

Test Report No. 7191020377-EEC11/03
dated 06 Dec 2011



PSB Singapore

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FORMAL REPORT ON TESTING IN ACCORDANCE WITH
47 CFR FCC Parts 15B & C : 2011
OF A
HOME THEATER AUDIO SYSTEM
[Model : SU-HTB550 & SU-HTB350]
[FCC ID : ACJ-11AT1201]

TEST FACILITY TÜV SÜD PSB Pte Ltd,
Electrical & Electronics Centre (EEC), Product Services,
No. 1 Science Park Drive, Singapore 118221

FCC REG. NO. 99142 (3m and 10m Semi-Anechoic Chamber, Science Park)

IND. CANADA REG. NO. 2932I-1 (3m and 10m Semi-Anechoic Chamber, Science Park)

PREPARED FOR Panasonic AVC Networks (S) Pte Ltd
202, Bedok South Avenue 1,
Singapore 469332

Tel : (+65) 6240 1891 Fax : (+65) 6245 8804

QUOTATION NUMBER 219140675

JOB NUMBER 7191020377

TEST PERIOD 14 Nov 2011 – 25 Nov 2011

PREPARED BY

APPROVED BY

Quek Keng Huat
Associate Engineer

Lim Cher Hwee
Assistance Vice President



Laboratory:
TÜV SÜD PSB Pte. Ltd.
No.1 Science Park Drive
Singapore 118221



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LA-2007-0385-E
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LA-2010-0464-D

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Phone : +65-6885 1333
Fax : +65-6776 8670
E-mail: testing@tuv-sud-psb.sg
www.tuv-sud-psb.sg
Co. Reg : 199002667R

Regional Head Office:
TÜV SÜD Asia Pacific Pte. Ltd.
3 Science Park Drive, #04-01/05
The Franklin, Singapore 118223
TUV®



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TEST SUMMARY

The product was tested in accordance with the customer's specifications.

Test Results Summary

Test Standard	Description	Pass / Fail
47 CFR FCC Part 15: 2011		
15.107(a), 15.207	Conducted Emissions	Pass
15.109(a), 15.205, 15.209	Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)	Pass
15.247(a)(1)	Carrier Frequency Separation	Pass
	Spectrum Bandwidth (20dB Bandwidth Measurement)	Pass
15.247(a)(1)(iii)	Number of Hopping Frequencies	Pass
	Average Frequency Dwell Time	Pass
15.247(b)(1)	Maximum Peak Power	Pass
15.247(d)	RF Conducted Spurious Emissions	Pass
15.247(d)	Band Edge Compliance (Conducted)	Pass
15.247(d)	Band Edge Compliance (Radiated)	Pass
15.247(e)	Peak Power Spectral Density	Pass
1.1310	Maximum Permissible Exposure	Pass



TEST SUMMARY

Notes

- Three channels as listed below, which respectively represent the lower, middle and upper channels of the Equipment Under Test (EUT) were chosen and tested. For each channel, the EUT was configured to operate in the test mode.

<u>Transmit Channel</u>	<u>Frequency (GHz)</u>
Channel 0	2.402
Channel 39	2.441
Channel 78	2.480

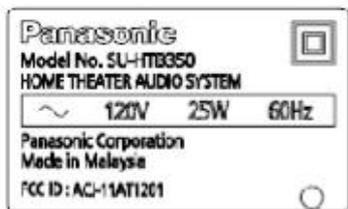
- All the measurements in section 15.247 were done based on conducted measurements.
- The EUT is a Class B device when in non-transmitting state and meets the 47 CFR FCC Part15B Class B requirements.
- All test measurement procedures are according to ANSI C63.4: 2003.
- The maximum measured RF power of the Equipment Under Test is 5.185dBm.
- The EUT was tested in continuous transmission mode; ie 0dB duty cycle.
- Panasonic AVC Networks Singapore Pte Ltd declared that the models **SC-HTB550, SC-HTB450, SC-HTB350 & SC-HTB351** are using the same RF module and identical in term of components, circuitry design, PCB layouts and mechanical structures. The model **SC-HTB550** is the worst case model among the declared models in view of RF and EMC performance. Shall the model **SC-HTB550** passes the RF and EMC test, the declared models **SC-HTB450, SC-HTB350 & SC-HTB351** are deemed to meet the same requirements. See below tables for the differences:

	Basic model	Similar model	Similar model	Similar model	Similar model
	SC-HTB550 US	SC-HTB550 Canada	SC-HTB450 Canada	SC-HTB350 US	SC-HTB351 US
Main Unit	SU-HTB550	SU-HTB550	SU-HTB450	SU-HTB350	SU-HTB350
HDMI Input	Yes (2X)	Yes (2X)	Yes (2X)	No	No
HDMI Output	Yes	Yes	Yes	No	No
Analog Input	No	No	No	Yes (Stereo)	Yes (Stereo)
Function Indicator	8 LEDS	8 LEDS	8 LEDS	7 LEDS	7 LEDS
Active Subwoofer	SB-HWA550	SB-HWA550	SB-HWA450	SB-HWA350	SB-HWA350
Wooden Box	Glossy	Glossy	Matt	Matt	Matt
Front Speaker	SB-HTB550	SB-HTB550	SB-HTB350	SB-HTB350	SB-HTB350
Metal Mesh	Anodizing	Anodizing	ED Coating	ED Coating	ED Coating

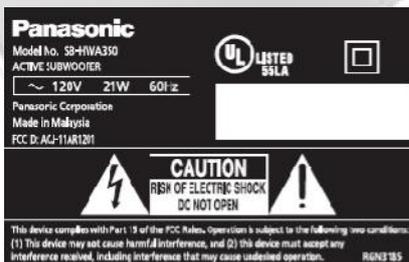
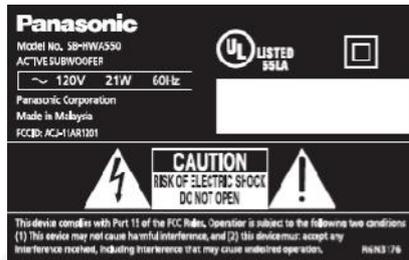
TEST SUMMARY

Notes (Continued)

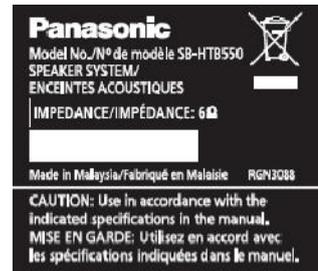
MAIN UNIT NAME PLATE



ACTIVE SUBWOOFER NAME PLATE



SPEAKER NAME PLATE



Modifications

No modifications were made.



PRODUCT DESCRIPTION

Description : The Equipment Under Test (EUT) is a **HOME THEATER AUDIO SYSTEM.**

Applicant : Panasonic AVC Networks (S) Pte Ltd
202, Bedok South Avenue 1,
Singapore 469332

Manufacturer : Panasonic Corporation
1006, Oaza Kadoma, Kadoma-City,
Osaka 571 8501, Japan

Factor(ies) : Panasonic AVC Networks Johor Malaysia Sdn Bhd
IE, PLO 460, Jalan Bandar, 81700
Pasir Gudang, Johor, Malaysia

Model Number : SU-HTB550 & SU-HTB350

FCC ID : ACJ-11AT1201

Serial Number : Nil

Microprocessor : CSR BlueCore5 BC57E687C

Operating / Transmitting Frequency : 2.402GHz (lower channel) to 2.480GHz (upper channel)
79 channels

Clock / Oscillator Frequency : 26MHz

Modulation : Gaussian Frequency Shift Keying (GFSK)

Antenna Gain : 2.0 dBi

Port / Connectors : Refer to manufacturer's user manual / operating manual.

Rated Input Power : 120V 60Hz

Accessories : 1. Remote Control with Battery
2. AC Cord
3. OI Book
4. Easy Setup Guide



SUPPORTING DESCRIPTION DESCRIPTION

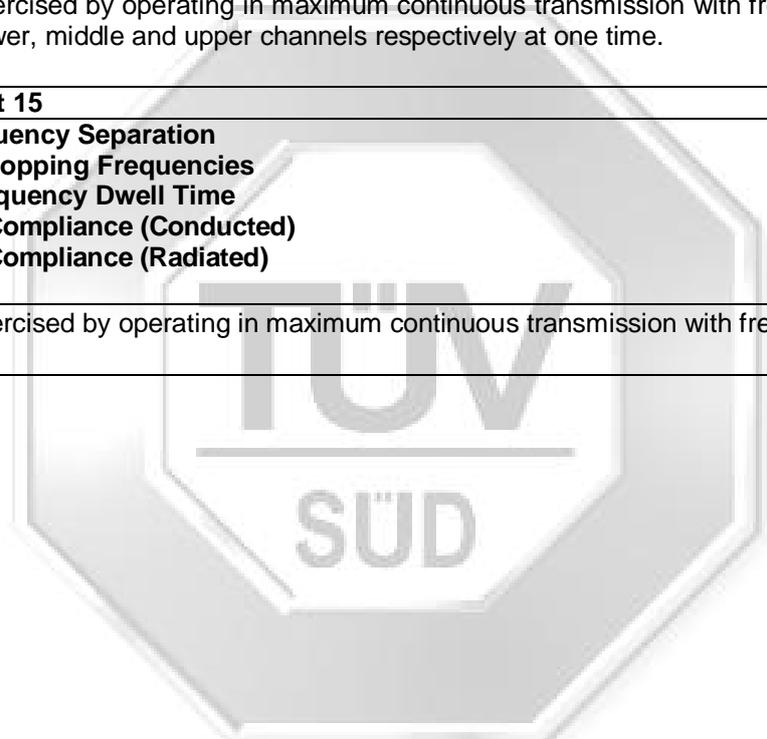
Equipment Description (Including Brand Name)	Model, Serial & FCC ID Number	Cable Description (List Length, Type & Purpose)
Hitachi Laptop	M/N: PC7NW7-GKN8M9410 S/N: 9146RZ100220060007CK FCC ID: DoC	1.80m unshielded power cable
Liteon AC Adapter (Laptop)	M/N: PA-1600-05 S/N: 260049628D FCC ID: DoC	1.80m unshielded power cable
Panasonic Speaker System	M/N: SB-HTB550 S/N: TN1JA001008 FCC ID: DoC	2.00m unshielded speaker cable





EUT OPERATING CONDITIONS

47 CFR FCC Part 15
<ol style="list-style-type: none">1. Conducted Emissions2. Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)3. Spectrum Bandwidth (20dB Bandwidth Measurement)4. Maximum Peak Power5. RF Conducted Spurious Emissions6. Peak Power Spectral Density7. Maximum Permissible Exposure
The EUT was exercised by operating in maximum continuous transmission with frequency hopping off, i.e transmitting at lower, middle and upper channels respectively at one time.
47 CFR FCC Part 15
<ol style="list-style-type: none">1. Carrier Frequency Separation2. Number of Hopping Frequencies3. Average Frequency Dwell Time4. Band Edge Compliance (Conducted)5. Band Edge Compliance (Radiated)
The EUT was exercised by operating in maximum continuous transmission with frequency hopping on.





CONDUCTED EMISSION TEST

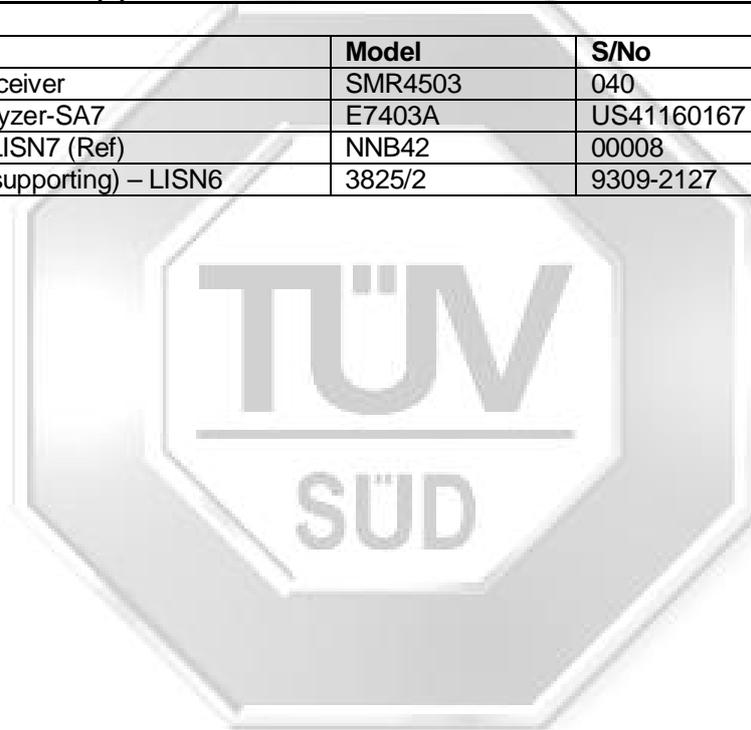
47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Limits

Frequency Range (MHz)	Limit Values (dBµV)	
	Quasi-peak (QP)	Average (AV)
0.15 - 0.5	66 – 56 *	56 – 46 *
0.5 - 5.0	56	46
5.0 - 30.0	60	50

* Decreasing linearly with the logarithm of the frequency

47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Schaffner EMI Receiver	SMR4503	040	10 Jun 2012
Agilent EMC Analyzer-SA7	E7403A	US41160167	27 May 2012
Schaffner LISN –LISN7 (Ref)	NNB42	00008	16 Jun 2012
EMCO LISN (for supporting) – LISN6	3825/2	9309-2127	29 Jul 2012





CONDUCTED EMISSION TEST

47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Test Setup

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipment were powered separately from another LISN.

