Sky Light Imaging Limited

Application
For
Certification

FCC ID: 2ABT4TSN47W

Portable Handy Scanner

Model: TSN47W+TSNA02
Additional Model: TSN47W, TSN470, TSN470+TSNA02, TSN45W, TSN45W+TSNA02

WiFi Transceiver

Report No.: 140506004SZN-001

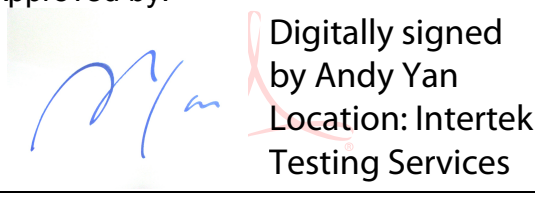
We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-13]

Prepared and Checked by:

Sign on file

Sen Lv
Project Engineer

Approved by:



Andy Yan
Project Engineer
Date: June 5, 2014

- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
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- For Terms And Conditions of the services, it can be provided upon request.
- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF no.: FCC 15C_Tx_b

Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch
6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China
Tel: (86 755) 8601 6288 Fax: (86 755) 8601 6751 Website: www.china.intertek-etlsemko.com

LIST OF EXHIBITS

MEASUREMENT/TECHNICAL REPORT

Sky Light Imaging Limited
MODEL: TSN47W+TSNA02
Additional Model: TSN47W, TSN470, TSN470+TSNA02, TSN45W, TSN45W+TSNA02

FCC ID: 2ABT4TSN47W

This report concerns (check one) Original Grant ___X___ Class II Change ____

Equipment Type: DTS - Part 15 Digital Transmission Systems (WiFi transmitter portion)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes _____ No ___X___

If yes, defer until : _____ date

Company Name agrees to notify the Commission by: _____ date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes _____ No ___X___

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-13] Edition] provision.

Report prepared by:

Sen Lv
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Nanshan District, Shenzhen, P. R. China
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Fax: (86 755) 8614 6751

Table of Contents

List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf

EXHIBIT 1

SUMMARY OF TEST RESULTS

1.0 Summary of Test results

Sky Light Imaging Limited
MODEL: TSN47W+TSNA02

FCC ID: 2ABT4TSN47W

TEST	REFERENCE	RESULTS
Max. Output power	15.247(b)(3)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d)	Pass
AC Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

EXHIBIT 2

GENERAL DESCRIPTION

2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a Portable Handy Scanner with WiFi function operating at 2412-2462MHz for 802.11b/g/n-HT20, 11 channels with 5MHz channel spacing and 2422-2452MHz for 802.11n-HT40, 9 channels with 5MHz channel spacing. The EUT was powered by 3.7Vdc rechargeable battery which can be charged by AC/DC adapter. For more detailed features description, please refer to the user's manual.

TSN47W+TSNA02 were consisted by scanner (TSN47W) and docking (TSNA02), scanner has WI-FI function and can transmit data to computer, docking hasn't any wireless function and it can be work with scanner together. We found that the worst case is that they work together.

The Model: TSN470 and TSN45W are the same as the Model: TSN47W in hardware aspect, they are differences in appearance, model number and brand name as trading purpose.
The Model: TSN470+TSNA02 and TSN45W+TSNA02 are the same as the Model: TSN47W+TSNA02 in hardware aspect, they are differences in appearance, model number and brand name as trading purpose.

Type of Modulation: BPSK, QPSK, 16QAM, 64QAM, CCK, DQPSK, DBPSK.
Antenna Type: Integral Antenna.

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

2.2 Related Submittal(s) Grants

This is an application for certification of:
DTS- Part 15 Digital Transmission Systems (WiFi transmitter portion)

Remaining portions are subject to the following procedures:
1. Receiver portion of WiFi: exempt from technical requirement of this Part.
2. Other Digital Function: Refer to DOC report.

2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009) and KDB 558074. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The Semi-Anechoic chamber and shield room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, Block D, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 242492).

EXHIBIT 3

SYSTEM TEST CONFIGURATION

3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by 3.7Vdc fully charged rechargeable battery and charged by Adapter (The adapter was powered by AC 120V/60Hz) during the testing. Only the worst case data was reported.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

The rear of unit shall be flushed with the rear of the table.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

The parameters of test software setting:
During the test, Channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the application and is going to be fixed on the firmware of the end product.

Power Parameters of IEEE 802.11b/g/n

Test software setting of IEEE 802.11b/g/n			
Channel No.	Output Power	Data rate	Modulation type
1,6,11	6.5	802.11b: 1-11Mbps	802.11b: CCK, DQPSK, DBPSK
	6.5	802.11g: 6-54Mbps	802.11g: BPSK, QPSK, 16QAM
	6.5	802.11n-HT20: 6.5-65Mbps	802.11n: BPSK, QPSK, 16QAM,

3,6,9	6.5	802.11n-HT40: 13.5-135Mbps	802.11n: BPSK, QPSK, 16QAM, 64QAM

3.3 Special Accessories

One shielded USB cable with a ferrite core is used.

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance – Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

3.5 Equipment Modification

Any modifications installed previous to testing by Sky Light Imaging Limited will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch.

3.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Model No.
USB Cable	Sky Light	shielded, with a ferrite core, Length 100cm
Mini SD Card	SanDisk	4G
Adapter	Sky Light	SP-02C0551000-U Input: 100~240V, 50/60Hz, 0.15A; Output: 5.5V, 1.0A

EXHIBIT 4

MEASUREMENT RESULTS

Applicant: Sky Light Imaging Limited
Date of Test: May 20, 2014
Model: TSN47W+TSNA02

4.0 **Measurement Results**

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):

[ ] The antenna power of the EUT was connected to the input of a spectrum analyzer. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

[×] The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set according to the FCC KDB 558074 spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges and power was read directly in dBm. External attenuation and cable loss were compensated from the measured value.

For antennas with gains of 6 dBi or less, maximum allowed Transmitter output is 1 watt (+30 dBm).

IEEE 802.11b (Antenna Gain = 3.47dBi) (CCK, 1Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	8.95	7.85
Middle Channel: 2437	8.78	7.55
High Channel: 2462	9.20	8.32

IEEE 802.11g (Antenna Gain = 3.47dBi) (16QAM, 6Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	8.34	6.82
Middle Channel: 2437	8.95	7.85
High Channel: 2462	9.21	8.34

IEEE 802.11n-HT20 (Antenna Gain = 3.47dBi) (16QAM, 6.5Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	8.52	7.11
Middle Channel: 2437	8.76	7.52
High Channel: 2462	8.89	7.74

IEEE 802.11n-HT40 (Antenna Gain = 3.47dBi) (64QAM, 13.5Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2422	8.76	7.52
Middle Channel: 2437	8.73	7.46
High Channel: 2452	9.36	8.63

Cable loss: 1.3 dB External Attenuation: 0 dB

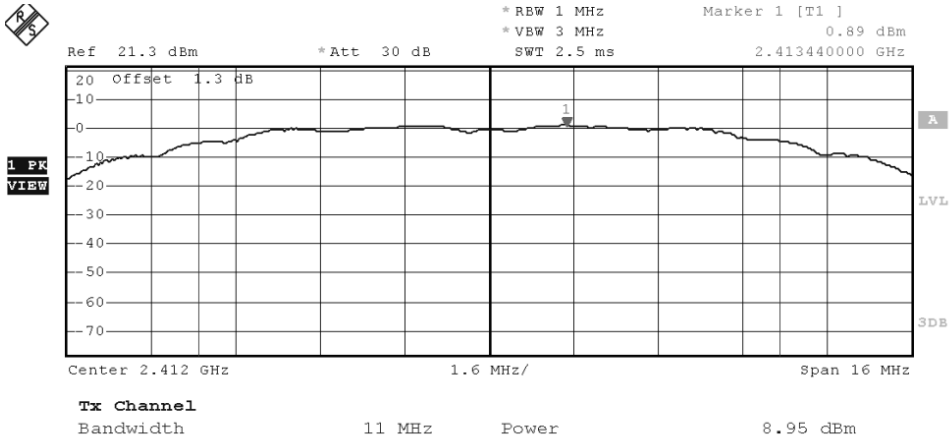
Cable loss, external attenuation has been included in OFFSET function

EUT max. output level = 9.36dBm

For RF Exposure, the information is saved with filename: RF exposure.pdf.

The test plots are attached as below.

802.11b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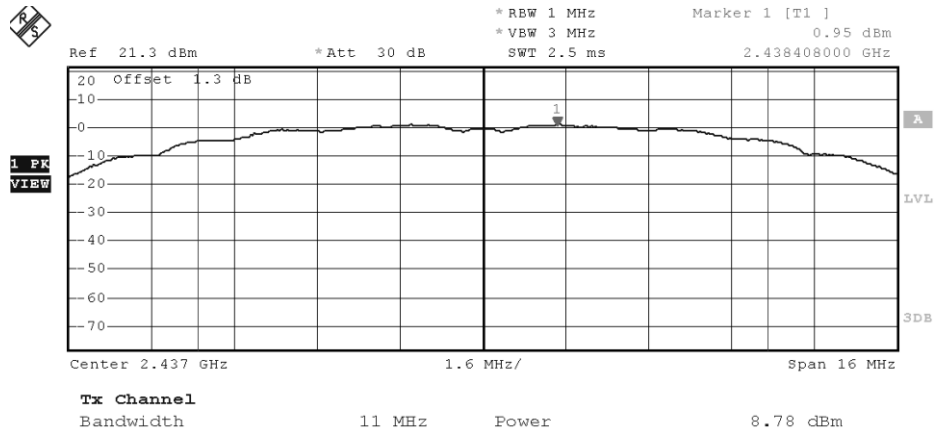
VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
0.89 dBm
2.413440000 GHz
Ref 21.3 dBm
Att 30 dB
20 Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
Center 2.412 GHz
1.6 MHz/
Span 16 MHz
Tx Channel
Bandwidth 11 MHz
Power 8.95 dBm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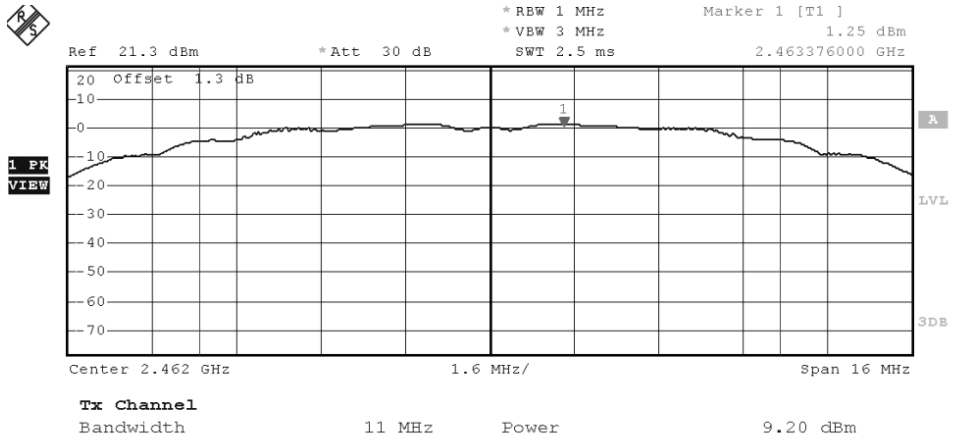
1.6 MHz/
Span 16 MHz
Tx Channel
Bandwidth 11 MHz
Power 8.78 dBm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VBW 3 MHz
SWT 2.5 ms
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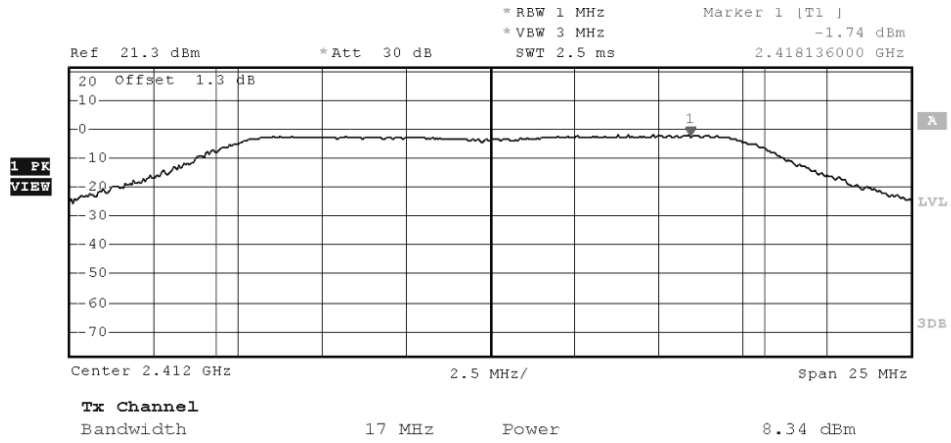
2.463376000 GHz
Ref 21.3 dBm
Att 30 dB
20 Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
Center 2.462 GHz
1.6 MHz/
Span 16 MHz
Tx Channel
Bandwidth 11 MHz
Power 9.20 dBm

802.11g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SWT 2.5 ms
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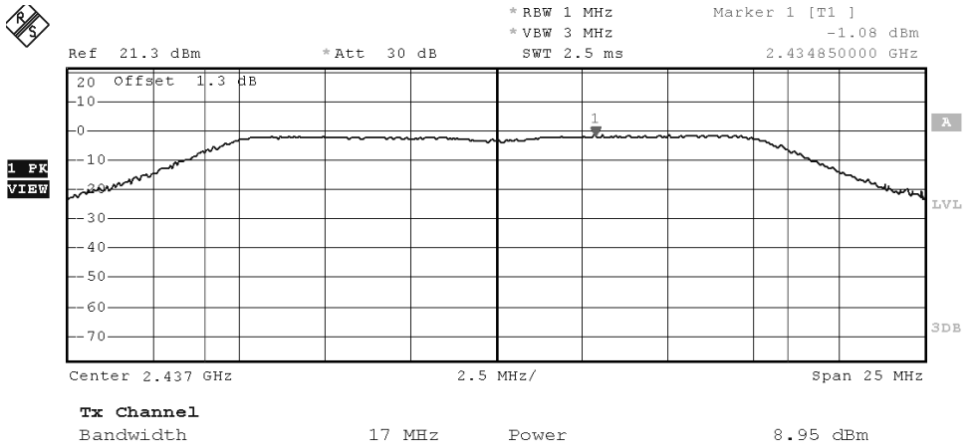
2.418136000 GHz
Ref 21.3 dBm
*Att 30 dB
20 Offset 1.3 dB
1 PK VIEW
A
LVL
3DB
Center 2.412 GHz
2.5 MHz/
Span 25 MHz
Tx Channel
Bandwidth 17 MHz
Power 8.34 dBm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2.434850000 GHz
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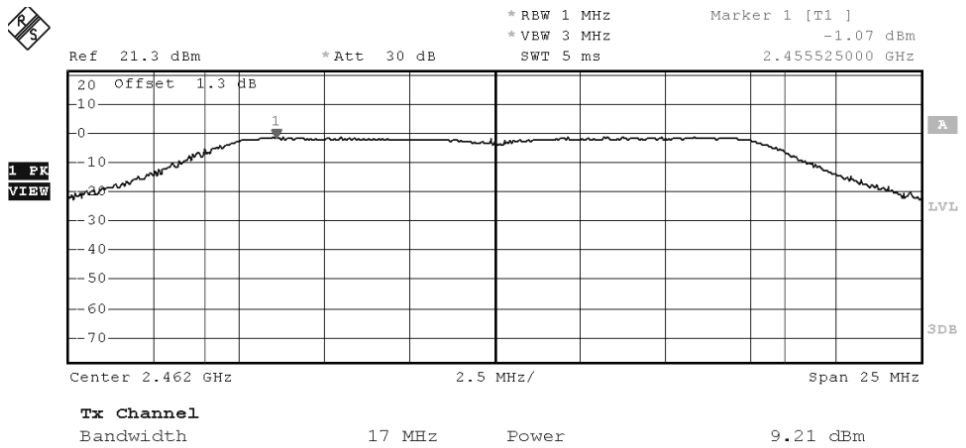
20 Offset 1.3 dB
1 PK VIEW
A
LVL
3DB
Center 2.437 GHz
2.5 MHz/
Span 25 MHz
Tx Channel
Bandwidth 17 MHz
Power 8.95 dBm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2.455525000 GHz
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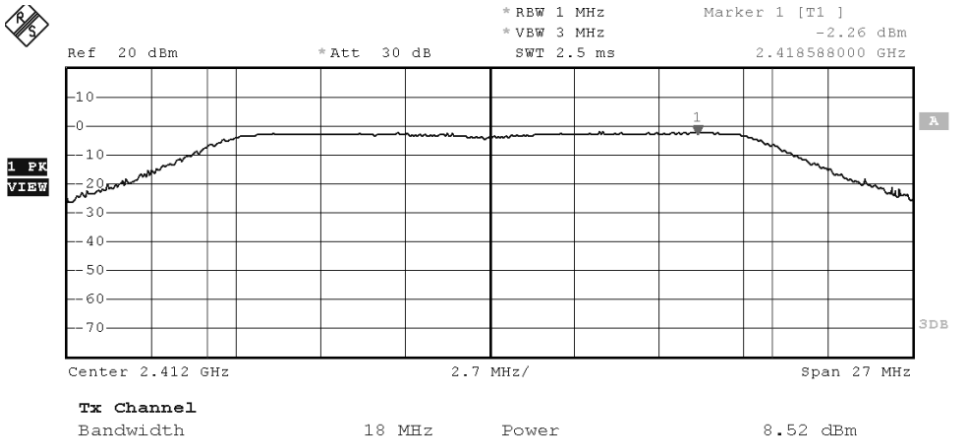
20 Offset 1.3 dB
1 PK VIEW
A
LVL
3DB
Center 2.462 GHz
2.5 MHz/
Span 25 MHz
Tx Channel
Bandwidth 17 MHz
Power 9.21 dBm

802.11 n-HT20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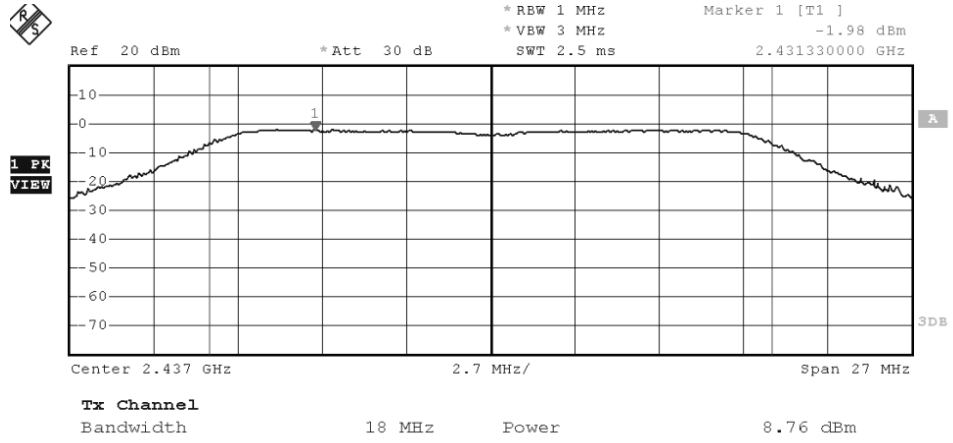
2.418588000 GHz
Ref 20 dBm
*Att 30 dB
1 PK
VIEW
A
3DB
Center 2.412 GHz
2.7 MHz/
Span 27 MHz
Tx Channel
Bandwidth
18 MHz
Power
8.52 dBm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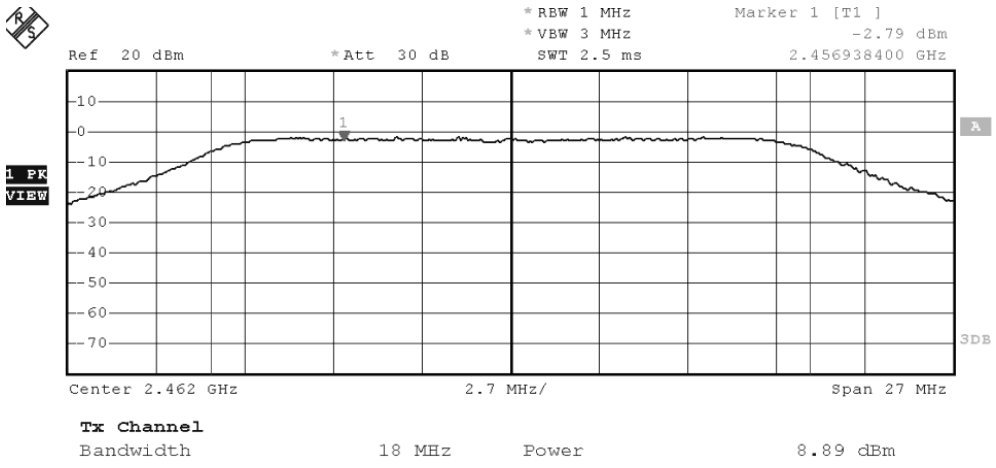
2.431330000 GHz
Ref 20 dBm
*Att 30 dB
1 PK
VIEW
A
3DB
Center 2.437 GHz
2.7 MHz/
Span 27 MHz
Tx Channel
Bandwidth
18 MHz
Power
8.76 dBm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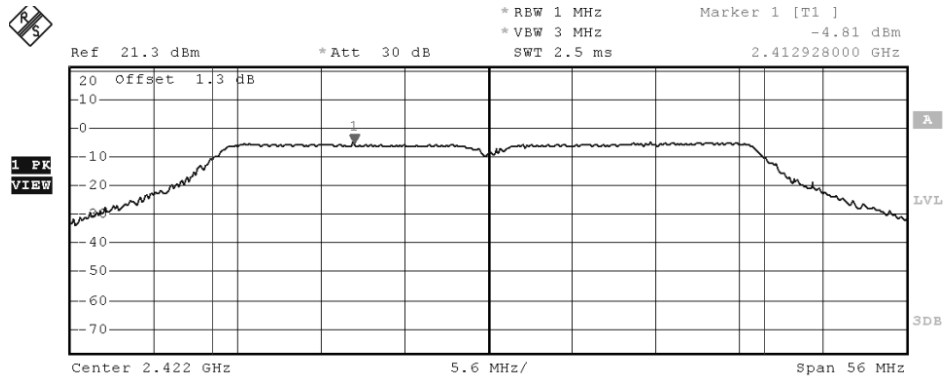
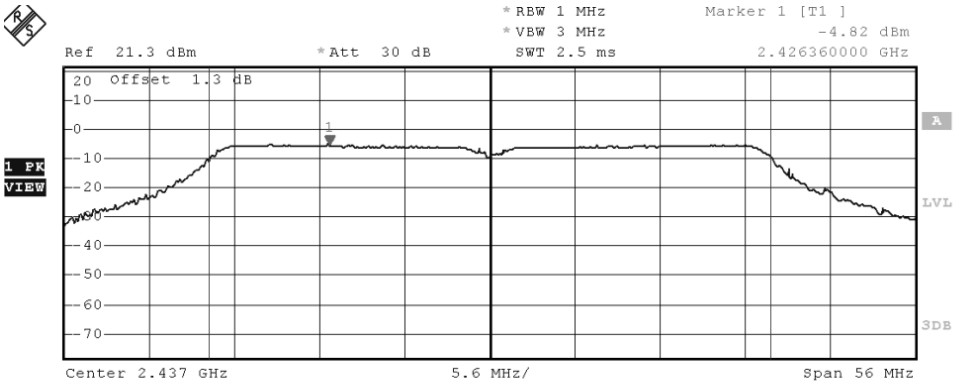
-2.79 dBm
2.456938400 GHz
Ref 20 dBm
*Att 30 dB
1 PK
VIEW
A
3DB
Center 2.462 GHz
2.7 MHz/
Span 27 MHz
Tx Channel
Bandwidth
18 MHz
Power
8.89 dBm

802.11 n-HT40



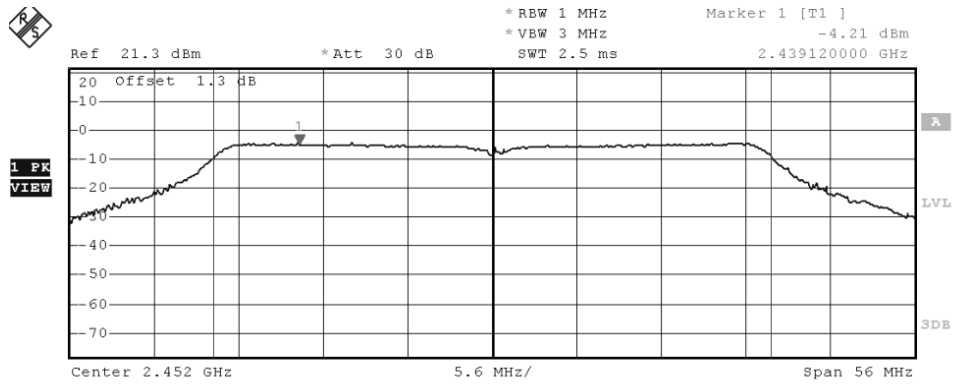
Tx Channel

Bandwidth	37 MHz	Power	8.76 dBm



Tx Channel

Bandwidth	37 MHz	Power	8.73 dBm



Tx Channel

Bandwidth	37 MHz	Power	9.36 dBm

Applicant: Sky Light Imaging Limited
Date of Test: May 20, 2014
Model: TSN47W+TSNA02

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 KHz according to FCC KDB 558074. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Limit: The 6 dB Bandwidth is at least 500 kHz.

IEEE 802.11b (CCK, 1Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	10.20
2437	10.20
2462	10.20

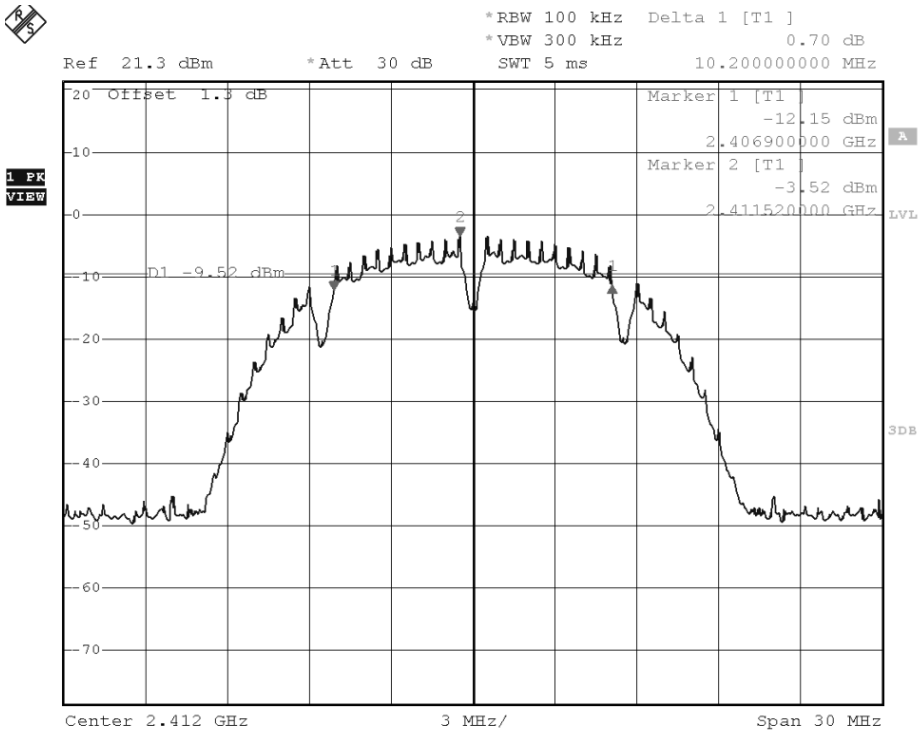
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	16.50
2437	16.56
2462	16.55

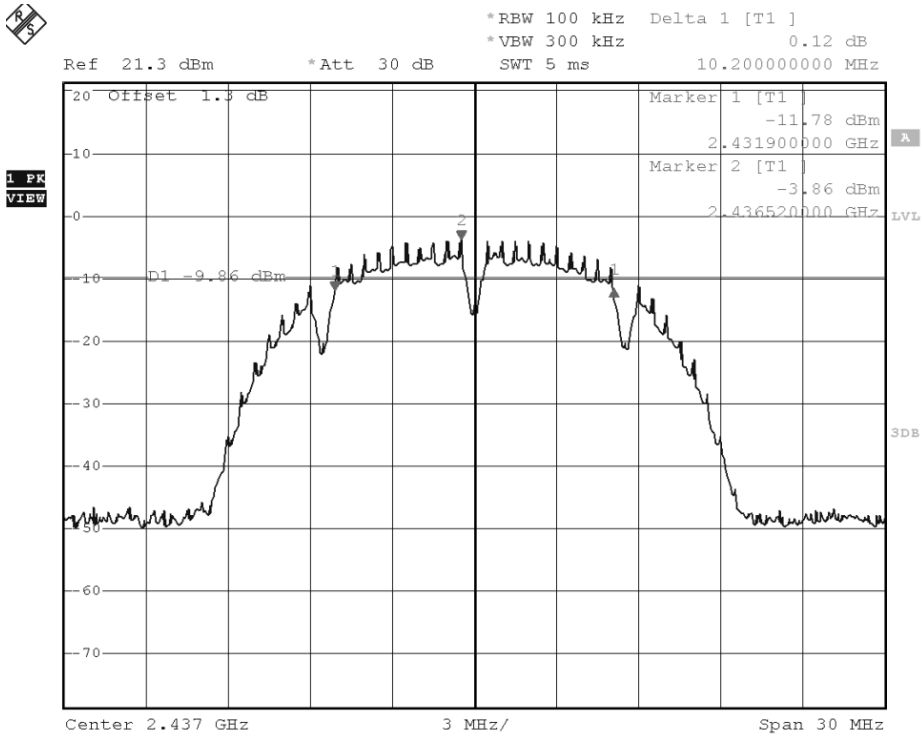
IEEE 802.11n-HT20 (16QAM, 6.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	17.76
2437	17.76
2462	17.76

IEEE 802.11n-HT40 (64QAM, 13.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2422	36.72
2437	36.72
2452	36.72

The test plots are attached as below.

802.11b


*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Delta 1 [T1]
0.70 dB
10.200000000 MHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
Marker 1 [T1]
-12.15 dBm
2.406900000 GHz
Marker 2 [T1]
-3.52 dBm
2.411520000 GHz
D1 -9.52 dBm
1 PK VIEW
A
LVL
3DB
Center 2.412 GHz
3 MHz/
Span 30 MHz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Delta 1 [T1]
0.12 dB
10.200000000 MHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
Marker 1 [T1]
-11.78 dBm
2.431900000 GHz
Marker 2 [T1]
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2.436520000 GHz
D1 -9.86 dBm
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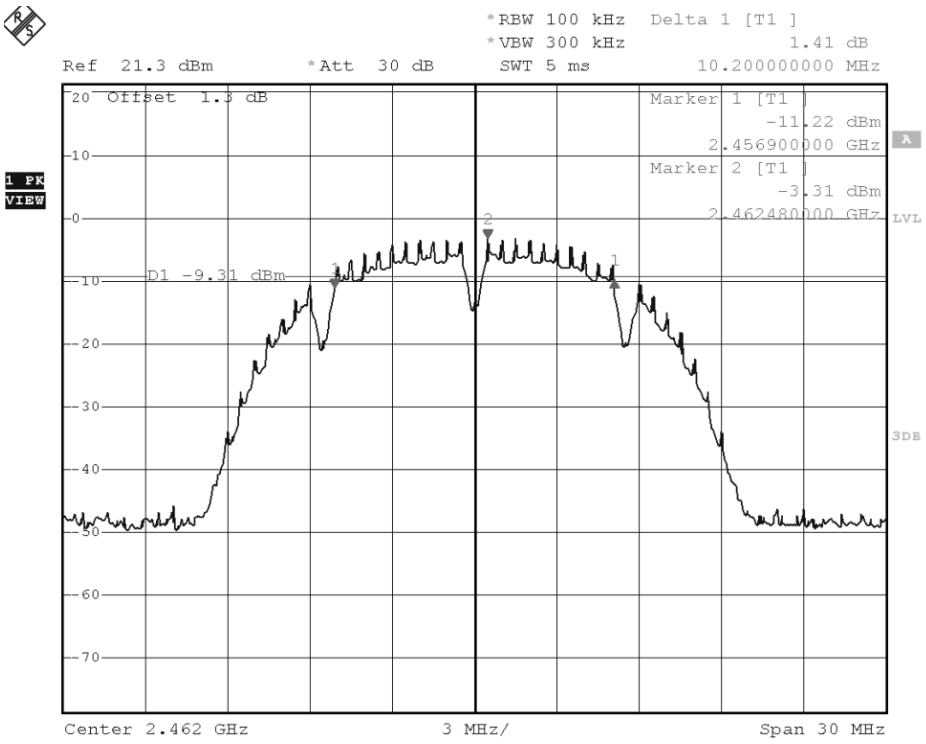
LVL
3DB
Center 2.437 GHz
3 MHz/
Span 30 MHz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Ref 21.3 dBm
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Offset 1.3 dB
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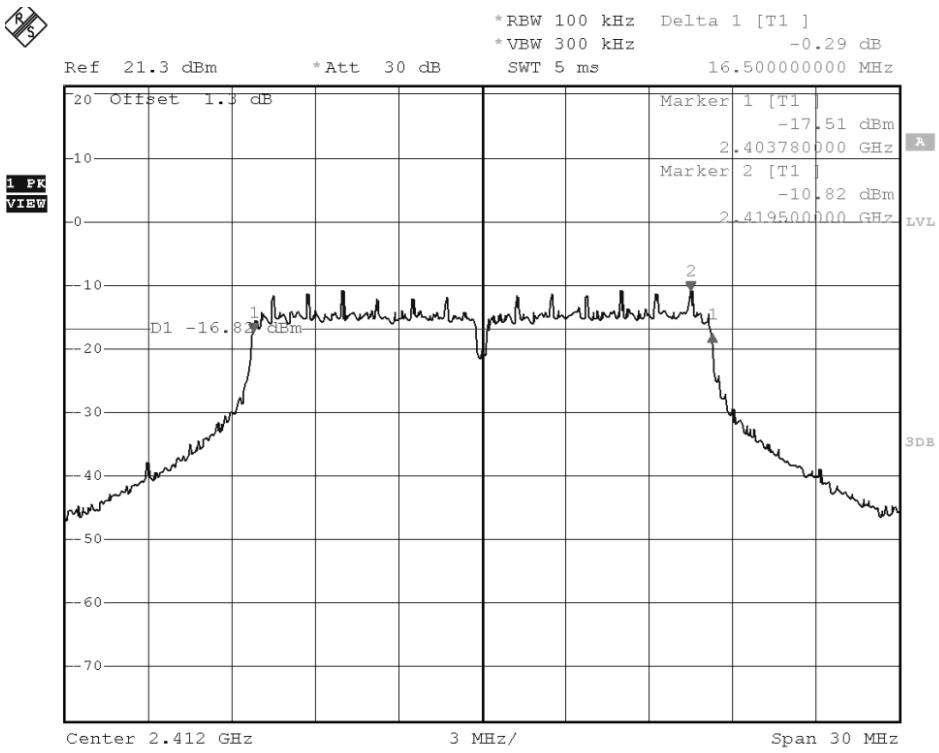
2.456900000 GHz
Marker 2 [T1]
-3.31 dBm
2.462480000 GHz
D1 -9.31 dBm
1 PK VIEW
A
LVL
3DB
Center 2.462 GHz
3 MHz/
Span 30 MHz

