FCC 47 CFR PART 15 SUBPART C
INDUSTRY (ISED) CANADA RSS-247 ISSUE 1

CERTIFICATION TEST REPORT

FOR

WIRELESS CAPABLE SECURITY CAMERA

HVIN: r1
PMN: AXIS M3045-WV

FCC ID: PNB-AXISM3045-WV
IC: 3919A-M3045WV

REPORT NUMBER: 11197251-E3

ISSUE DATE: 2016-09-21

Prepared for
AXIS COMMUNICATIONS AB
EMDALAVAGEN 14
LUND
SWEDEN, SE-223 69

Prepared by
UL LLC
12 LABORATORY DR.
RESEARCH TRIANGLE PARK, NC 27709 USA
TEL: (919) 549-1400

NVLAP Lab code: 200246-0

Revision History

Ver.	Issue Date	Revisions	Revised By
1	2016-07-18	Initial Issue	Brian Kiewra
2	2016-07-21	Added model numbers and EUT descriptive detail. Added Line Conducted Emissions setup diagram and revised serial number.	Brian Kiewra
3	2016-08-11	Removed model variants, added HVIN and PMN. Made editorial changes to references throughout.	Brian Kiewra
4	2016-09-08	Lowered Bluetooth GFSK power data.	Brian Kiewra
5	2016-09-19	Lowered all Bluetooth power data. Retested output power, only (all other data considered worst-case at higher power setting). Included information on samples used for retesting in Section 5.6.	Jeff Moser
6	2016-09-20	Revised Test and Measurement Equipment table, Section 6.	Jeff Moser
7	2016-09-21	Added clarifying information on power setting information and samples used.	Jeff Moser

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Axis Communications AB
Emdalavagen 14
Lund
Sweden, SE-223 69

EUT DESCRIPTION: Wireless Capable Security Camera

HVIN: r1
PMN: AXIS M3045-WV

SERIAL NUMBER: 00408C186CE0, 00408C186ECE (power only)

DATE TESTED: 2016-06-16 to 2016-06-29, 2016-08-24, 2016-09-15

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA (ISED CANADA) RSS-247 Issue 1	Pass
INDUSTRY CANADA (ISED CANADA) RSS-GEN Issue 4	Pass

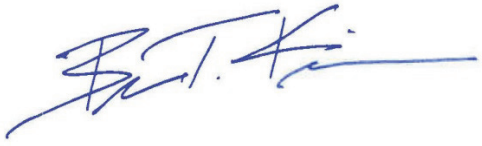
UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and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

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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 LLC By:

Jeffrey Moser
EMC Program Manager
UL – Consumer Technology Division

Prepared By:



WiSE Engineer
UL – Consumer Technology Division

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, RSS-GEN Issue 4, RSS-247 Issue 1.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Suite B, Perimeter Park Drive, Morrisville, NC 27560.

12 Laboratory Dr., RTP, NC 27709
☐ Chamber A
☐ Chamber C

2800 Suite B Perimeter Park Dr., Morrisville, NC 27560
☐ Chamber NORTH
☒ Chamber SOUTH

The onsite chambers are covered under ISED Canada company address code 2180C with site numbers 2180C -1 through 2180C-4, respectively.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at http://www.nist.gov/nvlap/.

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
Total RF power, conducted	± 0.45 dB
RF power density, conducted	± 1.5 dB
Spurious emissions, conducted	± 2.94 dB
All emissions, radiated up to 40 GHz	± 5.36 dB
Temperature	± 0.07°C
Humidity	± 2.26% RH
DC and low frequency voltages	± 1.27%
Conducted Emissions (0.150-30MHz)	± 2.37dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a network surveillance camera that contains an 802.11 a/b/g/n and Bluetooth transceivers, manufactured by AXIS Communications AB, Lund, SWEDEN.

The EUT is provided with an Axis PS-U05 rev. 1 power supply.

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	7.58	5.73
2402 - 2480	DQPSK	5.79	3.79
2402 - 2480	Enhanced 8PSK	6.02	4.00

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal inverted-f type antenna.
Peak antenna gain is +0.6 dBi for 2.5 GHz and +4.4 dBi for 5 GHz.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was *6.15_beta54*.
Special test firmware used for EMC was *15+snapshot_20160511* (this firmware allows for simultaneously operation for Bluetooth and WLAN in order to reduce test set-ups).

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that X-Axis orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X-Axis orientation.

For Enhanced Data rate modes, 8DPSK is considered worst-case and only select tests were performed for the DQPSK mode. Additionally, unless noted in the test report, all tests were performed with the DH5 packet size as this was considered worst-case.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Lenovo	T440	RTP1014PC015NUR	NA

I/O CABLES

I/O Cable List					
Cable No	**Port**	**# of Identical ports**	**Connector Type**	**Cable Length (m)**	**Remarks**
1	Antenna Port	1	EUT	<1m	NA
2	Ethernet	1	RJ45	>1m	CAT5E
3	AC Mains	1	AC	>1m	NA
4	HDMI	1	HDMI	>1m	NA

TEST SETUP

Test software exercised the radio card.

SAMPLES USED

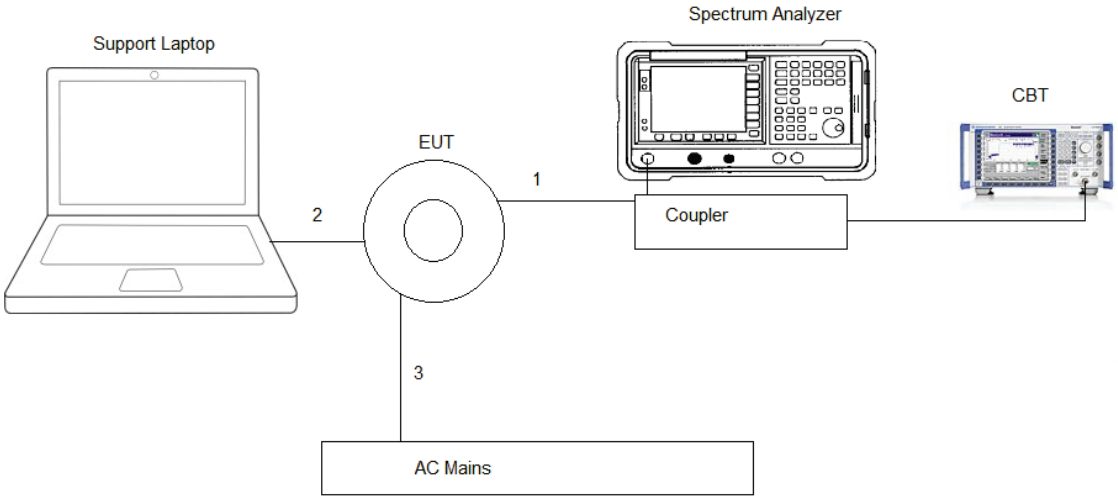
00408C186CE0, 00408C186ECE (conducted power only)

Note – Re-testing was required of the transmitter output power with reduced EUT power settings. All other tests were performed at the higher power settings (considered worst case).

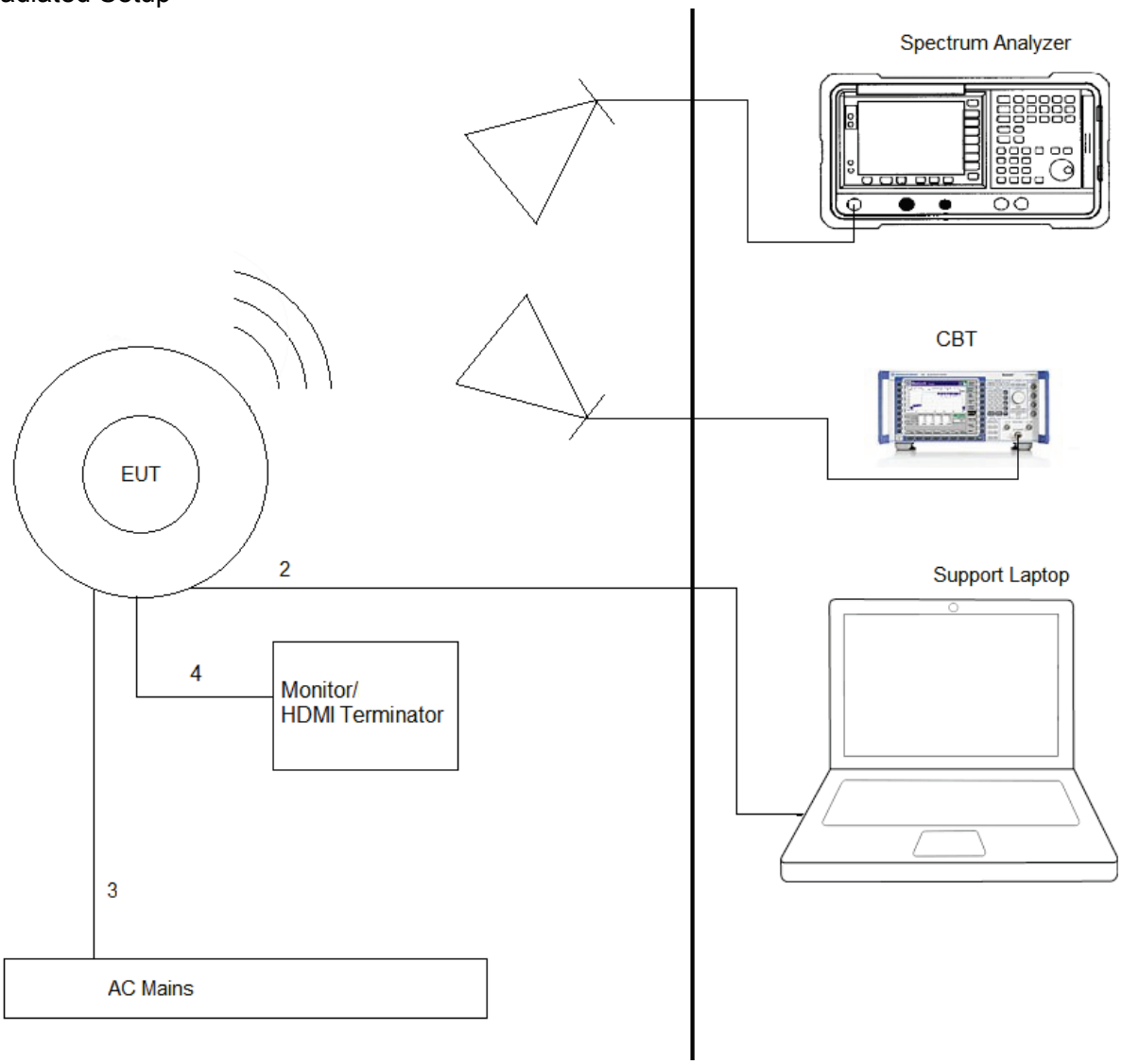
Test	Power Level	Comment
20 dB/99% OBW	Maximum allowed	This was the default setting provided.
Hopping Frequency	Maximum allowed	This was the default setting provided.
Number of Hopping Channels	Maximum allowed	This was the default setting provided.
Average Time of Occupancy	Maximum allowed	This was the default setting provided.
Output Power	Reduced	Reduced power setting.
Conducted Emissions	Maximum allowed	This was the default setting provided.
Radiated Emissions	Maximum allowed	This was the default setting provided.
Line Conducted Emissions	Maximum allowed	This was the default setting provided.

SETUP DIAGRAM FOR TESTS

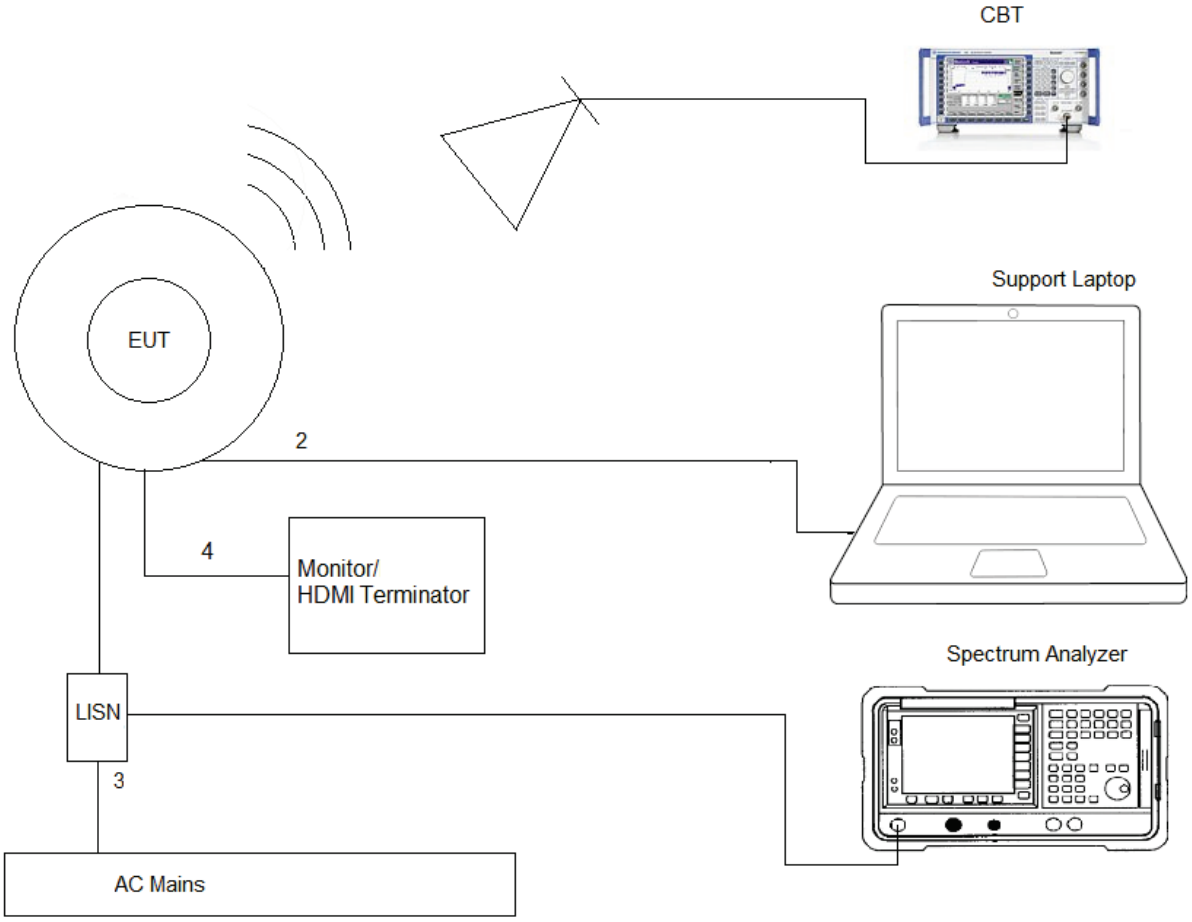
Conducted Setup



Radiated Setup



Line Conducted Setup



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz	**(Loop Ant.)**			
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2015-12-08	2016-12-31
	30-1000 MHz				
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2016-06-07	2017-06-30
	1-18 GHz				
AT0069	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2016-03-07	2017-03-31
	18-40 GHz				
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2015-08-27	2016-08-31
	Gain-Loss Chains				
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2015-10-07	2016-10-31
S-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2015-06-09	2016-06-30
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2015-08-22	2016-08-31
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2016-02-29	2017-02-28
	Receiver & Software				
SA0025	Spectrum Analyzer	Agilent	N9030A	2016-03-17	2017-03-31
SA0026 (18-40GHz RSE)	Spectrum Analyzer	Agilent	N9030A	2016-02-24	2017-02-28
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
HI0050	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2015-07-01	2016-07-31
77491	CBT Blue Tooth Tester	Rohde & Schwarz	1153.9000.35	NA	NA

Note 1 – CBT was used to assist in controlling the EUT and not to measure emissions.
Note 2 – This test area was used prior to 2016-06-30.

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 1				
72822 (SA0019)	Spectrum Analyzer	Agilent Technologies	E4446A	2015-09-02	2016-09-30
PWM004	RF Power Meter	Keysight Technologies	N1911A	2015-06-08, 2016-06-22	2016-06-30, 2017-06-22
PWS004	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2015-06-05, 2016-06-22	2016-06-30, 2017-06-22
HI0079	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2015-07-1	2016-07-31
HI0078	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2016-06-13	2017-06-13
	Conducted Room 2				
SA0020	Spectrum Analyzer	Agilent Technologies	E4446A	2016-03-22	2017-03-31
PWM003	RF Power Meter	Keysight Technologies	N1911A	2015-06-08, 2016-06-21	2016-06-30, 2017-06-21
PWS003	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2015-06-05, 2016-06-21	2016-06-30, 2017-06-21
T1024	EMPower USB RF Power Sensor, 10MHz to 6GHz	ETS Lindgren	7002-006	2015-10-01	2016-10-01
HI0080	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2015-07-01	2016-07-31
HI0078	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2016-06-13	2017-06-13
	Common Equipment				
77491	CBT Blue Tooth Tester	Rohde & Schwarz	1153.9000.35	NA	NA

Note 1 – CBT was used to assist in controlling the EUT and not to measure emissions.

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL077	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3476-240	2016-06-15	2017-06-30
HI0079	Temp/Humid/Pressure Meter	Springfield Precision	PreciseTemp	2015-07-01	2016-07-31
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2015-08-24	2016-08-31
LISN008	LISN, 50-ohm/50-uH, 2-conductor, 25A (For support gear only.)	Solar Electronics	8012-50-R-24-BNC	2015-09-03	2016-09-30
MM0167	Multi-meter	Agilent	U1232A	2015-08-17	2016-08-31
PRE0101521 (75141)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2015-08-26	2016-08-31
TL001	Transient Limiter, 0.009-30MHz	Com-Power	LIT-930A	2016-06-09	2017-06-30
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
PS215	AC Power Source	Elgar	CW2501M (s/n 1523A02397)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2016-06-04	2017-06-30
77491	CBT Blue Tooth Tester	Rohde & Schwarz	1153.9000.35	NA	NA

Note 1 – CBT was used to assist in controlling the EUT and not to measure emissions.
Note 2 – This test area was used prior to 2016-06-30.

7. MEASUREMENT METHODS

Duty Cycle: KDB 558074 Zero-Span Spectrum Analyzer Method

20 dB BW: ANSI C63.10 Section 6.9.2.

99% Occupied Bandwidth: ANSI C63.10-2013, Section 6.9.3

Hopping Frequency Separation: ANSI C63.10 Section 7.8.2

Number of Hopping Channels: ANSI C63.10 Section 7.8.3

Average Time of Occupancy: ANSI C63.10 Section 7.8.4

Output Power: ANSI C63.10 Section 7.8.5

Out-of-band emissions in non-restricted bands: ANSI C63.10 Section 7.8.6 & 7.8.8

Out-of-band emissions in restricted bands: ANSI C63.10:2013 Sections 6.3-6.6

Line Conducted Emissions: ANSI C63.10:2013 Sections 6.2

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

8.1.1. ON TIME AND DUTY CYCLE RESULTS

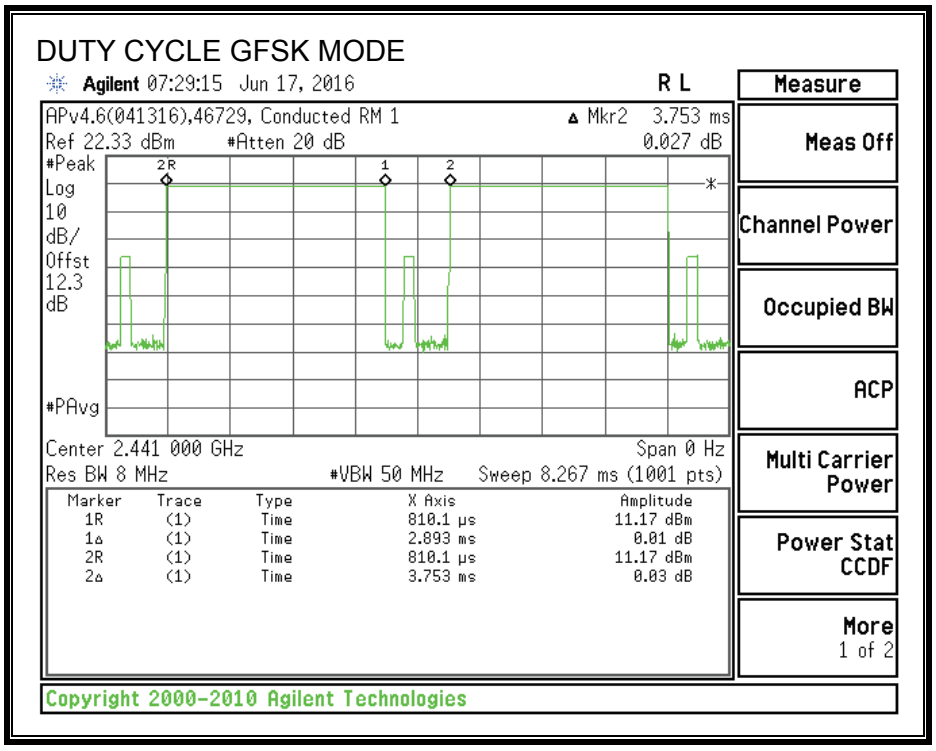
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4 GHz band						
Bluetooth GFSK	2.893	3.753	0.771	77.08%	1.13	0.346
Bluetooth 8PSK	2.893	3.753	0.771	77.08%	1.13	0.346

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

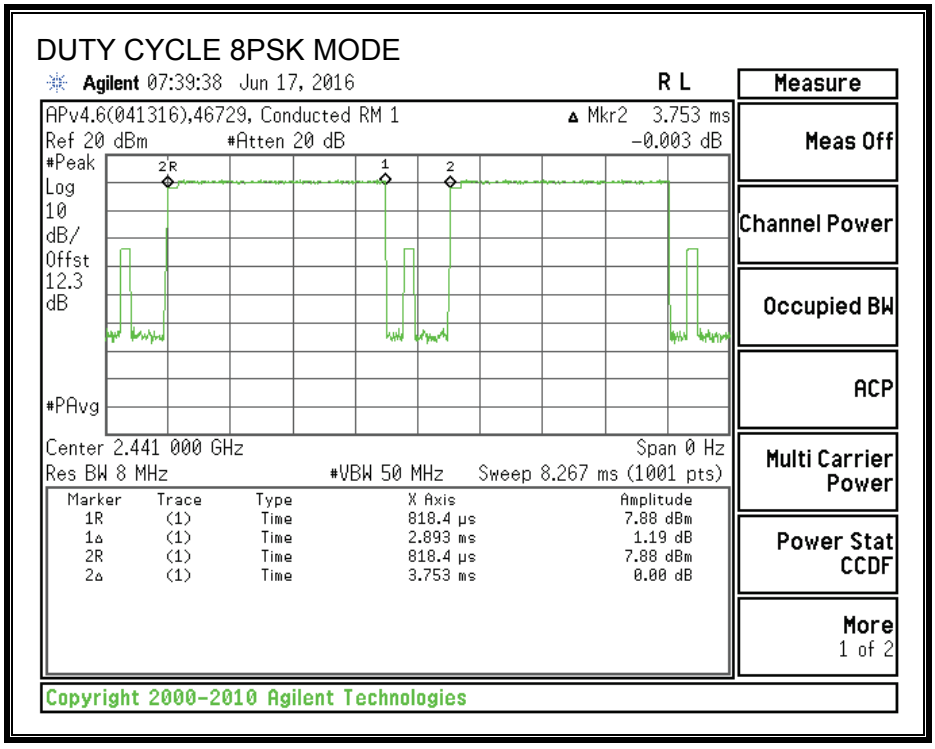
Note – This test was performed at the maximum allowed power setting.

8.1.2. DUTY CYCLE PLOTS

DUTY CYCLE GFSK MODE



DUTY CYCLE 8PSK MODE



8.2. BASIC DATA RATE GFSK MODULATION

8.2.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only. Test per FCC §15.247(a)(1); IC RSS-247 5.1 (1), RSS-Gen 6.6.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1-5% of the 20 dB bandwidth and 99% Occupied Bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

RESULTS

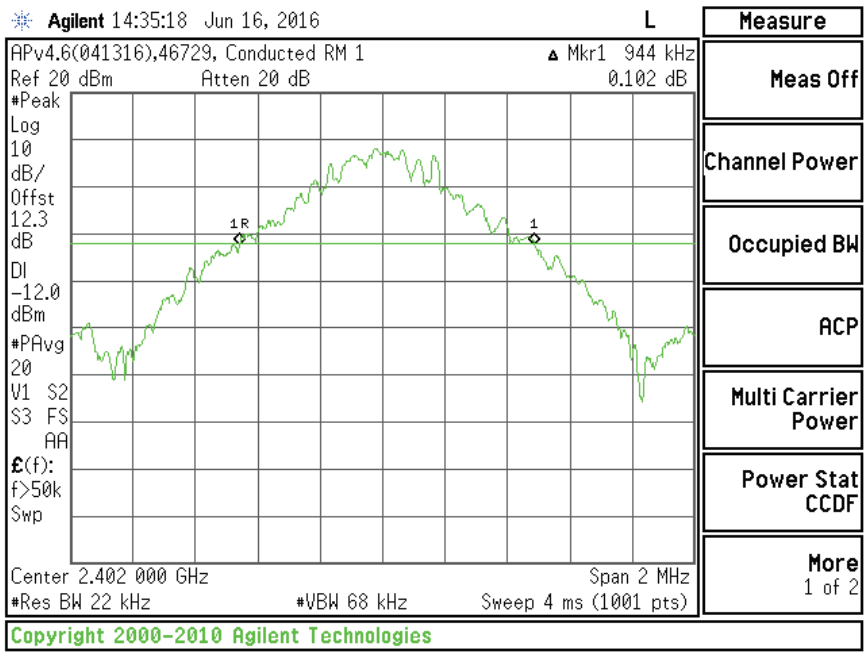
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	944	905.0206
Middle	2441	940	903.1006
High	2480	932	906.0911

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-16

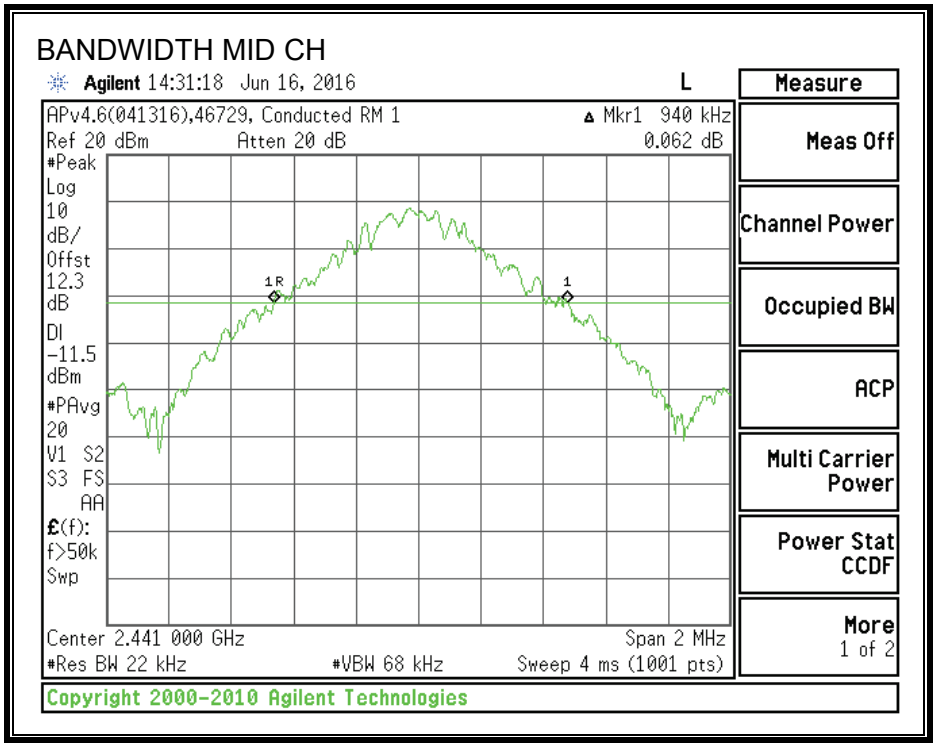
Note – This test was performed at the maximum allowed power setting.

