



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

CERTIFICATION TEST REPORT

FOR

OEM CAR HEAD UNIT

MODEL NUMBER: GA-130-COLR-NS

**FCC ID: ACJ-GA-130-COLR
IC: 216B-GA130COLRNS**

REPORT NUMBER: 12U14378-2

ISSUE DATE: 2012-04-20

Prepared for
**PANASONIC AUTOMOTIVE SYSTEMS COMPANY OF AMERICA
776 HWY. 74
PEACHTREE CITY
GA, 30276, USA**

Prepared by
**UNDERWRITERS LABORATORIES INC.
1285 WALT WHITMAN RD.
MELVILLE, NY 11747, U.S.A.
TEL: (631) 271-6200
FAX: (877) 854-3577**



NVLAP LAB CODE 100255-0

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PANASONIC AUTOMOTIVE SYSTEMS CO. OF AMERICA
776 HWY. 74
PEACHTREE CITY, GA, 30276, USA

EUT DESCRIPTION: OEM CAR HEAD UNIT

MODEL: GA-130-COLR-NS

SERIAL NUMBER: 100184 & 100223

DATE TESTED: 2012-04-06 to 2012-04-18

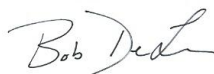
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

Underwriters Laboratories Inc. tested the above equipment in accordance with the requirements set forth in the above standards, using test results reported in the test report documents referenced below and/or documentation furnished by the applicant. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Inc. based on interpretations of these calculations. The results show that the equipment 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 by the referenced documents. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories 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 By:

Tested By:



Bob DeLisi
Sr. Staff Engineer
UL LLC

Mike Antola
Sr. Project Engineer
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.3-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, 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 1285 Walt Whitman Rd. Melville, NY 11747, USA.

UL Melville is accredited by NVLAP, Laboratory Code 100255-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/1002550.htm>.

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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamplifier Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

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	± 3.3 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.00 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g transceiver Model number CQ-XG01E0GD.

The radio module is manufactured by Panasonic Corporation of North America.

Note: Throughout the report the model number shown, CQ-XG01E0GD, should be GA-130-COLR-NS.

5.2. MAXIMUM OUTPUT POWER

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

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	IBM	T410	R81EHLE	NA
Laptop	Dell	Lattitude E410	-	NA
Faceplate	Sanyo	20843234	NA	NA
LCD Display	Sanyo	20937689	NA	NA
USB/Saint Module	CSI	The Saint	NA	NA
1324 USB/SPI Converter	Electronics CSR	1324 USB/SPI Converter	185467	NA
1324 USB/SPI Converter	CSR	1324 USB/SPI Converter	241361	NA
Fiber Optic Converter (Gryphon)	Dearborn Group Technology	SW CAN Fiber- Optic Gryphon Box	571181	NA
Fiber Optic Converter	Dearborn Group Technology	SW CAN Fiber- Optic Satellite Module	FOSM-SWCAN- 2015	NA

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an external PIFA antenna, with a maximum gain of 4 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was ptest_unifi_602xb_b07.xbv, Build 1150, 2/15/2011.

The EUT driver software installed in the host support equipment during testing was:

Software	Version	Software	Version
22950346	E0.0D.0A.04	66666666	C9.0D.00.04
22768311	E0.0D.0A.03	22768332	C9.02.21.12
22768303	E0.0D.0A.03	22950170	C9.0D.0B.02
22768304	E0.0D.0A.03	22950152	C9.0D.0B.30
22768305	E0.0D.0A.03	22768340	C9.0D.0B.30
22768306	E0.0D.0A.03	22950162	C9.0D.0B.30
22768307	E0.0D.0A.03	22950163	C9.0D.0B.02
22768308	E0.0D.0A.03	22950166	C9.0D.0B.02
22768309	E0.0D.0A.03	22950165	C9.0D.0B.02
22768310	E0.0D.0A.03	22950158	C9.0D.0B.02
22768501	E0.00.41.54	22950151	C9.02.05.B1
22950164	C9.0D.0B.30	22950167	C9.0D.0B.30
22950148	C9.0D.0B.02	22950155	C9.0D.0B.30
22952317	C9.0D.0B.02	22768345	C9.0D.0A.04
22950161	C9.0D.0B.30	-	-

The test utility software used during testing was UniTest, Version 7.2.1.5.

WLAN Power Profile: Board Profile: Profile -- Oct14 -- Modified Build -- With change on caps -- fcc update_apr16_rev.c.txt

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

All testing was performed at the worse-case data rate for 802.11b and 802.11g modes.

Radiated testing above 1GHz was performed in both 802.11b and 802.11g modes at the low, mid and high channels. Transmit mode testing below 1GHz and all receive mode tests were performed at the worse-case mode/channel only.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	IBM	T410	R81EHLE	NA
Laptop	Dell	Lattitude E410	-	NA
Faceplate	Sanyo	20843234	NA	NA
LCD Display	Sanyo	20937689	NA	NA
USB/Saint Module	CSI Electronics	The Saint	NA	NA
1324 USB/SPI Converter	CSR	1324 USB/SPI Converter	185467	NA
1324 USB/SPI Converter	CSR	1324 USB/SPI Converter	241361	NA
Fiber Optic Converter (Gryphon)	Dearborn Group Technology	SW CAN Fiber-Optic Gryphon Box	571181	NA
Fiber Optic Converter	Dearborn Group Technology	SW CAN Fiber-Optic Satellite Module	FOSM-SWCAN-2015	NA

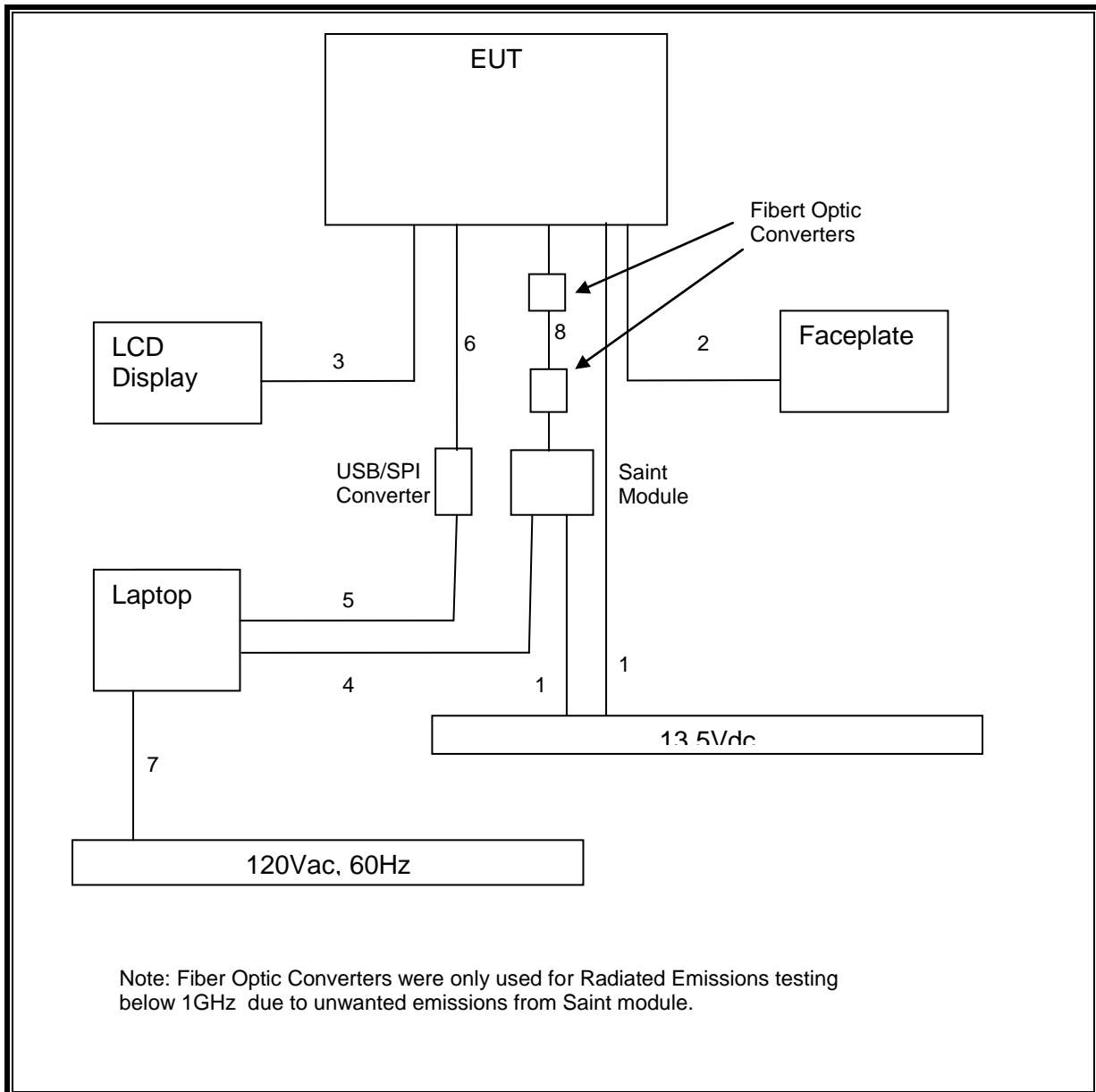
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	DC	1	Hardwire	Unshielded	1.0m / 1.5m	Cable harness for Conducted Antenna port test and Radiated Emissions Tests respectively.
2	I/O	1	Faceplate Radio Harness	Unshielded	1.0m	None
3	I/O	1	LCD Display Radio Harness	Unshielded	1.0m	None
4	I/O	1	USB	Shielded	1.8m	Used between support laptop and Saint module
5	I/O	1	USB	Shielded	1.8m	Used between USB/SPI converter and laptop
6	I/O	1	Serial	Unshielded	1.0m	Used between EUT and USB/SPI converter for control only
7	AC	1	AC	Unshielded	1.8m	Used to power laptops only. Not part of EUT

TEST SETUP

The EUT is a head-end radio with wireless capabilities. The wireless modules were located inside the head-end unit. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used – Radiated Emissions					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
30-1000MHz					
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081	2012-01-30	2013-01-30
Bicon Antenna	Schaffner	VBA6106A	43441	2011-10-11	2012-10-12
Log-P Antenna	Schaffner	UPA6109	44067	2011-04-29	2012-04-29
Preamp	Schaffner	CPA9231A	31613	N/A	N/A
Switch Driver	HP	11713A	ME7A-627	N/A	N/A
System Controller	Sunol Sciences	SC99V	44396	N/A	N/A
Camera Controller	Panasonic	WV-CU254	44395	N/A	N/A
RF Switch Box	UL	1	44398	N/A	N/A
Measurement Software	UL	Version 9.3	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	87V	44547	2012-02-01	2013-02-28
Above 1GHz (Band Optimized System)					
EMI Receiver	Rohde & Schwarz	ESIB40	34968	2012-03-06	2013-03-06
Horn Antenna (1-2 GHz)	ETS	3161-01	51442	2008-03-28	See * below
Horn Antenna (2-4 GHz)	ETS	3161-02	48107	2007-09-27	See * below
Horn Antenna (4-8 GHz)	ETS	3161-03	48106	2007-09-27	See * below
Horn Antenna (8-12 GHz)	ETS	3160-07	8933	2008-11-24	See * below
Horn Antenna (12-18 GHz)	ETS	3160-08	8932	2007-09-27	See * below
Horn Antenna (18-26.5 GHz)	ETS	3160-09	8947	2007-09-26	See * below
2.4G Notch Filter	Lorch	5BRX-2441.75/83.5-S	72668	N/A	N/A
Signal Path Controller	HP	11713A	50250	N/A	N/A
Gain Controller	HP	11713A	50251	N/A	N/A
RF Switch / Preamp Fixture	UL	BOMS1	50249	N/A	N/A
System Controller	UL	BOMS2	50252	N/A	N/A
Measurement Software	UL	Version 9.3	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	87V	44547	2012-02-01	2013-02-28
<p>* - Note: As allowed by the calibration standard ANSI C63.4 Section 4.4.2, standard gain horns need only a one-time calibration. Only if physical damage occurs will the horn antenna require re-calibration.</p> <p>* Gain standard horn antennas (sometimes called standard gain horn antennas) need not be calibrated beyond that which is provided by the manufacturer unless they are damaged or deterioration is suspected, or they are used at a distance closer than $2D^2/\lambda$. Gain standard horn antennas have gains that are fixed by their dimensions and dimensional tolerances.</p>					

Test Equipment Used – Conducted RF					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Spectrum Analyzer	Agilent	E4446A	72823	2012-01-31	2013-02-28
Power Meter	HP	437B	73872	2012-01-30	2013-02-28
Power Sensor	HP	8481A	71770	2012-01-31	2013-02-28
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	43733	2012-03-13	2014-03-13
Multimeter	Fluke	87V	44547	2012-02-01	2013-02-28

7. ANTENNA PORT TEST RESULTS

7.1. 802.11b MODE IN THE 2.4 GHz 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.

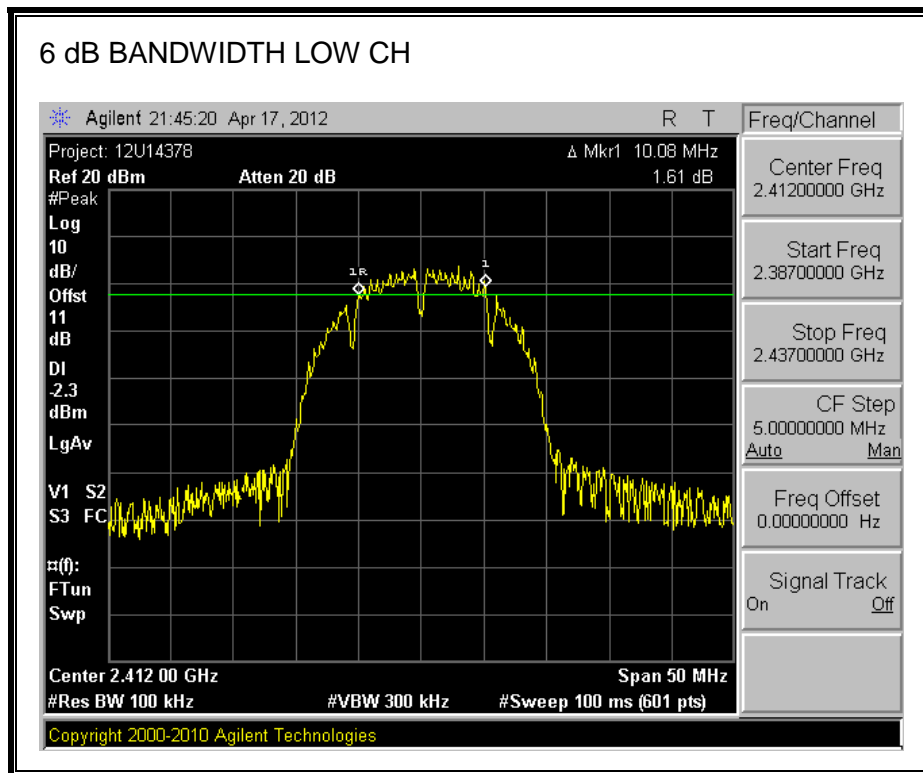
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

