EMC TEST REPORT

(FULL COMPLIANCE)

Report Number: 102675709BOX-002
Project Number: G102675709

Report Issue Date: 11/21/2016

Model(s) Tested:	WHITESTAR Signature Pro System NGP680301 Containing Japan MIC and US FCC compliant Bluetooth Radio- 0100-5060 PCBA, REAR PANEL CONNECTOR, BT 2.0
Model(s) Partially Tested:	None
Model(s) Not Tested but declared equivalent by the client:	None
Standards:	CFR47 FCC Part 15 Subpart C (15.247): 08/2016 RSS-247 Issue 1: 05/2015

Tested by:
Intertek Testing Services NA, Inc.
70 Codman Hill Road
Boxborough, MA 01719
USA

Client:
Abbott Medical Optics, Inc.
1700 E Saint Andrew PI Mail Station SA-2M
Santa Ana, CA 92705
USA

Report prepared by

Naga Suryadevara/EMC Engineer

Report reviewed by

Michael F. Murphy / Technical Team Leader, EMC

Table of Contents

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	
4	Description of Equipment Under Test and Variant Models	
5	System Setup and Method	
6	Output Power and Human RF Exposure (CFR47 FCC Part 15 Subpart C (15.247): 08/2016 RSS-247 Issue 1: 05/2015 RSS-102 Issue 5: 03/2015)	Pass
7	Occupied (99%) and 20 dB Bandwidth (CFR47 FCC Part 15 Subpart C (15.247): 08/2016 RSS-247 Issue 1: 05/2015)	Pass
8	Channel Separation (CFR47 FCC Part 15 Subpart C (15.247): 08/2016 RSS-247 Issue 1: 05/2015)	Pass
9	Number of Hopping Channels (CFR47 FCC Part 15 Subpart C (15.247): 08/2016 RSS-247 Issue 1: 05/2015)	Pass
10	Average Channel Occupancy Time (CFR47 FCC Part 15 Subpart C (15.247): 08/2016 RSS-247 Issue 1: 05/2015	Pass
11	Out of Band Conducted Emissions (CFR47 FCC Part 15 Subpart C (15.247): 08/2016 RSS-247 Issue 1: 05/2015)	Pass
12	Out of Band Radiated Spurious Emissions (CFR47 FCC Part 15 Subpart C (15.247): 08/2016 RSS-247 Issue 1: 05/2015)	Pass
13	Transmitter Spurious Emissions (CFR47 FCC Part 15 Subpart C (15.247): 08/2016 RSS-247 Issue 1: 05/2015)	Pass

14	Radiated Emissions from Digital parts and Receiver (CFR47 FCC Part 15 (15.109): 08/2016 ICES 003: 01/2016 and updated 06/2016)	Pass
--	AC Mains Conducted Emissions	NA(1)
15	Revision History	

(1) Not Applicable. The EUT does not have any direct connection to public power network. In normal use, EUT is installed inside the host unit and it is DC powered internally.

3 Client Information

This EUT was tested at the request of:

Client: Abbott Medical Optics, Inc.
1700 E Saint Andrew Pl Mail Station SA-2M
Santa Ana, CA 92705
USA

Contact: Fred Lee
Telephone: (714) 247-8578
Fax: None
Email: Fred.Lee@amo.abbott.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: Abbott Medical Optics, Inc.
1700 E Saint Andrew Pl Mail Station SA-2M
Santa Ana, CA 92705
USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
WHITESTAR Signature Pro System NGP680301 Containing Japan MIC and US FCC compliant Bluetooth Radio- 0100-5060 PCBA, REAR PANEL CONNECTOR, BT 2.0	Abbott Medical Optics, Inc.	0100-5060 revA	1631600002

Receive Date:	08/22/2016
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
The WHITESTAR Signature Advanced Control Pedal & Remote Control system consists of the Advanced Control Pedal (1RF module for a Foot Pedal control mounted in main system) and Remote Control Master 2.0 (2RF module for remote control of Monitor mounted in main system), Advanced Control Pedal Slave (3 RF module for a Foot Pedal control mounted outside of main system) and Remote Control Slave 2.0 (4RF module for remote control of Monitor mounted outside of main system). The [1]RF module for a Foot Pedal control mounted in main system and [3]RF module for a Foot Pedal control mounted outside of main system consists two National Semiconductor's LMX98XX series Bluetooth radios ICs (transceivers), operating in the 2.4 GHz frequency band. Only one transmitter can report the data to the host at any given time. This radio subsystem is used to communicate the footpedal control signal to the WHITESTAR Signature™ system for use in cataract surgery. The [2]RF module for remote control of Monitor mounted in main system and 4RF module for remote control of Monitor mounted outside of main system consists one National Semiconductor's LMX98XX series Bluetooth radios ICs (transceivers), operating in the 2.4 GHz frequency band. This radio subsystem is used to communicate the monitor control signal to the WHITESTAR Signature™ system for use in cataract surgery.

This report covers the [2]RF module for remote control of Monitor mounted in main system and the 1RF module for a Foot Pedal control mounted in main system is covered in separate report #3184783MPK-001A.

[3]RF module for a Foot Pedal control mounted outside of main system and 4RF module for remote control of Monitor mounted outside of main system are already FCC and Industry Canada certified.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
5V/12V/24V	100mA/200mA	N/A	N/A

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmit mode with Frequency hopping enabled.
2	Transmit mode with Frequency hopping disabled.
3	Receive mode

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	Tera Term Version 4.82

Radio/Receiver Characteristics	
Frequency Band(s)	2402 – 2480 MHz
Modulation Type(s)	GFSK (FHSS)
Maximum Output Power	Tx -1: 0.20137242499 mW Tx -2: 0.1297179271 mW Tx -1 + Tx -2: 0.33109 mW
Test Channels	Low Channel – 2402 MHz Mid Channel – 2441 MHz High Channel – 2480 MHz
Occupied Bandwidth	Tx-1: 952 kHz Tx-2: 956 kHz
Frequency Hopper: Number of Hopping Channels	Tx-1: 79 Tx-2: 79
Frequency Hopper: Channel Occupancy Time	Tx-1: 0.354 sec Tx-2: 0.379 sec
Frequency Hopper: Max interval between two instances of use of the same channel	N/A
MIMO Information (# of Transmit and Receive antenna ports)	2
Equipment Type	Standalone
ETSI LBT/Adaptivity	N/A
ETSI Adaptivity Type	N/A
ETSI Temperature Category (I, II, III)	N/A
ETSI Receiver Category (1, 2, 3)	N/A
Antenna Type and Gain	Omnidirectional Dipole, 2.2 dBi,

Variant Models:

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

5 System Setup and Method

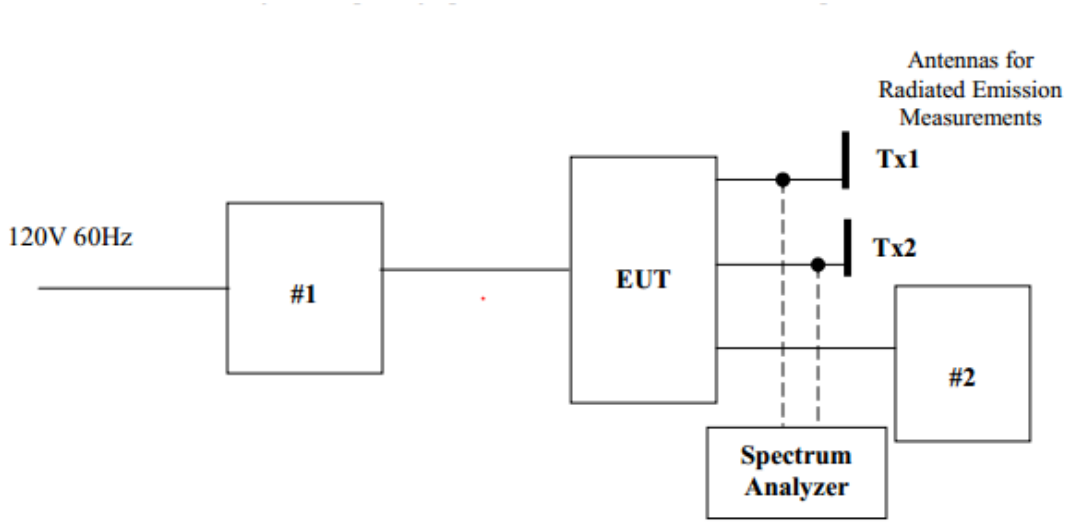
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	USB to Serial Cable	1	None	None	Laptop

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop	HP	EliteBook 840	53G537057N

5.1 Method:

Configuration as required by FCC CFR47 Part 15 Subpart C (15.247): 08/2016, RSS-247 Issue 1: 05/2015 RSS-102 Issue 5: 03/2015 and ANSI C63.1: 2013.

5.2 EUT Block Diagram:



6 Output Power and Human RF Exposure

6.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247), RSS 247 and RSS 102.

TEST SITE: EMC Lab – Intertek Lake Forest CA

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 380, and 440 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
001001'	Barometer/Humidity Control	Omega	iBTHX-W	0440775	04/22/2016	04/22/2017
000690'	Spectrum Analyzer, 9 KHz - 40 GHz	Rohde & Schwarz	FSP40	100027	01/11/2016	01/11/2017
CBLHF20 12-5M-1'	5m 9kHz-40GHz Coaxial Cable - SET 1	Huber & Suhner	SF102	252676001	02/09/2016	02/09/2017

Software Utilized:

Name	Manufacturer	Version
None		

6.3 Results:

The sample tested was foundto Comply. For systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum peak output power is 1 watt (30 dBm), for all other systems 0.125 W (21 dBm). The GUI board has 79 hopping channels.

Frequency	Data Rate	Tx-1 Output Power in dBm	Tx-2 Output Power in dBm	Tx-1 Output Power in mW	Tx-2 Output Power in mW
2402	DH5	-6.91	-9.12	0.20370420777	0.12246161993
2402	DH3	-6.96	-8.87	0.20137242499	0.1297179271
2402	DH1	-6.95	-8.97	0.20183663637	0.12676518659
2441	DH5	-11.23	-13.05	0.075335556373	0.04954501908
2441	DH3	-11.18	-13.07	0.076207901003	0.049317380395
2441	DH1	-11.21	-12.88	0.075683289502	0.051522864458
2480	DH5	-10.09	-11.89	0.097948998541	0.064714261575
2480	DH3	-9.99	-11.74	0.10023052381	0.066988460942
2480	DH1	-9.91	-11.73	0.10209394837	0.067142885293

Frequency	Data Rate	Total Output Power (Tx-1 + Tx-2) in mW	Limit
2402	DH5	0.326166	1 W
2402	DH3	0.33109	1 W
2402	DH1	0.328602	1 W
2441	DH5	0.124881	1 W
2441	DH3	0.125525	1 W
2441	DH1	0.127206	1 W
2480	DH5	0.162663	1 W
2480	DH3	0.167219	1 W

2480	DH1	0.169237	1 W

Note:

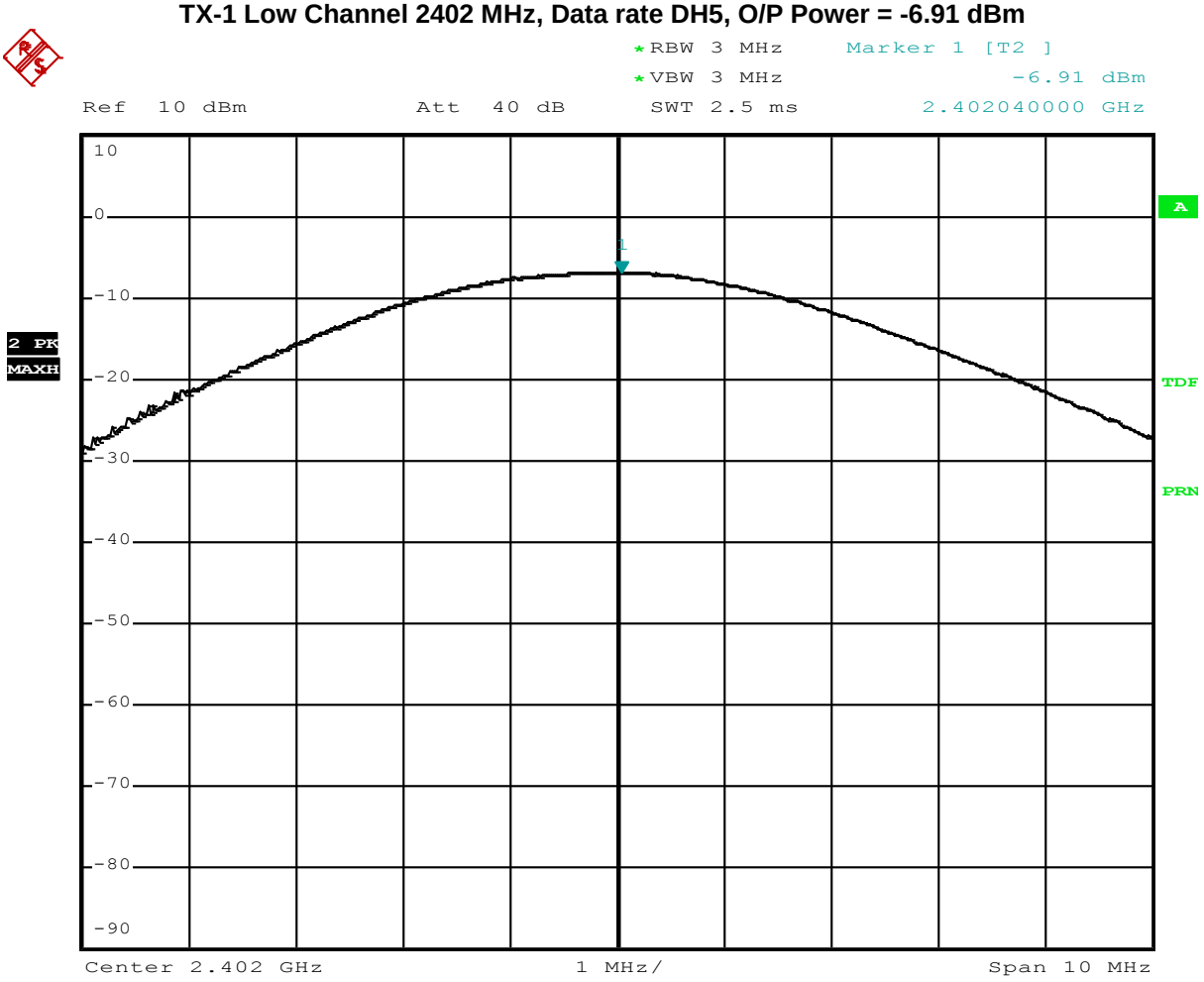
(1) The EUT's antenna has less than 6 dBi gain.

(2) As per KDB 662911: For conducted testing of emissions from transmitters with multiple outputs in the same band.. The FCC's emission limits apply to the total of emissions from all outputs of the transmitter or of composite system transmitters. Thus, emission measurements from the transmitter outputs are summed before comparing measured emissions to the emission limit.

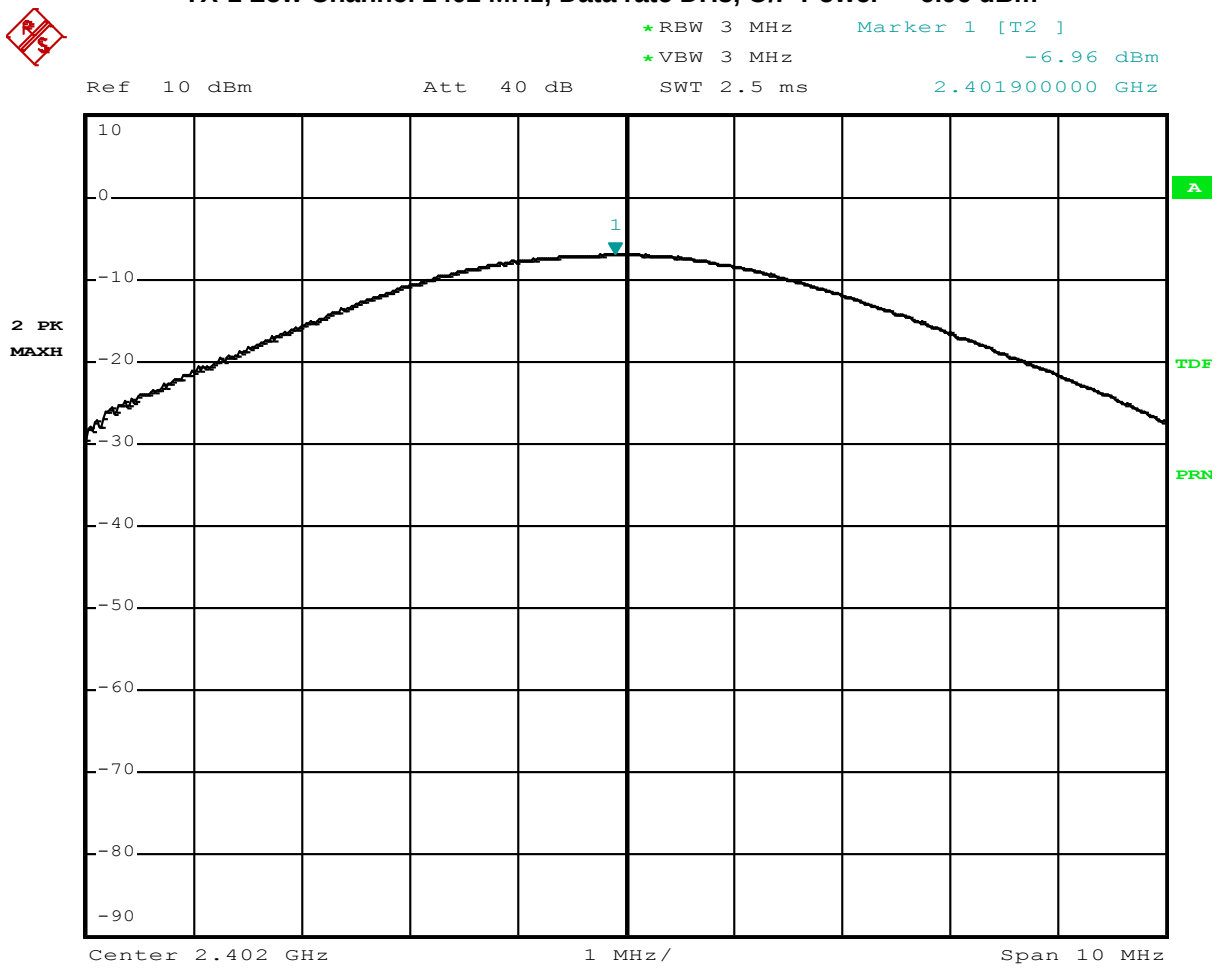
6.4 Setup Photographs:

6.5 Plots/Data:

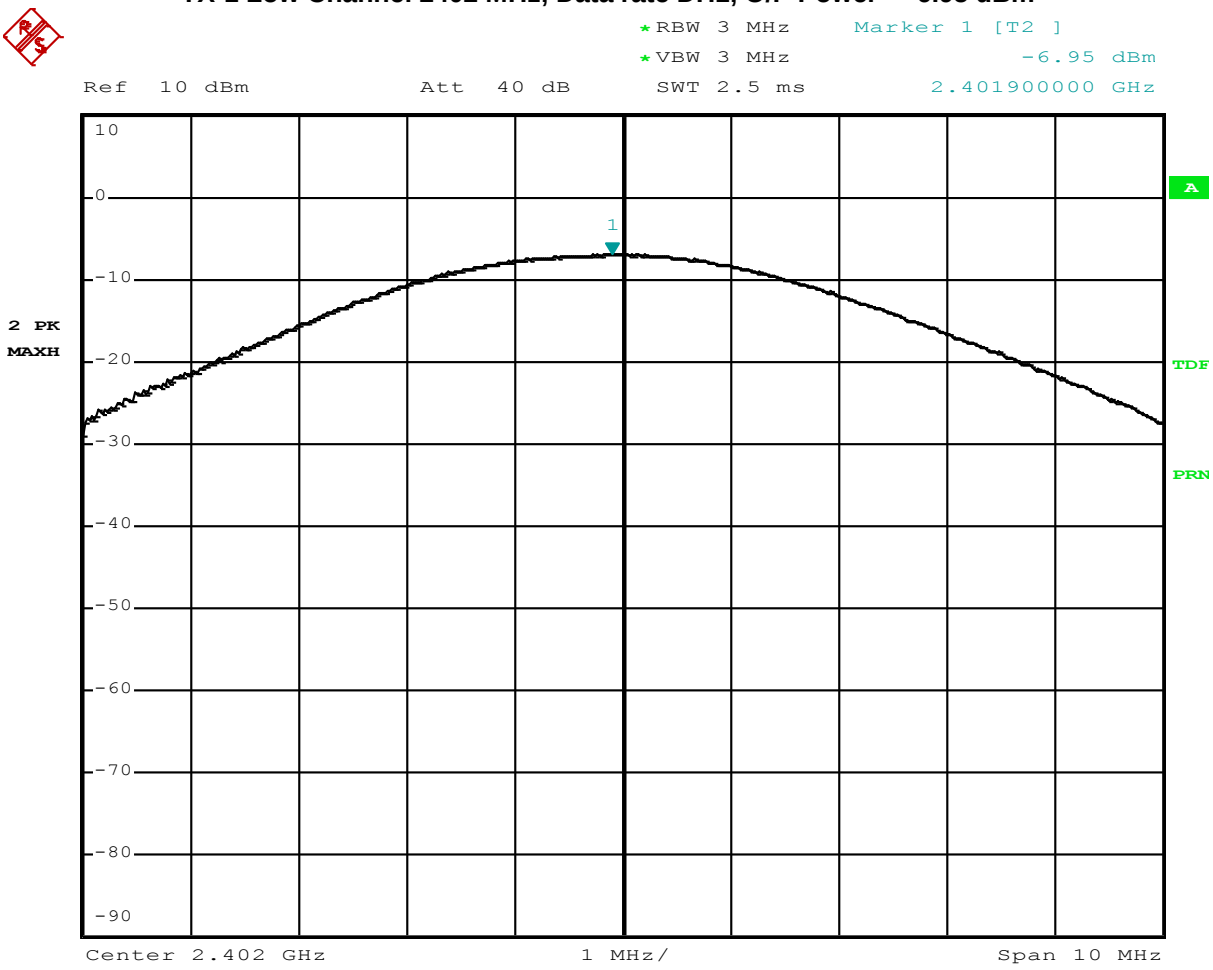
TX-1 Low Channel 2402 MHz, Data rate DH5, O/P Power = -6.91 dBm



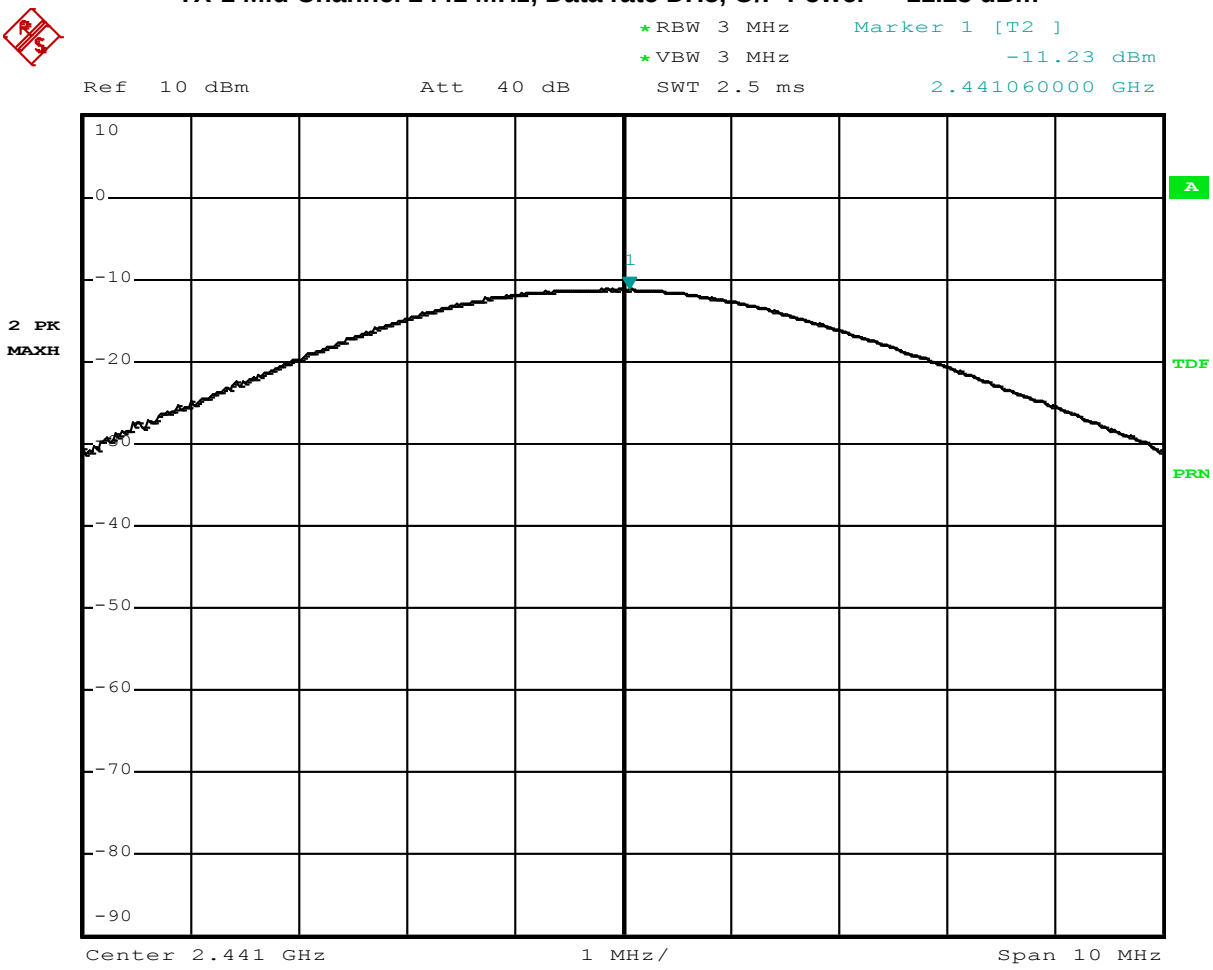
TX-1 Low Channel 2402 MHz, Data rate DH3, O/P Power = -6.96 dBm



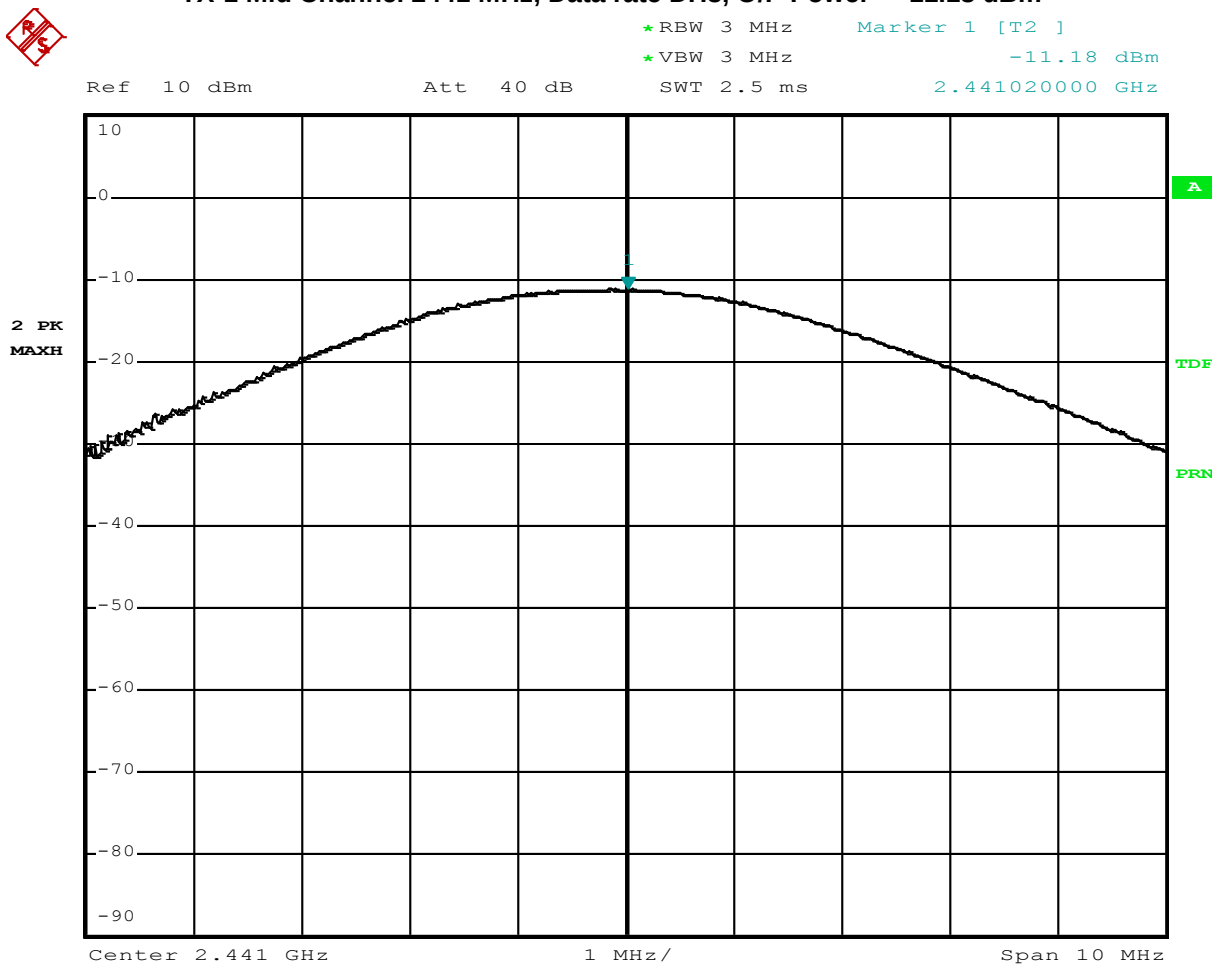
TX-1 Low Channel 2402 MHz, Data rate DH1, O/P Power = -6.95 dBm



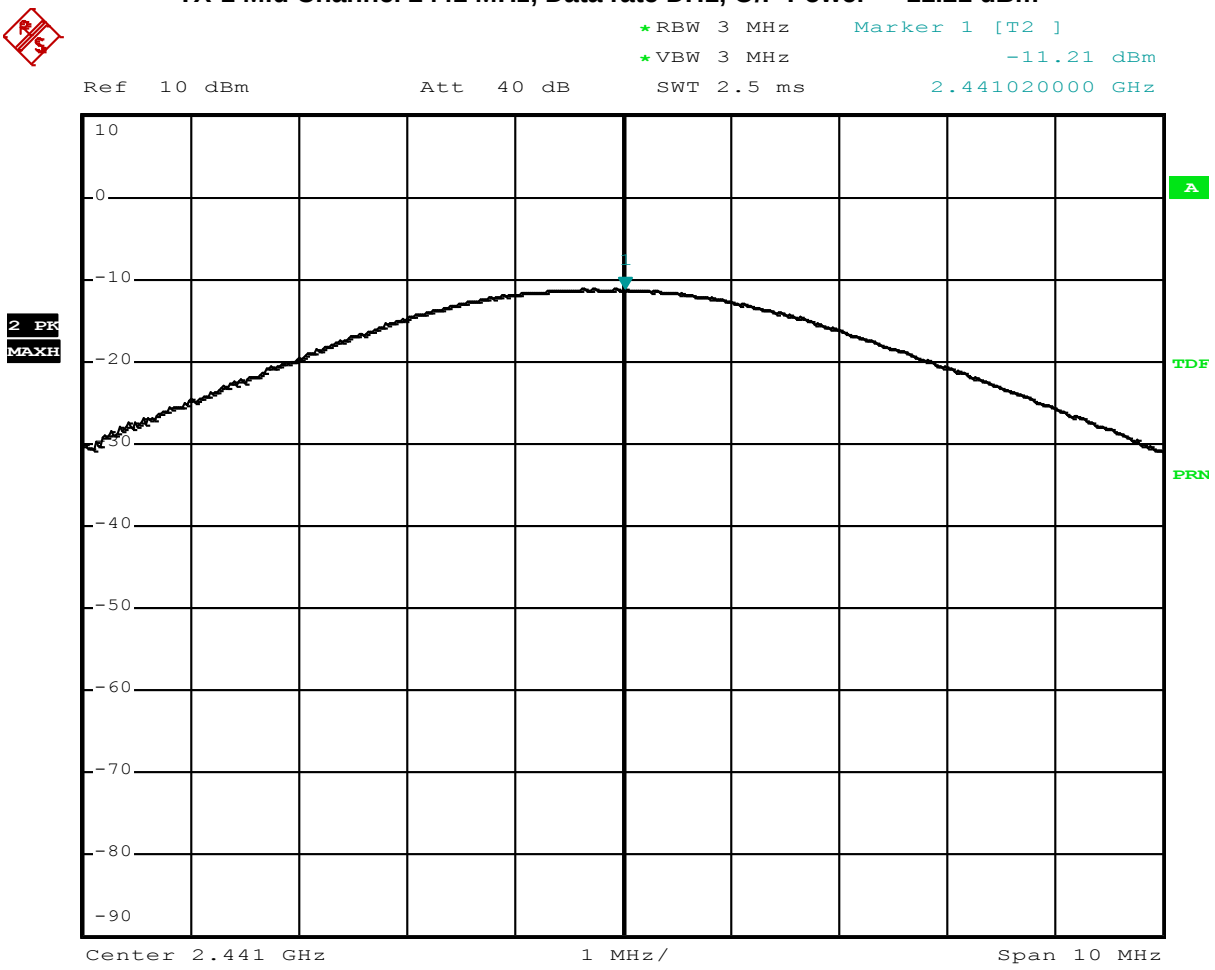
TX-1 Mid Channel 2441 MHz, Data rate DH5, O/P Power = -11.23 dBm



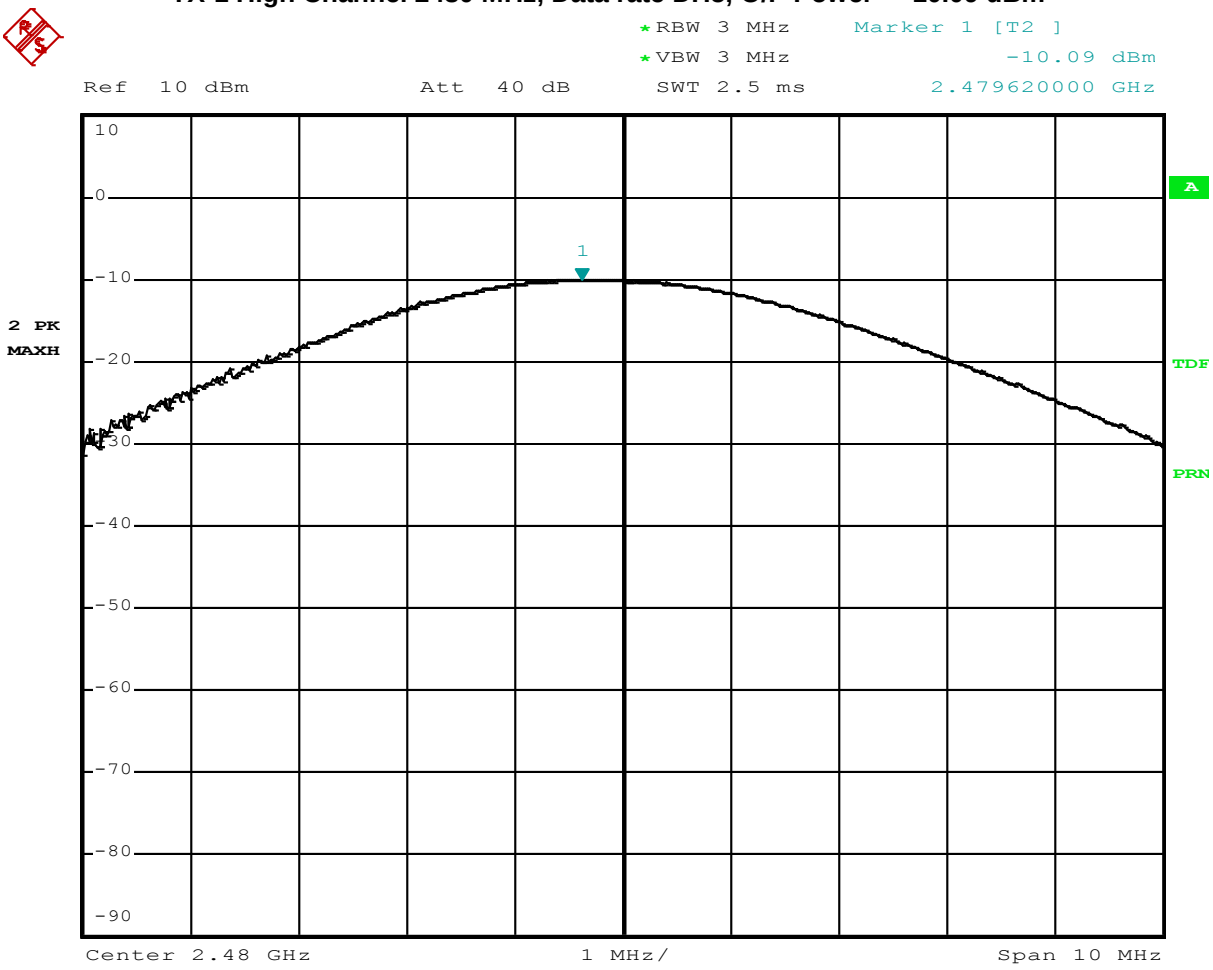
TX-1 Mid Channel 2441 MHz, Data rate DH3, O/P Power = -11.18 dBm



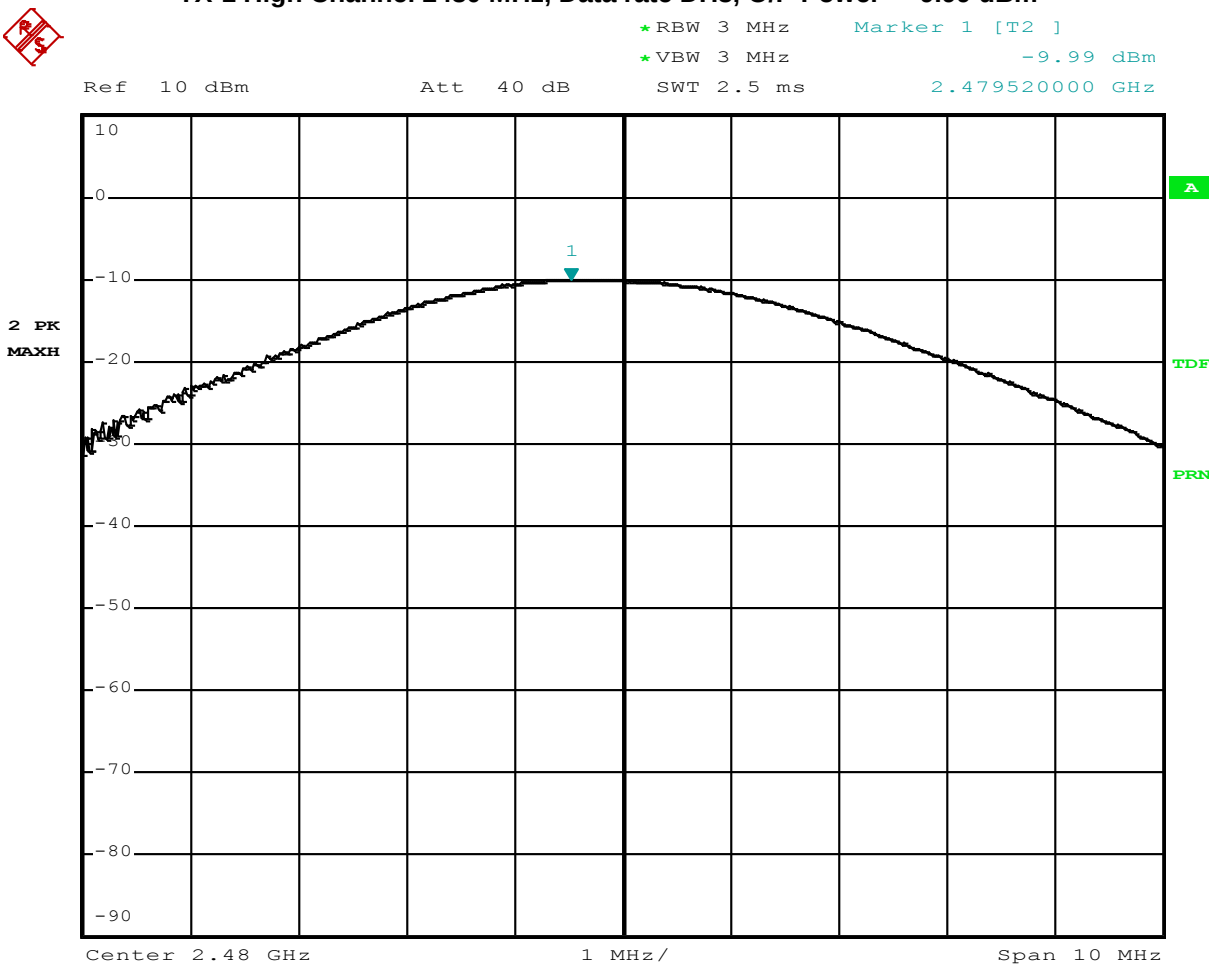
TX-1 Mid Channel 2441 MHz, Data rate DH1, O/P Power = -11.21 dBm



