FCC CFR47 PART 27 SUBPART M

CERTIFICATION TEST REPORT

FOR

WIMAX USB DONGLE

MODEL NUMBER: SWU-3400AN

FCC ID: V7MSWU-3400AN

REPORT NUMBER: 11I13868-1, REVISION B

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Revision History

Rev.	Issue Date	Revisions	Revised By
---	9/16/11	Initial Issue	T. Chan
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SEOWONINTECH CO., LTD.
689-47, GEUMJEONGDONG, GUNPOSI
KYOUNGKIDO, 436-862, KOREA

EUT DESCRIPTION: WIMAX USB DONGLE

MODEL: SWU-3400AN

SERIAL NUMBER: KRS0118U3400AN0000001

DATE TESTED: JUNE 20 - JULY 01, AUGUST 20 – 23 and SEPTEMBER 15, 2011

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 27 SUBPART M	PASS

Compliance Certification Services (UL CCS) 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 CCS 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS 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 CCS By:

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ENGINEERING MANAGER
UL CCS

Tested By:

CHIN PANG
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA/EIA 603C (2004), FCC CFR 47 Part 2, and FCC CFR 47 Part 27M.

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a WiMax USB dongle.

The WiMax radio module is manufactured by Seowon Intech Co., LTD.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum EIRP as follows:

Mode	Channel	Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)
5MHz QPSK	Mid	2506 - 2685	24.96	313.33
5MHz 16QAM	Mid	2506 - 2685	25.02	317.69
10MHz QPSK	Mid	2506 - 2685	24.84	304.79
10MHz 16QAM	Mid	2506 - 2685	24.62	289.73

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integrated PCB antenna, with a maximum peak gain of 4.5dBi.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was Seowon Wimax CM V2.1 for GUI Rev0.1.6x.

5.5. WORST-CASE CONFIGURATION AND MODE

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

PUSC and AMC Zone type were used to test on 5MHz and 10MHz band width; and the AMC Zone type was the worst case on both 5MHz and10MHz band width results from the baseline scan which had higher power than PUSC type.

To determine the worst-case, the EUT was investigated at X, Y and Z Positions, and the worst position is at Z position for 5MHZ and 10MHz Band.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Dell	Inspiron 6400	UT153A01	DoC
AC Adapter	Dell	PA-12	CN0DF2537161566C2F83	DoC

I/O CABLES (RF CONDUCTED TEST)

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	2m	N/A
3	USB	1	Dongle	Un-shielded	None	N/A
4	RF In/Out	1	Horn	Un-shielded	5m	N/A

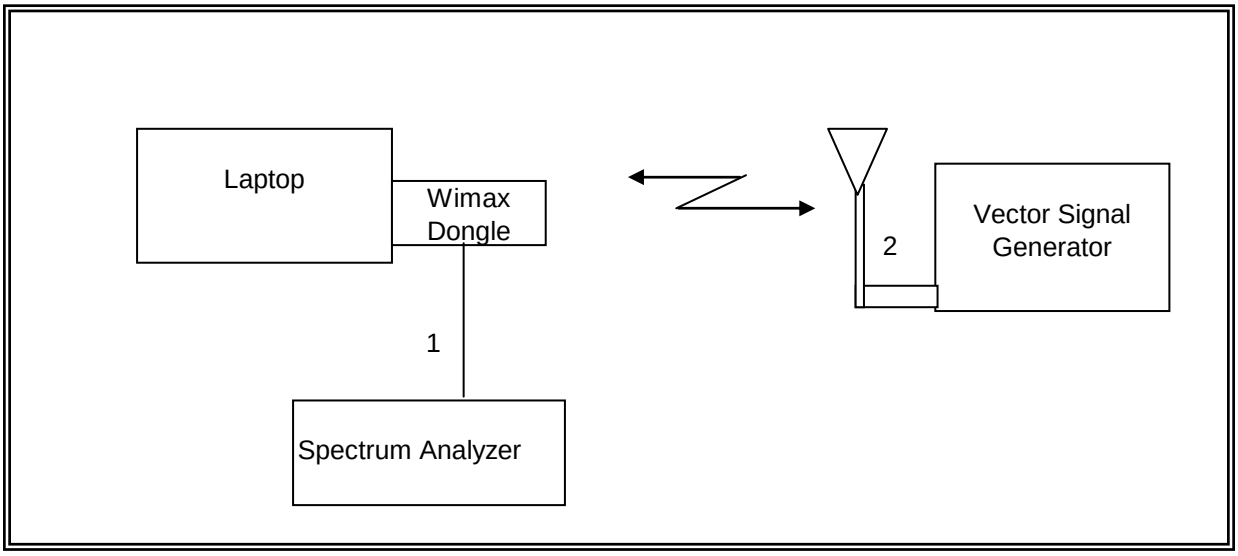
I/O CABLES (RF RADIATED TEST)

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	RF In/Out	1	Spectrum Anlayzer	Un-shielded	None	NA
1	RF In/Out	2	Antenna	Un-shielded	None	NA

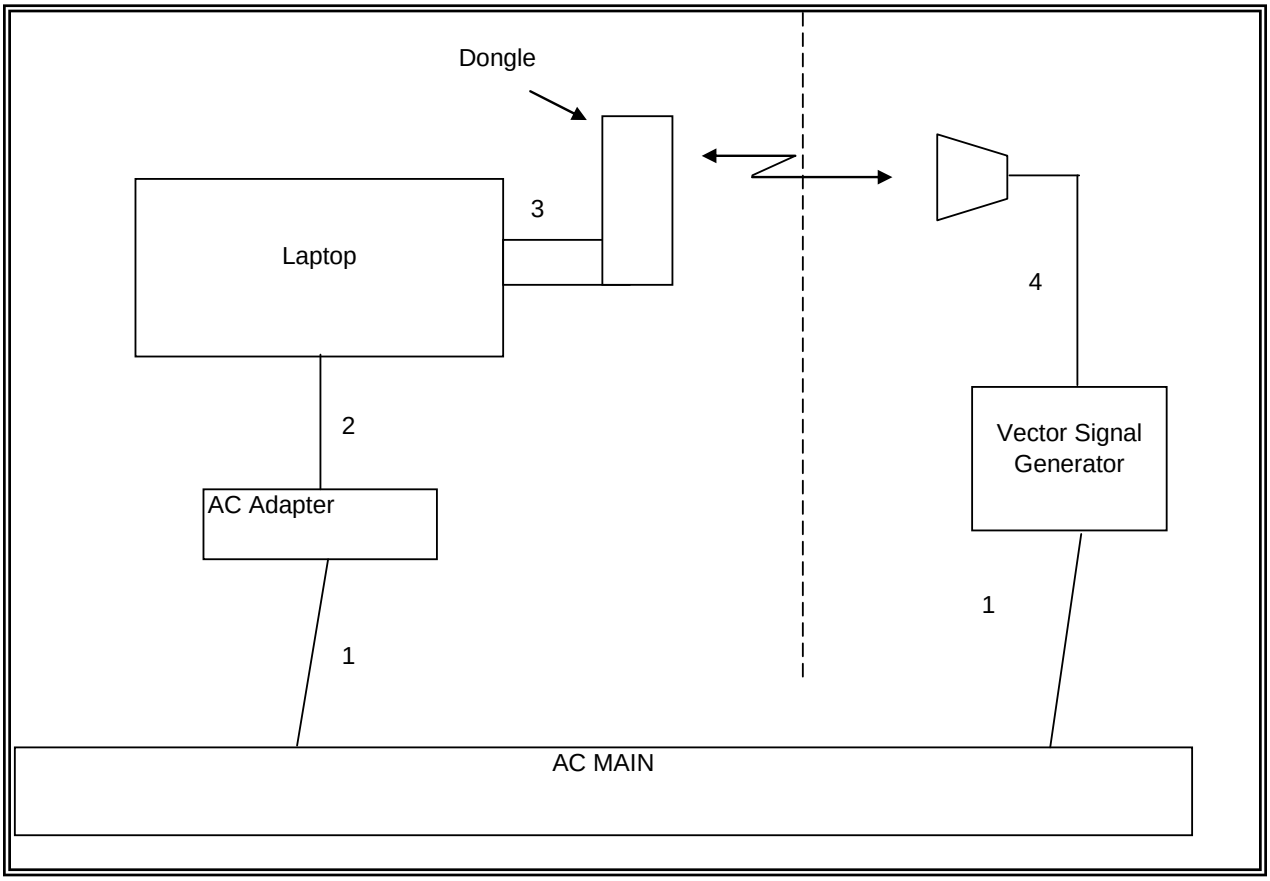
TEST SETUP

The EUT is a standalone device. Test software exercised the radio card.

SETUP DIAGRAM FOR RF CONDUCTED TESTS



SETUP DIAGRAM FOR RDIATED TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01176	08-15-12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	07-12-12
Antenna, Horn, 18 GHz	EMCO	3115	C00783	06-29-12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00778	01-27-12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	07-16-12
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	04-20-12
Highpass Filter, 4.0 GHz	Micro-Tronics	HPM13351	N02706	CNR
Vector Signal Generator	Agilent / HP	E4438C	None	09-28-11

7. RF POWER OUTPUT VERIFICATION

Maximum output power is verified on the Low, Middle and High channels.
The maximum conducted output power is measured for the uplink durst in the difference modulation and channel bandwidth. Conducted output powers were measured with the EUT connected to the Spectrum Analyzer with over-to-air communication link to Vector Signal generator. The output power is measured for the uplink bursts through triggering and gating

UL_AMC (5MHz)

Mode	Test Vector file name	Freq.	Output Pwr	
		(MHz)	(dBm)	(mW)
5MHz QPSK12	5MHZ_UL_QPSK12	2506	23.56	226.99
		2593	23.48	222.84
		2685	**23.40**	218.78
5MHz QPSK34	5MHZ_UL_QPSK34	2506	23.45	221.31
		2593	23.43	220.29
		2685	23.35	216.27
5MHz 16QAM12	5MHZ_UL_16QAMK12	2506	23.58	228.03
		2593	23.47	222.33
		2685	**23.30**	213.80
5MHz 16QAM34	5MHZ_UL_16QAMK34	2506	23.41	219.28
		2593	23.25	211.35
		2685	23.35	216.27

UL_PUSC

Mode	Test Vector file name	Freq.	Output Pwr	
		(MHz)	(dBm)	(mW)
5MHz QPSK12	5MHZ_UL_QPSK12	2506	23.14	206.06
		2593	23.06	202.30
		2685	**23.15**	206.54
5MHz QPSK34	5MHZ_UL_QPSK34	2506	22.96	197.70
		2593	22.68	185.35
		2685	23.04	201.37
5MHz 16QAM12	5MHZ_UL_16QAMK12	2506	23.04	201.37
		2593	22.84	192.31
		2685	**23.12**	205.12
5MHz 16QAM34	5MHZ_UL_16QAMK34	2506	22.79	190.11
		2593	22.89	194.54
		2685	22.83	191.87

UL_AMC

Mode	Test Vector file name	Freq.	Output Pwr	
		(MHz)	(dBm)	(mW)
10MHz QPSK12	10MHz_ULAMC_QPSK12	2506	**22.98**	198.61
		2593	22.72	187.07
		2685	22.84	192.31
10MHz QPSK34	10MHz_ULAMC_QPSK34	2506	23.14	206.06
		2593	22.91	195.43
		2685	23.12	205.12
10MHz 16QAM12	10MHz_ULAMC_16QAM12	2506	**23.15**	206.54
		2593	23.00	199.53
		2685	23.12	205.12
10MHz 16QAM34	10MHz_ULAMC_16QAM34	2506	23.02	200.45
		2593	23.04	201.37
		2685	22.86	193.20

UL_PUSC

Mode	Test Vector file name	Freq.	Output Pwr	
		(MHz)	(dBm)	(mW)
10MHz QPSK12	10MHz_UL_QPSK12	2506	22.97	198.15
		2593	22.72	187.07
		2685	**22.97**	198.15
10MHz QPSK34	10MHz_UL_QPSK34	2506	22.82	191.43
		2593	22.80	190.55
		2685	22.86	193.20
10MHz 16QAM12	10MHz_UL_16QAM12	2506	22.84	192.31
		2593	22.68	185.35
		2685	**23.01**	199.99
10MHz 16QAM34	10MHz_UL_16QAM34	2506	22.77	189.23
		2593	22.76	188.80
		2685	22.86	193.20

8. LIMITS AND RESULTS

8.1. ANTENNA PORT TEST RESULTS

8.1.1. 26 dB and 99% BANDWIDTH

LIMITS

§2.1049 & §27.53 (m)(6)

TEST PROCEDURE

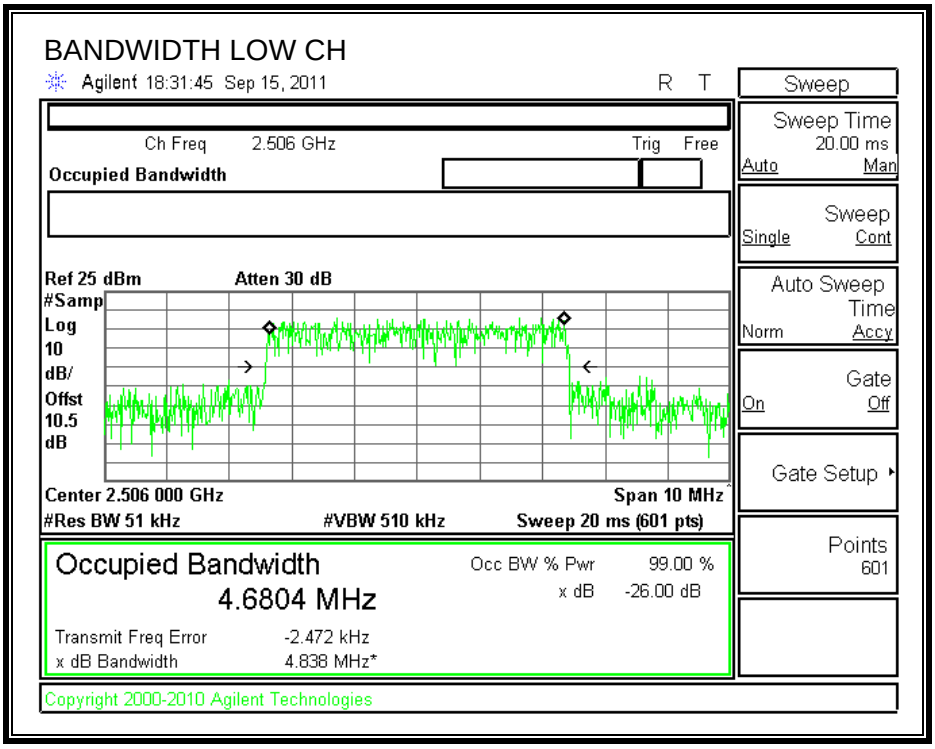
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

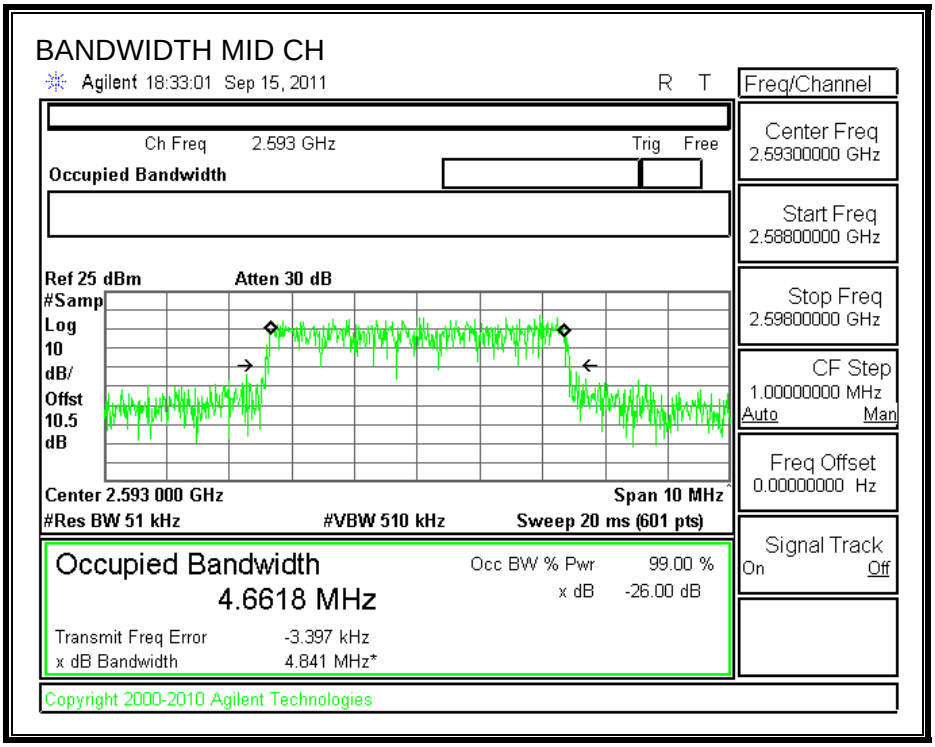
RESULTS

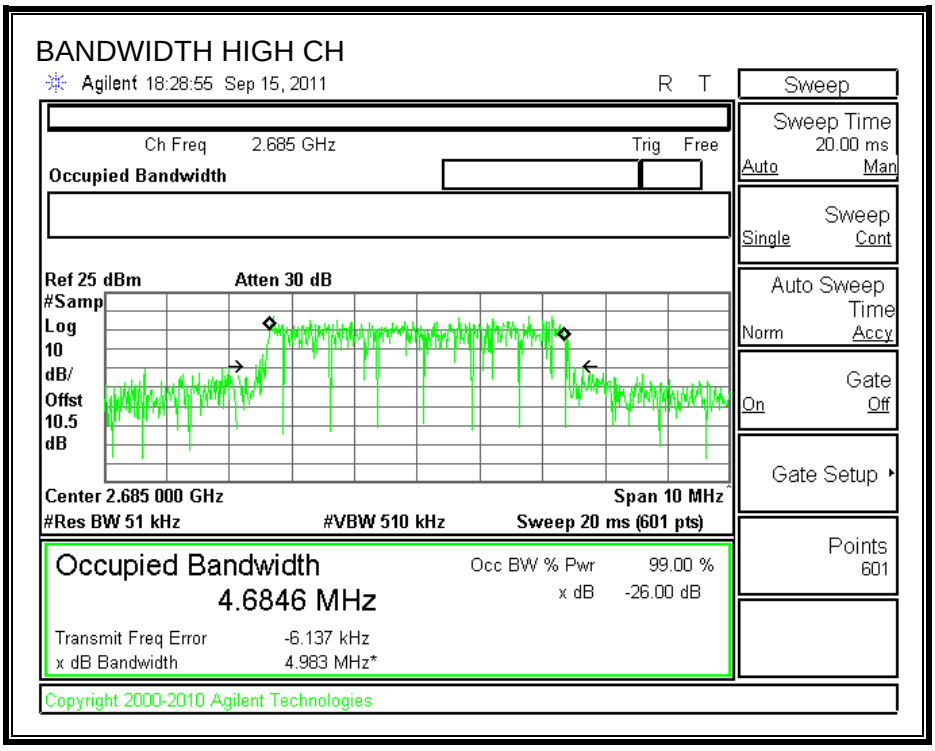
Mode	Channel	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
5MHz QPSK	Low	2506	4.6804	4.8380
	Middle	2593	4.6618	4.8410
	High	2685	4.6846	4.9830
5MHz 16QAM	Low	2506	4.7142	4.9790
	Middle	2593	4.6962	4.8440
	High	2685	4.7080	4.9280
10MHz QPSK	Low	2506	9.3081	9.6270
	Middle	2593	9.2380	9.6010
	High	2685	9.2329	9.5980
10MHz 16QAM	Low	2506	9.2431	9.7590
	Middle	2593	9.2451	9.6840
	High	2685	9.2451	9.7490

