

TEST REPORT

Reference No..... : WTS14S0412841E
FCC ID : YVV-AEEOM51S60S
Applicant..... : Shenzhen AEE Technology CO., LTD.
Address..... : AEE Hi-Tech Park, Sun Industrial Area, Xili, Nanshan District,
Shenzhen, P.R.C 518108
Manufacturer : The same as above.
Address..... : The same as above.
Product Name..... : Action Camcorder
Model No..... : S50, S51, OM51S,OM60S
Standards..... : FCC CFR47 Part 15 C Section 15.247:2012
Date of Receipt sample : Apr.01, 2014
Date of Test : Apr.01~18, 2014
Date of Issue..... : Apr.22, 2014
Test Result..... : **Pass ***

***Remarks:**

The results shown in this test report refer only to the sample(s) tested; this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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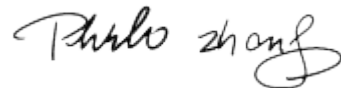
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Compiled by:



Zero Zhou / Project Engineer

Approved by:



Philo Zhong / Manager

2 Test Summary

Test Items	Test Requirement	Result
Radiated Emissions	15.247 15.205(a) 15.209(a)	PASS
Conducted Emissions	15.207(a)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(3),(4)	PASS
Power Spectral Density	15.247(e)	PASS
Band Edge	15.247(d)	PASS
Antenna Requirement	15.203	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

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4 General Information

4.1 General Description of E.U.T.

Product Name	: Action Camcorder
Model No.	: S50, S51, OM51S, OM60S
Model Description	: All the same (included PCB layout and Schematic) except the model name. The model S50 is tested sample.
Operation Frequency	: 2412MHz ~ 2462MHz
Lowest OSC Frequency	: Crystal 32.768kHz for RTC, 24MHz for RF module
Antenna Gain	: 0dBi
Type of Modulation	: IEEE 802.11b (CCK/QPSK/BPSK, 11Mbps max.) IEEE 802.11g (BPSK/QPSK/16QAM/64QAM, 54Mbps max.) IEEE 802.11n (BPSK/QPSK/16QAM/64QAM, HT20: 72Mbps max.)
Note	: All the modulation modes were tested, all the test data deeply conform to the rules and the data of the worst mode are recorded in the following pages.

4.2 Details of E.U.T.

Technical Data	: (1) DC 3.7V, 1500mAh powered from battery (2) DC 5V, 2000mA powered from adapter (INPUT: AC 100-240V, 50/60Hz 0.4A)
Adapter	: Manufacturer: shenzhen Diasinger Digital co., Ltd Model: DS-012W0502000LE

4.3 Test Mode

Table 1 Tests Carried Out Under FCC part 15.247

Test Items	Test Mode	Data Rate	Channel	TX/RX
Maximum Peak Output Power	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	72 Mbps	1/6/11	TX
Power Spectral Density	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	72 Mbps	1/6/11	TX
6 dB Bandwidth	802.11b	11 Mbps	1/11	TX
	802.11g	54 Mbps	1/11	TX
	802.11n HT20	72 Mbps	1/11	TX
Band Emissions	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	72 Mbps	1/6/11	TX
Radiated Emissions	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	72 Mbps	1/6/11	TX

Note: Parameters set by test software during channel & power tests, the software provided by the customer was used to set the operating channels as well as the output power level. The RF output power set is the power expected by the manufacturer and is going to be fixed on the firmware of the final product.

Table 2 Tests Carried Out Under FCC part 15.207 & FCC part 15.209

Test Item	Test Mode
Conduction Emission, 0.15MHz to 30MHz	Communication

4.4 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services (Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, July 12, 2012.

- **FCC – Registration No.: 880581**

Waltek Services (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, May 26, 2011.

4.5 General condition

Ambient Condition: 25.5 °C 58 %RH

5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.18,2013	Sep.17,2014
2.	LISN	R&S	ENV216	101215	Nov. 29,2013	Nov. 28,2014
3.	Cable	Top	TYPE16(3.5M)	-	Sep.18,2013	Sep.17,2014
3m Semi-anechoic Chamber for Radiation Emissions						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY45114943	Sep.18,2013	Sep.17,2014
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.18,2013	Sep.17,2014
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.20,2013	Apr.19,2014
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.18,2013	Sep.17,2014
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.20,2013	Apr.19,2014
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.20,2013	Apr.19,2014
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.17,2014	Mar.16,2015
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.20,2013	Apr.19,2014

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

Waltek Services (Shenzhen) Co., Ltd.

<http://www.waltek.com.cn>

6 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.4:2003
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class:	Class B
Limit:	66-56 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1 E.U.T. Operation

Operating Environment:

Temperature:	22.6 °C
Humidity:	52.5 % RH
Atmospheric Pressure:	101.2 kPa

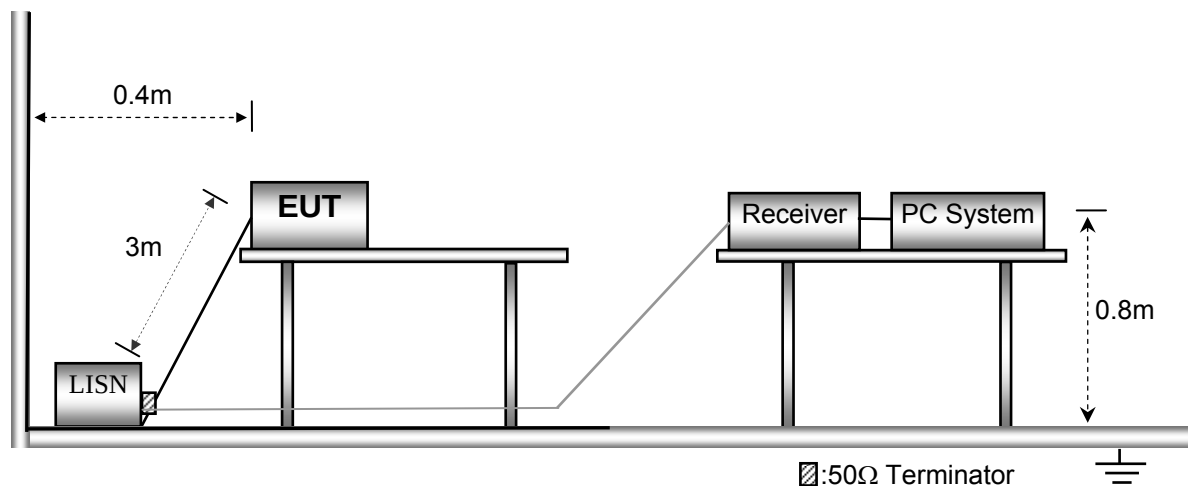
EUT Operation:

The pre-test was performed in Wi-Fi (adapter operation), recording+ Mini HDMI(adapter operation) mode, and Wi-Fi mode data was the worse, so the worst mode were shown as follow.

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.2 EUT Setup

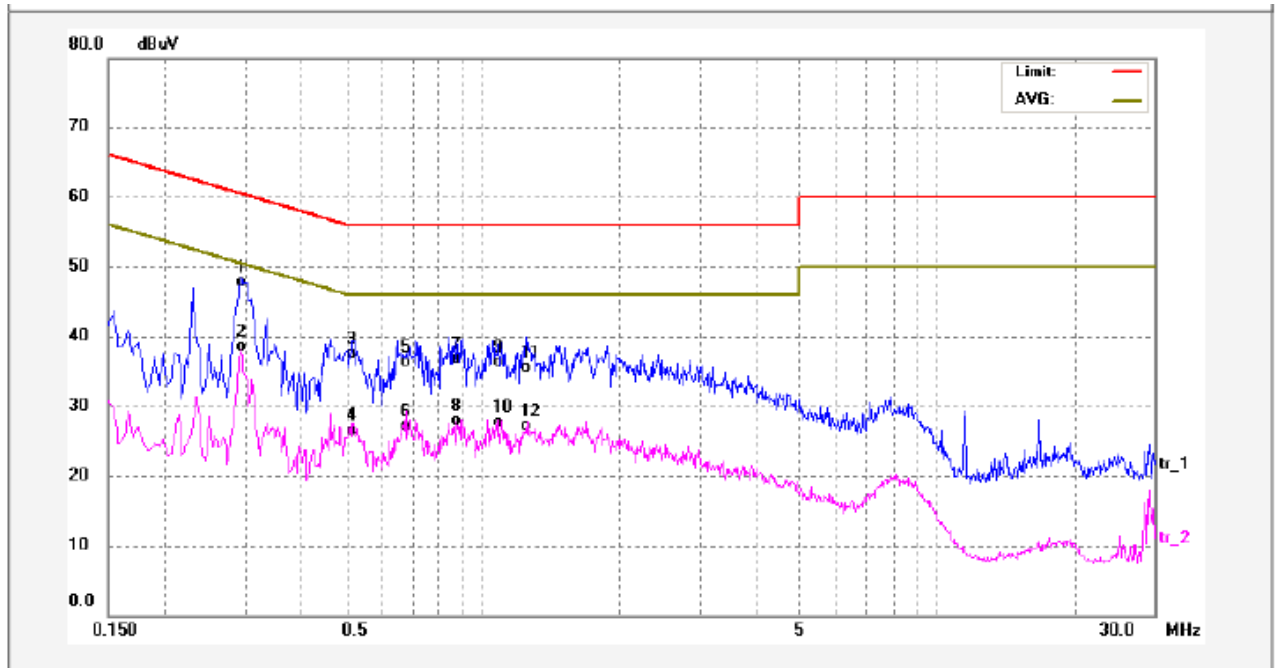
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003.



6.3 Conducted Emission Test Result

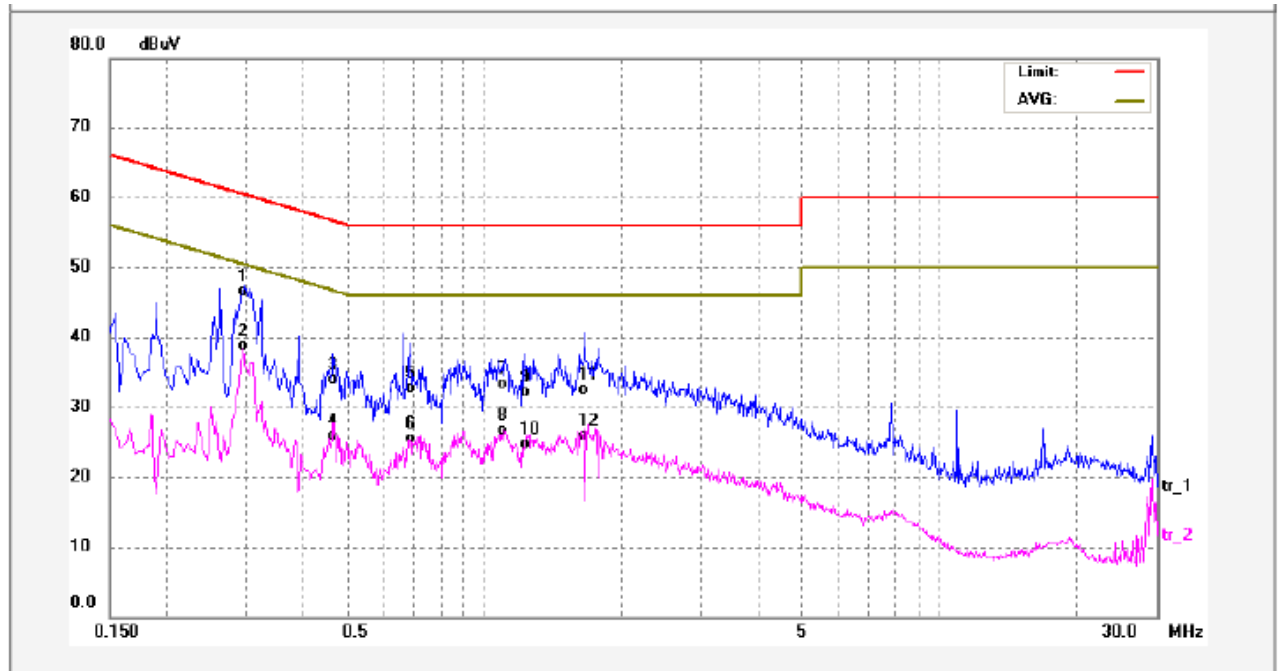
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2940	35.69	11.30	46.99	60.41	-13.42	QP	
2	0.2940	26.45	11.30	37.75	50.41	-12.66	AVG	
3	0.5180	25.34	11.31	36.65	56.00	-19.35	QP	
4	0.5180	14.36	11.31	25.67	46.00	-20.33	AVG	
5	0.6820	24.19	11.34	35.53	56.00	-20.47	QP	
6	0.6820	15.00	11.34	26.34	46.00	-19.66	AVG	
7	0.8780	24.65	11.24	35.89	56.00	-20.11	QP	
8	0.8780	15.94	11.24	27.18	46.00	-18.82	AVG	
9	1.0859	24.26	11.18	35.44	56.00	-20.56	QP	
10	1.0859	15.75	11.18	26.93	46.00	-19.07	AVG	
11	1.2660	23.57	11.19	34.76	56.00	-21.24	QP	
12	1.2660	15.12	11.19	26.31	46.00	-19.69	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2980	34.33	11.30	45.63	60.30	-14.67	QP	
2	0.2980	26.51	11.30	37.81	50.30	-12.49	AVG	
3	0.4660	21.75	11.31	33.06	56.58	-23.52	QP	
4	0.4660	13.71	11.31	25.02	46.58	-21.56	AVG	
5	0.6940	20.64	11.34	31.98	56.00	-24.02	QP	
6	0.6940	13.46	11.34	24.80	46.00	-21.20	AVG	
7	1.0940	21.36	11.18	32.54	56.00	-23.46	QP	
8	1.0940	14.73	11.18	25.91	46.00	-20.09	AVG	
9	1.2220	20.15	11.18	31.33	56.00	-24.67	QP	
10	1.2220	12.78	11.18	23.96	46.00	-22.04	AVG	
11	1.6620	20.53	11.19	31.72	56.00	-24.28	QP	
12	1.6620	13.83	11.19	25.02	46.00	-20.98	AVG	

