



Test Report

Product Name	WHDI Rx board
Model No	WV301A
FCC ID.	PPQ-WV301A

Applicant	LITE-ON TECHNOLOGY CORP.
Address	4F, 90, Chien 1 Road, Chung Ho, Taipei Hsien 235, Taiwan, R.O.C.

Date of Receipt	Sep. 16, 2011
Issue Date	Oct. 14, 2011
Report No.	119322R-RFUSP28V01
Report Version	V1.0

The test results relate only to the samples tested.

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Test Report Certification

Issue Date: Oct. 14, 2011

Report No.: 119322R-RFUSP28V01



Accredited by NIST (NVLAP)
NVLAP Lab Code: 200533-0

Product Name	WHDI Rx board	
Applicant	LITE-ON TECHNOLOGY CORP.	
Address	4F, 90, Chien 1 Road, Chung Ho, Taipei Hsien 235, Taiwan, R.O.C.	
Manufacturer	DONG GUAN G-COM COMPUTER CO., LTD	
Model No.	WV301A	
EUT Rated Voltage	DC 5V	
EUT Test Voltage	AC 120V/60Hz	
Trade Name	LITE-ON	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2010 ANSI C63.4: 2009	 NVLAP Lab Code: 200533-0
Test Result	Complied	

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Documented By : Anita Chou
(Senior Engineering Adm. Specialist / Anita Chou)



Tested By : Henk Huang
(Engineer / Henk Huang)



Approved By : Vincent Lin
(Manager / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	WHDI Rx board
Trade Name	LITE-ON
Model No.	WV301A
FCC ID.	PPQ-WV301A
Frequency Range	20MHz-BW:5745-5825MHz , 40MHz-BW:5755-5795MHz
Number of Channels	20MHz-BW: 5, 40MHz-BW: 2
Data Speed	20MHz mode: 30kbps, 40MHz mode: 60kbps
Channel separation	20MHz-BW: 20MHz, 40MHz-BW: 40MHz
Type of Modulation	OFDM
Antenna Type	Printed on PCB (PIFA)
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
Power Adapter	MFR: Asian, M/N: WA-15C05R Input: AC 100-240V, 50-60Hz, 0.5A Max. Output: DC 5V, 3A Cable Out: Shielded, 1.5m, with one ferrite core bonded.

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	LITE-ON	N/A	2dBi for 5GHz

Note: The antenna of EUT is conform to FCC 15.203

20MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 149:	5745 MHz	Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz
Channel 165:	5825 MHz						

40MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency
Channel 151:	5755 MHz	Channel 159:	5795 MHz

Note:

1. This device is a WHDI Rx board with a built-in and 5GHz WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. These tests are conducted on a sample for the purpose of demonstrating compliance of 5GHz transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

1.2. Operational Description

The EUT is a Full HD Video Wireless Receiver Module with a built-in 5GHz transceiver, together with Full HD Video Wireless Transmitter Module. It has a MISO design of five channel and one slow rate output wireless channel, which generates an upstream channel for data content transmissions.

The data modulation is OFDM, using five antennas to support 1(Transmit) * 5(Receive) technology. The device only provided one transmitting speed 30kbps in 20MHz bandwidth mode and 60kbps in 40MHz bandwidth mode.

Presents the ultimate solution for converting any High Definition (HD) system, including Full HD, into a wireless one. These add-on modules enable wireless A/V applications that fit easily into the living room and eliminate traditional A/V wiring. The perfect HD video and audio quality and the high robustness are unmatched by any other wireless technology and present a true alternative to cable. The WHDI system transmits uncompressed video and audio streams wirelessly and thus simplifies and eliminates system issues, such as: lip-sync, large buffers and other burdens like retransmissions or error propagation.

The device can receive audio and video signal from associate equipment, device will transmit signal to request associate equipment change transmission frequency. The IC AMN2220 WHDI baseband receiver chip is the heart of the WV301A WHDI Receiver module. The AMN2220 interfaces the A/V sink through the WHDI connector and is controlled by the internal MAC uC. The AMN2220 is based on MIMO technology receiving up to five input channels. Five analog-to-digital converters and one digital-to-analog converter are embedded within the chip.

The AMN2220 internal PLL accepts an input clock frequency of 40MHz. The input frequency is multiplied and then used as an internal system clock. The IC AMN3210 is a fully-integrated Zero-IF MIMO receiver specifically designed for WHDI applications using OFDM modulation for single-band 5.15 -5.25GHz and 5.725 - 5.85 GHz. The device consists of:

- Five Complete Downlink Zero-IF Receivers.
- One Uplink Direct Conversion Transmitter.
- Integrated Synthesizer/VCO.
- Internal DC Servo Loops.
- RSSI, RF and Baseband Control Interface.
- Power Management Unit.
- 3-Wire SPI Interface.

To complete the RF front-end solution, the AMN3210 uses external PA, RF Band Pass Filters (BPF), RF BALUNs and a few passive components.

Test Mode:	Mode 1: Transmit - 20BW
	Mode 2: Transmit - 40BW

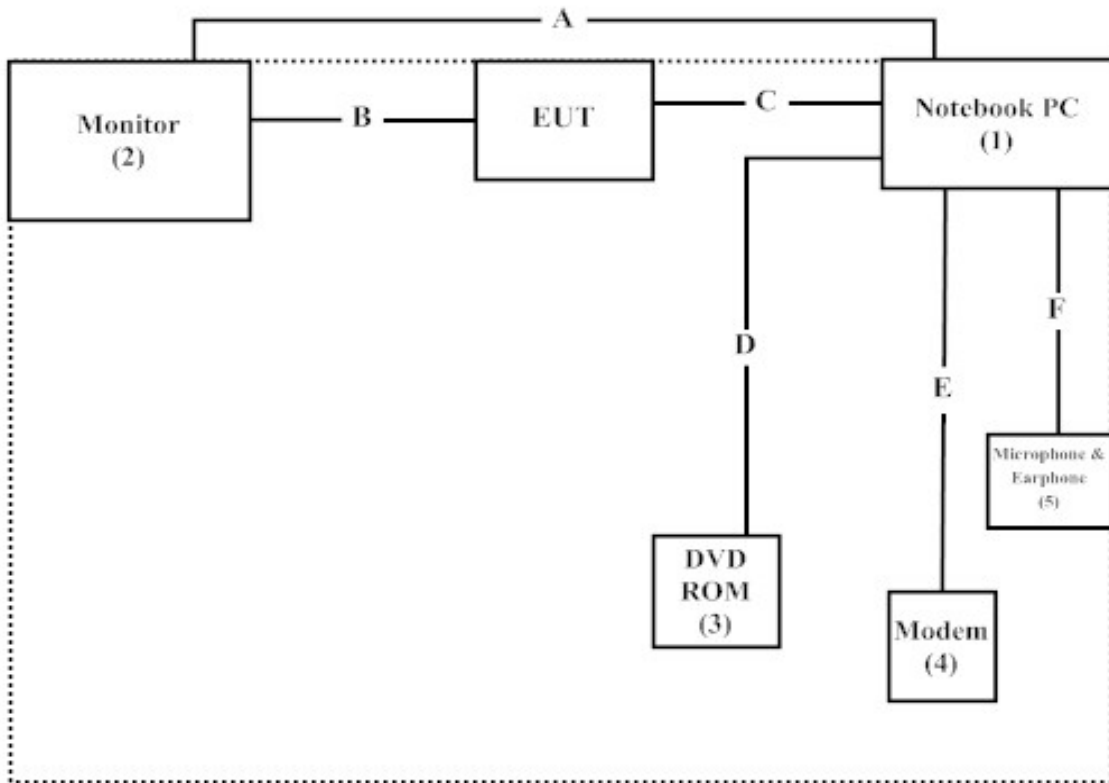
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
(1) Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m
(2) Monitor	LG	W2261VT	907YHZK07373	Non-Shielded, 1.8m
(3) DVD ROM	DELL	PD01S	03029	N/A
(4) Modem	ACEEX	DM-1414	0102027550	Non-Shielded, 1.8m
(5) Microphone & Earphone	Ergotech	ET-E201	N/A	N/A

Signal Cable Type	Signal cable Description
A VGA Cable	Shielded, 1.8m, with two ferrite cores bonded.
B HDMI Cable	Shielded, 1.2m
C USB Cable	Shielded, 1.2m
D DVD ROM Cable	Shielded, 0.6m
E Modem Cable	Non-Shielded, 1.8m
F Microphone & Earphone Cable	Non-Shielded, 1.0m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute “APPcom” program on the Notebook.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press “OK” to start the continuous Transmit.
- (5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from

Quietek Corporation's Web Site : <http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Registration Number: 92195



Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation
 Site Address: No.5-22, Ruishukeng Linkou Dist., New Taipei City 24451,
 Taiwan, R.O.C.
 TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
 E-Mail : service@quietek.com

FCC Accreditation Number: TW1014



2. Conducted Emission

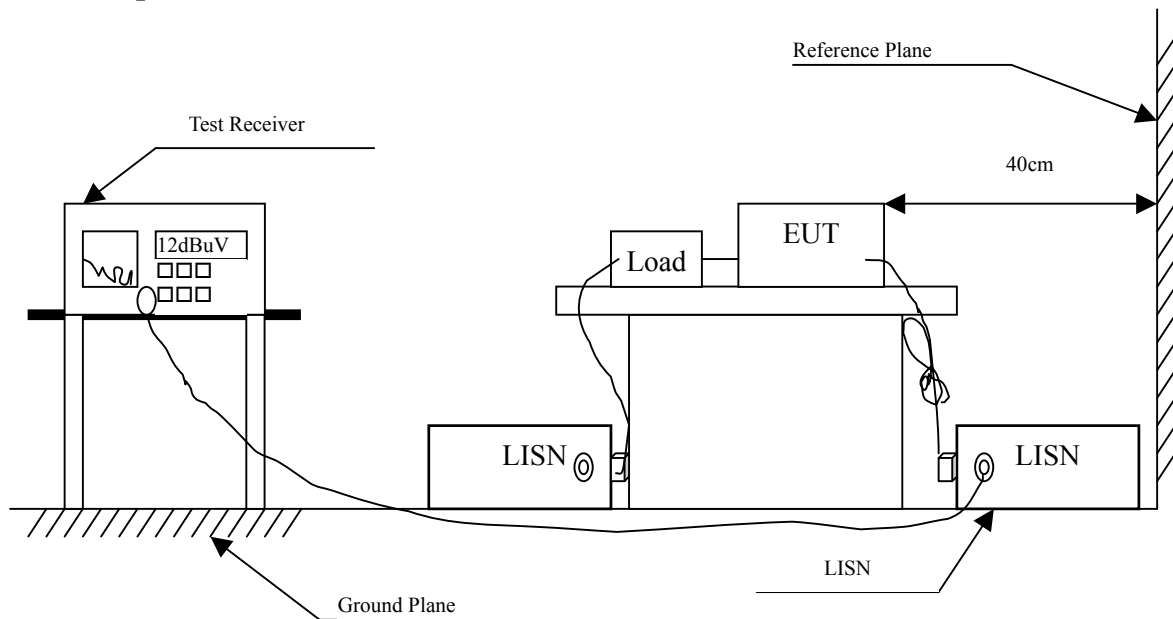
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2011	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2011	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2011	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2011	
5	No.8 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : WHDI Rx board
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: Transmit - 40BW (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 1					
Quasi-Peak					
0.201	9.706	50.020	59.726	-4.817	64.543
0.259	9.670	40.860	50.530	-12.356	62.886
0.459	9.640	37.120	46.760	-10.411	57.171
0.732	9.635	40.580	50.215	-5.785	56.000
1.541	9.680	25.980	35.660	-20.340	56.000
15.021	9.990	33.420	43.410	-16.590	60.000
Average					
0.201	9.706	37.450	47.156	-7.387	54.543
0.259	9.670	26.750	36.420	-16.466	52.886
0.459	9.640	26.320	35.960	-11.211	47.171
0.732	9.635	32.010	41.645	-4.355	46.000
1.541	9.680	13.120	22.800	-23.200	46.000
15.021	9.990	25.220	35.210	-14.790	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : WHDI Rx board
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 2: Transmit - 40BW (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 2					
Quasi-Peak					
0.201	9.716	51.780	61.496	-3.047	64.543
0.330	9.660	41.280	50.940	-9.917	60.857
0.443	9.645	41.160	50.805	-6.824	57.629
0.759	9.664	40.640	50.304	-5.696	56.000
1.517	9.680	28.160	37.840	-18.160	56.000
15.088	10.000	32.760	42.760	-17.240	60.000
Average					
0.201	9.716	39.040	48.756	-5.787	54.543
0.330	9.660	29.470	39.130	-11.727	50.857
0.443	9.645	28.350	37.995	-9.634	47.629
0.759	9.664	32.120	41.784	-4.216	46.000
1.517	9.680	15.350	25.030	-20.970	46.000
15.088	10.000	24.110	34.110	-15.890	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Peak Power Output

3.1. Test Equipment

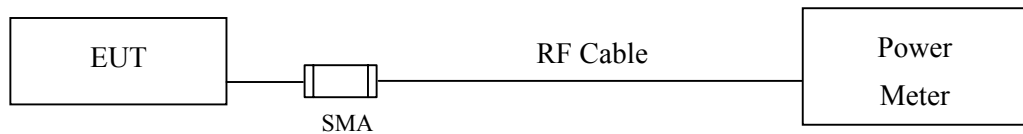
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2011
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2011