20 dB BANDWIDTH

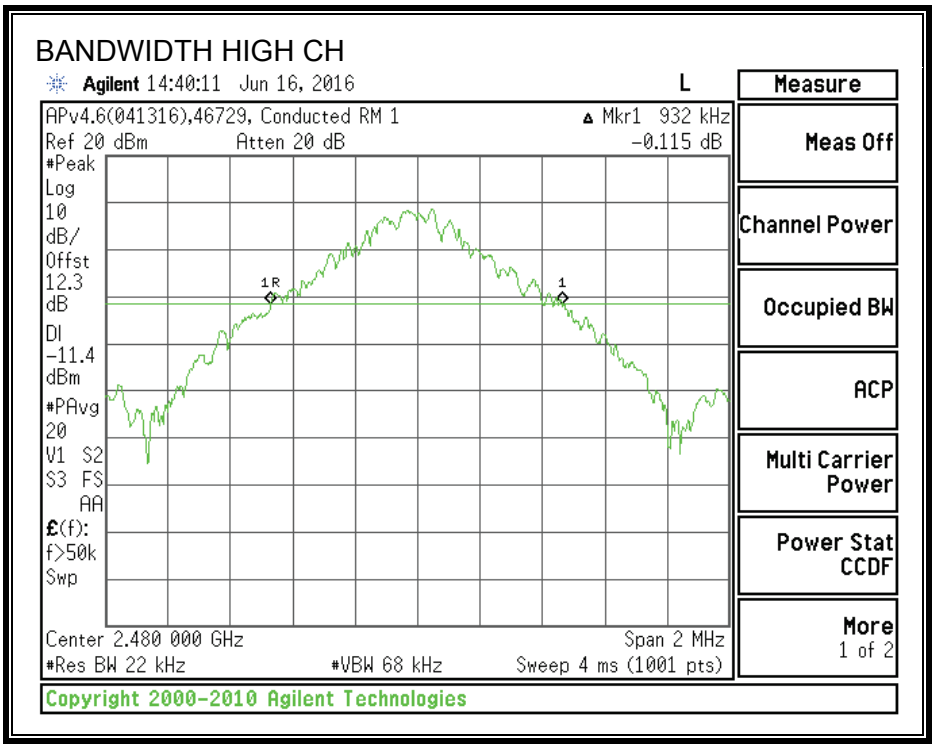
BANDWIDTH LOW CH



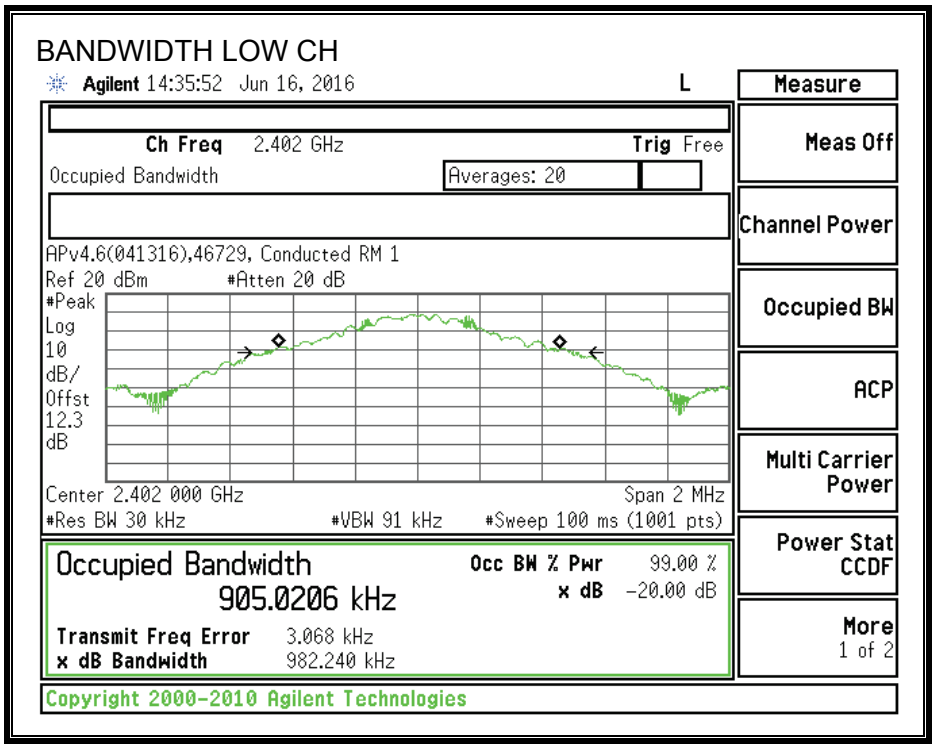
BANDWIDTH MID CH

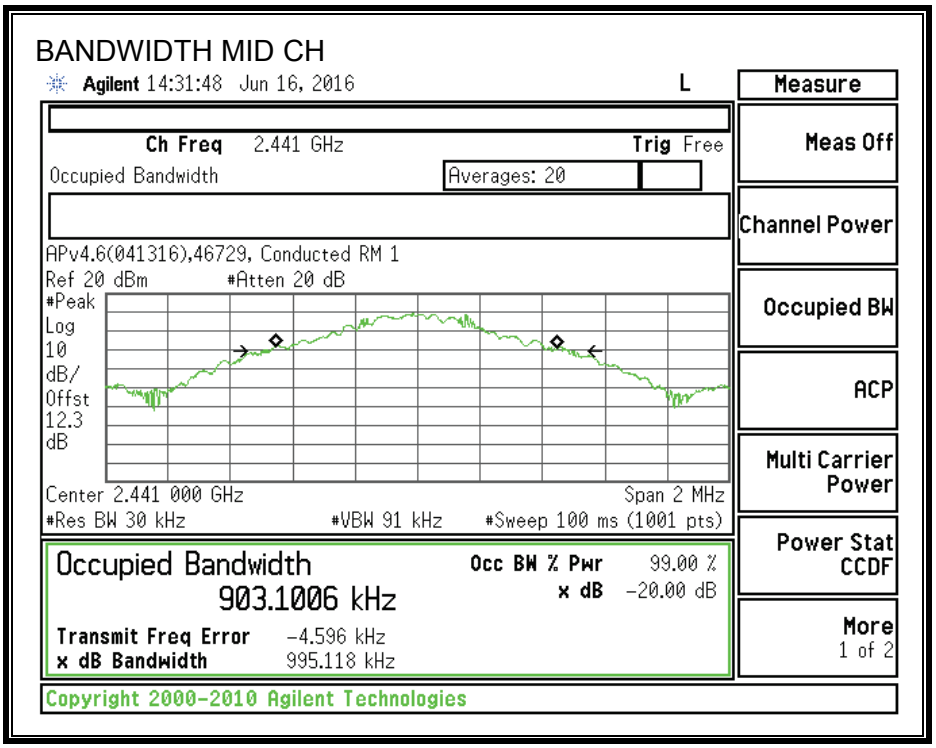


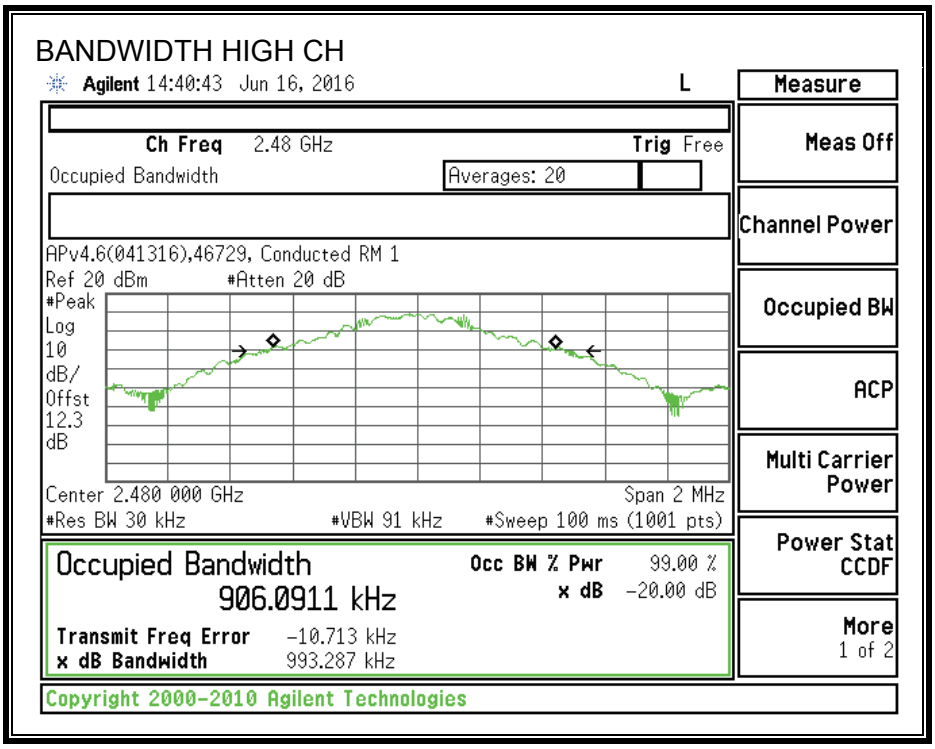
BANDWIDTH HIGH CH



99% BANDWIDTH







8.2.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-247 5.1 (2)

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

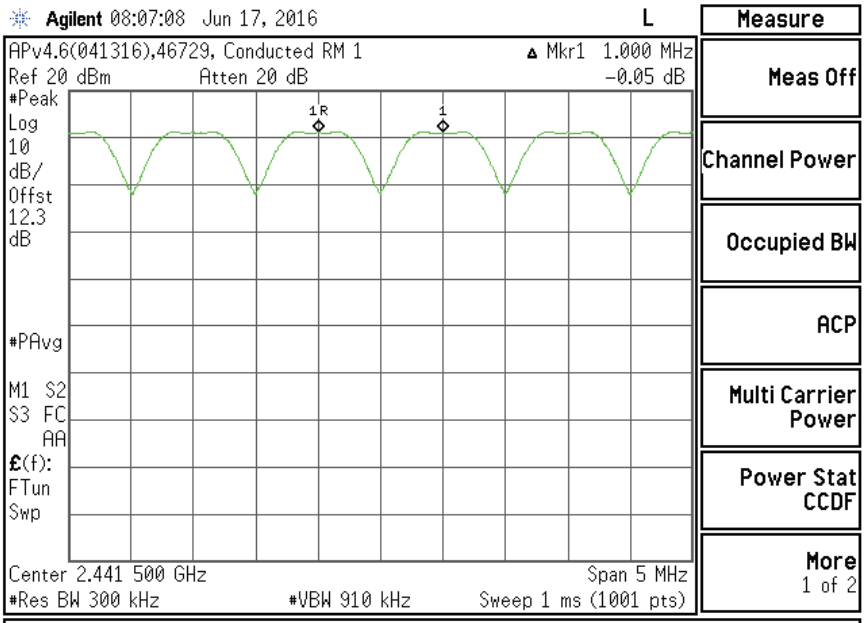
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

RESULTS

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

Note – This test was performed at the maximum allowed power setting.

HOPPING FREQUENCY SEPARATION



Ch. A (MHz)	Ch. B (MHz)	Ch. 1 to Ch. 2 Sep. (MHz)	Max. 20 dB BW (MHz)	Margin (MHz)
2441	2442	1.000	0.944	-0.056

8.2.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-247 5.1 (4)

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 for visibility of the entire span. Then, smaller spans are set to more clearly identify the channels. The RBW is set to 30% of the channel spacing (approx. 300 kHz). The analyzer is set to Max Hold.

RESULTS

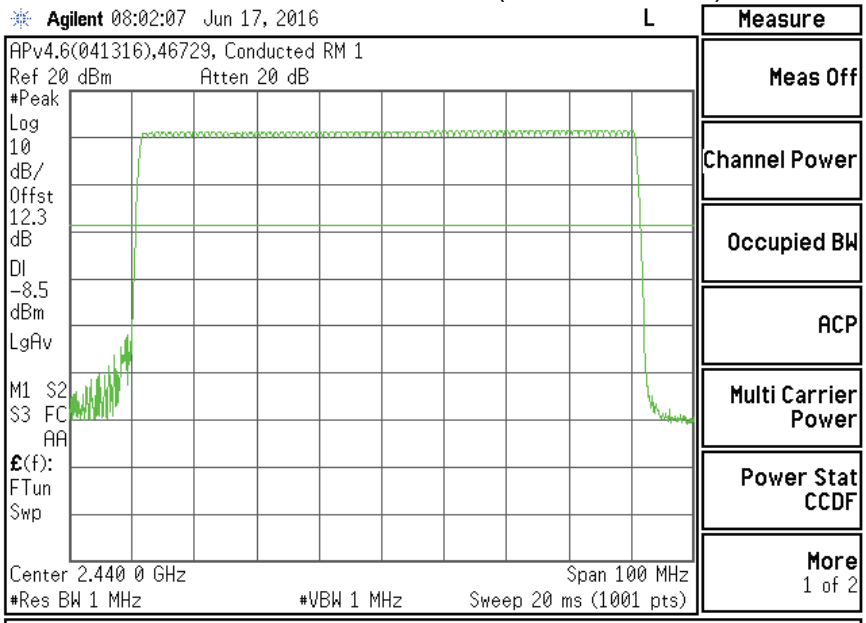
Normal Mode: 79 Channels observed.

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

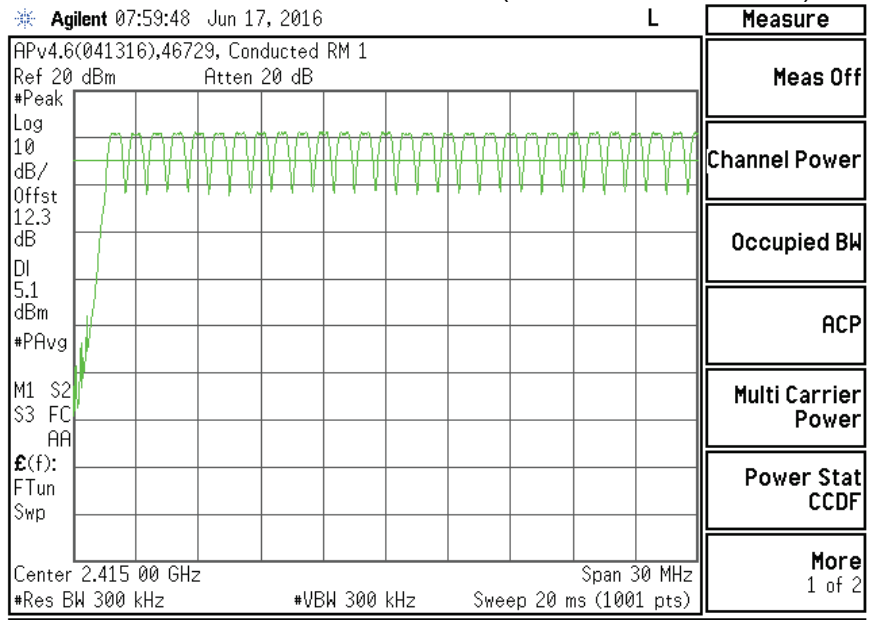
Note – This test was performed at the maximum allowed power setting.

NUMBER OF HOPPING CHANNELS

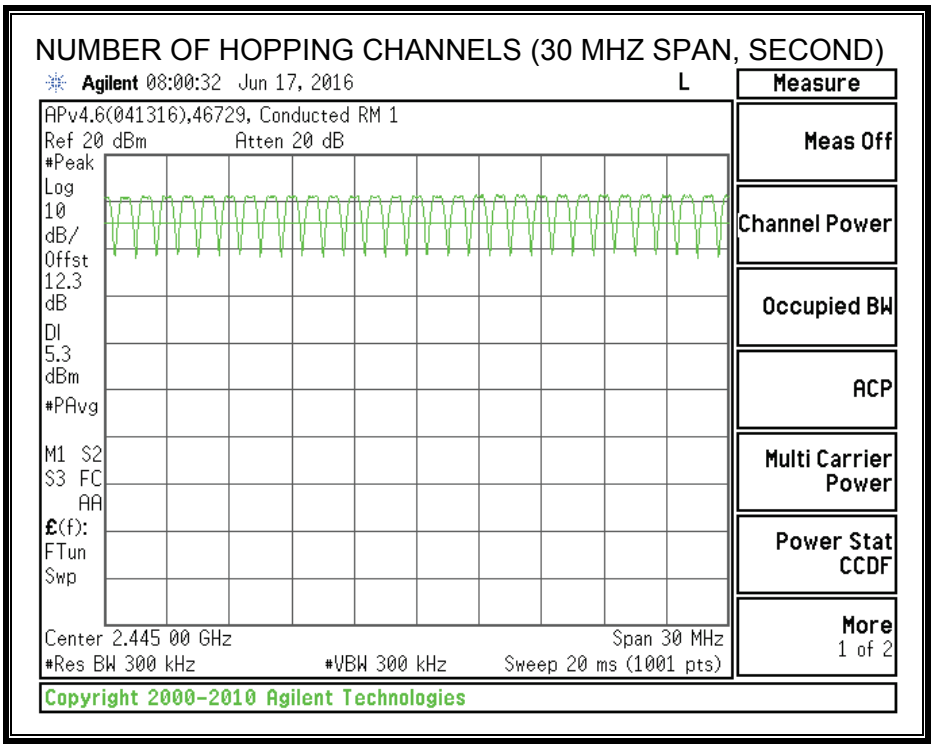
NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



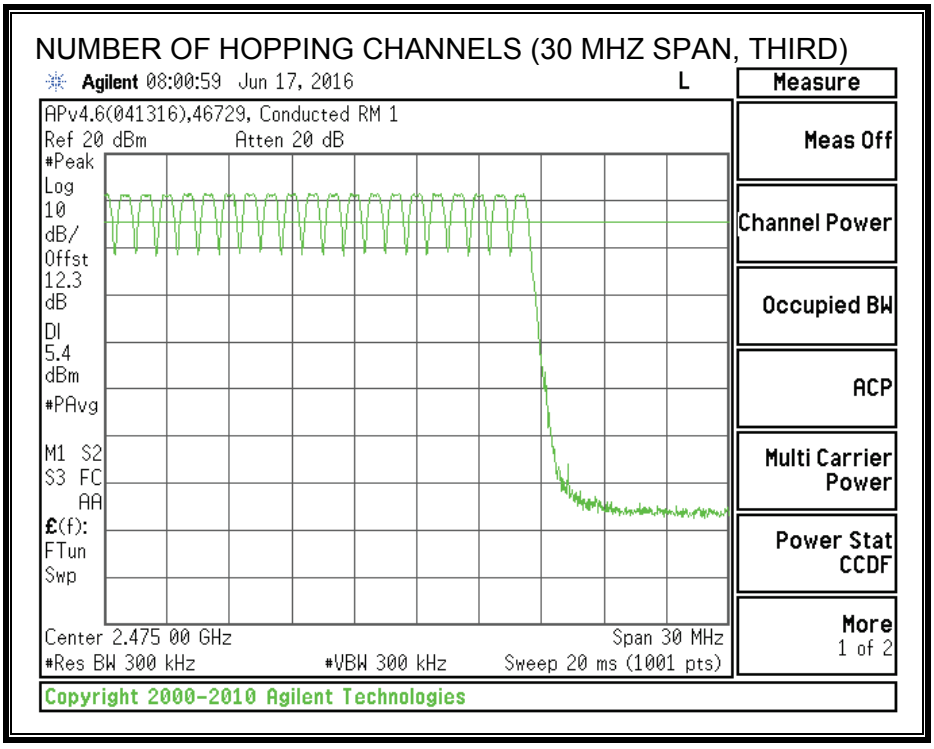
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD)



8.2.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-247 5.1 (4)

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.

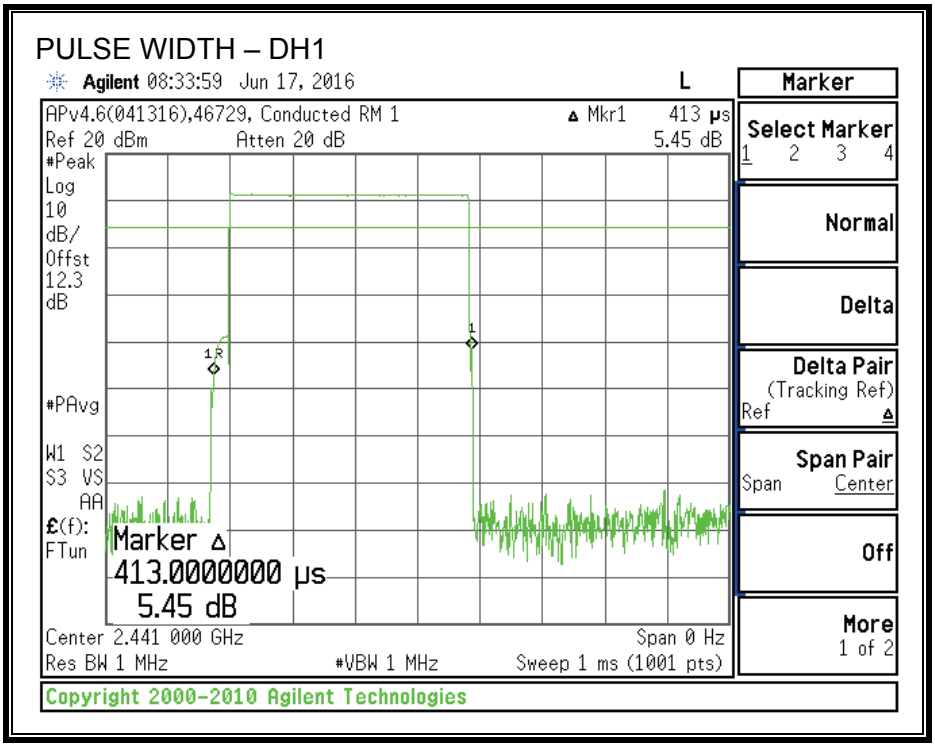
For AFH mode, the average time of occupancy in the specified 8 second period (20 channels * 0.4 seconds) is equal to 10 * (# of pulses in 0.8 s) * pulse width.

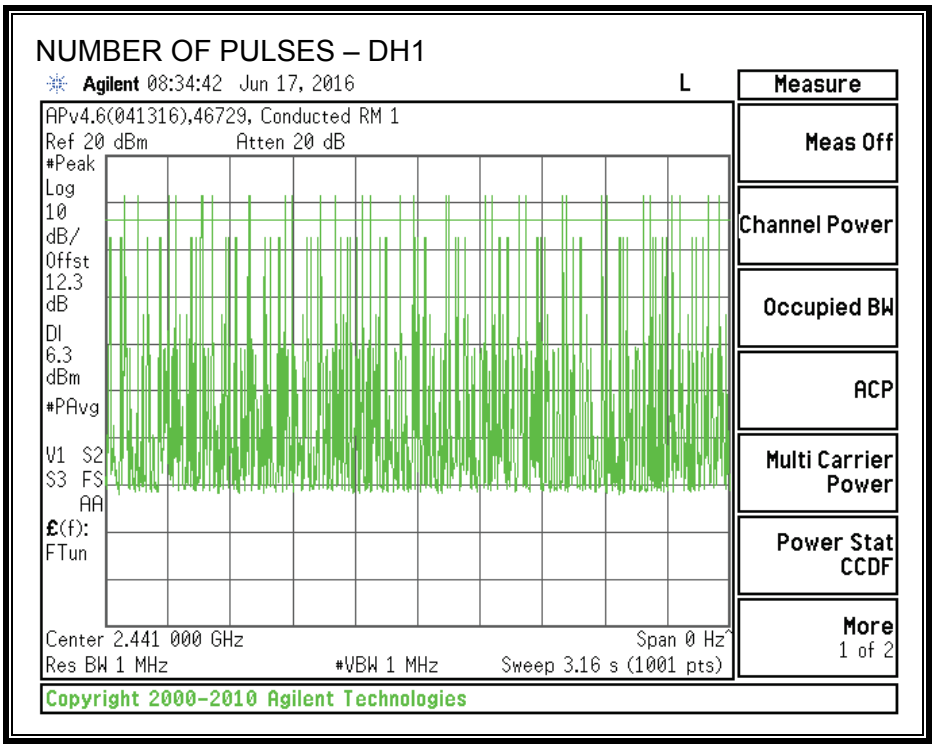
RESULTS

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH1	0.413	32	0.132	0.4	-0.268
DH3	1.668	17	0.284	0.4	-0.116
DH5	2.888	12	0.347	0.4	-0.053
DH Packet	Pulse Width (msec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.413	8	0.033	0.4	-0.367
DH3	1.668	4.25	0.071	0.4	-0.329
DH5	2.888	3	0.087	0.4	-0.313

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17
Note – This test was performed at the maximum allowed power setting.

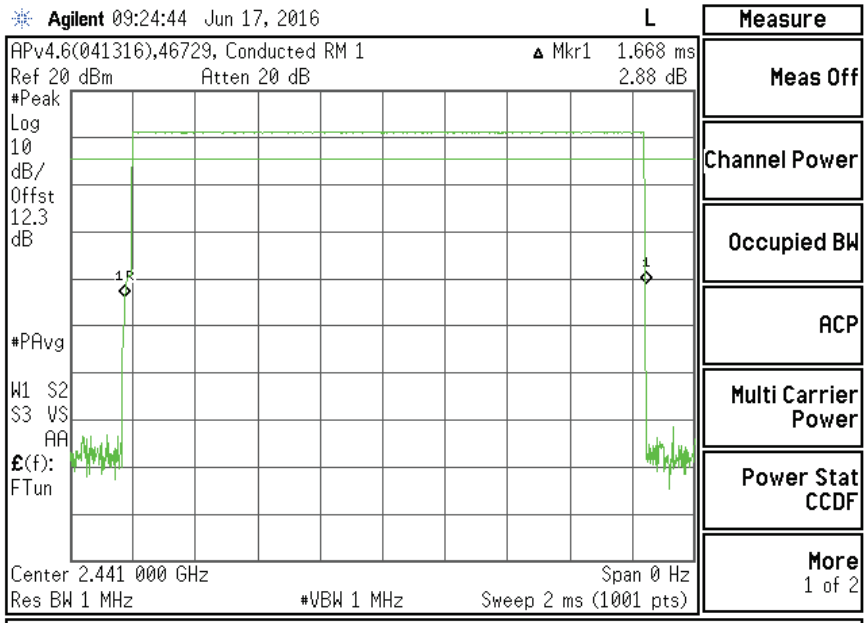
DH1



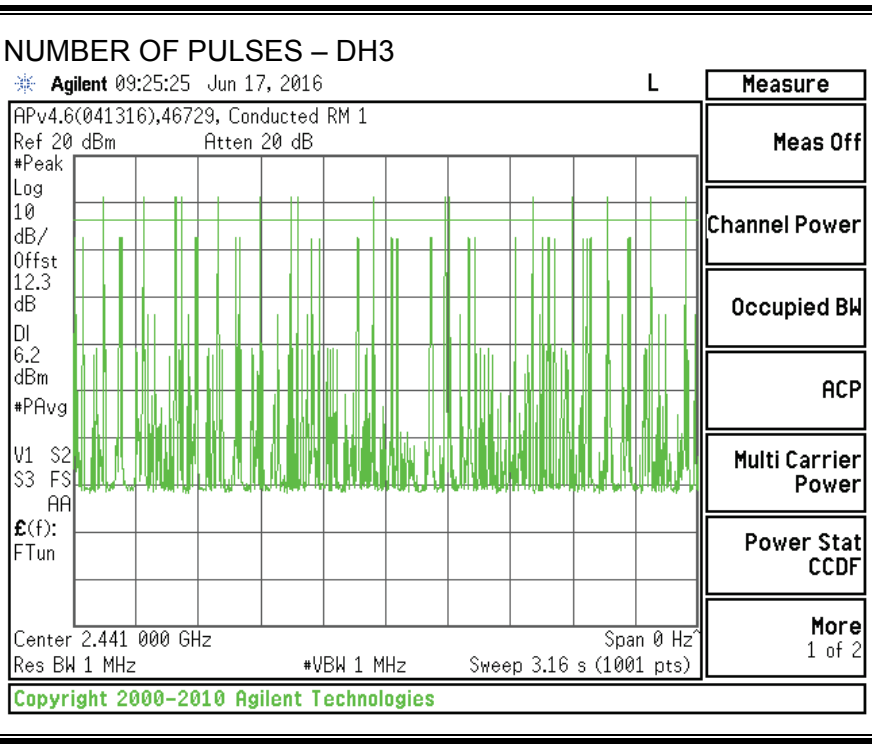


DH3

PULSE WIDTH – DH3

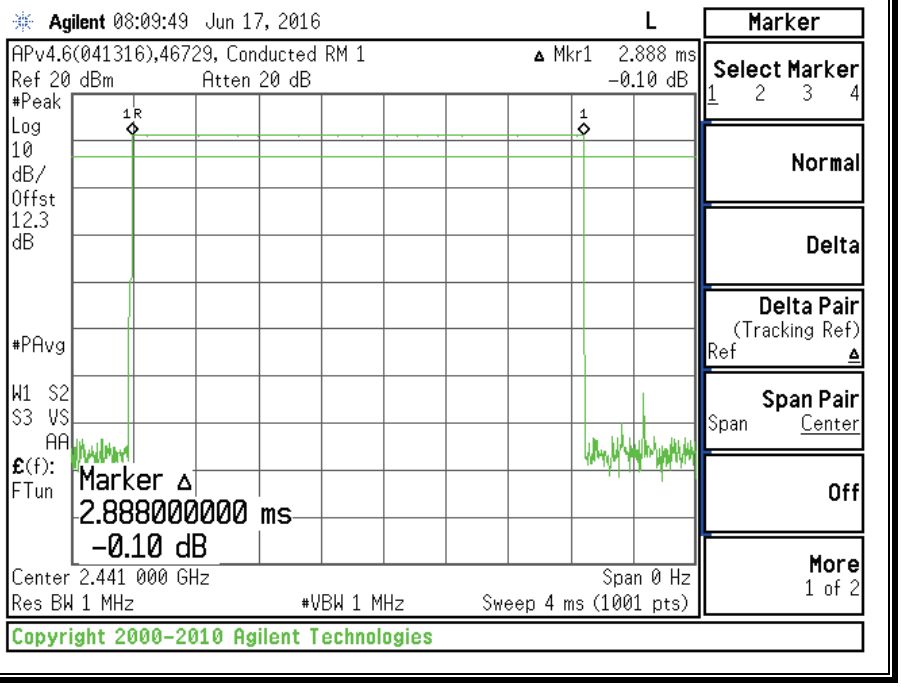


NUMBER OF PULSES – DH3

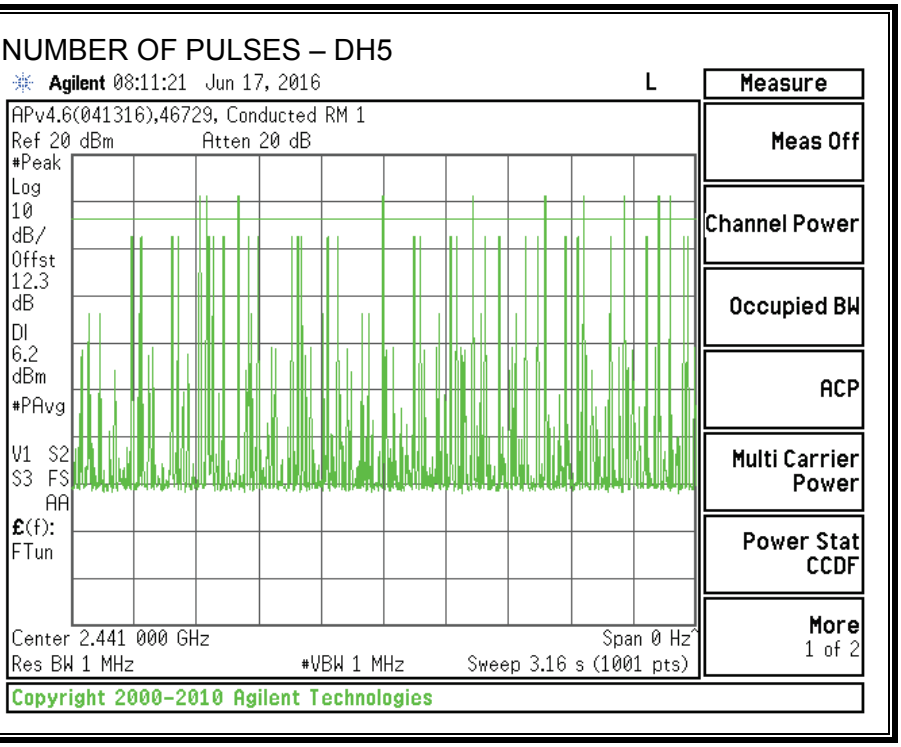


DH5

PULSE WIDTH – DH5



NUMBER OF PULSES – DH5



8.2.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

RSS-247 5.4 (2)

For frequency hopping systems operating in the band 2400-2483.5 MHz and employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Directional Gain (dBi)	Limit (dBm)	Margin (dB)
Low	2402	7.55	0.60	30	-22.45
Middle	2441	7.58	0.60	30	-22.42
High	2480	7.36	0.60	30	-22.64

Tested by: Nicklas Haydon/Jeff Cabrera
Test date: 2016-08-24

Note – This test was performed at a reduced power setting.

8.2.6. 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 12.04 dB (including 10 dB pad and 2.04 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	7.32
Middle	2441	7.39
High	2480	7.24

Tested by: Nicklas Haydon/Jeff Cabrera
Test date: 2016-08-24

Note – This test was performed at a reduced power setting.

8.2.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

IC RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

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.

