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Nemko Test Report:	2015 279131 FCC 15247
Applicant:	Alcatel USA 3400 West Plano Parkway Plano, TX 75075 USA
Equipment Under Test: **(E.U.T.)**	MPT-HLC Model #: 3DB19060BA FCC ID.: JF6-9558L-D IC ID: 6933B-9558L-D
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. 2210 Faraday Avenue. Suite 150 Carlsbad, California 92008

TESTED BY: _____ **DATE:** **12 March 2015**
Tran Phan, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** **12 March 2015**
Jim Morris, EMC/Wireless Manager

Number of Pages: 81

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Section 1. Summary of Test Results

Manufacturer: Alcatel USA

Model No.: MPT-HLC

Serial No.: BS1447UW08Y

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 C63.10-2013. Conducted tests were made in accordance with FCC OET Bulletin 558074 D01 v03r02. 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 Conducted Average 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
Max Average Power Spectral Density	15.247(e) / RSS-210 A8.2(b)	Complies

Footnotes:

Document History

REVISION	DATE	BY	COMMENTS
-	03/12/2015	Tran Phan	Initial Release
-	5/18/2015	James Morris	Split Report

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: 5725 to 5850 MHz

Channel Spacing: 5, 10 or 30 MHz

User Frequency Adjustment: Software controlled

Description of EUT

5 GHz rack-mounted point to point transceiver. This model includes two distinct radios as listed below, which were tested together as a system.
Not included in this report is:

Part # 3DB19060AA, FCC ID.: JF6-9558L, IC ID: 6933B-9558L.

This report includes:
Part # 3DB19060BA, FCC ID.: JF6-9558L-D, IC ID: 6933B-9558L-D

Software revision: 9500MPR 5.2 WebEML Version V05.02.24.

Table 6-J. 5.8 GHz unlicensed antenna options

PARABOLIC	FLAT
MPT-HL/9558HC	MPT-HL/9558HC
2 ft parabolic – 29 dB/6°	1 ft flat panel – 23 dB/9°
4 ft parabolic – 35 dB/3°	2 ft flat panel – 28 dB/3.5°
6 ft parabolic – 38 dB/2°	—
8 ft parabolic – 41 dB/1.5°	—
10 ft parabolic – 42.5 dB/1.2°	—

Section 3. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(2) RSS-210 A8.2(a)
TESTED BY: Tran Phan	DATE: 24 Feb 2015

Test Results: Complies.

Measurement Data: See attached plots

Test Conditions: 45 %RH
22 °C

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

Test Equipment Used: 1767

The Low/Mid/High Channels were selected as following:

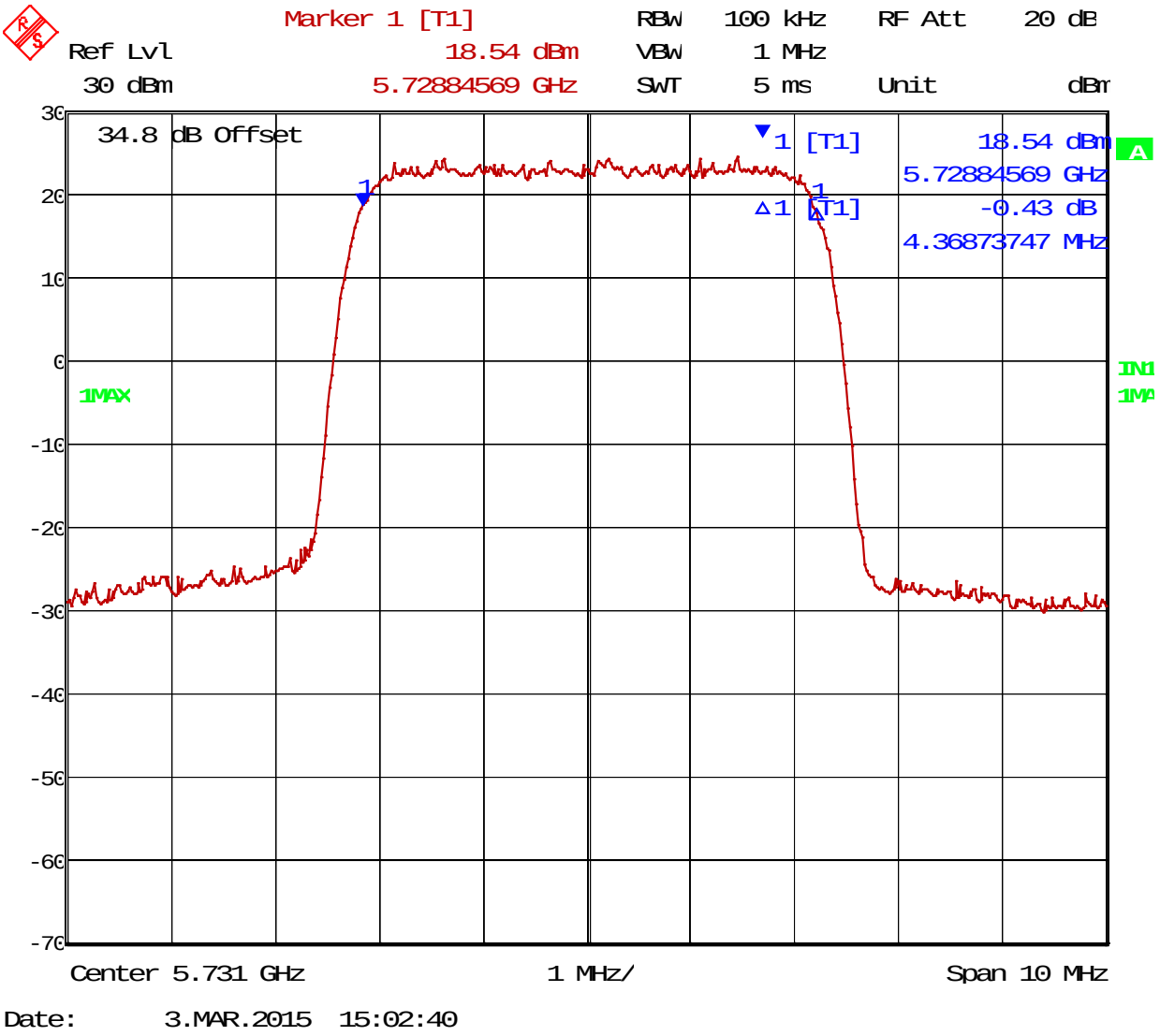
	Frequency		
Channel	**At 5MHz BW**	**At 10MHz BW**	**At 30MHz BW**
Low	5.731GHz	5.731GHz	5.741GHz
Mid	5.781GHz	5.781GHz	5.771GHz
High	5.844GHz	5.844GHz	5.834GHz

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

Only result from the lowest data rate was shown due to the worst case scenario.