802.11g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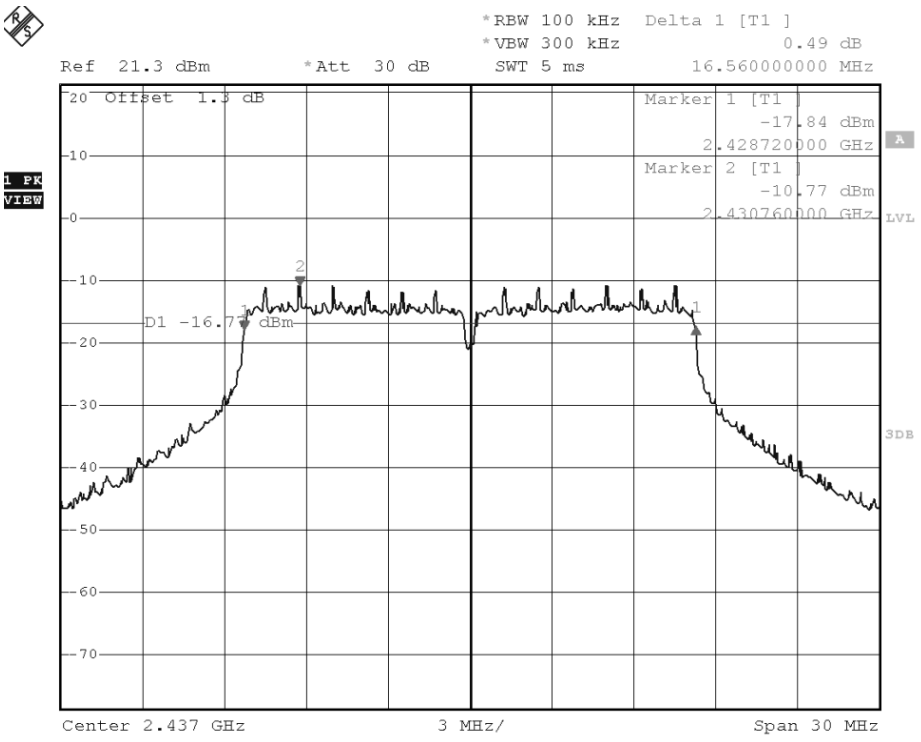
SWT 5 ms
Delta 1 [T1]
-0.29 dB
16.500000000 MHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
Marker 1 [T1]
-17.51 dBm
2.403780000 GHz
Marker 2 [T1]
-10.82 dBm
2.419500000 GHz
1 PK
VIEW
D1 -16.82 dBm
LVL
3DB
Center 2.412 GHz
3 MHz/
Span 30 MHz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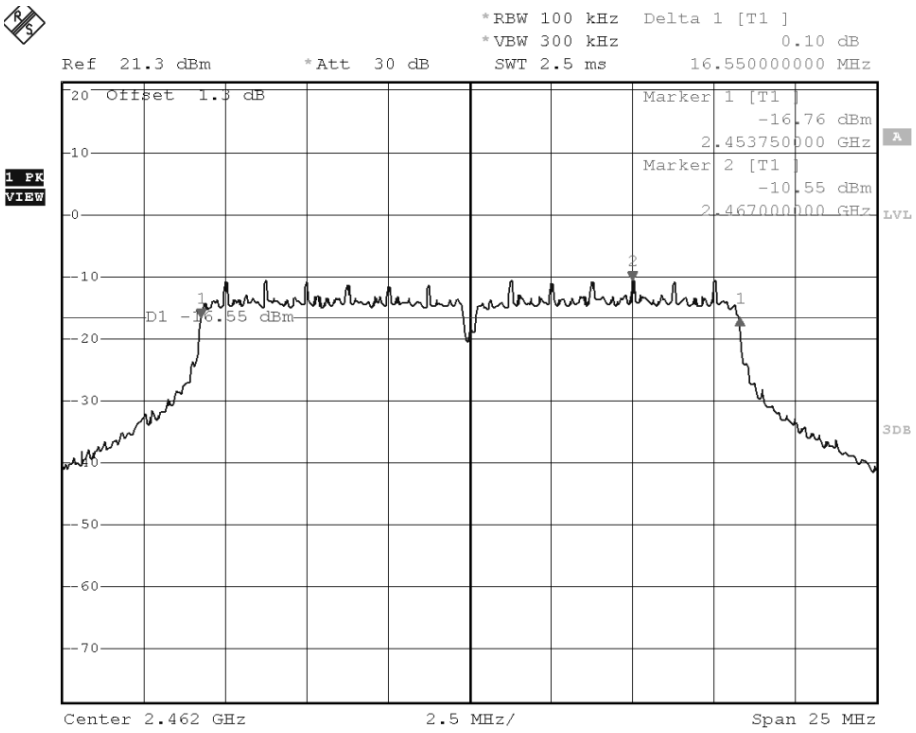
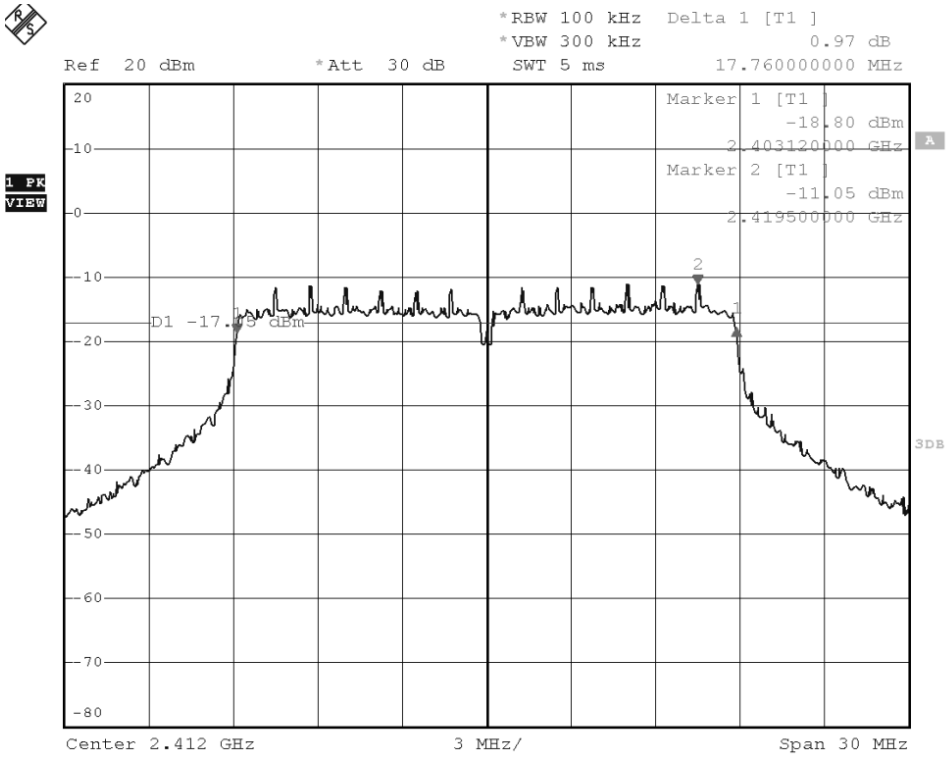
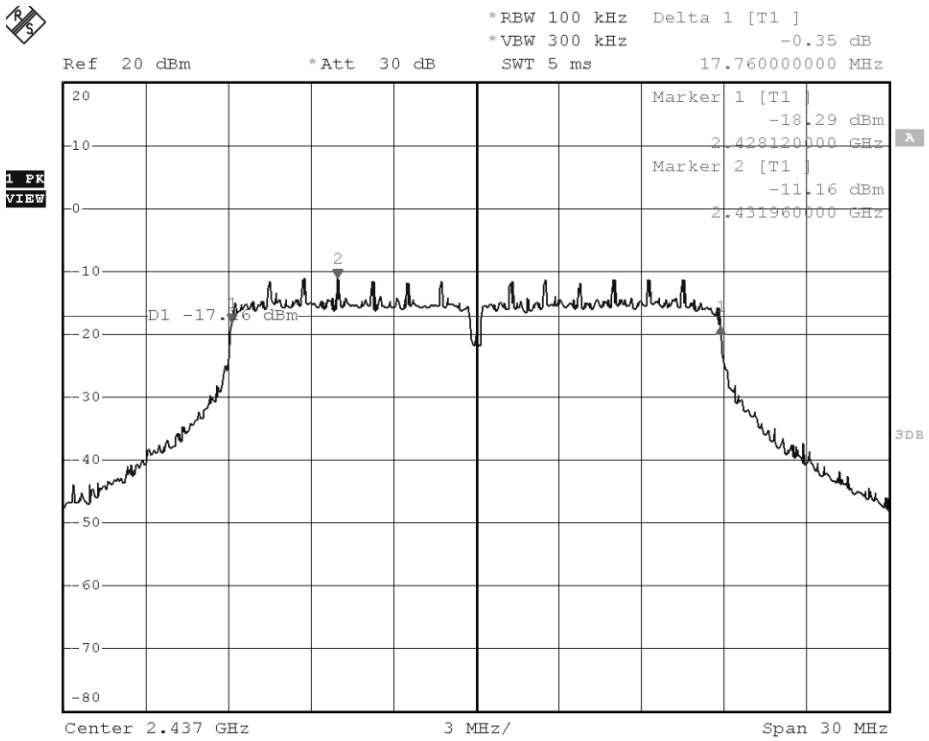
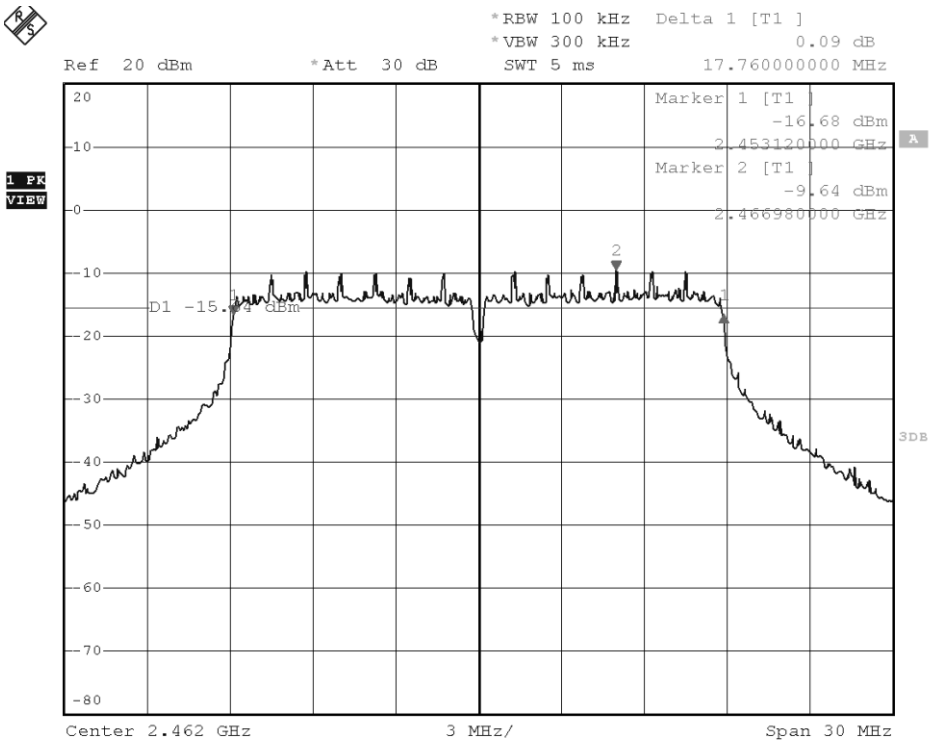
*VBW 300 kHz
SWT 5 ms
Delta 1 [T1]
0.49 dB
16.560000000 MHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
Marker 1 [T1]
-17.84 dBm
2.428720000 GHz
Marker 2 [T1]
-10.77 dBm
2.430760000 GHz
1 PK
VIEW
D1 -16.77 dBm
LVL
3DB
Center 2.437 GHz
3 MHz/
Span 30 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
0.10 dB
16.550000000 MHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
Marker 1 [T1]
-16.76 dBm
2.453750000 GHz
Marker 2 [T1]
-10.55 dBm
2.467000000 GHz
1 PK
VIEW
A
LVL
3DB
D1 -16.55 dBm
Center 2.462 GHz
2.5 MHz/
Span 25 MHz

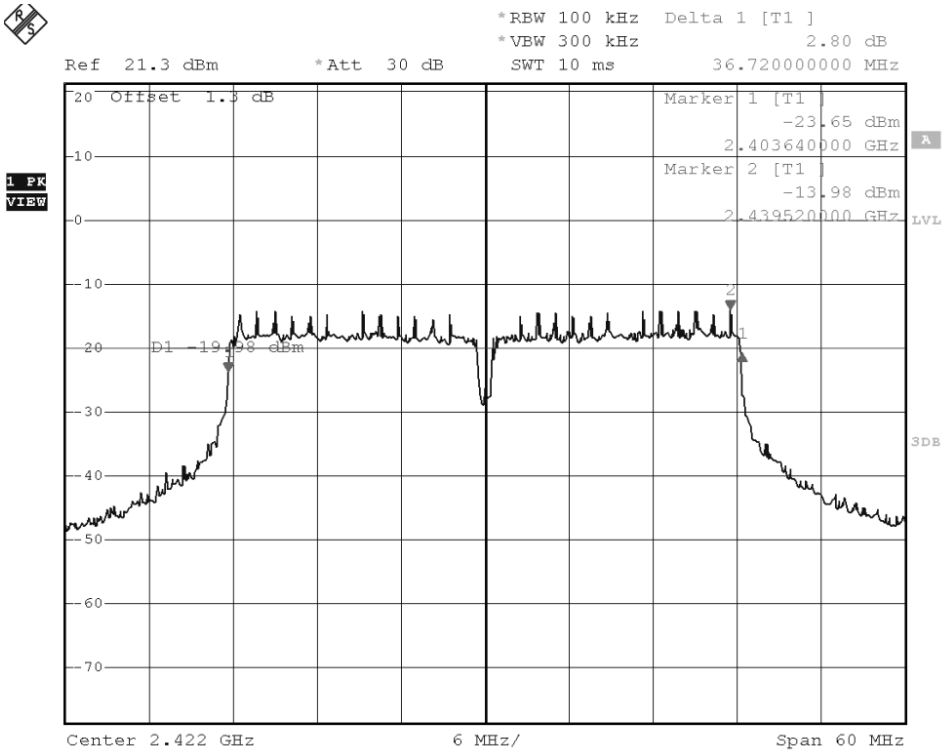
802.11 n-HT20

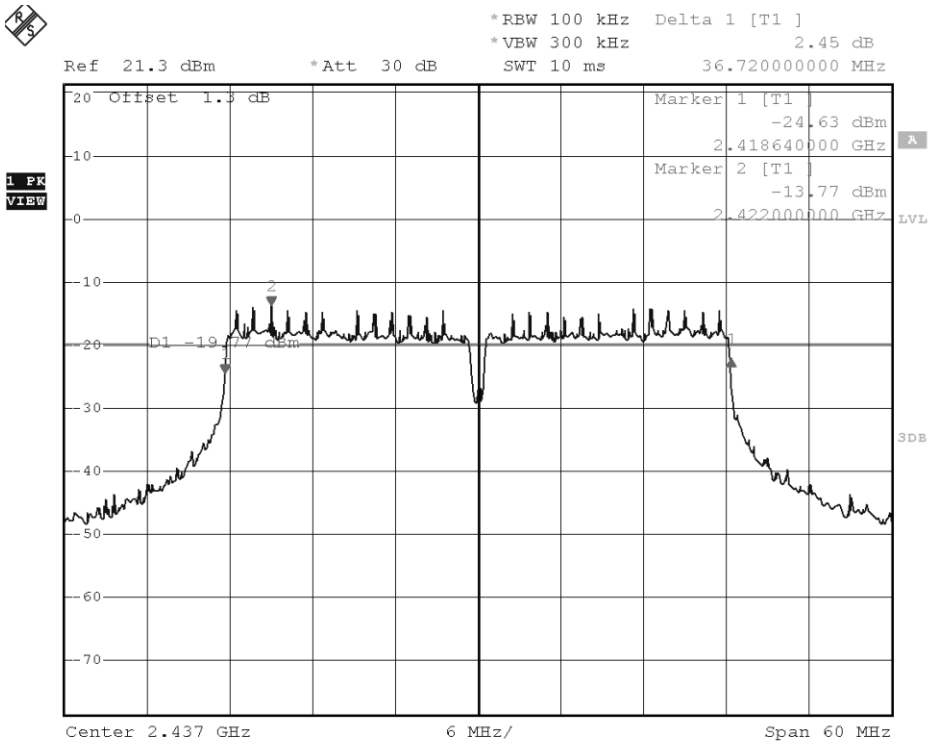

*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Delta 1 [T1]
0.97 dB
17.760000000 MHz
Ref 20 dBm
*Att 30 dB
Marker 1 [T1]
-18.80 dBm
2.403120000 GHz
Marker 2 [T1]
-11.05 dBm
2.419500000 GHz
1 PK
VIEW
D1 -17.8 dBm
3DB
Center 2.412 GHz
3 MHz/
Span 30 MHz

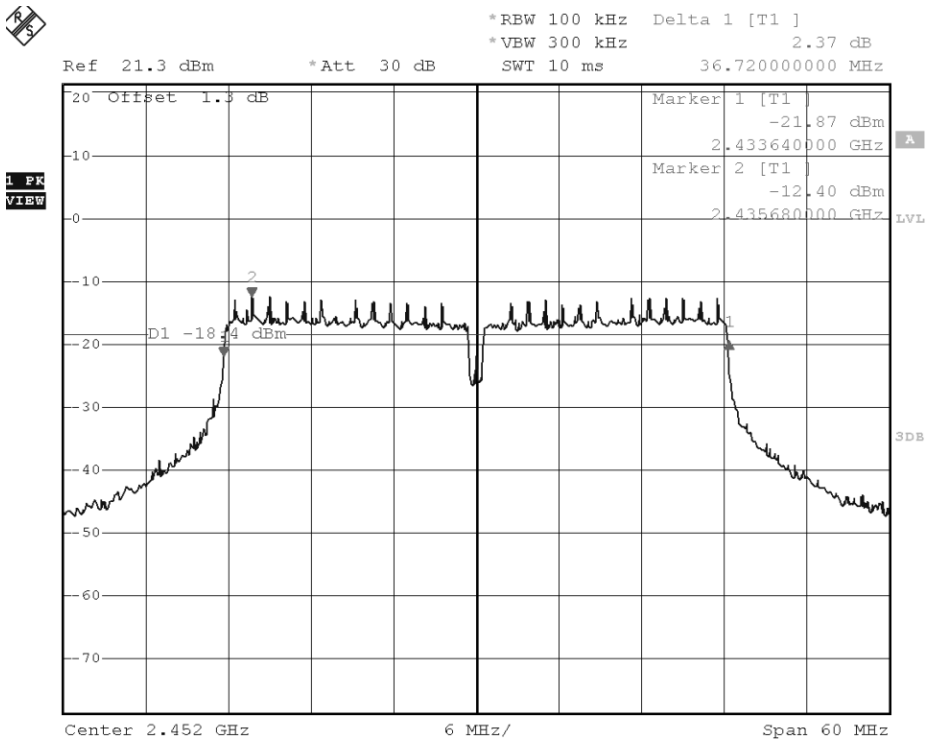

*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Delta 1 [T1]
-0.35 dB
17.760000000 MHz
Ref 20 dBm
*Att 30 dB
Marker 1 [T1]
-18.29 dBm
2.428120000 GHz
Marker 2 [T1]
-11.16 dBm
2.431960000 GHz
1 PK
VIEW
D1 -17.6 dBm
3DB
Center 2.437 GHz
3 MHz/
Span 30 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Delta 1 [T1]
0.09 dB
17.760000000 MHz
Ref 20 dBm
*Att 30 dB
Marker 1 [T1]
-16.68 dBm
2.453120000 GHz
Marker 2 [T1]
-9.64 dBm
2.466980000 GHz
1 PK
VIEW
D1 -15.64 dBm
3DB
Center 2.462 GHz
3 MHz/
Span 30 MHz

802.11 n-HT40


*RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Delta 1 [T1]
2.80 dB
36.720000000 MHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
Marker 1 [T1]
-23.65 dBm
2.403640000 GHz
Marker 2 [T1]
-13.98 dBm
2.439520000 GHz
1 PK
VIEW
D1 -19.98 dBm
3DB
LVL
Center 2.422 GHz
6 MHz/
Span 60 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Delta 1 [T1]
2.45 dB
36.720000000 MHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
Marker 1 [T1]
-24.63 dBm
2.418640000 GHz
Marker 2 [T1]
-13.77 dBm
2.422000000 GHz
1 PK
VIEW
D1 -19.77 dBm
3DB
LVL
Center 2.437 GHz
6 MHz/
Span 60 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Delta 1 [T1]
2.37 dB
36.720000000 MHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
Marker 1 [T1]
-21.87 dBm
2.433640000 GHz
Marker 2 [T1]
-12.40 dBm
2.435680000 GHz
1 PK
VIEW
D1 -18.44 dBm
Center 2.452 GHz
6 MHz/
Span 60 MHz

4.3 Maximum Power Density Reading, FCC Rule 15.247(e):

The Measurement Procedure PKPSD was set according to the FCC KDB 558074.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Limit: The Power Density does not exceed 8dBm/ 3 kHz.

IEEE 802.11b (CCK, 1Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	-3.67
2437	-3.78
2462	-3.25

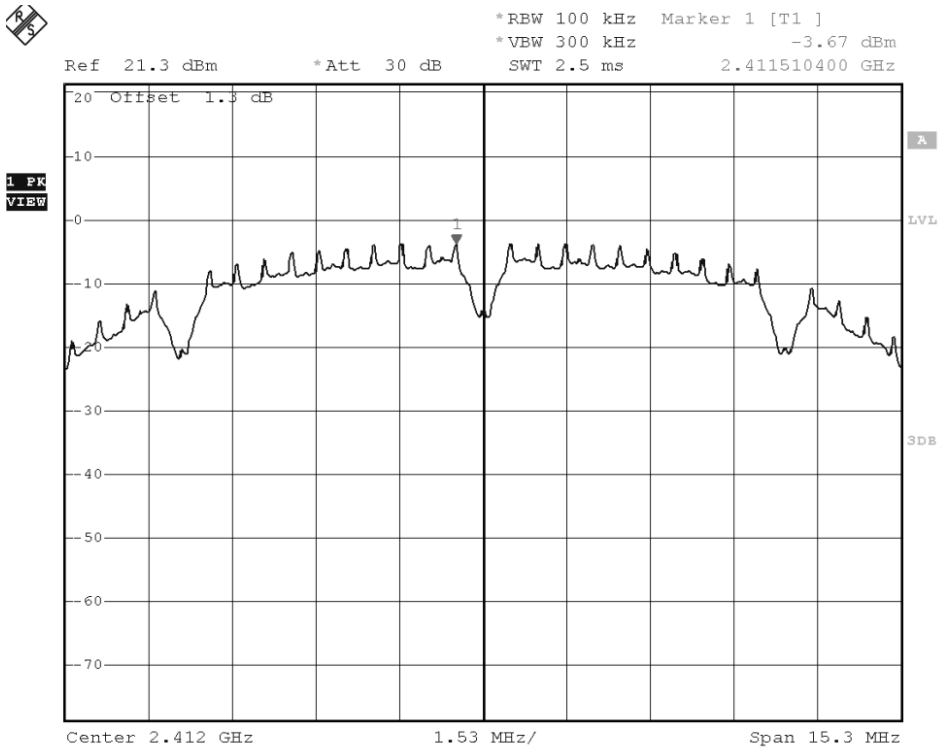
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	-12.33
2437	-10.81
2462	-10.57

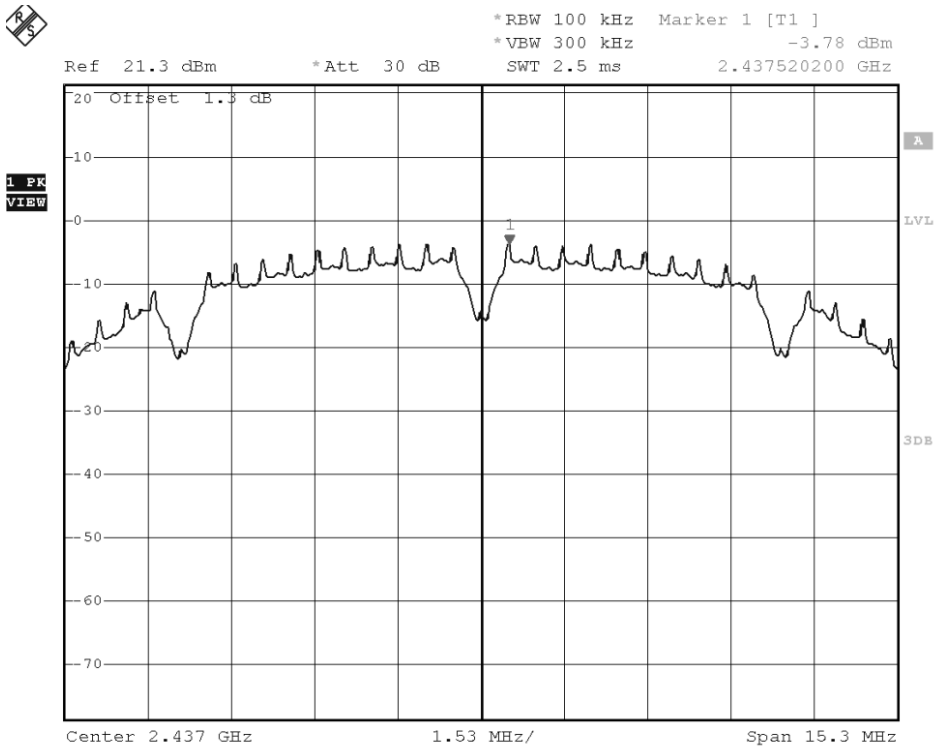
IEEE 802.11n-HT20 (16QAM, 6.5Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	-11.11
2437	-10.87
2462	-9.38

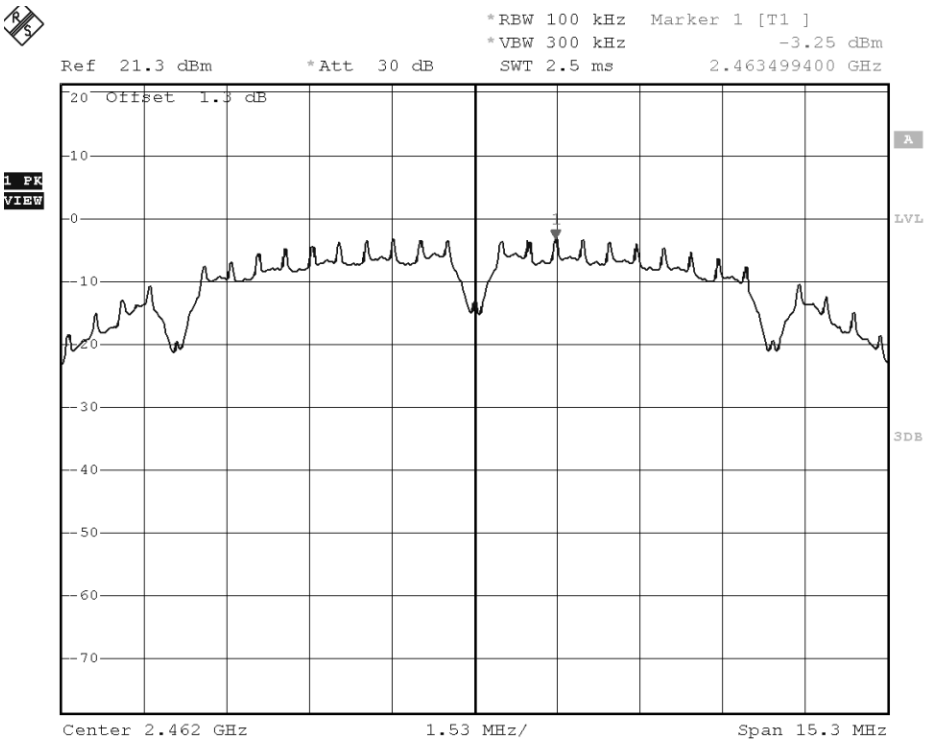
IEEE 802.11n-HT40 (64QAM, 13.5Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2422	-13.82
2437	-13.82
2452	-12.44

The test plots are attached as below.

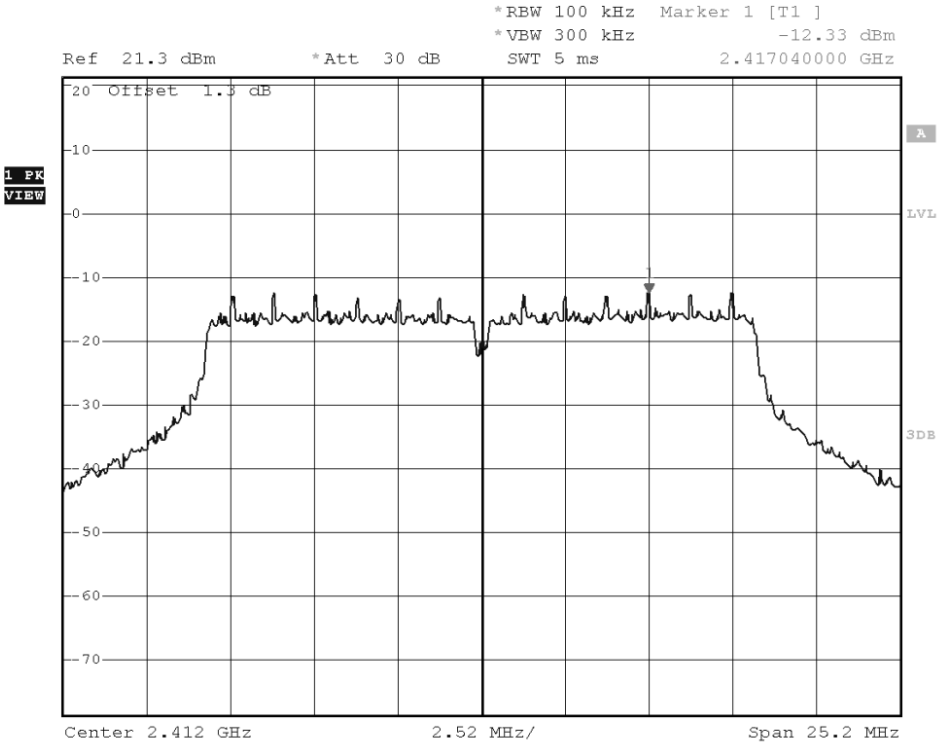
802.11b

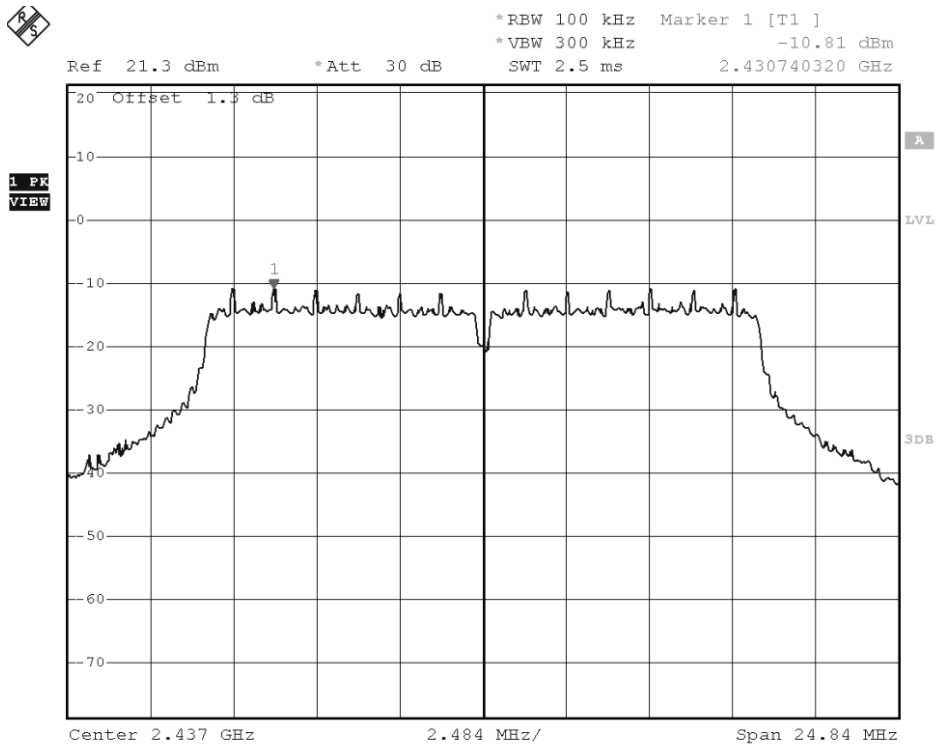

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-3.67 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 2.5 ms
2.411510400 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
Center 2.412 GHz
1.53 MHz/
Span 15.3 MHz

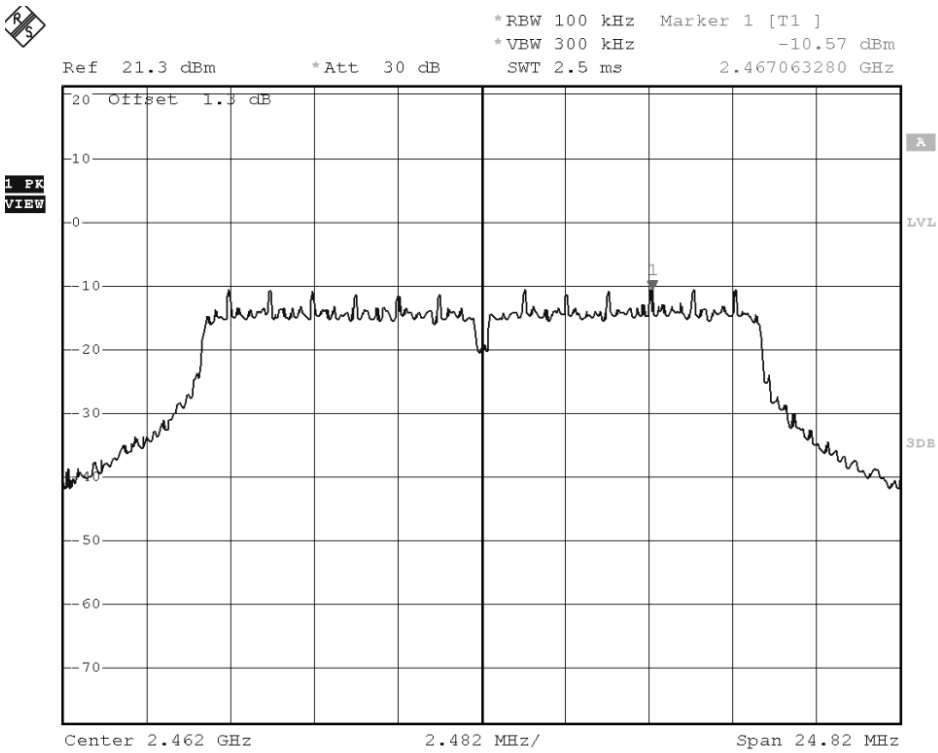

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-3.78 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 2.5 ms
2.437520200 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
Center 2.437 GHz
1.53 MHz/
Span 15.3 MHz


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-3.25 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 2.5 ms
2.463499400 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
Center 2.462 GHz
1.53 MHz/
Span 15.3 MHz

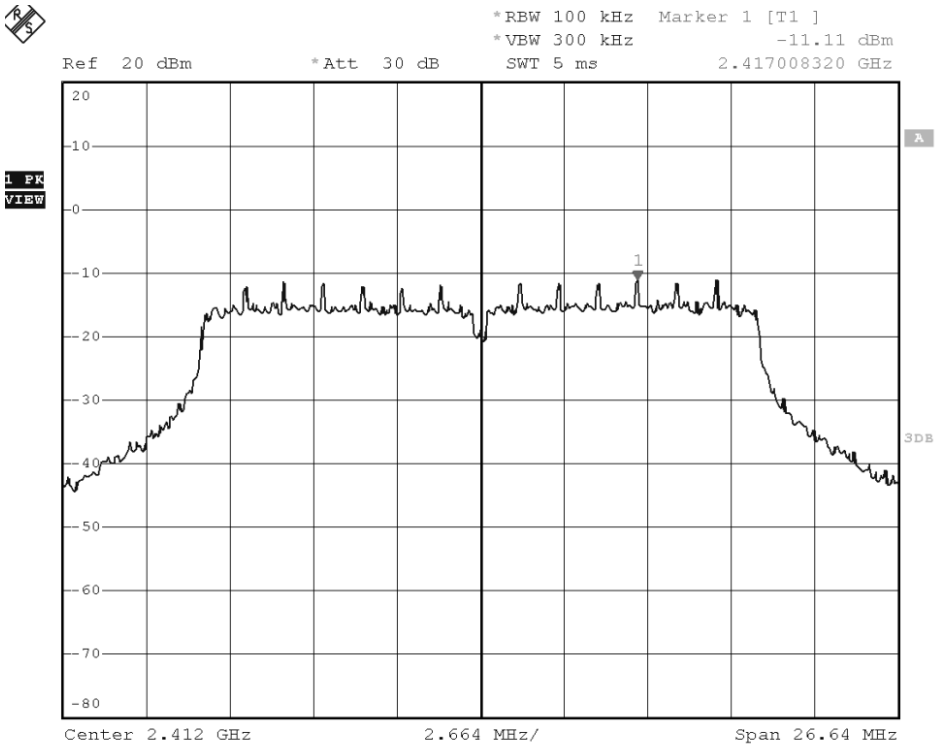
802.11g

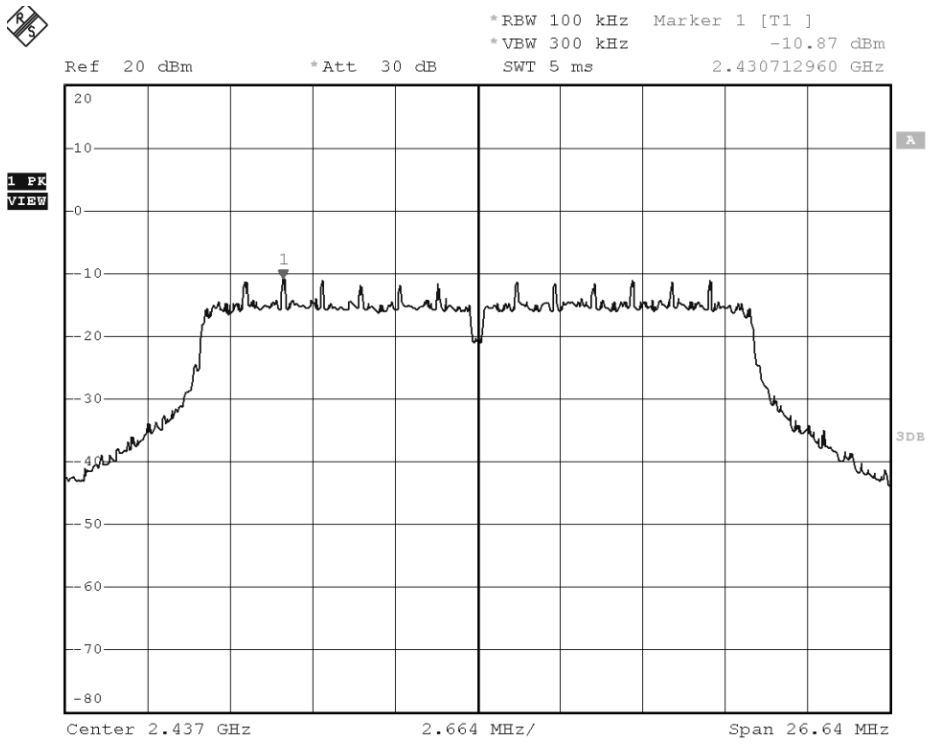

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-12.33 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 5 ms
2.417040000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
Center 2.412 GHz
2.52 MHz/
Span 25.2 MHz

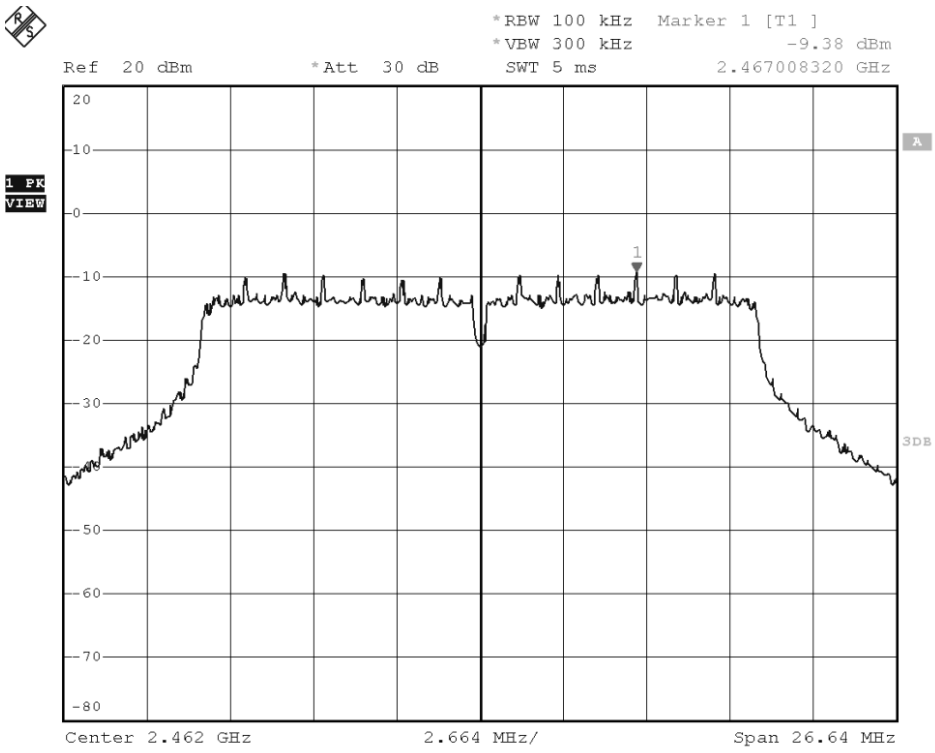

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-10.81 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 2.5 ms
2.430740320 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
Center 2.437 GHz
2.484 MHz/
Span 24.84 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Marker 1 [T1]
-10.57 dBm
2.467063280 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
Center 2.462 GHz
2.482 MHz/
Span 24.82 MHz

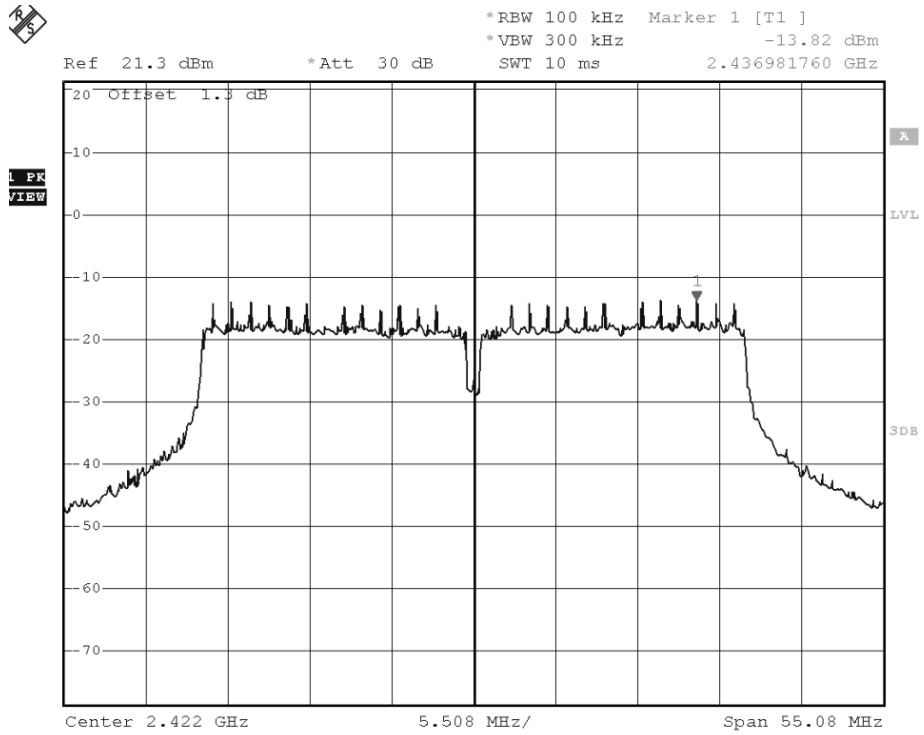
802.11 n-HT20

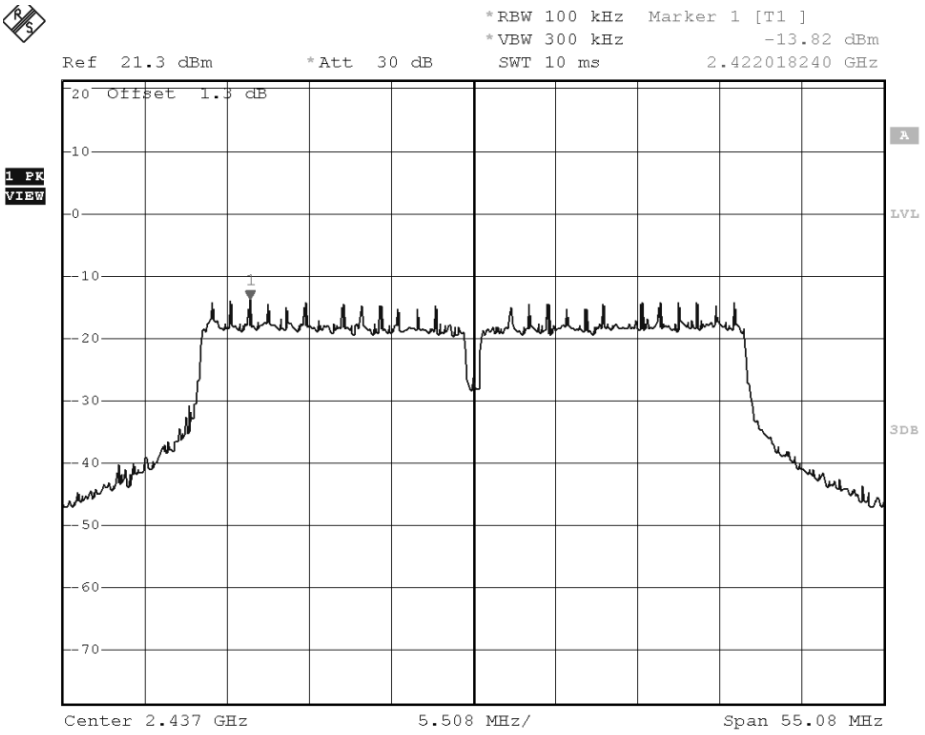

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-11.11 dBm
Ref 20 dBm
*Att 30 dB
SWT 5 ms
2.417008320 GHz
1 PK
VIEW
A
3DB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Center 2.412 GHz
2.664 MHz/
Span 26.64 MHz

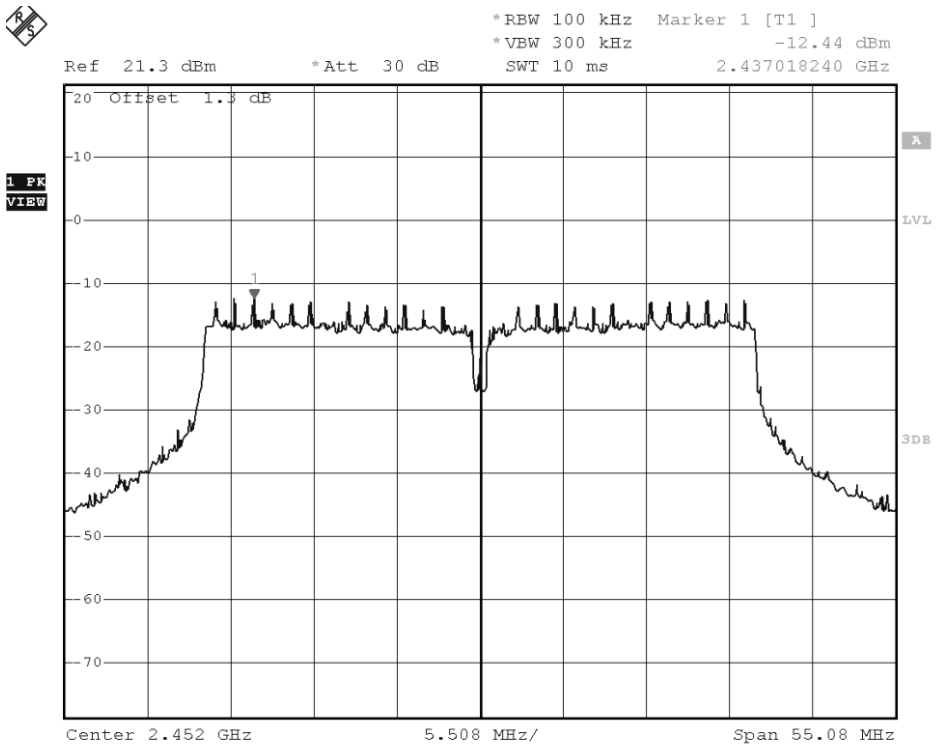

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-10.87 dBm
Ref 20 dBm
*Att 30 dB
SWT 5 ms
2.430712960 GHz
1 PK
VIEW
A
3DB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Center 2.437 GHz
2.664 MHz/
Span 26.64 MHz


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-9.38 dBm
Ref 20 dBm
*Att 30 dB
SWT 5 ms
2.467008320 GHz
1 PK
VIEW
A
3DB
Center 2.462 GHz
2.664 MHz/
Span 26.64 MHz

802.11 n-HT40


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-13.82 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 10 ms
2.436981760 GHz
20 Offset 1.3 dB
1 PK VIEW
A
LVL
3DB
Center 2.422 GHz
5.508 MHz/
Span 55.08 MHz


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-13.82 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 10 ms
2.422018240 GHz
20 Offset 1.3 dB
1 PK VIEW
A
LVL
3DB
Center 2.437 GHz
5.508 MHz/
Span 55.08 MHz


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-12.44 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 10 ms
2.437018240 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
Center 2.452 GHz
5.508 MHz/
Span 55.08 MHz

4.4 Out of Band Conducted Emissions, FCC Rule 15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. The Measurement Procedure was set according to the FCC KDB 558074.

