

Test Report

(Class II Permissive Change)

Product Name	WHDI Tx Stick
Model No	WV400A
FCC ID	PPQ-WV400A

Applicant	t LITE-ON Technology Corp.		
Address	4F, No.90, Chien 1 Rd., Chung-Ho, Taipei Hsien, Taiwan 235		

Date of Receipt	Dec. 21, 2011
Issued Date	Dec. 29, 2011
Report No.	11C384R-RFUSP32V01
Report Version	V1.0



The test results relate only to the samples tested.

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Test Report Certification

Issued Date: Dec. 29, 2011 Report No.: 11C384R-RFUSP32V01



Product Name	WHDI Tx Stick		
Applicant	LITE-ON Technology Corp.		
Address	4F, No.90, Chien 1 Rd., Chung-Ho, Taipei Hsien, Taiwan 235		
Manufacturer	DONG GUAN G-COM COMPUTER CO., LTD.		
Model No.	WV400A		
FCC ID.	PPQ-WV400A		
EUT Rated Voltage	DC 5V (Power by USB)		
EUT Test Voltage	AC 120V/60Hz		
Trade Name	LITE-ON		
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E: 2010		
	ANSI C63.4: 2009, FCC KDB-789033		
Test Result	Complied		

The Test Results relate only to the samples tested.

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(Manager / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	WHDI Tx Stick	
Trade Name	LITE-ON	
FCC ID.	PPQ-WV400A	
Model No.	WV400A	
Frequency Range	20MHz-BW: 5180-5240MHz; 40MHz-BW: 5190-5230MHz	
Number of Channels	20MHz-BW: 4; 40MHz-BW: 2	
Data Speed	20MHz mode: 31.5Mbps, 40MHz mode: 63Mbps	
Channel Control	Auto	
Type of Modulation	OFDM	
Antenna type	Chip Antenna	
Antenna Gain	Refer to the table "Antenna List"	

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	Walsin	RFECA3216060K1T	2.86dBi 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 36:	5180 MHz	Channel 40:	5200 MHz	Channel 44:	5220 MHz	Channel 48:	5240 MHz

40MHz Center Working Frequency of Each Channel:ChannelFrequencyChannel 38:5190 MHzChannel 46:5230 MHz

Note:

- 1. This device is a WHDI Tx Stick with a built-in and 5GHz transceiver.
- 2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
- 3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.
- 4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
- 5. This is to request a Class II permissive change for FCC ID: PPQ-WV400A, originally granted on 11/23/2011.

The major change filed under this application is:

Change #1: Addition new antenna, antenna gain: 2.86dBi.

Change #2: Modify the match circuit between amplifier to antenna. Others circuit and layout are identical with original granted.

1.3. Tested System Datails

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	РРТ	N/A	Non-Shielded, 0.8m

Signal Cable Type		Signal cable Description	
A USB Cable (STD-A to Micxo-B)		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

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 : <u>http://www.quietek.com/tw/ctg/cts/accreditations.htm</u>

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 : <u>service@quietek.com</u>

FCC Accreditation Number: TW1014

2. Conducted Emission

2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
Х	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2011	
Х	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2011	Peripherals
Х	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2011	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2011	EUT
Х	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2011	
	No.1 Shielded Room				

Note:

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

2.2. Test Setup



2.3. Limits

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

Remarks : In the above table, the tighter limit applies at the band edges.

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.

The EUT was setup to ANSI C63.4, 2009; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product	:	WHDI Tx Stick
Test Item	:	Conducted Emission Test
Power Line	:	Line 1
Test Mode	:	Mode 2: Transmit - 40BW (5190MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 1					
Quasi-Peak					
0.166	9.724	41.320	51.044	-14.499	65.543
0.263	9.662	29.820	39.482	-23.289	62.771
0.373	9.650	31.160	40.810	-18.819	59.629
0.736	9.661	37.080	46.742	-9.258	56.000
2.767	9.704	11.460	21.164	-34.836	56.000
7.107	9.756	10.080	19.836	-40.164	60.000
Average					
0.166	9.724	24.870	34.594	-20.949	55.543
0.263	9.662	14.110	23.772	-28.999	52.771
0.373	9.650	10.460	20.110	-29.519	49.629
0.736	9.661	27.860	37.522	-8.478	46.000
2.767	9.704	5.450	15.154	-30.846	46.000
7.107	9.756	4.280	14.036	-35.964	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 Tx Stick							
Test Item	: Conducted Emission Test							
Power Line	: Line 2							
Test Mode	: Mode 2	: Transmit - 40BW	7 (5190MHz)					
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV	dB	dBuV			
LINE 2								
Quasi-Peak								
0.162	9.727	39.120	48.847	-16.810	65.657			
0.209	9.692	34.960	44.651	-19.663	64.314			
0.341	9.650	29.120	38.770	-21.773	60.543			
0.502	9.650	25.280	34.930	-21.070	56.000			
0.685	9.650	35.900	45.550	-10.450	56.000			
6.287	9.754	7.060	16.814	-43.186	60.000			
Average								
0.162	9.727	25.640	35.367	-20.290	55.657			
0.209	9.692	16.800	26.491	-27.823	54.314			
0.341	9.650	13.300	22.950	-27.593	50.543			
0.502	9.650	13.450	23.100	-22.900	46.000			
0.685	9.650	27.390	37.040	-8.960	46.000			
6.287	9.754	0.200	9.954	-40.046	50.000			

- 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 Transmit Power

3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Х	Power Meter	Anritsu	ML2495A/6K00003357	May, 2011
Х	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2011
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2011
Ъ Т /				

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

26dBc Occupied Bandwidth



Conduction Power Measurement



3.3. Limits

- (1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (2) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (3) For the band 5.725-5.825 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 1W or 17 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

3.4. Test Procedur

As an alternative to FCC KDB-789033, the EUT peak power was measured with a peak power meter employing a video bandwidth greater than 6dB BW of the emission under test. Peak output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Transmit Power