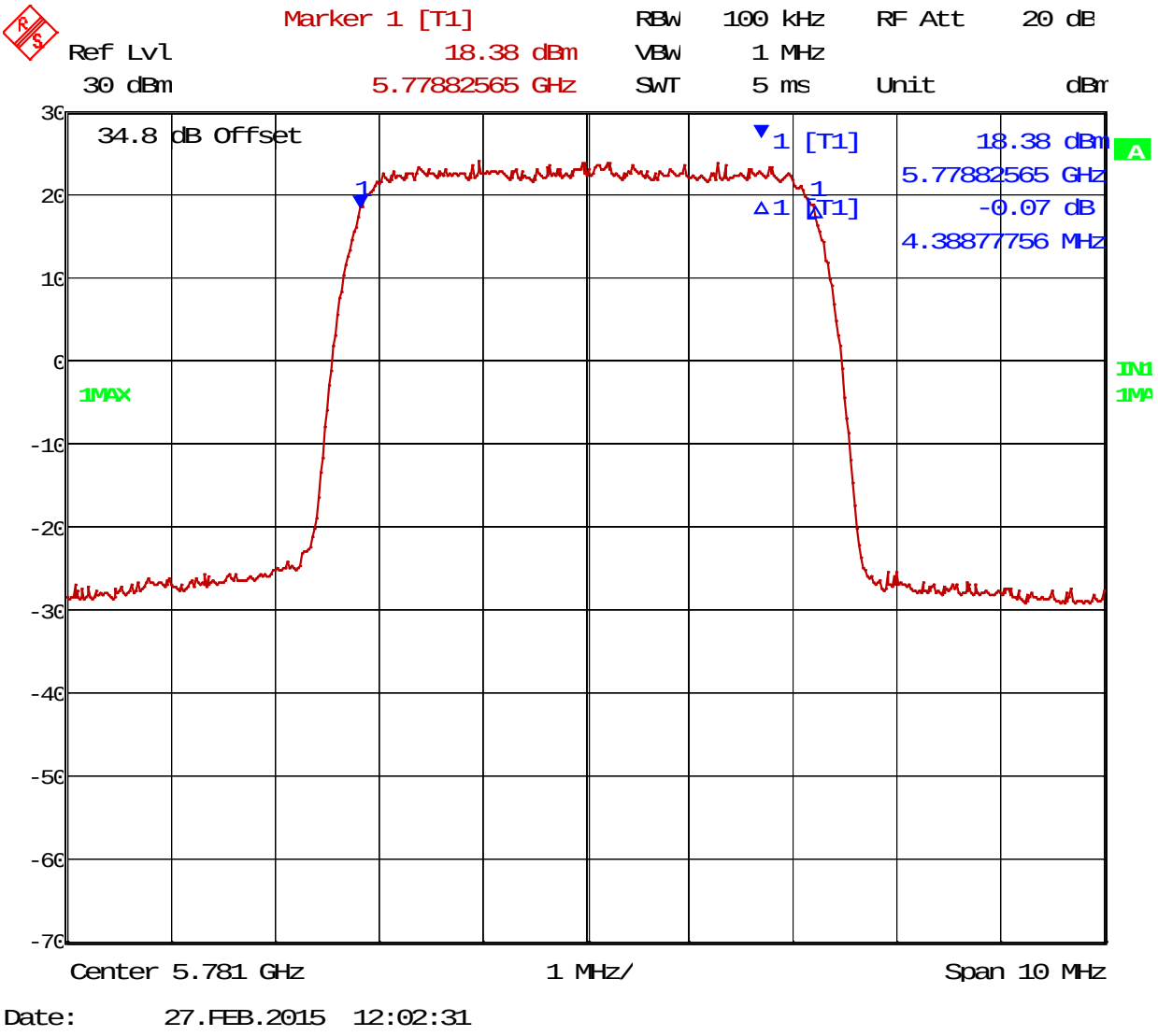
Test Data – Occupied Bandwidth

Low Channel (5.731GHz)
4QAM
5 MHz Channel
6 dB Bandwidth



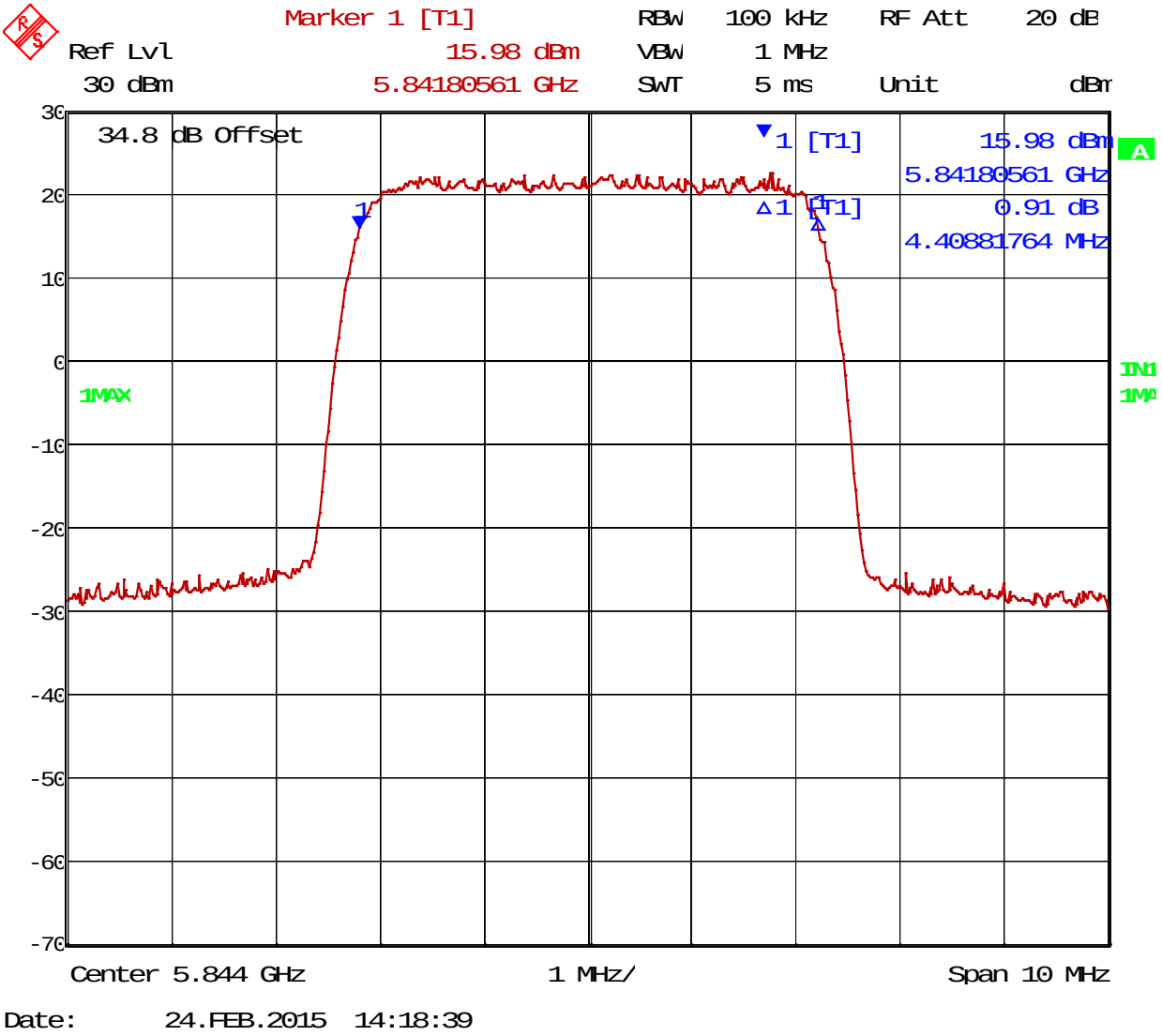
Test Data – Occupied Bandwidth

Mid Channel (5.781GHz)
4QAM
5 MHz Channel
6 dB Bandwidth



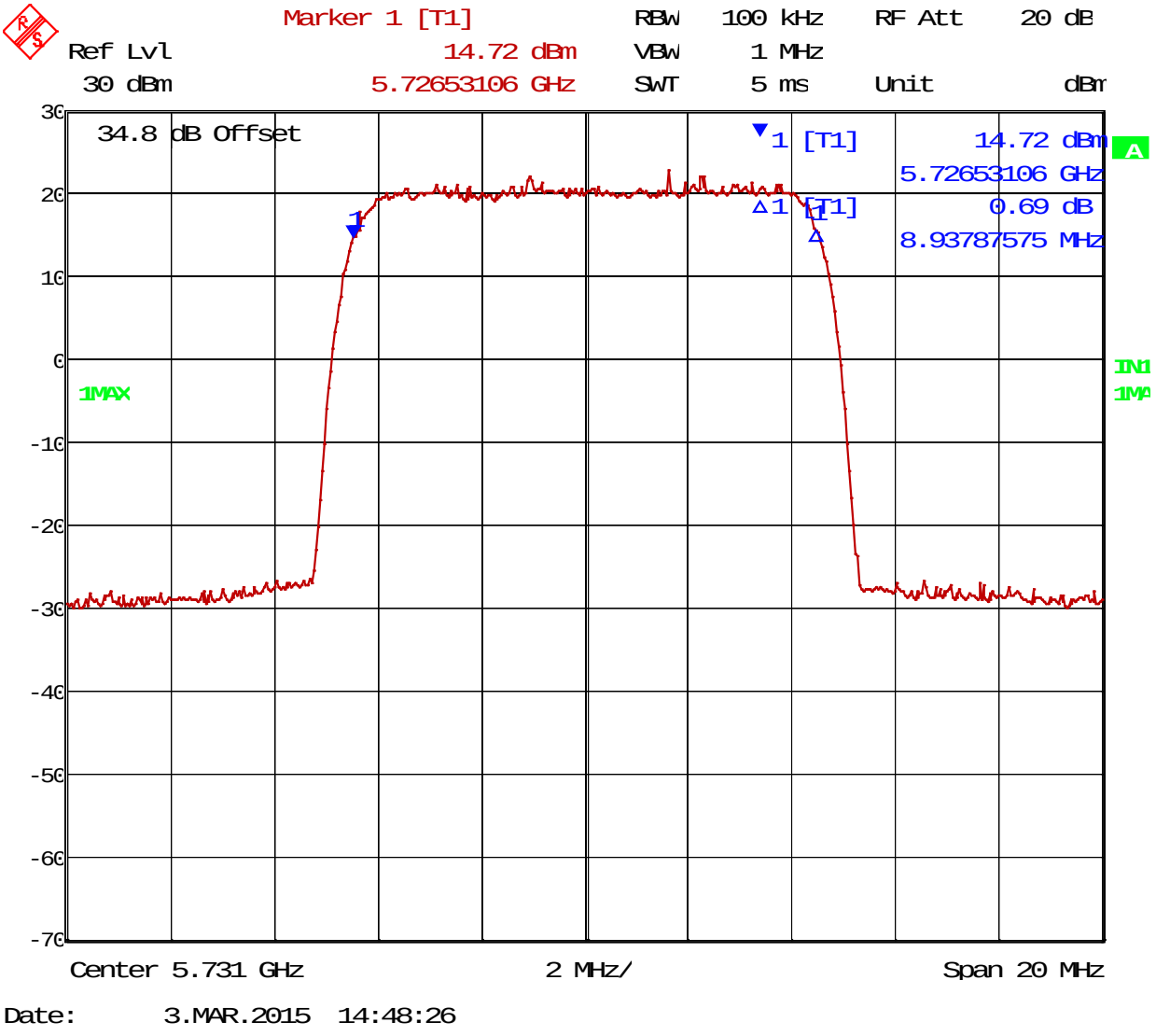
Test Data – Occupied Bandwidth

High Channel (5.834GHz)
4QAM
5 MHz Channel
6 dB Bandwidth



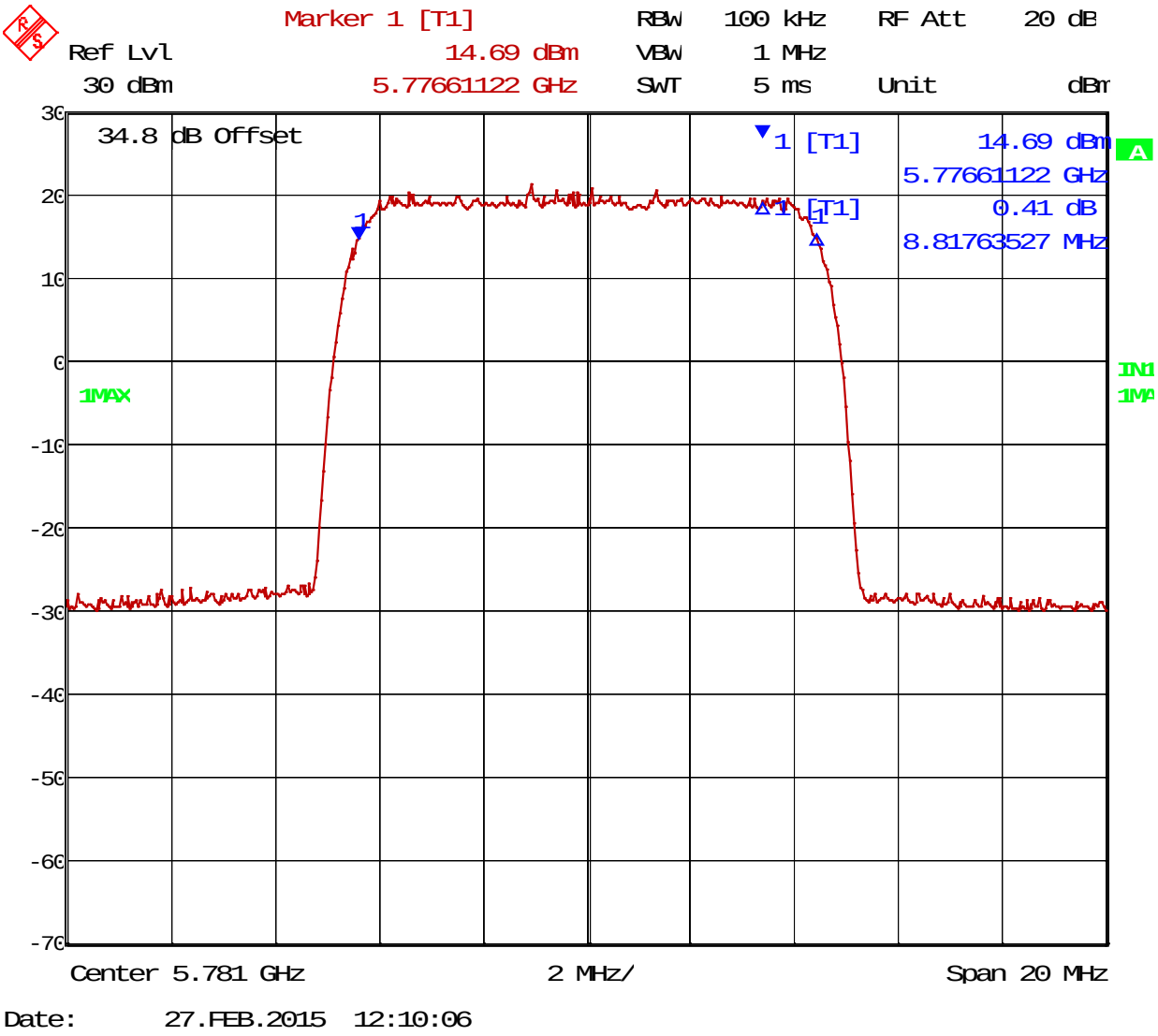
Test Data – Occupied Bandwidth

Low Channel (5.731GHz)
6 dB Bandwidth
10 MHz Channel
4QAM
6 dB Bandwidth



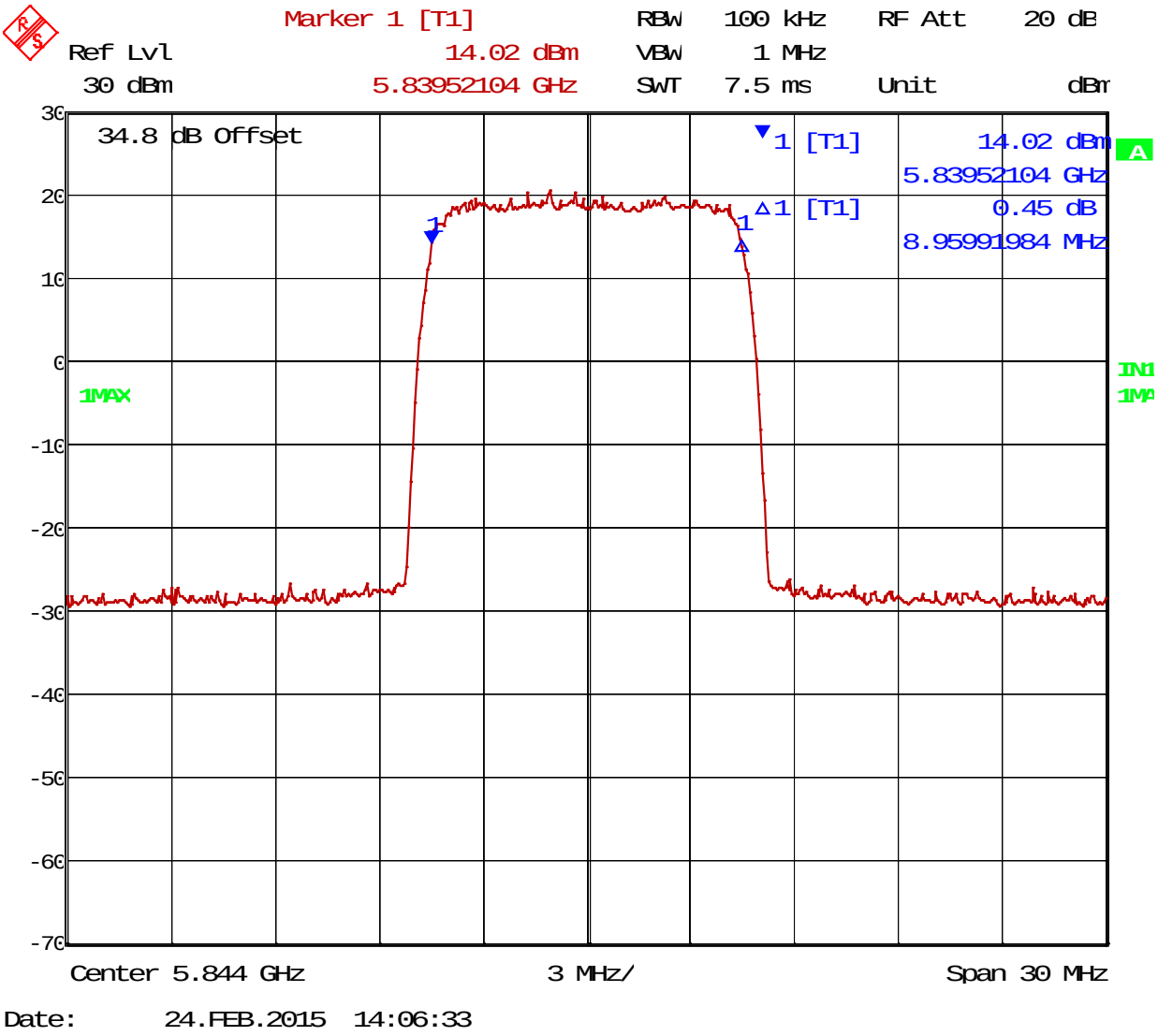
Test Data – Occupied Bandwidth

Mid Channel (5.781GHz)
10 MHz Channel
4QAM
6 dB Bandwidth



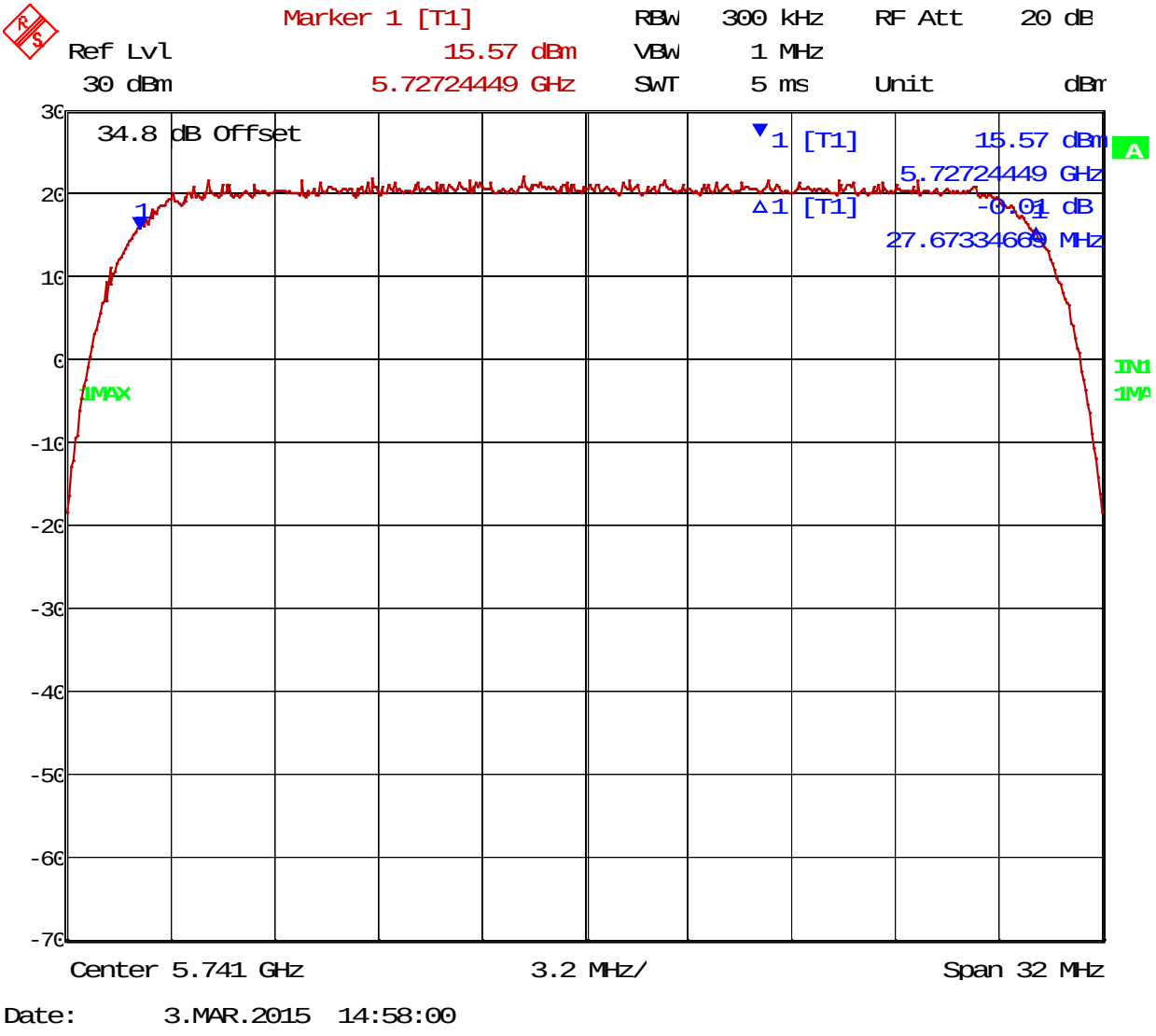
Test Data – Occupied Bandwidth

High Channel (5.844GHz)
4QAM
10 MHz Channel
6 dB Bandwidth



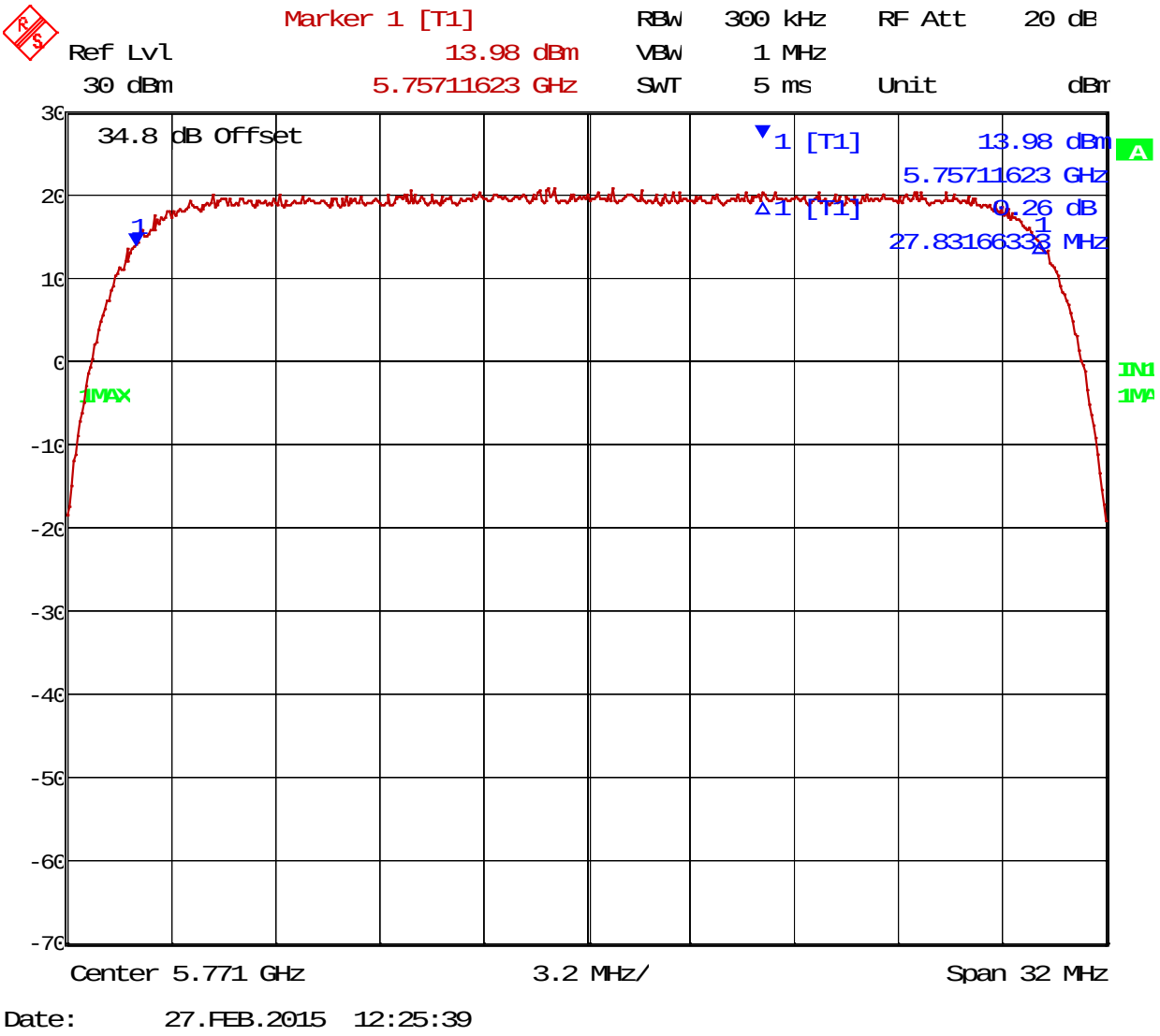
Test Data – Occupied Bandwidth

Low Channel (5.741GHz)
4QAM
30 MHz Channel
6 dB Bandwidth



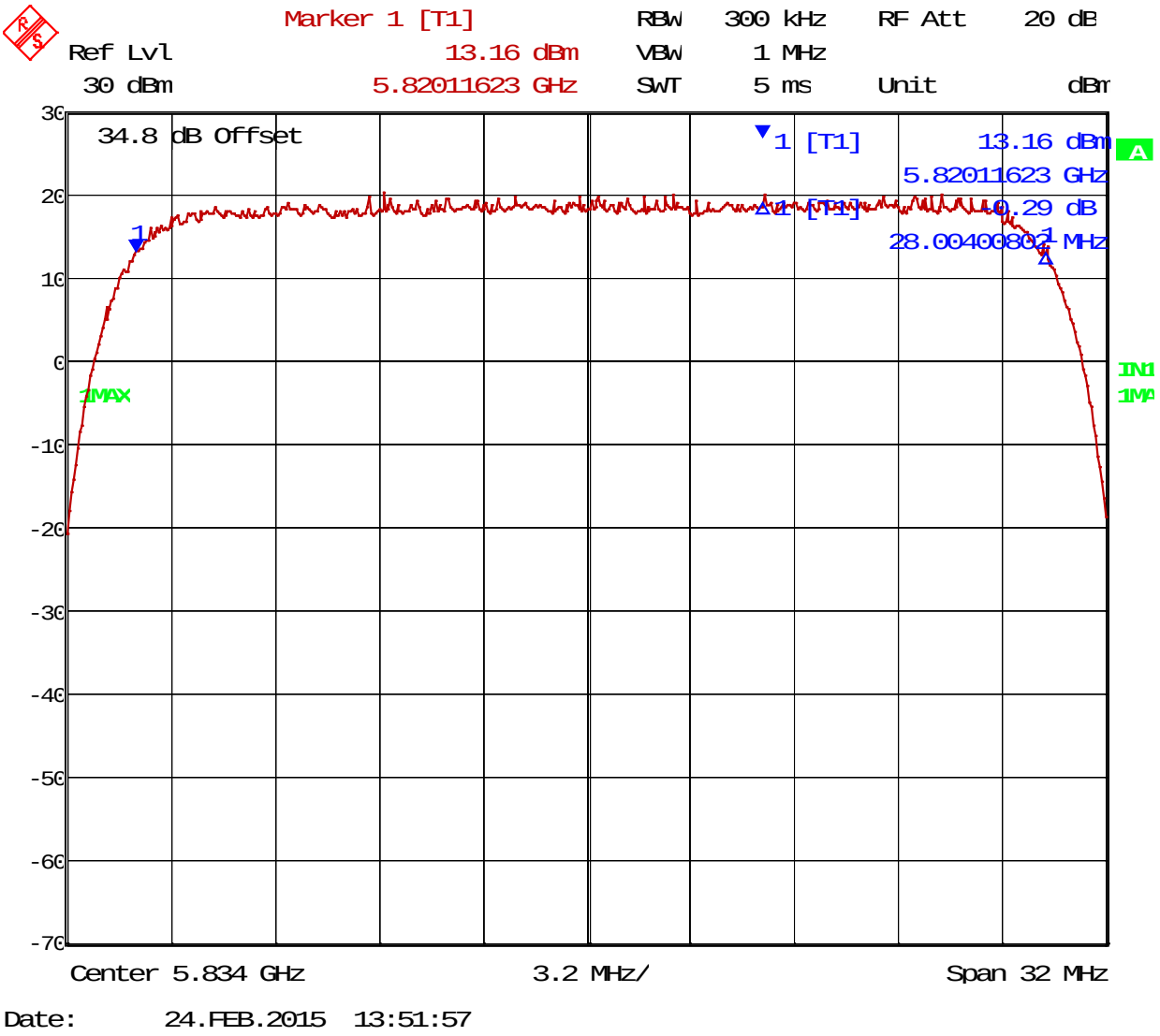
Test Data – Occupied Bandwidth

Mid Channel (5.771GHz)
4QAM
30 MHz Channel
6 dB Bandwidth



Test Data – Occupied Bandwidth

High Channel (5.834MHz)
4QAM
30 MHz Channel
6 dB Bandwidth



Section 4. Maximum Conducted Average Output Power

NAME OF TEST: Maximum Conducted Output power	PARA. NO.: 15.247(b)(3) RSS-210 A8.4(4)
TESTED BY: Tran Phan	DATE: 03 March 2015

Test Results: Complies.

Measurement Data: Refer to attached data

Test Conditions: 54 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1767

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

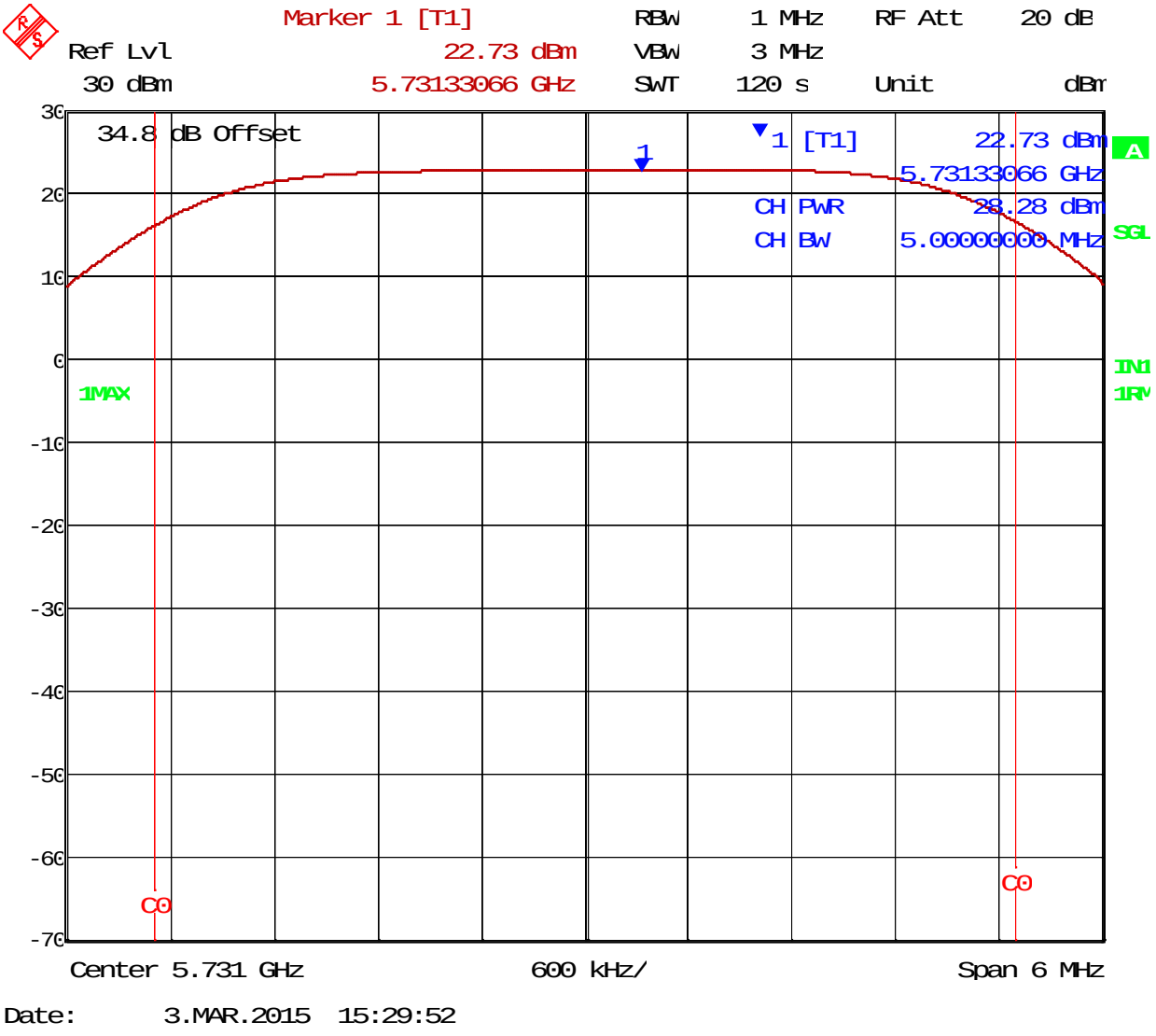
☐ For battery powered equipment, the device was tested with a fresh battery per 15.31(e).

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

☐ This test was performed radiated.

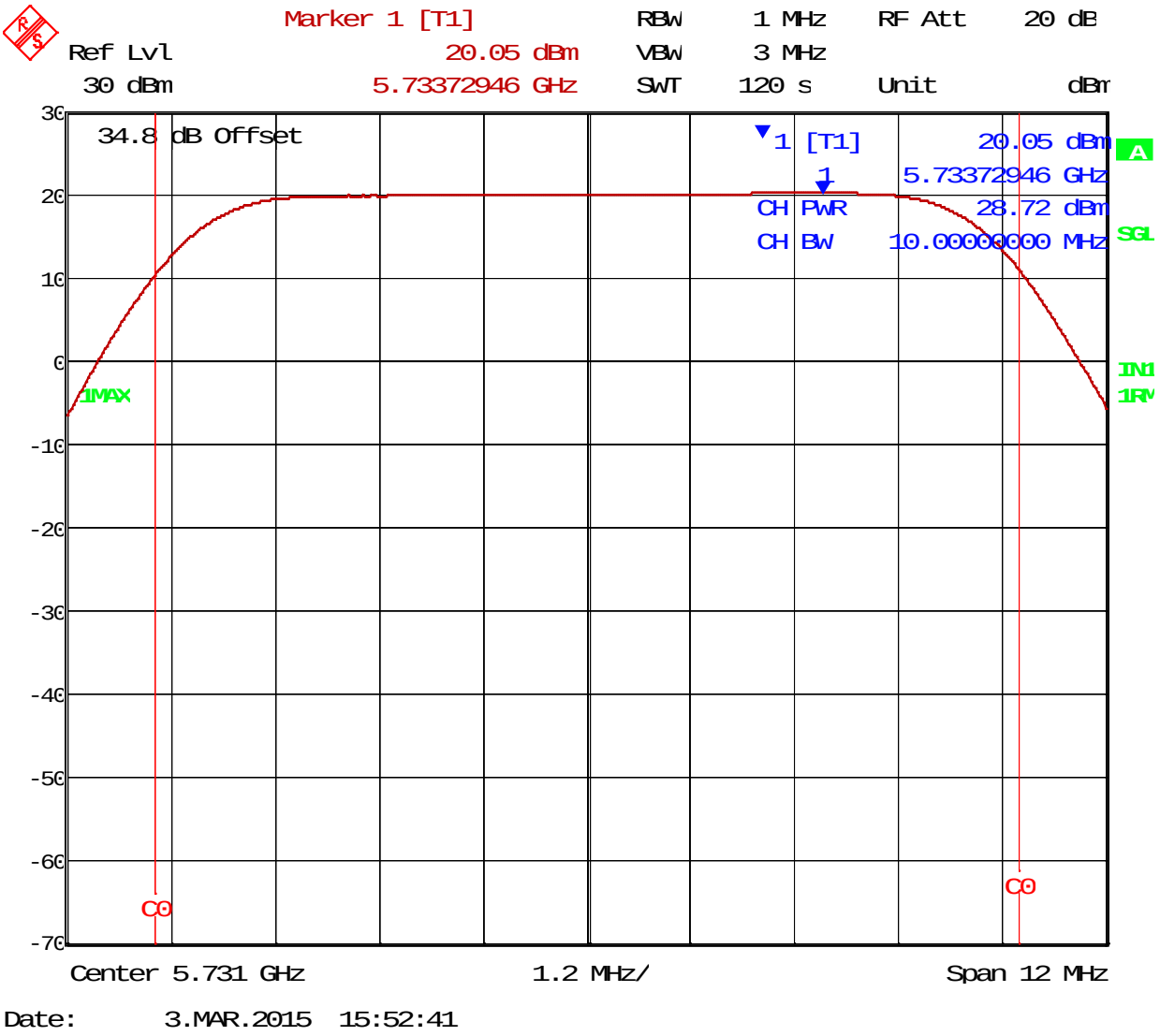
Test Data – Maximum Conducted Average Power

Low Channel (5.731GHz)
Output Power
5 MHz Channel
4QAM



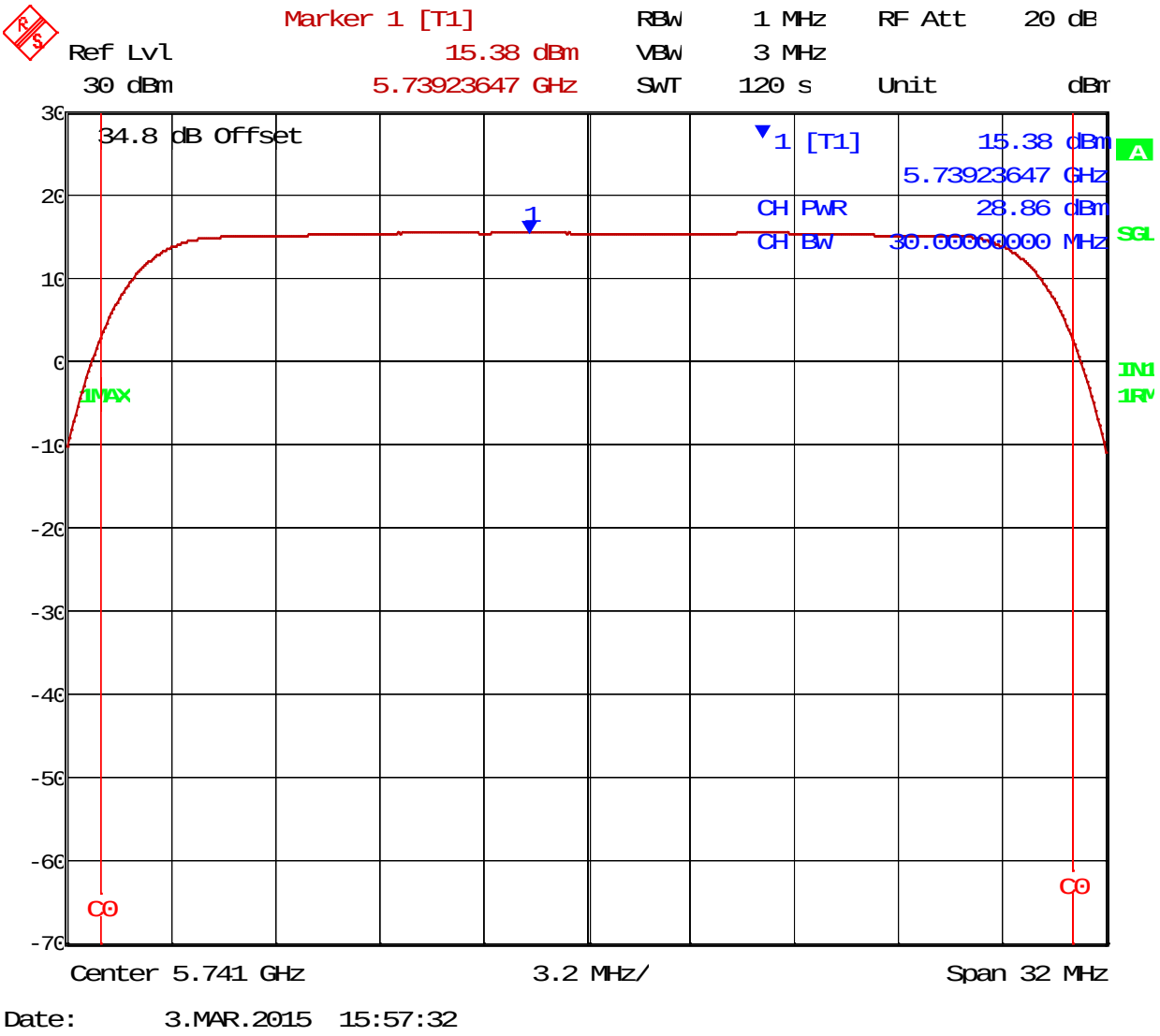
Test Data – Maximum Conducted Average Power

Low Channel (5.731GHz)
Output Power
10 MHz Channel
4QAM



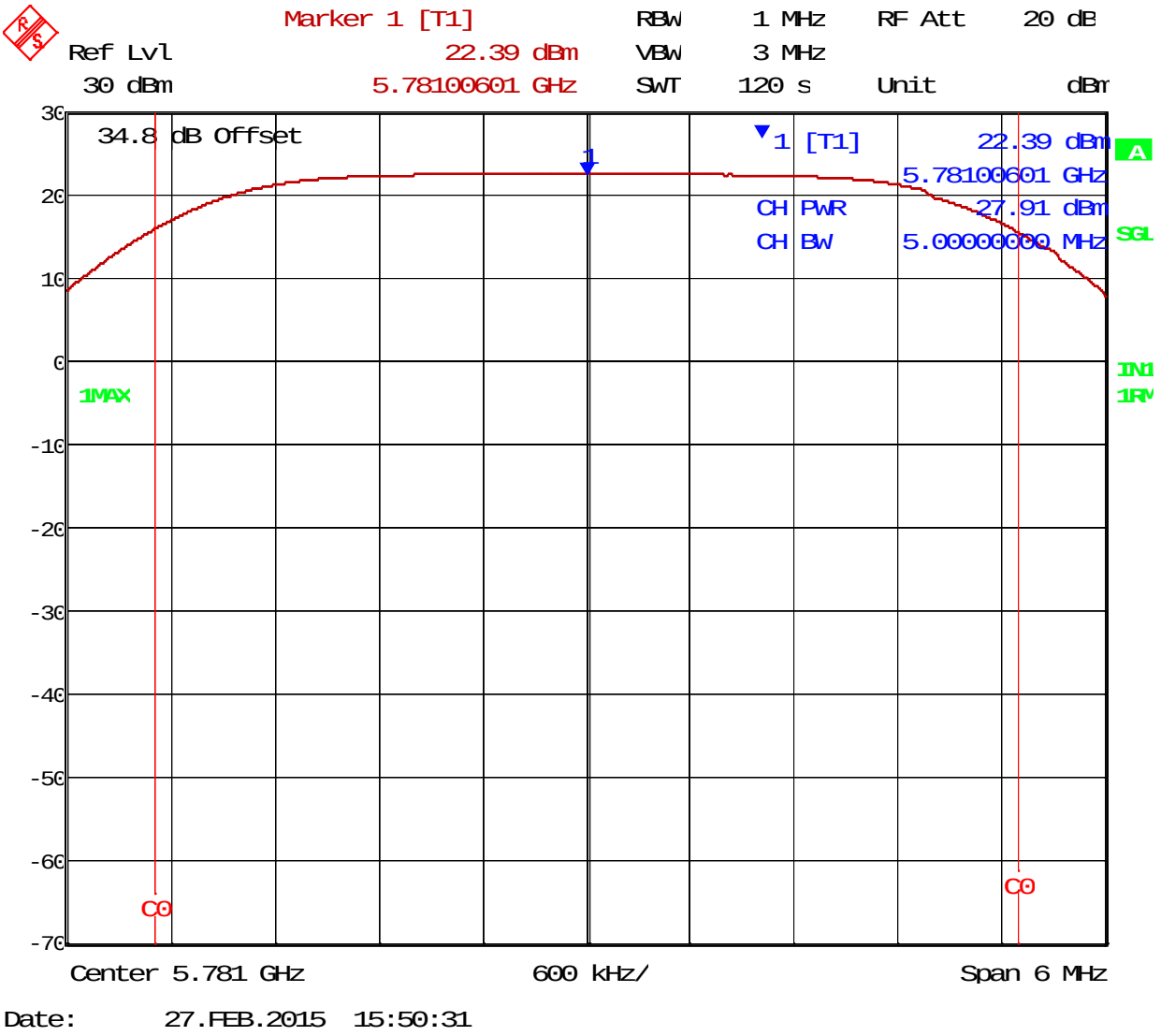
Test Data – Maximum Conducted Average Power

Low Channel (5.731GHz)
Output Power
30 MHz Channel
4QAM



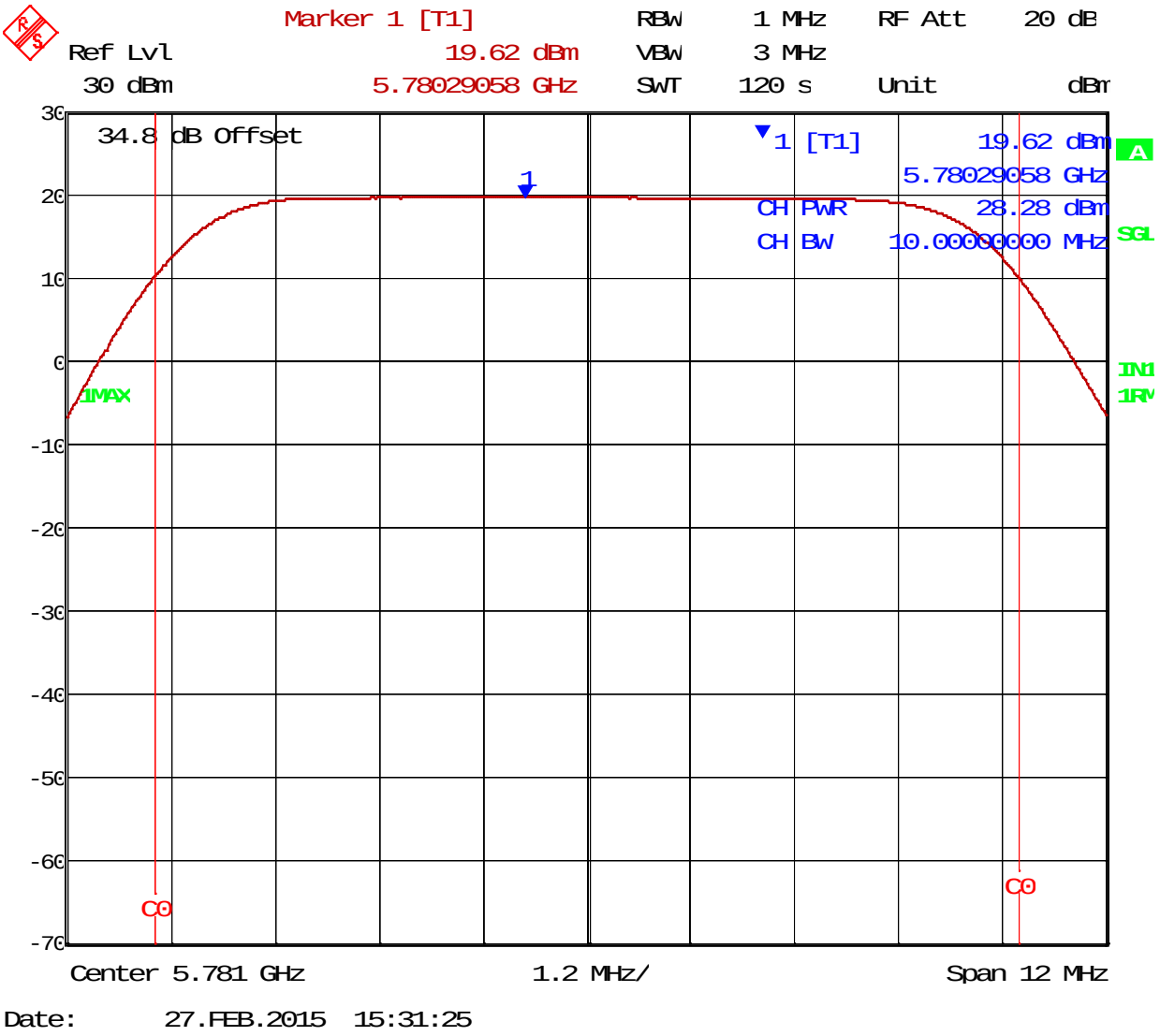
Test Data – Maximum Conducted Average Power