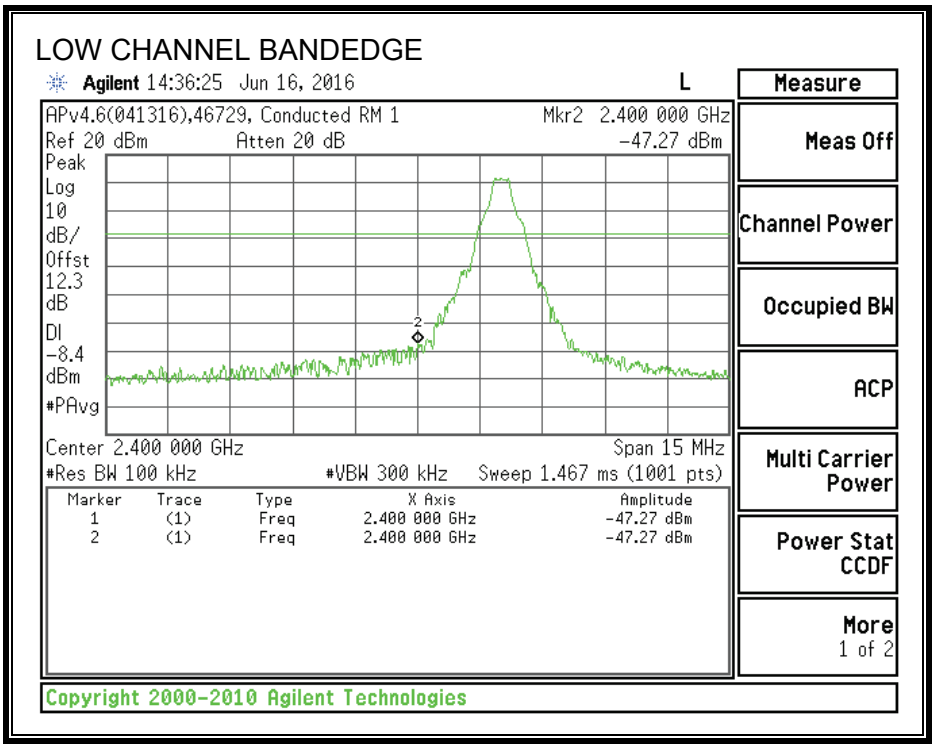
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

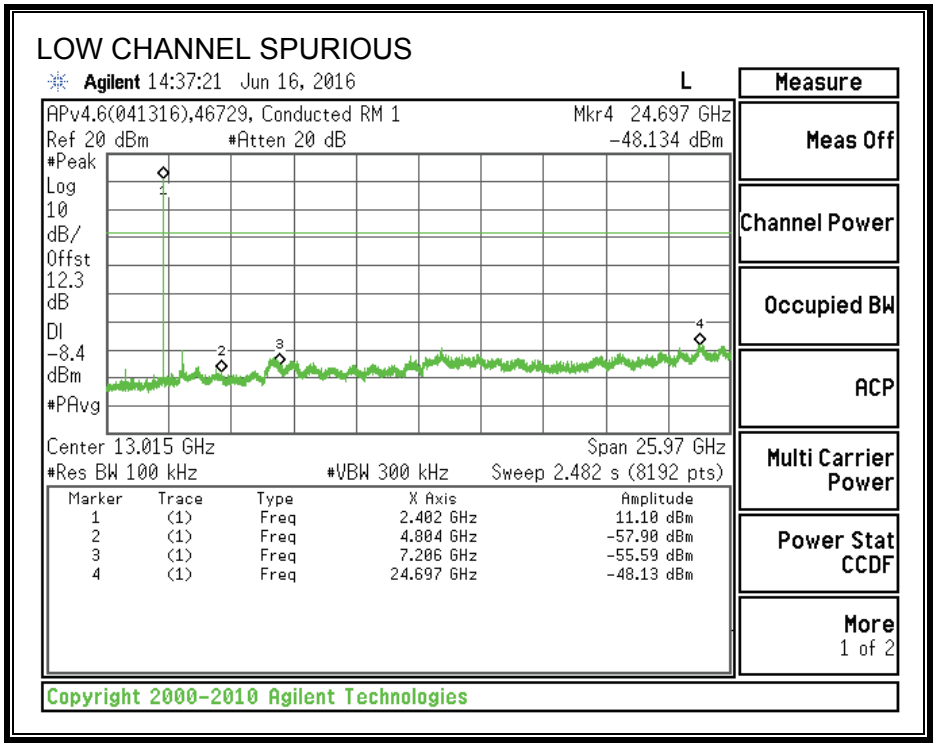
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-16 to 2016-06-17

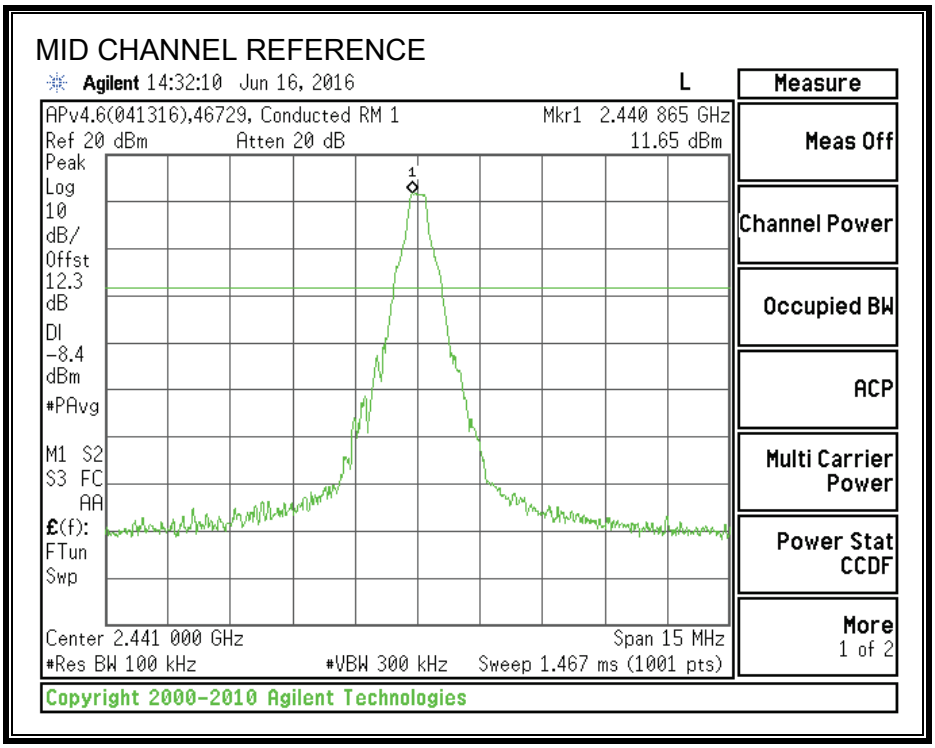
Note – This test was performed at the maximum allowed power setting.

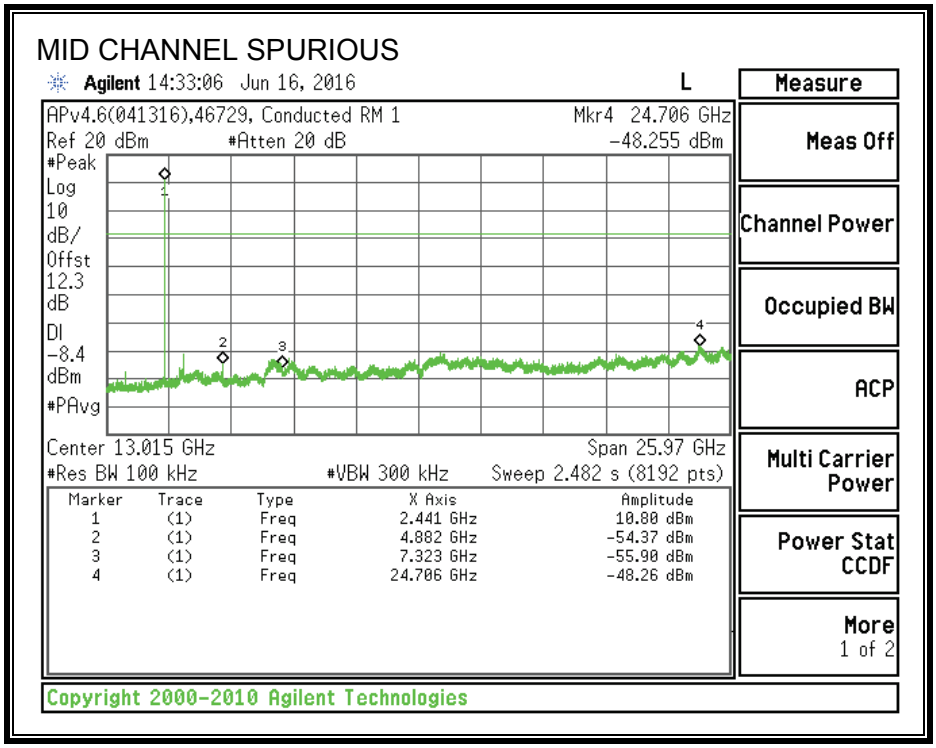
SPURIOUS EMISSIONS, LOW CHANNEL



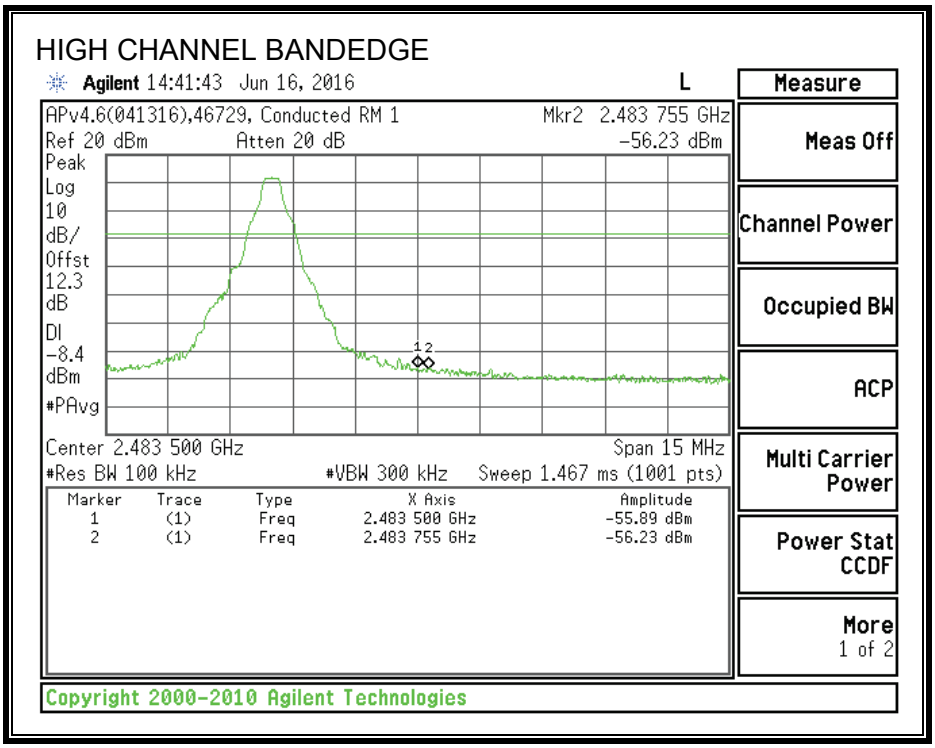


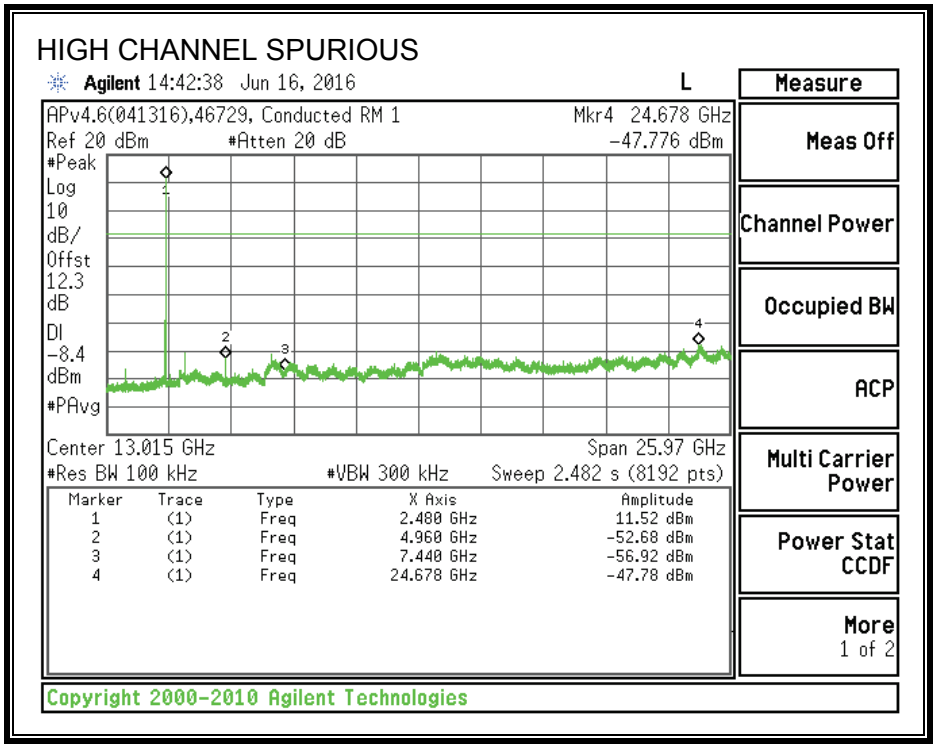
SPURIOUS EMISSIONS, MID CHANNEL





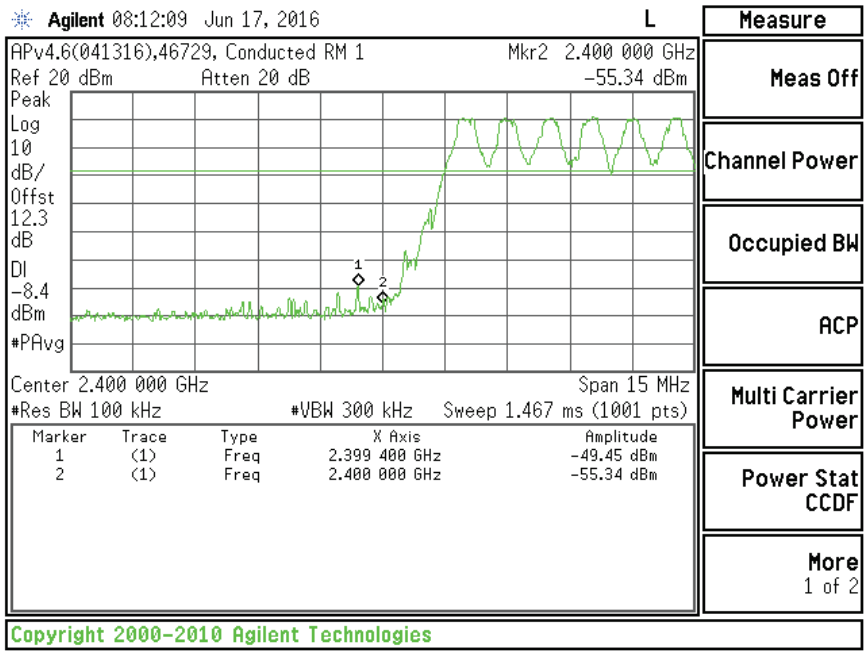
SPURIOUS EMISSIONS, HIGH CHANNEL



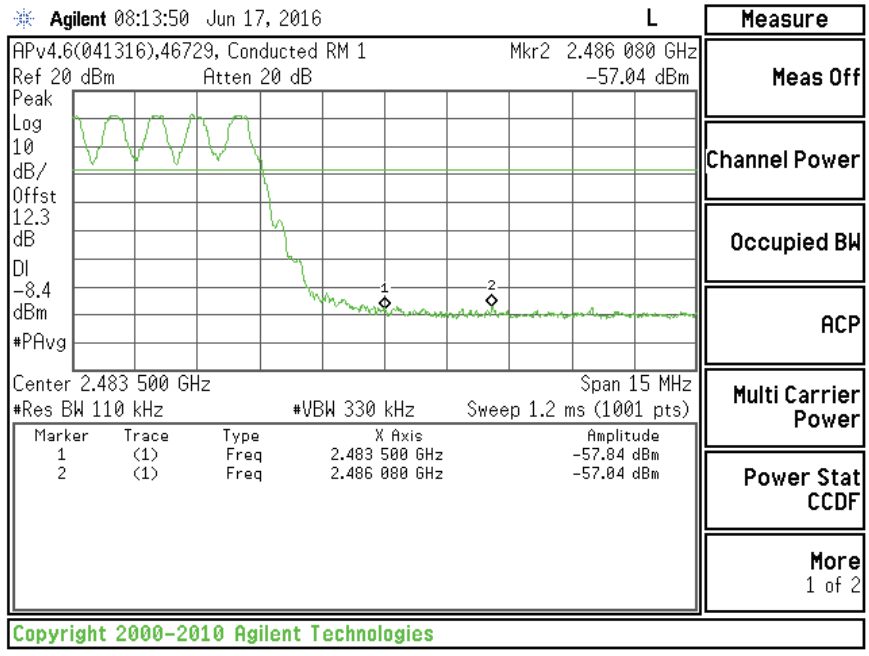


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



8.3. ENHANCED DATA RATE QPSK MODULATION

8.3.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only. Test per FCC §15.247(a)(1); IC RSS-247 5.1 (1), RSS-Gen 6.6.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1-5% of the 20 dB bandwidth and 99% Occupied Bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

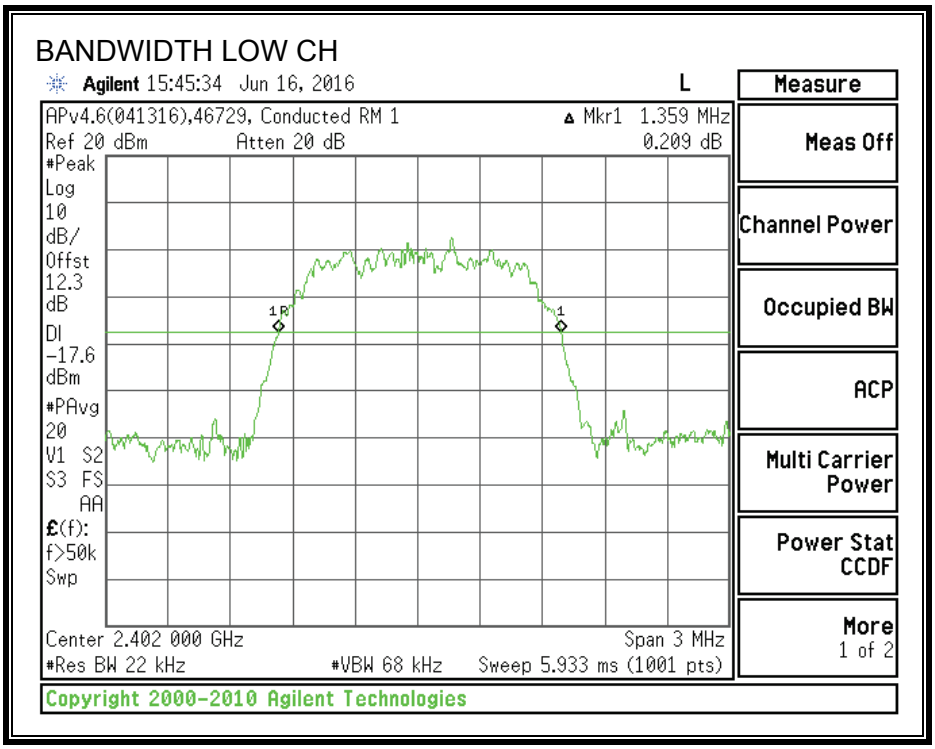
RESULTS

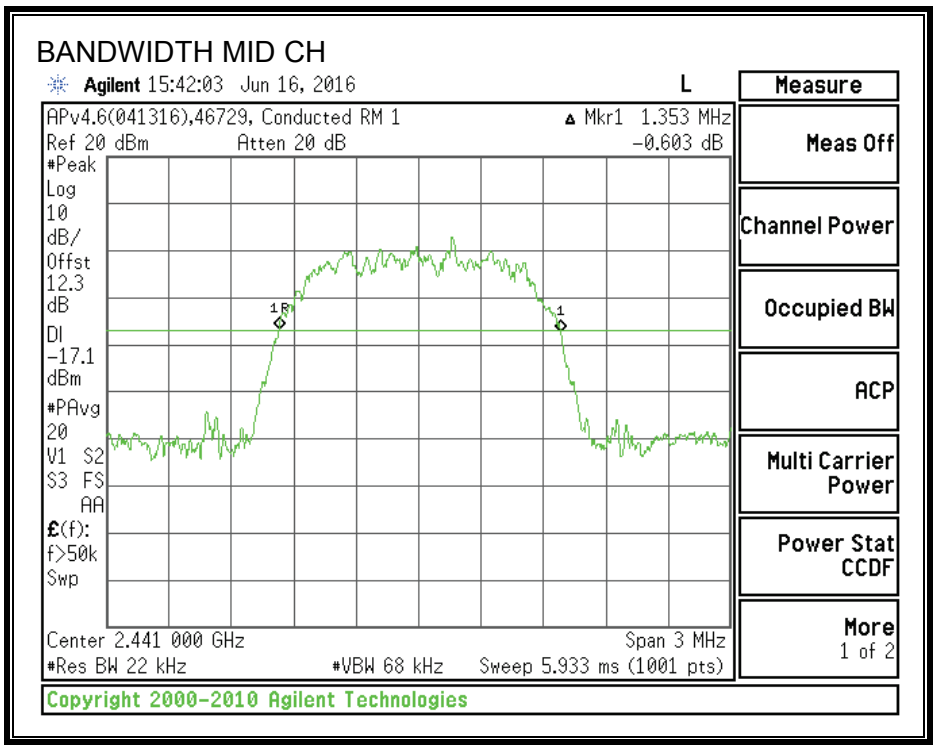
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1359	1217
Middle	2441	1353	1222
High	2480	1350	1223

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-16

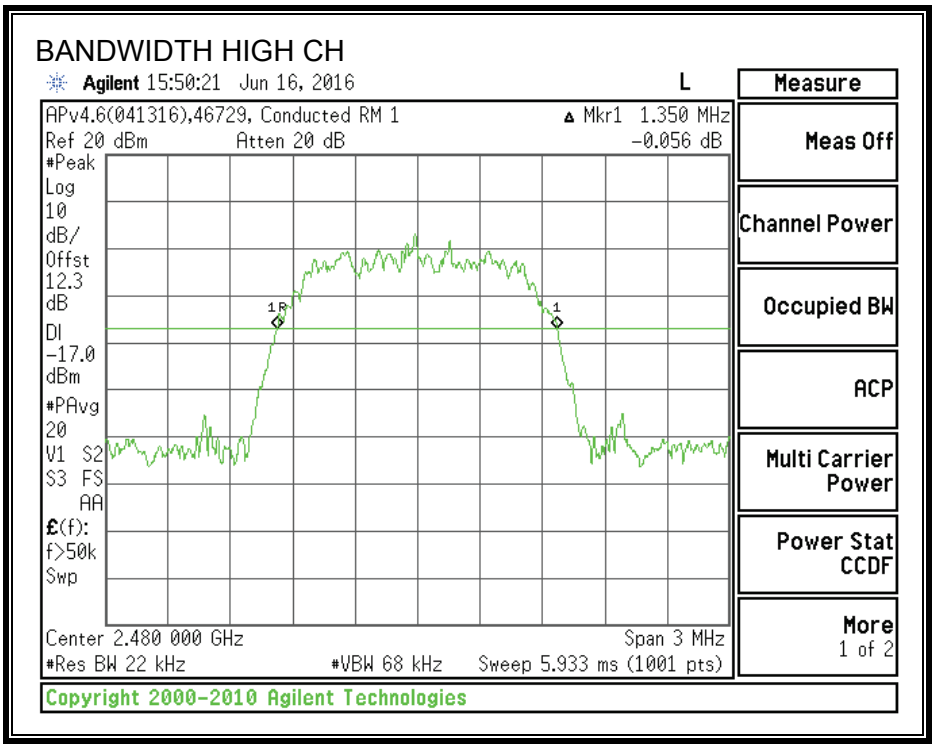
Note – This test was performed at the maximum allowed power setting.

20 dB BANDWIDTH

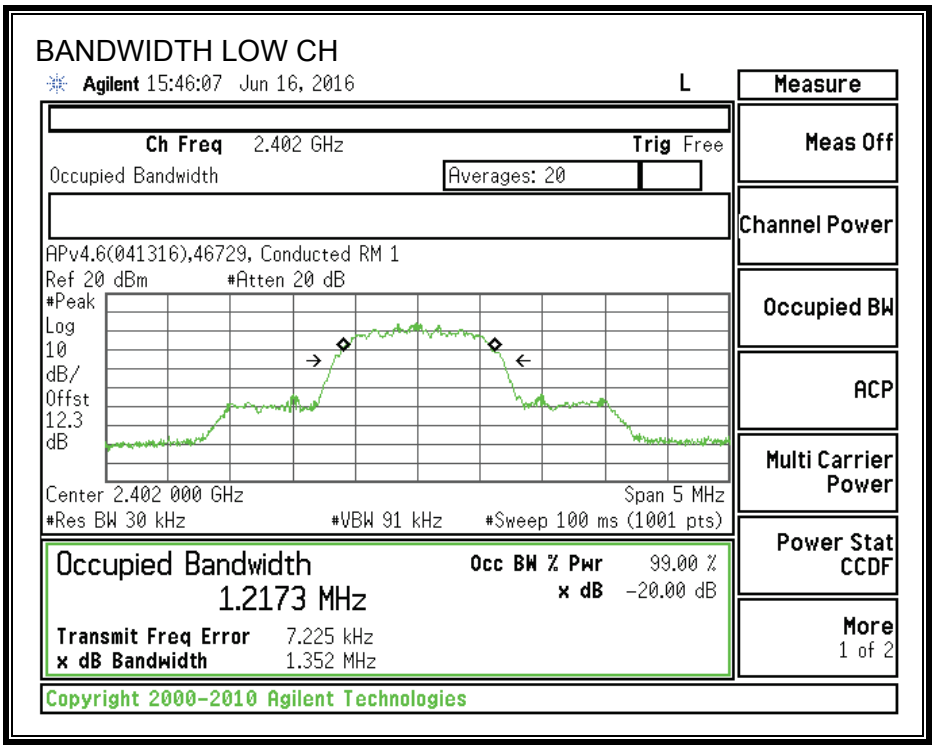


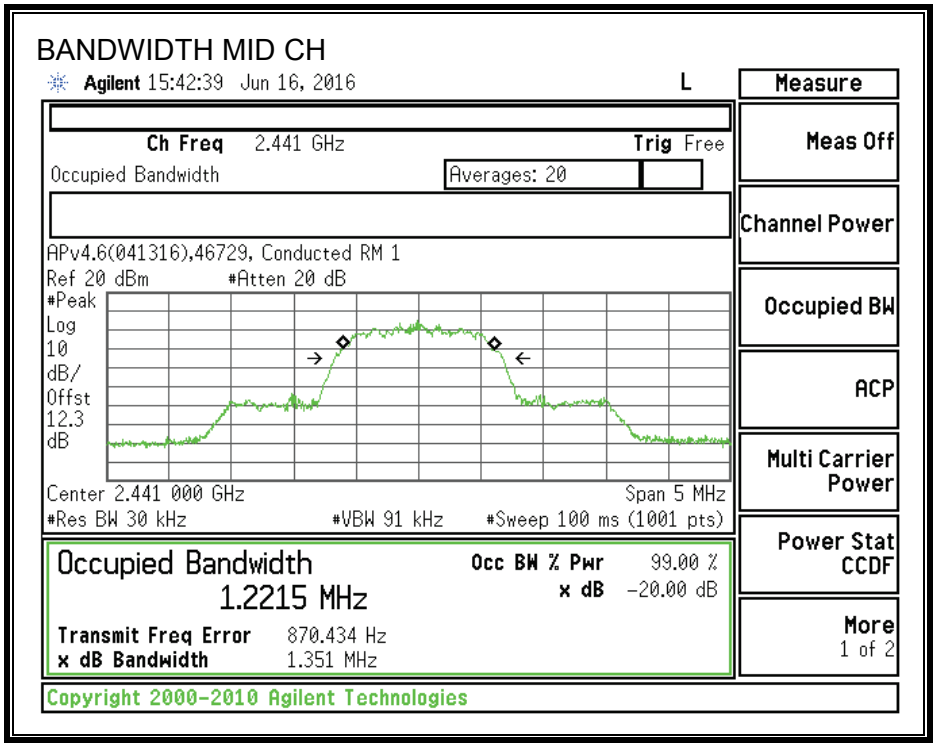


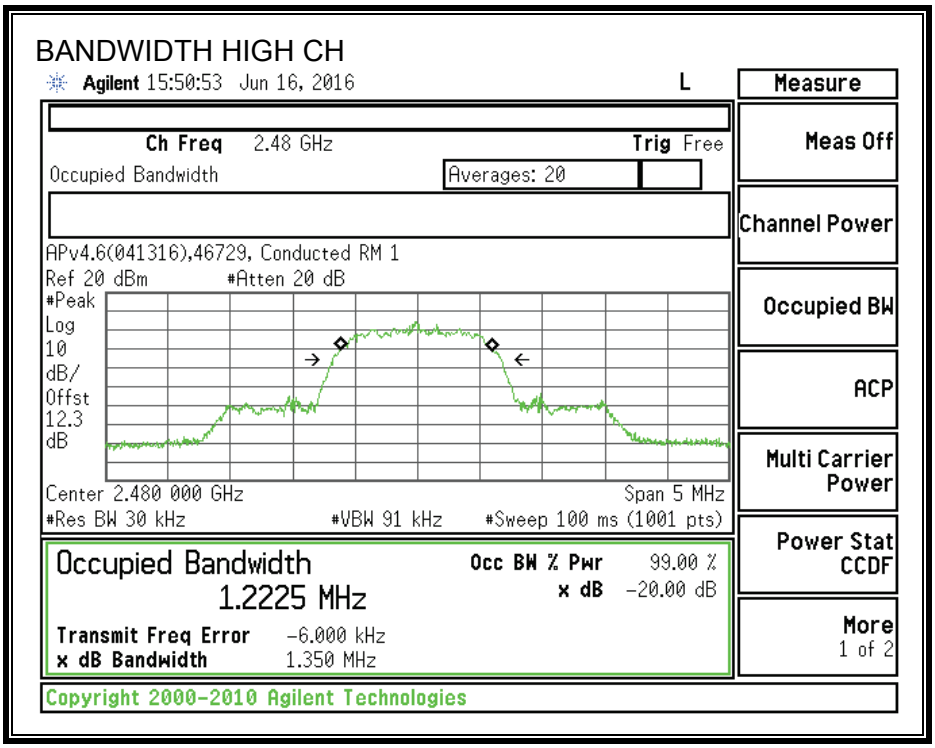
BANDWIDTH HIGH CH



99% BANDWIDTH







8.3.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-247 5.1 (2)

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.

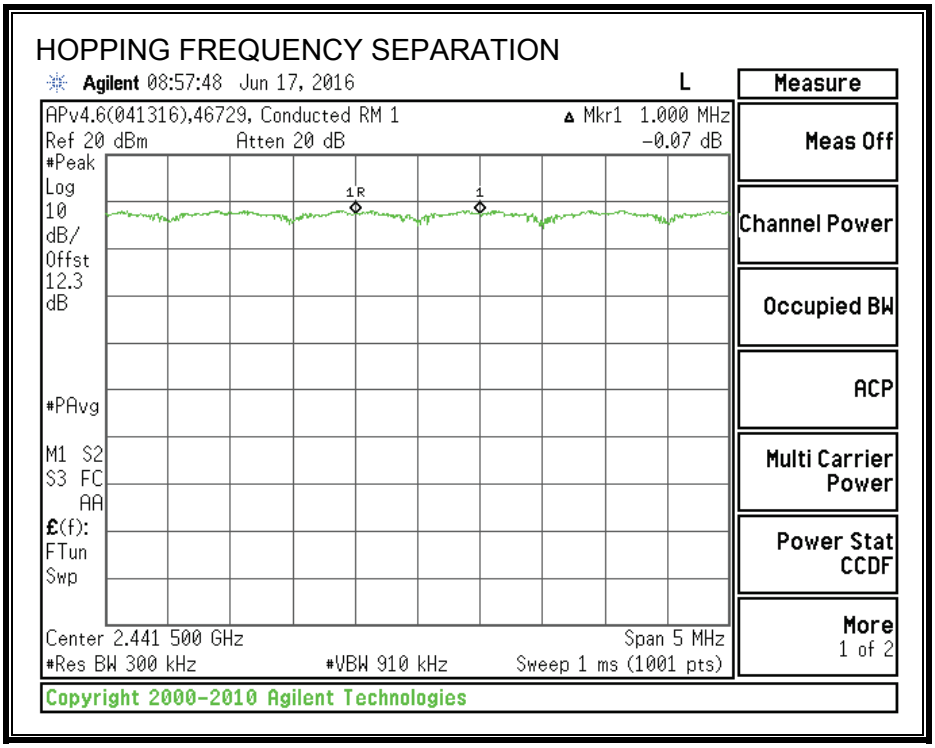
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 3x RBW. The sweep time is coupled.