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup

Conducted Measurement



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : WHDI Rx board
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - 20BW

Frequency (MHz)	Measurement (dBm)	Required Limit	Result
5745	23.73	<30dBm	Pass
5785	24.16	<30dBm	Pass
5825	23.93	<30dBm	Pass

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

Product : WHDI Rx board
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmit - 40BW

Frequency (MHz)	Measurement (dBm)	Required Limit	Result
5755	24.36	<30dBm	Pass
5795	24.29	<30dBm	Pass

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

4. Radiated Emission

4.1. Test Equipment

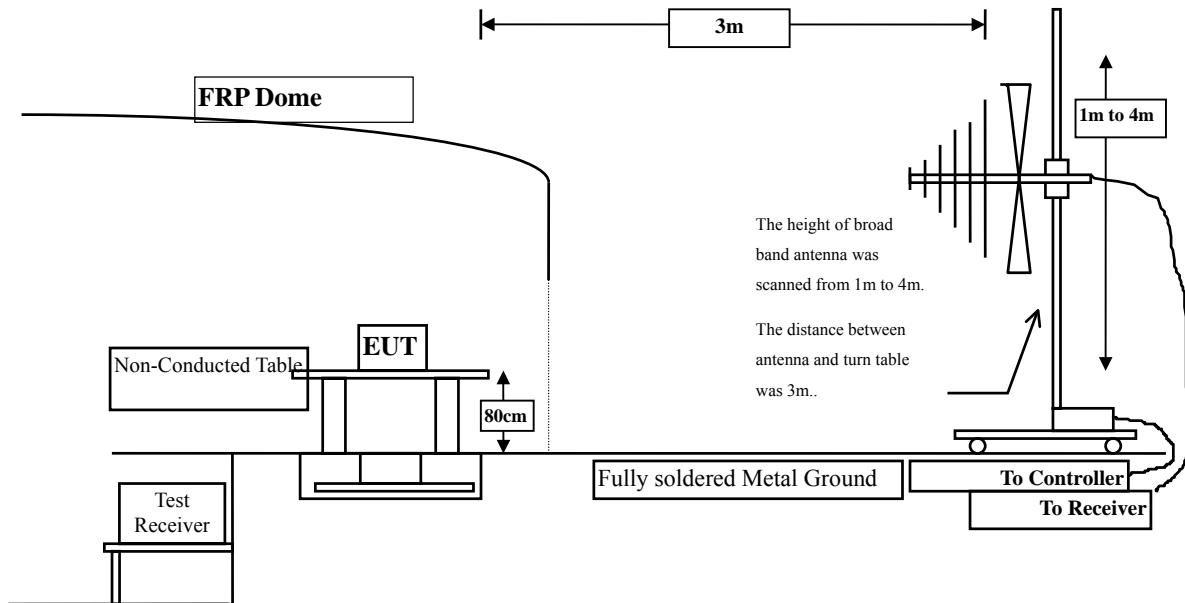
The following test equipment are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2011
	X Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2011
	X Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2011
	X Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2011
	X Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2011
	X Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2011
	X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2011
	X Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2011
	X Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2011
	X Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X Coaxial Switch	Anritsu	MP59B/6200265729	N/A

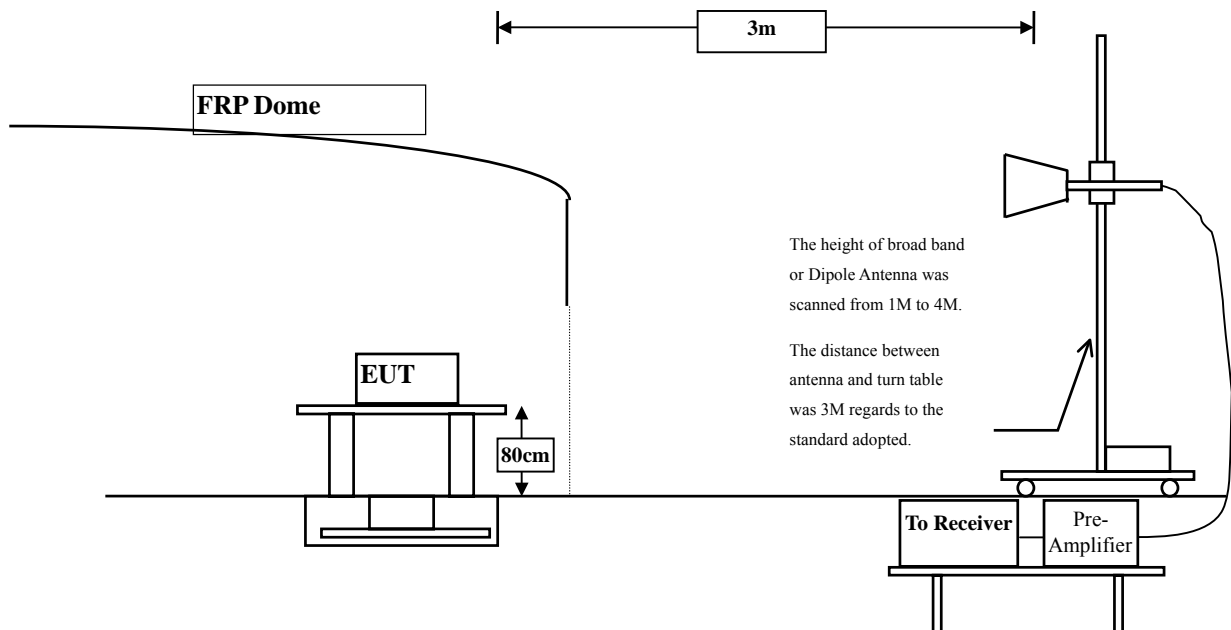
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range form 30MHz - 10th Harmonic of fundamental was investigated.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : WHDI Rx board
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW (5745 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
11490.000	17.106	35.550	52.657	-21.343	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
11490.000	18.034	36.370	54.405	-19.595	74.000
Average Detector:					
11490.000	18.034	24.110	42.145	-11.855	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WHDI Rx board
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW (5785 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBuV/m
	dB	dBuV	dBuV/m		

Horizontal

Peak Detector:

11570.000	16.809	35.370	52.179	-21.821	74.000
-----------	--------	--------	--------	---------	--------

Average Detector:

--

Vertical

Peak Detector:

11570.000	17.698	36.100	53.798	-20.202	74.000
-----------	--------	--------	--------	---------	--------

Average Detector:

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WHDI Rx board
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW (5825 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBuV/m
	dB	dBuV	dBuV/m		

Horizontal

Peak Detector:

11650.000	16.158	34.080	50.238	-23.762	74.000
-----------	--------	--------	--------	---------	--------

Average Detector:

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Vertical

Peak Detector:

11650.000	17.274	34.370	51.645	-22.355	74.000
-----------	--------	--------	--------	---------	--------

Average Detector:

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WHDI Rx board
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 40BW (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
11510.000	17.124	35.450	52.574	-21.426	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
11510.000	18.081	36.640	54.721	-19.279	74.000
Average Detector:					
11510.000	18.081	26.520	44.601	-9.399	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WHDI Rx board
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 40BW (5795 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBuV/m
	dB	dBuV	dBuV/m		

Horizontal

Peak Detector:

11590.000	16.701	34.790	51.490	-22.510	74.000
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Average Detector:

--

Vertical

Peak Detector:

11590.000	17.567	36.110	53.676	-20.324	74.000
-----------	--------	--------	--------	---------	--------

Average Detector:

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WHDI Rx board
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW (5785MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
148.340	-7.806	33.108	25.302	-18.198	43.500
295.780	-4.747	39.251	34.504	-11.496	46.000
445.160	-0.432	38.472	38.040	-7.960	46.000
594.540	3.555	33.855	37.410	-8.590	46.000
743.920	3.898	33.641	37.539	-8.461	46.000
891.360	6.265	35.126	41.391	-4.609	46.000
Vertical					
148.340	-5.406	33.108	27.702	-15.798	43.500
295.780	-4.687	31.651	26.964	-19.036	46.000
445.160	-6.402	37.272	30.870	-15.130	46.000
594.540	0.175	37.255	37.430	-8.570	46.000
743.920	0.718	33.041	33.759	-12.241	46.000
891.360	0.905	39.026	39.931	-6.069	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WHDI Rx board
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 40BW (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
148.340	-7.806	34.108	26.302	-17.198	43.500
295.780	-4.747	36.251	31.504	-14.496	46.000
445.160	-0.432	37.872	37.440	-8.560	46.000
594.540	3.555	36.255	39.810	-6.190	46.000
743.920	3.898	33.741	37.639	-8.361	46.000
891.360	6.265	34.726	40.991	-5.009	46.000
Vertical					
148.340	-5.406	34.108	28.702	-14.798	43.500
295.780	-4.687	34.751	30.064	-15.936	46.000
445.160	-6.402	44.572	38.170	-7.830	46.000
594.540	0.175	37.955	38.130	-7.870	46.000
743.920	0.718	34.341	35.059	-10.941	46.000
891.360	0.905	39.126	40.031	-5.969	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

5. RF antenna conducted test

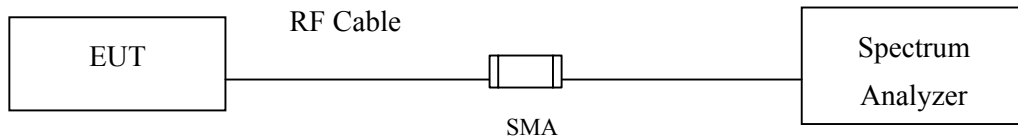
5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2011
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2011
	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2011

- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

5.2. Test Setup

RF antenna Conducted Measurement:



5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.4. Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

5.5. Uncertainty

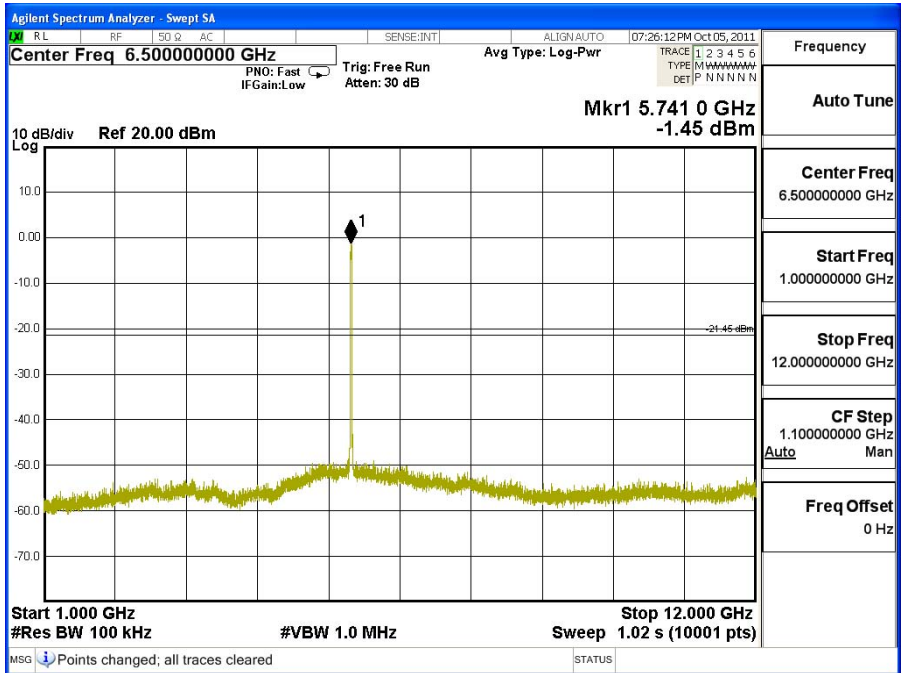
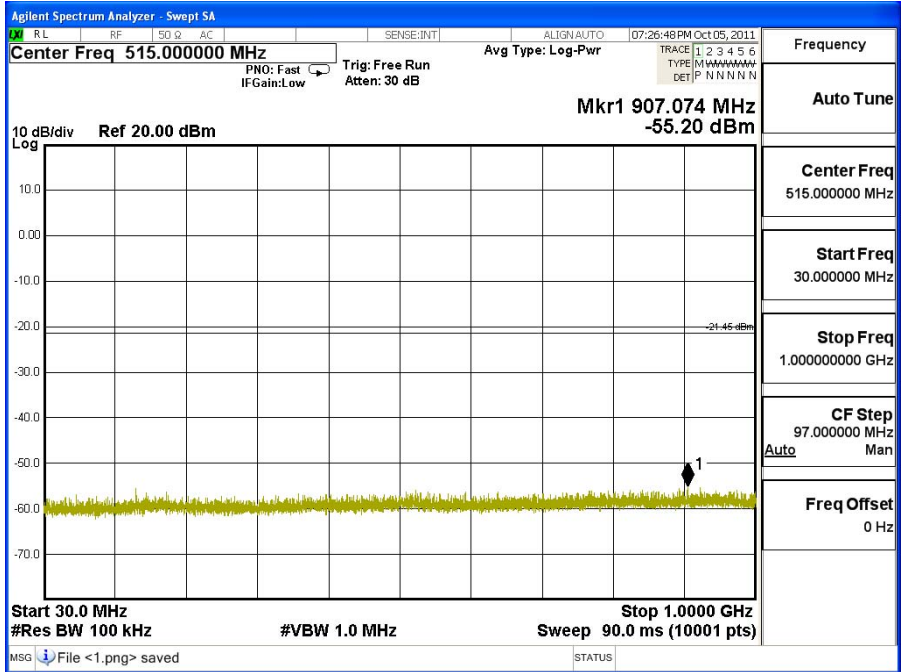
The measurement uncertainty

