



# Test Report

Product Name	Full HD Video Wireless Transmitter Module
Model No	ZRF-31100F
FCC ID.	YG7ZRF31100F

Applicant	ZINWELL CORPORATION
Address	7F 512, Yuan Shan Road, Chung Ho City, 235, Taipei Hsien, Taiwan

Date of Receipt	Oct. 14, 2010
Issue Date	Nov. 03, 2010
Report No.	10A253R-RFUSP42V01
Report Version	V1.0

The test results relate only to the samples tested.

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# Test Report Certification

Issue Date: Nov. 03, 2010

Report No.: 10A253R-RFUSP42V01



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

Product Name	Full HD Video Wireless Transmitter Module	
Applicant	ZINWELL CORPORATION	
Address	7F 512, Yuan Shan Road, Chung Ho City, 235, Taipei Hsien, Taiwan	
Manufacturer	ZINWELL CORPORATION	
Model No.	ZRF-31100F	
EUT Rated Voltage	AC 100-240V, 50-60Hz	
EUT Test Voltage	AC 120V/60Hz	
Trade Name	<b>ZINWELL</b> ®	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2009 ANSI C63.4: 2003	 NVLAP Lab Code: 200533-0
Test Result	Complied	

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( Assistant Engineer / Vincent Chu )



Approved By : [Signature]  
( Manager / Vincent Lin )

Testing Laboratory  
**0914**

## TABLE OF CONTENTS

Description	Page
<b>1. GENERAL INFORMATION .....</b>	<b>5</b>
1.1. EUT Description.....	5
1.2. Operational Description .....	7
1.3. Tested System Details.....	9
1.4. Configuration of Tested System .....	9
1.5. EUT Exercise Software .....	9
1.6. Test Facility .....	10
<b>2. Conducted Emission.....</b>	<b>11</b>
2.1. Test Equipment.....	11
2.2. Test Setup .....	11
2.3. Limits .....	12
2.4. Test Procedure .....	12
2.5. Uncertainty .....	12
2.6. Test Result of Conducted Emission.....	13
<b>3. Peak Power Output .....</b>	<b>15</b>
3.1. Test Equipment.....	15
3.2. Test Setup .....	15
3.3. Limits .....	15
3.4. Test Procedure .....	15
3.5. Uncertainty .....	15
3.6. Test Result of Peak Power Output.....	16
<b>4. Radiated Emission.....</b>	<b>18</b>
4.1. Test Equipment.....	18
4.2. Test Setup .....	19
4.3. Limits .....	20
4.4. Test Procedure .....	21
4.5. Uncertainty .....	21
4.6. Test Result of Radiated Emission.....	22
<b>5. RF antenna conducted test.....</b>	<b>29</b>
5.1. Test Equipment.....	29
5.2. Test Setup .....	29
5.3. Limits .....	29
5.4. Test Procedure .....	30
5.5. Uncertainty .....	30
5.6. Test Result of RF antenna conducted test.....	31
<b>6. Occupied Bandwidth.....</b>	<b>37</b>
6.1. Test Equipment.....	37
6.2. Test Setup .....	37
6.3. Limits .....	37
6.4. Test Procedure .....	37
6.5. Uncertainty .....	37
6.6. Test Result of Occupied Bandwidth .....	38

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<b>7.</b>	<b>Power Density .....</b>	<b>43</b>
7.1.	Test Equipment.....	43
7.2.	Test Setup .....	43
7.3.	Limits .....	43
7.4.	Test Procedure .....	44
7.5.	Uncertainty .....	44
7.6.	Test Result of Power Density .....	45
<b>8.</b>	<b>EMI Reduction Method During Compliance Testing .....</b>	<b>50</b>
Attachment 1:	EUT Test Photographs	
Attachment 2:	EUT Detailed Photographs	

## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	Full HD Video Wireless Transmitter Module
Trade Name	<b>ZINWELL</b> <sup>®</sup>
Model No.	ZRF-31100F
FCC ID.	YG7ZRF31100F
Frequency Range	20MHz: 5745-5825MHz, 40MHz: 5755-5795MHz
Number of Channels	20MHz-BW: 5, 40MHz-BW: 2
Data Speed	20MHz mode: 31.5Mbps, 40MHz mode: 63Mbps
Channel separation	20MHz-BW: 20MHz, 40MHz-BW: 40MHz
Type of Modulation	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	PIFA
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto

#### Antenna List

	Manufacturer	Model No.	Peak Gain
Internal	ZINWELL	N/A	3.83dBi for 5.725~5.850GHz
External	INVAX	NB0169-B	0.26dBi for 5.725~5.850GHz

NOTE: External Antenna only uses in receive mode.

All testing are use external antenna.

20MHz (5G Band) Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1:	5745 MHz	Channel 2:	5765 MHz	Channel 3:	5785 MHz	Channel 4:	5805 MHz
Channel 5:	5825 MHz						

40MHz (5G Band) Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency
Channel 1:	5755 MHz	Channel 2:	5795 MHz

Note:

1. This device is a Full HD Video Wireless Transmitter Module with a built-in 5GHz transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. The device is applied for modular approval.
4. These tests are conducted on a sample for the purpose of demonstrating compliance of transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices

## 1.2. Operational Description

The EUT is a Full HD Video Wireless Transmitter Module with a built-in 5GHz transceiver, together with Full HD Video Wireless Receiver Module. It has a SIMO 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 4(Transmit) \* 1(Receive) technology. The device only provided one transmitting speed 31.5Mbps in 20MHz bandwidth mode and 63Mbps 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 transmit audio and video signal to associate equipment, device will receive signal form associate equipment when associate equipment request change operation frequency.

The AMN2120 WHDITM baseband transmitter chip is the heart of the ZRF31100 WHDI transmitter module. The AMN2120 interfaces the A/V source through the WHDI connector. The AMN2120 includes an internal microcontroller for controlling the physical level.

The AMN2120 is based on MIMO technology transmitting through up to four output channels. Four digital-to-analog converters and one analog-to-digital converter are embedded within the chip.

The AMN2120 internal PLL accepts an input clock frequency of 40MHz. The input frequency is multiplied and then used as an internal system clock. The AMN2120 also generates a 10 MHz reference clock, derived from 40 MHz for general use.

The AMN3110 is a fully-integrated direct conversion MIMO transmitter specifically designed for WHDI applications using OFDM modulation in single-band 4.9 GHz to 5.9 GHz. The device consists of:

- Four Complete Downlink Direct Conversion Transmitters.
- One Uplink Receiver.
- Integrated Synthesizer.
- Internal DC Servo Loops.
- RSSI.
- IQ Detector.
- RF and Baseband Control Interface.
- Power Management Unit.
- 3-Wire SPI Interface.

To complete the RF front-end solution, the AMN3110 uses external PA, RF switches, RF Band Pass Filters (BPF), RF BALUNs and a few passive components.

The device antenna are use five PIFA (4TX, 1RX) and printed on PCB, for receiver function there are support one external antenna which can instead of printed antenna.

This device is slave equipment.

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



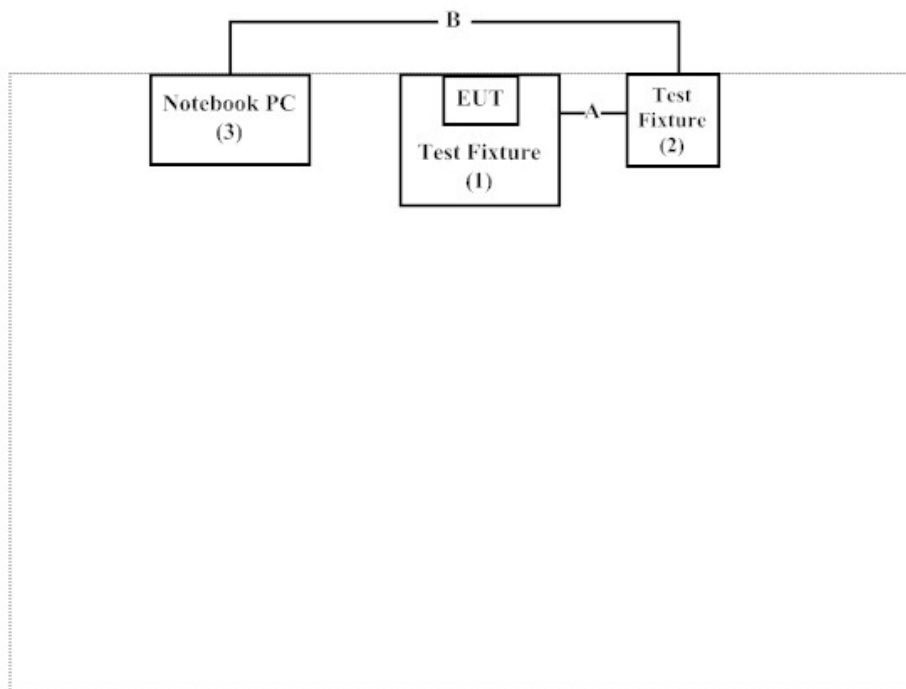
### 1.3. Tested System Details

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 Test Fixture	N/A	N/A	N/A	N/A
2 Test Fixture	N/A	N/A	N/A	N/A
3 Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m

Signal Cable Type	Signal cable Description
A Test Fixture Control Cable	Non-Shielded, 0.2m
B USB to RS-232 Cable	Non-Shielded, 1.5m

### 1.4. Configuration of Tested System



### 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute the UART program on the EUT
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press “OK” to start the continuous Transmitter.
- (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  
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 FCC Engineering Laboratory  
 7435 Oakland Mills Road  
 Columbia, MD 21046  
 Registration Number: 92195



Accreditation on NVLAP  
 NVLAP Lab Code: 200533-0



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FCC Accreditation Number: TW1014