Mid Channel
4QAM
5 MHz Channel
Output Power



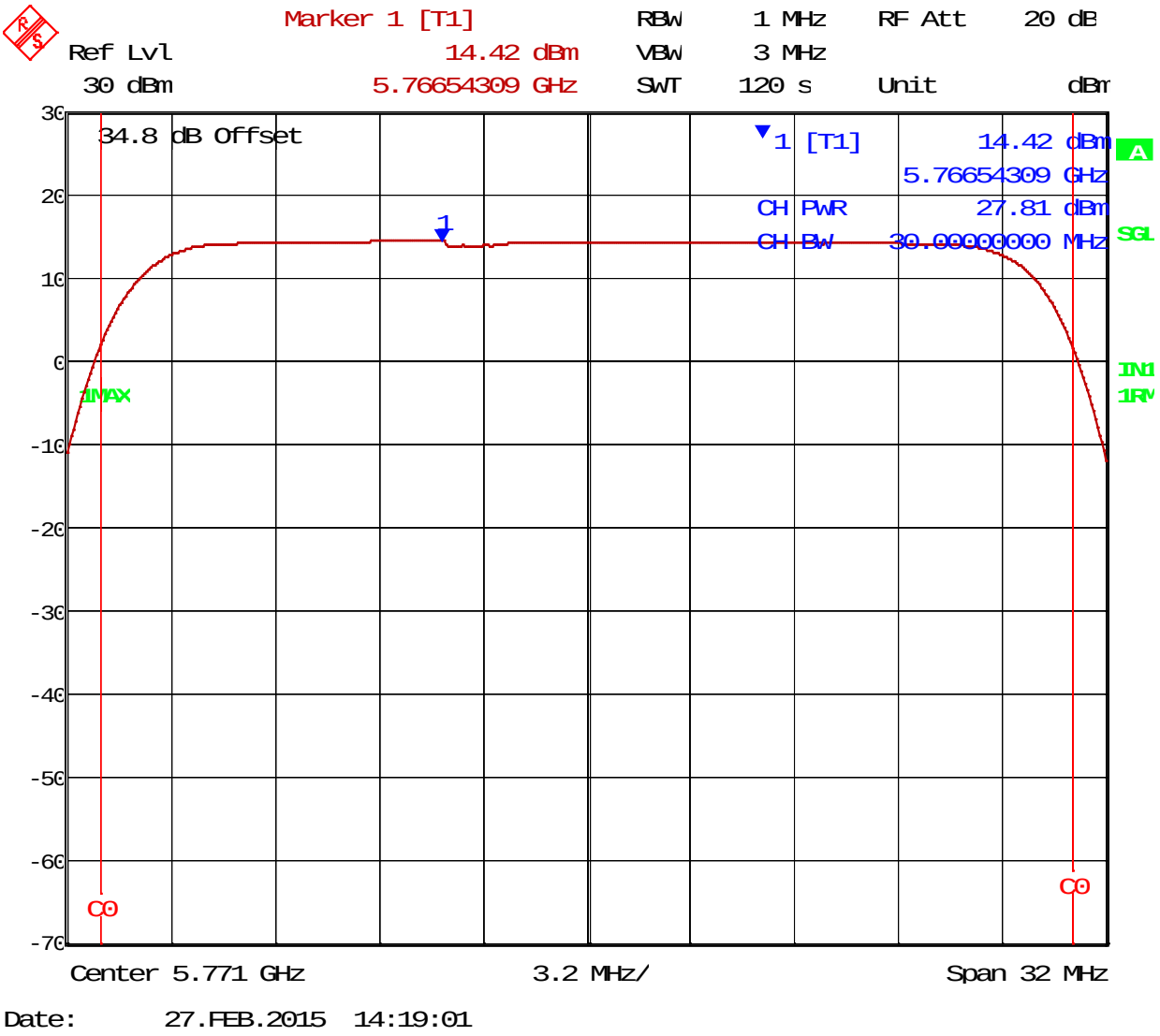
Test Data – Maximum Conducted Average Power

Mid Channel
10 MHz Channel
4QAM
Output Power



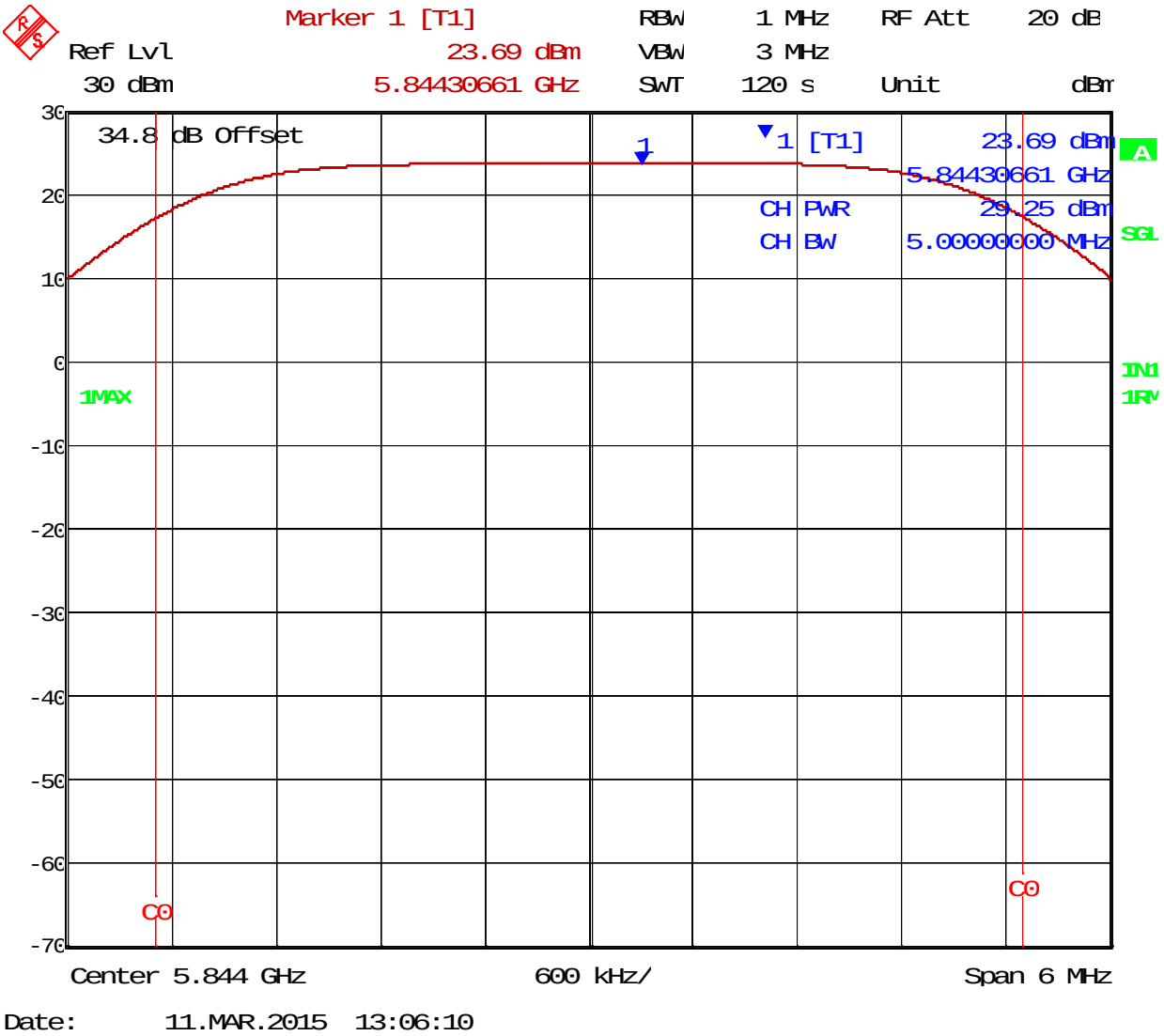
Test Data – Maximum Conducted Average Power

Mid Channel
4QAM
30 MHz Channel
Output Power



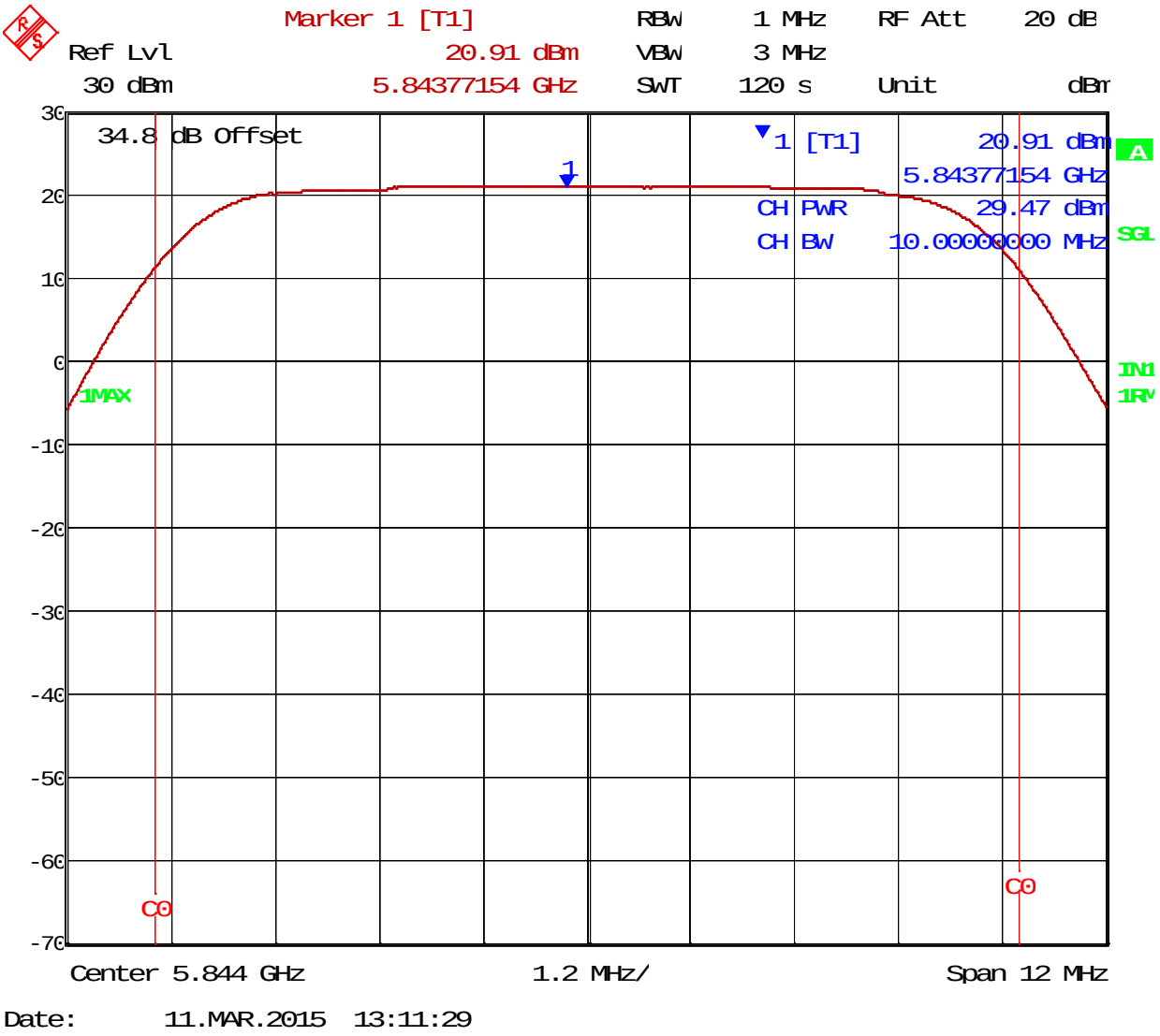
Test Data – Maximum Conducted Average Power

High Channel
4QAM
5 MHz Channel
Output Power



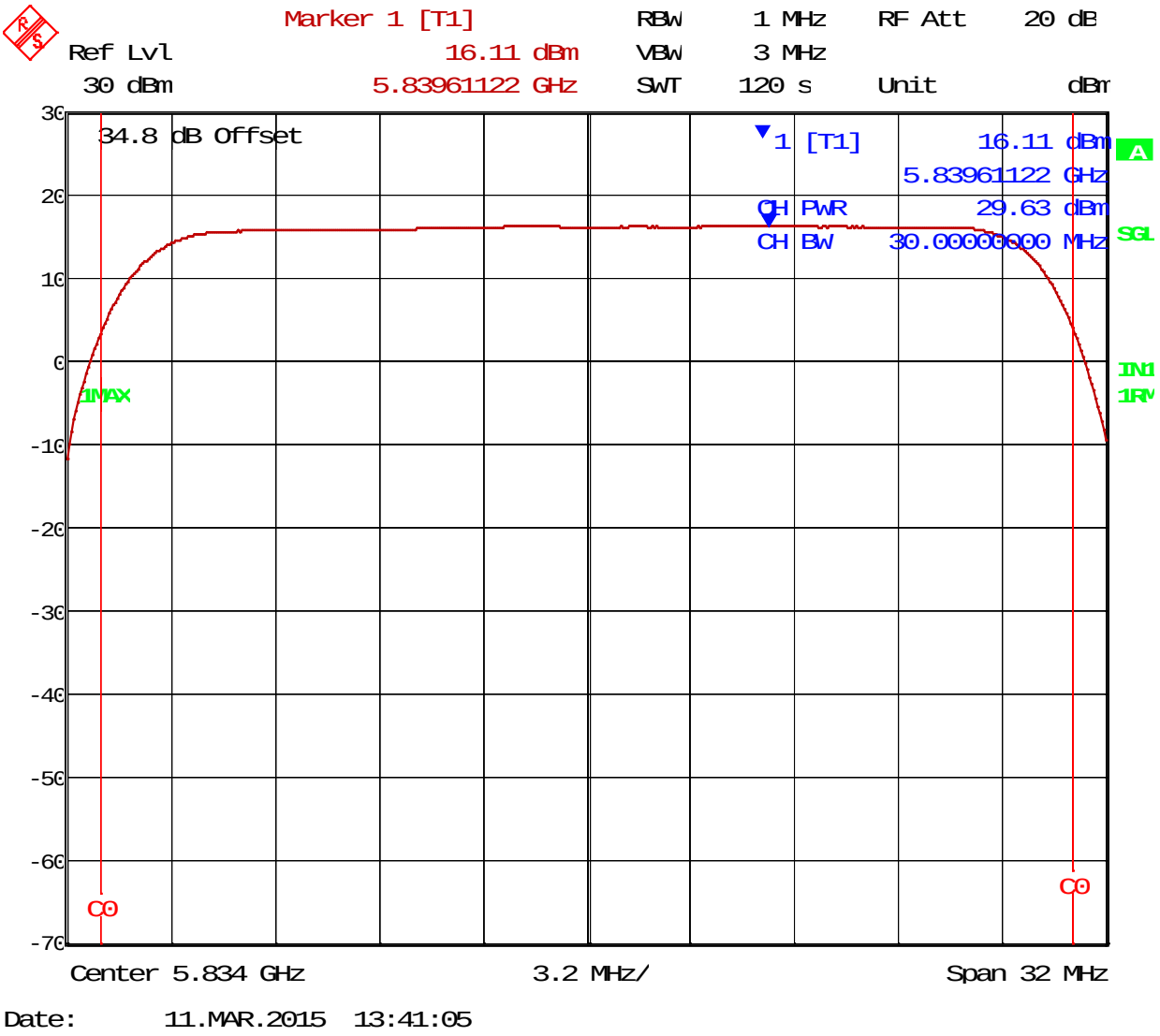
Test Data – Maximum Conducted Average Power

High Channel
4QAM
10 MHz Channel
Output Power



Test Data – Maximum Conducted Average 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: Tran Phan	DATE: 04 March 2015

Test Results: Complies.

Measurement Data: See attached plots.

Test Conditions: 54 %RH
22 °C

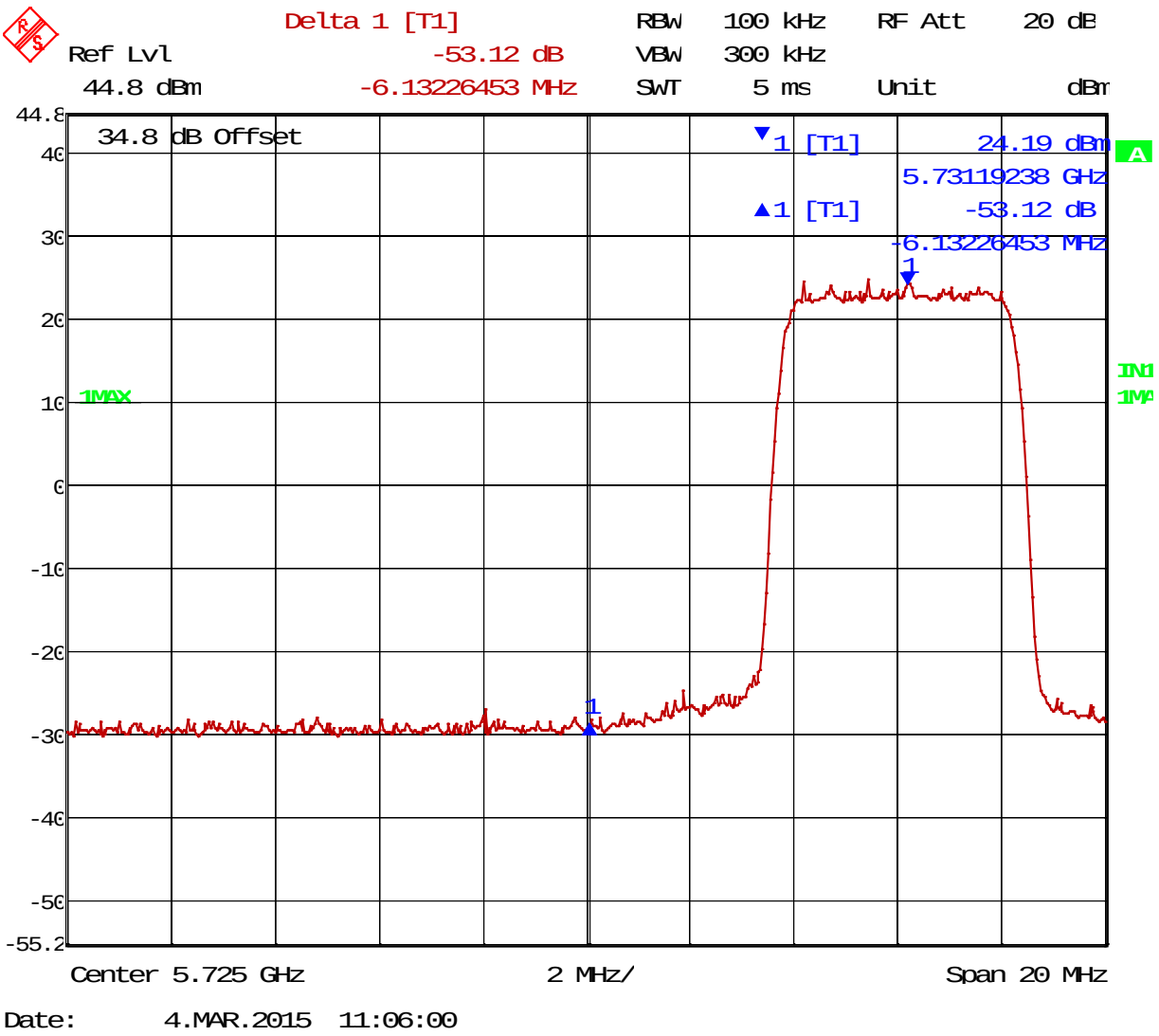
Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1767-835

Note: Average power is reported. All spurious emissions were determined to be 30 dB below the carrier power.

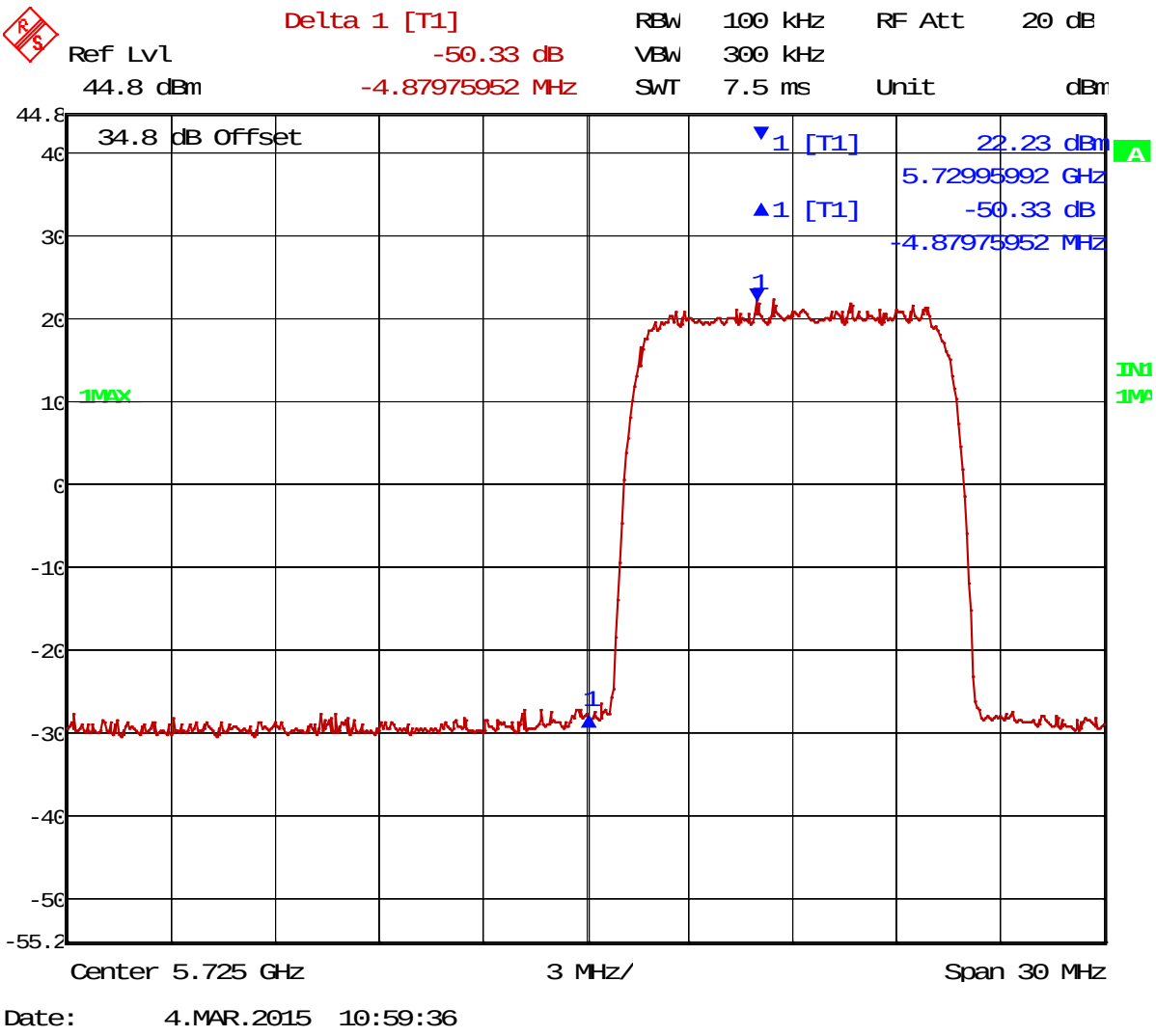
Test Data – Spurious Emissions at Antenna Terminals

Low Channel (5.731GHz)
Low Band Edge
5 MHz Channel
4 QAM



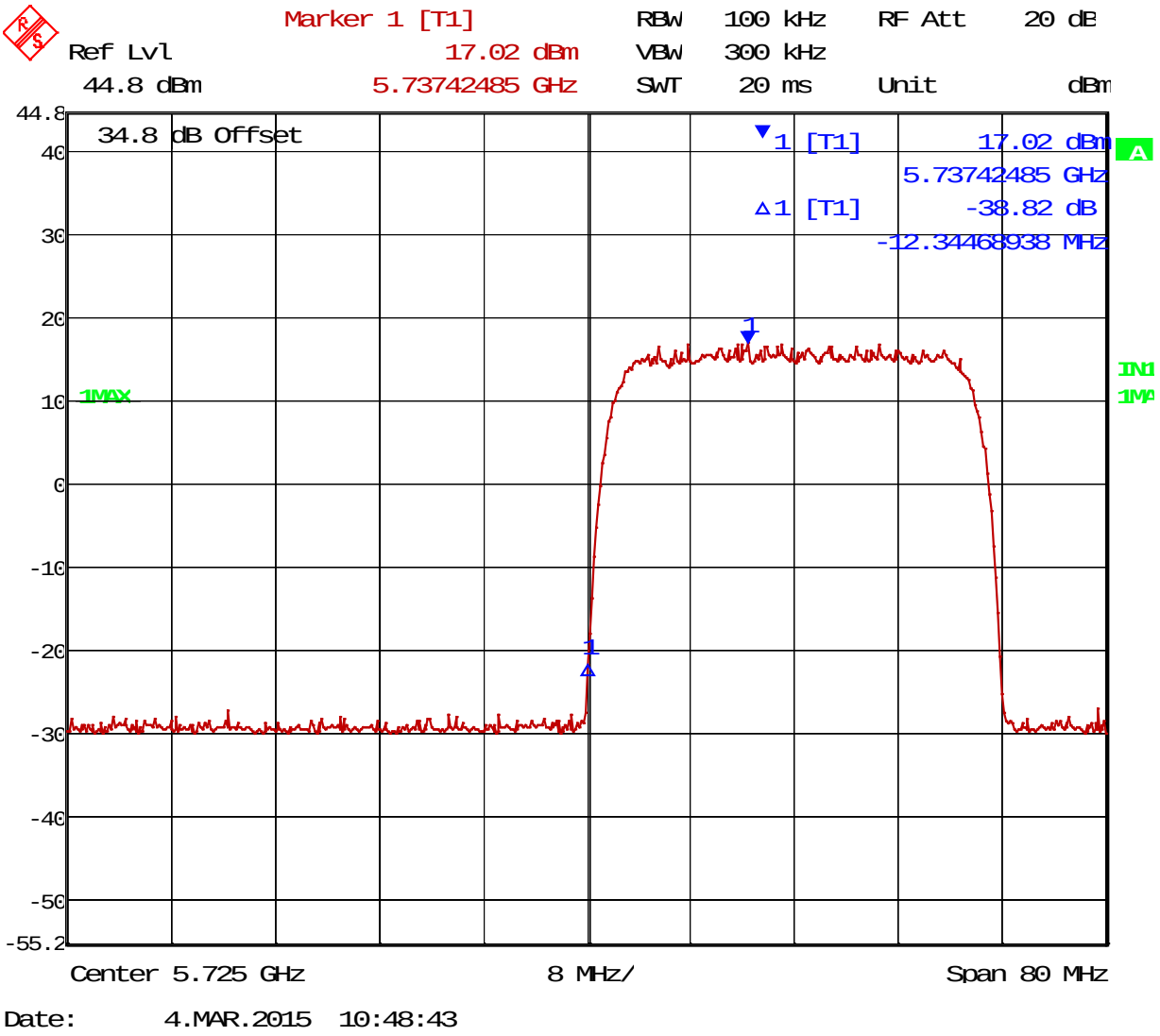
Test Data – Spurious Emissions at Antenna Terminals

