FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

QUAD-BAND RADIO WITH WLAN AND BT RADIO

Model: A1453 / A1533

FCC ID: BCG-E2642A
IC: 579C-E2642A
IC: 579C-E2642B

REPORT NUMBER: 13U14987-3

ISSUE DATE: JULY 22, 2013

Prepared for
APPLE
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	07/22/13	Initial Issue	T. Chan

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: QUAD-BAND RADIO WITH WLAN AND BT RADIO

MODEL: A1453/A1533

SERIAL NUMBER: C39KD007FHYY

DATE TESTED: APRIL 26-JUNE 10, 2013

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

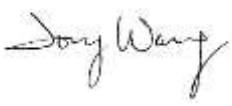
UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Verification Services Inc. By:

Thu Chan
WiSE Operations Manager
UL Verification Services Inc.

Tested By:



Tony Wang
WiSE Lab Technician
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2009, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Model A1453/A1533 is a mobile phone with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/CDMA/EVDO/LTE radio, IEEE 802.11a/b/g/n, Bluetooth and GPS radio. The rechargeable battery is not user accessible.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	17.290	53.58
2412 - 2462	802.11g	22.600	181.97
2412 - 2462	802.11n HT20	22.250	167.88
5745 - 5825	802.11a	22.615	182.60
5745 - 5825	802.11n HT20	22.673	185.05
5755 - 5795	802.11n HT40	22.600	181.97

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PiFA antenna, with a maximum gain as below table.

FREQUENCY (MHZ)	ANTENNA GAIN (dBi)
2400 -- 2483.5	1.09
5150 -- 5250	-5.91
5250 -- 5350	-5.83
5500 -- 5700	-4.25
5725 -- 5850	-4.21

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was WL Tool FW 6.10.56.166

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel for RF radiated emissions below 1GHz tests is channel with highest RF output power.

Based on the investigation results, the highest peak power and enhanced data rate is the worst-case scenario for all measurements.

For the fundamental investigation, the EUT is investigated for vertical and horizontal antenna orientations and the worst case was determined to be at X-position.

Based on the manufacturer's attestation that the nominal output power is reduced as the data rate increases, the data rates tested represent the highest power and worst-case with respect to EMC performance.

Worst-case data rates were used:

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List			
Description	**Manufacturer**	**Model**	**Serial Number**
AC adapter	Apple	A1385	D292365D11QDHLHCA
Earphone	Apple	NA	NA

I/O CABLES (Conducted Setup)

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Antenna	1	SMA	Shielded	0.1m	To Spectrum Analyzer

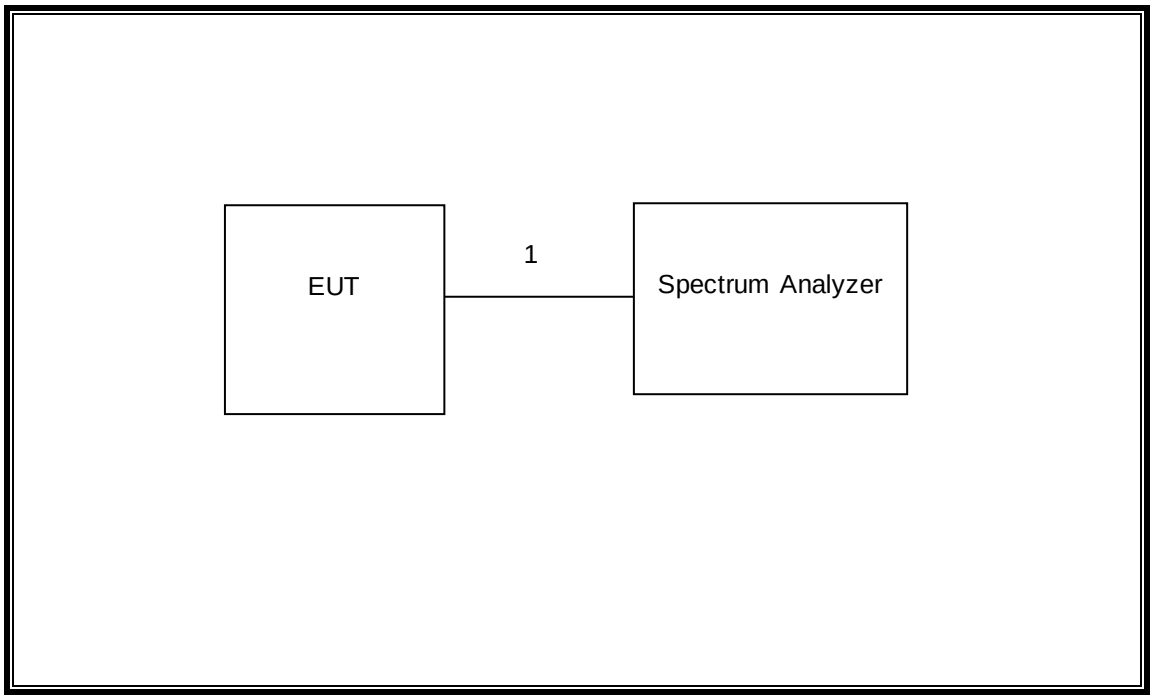
I/O CABLES(Radiated Setup)

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Jack	1	Earphone	Unshielded	0.5m	N/A

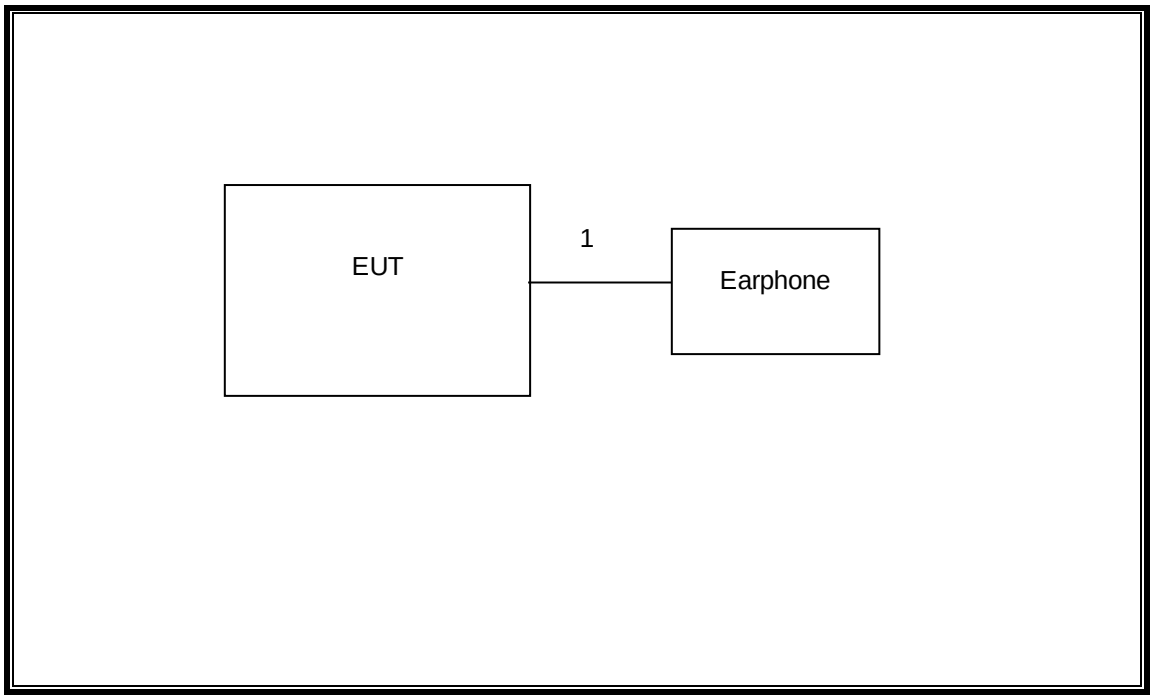
TEST SETUP

The EUT is a stand-alone device.

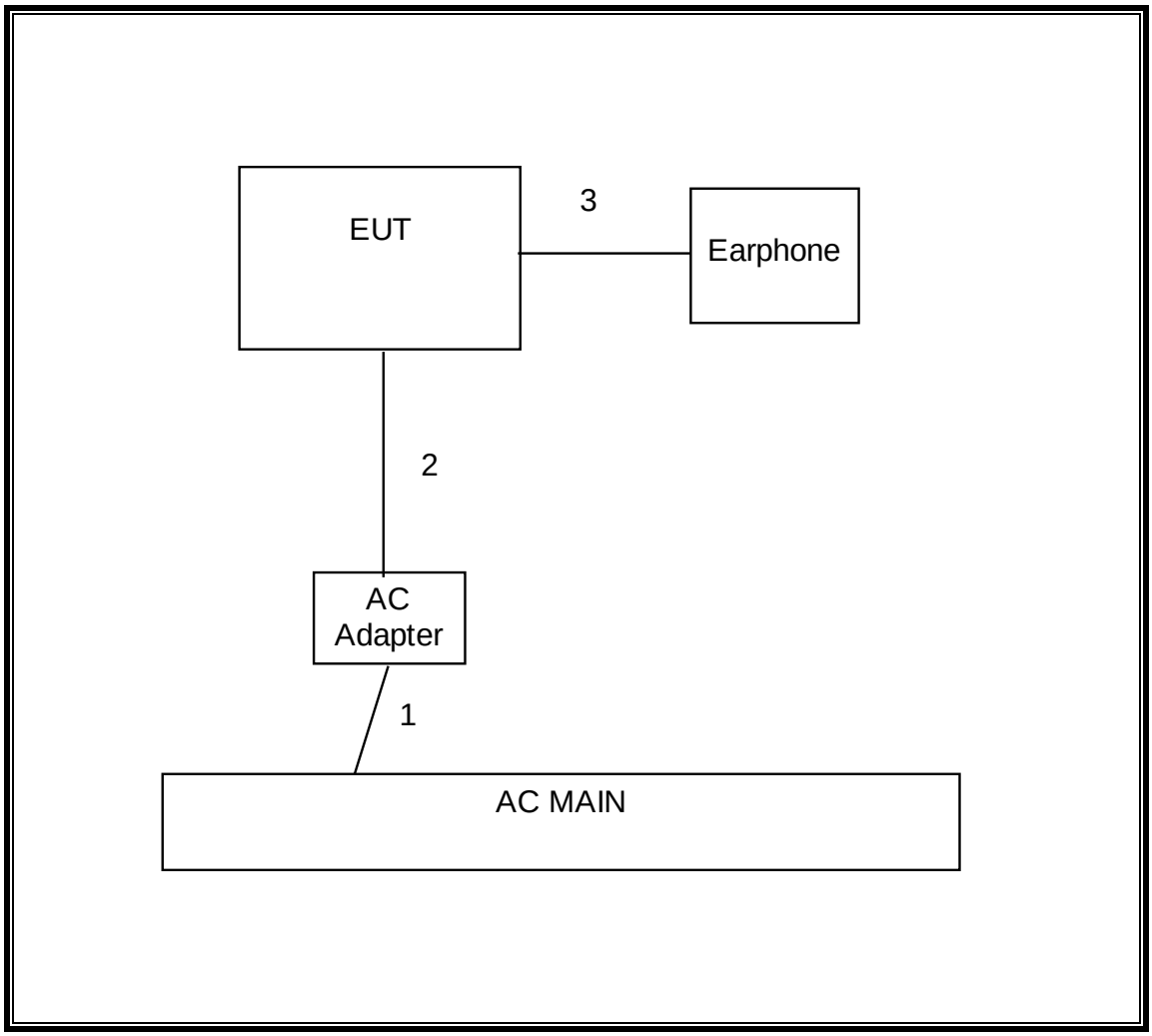
SETUP DIAGRAM FOR CONDUCTED TESTS



SETUP DIAGRAM FOR RADIATED TESTS



SETUP DIAGRAM FOR AC POWER CONDUCTED TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Horn Antenna 1-18GHz	ETS Lindgren	3117	F00131	02/19/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/14
Antenna, Horn, 26.5 GHz	ARA	SWH-28	C01015	05/06/14
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB3	F00027	03/07/14
Peak / Average Power Sensor	Agilent / HP	N1911A	F00153	04/05/14
P-Series single channel Power Meter	Agilent / HP	E9323A	F00026	04/03/14
Spectrum Analyzer, 44GHz	Agilent	N9030A	F00129	02/21/14
PreApmplifier, 1-26.5GHz	Agilent	8449B	C01052	10/22/13
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	06/14/14
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/13
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/02/13

7. ANTENNA PORT TEST RESULTS

7.1. 2.4GHz BAND

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

KDB 558074 D01 v01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247".

RESULTS

b MODE

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	8.052	0.5
Mid	2437	8.052	0.5
High	2462	8.064	0.5

g MODE

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	15.134	0.5
Mid	2437	15.123	0.5
High	2462	15.134	0.5

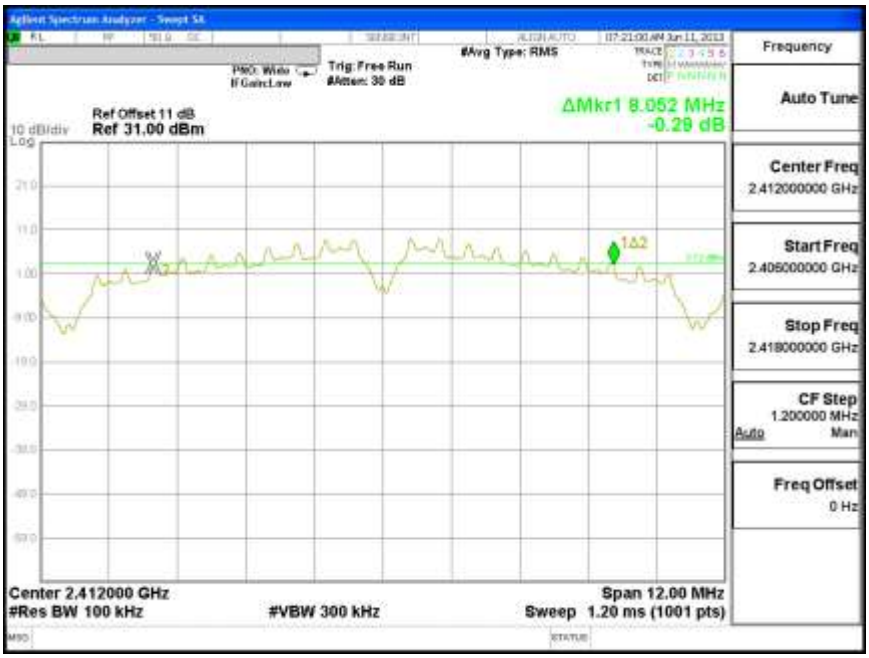
HT20

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	15.134	0.5
Mid	2437	15.157	0.5
High	2462	15.134	0.5

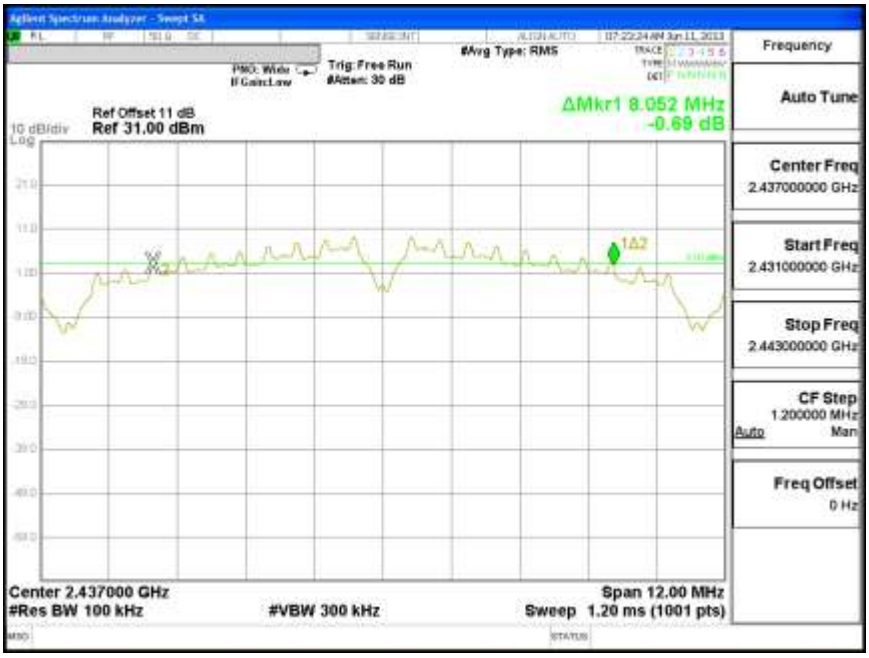
b mode

6 dB BANDWIDTH

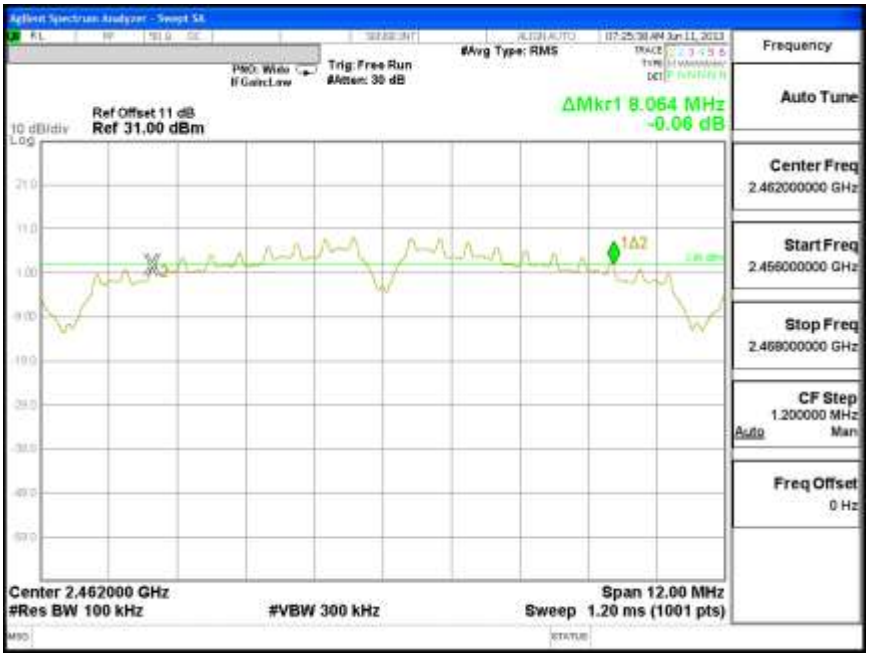
6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH MID CH



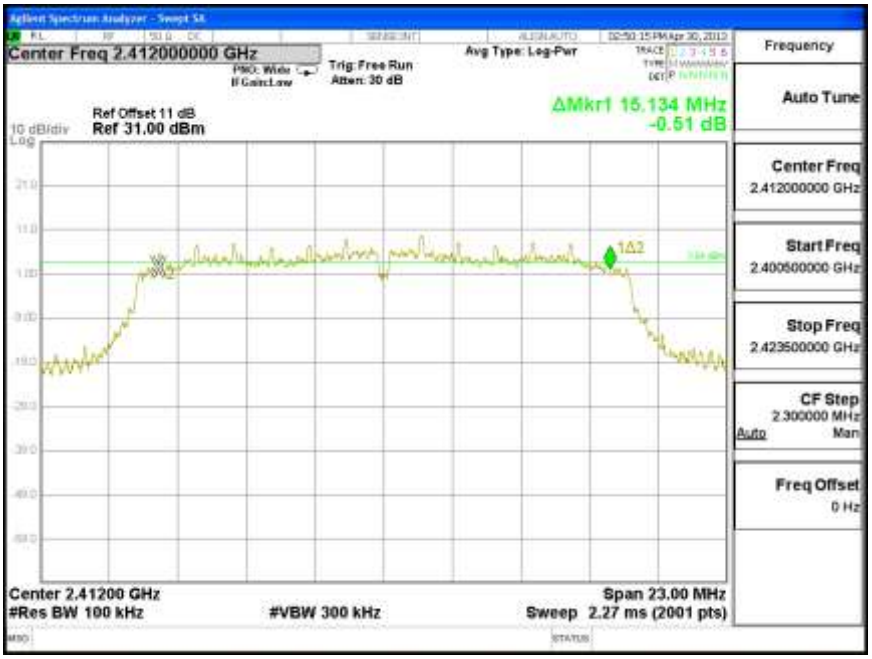
6 dB BANDWIDTH HIGH CH



g mode

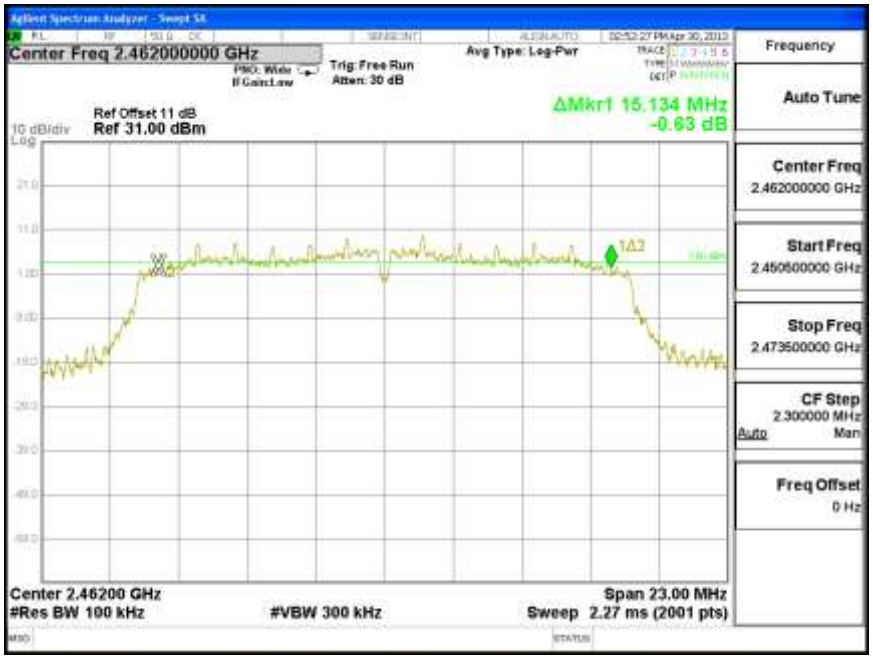
6 dB BANDWIDTH

6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH MID CH

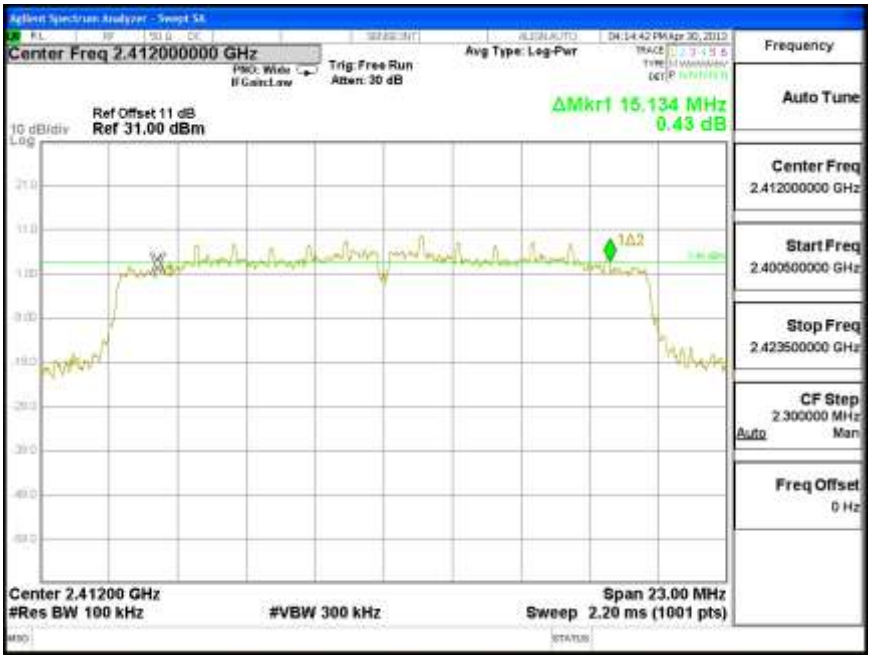
6 dB BANDWIDTH HIGH CH



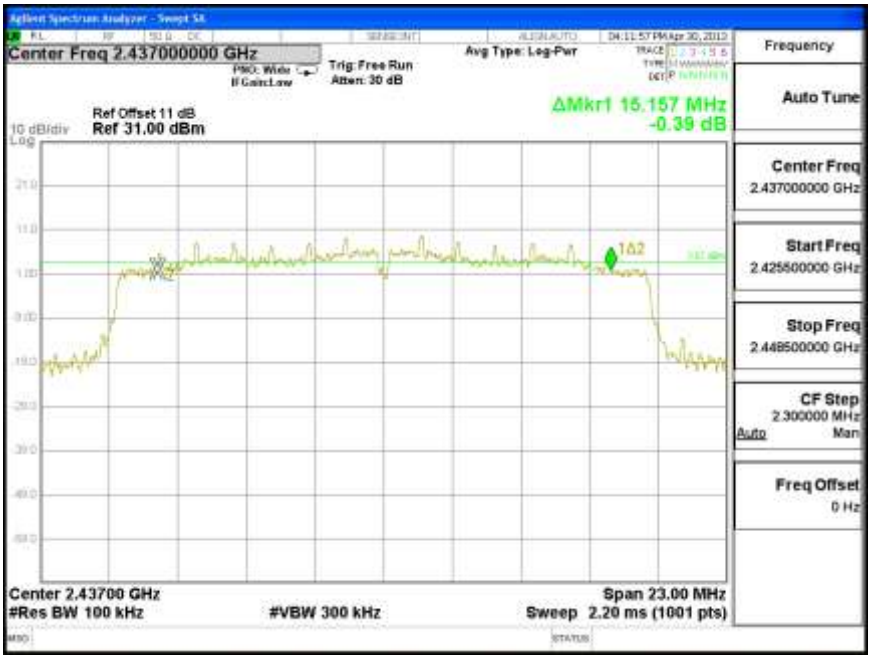
HT20

6 dB BANDWIDTH

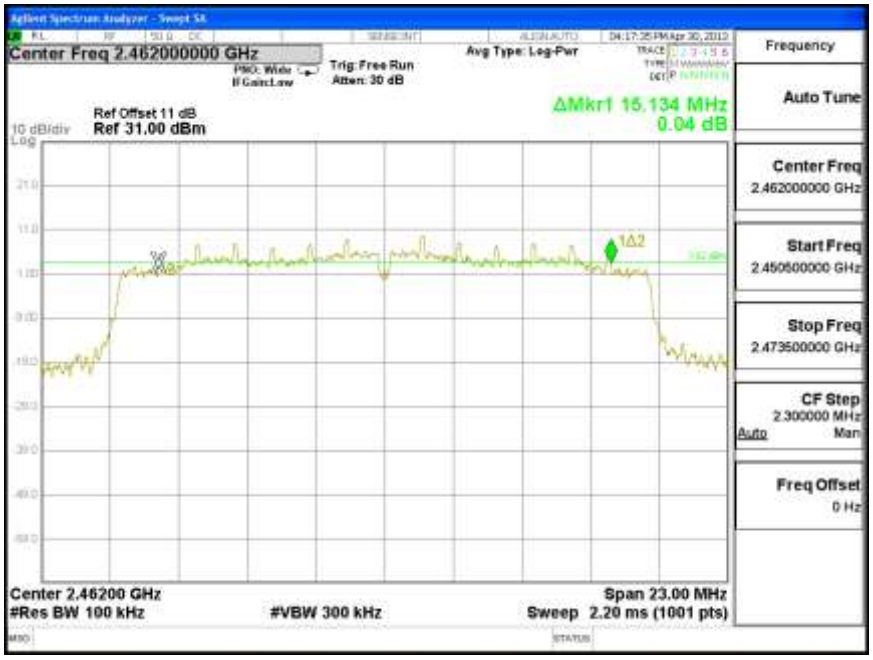
6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH MID CH



6 dB BANDWIDTH HIGH CH



7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

b mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	12.4980
Mid	2437	12.6040
High	2462	12.3370

g mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.4620
Mid	2437	16.4110
High	2462	16.5380

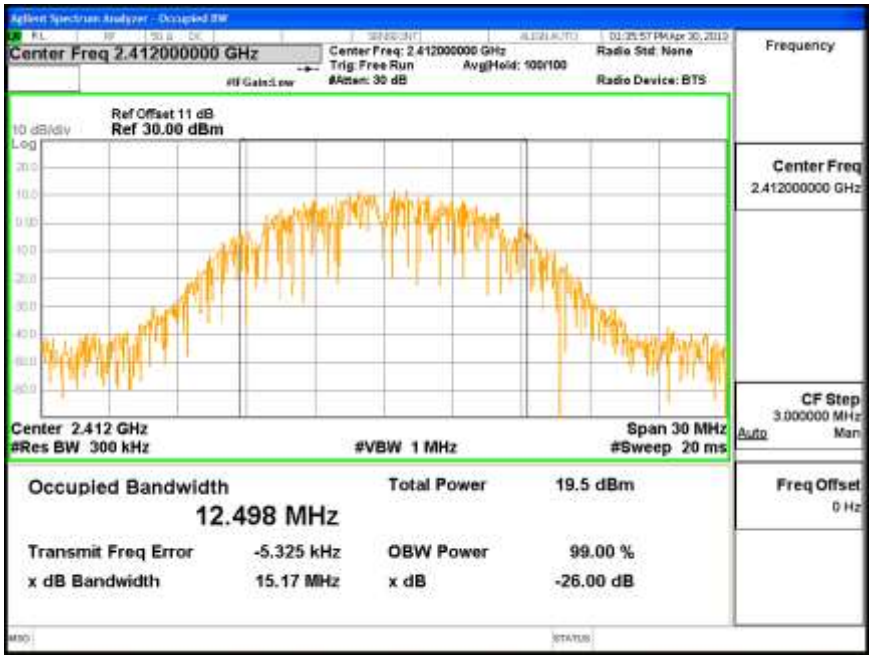
HT20

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.6280
Mid	2437	17.0680
High	2462	17.6200

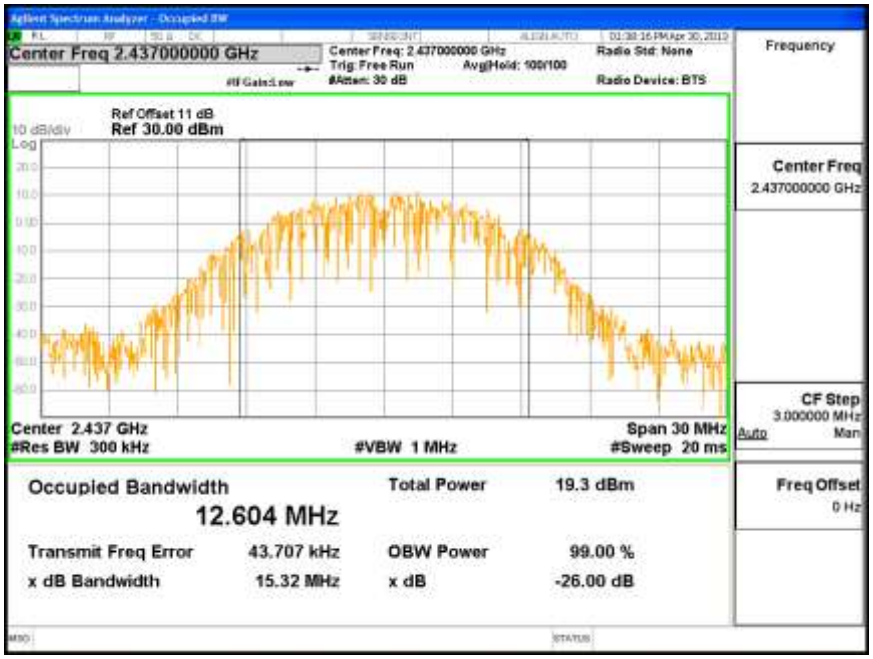
b mode

99% BANDWIDTH

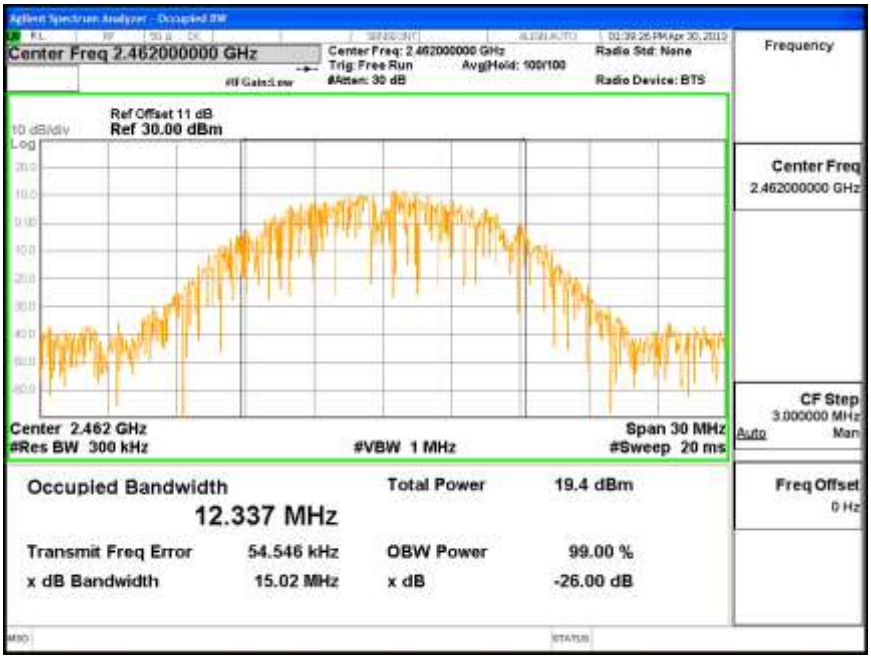
99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH



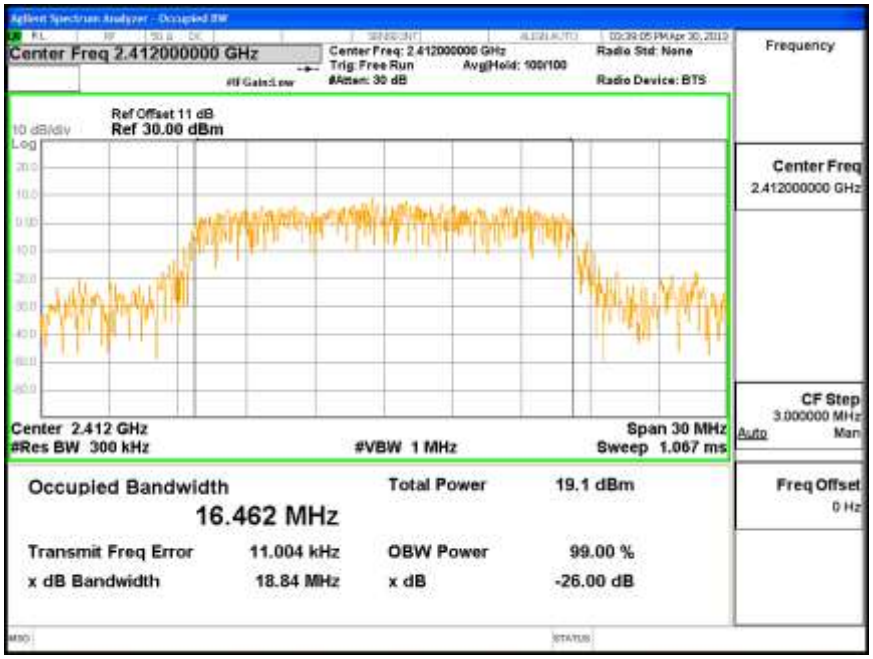
99% BANDWIDTH HIGH CH



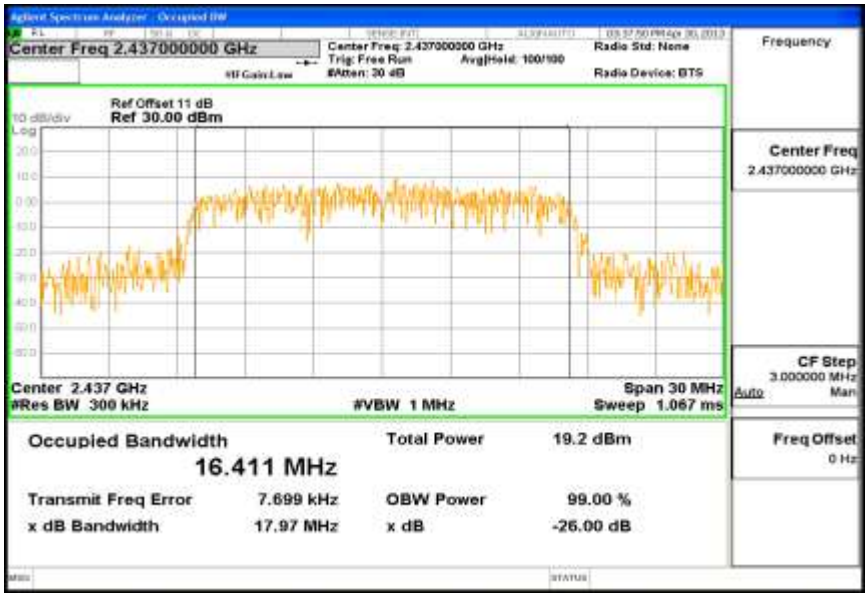
g mode

99% BANDWIDTH

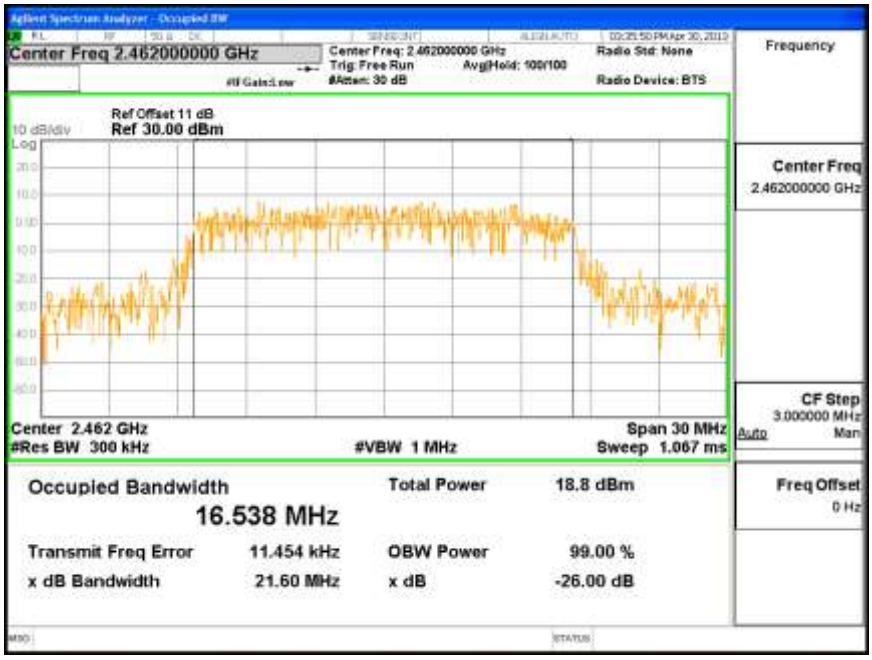
99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH



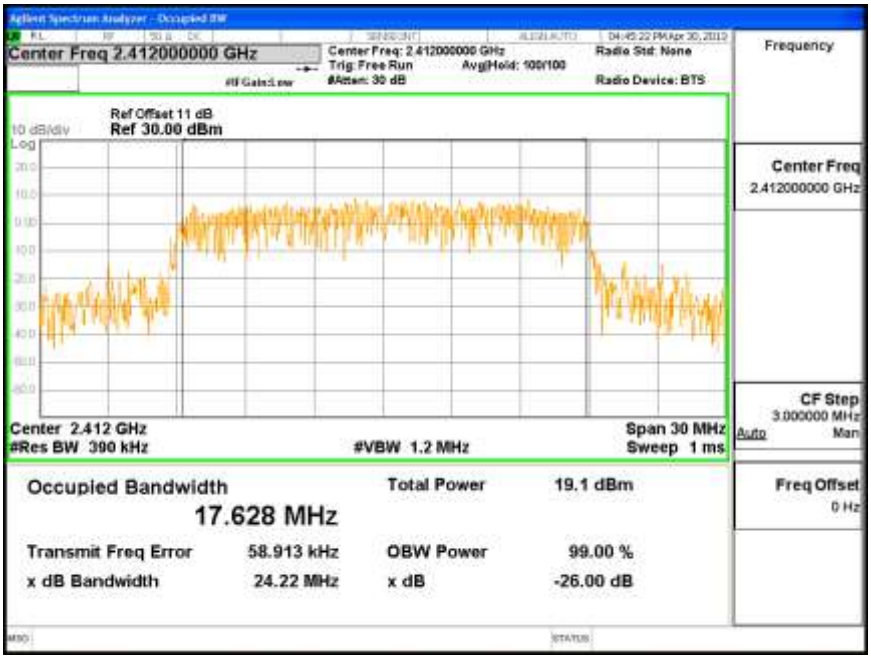
99% BANDWIDTH HIGH CH



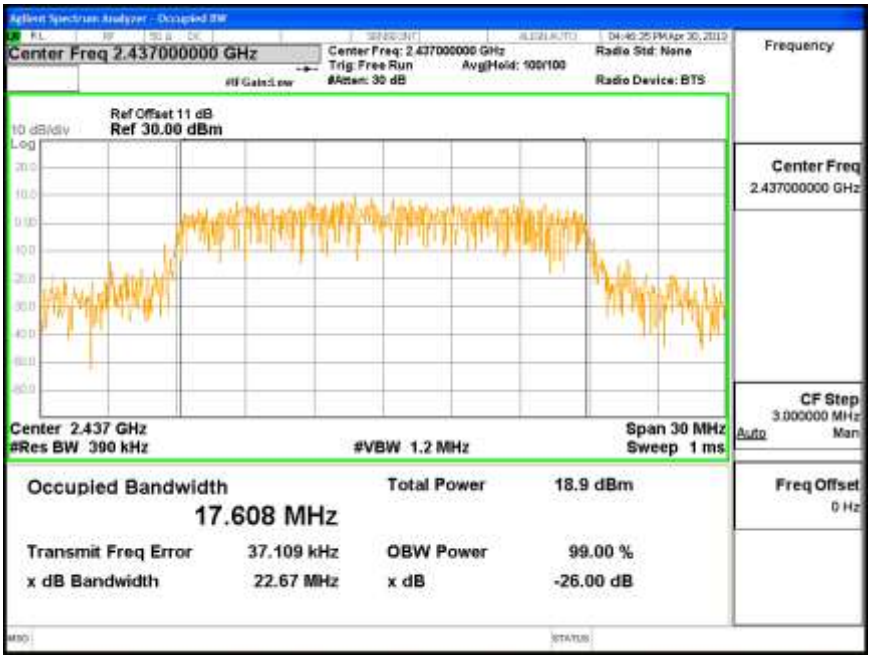
HT20

99% BANDWIDTH

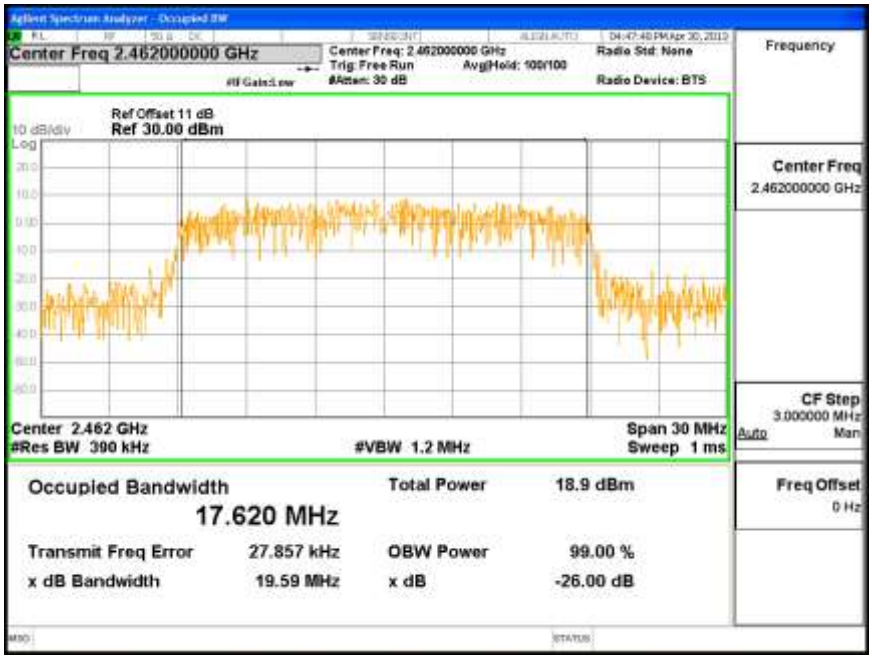
99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH



99% BANDWIDTH HIGH CH



7.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

B mode

Channel	Frequency (MHz)	Power (dBm)
Low	2412	14.55
Mid	2437	14.65
High	2462	14.66

G mode

Channel	Frequency (MHz)	Power (dBm)
Low	2412	14.58
Mid	2437	14.57
High	2462	14.58

HT20

Channel	Frequency (MHz)	Power (dBm)
Low	2412	14.43
Mid	2437	14.53
High	2462	14.46

7.1.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

b mode

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	1.09	30.00	30	36	30.00
Mid	2437	1.09	30.00	30	36	30.00
High	2462	1.09	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	17.150	17.15	30.00	-12.85
Mid	2437	17.290	17.29	30.00	-12.71
High	2462	17.139	17.14	30.00	-12.86

g mode

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	1.09	30.00	30	36	30.00
Mid	2437	1.09	30.00	30	36	30.00
High	2462	1.09	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	22.53	22.53	30.00	-7.47
Mid	2437	22.56	22.56	30.00	-7.44
High	2462	22.60	22.60	30.00	-7.40

HT20

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	1.09	30.00	30	36	30.00
Mid	2437	1.09	30.00	30	36	30.00
High	2462	1.09	30.00	30	36	30.00

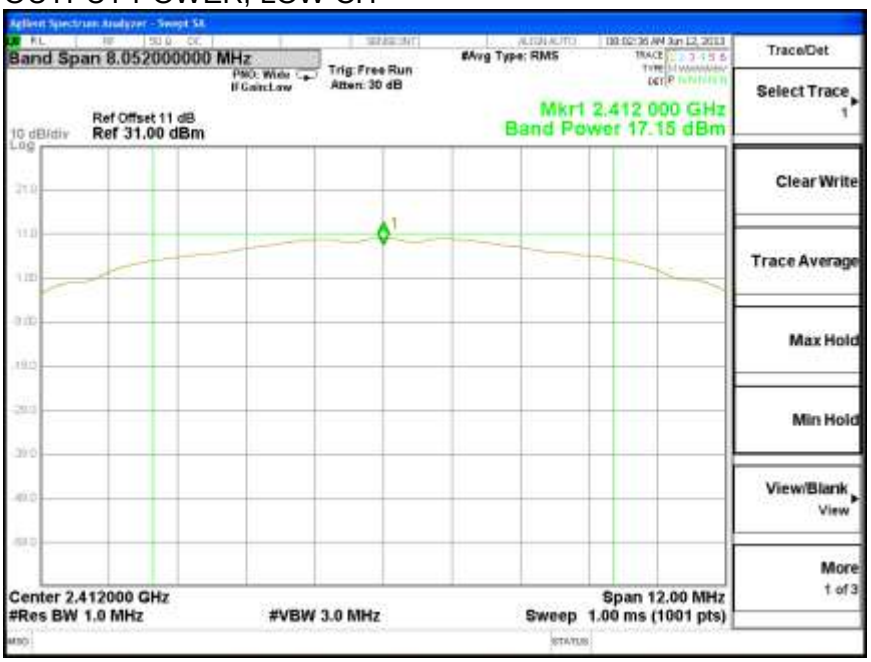
Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	22.19	22.19	30.00	-7.81
Mid	2437	22.25	22.25	30.00	-7.75
High	2462	22.25	22.25	30.00	-7.75

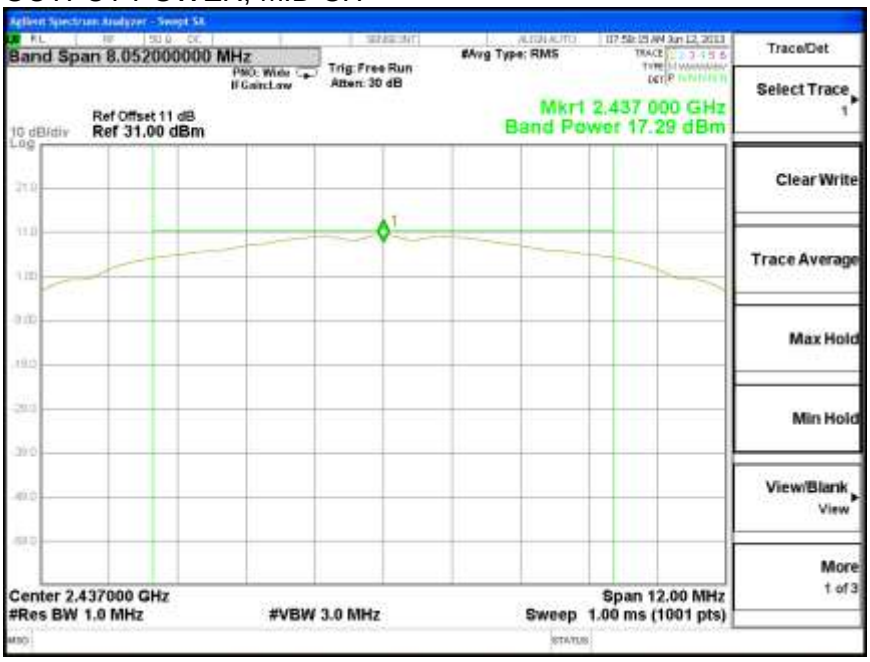
b mode

OUTPUT POWER

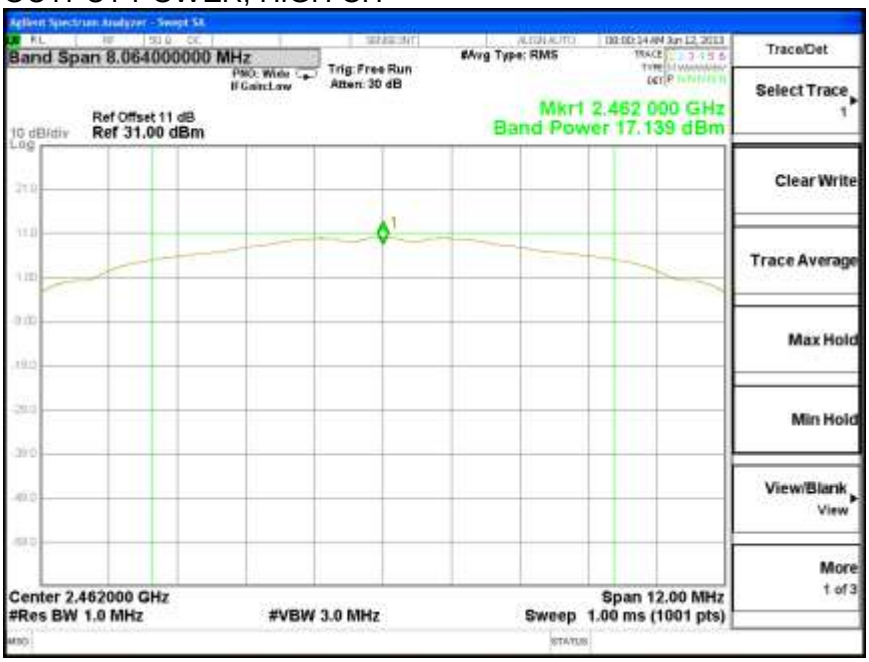
OUTPUT POWER, LOW CH



OUTPUT POWER, MID CH



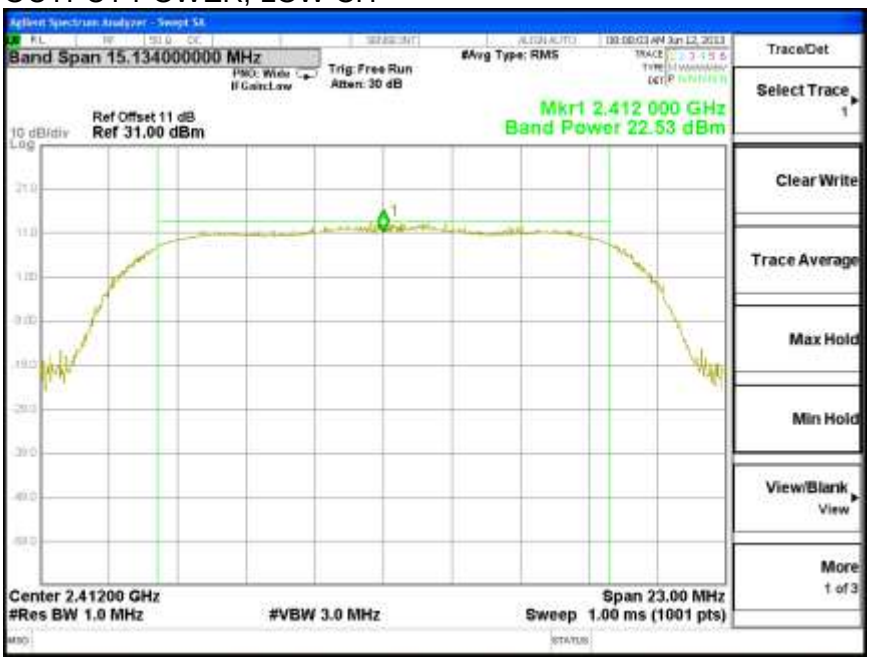
OUTPUT POWER, HIGH CH



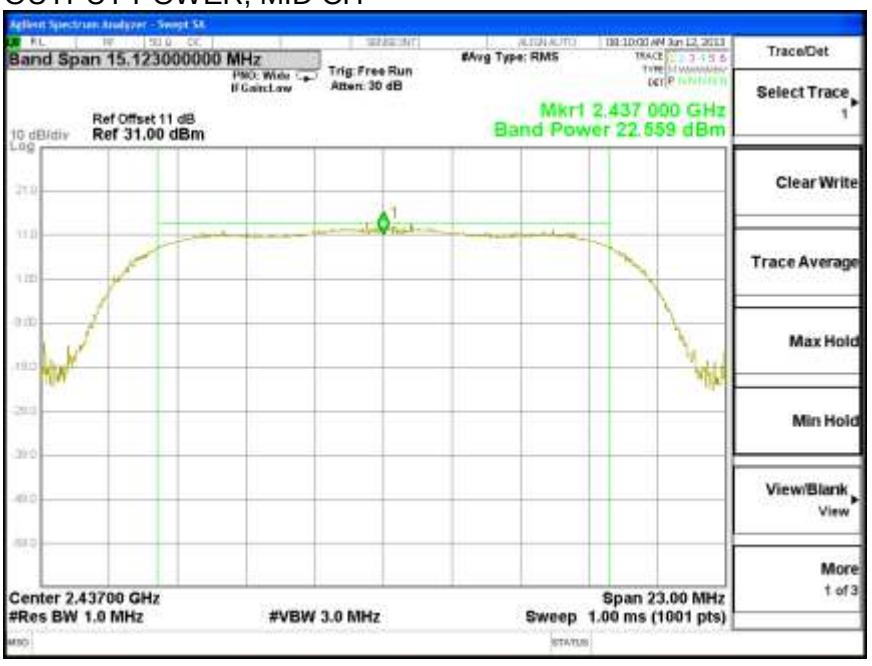
G mode

OUTPUT POWER

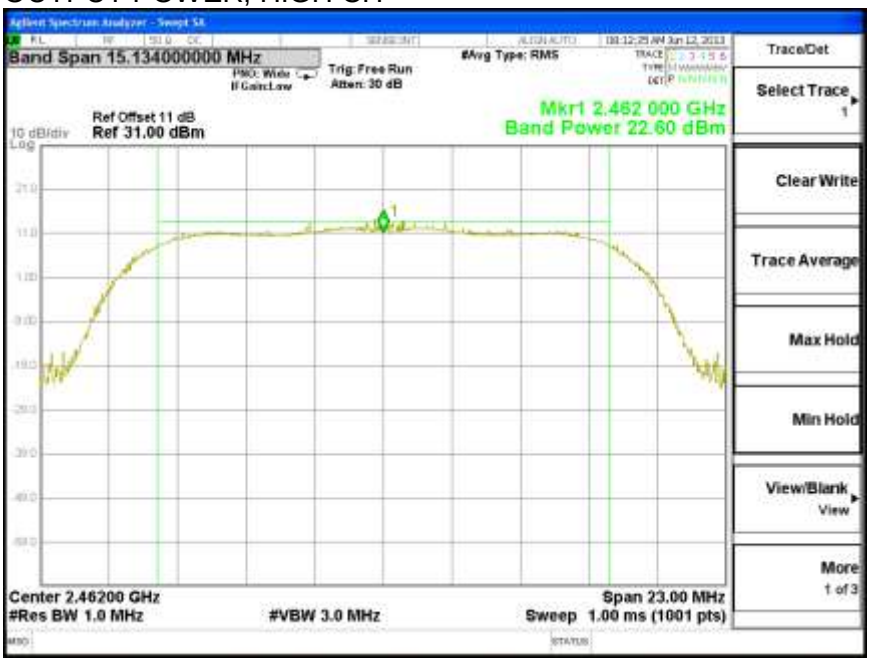
OUTPUT POWER, LOW CH



OUTPUT POWER, MID CH



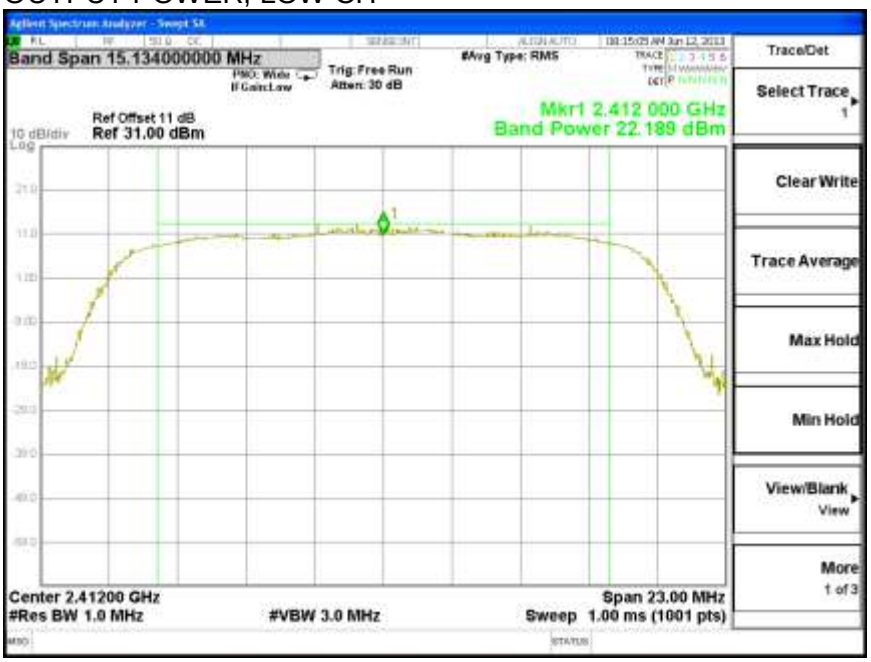
OUTPUT POWER, HIGH CH



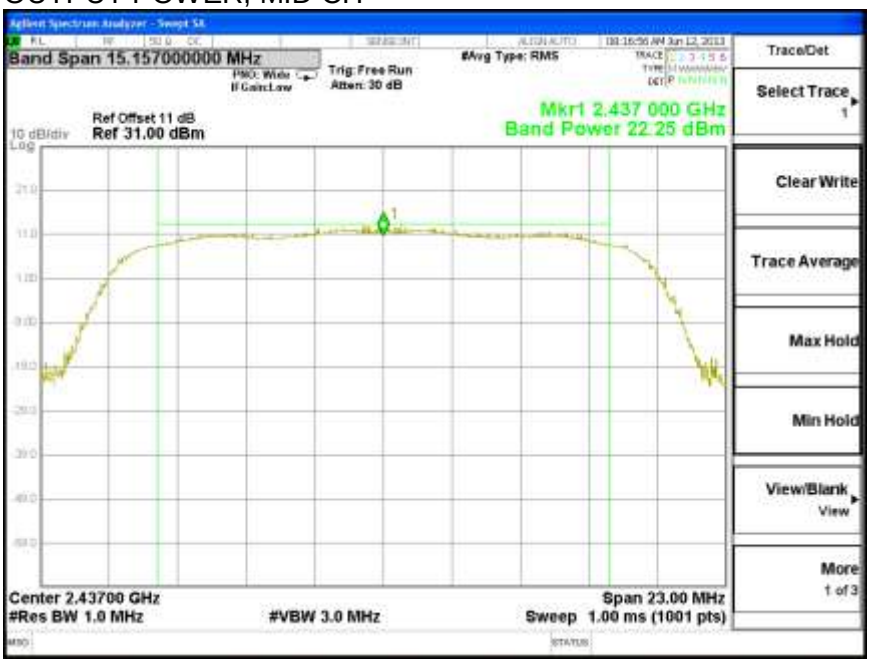
HT20

OUTPUT POWER

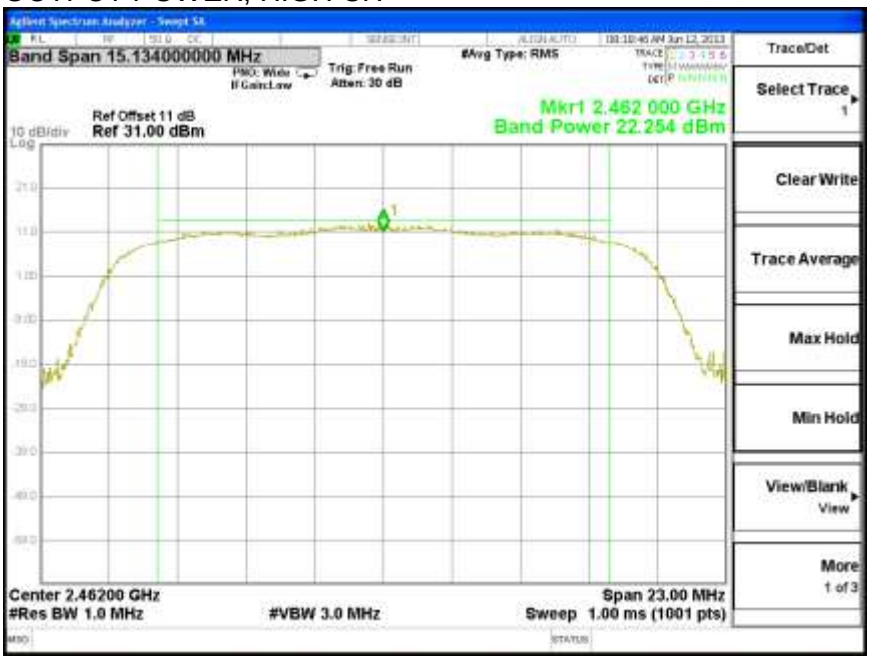
OUTPUT POWER, LOW CH



OUTPUT POWER, MID CH



OUTPUT POWER, HIGH CH



7.1.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

B mode

PSD Results

Channel	Frequency (MHz)	Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-2.12	8.0	-10.1
Mid	2437	-1.98	8.0	-10.0
High	2462	-2.33	8.0	-10.3

G mode

PSD Results

Channel	Frequency (MHz)	Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-5.29	8.0	-13.3
Mid	2437	-5.25	8.0	-13.3
High	2462	-5.02	8.0	-13.0

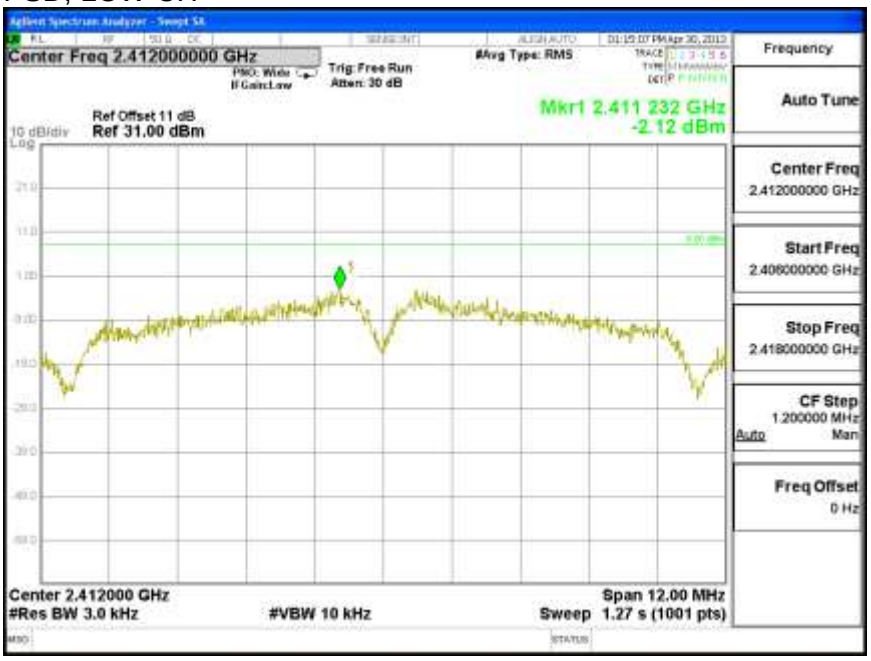
HT20

PSD Results

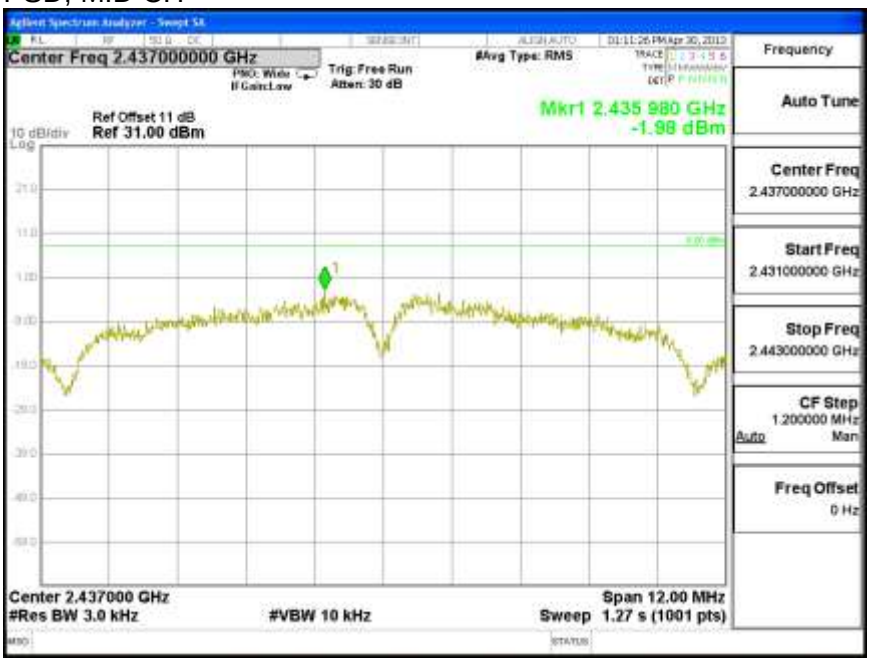
Channel	Frequency (MHz)	Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-5.50	8.0	-13.5
Mid	2437	-5.62	8.0	-13.6
High	2462	-5.17	8.0	-13.2

B mode, PSD

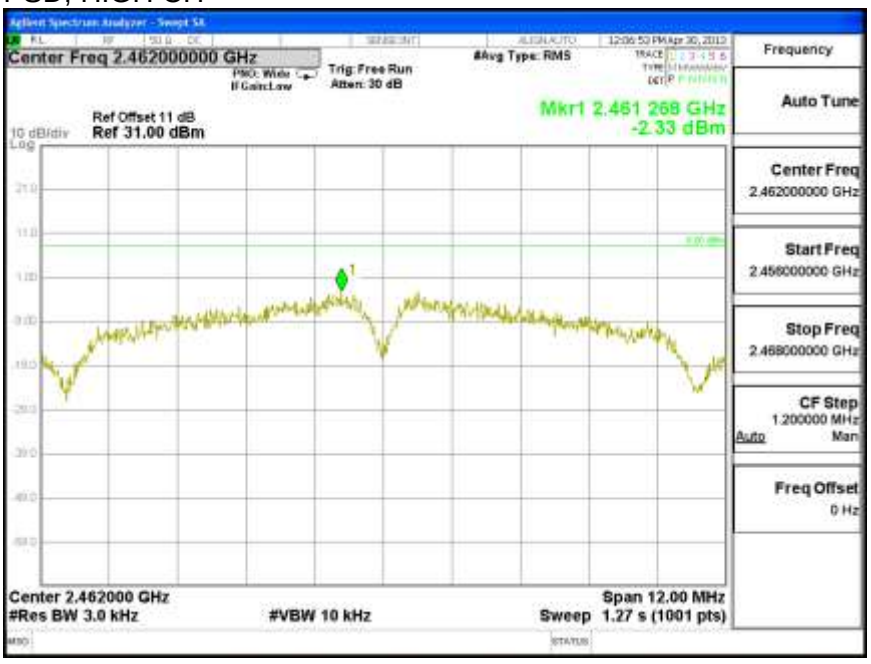
PSD, LOW CH



PSD, MID CH



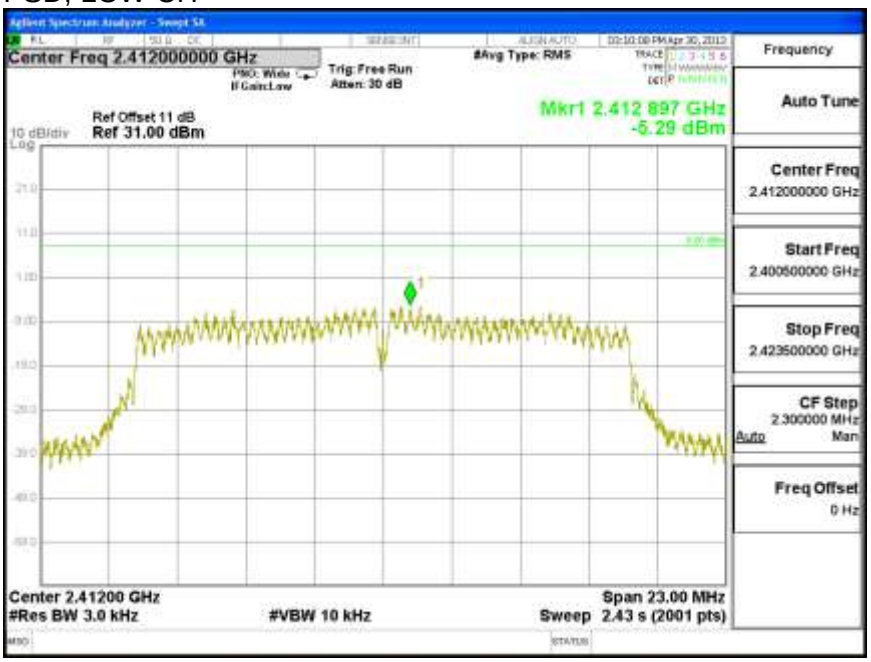
PSD, HIGH CH



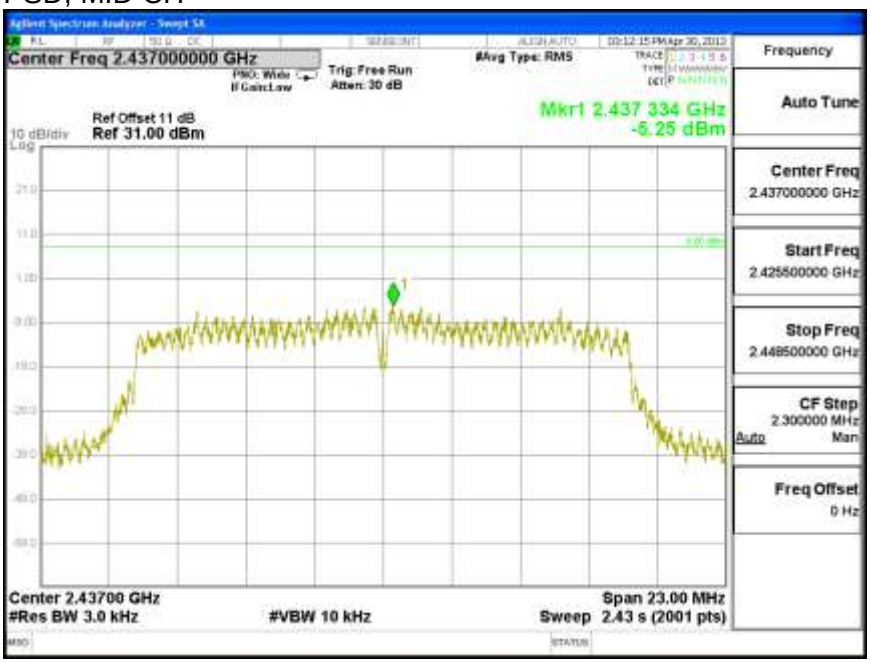
G mode

PSD

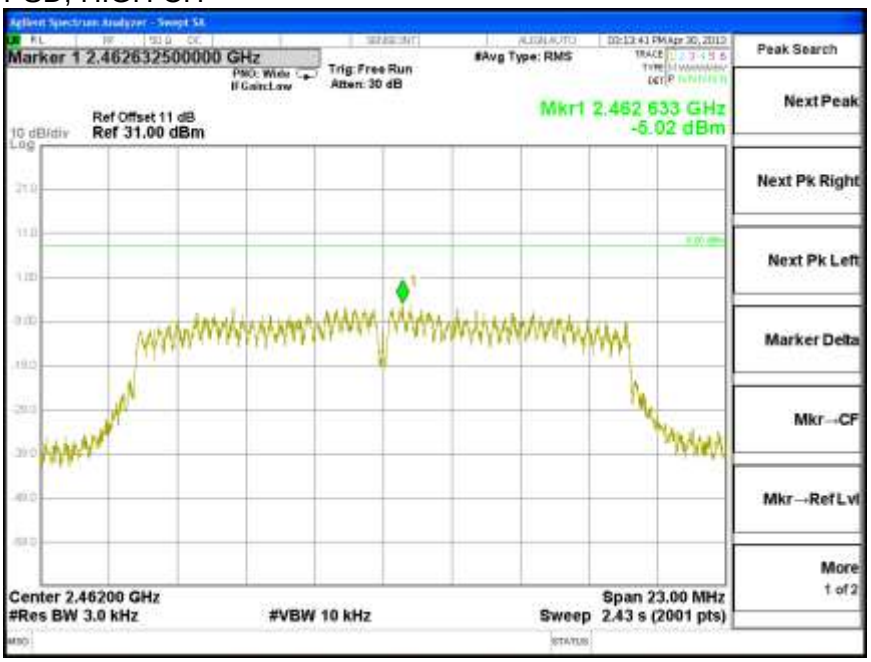
PSD, LOW CH



PSD, MID CH



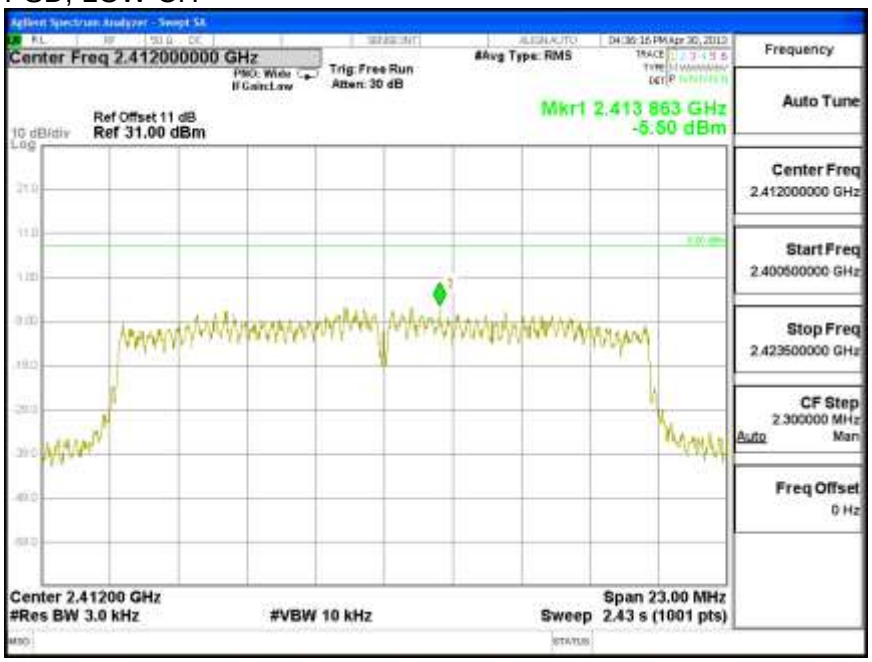
PSD, HIGH CH



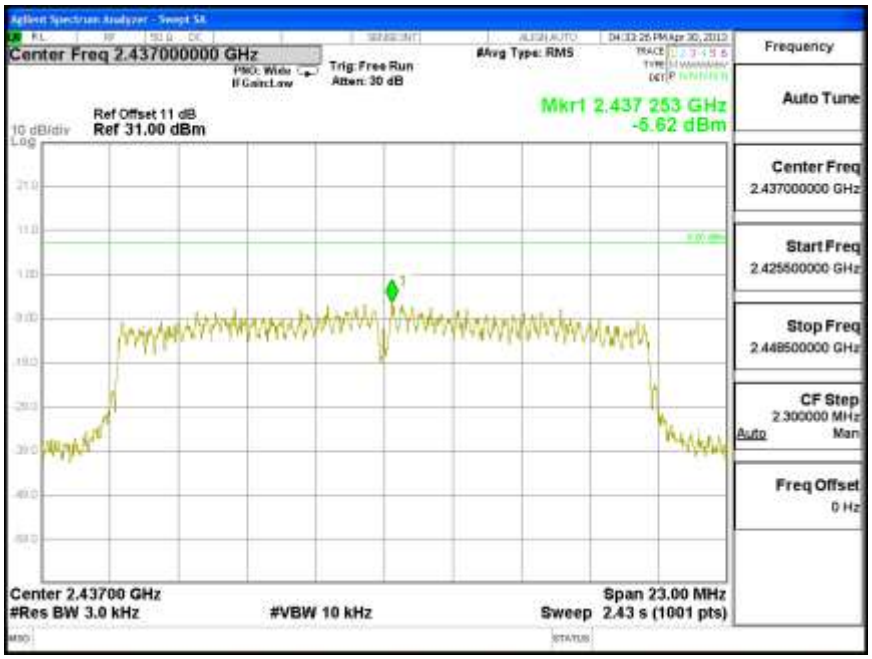
HT20

PSD

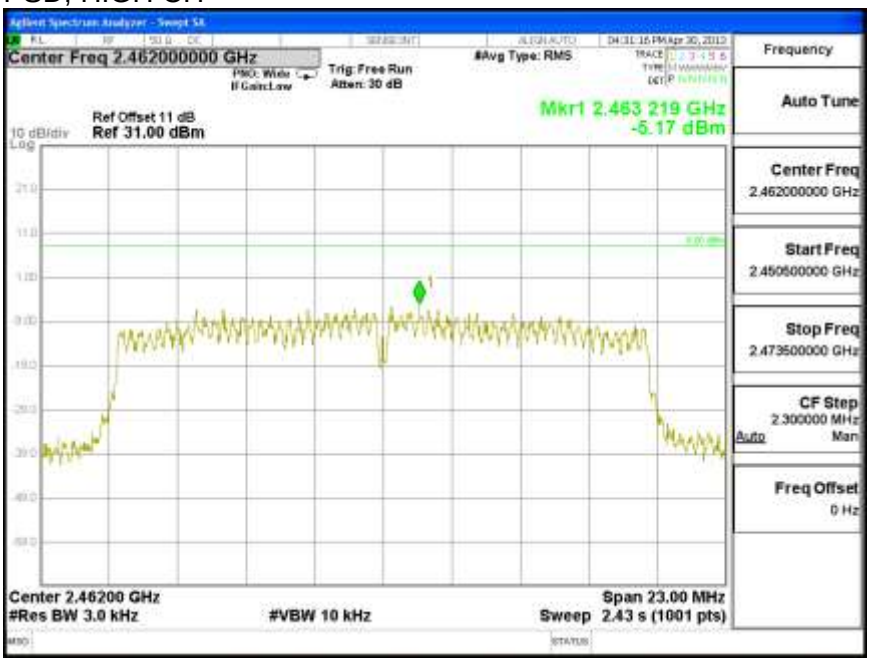
PSD, LOW CH



PSD MID CH



PSD, HIGH CH



7.1.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

RESULTS

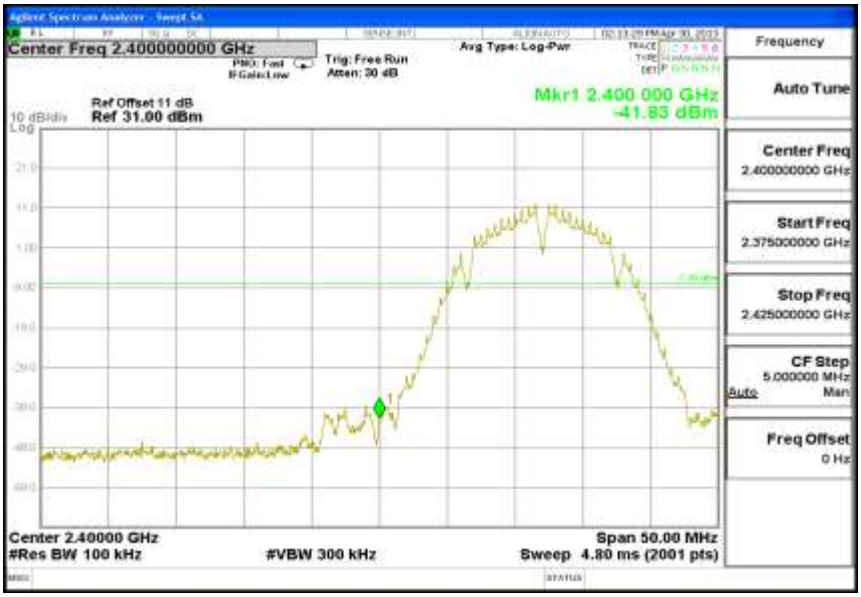
B mode,

IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH

LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH

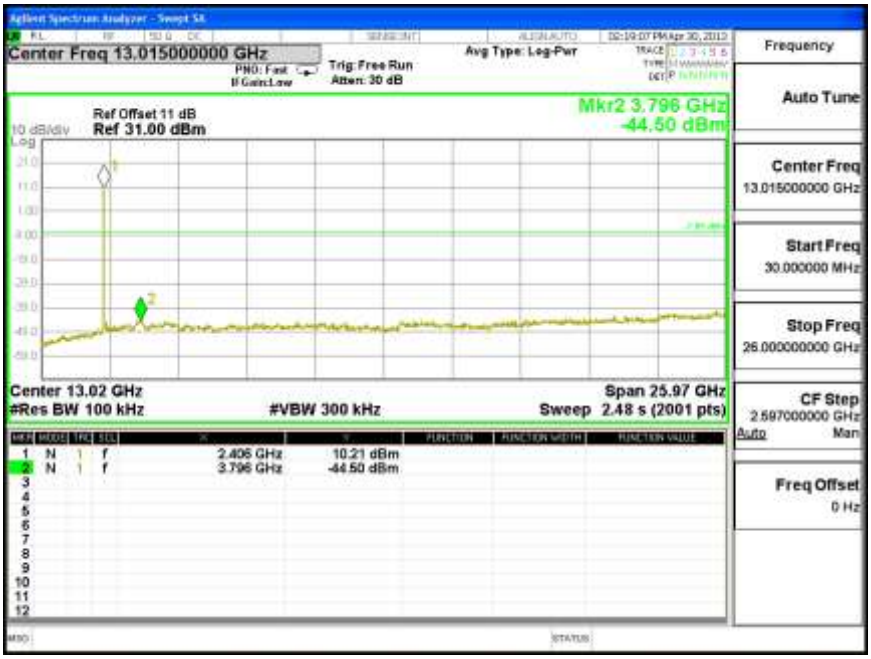


HIGH CHANNEL BANDEDGE

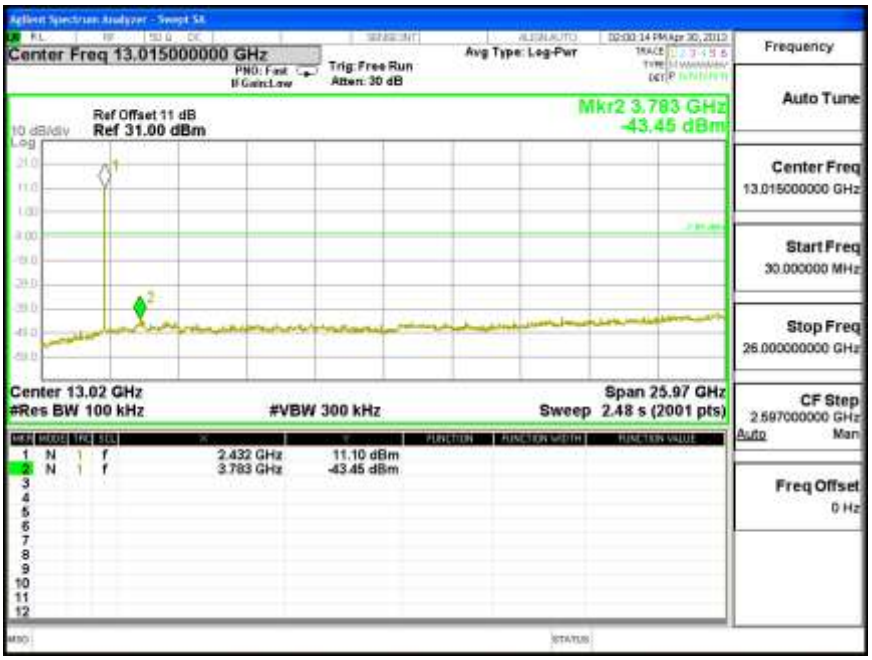
AUTHORIZED BAND EDGE HIGH CH

OUT-OF-BAND EMISSIONS

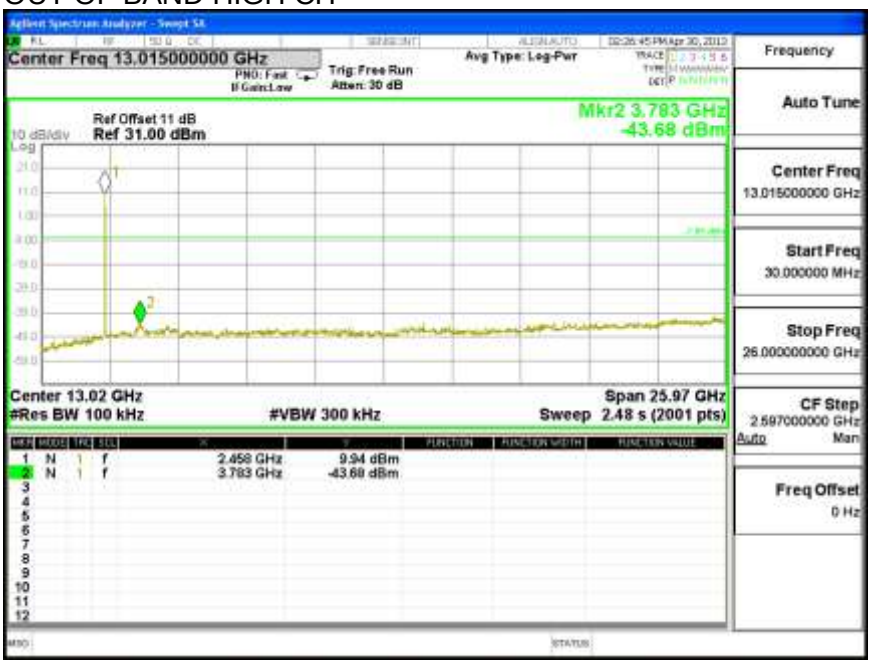
OUT OF BAND LOW CH



OUT OF BAND MID CH



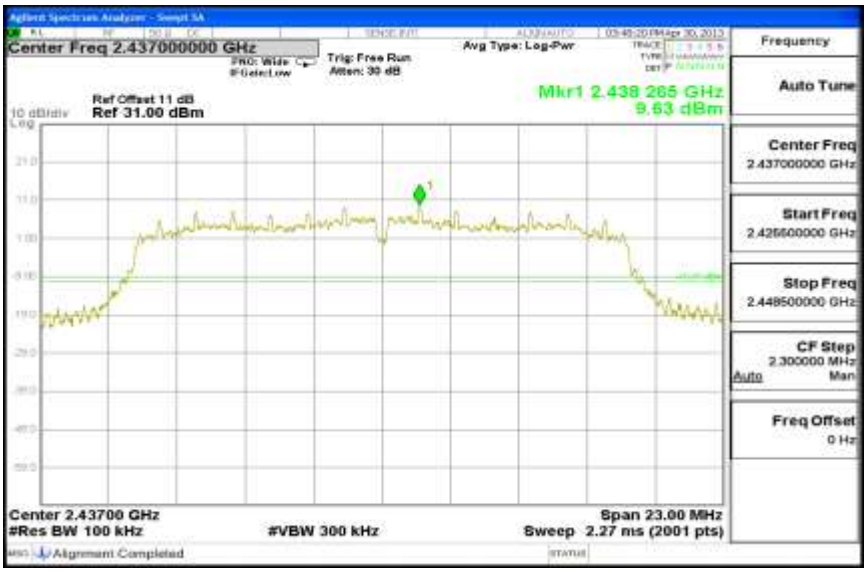
OUT OF BAND HIGH CH



G mode

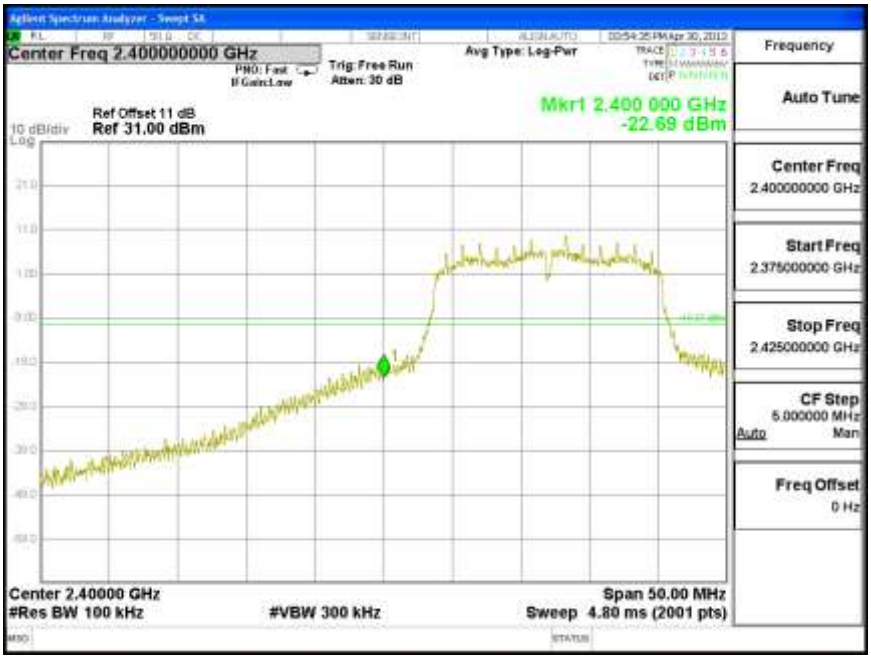
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