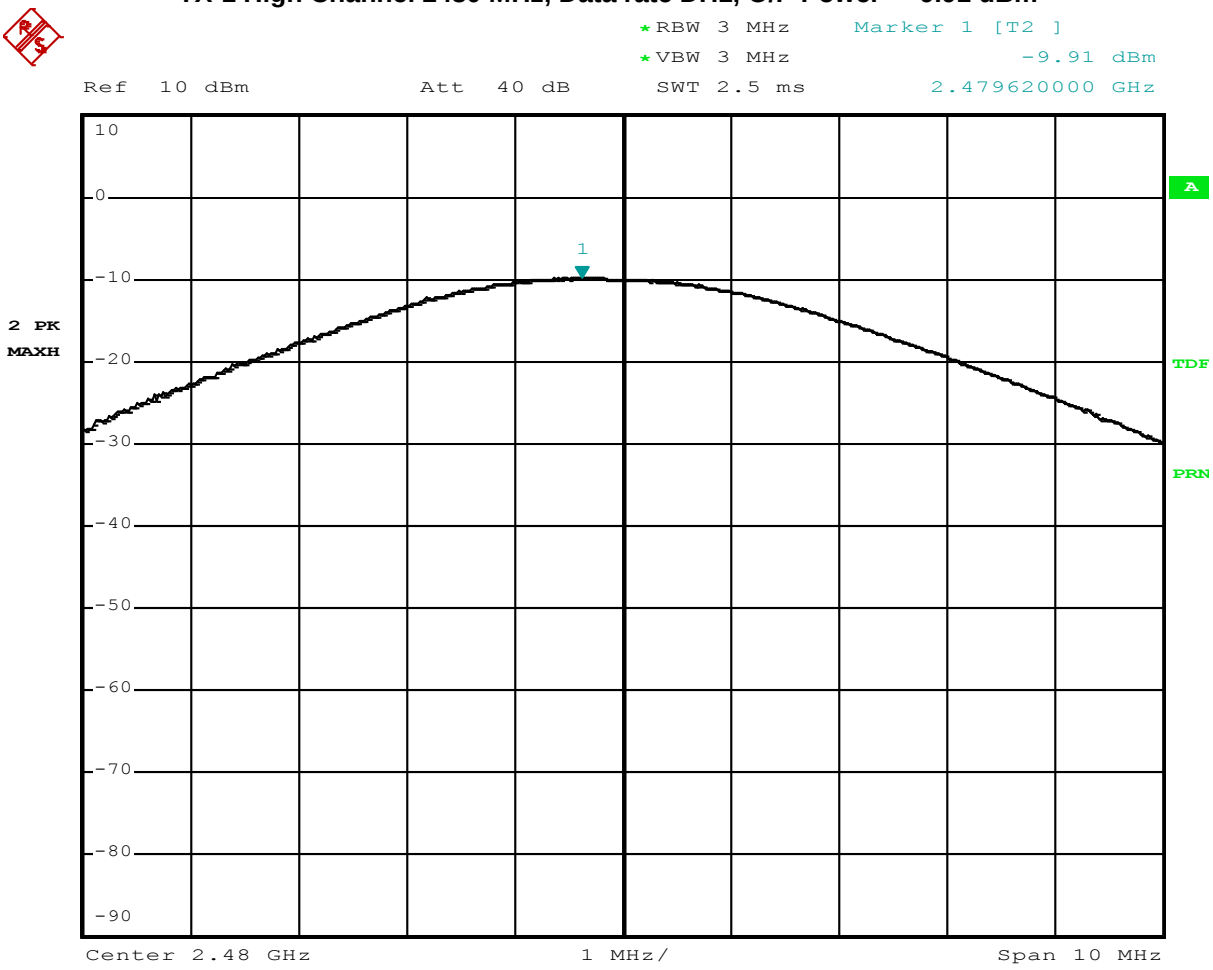
TX-1 High Channel 2480 MHz, Data rate DH5, O/P Power = -10.09 dBm



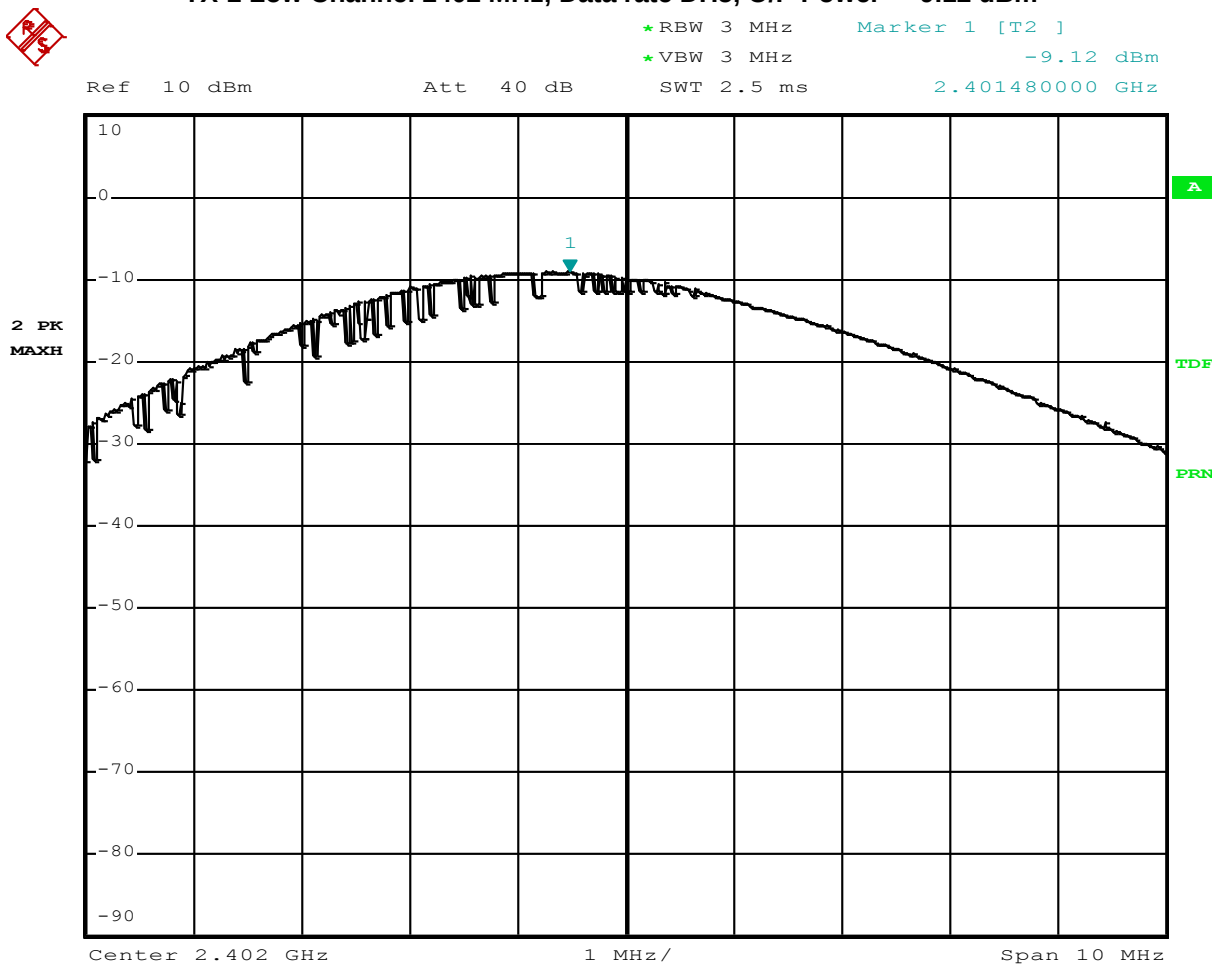
TX-1 High Channel 2480 MHz, Data rate DH3, O/P Power = -9.99 dBm



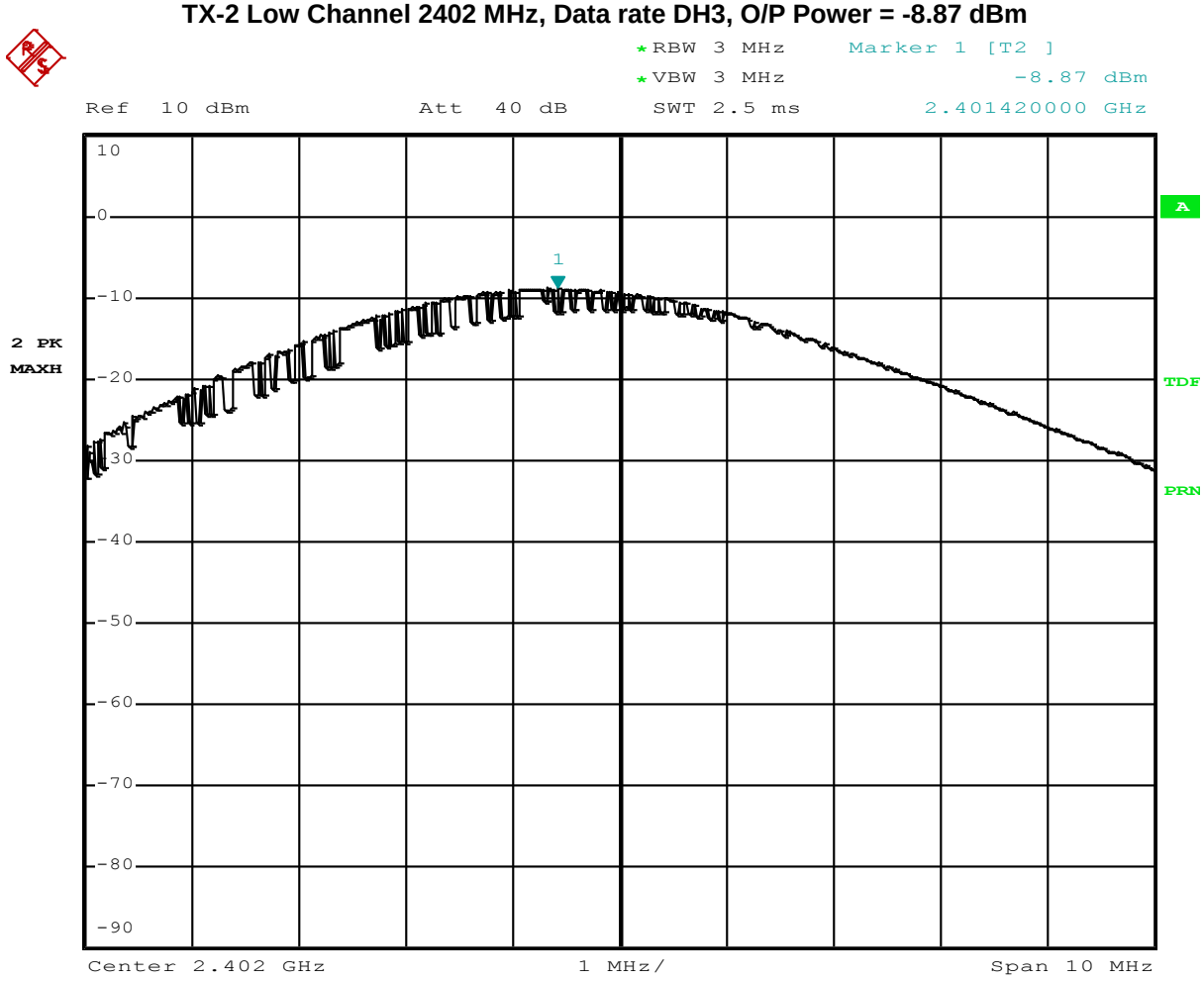
TX-1 High Channel 2480 MHz, Data rate DH1, O/P Power = -9.91 dBm



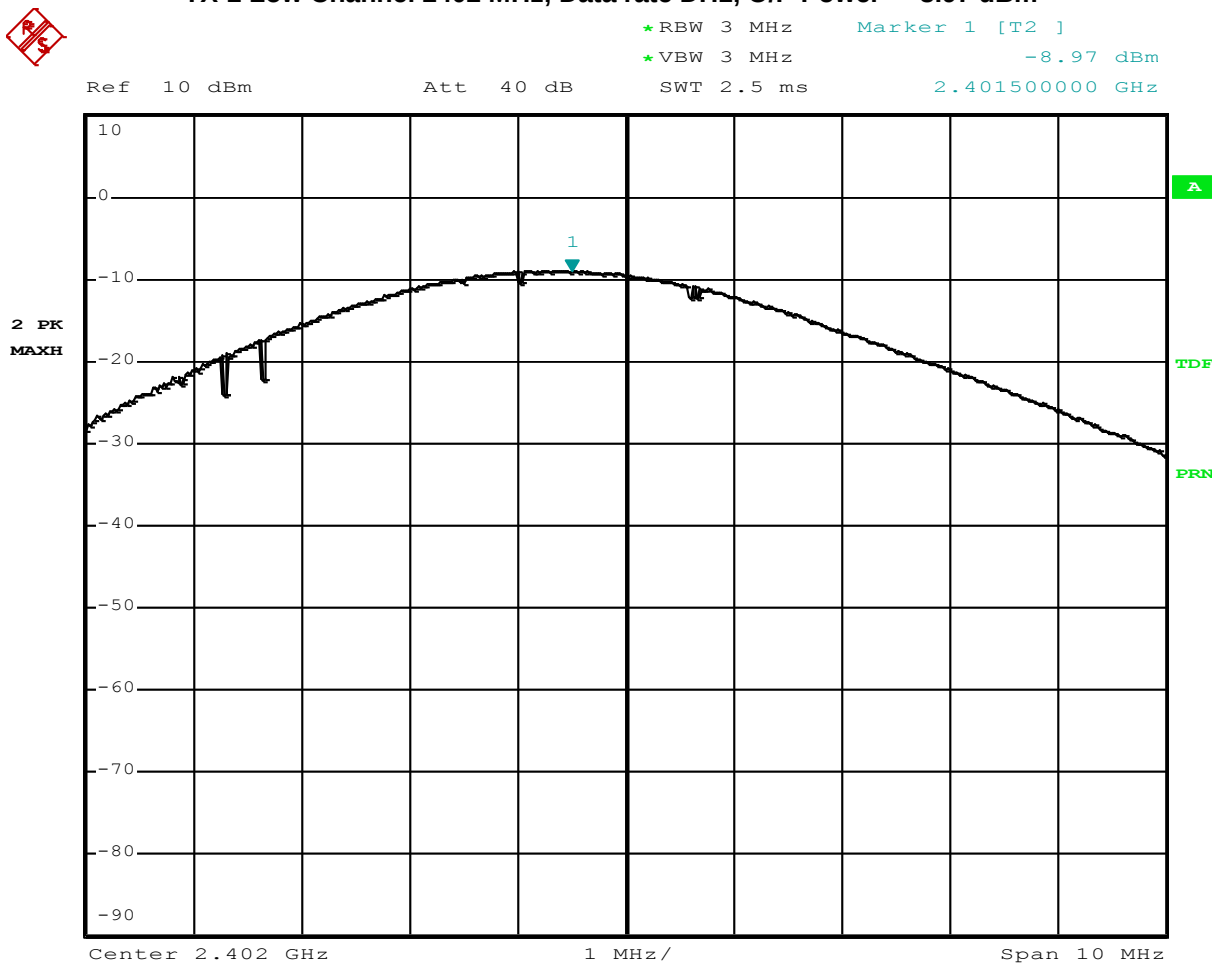
TX-2 Low Channel 2402 MHz, Data rate DH5, O/P Power = -9.12 dBm



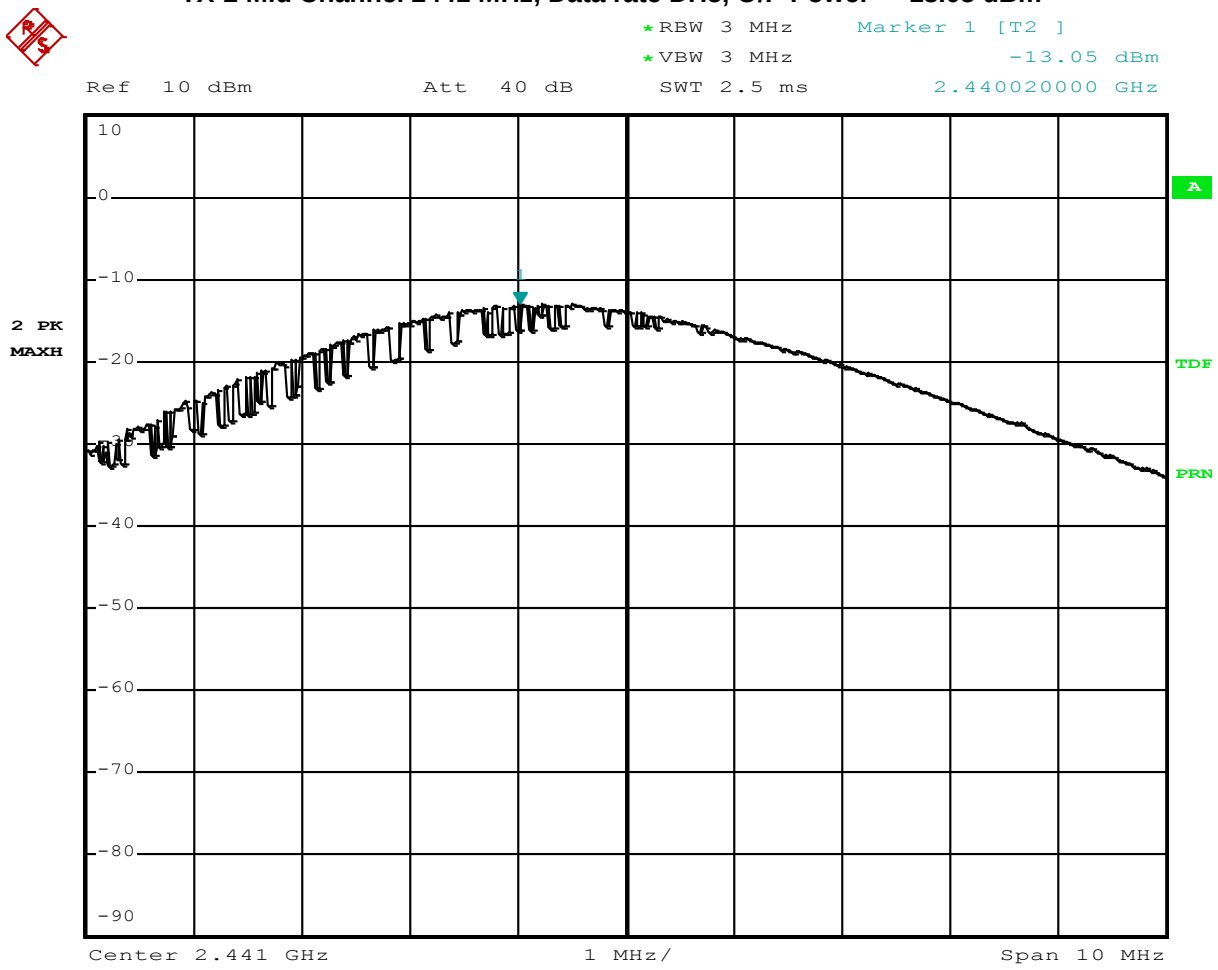
TX-2 Low Channel 2402 MHz, Data rate DH3, O/P Power = -8.87 dBm



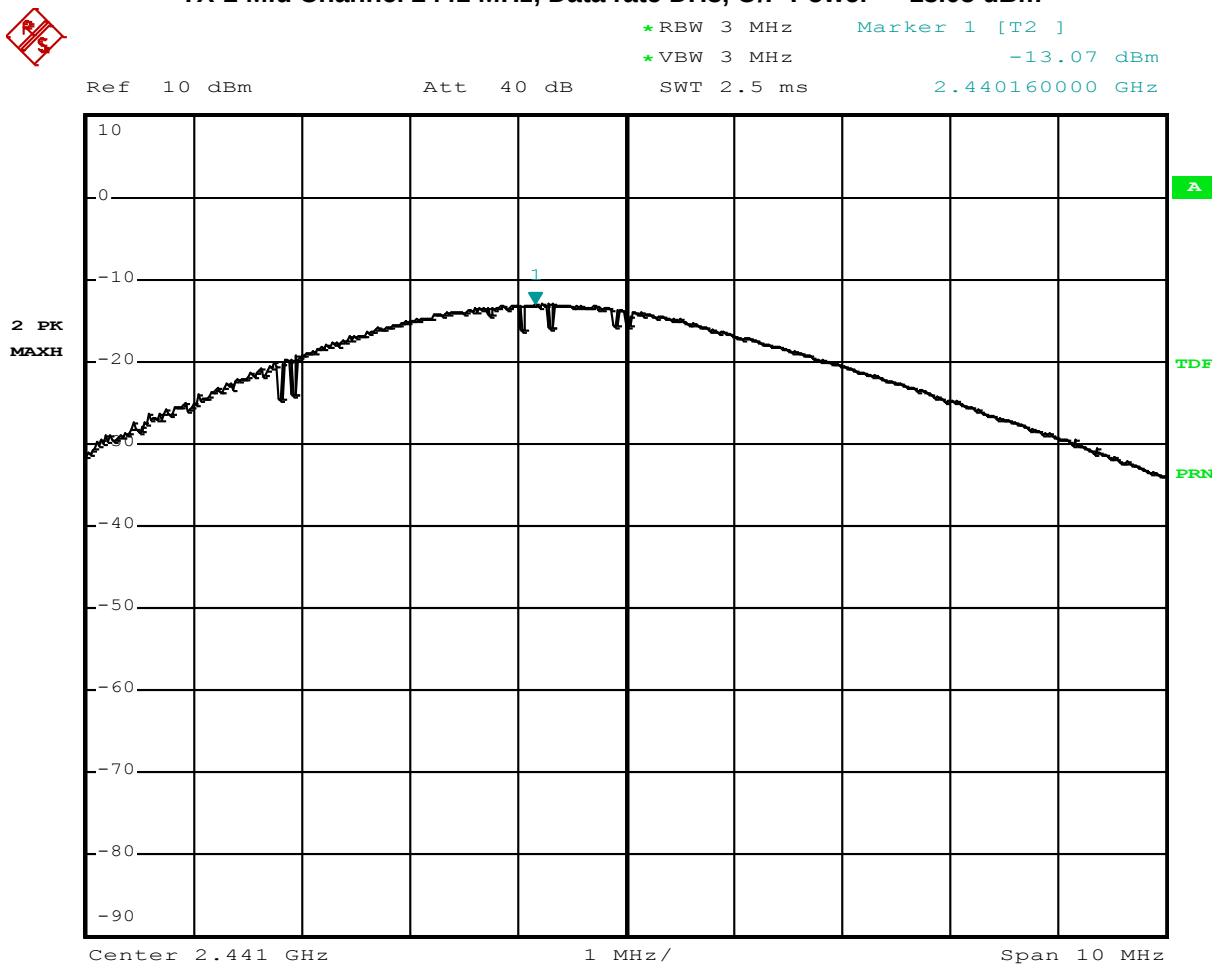
TX-2 Low Channel 2402 MHz, Data rate DH1, O/P Power = -8.97 dBm



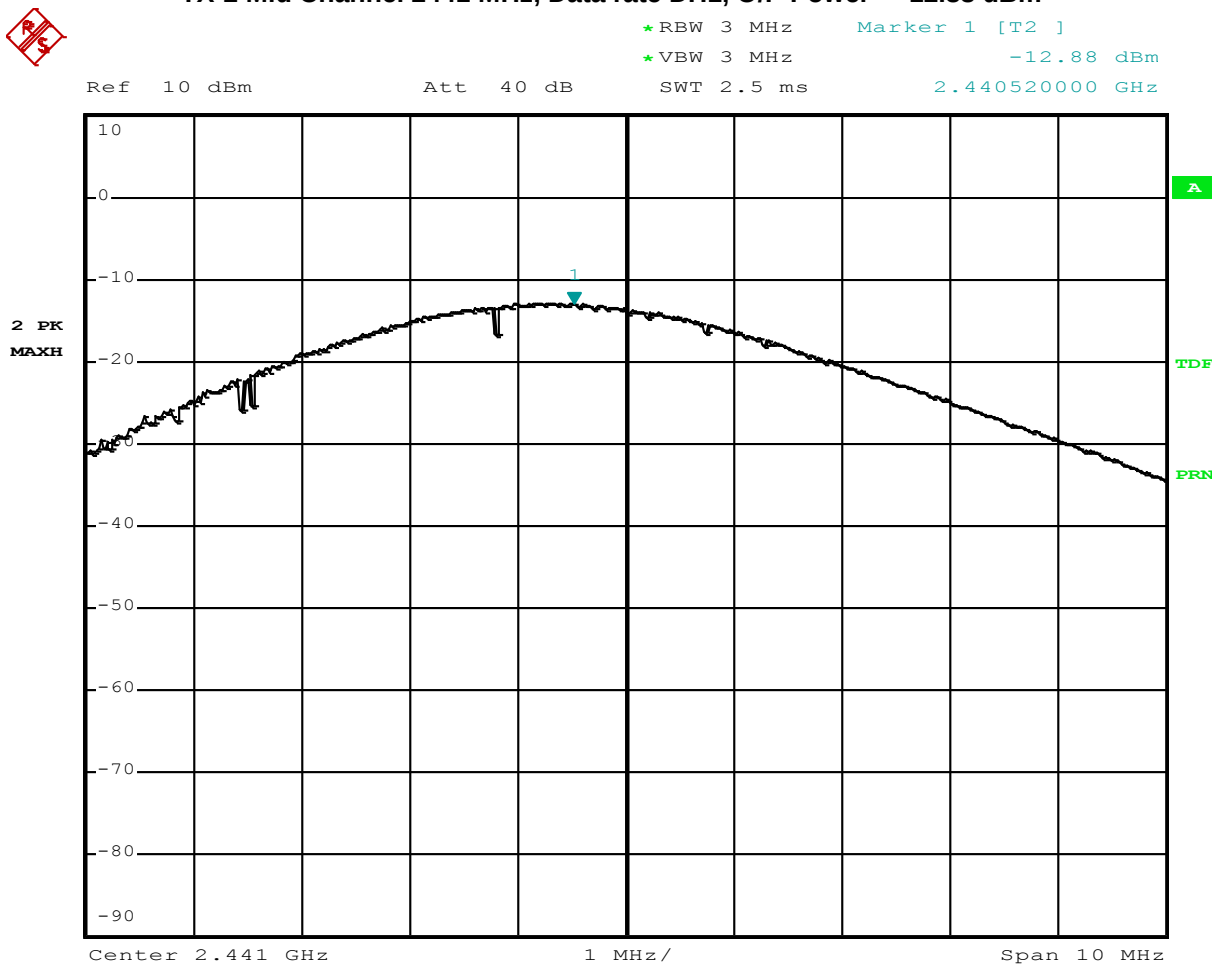
TX-2 Mid Channel 2441 MHz, Data rate DH5, O/P Power = -13.05 dBm



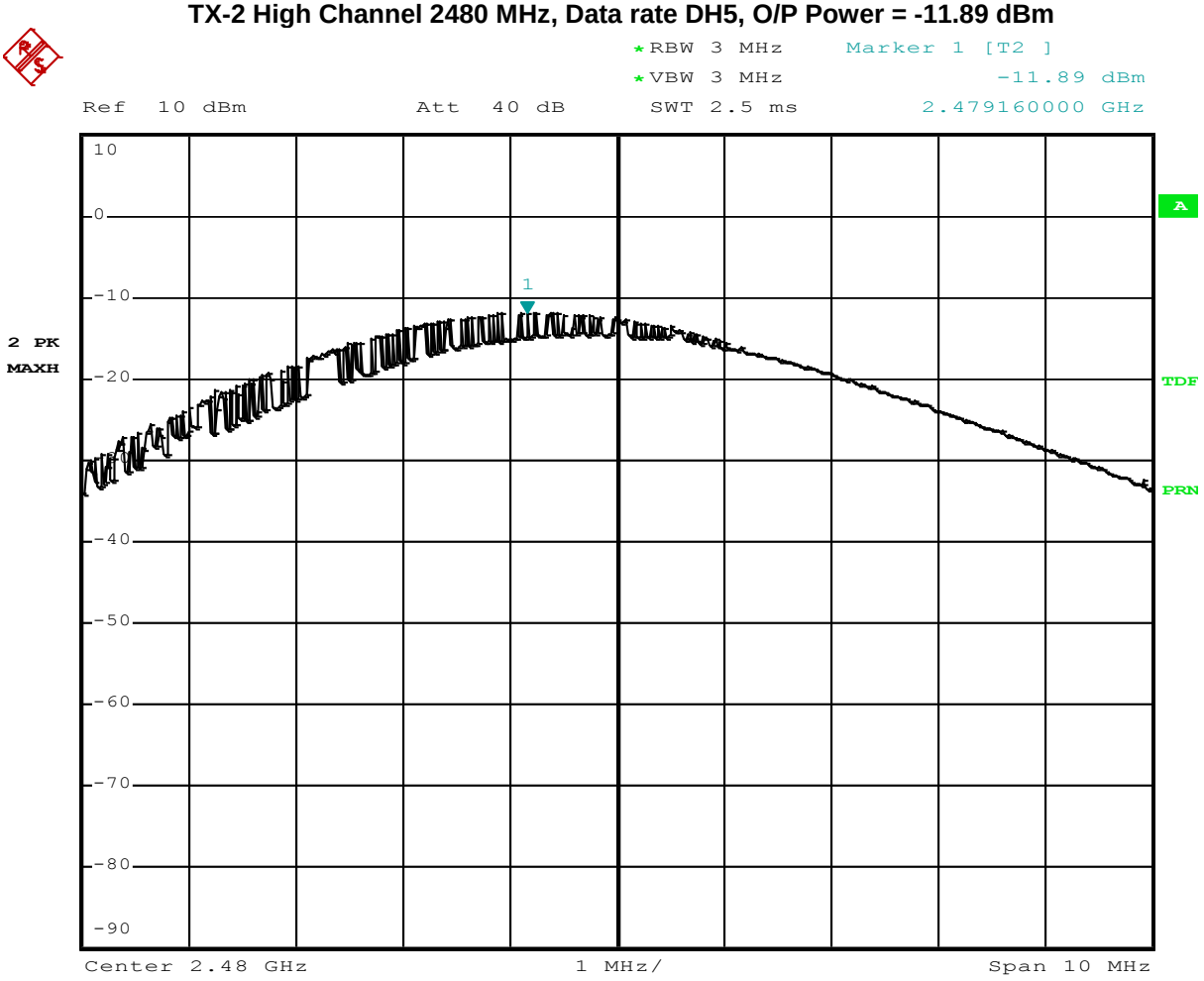
TX-2 Mid Channel 2441 MHz, Data rate DH3, O/P Power = -13.05 dBm



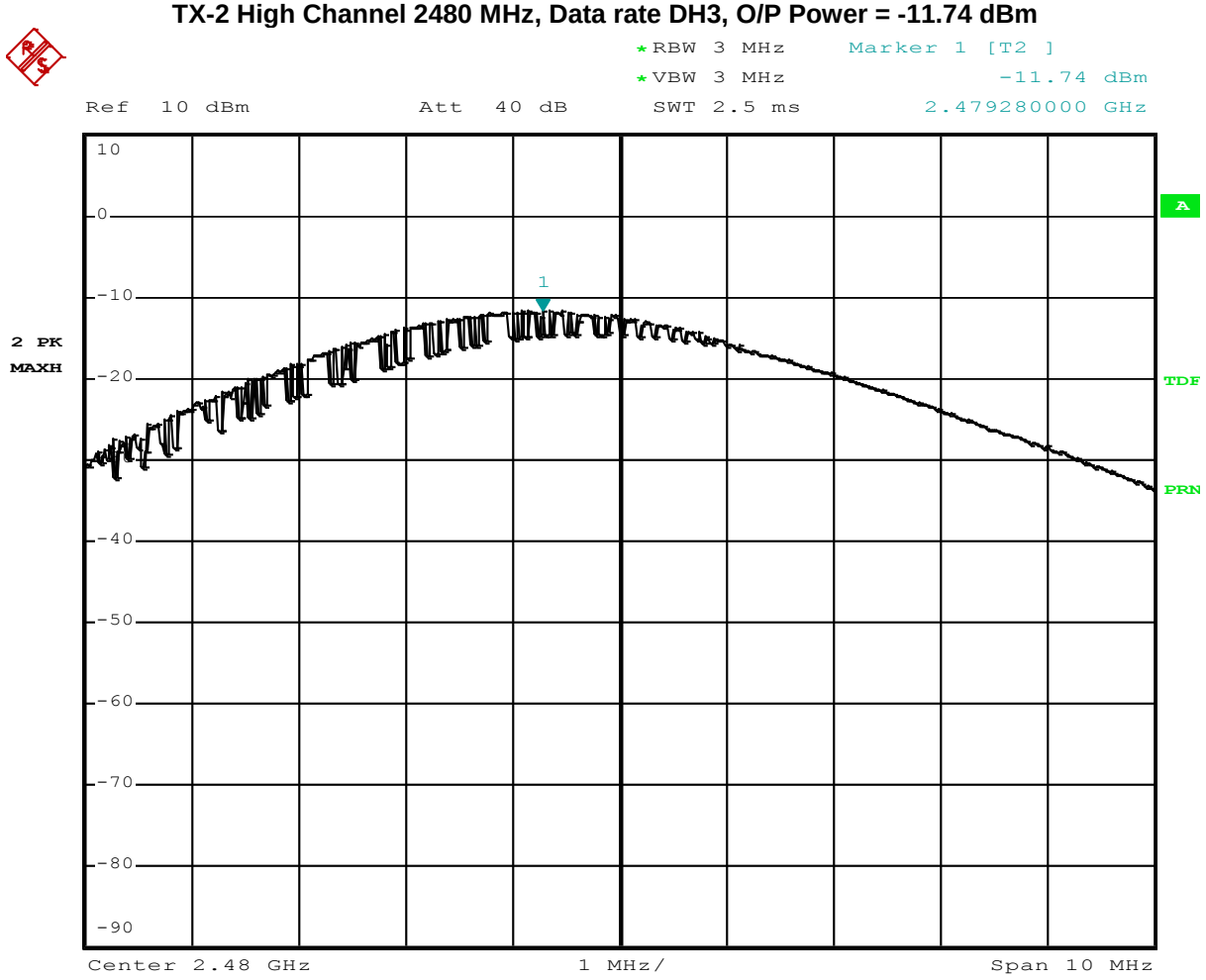
TX-2 Mid Channel 2441 MHz, Data rate DH1, O/P Power = -12.88 dBm



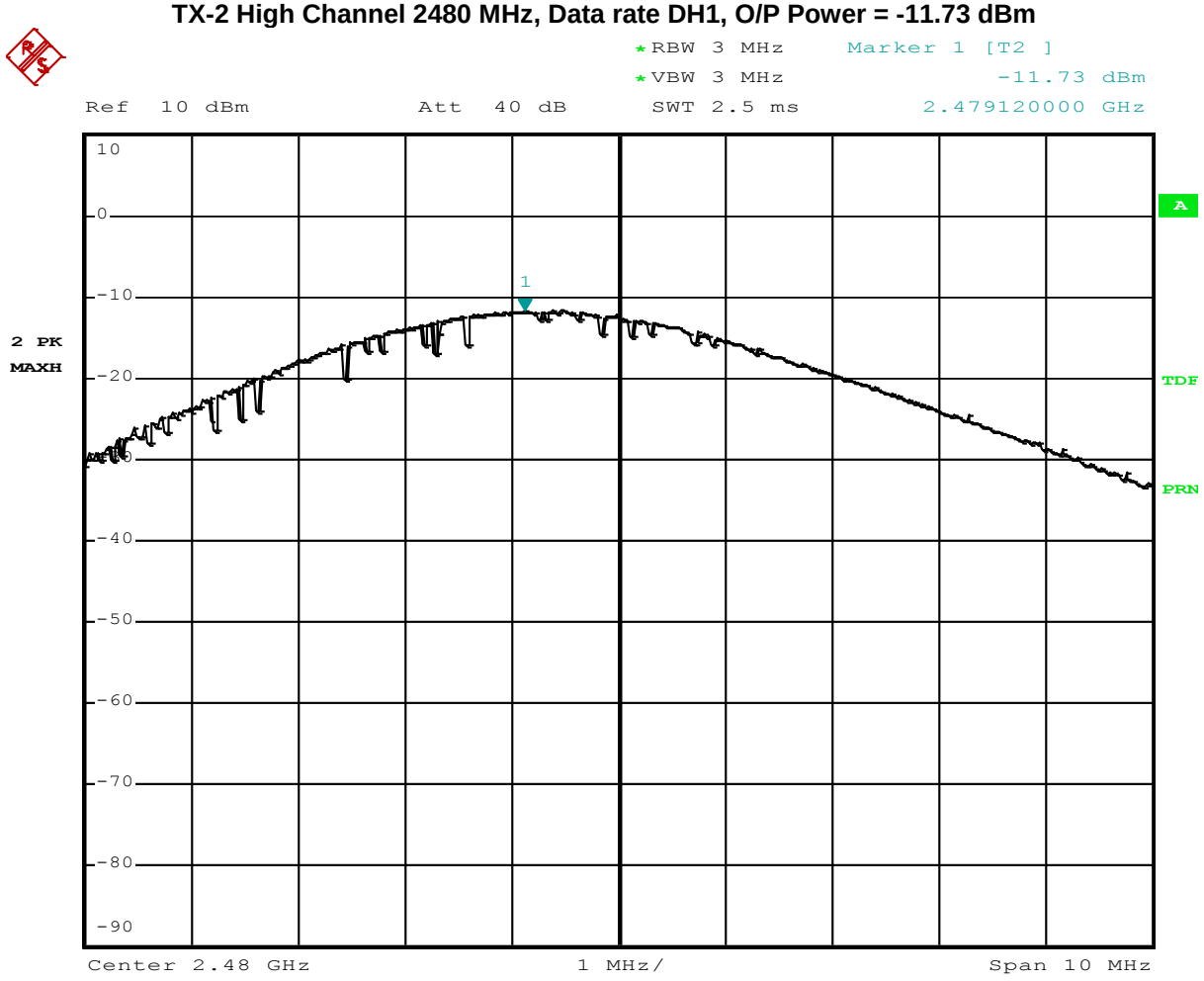
TX-2 High Channel 2480 MHz, Data rate DH5, O/P Power = -11.89 dBm



TX-2 High Channel 2480 MHz, Data rate DH3, O/P Power = -11.74 dBm



TX-2 High Channel 2480 MHz, Data rate DH1, O/P Power = -11.73 dBm



Human RF Exposure

N.5	MFM

Maximum measured output power is 0.33109 mW @ 2402 MHz

FCC SAR Exemption per KDB 447498

a) For 100 MHz to 6 GHz and *test separation distances* ≤ 50 mm, the 1-g and 10-g *SAR test exclusion thresholds* are determined by the following:

[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR,[30] where

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz

= (0.33109/5)*(sqrt(2.402))

= 1.54983< 3.0 (below the limit SAR Exempt per FCC)

RSS 102 SAR Exemption

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance[4,5]

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

The exemption limits in Table 1 are based on measurements and simulations of half-wave dipole antennas at separation distances of 5 mm to 25 mm from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from a linear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from a third order polynomial fit.