Product	:	WHDI Tx Stick
Test Item	:	Peak Transmit Power
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 20BW

Peak Transmit Power Measurement: (CHAIN A+B)

Channel Number	Frequency	26dB Bandwidth	Chain A Power	Chain B Power	Chain A+B Power	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)
36	5180	19.450	1.21	-0.09	3.62	17	16.89
44	5220	19.400	1.18	-1.56	3.03	17	16.88
48	5240	19.550	0.00	-0.14	2.94	17	16.91

Note:

- 1. Power Output Value =Reading value on peak power meter + cable loss
- 2. Output Power (dBm) = 10*LOG (Chain A Power (mW)+ Chain B Power (mW))
- 3. 26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

26dBc Occupied Bandwidth:

Channel 36 - Chain A

Agilent Spectrum Analyzer - Swept SA				
Center Freg 5.180000000 GHz	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	04:34:04 PMDec 29, 2011 TRACE 1 2 3 4 5 6	Frequency
IFGain:Low	Auto Tune			
Log 0.00 -10.0 -20.0	metril mono	angered l		Center Freq 5.180000000 GHz
-30.0 -40.0 -50.0		White day	-29.08 dBm	Start Freq 5.155000000 GHz
-80.0				Stop Freq 5.205000000 GHz
Center 5.18000 GHz #Res BW 300 kHz #VI	BW 1.0 MHz	#Sweep 5	Span 50.00 MHz 00 ms (1001 pts) FUNCTION VALUE	CF Step 5.000000 MHz <u>Auto</u> Man
1 N 1 f 5.178 15 GHz 2 N 1 f 5.170 15 GHz 3 N 1 f 5.170 15 GHz 4	-3.08 dBm -31.52 dBm -30.07 dBm			Freq Offset 0 Hz
B Image: Second se		STATUS		

Channel 36 - Chain B

Agilent Spec	trum Analyze	r - Swept SA							
Center I	RF Freq 5.1	50 Ω AC 80000000 GHz	SEN	SE:INT	Avg Type	ALIGNAUTO : Log-Pwr	05:19:17 P	MDec 29, 2011 E 1 2 3 4 5 6	Frequency
10 dB/div	Ref 10	IFGain:Lo	Atten: 20	dB		Mkr	2 5.170 -29.2	15 GHz 27 dBm	Auto Tune
0.00 -10.0		2	A1	m	non	3			Center Freq 5.180000000 GHz
-30.0	ىلى يەرىپە ئار م <mark>ى</mark> غە تىلەرچى چىل				{	Lunder	ang the and the first projection	-28.98 dBm	Start Freq 5.155000000 GHz
-60.0 -70.0 -80.0									Stop Freq 5.205000000 GHz
Center 5 #Res BW	.18000 G / 300 kHz	Hz #1	VBW 1.0 MHz	FUNC	TION FUI	#Sweep	Span 5 500 ms (EUNOIR	0.00 MHz 1001 pts) NVALUE	CF Step 5.000000 MHz <u>Auto</u> Man
2 N 3 N 4 5 6	1 f	5.170 15 GHz 5.189 70 GHz	-2.30 dB 2 -29.27 dB 2 -30.48 dB	m					Freq Offset 0 Hz
1 8 9 10 11 12									
MSG						STATUS			

Agilent Spectrum Analyzer - Swept SA	an a			
XX RL RF 50Ω AC	SENSE:INT	ALIGNAUTO	04:44:30 PMDec 29, 2011 TRACE 1 2 3 4 5 6	Frequency
	Trig: Free Run		TYPE MWWWWW DET P N N N N N	
lFGain:Low	Atten: 20 db	B.A.L. ut		Auto Tune
10 dB/div Ref 10.00 dBm		IVIKE	-33.69 dBm	
				Conton From
-10.0 blocket.or	under marked	warmen all		Center Freq
-20.0	V.	2		5.22000000 GH2
30.0			-28.90 dBm	
40.0		N		Start Freq
50.0 million and the second second second		Victoria I.I.	-	5.195000000 GHz
-50.0				
-80.0				Stop Fred
-70.0				5 245000000 GHz
-00.0				
Center 5.22000 GHz	an a	- 10 - 13 220	Span 50.00 MHz	05.0%**
#Res BW 300 kHz #VBV	V 1.0 MHz	#Sweep	500 ms (1001 pts)	5.000000 MHz
MKR MODE TRC SCL X	Y FUN	CTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f 5.212 00 GHz 2 N 1 f 5.210 10 GHz	-2.90 dBm -33.69 dBm			
3 N 1 f 5.229 50 GHz	-28.99 dBm	0		Freq Offset
5				0 Hz
6				
8				
10				
11				
MSG		STATUS		
		314103		

Channel 44 - Chain A

Channel 44 - Chain B

Agilent	Spect	rum A	Analy	yzer - Sw	ept SA																
LXI RL		F	RF	50 Ω	AC					SENS	E:INT	1			ALIGN AU	TO	05:27:2	2 PM [Dec 29, 20	011	Frequency
Cent	er F	rec	5	.2200	0000)0 G	Hz		Tria	Free F	Run		Avg	Гуре	: Log-Pv	vr	TF	RACE TYPE	12345 M	56	Frequency
						IFC	Gain:Lo	w 🗭	Atter	n: 20 d	В							DET	PNNN	N	
								5049							M	kr2	25 21	0 1	0 GH	7	Auto Tune
10 dB	/div	R	ef	10.00 d	dBm												-29	9.62	2 dBi	m	
									1	<u>}</u> 1											
0.00							ANN	no	month /	my	m.	ma	mar	m		- ſ					Center Freq
-10.0							1	¥.	*	V	Ŷ		*	1	10.0						5.220000000 GHz
-20.0			-				2-							7	3				20.02 4	Bro	
-30.0			+			-	-	_	-	-						-			-28.02 ui	DIII	Start From
-40.0								_						-	Y			-		-	5 40500000 CU
-50.0 😽		لمحمد		Laran and	-	north									Museles			-	والاستحداث والمحمد	-	5.195000000 GHZ
-60.0																2					
70.0																					Stop Fred
-70.0																- Î					5 245000000 GHz
-80.0 -																					0.240000000 0112
Cent	er 5.	220	00	GHz										0			Span	50.	.00 MH	īZ	
#Res	BW	30	0 k	Hz			#\	/BW	1.0 N	IHz				ä	#Swee	ep :	500 ms	5 (10	001 pt	s)	CF Step
MKO M		orl e	201		~	_			V			CLINIC	TION	I EUN	ICTION W/I	11.11	FUNG	MINN	VALUE		5.000000 MHz
1	N	1 f	-		5.	218 1	5 GHz		-3.0)2 dBr	m	TON	mon			2000	TON	SHOR	TALOL		Adio
2	N	1 f			5.	210 1	0 GHz		-29.6	2 dBr	n										
4	N	1 1			5.	2297	0 GHZ		-29.5	6 dBr	n					-					Freq Offset
5	_																				0 Hz
6																4				-	
8			1																		
9		-									-									-1	
11																					
12						_										_					
MSG															ST/	TUS					