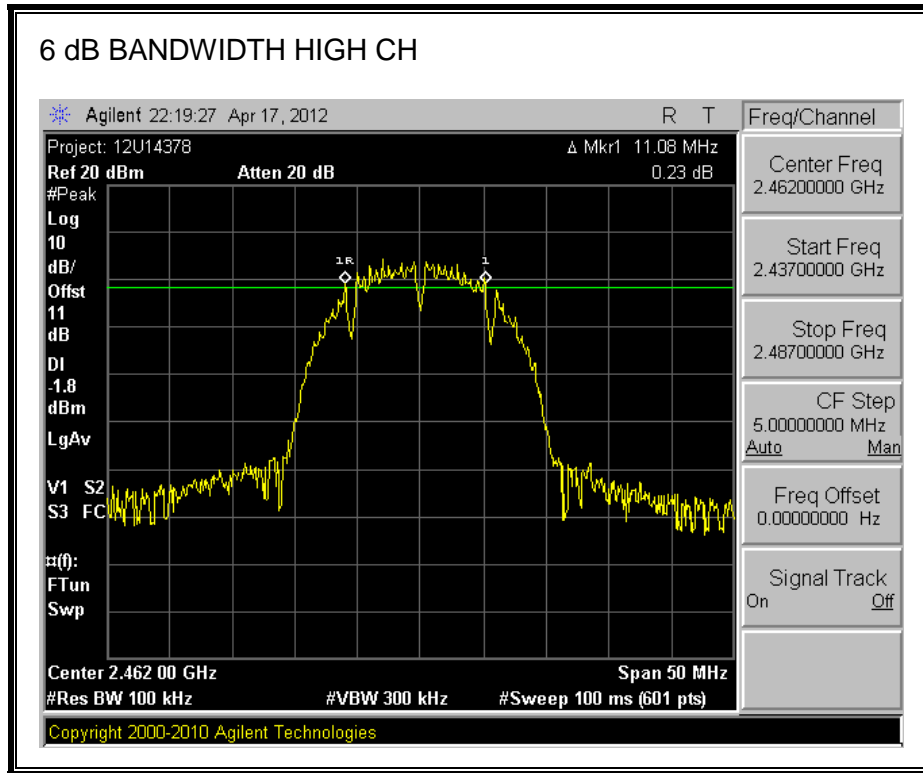
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	10.08	0.5
Middle	2437	9.17	0.5
High	2462	11.08	0.5

6 dB BANDWIDTH







7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

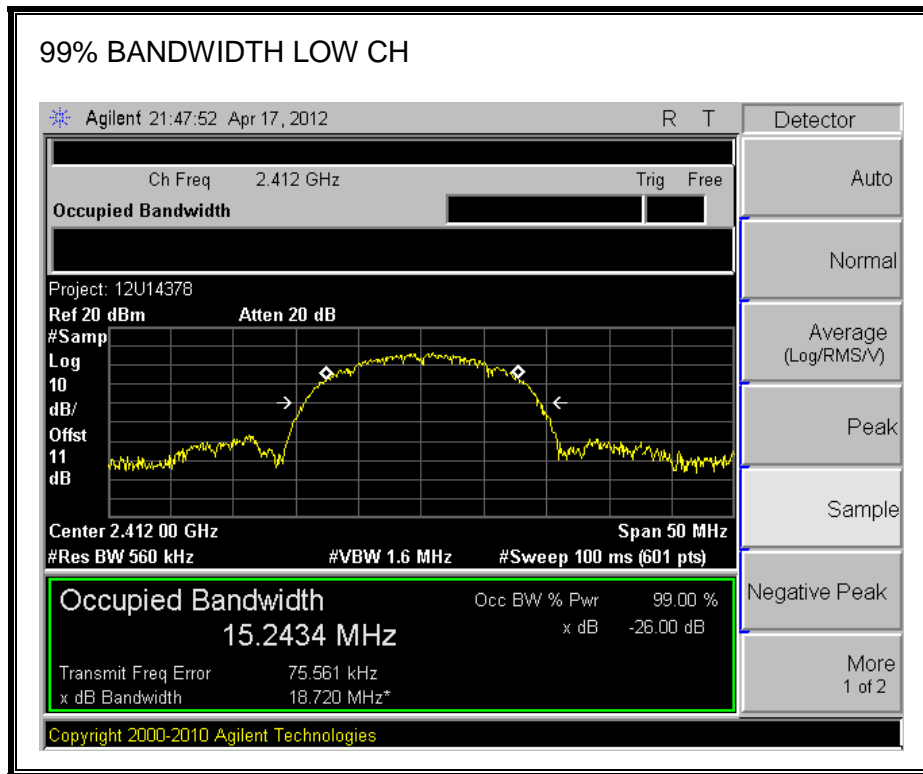
TEST PROCEDURE

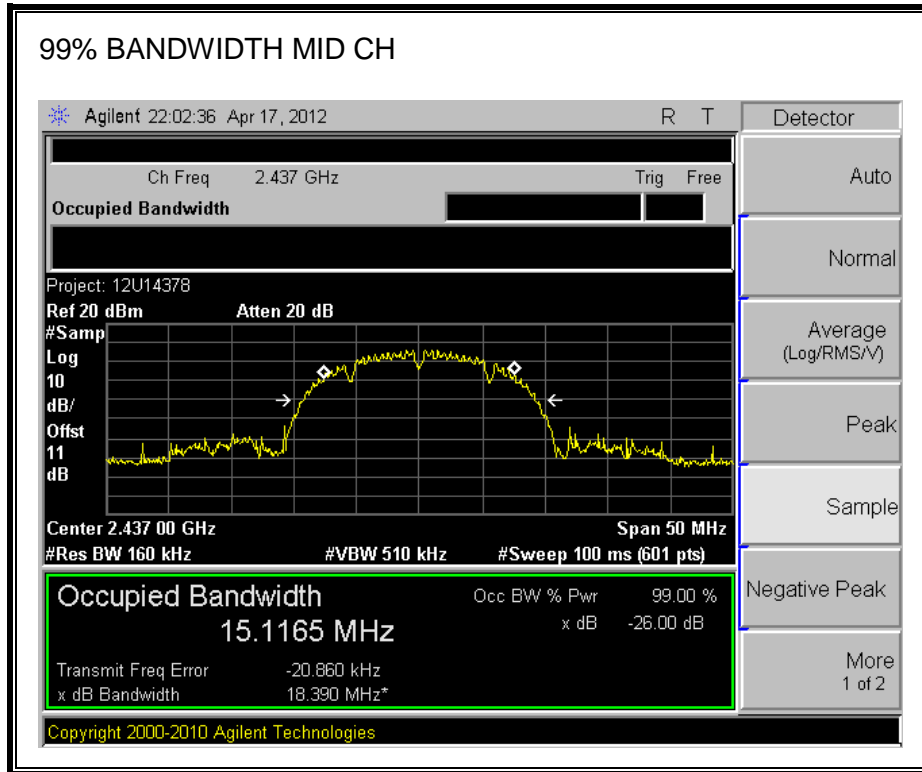
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

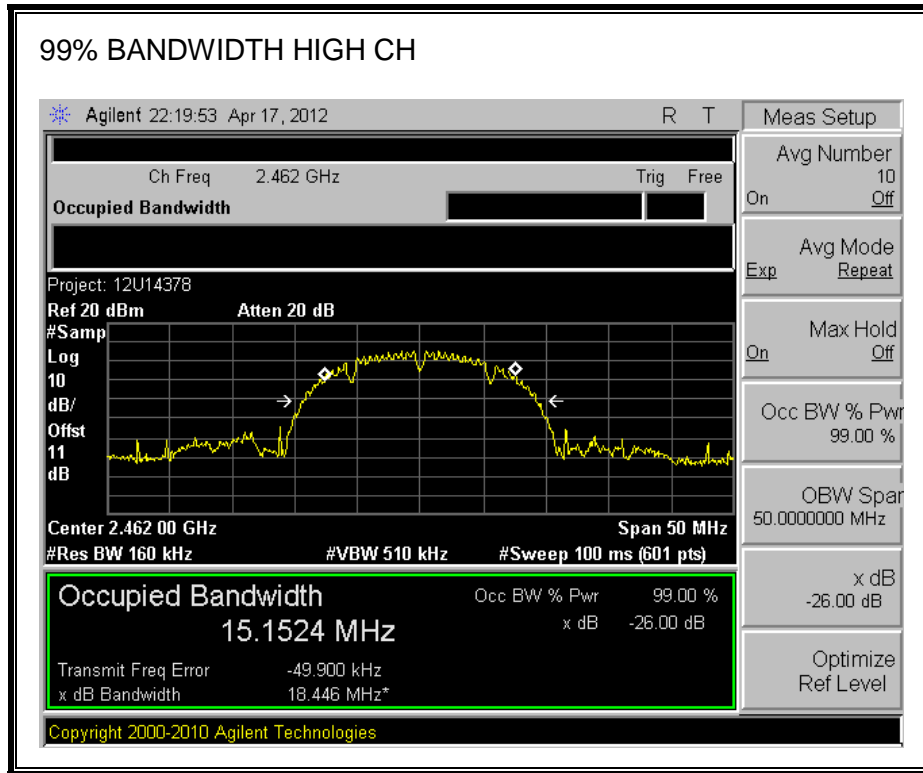
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	15.24
Middle	2437	15.12
High	2462	15.15

99% BANDWIDTH







7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

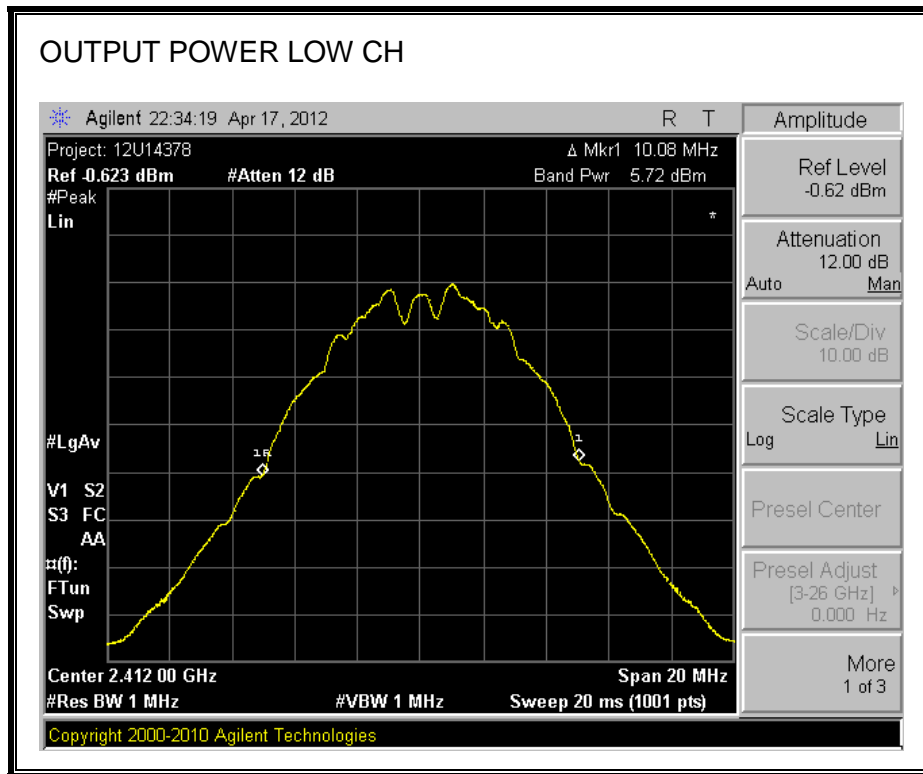
TEST PROCEDURE

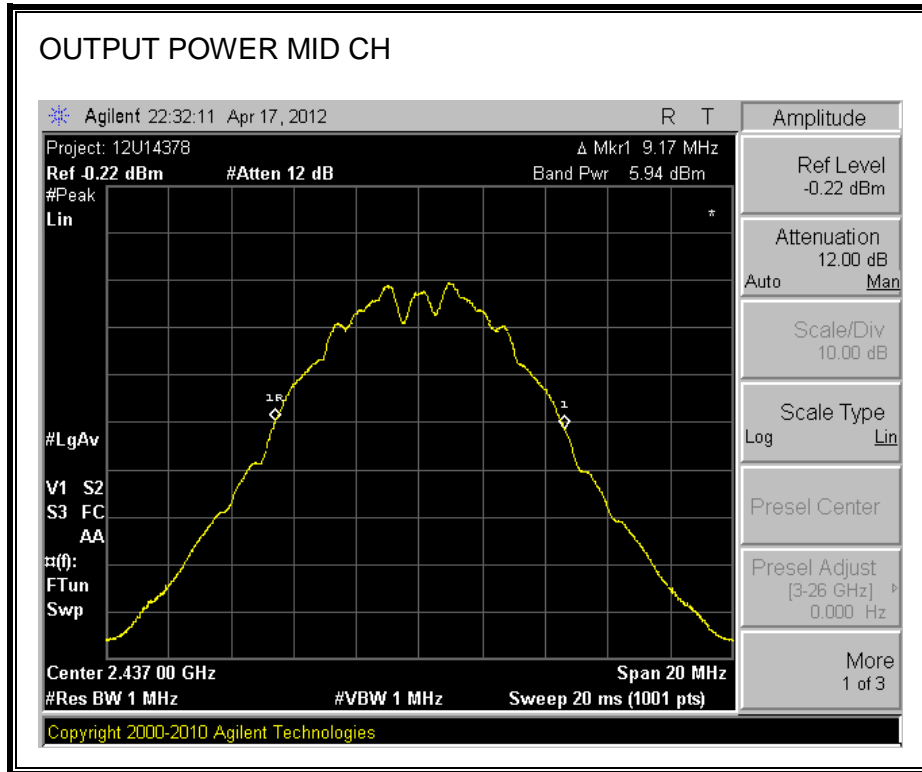
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

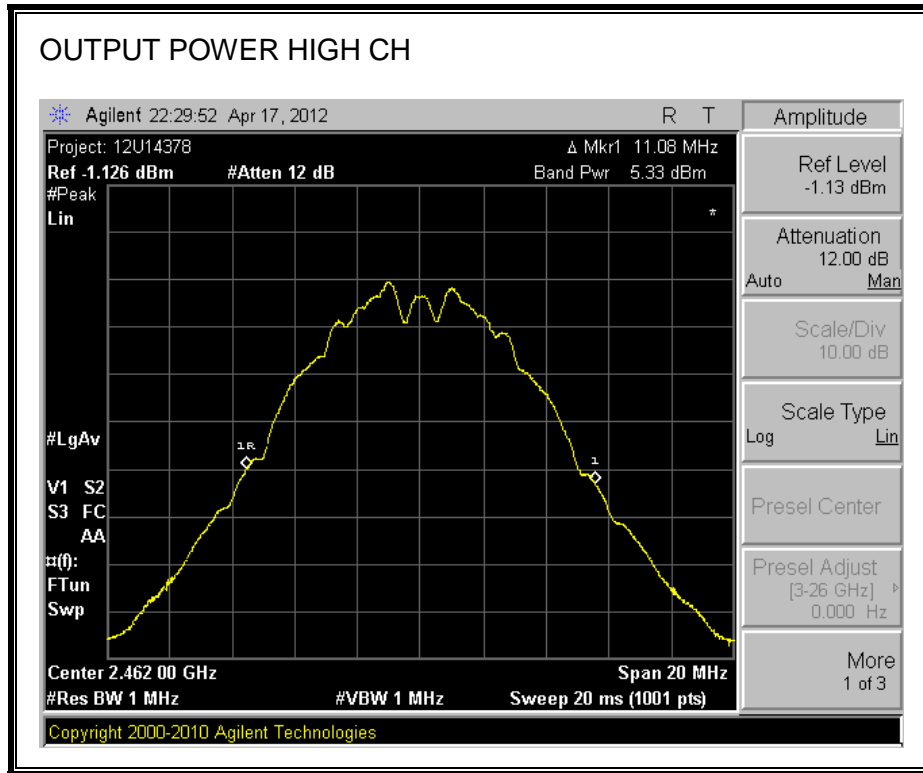
RESULTS

Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	5.72	11	16.72	30	-13.28
Middle	2437	5.94	11	16.94	30	-13.06
High	2462	5.33	11	16.33	30	-13.67

OUTPUT POWER







7.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

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

Channel	Frequency (MHz)	Power (dBm)
Low	2412	14.65
Middle	2437	15.00
High	2462	13.94

7.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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.