The measured maximum output power "0.33109 mW" is less than the limit @ 5mm seperation distance (4 mW) specified in the above table, hence the device is SAR exempt.

Test Personnel:	Naga Suryadevara NS	Test Date:	08/24/2016
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart C (15.247) and RSS-247	Limit Applied:	See test report section 6.3
Input Voltage:	12 VDC (System input 120 VAC 60 Hz)		
		Ambient Temperature:	22 ºC
Pretest Verification:	Yes	Relative Humidity:	44 %
		Atmospheric Pressure:	1003 mbars

Deviations, Additions, or Exclusions: None

7 20 dB and Occupied (99%) Bandwidth

7.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247) and RSS 247.

TEST SITE: EMC Lab – Intertek Lake Forest CA

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 380, and 440 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
001001'	Barometer/Humidity Control	Omega	iBTHX-W	0440775	04/22/2016	04/22/2017
000690'	Spectrum Analyzer, 9 KHz - 40 GHz	Rohde & Schwarz	FSP40	100027	01/11/2016	01/11/2017
CBLHF20 12-5M-1'	5m 9kHz-40GHz Coaxial Cable - SET 1	Huber & Suhner	SF102	252676001	02/09/2016	02/09/2017

Software Utilized:

Name	Manufacturer	Version
None		

7.3 Results:

The sample tested was found to Comply.

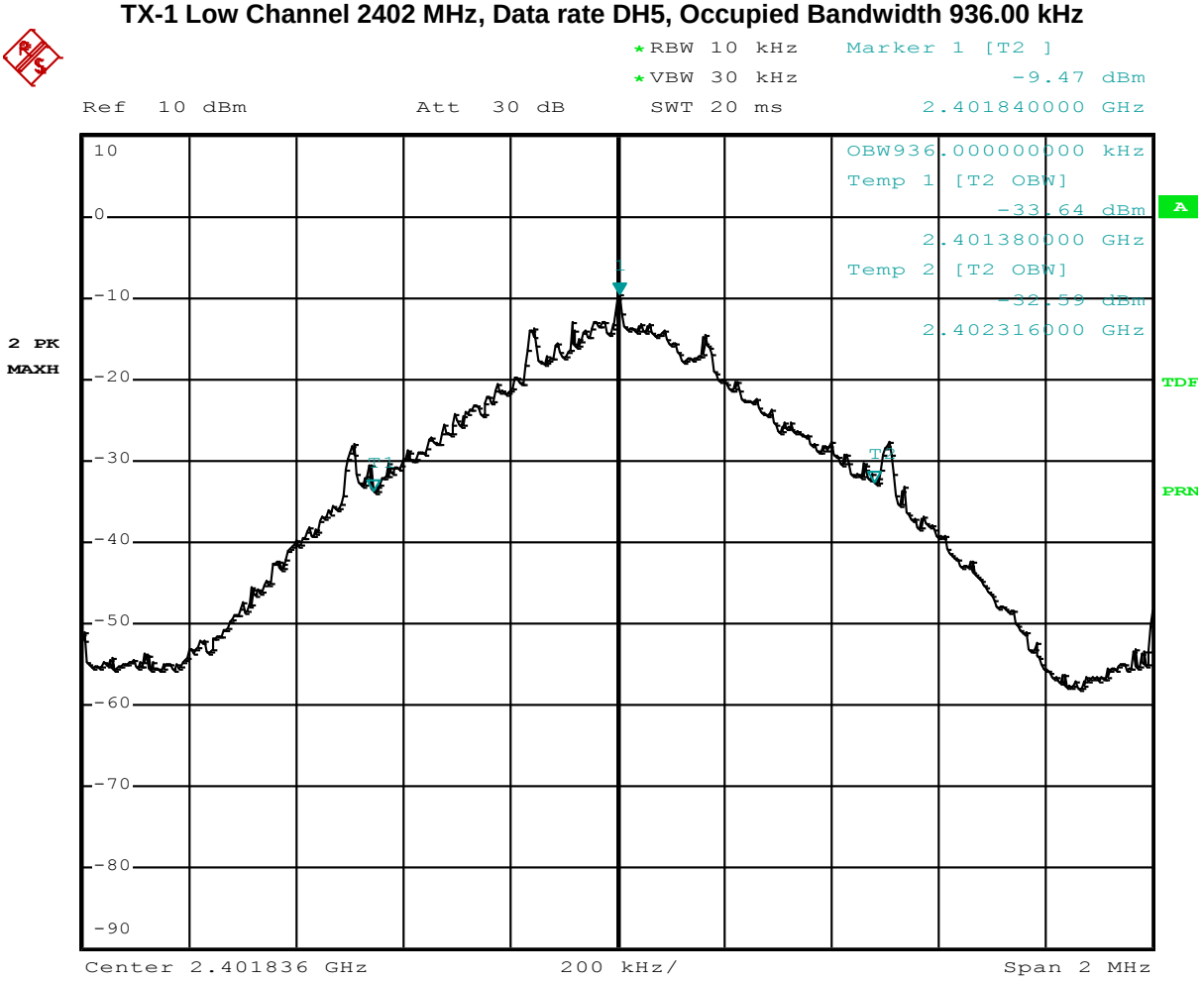
Frequency	Data Rate	Occupied Bandwidth Tx-1	20 dB Bandwidth Tx-1
2402	DH5	936 kHz	816 kHz
2441	DH3	936 kHz	824 kHz
2480	DH1	952 kHz	908 kHz

Frequency	Data Rate	Occupied Bandwidth Tx-2	20 dB Bandwidth Tx-2
2402	DH3	932 kHz	824 kHz
2441	DH1	944 kHz	756 kHz
2480	DH1	956 kHz	812 kHz

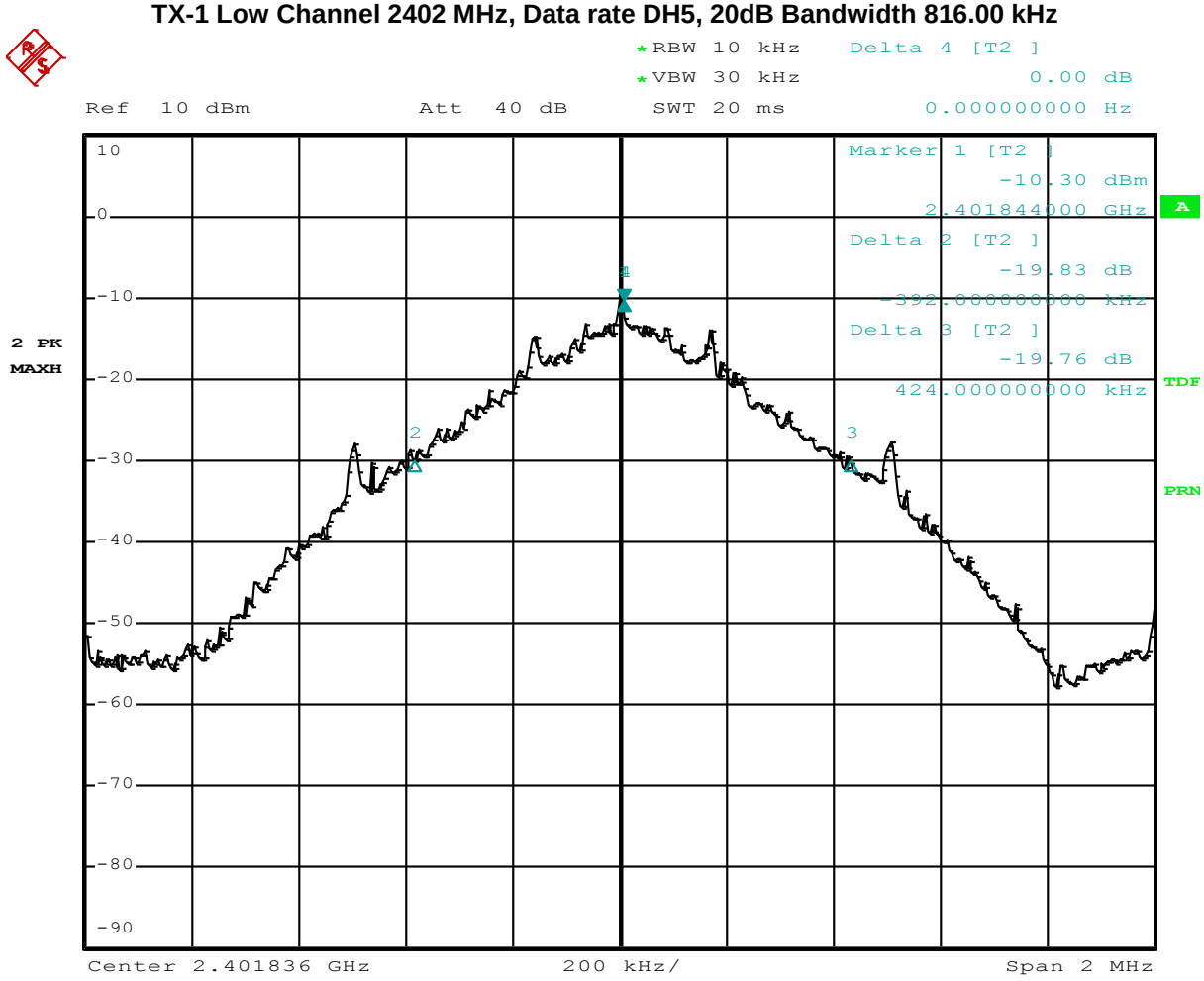
7.4 Setup Photographs:

7.5 Plots/Data:

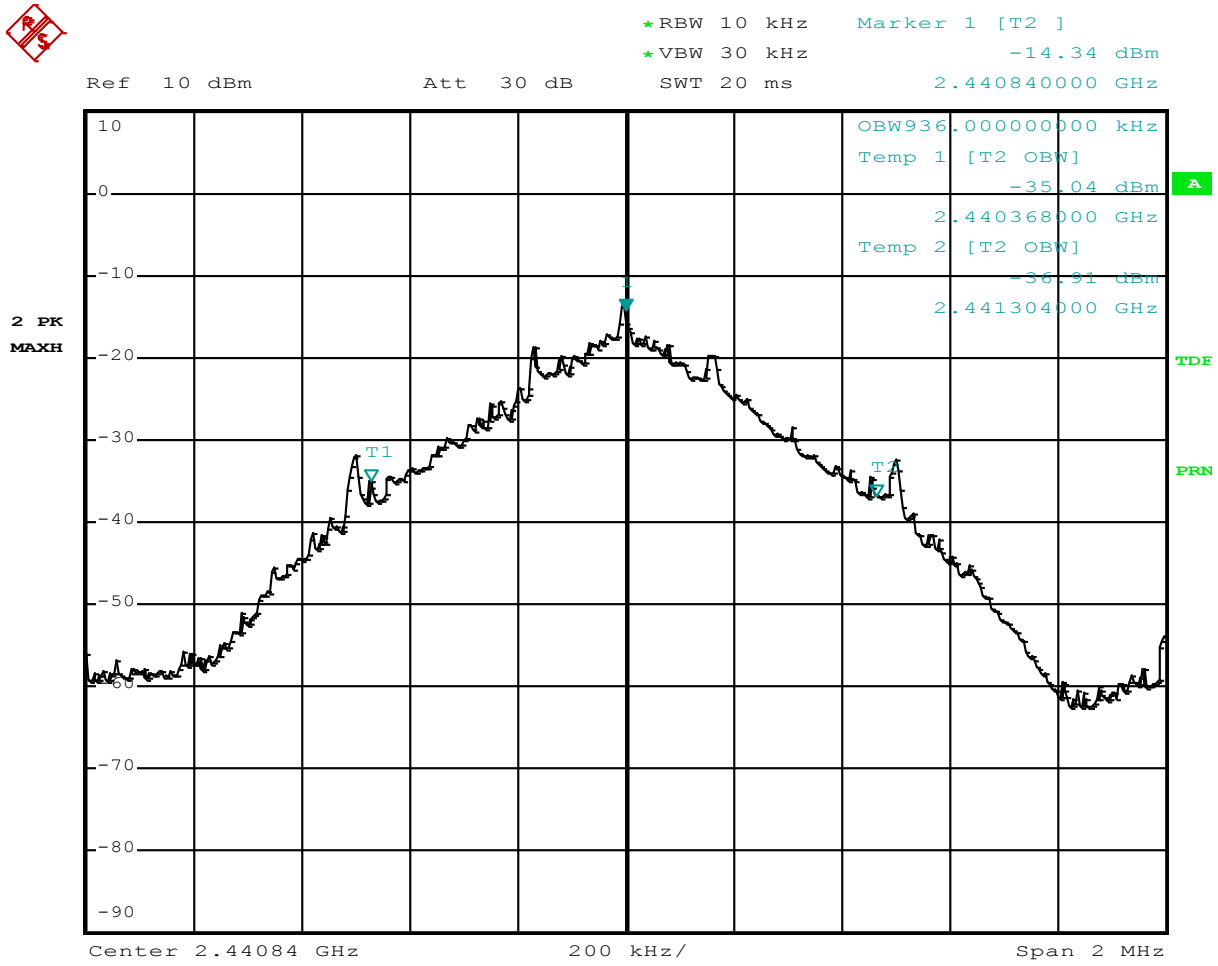
TX-1 Low Channel 2402 MHz, Data rate DH5, Occupied Bandwidth 936.00 kHz



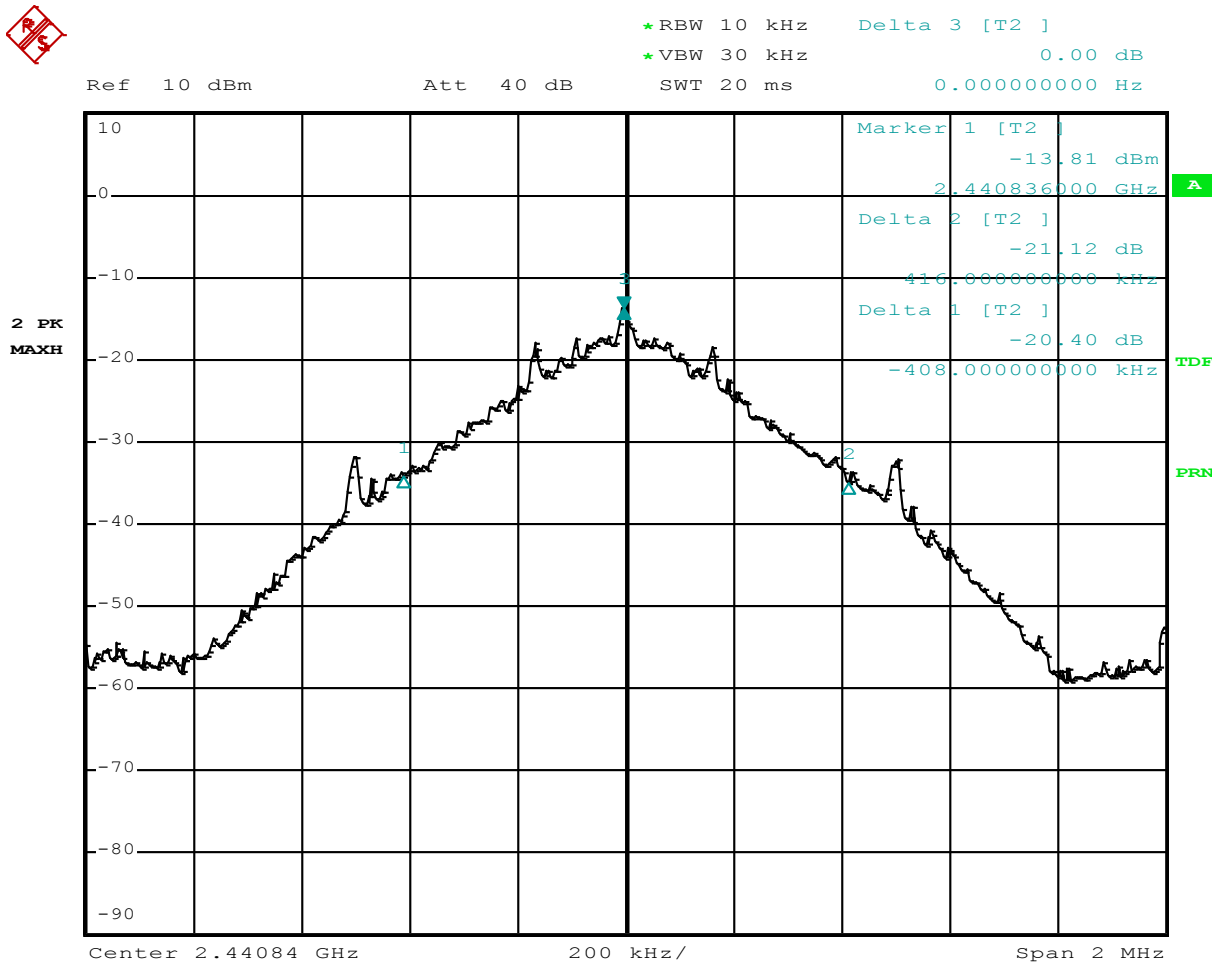
TX-1 Low Channel 2402 MHz, Data rate DH5, 20dB Bandwidth 816.00 kHz



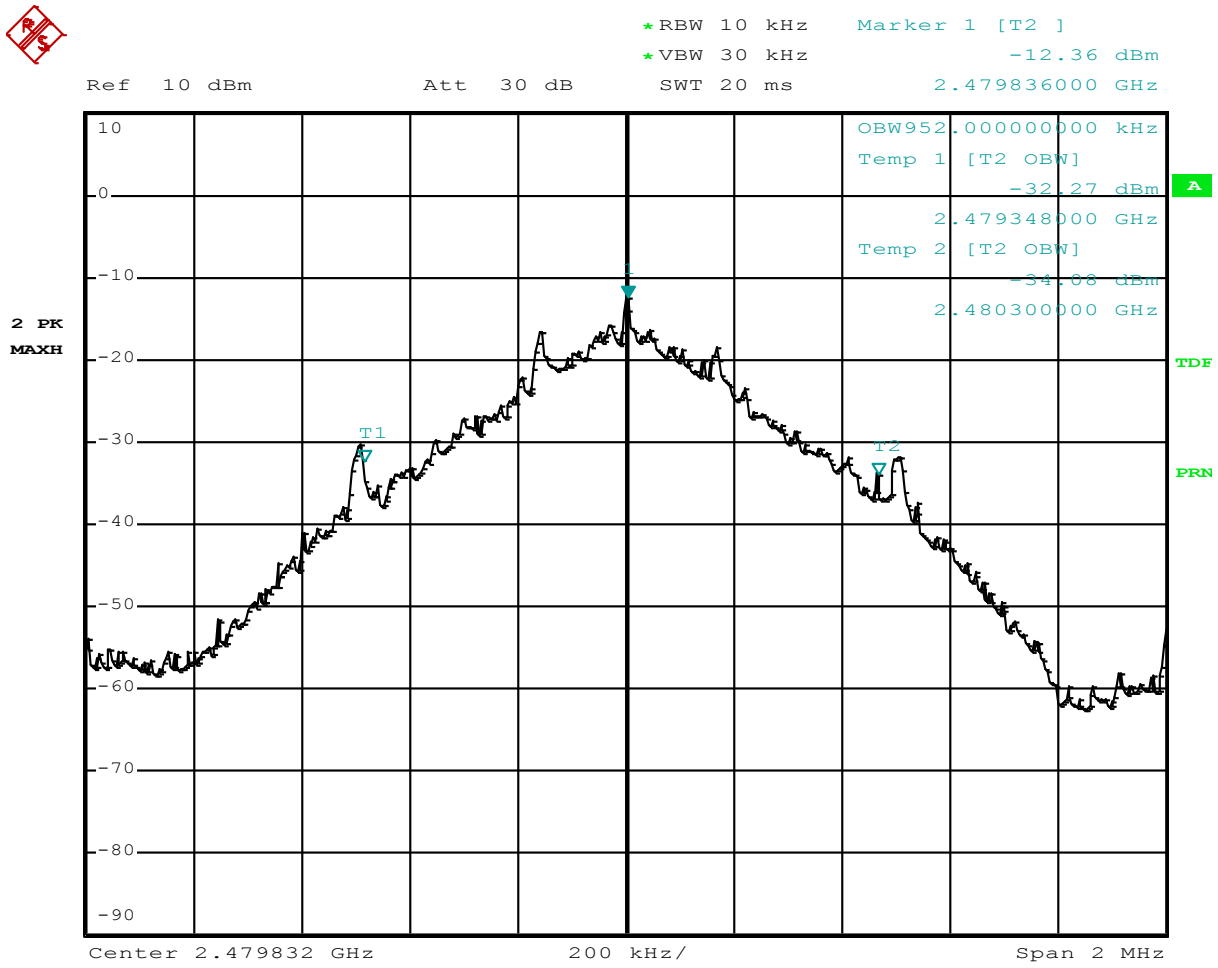
TX-1 Mid Channel 2441 MHz, Data rate DH3, Occupied Bandwidth 936.00 kHz



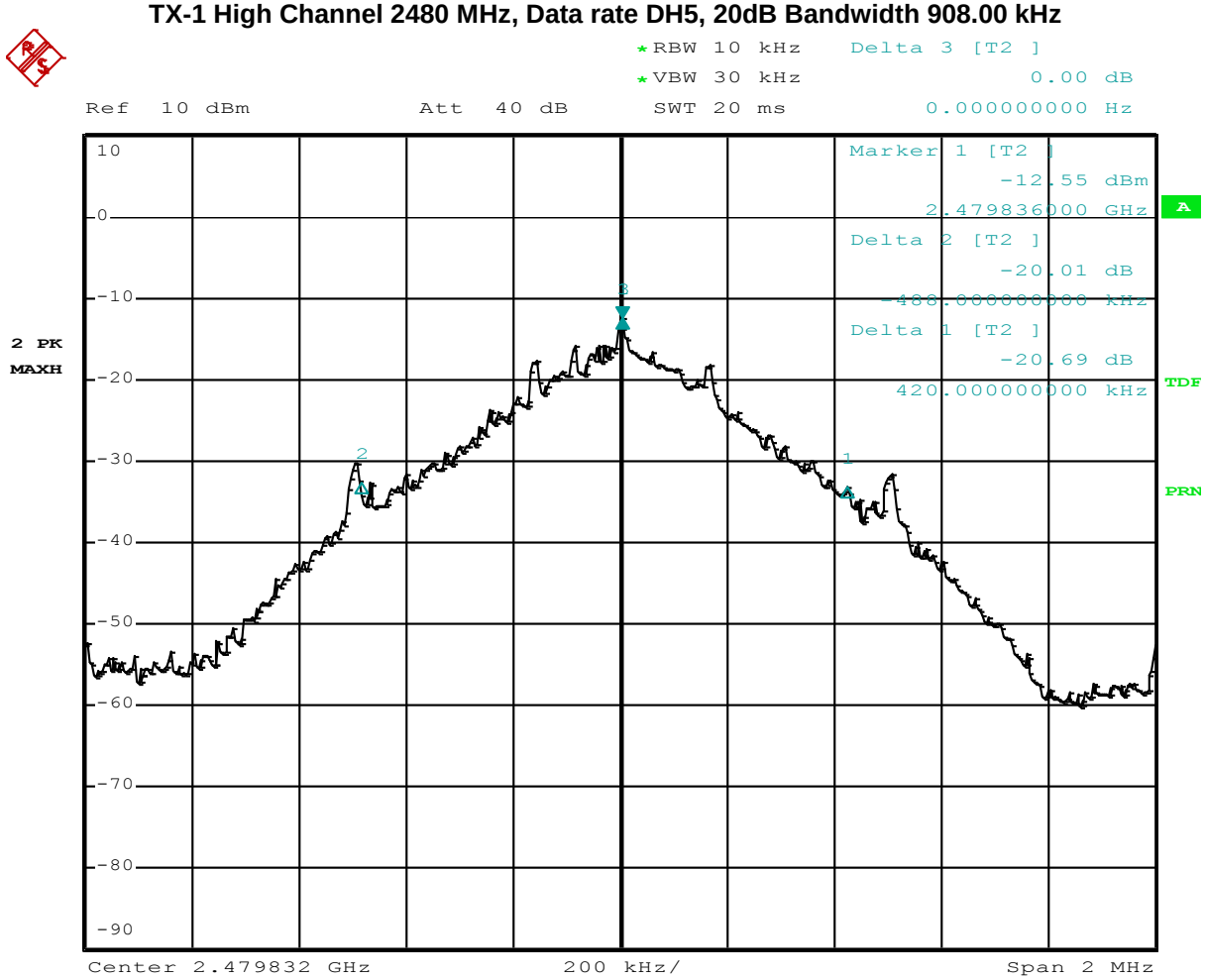
TX-1 Mid Channel 2441 MHz, Data rate DH3, 20dB Bandwidth 824.00 kHz



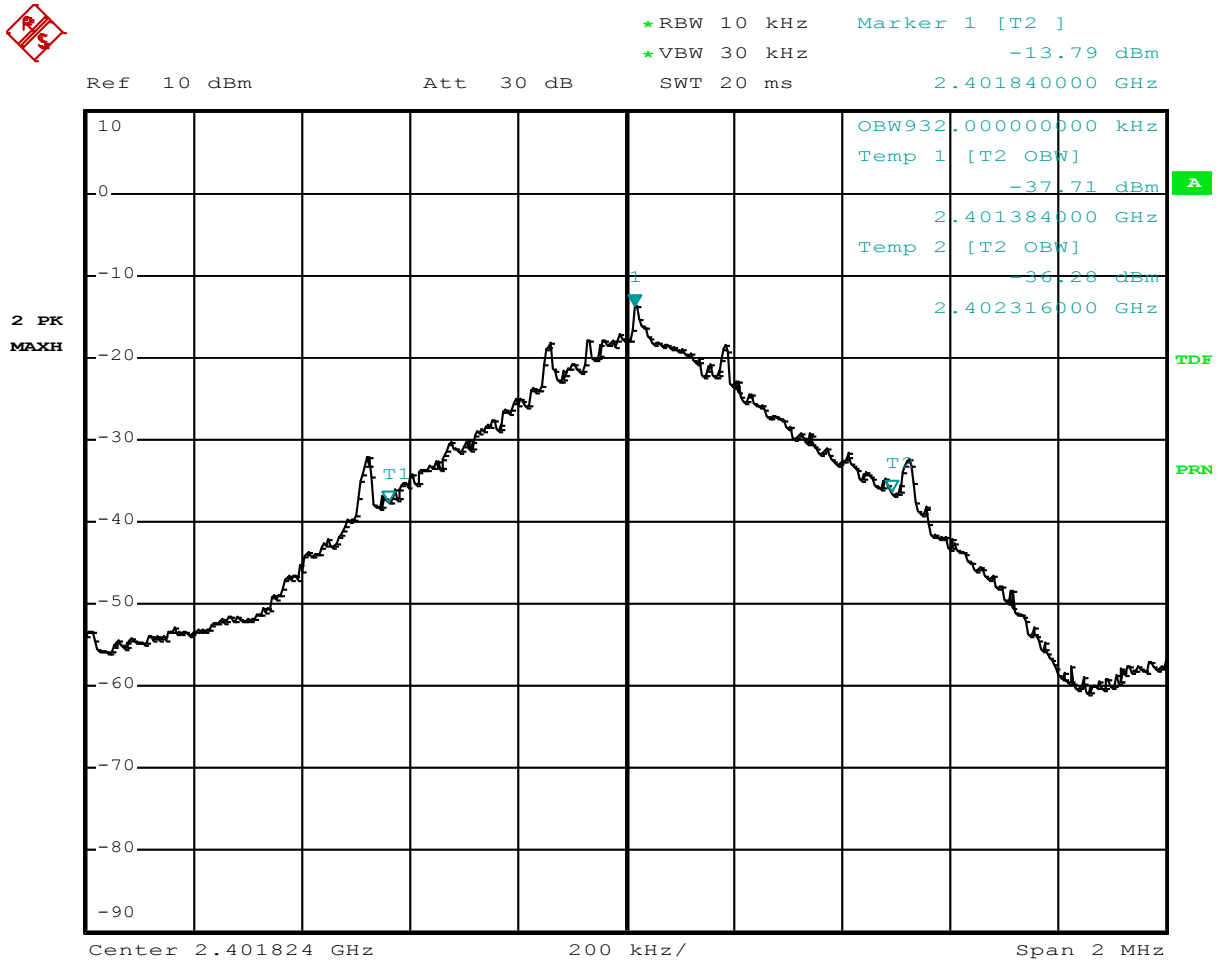
TX-1 High Channel 2480 MHz, Data rate DH1, Occupied Bandwidth 952.00 kHz



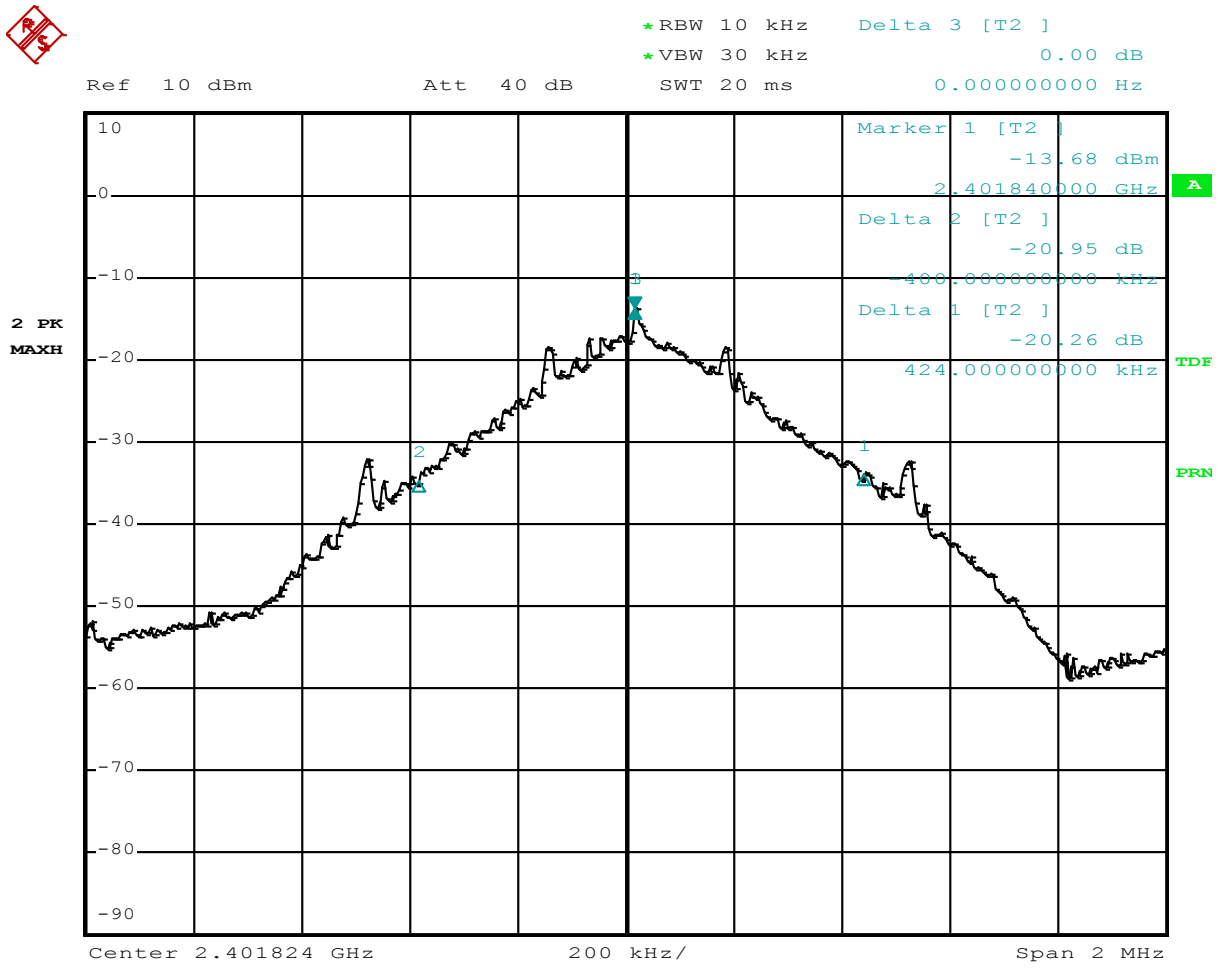
TX-1 High Channel 2480 MHz, Data rate DH5, 20dB Bandwidth 908.00 kHz



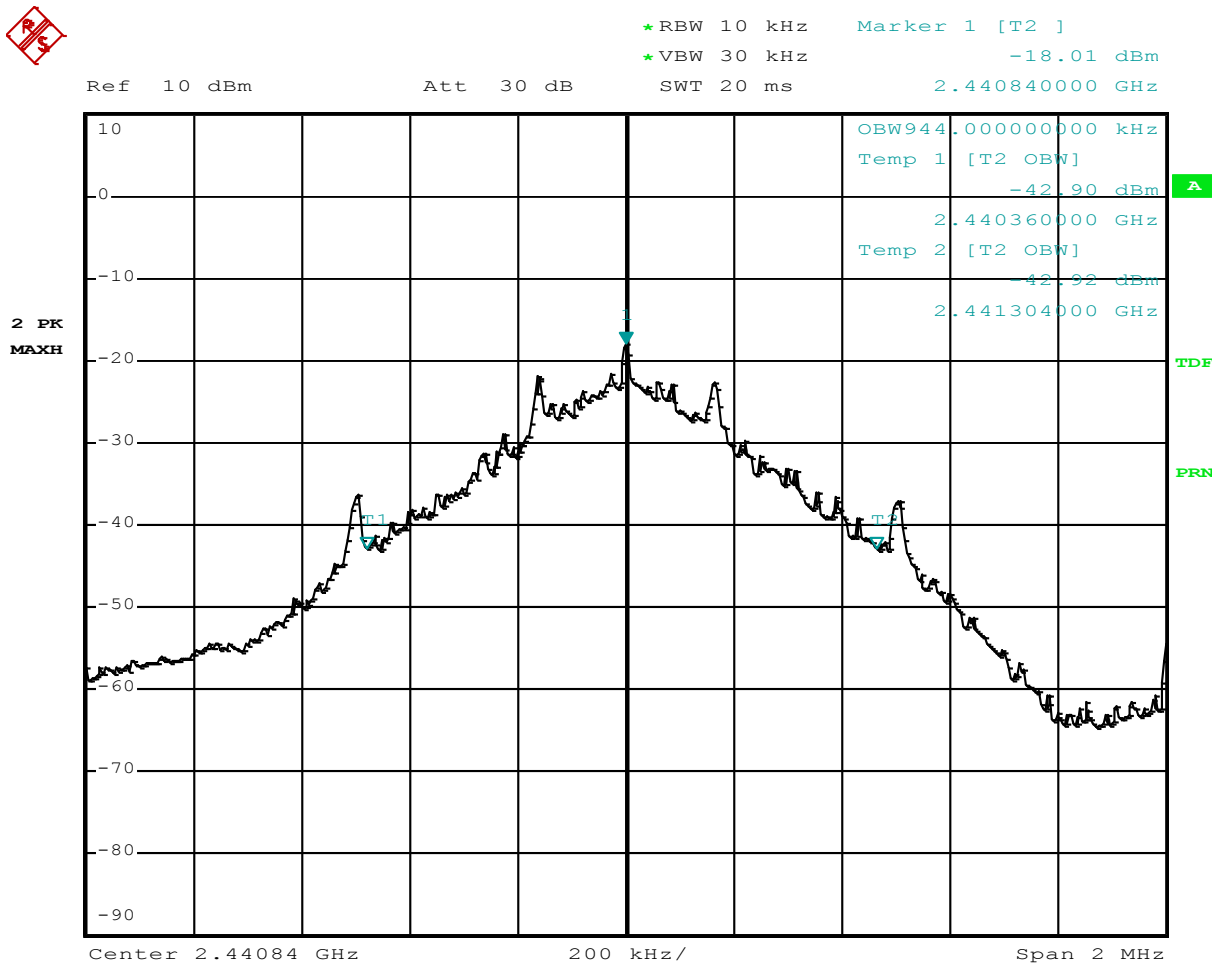
TX-2 Low Channel 2402 MHz, Data rate DH3, Occupied Bandwidth 932.00 kHz



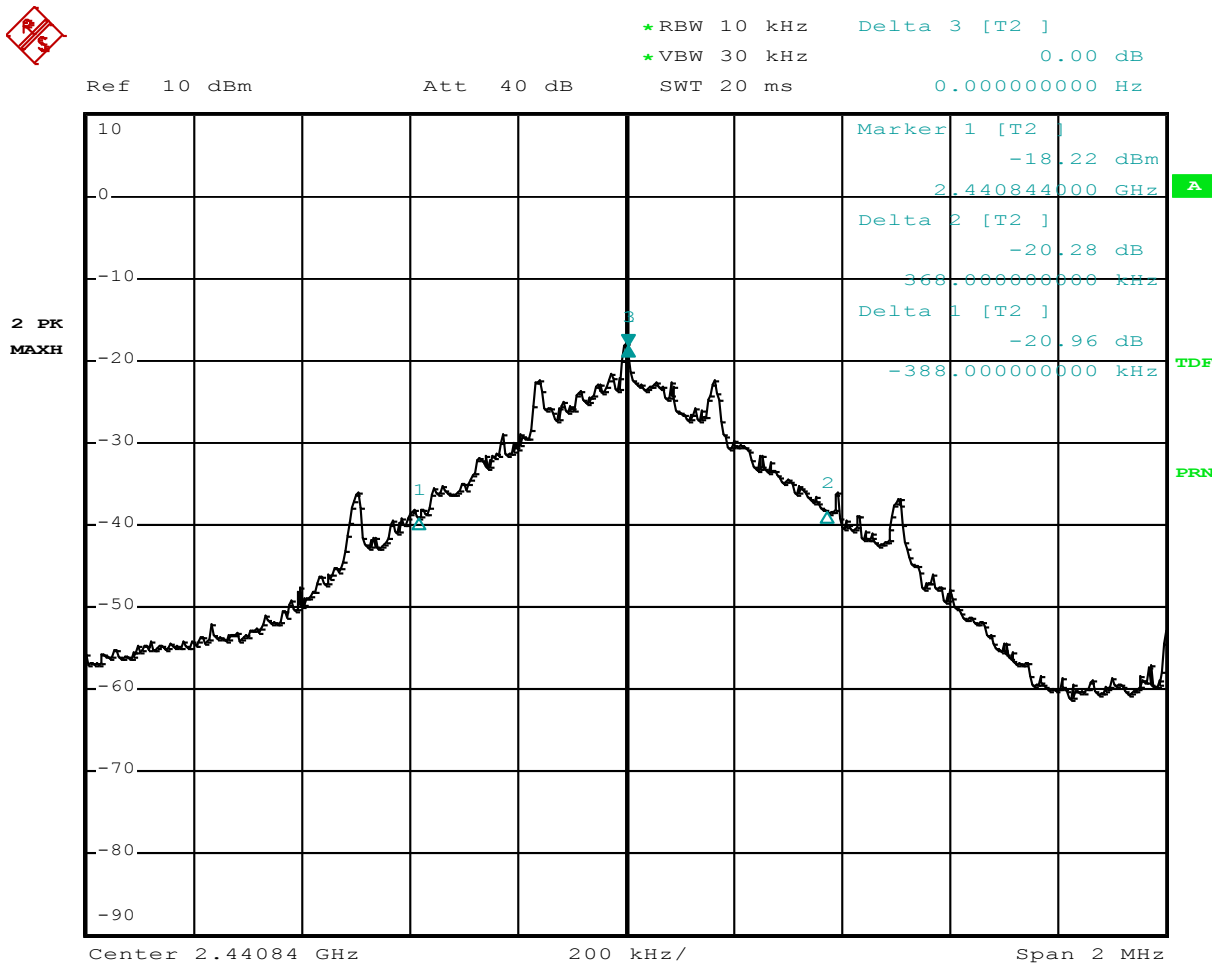
TX-2 Low Channel 2402 MHz, Data rate DH3, 20 dB Bandwidth 824.00 kHz