47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A scan was made on the NEUTRAL line over the required frequency range using an EMI test receiver.
3. High peaks, relative to the limit line, were then selected.
4. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 9kHz. Both Quasi-peak and Average measurements were made.
5. Steps 2 to 4 were then repeated for the LIVE line.

Sample Calculation Example

At 20 MHz Q-P limit (Class B) = 1000 μV = 60.0 dBμV
Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.2 dB
Q-P reading obtained directly from EMI Receiver = 40.0 dBμV
(Calibrated for system losses)
Therefore, Q-P margin = 40.0 - 60.0 = -20.0 i.e. 20.0 dB below Q-P limit



CONDUCTED EMISSION TEST

47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Results

Test Input Power	110V 60Hz	Temperature	24°C
Line Under Test	AC Mains	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chelmin Li

Frequency (MHz)	Q-P Value (dB μ V)	Q-P Margin (dB)	AV Value (dB μ V)	AV Margin (dB)	Line	Channel
0.6423	41.6	-14.4	34.6	-11.4	Live	0
0.7634	42.5	-13.5	35.5	-10.5	Neutral	0
0.8855	43.9	-12.1	37.0	-9.0	Neutral	0
0.9478	45.7	-10.3	36.8	-9.2	Live	0
1.0105	47.5	-8.5	39.8	-6.2	Live	0
1.0699	46.7	-9.3	38.9	-7.1	Neutral	0

Notes

- All possible modes of operation were investigated from 150kHz to 30MHz. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
- EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:
9kHz - 30MHz
RBW: 9kHz VBW: 30kHz
- Conducted Emissions Measurement Uncertainty
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 9kHz – 30MHz is ± 2.2 dB.

RADIATED EMISSION TEST

47 CFR FCC Part 15.205 Restricted Bands

MHz		MHz		MHz		GHz	
0.090	- 0.110	16.42	- 16.423	399.9	- 410	4.5	- 5.15
0.495	- 0.505	16.69475	- 16.69525	608	- 614	5.35	- 5.46
2.1735	- 2.1905	16.80425	- 16.80475	960	- 1240	7.25	- 7.75
4.125	- 4.128	25.5	- 25.67	1300	- 1427	8.025	- 8.5
4.17725	- 4.17775	37.5	- 38.25	1435	- 1626.5	9.0	- 9.2
4.20725	- 4.20775	73	- 74.6	1645.5	- 1646.5	9.3	- 9.5
6.215	- 6.218	74.8	- 75.2	1660	- 1710	10.6	- 12.7
6.26775	- 6.26825	108	- 121.94	1718.8	- 1722.2	13.25	- 13.4
6.31175	- 6.31225	123	- 138	2200	- 2300	14.47	- 14.5
8.291	- 8.294	149.9	- 150.05	2310	- 2390	15.35	- 16.2
8.362	- 8.366	156.52475	- 156.52525	2483.5	- 2500	17.7	- 21.4
8.37625	- 8.38675	156.7	- 156.9	2690	- 2900	22.01	- 23.12
8.41425	- 8.41475	162.0125	- 167.17	3260	- 3267	23.6	- 24.0
12.29	- 12.293	167.72	- 173.2	3332	- 3339	31.2	- 31.8
12.51975	- 12.52025	240	- 285	3345.8	- 3358	36.43	- 36.5
12.57675	- 12.57725	322	- 335.4	3600	- 4400	Above 38.6	
13.36	- 13.41						

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Limits

Frequency Range (MHz)	Quasi-Peak Limit Values (dBµV/m) @ 3m
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0*

* Above 1GHz, average detector was used. A peak limit of 20dB above the average limit does apply.

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Instrumentation

Instrument	Model	S/No	Cal Due Date
R&S Test Receiver – ESI1	ESI40	100010	06 Jun 2012
Schaffner Bilog Antenna – (30MHz-2GHz) BL3 (Ref)	CBL6112B	2549	06 Jan 2012
EMCO Horn Antenna (1GHz-18GHz) – H15 (Ref)	3115	0003-6008	20 May 2012
ETS Horn Antenna (18GHz-40GHz)(Ref)	3116	0004-2474	19 Apr 2012
Toyo Preamplifier (26.5GHz-40GHz)	HAP26-40W	00000005	19 Apr 2012
Agilent Preamplifier (1GHz-26.5GHz) (PA18)	8449D	3008A02305	08 Oct 2012
Teseq Preamplifier (9kHz-1GHz)	LNA6901	72266	23 Jun 2012
Micro-tronics Bandstop Filter	BRM50701-02	007	13 Aug 2012



RADIATED EMISSION TEST

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Setup

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A prescan was carried out to pick the worst emission frequencies from the EUT. For EUT which is a portable device, the prescan was carried out by rotating the EUT through three orthogonal axes to determine which altitude and equipment arrangement produces such emissions.
3. The test was carried out at the selected frequency points obtained from the prescan in step 2. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
 - a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
 - b. The EUT was then rotated to the direction that gave the maximum emission.
 - c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
4. A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point that above 1GHz, both Peak and Average measurements were carried out.
5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.
6. The frequency range covered was from 30MHz to 10th harmonics of the EUT fundamental frequency, using the Bi-log antenna for frequencies from 30MHz up to 1GHz, and the Horn antenna above 1GHz.

Sample Calculation Example

At 300 MHz	Q-P limit (Class B) = 200 μ V/m = 46.0 dB μ V/m
Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB	
Q-P reading obtained directly from EMI Receiver = 40.0 dB μ V/m (Calibrated level including antenna factors & cable losses)	
Therefore, Q-P margin = 40.0 - 46.0 = -6.0	i.e. 6 dB below Q-P limit



RADIATED EMISSION TEST

47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results

Test Input Power	110V 60Hz	Temperature	24°C
Test Distance	3m	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Calvin Diego / Zechs Ng / Dylan Lin

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dB μ V/m)	Q-P Margin (dB)	Azimuth (Degrees)	Height (cm)	Polarisation (H/V)	Channel
97.2660	-3.3	-46.8	264	208	V	39
104.4720	11.9	-31.6	333	262	H	39
116.7440	4.5	-39.0	332	231	H	39
141.3430	25.6	-17.9	328	202	H	39
147.4840	13.8	-29.7	129	200	H	39
445.9790	-0.9	-46.9	34	273	V	39

Spurious Emissions above 1GHz – 25GHz

Frequency (GHz)	Peak Value (dB μ V/m)	Peak Margin (dB)	Average Value (dB μ V/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Ch
1.4509	49.7	-24.3	38.2	-15.8	162	111	V	0
1.5951	47.0	-27.0	40.4	-13.6	249	237	V	0
2.1362	47.1	-26.9	40.6	-13.4	240	348	H	0
4.8056	56.4	-17.6	52.8	-1.2	158	100	H	0
6.9524	57.9	-16.1	44.8	-9.2	258	226	V	0
17.6954	65.6	-8.4	50.3	-3.7	169	100	V	0

Spurious Emissions above 1GHz – 25GHz

Frequency (GHz)	Peak Value (dB μ V/m)	Peak Margin (dB)	Average Value (dB μ V/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Ch
1.1052	36.2	-37.8	24.9	-29.1	14	225	V	39
1.7400	43.1	-30.9	36.5	-17.5	172	100	V	39
1.9933	44.0	-30.0	27.7	-26.3	356	354	H	39
2.1140	41.8	-32.2	28.1	-25.9	219	260	V	39
5.5677	54.7	-19.3	40.8	-13.2	176	220	V	39
6.9555	58.2	-15.8	45.4	-8.6	174	217	V	39



RADIATED EMISSION TEST

47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results

Spurious Emissions above 1GHz – 25GHz

Frequency (GHz)	Peak Value (dB μ V/m)	Peak Margin (dB)	Average Value (dB μ V/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Ch
1.6995	47.1	-26.9	26.4	-27.6	271	100	V	78
1.7443	41.4	-32.6	25.0	-29.0	180	111	V	78
1.9141	44.1	-29.9	26.0	-28.0	296	277	V	78
2.6935	42.8	-31.2	29.4	-24.6	179	313	V	78
2.9028	44.0	-30.0	30.8	-23.2	255	231	H	78
6.9259	57.5	-16.5	43.9	-10.1	274	106	V	78

Notes

- All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- Quasi-peak measurement was used for frequency measurement up to 1GHz. Average and peak measurements were used for emissions above 1GHz. The average measurement was done by averaging over a complete cycle of the pulse train, including the blanking interval as the pulse train duration does not exceed 0.1 second
- A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
- EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:
30MHz - 1GHz
 RBW: 120kHz VBW: 1MHz
>1GHz
 RBW: 1MHz VBW: 1MHz
- The upper frequency of radiated emission investigations was according to requirements stated in Section 15.33(a) for intentional radiators & Section 15.33(b) for unintentional radiators.
- The channel in the table refers to the transmit channel of the EUT.
- Radiated Emissions Measurement Uncertainty
 All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz – 25GHz is ± 4.0 dB.



CARRIER FREQUENCY SEPARATION TEST

47 CFR FCC Part 15.247(a)(1) Carrier Frequency Separation Limits

The EUT shows compliance to the requirements of this section, which states the adjacent carrier frequencies must be separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, the EUT may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW (21dBm).

47 CFR FCC Part 15.247(a)(1) Carrier Frequency Separation Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Agilent E4440A Spectrum Analyzer	E4440A	MY45304764	10 Jun 2012

47 CFR FCC Part 15.247(a)(1) Carrier Frequency Separation Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(a)(1) Carrier Frequency Separation Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with frequency hopping sequence on.
2. The start and stop frequencies of the spectrum analyser were set to 2.400GHz and 2.405GHz.
3. The spectrum analyser was set to max hold to capture the two adjacent transmitting frequencies within the span. The signal capturing was continuous until no further signals were detected.
4. The carrier frequency separation of the two adjacent transmitting / operating frequency was measured by finding the carrier frequency difference between the two adjacent channels.
5. The steps 2 to 4 were repeated with the following start and stop frequencies settings:
 - a. 2.4385GHz to 2.4435GHz
 - b. 2.477GHz to 2.482GHz

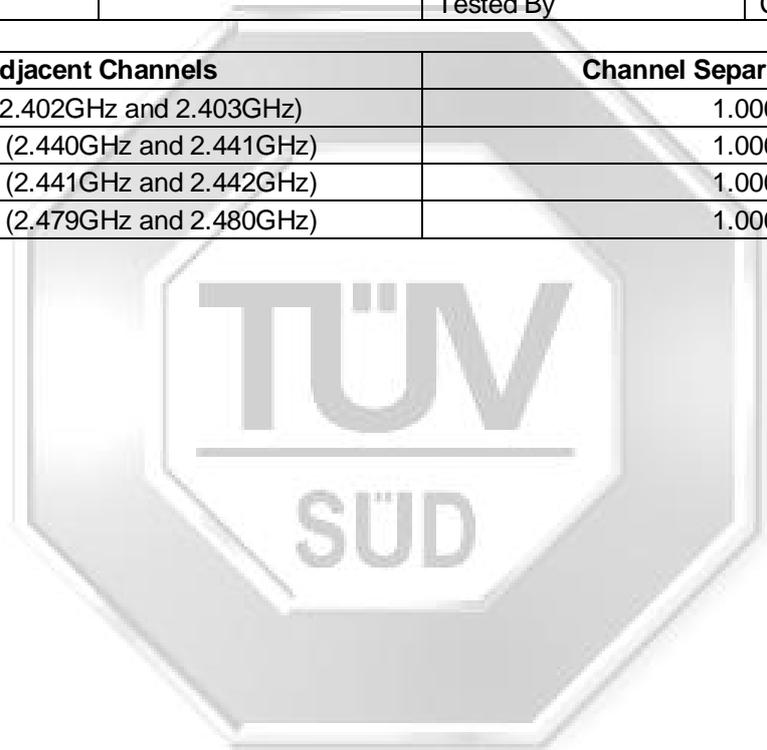


CARRIER FREQUENCY SEPARATION TEST

47 CFR FCC Part 15.247(a)(1) Carrier Frequency Separation Results

Test Input Power	110V 60Hz	Temperature	24°C
Attached Plots	1 - 4	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chelmin Li

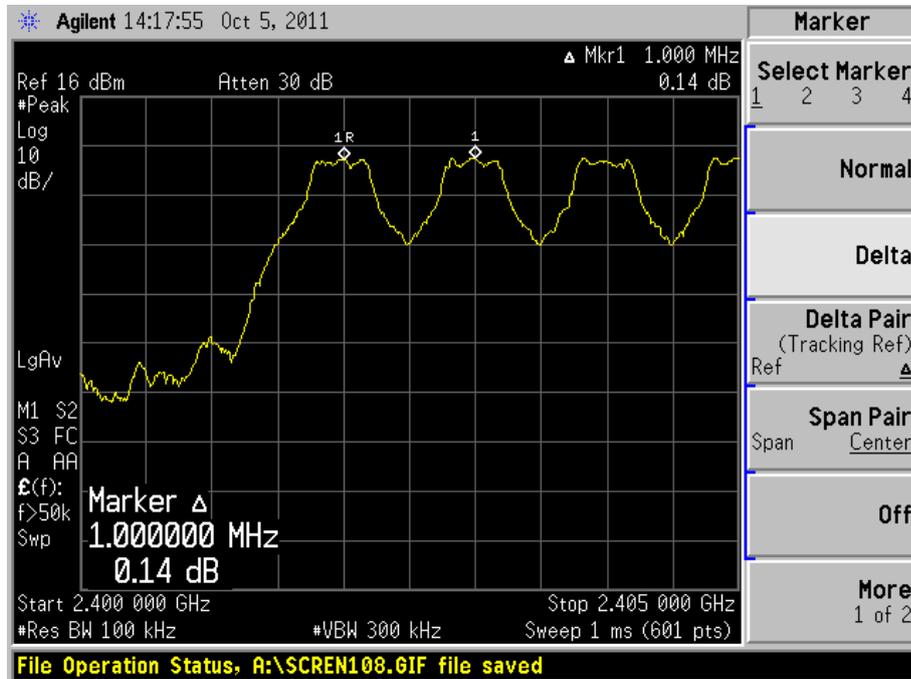
Adjacent Channels	Channel Separation (MHz)
0 and 1 (2.402GHz and 2.403GHz)	1.000
38 and 39 (2.440GHz and 2.441GHz)	1.000
39 and 40 (2.441GHz and 2.442GHz)	1.000
77 and 78 (2.479GHz and 2.480GHz)	1.000



