



**FCC CFR47 PART 27 SUBPART M
CERTIFICATION TEST REPORT**

FOR

NOTEBOOK PC - INTEL WIMAX-WLAN

FCC MODEL: NP-NC10 - SYSTEM APPROVAL

FCC ID: A3LNC10-512ANXM

REPORT NUMBER: 09I12437-5

ISSUE DATE: MARCH 24, 2009

Prepared for

**SAMSUNG ELECTRONICS CO., LTD
416, MAETAN 3-DONG, YEONGTONG-GU
SUWON-CITY, GYE 443-742, SOUTH KOREA**

Prepared by

**COMPLIANCE CERTIFICATION SERVICES
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888**



NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	03/24/09	Initial Issue	T. Chan

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION.....	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. MEASURING INSTRUMENT CALIBRATION	5
4.2. MEASUREMENT UNCERTAINTY	5
5. EQUIPMENT UNDER TEST	6
5.1. DESCRIPTION OF EUT.....	6
5.2. MAXIMUM OUTPUT POWER.....	6
5.3. CROSS REFERENCE REPORT.....	6
5.4. DESCRIPTION OF AVAILABLE ANTENNAS	6
5.5. SOFTWARE AND FIRMWARE	6
5.6. WORST-CASE CONFIGURATION AND MODE.....	6
5.7. DESCRIPTION OF TEST SETUP.....	7
6. TEST AND MEASUREMENT EQUIPMENT	9
7. LIMITS AND RESULTS	10
7.1. OUTPUT POWER VERIFICATION	10
7.2. RADIATED OUTPUT POWER	21
7.3. FIELD STRENGTH OF SPURIOUS RADIATION	24
8. AC POWER LINE CONDUCTED EMISSIONS.....	28
9. SETUP PHOTOS.....	31

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD
416, MAETAN 3-DONG, YEONGTONG-GU
SUWON-CITY, GYE 443-742, SOUTH KOREA

EUT DESCRIPTION: NOTEBOOK PC

FCC MODEL: NP-NC10 - SYSTEM APPROVAL

SERIAL NUMBER: 001D729200B2

DATE TESTED: MARCH 09-19, 2009

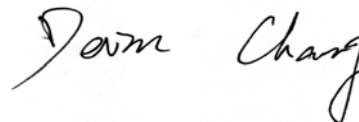
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 27 SUBPART M	PASS (RADIATED ONLY)

Compliance Certification Services, Inc. (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 CCS based on interpretations and/or observations of test results. 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

DEVIN CHANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

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

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. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Radiated Emission, Above 2000 MHz	+/- 4.3 dB
Power Line Conducted Emission	+/- 2.9 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Notebook PC contains BT module (FCC#: QDS-BRCM1018) and 512ANXMMW WiFi/WiMax Link 5150 are installed.

The WiFi/WiMax Link 5150 is manufactured by Intel.

5.2. MAXIMUM OUTPUT POWER

The test measurement passed within $\pm 0.5\text{dBm}$ of the original output power.

5.3. CROSS REFERENCE REPORT

All RF conducted emissions tests were performed under the Intel report # INTEL-080730F.

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB antenna, with a maximum gain of -0.57dBi .

5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was WiMAX VaTU version 3.0.0.0

5.6. WORST-CASE CONFIGURATION AND MODE

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

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Samsung	NT-WINCHST-PS2	ES4893GQ900069R	DoC
AC/DC Adapter	Delta	ADP-40MH AB	BA44-00262A	DoC

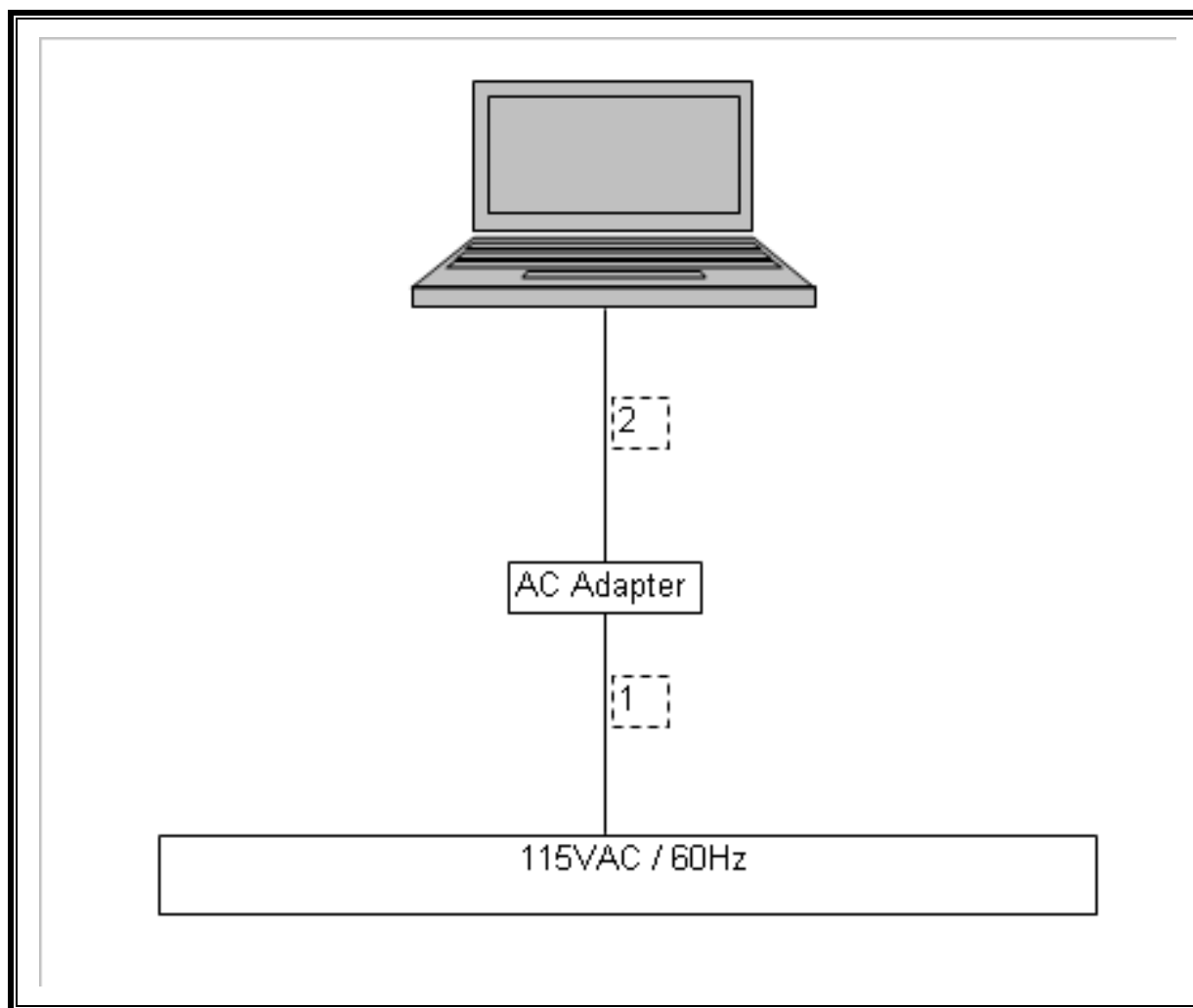
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	1.8m	NA
2	DC	1	DC	Un-shielded	1.8m	Ferrite at laptop's end

