

# FCC Test Report

Product Name	Free Style CAMERA QBiC
Model No	MS-1
FCC ID.	X3XMS-1

Applicant	ELMO COMPANY, LIMITED
Address	6-14, Meizen-cho, Mizuho-ku, Nagoya, 467-8567, JAPAN

Date of Receipt	Dec. 03, 2013
Issue Date	Feb. 10, 2014
Report No.	13C0155R-RFUSP26V00
Report Version	V1.0



The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

This report must not be used to claim product endorsement by TAF or any agency of the U.S. Government.

# Test Report Certification

Issue Date: Feb. 10, 2014

Report No.: 13C0155R-RFUSP26V00





Product Name	Free Style CAMERA QBiC
Applicant	ELMO COMPANY, LIMITED
Address	6-14, Meizen-cho, Mizuho-ku, Nagoya, 467-8567, JAPAN
Manufacturer	ELMO COMPANY, LIMITED
Model No.	MS-1
FCC ID.	X3XMS-1
EUT Rated Voltage	DC 3.7V by battery
EUT Test Voltage	AC 120V/60Hz
Trade Name	ELMO
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.10: 2009, KDB 558074
Test Result	Complied

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( Director / Vincent Lin )

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## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	Free Style CAMERA QBiC
Trade Name	ELMO
Model No.	MS-1
FCC ID.	X3XMS-1
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW
Number of Channels	802.11b/g/n-20MHz: 11
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 72.2Mbps
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	Chip Antenna
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto
Contain Module	ATHEROS / AR6103

#### Antenna List

No.	Manufacturer	Model No.	Antenna Type	Peak Gain
1	TAIYO YUDEN	AF 216M245001	Chip Antenna	1.5 dBi for 2.4 GHz

Note: The antenna of EUT is conform to FCC 15.203.

## 802.11b/g/n-20MHz Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		

## Note:

1. The EUT is a Free Style CAMERA QBiC with a built-in 2.4GHz WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps 、802.11g is 6Mbps 、802.11n(20M-BW) is 7.2Mbps .
4. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.
5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode:	Mode 1: Transmit (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

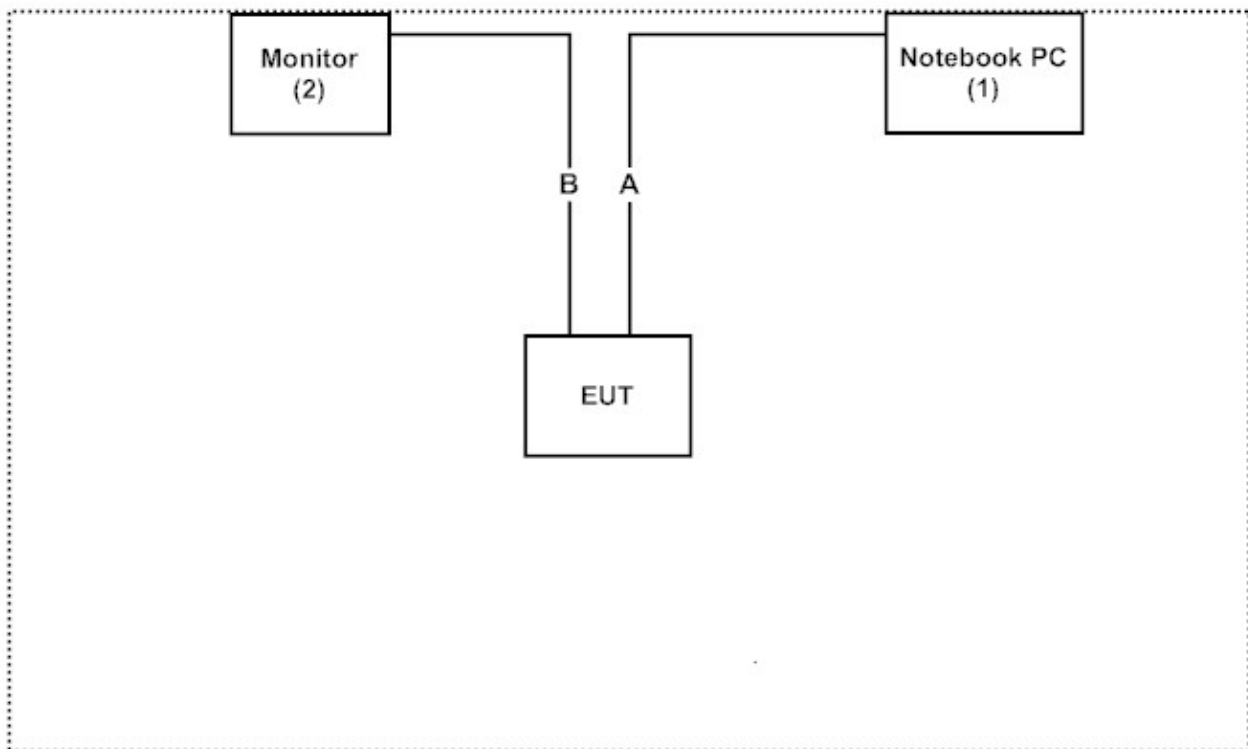
### 1.3. Tested System Details

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

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m
2	Monitor	Dell	ST2320LF	CN-OM2NN6-72872-22I-C9W5	Non-Shielded, 1.8m

	Signal Cable Type	Signal cable Description
A	USB Cable	Non-Shielded, 1.8m
B	HDMI Cable	Shielded, 1.8m

### 1.4. Configuration of Tested System



### 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Turn on the Notebook PC WLAN function to connect the EUT.
- (3) Start a browser and go to the EUT control website.
- (4) Configure the test mode, the test channel, and the data rate.
- (5) Press “OK” to start the continuous Transmit.
- (6) Turn off the Notebook PC WLAN function and verify that the EUT works properly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

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

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

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

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site:

<http://www.quietek.com/>

Site Description: File on  
Federal Communications Commission  
FCC Engineering Laboratory  
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FCC Accreditation Number: TW1014



## 2. Conducted Emission

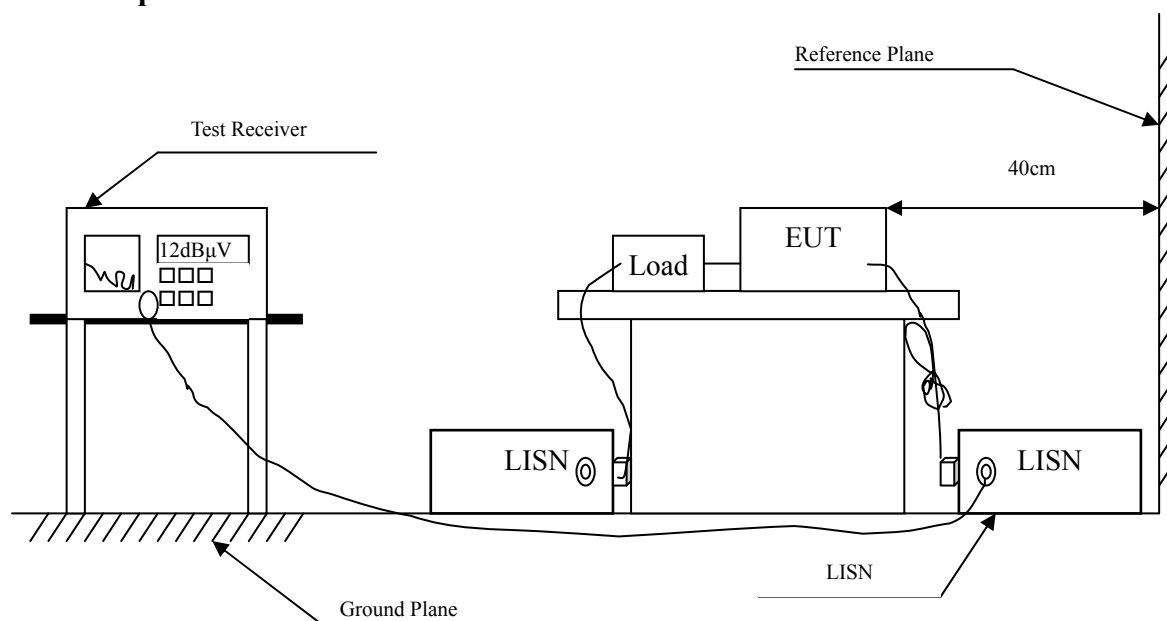
### 2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2013	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2014	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2014	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2013	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2014	
	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 (dBμV) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

### 2.4. Test Procedure

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

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.