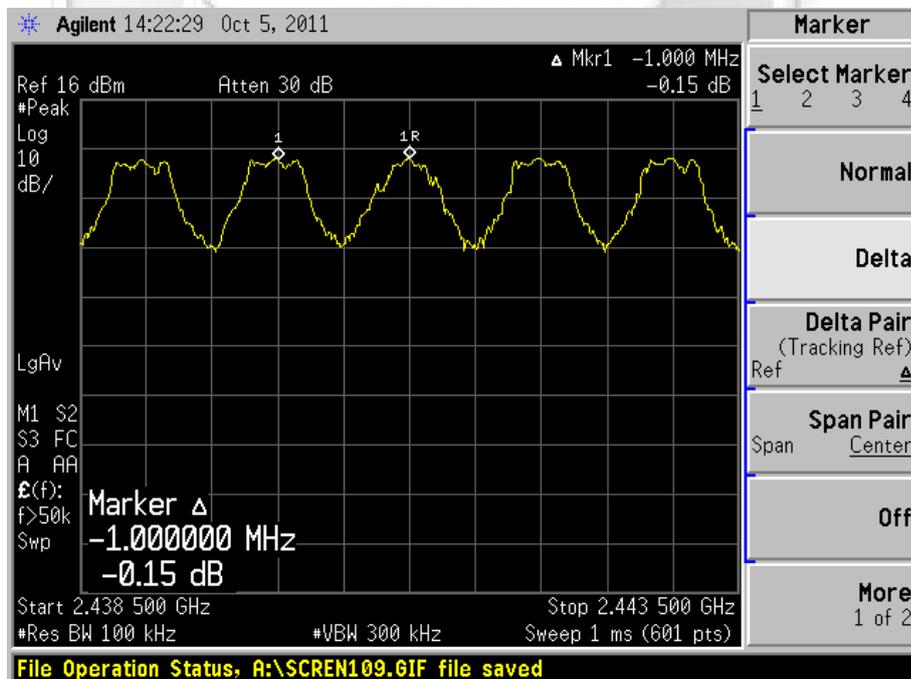


CARRIER FREQUENCY SEPARATION TEST

Carrier Frequency Separation Plots



Plot 1 - Channels 0 and 1 Separation

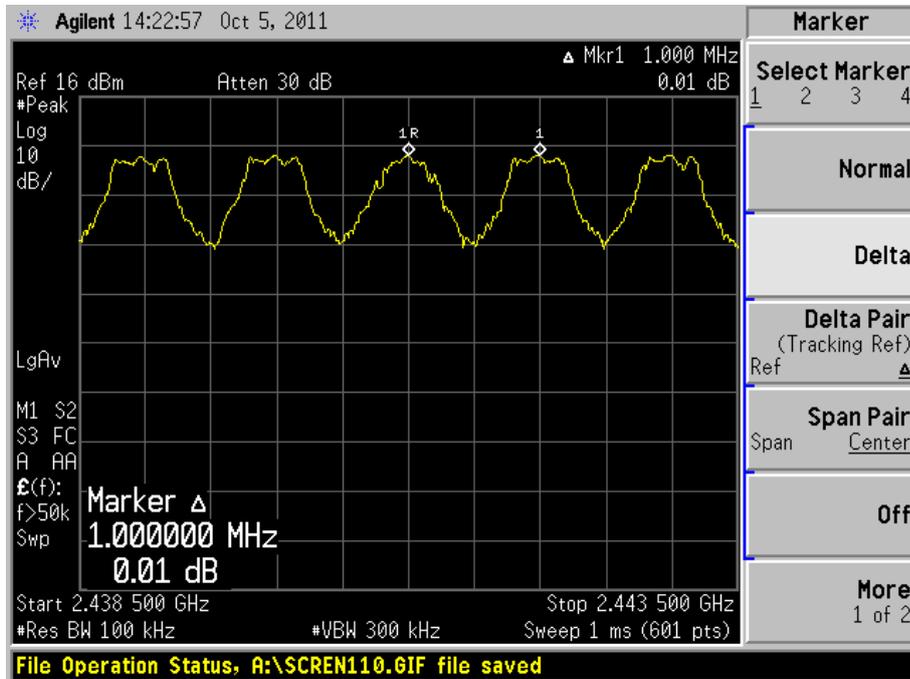


Plot 2 - Channels 38 and 39 Separation

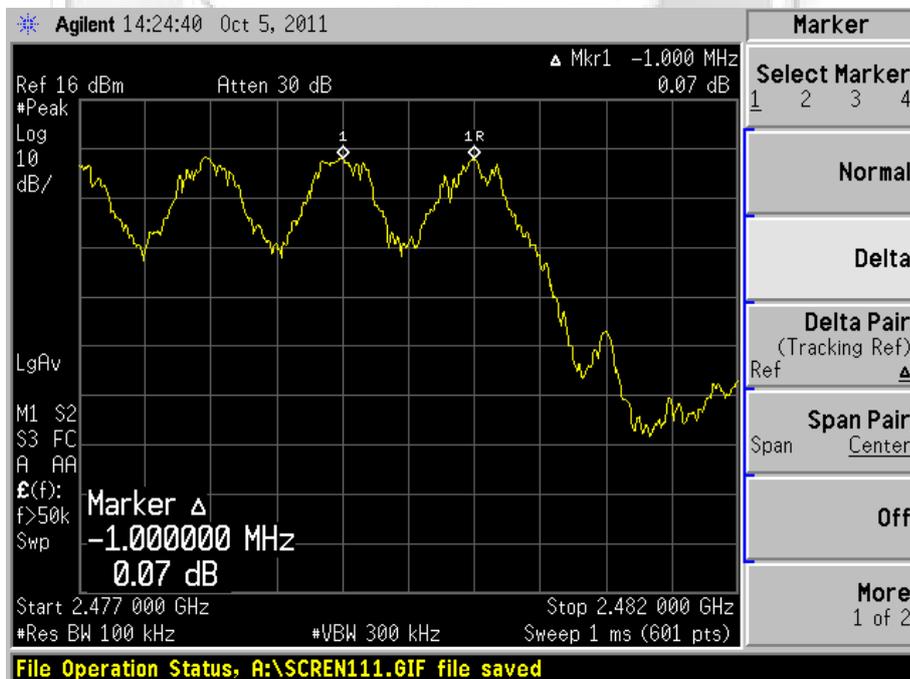


CARRIER FREQUENCY SEPARATION TEST

Carrier Frequency Separation Plots



Plot 3 - Channels 39 and 40 Separation



Plot 4 - Channels 77 and 78 Separation



SPECTRUM BANDWIDTH (20dB BANDWIDTH MEASUREMENT) TEST

47 CFR FCC Part 15.247(a)(1) Spectrum Bandwidth (20dB Bandwidth Measurement) Limits

The EUT shows compliance to the requirements of this section, which states that the 20dB bandwidth of the hopping channel shall be the channel frequency separation by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

47 CFR FCC Part 15.247(a)(1) Spectrum Bandwidth (20dB Bandwidth Measurement) Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Agilent E4440A Spectrum Analyzer	E4440A	MY45304764	10 Jun 2012

47 CFR FCC Part 15.247(a)(1) Spectrum Bandwidth (20dB Bandwidth Measurement) Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 10kHz and 30kHz.
5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(a)(1) Spectrum Bandwidth (20dB Bandwidth Measurement) Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, non-hopping with transmitting frequency at Channel 0 (2.402GHz).
2. The center frequency of the spectrum analyser was set to the transmitting frequency with the frequency span wide enough to capture the 20dB bandwidth of the transmitting frequency.
3. The spectrum analyser was set to max hold to capture the transmitting frequency. The signal capturing was continuous until no further changes were observed.
4. The peak of the transmitting frequency was detected with the marker peak function of the spectrum analyser. The frequencies below the 20dB peak frequency at lower (f_L) and upper (f_H) sides of the transmitting frequency were marked and measured by using the marker-delta function of the spectrum analyser.
5. The 20dB bandwidth of the transmitting frequency is the frequency difference between the marked lower and upper frequencies, $|f_H - f_L|$.
6. The steps 2 to 5 were repeated with the transmitting frequency was set to Channel 39 (2.441GHz) and Channel 78 (2.480GHz) respectively.



SPECTRUM BANDWIDTH (20dB BANDWIDTH MEASUREMENT) TEST

47 CFR FCC Part 15.247(a)(1) Spectrum Bandwidth (20dB Bandwidth Measurement) Results

Test Input Power	110V 60Hz	Temperature	24°C
Attached Plots	5 - 7	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chelmin Li

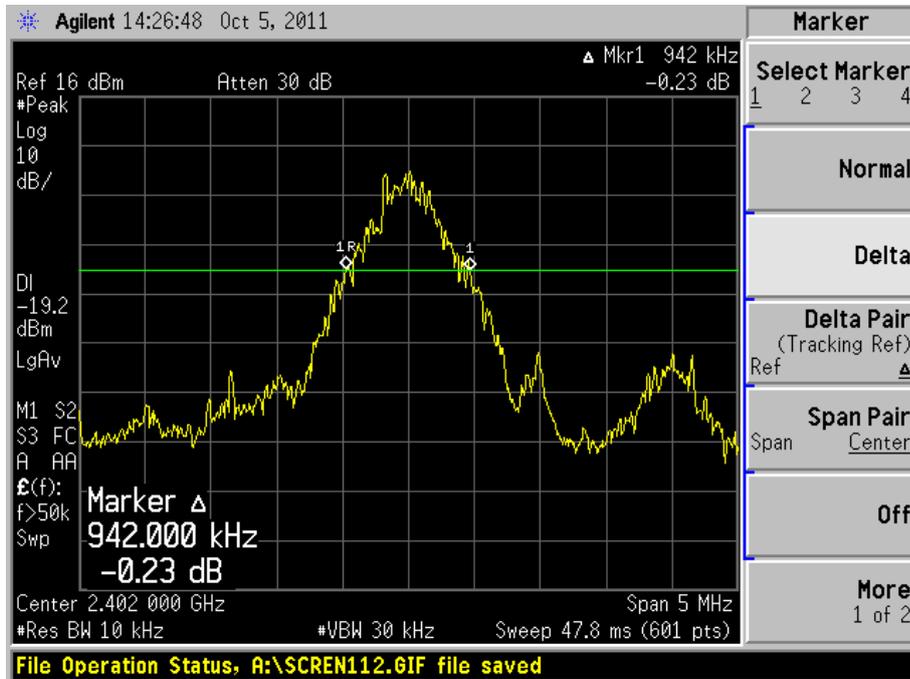
Channel	Channel Frequency (GHz)	20dB Bandwidth (MHz)
0	2.402	0.942
39	2.441	0.933
78	2.480	0.933