TEST SETUP

The EUT is installed in a host laptop computer during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	12/27/09
Antenna, Horn, 18 GHz	EMCO	3115	C00872	04/22/09
Preamplifier, 1000MHz	Sonoma	310N	N02891	03/31/09
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	02/11/10
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	09/19/09
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	09/19/09
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/25/09
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/06/09
Antenna, Horn, 26.5 GHz	ARA	SWH-28	C01015	12/28/09
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	03/03/09
Highpass Filter, 4.0 GHz	Micro-Tronics	HPM13351	N02709	CNR
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	12/11/09
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	04/29/09
ESG VECTOR SIGNAL GENERATOR	Agilent / HP	E4438C	US44271909	09/17/10

7. LIMITS AND RESULTS

7.1. OUTPUT POWER VERIFICATION

The max average conducted output power is measured for the uplink burst in the OFDM modulation and channel bandwidth. Conducted average output power were measured with the module connected to the test jig with over-the-air communication link to Vector Signal generator.

The EUT driver software installed in the host support equipment during testing was WiMAX VaTU, version: 3.0.0.0

The modes with highest output power channel were chosen for the conducted output power measurement.

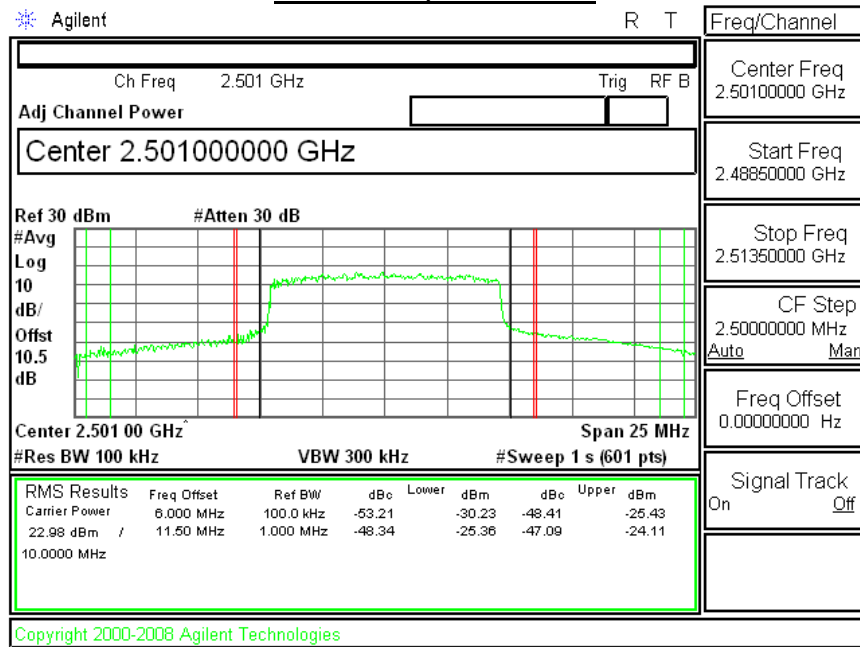
10 MHz

Mode	Test Vector file name	Ch. No	f (MHz)	Output power (dBm)	Output power (mW)
16QAM	RDQ4_12_UQ16_34_10M	0	2501	22.98	198.61
		368	2593	22.78	189.67
		736	2685	22.77	189.23
QPSK	RDQ64_56_UQ4_12_10M	0	2501	22.86	193.20
		368	2593	23.11	204.64
		736	2685	23.00	199.53

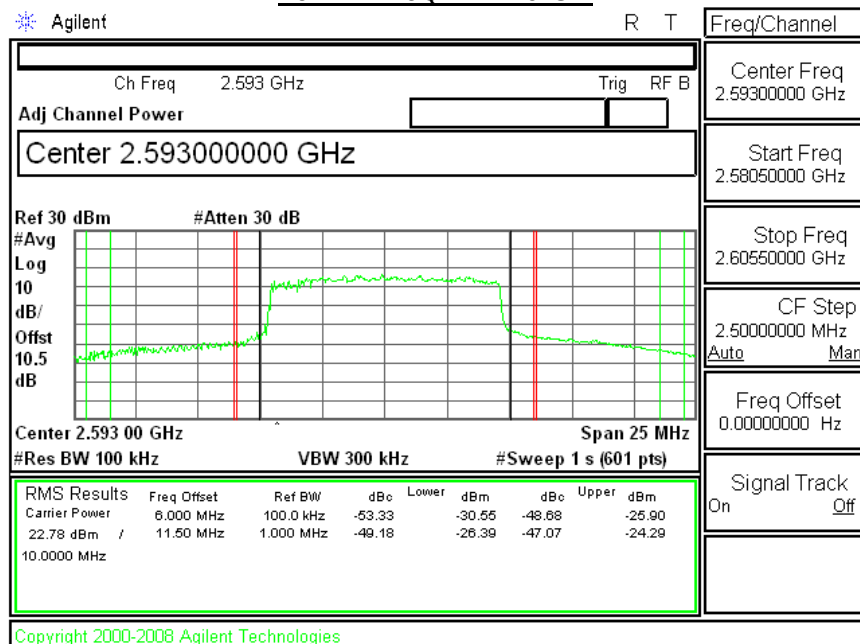
5 MHz

Mode	Test Vector file name	Ch. No	f (MHz)	Output Power (dBm)	Output Power (mW)
16QAM	RDQ4_12_UQ16_34_5M	0	2498.5	23.76	237.68
		378	2593	23.51	224.39
		756	2687.5	23.42	219.79
QPSK	RDQ64_56_UQ4_12_5M	0	2498.5	23.44	220.80
		378	2593	23.31	214.29
		756	2687.5	23.27	212.32