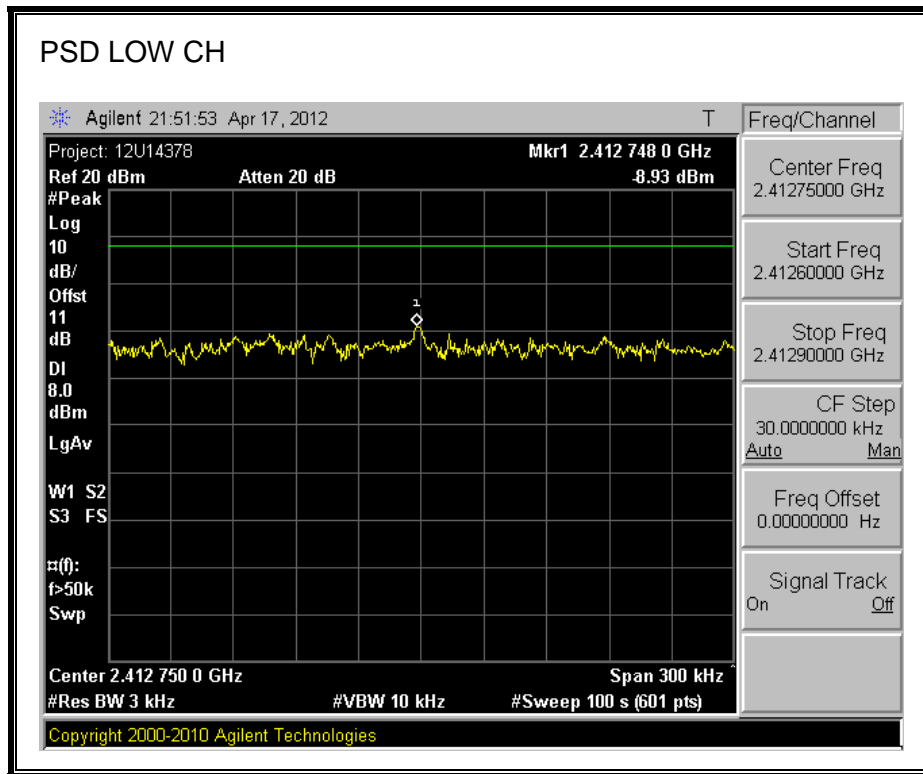
TEST PROCEDURE

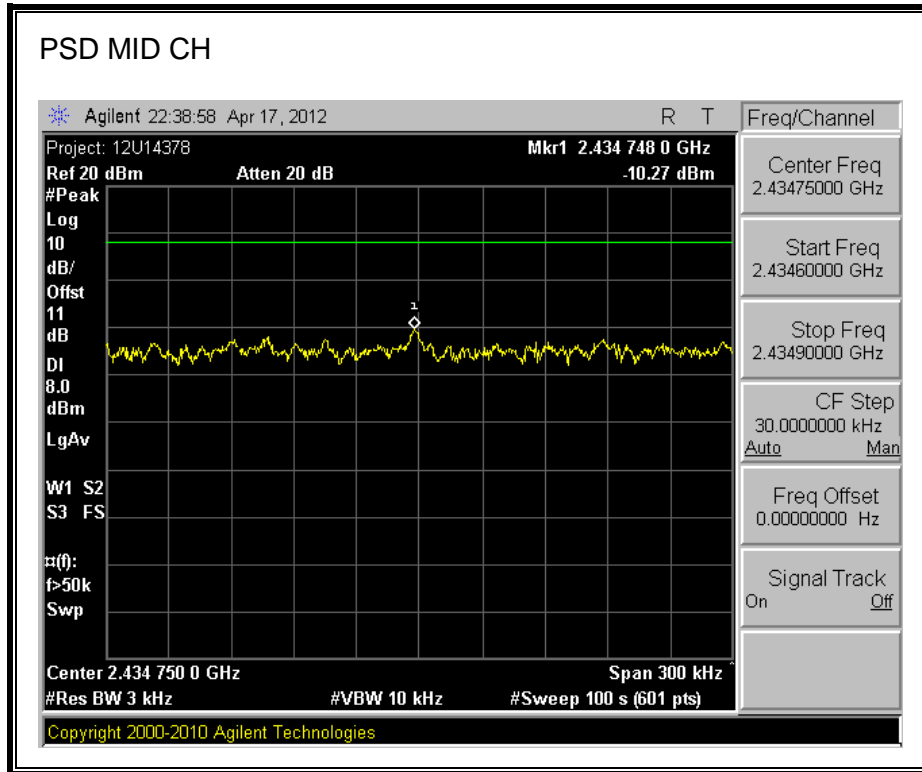
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

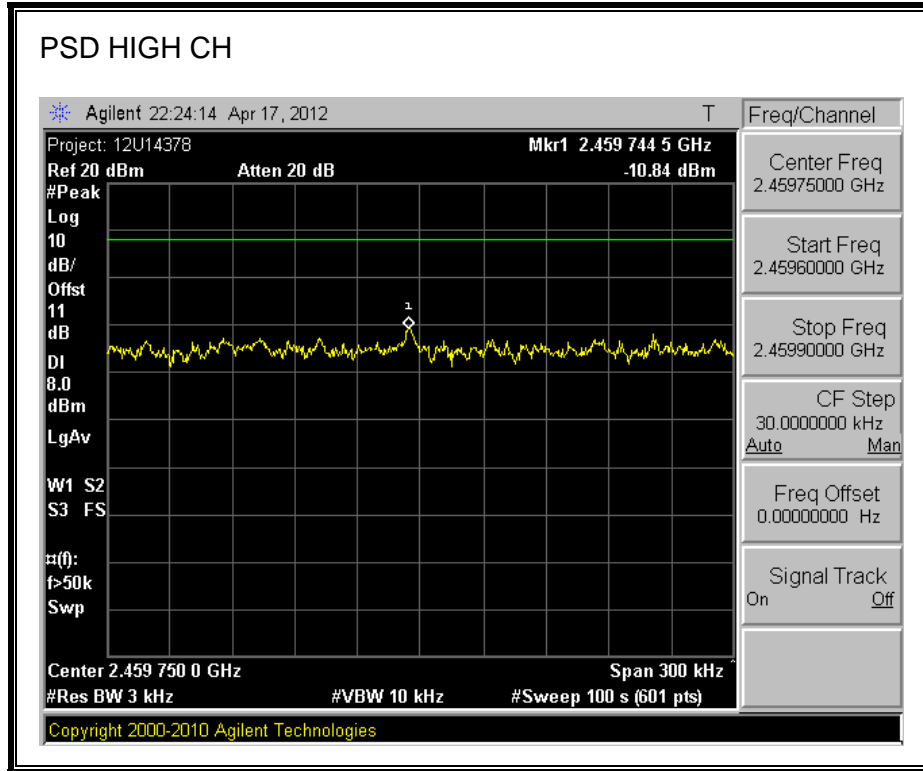
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-8.93	8	-16.93
Middle	2437	-10.27	8	-18.27
High	2462	-10.84	8	-18.84

POWER SPECTRAL DENSITY







7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

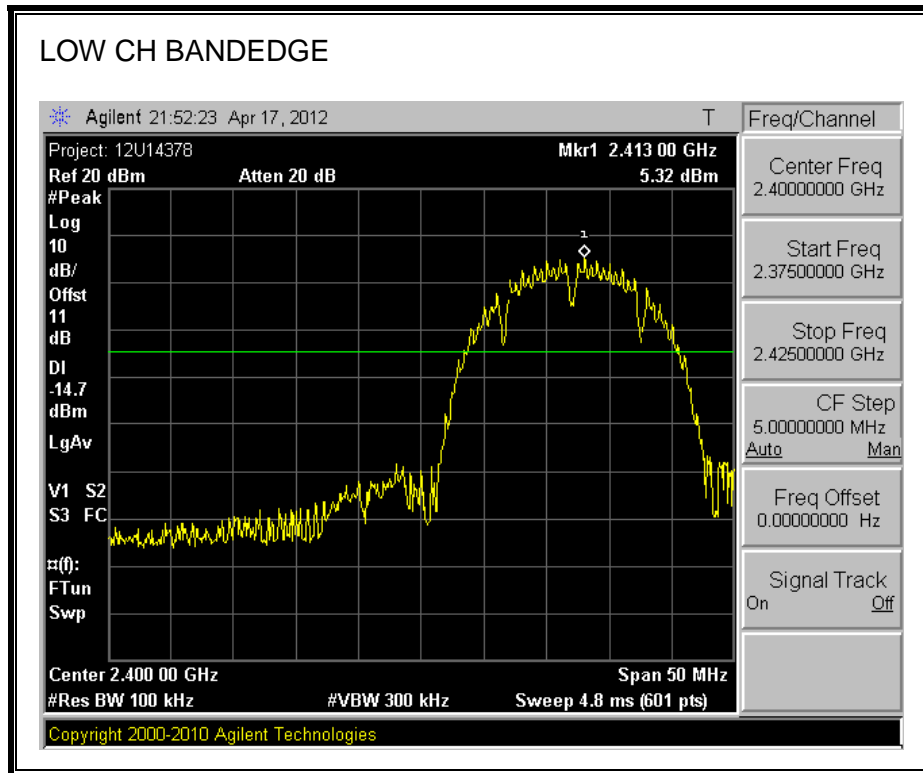
TEST PROCEDURE

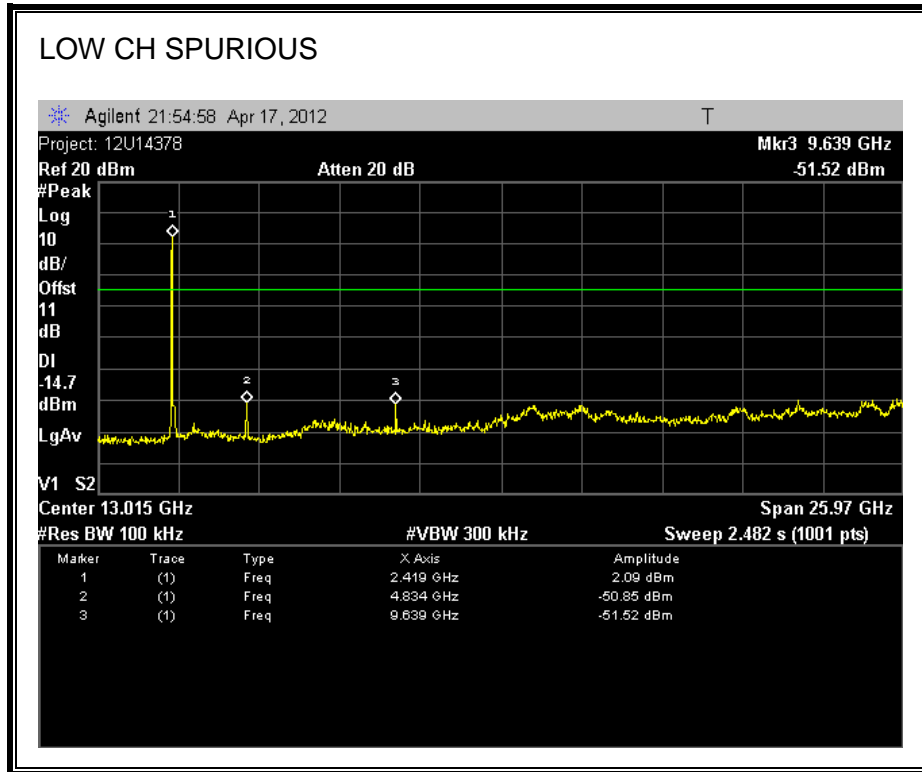
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