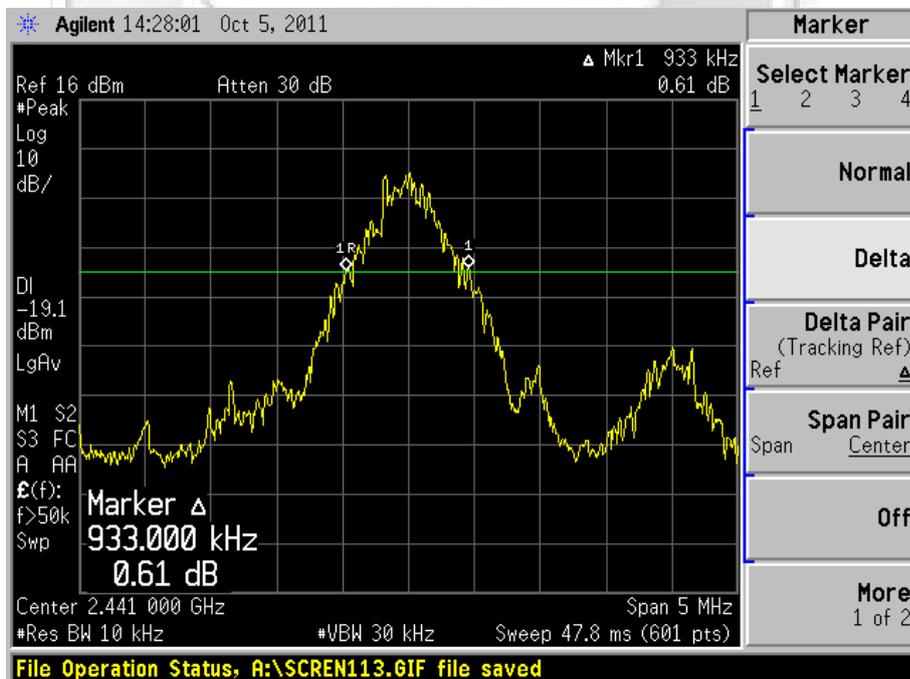


SPECTRUM BANDWIDTH (20dB BANDWIDTH MEASUREMENT) TEST

Spectrum Bandwidth (20dB Bandwidth Measurement) Plots



Plot 5 – Channel 0

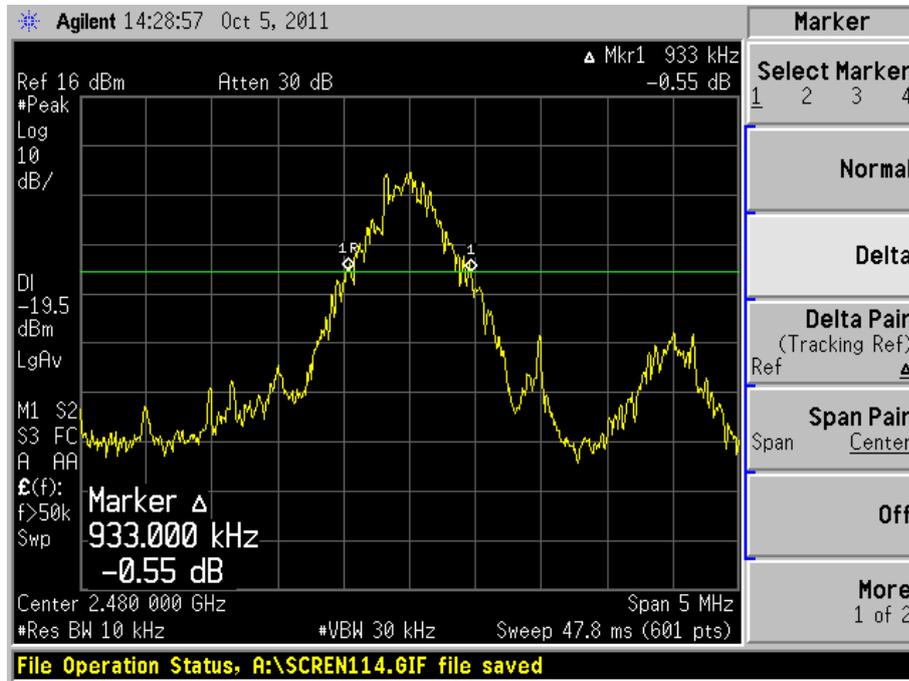


Plot 6 – Channel 39



SPECTRUM BANDWIDTH (20dB BANDWIDTH MEASUREMENT) TEST

Spectrum Bandwidth (20dB Bandwidth Measurement) Plots



Plot 7 - Channel 78





NUMBER OF HOPPING FREQUENCIES TEST

47 CFR FCC Part 15.247(a)(1)(iii) Number of Hopping Frequencies Limits

The EUT shows compliance to the requirements of this section, which states the EUT shall use at least 15 channels.

47 CFR FCC Part 15.247(a)(1)(iii) Number of Hopping Frequencies Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Agilent E4440A Spectrum Analyzer	E4440A	MY45304764	10 Jun 2012

47 CFR FCC Part 15.247(a)(1)(iii) Number of Hopping Frequencies Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(a)(1)(iii) Number of Hopping Frequencies Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with frequency hopping sequence on.
2. The start and stop frequencies of the spectrum analyser were set to 2.39GHz and 2.42GHz.
3. The spectrum analyser was set to max hold to capture all the transmitting frequencies within the span. The signal capturing was continuous until all the transmitting frequencies were captured and no further signals were detected.
4. The numbers of transmitting frequencies were counted and recorded.
5. The steps 2 to 4 were repeated with the following start and stop frequencies settings:
 - a. 2.420GHz to 2.441GHz
 - b. 2.441GHz to 2.461GHz
 - c. 2.461GHz to 2.4835GHz
6. The total number of hopping frequencies is the sum of the number of the hopping frequencies found for each span.



NUMBER OF HOPPING FREQUENCIES TEST

47 CFR FCC Part 15.247(a)(1)(iii) Number of Hopping Frequencies Results

Test Input Power	110V 60Hz	Temperature	24°C
Attached Plots	8 – 11	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chelmin Li

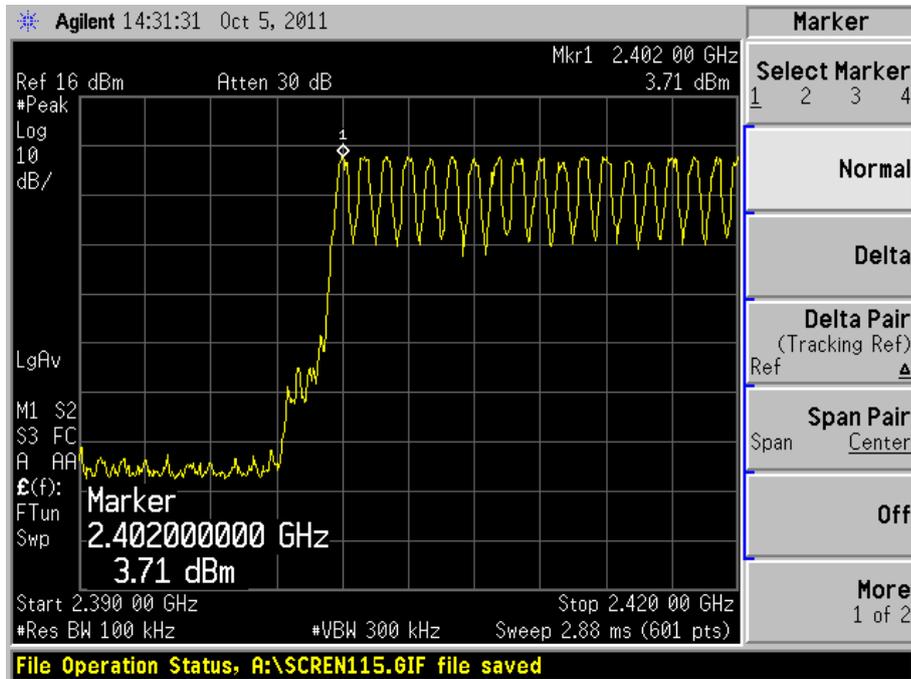
The EUT was found to have 79 hopping frequencies. Please refer to the attached plots.



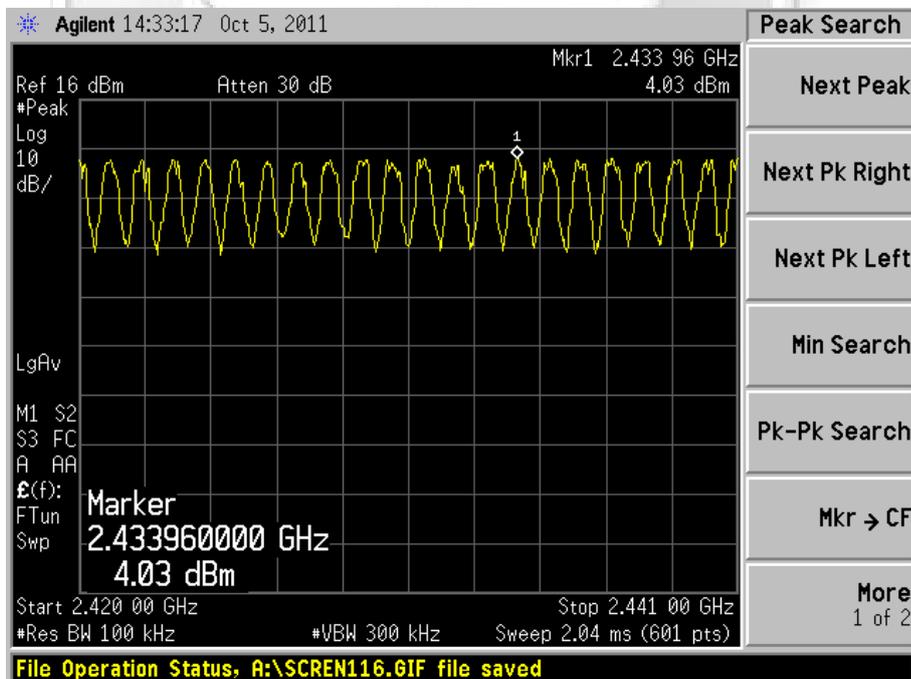


NUMBER OF HOPPING FREQUENCIES TEST

Number Of Hopping Frequencies Plots



Plot 8 - Channels 0 to 18

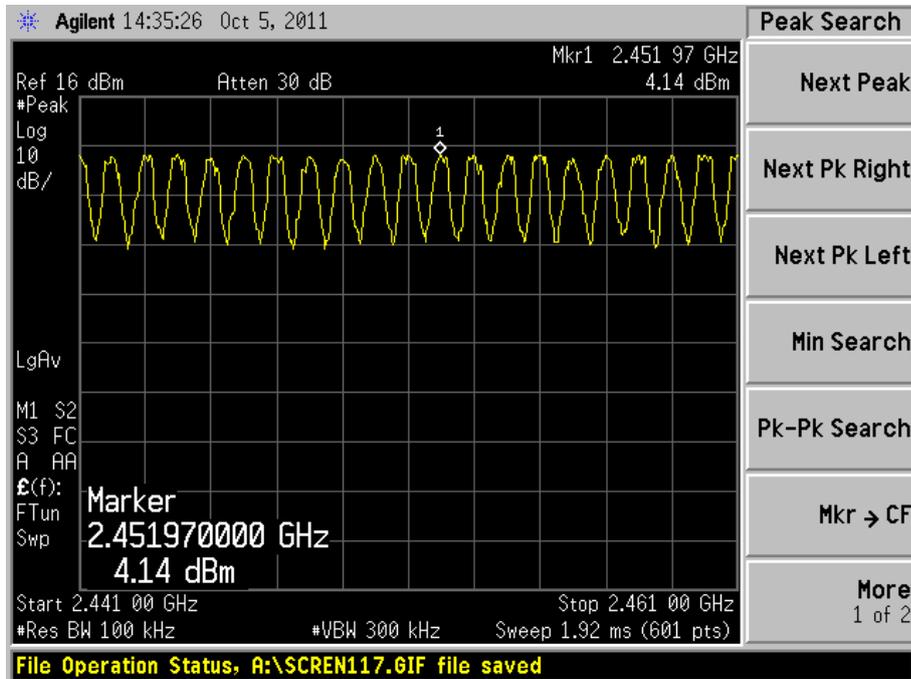


Plot 9 - Channels 18 to 39

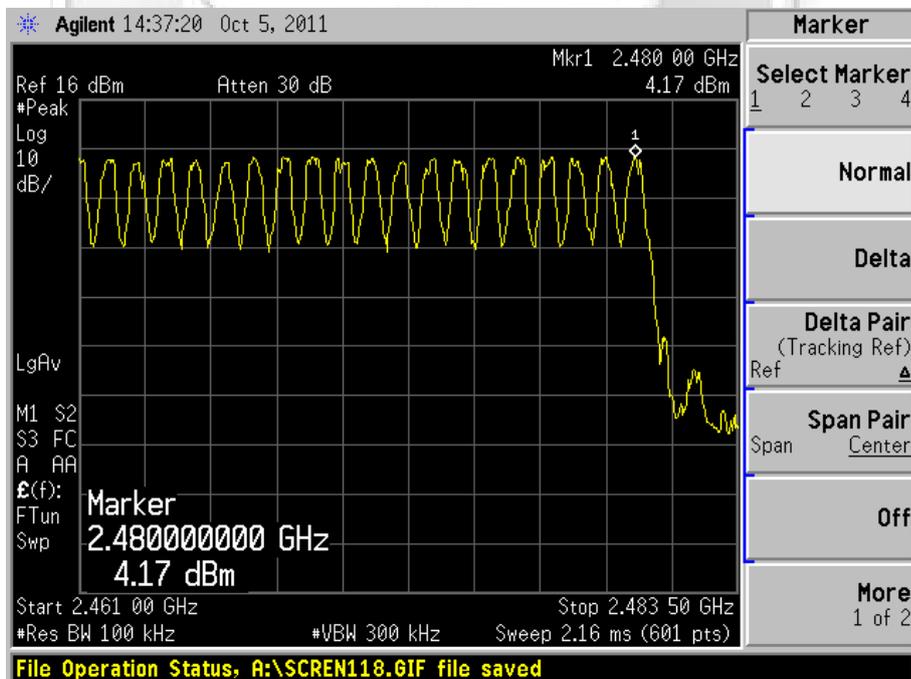


NUMBER OF HOPPING FREQUENCIES TEST

Number Of Hopping Frequencies Plots



Plot 10 - Channels 39 to 59



Plot 11 - Channels 59 to 78



AVERAGE FREQUENCY DWELL TIME TEST

47 CFR FCC Part 15.247(a)(1)(iii) Average Frequency Dwell Time Limits

The EUT shows compliance to the requirements of this section, which states the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

47 CFR FCC Part 15.247(a)(1)(iii) Average Frequency Dwell Time Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Agilent E4440A Spectrum Analyser	E4440A	MY45304764	10 Jun 2012

47 CFR FCC Part 15.247(a)(1)(iii) Average Frequency Dwell Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 1MHz and 3MHz.
5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(a)(1)(iii) Average Frequency Dwell Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with frequency hopping sequence on.
2. The center frequency of the spectrum analyser was set to 2.402GHz with zero frequency span (spectrum analyser acts as an oscilloscope).
3. The sweep time of the spectrum analyser was adjusted until a stable signal can be seen on the spectrum analyser.
4. The duration (dwell time) of a packet was measured using the marker-delta function of the spectrum analyser. The average dwell time of the transmitting frequency was computed based on general expression as shown below:
$$\text{Average Frequency Dwell Time} = \frac{\text{measured time slot length} \times \text{hopping rate}}{\text{number of hopping channels}} \times [0.4 \times \text{number of hopping channels}]$$
5. The steps 2 to 4 were repeated with the center frequency of the spectrum analyser were set to 2.441GHz and 2.480GHz respectively.