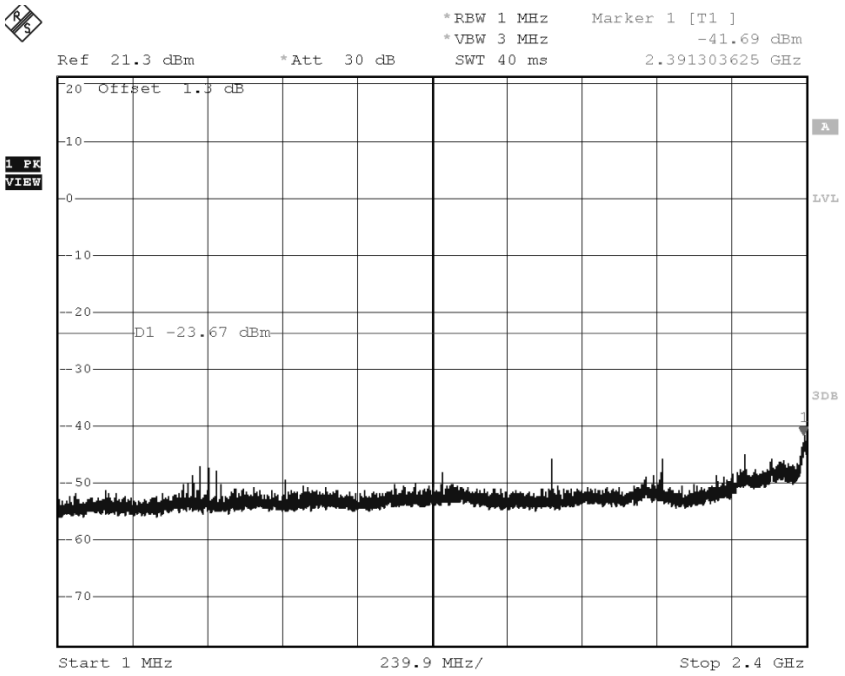
Refer to the attached test plots for out of band conducted emissions data with rate of 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n-HT20 and 13.5Mbps for 802.11n-HT40.

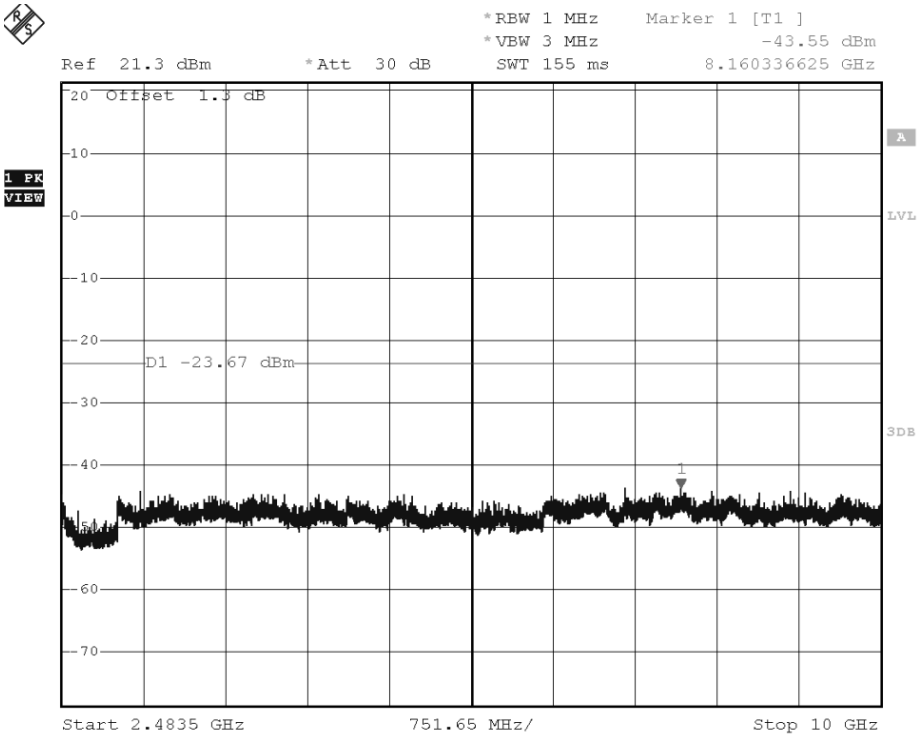
The test plots showed all spurious emission up to the tenth harmonic was measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

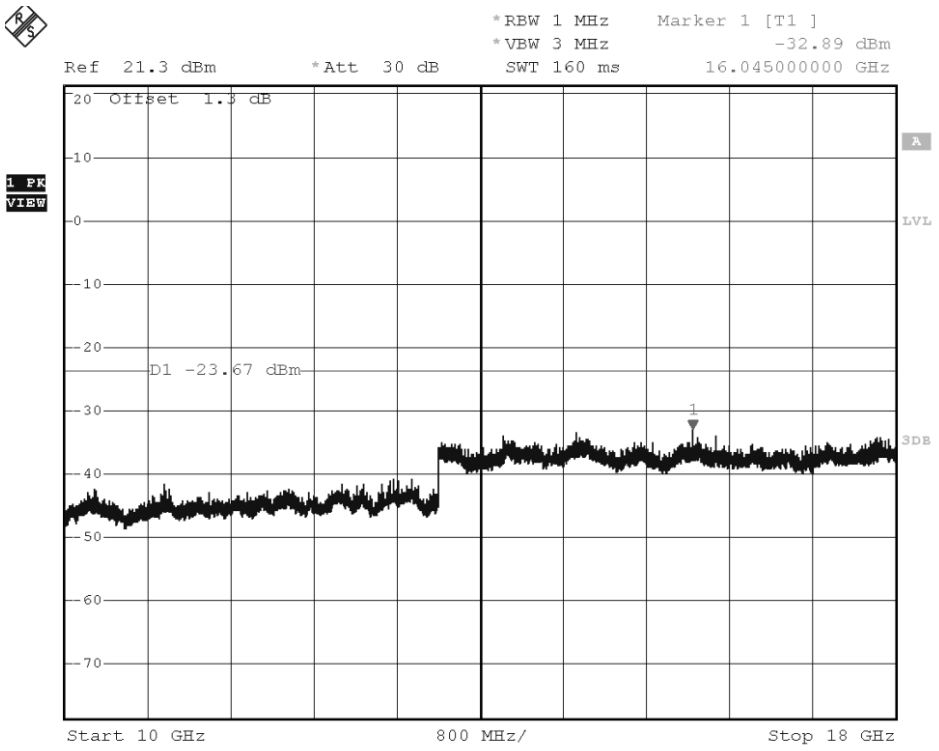
Note: the RBW was set to 1MHz rather than 100KHz in order to increase the measurement speed, if found out fail point at 1MHz RBW, we will use reduce the RBW to 100KHz determine the final result.

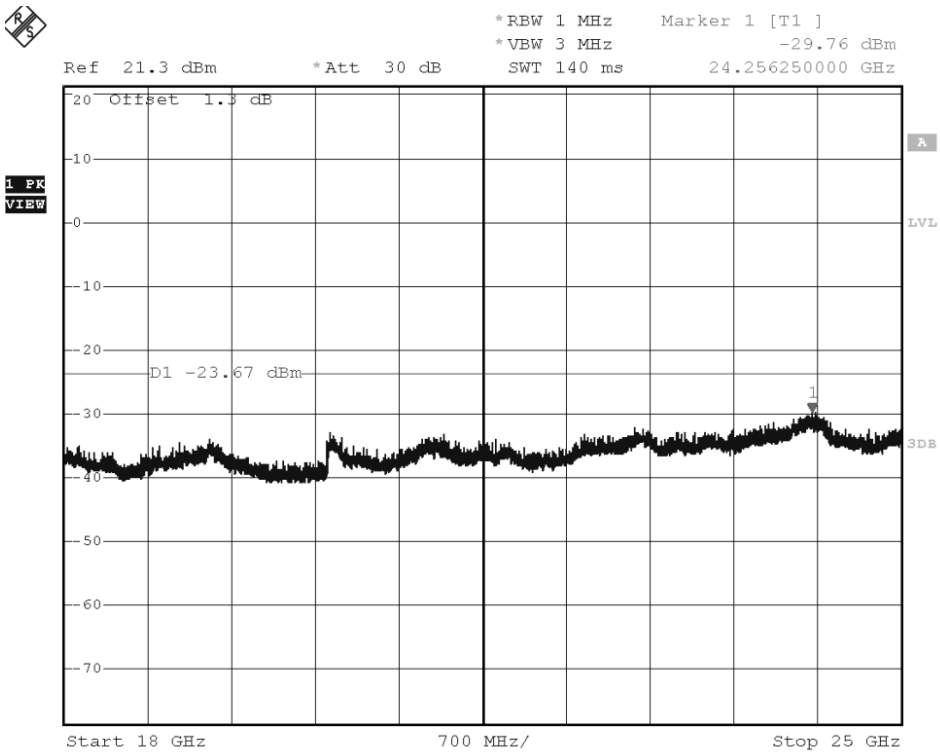
The test plots are attached as below.

802.11b
Channel 01 (2412MHz) Reference Level: -3.67dBm

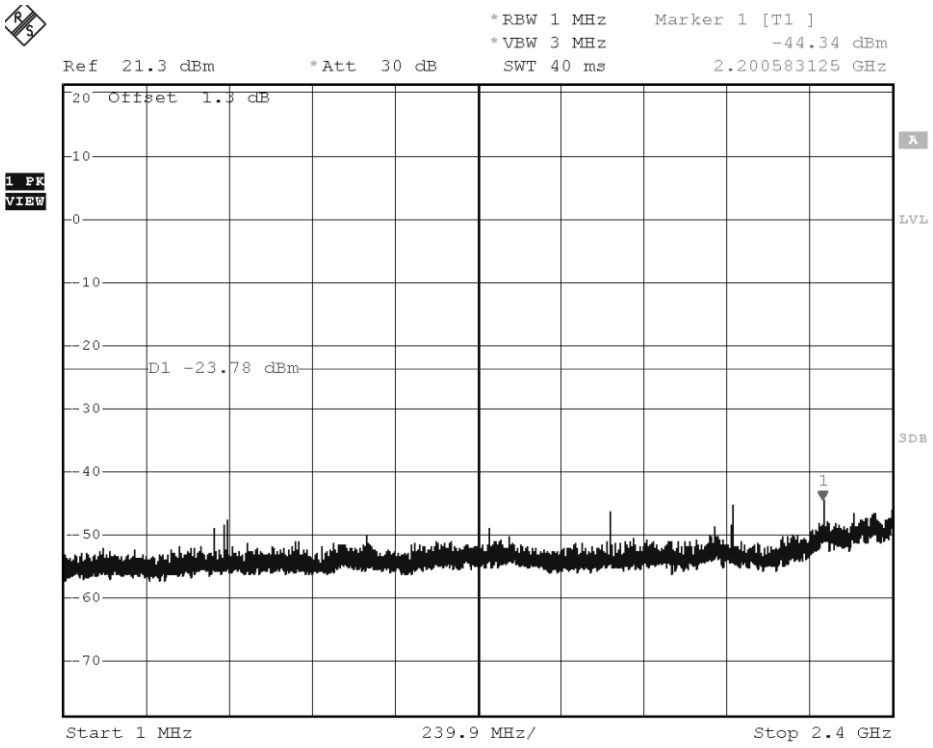


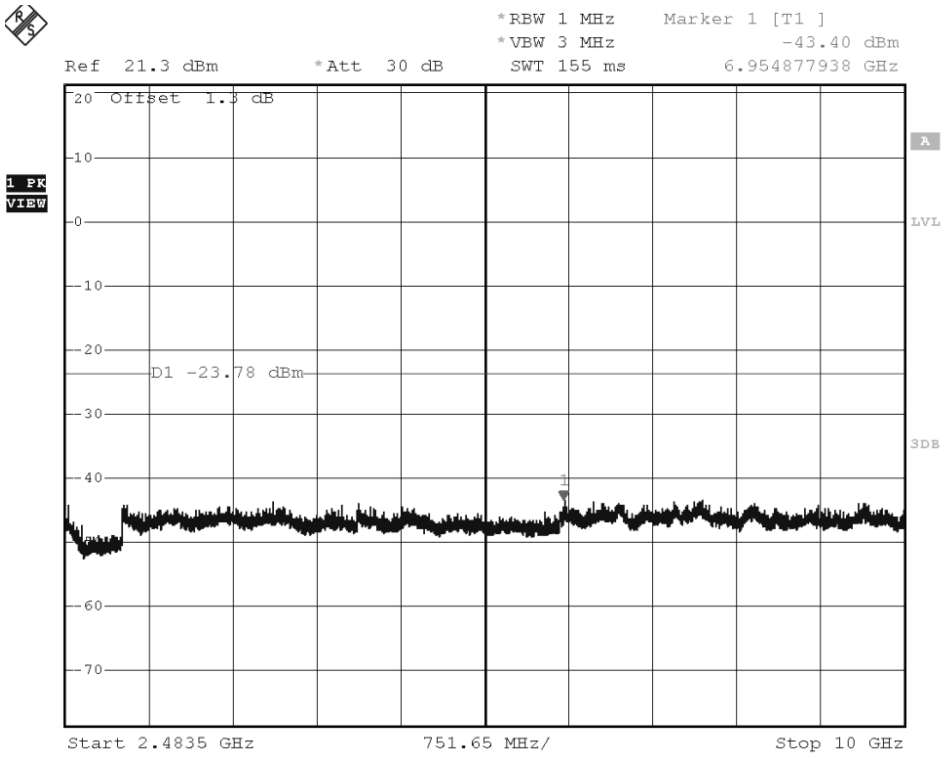


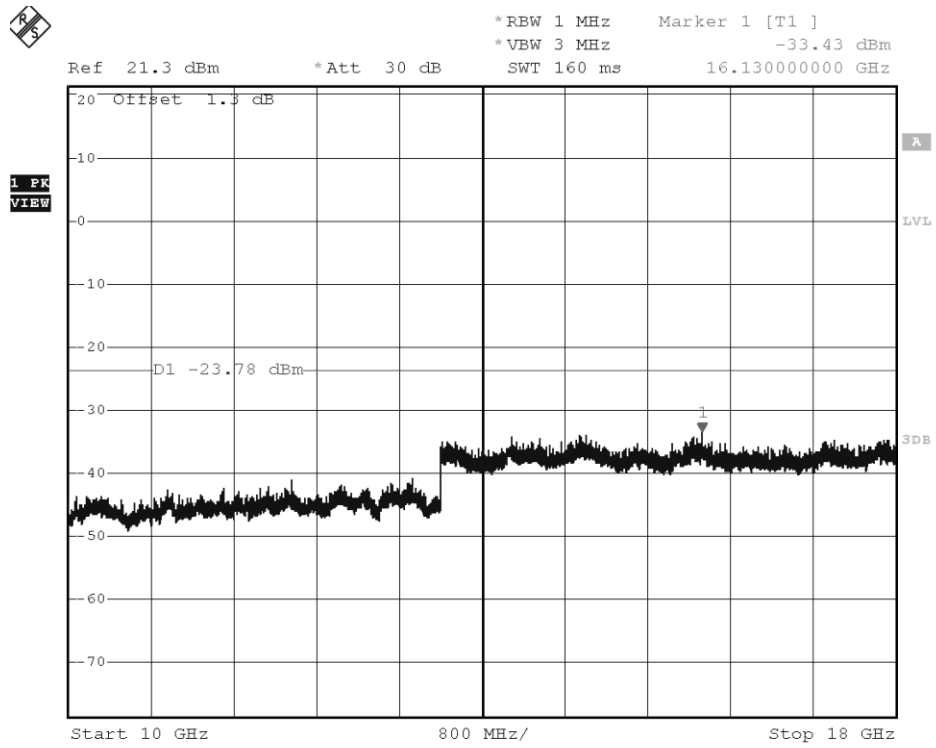

*RBW 1 MHz
*VBW 3 MHz
SWT 160 ms
Marker 1 [T1]
-32.89 dBm
16.045000000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -23.67 dBm
A
LVL
3DB
Start 10 GHz
800 MHz/
Stop 18 GHz

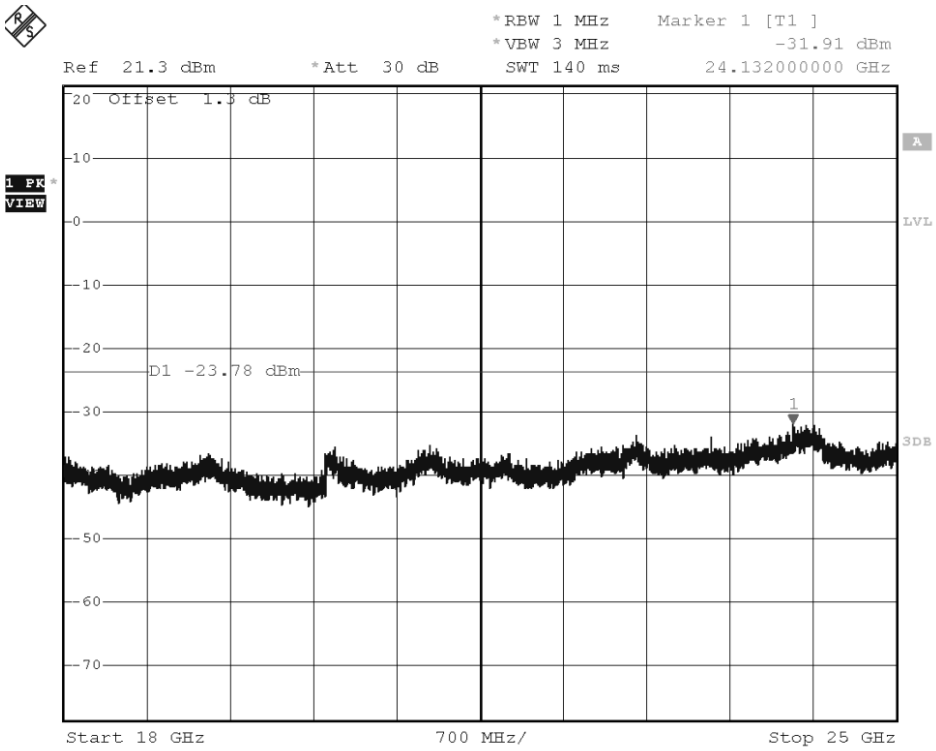

*RBW 1 MHz
*VBW 3 MHz
SWT 140 ms
Marker 1 [T1]
-29.76 dBm
24.256250000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -23.67 dBm
A
LVL
3DB
Start 18 GHz
700 MHz/
Stop 25 GHz

Channel 06 (2437MHz) Reference Level: -3.78dBm

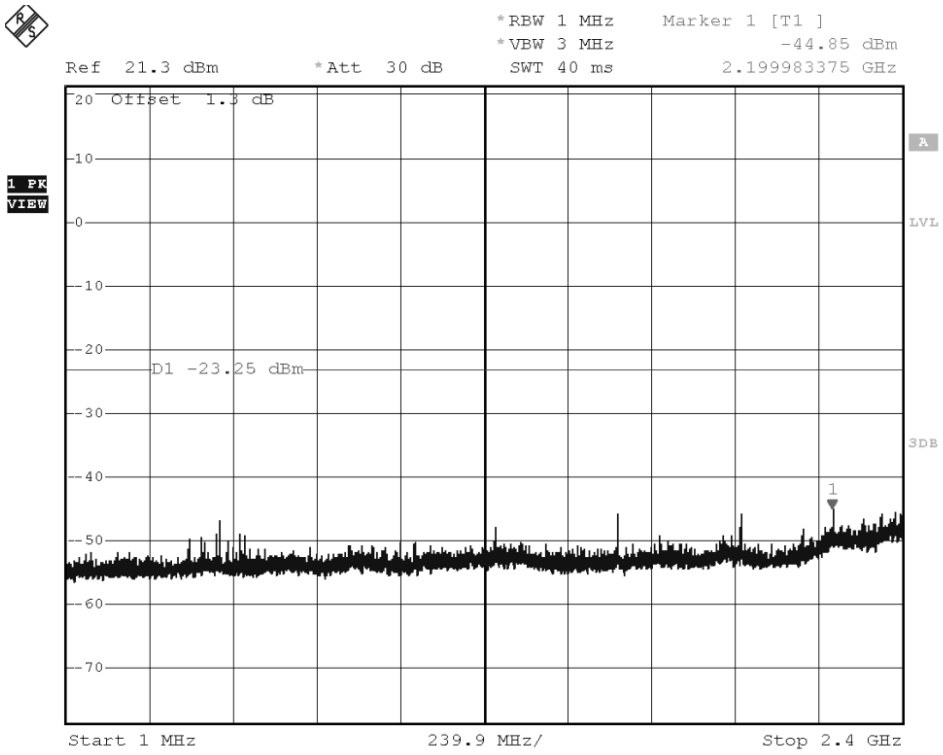


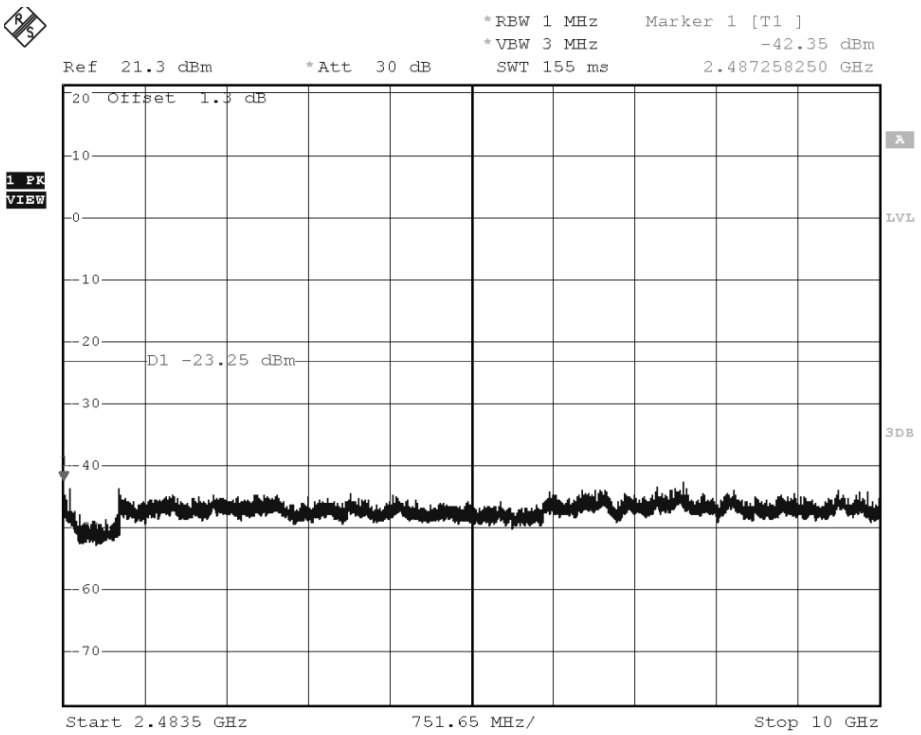


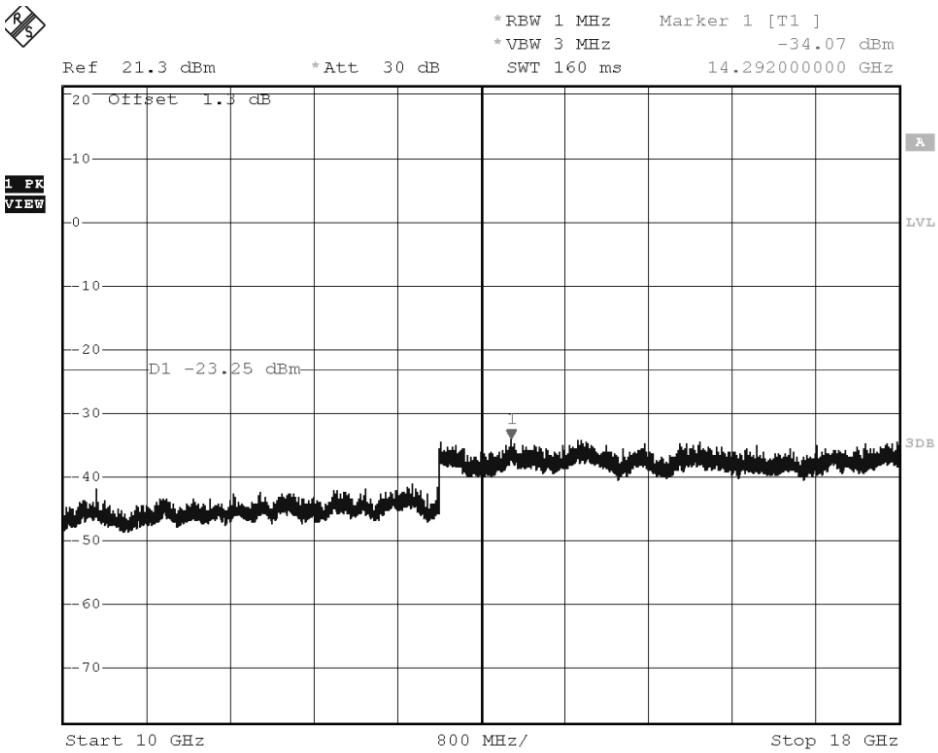

*RBW 1 MHz
Marker 1 [T1]
*VBW 3 MHz
-33.43 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 160 ms
16.130000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -23.78 dBm
Start 10 GHz
800 MHz/
Stop 18 GHz

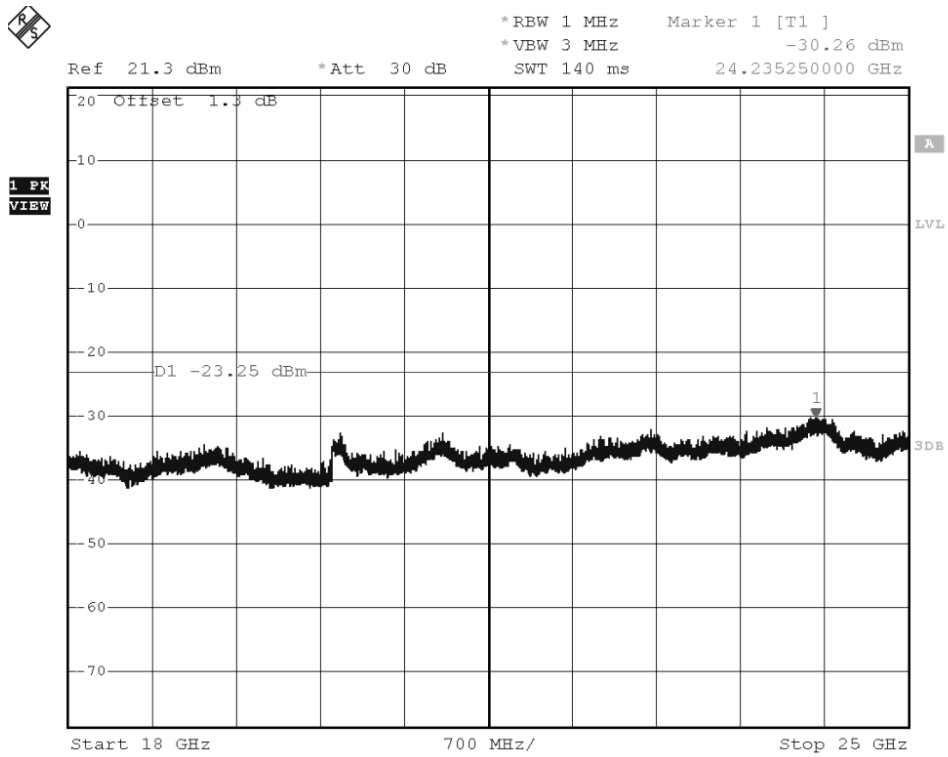

*RBW 1 MHz
Marker 1 [T1]
*VBW 3 MHz
-31.91 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 140 ms
24.132000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -23.78 dBm
Start 18 GHz
700 MHz/
Stop 25 GHz

Channel 11 (2462MHz) Reference Level: -3.25dBm

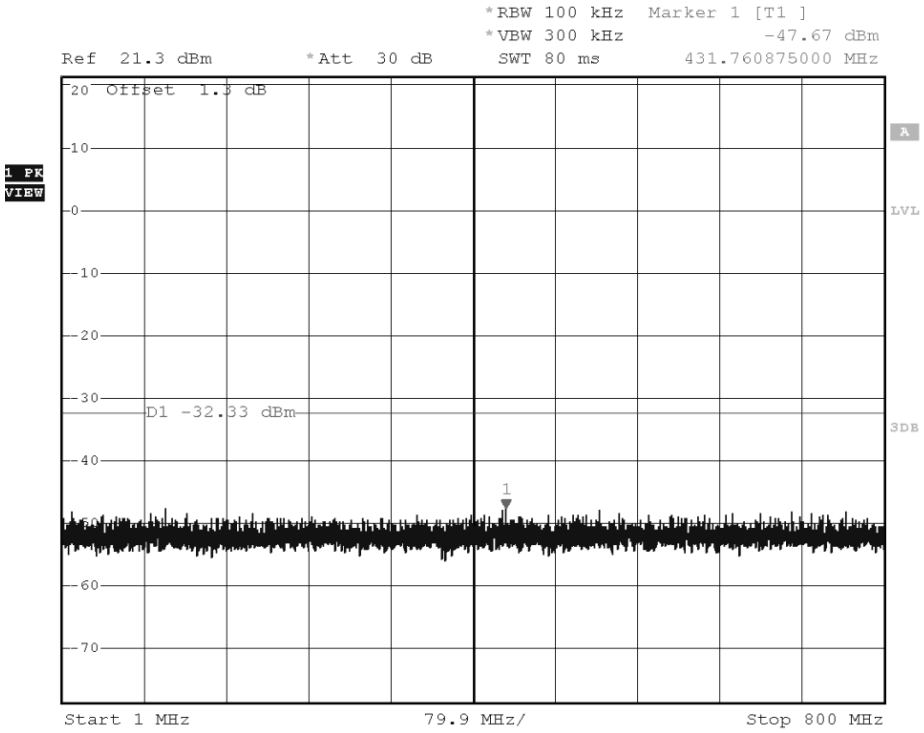


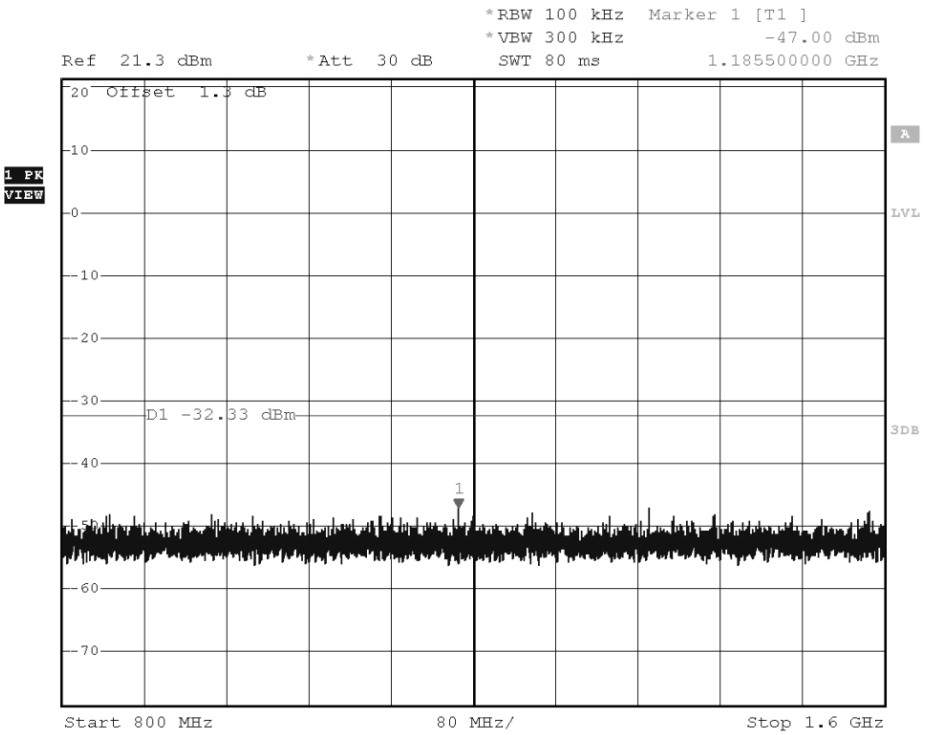


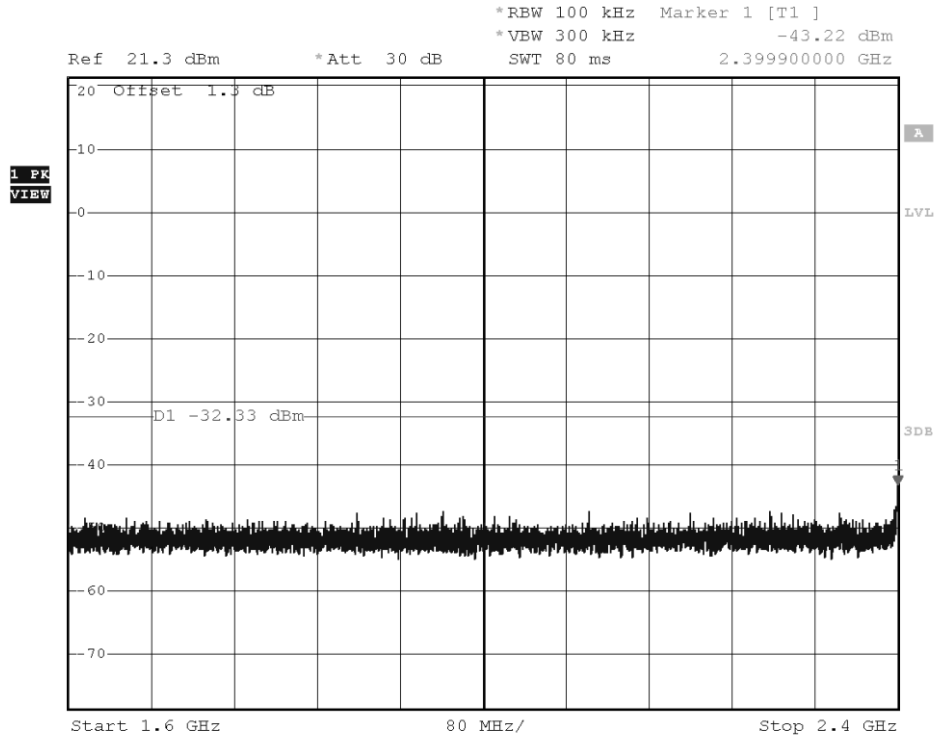

*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-34.07 dBm
14.292000000 GHz
Ref 21.3 dBm
*Att 30 dB
SWT 160 ms
Offset 1.3 dB
1 PK
VIEW
D1 -23.25 dBm
A
LVL
3DB
Start 10 GHz
800 MHz/
Stop 18 GHz

