



FCC RADIO TEST REPORT

FCC ID: BOOKP-20-XXX

Product : Android mini PC

Trade Name : N/A

Model Name : SY-20-19VC

Serial Model : SY-20-XXX(XXX in the model designation may be any alphanumeric characters denoting different configuration options)

Report No. : NTEK-2013NT0606340F

Prepared for

Unisen limited

Room 907, Fook Hong Industrial Bldg., 19 Sheung Yuet Road, Kowloon Bay, Kowloon, Hong Kong

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street
Bao'an District, Shenzhen P.R. China

Tel.: +86-0755-61156588 Fax.: +86-0755-61156599

Website: www.ntek.org.cn

TEST RESULT CERTIFICATION

Applicant's name : Unisen limited
Address : Room 907, Fook Hong Industrial Bldg.,19 Sheung Yuet Road,
Kowloon Bay,Kowloon, Hong Kong

Manufacture's Name..... : Unisen limited
Address : Room 907, Fook Hong Industrial Bldg.,19 Sheung Yuet Road,
Kowloon Bay,Kowloon, Hong Kong

Product description

Product name : Android mini PC
Model and/or type reference : SY-20-19VC
Serial Model : SY-20-XXX(XXX in the model designation may be any
alphanumeric characters denoting different configuration options)

Standards : FCC Part15.247

Test procedure..... ANSI C63.4-2003

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests : 06 Jun. 2013 ~05 Jul. 2013

Date of Issue..... : 05 Jul. 2013

Test Result..... : **Pass**

Testing Engineer : Eric Wang
(Eric Wang)

Technical Manager : Tom Zhang
(Tom Zhang)

Authorized Signatory : Bovey Yang
(Bovey Yang)

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247 (a)(2)	6dB Bandwidth	PASS	
15.247 (b)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (d)	Power Spectral Density	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd

Add.:1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

FCC Registration No.:238937; IC Registration No.:9270A-1

CNAS Registration No.:L5516

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Android mini PC	
Trade Name	N/A	
Model Name	SY-20-19VC	
Serial Model	SY-20-XXX(XXX in the model designation may be any alphanumeric characters denoting different configuration options)	
Model Difference	All the models are the same circuit and RF module, except the model names.	
Product Description	The EUT is a Android mini PC	
	Operation Frequency:	802.11b/g/n(20MHz):2412~2462 MHz 802.11n(40MHz):2422~2452
	Modulation Type:	CCK/OFDM/DBPSK/DAPSK
	Bit Rate of Transmitter	802.11b:11/5.5/2/1 Mbps 802.11g:54/48/36/24/18/12/9/6Mbps 802.11n(20MHz):150/144.44/130/117/115.56/104/86.67/78/52/6.5Mbps 802.11n(40MHz):300/270/240/180/150/120/108/90/54 Mbps
	Number Of Channel	802.11b/g/n20MHz:11CH 802.11n40MHz:7CH
	Antenna Designation:	Please see Note 3.
	Output Power(Conducted):	802.11b: 17.74 dBm (Max.) 802.11g: 16.94 dBm (Max.) 802.11n(20M) : 15.83 dBm (Max.) 802.11n (40M): 13.63 dBm (Max.)
	Antenna Gain (dBi)	1.0dbi
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
	Channel List	Please refer to the Note 2.
Ratings	DC 5V From Adapter	
Adapter	Model:SAW-0502000, AC Power Input: 100-240V~, 50-60Hz, 0.5A Output: 5V $\overline{\text{---}}$, 2000mA	
Battery	N/A	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List for 802.11b/g/n(20)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

Channel List for 802.11n(40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
03	2422	06	2437	09	2452		
04	2427	07	2442				
05	2432	08	2447				

3.

Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	Integrated Antenna	N/A	1.0	Wifi Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n CH1/ CH6/ CH11
Mode 4	802.11n CH3/ CH6/ CH9
Mode 5	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 5	Link Mode

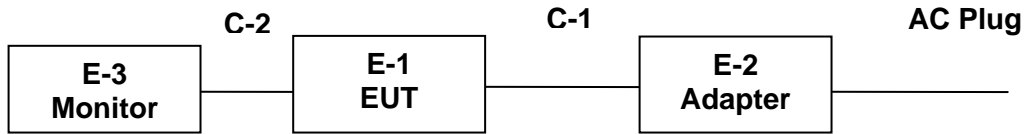
For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n CH1/ CH6/ CH11
Mode 4	802.11n CH3/ CH6/ CH9

Note:

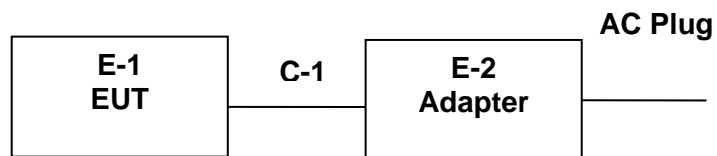
- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Test



Radiated Spurious Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	Android mini PC	N/A	SY-20-19VC	N/A	EUT
E-2	Adapter	N/A	SAW-0502000	N/A	
E-3	HDMI	N/A	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	120cm	
C-2	YES	NO	120cm	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2012.07.06	2013.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2013.06.07	2014.06.06	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2012.07.06	2013.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2013.06.07	2014.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2013.06.07	2014.06.06	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2012.07.06	2013.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2012.07.06	2013.07.05	1 year
8	Amplifier	EM	EM-30180	060538	2012.12.22	2013.12.21	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2013.06.08	2014.06.07	1 year
10	Power Meter	R&S	NRVS	100696	2012.07.06	2013.07.05	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2012.07.06	2013.07.05	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2013.06.06	2014.06.05	1 year
2	LISN	R&S	ENV216	101313	2012.08.24	2013.08.23	1 year
3	LISN	EMCO	3816/2	00042990	2012.08.24	2013.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2013.06.07	2014.06.06	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2013.06.07	2014.06.06	1 year
6	Absorbing clamp	R&S	MOS-21	100423	2013.06.08	2014.06.07	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

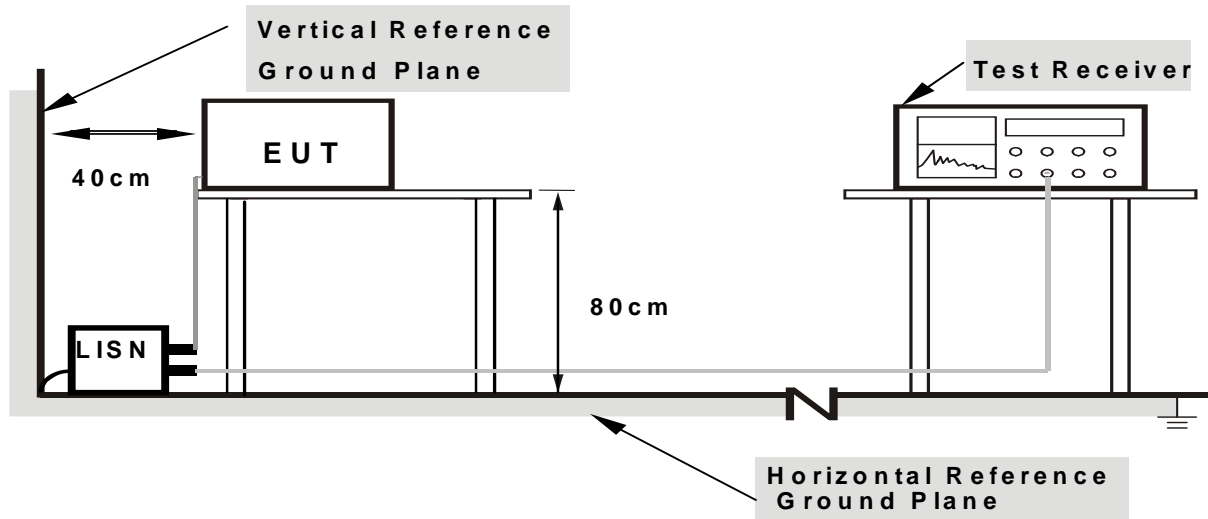
3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



- Note:**
- 1. Support units were connected to second LISN.
 - 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

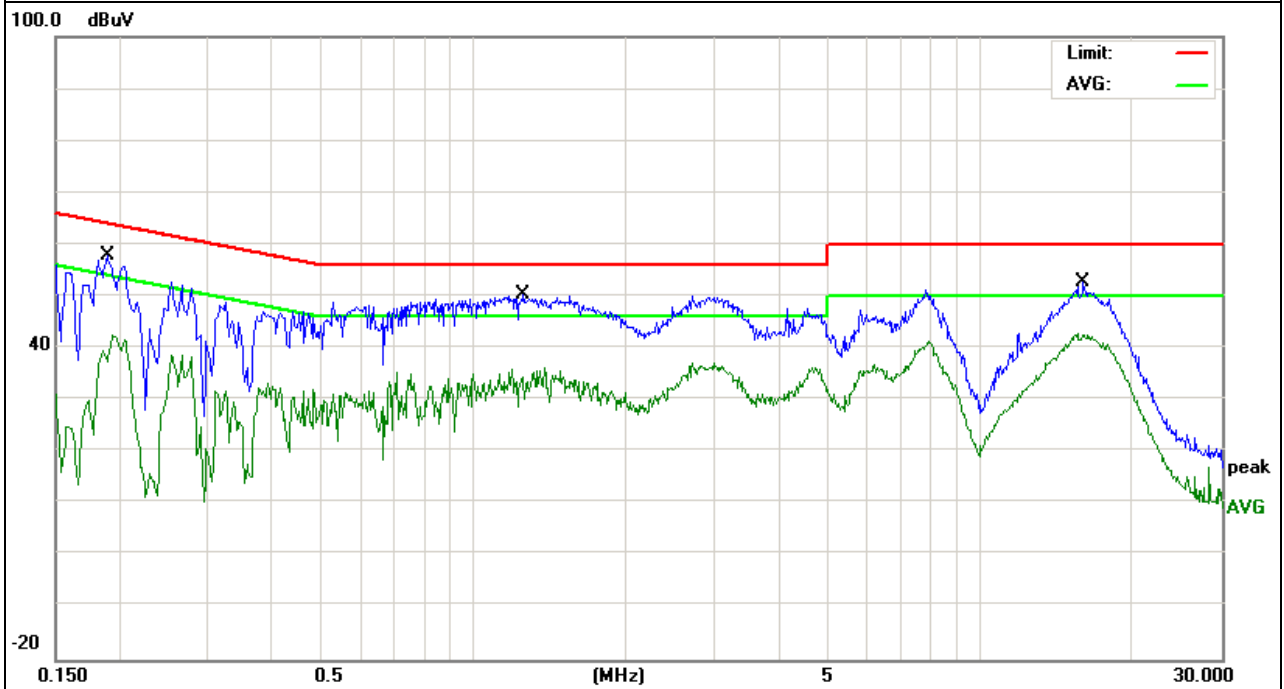
3.1.6 TEST RESULTS

EUT :	Android mini PC	Model Name. :	SY-20-19VC
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC120V/60Hz	Test Mode :	Mode 1

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector Type
0.1900	47.61	10.12	57.73	64.03	-6.30	QP
0.1900	32.42	10.12	42.54	54.03	-11.49	AVG
1.2579	40.05	10.18	50.23	56.00	-5.77	QP
1.2579	26.09	10.18	36.27	46.00	-9.73	AVG
16.0180	42.14	10.57	52.71	60.00	-7.29	QP
16.0180	32.18	10.57	42.75	50.00	-7.25	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

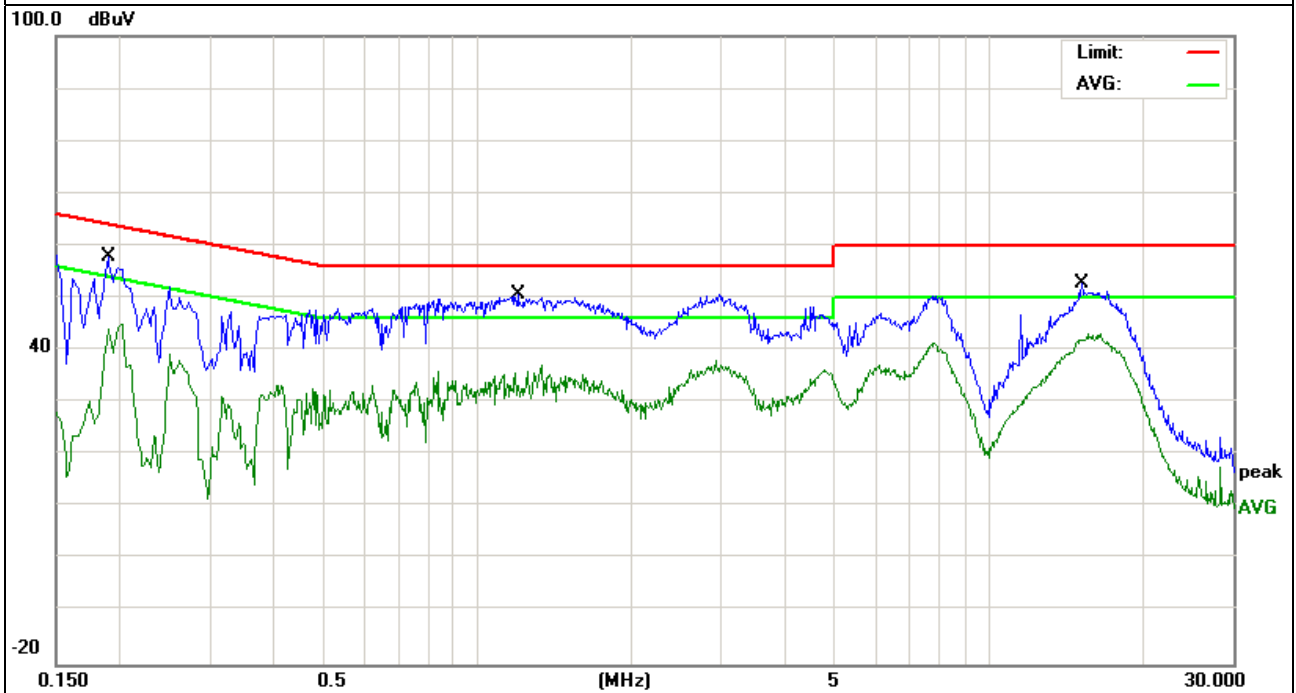


EUT :	Android mini PC	Model Name. :	SY-20-19VC
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC120V/60Hz	Test Mode :	Mode 1

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector Type
0.1900	47.68	10.12	57.80	64.03	-6.23	QP
0.1900	34.95	10.12	45.07	54.03	-8.96	AVG
1.2020	40.34	10.17	50.51	56.00	-5.49	QP
1.2020	27.13	10.17	37.30	46.00	-8.70	AVG
15.1500	42.33	10.52	52.85	60.00	-7.15	QP
15.1500	32.76	10.52	43.28	50.00	-6.72	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

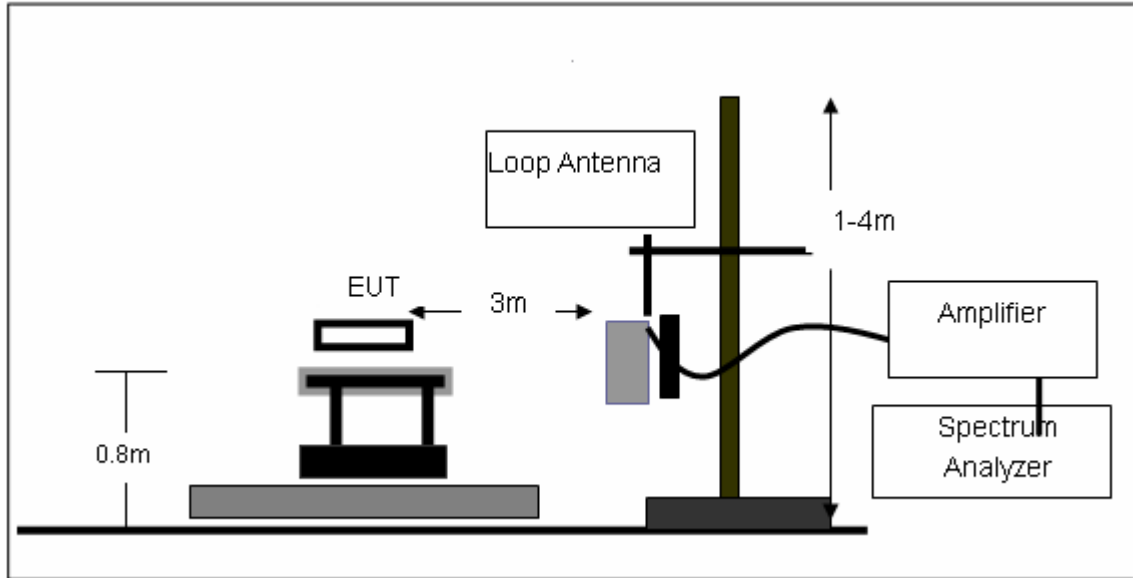
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

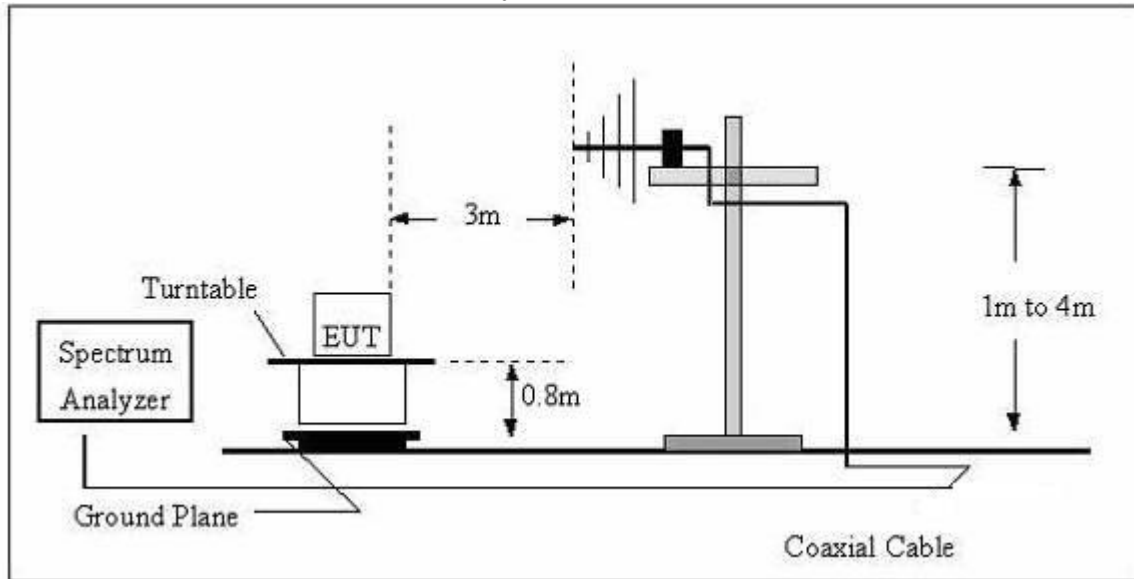
No deviation

3.2.4 TEST SETUP

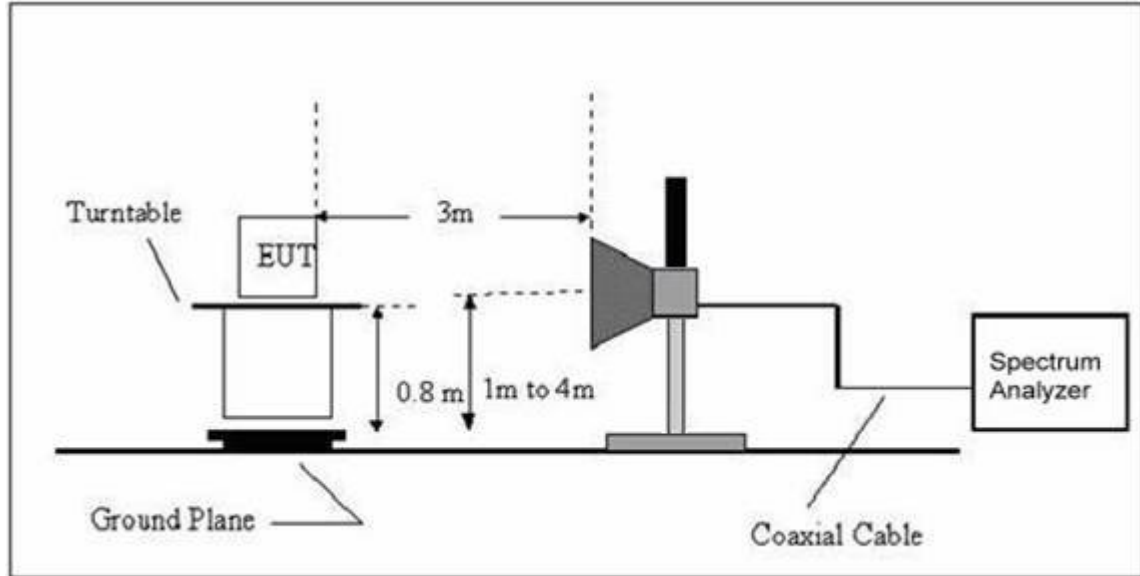
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	Android mini PC	Model Name. :	SY-20-19VC
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 5V From Adapter
Test Mode :	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})(\text{dB})$;

Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (BETWEEN 30MHZ – 25GHZ)

EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX		

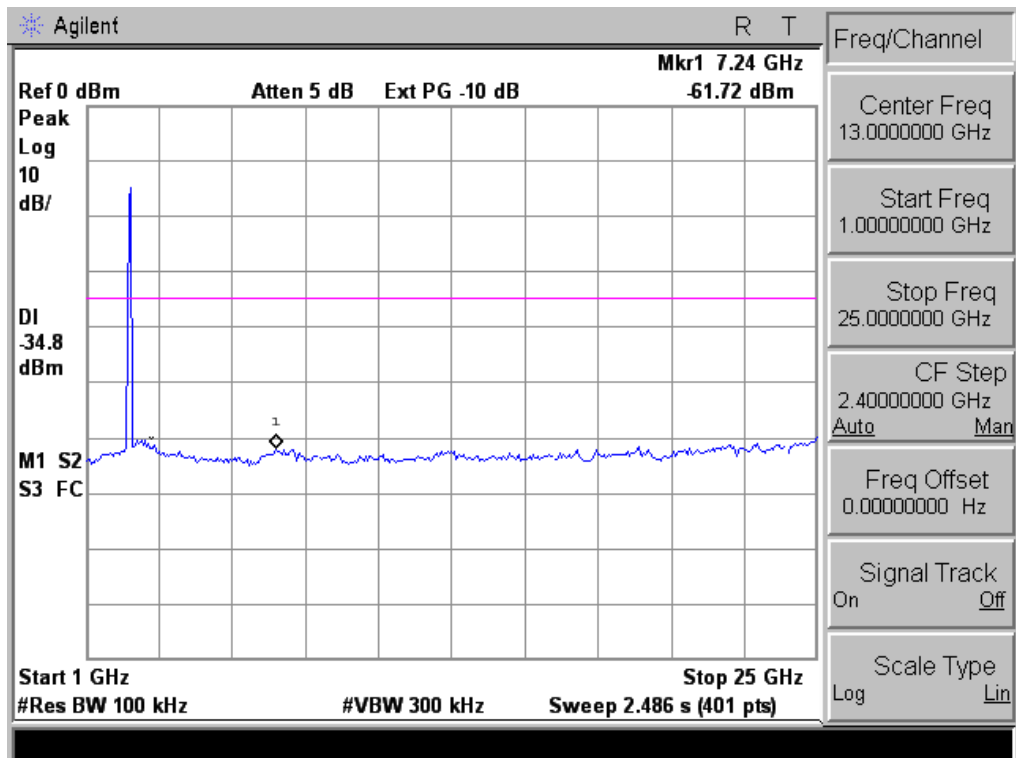
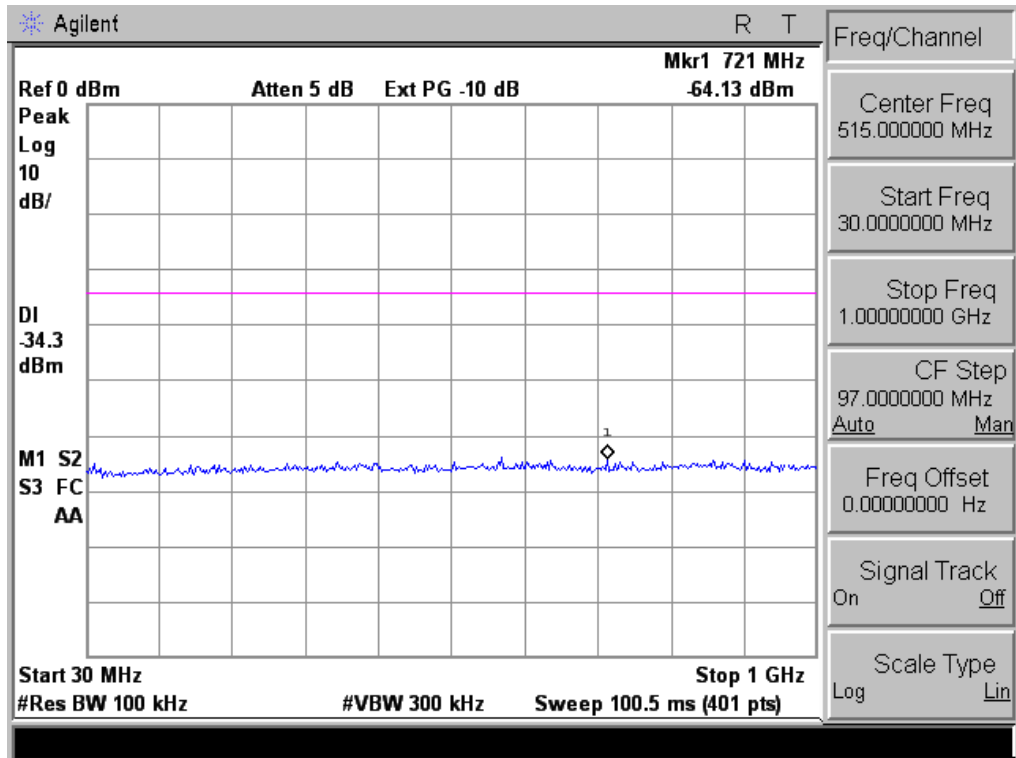
Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detect or Type	Comment
Low Channel (2412 MHz)-Below 1G-802.11b							
135.0319	16.11	12.25	28.36	43.5	-15.14	QP	Vertical
239.9874	14.03	11.65	25.68	46.0	-20.32	QP	Vertical
406.088	16.17	18.54	34.71	46.0	-11.29	QP	Vertical
495.9343	15.25	20.59	35.84	46.0	-10.16	QP	Vertical
528.2458	16.37	21.12	37.49	46.0	-8.51	QP	Vertical
815.9678	9.08	26.46	35.54	46.0	-10.46	QP	Vertical
125.0066	16.11	12.21	28.32	43.5	-15.18	QP	Horizontal
164.9071	15.73	10.81	26.54	43.5	-16.96	QP	Horizontal
287.9904	16.74	14.30	31.04	46.0	-14.96	QP	Horizontal
528.2458	16.55	21.12	37.67	46.0	-8.33	QP	Horizontal
721.7259	9.62	25.59	35.21	46.0	-10.79	QP	Horizontal
815.9678	10.23	26.46	36.69	46.0	-9.31	QP	Horizontal
Low Channel (2412 MHz)-Above 1G-802.11b							
1464.692	63.77	-17.01	46.76	74.0	-27.24	Pk	Vertical
2004.115	60.56	-13.21	47.35	74.0	-26.65	Pk	Vertical
4824.125	52.63	-3.60	49.03	74.0	-24.97	pk	Vertical
1336.782	62.78	-17.51	45.27	74.0	-28.73	pk	Horizontal
1651.514	63.11	-15.93	47.18	74.0	-26.82	pk	Horizontal
1993.371	62.11	-13.42	48.69	74.0	-25.31	pk	Horizontal
4824.250	53.17	-3.60	49.57	74.0	-24.43	Pk	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detect or Type	Comment
Middel Channel (2437 MHz)-Below 1G-802.11b							
135.0319	14.65	12.25	26.9	43.5	-16.6	QP	Vertical
225.3077	14.75	10.73	25.48	46.0	-20.52	QP	Vertical
263.819	14.65	14.62	29.27	46.0	-16.73	QP	Vertical
315.4806	15.33	15.26	30.59	46.0	-15.41	QP	Vertical
528.2458	15.87	21.12	36.99	46.0	-9.01	QP	Vertical
815.9678	10.32	26.46	36.78	46.0	-9.22	QP	Vertical
125.0066	16.13	12.21	28.34	43.5	-15.16	QP	Horizontal
263.819	16.73	14.62	31.35	46.0	-14.65	QP	Horizontal
432.5457	16.22	18.82	35.04	46.0	-10.96	QP	Horizontal
528.2458	15.65	21.12	36.77	46.0	-9.23	QP	Horizontal
721.7259	9.46	25.59	35.05	46.0	-10.95	QP	Horizontal
815.9678	11.38	26.46	37.84	46.0	-8.16	QP	Horizontal
Middel Channel (2437 MHz)-Above 1G-802.11b							
1329.615	62.77	-17.59	45.18	74.0	-28.82	Pk	Vertical
1501.898	61.32	-17.15	44.17	74.0	-29.83	pk	Vertical
1663.393	60.12	-15.86	44.26	74.0	-29.74	pk	Vertical
1996.946	58.34	-13.36	44.98	74.0	-29.02	pk	Vertical
4874.125	54.76	-3.6	51.16	74.0	-22.84	pk	Vertical
1107.528	63.52	-19.4	44.12	74.0	-29.88	Pk	Horizontal
1334.389	62.11	-17.53	44.58	74.0	-29.42	pk	Horizontal
1663.393	59.83	-15.86	43.97	74.0	-30.03	Pk	Horizontal
1993.371	62.17	-13.42	48.75	74.0	-25.25	Pk	Horizontal
4874.250	51.65	-3.6	48.05	74.0	-25.95	Pk	Horizontal

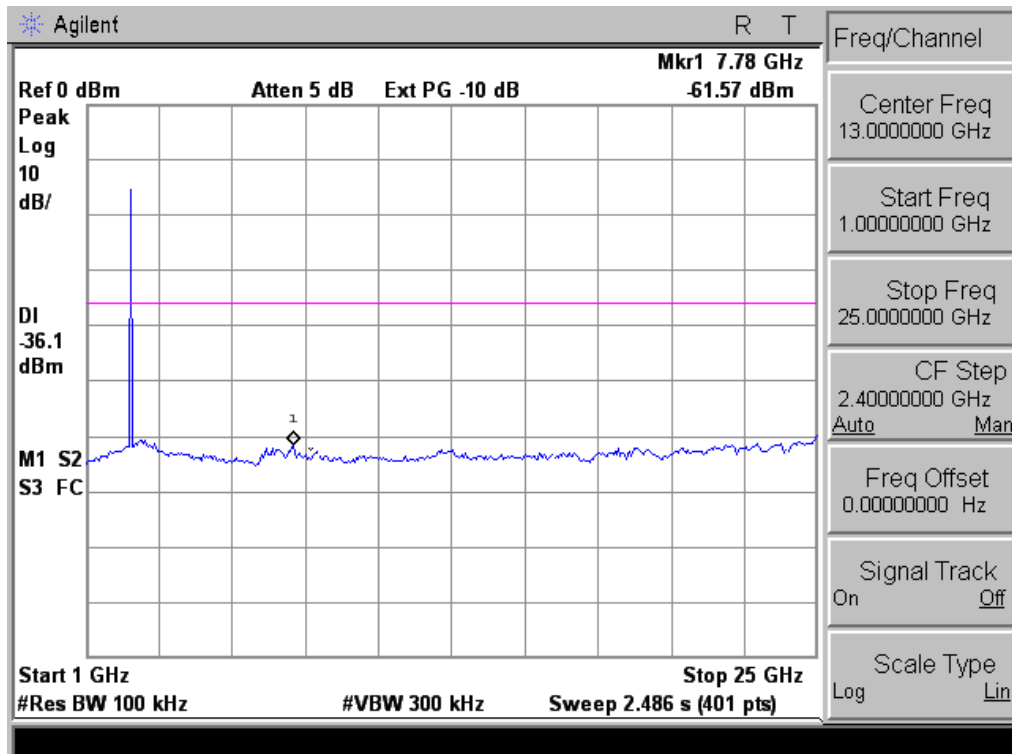
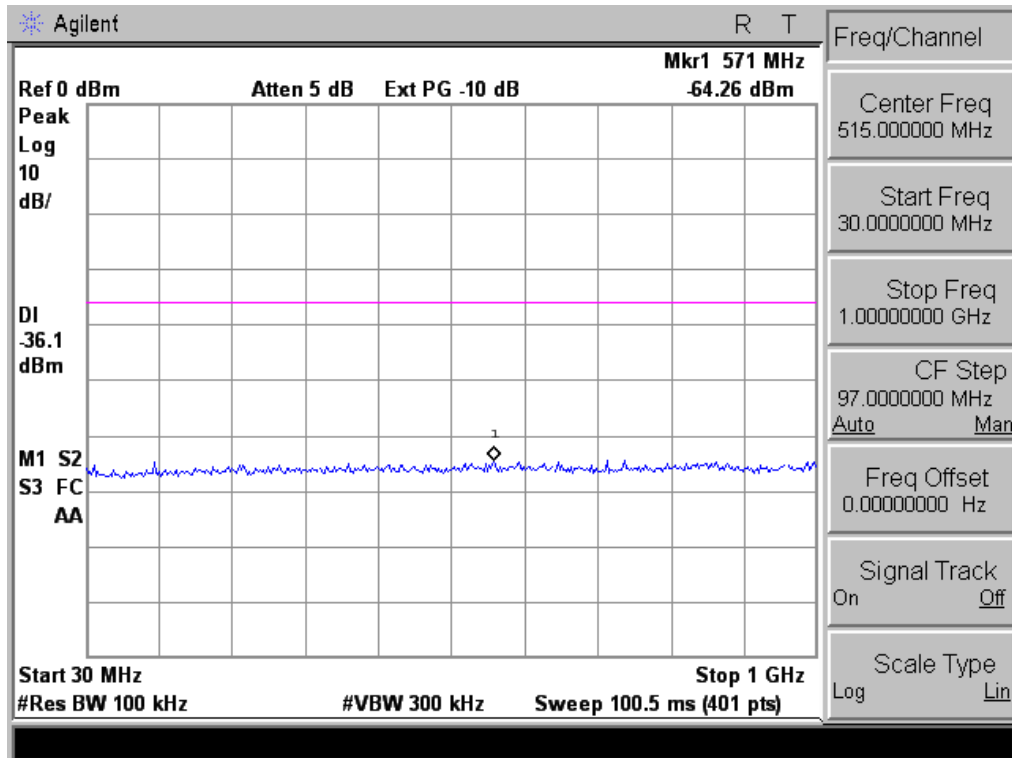
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detect or Type	Comment
High Channel (2462 MHz)-Below 1G-802.11b							
98.8324	14.43	10.51	24.94	43.5	-18.56	QP	Vertical
143.8291	13.56	12.06	25.62	43.5	-17.88	QP	Vertical
336.035	12.72	16.03	28.75	46.0	-17.25	QP	Vertical
383.9318	11.64	17.38	29.02	46.0	-16.98	QP	Vertical
528.2458	13.66	21.12	34.78	46.0	-11.22	QP	Vertical
815.9678	8.12	26.46	34.58	46.0	-11.42	QP	Vertical
131.7572	15.64	12.22	27.86	43.5	-15.64	QP	Horizontal
197.8925	15.73	8.99	24.72	43.5	-18.78	QP	Horizontal
287.9904	15.76	14.3	30.06	46.0	-15.94	QP	Horizontal
462.3455	13.45	19.5	32.95	46.0	-13.05	QP	Horizontal
625.0778	9.88	23.6	33.48	46.0	-12.52	QP	Horizontal
721.7259	9.24	25.59	34.83	46.0	-11.17	QP	Horizontal
High Channel (2462 MHz)-Above 1G-802.11b							
1329.615	66.34	-17.59	48.75	74	-25.25	pk	Vertical
1663.393	64.51	-15.86	48.65	74	-25.35	pk	Vertical
1829.098	59.35	-14.78	44.57	74	-29.43	pk	Vertical
1993.371	58.73	-13.42	45.31	74	-28.69	pk	Vertical
4924.350	49.11	-3.6	45.51	74	-28.49	pk	Vertical
1329.615	62.32	-17.59	44.73	74	-29.27	pk	Horizontal
1663.393	58.11	-15.86	42.25	74	-31.75	pk	Horizontal
1993.371	56.64	-13.42	43.22	74	-30.78	pk	Horizontal
2806.824	55.73	-11.69	44.04	74	-29.96	pk	Horizontal
4924.167	49.19	-3.6	45.59	74	-28.41	pk	Horizontal

Note: (Scan with 802.11b, 802.11g,802.11n),the worst case is 802.11b.

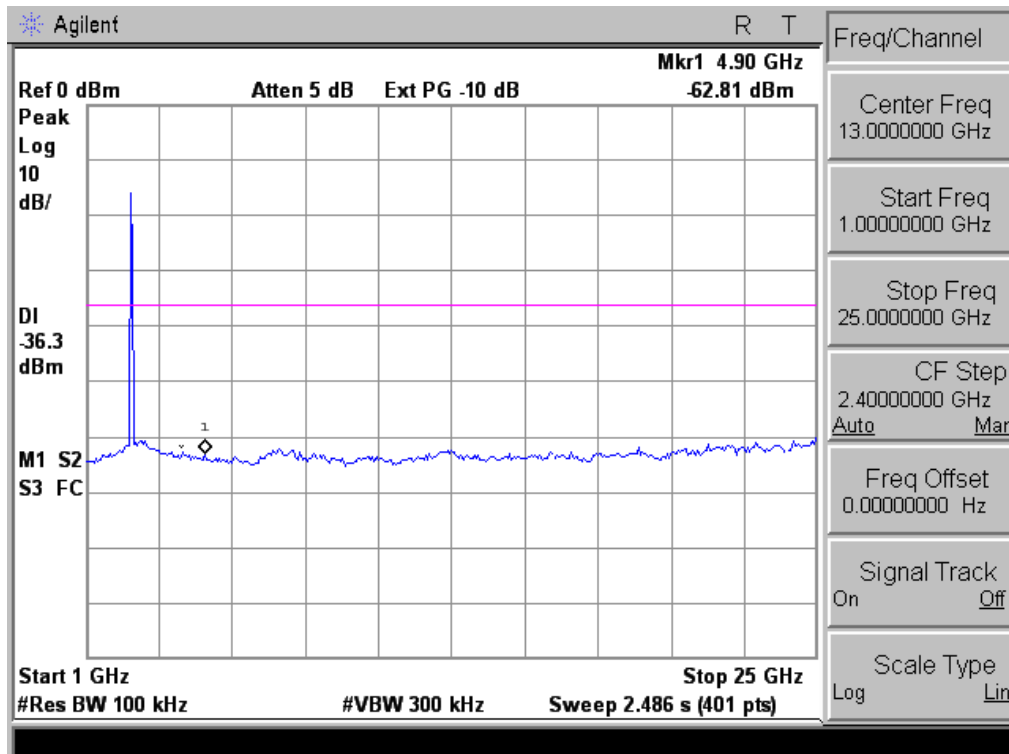
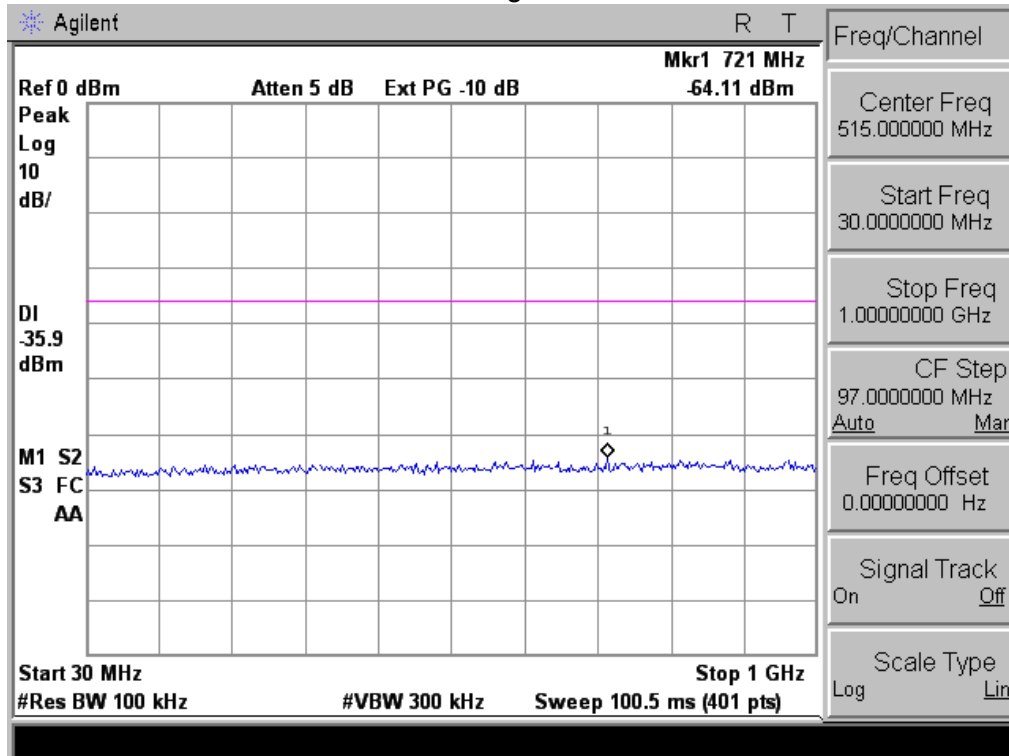
Conducted Spurious Emissions at Antenna Port:
802.11b Low Channel