Agilent Spect	rum Ana	alyzer - Swept SA						
Center F	RF req	50 Ω AC 5.240000000 GHz	SENSE:	Avg Type	ALIGNAUTO : Log-Pwr	04:59:55 PM Dec 2 TRACE 1 2 3	9,2011 3 4 5 6	Frequency
10 dB/div	Ref	IFGain:L	ow Atten: 20 dB	un }	Mkr2	5.230 15 C -28.03 d	GHZ Bm	Auto Tune
-10.0		2-	manh	manna	3			Center Freq 5.24000000 GHz
-30.0 -40.0 -50.0	yur	- Alter and the sub-sub-sub-			hological and the second second	-28.		Start Freq 5.215000000 GHz
-60.0								Stop Freq 5.265000000 GHz
Center 5. #Res BW	2400 300	0 GHz kHz #	VBW 1.0 MHz	;	#Sweep 50	Span 50.00 00 ms (1001	MHz pts)	CF Step 5.000000 MHz
MKR MODE T	RC SCL	× 5.238 10 GH	z <u>-0.67 dBm</u>	FUNCTION FUN	NCTION WIDTH	FUNCTION VALU		<u>Auto</u> Man
3 N 4 5 6	f	5.249 70 GH	z -27.59 dBm					Freq Offset 0 Hz
7 8 9 10 11								
12 MSG		<i></i>			STATUS			

Channel 48 - Chain A

Channel 48 - Chain B

Agilent Spectrum Analyzer - Swept SA				
M RL RF 50 Ω AC Center Freq 5.240000000 GHz	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	05:06:53 PM Dec 29, 2011 TRACE 1 2 3 4 5 6	Frequency
IFGain:Low	Atten: 20 dB	Mkrź	2 5.230 15 GHz -29.77 dBm	Auto Tune
Log 0.00 -10.0 -20.0	manum	1 V/WWy V3		Center Freq 5.240000000 GHz
-30.0 -40.0 -50.0 www.inc.letter.com.en.en.en.en.en.en.en.en.en.en.en.en.en.		hadener	-28.66 dBm	Start Freq 5.215000000 GHz
-60.0				Stop Freq 5.265000000 GHz
Center 5.24000 GHz #Res BW 300 kHz #VBW MKR MODE TRO SCI X 1 N 1 f	1.0 MHz Y FUNO -2.66 dBm	#Sweep	Span 50.00 MHz 500 ms (1001 pts) FUNCTION VALUE	CF Step 5.000000 MHz <u>Auto</u> Man
2 N 1 f 5.230 15 GHz 3 N 1 f 5.249 70 GHz 4	-29.77 dBm -28.73 dBm			Freq Offset 0 Hz
8				

Product	:	WHDI Tx Stick
Test Item	:	Peak Transmit Power
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 40BW

Peak Transmit Power Measurement: (CHAIN A+B)

Channel Number	Frequency	26dB Bandwidth	Chain A Power	Chain B Power	Chain A+B Power	Outp	out Power Limit
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)
38	5190	39.150	-3.03	-3.97	-0.46	17	19.93
46	5230	39.100	-2.49	-2.60	0.47	17	19.92

Note:

1. Power Output Value =Reading value on peak power meter + cable loss

2. Output Power (dBm) = 10*LOG (Chain A Power (mW)+ Chain B Power (mW))

3. 26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

26dBc Occupied Bandwidth:

Channel 38 – Chain A

Agilent Spec	trum Analyze	r - Swept SA							
Center F	RF Freq 5.1	50 Ω AC) GHz	SENSE:	Avg Typ	ALIGN AUTO e: Log-Pwr	05:43:47 F	MDec 29, 2011 E 1 2 3 4 5 6	Frequency
10 dB/div	Ref 10	.00 dBm	IFGain:Low	Atten: 20 dB		Mkr	2 5.170 -33.	40 GHz 51 dBm	Auto Tune
-10.0	plm	in many films	ารเป็นผู้เสียนองเหนึ่งว่า	1	ประการเป็นแห่งการเป็นหรื	a water and the second states	mann		Center Freq 5.190000000 GHz
-30.0 -40.0 -50.0 shawe	2							3 -33.27 dBm	Start Freq 5.165000000 GHz
-70.0 -80.0									Stop Freq 5.215000000 GHz
Center 5 #Res BW	5.19000 G V 300 kHz TEC SCL	Hz 2 5.18	#VB	W 1.0 MHz -7.27 dBm	FUNCTION FU	#Sweep	Span 5 500 ms (0.00 MHz 1001 pts) IN VALUE	CF Step 5.000000 MHz <u>Auto</u> Man
2 N 3 N 4 5 6	1 f 1 f	5.1 5.20	70 40 GHz 09 55 GHz	-33.51 dBm -33.66 dBm					Freq Offset 0 Hz
7 8 9 10 11 12									
MSG						STATUS			