7 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.4:2003

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

7.1 EUT Operation:

Operating Environment:

Temperature: 22.5 °C

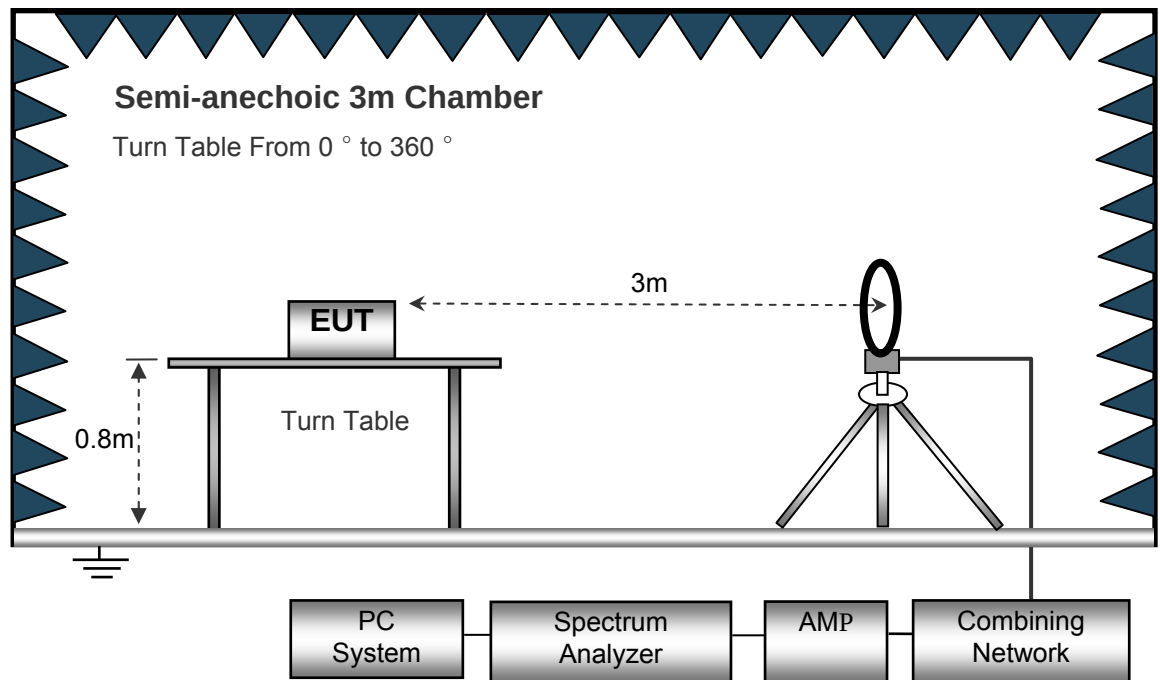
Humidity: 52.3 % RH

Atmospheric Pressure: 101.3 kPa

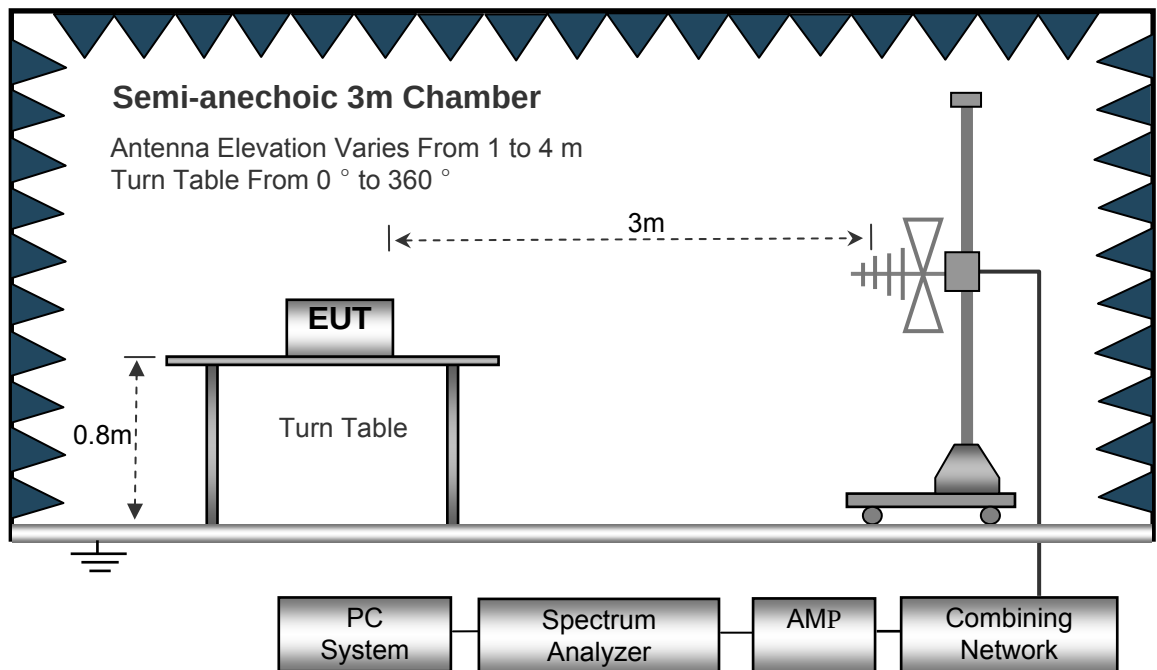
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.

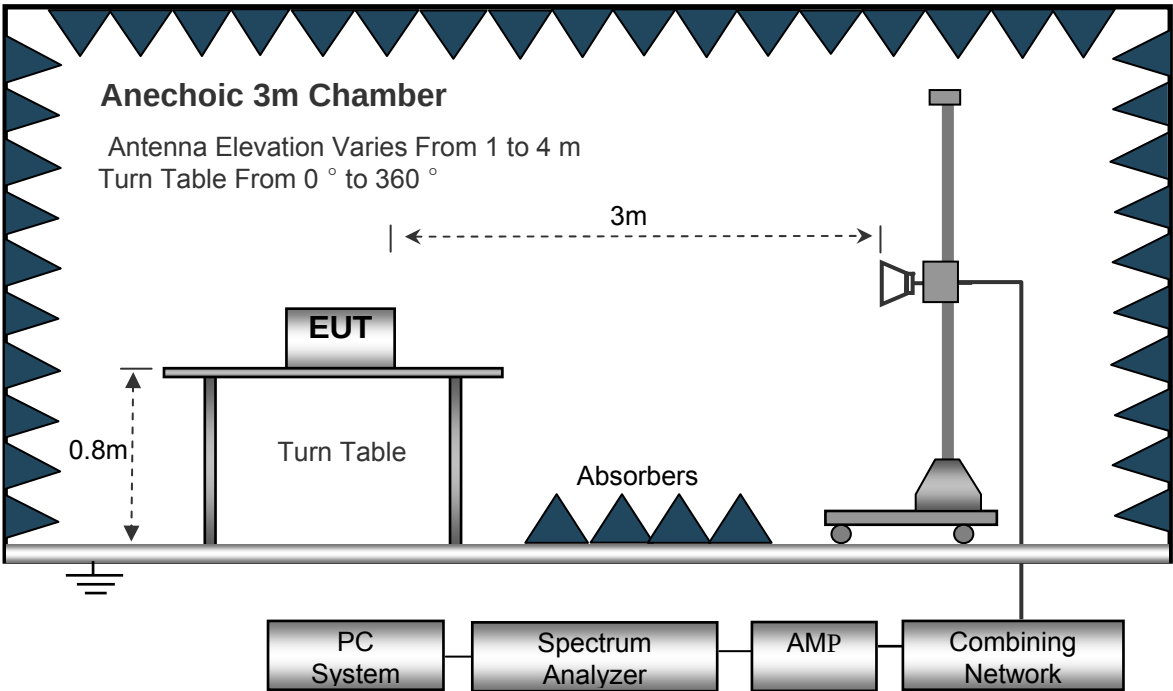
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



7.3 Spectrum Analyzer Setup

According to FCC Part15 Rules, the system was tested from 32.768kHz to 25000MHz.

Below 30MHz	
Sweep Speed	Auto
IF Bandwidth.....	10kHz
Video Bandwidth.....	10kHz
Resolution Bandwidth.....	10kHz
30MHz ~ 1GHz	
Sweep Speed	Auto
Detector	PK
Resolution Bandwidth.....	100kHz
Video Bandwidth.....	300kHz
Above 1GHz	
Sweep Speed	Auto
Detector	PK
Resolution Bandwidth.....	1MHz
Video Bandwidth.....	3MHz
Detector	Ave.
Resolution Bandwidth.....	1MHz
Video Bandwidth.....	10Hz

7.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used during radiated emissions above 1GHz measurement.

7.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

7.6 Summary of Test Results

Test Frequency: Below 30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency: 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11b: Low Channel 2412MHz									
289.60	14.33	PK	281	1.7	H	17.12	31.45	40.00	-8.55
289.60	15.16	PK	88	1.9	V	17.12	32.28	40.00	-7.72
4824.00	53.70	PK	285	1.6	V	-1.06	52.64	74.00	-21.36
4824.00	44.96	Ave	285	1.6	V	-1.06	43.90	54.00	-10.10
7236.00	41.67	PK	283	1.9	H	1.33	43.00	74.00	-31.00
7236.00	38.83	Ave	283	1.9	H	1.33	40.16	54.00	-13.84
2342.77	45.23	PK	157	1.4	V	-13.19	32.04	74.00	-41.96
2342.77	39.95	Ave	157	1.4	V	-13.19	26.76	54.00	-27.24
2383.47	43.30	PK	347	1.2	H	-13.14	30.16	74.00	-43.84
2383.47	36.26	Ave	347	1.2	H	-13.14	23.12	54.00	-30.88
2498.49	42.16	PK	156	1.8	V	-13.08	29.08	74.00	-44.92
2498.49	36.12	Ave	156	1.8	V	-13.08	23.04	54.00	-30.96

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11b: Middle Channel 2437MHz									
289.60	13.68	PK	59	2.0	H	17.12	30.80	40.00	-9.20
289.60	14.29	PK	203	1.9	V	17.12	31.41	40.00	-8.59
4874.00	49.33	PK	100	1.4	V	-0.62	48.71	74.00	-25.29
4874.00	41.71	Ave	100	1.4	V	-0.62	41.09	54.00	-12.91
7311.00	46.49	PK	80	1.6	H	2.21	48.70	74.00	-25.30
7311.00	39.73	Ave	80	1.6	H	2.21	41.94	54.00	-12.06
2340.30	45.56	PK	239	1.3	V	-13.19	32.37	74.00	-41.63
2340.30	37.91	Ave	239	1.3	V	-13.19	24.72	54.00	-29.28
2386.51	43.14	PK	229	1.7	H	-13.14	30.00	74.00	-44.00
2386.51	36.47	Ave	229	1.7	H	-13.14	23.33	54.00	-30.67
2489.58	44.94	PK	107	1.2	V	-13.08	31.86	74.00	-42.14
2489.58	38.17	Ave	107	1.2	V	-13.08	25.09	54.00	-28.91

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11b: High Channel 2462MHz									
289.60	14.54	PK	7	1.5	H	17.12	31.66	40.00	-8.34
289.60	14.86	PK	152	2.0	V	17.12	31.98	40.00	-8.02
4924.00	50.36	PK	123	1.7	V	-0.24	50.12	74.00	-23.88
4924.00	42.93	Ave	123	1.7	V	-0.24	42.69	54.00	-11.31
7386.00	48.60	PK	335	1.2	H	2.84	51.44	74.00	-22.56
7386.00	40.37	Ave	335	1.2	H	2.84	43.21	54.00	-10.79
2313.48	45.14	PK	338	1.3	V	-13.19	31.95	74.00	-42.05
2313.48	39.25	Ave	338	1.3	V	-13.19	26.06	54.00	-27.94
2384.94	44.49	PK	325	1.9	H	-13.14	31.35	74.00	-42.65
2384.94	37.83	Ave	325	1.9	H	-13.14	24.69	54.00	-29.31
2494.84	44.67	PK	346	1.2	V	-13.08	31.59	74.00	-42.41
2494.84	36.45	Ave	346	1.2	V	-13.08	23.37	54.00	-30.63

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11g: Low Channel 2412MHz									
289.60	15.23	PK	200	1.8	H	17.12	32.35	40.00	-7.65
289.60	14.53	PK	127	1.3	V	17.12	31.65	40.00	-8.35
4824.00	54.11	PK	140	1.2	V	-1.06	53.05	74.00	-20.95
4824.00	44.08	Ave	140	1.2	V	-1.06	43.02	54.00	-10.98
7236.00	42.36	PK	250	1.9	H	1.33	43.69	74.00	-30.31
7236.00	38.97	Ave	250	1.9	H	1.33	40.30	54.00	-13.70
2337.61	46.86	PK	110	1.5	V	-13.19	33.67	74.00	-40.33
2337.61	37.66	Ave	110	1.5	V	-13.19	24.47	54.00	-29.53
2371.49	44.28	PK	237	1.0	H	-13.14	31.14	74.00	-42.86
2371.49	37.50	Ave	237	1.0	H	-13.14	24.36	54.00	-29.64
2492.36	44.40	PK	249	1.8	V	-13.08	31.32	74.00	-42.68
2492.36	36.65	Ave	249	1.8	V	-13.08	23.57	54.00	-30.43