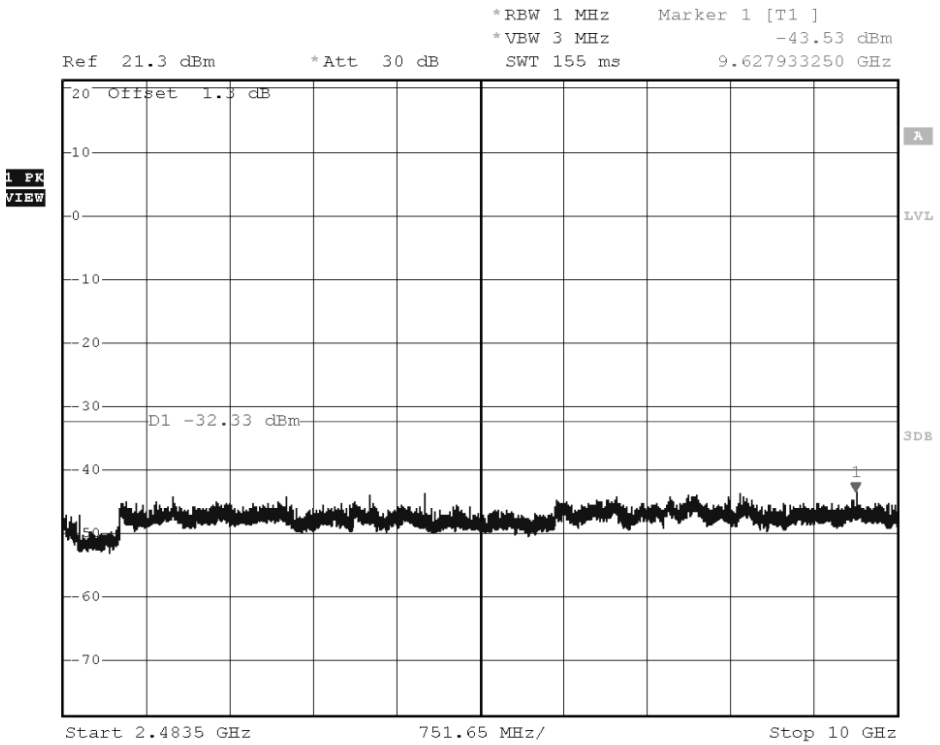

*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-30.26 dBm
24.235250000 GHz
Ref 21.3 dBm
*Att 30 dB
SWT 140 ms
Offset 1.3 dB
1 PK
VIEW
D1 -23.25 dBm
A
LVL
3DB
Start 18 GHz
700 MHz/
Stop 25 GHz

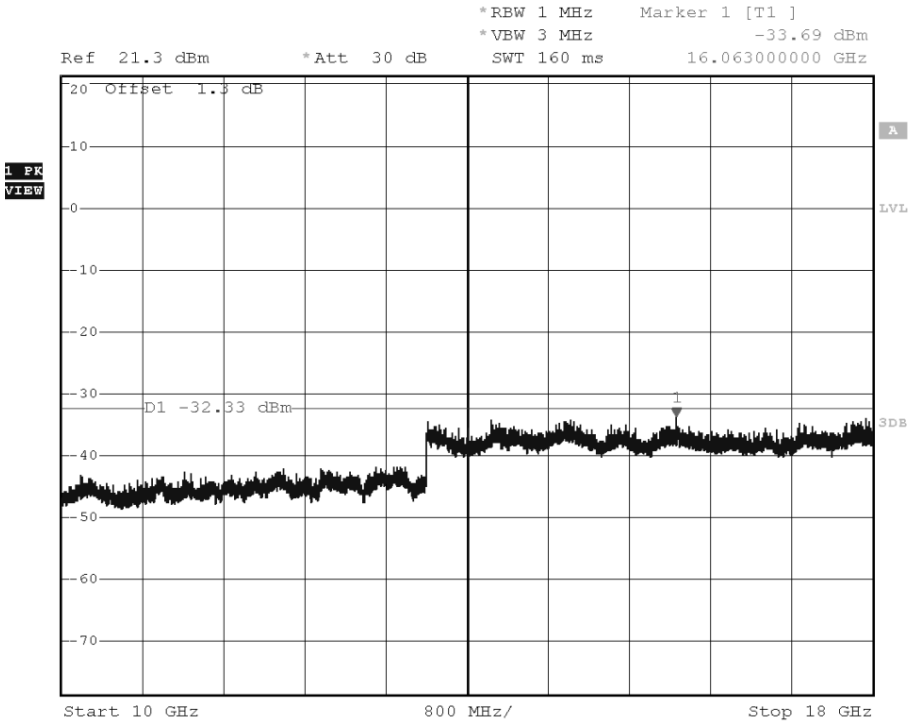
802.11g
Channel 01 (2412MHz) Reference Level: -12.33dBm

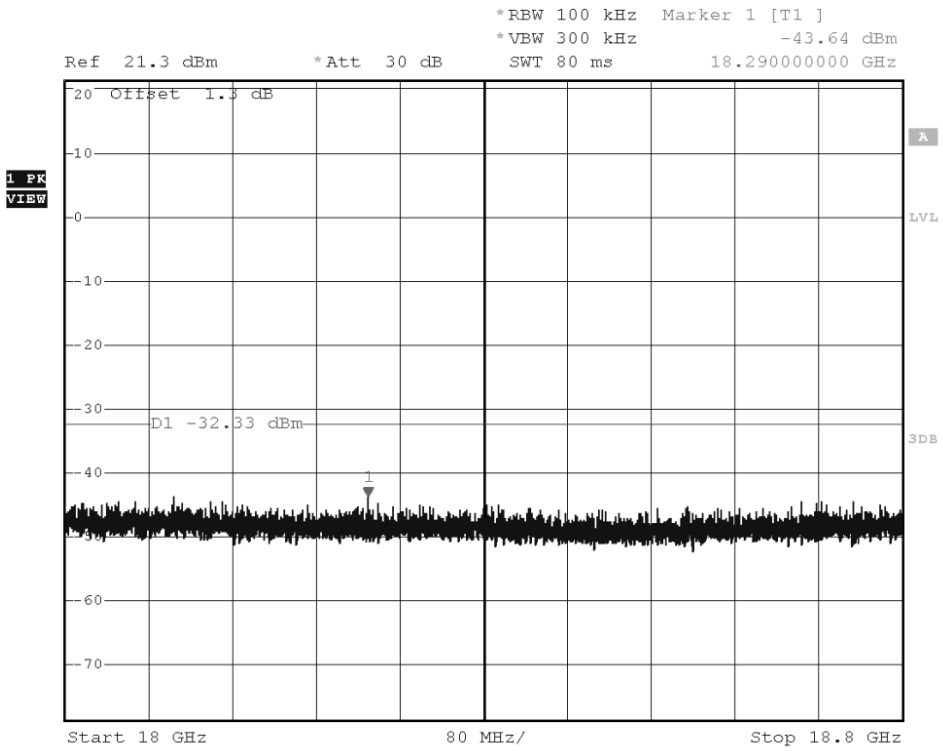


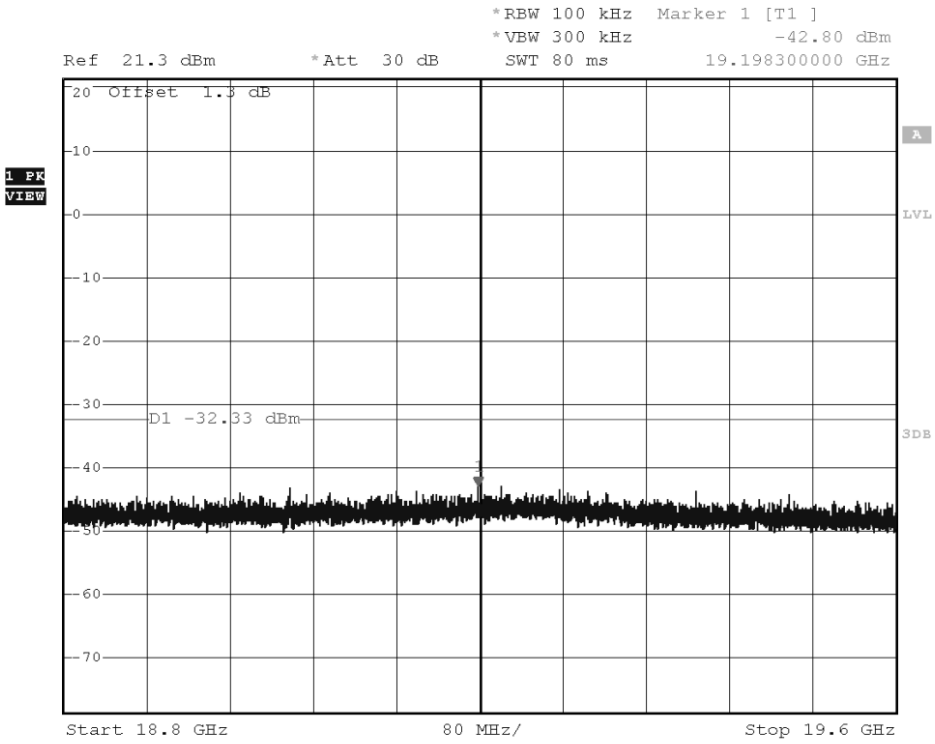


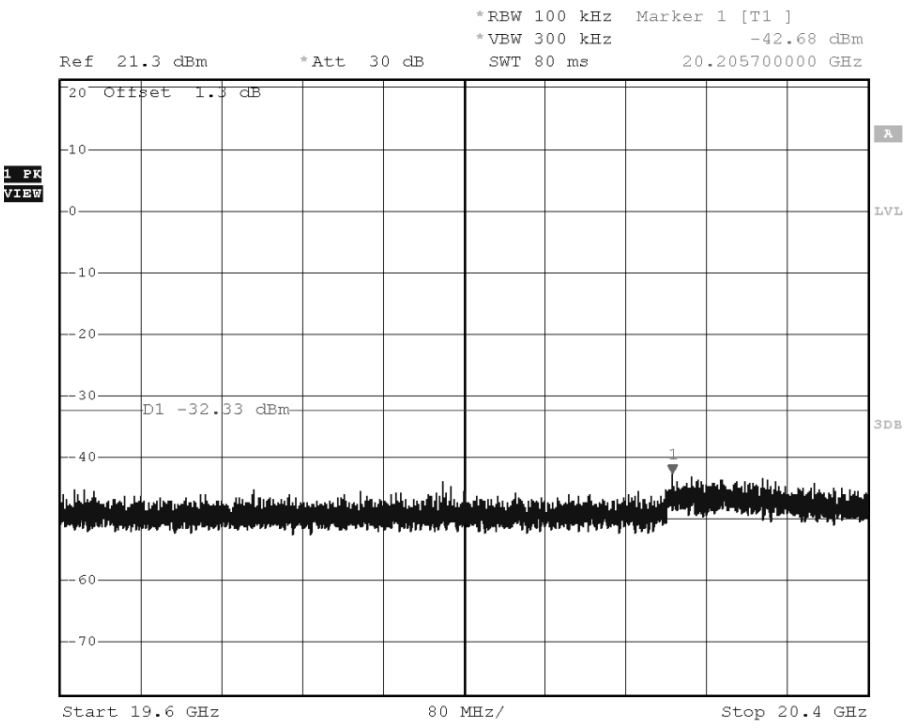

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-43.22 dBm
2.399900000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -32.33 dBm
A
LVL
3DB
Start 1.6 GHz
80 MHz/
Stop 2.4 GHz

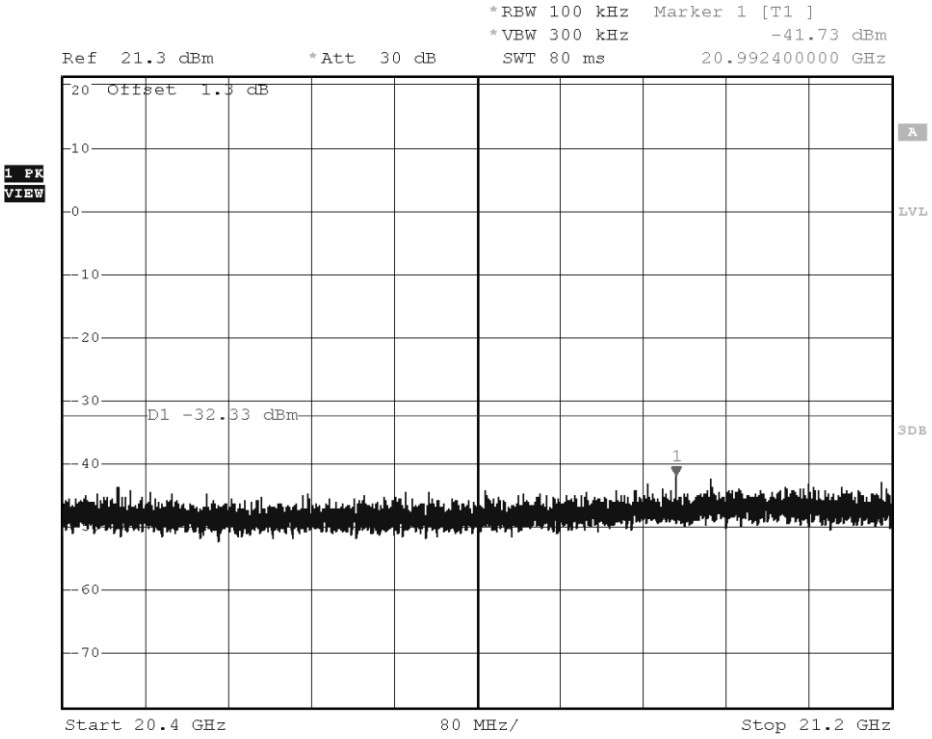

*RBW 1 MHz
*VBW 3 MHz
SWT 155 ms
Marker 1 [T1]
-43.53 dBm
9.627933250 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -32.33 dBm
A
LVL
3DB
Start 2.4835 GHz
751.65 MHz/
Stop 10 GHz

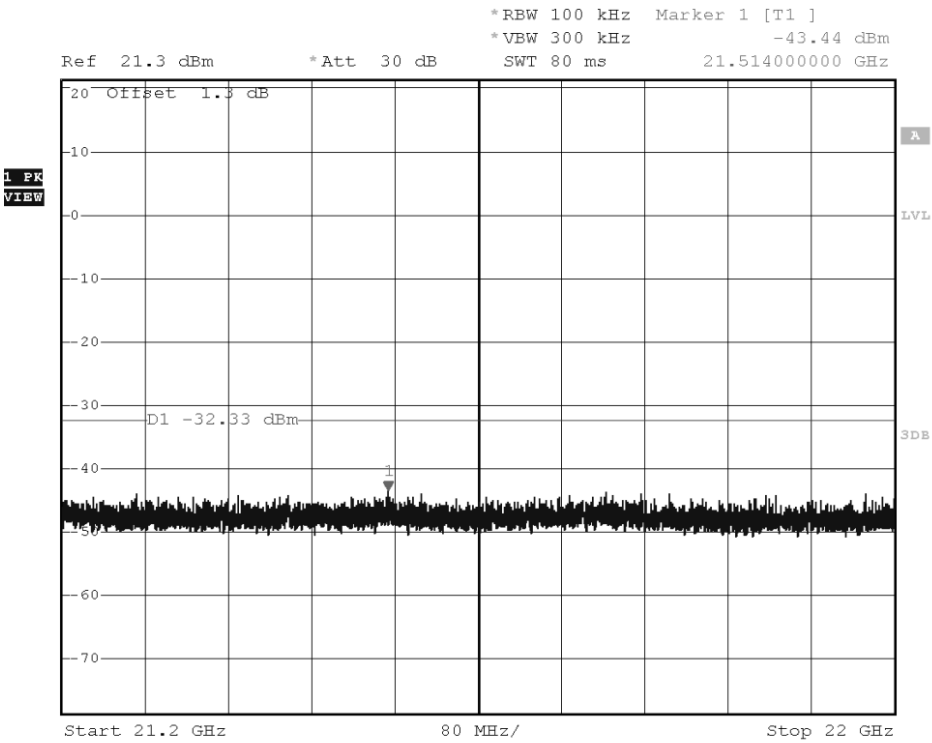

*RBW 1 MHz
Marker 1 [T1]
*VBW 3 MHz
-33.69 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 160 ms
16.063000000 GHz
20 Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.33 dBm
Start 10 GHz
800 MHz/
Stop 18 GHz

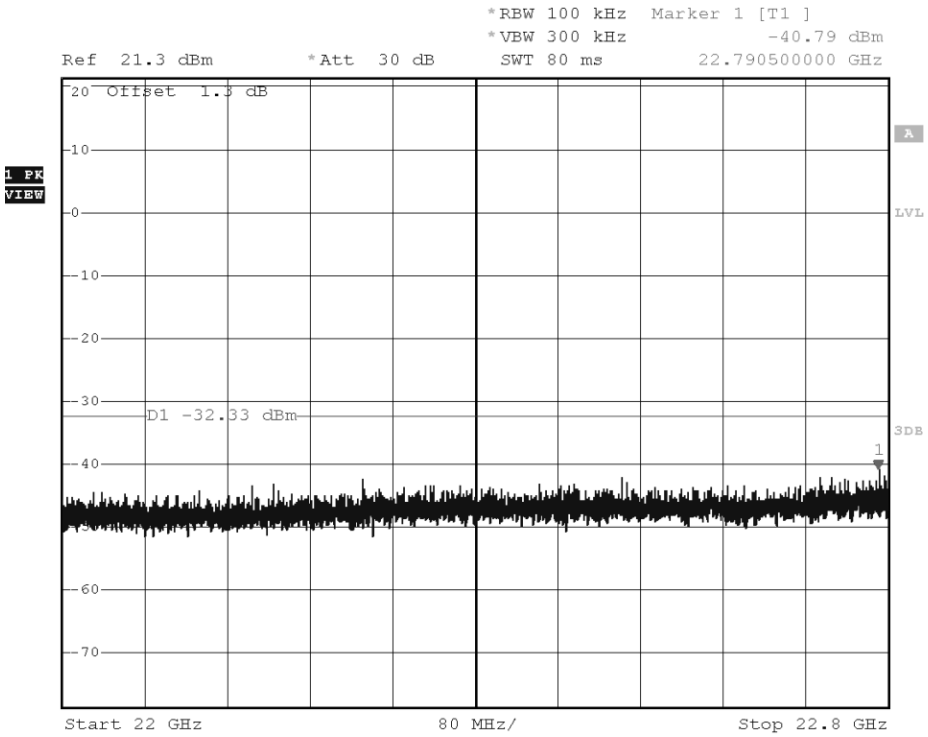

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-43.64 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
18.290000000 GHz
20 Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.33 dBm
Start 18 GHz
80 MHz/
Stop 18.8 GHz

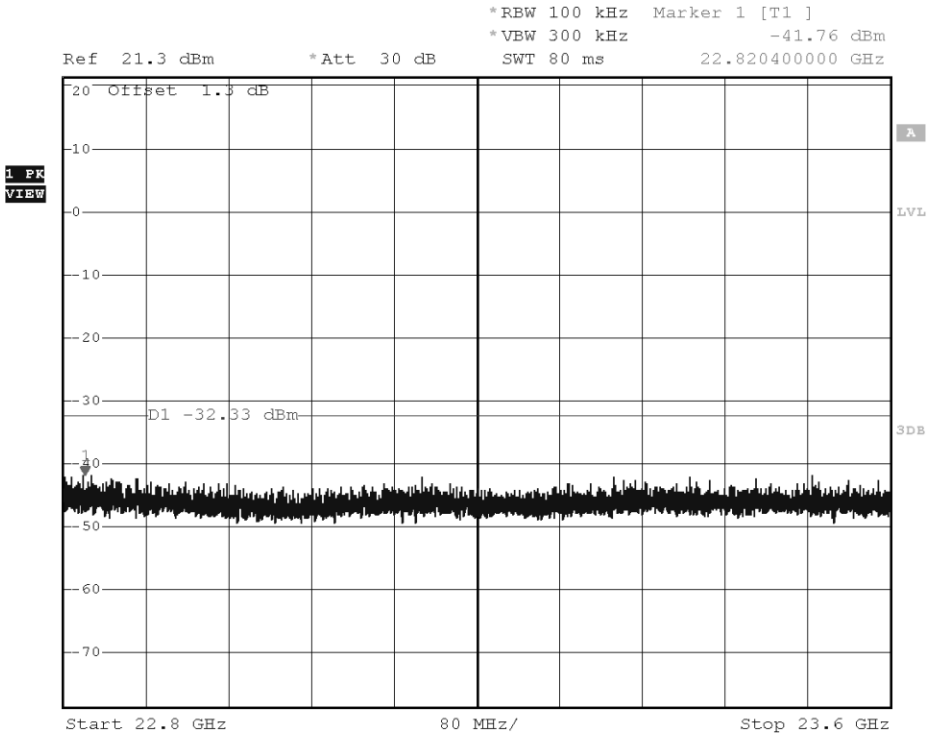

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-42.80 dBm
19.198300000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -32.33 dBm
A
LVL
3DB
Start 18.8 GHz
80 MHz/
Stop 19.6 GHz

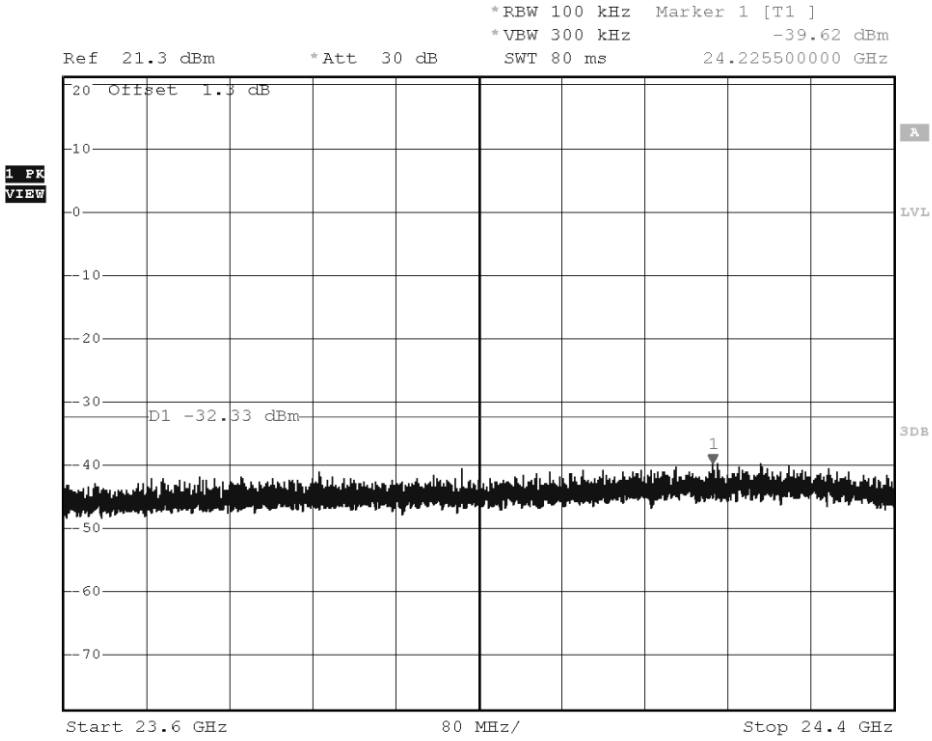

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-42.68 dBm
20.205700000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -32.33 dBm
A
LVL
3DB
Start 19.6 GHz
80 MHz/
Stop 20.4 GHz

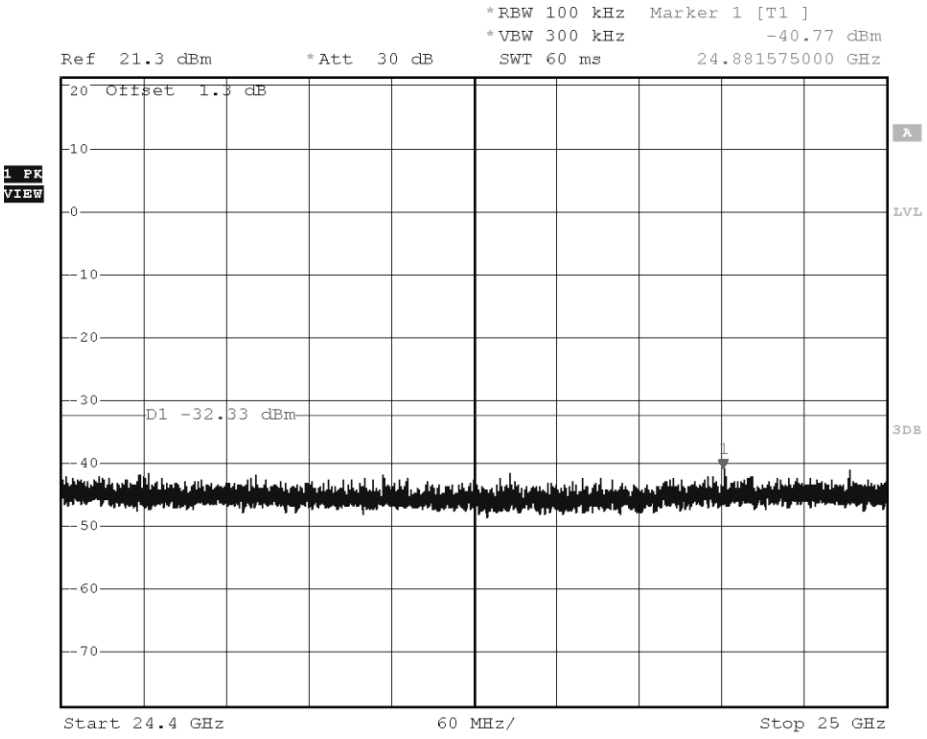

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-41.73 dBm
20.992400000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -32.33 dBm
A
LVL
3DB
Start 20.4 GHz
80 MHz/
Stop 21.2 GHz


*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-43.44 dBm
21.514000000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -32.33 dBm
A
LVL
3DB
Start 21.2 GHz
80 MHz/
Stop 22 GHz

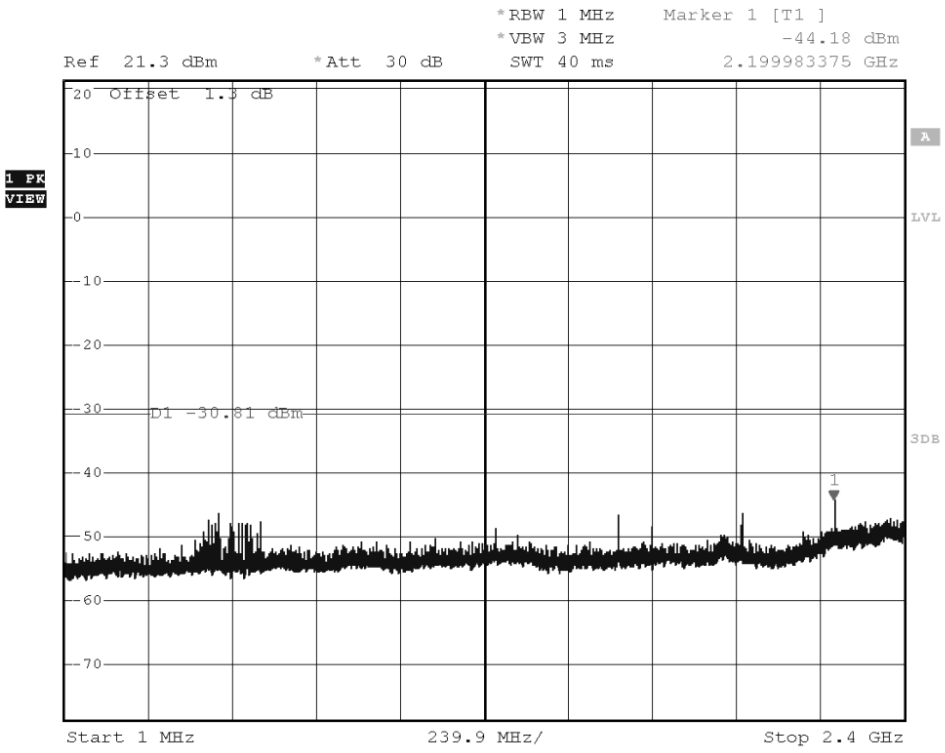

*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
-40.79 dBm
22.790500000 GHz
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
Offset 1.3 dB
1 PK
VIEW
D1 -32.33 dBm
3DB
LVL
Start 22 GHz
80 MHz/
Stop 22.8 GHz

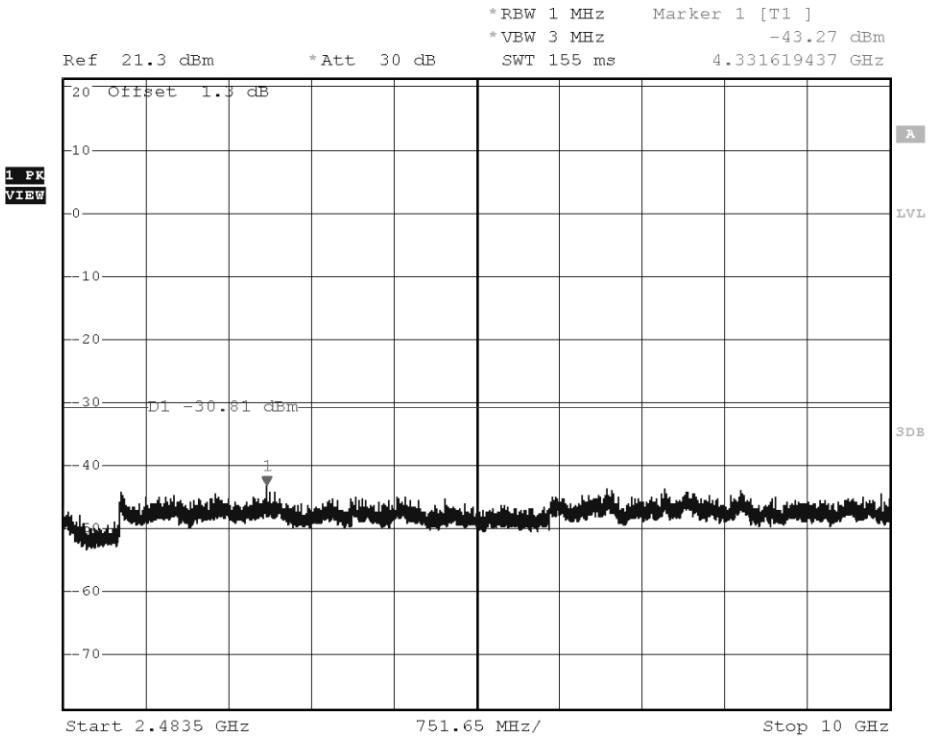

*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
-41.76 dBm
22.820400000 GHz
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
Offset 1.3 dB
1 PK
VIEW
D1 -32.33 dBm
3DB
LVL
Start 22.8 GHz
80 MHz/
Stop 23.6 GHz

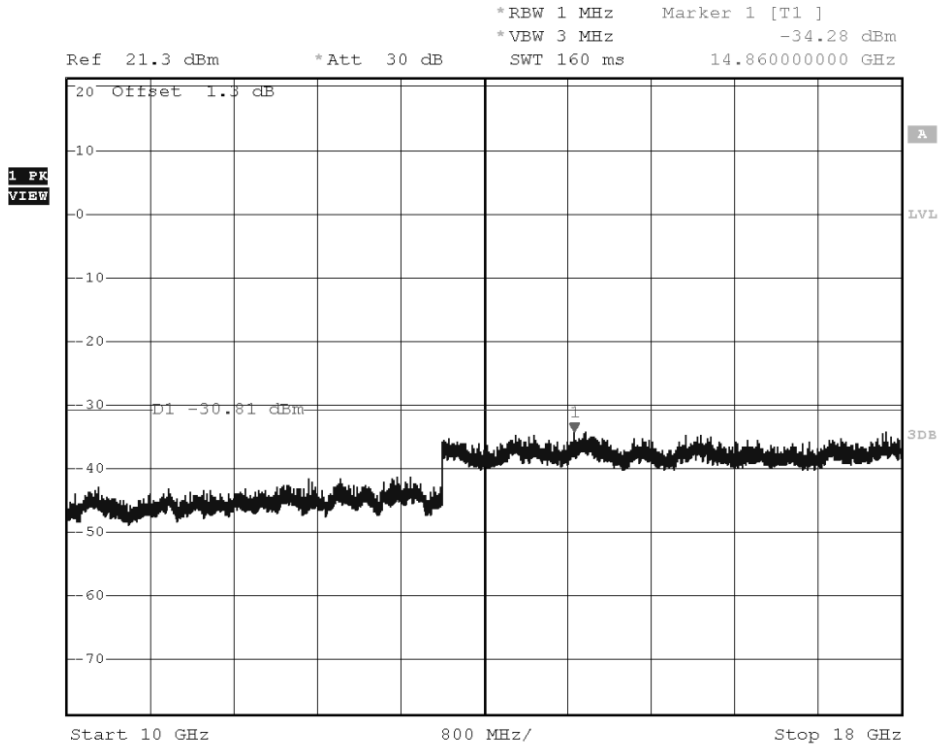

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-39.62 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
24.225500000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.33 dBm
Start 23.6 GHz
80 MHz/
Stop 24.4 GHz

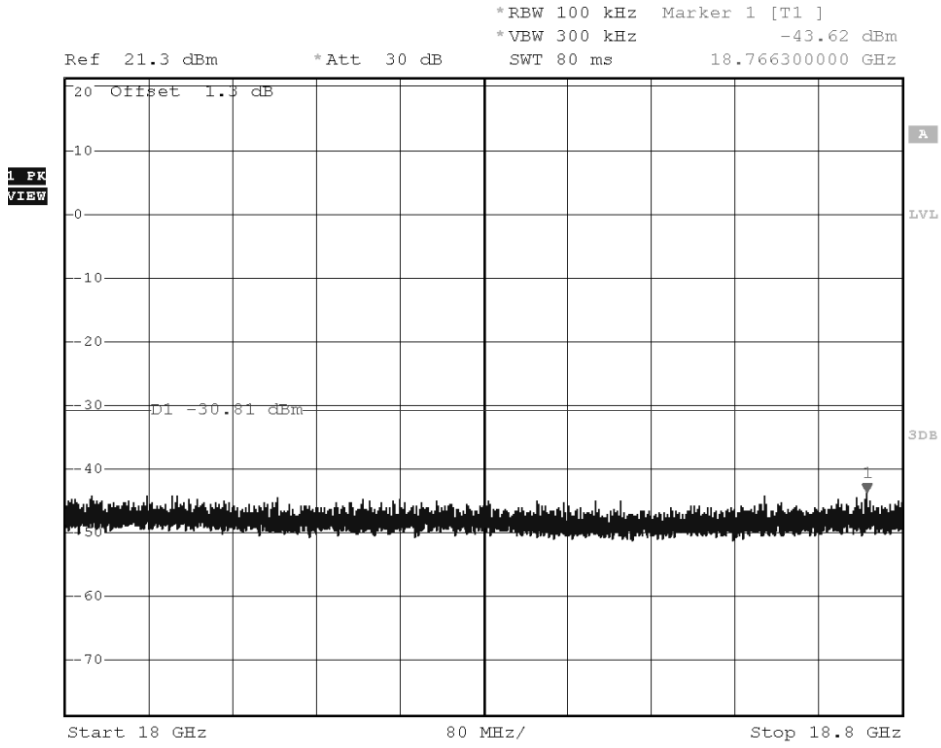

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-40.77 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 60 ms
24.881575000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.33 dBm
Start 24.4 GHz
60 MHz/
Stop 25 GHz

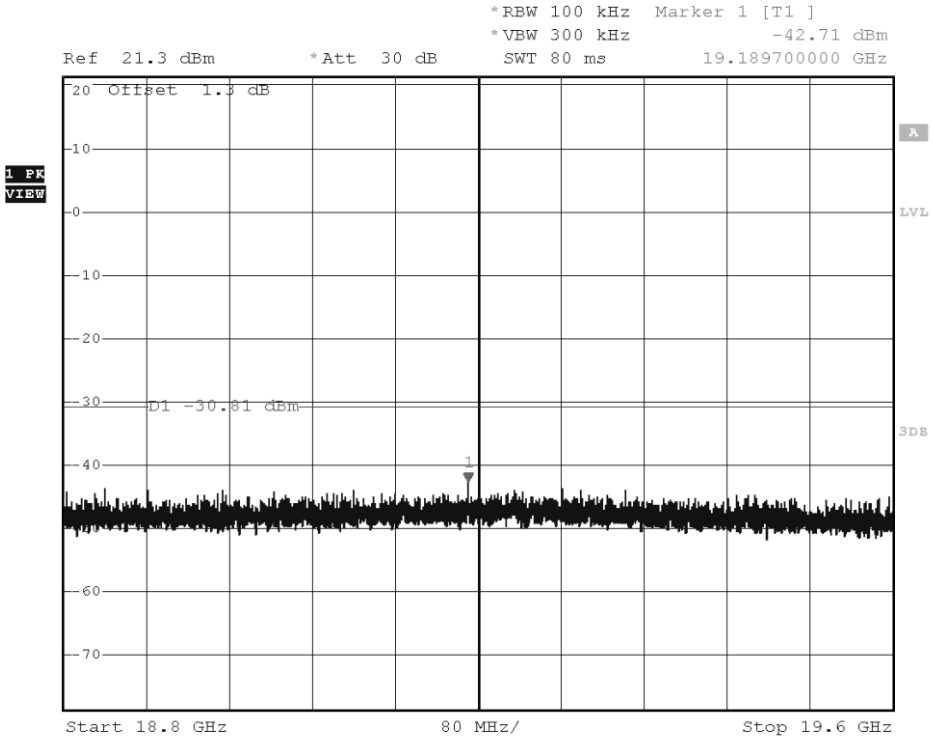
Channel 06 (2437MHz) Reference Level: -10.81dBm