AVERAGE FREQUENCY DWELL TIME TEST

47 CFR FCC Part 15.247(a)(1)(iii) Average Frequency Dwell Time Results

Test Input Power	110V 60Hz	Temperature	24°C
Attached Plots	12 – 14	Relative Humidity	60%
Hopping Rate	1600 hops / s	Atmospheric Pressure	1030mbar
Number of Hopping Channels	79 channels	Tested By	Chelmin Li

Channel	Channel Frequency (GHz)	Average Frequency Dwell Time (s)	Average Occupancy Limit (s)
0	2.402	0.2000	0.4
39	2.441	0.2000	0.4
78	2.480	0.2000	0.4

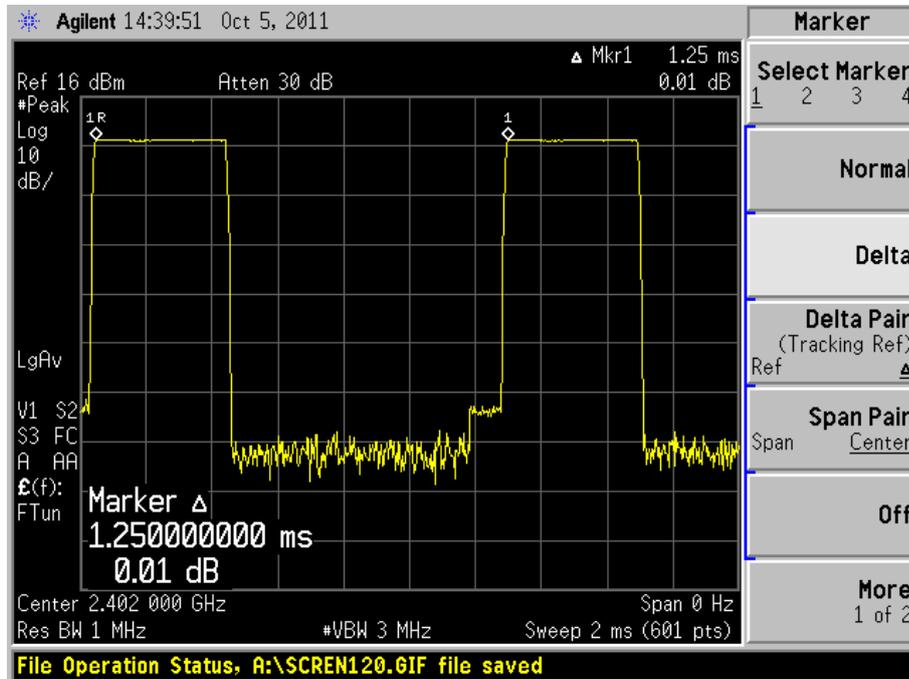
Notes

1. The EUT operates based on 1-slot transmission and 1-slot reception basis. As such, there are [1600 / (1 + 1)] transmissions per second and the time occupancy per channel is [measured time slot length / 2].
2. Average Frequency Dwell Time = [measured time slot length / 2 x hopping rate / 2 / number of hopping channels] x [0.4 x number of hopping channels]

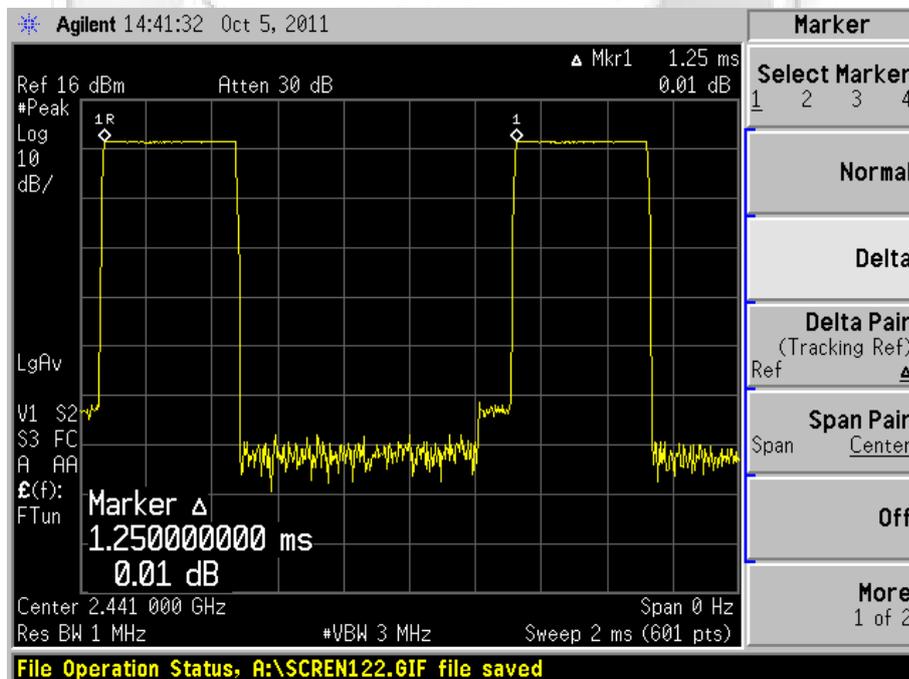


AVERAGE FREQUENCY DWELL TIME TEST

Average Frequency Dwell Time Plots



Plot 12 – Channel 0

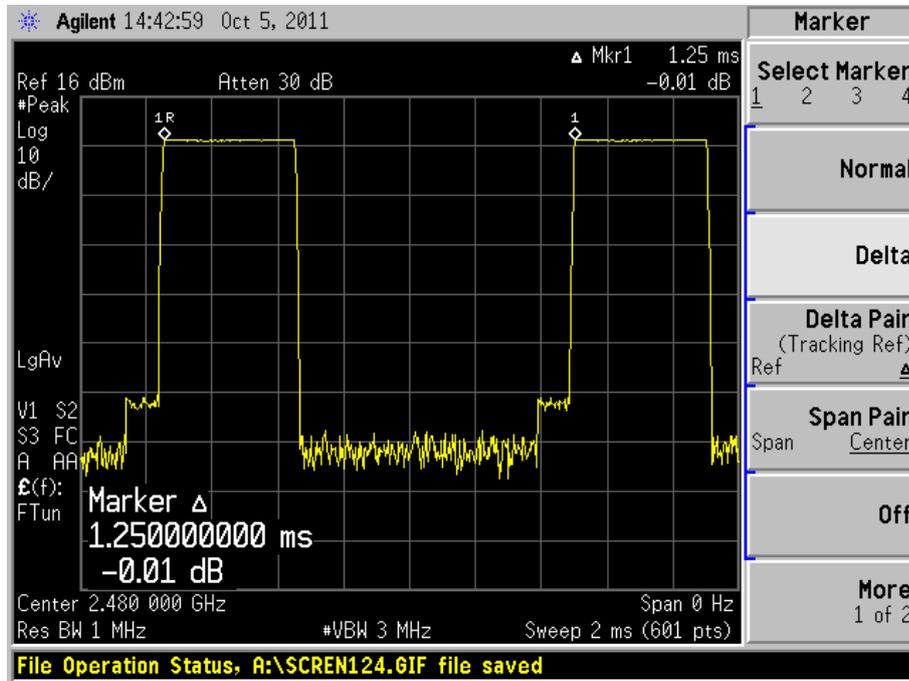


Plot 13 – Channel 39



AVERAGE FREQUENCY DWELL TIME TEST

Average Frequency Dwell Time Plots



Plot 14 – Channel 78





MAXIMUM PEAK POWER TEST

47 CFR FCC Part 15.247(b)(1) Maximum Peak Power Limits

The EUT shows compliance to the requirements of this section, which states the EUT employing at least 75 non-overlapping hopping channels shall not exceed 1W (30dBm). For the EUT employs other frequency hopping systems, the peak power shall not greater than 0.125W (21dBm).

47 CFR FCC Part 15.247(b)(1) Maximum Peak Power Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Boonton RF Power Meter	4532	72901	24 Mar 2012
Boonton Power Sensor	56218-S/1	1417	24 Mar 2012

47 CFR FCC Part 15.247(b)(1) Maximum Peak Power Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the Universal Radio Communication Tester, which set into power analyser mode via a low-loss coaxial cable.
4. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(b)(1) Maximum Peak Power Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, non-hopping with transmitting frequency at Channel 0 (2.402GHz).
2. The maximum peak power of the transmitting frequency was detected and recorded.
3. The Equivalent Isotropic Radiated Power (EIRP) of the EUT was computed by adding its antenna gain to the measured maximum peak power.
4. The steps 2 to 3 were repeated with the transmitting frequency was set to Channel 39 (2.441GHz) and Channel 78 (2.480GHz) respectively.



MAXIMUM PEAK POWER TEST

47 CFR FCC Part 15.247(b)(1) Maximum Peak Power Results

Test Input Power	110V 60Hz	Temperature	24°C
Antenna Gain	2.0 dBi	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chelmin Li

Channel	Channel Frequency (GHz)	Maximum Peak Power (W)	Maximum EIRP (W)	Limit (W)
0	2.402	0.0027	0.0043	1.0
39	2.441	0.0033	0.0052	1.0
78	2.480	0.0028	0.0044	1.0





RF CONDUCTED SPURIOUS EMISSIONS TEST

47 CFR FCC Part 15.247(d) RF Conducted Spurious Emissions Limits

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

47 CFR FCC Part 15.247(d) RF Conducted Spurious Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Agilent E4440A Spectrum Analyzer	E4440A	MY45304764	10 Jun 2012

47 CFR FCC Part 15.247(d) RF Conducted Spurious Emissions Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(d) RF Conducted Spurious Emissions Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, non-hopping with transmitting frequency at Channel 0 (2.402GHz).
2. The start and stop frequencies of the spectrum analyser were set to 30MHz and 10GHz.
3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
4. The steps 2 to 3 were repeated with frequency span was set from 10GHz to 25GHz.
5. The steps 2 to 4 were repeated with the transmitting frequency was set to Channel 39 (2.441GHz) and Channel 78 (2.480GHz) respectively.



RF CONDUCTED SPURIOUS EMISSIONS TEST

47 CFR FCC Part 15.247(d) RF Conducted Spurious Emissions Results

Test Input Power	110V 60Hz	Temperature	24°C
Attached Plots	15 – 20	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chelmin Li

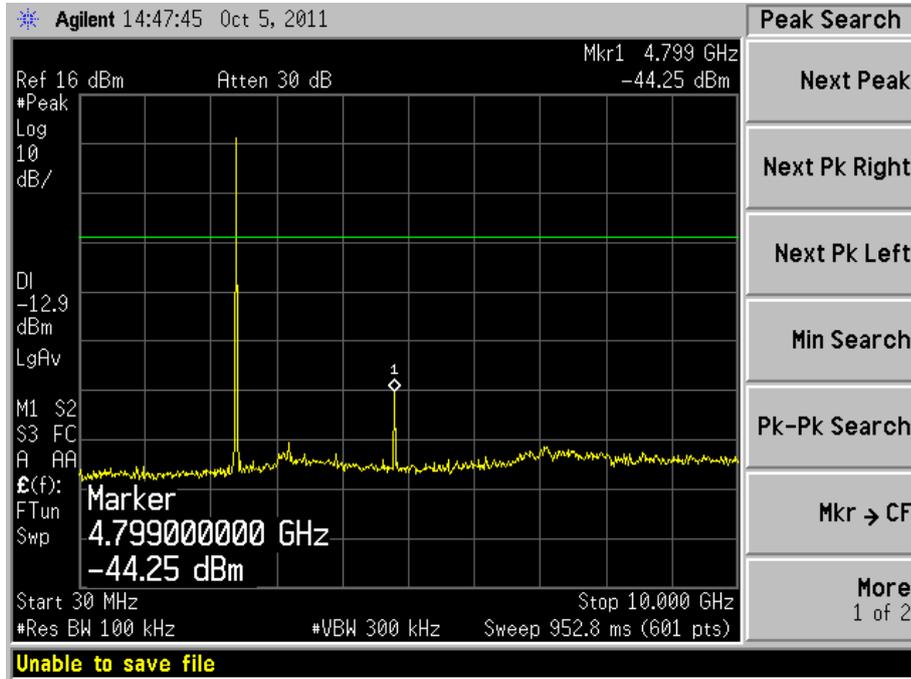
All spurious signals found were below the specified limit. Please refer to the attached plots.