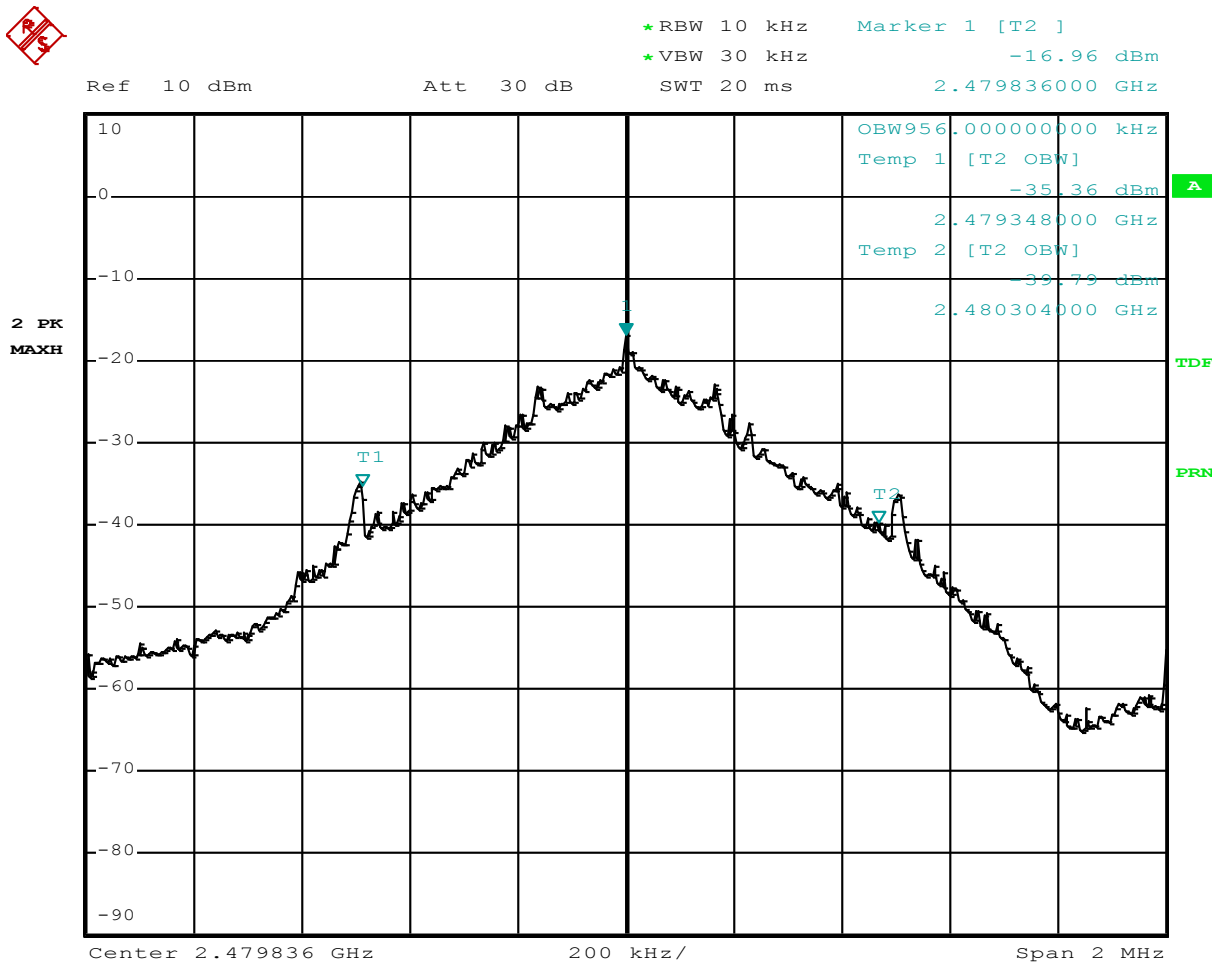
TX-2 Mid Channel 2441 MHz, Data rate DH1, Occupied Bandwidth 944.00 kHz



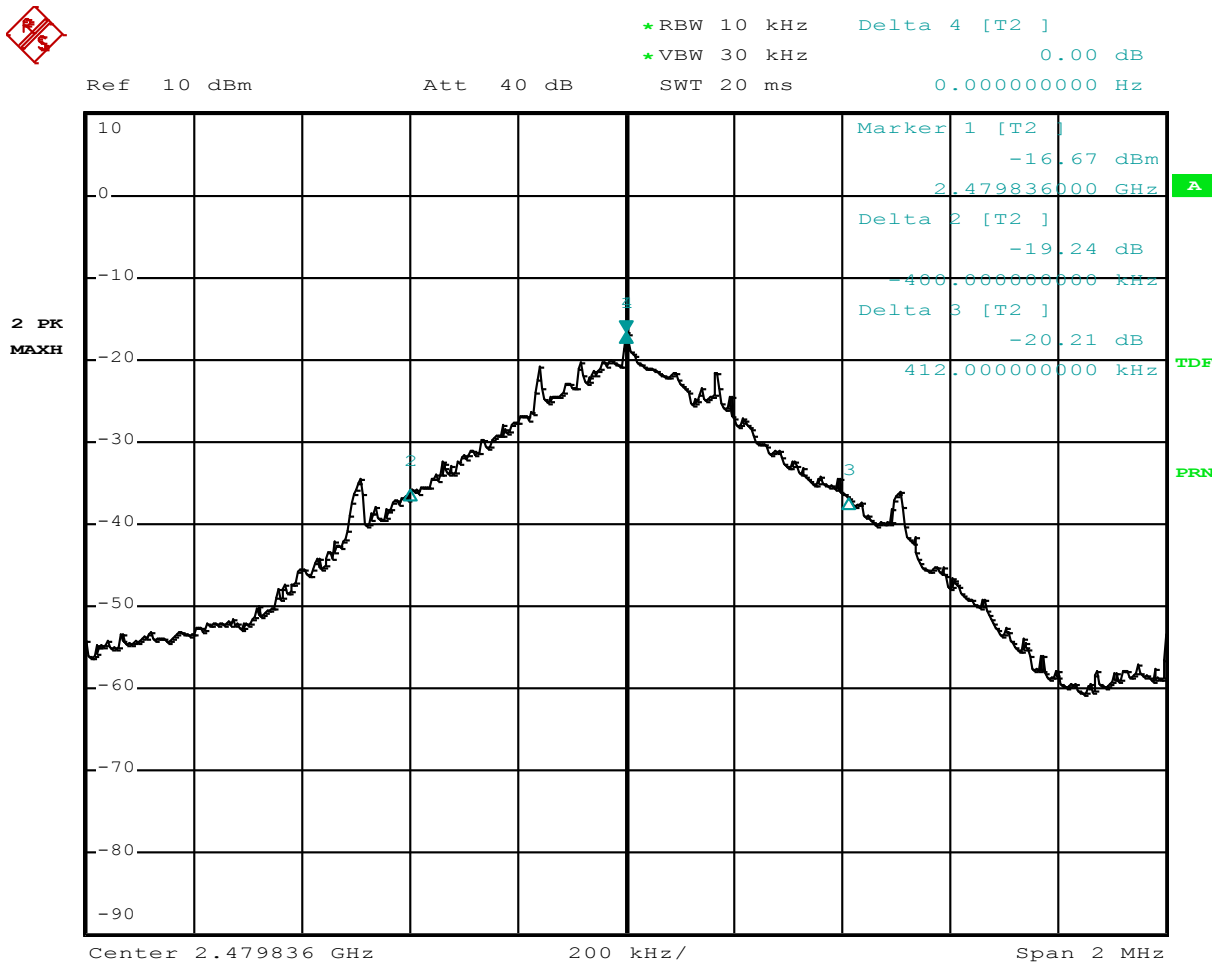
TX-2 Mid Channel 2441 MHz, Data rate DH1, 20dB Bandwidth 756.00 kHz



TX-2 High Channel 2480 MHz, Data rate DH1, Occupied Bandwidth 956.00 kHz



TX-2 High Channel 2480 MHz, Data rate DH5, 20dB Bandwidth 812.00 kHz



Test Personnel:	Naga Suryadevara NS	Test Date:	08/24/2016
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart C (15.247) and RSS-247	Limit Applied:	See test report section 7.3
Input Voltage:	12 VDC (System input 120 VAC 60 Hz)		
		Ambient Temperature:	22 ºC
Pretest Verification:	Yes	Relative Humidity:	44 %
		Atmospheric Pressure:	1003 mbars

Deviations, Additions, or Exclusions: None

8 Channel Separation

8.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247) and RSS 247.

TEST SITE: EMC Lab – Intertek Lake Forest CA

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 380, and 440 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
001001'	Barometer/Humidity Control	Omega	iBTHX-W	0440775	04/22/2016	04/22/2017
000690'	Spectrum Analyzer, 9 KHz - 40 GHz	Rohde & Schwarz	FSP40	100027	01/11/2016	01/11/2017
CBLHF2012-5M-1'	5m 9kHz-40GHz Coaxial Cable - SET 1	Huber & Suhner	SF102	252676001	02/09/2016	02/09/2017

Software Utilized:

Name	Manufacturer	Version
None		

8.3 Results:

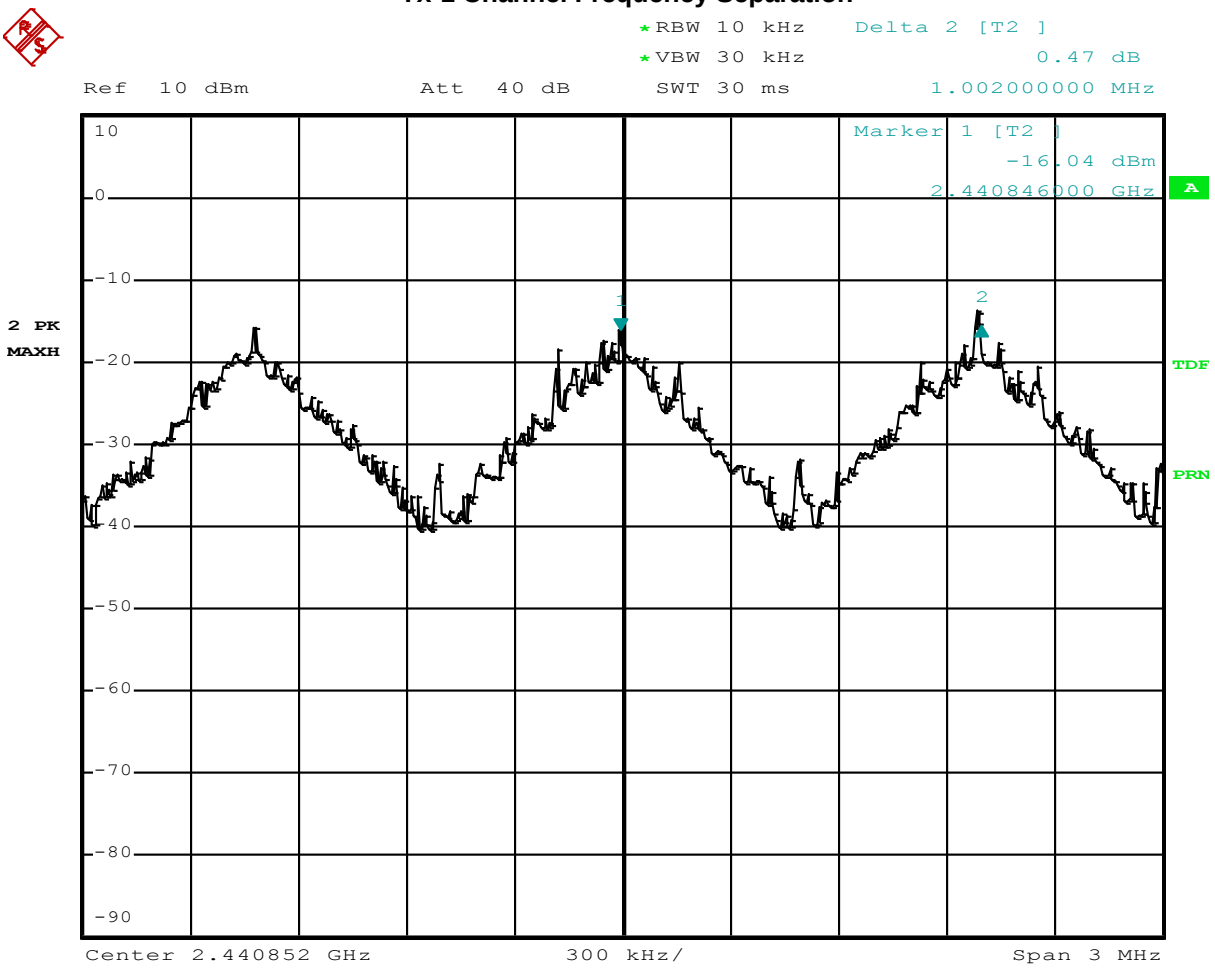
The sample tested was found to Comply. Systems shall have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20-dB bandwidth of the hopping channel, whichever is greater.

The measured channel frequency separation is 1.002 MHz for both Tx-1 and Tx-2.

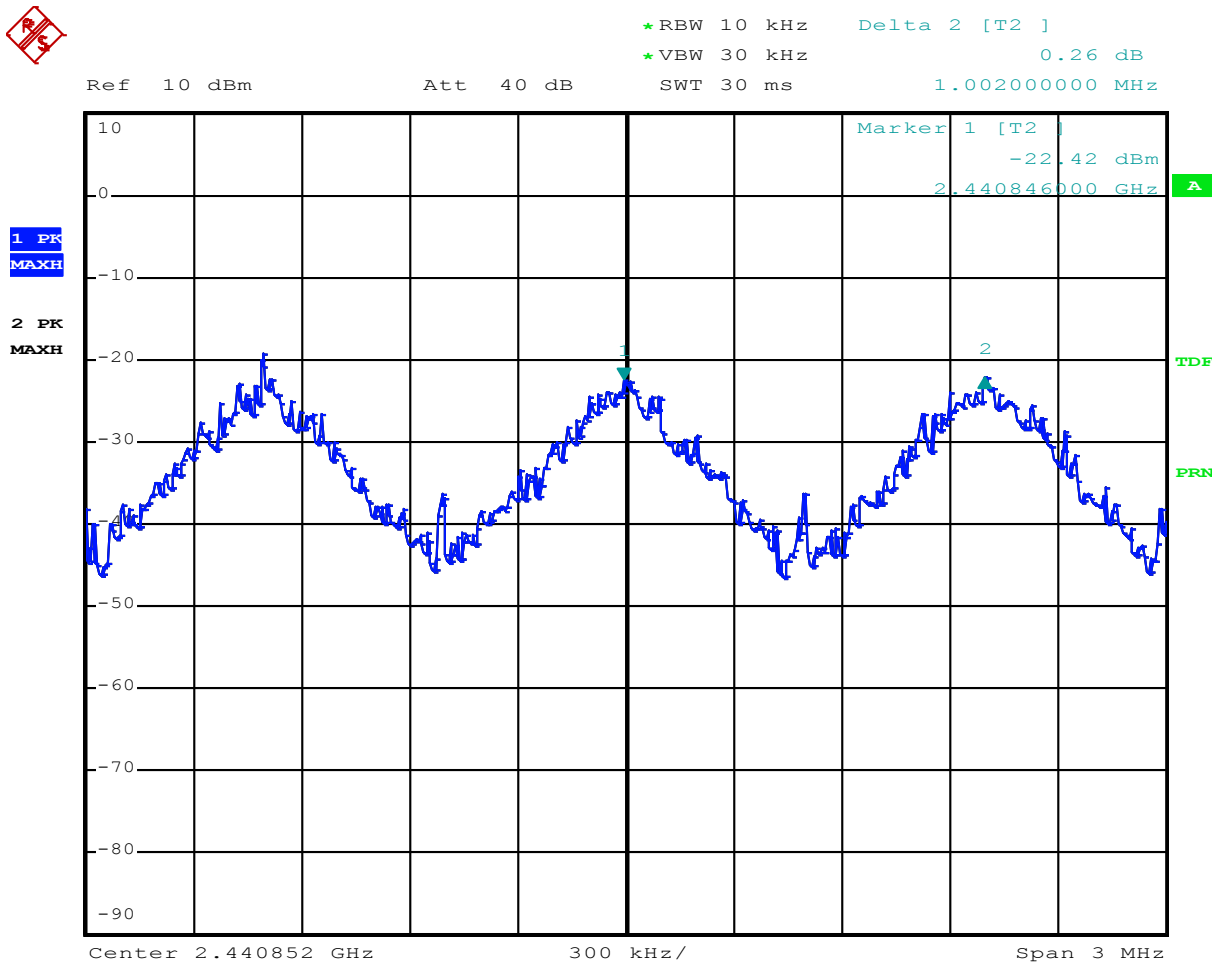
8.4 Setup Photographs:

8.5 Plots/Data:

Tx-1 Channel Frequency Separation



Tx-2 Channel Frequency Separation



Test Personnel:	Naga Suryadevara NS	Test Date:	08/24/2016
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart C (15.247) and RSS-247	Limit Applied:	See test report section 8.3
Input Voltage:	12 VDC (System input 120 VAC 60 Hz)		
		Ambient Temperature:	22 ºC
Pretest Verification:	Yes	Relative Humidity:	44 %
		Atmospheric Pressure:	1003 mbars

Deviations, Additions, or Exclusions: None

9 Number of Hopping Channels

9.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247) and RSS 247.

TEST SITE: EMC Lab – Intertek Lake Forest CA

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 380, and 440 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
001001'	Barometer/Humidity Control	Omega	iBTHX-W	0440775	04/22/2016	04/22/2017
000690'	Spectrum Analyzer, 9 KHz - 40 GHz	Rohde & Schwarz	FSP40	100027	01/11/2016	01/11/2017
CBLHF2012-5M-1'	5m 9kHz-40GHz Coaxial Cable - SET 1	Huber & Suhner	SF102	252676001	02/09/2016	02/09/2017

Software Utilized:

Name	Manufacturer	Version
None		

9.3 Results:

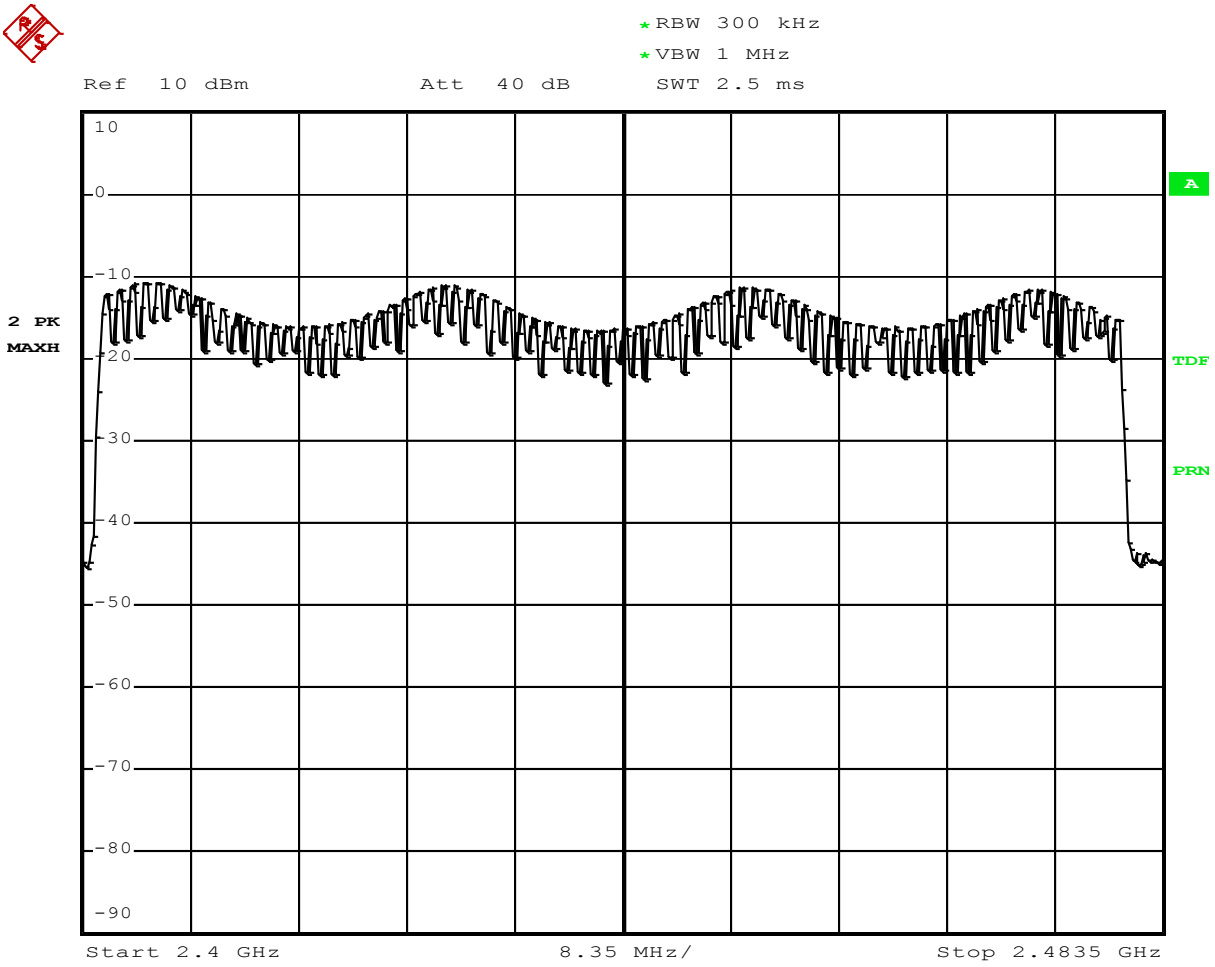
The sample tested was found to Comply. Systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping channels.

Tx-1 and Tx-2 have 79 hopping channels.

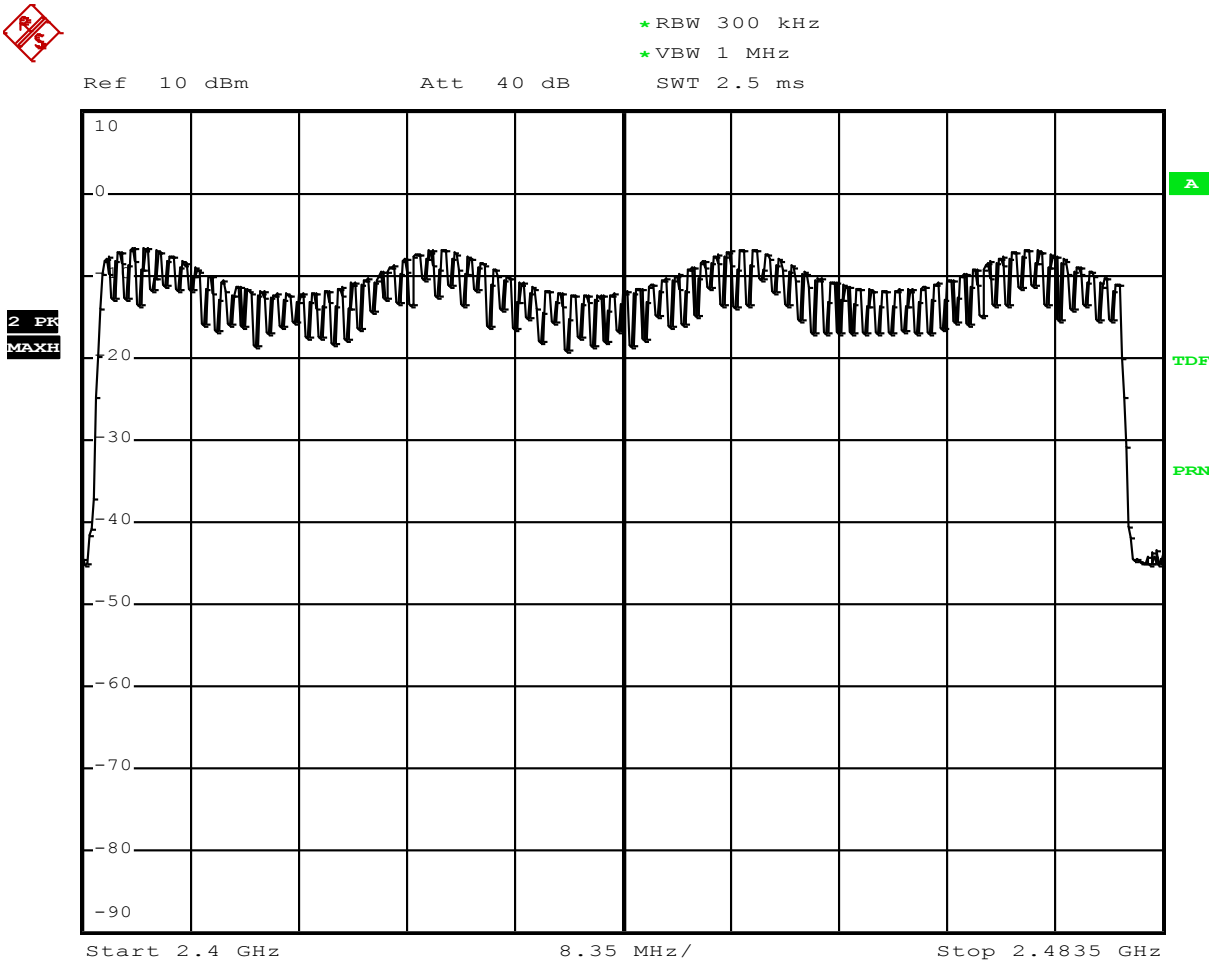
9.4 Setup Photographs:

9.5 Plots/Data:

Tx-1 Number of Hopping Channels



Tx-2 Number of Hopping Channels



Test Personnel:	Naga Suryadevara NS	Test Date:	08/24/2016
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart C (15.247) and RSS-247	Limit Applied:	See test report section 9.3
Input Voltage:	12 VDC (System input 120 VAC 60 Hz)		
		Ambient Temperature:	22 ºC
Pretest Verification:	Yes	Relative Humidity:	44 %
		Atmospheric Pressure:	1003 mbars

Deviations, Additions, or Exclusions: None

10 Average Channel Occupancy Time

10.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247) and RSS 247.

TEST SITE: EMC Lab – Intertek Lake Forest CA

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 380, and 440 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
001001'	Barometer/Humidity Control	Omega	iBTHX-W	0440775	04/22/2016	04/22/2017
000690'	Spectrum Analyzer, 9 KHz - 40 GHz	Rohde & Schwarz	FSP40	100027	01/11/2016	01/11/2017
CBLHF2012-5M-1'	5m 9kHz-40GHz Coaxial Cable - SET 1	Huber & Suhner	SF102	252676001	02/09/2016	02/09/2017

Software Utilized:

Name	Manufacturer	Version
None		

10.3 Results:

The sample tested was found to Comply. For systems operating in the 2400-2483.5 MHz band, the average time of occupancy on any channel shall not be greater than 0.4 second within a period of 0.4 second multiplied by the number of hopping channels employed

Since the radio employs 79 channels, Occupancy time was calculated during the period of 0.4 * 79 = 31.6 sec.

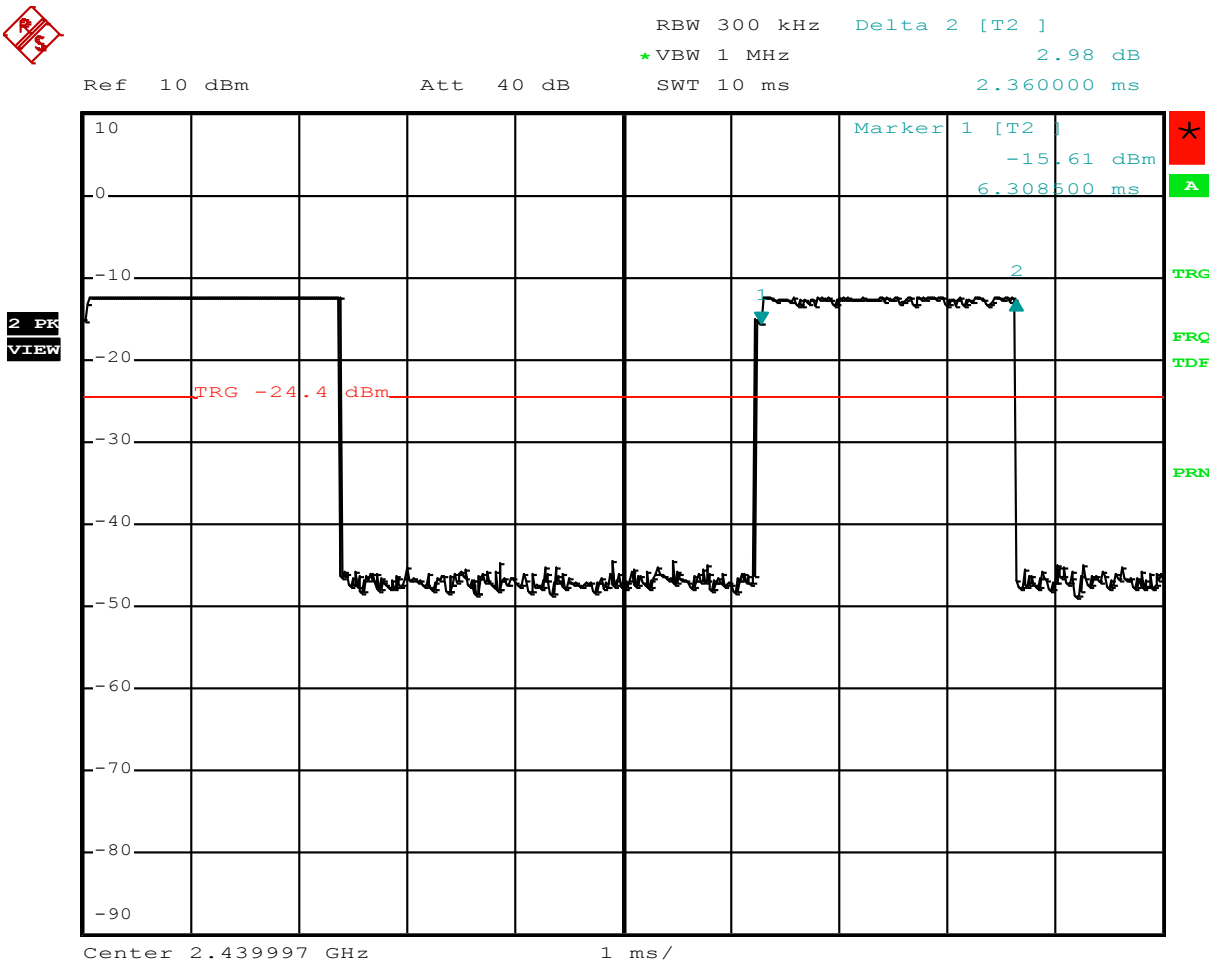
Tx-1 Occupancy Time (see plots in section 10.5) = 0.00236 * 15 *10 = 0.354 sec

Tx-2 Occupancy Time (see plots in section 10.5) = 0.00292 * 13 *10 = 0.379 sec

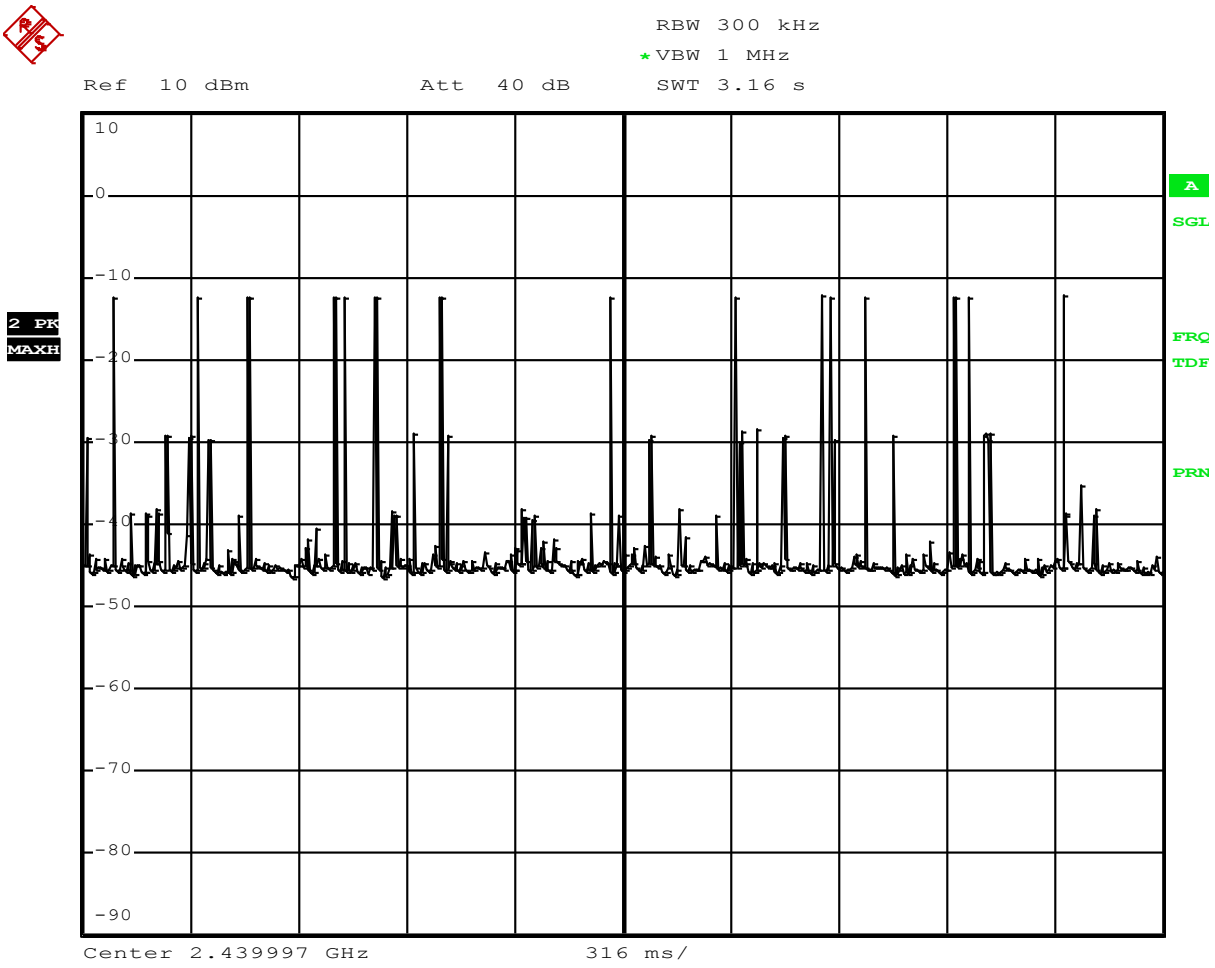
10.4 Setup Photographs:

10.5 Plots/Data:

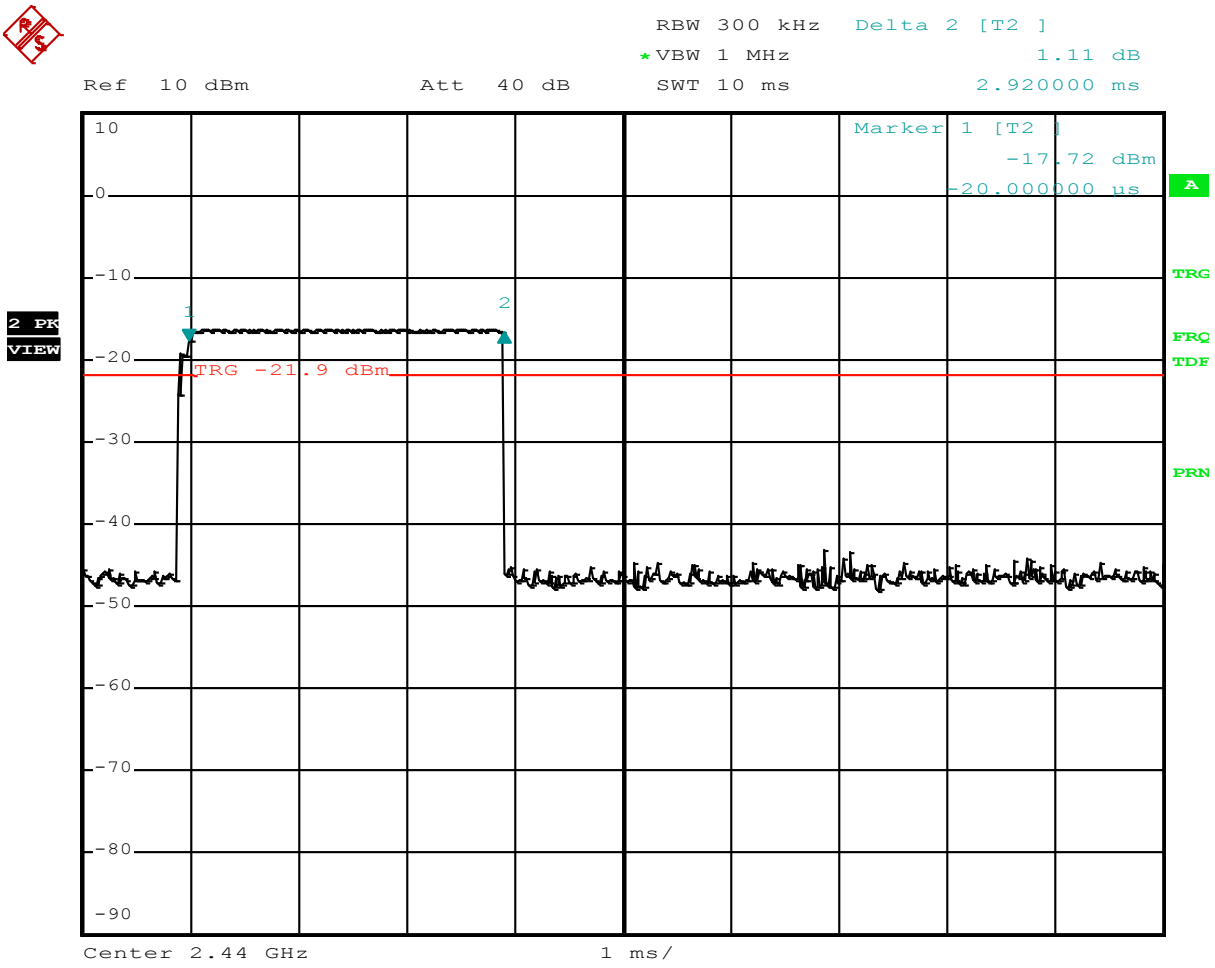
Tx-1 Channel Occupancy Time



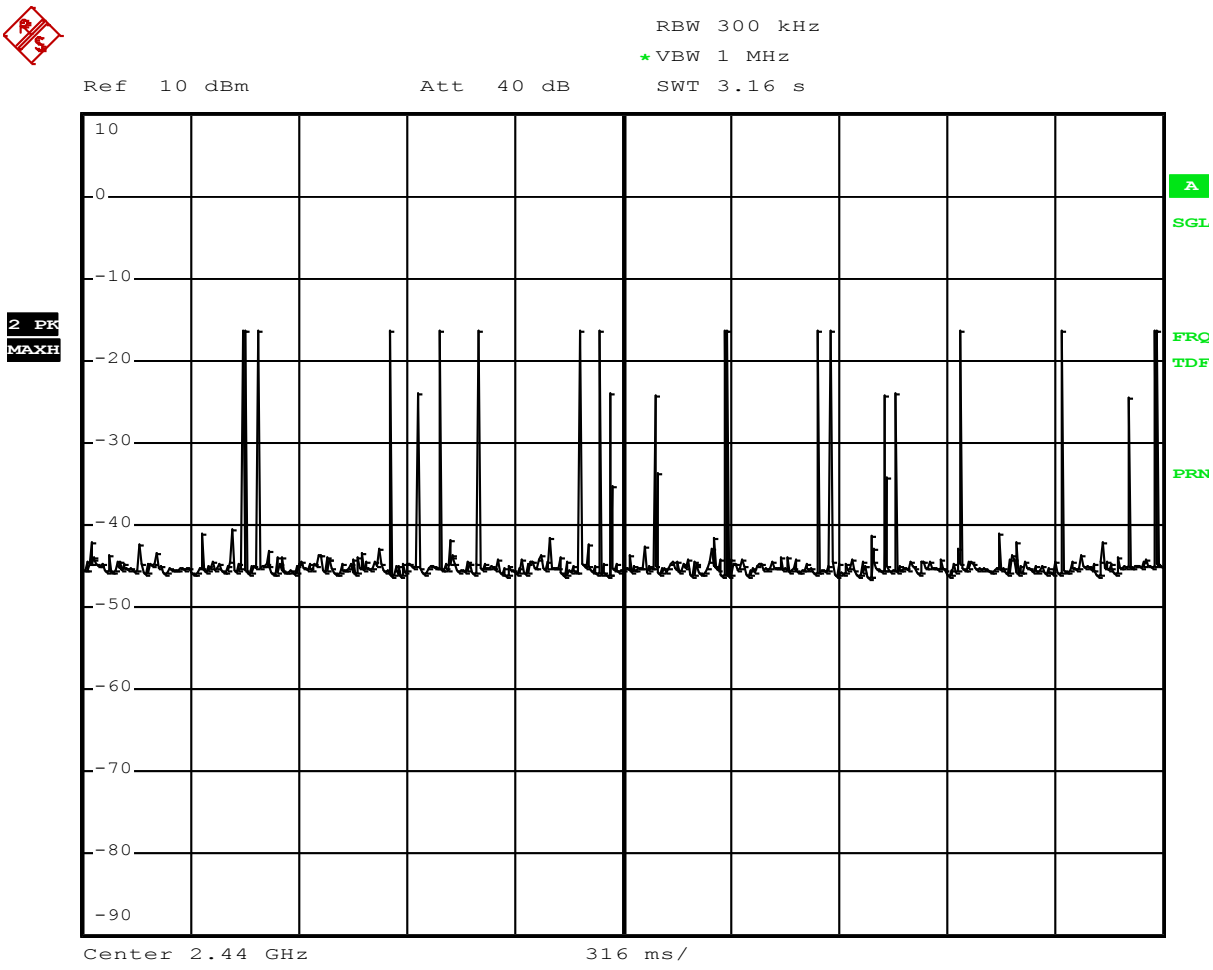
Tx-1 Channel Occupancy Time



Tx-2 Channel Occupancy Time



Tx-2 Channel Occupancy Time



Test Personnel:	Naga Suryadevara NS	Test Date:	08/24/2016
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart C (15.247) and RSS-247	Limit Applied:	See test report section 10.3
Input Voltage:	12 VDC (System input 120 VAC 60 Hz)		
		Ambient Temperature:	22 ºC
Pretest Verification:	Yes	Relative Humidity:	44 %
		Atmospheric Pressure:	1003 mbars

Deviations, Additions, or Exclusions: None

11 Out of Band and Band Edge Conducted Emissions

11.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247) and RSS 247.