5MHz_QPSK12

26 dB and 99% BANDWIDTH

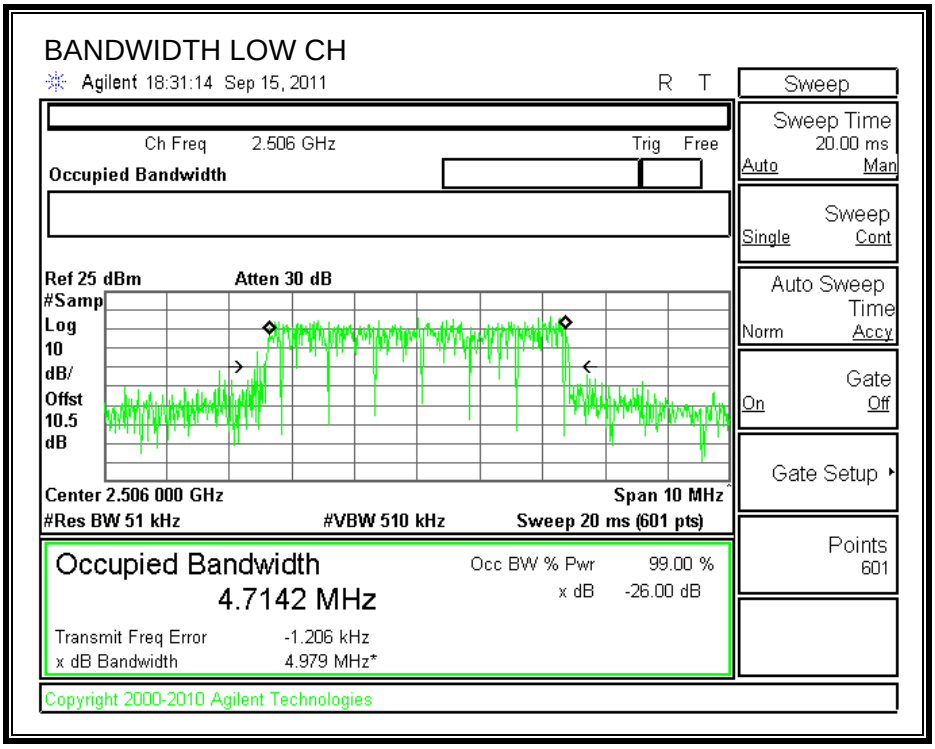


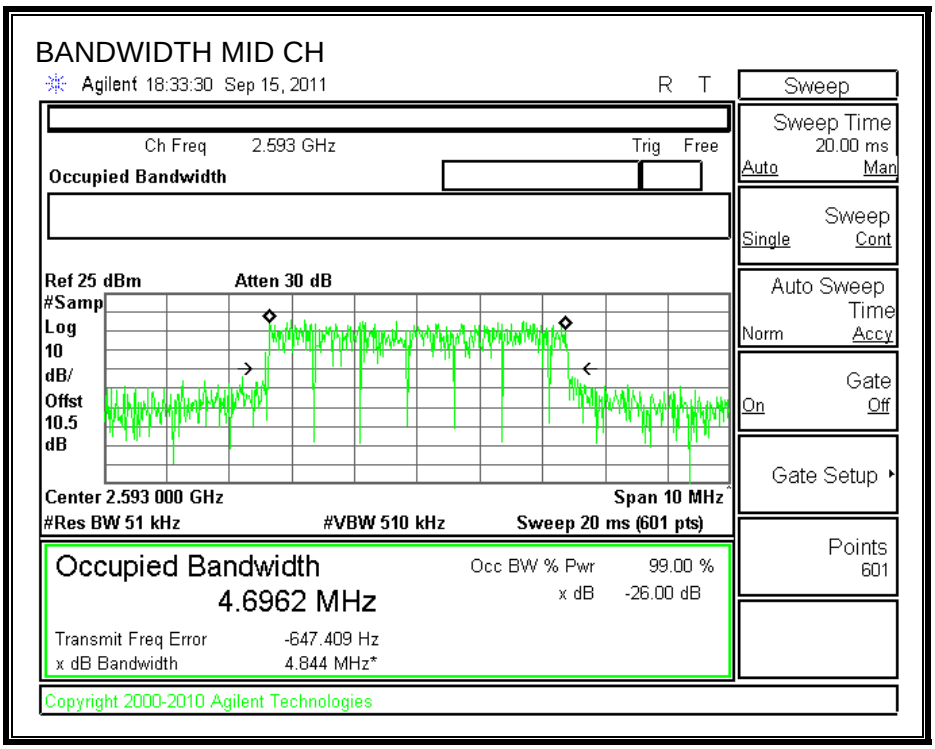


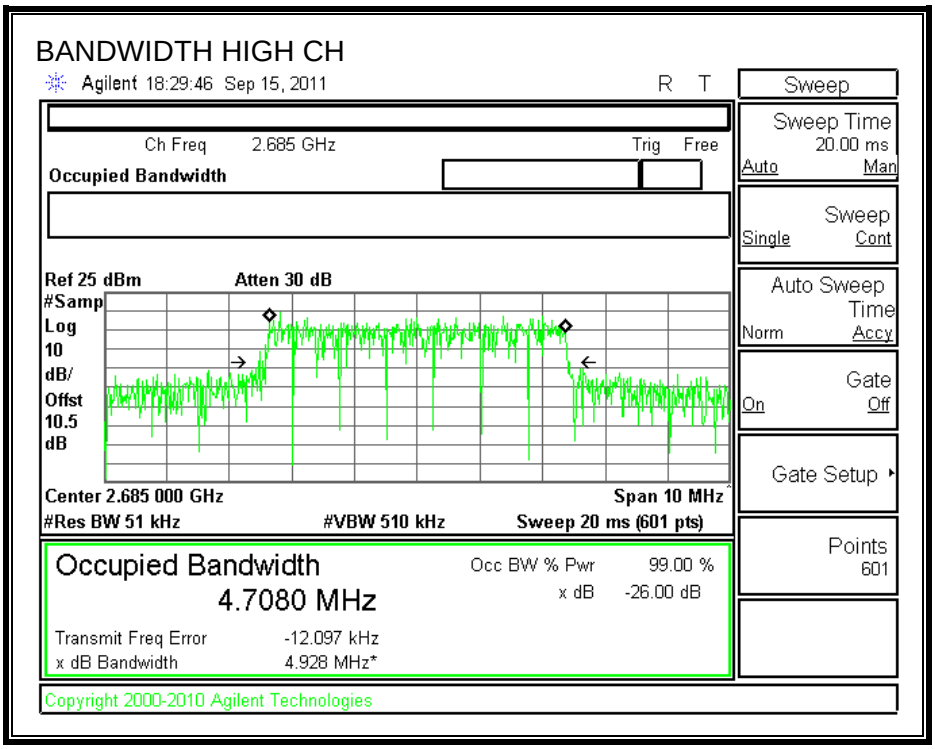


5MHz_16QAM12

26 dB and 99% BANDWIDTH

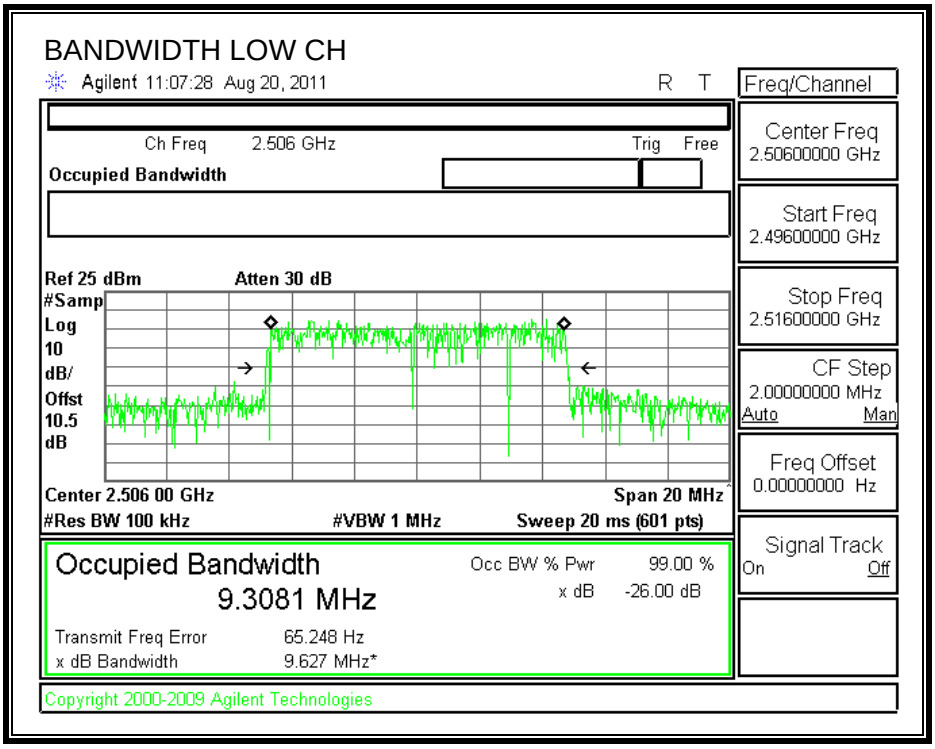


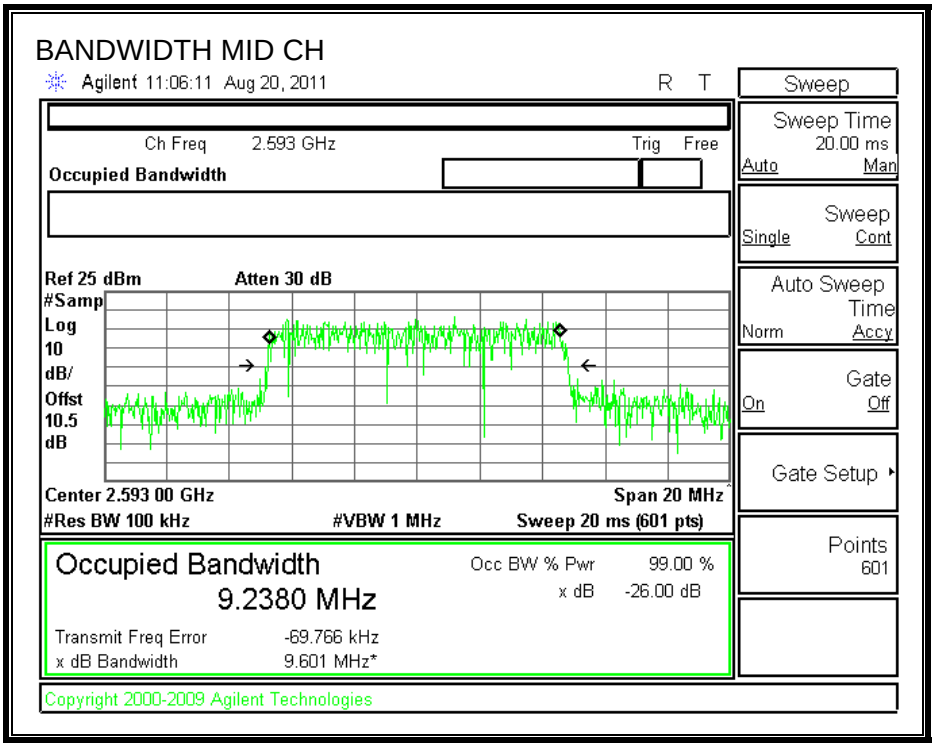


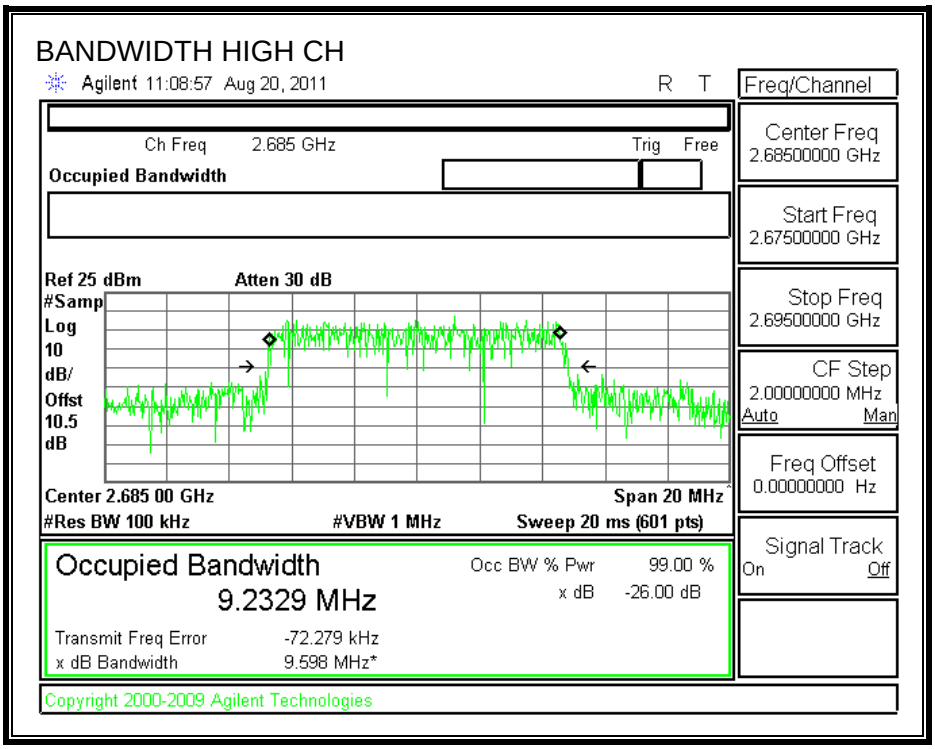


10MHz_QPSK34

26 dB and 99% BANDWIDTH

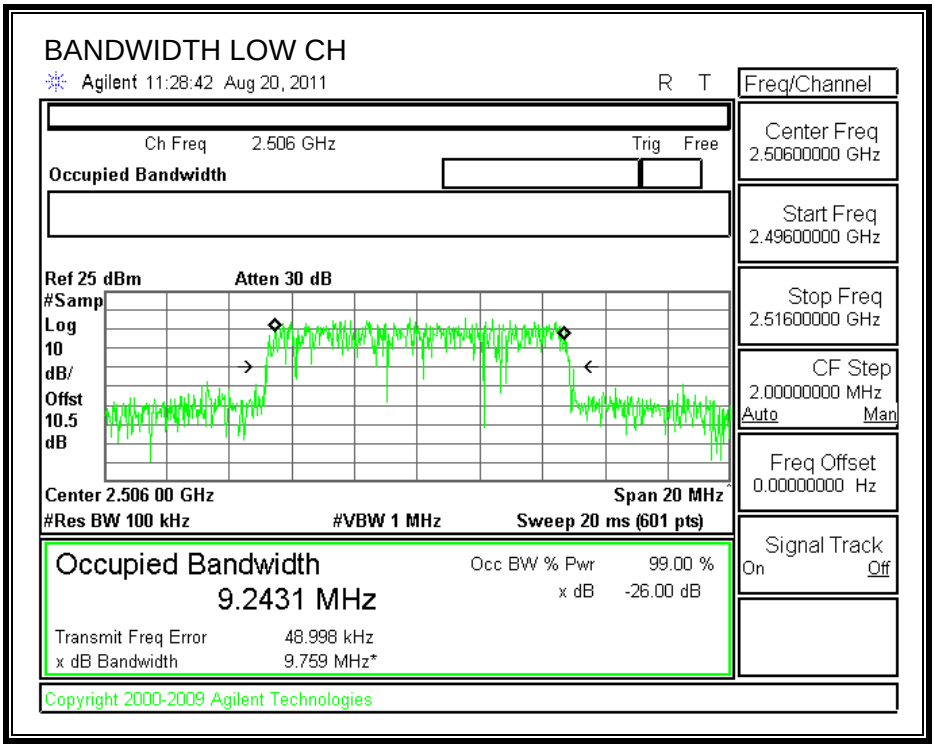


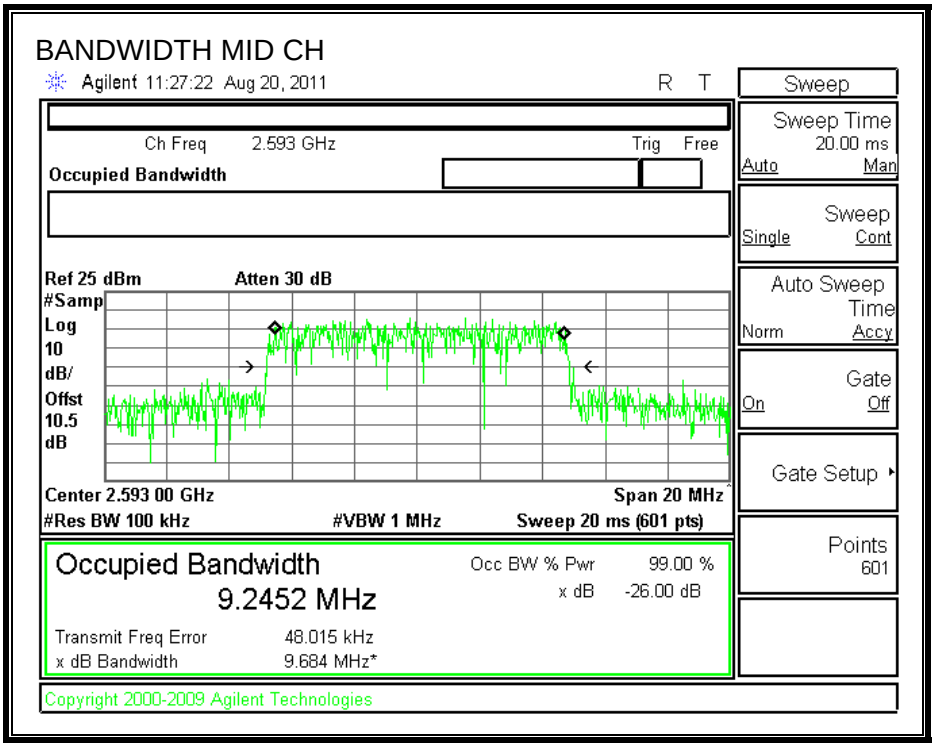


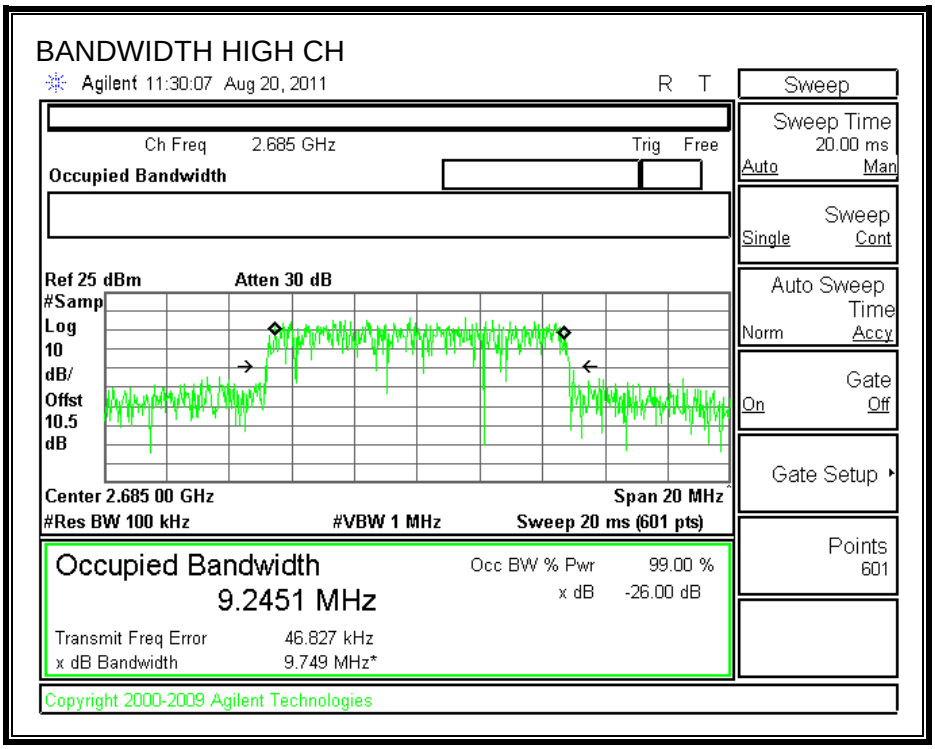


10MHz_16QAM12

26 dB and 99% BANDWIDTH







8.1.2. RF POWER OUTPUT AT THE ANTENNA TERMINALS

LIMITS

§2.1046 & §27.50 (h)(2) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

TEST PROCEDURE

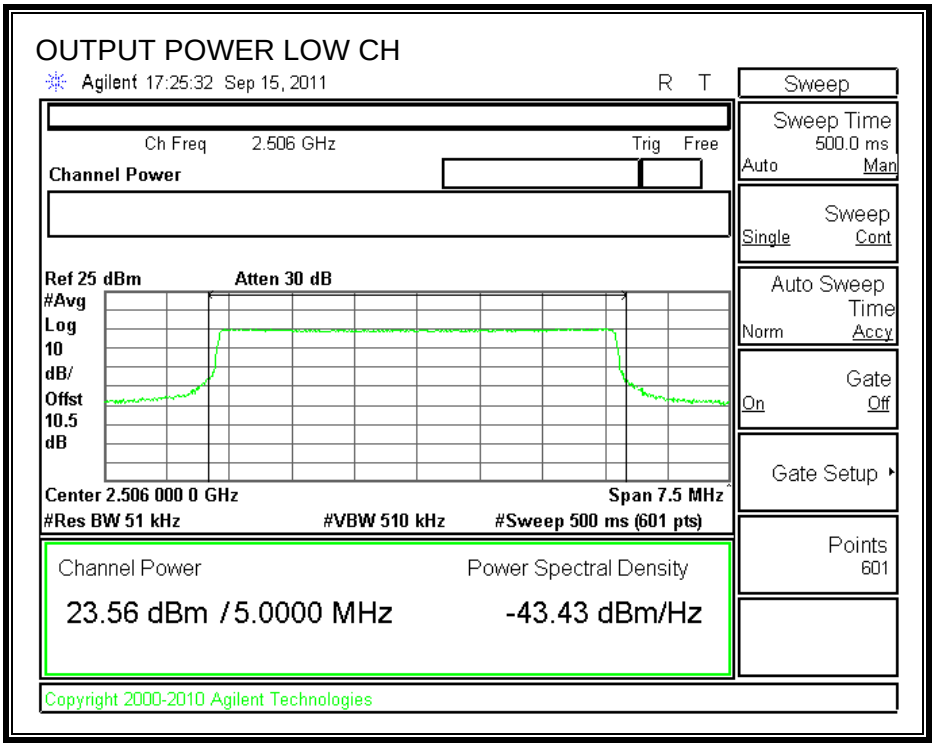
ANSI / TIA / EIA 603 Clause 2.2.17 and §27.50 (i)

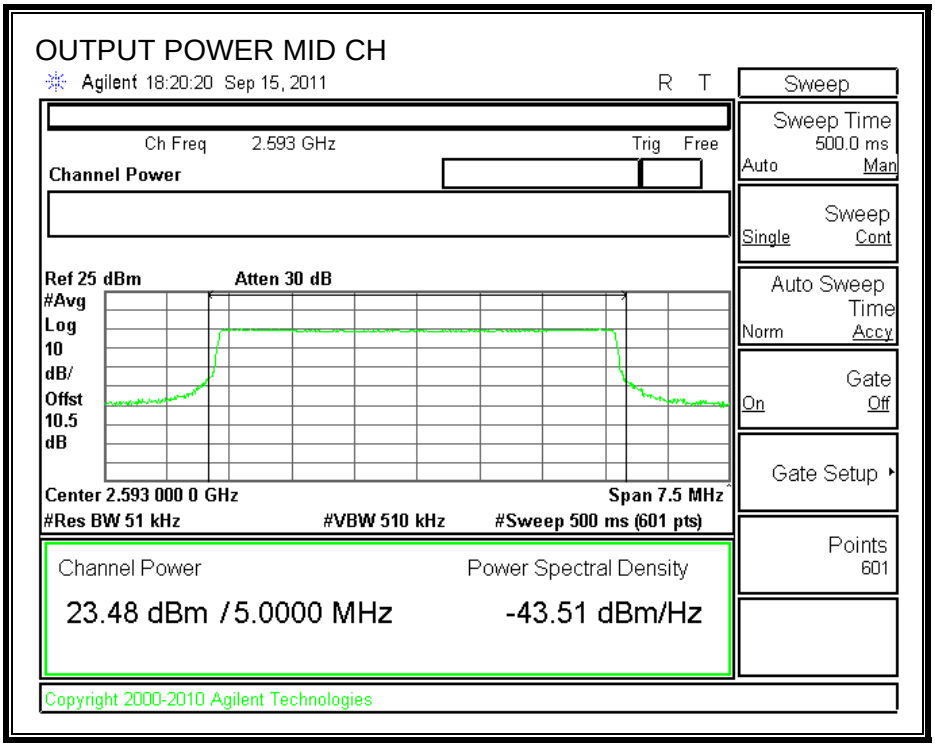
RESULTS

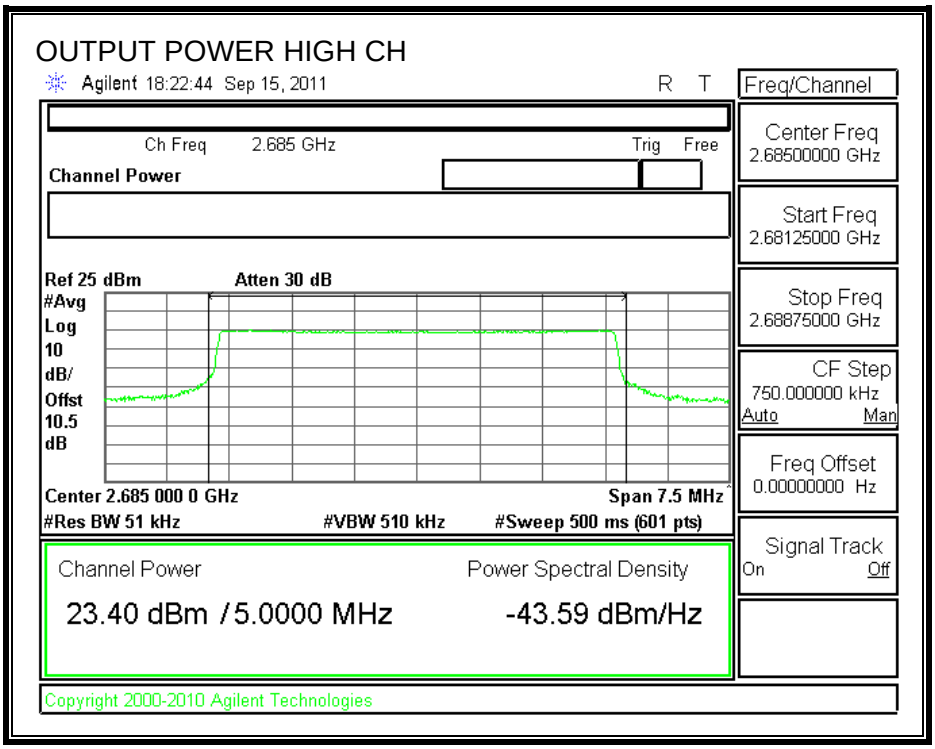
Mode	Test Vector file name	Channel	Frequency (MHz)	Output power (dBm)	Output power (mW)
5MHz QPSK	5MHZ_UL_QPSK12	Low	2506	23.56	226.99
		Middle	2593	23.48	222.84
		High	2685	23.40	218.78
5MHz 16QAM	5MHZ_UL_16QAM12	Low	2506	23.58	228.03
		Middle	2593	23.47	222.33
		High	2685	23.30	213.80
10MHz QPSK	10MHz_ULAMC_QPSK34	Low	2506	23.14	206.06
		Middle	2593	22.91	195.43
		High	2685	23.12	205.12
10MHz 16QAM	10MHz_ULAMC_16QAM12	Low	2506	23.15	206.54
		Middle	2593	23.00	199.53
		High	2685	23.12	205.12