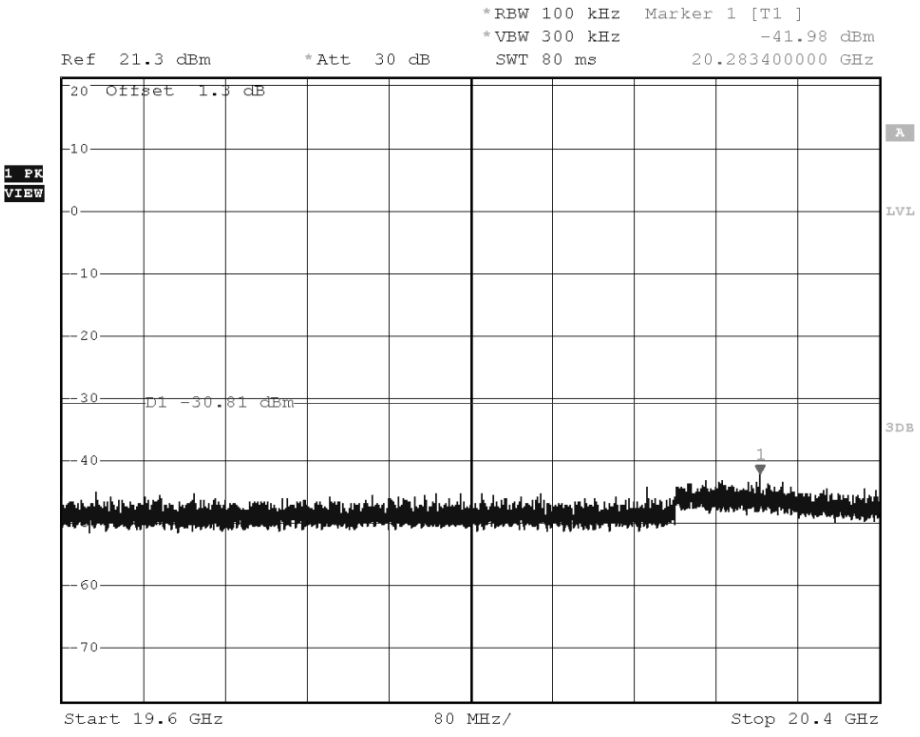


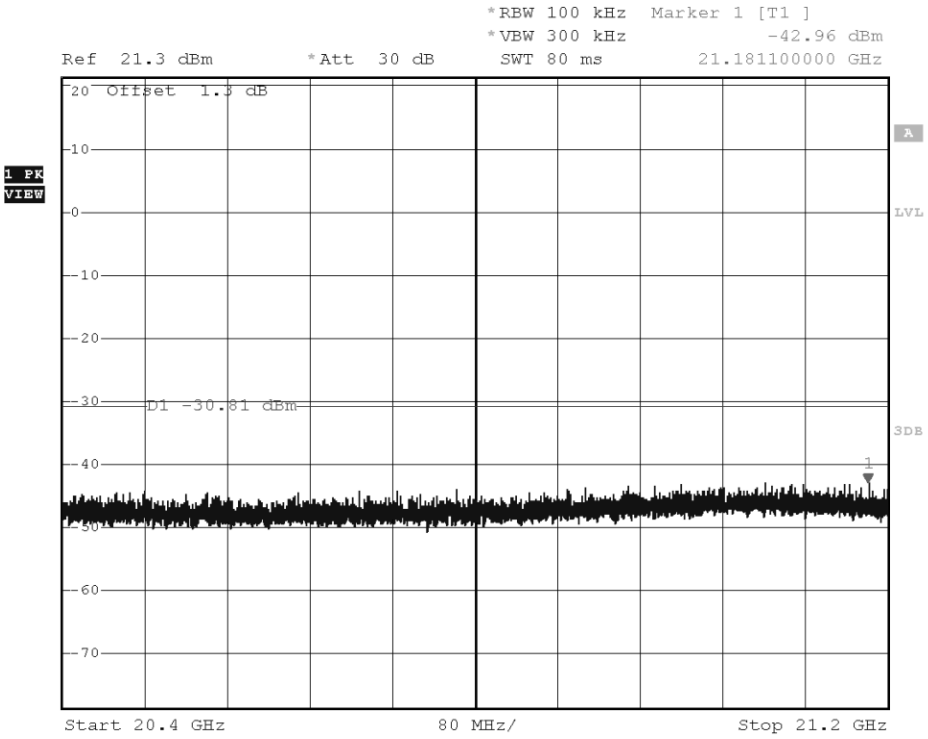


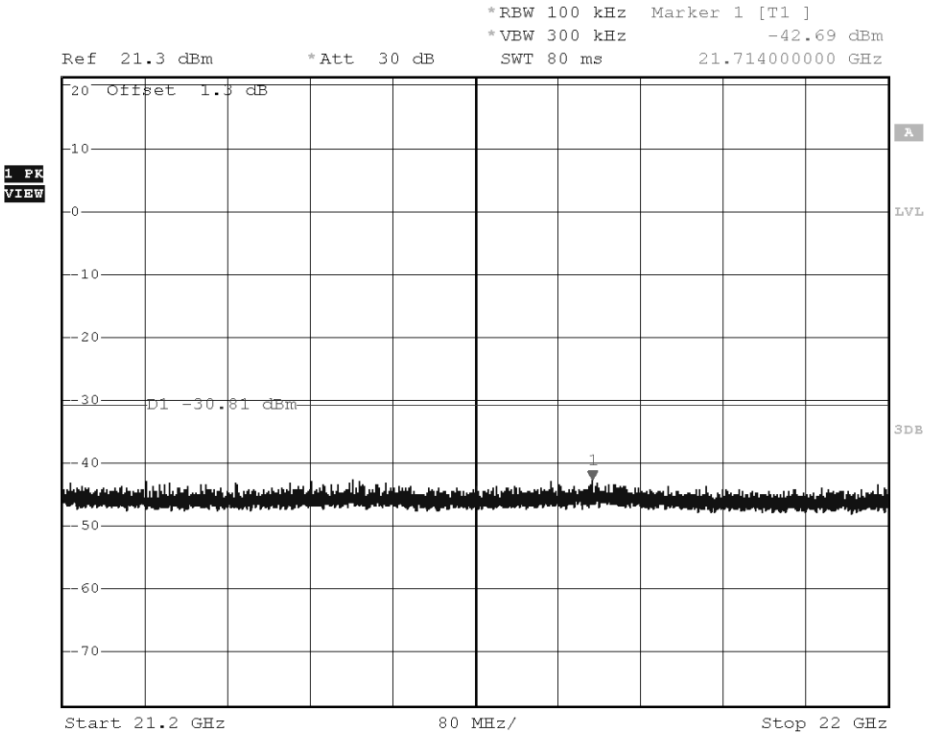

*RBW 1 MHz
Marker 1 [T1]
*VBW 3 MHz
-34.28 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 160 ms
14.860000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -30.81 dBm
Start 10 GHz
800 MHz/
Stop 18 GHz

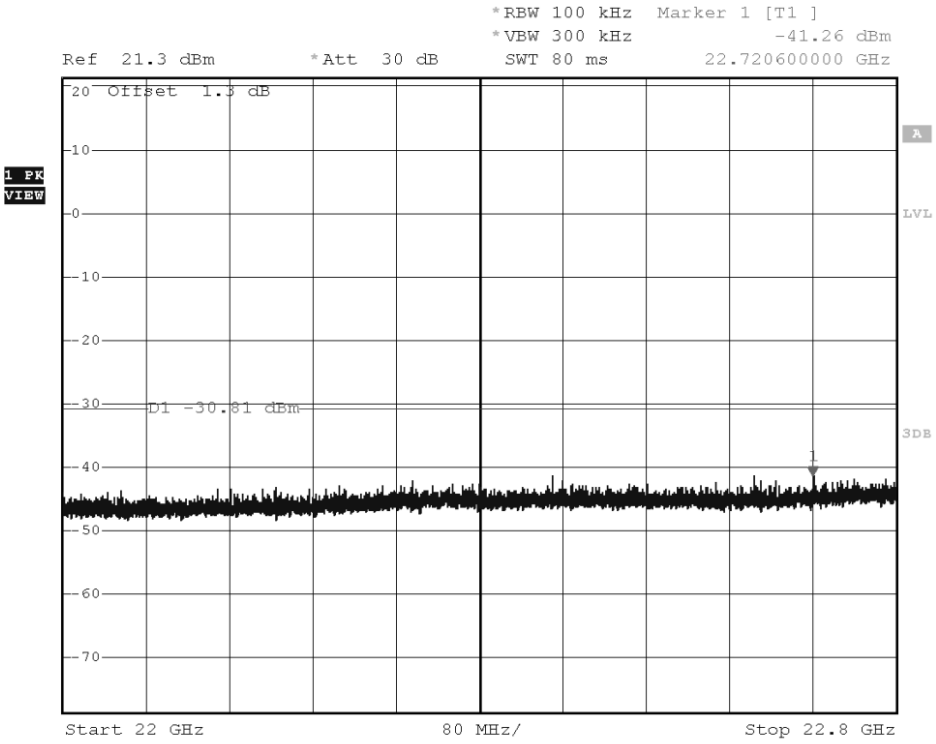

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-43.62 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
18.766300000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -30.81 dBm
Start 18 GHz
80 MHz/
Stop 18.8 GHz

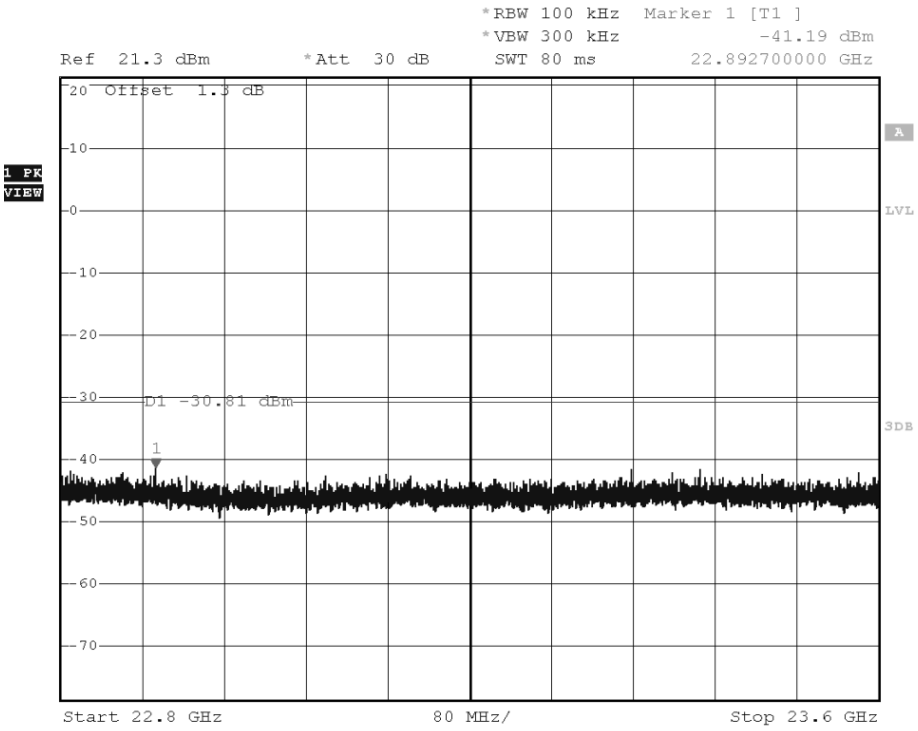

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-42.71 dBm
19.189700000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -30.81 dBm
Start 18.8 GHz
80 MHz/
Stop 19.6 GHz

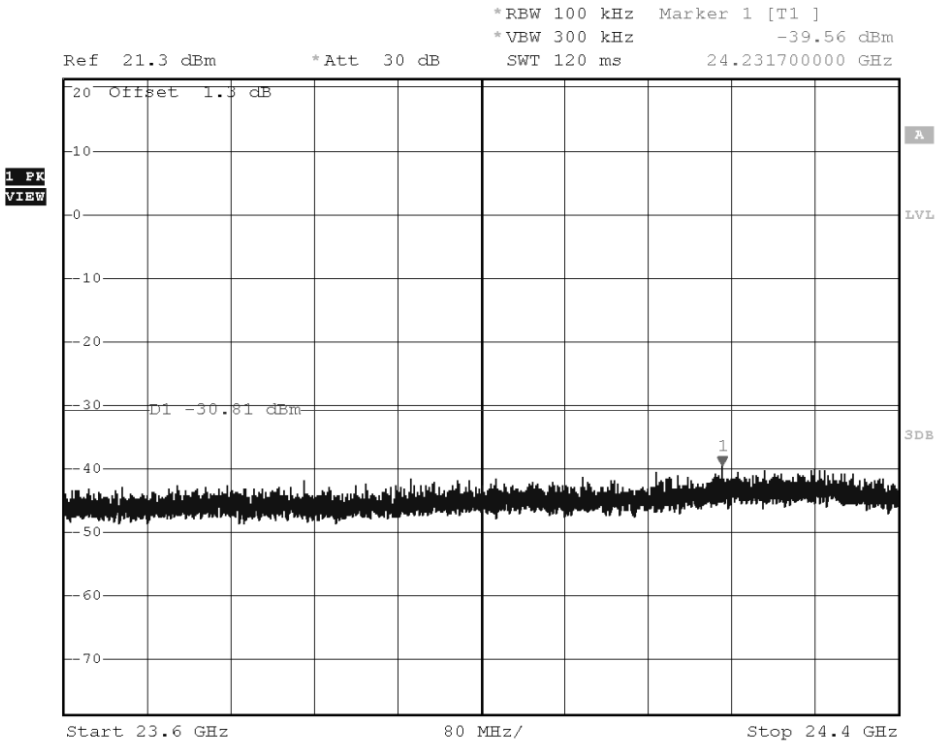

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-41.98 dBm
20.283400000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -30.81 dBm
Start 19.6 GHz
80 MHz/
Stop 20.4 GHz

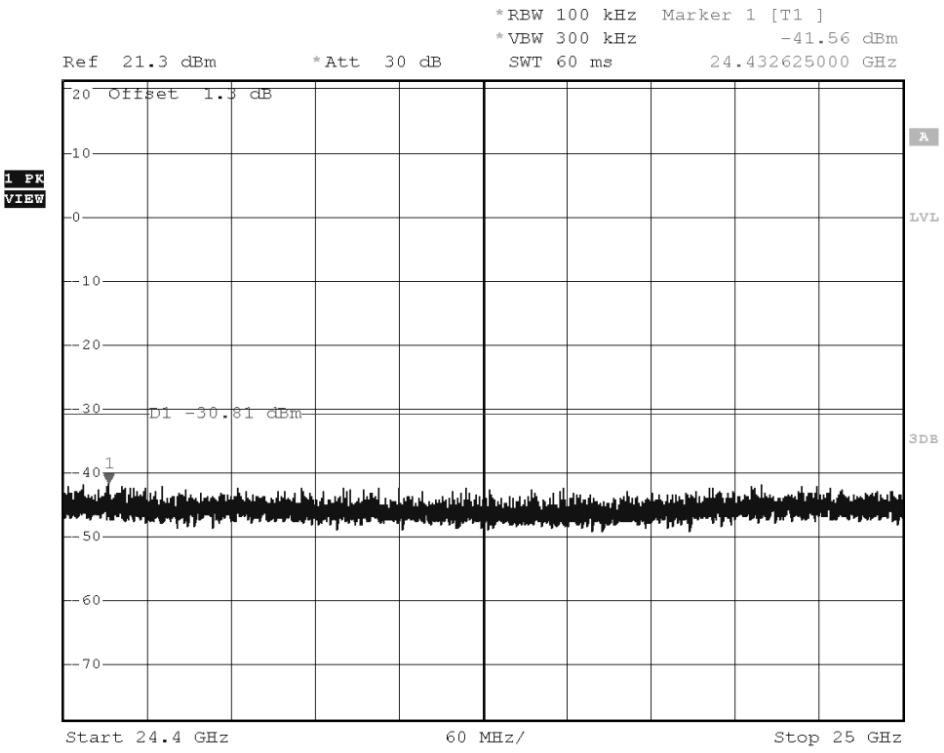

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-42.96 dBm
21.181100000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -30.81 dBm
A
LVL
3DB
Start 20.4 GHz
80 MHz/
Stop 21.2 GHz


*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-42.69 dBm
21.714000000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -30.81 dBm
A
LVL
3DB
Start 21.2 GHz
80 MHz/
Stop 22 GHz

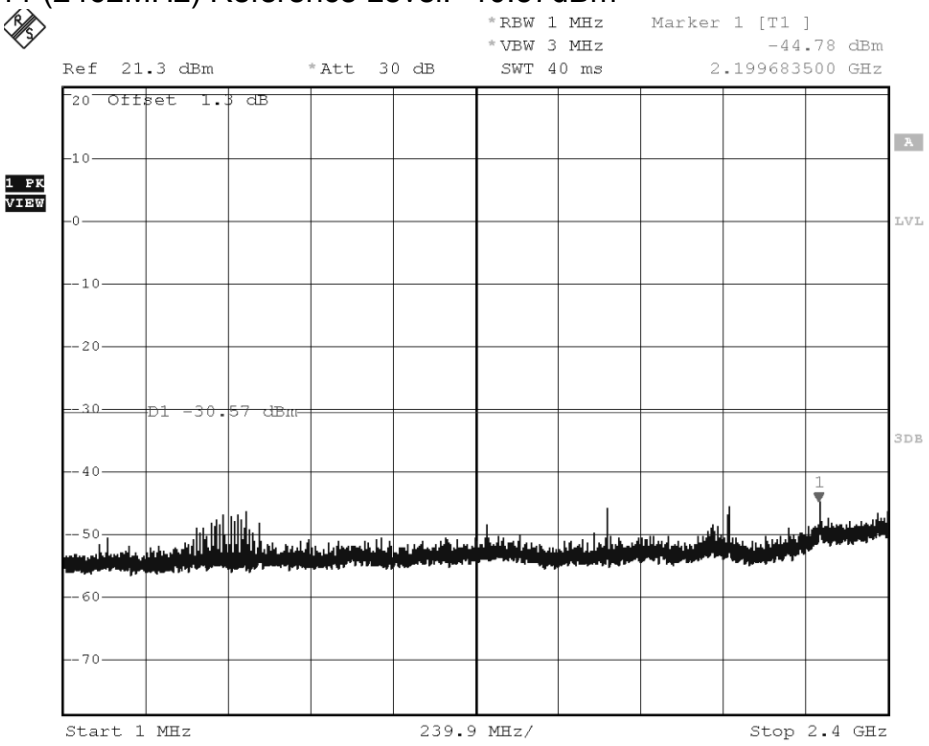

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-41.26 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
22.720600000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -30.81 dBm
Start 22 GHz
80 MHz/
Stop 22.8 GHz

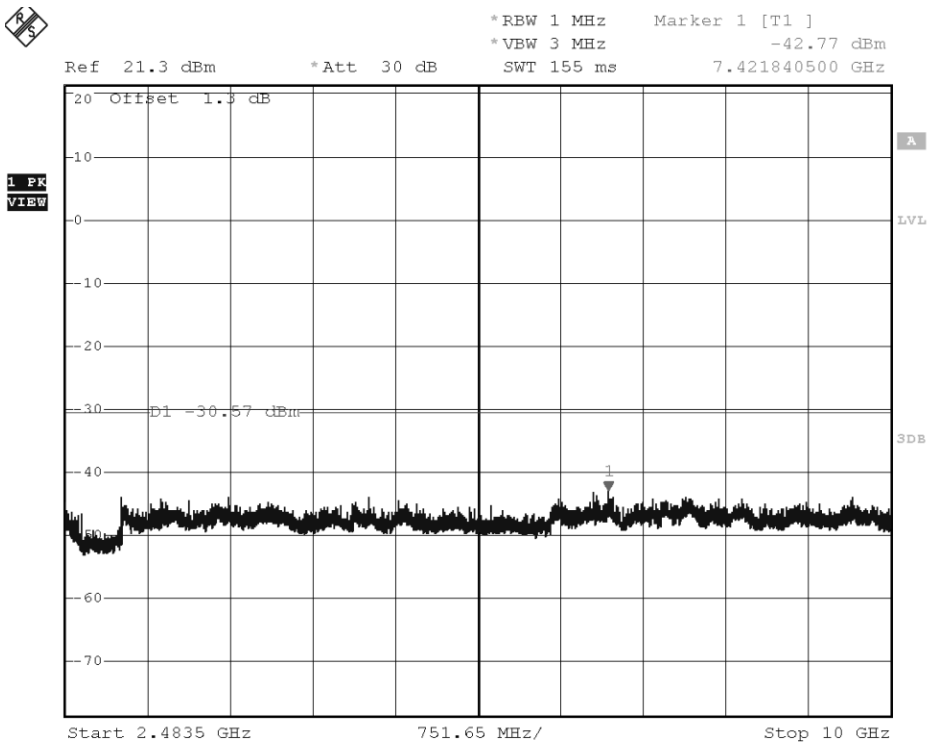

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-41.19 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
22.892700000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -30.81 dBm
Start 22.8 GHz
80 MHz/
Stop 23.6 GHz

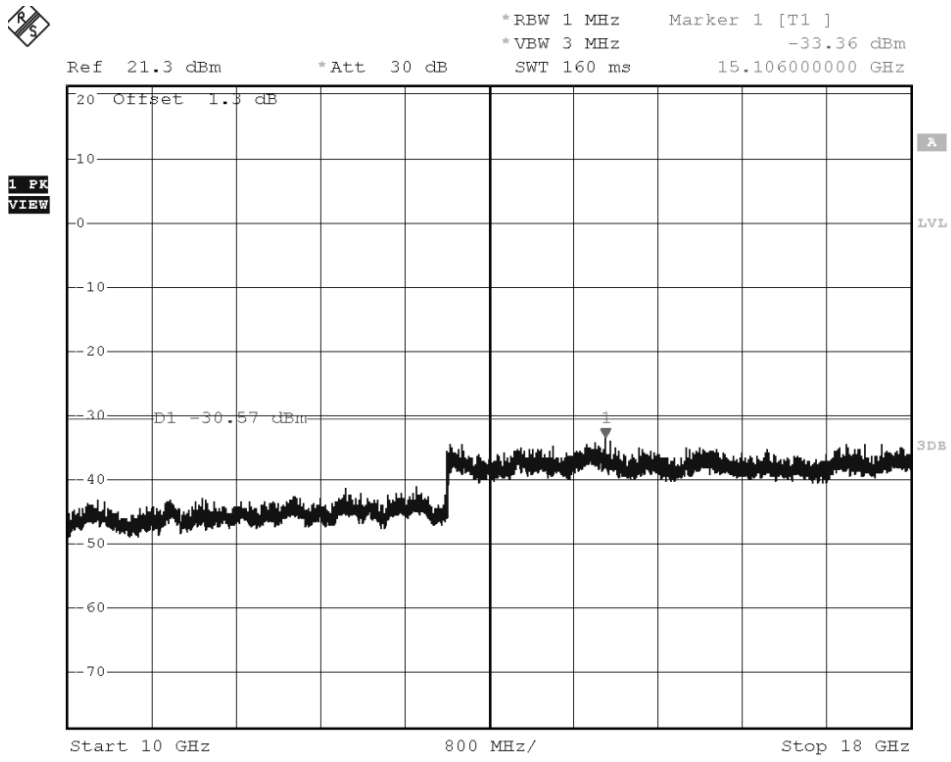

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-39.56 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 120 ms
24.231700000 GHz
Offset 1.3 dB
1 PK
VIEW
D1 -30.81 dBm
LVL
3DB
Start 23.6 GHz
80 MHz/
Stop 24.4 GHz

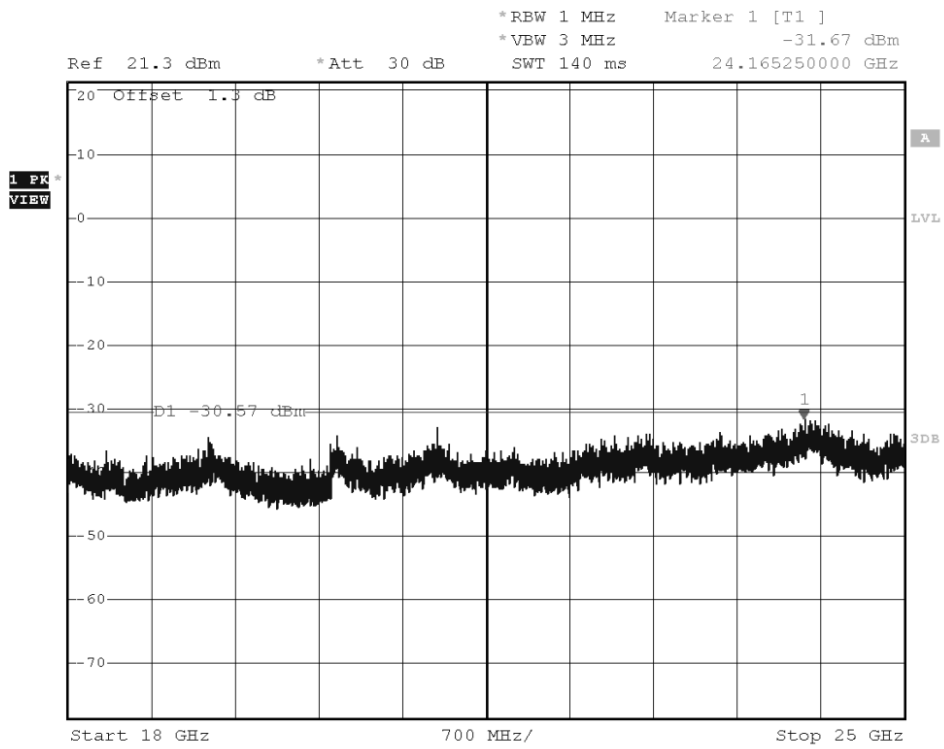

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-41.56 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 60 ms
24.432625000 GHz
Offset 1.3 dB
1 PK
VIEW
D1 -30.81 dBm
LVL
3DB
Start 24.4 GHz
60 MHz/
Stop 25 GHz

Channel 11 (2462MHz) Reference Level: -10.57dBm

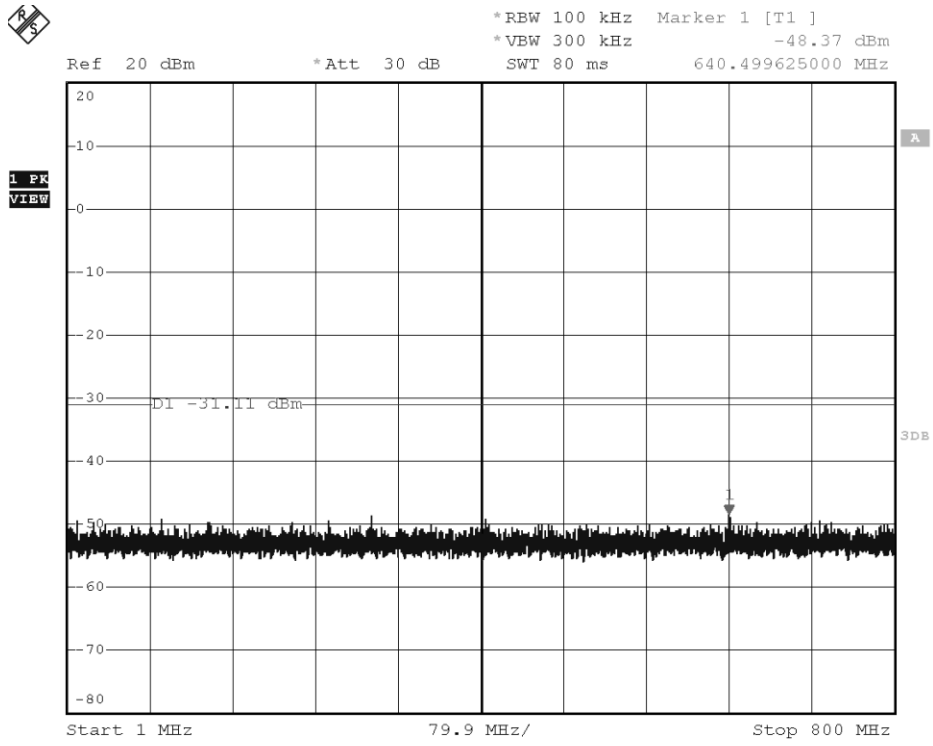


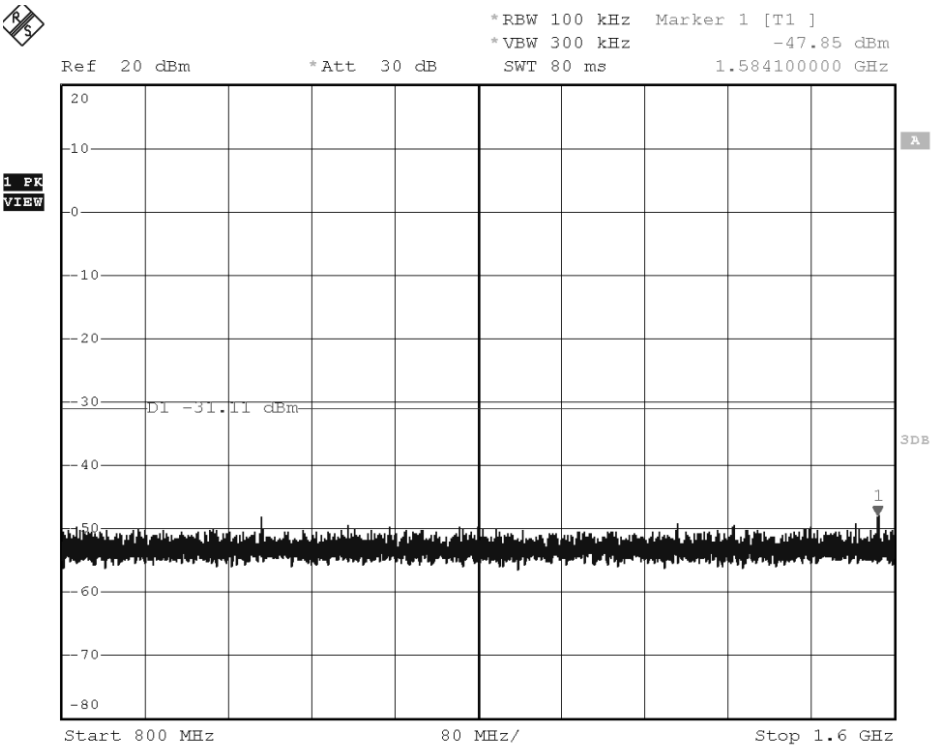


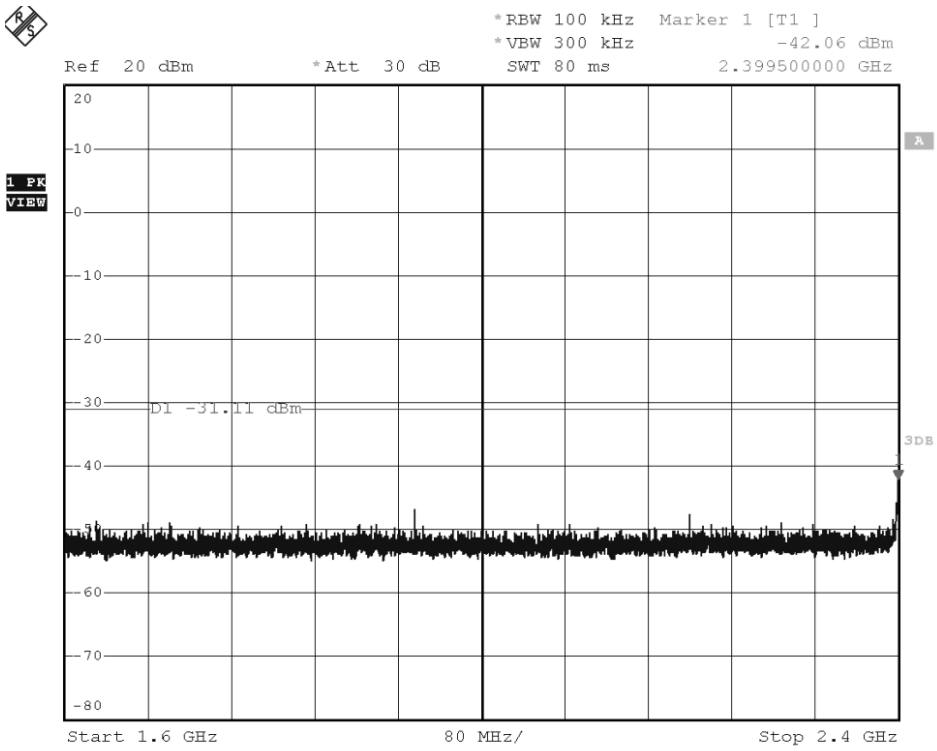

*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-33.36 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 160 ms
15.106000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -30.57 dBm
Start 10 GHz
800 MHz/
Stop 18 GHz

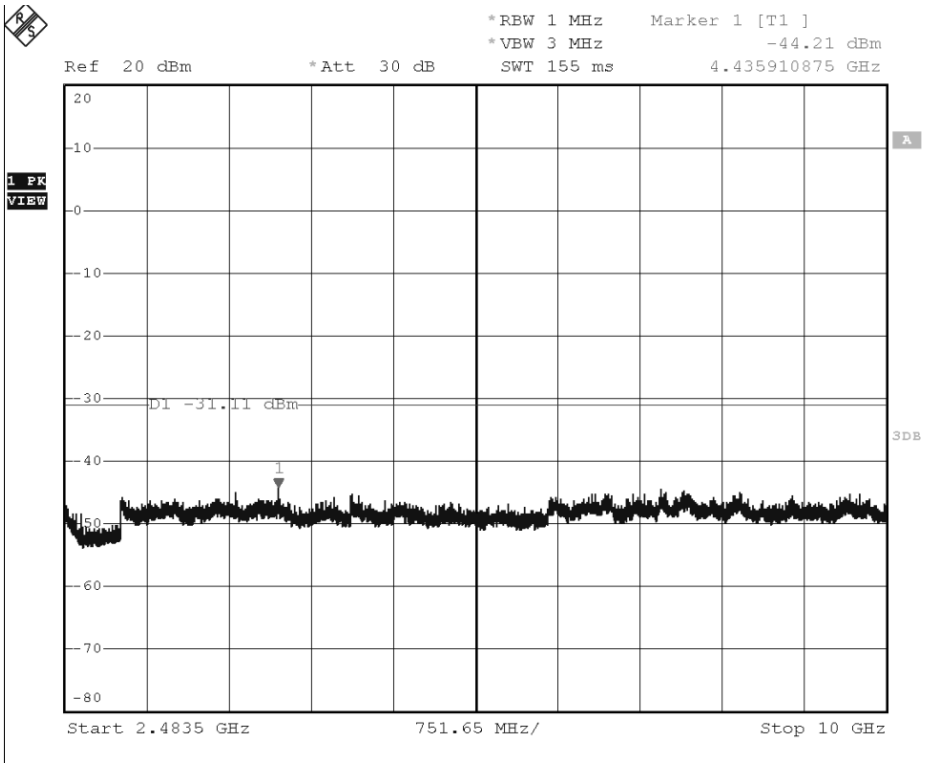

*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-31.67 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 140 ms
24.165250000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -30.57 dBm
Start 18 GHz
700 MHz/
Stop 25 GHz

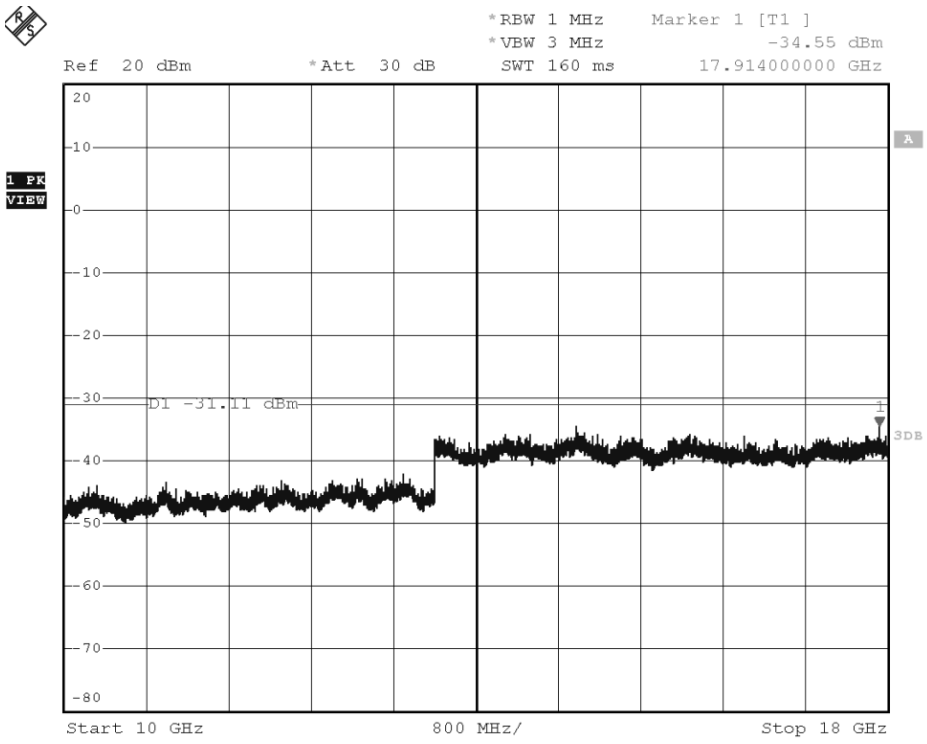
802.11 n-HT20
Channel 01 (2412MHz) Reference Level: -11.11dBm

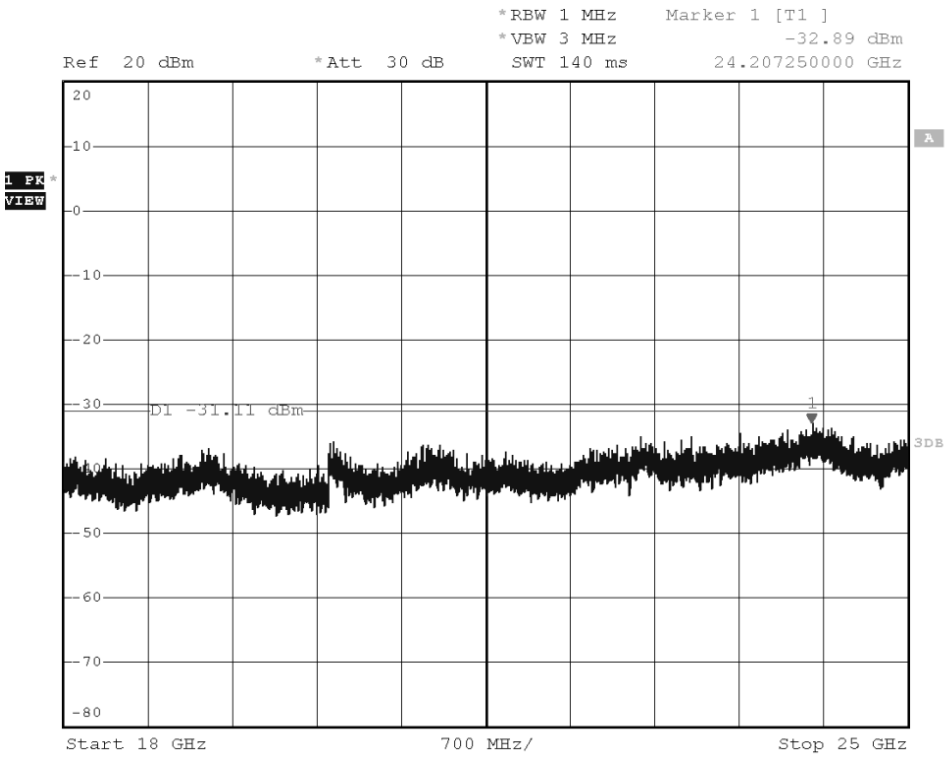




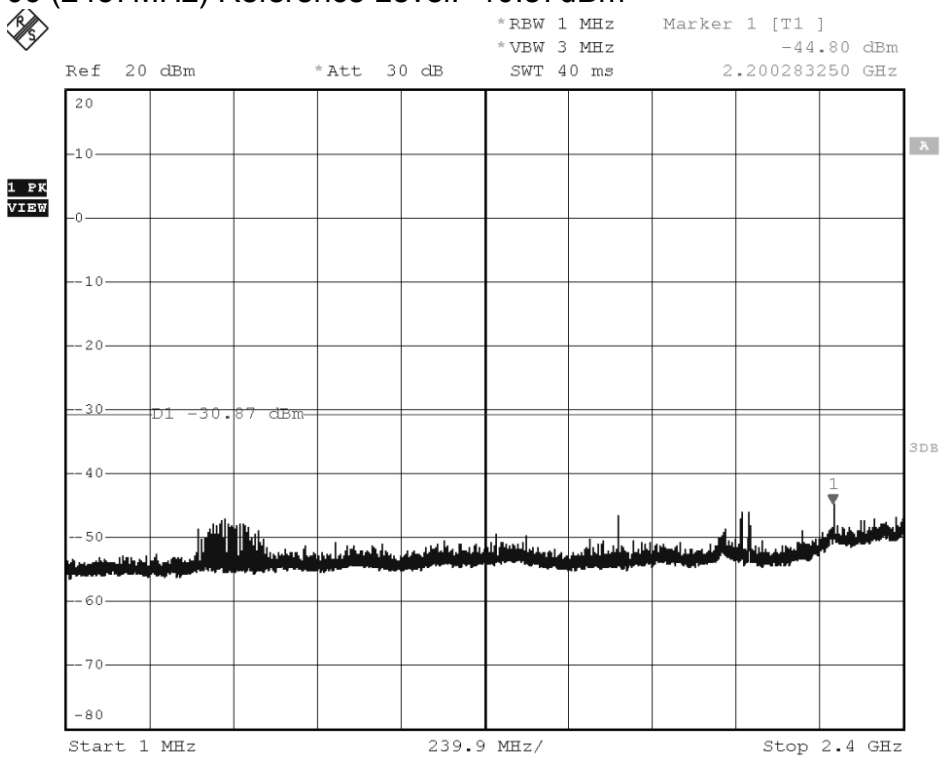

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-42.06 dBm
Ref 20 dBm
*Att 30 dB
SWT 80 ms
2.399500000 GHz
1 PK VIEW
D1 -31.11 dBm
3DB
Start 1.6 GHz
80 MHz/
Stop 2.4 GHz