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11g: Middle Channel 2437MHz									
289.60	14.89	PK	236	1.1	H	17.12	32.01	40.00	-7.99
289.60	13.92	PK	312	1.9	V	17.12	31.04	40.00	-8.96
4874.00	49.26	PK	334	1.3	V	-0.62	48.64	74.00	-25.36
4874.00	41.34	Ave	334	1.3	V	-0.62	40.72	54.00	-13.28
7311.00	46.08	PK	314	1.8	H	2.21	48.29	74.00	-25.71
7311.00	38.80	Ave	314	1.8	H	2.21	41.01	54.00	-12.99
2318.09	45.42	PK	134	1.2	V	-13.19	32.23	74.00	-41.77
2318.09	37.65	Ave	134	1.2	V	-13.19	24.46	54.00	-29.54
2364.91	44.52	PK	173	1.7	H	-13.14	31.38	74.00	-42.62
2364.91	37.43	Ave	173	1.7	H	-13.14	24.29	54.00	-29.71
2498.51	43.99	PK	213	1.5	V	-13.08	30.91	74.00	-43.09
2498.51	37.43	Ave	213	1.5	V	-13.08	24.35	54.00	-29.65

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11g: High Channel 2462MHz									
289.60	14.33	PK	32	1.1	H	17.12	31.45	40.00	-8.55
289.60	13.51	PK	309	1.2	V	17.12	30.63	40.00	-9.37
4924.00	51.14	PK	163	1.2	V	-0.24	50.90	74.00	-23.10
4924.00	44.49	Ave	163	1.2	V	-0.24	44.25	54.00	-9.75
7386.00	48.25	PK	87	1.6	H	2.84	51.09	74.00	-22.91
7386.00	39.15	Ave	87	1.6	H	2.84	41.99	54.00	-12.01
2321.50	45.66	PK	92	1.1	V	-13.19	32.47	74.00	-41.53
2321.50	38.22	Ave	92	1.1	V	-13.19	25.03	54.00	-28.97
2368.93	42.48	PK	191	1.0	H	-13.14	29.34	74.00	-44.66
2368.93	37.74	Ave	191	1.0	H	-13.14	24.60	54.00	-29.40
2487.21	44.18	PK	353	1.7	V	-13.08	31.10	74.00	-42.90
2487.21	37.83	Ave	353	1.7	V	-13.08	24.75	54.00	-29.25

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n(HT20): Low Channel 2412MHz									
289.60	14.36	PK	354	1.2	H	17.12	31.48	40.00	-8.52
289.60	13.81	PK	193	1.4	V	17.12	30.93	40.00	-9.07
4824.00	52.49	PK	297	1.9	V	-1.06	51.43	74.00	-22.57
4824.00	44.93	Ave	297	1.9	V	-1.06	43.87	54.00	-10.13
7236.00	42.98	PK	142	1.1	H	1.33	44.31	74.00	-29.69
7236.00	39.18	Ave	142	1.1	H	1.33	40.51	54.00	-13.49
2325.34	46.04	PK	338	1.8	V	-13.19	32.85	74.00	-41.15
2325.34	38.22	Ave	338	1.8	V	-13.19	25.03	54.00	-28.97
2354.18	43.96	PK	177	1.3	H	-13.14	30.82	74.00	-43.18
2354.18	38.72	Ave	177	1.3	H	-13.14	25.58	54.00	-28.42
2493.98	43.94	PK	186	1.7	V	-13.08	30.86	74.00	-43.14
2493.98	37.63	Ave	186	1.7	V	-13.08	24.55	54.00	-29.45

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n(HT20):Middle Channel 2437MHz									
289.60	13.84	PK	190	1.4	H	17.12	30.96	40.00	-9.04
289.60	14.07	PK	15	1.1	V	17.12	31.19	40.00	-8.81
4874.00	50.77	PK	310	1.5	V	-0.62	50.15	74.00	-23.85
4874.00	40.57	Ave	310	1.5	V	-0.62	39.95	54.00	-14.05
7311.00	46.76	PK	112	1.8	H	2.21	48.97	74.00	-25.03
7311.00	38.80	Ave	112	1.8	H	2.21	41.01	54.00	-12.99
2343.60	45.94	PK	45	1.7	V	-13.19	32.75	74.00	-41.25
2343.60	39.71	Ave	45	1.7	V	-13.19	26.52	54.00	-27.48
2356.89	42.66	PK	231	1.5	H	-13.14	29.52	74.00	-44.48
2356.89	38.88	Ave	231	1.5	H	-13.14	25.74	54.00	-28.26
2489.50	42.94	PK	10	1.9	V	-13.08	29.86	74.00	-44.14
2489.50	37.42	Ave	10	1.9	V	-13.08	24.34	54.00	-29.66

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n(HT20): High Channel 2462MHz									
289.60	13.75	PK	194	1.8	H	17.12	30.87	40.00	-9.13
289.60	14.38	PK	224	1.7	V	17.12	31.50	40.00	-8.50
4924.00	51.26	PK	355	1.4	V	-0.24	51.02	74.00	-22.98
4924.00	44.39	Ave	355	1.4	V	-0.24	44.15	54.00	-9.85
7386.00	48.82	PK	109	1.6	H	2.84	51.66	74.00	-22.34
7386.00	38.70	Ave	109	1.6	H	2.84	41.54	54.00	-12.46
2319.10	46.18	PK	255	1.8	V	-13.19	32.99	74.00	-41.01
2319.10	37.11	Ave	255	1.8	V	-13.19	23.92	54.00	-30.08
2372.19	43.40	PK	19	1.8	H	-13.14	30.26	74.00	-43.74
2372.19	38.86	Ave	19	1.8	H	-13.14	25.72	54.00	-28.28
2499.55	42.62	PK	256	1.1	V	-13.08	29.54	74.00	-44.46
2499.55	37.81	Ave	256	1.1	V	-13.08	24.73	54.00	-29.27

Test Frequency: Above 18GHz

The measurements were more than 20 dB below the limit and not reported.

8 Band Edge Measurement

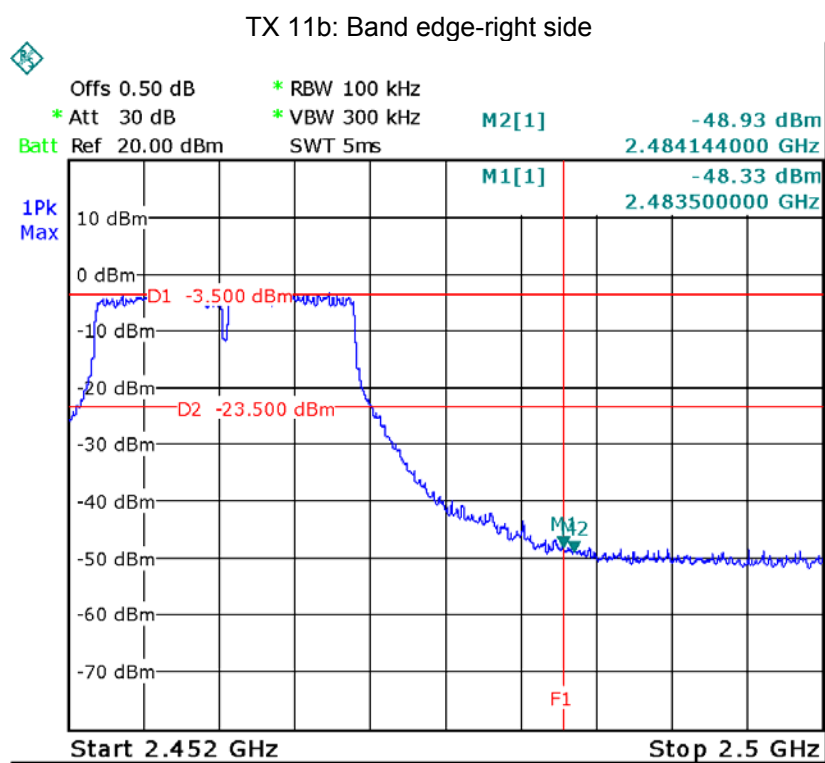
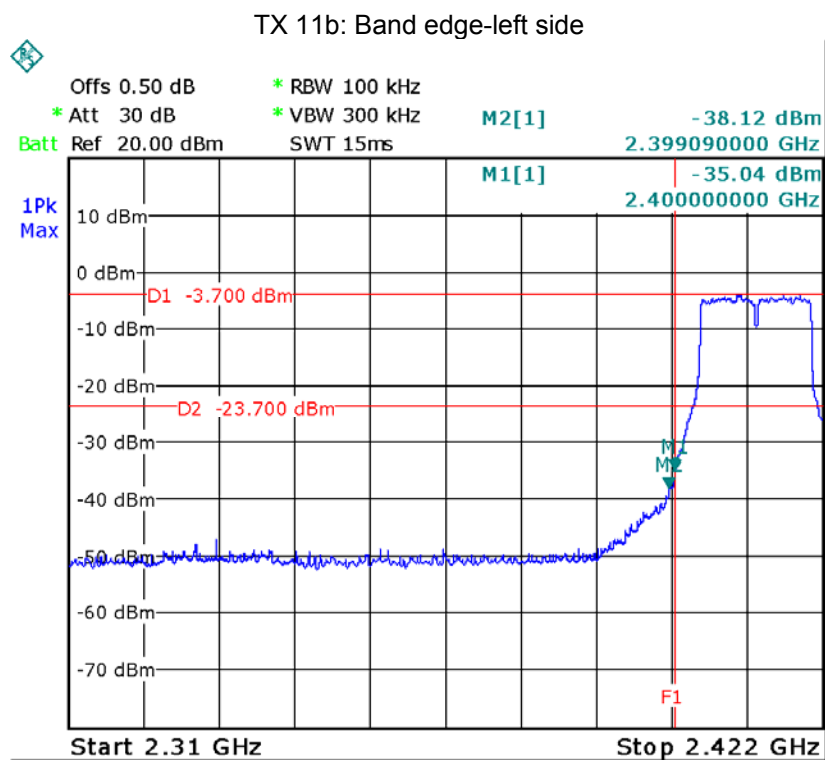
Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	KDB558074 D01 v03r01 04/09/2013
Detector:	For Peak value: RBW = 100kHz VBW = 300kHz; Sweep = auto Detector function = p Trace = max hold

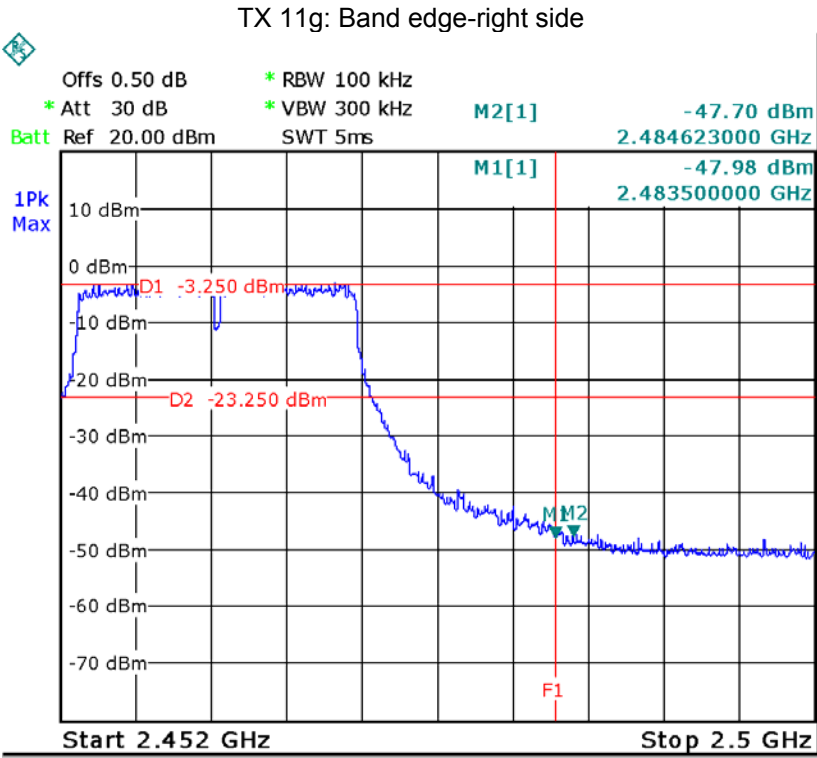
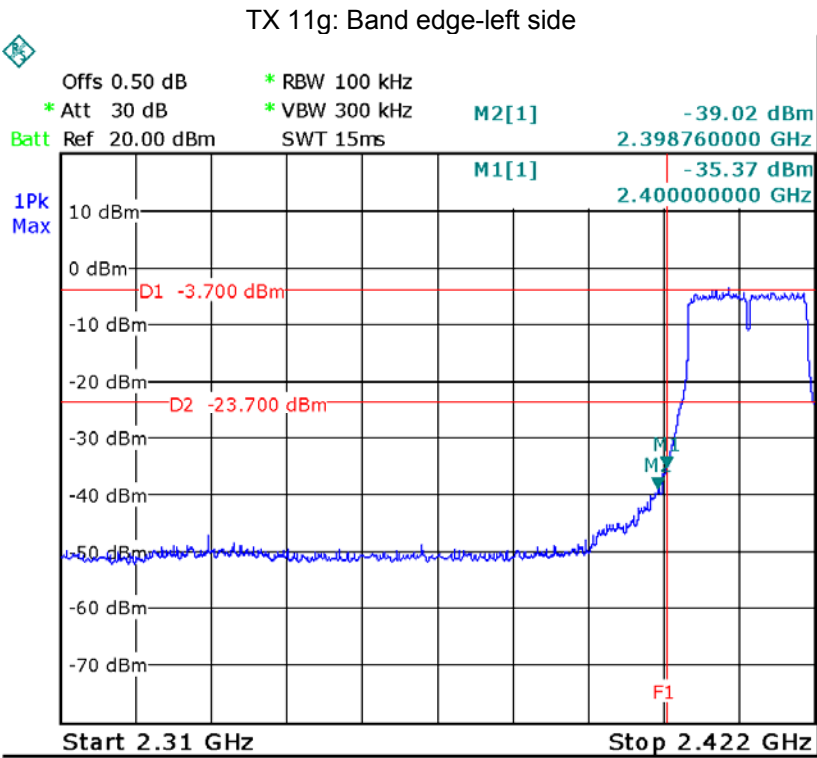
8.1 Test Produce