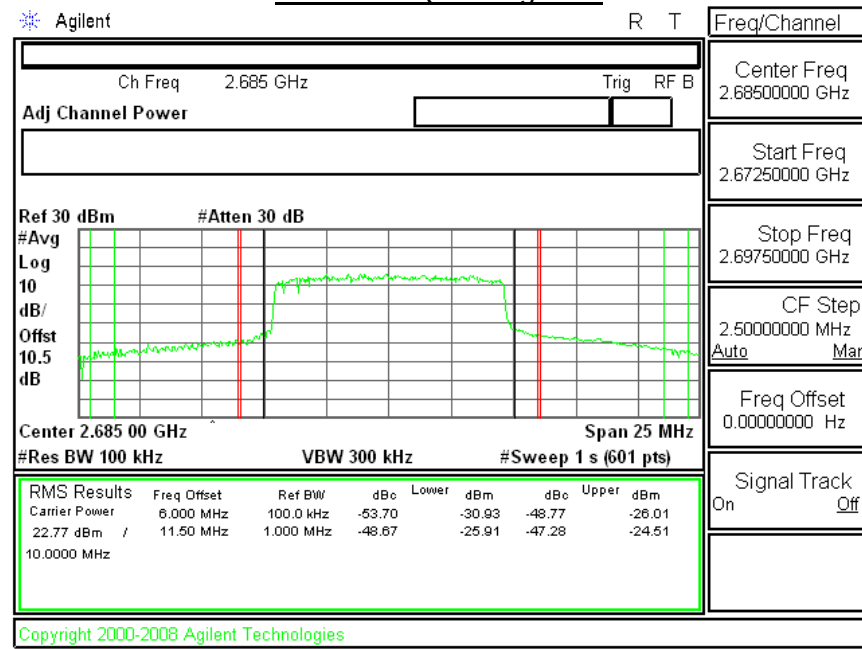
10MHz 16QAM Low CH



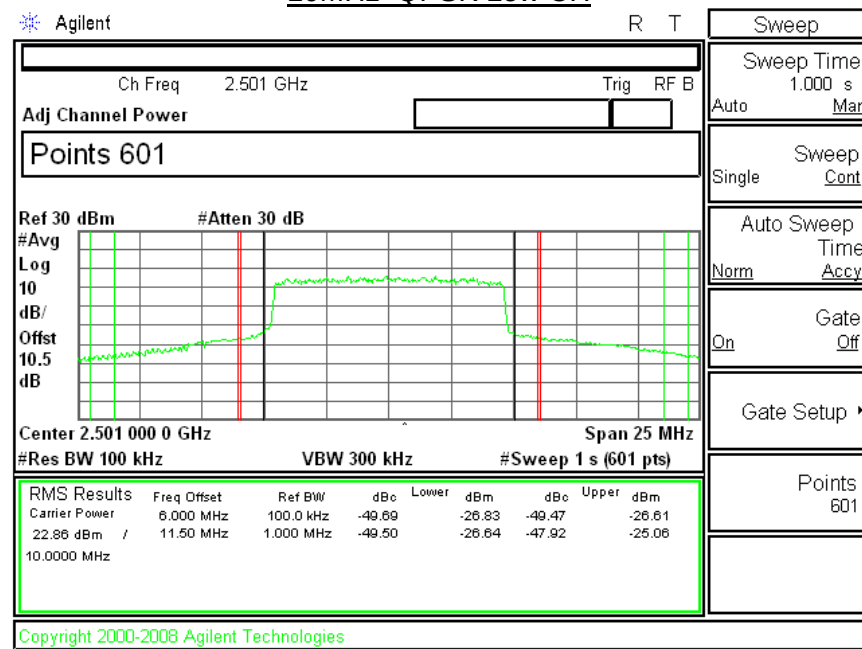
10MHz 16QAM Mid CH



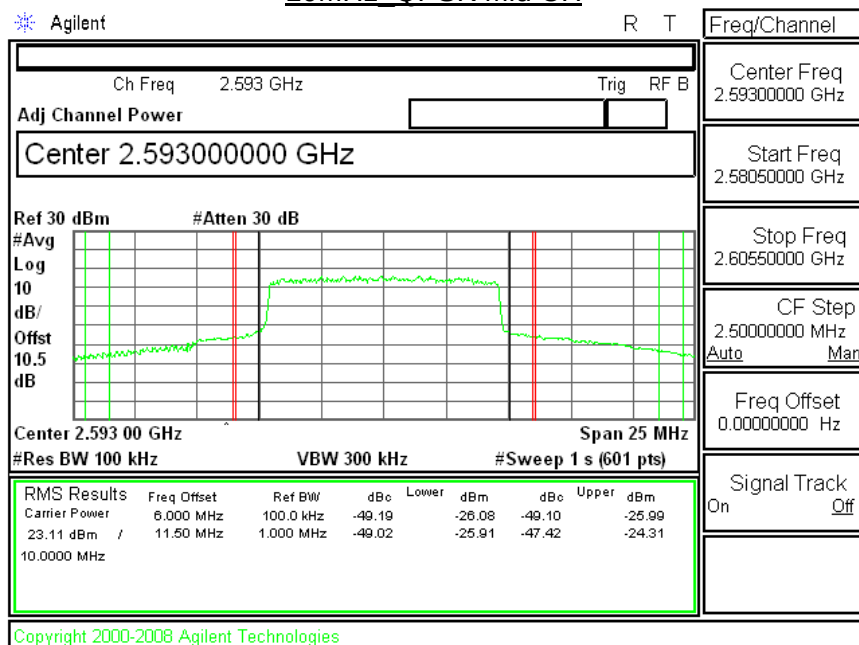
10MHz 16QAM High CH



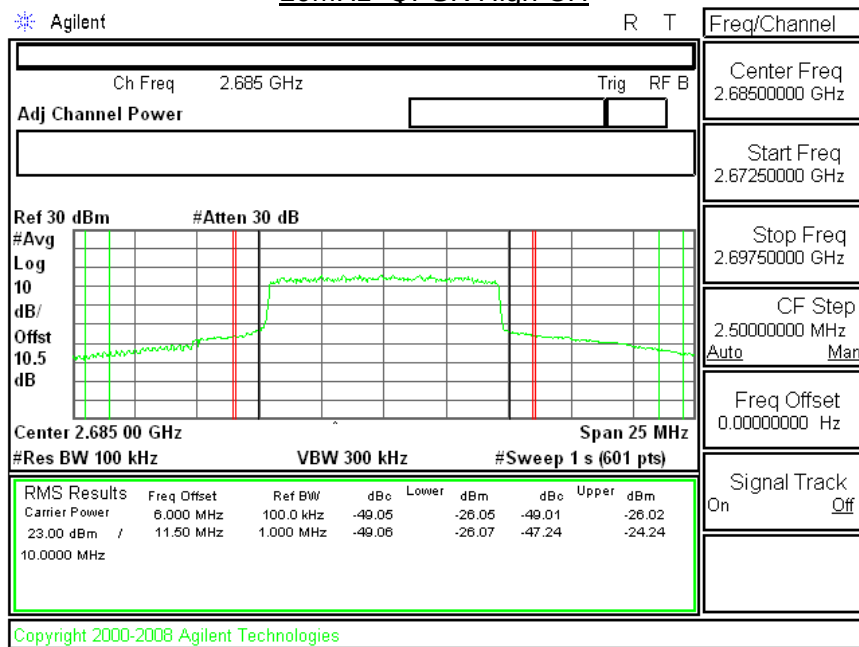
10MHz QPSK Low CH



10MHz_QPSK Mid CH

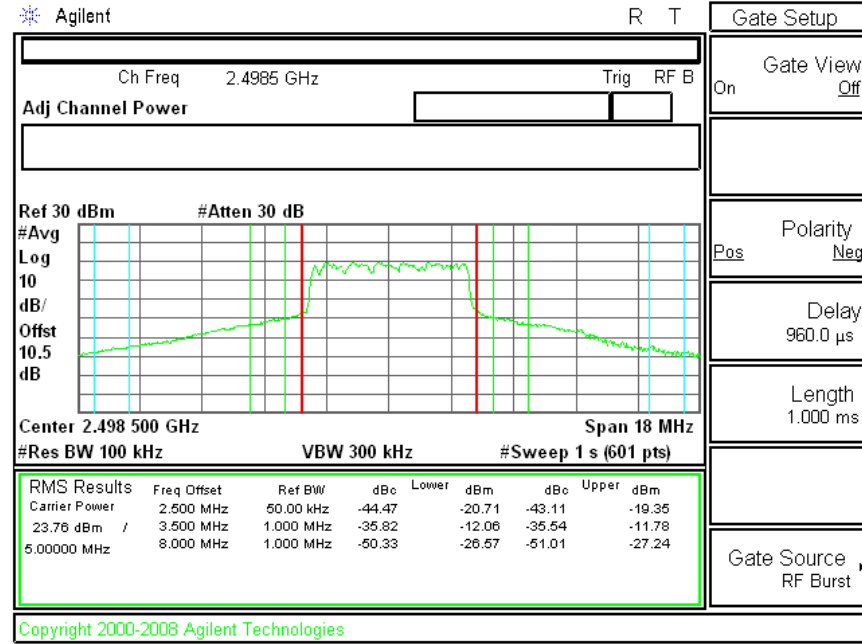


10MHz_QPSK High CH

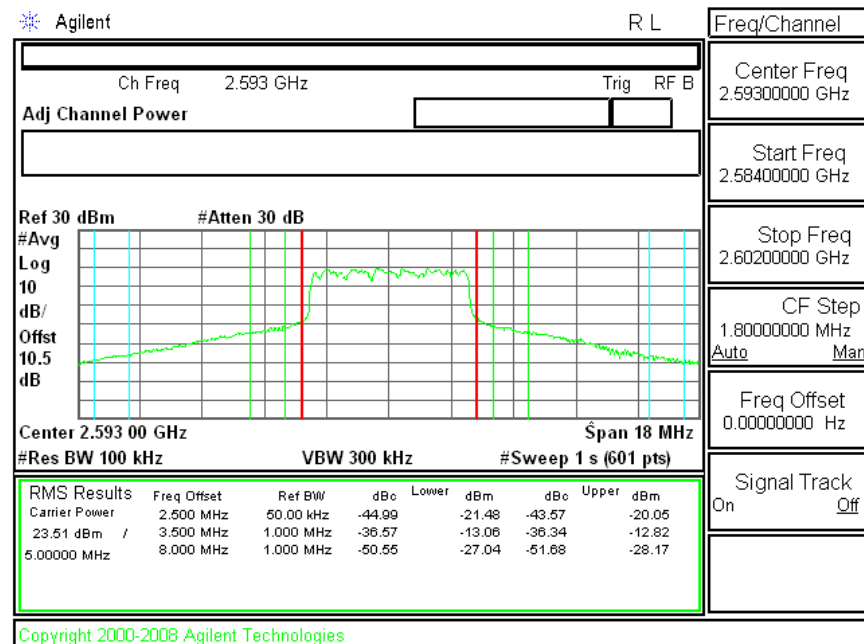


Power Plots 5 MHz