5MHz_QPSK 12

OUTPUT POWER

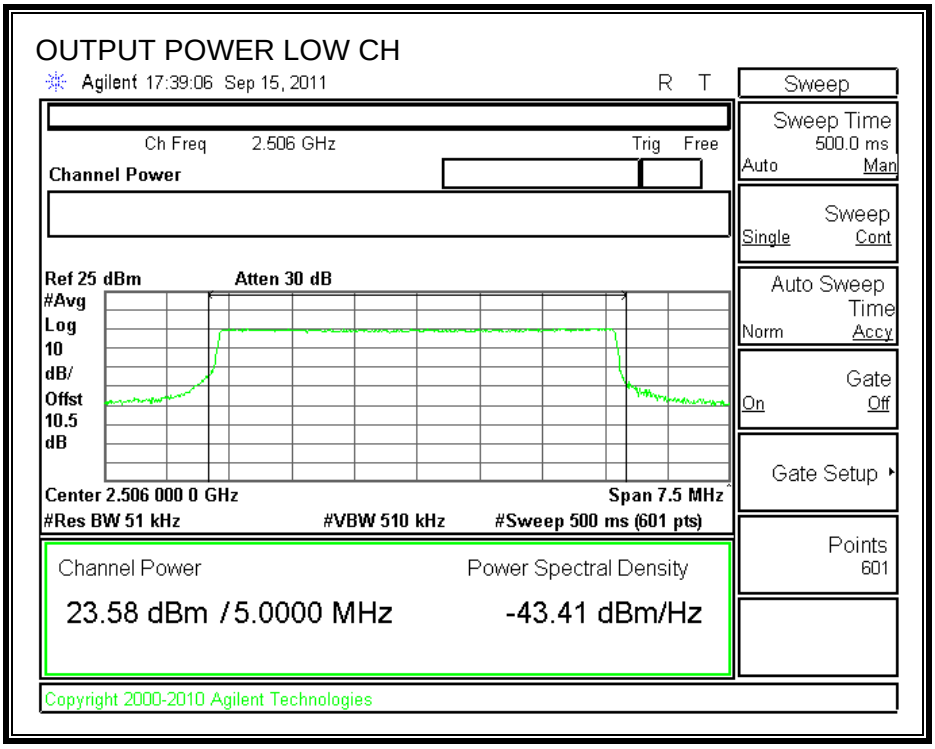


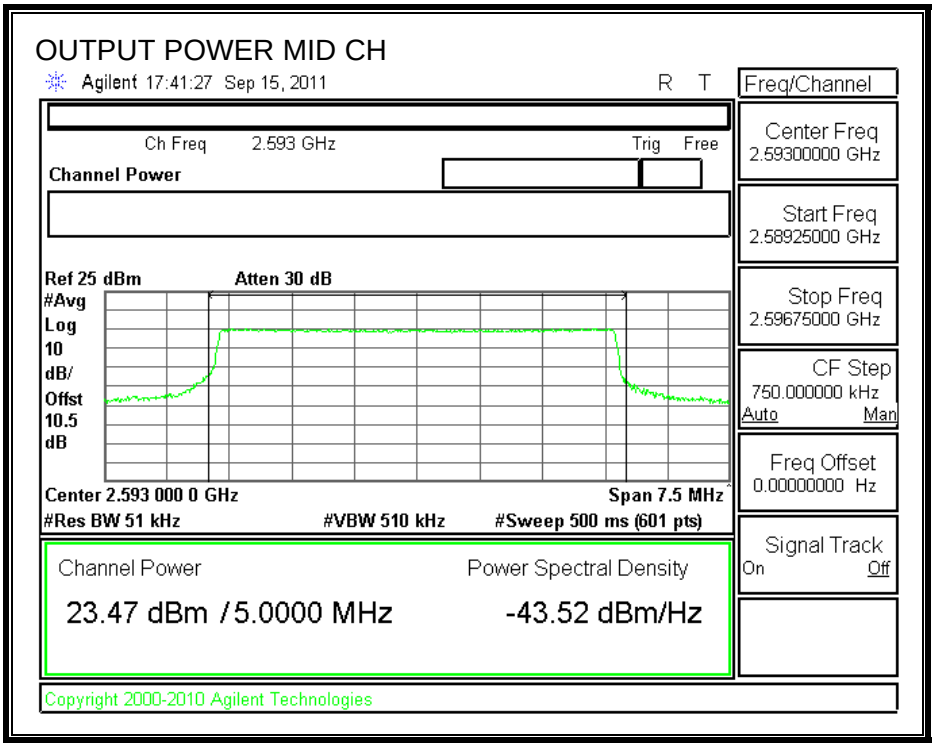


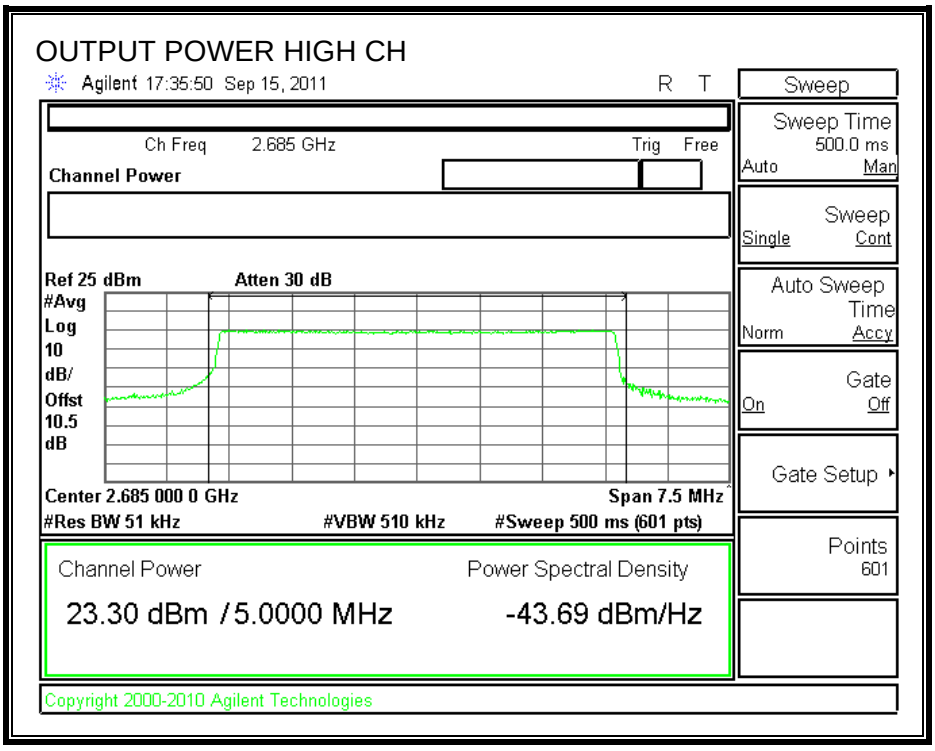


5MHz_16QAM12

OUTPUT POWER

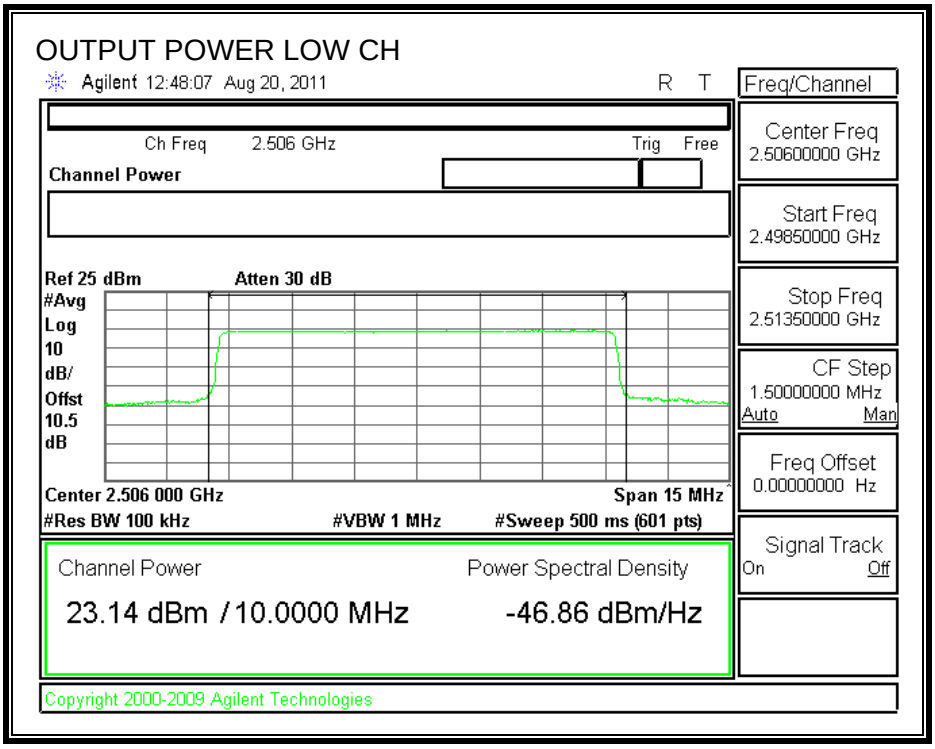


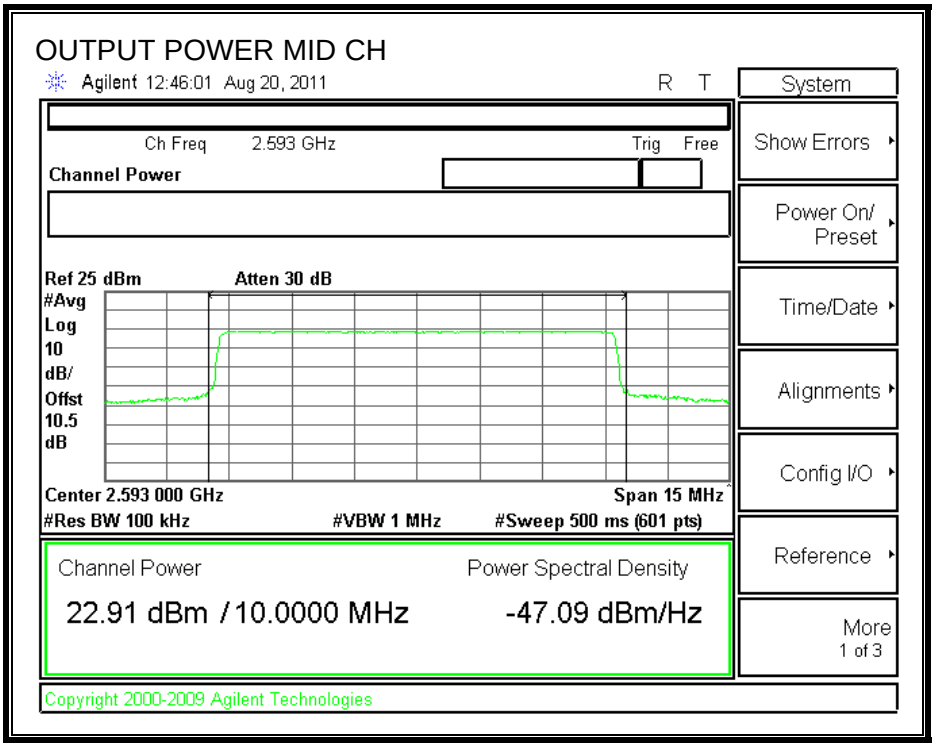


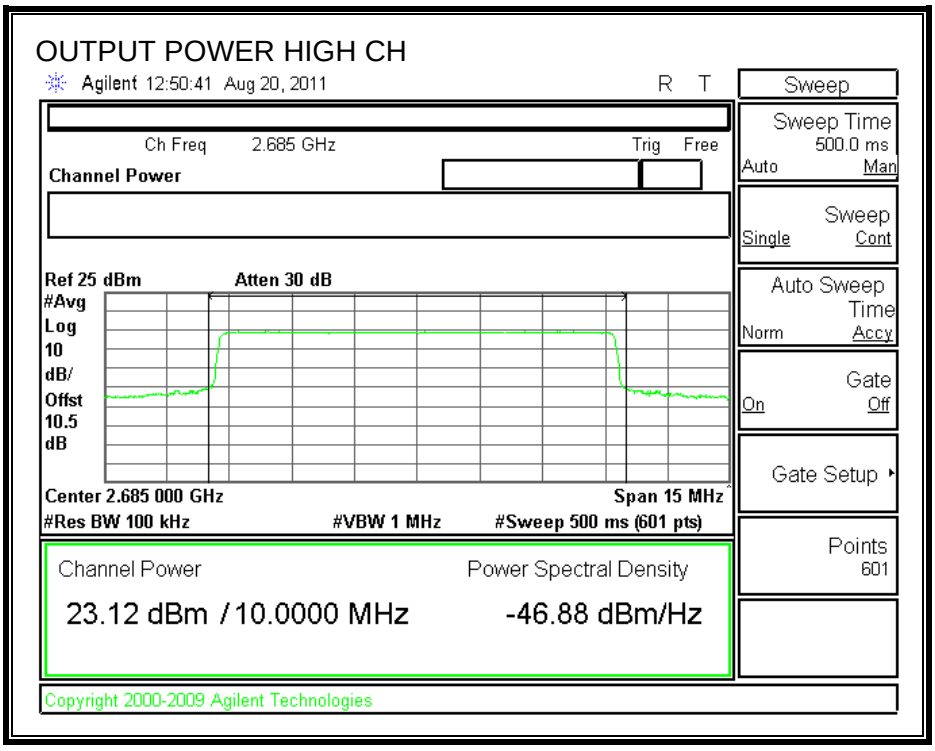


10MHz_QPSK34

OUTPUT POWER

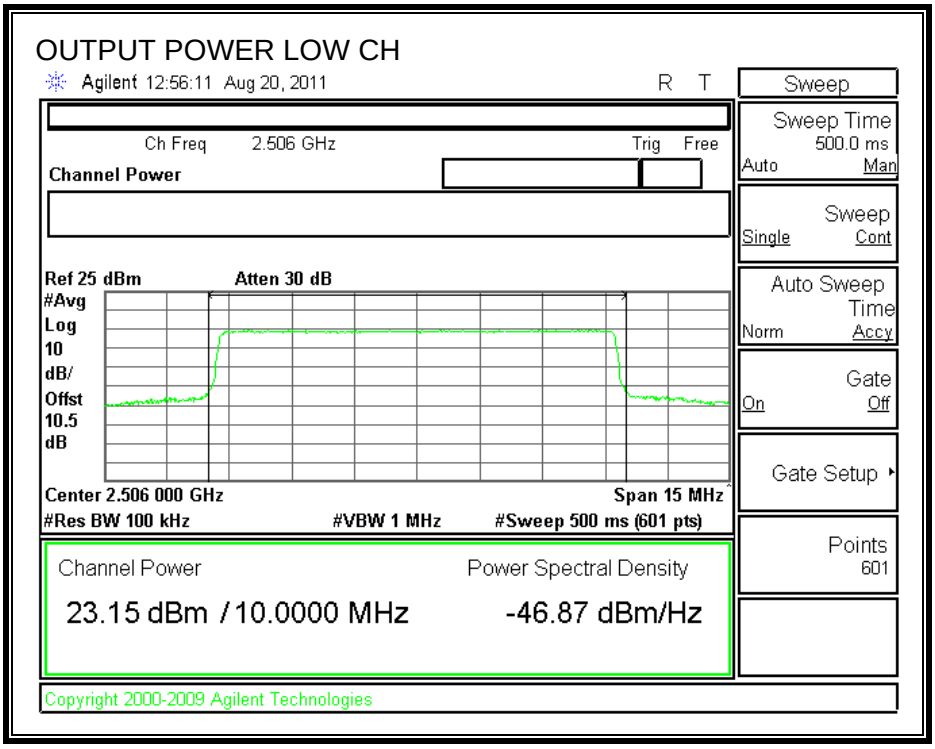


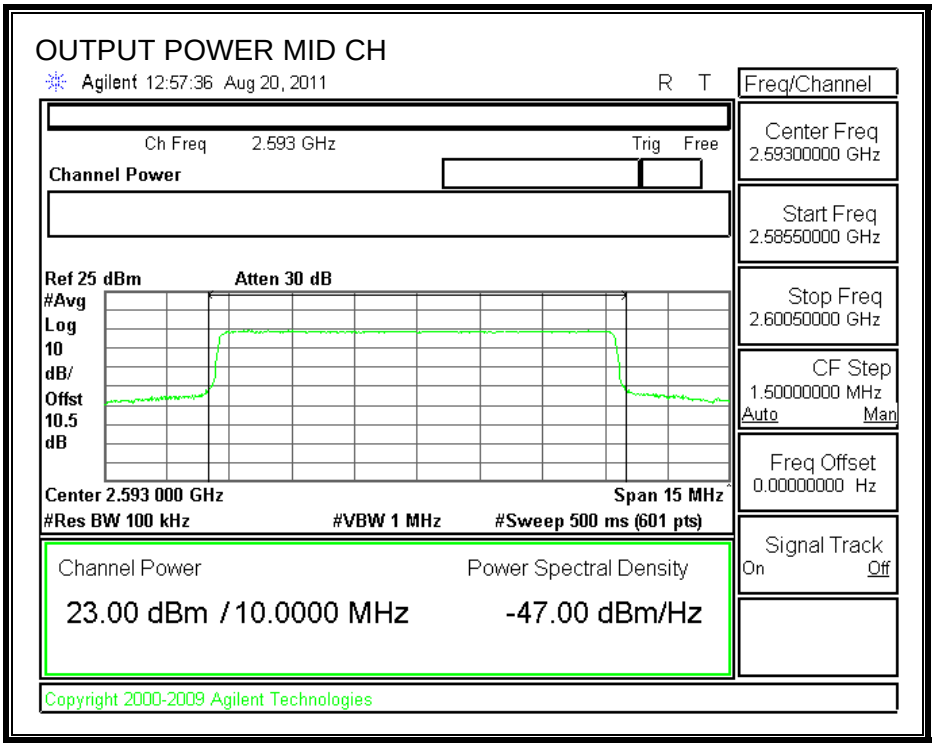


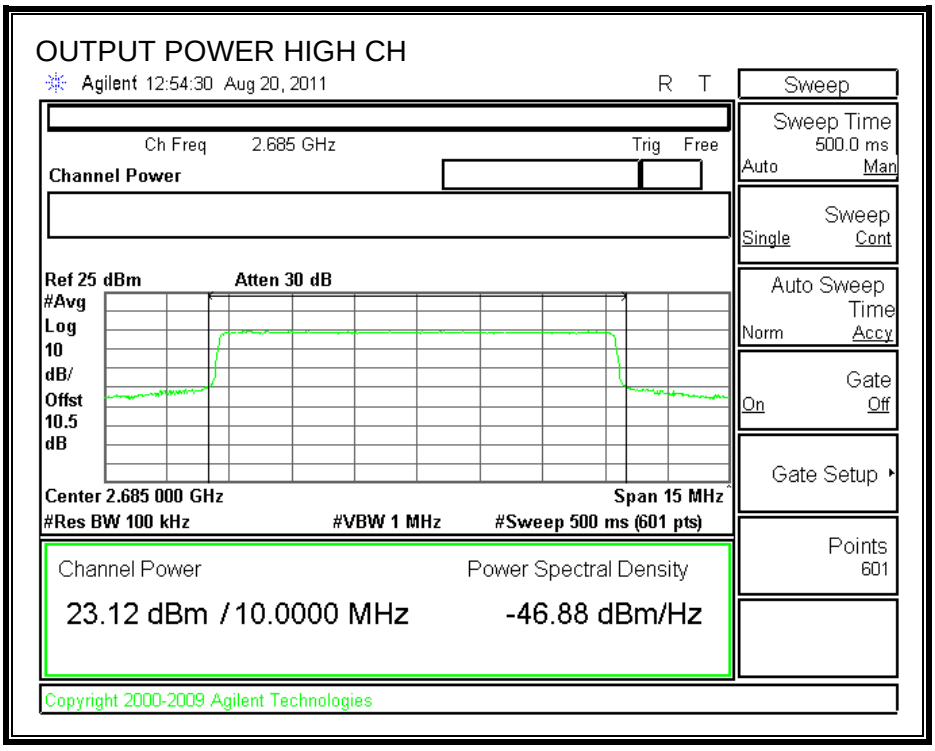


10MHz_16QAM12

OUTPUT POWER







Peak-To-Average Ratio:

Offset: 0.9 (cable) + 10 (pad) = 10.90 dB

Mode	Channel Band-width (MHZ)	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5	378	2593	31.8	23.75	8.05