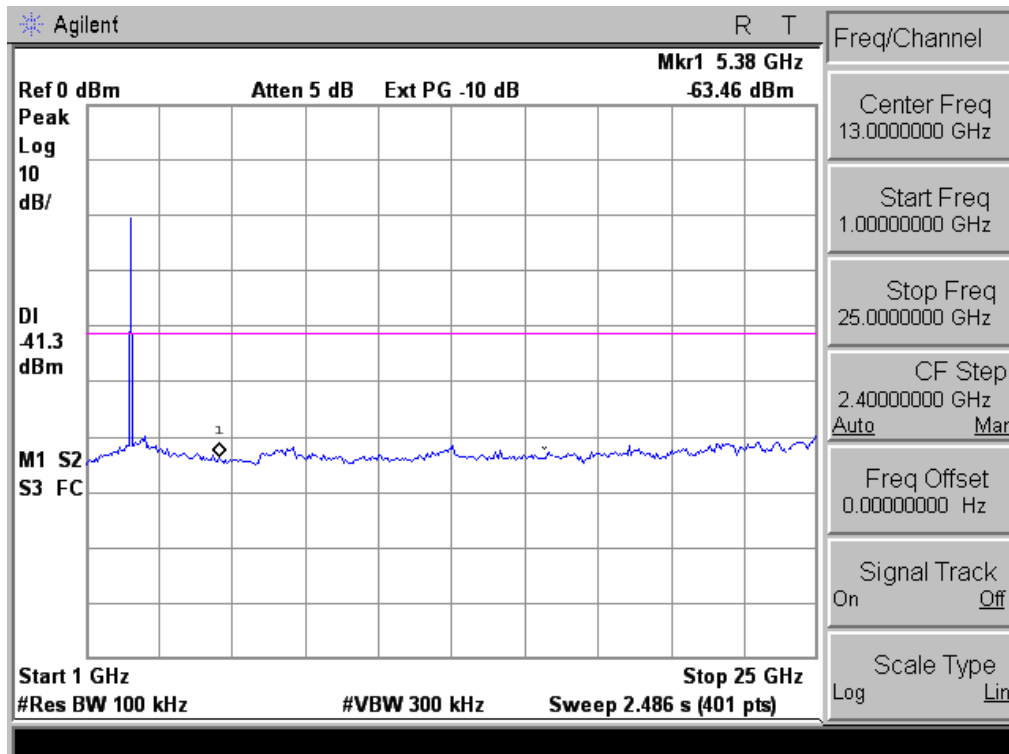
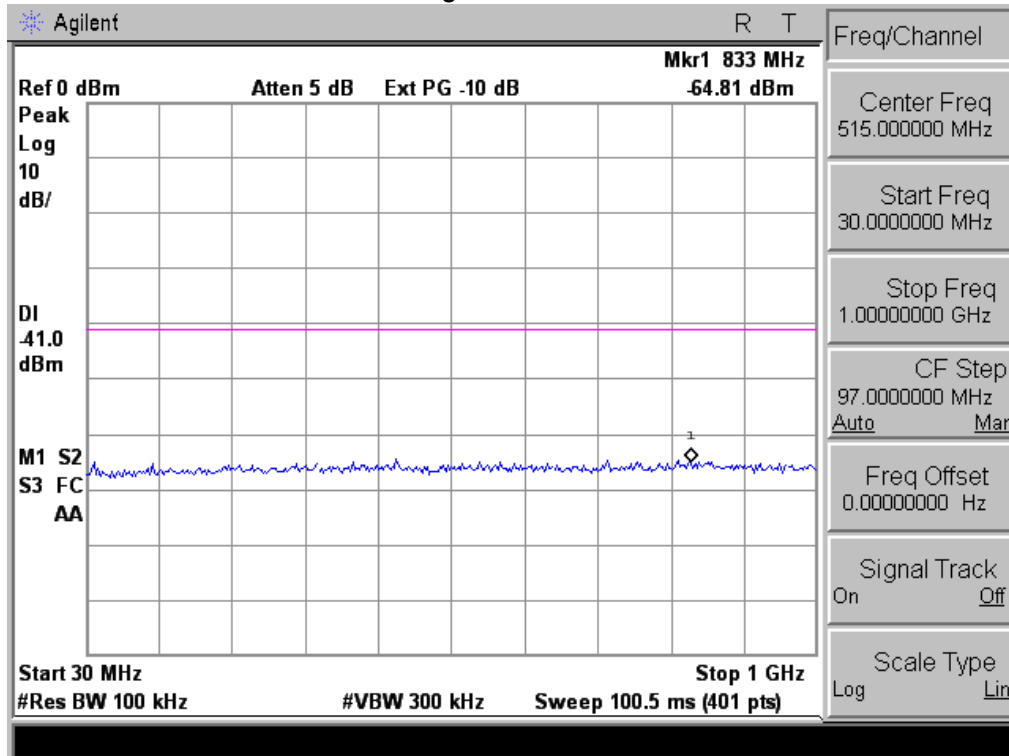
802.11b Middle Channel



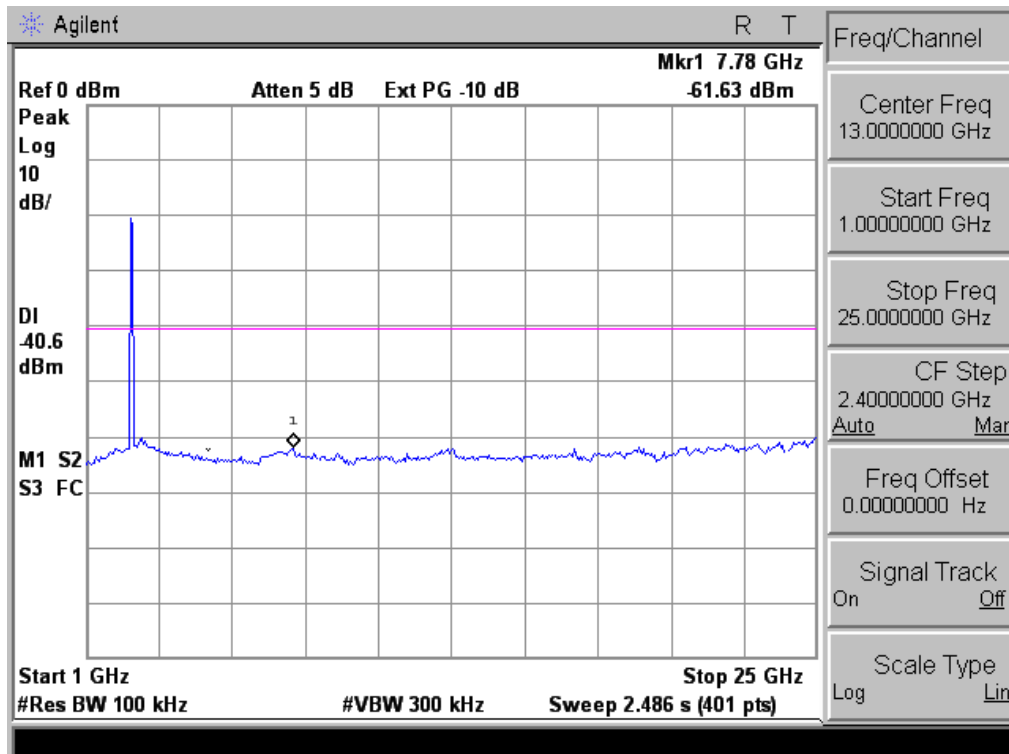
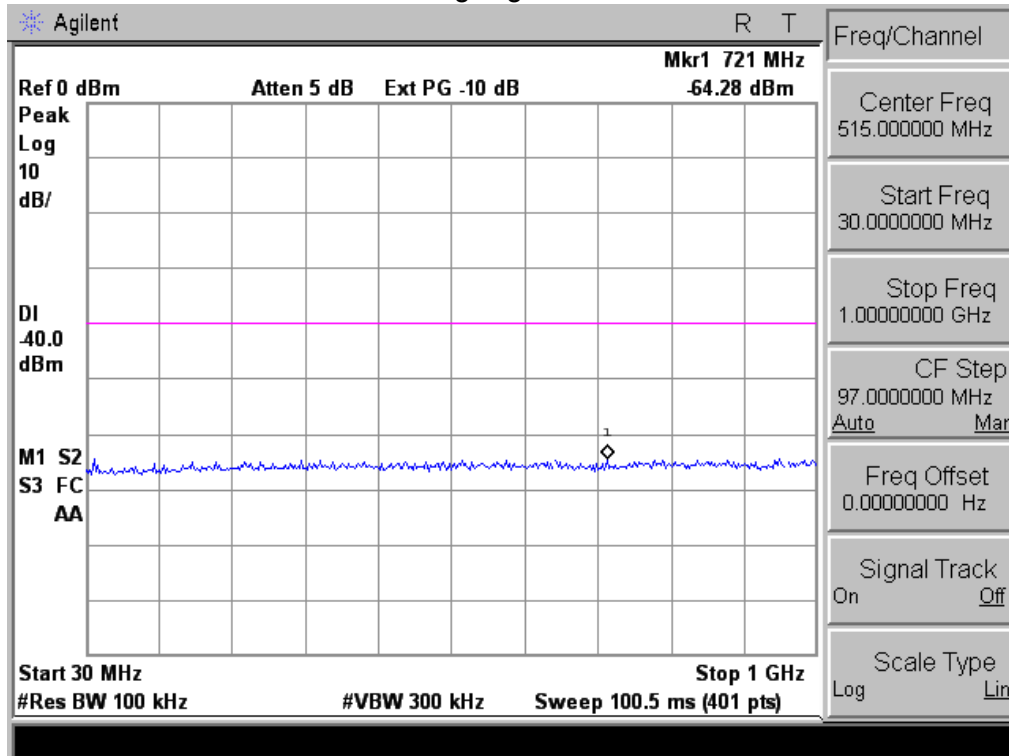
802.11b High Channel



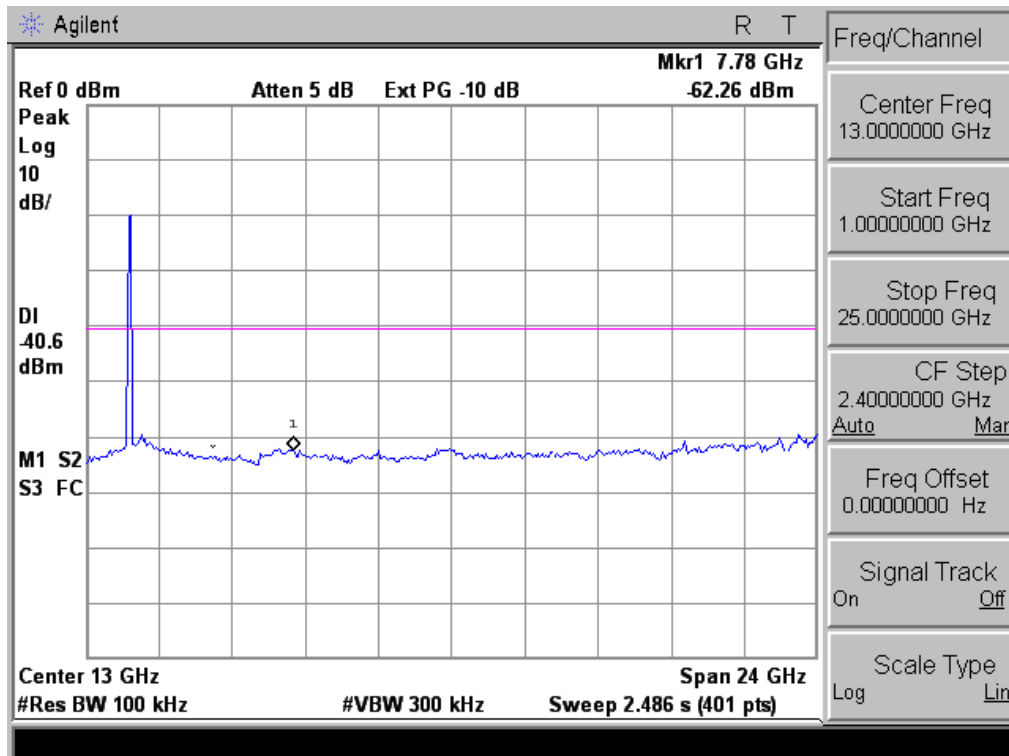
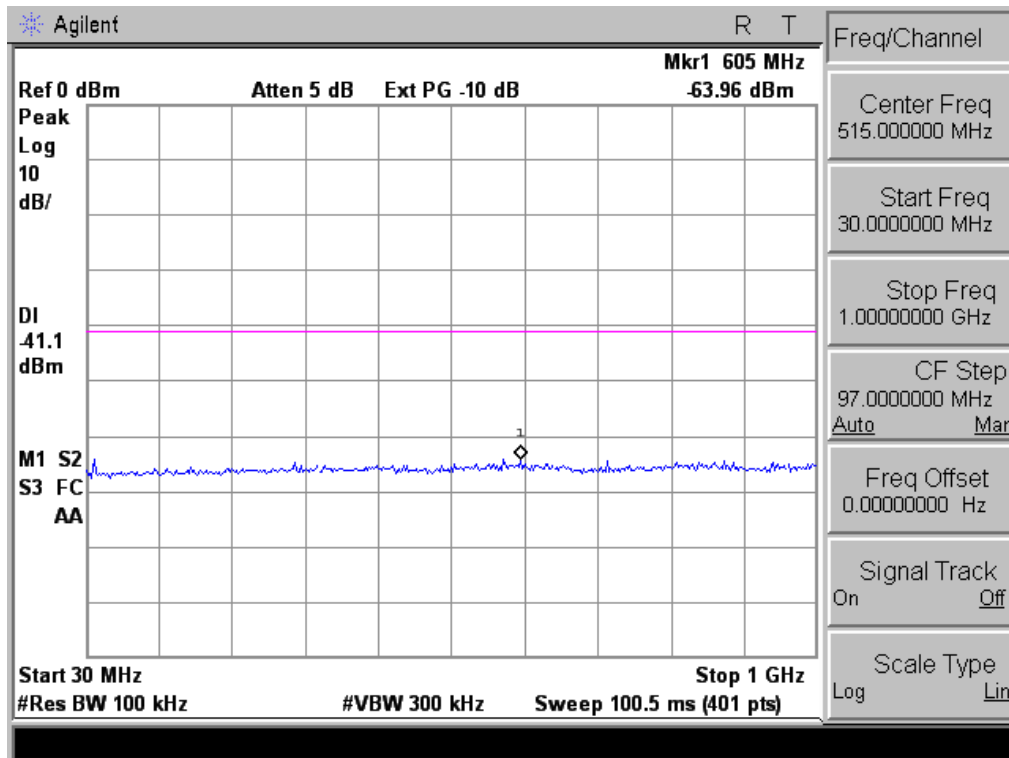
802.11g Middle Channel



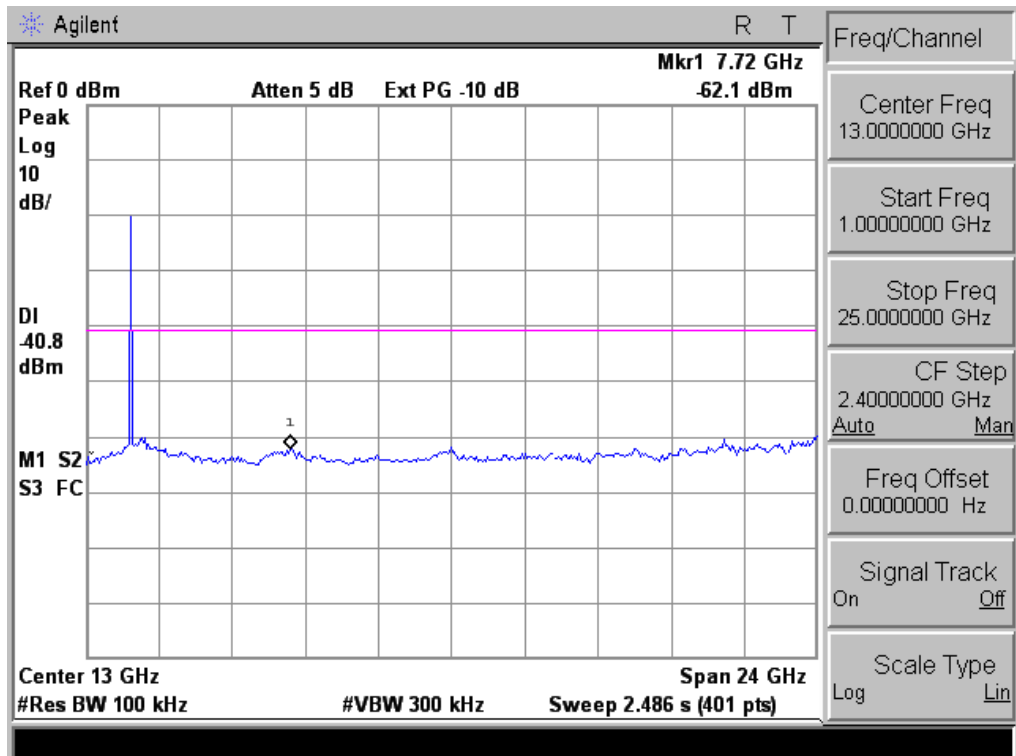
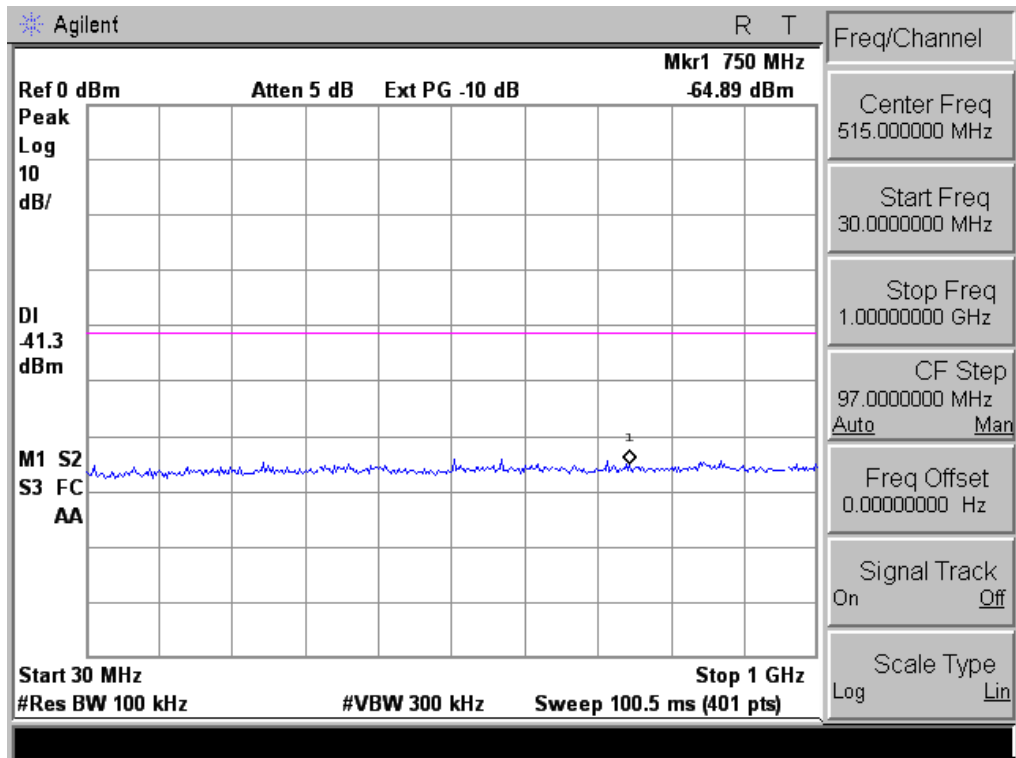
802.11g High Channel



