FCC PART 90 TEST REPORT

for

Wireless Table Call System

Model No.: TB-A06

FCC ID: NDATBA06XU

of

Applicant: **Gold Apollo Co., Ltd.**
Address: **Rm 1, 3th Fl., No. 77 Sec 1 Hsin Tai Wu Rd, Hsi-Chih Dist, New Taipei City, Taiwan,R.O.C.221**

Tested and Prepared

by

Worldwide Testing Services (Taiwan) Co., Ltd.

FCC Registration No.: 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1

A2LA Accredited No.: 2732.01

Report No.: W6M21403-13988-C-1

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
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TABLE OF CONTENTS

1. GENERAL INFORMATION 3

1.1 NOTES 3
1.2 TESTING LABORATORY 4
1.2.1 Location 4
1.2.2 Details of accreditation status 4
1.3 DETAILS OF APPROVAL HOLDER 5
1.4 APPLICATION DETAILS 5
1.5 GENERAL INFORMATION OF TEST ITEM 5
1.6 TEST STANDARDS 6

2. TECHNICAL TEST 7

2.1 SUMMARY OF TEST RESULTS 7
2.2 TEST ENVIRONMENT 7
2.3 DESCRIPTION OF TESTED SYSTEM 7
2.4 TEST EQUIPMENT LIST 8
2.5 GENERAL TEST PROCEDURE 10

3. TEST RESULTS (ENCLOSURE) 11

4. MODULATION CHARACTERISTICS 12

4.1 TEST PROCEDURE 12
4.2 TEST SETUP 12
4.3 TEST RESULTS 12
4.3.1 Audio Frequency Response 12
4.3.2 AUDIO INPUT VERSUS MODULATION 12
4.3.3 Necessary Bandwidth 14

5. FREQUENCY STABILITY 16

5.1 TEST PROCEDURES 16
5.2 TEST SETUP 16
5.3 TEST RESULT 17

6. TRANSMITTER OUTPUT POWER 20

6.1 TEST PROCEDURES 20
6.2 TEST SETUP 20
6.3 TEST RESULT 21
6.3.1 Conducted Power 21
6.3.2 Radiated Power 23
6.4 LIMIT 23

7. EMISSION MASKS 24

7.1 TEST PROCEDURES 24
7.2 TEST SETUP 24
7.3 TEST RESULT 24

8. TRANSMITTER SPURIOUS RADIATED EMISSION 26

8.1 TEST PROCEDURES....26
8.2 TEST SETUP....26
8.3 TEST RESULT....27

9. TRANSMITTER SPURIOUS CONDUCTED EMISSION....29

9.1 TEST PROCEDURES....29
9.2 TEST SETUP....29
9.3 TEST RESULT....29

10. TRANSIENT FREQUENCY BEHAVIOR....33

10.1 TEST PROCEDURES....33
10.2 TEST SETUP....33
10.3 TEST RESULT....34

11. CONDUCTED EMISSION....37

1. General Information

1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that is performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

The test report may only be reproduced or published in full.

Reproduction or publication of extracts from the report requires the prior written approval of the Worldwide Testing Services(Taiwan) Co., Ltd.

Tester:

May 15, 2014		Robert Ren	Robert Ren
Date	WTS-Lab.	Name	Signature

Technical responsibility for area of testing:

May 15, 2014		Kevin Wang	Kevin Wang
Date	WTS	Name	Signature

1.2 Testing laboratory

1.2.1 Location

OATS
No.5-1, Lishui, Shuang Sing Village,
Wanli Dist., New Taipei City 207,
Taiwan (R.O.C.)
Company
Worldwide Testing Services(Taiwan) Co., Ltd.
6F, NO. 58, LANE 188, RUEY-KUANG RD.
NEIHU, TAIPEI 114, TAIWAN R.O.C.
Tel : 886-2-66068877
Fax : 886-2-66068879

1.2.2 Details of accreditation status

Accredited testing laboratory

A2LA accredited number: 2732.01

FCC filed test laboratory Reg. No. 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1

Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd. :

Name:	./.
Accredited number:	./.
Street:	./.
Town:	./.
Country:	./.
Telephone:	./.
Fax:	./.

1.3 Details of approval holder

Name:	Gold Apollo Co., Ltd.
Street:	Rm 1, 3th Fl., No. 77 Sec 1 Hsin Tai Wu Rd, Hsi-Chih Dist,
City:	New Taipei City, 221
Country:	Taiwan,R.O.C.
Telephone:	+886 2 2698 8888
Fax:	+886 2 2698 1750

1.4 Application details

Date of receipt of test item:	March 10, 2014
Date of test:	from March 11, 2014 to May 15, 2014

1.5 General information of Test item

Type of test item:	Wireless Table Call System
Model Number:	TB-A06
Brand Name:	Apollo
Multi-listing model number:	./.
Photos:	See appendix

Technical data

Operating frequency band:

Frequency(MHz)	Used Band
450~470	☒

Sample tested frequency:	Low channel: 450.0125 MHz Middle channel: 460 MHz High channel: 469.9875 MHz
Type of modulation:	FM
Designation of emission:	8K4F1D
Channel spacing:	12.5 kHz
Antenna Type:	Wire antenna
Connection of Antenna:	☐ detachable ☒ not detachable

Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

Power Rating:	Battery 3.6Vdc, 350mAh Adapter (I/P: 100-240Vac, 50-60Hz, 0.4A O/P: 6Vdc, 2.0A)
Operation modes:	half-duplex

Manufacturer: (if applicable)

Name:	Gold Apollo Co., Ltd.
Street:	Rm 1, 3th Fl., No. 77 Sec 1 Hsin Tai Wu Rd, Hsi-Chih Dist,
City:	New Taipei City, 221
Country:	Taiwan,R.O.C.
Telephone:	+886 2 2698 8888
Fax:	+886 2 2698 1750

1.6 Test standards

Technical standard: FCC RULES PART 90 (2013-10)

2. Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations as specified in 3 were ascertained in the course of the tests performed. ☐

2.2 Test environment

Temperature: 23 °C

Relative humidity content: 20 ... 75 %

Air pressure: 86-103 KPa

2.3 Description of Tested System

The EUT was tested with the Accessories or Peripherals Listed below:

Equipment	Model No.	Series No.	Software	Cable information	Note
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

Explanation: The EUT was configured as stand alone device, and there are no accessories or peripherals during the test.

2.4 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2013/9/2	2014/9/1
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
ETSTW-CE 008	HF-EICHLEITUNG RF STEP ATTENUATOR 139dB DPSP	334.6010.02	844581/024	R&S	Function Test	
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2013/7/10	2014/7/9
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2013/10/28	2014/10/27
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2013/9/2	2014/9/1
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2013/9/2	2014/9/1
ETSTW-RE 012	TUNABLE BANDREJECT FILTER	D.C 0309	146	K&L	Function Test	
ETSTW-RE 013	TUNABLE BANDREJECT FILTER	D.C 0336	397	K&L	Function Test	
ETSTW-RE 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2013/10/15	2014/10/14
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2013/7/3	2014/7/2
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2014/2/25	2015/2/24
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test Use	
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2014/2/18	2015/2/17
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2014/3/3	2015/3/2
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2014/3/3	2015/3/2
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2014/3/3	2015/3/2
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2013/5/31	2014/5/30
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2014/3/3	2015/3/2
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2013/11/27	2014/11/26
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 069	Double-Ridged Guide Horn Antenna	3117	00069377	EMCO	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2013/10/7	2014/10/6
ETSTW-RE 088	SOLID STATE AMPLIFIER	KMA180265A01	99057	KMIC	2013/10/11	2014/10/10
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2014/3/3	2015/3/2
ETSTW-RE 106	Humidity Temperature Meter	TES-1366	091011113	TES	2013/12/04	2014/12/03
ETSTW-RE 111	TRILOG Super Broadband test Antenna	VULB 9160	9160-3309	Schwarz beck	2013/12/27	2014/12/26
ETSTW-RE 112	AC POWER SOURCE	TFC-1005	None	T-Power	Function test	
ETSTW-RE 115	2.4GHz Notch Filter	N0124411	473874	MICROWAVE CIRCUITS	2014/1/10	2015/1/09
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	Function test	
ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2013/6/28	2014/6/27
ETSTW-RE 125	5GHz Notch filter	5NSL11-5200/E221.3-O/O	1	K&L Microwave	2013/8/16	2014/8/15
ETSTW-RE 126	5GHz Notch filter	5NSL11-5800/E221.3-O/O	1	K&L Microwave	2013/8/16	2014/8/15

ETSTW-RE 127	RF Switch Box	RFS-01	None	WTS	2014/3/3	2015/3/2
ETSTW-RE 128	5.3GHz Notch filter	N0153001	SN487233	Microwave Circits	2013/8/13	2014/8/12
ETSTW-RE 129	5.5GHz Notch filter	N0555984	SN487234	Microwave Circits	2013/8/13	2014/8/12
ETSTW-RE 130	Handheld RF Spectrum Analyzer	N9340A	CN0147000204	Agilent	Pre-test Use	
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2013/10/7	2014/10/6
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40 /12+9SS	3	WI	2014/1/10	2015/1/09
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2014/1/10	2015/1/09
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2014/1/10	2015/1/09
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2014/1/10	2015/1/09
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2013/9/18	2014/9/17
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2014/2/27	2015/2/26
ETSTW-Cable 011	BNC Cable	BNC Cable 1	None	JYE BAO CO.,LTD.	Pre-test Use NCR	
ETSTW-Cable 012	N TYPE To SMA Cable	Cable 012	None	JYE BAO CO.,LTD.	2014/2/27	2015/2/26
ETSTW-Cable 016	BNC Cable	Switch Box	B Cable 1	Schwarz beck	2014/2/27	2015/2/26
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2014/2/27	2015/2/26
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2014/2/27	2015/2/26
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2014/2/27	2015/2/26
ETSTW-Cable 022	N TYPE Cable	5006	0002	JYE BAO CO.,LTD.	2014/2/19	2015/2/18
ETSTW-Cable 026	Microwave Cable	SUCOFLEX 104	279075	HUBER+SUHNER	2014/3/3	2015/3/2
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2014/3/3	2015/3/2
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2013/10/11	2014/10/10
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2013/10/11	2014/10/10
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104（S_Cable 9）	279067	HUBER+SUHNER	2014/3/3	2015/3/2
ETSTW-Cable 031	Microwave Cable	SUCOFLEX 104（S_Cable 10）	238092	HUBER+SUHNER	2013/11/27	2014/11/26
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2013/11/27	2014/11/26
ETSTW-Cable 047	Microwave Cable	SUCOFLEX 104	325518	HUBER+SUHNER	2013/11/27	2014/11/26
ETSTW-Cable 053	N TYPE To SMA Cable	RG142	None	JYE BAO CO.,LTD.	2014/2/19	2015/2/18
ETSTW-Cable 058	Microwave Cable	SUCOFLEX 104	none	HUBER+SUHNER	2014/2/19	2015/2/18
WTSTW-SW 002	EMI TEST SOFTWARE	EZ_EMC	None	Farad	Version ETS-03A1	

2.5 General Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 using a 50µH LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

RADIATION INTERFERENCE: The test procedure used was according to ANSI STANDARD C63.4-2003 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100 kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

For hand-held devices, an exploratory test was performed with three (3) orthogonal planes to determine the highest emissions.

Measurements were made by at the registered open field test site located at The Registration Number: 930600. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

3. Test results (enclosure)

TEST CASE	Para. Number	Required	Test passed	Test failed
Modulation Characteristics	2.1047(a) (b); 2.1033(c)	☐	☐	☐
Frequency stability.	90.213	☒	☒	☐
Transmitter Output Power	90.205	☒	☒	☐
Emission masks	90.210	☒	☒	☐
Transmitter Spurious Radiated Emission	90.210	☒	☒	☐
Transmitter Spurious Conducted Emission	90.210	☒	☒	☐
Transient frequency behavior	90.214	☒	☒	☐
Power Line Conducted Emission	15.207(a)	☒	☒	☐

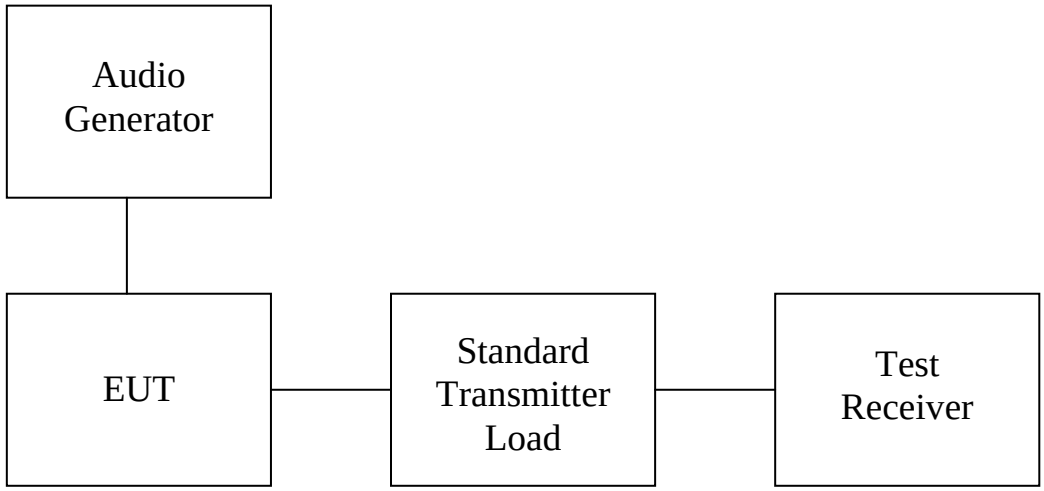
The following is intentionally left blank.

4. Modulation Characteristics

4.1 Test procedure

Modulation limiting is the transmitter circuit's ability to limit the transmitter from producing deviations in excess of rated system deviation.
The audio signal generator is connected to the audio input of the EUT with its full rating.
The modulation response is measured at certain modulation frequencies, related to 1000Hz reference signal. Tests are performed for positive and negative modulation.

4.2 Test Setup



4.3 Test results

4.3.1 Audio Frequency Response

Rule Part No.: Part 2.1047(a)(b) Method of Measurement: The audio frequency response was measured in accordance with TIA/EIA Specification 603 with no exception. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 300 – 3000Hz shall be submitted. The audio frequency response curve is shown below.
Test Audio level (1kHz and 20% max. deviation): 25mV

Explanation: This test item is not required, due to the device does not have audio input port.

Test equipment used: ETSTW-RE 072

4.3.2 AUDIO INPUT VERSUS MODULATION

Rule Part No.: Part 2.1047(b) & 90
Test Requirements: Modulation cannot exceed 100%
Method of Measurement: The audio input level needed for a particular percentage of modulation was measured in accordance with TIA/EIA Specification 603. The audio input curves versus modulation are

shown below. Curves are provided for audio input frequencies of 300, 1000, and 3000 Hz.
EUT Max deviation: 5kHz 60% EUT Max deviation: 3kHz

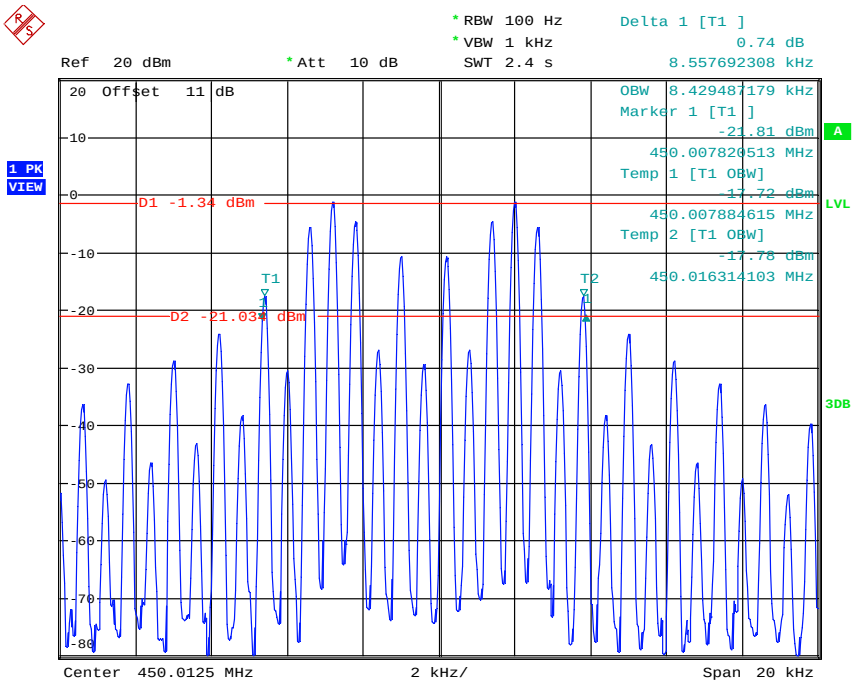
Explanation: This test item is not required, due to the device does not have audio input port.

Test equipment used: ETSTW-RE 072

4.3.3 Necessary Bandwidth

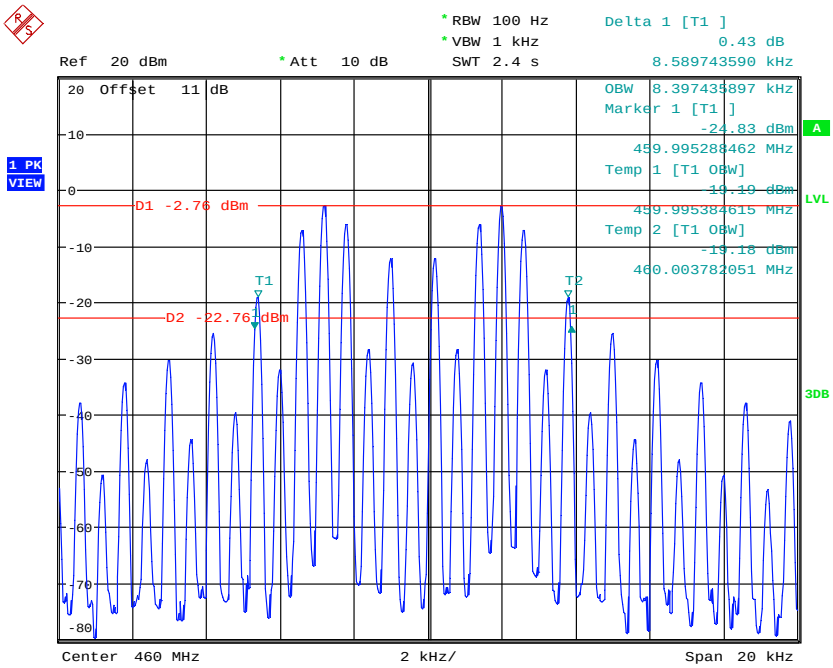
12.5 kHz

Frequency (MHz)	26dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)	Max. Limit (kHz)
450.0125	8.55769	8.42948	11.25
460	8.58974	8.39743	11.25
469.9875	8.58974	8.39743	11.25

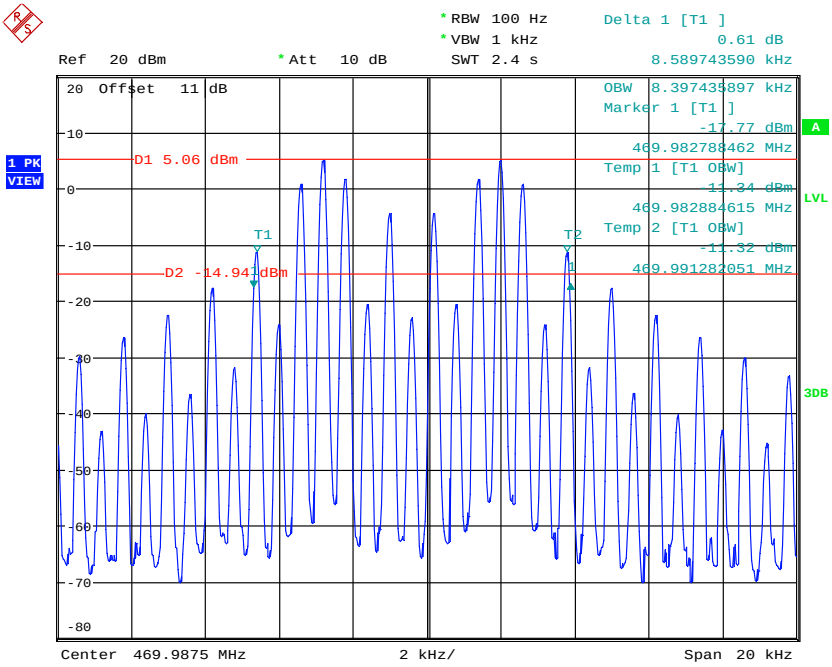


OBW Bandwidth
Date: 18.APR.2014 20:50:05

Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU



OBW Bandwidth
Date: 18.APR.2014 20:45:52



OBW Bandwidth
Date: 18.APR.2014 20:40:53

Measurement uncertainty = ±0.8024 kHz ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

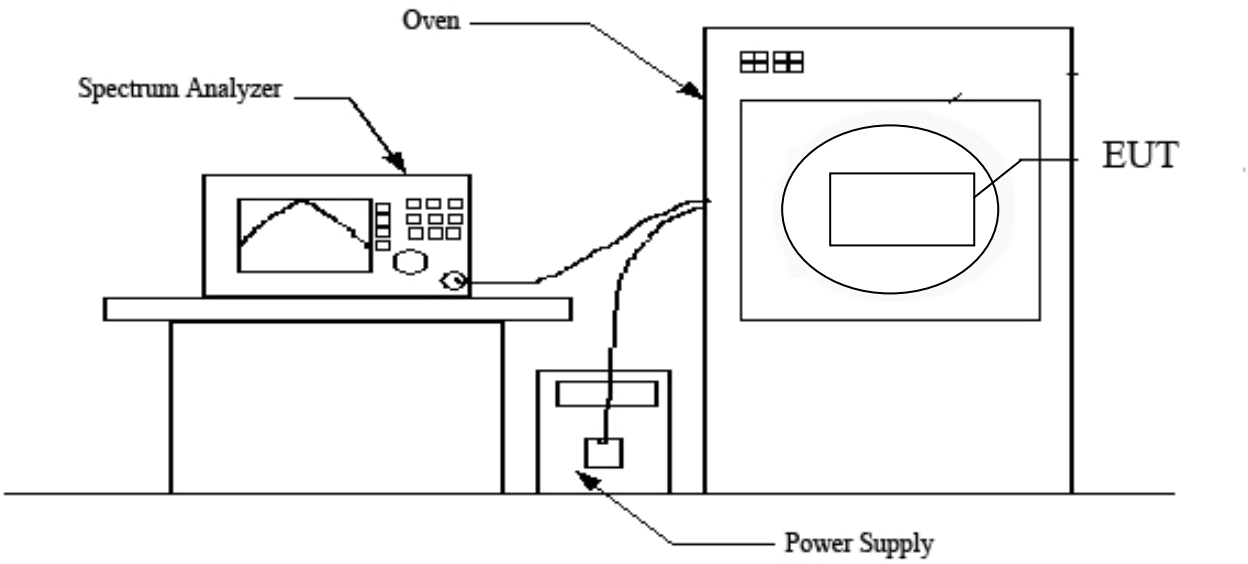
Test equipment used: ETSTW-RE 055, ETSTW-RE 060

5. Frequency stability

5.1 Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 1kHz and VBW to 1kHz.
3. Use peak detector mode, Max-hold and search the peak of trace 1.
4. According to the part 2.1055(d)(1), the supply voltage has to be changed from 85 to 115 percent of the nominal value.
5. According to the part 2.1055(a)(1), extreme temperature has to be changed from -20℃ to 50℃.
6. Read the frequency of the carrier and calculate the deviation.

