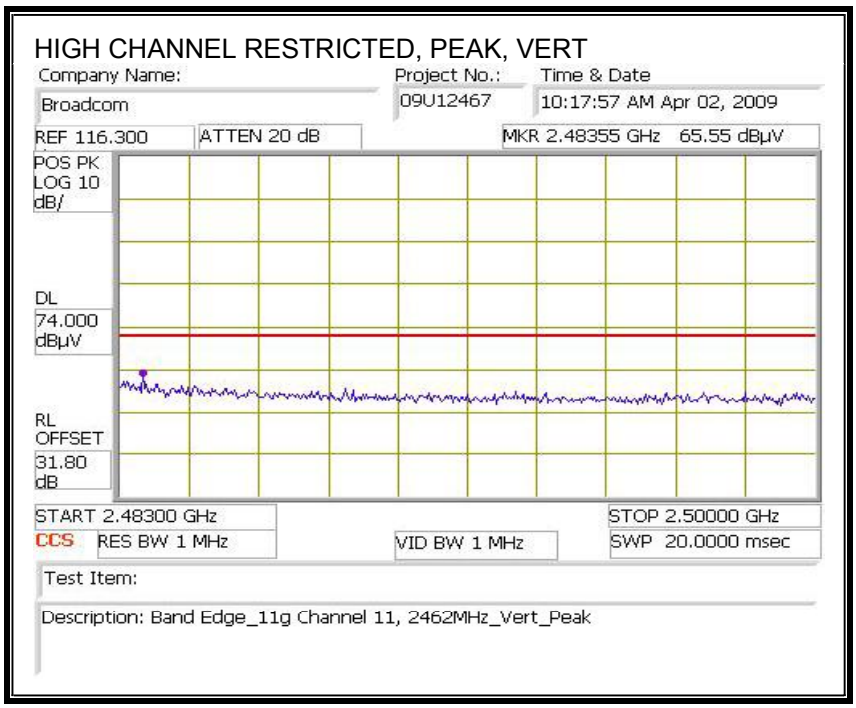
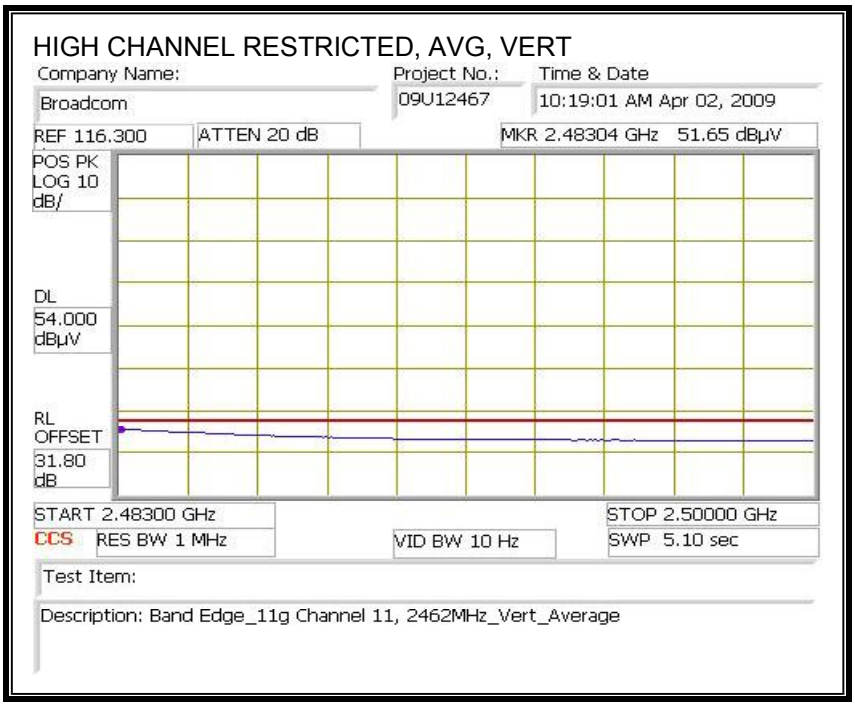
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 09U12467
Date: 04/02/09
Test Engineer: Vien Tran
Configuration: Access Point / Laptop
Mode: Tx 11g Mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel, 2412MHz															
4.824	3.0	53.5	42.6	32.7	5.8	-34.8	0.0	0.0	57.1	46.3	74	54	-16.9	-7.7	H
4.824	3.0	51.8	40.9	32.7	5.8	-34.8	0.0	0.0	55.4	44.5	74	54	-18.6	-9.5	V
Mid channel, 2437MHz															
4.874	3.0	52.5	41.5	32.7	5.8	-34.8	0.0	0.0	56.2	45.2	74	54	-17.8	-8.8	H
7.311	3.0	49.2	35.9	35.5	7.3	-34.1	0.0	0.0	57.8	44.5	74	54	-16.2	-9.5	H
4.874	3.0	52.4	40.5	32.7	5.8	-34.8	0.0	0.0	56.1	44.2	74	54	-17.9	-9.8	V
7.311	3.0	46.6	33.7	35.5	7.3	-34.1	0.0	0.0	55.2	42.3	74	54	-18.8	-11.7	V
High channel, 2462MHz															
4.924	3.0	52.9	41.8	32.7	5.9	-34.8	0.0	0.0	56.7	45.6	74	54	-17.3	-8.4	H
7.386	3.0	51.0	38.9	35.6	7.3	-34.1	0.0	0.0	59.8	47.7	74	54	-14.2	-6.3	H
4.924	3.0	51.3	40.0	32.7	5.9	-34.8	0.0	0.0	55.1	43.8	74	54	-18.9	-10.2	V
7.386	3.0	45.1	33.1	35.6	7.3	-34.1	0.0	0.0	53.9	41.9	74	54	-20.1	-12.1	V

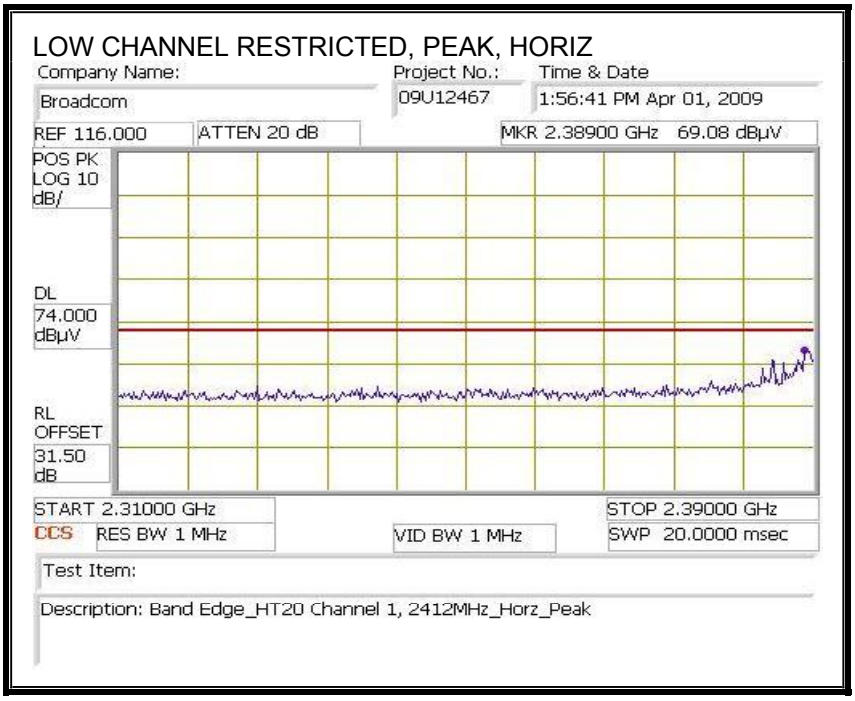
Rev. 03.09.09

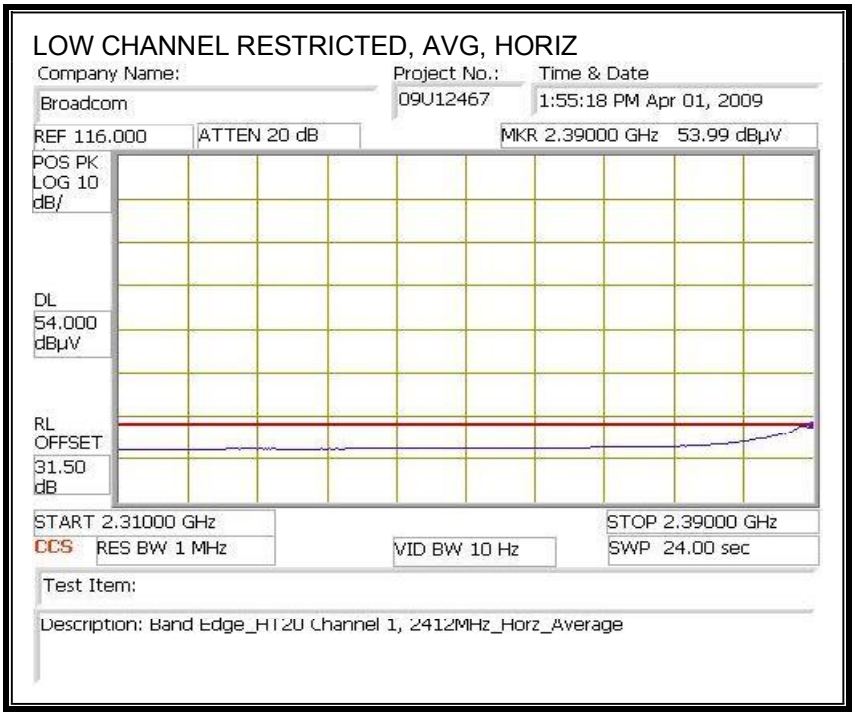
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

8.2.3. 802.11n HT20 MIMO MODE

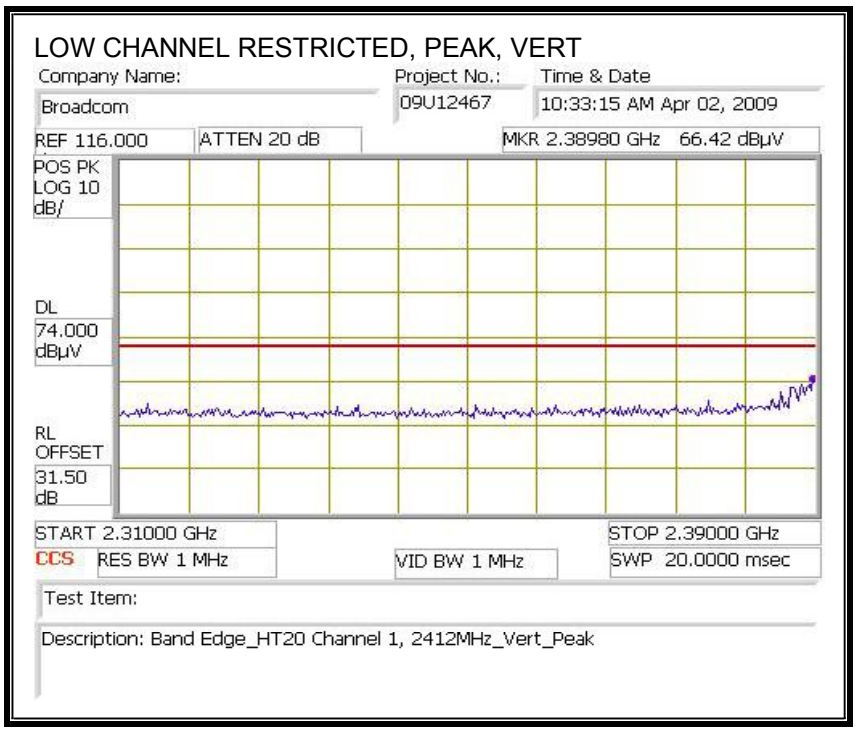
CHANNEL 1, 2412MHz

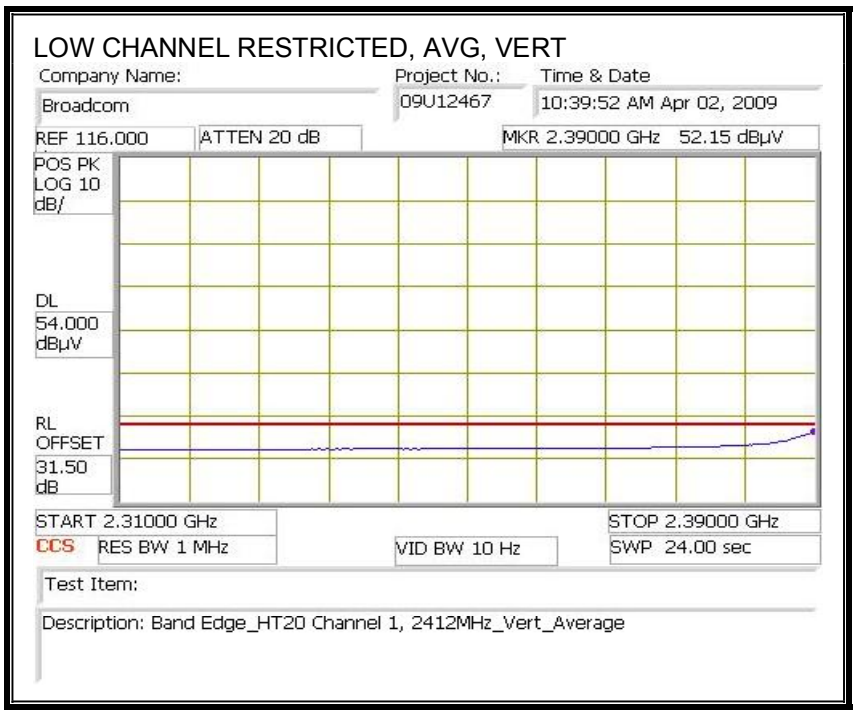
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