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

### 2.5. Uncertainty

± 2.26 dB

## 2.6. Test Result of Conducted Emission

Product : Free Style CAMERA QBiC  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV	Margin dB	Limit dBμV
<b>Line 1</b>					
<b>Quasi-Peak</b>					
0.166	9.830	27.980	37.810	-27.733	65.543
0.334	9.830	22.740	32.570	-28.173	60.743
0.502	9.830	25.940	35.770	-20.230	56.000
2.502	9.841	24.130	33.971	-22.029	56.000
6.002	9.892	22.250	32.142	-27.858	60.000
22.587	10.110	20.690	30.800	-29.200	60.000
<b>Average</b>					
0.166	9.830	27.520	37.350	-18.193	55.543
0.334	9.830	22.730	32.560	-18.183	50.743
0.502	9.830	25.740	35.570	-10.430	46.000
2.502	9.841	22.290	32.131	-13.869	46.000
6.002	9.892	9.340	19.232	-30.768	50.000
22.587	10.110	13.920	24.030	-25.970	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 : Free Style CAMERA QBiC  
 Test Item : Conducted Emission Test  
 Power Line : Line 2  
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBμV
	dB	dBμV	dBμV		
<b>Line 2</b>					
<b>Quasi-Peak</b>					
0.166	9.838	25.830	35.668	-29.875	65.543
0.252	9.830	17.850	27.680	-35.406	63.086
0.502	9.840	19.970	29.810	-26.190	56.000
3.334	9.870	15.920	25.790	-30.210	56.000
6.005	9.922	18.420	28.342	-31.658	60.000
15.509	10.230	17.400	27.630	-32.370	60.000
<b>Average</b>					
0.166	9.838	25.460	35.298	-20.245	55.543
0.252	9.830	16.090	25.920	-27.166	53.086
0.502	9.840	19.960	29.800	-16.200	46.000
3.334	9.870	7.930	17.800	-28.200	46.000
6.005	9.922	7.780	17.702	-32.298	50.000
15.509	10.230	11.300	21.530	-28.470	50.000

Note:

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

### 3. Peak Power Output

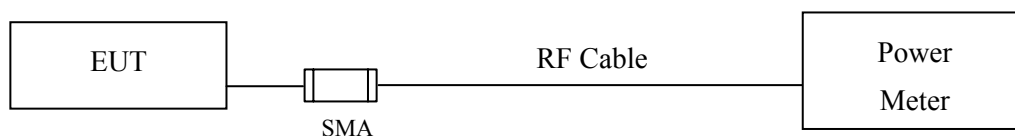
#### 3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2013
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2013

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



#### 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 KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 9.1.3 PKPM1 Peak power meter method.

#### 3.5. Uncertainty

± 1.27 dB

### 3.6. Test Result of Peak Power Output

Product : Free Style CAMERA QBiC  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)				Peak Power	Required Limit	Result
		1	2	5.5	11	1		
		Measurement Level (dBm)						
01	2412	14.01	--	--	--	16.32	<30dBm	Pass
06	2437	14.25	14.13	14.02	13.94	16.63	<30dBm	Pass
11	2462	14.64	--	--	--	16.81	<30dBm	Pass

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

Product : Free Style CAMERA QBiC  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
01	2412	12.45	--	--	--	--	--	--	--	21.32	<30dBm	Pass
06	2437	14.61	14.5	14.34	14.23	14.11	14.02	13.91	13.82	21.98	<30dBm	Pass
11	2462	10.66	--	--	--	--	--	--	--	19.38	<30dBm	Pass

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

Product : Free Style CAMERA QBiC  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	7.2		
		Measurement Level (dBm)										
01	2412	11.56	--	--	--	--	--	--	--	20.72	<30dBm	Pass
06	2437	14.33	14.21	14.08	13.92	13.81	13.69	13.57	13.44	21.86	<30dBm	Pass
11	2462	9.89	--	--	--	--	--	--	--	18.92	<30dBm	Pass

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



#### 4. Radiated Emission

##### 4.1. Test Equipment

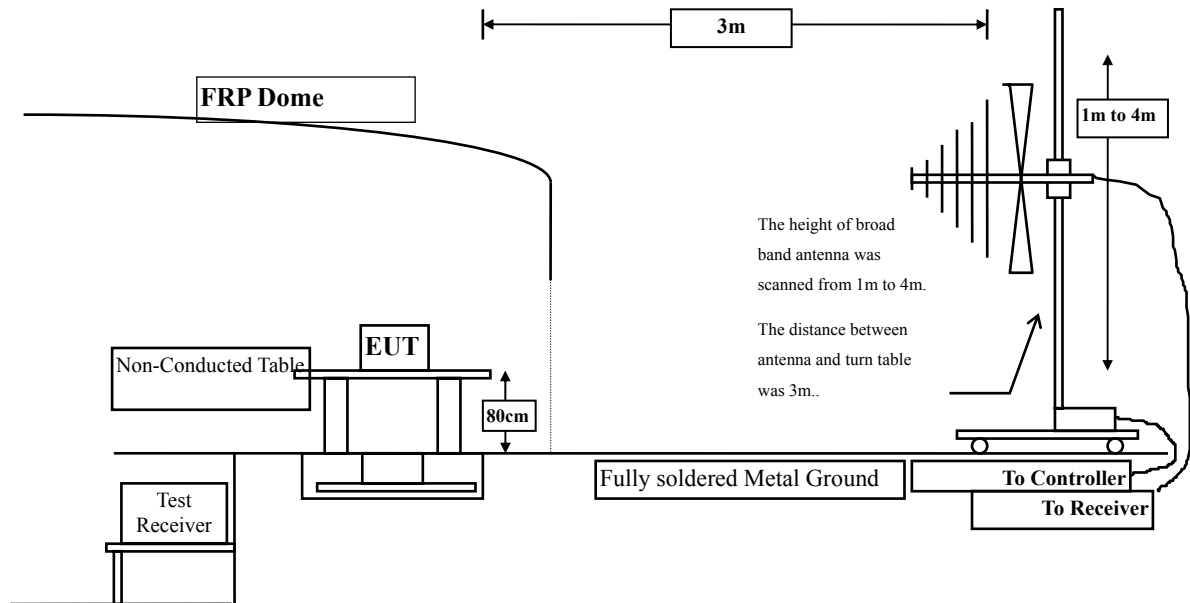
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2013
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2014
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