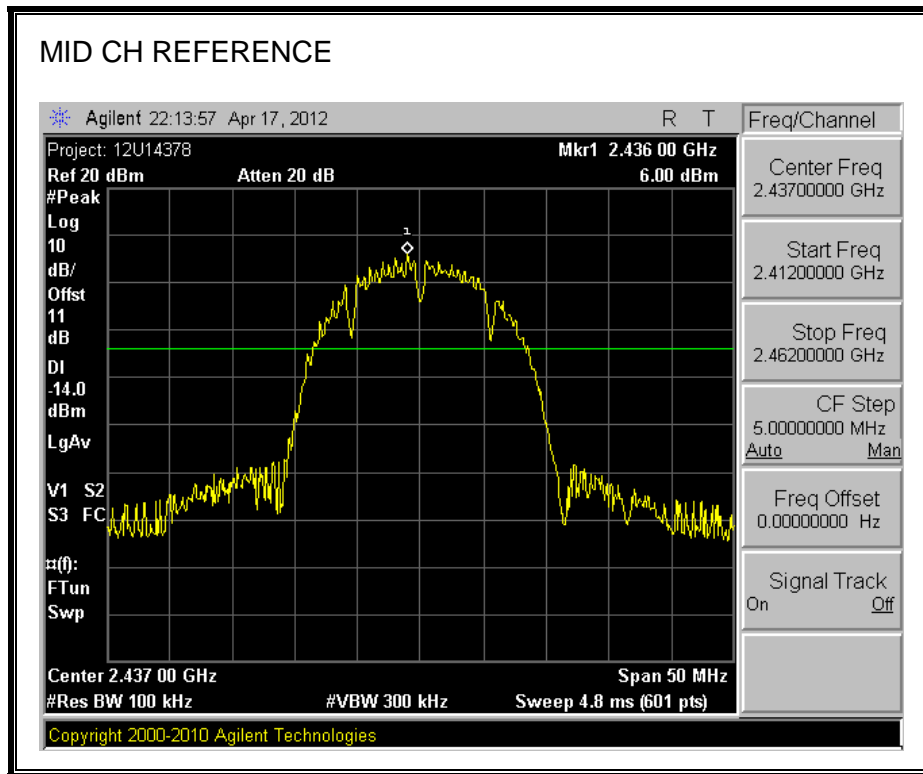
RESULTS

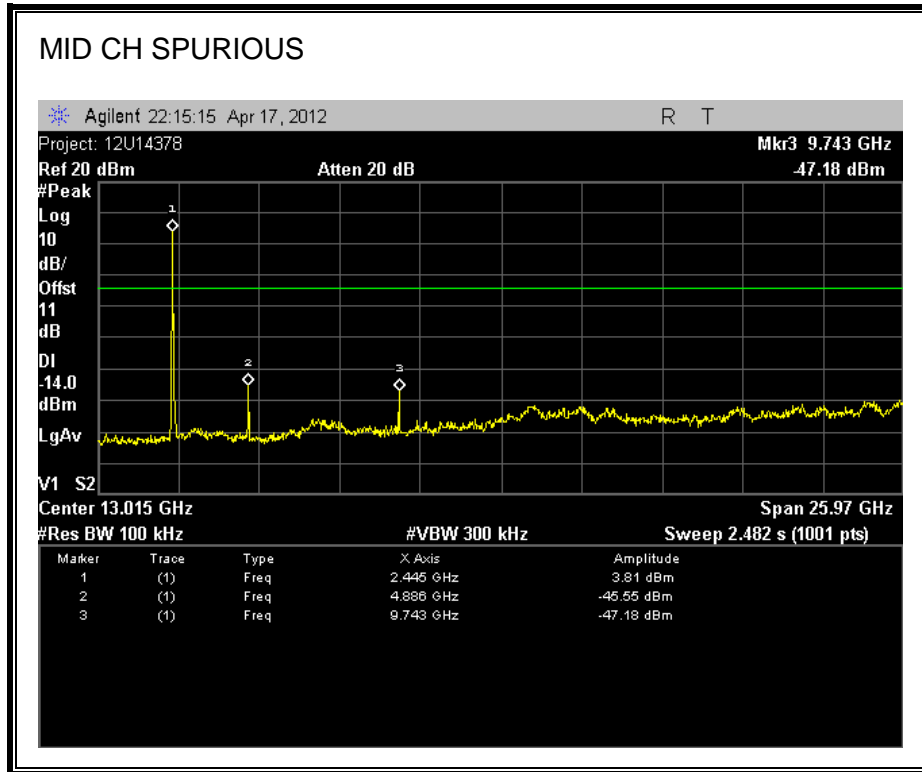
SPURIOUS EMISSIONS, LOW CHANNEL



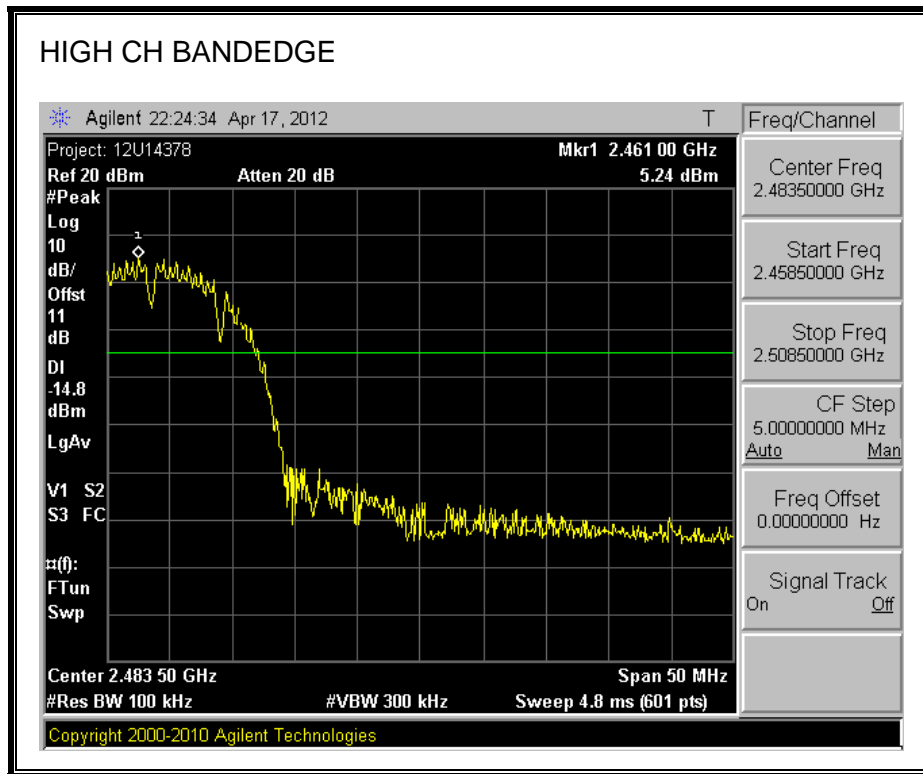


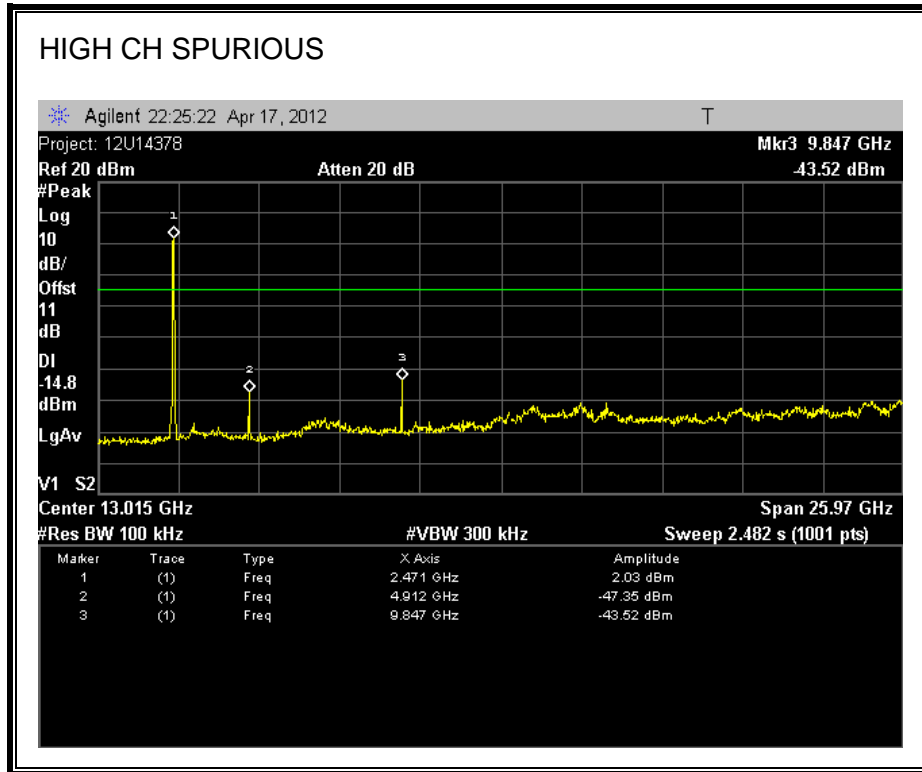
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





7.2. 802.11g MODE IN THE 2.4 GHz 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.

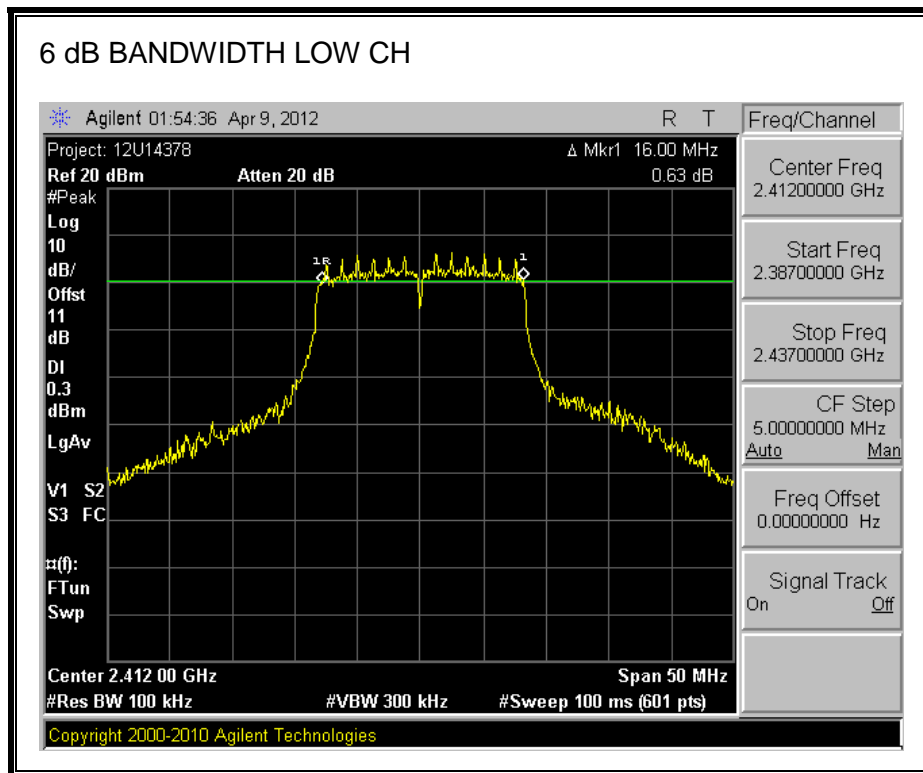
TEST PROCEDURE

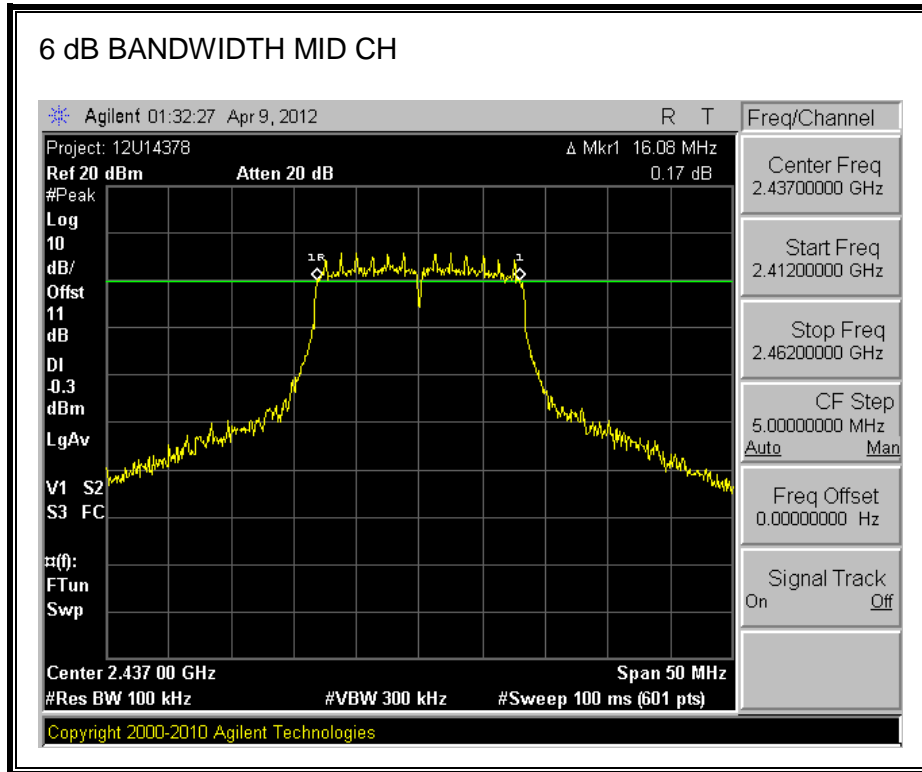
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

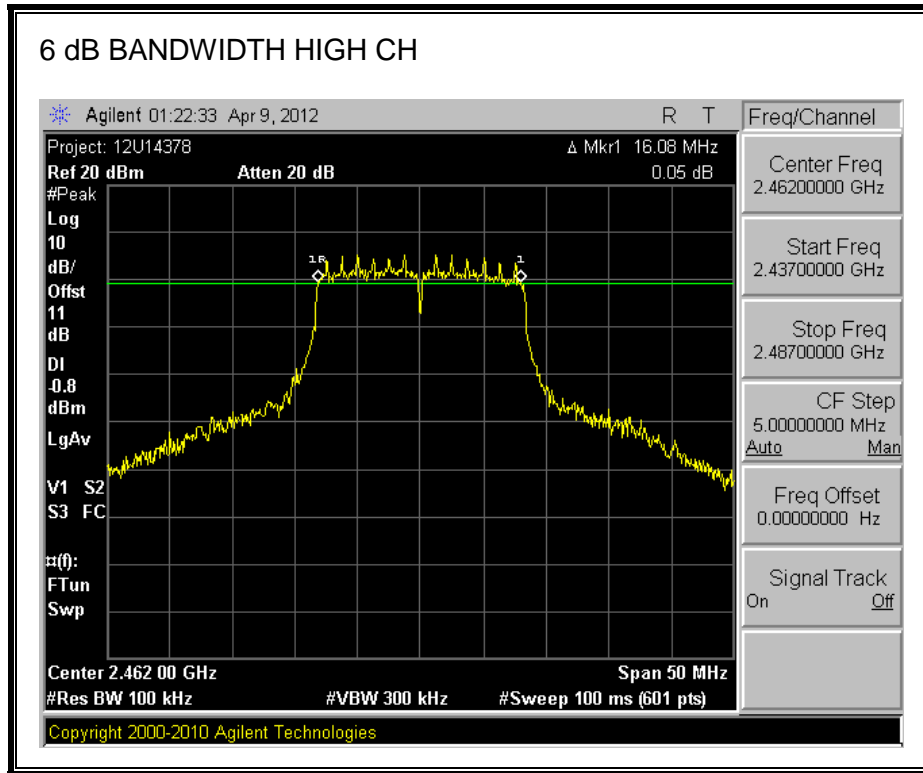
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16	0.5
Middle	2437	16.08	0.5
High	2462	16.08	0.5

6 dB BANDWIDTH







7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

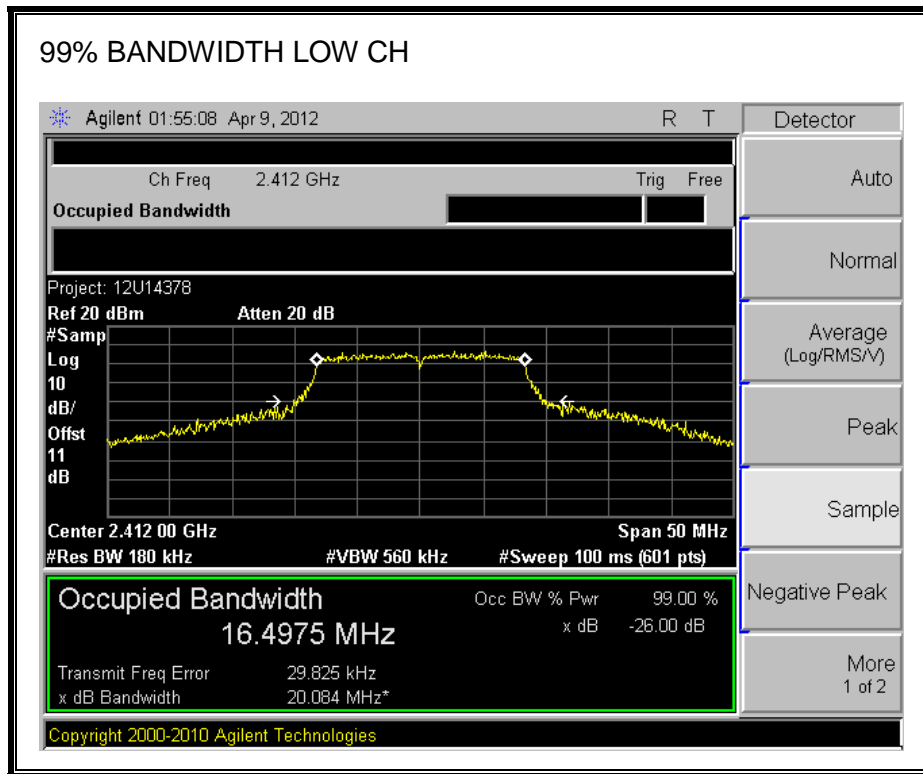
TEST PROCEDURE

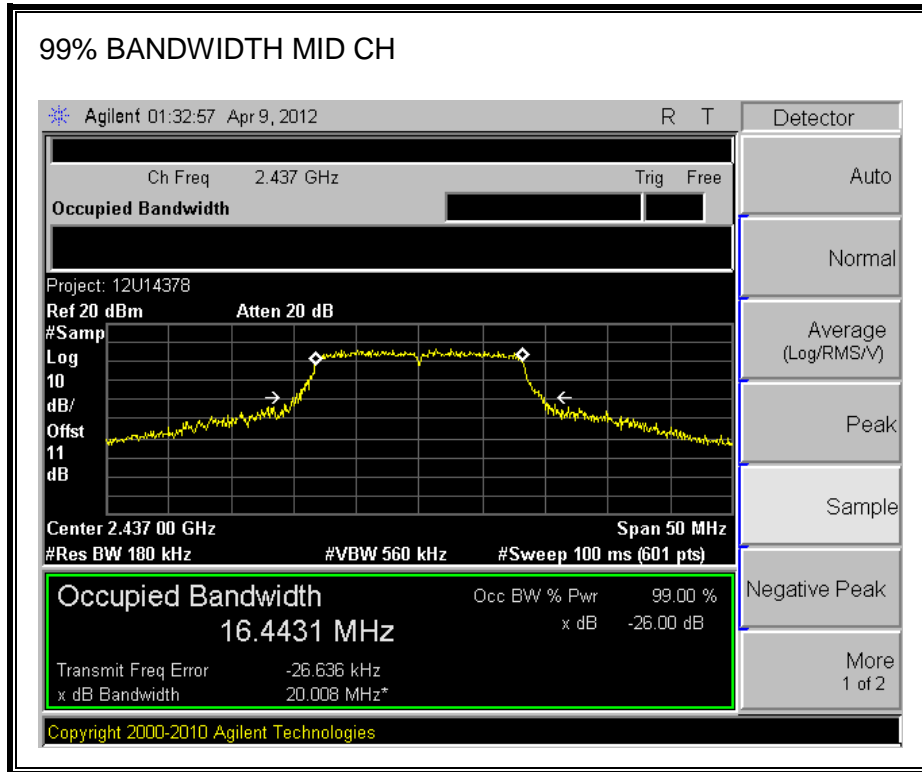
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

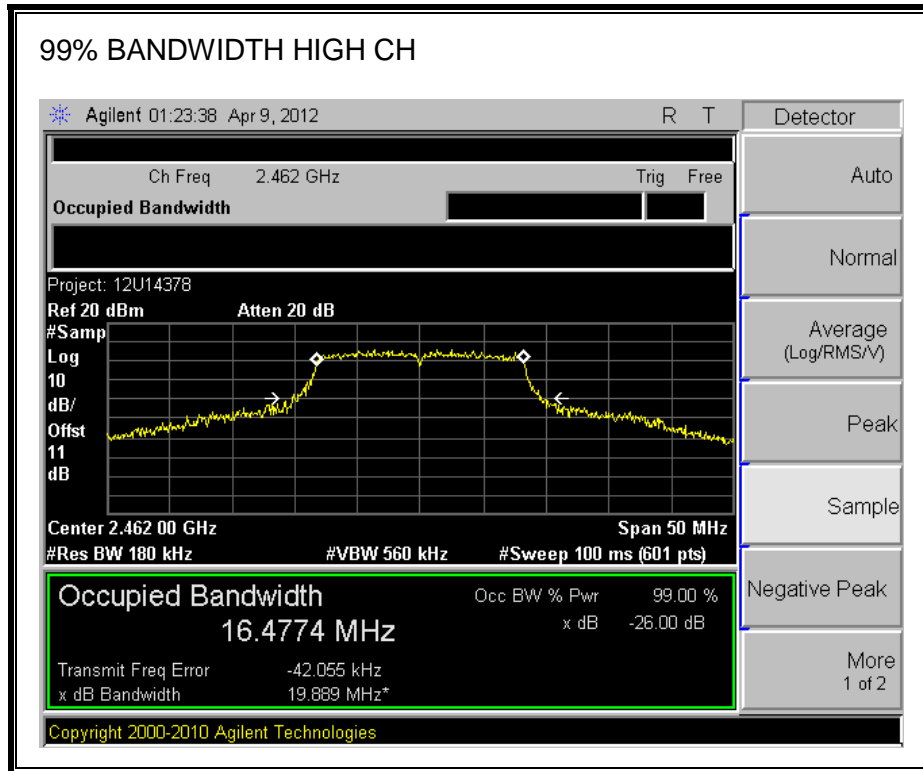
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.5
Middle	2437	16.44
High	2462	16.47