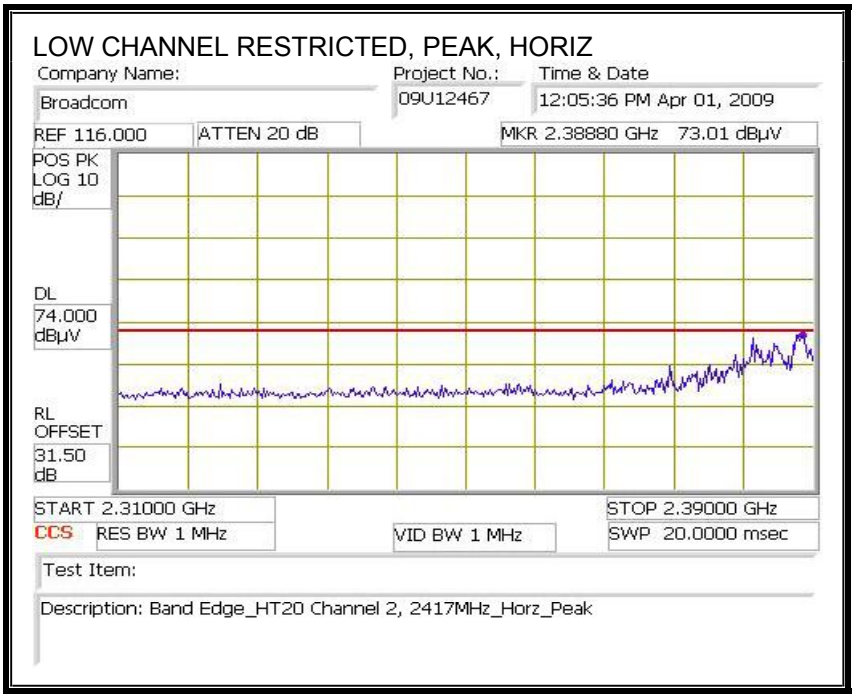
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

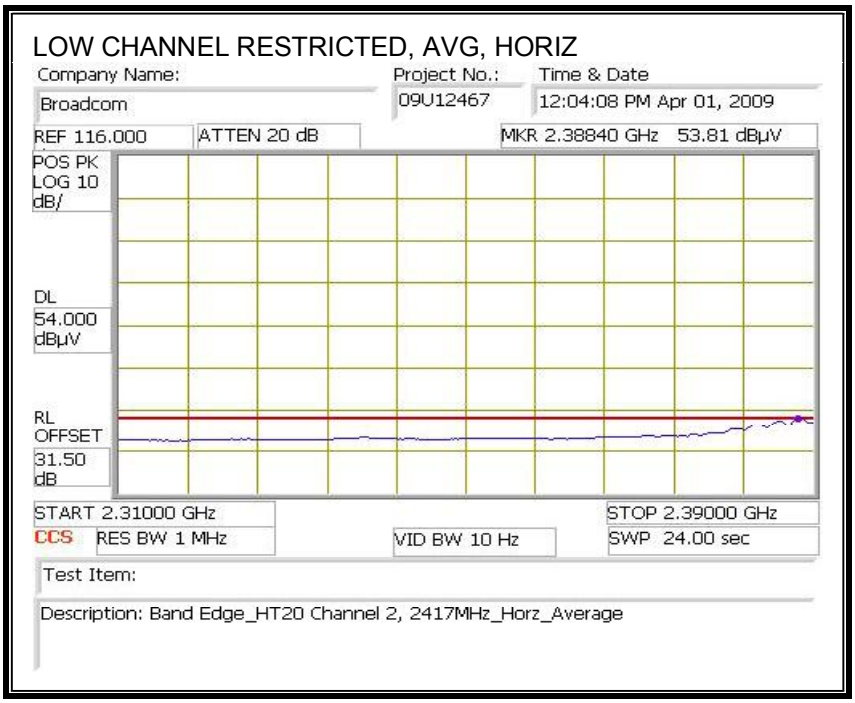




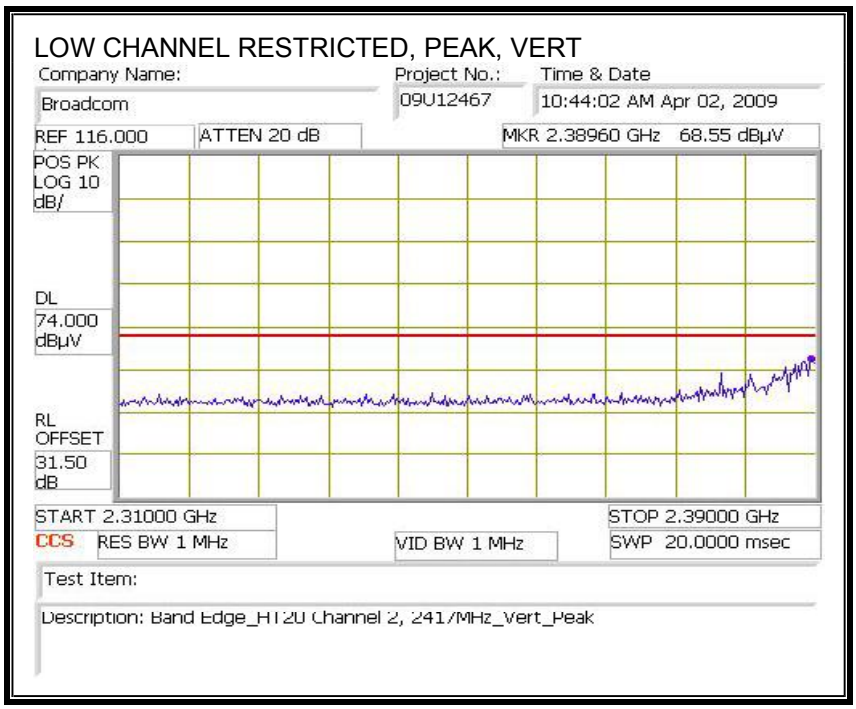
CHANNEL 2, 2417MHz

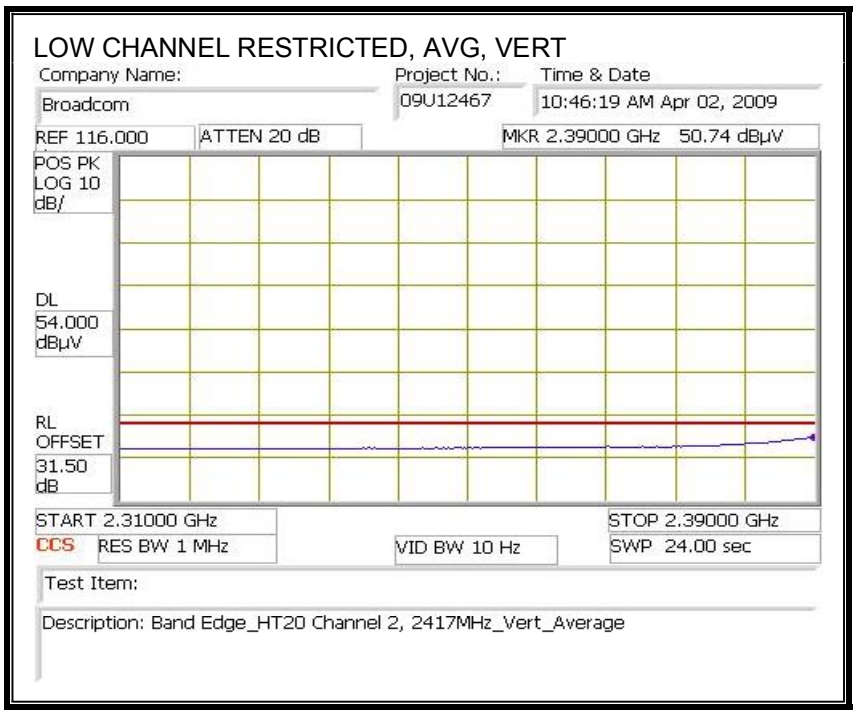
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





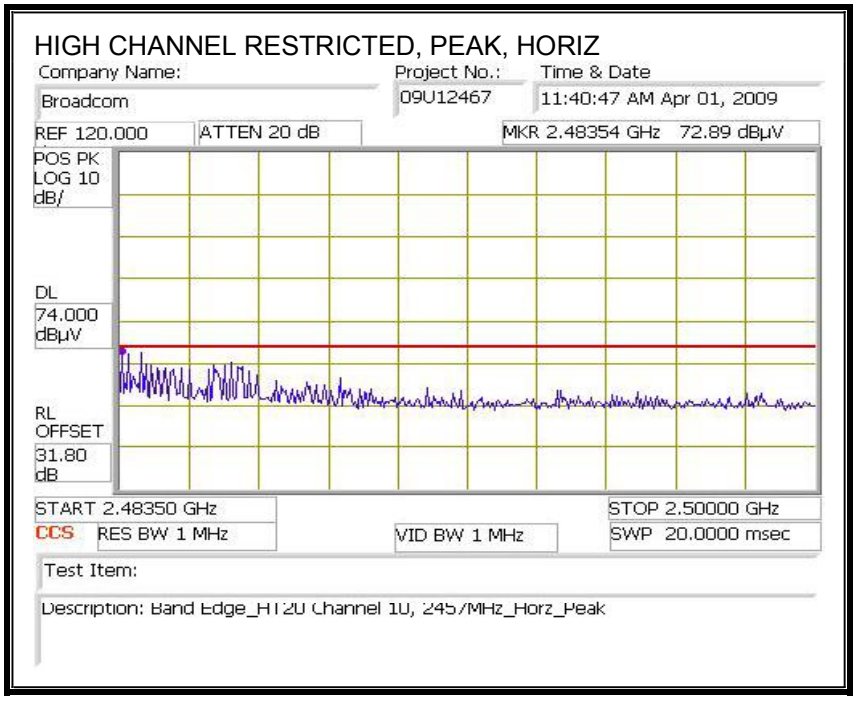
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

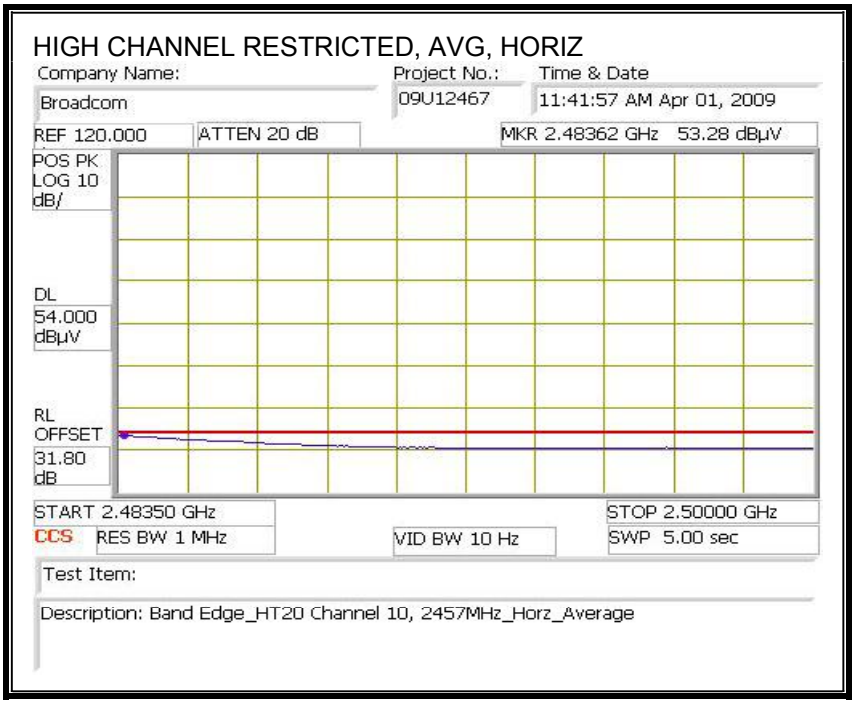




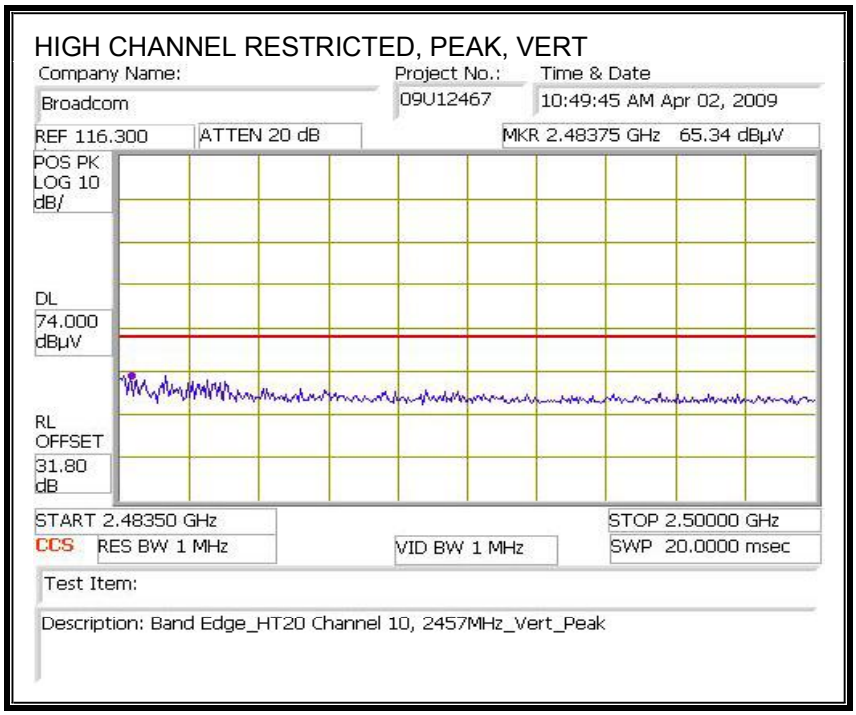
CHANNEL 10, 2457 MHz

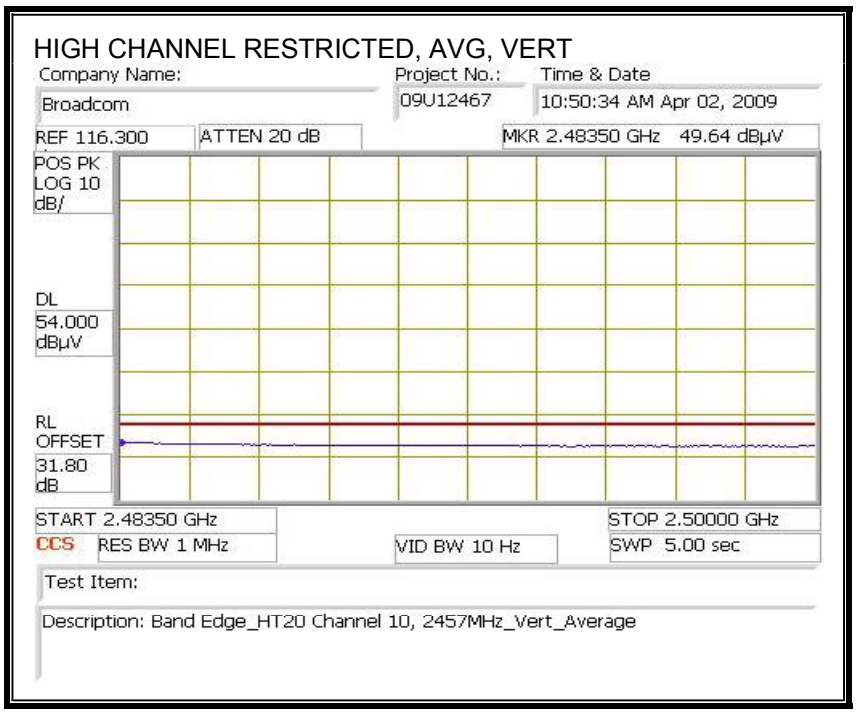
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