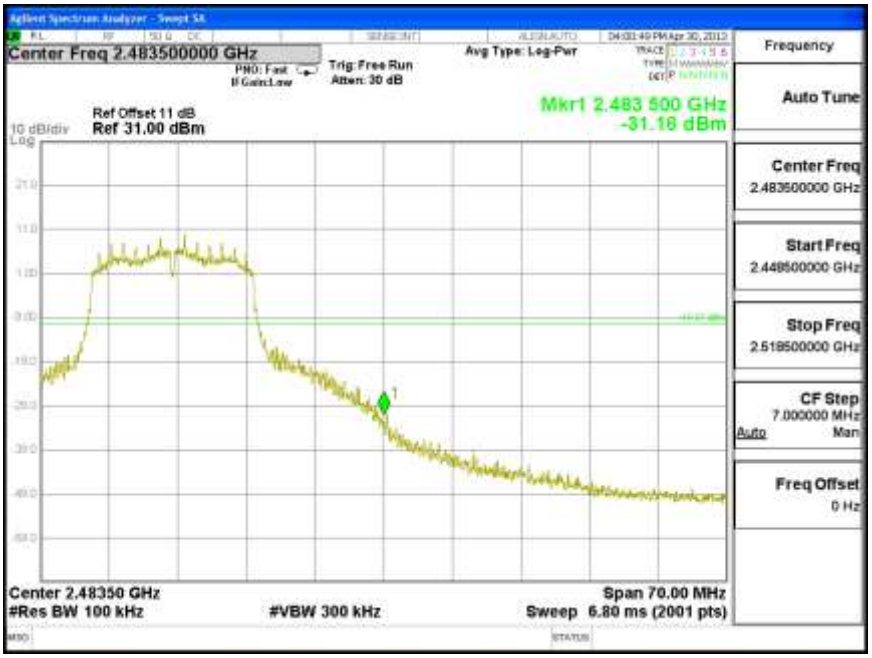
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



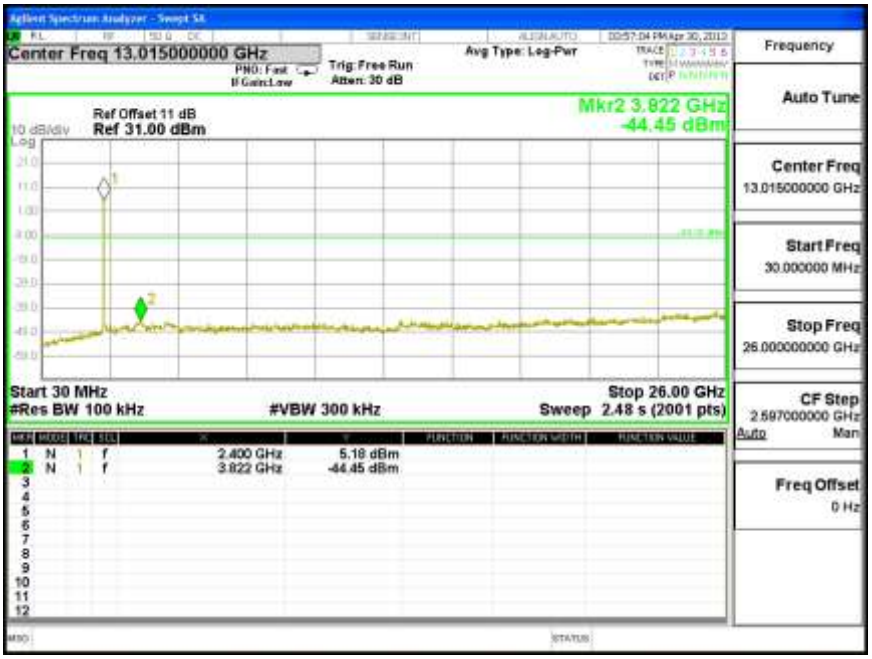
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

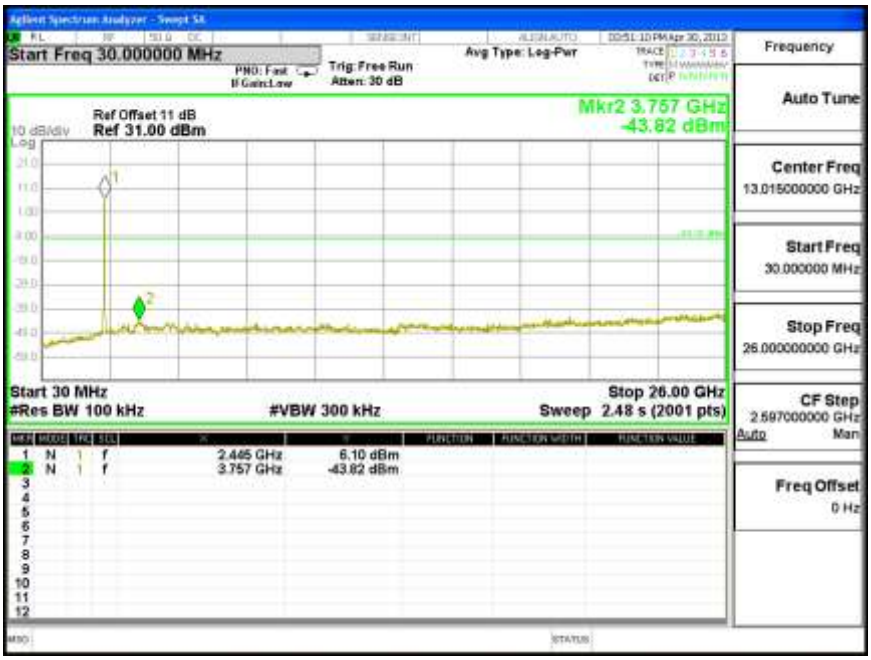


OUT-OF-BAND EMISSIONS

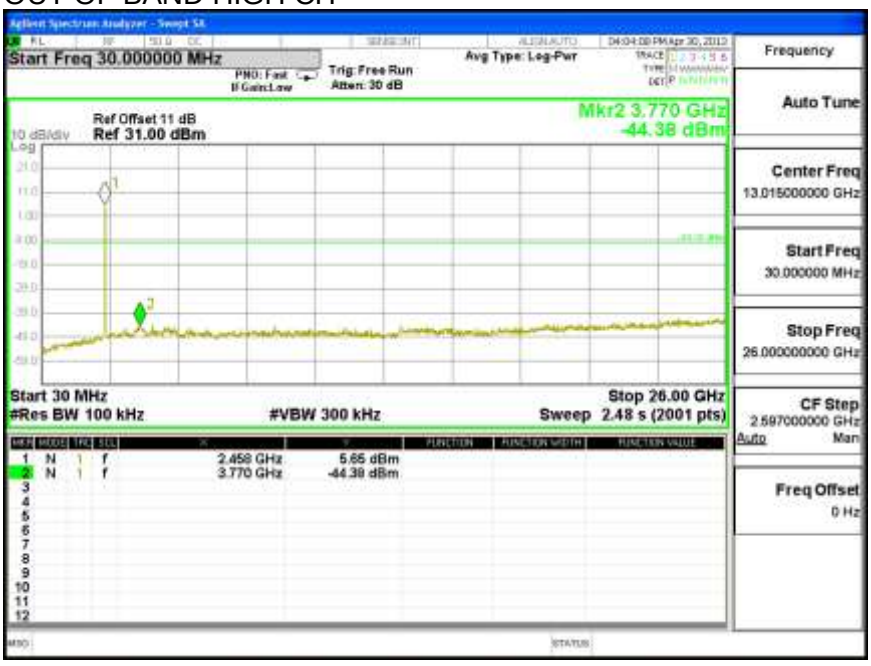
OUT OF BAND LOW CH



OUT OF BAND MID CH



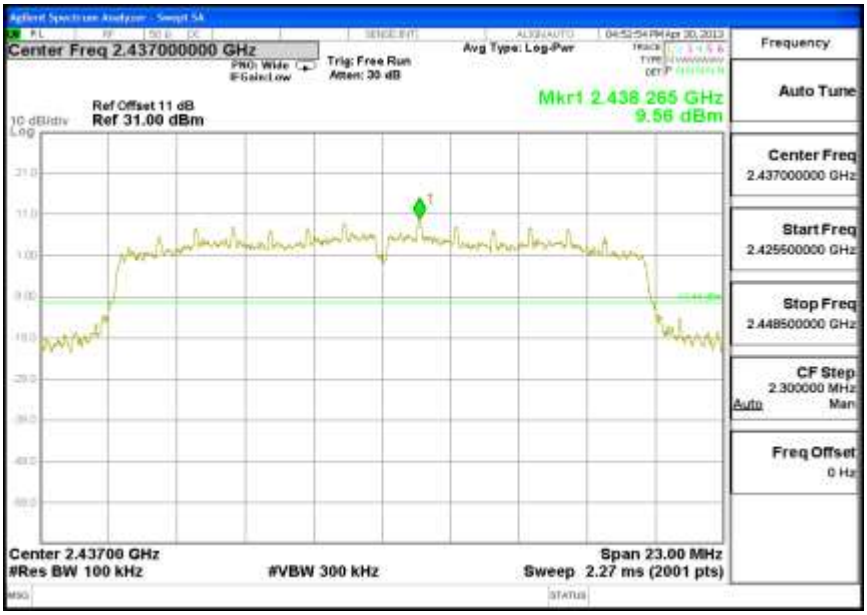
OUT OF BAND HIGH CH



HT20

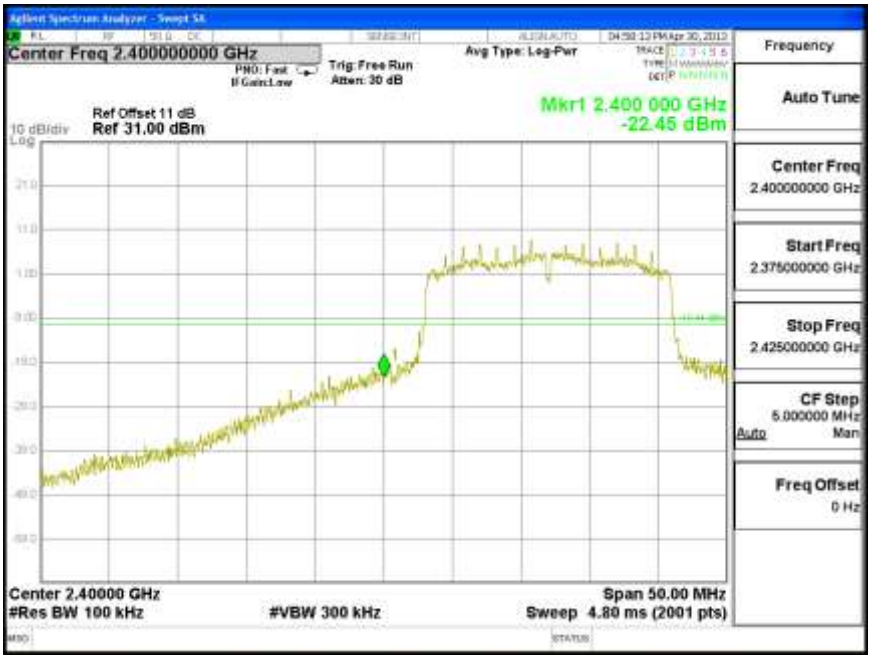
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



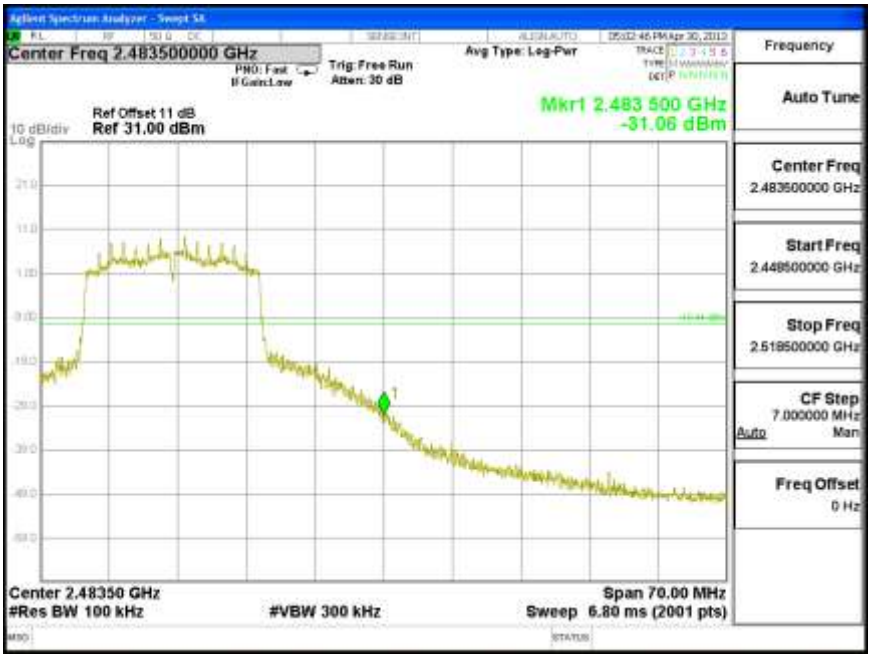
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



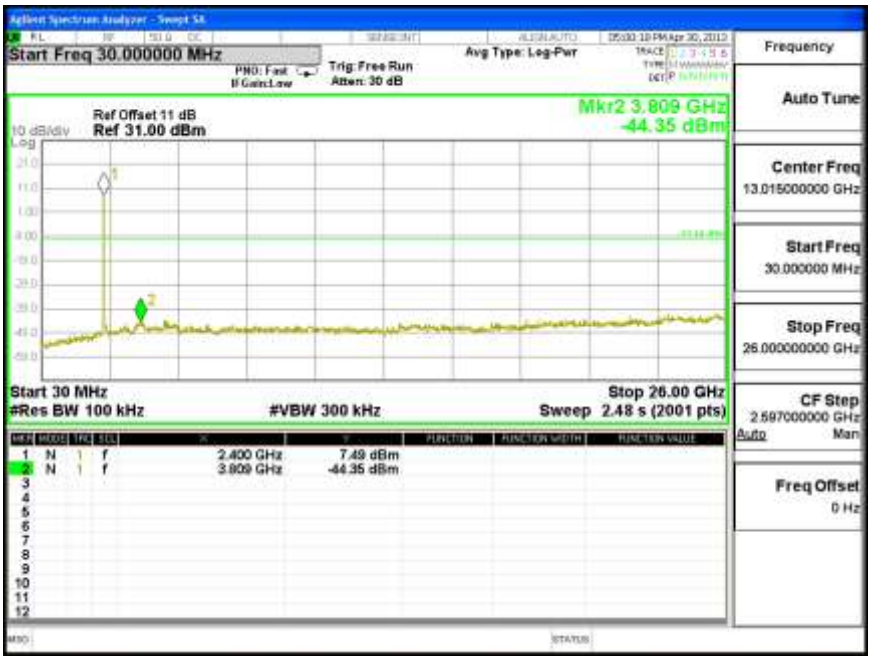
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

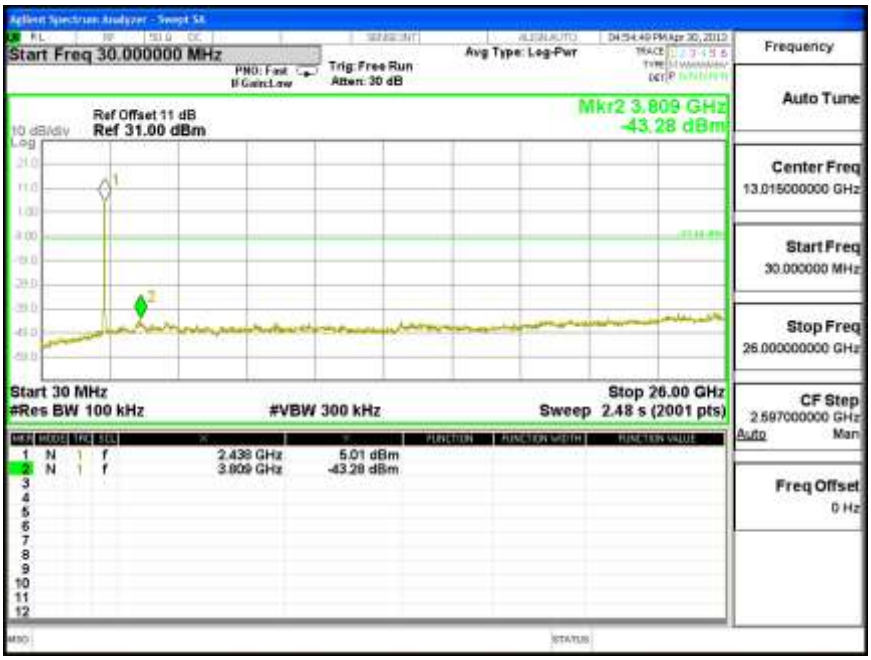


OUT-OF-BAND EMISSIONS

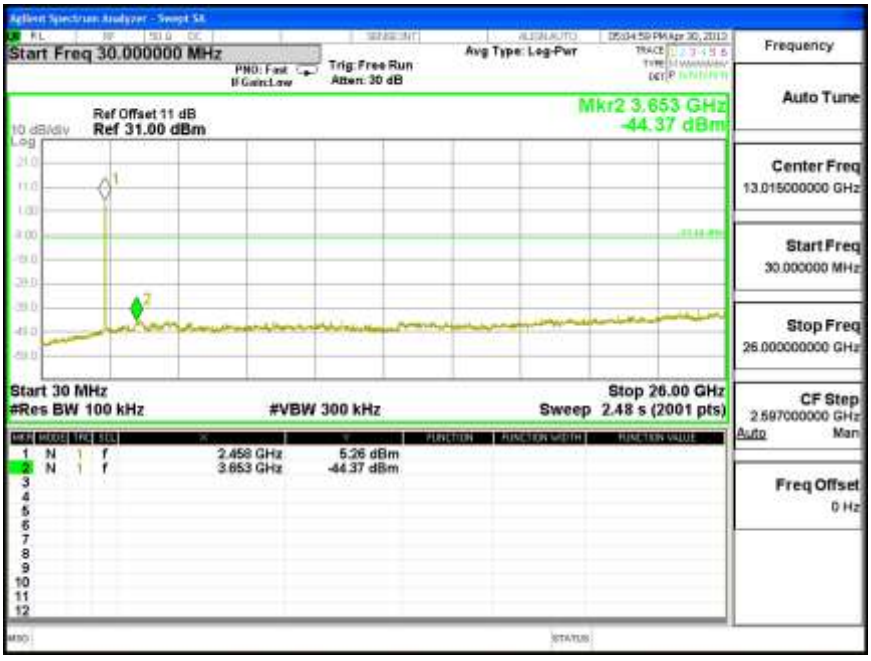
OUT OF BAND LOW CH



OUT OF BAND MID CH



OUT OF BAND HIGH CH



7.2. 5.8GHz BAND

7.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

KDB 558074 D01 v01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247".

RESULTS

a mode

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	15.144	0.5
Mid	5785	15.120	0.5
High	5825	15.144	0.5

HT20 Mode

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	15.168	0.5
Mid	5785	15.096	0.5
High	5825	15.096	0.5

HT40

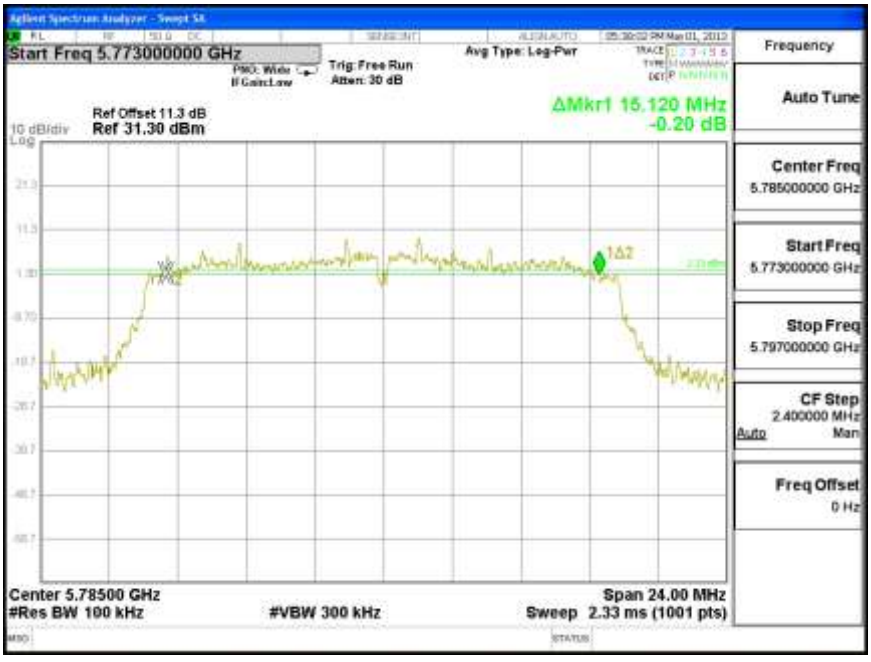
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	35.112	0.5
High	5795	35.112	0.5

a mode

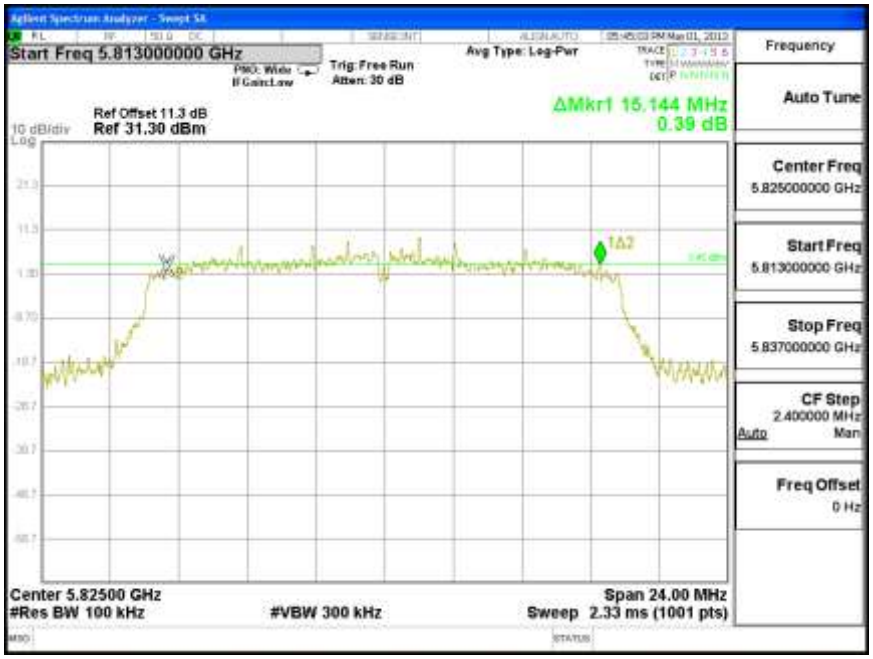
6 dB BANDWIDTH

6 dB BANDWIDTH LOW CH

6 dB BANDWIDTH MID CH



6 dB BANDWIDTH HIGH CH



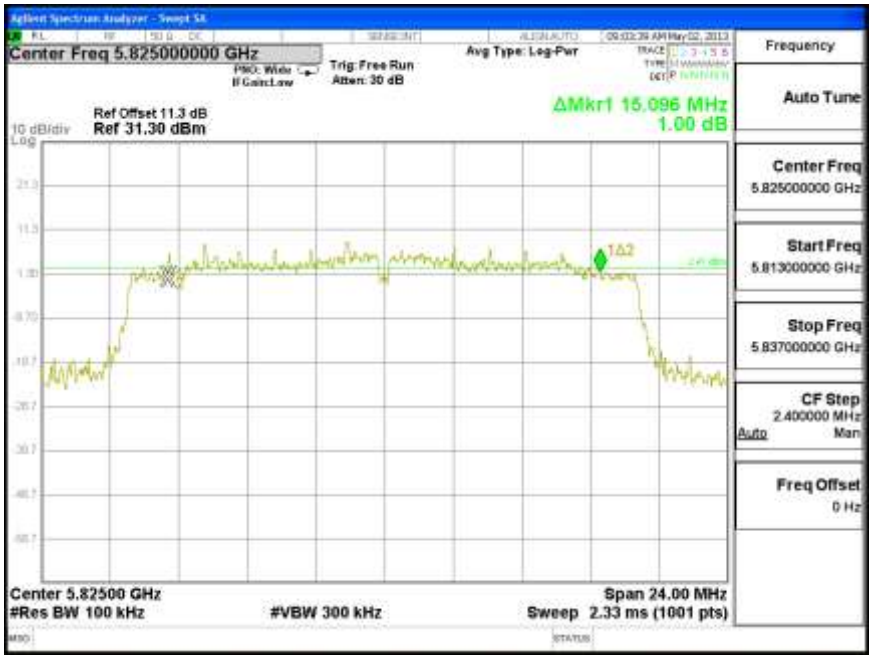
HT20

6 dB BANDWIDTH

6 dB BANDWIDTH LOW CH

6 dB BANDWIDTH MID CH

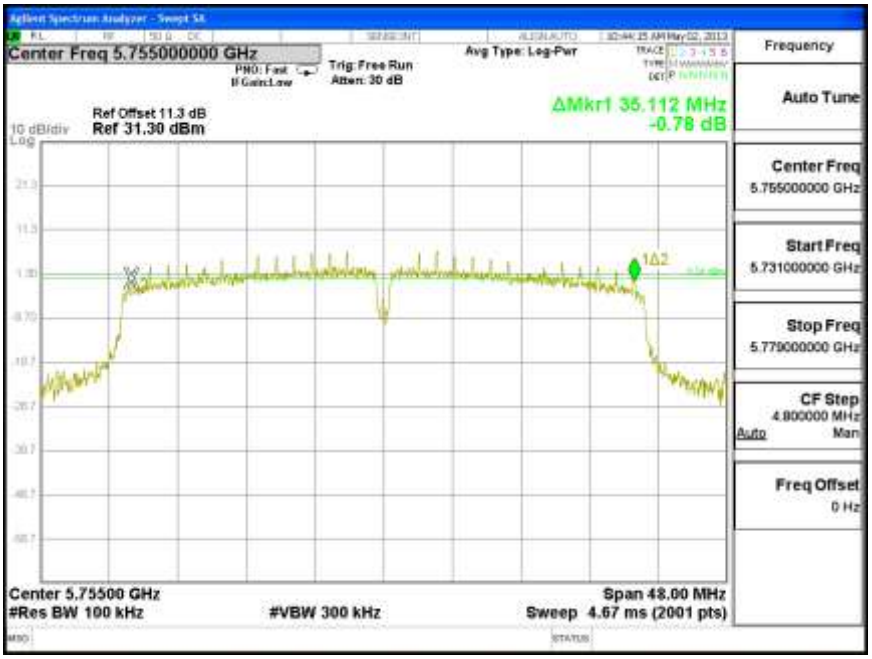
6 dB BANDWIDTH HIGH CH



HT40

6 dB BANDWIDTH

6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH HIGH CH

7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

a mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.3380
Mid	5785	16.4100
High	5825	16.4550

HT20

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.6220
Mid	5785	17.6570
High	5825	17.6440

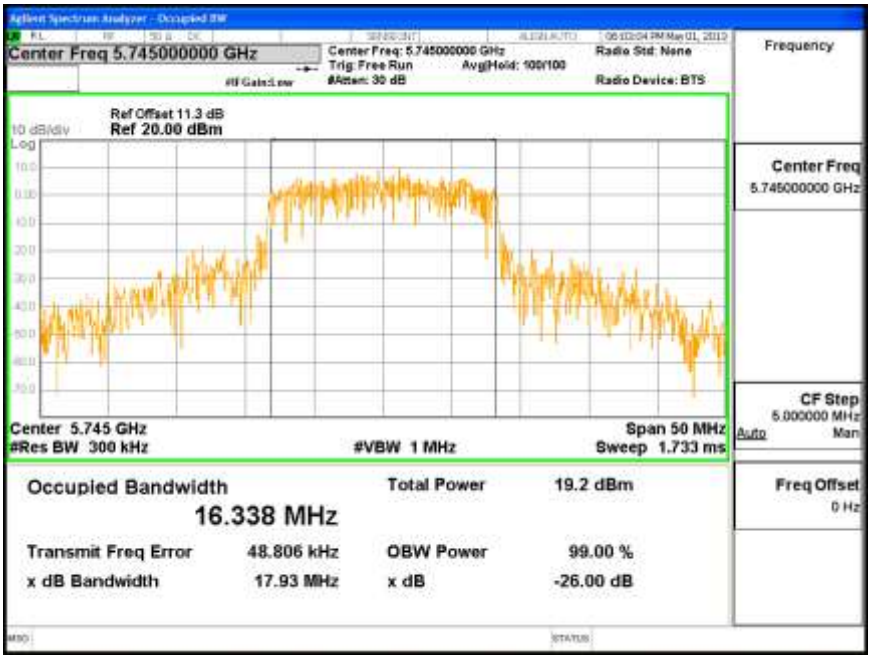
HT40

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.1210
High	5795	36.1840

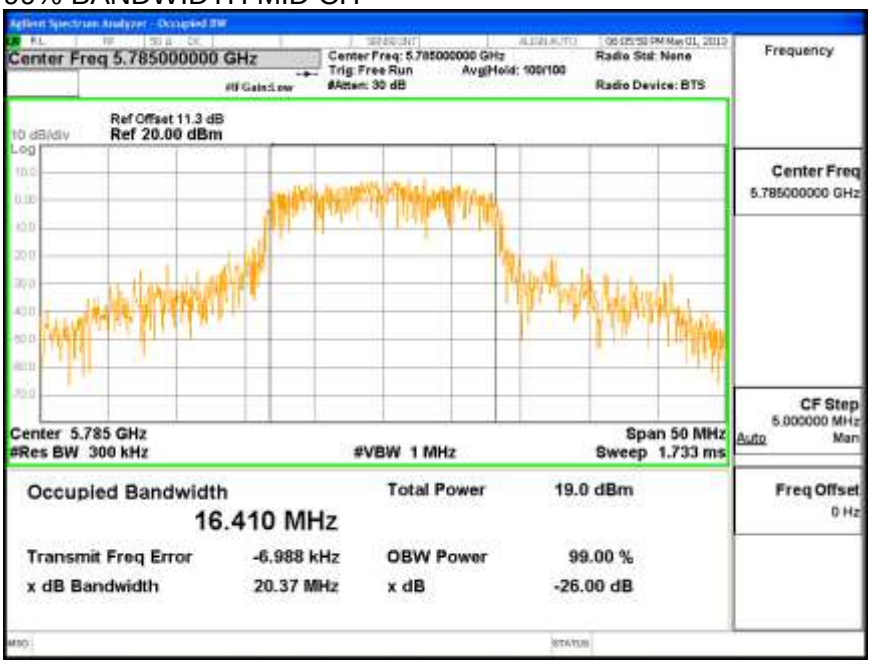
a mode

99% BANDWIDTH

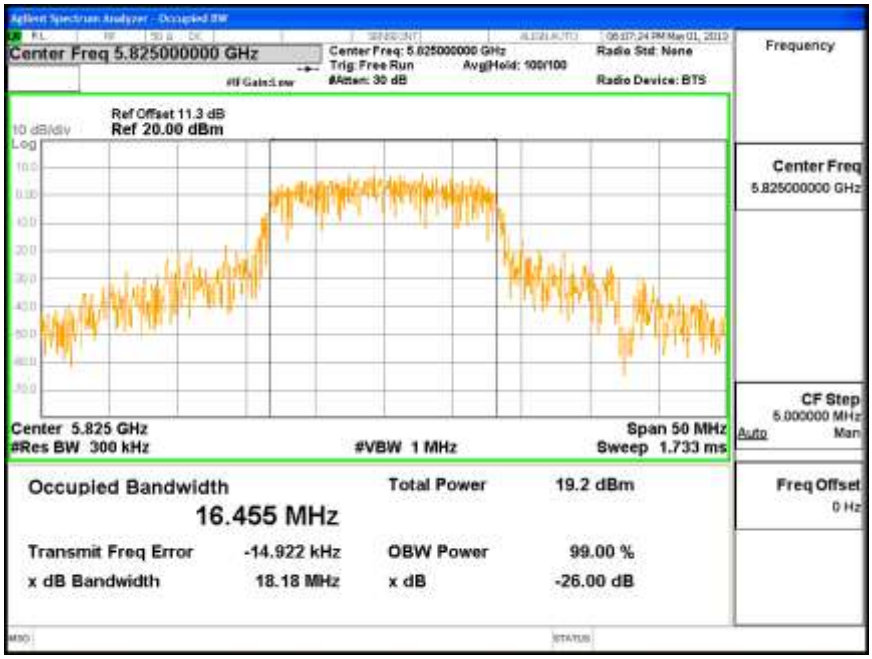
99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH



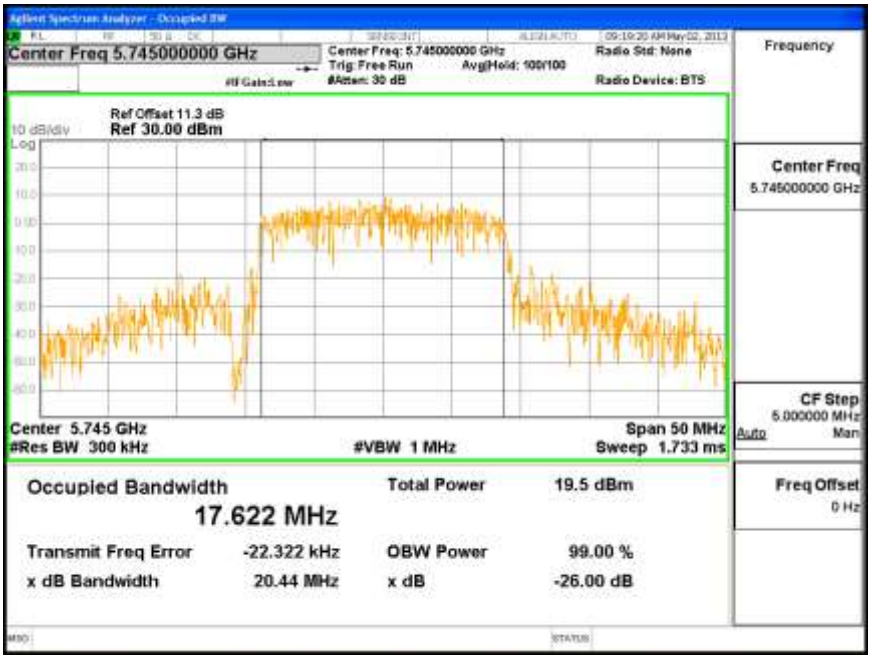
99% BANDWIDTH HIGH CH



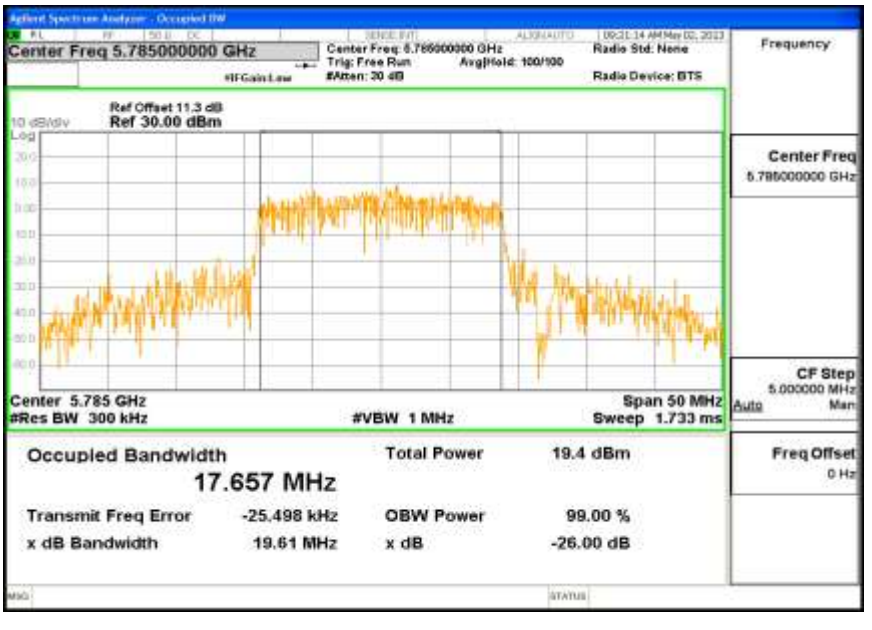
HT20

99% BANDWIDTH

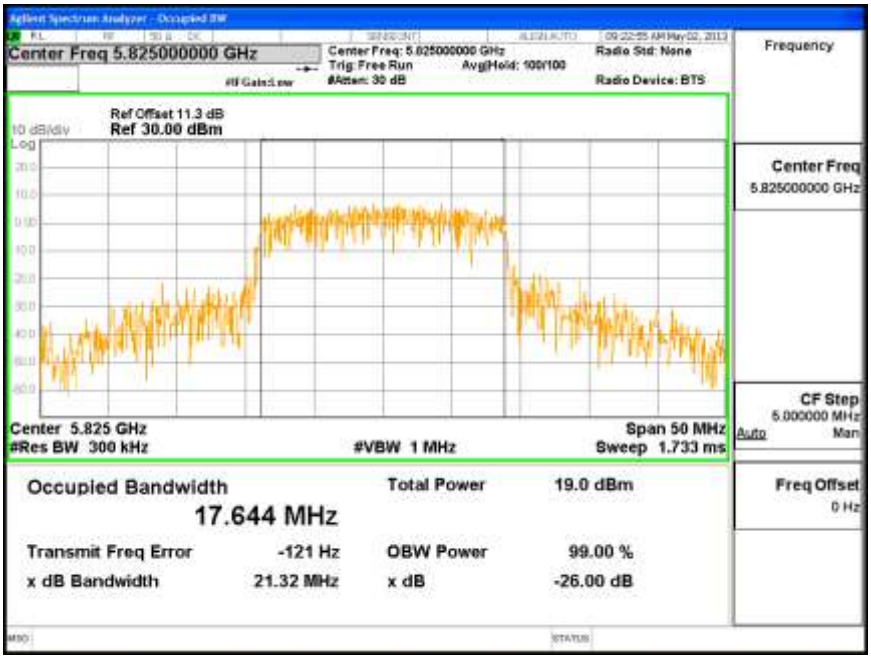
99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH



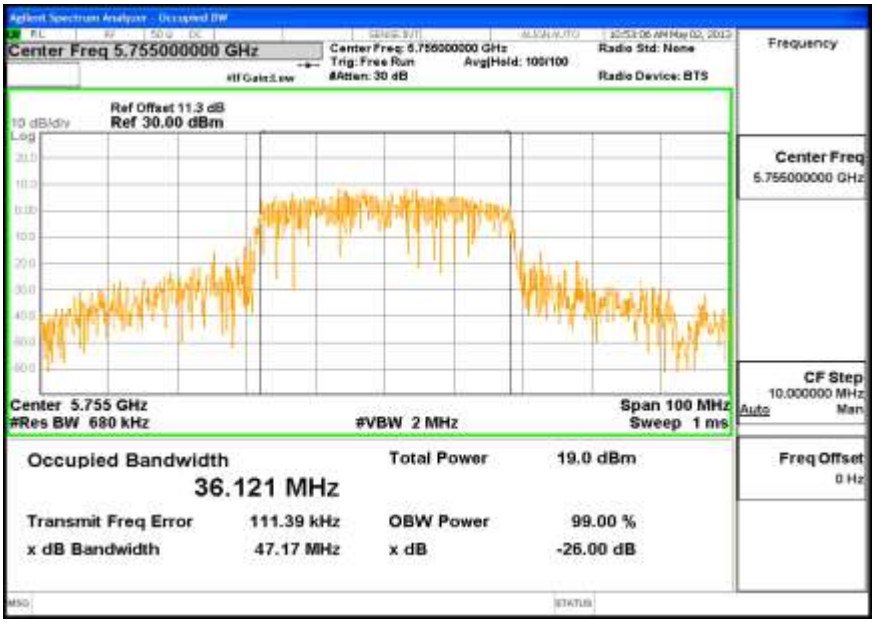
99% BANDWIDTH HIGH CH



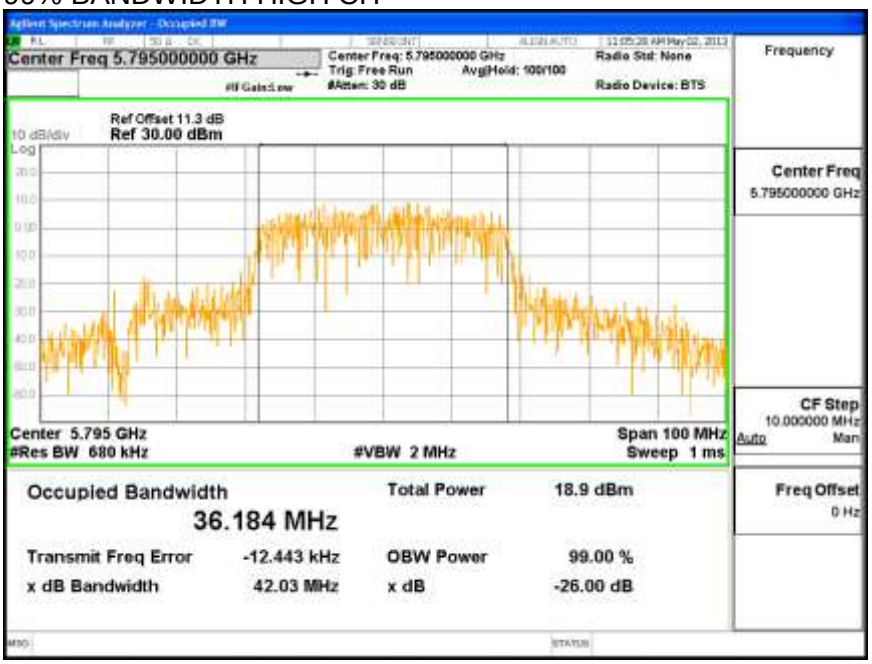
HT40

99% BANDWIDTH

99% BANDWIDTH LOW CH



99% BANDWIDTH HIGH CH



7.2.3. AVERAGE POWER

LIMITS

Note; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

a mode

Channel	Frequency (MHz)	Power (dBm)
Low	5745	15.17
Mid	5785	15.14
High	5825	15.08

HT20

Channel	Frequency (MHz)	Power (dBm)
Low	5745	15.14
Mid	5785	15.03
High	5825	14.99

HT40

Channel	Frequency (MHz)	Power (dBm)
Low	5755	15.09
High	5795	15.00

7.2.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

a mode

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5745	-4.21	30.00	30	36	30.00
Mid	5785	-4.21	30.00	30	36	30.00
High	5825	-4.21	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5745	22.615	22.615	30.00	-7.39
Mid	5785	22.435	22.435	30.00	-7.57
High	5825	22.210	22.210	30.00	-7.79

HT20

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5745	-4.21	30.00	30	36	30.00
Mid	5785	-4.21	30.00	30	36	30.00
High	5825	-4.21	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5745	22.673	22.673	30.00	-7.33
Mid	5785	22.209	22.209	30.00	-7.79
High	5825	22.215	22.215	30.00	-7.79

HT40

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5755	-4.21	30.00	30	36	30.00
High	5795	-4.21	30.00	30	36	30.00

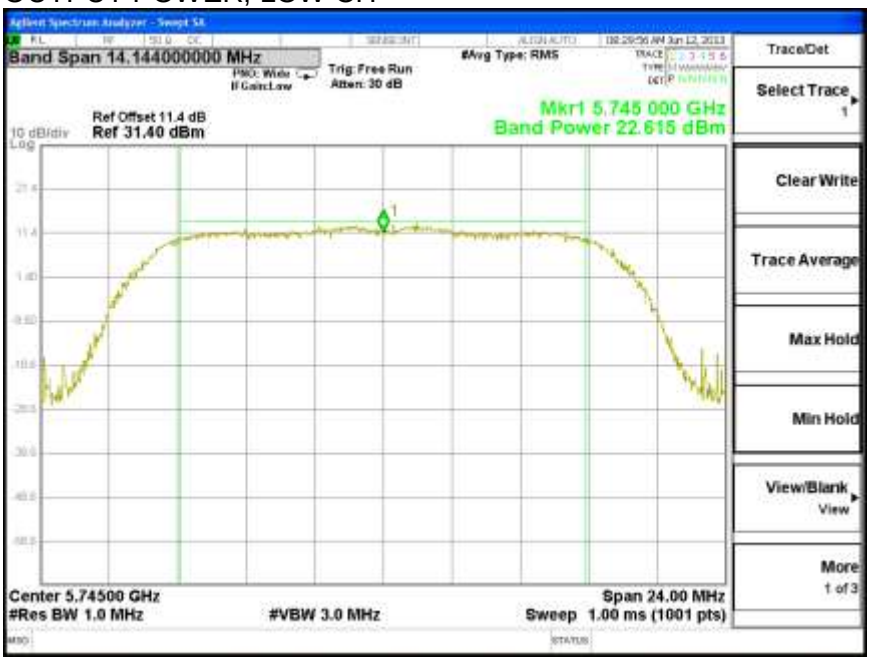
Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5755	22.600	22.60	30.00	-7.40
High	5795	22.555	22.56	30.00	-7.44

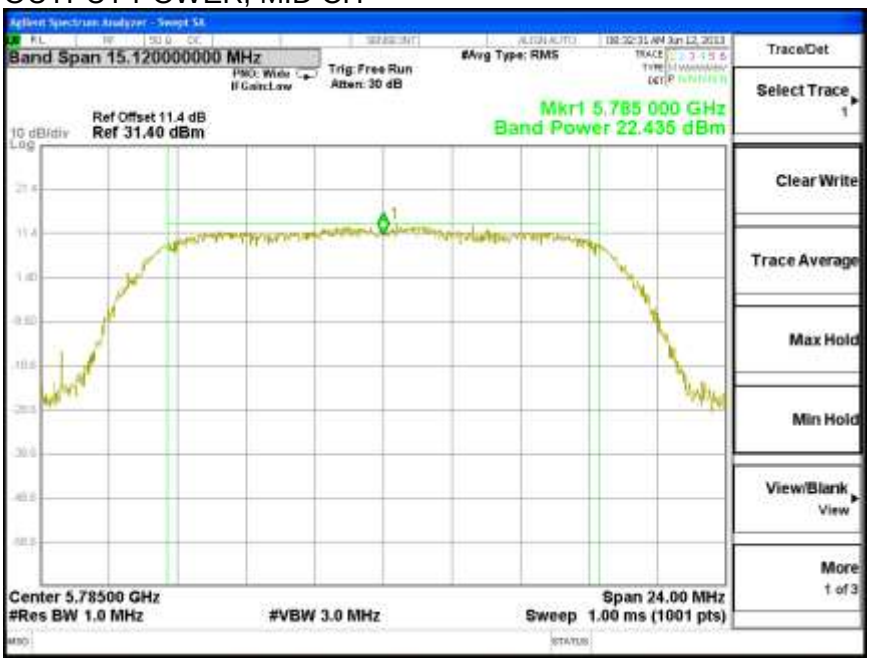
a mode

OUTPUT POWER

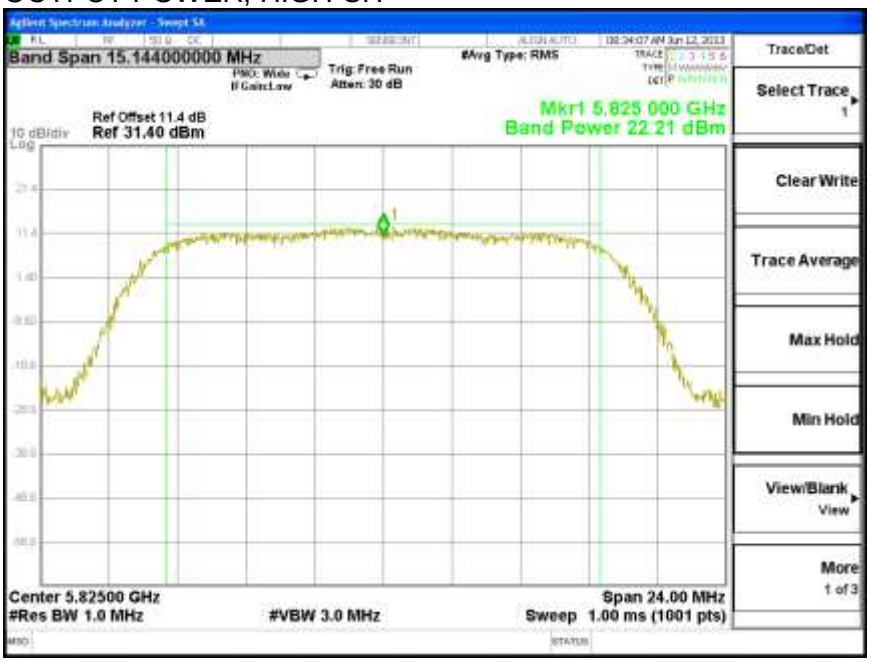
OUTPUT POWER, LOW CH



OUTPUT POWER, MID CH



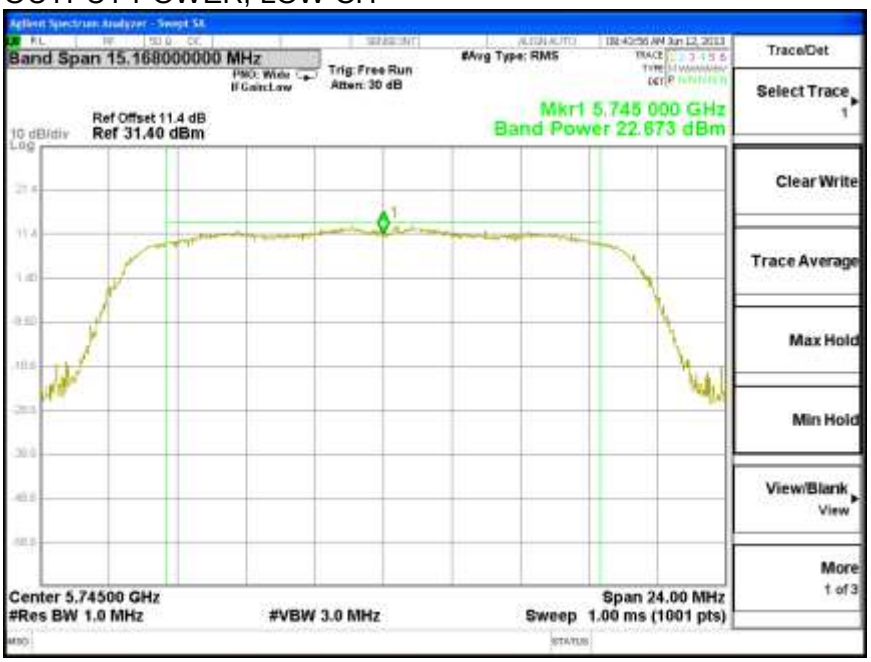
OUTPUT POWER, HIGH CH



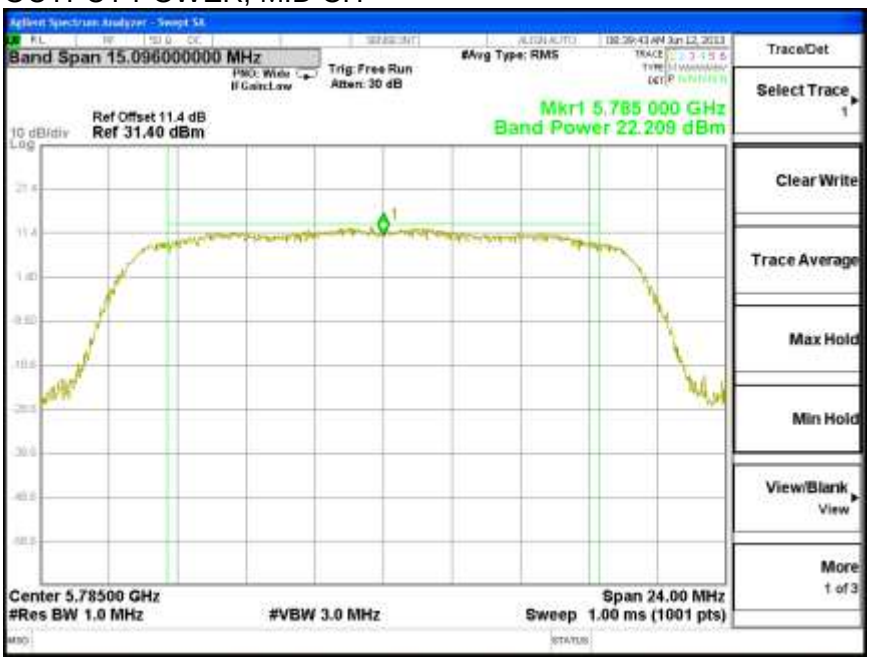
HT20

OUTPUT POWER

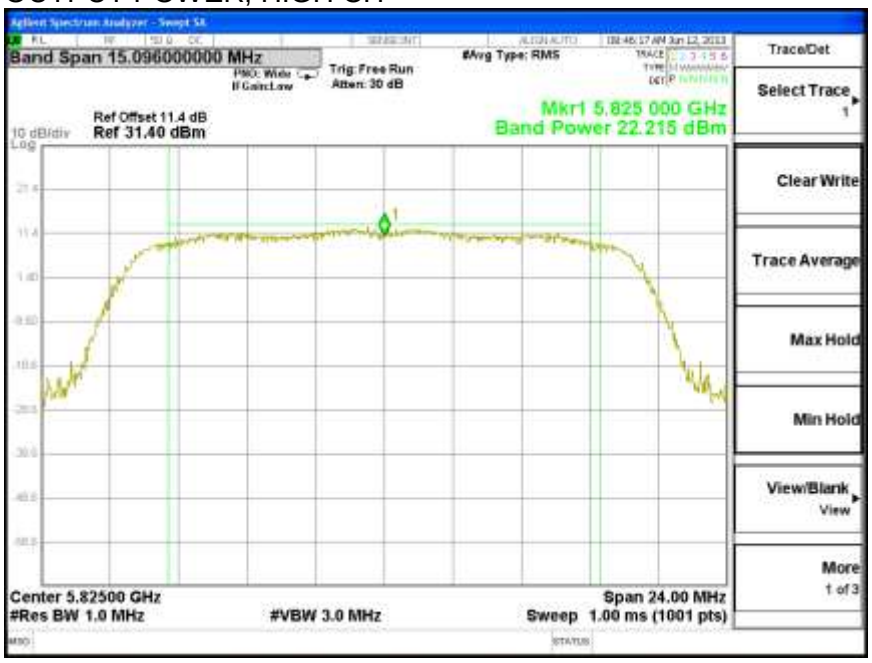
OUTPUT POWER, LOW CH



OUTPUT POWER, MID CH



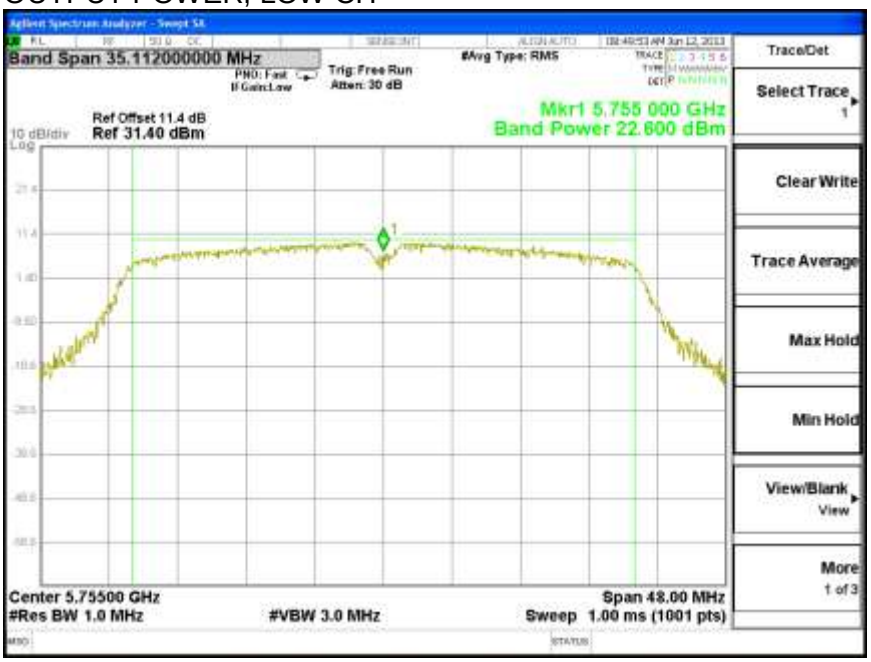
OUTPUT POWER, HIGH CH



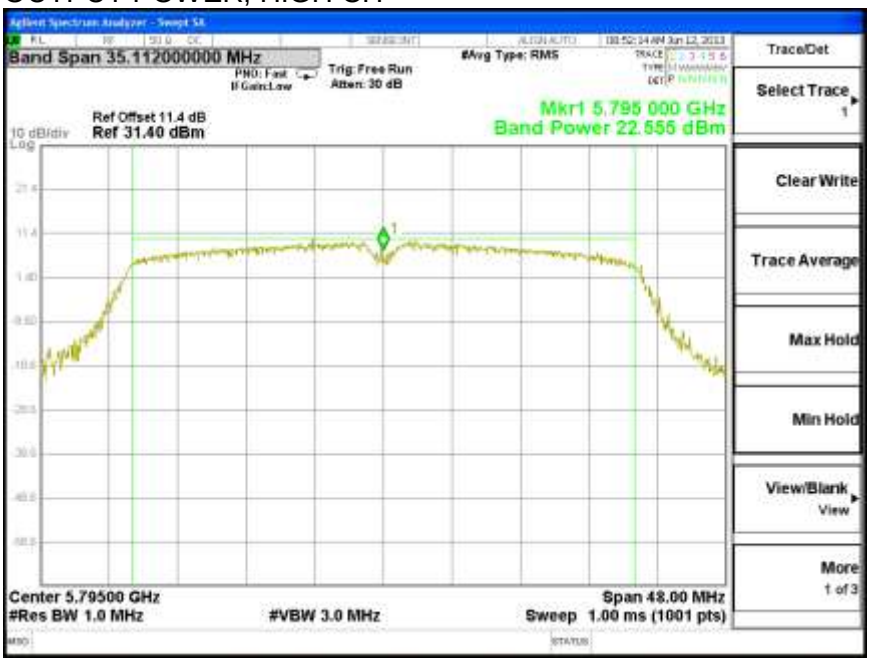
HT40

OUTPUT POWER

OUTPUT POWER, LOW CH



OUTPUT POWER, HIGH CH



7.2.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

a mode

PSD Results

Channel	Frequency (MHz)	Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-5.60	8.0	-13.6
Mid	5785	-5.46	8.0	-13.5
High	5825	-4.93	8.0	-12.9

HT20

PSD Results

Channel	Frequency (MHz)	Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-5.39	8.0	-13.4
Mid	5785	-5.76	8.0	-13.8
High	5825	-5.59	8.0	-13.6

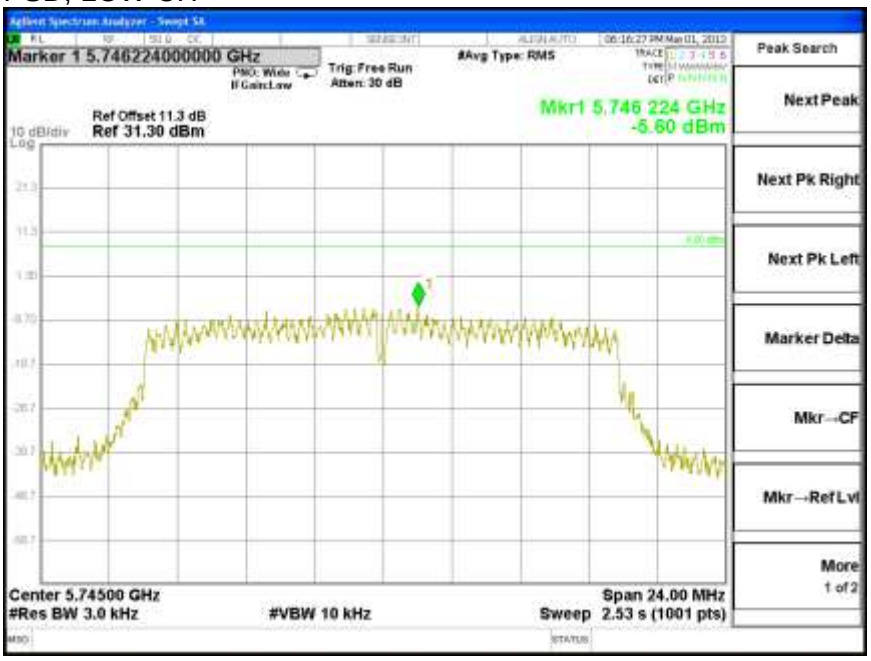
HT40

PSD Results

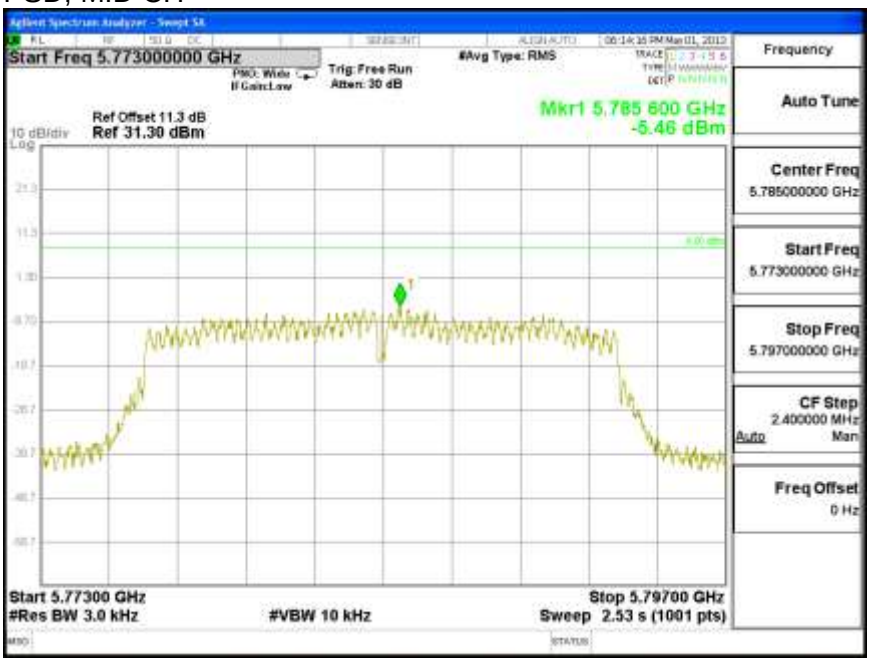
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-8.64	8.0	-16.6
High	5795	-9.04	8.0	-17.0