## 2. Conducted Emission

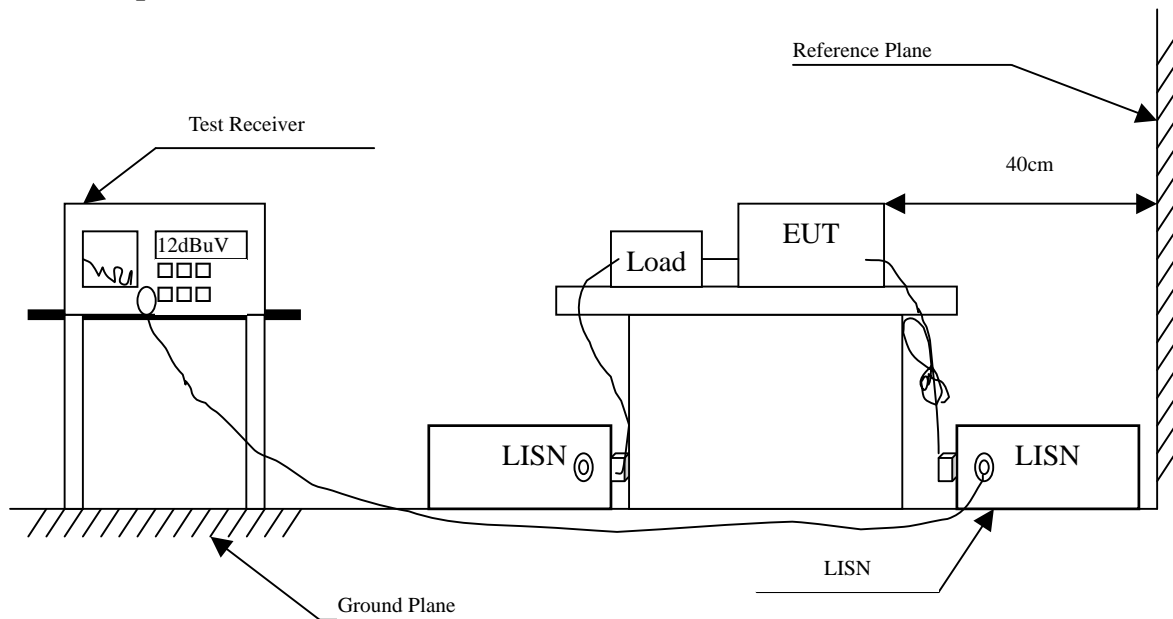
### 2.1. Test Equipment

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, 2010	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2010	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2010	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2010	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

### 2.2. Test Setup



### 2.3. Limits

<b>FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit</b>		
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: 2003 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 : Full HD Video Wireless Transmitter Module  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Mode : Mode 2: Transmitter -40BW (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
<b>Line 1</b>					
<b>Quasi-Peak</b>					
0.193	9.711	26.450	36.161	-28.610	64.771
0.334	9.650	22.950	32.600	-28.143	60.743
0.404	9.648	26.480	36.128	-22.615	58.743
0.470	9.640	28.510	38.150	-18.707	56.857
0.509	9.640	33.610	43.250	-12.750	56.000
1.134	9.670	26.350	36.020	-19.980	56.000
<b>Average</b>					
0.193	9.711	20.900	30.611	-24.160	54.771
0.334	9.650	19.800	29.450	-21.293	50.743
0.404	9.648	23.040	32.688	-16.055	48.743
0.470	9.640	24.850	34.490	-12.367	46.857
0.509	9.640	30.190	39.830	-6.170	46.000
1.134	9.670	23.350	33.020	-12.980	46.000

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 : Full HD Video Wireless Transmitter Module  
 Test Item : Conducted Emission Test  
 Power Line : Line 2  
 Test Mode : Mode 2: Transmitter -40BW (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
<b>Line 2</b>					
<b>Quasi-Peak</b>					
0.201	9.716	35.320	45.036	-19.507	64.543
0.255	9.683	31.780	41.462	-21.538	63.000
0.334	9.660	27.790	37.450	-23.293	60.743
0.380	9.650	32.170	41.820	-17.609	59.429
0.443	9.645	34.650	44.295	-13.334	57.629
0.509	9.640	33.240	42.880	-13.120	56.000
<b>Average</b>					
0.201	9.716	31.470	41.186	-13.357	54.543
0.255	9.683	29.620	39.302	-13.698	53.000
0.334	9.660	24.830	34.490	-16.253	50.743
0.380	9.650	29.260	38.910	-10.519	49.429
0.443	9.645	31.400	41.045	-6.584	47.629
0.509	9.640	30.150	39.790	-6.210	46.000

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

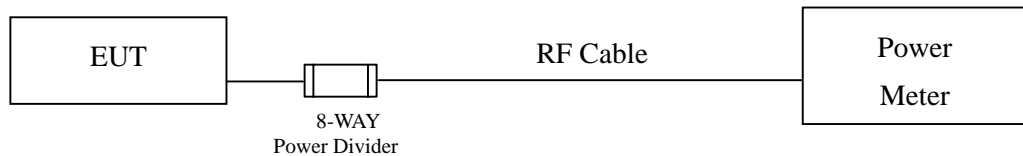
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2010
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2010
X	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2010

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. The power combiner is used for measure 11n mode.

#### 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 : Full HD Video Wireless Transmitter Module  
Test Item : Peak Power Output Data  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmitter -20BW

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
01	5745	27.14	1Watt= 30	Pass
03	5785	26.40	1Watt= 30	Pass
05	5825	26.25	1Watt= 30	Pass

Note: 1. Peak Power Output Value =Reading value on peak power meter + cable loss  
2. Using 8-Way Power Divider (factor =10dB), to compensate in the spectrum.



Product : Full HD Video Wireless Transmitter Module  
Test Item : Peak Power Output Data  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmitter -40BW

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
01	5755	26.45	1Watt= 30	Pass
02	5795	26.09	1Watt= 30	Pass

Note: 1. Peak Power Output Value =Reading value on peak power meter + cable loss  
2. Using 8-Way Power Divider (factor =10dB), to compensate in the spectrum.

## 4. Radiated Emission

### 4.1. Test Equipment

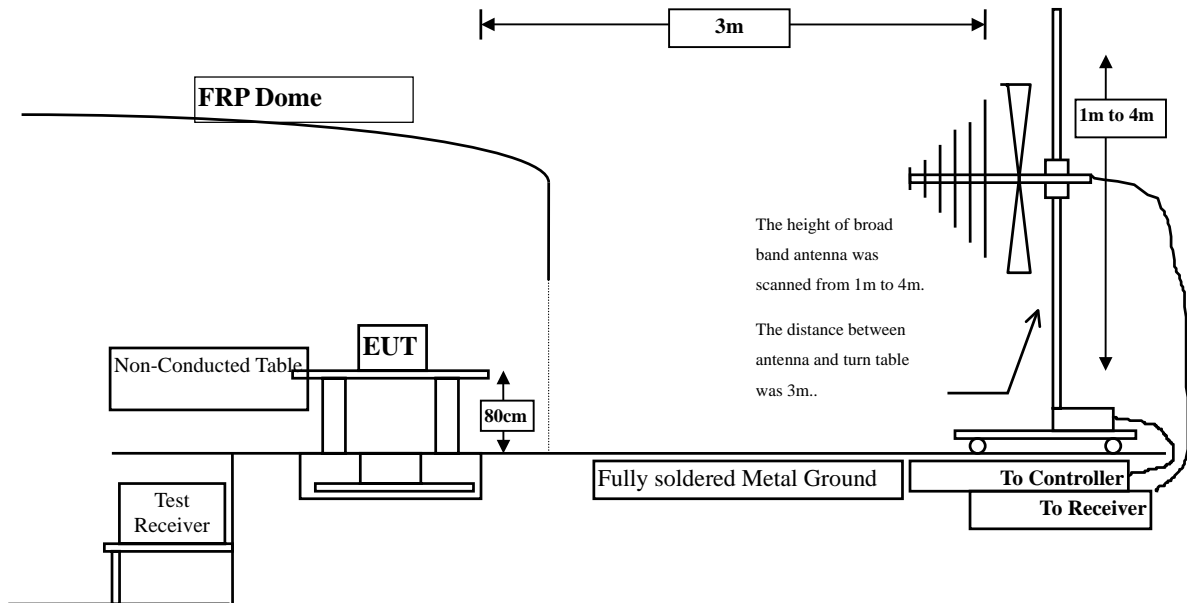
The following test equipment are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2010
	X Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2010
	X Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2010
	X Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2010
	X Pre-Amplifier	HP	8449B/3008A01123	July., 2010
	X Spectrum Analyzer	Agilent	E4407B / US39440758	May., 2010
	X Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2010
	X Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2010
	X Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X Coaxial Switch	Anritsu	MP59B/6200265729	N/A