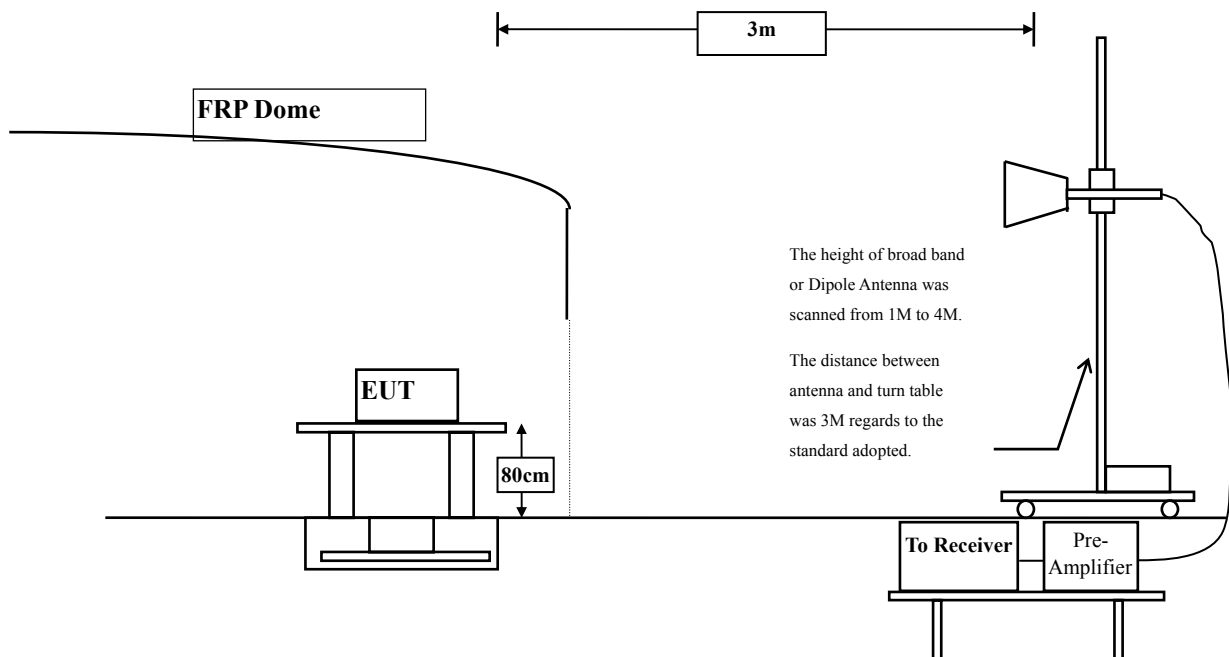
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
  2. The test instruments marked with “X” are used to measure the final test results.

## 4.2. Test Setup

### Radiated Emission Below 1GHz



### Radiated Emission Above 1GHz



### 4.3. Limits

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

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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

#### 4.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009 and tested according to DTS test procedure of KDB 558074 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 C63.10: 2009 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~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 frequency range from 9kHz to 10th harmonics is checked.

#### 4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

#### 4.6. Test Result of Radiated Emission

Product : Free Style CAMERA QBiC  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dB $\mu$ V/m
	dB	dB $\mu$ V	dB $\mu$ V/m		

##### Horizontal

##### Peak Detector:

4824.000	3.261	38.740	42.001	-31.999	74.000
7236.000	10.650	37.070	47.720	-26.280	74.000
9648.000	13.337	37.410	50.746	-23.254	74.000

##### Average Detector:

--

##### Vertical

##### Peak Detector:

4824.000	6.421	39.130	45.551	-28.449	74.000
7236.000	11.495	36.670	48.165	-25.835	74.000
9648.000	13.807	38.130	51.936	-22.064	74.000

##### Average Detector:

--

##### Note:

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

Product : Free Style CAMERA QBiC  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4874.000	3.038	38.650	41.687	-32.313	74.000
7311.000	11.795	36.200	47.994	-26.006	74.000
9748.000	12.635	37.420	50.055	-23.945	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4874.000	5.812	38.160	43.971	-30.029	74.000
7311.000	12.630	37.120	49.749	-24.251	74.000
9748.000	13.126	36.880	50.006	-23.994	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. 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 : Free Style CAMERA QBiC  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m

#### Horizontal

##### Peak Detector:

4924.000	2.858	39.400	42.257	-31.743	74.000
7386.000	12.127	36.850	48.978	-25.022	74.000
9848.000	12.852	37.210	50.063	-23.937	74.000

##### Average Detector:

--

#### Vertical

##### Peak Detector:

4924.000	5.521	38.510	44.030	-29.970	74.000
7386.000	13.254	36.270	49.524	-24.476	74.000
9848.000	13.367	37.290	50.657	-23.343	74.000

##### Average Detector:

--

#### Note:

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

Product : Free Style CAMERA QBiC  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m

#### Horizontal

##### Peak Detector:

4824.000	3.261	39.000	42.261	-31.739	74.000
7236.000	10.650	36.750	47.400	-26.600	74.000
9648.000	13.337	37.580	50.916	-23.084	74.000

##### Average Detector:

--

#### Vertical

##### Peak Detector:

4824.000	6.421	38.610	45.031	-28.969	74.000
7236.000	11.495	37.310	48.805	-25.195	74.000
9648.000	13.807	37.700	51.506	-22.494	74.000

##### Average Detector:

--

#### Note:

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



Product : Free Style CAMERA QBiC  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m

#### Horizontal

##### Peak Detector:

4874.000	3.038	38.160	41.197	-32.803	74.000
7311.000	11.795	36.390	48.184	-25.816	74.000
9748.000	12.635	37.220	49.855	-24.145	74.000

##### Average Detector:

--

##### Peak Detector:

4874.000	5.812	37.980	43.791	-30.209	74.000
7311.000	12.630	36.750	49.379	-24.621	74.000
9748.000	13.126	37.330	50.456	-23.544	74.000

##### Average Detector:

--

#### Note:

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

Product : Free Style CAMERA QBiC  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m

#### Horizontal

##### Peak Detector:

4924.000	2.858	38.130	40.987	-33.013	74.000
7386.000	12.127	36.230	48.358	-25.642	74.000
9848.000	12.852	37.380	50.233	-23.767	74.000

##### Average Detector:

--

#### Vertical

##### Peak Detector:

4924.000	5.521	37.730	43.250	-30.750	74.000
7386.000	13.254	36.160	49.414	-24.586	74.000
9848.000	13.367	37.180	50.547	-23.453	74.000

##### Average Detector:

--

#### Note:

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

Product : Free Style CAMERA QBiC  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m

#### Horizontal

##### Peak Detector:

4824.000	3.261	38.260	41.521	-32.479	74.000
7236.000	10.650	37.040	47.690	-26.310	74.000
9648.000	13.337	37.910	51.246	-22.754	74.000

##### Average Detector:

--

#### Vertical

##### Peak Detector:

4824.000	6.421	38.890	45.311	-28.689	74.000
7236.000	11.495	37.260	48.755	-25.245	74.000
9648.000	13.807	37.120	50.926	-23.074	74.000

##### Average Detector:

--

#### Note:

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

Product : Free Style CAMERA QBiC  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

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

#### Horizontal

##### Peak Detector:

4874.000	3.038	38.720	41.757	-32.243	74.000
7311.000	11.795	36.490	48.284	-25.716	74.000
9748.000	12.635	36.930	49.565	-24.435	74.000

##### Average Detector:

--

#### Vertical

##### Peak Detector:

4874.000	5.812	38.650	44.461	-29.539	74.000
7311.000	12.630	36.380	49.009	-24.991	74.000
9748.000	13.126	37.140	50.266	-23.734	74.000

##### Average Detector:

--

#### Note:

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

Product : Free Style CAMERA QBiC  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz)

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

#### Horizontal

##### Peak Detector:

4924.000	2.858	37.590	40.447	-33.553	74.000
7386.000	12.127	36.150	48.278	-25.722	74.000
9848.000	12.852	37.380	50.233	-23.767	74.000

##### Average Detector:

--

#### Vertical

##### Peak Detector:

4924.000	5.521	38.660	44.180	-29.820	74.000
7386.000	13.254	36.140	49.394	-24.606	74.000
9848.000	13.367	37.010	50.377	-23.623	74.000