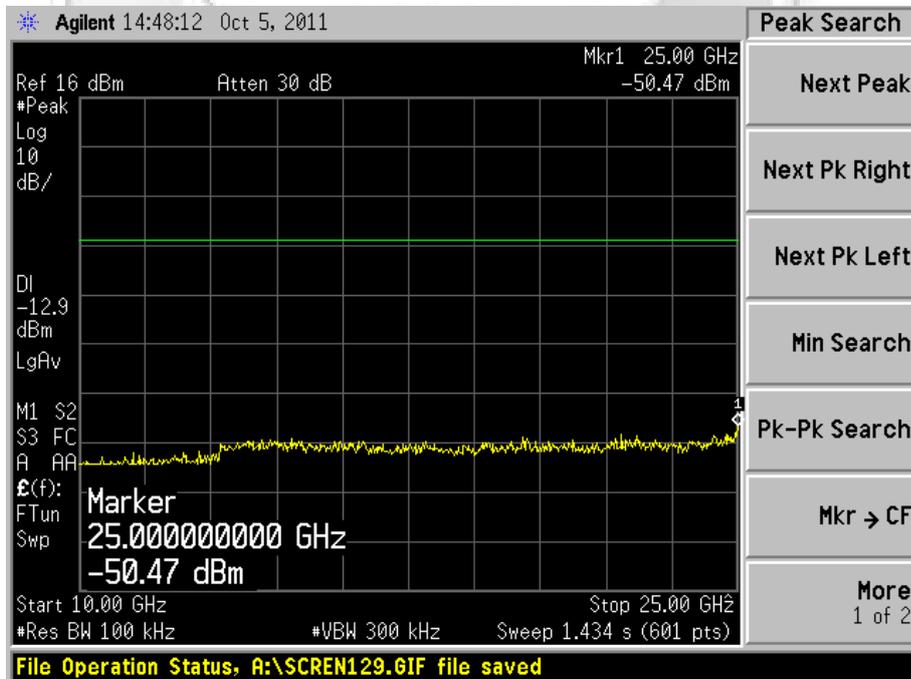


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots



Plot 15 – Channel 0

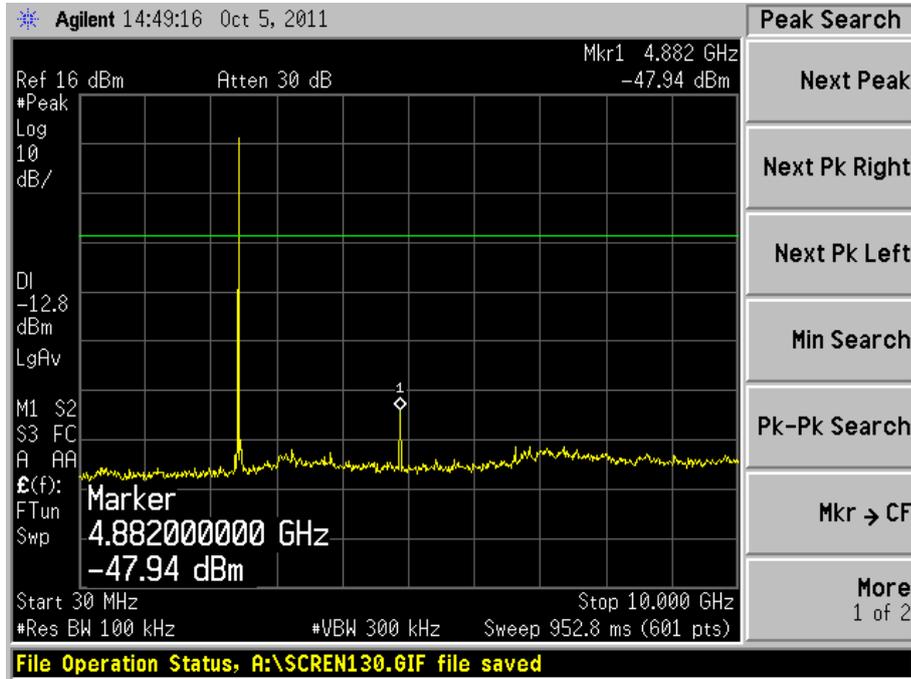


Plot 16 – Channel 0

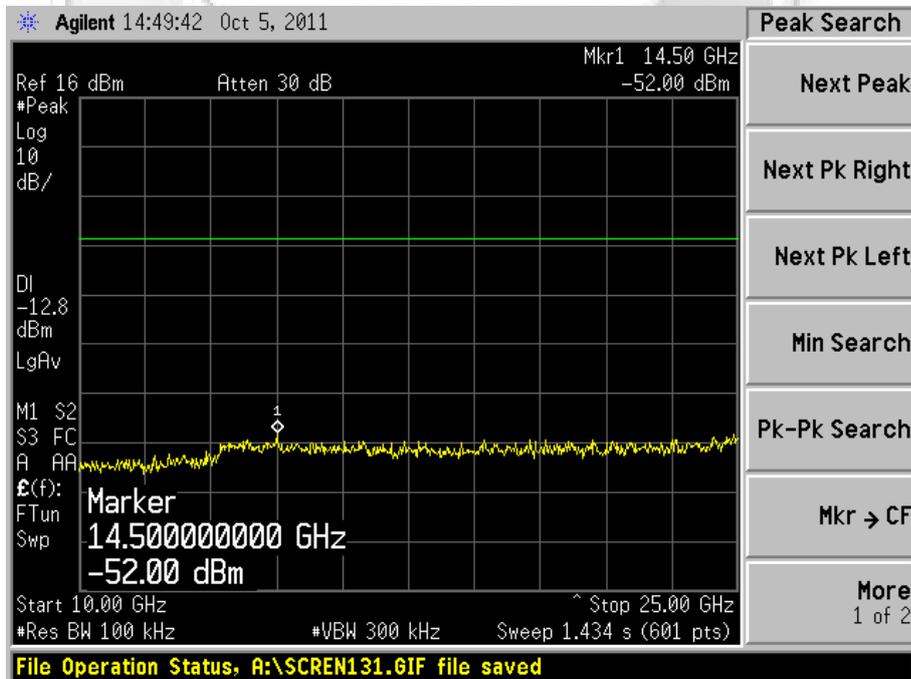


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots



Plot 17 – Channel 39

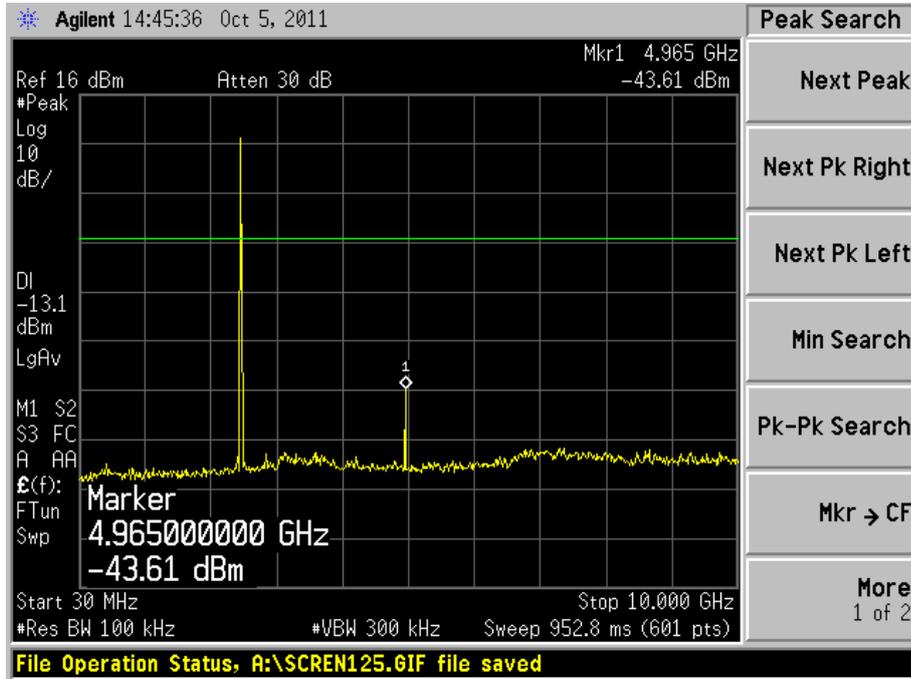


Plot 18 – Channel 39

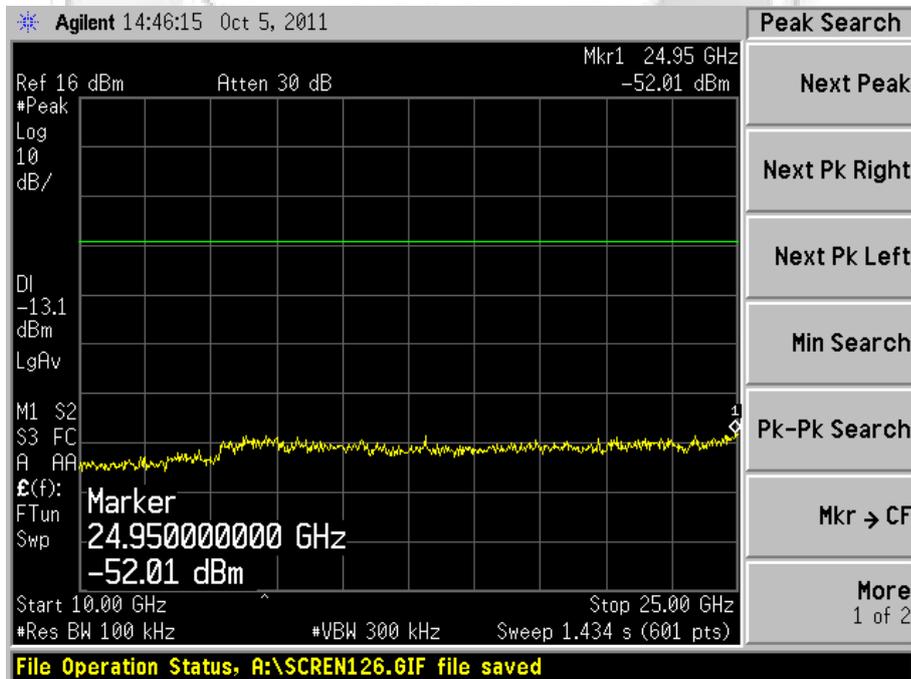


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots



Plot 19 – Channel 78



Plot 20 – Channel 78



BAND EDGE COMPLIANCE (CONDUCTED) TEST

47 CFR FCC Part 15.247(d) Band Edge Compliance (Conducted) Limits

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

47 CFR FCC Part 15.247(d) Band Edge Compliance (Conducted) Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Agilent E4440A Spectrum Analyzer	E4440A	MY45304764	10 Jun 2012

47 CFR FCC Part 15.247(d) Band Edge Compliance (Conducted) Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(d) Band Edge Compliance (Conducted) Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with frequency hopping sequence on.
2. The frequency span of the spectrum analyser was set to wide enough to capture the lower band edge of the transmission band, 2.400GHz and any spurious emissions at the band edge.
3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
4. The steps 2 to 3 were repeated with the frequency span of the spectrum analyser was set to wide enough to capture the upper band edge frequency of the transmission band, 2.4835GHz and the any spurious emissions at the band-edge.



BAND EDGE COMPLIANCE (CONDUCTED) TEST

47 CFR FCC Part 15.247(d) Band Edge Compliance (Conducted) Results

Test Input Power	110V 60Hz	Temperature	24°C
Attached Plots	21 – 22	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chelmin Li

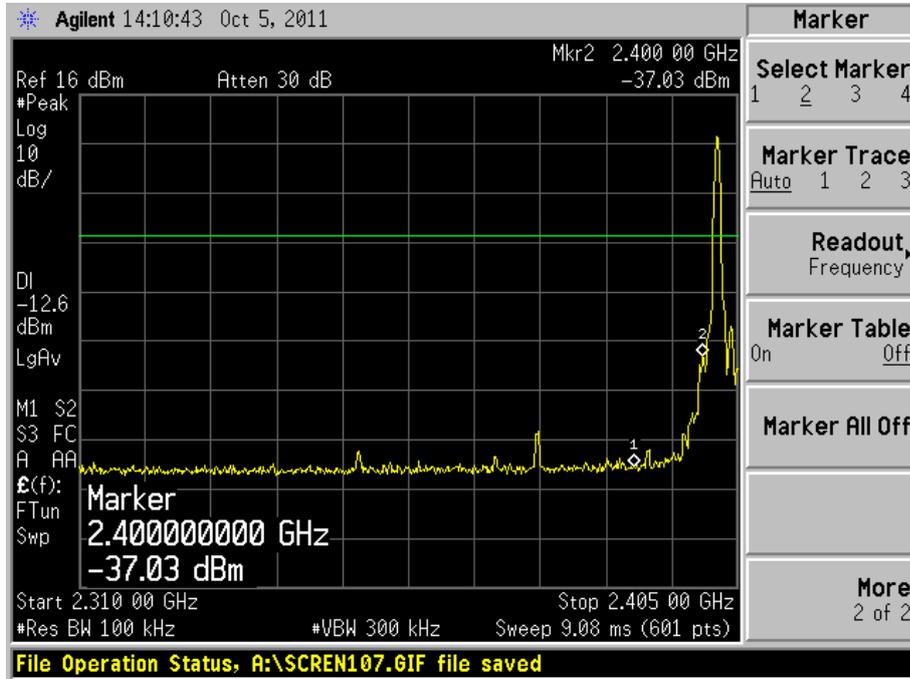
No significant signal was found and they were below the specified limit.



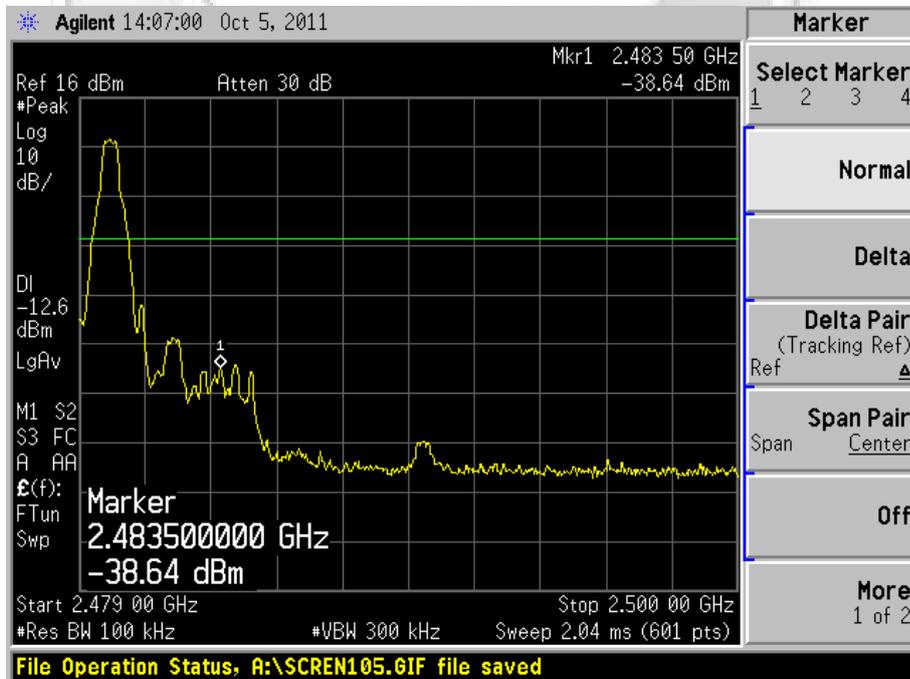


BAND EDGE COMPLIANCE (CONDUCTED) TEST

Band Edge Compliance (Conducted) Plots



Plot 21 – Lower Band Edge at 2.400GHz



Plot 22 – Upper Band Edge at 2.4835GHz



BAND EDGE COMPLIANCE (RADIATED) TEST

47 CFR FCC Part 15.247(d) Band Edge Compliance (Radiated) Limits

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power. In addition, radiated emissions which fall in the restricted bands shall comply to the radiated emission limits specified in 15.209.

