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: 12U14378-1

ISSUE DATE: 2012-04-20

Prepared for
PANASONIC AUTOMOTIVE SYSTEMS COMPANY OF AMERICA
776 HWY. 74
PEACHTREE CITY
GA, 30269, USA

Prepared by
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NVLAP LAB CODE 100255-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	4/20/12	Initial Issue	M. Antola

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PANASONIC AUTOMOTIVE SYSTEMS CO. OF AMERICA
776 HWY. 74
PEACHTREE CITY, GA, 30269, 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:

Bob DeLisi
Sr. Staff Engineer
UL LLC

Tested By:

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UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, 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:

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	± 3.3 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 a Bluetooth 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:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	3.34	2.16
2402 - 2480	Enhanced QPSK	3.12	2.05
2402 - 2480	Enhanced 8PSK	3.08	2.03

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 CSR BlueTest3 BC5 (Hardware ID 0xE1), Firmware Ver. 6530.

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.

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 which was found to be DH5, with the exception of the Output Power and Time of Occupancy test, which were tested in all data rates.

Radiated testing above 1GHz was performed in all three modulations 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

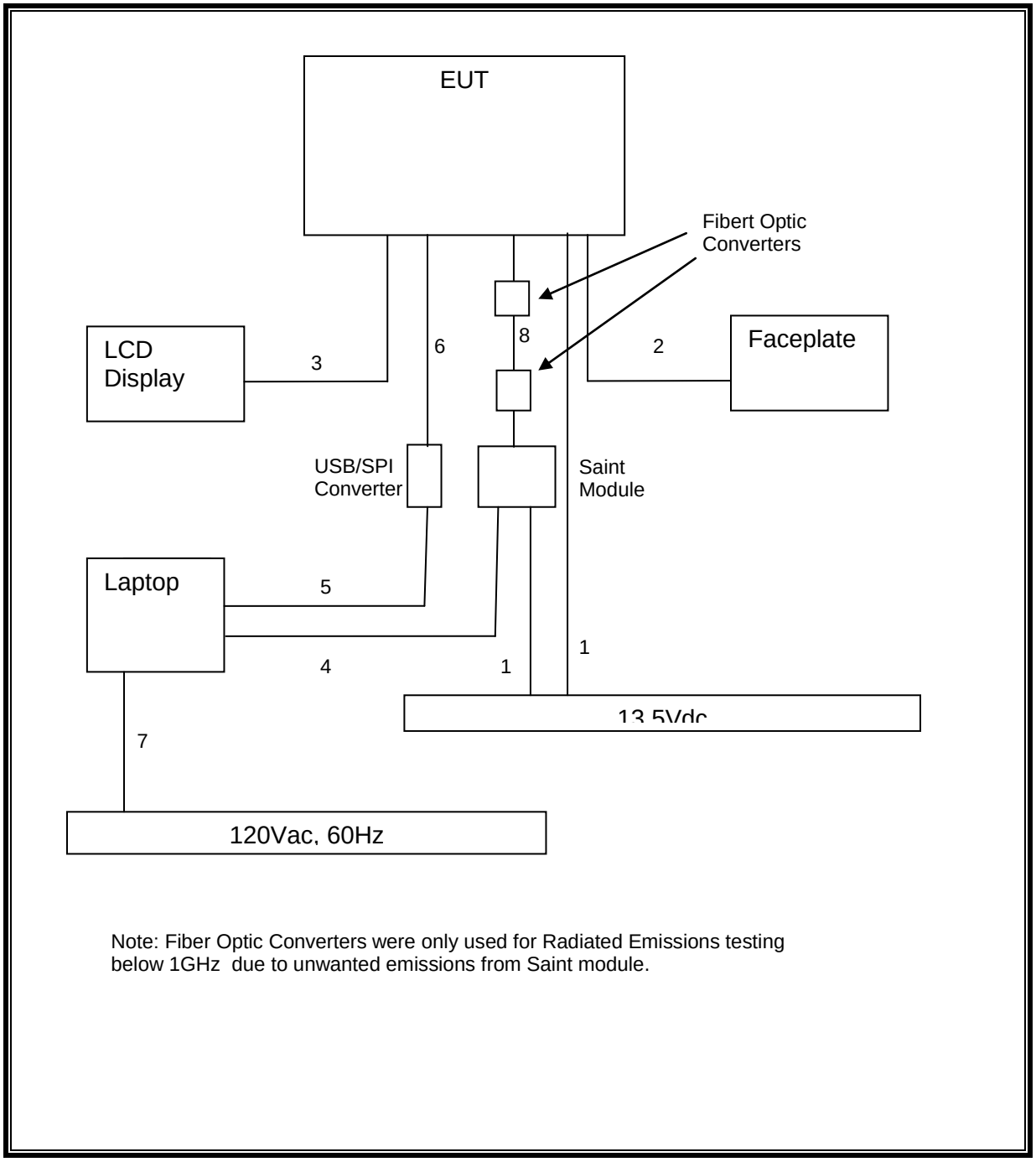
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica 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



Note: Fiber Optic Converters were only used for Radiated Emissions testing below 1GHz due to unwanted emissions from Saint module.

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

* - 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.
* 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.

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. BASIC DATA RATE GFSK MODULATION

7.1.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

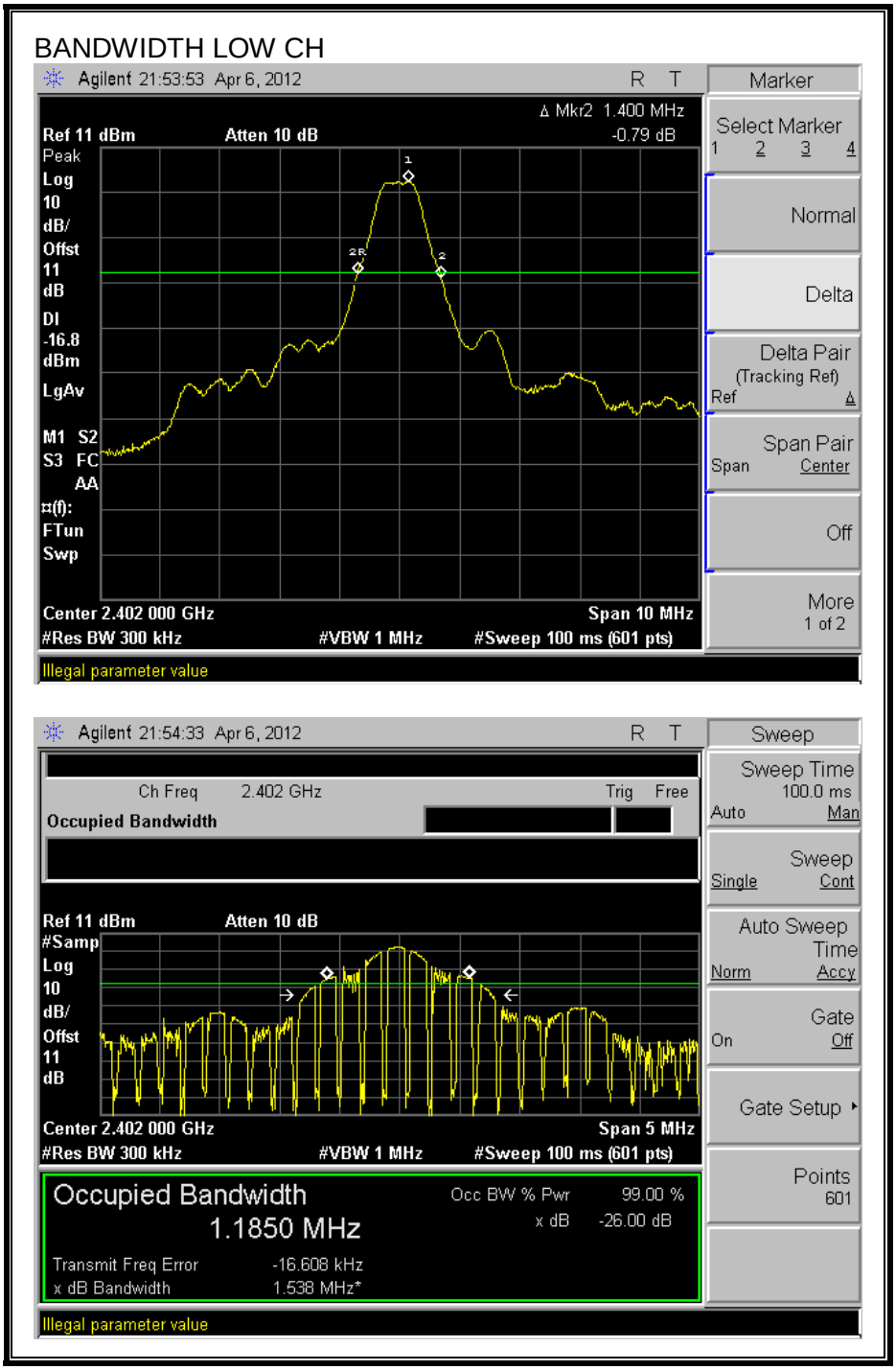
The transmitter output is connected to a spectrum analyzer. The RBW is set to ≥ 1% of the 20 dB bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

RESULTS

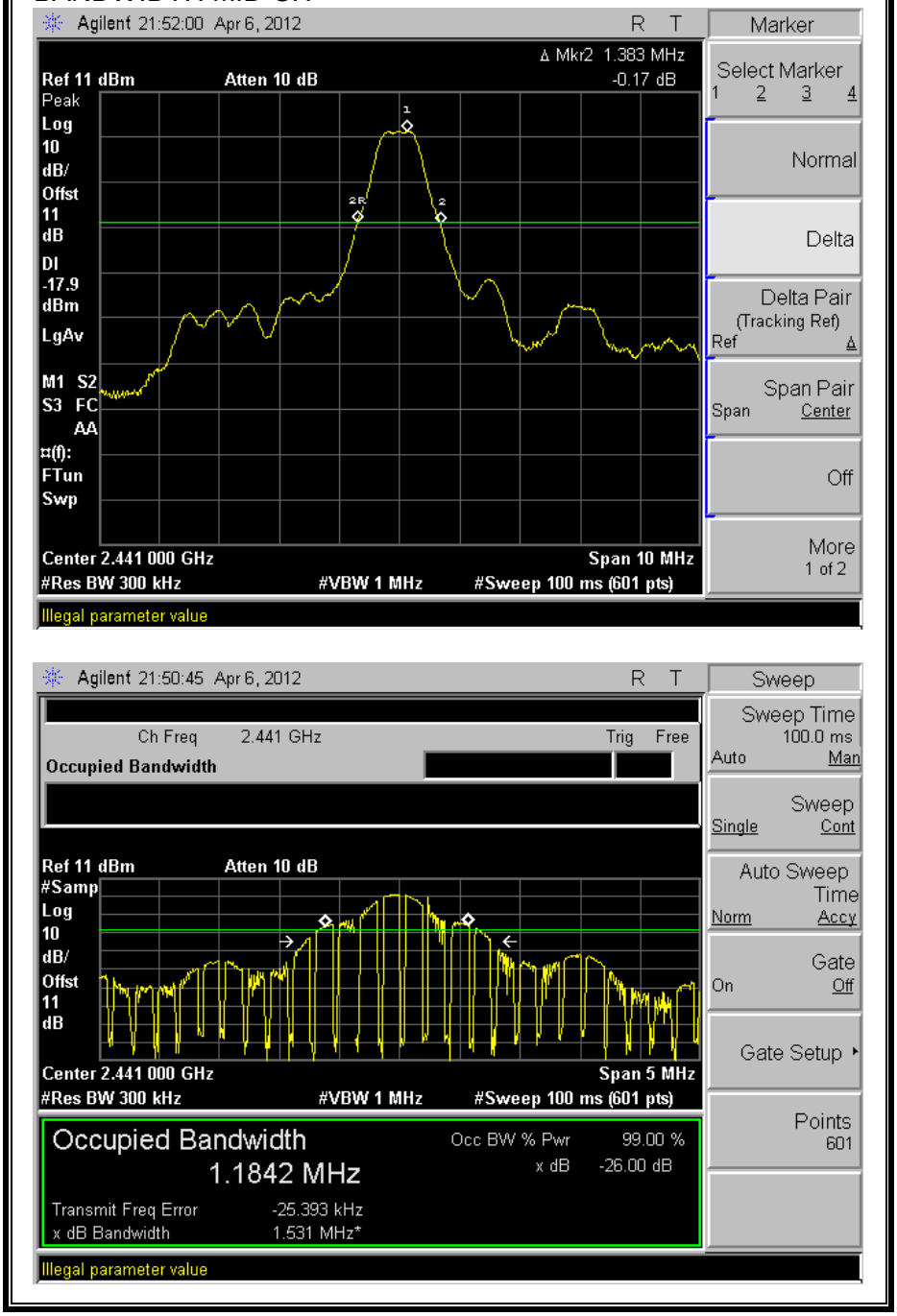
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1400	1185
Middle	2441	1383	1184
High	2480	1417	1237

20 dB AND 99% BANDWIDTH

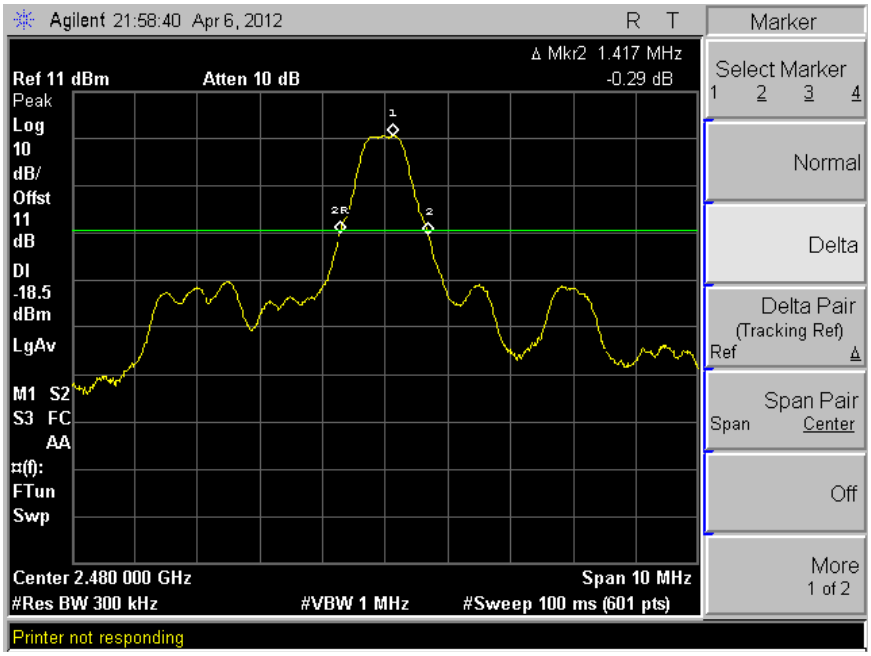
BANDWIDTH LOW CH

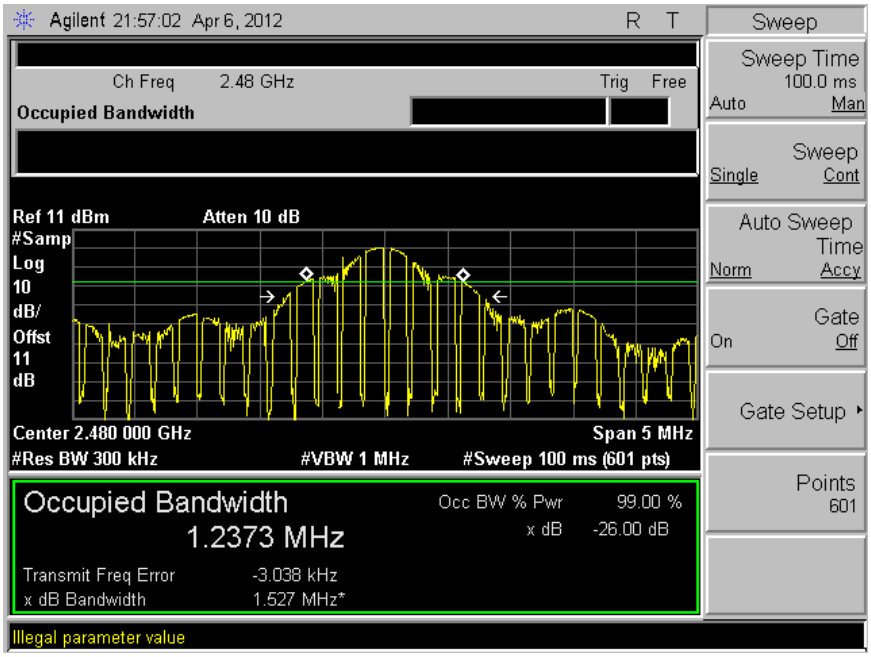


BANDWIDTH MID CH



BANDWIDTH HIGH CH





7.1.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

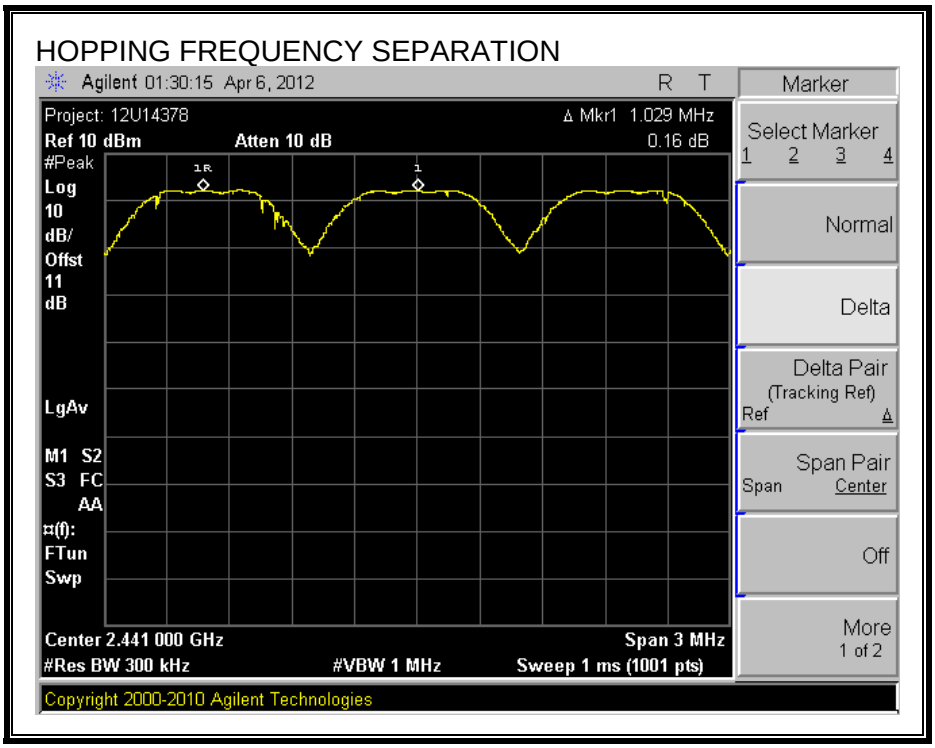
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 1 MHz. The sweep time is coupled.

RESULTS

HOPPING FREQUENCY SEPARATION



7.1.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

TEST PROCEDURE

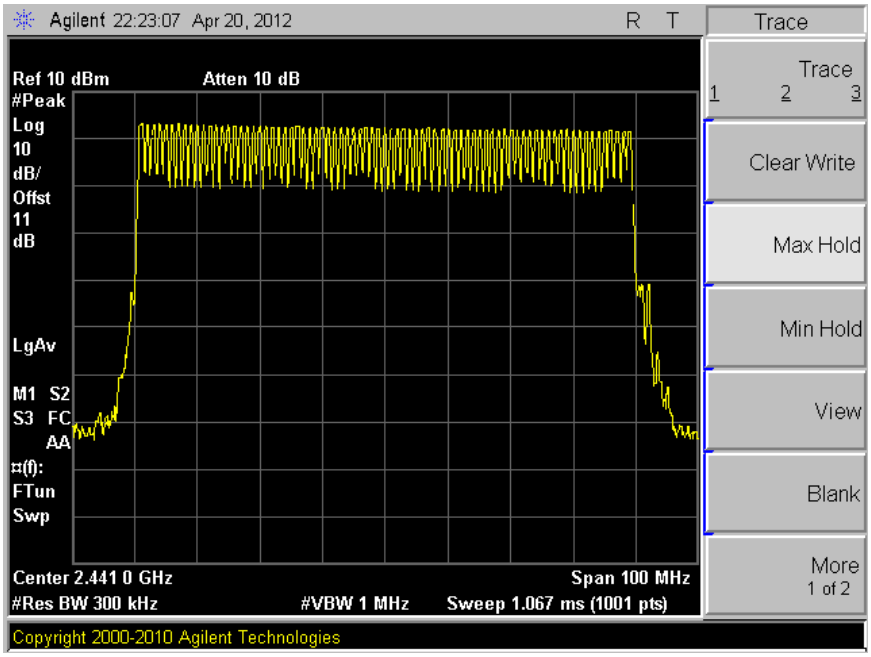
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

RESULTS

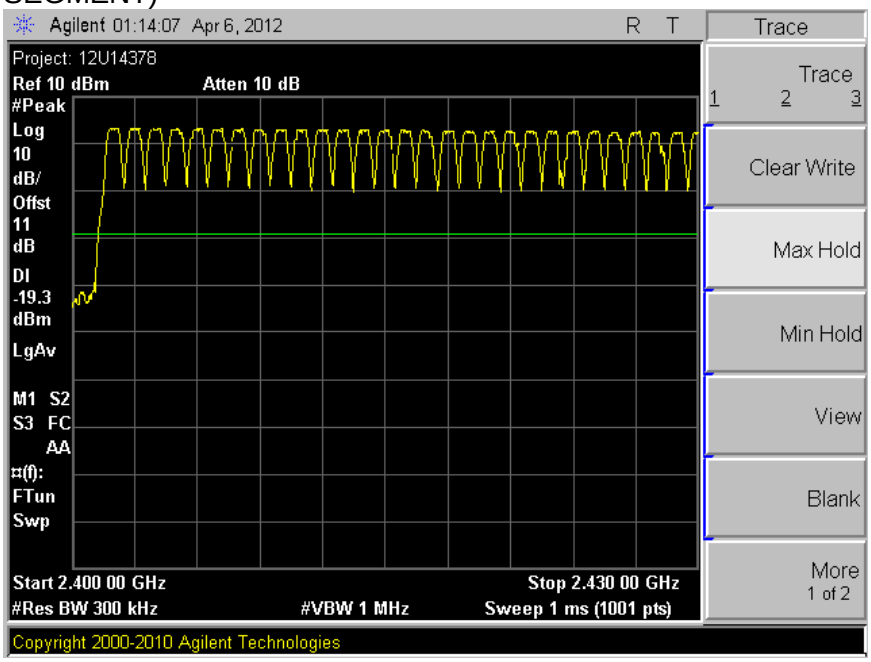
79 Channels observed.

NUMBER OF HOPPING CHANNELS

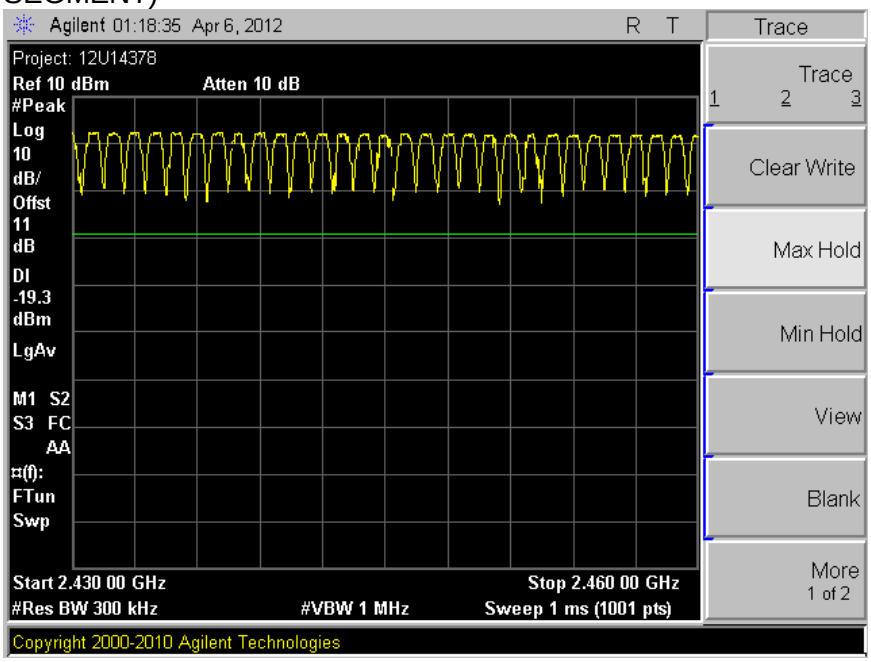
NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



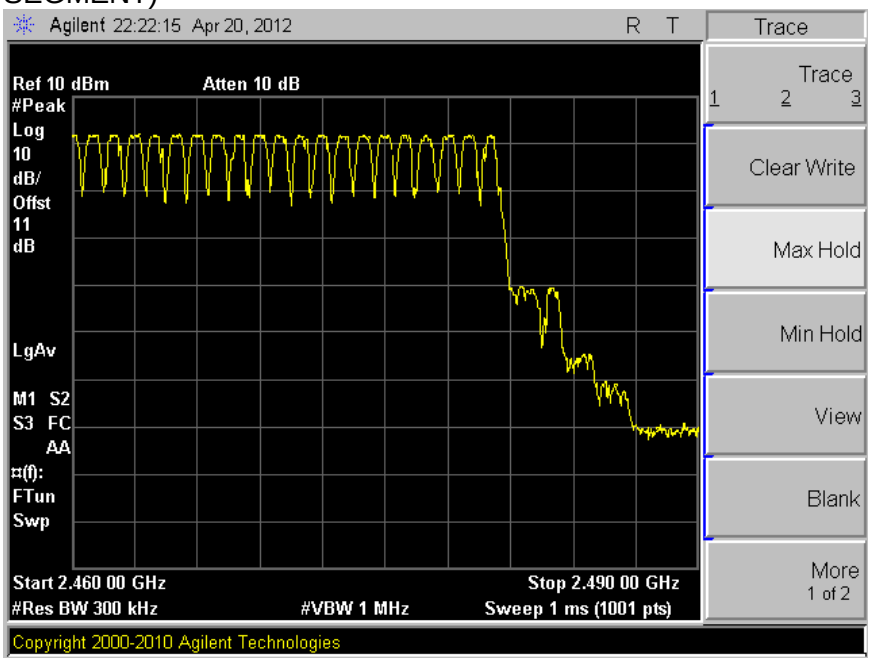
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)