Low Channel (5.731GHz)
Low Band Edge
10 MHz Channel
4QAM



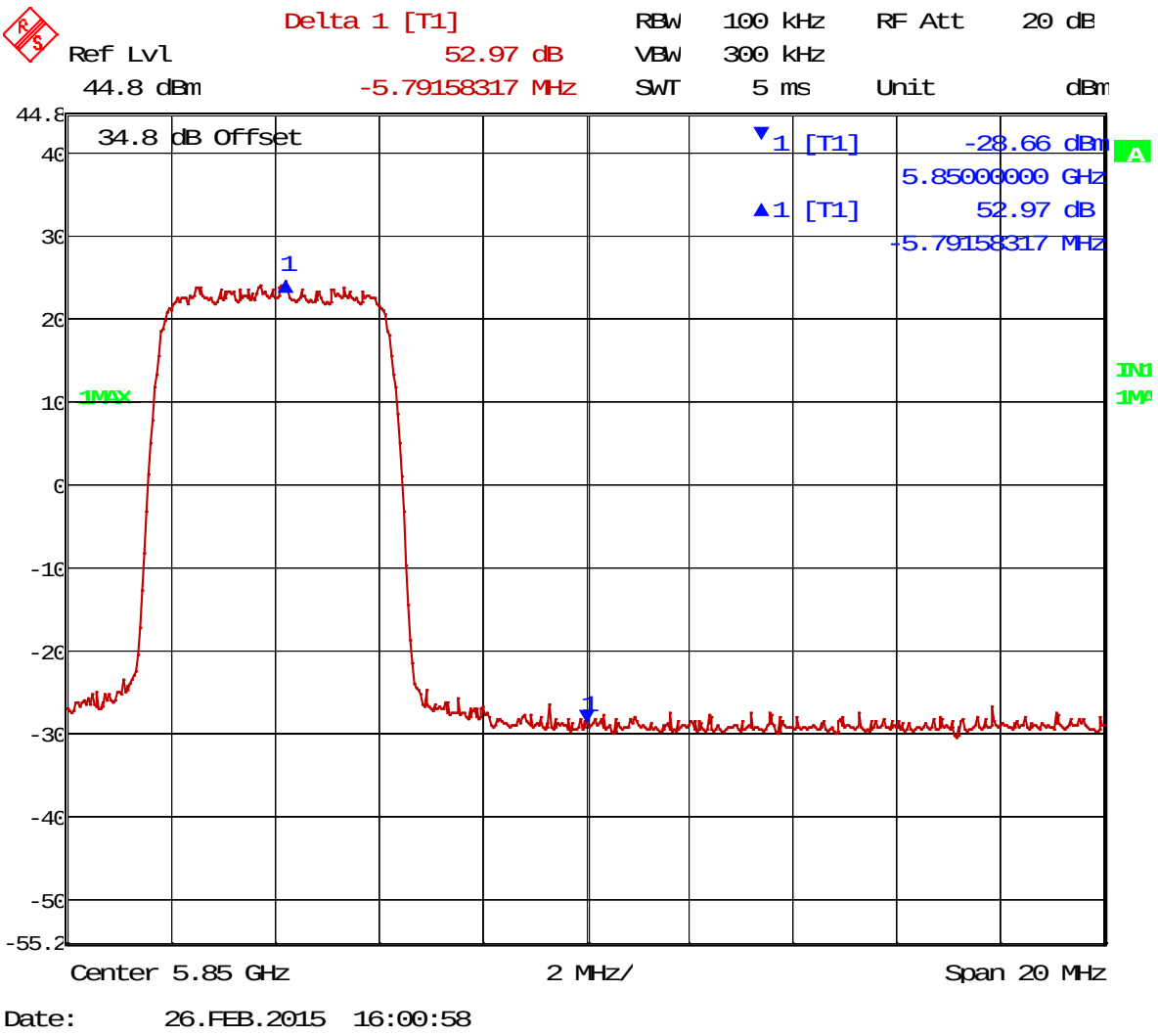
Test Data – Spurious Emissions at Antenna Terminals

Low Channel(5.741GHz)
Low Band Edge
30 MHz Channel
4QAM



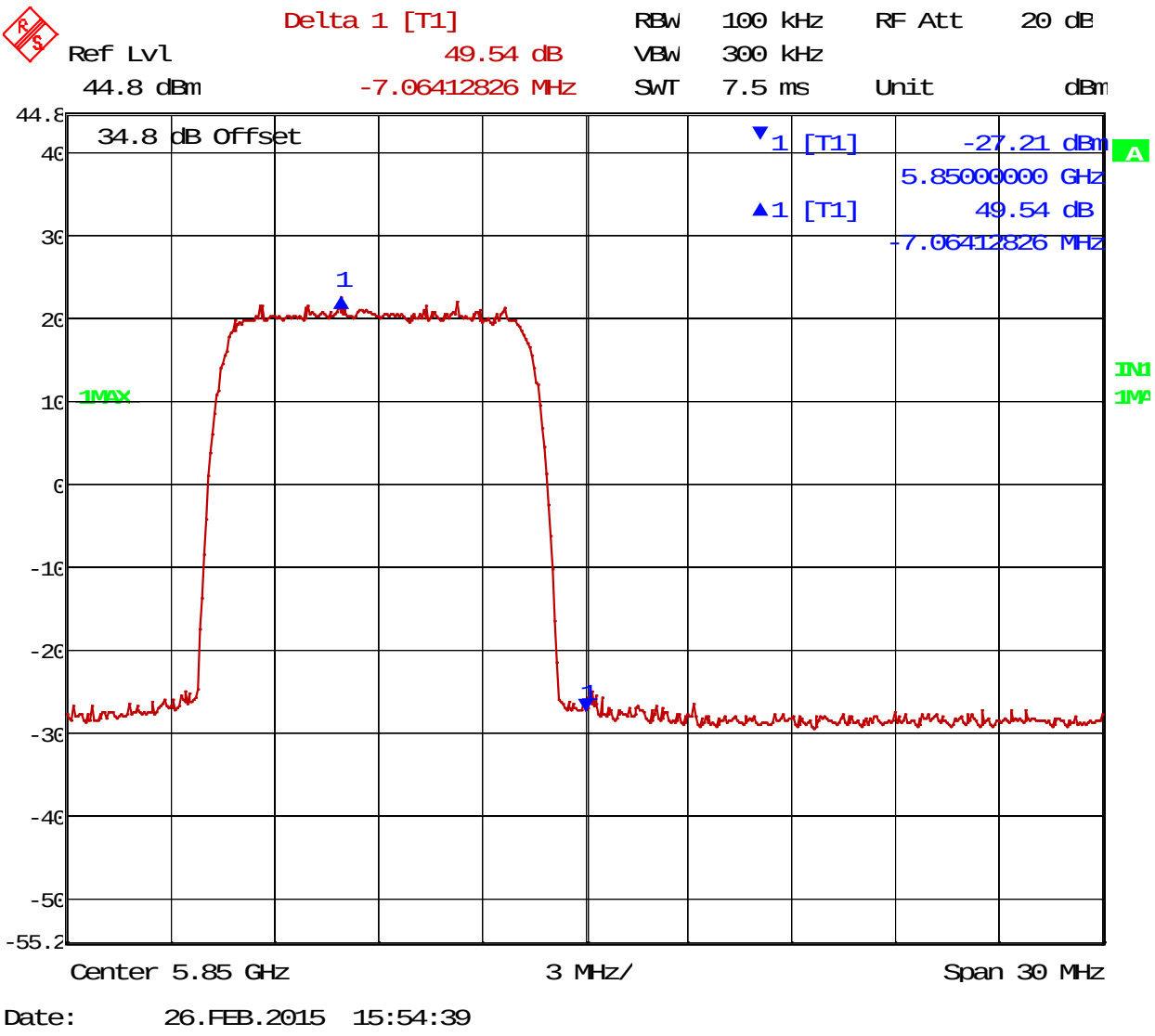
Test Data – Spurious Emissions at Antenna Terminals

High Channel (5.844GHz)
4QAM
5 MHz Channel
Upper Band Edge



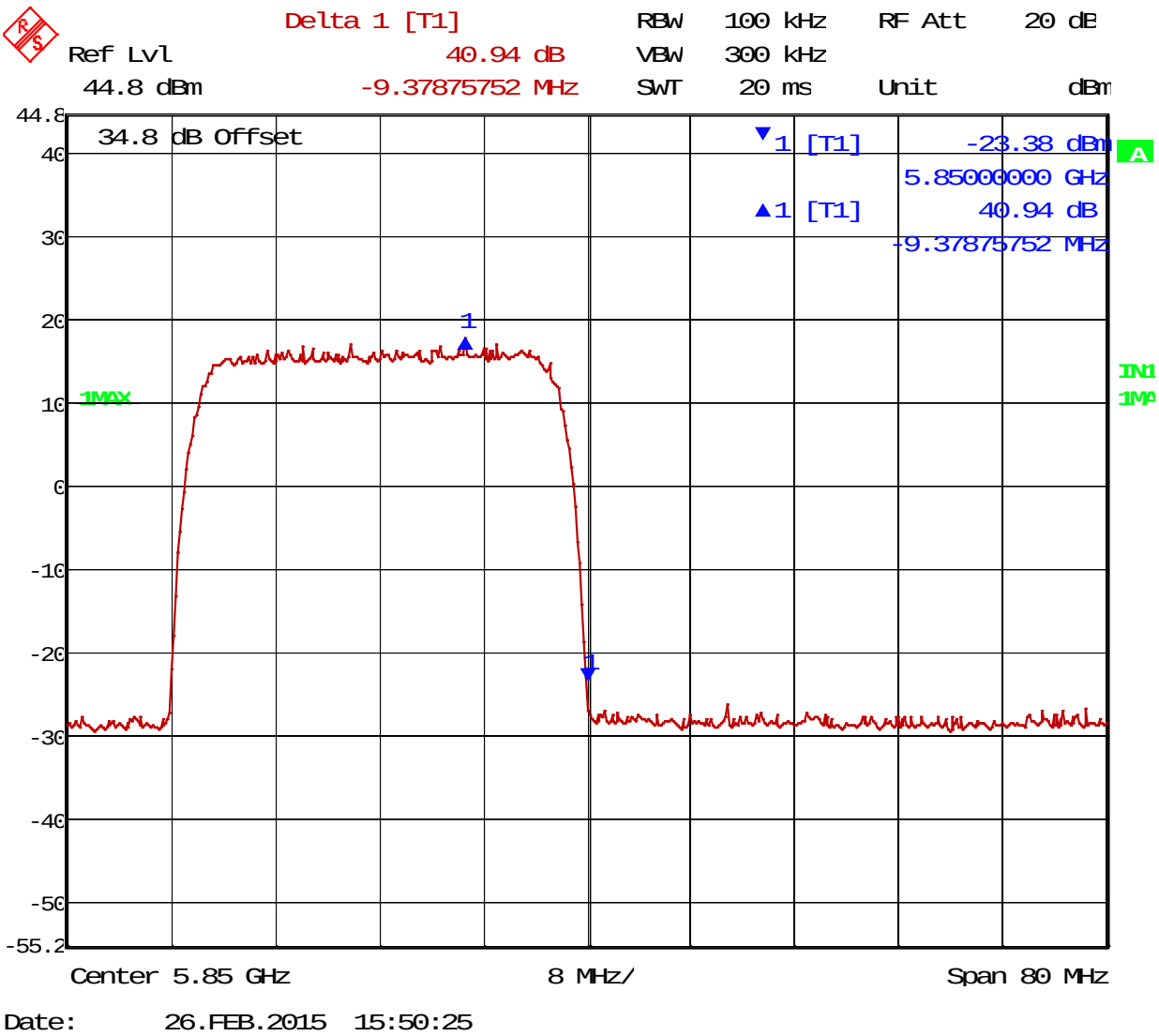
Test Data – Spurious Emissions at Antenna Terminals

High Channel (5.844GHz)
4QAM
10 MHz Channel
Upper Band Edge



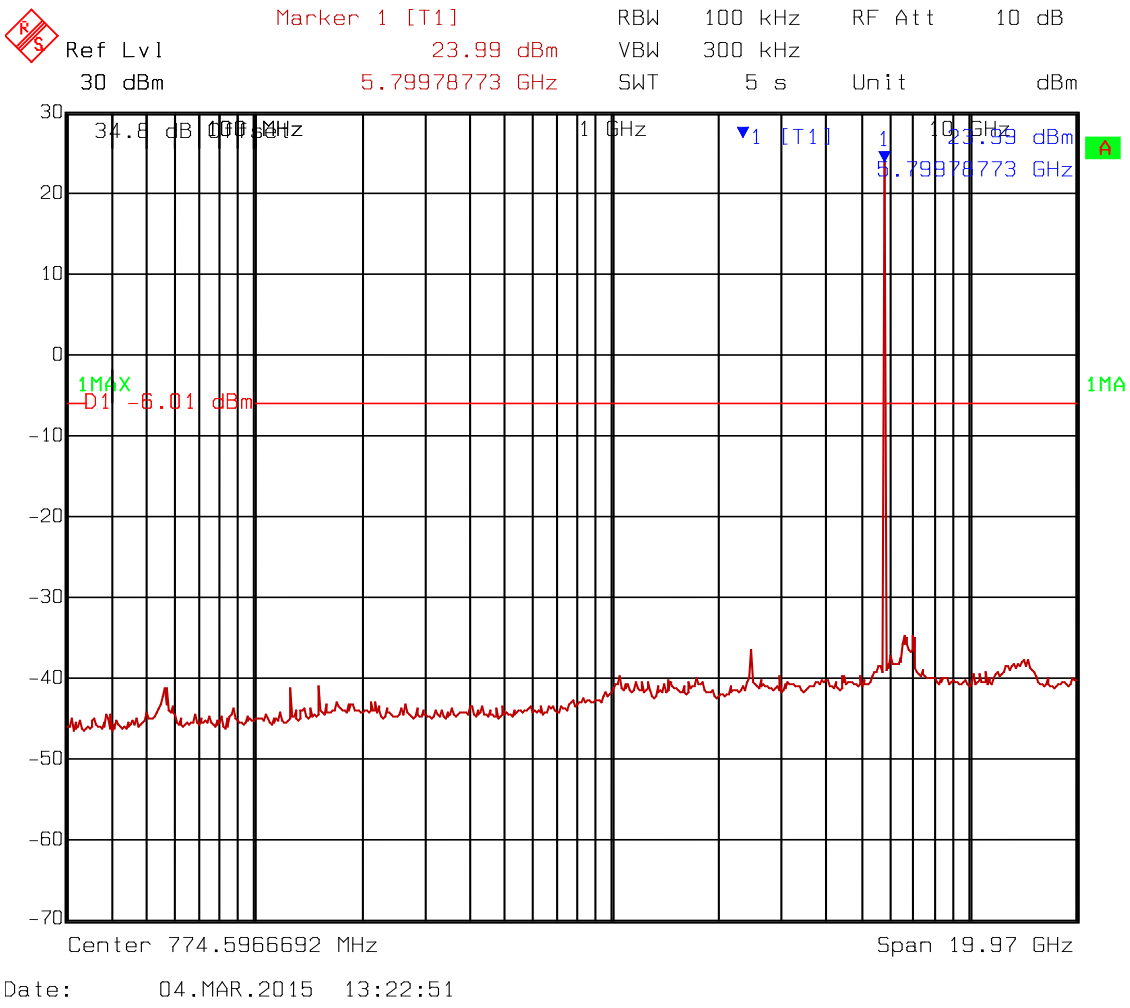
Test Data – Spurious Emissions at Antenna Terminals