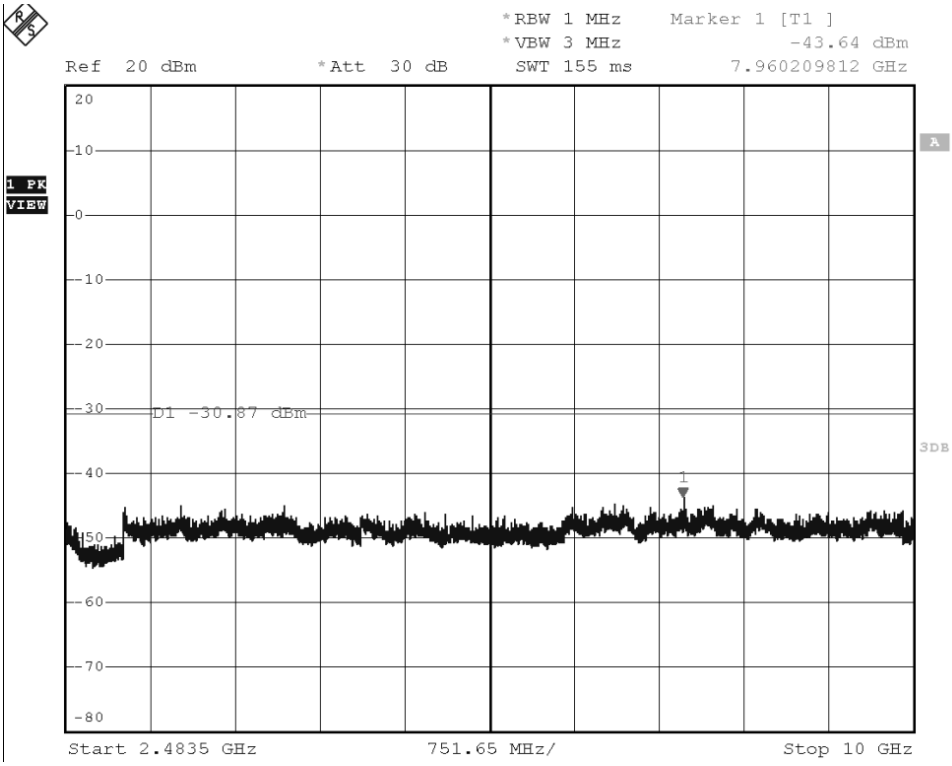

*RBW 1 MHz
Marker 1 [T1]
*VBW 3 MHz
-44.21 dBm
Ref 20 dBm
*Att 30 dB
SWT 155 ms
4.435910875 GHz
1 PK VIEW
D1 -31.11 dBm
3DB
Start 2.4835 GHz
751.65 MHz/
Stop 10 GHz

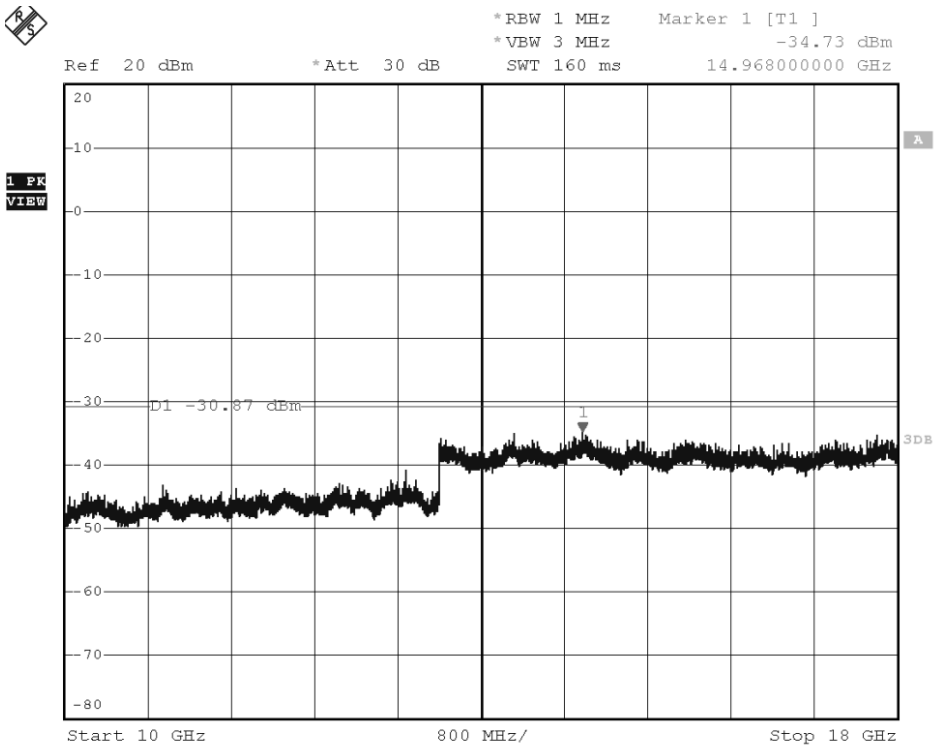

*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-34.55 dBm
17.914000000 GHz
Ref 20 dBm
*Att 30 dB
SWT 160 ms
1 PK VIEW
D1 -31.11 dBm
3DB
Start 10 GHz
800 MHz/
Stop 18 GHz

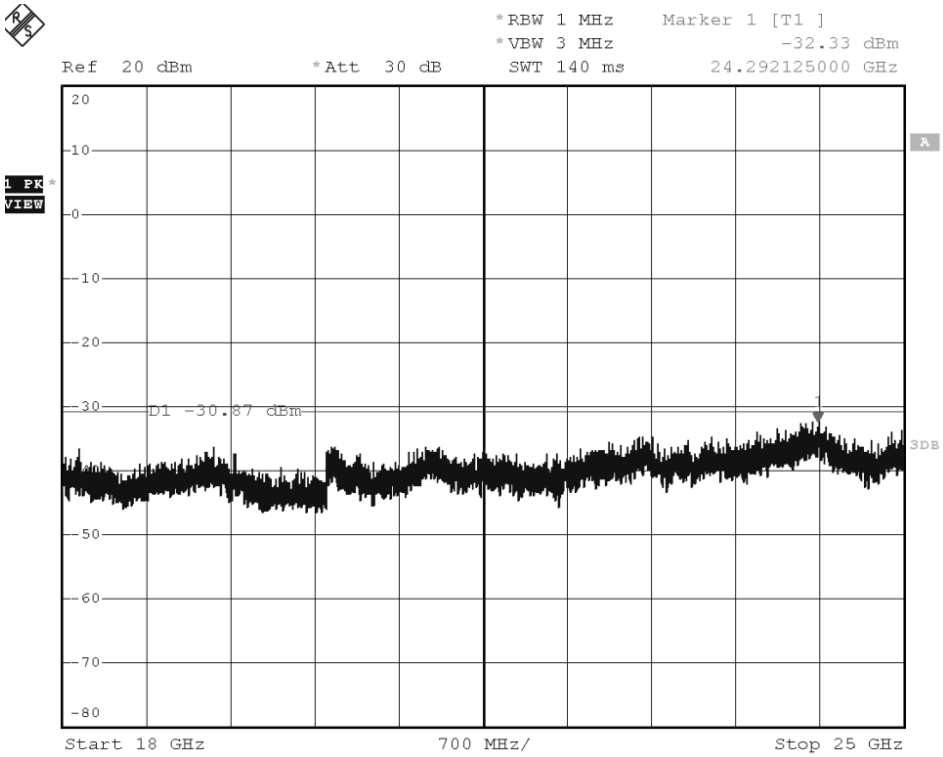

*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-32.89 dBm
24.207250000 GHz
Ref 20 dBm
*Att 30 dB
SWT 140 ms
1 PK VIEW
D1 -31.11 dBm
3DB
Start 18 GHz
700 MHz/
Stop 25 GHz

Channel 06 (2437MHz) Reference Level: -10.87dBm

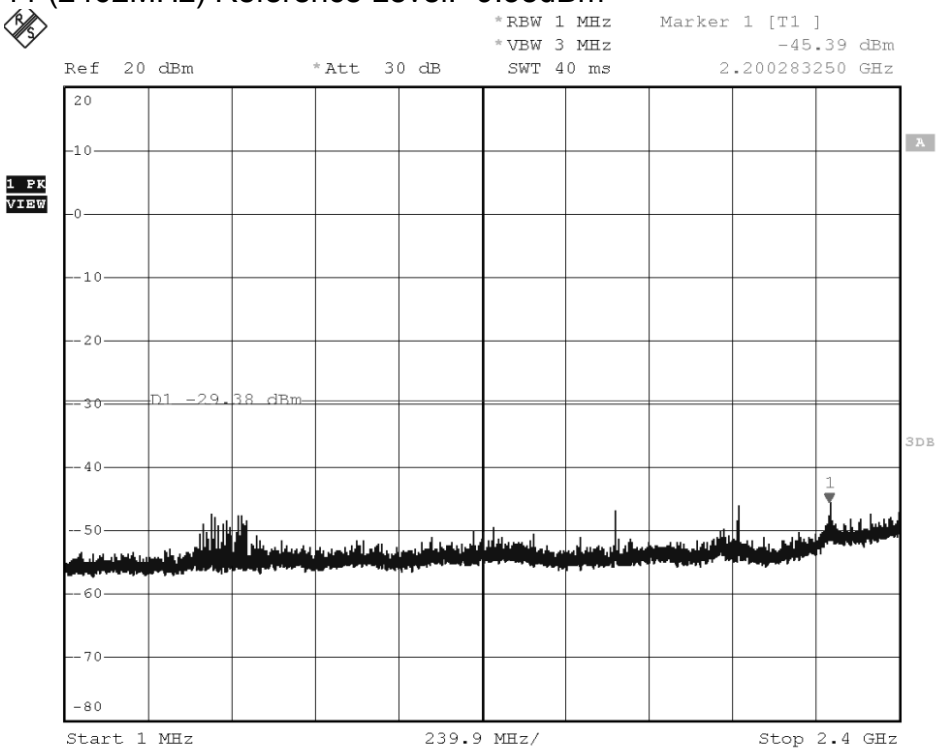


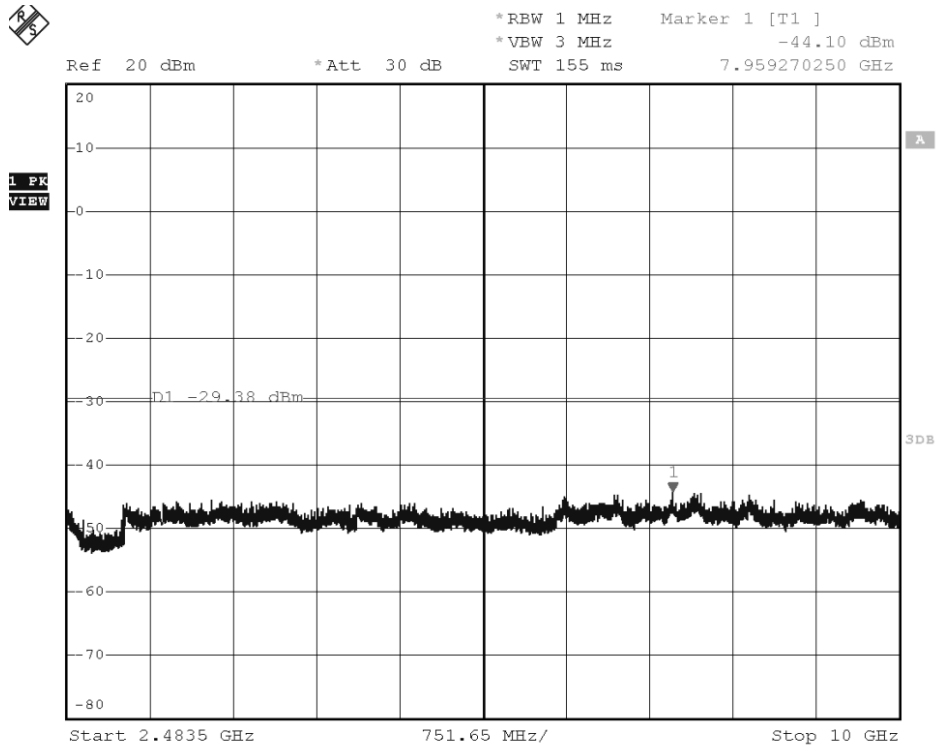


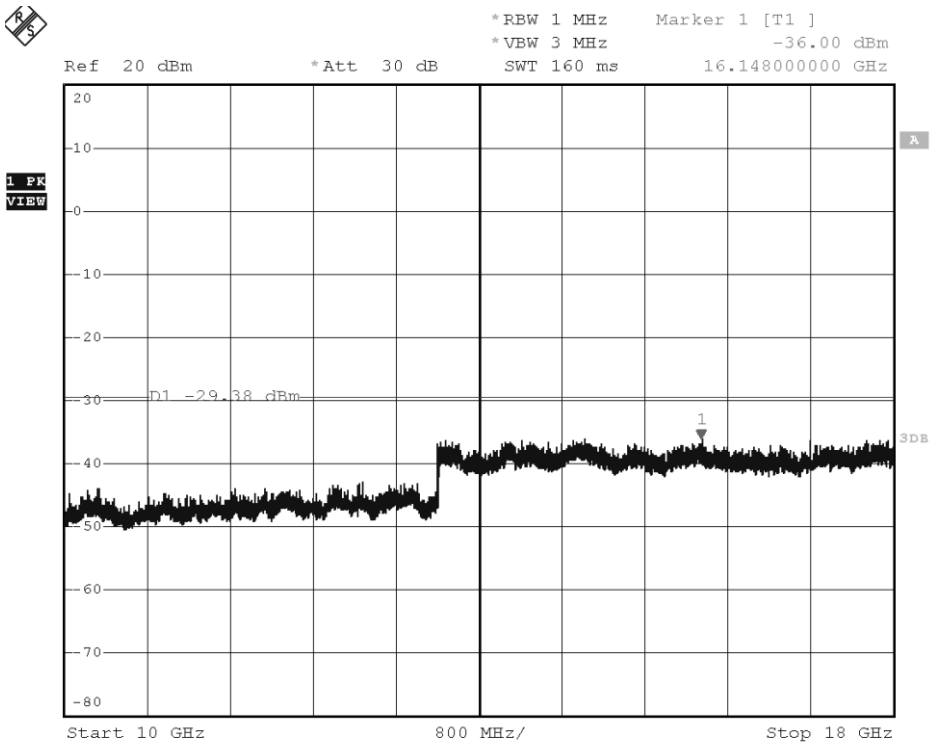

*RBW 1 MHz
Marker 1 [T1]
*VBW 3 MHz
-34.73 dBm
Ref 20 dBm
*Att 30 dB
SWT 160 ms
14.968000000 GHz
1 PK VIEW
D1 -30.87 dBm
3DB
Start 10 GHz
800 MHz/
Stop 18 GHz

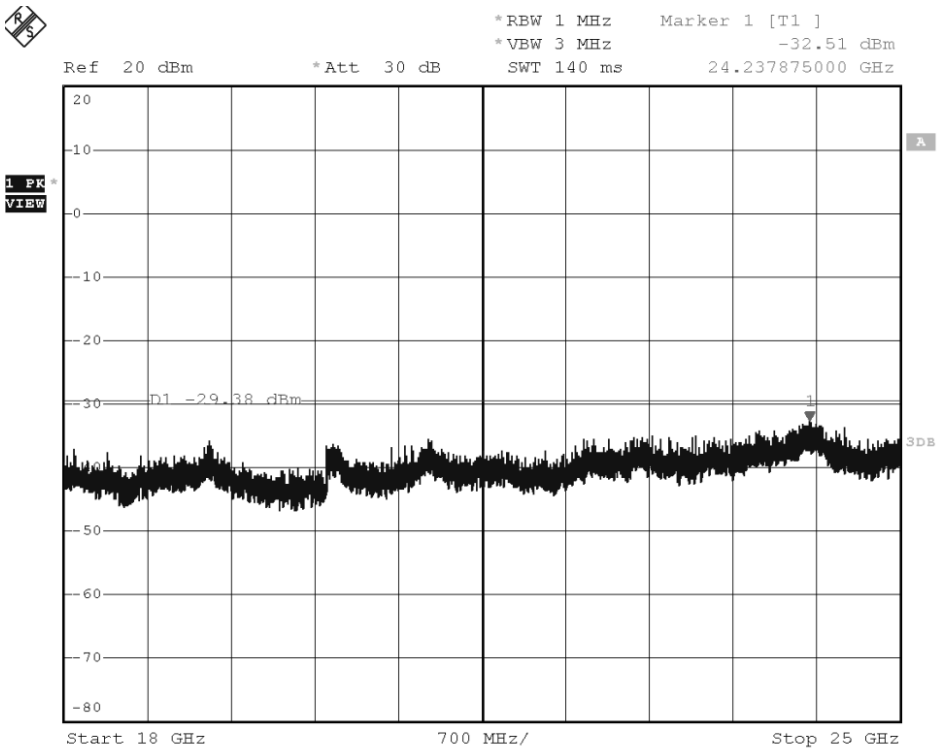

*RBW 1 MHz
Marker 1 [T1]
*VBW 3 MHz
-32.33 dBm
Ref 20 dBm
*Att 30 dB
SWT 140 ms
24.292125000 GHz
1 PK VIEW
D1 -30.87 dBm
3DB
Start 18 GHz
700 MHz/
Stop 25 GHz

Channel 11 (2462MHz) Reference Level: -9.38dBm

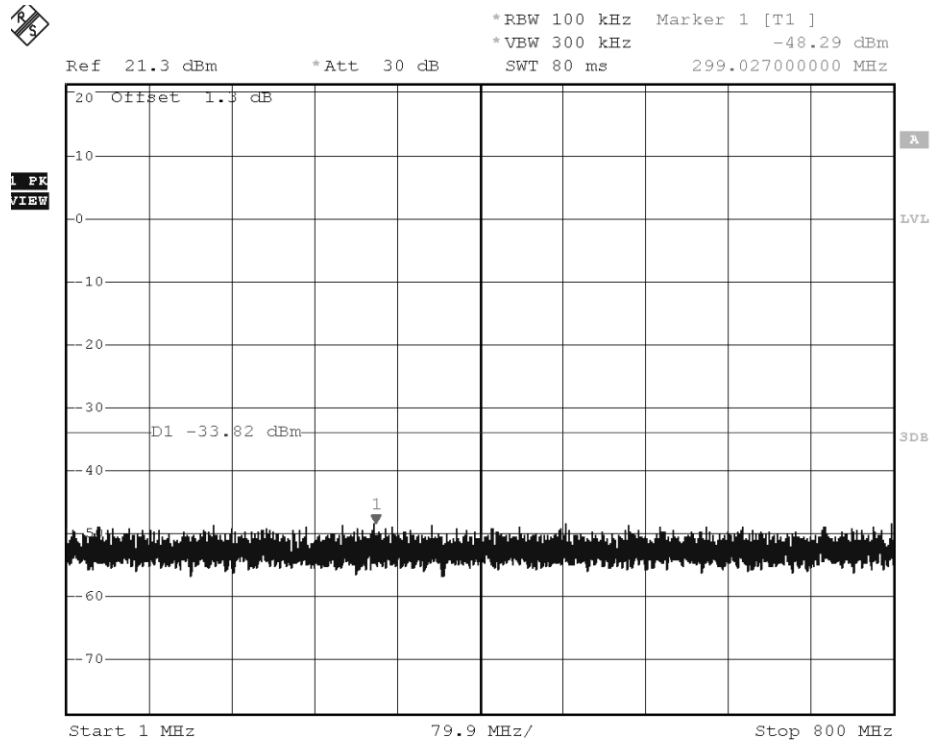


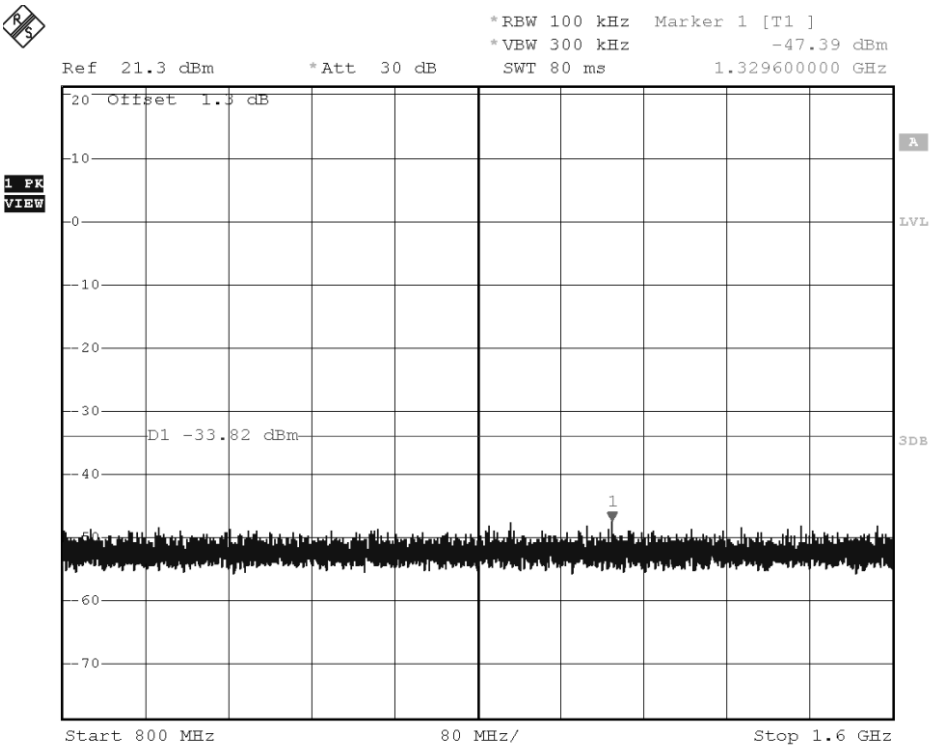


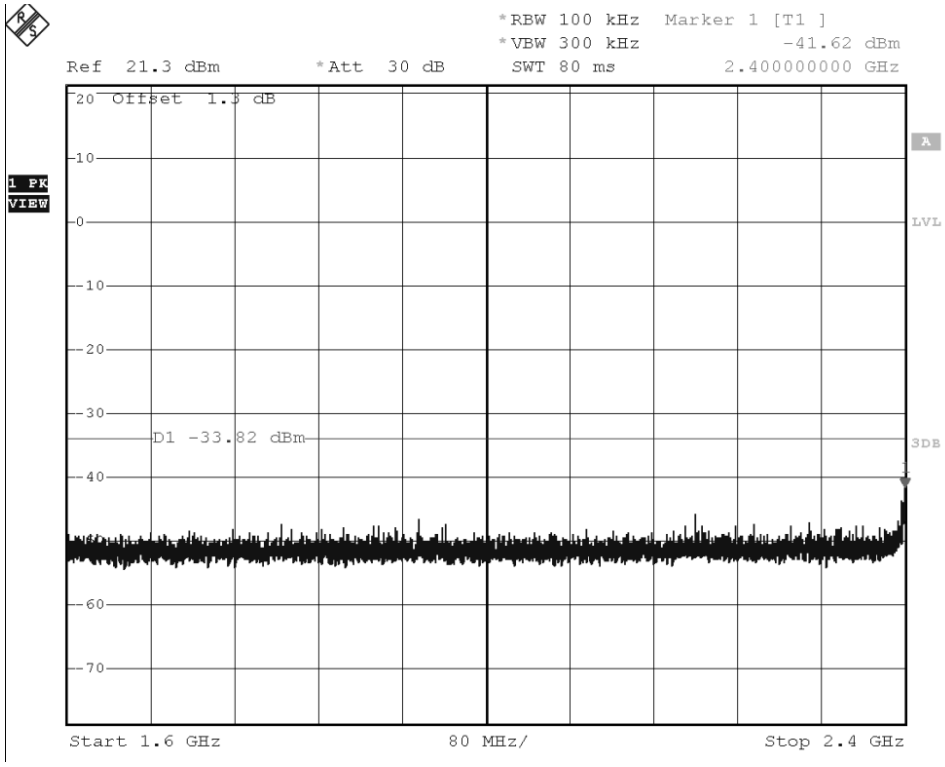

*RBW 1 MHz
*VBW 3 MHz
SWT 160 ms
Marker 1 [T1]
-36.00 dBm
16.148000000 GHz
Ref 20 dBm
*Att 30 dB
1 PK
VIEW
D1 -29.38 dBm
3DB
Start 10 GHz
800 MHz/
Stop 18 GHz

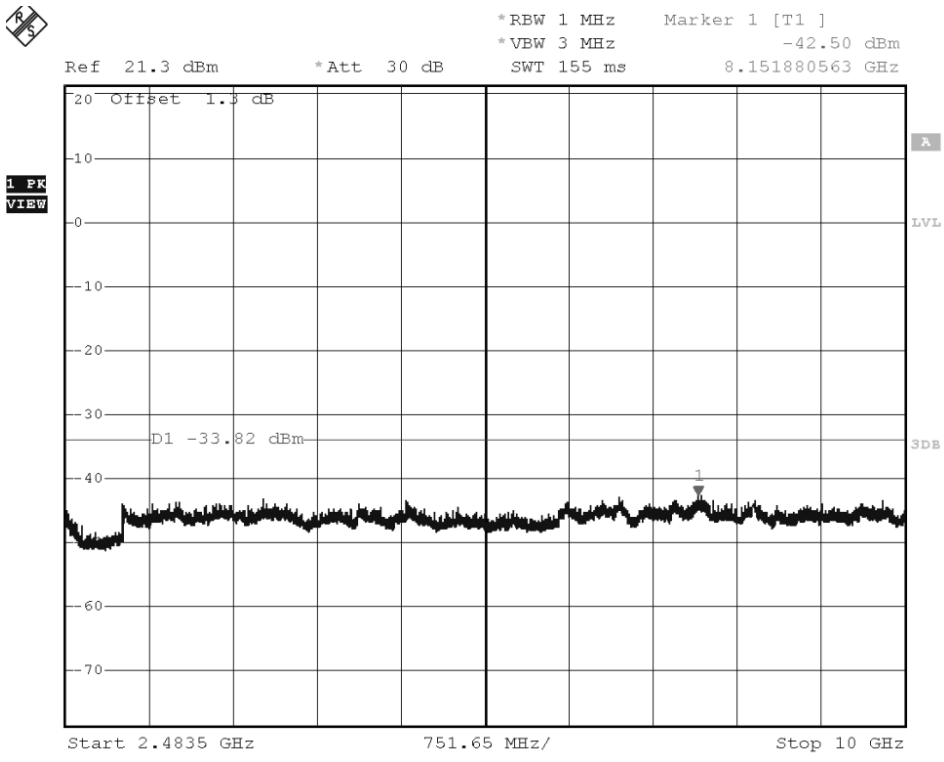

*RBW 1 MHz
*VBW 3 MHz
SWT 140 ms
Marker 1 [T1]
-32.51 dBm
24.237875000 GHz
Ref 20 dBm
*Att 30 dB
1 PK
VIEW
D1 -29.38 dBm
3DB
Start 18 GHz
700 MHz/
Stop 25 GHz

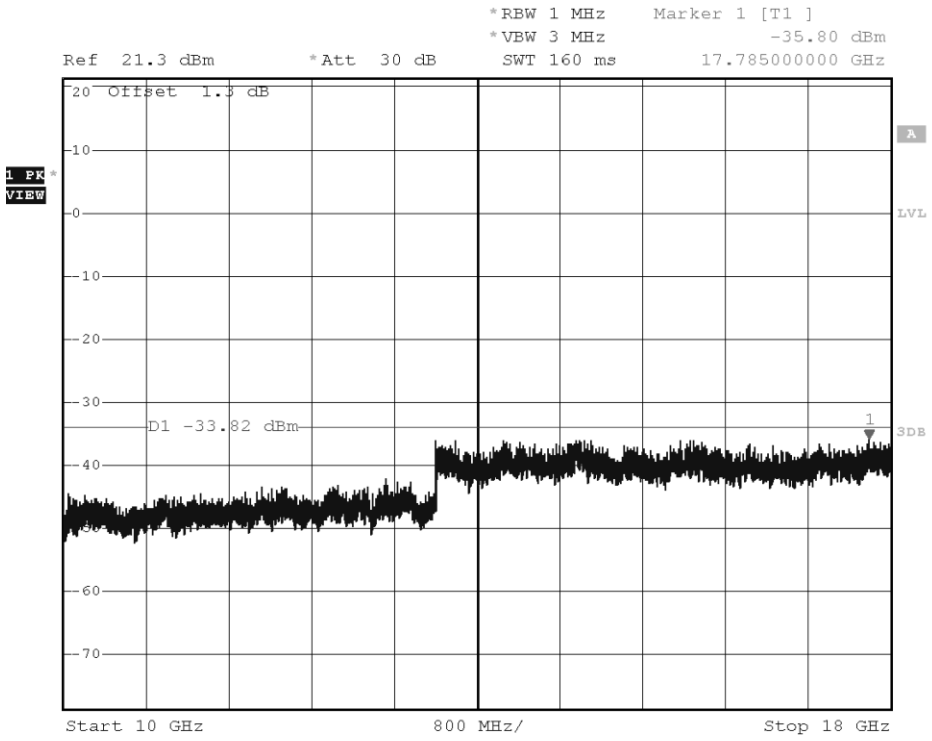
802.11 n-HT40
Channel 03 (2422MHz) Reference Level: -13.82dBm

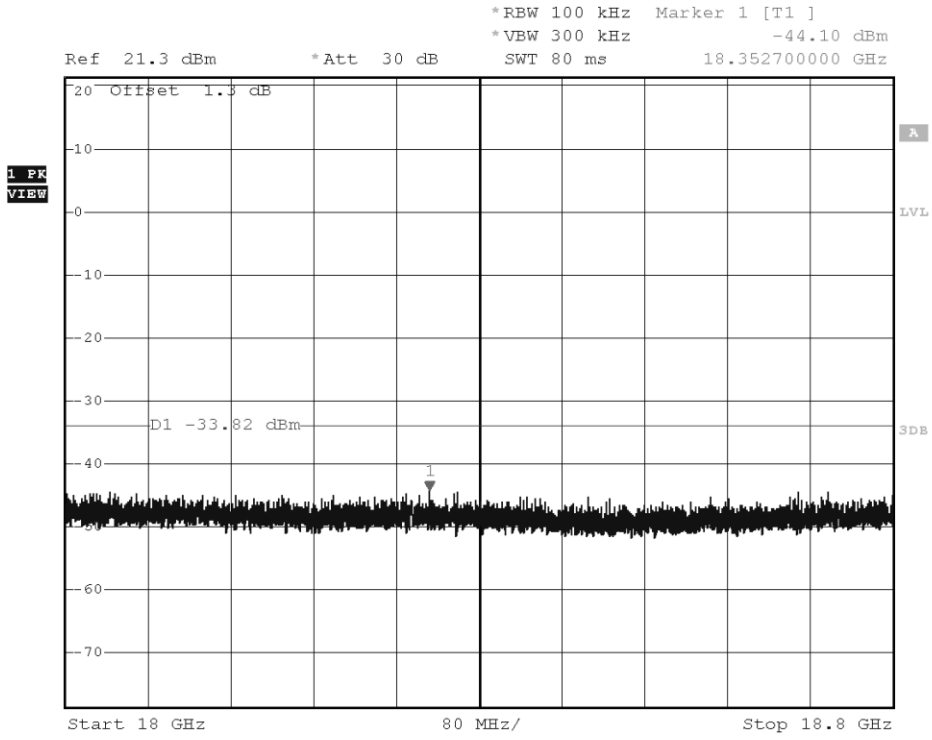


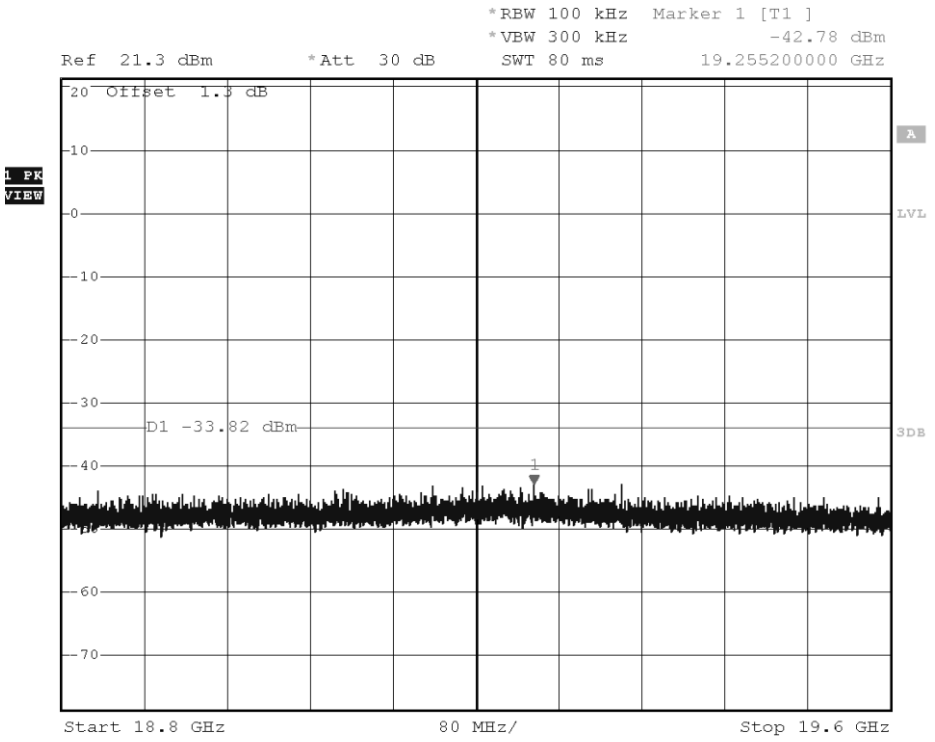


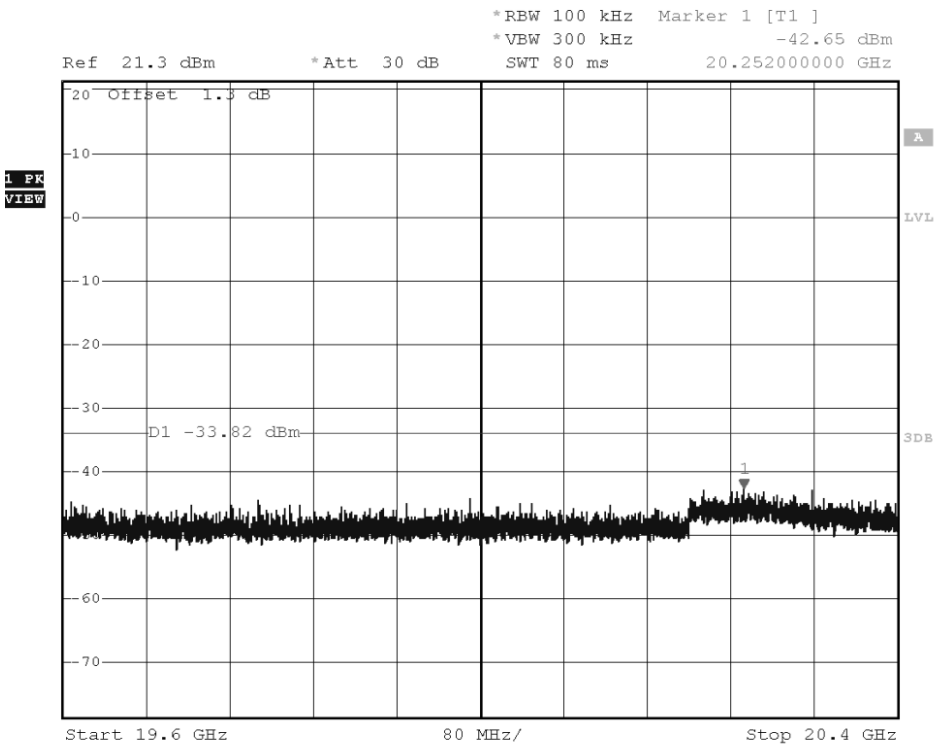

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-41.62 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
2.400000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 1.6 GHz
80 MHz/
Stop 2.4 GHz

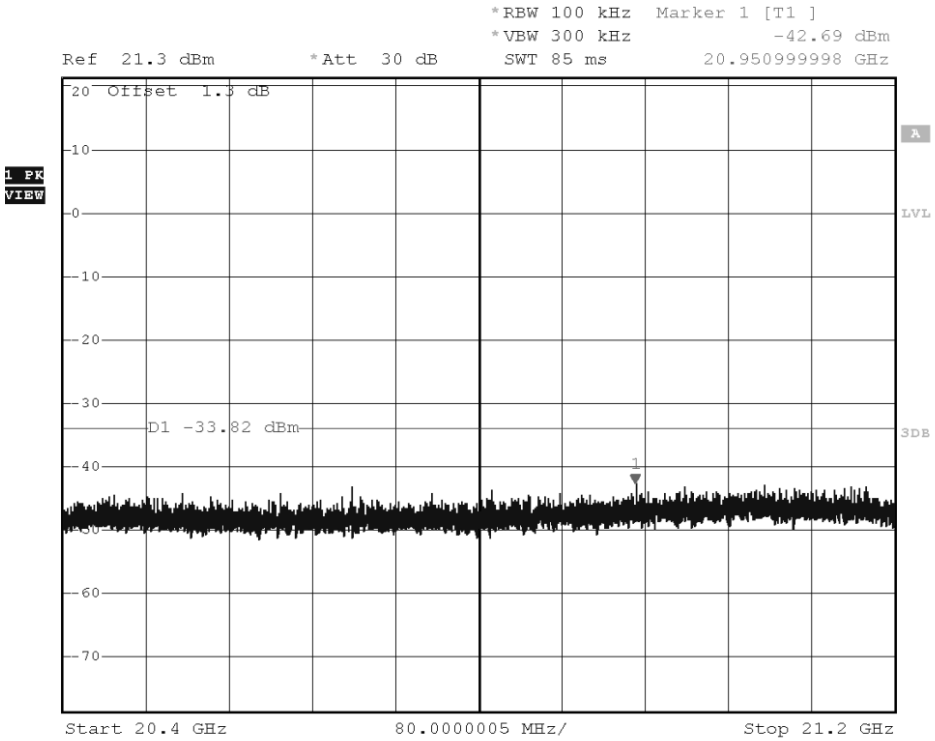

*RBW 1 MHz
Marker 1 [T1]
*VBW 3 MHz
-42.50 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 155 ms
8.151880563 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 2.4835 GHz
751.65 MHz/
Stop 10 GHz

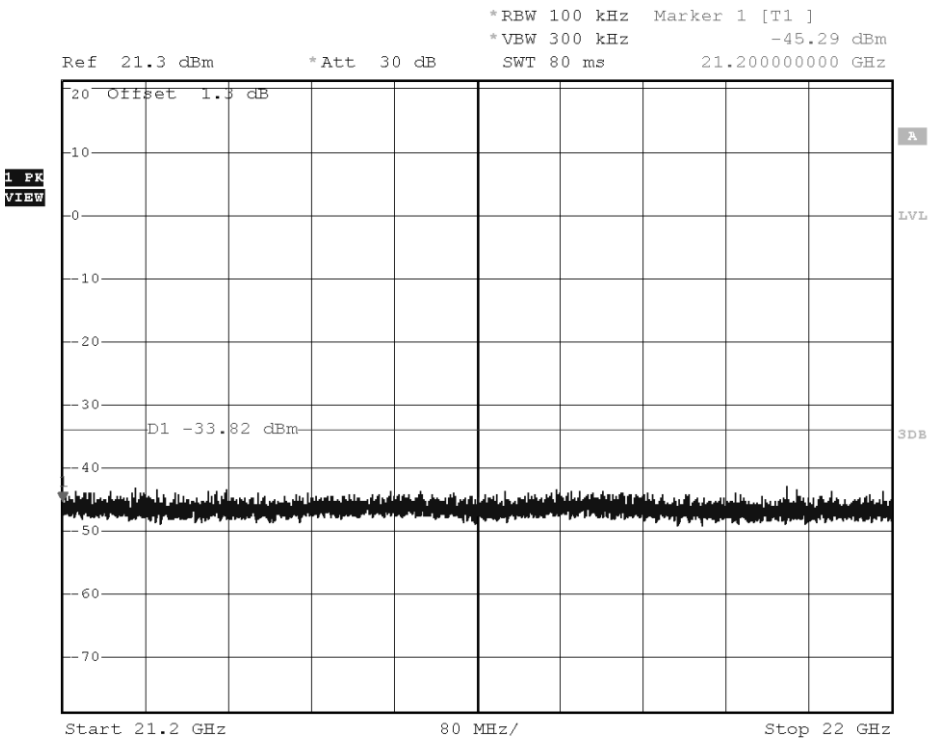

*RBW 1 MHz
*VBW 3 MHz
SWT 160 ms
Marker 1 [T1]
-35.80 dBm
17.785000000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK VIEW
D1 -33.82 dBm
A
LVL
3DB
Start 10 GHz
800 MHz/
Stop 18 GHz