##### Average Detector:

--

#### Note:

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

Product : Free Style CAMERA QBiC  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV/m	dB	dBμV/m
<b>Horizontal</b>					
156.100	-10.461	34.180	23.718	-19.782	43.500
258.920	-5.050	45.714	40.664	-5.336	46.000
468.440	1.195	28.139	29.334	-16.666	46.000
699.300	2.875	38.345	41.220	-4.780	46.000
792.420	5.209	29.685	34.894	-11.106	46.000
974.780	6.652	23.924	30.576	-23.424	54.000
<b>Vertical</b>					
189.080	-10.969	42.321	31.352	-12.148	43.500
258.920	-7.490	46.409	38.919	-7.081	46.000
363.680	-2.393	33.677	31.284	-14.716	46.000
536.340	-0.305	28.045	27.740	-18.260	46.000
792.420	2.889	26.518	29.407	-16.593	46.000
961.200	7.260	23.263	30.523	-23.477	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.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Free Style CAMERA QBiC  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
43.580	-4.496	28.862	24.366	-15.634	40.000
311.300	-4.026	40.955	36.929	-9.071	46.000
458.740	0.833	25.445	26.278	-19.722	46.000
604.240	4.770	21.815	26.585	-19.415	46.000
745.860	3.308	25.253	28.561	-17.439	46.000
829.280	6.344	24.379	30.723	-15.277	46.000
<b>Vertical</b>					
158.040	-6.191	39.887	33.696	-9.804	43.500
311.300	-6.856	47.113	40.257	-5.743	46.000
454.860	-5.499	33.645	28.145	-17.855	46.000
520.820	-0.298	24.577	24.279	-21.721	46.000
792.420	2.889	26.835	29.724	-16.276	46.000
914.640	1.033	30.480	31.513	-14.487	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Free Style CAMERA QBiC  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV/m	dB	dBμV/m
<b>Horizontal</b>					
43.580	-4.496	32.875	28.379	-11.621	40.000
258.920	-5.050	43.765	38.715	-7.285	46.000
363.680	-1.433	35.603	34.170	-11.830	46.000
573.200	2.537	30.353	32.890	-13.110	46.000
792.420	5.209	27.847	33.056	-12.944	46.000
885.540	6.102	26.775	32.877	-13.123	46.000
<b>Vertical</b>					
92.080	-3.339	38.757	35.418	-8.082	43.500
196.840	-8.766	40.793	32.027	-11.473	43.500
363.680	-2.393	35.344	32.951	-13.049	46.000
577.080	-5.661	28.768	23.107	-22.893	46.000
792.420	2.889	29.407	32.296	-13.704	46.000
967.020	8.071	23.448	31.519	-22.481	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.
8. No emission found between lowest internal used/generated frequency to 30MHz.



## 5. RF antenna conducted test

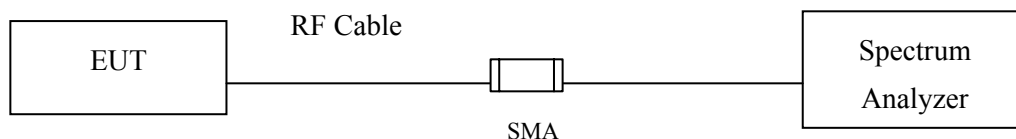
### 5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