High Channel (5.834GHz)
4QAM
30 MHz Channel
Upper Band Edge

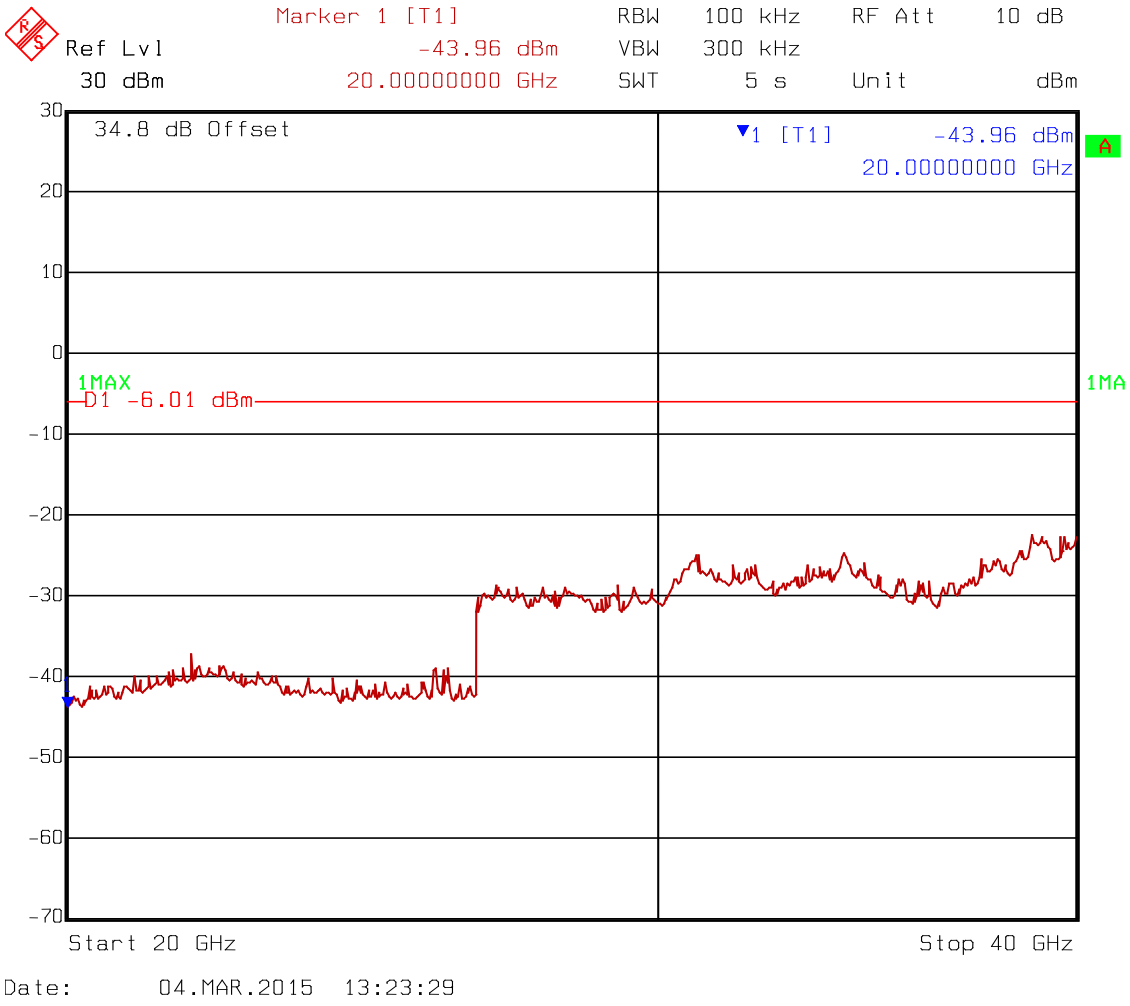


Test Data – Spurious Emissions at Antenna Terminals

Low Channel
Spurious Emissions (30MHz to 20GHz)
5 MHz Channel
4QAM

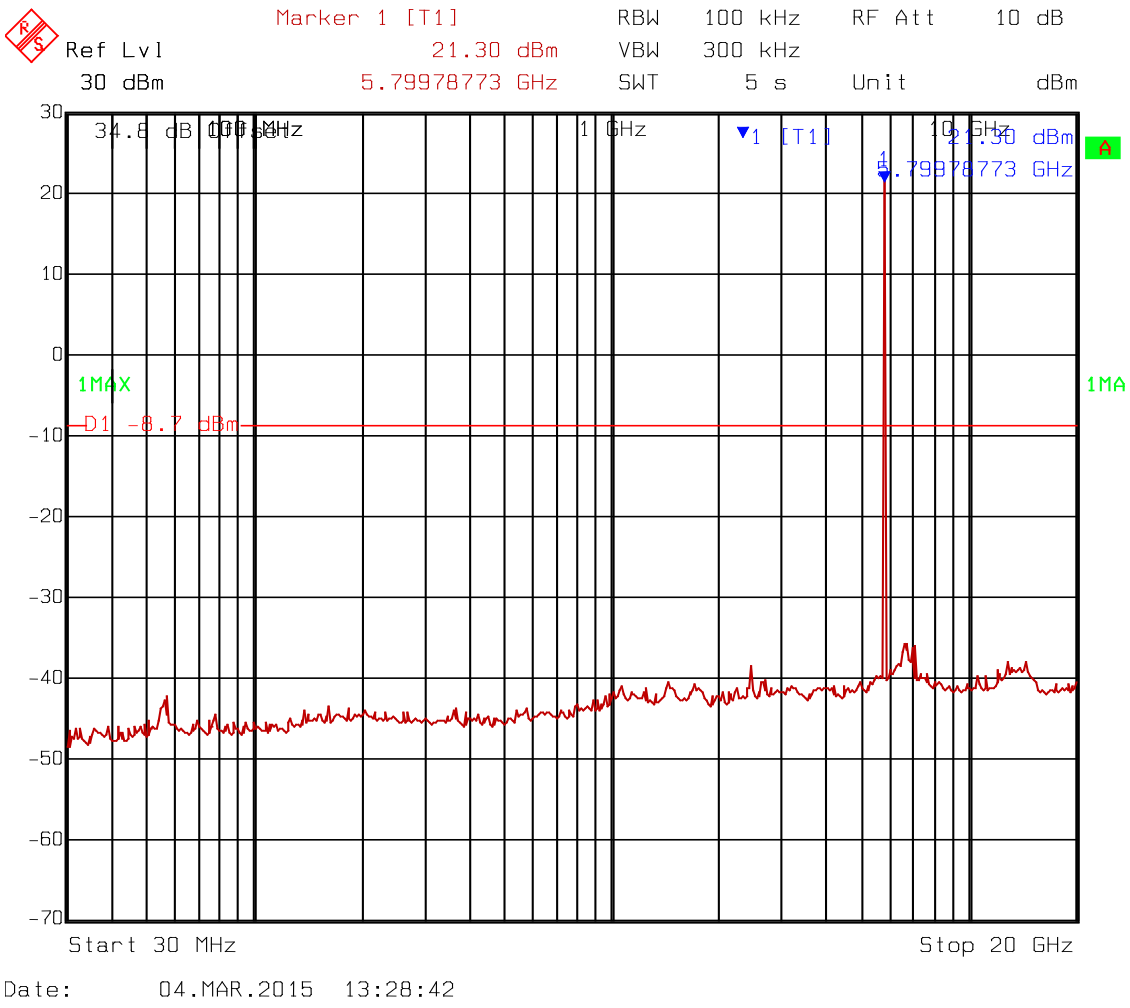


Low Channel
Spurious Emissions (20GHz to 40GHz)
5 MHz Channel
4QAM

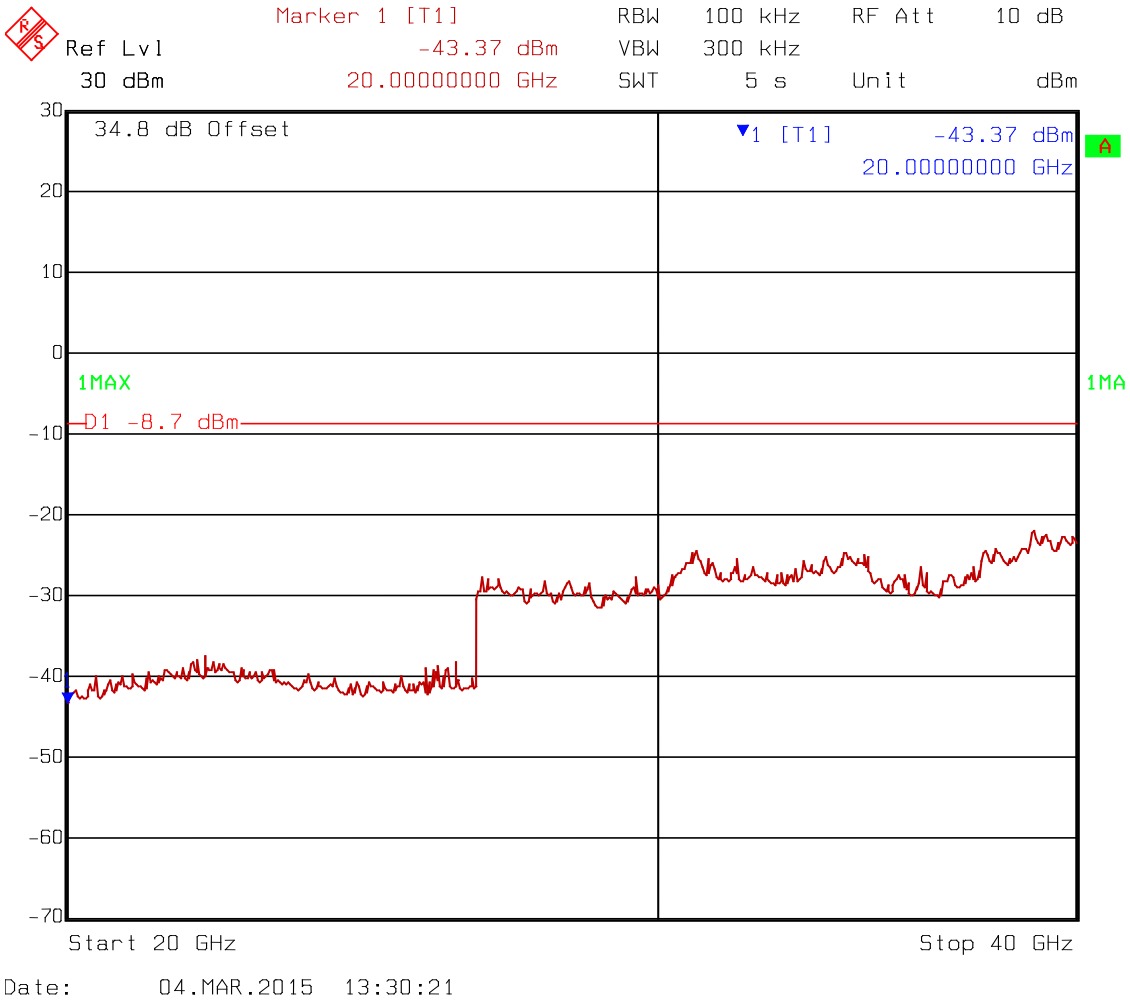


Test Data – Spurious Emissions at Antenna Terminals

Low Channel
Spurious Emissions (30MHz to 20GHz)
10 MHz Channel
4 QAM

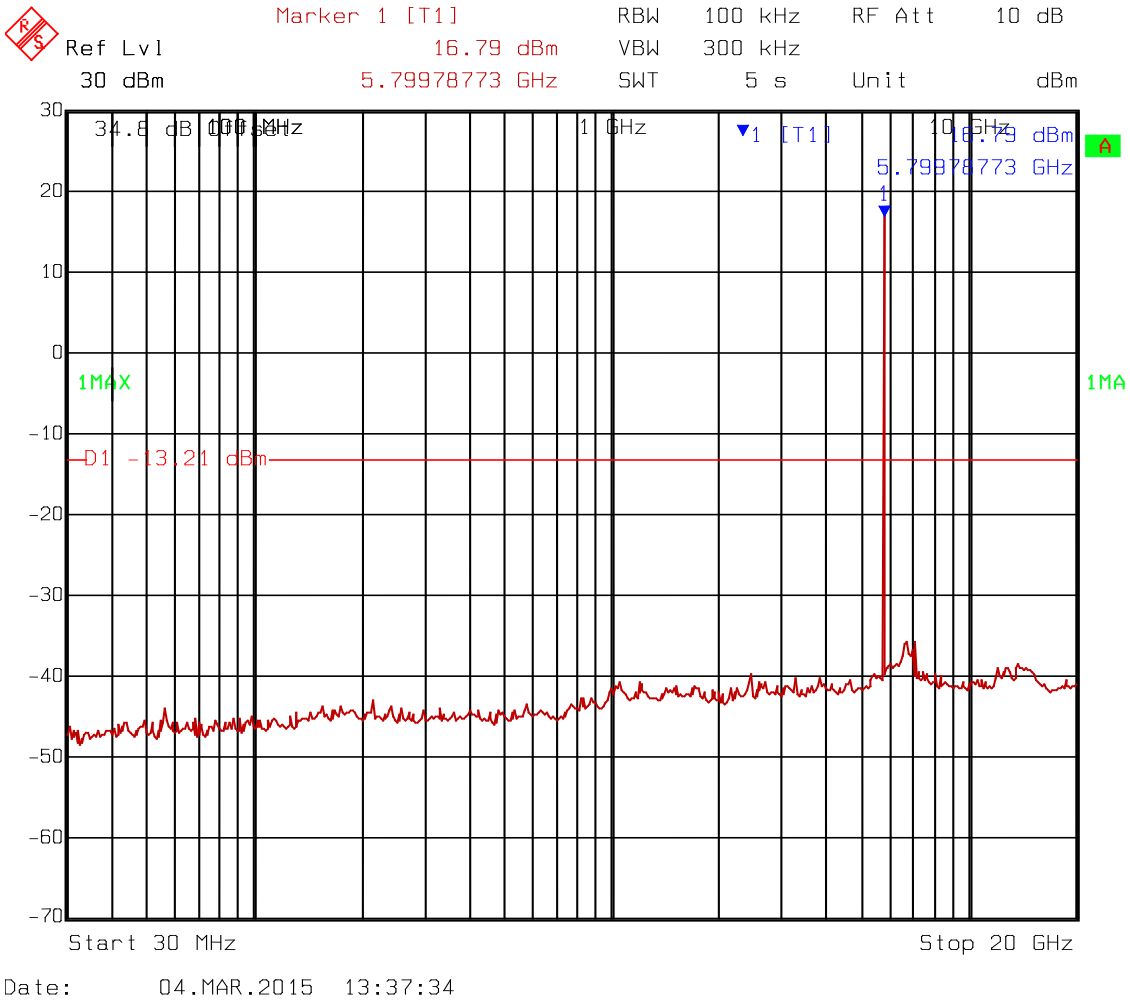


Low Channel
Spurious Emissions (20GHz to 40GHz)
10 MHz Channel
4 QAM

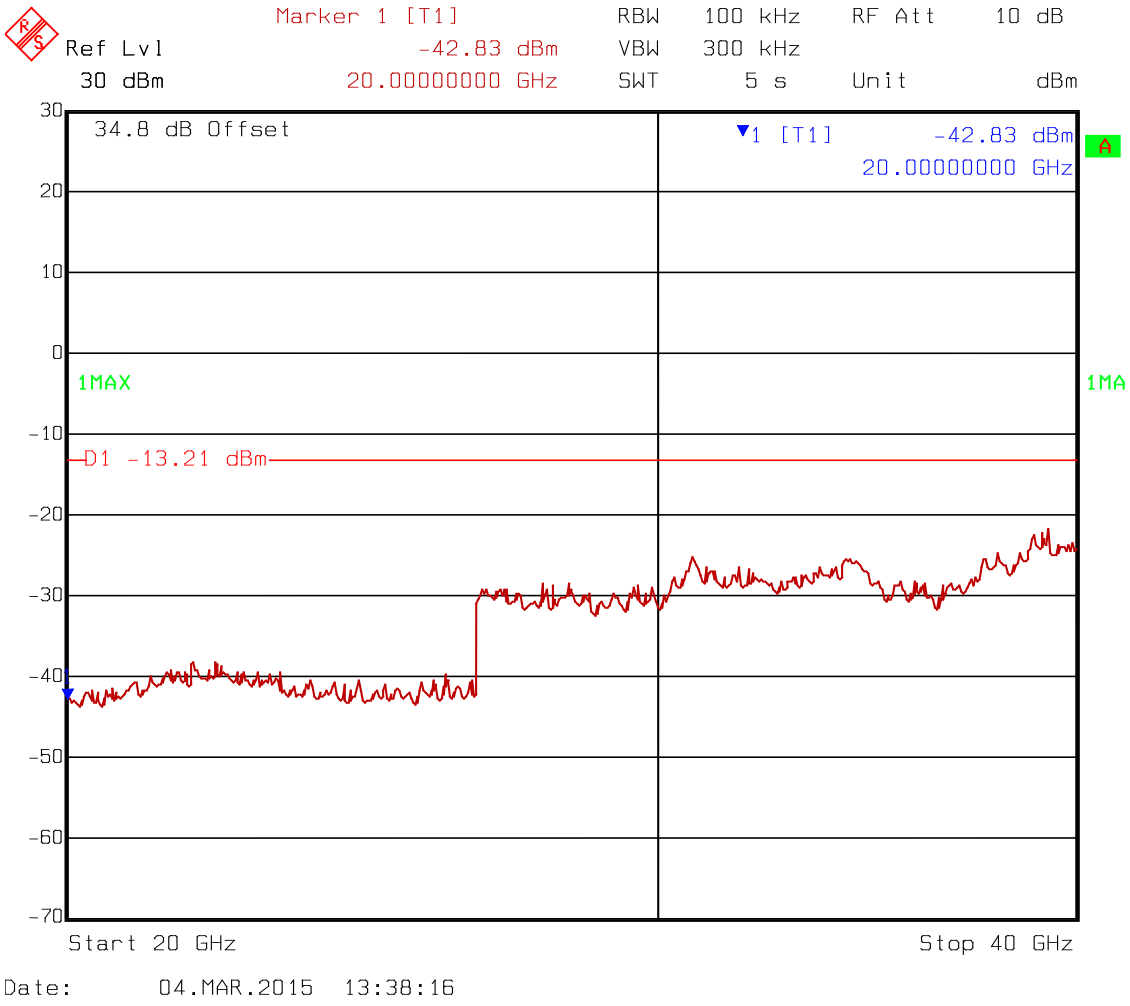


Test Data – Spurious Emissions at Antenna Terminals

Low Channel
Spurious Emissions (30MHz to 20GHz)
30 MHz Channel
4QAM

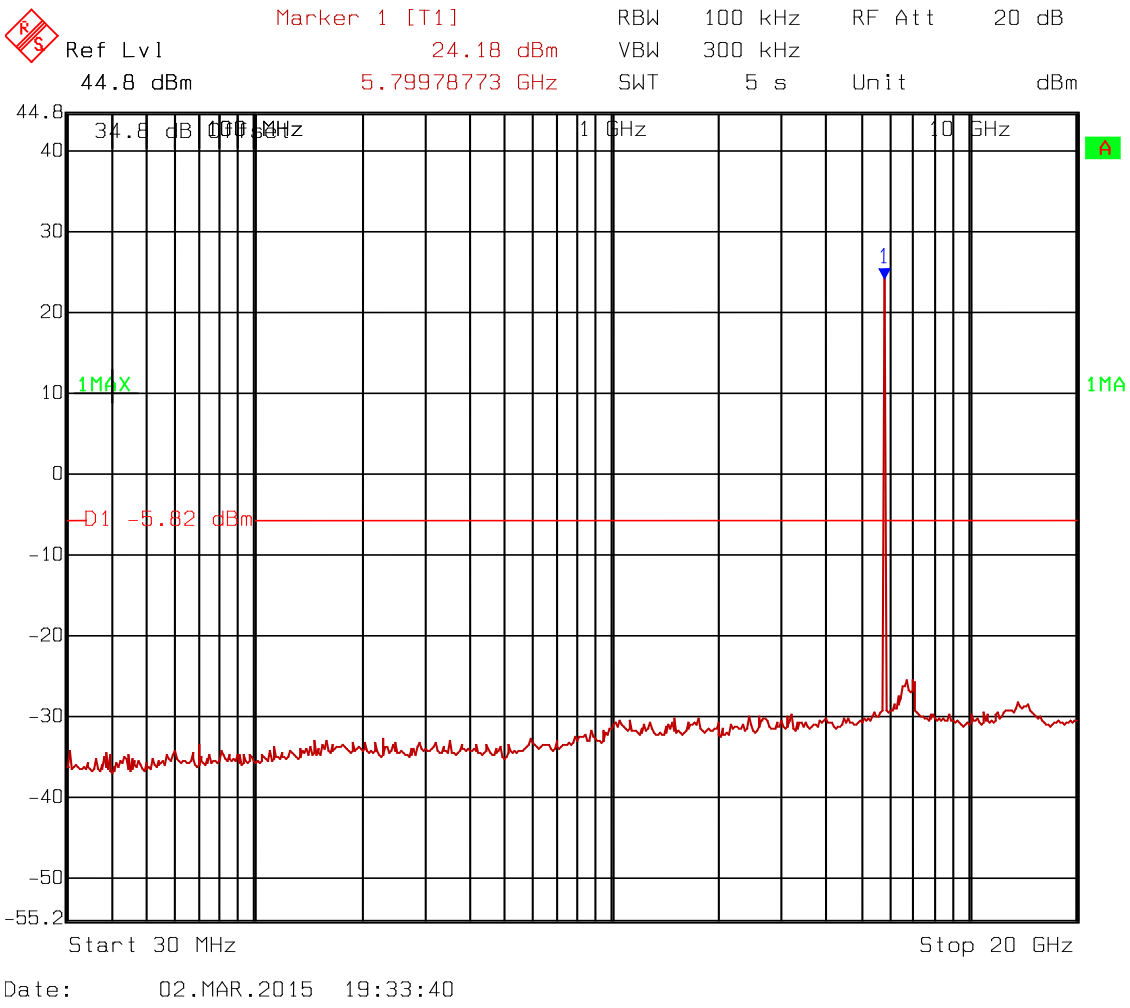


Low Channel
Spurious Emissions (20GHz to 40GHz)
30 MHz Channel
4QAM

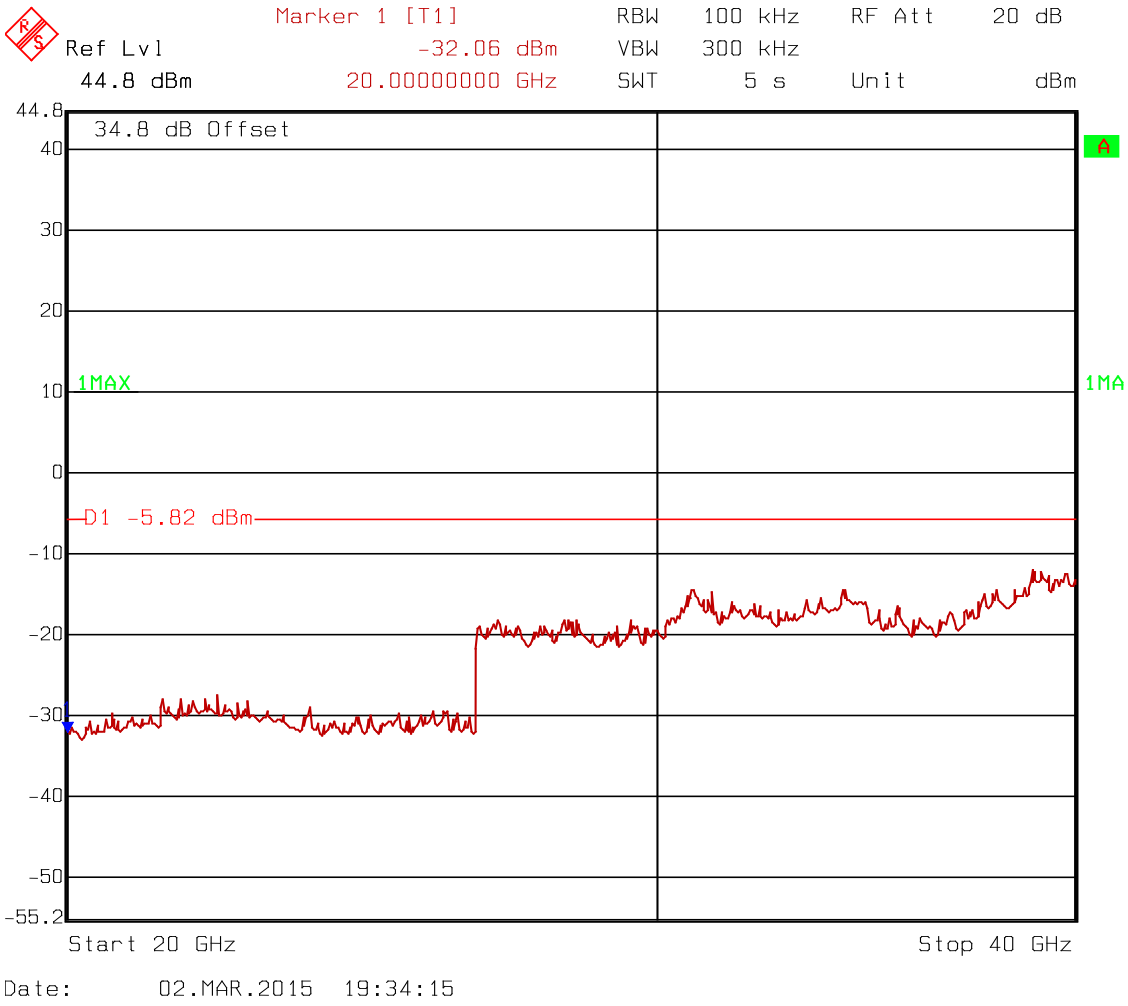


Test Data – Spurious Emissions at Antenna Terminals

Mid Channel
Spurious Emissions (30MHz to 20GHz)
5 MHz Channel
4QAM

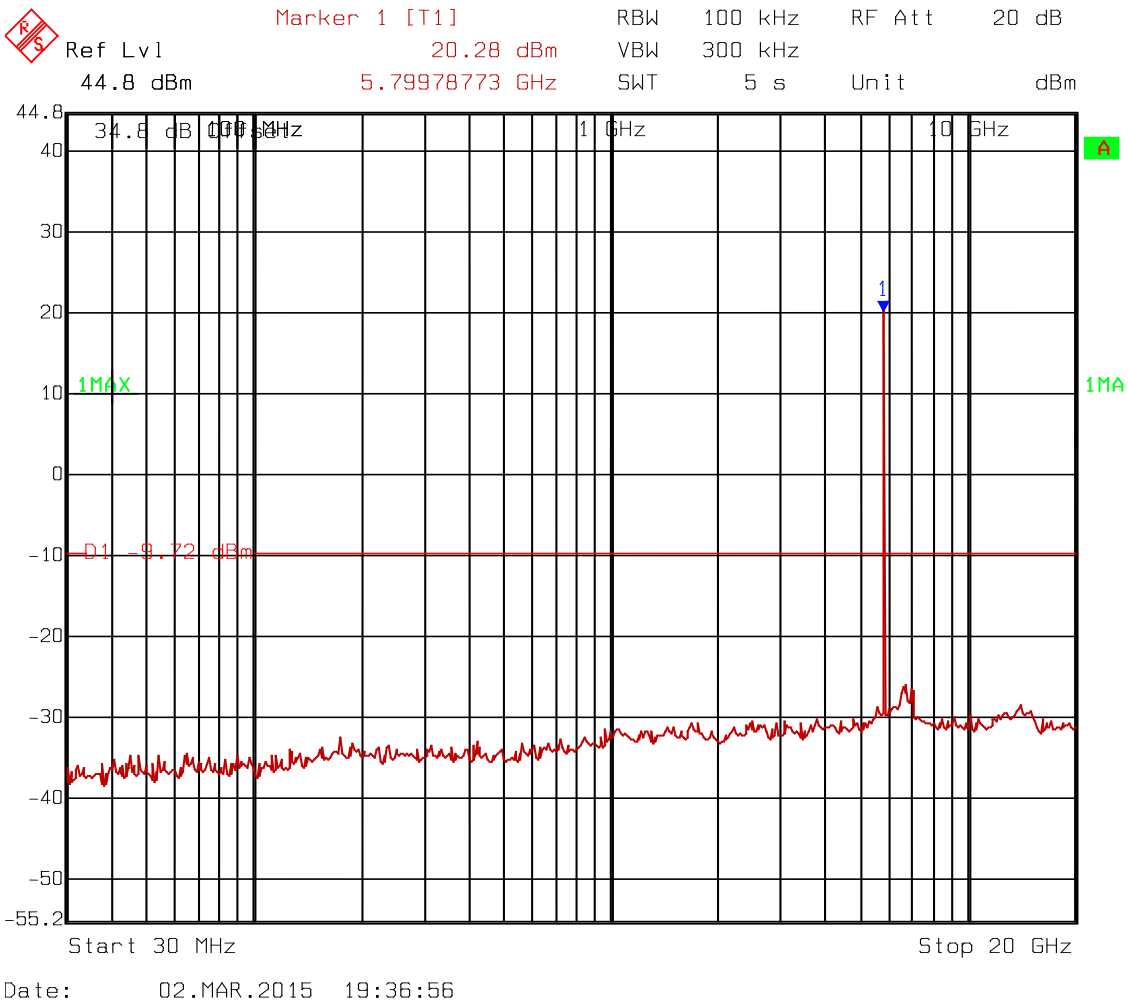


Mid Channel
Spurious Emissions (20GHz to 40GHz)
5 MHz Channel
4QAM

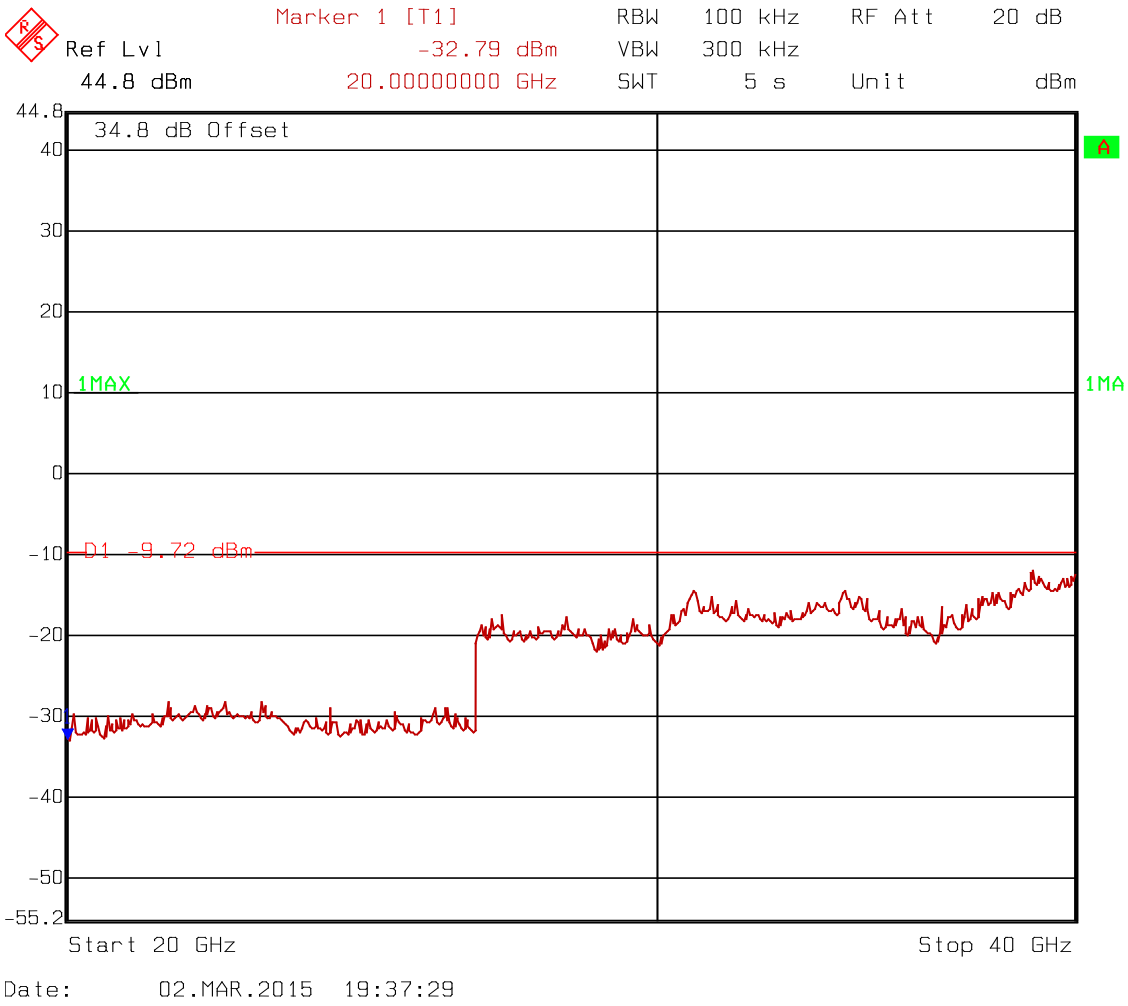


Test Data – Spurious Emissions at Antenna Terminals

Mid Channel
Spurious Emissions (30MHz to 20GHz)
10 MHz Channel
4QAM

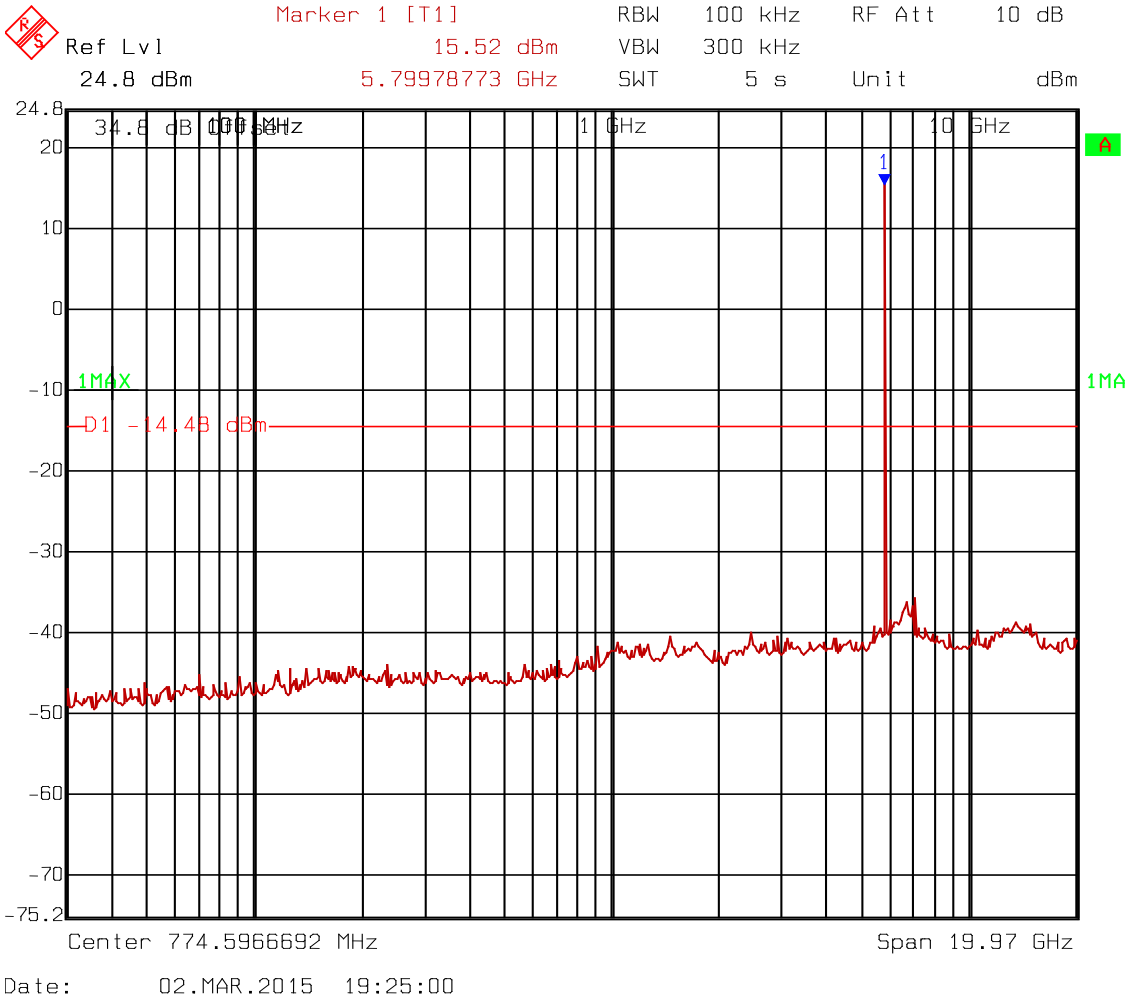


Mid Channel
Spurious Emissions (20GHz to 40GHz)
10 MHz Channel
4QAM

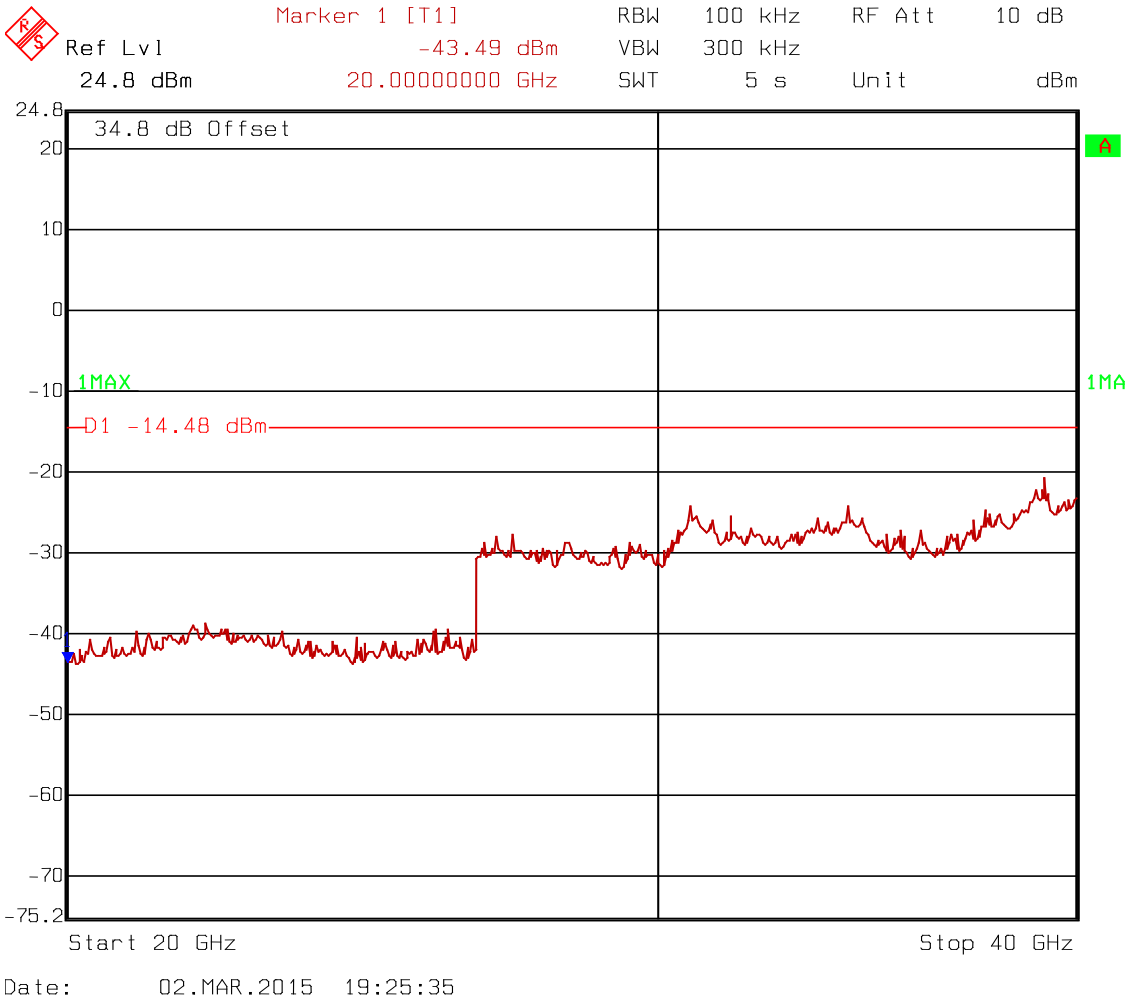


Test Data – Spurious Emissions at Antenna Terminals

Mid Channel
Spurious Emissions (30MHz to 20GHz)
4QAM
30 MHz Channel

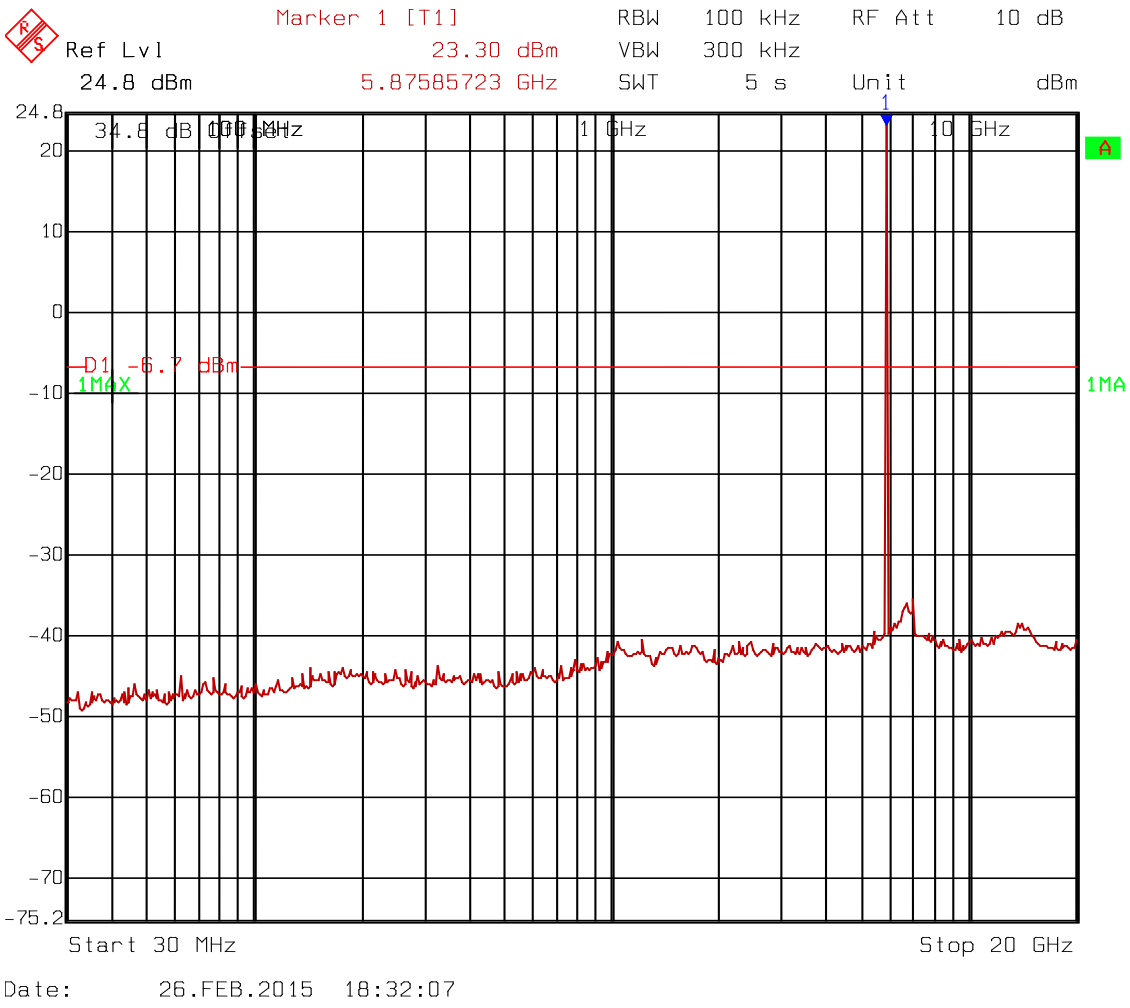


Mid Channel
Spurious Emissions (20GHz to 40GHz)
4QAM
30 MHz Channel

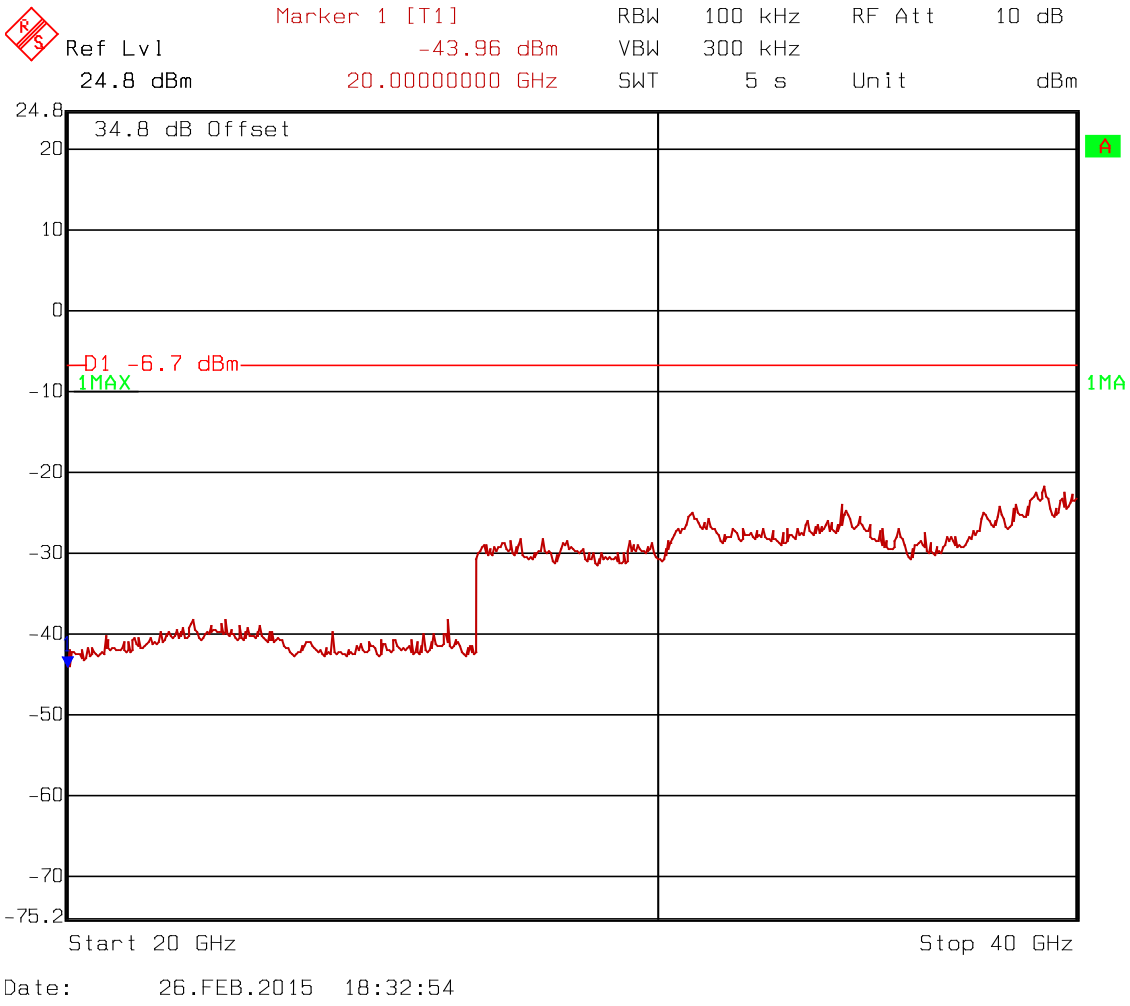


Test Data – Spurious Emissions at Antenna Terminals

High Channel
Spurious Emissions (30MHz to 20GHz)
4QAM
5 MHz Channel

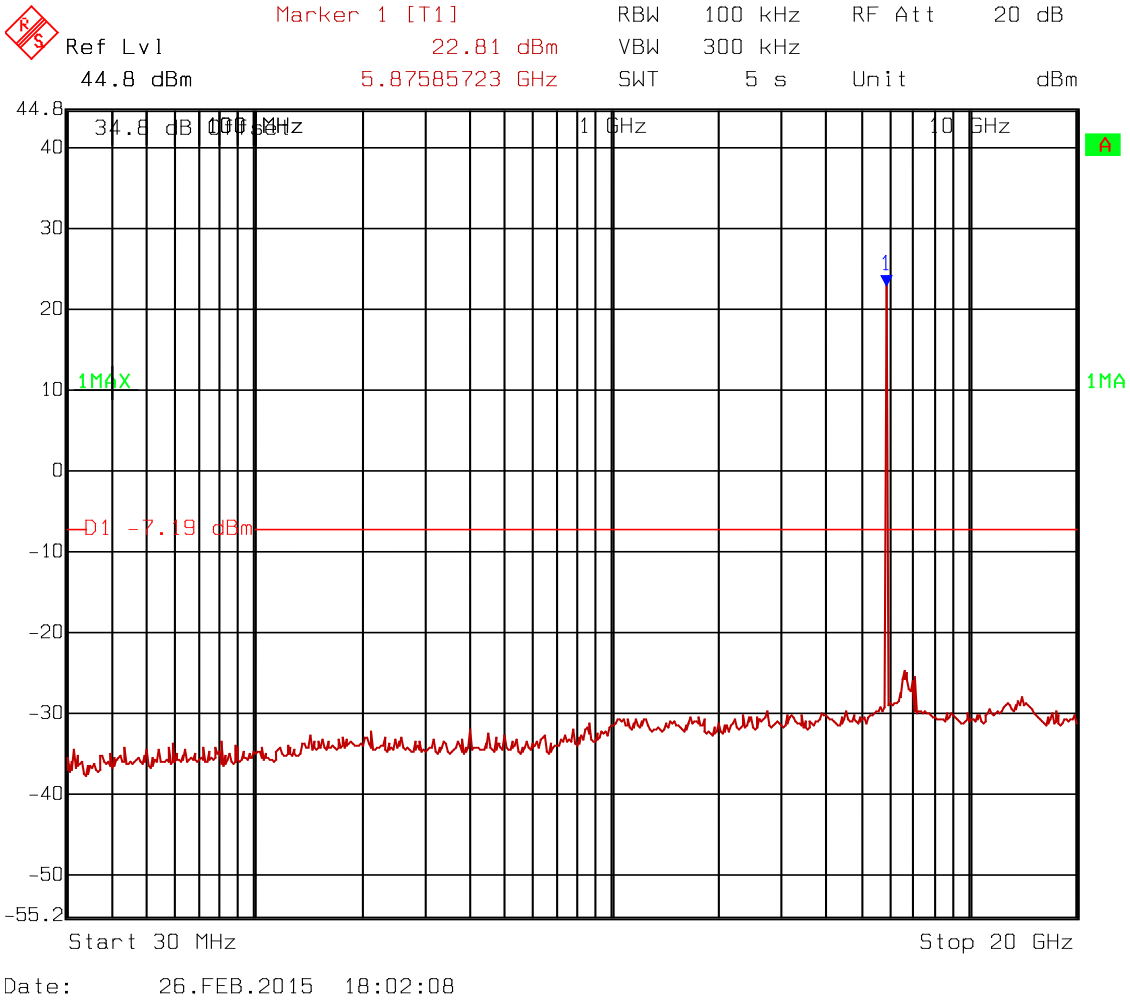


High Channel
Spurious Emissions (20GHz to 40GHz)
4QAM
5 MHz Channel

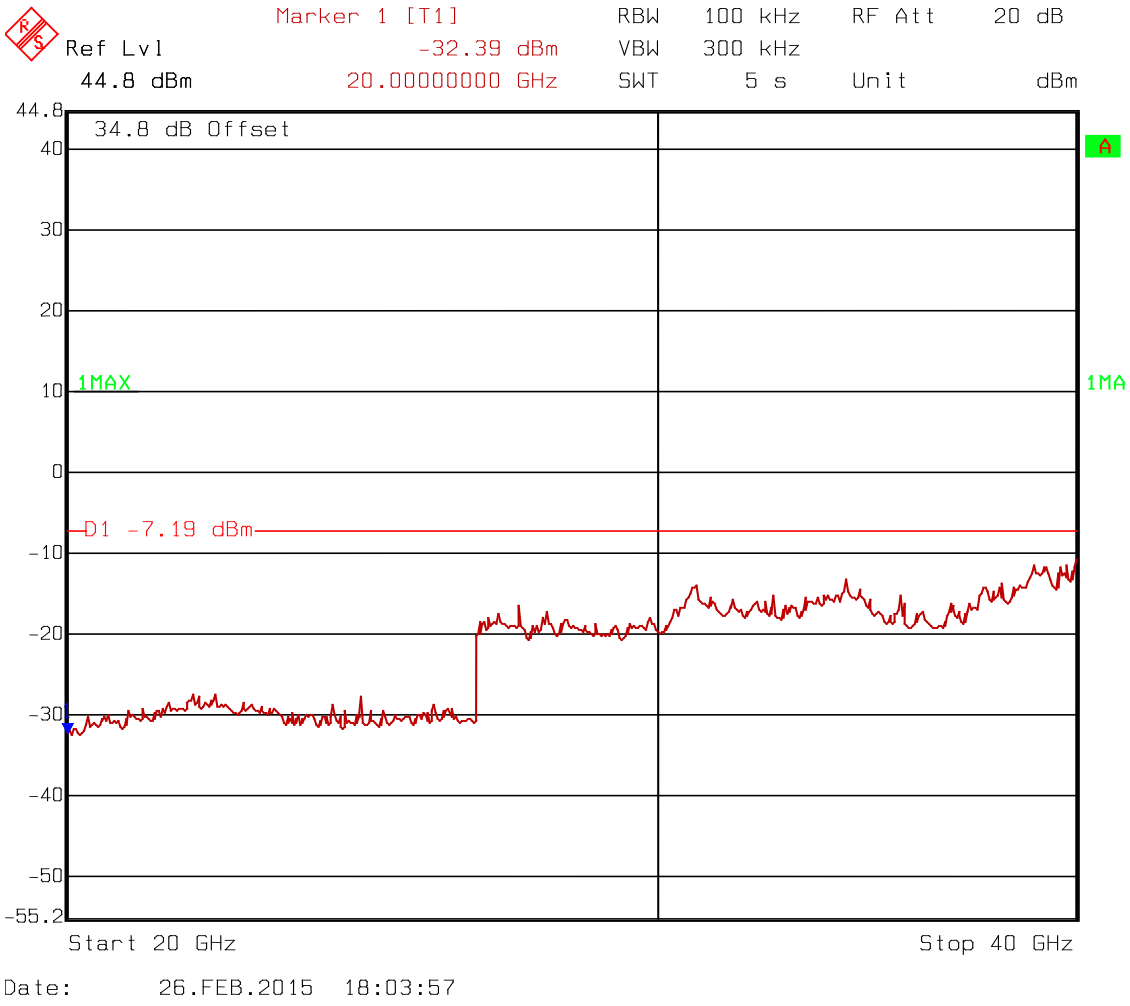


Test Data – Spurious Emissions at Antenna Terminals

High Channel
Spurious Emissions (30MHz to 20GHz)
4QAM
10 MHz Channel

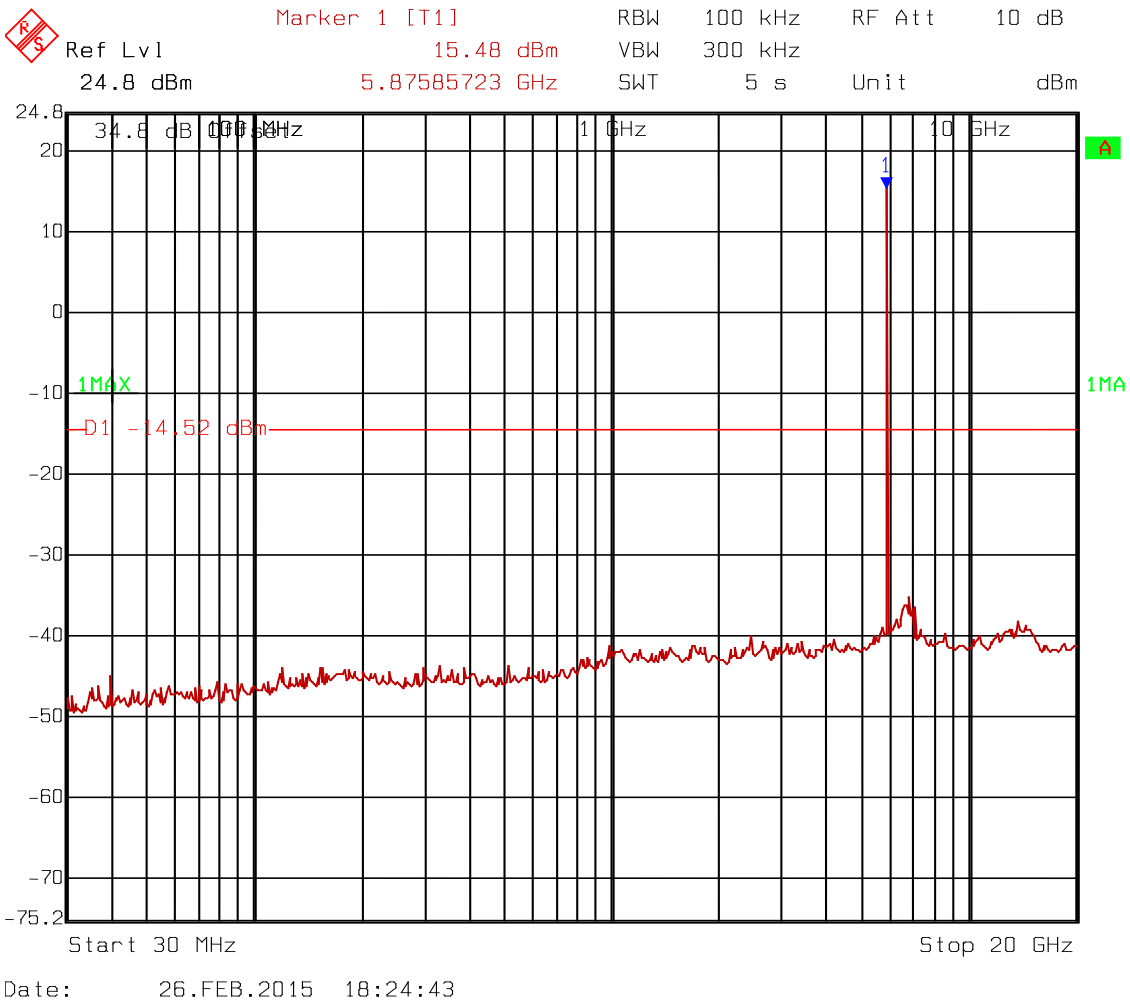


High Channel
Spurious Emissions (20GHz to 40GHz)
4QAM
10 MHz Channel

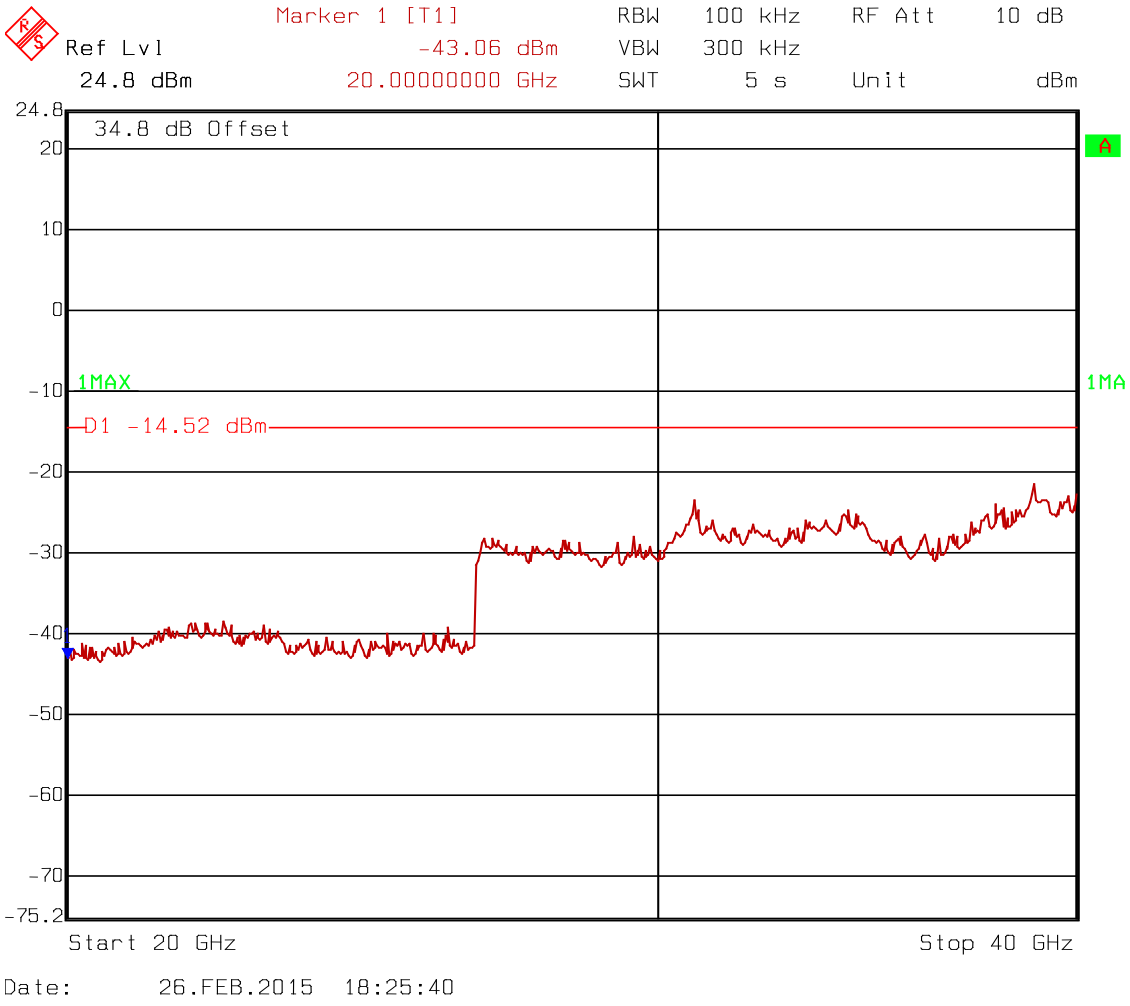


Test Data – Spurious Emissions at Antenna Terminals

High Channel
Spurious Emissions (30MHz to 20GHz)
4QAM
30 MHz Channel



High Channel
Spurious Emissions (20GHz to 40GHz)
4QAM
30 MHz Channel



Section 6. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.247 (d) RSS-Gen 7.2.2