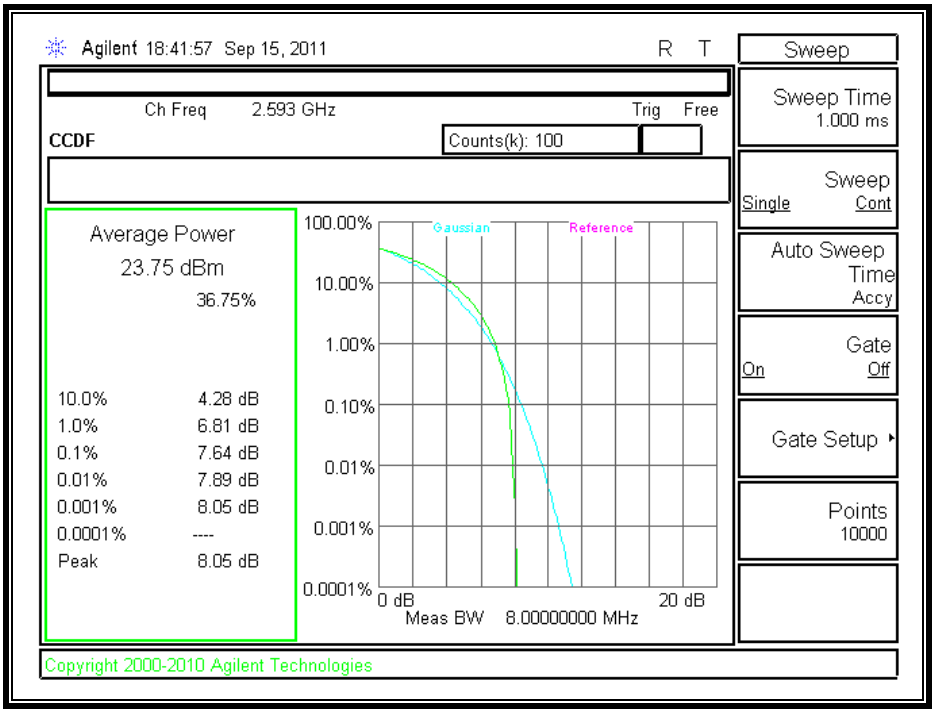
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5	378	2593	31.84	23.69	8.15

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
QPSK	10	368	2593	31.53	22.94	8.59

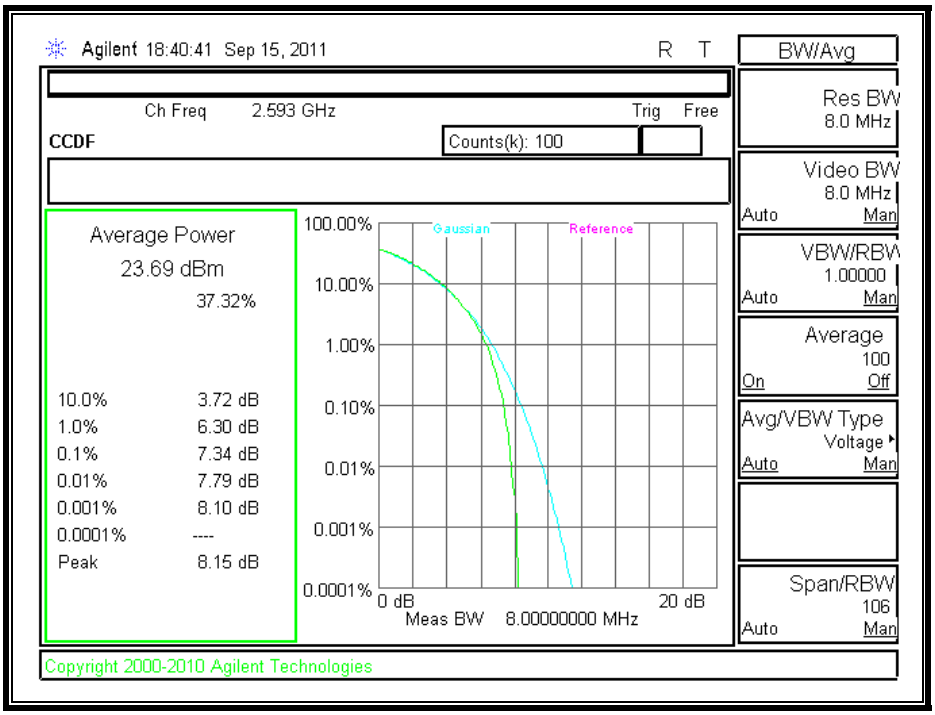
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10	368	2593	31.55	22.96	8.59

*Peak Reading = Average Reading + Peak-to-Average Ratio

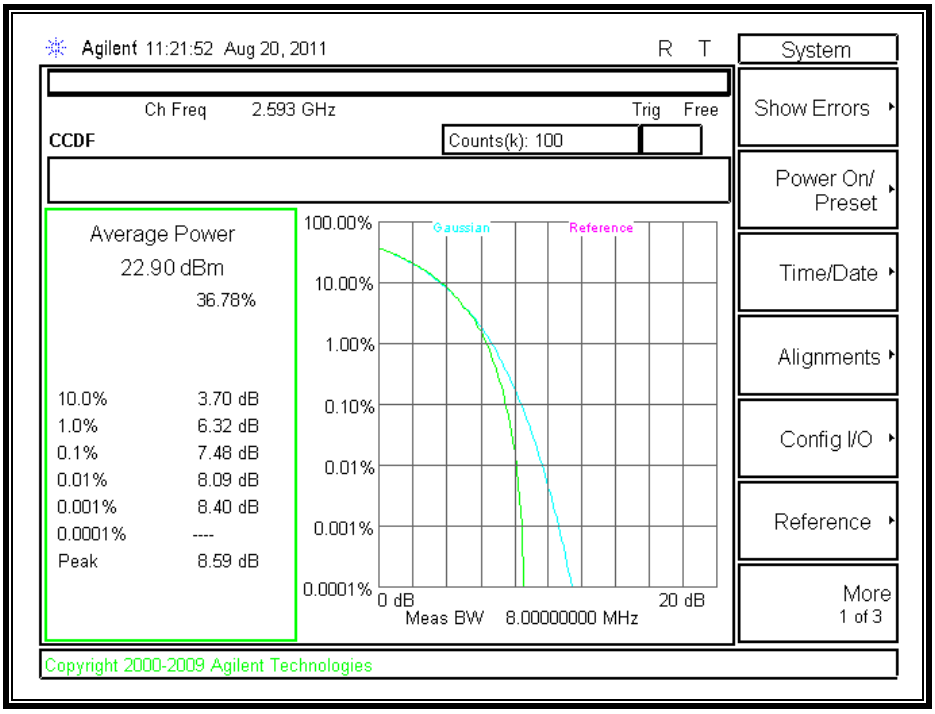
5MHz_QPSK12



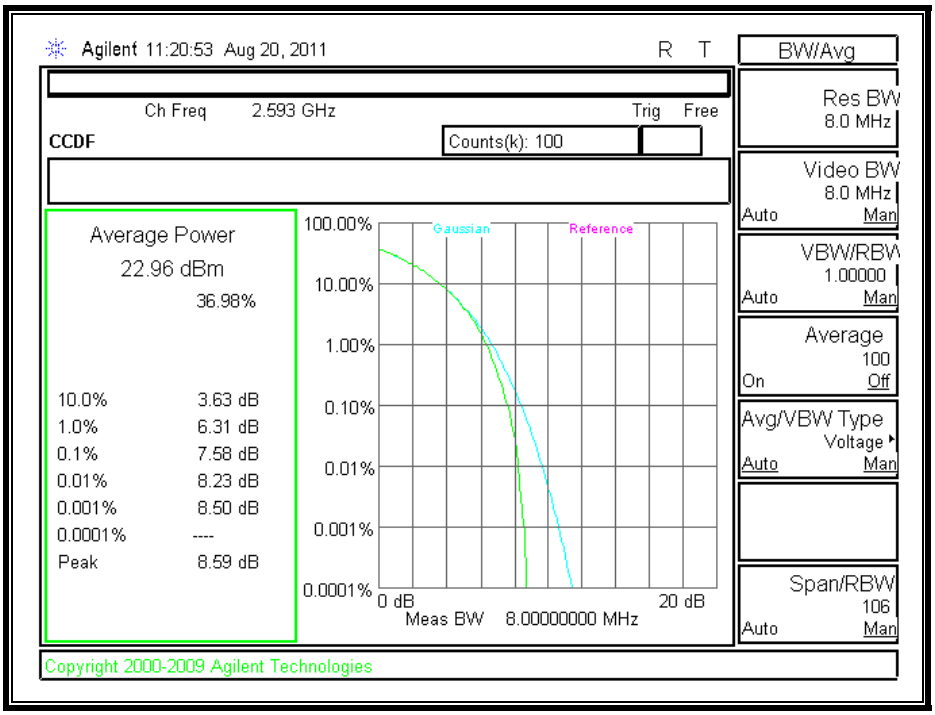
5MHz_16QAM12



10MHz_QPSK34



10MHz_16QAM12



8.1.3. LIMITS OF CHANNEL EDGE

LIMITs

§2.1051

§27.53 (m)(4)(6) For mobile digital stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge, the limit of emission equal to -13dBm, and 55 + 10 log (P) dB at 5.5 megahertz from the channel edges, the limit of emission equal to -25dBm.