5.2 Test Setup



5.3 Test Result

450.0120513 MHz

Voltage VS. Frequency Stability	
Voltage	Measurement Frequency
3.6 VDC	450.0120513 MHz
3.96 VDC	450.0120833 MHz
3.24 VDC	450.0120513 MHz
Max Deviation (MHz)	0.4487 MHz
Max Deviation (ppm)	-0.99708 MHz
Limit (ppm)	2.5
Temperature VS. Frequency Stability	
Temperature (℃)	Measurement Frequency
-20.00	450.012015 MHz
-10.00	450.012012 MHz
0.00	450.012111 MHz
10.00	450.012095 MHz
20.00	450.012083 MHz
30.00	450.012081 MHz
40.00	450.012079 MHz
50.00	450.012077 MHz
Max Deviation (MHz)	0.485
Max Deviation (ppm)	-1.0777478
Limit (ppm)	2.5

460 MHz

Voltage VS. Frequency Stability	
Voltage	Measurement Frequency
3.6 VDC	459.9995513 MHz
3.96 VDC	459.9995513 MHz
3.24 VDC	459.9995483 MHz
Max Deviation (MHz)	-0.4517
Max Deviation (ppm)	-0.981956
Limit (ppm)	2.5
Temperature VS. Frequency Stability	
Temperature (℃)	Measurement Frequency
-20.00	459.999569 MHz
-10.00	459.999565 MHz
0.00	459.999561 MHz
10.00	459.999552 MHz
20.00	459.999551 MHz
30.00	459.999551 MHz
40.00	459.999552 MHz
50.00	459.999554 MHz
Max Deviation (MHz)	0.4465
Max Deviation (ppm)	-0.970652
Limit (ppm)	2.5

Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

469.9875 MHz

Voltage VS. Frequency Stability	
Voltage	Measurement Frequency
3.6 VDC	469.9885192 MHz
3.96 VDC	469.9870192 MHz
3.24 VDC	469.9870513 MHz
Max Deviation (MHz)	0.4487
Max Deviation (ppm)	-0.9547062
Limit (ppm)	2.5
Temperature VS. Frequency Stability	
Temperature (℃)	Measurement Frequency
-20.00	469.987056 MHz
-10.00	469.987055 MHz
0.00	469.987054 MHz
10.00	469.987053 MHz
20.00	469.987051 MHz
30.00	469.987048 MHz
40.00	469.987048 MHz
50.00	469.987047 MHz
Max Deviation (MHz)	0.4528
Max Deviation (ppm)	-0.96342987
Limit (ppm)	2.5

Measurement uncertainty = ±6.06 Hz ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

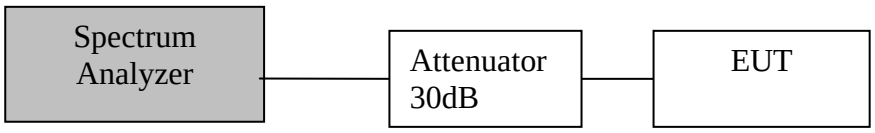
Test equipment used: ETSTW-RE 055, ETSTW-RE 060, ETSTW-CE 009

6. Transmitter Output Power

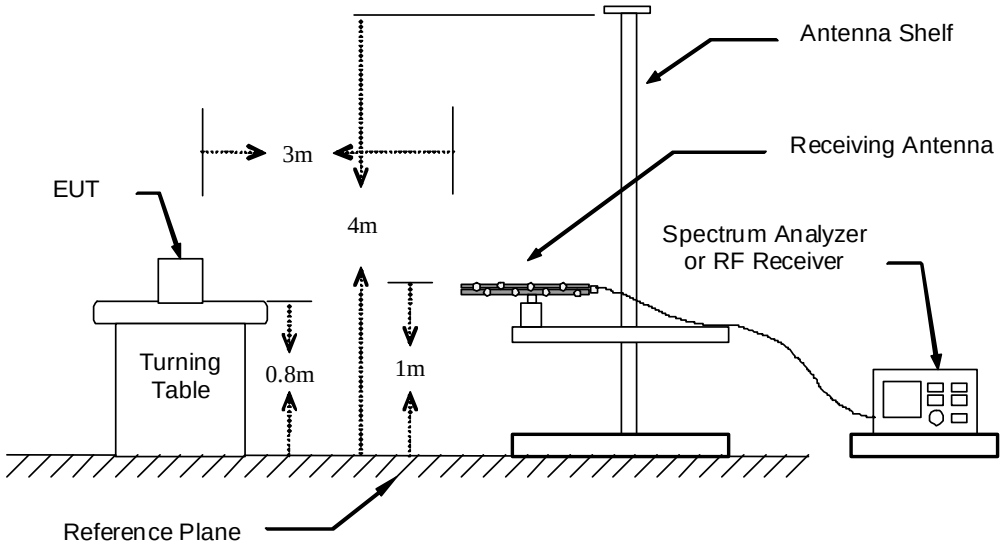
6.1 Test Procedures

1. The EUT was placed on the top of the turntable in semi-anechoic chamber.
2. The test shall be made in the transmitting mode. Antenna tower was scan (from 1 M to 4 M) and the turn table was rotated by 360 degrees to determine the position of the highest radiation.
3. The receiving Horn antenna was placed 0.5 meters far away from the turntable.
4. The receiving antenna was fixed on the same height with the EUT to find maximum suspected emissions. Recorded suspected value is indicated as Read Level (Raw).
5. Replace the EUT by standard antenna and feed the RF port by signal generator.
6. Adjust the frequency of the signal generator to the suspected emission and slightly rotate the turntable to locate the position with maximum reading.
7. Adjust the power level of the signal generator to reach the same reading with Read Level (Raw).
8. The level of the spurious emission is the power level of (7) plus the gain of the standard antenna in dBd and minus the loss of the cable used between the signal generator and the standard antenna.

6.2 Test Setup



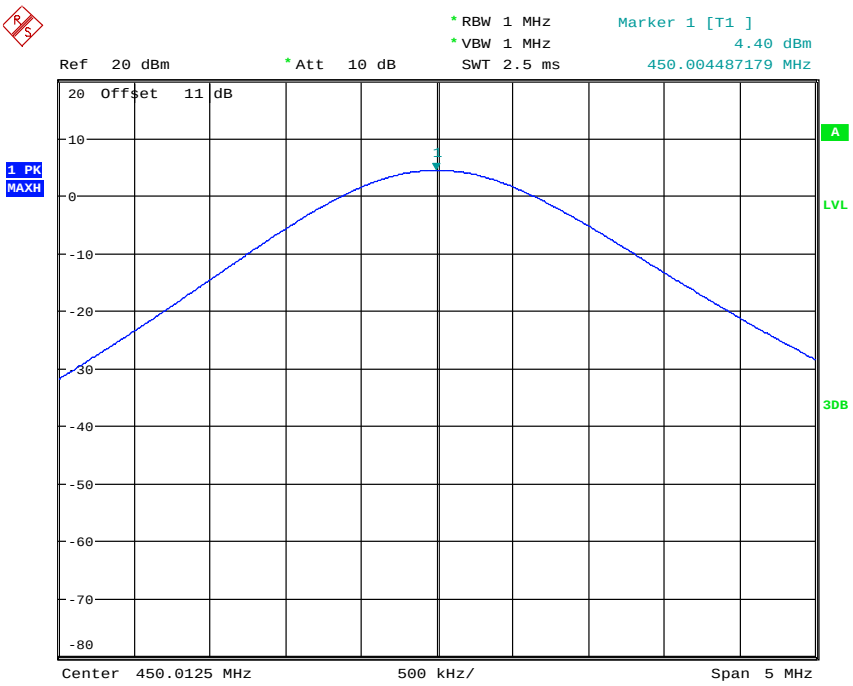
Setup for Conducted Power



Setup for Radiated Power

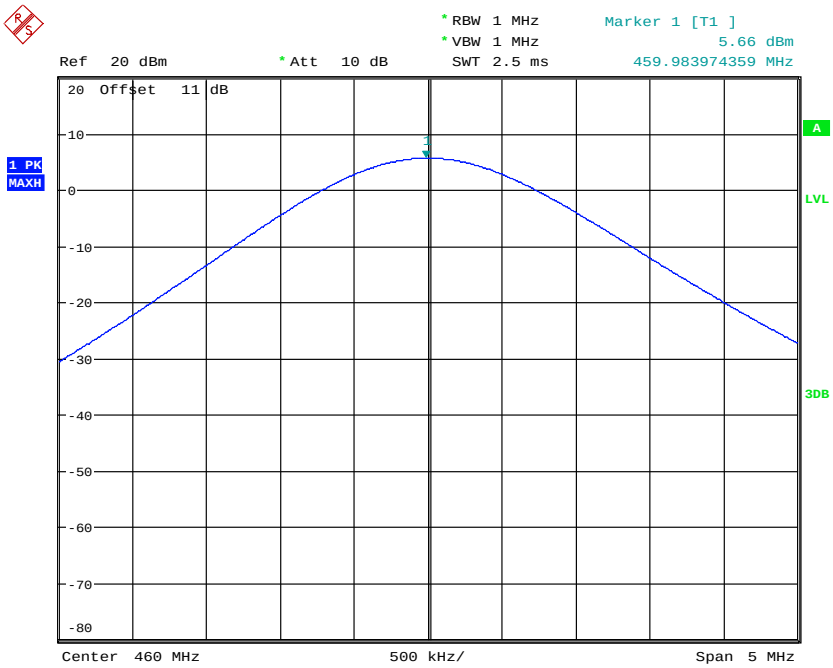
6.3 Test Result

6.3.1 Conducted Power



Conducted Power
Date: 18.APR.2014 20:51:49

Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU



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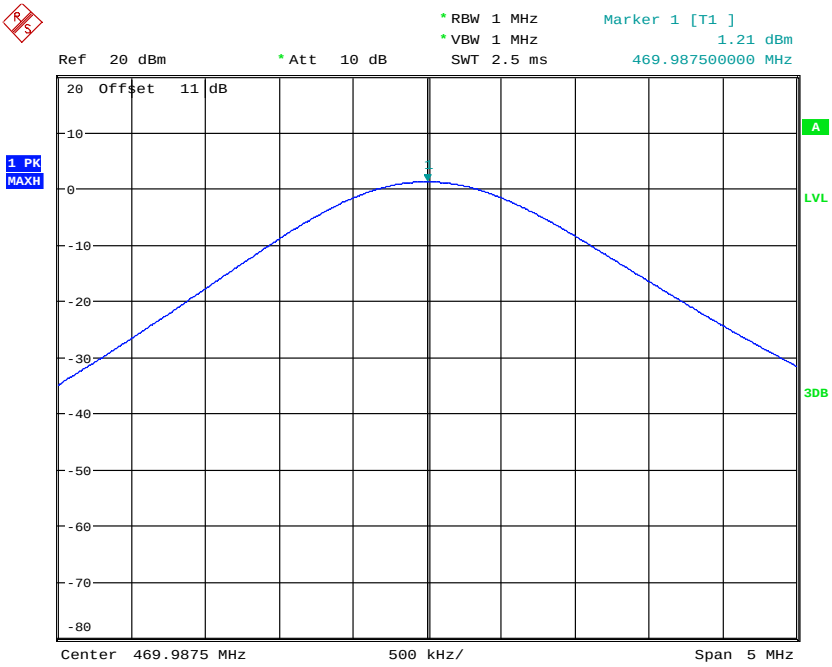
Date: 18.APR.2014 20:53:19



Conducted Power
Date: 18.APR.2014 20:55:00

Measurement uncertainty = ±1.80 dB ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Test equipment used: ETSTW-RE 055, ETSTW-RE 060

6.3.2 Radiated Power

Model: TB-A06 Date: 2014/04/18
Mode: 450.0125MHz Temperature: 24 °C Engineer: Robert
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
450.0065	-29.88	29.09	-0.79	43.00	-43.79	160	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
450.0105	-33.59	28.56	-5.03	43.00	-48.03	120	150

Mode: 460 MHz
Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
459.9900	-30.11	29.34	-0.77	43.00	-43.77	130	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
459.9980	-31.98	29.33	-2.65	43.00	-45.65	130	150

Mode: 469.9875 MHz
Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
469.9855	-28.78	29.13	0.35	43.00	-42.65	160	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
469.9775	-34.06	29.68	-4.38	43.00	-47.38	130	150

Test equipment used: ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 062, ETSTW-RE 111

Measurement uncertainty = 30-200MHz：±2.11 dB, 200-1000MHz：±2.09 dB, ±1-18GHz：2.71 dB, 18-40GHz：± 2.71 dB; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Note: See attached diagrams in appendix.

6.4 Limit

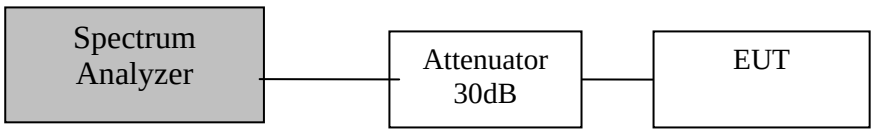
Power limit according to FCC § 90.261: 20 watts (43 dBm)

7. Emission masks

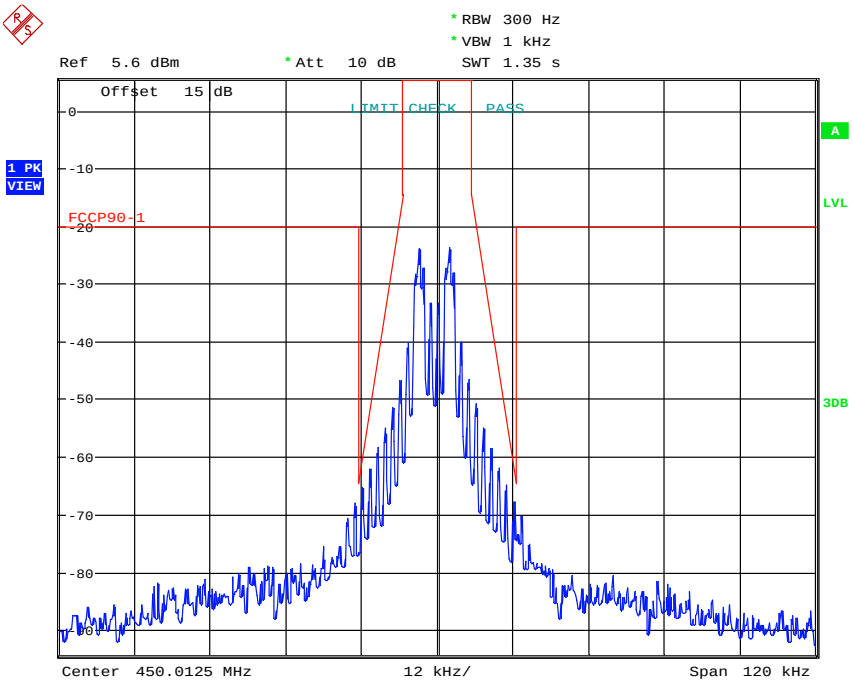
7.1 Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 300Hz and VBW to 1 kHz.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum
4. Set the span to 120 kHz and the sweep time to Auto.
5. Record the power spectral and compare to the Mask.

7.2 Test Setup



7.3 Test Result



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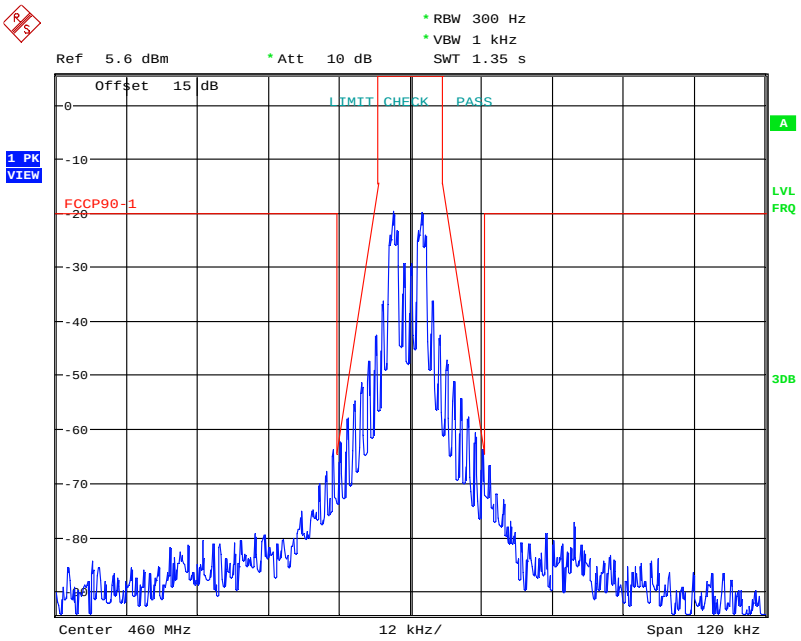
Date: 15.MAY.2014 19:35:51

Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU



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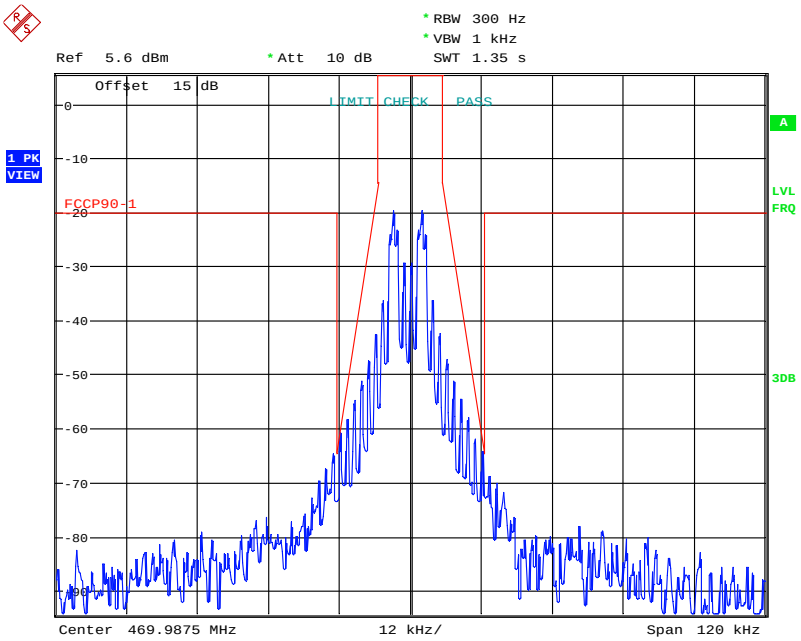


MASK
Date: 15.MAY.2014 19:37:28

Measurement uncertainty = ±1.84 dB ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

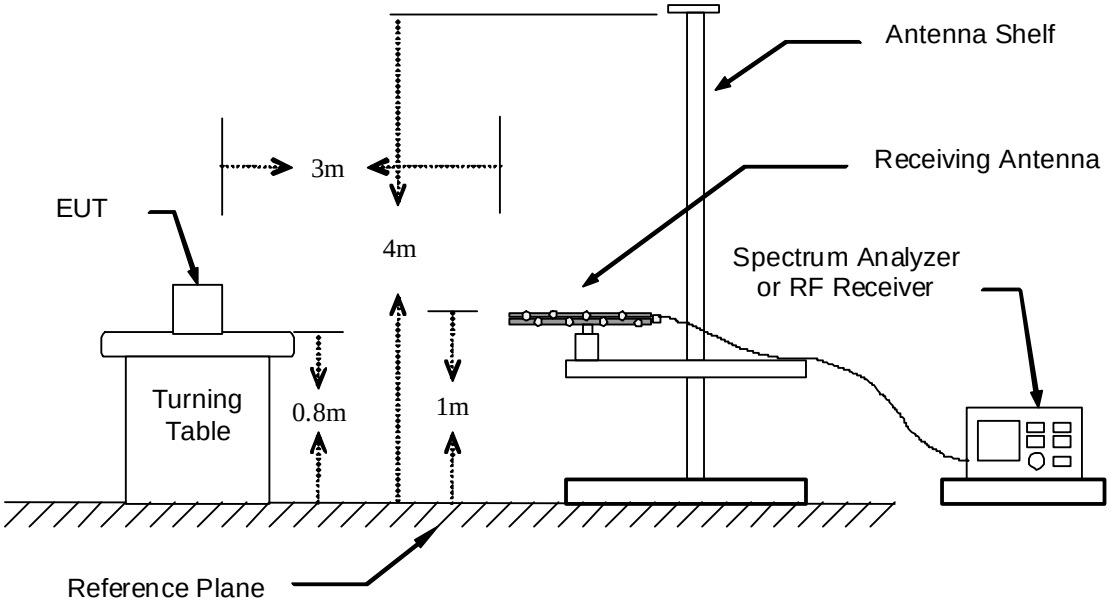
Test equipment used: ETSTW-RE 055, ETSTW-RE 060
Limit according to FCC § 90.210: 12.5 kHz: Emission Mask D.