TESTED BY: Tran Phan	DATE: 10 March 2015

Test Results: Complies.

Measurement Data: See attached table.

Test Conditions: 46 %RH
21 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: E1064-E1029-529-835

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=10MHz (Average)

Test Data – Conducted Emissions in Restricted Bands

The device was tested on three channels at the highest and lowest data rates using both Peak detector and Average detector with bandwidths as listed. Results for peak detector are worst case of these.

Only one data rate result was shown due to the data consistency.

The -83.73 dBm Limit is derived from the following:
(54dBuv/m-42.5dBi -95.23dB=-83.73dBm
(Average Limit @ 3m(dBuV/m) – Ant Gain - Conversion = Spec Limit (dBm))

Measured Frequency (MHz)	Meter Reading for 5MHz CH BW (dBm)	Meter Reading for 10MHz CH BW (dBm)	Meter Reading for 30MHz CH BW (dBm)	Spec Limit (dBm)	Difference from Limit (dB)	Pas Fail	Comment
	TX 5731 MHz	**TX 5731 MHz**	**TX 5741 MHz**				**Tx 5731/5741 MHz**
11462	-98.33			-83.73	-14.60	Pass	Low Channel
11462		-97.31		-83.73	-13.58	Pass	Low Channel
11462			-98.26	-83.73	-14.53	Pass	Low Channel
	TX 5781 MHz	**TX 5781 MHz**	**TX 5771 MHz**				**Tx 5771/5781 MHz**
11562	-98.74			-83.73	-15.01	Pass	Mid Channel
11562		-98.33		-83.73	-14.60	Pass	Mid Channel
11542			--97.27	-83.73	-13.54	Pass	Mid Channel
	TX 5844 MHz	**TX 5844 MHz**	**TX 5834 MHz**				**Tx 5834/5844 MHz**
11688	-97.87			-83.73	-14.14	Pass	High Channel
11688		-95.75		-83.73	-12.02	Pass	High Channel
23336			-97.54	-83.73	-13.84	Pass	High Channel

Test Data - Radiated Emissions in Restricted Bands

The device was tested on three channels at the highest and lowest data rates using both Peak detector and Average detector using bandwidths as listed. Results for peak detector are worst case of these.

Only one channel and one data rate was shown due to the data consistency.

The device was tested conducted (above) and then radiated with the antenna port loaded.

Measured Frequency (MHz)	Antenna Polarity (H/V)	Atten (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuv/m)	Avg Limit (dBuVm)	Difference from Limt (dB)	Pas Fail	Comment
											Tx 5731 MHz
11462	H	0	36.1	40	17	45.2	47.9	54	-6.1	Pass	
11462	V	0	36.1	40	17	45.2	47.9	54	-6.1	Pass	
22924	H	0	Noise Floor					54		Pass	Not measurable
22924	V	0	Noise Floot					54		Pass	Not measurable

Section 7. Maximum Average Power Spectral Density

NAME OF TEST: Average Power Spectral Density	PARA. NO.: 15.247(e) RSS-210 A8.2(b)
TESTED BY: Tran Phan	DATE: 04 March 2015

Test Results: Complies.

Measurement Data: See attached plots.