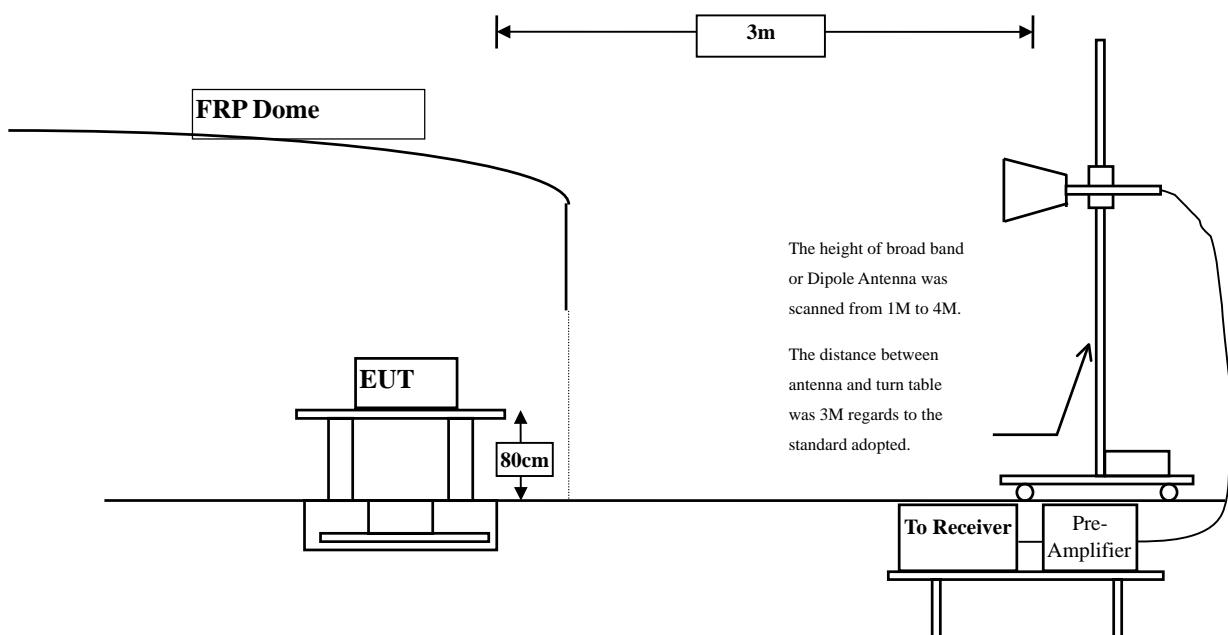
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
  2. The test instruments marked with “X” are used to measure the final test results.

## 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.

<b>FCC Part 15 Subpart C Paragraph 15.209(a) Limits</b>		
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, 2003 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 C63.4:2003 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 : Full HD Video Wireless Transmitter Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter -20BW (5745MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11490.000	17.106	39.920	57.027	-16.973	74.000
<b>Average Detector:</b>					
11490.000	17.106	34.150	51.257	-2.743	54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
11490.000	18.034	38.890	56.925	-17.075	74.000
<b>Average Detector:</b>					
11490.000	18.034	31.520	49.555	-4.445	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. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
7. The average measurement was not performed when the peak measured data under the limit of average detection.
8. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Full HD Video Wireless Transmitter Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter -20BW (5785 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11570.000	16.809	40.100	56.909	-17.091	74.000
<b>Average Detector:</b>					
11570.000	16.809	33.640	50.449	-3.551	54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
11570.000	17.698	38.680	56.378	-17.622	74.000
<b>Average Detector:</b>					
11570.000	17.698	31.880	49.578	-4.422	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. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
7. The average measurement was not performed when the peak measured data under the limit of average detection.
8. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Full HD Video Wireless Transmitter Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter -20BW (5825 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11650.000	16.158	37.450	53.608	-20.392	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11650.000	17.274	36.170	53.445	-20.555	74.000
<b>Average Detector:</b>					
--					

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. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
7. The average measurement was not performed when the peak measured data under the limit of average detection.
8. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product : Full HD Video Wireless Transmitter Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmitter -40BW (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11510.000	17.124	39.950	57.074	-16.926	74.000
<b>Average Detector:</b>					
11510.000	17.124	33.200	50.324	-3.676	54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
11510.000	18.081	37.650	55.731	-18.269	74.000
<b>Average Detector:</b>					
11510.000	18.081	30.510	48.591	-5.409	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. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
7. The average measurement was not performed when the peak measured data under the limit of average detection.
8. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Full HD Video Wireless Transmitter Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmitter -40BW (5795 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11590.000	16.701	39.080	55.780	-18.220	74.000
<b>Average Detector:</b>					
11590.000	16.701	32.570	49.270	-4.730	54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
11590.000	17.567	36.200	53.766	-20.234	74.000
<b>Average Detector:</b>					
---					

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. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
7. The average measurement was not performed when the peak measured data under the limit of average detection.
8. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Full HD Video Wireless Transmitter Module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter -20BW (5785 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
119.240	-9.621	42.739	33.118	-10.382	43.500
202.660	-10.889	51.800	40.911	-2.589	43.500
245.340	-6.346	48.225	41.879	-4.121	46.000
350.100	-2.332	38.089	35.757	-10.243	46.000
507.240	0.759	34.762	35.521	-10.479	46.000
664.380	2.062	37.130	39.192	-6.808	46.000
<b>Vertical</b>					
109.540	-0.418	41.463	41.045	-2.455	43.500
251.160	-7.505	45.667	38.162	-7.838	46.000
352.040	-3.833	38.222	34.389	-11.611	46.000
507.240	-0.471	38.214	37.743	-8.257	46.000
664.380	-1.918	37.247	35.329	-10.671	46.000
749.740	2.510	30.807	33.317	-12.683	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. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
7. The average measurement was not performed when the peak measured data under the limit of average detection.
8. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Full HD Video Wireless Transmitter Module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmitter -40BW (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
105.660	-6.673	47.258	40.585	-2.915	43.500
130.880	-10.159	50.983	40.824	-2.676	43.500
200.720	-10.595	51.131	40.536	-2.964	43.500
249.220	-6.014	46.685	40.671	-5.329	46.000
297.720	-3.633	44.402	40.770	-5.230	46.000
604.240	4.770	34.145	38.915	-7.085	46.000
<b>Vertical</b>					
249.220	-7.634	48.070	40.436	-5.564	46.000
346.220	-3.093	44.697	41.604	-4.396	46.000
507.240	-0.471	39.558	39.087	-6.913	46.000
664.380	-1.918	38.471	36.553	-9.447	46.000
749.740	2.510	29.925	32.435	-13.565	46.000
881.660	2.557	32.711	35.268	-10.732	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. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
7. The average measurement was not performed when the peak measured data under the limit of average detection.
8. The emission levels of other frequencies are very lower than the limit and not show in test report.

**5. RF antenna conducted test**

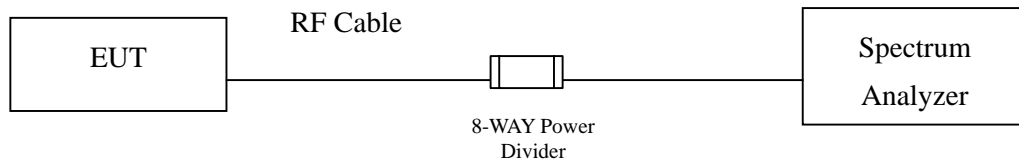
**5.1. Test Equipment**

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2010
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2010
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2010
X	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2010

- 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. The power combiner is used for measure 11n mode.

**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

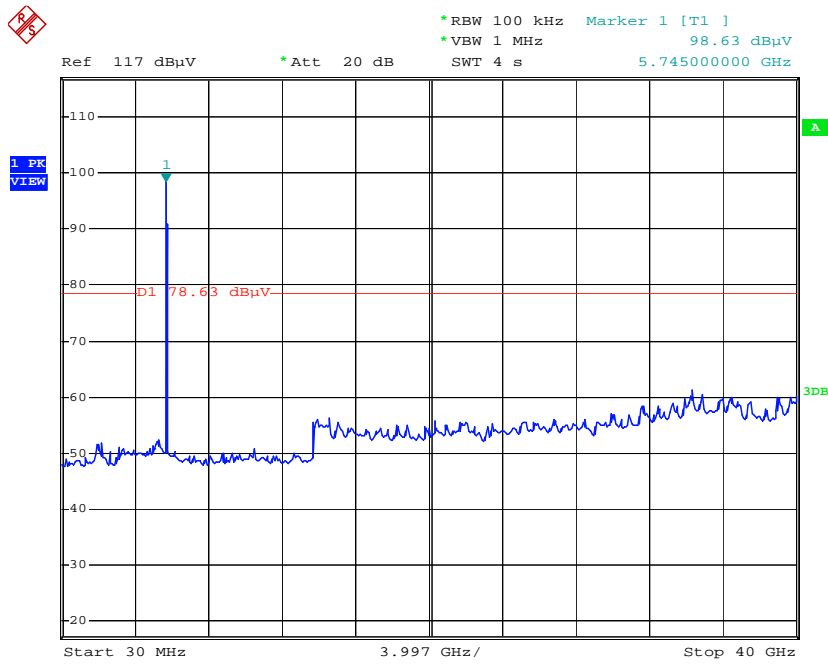
The measurement uncertainty

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

### 5.6. Test Result of RF antenna conducted test

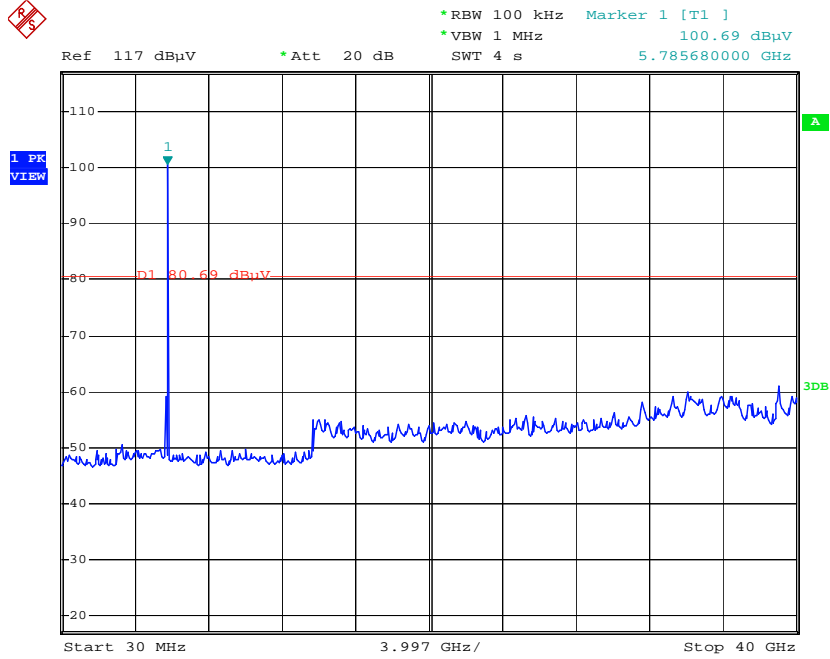
Product : Full HD Video Wireless Transmitter Module  
Test Item : RF Antenna Conducted Spurious  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmitter -20BW