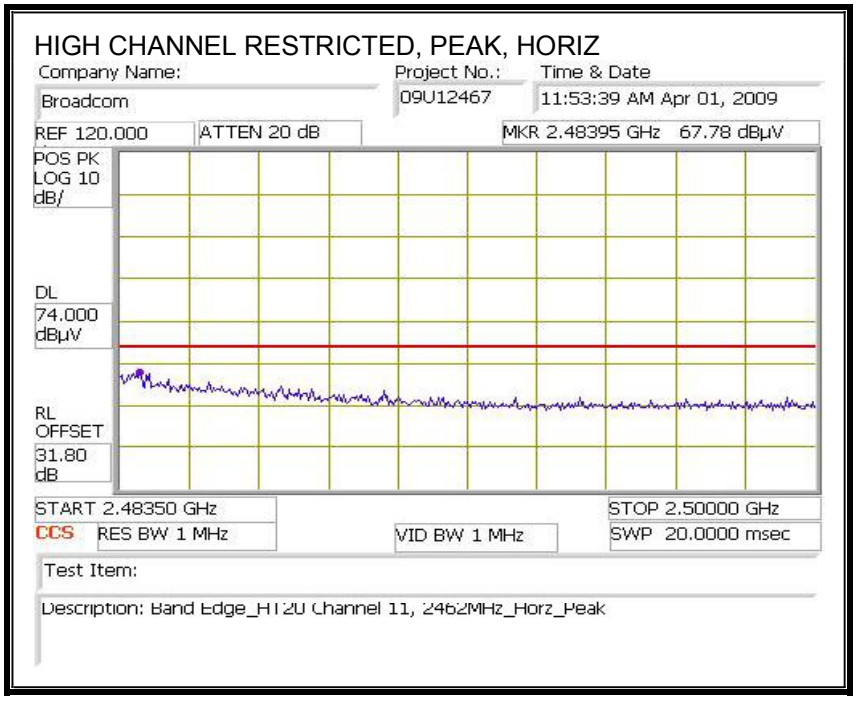
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

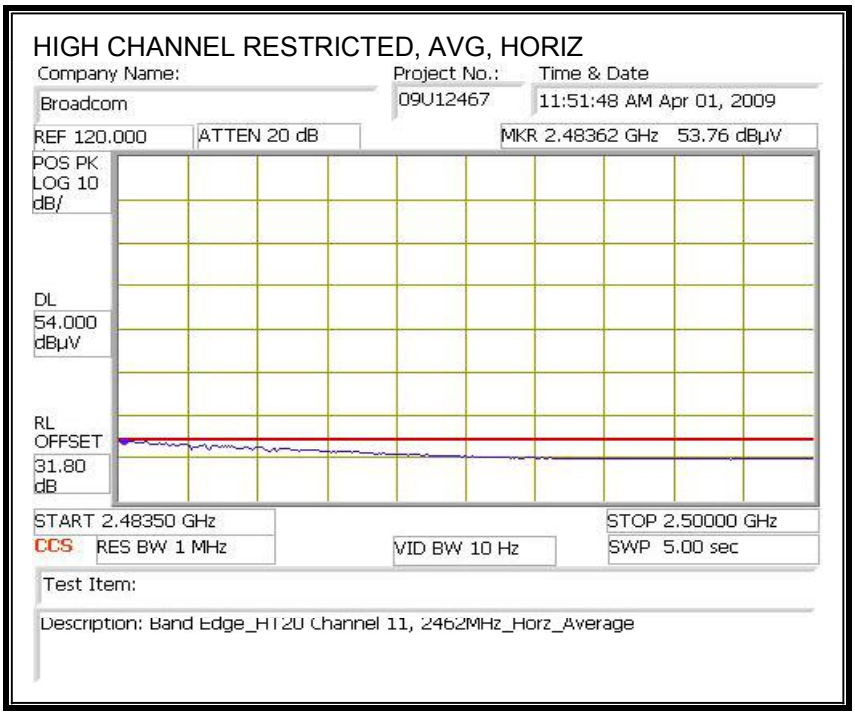




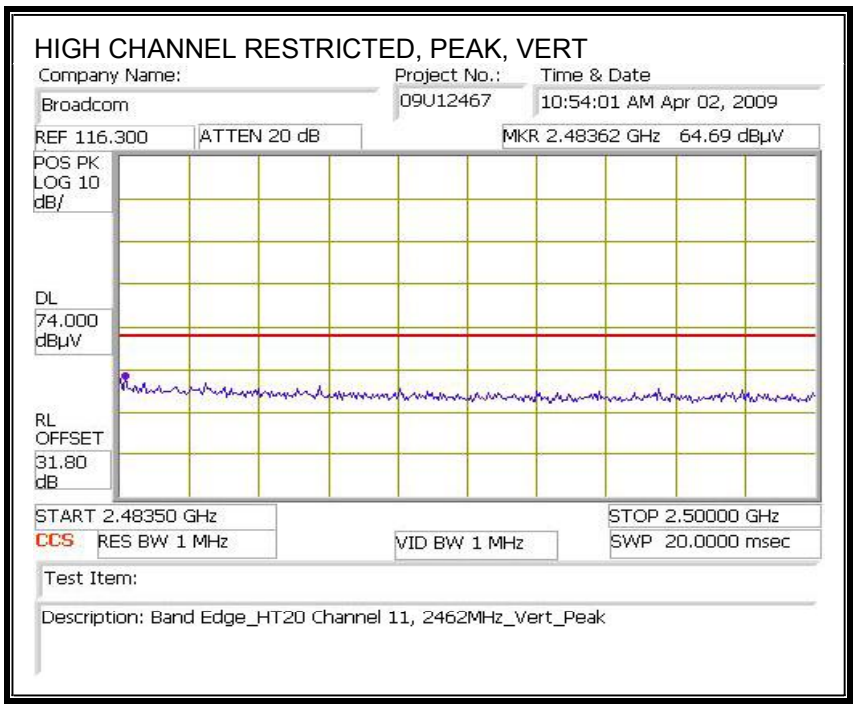
CHANNEL 11, 2462 MHz

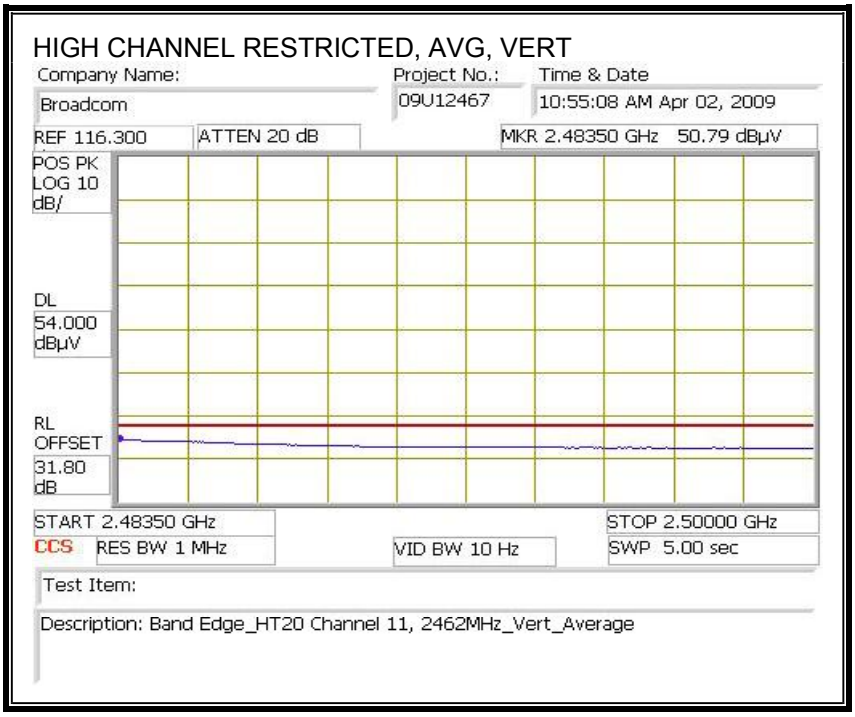
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 09U12467
Date: 04/02/09
Test Engineer: Vien Tran
Configuration: Access Point / Laptop
Mode: Tx HT20 Mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel, 2412MHz															
4.824	3.0	51.3	39.6	32.7	5.8	-34.8	0.0	0.0	54.9	43.3	74	54	-19.1	-10.7	H
4.824	3.0	49.8	37.1	32.7	5.8	-34.8	0.0	0.0	53.4	40.7	74	54	-20.6	-13.3	V
Mid channel, 2437MHz															
4.874	3.0	51.0	40.6	32.7	5.8	-34.8	0.0	0.0	54.7	44.3	74	54	-19.3	-9.7	H
7.311	3.0	49.8	38.9	35.5	7.3	-34.1	0.0	0.0	58.4	47.5	74	54	-15.6	-6.5	H
4.874	3.0	46.1	35.1	32.7	5.8	-34.8	0.0	0.0	49.8	38.8	74	54	-24.2	-15.2	V
7.311	3.0	49.3	36.2	35.5	7.3	-34.1	0.0	0.0	57.9	44.8	74	54	-16.1	-9.2	V
High channel, 2462MHz															
4.924	3.0	51.4	41.3	32.7	5.9	-34.8	0.0	0.0	55.2	45.1	74	54	-18.8	-8.9	H
7.386	3.0	50.4	39.8	35.6	7.3	-34.1	0.0	0.0	59.2	48.6	74	54	-14.8	-5.4	H
4.924	3.0	46.7	35.3	32.7	5.9	-34.8	0.0	0.0	50.5	39.1	74	54	-23.5	-14.9	V
7.386	3.0	50.1	37.2	35.6	7.3	-34.1	0.0	0.0	58.9	46.0	74	54	-15.1	-8.0	V

Rev. 03.09.09

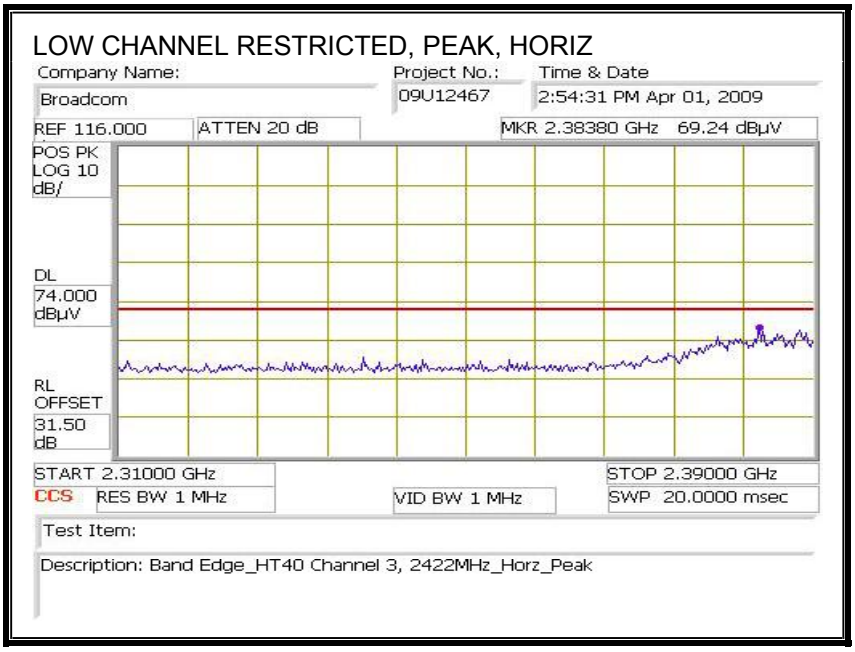
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