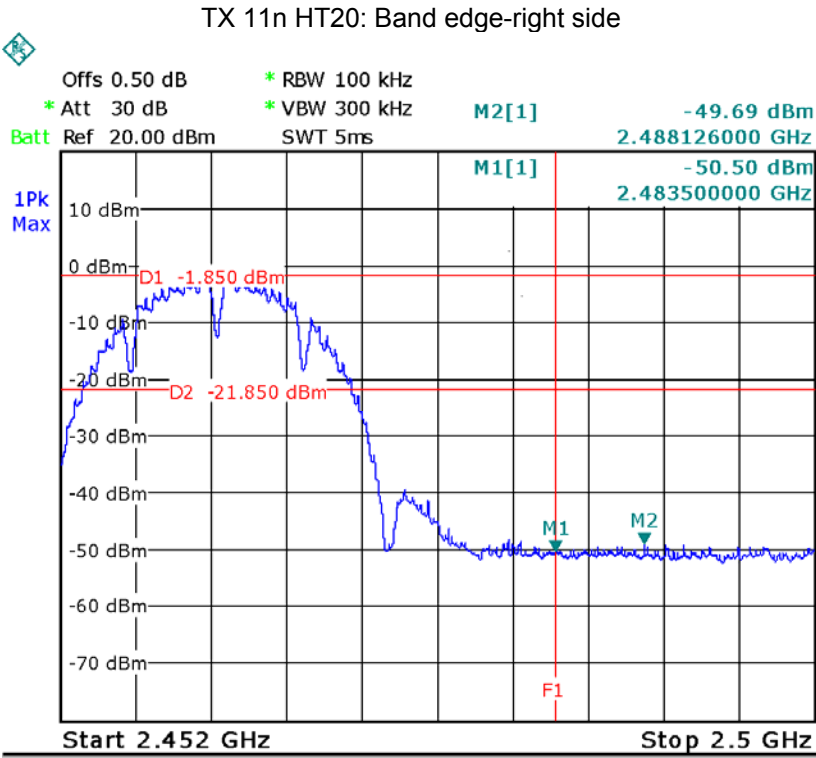
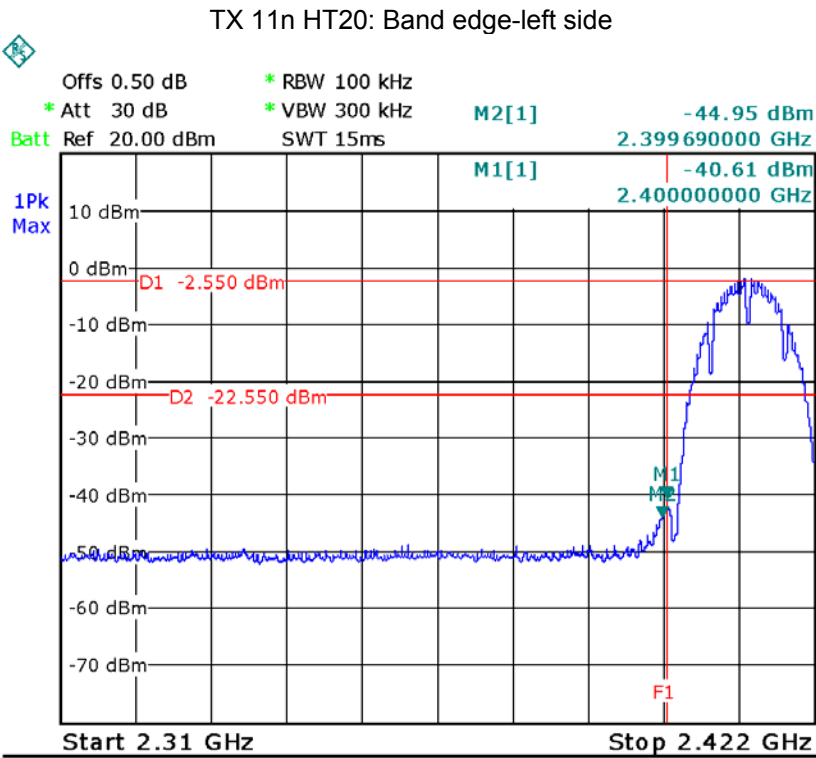
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. 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.
4. 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.
5. Repeat above procedures until all measured frequencies were complete.

8.2 Test Result

Test result plots shown as follows:







9 6 dB Bandwidth Measurement

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

KDB558074 D01 v03r01 04/09/2013

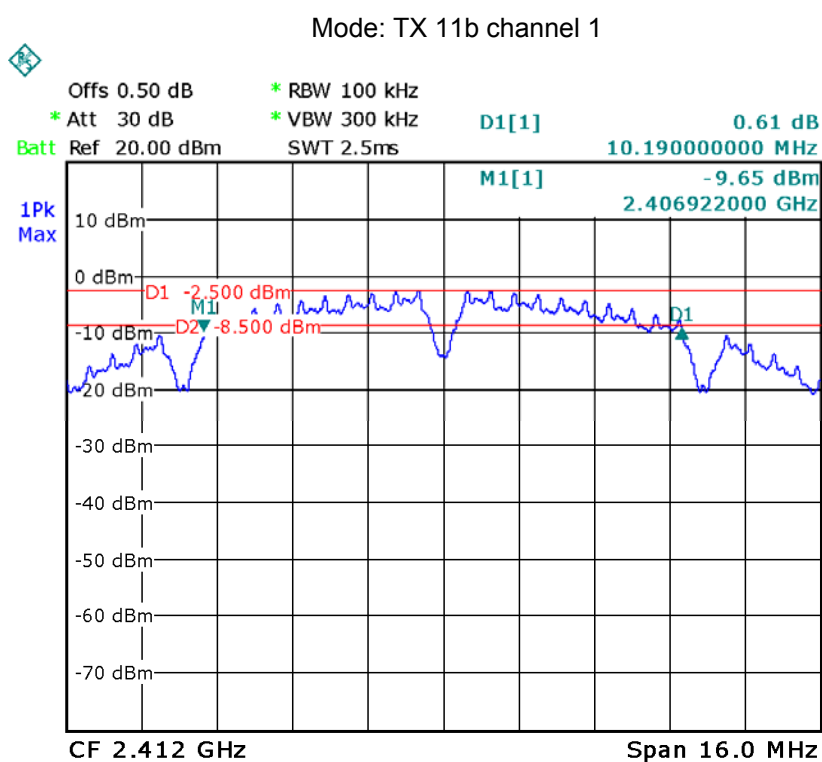
9.1 Test Procedure:

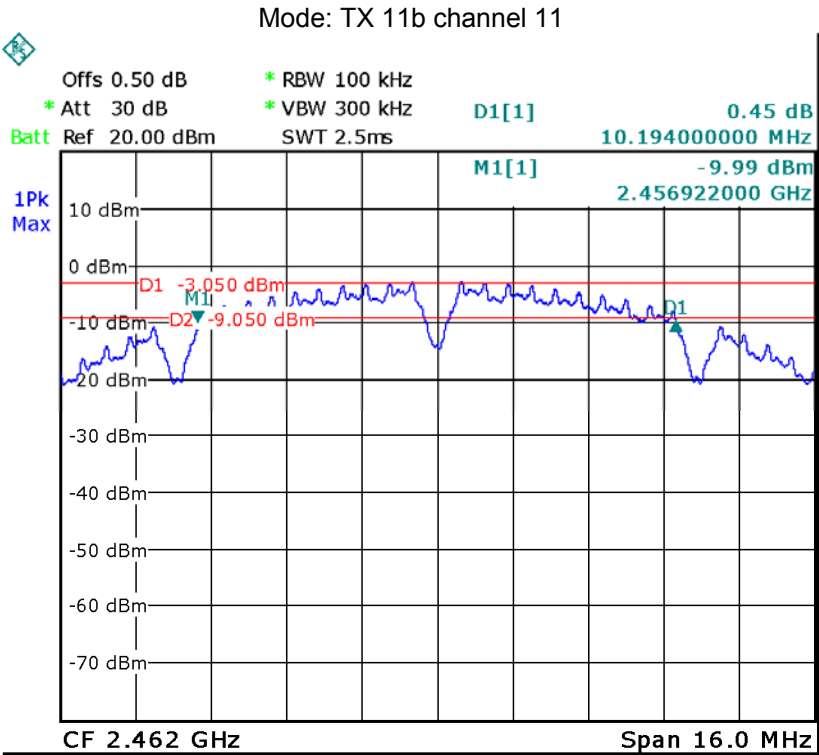
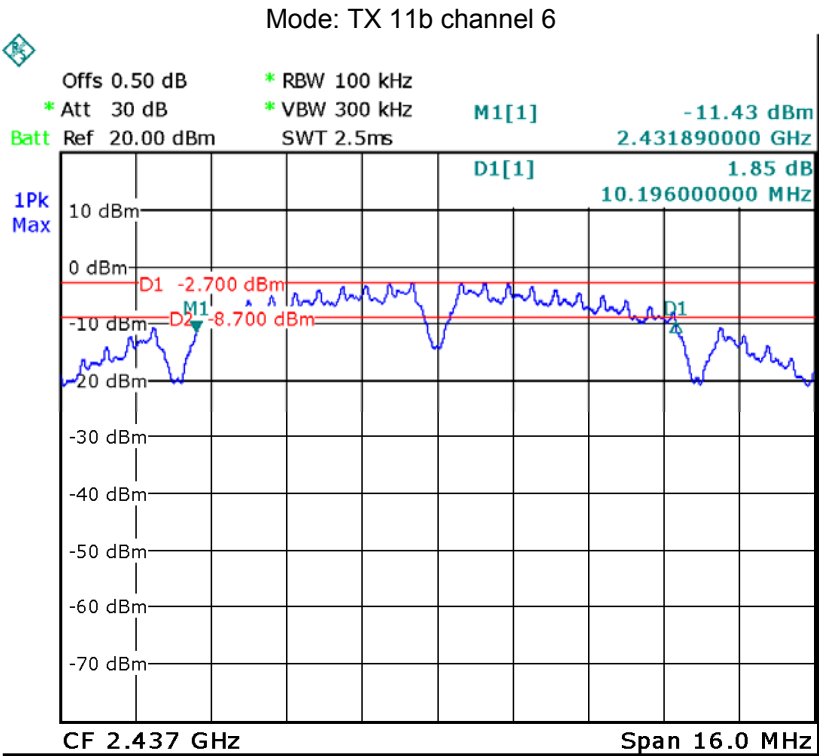
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

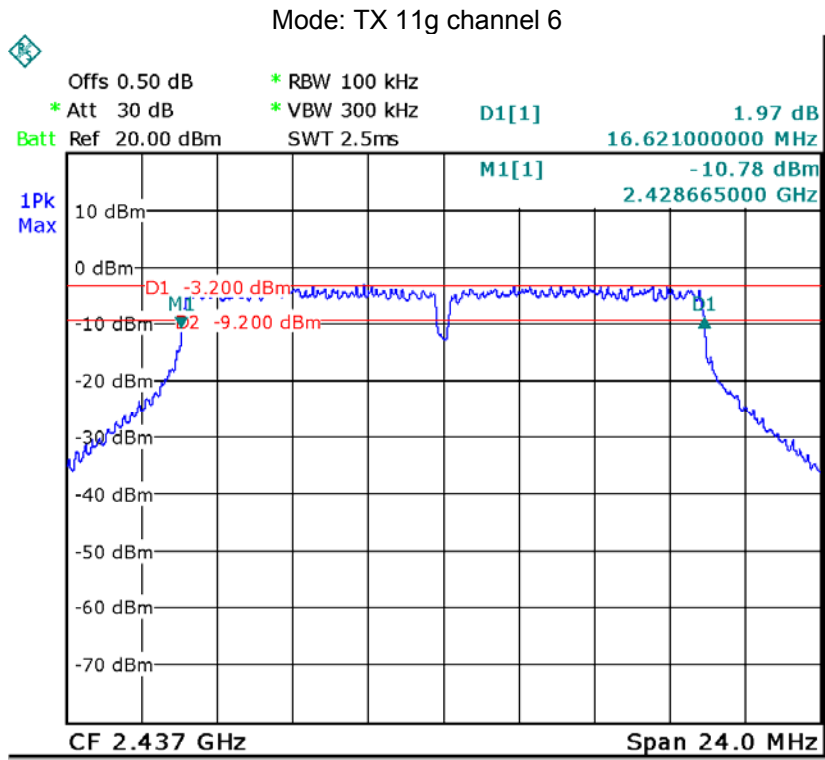
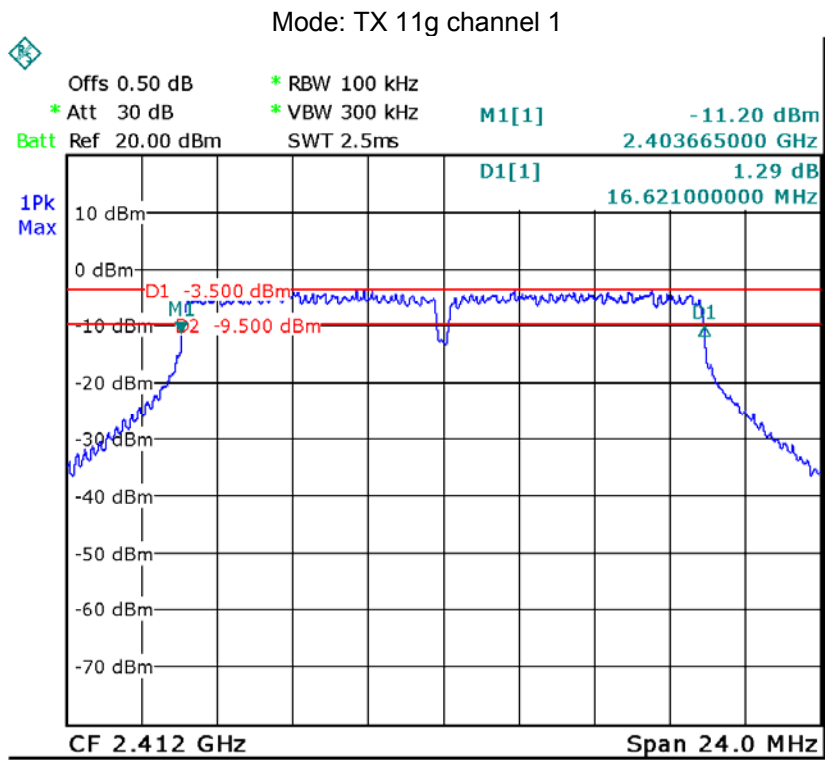
9.2 Test Result:

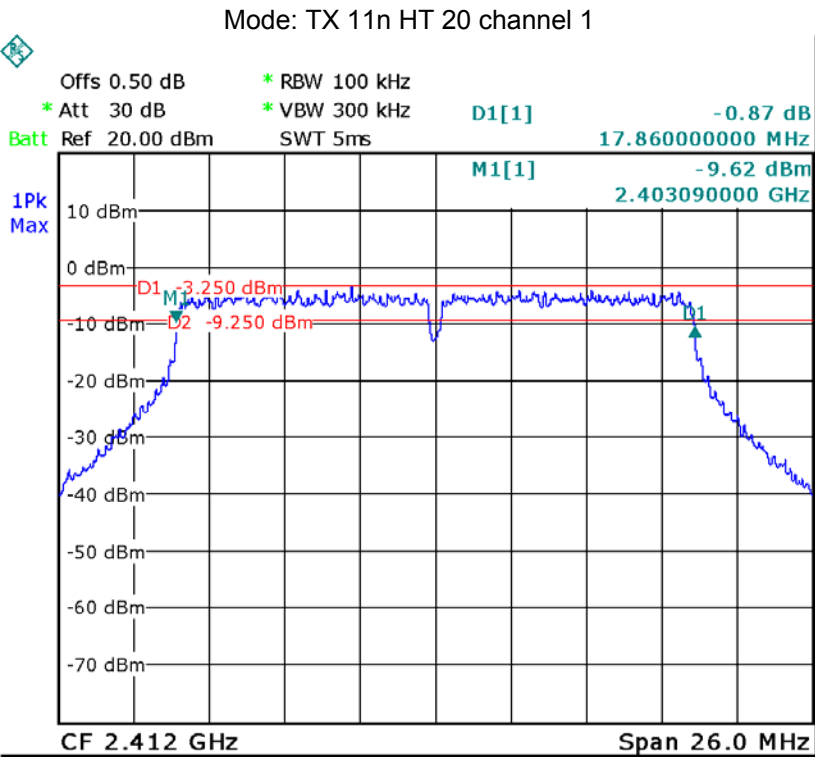
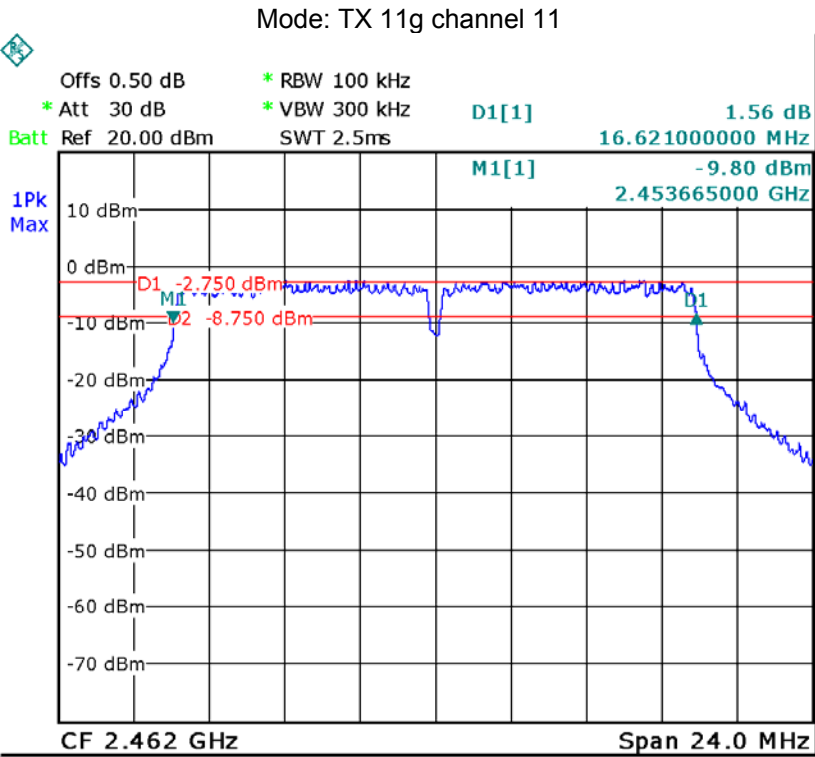
Operation mode	Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11
	10.190	10.196	10.194
TX 11g	Channel 1	Channel 6	Channel 11
	16.621	16.621	16.621
TX 11n HT 20	Channel 1	Channel 6	Channel 11
	17.860	17.860	17.860

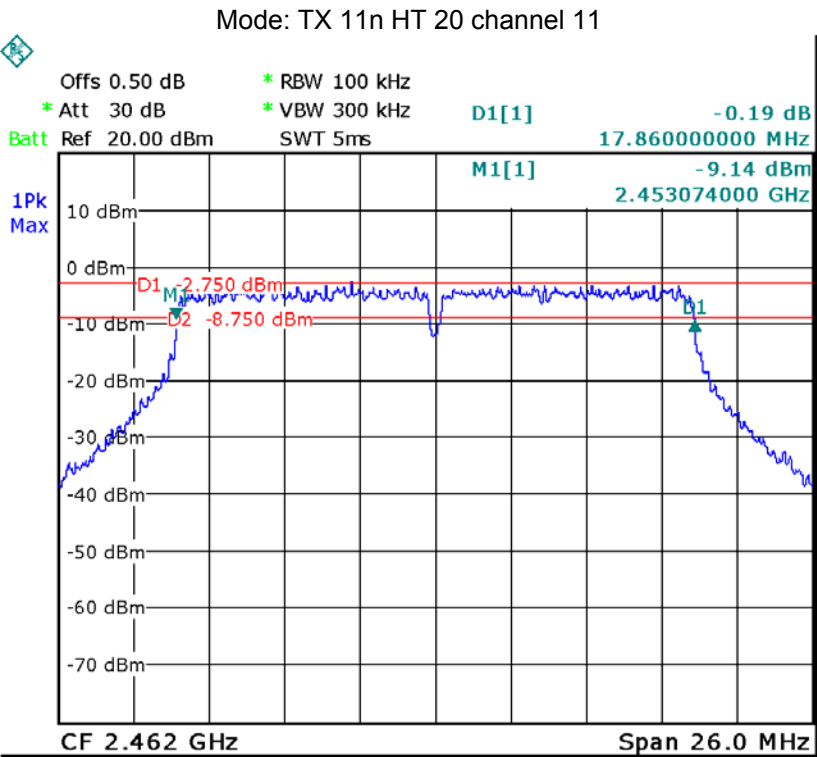
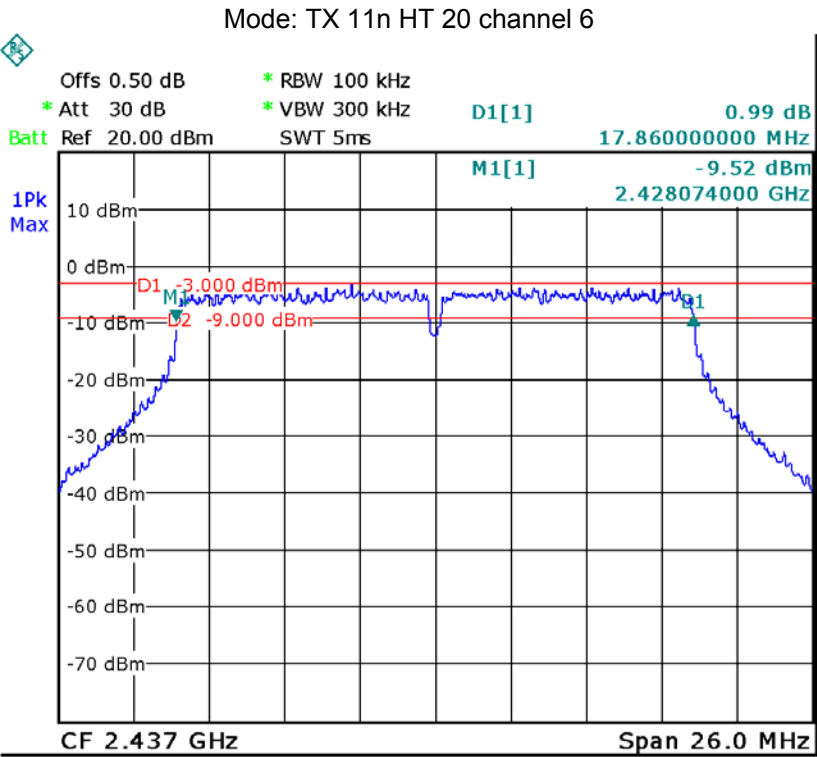
Test result plot as follows:











10 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB558074 D01 v03r01 04/09/2013

10.1 Test Procedure:

KDB558074 D01 v03r01 04/09/2013 section 9.1.2

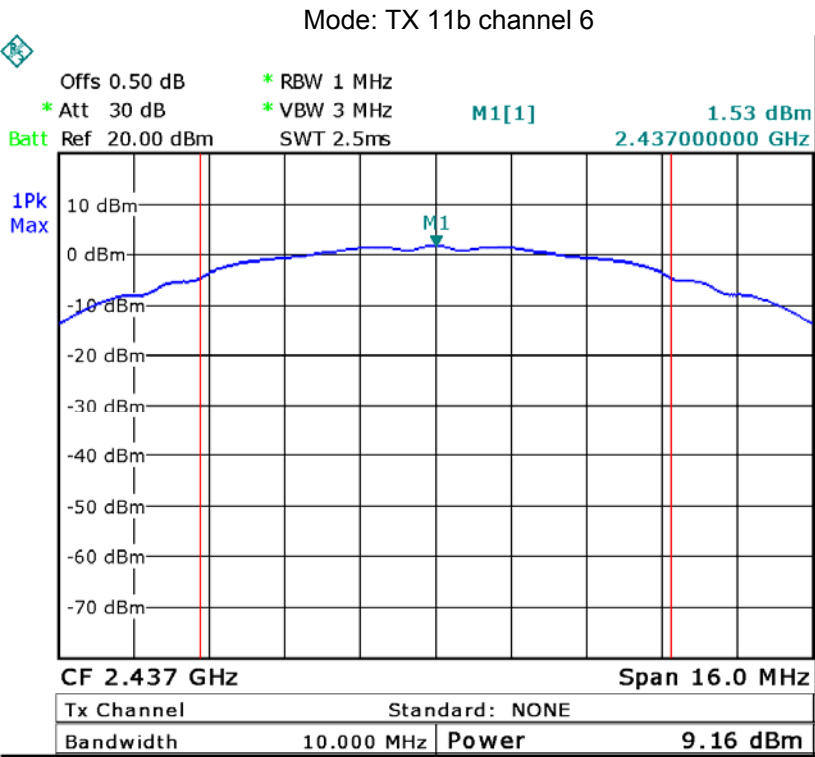
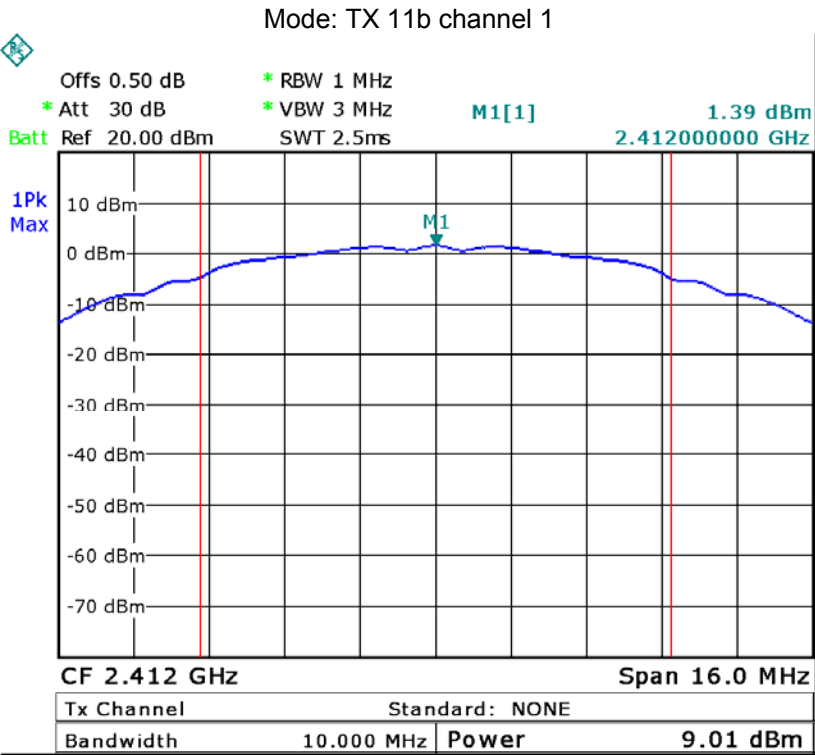
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