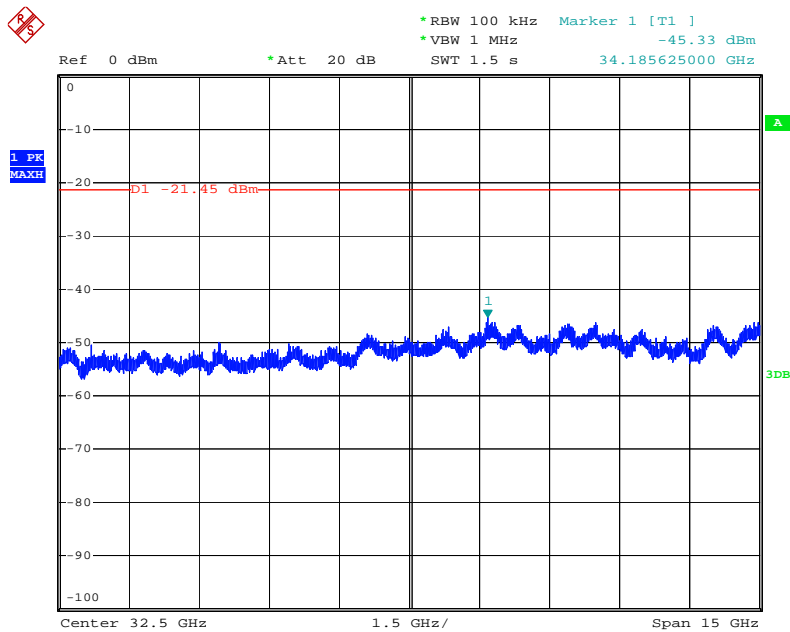
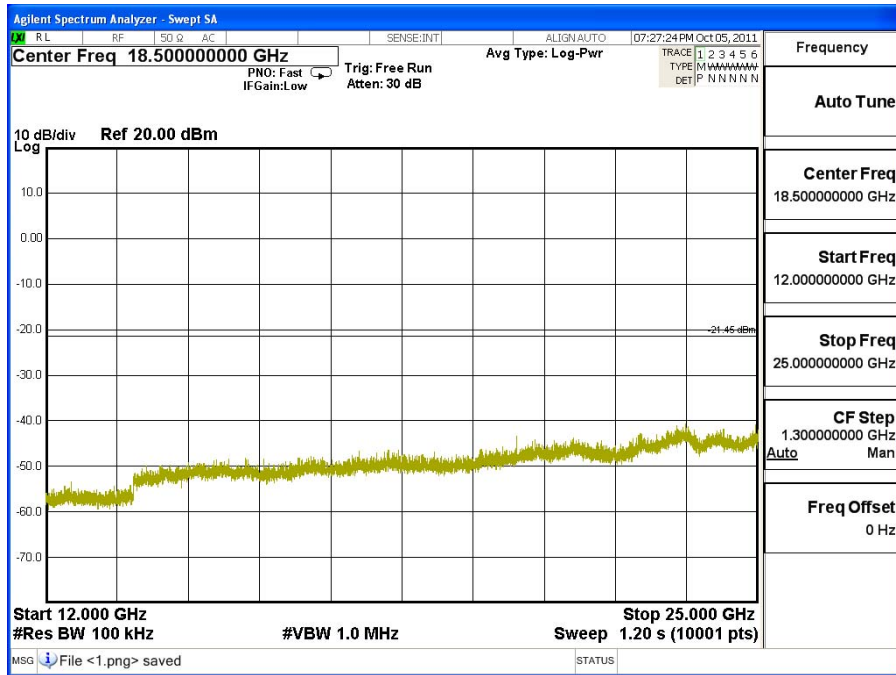
Conducted is defined as $\pm 1.27\text{dB}$

5.6. Test Result of RF antenna conducted test

Product : WHDI Rx board
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW

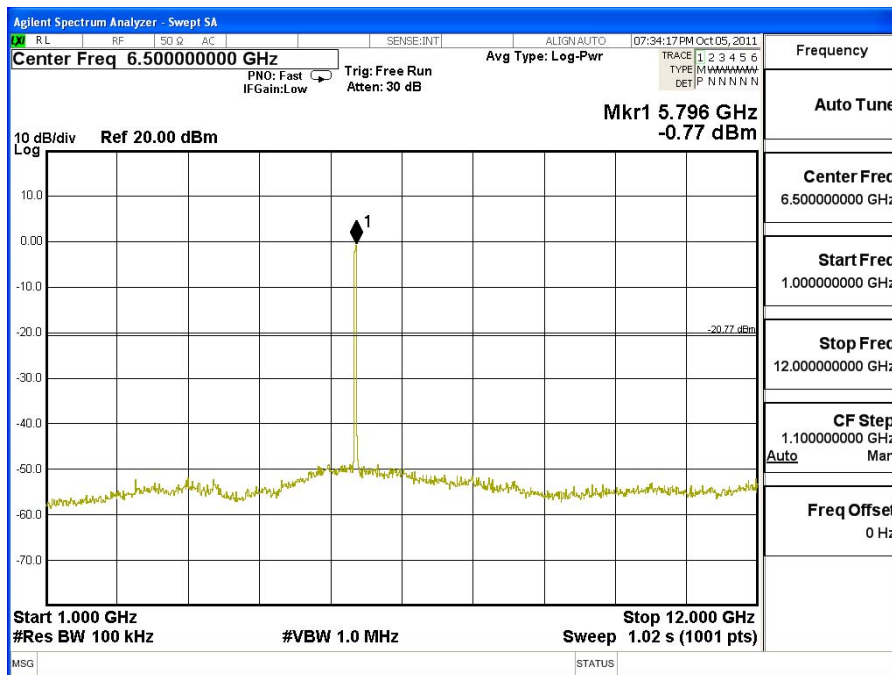
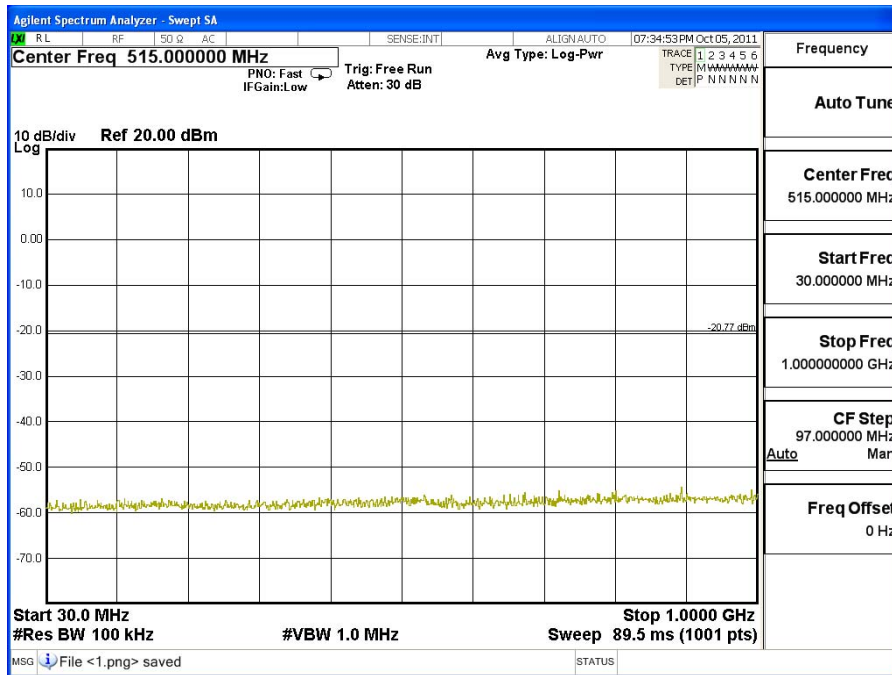
Channel 149 (5745MHz) 30MHz -40GHz

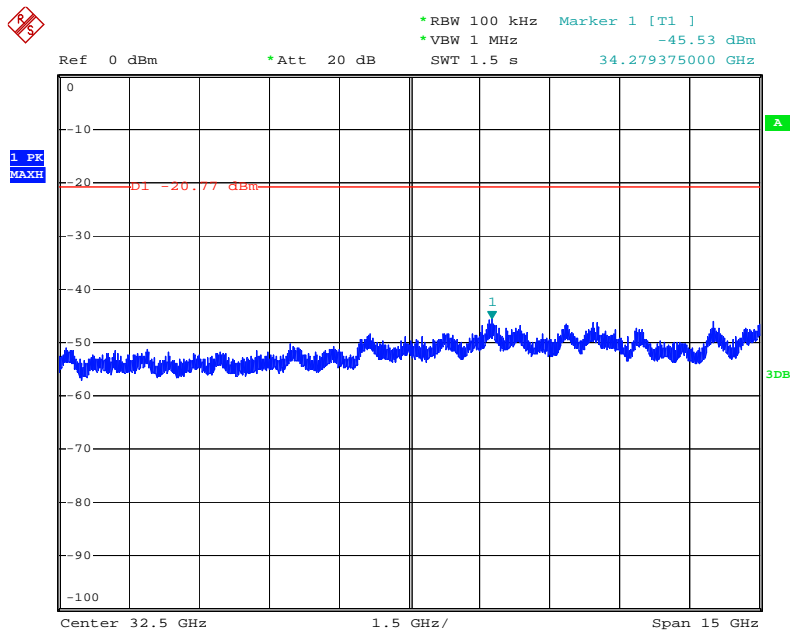
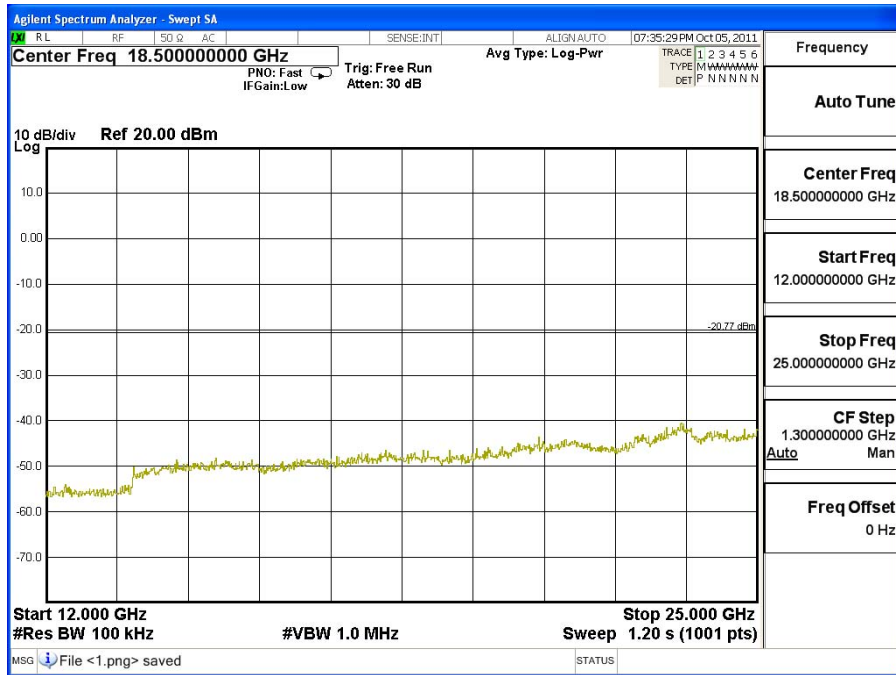