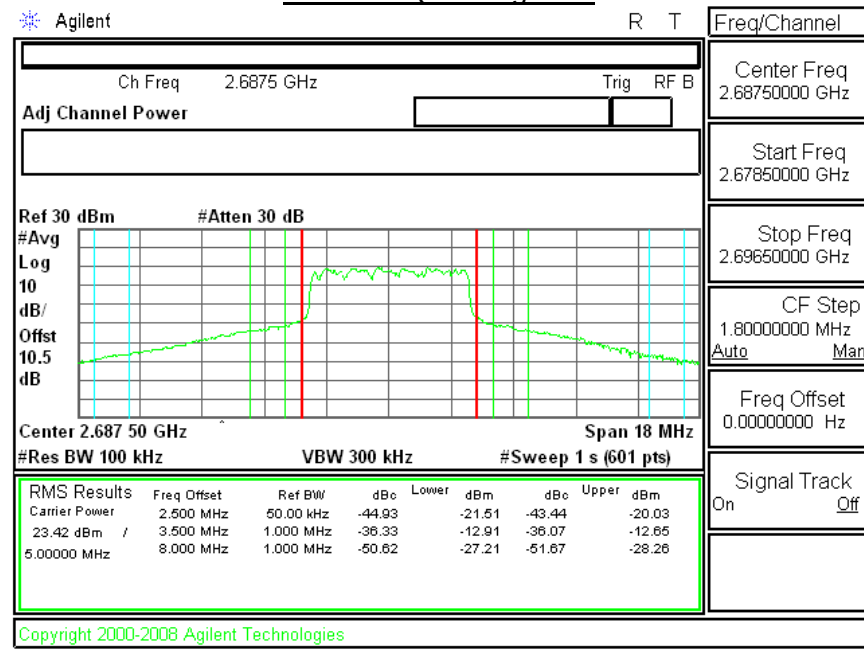
5MHz 16QAM Low CH



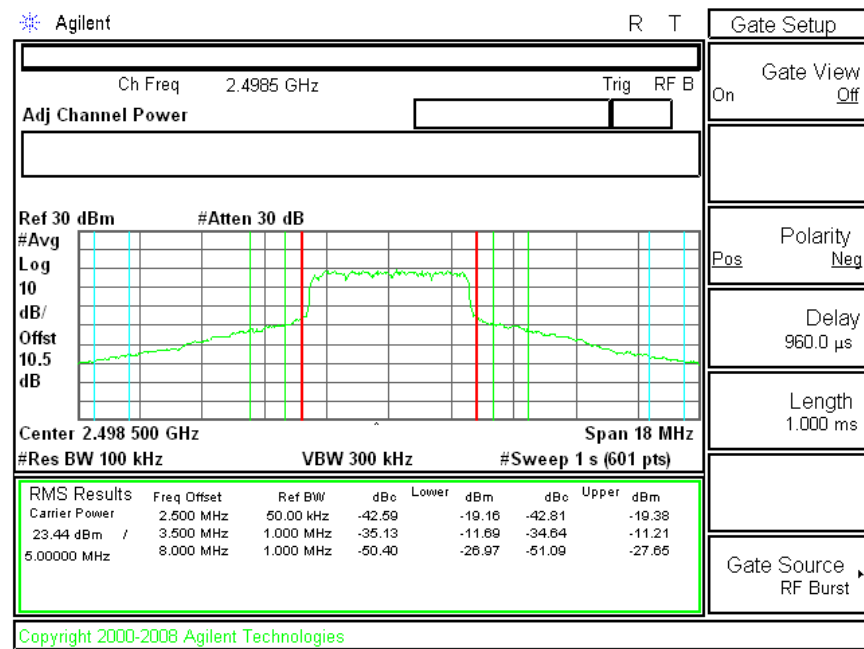
5MHz 16QAM Mid CH



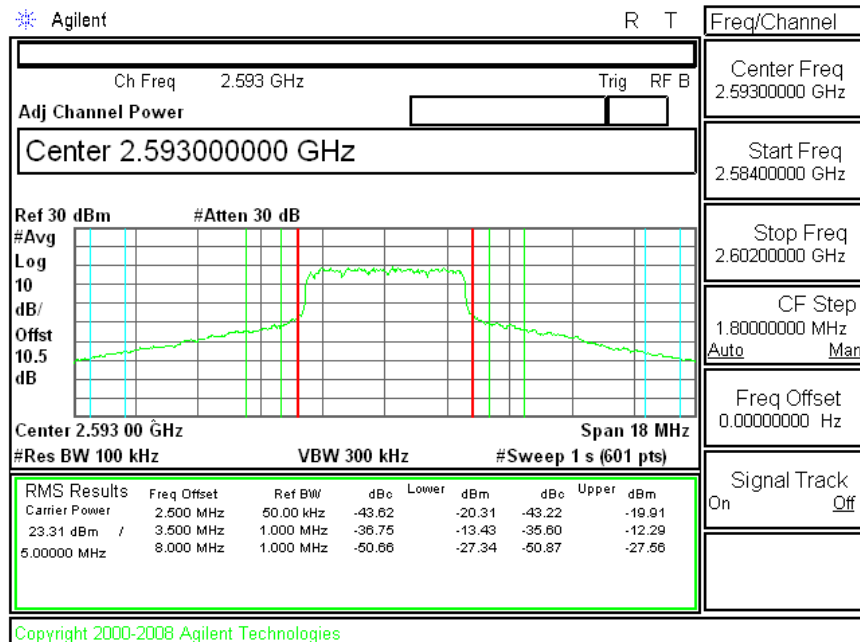
5MHz 16QAM High CH



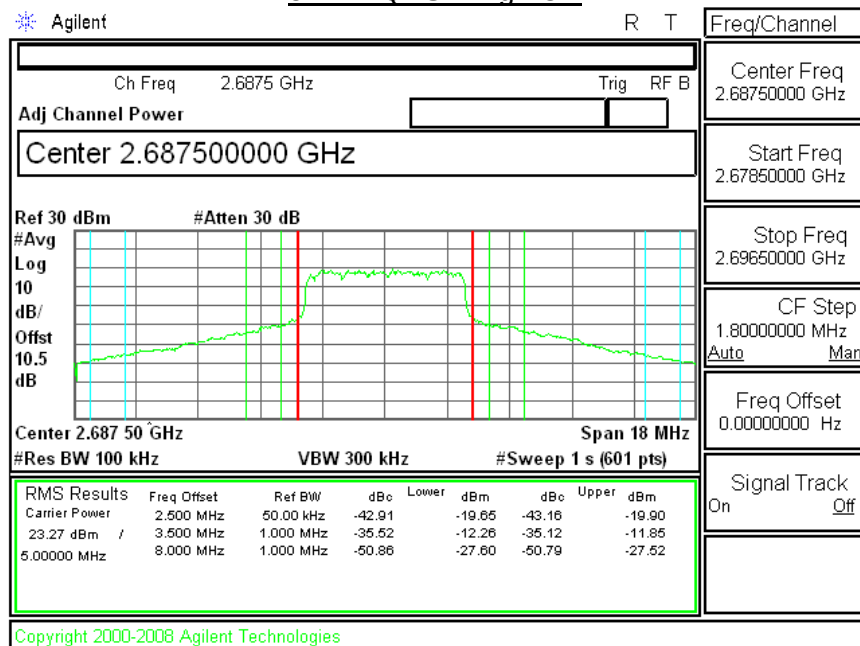
5MHz QPSK Low CH



5MHz_QPSK Mid CH



5MHz_QPSK High CH



Offset: 1 (cable) + 10 (pad) + 6.3 (Splitter) = 17.3 dB

Peak and Average Output power measurements were made with Power Meter