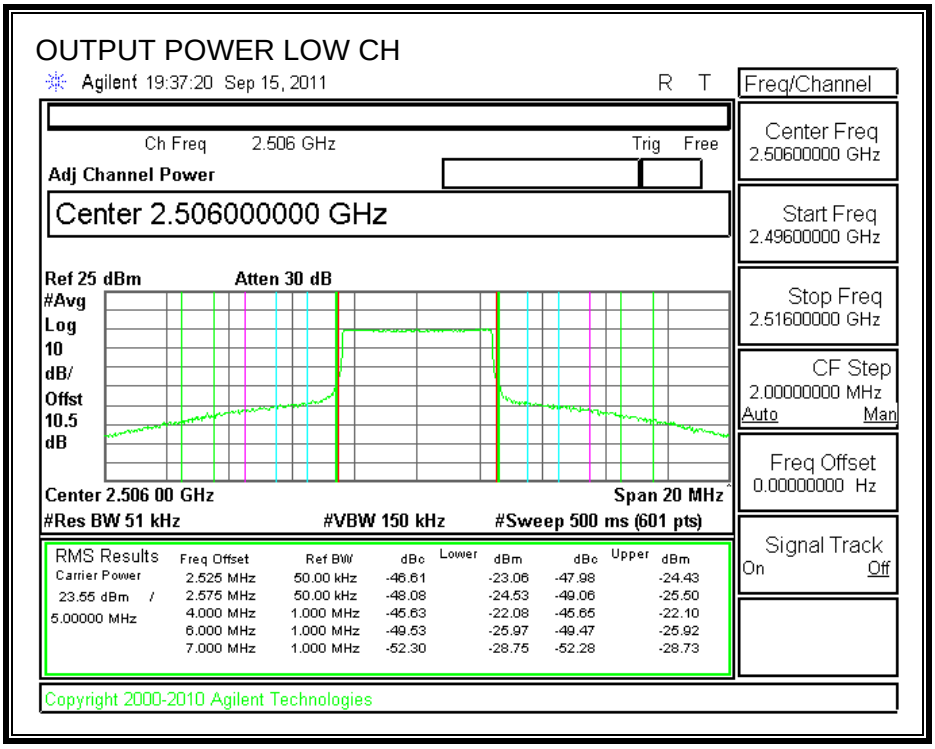
TEST PROCEDURE

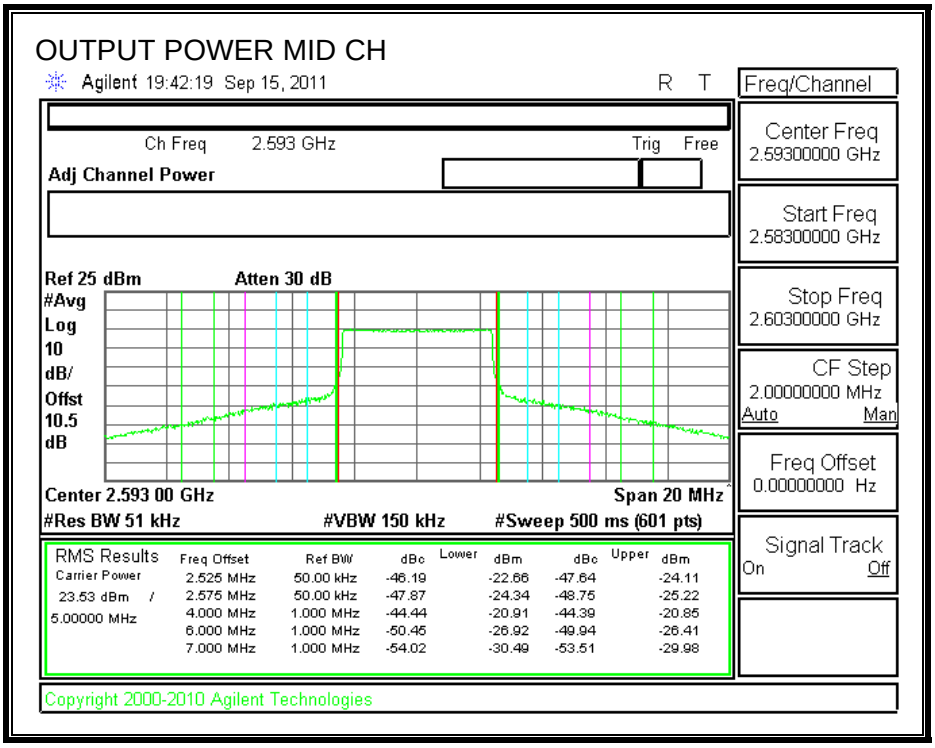
ANSI / TIA / EIA 603 Clause 3.2.12

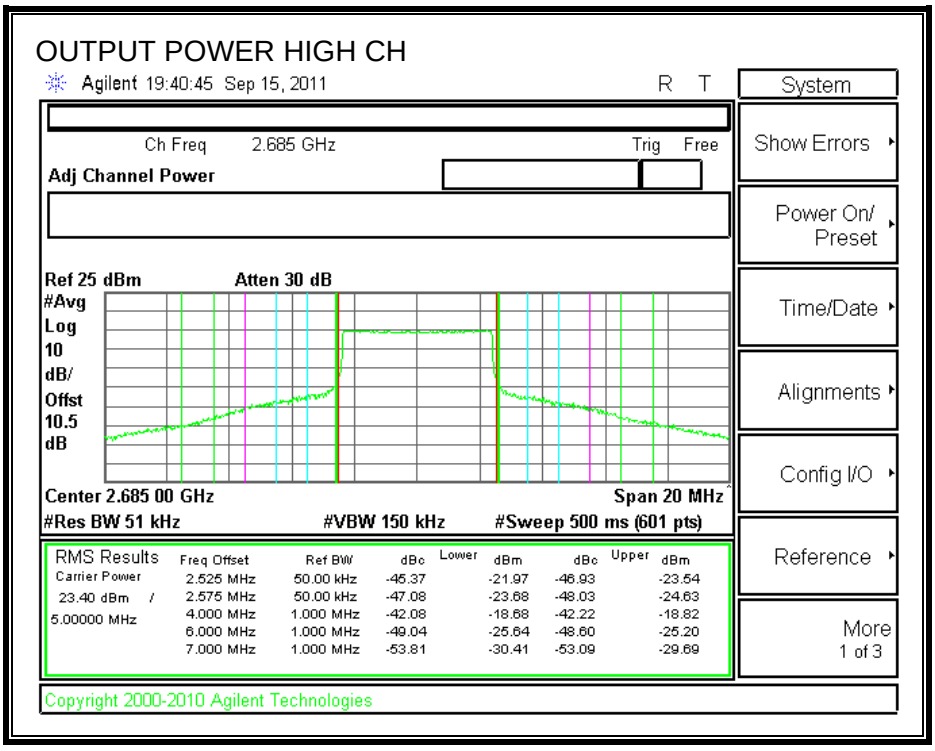
RESULTS

5MHz_QPSK12

OUTPUT POWER

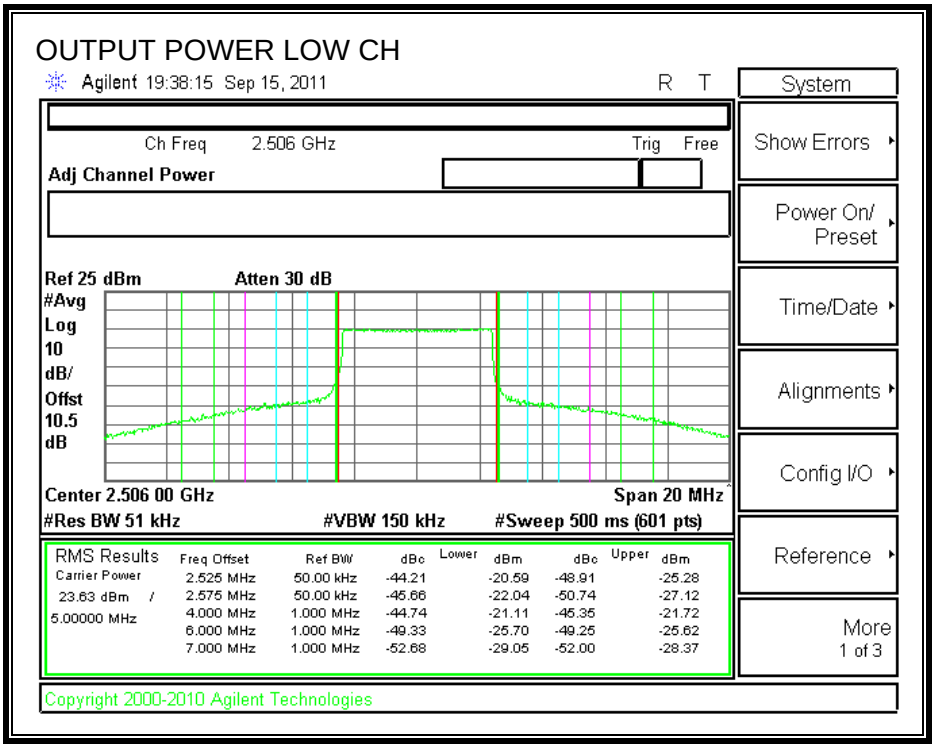


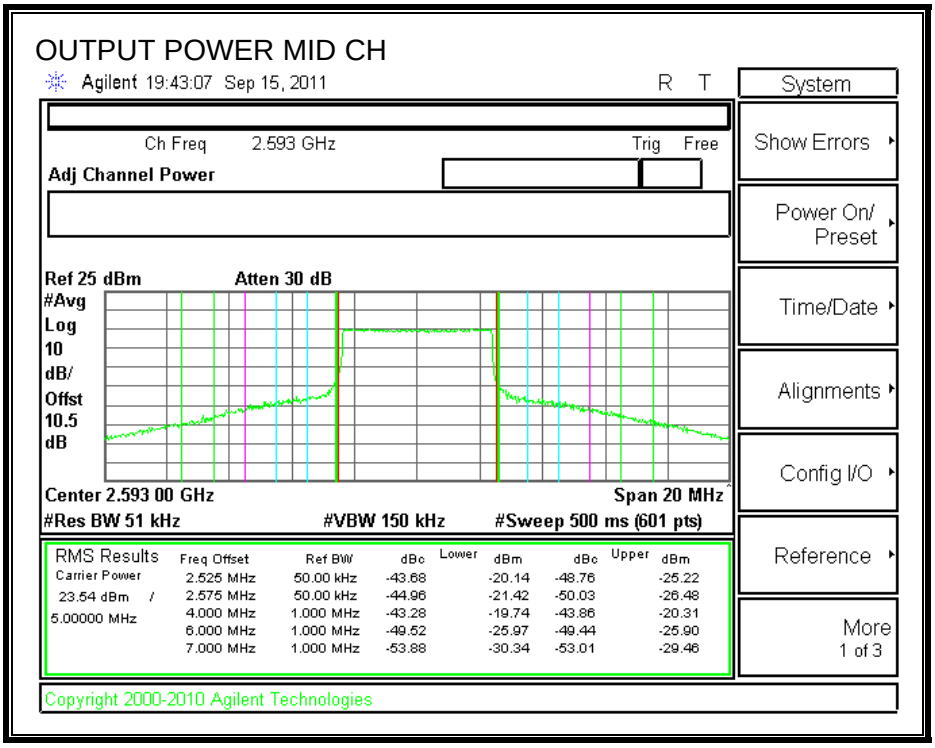


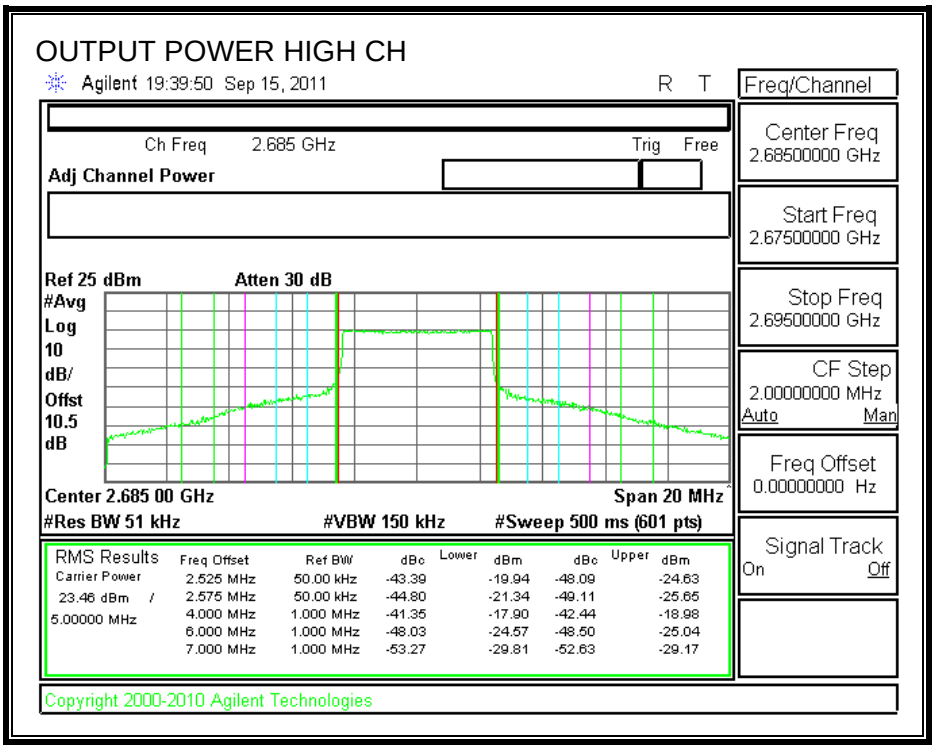


5MHz_16QAM12

OUTPUT POWER

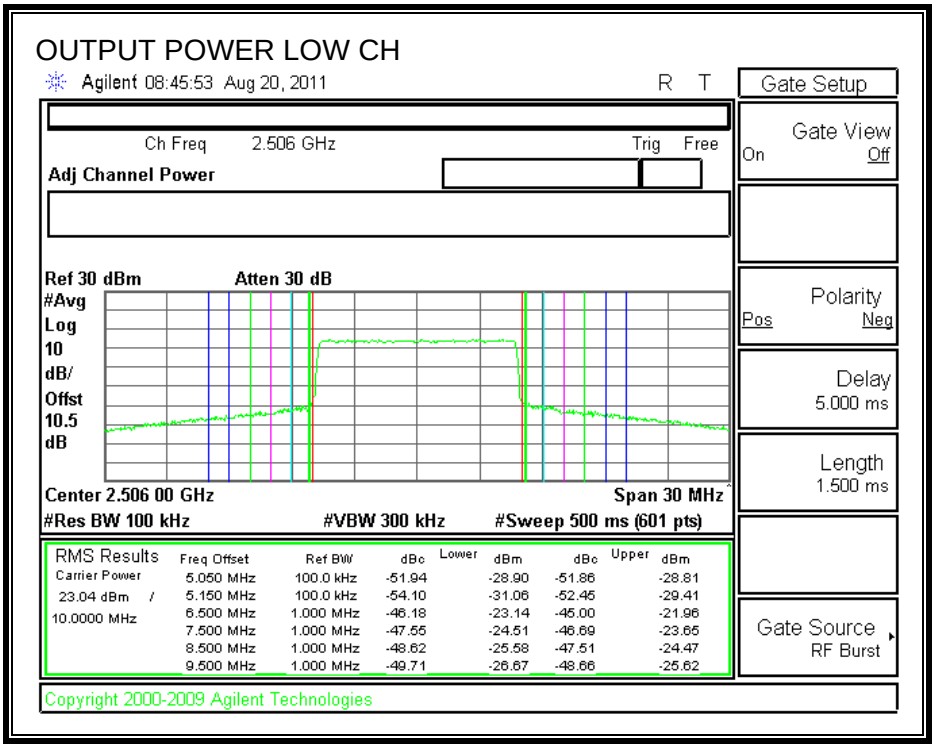


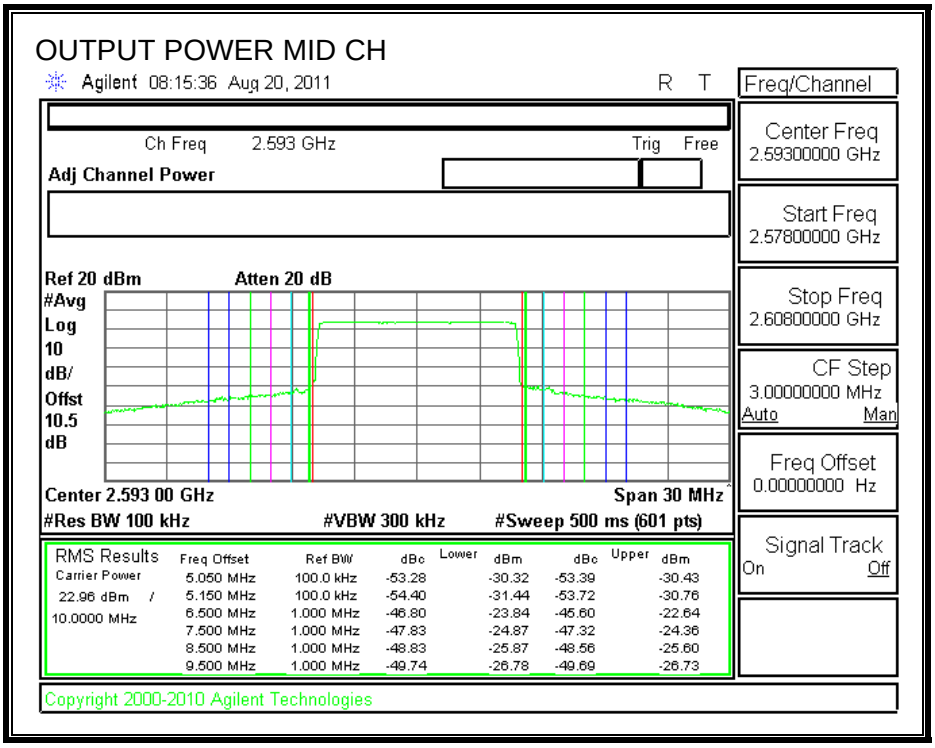


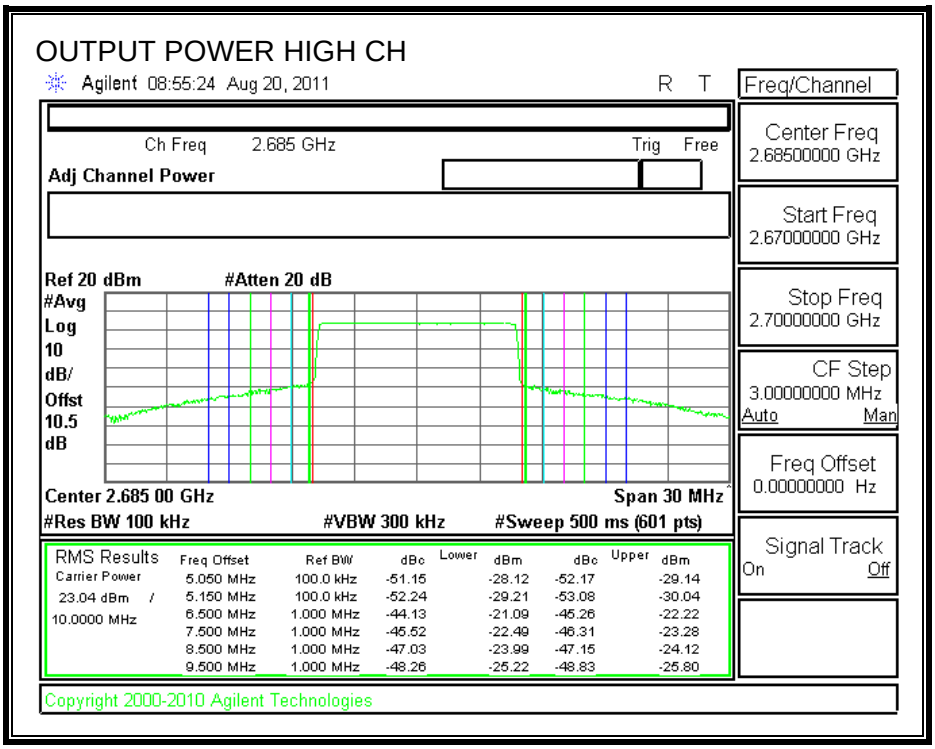


10MHz_QPSK34

OUTPUT POWER

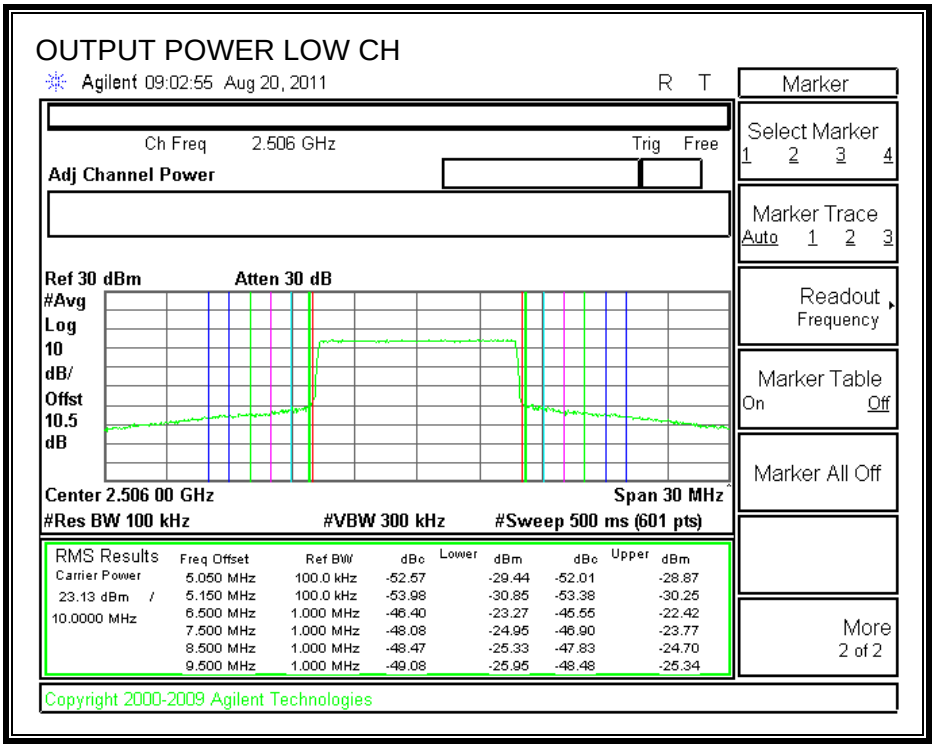


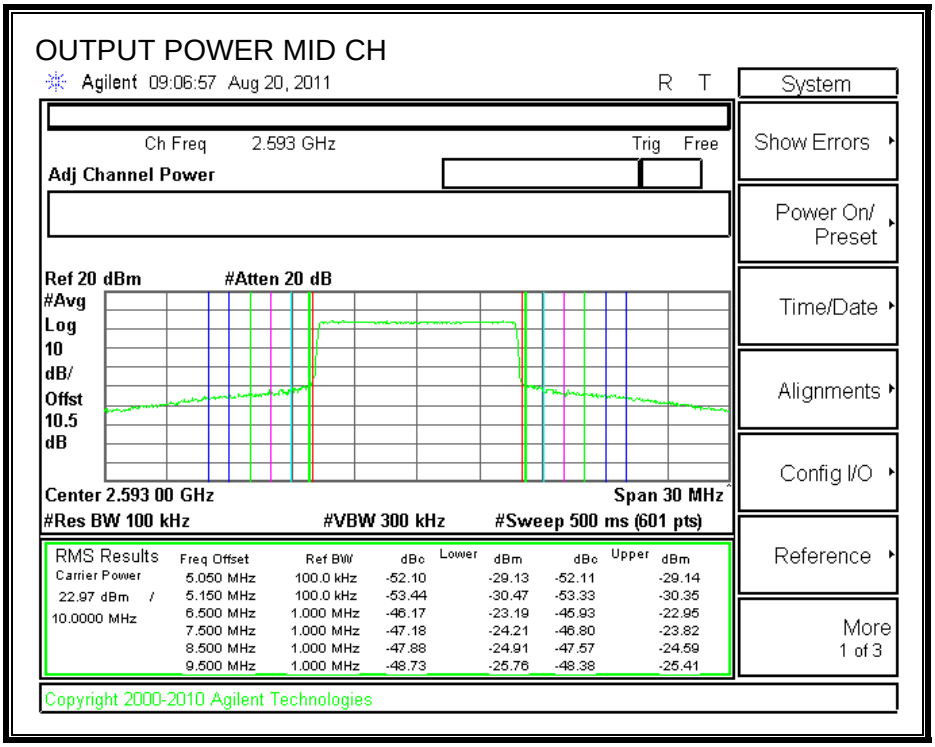


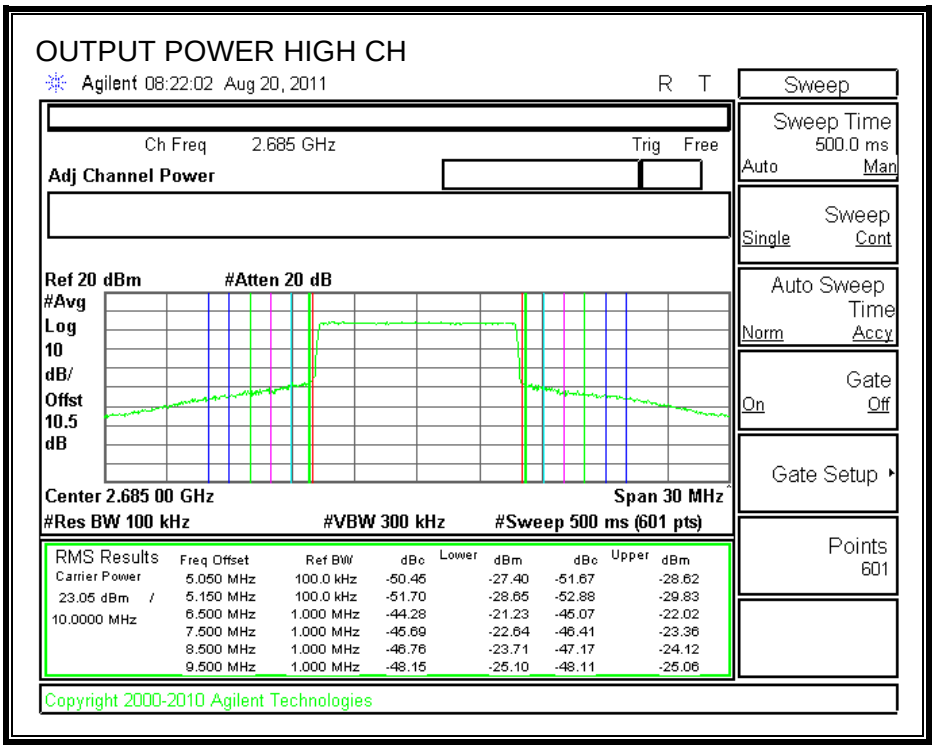


10MHz_16QAM12

OUTPUT POWER







8.1.4. CONDUCTED SPURIOUS EMISSIONS

LIMIT

§2.1051

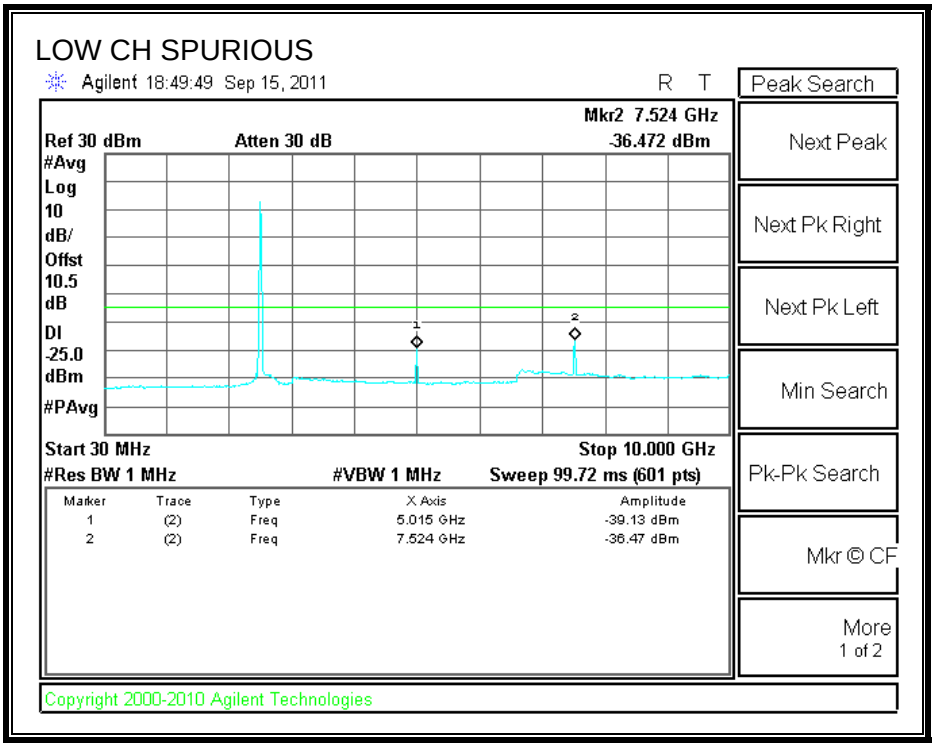
§27.53 (m)(4)(6) For mobile digital stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge and 55 + 10 log (P) dB at 5.5 megahertz from the channel edges.

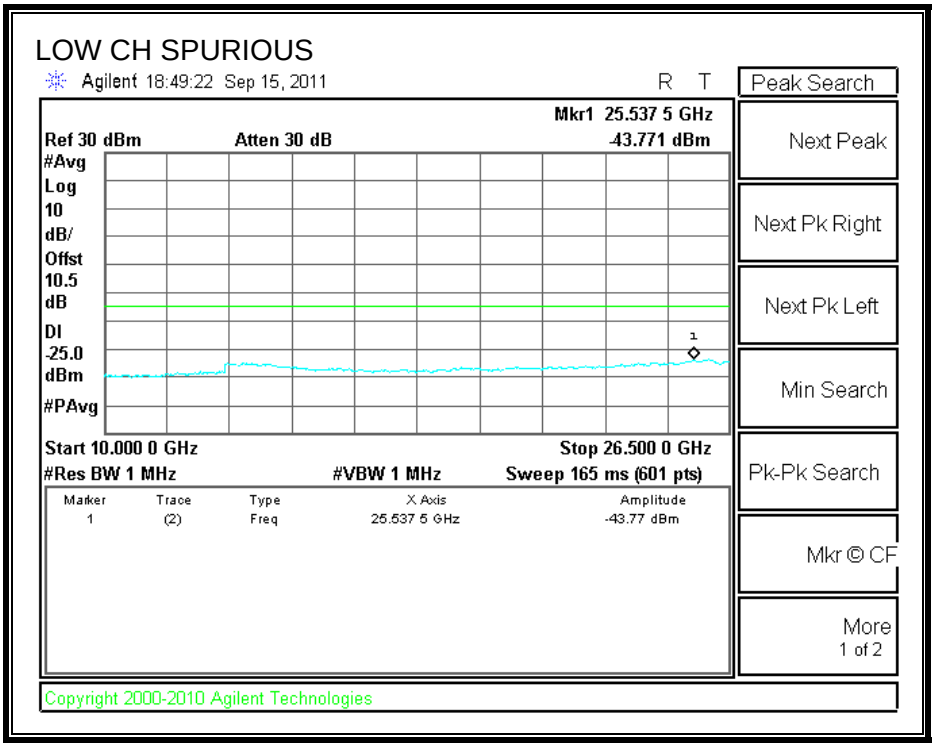
TEST PROCEDURE

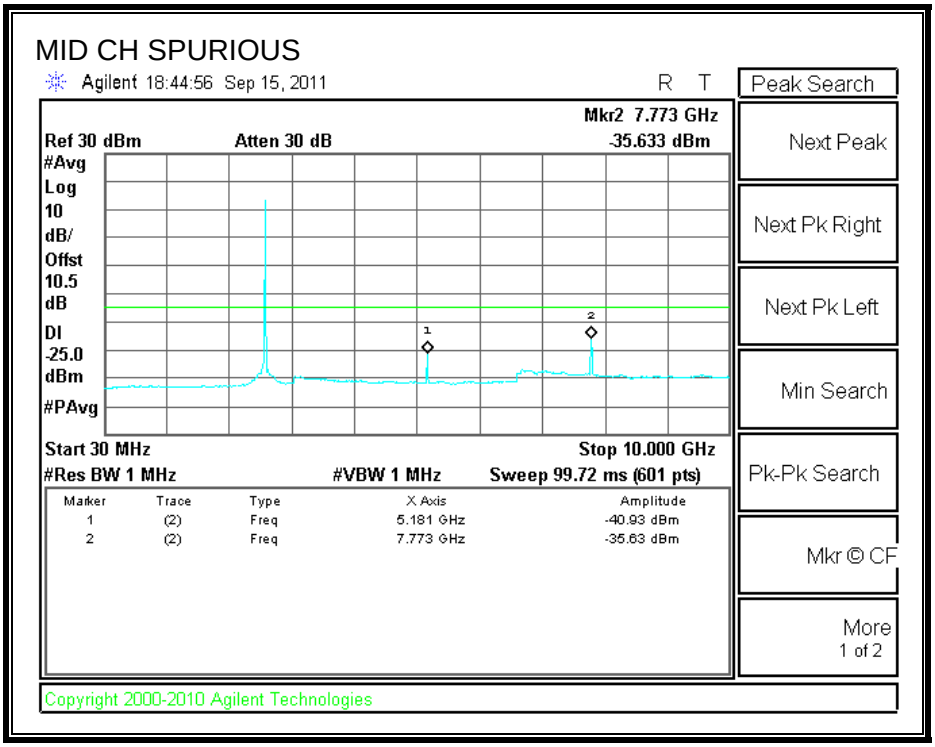
ANSI / TIA / EIA 603 Clause 3.2.12 & FCC 27