a mode, PSD

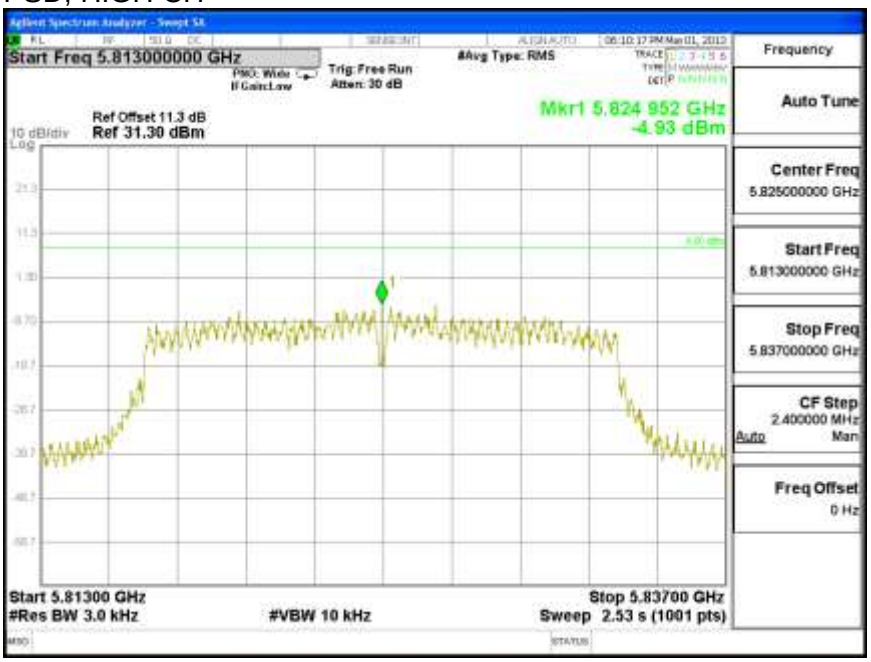
PSD, LOW CH



PSD, MID CH

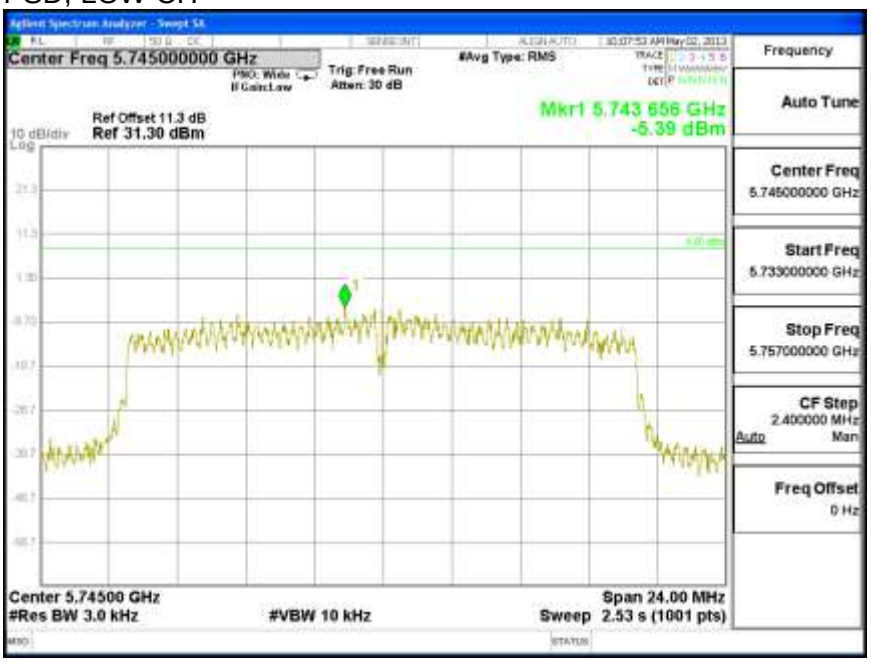


PSD, HIGH CH

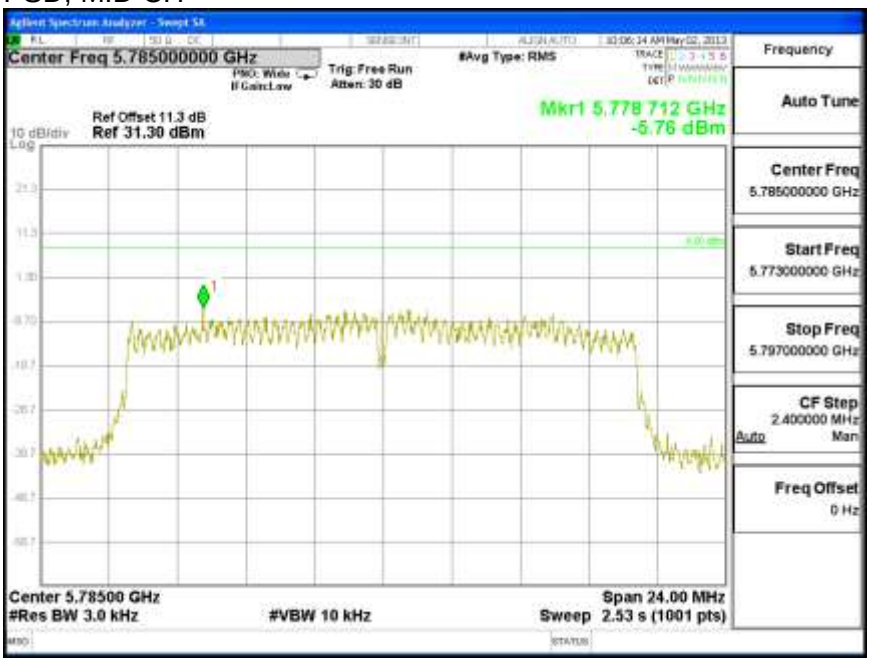


HT20, PSD

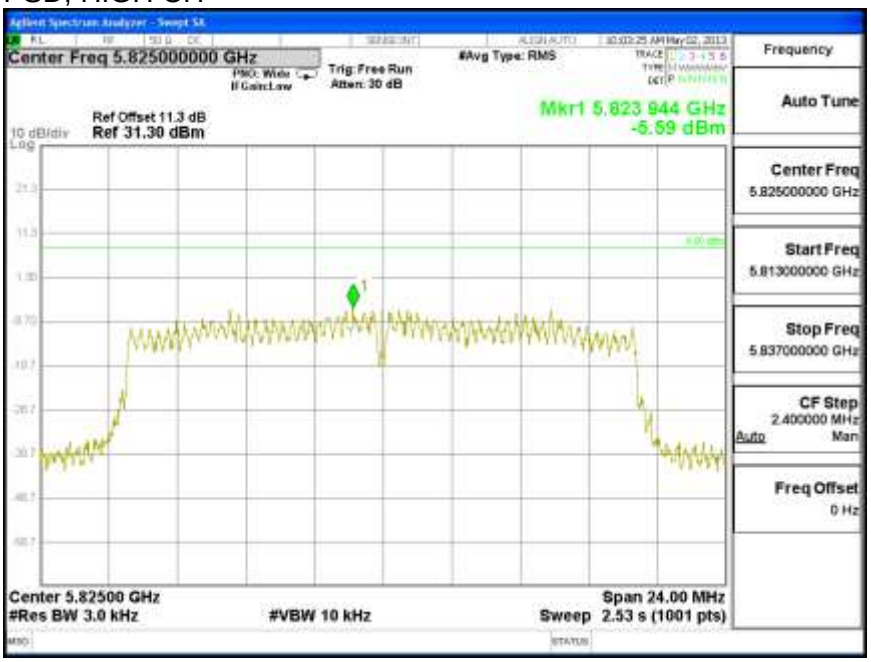
PSD, LOW CH



PSD, MID CH

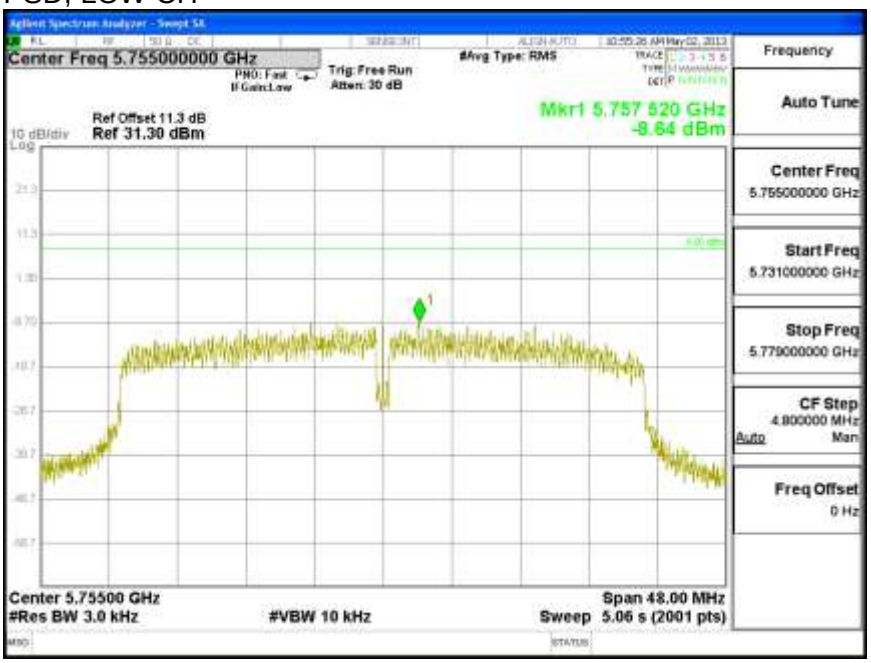


PSD, HIGH CH

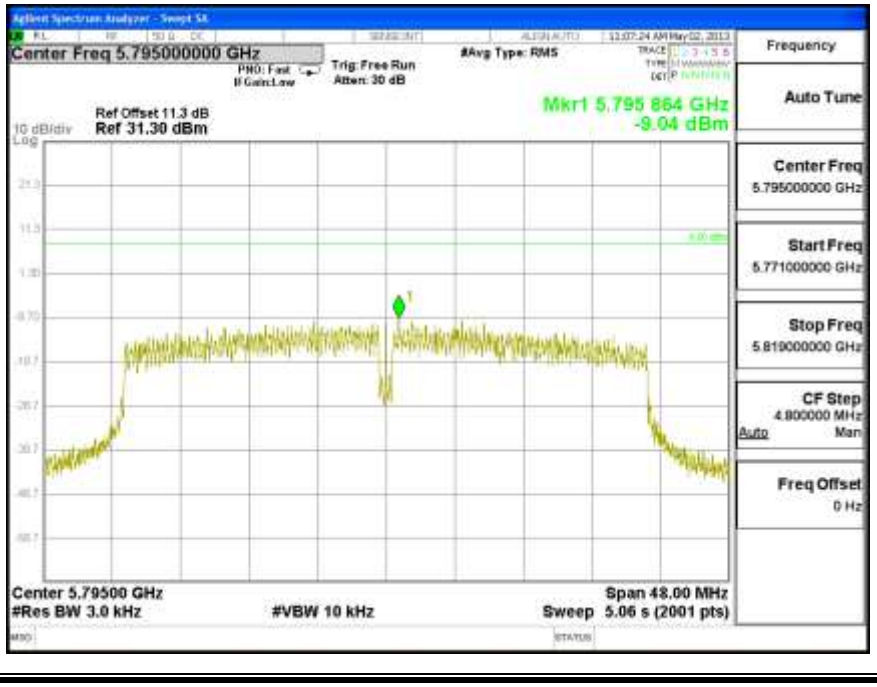


HT40, PSD

PSD, LOW CH



PSD HIGH CH



7.2.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

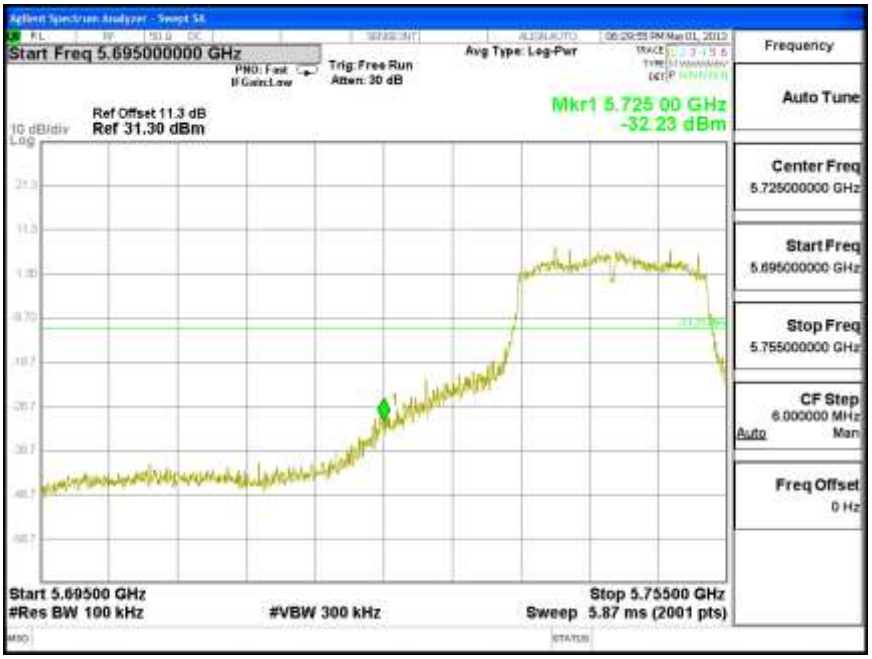
RESULTS

a mode, IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH

LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH

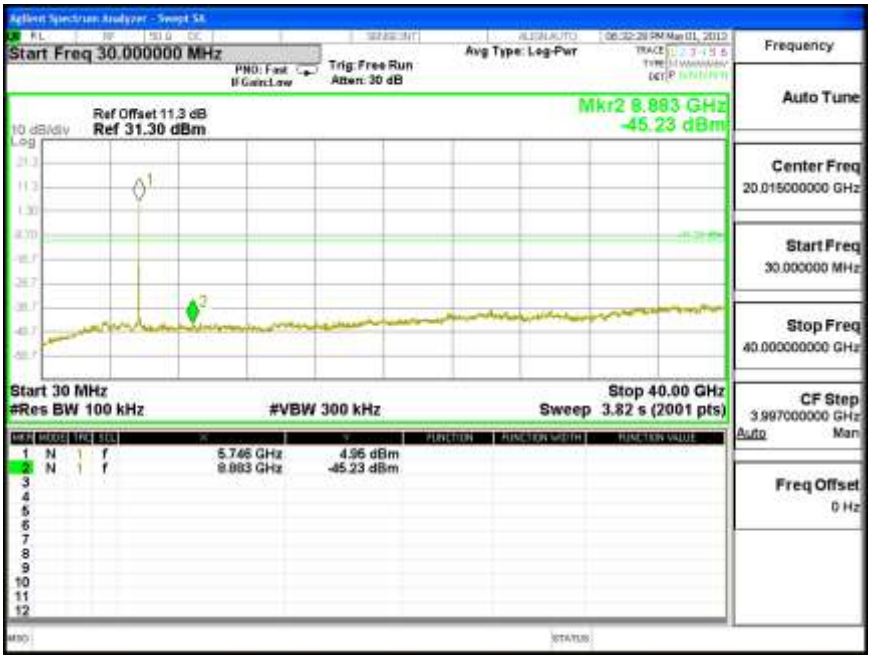


HIGH CHANNEL BANDEDGE

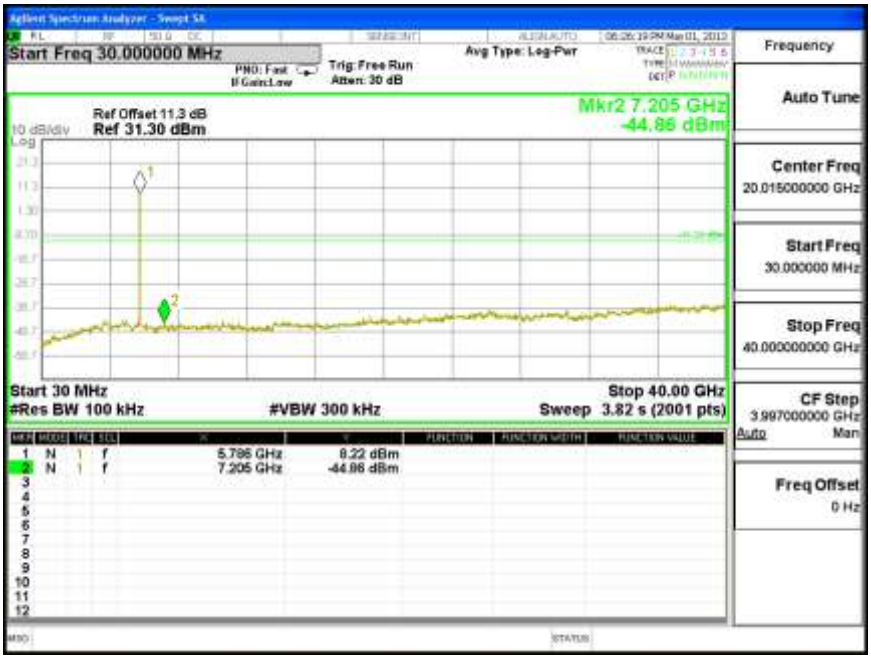
AUTHORIZED BAND EDGE HIGH CH

a mode, OUT-OF-BAND EMISSIONS

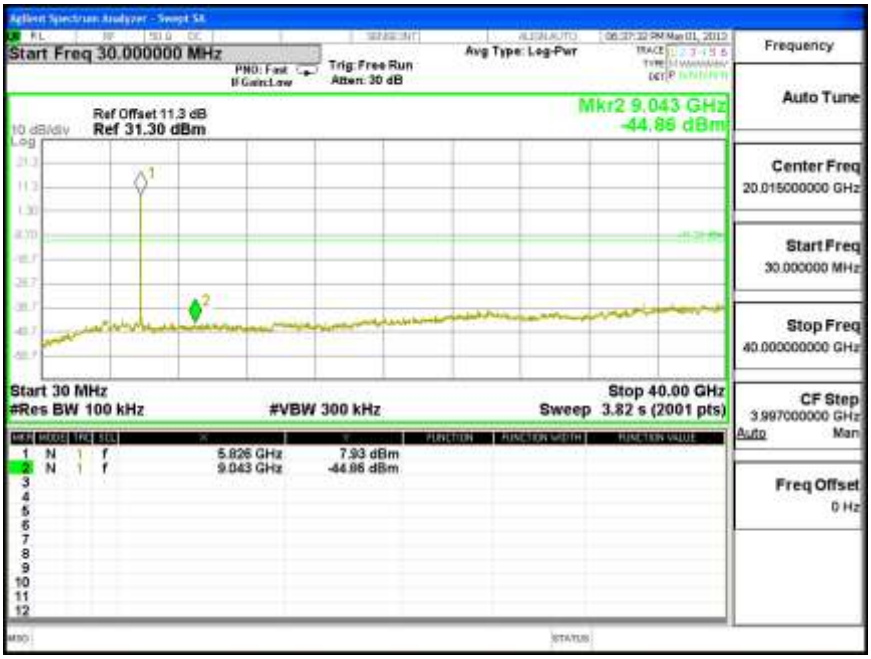
OUT OF BAND LOW CH



OUT OF BAND MID CH



OUT OF BAND HIGH CH

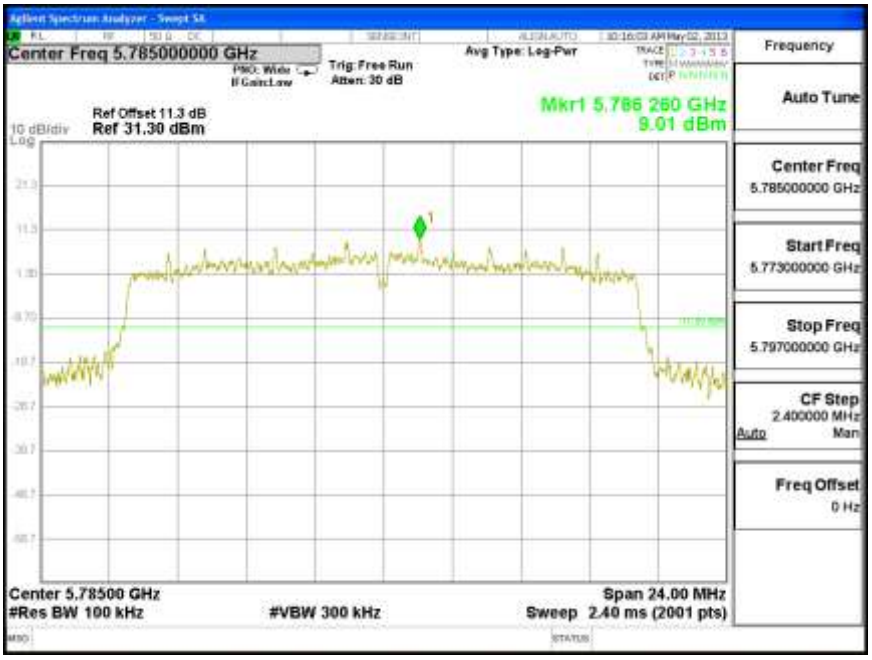


HT20

RESULTS

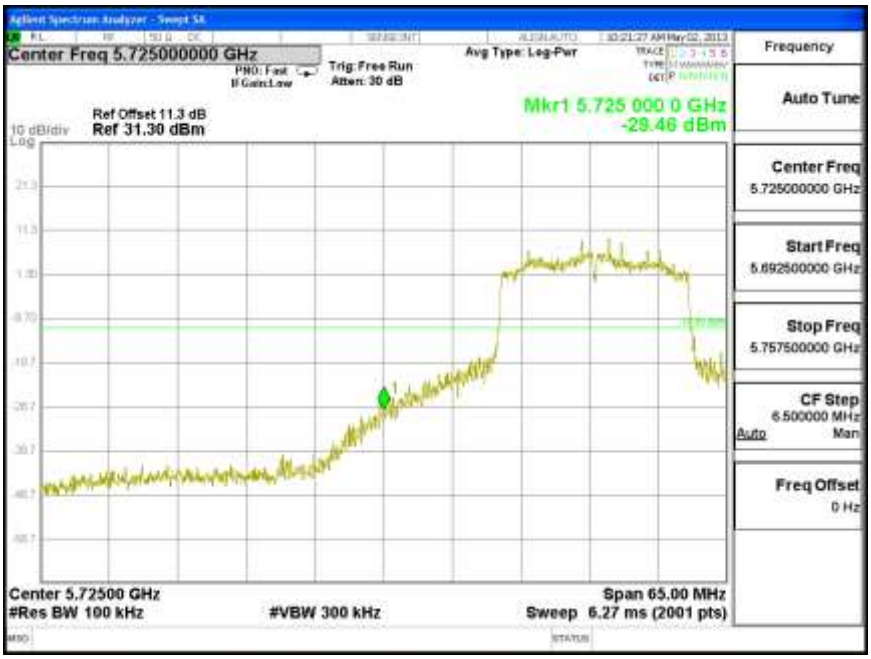
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



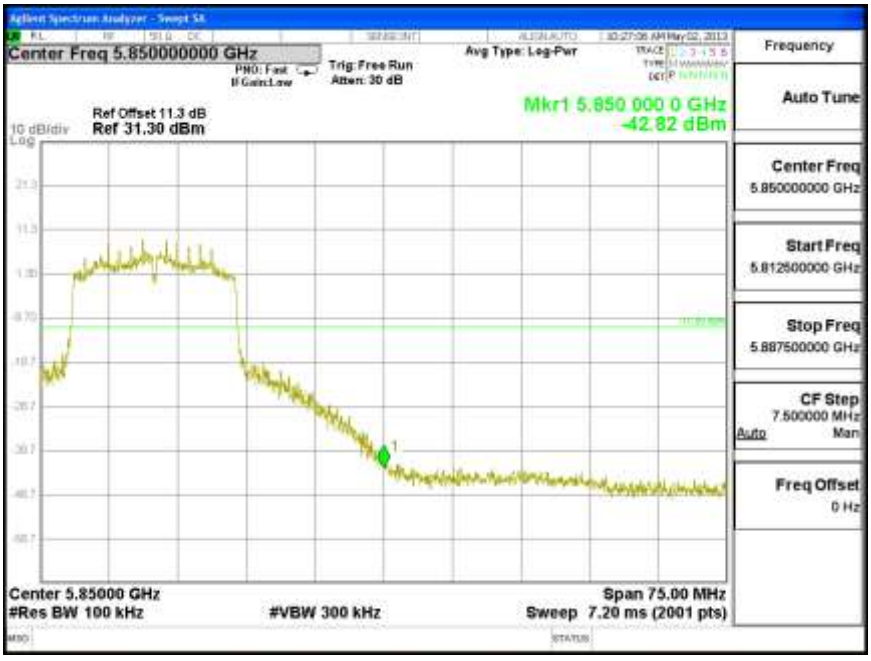
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



HIGH CHANNEL BANDEDGE

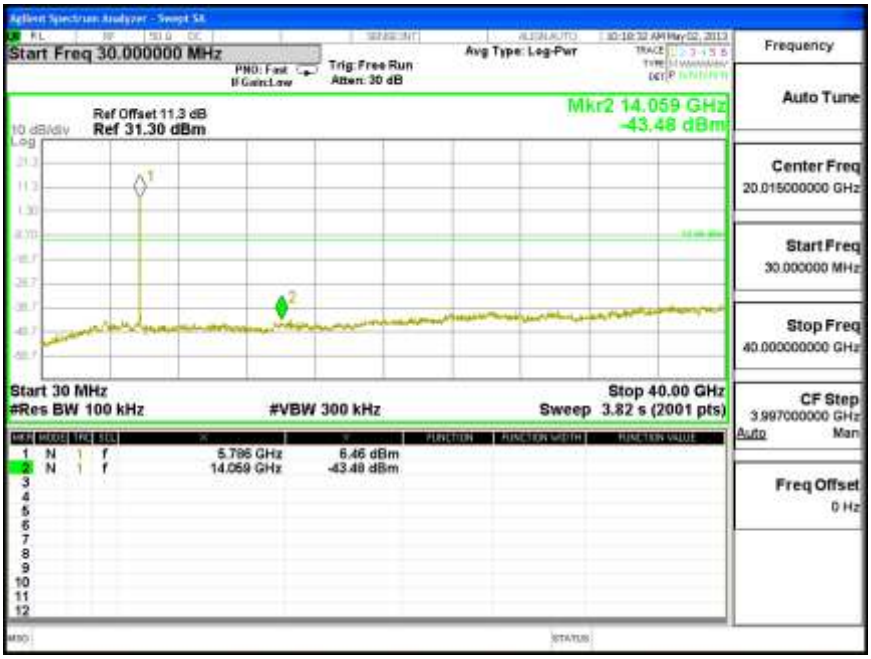
AUTHORIZED BAND EDGE HIGH CH



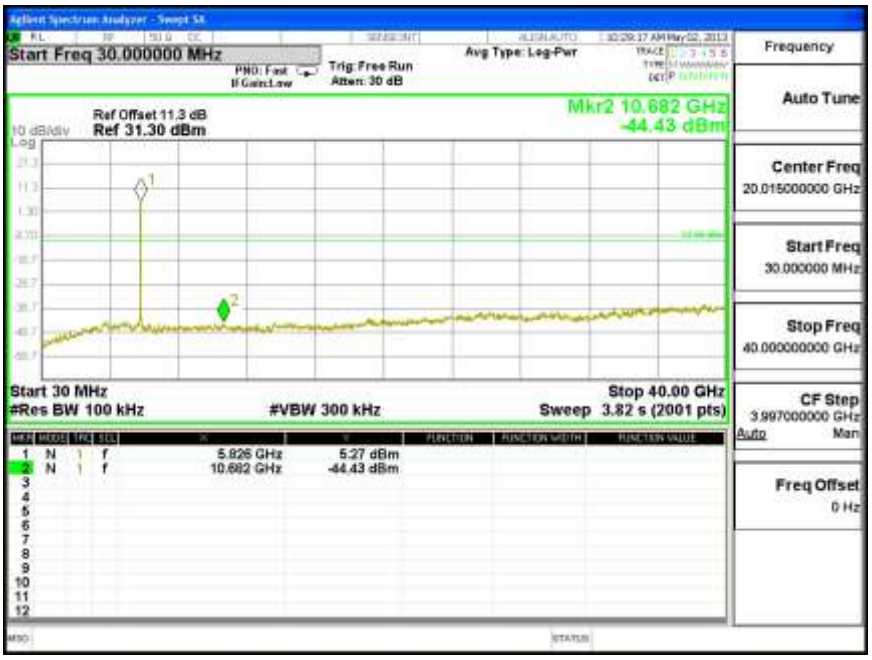
OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH

OUT OF BAND MID CH



OUT OF BAND HIGH CH

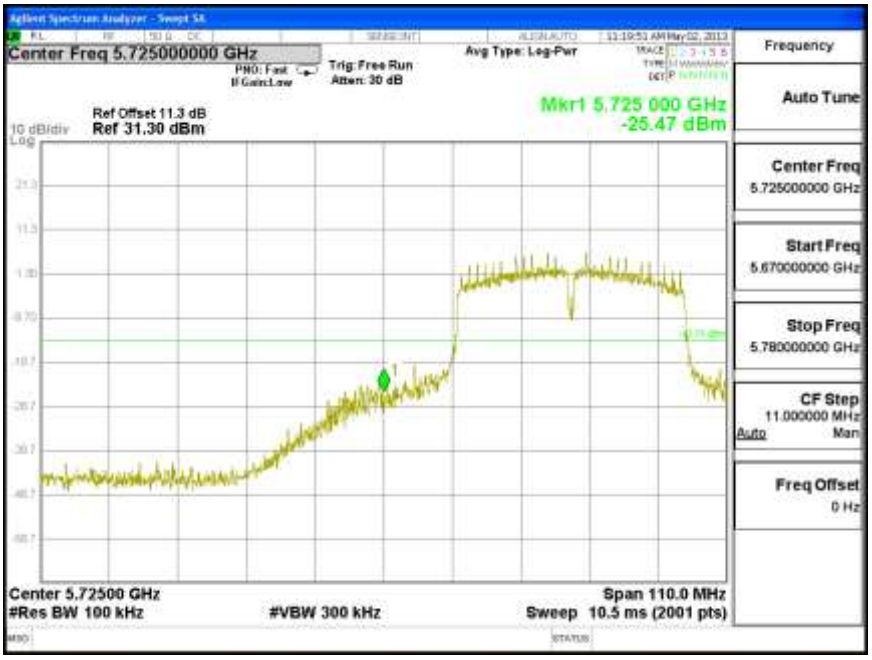


HT40

RESULTS

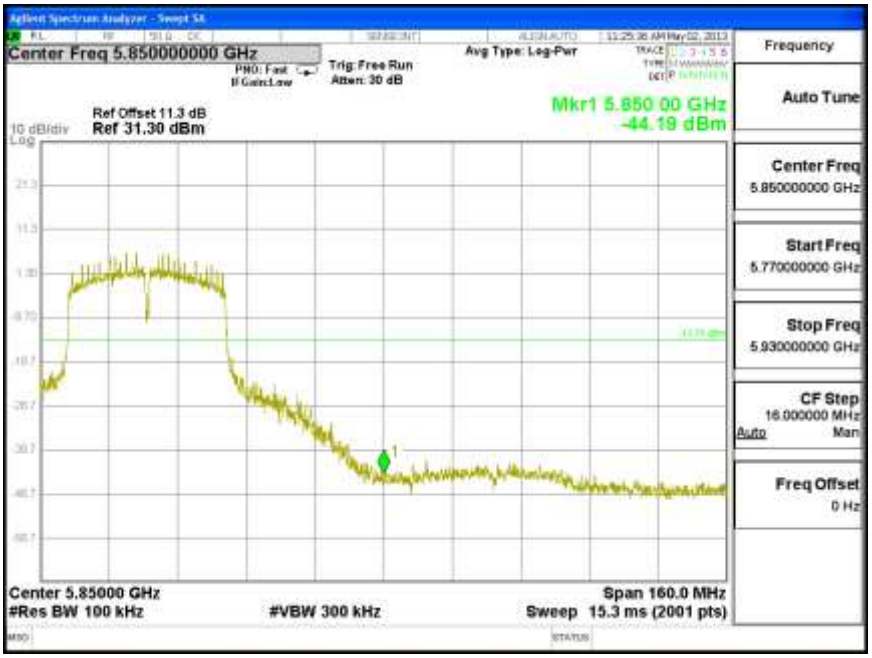
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



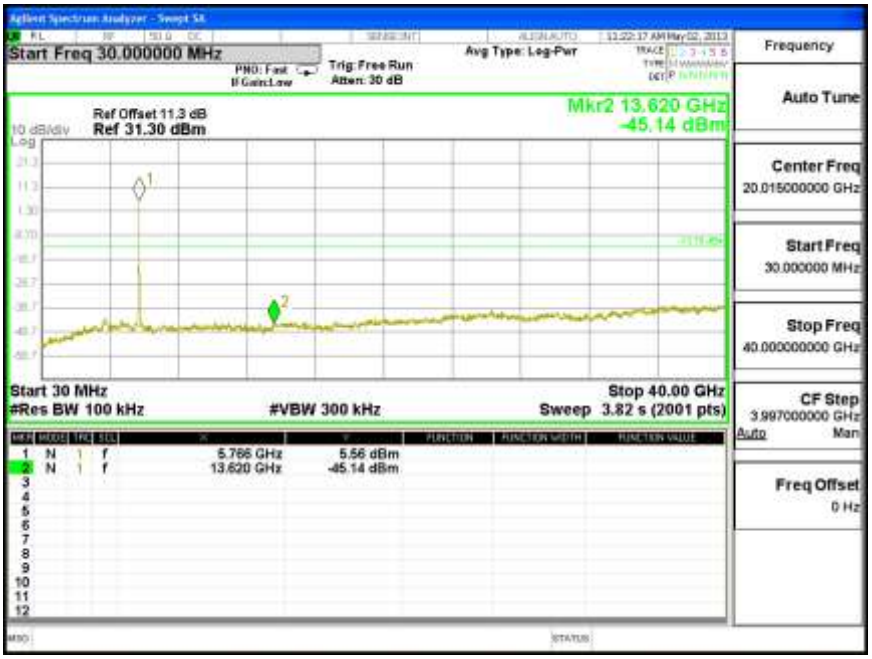
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

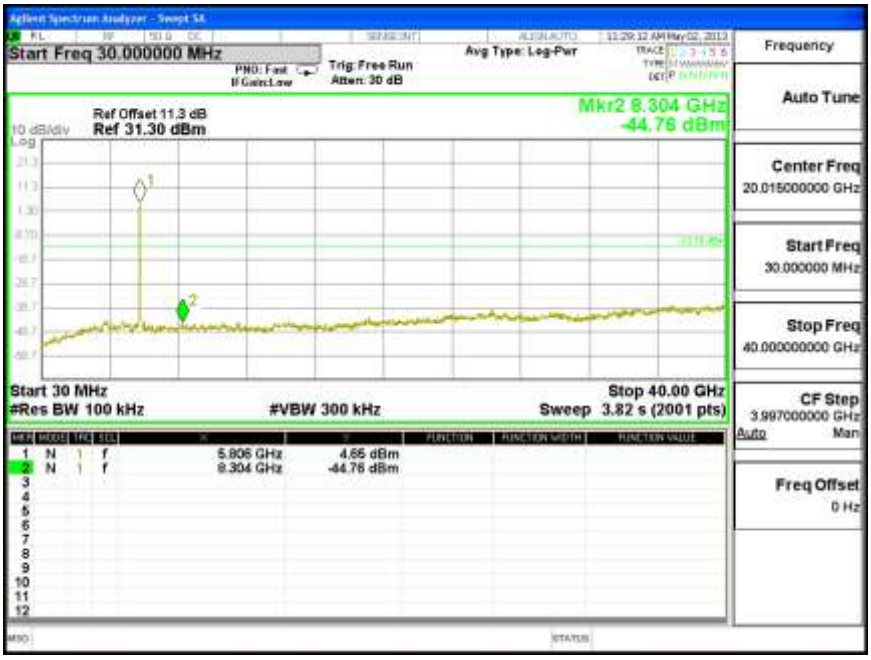


OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH



OUT OF BAND HIGH CH



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

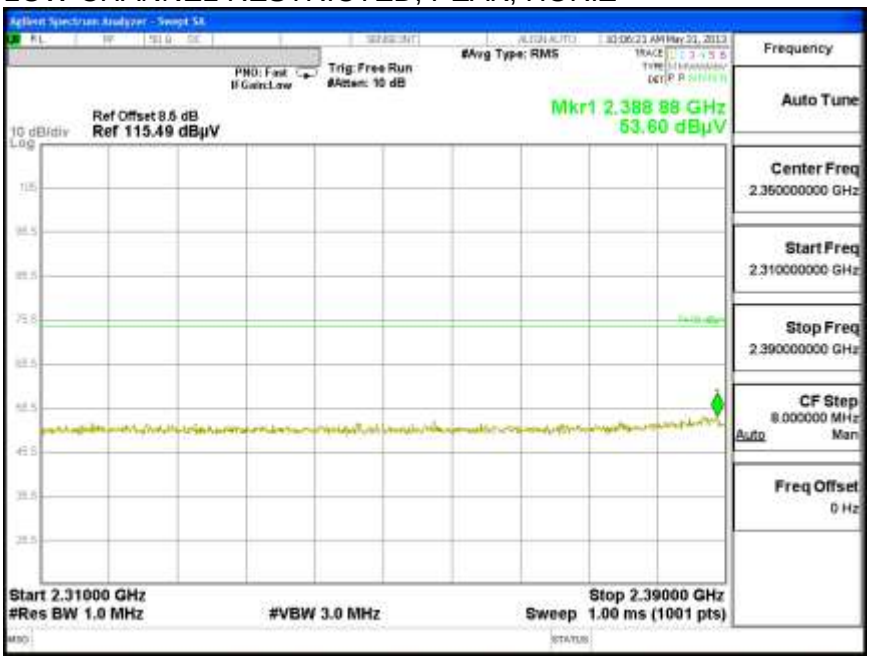
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

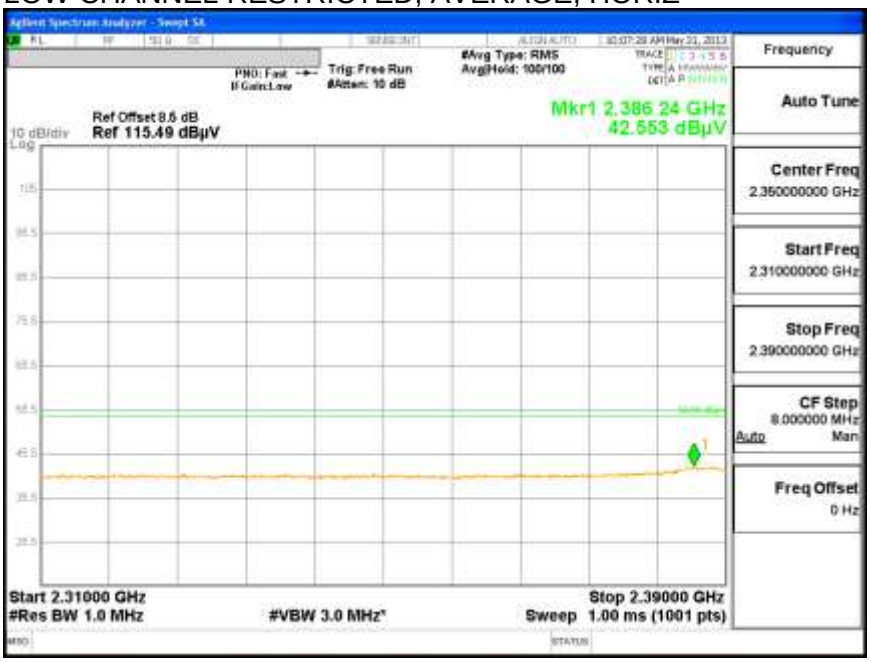
8.2. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

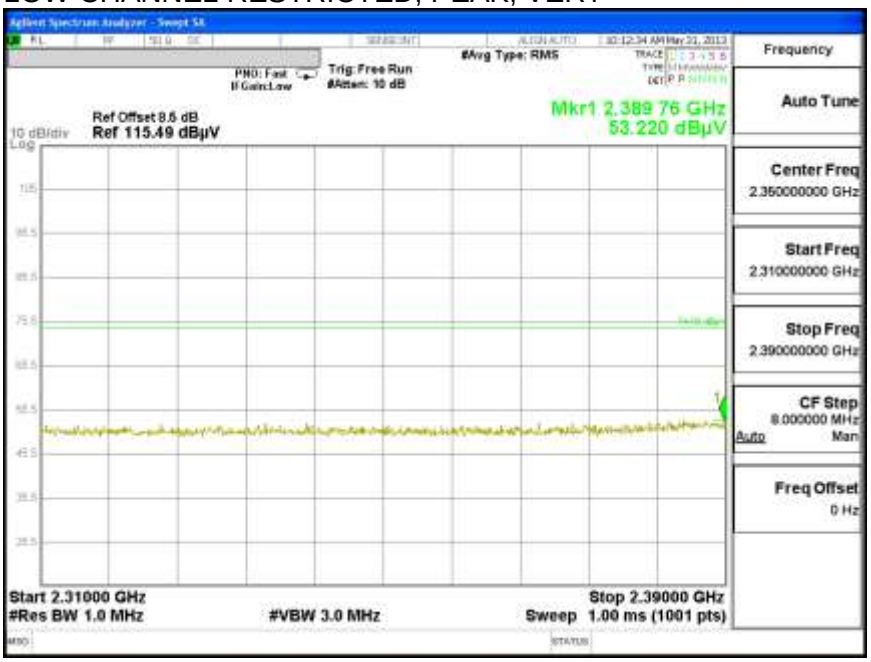
LOW CHANNEL RESTRICTED, PEAK, HORIZ



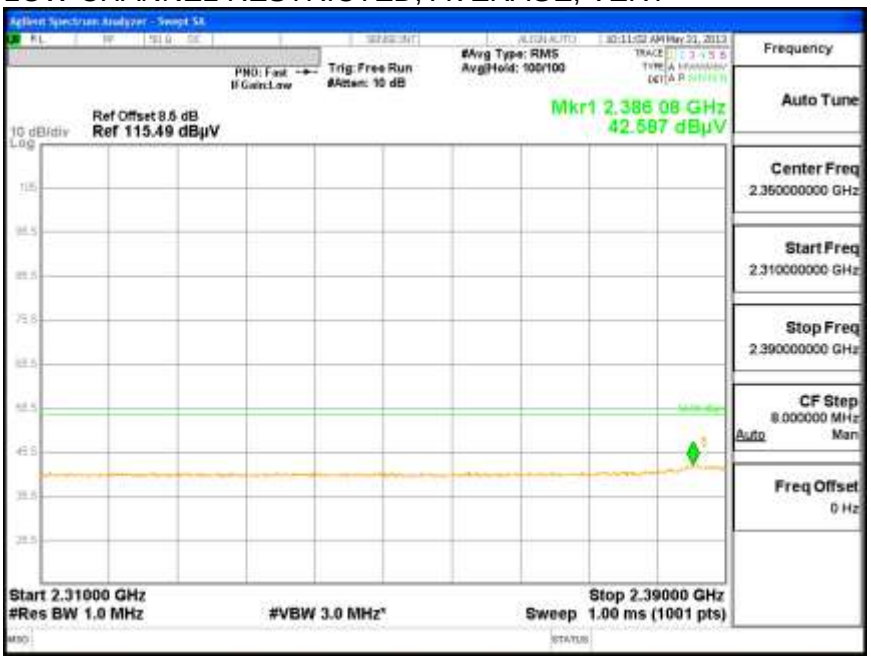
LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



LOW CHANNEL RESTRICTED, PEAK, VERT

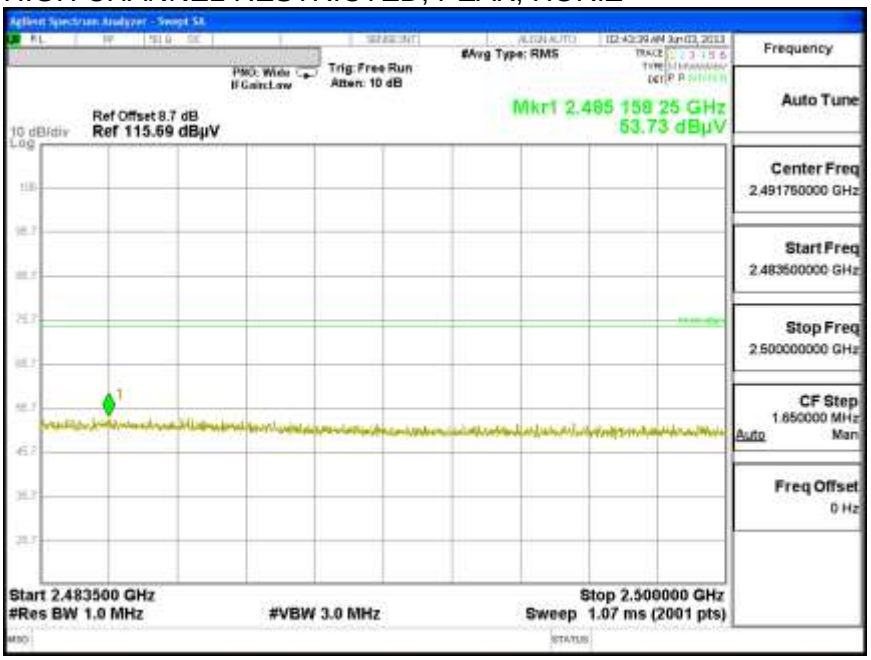


LOW CHANNEL RESTRICTED, AVERAGE, VERT

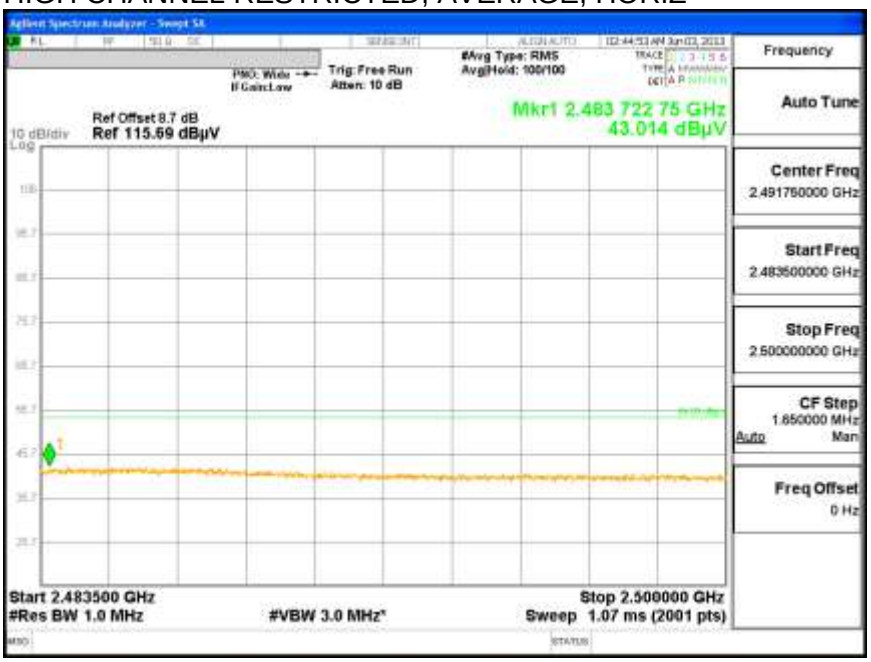


RESTRICTED BANDEDGE (HIGH CHANNEL)

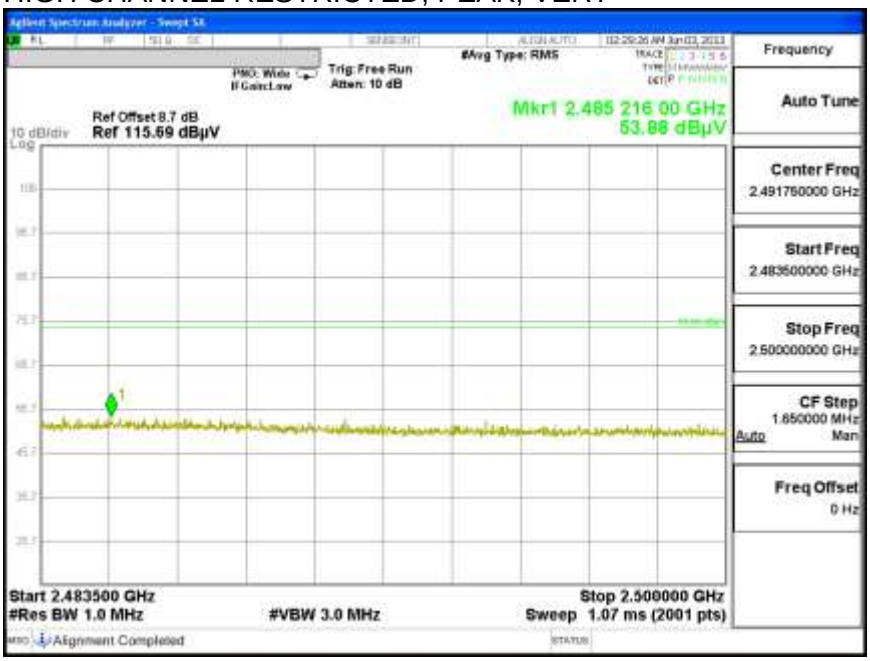
HIGH CHANNEL RESTRICTED, PEAK, HORIZ



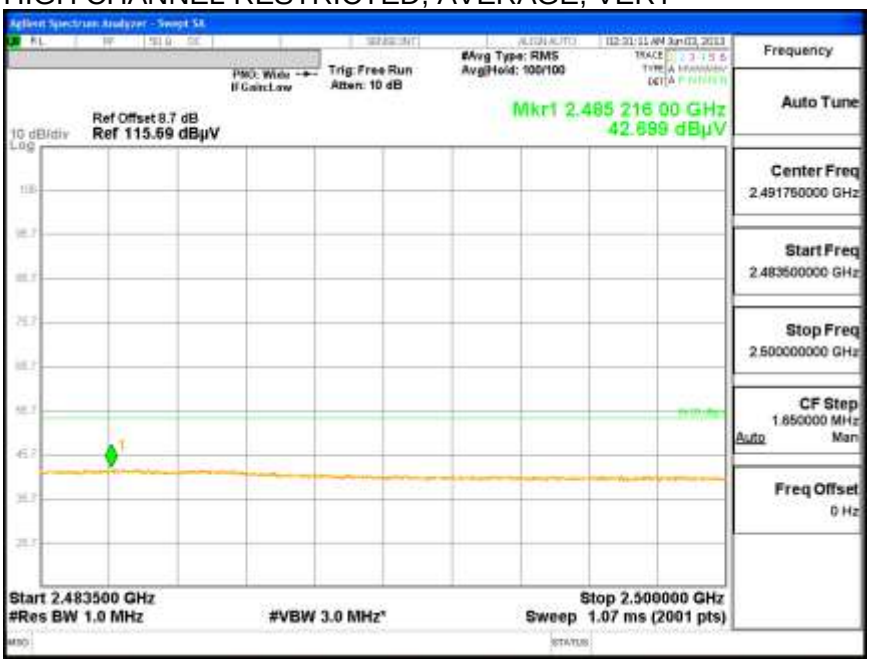
HIGH CHANNEL RESTRICTED, AVERAGE, HORIZ



HIGH CHANNEL RESTRICTED, PEAK, VERT

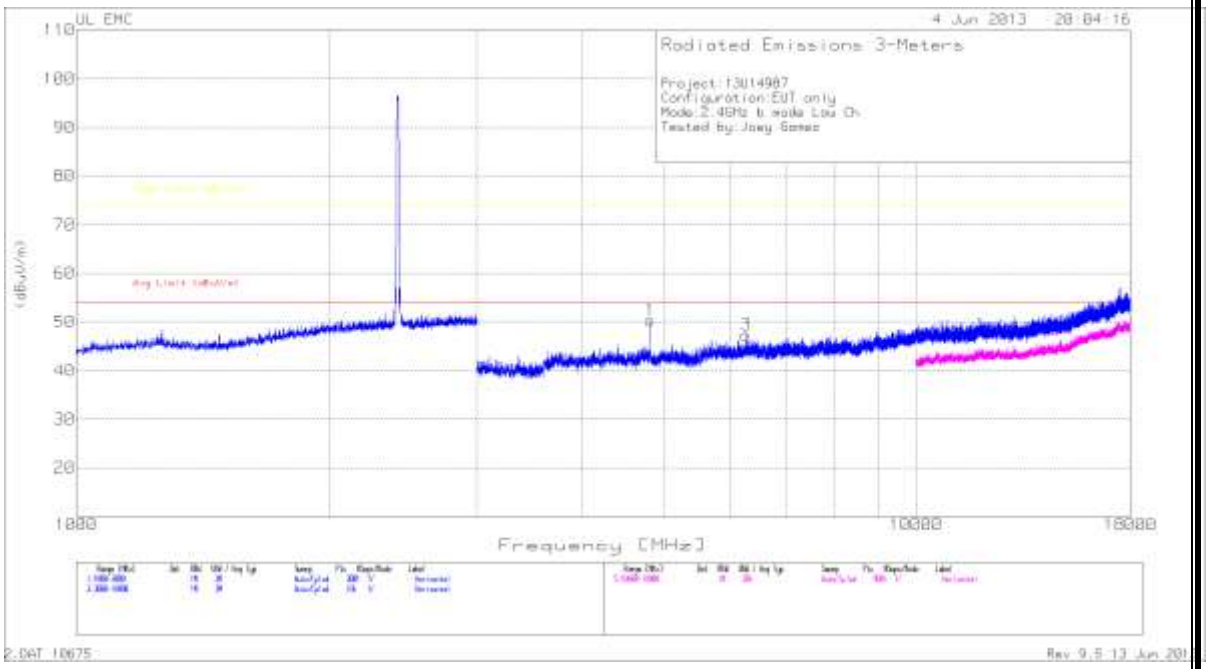


HIGH CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESTRICTED, HORIZONTAL



Horizontal 3000 - 18000MHz

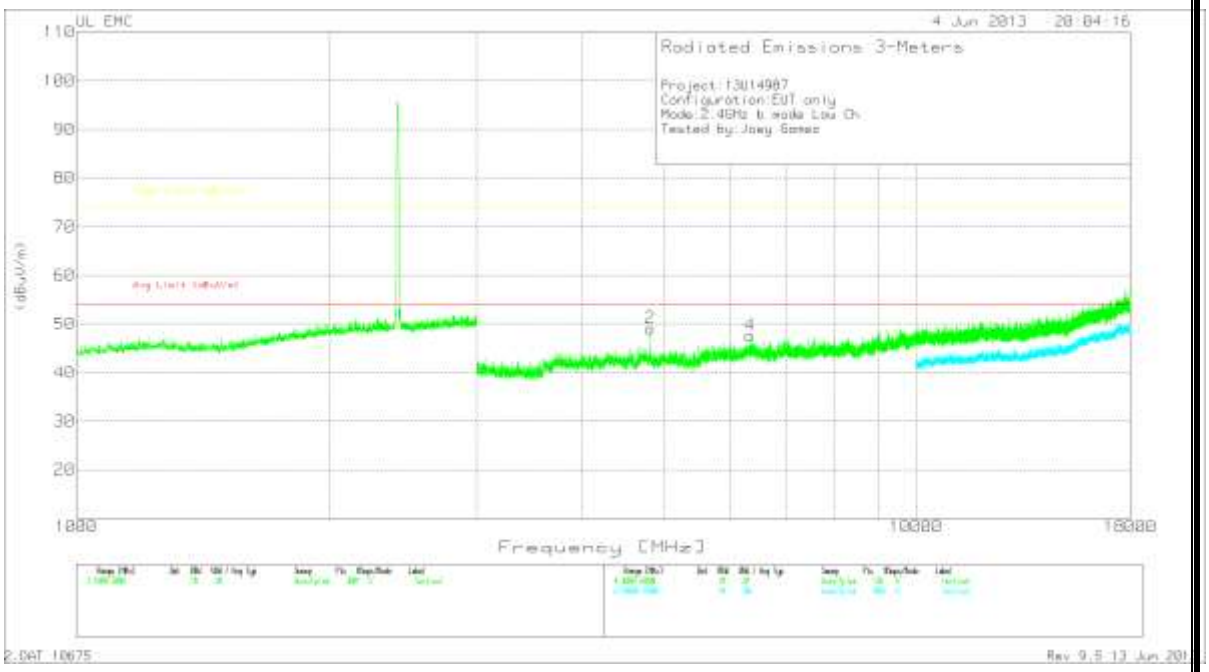
Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
1	4824.899	47.7	PK	34.4	-31.8	50.3	-3.67	53.97	74	-23.7	199	Horz
3*	7247.264	38.62	PK	36	-29.1	45.52	-8.45	53.97	74	-28.48	199	Horz

Horizontal 3000 - 18000MHz

Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4824.0013	42.56	Av	34.4	-31.8	45.16	53.97	-8.81	74	-28.84	334	372	Horz

Av - Average detector
PK - Peak detector

LOW CHANNEL RESTRICTED, VERTICAL



Vertical 3000 - 18000MHz

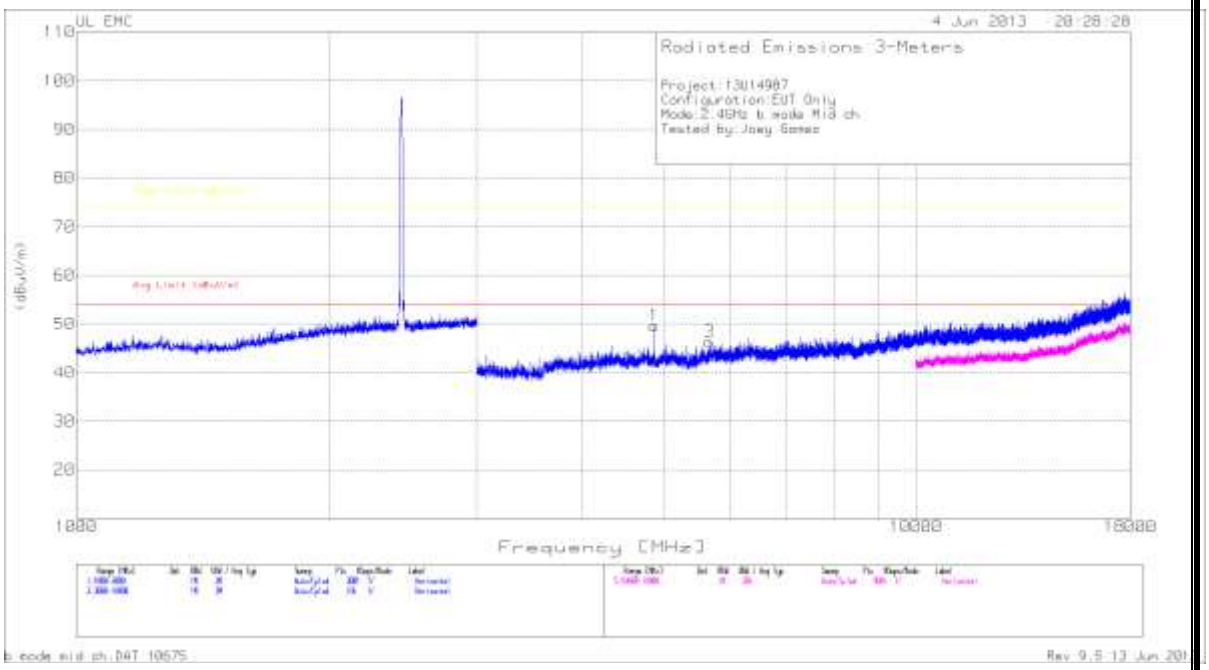
Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
2	4824.899	46.47	PK	34.4	-31.8	49.07	-4.9	53.97	74	-24.93	199	Vert
4*	7238.098	39.32	PK	36	-29.4	45.92	-8.05	53.97	74	-28.08	199	Vert