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

Note – This test was performed at the maximum allowed power setting.

RESULTS



Ch. A (MHz)	Ch. B (MHz)	Ch. 1 to Ch. 2 Sep. (MHz)	Max. 20 dB BW (MHz)	2/3 20 dB Margin (MHz)	Margin (MHz)
2441	2442	1.000	1.359	0.906	-0.094

Note – The channel hopping separation of 1MHz is less than the 20 dB bandwidth (approx. 1.3 MHz). However, the output power is less than 125 mW and the channel separation is greater than 2/3 the 20 dB bandwidth (approx. 900 kHz).

8.3.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-247 5.1 (4)

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 for visibility of the entire span. Then, smaller spans are set to more clearly identify the channels. The RBW is set to 30% of the channel spacing (approx. 300 kHz). The analyzer is set to Max Hold.

RESULTS

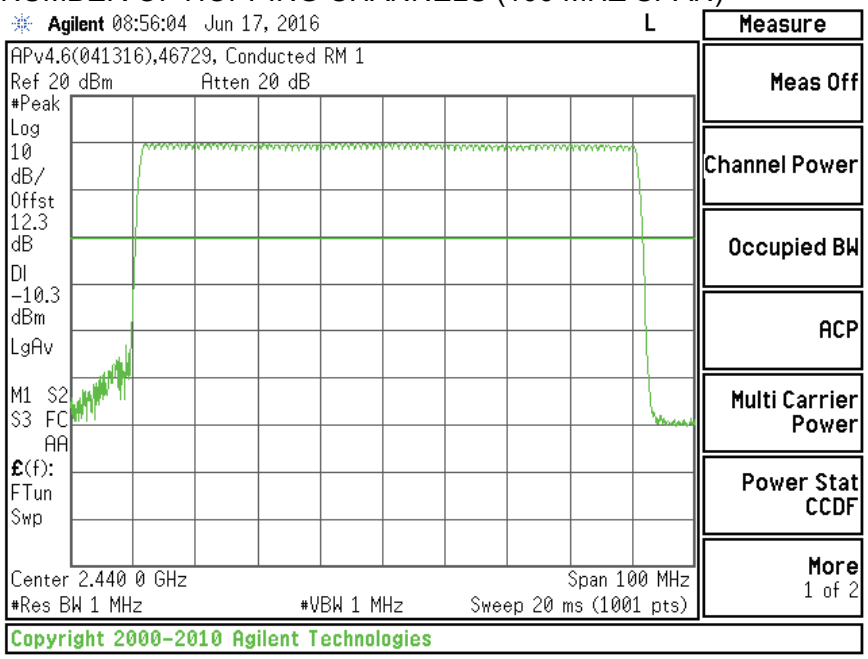
Normal Mode: 79 Channels observed.

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

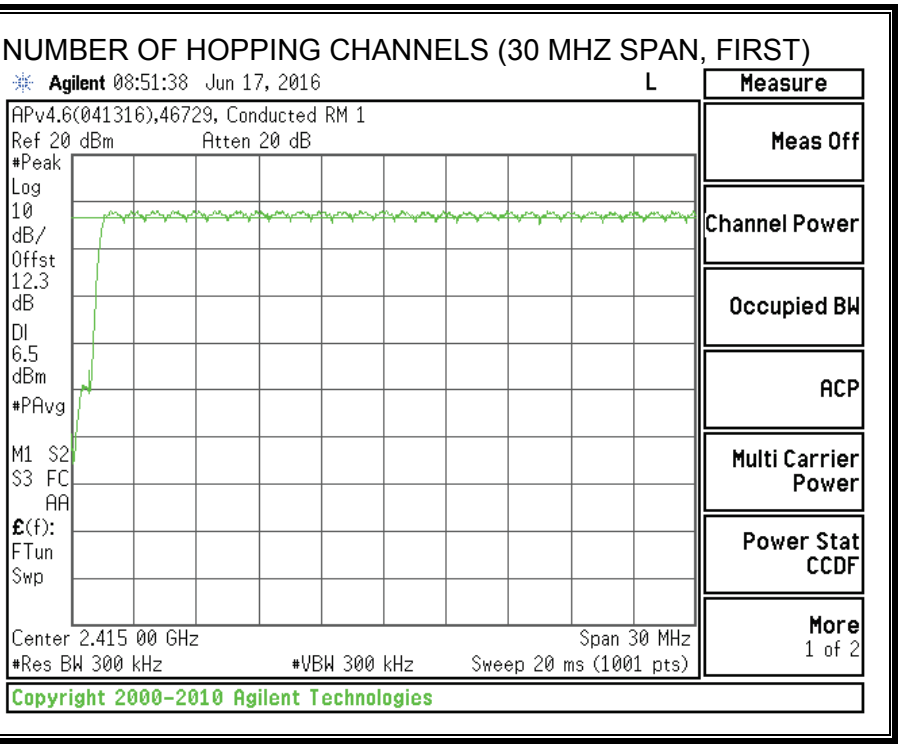
Note – This test was performed at the maximum allowed power setting.

NUMBER OF HOPPING CHANNELS

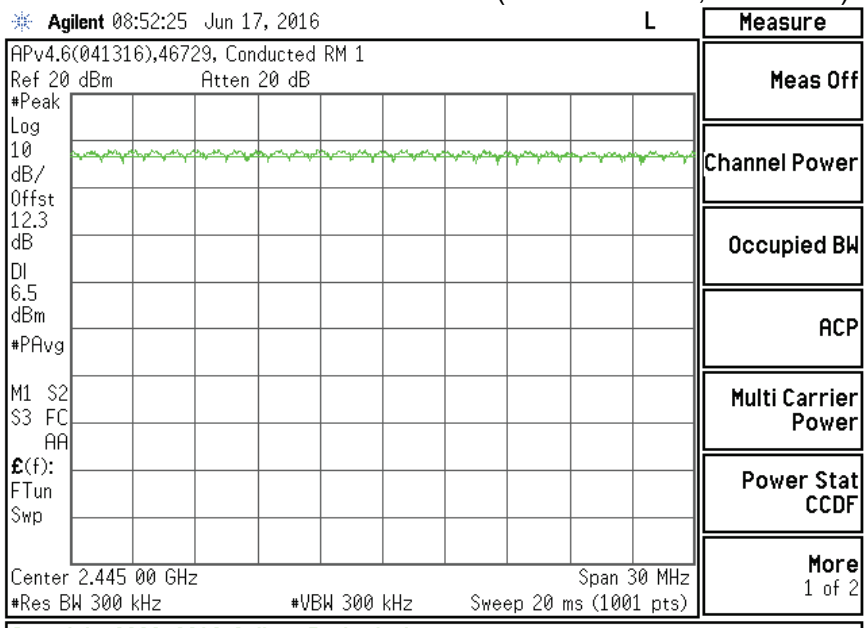
NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



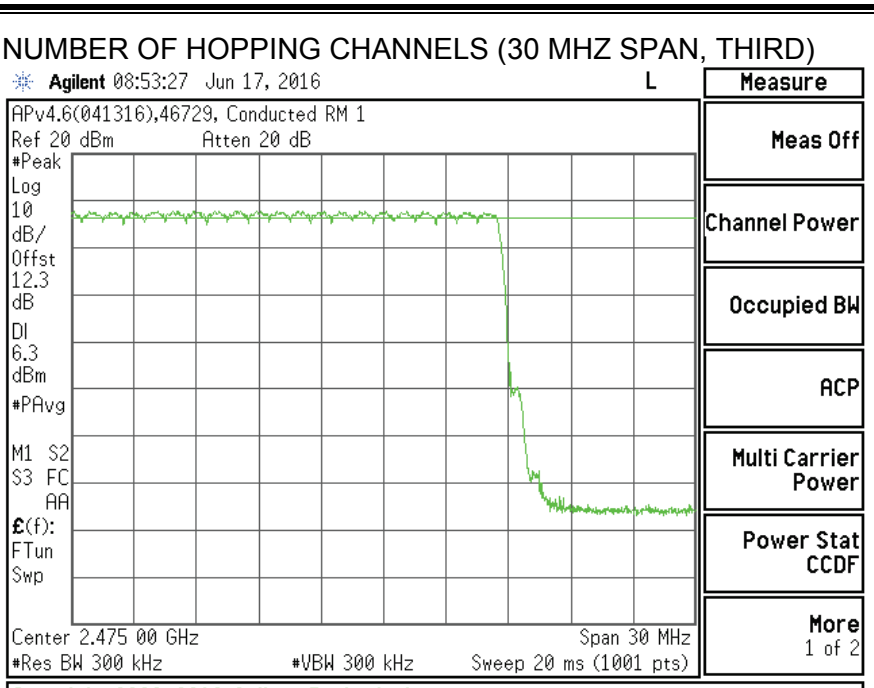
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD)



8.3.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-247 5.1 (4)

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 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 (31.6/3) * (# of pulses in 3 s) * pulse width.

RESULTS

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

DQPSK Mode

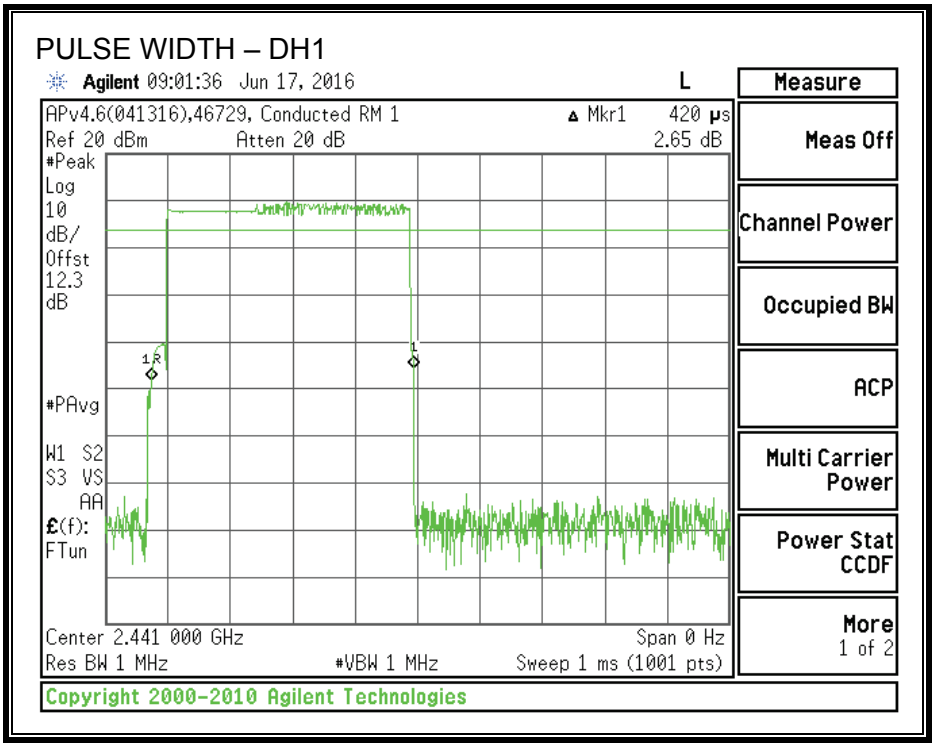
DH Packet	Pulse Width (msec)	Number of Pulses in 3 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.42	30	0.133	0.4	-0.267
DH3	1.67	17	0.299	0.4	-0.101
DH5	2.916	12	0.369	0.4	-0.031

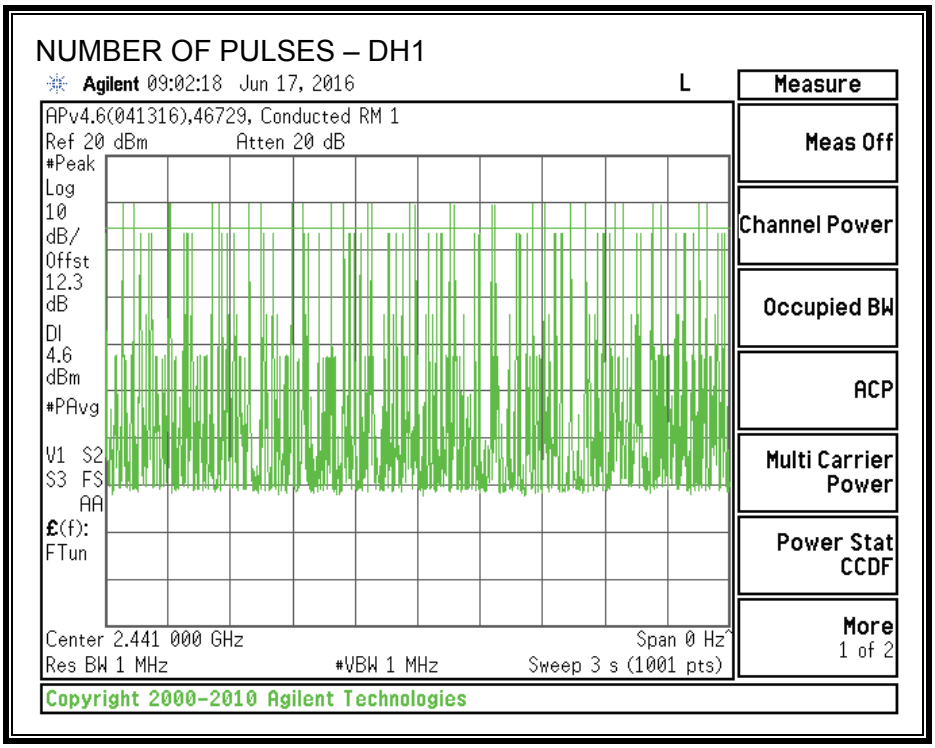
Note: for AFH (DQPSK) mode, please refer to the results of AFH (GFSK) mode; the channel selection and hopping rate are the same for both EDR and Basic Rate operation, data for Basic Rate on page 30 demonstrates compliance with channel occupancy when AFH is employed.

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

Note – This test was performed at the maximum allowed power setting.

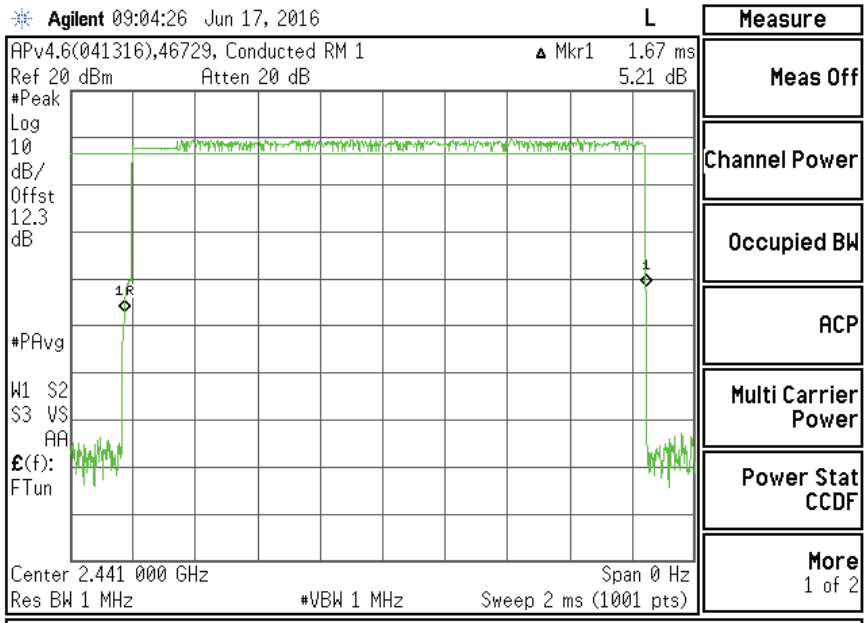
DH1



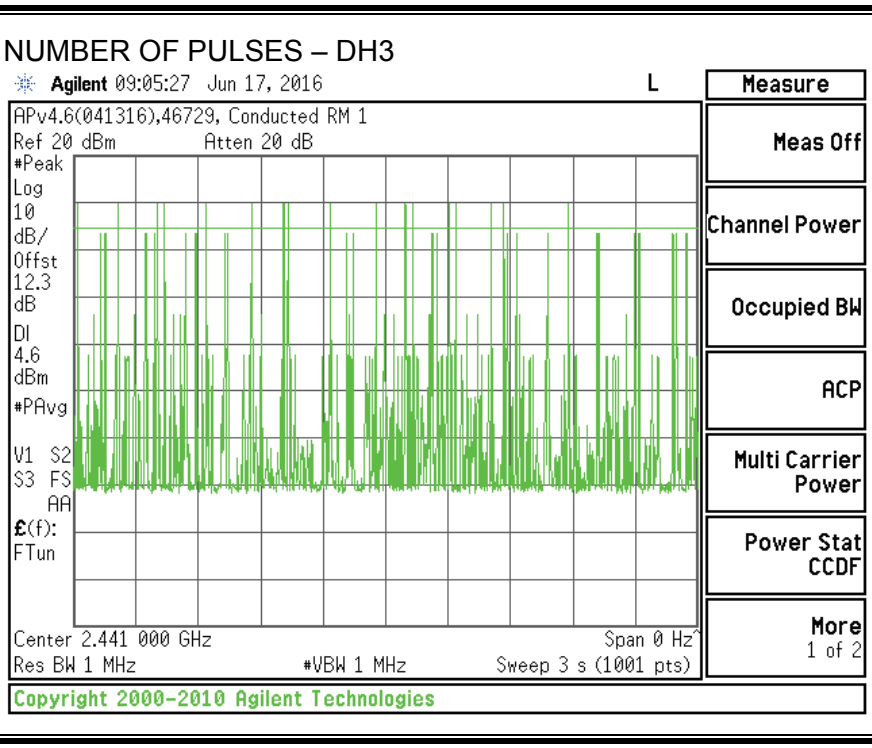


DH3

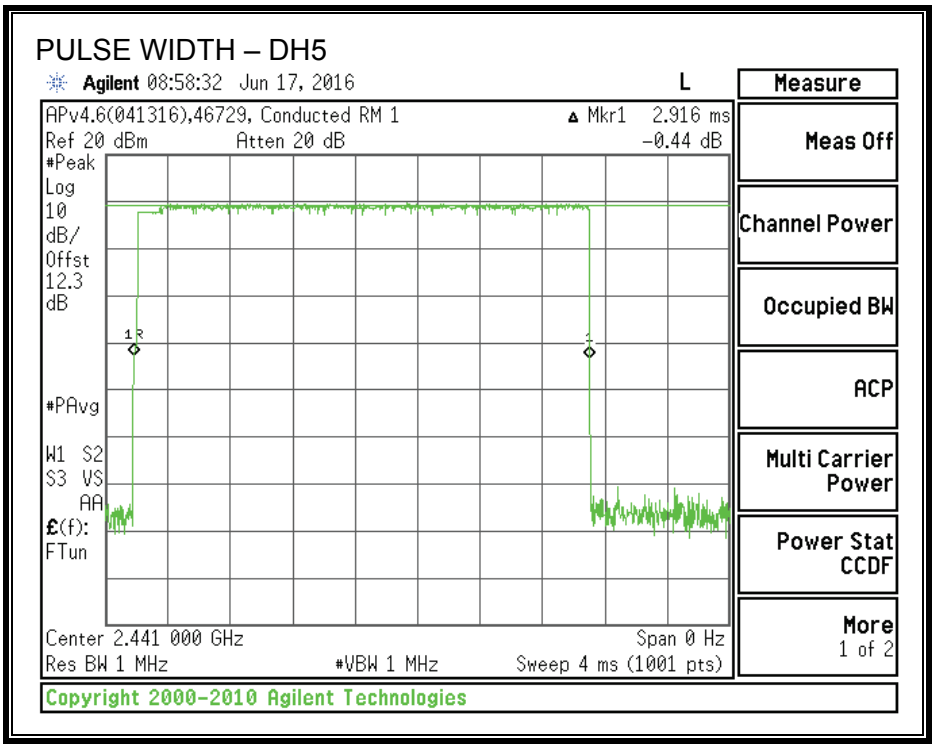
PULSE WIDTH – DH3

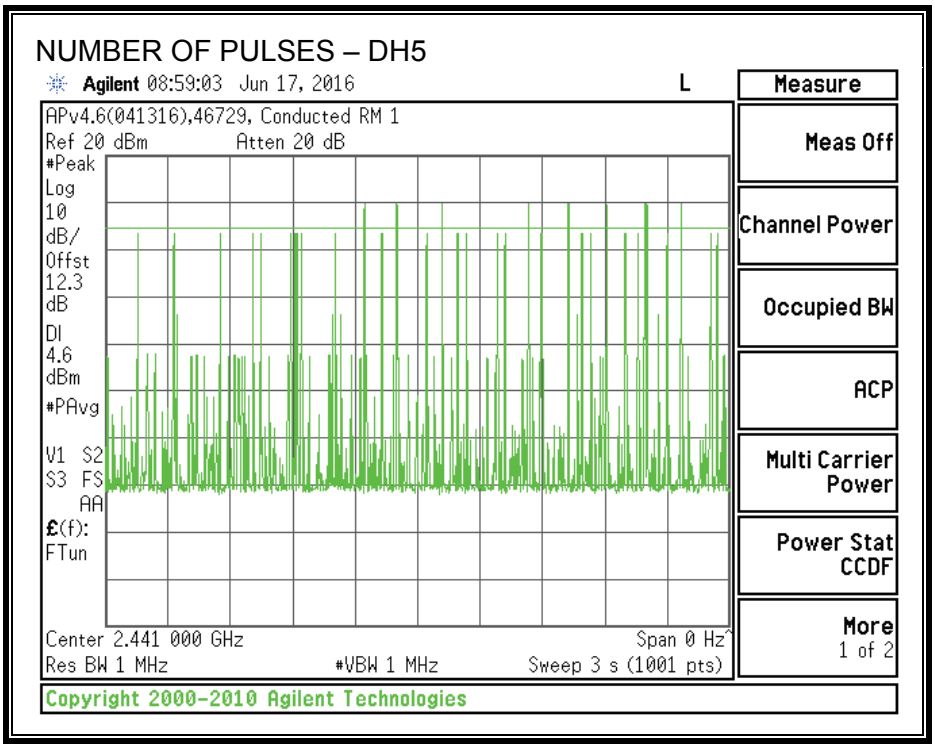


NUMBER OF PULSES – DH3



PULSE WIDTH – DH5





8.3.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

RSS-247 5.4 (2)

For frequency hopping systems operating in the band 2400-2483.5 MHz and employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

For DQPSK mode, the channel separation was limited to 2/3 the 20 dB bandwidth. Therefore, the output power was limited to 125 mW.

Channel	Frequency (MHz)	Output Power (dBm)	Directional Gain (dBi)	Limit (dBm)	Margin (dB)
Low	2402	5.50	0.60	21	-15.50
Middle	2441	5.79	0.60	21	-15.21
High	2480	5.21	0.60	21	-15.79

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

Note – This test was performed at a reduced power setting.

8.3.6. 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 12.04 dB (including 10 dB pad and 2.04 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	2.78
Middle	2441	3.01
High	2480	2.43

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

Note – This test was performed at a reduced power setting.

8.3.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

IC RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

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.

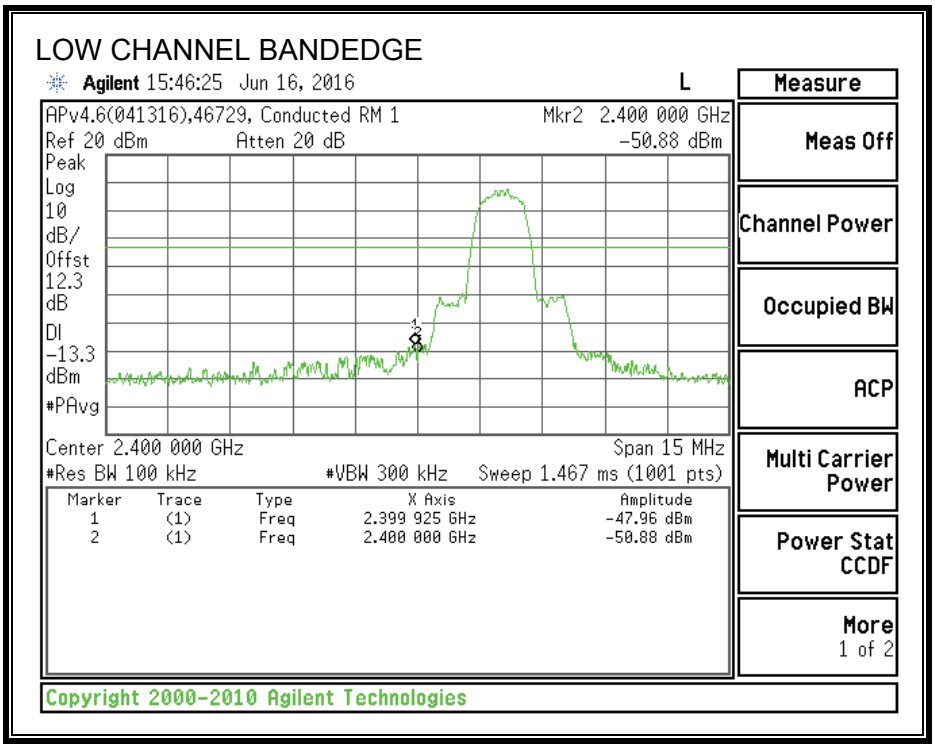
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

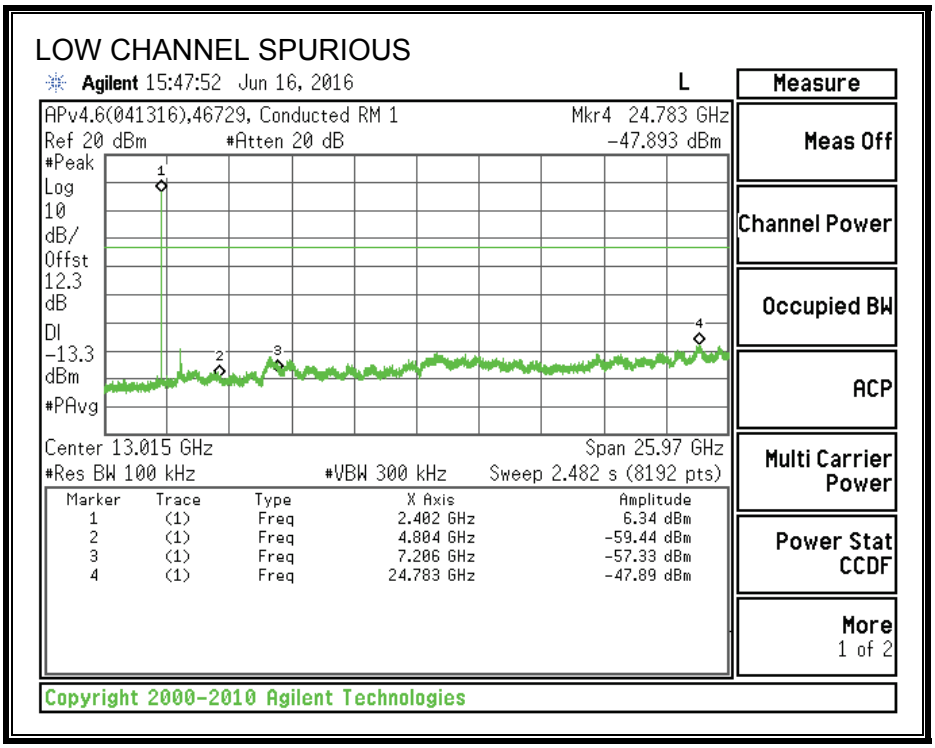
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-16 to 2016-06-17

Note – This test was performed at the maximum allowed power setting.