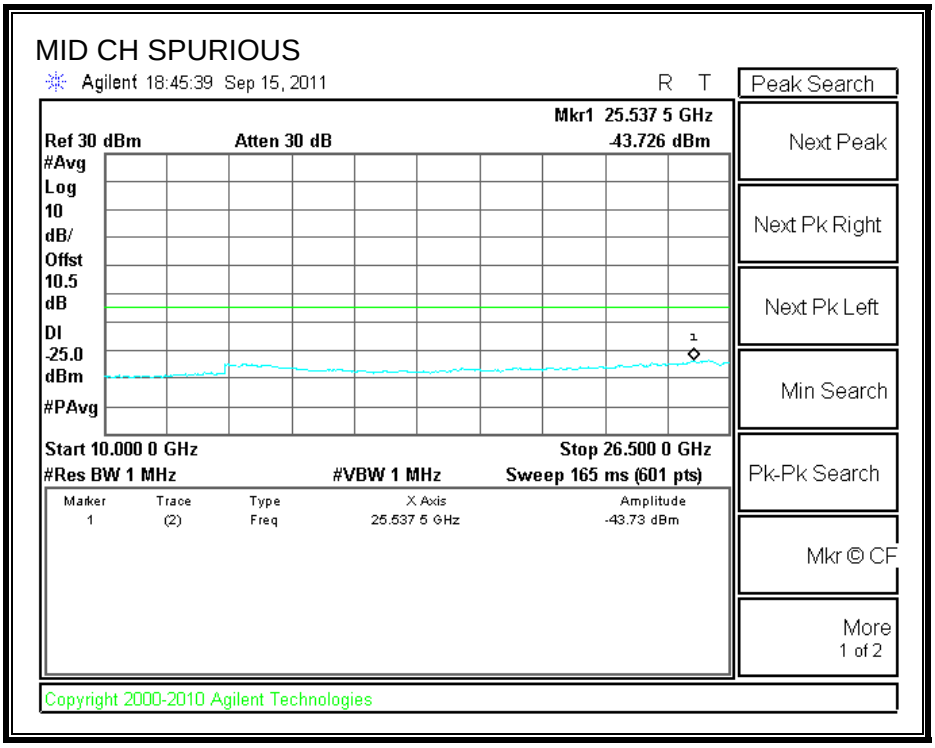
RESULTS

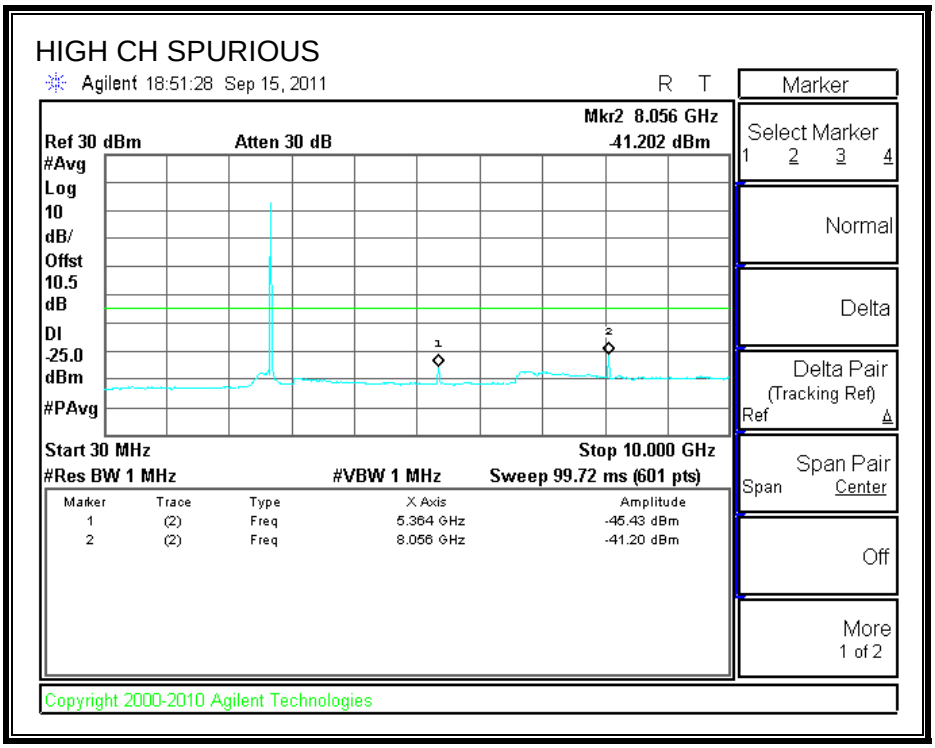
5MHz_QPSK

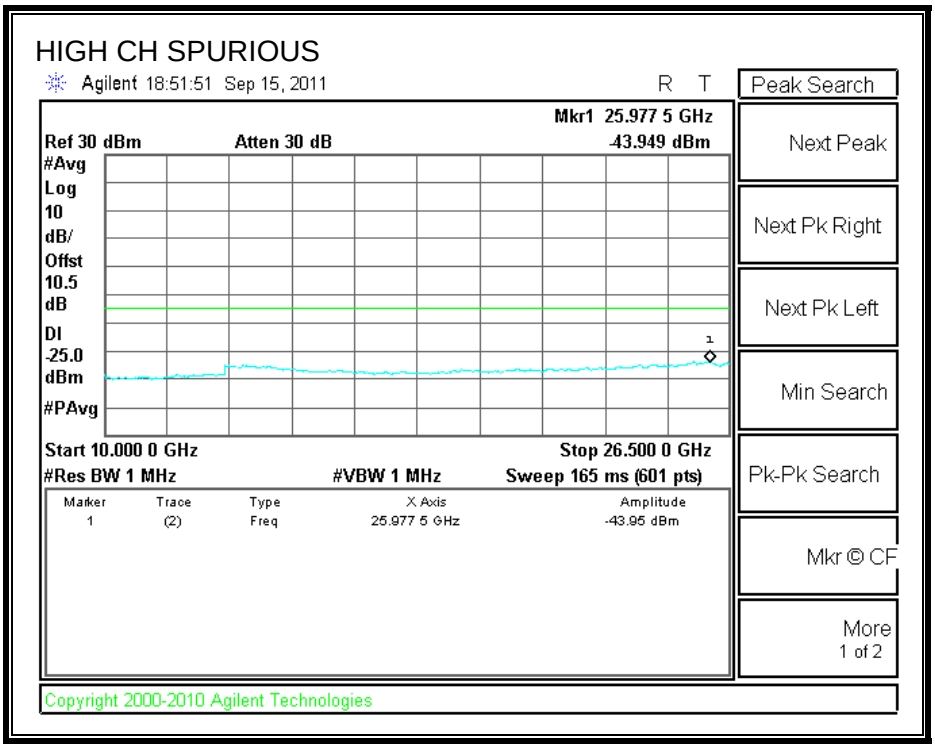




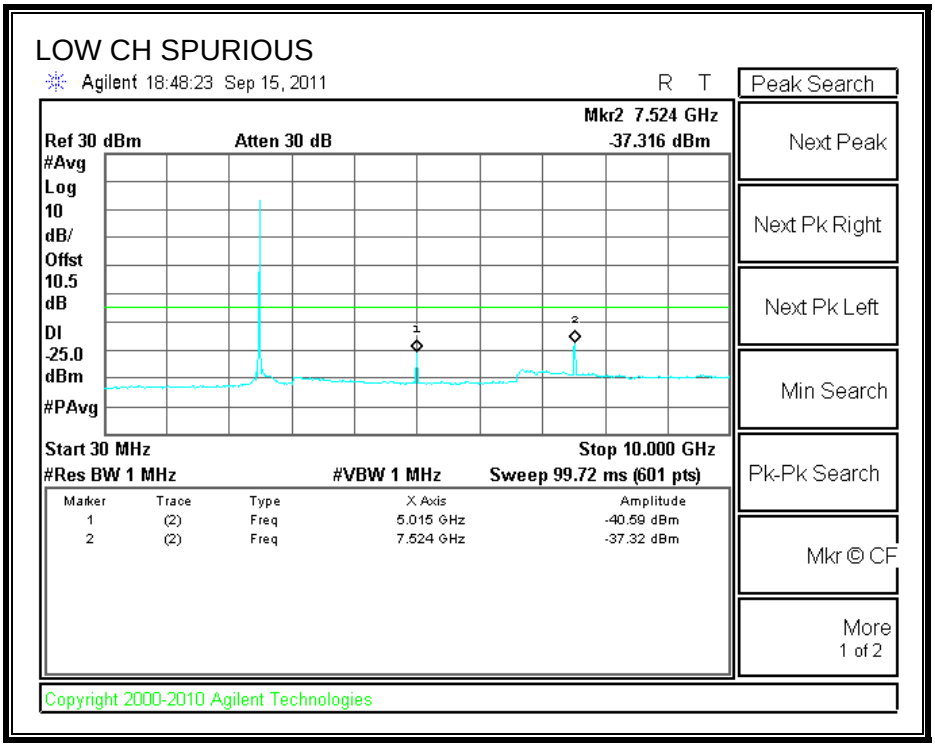


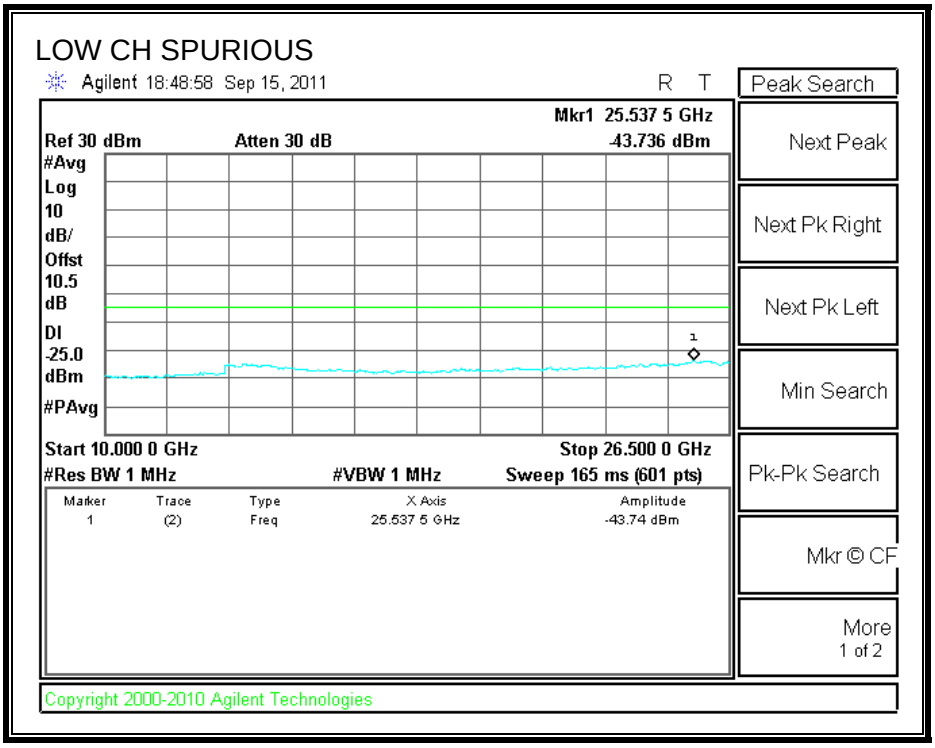


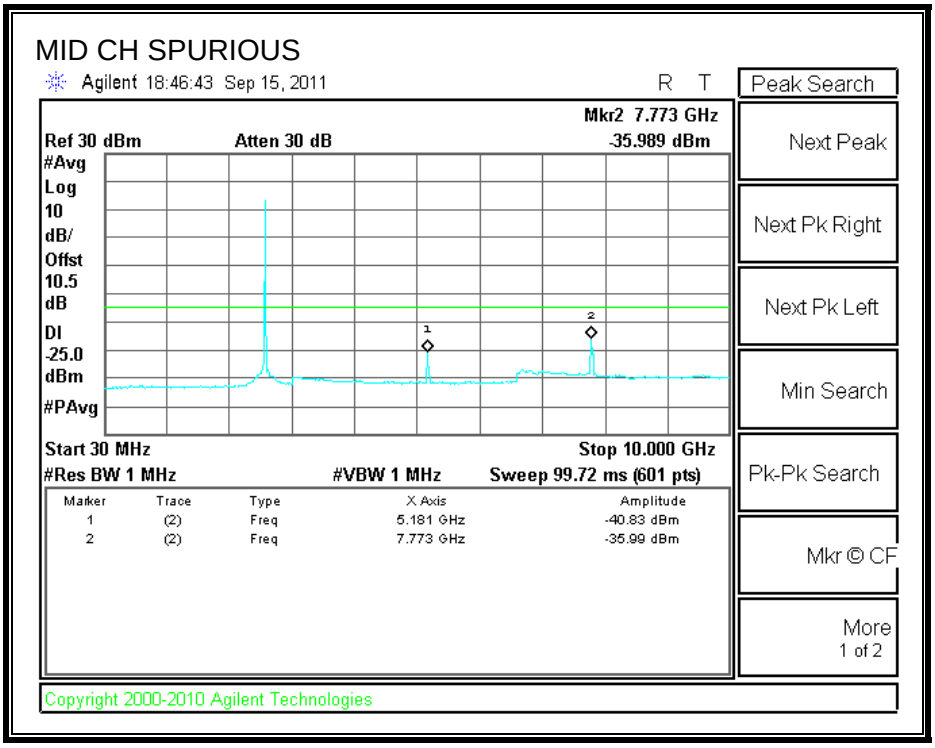


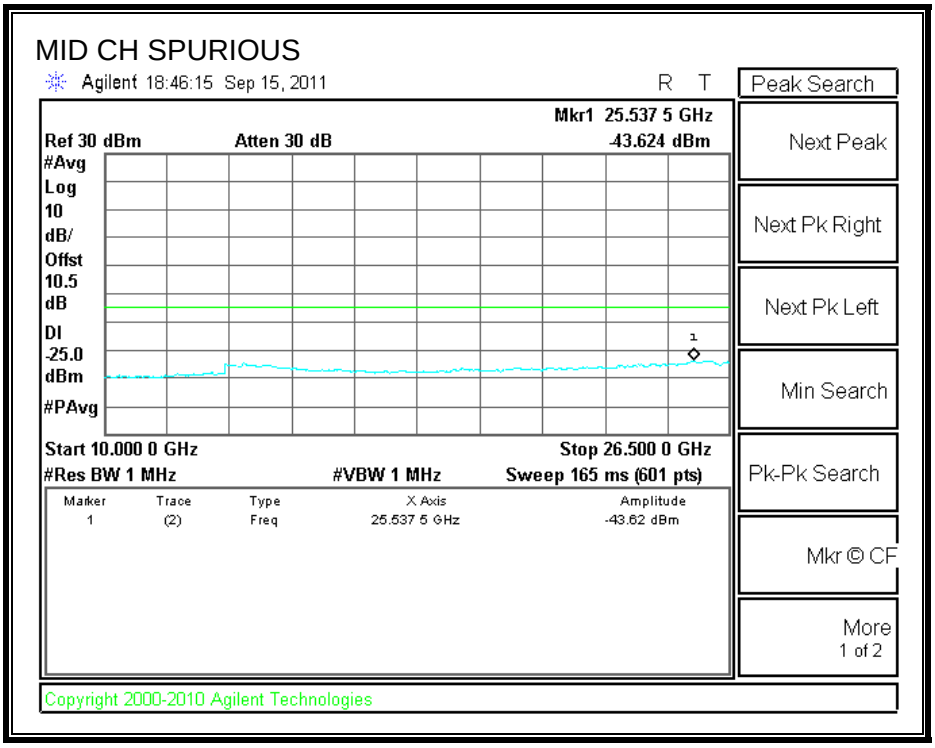


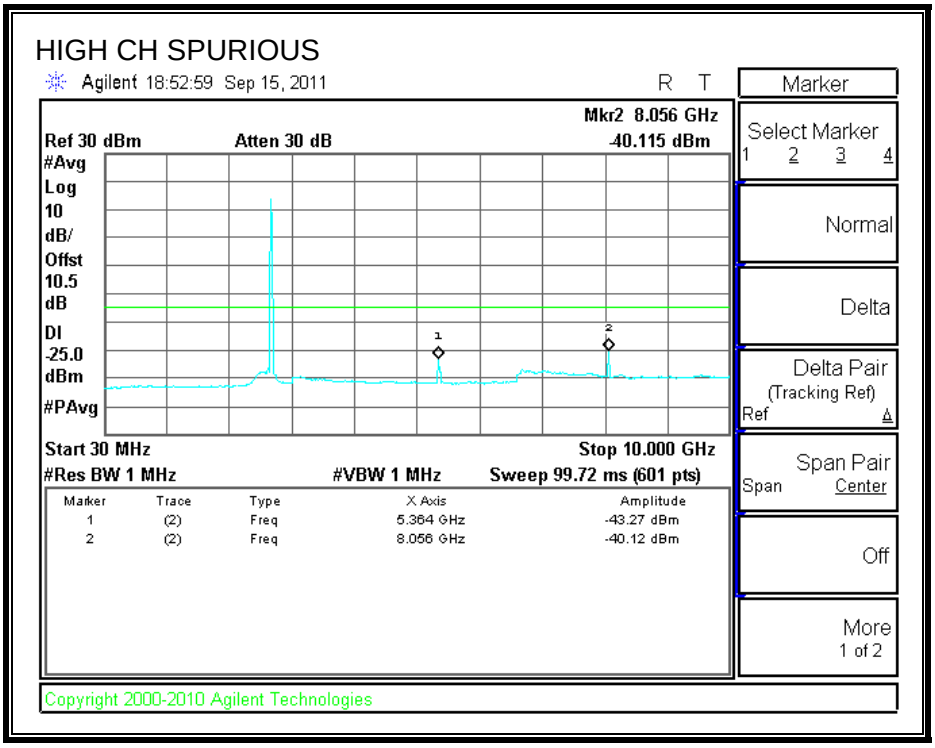
5MHz_16QAM12

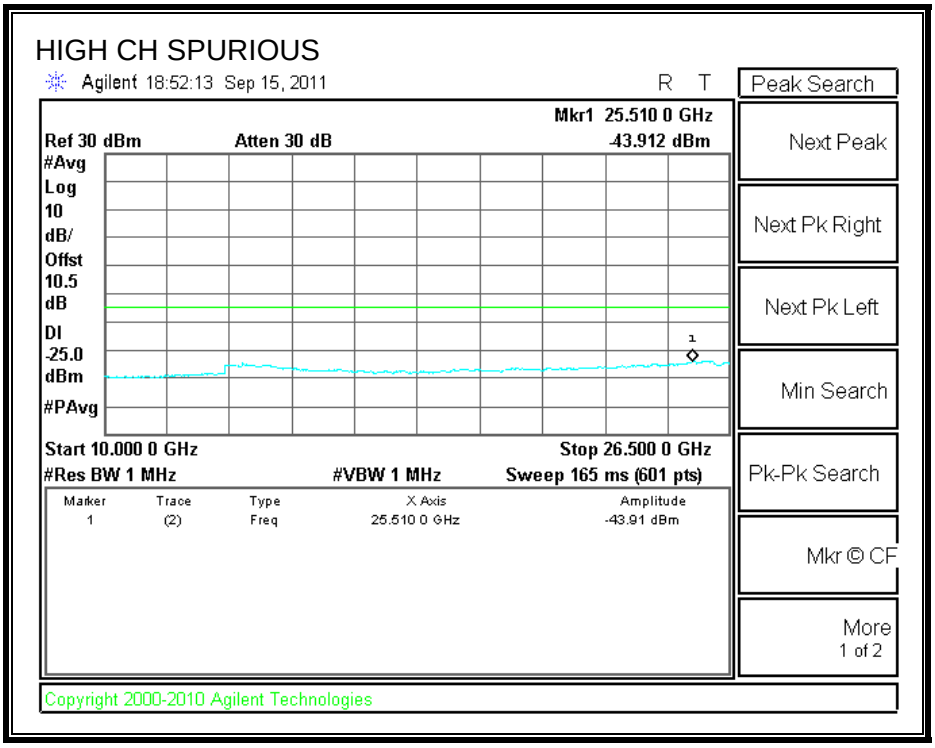




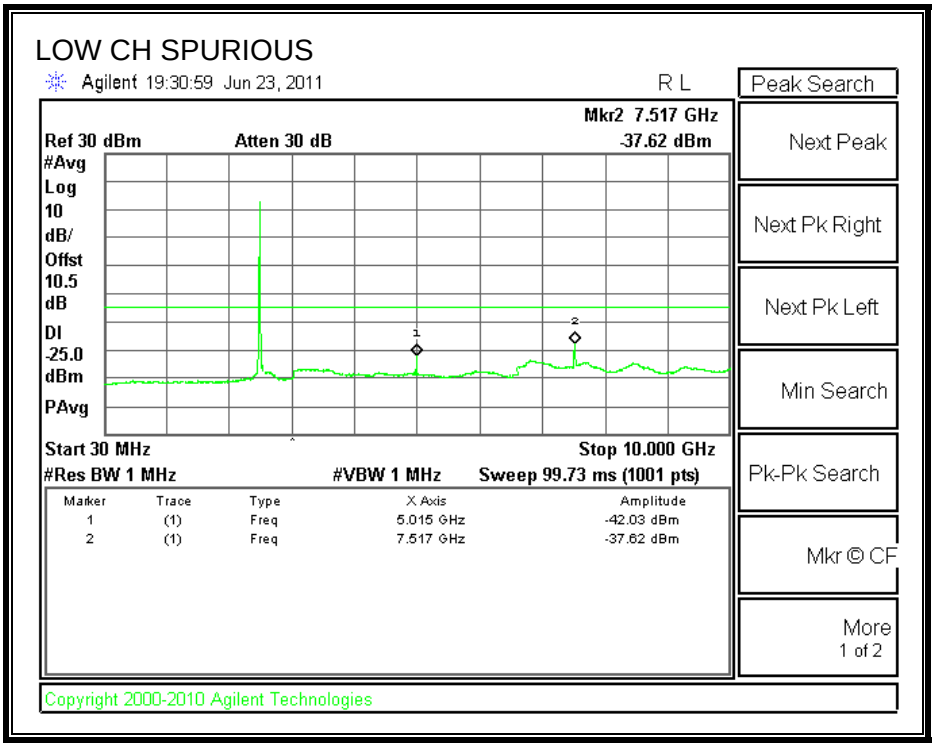


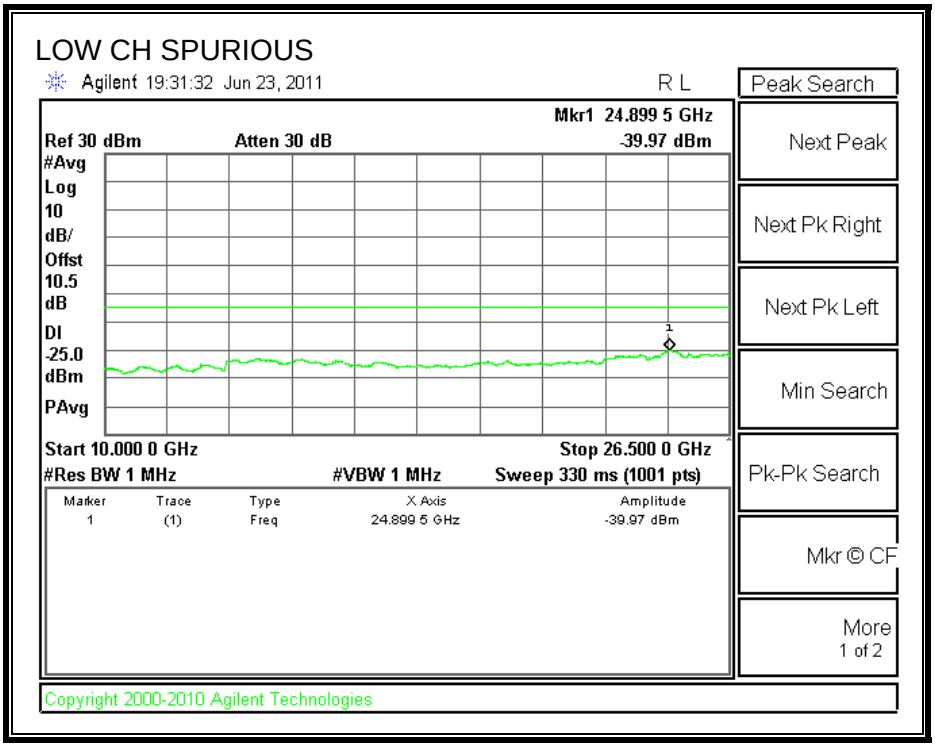


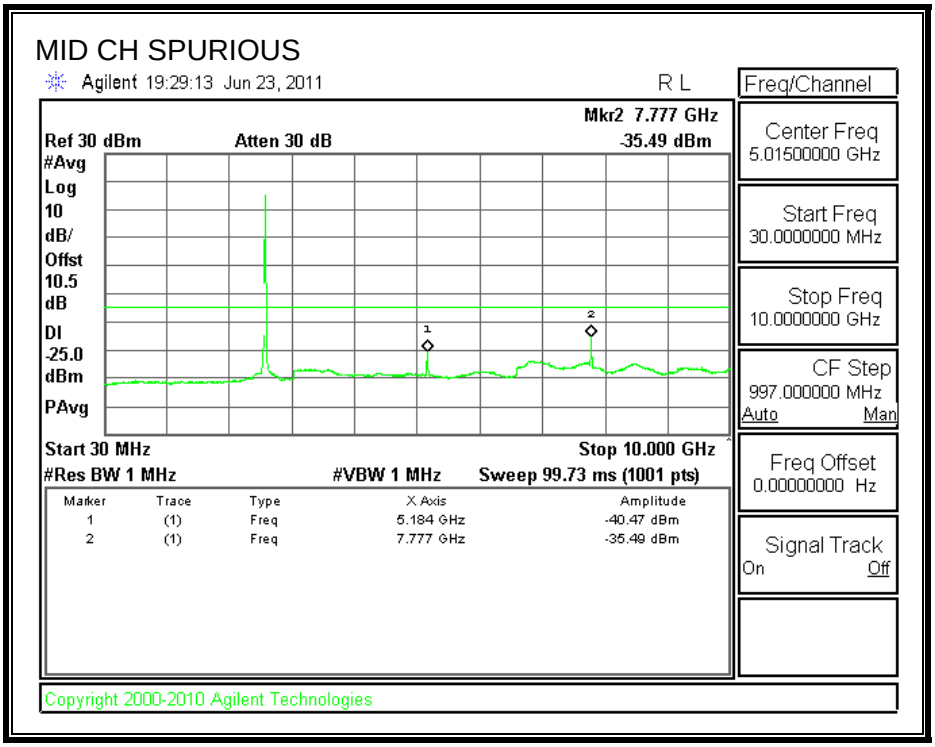


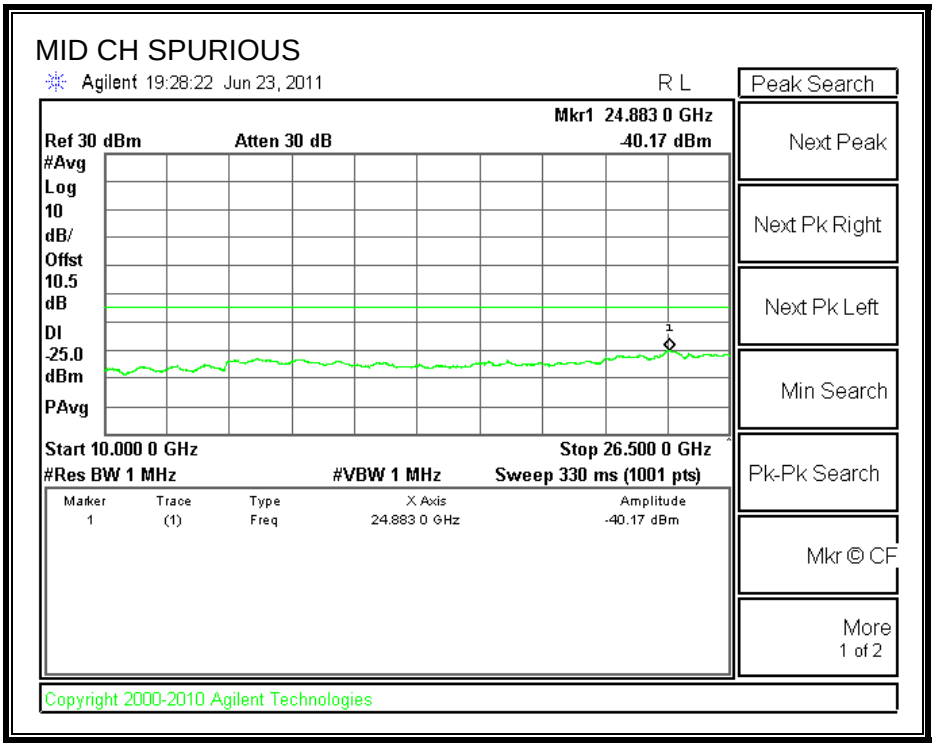