#### Channel 01 (5745MHz) 30MHz -40GHz



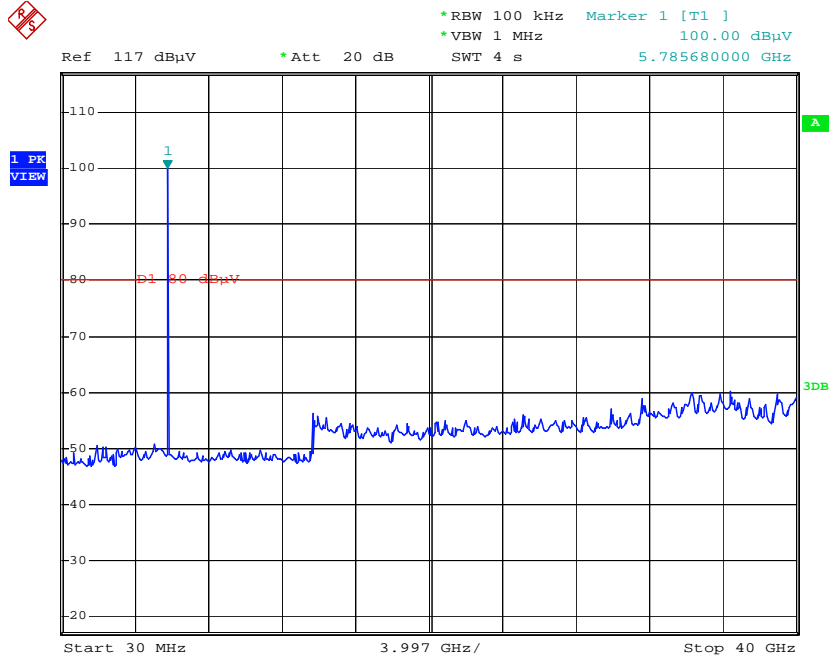
Date: 29.OCT.2010 15:07:49

### Channel 03 (5785MHz) 30MHz -40GHz



Date: 29.OCT.2010 15:23:49

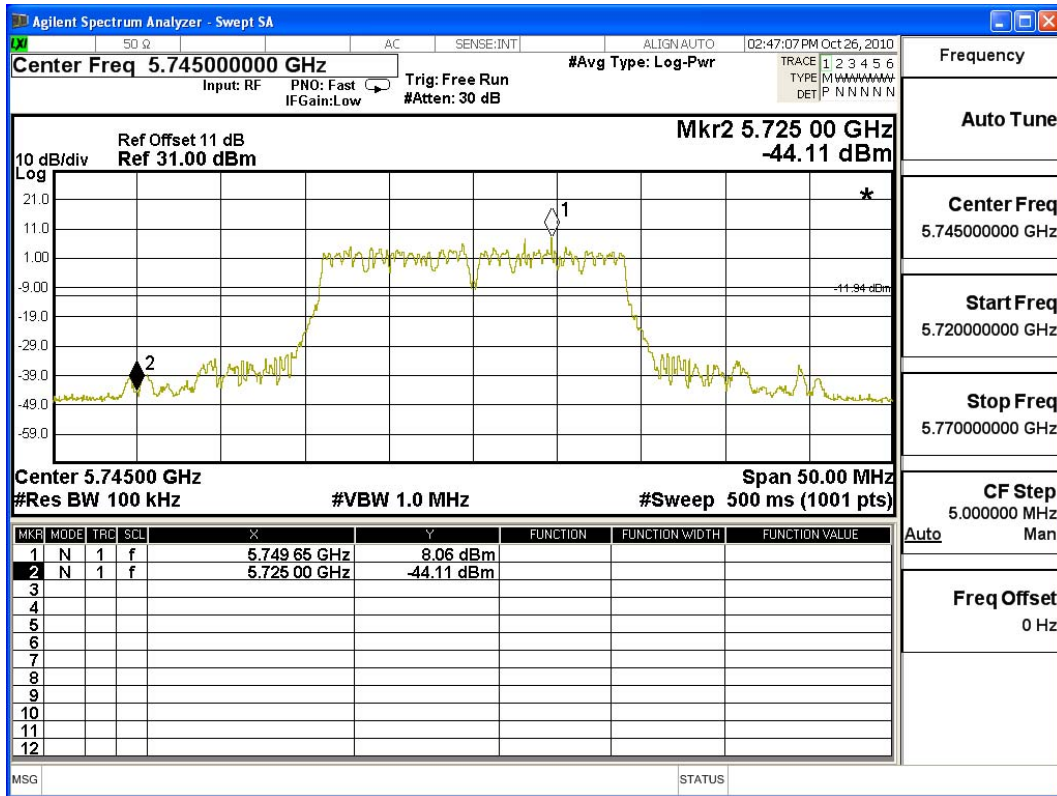
### Channel 05 (5825MHz) 30MHz -40GHz



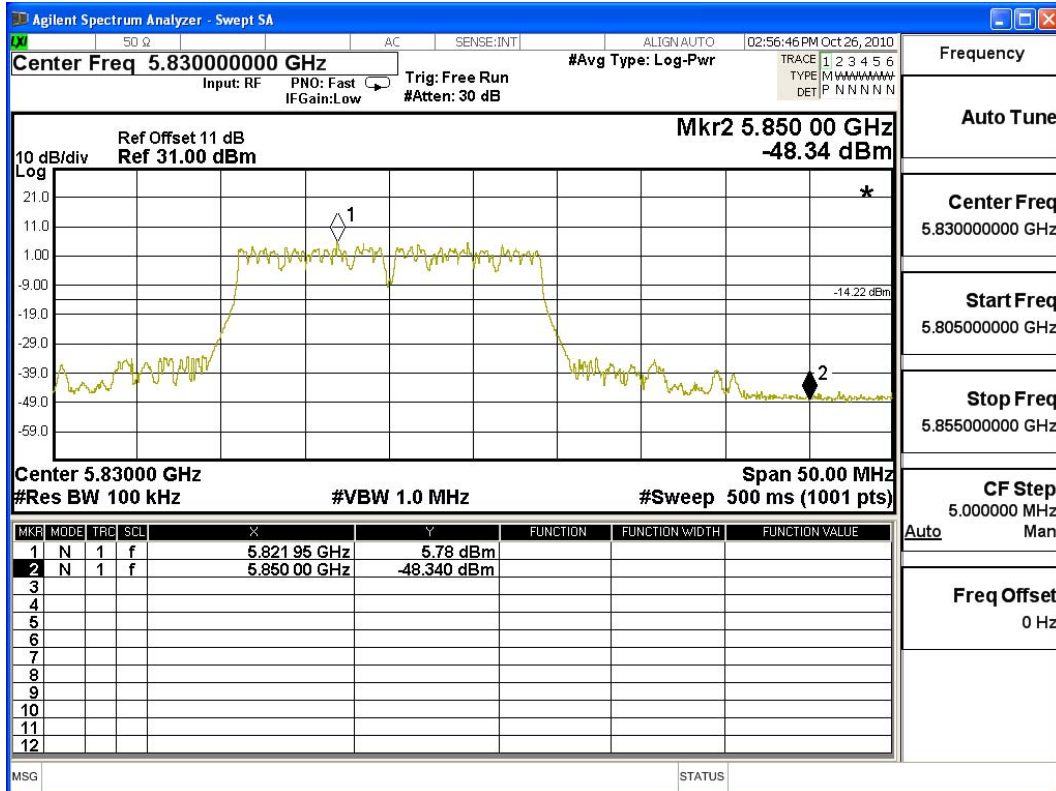
Date: 29.OCT.2010 15:42:17



### Channel 01 (5745MHz) Band Edge

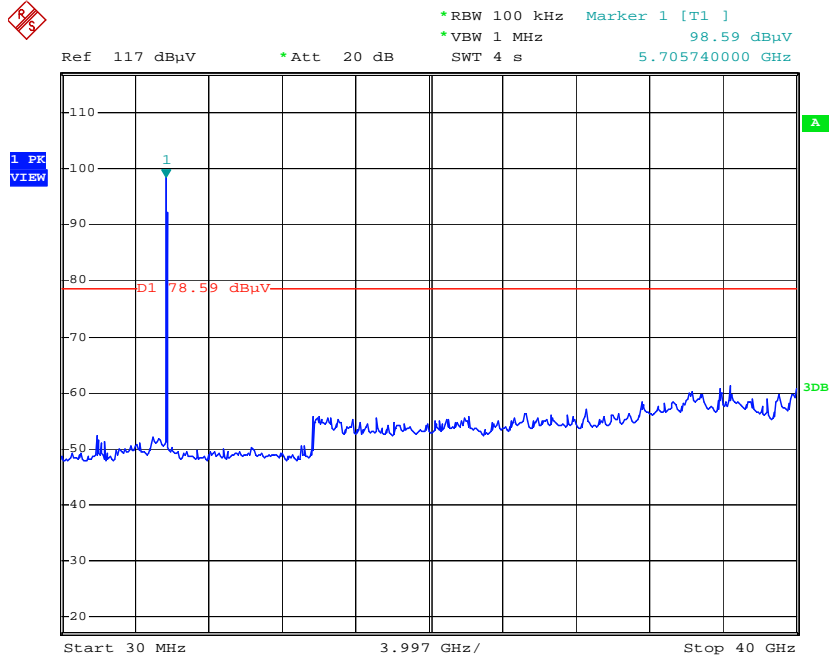


### Channel 05 (5825MHz) Band Edge



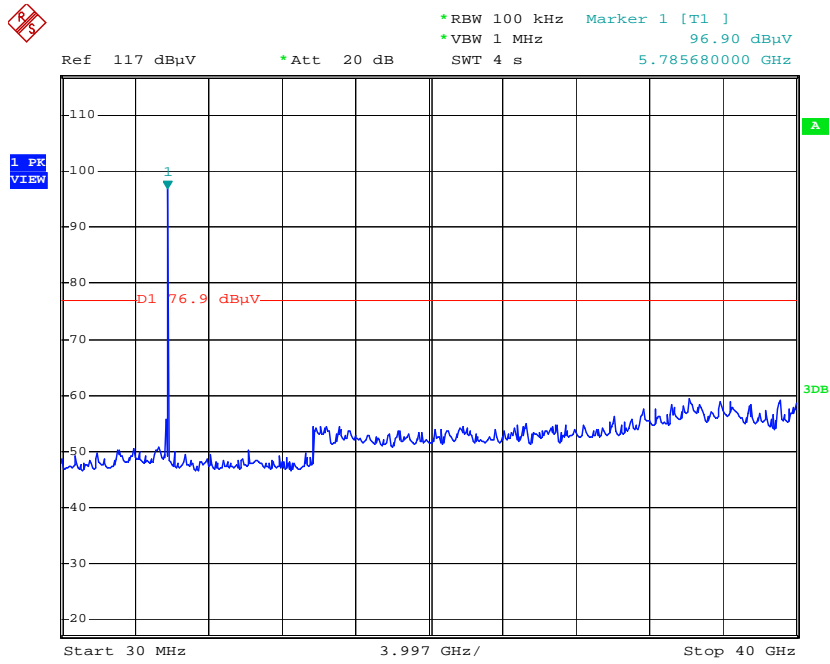
Product : Full HD Video Wireless Transmitter Module  
Test Item : RF Antenna Conducted Spurious  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmitter -40BW

### Channel 01 (5755MHz) 30MHz -40GHz



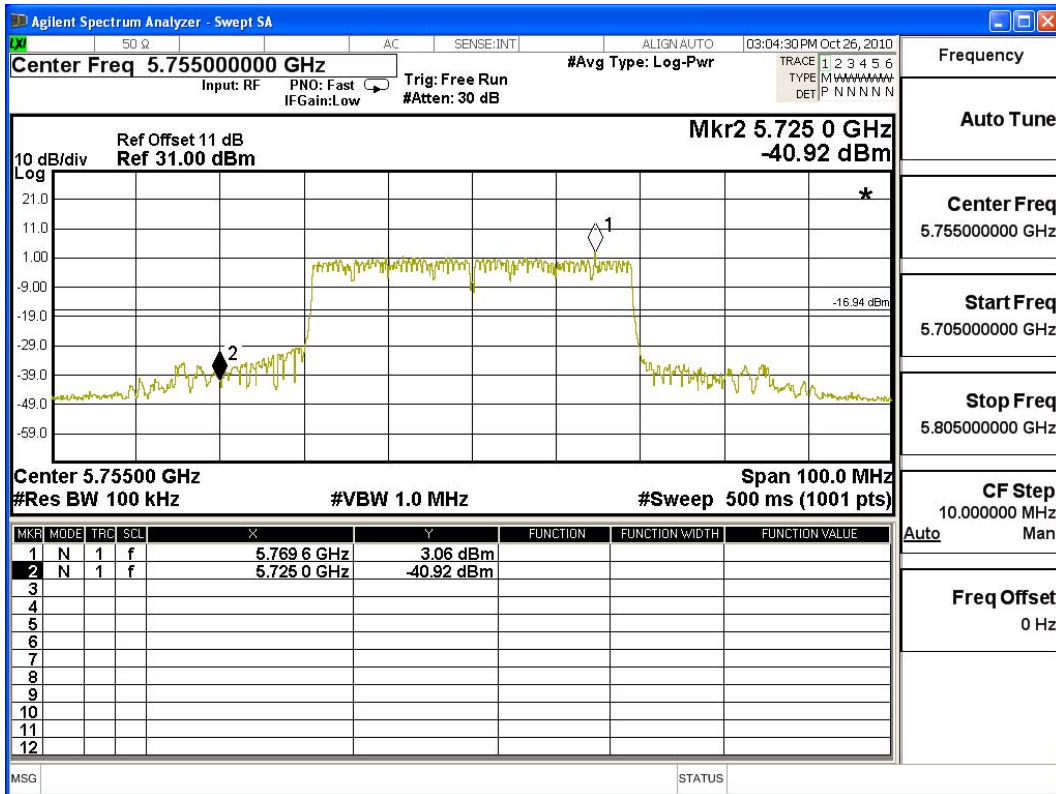