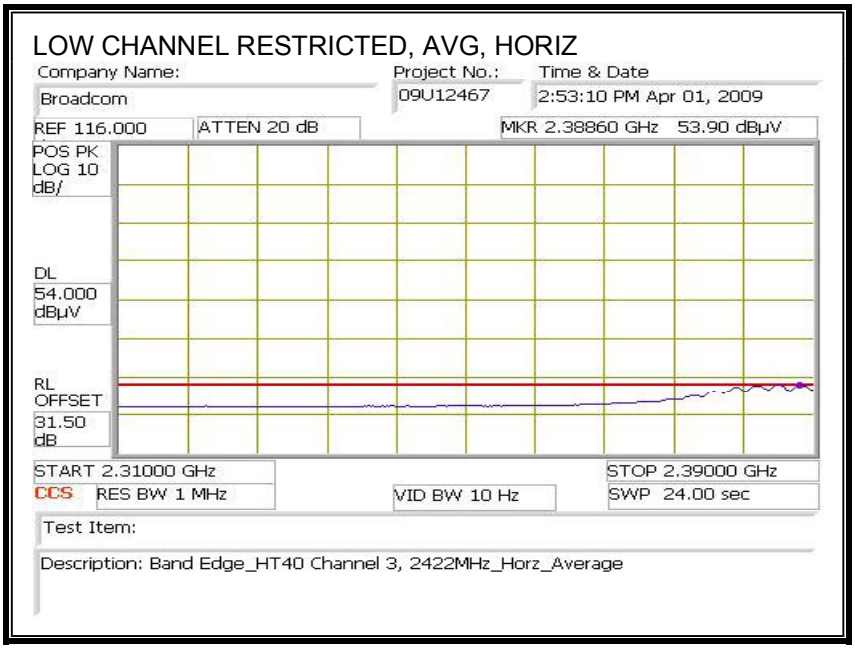
8.2.4. 802.11n HT40 MIMO MODE

MCS0

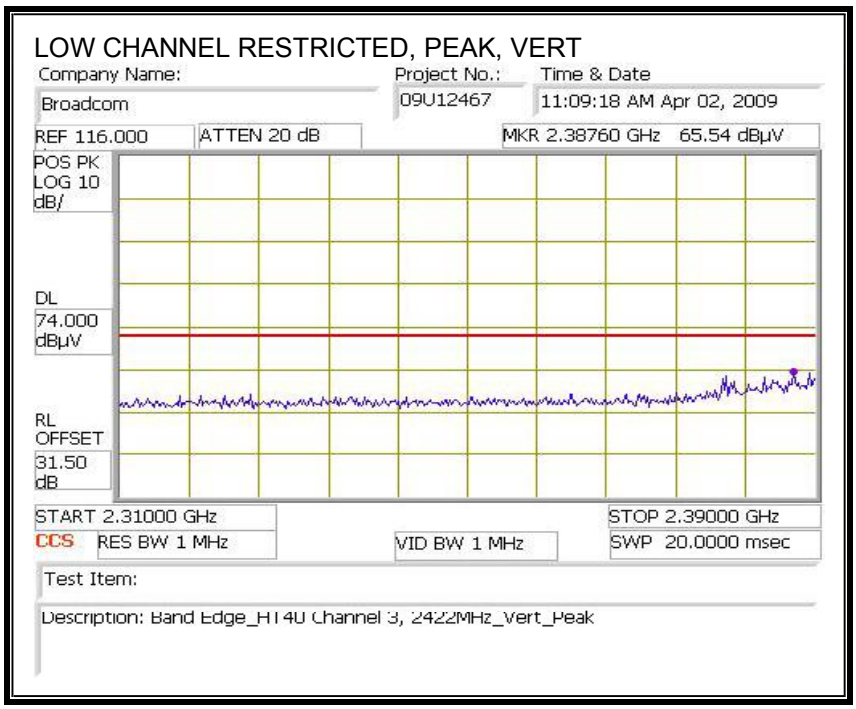
CHANNEL 2422 MHz

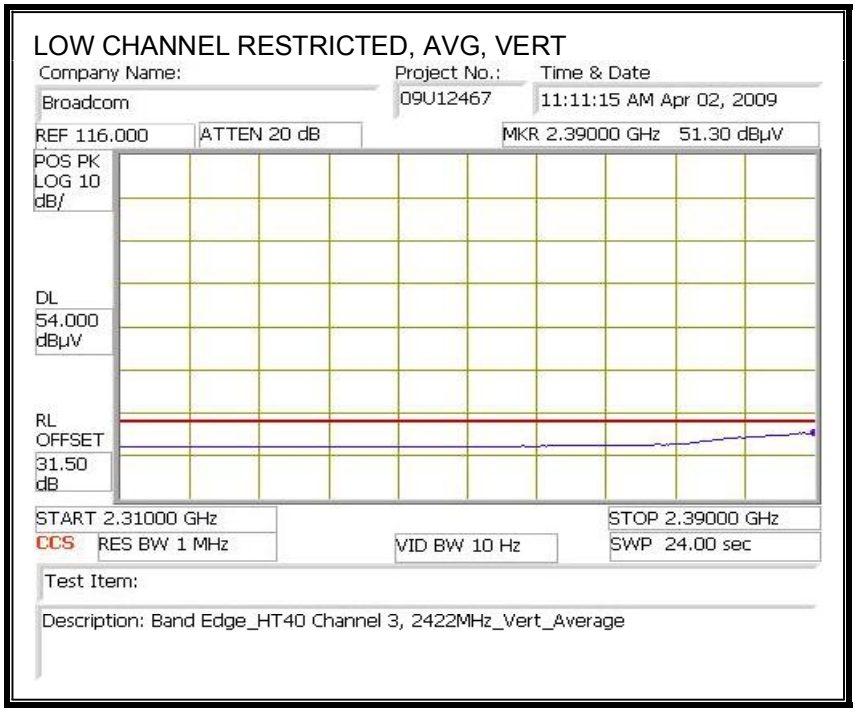
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





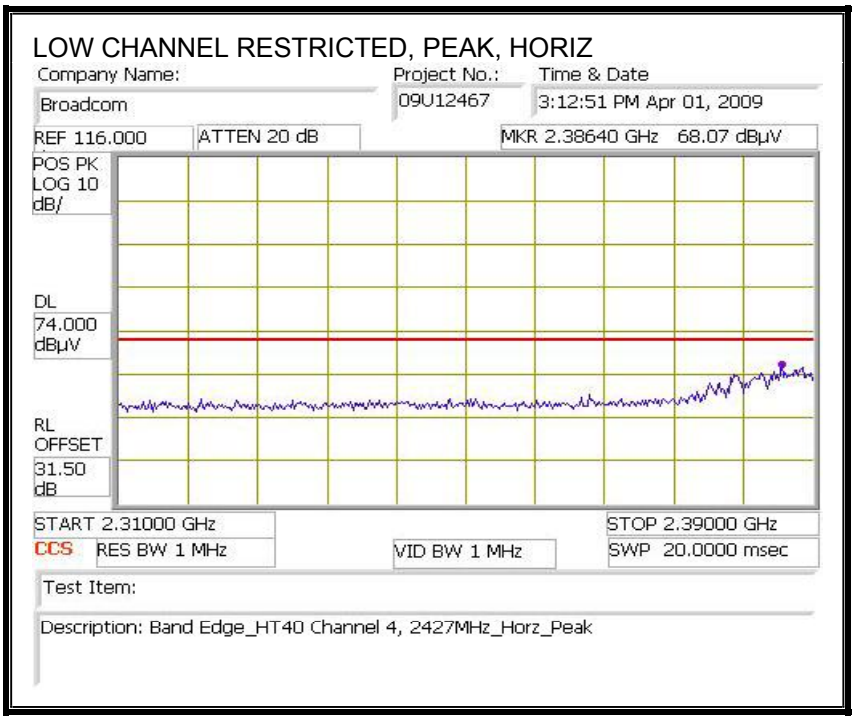
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

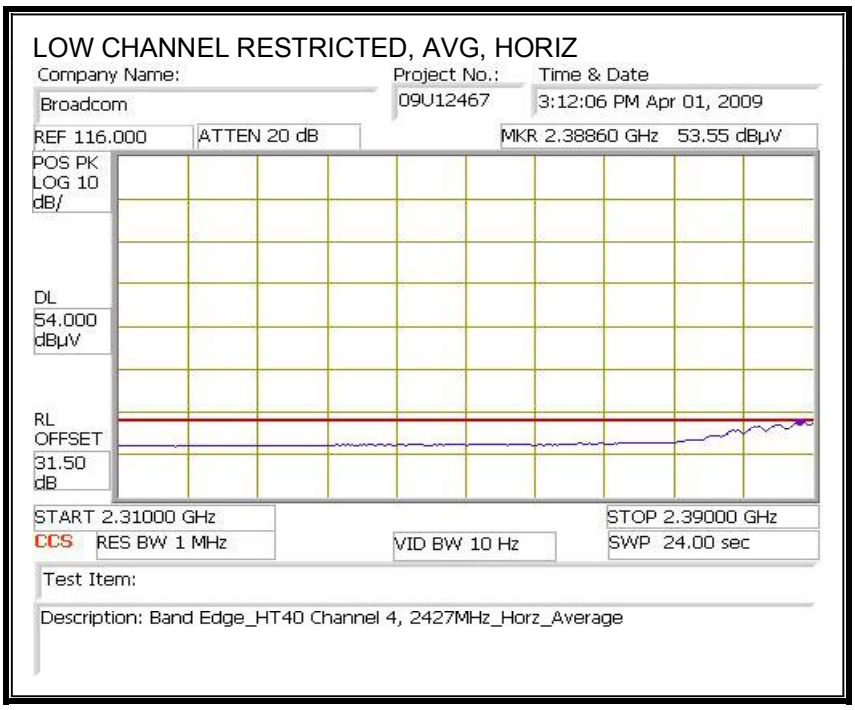




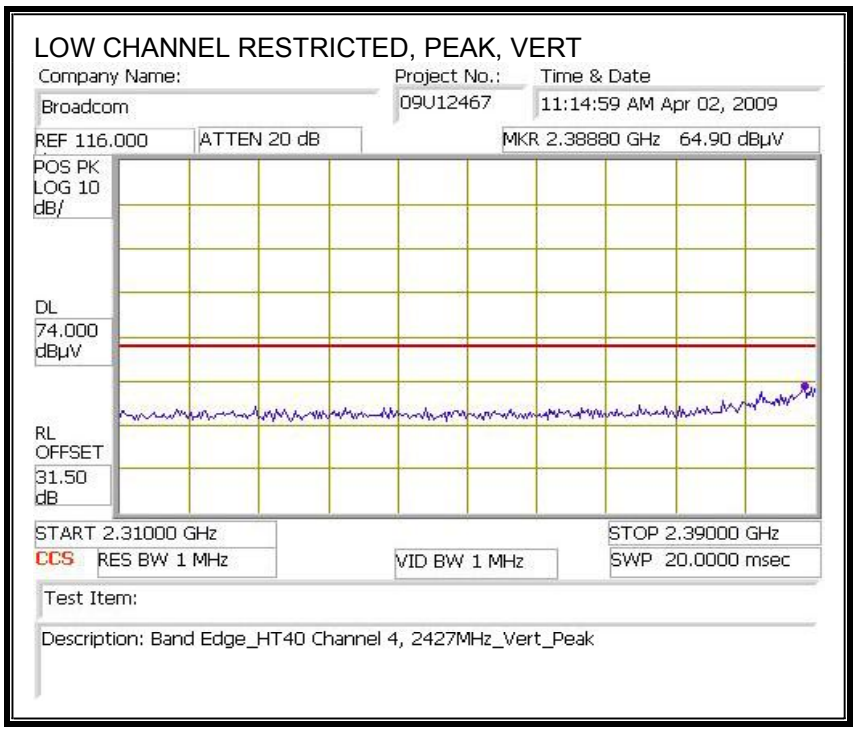
CHANNEL 2427 MHz

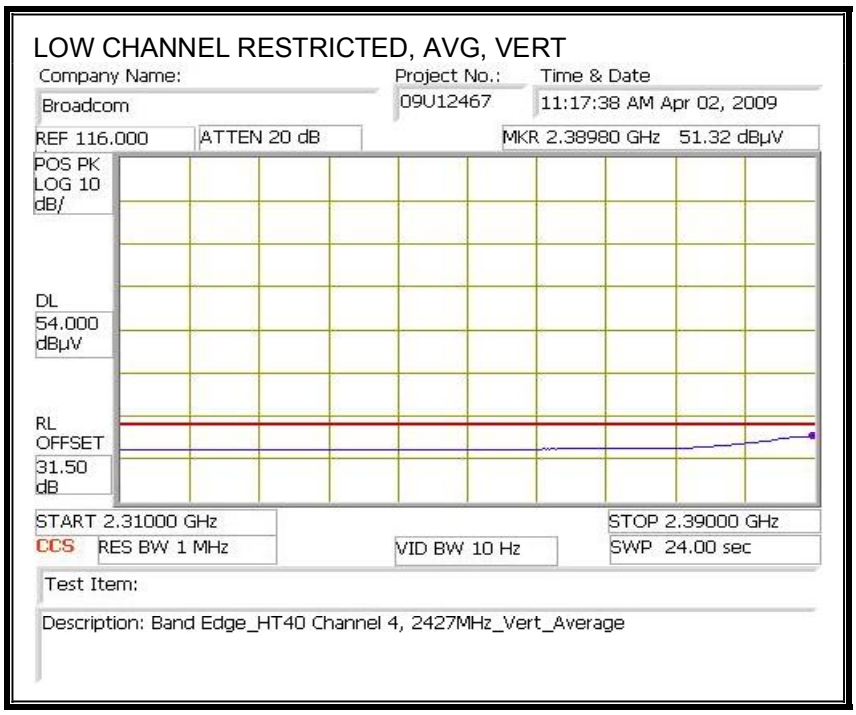
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