Vertical 3000 - 18000MHz

Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4823.999	43.94	Av	34.4	-31.8	46.54	53.97	-7.43	74	-27.46	302	256	Vert

Av - Average detector
PK - Peak detector

MID CHANNEL RESTRICTED, HORIZONTAL



Horizontal 3000 - 18000MHz

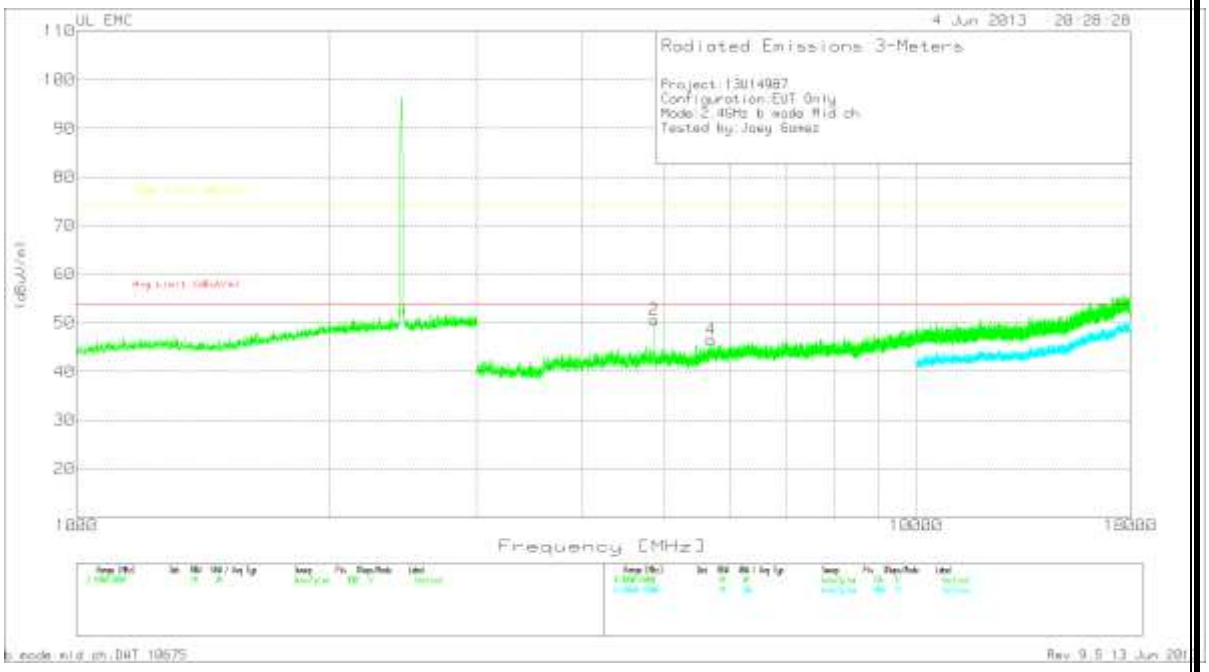
Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
1	4874.896	46.83	PK	34.4	-31.6	49.63	-4.34	53.97	74	-24.37	199	Horz
3	7312.26	39.06	PK	36	-28.7	46.36	-7.61	53.97	74	-27.64	199	Horz

Horizontal 3000 - 18000MHz

Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4824.0013	42.56	Av	34.4	-31.8	45.16	53.97	-8.81	74	-28.84	334	372	Horz

Av - Average detector
PK - Peak detector

MID CHANNEL RESTRICTED, VERTICAL



Vertical 3000 - 18000MHz

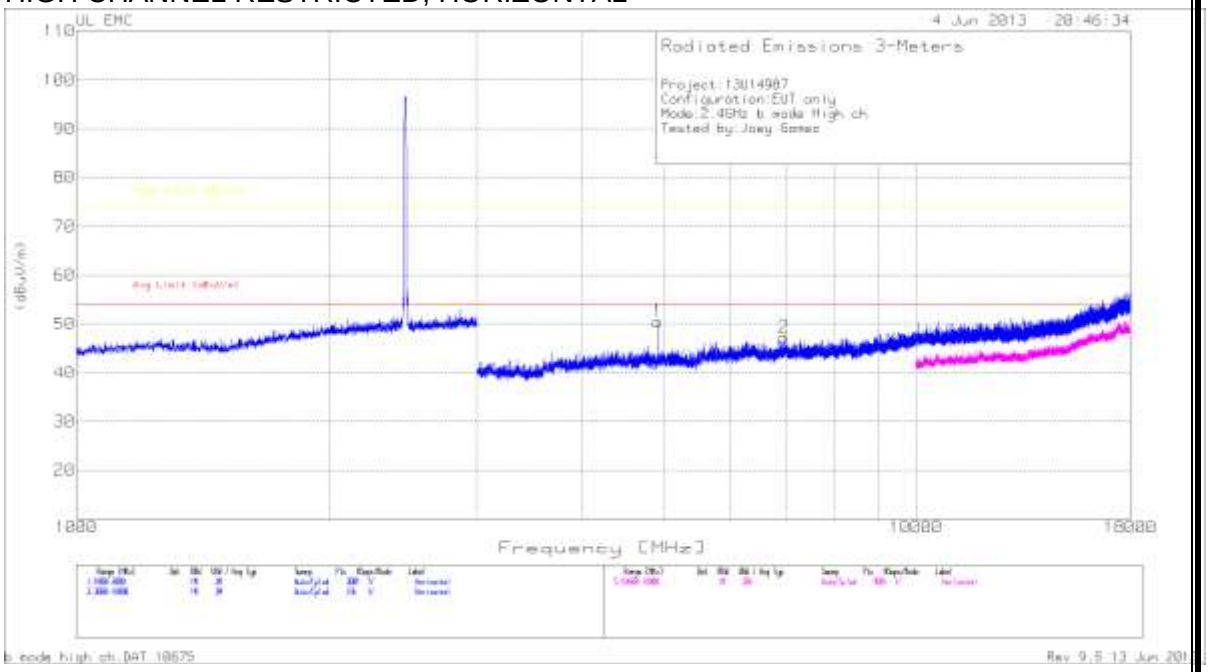
Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
2	4874.896	47.8	PK	34.4	-31.6	50.6	-3.37	53.97	74	-23.4	199	Vert
4	7307.261	38.67	PK	36	-28.7	45.97	-8	53.97	74	-28.03	199	Vert

Vertical 3000 - 18000MHz

Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4823.999	43.94	Av	34.4	-31.8	46.54	53.97	-7.43	74	-27.46	302	256	Vert

Av - Average detector
PK - Peak detector

HIGH CHANNEL RESTRICTED, HORIZONTAL



Horizontal 3000 - 18000MHz

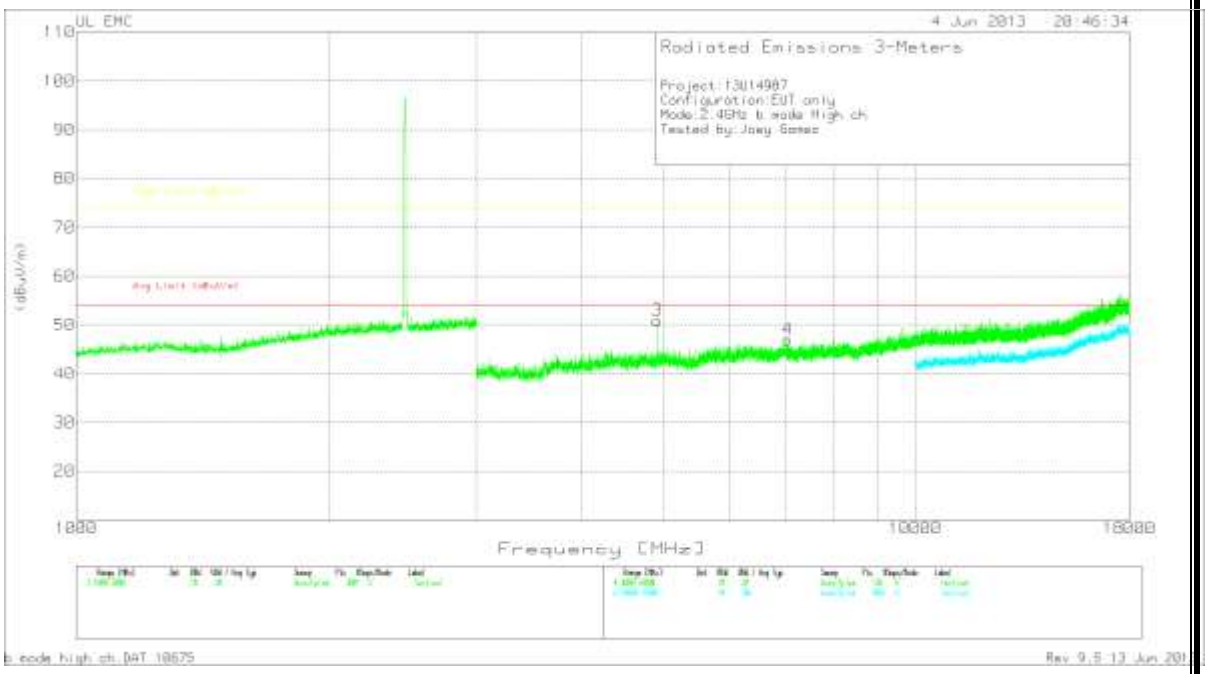
Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
1	4924.06	47.69	PK	34.4	-31.6	50.49	-3.48	53.97	74	-23.51	199	Horz
3	7387.256	37.55	PK	36.1	-28.4	45.25	-8.72	53.97	74	-28.75	199	Horz

Horizontal 3000 - 18000MHz

Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4924.0057	45.99	Av	34.4	-31.6	48.79	53.97	-5.18	74	-25.21	138	320	Horz

Av - Average detector
PK - Peak detector

HIGH CHANNEL RESTRICTED, VERTICAL



Vertical 3000 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
2	4924.06	48.08	PK	34.4	-31.6	50.88	-3.09	53.97	74	-23.12	199	Vert
4	7386.423	38.38	PK	36.1	-28.4	46.08	-7.89	53.97	74	-27.92	199	Vert

Vertical 3000 - 18000MHz

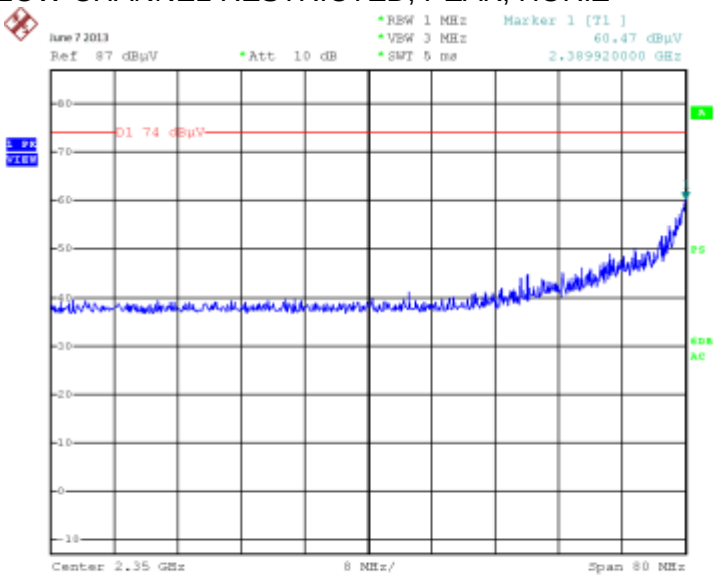
Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4924.0013	46.2	Av	34.4	-31.6	49	53.97	-4.97	74	-25	132	280	Vert

Av - Average detector
PK - Peak detector

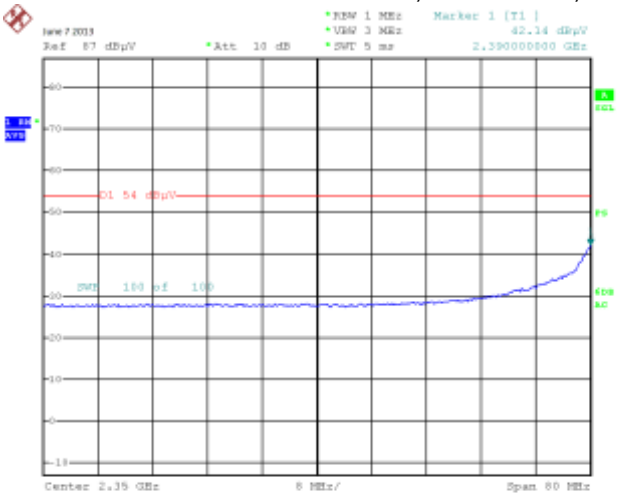
8.3. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

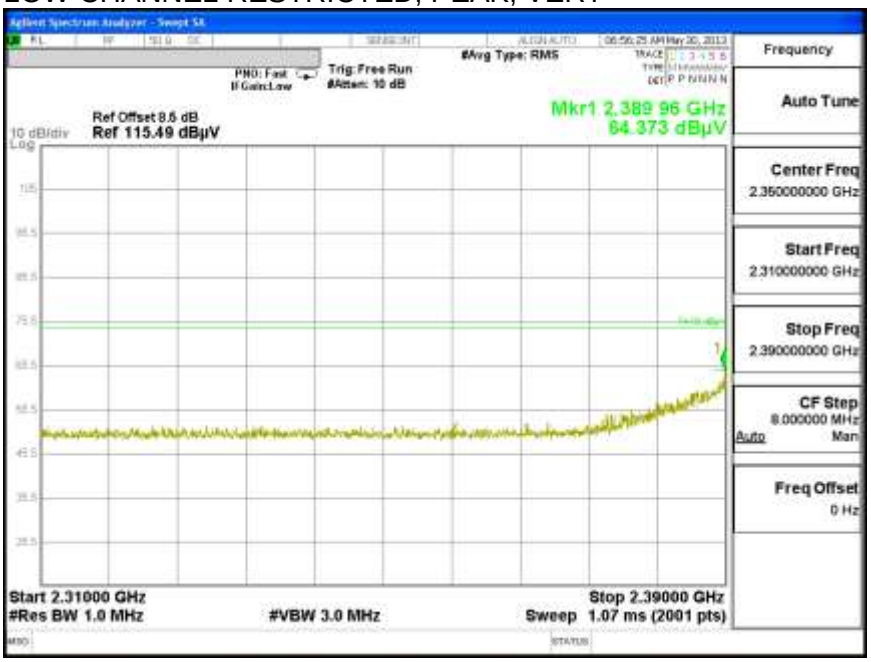
LOW CHANNEL RESTRICTED, PEAK, HORIZ



LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



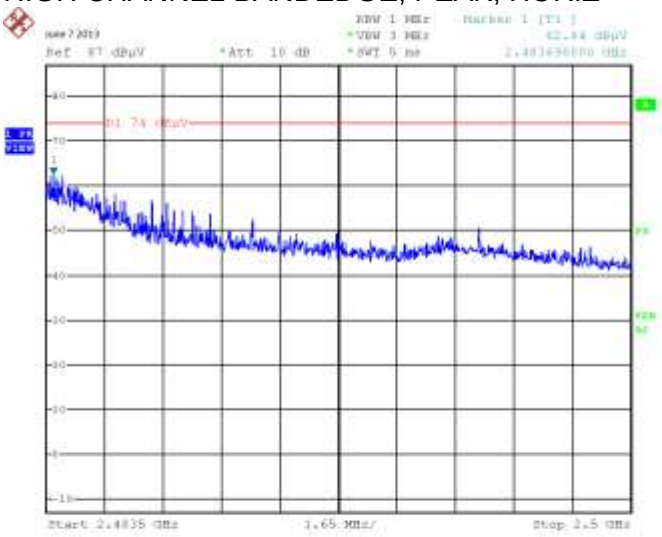
LOW CHANNEL RESTRICTED, PEAK, VERT



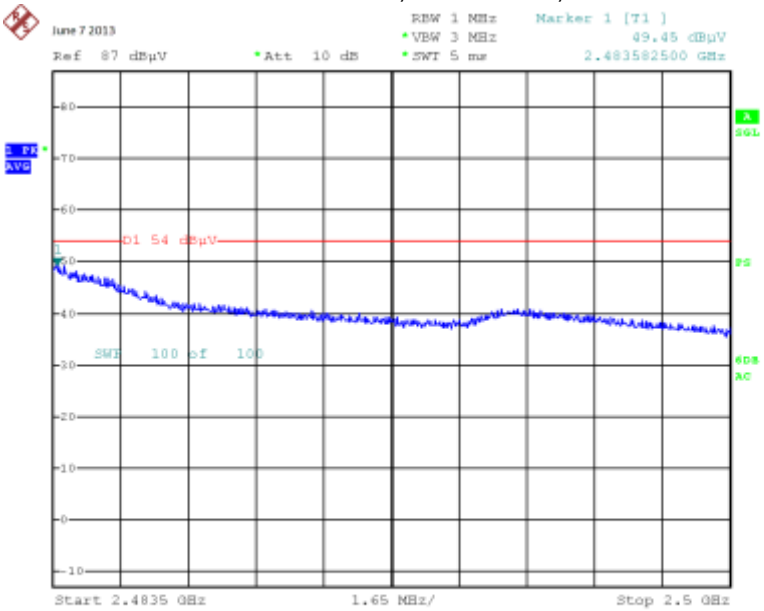
LOW CHANNEL RESTRICTED, AVERAGE, VERT

RESTRICTED BANDEDGE (HIGH CHANNEL)

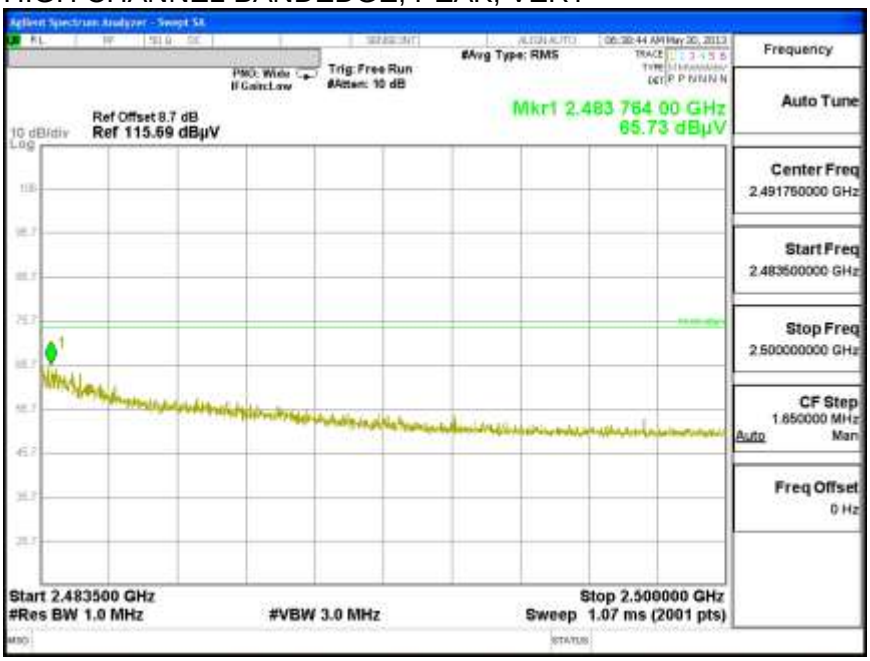
HIGH CHANNEL BANDEDGE, PEAK, HORIZ



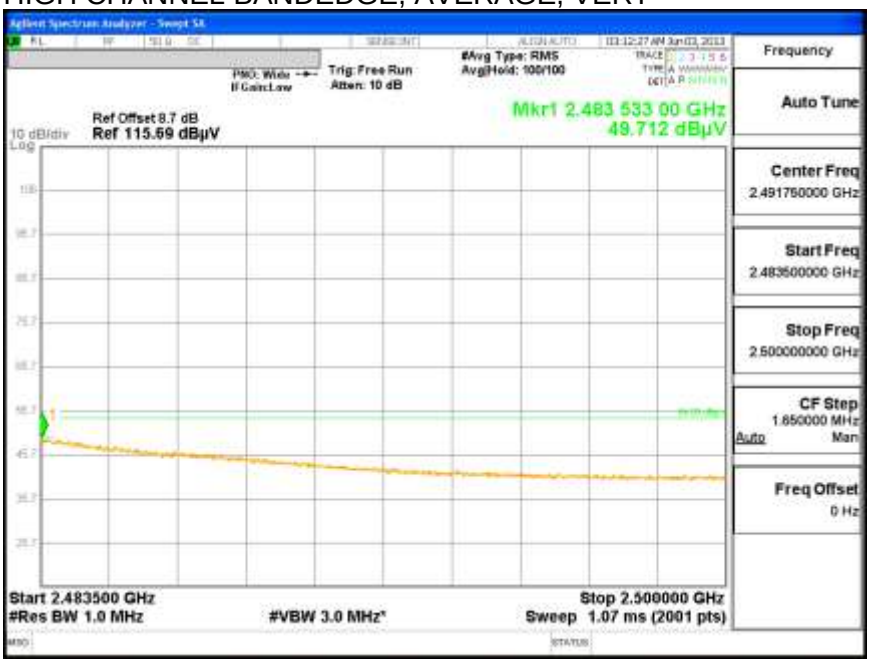
HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ



HIGH CHANNEL BANDEDGE, PEAK, VERT

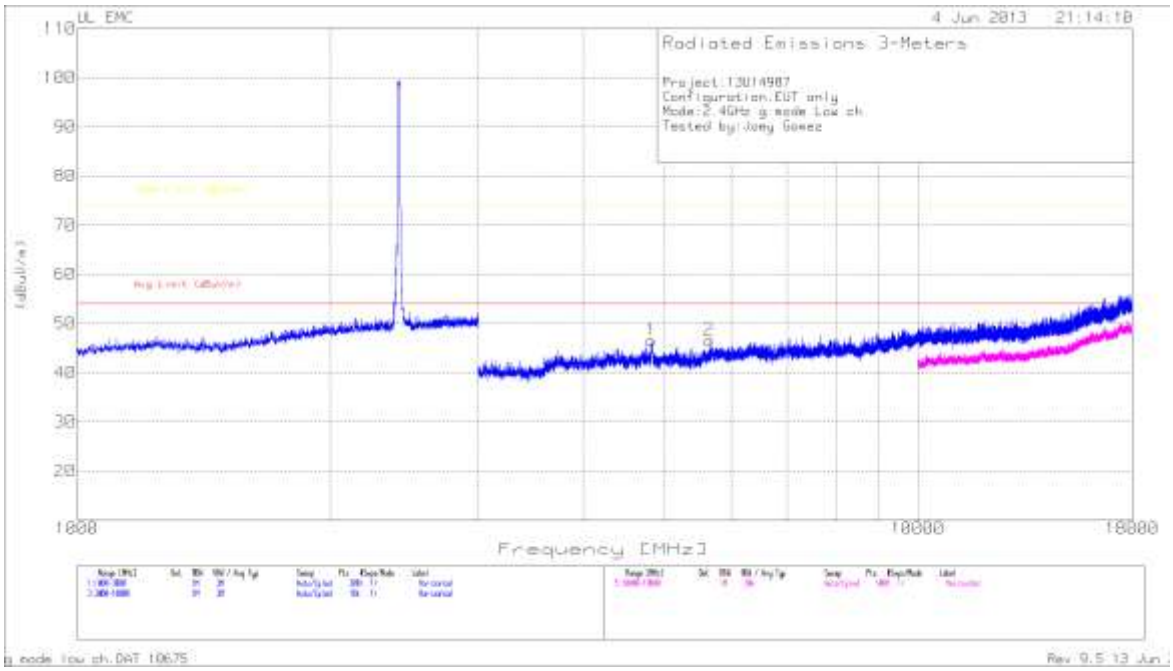


HIGH CHANNEL BANDEDGE, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

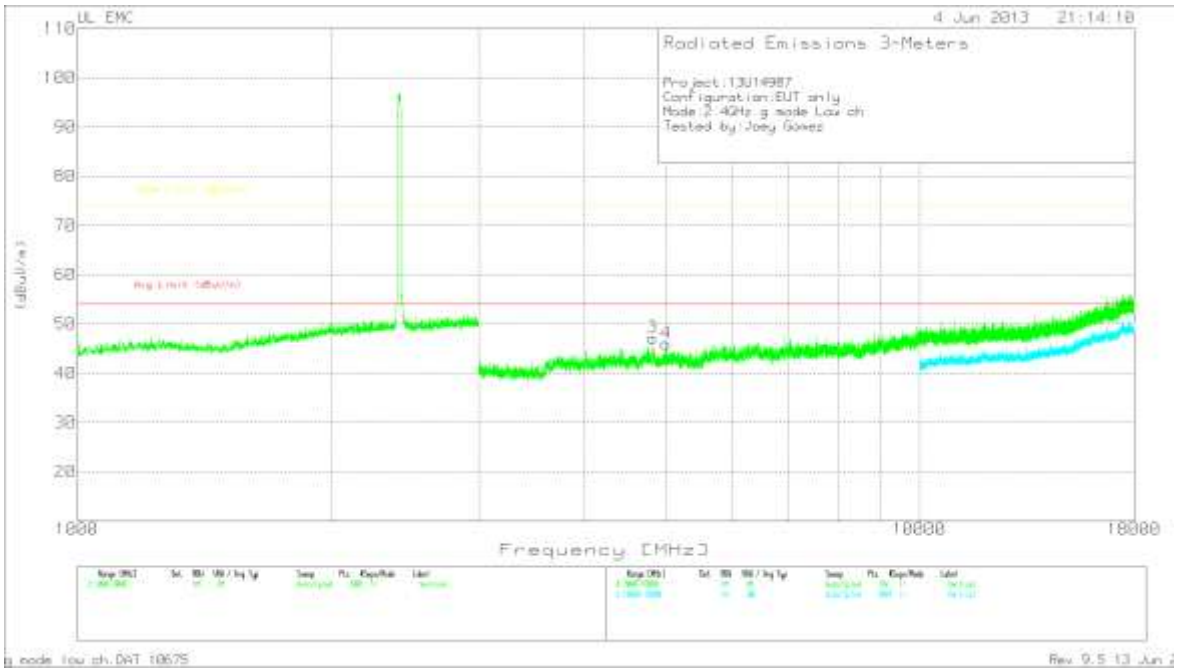
LOW CHANNEL RESTRICTED, HORIZONTAL



Horizontal 3000 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
1	4819.066	43.92	PK	34.4	-31.8	46.52	-7.45	53.97	74	-27.48	199	Horz
3*	7255.597	38.46	PK	36	-29.3	45.16	-8.81	53.97	74	-28.84	199	Horz

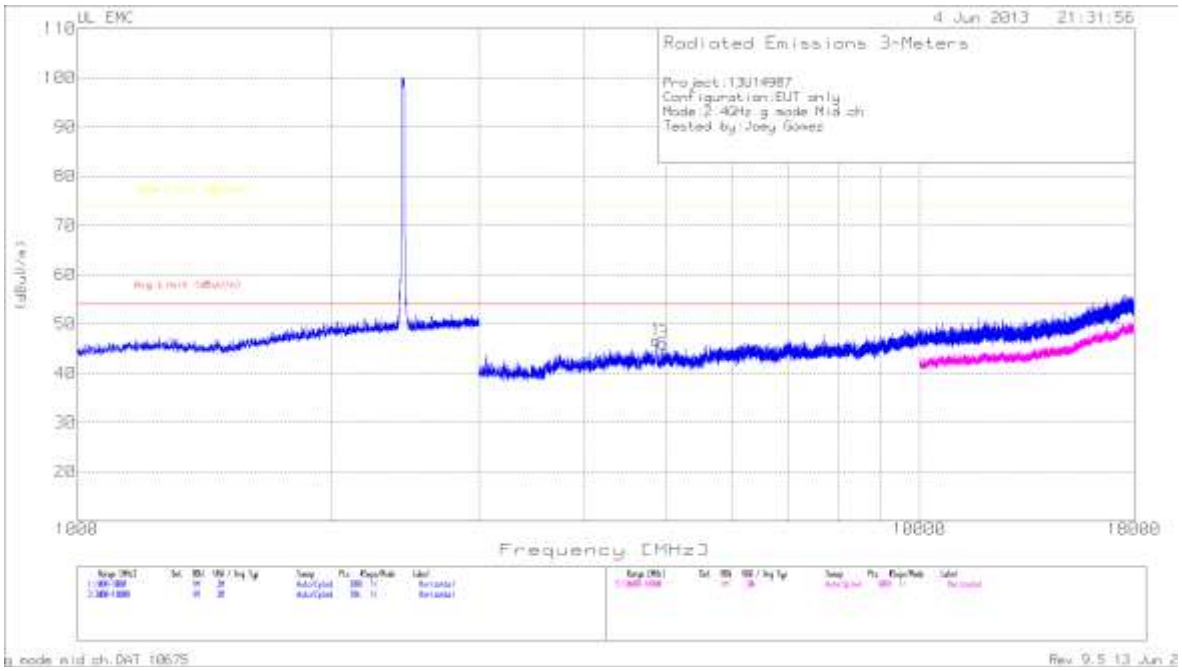
LOW CHANNEL RESTRICTED, VERTICAL



Vertical 3000 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
2	4824.065	44.54	PK	34.4	-31.8	47.14	-6.83	53.97	74	-26.86	199	Vert
4*	7231.432	38.65	PK	36	-29.3	45.35	-8.62	53.97	74	-28.65	199	Vert

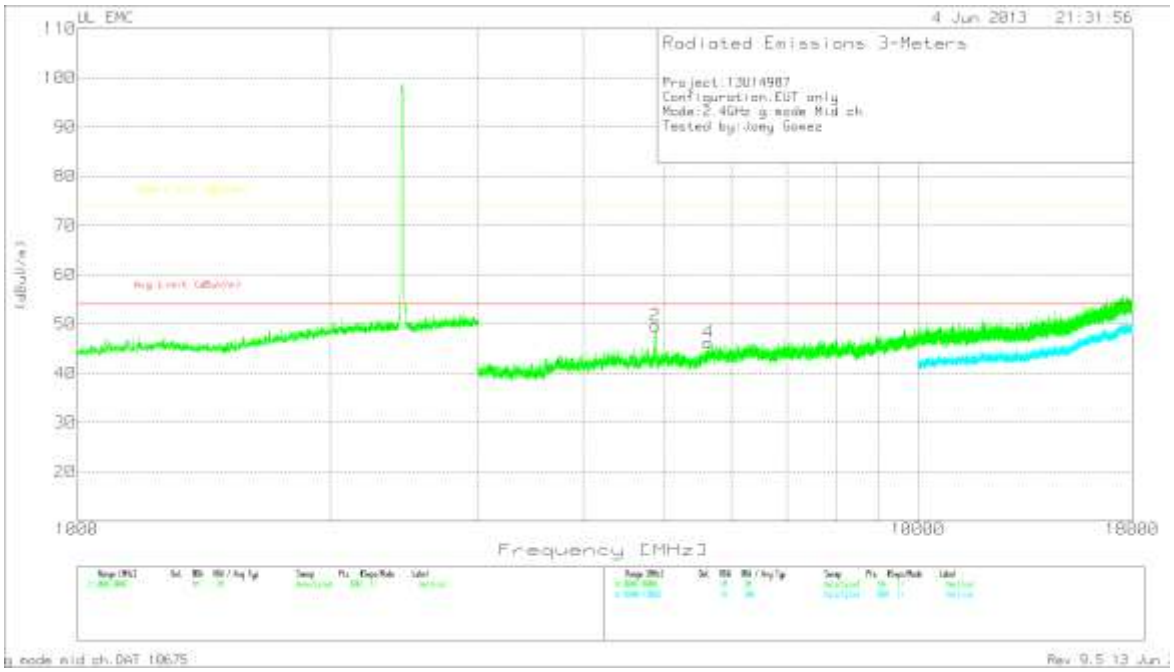
MID CHANNEL RESTRICTED, HORIZONTAL



Horizontal 3000 - 18000MHz

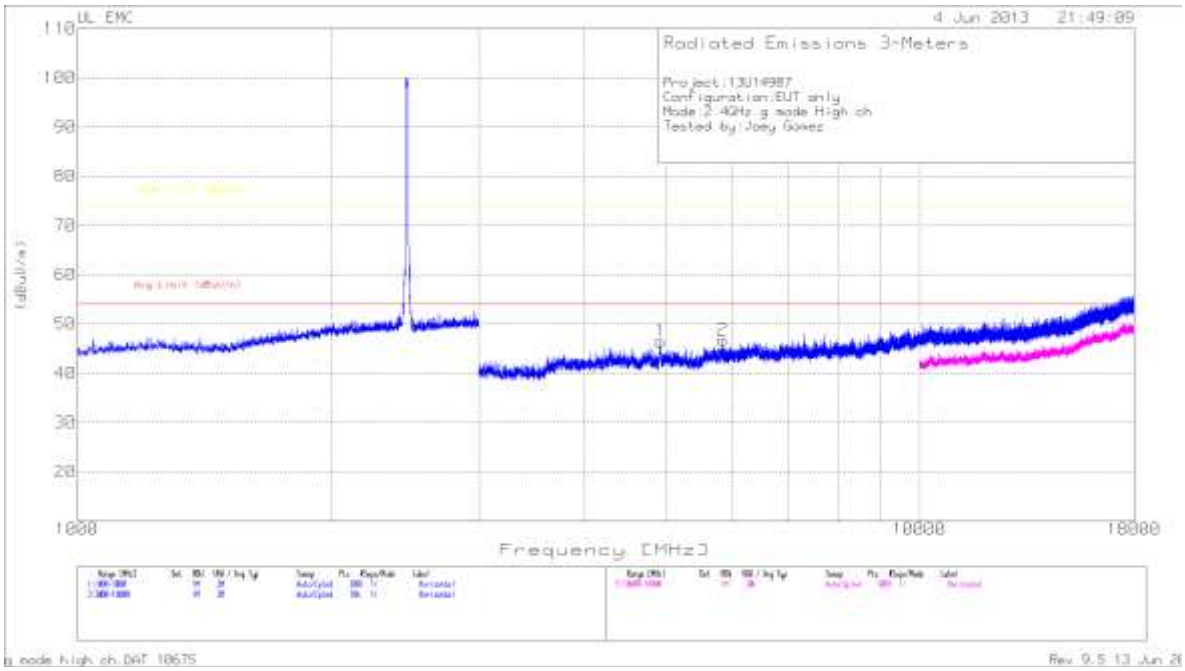
Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
1	4874.063	43.91	PK	34.4	-31.6	46.71	-7.26	53.97	74	-27.29	199	Horz
3	7320.593	38.9	PK	36	-28.5	46.4	-7.57	53.97	74	-27.6	199	Horz

MID CHANNEL RESTRICTED, VERTICAL



Vertical 3000 - 18000MHz												
Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
2	4879.896	46.76	PK	34.4	-31.5	49.66	-4.31	53.97	74	-24.34	199	Vert
4	7323.926	38.84	PK	36	-28.4	46.44	-7.53	53.97	74	-27.56	199	Vert

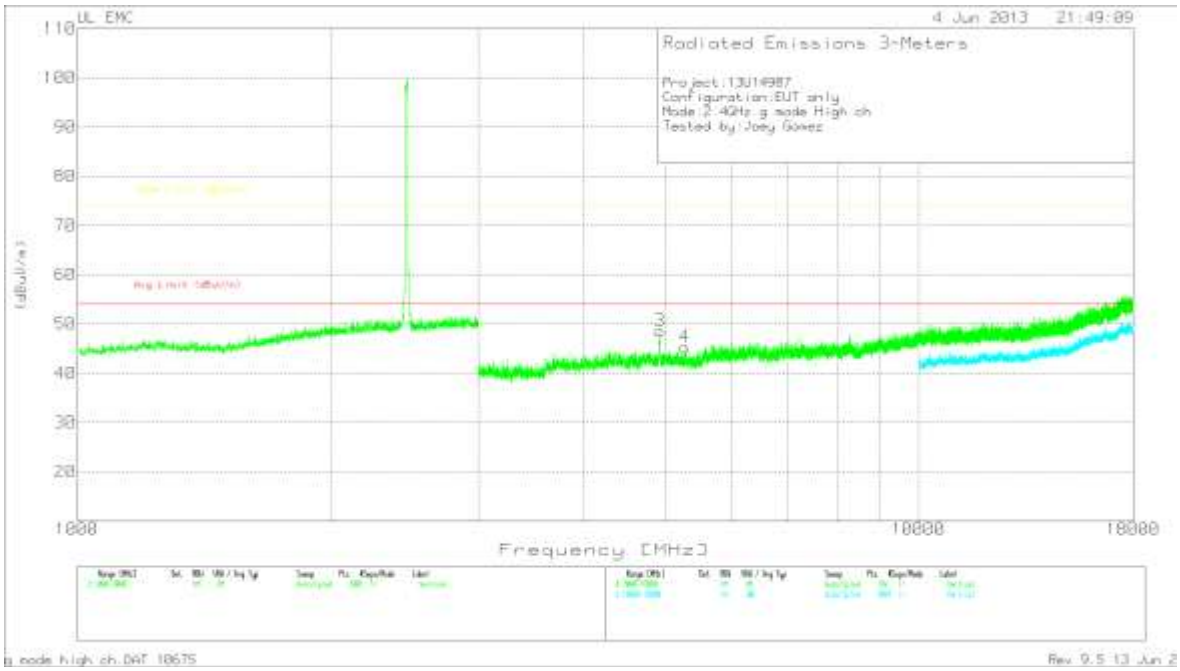
HIGH CHANNEL RESTRICTED, HORIZONTAL



Horizontal 3000 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
1	4929.059	43.43	PK	34.4	-31.4	46.43	-7.54	53.97	74	-27.57	199	Horz
3	7390.589	38.04	PK	36.1	-28.5	45.64	-8.33	53.97	74	-28.36	199	Horz

HIGH CHANNEL RESTRICTED, VERTICAL

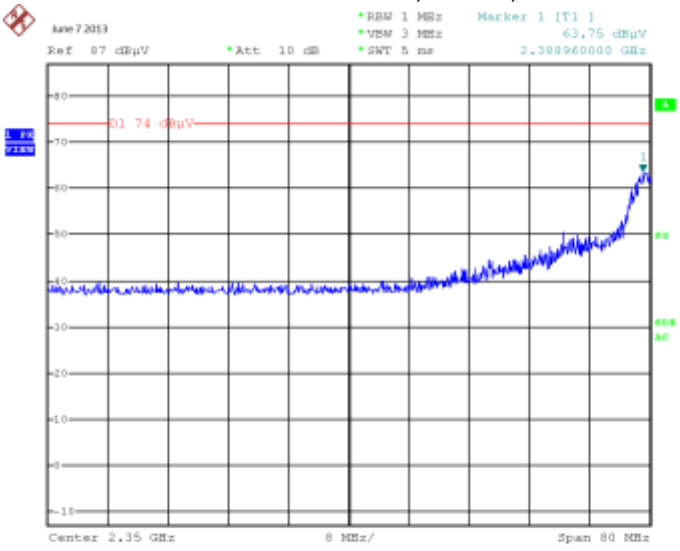


Vertical 3000 - 18000MHz												
Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /3GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
2	4927.393	45.66	PK	34.4	-31.5	48.56	-5.41	53.97	74	-25.44	199	Vert
4	7386.423	37.65	PK	36.1	-28.4	45.35	-8.62	53.97	74	-28.65	199	Vert

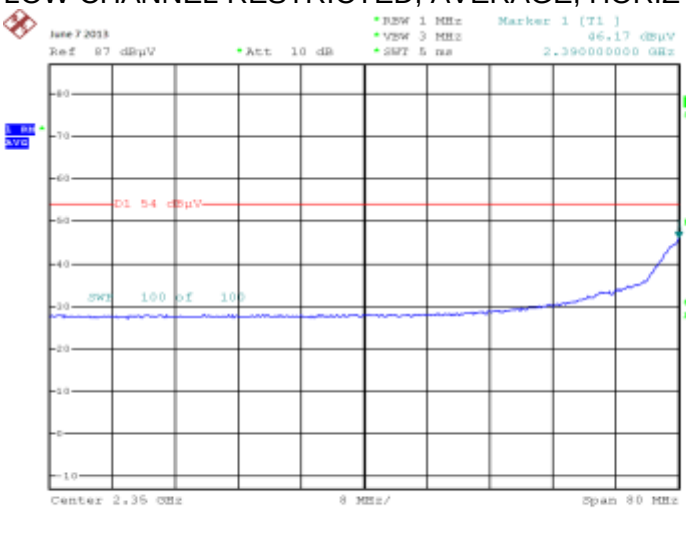
8.4. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