Channel 38 – Chain B

Agilent Spectrum A	Analyzer - Swept	t SA						
	RF 50 Ω		SENSE:II		ALIGNAUTO	05:55:20 F	MDec 29, 2011	Frequency
	3.130000	IFGain:Low	Trig: Free Run Atten: 20 dB	n S,		TY D		Auto Tuno
10 dB/div R	ef 10.00 dE	3m			Mkr:	2 5.170 -34	35 GHz 41 dBm	Auto Tune
-10.0	puramony	and the state of the state of the	are and and and	therman and the second s	and the second	malina		Center Freq 5.190000000 GHz
-30.0 -40.0 -50.0	2						3 -33,64 dBm	Start Freq 5.165000000 GHz
-60.0 -70.0 -80.0								Stop Freq 5.215000000 GHz
Center 5.190 #Res BW 300	000 GHz 0 kHz	#VB	W 1.0 MHz		#Sweep	Span 5 500 ms (0.00 MHz 1001 pts)	CF Step 5.000000 MHz
		5.189 45 GHz	-7.64 dBm	FUNCTION	FUNCTION WIDTH	FUNCTI	JN VALUE	<u>Auto</u> Man
3 N 1 1 4 5 6	F	5.209 55 GHz	-35.25 dBm					Freq Offset 0 Hz
7 8 9 10 11 12								
MSG					STATUS			

Agilent Spectrum Analyzer - Swept SA	Real Andrea	at as			
XIRL RF 50Ω AC		SENSE:INT	ALIGNAUTO	06:47:15 PMDec 29, 2011	Frequency
Center Freq 5.2500000	IFGain:Low	Trig: Free Run Atten: 20 dB	nig type. Log t ut	TYPE MWWWWW DET P N N N N N	
10 dB/div Ref 10.00 dBm	C		Mkr2	2 5.210 35 GHz -33.26 dBm	Auto Tune
Log 0.00 -10.0 -20.0	ىرىللارەلىلەردۈمەتچىرىكىرىيەلىرەرەمەكىرىيە ئىللارەلىلەردەرىيەرچىرىكىرىيەرلىرىيەرەمەكىرىيەرىيەرىيەرىيەرىيەرىيەرىيەرىيەرىيەرىي	Lopes Barris of the program to	sey with a second se		Center Freq 5.230000000 GHz
-30.0 -40.0 -50.0					Start Freq 5.205000000 GHz
-80.0					Stop Freq 5.255000000 GHz
Center 5.23000 GHz #Res BW 300 kHz	#VBW	1.0 MHz	#Sweep	Span 50.00 MHz 500 ms (1001 pts)	CF Step 5.000000 MHz
MKB MODE TRC SCL X 1 N 1 f 55 2 N 1 f 55	244 20 GHz	-6.44 dBm	INCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
3 N 1 f 5 4 5 6 7	.249 55 GHz	-32.96 dBm			Freq Offset 0 Hz
9 10 10 11 12 12			etatie		

Channel 46 – Chain A

Channel 46 – Chain B

Agilent Spect	rum Analy:	zer - Swept SA								
Center F	req 5.	50 Ω AC 23000000	00 GHz	SEN	ISE:INT	Avg Typ	ALIGNAUTO be: Log-Pwr	06:52:54 F	MDec 29, 2011 E 1 2 3 4 5 6	Frequency
10 dB/div	Ref 1	0.00 dBm	IFGain:Lov	v Atten: 20	dB		Mkr	2 5.210 -32.	40 GHz 86 dBm	Auto Tune
-10.0		wither the second states and	arter poly along a solo	and the state of the	the state of the s	anter an tradest	- Vouce of the			Center Freq 5.230000000 GHz
-30.0 -40.0 -50.0	2 							(3 -32.77 dBm	Start Freq 5.205000000 GHz
-60.0 -70.0 -80.0										Stop Freq 5.255000000 GHz
Center 5 #Res BW	.23000 (300 kH	GHz Iz	#V	BW 1.0 MHz	FUN	ICTION F	#Sweep	Span 5 500 ms (FUNCT	0.00 MHz 1001 pts)	CF Step 5.000000 MHz <u>Auto</u> Man
1 N 2 N 3 N 4 5 6 7 8	1 f 1 f	5.	244 10 GHz 210 40 GHz 249 50 GHz	-6.77 dE -32.86 dE -33.06 dE	sm Sm Sm					Freq Offset 0 Hz
9 10 11 12 MSG							STATUS			

QuieTer

4. Peak Power Spectral Density

4.1. 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
Х	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.

4.2. Test Setup



4.3. Limits

- (1) For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (2) For the band 5.25-5.35 GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (3) For the band 5.725-5.825 GHz, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

4.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

4.5. Uncertainty

± 1.27 dB

4.6. Test Result of Peak Power Spectral Density

Product	:	WHDI Tx Stick
Test Item	:	Peak Power Spectral Density
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 20BW

Channel	Frequency	Chain A	Chain B	Chain A+B	Doquirad Limit	
		Power	Power	Power	(dPm)	Result
Number	(MHZ)	(dBm)	(dBm)	(dBm)	(dBill)	
36	5180	-13.960	-11.940	-9.823	<4	Pass
44	5220	-14.140	-13.810	-10.962	<4	Pass
48	5240	-9.630	-11.590	-7.490	<4	Pass

Note:

1. Measurement Level (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))

Agilent Spectrum Analyzer - Swept SA				
Center Freq 5.180000000 GHz	SENSE:INT	#Avg Type: Pwr(RMS)	04:33:19 PM Dec 29, 2011 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
IFGain:L 10 dB/div Ref 10.00 dBm	ow Atten: 20 dB	Mkr1	5.178 325 GHz -13.96 dBm	Auto Tune
0.00				Center Freq 5.18000000 GHz
-10.0				Start Freq 5.167500000 GHz
-30.0				Stop Freq 5.192500000 GHz
-50.0				CF Step 2.500000 MHz
-60.0				<u>Auto</u> Mari
-70.0				Freq Offset 0 Hz
-80.0				
Center 5.18000 GHz #Res BW 1.0 MHz #	VBW 3.0 MHz	#Sweep 5	Span 25.00 MHz i0.0 ms (1001 pts)	
MSG		STATUS		