Date: 29.OCT.2010 15:12:08

### Channel 02 (5795MHz) 30MHz -40GHz

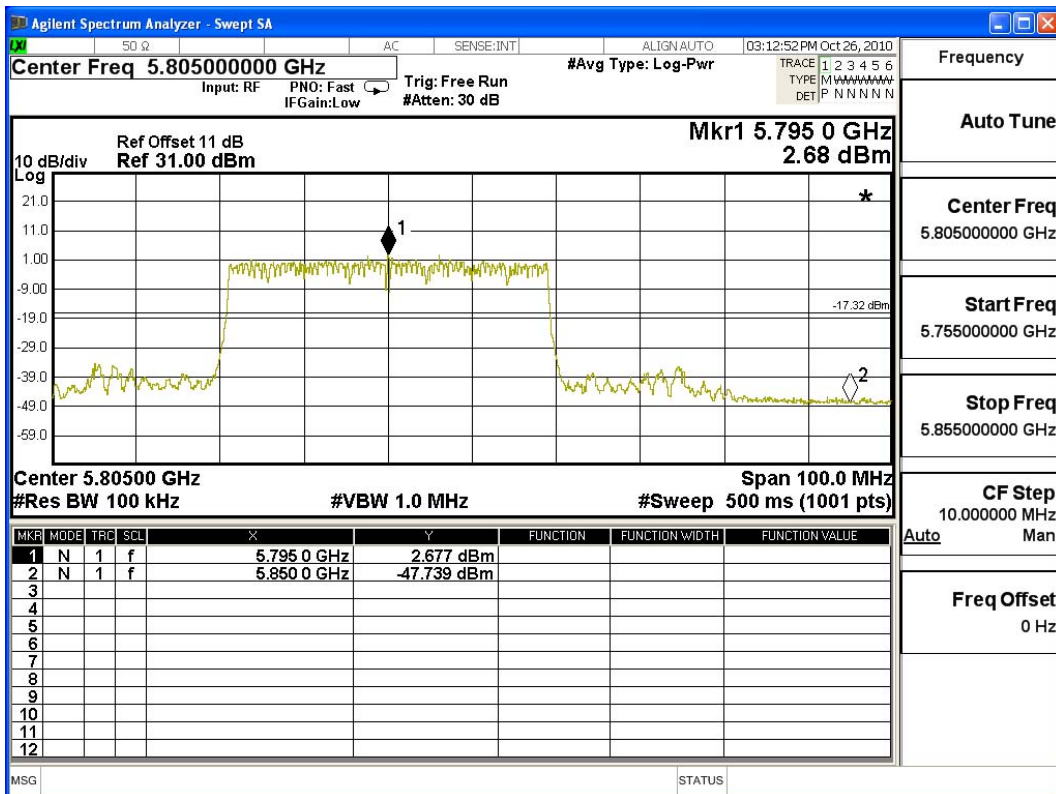


Date: 29.OCT.2010 15:36:21

### Channel 01 (5755MHz) Band Edge



### Channel 02 (5795MHz) Band Edge



## 6. Occupied Bandwidth

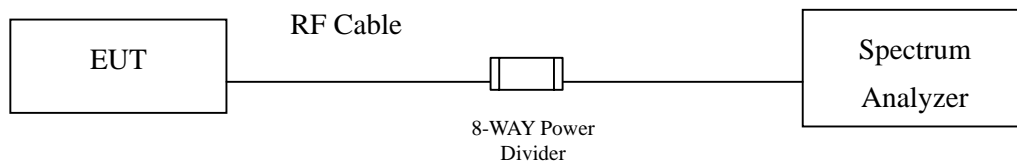
### 6.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2010
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2010
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2010
X	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2010

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. The power combiner is used for measure 11n mode.

### 6.2. Test Setup



### 6.3. Limits

The minimum bandwidth shall be at least 500 kHz.

