Power Spectral Density

High Channel
256QAM
30 MHz Channel
Density
8.34-15.2=-6.86 dBm



Section 8. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a) RSS-Gen 7.2.4
TESTED BY: David Light	DATE: 11 June 2012

Test Results: Complies.

Measurement Data: See attached plots.

Measurement Uncertainty: +/- 1.7 dB

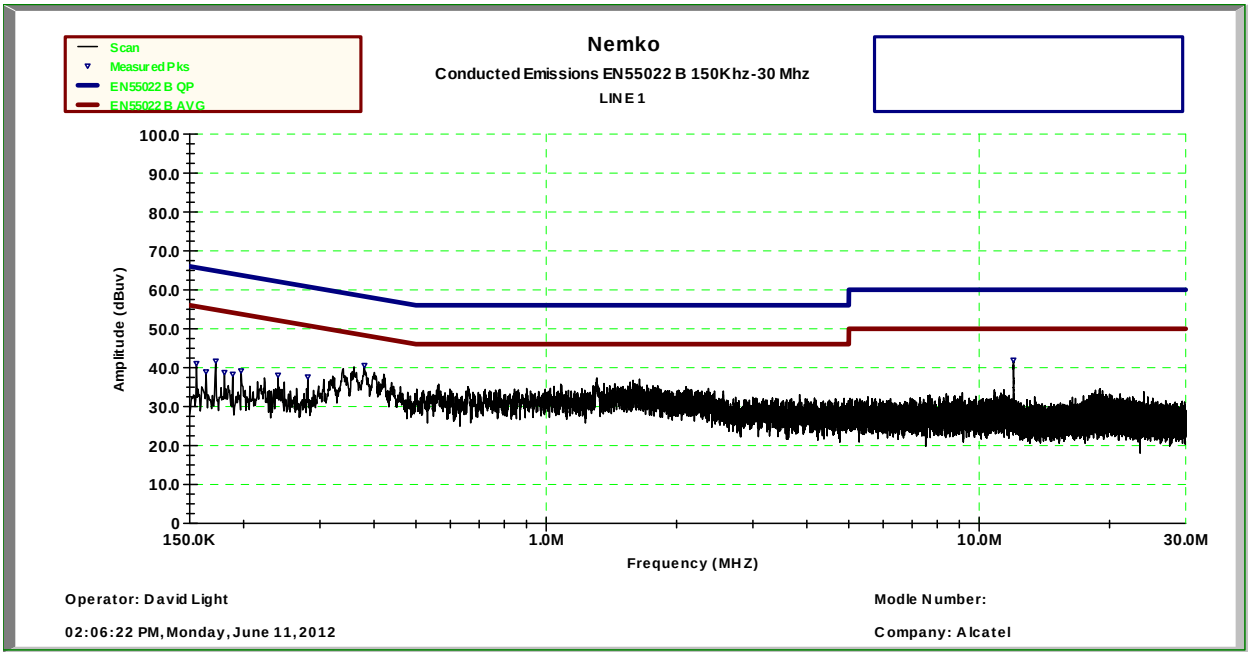
Temperature: 23° C

Relative Humidity; 50%

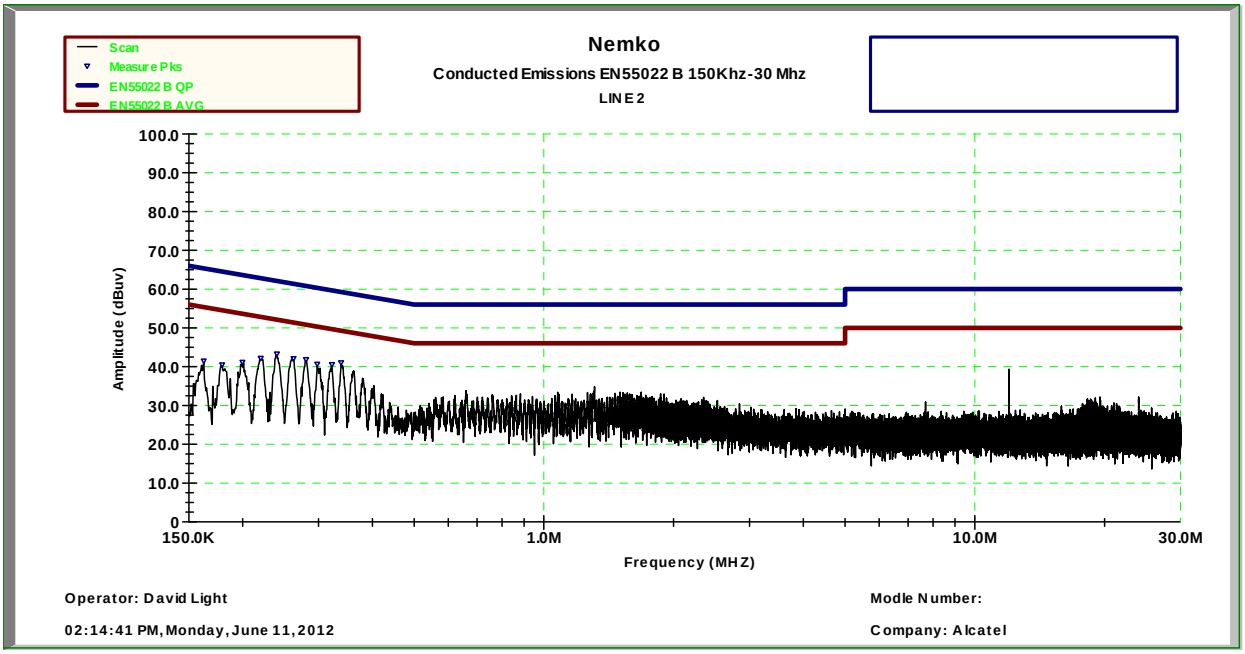
Test Equipment Used: 1188-1275-1925-968-1663-674