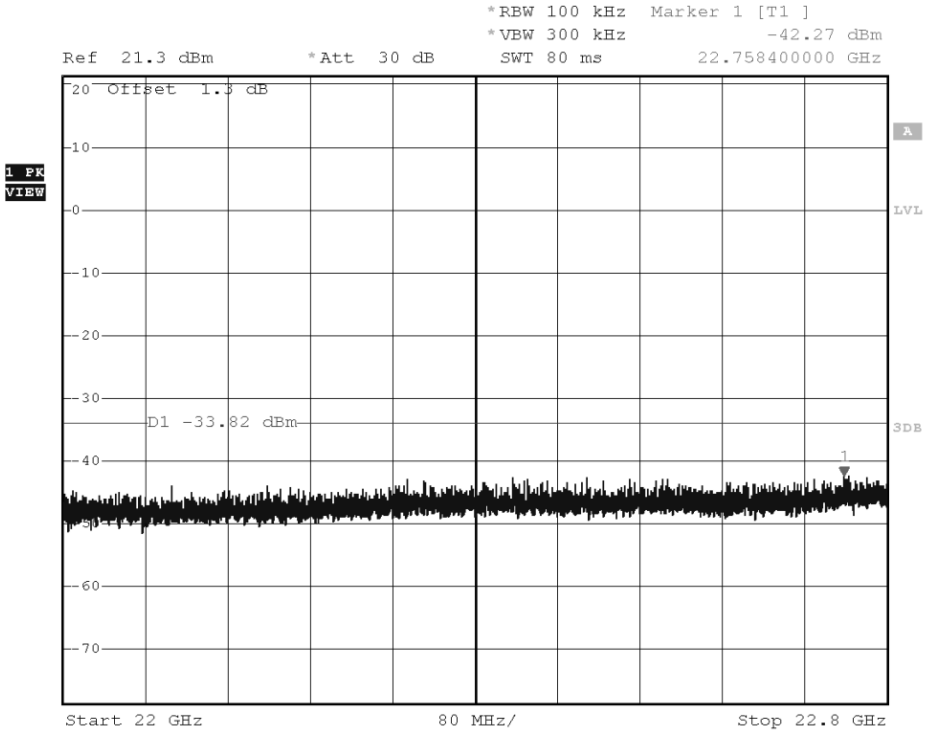

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-44.10 dBm
18.352700000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK VIEW
D1 -33.82 dBm
A
LVL
3DB
Start 18 GHz
80 MHz/
Stop 18.8 GHz

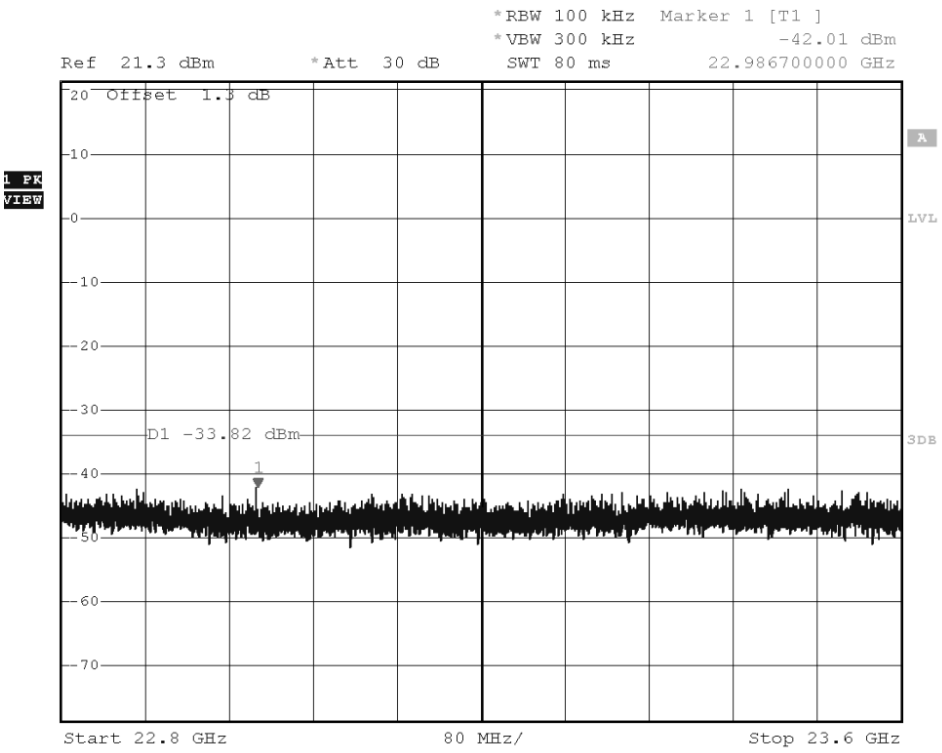

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-42.78 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
19.255200000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 18.8 GHz
80 MHz/
Stop 19.6 GHz

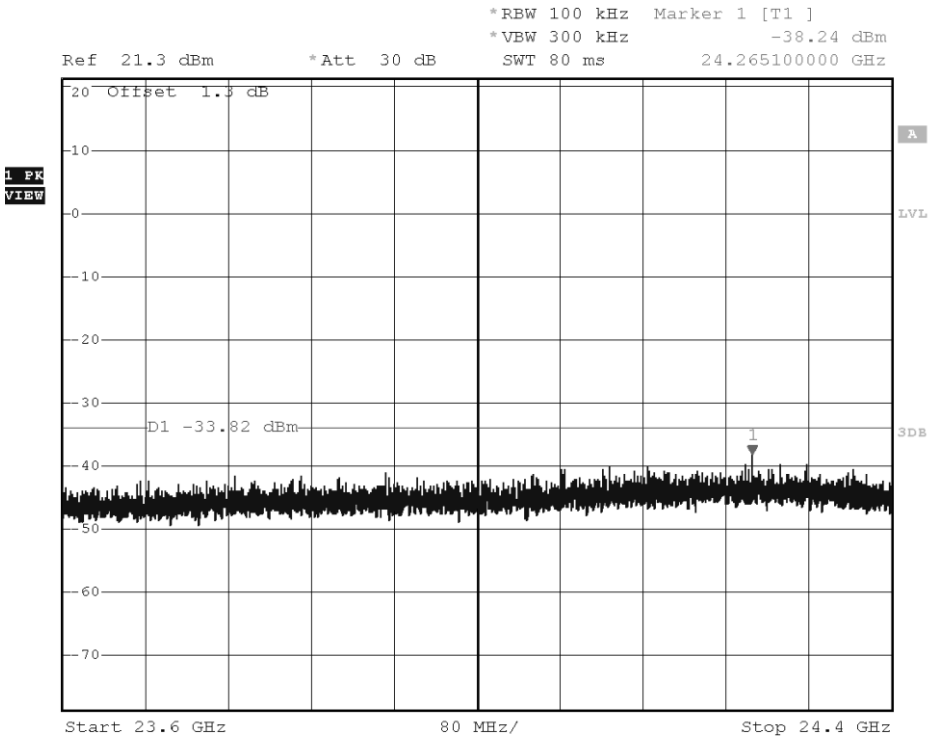

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-42.65 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
20.252000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 19.6 GHz
80 MHz/
Stop 20.4 GHz

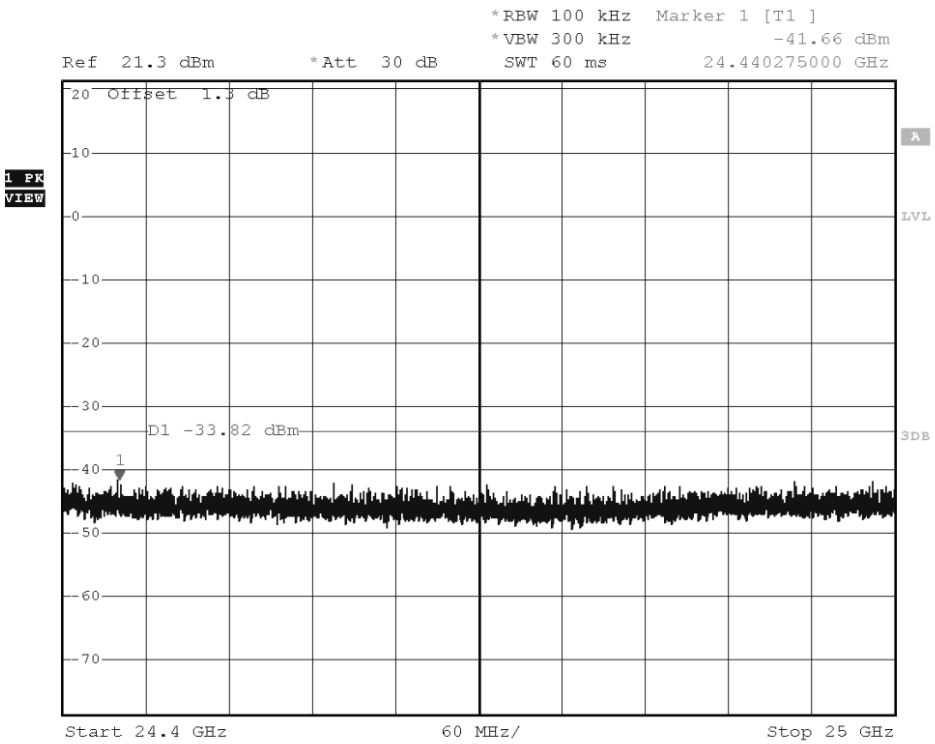

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-42.69 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 85 ms
20.950999998 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
1
Start 20.4 GHz
80.0000005 MHz/
Stop 21.2 GHz


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-45.29 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
21.200000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 21.2 GHz
80 MHz/
Stop 22 GHz

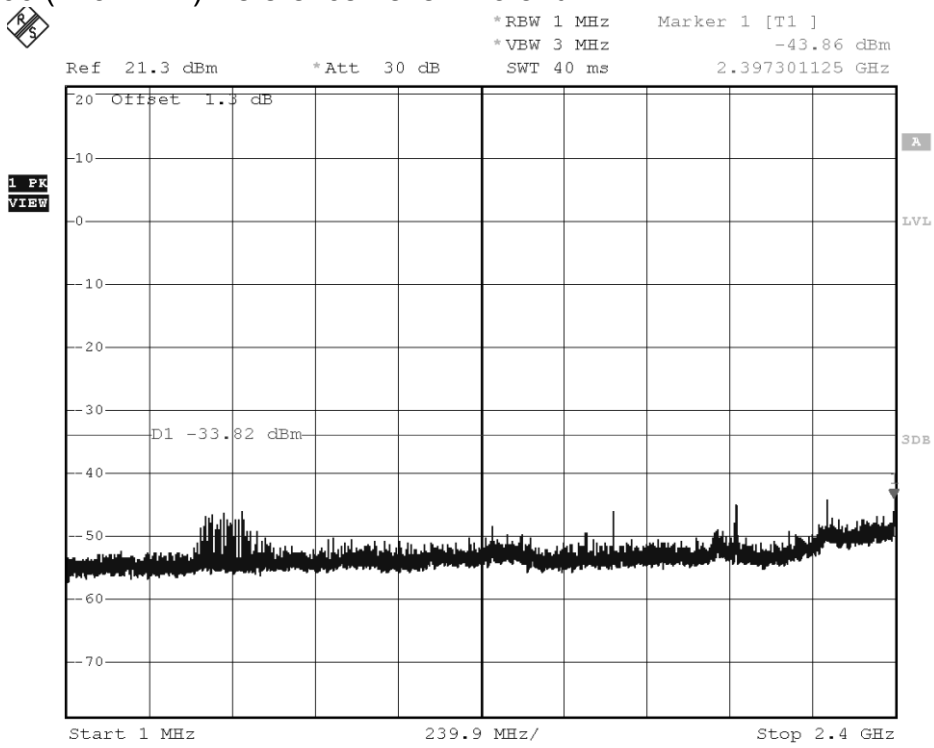

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-42.27 dBm
22.758400000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 22 GHz
80 MHz/
Stop 22.8 GHz

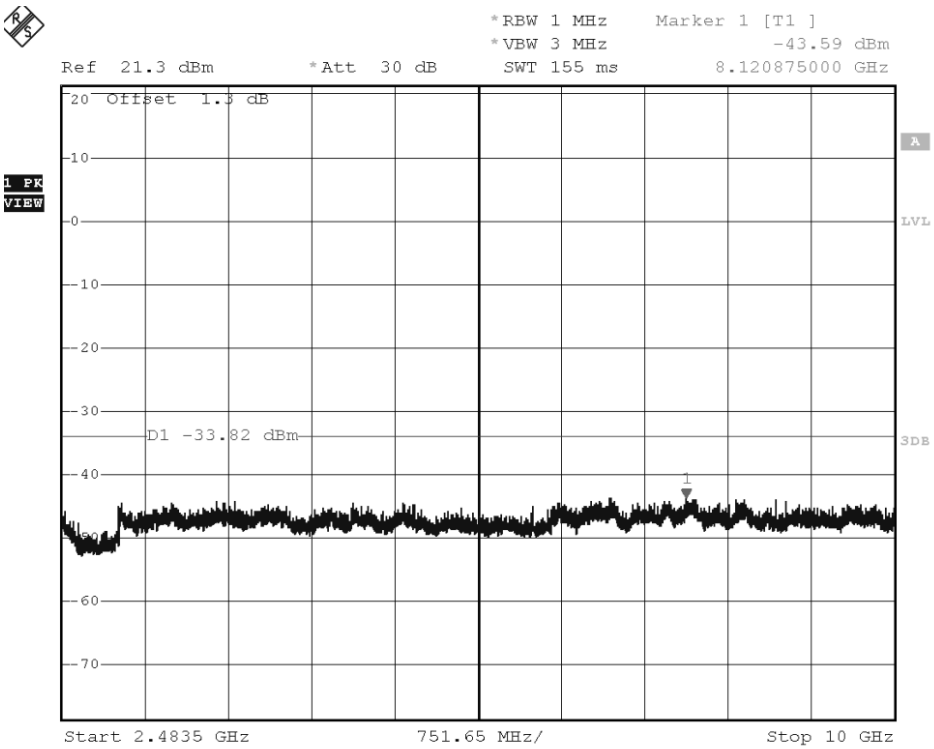

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-42.01 dBm
22.986700000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 22.8 GHz
80 MHz/
Stop 23.6 GHz

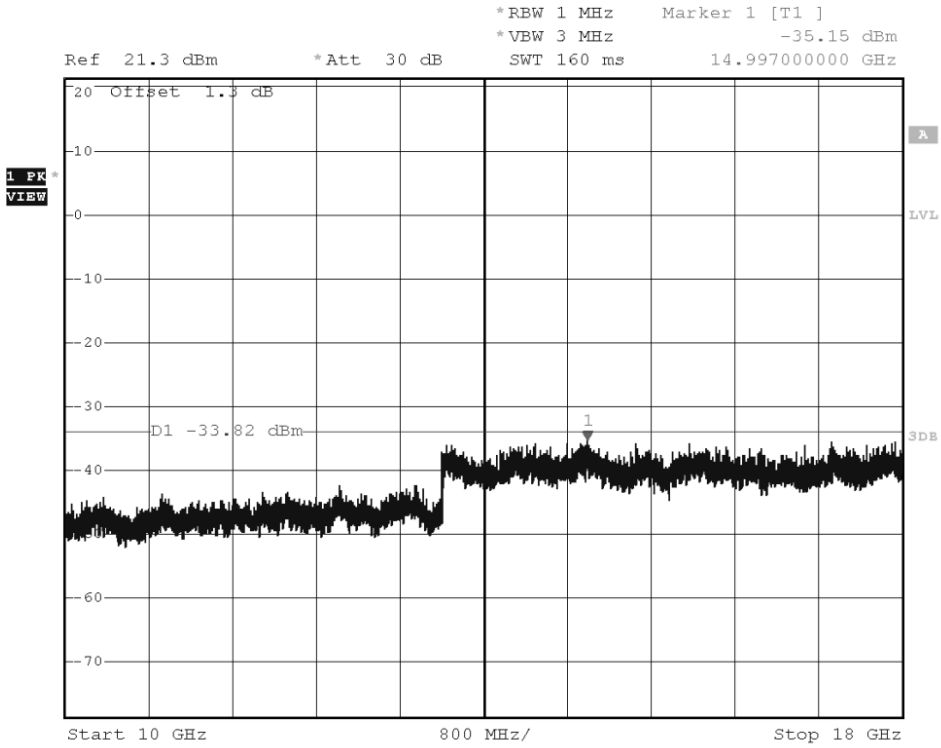

*RBW 100 kHz
*VBW 300 kHz
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
Marker 1 [T1]
-38.24 dBm
24.265100000 GHz
Offset 1.3 dB
1 PK
VIEW
D1 -33.82 dBm
A
LVL
3DB
Start 23.6 GHz
80 MHz/
Stop 24.4 GHz

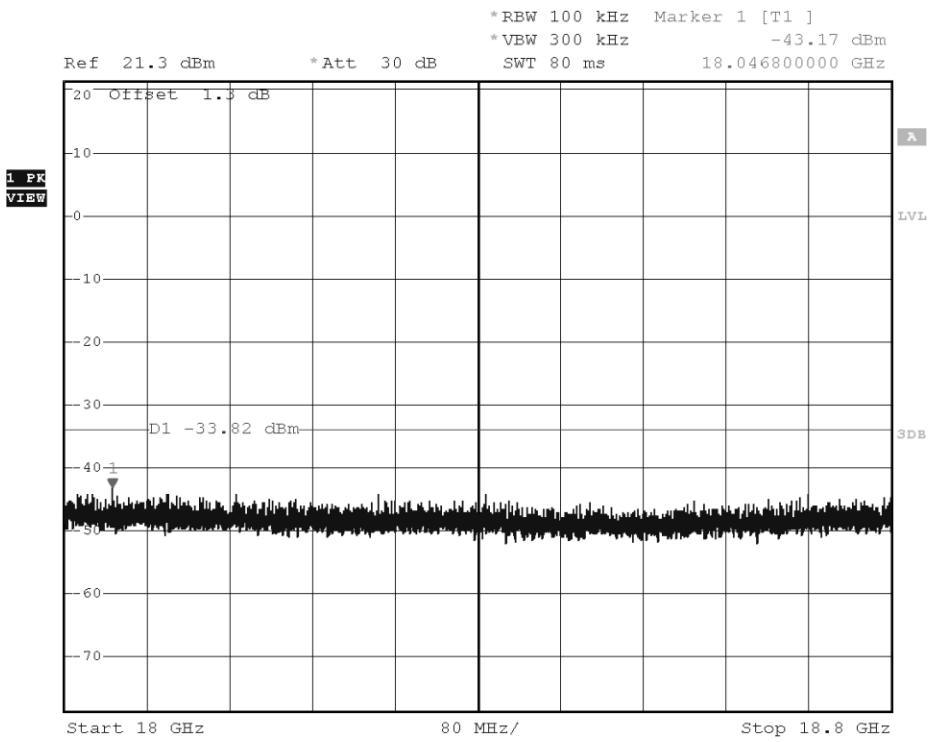

*RBW 100 kHz
*VBW 300 kHz
Ref 21.3 dBm
*Att 30 dB
SWT 60 ms
Marker 1 [T1]
-41.66 dBm
24.440275000 GHz
Offset 1.3 dB
1 PK
VIEW
D1 -33.82 dBm
A
LVL
3DB
Start 24.4 GHz
60 MHz/
Stop 25 GHz

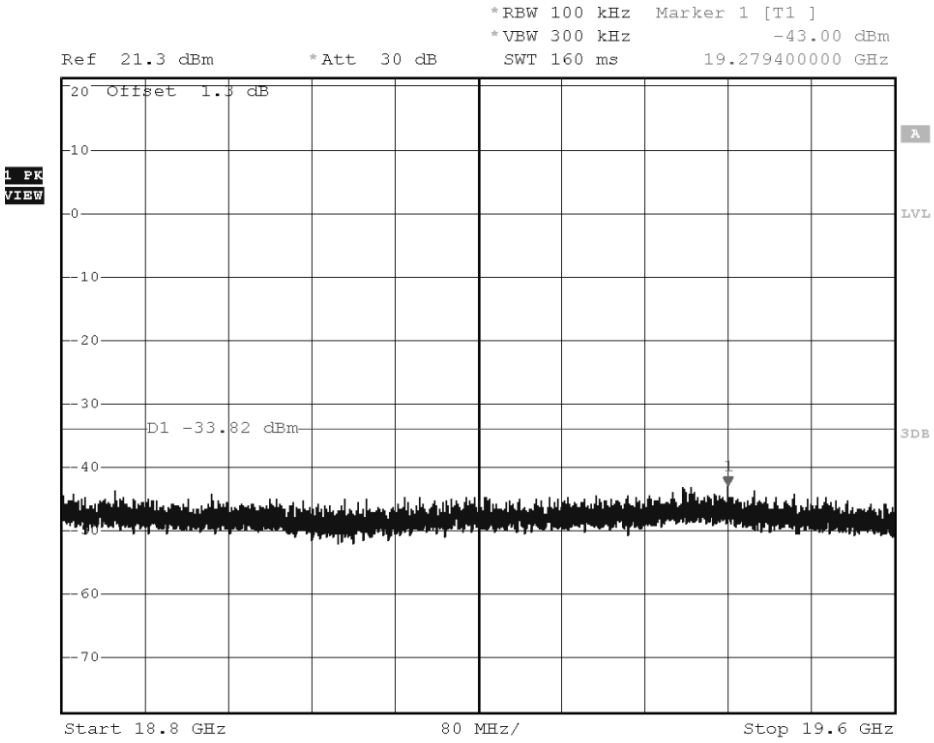
Channel 06 (2437MHz) Reference Level: -13.82dBm

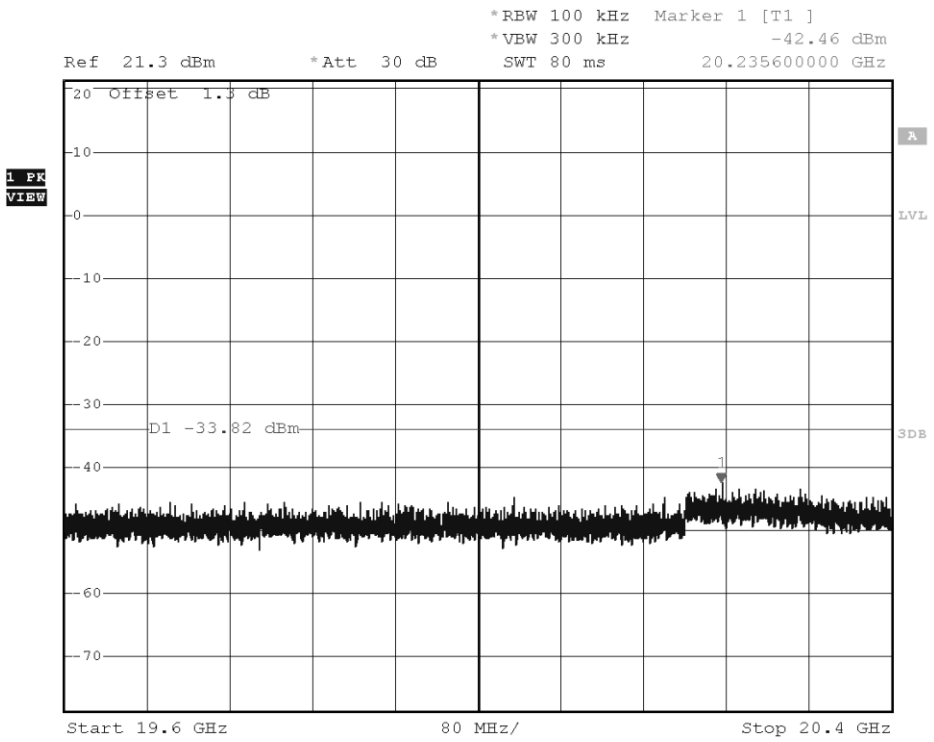


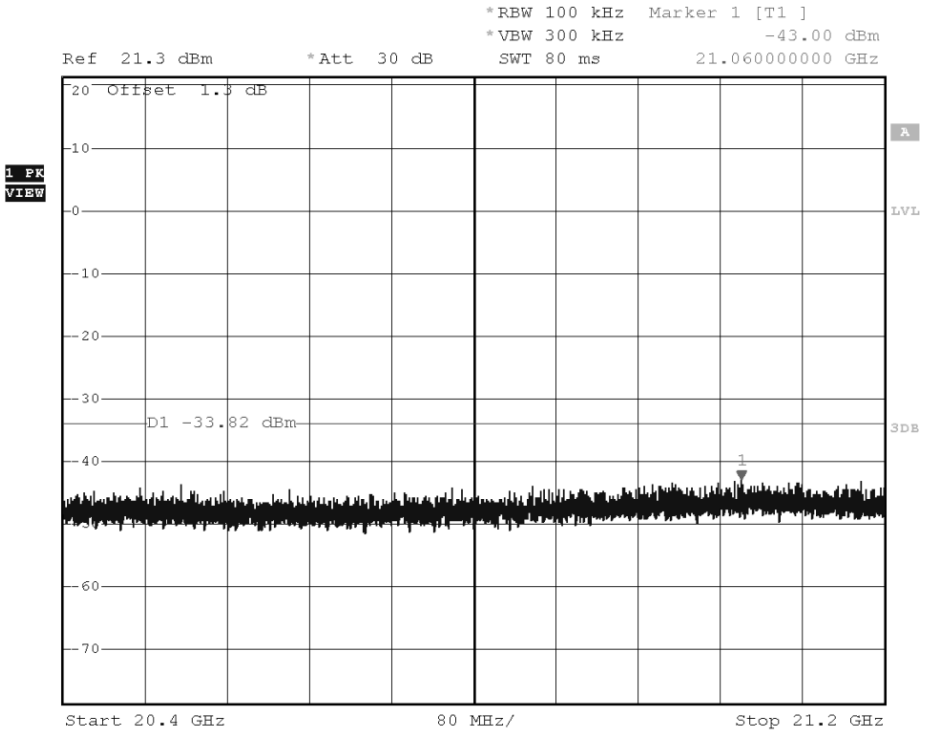


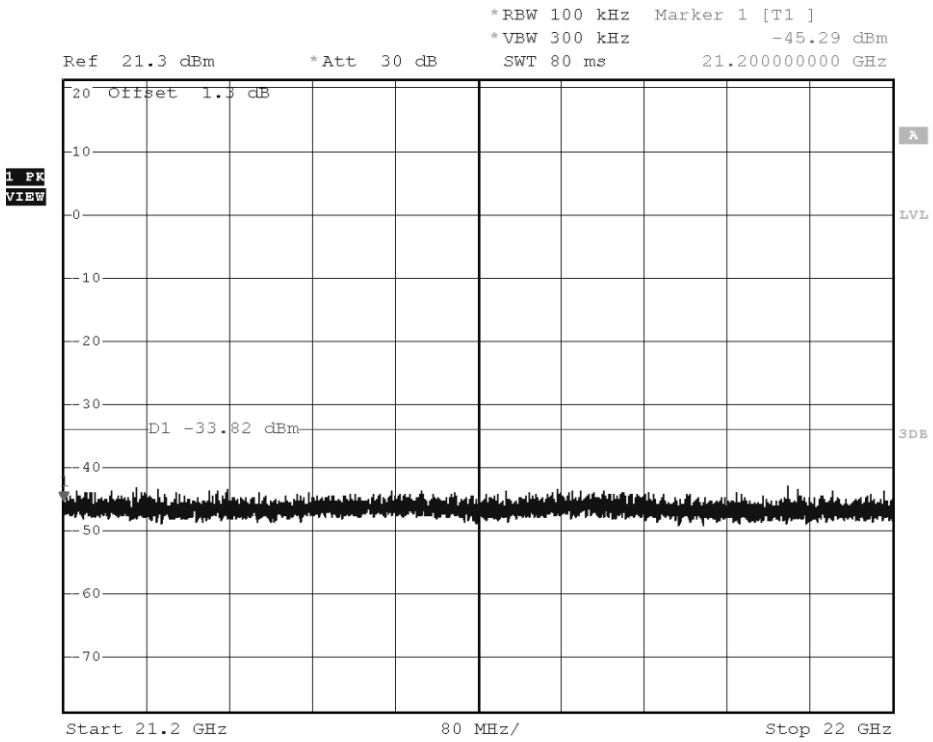

*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-35.15 dBm
14.997000000 GHz
Ref 21.3 dBm
*Att 30 dB
SWT 160 ms
Offset 1.5 dB
1 PK VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 10 GHz
800 MHz/
Stop 18 GHz

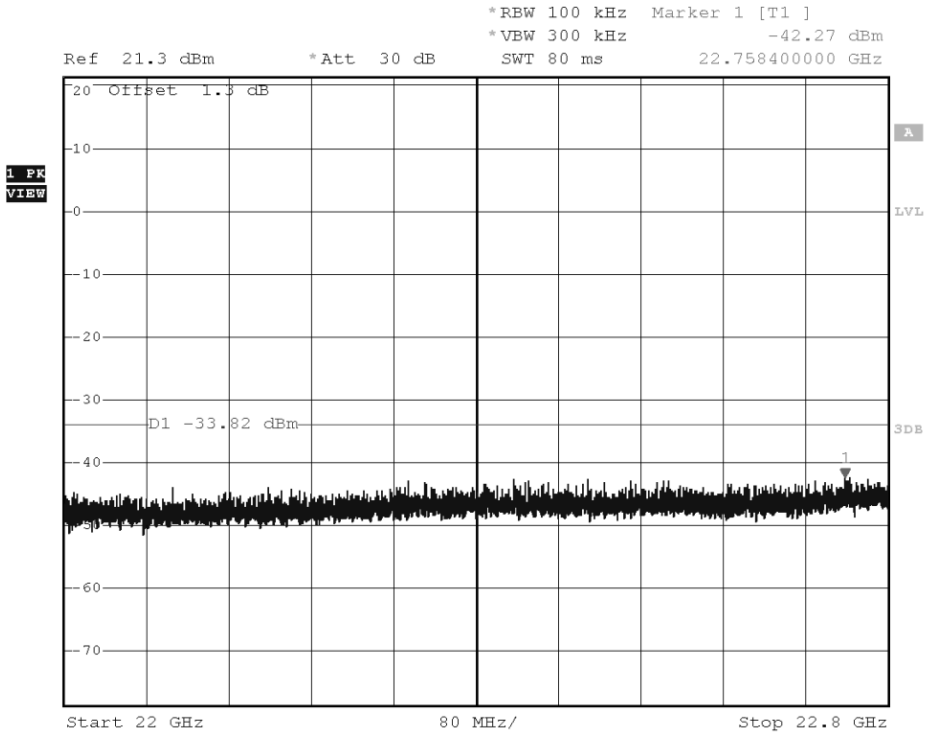

*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
-43.17 dBm
18.046800000 GHz
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
Offset 1.5 dB
1 PK VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 18 GHz
80 MHz/
Stop 18.8 GHz

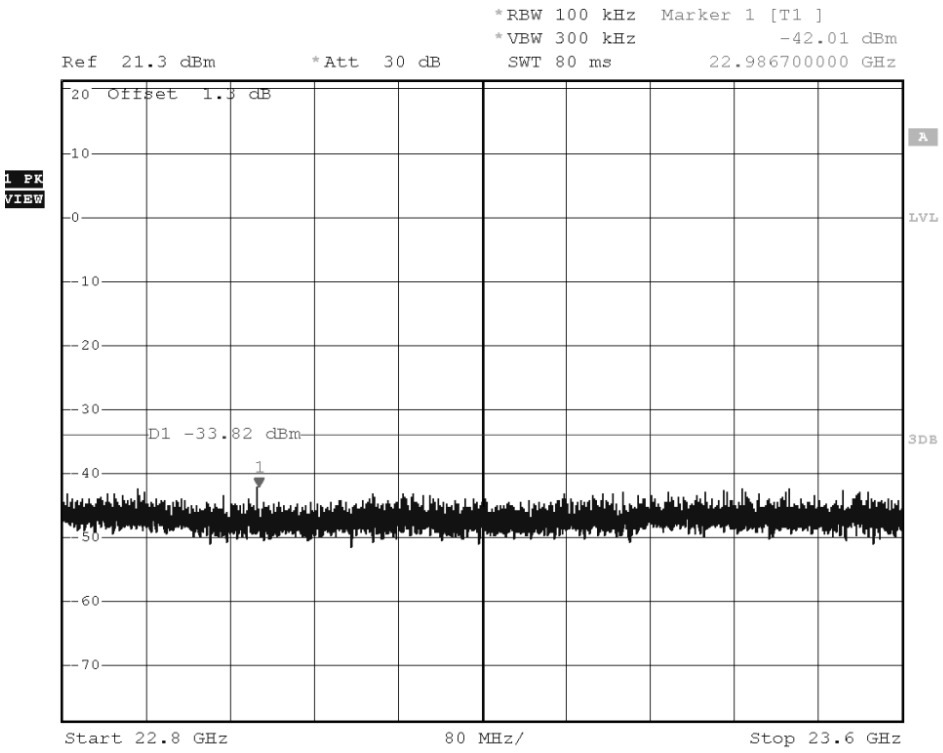

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-43.00 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 160 ms
19.279400000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 18.8 GHz
80 MHz/
Stop 19.6 GHz

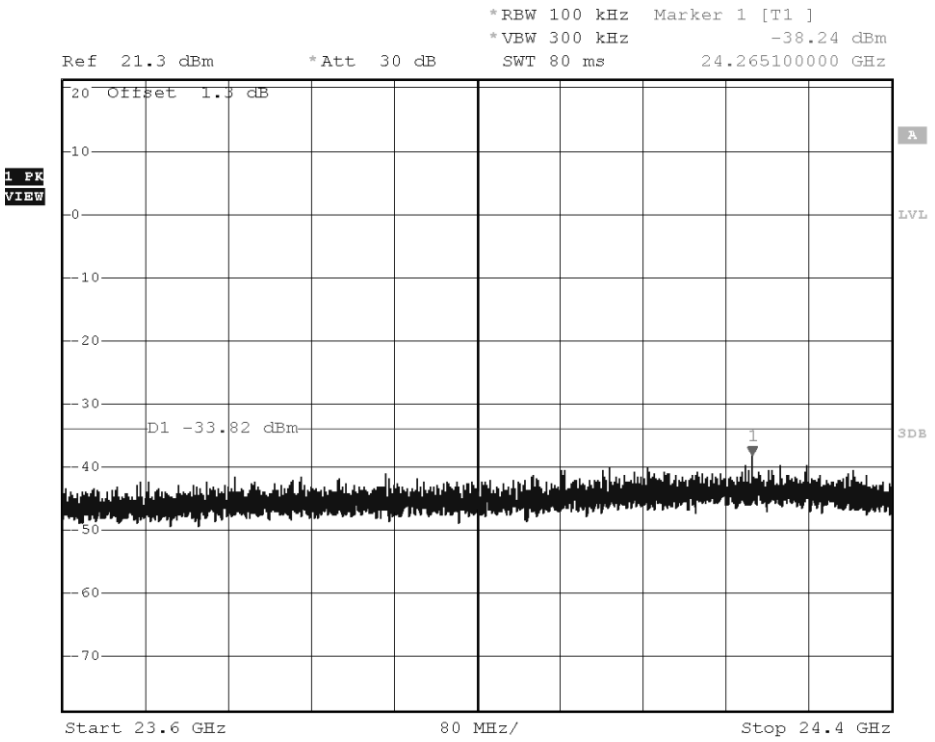

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-42.46 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
20.235600000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 19.6 GHz
80 MHz/
Stop 20.4 GHz

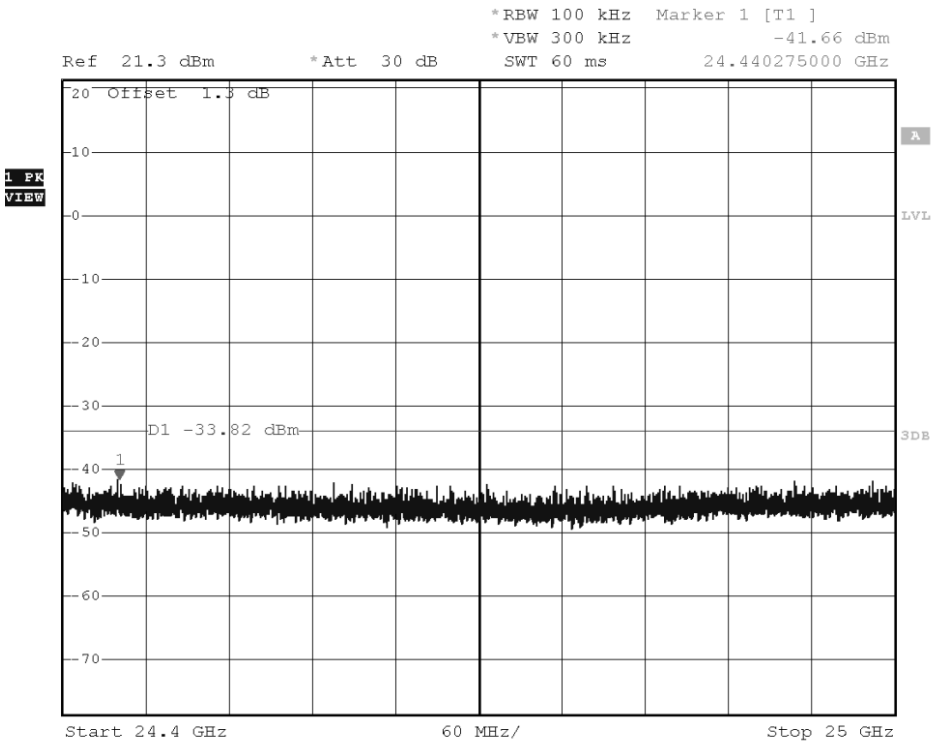

*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
-43.00 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
21.060000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 20.4 GHz
80 MHz/
Stop 21.2 GHz


*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
-45.29 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
21.200000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 21.2 GHz
80 MHz/
Stop 22 GHz

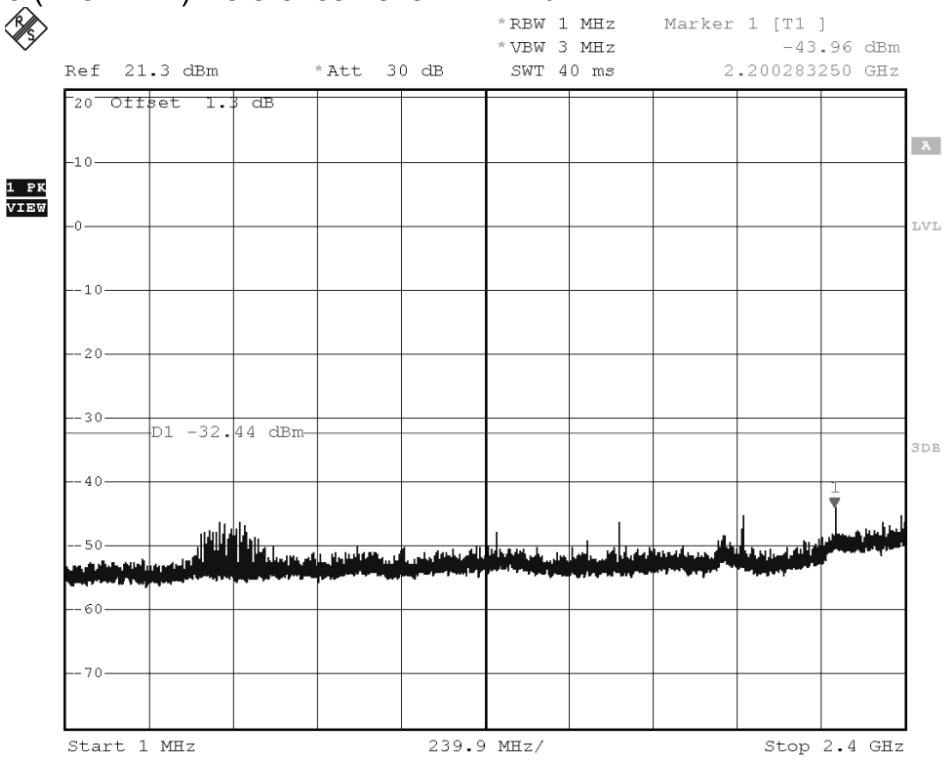

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-42.27 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
22.758400000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 22 GHz
80 MHz/
Stop 22.8 GHz