### 6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003; 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.

### 6.5. Uncertainty

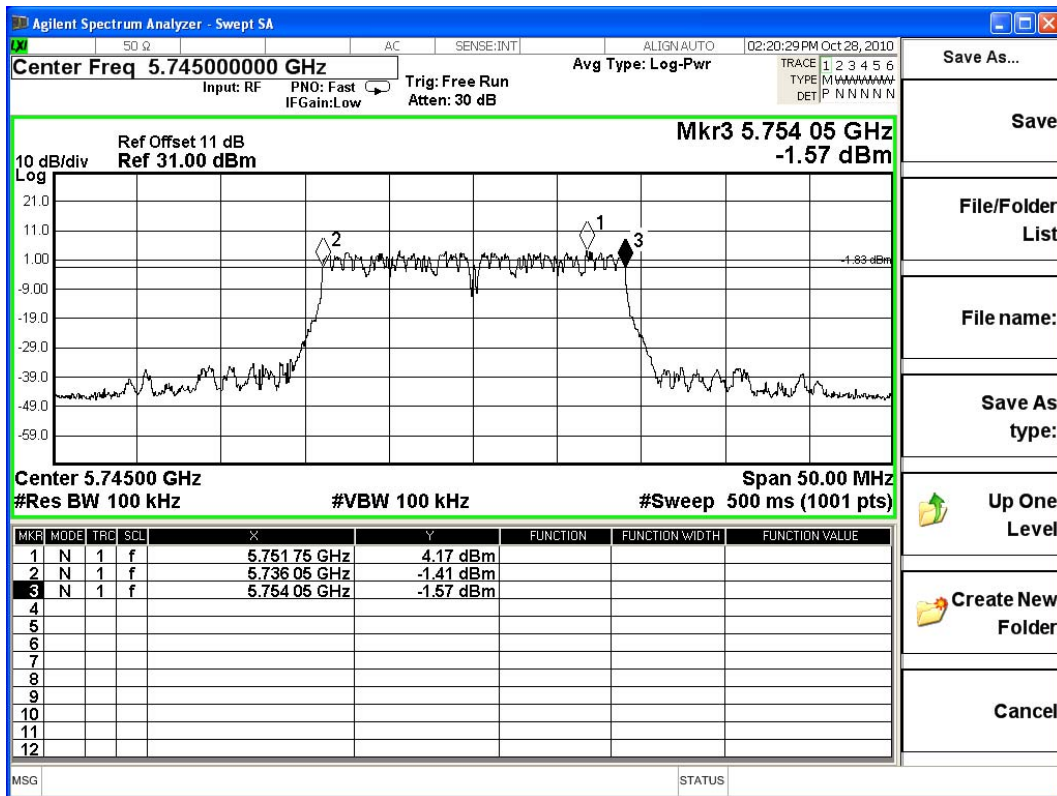
± 150Hz

### 6.6. Test Result of Occupied Bandwidth

Product : Full HD Video Wireless Transmitter Module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter -20BW (5745MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	5745.00	18000	>500	Pass

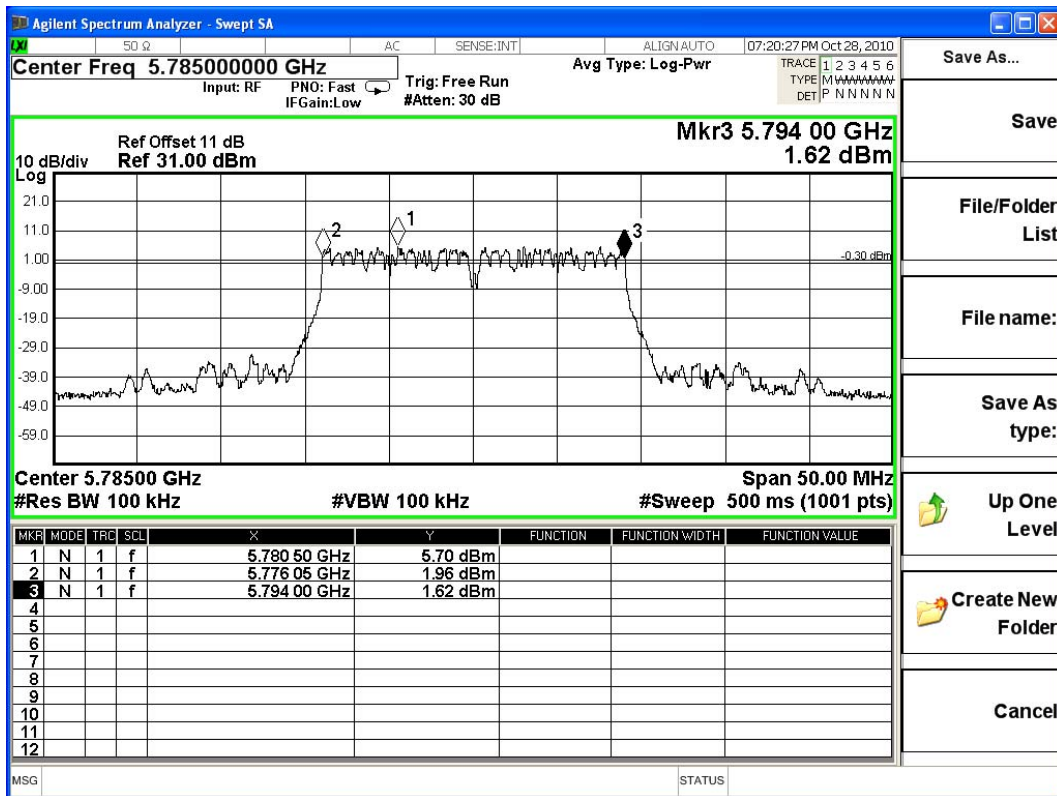
**Figure Channel 01:**



Product : Full HD Video Wireless Transmitter Module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter -20BW (5785MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
03	5785.00	17950	>500	Pass

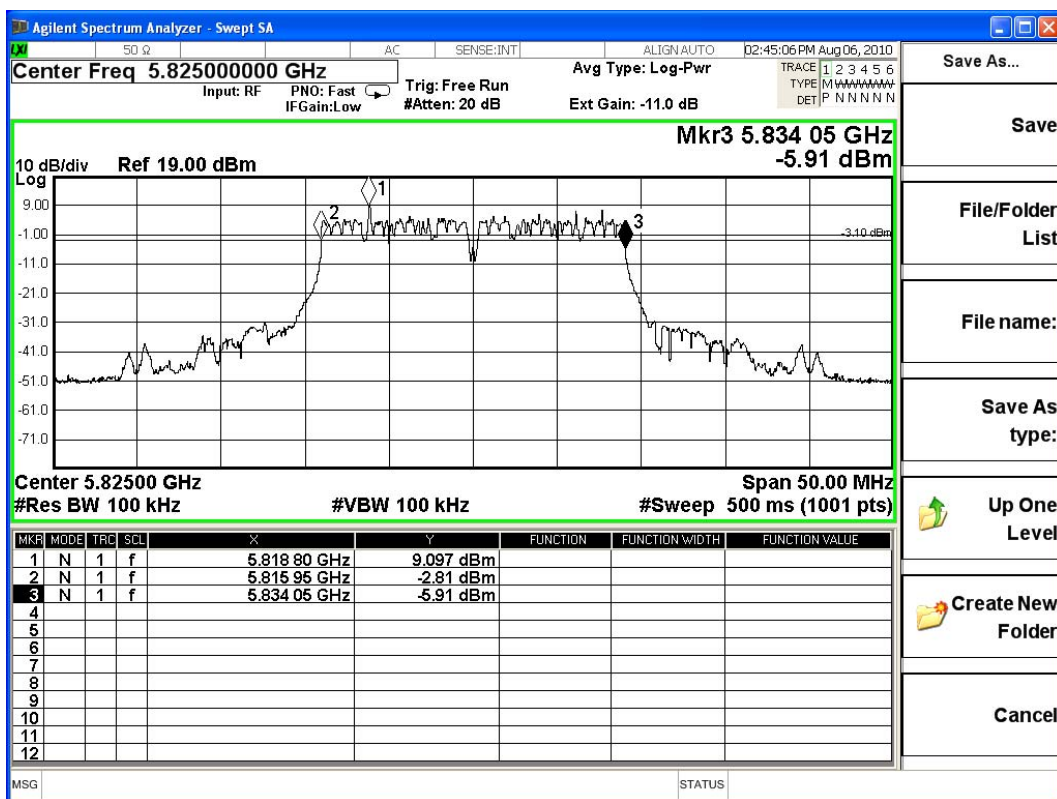
**Figure Channel 03:**



Product : Full HD Video Wireless Transmitter Module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter -20BW (5825MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
05	5825.00	18100	>500	Pass

**Figure Channel 05:**

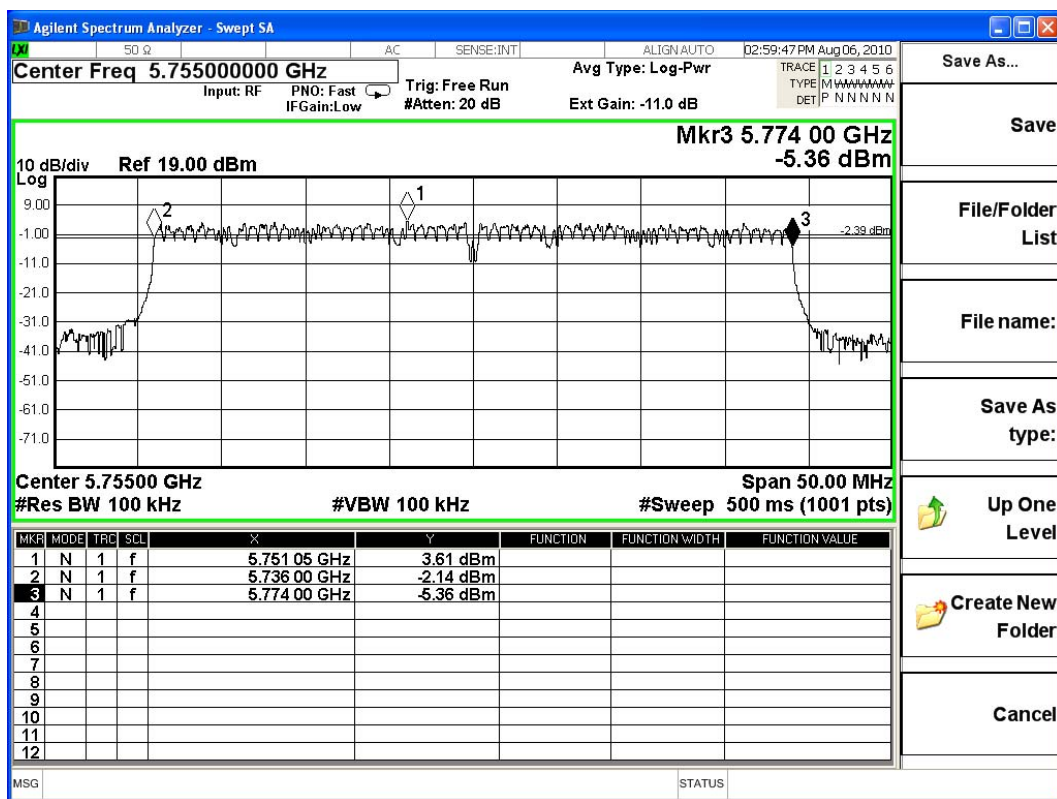




Product : Full HD Video Wireless Transmitter Module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmitter -40BW (5755MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	5755.00	38000	>500	Pass