8. Transmitter Spurious Radiated Emission

8.1 Test Procedures

The EUT was positioned on a non-conductive turntable, 0.8m above the ground plane.
The radiated emission at the fundamental frequency was measured at 3 m distance with a test antenna and spectrum analyzer.
Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna.
ERP was measured using a substitution method. The EUT was replaced by reference antenna connected to a signal generator.
The test of spurious radiated emission has been carried out with the validated test software. The measurements below 1GHz were performed with a measurement bandwidth of 100 kHz, above 1GHz with a bandwidth of 1MHz.
Spurious emission limits near the carrier are defined by a emission mask.

8.2 Test Setup



8.3 Test Result

Model: TB-A06 Date: 2014/04/18
Mode: 450.0125 MHz Temperature: 24 °C Engineer: Robert
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
81.4430	-88.78	24.04	-64.74	-13.00	-51.74	250	150
175.8116	-88.22	24.94	-63.28	-13.00	-50.28	130	150
900.6012	-71.59	36.49	-35.10	-13.00	-22.10	130	150
1348.6970	-26.02	2.78	-23.24	-13.00	-10.24	130	150
1799.5990	-37.85	3.78	-34.07	-13.00	-21.07	210	150
2250.5010	-51.48	6.16	-45.32	-13.00	-32.32	130	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
102.2244	-90.40	24.42	-65.98	-13.00	-52.98	190	150
146.5130	-89.33	24.13	-65.20	-13.00	-52.20	140	150
900.6012	-74.95	34.49	-40.46	-13.00	-27.46	100	150
1348.6970	-28.90	0.51	-28.39	-13.00	-15.39	190	150
1799.5990	-35.27	3.54	-31.73	-13.00	-18.73	250	150
2250.5010	-49.57	6.44	-43.13	-13.00	-30.13	140	150

Mode: 460 MHz
Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
75.9920	-87.96	23.74	-64.22	-13.00	-51.22	200	150
164.9098	-88.27	24.70	-63.57	-13.00	-50.57	130	150
921.4430	-64.67	35.92	-28.75	-13.00	-15.75	100	150
1378.7570	-21.59	3.06	-18.53	-13.00	-5.53	200	150
1835.6710	-34.65	3.61	-31.04	-13.00	-18.04	240	150
2298.5970	-48.81	8.26	-40.55	-13.00	-27.55	130	150

Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
81.7836	-86.45	24.10	-62.35	-13.00	-49.35	130	150
153.3267	-88.04	24.70	-63.34	-13.00	-50.34	210	150
921.4430	-67.72	34.42	-33.30	-13.00	-20.30	130	150
1378.7570	-23.87	0.22	-23.65	-13.00	-10.65	130	150
1835.6710	-34.66	3.38	-31.28	-13.00	-18.28	50	150
2298.5970	-49.06	7.06	-42.00	-13.00	-29.00	140	150

Mode: 469.9875 MHz
Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
101.5431	-88.35	23.31	-65.04	-13.00	-52.04	290	150
174.7896	-89.45	24.92	-64.53	-13.00	-51.53	180	150
940.6814	-68.09	35.39	-32.70	-13.00	-19.70	100	150
1408.8180	-34.95	3.14	-31.81	-13.00	-18.81	100	150
1877.7550	-38.02	3.41	-34.61	-13.00	-21.61	240	150
2346.6930	-58.03	7.18	-50.85	-13.00	-37.85	190	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
81.4430	-86.56	24.12	-62.44	-13.00	-49.44	200	150
157.4148	-88.22	25.04	-63.18	-13.00	-50.18	190	150
940.6814	-69.80	34.36	-35.44	-13.00	-22.44	200	150
1408.8180	-31.32	0.40	-30.92	-13.00	-17.92	130	150
1877.7550	-34.73	3.18	-31.55	-13.00	-18.55	120	150
2346.6930	-56.23	6.84	-49.39	-13.00	-36.39	140	150

Measurement uncertainty = 30-200MHz：±2.11 dB, 200-1000MHz：±2.09 dB, ±1-18GHz：2.71 dB, 18-40GHz：± 2.71 dB; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

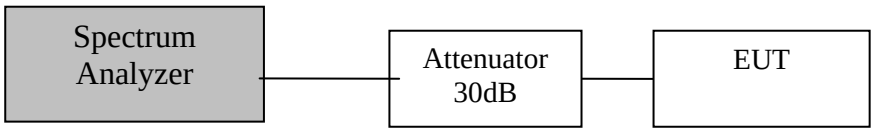
Test equipment used: ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 062, ETSTW-RE 111

9. Transmitter Spurious Conducted Emission

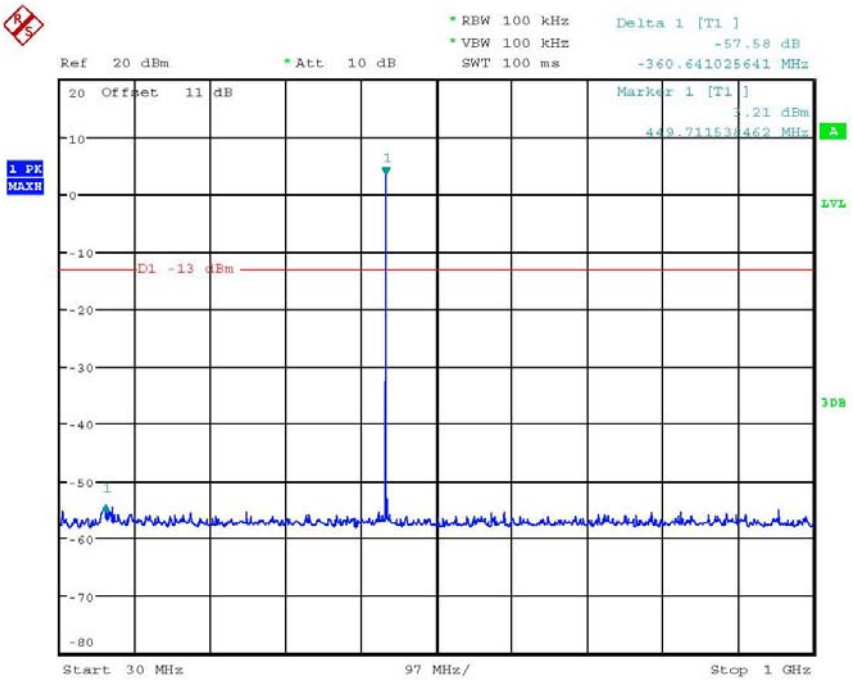
9.1 Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Adjust the spectrum analyzer for the following settings:
   - Resolution Bandwidth = 100 kHz for spurious emissions below 1 GHz and 1 MHz for spurious emissions above 1GHz.
   - Video Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.
   - Sweep Speed slow enough to maintain measurement calibration. Detector Mode = Positive Peak.
3. Limits=P (dBm)+10log(P(W)) = -13dBm

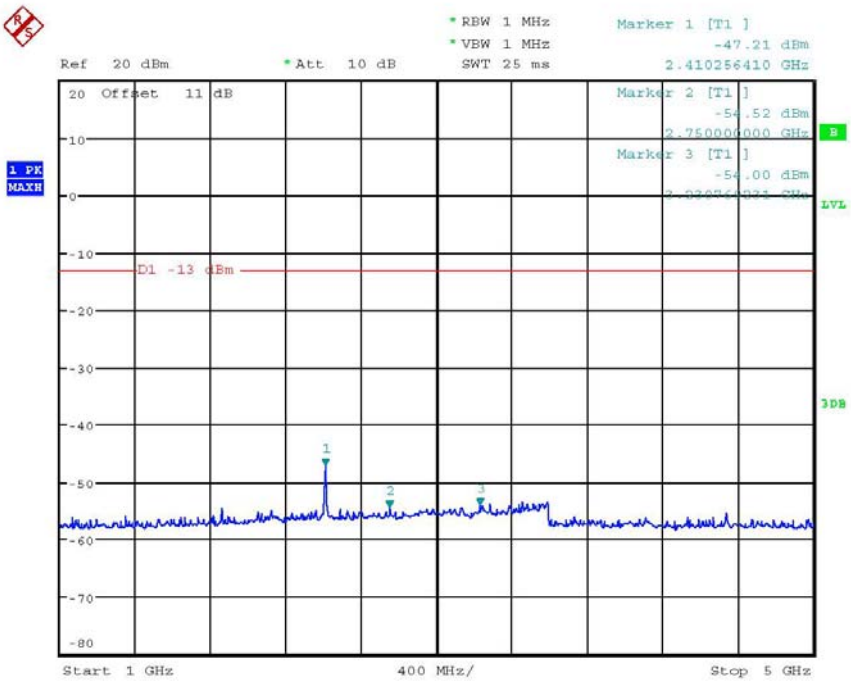
9.2 Test Setup



9.3 Test Result



Conducted Spurious Emission 450.0125MHz
Date: 18.APR.2014 21:13:31



Conducted Spurious Emission 450.0125MHz
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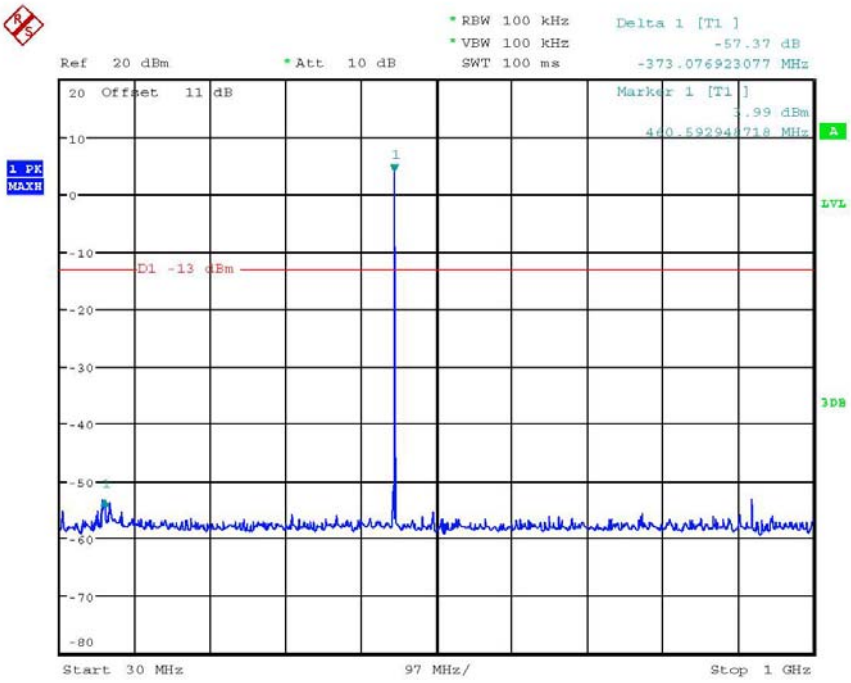

Conducted Spurious Emission 460MHz
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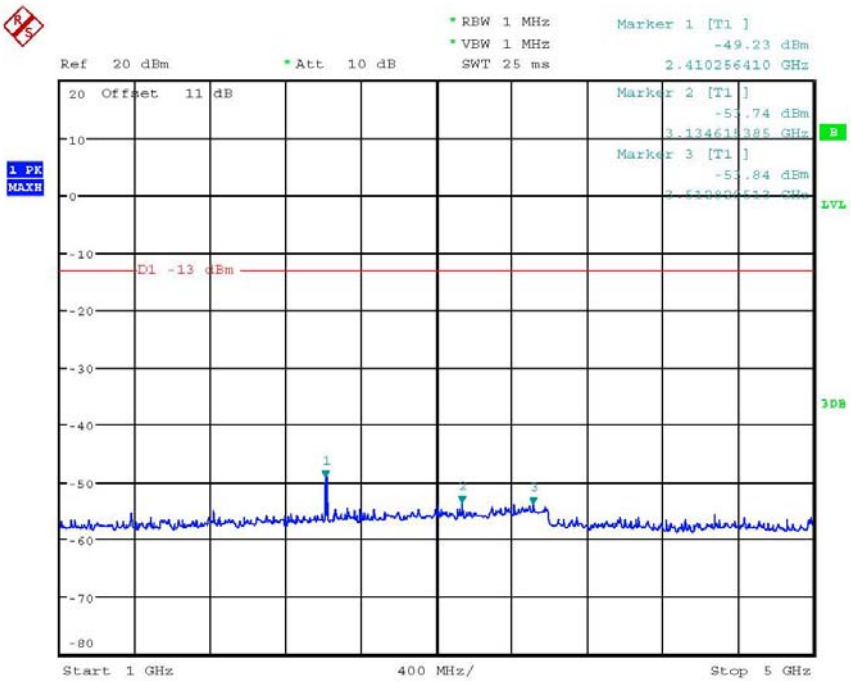

Conducted Spurious Emission 460MHz

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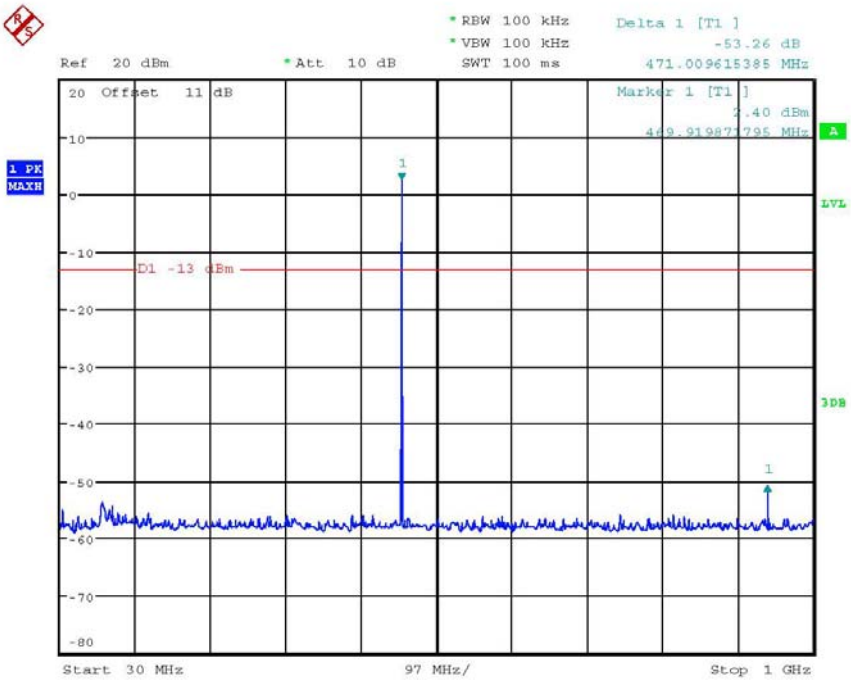
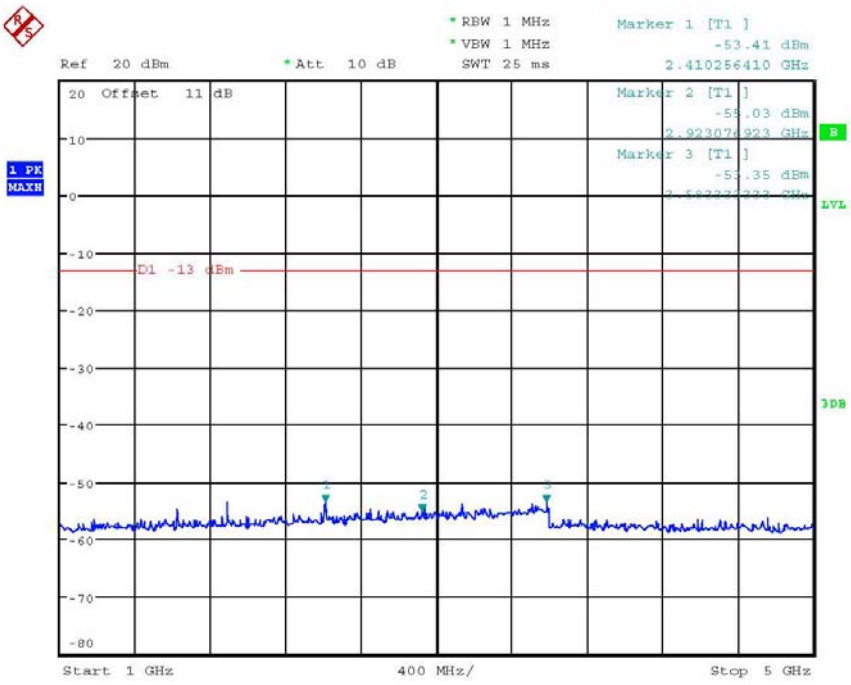


Conducted Spurious Emission 469.9875MHz

Date: 18.APR.2014 21:22:12

Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU



Measurement uncertainty = ±1.84 dB ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

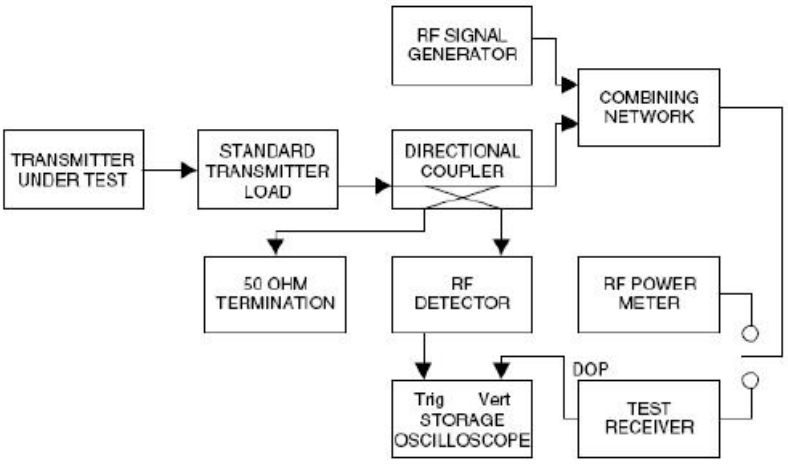
Test equipment used: ETSTW-RE 055, ETSTW-RE 060

10. Transient frequency behavior

10.1 Test Procedures

1. SG to the assigned transmitter frequency and modulate it with a 1 kHz tone at ±25 kHz deviation and set its output level to below 30dB of EUT signal level to receiver.
2. Set the horizontal sweep rate on the storageoscilloscope to 10 ms per division and adjust the display to continuously view the 1000 Hz tone from the DOP. Adjust the vertical amplitude control of the oscilloscope to display the 1000 Hz at ±4 divisions vertically centered on the display.
3. Transmitter on and observe the stored display. The output at the DOP, due to the change in the ratio of power between the signal generator input power and the transmitter output power will, because of the capture effect of the test receiver, produce a change in display: For the first part of the sweep it will show the 1 kHz test signal. Then once the receiver's demodulator has been captured by the transmitter power, the display will show the frequency difference from the assigned frequency to the actual transmitter frequency versus time. The instant when the 1 kHz test signal is completely suppressed (including any capture time due to phasing) is considered to be ton . The trace should be maintained within the allowed divisions during the period t1 and t2 . See the figure in the appropriate standards section.
4. During the time from the end of t2 to the beginning of t3 the frequency difference should not exceed the limits set by the FCC in 47 CFR 90.214 and outlined in 3.2.2. The allowed limit is equal to the transmitter frequency times its FCC frequency tolerance times ±4 display divisions divided by 25 kHz. For example, at a transmitter assigned frequency of 500 MHz and a frequency tolerance of 5 ppm. This would be 500 MHz times 5 ppm times ±4 divisions divided by 25 kHz. This equals ±0.4 divisions in this example. Greater vertical sensitivity may be required to view this accurately
5. Adjust the oscilloscope trigger controls so it will trigger on a decreasing magnitude from the RF peak detector, at 1 division from the right side of the display, when the transmitter is turned off. Set the controls to store the display. The moment when the 1 kHz test signal starts to rise is considered to provide toff.