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

### 5.2. Test Setup

#### RF antenna Conducted Measurement:



### 5.3. Limits

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

### 5.4. Test Procedure

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

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

## 5.5. Uncertainty

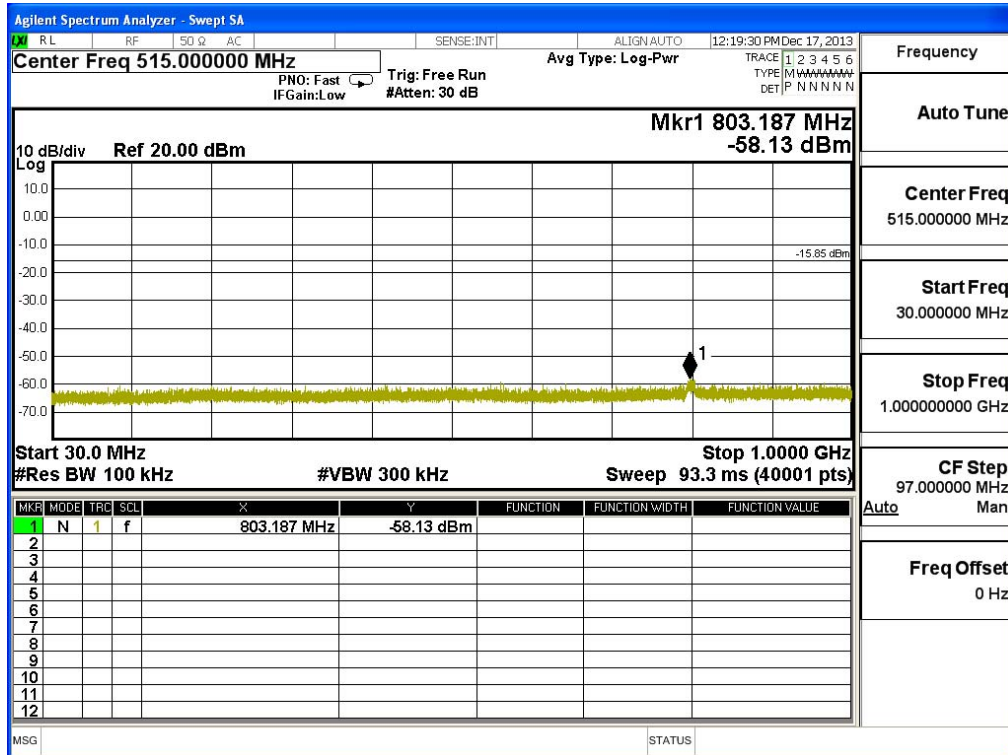
The measurement uncertainty

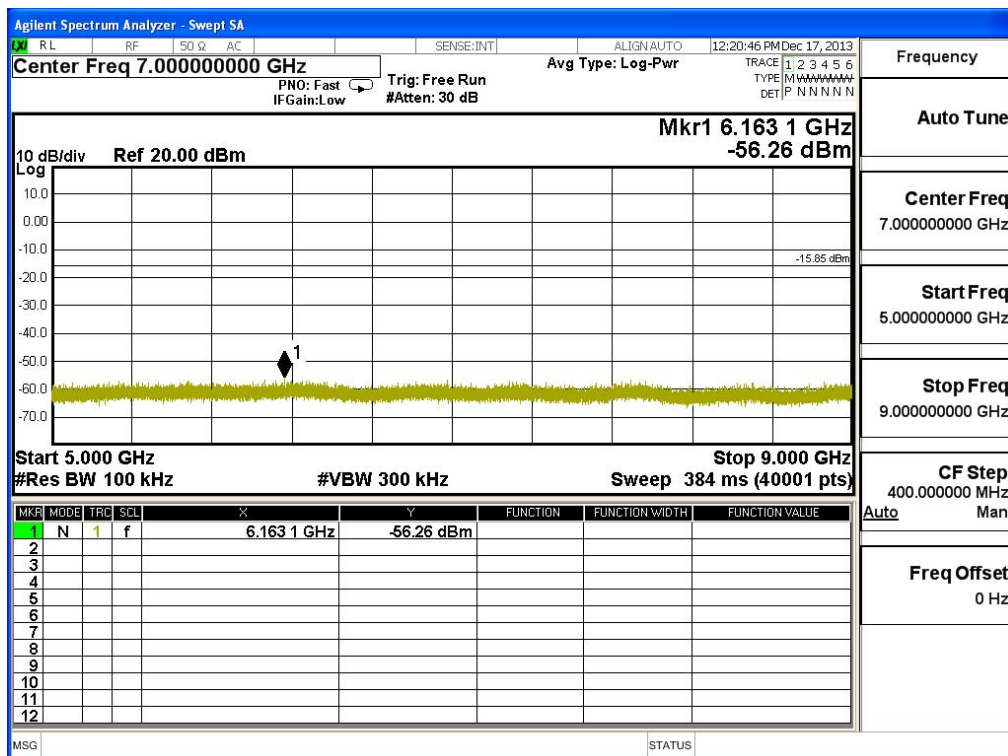
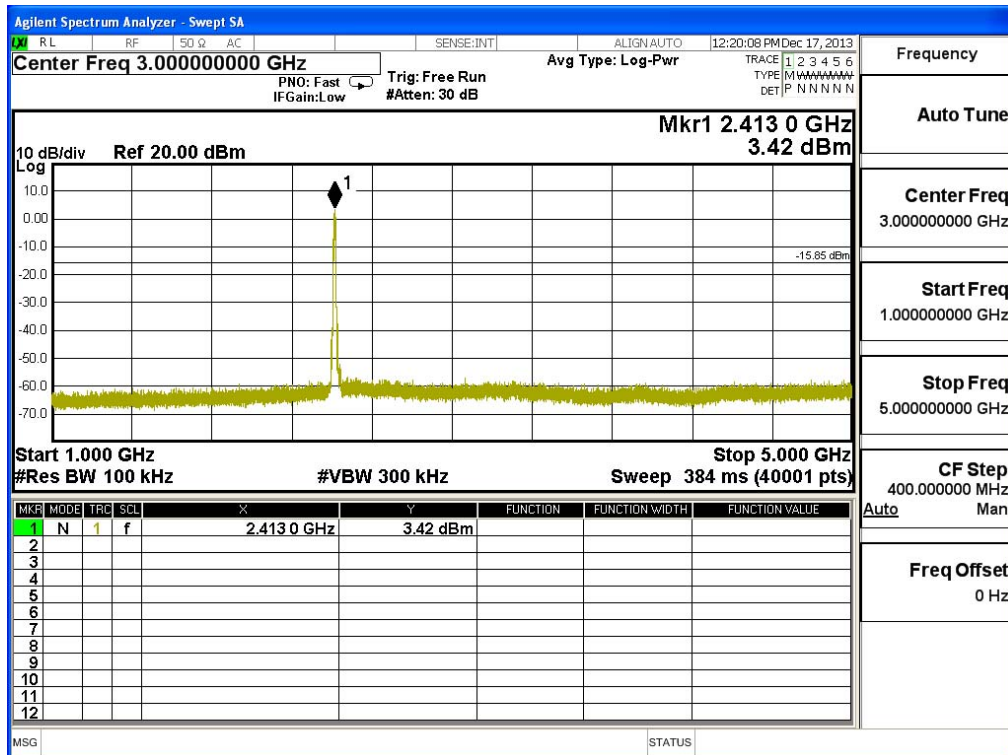
Conducted is defined as  $\pm 1.27\text{dB}$

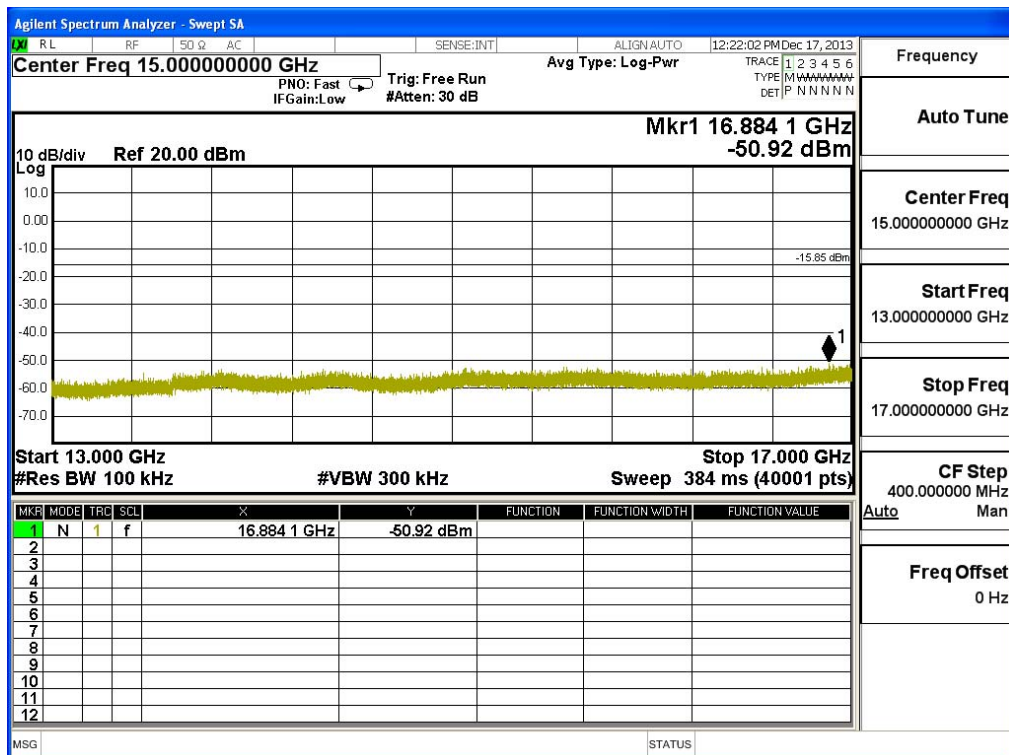
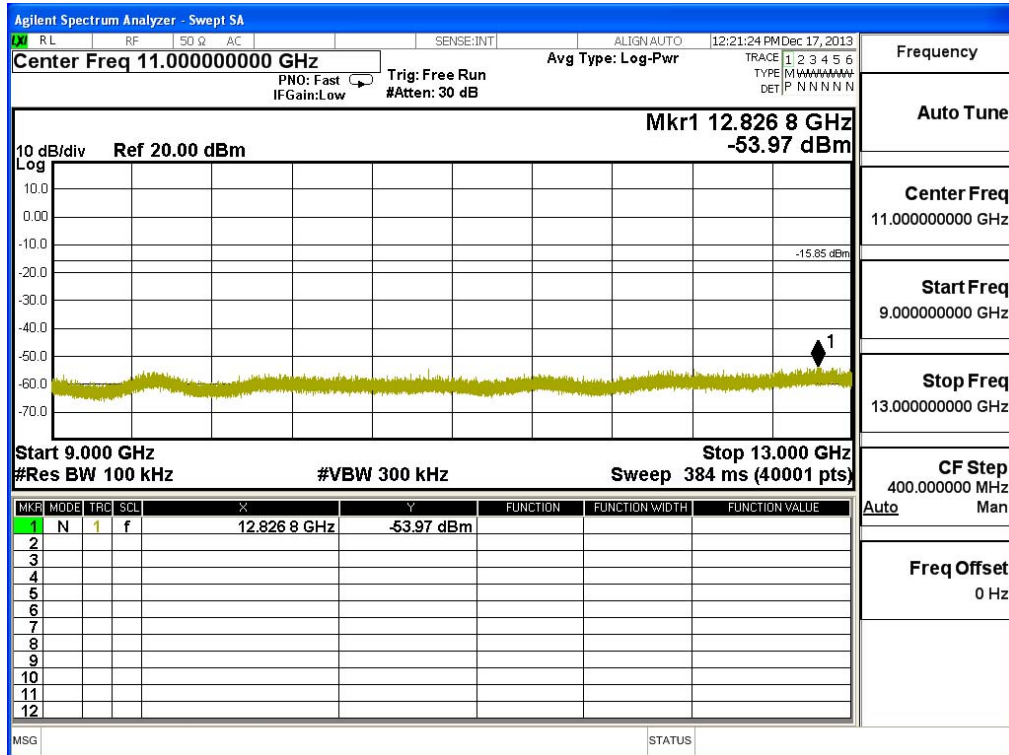
## 5.6. Test Result of RF antenna conducted test