99% BANDWIDTH







7.2.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

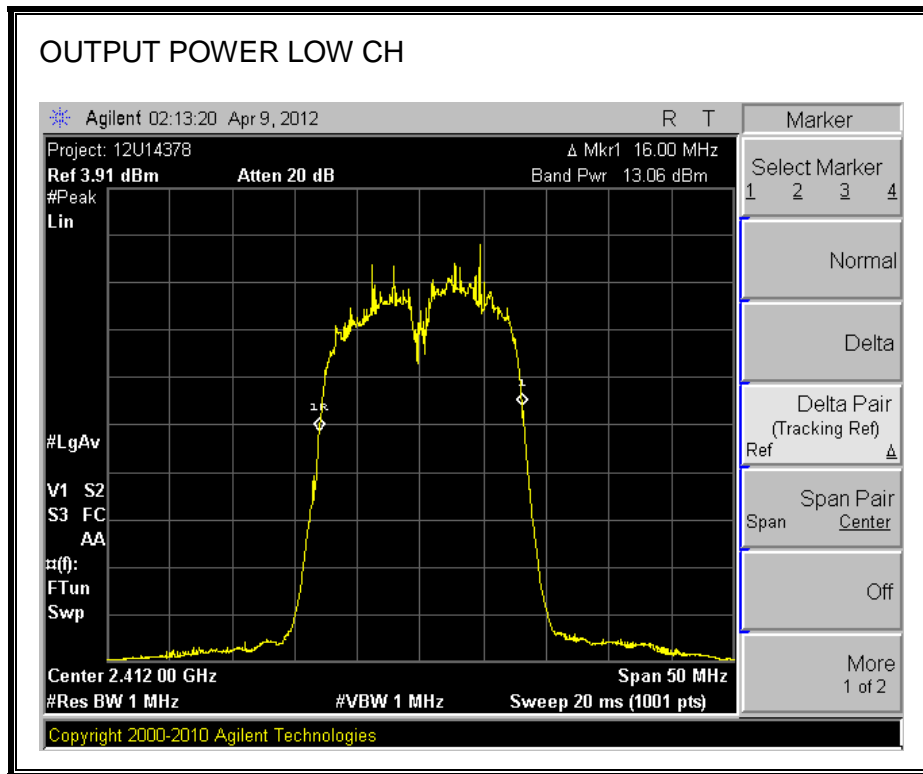
TEST PROCEDURE

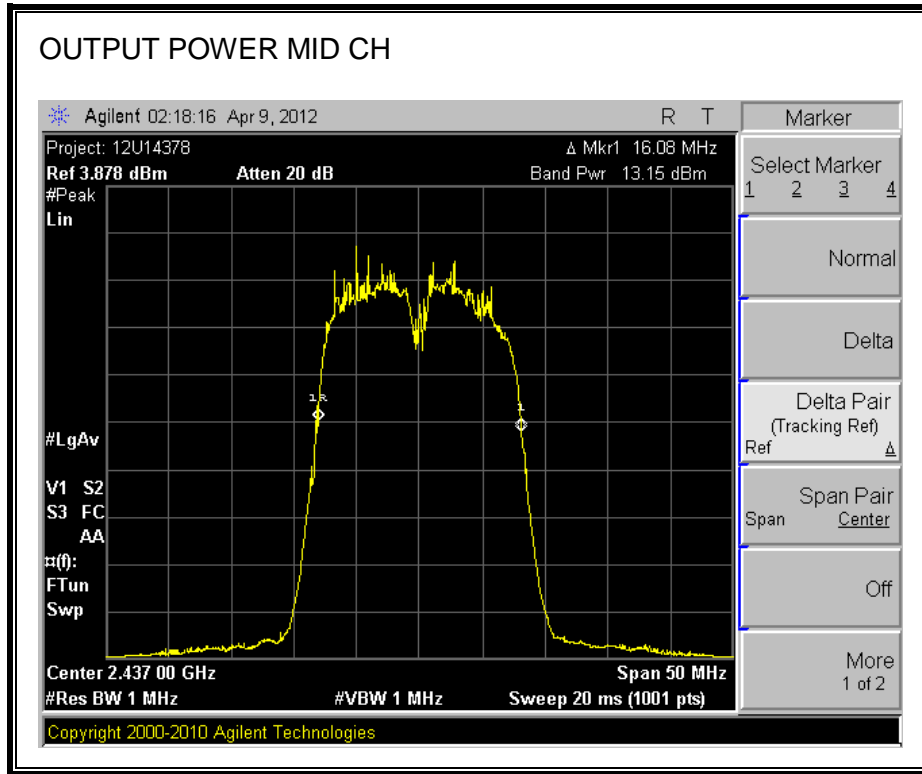
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

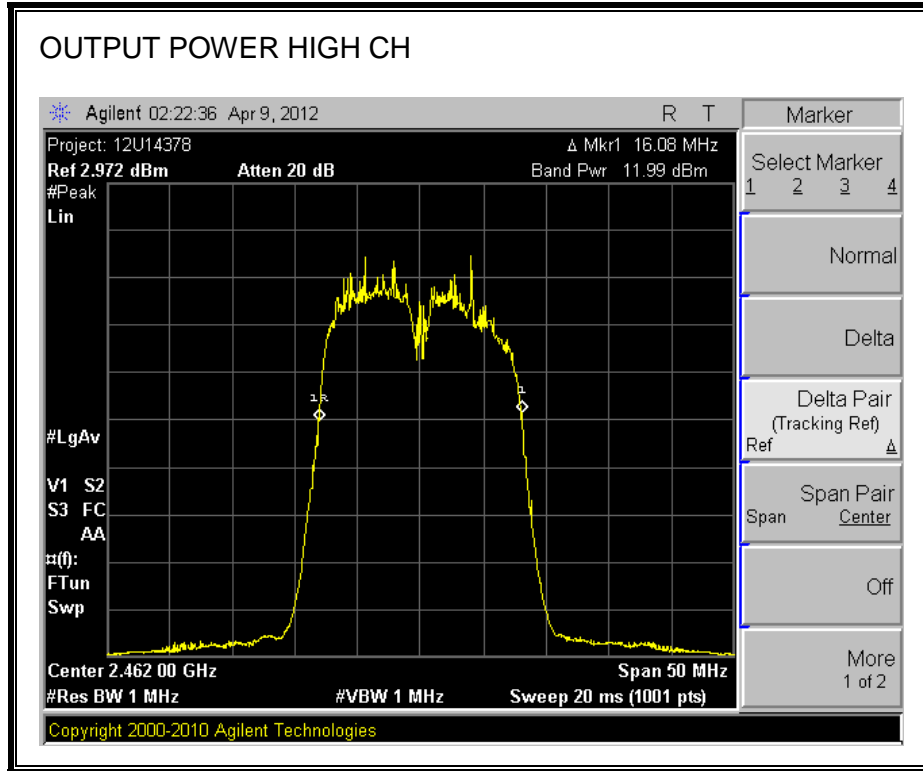
RESULTS

Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	13.06	11	24.06	30	-5.94
Middle	2437	13.15	11	24.15	30	-5.85
High	2462	11.99	11	22.99	30	-7.01

OUTPUT POWER







7.2.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

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

Channel	Frequency (MHz)	Power (dBm)
Low	2412	16.71
Middle	2437	16.32
High	2462	15.28

7.2.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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.

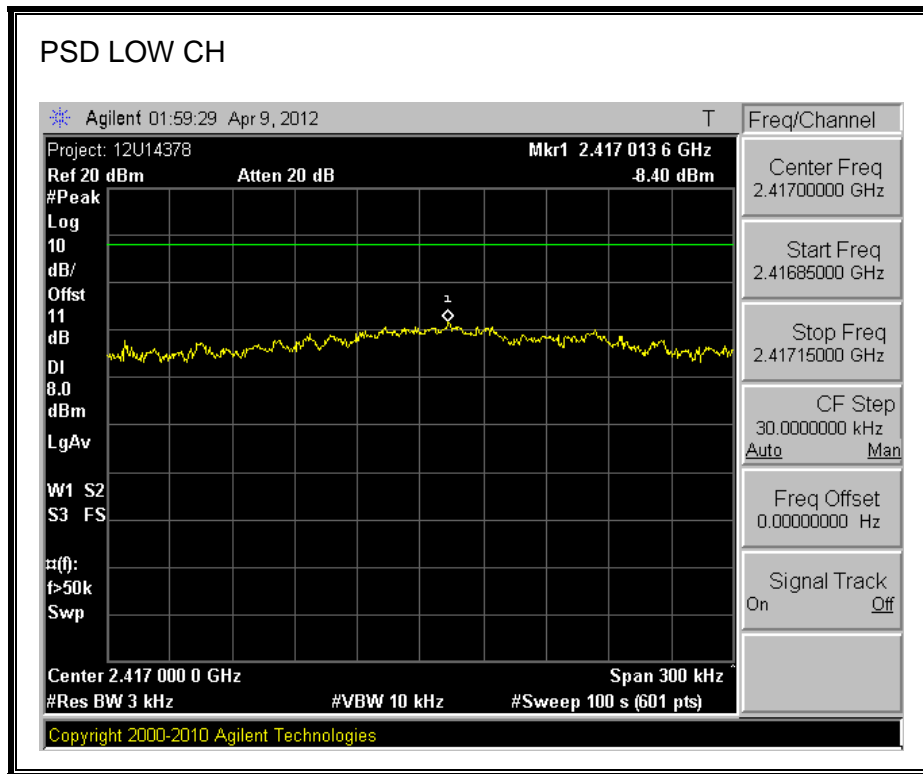
TEST PROCEDURE

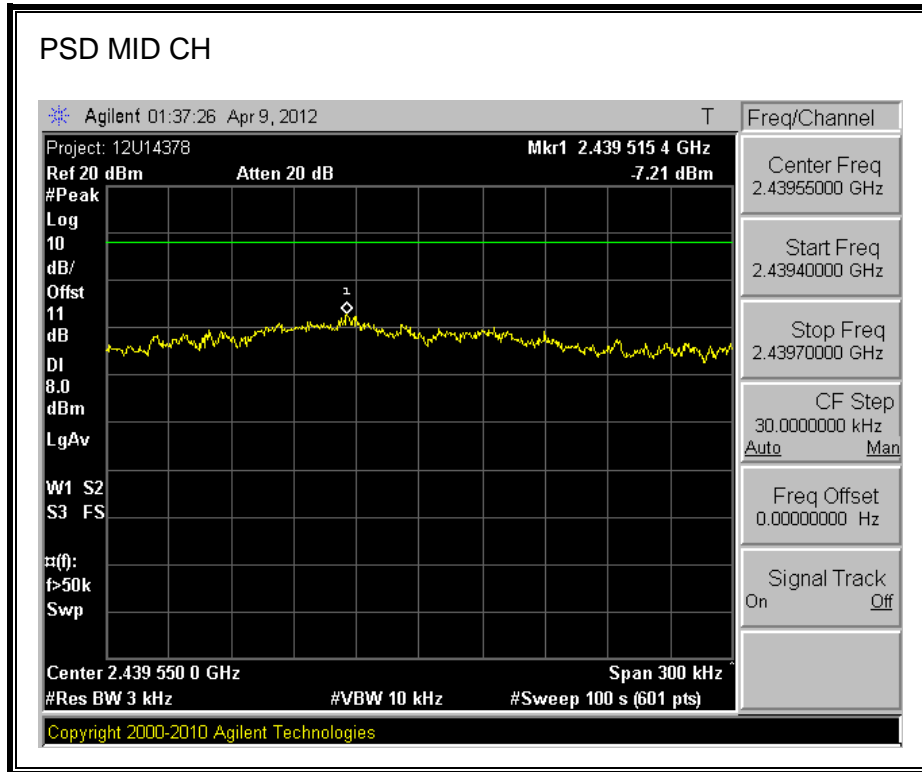
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

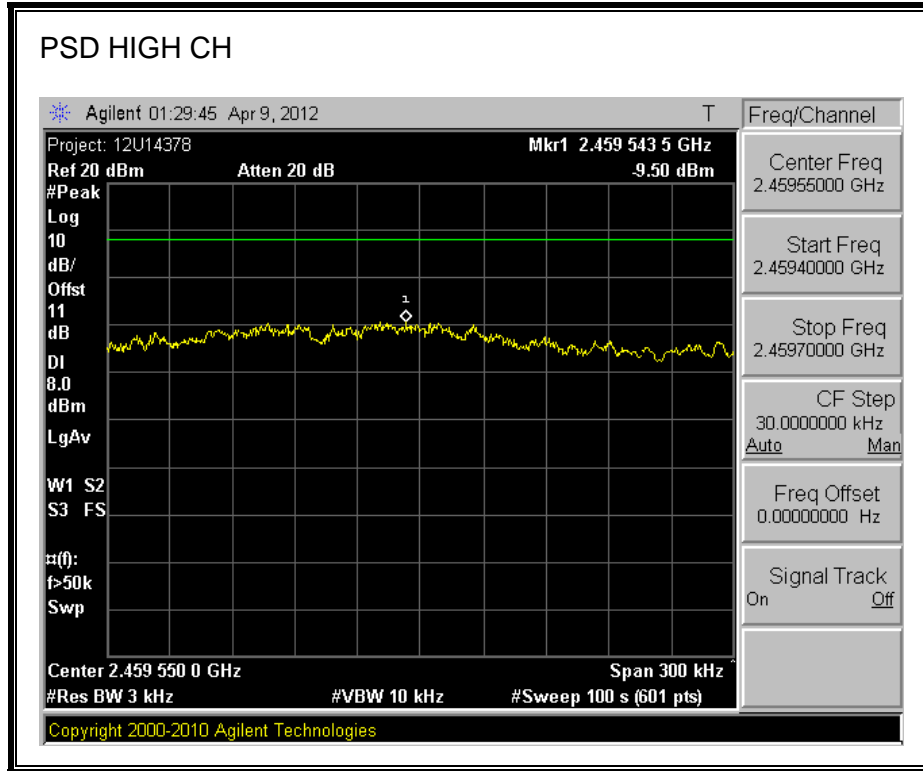
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-8.40	8	-16.40
Middle	2437	-7.21	8	-15.21
High	2462	-9.50	8	-17.50