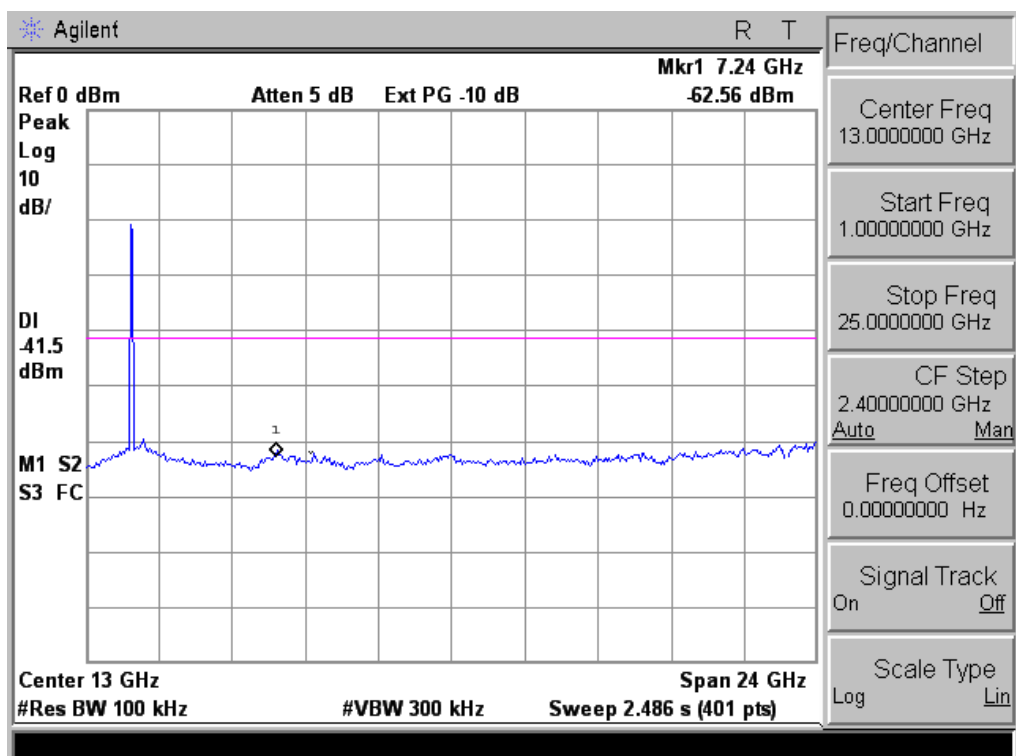
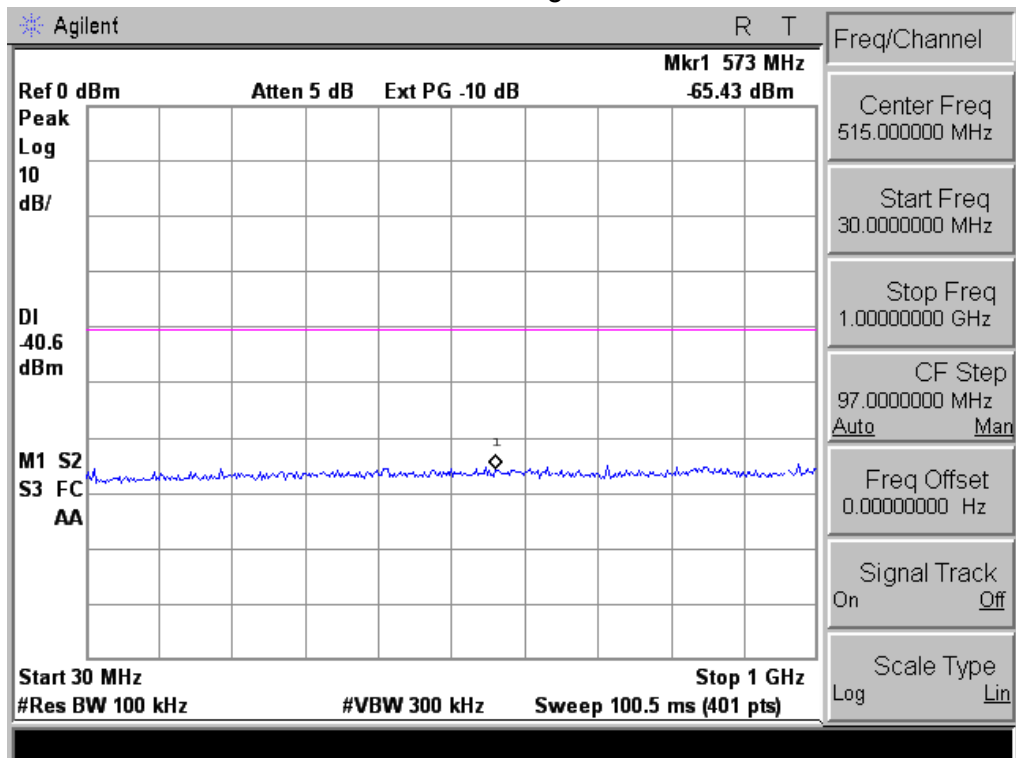
802.11n-HT20 Low Channel



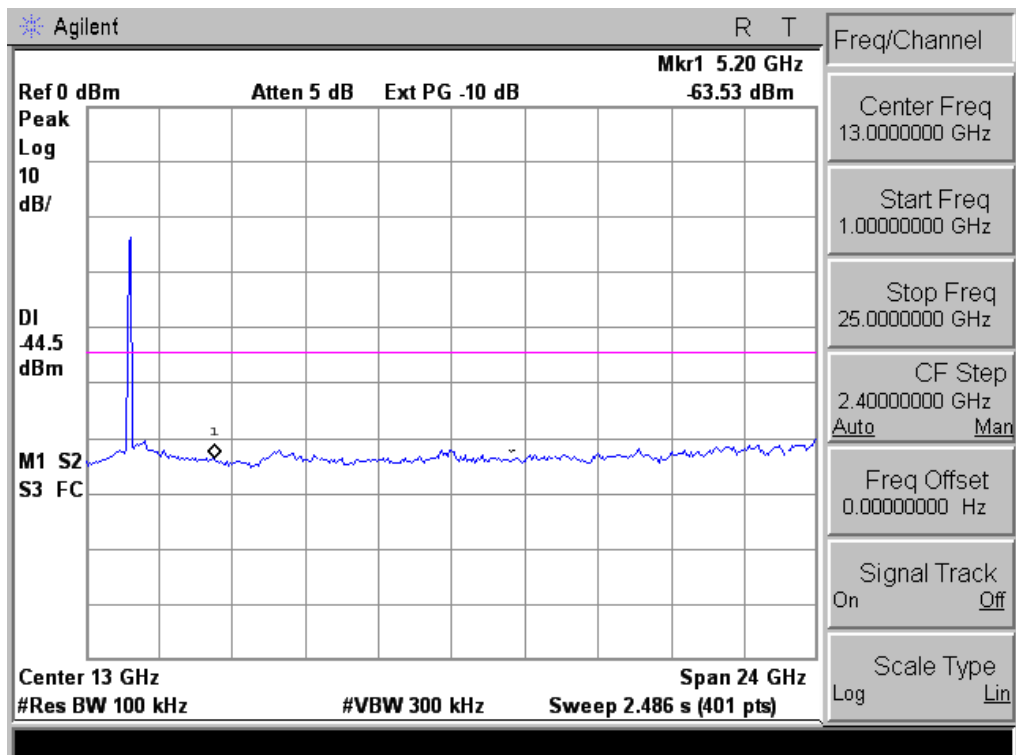
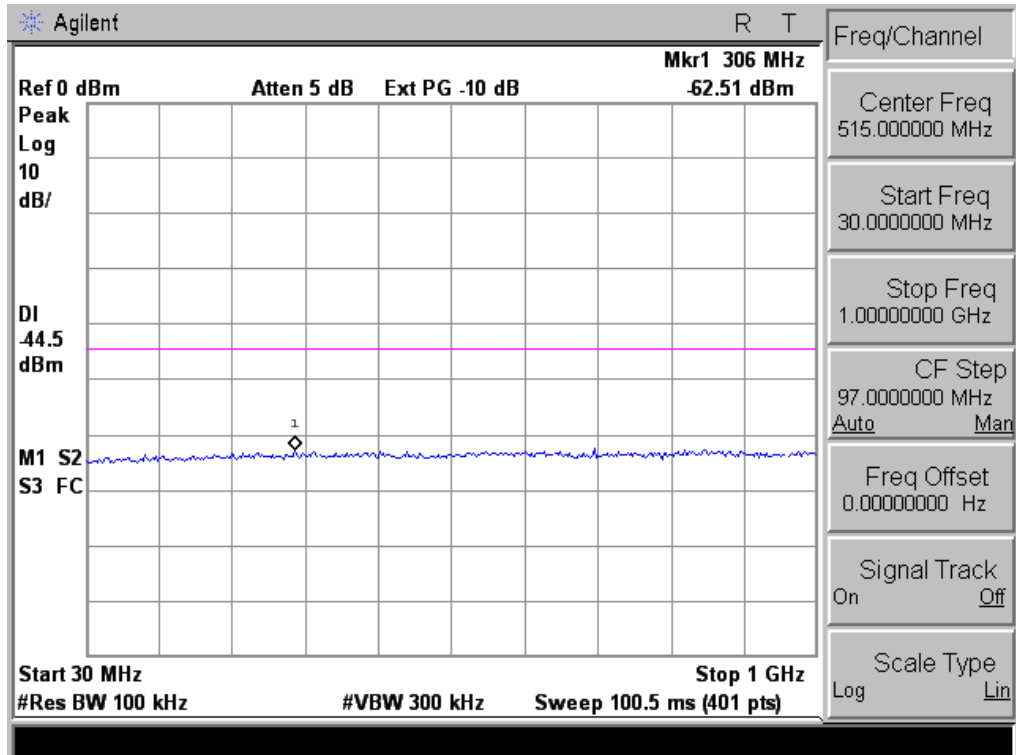
802.11n-HT20 Middle Channel



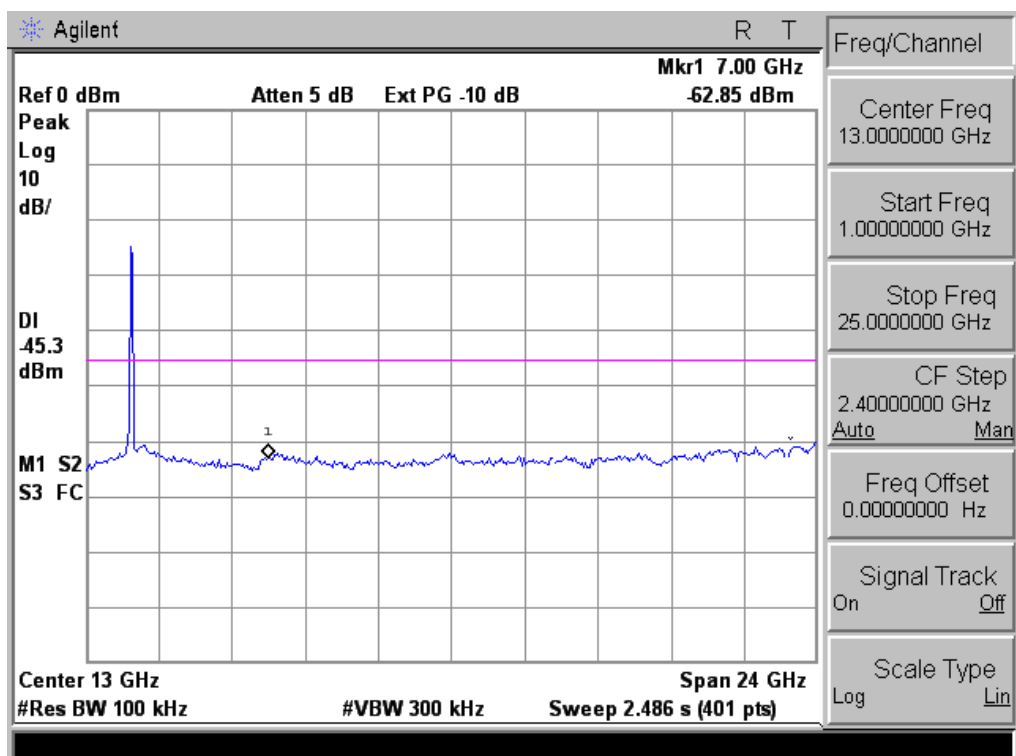
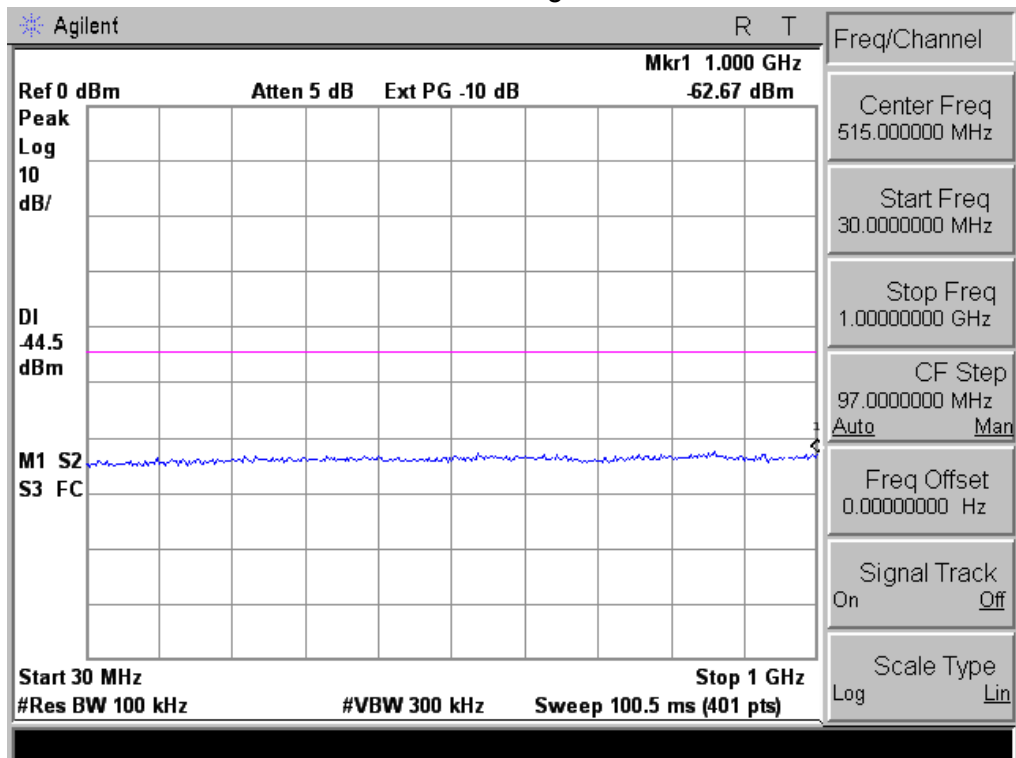
802.11n-HT20 High Channel



802.11n-HT40 Low Channel



802.11n-HT40 High Channel



4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

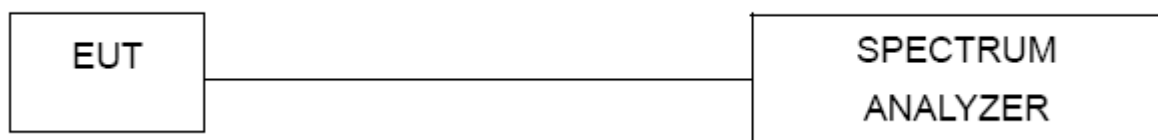
4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW \geq 3 kHz.
4. Set the VBW \geq 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