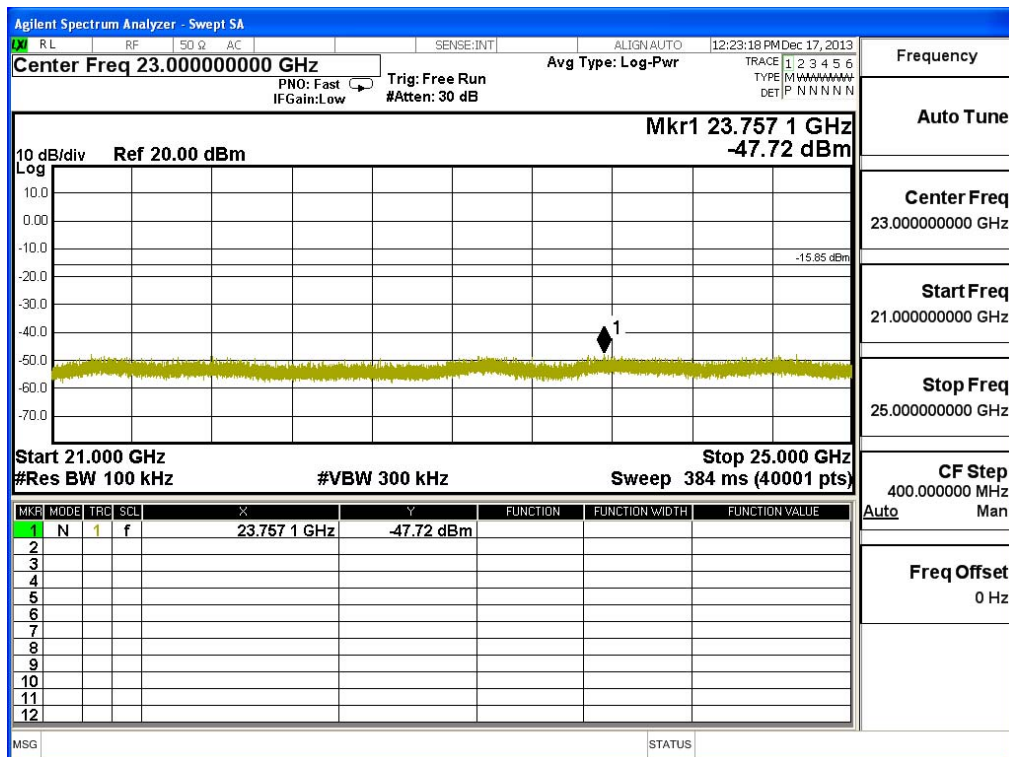
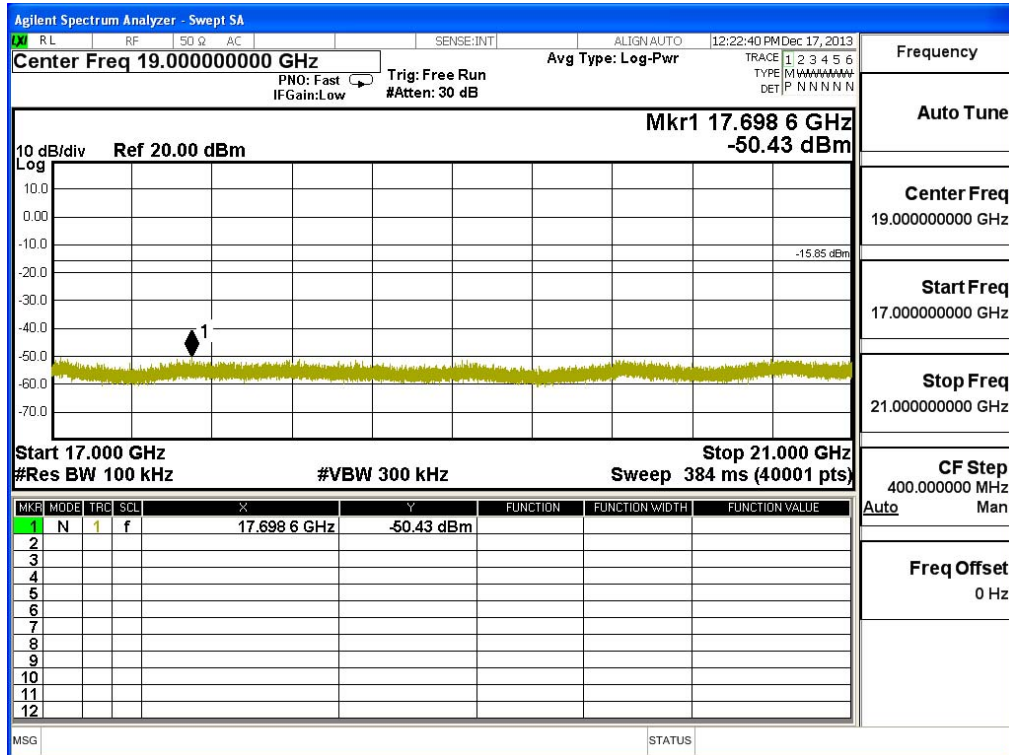
Product : Free Style CAMERA QBiC  
 Test Item : RF antenna conducted test  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