7.1.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

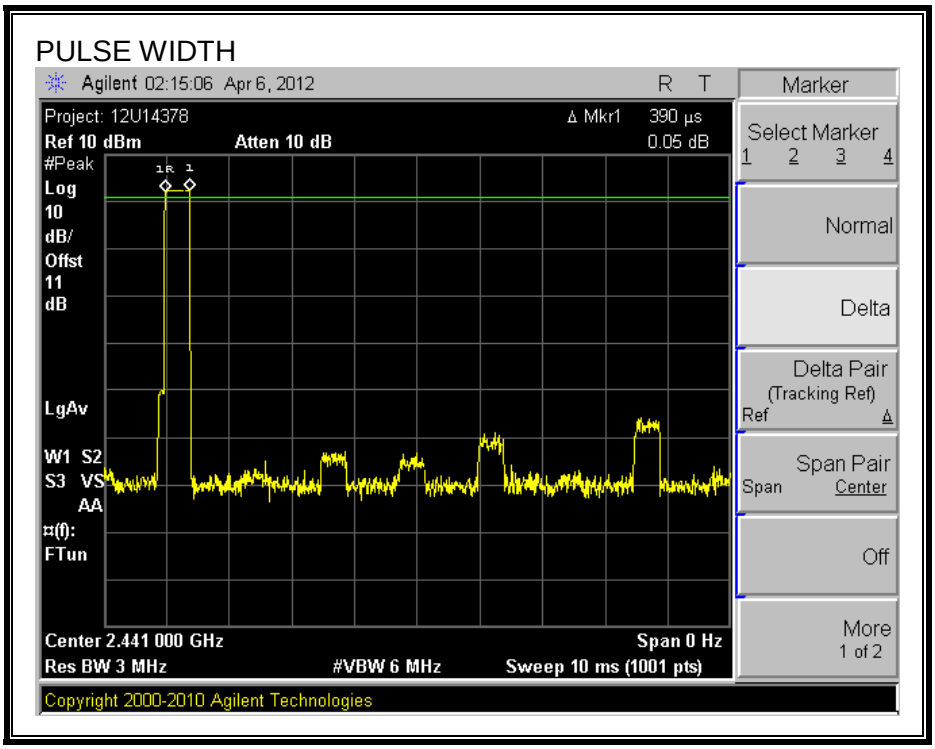
RESULTS

Time of Occupancy = 10 * xx pulses * yy msec = zz msec

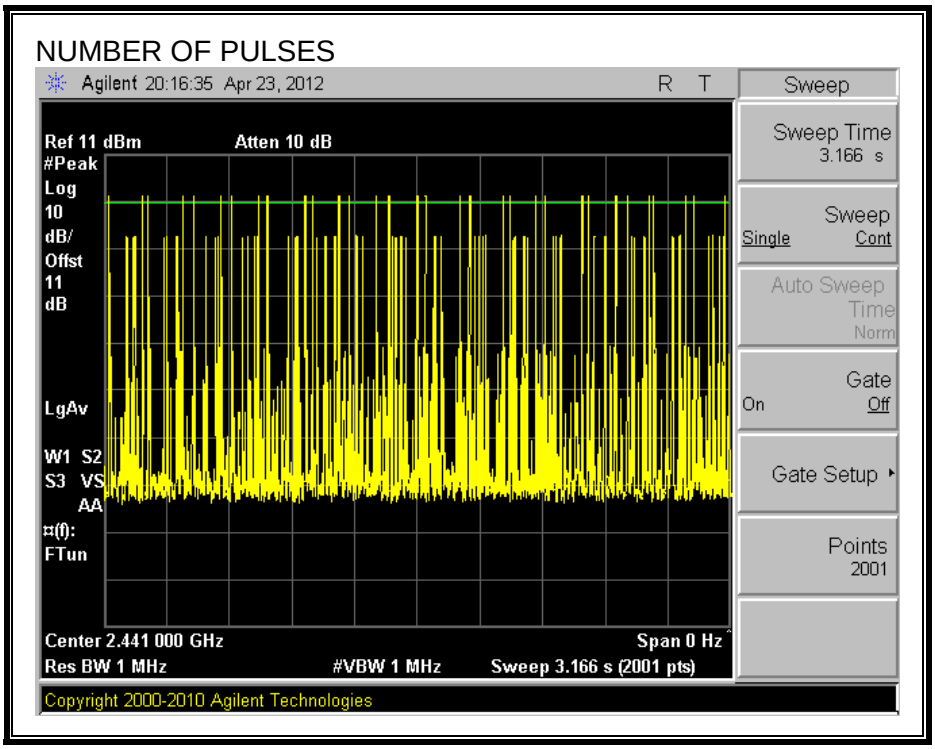
GFSK Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.39	32	0.125	0.4	0.275
DH3	1.64	16	0.262	0.4	0.138
DH5	2.9	12	0.348	0.4	0.052

PULSE WIDTH – DH1 DATA RATE

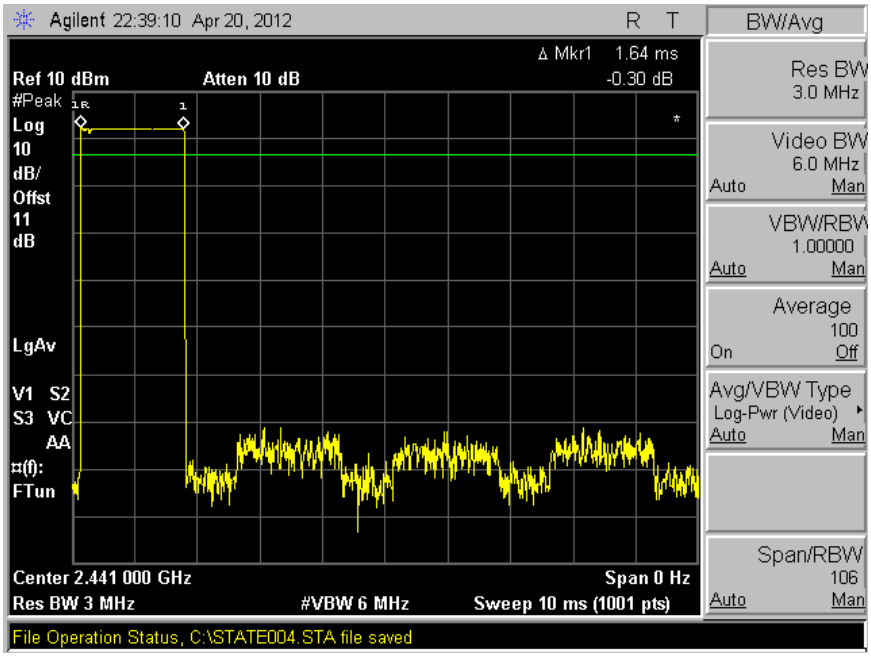


NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1 DATA RATE

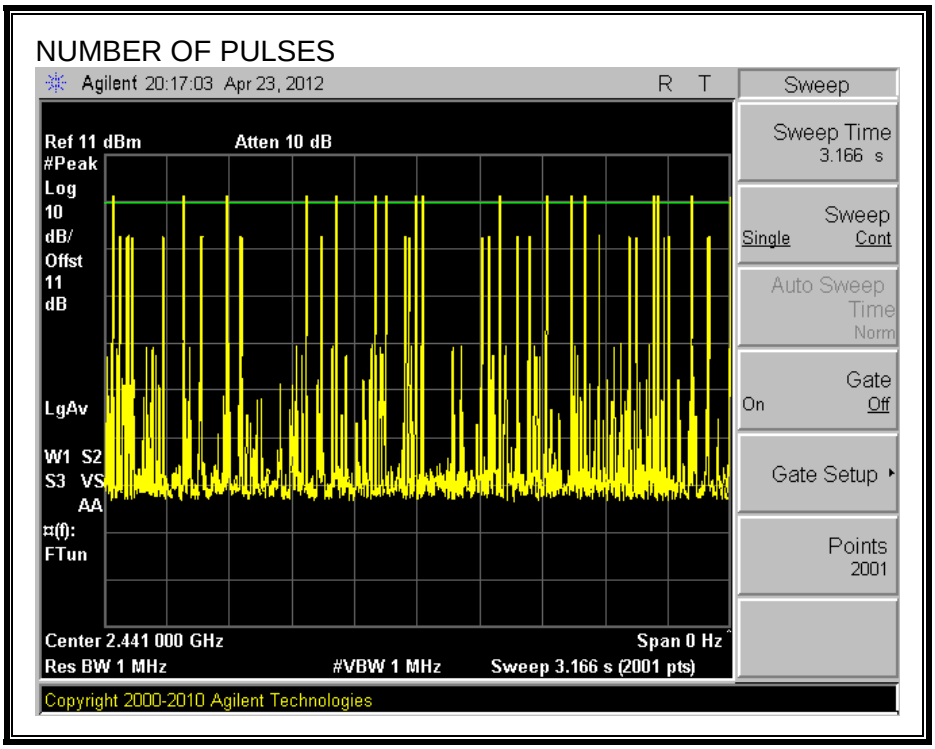


PULSE WIDTH – DH3 DATA RATE

PULSE WIDTH

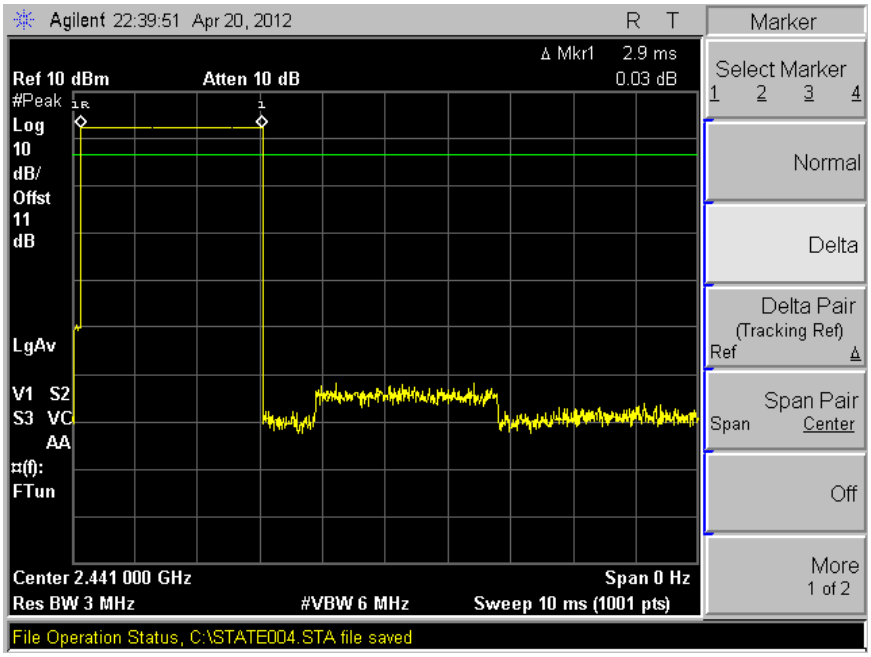


NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3 DATA RATE



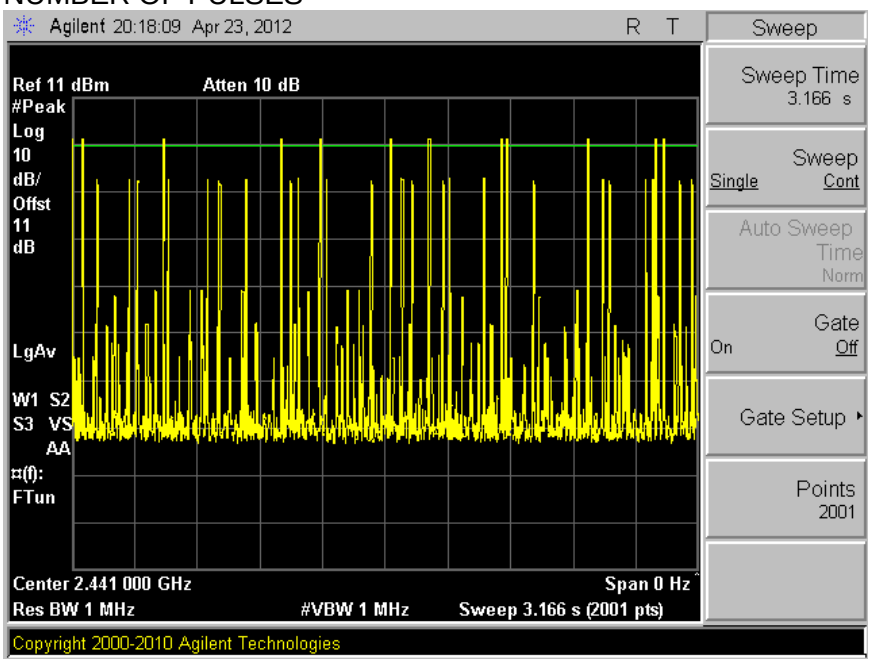
PULSE WIDTH – DH5 DATA RATE

PULSE WIDTH



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5 DATA RATE

NUMBER OF PULSES



7.1.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

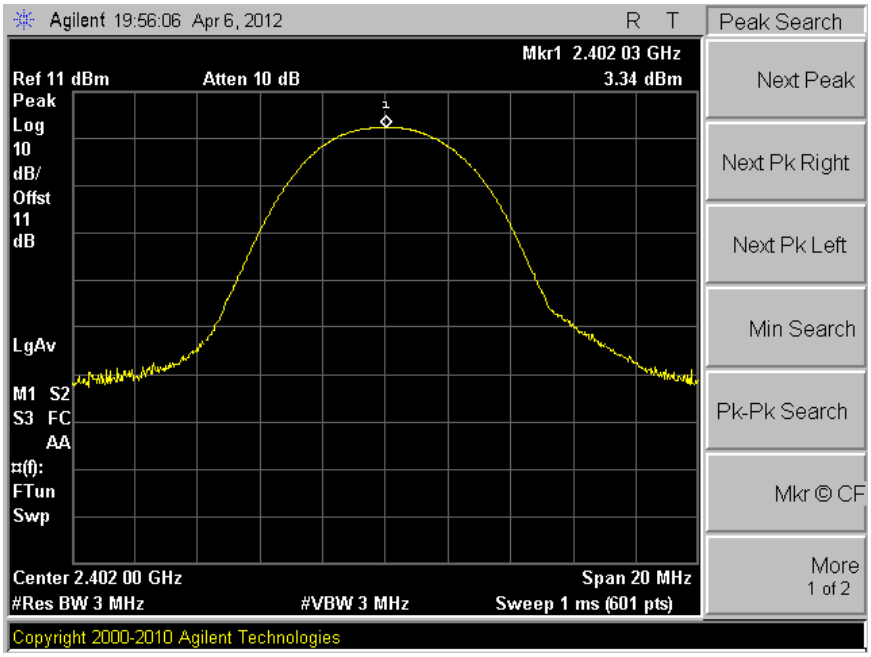
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.34	21	-17.56
Middle	2441	2.18	21	-18.72
High	2480	1.54	21	-19.36

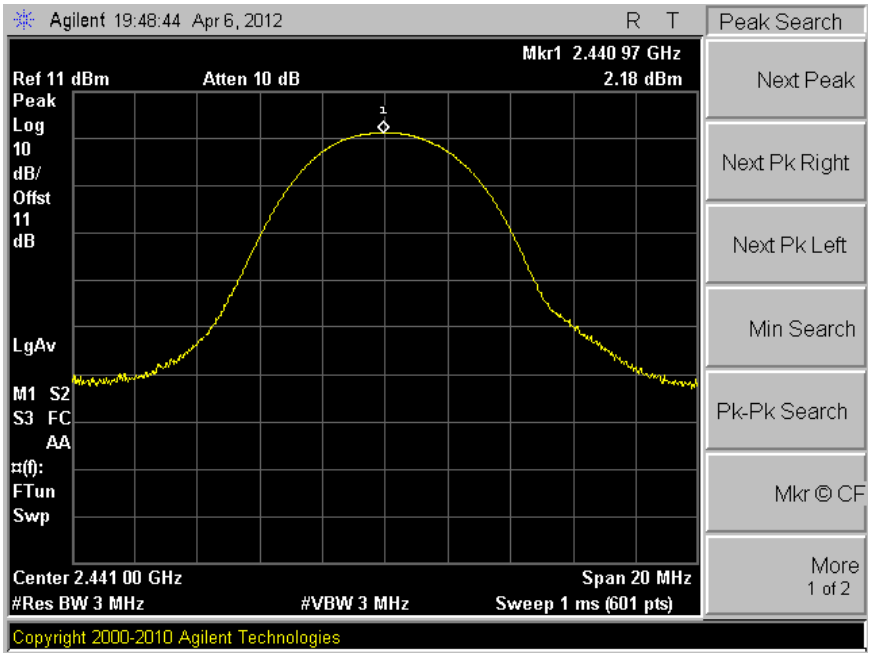
Note: Since the frequency separation is less than the 20dB bandwidth, the limit for output power was reduced to 125mW (21dBm)

OUTPUT POWER

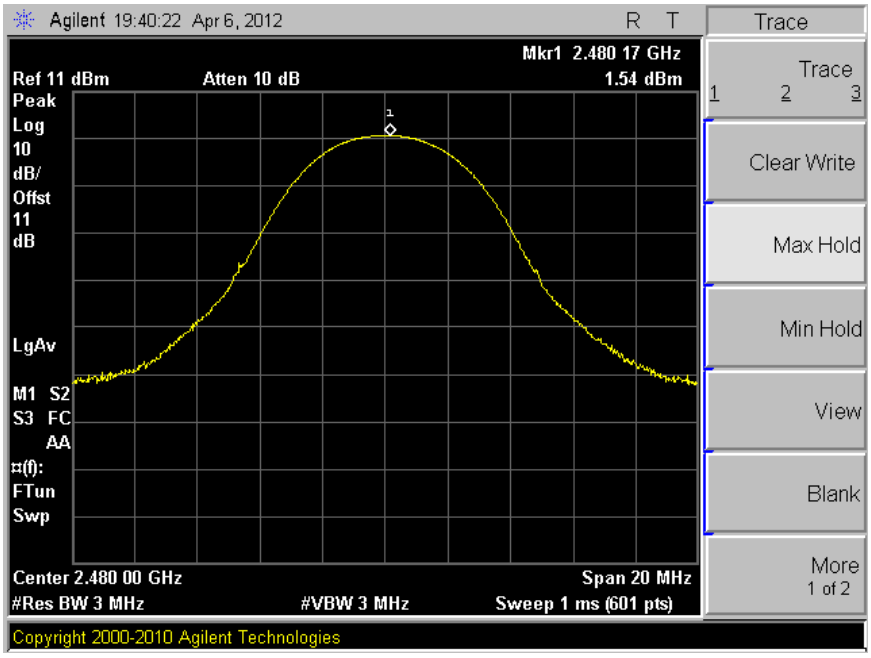
PEAK POWER LOW CH



PEAK POWER MID CH



PEAK POWER HIGH CH



7.1.6. AVERAGE POWER

LIMIT

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)	Average Power (dBm)
Low	2402	1.97
Middle	2441	0.50
High	2480	0.24

7.1.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

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.

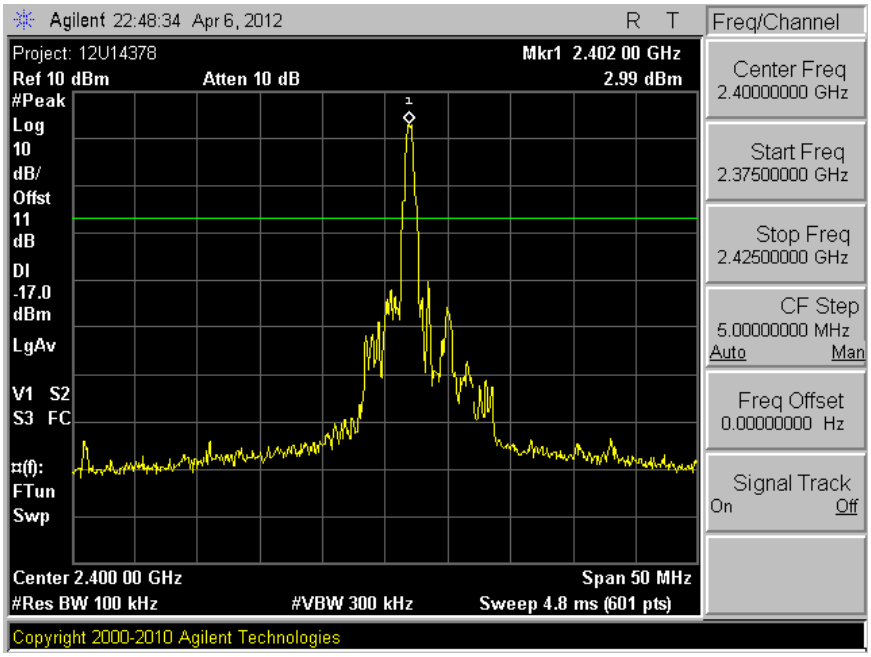
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

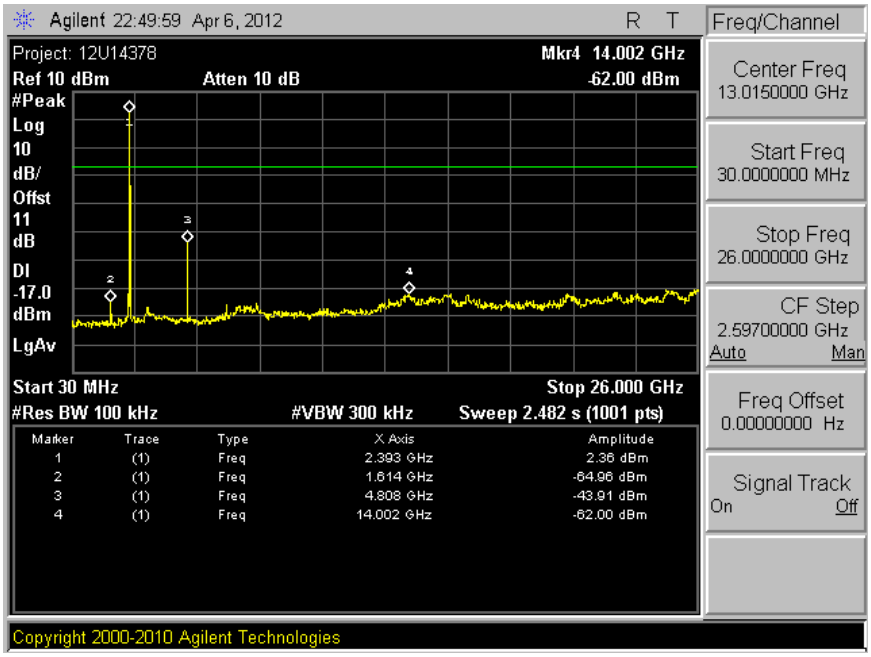
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