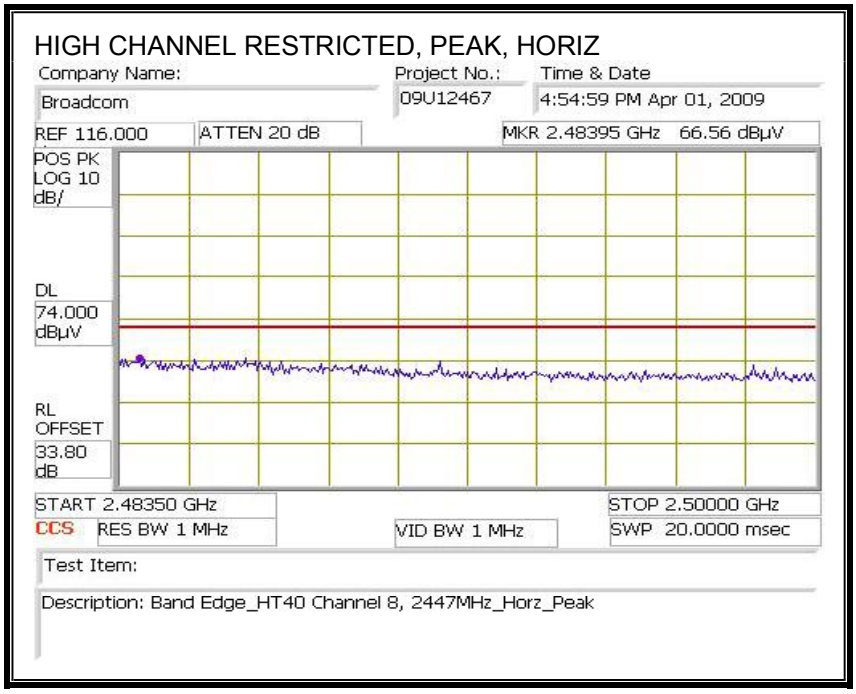
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

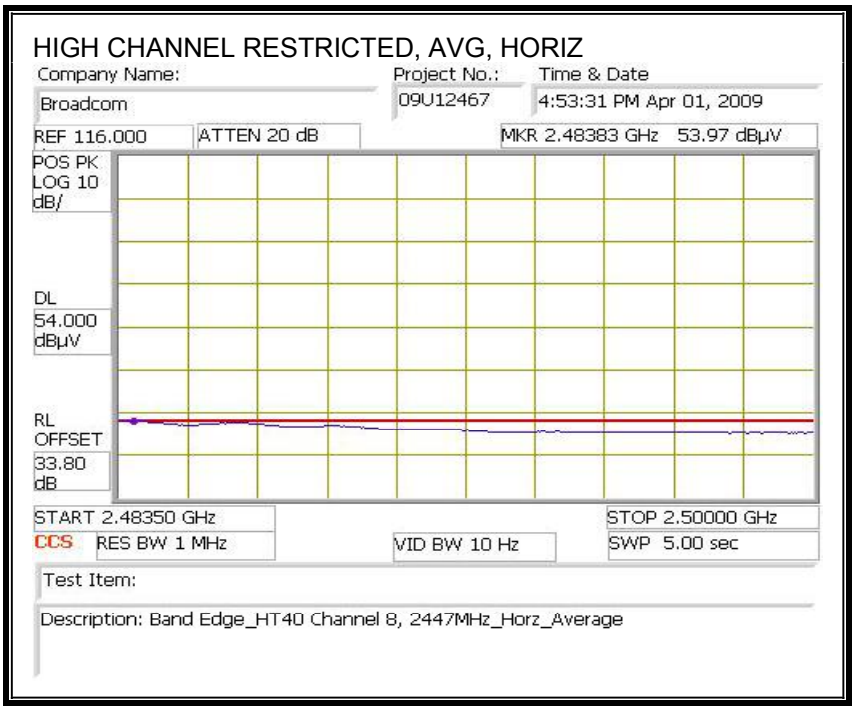




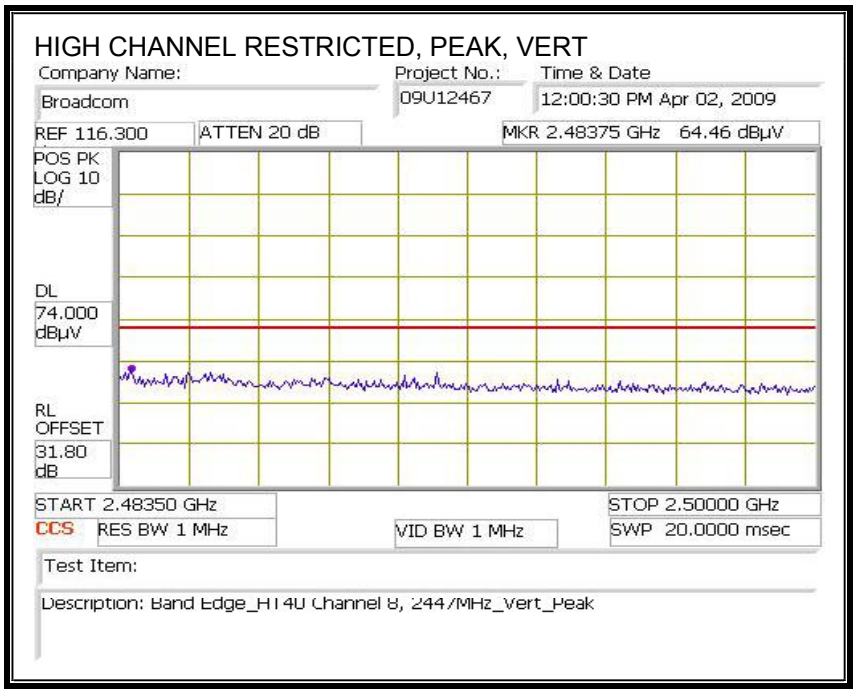
CHANNEL 2447 MHz

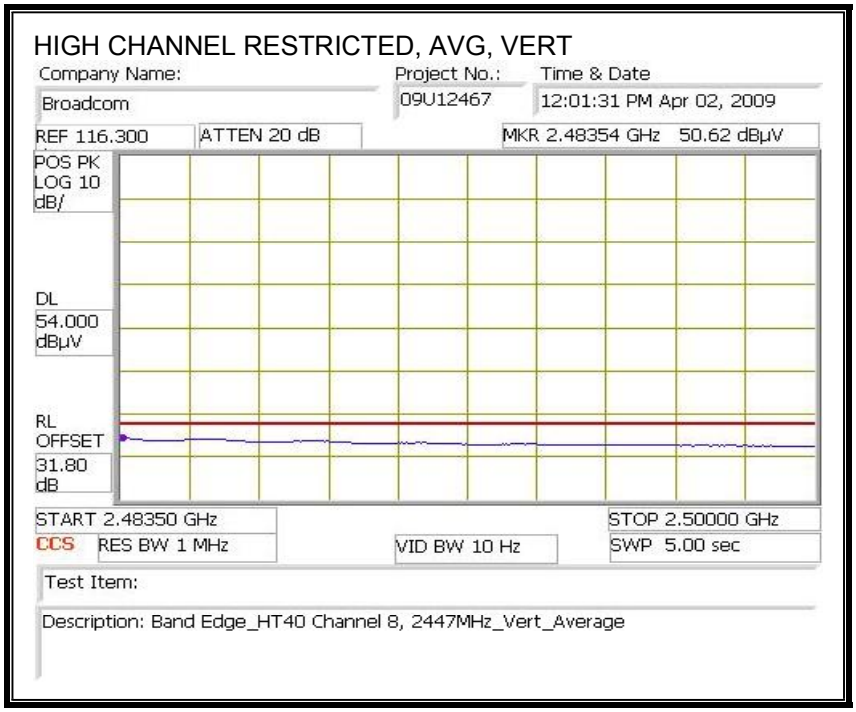
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





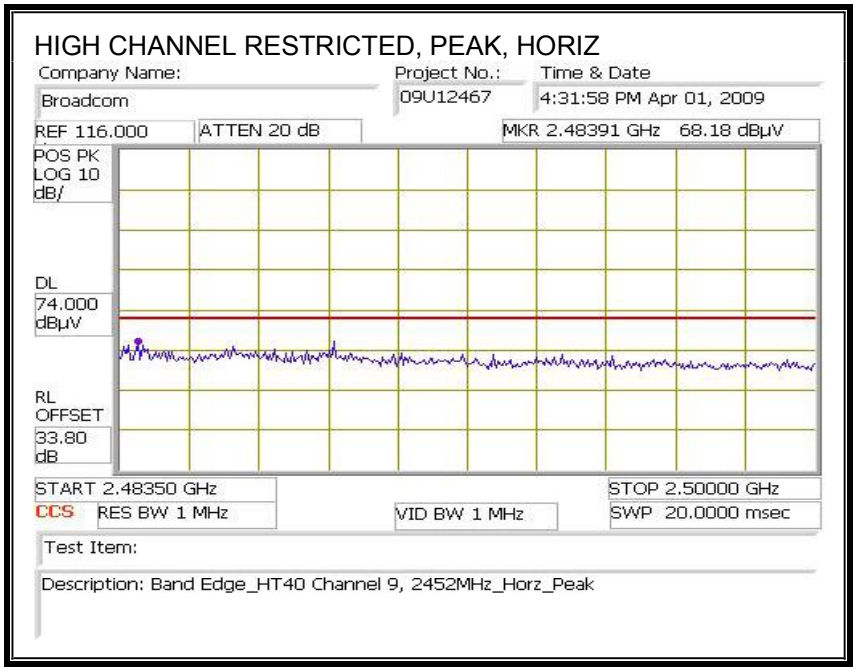
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

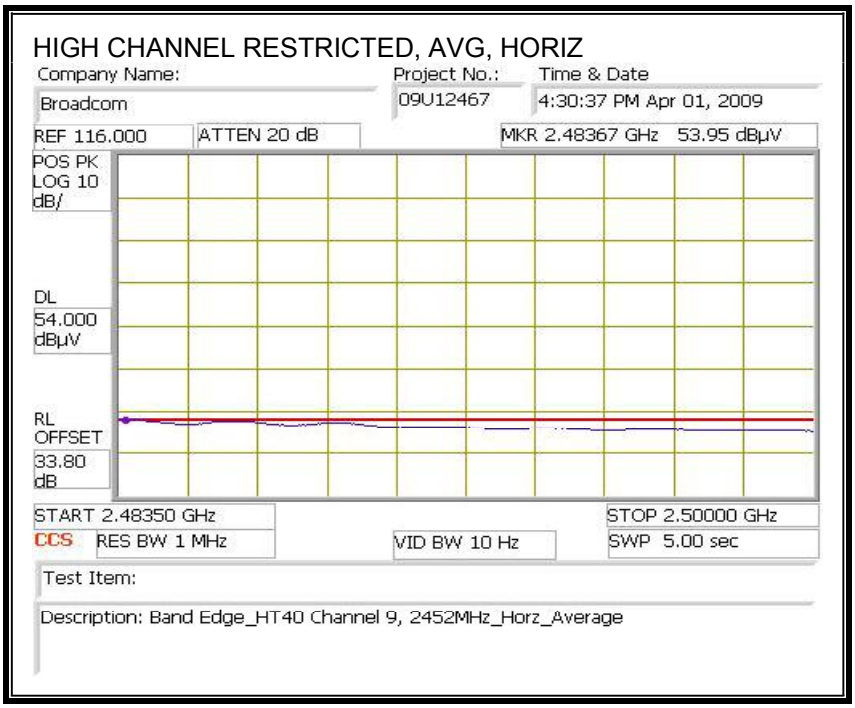




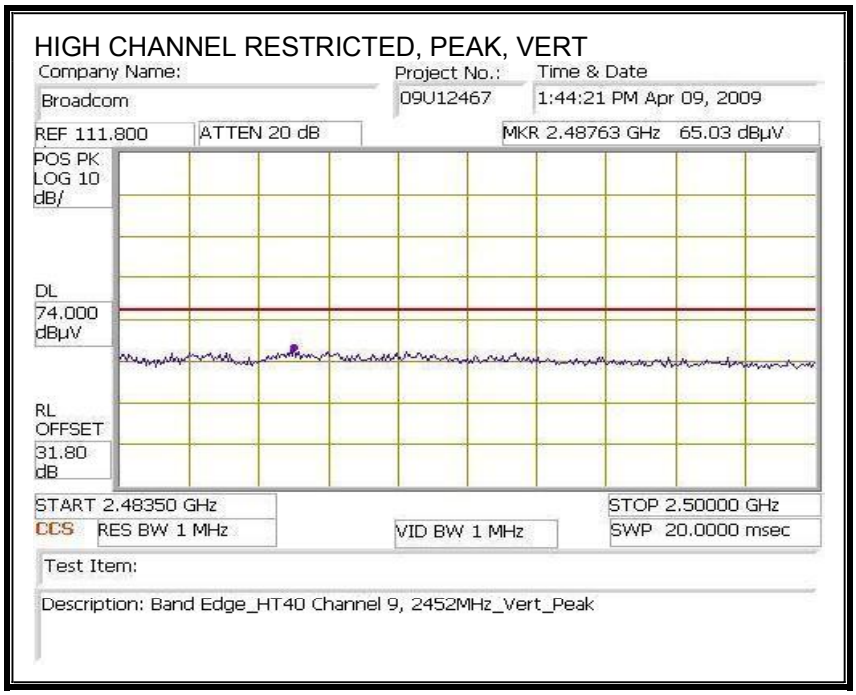
CHANNEL 2452 MHz

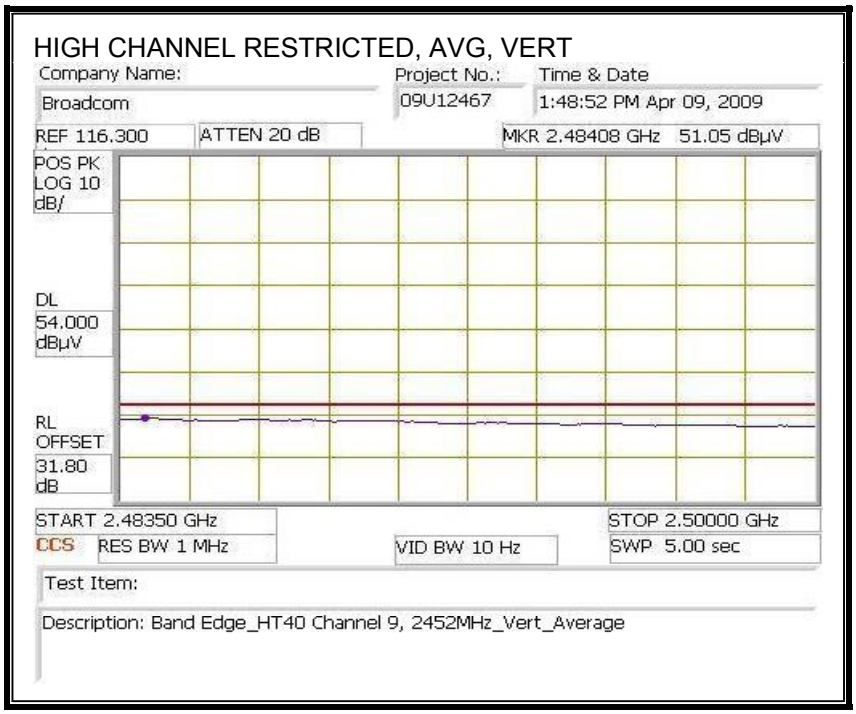
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