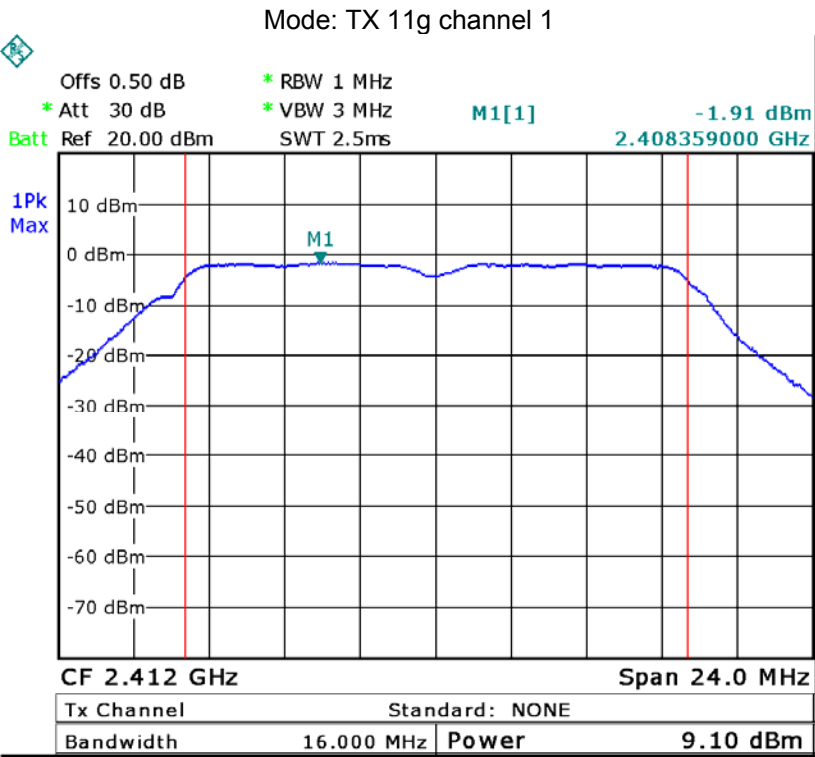
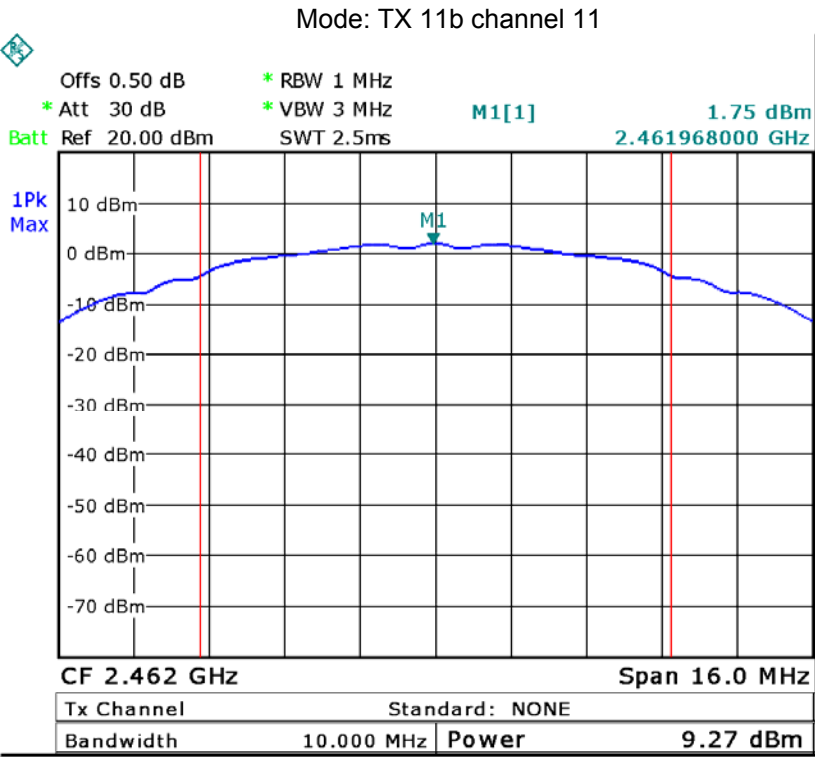
10.2 Test Result:

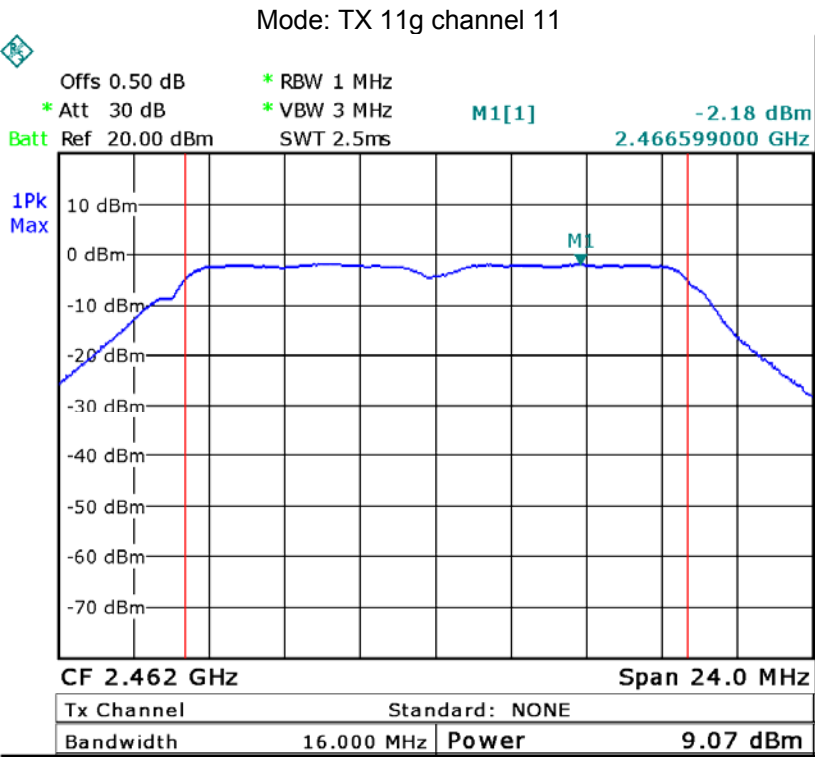
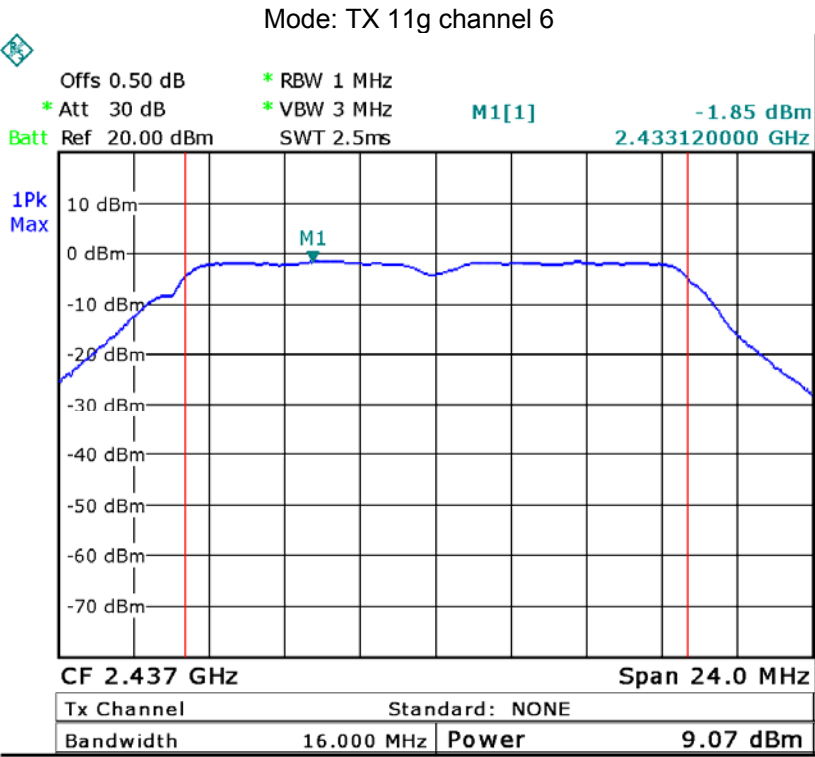
Test mode :TX 11b		
10 Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
9.01	9.16	9.27
Limit		
1W/30dBm		

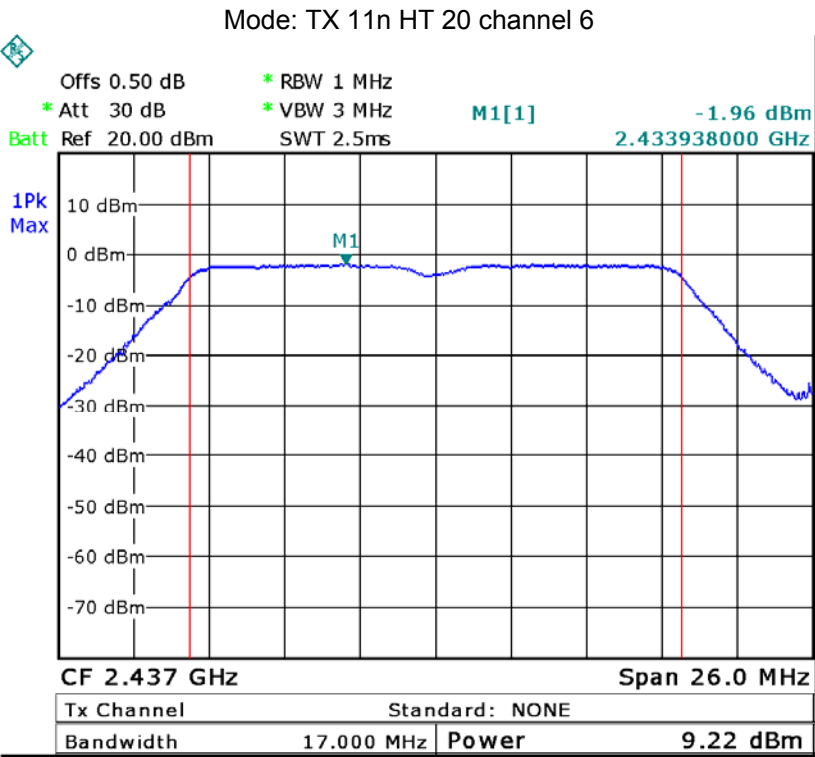
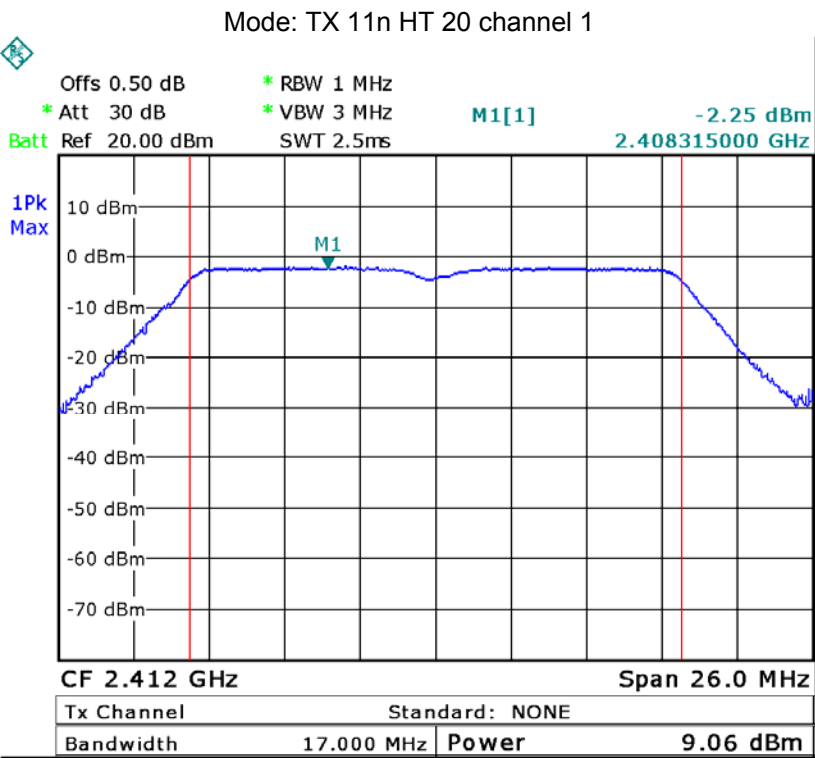
Test mode :TX 11g		
10 Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
9.10	9.07	9.07
Limit		
1W/30dBm		