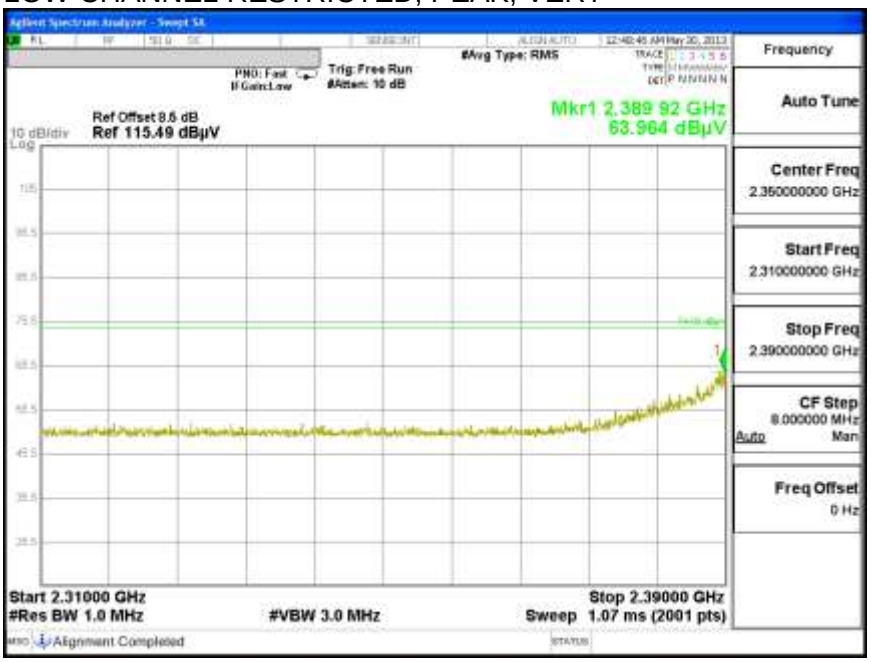
LOW CHANNEL RESTRICTED, PEAK, HORIZ



LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



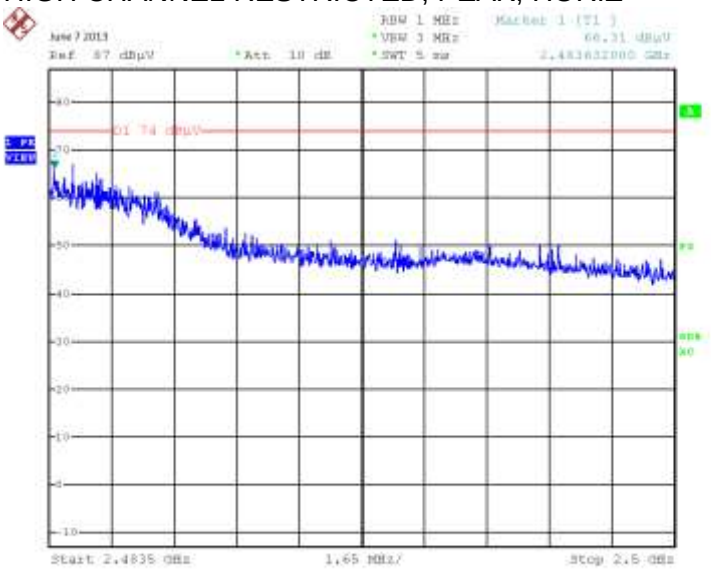
LOW CHANNEL RESTRICTED, PEAK, VERT



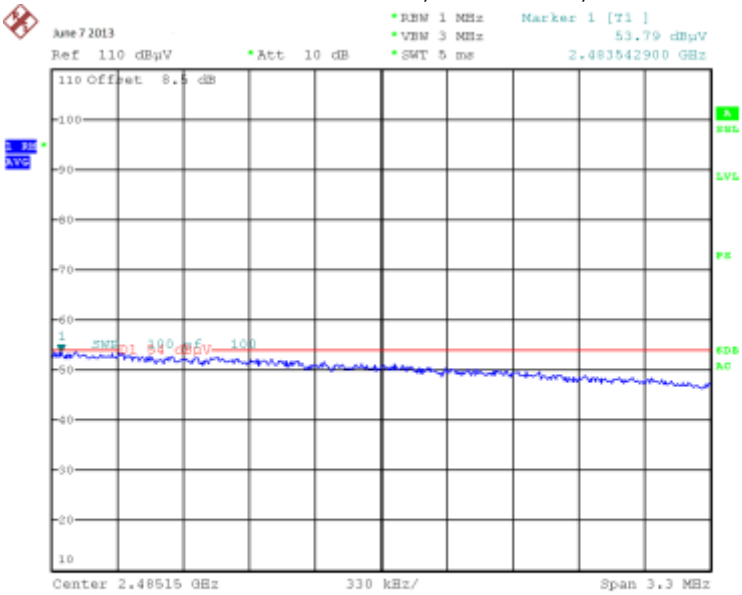
LOW CHANNEL RESTRICTED, AVERAGE, VERT

RESTRICTED BANDEDGE (HIGH CHANNEL)

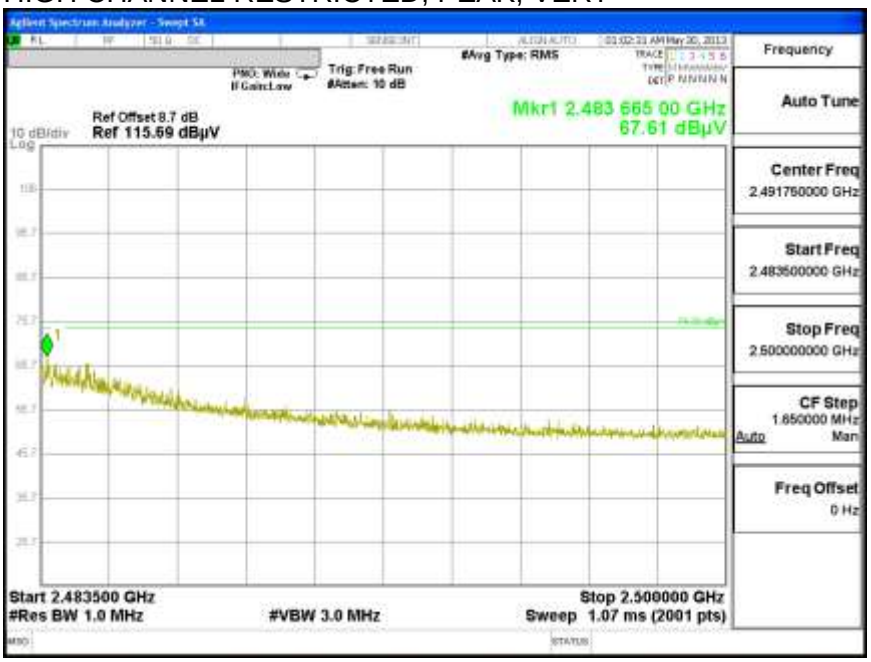
HIGH CHANNEL RESTRICTED, PEAK, HORIZ



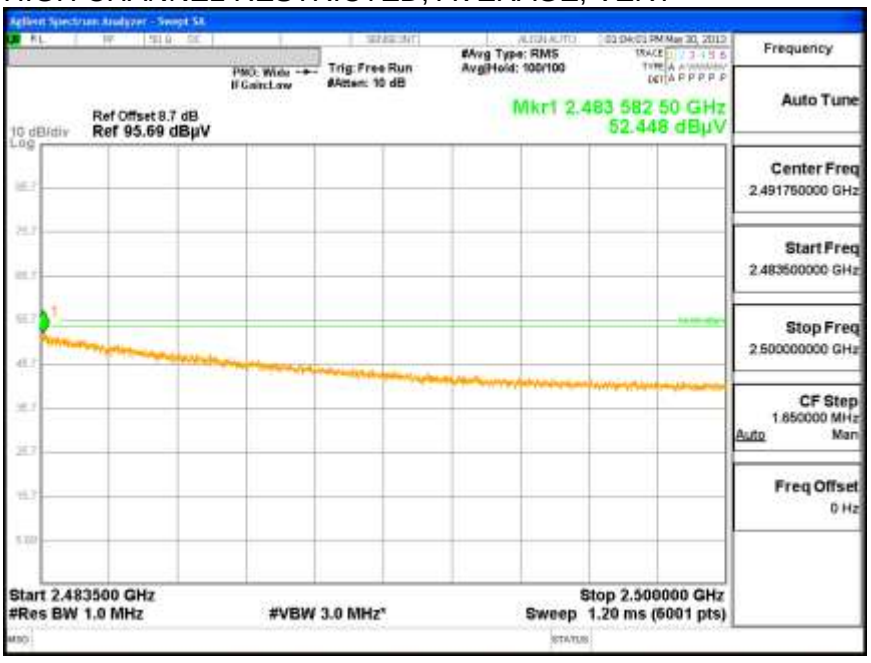
HIGH CHANNEL RESTRICTED, AVERAGE, HORIZ



HIGH CHANNEL RESTRICTED, PEAK, VERT

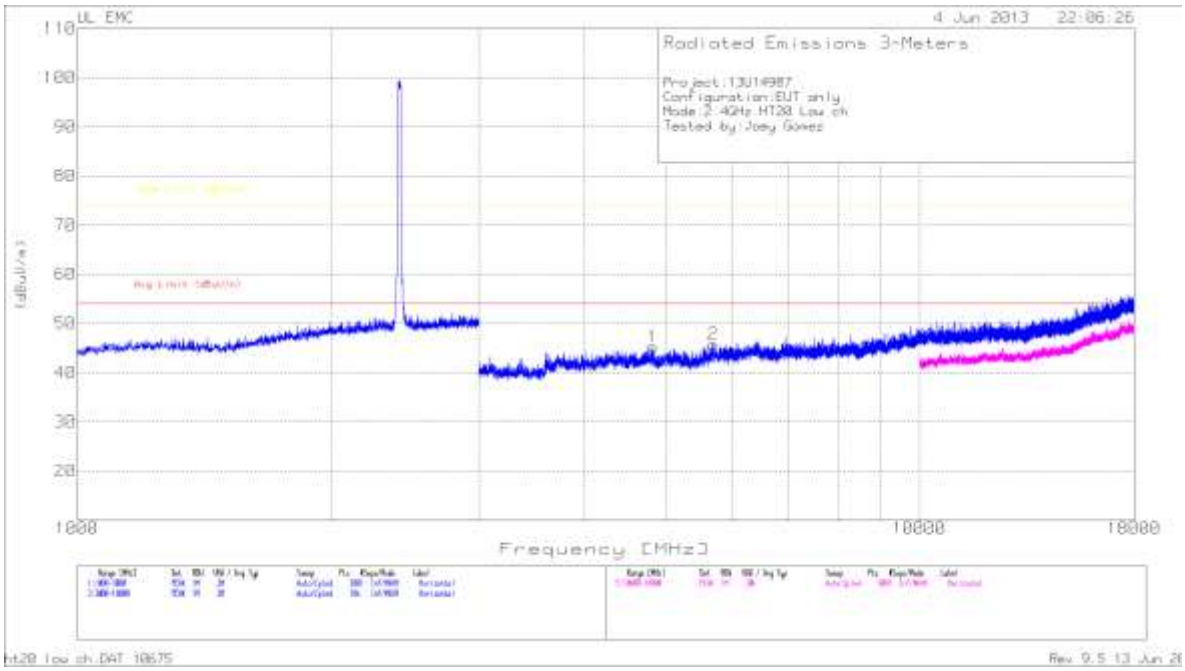


HIGH CHANNEL RESTRICTED, AVERAGE, VERT



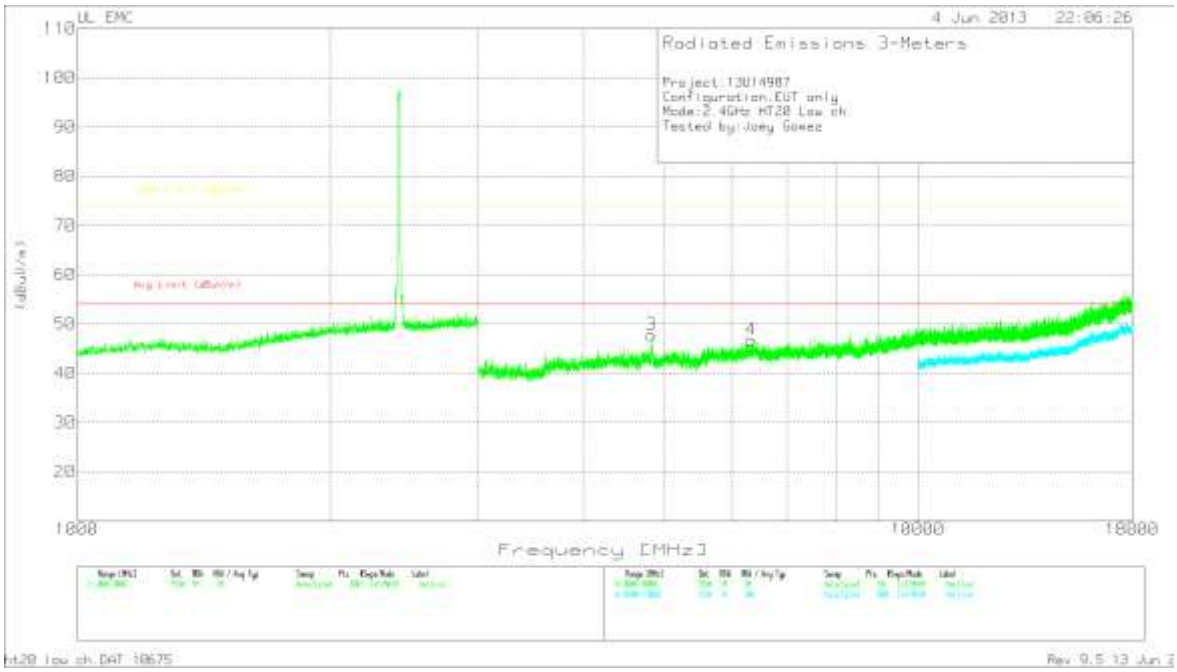
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESTRICTED, HORIZONTAL



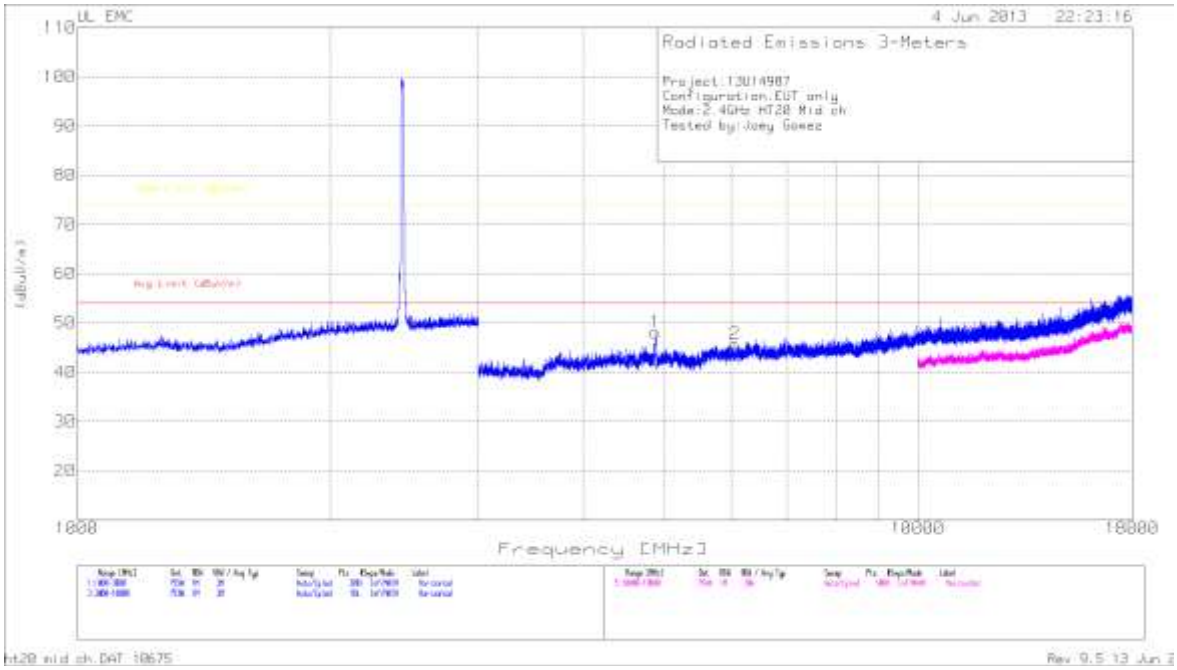
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/3 GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height (cm)	Polarity
1	4.826	42.5	PK	34.4	-31.7	45.2	53.97	-8.77	74	-28.8	199	H
2	5.698	40.52	PK	35.3	-30.1	45.72	53.97	-8.25	74	-28.28	199	H

LOW CHANNEL RESTRICTED, VERTICAL



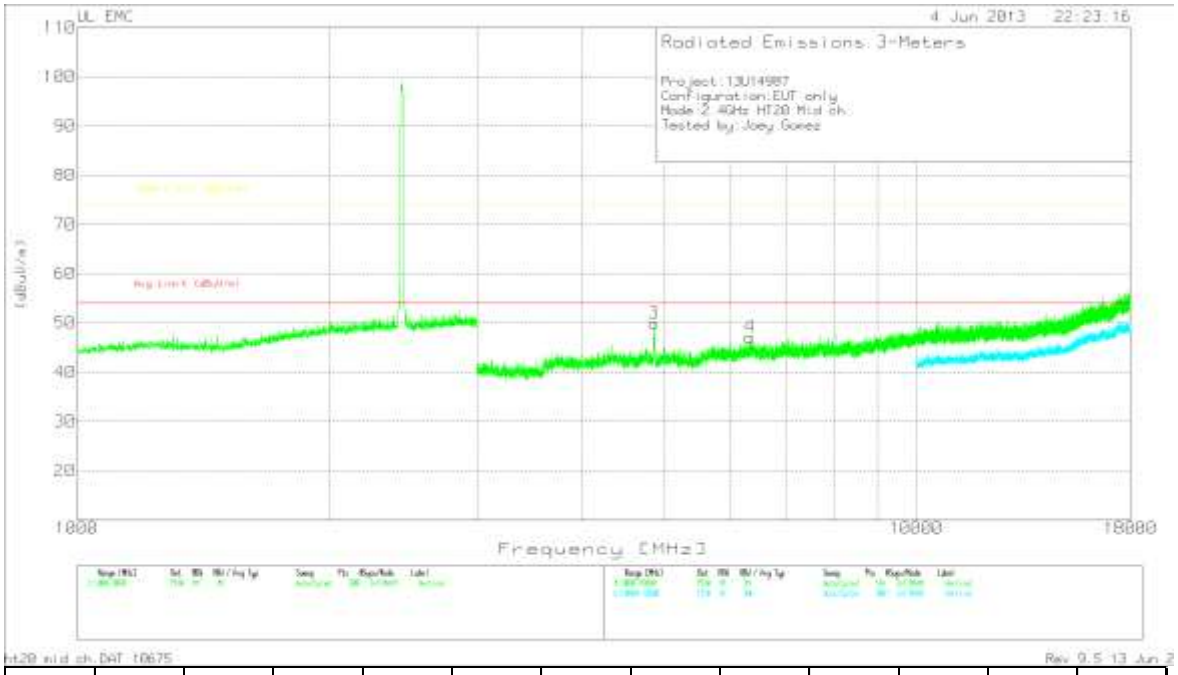
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/3 GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height (cm)	Polarity
3	4.824	45.13	PK	34.4	-31.8	47.73	53.97	-6.24	74	-26.27	199	V
4	6.341	39.89	PK	35.9	-29	46.79	53.97	-7.18	74	-27.21	199	V

MID CHANNEL RESTRICTED, HORIZONTAL



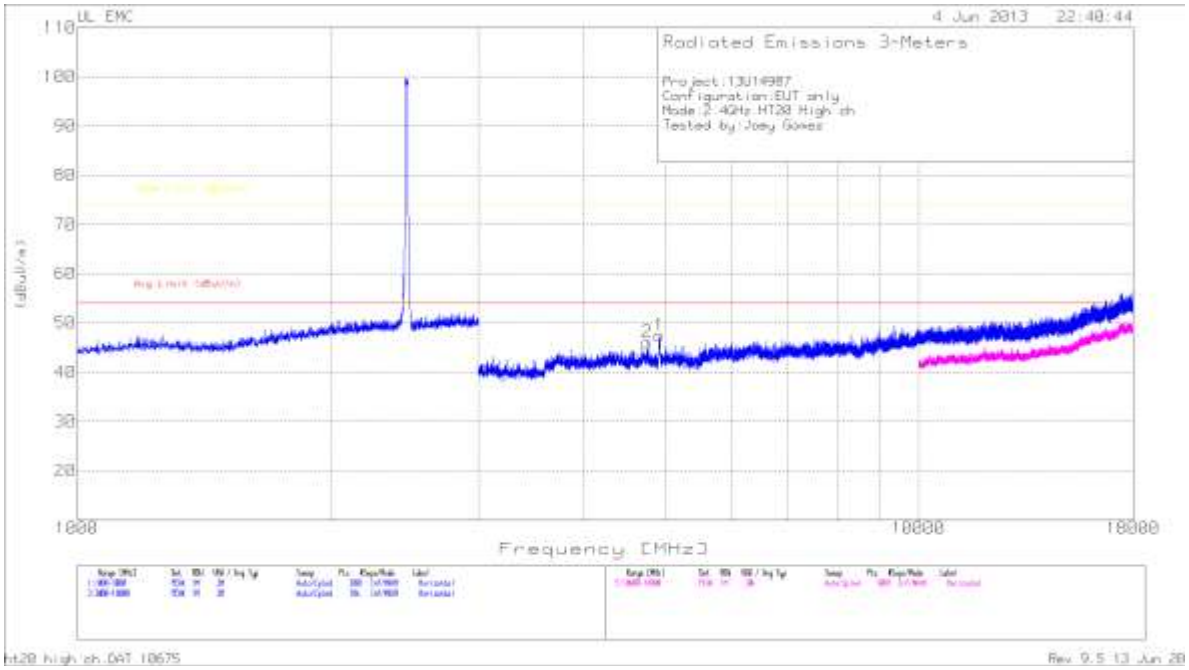
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/3 GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height (cm)	Polarity
1	4.872	45.43	PK	34.4	-31.7	48.13	53.97	-5.84	74	-25.87	199	H
2	6.061	39.47	PK	35.8	-29.6	45.67	53.97	-8.3	74	-28.33	199	H

MID CHANNEL RESTRICTED, VERTICAL



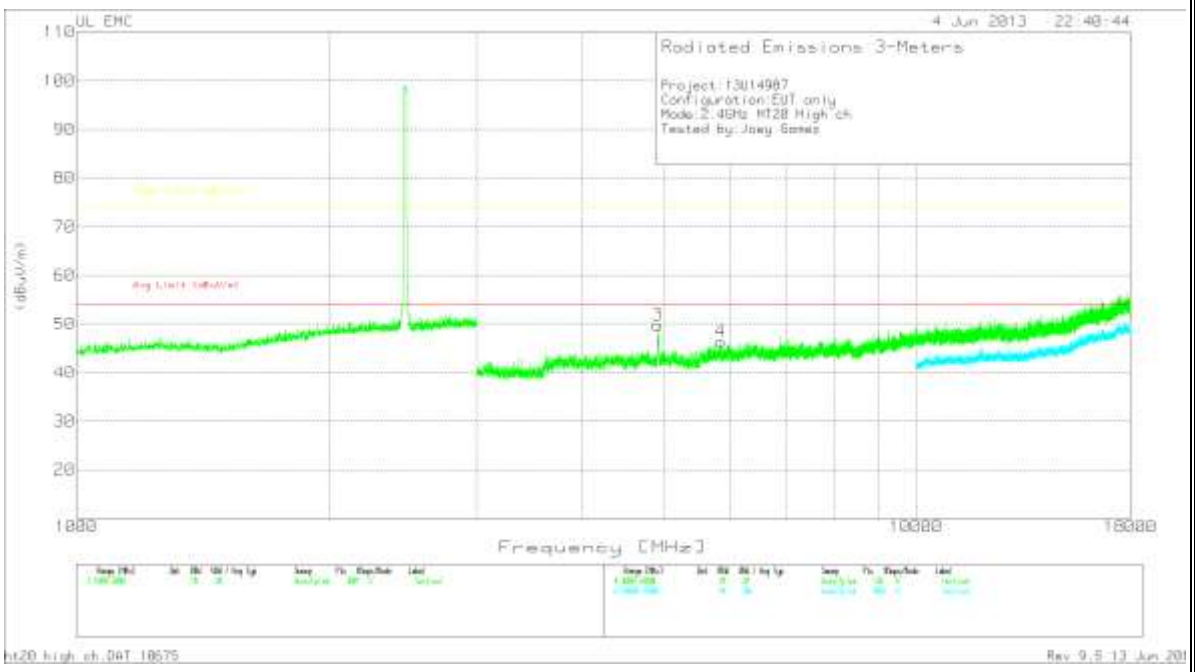
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/3 GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height (cm)	Polarity
3	4.874	47.13	PK	34.4	-31.6	49.93	53.97	-4.04	74	-24.07	199	V
4	6.336	40.22	PK	35.9	-29	47.12	53.97	-6.85	74	-26.88	199	V

HIGH CHANNEL RESTRICTED, HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/3 GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height (cm)	Polarity
1	4.922	44.64	PK	34.4	-31.6	47.44	53.97	-6.53	74	-26.56	199	H
2	4.761	43.04	PK	34.4	-31.4	46.04	53.97	-7.93	74	-27.96	199	H

HIGH CHANNEL RESTRICTED, VERTICAL

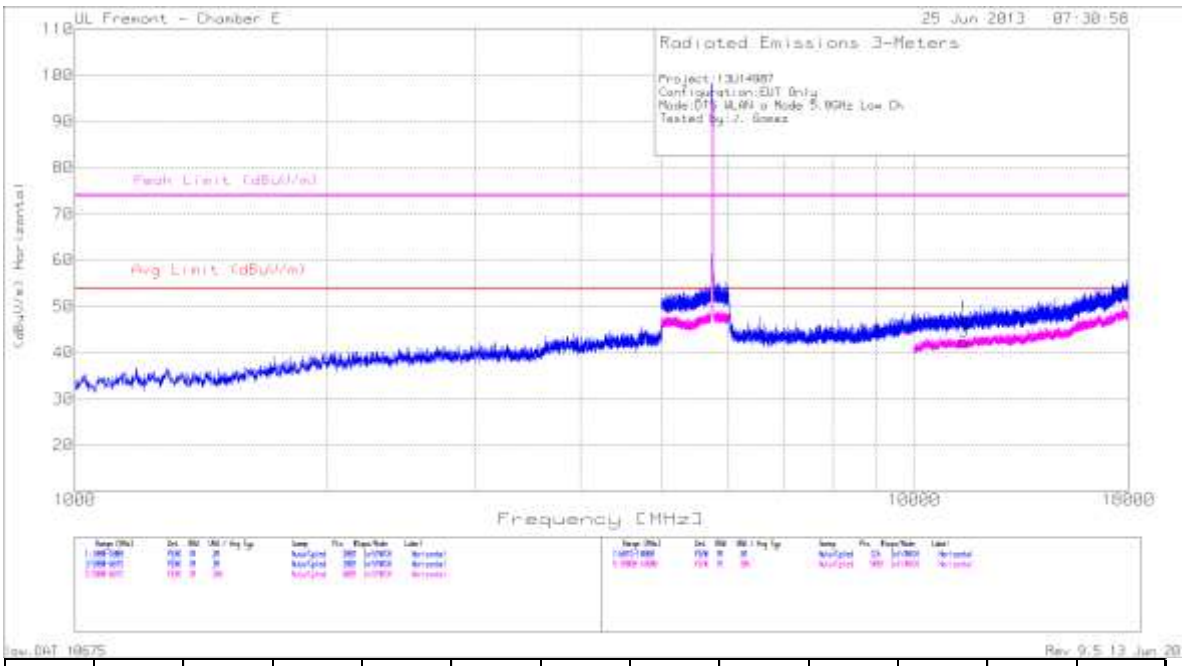


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/3 GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height (cm)	Polarity
3	4.922	46.97	PK	34.4	-31.6	49.77	53.97	-4.2	74	-24.23	199	V
4	5.853	41.51	PK	35.6	-30.8	46.31	53.97	-7.66	74	-27.69	199	V

8.5. TX ABOVE 1 GHz 802.11a MODE IN THE 5.8 GHz BAND

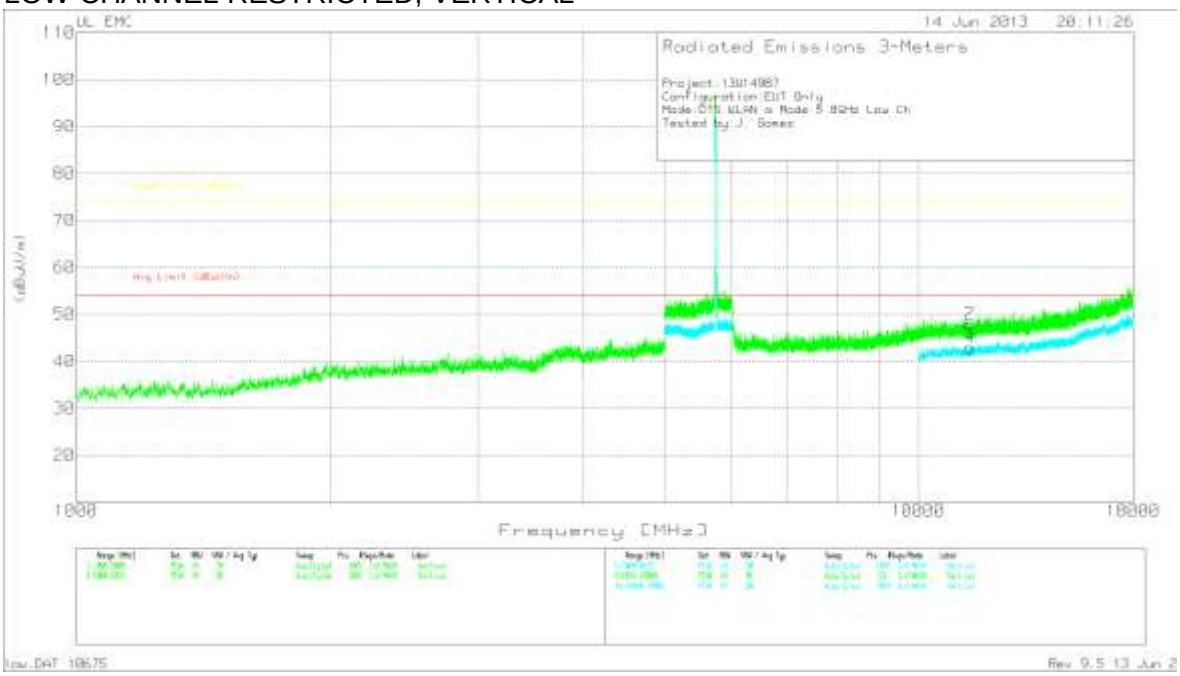
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESTRICTED, HORIZONTAL



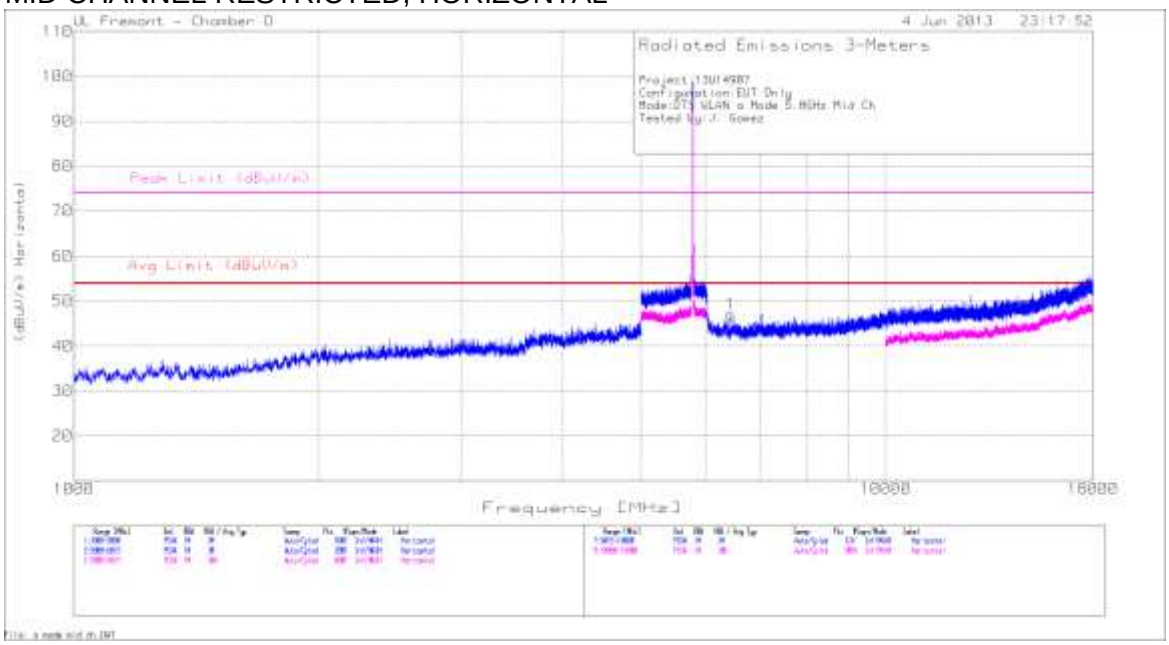
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/6 GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height (cm)	Polarity
1	11.479	34.63	PK	38.7	-25.8	47.53	54	-6.47	74	-26.47	100	H
3	11.475	29.63	PK	38.7	-25.8	42.53	54	-11.47	74	-31.47	100	H

LOW CHANNEL RESTRICTED, VERTICAL



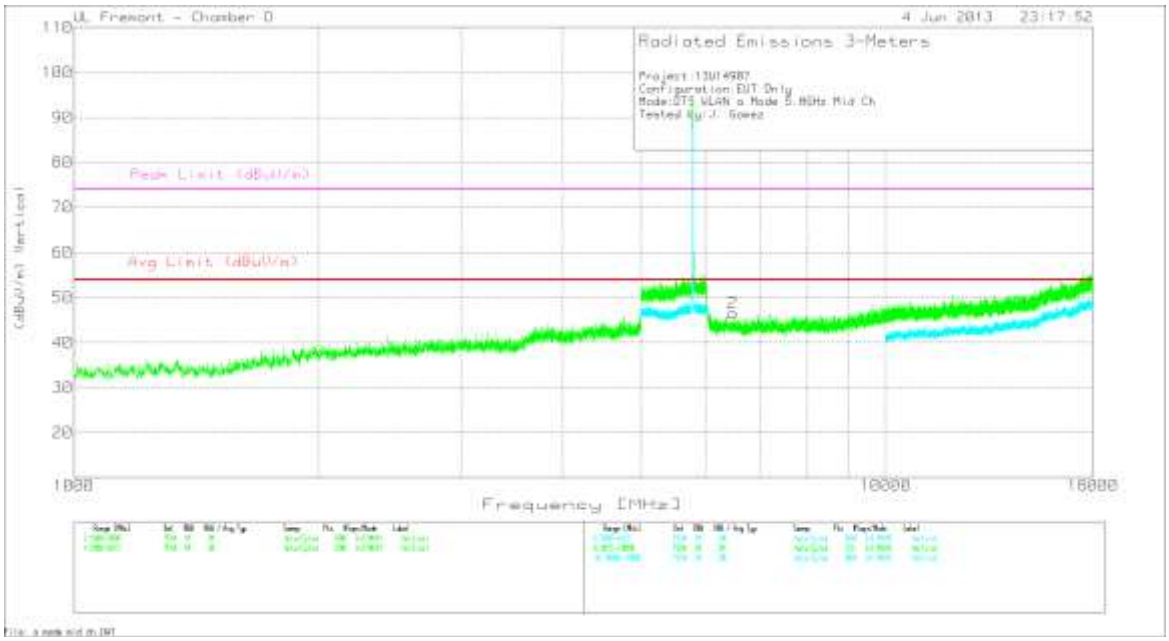
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/6 GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height (cm)	Polarity
2	11.511	34.83	PK	38.7	-25.6	47.93	54	-6.07	74	-26.07	100	V
4	11.51	29.81	PK	38.7	-25.6	42.91	54	-11.09	74	-31.09	100	V

MID CHANNEL RESTRICTED, HORIZONTAL



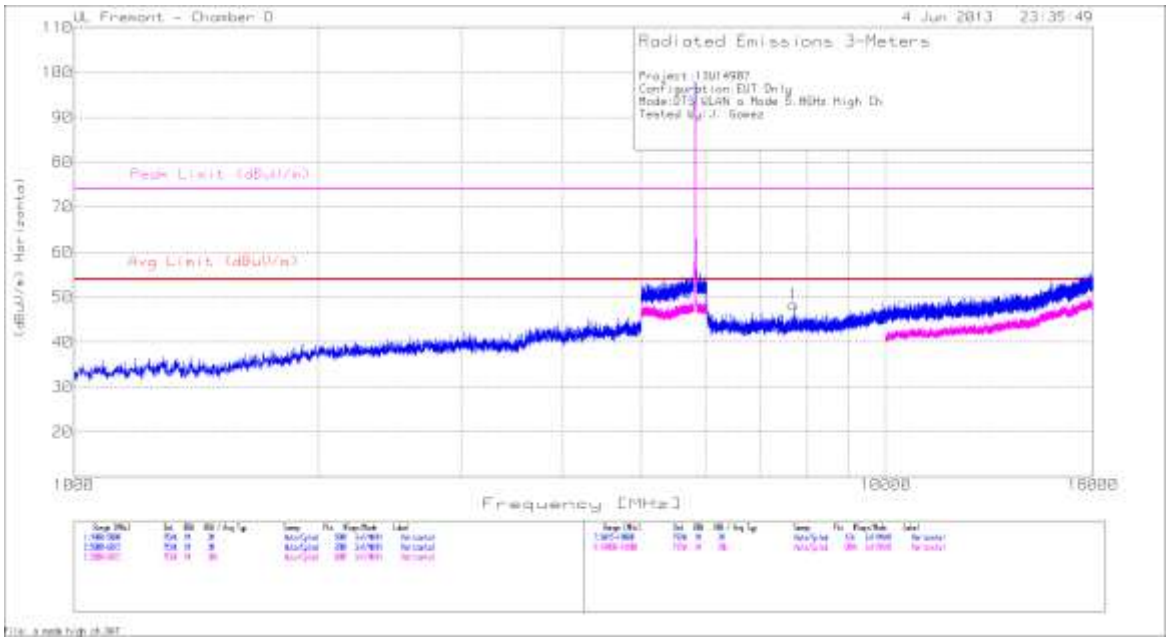
Marker No.	Test Frequency	Meter Reading(dBuV)	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
Horizontal 6015 - 18000MHz												
1	6445.425	41.57	PK	35.8	-30.3	47.07	53.97	-6.9	74	-26.93	100	Horz

MID CHANNEL RESTRICTED, VERTICAL



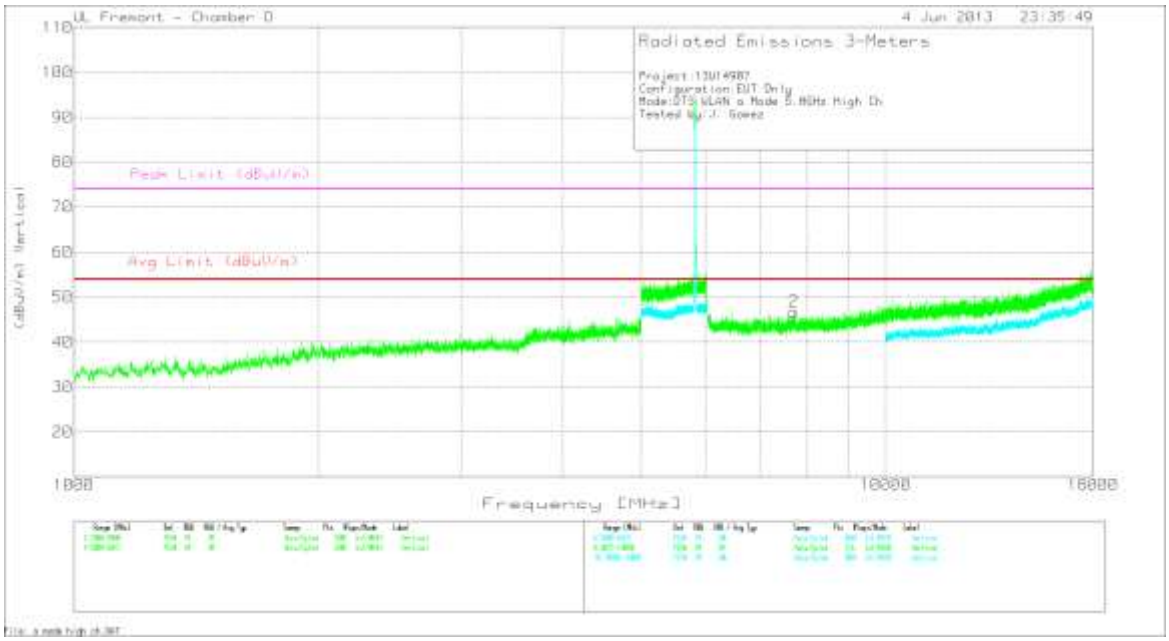
Marker No.	Test Frequency	Meter Reading(dBuV)	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
Vertical 6015 - 18000MHz												
2	6485.372	40.34	PK	35.8	-29.6	46.54	53.97	-7.43	74	-27.46	100	Vert

HIGH CHANNEL RESTRICTED, HORIZONTAL



Marker No.	Test Frequency	Meter Reading(dBuV)	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
Horizontal 6015 - 18000MHz												
1	7702.747	40.5	PK	36.2	-28.4	48.3	53.97	-5.67	74	-25.7	100	Horz

HIGH CHANNEL RESTRICTED, VERTICAL

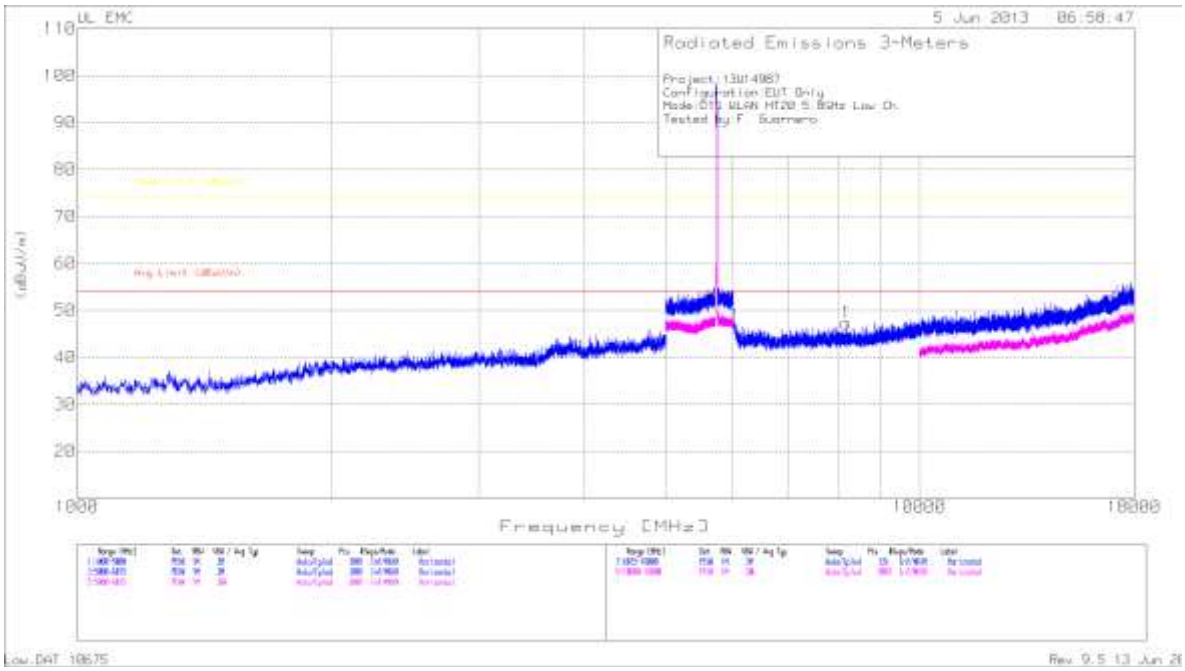


Marker No.	Test Frequency	Meter Reading(dBuV)	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
Vertical 6015 - 18000MHz												
2	7710.736	39	PK	36.2	-28.5	46.7	53.97	-7.27	74	-27.3	100	Vert