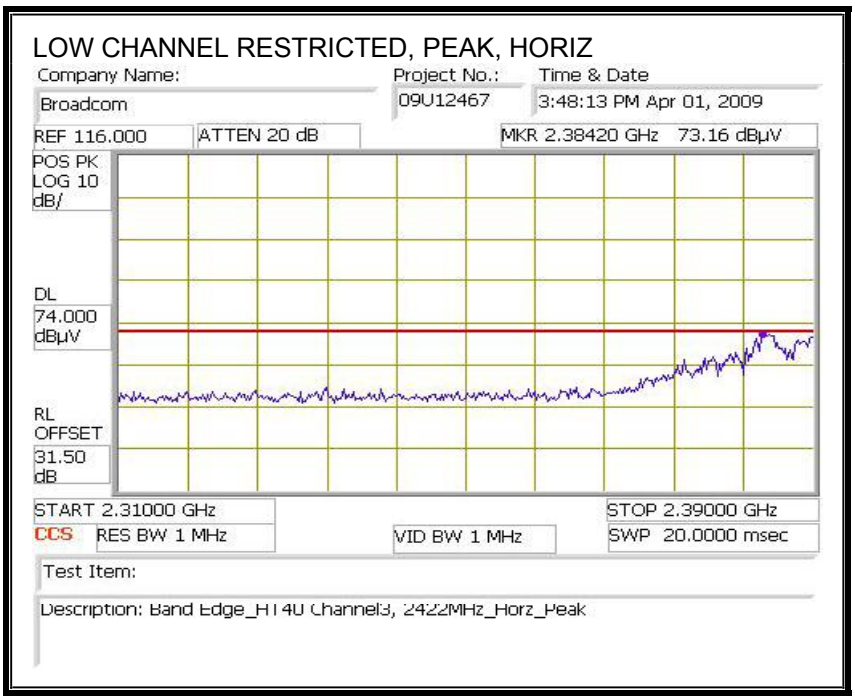


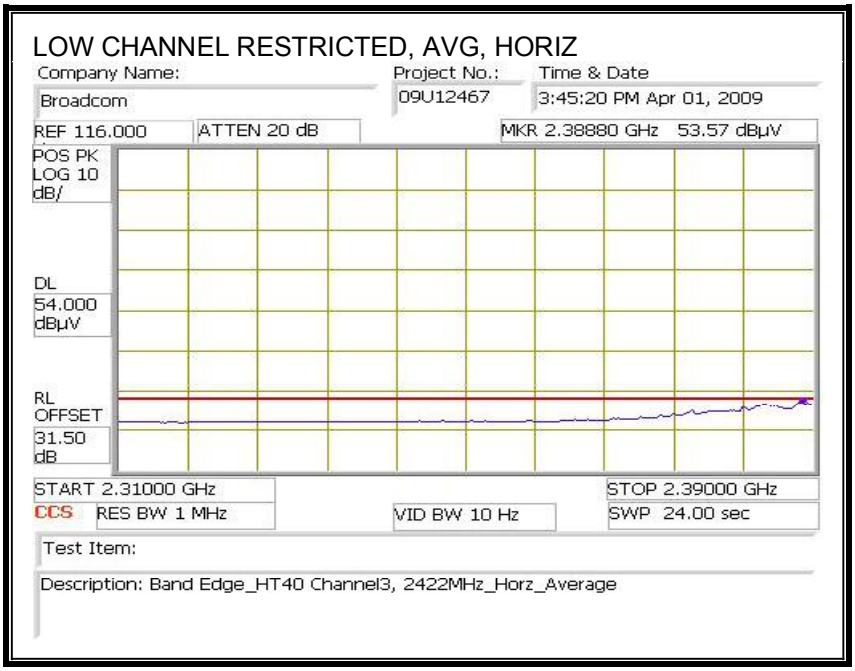


MCS12

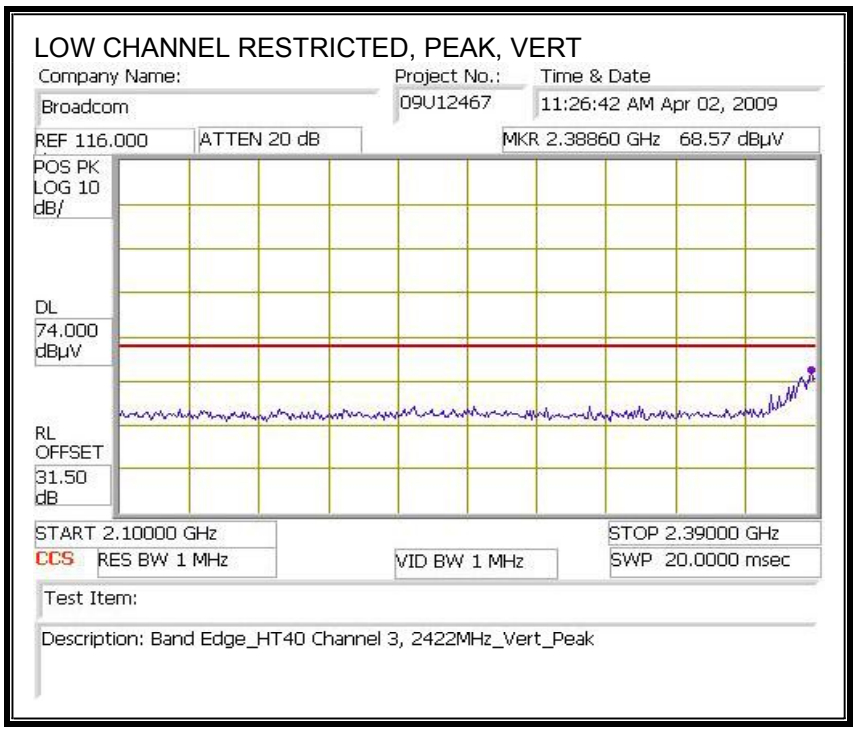
CHANNEL 2422 MHz

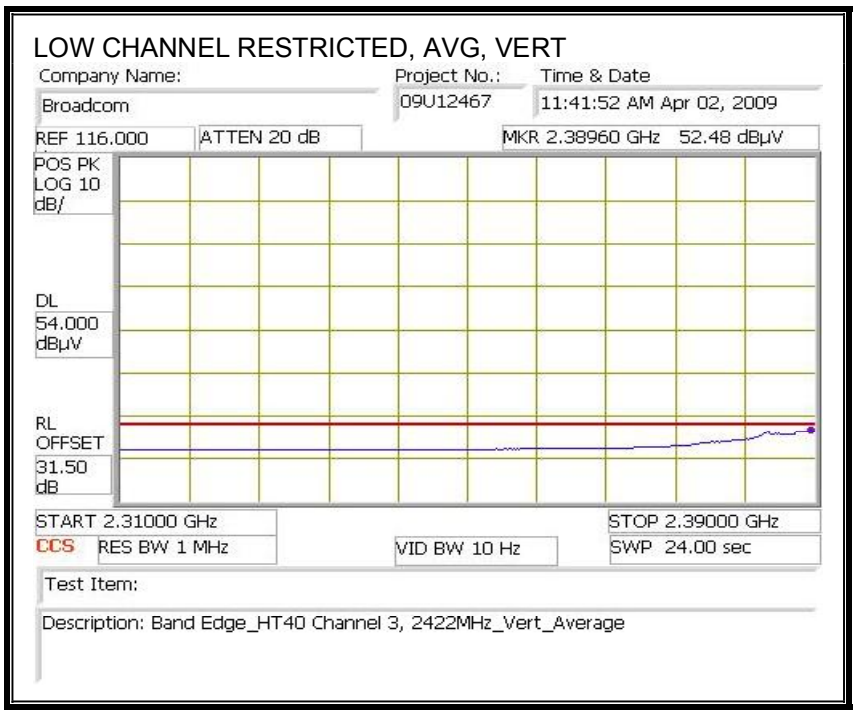
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





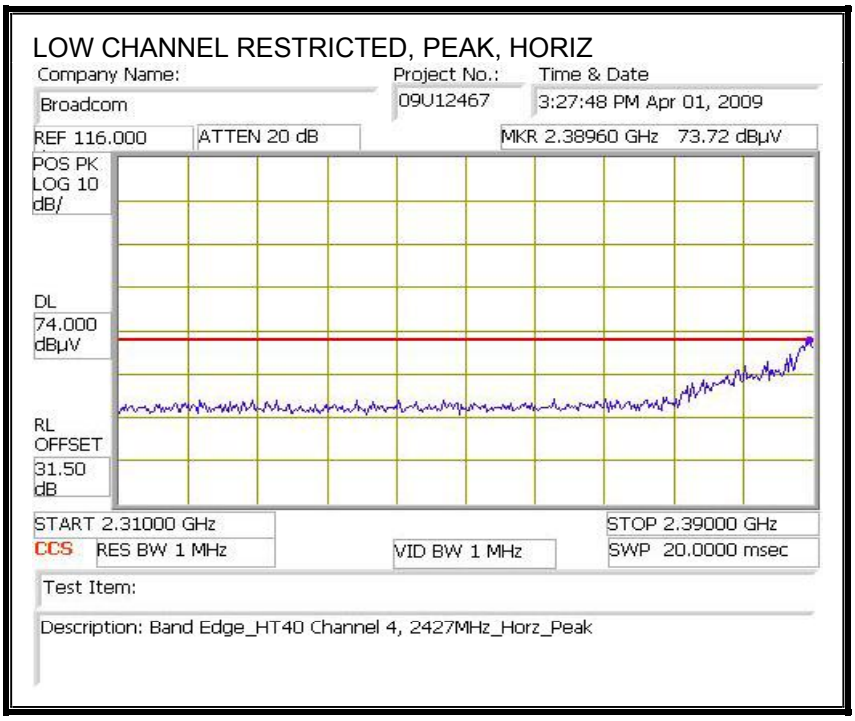
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