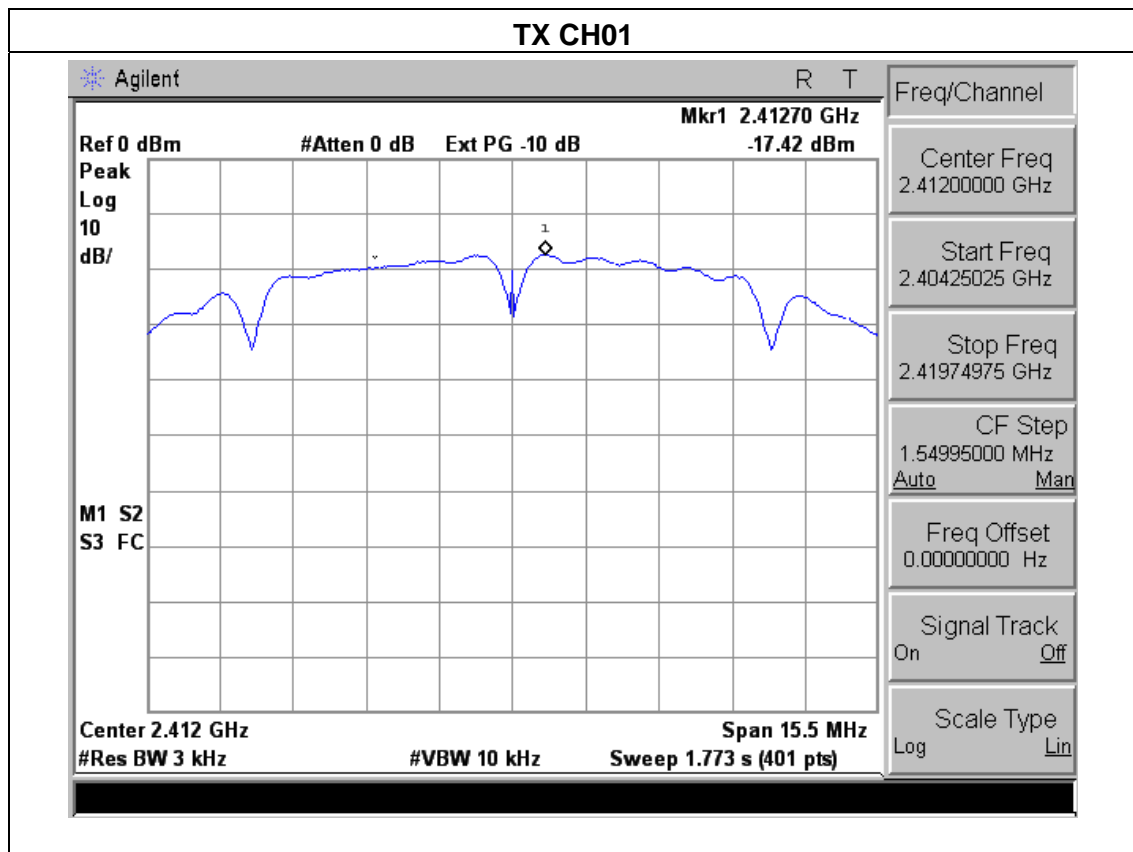
4.1.4 EUT OPERATION CONDITIONS

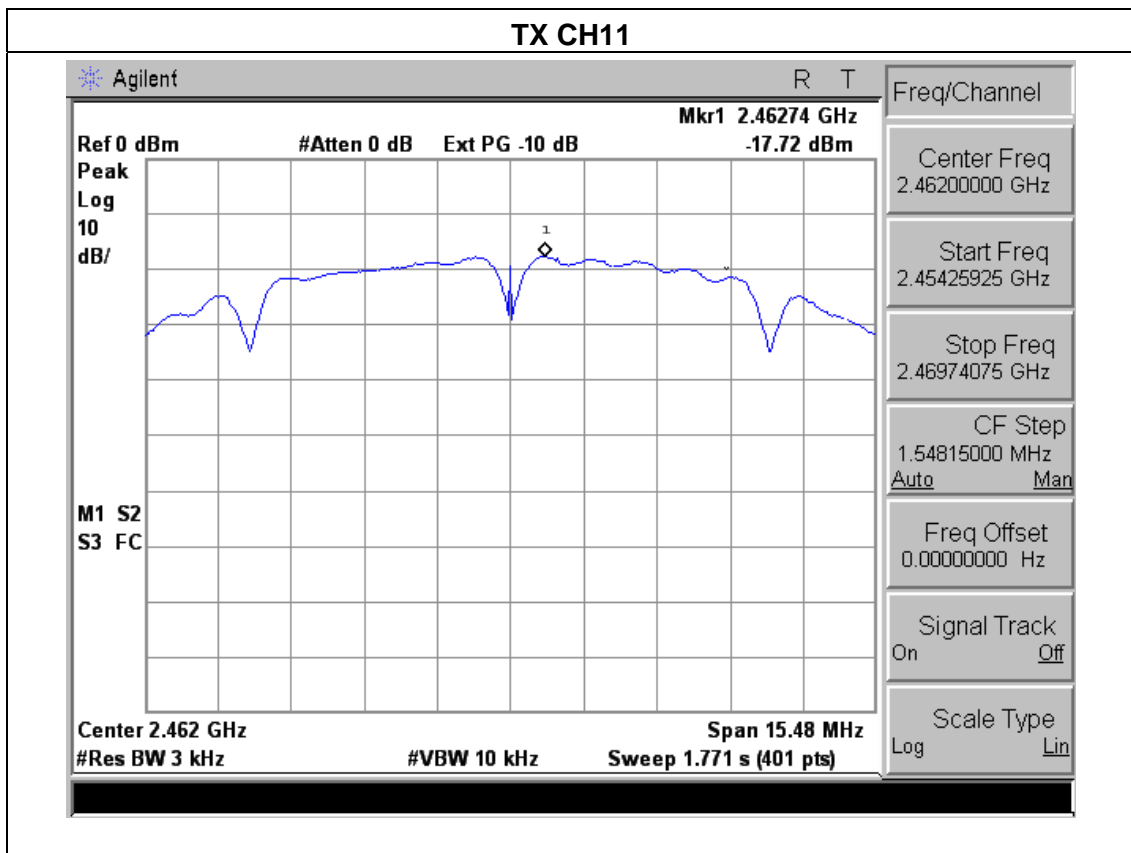
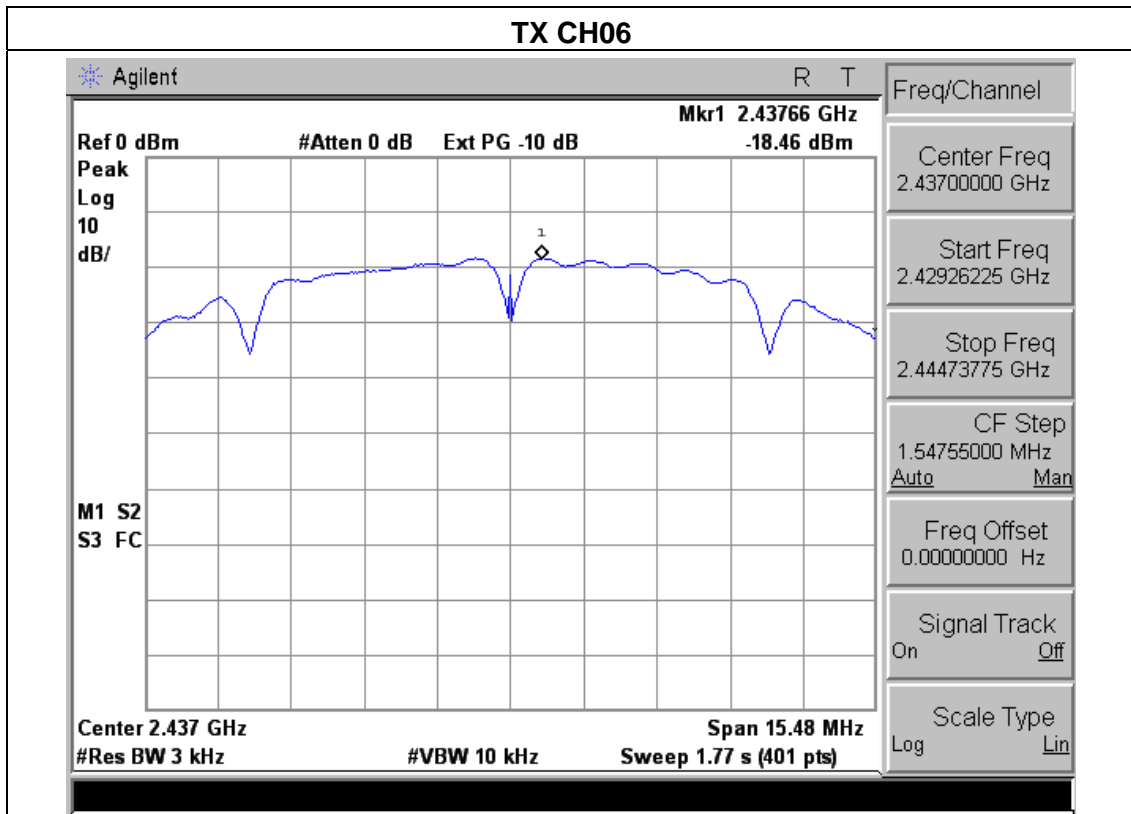
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX b Mode /CH01, CH06, CH11		

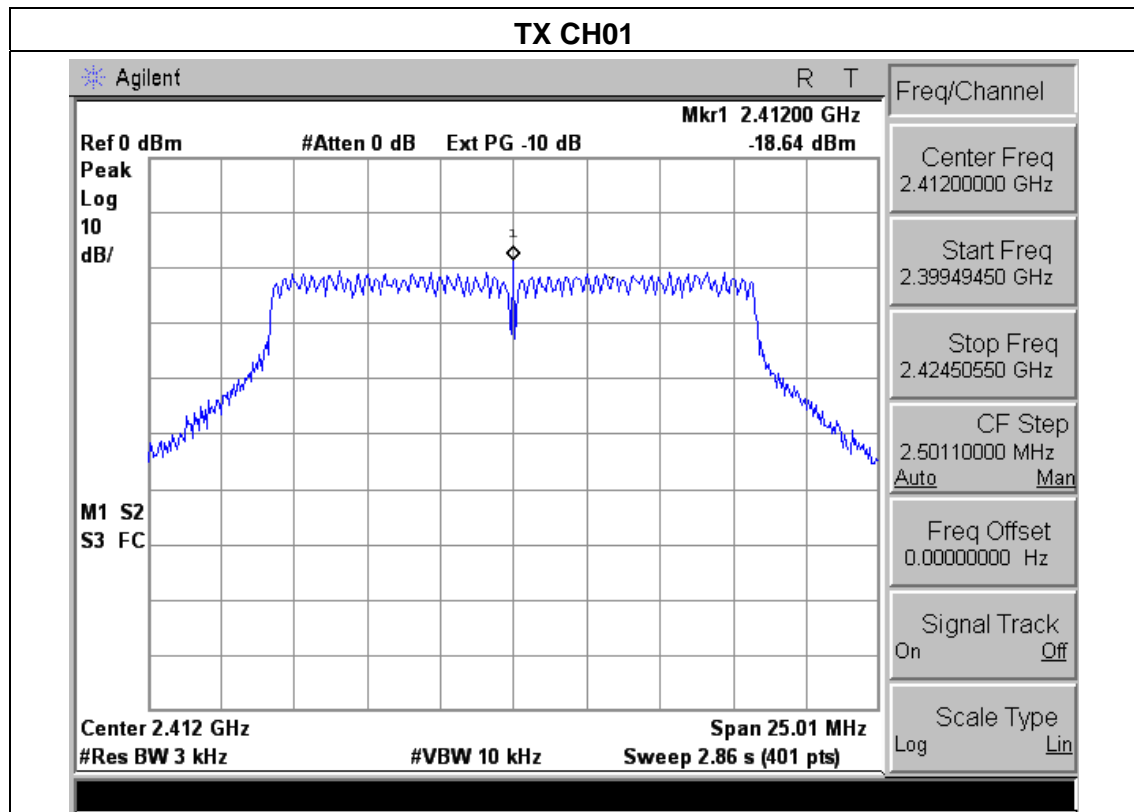
Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-17.42	8	PASS
2437 MHz	-18.46	8	PASS
2462 MHz	-17.72	8	PASS

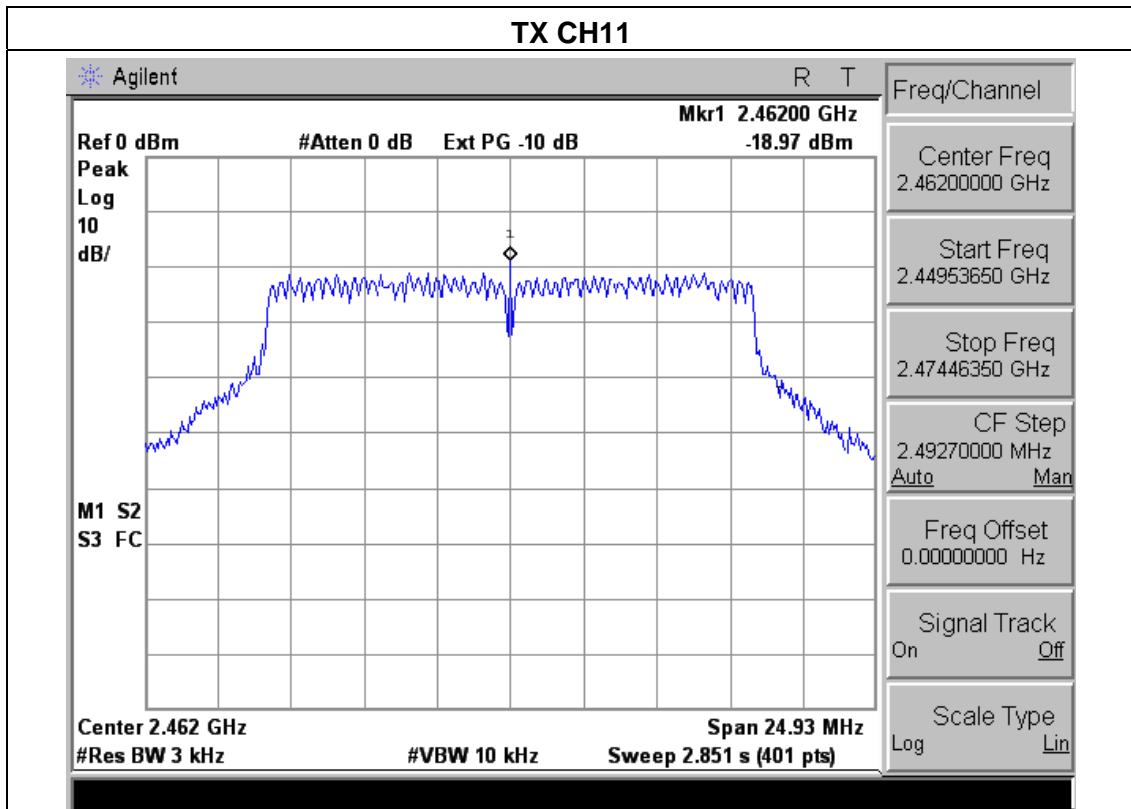
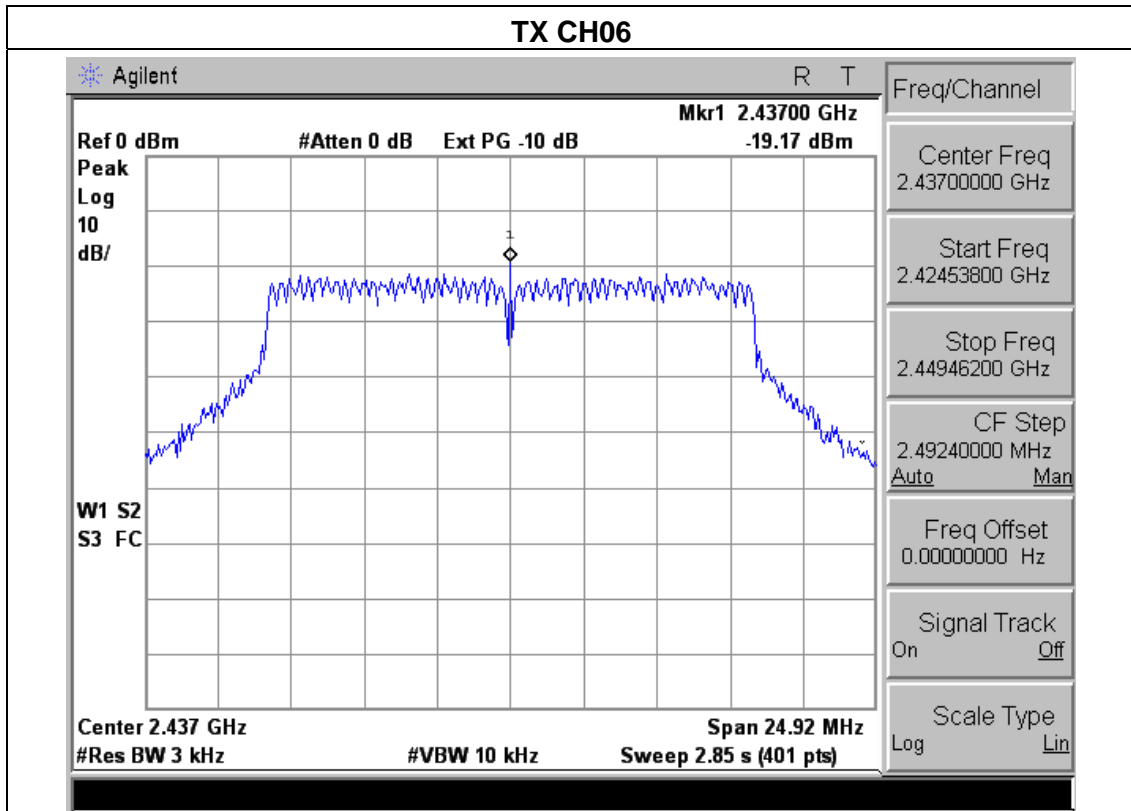




EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX g Mode /CH01, CH06, CH11		

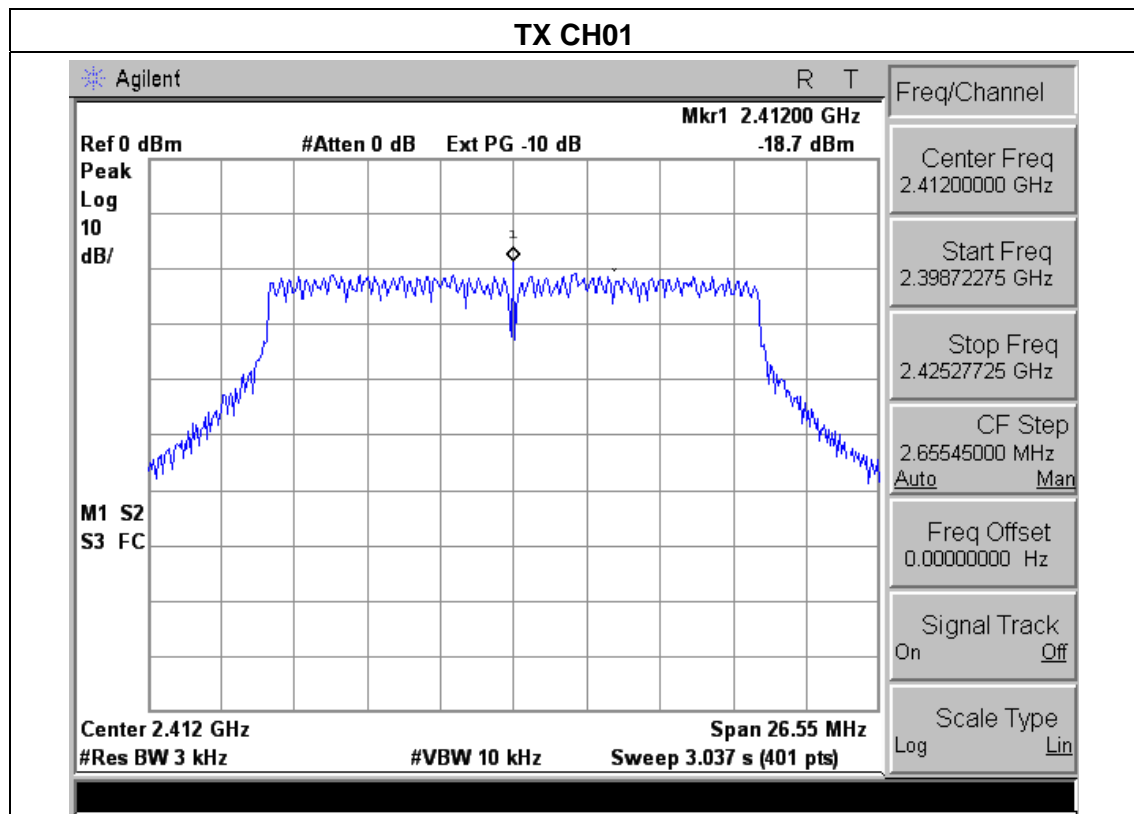
Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-18.64	8	PASS
2437 MHz	-19.17	8	PASS
2462 MHz	-18.97	8	PASS