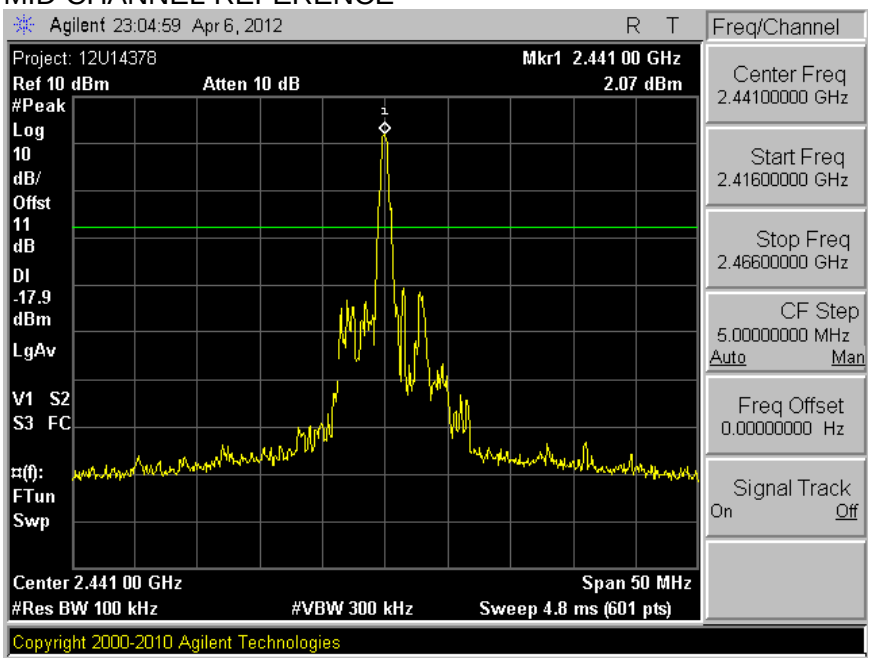


LOW CHANNEL SPURIOUS

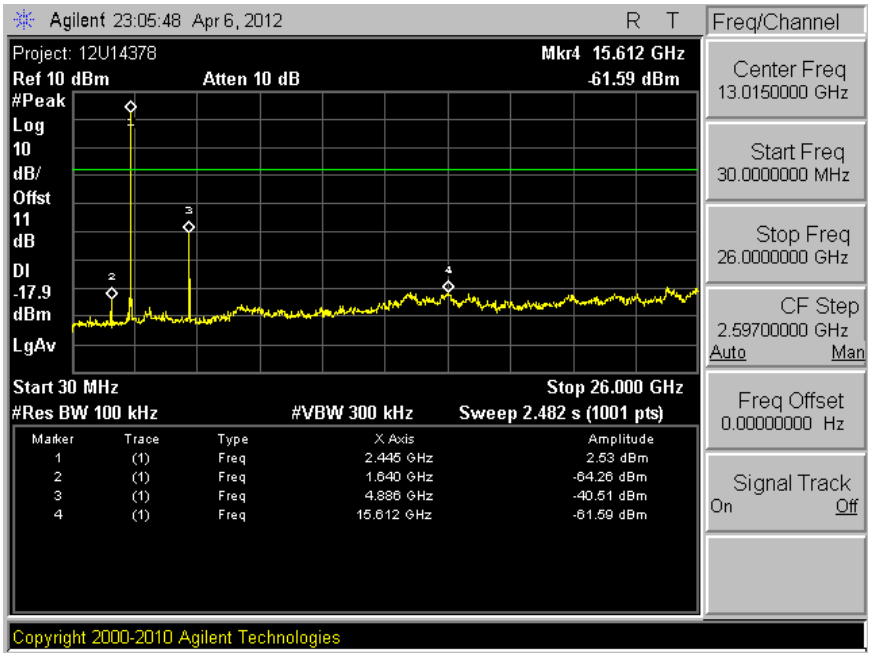


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

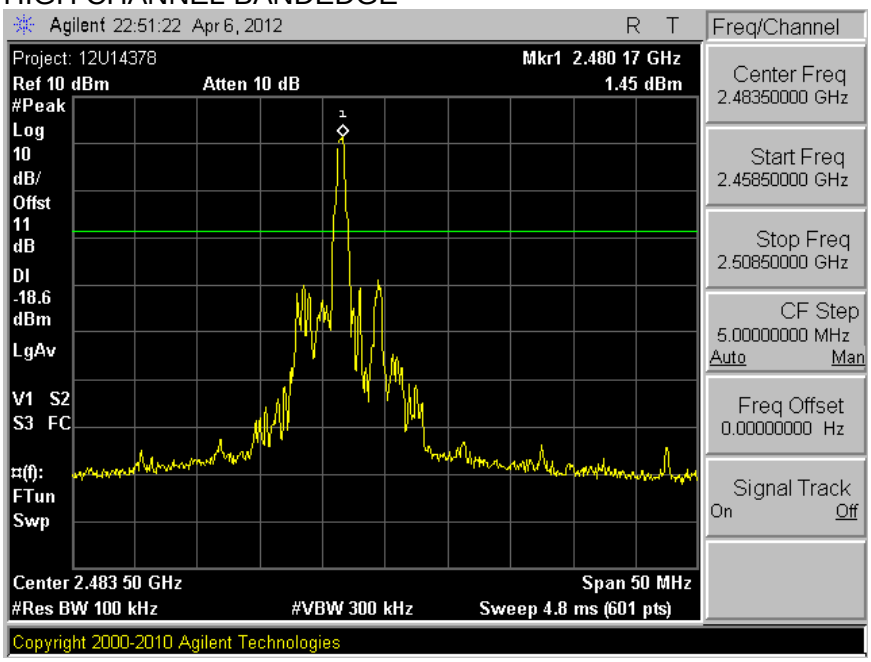


MID CHANNEL SPURIOUS

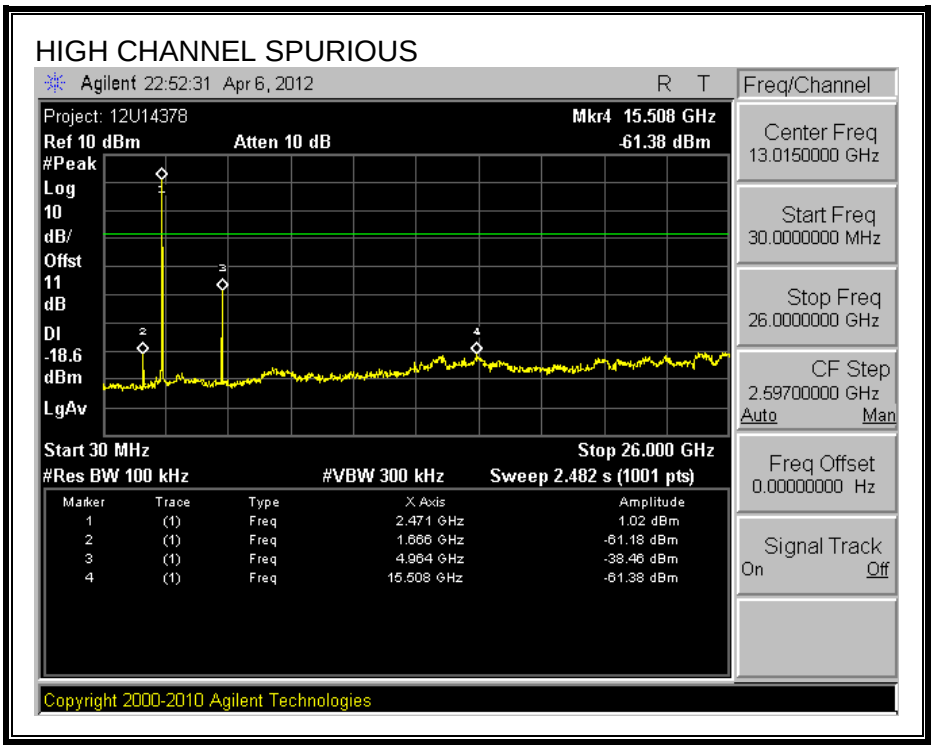


SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE

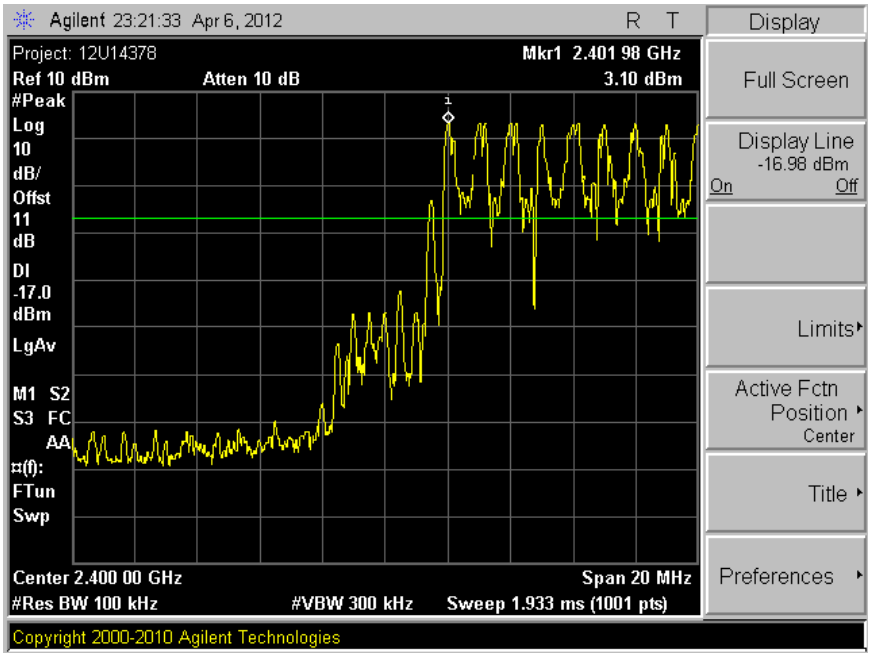


HIGH CHANNEL SPURIOUS

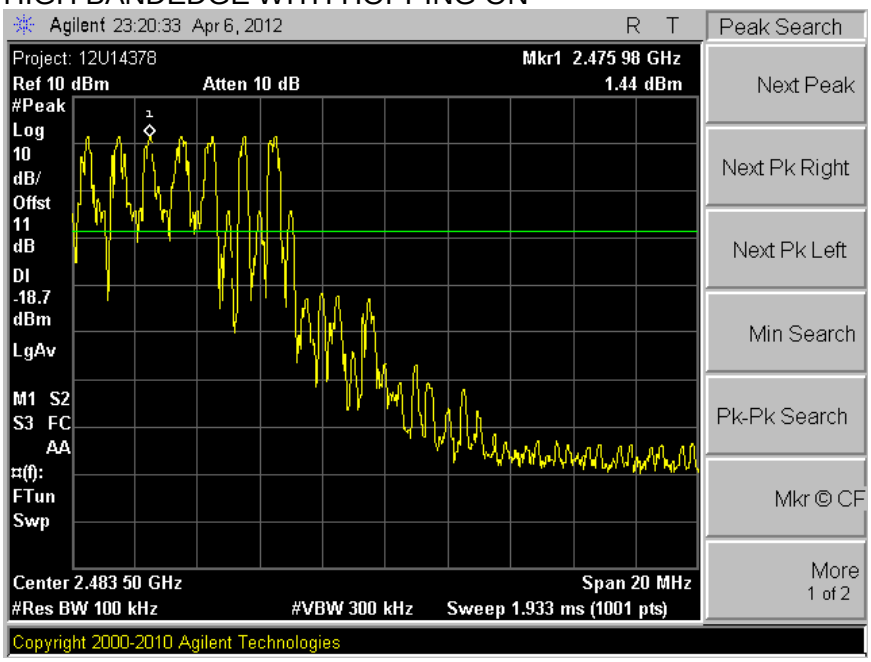


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



7.1.8. DUTY CYCLE

LIMITS

FCC §15.35 (c)
The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 1 MHz and the VBW is set to 1 MHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

CALCULATION

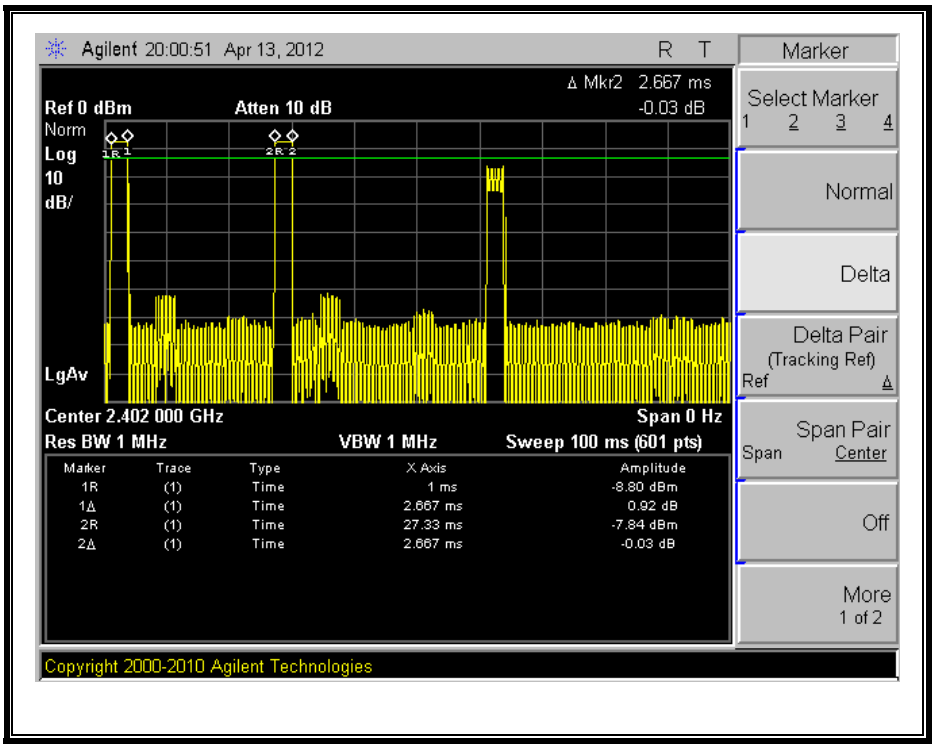
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is
(# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

No non-compliance noted:

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	0	0	2.67	2	0.053	-25.46

PULSE WIDTHS



7.2. ENHANCED DATA RATE QGFSK MODULATION

7.2.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

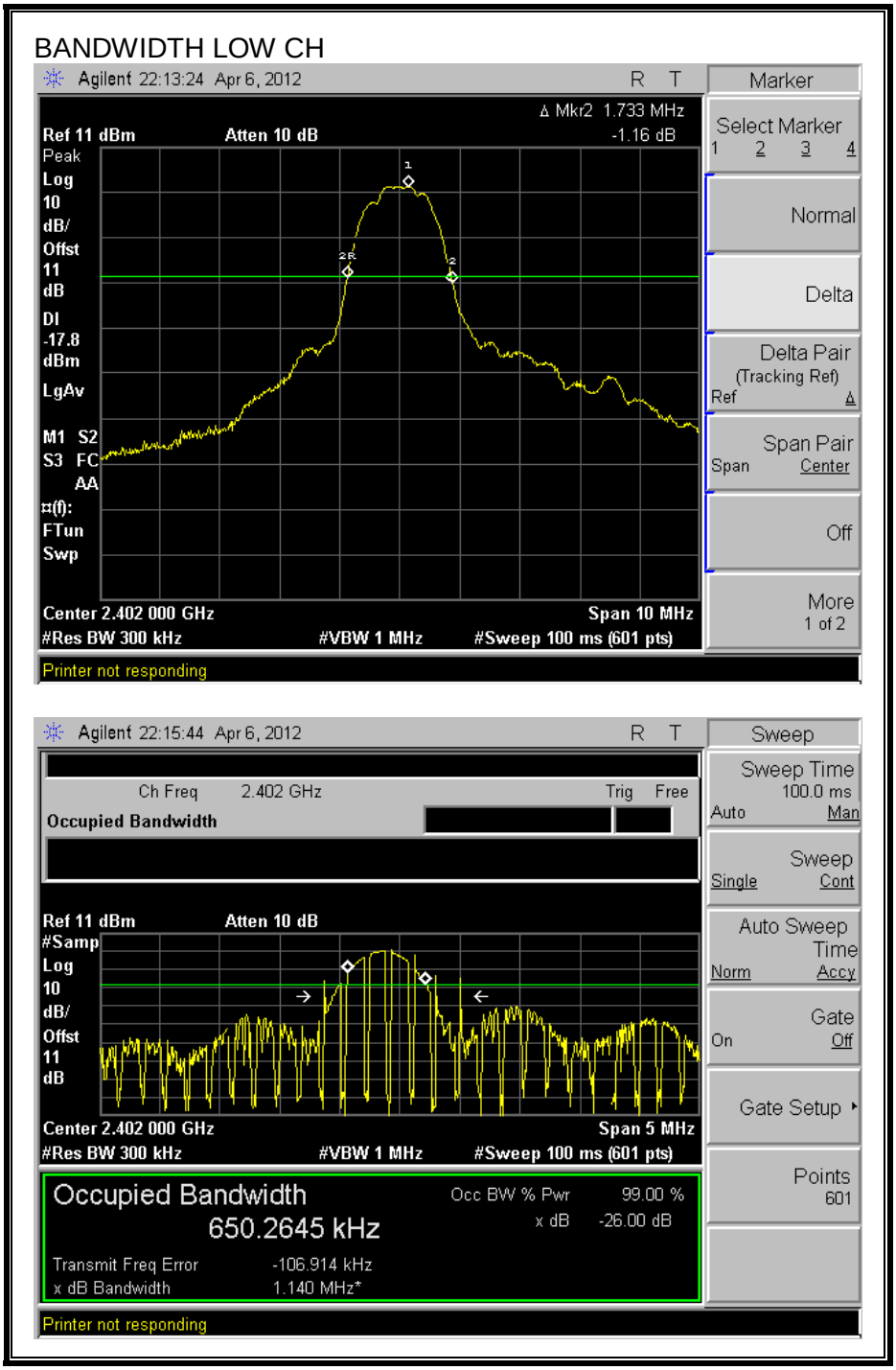
The transmitter output is connected to a spectrum analyzer. The RBW is set to ≥ 1% of the 20 dB bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

RESULTS

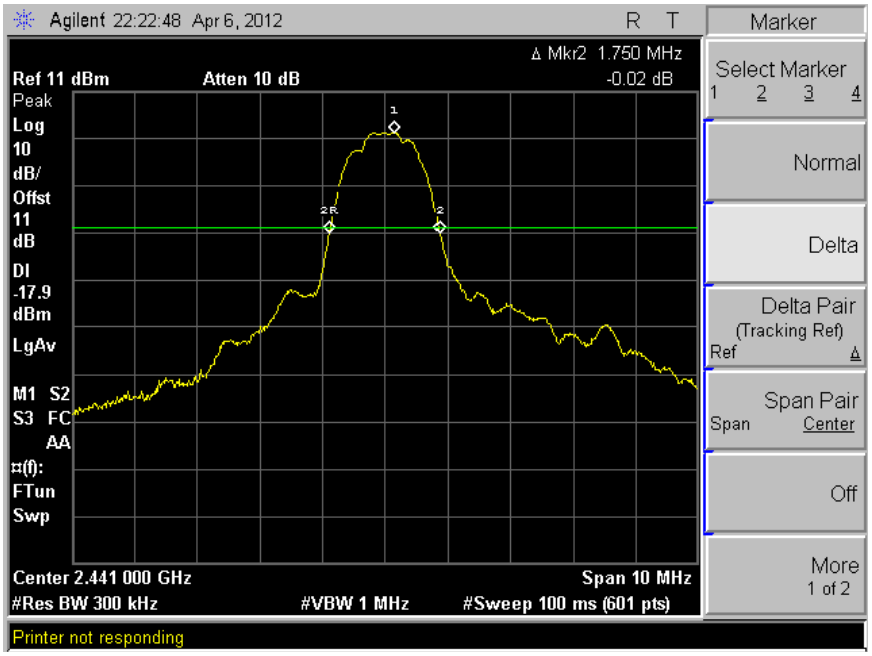
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1733	650
Middle	2441	1750	620
High	2480	1750	641

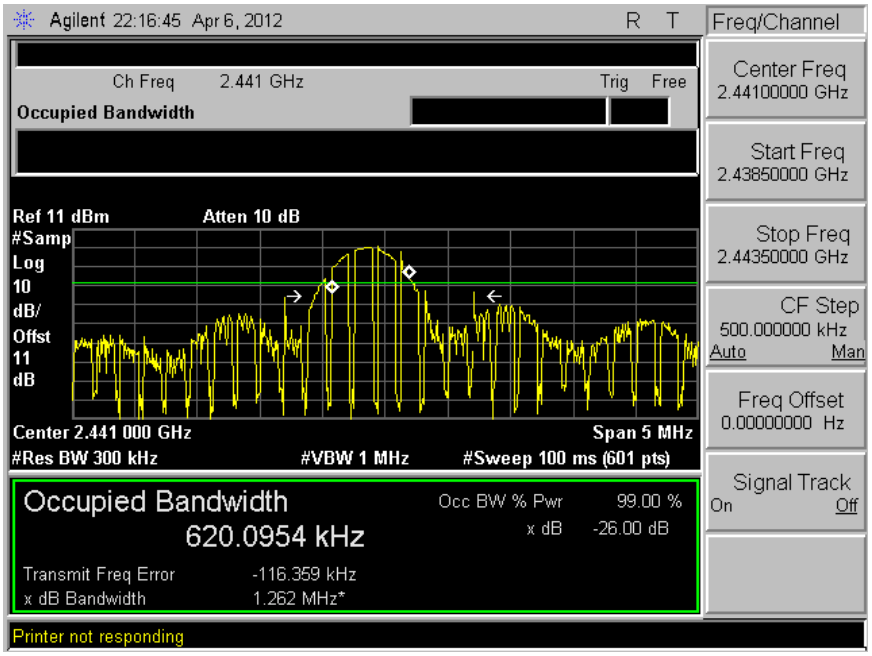
20 dB AND 99% BANDWIDTH

BANDWIDTH LOW CH

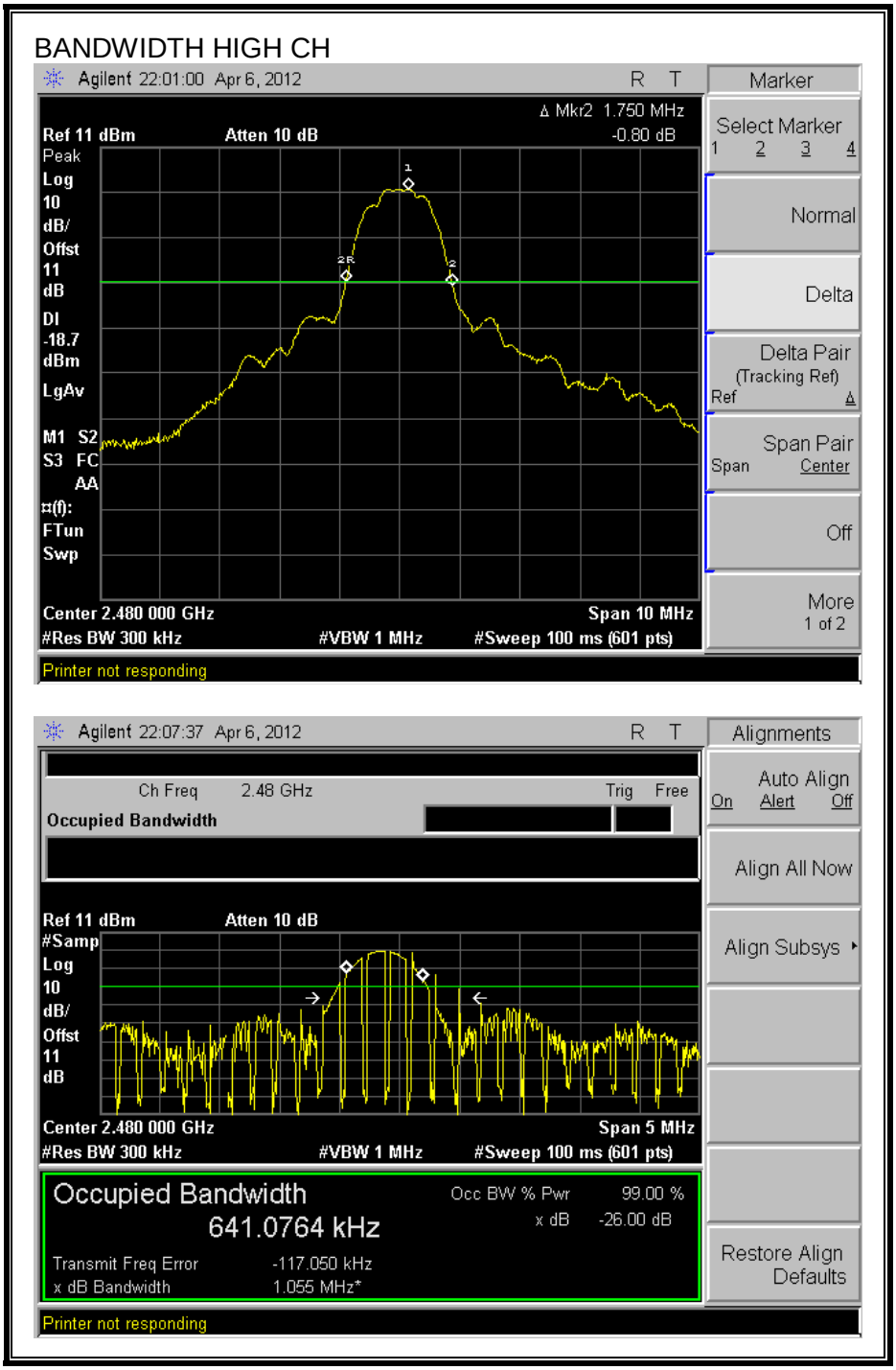


BANDWIDTH MID CH





BANDWIDTH HIGH CH



7.2.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

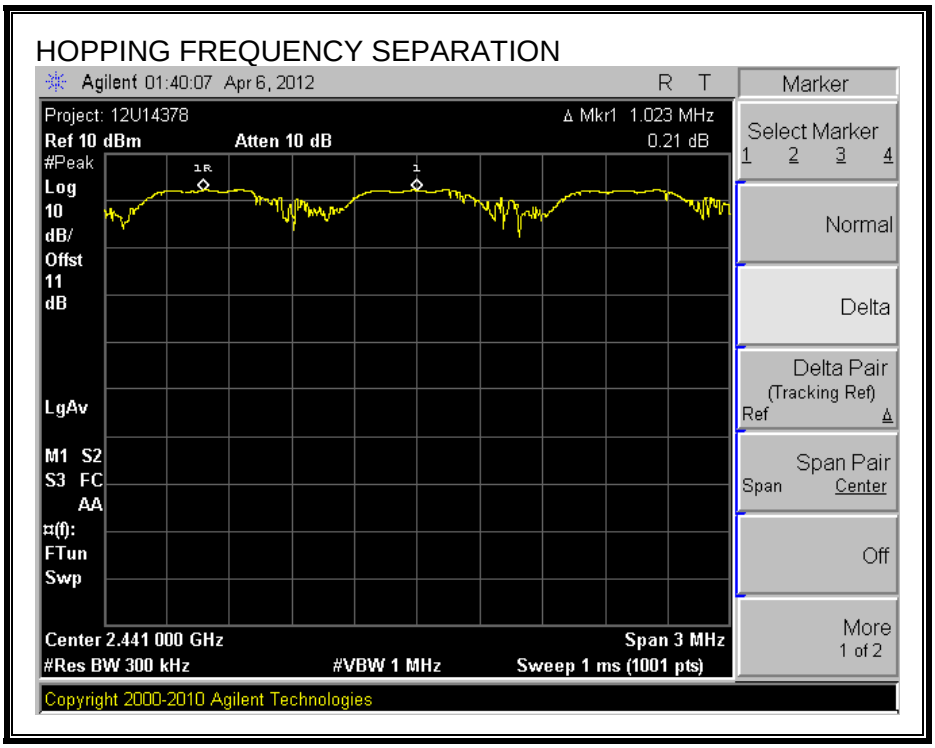
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 1 MHz. The sweep time is coupled.

RESULTS

HOPPING FREQUENCY SEPARATION



7.2.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

TEST PROCEDURE

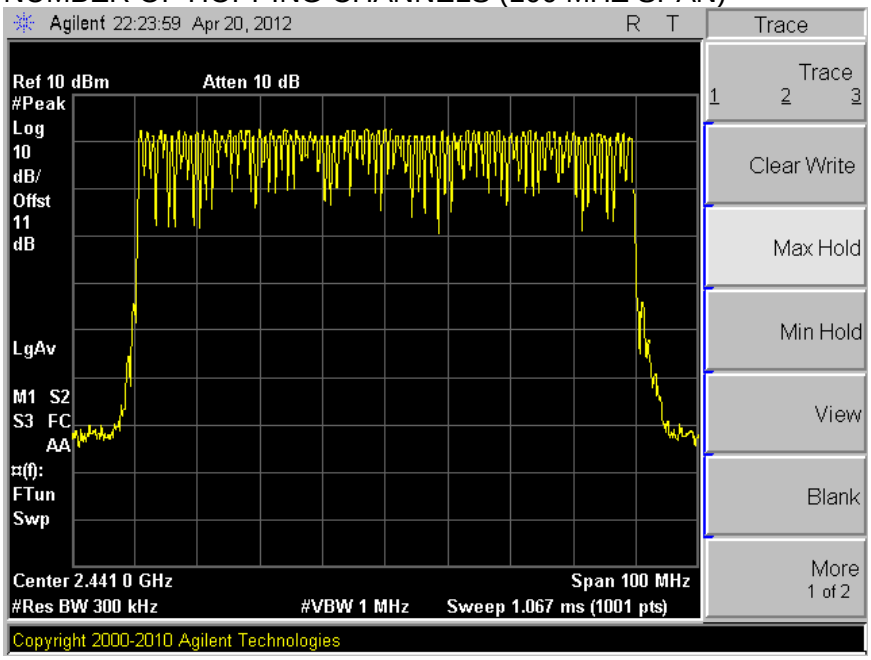
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

RESULTS

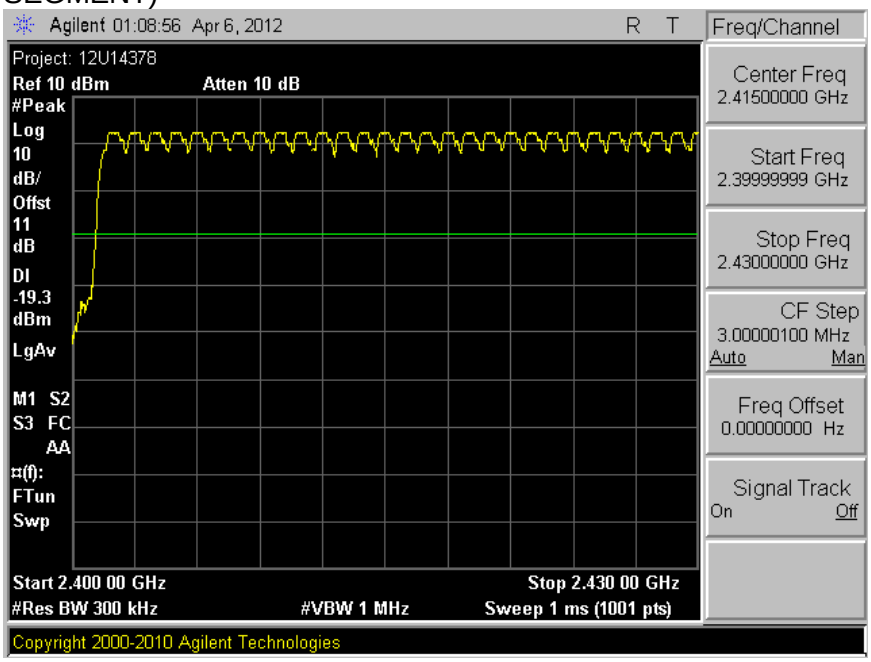
79 Channels observed.