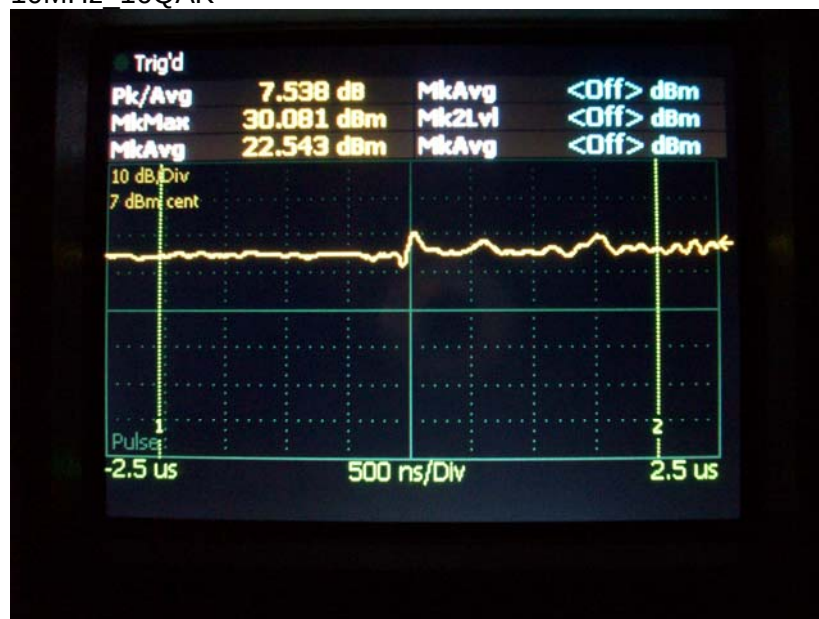
Mode	Channel Band-width (MHZ)	Ch. No.	f (MHz)	Couducted Power (dBm)		Average Ratio (PAR)
				Peak	Average	
16QAM	10	368	2593	30.081	22.543	7.538

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average
				Peak	Average	
QPSK	10	368	2593	30.494	23.102	7.392

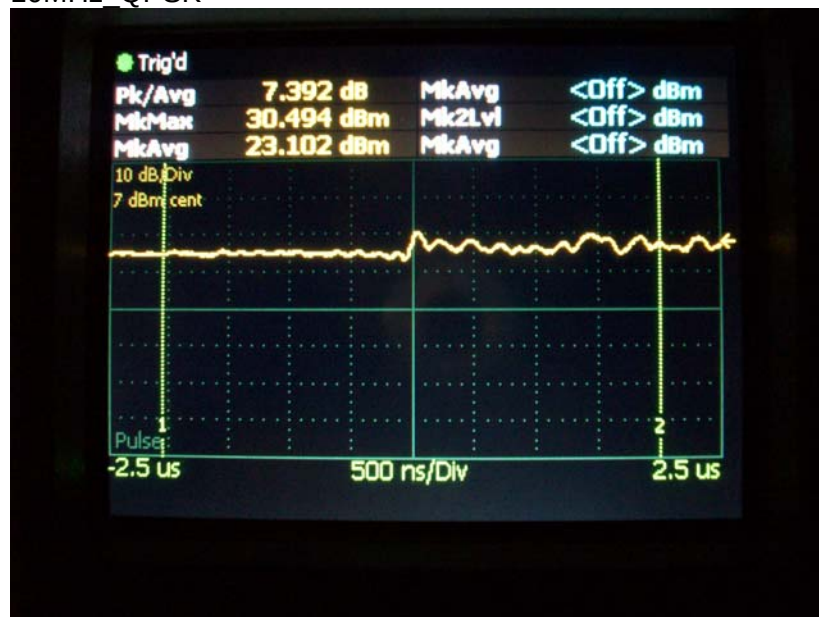
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average