### Channel 01 (2412MHz)

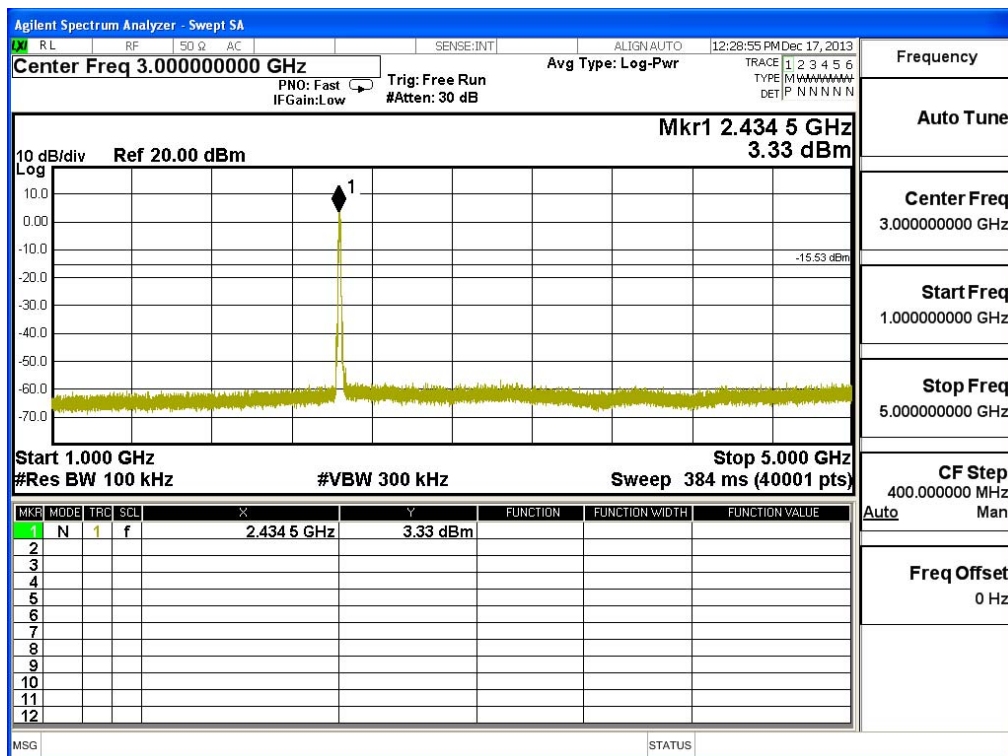
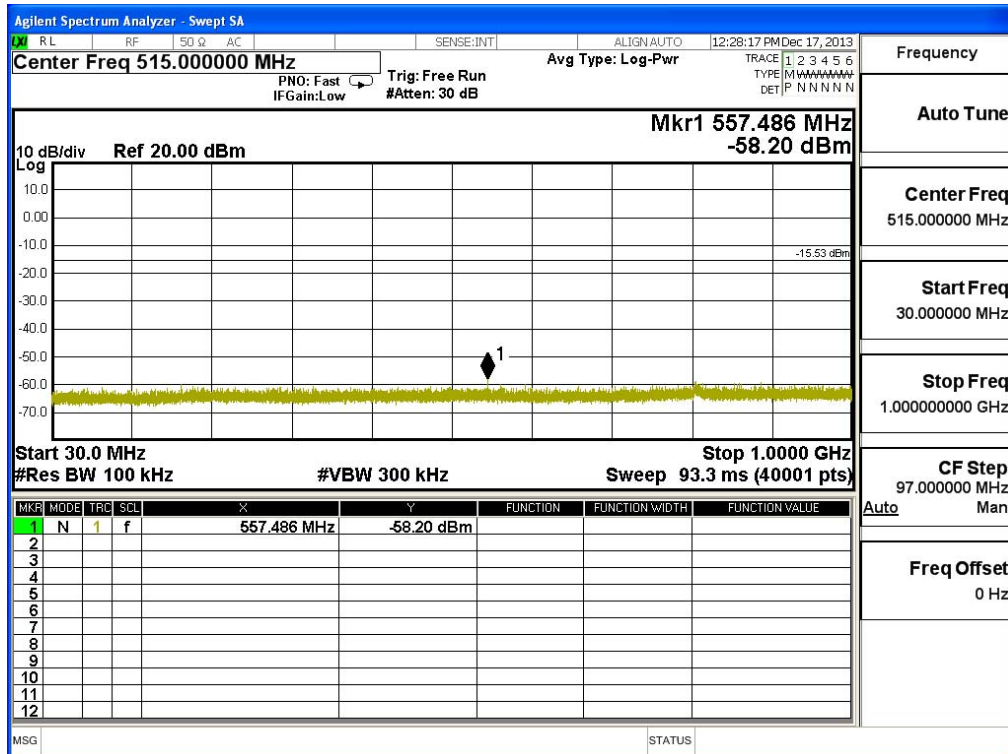




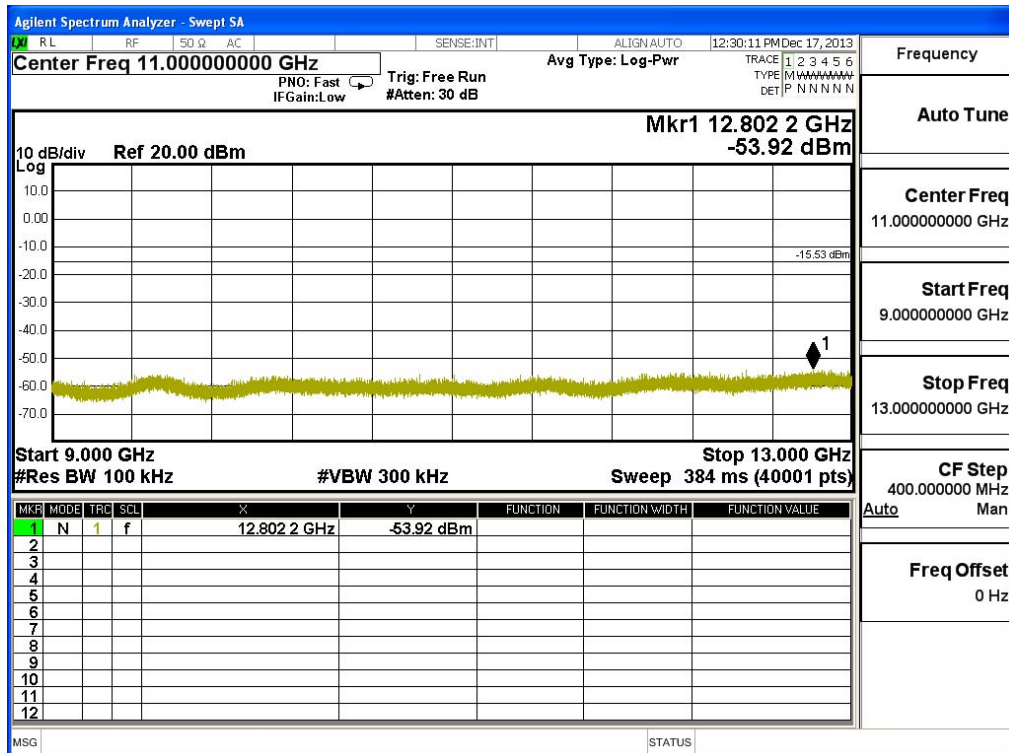
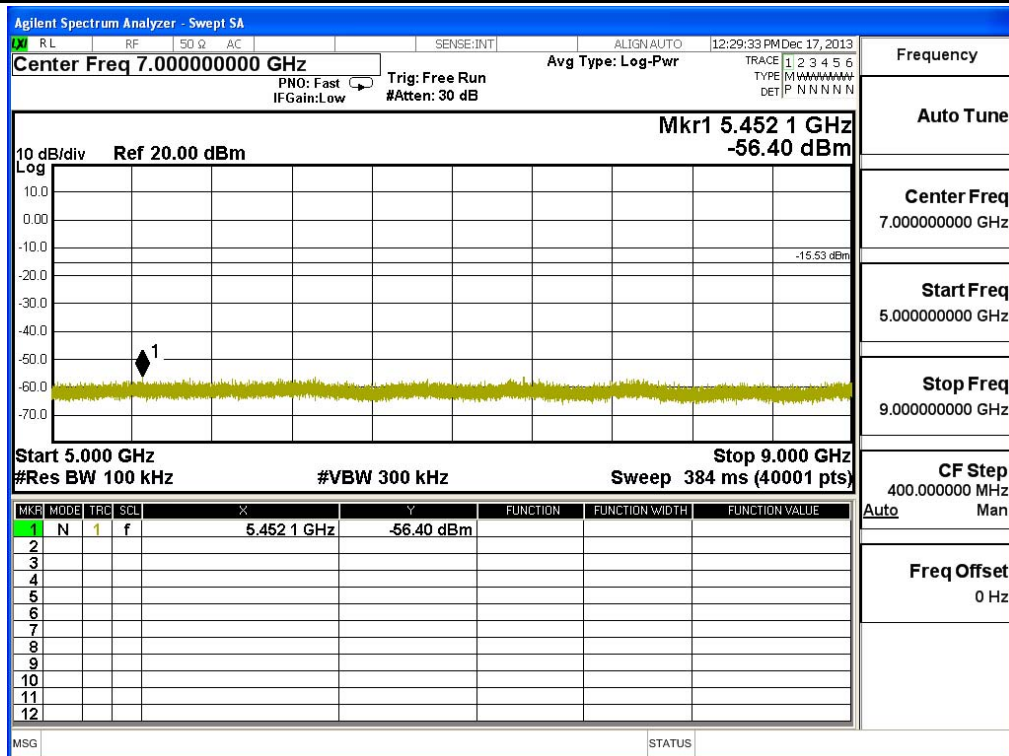