Date: 7.OCT.2011 16:28:24

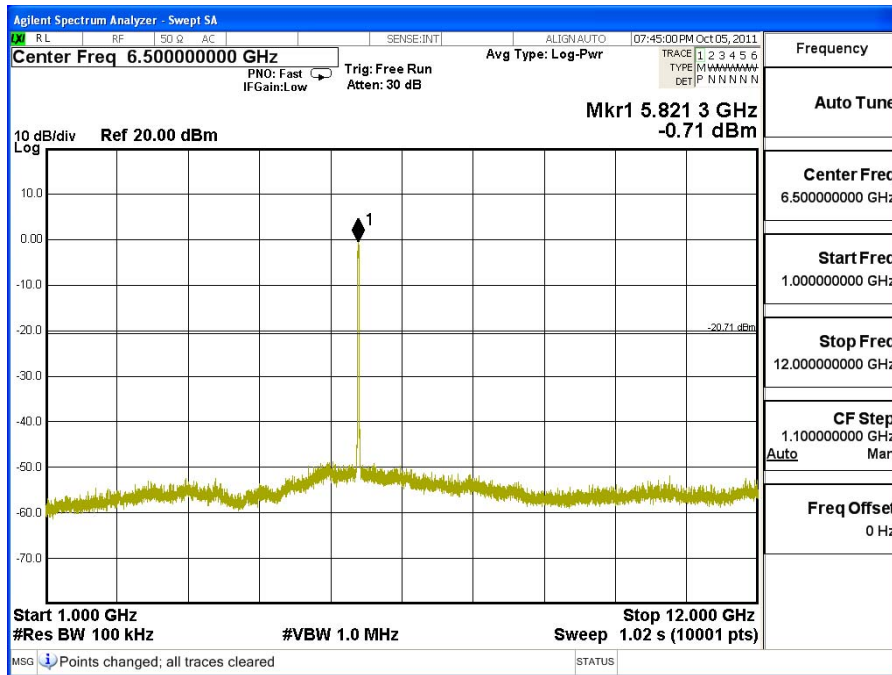
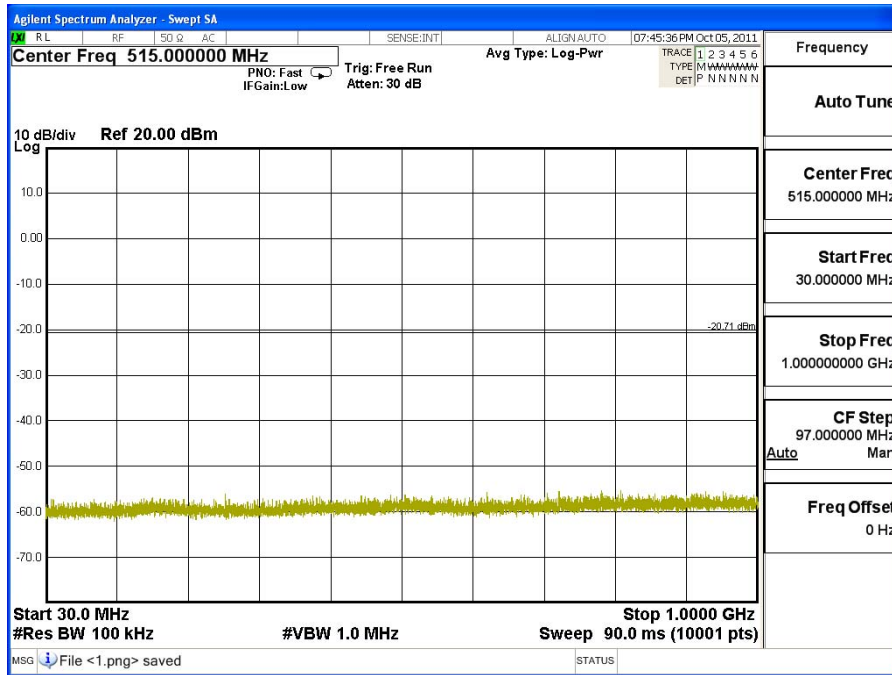
Channel 157 (5785MHz) 30MHz -40GHz

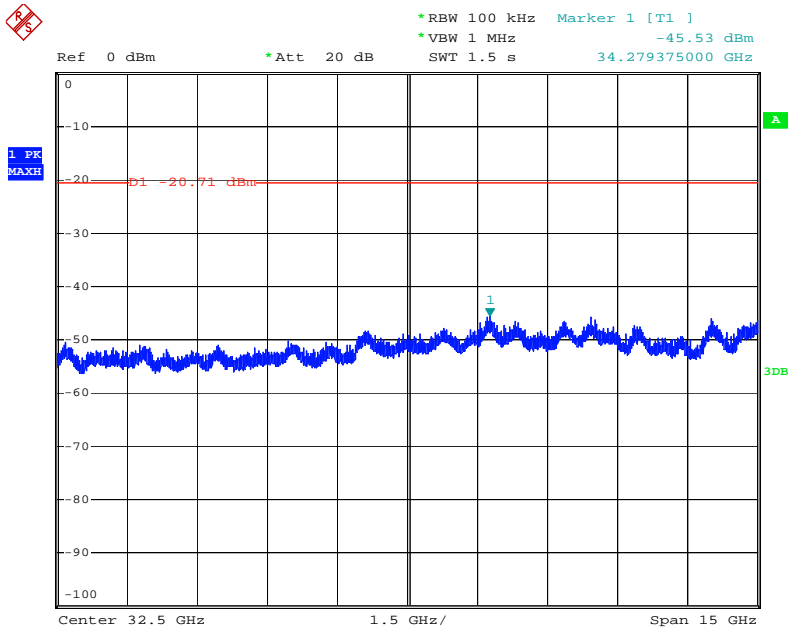
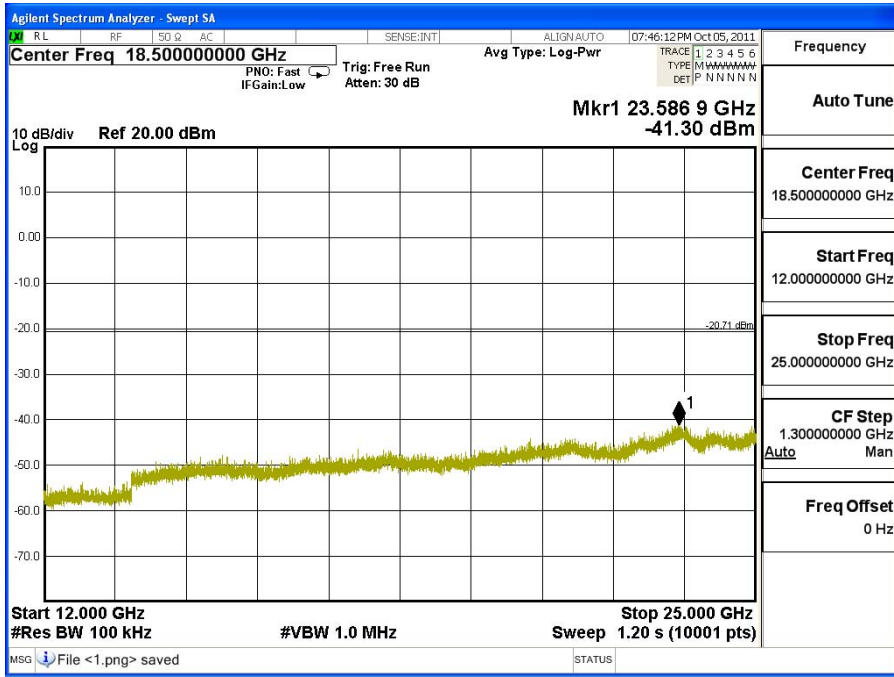




Date: 7.OCT.2011 16:31:10

Channel 165 (5825MHz) 30MHz -40GHz

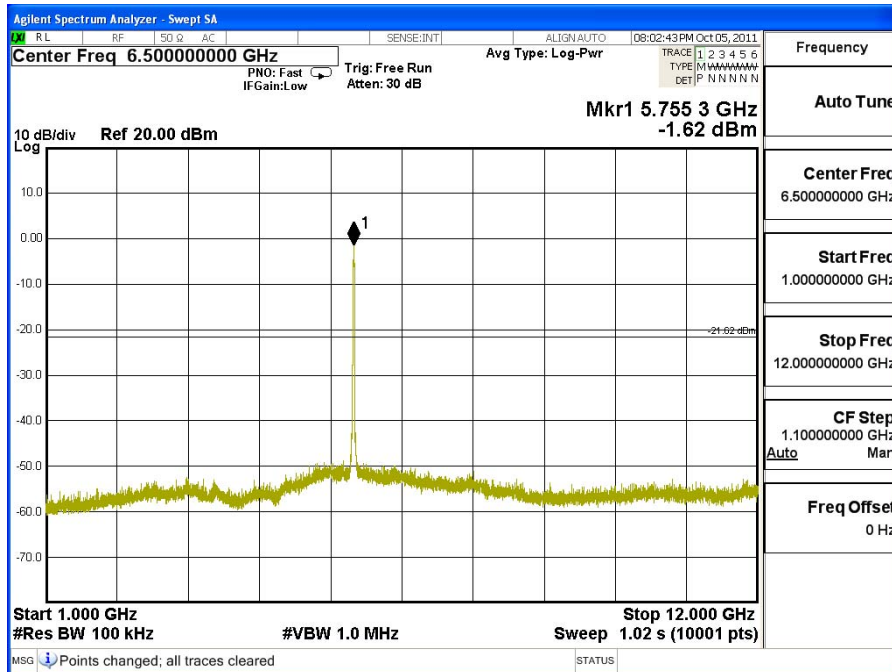
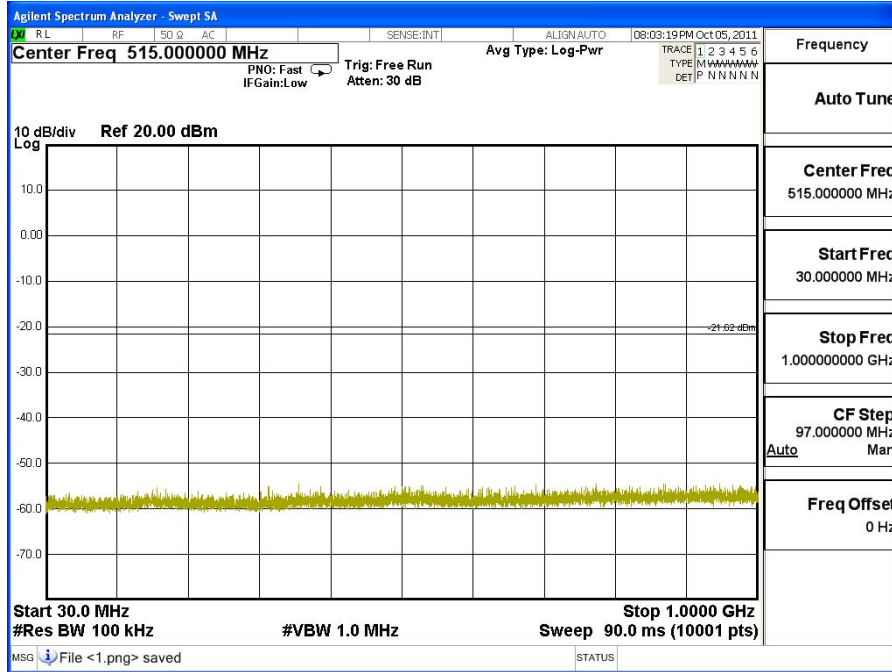


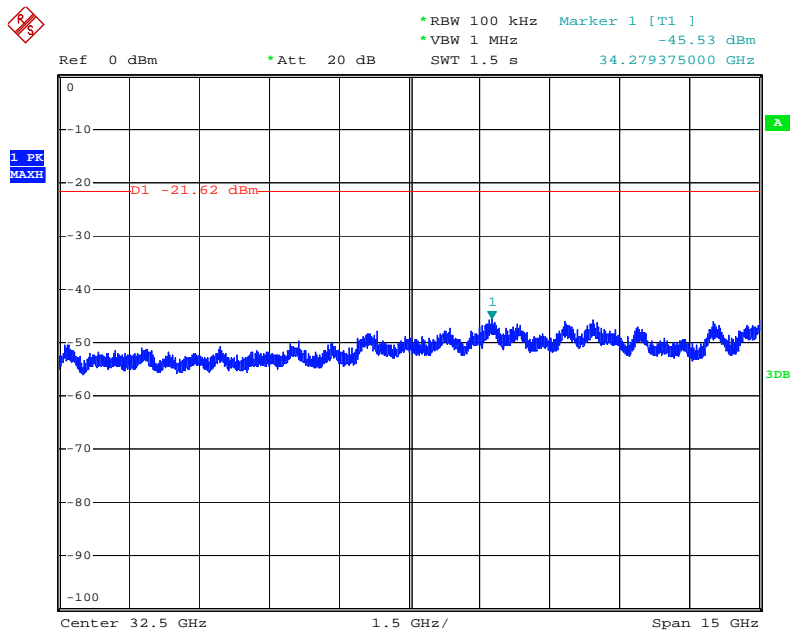
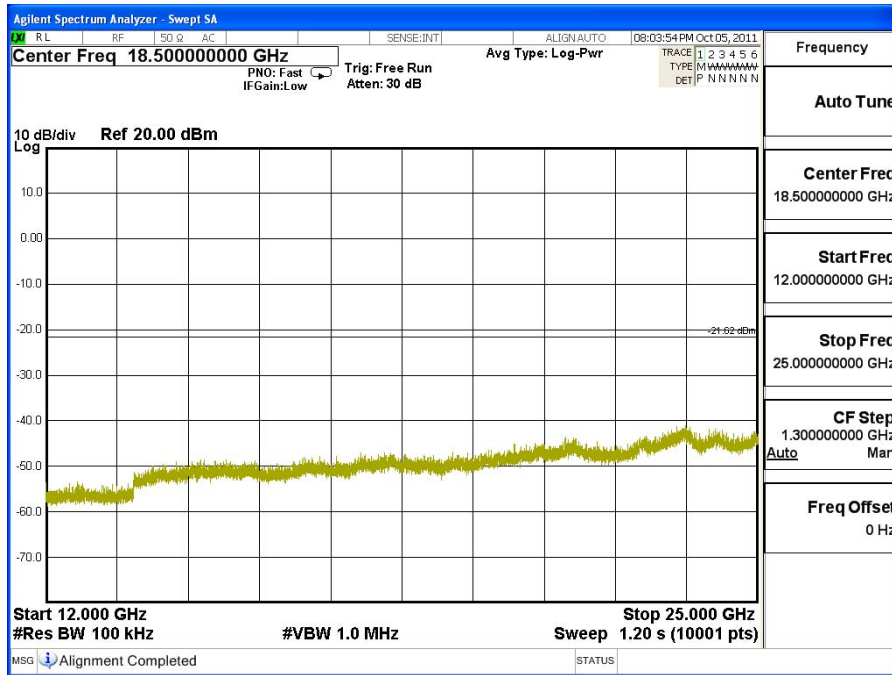