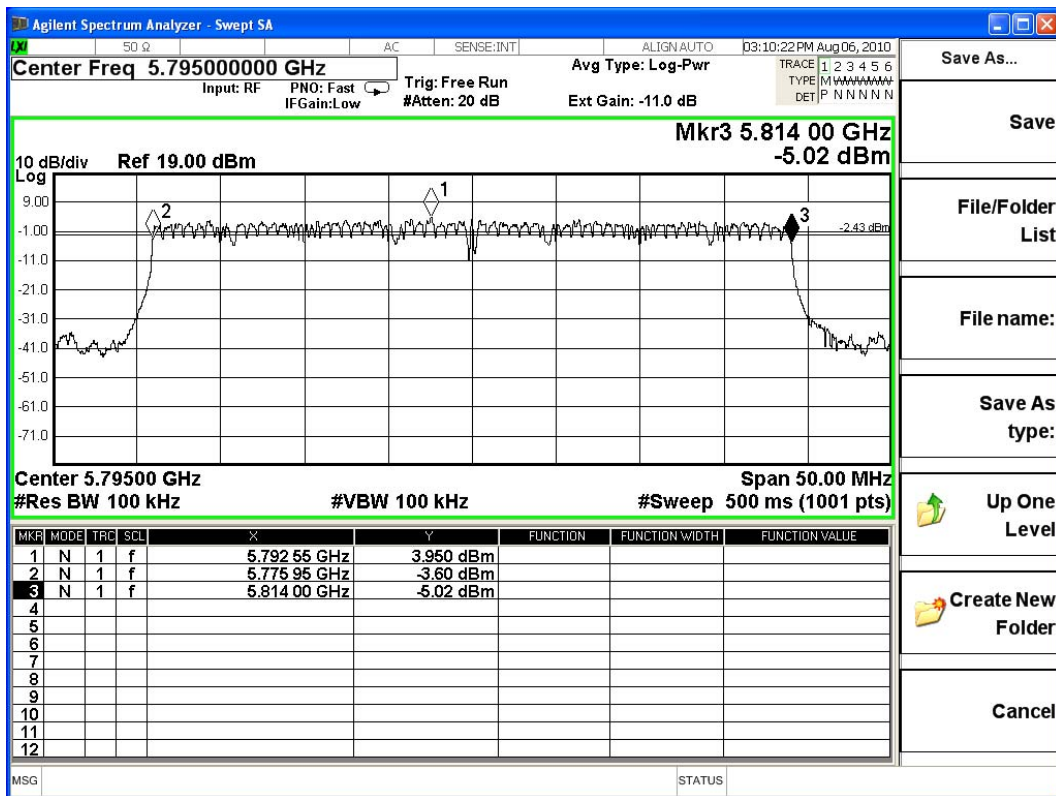
**Figure Channel 01:**



Product : Full HD Video Wireless Transmitter Module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmitter -40BW (5795MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
02	5795.00	38050	>500	Pass

**Figure Channel 02:**



## 7. Power Density

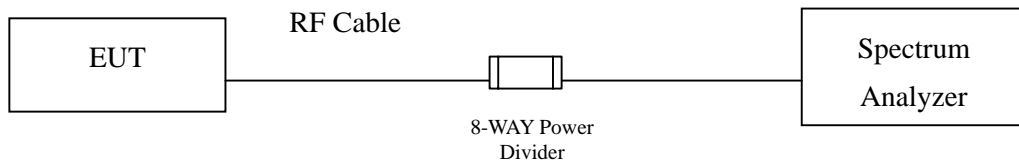
### 7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2010
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2010
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2010
X	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2010

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. The power combiner is used for measure 11n mode.

### 7.2. Test Setup



### 7.3. Limits

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

#### 7.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003; 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

#### 7.5. Uncertainty

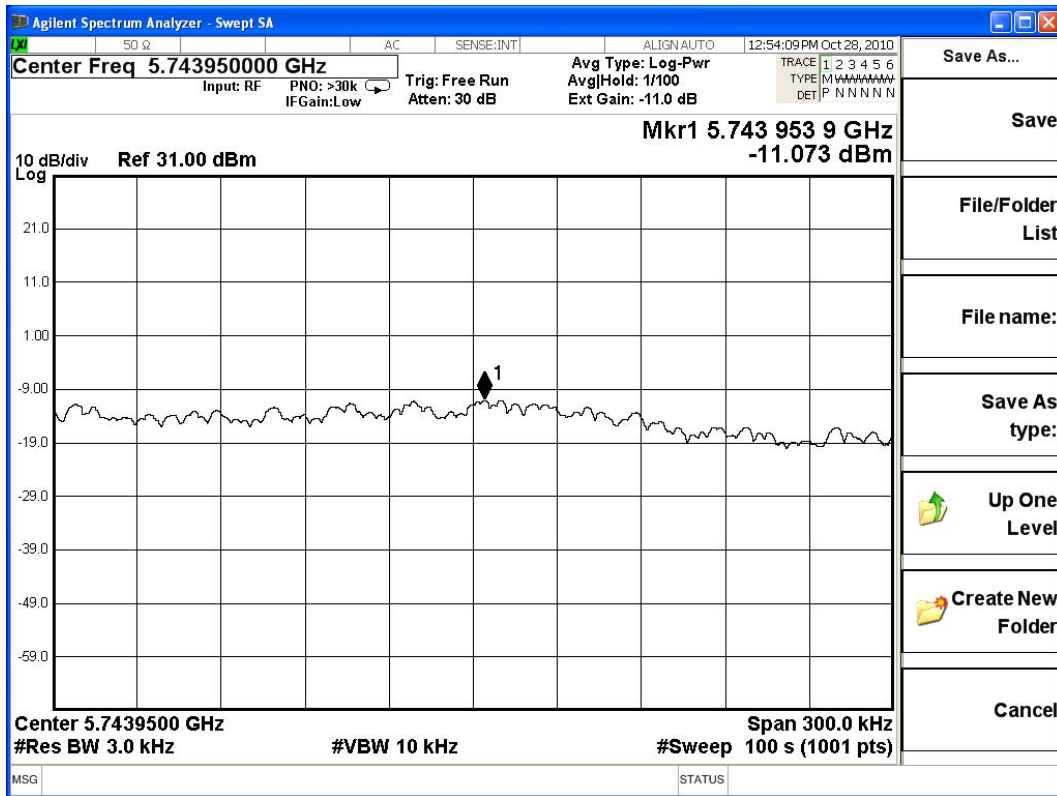
$\pm 1.27$  dB

### 7.6. Test Result of Power Density

Product : Full HD Video Wireless Transmitter Module  
 Test Item : Power Density Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter -20BW (5745MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	5745.00	-11.073	< 8dBm	Pass

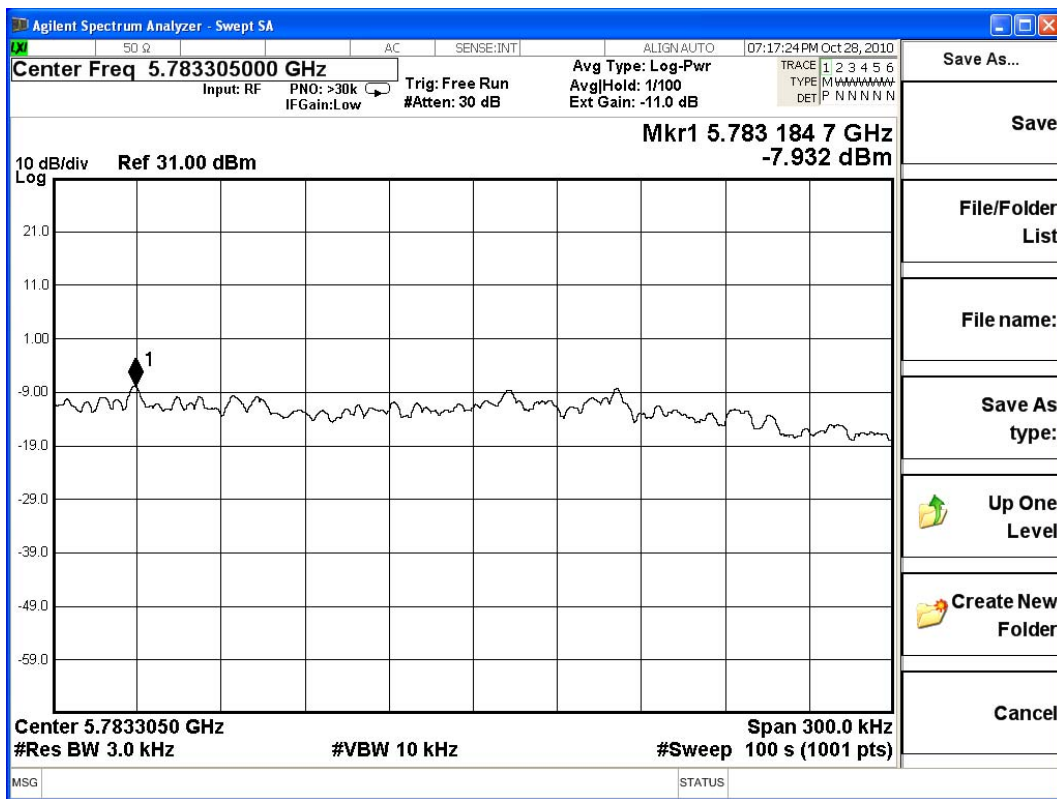
**Figure Channel 01:**



Product : Full HD Video Wireless Transmitter Module  
 Test Item : Power Density Data  
 Test Site : No.3OATS  
 Test Mode : Mode 1: Transmitter -20BW (5785MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
03	5785.000	-7.932	< 8dBm	Pass