				Peak	Average	
16QAM	5	378	2593	30.113	24.081	6.032

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average
				Peak	Average	
QPSK	5	378	2593	30.421	23.857	6.563

10MHz_16QAK



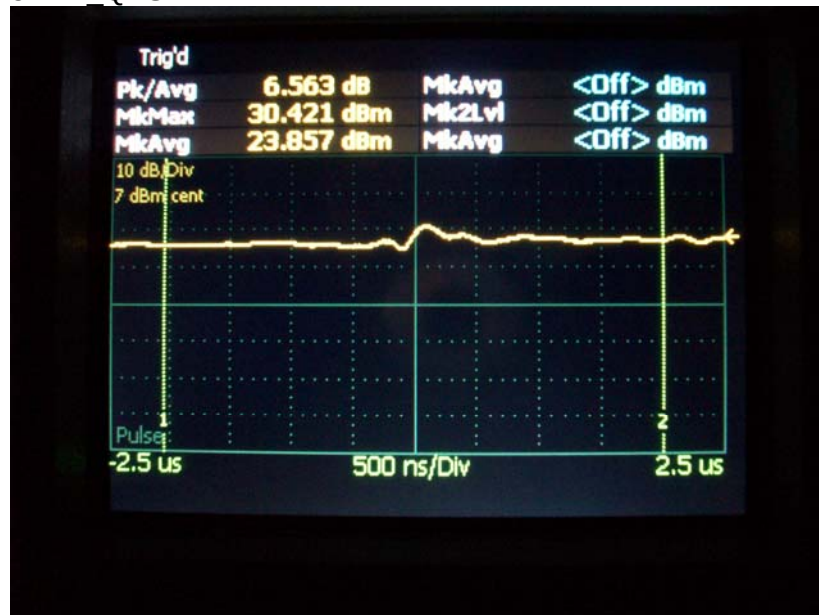
10MHz_QPSK



5MHz_16QAK



5MHz_QPSK



7.2. RADIATED OUTPUT POWER

LIMITS

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

OUTPUT POWER (EIRP)