NUMBER OF HOPPING CHANNELS

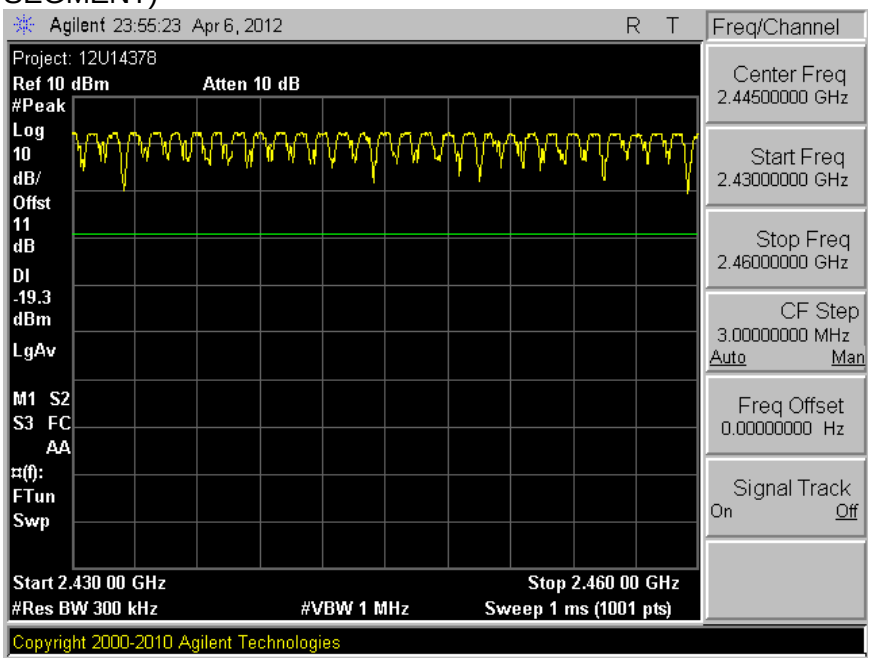
NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



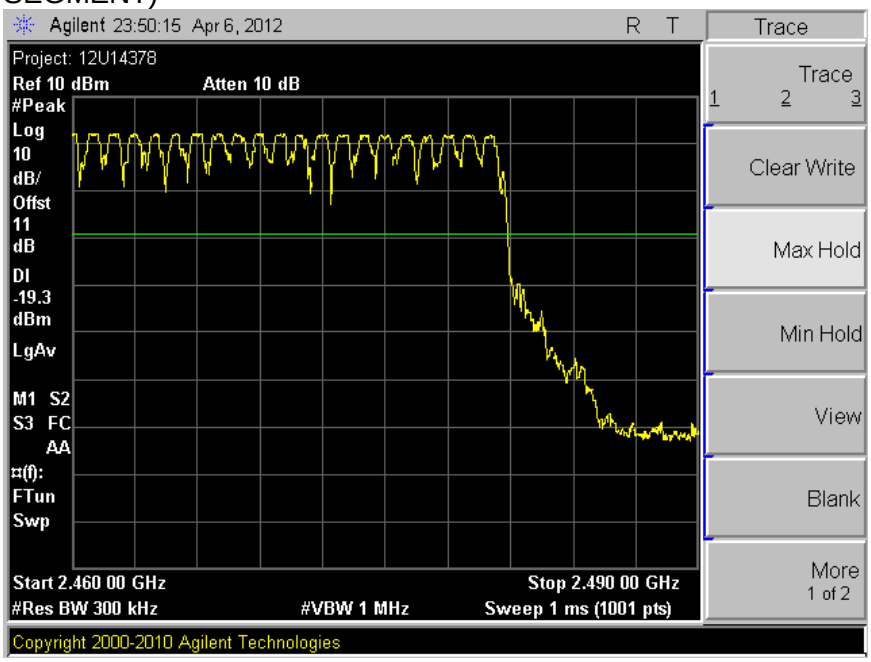
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)



7.2.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

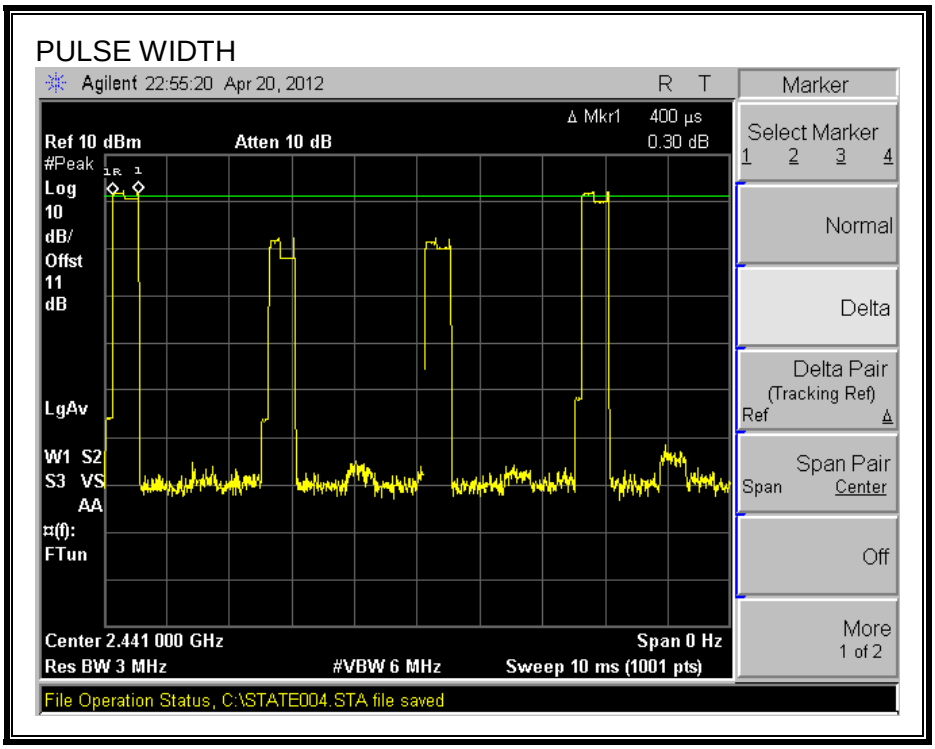
RESULTS

Time of Occupancy = 10 * xx pulses * yy msec = zz msec

QGFSK Mode

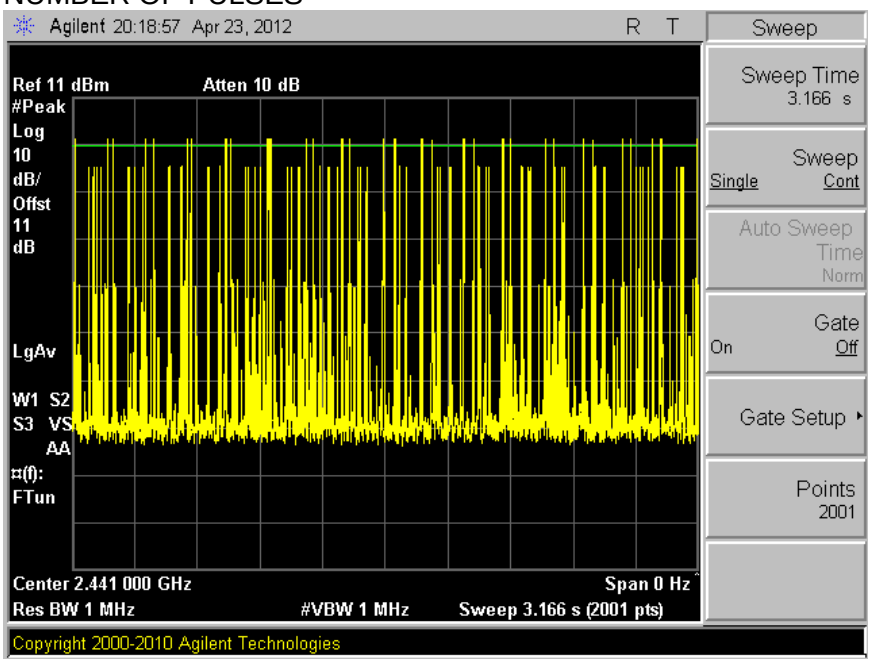
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.4	32	0.128	0.4	0.272
DH3	1.65	14	0.231	0.4	0.169
DH5	2.9	13	0.377	0.4	0.023

PULSE WIDTH – DH1 DATA RATE

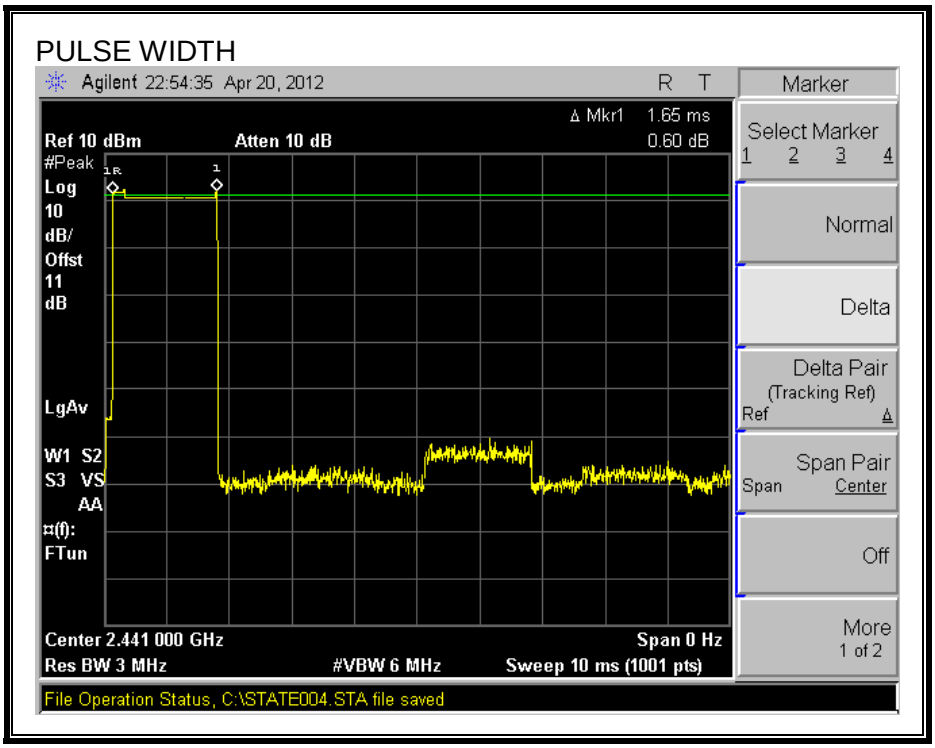


NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1 DATA RATE

NUMBER OF PULSES

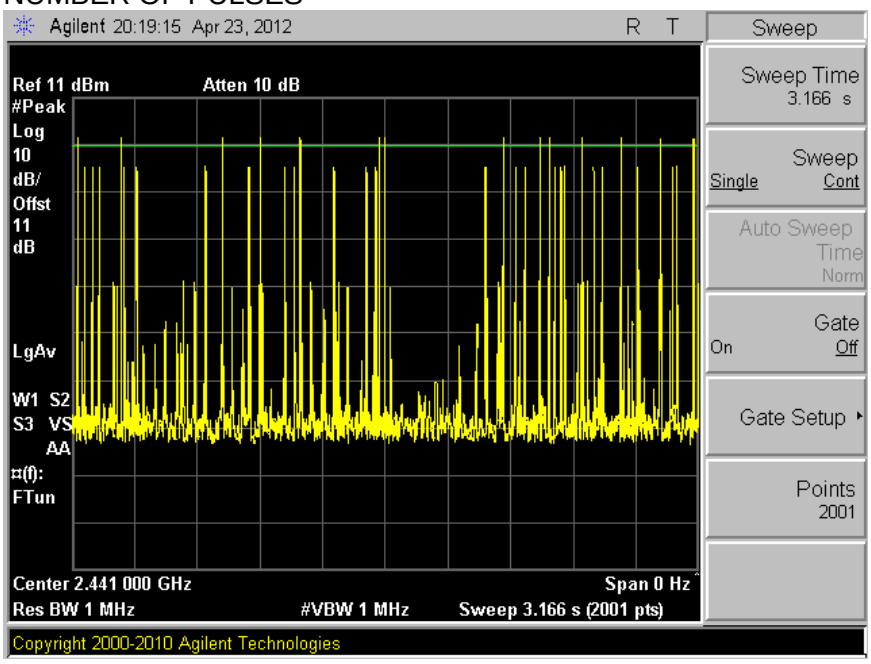


PULSE WIDTH – DH3 DATA RATE

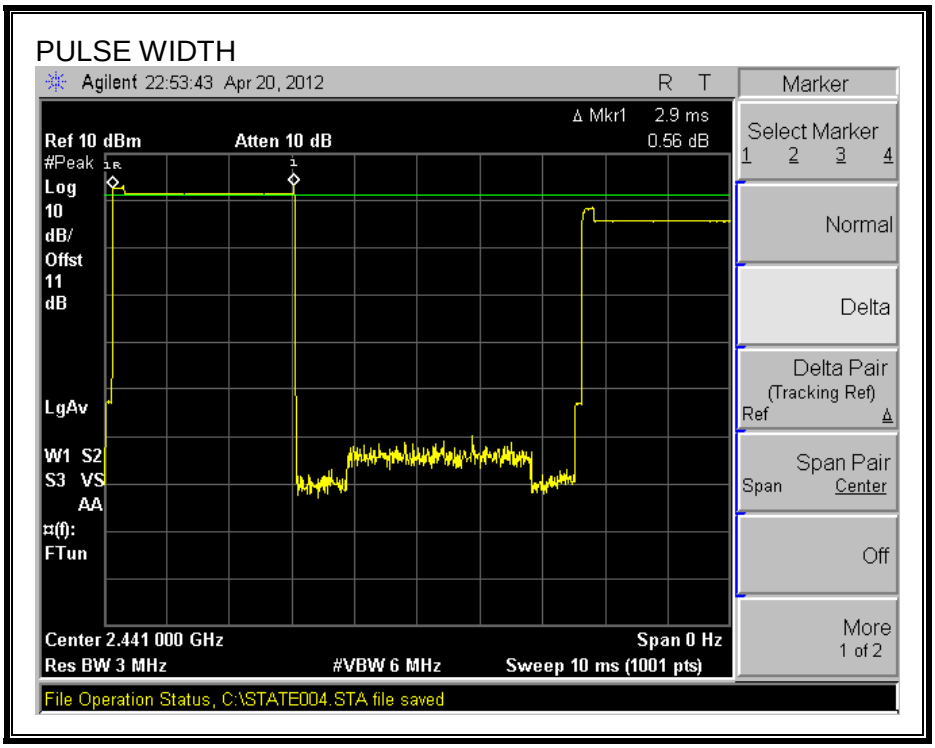


NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3 DATA RATE

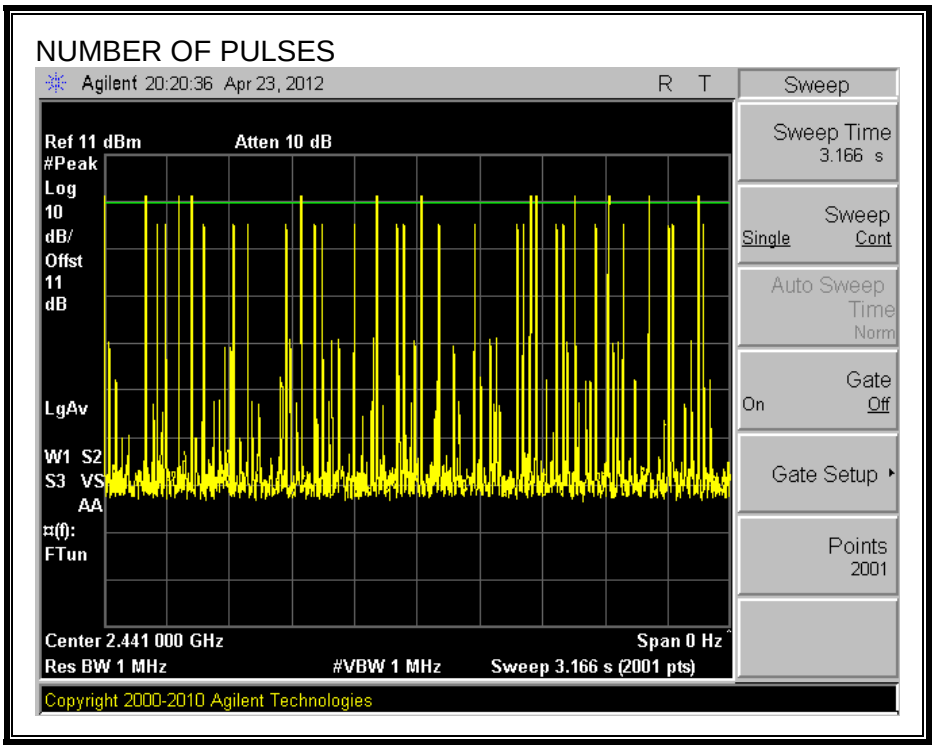
NUMBER OF PULSES



PULSE WIDTH – DH5 DATA RATE



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5 DATA RATE



7.2.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

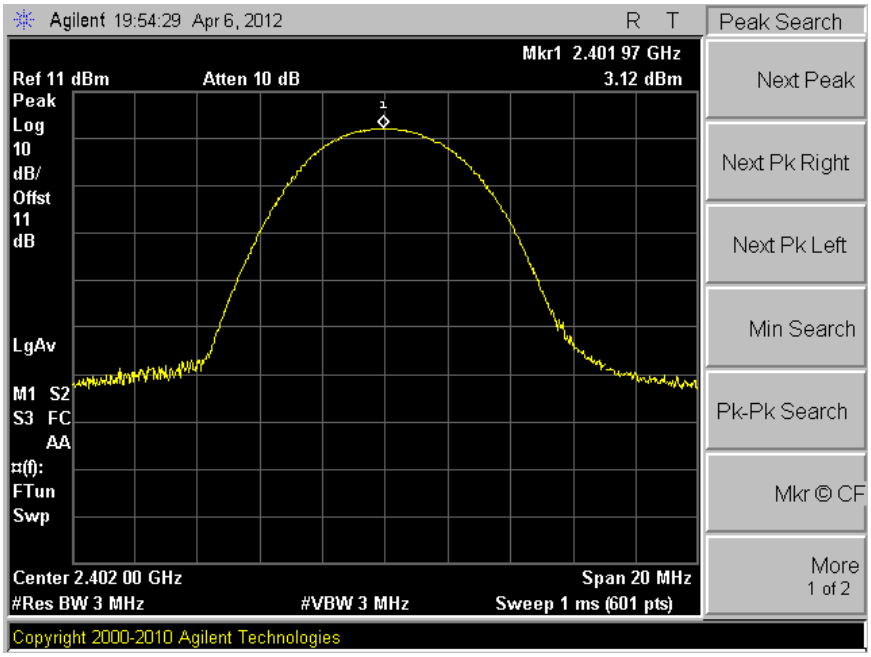
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.12	21	-17.78
Middle	2441	2.82	21	-18.08
High	2480	2.12	21	-18.78

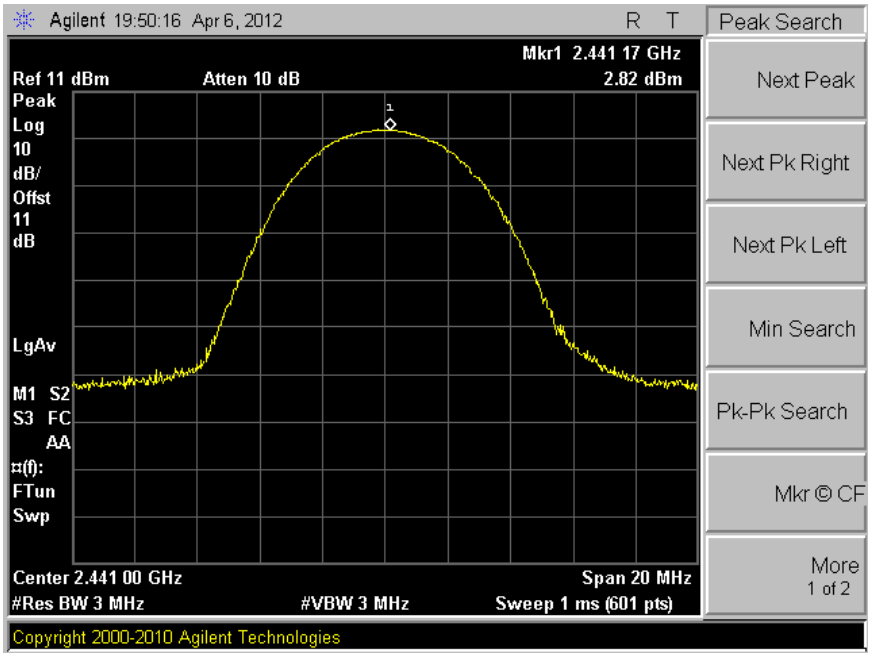
Note: Since the frequency separation is less than the 20dB bandwidth, the limit for output power was reduced to 125mW (21dBm)

OUTPUT POWER

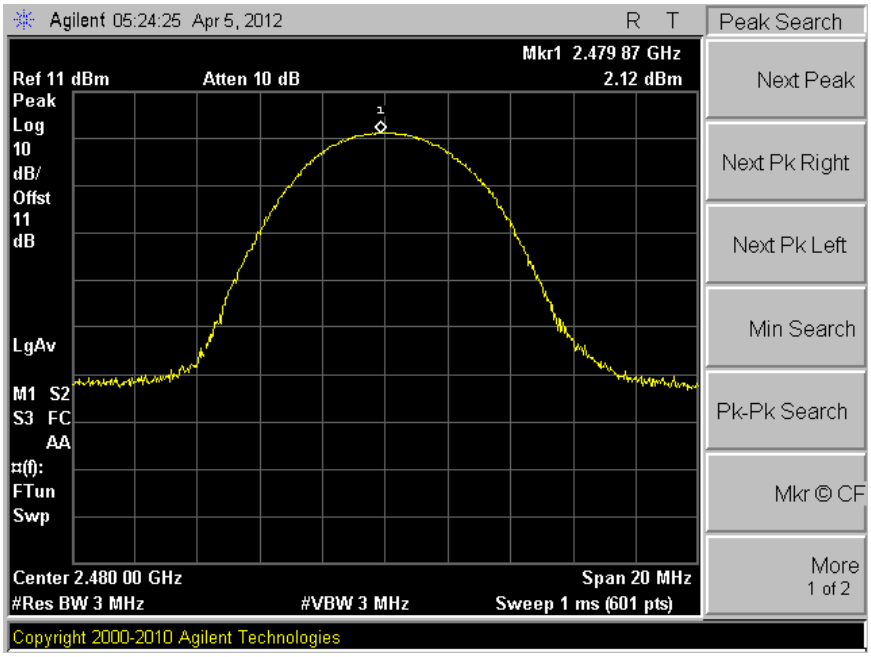
PEAK POWER LOW CH



PEAK POWER MID CH



PEAK POWER HIGH CH



7.2.6. AVERAGE POWER

LIMIT

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)	Average Power (dBm)
Low	2402	-0.15
Middle	2441	-0.30
High	2480	-0.71

7.2.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

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.

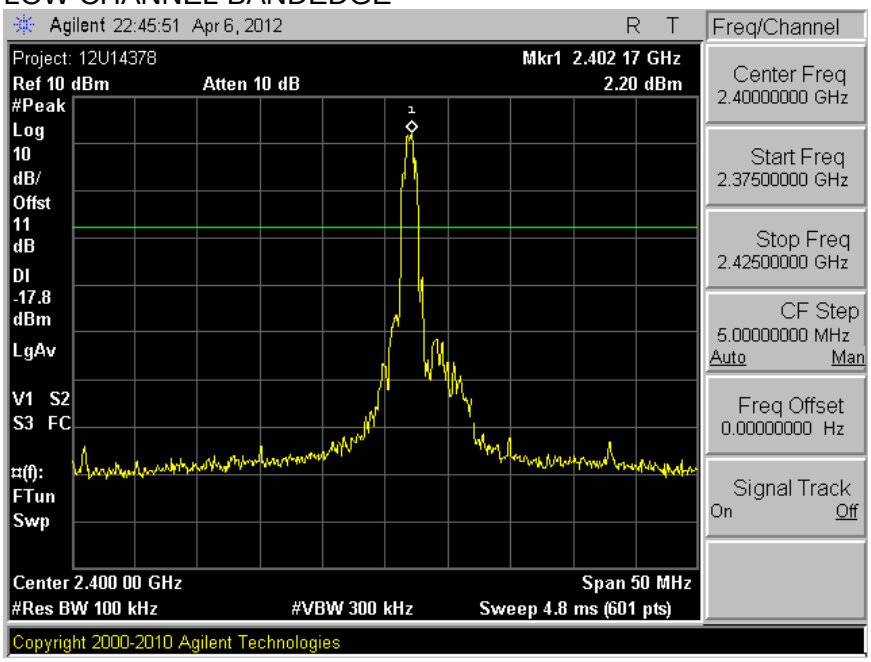
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

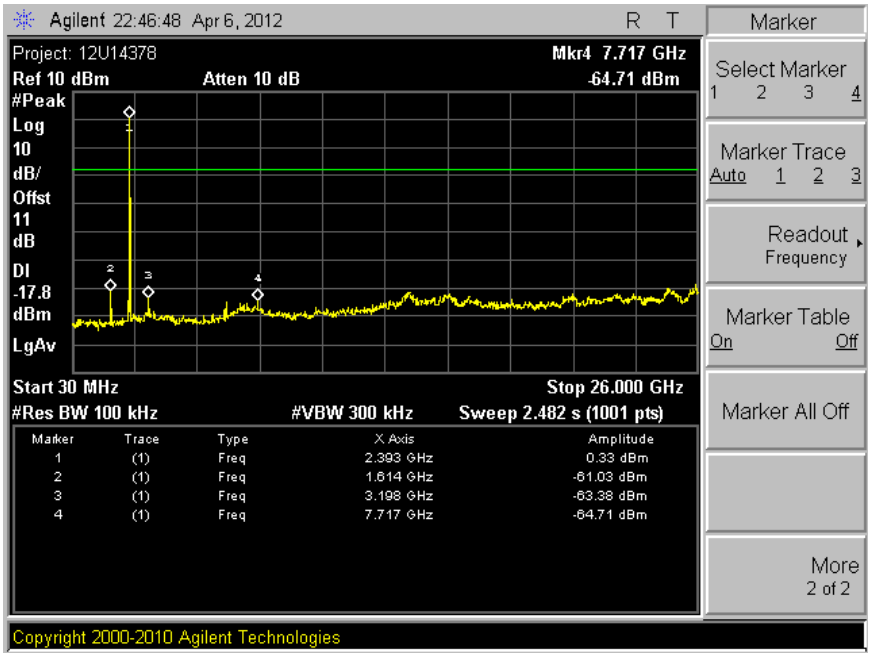
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