Channel 36 – Chain A

Channel 36 – Chain B



Agilent Spect	trum Analyzer - Swo	ept SA								
Center F	RF 50 Ω Freq 5.2200	AC) GHz	SEN	ISE:INT	#Avg Type	ALIGNAUTO	04:43:45 F 5) TRAC TYI	MDec 29, 2011 E 1 2 3 4 5 6 E A WWWWW	Frequency
10 dB/div	Ref 10.00 c	1Bm	IFGain:Low	Atten: 20	dB		Mkr1	5.221 2 -14.	25 GHz 14 dBm	Auto Tune
0.00					ŝei			0		Center Freq 5.22000000 GHz
-10.0								mann		Start Freq 5.207500000 GHz
-30.0										Stop Freq 5.232500000 GHz
-50.0										CF Step 2.500000 MHz Auto Map
-60.0										Freq Offset
-80.0										0 Hz
Center 5 #Res BW	.22000 GHz 1.0 MHz		#VBW	3.0 MHz		#	≠Sweep	Span 2 50.0 ms (5.00 MHz 1001 pts)	
MSG							STATU	s		

Channel 44 – Chain A

Channel 44 – Chain B





Channel 48 – Chain A

Channel 48 – Chain B



Product	:	WHDI Tx Stick
Test Item	:	Peak Power Spectral Density
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 40BW

Channel Number	Frequency (MHz)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Required Limit (dBm)	Result
38	5190	-16.260	-16.470	-13.353	<4	Pass
46	5230	-14.980	-15.700	-12.315	<4	Pass

1. Measurement Level (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))



Channel 38 – Chain A





Agilen	t Spectrum	Analyzer - Sw	ept SA								
Cen	ter Fred	RF 50 Ω g 5.2300	AC 00000	GHz	SE Trig: Free	NSE:INT	#Avg Type	ALIGN AUTO Pwr(RMS)	06:46:28 P TRAC TYP	MDec 29, 2011 E 1 2 3 4 5 6 E A WWWWW	Frequency
10 dE	3/div R	ef 10.00 (dBm	IFGain:Low	Atten: 20	dB		Mkr	1 5.244 -14.9	05 GHz 98 dBm	Auto Tune
0.00											Center Freq 5.230000000 GHz
-10.0											Start Freq 5.20500000 GHz
-30.0		/	-								Stop Freq
-40.0											5.255000000 GHz
-50.0 -60.0											CF Step 5.000000 MHz <u>Auto</u> Man
-70.0											Freq Offset 0 Hz
-80.0											
Cent #Res	ter 5.230 s BW 1.0)00 GHz) MHz		#VBW	3.0 MHz		#	Sweep	Span 5 50.0 ms (0.00 MHz 1001 pts)	
MSG								STATUS			

Channel 46 – Chain A

Channel 46 – Chain B



5. Peak Excursion

5.1. 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
Х	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

Conduction Power Measurement



5.3. Limits

The ratio of the peak excursion of the modulation envelope (measured suing a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

5.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

5.5. Uncertainty

± 1.27 dB

5.6. Test Result of Peak Excursion

Product	:	WHDI Tx Stick
Test Item	:	Peak Excursion
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 20BW

Chain A

Channel No.	Frequency (MHz)	Measurement Level (dB)	Required Limit (dB)	Result
36	5180	10.516	<13	Pass
44	5220	11.735	<13	Pass
48	5240	11.715	<13	Pass

NAUTO 05:36:50 PMDec 29, 2011 Trace/Det g-Pwr TRACE 1 2 3 4 5 6 Trace/Det
Vkr2 5.179 900 GHz Trace 2 -11.066 dBm Trace 2
Clear Write
Trace Average
Max Hold
Span 25.00 MHz weep 500 ms (1001 pts) IN WIDTH FUNCTION VALUE
View/Blank View
More 1 of 3
SENSE:INT ALIC Avg Type: Lo 2 dB Aug Type: Lo Avg Type:

Channel 36:



Agilent Spectrum Ana	lyzer - Swept SA	and a second			
Marker 2 5.21	50 Ω AC 19600000000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	04:48:49 PMDec 29, 2011 TRACE 1 2 3 4 5 6	Marker Function
	(IFGain:Low	Atten: 20 dB		DET P S N N N N	Select Marker
10 dB/div Ref	10.00 dBm		Mkr2	5.219 600 GHz -11.79 dBm	2
Log 0.00 -10.0 -20.0	A Jamit Haward and Main San Mar	ang the line of the state	and the second		Marker Noise
-30.0 -40.0 cohline -50.0				The Million	Band/Interval Power
-60.0 -70.0 -80.0					Band/Interval Density
Center 5.22000 #Res BW 1.0 N) GHz IHz #VE	W 3.0 MHz	#Sweep	Span 25.00 MHz 500 ms (1001 pts)	Marker
MKR MODE TRC SCL 1 N 1 f 2 N 2 f 3 - - 4 - - 5 - - 6 - -	× 5.228 275 GHz 5.219 600 GHz	Y FU 0.055 dBm -11.79 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	Function On
7 8 9 10 11 12					Measure at Marker
MSG			STATUS	;	

Channel 44:

Channel 48:

Agilent Spectrum Analyzer - Swept SA	
Marker 2 5.240050000000 GHz SENSE:INT ALIGNAUTO 05:03:23 PM Dec 29, 2011 Marker Trace 1/2 3 4 5 6 Trace 1/2 3 4 5 6 Trace 1/2 3 4 5 6 Marker	ker Function
IFGain:Low Atten: 20 dB Sel	lect Marker
Mkr2 5.240 050 GHz 10 dB/div Ref 10.00 dBm -7.79 dBm	2
-10.0	Marker Noise
20.0	
-30.0 mm / / / / / / / / / / / / / / / / / /	Band/Interval
-50.0	Power
-60.0	
-70.0 B	Band/Interval Densitv
	2
#Res BW 1.0 MHz #VBW 3.0 MHz #Sweep 500 ms (1001 pts)	Marker
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE	Function Off
2 N 2 f 5.240 873 GHZ -7.79 dBm	
83 5	and Adjust▶
8	Measure at
	Marker

Channel No.	Frequency (MHz)	Measurement Level (dB)	Required Limit (dB)	Result
36	5180	9.690	<13	Pass
44	5220	10.147	<13	Pass
48	5240	11.890	<13	Pass

Chain B

Channel 36:

Agilent Spectrum Analyzer - Swept SA				
Marker 2 5 179725000000 GHz	SENSE:INT	ALIGN AUTO Ava Type: Log-Pwr	05:24:53 PMDec 29, 2011 TRACE 1 2 3 4 5 6	Marker
IFGain	Low Trig: Free Run Atten: 20 dB		TYPE MM WWWW DET P S N N N N	Select Marker
10 dB/div Ref 10.00 dBm		Mkr2	5.179 725 GHz -8.04 dBm	2
	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	interroration to the test fille with the section of	Winterflerold	Normal
-10.0				
-30.0			Wei Manner	Delta
-60.0				
-70.0				Fixed⊳
Center 5.18000 GHz #Res BW 1.0 MHz	#VBW 3.0 MHz	#Sweep	Span 25.00 MHz 500 ms (1001 pts)	Off
MKR MODE TRC SCL X 1 N 1 f 5.185 850 G	Y FUN Hz 1.65 dBm	ICTION FUNCTION WIDTH	FUNCTION VALUE	
2 N 2 T 5.1/9/25 G 3 4 5 6	HZ -8.04 dBm			Properties►
7 8 9 10				More 1 of 2
12 MSG		STATUS		



nt Spectrum Analyzer - Swept SA 05:33:06 PMDec 29, 2011 Trace/Det Avg Type: Log-Pwr TRACE 1234 Trig: Free Run Atten: 20 dB 9 IFGain:Low Select Trace Mkr2 5.220 000 GHz -8.428 dBm Trace 2 B/div Ref 10.00 dBm 10 d Log $\Diamond 1$ 2 mint man har har was Jelet and Survey La a Bull Indani Willy a story to the **Clear Write** Trace Average Max Hold Center 5.22000 GHz #Res BW 1.0 MHz Span 25.00 MHz #Sweep 500 ms (1001 pts) #VBW 3.0 MHz **Min Hold** 5.225 825 GHz 5.220 000 GHz 1.719 dBm -8.428 dBm N 1 f N 2 f 1 View/Blank View 6 More 10 11 12 1 of 3

Channel 44:

Channel 48:



Product	:	WHDI Tx Stick
Test Item	:	Peak Excursion
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 40BW

Chain A

Channel	Frequency	Measurement Level	Required Limit	Dogult
No.	(MHz)	(dB)	(dB)	Kesun
38	5190	10.043	<13	Pass
46	5230	9.484	<13	Pass

Channel 38:

Agilent Spectrum	Analyzer - Swept SA				
LXI L	RF 50 Ω AC	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	05:49:07 PMDec 29, 2011 TRACE 1 2 3 4 5 6	Trace/Det
	IFGain:Low	Atten: 20 dB		DET P S N N N N	Select Trace
10 dB/div R	ef 10.00 dBm		Mkr	2 5.190 00 GHz -12.641 dBm	Trace 2
-20.0	part of a second s	af Torreche - and 2 torreson - a	Januar Stratigner and Land a series		Clear Write
-30.0 -40.0 Minut Property -50.0				Marshow and	Trace Average
-80.0 -80.0					Max Hold
Center 5.19000 GHz Span 50.00 MHz #Res BW 1.0 MHz #VBW 3.0 MHz #Sweep 500 ms (1001 pts)					
1 N 1 1 2 N 2 1	f 5.202 45 GHz f 5.190 00 GHz	-2.598 dBm -12.641 dBm			
3 4 5 6 7					View/Blank View
8 9 10 11 12					More 1 of 3
MSG			STATUS		



BE	ίη ο Ας	SENSE:INT	ALIGNAUTO	07:10:05 PMDec 29, 2011	
<u>s. a 60 is</u>		Trig: Free Run	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE MMWWWW DET P S N N N N	Trace/De
	IFGain:Low	Atten: 20 dB	Mkr	2 5.229 65 GHz -10.479 dBm	Select Tr Tra
	1	2	an	the second and the second s	Clear
philaland				Van annous Vin Marchite	Trace Ave
					May
					IMAX
ter 5.23000 GH s BW 1.0 MHz	z #VE	3W 3.0 MHz	#Sweep	Span 50.00 MHz 500 ms (1001 pts)	Min
MODE TRC SCL N 1 f N 2 f	× 5.220 35 GHz 5.229 65 GHz	-0.995 dBm -10.479 dBm	INCTION FUNCTION WIDTH	FUNCTION VALUE	
					View/B

Channel 46:

Channel	Frequency	Measurement Level	Required Limit	Pogult
No.	(MHz)	(dB)	(dB)	Kesult
38	5190	10.825	<13	Pass
46	5230	9.855	<13	Pass

Chain B

Channel 38:

Agilent Spectrum Analyzer - Swept SA				
L RF 50Ω AC	SENSE:INT	ALIGNAUTO C Avg Type: Log-Pwr	5:51:53 PMDec 29, 2011 TRACE 1 2 3 4 5 6	Trace/Det
10 dB/div Ref 10.00 dBm	ain:Low Atten: 20 dB	Avg Hold>100/100	5.189 75 GHz -12.559 dBm	Select Trace
-20.0	กรรมการเป็นการการการการการการการการการการการการการก	aller and a state and a state of the		Clear Write
-30.0 -40.0 -50.0			howard	Trace Average
-60.0 -70.0 -80.0				Max Hold
Center 5.19000 GHz #Res BW 1.0 MHz MKR MODE TRC SCL X 1 N 1 f 5.176 20	#VBW 3.0 MHz	S #Sweep 50	Span 50.00 MHz 0 ms (1001 pts) FUNCTION VALUE	Min Hold
2 N 2 f 5.18975 3 4 5 5 6 4	5 GHz -12.559 dBm			View/Blank View
, 9 10 11 12				More 1 of 3
MSG		STATUS		



	,2011	3 PM Dec 29, 2011	07:01:33 F	ALIGN AUTO		ENSE:INT	SE		AC	50 Ω	RF	
	456 Trace/De	TYPE MMWWWW	TRA/ TY	e: Log-Pwr	Avg Type	e Run	Trig: Fre					
	Select Tr	DETIPSINNINN	D			0 dB	Atten: 20	Gain:Low	IF			
3/div Ref 10	iHz Tra Bm	9 80 GHz 094 dBm	2 5.229 -12.0	Mkr					lBm	10.00	Ref	/div
					∆ 1							
M	Clear	V	Mulansky	ultrant und	A Rima entroles	2 min	handling	and the second	manun	- a lime		
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			4								-	
ter 5.23000 G		50.00 MHZ	Span 5	#Curson			2.0 MIL-	#\/D\		0 GHz	2300	er 5.2
	Min	s (1001 pts)	500 ms (#Sweep		<u> </u>	3.0 IVIH2	#VDV			1.0 P	DVV
MODE TRC SCL		TION VALUE	FUNCTI	INCTION WIDTH	NCTION FU	E I	Y 020 4		×		C SCL	DDE TR
N 2 f						IBm	-12.094 d	0 GHz	5.229		f	N 2
	View/B								20000			
	— I ,											
										8		
			_					9			_	_
											-	-
	_											

Channel 46:

6. Radiated Emission

6.1. Test Equipment

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

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

6.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



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.

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)

6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to KDB-789033 test procedure for compliance to FCC 47CFR 15.407 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.

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.

6.5. Uncertainty

- ± 3.8 dB below 1GHz
- ± 3.9 dB above 1GHz

6.6. Test Result of Radiated Emission

Product	:	WHDI Tx Stick
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 20BW (5180MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
10360.000	12.930	36.720	49.650	-24.350	74.000
15540.000	*	*	*	*	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000
Average					
Detector:					
10360.000	*	*	*	*	74.000
15540.000	*	*	*	*	54.000
20720.000	*	*	*	*	54.000
25900.000	*	*	*	*	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	'x Stick						
Test Item	: Harmonic Radiated Emission Data							
Test Site	: No.3 OATS							
Test Mode	: Mode 1: Transmit - 20BW (5180MHz)							
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV/m	dB	dBuV/m			
Vertical								
Peak Detector:								
10360.000	13.724	36.770	50.494	-23.506	74.000			
15540.000	*	*	*	*	74.000			
20720.000	*	*	*	*	74.000			
25900.000	*	*	*	*	74.000			
Average								
Detector:								
10360.000	*	*	*	*	54.000			
15540.000	*	*	*	*	54.000			
20720.000	*	*	*	*	54.000			
25900.000	*	*	*	*	54.000			

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- 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 Tx Stick								
Test Item	: Harmonic Radiated Emission Data								
Test Site	: No.3 OATS								
Test Mode	: Mode 1	: Mode 1: Transmit - 20BW (5220MHz)							
Frequency	Correct	Reading	Measurement	Margin	Limit				
	Factor	Level	Level						
MHz	dB	dBuV	dBuV/m	dB	dBuV/m				
Horizontal									
Peak Detector:									
10440.000	13.322	37.160	50.482	-23.518	74.000				
15660.000	*	*	*	*	74.000				
20880.000	*	*	*	*	74.000				
26100.000	*	*	*	*	74.000				
Average									
Detector:									
10440.000	*	*	*	*	74.000				
15660.000	*	*	*	*	74.000				
20880.000	*	*	*	*	74.000				
26100.000	*	*	*	*	74.000				

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- 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 Tx Stick						
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OATS						
Test Mode	: Mode 1: Transmit - 20BW (5220MHz)						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Vertical							
Peak Detector:							
10440.000	14.245	36.640	50.885	-23.115	74.000		
15660.000	*	*	*	*	74.000		
20880.000	*	*	*	*	74.000		
26100.000	*	*	*	*	74.000		
Average							
Detector:							
10440.000	*	*	*	*	74.000		
15660.000	*	*	*	*	74.000		
20880.000	*	*	*	*	74.000		
26100.000	*	*	*	*	74.000		

- 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 Tx Stick							
Test Item	: Harmonic Radiated Emission Data							
Test Site	: No.3 OATS							
Test Mode	: Mode 1:	Transmit - 20BW	/ (5240MHz)					
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV/m	dB	dBuV/m			
Horizontal								
Peak Detector:								
10480.000	13.693	37.320	51.014	-22.986	74.000			
15720.000	*	*	*	*	74.000			
20960.000	*	*	*	*	74.000			
26200.000	*	*	*	*	74.000			
Average								
Detector:								
10480.000	*	*	*	*	74.000			
15720.000	*	*	*	*	74.000			
20960.000	*	*	*	*	74.000			
26200.000	*	*	*	*	74.000			

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- 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 Tx Stick								
Test Item	: Harmonic Radiated Emission Data								
Test Site	: No.3 OATS								
Test Mode	: Mode 1	: Mode 1: Transmit - 20BW (5240MHz)							
Frequency	Correct	Reading	Measurement	Margin	Limit				
	Factor	Level	Level						
MHz	dB	dBuV	dBuV/m	dB	dBuV/m				
Vertical									
Peak Detector:									
10480.000	14.620	37.870	52.491	-21.509	74.000				
15720.000	*	*	*	*	74.000				
20960.000	*	*	*	*	74.000				
26200.000	*	*	*	*	74.000				
Average									
Detector:									
10480.000	*	*	*	*	74.000				
15720.000	*	*	*	*	74.000				
20960.000	*	*	*	*	74.000				
26200.000	*	*	*	*	74.000				