QPSK_10MHz

Compliance Certification Services

Above 1GHz High Frequency Substitution Measurement

Company: Samsung

Project #: 09I12437

Date: 3/10/2009

Test Engineer: Devin Chang

Configuration: EUT

Mode: QPSK_10MHz

Chamber

Pre-amplifier

Filter

Limit

5m Chamber B

Part 27

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
2.501	-21.9	V	3.0	41.8			19.9	33.0	-13.1	
2.501	-18.8	H	3.0	39.8			21.1	33.0	-11.9	
2.593	-20.5	V	3.0	42.1			21.7	33.0	-11.3	
2.593	-15.6	H	3.0	40.4			24.8	33.0	-8.2	
2.685	-22.9	V	3.0	42.4			19.5	33.0	-13.5	
2.685	-20.0	H	3.0	41.0			21.0	33.0	-12.0	

Rev. 03.03.09

16QAM_5MHz

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 09I12437
Date: 3/10/2009
Test Engineer: Devin Chang
Configuration: EUT only
Mode: 16QAM_5MHz

Chamber	Pre-amplifier	Filter	Limit
5m Chamber B			Part 27

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
2.4985	-19.9	V	3.0	41.8			21.9	33.0	-11.1	
2.4985	-16.2	H	3.0	39.8			23.6	33.0	-9.4	
2.5930	-19.7	V	3.0	42.1			22.4	33.0	-10.6	
2.5930	-15.2	H	3.0	40.4			25.2	33.0	-7.8	
2.6875	-21.6	V	3.0	42.4			20.8	33.0	-12.2	
2.6875	-20.0	H	3.0	41.0			21.0	33.0	-12.0	

Rev. 03.03.09

7.3. FIELD STRENGTH OF SPURIOUS RADIATION

LIMIT

§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

SPURIOUS & HARMONIC (ERP)

Below 1GHz

Compliance Certification Services 30 - 1000MHz Substitution Measurement										
Company: Samsung Project #: 09I12437 Date: 3/10/2009 Test Engineer: Devin Chang Configuration: EUT Mode: Tx mode										
Chamber Pre-amplifier Filter Limit 5m Chamber B T173 Sonoma Part 27										
f MHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
114.55	-62.2	H	3.0	19.4	32.6		-75.4	-25.0	-50.4	
143.21	-58.4	H	3.0	20.7	32.6		-70.3	-25.0	-45.3	
299.77	-43.2	H	3.0	22.1	32.6		-53.6	-25.0	-28.6	
527.97	-55.0	H	3.0	25.6	32.8		-62.2	-25.0	-37.2	
624.01	-58.8	H	3.0	28.1	32.9		-63.6	-25.0	-38.6	
796.31	-60.4	H	3.0	30.8	32.5		-62.1	-25.0	-37.1	
114.55	-64.8	V	3.0	23.4	32.6		-74.0	-25.0	-49.0	
299.89	-49.8	V	3.0	23.3	32.6		-59.1	-25.0	-34.1	
499.66	-62.4	V	3.0	27.4	32.8		-67.8	-25.0	-42.8	
576.05	-60.5	V	3.0	29.1	32.8		-64.3	-25.0	-39.3	
624.01	-57.9	V	3.0	30.1	32.9		-60.7	-25.0	-35.7	
720.05	-61.7	V	3.0	32.2	32.9		-62.4	-25.0	-37.4	
Rev. 03.03.09										

Above 1GHz

QPSK_10MHz

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 09I12437
Date: 3/10/2009
Test Engineer: Devin Chang
Configuration: EUT
Mode: QPSK_10MHz

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

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
2501MHz										
5.002	-60.5	H	3.0	48.9	35.3	1.0	-45.9	-25.0	-20.9	
7.503	-56.0	H	3.0	53.1	35.7	1.0	-37.6	-25.0	-12.6	
5.002	-62.8	V	3.0	48.3	35.3	1.0	-48.8	-25.0	-23.8	
7.503	-53.8	V	3.0	51.4	35.7	1.0	-37.1	-25.0	-12.1	
2593MHz										
5.186	-53.4	H	3.0	49.4	35.3	1.0	-38.4	-25.0	-13.4	
7.779	-52.5	H	3.0	53.4	35.7	1.0	-33.8	-25.0	-8.8	
5.186	-55.9	V	3.0	48.8	35.3	1.0	-41.5	-25.0	-16.5	
7.779	-47.9	V	3.0	51.8	35.7	1.0	-30.8	-25.0	-5.8	
2685MHz										
5.370	-55.7	H	3.0	49.7	35.4	1.0	-40.3	-25.0	-15.3	
8.055	-56.7	H	3.0	53.7	35.7	1.0	-37.7	-25.0	-12.7	
5.370	-55.7	V	3.0	49.0	35.4	1.0	-41.1	-25.0	-16.1	
8.055	-55.9	V	3.0	52.1	35.7	1.0	-38.5	-25.0	-13.5	

Rev. 03.03.09

16QAM_5MHz

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 09I12437
Date: 3/10/2009
Test Engineer: Devin Chang
Configuration: EUT
Mode: 16QAM_5MHz