10.2 Test Setup

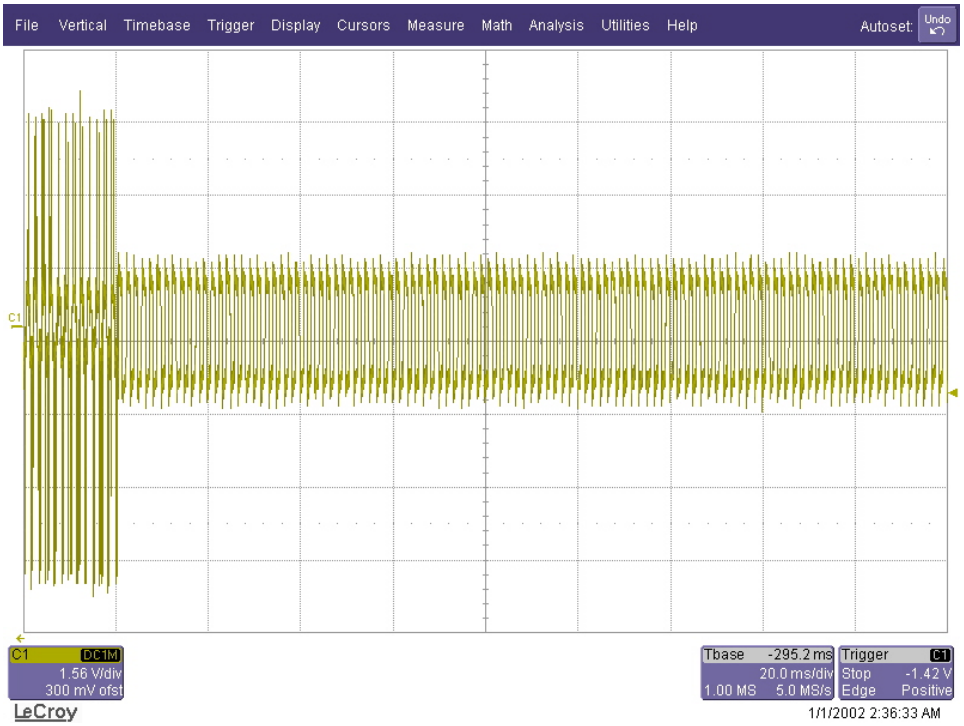


Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

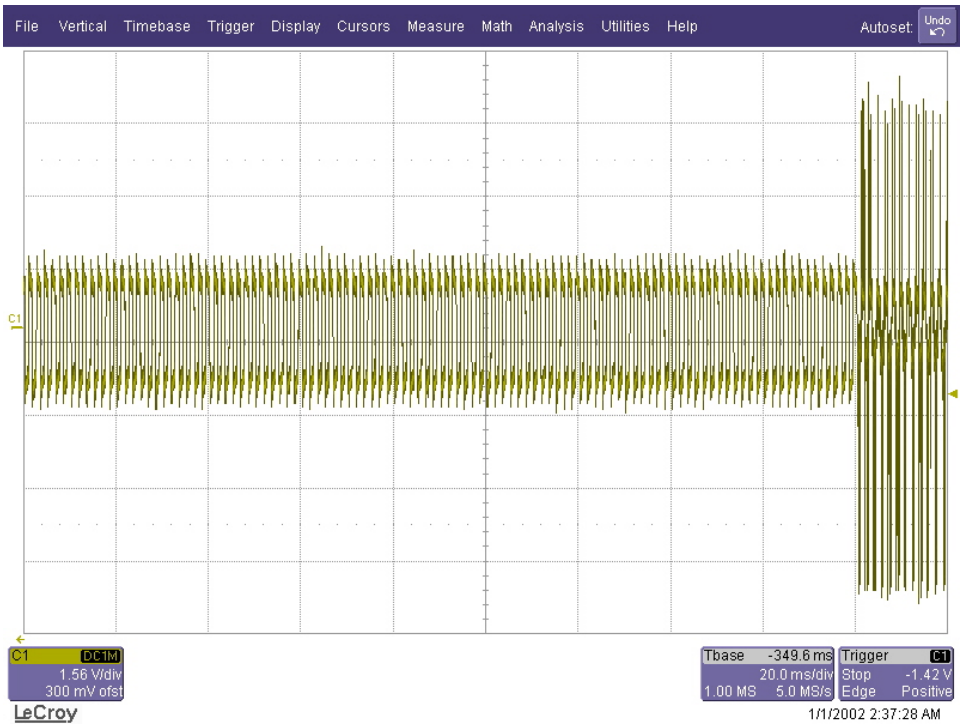
10.3 Test Result

12.5 kHz

450 MHz On

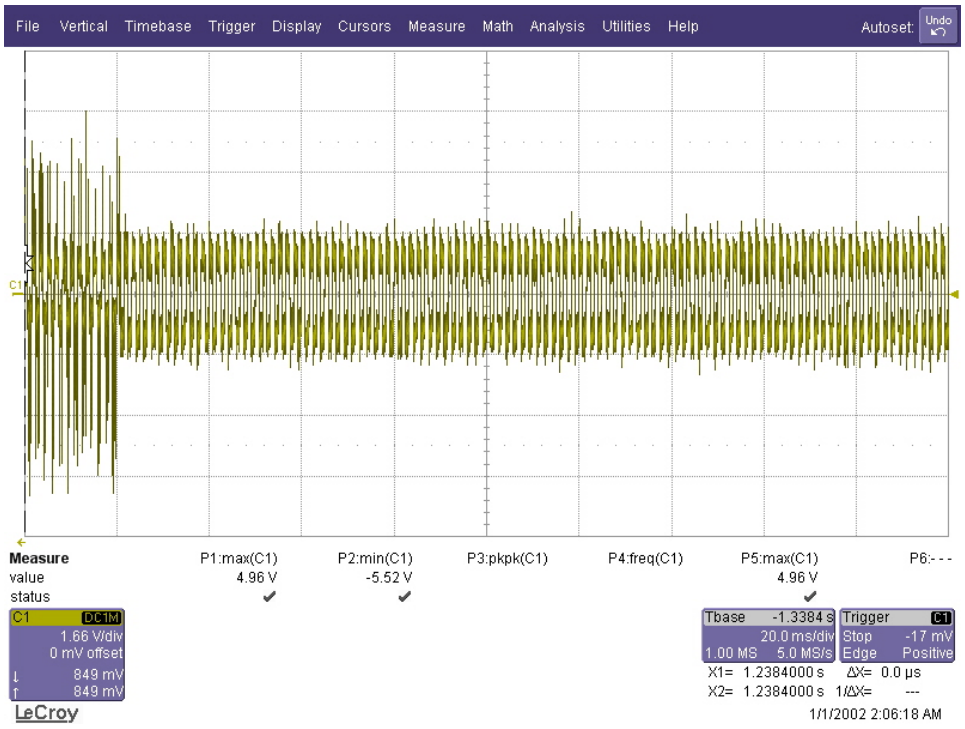


450 MHz Off

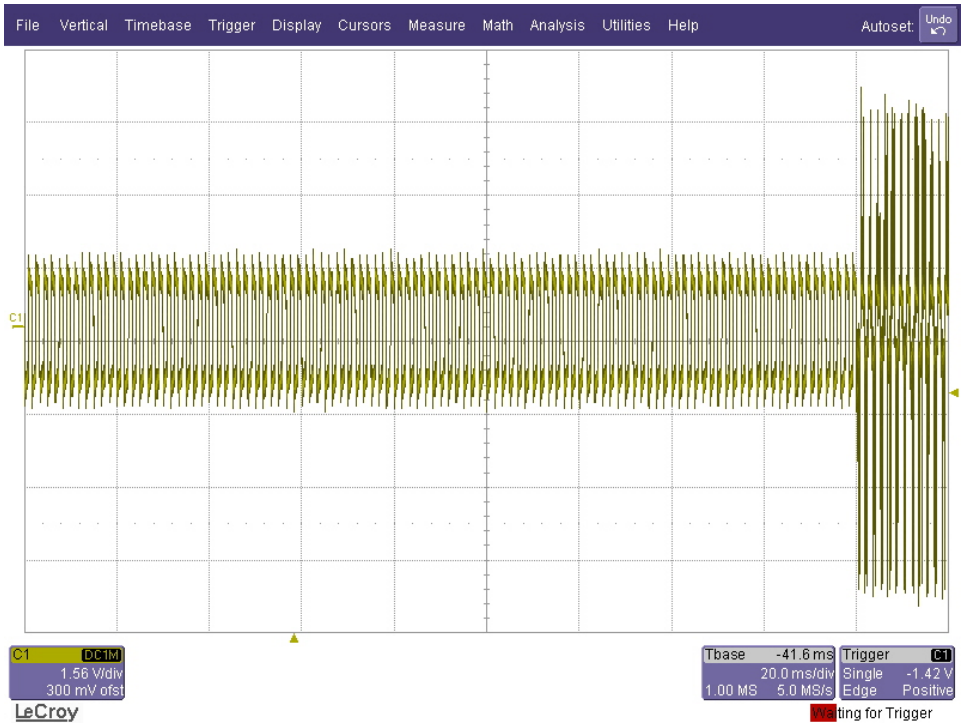


Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

460 MHz On

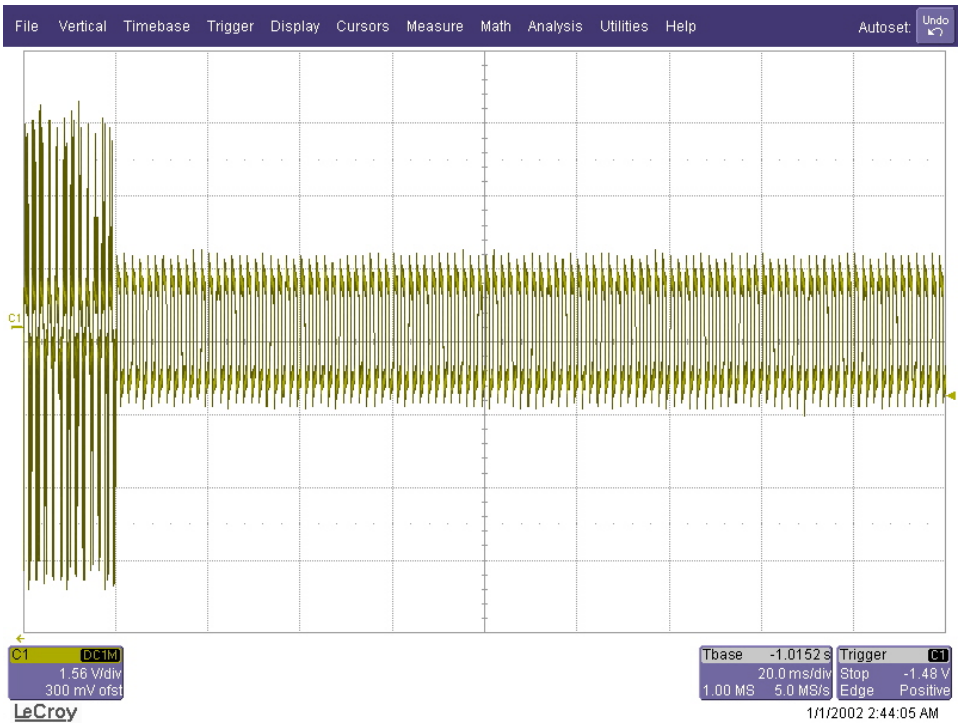


460 MHz Off

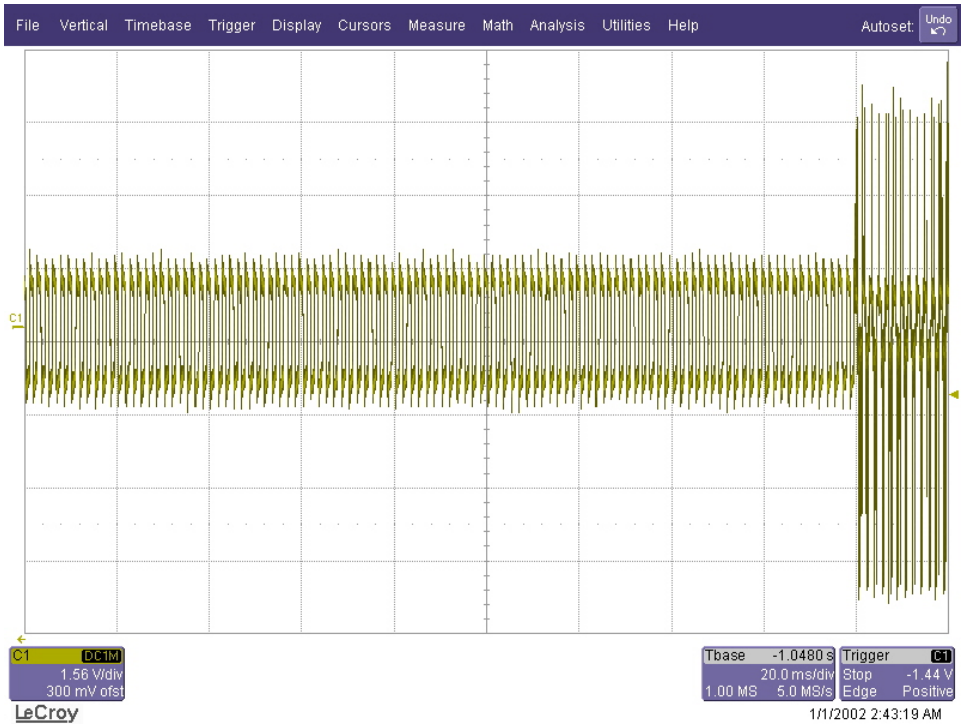


Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

469 MHz On



469 MHz Off

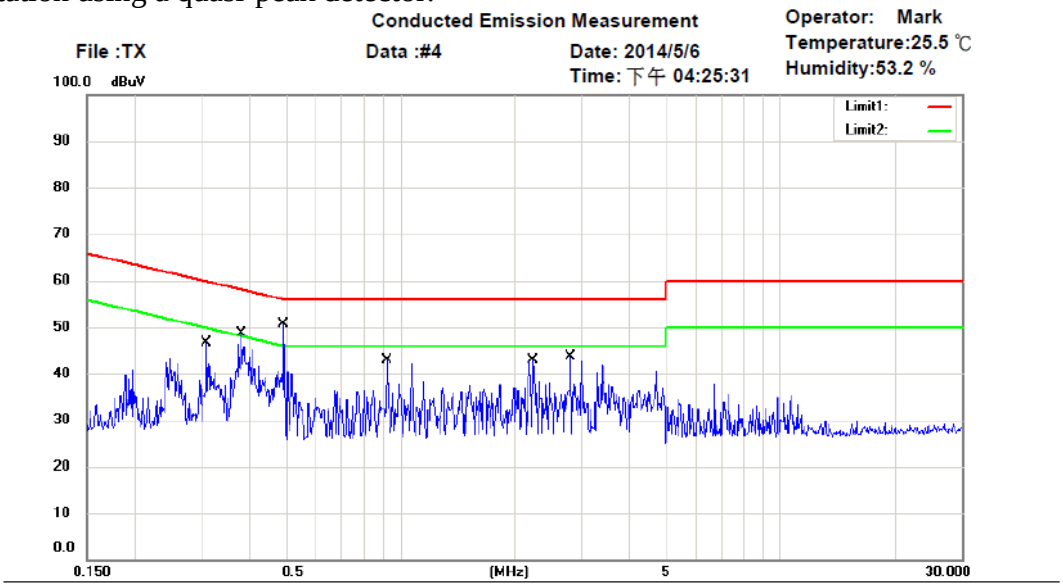


Test equipment used: ETSTW-RE 033, ETSTW-RE 072

11. Conducted Emission

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

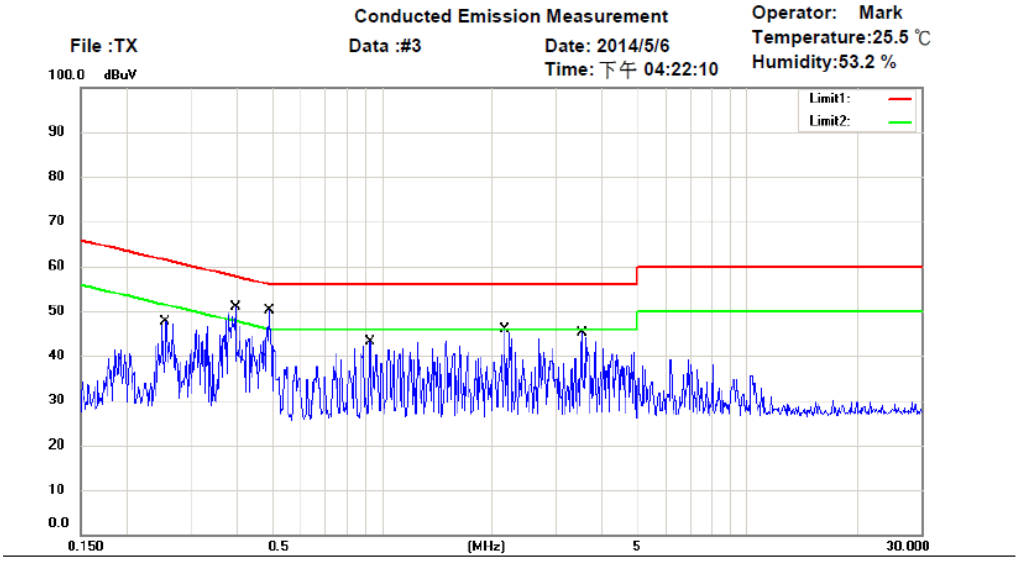
This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.



Site : Chamber_03
Condition : FCC Part 15 Class B Conduction (QP)
Phase: N
EUT : W6M21403-13988
Power : 120 Va.c.
M/N: TBA-06
Test Mode : Tx
Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	0.3100	18.00	QP	9.67	27.67	59.97	-32.30	
	0.3100	-2.66	AVG	9.67	7.01	49.97	-42.96	
	0.3826	23.66	QP	9.68	33.34	58.22	-24.88	
	0.3826	1.45	AVG	9.68	11.13	48.22	-37.09	
*	0.4923	23.35	QP	9.68	33.03	56.13	-23.10	
	0.4923	0.26	AVG	9.68	9.94	46.13	-36.19	
	0.9230	17.46	QP	9.70	27.16	56.00	-28.84	
	0.9230	-3.23	AVG	9.70	6.47	46.00	-39.53	
	2.2348	17.42	QP	9.76	27.18	56.00	-28.82	
	2.2348	-3.05	AVG	9.76	6.71	46.00	-39.29	
	2.8063	16.09	QP	9.77	25.86	56.00	-30.14	
	2.8063	-3.38	AVG	9.77	6.39	46.00	-39.61	

Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU



Site : Chamber_03
Condition : FCC Part 15 Class B Conduction (QP)
EUT : W6M21403-13988
M/N: TB-A06
Test Mode : Tx
Note :

Phase: L1
Power : 120 Va.c.

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	0.2562	25.50	QP	9.66	35.16	61.55	-26.39	
	0.2562	4.42	AVG	9.66	14.08	51.55	-37.47	
	0.3960	25.23	QP	9.67	34.90	57.94	-23.04	
	0.3960	3.74	AVG	9.67	13.41	47.94	-34.53	
*	0.4897	25.44	QP	9.67	35.11	56.17	-21.06	
	0.4897	4.44	AVG	9.67	14.11	46.17	-32.06	
	0.9252	21.04	QP	9.70	30.74	56.00	-25.26	
	0.9252	-0.74	AVG	9.70	8.96	46.00	-37.04	
	2.1740	20.87	QP	9.76	30.63	56.00	-25.37	
	2.1740	0.19	AVG	9.76	9.95	46.00	-36.05	
	3.5240	19.21	QP	9.80	29.01	56.00	-26.99	
	3.5240	-0.82	AVG	9.80	8.98	46.00	-37.02	

Note

1. **The formula of measured value as: Test Result = Reading + Correction Factor**
2. **The Correction Factor = Cable Loss + LISN Insertion Loss + Pulse Limit Loss**
3. **Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average**
4. **All not in the table noted test results are more than 20 dB below the relevant limits.**
5. **Measurement uncertainty = ±1.41 dB; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.**
6. **Up Line: QP Limit Line, Down Line: Ave Limit Line.**

Limits:

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

Test equipment used: ETSTW-CE 001, ETSTW-CE 016, ETSTW-CE 006, ETSTW-RE 045

Appendix

Measurement diagrams

1. Power

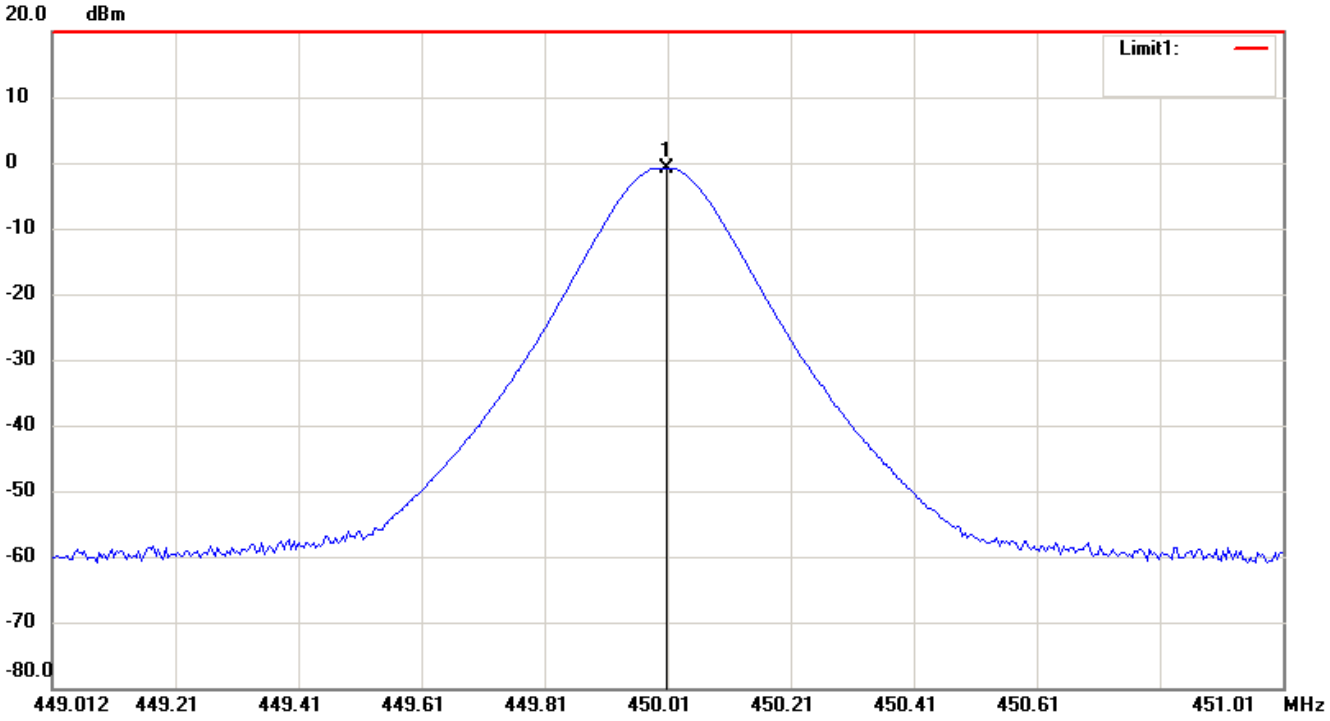
2. Radiated Spurious Emission

Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

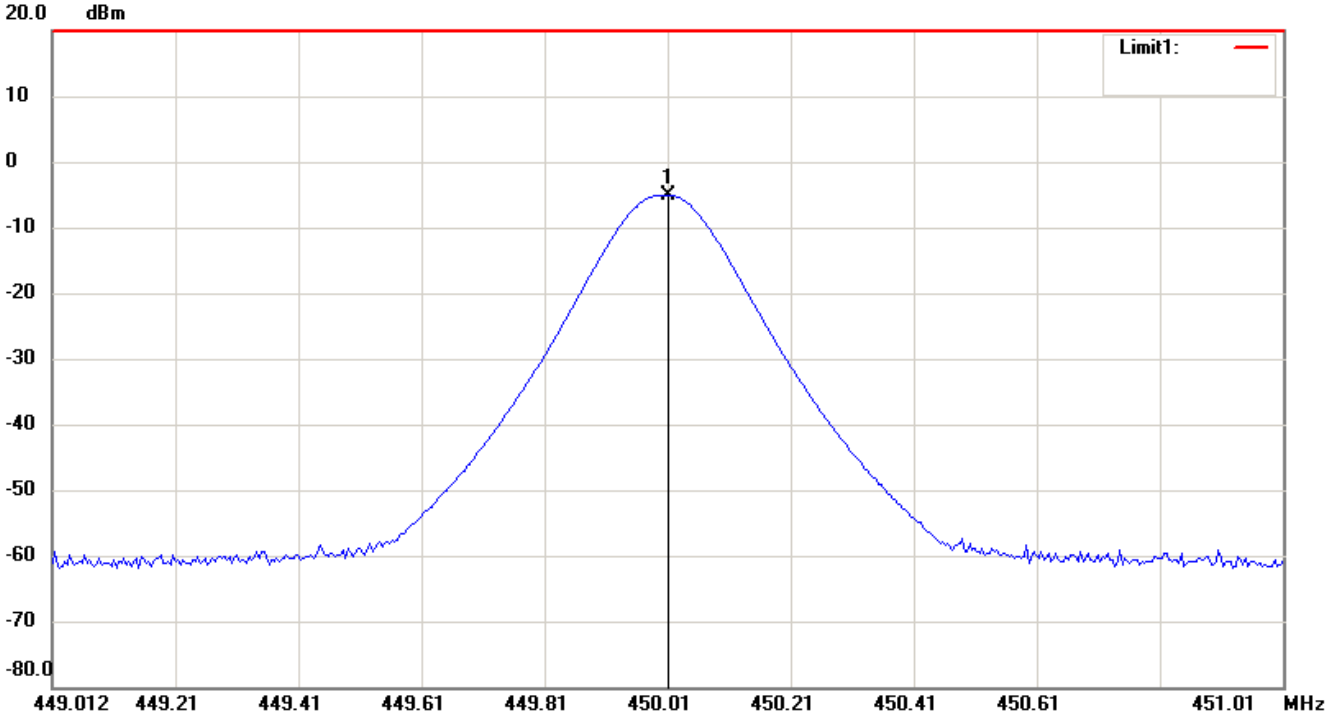
Power

12.5 kHz- 450.0125 MHz

Antenna Polarization H



Antenna Polarization V



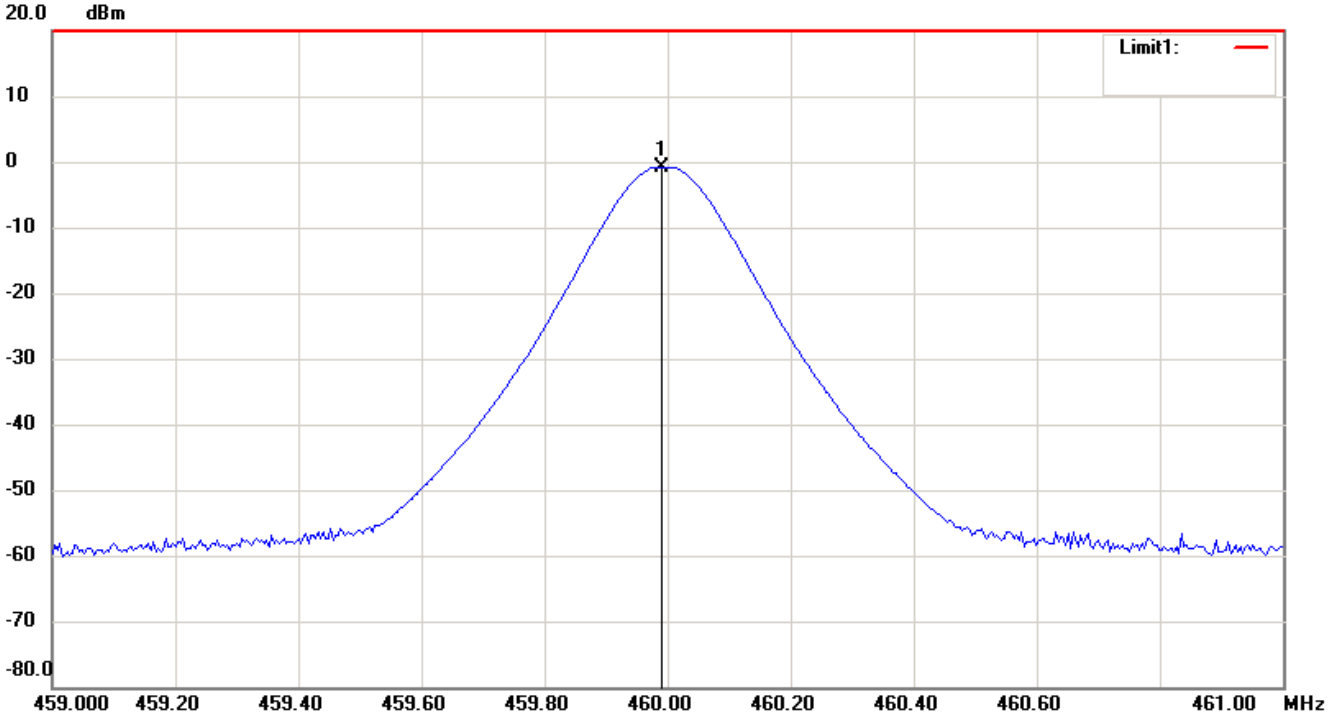
Note:

1. **The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.**
2. **The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.**
3. **For corrected test results are listed in the relevant table of radiated test data of this test report.**

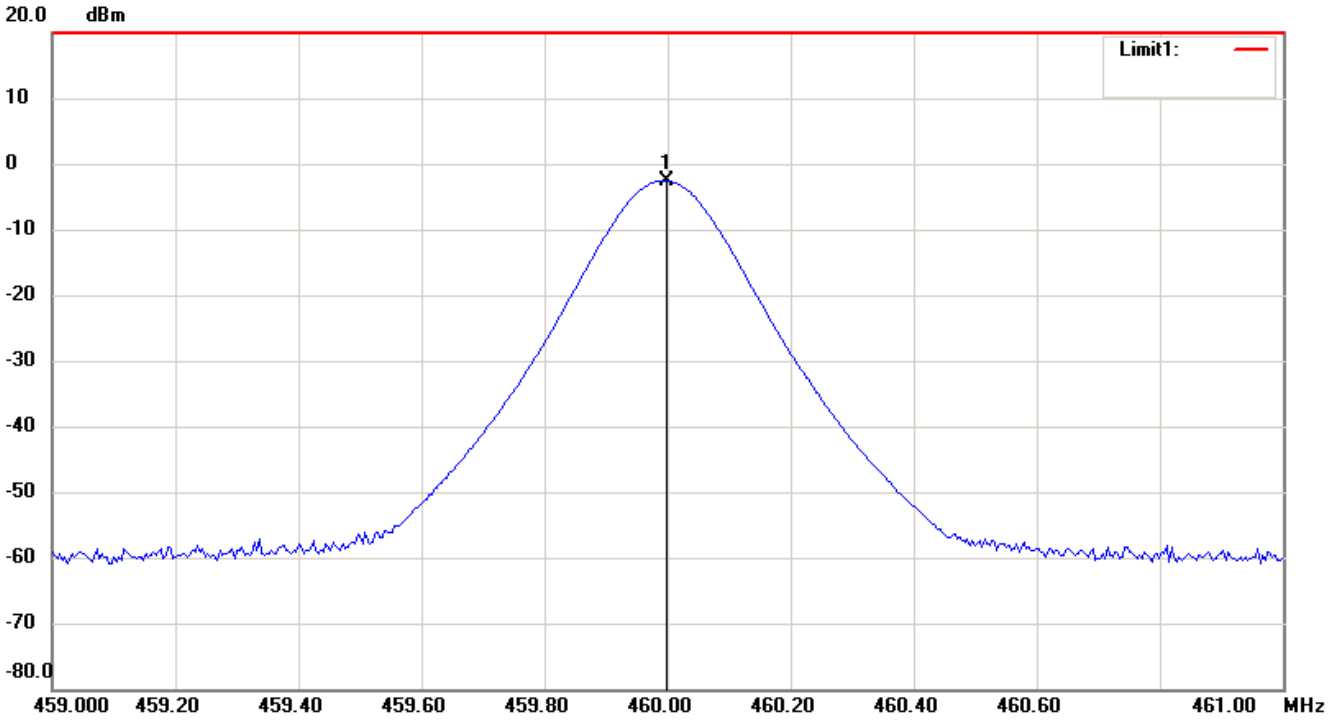
Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

12.5 kHz-460 MHz

Antenna Polarization H



Antenna Polarization V



Note:

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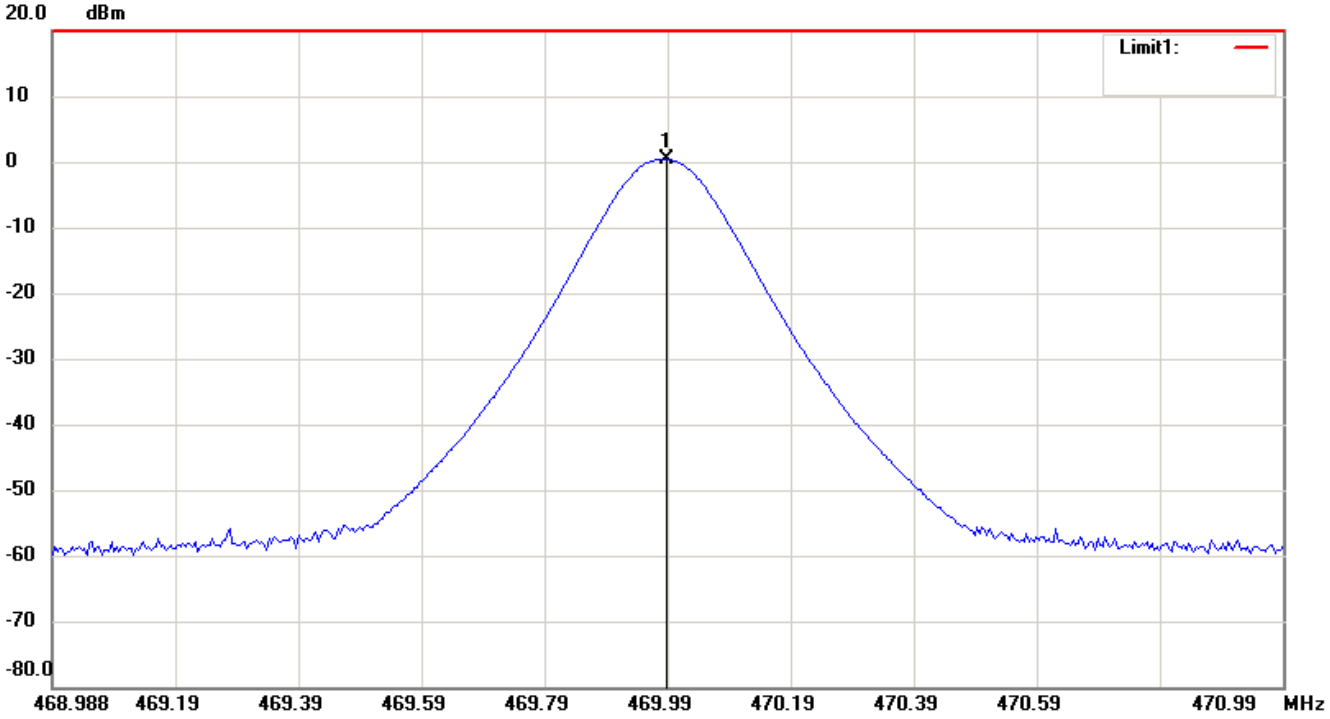
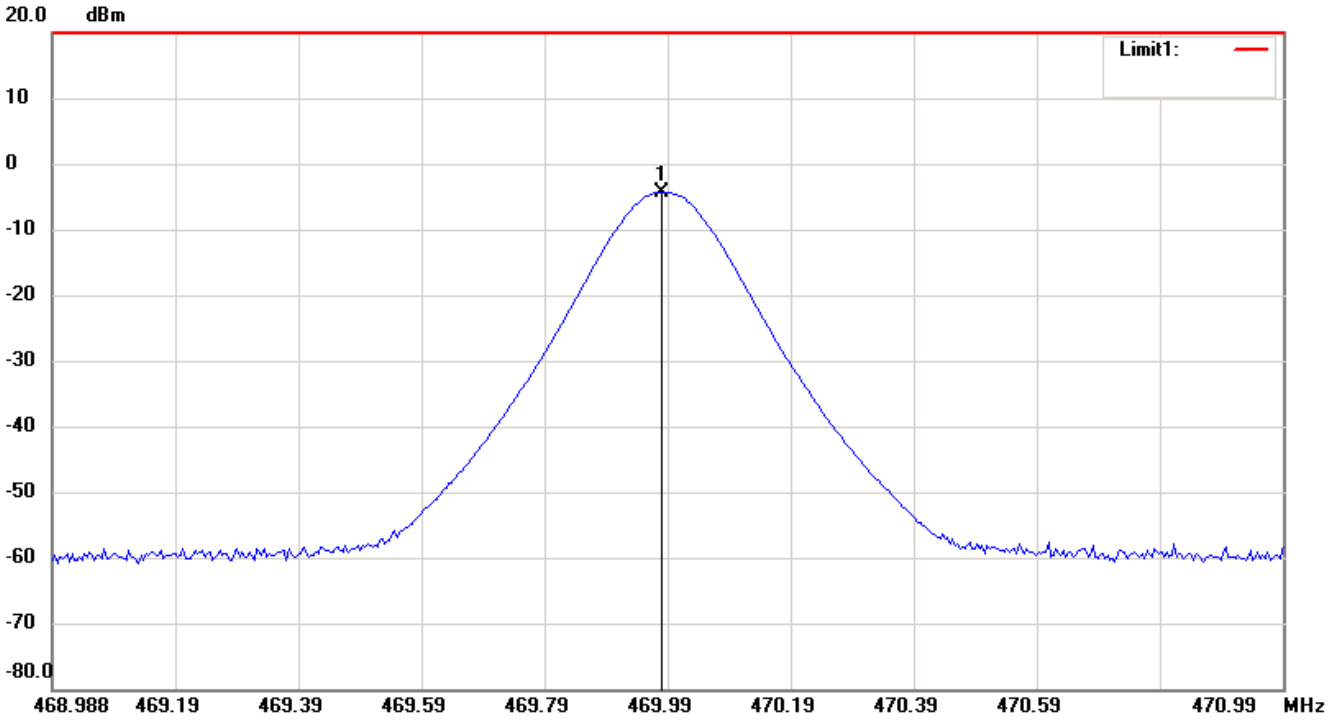
Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

12.5 kHz- 469.9875 MHz

Antenna Polarization H



Antenna Polarization V



Note:

1. **The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.**
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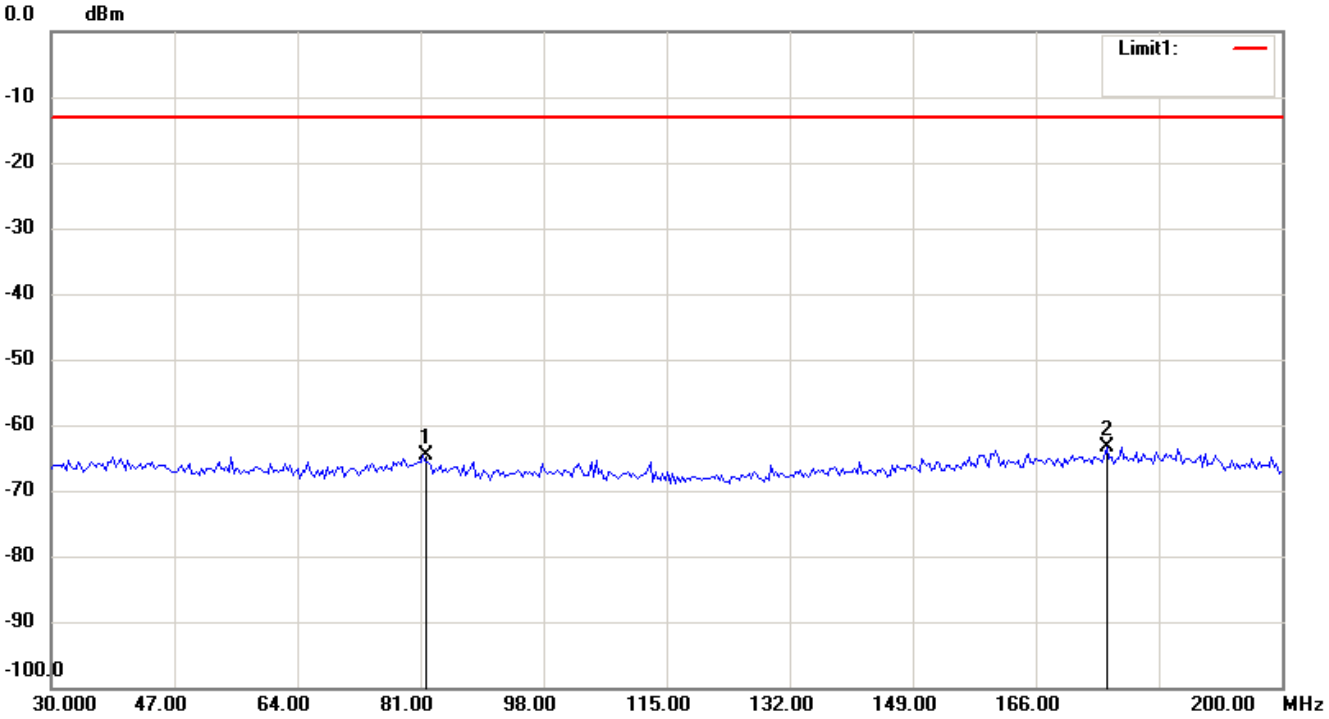
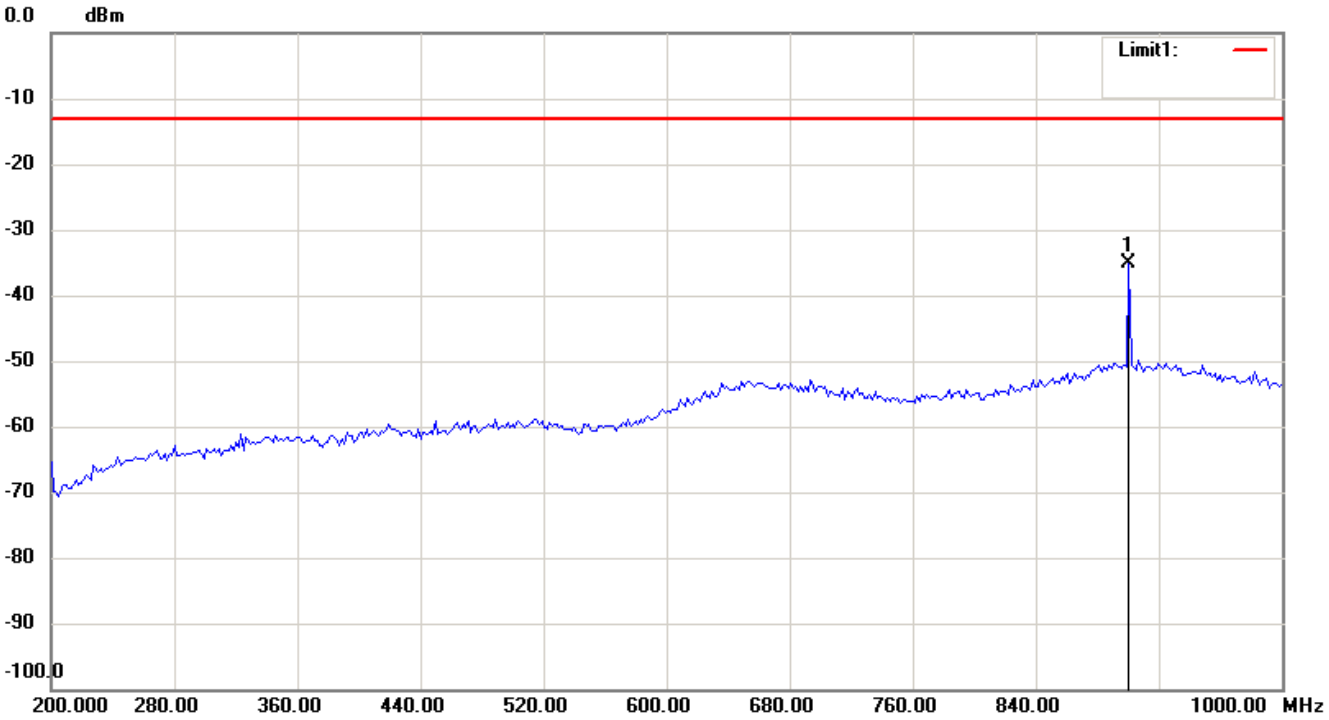
3. **For corrected test results are listed in the relevant table of radiated test data of this test report.**

Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

Radiated Spurious Emission
12.5 kHz- 450.0125 MHz
Antenna Polarization H





Note:

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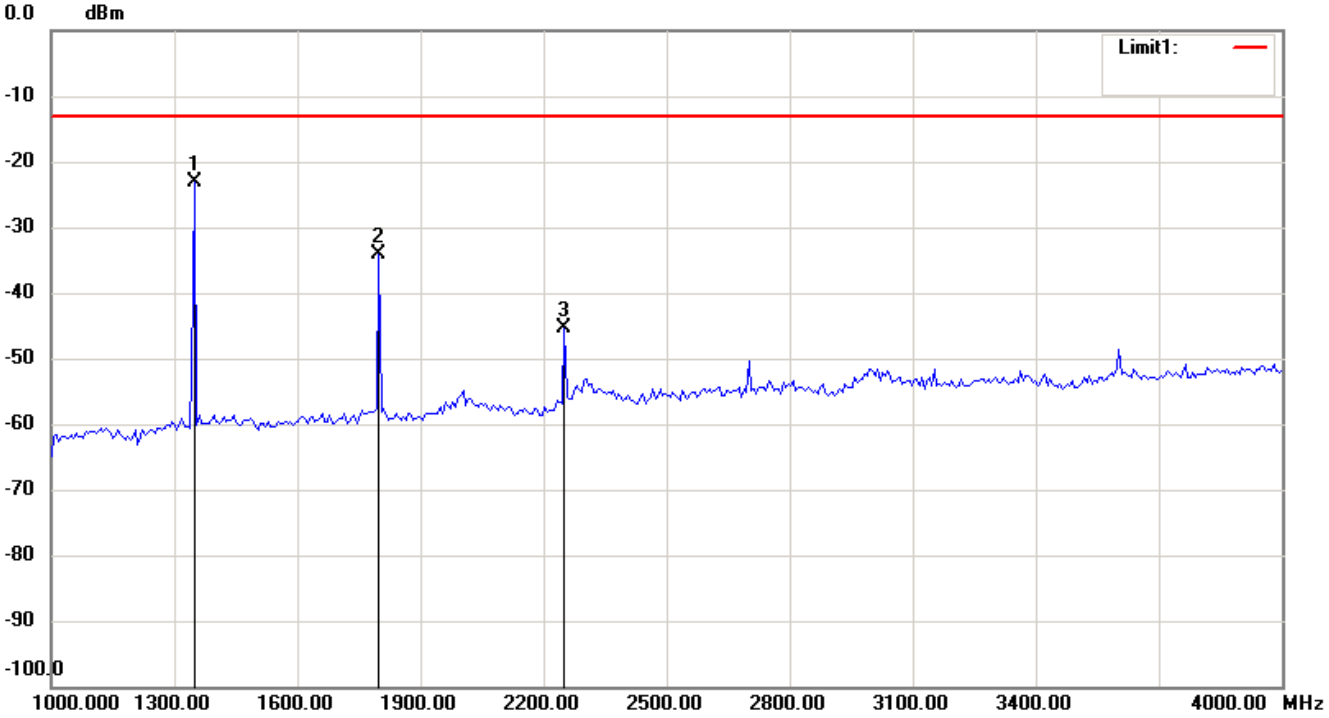
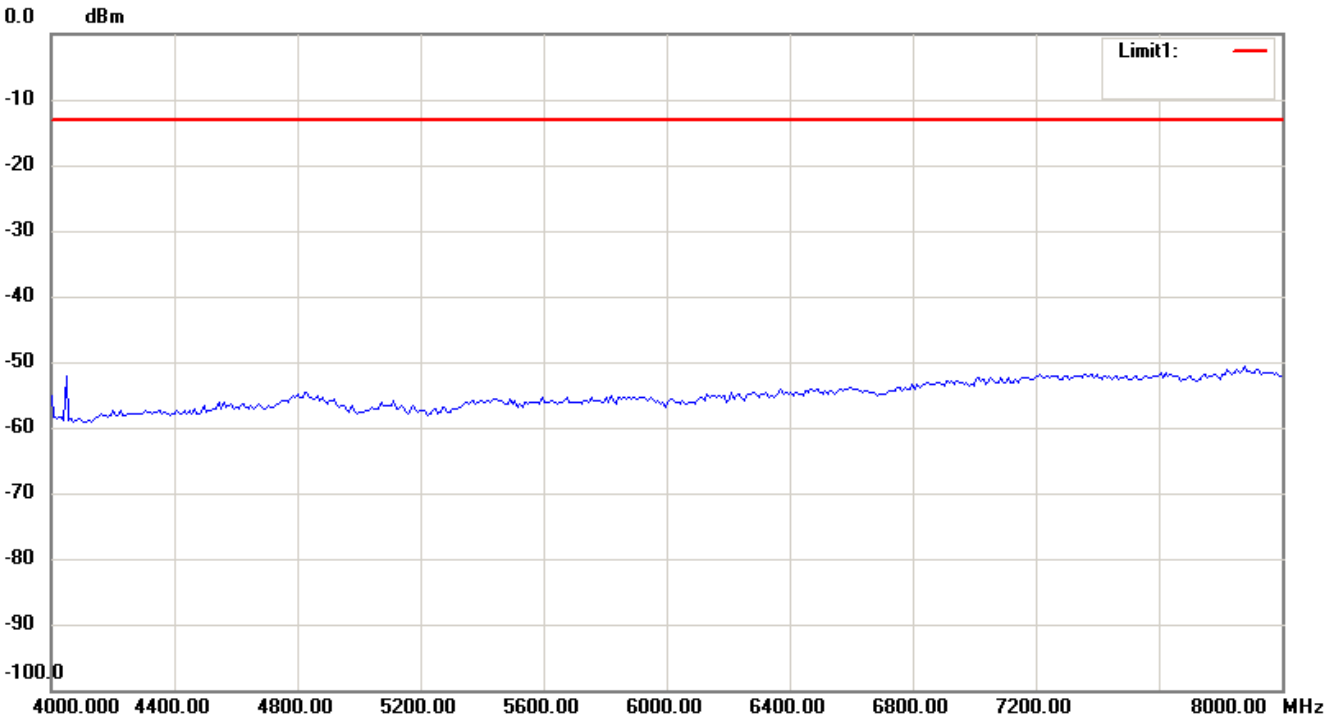
3. **For corrected test results are listed in the relevant table of radiated test data of this test report.**





Note:

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2. **The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.**
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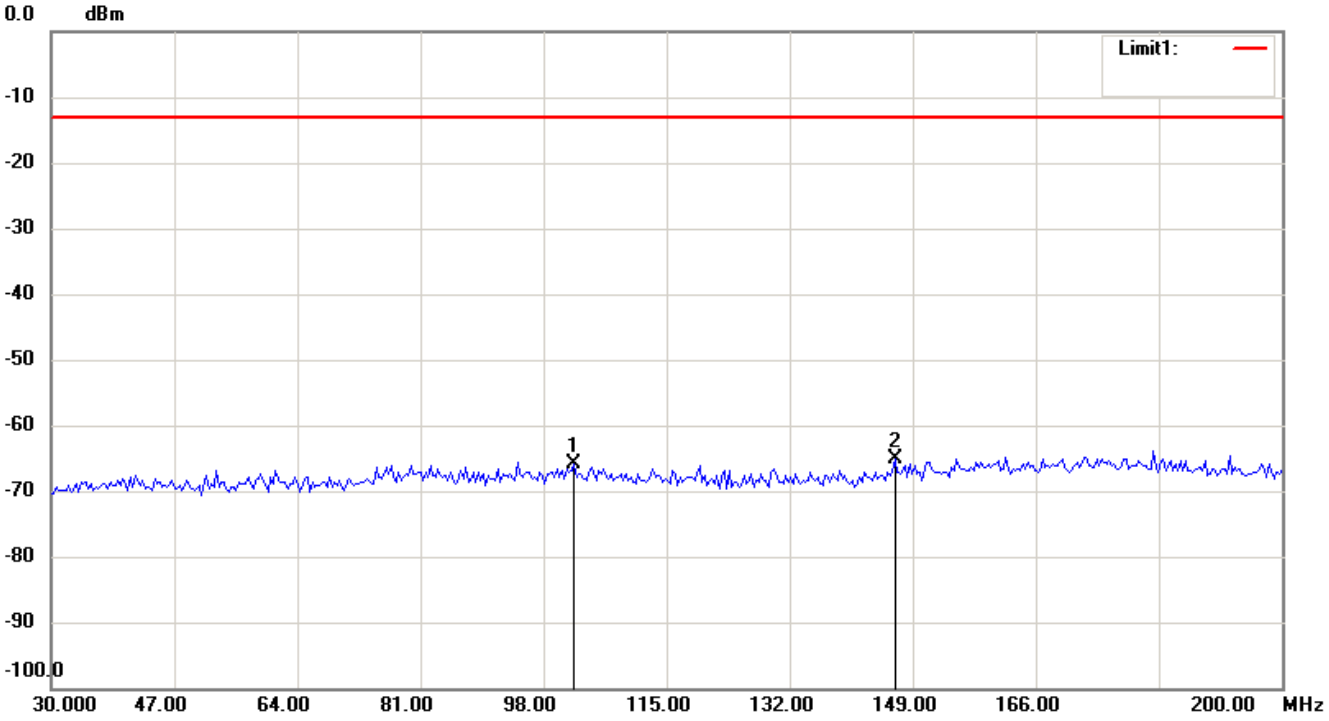
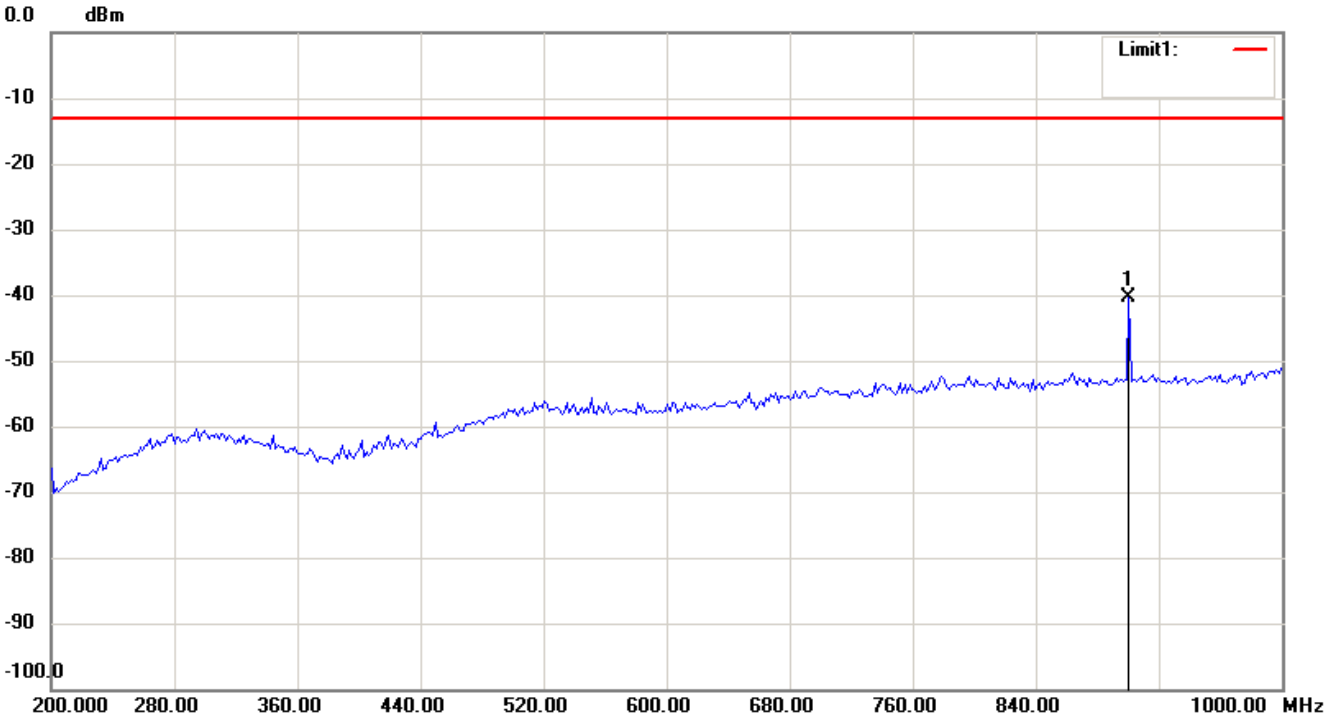
Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

Antenna Polarization V





Note:

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2. **The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.**
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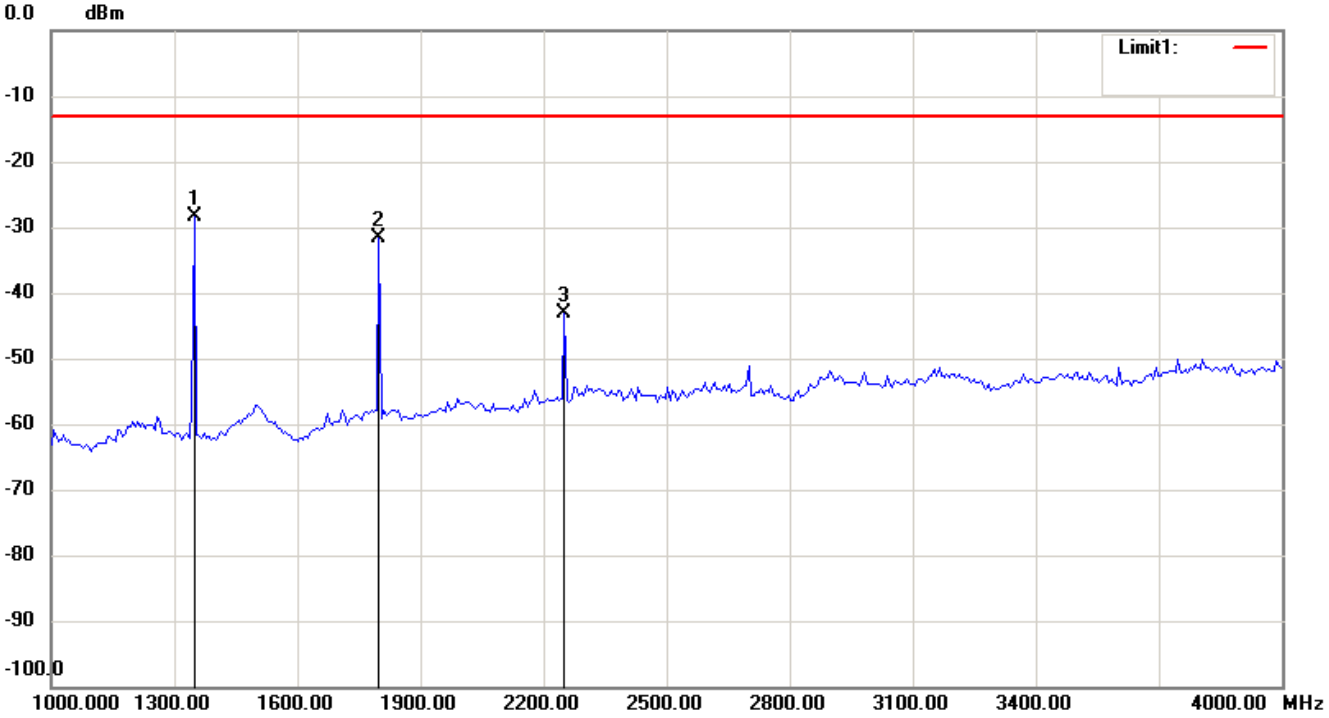

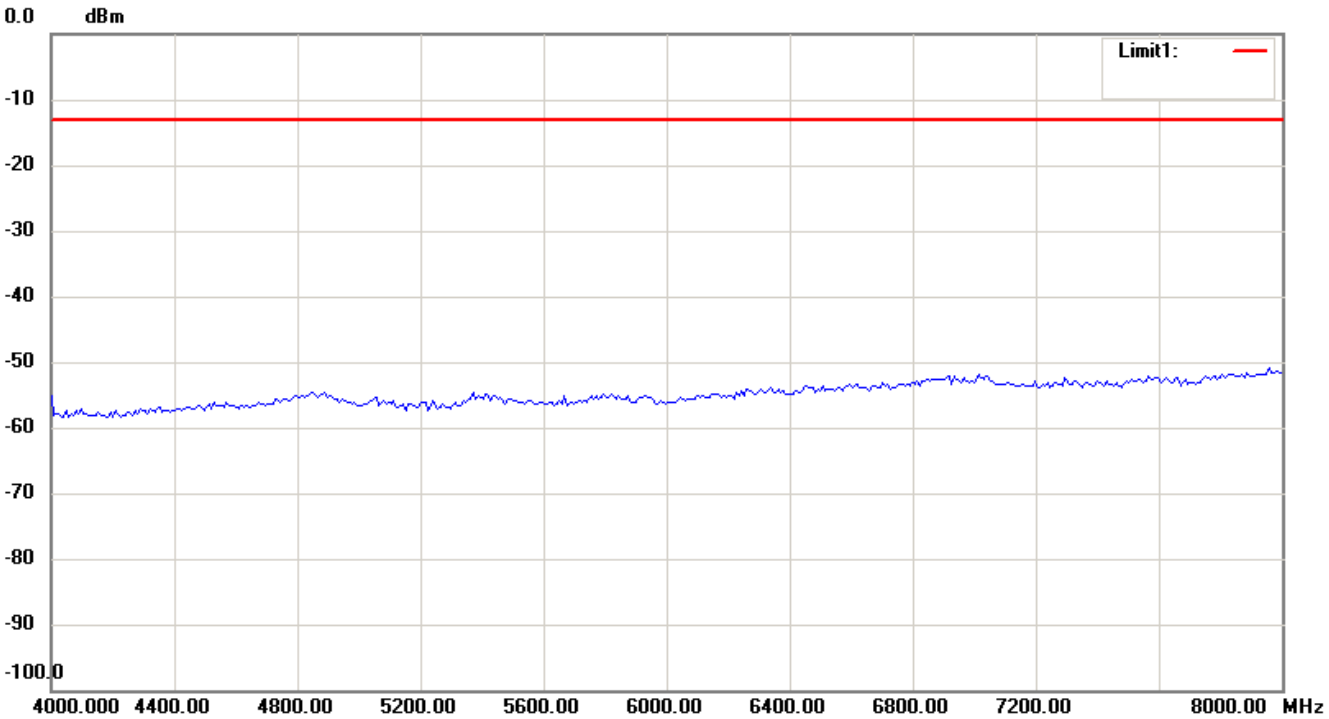

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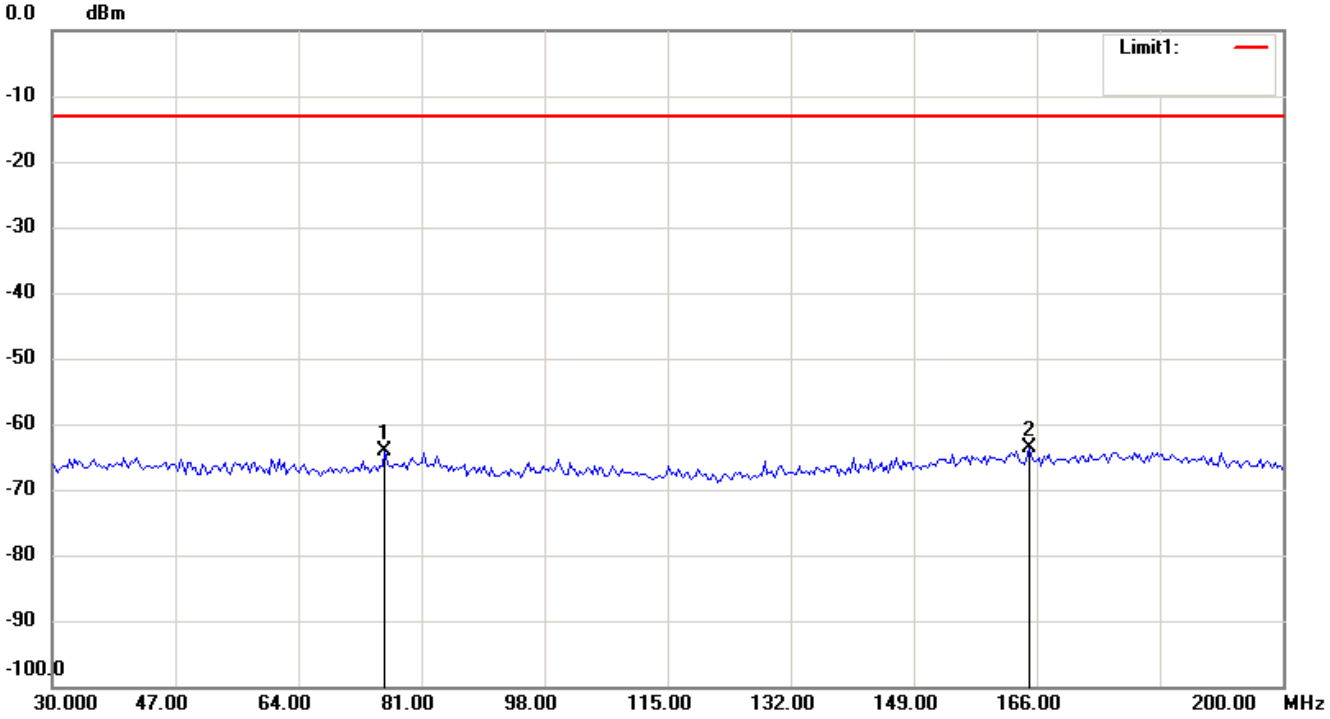
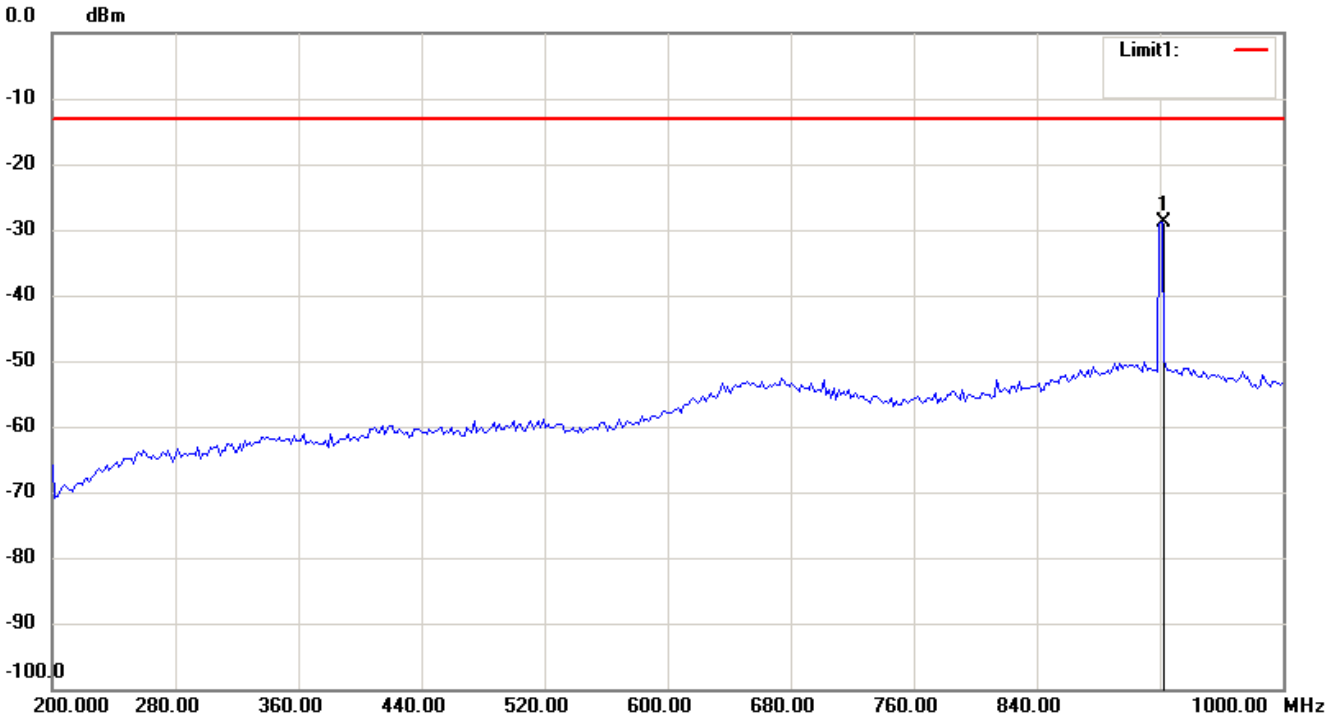
Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