Date: 7.OCT.2011 16:32:04

Product : WHDI Rx board
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 40BW

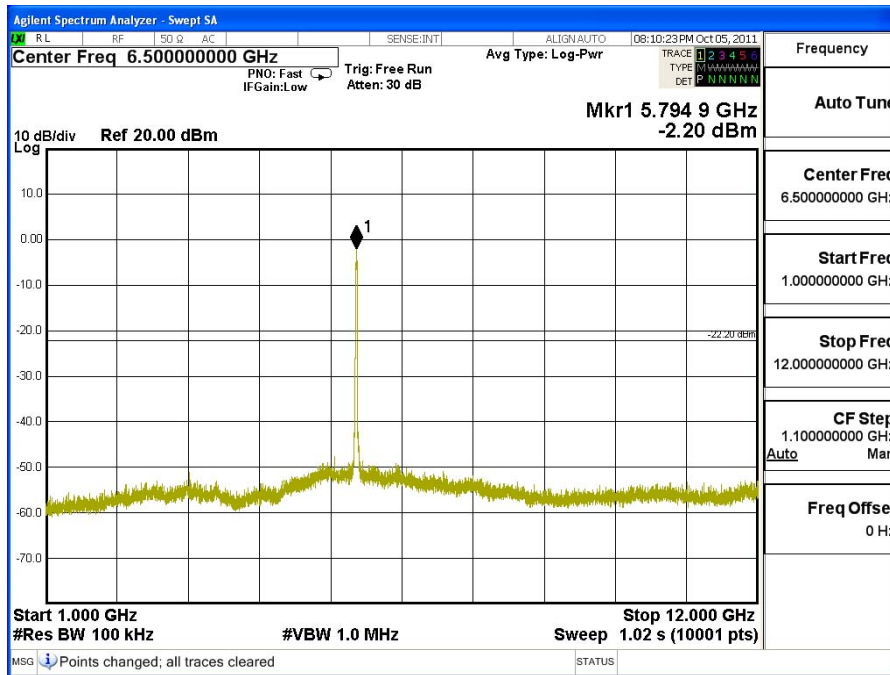
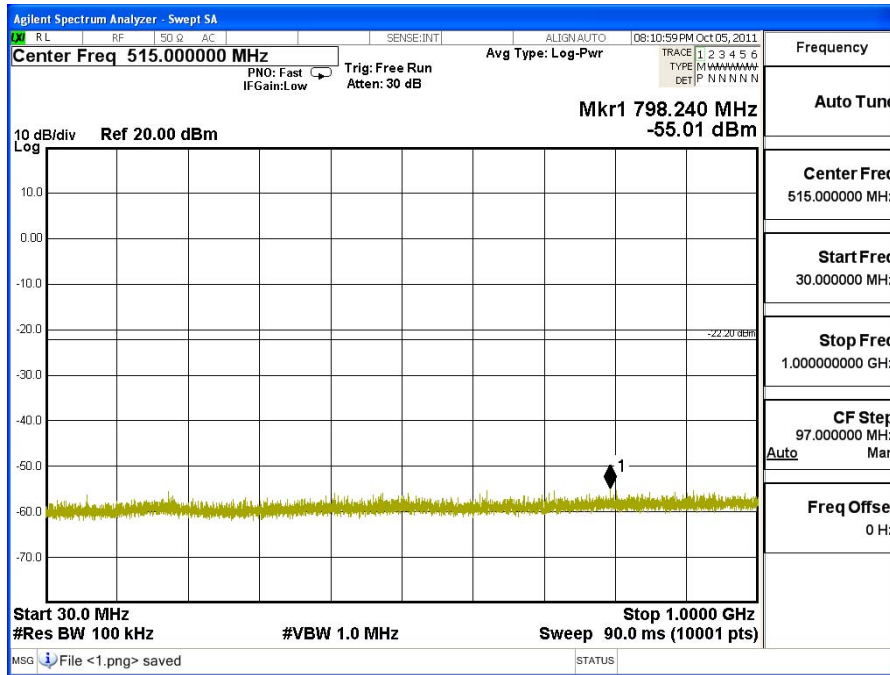
Channel 151 (5755MHz) 30MHz -40GHz

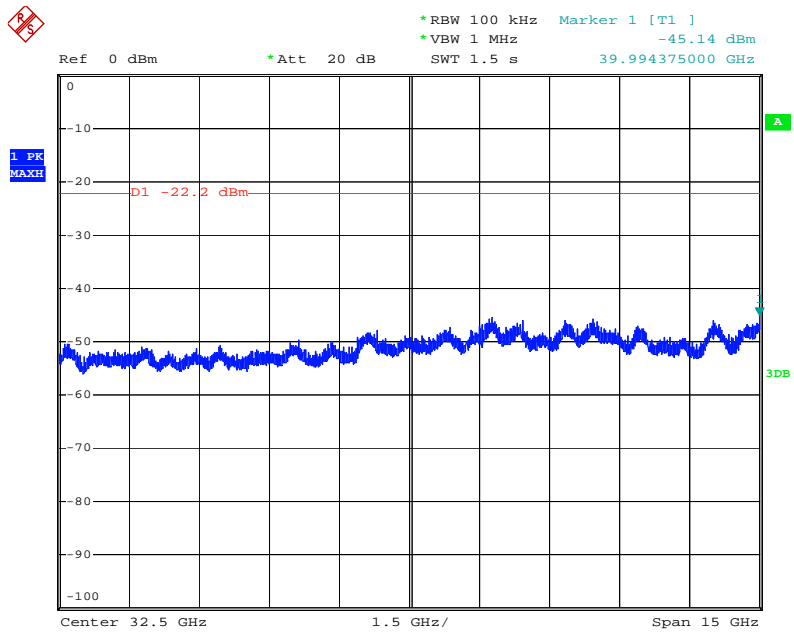
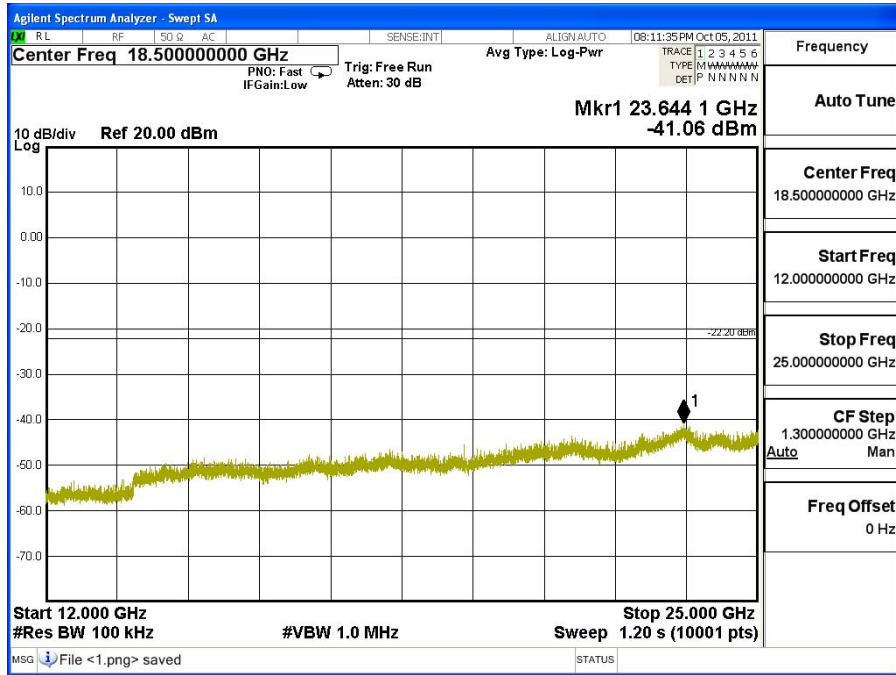




Date: 7.OCT.2011 16:33:52

Channel 159 (5795MHz) 30MHz -40GHz





Date: 7.OCT.2011 16:34:39

6. Band Edge

6.1. Test Equipment

RF Conducted Measurement

The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2011
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2011
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2011

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with "X" are used to measure the final test results.

RF Radiated Measurement:

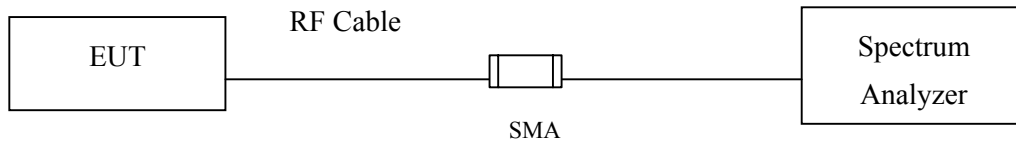
The following test equipments are used during the band edge tests:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2011
	X Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2011
	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2011
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2011
	X Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2011
	Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2011
	X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2011
	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2011
	X Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2011
	X Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X Coaxial Switch	Anritsu	MP59B/6200265729	N/A

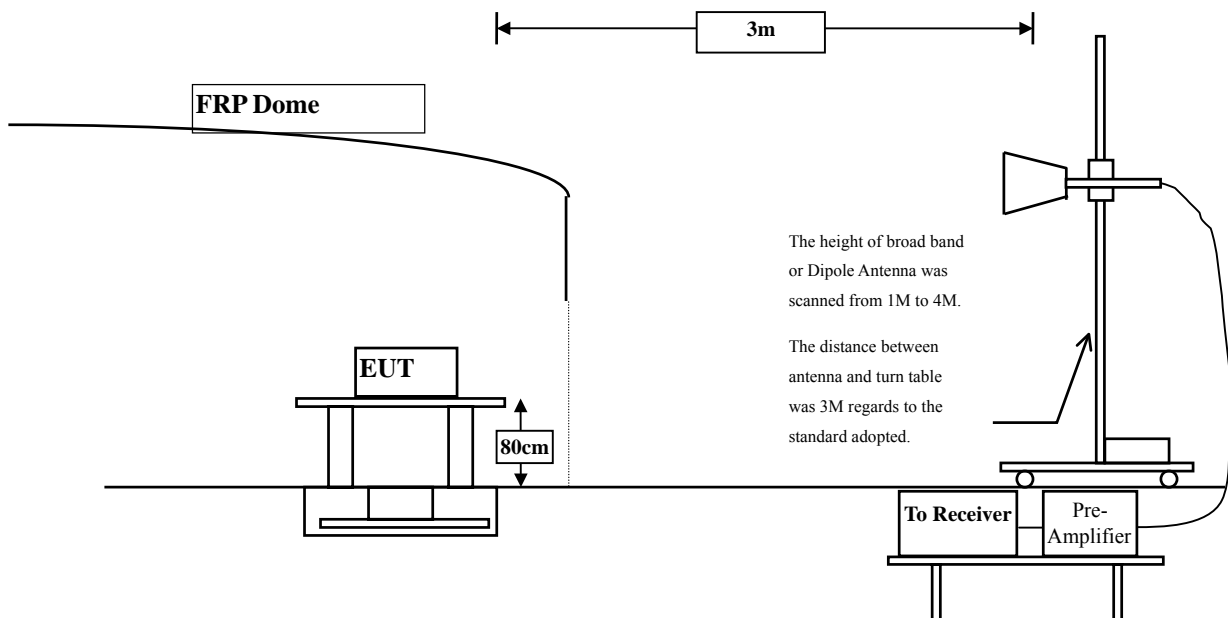
- Note:
1. All instruments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

6.2. Test Setup

RF Conducted Measurement



RF Radiated Measurement:



6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2009 on radiated measurement.