Chamber
5m Chamber B

Pre-amplifier
T145 8449B

Filter
Filter 1

Limit
Part 27

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
2498.5MHz										
4.997	-61.8	H	3.0	48.9	35.3	1.0	-47.3	-25.0	-22.3	
7.496	-54.5	H	3.0	53.1	35.7	1.0	-36.1	-25.0	-11.1	
4.997	-60.0	V	3.0	48.3	35.3	1.0	-46.0	-25.0	-21.0	
7.496	-51.1	V	3.0	51.4	35.7	1.0	-34.4	-25.0	-9.4	
2593MHz										
5.186	-51.1	H	3.0	49.4	35.3	1.0	-36.0	-25.0	-11.0	
7.779	-51.3	H	3.0	53.4	35.7	1.0	-32.6	-25.0	-7.6	
5.186	-52.4	V	3.0	48.8	35.3	1.0	-38.0	-25.0	-13.0	
7.779	-44.7	V	3.0	51.8	35.7	1.0	-27.6	-25.0	-2.6	
2687.5MHz										
5.375	-54.5	H	3.0	49.7	35.4	1.0	-39.2	-25.0	-14.2	
8.062	-53.7	H	3.0	53.7	35.7	1.0	-34.7	-25.0	-9.7	
5.375	-54.9	V	3.0	49.0	35.4	1.0	-40.3	-25.0	-15.3	
8.062	-53.5	V	3.0	52.1	35.7	1.0	-36.1	-25.0	-11.1	

Rev. 03.03.09

8. 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

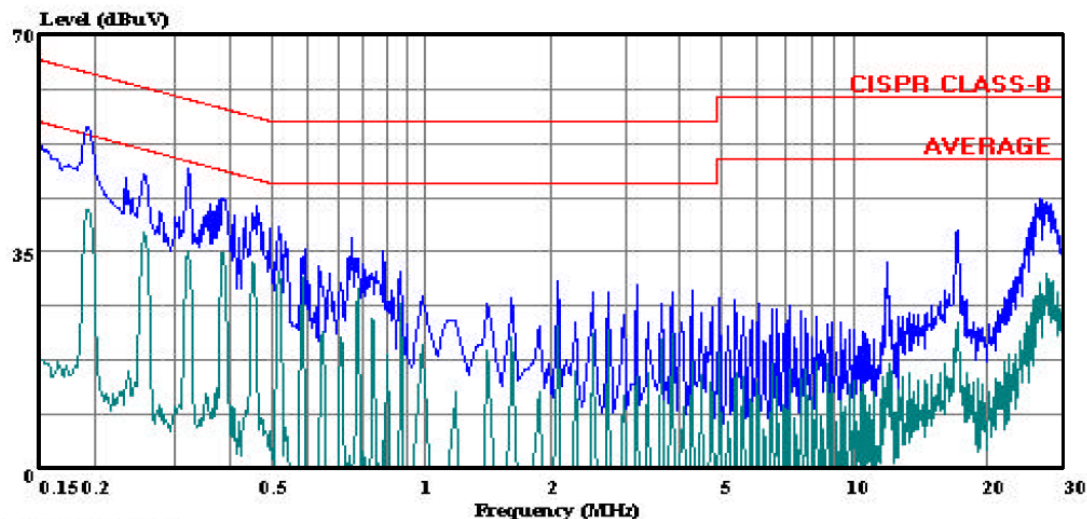
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.19	55.16	--	41.92	0.00	63.95	53.95	-8.79	-12.03	L1
0.26	47.67	--	38.05	0.00	61.50	51.50	-13.83	-13.45	L1
27.27	43.63	--	31.38	0.00	60.00	50.00	-16.37	-18.62	L1
0.19	56.86	--	38.69	0.00	63.95	53.95	-7.09	-15.26	L2
0.45	46.30	--	38.71	0.00	56.84	46.84	-10.54	-8.13	L2
26.84	39.54	--	28.28	0.00	60.00	50.00	-20.46	-21.72	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#: 14 File#: 09i12437.emi Date: 03-11-2009 Time: 14:02:33



(Line Conduction)

Trace: 12

Ref Trace:

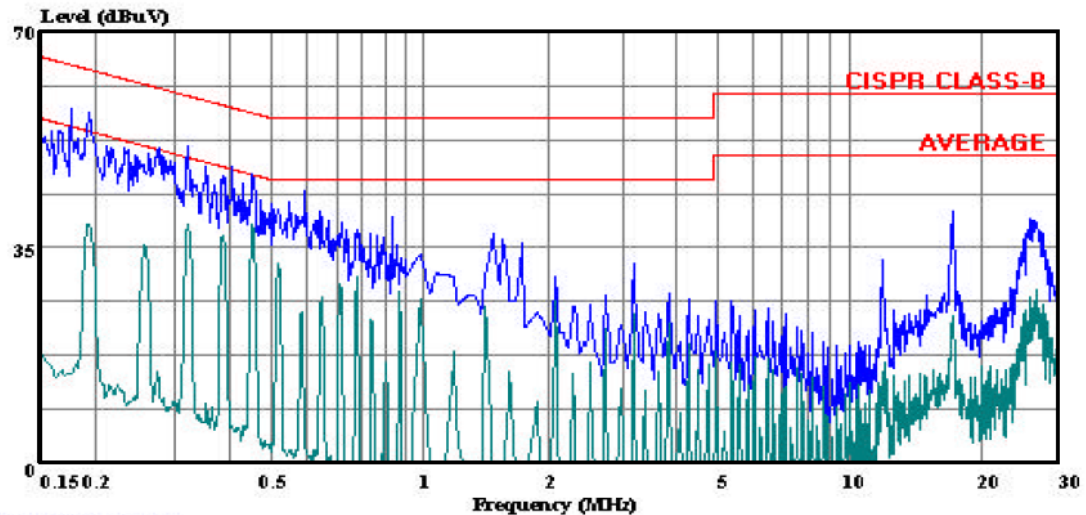
Condition: CISPR CLASS-B
Test Operator:: Devin Chang
Project #: : 09I12437
Company: : Samsung
Configuration:: EUT only
Mode: : Tx mode
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: L1: Peak (Blue), Average (Green)

LINE 2 RESULTS



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

Data#: 21 File#: 09i12437.emi Date: 03-11-2009 Time: 14:17:25



(Line Conduction)

Trace: 19

Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Devin Chang
Project #: 09I12437
Company: Samsung
Configuration:: EUT only
Mode: Tx mode
Target: FCC Class B
Voltage: 115VAC / 60Hz
L2: Peak (Blue), Average (Green)