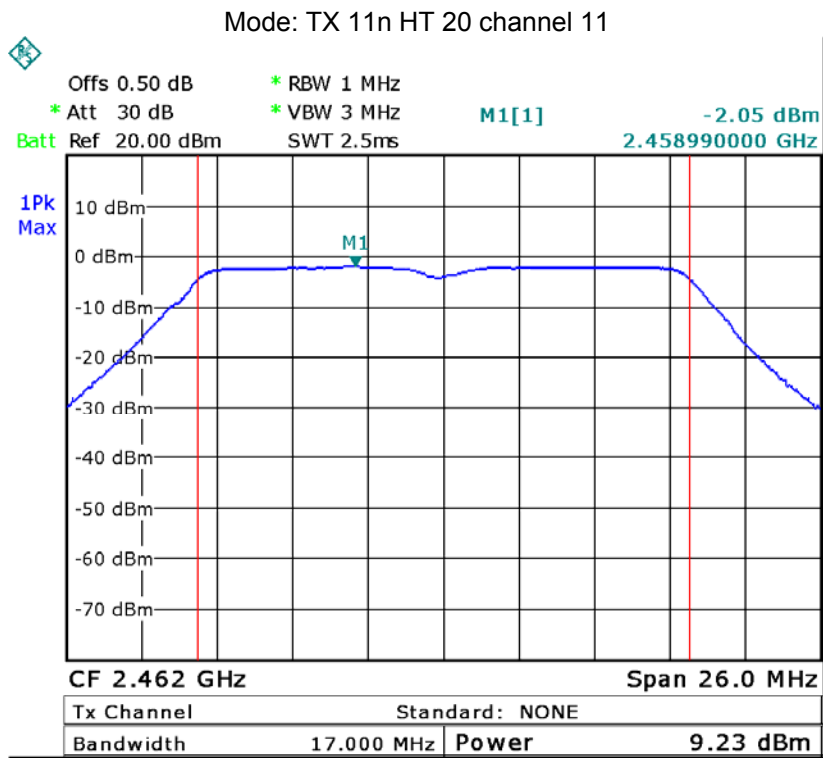
Test mode :TX 11n HT 20		
10 Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
9.06	9.22	9.23
Limit		
1W/30dBm		











11 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB558074 D01 v03r01 04/09/2013

11.1 Test Procedure:

KDB558074 D01 v03r01 04/09/2013 section 10.2

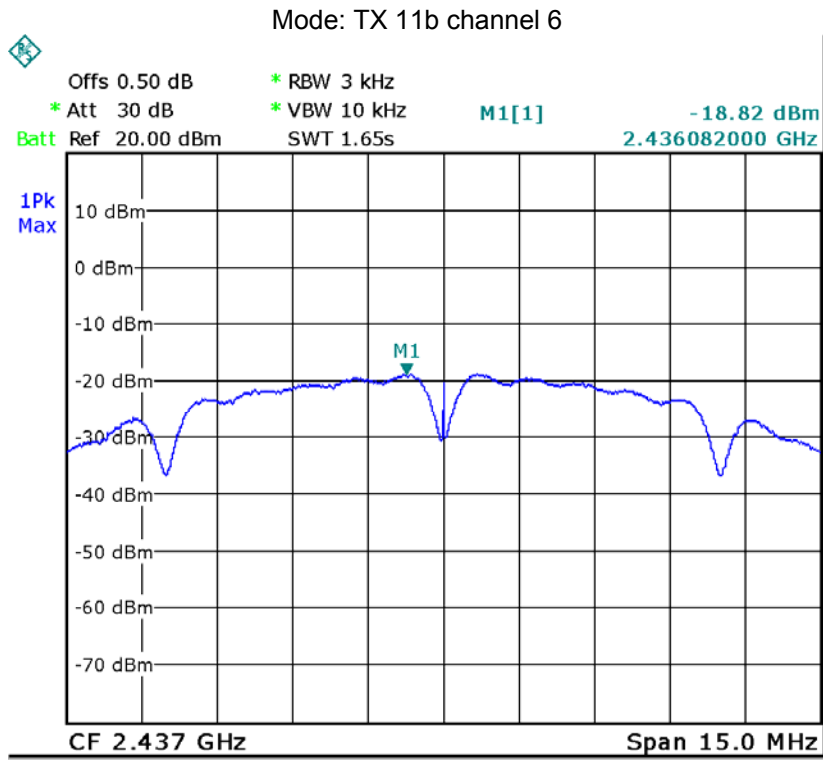
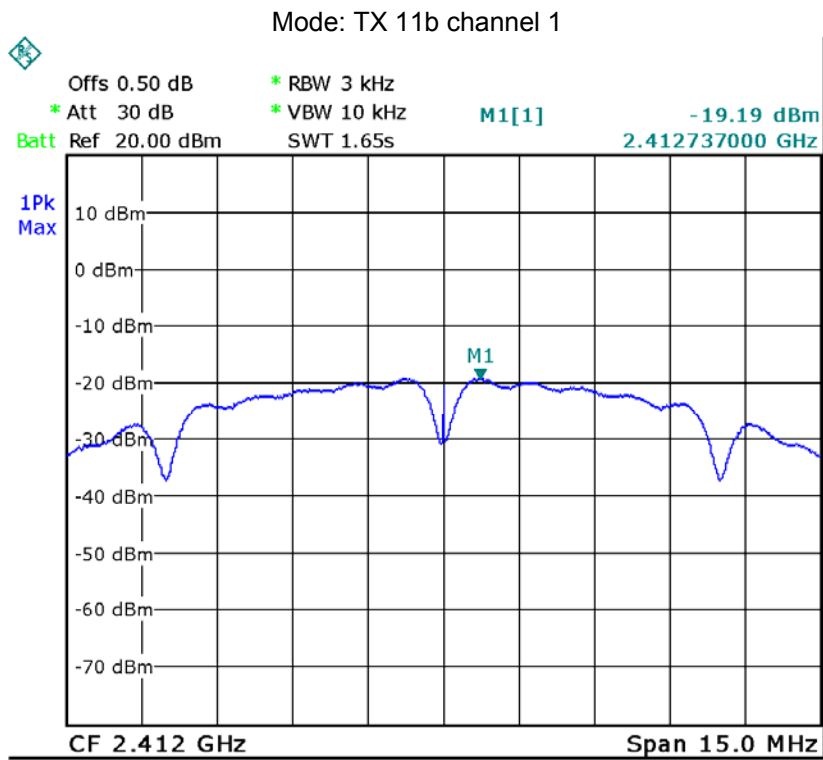
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section
Submit this plot.

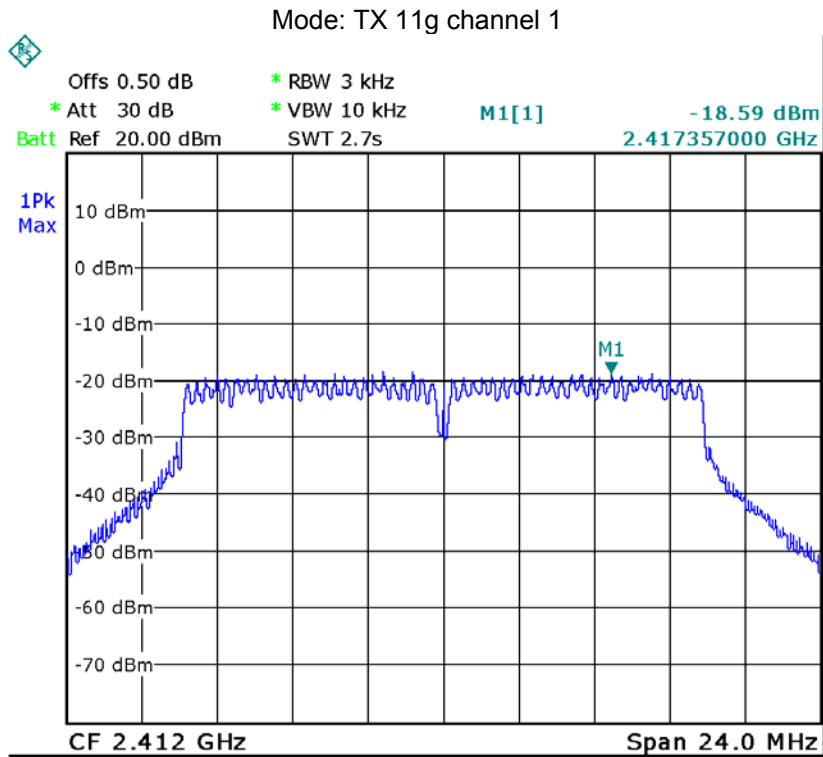
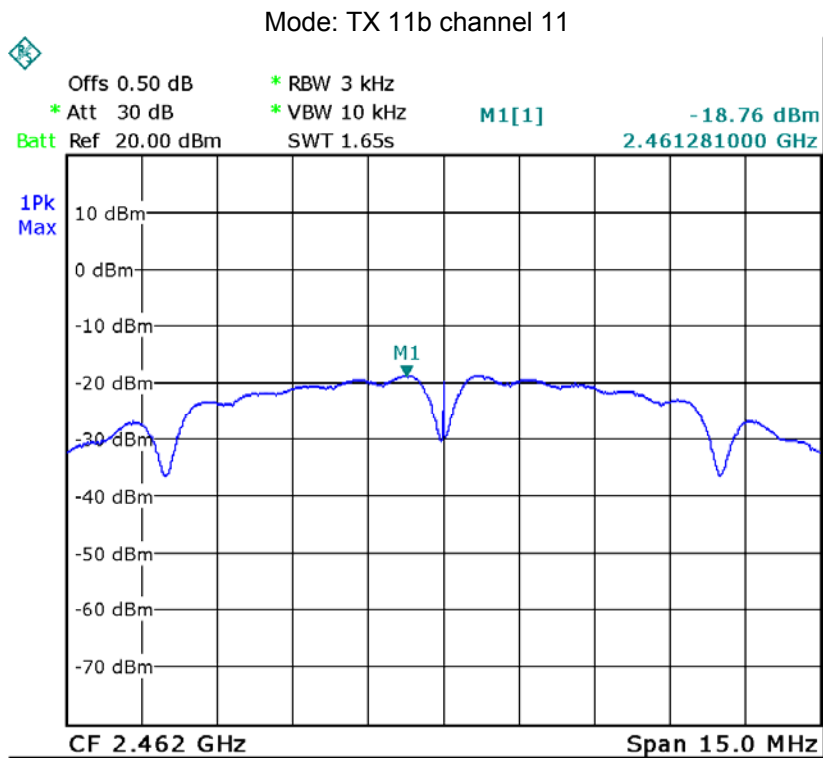
11.2 Test Result:

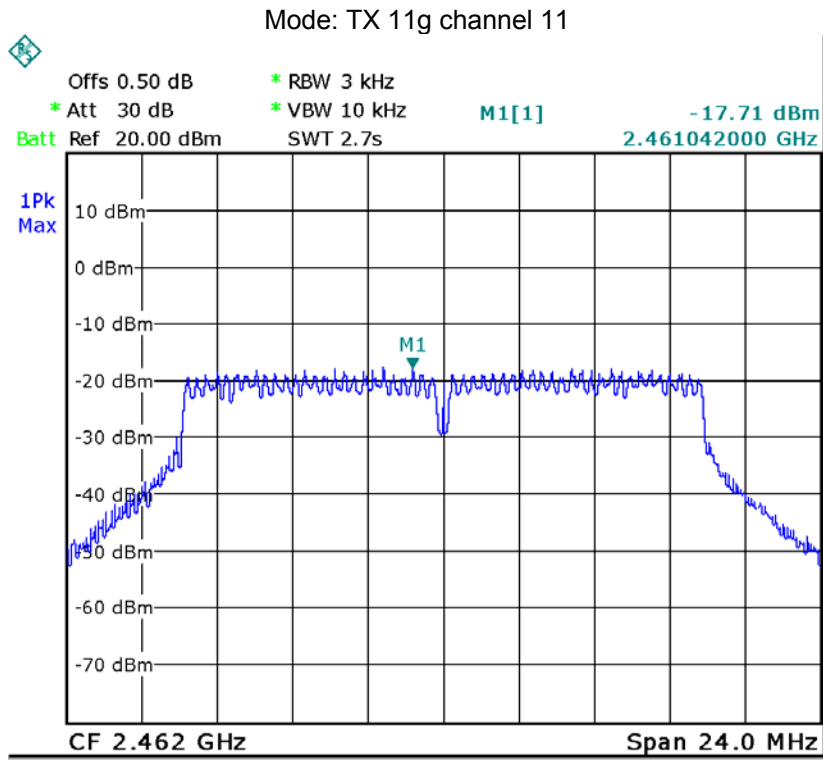
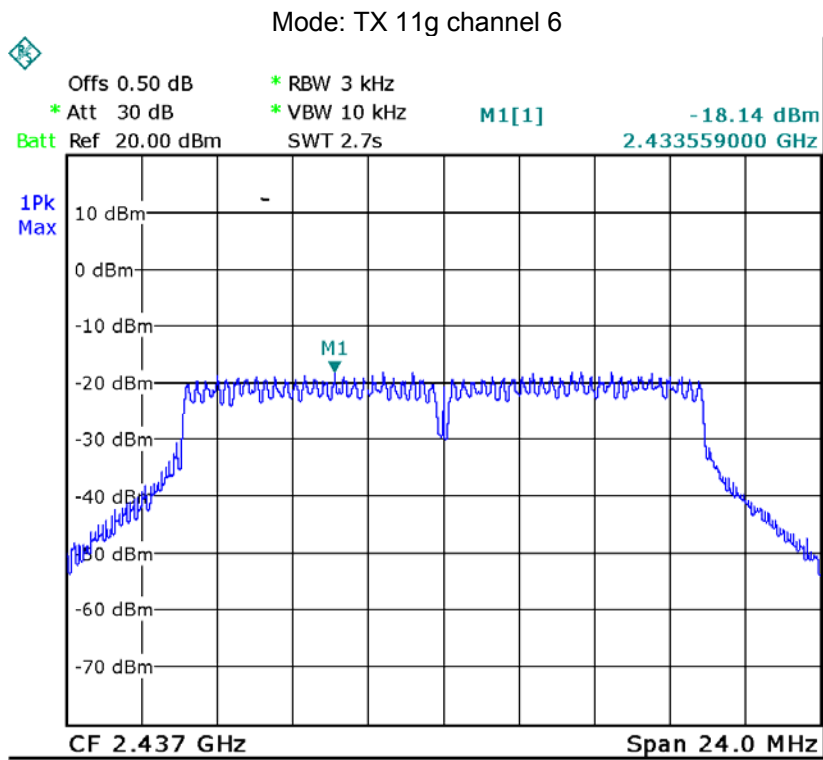
Test mode :TX 11b		
10 Maximum Peak Output Power (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-19.19	-18.82	-18.76
Limit		
8dBm per 3kHz		