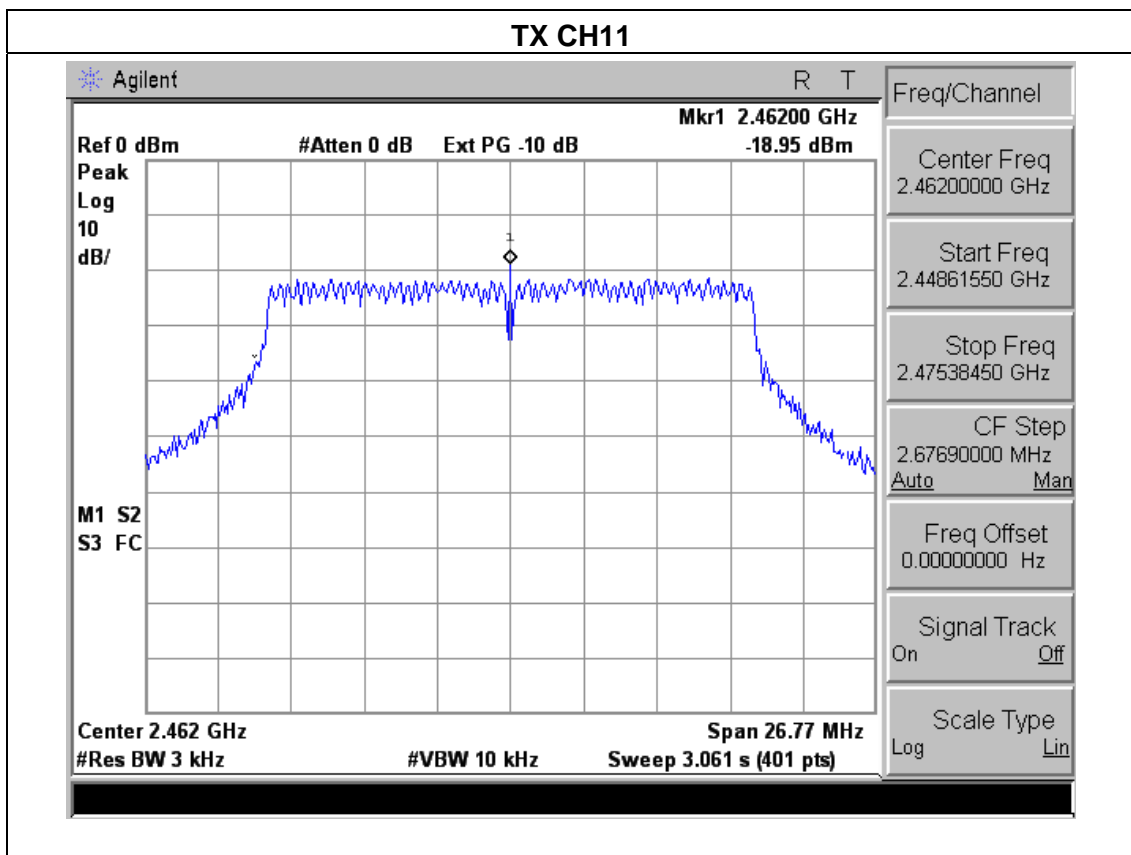
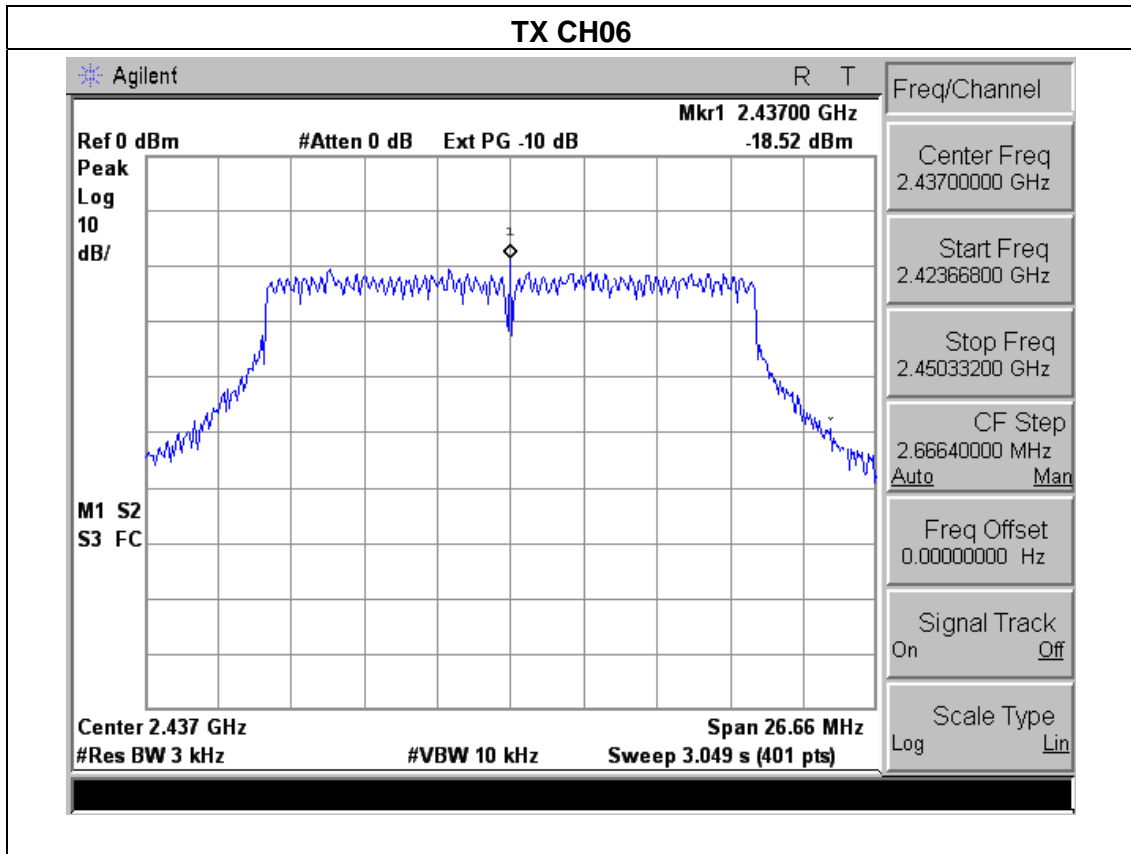




EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX n Mode(20M) /CH01, CH06, CH11		

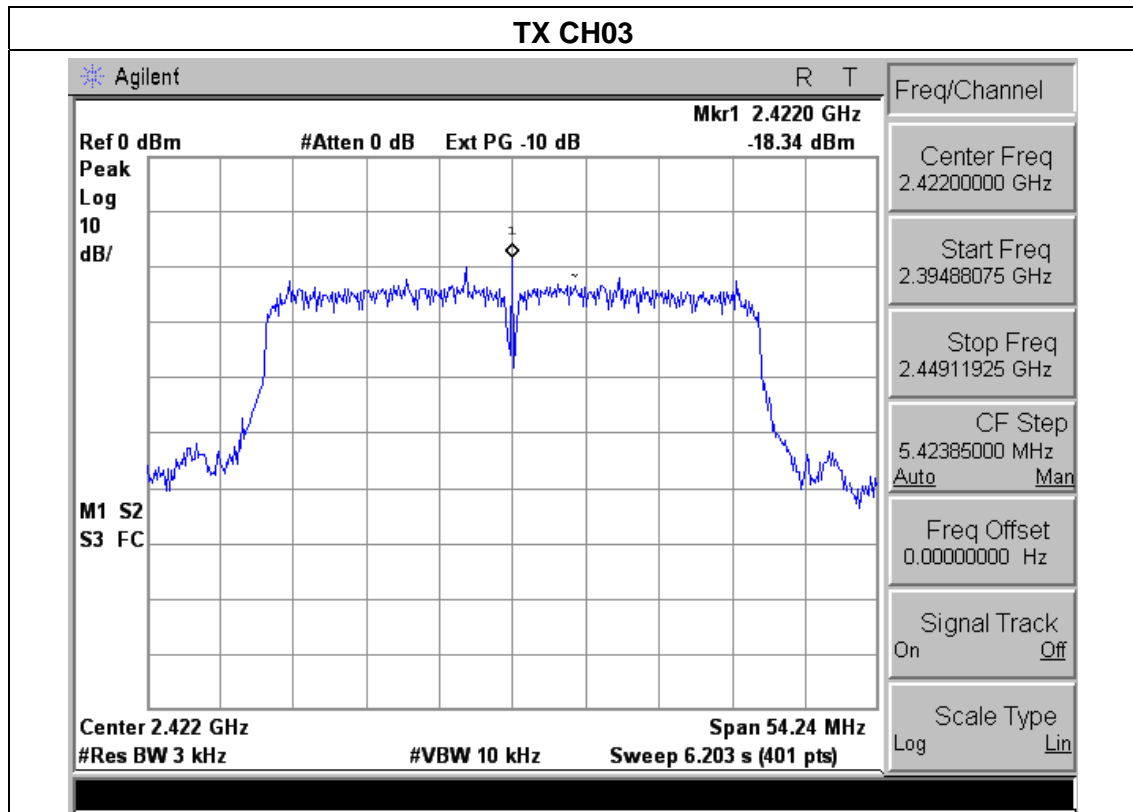
Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-18.70	8	PASS
2437 MHz	-18.52	8	PASS
2462 MHz	-18.95	8	PASS

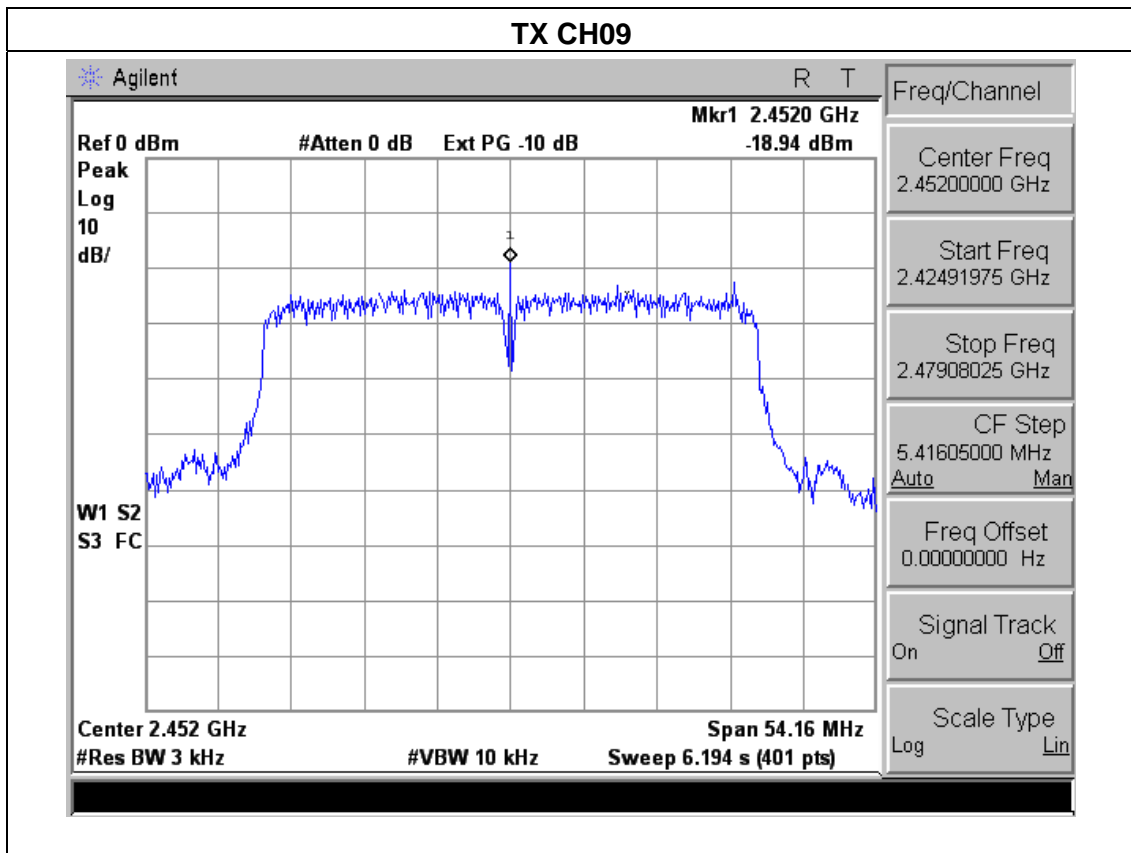
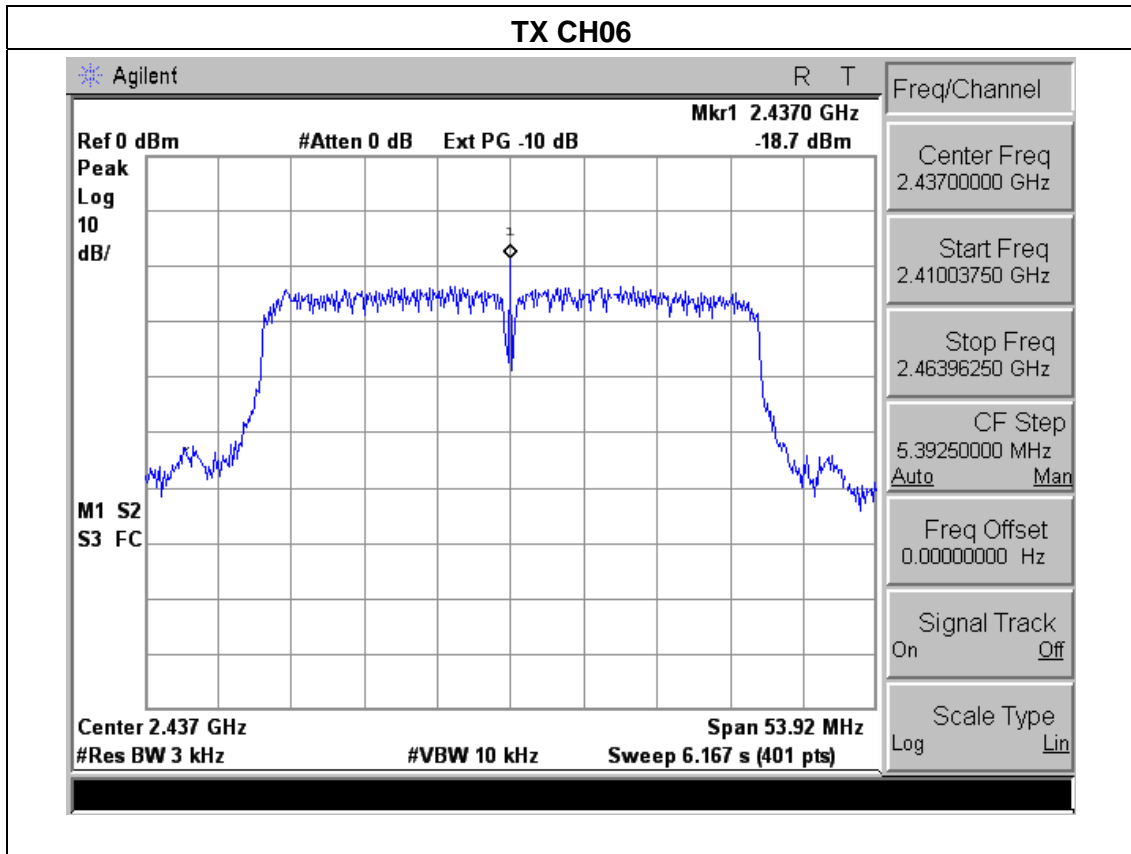




EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX n Mode(40M) /CH03, CH06, CH09		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2422 MHz	-18.34	8	PASS
2437 MHz	-18.70	8	PASS
2452 MHz	-18.94	8	PASS





5. BANDWIDTH TEST

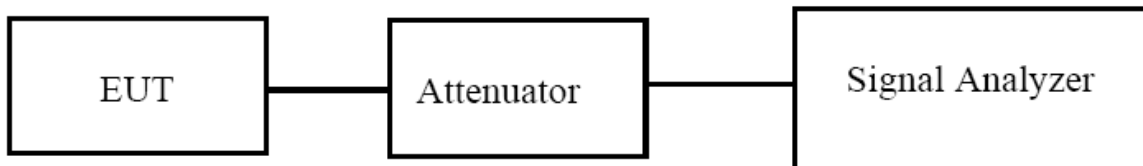
5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

According to KDB 558074 D01 DTS Meas Guidance v03r01

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



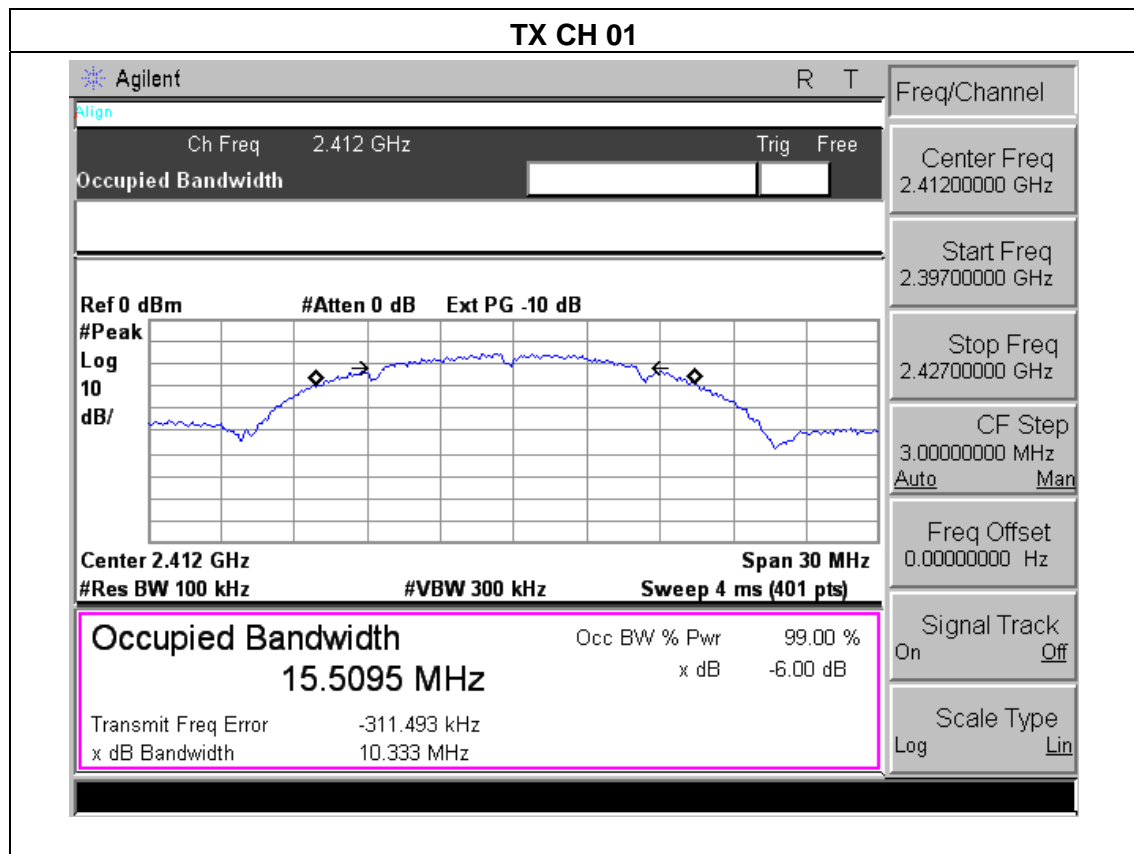
5.1.2 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.3 TEST RESULTS

EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX b Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	Data Rate (Mbps)	Antenna port	6dB bandwidth (MHz)	Limit (kHz)	Result
802.11B mode						
Low	2412	1	Chain 0	10.33	500	Pass
Middle	2437	1	Chain 0	10.33	500	Pass
High	2462	1	Chain 0	10.32	500	Pass



TX CH 06

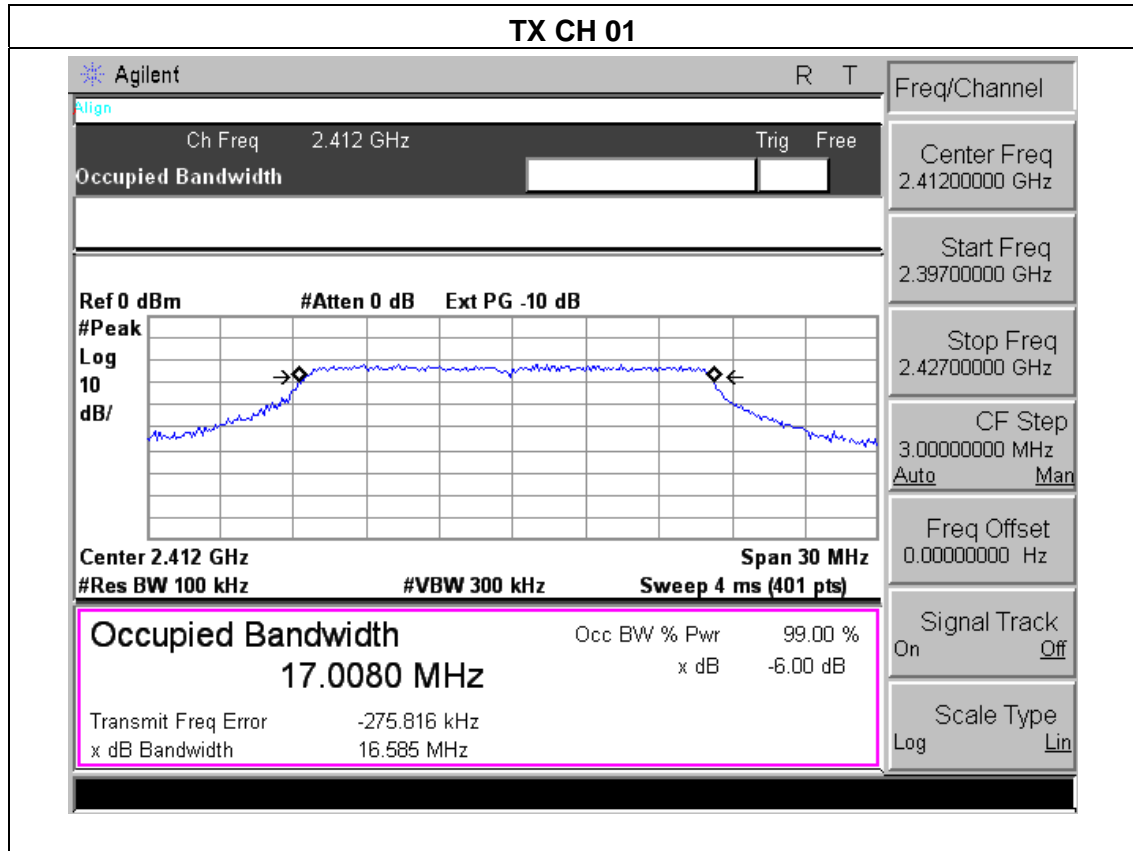
Agilent		R	T	Freq/Channel	
Align		Ch Freq 2.437 GHz		Center Freq 2.43700000 GHz	
Occupied Bandwidth		Trig Free		Start Freq 2.42200000 GHz	
Ref 0 dBm #Atten 0 dB Ext PG -10 dB		Stop Freq 2.45200000 GHz		CF Step 3.00000000 MHz	
		Freq Offset 0.00000000 Hz Signal Track On Off		Scale Type Log Lin	
Center 2.437 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)		Occupied Bandwidth 15.4671 MHz		Occ BW % Pwr 99.00 % x dB -6.00 dB	
Transmit Freq Error -269.268 kHz x dB Bandwidth 10.325 MHz					