POWER SPECTRAL DENSITY







7.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

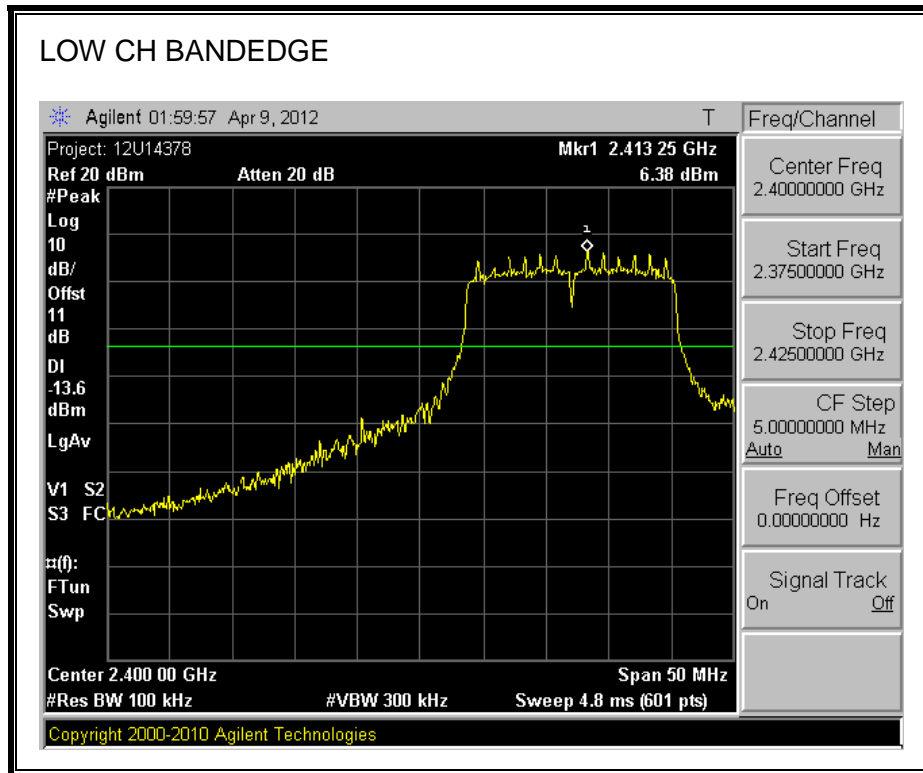
TEST PROCEDURE

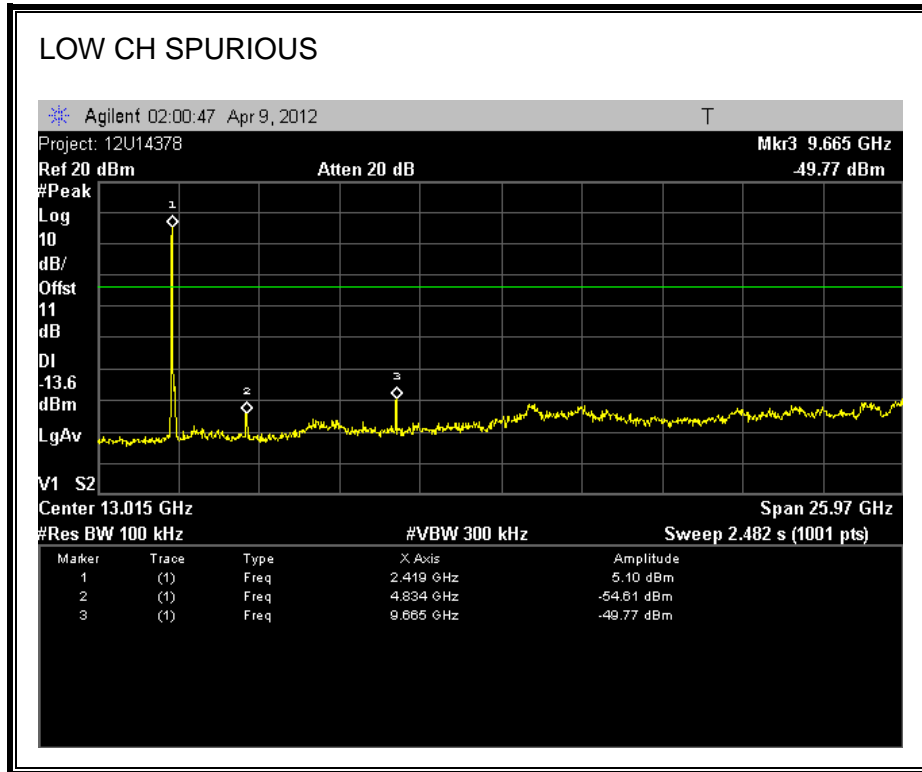
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

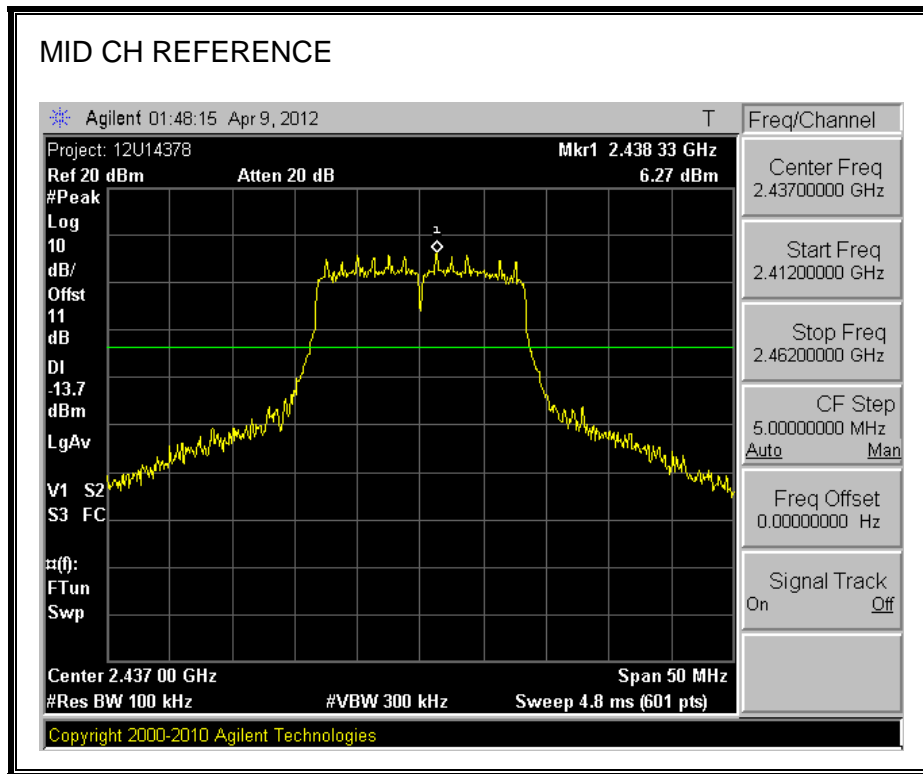
RESULTS

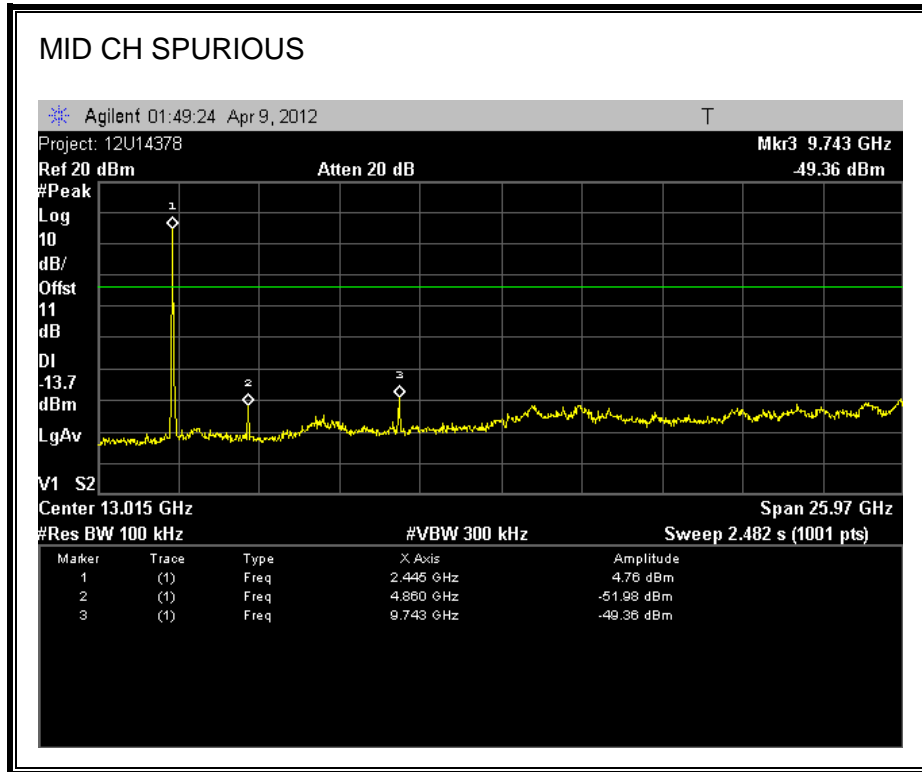
SPURIOUS EMISSIONS, LOW CHANNEL



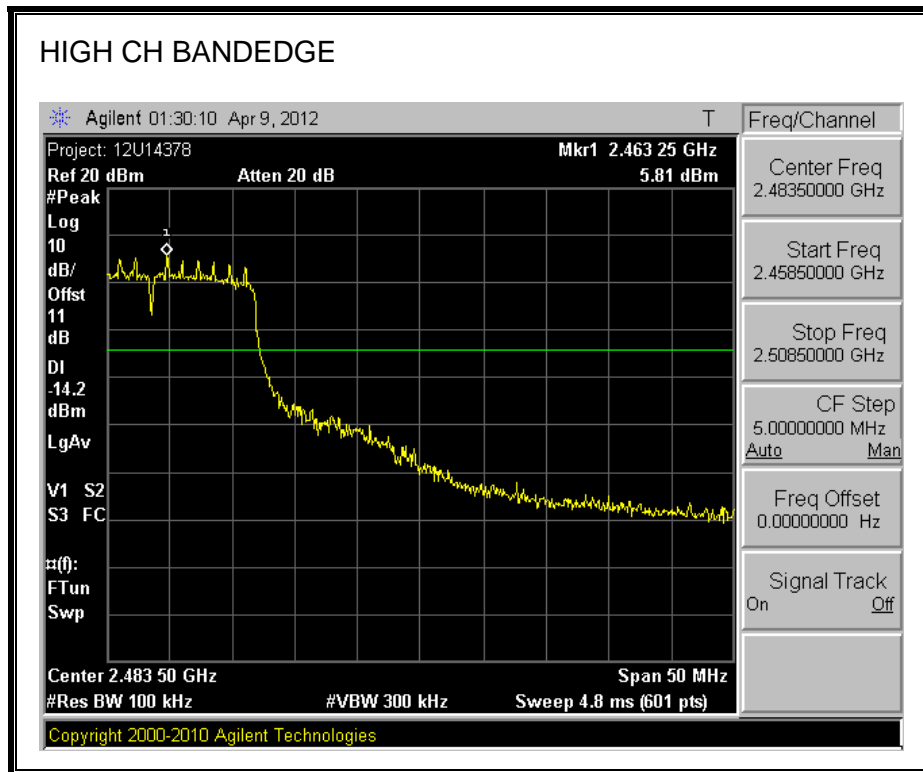


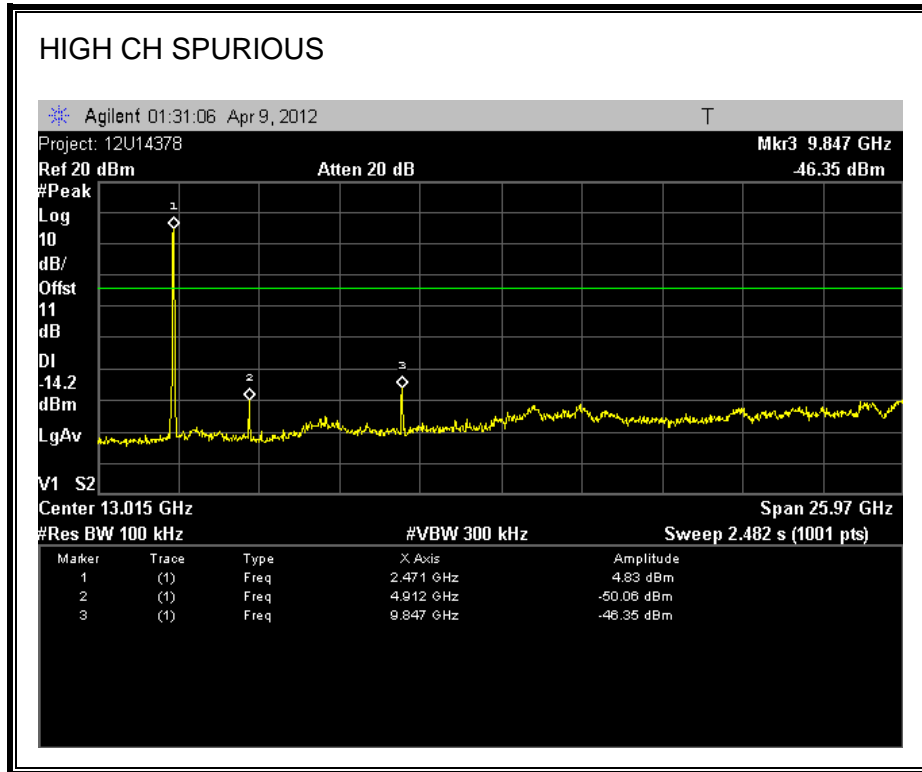
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





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.

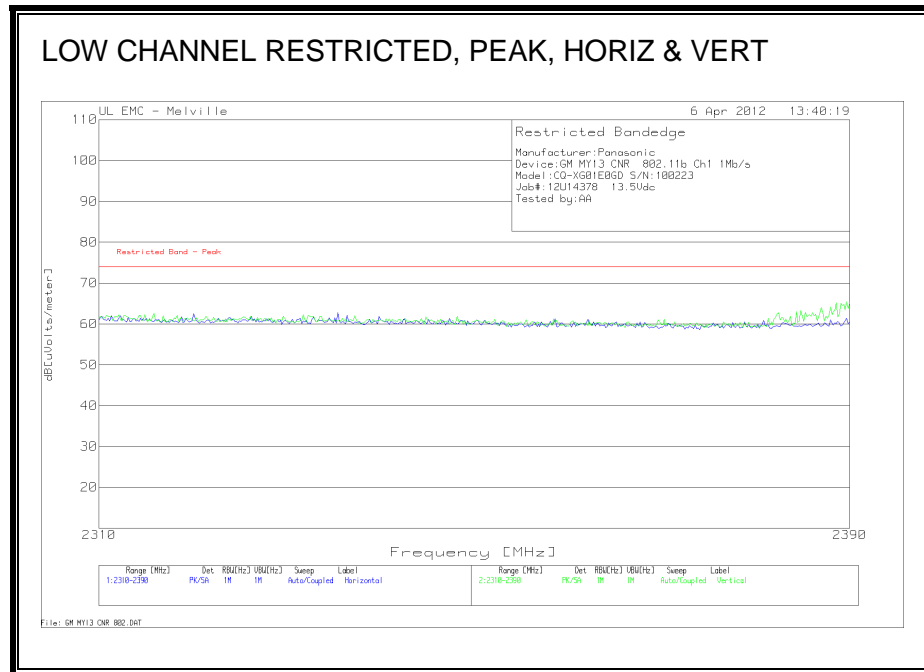
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

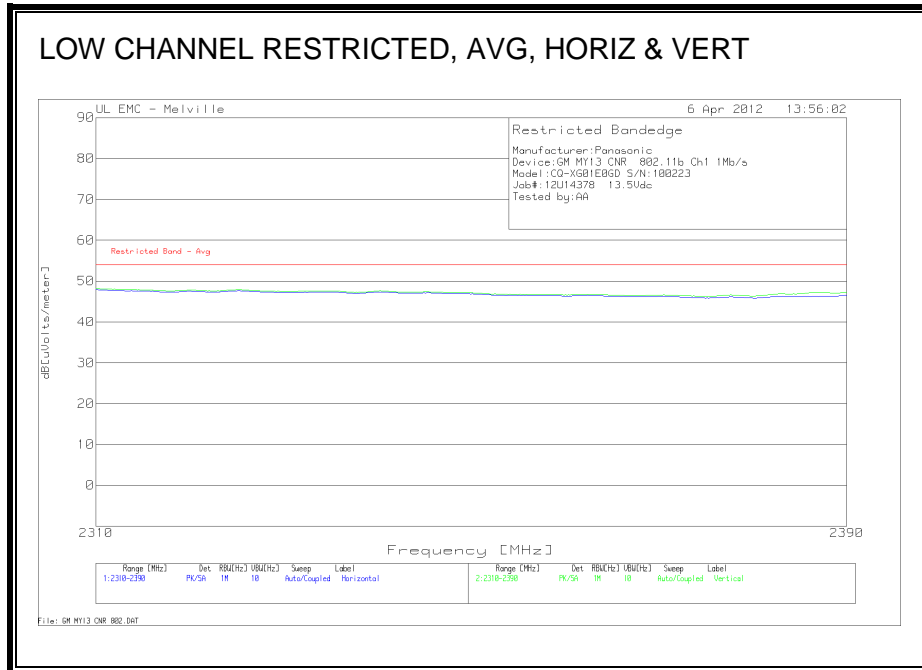
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