TEST SITE: EMC Lab – Intertek Lake Forest CA

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 380, and 440 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

11.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
001001'	Barometer/Humidity Control	Omega	iBTHX-W	0440775	04/22/2016	04/22/2017
000690'	Spectrum Analyzer, 9 KHz - 40 GHz	Rohde & Schwarz	FSP40	100027	01/11/2016	01/11/2017
CBLHF2012-5M-1'	5m 9kHz-40GHz Coaxial Cable - SET 1	Huber & Suhner	SF102	252676001	02/09/2016	02/09/2017

Software Utilized:

Name	Manufacturer	Version
None		

11.3 Results:

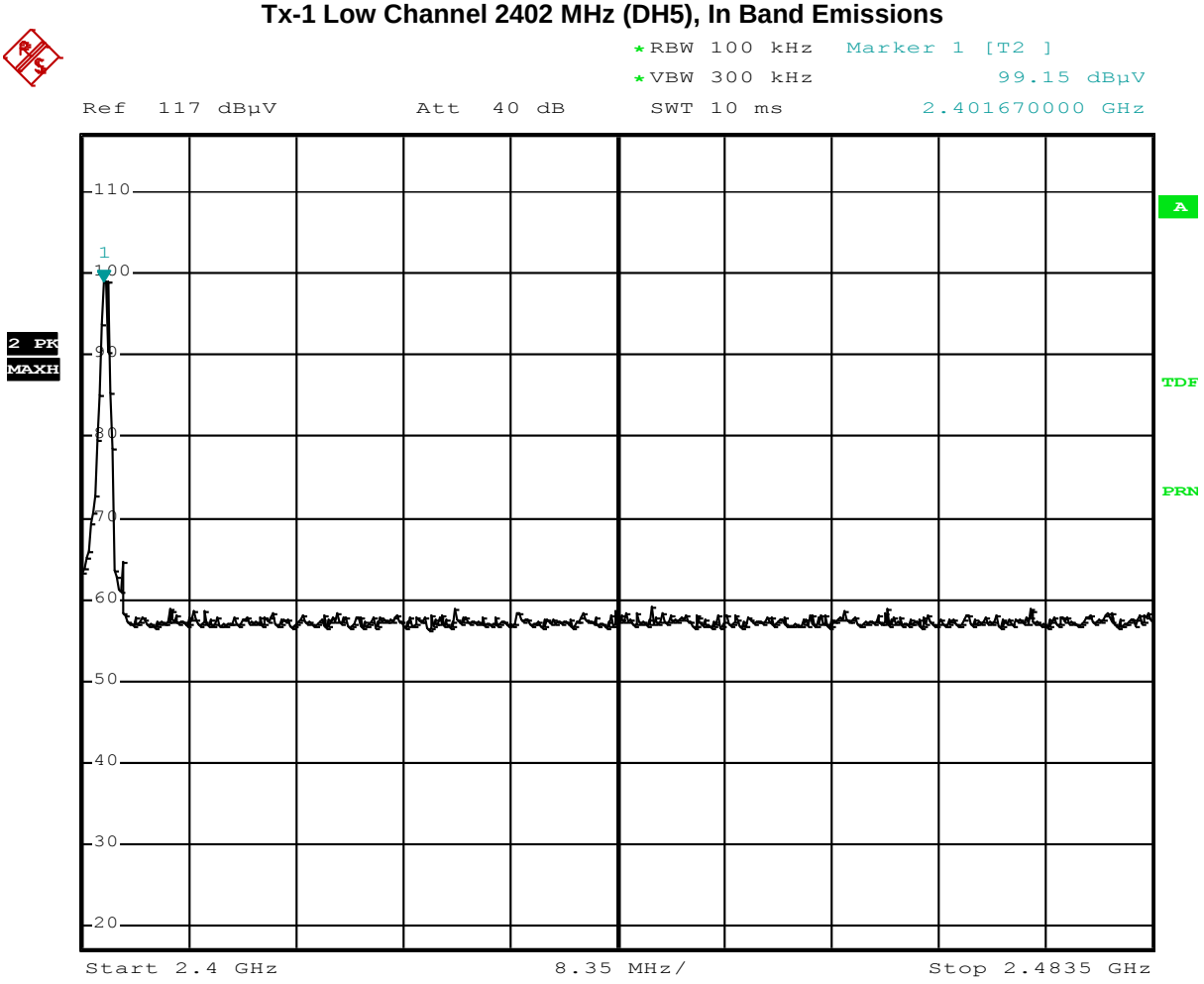
The sample tested was found to Comply. In any 100 kHz bandwidth outside the EUT pass-band, the RF power shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

All emissions measured were 20 dB below fundamental as indicated in the plots in sections 11.5.

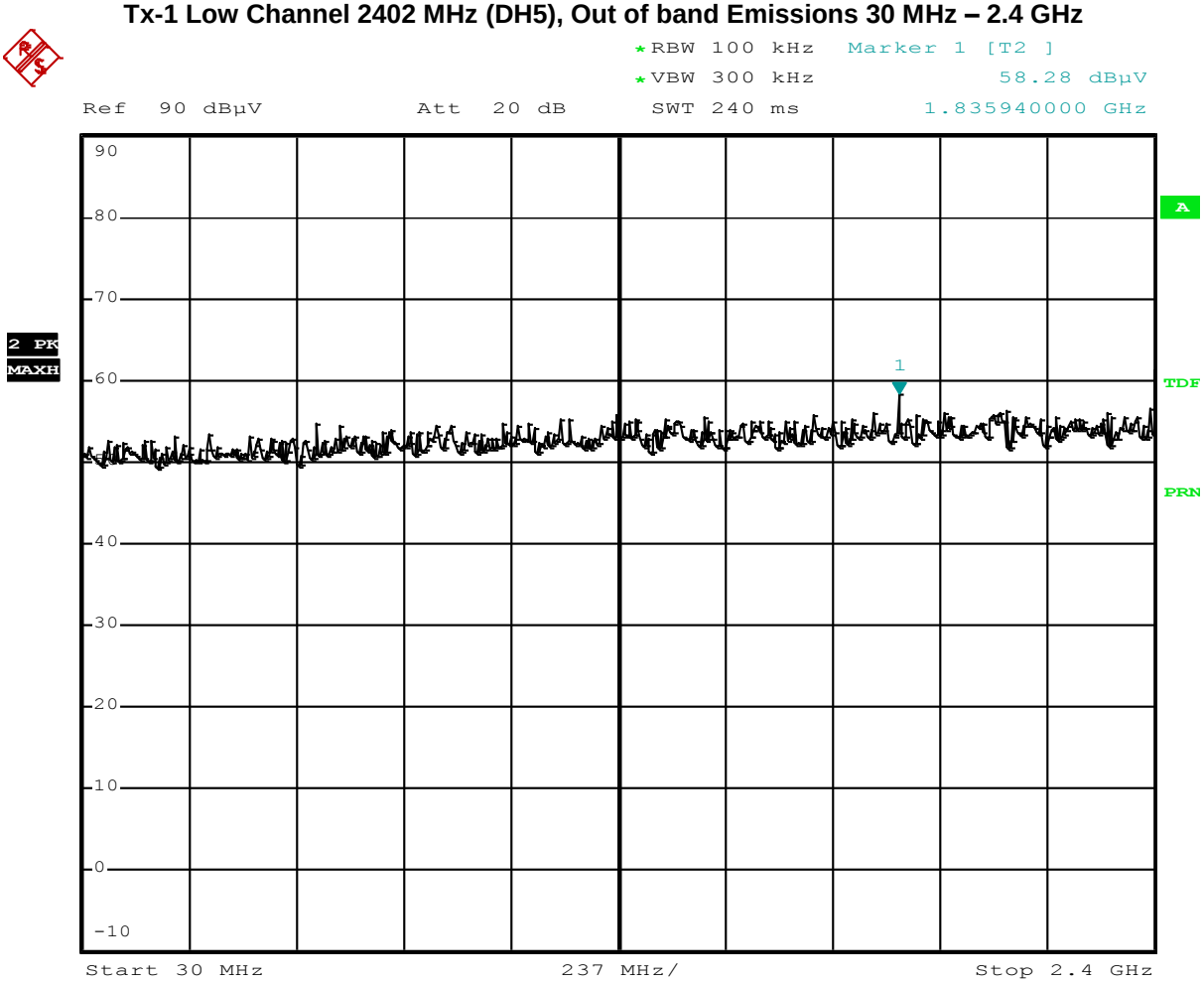
11.4 Setup Photographs:

11.5 Plots/Data:

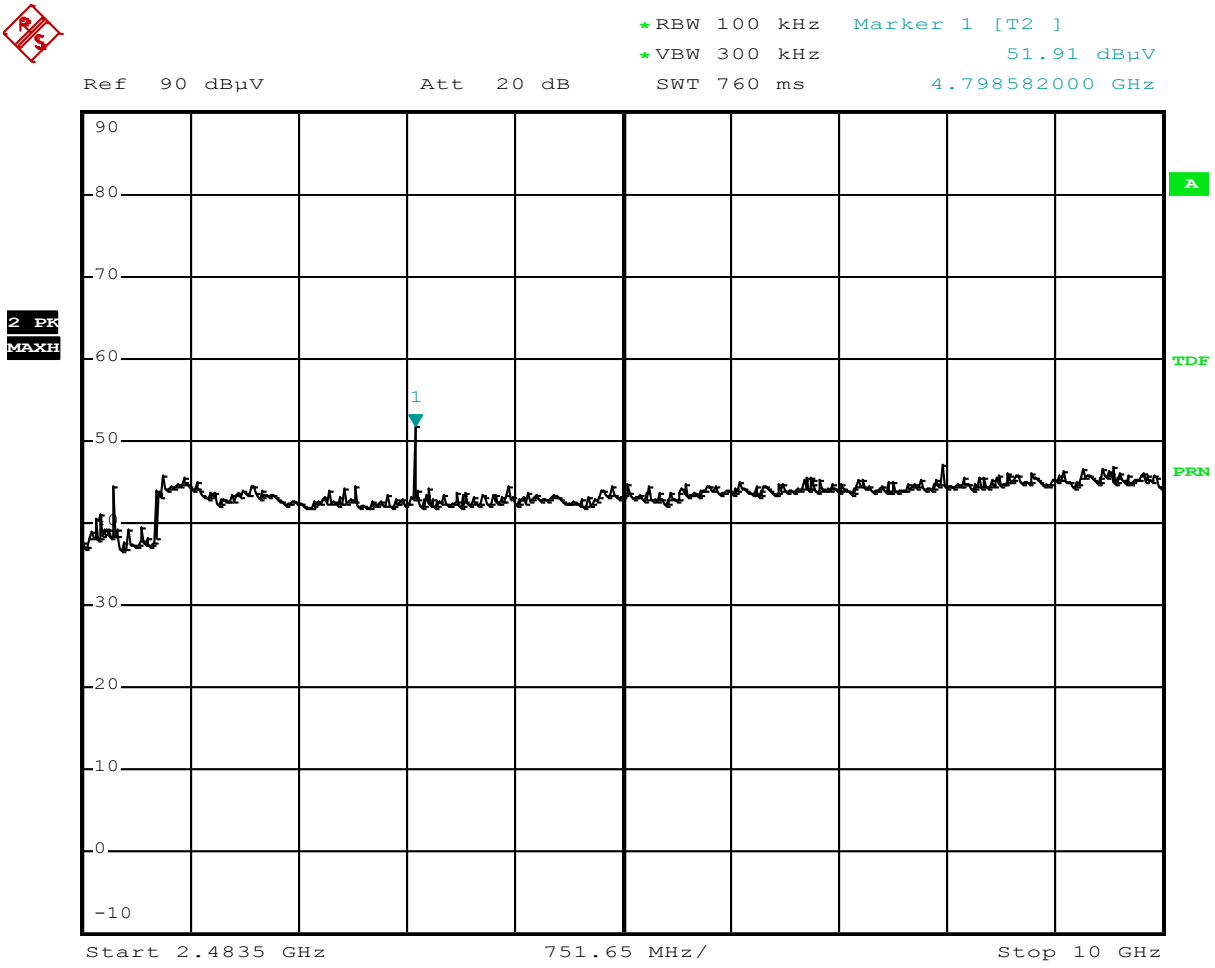
Tx-1 Low Channel 2402 MHz (DH5), In Band Emissions



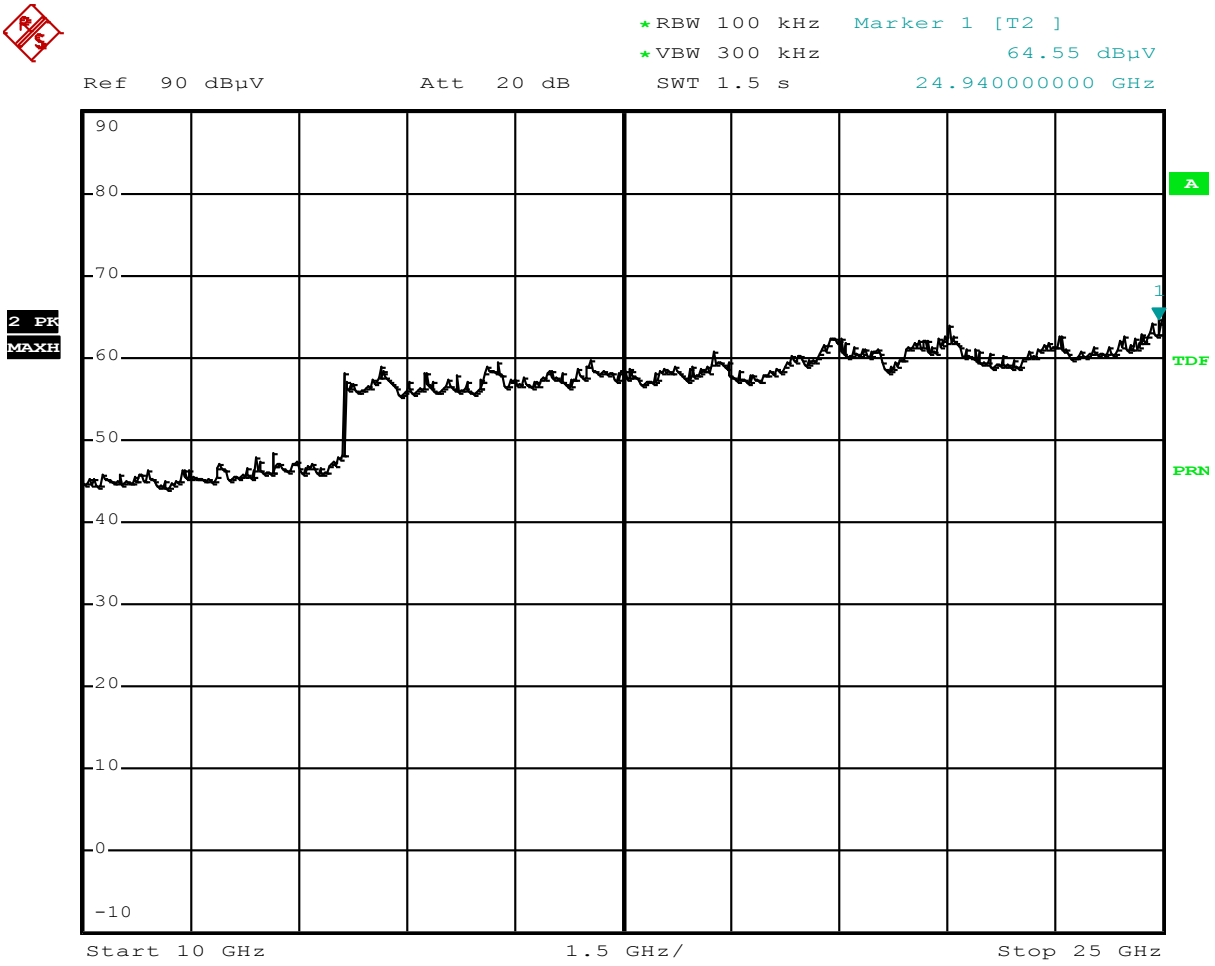
Tx-1 Low Channel 2402 MHz (DH5), Out of band Emissions 30 MHz – 2.4 GHz



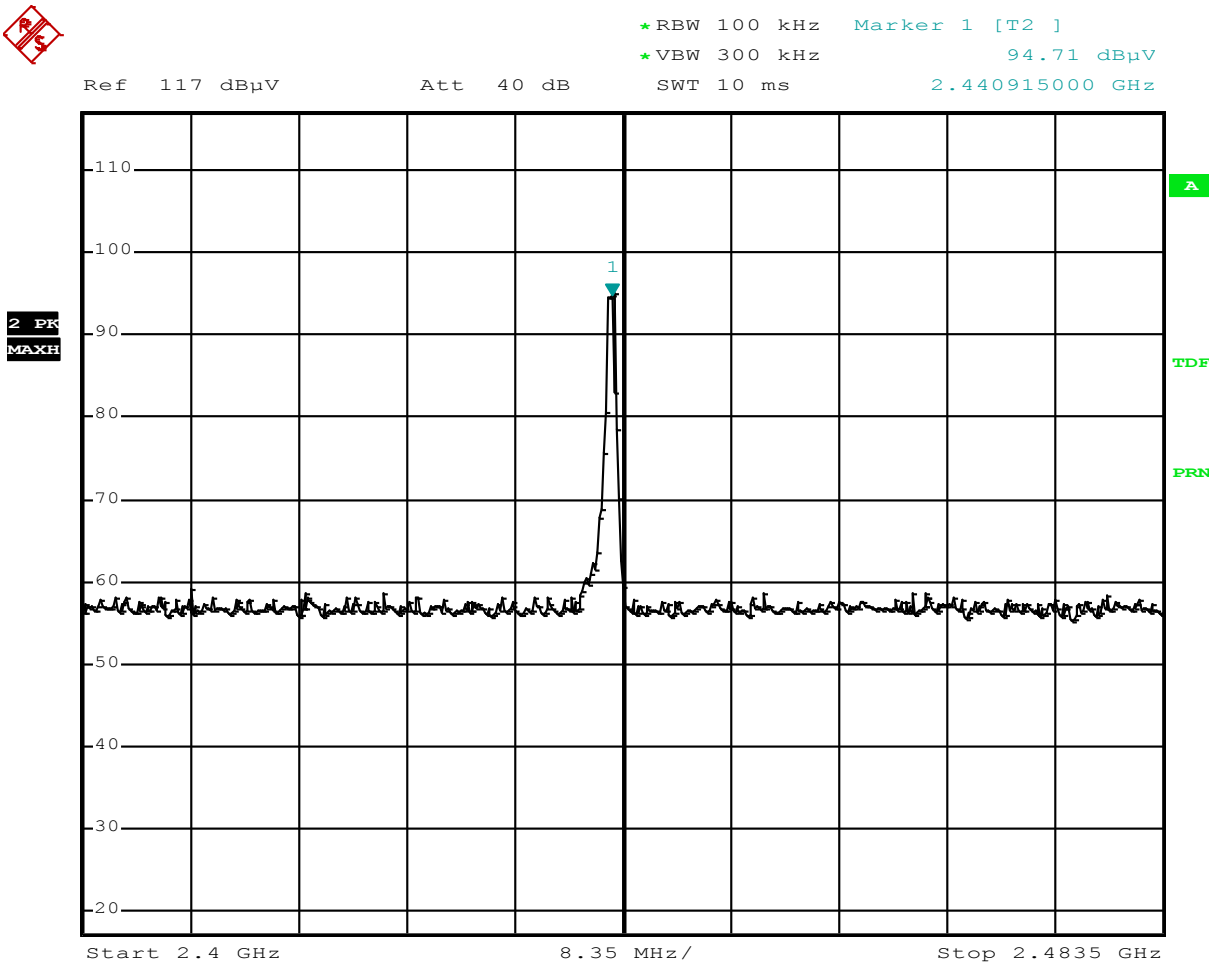
Tx-1 Low Channel 2402 MHz (DH5), Out of band Emissions 2.4835 GHz – 10 GHz



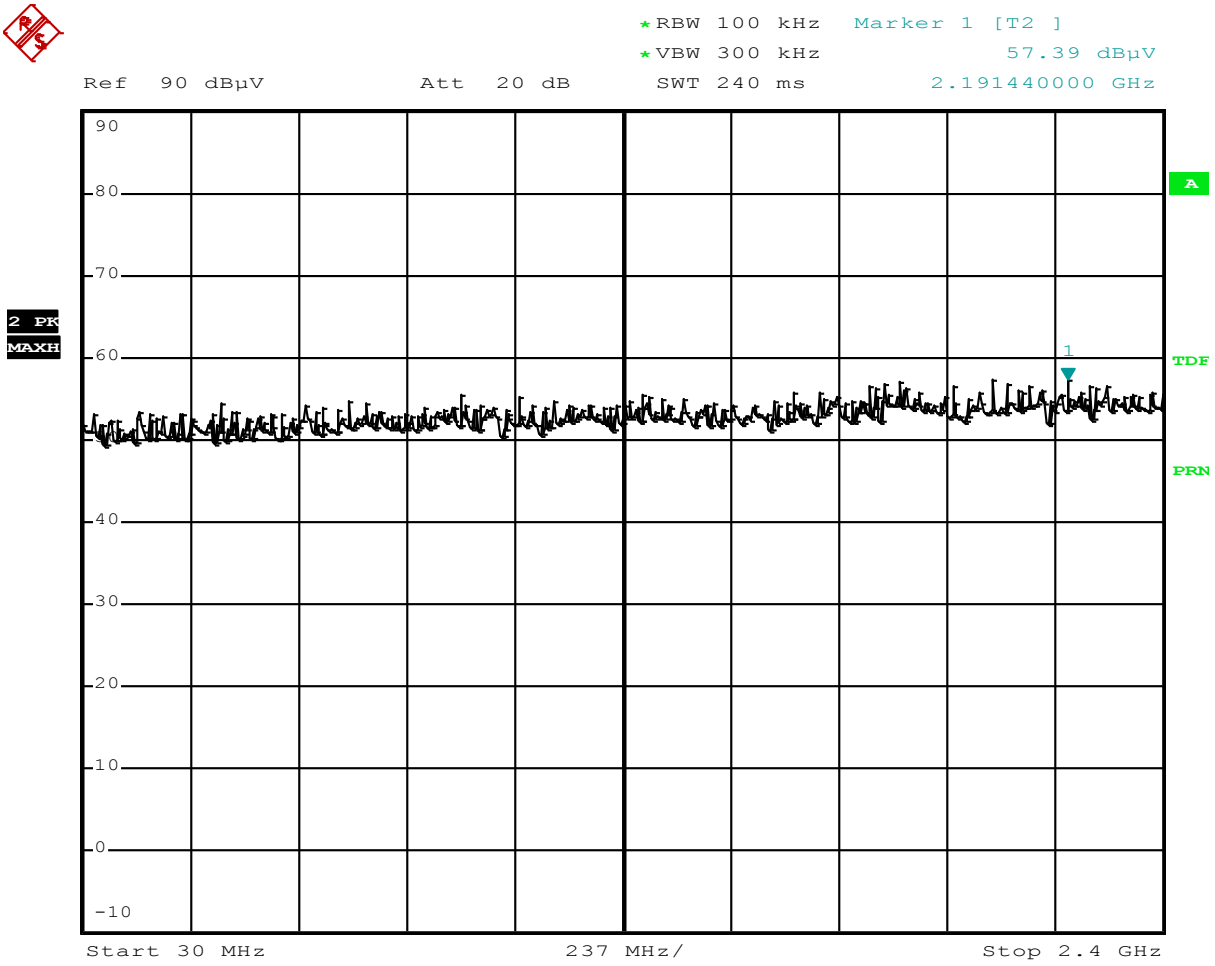
Tx-1 Low Channel 2402 MHz (DH5), Out of band Emissions 10 GHz – 25 GHz



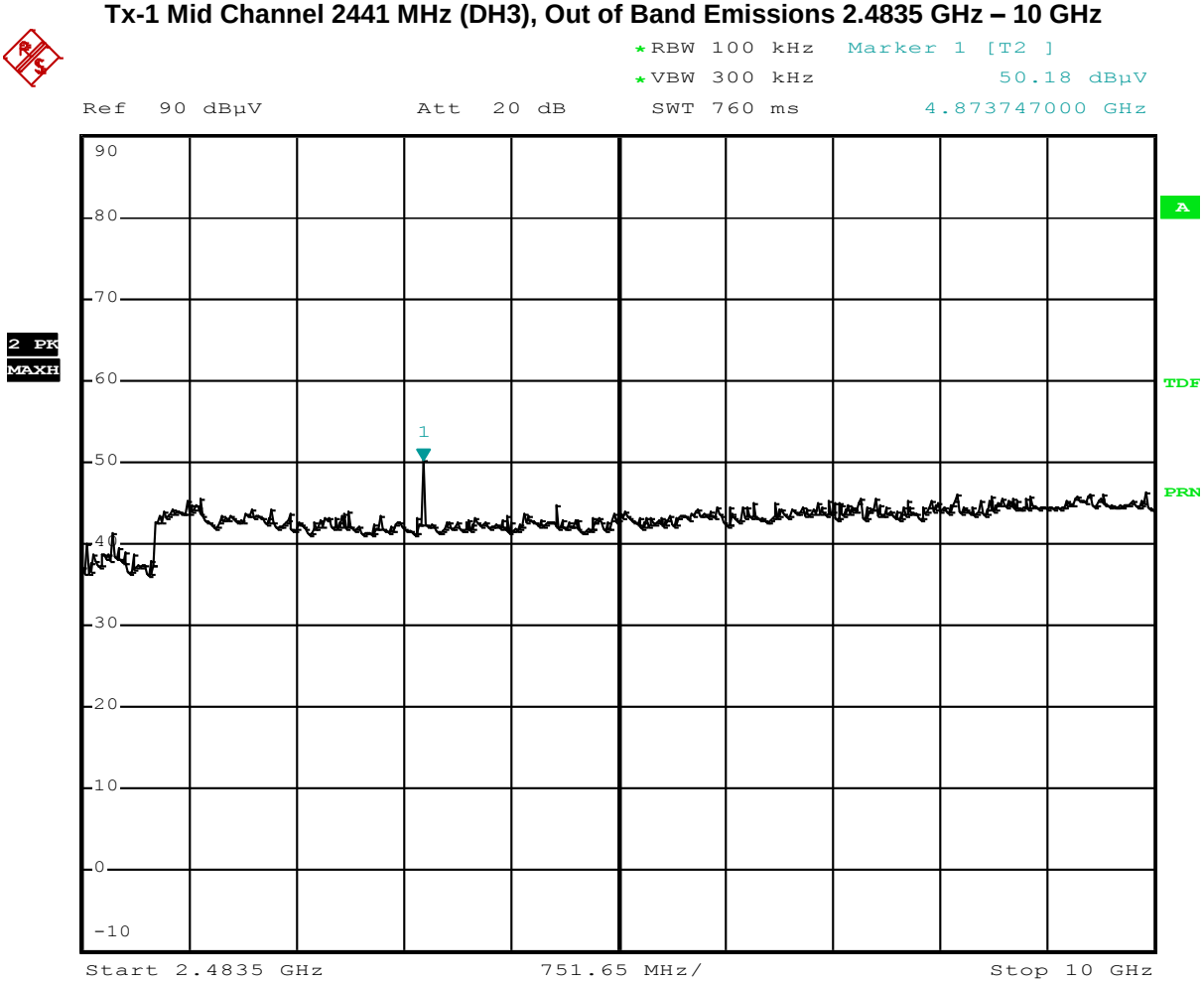
Tx-1 Mid Channel 2441 MHz (DH3), In Band Emissions



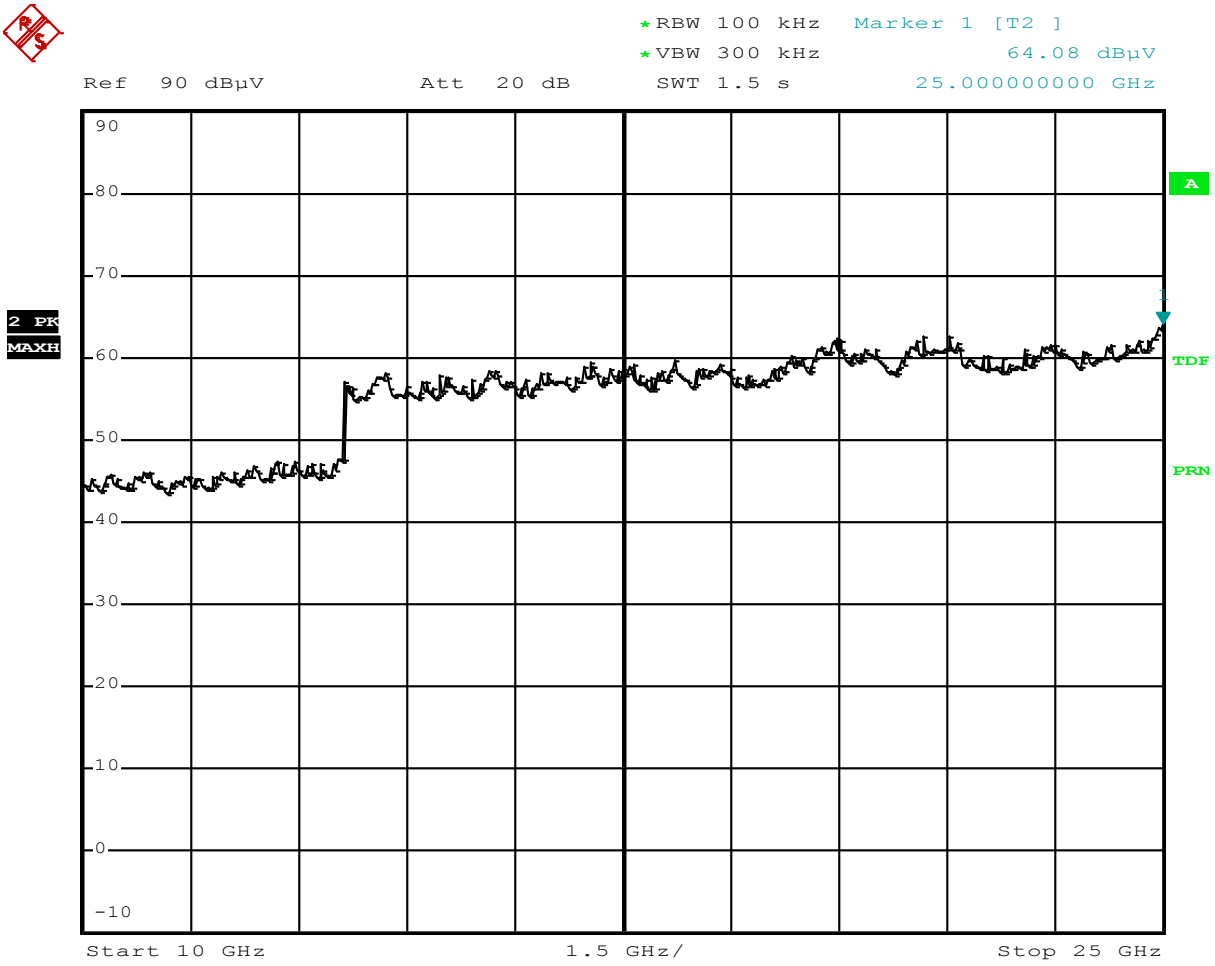
Tx-1 Mid Channel 2441 MHz (DH3), Out of Band Emissions 30 MHz – 2.4 GHz



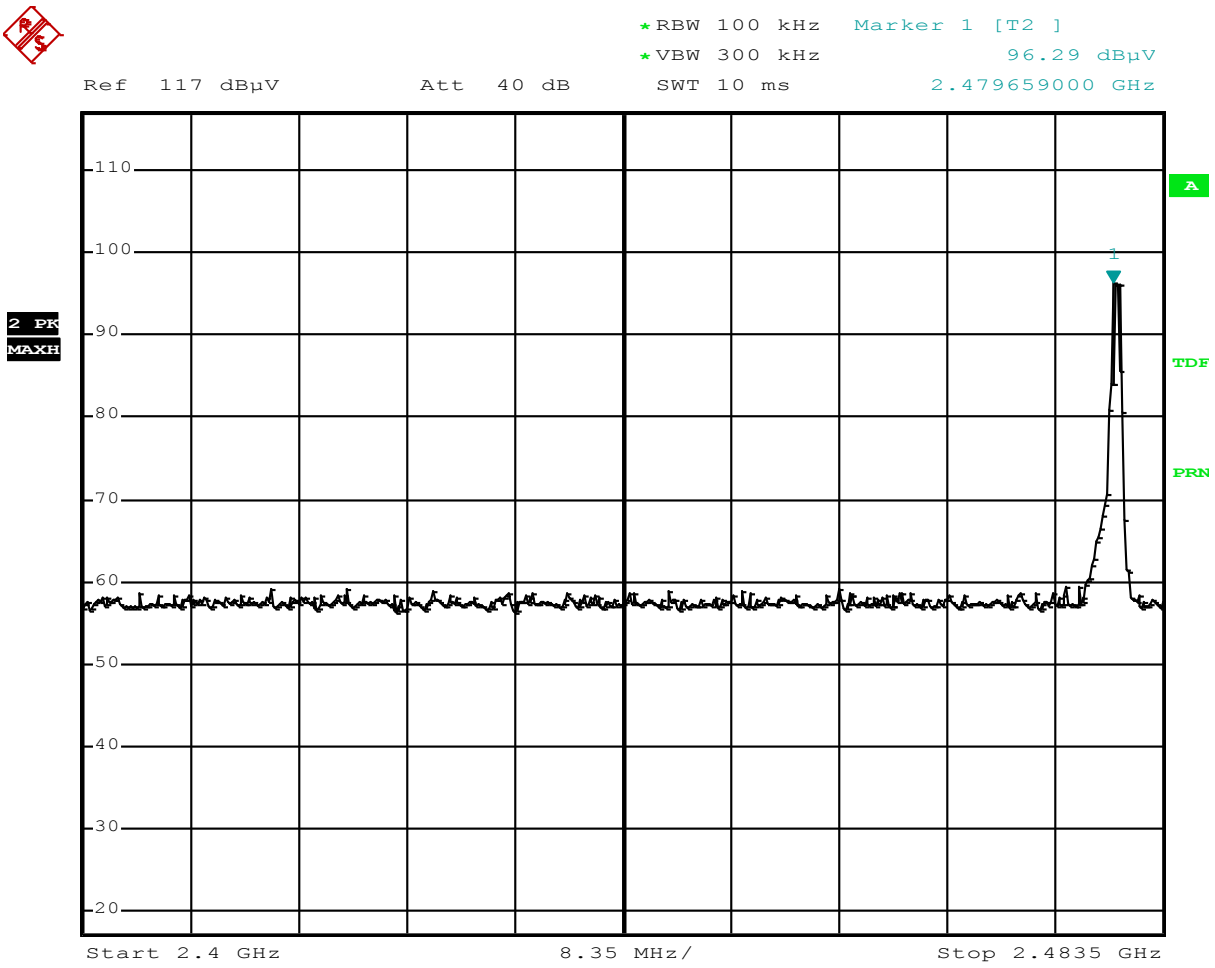
Tx-1 Mid Channel 2441 MHz (DH3), Out of Band Emissions 2.4835 GHz – 10 GHz



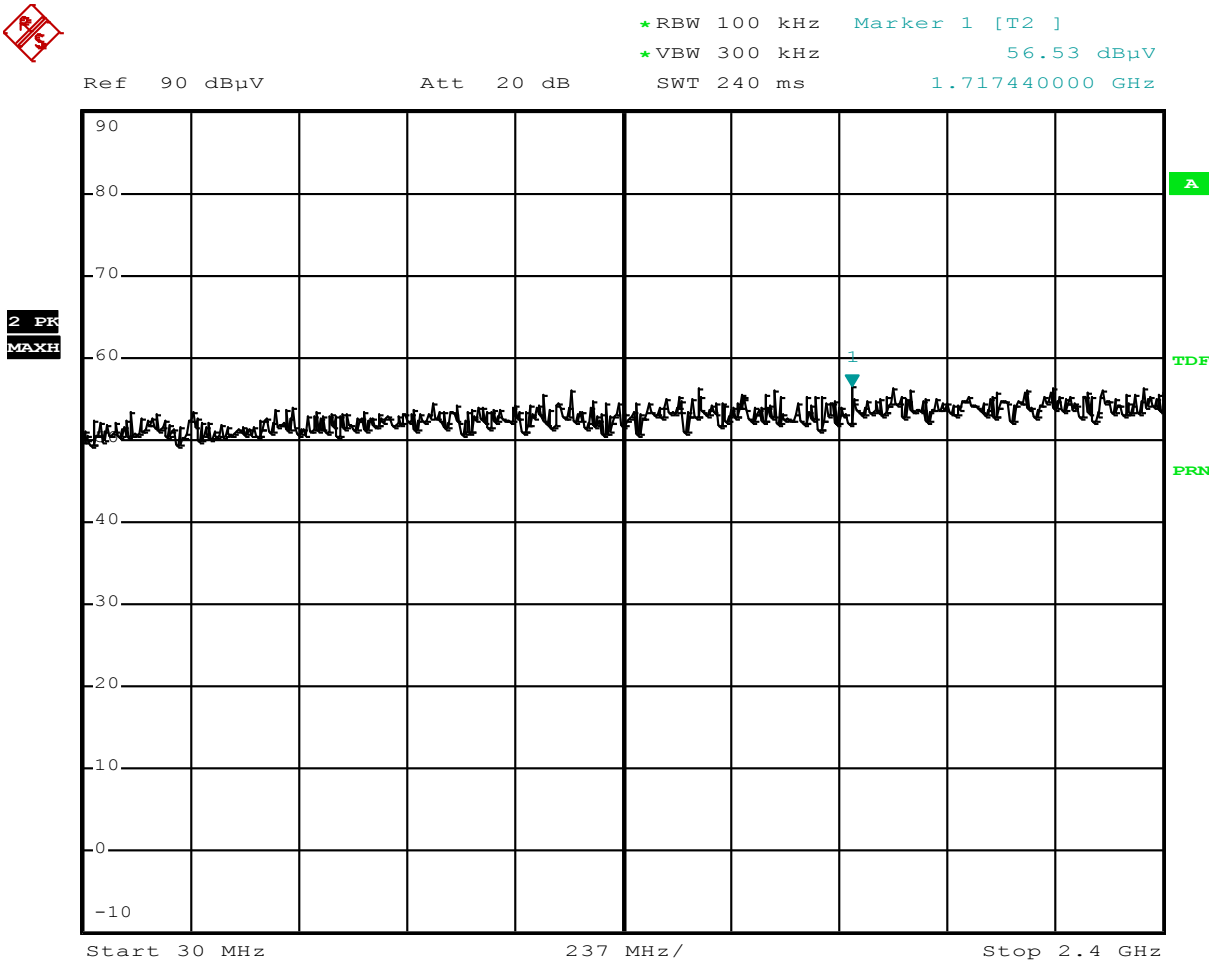
Tx-1 Mid Channel 2441 MHz (DH3), Out of Band Emissions 10 GHz – 25 GHz