8.6. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

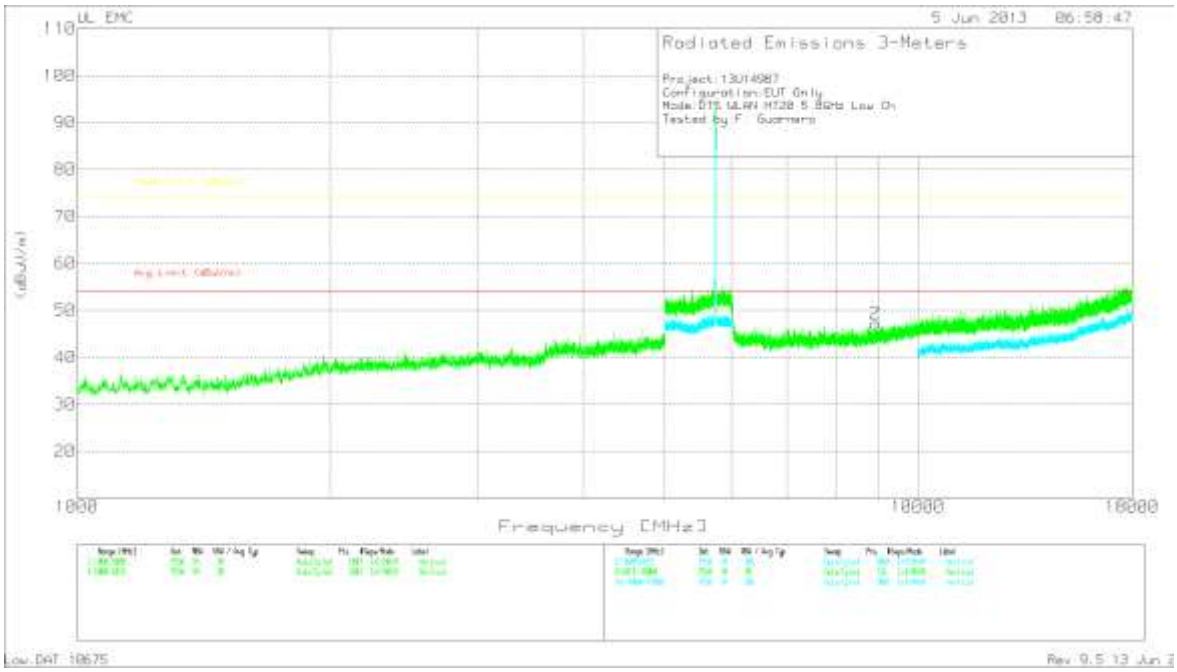
LOW CHANNEL, HORIZONTAL



Horizontal 6015 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
1	8190.096	39.57	PK	36.2	-28.5	47.27	53.97	-6.7	74	-26.73	100	Horz

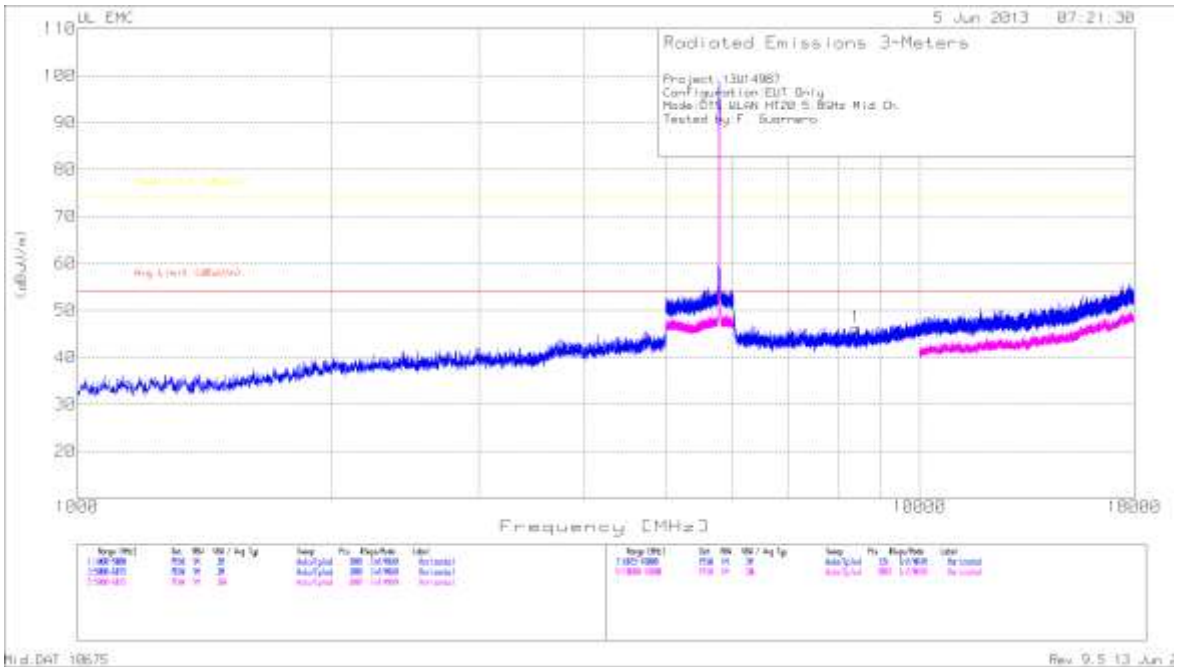
LOW CHANNEL, VERTICAL



Vertical 6015 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
2	8907.139	37.58	PK	36.7	-27.1	47.18	53.97	-6.79	74	-26.82	100	Vert

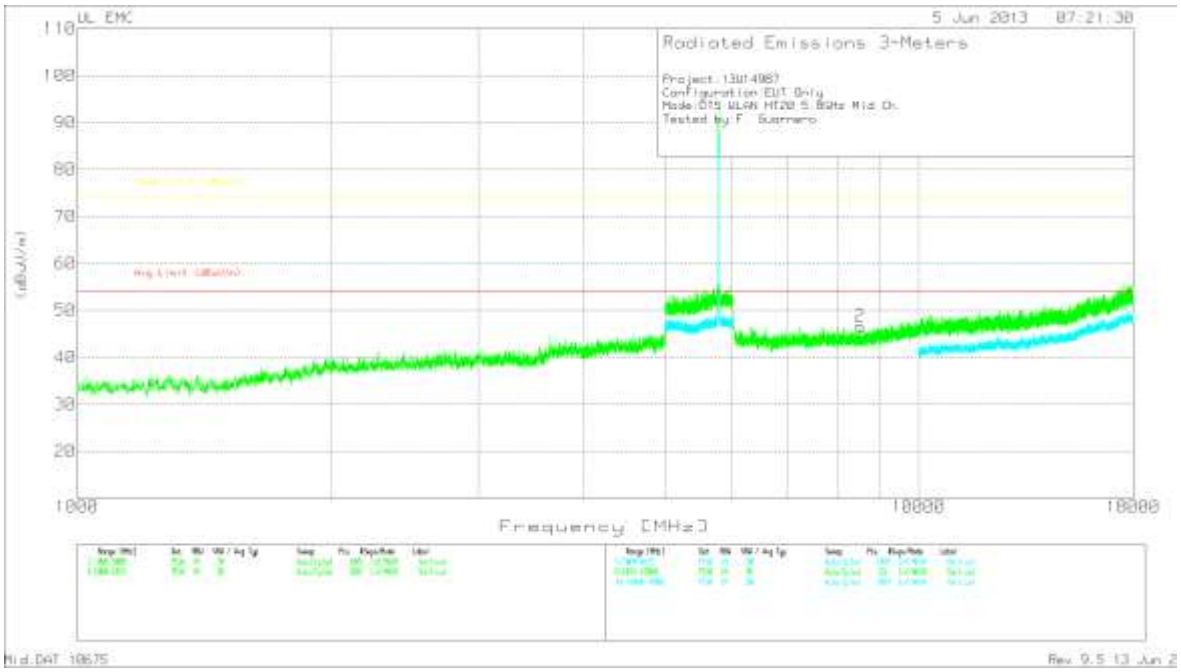
MID CHANNEL, HORIZONTAL



Horizontal 6015 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
1	8413.798	38.18	PK	36.2	-28.1	46.28	53.97	-7.69	74	-27.72	100	Horz

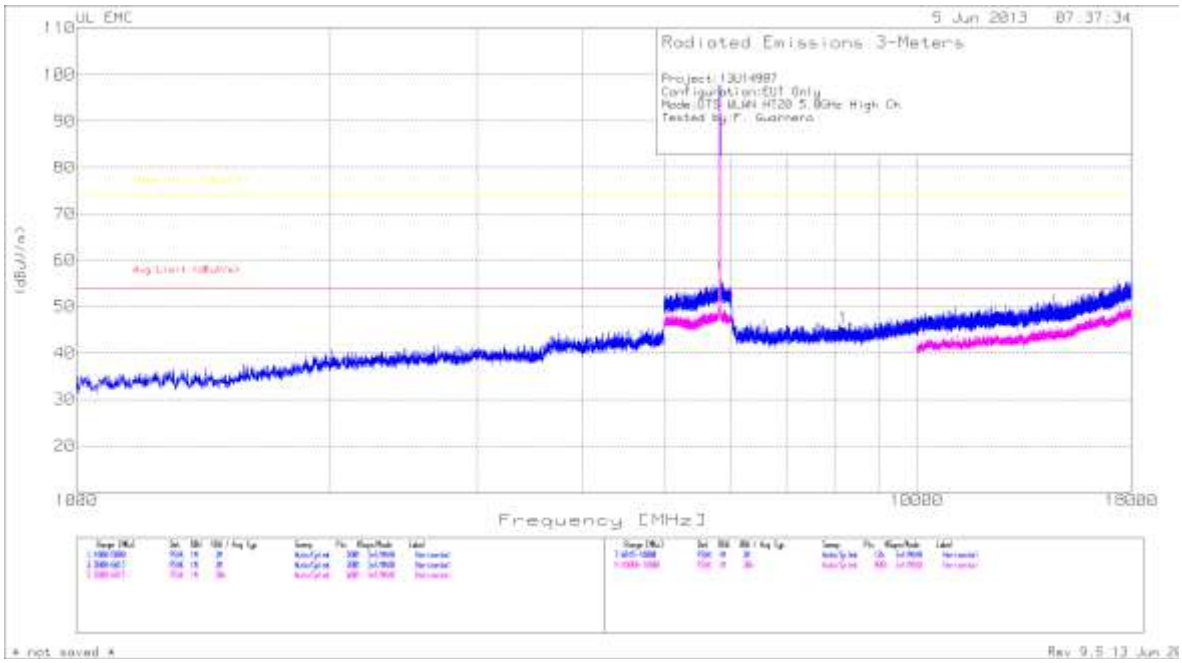
MID CHANNEL, VERTICAL



Vertical 6015 - 18000MHz

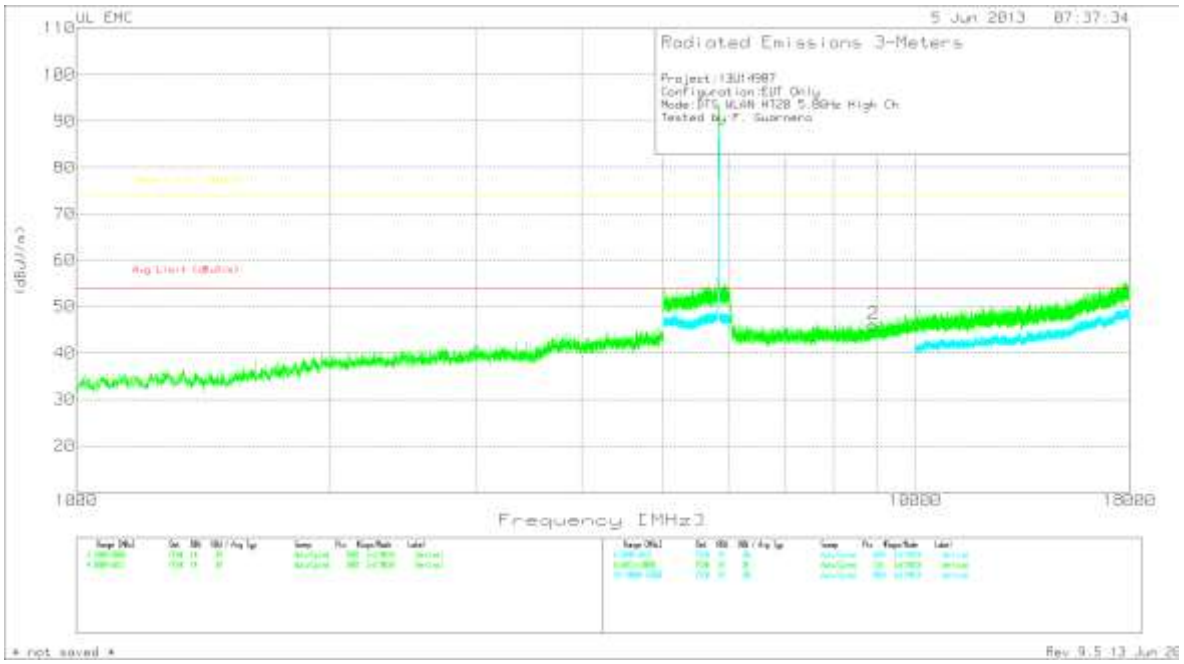
Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
2	8527.646	37.84	PK	36.2	-27.4	46.64	53.97	-7.33	74	-27.36	100	Vert

HIGH CHANNEL, HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/6 GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height (cm)	Polarity
1	8.181	37.41	PK	36.2	-28.5	45.11	53.97	-8.86	74	-28.89	100	H

HIGH CHANNEL, VERTICAL

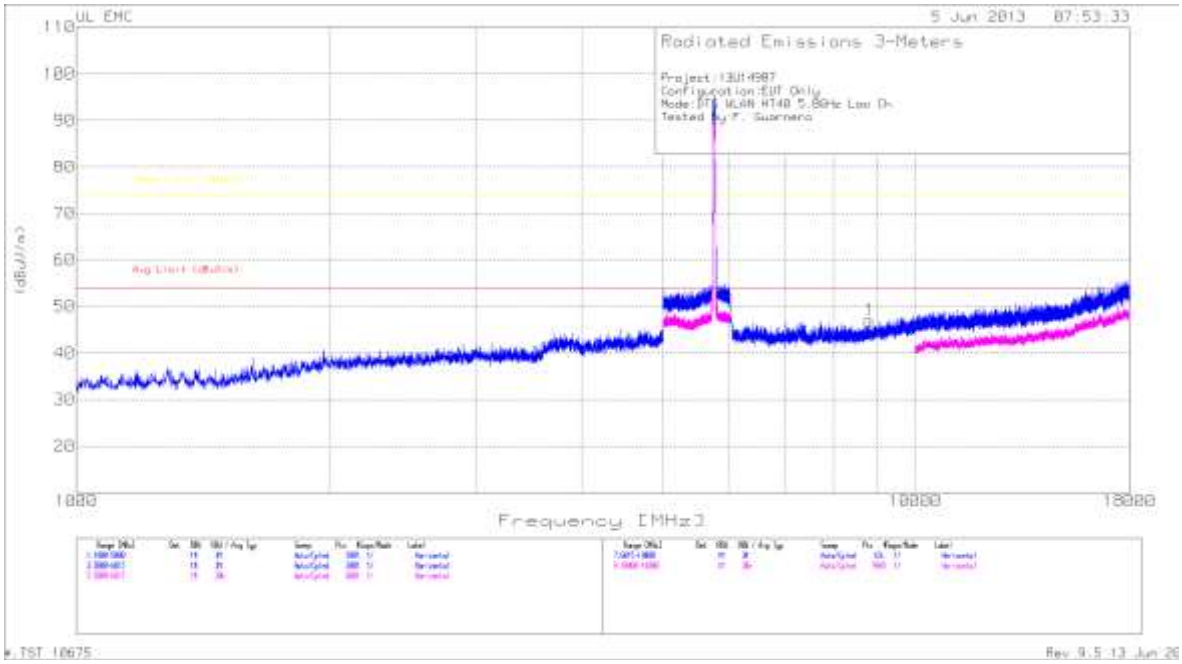


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/6 GHz HPF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height (cm)	Polarity
2	8.908	36.56	PK	36.7	-27.1	46.16	53.97	-7.81	74	-27.84	100	V

8.7. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

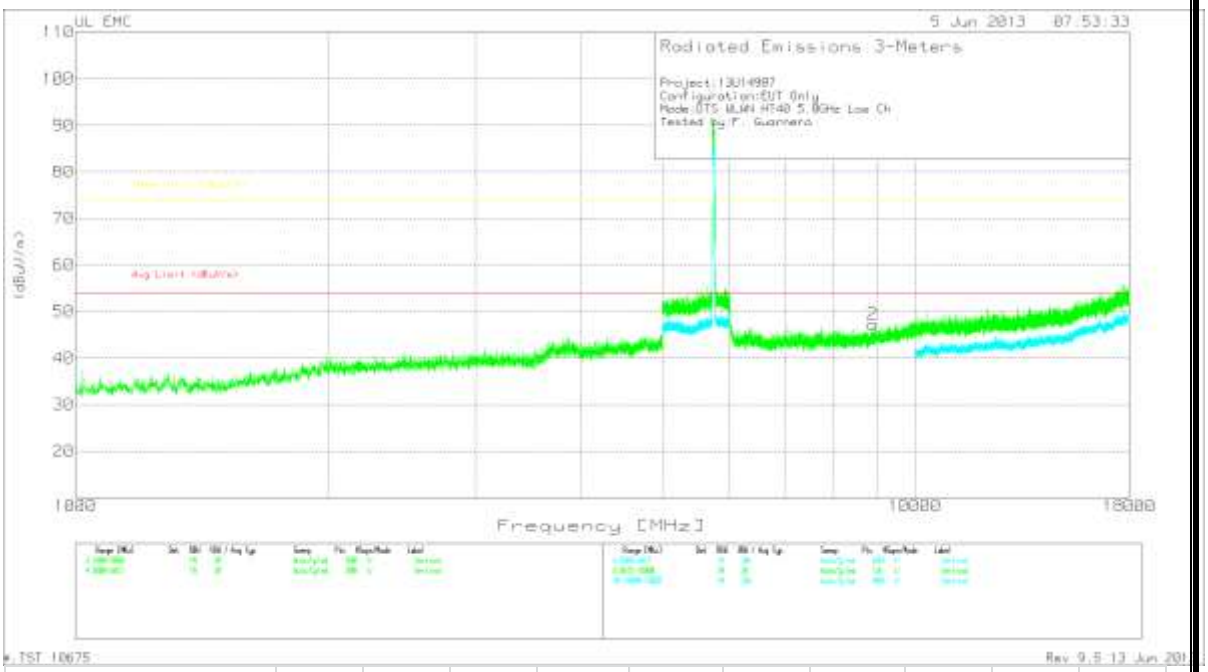
LOW CHANNEL, HORIZONTAL



Horizontal 6015 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
1	8815.262	38.4	PK	36.7	-28.1	47	53.97	-6.97	74	-27	100	Horz

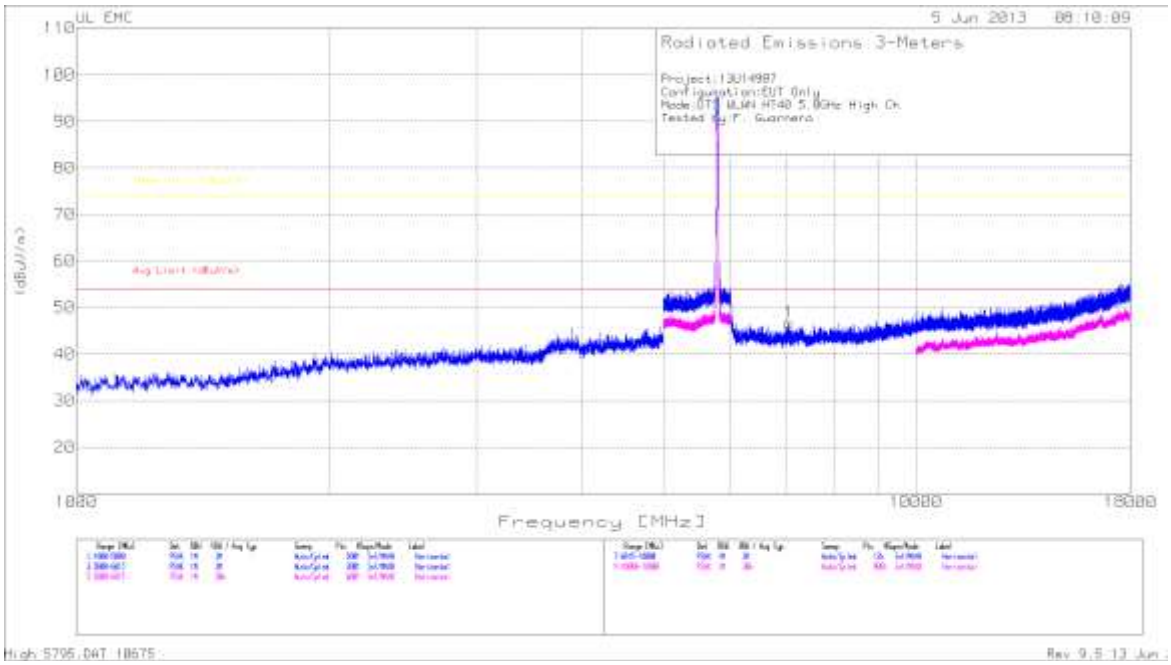
LOW CHANNEL, VERTICAL



Vertical 6015 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
2	8904.143	37.65	PK	36.7	-27.1	47.25	53.97	-6.72	74	-26.75	100	Vert

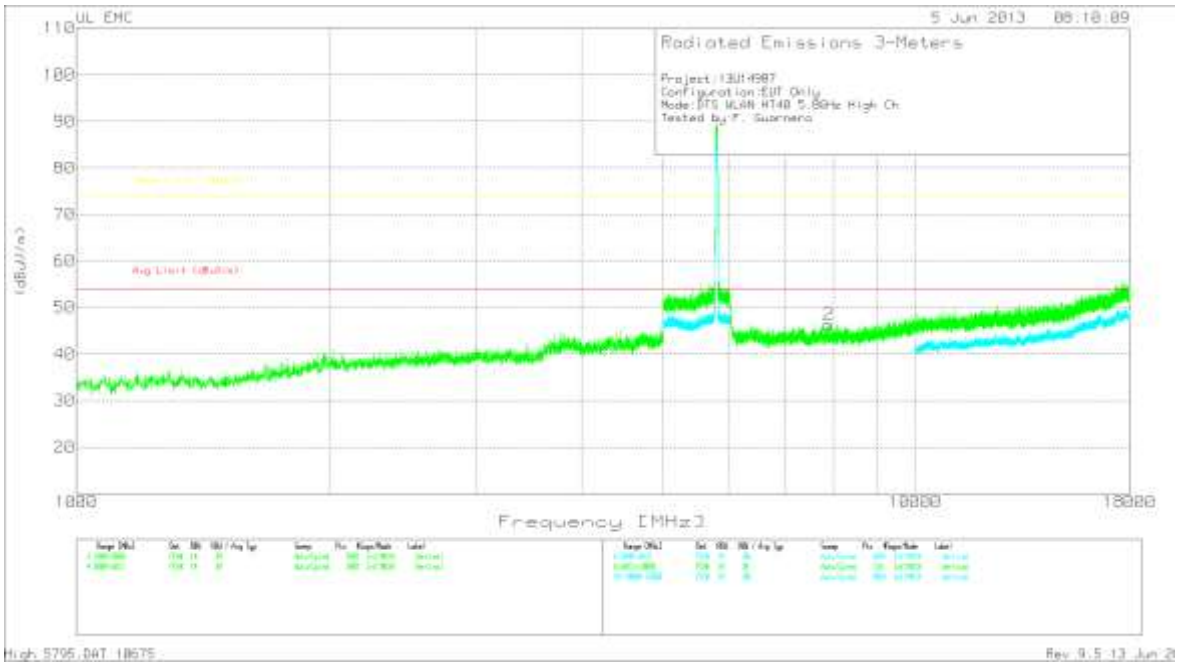
HIGH CHANNEL, HORIZONTAL



Horizontal 6015 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
1	7057.608	39.79	PK	36	-29.1	46.69	53.97	-7.28	74	-27.31	100	Horz

HIGH CHANNEL, VERTICAL



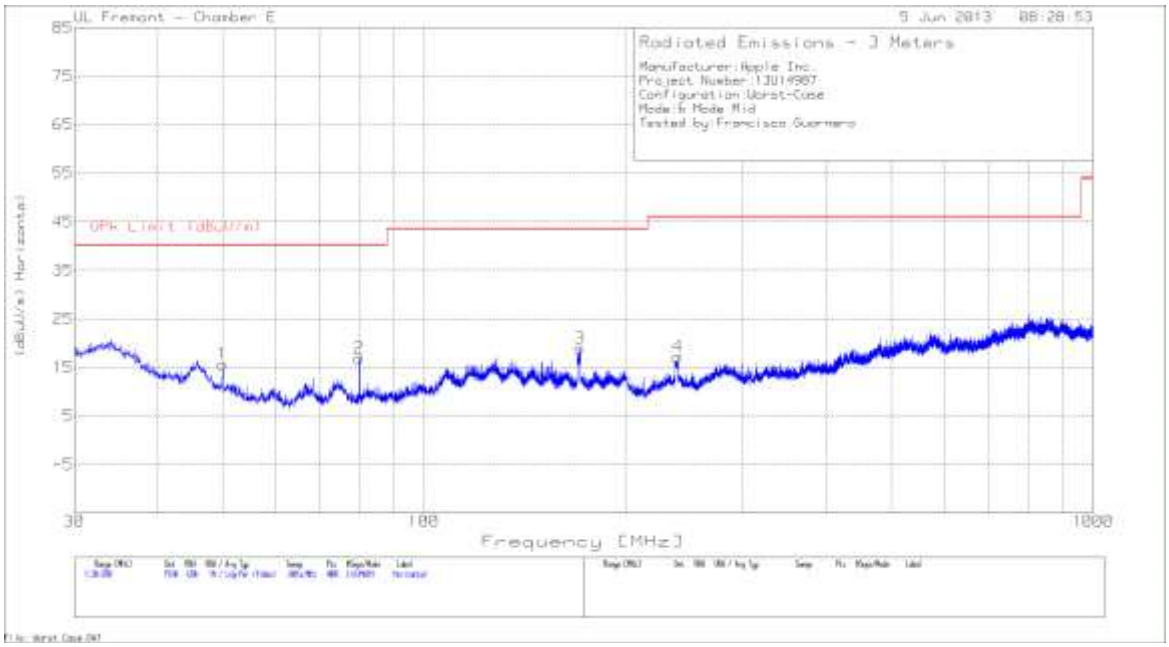
Vertical 6015 - 18000MHz												
Marker No.	Test Frequency	Meter Reading	Detector	AF T346 (dB/m)	Amp/Cbl /6GHz HPF (dB)	(dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
2	7885.503	38.31	PK	36.2	-28.2	46.31	53.97	-7.66	74	-27.69	100	Vert

8.8. WORST-CASE BELOW 1 GHz

2.4GHz BAND

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

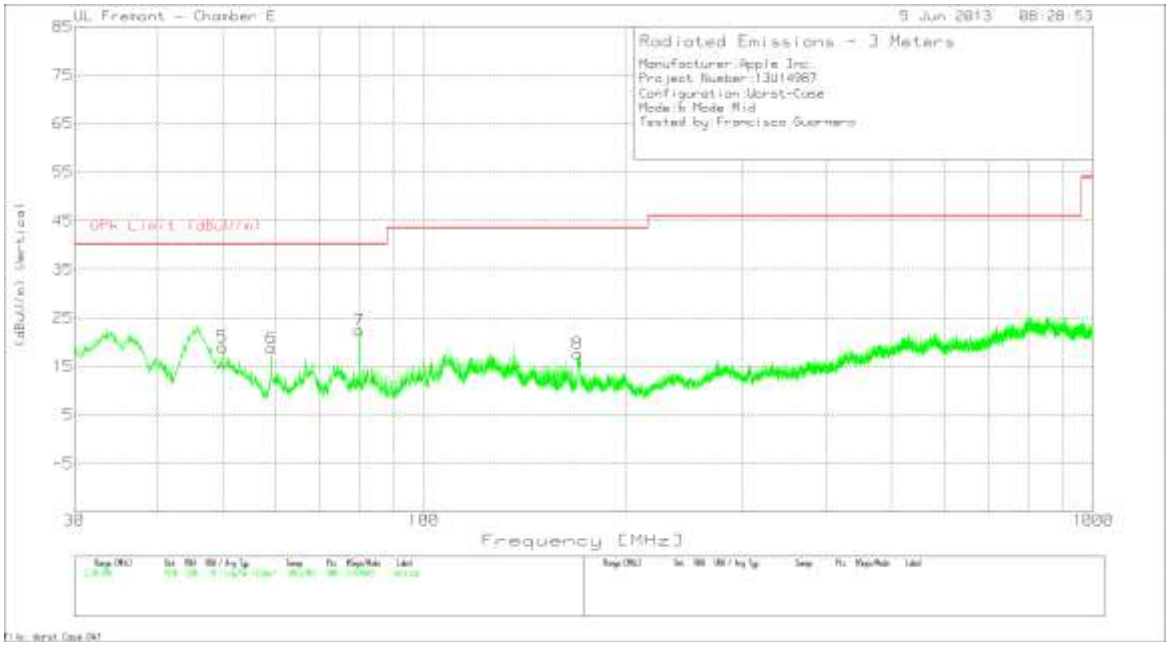
HORIZONTAL PLOT



Marker No.	Test Frequency	Meter Reading	Detector	AF T408 (dB/m)	Amp/Cbl (dB)	(dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
Horizontal 30 - 200MHz										
1	50.0175	35.16	PK	7.9	-27.7	15.36	40	-24.64	300	Horz
2	80.0225	39.14	PK	7.7	-27.7	19.14	40	-20.86	400	Horz
3	171.015	34.45	PK	11.7	-27.3	18.85	43.52	-24.67	99	Horz
Horizontal 200 - 1000MHz										
4	239.5	32.61	PK	11.5	-26.3	17.81	46.02	-28.21	400	Horz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT

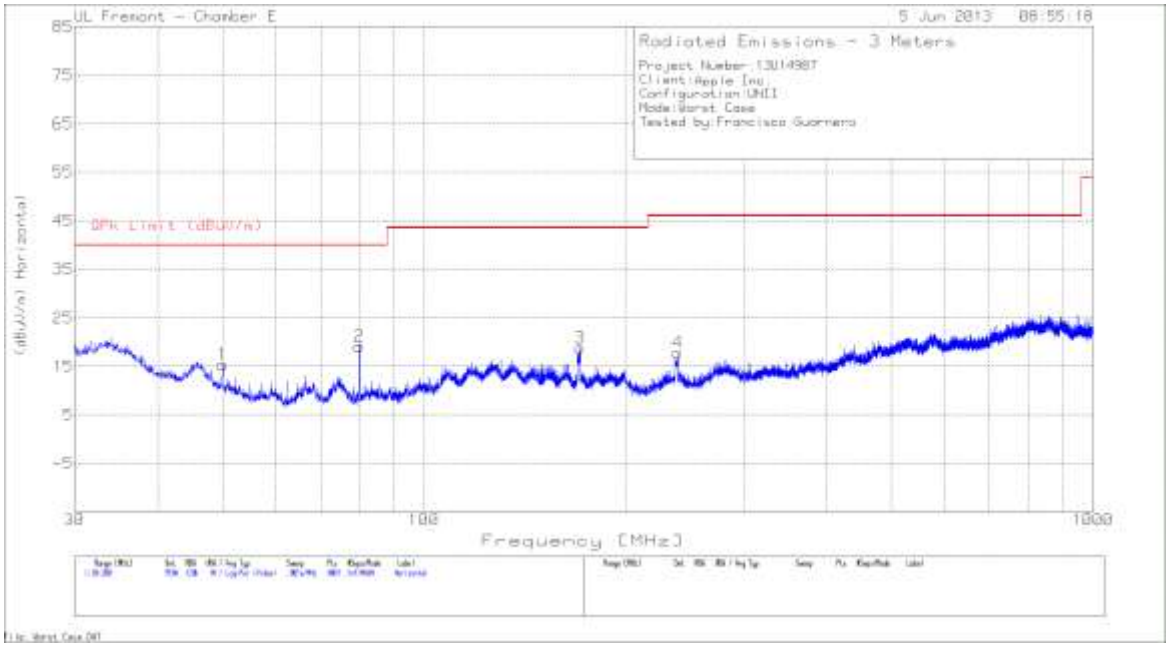


Vertical 30 - 200MHz										
5	49.6775	42.77	PK	8	-27.6	23.17	40	-16.83	100	Vert
6	79.98	42.78	PK	7.7	-27.7	22.78	40	-17.22	100	Vert
7	171.0575	33.26	PK	11.7	-27.3	17.66	43.52	-25.86	100	Vert

5.8GHz BAND

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

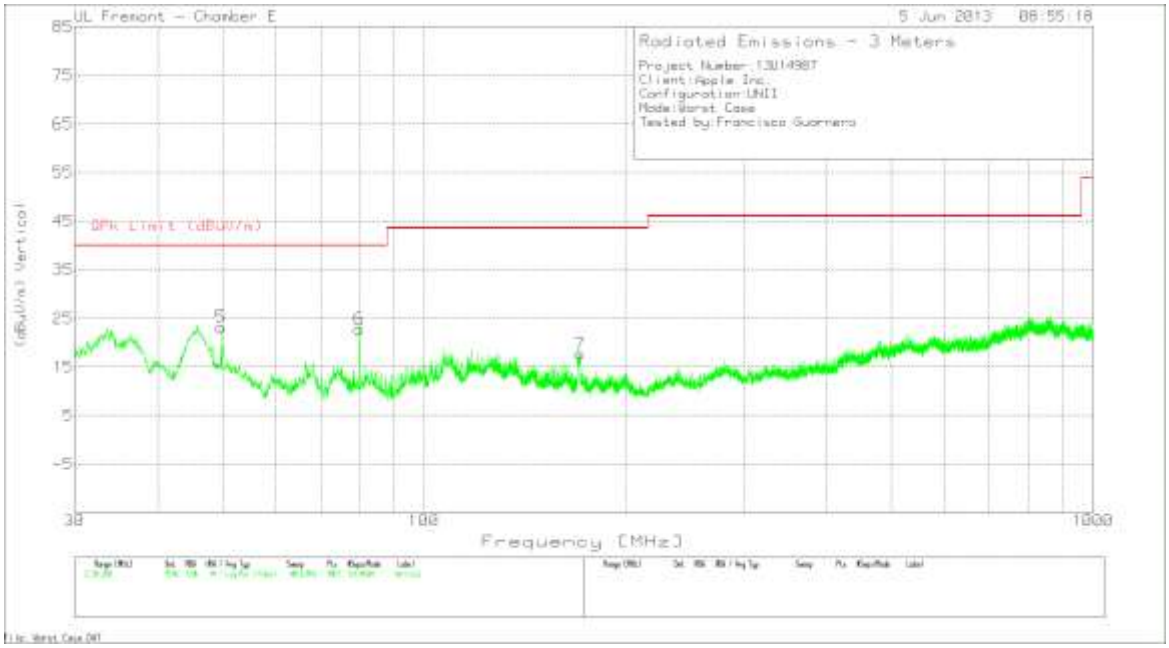
HORIZONTAL PLOT



Marker No.	Test Frequency	Meter Reading	Detector	AF T408 (dB/m)	Amp/Cbl (dB)	(dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
Horizontal 30 - 200MHz										
1	50.0175	35.16	PK	7.9	-27.7	15.36	40	-24.64	300	Horz
2	80.0225	39.14	PK	7.7	-27.7	19.14	40	-20.86	400	Horz
3	171.015	34.45	PK	11.7	-27.3	18.85	43.52	-24.67	99	Horz
Horizontal 200 - 1000MHz										
4	239.5	32.61	PK	11.5	-26.3	17.81	46.02	-28.21	400	Horz
PK - Peak detector										

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



Marker No.	Test Frequency	Meter Reading	Detector	AF T408 (dB/m)	Amp/Cbl (dB)	(dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Height [cm]	Polarity
Vertical 30 - 200MHz										
5	49.6775	42.77	PK	8	-27.6	23.17	40	-16.83	100	Vert
6	79.98	42.78	PK	7.7	-27.7	22.78	40	-17.22	100	Vert
7	171.0575	33.26	PK	11.7	-27.3	17.66	43.52	-25.86	100	Vert
PK - Peak detector										

8.9. RECEIVER ABOVE 1 GHz

Note: No emissions were detected above the system noise floor.

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

ANSI C63.4

RESULTS

6 WORST EMISSIONS

Project No:13U14987
Model/Device:WLAN Worst Case
Test Volt/Freq:115V 60Hz
Test By:F. Guarnero

Line-L1 .15 - 30MHz

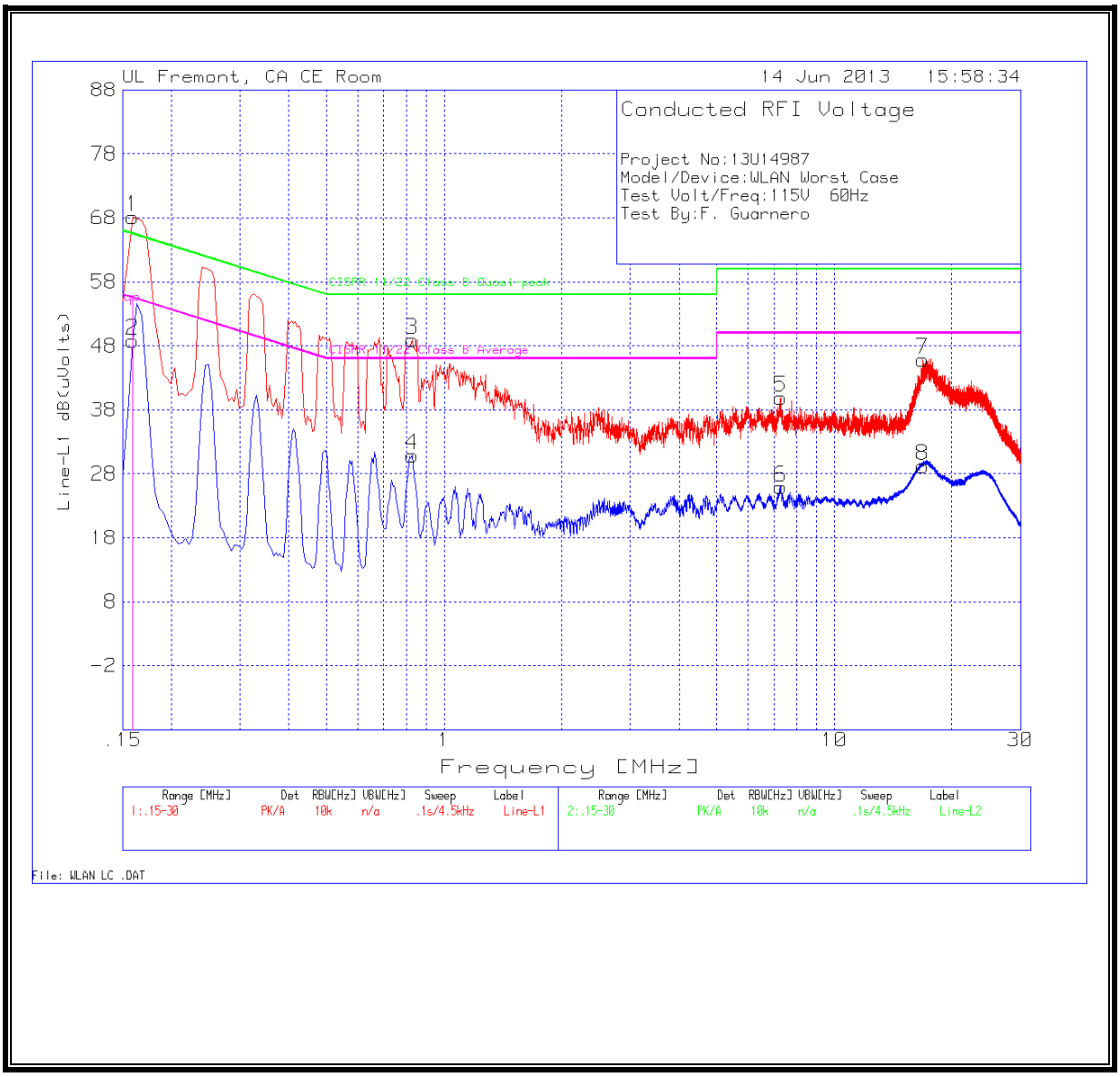
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin	CISPR 11/22 Class B Average	Margin
0.159	54.38	QP	0.1	0	54.48	65.52	-11.04	-	-
0.159	48.7	Av	0.1	0	48.8	-	-	55.5	-6.7
0.8295	48.8	PK	0.1	0	48.9	56	-7.1	-	-
0.8295	30.76	Av	0.1	0	30.86	-	-	46	-15.14
7.278	39.71	PK	0.1	0.1	39.91	60	-20.09	-	-
7.278	25.72	Av	0.1	0.1	25.92	-	-	50	-24.08
16.854	45.42	PK	0.2	0.2	45.82	60	-14.18	-	-
16.854	28.85	Av	0.2	0.2	29.25	-	-	50	-20.75

Line-L2 .15 - 30MHz

Test Frequency	Meter Reading	Detector	T24 IL L2.TXT (dB)	LC Cables 2&3.TXT (dB)	dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin	CISPR 11/22 Class B Average	Margin
0.1545	54.75	PK	0.1	0	54.85	65.8	-10.95	-	-
0.1545	40.25	Av	0.1	0	40.35	-	-	55.8	-15.45
0.78	42.3	PK	0.1	0	42.4	56	-13.6	-	-
0.78	24.89	Av	0.1	0	24.99	-	-	46	-21.01
2.4585	35.55	PK	0.1	0.1	35.75	56	-20.25	-	-
2.4585	22.07	Av	0.1	0.1	22.27	-	-	46	-23.73
17.5425	42	PK	0.2	0.2	42.4	60	-17.6	-	-
17.5425	29.72	Av	0.2	0.2	30.12	-	-	50	-19.88

PK - Peak detector
QP - Quasi-Peak detector
Av - Average detector

LINE 1 RESULTS



LINE 2 RESULTS