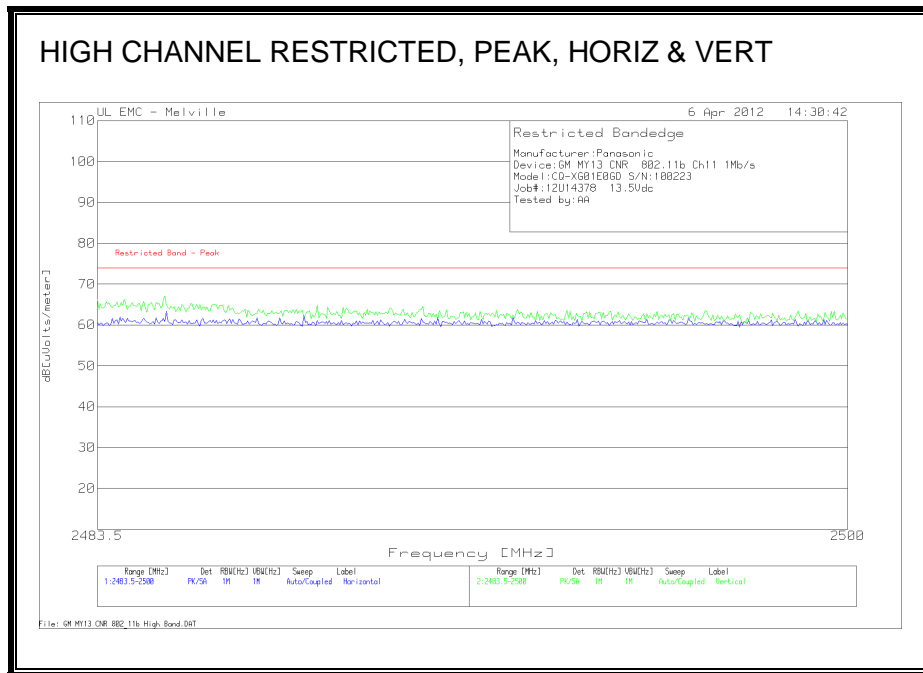
8.2.1. TRANSMITTER ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

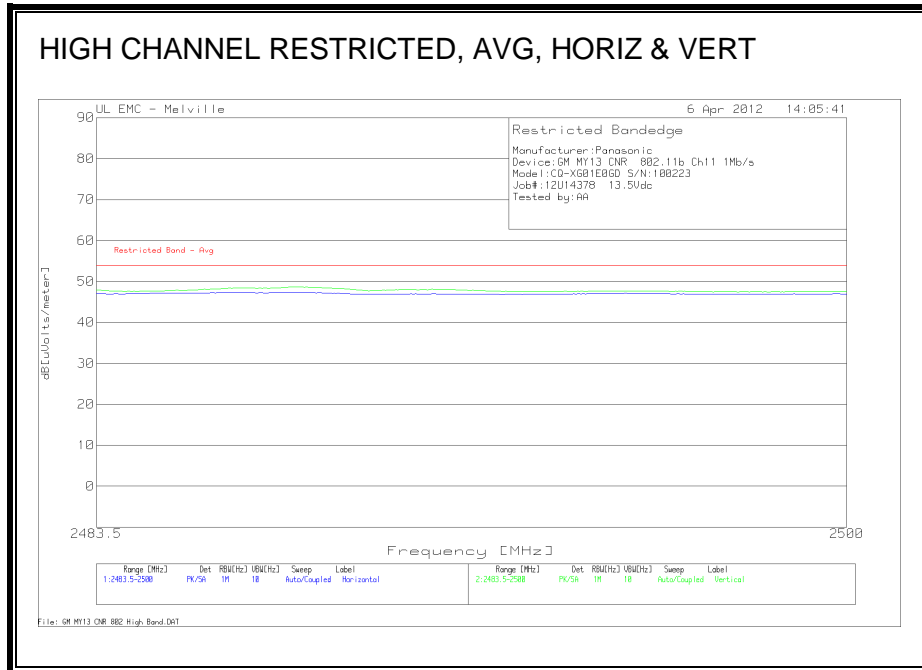
RESTRICTED BANDEDGE (LOW CHANNEL)





RESTRICTED BANEDGE (HIGH CHANNEL)



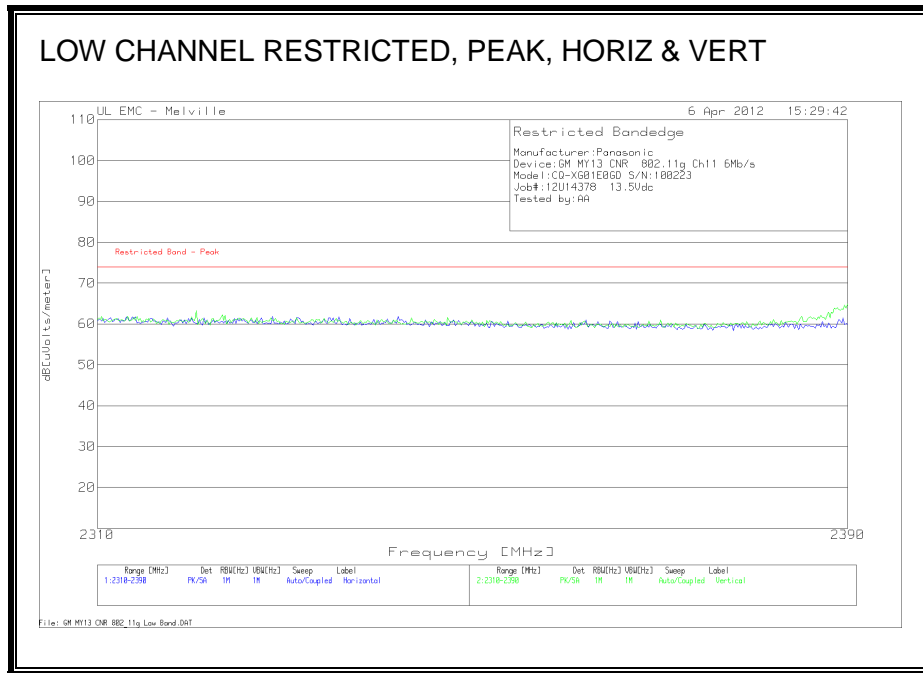


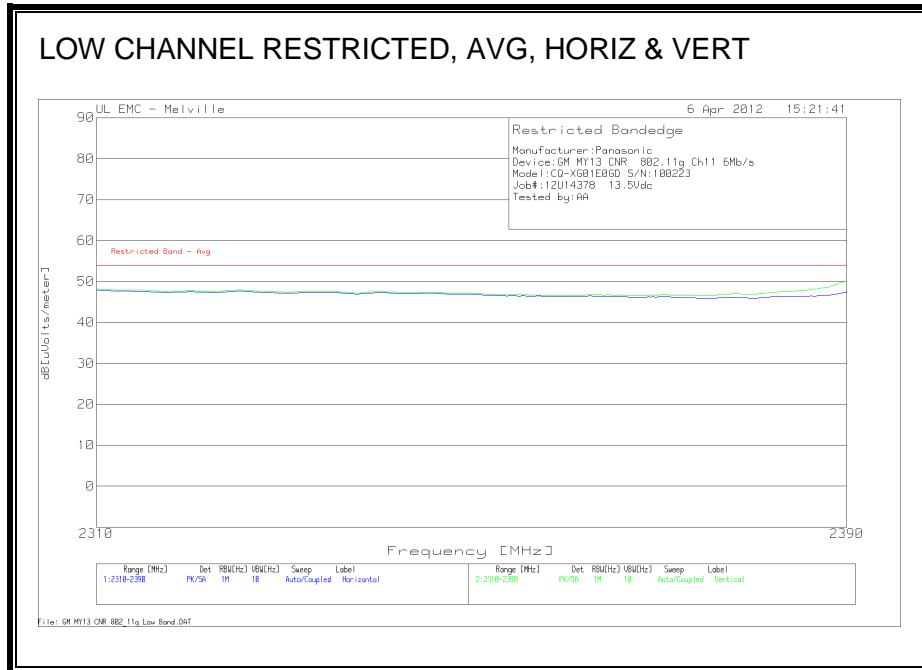
HIGH CHANNEL

Manufacturer:Panasonic												
Device:GM MY13 CNR 802.11b 1Mbps												
Model:CQ-XG01E0GD S/N:100223												
Job#:12U14378 13.5Vdc high Ch (Ch11)												
Tested by:GB/RM												
				BOMS		FCC Part 15		FCC Part 15		Azimuth	Height	
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	Factor [dB]	dB[uVolts/meter]	Subpart C	Margin	Subpart C	Margin	[Degs]	[cm]	Polarity
4924.002	78.49	PK	27.2	-52.5	53.16	-	-	74	-20.84	37	150	Horz
4924.002	76.49	Av	27.2	-52.5	51.16	54	-2.84	-	-	37	150	Horz
4924.002	80.49	PK	27.2	-52.5	55.16	-	-	74	-18.84	3	105	Vert
4924.002	78.79	Av	27.2	-52.5	53.46	54	-0.54	-	-	3	105	Vert
7386	73.93	PK	28.1	-51.5	50.49	-	-	74	-23.51	34	219	Horz
7386	64.05	Av	28.1	-51.5	40.61	54	-13.39	-	-	34	219	Horz
7386	77.2	PK	28.1	-51.5	53.76	-	-	74	-20.24	17	118	Vert
7386	67.49	Av	28.1	-51.5	44.05	54	-9.95	-	-	17	118	Vert
				BOMS		FCC Part 15		FCC Part 15		Azimuth	Height	
Test Frequency	Meter Reading	Detector	AF-8932 [dB]	Factor [dB]	dB[uVolts/meter]	Subpart C	Margin	Subpart C	Margin	[Degs]	[cm]	Polarity
12310	54.3	PK	37.2	-49.4	42.14	-	-	74	-31.86	144	231	Horz
12310	42.61	Av	37.2	-49.4	30.45	54	-23.55	-	-	144	231	Horz
12310	57.03	PK	37.2	-49.4	44.86	-	-	74	-29.14	9	276	Vert
12310	42.75	Av	37.2	-49.3	30.68	54	-23.32	-	-	9	276	Vert
				BOMS		FCC Part 15		FCC Part 15		Azimuth	Height	
Test Frequency	Meter Reading	Detector	AF-8947 [dB]	Factor [dB]	dB[uVolts/meter]	Subpart C	Margin	Subpart C	Margin	[Degs]	[cm]	Polarity
22158	62.32	PK	40.8	-53.2	49.97	-	-	74	-24.03	232	302	Horz
22158	57.78	PK	40.8	-53	45.57	-	-	74	-28.43	0	326	Vert
PK - Peak detector												
Av - Average detector												

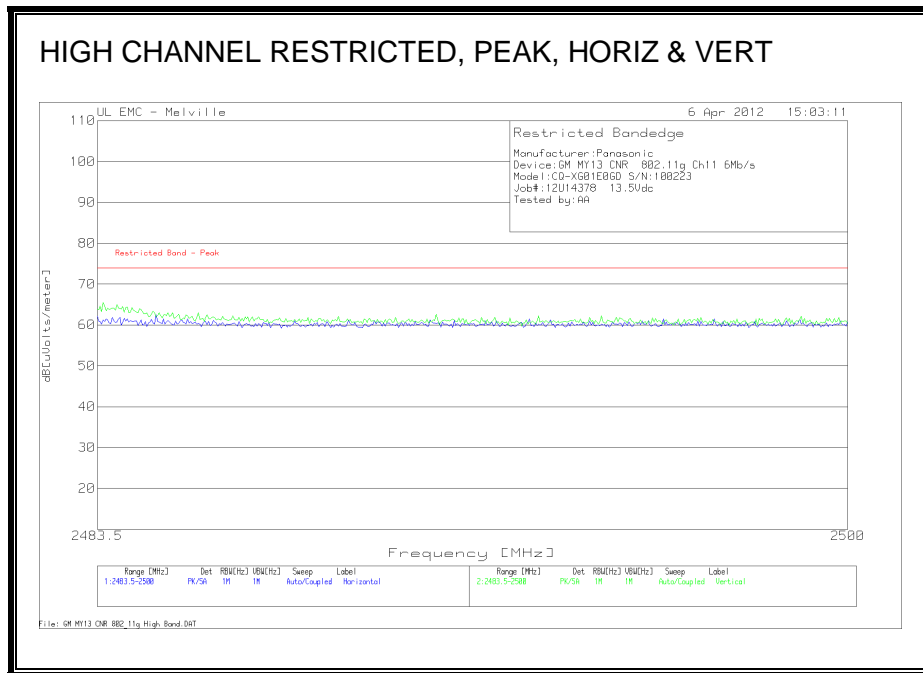
8.2.2. TRANSMITTER ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

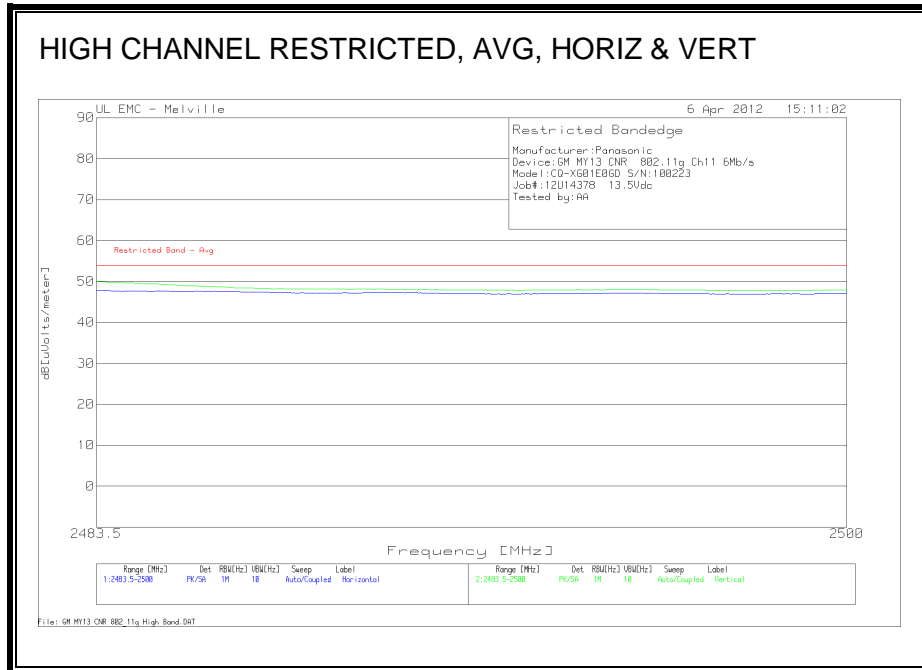
RESTRICTED BANDEDGE (LOW CHANNEL)





RESTRICTED BANEDGE (HIGH CHANNEL)





HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL

Manufacturer: Panasonic												
Device: GM MY13 CNR 802.11g												
Model: CQ-XG01E0GD S/N: 100223												
Job#: 12U14378 13.5Vdc Low Ch (Ch 1)												
Tested by: GB/RM												
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4825.481	73.93	PK	27.4	-52.4	48.98	-	-	74	-25.02	194	143	Horz
4825.4812	64.22	Av	27.1	-52.4	38.97	54	-15.03	-	-	192	144	Horz
4825.964	65.63	PK	27.4	-52.4	40.67	-	-	74	-33.33	244	180	Vert
4825.9639	62.43	Av	27.4	-52.4	37.47	54	-16.53	-	-	242	181	Vert
7237.273	73.93	PK	27.9	-52	49.84	-	-	74	-24.16	37	267	Horz
7237.2734	59.66	Av	27.9	-52	35.57	54	-18.43	-	-	36	267	Horz
7235.579	76.78	PK	27.9	-51.9	52.81	-	-	74	-21.19	359	162	Vert
7235.5792	64.4	Av	27.9	-51.9	40.43	54	-13.57	-	-	357	163	Vert
PK - Peak detector												
Av - Average detector												