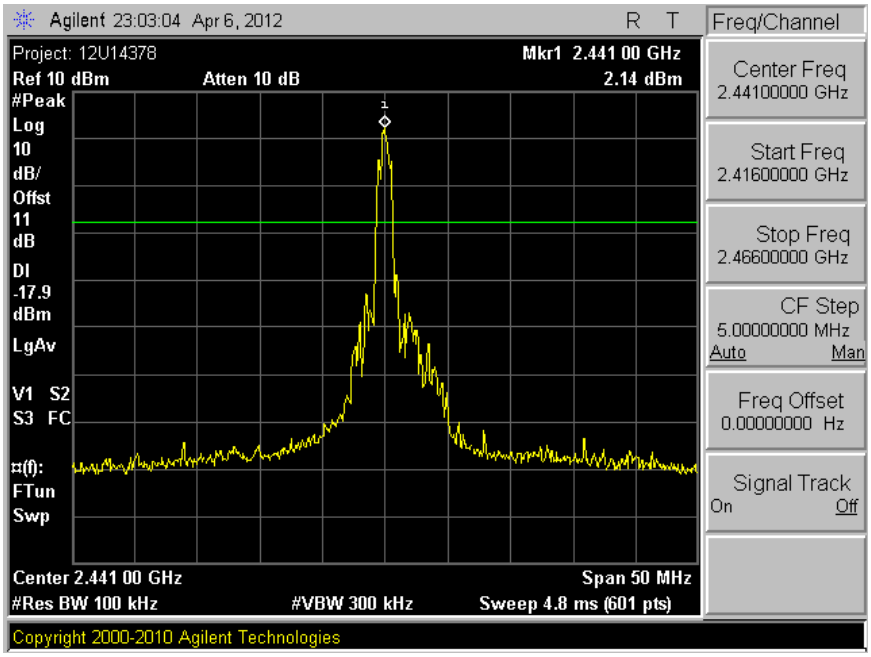


LOW CHANNEL SPURIOUS

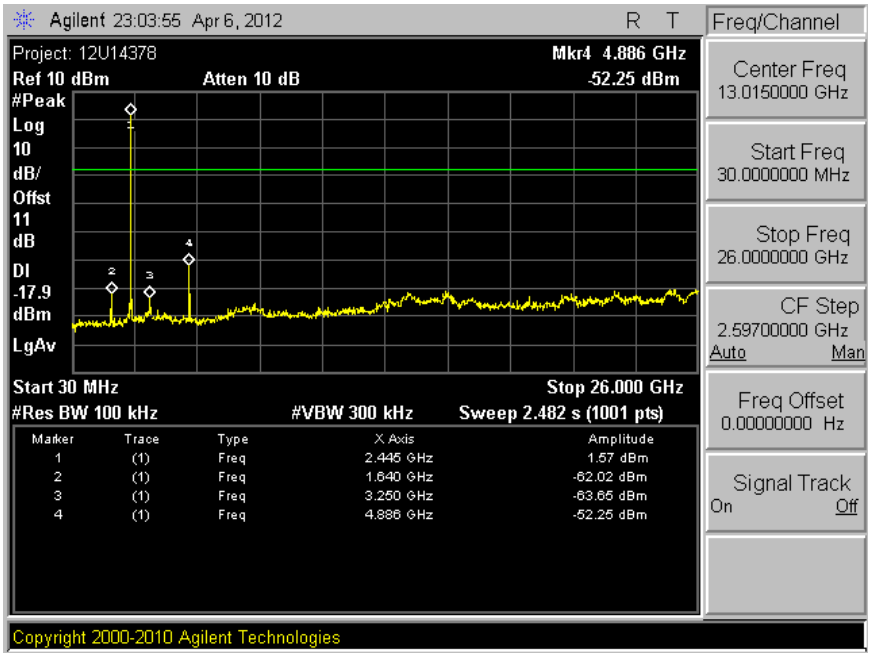


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

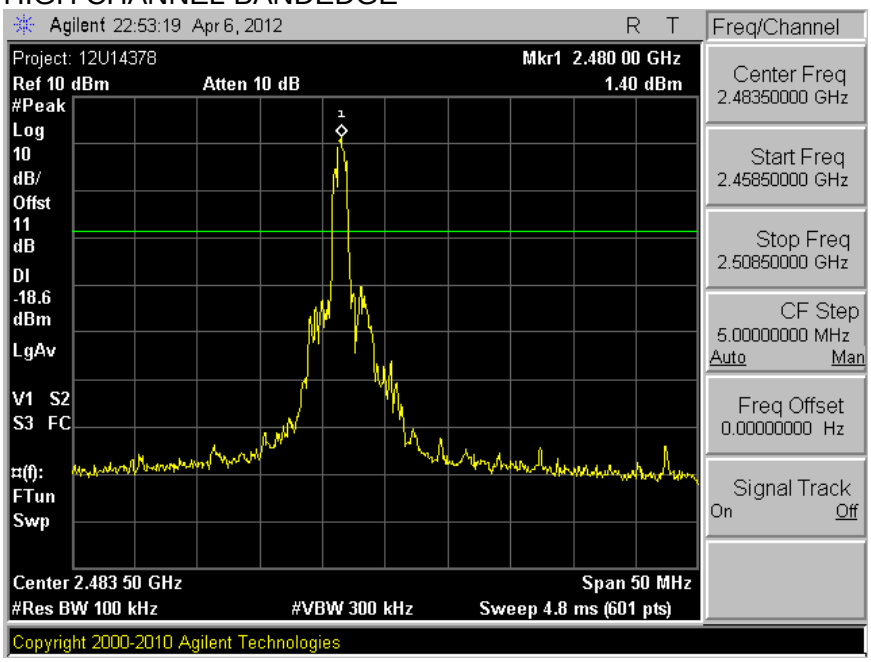


MID CHANNEL SPURIOUS

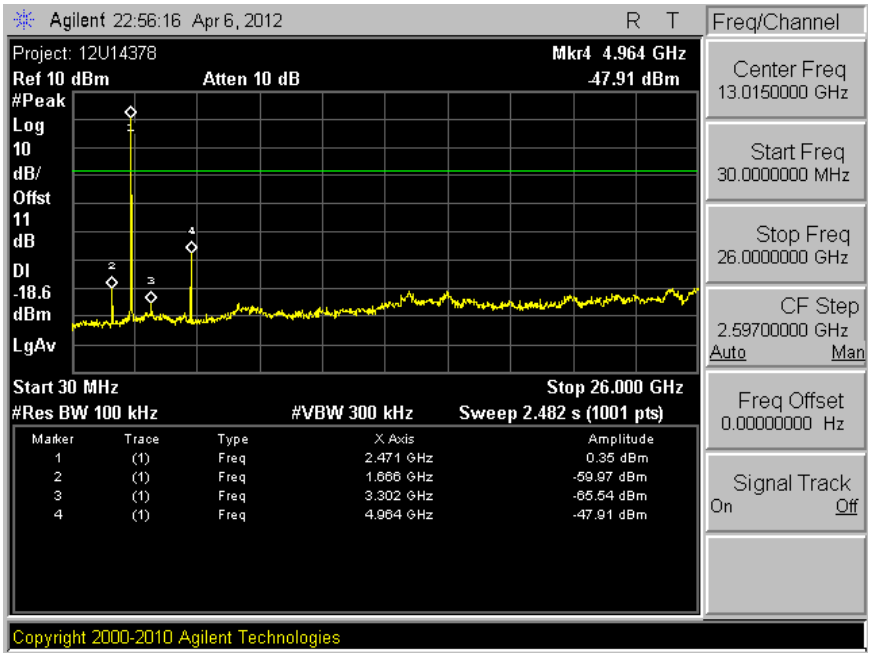


SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE

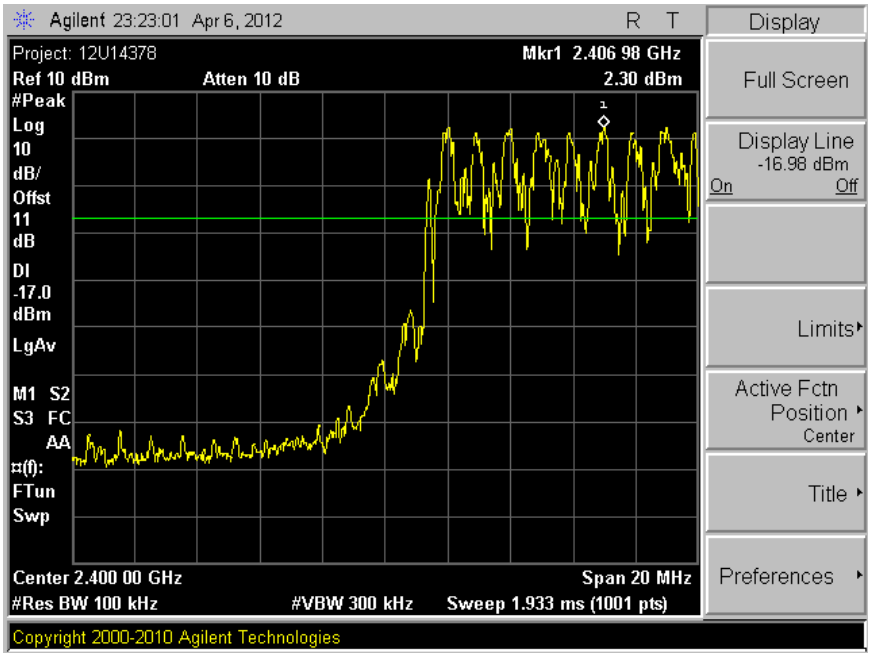


HIGH CHANNEL SPURIOUS

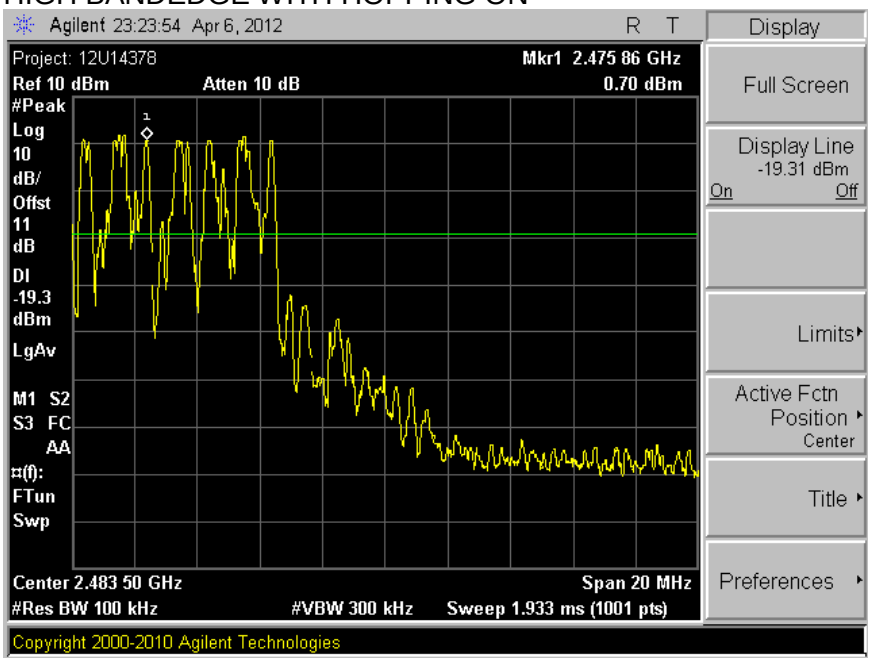


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



7.2.8. DUTY CYCLE

LIMITS

FCC §15.35 (c)
The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 1 MHz and the VBW is set to 1 MHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

CALCULATION

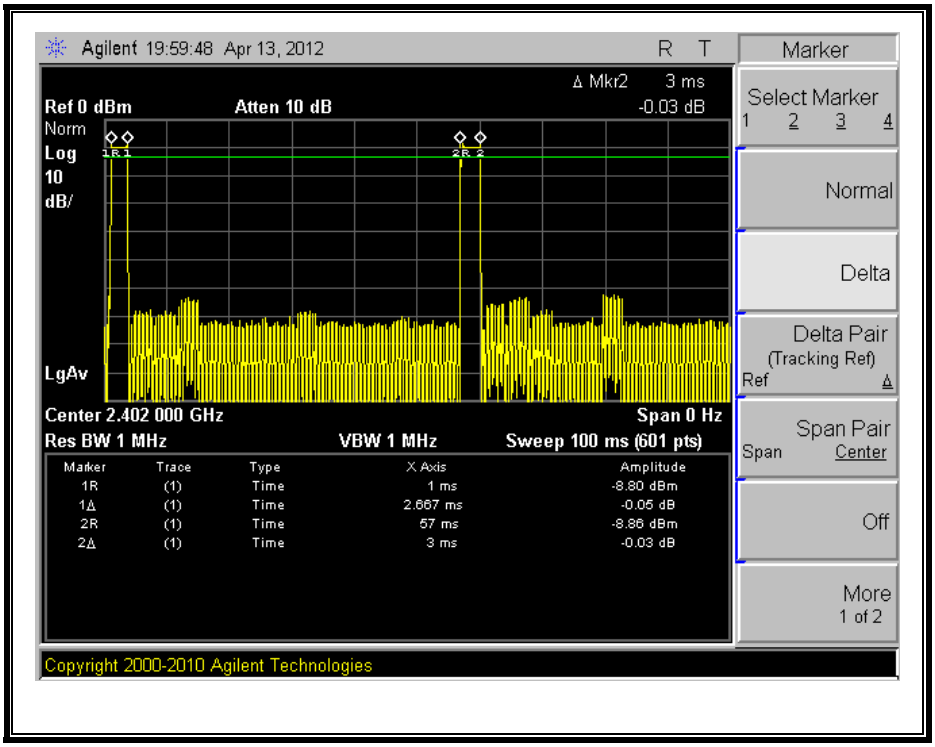
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is
(# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

No non-compliance noted:

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	3	1	2.67	1	0.057	-24.93

PULSE WIDTHS



7.3. ENHANCED DATA RATE 8DPSK MODULATION

7.3.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

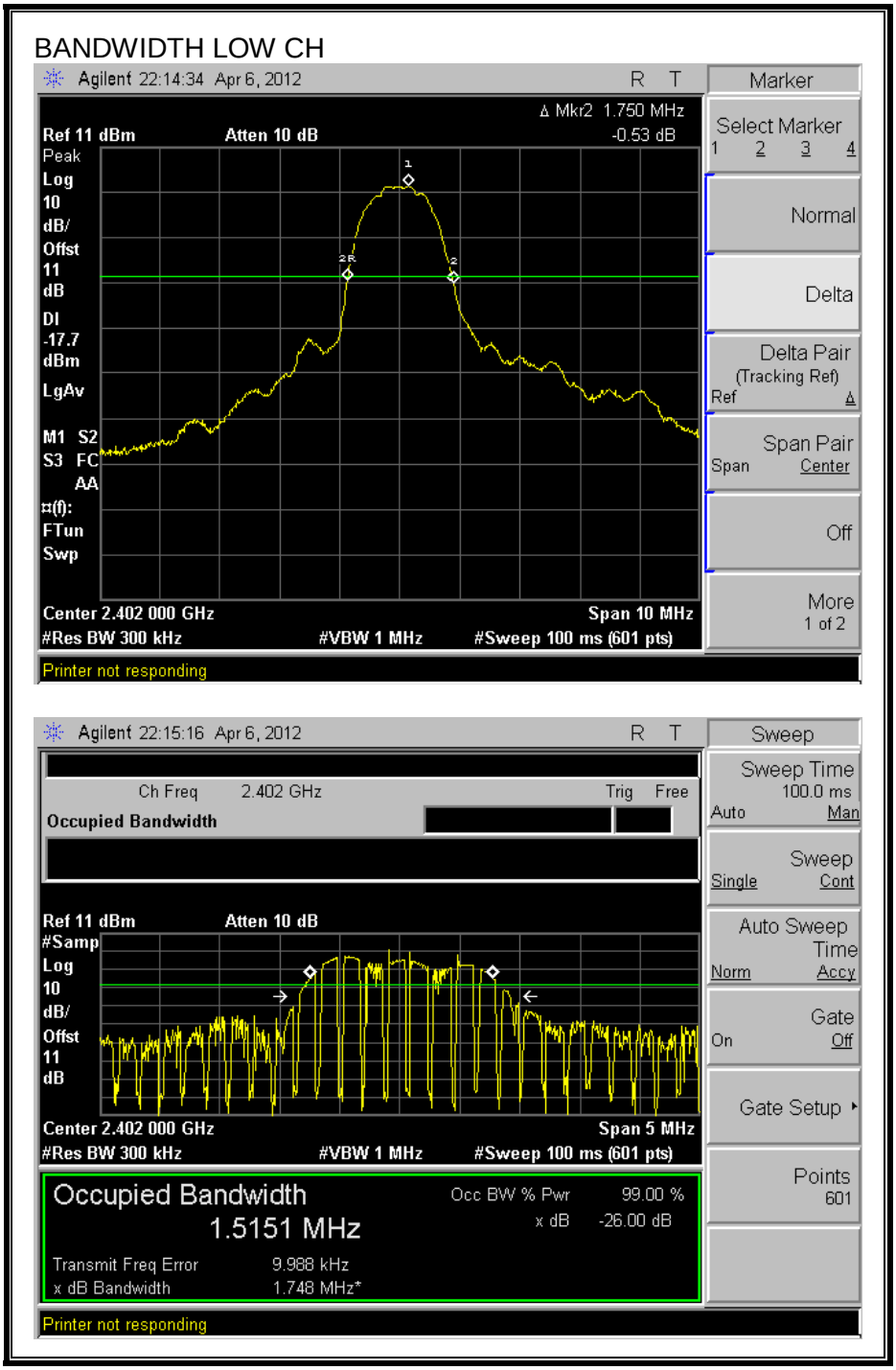
The transmitter output is connected to a spectrum analyzer. The RBW is set to ≥ 1% of the 20 dB bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

RESULTS

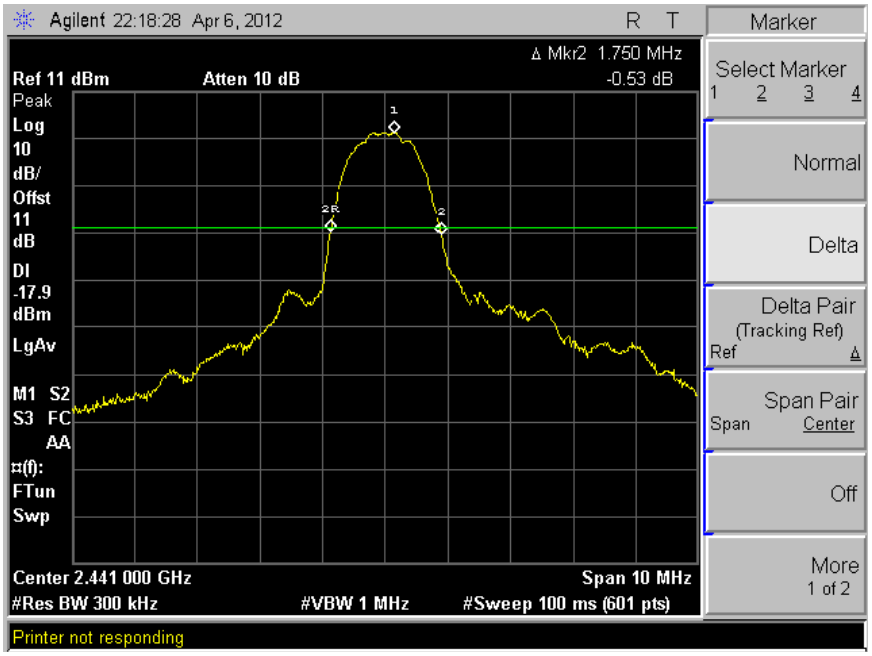
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1750	1515
Middle	2441	1750	1519
High	2480	1783	1538

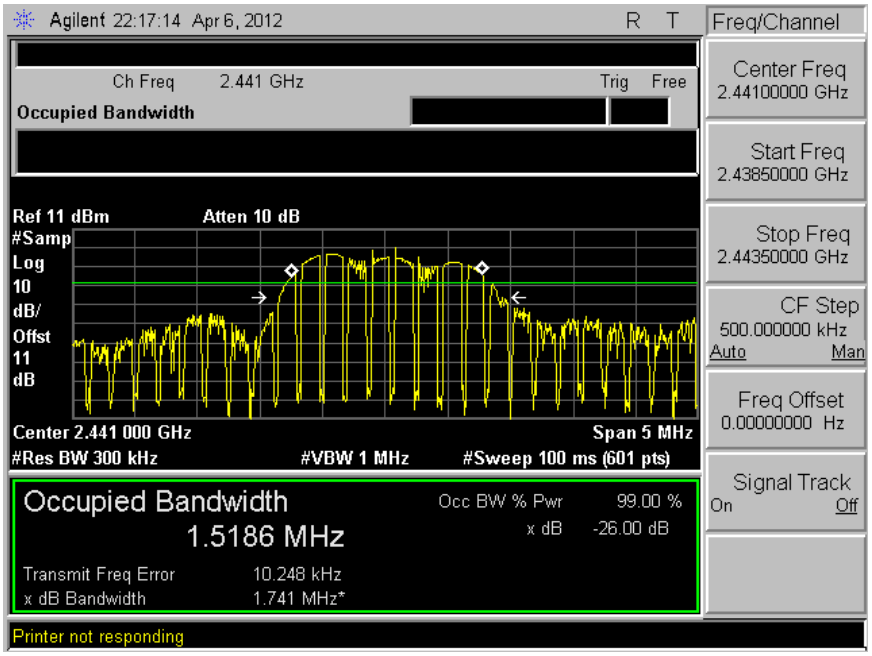
20 dB AND 99% BANDWIDTH

BANDWIDTH LOW CH

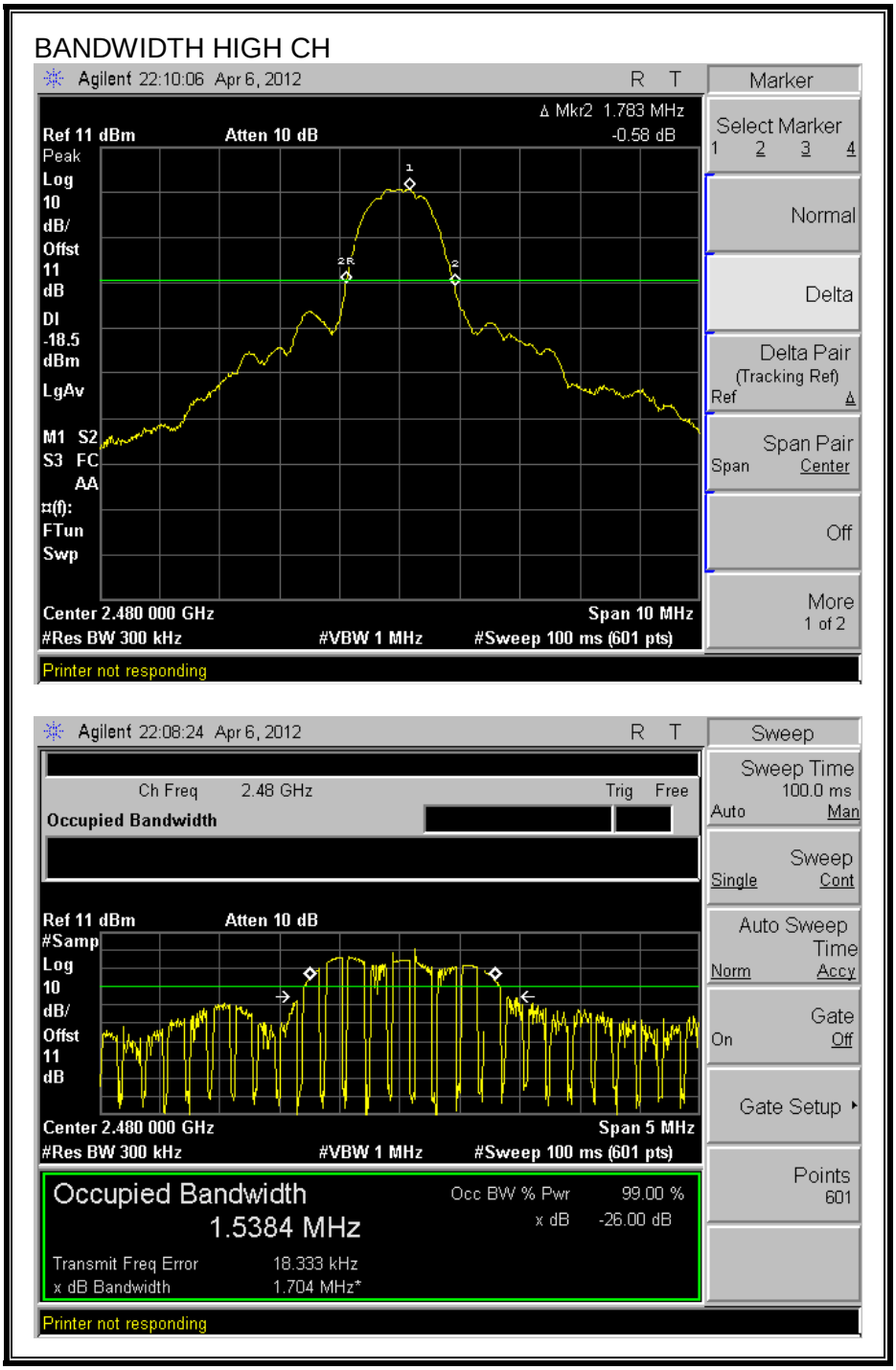


BANDWIDTH MID CH





BANDWIDTH HIGH CH



7.3.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

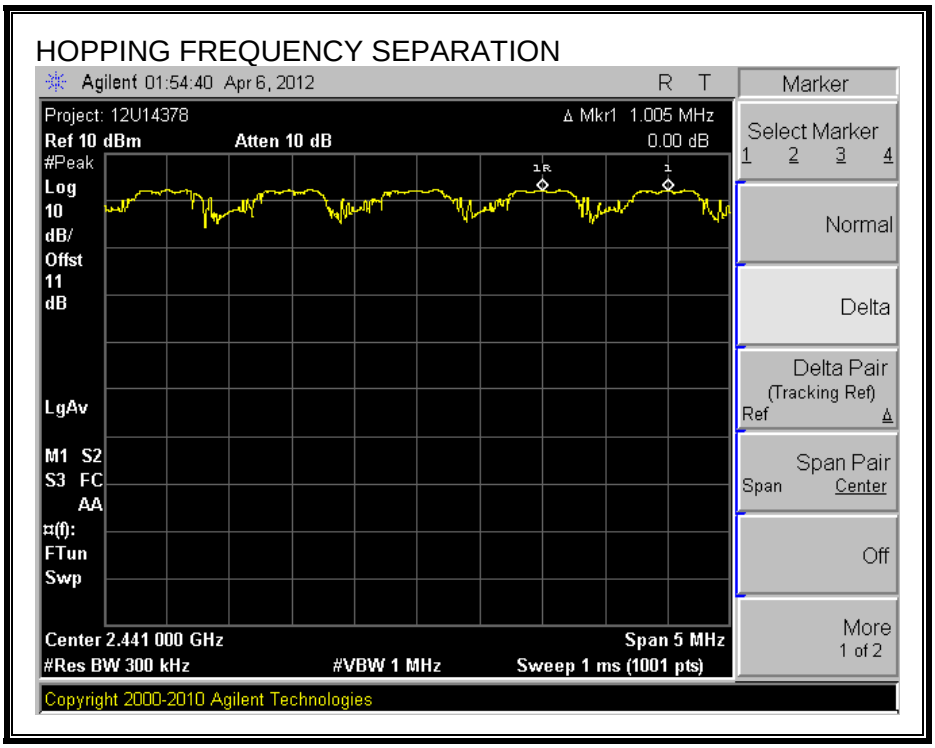
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 1 MHz. The sweep time is coupled.

RESULTS

HOPPING FREQUENCY SEPARATION



7.3.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

TEST PROCEDURE

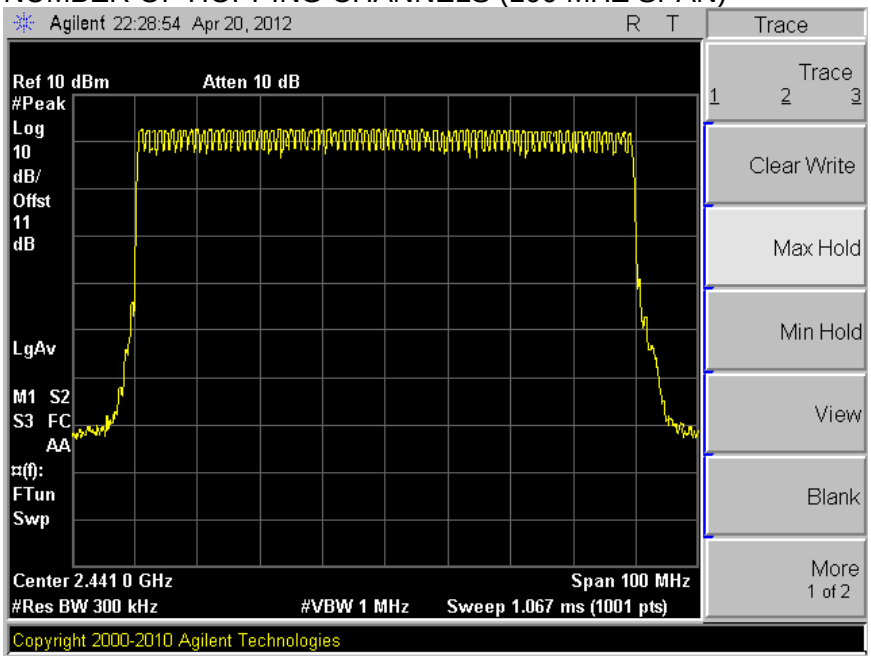
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

RESULTS

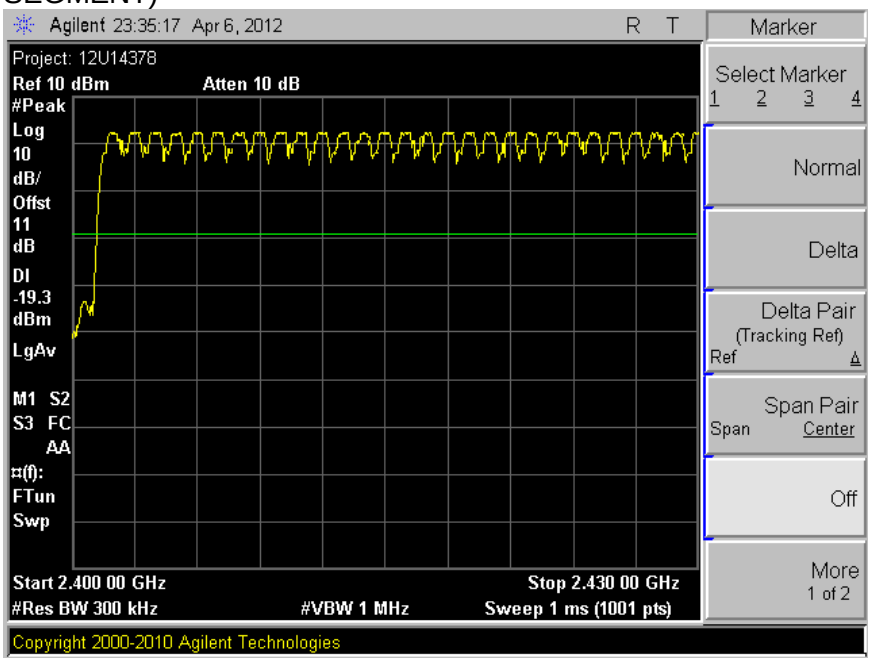
79 Channels observed.