47 CFR FCC Part 15.247(d) Band Edge Compliance (Radiated) Test Instrumentation

Instrument	Model	S/No	Cal Due Date
R&S Test Receiver – ESI1	ESI40	100010	06 Jun 2012
EMCO Horn Antenna(1GHz-18GHz) – H15 (Ref)	3115	0003-6008	20 May 2012
Agilent Preamplifier(1GHz-26.5GHz) (PA18)	8449D	3008A02305	08 Oct 2012
ETS Horn Antenna (18GHz-40GHz)(Ref)	3116	0004-2474	19 Apr 2012
Toyo Preamplifier (26.5GHz-40GHz)	HAP26-40W	00000005	19 Apr 2012
Agilent EMC Analyzer (9kHz-26.5GHz)	E7405A	US40240195	16 Mar 2012

47 CFR FCC Part 15.247(d) Band Edge Compliance (Radiated) Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz to show compliance of spurious at band edges are at least 20dB below the carriers. For restricted band spurious at band edges, peak and average measurement plots were taken using the following setting:
 - a. Peak Plot:
RBW = VBW = 1MHz
 - b. Average Plot
RBW = 1MHz, VBW = 10Hz
4. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(d) Band Edge Compliance (Radiated) Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with frequency hopping sequence on.
2. The frequency span of the spectrum analyser was set to wide enough to capture the lower band edge of the transmission band, 2.400GHz and any spurious emissions at the band edge.
3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
4. The steps 2 to 3 were repeated with the frequency span of the spectrum analyser was set to wide enough to capture the upper band edge frequency of the transmission band, 2.4835GHz and the any spurious emissions at the band-edge.



BAND EDGE COMPLIANCE (RADIATED) TEST

47 CFR FCC Part 15.247(d) Band Edge Compliance (Radiated) Results

Test Input Power	110V 60Hz	Temperature	24°C
Attached Plots	23 - 28	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Zechs Ng

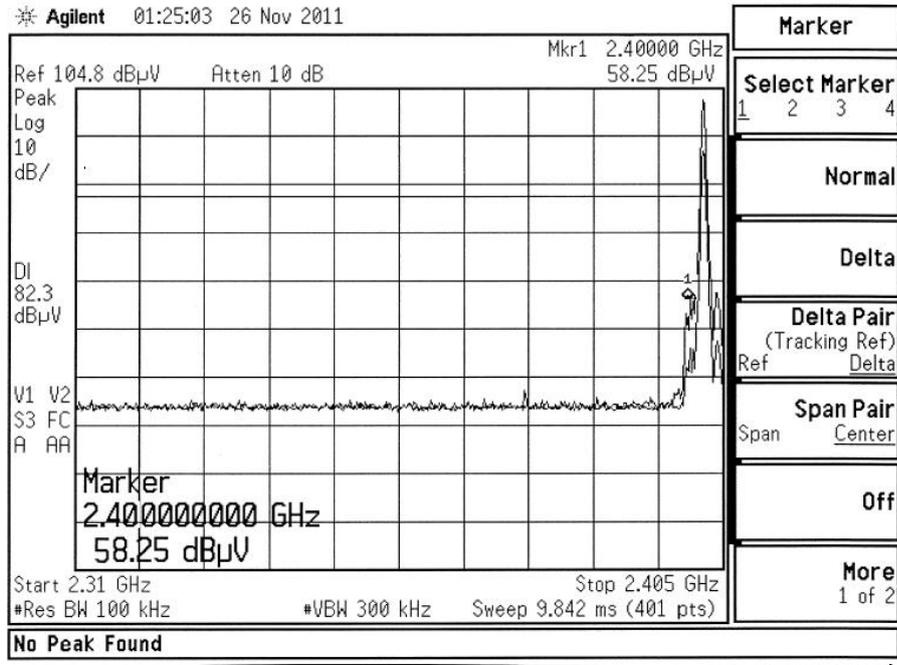
No significant signal was found and they were below the specified limit.



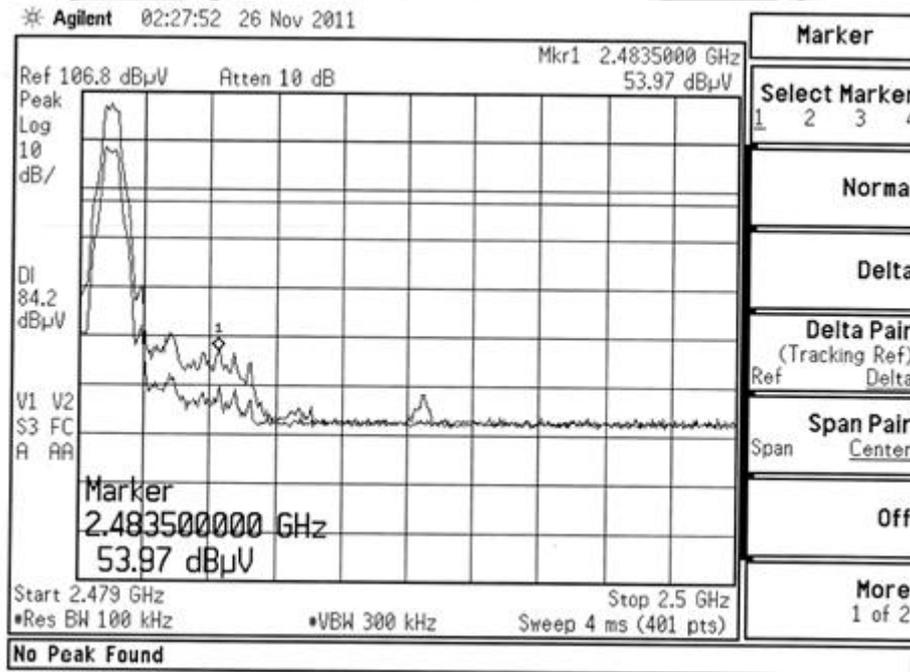


BAND EDGE COMPLIANCE (RADIATED) TEST

Band Edge Compliance (Radiated) Plots (20dB Delta from Carrier at Band Edge)



Plot 23 – Lower Band Edge at 2.400GHz

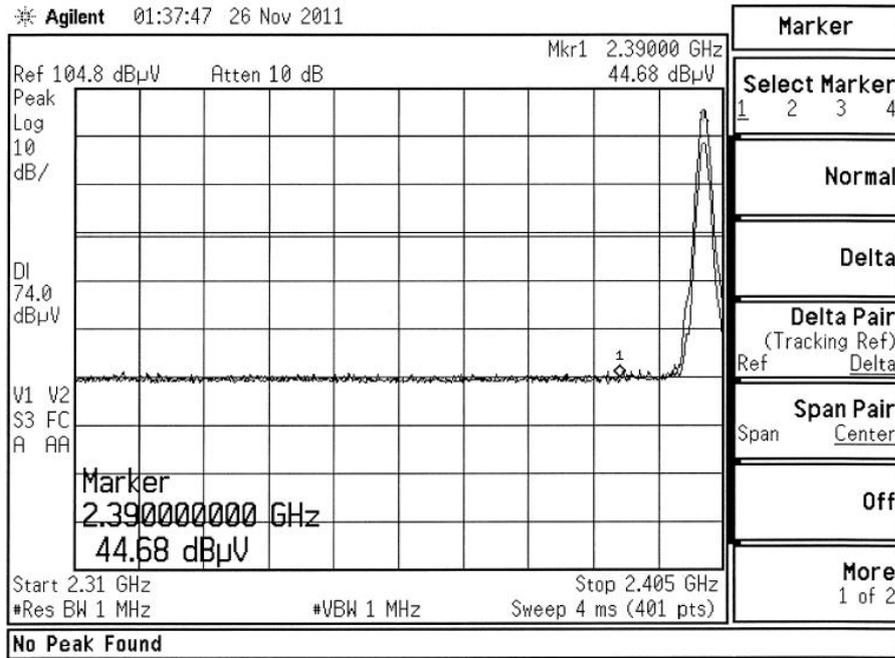


Plot 24 – Upper Band Edge at 2.4835GHz

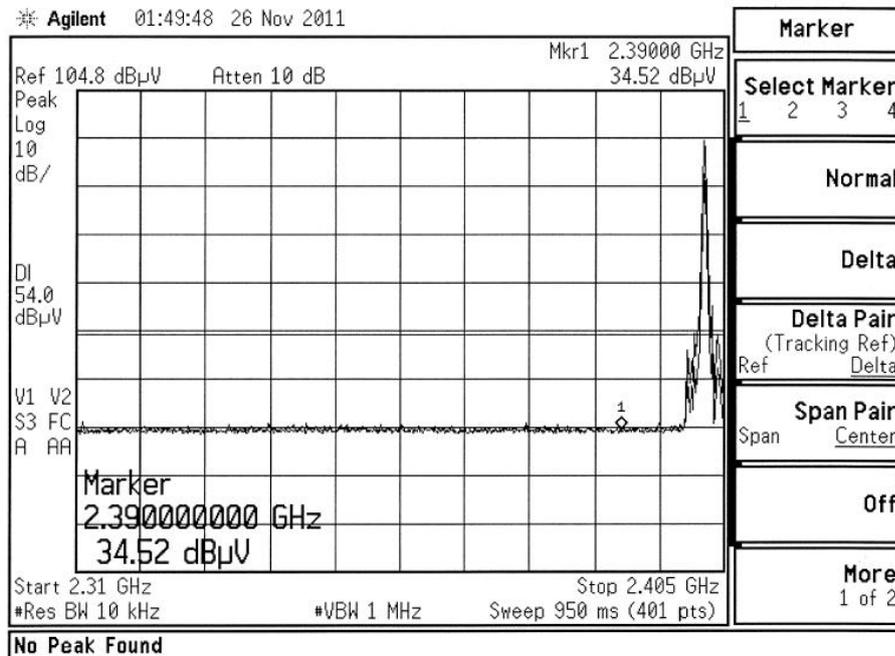


BAND EDGE COMPLIANCE (RADIATED) TEST

Band Edge Compliance (Radiated) Plots (Restricted Band)



Plot 25 – Peak Plot at Lower Band Edge at 2.4000GHz

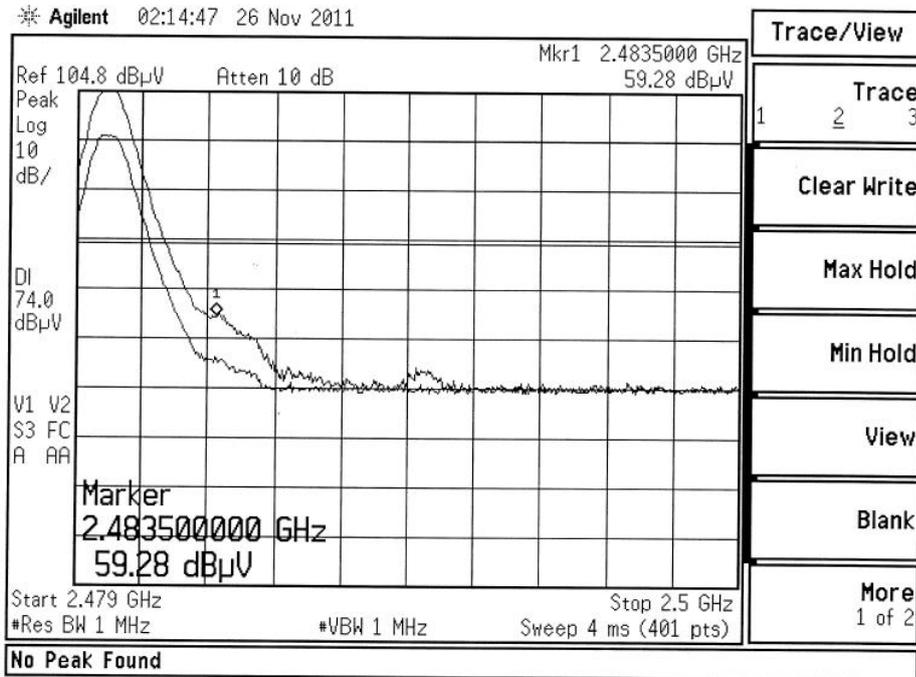


Plot 26 – Average Plot at Lower Band Edge at 2.4000GHz

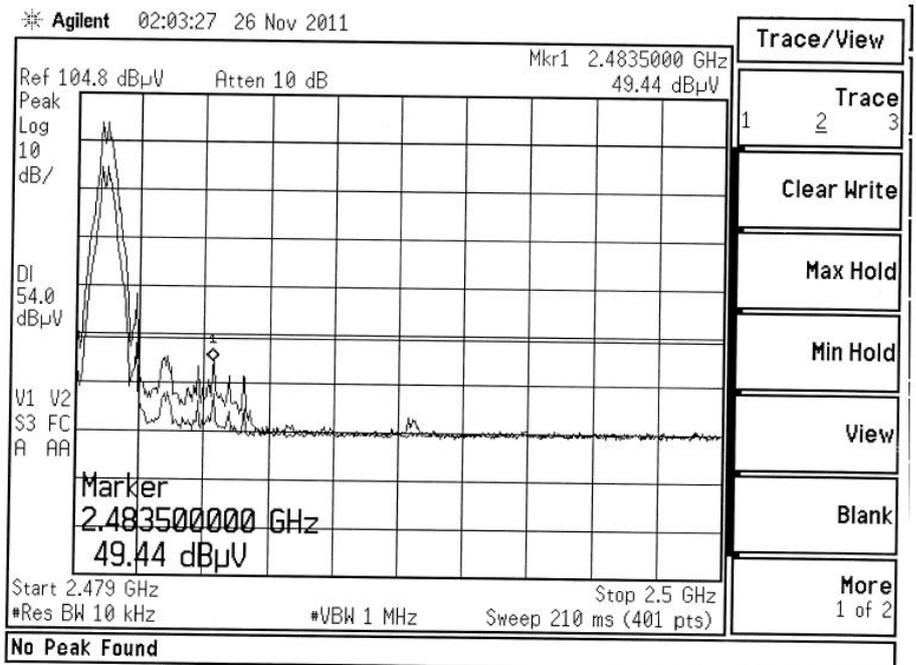


BAND EDGE COMPLIANCE (RADIATED) TEST

Band Edge Compliance (Radiated) Plots (Restricted Band)



Plot 27 – Peak Plot at Upper Band Edge at 2.4835GHz



Plot 28 – Average Plot at Upper Band Edge at 2.4835GHz



PEAK POWER SPECTRAL DENSITY TEST

47 CFR FCC Part 15.247(e) Peak Power Spectral Density Limits

The EUT shows compliance to the requirements of this section, which states the peak power spectral density conducted from the intentional radiator (EUT) to the antenna shall not be greater than 8dBm (6.3mW) in any 3kHz band during any time interval of continuous transmission.