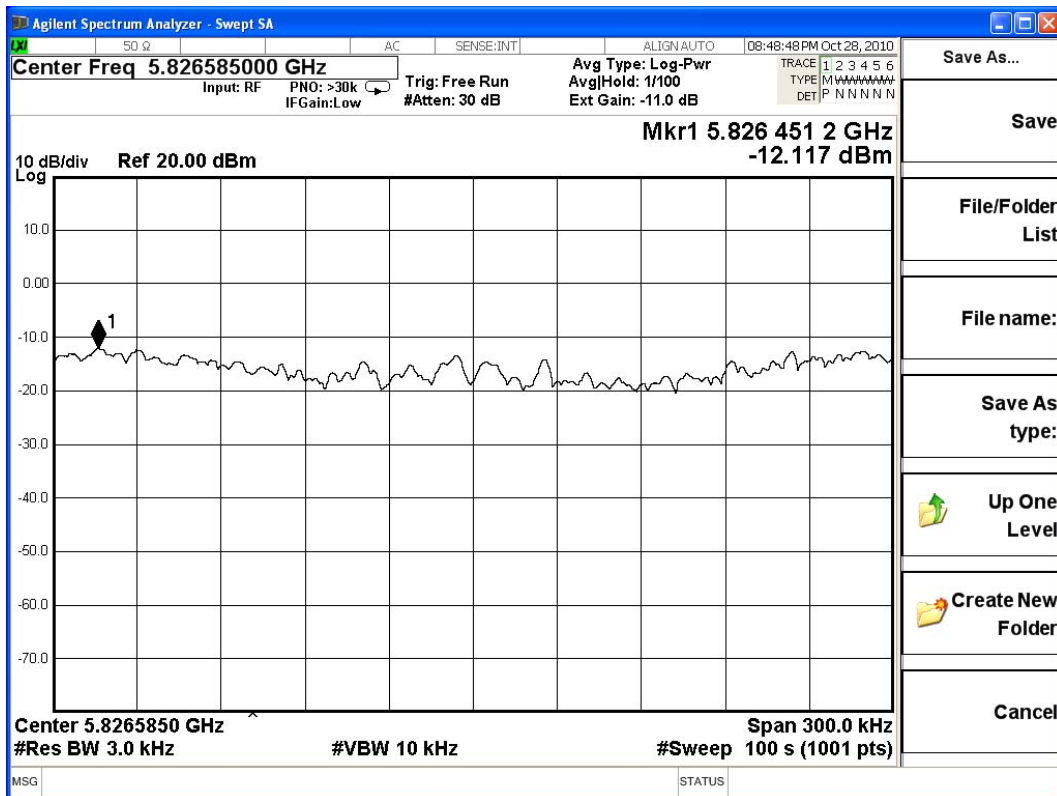
**Figure Channel 03:**



Product : Full HD Video Wireless Transmitter Module  
 Test Item : Power Density Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter -20BW (5825MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
05	5825.00	-12.117	< 8dBm	Pass

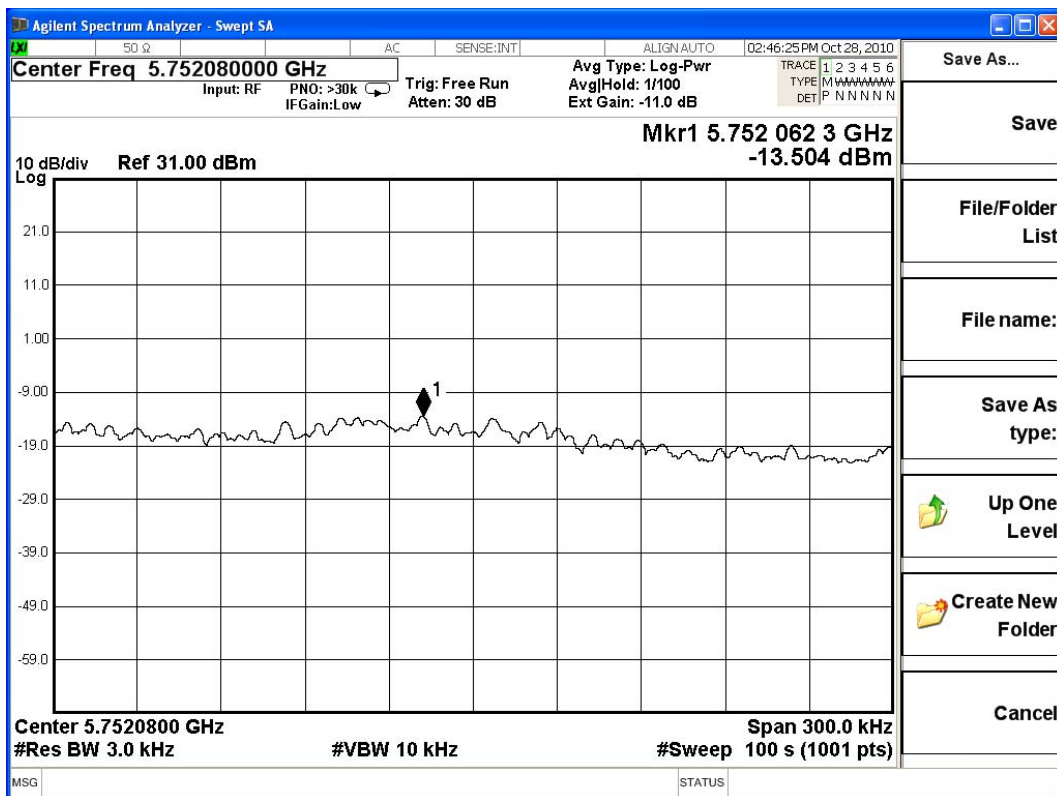
**Figure Channel 05:**



Product : Full HD Video Wireless Transmitter Module  
 Test Item : Power Density Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmitter -40BW (5755MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	5755.00	-13.504	< 8dBm	Pass

**Figure Channel 01:**

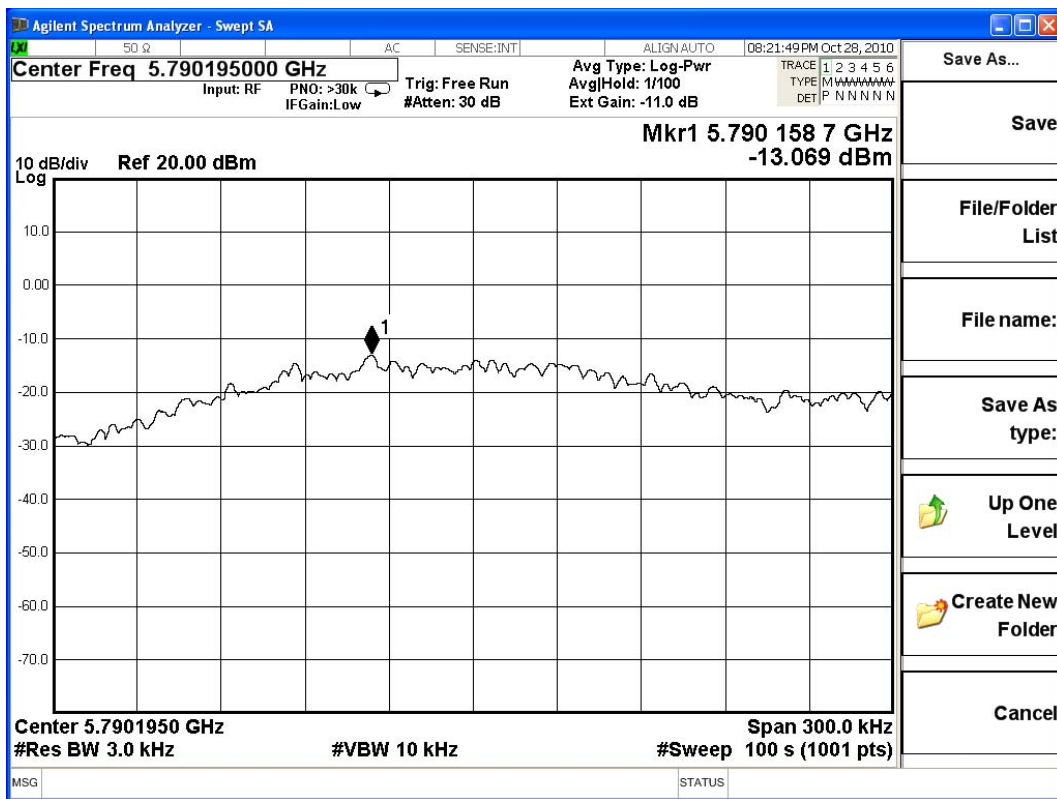




Product : Full HD Video Wireless Transmitter Module  
 Test Item : Power Density Data  
 Test Site : No.3OATS  
 Test Mode : Mode 2: Transmitter -40BW (5795MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
02	5795.000	-13.069	< 8dBm	Pass

**Figure Channel 02:**



## 8. EMI Reduction Method During Compliance Testing

No modification was made during testing.