12.5 kHz-460 MHz

Antenna Polarization H





Note:

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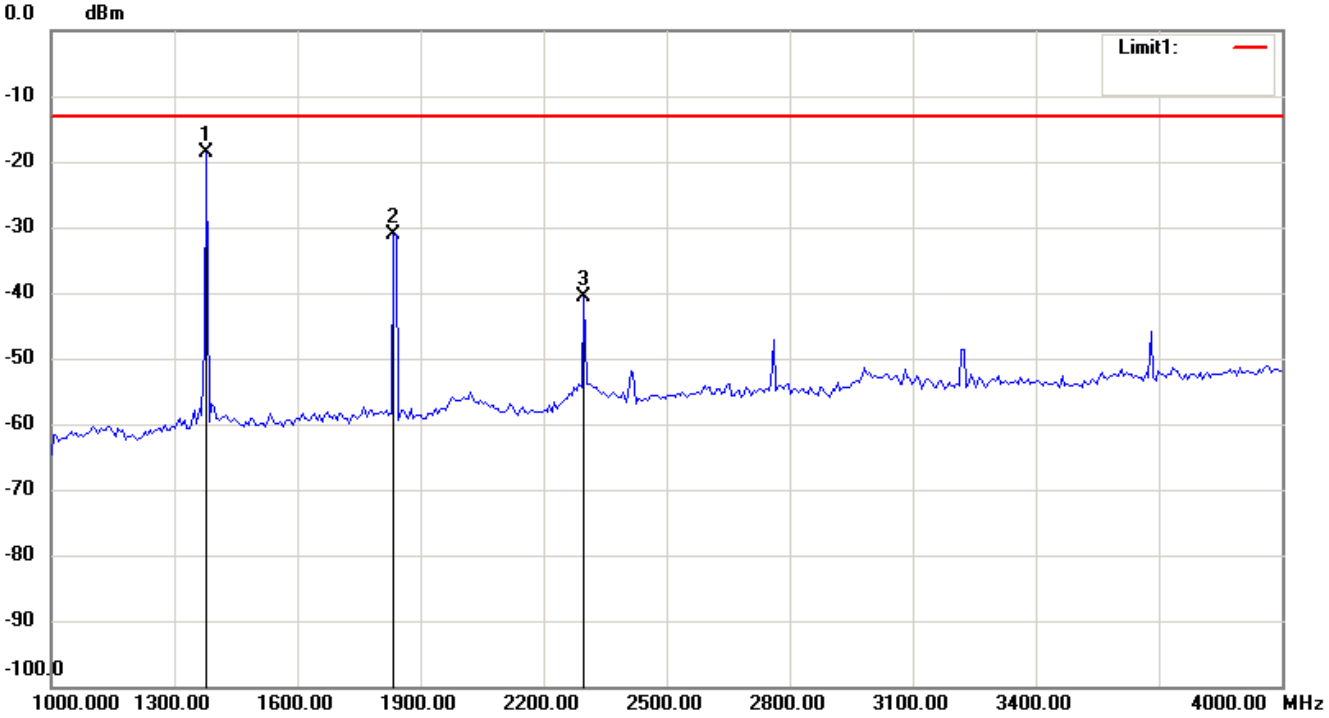

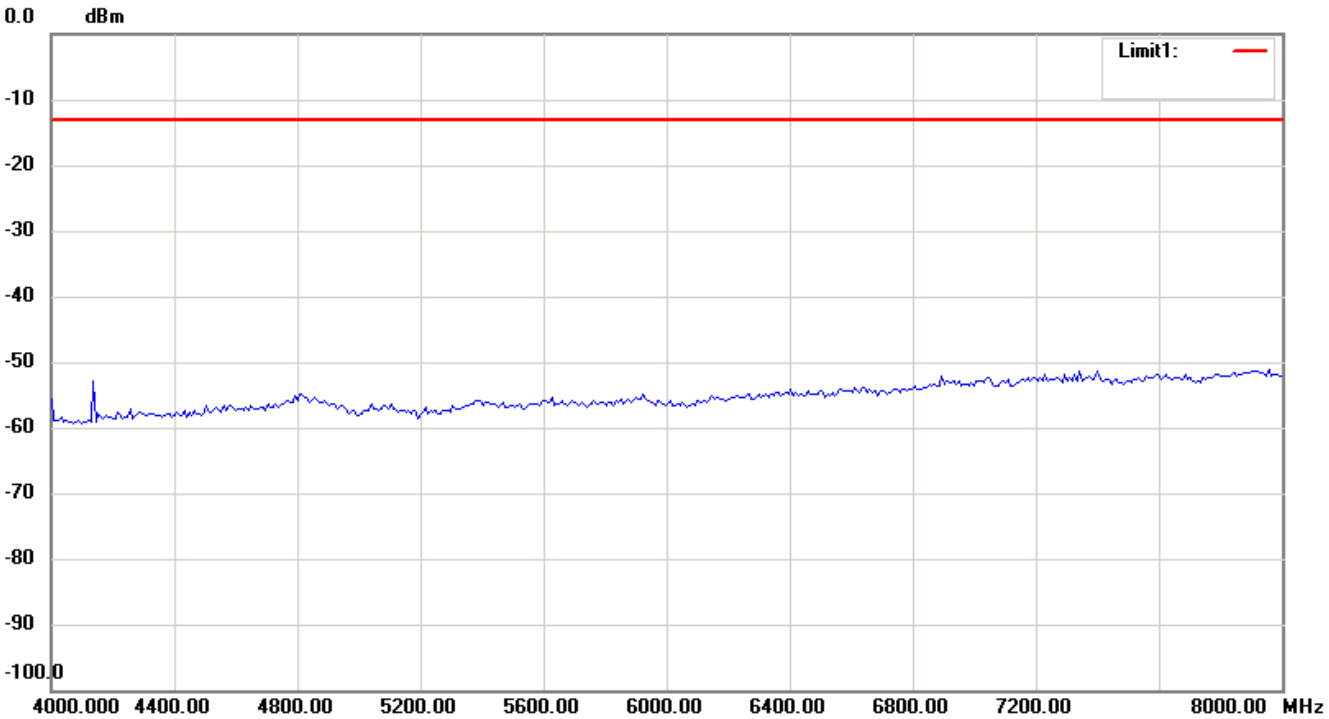

Note:

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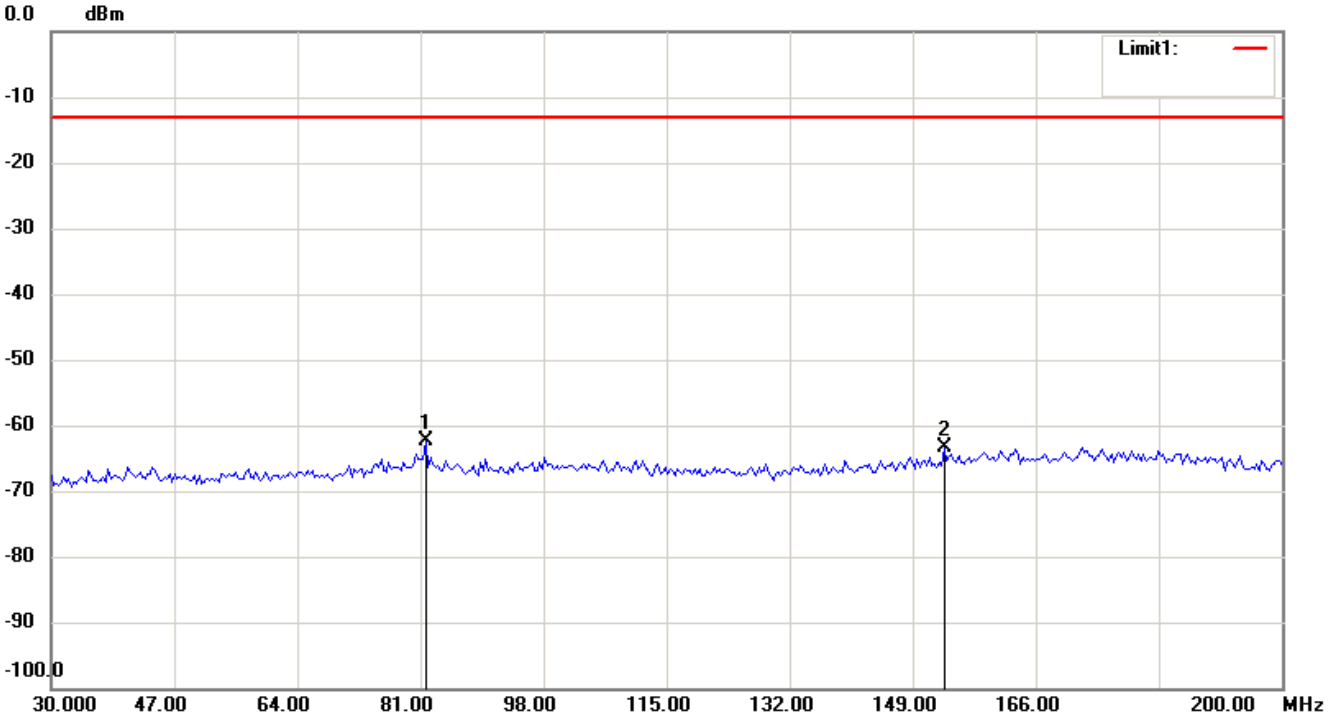
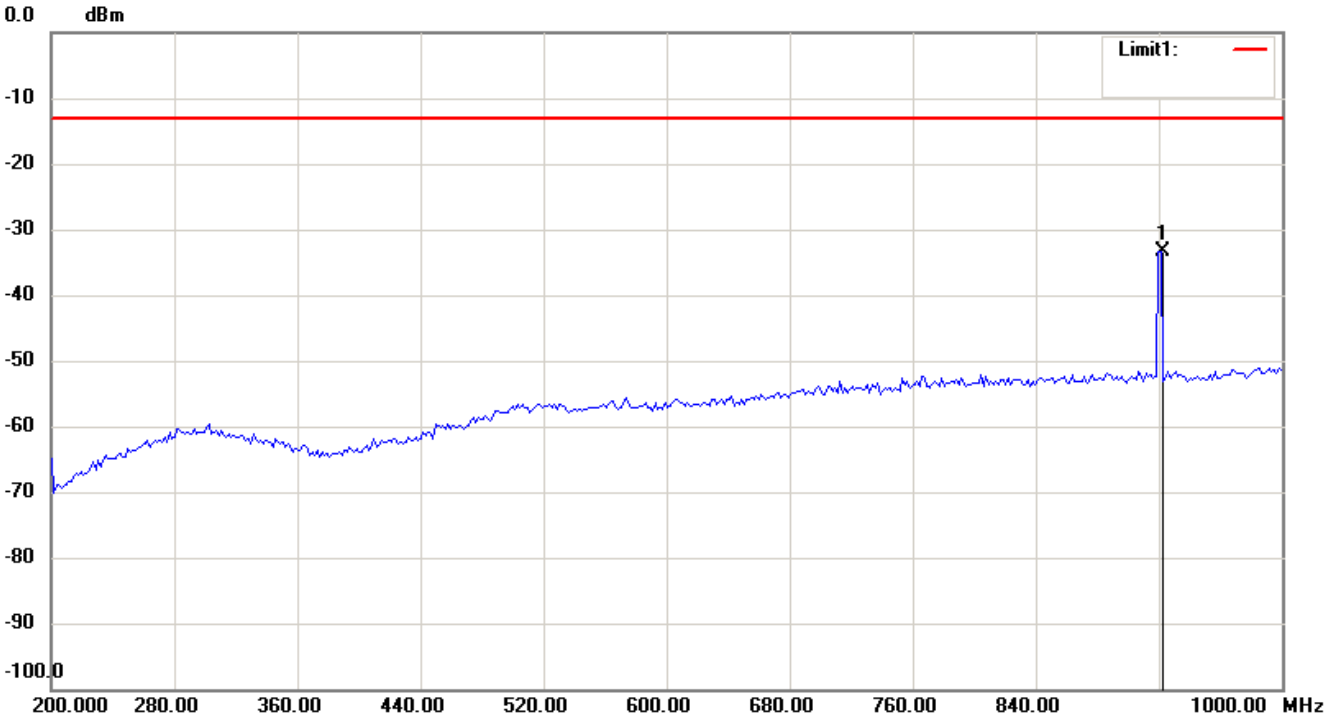
Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

Antenna Polarization V





Note:

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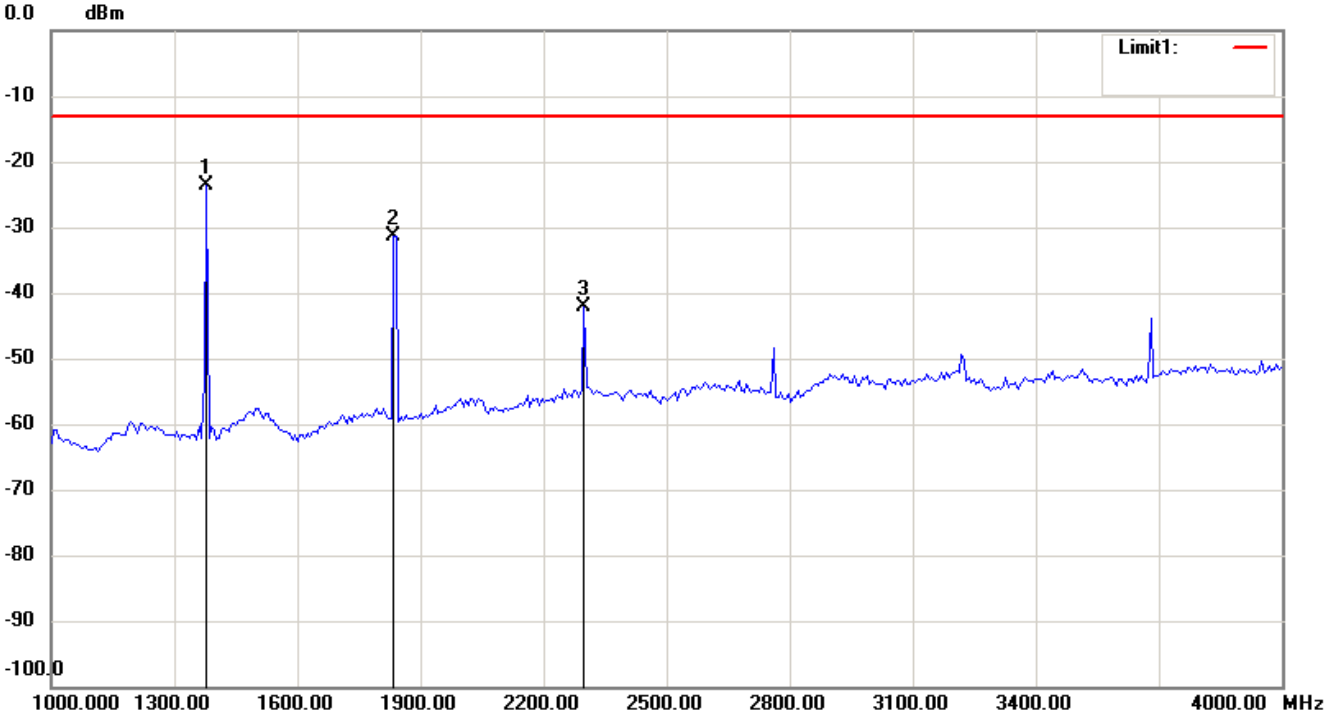

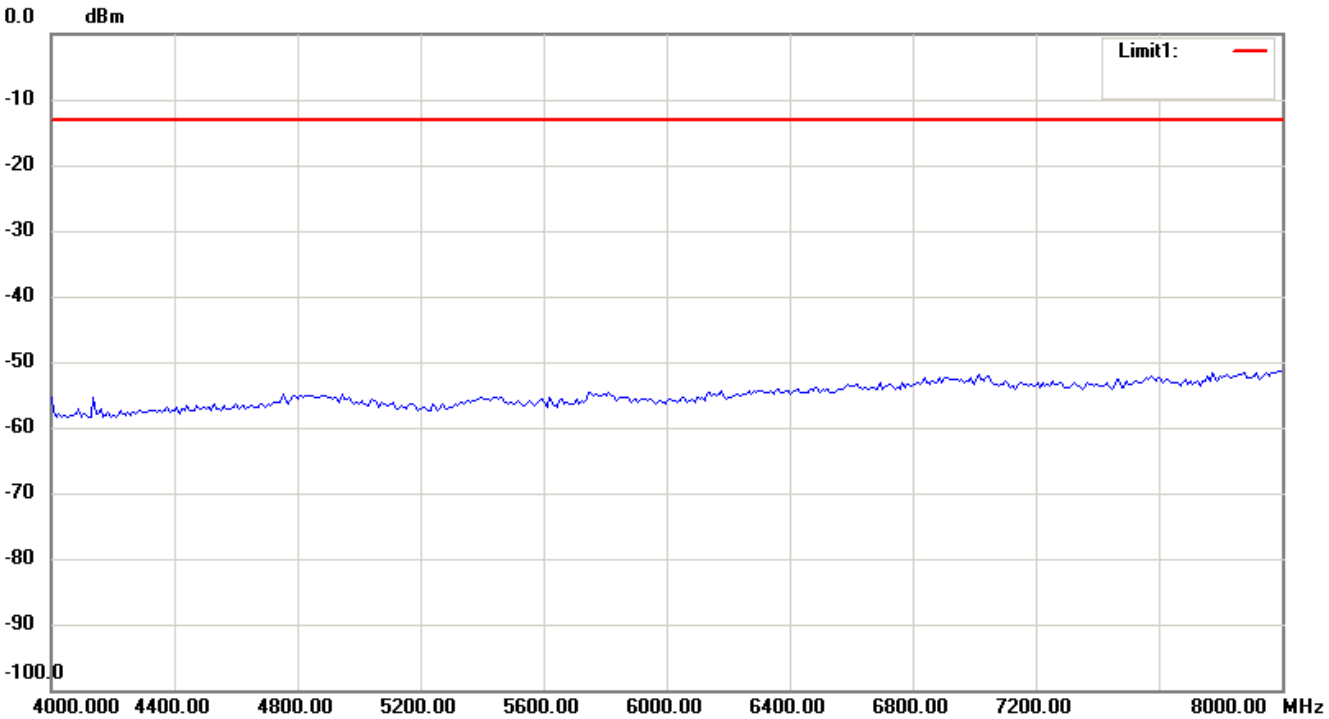

Note:

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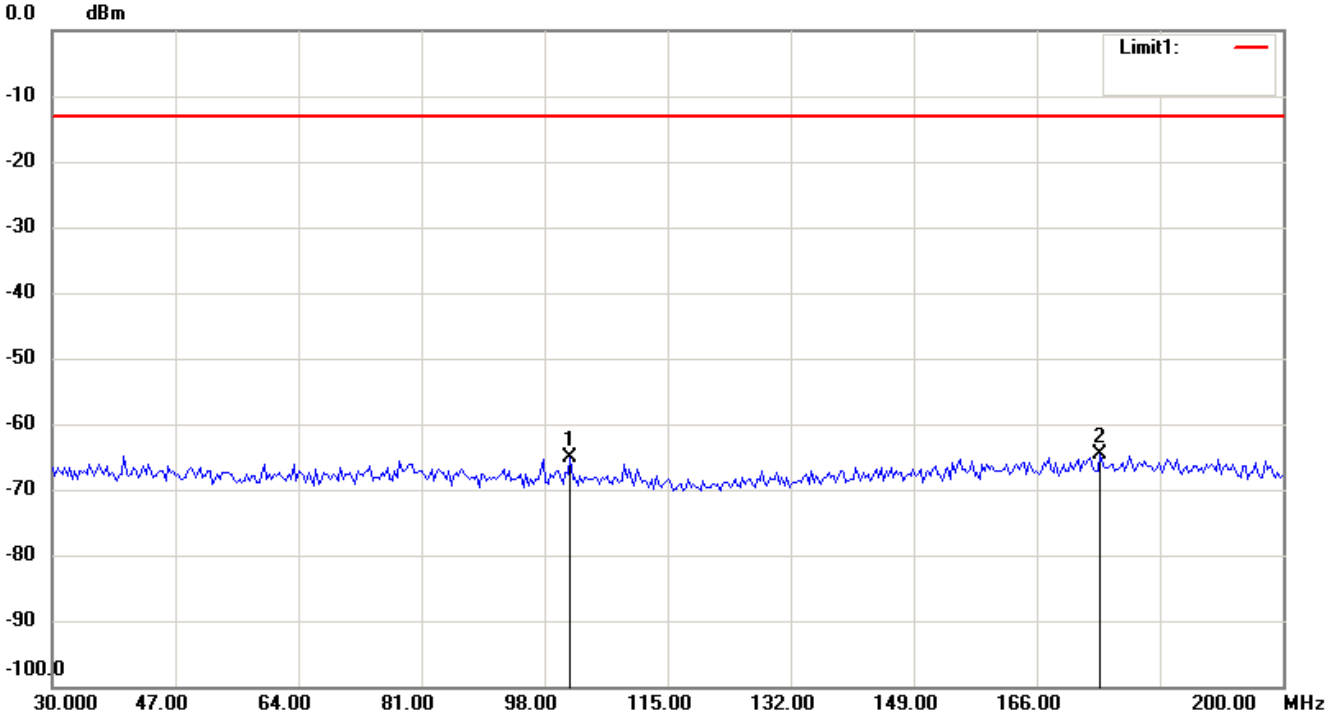
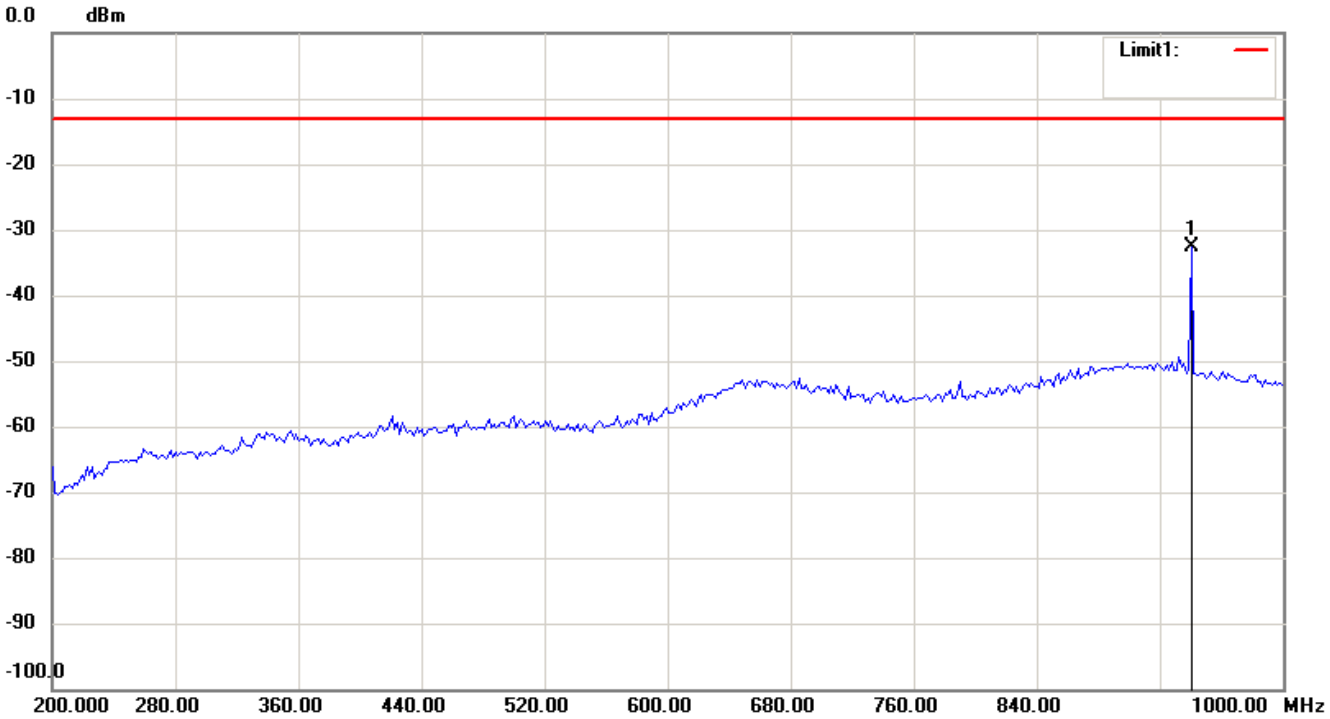
Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

12.5 kHz-469.9875 MHz

Antenna Polarization H





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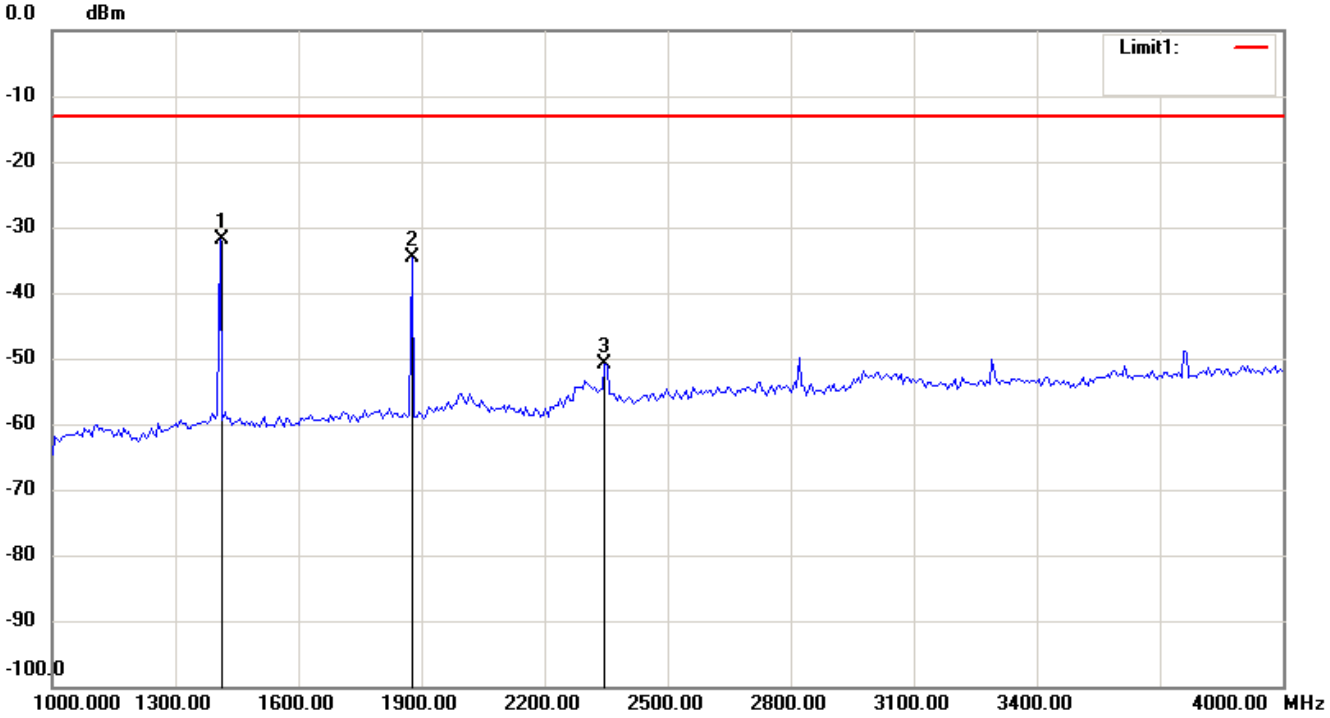

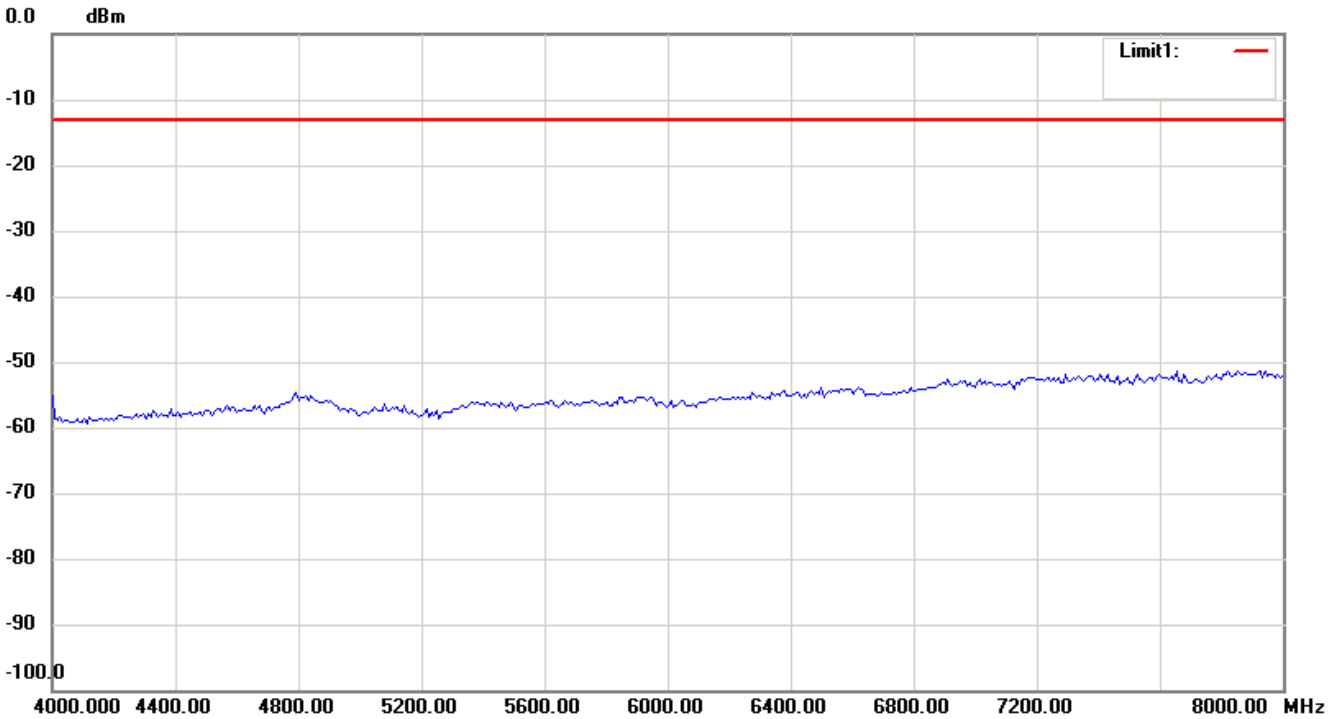

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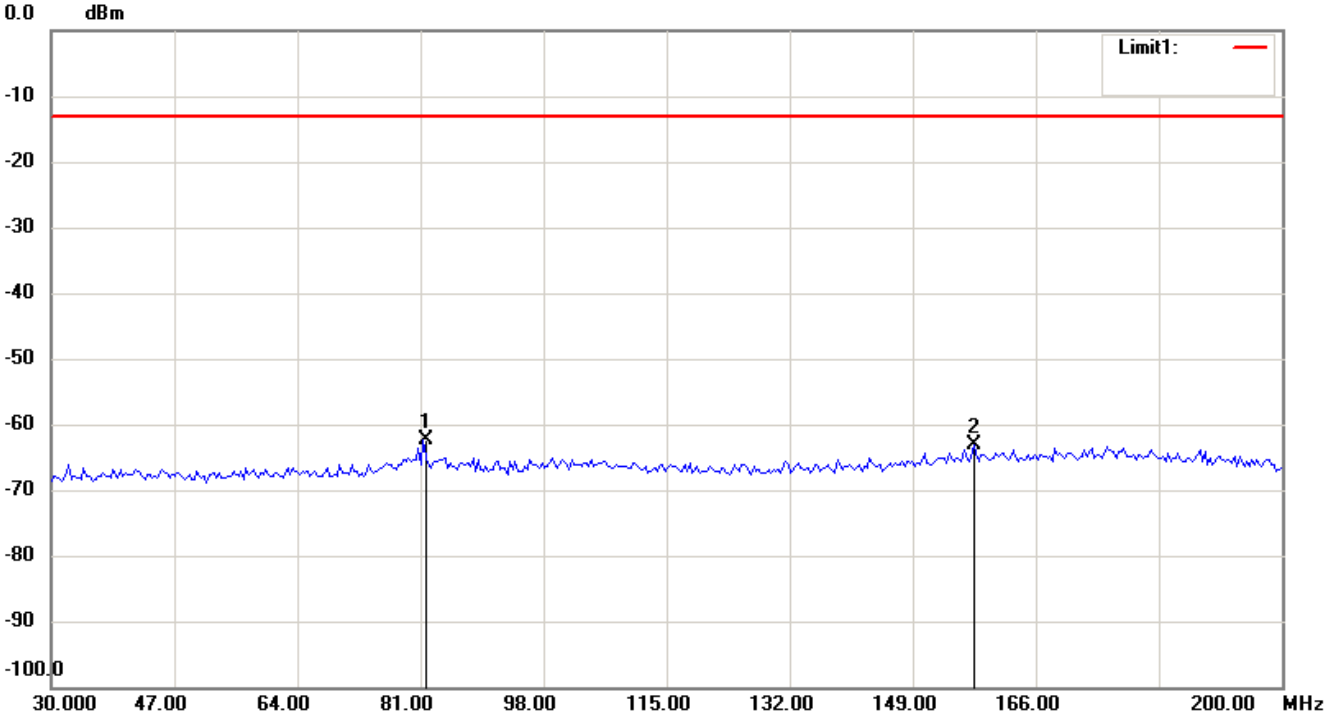
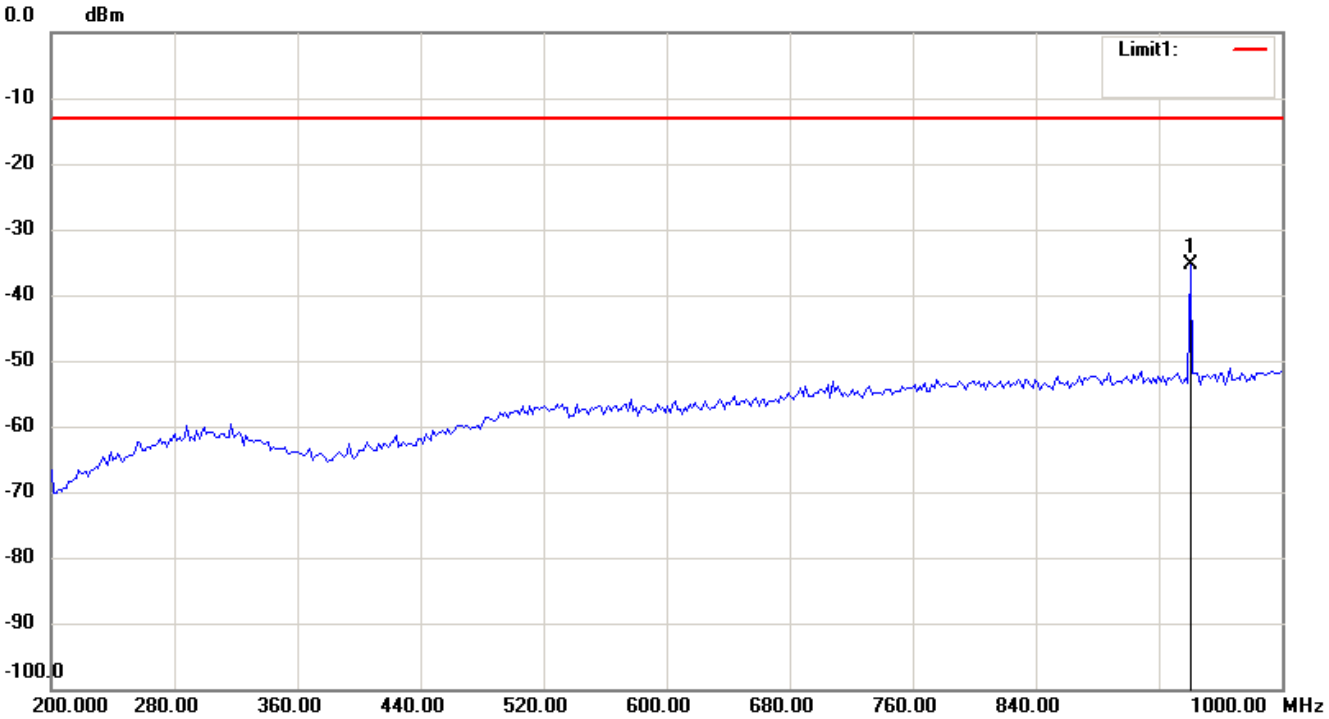
Registration number: W6M21403-13988-C-1
FCC ID: NDATBA06XU

Antenna Polarization V





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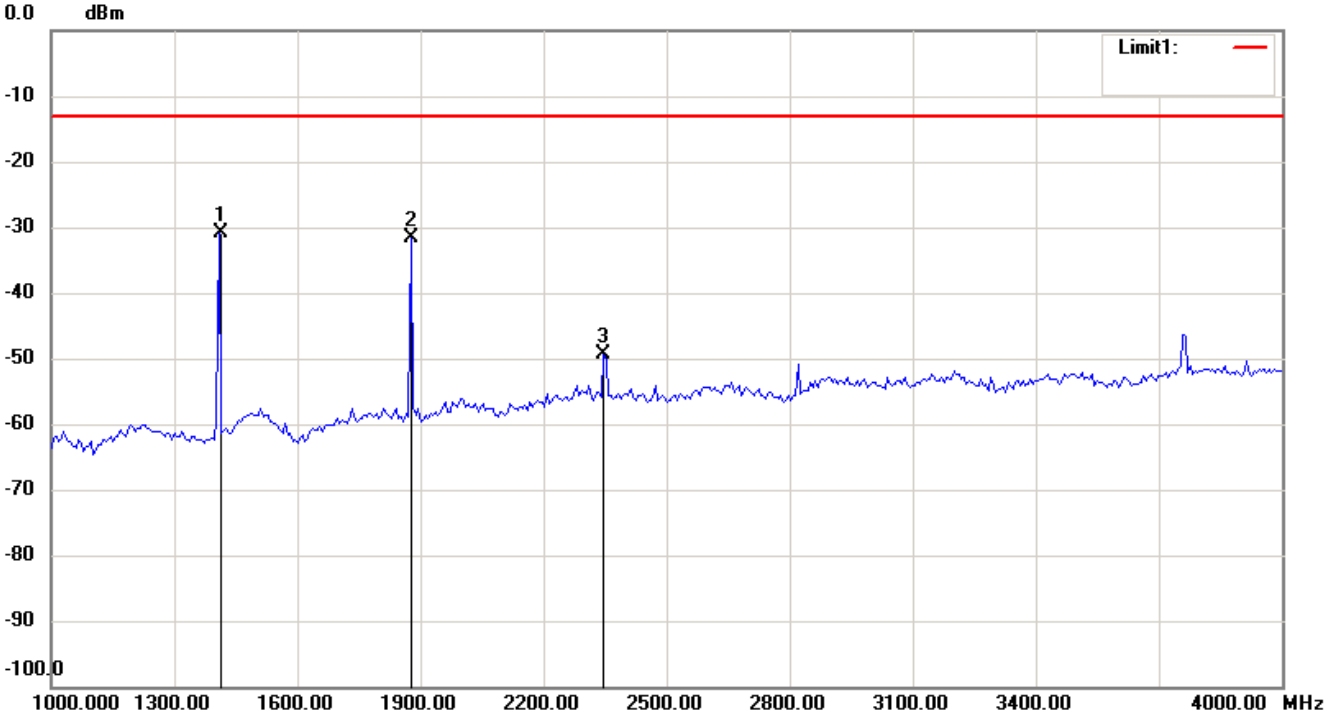

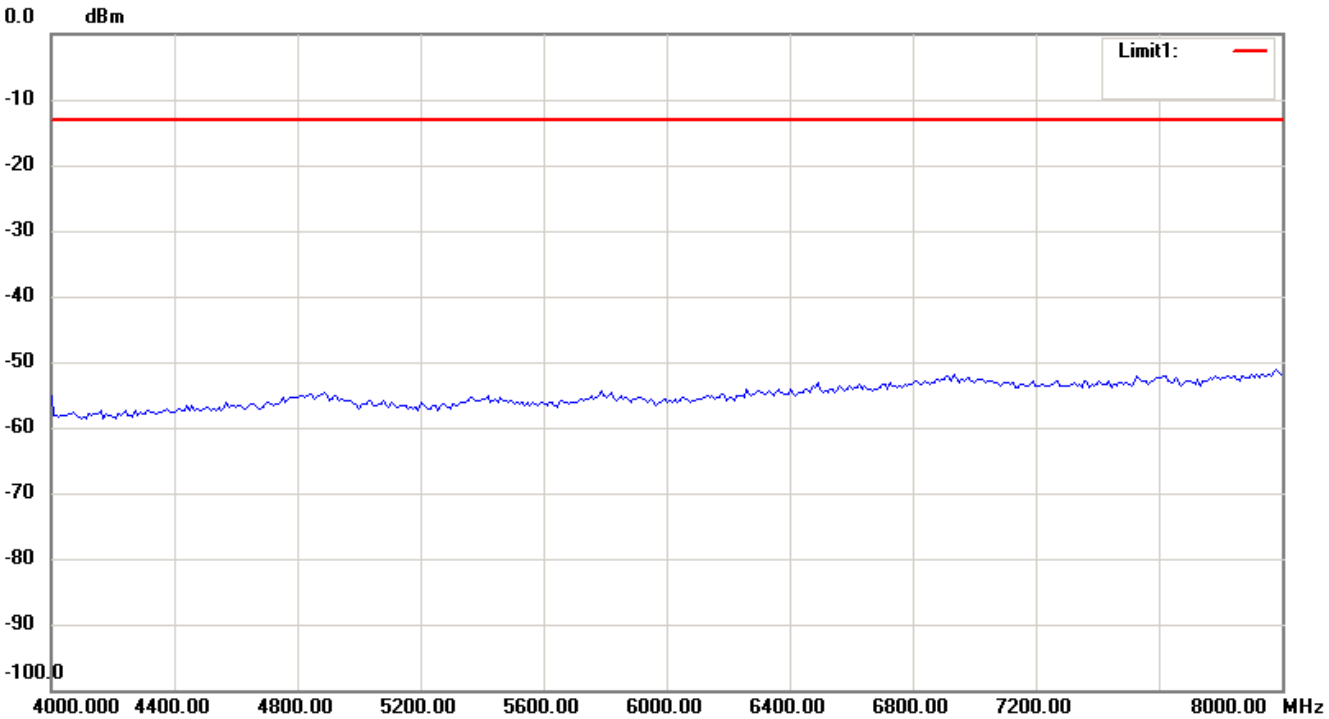

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