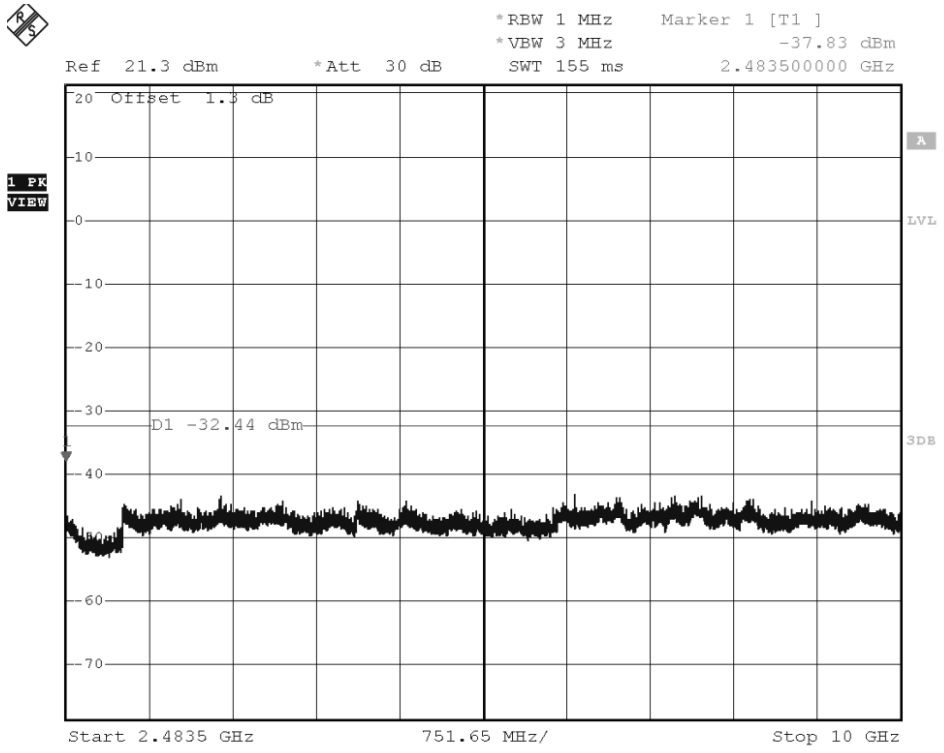

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-42.01 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
22.986700000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 22.8 GHz
80 MHz/
Stop 23.6 GHz

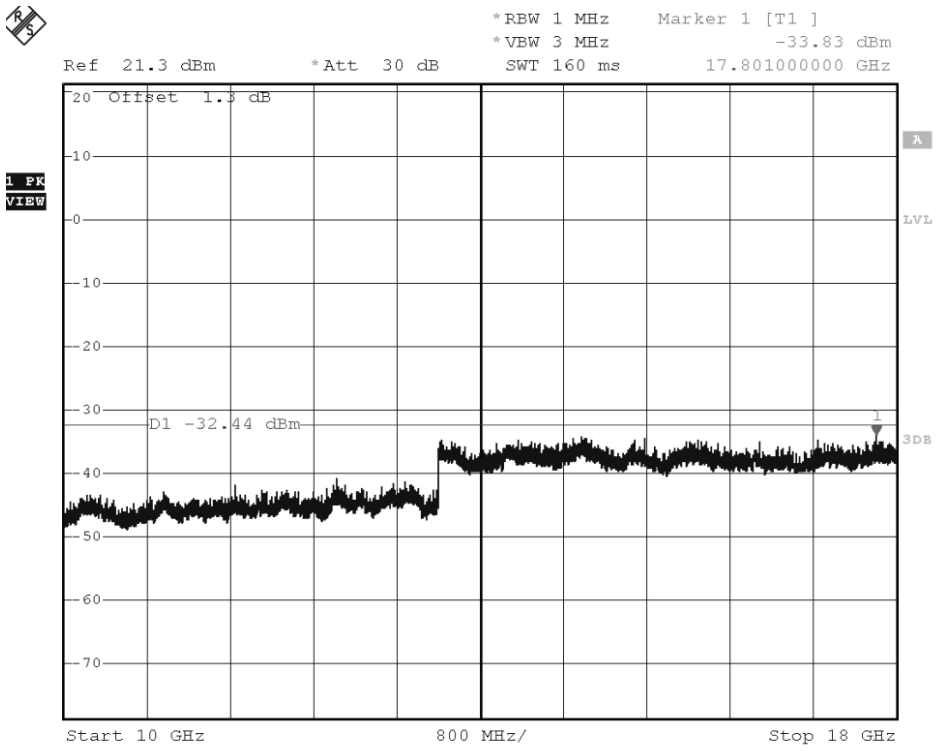

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-38.24 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
24.265100000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 23.6 GHz
80 MHz/
Stop 24.4 GHz

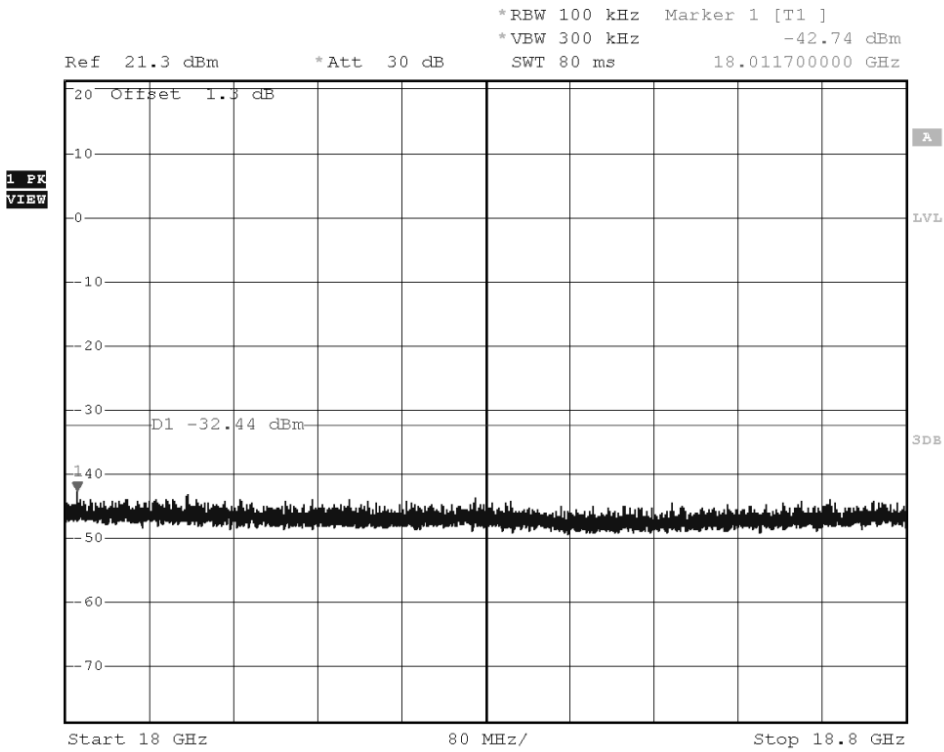

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-41.66 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 60 ms
24.440275000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -33.82 dBm
Start 24.4 GHz
60 MHz/
Stop 25 GHz

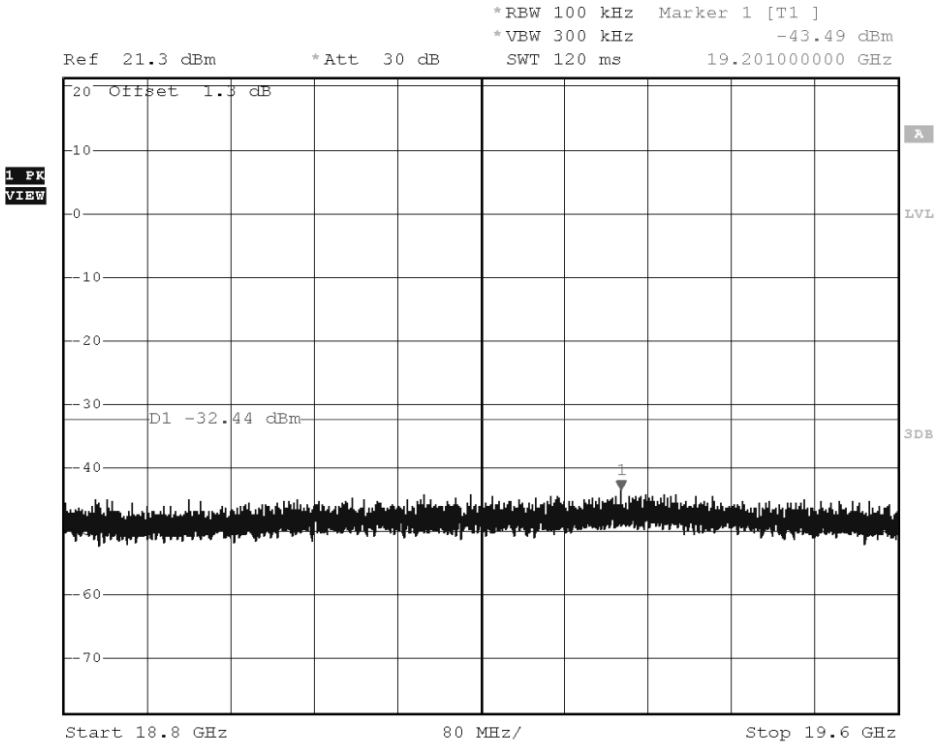
Channel 9 (2452MHz) Reference Level: -12.44dBm

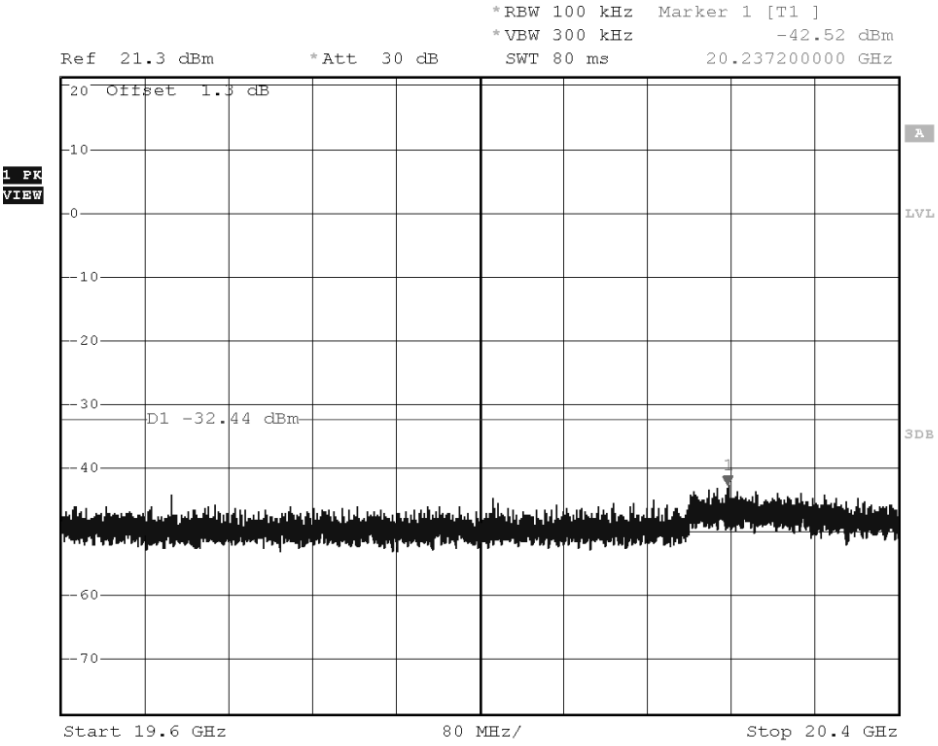


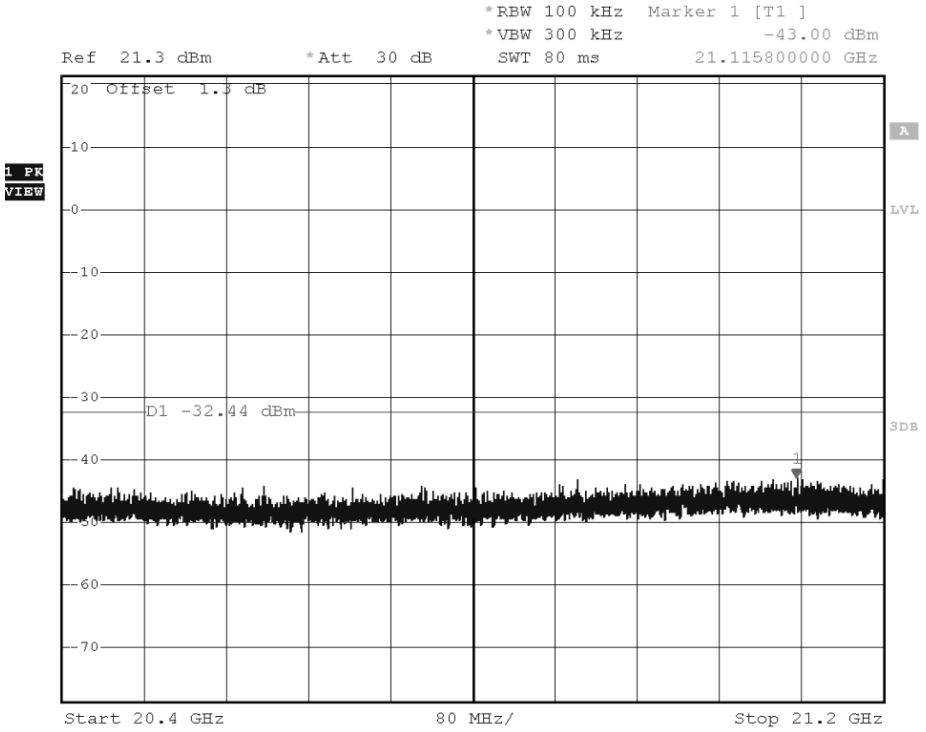


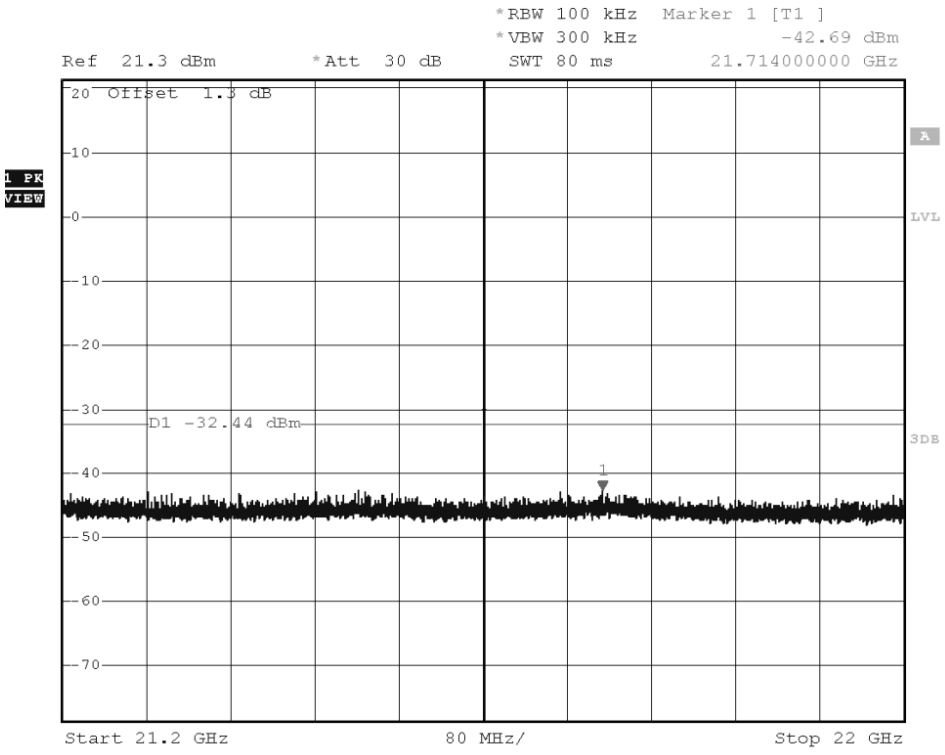

*RBW 1 MHz
*VBW 3 MHz
SWT 160 ms
Marker 1 [T1]
-33.83 dBm
17.801000000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -32.44 dBm
A
LVL
3DB
Start 10 GHz
800 MHz/
Stop 18 GHz

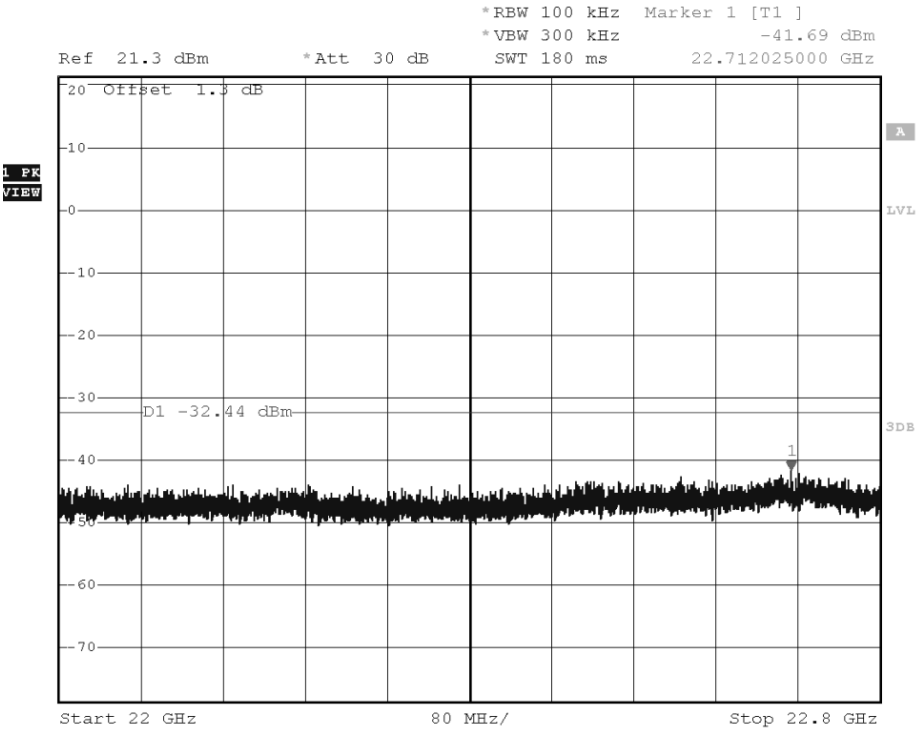

*RBW 100 kHz
*VBW 300 kHz
SWT 80 ms
Marker 1 [T1]
-42.74 dBm
18.011700000 GHz
Ref 21.3 dBm
*Att 30 dB
Offset 1.3 dB
1 PK
VIEW
D1 -32.44 dBm
A
LVL
3DB
Start 18 GHz
80 MHz/
Stop 18.8 GHz

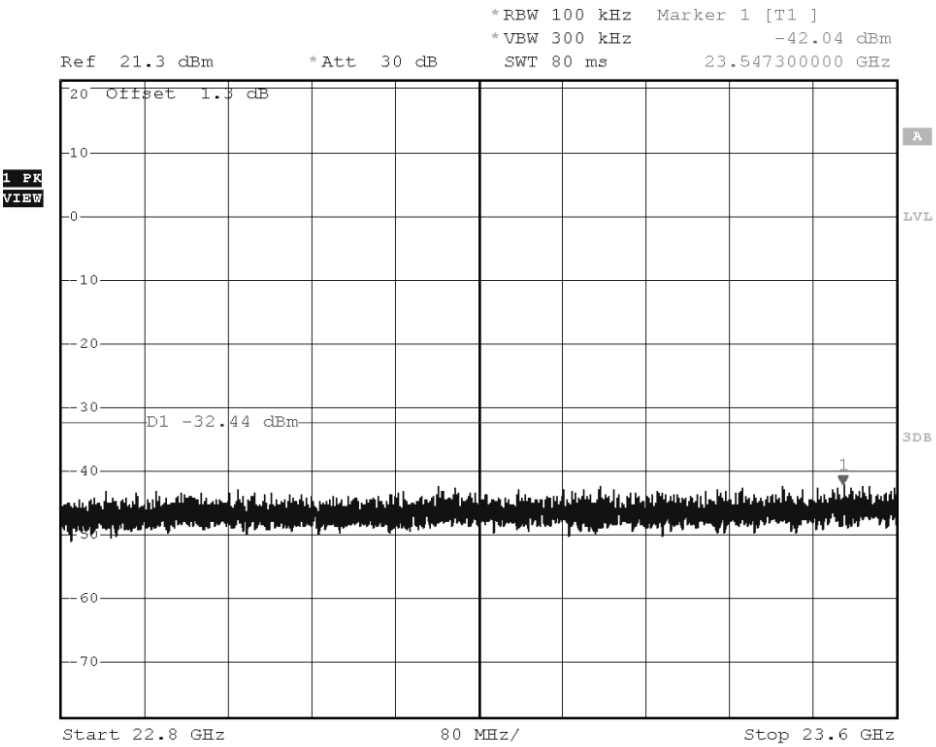

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-43.49 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 120 ms
19.201000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.44 dBm
Start 18.8 GHz
80 MHz/
Stop 19.6 GHz

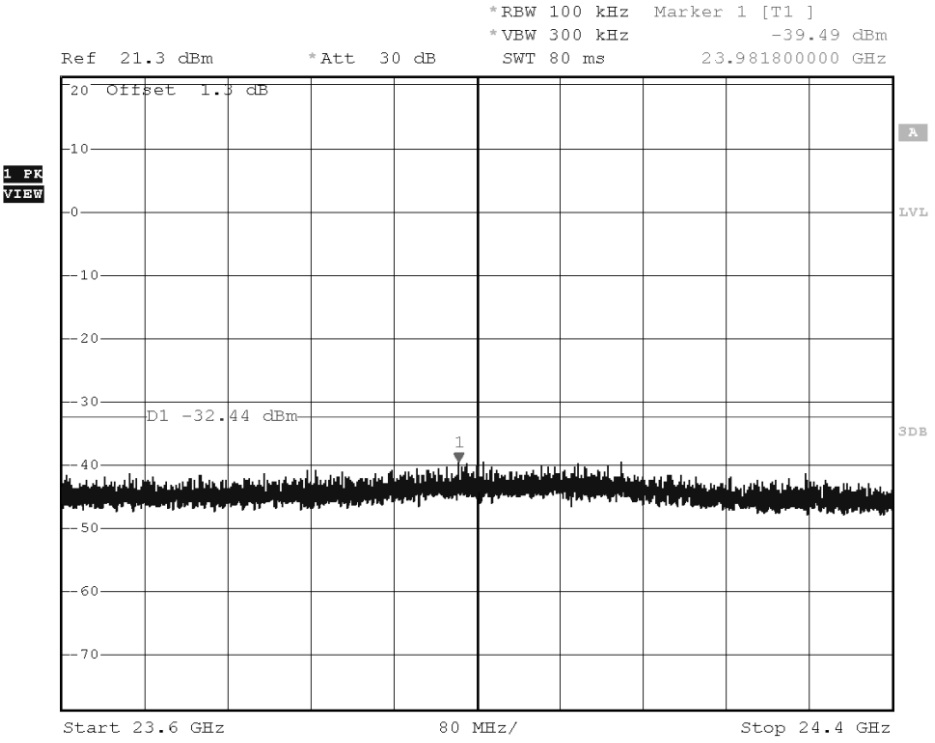

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-42.52 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
20.237200000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.44 dBm
Start 19.6 GHz
80 MHz/
Stop 20.4 GHz

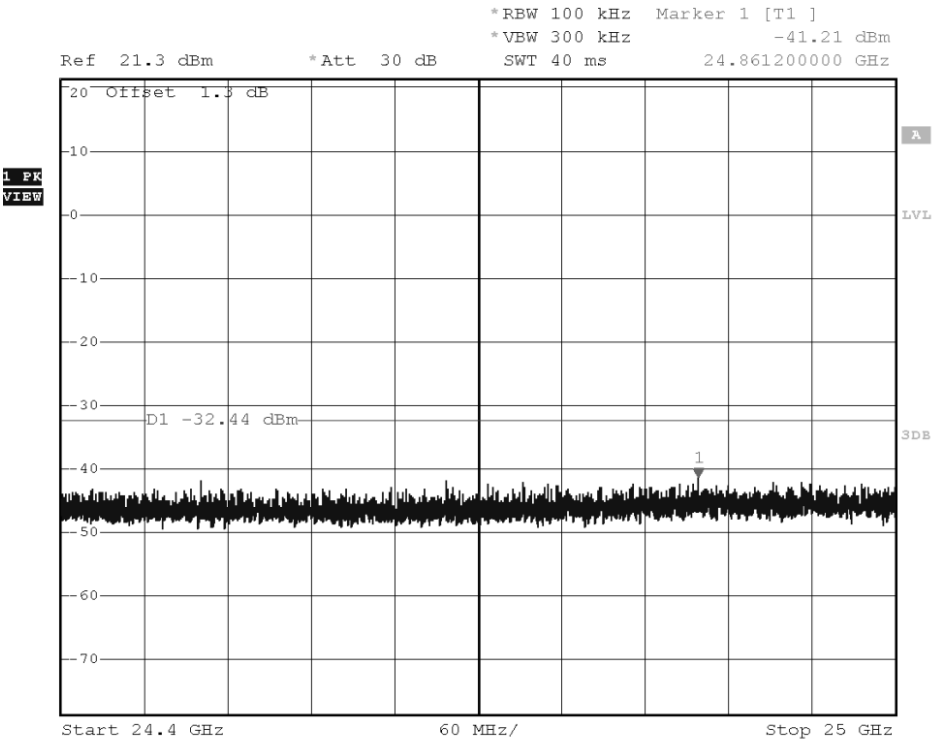

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-43.00 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
21.115800000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.44 dBm
Start 20.4 GHz
80 MHz/
Stop 21.2 GHz


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-42.69 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
21.714000000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.44 dBm
Start 21.2 GHz
80 MHz/
Stop 22 GHz


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-41.69 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 180 ms
22.712025000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.44 dBm
1
Start 22 GHz
80 MHz/
Stop 22.8 GHz


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-42.04 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
23.547300000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.44 dBm
1
Start 22.8 GHz
80 MHz/
Stop 23.6 GHz


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-39.49 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 80 ms
23.981800000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.44 dBm
Start 23.6 GHz
80 MHz/
Stop 24.4 GHz


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-41.21 dBm
Ref 21.3 dBm
*Att 30 dB
SWT 40 ms
24.861200000 GHz
Offset 1.3 dB
1 PK
VIEW
A
LVL
3DB
D1 -32.44 dBm
Start 24.4 GHz
60 MHz/
Stop 25 GHz

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02

4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

[×] Not required, since all emissions are more than 20dB below fundamental
[ ] See attached data sheet

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b), (c):

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02

4.7 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD

Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD

Example
Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB. The net field strength for comparison to the appropriate emission limit is 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB
FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 dBμV/m

Level in mV/m = Common Antilogarithm [(42 dBμV/m)/20] = 125.9 μV/m

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02

4.8 Radiated Spurious Emission

Worst Case Radiated Spurious Emission (802.11 n-HT20) at 211.912MHz is passed by 2.3 dB margin.

For the electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Worst Case Operating Mode: 802.11 n-HT20 (TX-Channel 01)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	211.912	55.1	20.0	6.1	41.2	43.5	-2.3
Horizontal	320.030	47.3	20.0	10.3	37.6	46.0	-8.4
Horizontal	556.225	42.0	20.0	13.9	35.9	46.0	-10.1
Vertical	50.015	46.8	20.0	9.8	36.6	40.0	-3.4
Vertical	209.935	50.7	20.0	6.8	37.5	43.5	-6.0
Vertical	546.040	41.7	20.0	16.3	38.0	46.0	-8.0

NOTES: 1. Quasi-Peak detector is used except for others stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. All emissions are below the QP limit.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11b (TX-Channel 01)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	53.8	36.1	34.1	51.8	74.0	-22.2
Horizontal	*2387.000	64.1	36.8	26.5	53.8	74.0	-20.2

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	42.2	36.1	34.1	40.2	54.0	-13.8
Horizontal	*2387.000	58.7	36.8	26.5	48.4	54.0	-5.6

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11b (TX-Channel 06)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	54.5	36.1	34.5	52.9	74.0	-21.1
Horizontal	*7311.000	55.4	35.6	37.1	56.9	74.0	-17.1

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	46.2	36.1	34.5	44.6	54.0	-9.4
Horizontal	*7311.000	40.2	35.6	37.1	41.7	54.0	-12.3

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11b (TX-Channel 11)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	54.1	36.1	34.7	52.7	74.0	-21.3
Horizontal	*2483.550	51.1	35.6	39.5	55.0	74.0	-19.0

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	45.2	36.1	34.7	43.8	54.0	-10.2
Horizontal	*2483.550	42.9	35.6	39.5	46.8	54.0	-7.2

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11g (TX-Channel 01)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	52.8	36.1	34.1	50.8	74.0	-23.2
Horizontal	*2388.836	60.3	36.8	26.5	50.0	74.0	-24.0

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	37.4	36.1	34.1	35.4	54.0	-18.6
Horizontal	*2388.836	43.9	36.8	26.5	33.6	54.0	-20.4

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11g (TX-Channel 06)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	52.7	36.1	34.5	51.1	74.0	-22.9
Horizontal	*7311.000	55.5	35.6	37.1	57.0	74.0	-17.0

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	37.2	36.1	34.5	35.6	54.0	-18.4
Horizontal	*7311.000	40.0	35.6	37.1	41.5	54.0	-12.5

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11g (TX-Channel 11)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	53.4	36.1	34.7	52.0	74.0	-22.0
Horizontal	*2483.612	47.0	35.6	39.5	50.9	74.0	-23.1

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	37.6	36.1	34.7	36.2	54.0	-17.8
Horizontal	*2483.612	31.3	35.6	39.5	35.2	54.0	-18.8

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11 n-HT20 (TX-Channel 01)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	53.1	36.1	34.1	51.1	74.0	-22.9
Horizontal	*2389.154	61.9	36.8	26.5	51.6	74.0	-22.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	37.2	36.1	34.1	35.2	54.0	-18.8
Horizontal	*2389.154	44.9	36.8	26.5	34.6	54.0	-19.4

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11 n-HT20 (TX-Channel 06)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	53.9	36.1	34.5	52.3	74.0	-21.7
Horizontal	*7311.000	55.4	35.6	37.1	56.9	74.0	-17.1

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	37.4	36.1	34.5	35.8	54.0	-18.2
Horizontal	*7311.000	40.2	35.6	37.1	41.7	54.0	-12.3

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11 n-HT20 (TX-Channel 11)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	53.4	36.1	34.7	52.0	74.0	-22.0
Horizontal	*2483.521	46.2	35.6	39.5	50.1	74.0	-23.9

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	36.8	36.1	34.7	35.4	54.0	-18.6
Horizontal	*2483.521	30.0	35.6	39.5	33.9	54.0	-20.1

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11 n-HT40 (TX-Channel 03)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4844.000	52.5	36.1	34.1	50.5	74.0	-23.5
Horizontal	*2389.920	71.3	36.8	26.5	61.0	74.0	-13.0

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4844.000	37.2	36.1	34.1	35.2	54.0	-18.8
Horizontal	*2389.920	54.6	36.8	26.5	44.3	54.0	-9.7

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11 n-HT40 (TX-Channel 06)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	52.7	36.1	34.5	51.1	74.0	-22.9
Horizontal	*7311.000	56.4	35.6	37.1	57.9	74.0	-16.1

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	36.9	36.1	34.5	35.3	54.0	-18.7
Horizontal	*7311.000	41.1	35.6	37.1	42.6	54.0	-11.4

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Sky Light Imaging Limited
Date of Test: May 25, 2014
Model: TSN47W+TSNA02
Mode: 802.11 n-HT40 (TX-Channel 9)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4904.000	53.7	36.1	34.7	52.3	74.0	-21.7
Horizontal	*2483.521	55.3	35.6	39.5	59.2	74.0	-14.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4904.000	38.1	36.1	34.7	36.7	54.0	-17.3
Horizontal	*2483.521	39.4	35.6	39.5	43.3	54.0	-10.7

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

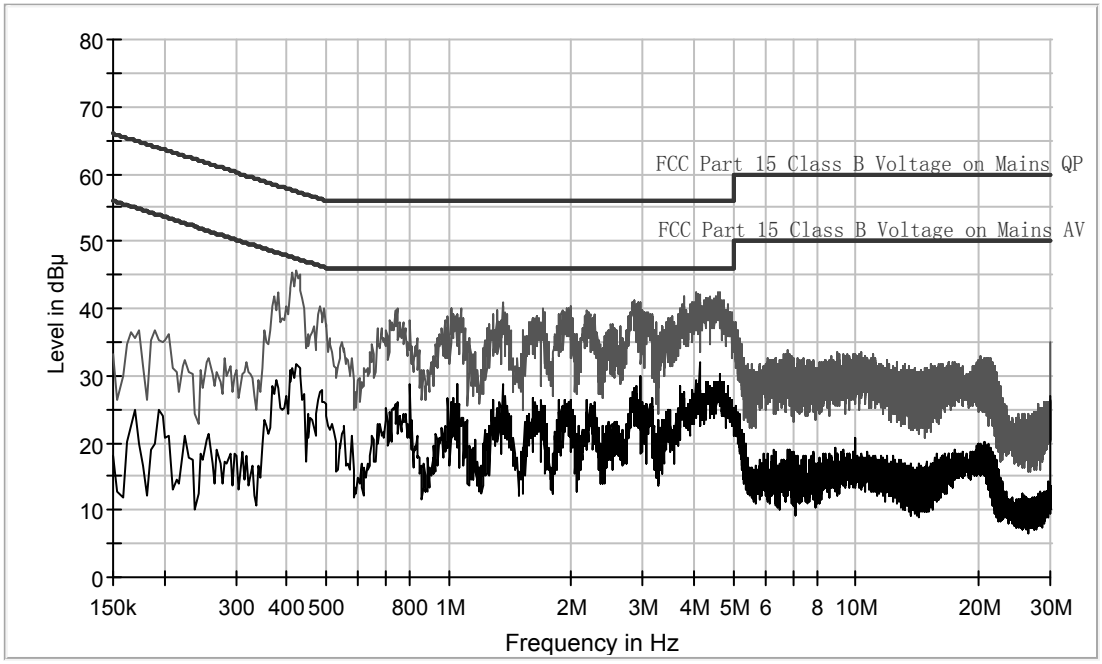
4.9 Conducted Emission

Worst Case Conducted emission at 0.410MHz is Passed by 12.0 dB margin

For electronic filing, the worst case conducted emission configuration photograph is saved with filename: conducted photos.pdf.

Applicant: Sky Light Imaging Limited
Date of Test: May 28, 2014
Model: TSN47W+TSNA02
Worst Case Operating Mode: 802.11 n-HT20 (TX-Channel 01)

Conducted Emission Test - FCC



Result Table QP

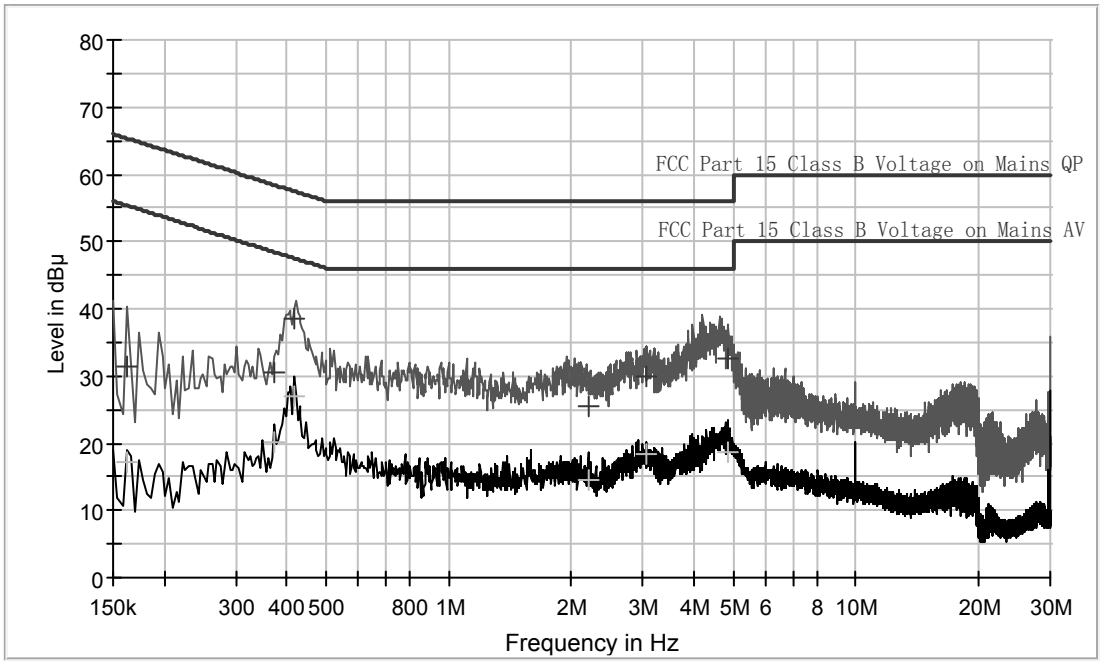
Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.410000	45.6	L1	9.7	12.0	57.6
0.638000	33.9	L1	9.7	22.1	56.0
0.974000	31.4	L1	9.8	24.6	56.0
2.690000	31.6	L1	9.8	24.4	56.0
3.070000	32.9	L1	9.8	23.1	56.0
4.570000	35.8	L1	9.9	20.2	56.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.410000	32.0	L1	9.7	15.6	47.6
0.638000	21.4	L1	9.7	24.6	46.0
0.974000	17.9	L1	9.8	28.1	46.0
2.690000	19.2	L1	9.8	26.8	46.0
3.070000	21.3	L1	9.8	24.7	46.0
4.570000	26.5	L1	9.9	19.5	46.0

Applicant: Sky Light Imaging Limited
Date of Test: May 28, 2014
Model: TSN47W+TSNA02
Worst Case Operating Mode: 802.11n-HT20 (TX-Channel 01)

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.162000	31.4	N	10.2	34.0	65.4
0.374000	30.6	N	10.2	27.8	58.4
0.418000	38.4	N	10.2	19.1	57.5
2.198000	25.5	N	10.4	30.5	56.0
3.046000	29.9	N	10.3	26.1	56.0
4.842000	32.6	N	10.4	23.4	56.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.162000	17.2	N	10.2	38.2	55.4
0.374000	20.1	N	10.2	28.3	48.4
0.418000	27.0	N	10.2	20.5	47.5
2.198000	14.5	N	10.4	31.5	46.0
3.046000	18.3	N	10.3	27.7	46.0
4.842000	18.7	N	10.4	27.3	46.0

Applicant: Sky Light Imaging Limited
Date of Test: May 28, 2014
Model: TSN47W+TSNA02

4.10 Radiated Emissions from Digital Section of Transceiver, FCC Ref: 15.109

[ ] Not required - No digital part

[ ] Test results are attached

[x] Included in the separated report.

Applicant: Sky Light Imaging Limited
Date of Test: May 28, 2014
Model: TSN47W+TSNA02

4.11 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
x	Not applicable, duty cycle was not used.

EXHIBIT 5

EQUIPMENT PHOTOGRAPHS

5.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.doc & internal photos.pdf.

EXHIBIT 6

PRODUCT LABELLING

6.0 **Product Labeling**

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf.

EXHIBIT 7

TECHNICAL SPECIFICATIONS

7.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

EXHIBIT 8

INSTRUCTION MANUAL

8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

EXHIBIT 9

CONFIDENTIALITY REQUEST

9.0 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

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EXHIBIT 10

MISCELLANEOUS INFORMATION

10.0 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF.*

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

EXHIBIT 11

TEST EQUIPMENT LIST

11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-03	BiConiLog Antenna	ETS	3142C	00066460	29-Jun-13	29-Jun-14
SZ185-01	EMI Receiver	R&S	ESCI	100547	12-Mar-14	12-Mar-15
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	26-Oct-13	26-Oct-14
SZ061-08	Horn Antenna	ETS	3115	00092346	12-Mar-14	12-Mar-15
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	27-Aug-13	27-Aug-14
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	12-Mar-14	12-Mar-15
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	12-Mar-14	12-Mar-15
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	2-Mar-14	2-Mar-15
SZ062-02	RF Cable	RADIALL	RG 213U	--	8-Jan-14	8-Jul-14
SZ062-06	RF Cable	RADIALL	0.04-26.5GHz	--	8-Jan-14	8-Jul-14
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	17-Oct-13	17-Apr-15
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	12-Mar-14	12-Mar-15
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	9-Nov-13	9-Nov-14
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	9-Nov-13	9-Nov-14
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	9-Nov-13	9-Nov-14
SZ188-03	Shielding Room	ETS	RFD-100	4100	23-Aug-13	23-Aug-14