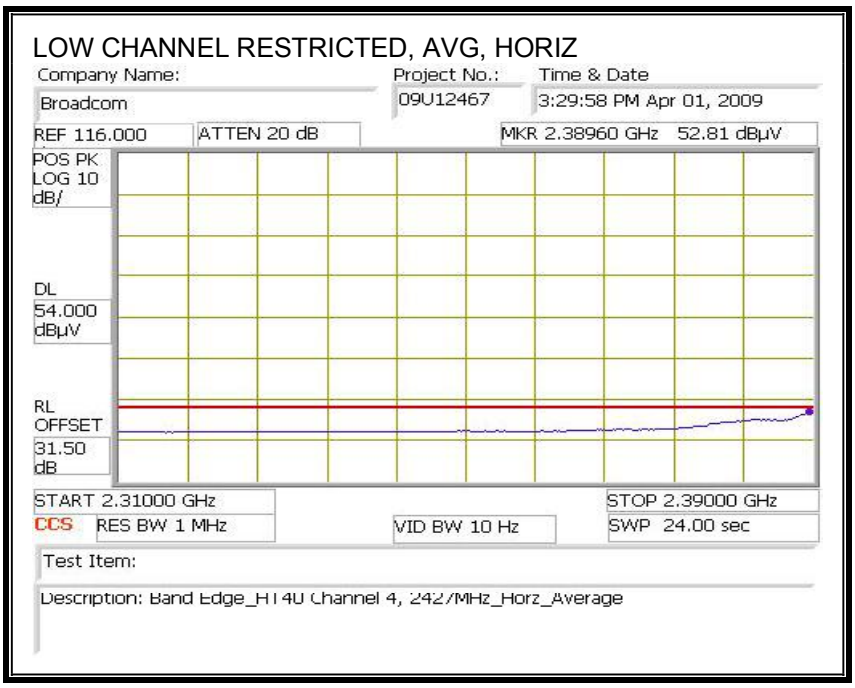




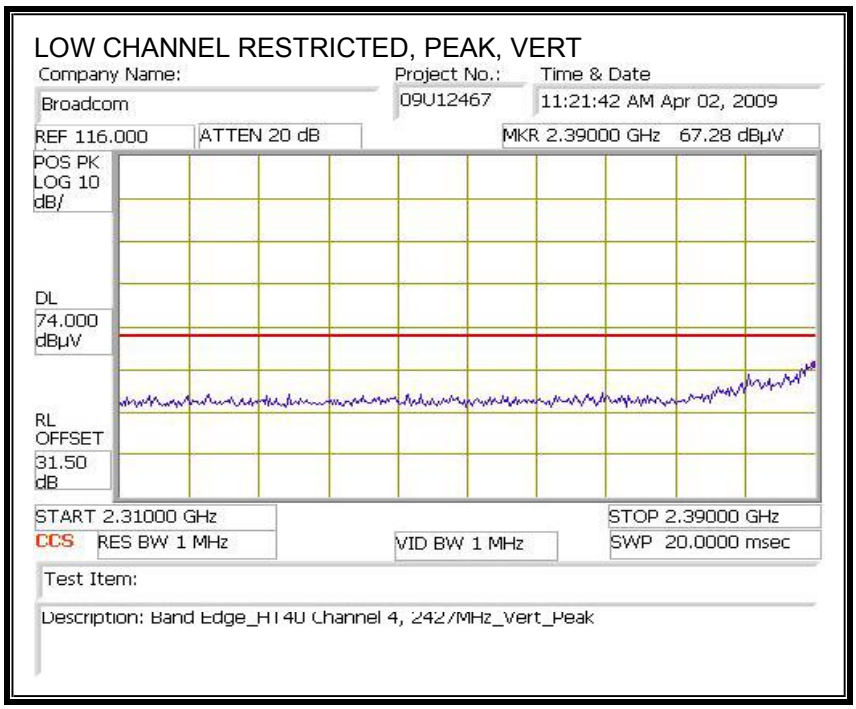
CHANNEL 2427 MHz

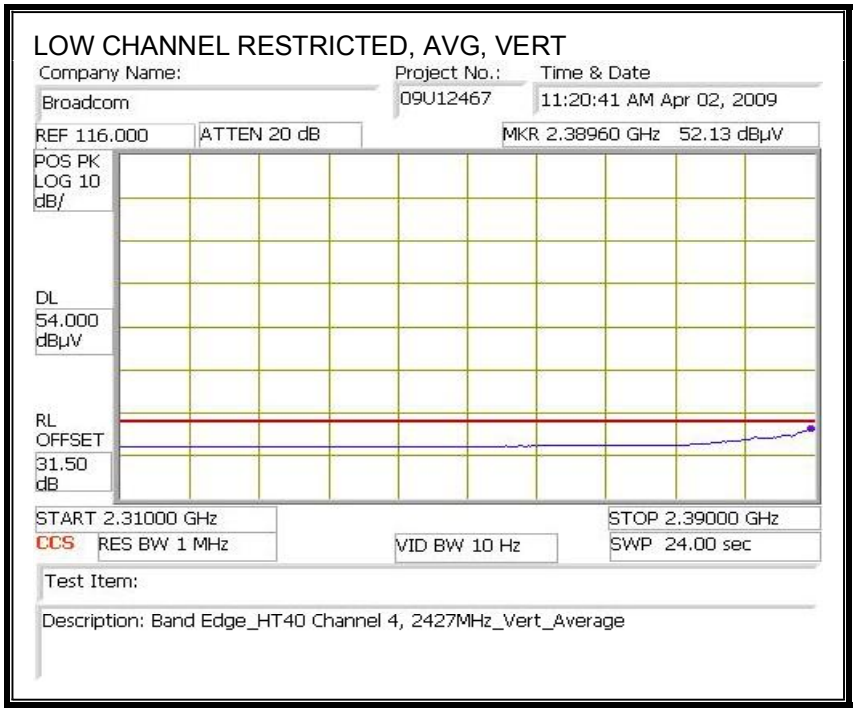
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





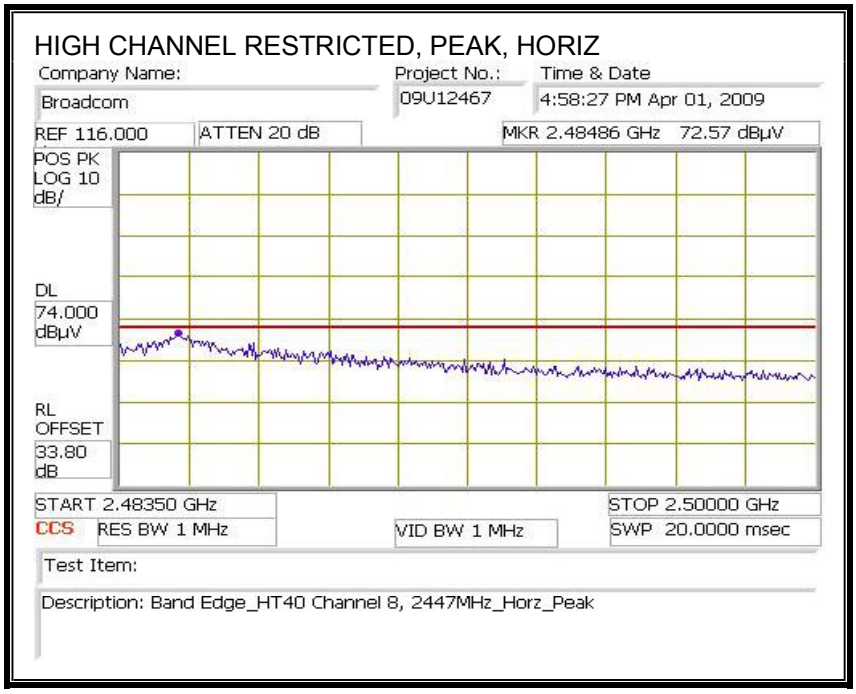
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

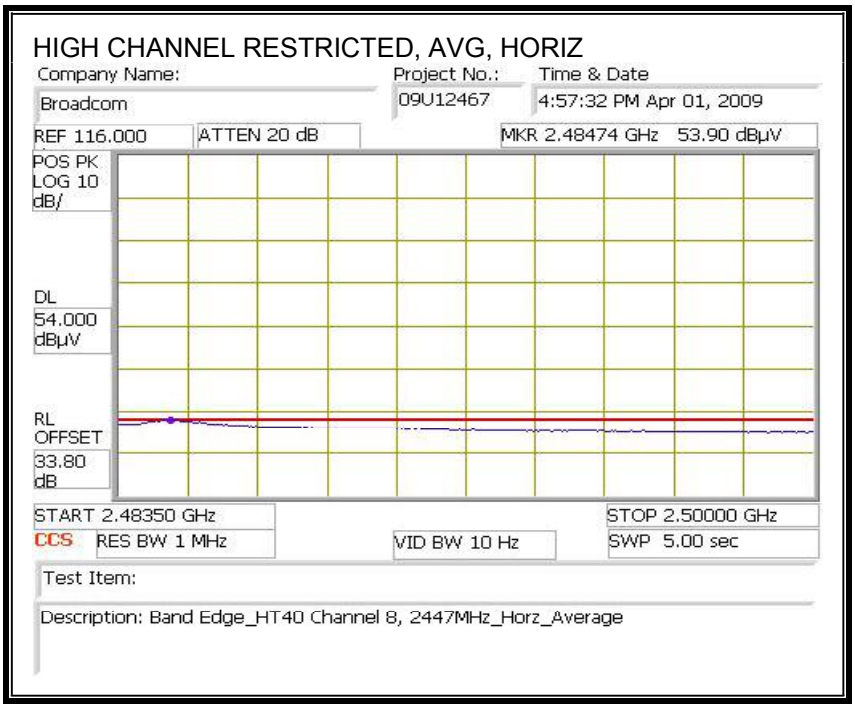




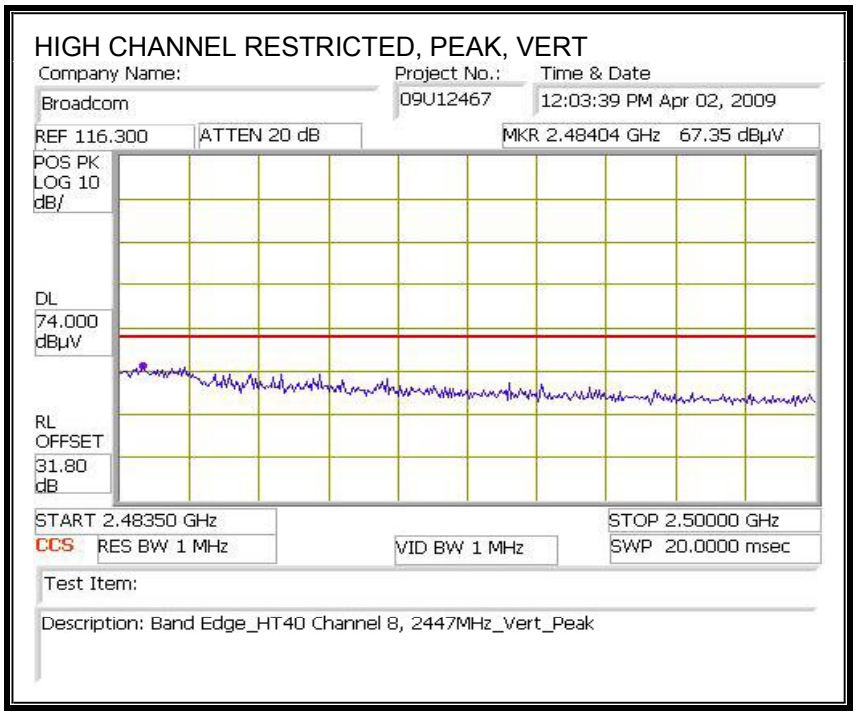
CHANNEL 2447 MHz

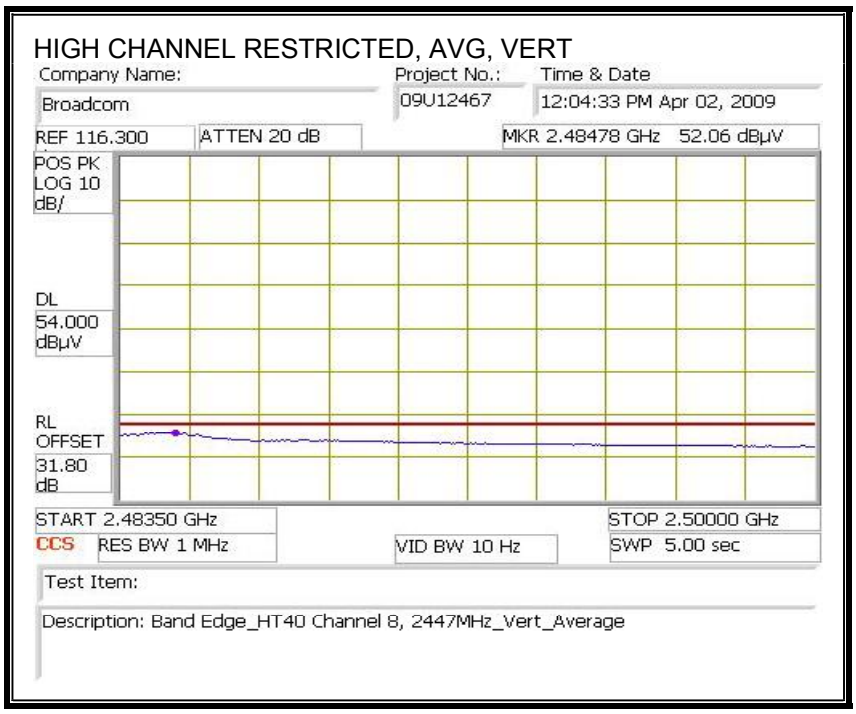
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





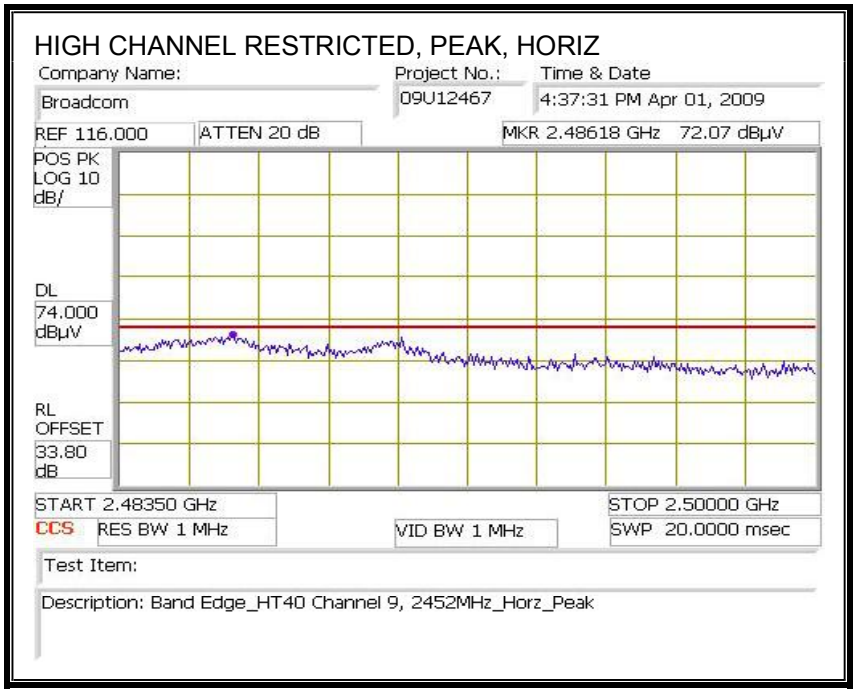
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