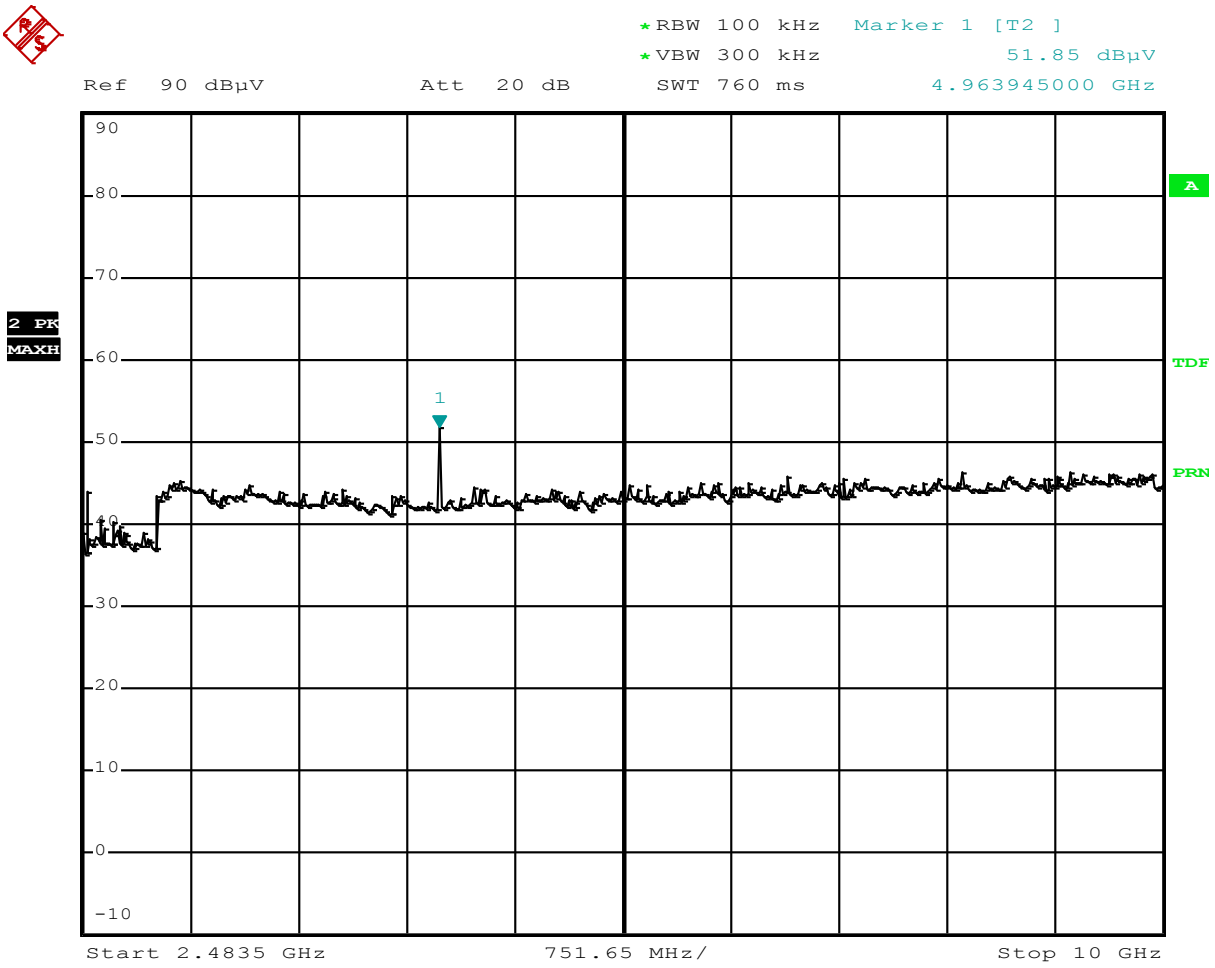
Tx-1 High Channel 2480 MHz (DH1), In Band Emissions



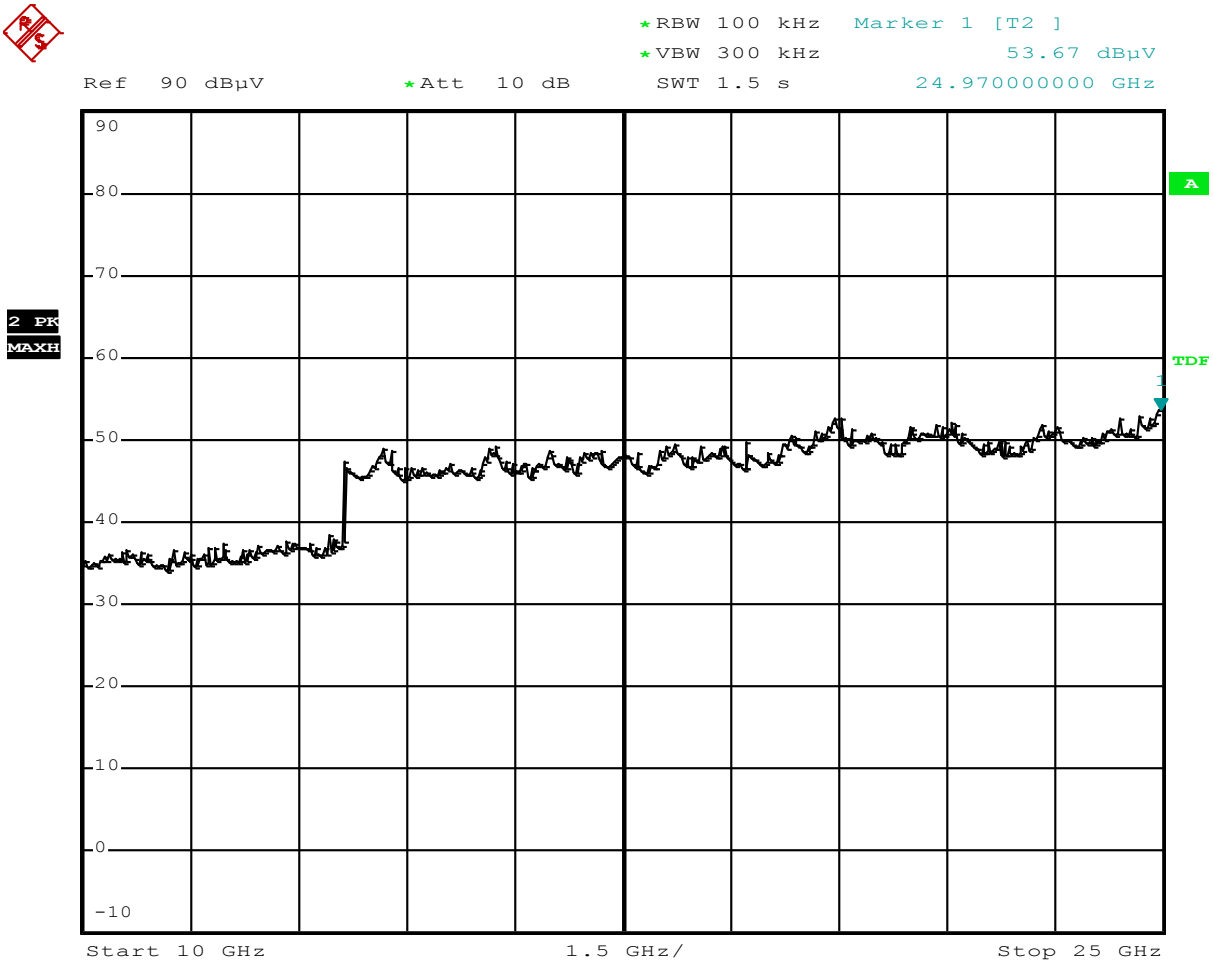
Tx-1 High Channel 2480 MHz (DH1), Out of Band Emissions 30 MHz – 2.4 GHz



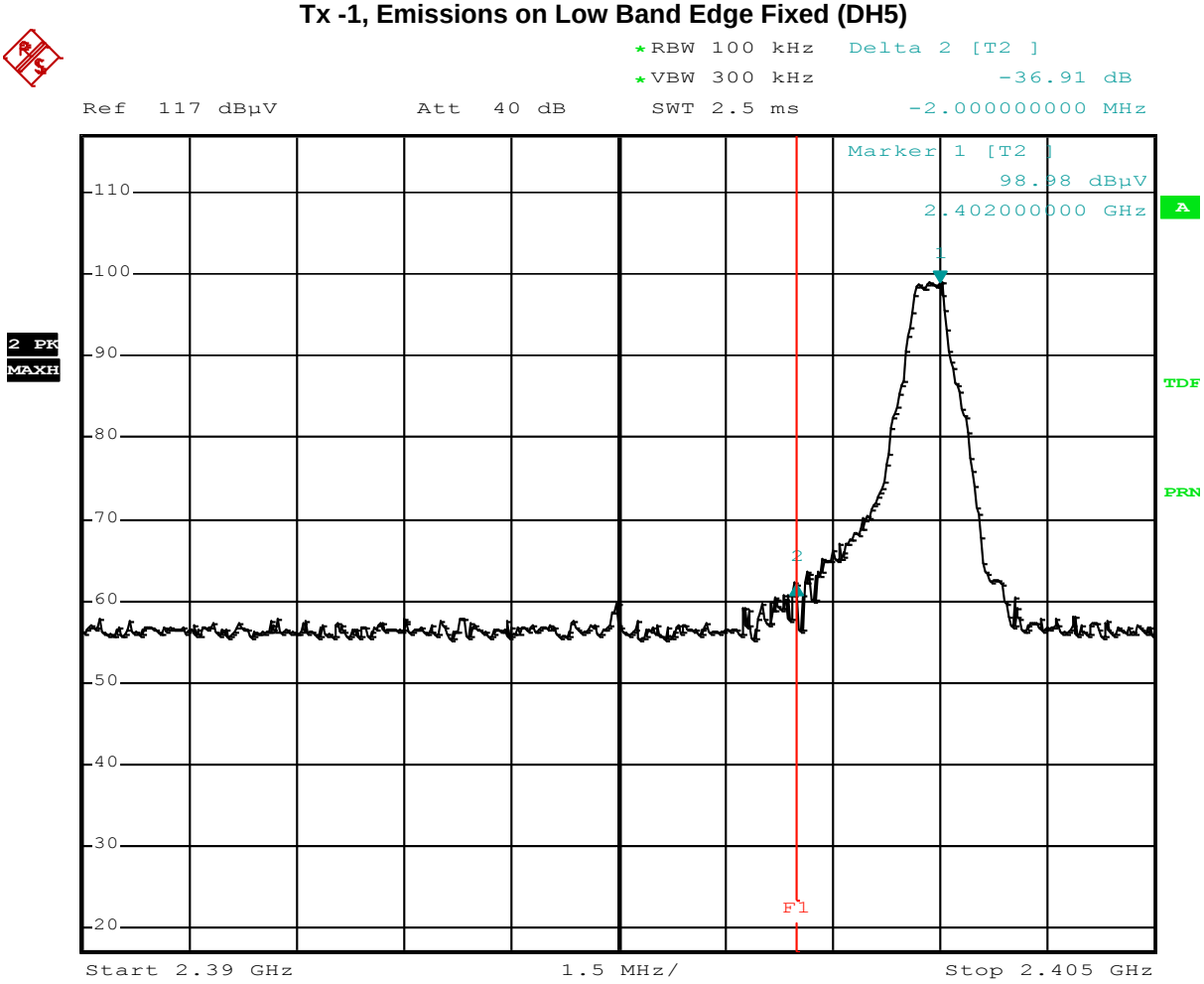
Tx-1 High Channel 2480 MHz (DH1), Out of Band Emissions 2.4 GHz – 10 GHz



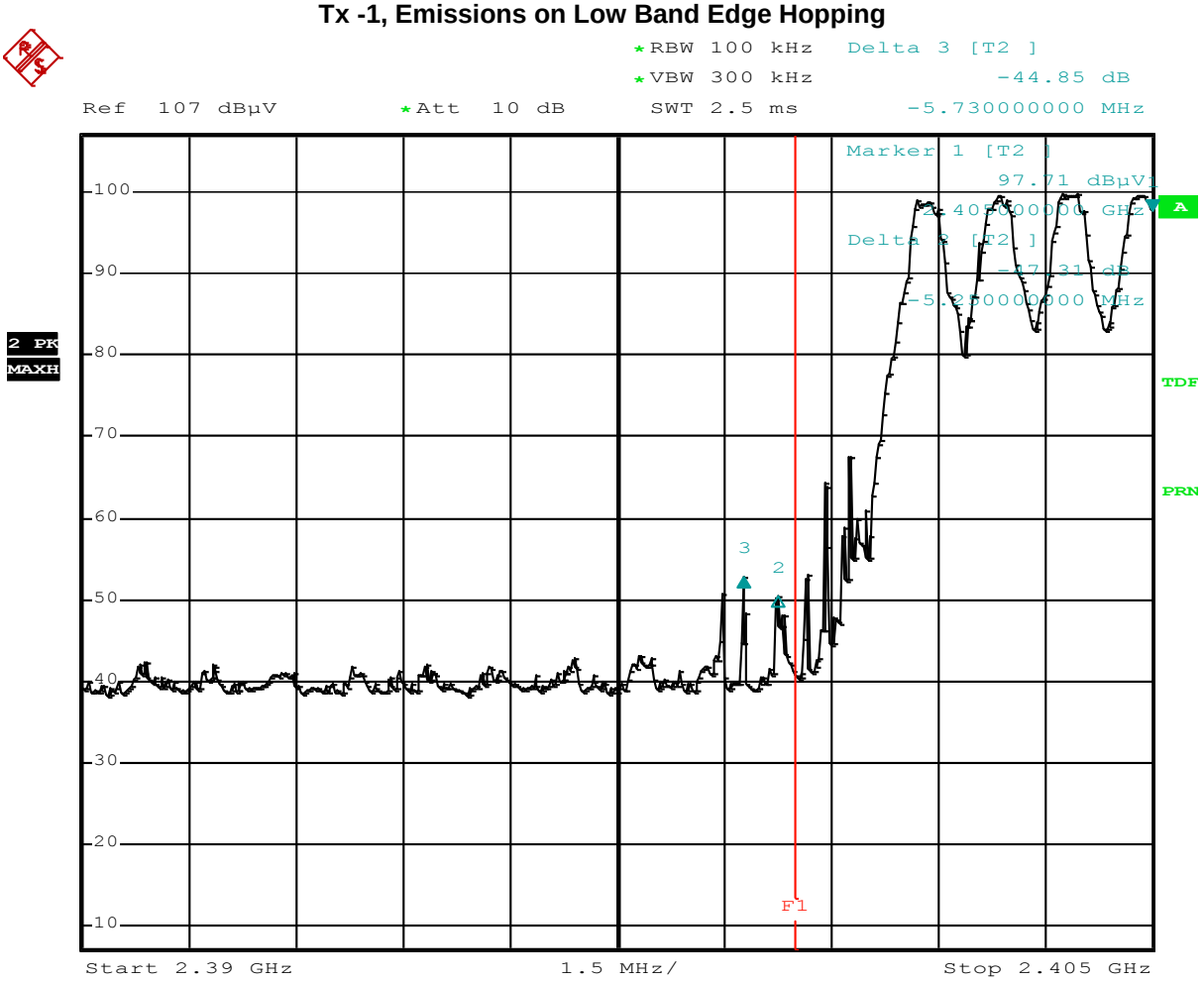
Tx-1 High Channel 2480 MHz (DH1), Out of Band Emissions 10 GHz – 25 GHz



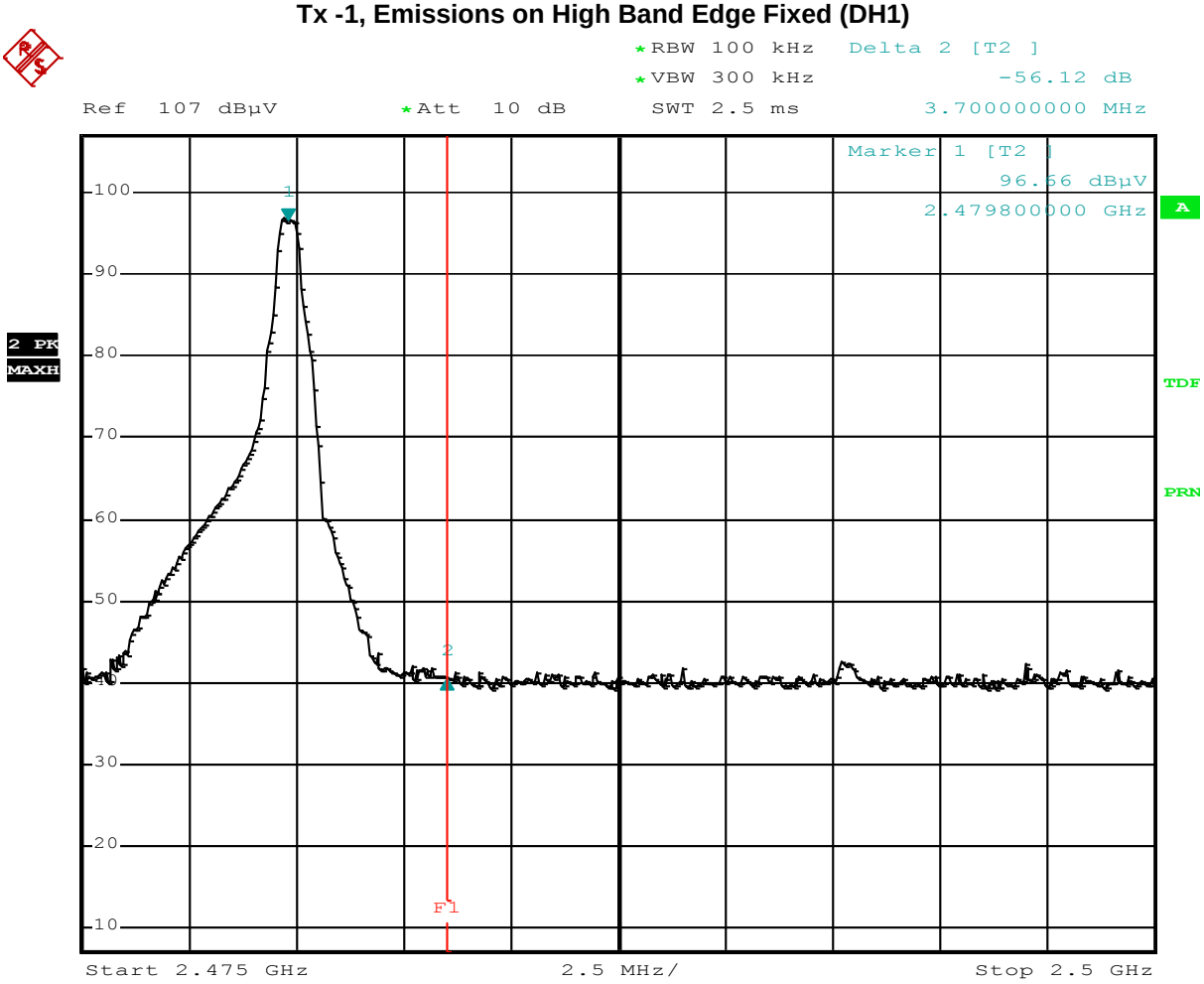
Tx -1, Emissions on Low Band Edge Fixed (DH5)



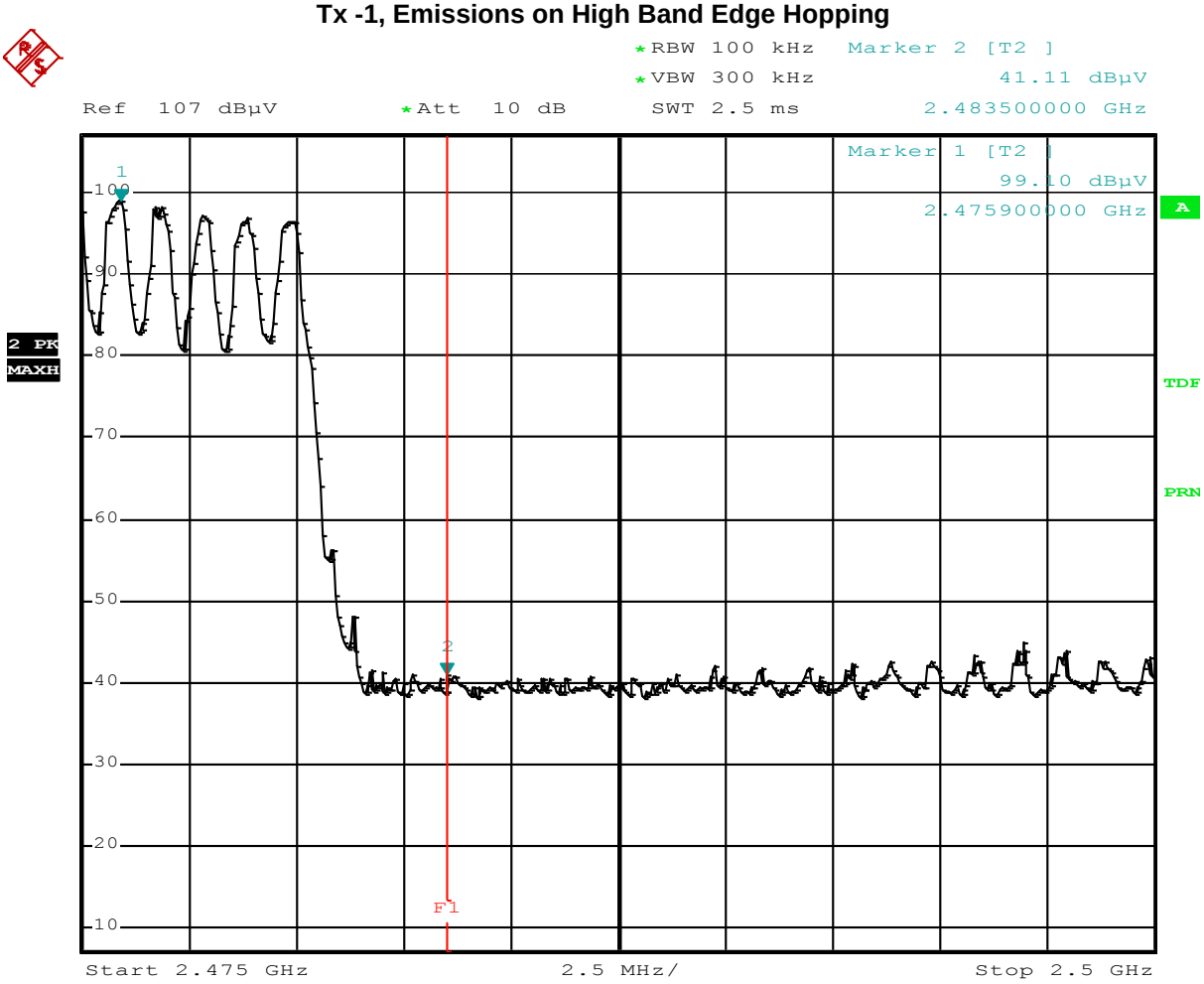
Tx -1, Emissions on Low Band Edge Hopping



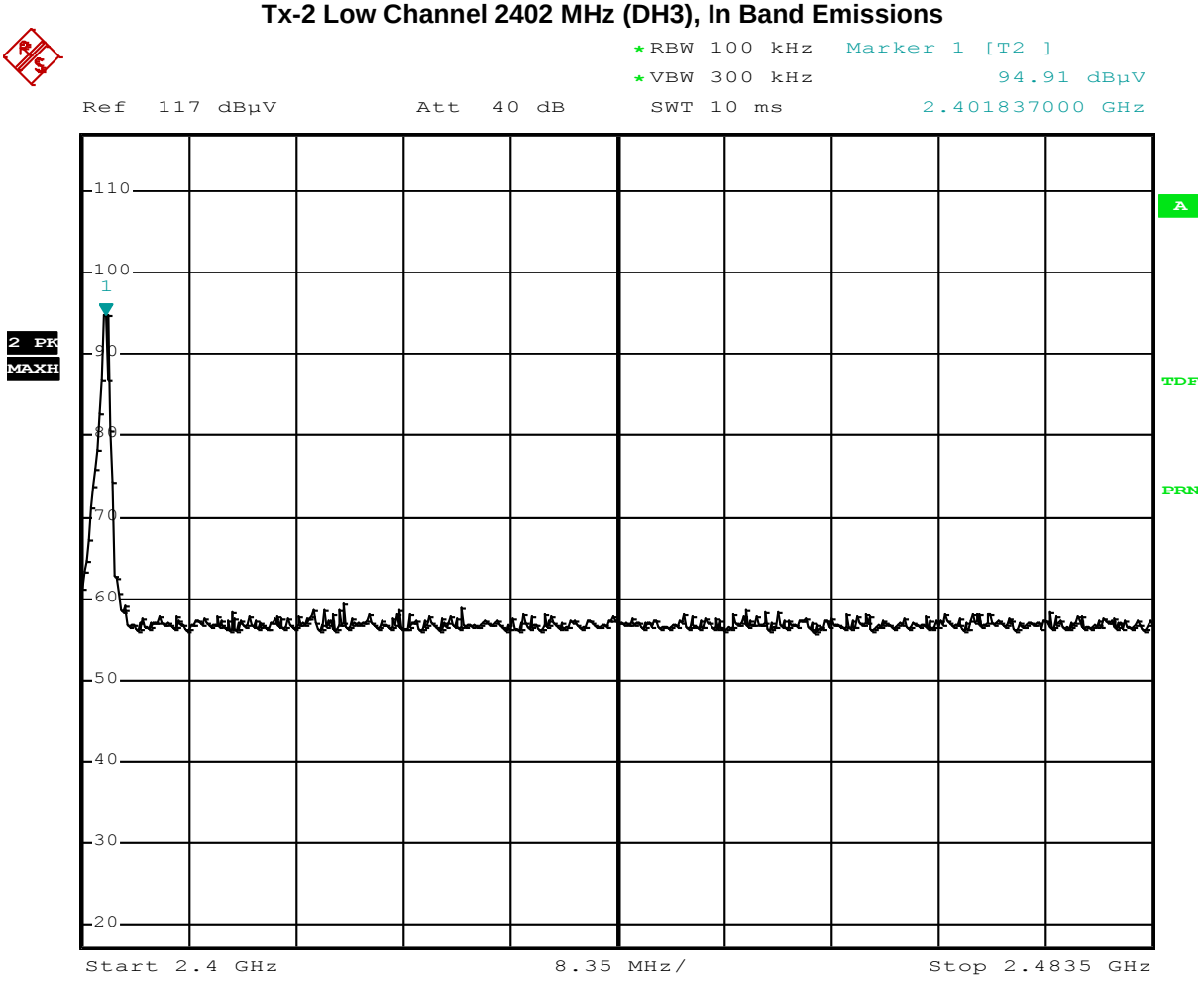
Tx -1, Emissions on High Band Edge Fixed (DH1)



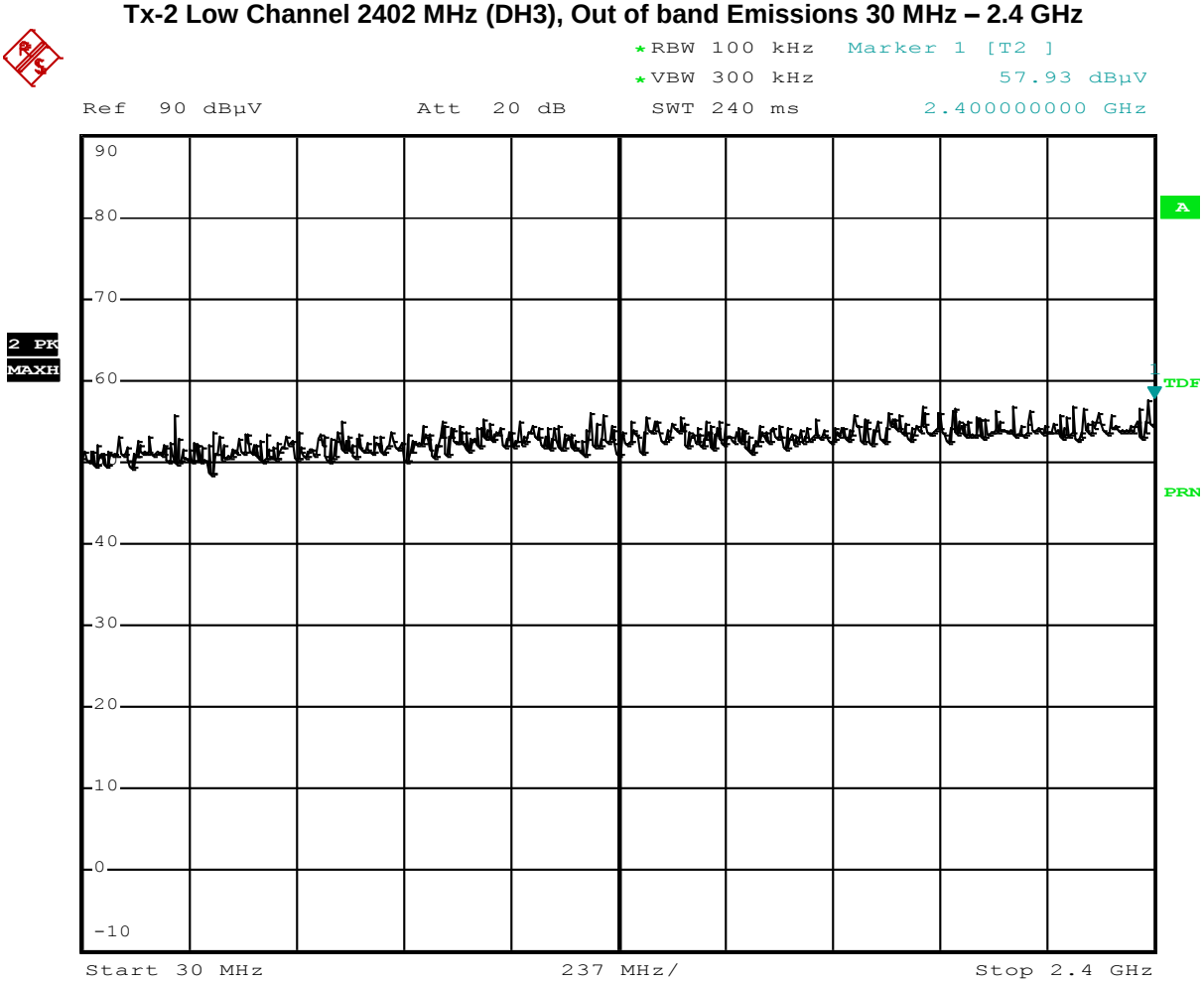
Tx -1, Emissions on High Band Edge Hopping



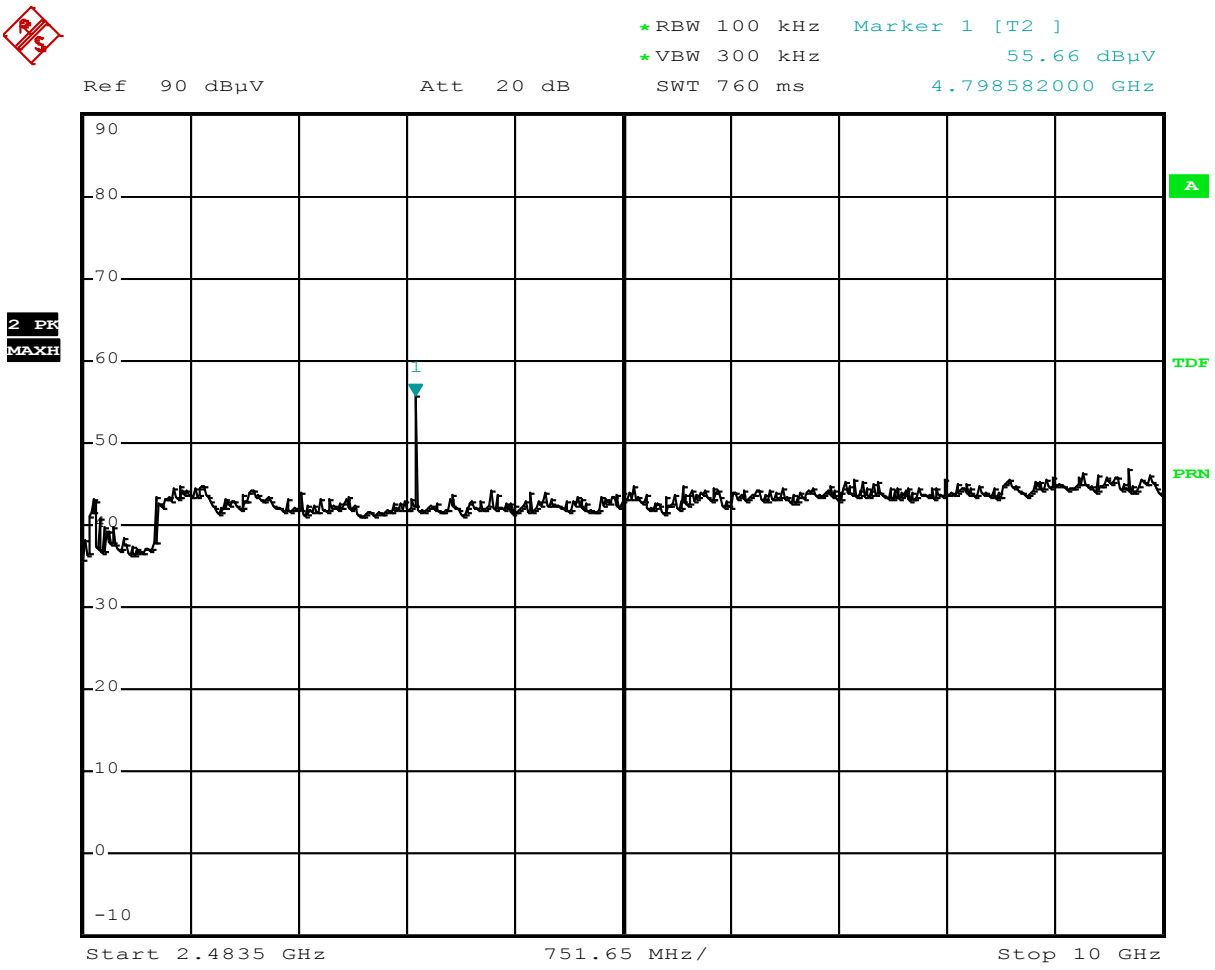
Tx-2 Low Channel 2402 MHz (DH3), In Band Emissions



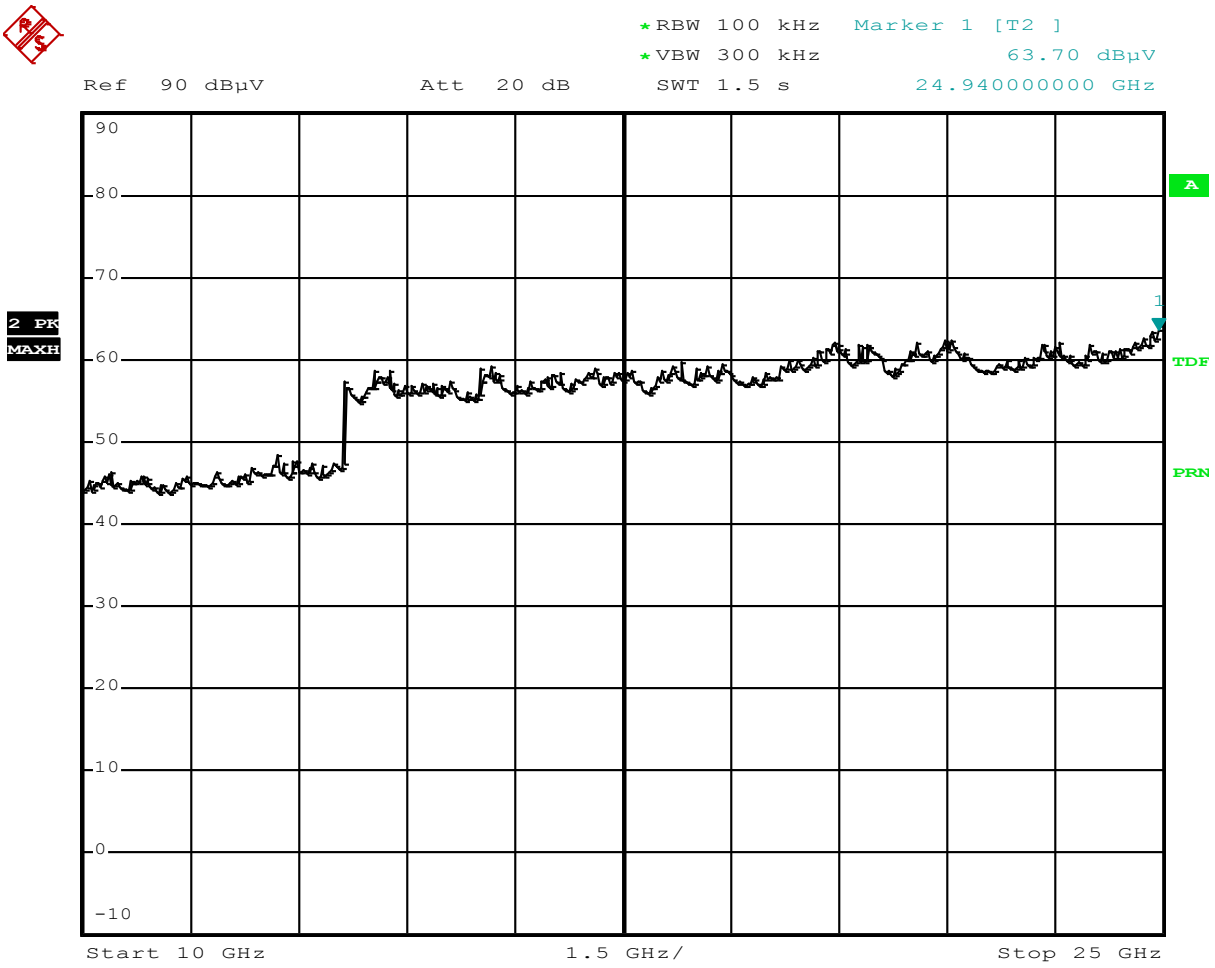
Tx-2 Low Channel 2402 MHz (DH3), Out of band Emissions 30 MHz – 2.4 GHz