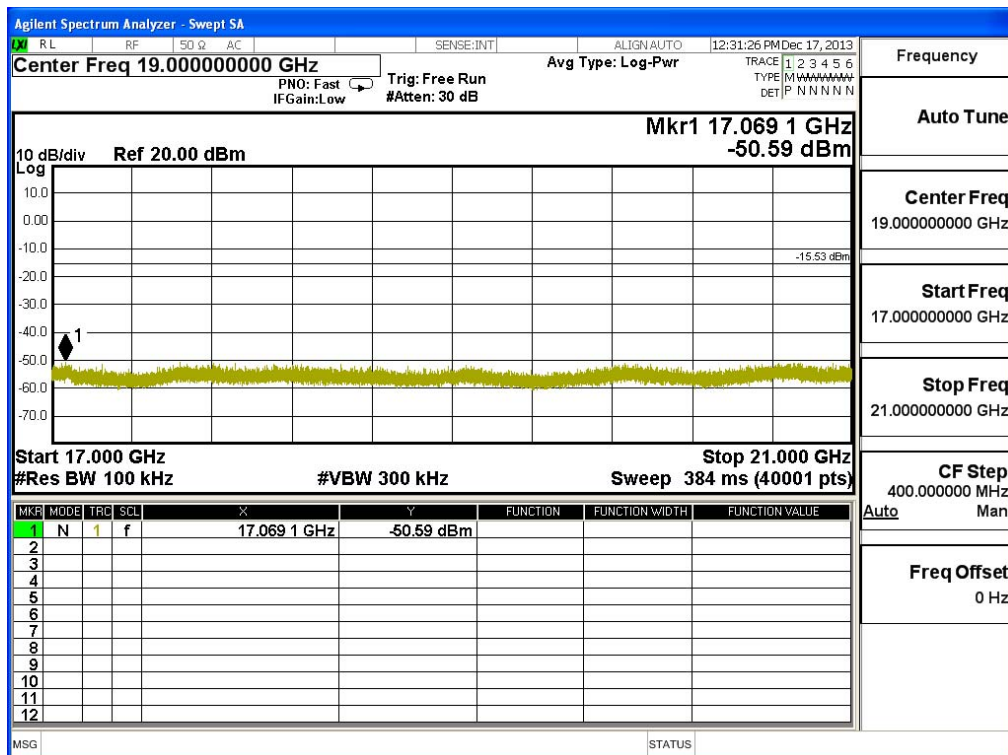
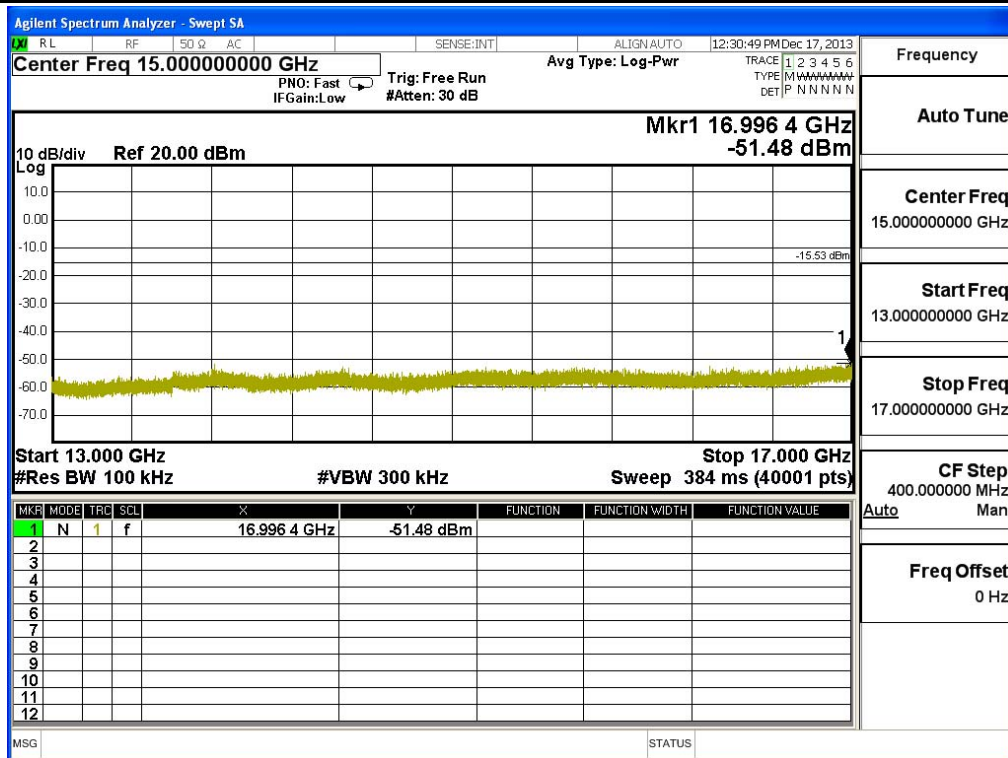
### Channel 06 (2437MHz)

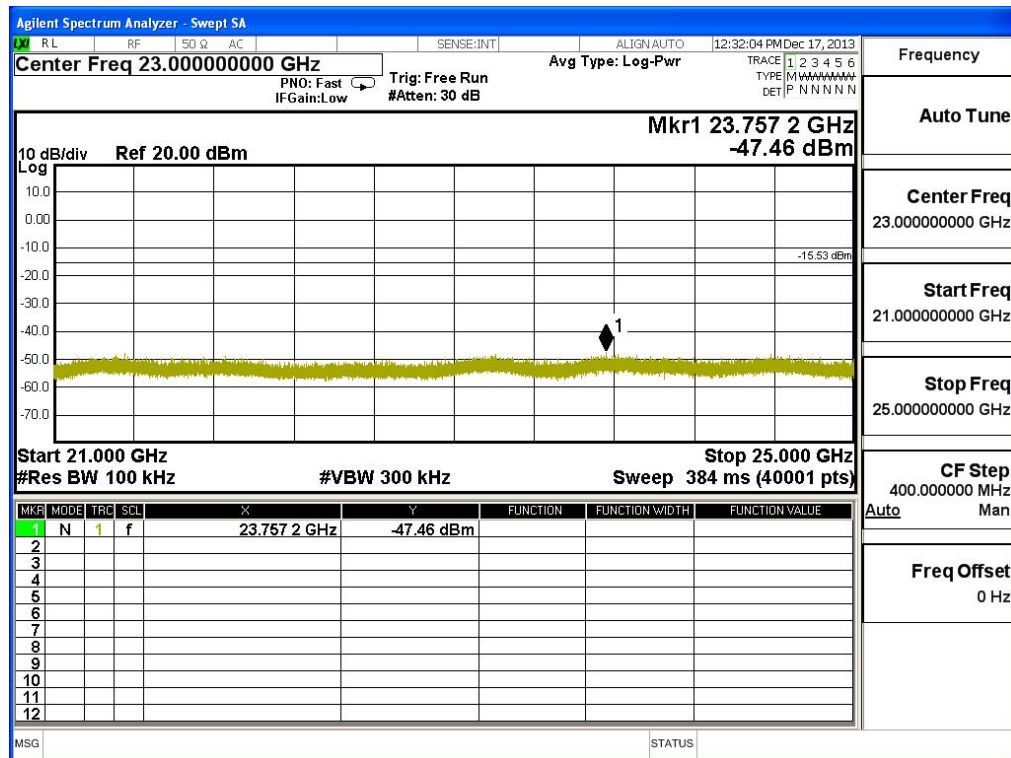












### Channel 11 (2462MHz)