Test Data – Powerline Conducted Emissions

Line 1



Line 2



Section 9. Test Equipment List

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
674	Limiter	Hewlett Packard	11947A	3107A02200	01-Nov-2011	01-Nov-2012
968*	150KHz to 30MHz High Pass Filter	Solar Electronics	7930-5.0	933124	25 July-2012	25-July-2013
993	Antenna, Horn	A.H. Systems	SAS-200/571	162	22-Sep-2011	22-Sep-2013
1016	Preamplifier	Hewlett Packard	8449A	2749A00159	20-Jul-2011	20-Jul-2012
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	23-Dec-2011	23-Dec-2013
1082	Cable, 2m	Astrolab	32027-2-29094-72TC		N/R	
1188	LISN	EMCO	3825/2	1214	22-Nov-2011	22-Nov-2012
1275*	Cable, 2.3m	Nemko USA, Inc.	RG214		06-Aug-2012	06-Aug-2013
1472	Attenuator, 20dB,	Omni Spectra	20600-20db		N/R	
1480	Antenna, Bilog	Schaffner-Chase	CBL6111C	2572	07-Feb-2012	07-Feb-2013
1663	Spectrum Analyzer	Rohde & Schwartz	FSP3	100073	02-Sep-2011	02-Sep-2013
1767	Receiver	Rohde & Schwartz	ESIB26	837491/0002	09-Dec-2011	09-Dec-2012
1783	Cable Assy,	Nemko	Chamber		26-Sep-2011	26-Sep-2012
1925	3m Cable	Nemko USA	1925 RG 214	1	14-Feb-2012	14-Feb-2013

*Note-These items were past the calibration date when testing was performed. Upon calibration at the date(s) indicated, the items were found to be within tolerance.

ANNEX A - TEST DETAILS

NAME OF TEST: Powerline Conducted Emissions PARA. NO.: 15.207(a)/7.2.4

Minimum Standard: 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.

NAME OF TEST: Maximum Peak Output Power PARA. NO.: 15.247(b)(3)/A8.4(4)

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.

5.2.1.1 Measurement Procedure PK1:

1. This procedure requires availability of a spectrum analyzer resolution bandwidth that is ≥ EBW.
2. Set the RBW ≥ EBW.
3. Set VBW ≥ 3 x RBW.
4. Set span = zero.
5. Sweep time = auto couple.
6. Detector = peak.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use peak marker function to determine the peak amplitude level within the fundamental emission.

5.2.1.2 Measurement Procedure PK2:

1. This procedure provides an integrated measurement alternative when the maximum available RBW < EBW.
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Set the span to a value that is 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges (for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at 1 MHz intervals extending across the EBW of the spectrum.

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(2)/A8.2(a)

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:

5.1.1 EBW Measurement Procedure:
1. Set resolution bandwidth (RBW) = 1-5 % of the emission bandwidth (EBW).
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1-5 %.

5.1.2 Alternate EBW Measurement Procedure:
The automatic bandwidth measurement capability of a spectrum analyzer may be employed if it implements the functionality described above (*e.g.*, RBW = 1-5% of EBW, VBW ≥ 3 x RBW, peak detector with maximum hold). When using this capability, care should be taken to ensure that the bandwidth measurement is not influenced by any nulls in the fundamental emission.

NAME OF TEST: Spurious Emissions(conducted)	PARA. NO.: 15.247(d)/A8.5

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:

5.4.1.1 Measurement Procedure – Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Set the span to 5-30 % greater than the EBW.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW. Next, determine the power in 100 kHz band segments outside of the authorized frequency band using the following measurement:

5.4.1.2 Measurement Procedure - Unwanted Emissions

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified above.

NAME OF TEST: Radiated Spurious Emissions PARA. NO.: 15.247(c)/7.2.2

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)/A8.2(b)

Minimum Standard: The transmitted power density averaged over any 1 second interval shall not be greater than +8 dBm in any 3 kHz bandwidth.