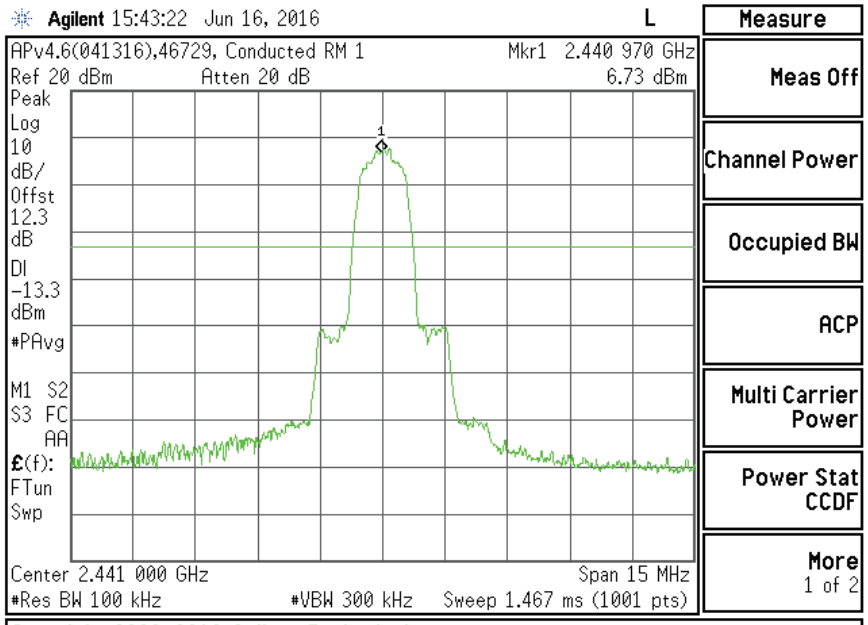
SPURIOUS EMISSIONS, LOW CHANNEL



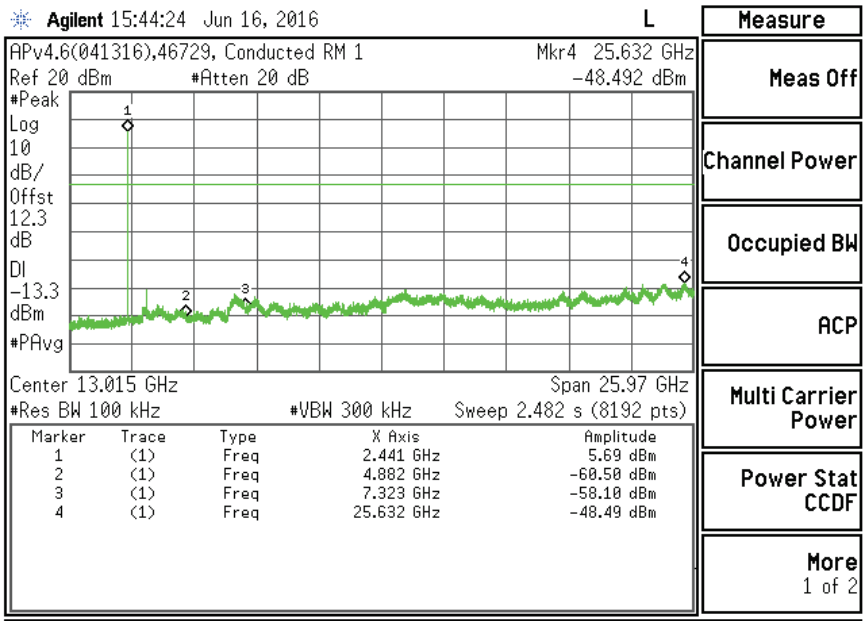


SPURIOUS EMISSIONS, MID CHANNEL

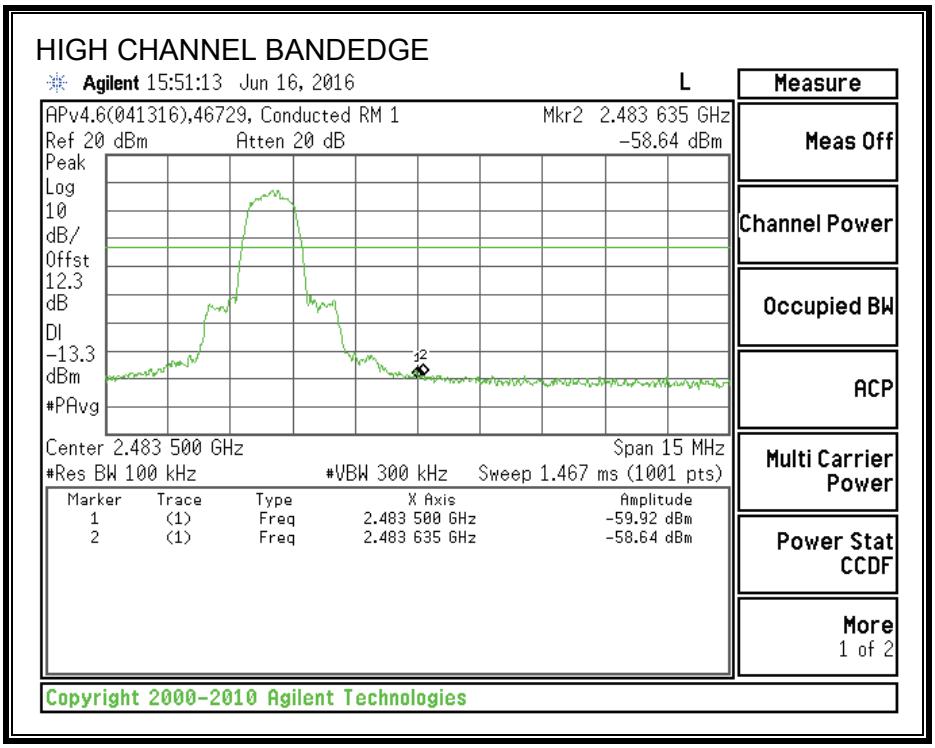
MID CHANNEL REFERENCE

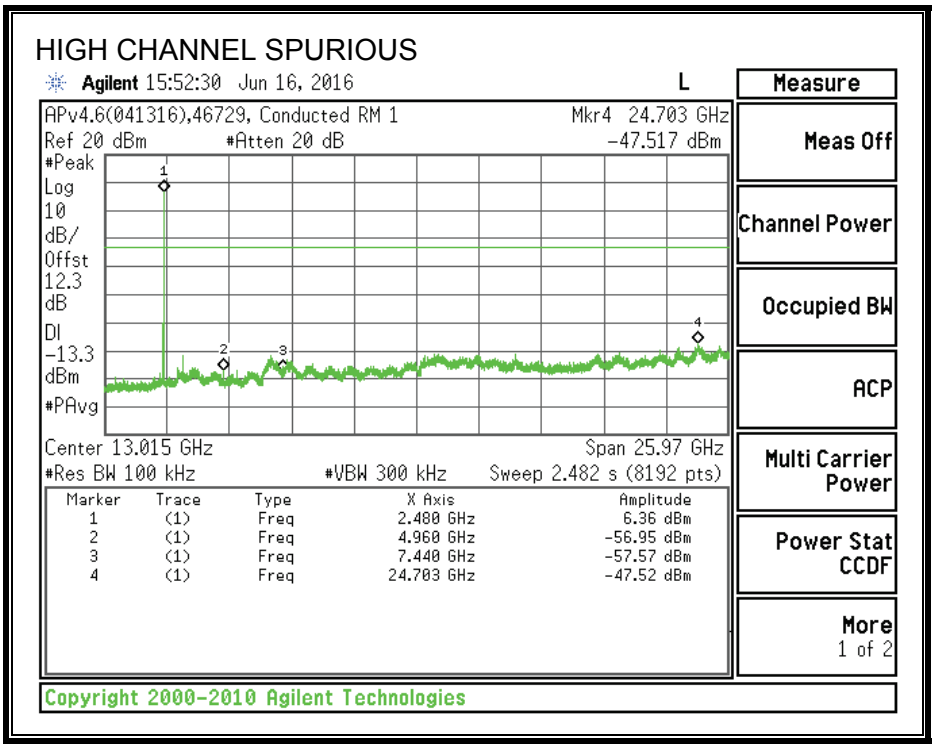


MID CHANNEL SPURIOUS



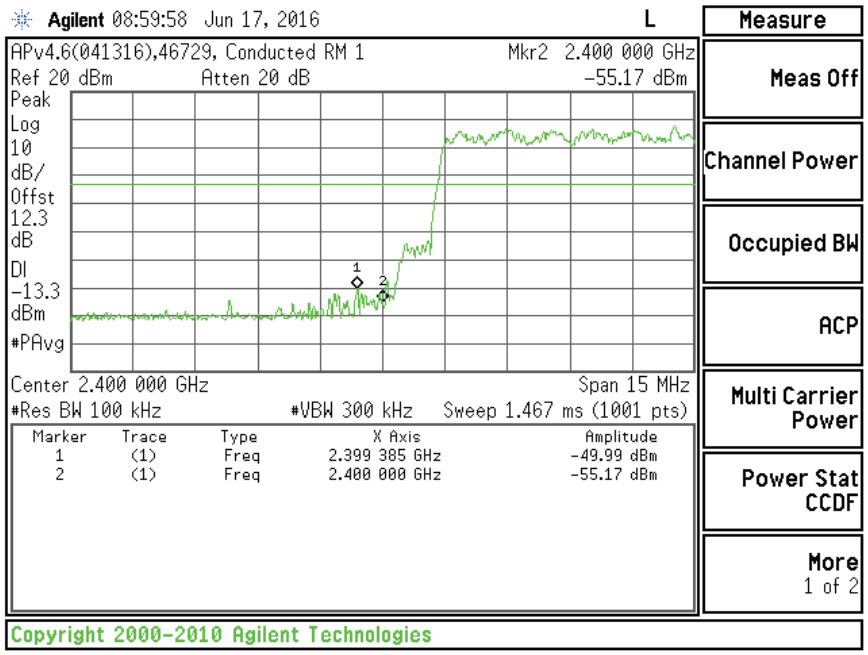
SPURIOUS EMISSIONS, HIGH CHANNEL



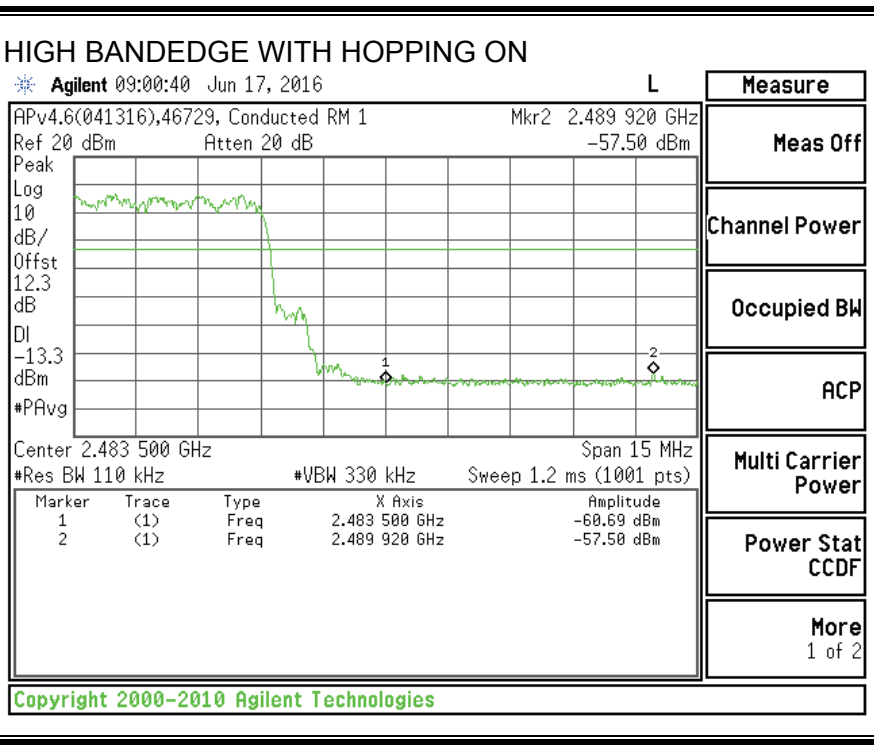


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



8.4. ENHANCED DATA RATE 8PSK MODULATION

8.4.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only. Test per FCC §15.247(a)(1); IC RSS-247 5.1 (1), RSS-Gen 6.6.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1-5% of the 20 dB bandwidth and 99% Occupied Bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

RESULTS

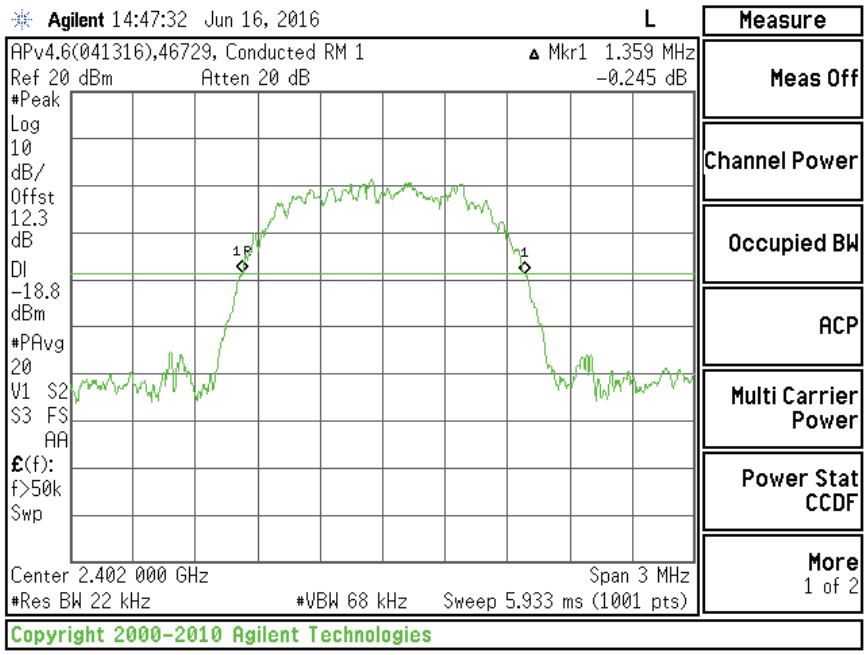
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1359	1223
Middle	2441	1356	1221
High	2480	1344	1217

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-16

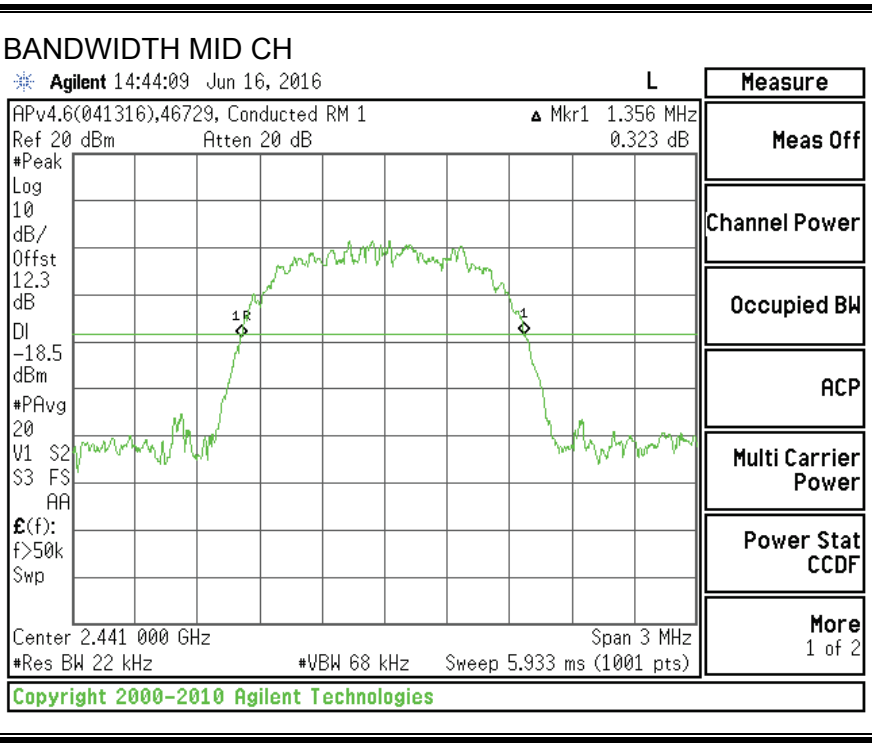
Note – This test was performed at the maximum allowed power setting.

20 dB BANDWIDTH

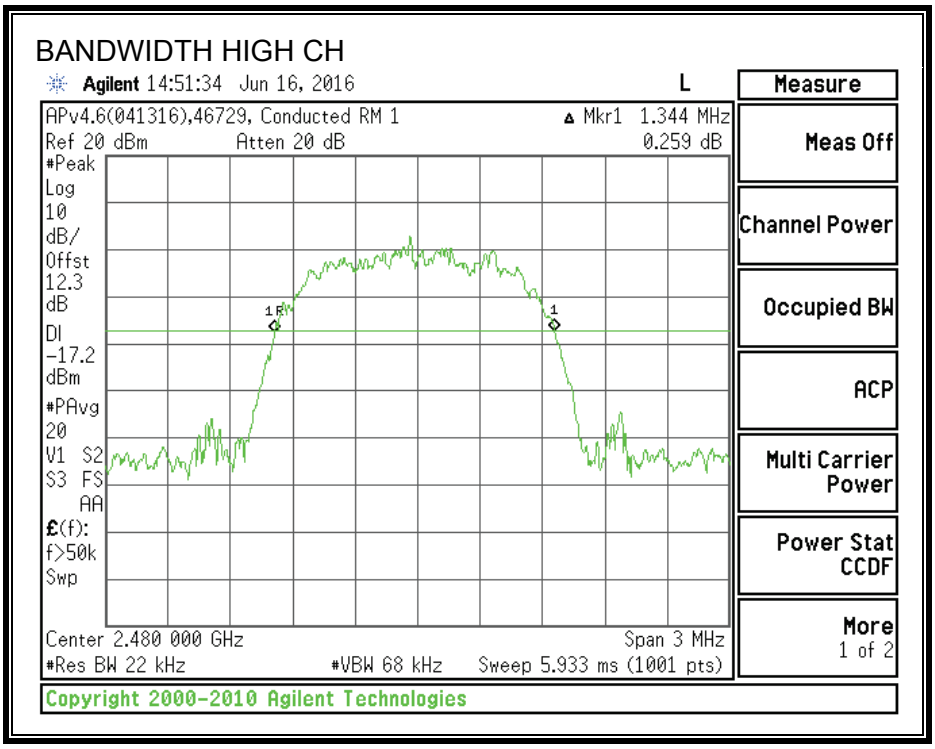
BANDWIDTH LOW CH



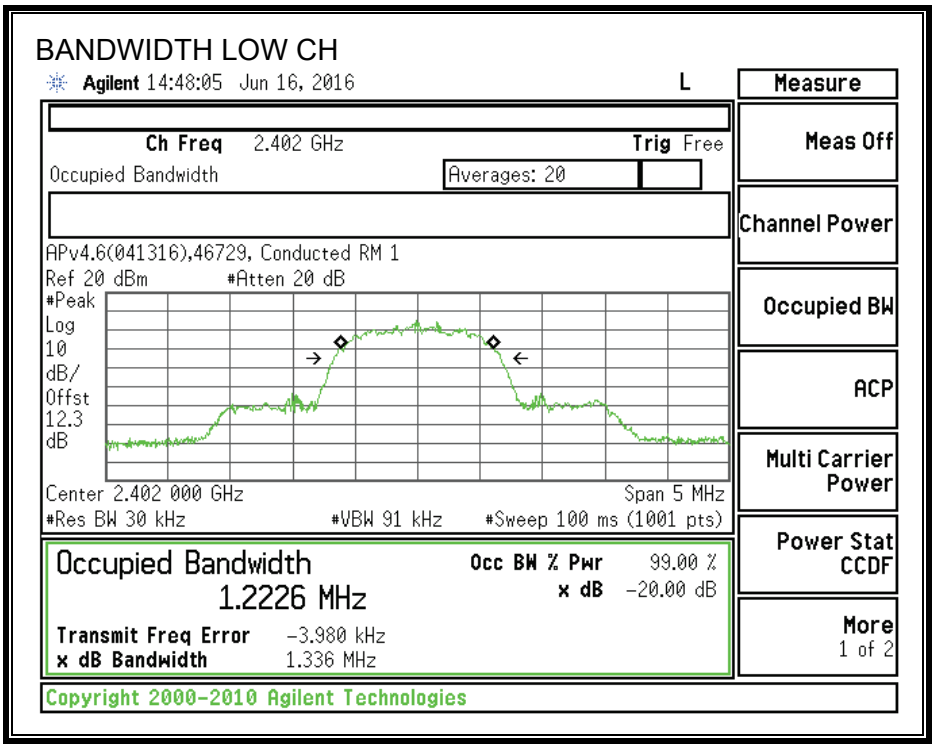
BANDWIDTH MID CH

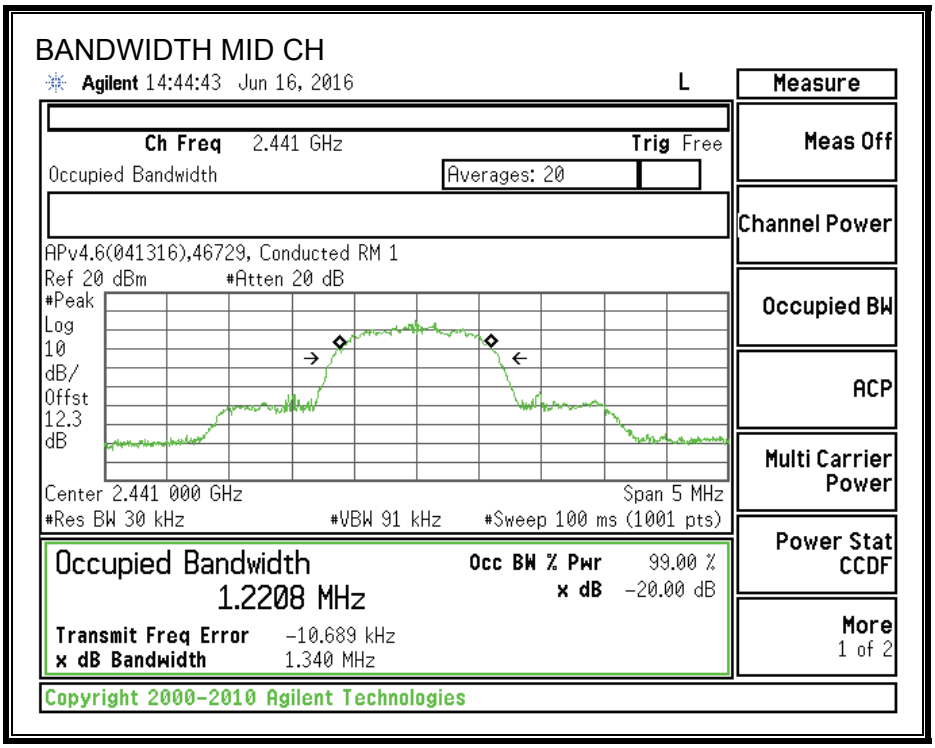


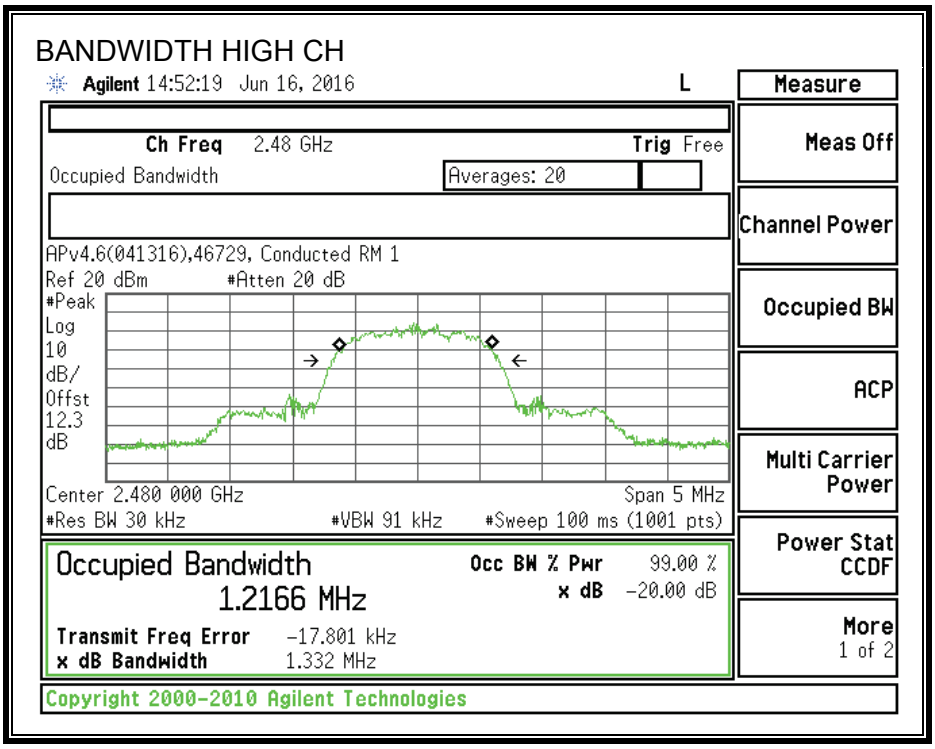
BANDWIDTH HIGH CH



99% BANDWIDTH







8.4.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-247 5.1 (2)

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 3x RBW. The sweep time is coupled.

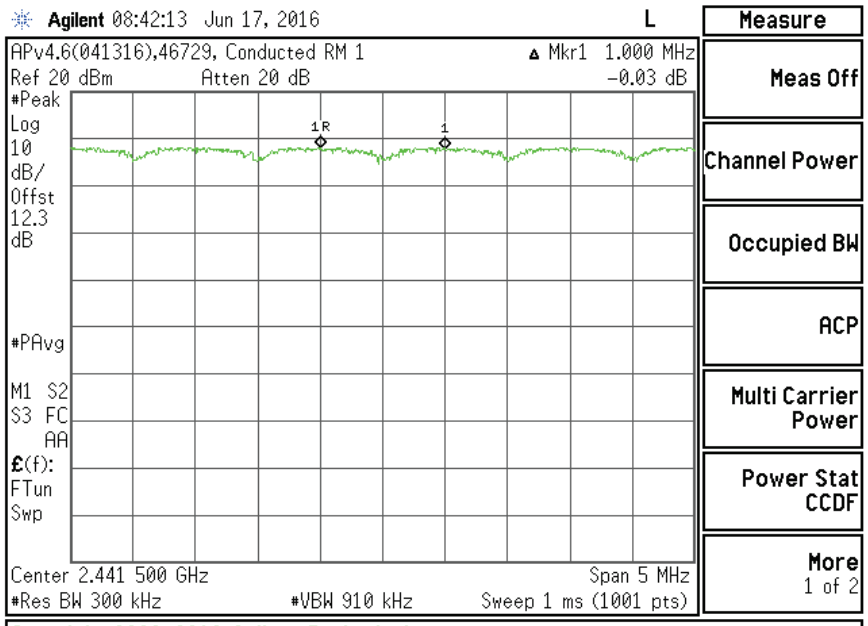
Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

Note – This test was performed at the maximum allowed power setting.

RESULTS

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

HOPPING FREQUENCY SEPARATION



Ch. A (MHz)	Ch. B (MHz)	Ch. 1 to Ch. 2 Sep. (MHz)	Max. 20 dB BW (MHz)	2/3 20 dB Margin (MHz)	Margin (MHz)
2441	2442	1.000	1.359	0.906	-0.094

Note – The channel hopping separation of 1MHz is less than the 20 dB bandwidth (approx. 1.3 MHz). However, the output power is less than 125 mW and the channel separation is greater than 2/3 the 20 dB bandwidth (approx. 900 kHz).

8.4.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-247 5.1 (4)

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 for visibility of the entire span. Then, smaller spans are set to more clearly identify the channels. The RBW is set to 30% of the channel spacing (approx. 300 kHz). The analyzer is set to Max Hold.

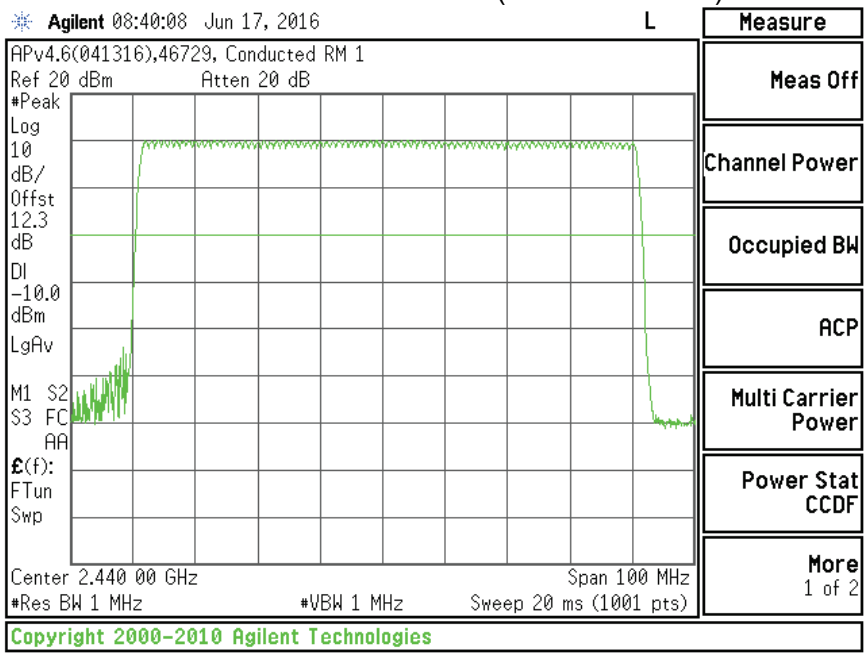
RESULTS

Normal Mode: 79 Channels observed.

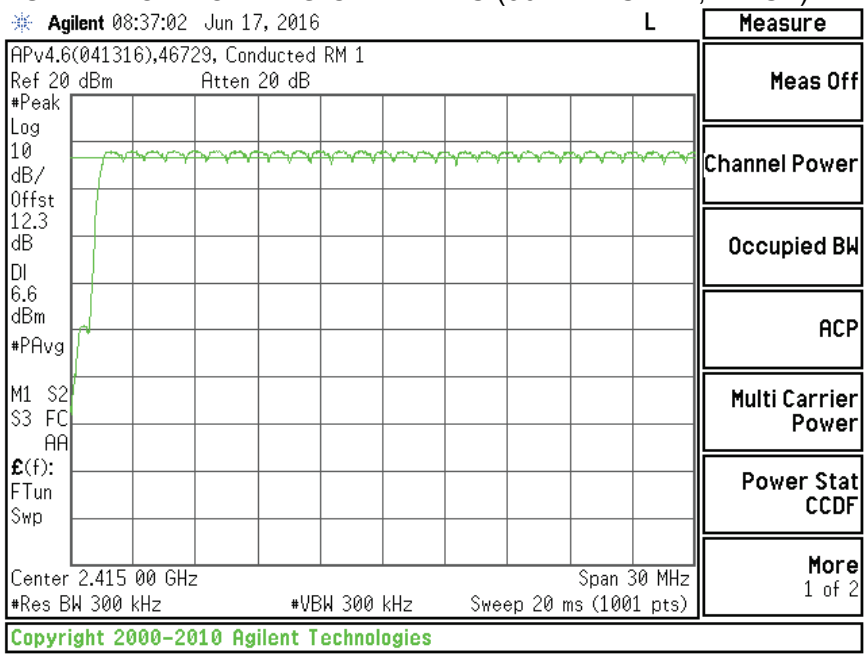
Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

Note – This test was performed at the maximum allowed power setting.

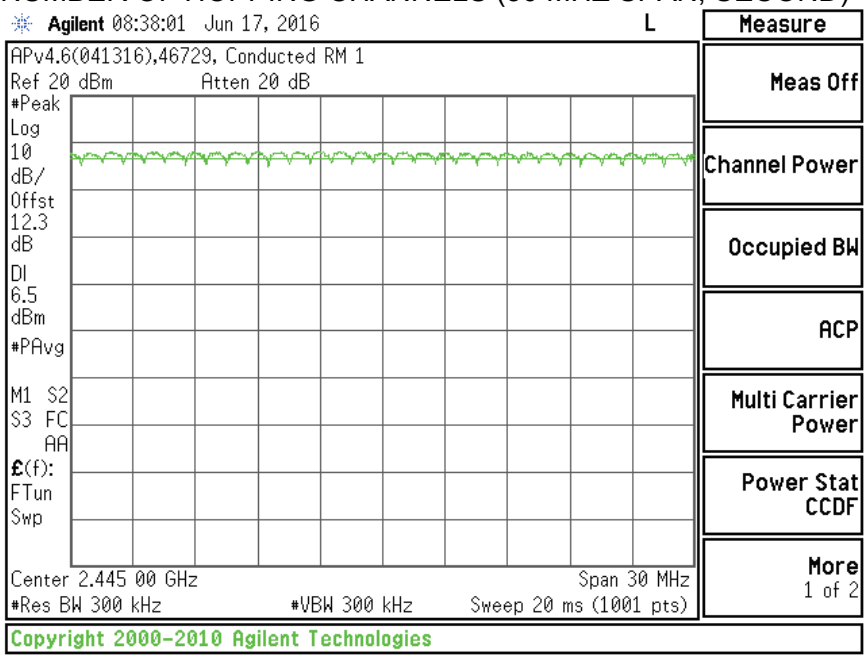
NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



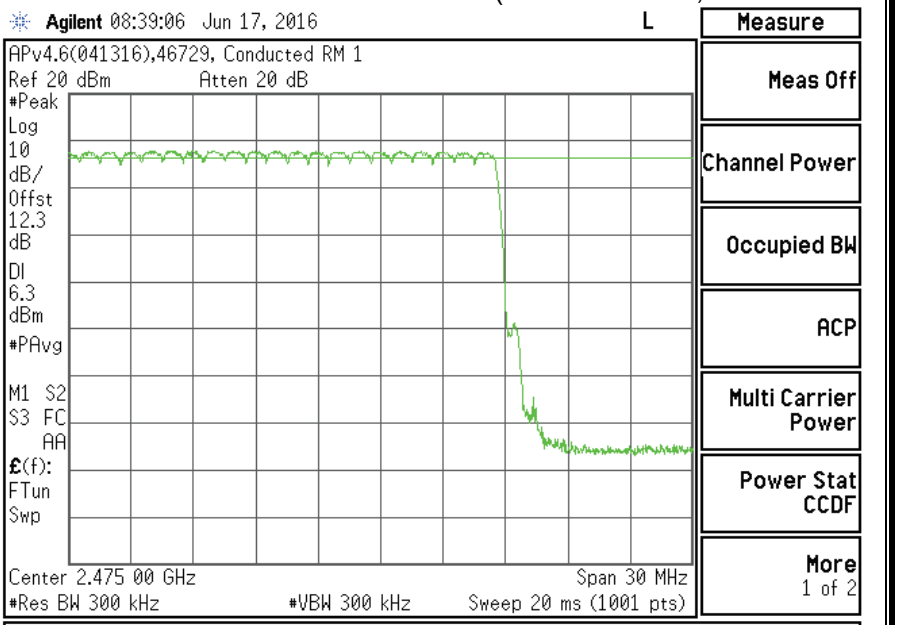
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD



8.4.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-247 5.1 (4)

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 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 (31.6/3) * (# of pulses in 3 s) * pulse width.