NUMBER OF HOPPING CHANNELS

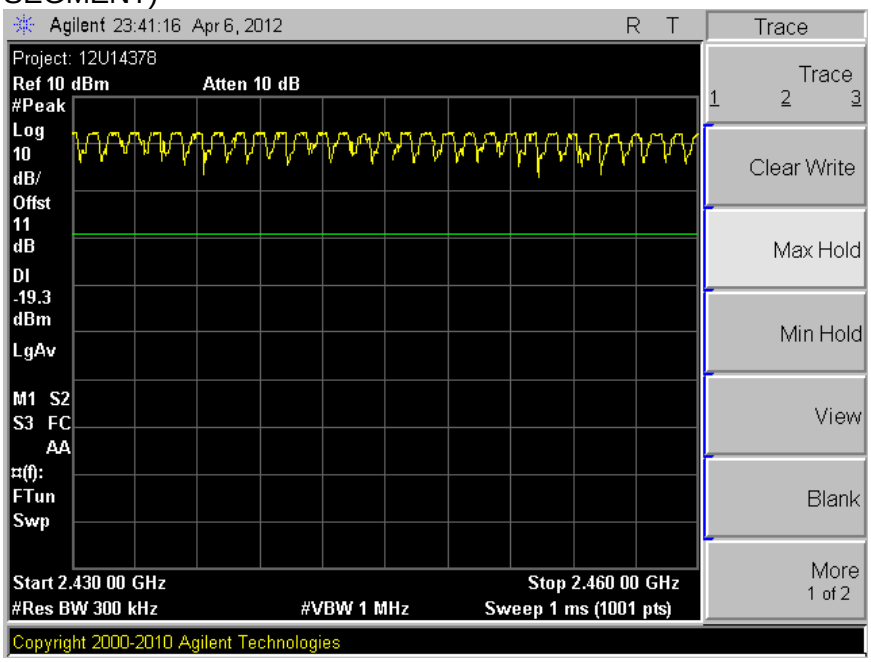
NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



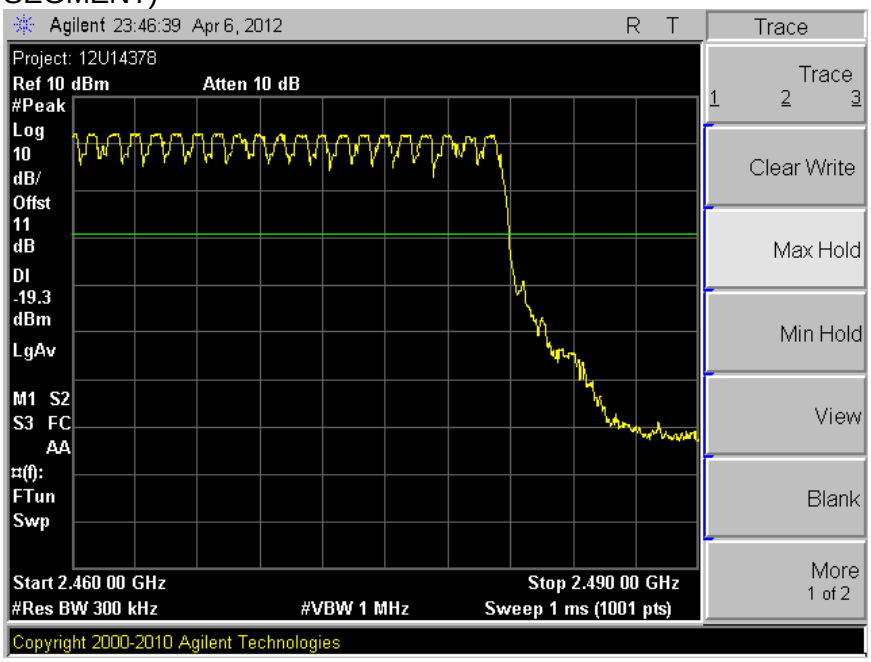
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)



7.3.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

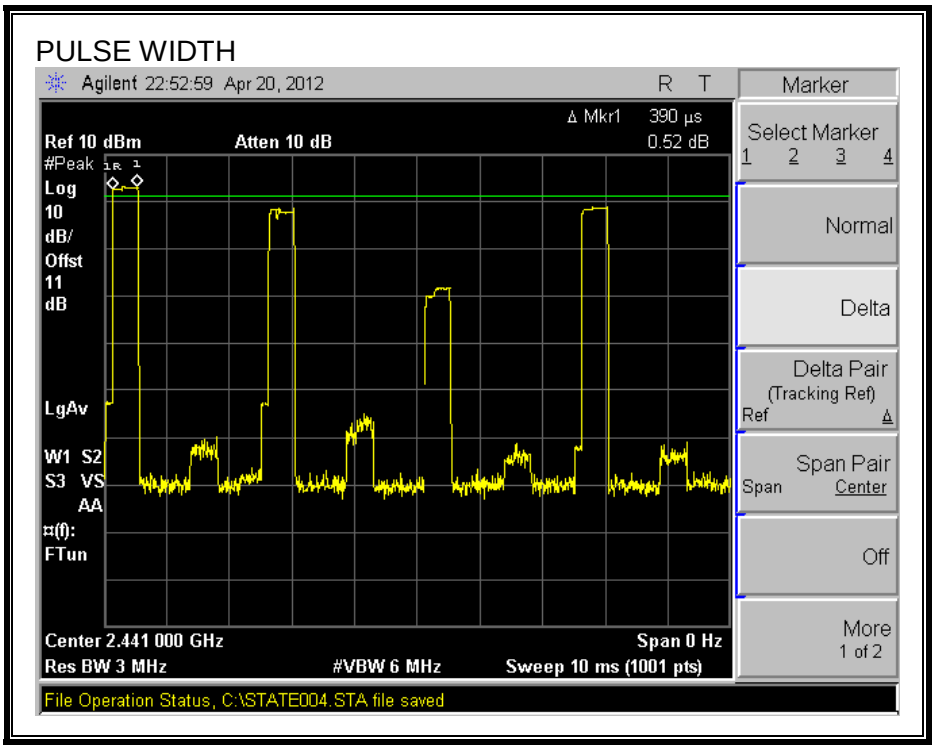
The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

RESULTS

Time of Occupancy = 10 * xx pulses * yy msec = zz msec

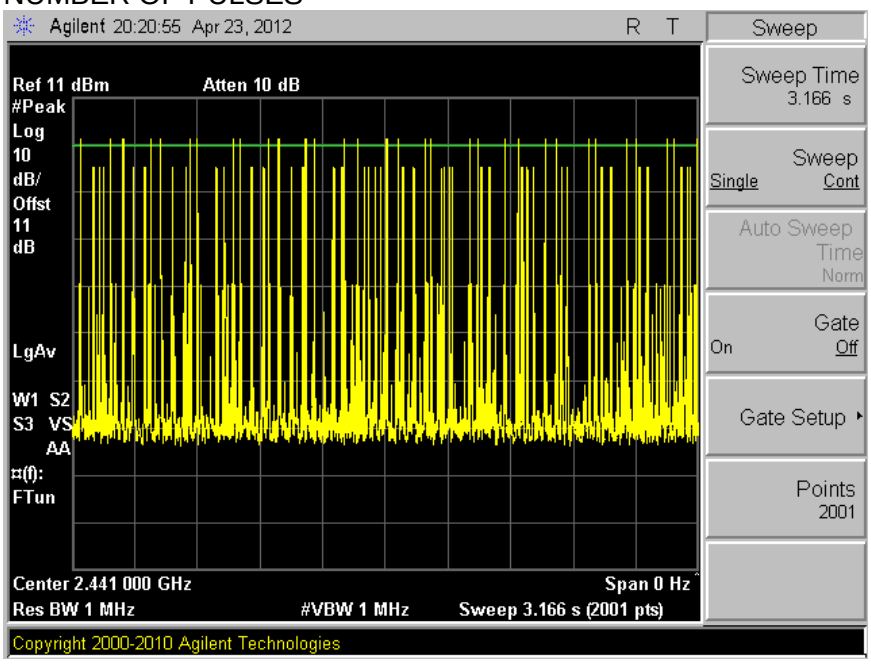
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.39	32	0.125	0.4	0.275
DH3	1.66	15	0.249	0.4	0.151
DH5	2.89	10	0.289	0.4	0.111

PULSE WIDTH – DH1 DATA RATE

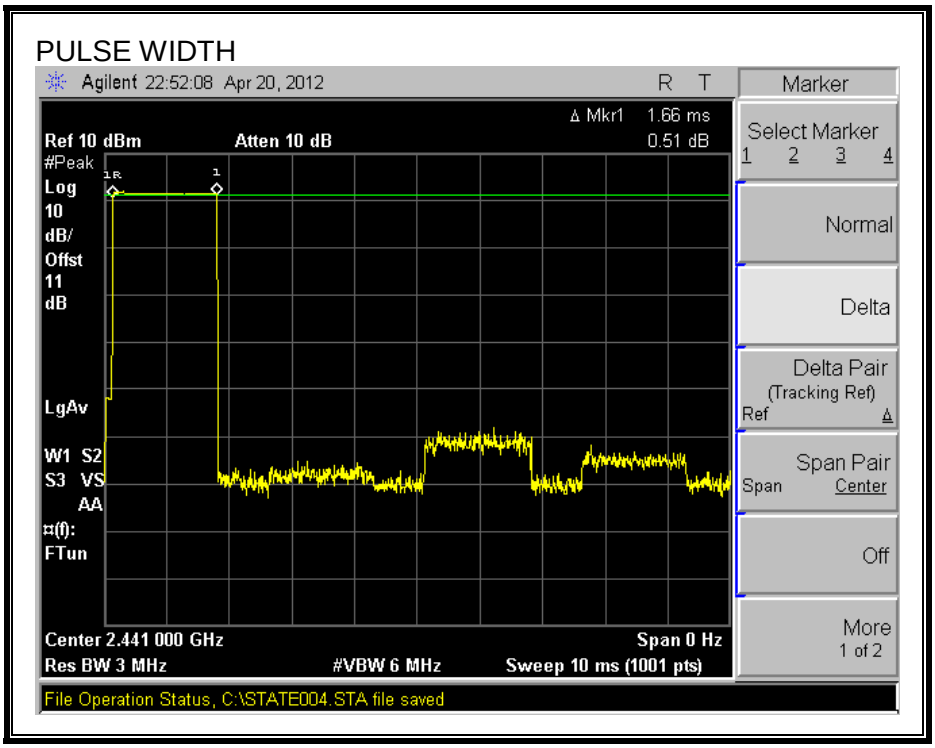


NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1 DATA RATE

NUMBER OF PULSES

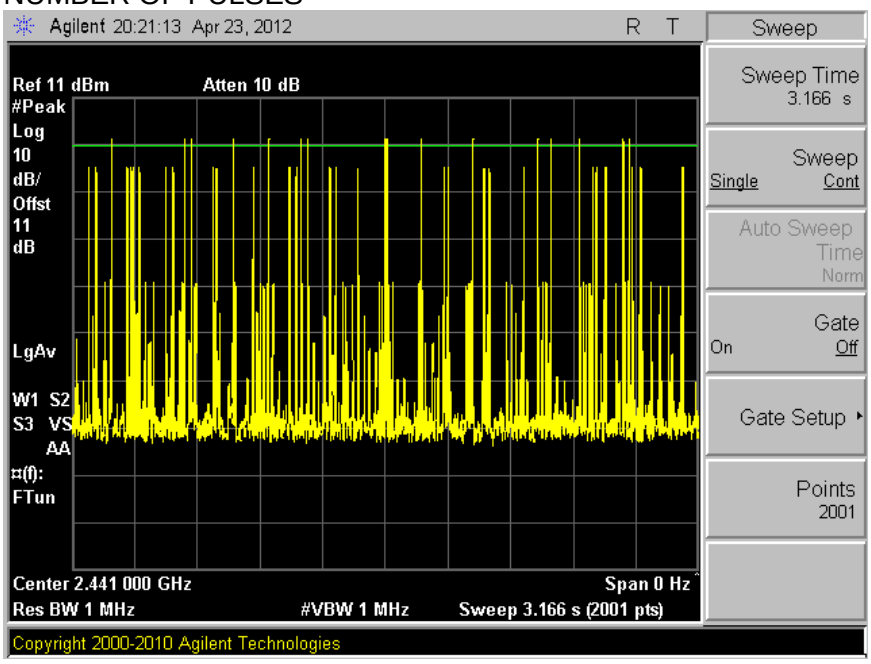


PULSE WIDTH – DH3 DATA RATE

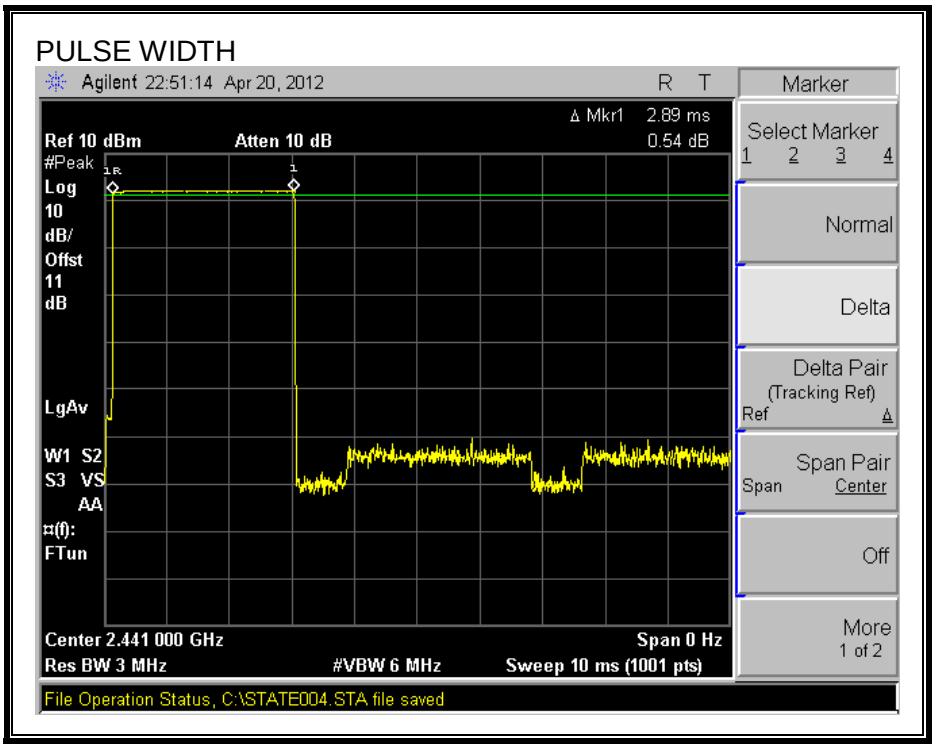


NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3 DATA RATE

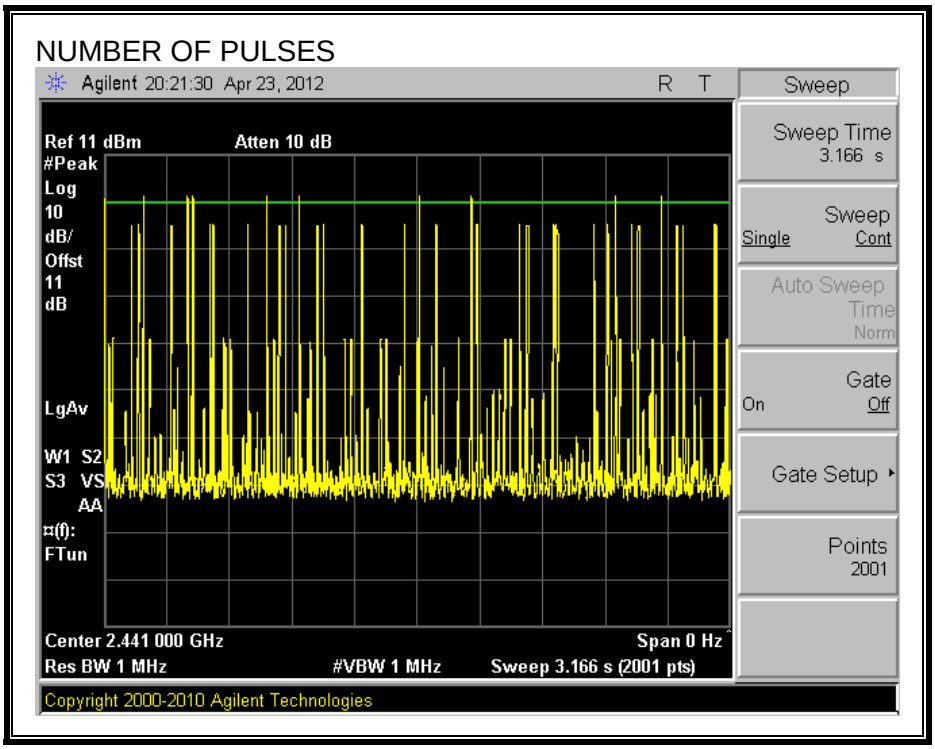
NUMBER OF PULSES



PULSE WIDTH – DH5 DATA RATE



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5 DATA RATE



7.3.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

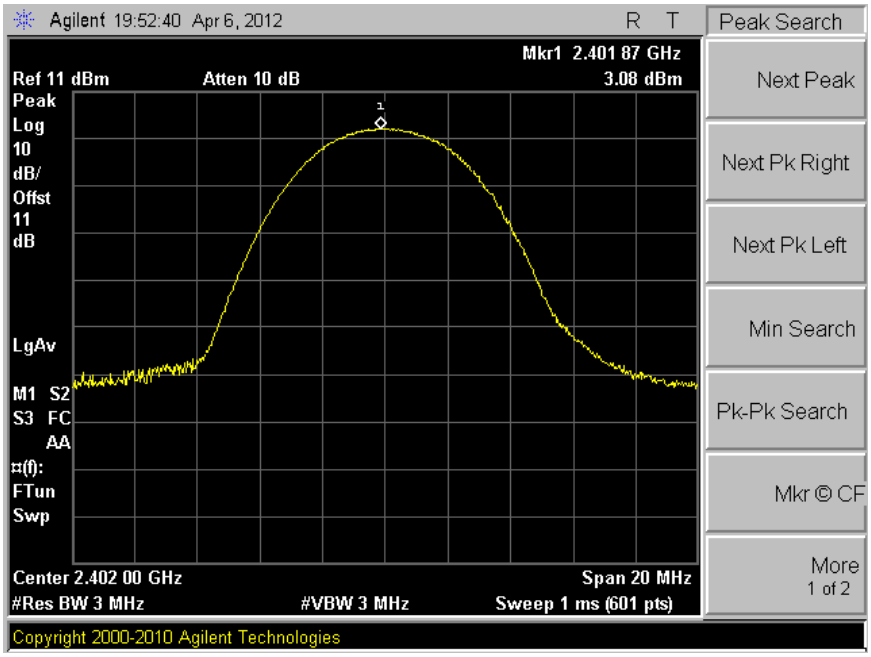
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.08	21	-17.82
Middle	2441	2.96	21	-17.94
High	2480	2.15	21	-18.75

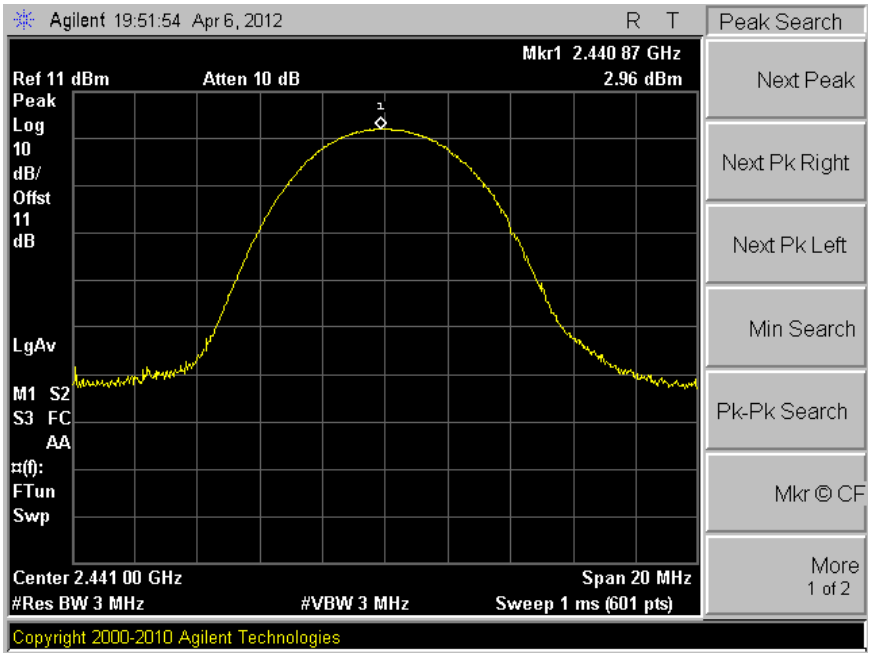
Note: Since the frequency separation is less than the 20dB bandwidth, the limit for output power was reduced to 125mW (21dBm)

OUTPUT POWER

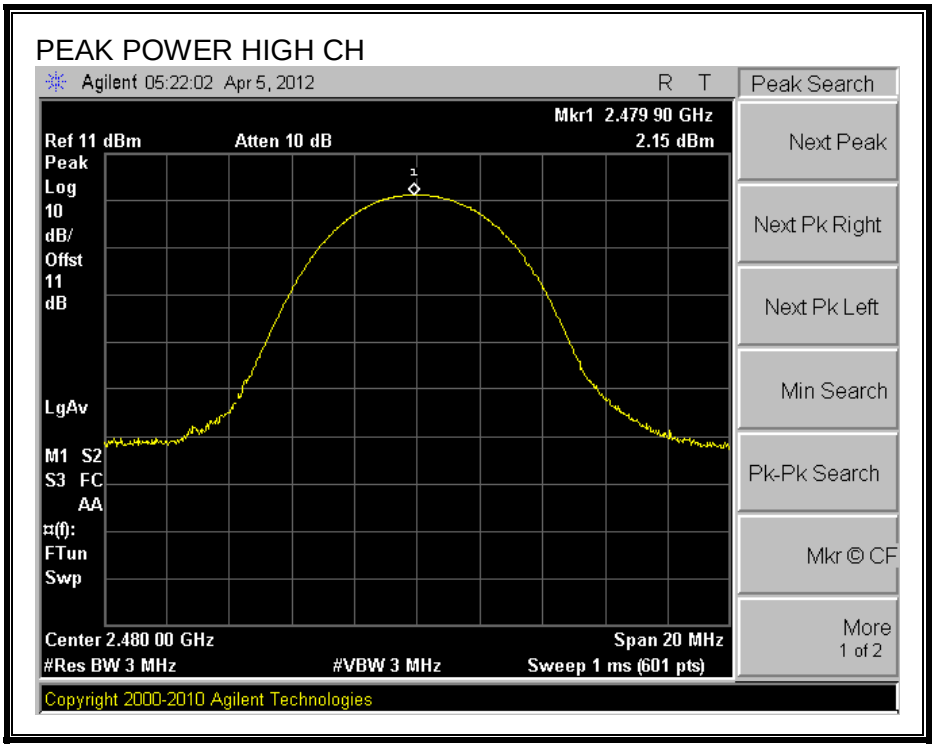
PEAK POWER LOW CH



PEAK POWER MID CH



PEAK POWER HIGH CH



7.3.6. AVERAGE POWER

LIMIT

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)	Average Power (dBm)
Low	2402	-0.23
Middle	2441	-0.40
High	2480	-0.95

7.3.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

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.