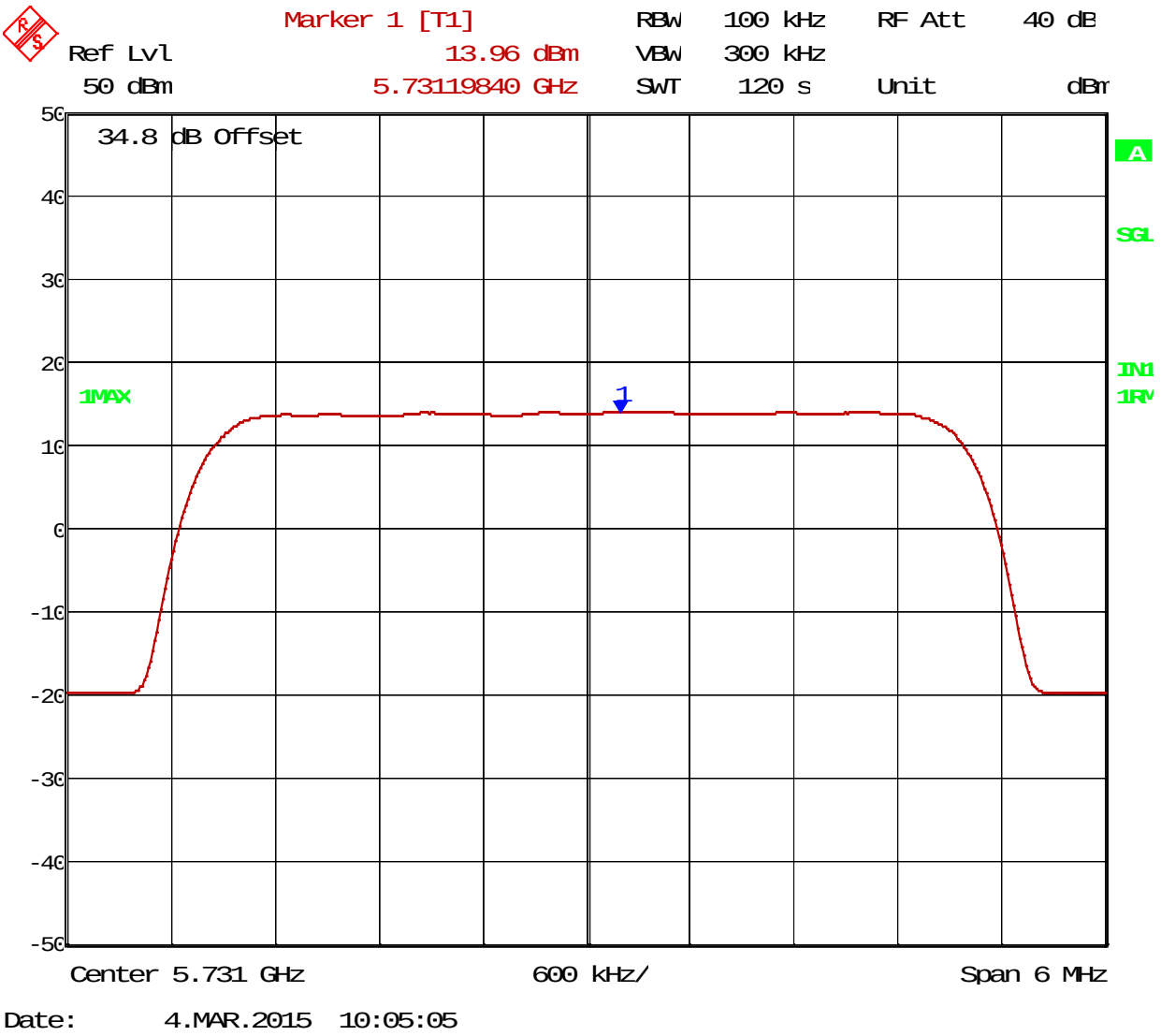
Test Conditions: 45 %RH
21 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1767

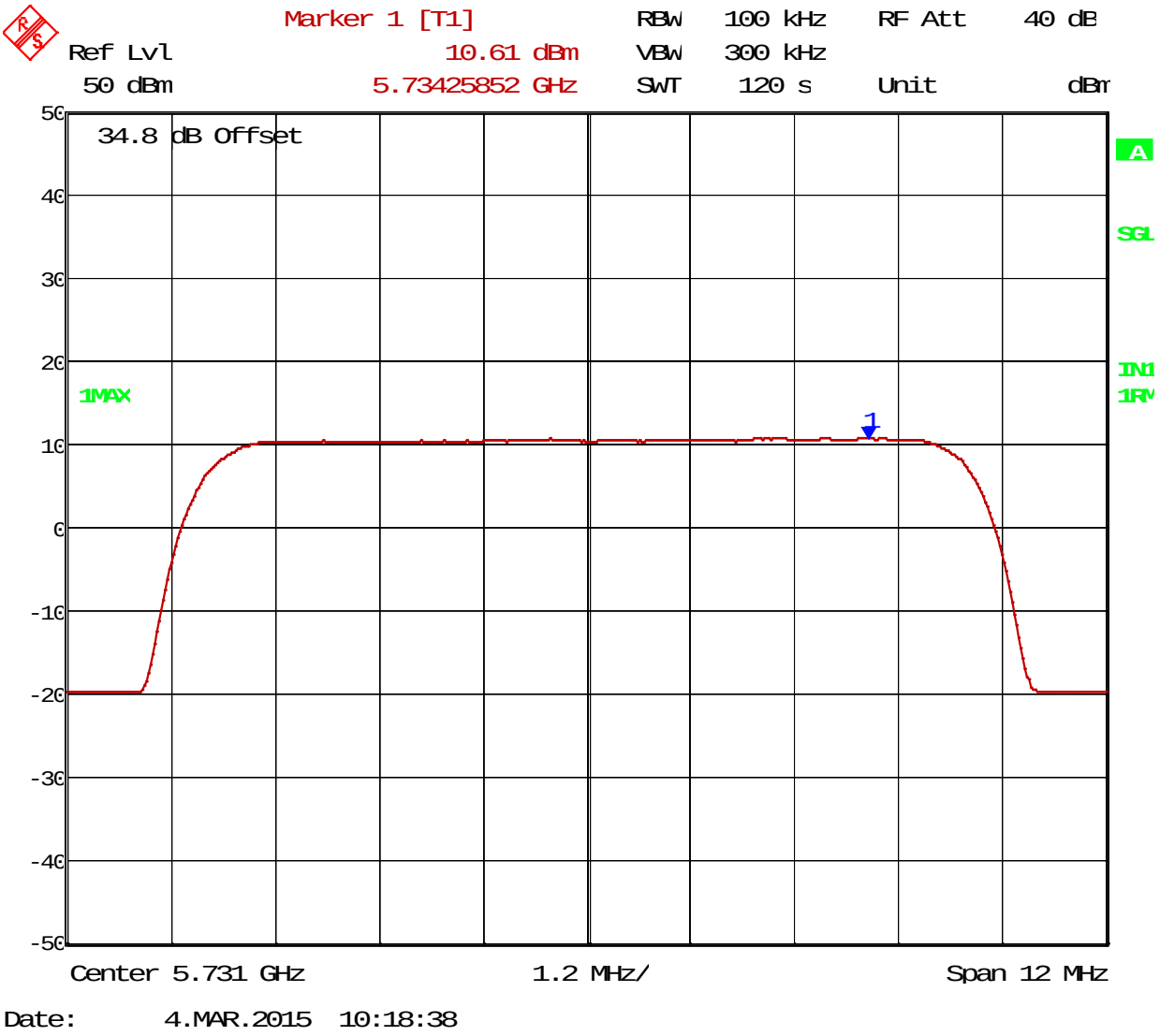
Maximum Average Power Spectral Density

Low Channel
5 MHz Channel
4QAM
13.96 – 15.2 = -1.24dBm < 8dBm



Maximum Average Power Spectral Density

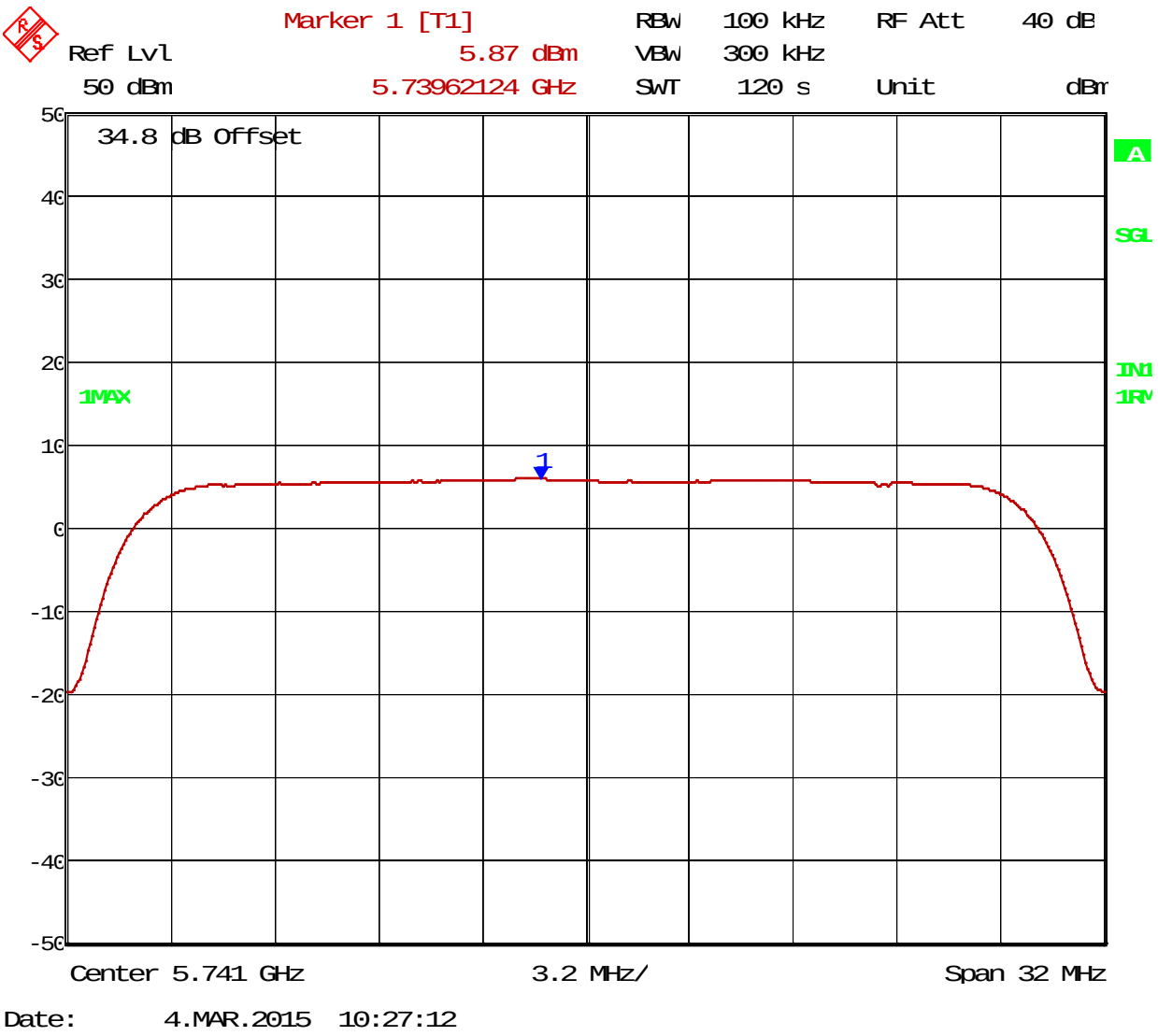
Low Channel
10 MHz Channel
4QAM
10.61 – 15.2 = -4.59 dBm < 8dBm



Maximum Average Power Spectral Density

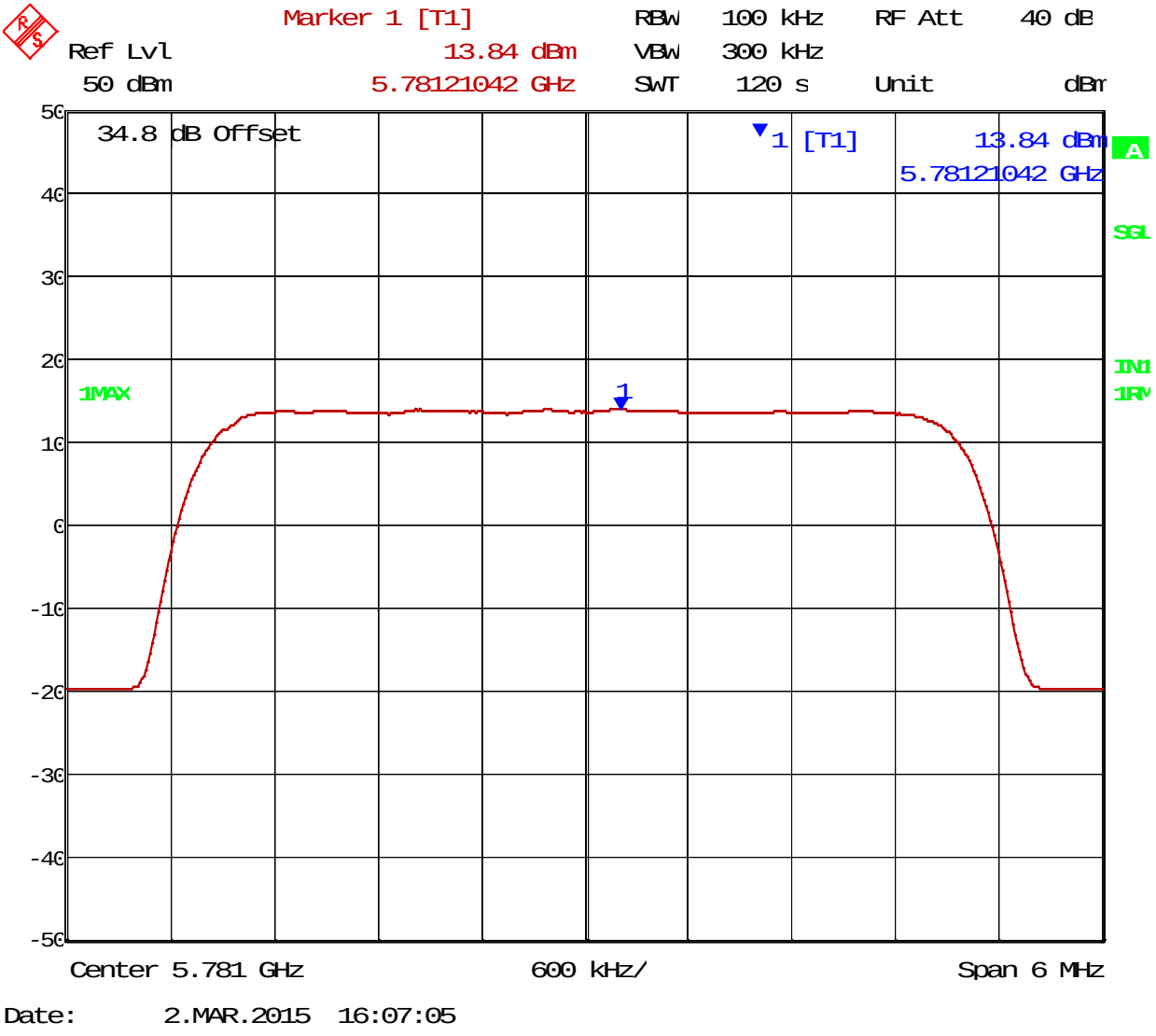
Low Channel
30 MHz Channel
4QAM

5.87 – 15.2 = -9.33 dBm < 8dBm



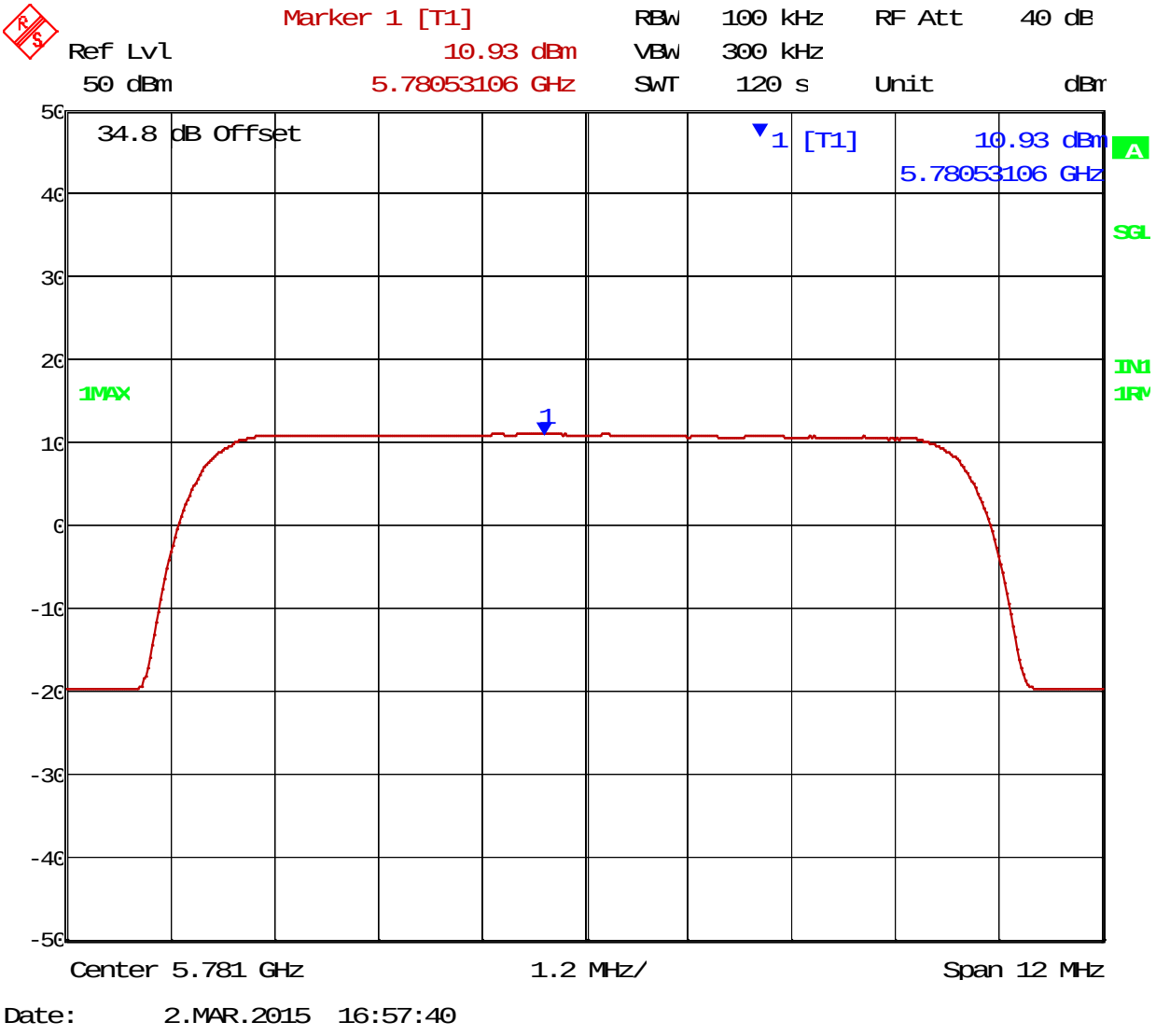
Maximum Average Power Spectral Density

Mid Channel
5 MHz Channel
4QAM
Density
13.64 -15.2= -1.56 dBm < 8 dBm



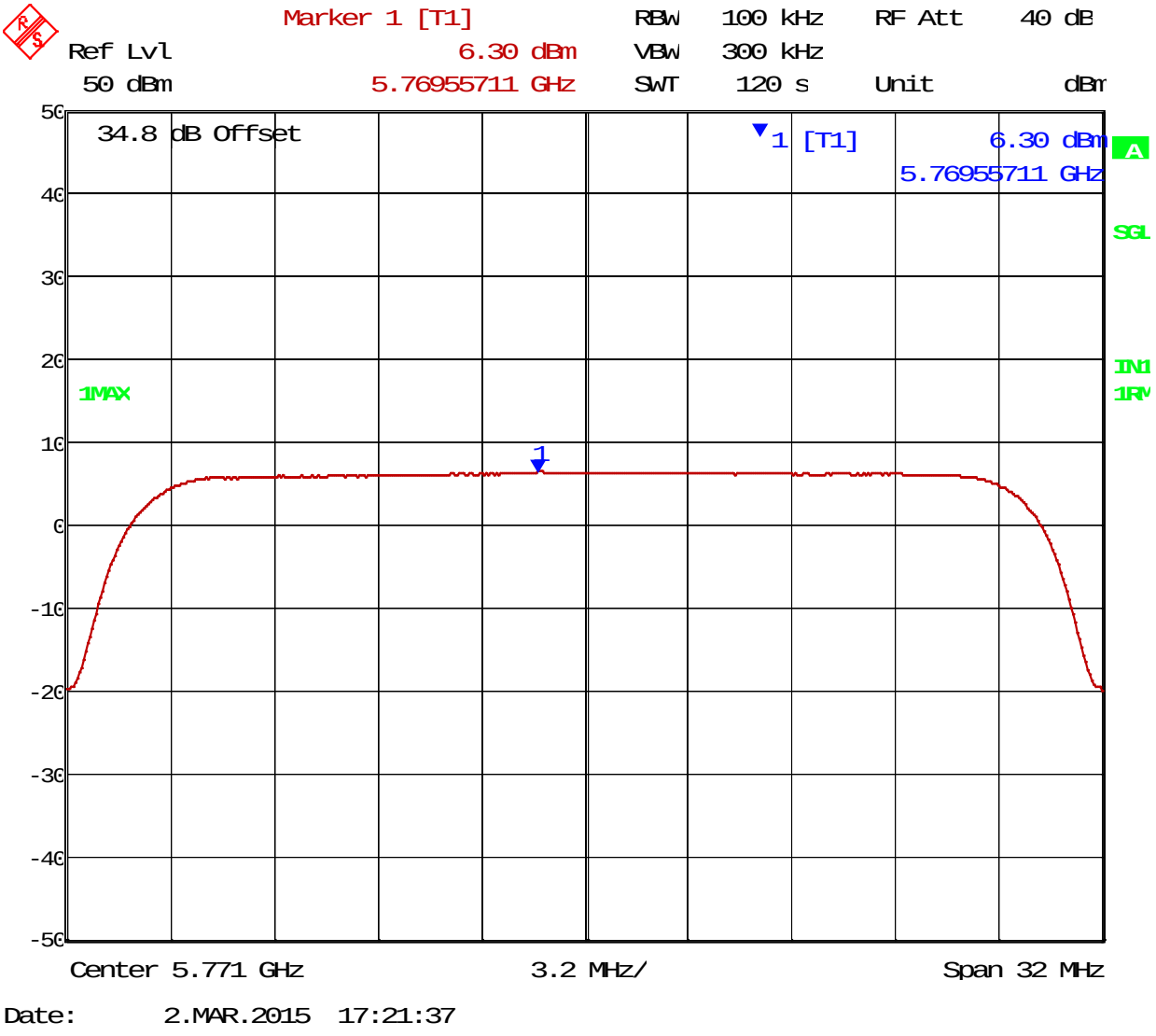
Maximum Average Power Spectral Density

Mid Channel
10 MHz Channel
4QAM
Density
10.93-15.2= -4.27 dBm < 8 dBm



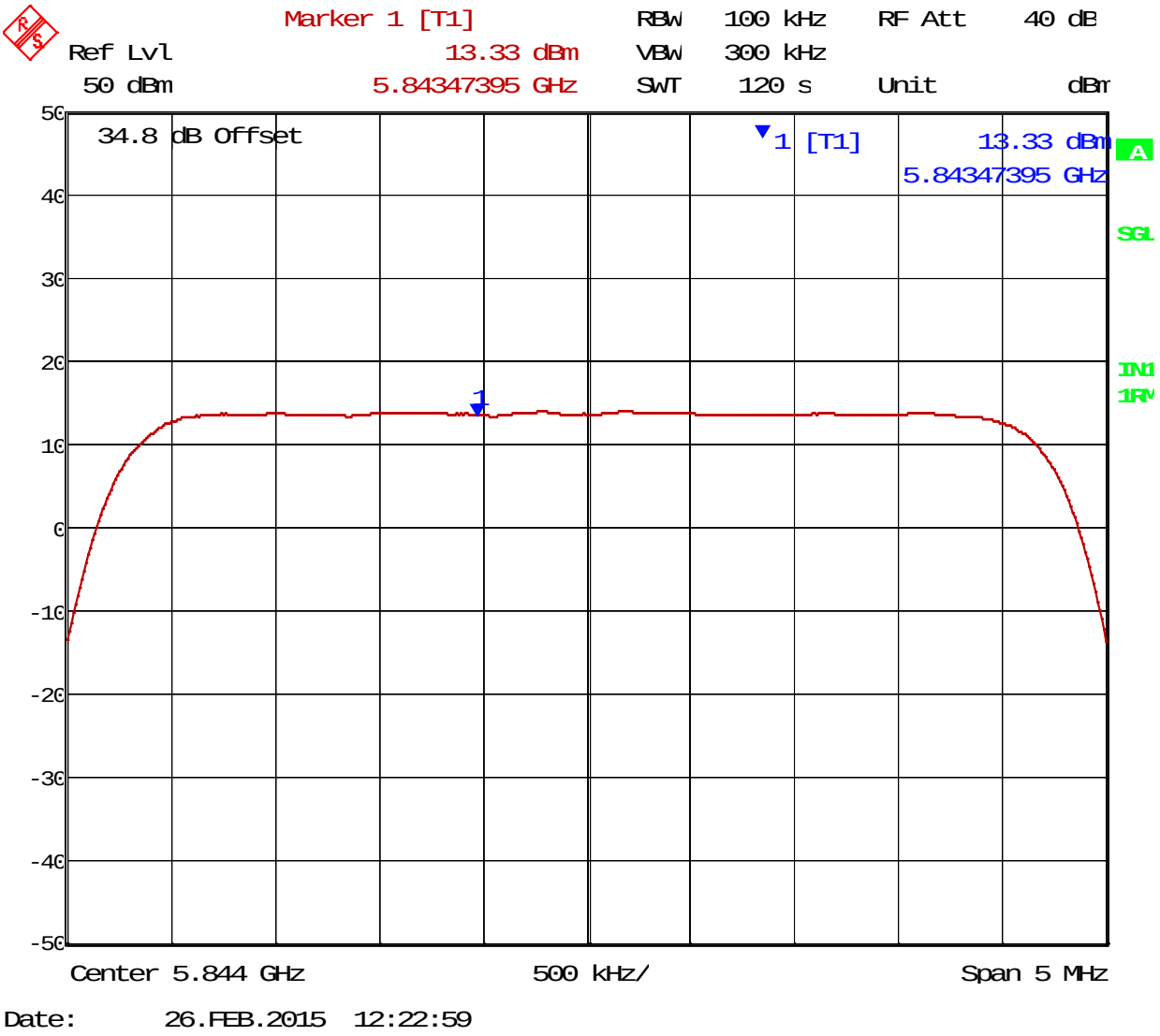
Maximum Average Power Spectral Density

Mid Channel
4QAM
30 MHz Channel
Density
6.36-15.2= -8.84 dBm < 8dBm

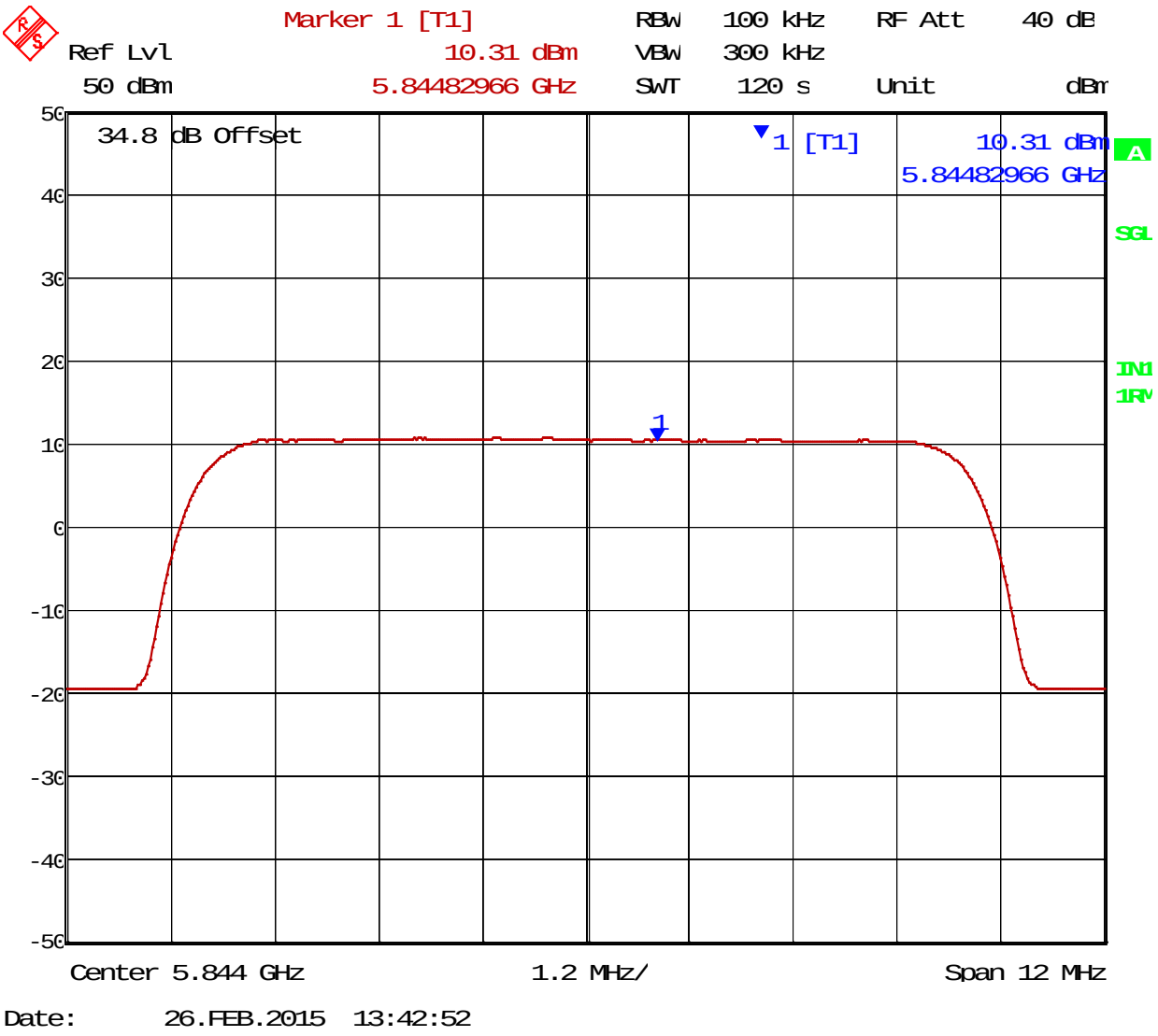


Maximum Average Power Spectral Density

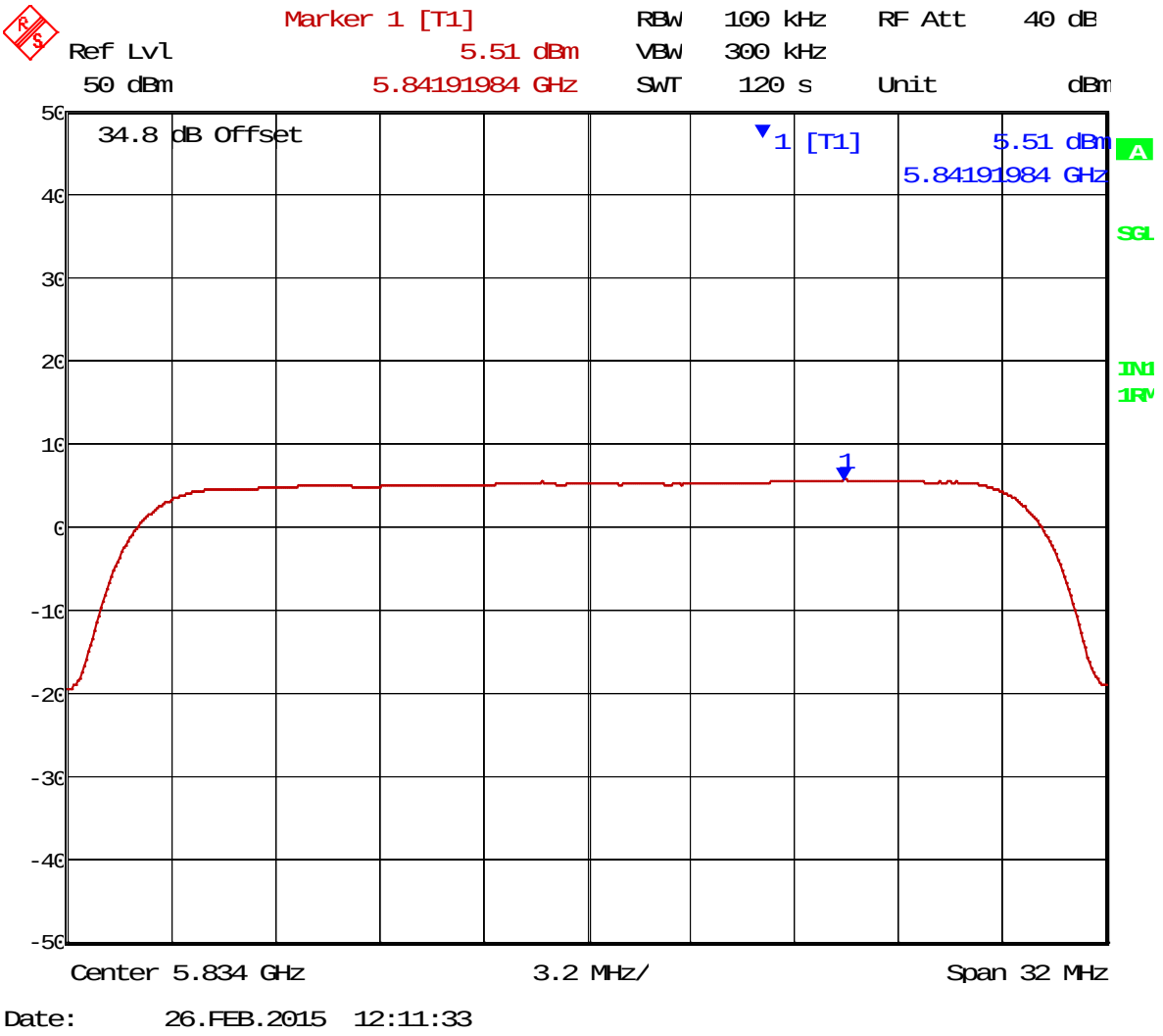
High Channel
4QAM
5 MHz Channel
13.33 – 15.2 =-1.9dBm < 8dBm



Maximum Average Power Spectral Density
High Channel
4QAM
10 MHz Channel
Density
10.31 – 15.2 = -4.89dBm < 8dBm



Maximum Average Power Spectral Density
High Channel
4QAM
30 MHz Channel
Density
5.51-15.2= -9.69 dBm < 8dBm



Section 8. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a) RSS-Gen 7.2.4
TESTED BY: Tran Phan	DATE: 06 March 2015

Test Results: Complies.