RESULTS

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

8PSK (EDR) Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.42	31	0.137	0.4	-0.263
DH3	1.67	17	0.299	0.4	-0.101
DH5	2.92	5	0.154	0.4	-0.246

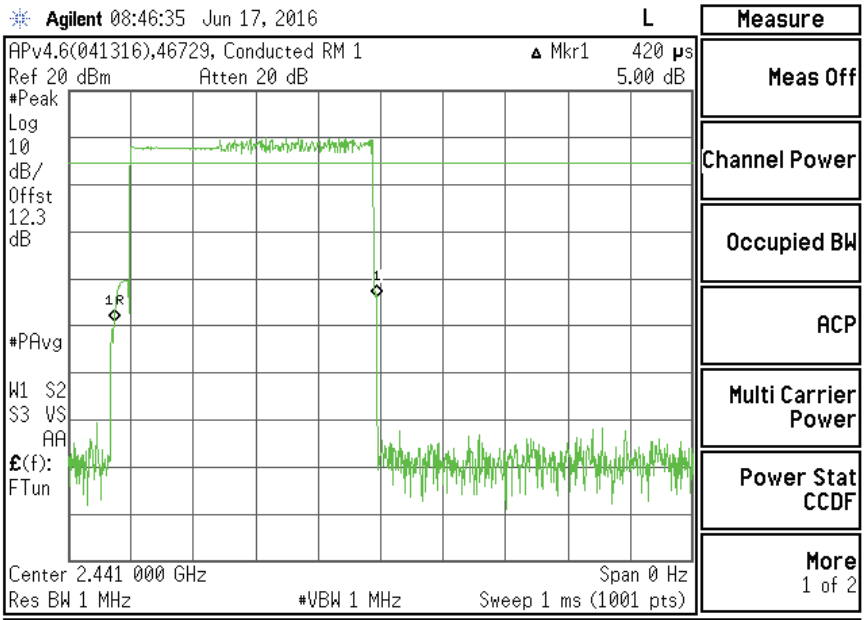
Note: for AFH (8PSK) mode, please refer to the results of AFH (GFSK) mode; the channel selection and hopping rate are the same for both EDR and Basic Rate operation, data for Basic Rate on page 30 demonstrates compliance with channel occupancy when AFH is employed.

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17, 2016-06-23

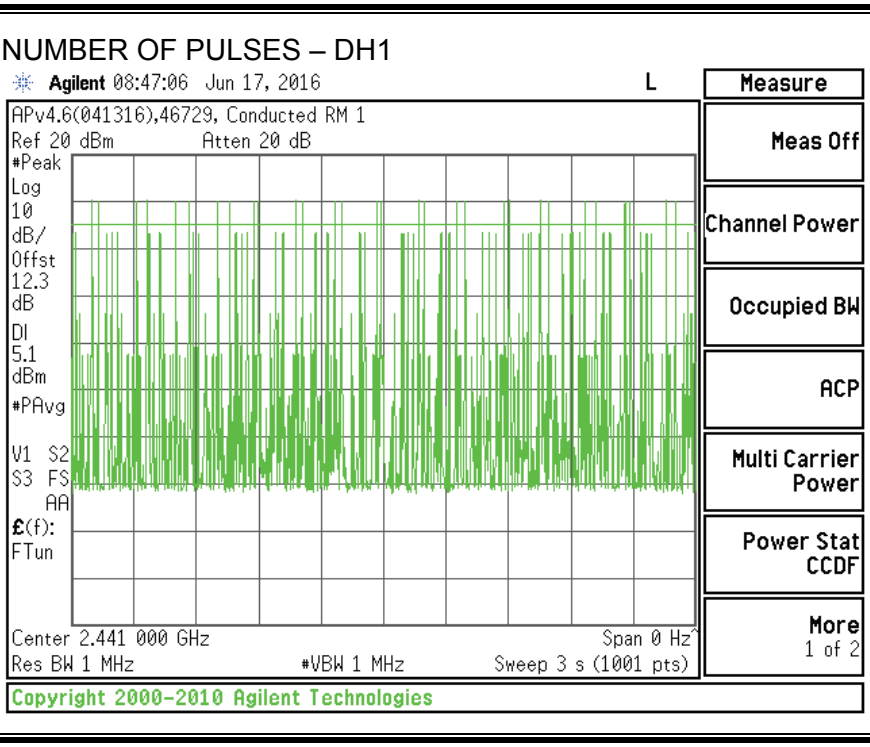
Note – This test was performed at the maximum allowed power setting.

DH1

PULSE WIDTH – DH1

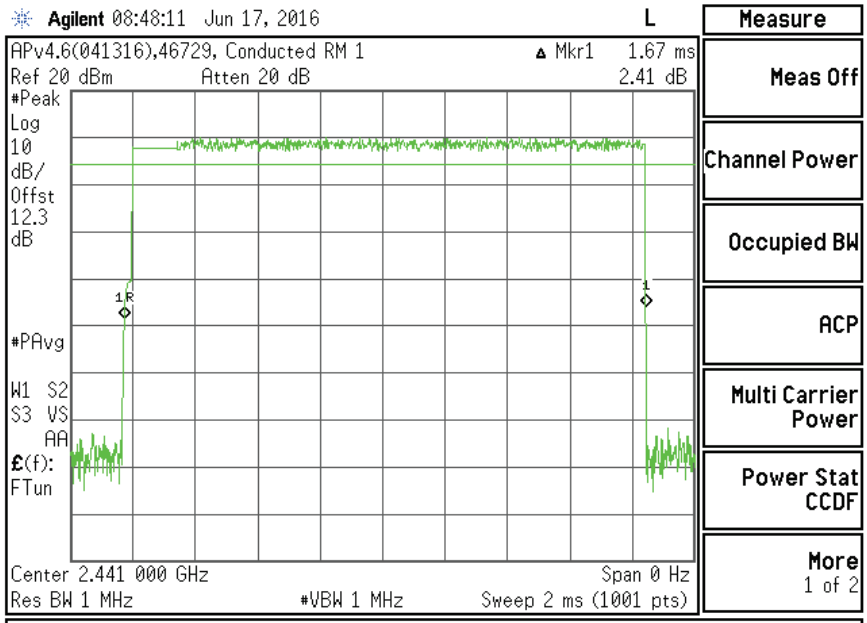


NUMBER OF PULSES – DH1

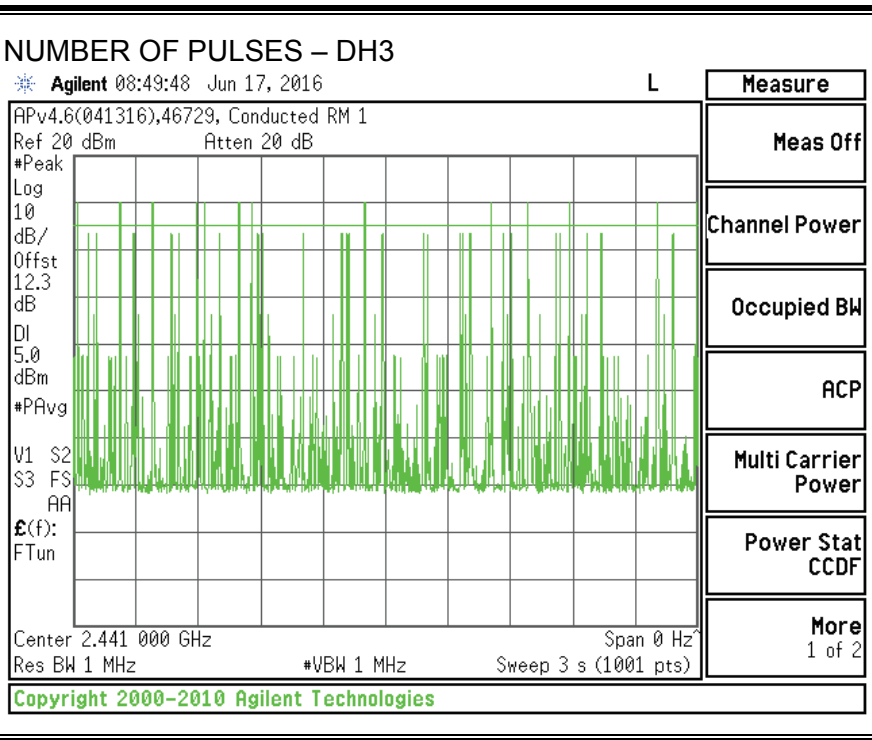


DH3

PULSE WIDTH – DH3

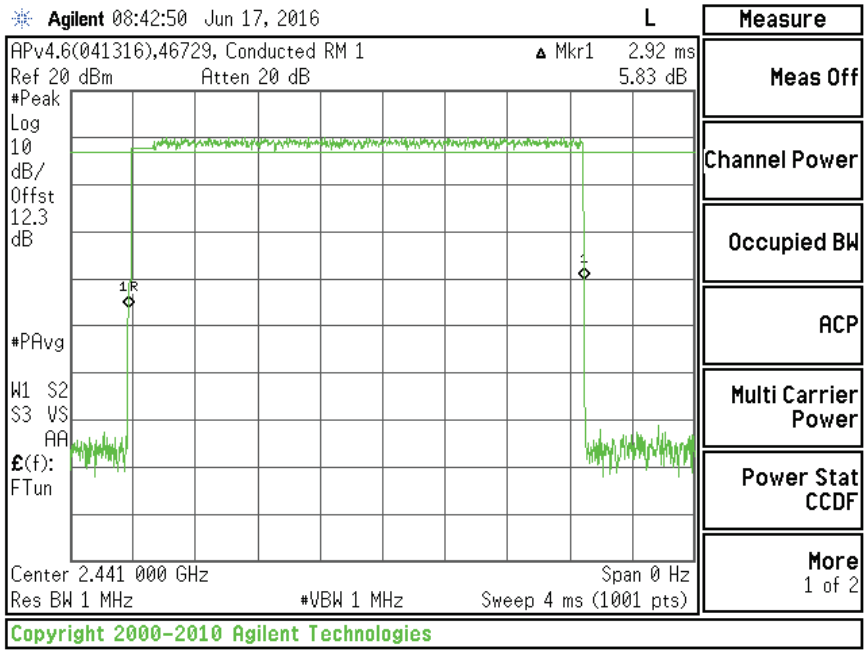


NUMBER OF PULSES – DH3

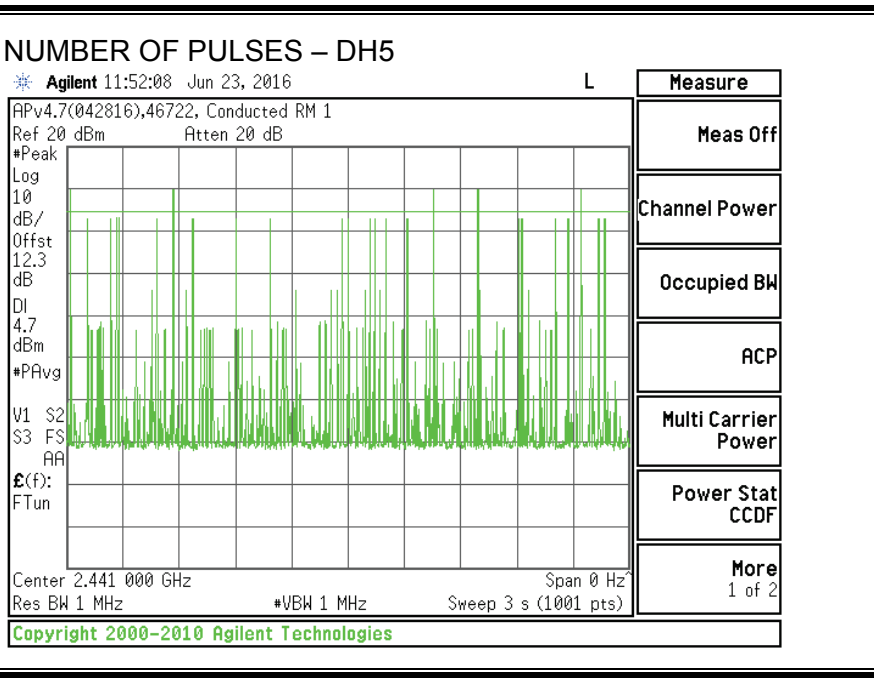


DH5

PULSE WIDTH – DH5



NUMBER OF PULSES – DH5



8.4.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

RSS-247 5.4 (2)

For frequency hopping systems operating in the band 2400-2483.5 MHz and employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

For 8DPSK mode, the channel separation was limited to 2/3 the 20 dB bandwidth. Therefore, the output power was limited to 125 mW.

Channel	Frequency (MHz)	Output Power (dBm)	Directional Gain (dBi)	Limit (dBm)	Margin (dB)
Low	2402	5.83	0.60	21	-15.17
Middle	2441	6.02	0.60	21	-14.98
High	2480	5.46	0.60	21	-15.54

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

Note – This test was performed at a reduced power setting.

8.4.6. 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 12.04 dB (including 10 dB pad and 2.04 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	2.82
Middle	2441	2.95
High	2480	2.46

Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-17

Note – This test was performed at a reduced power setting.

8.4.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

IC RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

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.

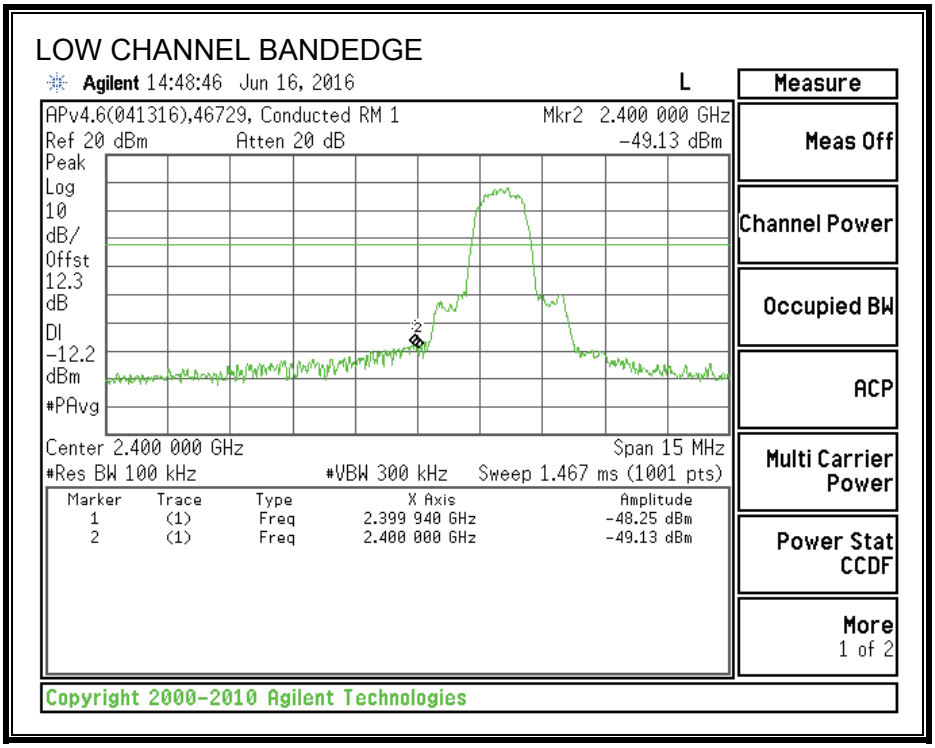
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

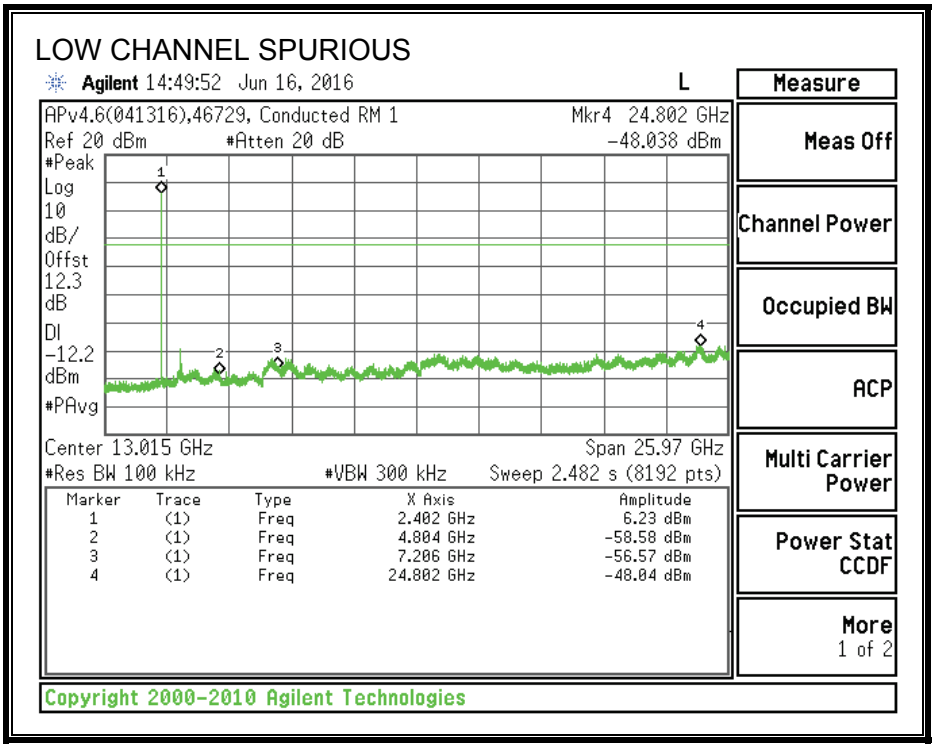
Tested by: Ron Reichard/Jeff Cabrera
Test date: 2016-06-16 to 2016-06-17

Note – This test was performed at the maximum allowed power setting.

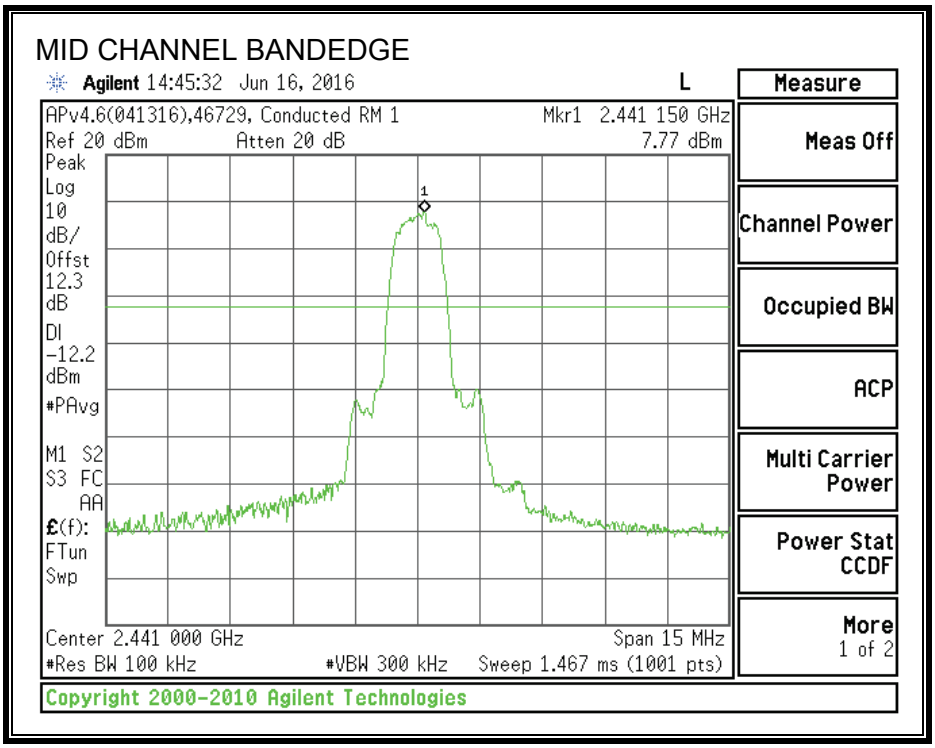
RESULTS

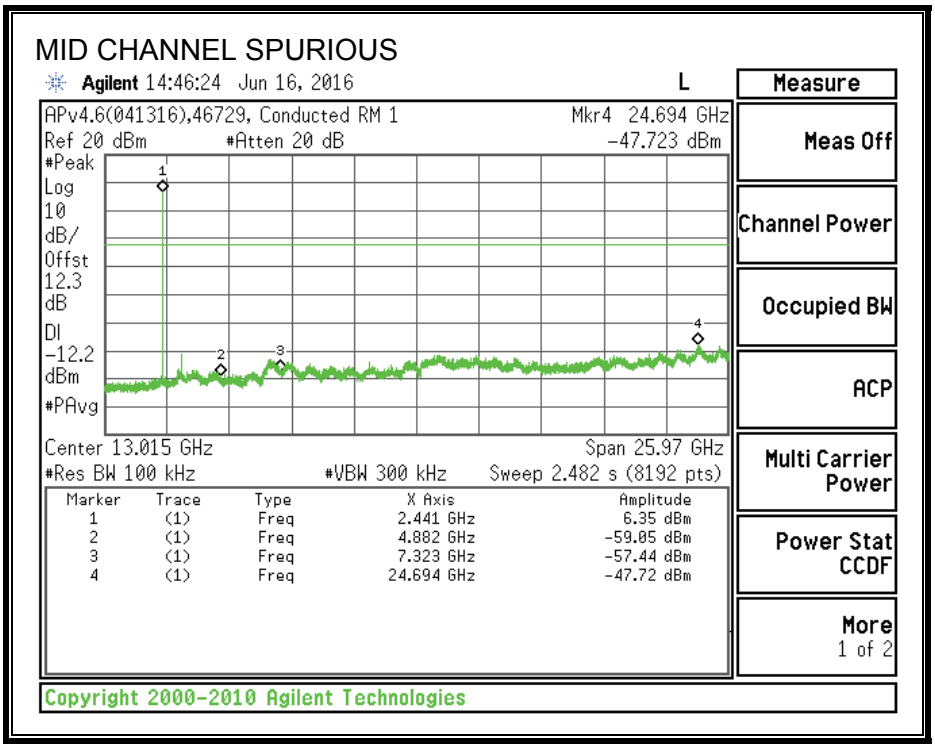
SPURIOUS EMISSIONS, LOW CHANNEL



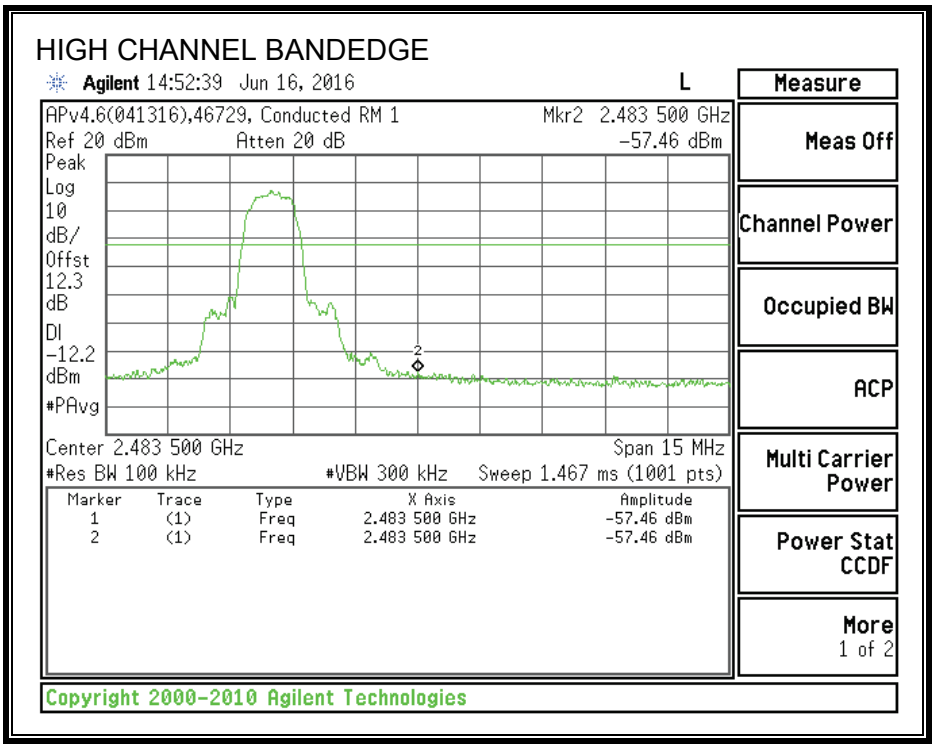


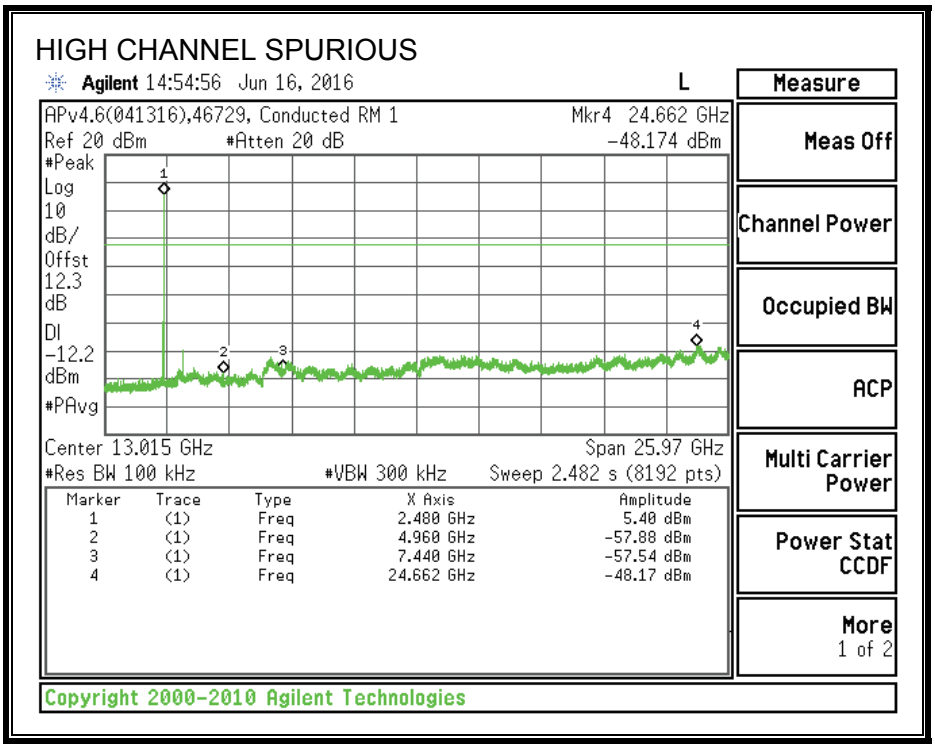
SPURIOUS EMISSIONS, MID CHANNEL





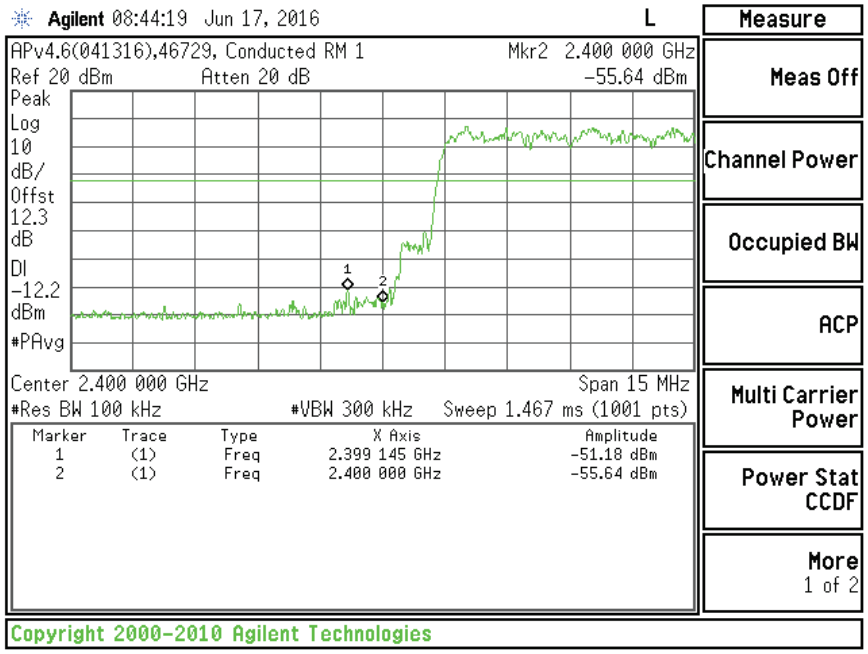
SPURIOUS EMISSIONS, HIGH CHANNEL



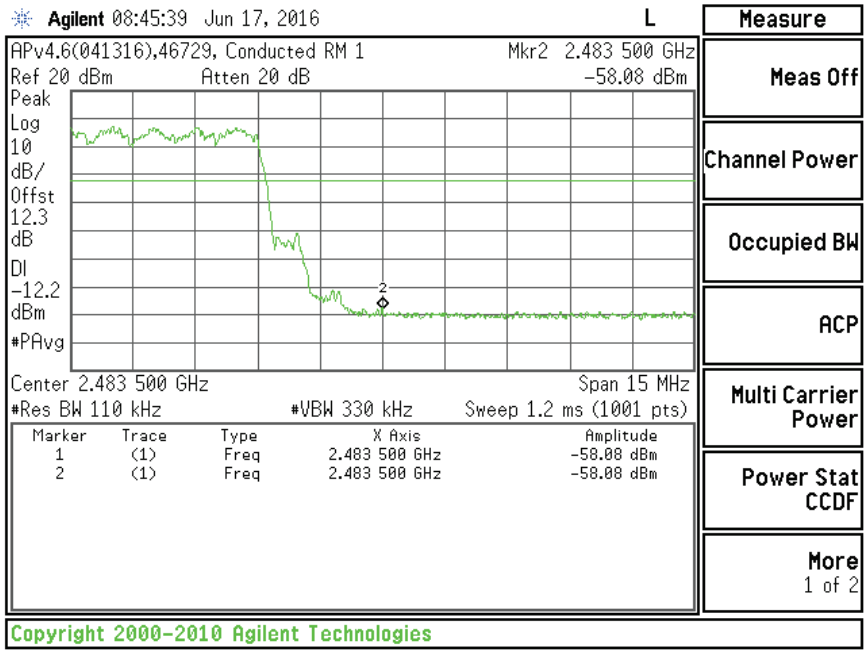


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

FCC §15.205, §15.209, §15.247 (d)

IC RSS-GEN Clause 8.9 (Transmitter)

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 for below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements for the 30-1000 MHz range, 9 kHz for peak detection measurements or 9 kHz for quasi-peak detection measurements for the 0.15-30 MHz range and 200 Hz for peak detection measurements or 200 Hz for quasi-peak detection measurements for the 9 to 150 kHz range. Peak detection is used unless otherwise noted as quasi-peak.