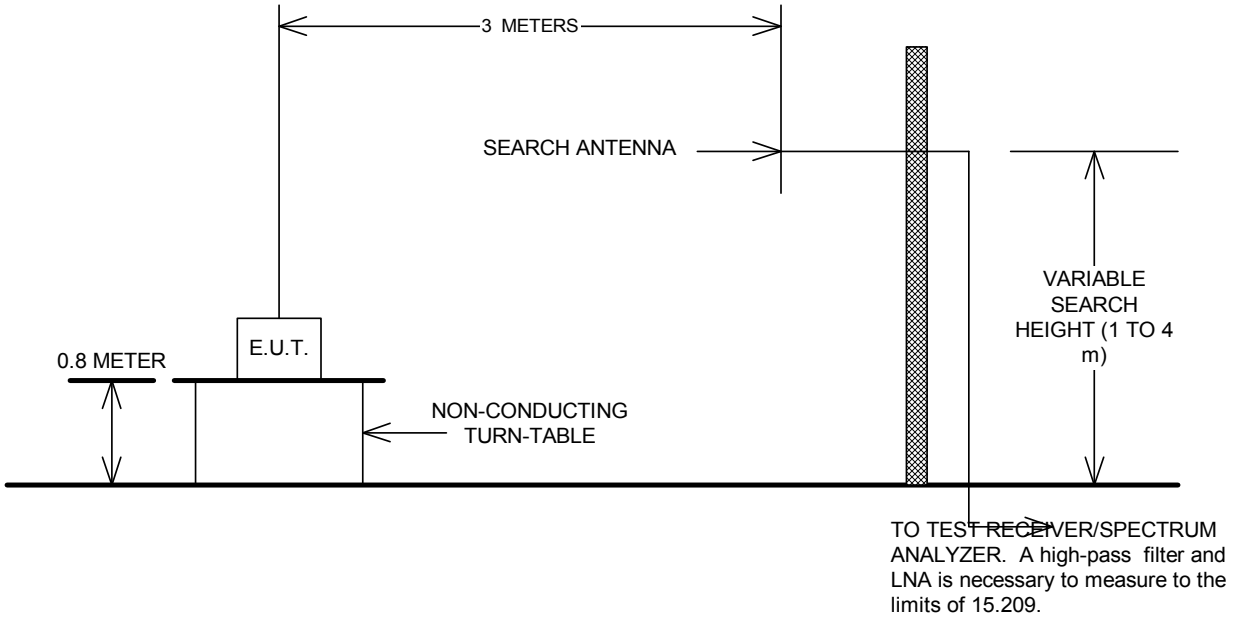
Method Of Measurement:

5.3.1 Measurement Procedure PKPSD:
1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 100 kHz.
3. Set the VBW ≥ 300 kHz.
4. Set the span to 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where
BWCF = 10log (3 kHz/100 kHz = -15.2 dB).
11. The resulting peak PSD level must be ≤ 8 dBm.

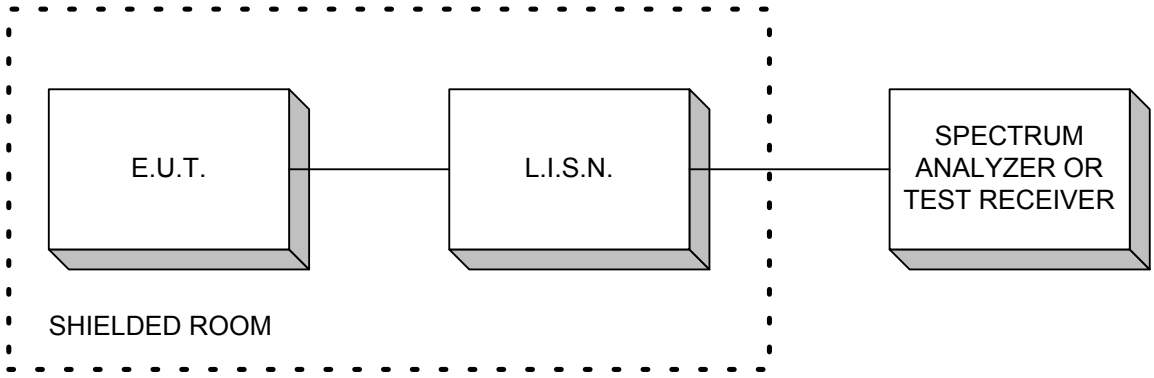
5.3.2 Measurement Procedure AVGPSD:
1. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
2. Set the analyzer span to 5-30% greater than the EBW.
3. Set the RBW = 100 kHz.
4. Set the VBW ≥ 300 kHz.
5. Detector = power average (RMS).
6. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW (use of a greater number of measurement points than this minimum requirement is recommended).
7. Manually set the sweep time to: ≥ 10 x (number of measurement points in sweep) x (transmission symbol period).
8. Perform the measurement over a single sweep.
9. Use the peak marker function to determine the maximum level in any 100 kHz band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent level in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where:
BWCF = 10log (3 kHz/100 kHz = -15.2 dB).
11. The resulting PSD level must be ≤ 8 dBm.

ANNEX B - TEST DIAGRAMS

Test Site For Radiated Emissions



Conducted Emissions



Peak Power At Antenna Terminals

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