Measurement Data: See attached plots.

Measurement Uncertainty: +/- 1.7 dB

Temperature: 21° C

Relative Humidity; 46%

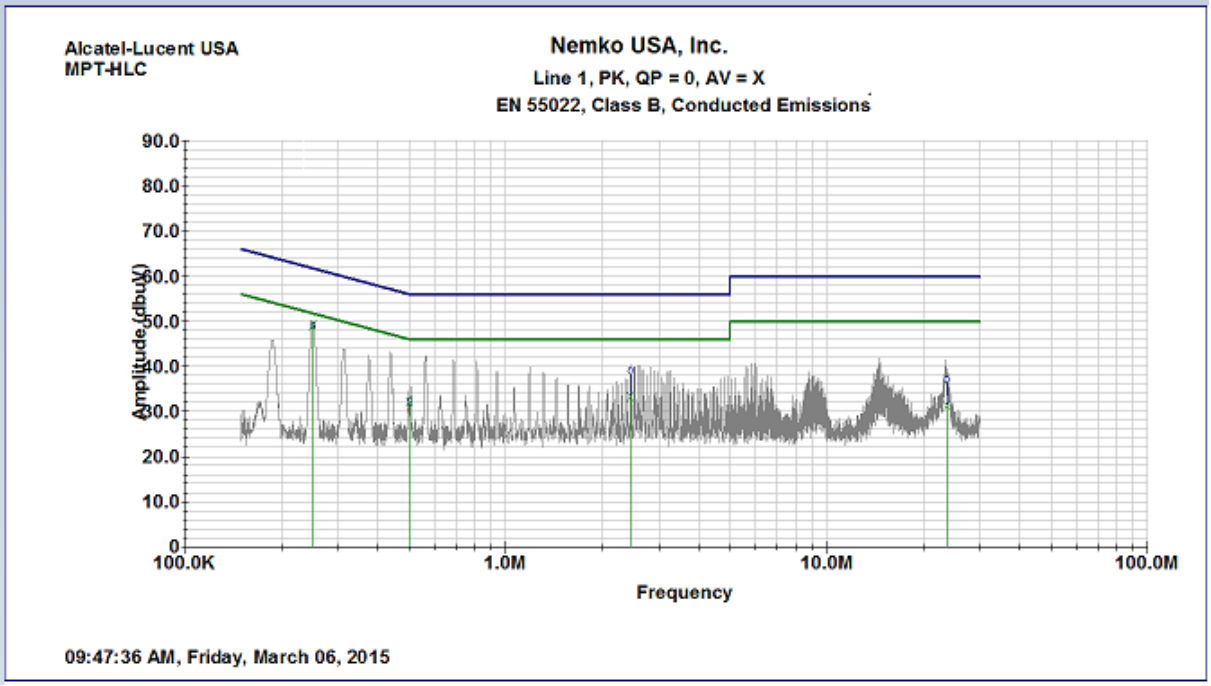
Test Equipment Used: E1026-E1019

Notes:

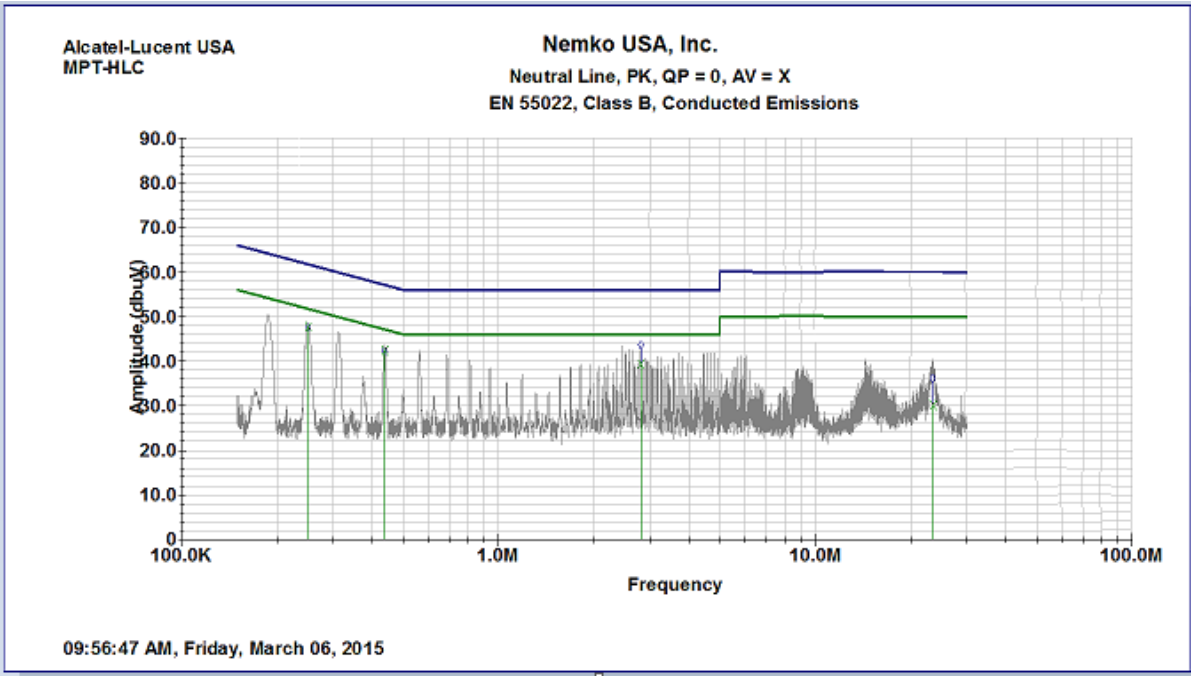
1) There was no DC power supply provided from the client. The DUT system was powered by the lab DC power supply (Manufacturer=Xantrex, Model=XFR300-4, and Serial number=1917)
2) A 5W load was connected to the DUT Antenna Port (the diplexer's output port)

Test Data – Powerline Conducted Emissions

Line 1



Line 2



Section 9. Test Equipment List

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
529	Antenna, Horn	EMCO	3115	2505	08-Dec-2014	08-Dec-2016
E1029	Preamplifier	A.H. Systems, Inc.	PAM-0118	343	14-Aug-2014	14-Aug-2015
E1064	Spectrum Analyzer	Agilent	E4440A	US42221762	22-Dec-2014	22-Dec-2015
835	Spectrum Analyzer	Rohde & Schwartz	RHDFSEK	8290584/005	09-Jun-2014	09-Jun-2015
E1026	Spectrum Analyzer	Rohde & Schwartz	ESCI 7	100800	14-Aug-2014	14-Aug-2015
1767	Receiver	Rohde & Schwartz	ESIB26	837491/0002	04-Nov-2014	04-Nov-2015
E1019	Two Line V-Network	Rohde & Schwartz	ENV216	101045	07-May-2014	07-May-2015

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 100 kHz 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 100 kHz 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	22.01-23.120
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.

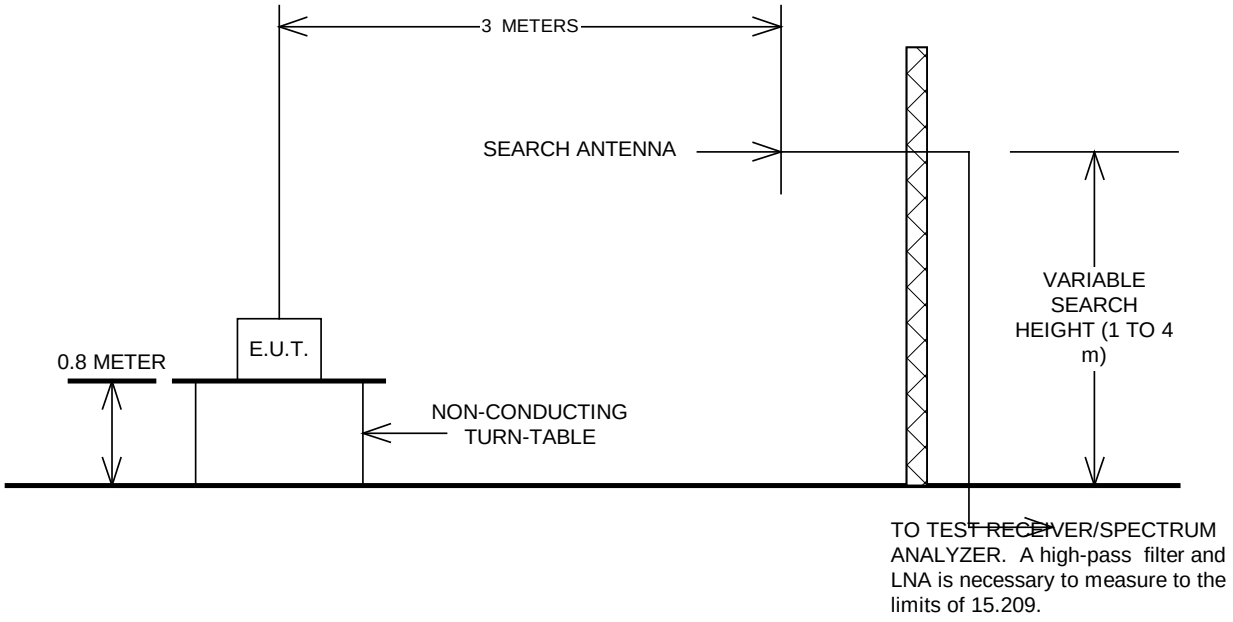
Method Of Measurement:

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.

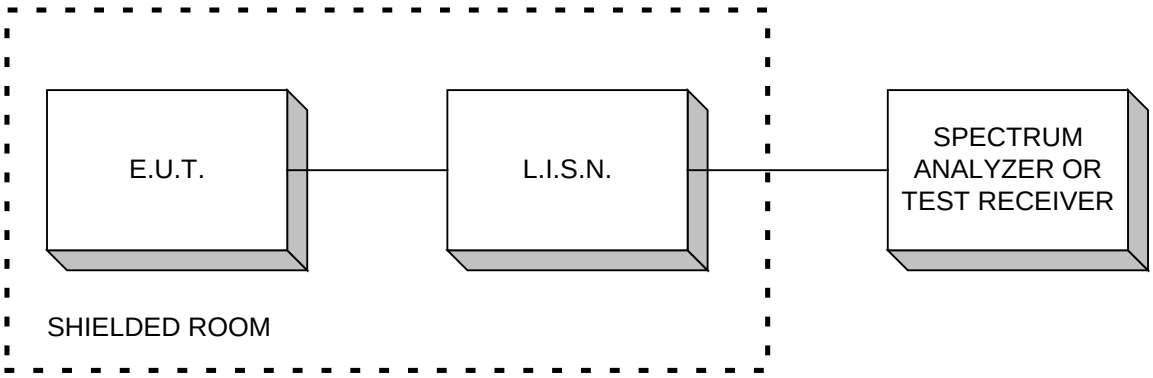
5.3.2 Measurement Procedure AVGPSD:
1. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
2. Set the analyzer span to 5-30% greater than 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

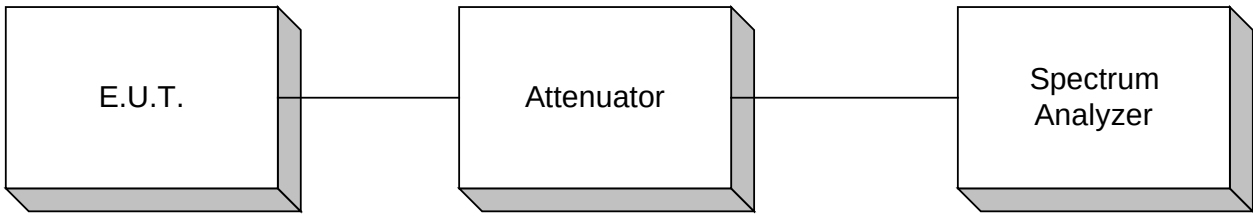
Test Site For Radiated Emissions



Conducted Emissions

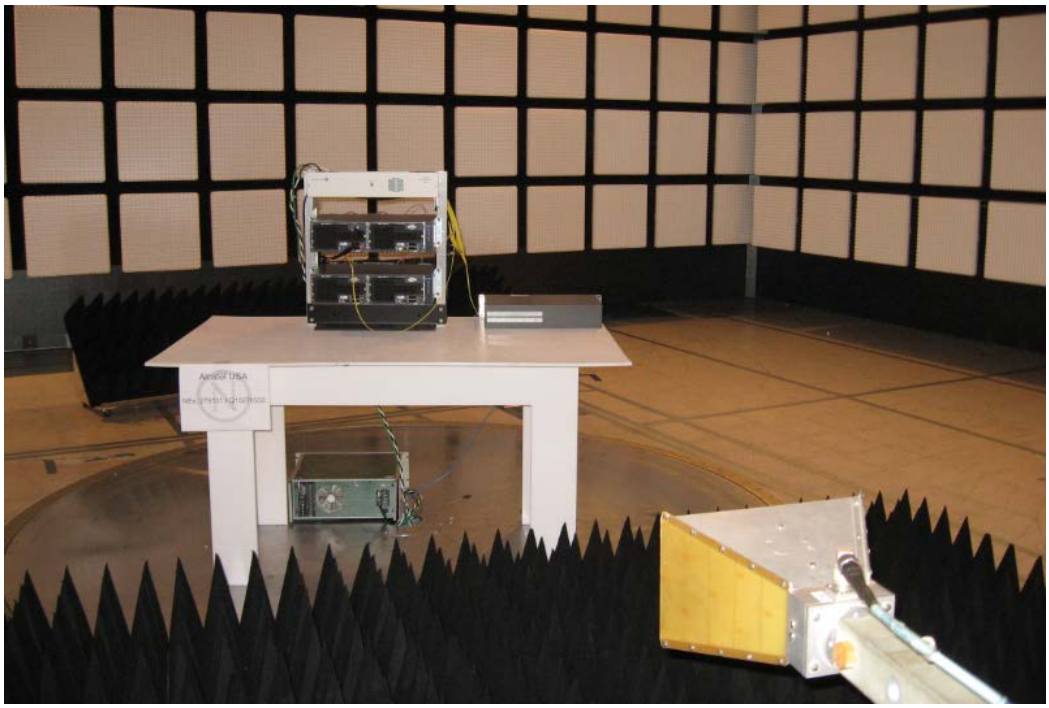


Peak Power At Antenna Terminals
Minimum 6 dB Bandwidth
Peak Power Spectral Density
Spurious Emissions (conducted)

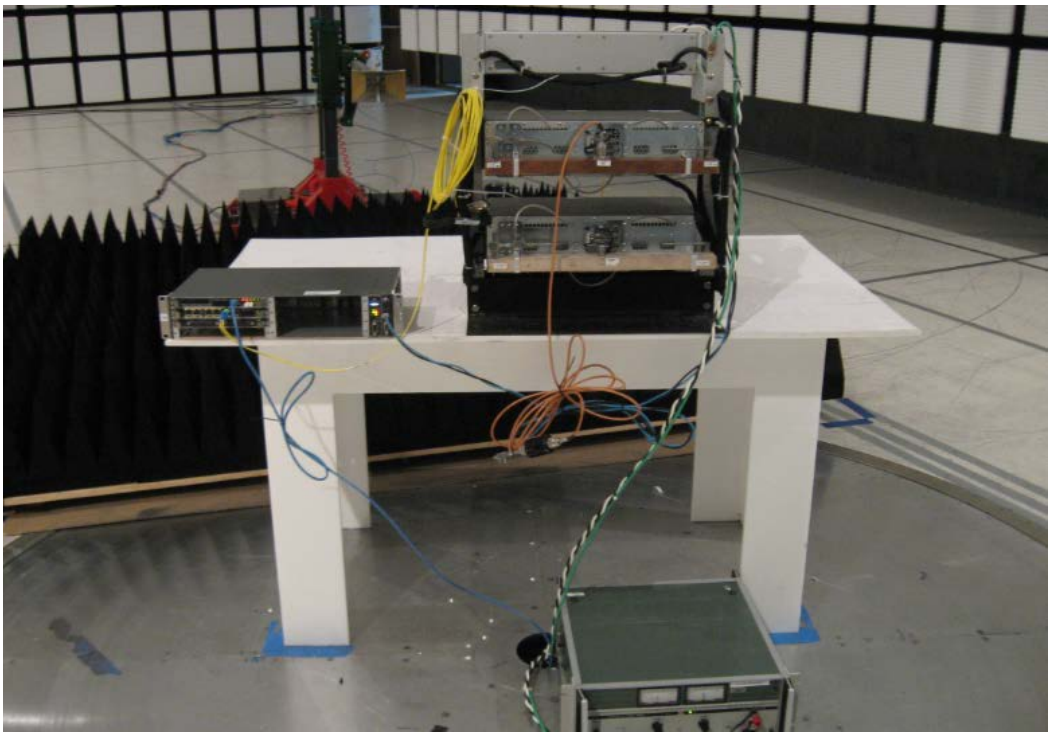


ANNEX C - PHOTO

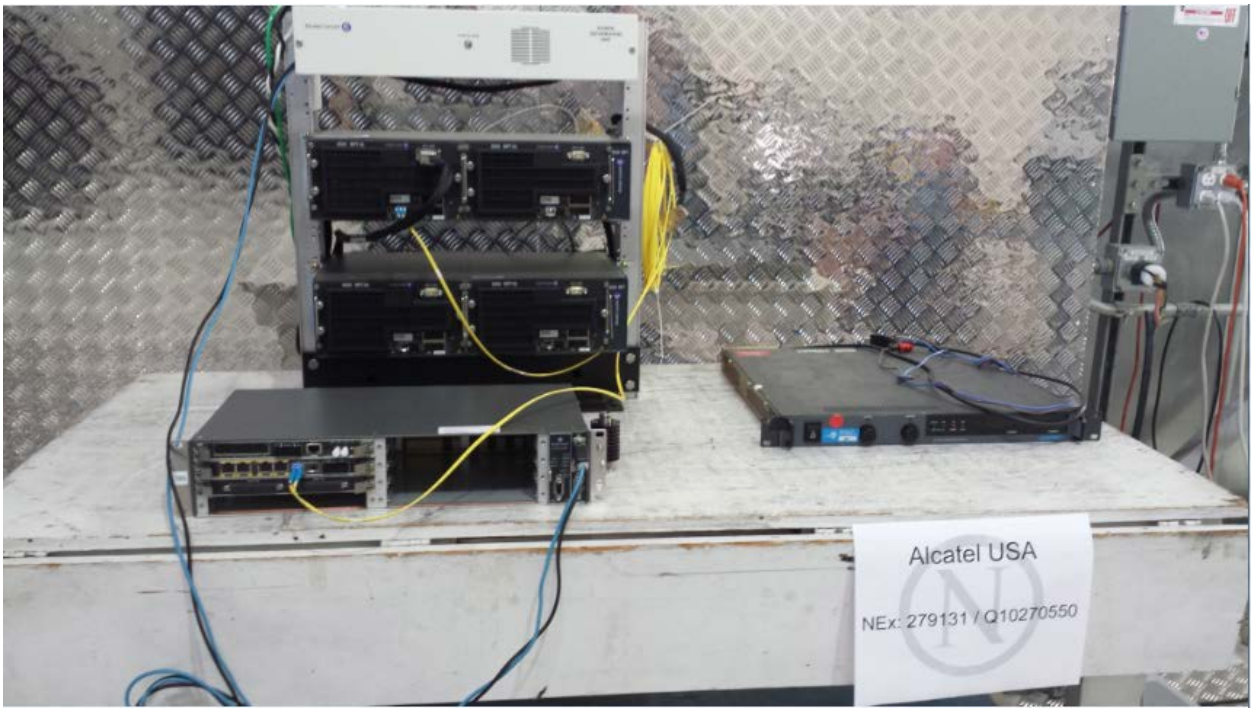
Front of Radiated Emissions Setup



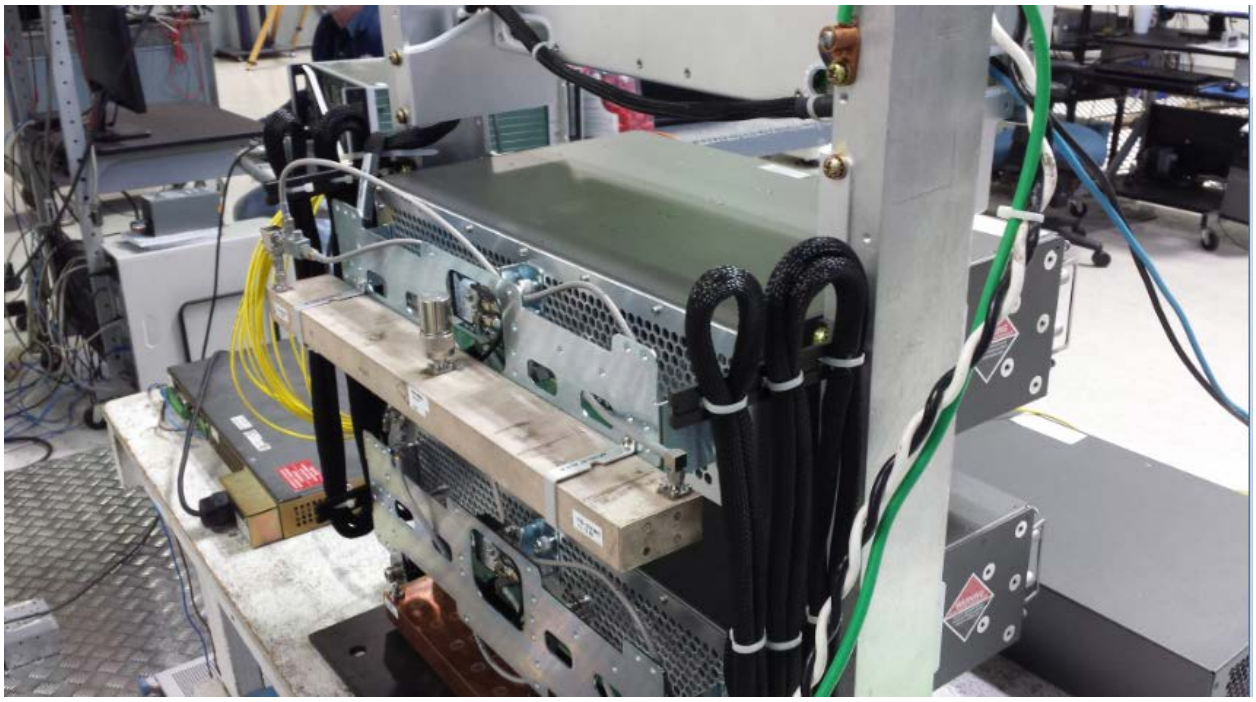
Rear of Radiated Emissions Setup



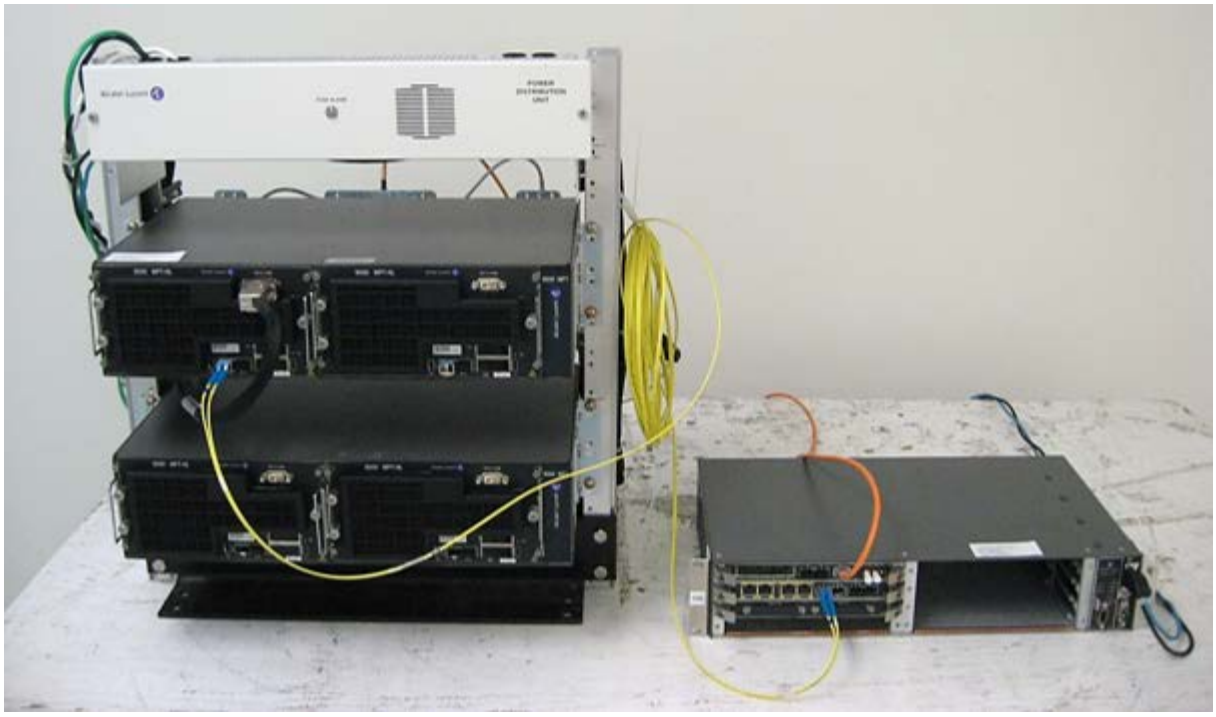
Front of Powerline Conducted Emissions Setup



Rear of Powerline Conducted Emissions Setup



Front of EUT



Rear of EUT