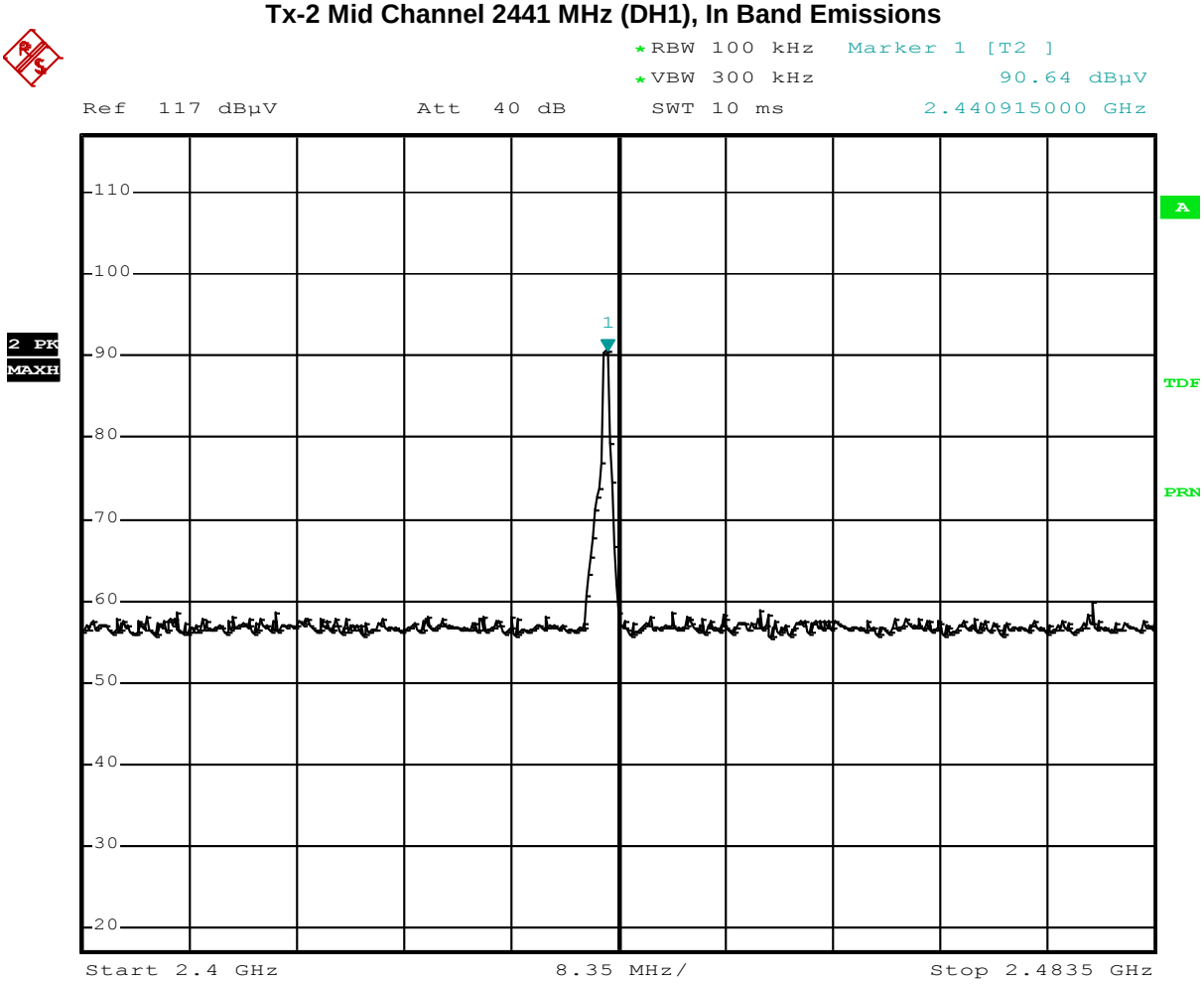
Tx-2 Low Channel 2402 MHz (DH3), Out of band Emissions 2.4835 GHz – 10 GHz



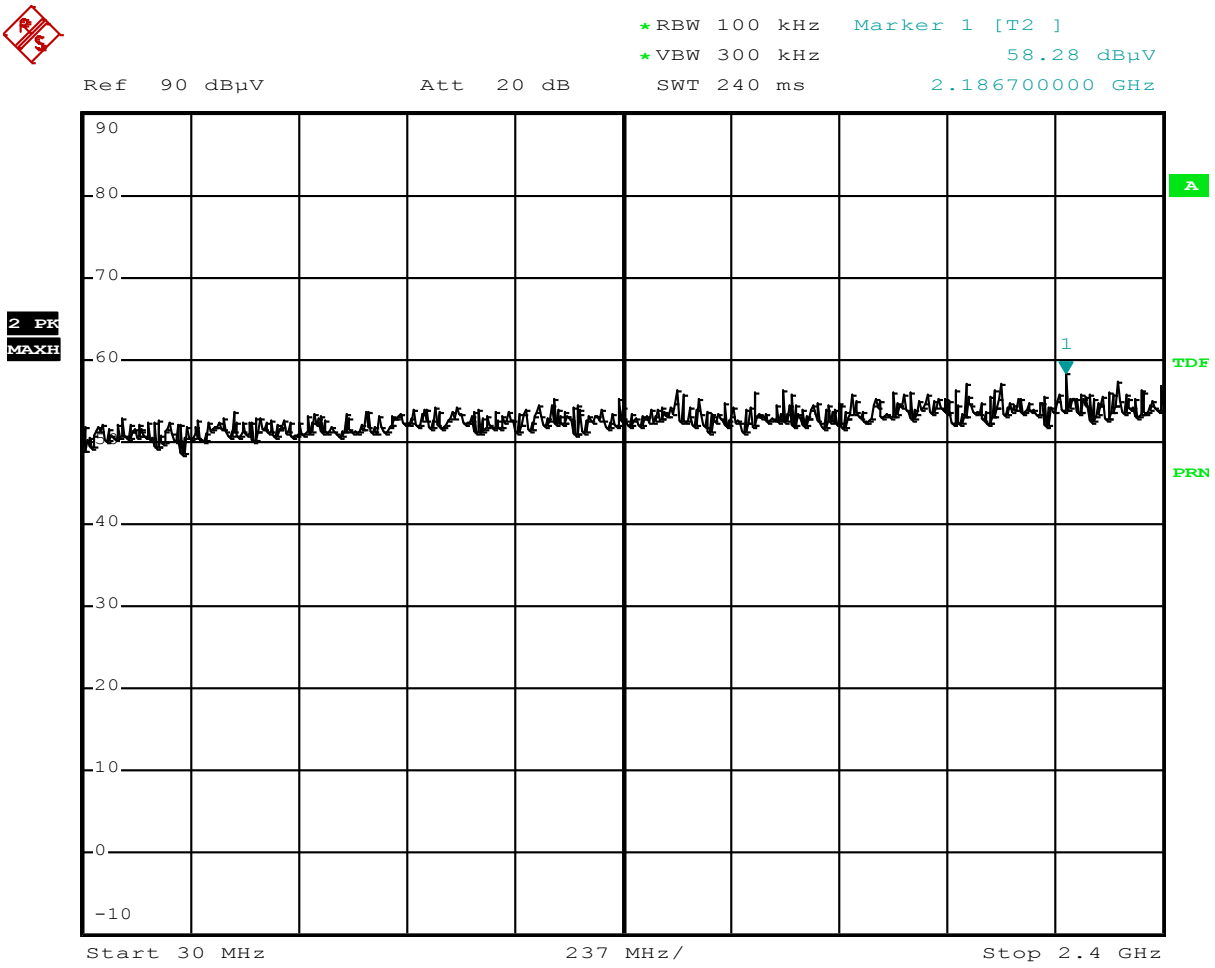
Tx-2 Low Channel 2402 MHz (DH3), Out of band Emissions 10 GHz – 25 GHz



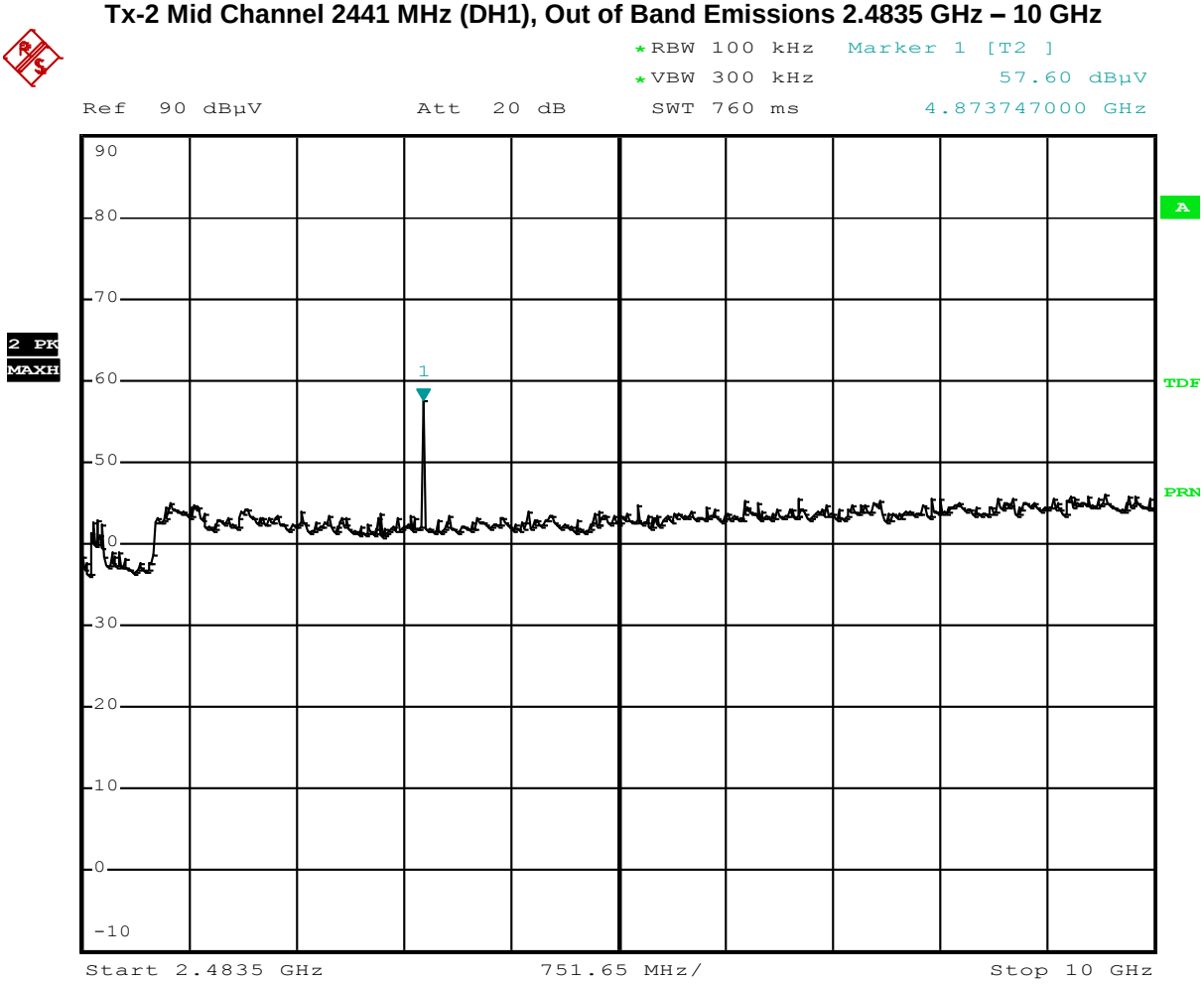
Tx-2 Mid Channel 2441 MHz (DH1), In Band Emissions



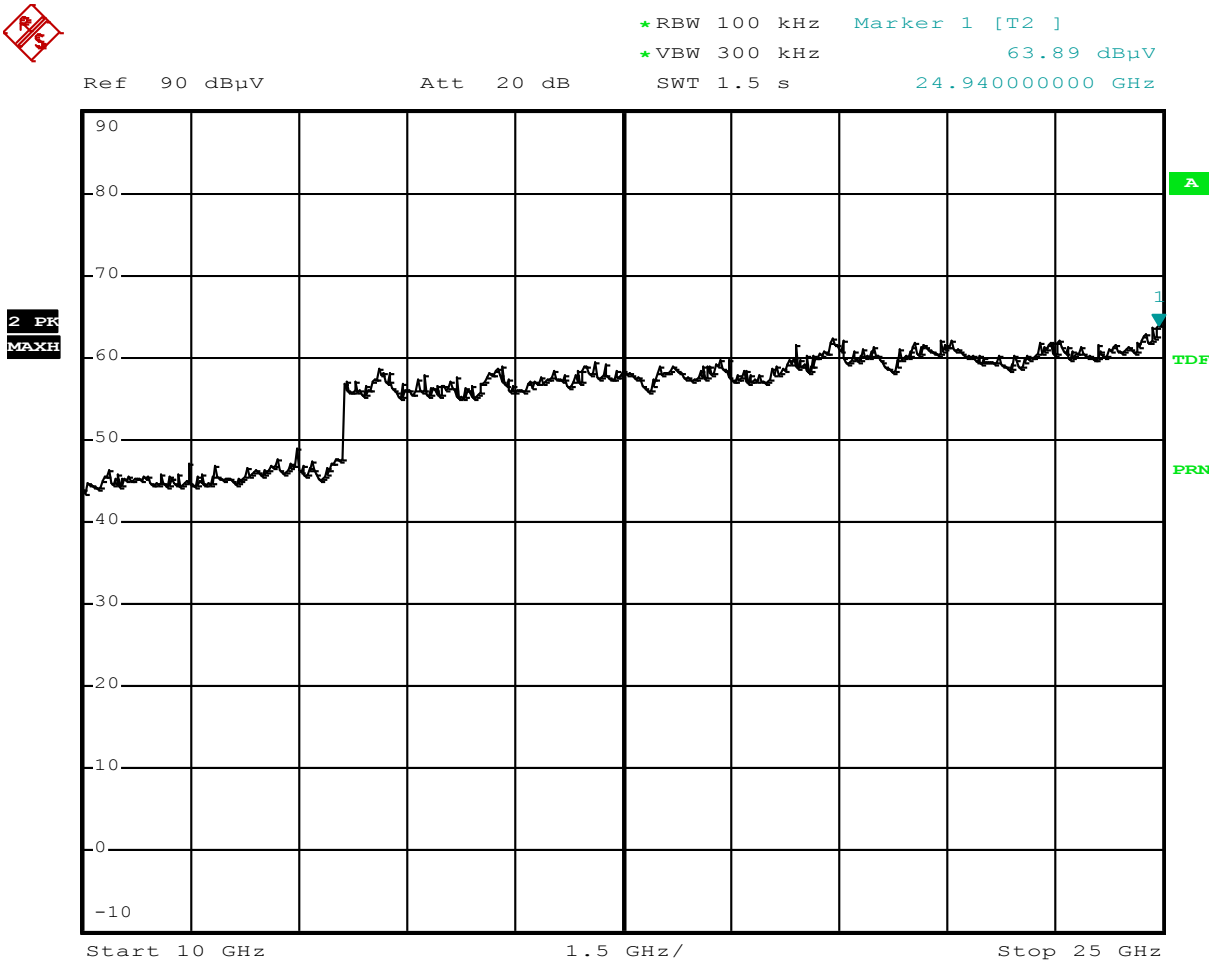
Tx-2 Mid Channel 2441 MHz (DH1), Out of Band Emissions 30 MHz – 2.4 GHz



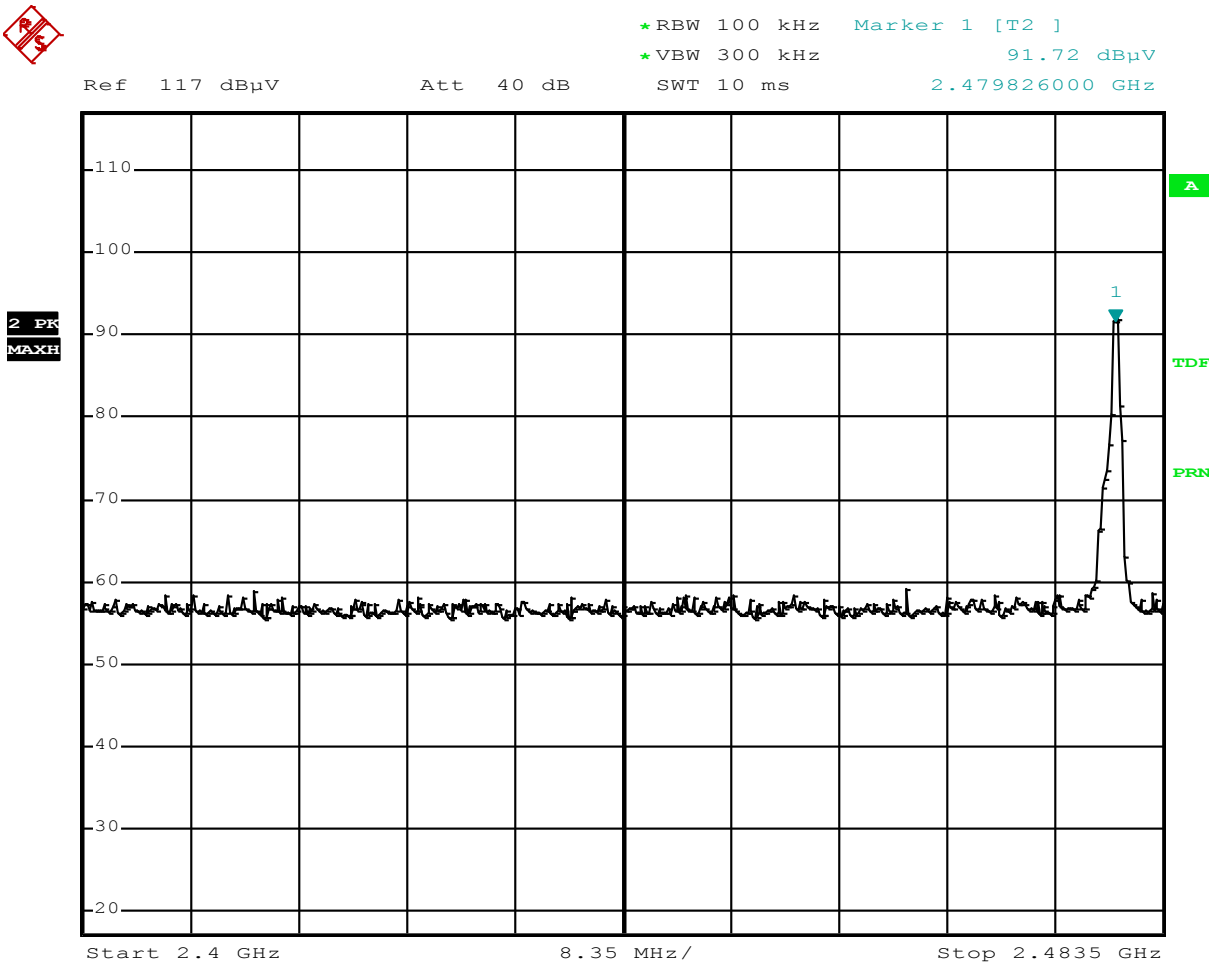
Tx-2 Mid Channel 2441 MHz (DH1), Out of Band Emissions 2.4835 GHz – 10 GHz



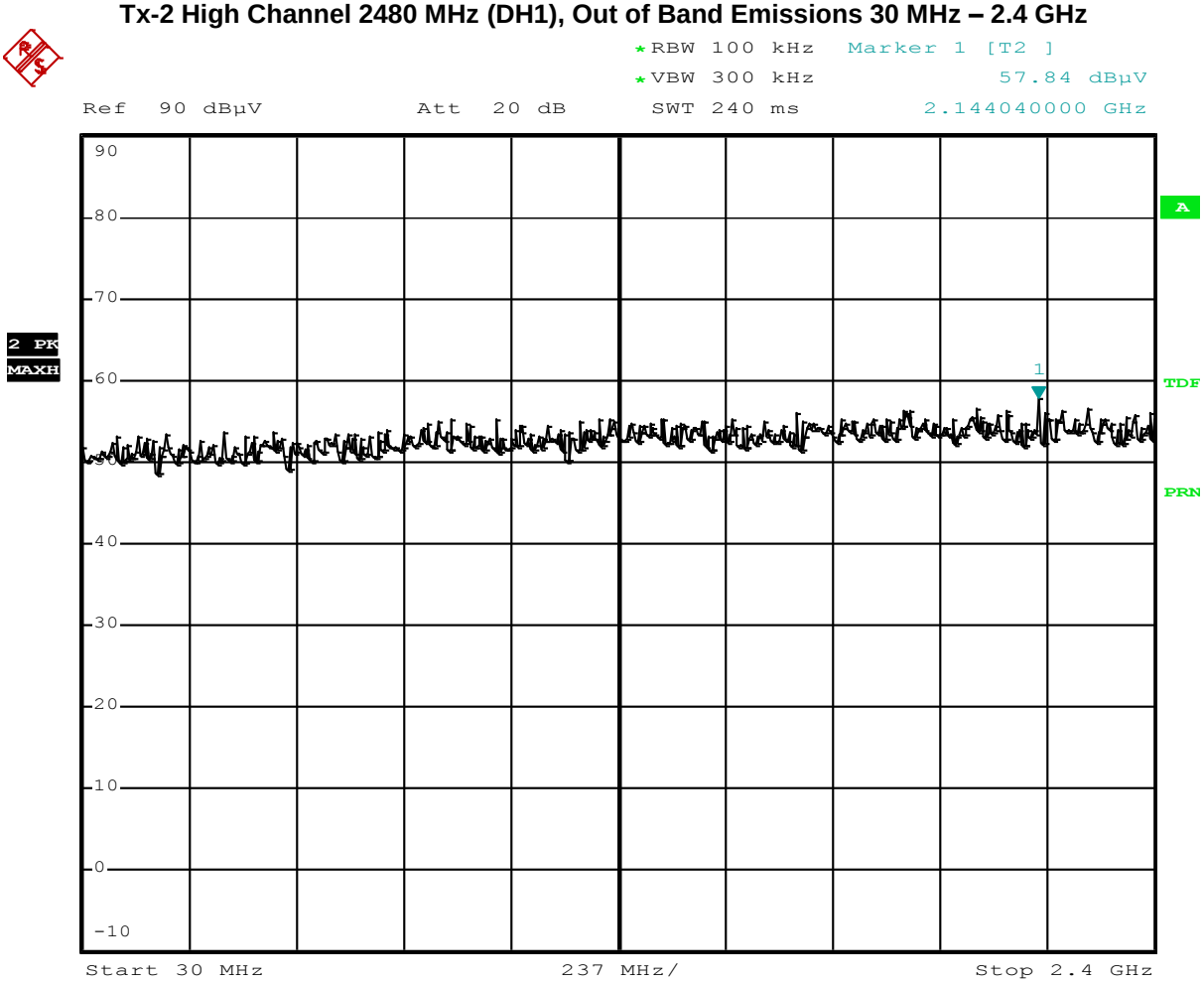
Tx-2 Mid Channel 2441 MHz (DH1), Out of Band Emissions 10 GHz – 25 GHz



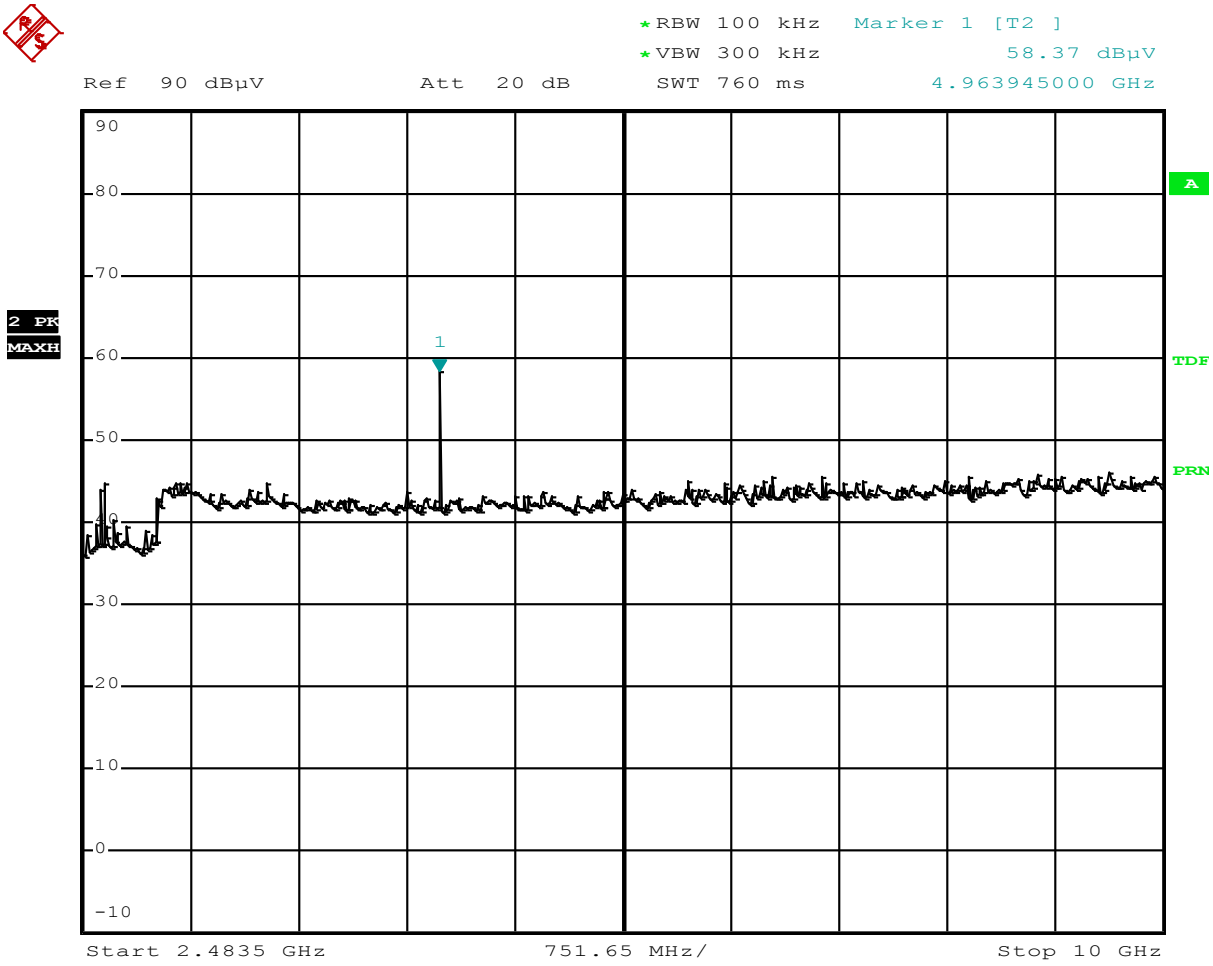
Tx-2 High Channel 2480 MHz (DH1), In Band Emissions



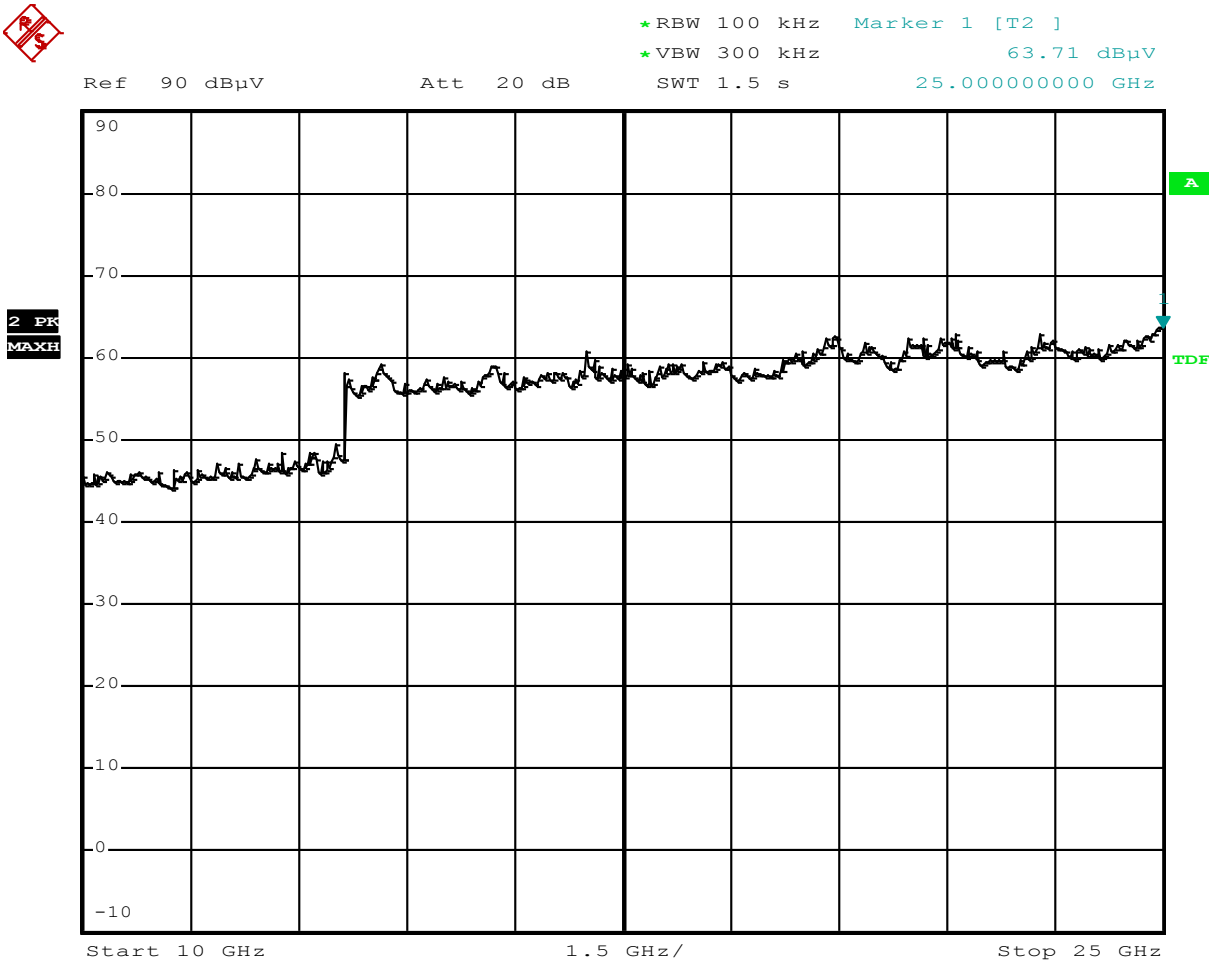
Tx-2 High Channel 2480 MHz (DH1), Out of Band Emissions 30 MHz – 2.4 GHz



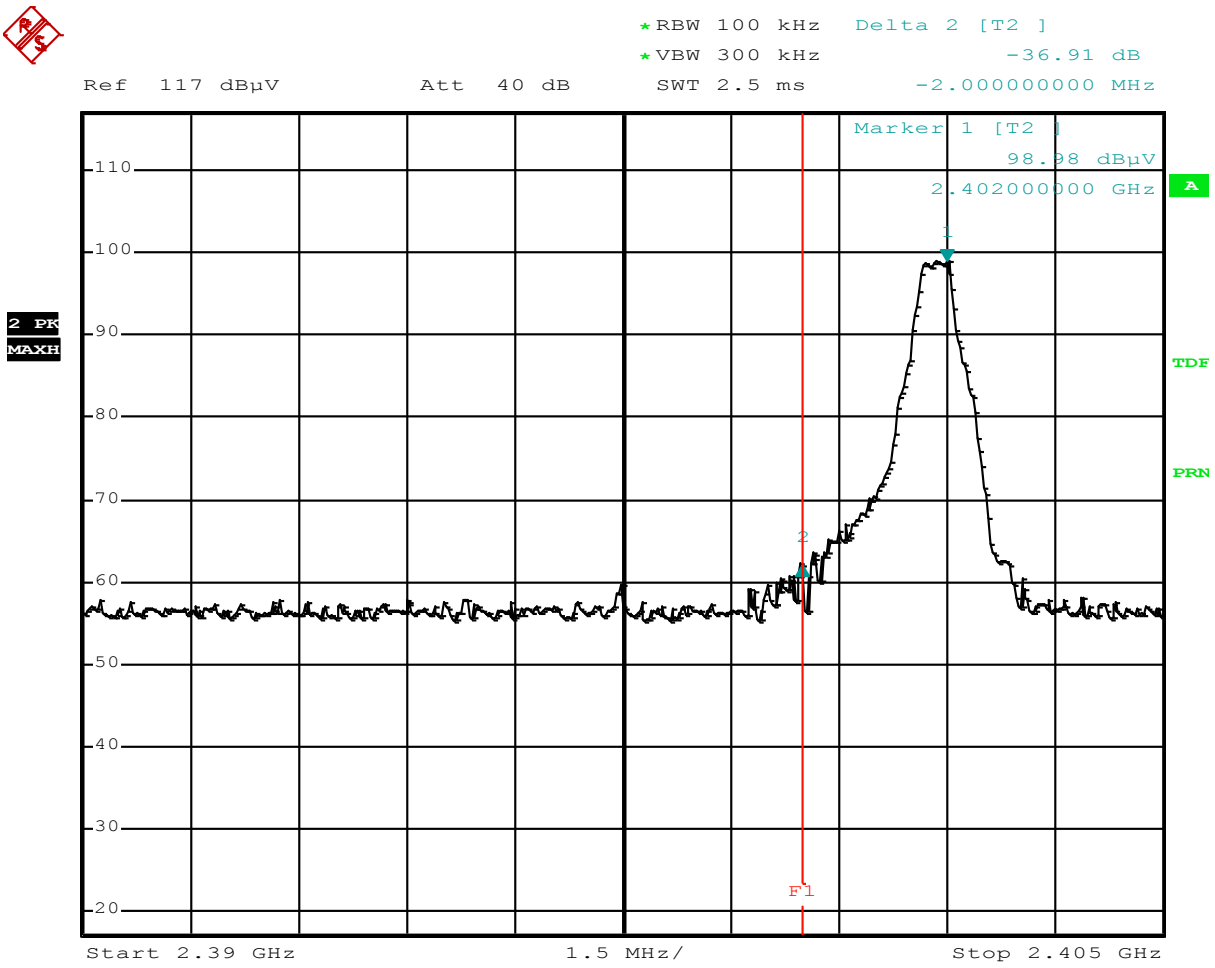
Tx-2 High Channel 2480 MHz (DH1), Out of Band Emissions 2.4835 GHz – 10 GHz



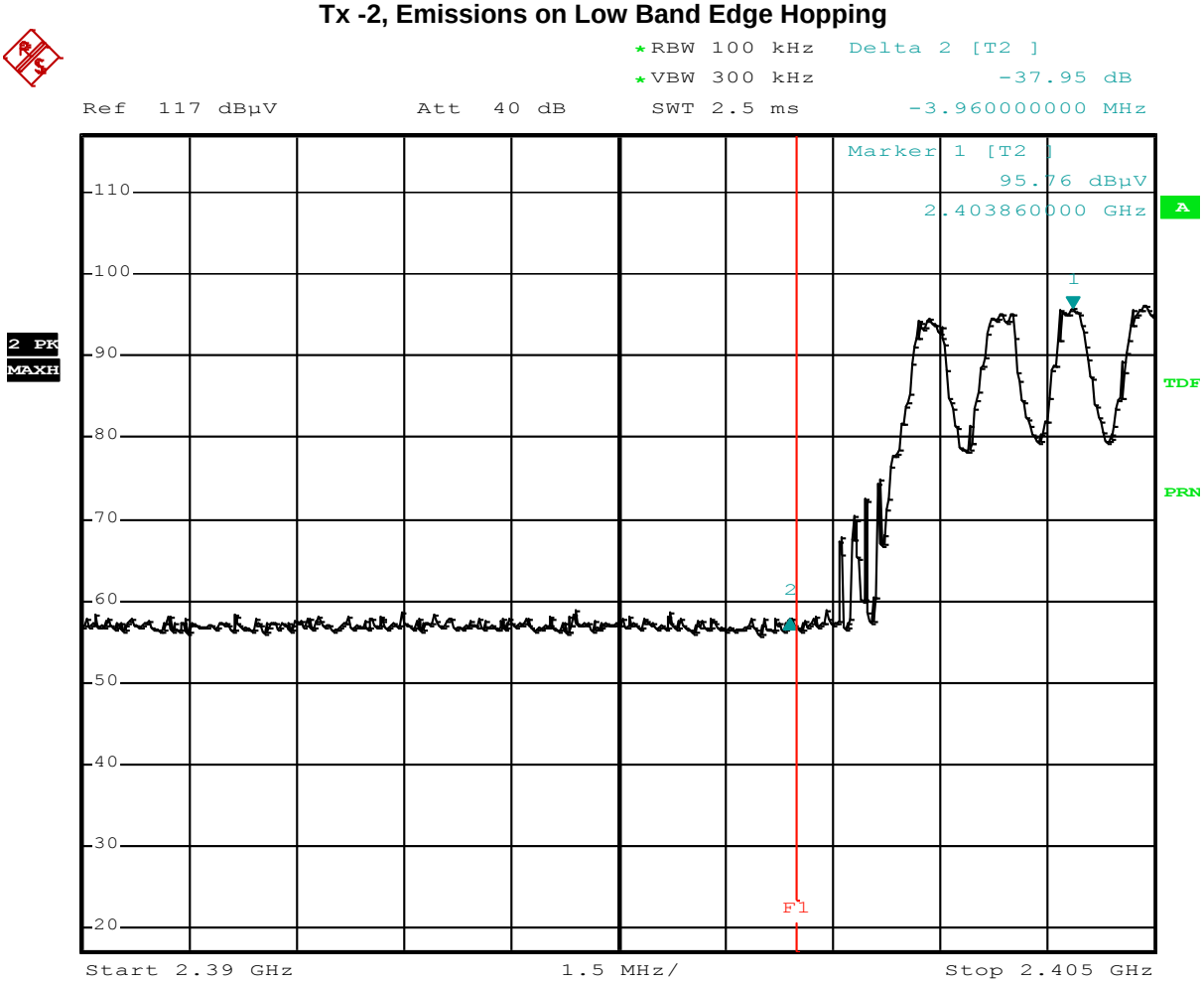
Tx-2 High Channel 2480 MHz (DH1), Out of Band Emissions 10 GHz – 25 GHz