MIDDLE CHANNEL

Manufacturer:Panasonic												
Device:GM MY13 CNR 802.11g												
Model:CQ-XG01E0GD S/N:100223												
Job#:12U14378 13.5Vdc Mid Ch (Ch 6)												
Tested by:GB/RM												
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	FCC Part 15		FCC Part 15		Azimuth [Degs]	Height [cm]	Polarity
						Subpart C 15.209	Margin	Subpart C Peak	Margin			
4876.315	78.49	PK	27.2	-52.6	53.08	-	-	74	-20.92	196	169	Horz
4876.3146	64.34	Av	27.2	-52.6	38.93	54	-15.07	-	-	194	169	Horz
4876.281	76.29	PK	27.5	-52.6	51.18	-	-	74	-22.82	359	387	Vert
4876.2806	69.65	Av	27.5	-52.6	44.54	54	-9.46	-	-	360	388	Vert
7305.86	67.26	PK	28	-52.1	43.15	-	-	74	-30.85	39	268	Horz
7305.8597	52.44	Av	28	-52.1	28.33	54	-25.67	-	-	38	268	Horz
7305.8	69.28	PK	27.9	-52.1	45.06	-	-	74	-28.94	7	124	Vert
7305.7999	56.57	Av	27.9	-52.1	32.35	54	-21.65	-	-	6	125	Vert
PK - Peak detector												
Av - Average detector												

HIGH CHANNEL

Manufacturer:Panasonic												
Device:GM MY13 CNR 802.11g												
Model:CQ-XG01E0GD S/N:100223												
Job#:12U14378 13.5Vdc High Ch (Ch 11)												
Tested by:GB/RM												
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4924.681	81.36	PK	27.2	-52.6	56	-	-	74	-18	51	218	Horz
4924.6814	65.91	Av	27.2	-52.6	40.55	54	-13.45	-	-	50	218	Horz
4925.663	78.52	PK	27.5	-52.6	53.46	-	-	74	-20.54	21	100	Vert
4925.6631	67.81	Av	27.5	-52.6	42.75	54	-11.25	-	-	20	101	Vert
7388.263	79.6	PK	28.1	-51.6	56.09	-	-	74	-17.91	45	104	Horz
7388.2625	63.81	Av	28.1	-51.6	40.3	54	-13.7	-	-	44	105	Horz
7387.742	80.91	PK	28	-51.6	57.32	-	-	74	-16.68	359	158	Vert
7387.742	67.44	Av	28	-51.6	43.85	54	-10.15	-	-	359	158	Vert
PK - Peak detector												
Av - Average detector												

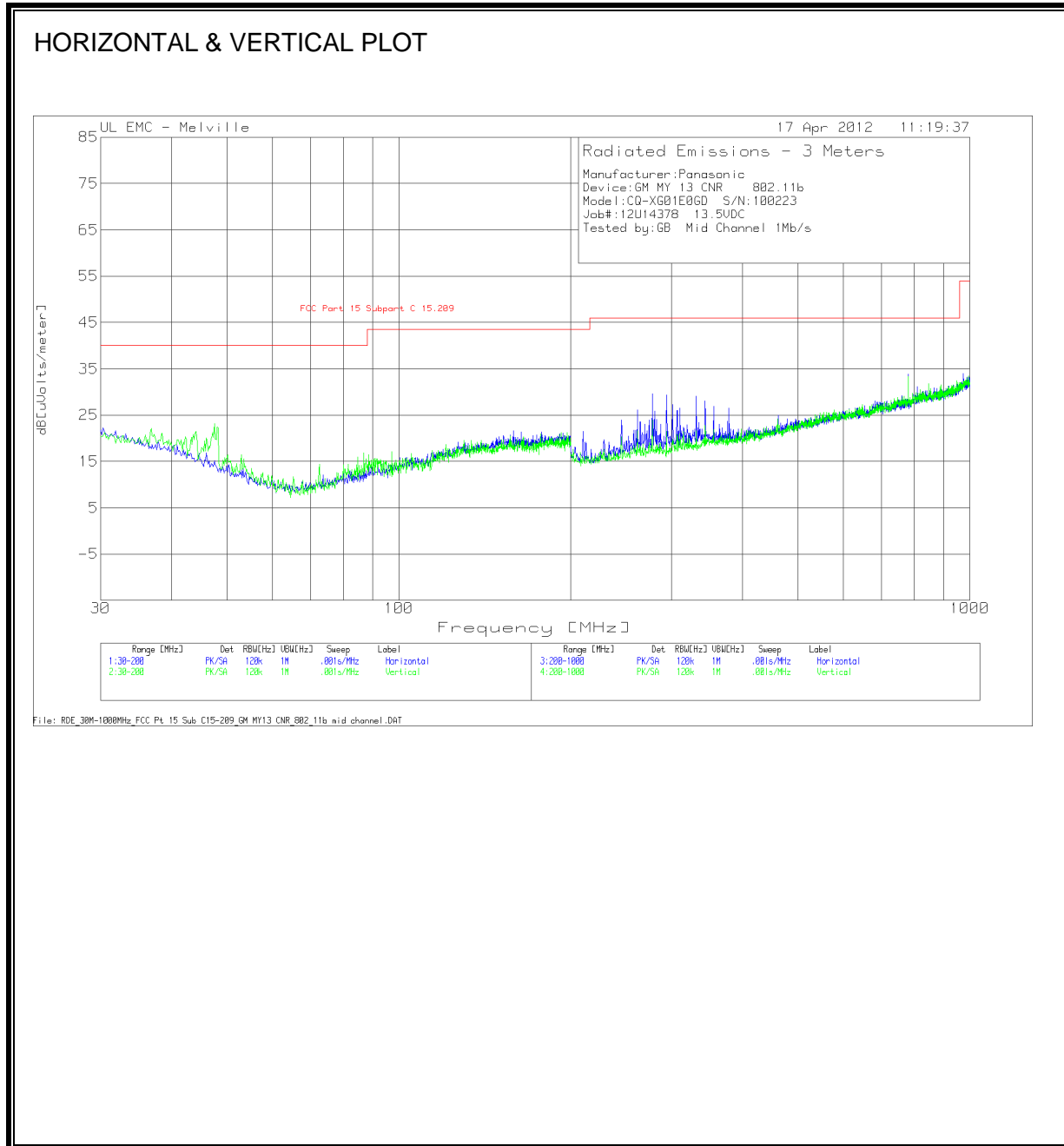
8.3. RECEIVER ABOVE 1 GHz

8.3.1. RECEIVER ABOVE 1 GHz FOR THE 2.4 GHz BAND

Manufacturer:Panasonic										
Device:GM MY13 CNR Mode: Rx										
Model:CQ-XG01E0GD S/N:100223										
Job#:12U14378 13.5Vdc 802.11 MID Ch										
Tested by:BD										
Horizontal 1000 - 2000MHz										
Test Frequency	Meter Reading	Detector	AF-51442 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	FCC Part 15 Class B	Margin	Azimuth [Degs]	Height [cm]	Polarity
1370.37	62.54	PK	20.6	-44.7	38.49	54	-15.51	19	251	Horz
1730.731	63.35	PK	20.8	-44.3	39.86	54	-14.14	358	100	Horz
Horizontal 2000 - 4000MHz										
Test Frequency	Meter Reading	Detector	AF-48107 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	FCC Part 15 Class B	Margin	Azimuth [Degs]	Height [cm]	Polarity
2514.515	60.95	PK	21.4	-43.4	38.98	54	-15.02	358	251	Horz
3119.119	63.32	PK	21.8	-42.9	42.18	54	-11.82	227	101	Horz
Horizontal 4000 - 8000MHz										
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	FCC Part 15 Class B	Margin	Azimuth [Degs]	Height [cm]	Polarity
4555.037	61.76	PK	27.3	-52.4	36.65	54	-17.35	183	101	Horz
6348.232	60.89	PK	27.9	-51.7	37.08	54	-16.92	78	101	Horz
PK - Peak detector										

8.4. WORST-CASE BELOW 1 GHz

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

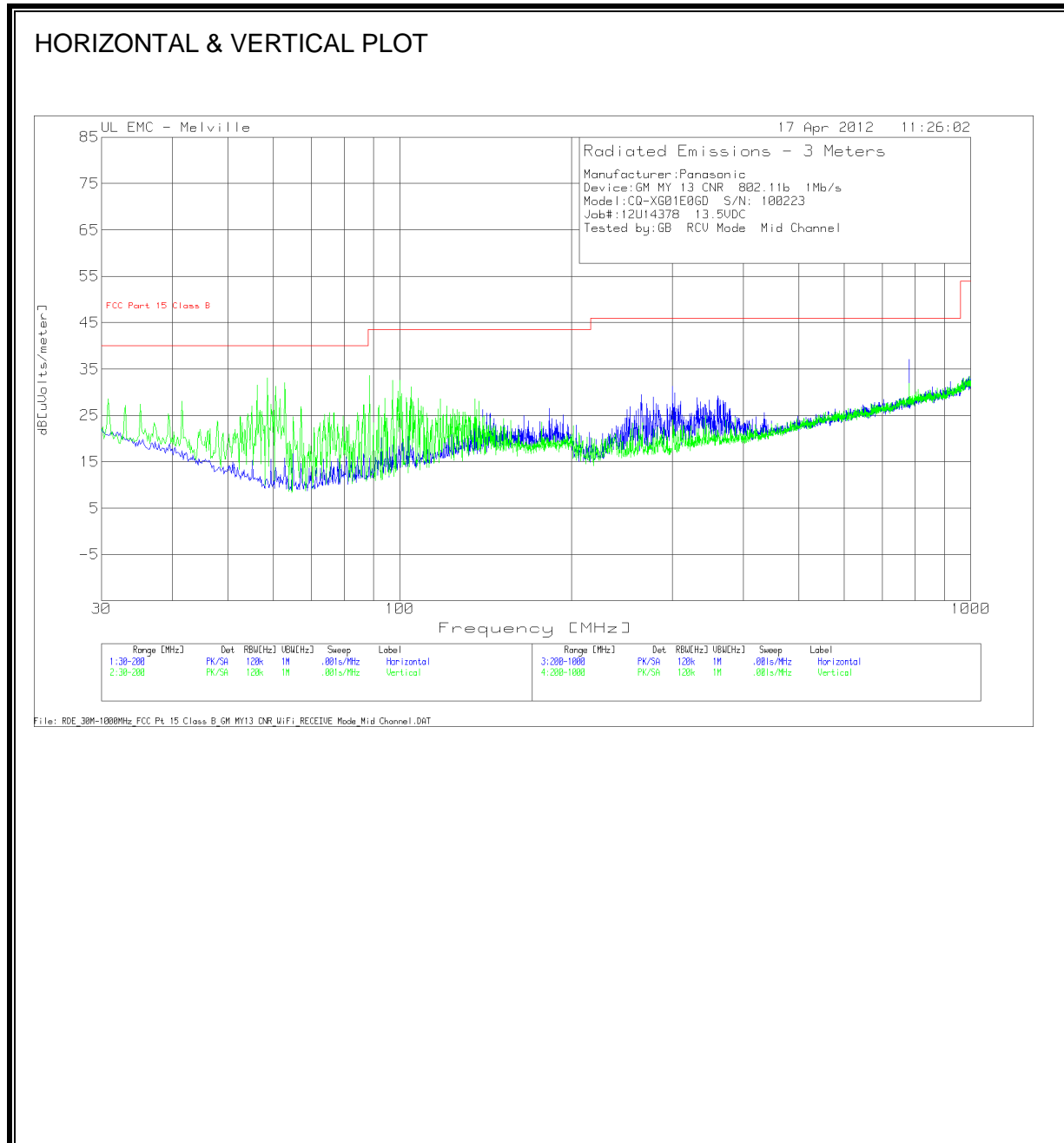


HORIZONTAL & VERTICAL DATA

Manufacturer:Panasonic										
Device:GM MY 13 CNR 802.11b										
Model:CQ-XG01EOGD S/N:100223										
Job#:12U14378 13.5VDC										
Tested by:GB Mid Channel 1Mb/s										
Vertical 30 - 200MHz										
	Meter		AF-43441	GL-3M	dB[uVolts/ meter]	FCC Part 15 Subpart C		Azimuth	Height	
Test Frequency	Reading	Detector	[dB]	[dB]		15.209	Margin	[Degs]	[cm]	Polarity
36.8068	30.68	PK	15.5	-24	22.18	40	-17.82	216	101	Vert
44.2943	30.49	PK	12.4	-23.9	18.99	40	-21.01	273	101	Vert
47.5275	35.96	PK	11.1	-23.9	23.16	40	-16.84	245	101	Vert
Horizontal 200 - 1000MHz										
	Meter		AF-44067	GL-3M	dB[uVolts/ meter]	FCC Part 15 Subpart C		Azimuth	Height	
Test Frequency	Reading	Detector	[dB]	[dB]		15.209	Margin	[Degs]	[cm]	Polarity
278.039	39.02	PK	13.6	-23	29.62	46	-16.38	301	101	Horz
294.4472	38.59	PK	13.9	-23.1	29.39	46	-16.61	332	101	Horz
331.6658	37.12	PK	14.9	-22.9	29.12	46	-16.88	301	101	Horz
PK - Peak detector										

8.5. RECEIVER BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz



HORIZONTAL & VERTICAL DATA

Manufacturer:Panasonic										
Device:GM MY 13 CNR 802.11b 1Mb/s										
Model:CQ-XG01E0GD S/N: 100223										
Job#:12U14378 13.5VDC										
Tested by:GB RCV Mode Mid Channel										
Vertical 30 - 200MHz										
Test Frequency	Meter Reading	Detector	AF-43441 [dB]	GL-3M [dB]	dB[uVolts/ meter]	FCC Part 15 Class B	Margin	Azimuth [Degs]	Height [cm]	Polarity
58.5886	50.1	PK	6.8	-23.8	33.1	40	-6.9	246	101	Vert
62.8428	49.72	PK	6.1	-23.8	32.02	40	-7.98	331	101	Vert
56.2062	47.78	PK	7.6	-23.8	31.58	40	-8.42	105	101	Vert
88.5385	48.04	PK	9.2	-23.7	33.54	43.5	-9.96	331	101	Vert
100.1101	45.29	PK	10.9	-23.6	32.59	43.5	-10.91	48	101	Vert
Horizontal 200 - 1000MHz										
Test Frequency	Meter Reading	Detector	AF-44067 [dB]	GL-3M [dB]	dB[uVolts/ meter]	FCC Part 15 Class B	Margin	Azimuth [Degs]	Height [cm]	Polarity
780.2901	36.61	PK	21.7	-21.2	37.11	46	-8.89	302	101	Horz
PK - Peak detector										

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

N/A – EUT is not AC powered.

10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

**Table 5
 Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)**

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m ²)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	280/ <i>f</i>	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 / <i>f</i> ^{1.2}
150 000–300 000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616 000 / <i>f</i> ^{1.2}

* Power density limit is applicable at frequencies greater than 100 MHz.

- Notes:**
1. Frequency, *f*, is in MHz.
 2. A power density of 10 W/m² is equivalent to 1 mW/cm².
 3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

RSS-102 Clause 2.5.2

RF exposure evaluation is required if the separation distance between the user and the device’s radiating element is greater than 20 cm, except when the device operates as follows:

- below 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 2.5 W;
- at or above 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 5 W.

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

EQUATIONS

Power density is given by:

$$S = \text{EIRP} / (4 * \text{Pi} * D^2)$$

where

S = Power density in W/m²

EIRP = Equivalent Isotropic Radiated Power in W

D = Separation distance in m

Power density in units of W/m² is converted to units of mW/cm² by dividing by 10.

Distance is given by:

$$D = \text{SQRT} (\text{EIRP} / (4 * \text{Pi} * S))$$

where

D = Separation distance in m

EIRP = Equivalent Isotropic Radiated Power in W

S = Power density in W/m²

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m²

RESULTS

MPE distance is greater than 20 cm

Band	Mode	FCC Limit (mW/cm ²)	IC Limit (W/m ²)	Output Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	Source Based EIRP (mW)	Separation Distance (cm)
2.4 GHz	WLAN	1.0	10.0	24.15	4.00	100	653.1	7.21

The device operates above 1.5 GHz with a maximum EIRP less than or equal to 5 Watts as a mobile device with a minimum separation distance of 20 cm, therefore it is exempt from routine RF Exposure Evaluation.

CO-LOCATED RESULTS

MPE distance is greater than 20 cm, limit is the same for all bands

Band	Mode	IC Limit (W/m ²)	FCC Limit (mW/cm ²)	Output Power (dBm)	Antenna Gain (dBi)	Separation Distance (m)
2.4 GHz	Bluetooth			1.97	4.00	
2.4 GHz	WLAN			24.15	4.00	
Combined		10.00	1.000			0.07

END OF REPORT