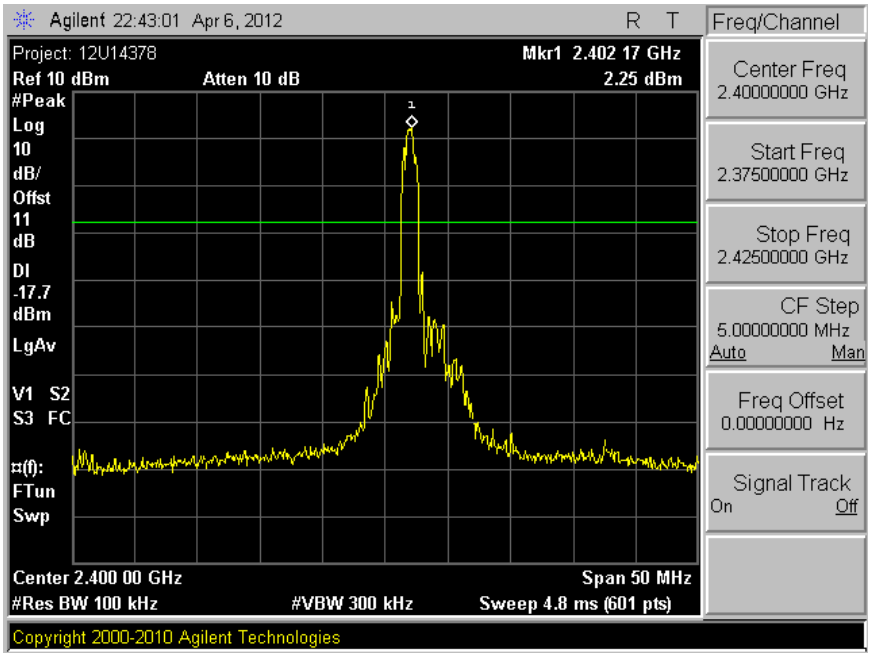
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

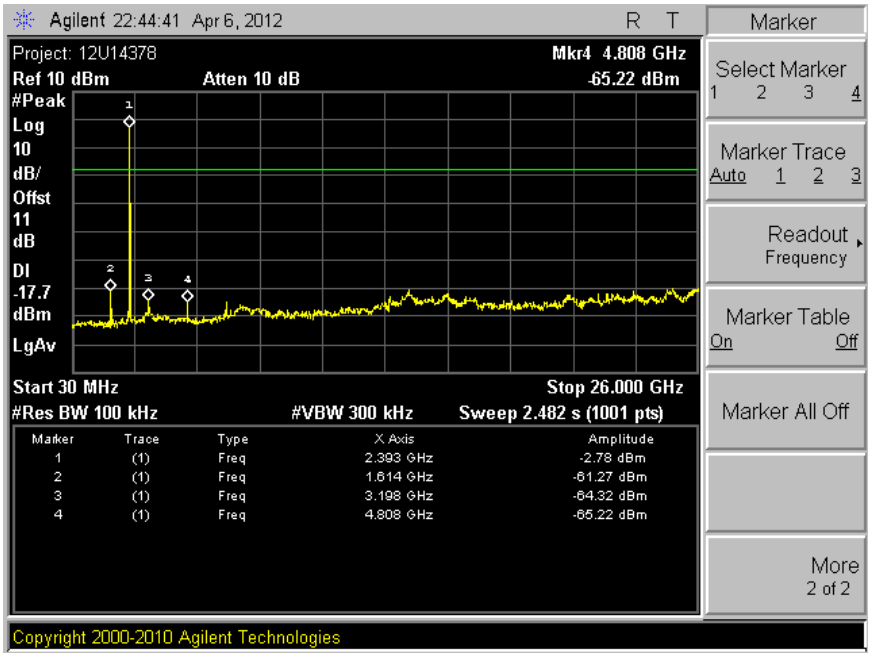
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

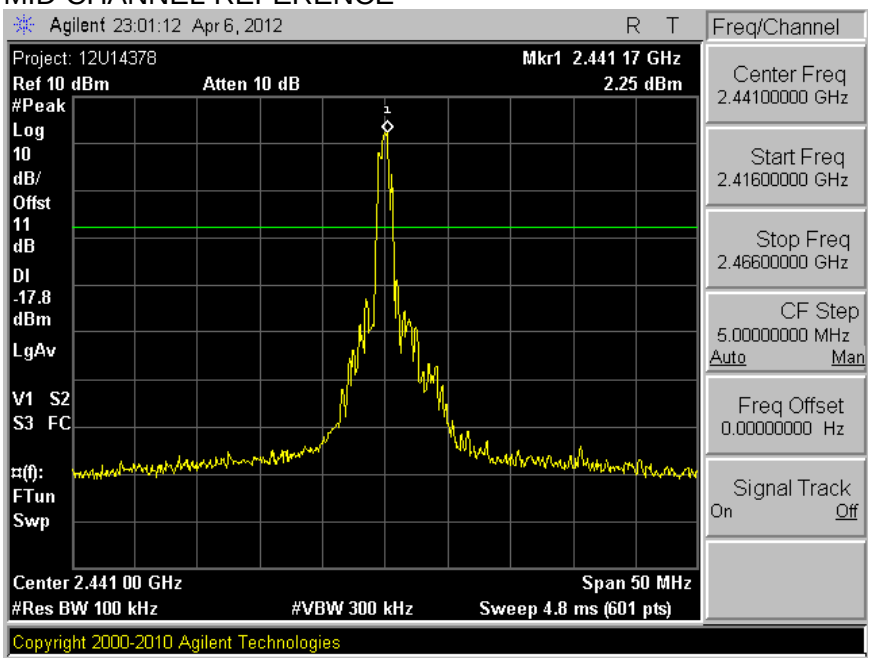


LOW CHANNEL SPURIOUS

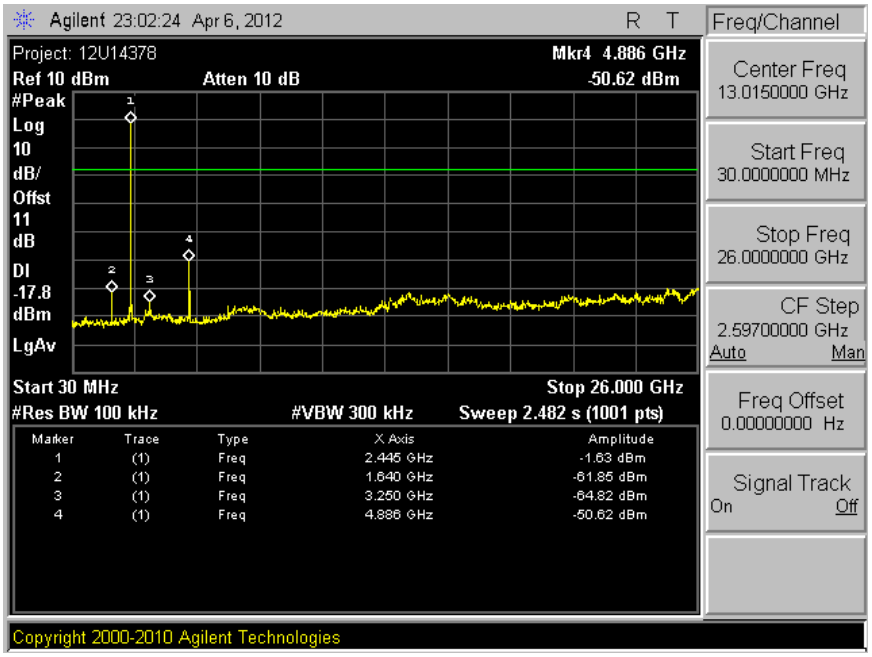


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

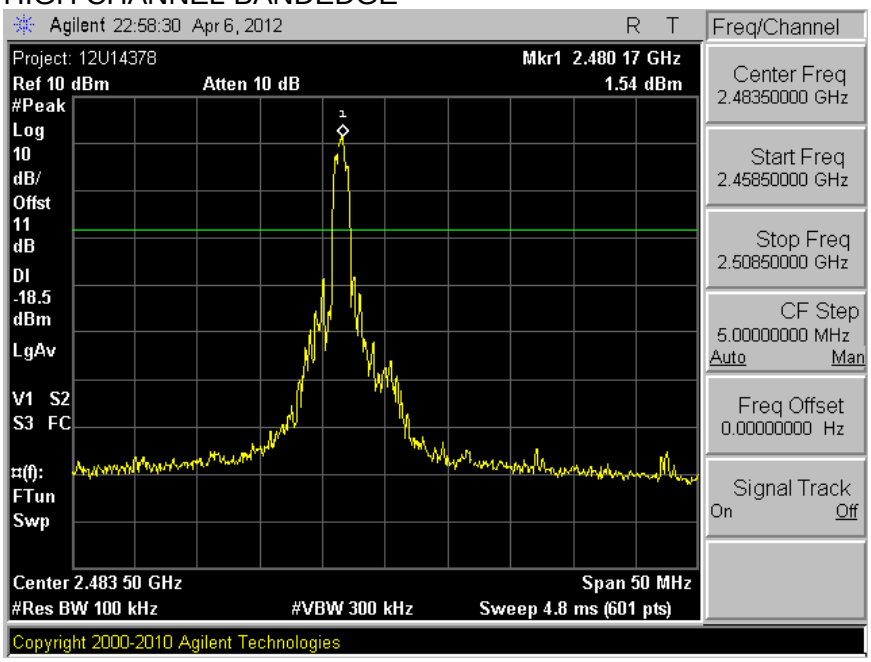


MID CHANNEL SPURIOUS

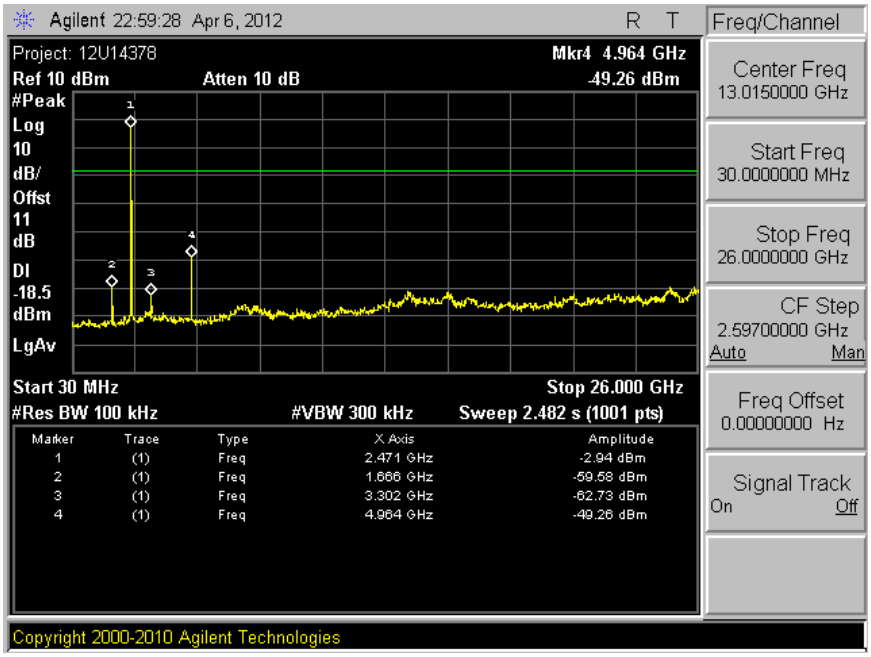


SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE

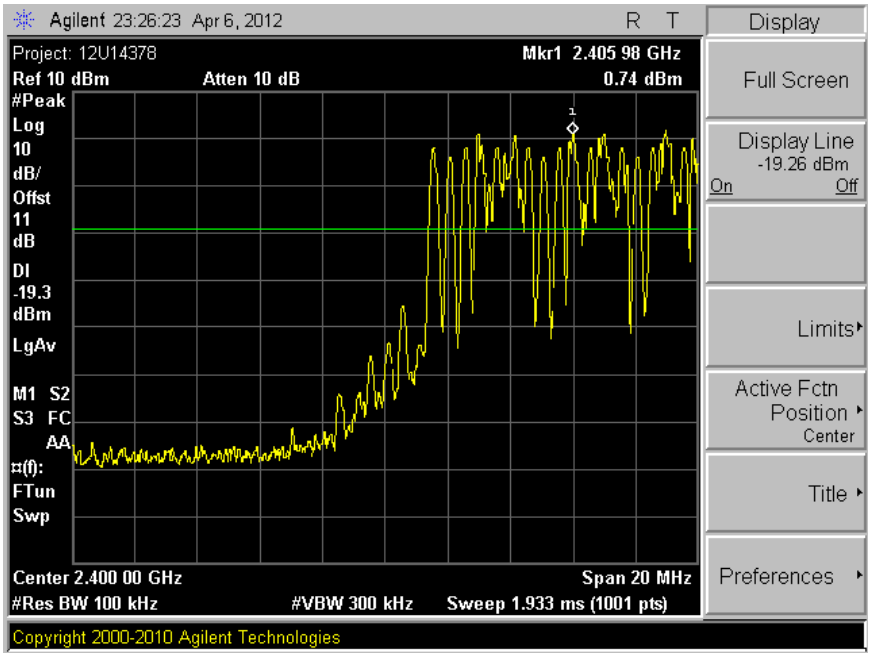


HIGH CHANNEL SPURIOUS

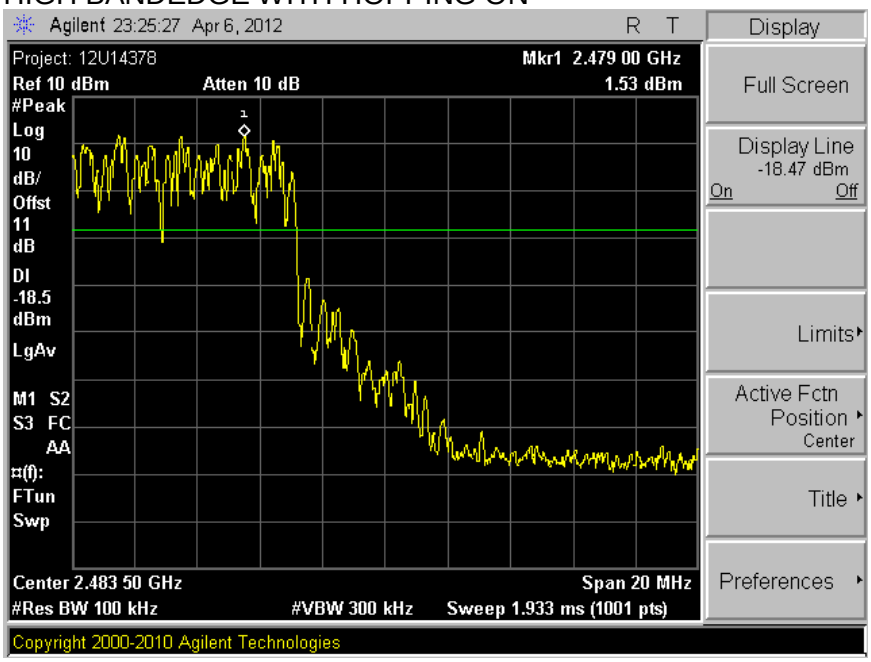


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



7.3.8. DUTY CYCLE

LIMITS

FCC §15.35 (c)
The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 1 MHz and the VBW is set to 1 MHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

CALCULATION

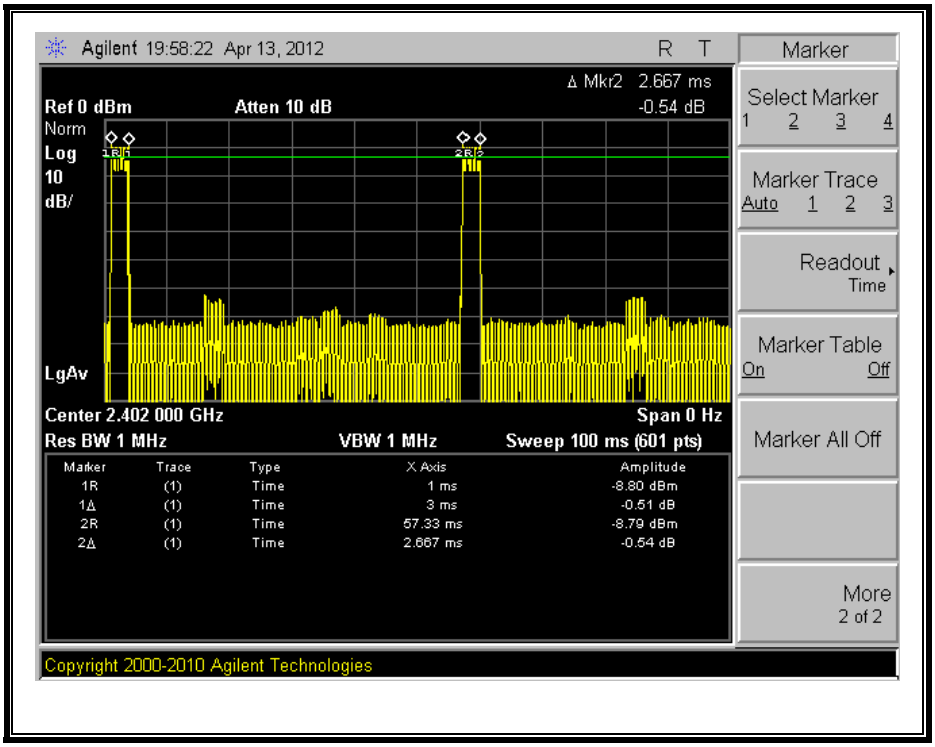
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is
(# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

No non-compliance noted:

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	3	1	2.67	1	0.057	-24.93

PULSE WIDTHS



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 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.

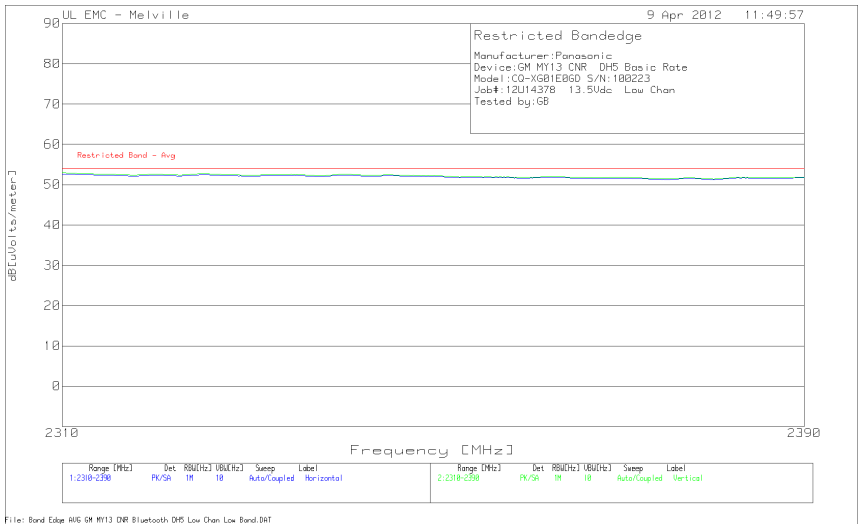
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. BASIC DATA RATE GFSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL)

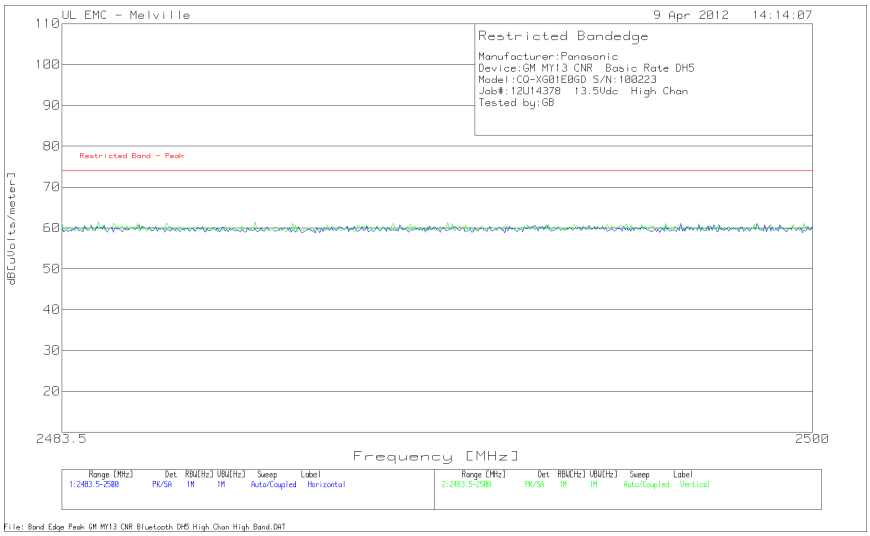
LOW CHANNEL RESTRICTED, PEAK, HORIZ & VERT

LOW CHANNEL RESTRICTED, AVG, HORIZ & VERT

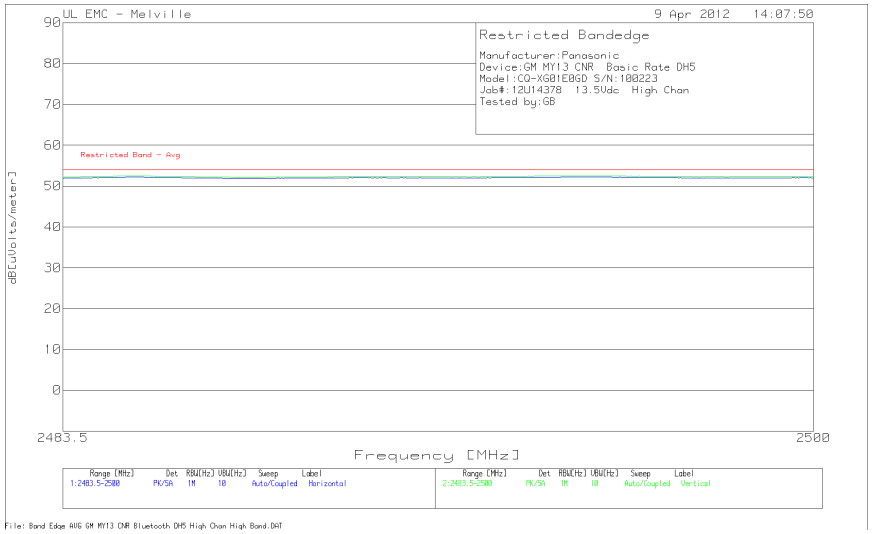


RESTRICTED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL RESTRICTED, PEAK, HORIZ & VERT



HIGH CHANNEL RESTRICTED, AVG, HORIZ & VERT



HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL

Manufacturer:Panasonic														
Device:GM MY13 CNR GFSK DH5														
Model:CQ-XG01E0GD S/N:100223														
Job#:12U14378 13.5Vdc Low Chan														
Tested by:GB														
Horizontal 4000 - 8000MHz														
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	DCF [dB]	Corrected Level dB[uVolts/ meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4804.3332	85.62	PK	27.1	-52.69	60.03	-25.5	34.57	54	-19.43	74	-13.97	284	367	Horz
Vertical 4000 - 8000MHz														
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	DCF [dB]	Corrected Level dB[uVolts/ meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4804.2395	90.49	PK	27.3	-52.69	65.1	-25.5	39.64	54	-14.36	74	-8.9	47	356	Vert
Horizontal 4000 - 8000MHz														
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	DCF [dB]	Corrected Level dB[uVolts/ meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4804.2756	82.16	Av	27.3	-52.69	56.77	-25.5	31.31	54	-22.69	74	-17.23	36	298	Horz
Vertical 4000 - 8000MHz														
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	DCF [dB]	Corrected Level dB[uVolts/ meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4804.3657	81.52	Av	27.3	-52.69	56.13	-25.5	30.67	54	-23.33	74	-17.87	107	355	Vert
NOTE: Duty Cycle Corrected level compared to the 15.209 limit only														
PK - Peak detector														
Av - Average detector														

NOTE: No other harmonics besides the 1st harmonic was observed during the pre-scan.

MIDDLE CHANNEL

Manufacturer:Panasonic												
Device:GM MY13 CNR GFSK DH5												
Model:CQ-XG01E0GD S/N:100223												
Job#:12U14378 13.5Vdc Mid Chan												
Tested by:AA												
Horizontal 4000 - 8000MHz												
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
4882.0301	83.78	PK	27.2	-52.5	58.48	54	4.48	74	-15.52	223	253	Horz
Vertical 4000 - 8000MHz												
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
4882.0301	84.18	PK	27.5	-52.5	59.18	54	5.18	74	-14.82	236	362	Horz
Horizontal 4000 - 8000MHz												
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
4882.0376	76.82	Av	27.2	-52.5	51.52	54	-2.48	74	-22.48	243	385	Horz
Vertical 4000 - 8000MHz												
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
4881.985	77.21	Av	27.5	-52.5	52.21	54	-1.79	74	-21.79	215	193	Vert
PK - Peak detector												
Av - Average detector												

NOTE: No other harmonics besides the 1st harmonic was observed during the pre-scan.

HIGH CHANNEL

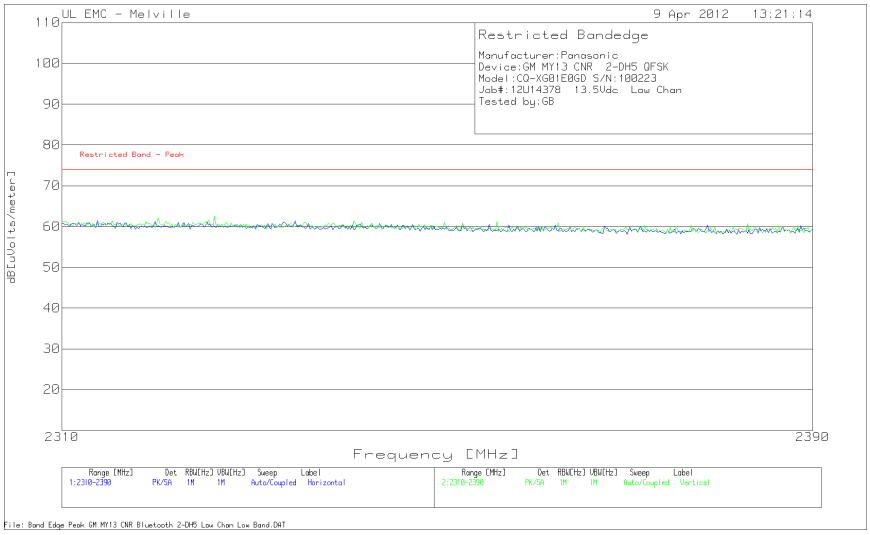
Manufacturer:Panasonic													
Device:GM MY13 CNR GFSK DH5													
Model:CQ-XG01E0GD S/N:100223													
Job#:12U14378 13.5Vdc High Chan													
Tested by:AA													
Horizontal 4000 - 8000MHz													
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	DCF [dB]	Corrected Level dB[uVolts/ meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4959.9299	89.44	PK	27.3	-52.4	64.39	-25.5	38.93	54	-15.07	74	-9.61	240	384	Horz
Vertical 4000 - 8000MHz														
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	DCF [dB]	Corrected Level dB[uVolts/ meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4960.2906	90.43	PK	27.4	-52.3	65.49	-25.5	40.03	54	-13.97	74	-8.51	238	347	Vert
Horizontal 4000 - 8000MHz														
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	DCF [dB]	Corrected Level dB[uVolts/ meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4960.0426	86.04	Av	27.3	-52.3	61	-25.5	35.54	54	-18.46	74	-13	245	385	Horz
Vertical 4000 - 8000MHz														
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	DCF [dB]	Corrected Level dB[uVolts/ meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4960.1127	85.2	Av	27.4	-52.3	60.26	-25.5	34.8	54	-19.2	74	-13.74	296	147	Vert
PK - Peak detector														
Av - Average detector														

NOTE: No other harmonics besides the 1st harmonic was observed during the pre-scan.