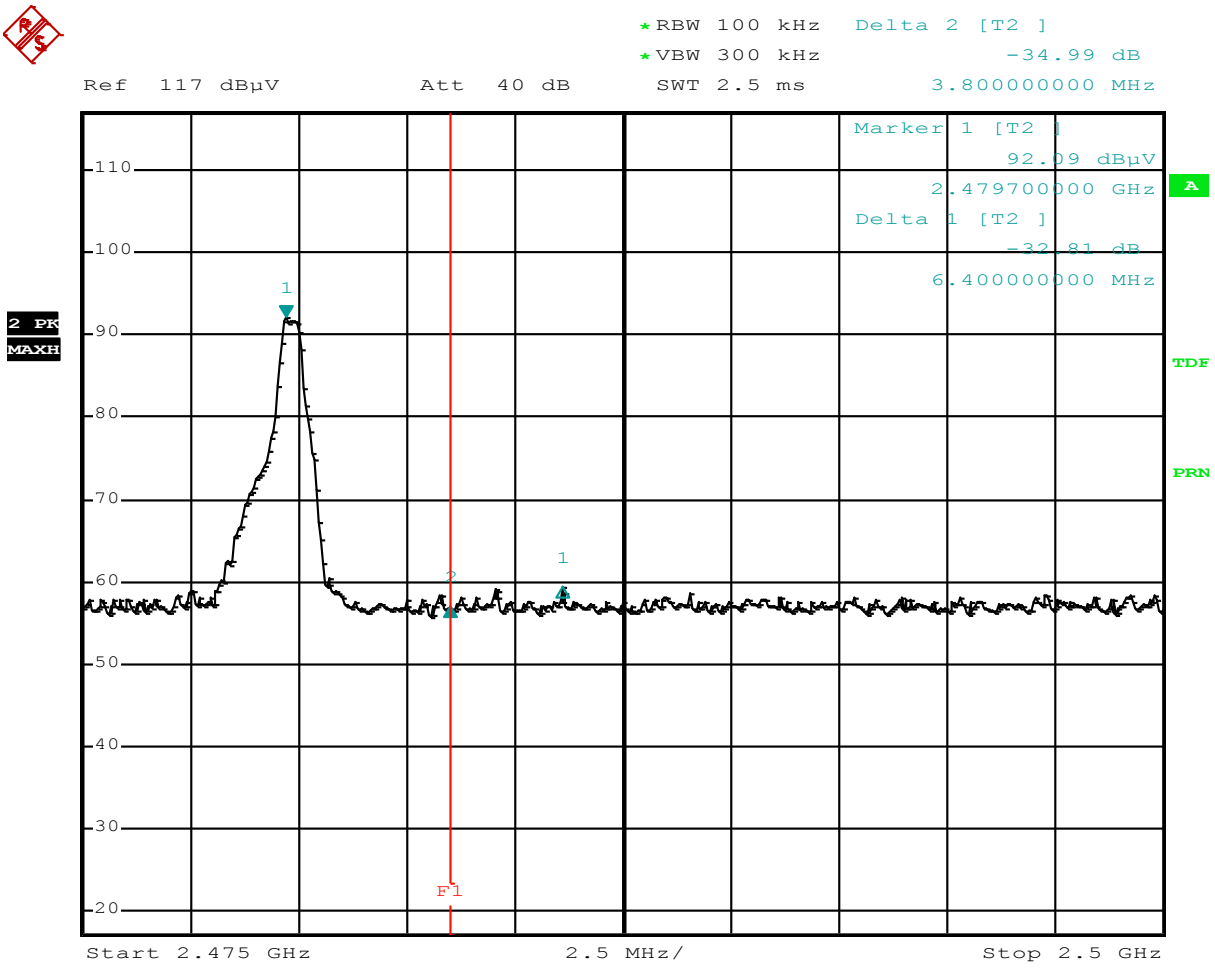
Tx -2, Emissions on Low Band Edge Fixed (DH3)



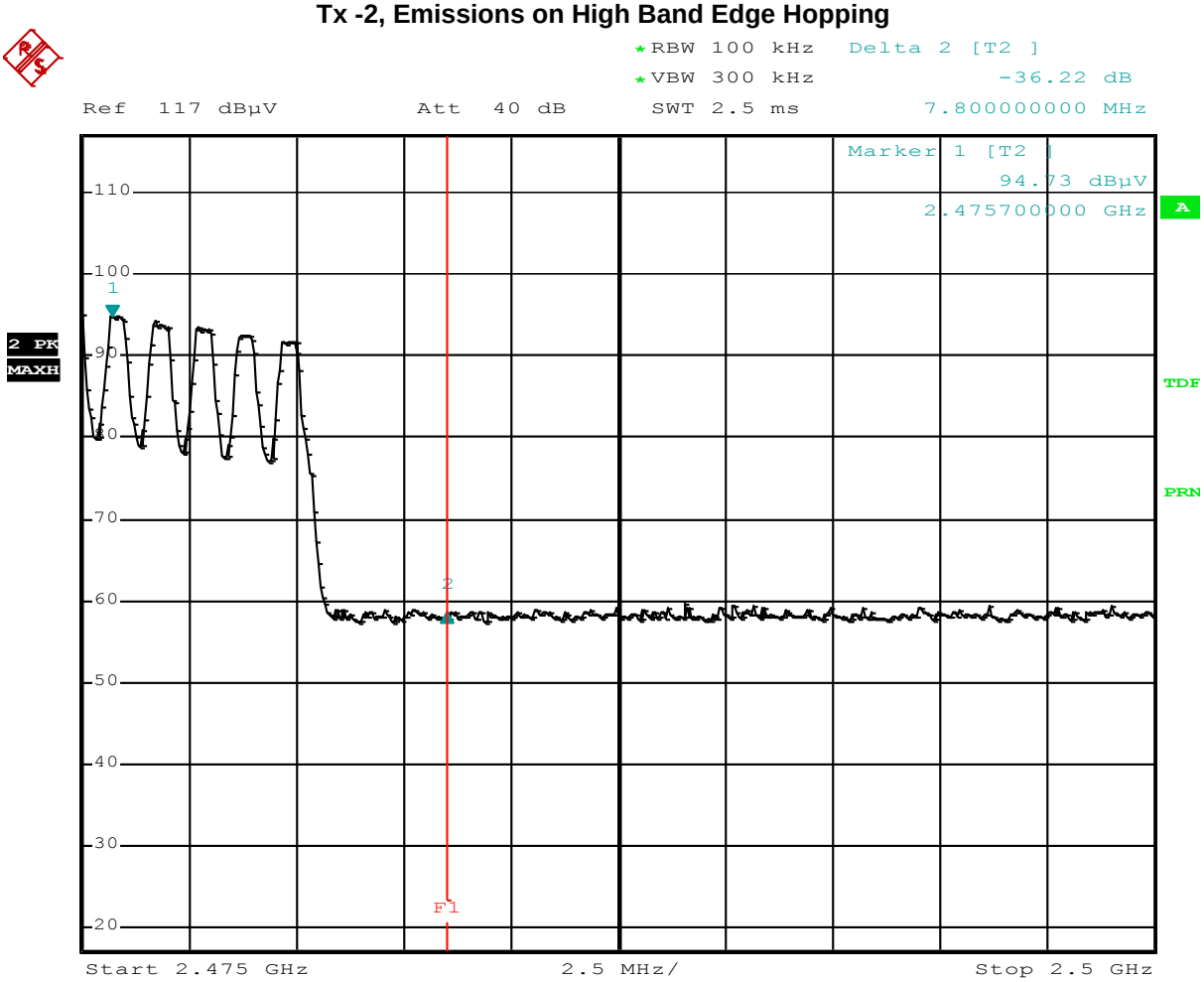
Tx -2, Emissions on Low Band Edge Hopping



Tx -2, Emissions on High Band Edge Fixed (DH1)



Tx -2, Emissions on High Band Edge Hopping



Test Personnel:	Naga Suryadevara NS	Test Date:	08/24/2016
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart C (15.247) and RSS-247	Limit Applied:	See test report section 11.3
Input Voltage:	12 VDC (System input 120 VAC 60 Hz)		
		Ambient Temperature:	22 ºC
Pretest Verification:	Yes	Relative Humidity:	44 %
		Atmospheric Pressure:	1003 mbars

Deviations, Additions, or Exclusions: None

12 Transmitter Spurious Emissions

12.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C (15.247) and RSS 247.

TEST SITE: 3m Semi-Anechoic Chamber at Intertek Lake Forest CA

Radiated emission measurements are performed in a 3 meter Semi-Anechoic Chamber. The chamber is a shielded enclosure used to control and maintain a predictable EMI environment within the test region. A lining of RF absorbing material (Absorber) and other anechoic materials are installed over all interior wall and ceiling surfaces as to completely shroud exposed metallic components and disrupt reflective properties. The ground plane is an exposed RF reflective surface. The turntable is flush mounted, 2 meters in diameter, and remotely controlled. The antenna mast can be positioned at 3 meters away from the turntable. The antenna mast is remote controlled and can lower/raise an antenna between 1 – 4 meters. The antenna mast can also rotate between horizontal and vertical polarizations.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.5 dB	6.3 dB
Radiated Emissions, 3m	1-18 GHz	4.7 dB	5.2 dB
Radiated Emissions, 1m	18-40 GHz	4.5 dB	-

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
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

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 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, giving field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m

CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

12.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
001001'	Barometer/Humidity Control	Omega	iBTHX-W	0440775	04/22/2016	04/22/2017
001093'	Double Ridge Guide Horn Antenna	A.H. Systems Inc.	SAS-571	1513	02/12/2016	02/12/2017
000880'	Horn Antenna, 10-40 GHZ	ETS Lindgren	3116C	00153521	11/09/2015	11/09/2016
001517'	RF Cable 30Mhz - 18Ghz	Rohde & Schwarz	TSPR-B7	101528	07/01/2016	07/01/2017
001518'	RF Cable 30Mhz - 18Ghz	Rohde & Schwarz	TSPR-B7	101529	07/01/2016	07/01/2017
000690'	Spectrum Analyzer, 9 KHz - 40 GHz	Rohde & Schwarz	FSP40	100027	01/11/2016	01/11/2017
001147'	Bilog Antenna	TESEQ Gmbh	CBL 6112D	32852	10/28/2015	10/28/2016
001135'	Amplifier	Miteq	AMF-6D-00501800-24-	1685147	04/15/2016	04/15/2017
001140'	EMI Test Receiver	Rohde & Schwarz	ESCI7	100825	02/22/2016	02/22/2017
001568'	Preamplifier 10 KHz - 1 GHz	Rohde & Schwarz	TS-PR1	102061	12/02/2015	12/02/2016
CBLHF2012-5M-1'	5m 9kHz-40GHz Coaxial Cable - SET 1	Huber & Suhner	SF102	252676001	02/09/2016	02/09/2017

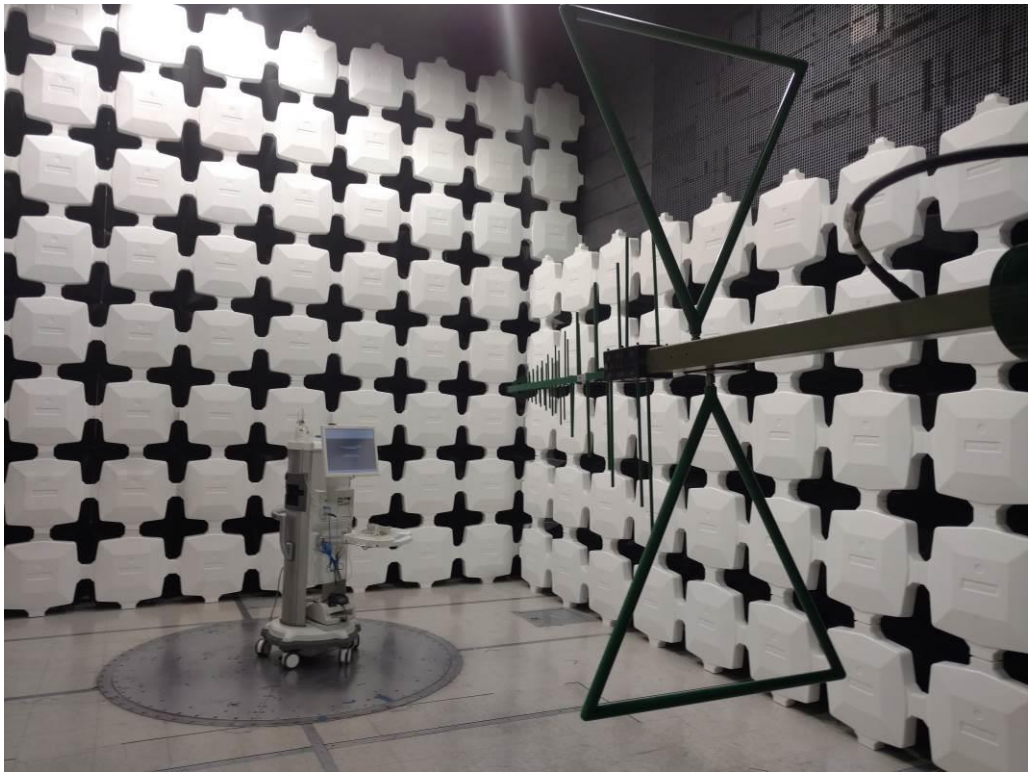
Software Utilized:

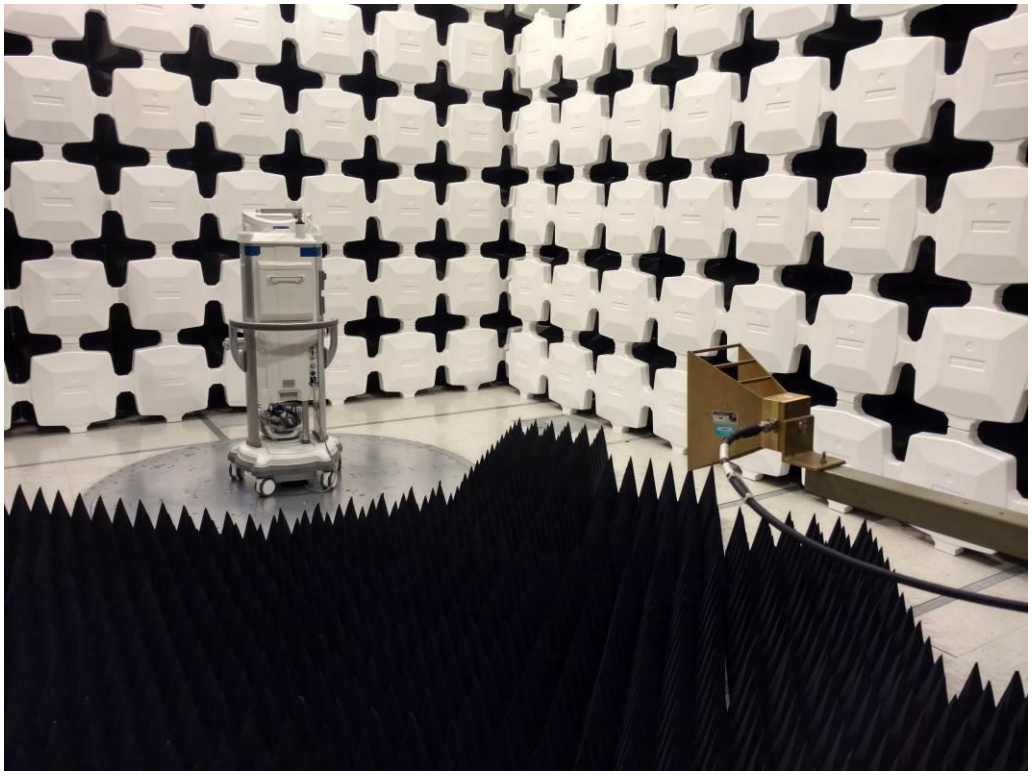
Name	Manufacturer	Version
None		

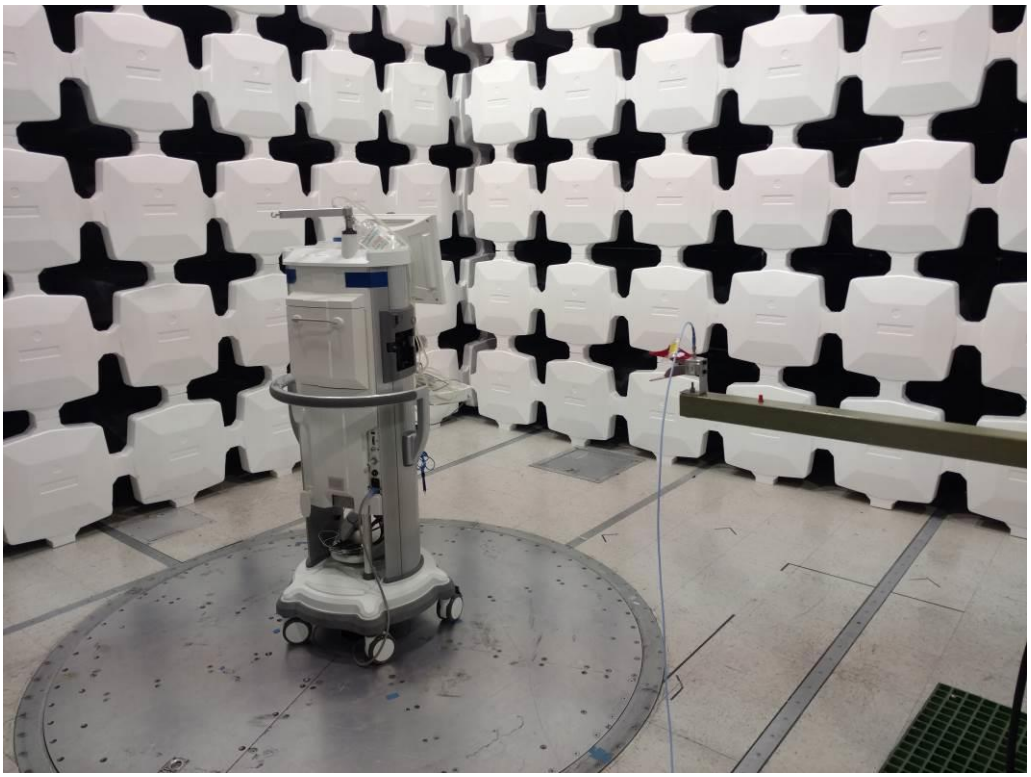
12.3 Results:

The sample tested was found to Comply.

12.4 Setup Photographs:







12.5 Plots/Data:

Both the transmitters set to transmit mode, 30 MHz – 1 GHz

Transmitter Spurious Emissions

Company: Abbott Medical Optics Inc. Antenna & Cables: LF Bands: LF
Model #: RPC Board Antenna: BilogAntenna1147Horizontal(10-28-2015).txt BilogAntenna1147Horizontal(10-28-2015).txt
Serial #: 1631600002 Cable(s): 1517 and 1518.txt NONE.
Engineers: Naga Suryadevara Location: 3 m chamber Barometer: 1001 Filter: NONE
Project #: G102675709 Date(s): 08/24/16
Standard: FCC Part 15 Subpart C Temp/Humidity/Pressure: 26.2/50/990
Receiver: R&S ESCI7 02/22/2017 Limit Distance (m): 3
PreAmp: DATA 001568.txt Test Distance (m): 3
PreAmp Used? (Y or N): Y Voltage/Frequency: As specified below Frequency Range: 30 MHz - 1 GHz
Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	
QP	V	58.390	56.74	12.06	0.43	30.69	0.00	24.55	40.00	-1.45	120/300 kHz	FCC
QP	H	58.390	39.98	12.06	0.43	30.69	0.00	21.79	40.00	-18.21	120/300 kHz	
QP	V	144.070	44.51	16.80	0.82	29.88	0.00	32.26	43.50	-11.24	120/300 kHz	
QP	H	144.070	39.51	16.80	0.82	29.88	0.00	27.26	43.50	-16.24	120/300 kHz	
QP	V	291.670	46.90	18.90	1.22	29.63	0.00	37.40	46.00	-8.60	120/300 kHz	
QP	H	291.670	41.52	18.90	1.22	29.63	0.00	32.02	46.00	-13.98	120/300 kHz	
QP	V	443.800	33.48	22.48	1.53	29.82	0.00	27.67	46.00	-18.33	120/300 kHz	
QP	H	443.800	31.87	22.48	1.53	29.82	0.00	26.06	46.00	-19.94	120/300 kHz	
QP	V	974.000	39.93	27.10	2.32	29.32	0.00	40.03	54.00	-13.97	120/300 kHz	RB
QP	H	974.000	41.43	27.10	2.32	29.32	0.00	41.53	54.00	-12.47	120/300 kHz	RB

Both the transmitters set to transmit mode, 1 GHz – 25 GHz

Intertek

Transmitter Spurious Emissions

Company: Abbott Optical Inc
Model #: RPC Board
Serial #: 1631600002
Engineers: Naga Suryadevara
Project #: G102675709
Standard: FCC Part 15 Subpart C
Receiver: R&S ESCI7 02/22/2017
PreAmp: Preamp 1135.txt
PreAmp Used? (Y or N): Y
Antenna & Cables: HF Bands: HF
Antenna: 1093H.txt 1093V.txt
Cable(s): 001517.txt
Location: 3m Chamber Barometer: 1001 Filter: REA004
Date(s): 08/25/16
Temp/Humidity/Pressure: 24/48/1003
Limit Distance (m): 3
Test Distance (m): 3
Voltage/Frequency: As specified below Frequency Range: 1-25 GHz

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	REA004 Bandwidth	
				Tx1 and Tx2= 2402 MHz								
PK	V	2397.310	44.98	28.06	-2.02	0.00	0.00	71.02	74.00	-2.98	1/3 MHz	
AVG	V	2397.310	25.12	28.06	-2.02	0.00	0.00	51.16	54.00	-2.84	1/3 MHz	
PK	V	4804.000	78.58	32.93	-3.11	43.41	0.00	64.99	74.00	-9.01	1/3 MHz	RB
AVG	V	4804.000	62.21	32.93	-3.11	43.41	0.00	48.62	54.00	-5.38	1/3 MHz	RB
PK	H	7206.000	68.21	36.50	-3.40	43.35	0.00	57.95	74.00	-16.05	1/3 MHz	
AVG	H	7206.000	59.17	36.50	-3.40	43.35	0.00	48.91	54.00	-5.09	1/3 MHz	
PK	V	9608.000	61.31	38.36	-4.47	43.63	0.00	51.57	74.00	-22.43	1/3 MHz	
AVG	V	9608.000	47.21	38.36	-4.47	43.63	0.00	37.47	54.00	-16.53	1/3 MHz	
PK	V	12010.000	59.19	40.23	-4.58	45.34	0.00	49.49	74.00	-24.51	1/3 MHz	RB
AVG	V	12010.000	50.55	40.23	-4.58	45.34	0.00	40.85	54.00	-13.15	1/3 MHz	RB
PK	H	14412.000	52.12	41.03	-5.47	43.74	0.00	43.94	74.00	-30.06	1/3 MHz	
AVG	H	14412.000	46.98	41.03	-5.47	43.74	0.00	38.80	54.00	-15.20	1/3 MHz	
			No emissions detected above this frequency									
				Tx1 and Tx2 = 2441 MHz								
PK	V	4882.000	72.19	33.10	-3.14	43.33	0.00	58.82	74.00	-15.19	1/3 MHz	RB
AVG	V	4882.000	60.18	33.10	-3.14	43.33	0.00	46.81	54.00	-7.20	1/3 MHz	RB
PK	V	7323.000	64.22	36.86	-3.48	42.99	0.00	54.60	74.00	-19.40	1/3 MHz	RB
AVG	V	7323.000	58.37	36.86	-3.48	42.99	0.00	48.75	54.00	-5.25	1/3 MHz	RB
PK	H	9764.000	53.19	38.50	-4.51	43.73	0.00	43.44	74.00	-30.56	1/3 MHz	
AVG	H	9764.000	49.17	38.50	-4.51	43.73	0.00	39.42	54.00	-14.58	1/3 MHz	
PK	V	12205.000	50.79	39.75	-4.63	45.48	0.00	40.42	74.00	-33.58	1/3 MHz	RB
AVG	V	12205.000	42.54	39.75	-4.63	45.48	0.00	32.17	54.00	-21.83	1/3 MHz	RB
PK	V	14646.000	46.24	41.76	-5.54	43.67	0.00	38.78	74.00	-35.22	1/3 MHz	
AVG	V	14646.000	39.86	41.76	-5.54	43.67	0.00	32.40	54.00	-21.60	1/3 MHz	
			No emissions detected above this frequency									
				TX = 2480 MHz								
PK	V	2483.500	46.32	28.34	-2.06	0.00	0.00	72.59	74.00	-1.41	1/3 MHz	RB
AVG	V	2483.500	25.18	28.34	-2.06	0.00	0.00	51.45	54.00	-2.55	1/3 MHz	RB
PK	V	4960.000	74.47	33.20	-3.17	43.32	0.00	61.18	74.00	-12.82	1/3 MHz	RB
AVG	V	4960.000	61.39	33.20	-3.17	43.32	0.00	48.10	54.00	-5.90	1/3 MHz	RB
PK	V	7440.000	66.24	36.83	-3.56	42.70	0.00	56.81	74.00	-17.19	1/3 MHz	RB
AVG	V	7440.000	58.87	36.83	-3.56	42.70	0.00	49.44	54.00	-4.56	1/3 MHz	RB
PK	H	9920.000	62.18	38.66	-4.54	43.76	0.00	52.54	74.00	-21.46	1/3 MHz	
AVG	H	9920.000	54.46	38.66	-4.54	43.76	0.00	44.82	54.00	-9.18	1/3 MHz	
PK	H	12400.000	56.62	39.97	-4.74	45.31	0.00	46.54	74.00	-27.46	1/3 MHz	RB
AVG	H	12400.000	48.65	39.97	-4.74	45.31	0.00	38.57	54.00	-15.43	1/3 MHz	RB
			No emissions detected above this frequency									

Test Personnel:	Naga Suryadevara NS	Test Date:	08/24/2016 08/25/2016
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart C (15.247) and RSS-247	Limit Applied:	As specified
Input Voltage:	12 VDC (System input 120 VAC 60 Hz)		
Pretest Verification w/ Ambient Signals or BB Source:	Yes	Ambient Temperature:	26.2, 24 ºC
		Relative Humidity:	50, 48 %
		Atmospheric Pressure:	990, 1003 mbars

Deviations, Additions, or Exclusions: None

13 Receiver Spurious Emissions

13.1 Method

Tests are performed in accordance with FCC Part 15.209 and ICES 003.

TEST SITE: 3m Semi-Anechoic Chamber at Intertek Lake Forest CA

Radiated emission measurements are performed in a 3 meter Semi-Anechoic Chamber. The chamber is a shielded enclosure used to control and maintain a predictable EMI environment within the test region. A lining of RF absorbing material (Absorber) and other anechoic materials are installed over all interior wall and ceiling surfaces as to completely shroud exposed metallic components and disrupt reflective properties. The ground plane is an exposed RF reflective surface. The turntable is flush mounted, 2 meters in diameter, and remotely controlled. The antenna mast can be positioned at 3 meters away from the turntable. The antenna mast is remote controlled and can lower/raise an antenna between 1 – 4 meters. The antenna mast can also rotate between horizontal and vertical polarizations.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.5 dB	6.3 dB
Radiated Emissions, 3m	1-18 GHz	4.7 dB	5.2 dB
Radiated Emissions, 1m	18-40 GHz	4.5 dB	-

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
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

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 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, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m

CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

13.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
001001'	Barometer/Humidity Control	Omega	iBTHX-W	0440775	04/22/2016	04/22/2017
001093'	Double Ridge Guide Horn Antenna	A.H. Systems Inc.	SAS-571	1513	02/12/2016	02/12/2017
000880'	Horn Antenna, 10-40 GHZ	ETS Lindgren	3116C	00153521	11/09/2015	11/09/2016
001517'	RF Cable 30Mhz - 18Ghz	Rohde & Schwarz	TSPR-B7	101528	07/01/2016	07/01/2017
001518'	RF Cable 30Mhz - 18Ghz	Rohde & Schwarz	TSPR-B7	101529	07/01/2016	07/01/2017
000690'	Spectrum Analyzer, 9 KHz - 40 GHz	Rohde & Schwarz	FSP40	100027	01/11/2016	01/11/2017
001147'	Bilog Antenna	TESEQ Gmbh	CBL 6112D	32852	10/28/2015	10/28/2016
001135'	Amplifier	Miteq	AMF-6D-00501800-24-	1685147	04/15/2016	04/15/2017
001140'	EMI Test Receiver	Rohde & Schwarz	ESCI7	100825	02/22/2016	02/22/2017
001568'	Preamplifier 10 KHz - 1 GHz	Rohde & Schwarz	TS-PR1	102061	12/02/2015	12/02/2016
CBLHF2012-5M-1'	5m 9kHz-40GHz Coaxial Cable - SET 1	Huber & Suhner	SF102	252676001	02/09/2016	02/09/2017

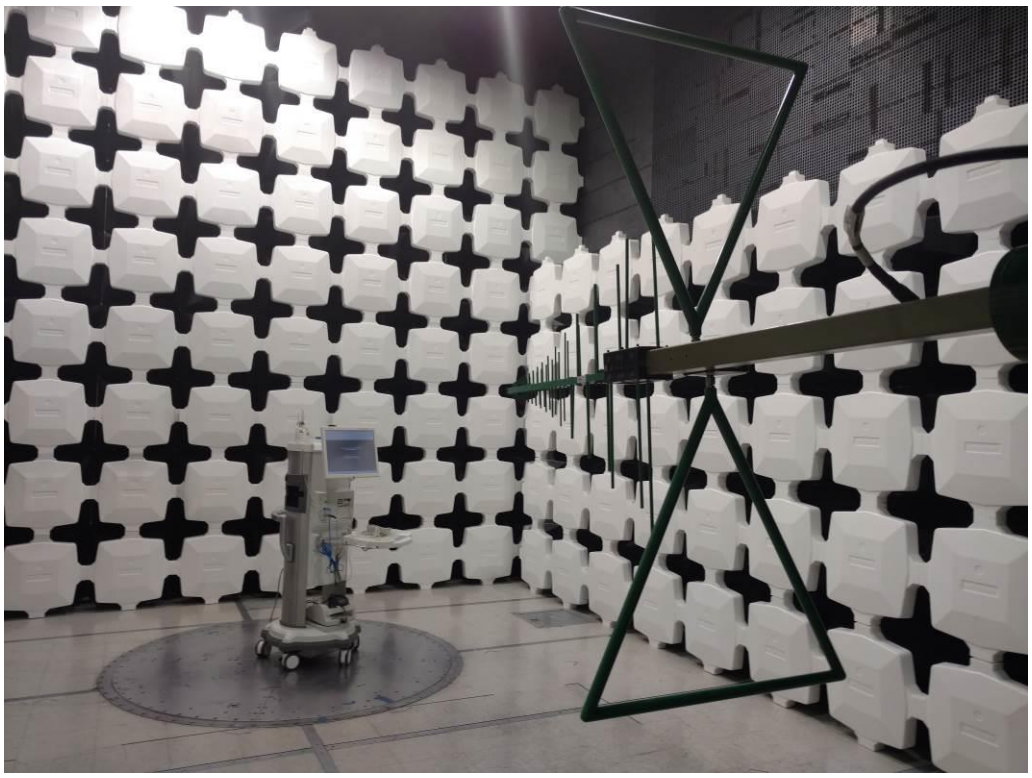
Software Utilized:

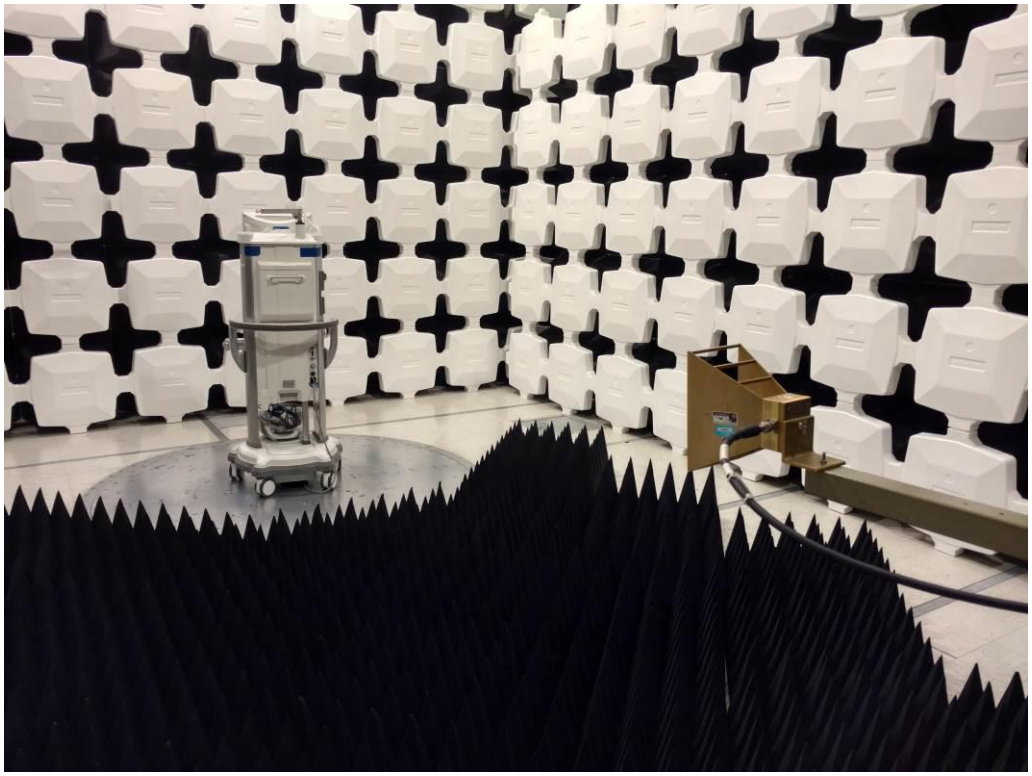
Name	Manufacturer	Version
None		

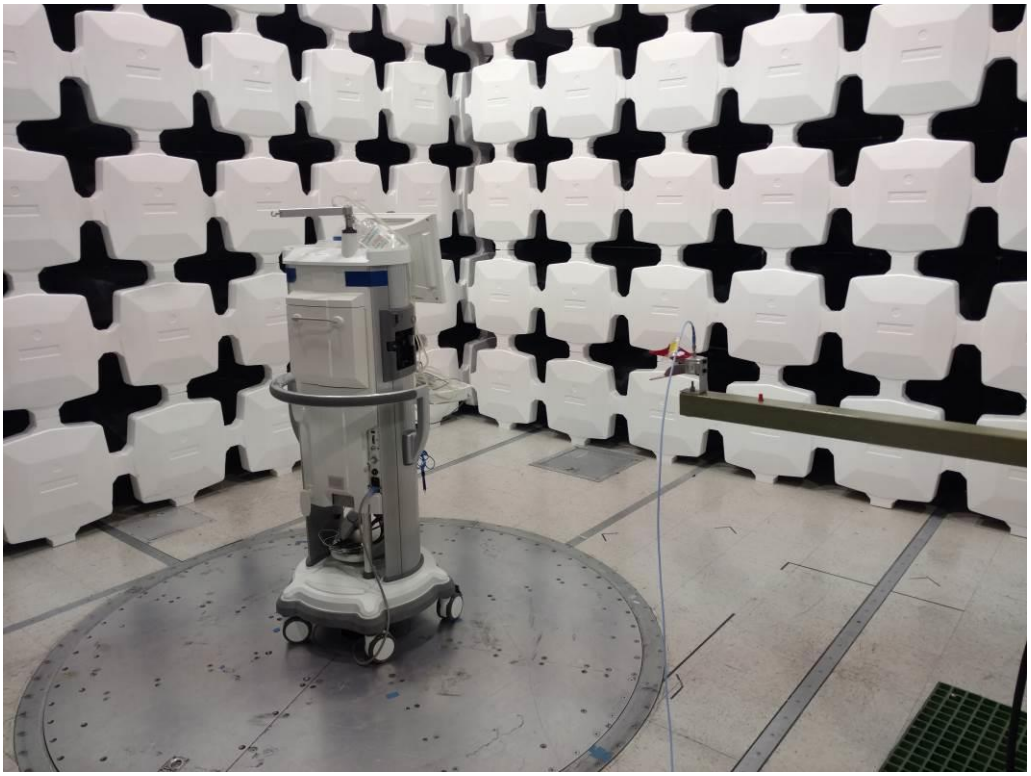
13.3 Results:

The sample tested was found to Comply.

13.4 Setup Photographs:







13.5 Plots/Data:

Device Operating in Receive mode, 30 MHz – 1 GHz

Radiated Emissions

Company: Abbott Medical Optics Inc. Antenna & Cables: LF Bands: LF
Model #: RPC Board Antenna: BilogAntenna1147Horizontal(10-28-2015).txt BilogAntenna1147Horizontal(10-28-2015).txt
Serial #: 1631600002 Cable(s): 1517 and 1518.txt NONE.
Engineers: Naga Suryadevara Location: 3 m chamber Barometer: 1001 Filter: NONE
Project #: G102675709 Date(s): 08/24/16
Standard: FCC Part 15 Subpart C 15.209 Temp/Humidity/Pressure: 26.2/50/990
Receiver: R&S ESCI7 02/22/2017 Limit Distance (m): 3
PreAmp: DATA 001568.txt Test Distance (m): 3
PreAmp Used? (Y or N): Y Voltage/Frequency: 12 VDC Frequency Range: 30 MHz - 1 GHz
Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	
QP	V	58.390	56.74	12.06	0.43	30.69	0.00	24.55	40.00	-1.45	120/300 kHz	FCC
QP	H	58.390	39.98	12.06	0.43	30.69	0.00	21.79	40.00	-18.21	120/300 kHz	
QP	V	144.070	44.51	16.80	0.82	29.88	0.00	32.26	43.50	-11.24	120/300 kHz	
QP	H	144.070	39.51	16.80	0.82	29.88	0.00	27.26	43.50	-16.24	120/300 kHz	
QP	V	291.670	46.90	18.90	1.22	29.63	0.00	37.40	46.00	-8.60	120/300 kHz	
QP	H	291.670	41.52	18.90	1.22	29.63	0.00	32.02	46.00	-13.98	120/300 kHz	
QP	V	443.800	33.48	22.48	1.53	29.82	0.00	27.67	46.00	-18.33	120/300 kHz	
QP	H	443.800	31.87	22.48	1.53	29.82	0.00	26.06	46.00	-19.94	120/300 kHz	
QP	V	974.000	39.93	27.10	2.32	29.32	0.00	40.03	54.00	-13.97	120/300 kHz	RB
QP	H	974.000	41.43	27.10	2.32	29.32	0.00	41.53	54.00	-12.47	120/300 kHz	RB

Device Operating in Receive mode, 1 GHz – 25 GHz

Intertek

Radiated Emissions

Company: Abbott Medical
Model #: RPC Board
Serial #: 1631600002
Engineers: Naga Suryadevara
Project #: G102675709
Standard: FCC Part 15 Subpart C 15.209
Receiver: R&S ESCI7 02/22/2017
PreAmp: preamp1135.txt
PreAmp Used? (Y or N): Y
Date(s): 08/24/16
Location: 3 m chamber
Limit Distance (m): 3
Test Distance (m): 3
Voltage/Frequency: As specified below
Antenna & Cables: HF
Antenna: 1093H.txt
Cable(s): 001517.txt
Barometer: 1001
Temp/Humidity/Pressure: 24/48/1003
Bands: HF
1093V.txt
NONE.
Filter: None
Frequency Range: 1-25 GHz

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	REA004 Bandwidth	FCC
				Receive mode								
PK	V	1236.580	68.32	24.64	-1.40	45.15	0.00	46.40	74.00	-27.60	1/3 MHz	RB
AVG	V	1236.580	55.19	24.64	-1.40	45.15	0.00	33.27	54.00	-20.73	1/3 MHz	RB
PK	V	2485.980	60.15	28.35	-2.06	44.64	0.00	41.80	74.00	-32.20	1/3 MHz	RB
AVG	V	2485.980	55.19	28.35	-2.06	44.64	0.00	36.84	54.00	-17.16	1/3 MHz	RB
PK	V	3120.360	56.28	30.61	-2.34	43.83	0.00	40.71	74.00	-33.29	1/3 MHz	
AVG	V	3120.360	48.17	30.61	-2.34	43.83	0.00	32.60	54.00	-21.40	1/3 MHz	
PK	H	7320.280	49.45	36.86	-3.48	43.00	0.00	39.84	74.00	-34.16	1/3 MHz	RB
AVG	H	7320.280	42.12	36.86	-3.48	43.00	0.00	32.51	54.00	-21.49	1/3 MHz	RB
PK	H	12236.320	51.17	39.85	-4.65	45.49	0.00	40.89	74.00	-33.11	1/3 MHz	RB
AVG	H	12236.320	39.08	39.85	-4.65	45.49	0.00	28.80	54.00	-25.20	1/3 MHz	RB

Test Personnel: Naga Suryadevara N5
Test Date: 08/24/2016
08/25/2016

Supervising/Reviewing Engineer: (Where Applicable) N/A

Product Standard: FCC Part 15 (15.209) and ICES 003

Limit Applied: FCC 15.109 Class B

Input Voltage: 12 VDC (System input 120 VAC 60 Hz)

Ambient Temperature: 26.2, 24 ºC

Pretest Verification w/ Ambient Signals or BB Source: Yes

Relative Humidity: 50, 48 %

Atmospheric Pressure: 990, 1003 mbars

Deviations, Additions, or Exclusions: None

14 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	09/07/2016	102675709BOX-002	NS	MFM	Original Issue
1	10/04/2016	102675709BOX-002	NS	MFM	Updated model name
2	11/11/2016	102675709BOX-002	NS	MFM	Updated antenna gain ,RF exposure calculation and added measurement uncertainty value for 18-40 GHz.
3	11/21/2016	102675709BOX-002	NS	MFM	Added SAR Exemption Calculation