6.5. Uncertainty

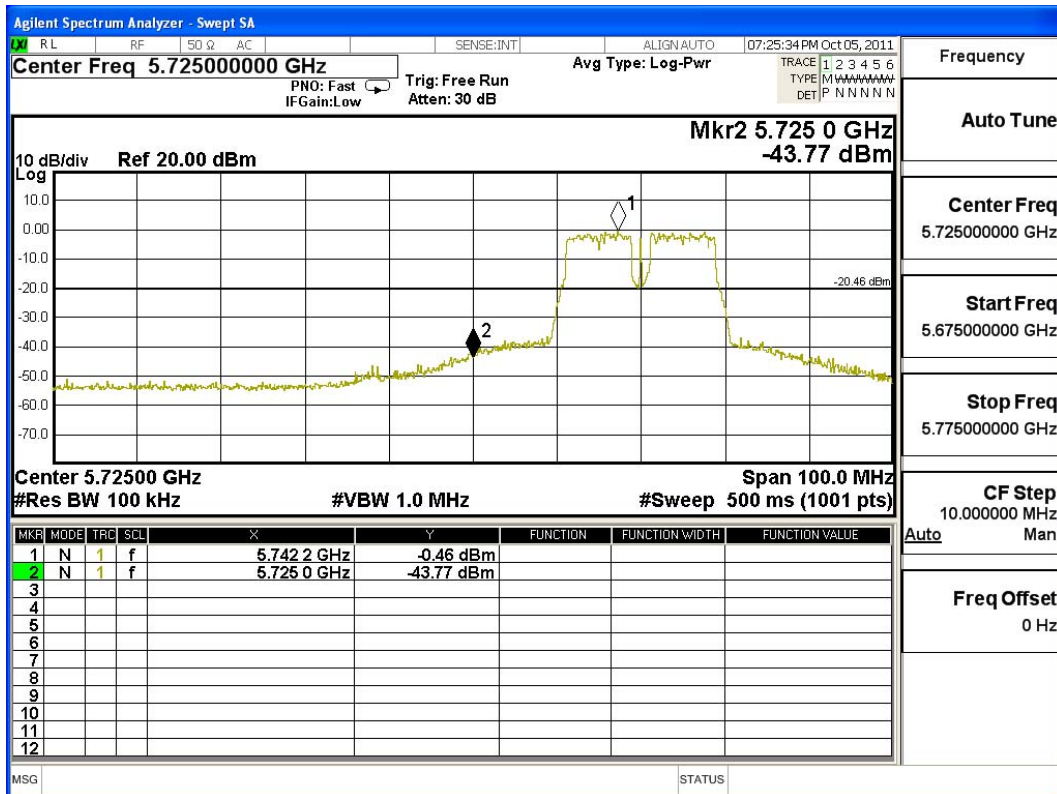
± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

6.6. Test Result of Band Edge

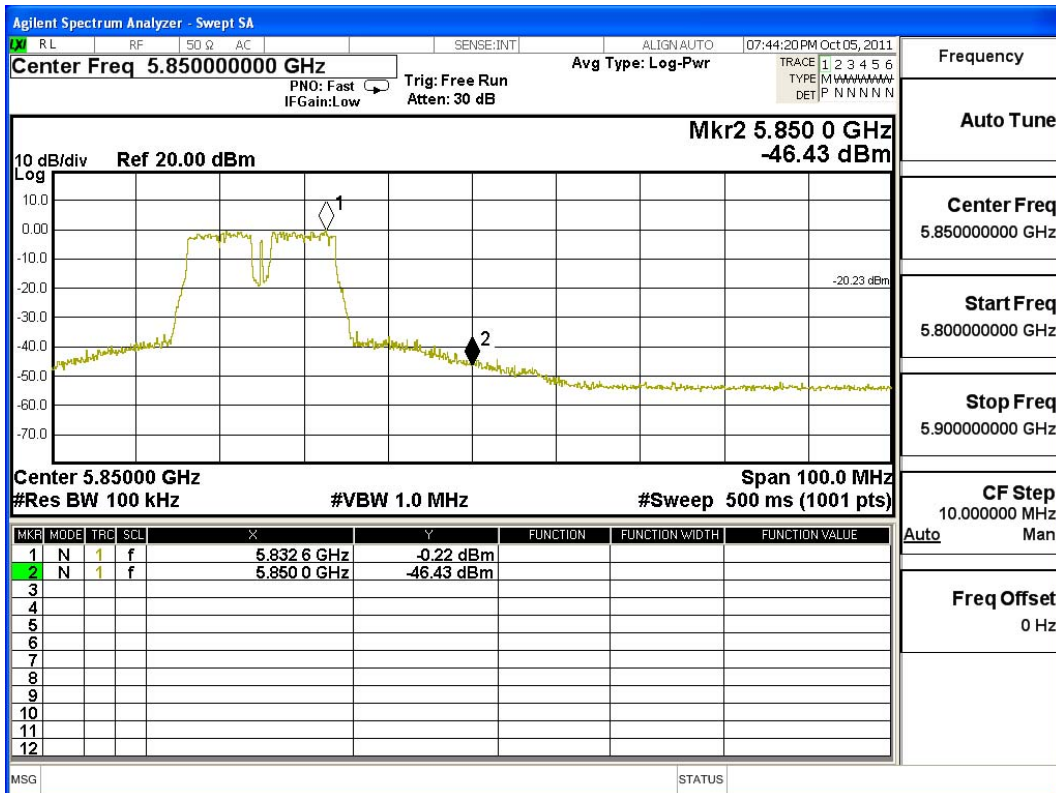
Product : WHDI Rx board
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5745	43.310	>20	PASS



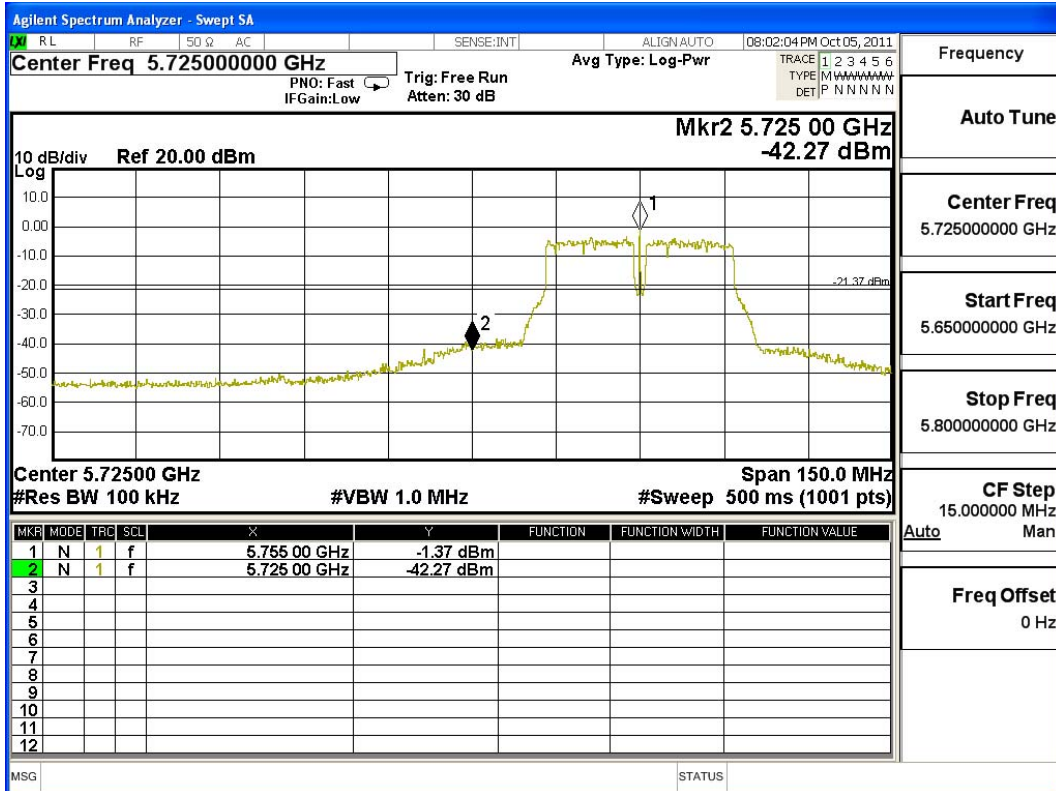
Product : WHDI Rx board
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5825	46.210	>20	PASS



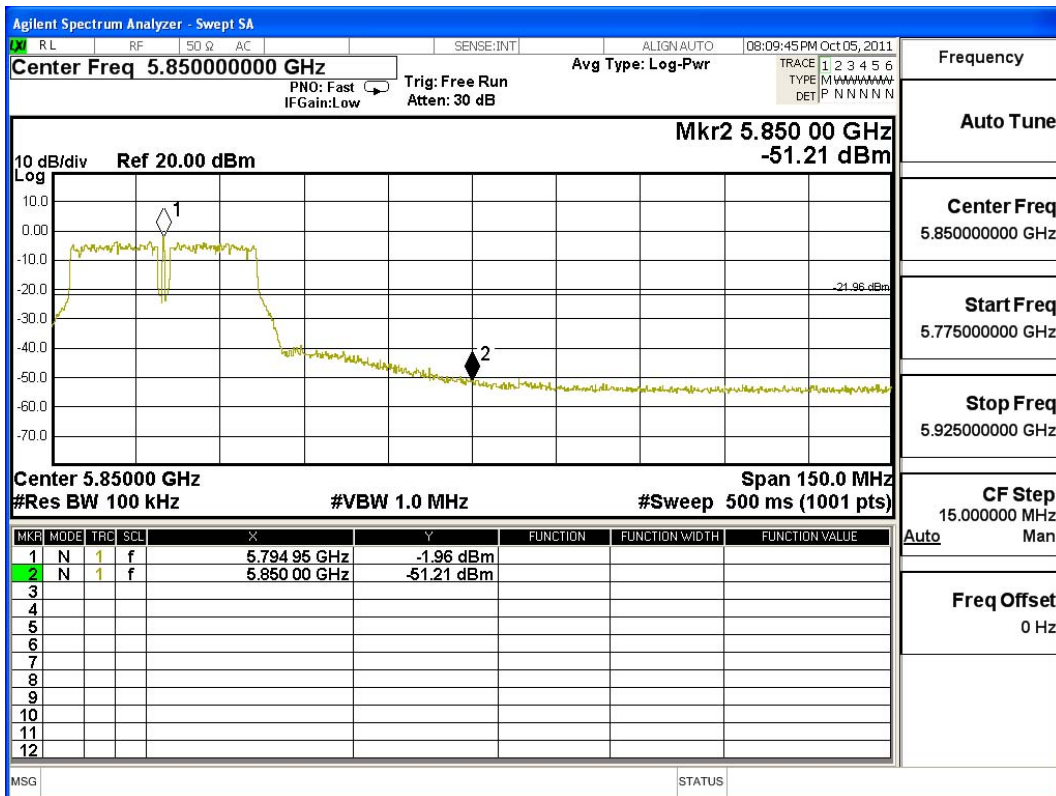
Product : WHDI Rx board
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 40BW

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5755	40.90	>20	PASS



Product : WHDI Rx board
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 40BW

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5795	49.250	>20	PASS



7. Occupied Bandwidth

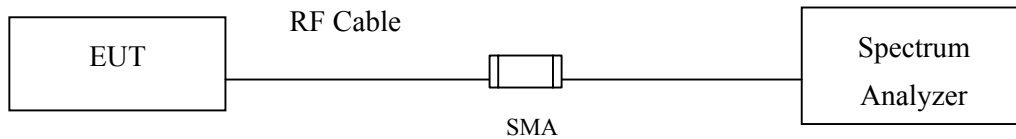
7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2011
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2011
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2011

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

7.2. Test Setup



7.3. Limits

The minimum bandwidth shall be at least 500 kHz.

7.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009; tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Span greater than RBW.

7.5. Uncertainty

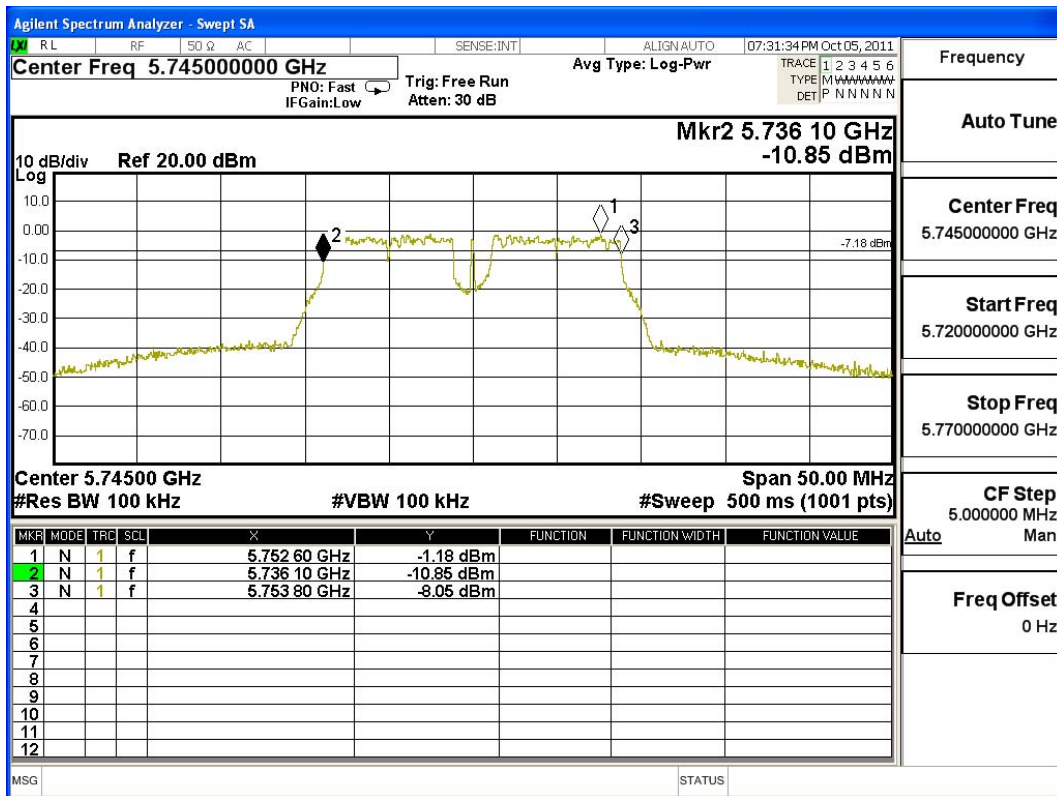
± 150Hz

7.6. Test Result of Occupied Bandwidth

Product : WHDI Rx board
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW (5745MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	17700	>500	Pass