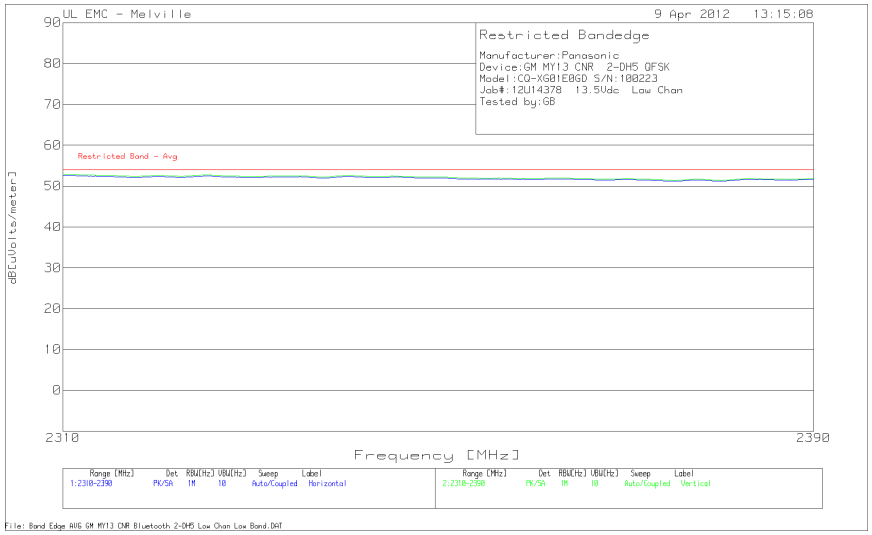
8.2.2. ENHANCED DATA RATE QPFSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL RESTRICTED, PEAK, HORIZ & VERT

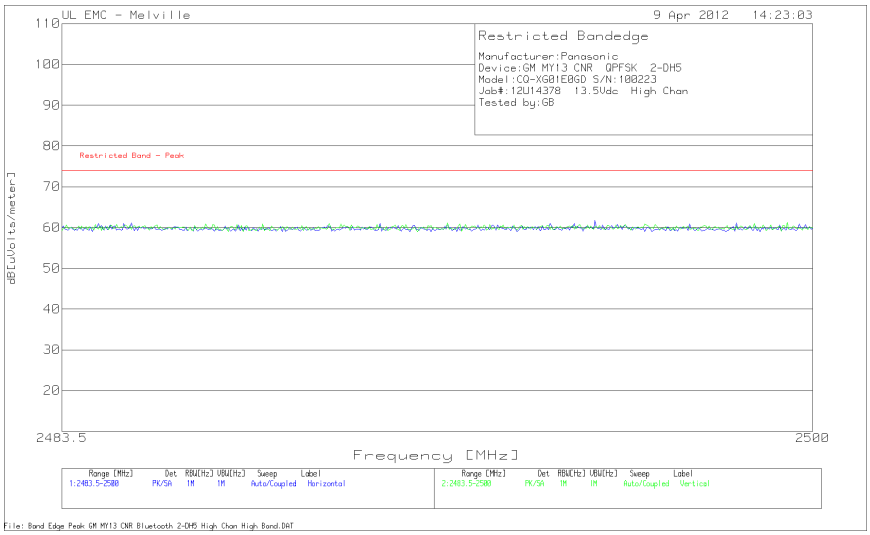


LOW CHANNEL RESTRICTED, AVG, HORIZ & VERT

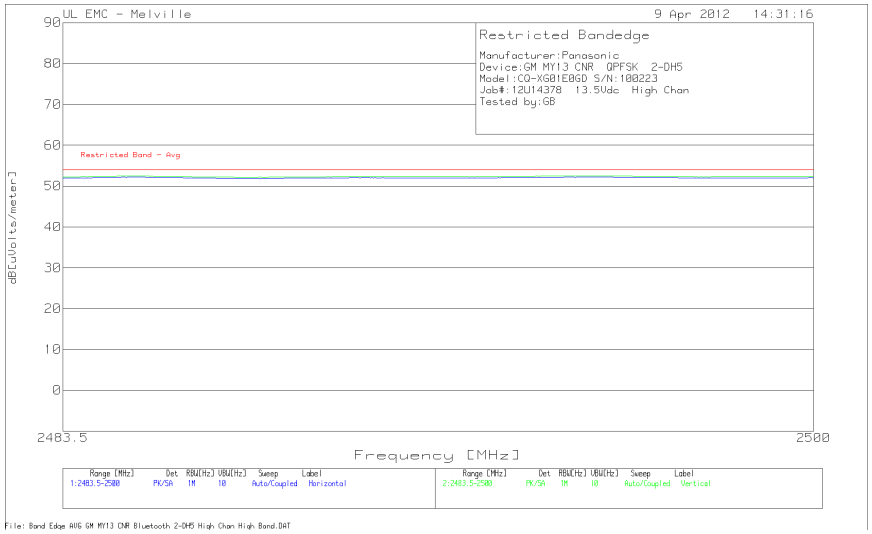


RESTRICTED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL RESTRICTED, PEAK, HORIZ & VERT



HIGH CHANNEL RESTRICTED, AVG, HORIZ & VERT



HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL

Manufacturer:Panasonic												
Device:GM MY13 CNR QPFSK 2-DH5												
Model:CQ-XG01E0GD S/N:100223												
Job#:12U14378 13.5Vdc Low Chan												
Tested by:AA												
Horizontal 4000 - 8000MHz												
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
4804.3006	85.13	PK	27.1	-52.7	59.54	54	5.54	74	-14.46	39	348	Horz
Vertical 4000 - 8000MHz												
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
4803.6994	85.19	PK	27.3	-52.7	59.79	54	5.79	74	-14.21	38	356	Vert
Horizontal 4000 - 8000MHz												
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
4804.02	71.97	Av	27.1	-52.7	46.38	54	-7.62	74	-27.62	232	393	Horz
Vertical 4000 - 8000MHz												
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
4803.9539	79.28	Av	27.3	-52.7	53.88	54	-0.12	74	-20.12	0	312	Vert
PK - Peak detector												
Av - Average detector												

NOTE: No other harmonics besides the 1st harmonic was observed during the pre-scan.

MIDDLE CHANNEL

Manufacturer:Panasonic												
Device:GM MY13 CNR QPFSK 2-DH5												
Model:CQ-XG01E0GD S/N:100223												
Job#:12U14378 13.5Vdc Mid Chan												
Tested by:AA												
Horizontal 4000 - 8000MHz												
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
4881.7695	81.37	PK	27.2	-52.5	56.07	54	2.07	74	-17.93	228	328	Horz
Vertical 4000 - 8000MHz												
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
4882.3707	79.52	PK	27.5	-52.5	54.52	54	0.52	74	-19.48	223	253	Vert
Horizontal 4000 - 8000MHz												
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
4881.9499	63.72	Av	27.2	-52.5	38.42	54	-15.58	74	-35.58	251	397	Horz
Vertical 4000 - 8000MHz												
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
4882.2054	64.09	Av	27.5	-52.5	39.09	54	-14.91	74	-34.91	6	297	Vert
PK - Peak detector												
Av - Average detector												

NOTE: No other harmonics besides the 1st harmonic was observed during the pre-scan.

HIGH CHANNEL

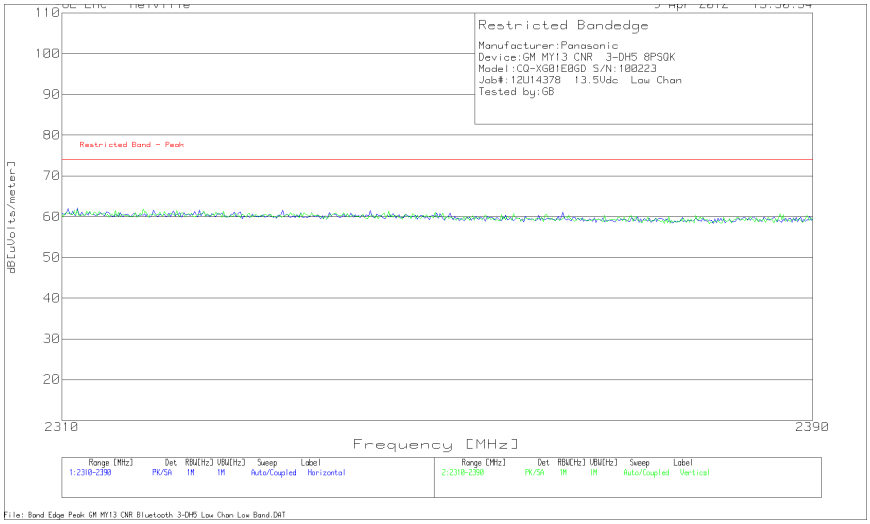
Manufacturer:Panasonic												
Device:GM MY13 CNR QPFSK 2-DH5												
Model:CQ-XG01E0GD S/N:100223												
Job#:12U14378 13.5Vdc High Chan												
Tested by:AA												
Horizontal 4000 - 8000MHz												
Test Frequency	Meter Reading	Detector	AF-48106 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4959.99	80.78	PK	27.4	-52.3	55.84	54	1.84	74	-18.16	270	350	Horz
Vertical 4000 - 8000MHz												
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
4960.1102	82.49	PK	27.4	-52.3	57.55	54	3.55	74	-16.45	308	227	Vert
Horizontal 4000 - 8000MHz												
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
4959.6994	72.45	Av	27.3	-52.4	47.4	54	-6.6	74	-26.6	241	330	Horz
Vertical 4000 - 8000MHz												
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
4959.6368	69.47	Av	27.4	-52.4	44.52	54	-9.48	74	-29.48	234	331	Vert
PK - Peak detector												
Av - Average detector												

NOTE: No other harmonics besides the 1st harmonic was observed during the pre-scan.

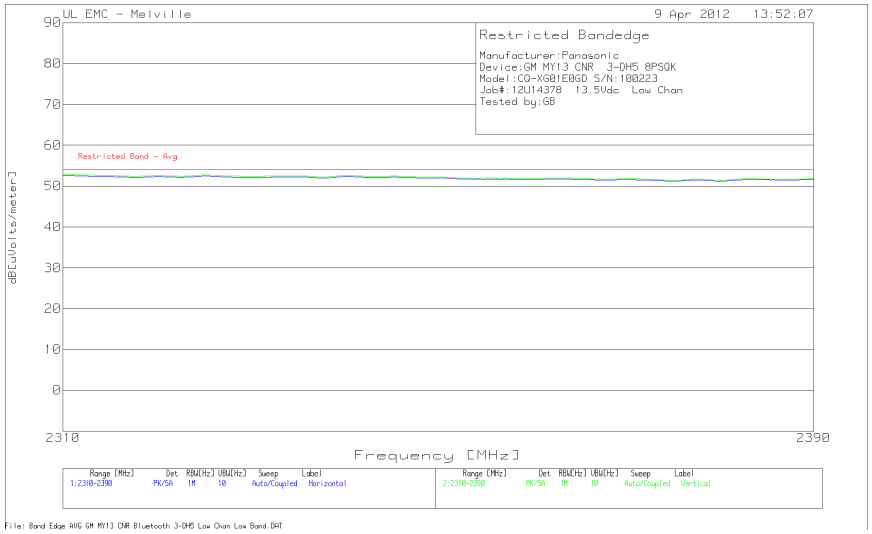
8.2.3. ENHANCED DATA RATE 8PSQK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL RESTRICTED, PEAK, HORIZ & VERT

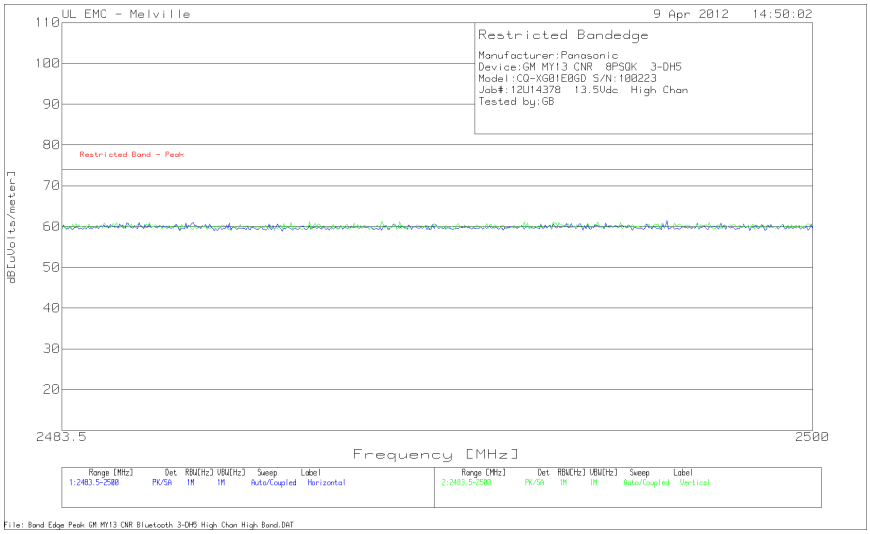


LOW CHANNEL RESTRICTED, AVG, HORIZ & VERT

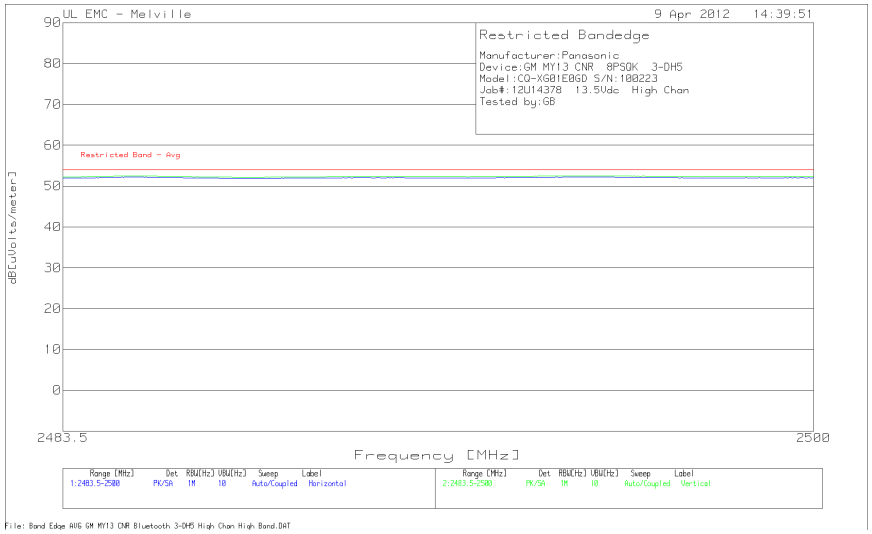


RESTRICTED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL RESTRICTED, PEAK, HORIZ & VERT



HIGH CHANNEL RESTRICTED, AVG, HORIZ & VERT



HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL

Manufacturer:Panasonic												
Device:GM MY13 CNR 8PSQK 3-DH5												
Model:CQ-XG01E0GD S/N:100223												
Job#:12U14378 13.5Vdc Low Chan												
Tested by:AA												
Horizontal 4000 - 8000MHz												
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
4804.1002	82.85	PK	27.1	-52.7	57.26	54	3.26	74	-16.74	193	293	Horz
Vertical 4000 - 8000MHz												
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
4803.6994	85.65	PK	27.3	-52.7	60.25	54	6.25	74	-13.75	36	347	Vert
Horizontal 4000 - 8000MHz												
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
4804.2505	66.26	Av	27.1	-52.7	40.67	54	-13.33	74	-33.33	229	334	Horz
Vertical 4000 - 8000MHz												
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
4803.9399	75.41	Av	27.3	-52.7	50.01	54	-3.99	74	-23.99	360	271	Vert
PK - Peak detector												
Av - Average detector												

NOTE: No other harmonics besides the 1st harmonic was observed during the pre-scan.

MIDDLE CHANNEL

Manufacturer:Panasonic												
Device:GM MY13 CNR 8PSQK 3-DH5												
Model:CQ-XG01E0GD S/N:100223												
Job#:12U14378 13.5Vdc Mid Chan												
Tested by:AA												
Horizontal 4000 - 8000MHz												
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
4881.9699	79.06	PK	27.2	-52.5	53.76	54	-0.24	74	-20.24	232	333	Horz
Vertical 4000 - 8000MHz												
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
4881.6092	78.61	PK	27.5	-52.5	53.61	54	-0.39	74	-20.39	243	375	Vert
Horizontal 4000 - 8000MHz												
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
4881.5641	66.84	Av	27.2	-52.5	41.54	54	-12.46	74	-32.46	191	357	Horz
Vertical 4000 - 8000MHz												
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
4881.6543	70.25	Av	27.5	-52.5	45.25	54	-8.75	74	-28.75	225	332	Vert
PK - Peak detector												
Av - Average detector												

NOTE: No other harmonics besides the 1st harmonic was observed during the pre-scan.

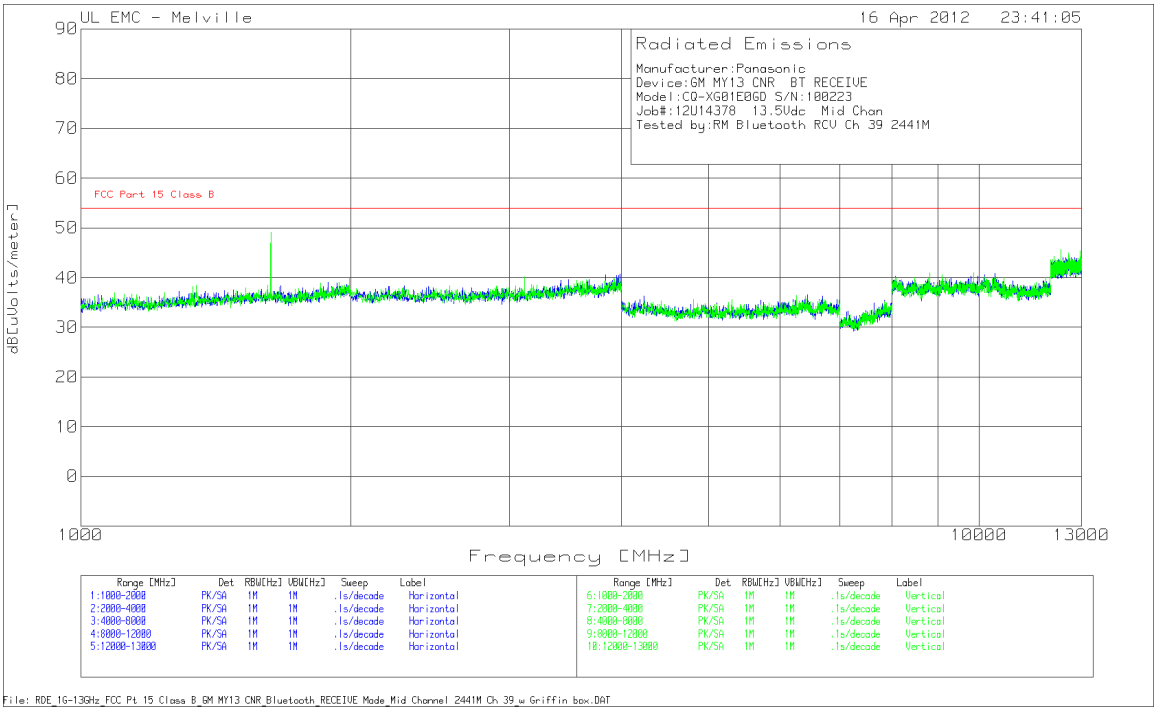
HIGH CHANNEL

Manufacturer:Panasonic												
Device:GM MY13 CNR 8PSQK 3-DH5												
Model:CQ-XG01E0GD S/N:100223												
Job#:12U14378 13.5Vdc High Chan												
Tested by:AA												
Horizontal 4000 - 8000MHz												
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
4959.99	80.78	PK	27.4	-52.3	55.84	54	1.84	74	-18.16	270	350	Horz
Vertical 4000 - 8000MHz												
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
4960.1102	82.49	PK	27.4	-52.3	57.55	54	3.55	74	-16.45	308	227	Vert
Horizontal 4000 - 8000MHz												
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
4959.4439	68.16	Av	27.3	-52.4	43.1	54	-10.9	74	-30.9	247	380	Horz
Vertical 4000 - 8000MHz												
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
4959.6192	66.62	Av	27.4	-52.4	41.67	54	-12.33	74	-32.33	238	374	Vert
PK - Peak detector												
Av - Average detector												

NOTE: No other harmonics besides the 1st harmonic was observed during the pre-scan.

8.3. RECEIVER ABOVE 1 GHz

8.3.1. RECEIVER ABOVE 1 GHz



Manufacturer:Panasonic
Device:GM MY13 CNR BT RECEIVE
Model:CQ-XG01E0GD S/N:100223
Job#:12U14378 13.5Vdc Mid Chan
Tested by:RM Bluetooth RCV Ch 39 2441M

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
1628.629	71.92	PK	21.1	-44.3	48.69	54	-5.31	266	99	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
3491.491	59.71	PK	22.2	-42.4	39.56	54	-14.44	6	250	Horz
3841.842	61.07	PK	22.5	-43	40.56	54	-13.44	303	250	Horz

Vertical 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
1628.629	72.31	PK	21.1	-44.3	49.08	54	-4.92	341	99	Vert

Vertical 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
3119.119	61.13	PK	21.9	-42.9	40.09	54	-13.91	171	250	Vert
3657.658	59.7	PK	22.3	-42.4	39.59	54	-14.41	134	250	Vert

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
1628.3415	70.95	Av	21.1	-44.3	47.72	54	-6.28	252	187	Horz

Vertical 1000 - 2000MHz

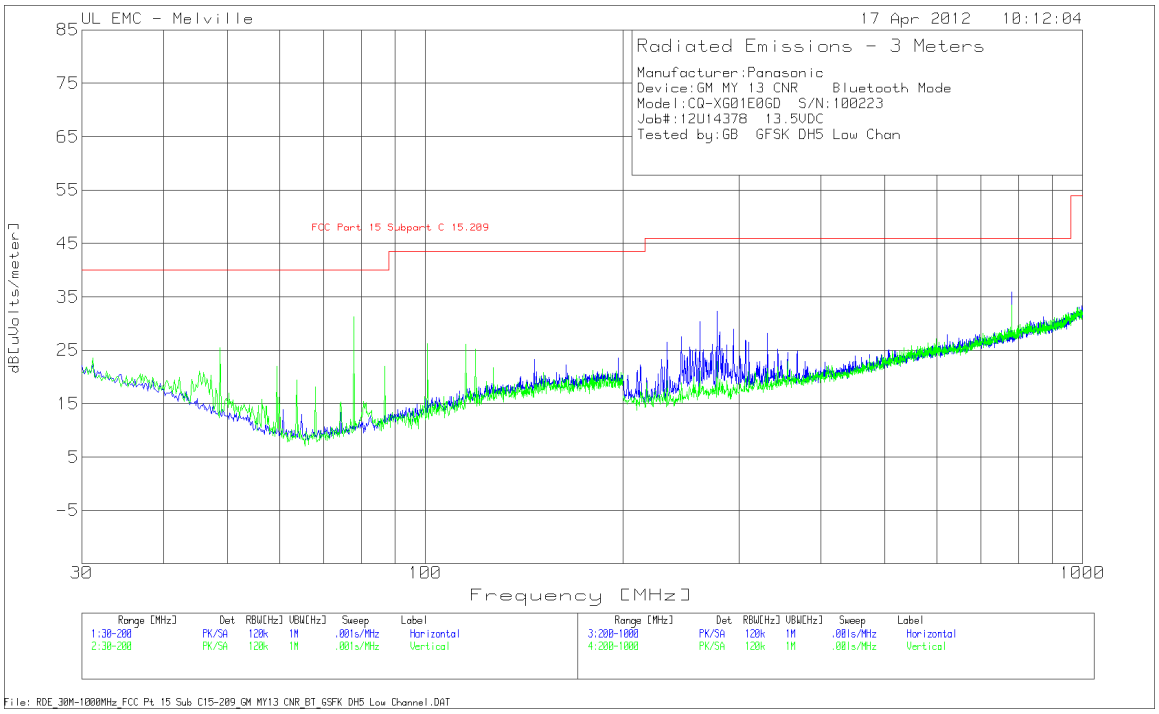
Test Frequency	Meter Reading	Detector	AF-51442 [dB]	BOMS Factor [dB]	dB[uVolts/ meter]	FCC Part 15 Class B	Margin	Azimuth [Degs]	Height [cm]	Polarity
1628.3415	71.28	Av	21.1	-44.3	48.05	54	-5.95	234	292	Vert

PK - Peak detector
Av - Average detector

8.4. WORST-CASE BELOW 1 GHz

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

HORIZONTAL & VERTICAL PLOT



HORIZONTAL & VERTICAL DATA

Manufacturer:Panasonic
Device:GM MY 13 CNR Bluetooth Mode
Model:CQ-XG01E0GD S/N:100223
Job#:12U14378 13.5VDC
Tested by:GB GFSK DH5 Low Chan

Vertical 30 - 200MHz

Test Frequency	Meter Reading	Detector	AF-43441 [dB]	GL-3M [dB]	dB[uVolts/meter]	FCC Part 15 Subpart C 15.209	Margin	Azimuth [Degs]	Height [cm]	Polarity
48.7187	38.77	PK	10.6	-23.9	25.47	40	-14.53	216	101	Vert
77.8178	47.76	PK	7.2	-23.7	31.26	40	-8.74	72	101	Vert
100.7908	38.88	PK	11	-23.6	26.28	43.5	-17.22	72	101	Vert

Horizontal 200 - 1000MHz

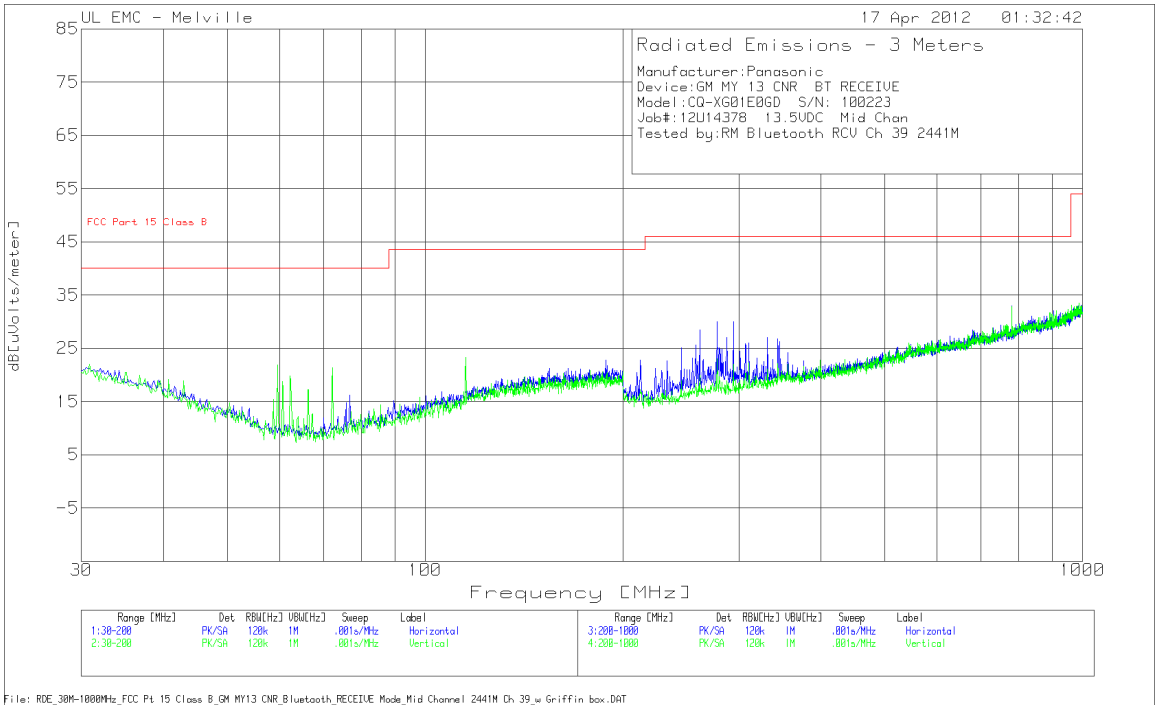
Test Frequency	Meter Reading	Detector	AF-44067 [dB]	GL-3M [dB]	dB[uVolts/meter]	FCC Part 15 Subpart C 15.209	Margin	Azimuth [Degs]	Height [cm]	Polarity
261.6308	40.24	PK	13.2	-23.1	30.34	46	-15.66	144	101	Horz
278.039	41.76	PK	13.6	-23	32.36	46	-13.64	174	101	Horz
779.8899	35.43	PK	21.7	-21.2	35.93	46	-10.07	55	101	Horz

PK - Peak detector

8.5. RECEIVER BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz

HORIZONTAL & VERTICAL PLOT



HORIZONTAL & VERTICAL DATA

Manufacturer:Panasonic
Device:GM MY 13 CNR BT RECEIVE
Model:CQ-XG01E0GD S/N: 100223
Job#:12U14378 13.5VDC Mid Chan
Tested by:RM Bluetooth RCV Ch 39 2441M

Horizontal 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
76.7968	32.95	PK	7	-23.7	16.25	40	-23.75	15	301	Horz

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
59.6096	39.04	PK	6.6	-23.8	21.84	40	-18.16	330	101	Vert
72.3724	38.7	PK	6.4	-23.7	21.4	40	-18.6	12	101	Vert
115.2553	34.07	PK	12.7	-23.5	23.27	43.5	-20.23	300	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
261.6308	38.32	PK	13.2	-23.1	28.42	46	-17.58	144	101	Horz
278.039	39.34	PK	13.6	-23	29.94	46	-16.06	0	101	Horz
294.4472	39.25	PK	13.9	-23.1	30.05	46	-15.95	83	101	Horz
331.6658	35.02	PK	14.9	-22.9	27.02	46	-18.98	144	101	Horz
780.2901	32.49	PK	21.7	-21.2	32.99	46	-13.01	89	101	Horz

Vertical 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	31.81	PK	22.2	-21.2	32.81	46	-13.19	87	201	Vert

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

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

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	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

* 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/m^2 is equivalent to 1 mW/cm^2.
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 = EIRP / (4 * Pi * D^2)
where
S = Power density in W/m^2
EIRP = Equivalent Isotropic Radiated Power in W
D = Separation distance in m

Power density in units of W/m^2 is converted to units of mWc/m^2 by dividing by 10.

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))
where
D = Separation distance in m
EIRP = Equivalent Isotropic Radiated Power in W
S = Power density in W/m^2

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/cm^2

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m^2

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	Bluetooth	1.0	10.0	1.97	4.00	100	4.0	0.56

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