TX CH 11

Agilent		R	T	Freq/Channel	
Align		Ch Freq 2.462 GHz		Center Freq 2.46200000 GHz	
Occupied Bandwidth		Trig Free		Start Freq 2.44700000 GHz	
Ref 0 dBm #Atten 0 dB Ext PG -10 dB		Stop Freq 2.47700000 GHz		CF Step 3.00000000 MHz	
		Freq Offset 0.00000000 Hz Signal Track On Off		Scale Type Log Lin	
Center 2.462 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)		Occupied Bandwidth 15.5590 MHz		Occ BW % Pwr 99.00 % x dB -6.00 dB	
Transmit Freq Error -243.625 kHz x dB Bandwidth 10.321 MHz					

EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX g Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	Data Rate (Mbps)	Antenna port	6dB bandwidth (MHz)	Limit (kHz)	Result
802.11G mode						
Low	2412	6	Chain 0	16.59	500	Pass
Middle	2437	6	Chain 0	16.62	500	Pass
High	2462	6	Chain 0	16.63	500	Pass



TX CH 06

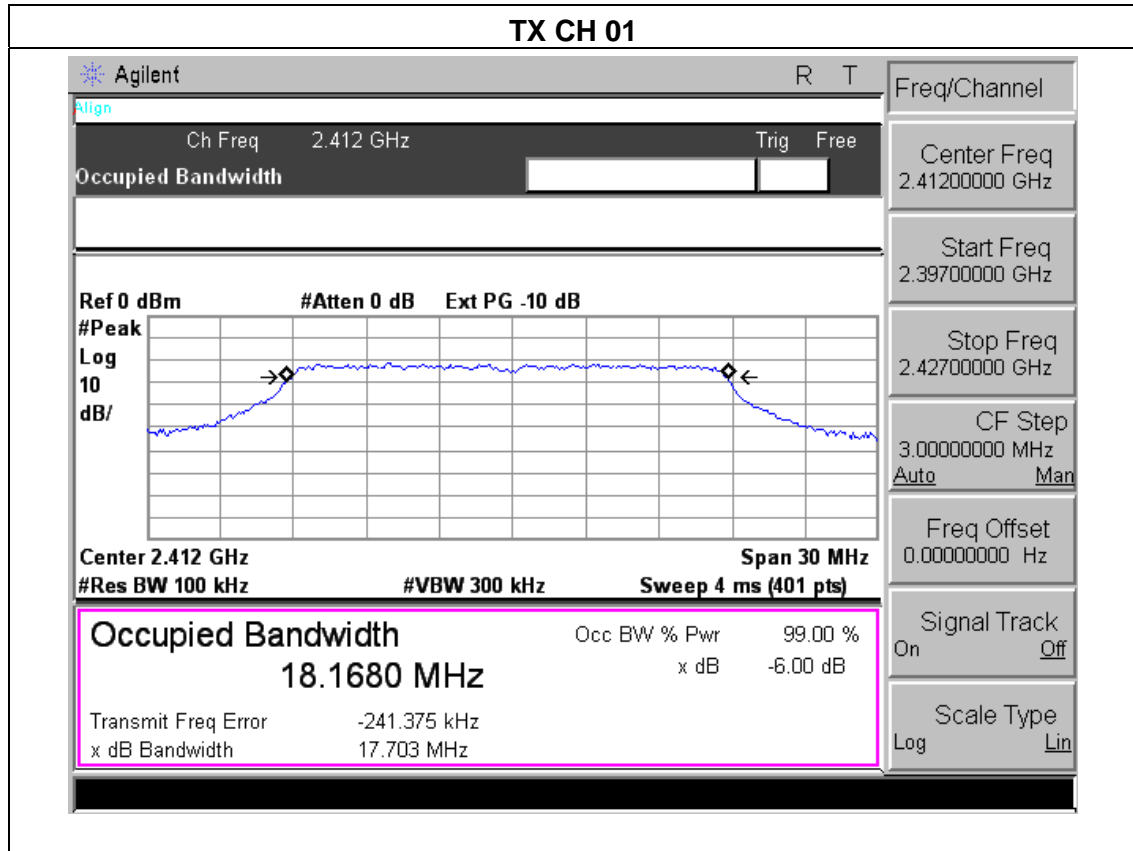
Agilent R T		Freq/Channel
Align		
Ch Freq 2.437 GHz	Trig Free	Center Freq 2.43700000 GHz
Occupied Bandwidth		Start Freq 2.42200000 GHz
Ref 0 dBm #Atten 0 dB Ext PG -10 dB		Stop Freq 2.45200000 GHz
#Peak		CF Step 3.00000000 MHz <u>Auto</u> <u>Man</u>
Log		Freq Offset 0.00000000 Hz
10		Signal Track On <u>Off</u>
dB/		Scale Type Log <u>Lin</u>
Center 2.437 GHz Span 30 MHz		
#Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)		
<div style="border: 2px solid magenta; padding: 5px;"> Occupied Bandwidth 17.0539 MHz </div>		
Occ BW % Pwr 99.00 %		
x dB -6.00 dB		
Transmit Freq Error -268.219 kHz		
x dB Bandwidth 16.616 MHz		

TX CH 11

Agilent R T		Freq/Channel
Align		
Ch Freq 2.462 GHz	Trig Free	Center Freq 2.46200000 GHz
Occupied Bandwidth		Start Freq 2.44700000 GHz
Ref 0 dBm #Atten 0 dB Ext PG -10 dB		Stop Freq 2.47700000 GHz
#Peak		CF Step 3.00000000 MHz <u>Auto</u> <u>Man</u>
Log		Freq Offset 0.00000000 Hz
10		Signal Track On <u>Off</u>
dB/		Scale Type Log <u>Lin</u>
Center 2.462 GHz Span 30 MHz		
#Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)		
<div style="border: 2px solid magenta; padding: 5px;"> Occupied Bandwidth 17.0399 MHz </div>		
Occ BW % Pwr 99.00 %		
x dB -6.00 dB		
Transmit Freq Error -255.033 kHz		
x dB Bandwidth 16.625 MHz		

EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX n Mode(20M) /CH01, CH06, CH11		

Channel	Frequency (MHz)	Data Rate (Mbps)	Antenna port	6dB bandwidth (MHz)	Limit (kHz)	Result
802.11N(20) mode						
Low	2412	Msc7	Chain 0	17.70	500	Pass
Middle	2437	Msc7	Chain 0	17.81	500	Pass
High	2462	Msc7	Chain 0	17.85	500	Pass



TX CH 06

Agilent R T

Align

Ch Freq 2.437 GHz Trig Free

Occupied Bandwidth [] []

Ref 0 dBm #Atten 0 dB Ext PG -10 dB

#Peak

Log

10

dB/

Center 2.437 GHz Span 30 MHz

#Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)

Occupied Bandwidth Occ BW % Pwr 99.00 %

18.1375 MHz

x dB -6.00 dB

Transmit Freq Error -225.667 kHz

x dB Bandwidth 17.806 MHz

Freq/Channel

Center Freq 2.43700000 GHz

Start Freq 2.42200000 GHz

Stop Freq 2.45200000 GHz

CF Step 3.00000000 MHz

Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

Scale Type Log Lin

TX CH 11

Agilent R T

Align

Ch Freq 2.462 GHz Trig Free

Occupied Bandwidth [] []

Ref 0 dBm #Atten 0 dB Ext PG -10 dB

#Peak

Log

10

dB/

Center 2.462 GHz Span 30 MHz

#Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)

Occupied Bandwidth Occ BW % Pwr 99.00 %

18.1510 MHz

x dB -6.00 dB

Transmit Freq Error -213.424 kHz

x dB Bandwidth 17.846 MHz

Freq/Channel

Center Freq 2.46200000 GHz

Start Freq 2.44700000 GHz

Stop Freq 2.47700000 GHz

CF Step 3.00000000 MHz

Auto Man

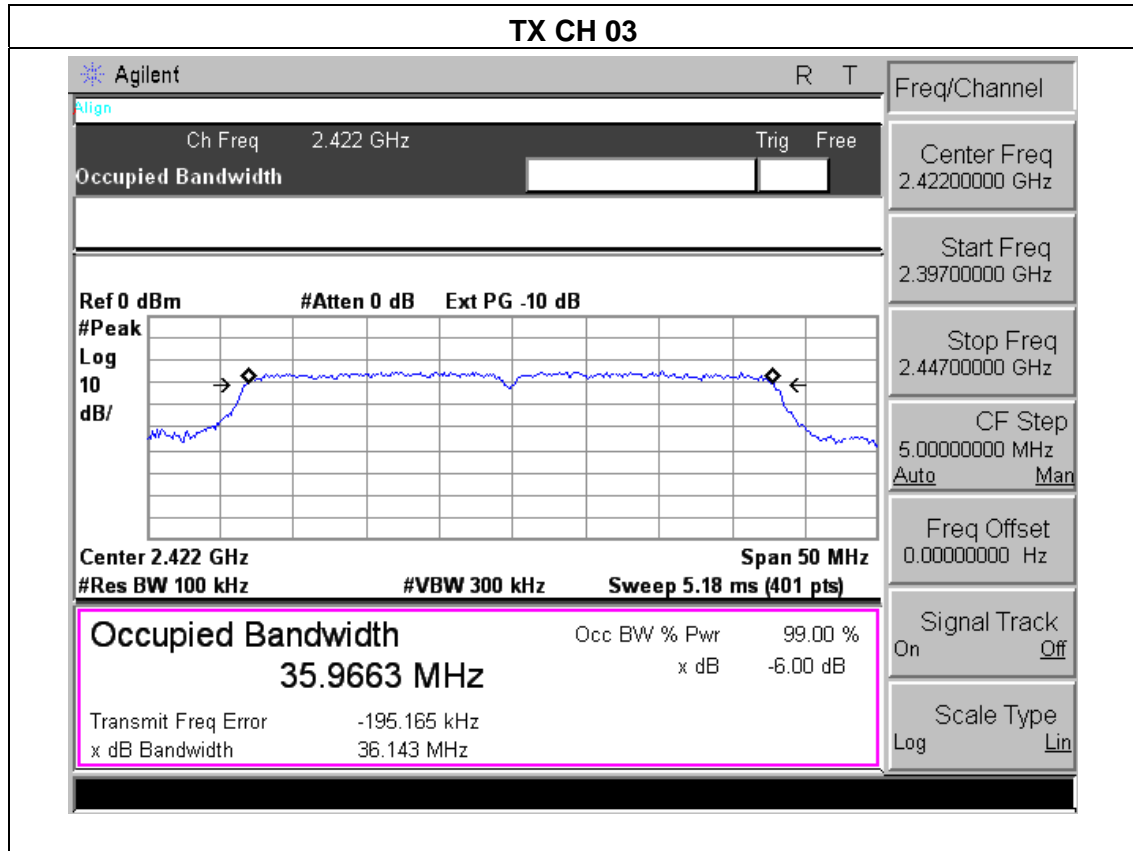
Freq Offset 0.00000000 Hz

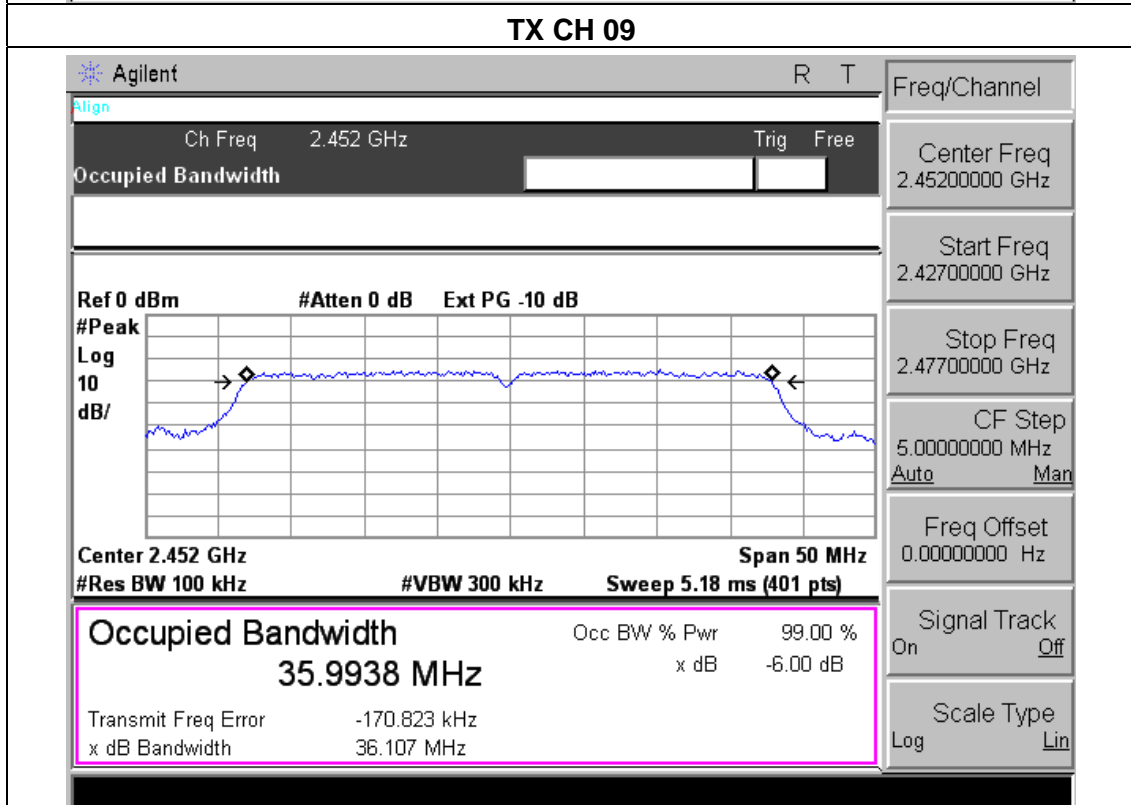
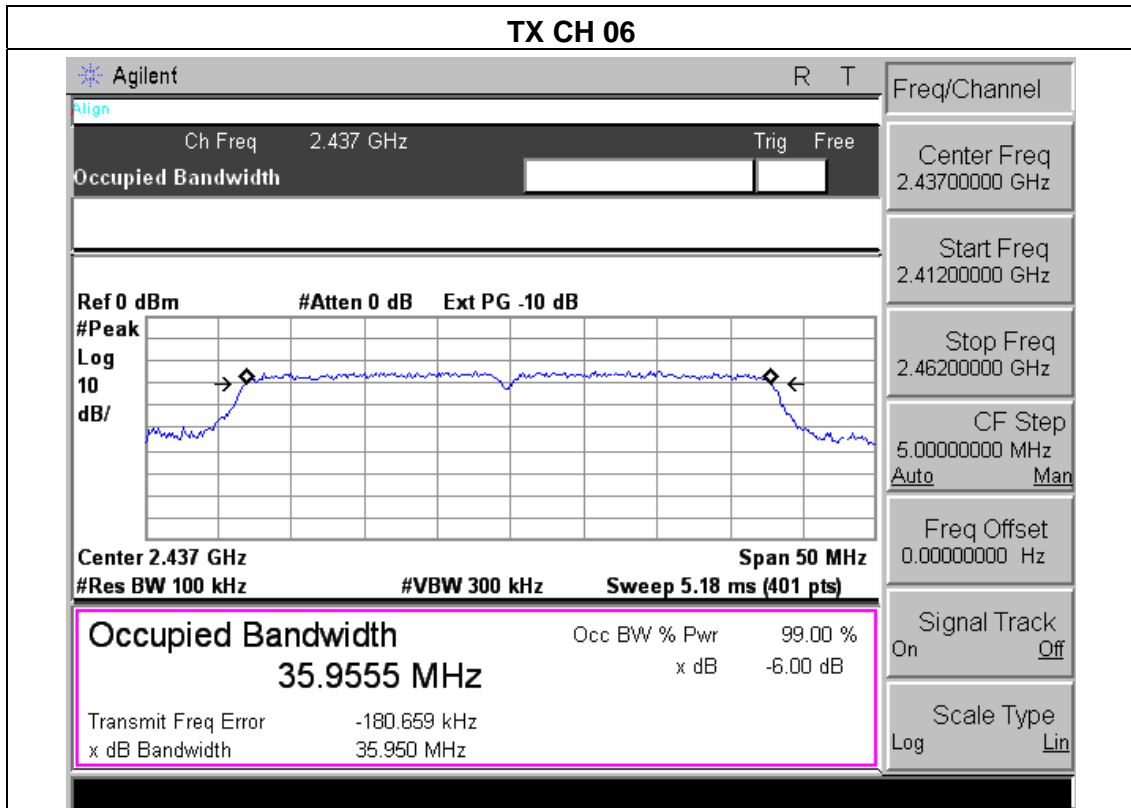
Signal Track On Off

Scale Type Log Lin

EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX n Mode(40M) /CH03, CH06, CH09		

Channel	Frequency (MHz)	Data Rate (Mbps)	Antenna port	6dB bandwidth (MHz)	Limit (kHz)	Result
802.11N(40) mode						
Low	2422	Msc7	Chain 0	36.14	500	Pass
Middle	2437	Msc7	Chain 0	35.95	500	Pass
High	2452	Msc7	Chain 0	36.11	500	Pass





6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX b/g/n(20M, 40M) Mode		

TX 802.11b Mode				
Test Channe	Frequency	Maximum Conducted Output Power	LIMIT	Pass/Fail
	(MHz)	(dBm)	(dBm)	
TX 802.11b Mode				
CH01	2412	17.74	30	Pass
CH06	2437	17.65	30	Pass
CH11	2462	17.44	30	Pass
TX 802.11g Mode				
CH01	2412	16.54	30	Pass
CH06	2437	16.36	30	Pass
CH11	2462	16.94	30	Pass
TX 802.11n-HT20 Mode				
CH01	2412	15.65	30	Pass
CH06	2437	15.73	30	Pass
CH11	2462	15.83	30	Pass
TX 802.11n-HT40 Mode				
CH03	2422	13.53	30	Pass
CH06	2437	13.63	30	Pass
CH09	2452	13.08	30	Pass

7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

7.1 DEVIATION FROM STANDARD

No deviation.