47 CFR FCC Part 15.247(e) Peak Power Spectral Density Test Instrumentation

Instrument	Model	S/No	Cal Due Date
Agilent E4440A Spectrum Analyzer	E4440A	MY45304764	10 Jun 2012

47 CFR FCC Part 15.247(e) Peak Power Spectral Density Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 3kHz and 10kHz.
5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(e) Peak Power Spectral Density Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, non-hopping with transmitting frequency at Channel 0 (2.402GHz).
2. The sweep time of the spectrum analyser was set to the value of the ratio of the frequency span divided by the RBW.
3. The peak power density of the transmitting frequency was detected and recorded.
4. The step 3 was repeated with the transmitting frequency was set to Channel 39 (2.441GHz) and Channel 78 (2.480GHz) respectively.



PEAK POWER SPECTRAL DENSITY TEST

47 CFR FCC Part 15.247(e) Peak Power Spectral Density Results

Test Input Power	110V 60Hz	Temperature	24°C
Attached Plots	29 – 31	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chelmin Li

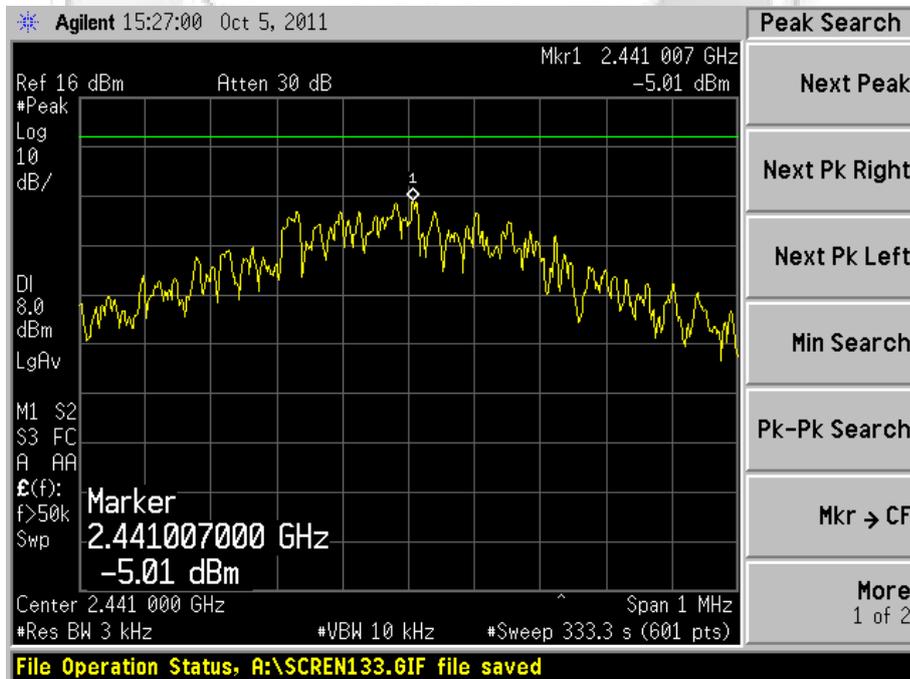
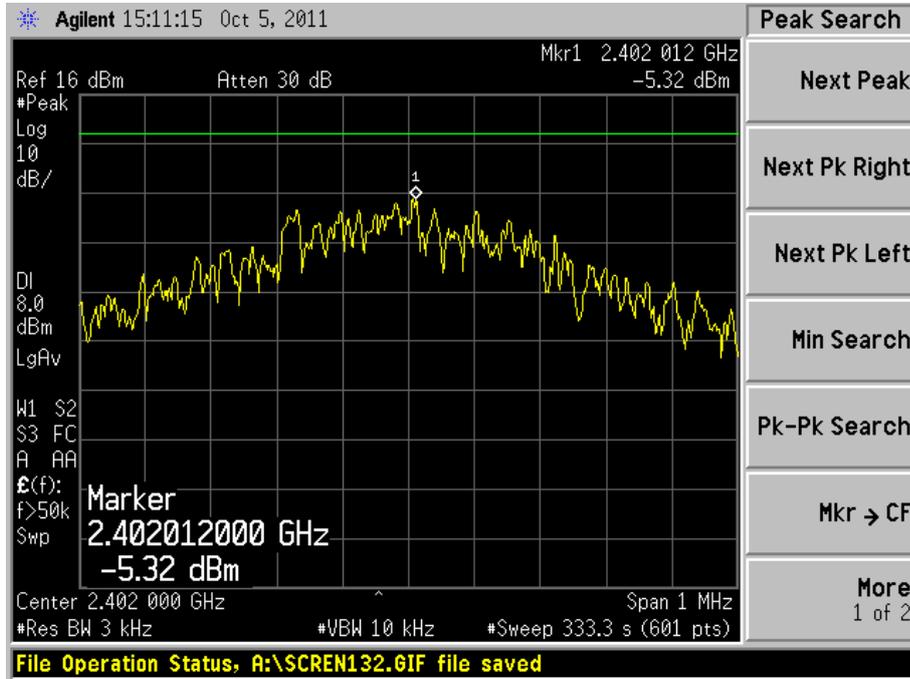
Channel	Channel Frequency (GHz)	Peak Power Spectral Density (mW)	Limit (mW)
0	2.402	0.294	6.3
39	2.441	0.316	6.3
78	2.480	0.316	6.3





PEAK POWER SPECTRAL DENSITY TEST

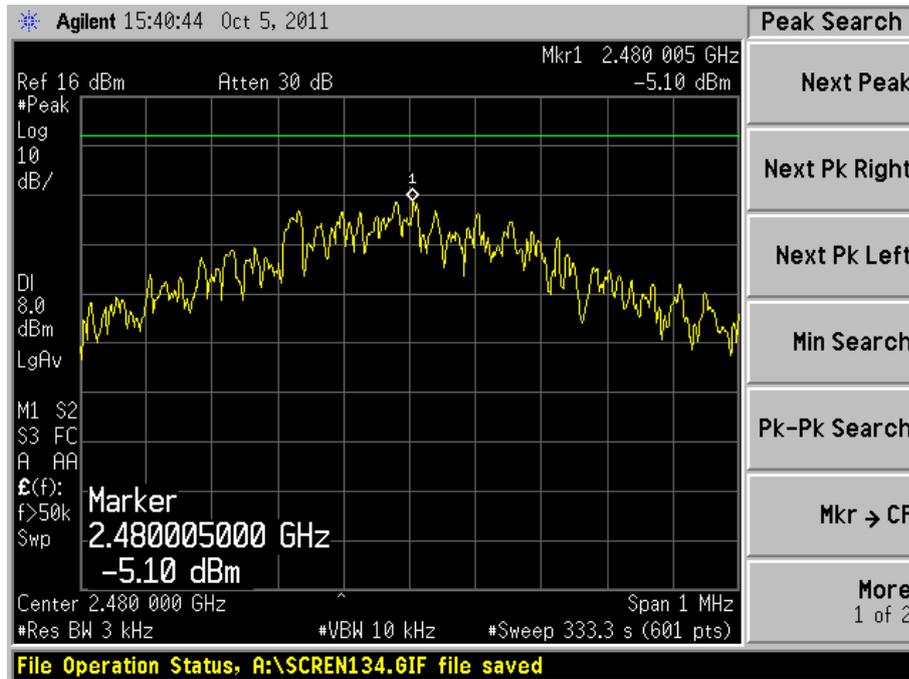
Peak Power Spectral Density Plots





PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots



Plot 31 – Channel 78





MAXIMUM PERMISSIBLE EXPOSURE (MPE) TEST

47 CFR FCC Part 1.1310 Maximum Permissible Exposure (MPE) Limits

The EUT shows compliance to the requirements of this section, which states the MPE limits for general population / uncontrolled exposure are as shown below:

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (min)
0.3 - 1.34	614	1.63	100 ^{Note 2}	30
1.34 - 30	824 / f	2.19 / f	180 / f ² ^{Note 2}	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	-	-	f / 1500	30
1500 - 100000	-	-	1.0	30
Notes				
1.	f = frequency in MHz			
2.	Plane wave equivalent power density			

47 CFR FCC Part 1.1310 Maximum Permissible Exposure Computation

The power density at 20cm distance was computed from the following formula:

$$S = (30GP) / (377d^2)$$

where

- S = Power density in W/m²
- P = 0.0033W
- d = Test distance at 0.2m
- G = Numerical isotropic gain, 1.59 (2.0dBi)

Substituting the relevant parameters into the formula:

$$S = [(30GP) / 377d^2]$$

$$= 0.0104 \text{ W/m}^2$$

$$= 0.0011 \text{ mW/cm}^2$$

∴ The power density of the EUT at 20cm distance is 0.0011 mW/cm² based on the above computation and found to be lower than the power density limit of 1.0mW/cm².

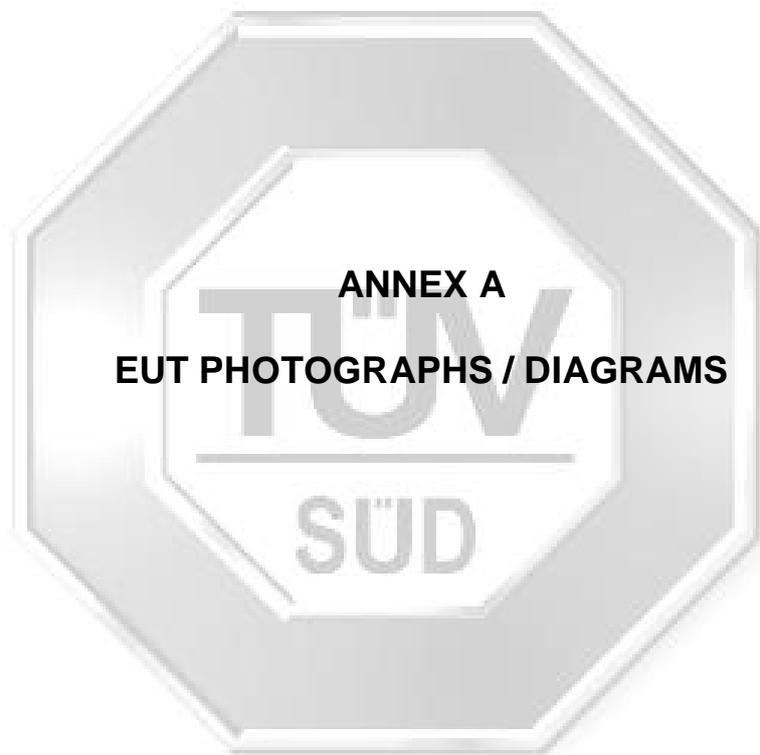


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July 2011







FCC LABEL & POSITION

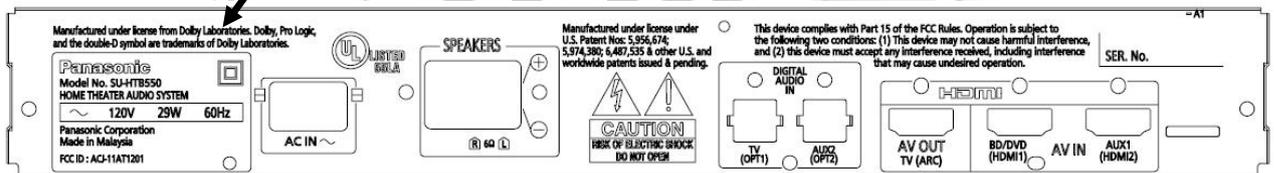
ANNEX B

Labelling requirements per Section 2.925 & 15.19

The label shown will be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.



Sample Label



Physical Location of FCC Label on EUT



**USER MANUAL TECHNICAL DESCRIPTION BLOCK
& CIRCUIT DIAGRAM**

ANNEX C