- 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 Tx Stick							
Test Item	: Harmonic Radiated Emission Data							
Test Site	: No.3 OATS							
Test Mode	: Mode 2: Transmit - 40BW (5190MHz)							
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV/m	dB	dBuV/m			
Horizontal								
Peak Detector:								
10380.000	12.939	36.110	49.049	-24.951	74.000			
15570.000	*	*	*	*	74.000			
20760.000	*	*	*	*	74.000			
25950.000	*	*	*	*	74.000			
Average								
Detector:								
10380.000	*	*	*	*	74.000			
15570.000	*	*	*	*	74.000			
20760.000	*	*	*	*	74.000			
25950.000	*	*	*	*	74.000			

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- 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 Tx Stick							
Test Item	: Harmonic Radiated Emission Data							
Test Site	: No.3 OATS							
Test Mode	: Mode 2: Transmit - 40BW (5190MHz)							
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV/m	dB	dBuV/m			
Vertical								
Peak Detector:								
10380.000	13.796	35.820	49.616	-24.384	74.000			
15570.000	*	*	*	*	74.000			
20760.000	*	*	*	*	74.000			
25950.000	*	*	*	*	74.000			
Average								
Detector:								
10380.000	*	*	*	*	74.000			
15570.000	*	*	*	*	74.000			
20760.000	*	*	*	*	74.000			
25950.000	*	*	*	*	74.000			

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- 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 Tx Stick							
Test Item	: Harmonic Radiated Emission Data							
Test Site	: No.3 OATS							
Test Mode	: Mode 2: Transmit - 40BW (5230MHz)							
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV/m	dB	dBuV/m			
Horizontal								
Peak Detector:								
10460.000	13.508	36.230	49.738	-24.262	74.000			
15690.000	*	*	*	*	74.000			
20920.000	*	*	*	*	74.000			
26150.000	*	*	*	*	74.000			
Average								
Detector:								
10460.000	*	*	*	*	74.000			
15690.000	*	*	*	*	74.000			
20920.000	*	*	*	*	74.000			
26150.000	*	*	*	*	74.000			

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- 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.

: WHDI Tx Stick							
: Harmonic Radiated Emission Data							
: No.3 OATS							
: Mode 2: Transmit - 40BW (5230MHz)							
Correct	Reading	Measurement	Margin	Limit			
Factor	Level	Level					
dB	dBuV	dBuV/m	dB	dBuV/m			
14.433	36.900	51.333	-22.667	74.000			
*	*	*	*	74.000			
*	*	*	*	74.000			
*	*	*	*	74.000			
*	*	*	*	74.000			
*	*	*	*	74.000			
*	*	*	*	74.000			
*	*	*	*	74.000			
	: WHDI' : Harmor : No.3 O. : Mode 2 Correct Factor dB 14.433 * * * * * *	 WHDI Tx Stick Harmonic Radiated Emiss No.3 OATS Mode 2: Transmit - 40BW Correct Reading Factor Level dB dBuV 14.433 36.900 * *	 WHDI Tx Stick Harmonic Radiated Emission Data No.3 OATS Mode 2: Transmit - 40BW (5230MHz) Correct Reading Measurement Level Level dB dBuV dBuV/m 14.433 36.900 51.333 * * * 	 WHDI Tx Stick Harmonic Radiated Emission Data No.3 OATS Mode 2: Transmit - 40BW (5230MHz) Correct Reading Measurement Margin Factor Level Level dB dBuV dBuV/m dB 14.433 36.900 51.333 -22.667 * * * * * * * * 			

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- 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 Tx Stick						
Test Item	: General Radiated Emission						
Test Site	: No.3 OATS						
Test Mode	: Mode 1: Transmit - 20BW (5220MHz)						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector							
346.220	-2.213	26.852	24.639	-21.361	46.000		
458.740	0.833	24.274	25.107	-20.893	46.000		
590.660	3.625	25.822	29.447	-16.553	46.000		
745.860	3.308	26.252	29.560	-16.440	46.000		
848.680	5.776	21.901	27.676	-18.324	46.000		
930.160	7.187	21.634	28.821	-17.179	46.000		
Vertical							
Peak Detector							
383.080	-1.164	30.531	29.367	-16.633	46.000		
472.320	0.637	25.377	26.014	-19.986	46.000		
547.980	3.252	23.155	26.407	-19.593	46.000		
674.080	2.799	21.589	24.388	-21.612	46.000		
757.500	4.361	28.460	32.821	-13.179	46.000		
930.160	7.187	22.553	29.740	-16.260	46.000		

- 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 Tx Stick							
Test Item	: General	Radiated Emission	1					
Test Site	: No.3 O	: No.3 OATS						
Test Mode	: Mode 2	: Transmit - 40BW	(5190MHz)					
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level	-				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m			
Horizontal								
Peak Detector								
319.060	-4.317	31.429	27.112	-18.888	46.000			
373.380	-1.163	34.037	32.874	-13.126	46.000			
530.520	1.873	30.084	31.957	-14.043	46.000			
604.240	4.770	25.922	30.692	-15.308	46.000			
823.460	6.122	25.549	31.672	-14.328	46.000			
930.160	7.187	23.051	30.238	-15.762	46.000			
Vertical								
Peak Detector								
200.720	-7.835	33.493	25.658	-17.842	43.500			
353.980	-3.652	35.412	31.760	-14.240	46.000			
532.460	-0.563	29.260	28.697	-17.303	46.000			
697.360	1.311	29.706	31.017	-14.983	46.000			
835.100	1.995	27.071	29.066	-16.934	46.000			
967.020	8.071	25.568	33.639	-20.361	54.000			

- 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.