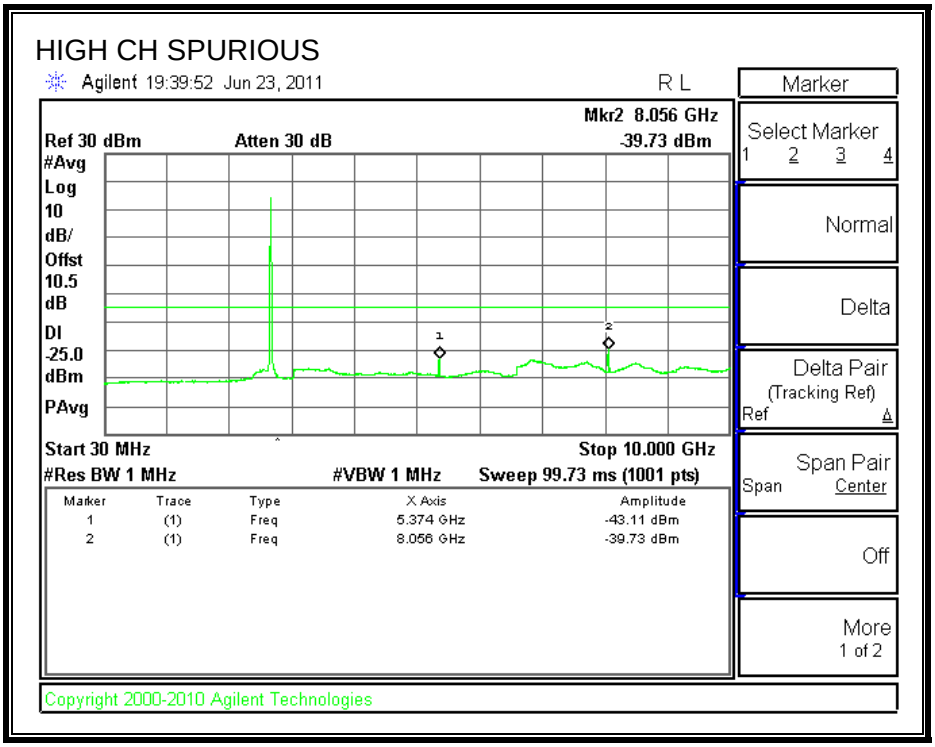
10MHz_QPSK34

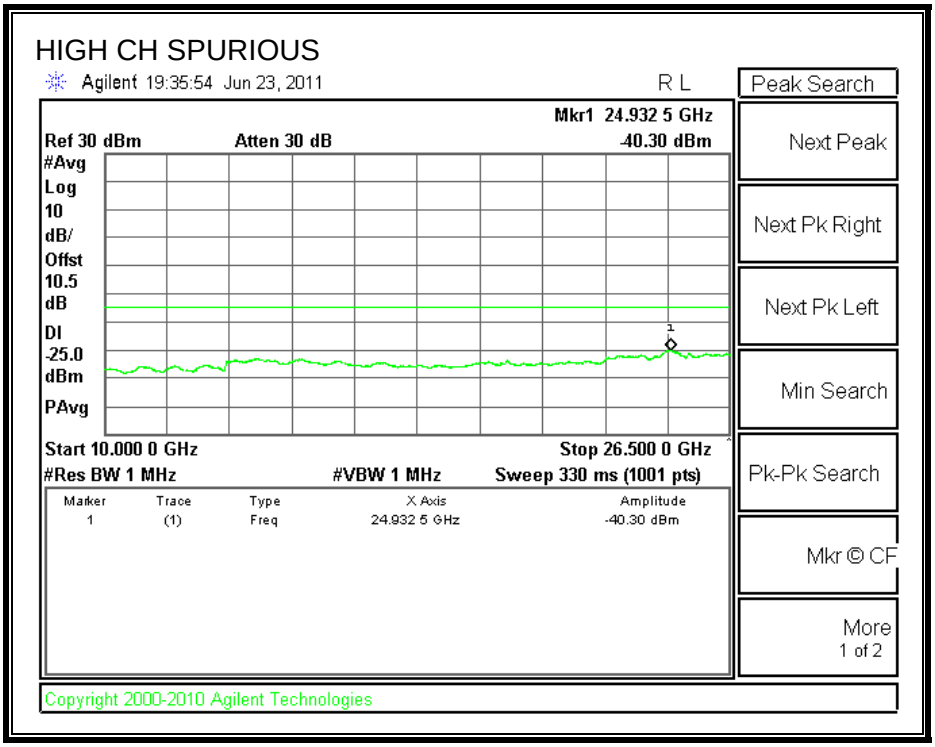




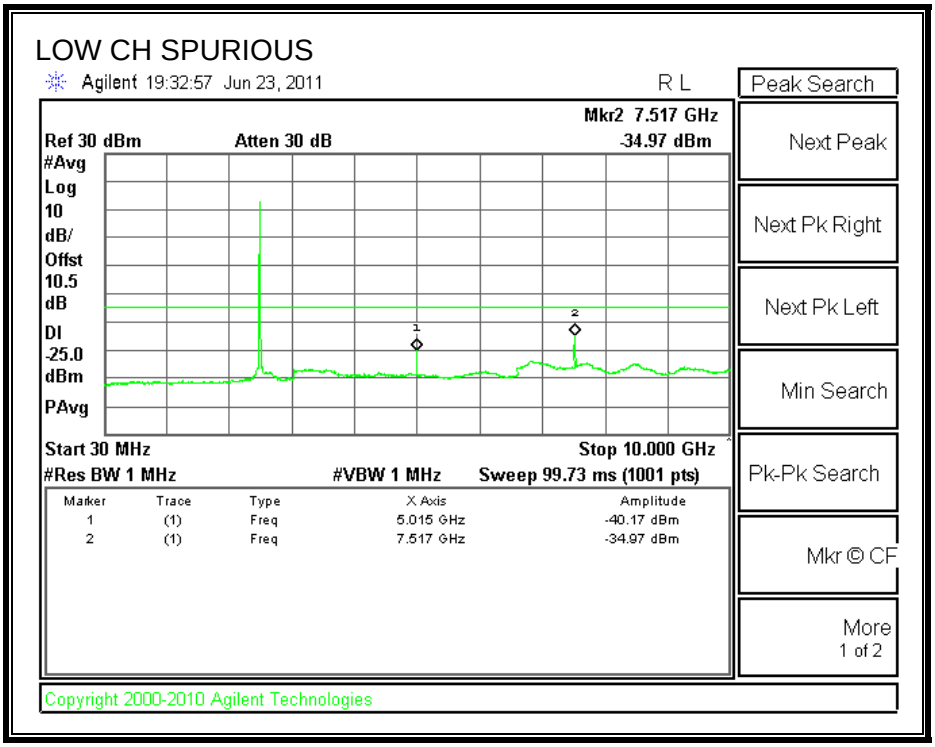


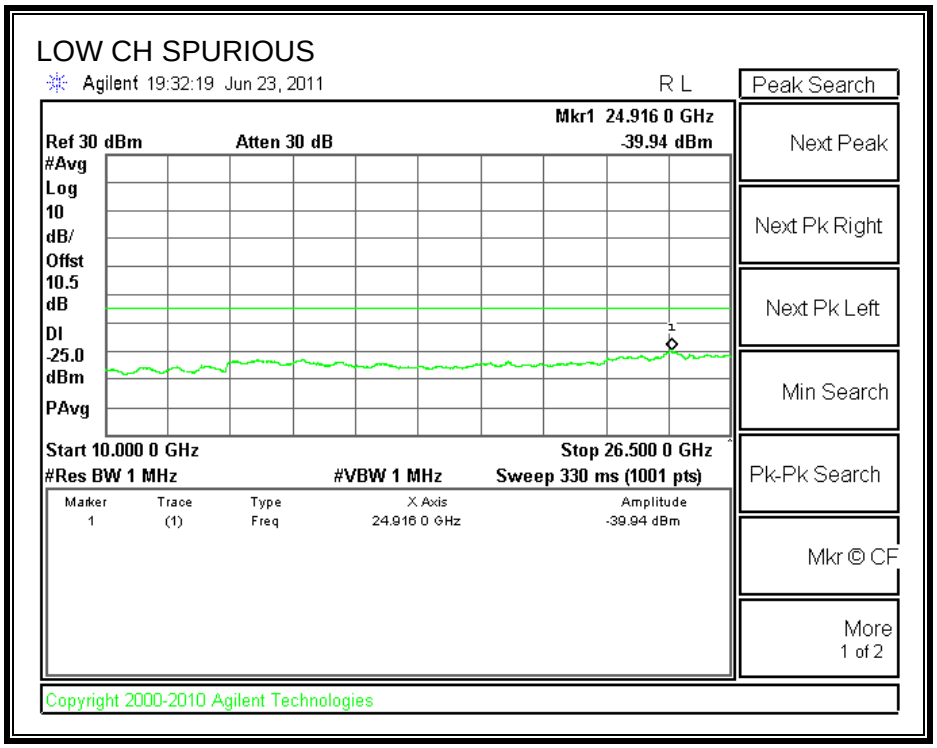


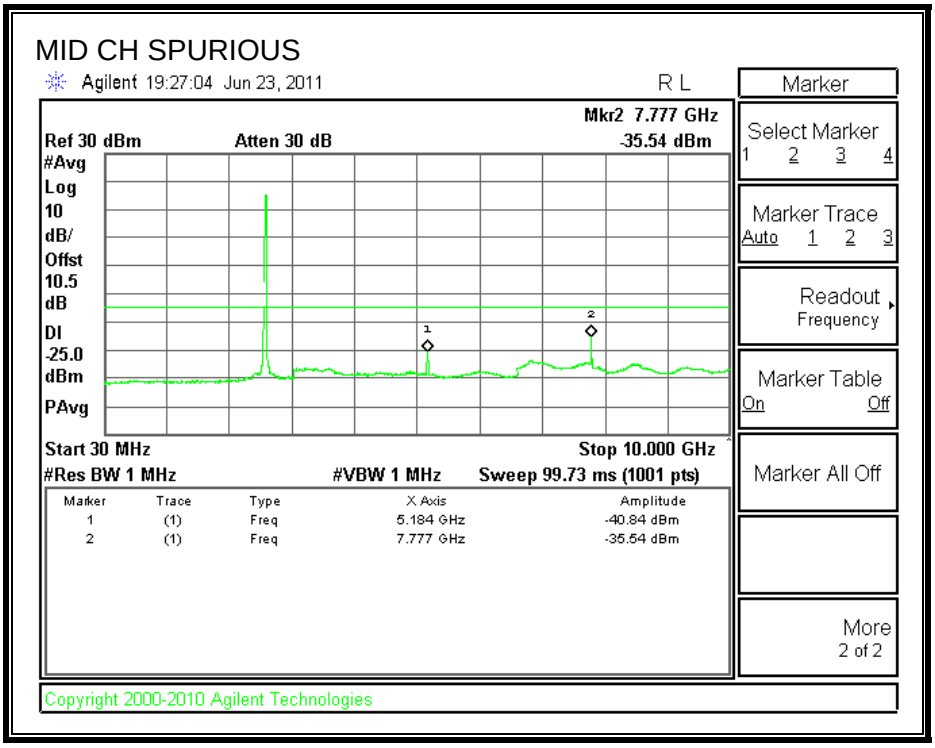


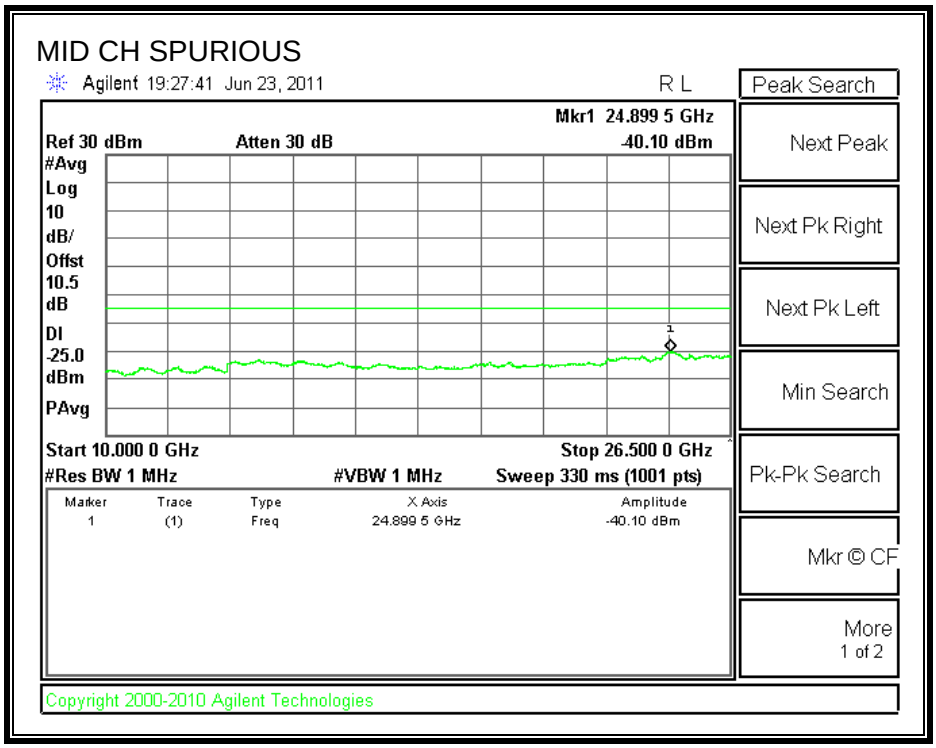


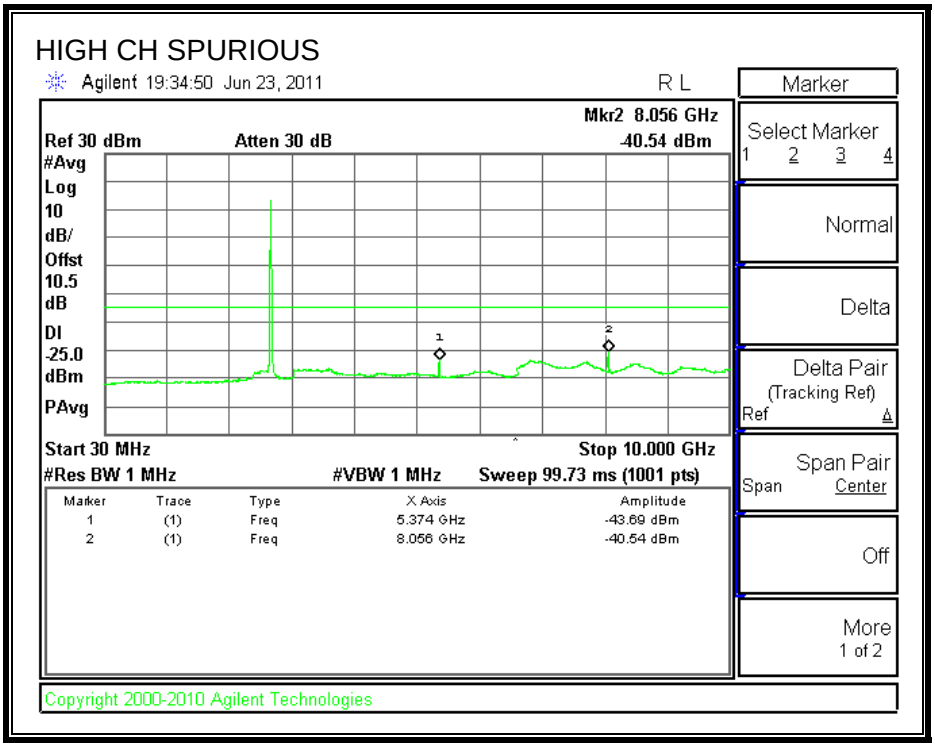
10MHz_16QAM12

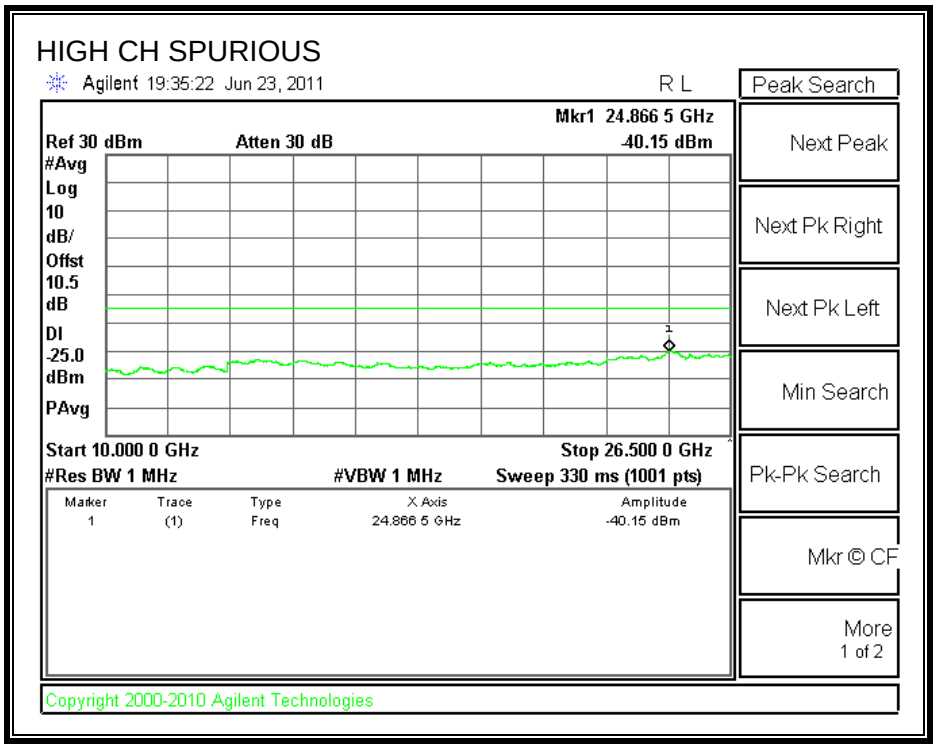












8.1.5. FREQUENCY STABILITY MEASUREMENT

LIMIT

§27.54 & 2.1055 Frequency stability.
Manufacturers of wireless medical telemetry devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all of the manufacturer's specified conditions.