For peak measurements above 1 GHz, the resolution bandwidth is set to 1 MHz and the video bandwidth is set to 3 MHz. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The particular averaging method used for this test program was by measuring using a Peak detector with the resolution bandwidth set to 1MHz and a reduced video bandwidth, based on $1/T_{on}$ where T_{on} is the transmit on time.

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

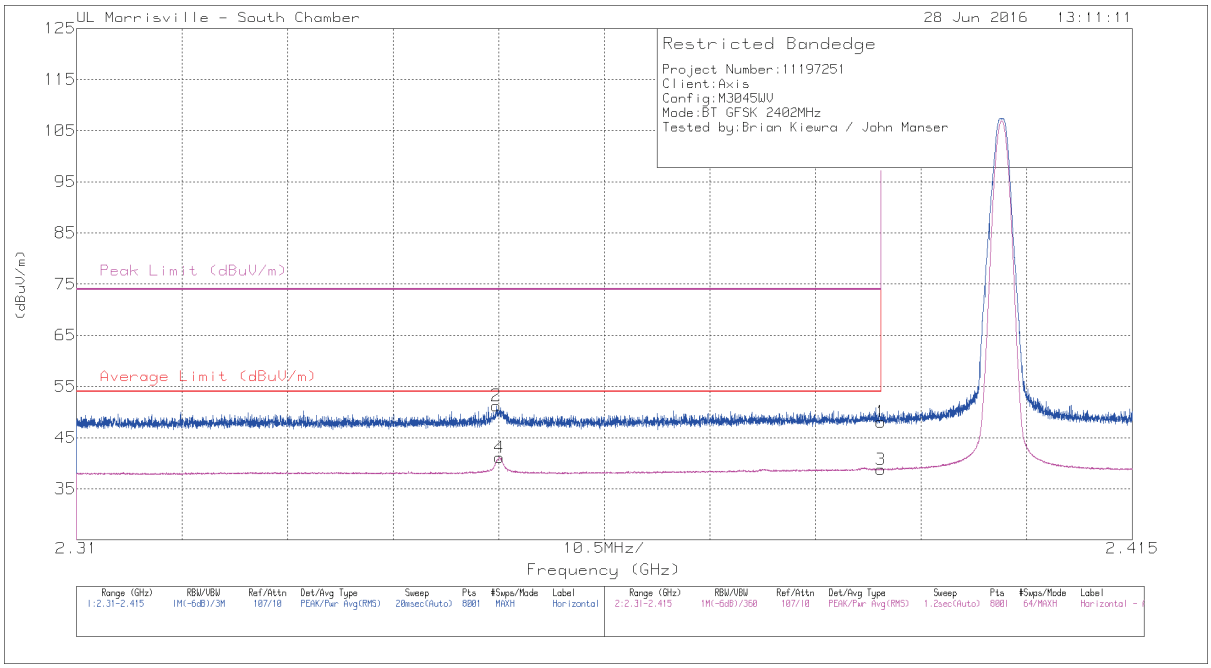
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

Note – This test was performed at the maximum allowed power setting.

9.2. TRANSMITTER 1-18 GHz

9.2.1. BASIC DATA RATE GFSK MODULATION

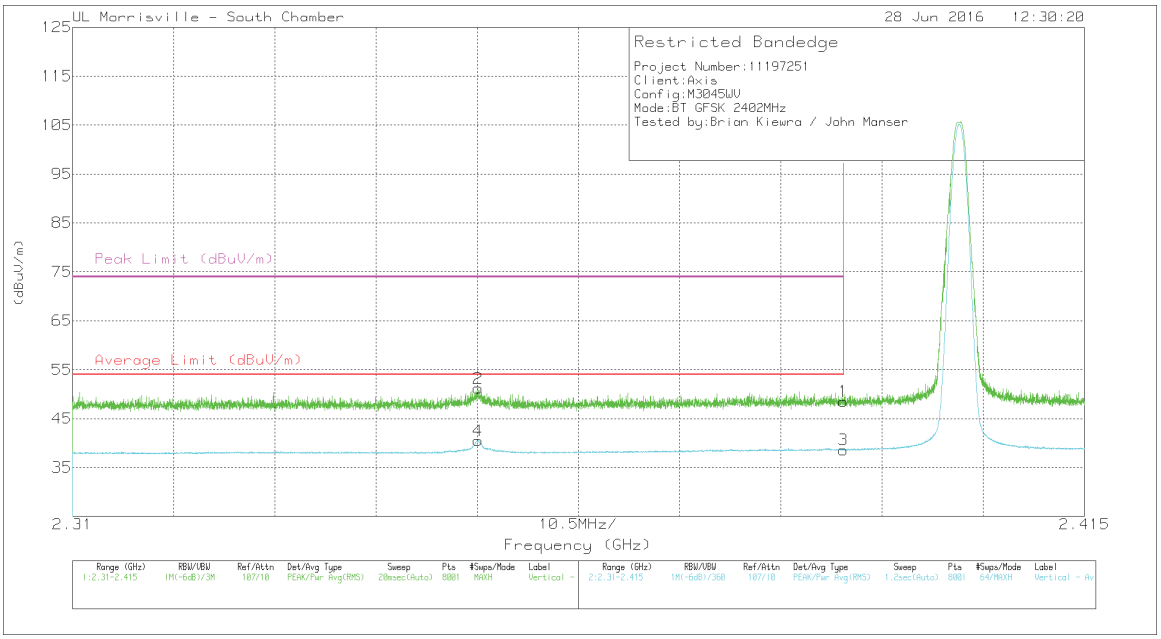
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.68	Pk	32.2	-24.8	48.08	-	-	74	-25.92	237	177	H
2	* 2.352	44.25	Pk	31.8	-24.8	51.25	-	-	74	-22.75	237	177	H
3	* 2.39	31.42	V1TR	32.2	-24.8	38.82	54	-15.18	-	-	237	177	H
4	* 2.352	34.11	V1TR	31.8	-24.8	41.11	54	-12.89	-	-	237	177	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
V1TR: VB=1/Ton, Ton is packet duration

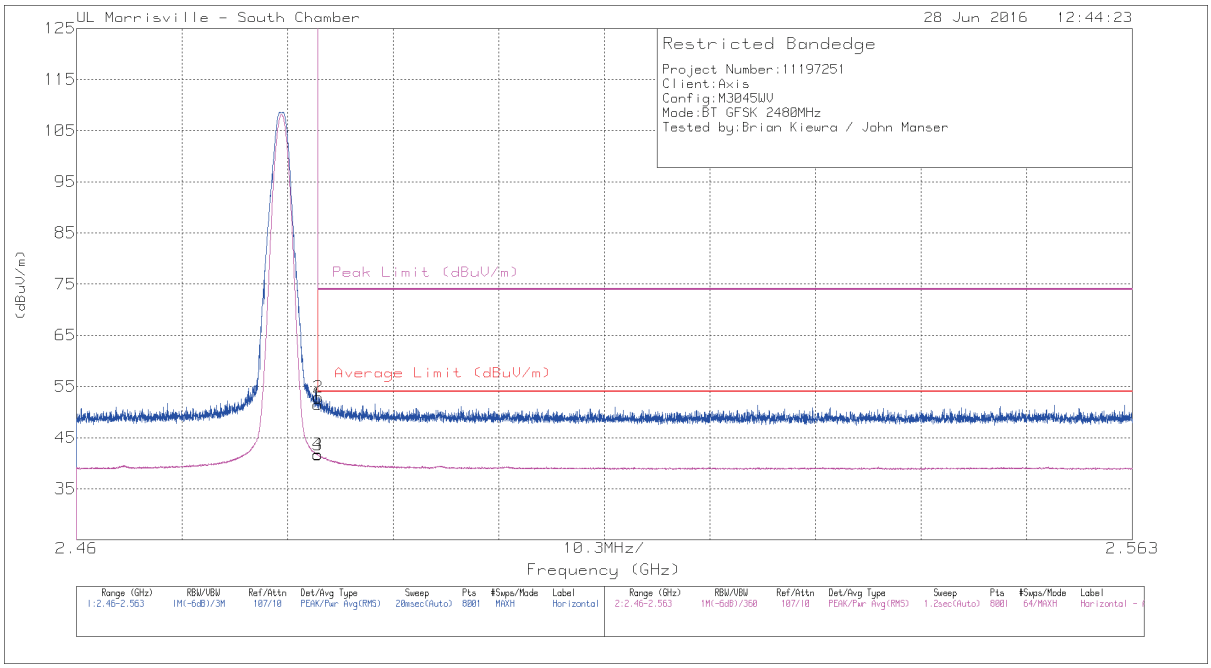
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.14	Pk	32.2	-24.8	48.54	-	-	74	-25.46	188	117	V
2	* 2.352	44.17	Pk	31.8	-24.8	51.17	-	-	74	-22.83	188	117	V
3	* 2.39	31.21	V1TR	32.2	-24.8	38.61	54	-15.39	-	-	188	117	V
4	* 2.352	33.5	V1TR	31.8	-24.8	40.5	54	-13.5	-	-	188	117	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
V1TR: VB=1/Ton, Ton is packet duration

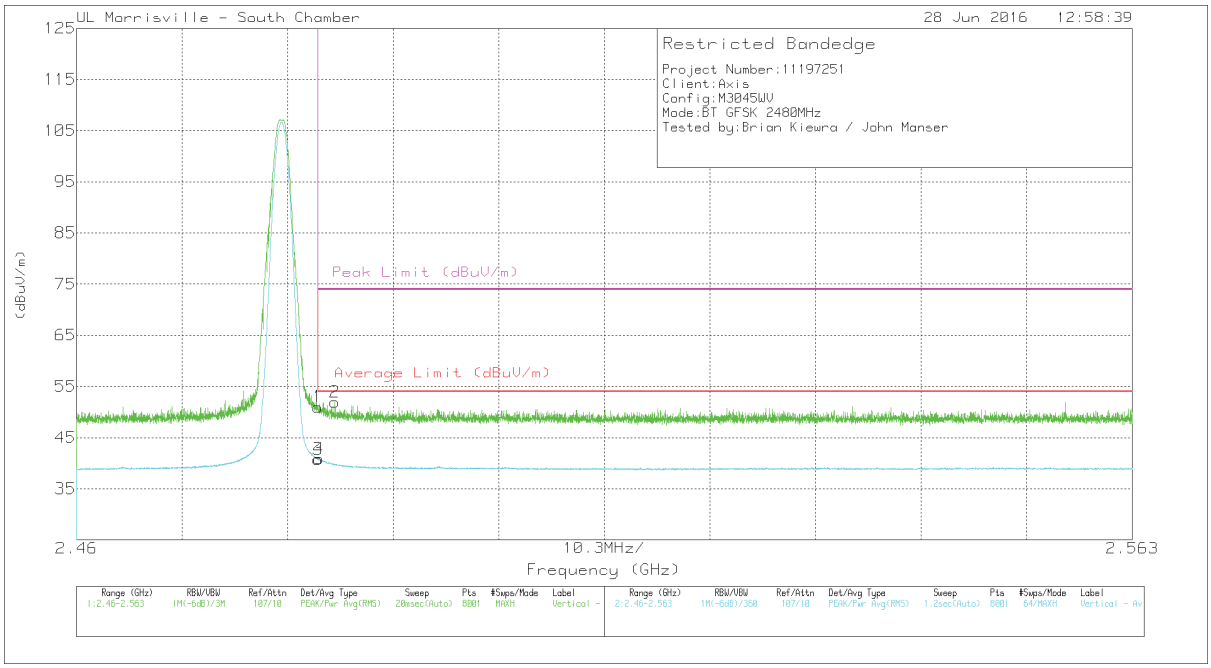
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	43.77	Pk	32.4	-24.7	51.47	-	-	74	-22.53	232	162	H
2	* 2.484	45.25	Pk	32.4	-24.7	52.95	-	-	74	-21.05	232	162	H
3	* 2.484	33.95	V1TR	32.4	-24.7	41.65	54	-12.35	-	-	232	162	H
4	* 2.484	34.05	V1TR	32.4	-24.7	41.75	54	-12.25	-	-	232	162	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
V1TR: VB=1/Ton, Ton is packet duration

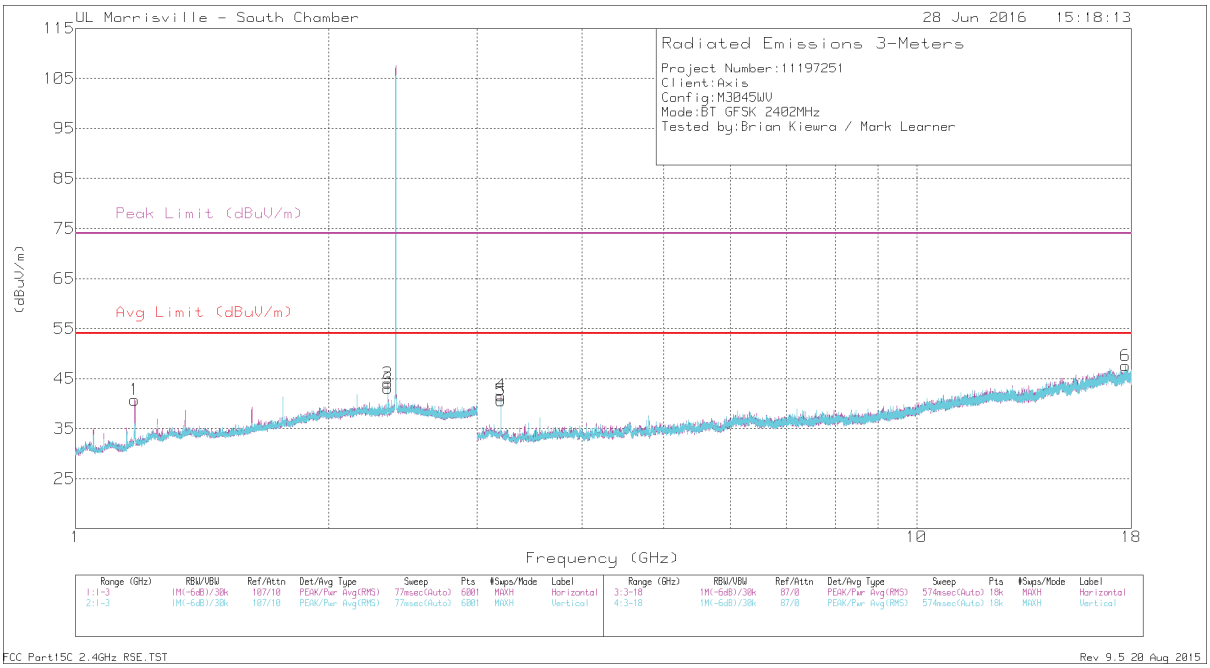
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	43.31	Pk	32.4	-24.7	51.01	-	-	74	-22.99	187	112	V
2	* 2.485	44.26	Pk	32.4	-24.7	51.96	-	-	74	-22.04	187	112	V
3	* 2.484	33.11	V1TR	32.4	-24.7	40.81	54	-13.19	-	-	187	112	V
4	* 2.484	33.17	V1TR	32.4	-24.7	40.87	54	-13.13	-	-	187	112	V

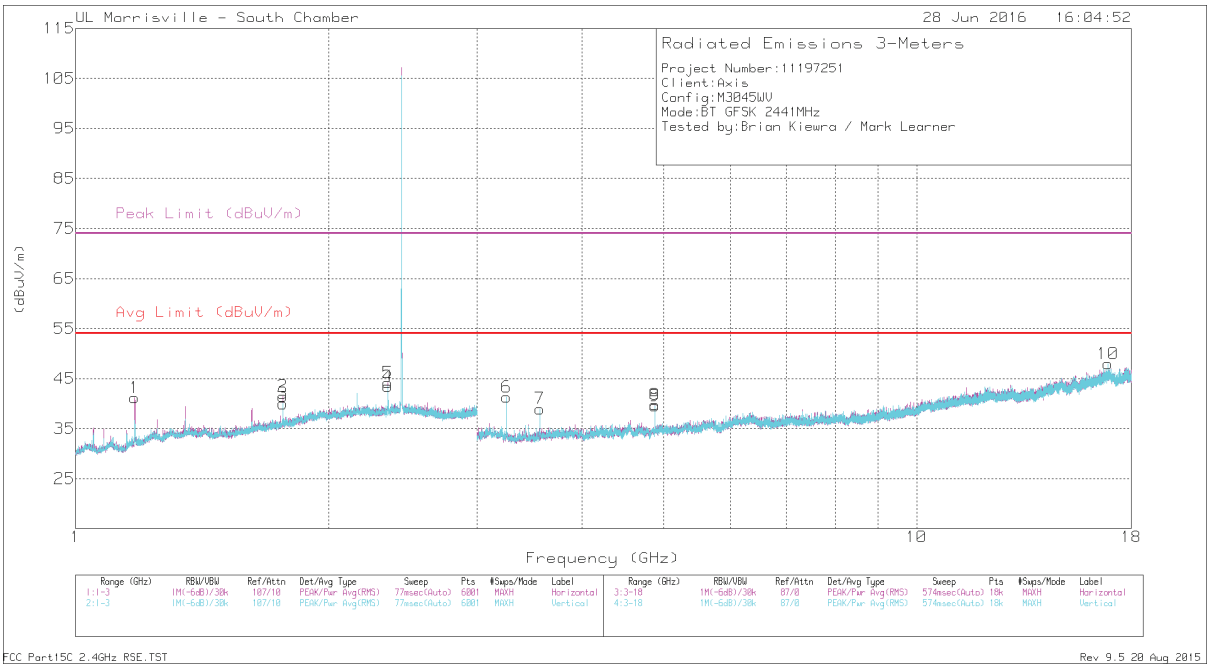
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
V1TR: VB=1/Ton, Ton is packet duration

HARMONICS AND SPURIOUS EMISSIONS



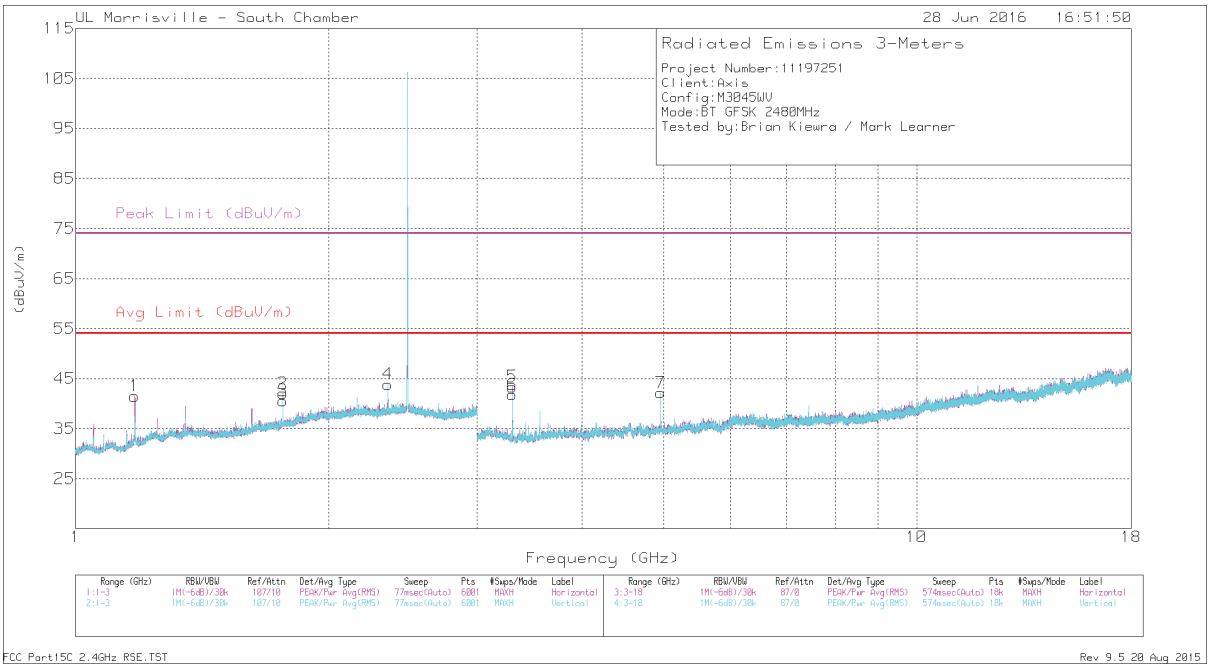
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.176	41.68	PK-U	27.8	-24.1	45.38	-	-	74	-28.62	184	124	H
	* 1.176	34.5	V1TR	27.8	-24.1	38.2	54	-15.8	-	-	184	124	H
2	* 2.352	42.83	PK-U	31.8	-24	50.63	-	-	74	-23.37	245	260	H
	* 2.352	33.69	V1TR	31.8	-24	41.49	54	-12.51	-	-	245	260	H
6	* 17.712	34.52	PK-U	41.2	-23.1	52.62	-	-	74	-21.38	331	116	H
	* 17.713	23.49	V1TR	41.2	-23.1	41.59	54	-12.41	-	-	331	116	H
3	* 2.352	43.15	PK-U	31.8	-24	50.95	-	-	74	-23.05	241	105	V
	* 2.352	33.29	V1TR	31.8	-24	41.09	54	-12.91	-	-	241	105	V
4	3.202	41.62	Pk	33.4	-33.4	41.62	-	-	-	-	0-360	199	H
5	3.202	40.64	Pk	33.4	-33.4	40.64	-	-	-	-	0-360	102	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
V1TR: VB=1/Ton, Ton is packet duration



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.176	42.96	PK-U	27.8	-24.1	46.66	-	-	74	-27.34	192	139	H
	* 1.176	35.4	V1TR	27.8	-24.1	39.1	54	-14.9	-	-	192	139	H
5	* 2.352	42.07	PK-U	31.8	-24	49.87	-	-	74	-24.13	247	262	H
	* 2.352	32.94	V1TR	31.8	-24	40.74	54	-13.26	-	-	247	262	H
4	* 2.352	41.85	PK-U	31.8	-24	49.65	-	-	74	-24.35	200	227	V
	* 2.352	34.05	V1TR	31.8	-24	41.85	54	-12.15	-	-	200	227	V
8	* 4.882	43.55	PK-U	34.1	-31.5	46.15	-	-	74	-27.85	56	260	H
	* 4.882	36.72	V1TR	34.1	-31.5	39.32	54	-14.68	-	-	56	260	H
7	* 3.564	45.62	PK-U	32.9	-32.9	45.62	-	-	74	-28.38	217	202	V
	* 3.563	33.83	V1TR	32.9	-33	33.73	54	-20.27	-	-	217	202	V
9	* 4.882	42.63	PK-U	34.1	-31.5	45.23	-	-	74	-28.77	302	274	V
	* 4.882	35.58	V1TR	34.1	-31.5	38.18	54	-15.82	-	-	302	274	V
2	1.764	34.39	Pk	29.6	-22.5	41.49	-	-	-	-	0-360	199	H
3	1.764	32.91	Pk	29.6	-22.5	40.01	-	-	-	-	0-360	199	V
6	3.255	41.91	Pk	33.1	-33.7	41.31	-	-	-	-	0-360	199	V
10	16.878	30.09	Pk	41.6	-23.7	47.99	-	-	-	-	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
V1TR: VB=1/Ton, Ton is packet duration

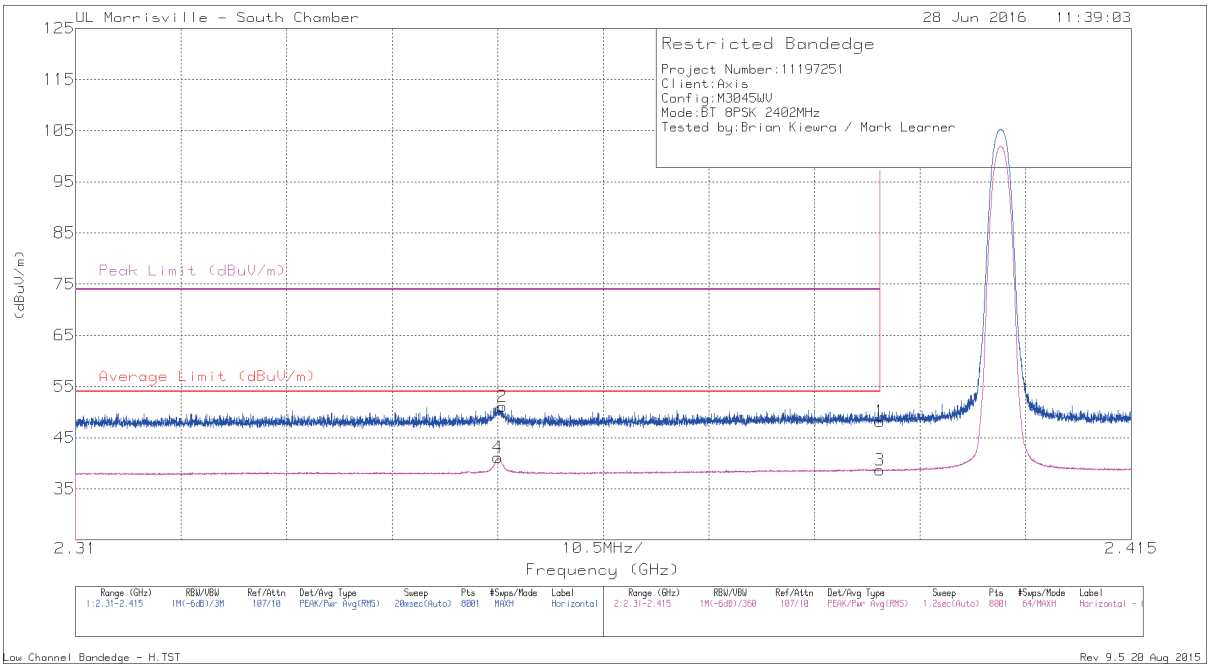


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.176	42.87	PK-U	27.8	-24.1	46.57	-	-	74	-27.43	198	150	H
	* 1.176	34.31	V1TR	27.8	-24.1	38.01	54	-15.99	-	-	198	150	H
4	* 2.352	42.17	PK-U	31.8	-24	49.97	-	-	74	-24.03	237	108	V
	* 2.352	33.3	V1TR	31.8	-24	41.1	54	-12.9	-	-	237	108	V
7	* 4.96	43.29	PK-U	34.1	-31.6	45.79	-	-	74	-28.21	293	129	V
	* 4.96	35.93	V1TR	34.1	-31.6	38.43	54	-15.57	-	-	293	129	V
2	1.764	34.94	Pk	29.6	-22.5	42.04	-	-	-	-	0-360	199	H
3	1.764	33.49	Pk	29.6	-22.5	40.59	-	-	-	-	0-360	102	V
5	3.307	44.17	Pk	32.7	-33.5	43.37	-	-	-	-	0-360	199	H
6	3.307	42.63	Pk	32.7	-33.5	41.83	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
V1TR: VB=1/Ton, Ton is packet duration

9.2.2. ENHANCED DATA RATE 8PSK MODULATION

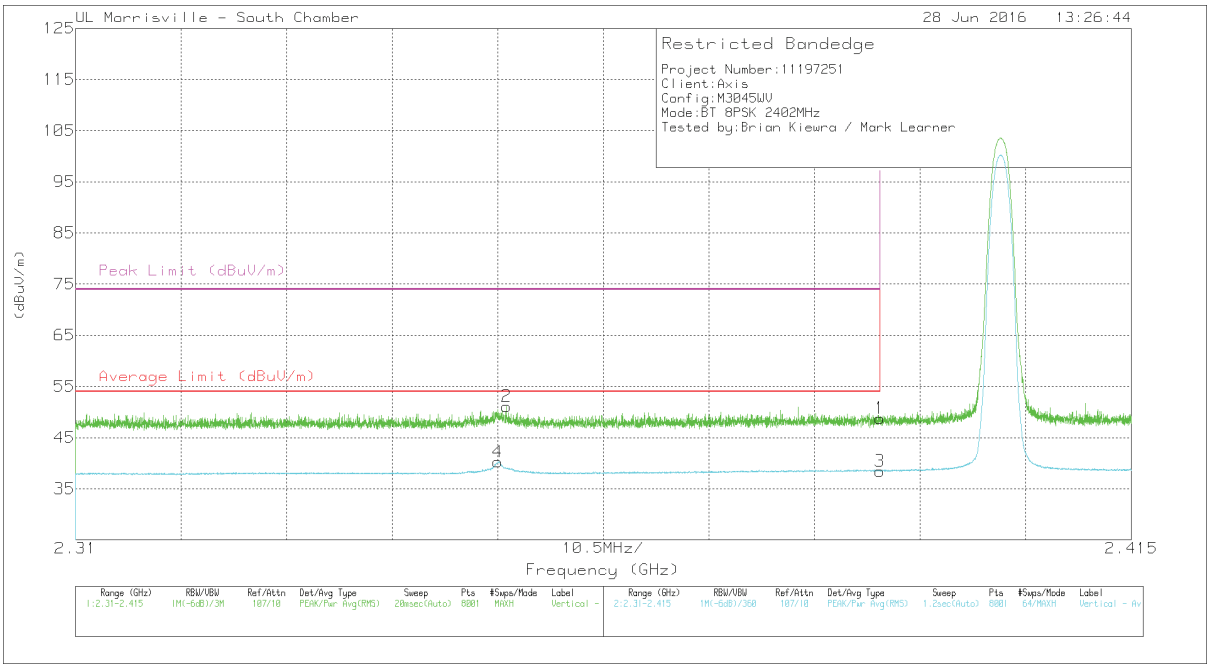
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.79	Pk	32.2	-24.8	48.19	-	-	74	-25.81	237	171	H
2	* 2.352	44.11	Pk	31.8	-24.8	51.11	-	-	74	-22.89	237	171	H
3	* 2.39	31.24	V1TR	32.2	-24.8	38.64	54	-15.36	-	-	237	171	H
4	* 2.352	34.12	V1TR	31.8	-24.8	41.12	54	-12.88	-	-	237	171	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
V1TR: VB=1/Ton, Ton is packet duration