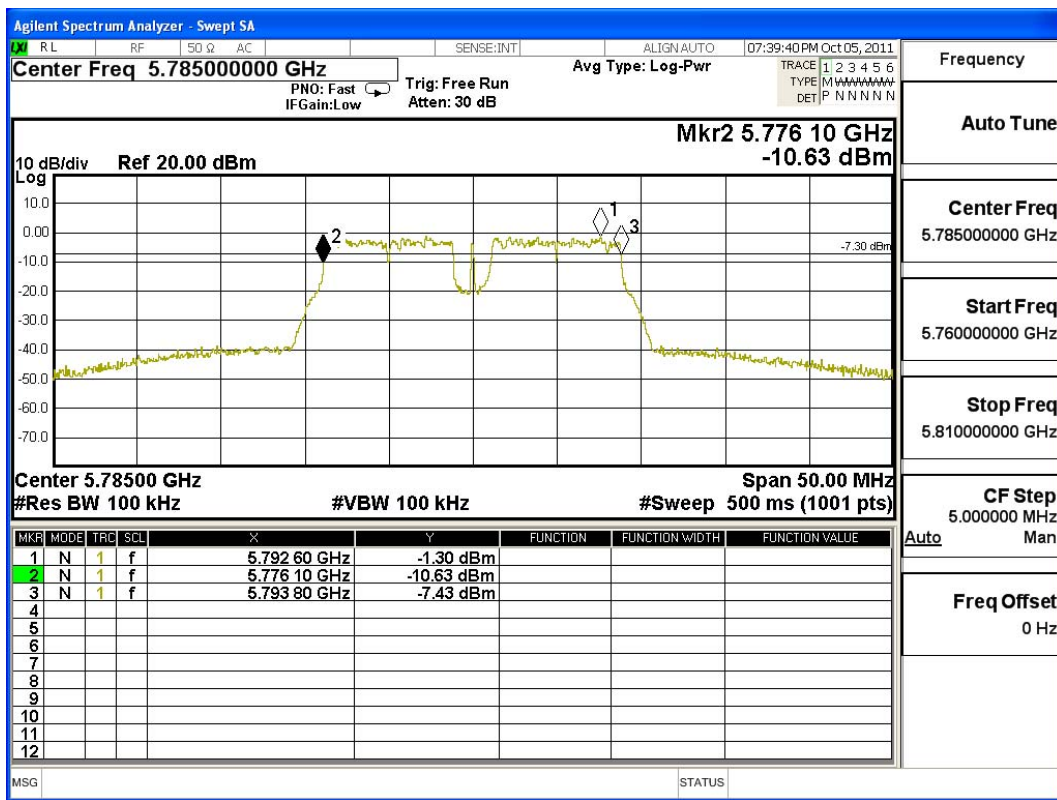
Figure Channel 149:



Product : WHDI Rx board
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW (5785MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	17700	>500	Pass

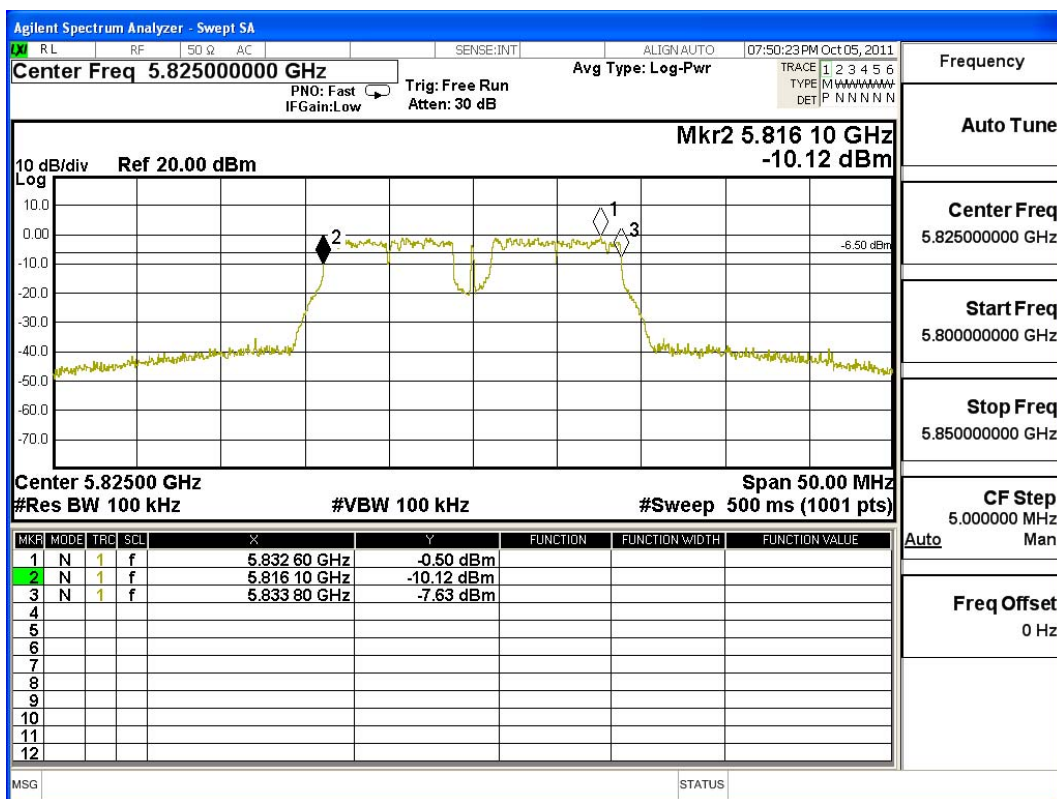
Figure Channel 157:



Product : WHDI Rx board
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW (5825MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	17700	>500	Pass

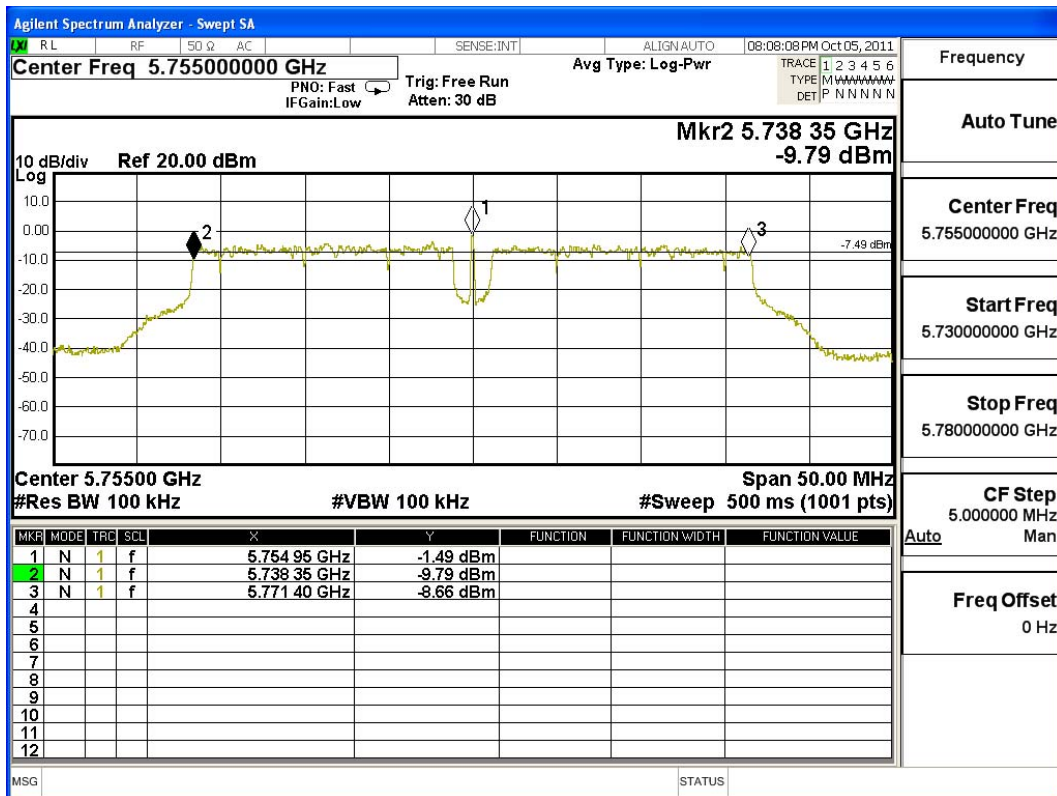
Figure Channel 165:



Product : WHDI Rx board
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 40BW (5755MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755.00	33050	>500	Pass

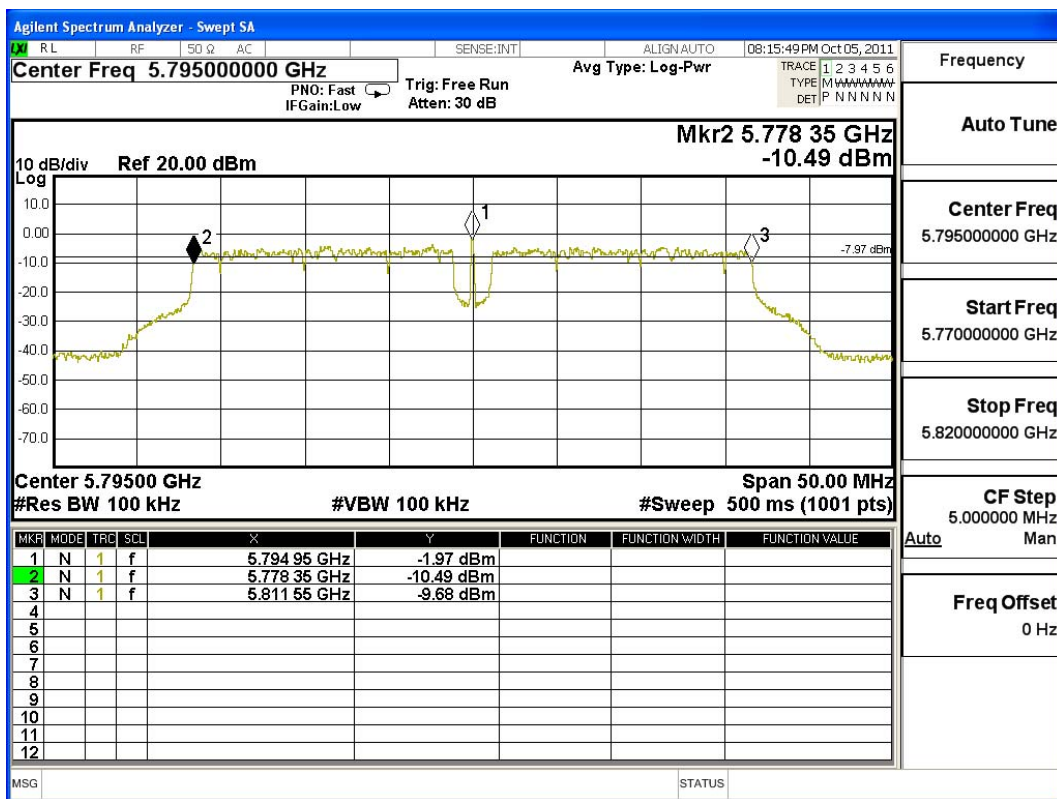
Figure Channel 151:



Product : WHDI Rx board
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 40BW (5795MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
159	5795.00	33200	>500	Pass

Figure Channel 159:



8. Power Density

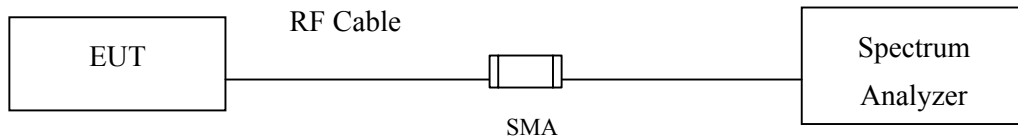
8.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2011
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2011
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2011

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

8.2. Test Setup



8.3. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009; tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW= 3 kHz, VBW=10KHz, Sweep time=(SPAN/3KHz), detector=Peak detector