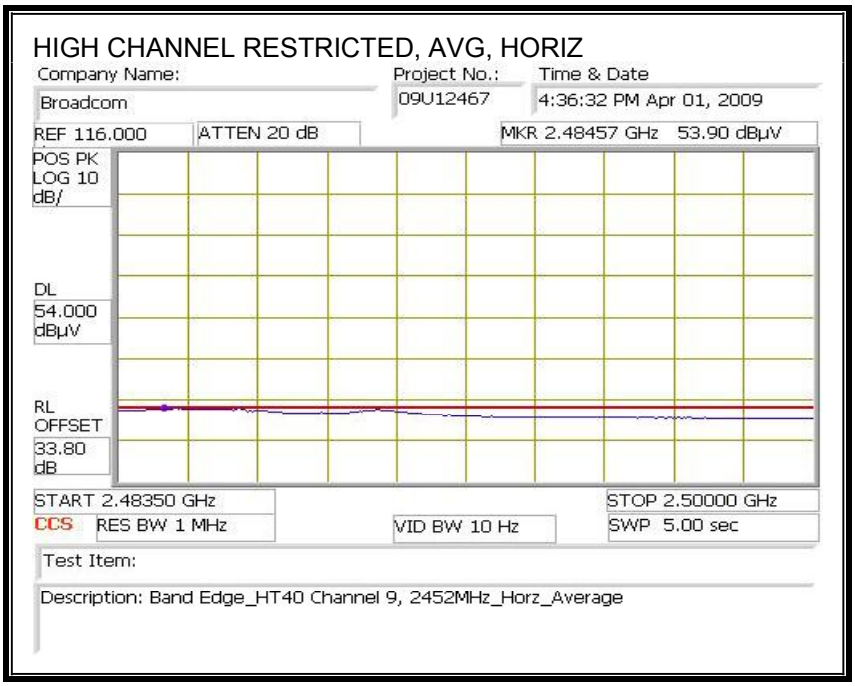




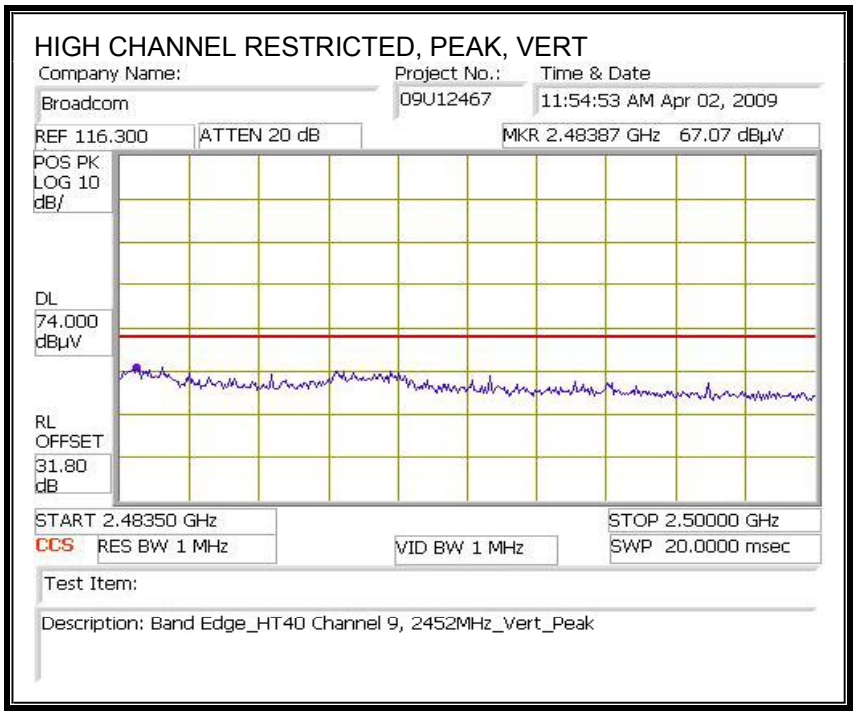
CHANNEL 2452 MHz

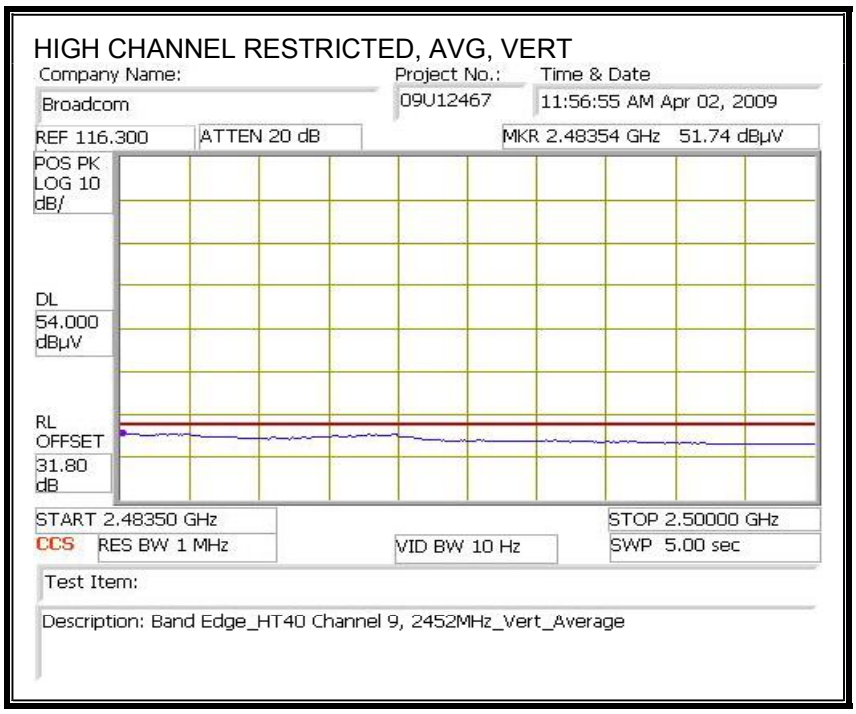
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS – WORST CASE MCS 0

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 09U12467
Date: 04/02/09
Test Engineer: Vien Tran
Configuration: Access Point / Laptop
Mode: Tx HT40 Mode_MCS 0

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel, 2422MHz															
4.844	3.0	45.1	32.9	32.7	5.8	-34.8	0.0	0.0	48.8	36.5	74	54	-25.2	-17.5	H
4.844	3.0	43.2	30.7	32.7	5.8	-34.8	0.0	0.0	46.9	34.4	74	54	-27.1	-19.6	V
Mid channel, 2437MHz															
4.874	3.0	44.3	32.8	32.7	5.8	-34.8	0.0	0.0	48.0	36.5	74	54	-26.0	-17.5	H
7.311	3.0	43.0	32.2	35.5	7.3	-34.1	0.0	0.0	51.6	40.8	74	54	-22.4	-13.2	H
4.874	3.0	42.8	30.9	32.7	5.8	-34.8	0.0	0.0	46.5	34.6	74	54	-27.5	-19.4	V
7.311	3.0	40.8	29.0	35.5	7.3	-34.1	0.0	0.0	49.4	37.6	74	54	-24.6	-16.4	V
High channel, 2452MHz															
4.904	3.0	44.5	33.2	32.7	5.9	-34.8	0.0	0.0	48.3	37.0	74	54	-25.7	-17.0	H
7.356	3.0	41.8	31.8	35.5	7.3	-34.1	0.0	0.0	50.5	40.5	74	54	-23.5	-13.5	H
4.904	3.0	42.2	30.5	32.7	5.9	-34.8	0.0	0.0	46.0	34.3	74	54	-28.0	-19.7	V
7.356	3.0	40.2	28.1	35.5	7.3	-34.1	0.0	0.0	48.9	36.8	74	54	-25.1	-17.2	V

Rev. 03.09.09

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

8.3. RECEIVER ABOVE 1 GHz

8.3.1. 20 MHz BANDWIDTH IN THE 2.4 GHz BAND

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 09U12467
Date: 04/02/09
Test Engineer: Vien Tran
Configuration: Access Point / Laptop
Mode: Rx HT20 Mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			RX RSS 210

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.197	3.0	55.8	36.8	25.1	2.6	-38.0	0.0	0.0	45.5	26.5	74	54	-28.5	-27.5	H
1.460	3.0	56.8	38.6	26.0	2.9	-37.6	0.0	0.0	48.1	29.9	74	54	-25.9	-24.1	H
2.437	3.0	51.9	48.9	28.1	3.9	-36.3	0.0	0.0	47.6	44.6	74	54	-26.4	-9.4	H
1.197	3.0	58.5	44.6	25.1	2.6	-38.0	0.0	0.0	48.2	34.3	74	54	-25.8	-19.7	V
1.460	3.0	61.1	39.8	26.0	2.9	-37.6	0.0	0.0	52.4	31.1	74	54	-21.6	-22.9	V
2.437	3.0	48.6	43.8	28.1	3.9	-36.3	0.0	0.0	44.3	39.5	74	54	-29.7	-14.5	V

Rev. 03.09.09

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

8.3.2. 40 MHz BANDWIDTH IN THE 2.4 GHz BAND

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 09U12467
Date: 04/02/09
Test Engineer: Vien Tran
Configuration: Access Point / Laptop
Mode: Rx HT40 Mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			RX RSS 210

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.197	3.0	58.9	39.9	25.1	2.6	-38.0	0.0	0.0	48.6	29.6	74	54	-25.4	-24.4	H
1.460	3.0	55.8	37.6	26.0	2.9	-37.6	0.0	0.0	47.1	28.9	74	54	-26.9	-25.1	H
2.437	3.0	51.9	47.9	28.1	3.9	-36.3	0.0	0.0	47.6	43.6	74	54	-26.4	-10.4	H
1.197	3.0	56.1	44.5	25.1	2.6	-38.0	0.0	0.0	45.8	34.2	74	54	-28.2	-19.8	V
1.460	3.0	53.2	37.8	26.0	2.9	-37.6	0.0	0.0	44.5	29.1	74	54	-29.5	-24.9	V
2.437	3.0	47.6	40.8	28.1	3.9	-36.3	0.0	0.0	43.3	36.5	74	54	-30.7	-17.5	V

Rev. 03.09.09

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

8.4. WORST-CASE BELOW 1 GHz

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

The Radiated Emission 30 – 1000MHz test is not to be performed by CCS.

Please see WRT310N v2 FCC 15C TX Low band emission test report 03_30_2009 from ADT lab.

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

ANSI C63.4

RESULTS

6 WORST EMISSIONS

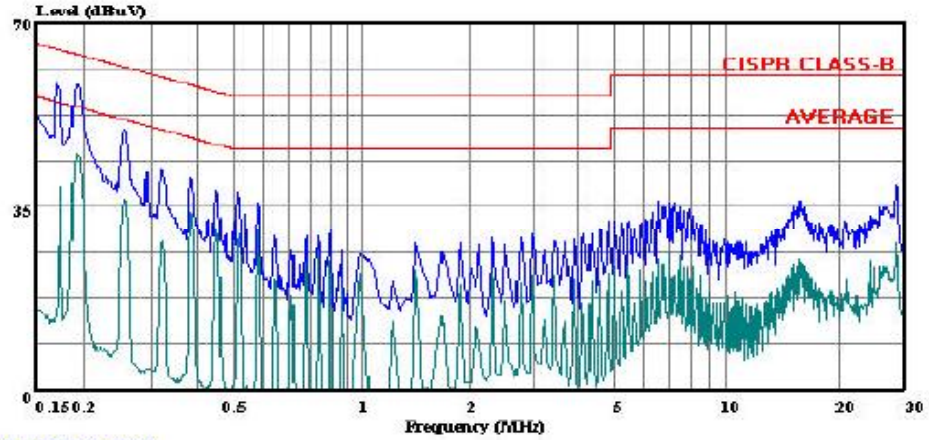
CONDUCTED EMISSIONS DATA (115VAC 60Hz)

Freq.	Reading			Closs	Limit	FCC_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.17	58.18	--	38.83	0.00	64.96	54.96	-6.78	-16.13	L1
0.19	58.04	--	44.73	0.00	63.91	53.91	-5.87	-9.18	L1
0.26	49.35	--	35.96	0.00	61.46	51.46	-12.11	-15.50	L1
0.19	55.89	--	43.14	0.00	63.91	53.91	-8.02	-10.77	L2
0.26	47.70	--	35.08	0.00	61.46	51.46	-13.76	-16.38	L2
0.39	40.18	--	33.77	0.00	58.17	48.17	-17.99	-14.40	L2
6 Worst Data									

LINE 1 RESULTS

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 7 File#: 09U12467 LC.EMI Date: 04-07-2009 Time: 09:00:31



(Line Conduction)

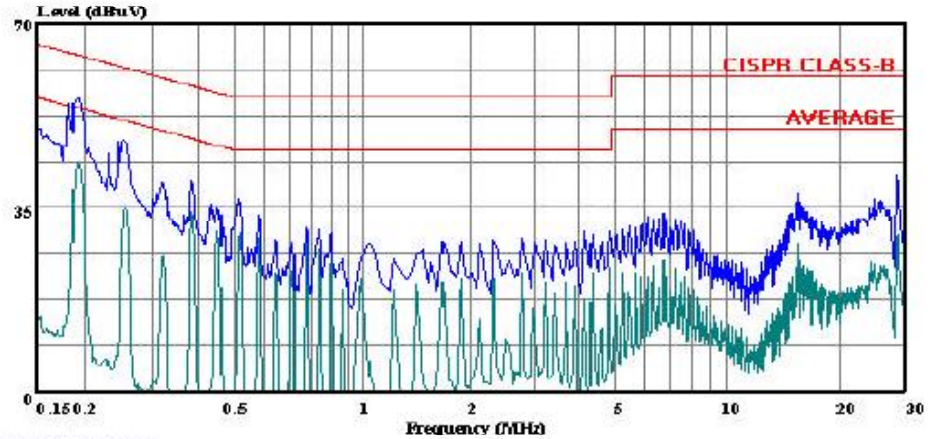
Trace: 5 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Vien Tan
Project #: : 09U12467
Company: : Broadcom
Configuration:: EUT / laptop
Mode: : Tx worst-case
Target: : CISPR Class B
Voltage: : 115VAC / 60Hz
: L1: Peak (Blue), Average (Green)

LINE 2 RESULTS

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 14 File#: 09U12467 LC.EMI Date: 04-07-2009 Time: 09:47:52



(Line Conduction)

Trace: 12 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Vien Tan
Project #: : 09U12467
Company: : Broadcom
Configuration:: EUT / laptop
Mode: : Tx worst-case
Target: : CISPR Class B
Voltage: : 115VAC / 60Hz
: L2: Peak (Blue), Average (Green)

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).

CALCULATIONS

Given

$E = \sqrt{(30 * P * G)} / d$

and

$S = E ^ 2 / 3770$

where

E = Field Strength in Volts/meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power Density in milliwatts/square centimeter

Combining equations, rearranging the terms to express the distance as a function of the remaining variables, changing to units of Power to mW and Distance to cm, and substituting the logarithmic form of power and gain yields:

$d = 0.282 * 10 ^ ((P + G) / 20) / \sqrt{S}$

where

d = MPE distance in cm
P = Power in dBm
G = Antenna Gain in dBi
S = Power Density Limit in mW/cm^2

Rearranging terms to calculate the power density at a specific distance yields

$S = 0.0795 * 10 ^ ((P + G) / 10) / (d^2)$

The power density in units of mW/cm^2 is converted to units of W/m^2 by multiplying by a factor of 10.

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 equals 20 cm)

Mode	Band	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	FCC Power Density (mW/cm^2)	IC Power Density (W/m^2)
WLAN	2.4 GHz	20.0	26.65	4.51	0.26	2.60