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.3.1 and 2.3.2

TEST RESULTS

10MHz_QPSK34

		Reference Frequency:	2592.999778	MHz @ 20°C
		Limit: ± 20 ppm =	51860	Hz
Power	Environment	Frequency Deviation Measureed with Time Elapse		
(From Laptop)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
5.00	50	2592.999758	0.008	
5.00	40	2592.999762	0.006	
5.00	30	2592.999770	0.003	
5.00	20	2592.999778	0.000	Within the
5.00	10	2592.999790	-0.005	authorized
5.00	0	2592.999803	-0.010	frequency band
5.00	-10	2592.999820	-0.016	
5.00	-20	2592.999828	-0.019	
5.00	-30	2592.999833	-0.021	
85%	20	2592.99770	0.801	Within the authorized
115%	20	2592.99980	-0.009	frequency band

TEST RESULTS

10MHz_16QAM12

		Reference Frequency:	2592.999762	MHz @ 20°C
		Limit: ± 20 ppm =	51860	Hz
Power	Environment	Frequency Deviation Measureed with Time Elapse		
from Laptop	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
5.00	50	2592.999725	0.014	
5.00	40	2592.999745	0.007	
5.00	30	2592.999758	0.002	
5.00	20	2592.999762	0.000	Within the
5.00	10	2592.999770	-0.003	authorized
5.00	0	2592.999782	-0.008	frequency band
5.00	-10	2592.999802	-0.015	
5.00	-20	2592.999820	-0.022	
5.00	-30	2592.999935	-0.067	
85%	20	2592.99977	-0.004	Within the authorized
115%	20	2592.99980	-0.015	frequency band

TEST RESULTS

5MHz_QPSK12

		Reference Frequency:	2592.999970	MHz @ 20°C
		Limit: ± 20 ppm =	51860	Hz
Power	Environment	Frequency Deviation Measureed with Time Elapse		
from Laptop	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
5.00	50	2592.999835	0.052	
5.00	40	2592.999845	0.048	
5.00	30	2592.999986	-0.006	
5.00	20	2592.999970	0.000	Within the
5.00	10	2592.999876	0.036	authorized
5.00	0	2592.999880	0.035	frequency band
5.00	-10	2592.999892	0.030	
5.00	-20	2592.999902	0.026	
5.00	-30	2592.999928	0.016	
85%	20	2592.999975	-0.002	Within the authorized
115%	20	2592.999985	-0.006	frequency band

TEST RESULTS

5MHz_16QAM12

		Reference Frequency:	2592.999836	MHz @ 20°C
		Limit: ± 20 ppm =	51860	Hz
Power	Environment	Frequency Deviation Measureed with Time Elapse		
from Laptop	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
5.00	50	2592.999770	0.025	
5.00	40	2592.999787	0.019	
5.00	30	2592.999812	0.009	
5.00	20	2592.999836	0.000	Within the
5.00	10	2592.999828	0.003	authorized
5.00	0	2592.999853	-0.007	frequency band
5.00	-10	2592.999858	-0.008	
5.00	-20	2592.999863	-0.010	
5.00	-30	2592.999870	-0.013	
85%	20	2592.999845	-0.003	Within the authorized
115%	20	2592.999860	-0.009	frequency band

9. RADIATED TEST RESULTS

9.1.1. RADIATED OUTPUT POWER (EIRP)

LIMITS

§2.1046 & §27.50 (h)(2) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 2.2.17& FCC 27

RESULTS

Mode	Channel	Frequency (MHz)	EIRP (dBm)	EIRP (mW)
5MHz QPSK12	Low	2506	24.96	313.33
	Middle	2593	24.65	291.74
	High	2685	24.59	287.74
5MHz 16QAM12	Low	2506	25.02	317.69
	Middle	2593	24.80	302.00
	High	2685	24.75	298.54
10MHz QPSK34	Low	2506	24.84	304.79
	Middle	2593	23.89	244.91
	High	2685	24.62	289.73
10MHz 16QAM12	Low	2506	24.62	289.73
	Middle	2593	23.75	237.14
	High	2685	24.39	274.79

OUTPUT POWER (EIRP)

5MHz_QPSK12

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: SGS
Project #: 11I13868
Date: 2011-9-15
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, QPSK12_5 MHz BW_AMC

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2.5060	16.6	V	0.85	9.17	24.96	33.0	-8.0	
2.5060	10.5	H	0.85	9.17	18.82	33.0	-14.2	
Mid Ch								
2.5930	16.2	V	0.85	9.30	24.65	33.0	-8.4	
2.5930	10.6	H	0.85	9.30	19.08	33.0	-13.9	
High Ch								
2.6850	16.0	V	0.85	9.44	24.59	33.0	-8.4	
2.6850	10.6	H	0.85	9.44	19.19	33.0	-13.8	

Rev. 3.17.11

5MHz _16QAM

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: SGS
Project #: 11I13868
Date: 2011-8-23
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, 16QAM12_5 MHz BW

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2.5060	16.7	V	0.85	9.17	25.02	33.0	-8.0	
2.5060	10.3	H	0.85	9.17	18.62	33.0	-14.4	
Mid Ch								
2.5930	16.4	V	0.85	9.30	24.80	33.0	-8.2	
2.5930	11.0	H	0.85	9.30	19.45	33.0	-13.6	
High Ch								
2.6850	16.2	V	0.85	9.44	24.75	33.0	-8.3	
2.6850	11.3	H	0.85	9.44	19.89	33.0	-13.1	

Rev. 3.17.11

10MHz_QPSK

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: SGS
Project #: 11I13868
Date: 2011-8-23
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, QPSK34_10 MHz BW

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2.5060	16.5	V	0.85	9.17	24.84	33.0	-8.2	
2.5060	8.5	H	0.85	9.17	16.81	33.0	-16.2	
Mid Ch								
2.5930	15.4	V	0.85	9.30	23.89	33.0	-9.1	
2.5930	9.6	H	0.85	9.30	18.08	33.0	-14.9	
High Ch								
2.6850	16.0	V	0.85	9.44	24.62	33.0	-8.4	
2.6850	9.8	H	0.85	9.44	18.39	33.0	-14.6	

Rev. 3.17.11

10MHz _16QAM

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: SGS
Project #: 11I13868
Date: 2011-8-23
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, 16QAM12_10 MHz BW

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2.5060	16.3	V	0.85	9.17	24.62	33.0	-8.4	
2.5060	9.2	H	0.85	9.17	17.52	33.0	-15.5	
Mid Ch								
2.5930	15.3	V	0.85	9.30	23.75	33.0	-9.3	
2.5930	9.7	H	0.85	9.30	18.15	33.0	-14.9	
High Ch								
2.6850	15.8	V	0.85	9.44	24.39	33.0	-8.6	
2.6850	9.9	H	0.85	9.44	18.49	33.0	-14.5	

Rev. 3.17.11

9.1.2. FIELD STRENGTH OF SPURIOUS RADIATION

LIMIT

§2.1053

§27.53 (m)(4) For mobile digital stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge and 55 + 10 log (P) dB at 5.5 megahertz from the channel edges.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 3.2.12 & FCC 27

RESULTS

Below 1GHz at 5MHz Bandwidth (Worst Case)

Compliance Certification Services
30 - 1000MHz Substitution Measurement

Company:	SGS
Project #:	11I13868
Date:	2011-6-27
Test Engineer:	Chin Pang
Configuration:	EUT only
Mode:	TX, QPSK12_5 MHz BW (WORST CASE)

f MHz	SA reading (dBm)	Ant. Pol. (H/V)	SG reading (dBm)	Cable Loss (dB)	Antenn Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
109.90	-51.5	H	-62.0	0.5	-2.15	-64.7	-25.0	-39.7	
149.85	-57.0	H	-65.3	0.5	-2.15	-68.0	-25.0	-43.0	
262.70	-57.5	H	-64.1	0.5	-2.15	-66.8	-25.0	-41.8	
300.00	-56.9	H	-61.7	0.5	-2.15	-64.3	-25.0	-39.3	
336.00	-52.6	H	-57.2	0.5	-2.15	-59.8	-25.0	-34.8	
109.90	-51.2	V	-57.1	0.5	-2.15	-59.8	-25.0	-34.8	
149.60	-57.0	V	-61.0	0.5	-2.15	-63.7	-25.0	-38.7	
300.00	-57.5	V	-62.7	0.5	-2.15	-65.4	-25.0	-40.4	
337.30	-52.4	V	-76.6	0.5	-2.15	-79.2	-25.0	-54.2	
373.30	-57.8	V	-73.4	0.5	-2.15	-76.1	-25.0	-51.1	

Below 1GHz at 10MHz Bandwidth (Worst Case)

Compliance Certification Services
30 - 1000MHz Substitution Measurement

Company: SGS
Project #: 11I13868
Date: 2011-6-27
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, QPSK34_AMC_10 MHz BW (WORST CASE)

f MHz	SA reading (dBm)	Ant. Pol. (H/V)	SG reading (dBm)	Cable Loss (dB)	Antenn Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
109.90	-57.3	H	-67.8	0.5	-2.15	-70.5	-25.0	-45.5	
149.85	-60.0	H	-68.3	0.5	-2.15	-71.0	-25.0	-46.0	
262.70	-59.3	H	-65.9	0.5	-2.15	-68.6	-25.0	-43.6	
300.00	-59.4	H	-64.2	0.5	-2.15	-66.8	-25.0	-41.8	
769.00	-57.8	H	-62.4	0.5	-2.15	-65.0	-25.0	-40.0	
109.90	-55.7	V	-58.9	0.5	-2.15	-61.6	-25.0	-36.6	
149.60	-62.0	V	-67.4	0.5	-2.15	-70.1	-25.0	-45.1	
261.30	-59.3	V	-64.5	0.5	-2.15	-67.2	-25.0	-42.2	
300.00	-58.8	V	-64.1	0.5	-2.15	-66.8	-25.0	-41.8	
336.00	-59.6	V	-73.4	0.5	-2.15	-76.1	-25.0	-51.1	
796.00	-59.0	V	-73.4	0.5	-2.15	-76.1	-25.0	-51.1	

Above 1GHz at 5MHz Bandwidth

5MHz_QPSK12

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: SGS
Project #: 11I13868
Date:9/15/2011
Test Engineer: Chin Pang
Configuration: EUT only
Mode: QPSK12_5MHz_AMC

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 2506MHz									
5.012	0.3	V	3.0	35.3	1.0	-34.0	-25.0	-9.0	
7.518	1.4	V	3.0	35.7	1.0	-33.3	-25.0	-8.3	
12.530	4.2	V	3.0	34.1	1.0	-28.9	-25.0	-3.9	
5.012	-3.2	H	3.0	35.3	1.0	-37.5	-25.0	-12.5	
7.518	8.3	H	3.0	35.7	1.0	-26.4	-25.0	-1.4	
12.530	-1.5	H	3.0	34.1	1.0	-34.6	-25.0	-9.6	
Mid Ch, 2593MHz									
5.186	-3.7	V	3.0	35.3	1.0	-38.1	-25.0	-13.1	
7.779	-1.4	V	3.0	35.7	1.0	-36.1	-25.0	-11.1	
12.965	-4.6	V	3.0	34.0	1.0	-37.6	-25.0	-12.6	
5.186	-4.2	H	3.0	35.3	1.0	-38.6	-25.0	-13.6	
7.779	8.1	H	3.0	35.7	1.0	-26.6	-25.0	-1.6	
12.965	-7.1	H	3.0	34.0	1.0	-40.1	-25.0	-15.1	
High Ch, 2685MHz									
5.370	-1.2	V	3.0	35.4	1.0	-35.6	-25.0	-10.6	
8.055	-1.6	V	3.0	35.7	1.0	-36.3	-25.0	-11.3	
10.740	1.9	V	3.0	35.0	1.0	-32.1	-25.0	-7.1	
5.370	-5.9	H	3.0	35.4	1.0	-40.3	-25.0	-15.3	
8.055	8.2	H	3.0	35.7	1.0	-26.5	-25.0	-1.5	
10.740	-1.5	H	3.0	35.0	1.0	-35.5	-25.0	-10.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

Above 1GHz at 5MHz Bandwidth

5MHz_16QAM12

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: SGS
Project #: 11I13868
Date:9/15/11
Test Engineer: Chin Pang
Configuration: EUT only
Mode: 16QAM12_5MHz_AMC

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 2506MHz									
5.012	1.8	V	3.0	35.3	1.0	-32.5	-25.0	-7.5	
7.518	-1.8	V	3.0	35.7	1.0	-36.5	-25.0	-11.5	
12.530	-1.7	V	3.0	34.1	1.0	-34.8	-25.0	-9.8	
5.012	-5.1	H	3.0	35.3	1.0	-39.4	-25.0	-14.4	
7.518	8.1	H	3.0	35.7	1.0	-26.6	-25.0	-1.6	
12.530	-7.1	H	3.0	34.1	1.0	-40.2	-25.0	-15.2	
Mid Ch, 2593MHz									
5.186	-6.2	V	3.0	35.3	1.0	-40.6	-25.0	-15.6	
7.779	1.5	V	3.0	35.7	1.0	-33.2	-25.0	-8.2	
12.965	-6.2	V	3.0	34.0	1.0	-39.2	-25.0	-14.2	
5.186	-3.2	H	3.0	35.3	1.0	-37.6	-25.0	-12.6	
7.779	7.3	H	3.0	35.7	1.0	-27.4	-25.0	-2.4	
12.965	-7.4	H	3.0	34.0	1.0	-40.4	-25.0	-15.4	
High Ch, 2685MHz									
5.370	-3.0	V	3.0	35.4	1.0	-37.4	-25.0	-12.4	
8.055	-1.9	V	3.0	35.7	1.0	-36.6	-25.0	-11.6	
10.740	4.2	V	3.0	35.0	1.0	-29.8	-25.0	-4.8	
5.370	-6.8	H	3.0	35.4	1.0	-41.2	-25.0	-16.2	
8.055	8.1	H	3.0	35.7	1.0	-26.6	-25.0	-1.6	
10.740	-2.3	H	3.0	35.0	1.0	-36.3	-25.0	-11.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

Above 1GHz at 10MHz Bandwidth

10MHz_QPSK34

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: SGS
Project #: 11I13868
Date:6/25/2011
Test Engineer: Chin Pang
Configuration: EUT only
Mode: QPSK34_AMC_10MHz

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 2506MHz									
5.012	-2.2	V	3.0	36.3	1.0	-37.5	-25.0	-12.5	
7.518	-5.8	V	3.0	36.6	1.0	-41.4	-25.0	-16.4	
12.530	-4.6	V	3.0	36.3	1.0	-39.9	-25.0	-14.9	
5.012	-7.0	H	3.0	36.3	1.0	-42.3	-25.0	-17.3	
7.518	1.6	H	3.0	36.6	1.0	-34.0	-25.0	-9.0	
12.530	-8.7	H	3.0	36.3	1.0	-44.0	-25.0	-19.0	
Mid Ch, 2593MHz									
5.186	-5.4	V	3.0	36.3	1.0	-40.6	-25.0	-15.6	
7.779	-5.7	V	3.0	36.7	1.0	-41.3	-25.0	-16.3	
12.965	-9.0	V	3.0	36.0	1.0	-44.0	-25.0	-19.0	
5.186	2.3	H	3.0	36.3	1.0	-32.9	-25.0	-7.9	
7.779	3.9	H	3.0	36.7	1.0	-31.8	-25.0	-6.8	
12.965	-12.8	H	3.0	36.0	1.0	-47.8	-25.0	-22.8	
High Ch, 2685MHz									
5.370	-7.0	V	3.0	36.3	1.0	-42.2	-25.0	-17.2	
8.055	-5.8	V	3.0	36.7	1.0	-41.6	-25.0	-16.6	
10.740	1.3	V	3.0	37.0	1.0	-34.6	-25.0	-9.6	
5.370	-8.4	H	3.0	36.3	1.0	-43.6	-25.0	-18.6	
8.055	8.3	H	3.0	36.7	1.0	-27.4	-25.0	-2.4	
10.740	-4.7	H	3.0	37.0	1.0	-40.7	-25.0	-15.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

Above 1GHz at 10MHz Bandwidth

10MHz_16QAM12

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: SGS
Project #: 11I13868
Date:6/25/2011
Test Engineer: Chin Pang
Configuration: EUT only
Mode: 16QAM12_AMC_10MHz

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 2506MHz									
5.012	-3.7	V	3.0	36.3	1.0	-39.0	-25.0	-14.0	
7.518	-4.2	V	3.0	36.6	1.0	-39.8	-25.0	-14.8	
12.530	-3.9	V	3.0	36.3	1.0	-39.2	-25.0	-14.2	
5.012	-9.2	H	3.0	36.3	1.0	-44.5	-25.0	-19.5	
7.518	5.1	H	3.0	36.6	1.0	-30.5	-25.0	-5.5	
12.530	-7.3	H	3.0	36.3	1.0	-42.6	-25.0	-17.6	
Mid Ch, 2593MHz									
5.186	-4.5	V	3.0	36.3	1.0	-39.7	-25.0	-14.7	
7.779	-4.7	V	3.0	36.7	1.0	-40.3	-25.0	-15.3	
12.965	-8.3	V	3.0	36.0	1.0	-43.3	-25.0	-18.3	
5.186	-5.7	H	3.0	36.3	1.0	-40.9	-25.0	-15.9	
7.779	4.5	H	3.0	36.7	1.0	-31.2	-25.0	-6.2	
12.965	-12.4	H	3.0	36.0	1.0	-47.4	-25.0	-22.4	
High Ch, 2685MHz									
5.370	-5.8	V	3.0	36.3	1.0	-41.0	-25.0	-16.0	
8.055	-5.3	V	3.0	36.7	1.0	-41.1	-25.0	-16.1	
10.740	2.5	V	3.0	37.0	1.0	-33.4	-25.0	-8.4	
5.370	-7.9	H	3.0	36.3	1.0	-43.1	-25.0	-18.1	
8.055	7.4	H	3.0	36.7	1.0	-28.3	-25.0	-3.3	
10.740	-3.6	H	3.0	37.0	1.0	-39.6	-25.0	-14.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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

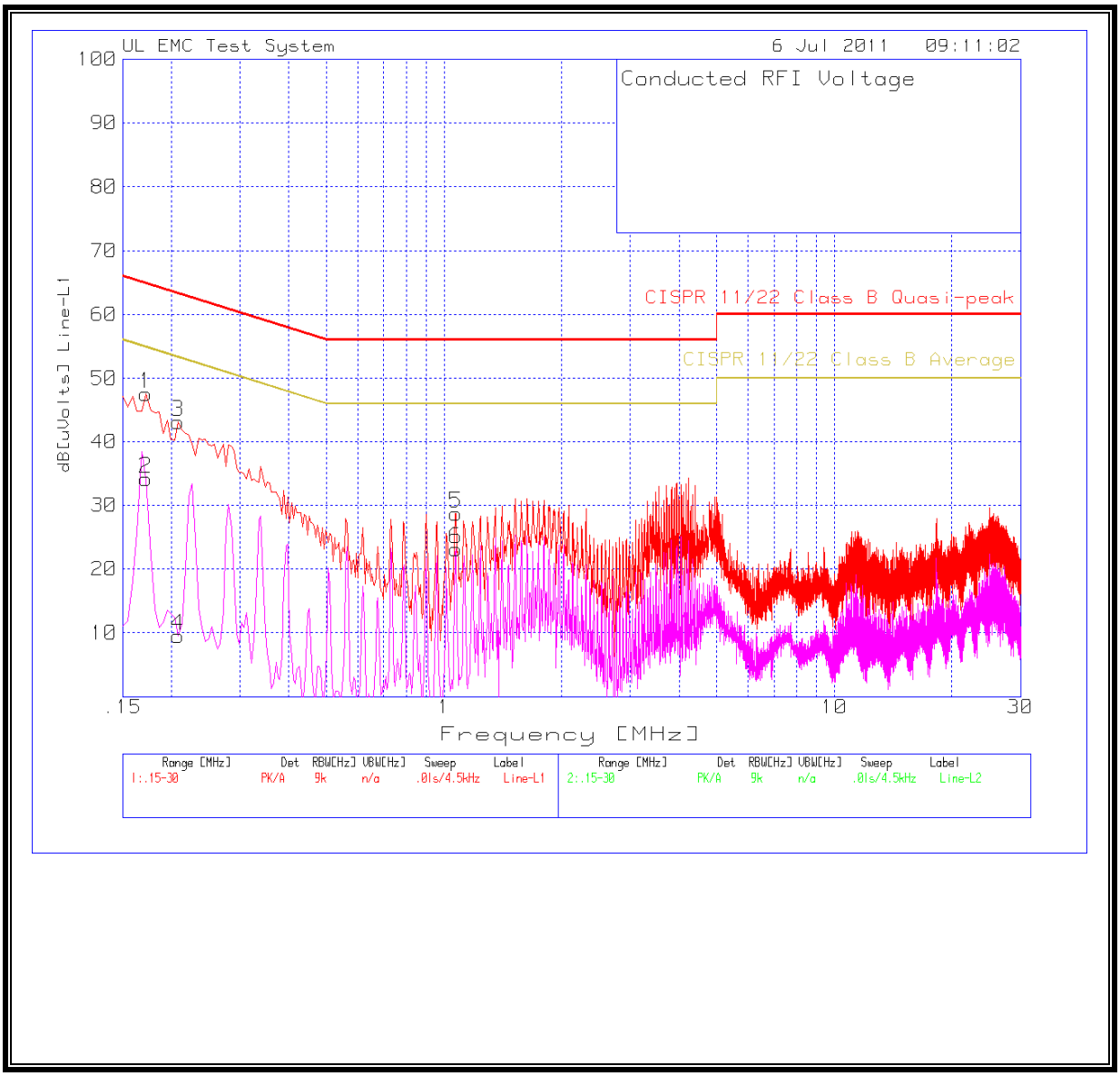
ANSI C63.4

RESULTS

6 WORST EMISSIONS

Line-L1 .15 - 30MHz									
Test Frec	Meter Rea	Detector	LISN [dB]	Conducted	dB[uVolts	CISPR 11/	Margin	CISPR 11/	Margin
0.1725	47.55	PK	0	0	47.55	64.8	-17.25	54.8	-7.25
0.1725	34.08	Av	0	0	34.08	-	-	54.8	-20.72
0.2085	43.21	PK	0	0	43.21	63.3	-20.09	53.3	-10.09
0.2085	9.58	Av	0	0	9.58	-	-	53.3	-43.72
1.0725	28.69	PK	0	0	28.69	56	-27.31	46	-17.31
1.0725	23.06	Av	0	0	23.06	-	-	46	-22.94
Line-L2 .15 - 30MHz									
Test Frec	Meter Rea	Detector	LISN [dB]	Conducted	dB[uVolts	CISPR 11/	Margin	CISPR 11/	Margin
0.177	46.83	PK	0	0	46.83	64.6	-17.77	54.6	-7.77
0.177	25.2	Av	0	0	25.2	-	-	54.6	-29.4
0.2265	43.28	PK	0	0	43.28	62.6	-19.32	52.6	-9.32
0.2265	34.92	Av	0	0	34.92	-	-	52.6	-17.68
0.393	35.29	PK	0	0	35.29	58	-22.71	48	-12.71
0.393	27.06	Av	0	0	27.06	-	-	48	-20.94

LINE 1 RESULTS



LINE 2 RESULTS