8.5. Uncertainty

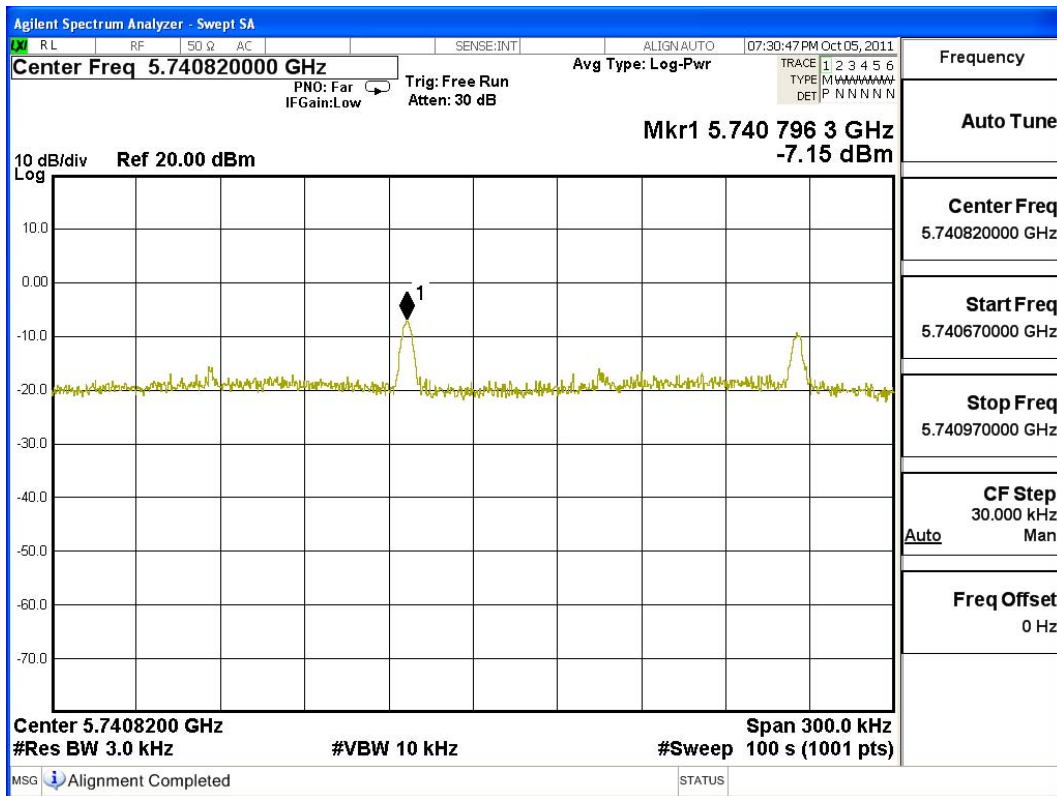
± 1.27 dB

8.6. Test Result of Power Density

Product : WHDI Rx board
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW (5745MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
149	5745.00	-7.15	< 8dBm	Pass

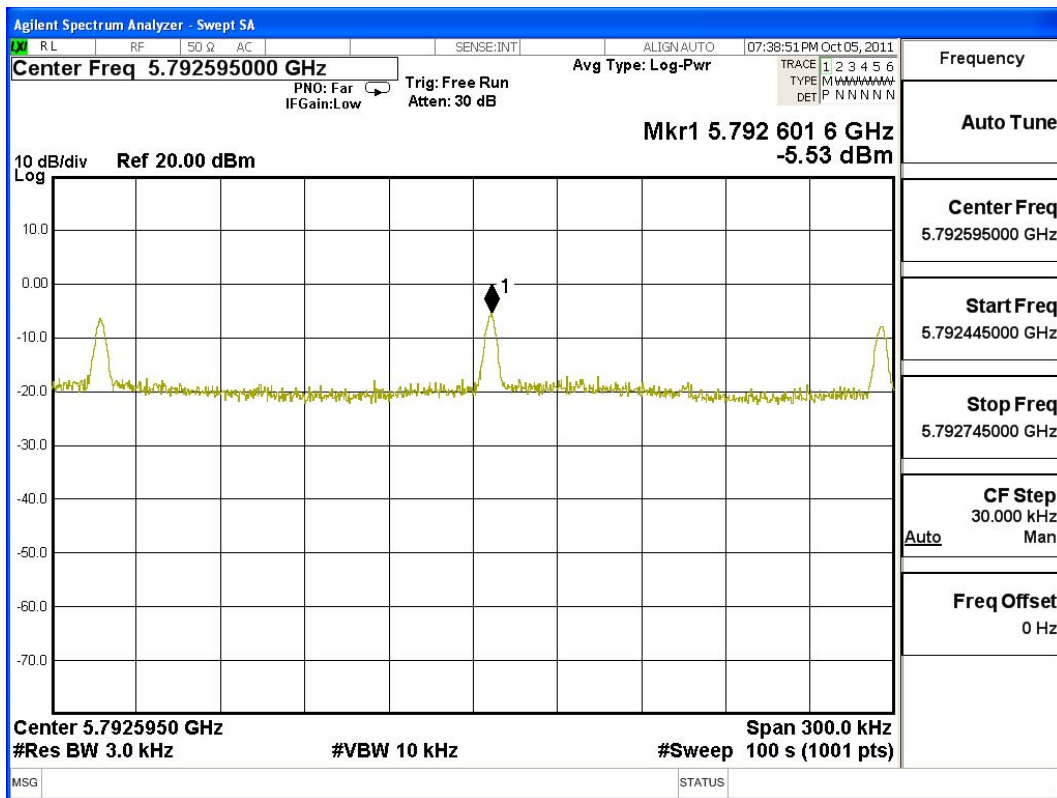
Figure Channel 149:



Product : WHDI Rx board
 Test Item : Power Density Data
 Test Site : No.3OATS
 Test Mode : Mode 1: Transmit - 20BW (5785MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
157	5785.000	-5.53	< 8dBm	Pass

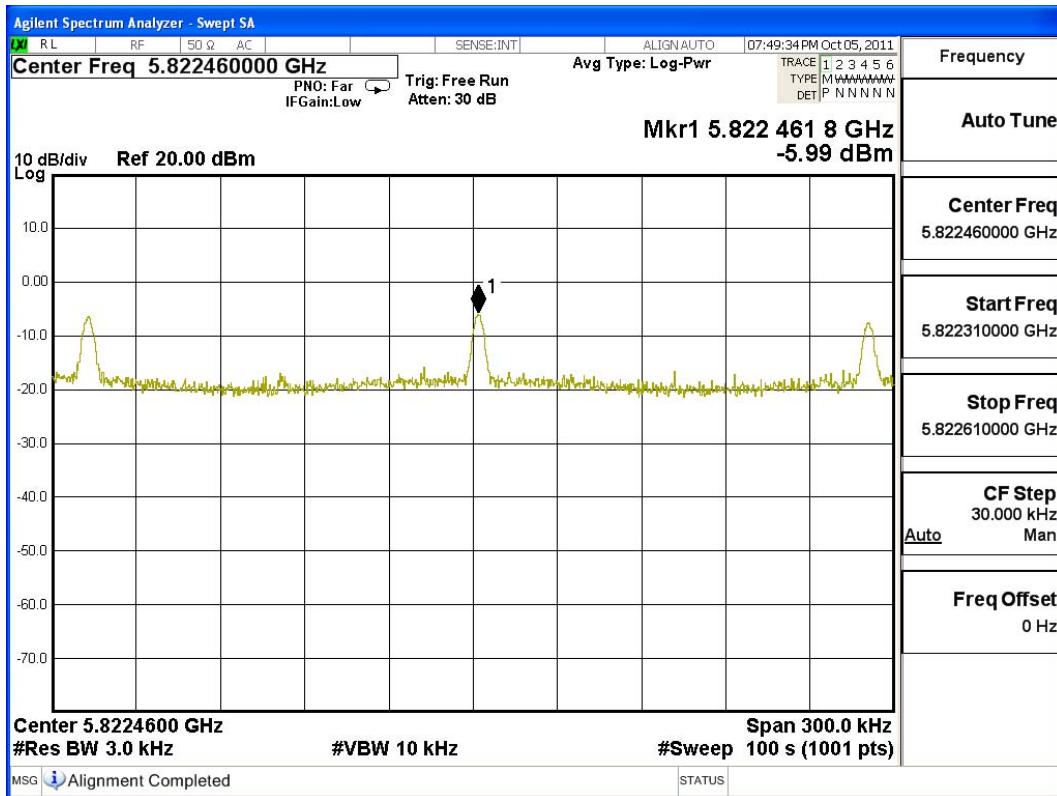
Figure Channel 157:



Product : WHDI Rx board
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 20BW (5825MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
165	5825.00	-5.99	< 8dBm	Pass

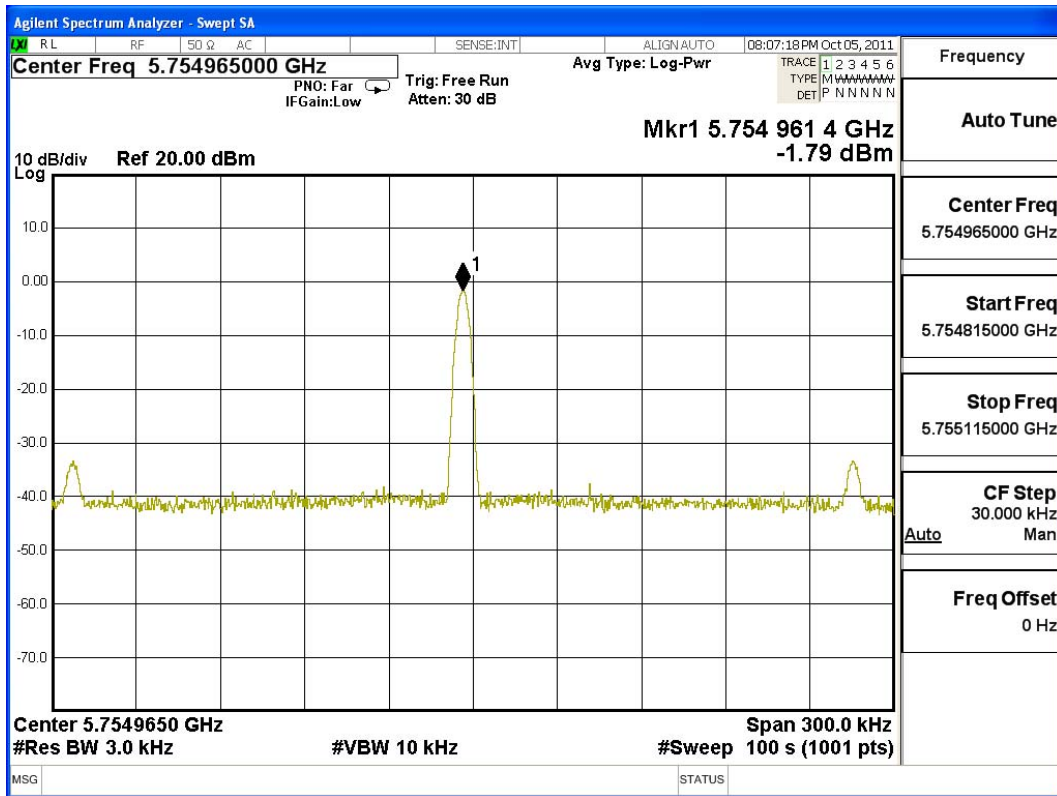
Figure Channel 165:



Product : WHDI Rx board
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 40BW (5755MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
151	5755.00	-1.79	< 8dBm	Pass

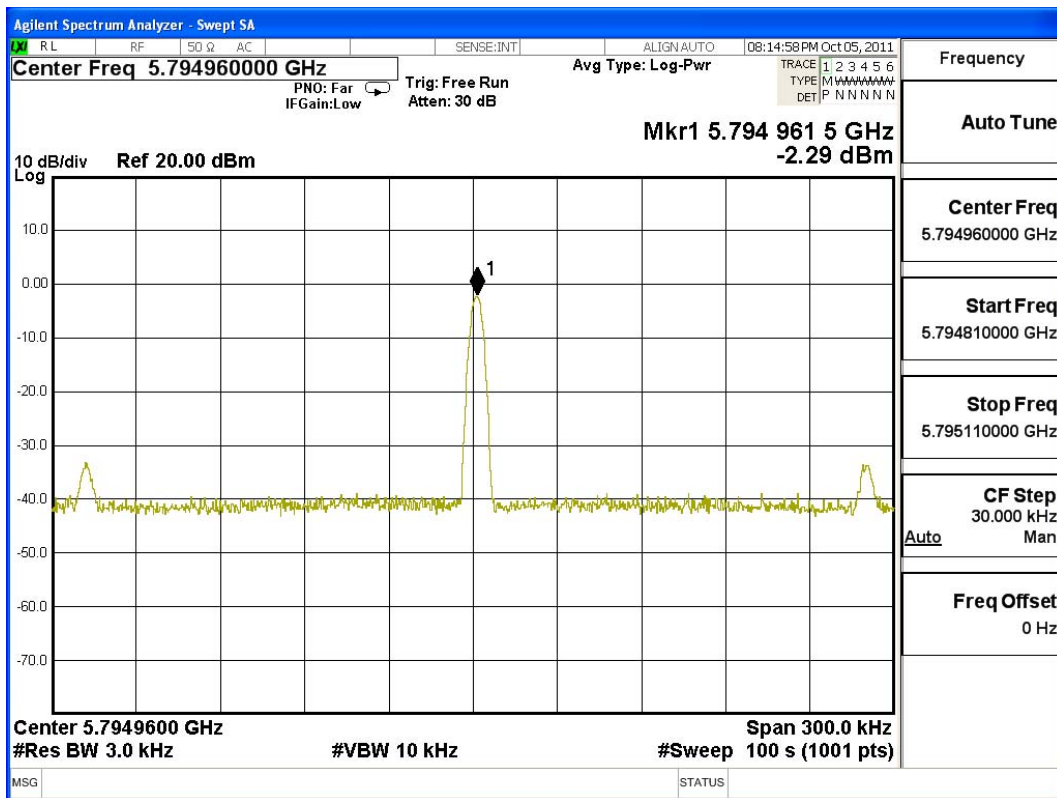
Figure Channel 151:



Product : WHDI Rx board
 Test Item : Power Density Data
 Test Site : No.3OATS
 Test Mode : Mode 2: Transmit - 40BW (5795MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
159	5795.000	-2.29	< 8dBm	Pass

Figure Channel 159:



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.