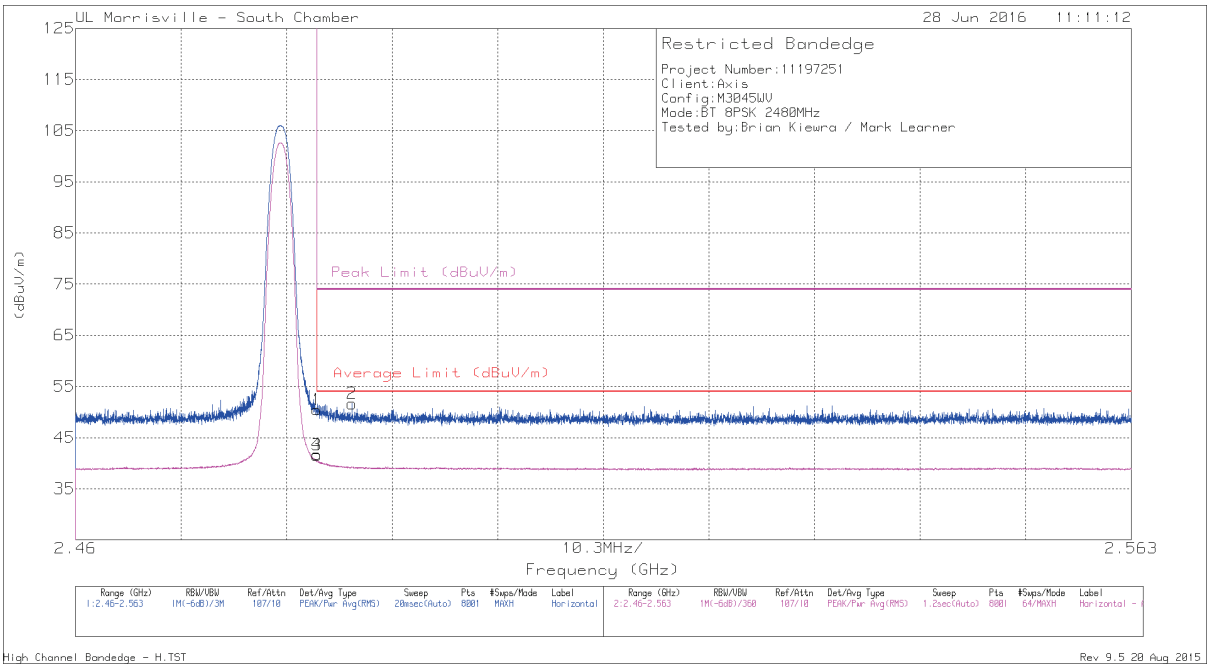
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.39	Pk	32.2	-24.8	48.79	-	-	74	-25.21	188	113	V
2	* 2.353	44.13	Pk	31.8	-24.8	51.13	-	-	74	-22.87	188	113	V
3	* 2.39	31.06	V1TR	32.2	-24.8	38.46	54	-15.54	-	-	188	113	V
4	* 2.352	33.28	V1TR	31.8	-24.8	40.28	54	-13.72	-	-	188	113	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
V1TR: VB=1/Ton, Ton is packet duration

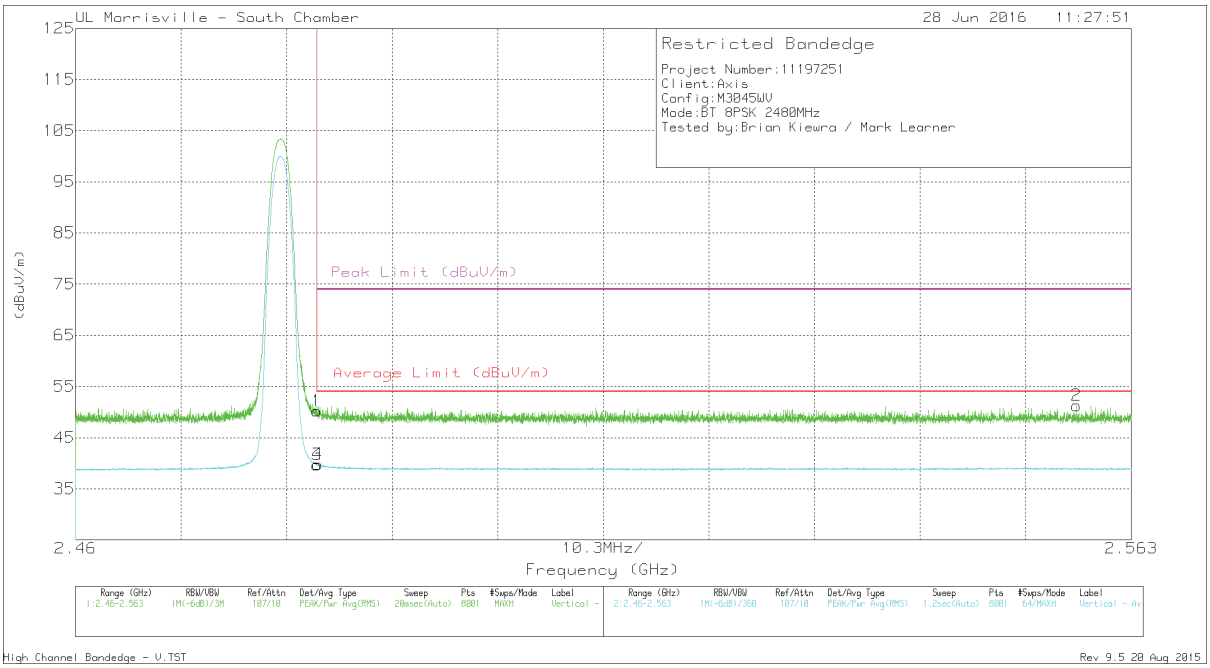
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.77	Pk	32.4	-24.7	50.47	-	-	74	-23.53	237	188	H
2	* 2.487	43.95	Pk	32.4	-24.7	51.65	-	-	74	-22.35	237	188	H
3	* 2.484	32.74	V1TR	32.4	-24.7	40.44	54	-13.56	-	-	237	188	H
4	* 2.484	32.89	V1TR	32.4	-24.7	40.59	54	-13.41	-	-	237	188	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
V1TR: VB=1/Ton, Ton is packet duration

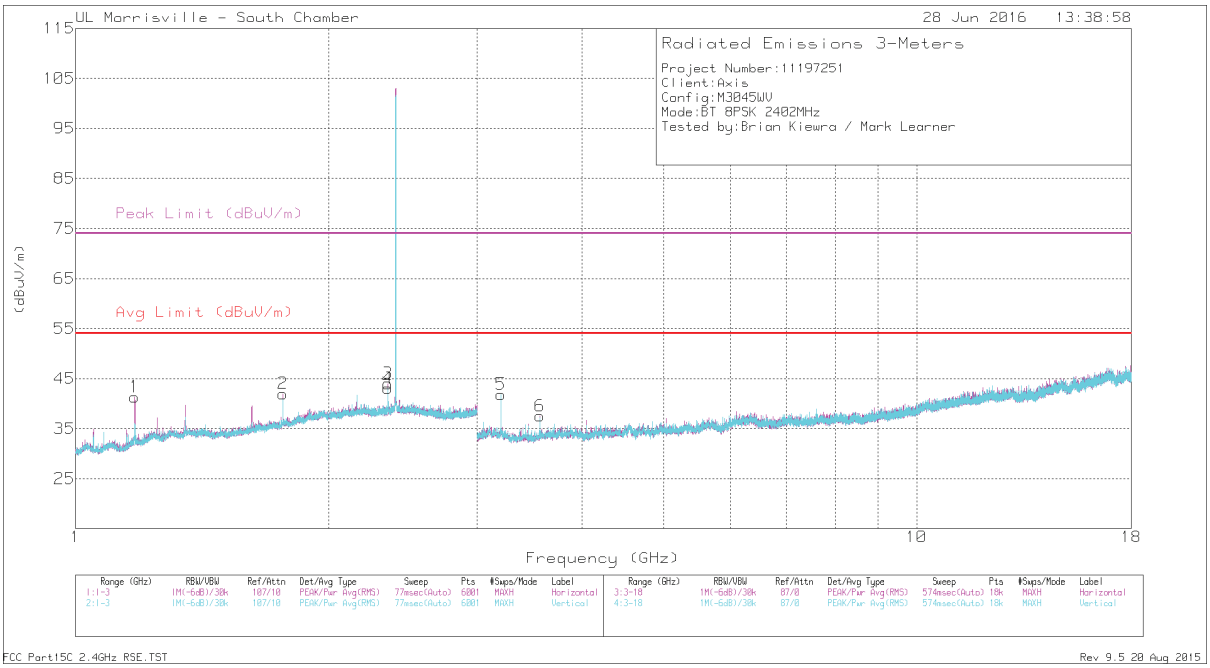
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.53	Pk	32.4	-24.7	50.23	-	-	74	-23.77	186	125	V
3	* 2.484	32.01	V1TR	32.4	-24.7	39.71	54	-14.29	-	-	186	125	V
4	* 2.484	32.12	V1TR	32.4	-24.7	39.82	54	-14.18	-	-	186	125	V
2	2.558	43.57	Pk	32.4	-24.7	51.27	-	-	74	-22.73	186	125	V

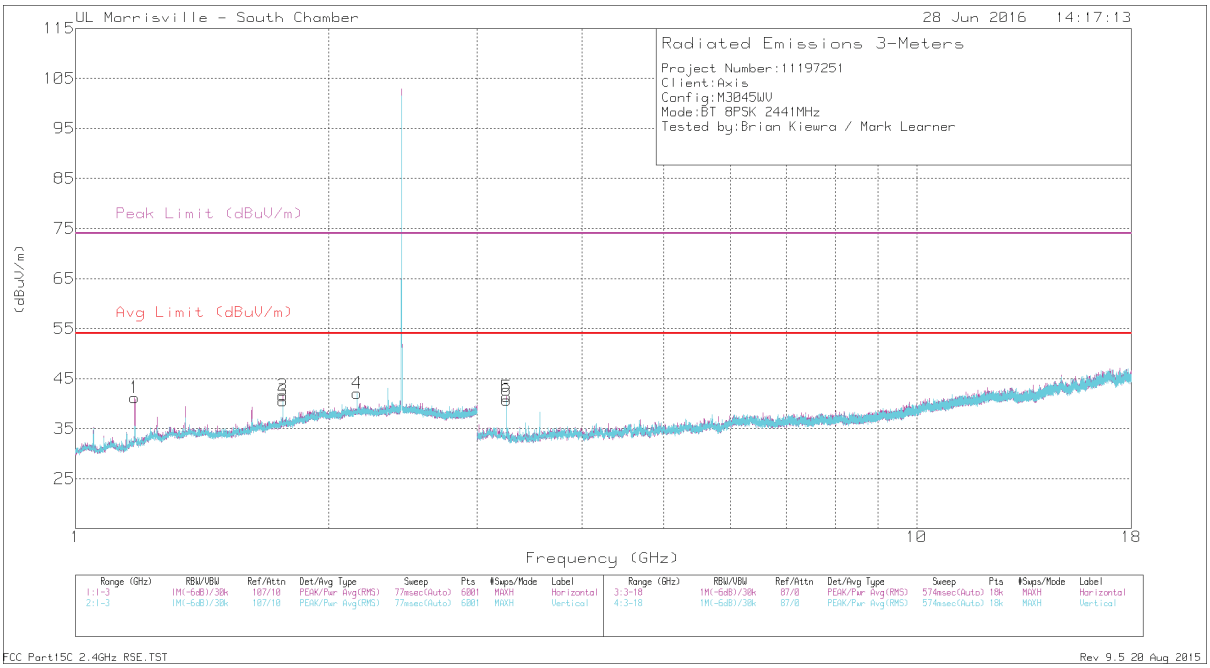
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
V1TR: VB=1/Ton, Ton is packet duration

HARMONICS AND SPURIOUS EMISSIONS



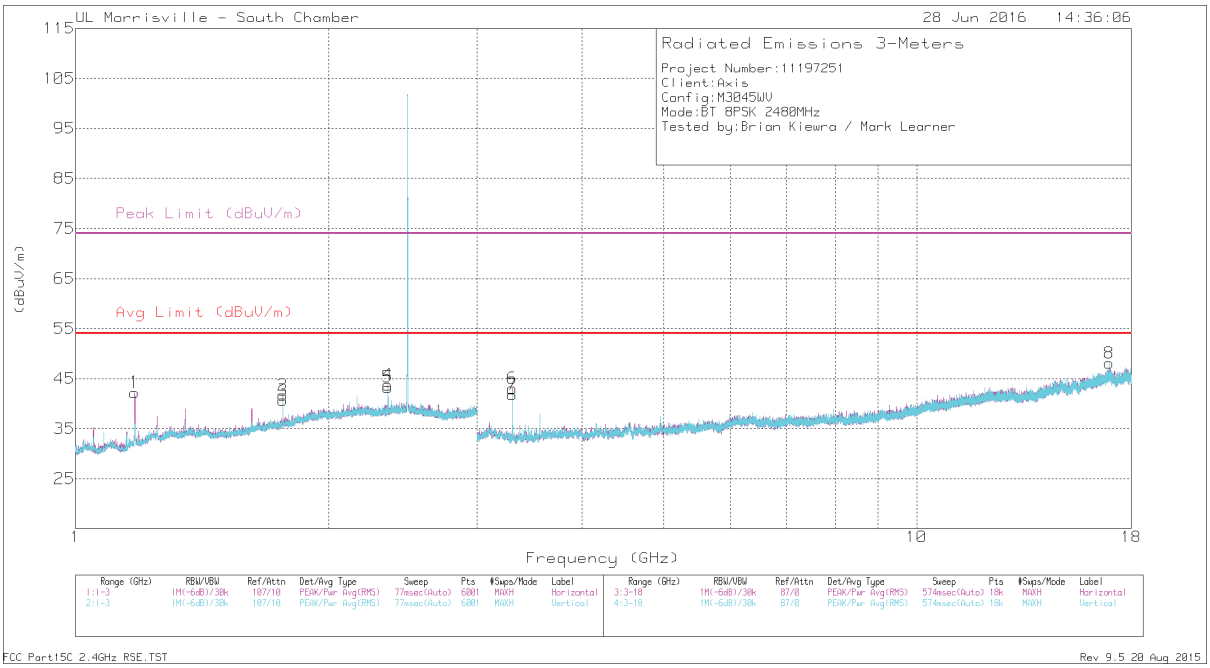
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.176	42.11	PK-U	27.8	-24.1	45.81	-	-	74	-28.19	192	134	H
	* 1.176	34.2	V1TR	27.8	-24.1	37.9	54	-16.1	-	-	192	134	H
3	* 2.352	42.67	PK-U	31.8	-24	50.47	-	-	74	-23.53	249	198	H
	* 2.352	33.86	V1TR	31.8	-24	41.66	54	-12.34	-	-	249	198	H
6	* 3.564	44.68	PK-U	32.9	-32.9	44.68	-	-	74	-29.32	231	157	H
	* 3.565	33.6	V1TR	32.9	-32.9	33.6	54	-20.4	-	-	231	157	H
4	* 2.352	42.56	PK-U	31.8	-24	50.36	-	-	74	-23.64	186	328	V
	* 2.352	33.51	V1TR	31.8	-24	41.31	54	-12.69	-	-	186	328	V
2	1.764	34.9	Pk	29.6	-22.5	42	-	-	-	-	0-360	199	H
5	3.202	41.86	Pk	33.4	-33.4	41.86	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
V1TR: VB=1/Ton, Ton is packet duration



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.176	41.47	PK-U	27.8	-24.1	45.17	-	-	74	-28.83	198	196	H
	* 1.176	35.38	V1TR	27.8	-24.1	39.08	54	-14.92	-	-	198	196	H
2	1.764	34.54	Pk	29.6	-22.5	41.64	-	-	-	-	0-360	199	H
5	3.254	42	Pk	33.1	-33.7	41.4	-	-	-	-	0-360	199	H
3	1.764	33.52	Pk	29.6	-22.5	40.62	-	-	-	-	0-360	199	V
4	2.16	33.7	Pk	31.7	-23.3	42.1	-	-	-	-	0-360	199	V
6	3.255	41.33	Pk	33.1	-33.7	40.73	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
V1TR: VB=1/Ton, Ton is packet duration

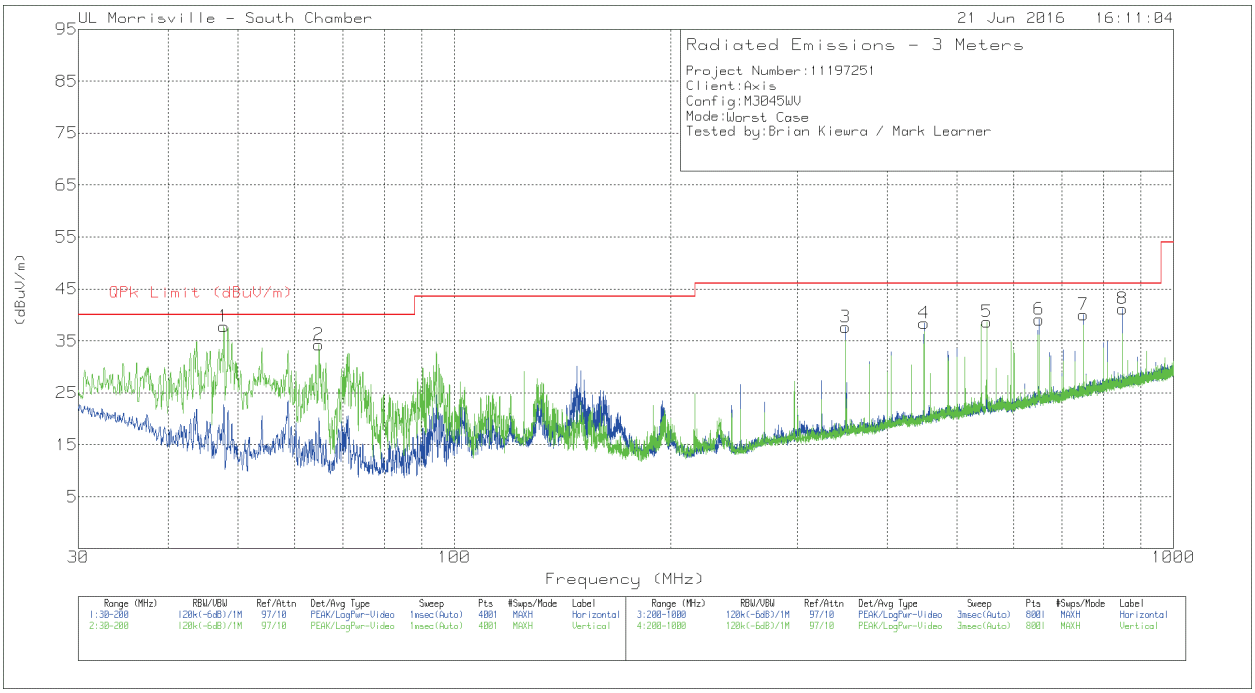


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.176	42.44	PK-U	27.8	-24.1	46.14	-	-	74	-27.86	197	199	H
	* 1.176	34.99	V1TR	27.8	-24.1	38.69	54	-15.31	-	-	197	199	H
4	* 2.352	42.57	PK-U	31.8	-24	50.37	-	-	74	-23.63	248	103	H
	* 2.352	33.7	V1TR	31.8	-24	41.5	54	-12.5	-	-	248	103	H
5	* 2.352	42	PK-U	31.8	-24	49.8	-	-	74	-24.2	239	114	V
	* 2.352	33.19	V1TR	31.8	-24	40.99	54	-13.01	-	-	239	114	V
2	1.764	34.62	Pk	29.6	-22.5	41.72	-	-	-	-	0-360	199	H
6	3.307	43.82	Pk	32.7	-33.5	43.02	-	-	-	-	0-360	199	H
3	1.764	33.57	Pk	29.6	-22.5	40.67	-	-	-	-	0-360	102	V
7	3.307	42.6	Pk	32.7	-33.5	41.8	-	-	-	-	0-360	199	V
8	16.937	30.96	Pk	41.5	-24.4	48.06	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
V1TR: VB=1/Ton, Ton is packet duration

9.3. WORST-CASE BELOW 1 GHz

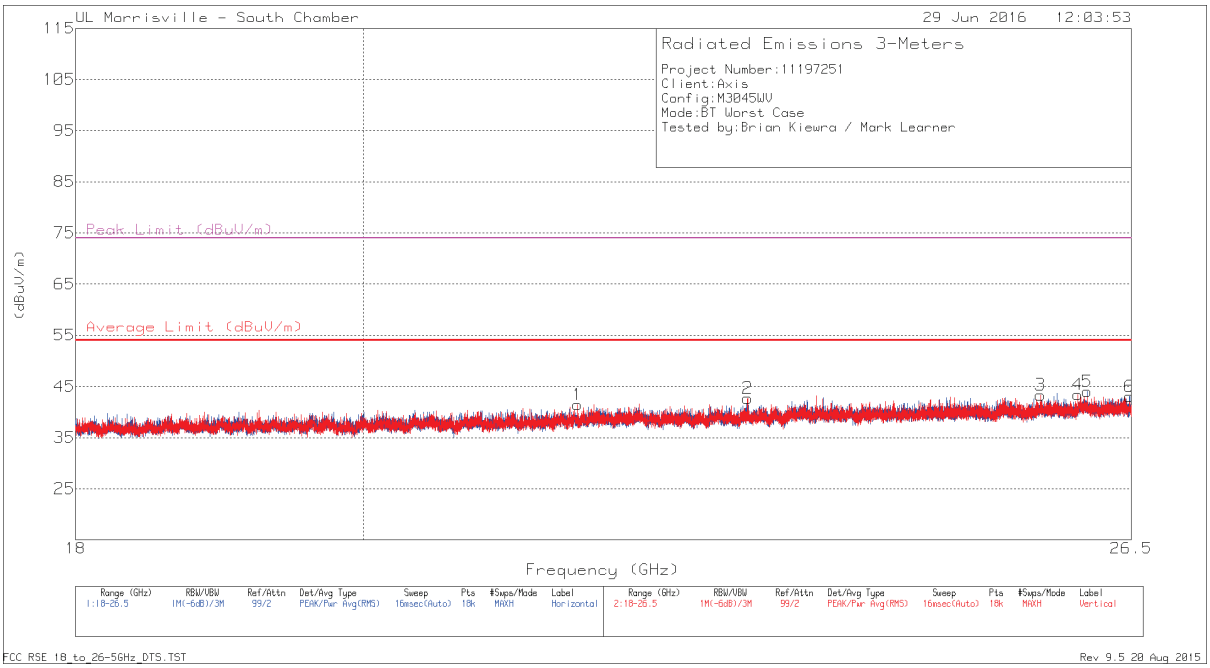
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	47.8075	54.34	Qp	13.4	-31.6	36.14	40	-3.86	137	102	V
2	64.771	53.52	Qp	12.2	-31.4	34.32	40	-5.68	310	102	V
3	350	47.87	Pk	19.2	-29.4	37.67	46.02	-8.35	0-360	102	H
4	450	46.18	Pk	21.2	-29	38.38	46.02	-7.64	0-360	199	H
5	550	44.52	Pk	22.8	-28.7	38.62	46.02	-7.4	0-360	102	V
6	650	43.21	Pk	24.4	-28.5	39.11	46.02	-6.91	0-360	102	H
7	750	42.8	Pk	25.2	-28	40	46.02	-6.02	0-360	102	H
8	850.013	41.29	Qp	26.4	-27.4	40.29	46.02	-5.73	168	102	H

9.4. WORST-CASE 18 - 26GHz

SPURIOUS EMISSIONS 18 to 26GHz (WORST-CASE CONFIGURATION)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0076 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 23.023	47.07	PK-U	34.2	-39.5	41.77	54	-12.23	74	-32.23	253	102	V
	* 23.024	35.88	V1TR	34.2	-39.5	30.58	54	-23.42	74	-43.42	253	102	V
1	21.634	47.83	Pk	33.7	-40.1	41.43	54	-12.57	74	-32.57	0-360	152	V
3	25.632	46.45	Pk	34.7	-37.8	43.35	54	-10.65	74	-30.65	0-360	202	V
4	25.986	45.99	Pk	35	-37.6	43.39	54	-10.61	74	-30.61	0-360	252	V
5	26.077	46.55	Pk	35	-37.5	44.05	54	-9.95	74	-29.95	0-360	150	H
6	26.479	45.46	Pk	35	-37.4	43.06	54	-10.94	74	-30.94	0-360	101	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
V1TR: VB=1/Ton, Ton is packet duration

10. 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 C63.10.

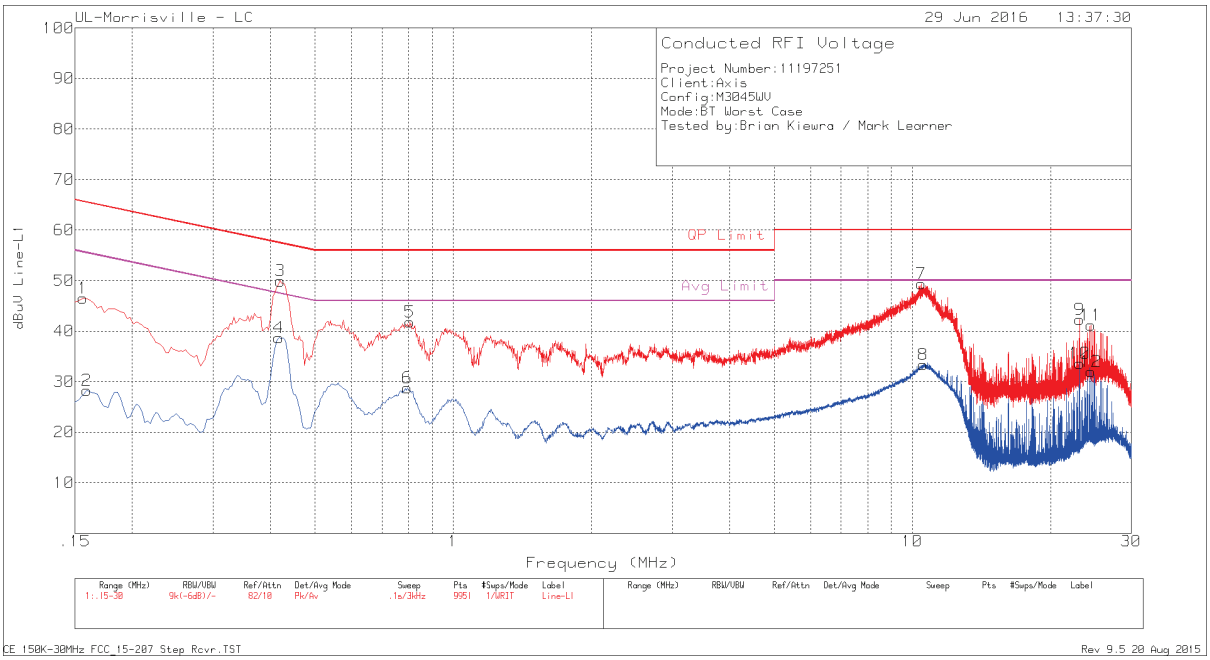
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

Note – This test was performed at the maximum allowed power setting.

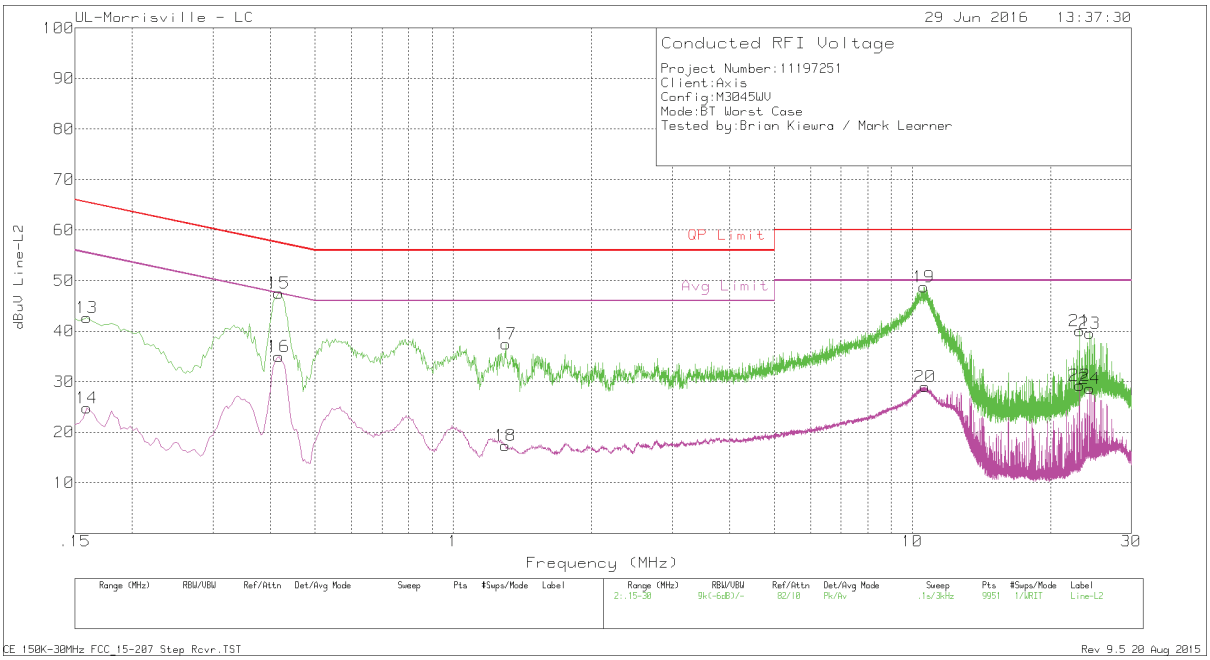
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz										
Marker	**Frequency (MHz)**	**Meter Reading (dBuV)**	**Det**	**LISN VCF [dB]**	**Cbl/Limiter (dB)**	**Corrected Reading dBuV**	**QP Limit**	**Margin (dB)**	**Avg Limit**	**Margin (dB)**
1	.156	36.31	Pk	.2	10	46.51	65.67	-19.16	-	-
2	.159	18.11	Av	.2	10	28.31	-	-	55.52	-27.21
3	.42	39.84	Pk	.1	10	49.94	57.45	-7.51	-	-
4	.417	28.64	Av	.1	10	38.74	-	-	47.51	-8.77
5	.804	31.86	Pk	0	10	41.86	56	-14.14	-	-
6	.795	18.73	Av	0	10	28.73	-	-	46	-17.27
7	10.461	38.93	Pk	.1	10.3	49.33	60	-10.67	-	-
8	10.551	22.98	Av	.1	10.3	33.38	-	-	50	-16.62
9	23.13	31.36	Pk	.3	10.6	42.26	60	-17.74	-	-
10	23.13	22.74	Av	.3	10.6	33.64	-	-	50	-16.36
11	24.534	30.25	Pk	.3	10.6	41.15	60	-18.85	-	-
12	24.534	21.05	Av	.3	10.6	31.95	-	-	50	-18.05

Pk - Peak detector
Av - Average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF [dB]	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit	Margin (dB)	Avg Limit	Margin (dB)
13	.159	32.52	Pk	.2	10	42.72	65.52	-22.8	-	-
14	.159	14.55	Av	.2	10	24.75	-	-	55.52	-30.77
15	.417	37.46	Pk	.1	10	47.56	57.51	-9.95	-	-
16	.417	24.85	Av	.1	10	34.95	-	-	47.51	-12.56
17	1.302	27.43	Pk	0	10	37.43	56	-18.57	-	-
18	1.299	7.33	Av	0	10	17.33	-	-	46	-28.67
19	10.611	38.37	Pk	.1	10.3	48.77	60	-11.23	-	-
20	10.65	18.65	Av	.1	10.3	29.05	-	-	50	-20.95
21	23.13	29.25	Pk	.2	10.6	40.05	60	-19.95	-	-
22	23.13	18.43	Av	.2	10.6	29.23	-	-	50	-20.77
23	24.351	28.65	Pk	.3	10.6	39.55	60	-20.45	-	-
24	24.351	17.75	Av	.3	10.6	28.65	-	-	50	-21.35

Pk - Peak detector
Av - Average detection