7.2 TEST SETUP



7.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

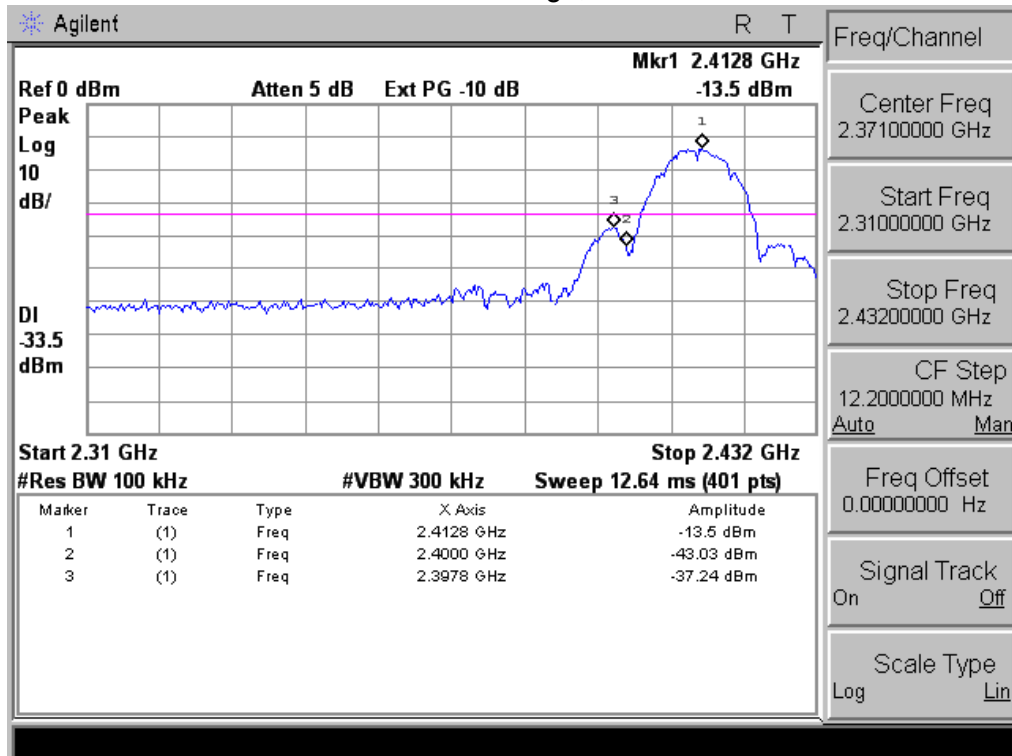
7.4 TEST RESULTS

EUT :	Android mini PC	Model Name :	SY-20-19VC
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC120V/60Hz

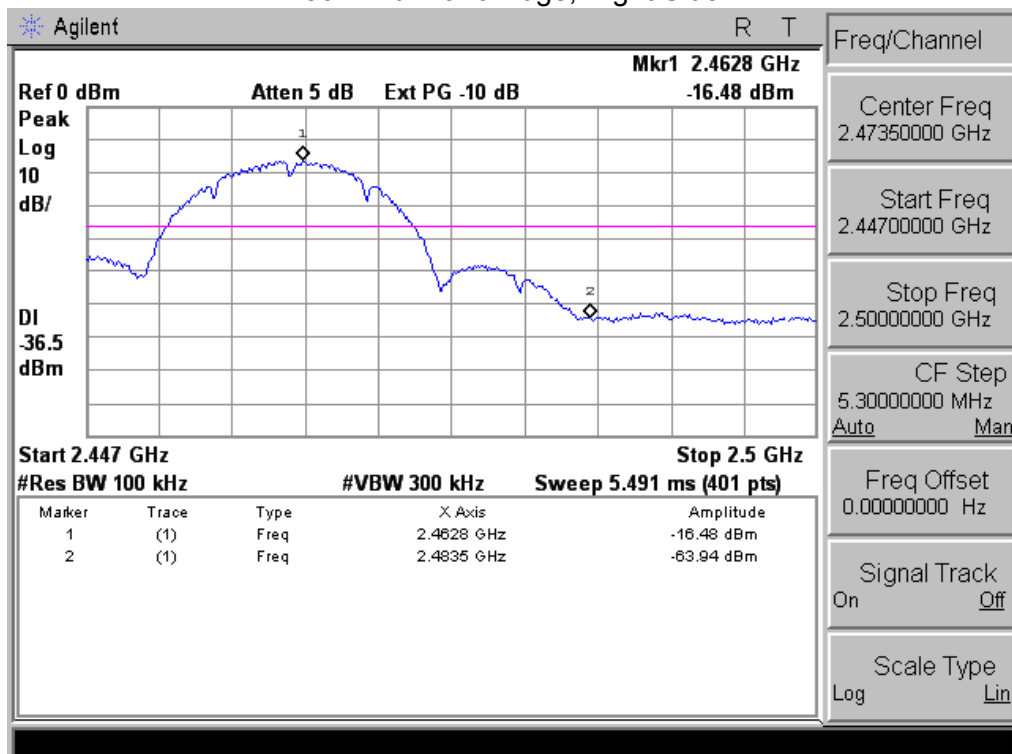
Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
802.11b mode			
Left-band	23.74	20	Pass
Right-band	47.46	20	Pass
802.11g mode			
Left-band	22.53	20	Pass
Right-band	37.20	20	Pass
802.11n-HT20 mode			
Left-band	24.97	20	Pass
Right-band	34.46	20	Pass
802.11n-HT40 mode			
Left-band	23.15	20	Pass
Right-band	32.11	20	Pass

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
802.11b							
2390	41.33	-13.06	28.27	74	-45.73	peak	Vertical
2390	44.72	-13.06	31.66	74	-42.34	peak	Horizontal
2483.5	45.67	-12.78	32.89	74	-41.11	peak	Vertical
2483.5	43.44	-12.78	30.66	74	-43.34	peak	Horizontal
802.11g							
2390	41.48	-13.06	28.42	74	-45.58	peak	Vertical
2390	40.34	-13.06	27.28	74	-46.72	peak	Horizontal
2483.5	48.03	-12.78	35.25	74	-38.75	peak	Vertical
2483.5	41.26	-12.78	28.48	74	-45.52	peak	Horizontal
802.11n (20)							
2390	38.77	-13.06	25.71	74	-48.29	peak	Vertical
2390	39.59	-13.06	26.53	74	-47.47	peak	Horizontal
2483.5	46.44	-12.78	33.66	74	-40.34	peak	Vertical
2483.5	45.13	-12.78	32.35	74	-41.65	peak	Horizontal
802.11n (40)							
2390	39.46	-13.06	26.4	74	-47.6	peak	Vertical
2390	38.78	-13.06	25.72	74	-48.28	peak	Horizontal
2483.5	45.86	-12.78	33.08	74	-40.92	peak	Vertical
2483.5	45.11	-12.78	32.33	74	-41.67	peak	Horizontal

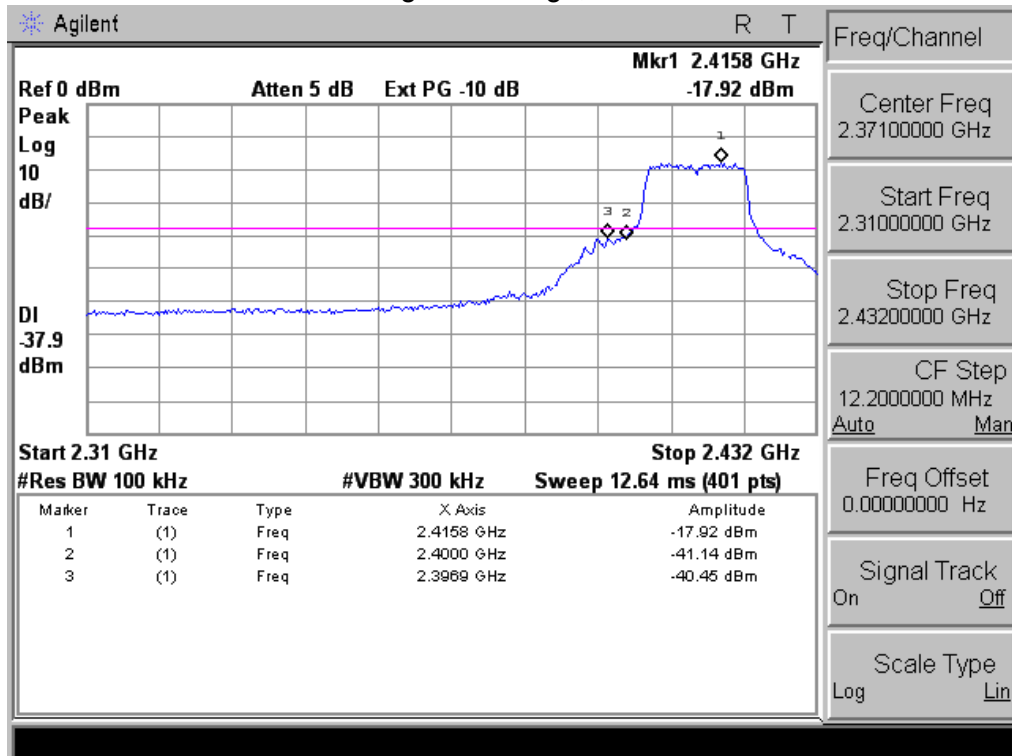
802.11b: Band Edge, Left Side



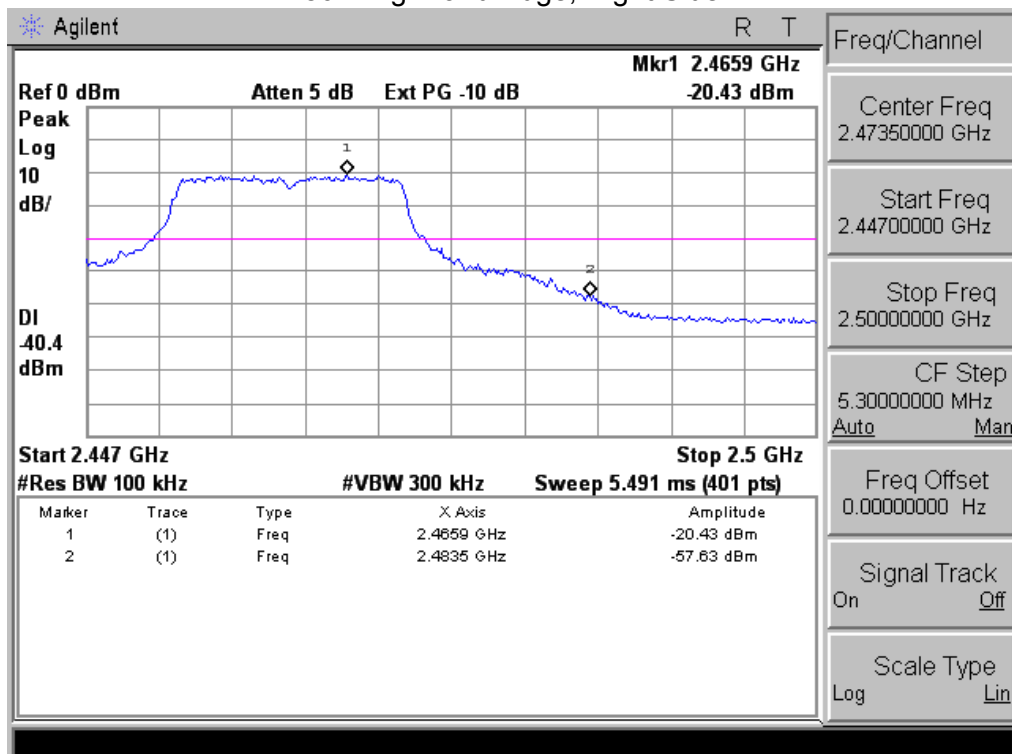
802.11b: Band Edge, Right Side



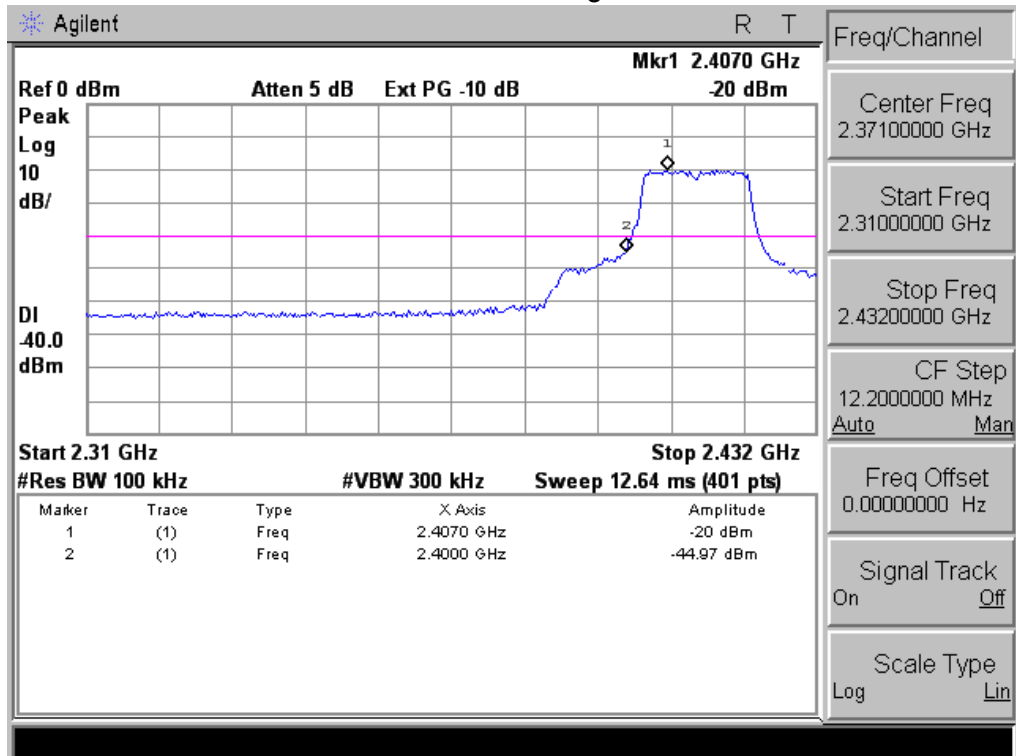
802.11g: Band Edge, Left Side



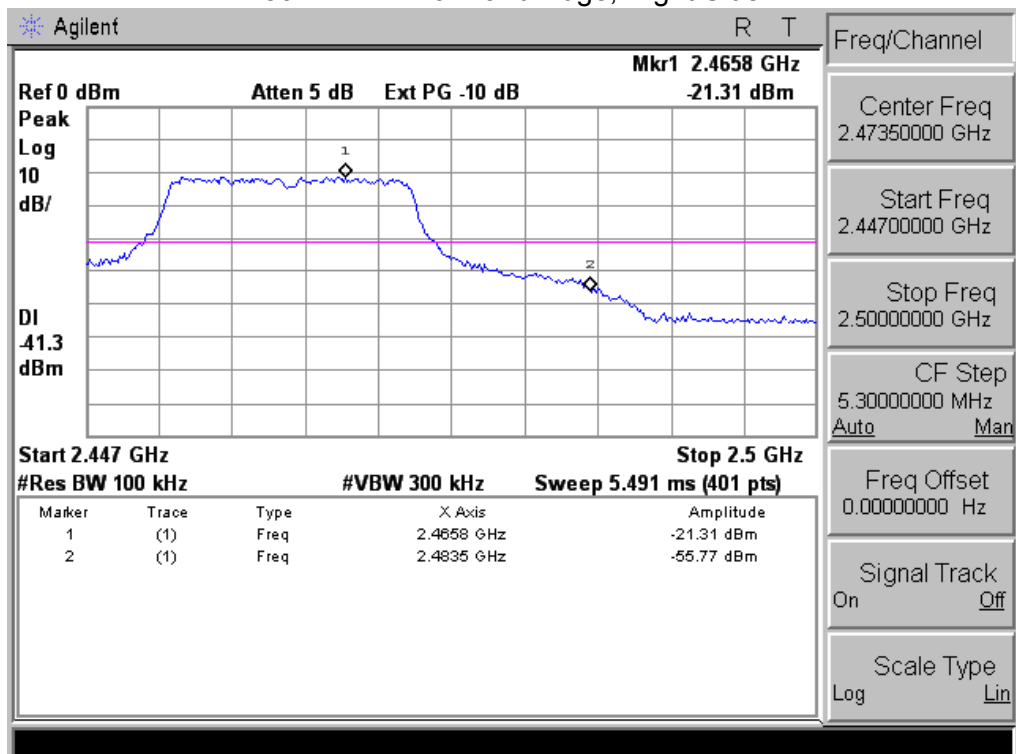
802.11g: Band Edge, Right Side



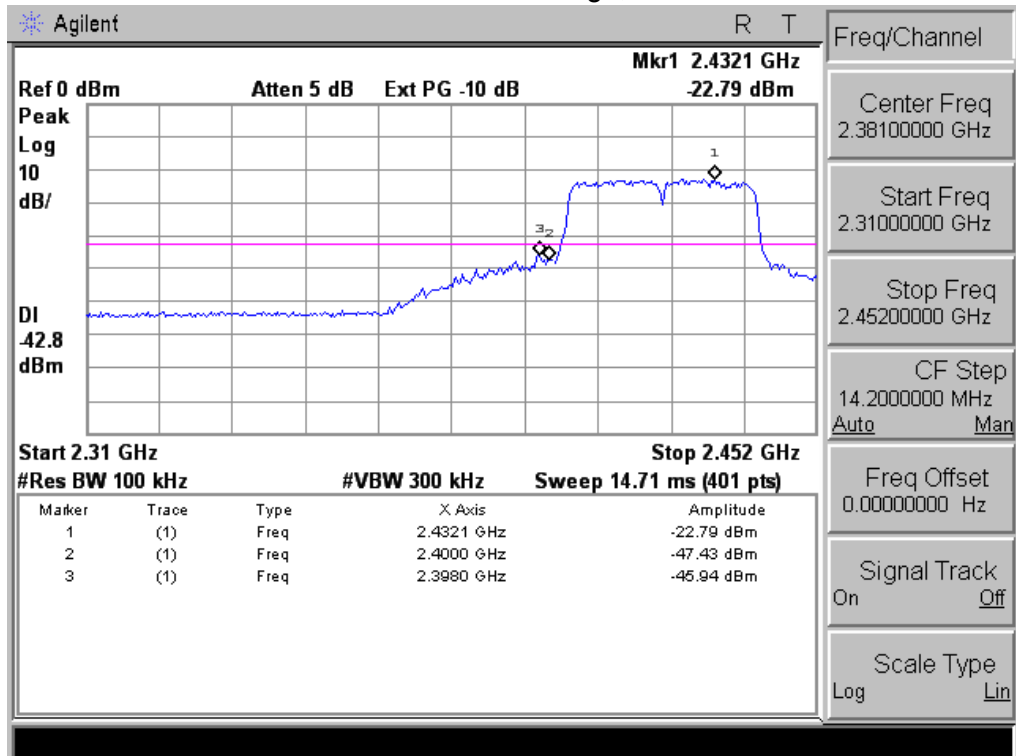
802.11n-HT20: Band Edge, Left Side



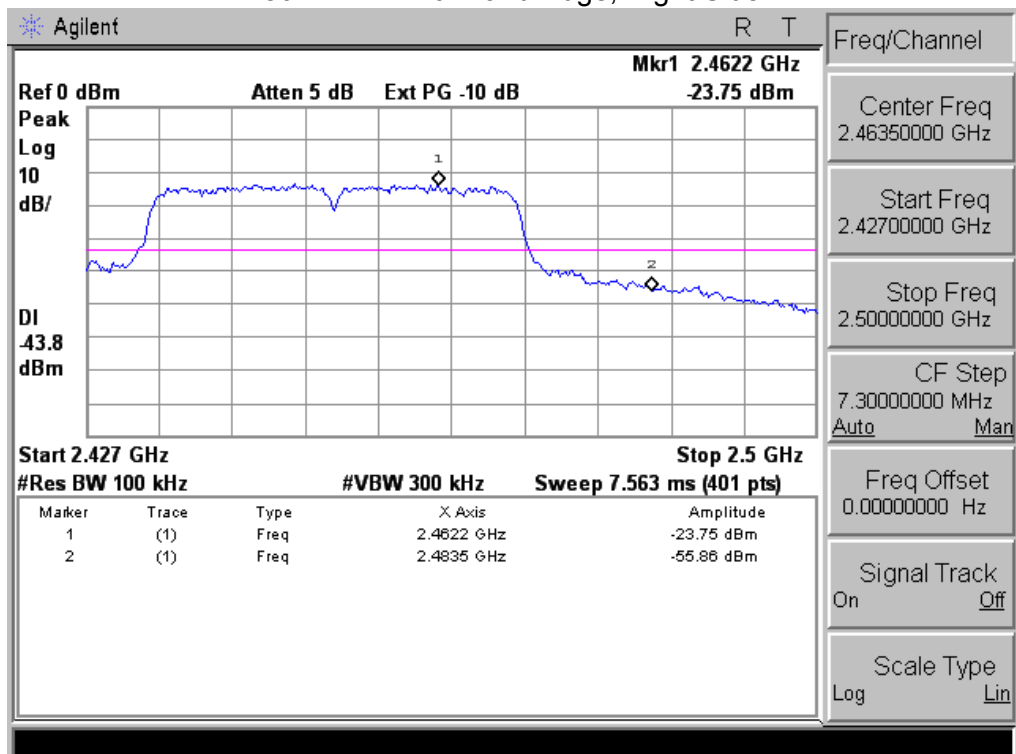
802.11n-HT20: Band Edge, Right Side



802.11n-HT40: Band Edge, Left Side



802.11n-HT40: Band Edge, Right Side



8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2 EUT ANTENNA

The EUT antenna is integrated antenna. It comply with the standard requirement.

9. EUT TEST PHOTO

Radiated Measurement Photos



Conducted Measurement Photos