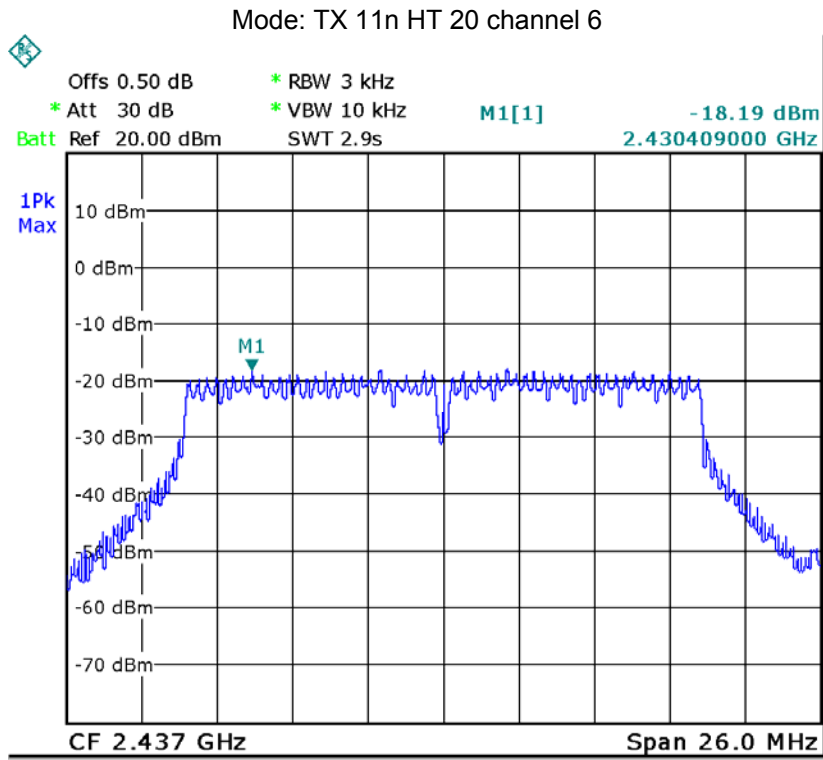
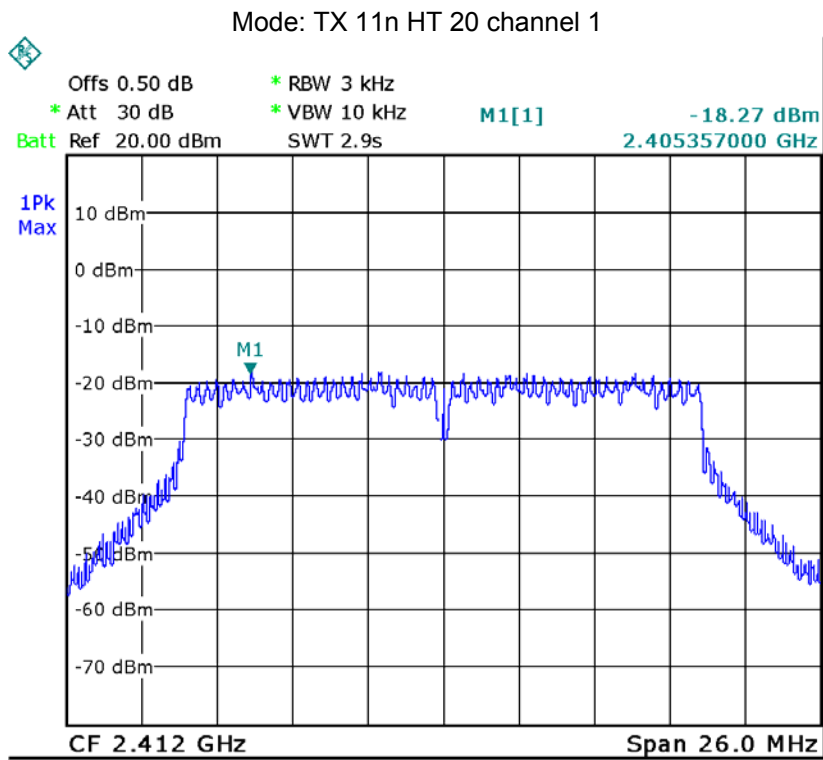
Test mode :TX 11g		
10 Maximum Peak Output Power (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-18.59	-18.14	-17.71
Limit		
8dBm per 3kHz		

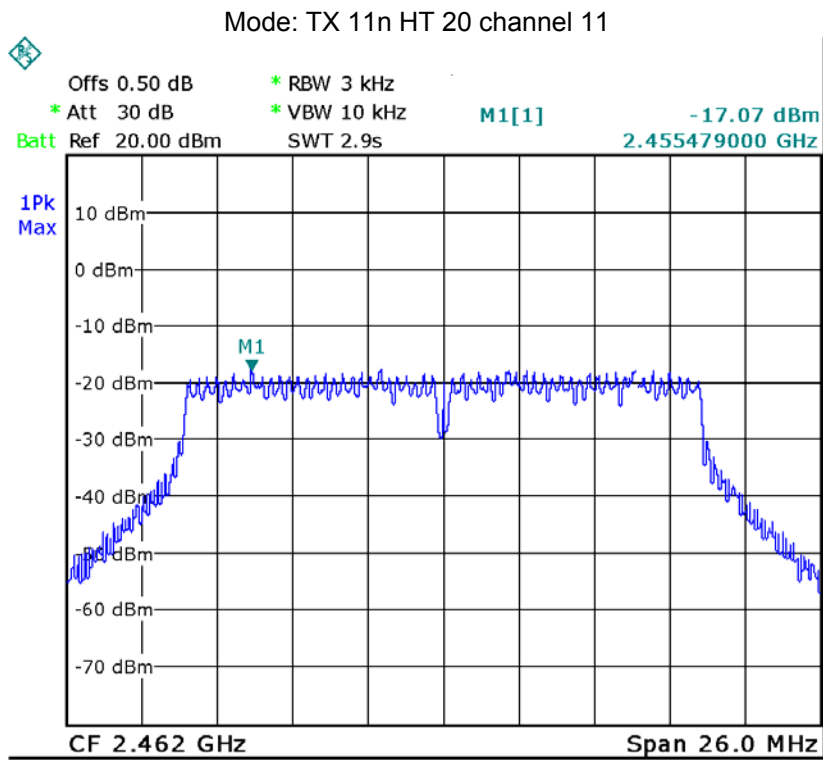
Test mode :TX 11n HT 20		
10 Maximum Peak Output Power (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-18.27	-18.19	-17.07
Limit		
8dBm per 3kHz		











12 Antenna Requirement

According to the FCC Part 15 Paragraph 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. This product has a internal permanent antenna, fulfil the requirement of this section.

13 RF Exposure

Test Requirement:	FCC Part 1.1307
Test Method	KDB 447498 D01 General RF Exposure Guidance v05
Test Mode:	The EUT work in test mode(Tx).

13.1 Requirements:

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR where}$$

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz
2. Power and distance are rounded to the nearest mW and mm before calculation
3. The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

13.2 Test Result

Conducted Peak power(dBm)	Conducted Peak power(mW)	Source-based time-averaged maximum conducted output power(mW)	Minimum test separation distance required for the exposure conditions (mm)	SAR Test Exclusion Thresholds(mW)
9.27	8.453	8.453	5	10

Remark: Duty factor is 100%

Calculation formula: Source-based time-averaged maximum conducted output power(mW) =Conducted peak power(mW)*Duty factor

14 Photographs – Test Setup

14.1 Conducted Emission

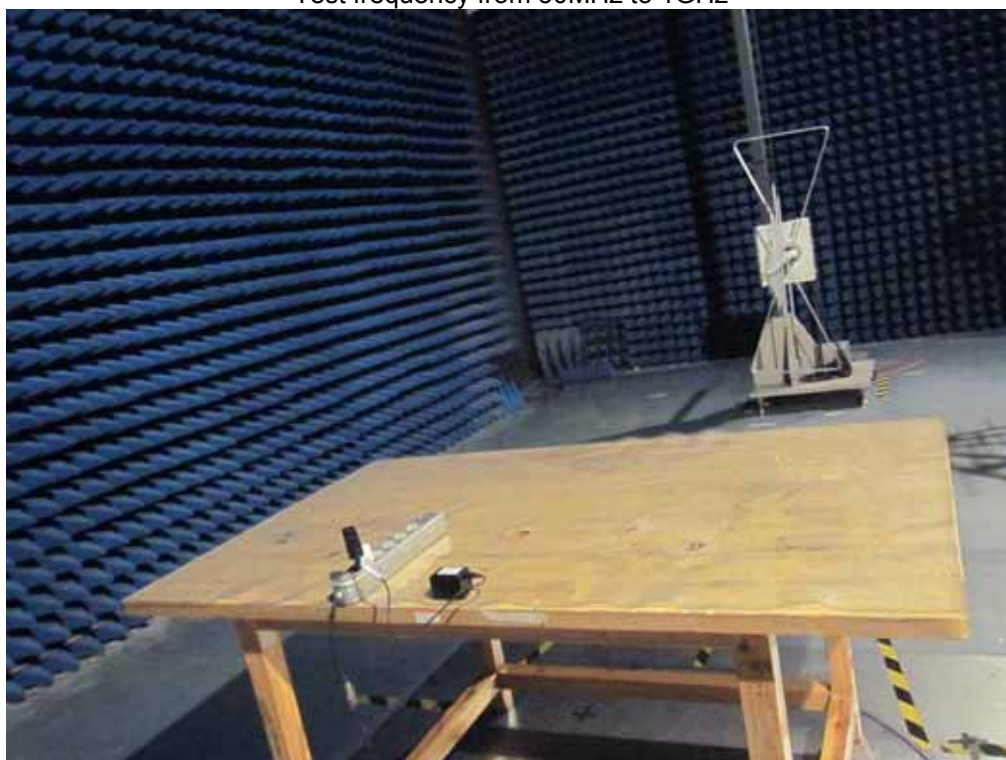


14.2 Radiated Emission

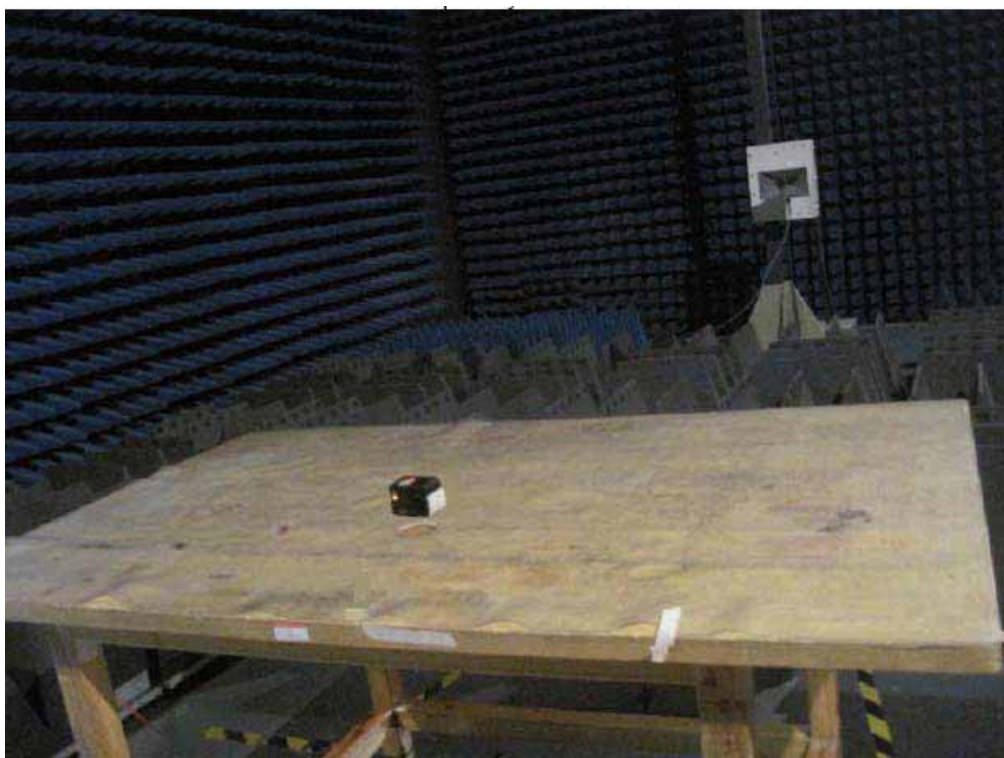
Test frequency below 30MHz



Test frequency from 30MHz to 1GHz



Test frequency above 1GHz



15 Photographs - Constructional Details

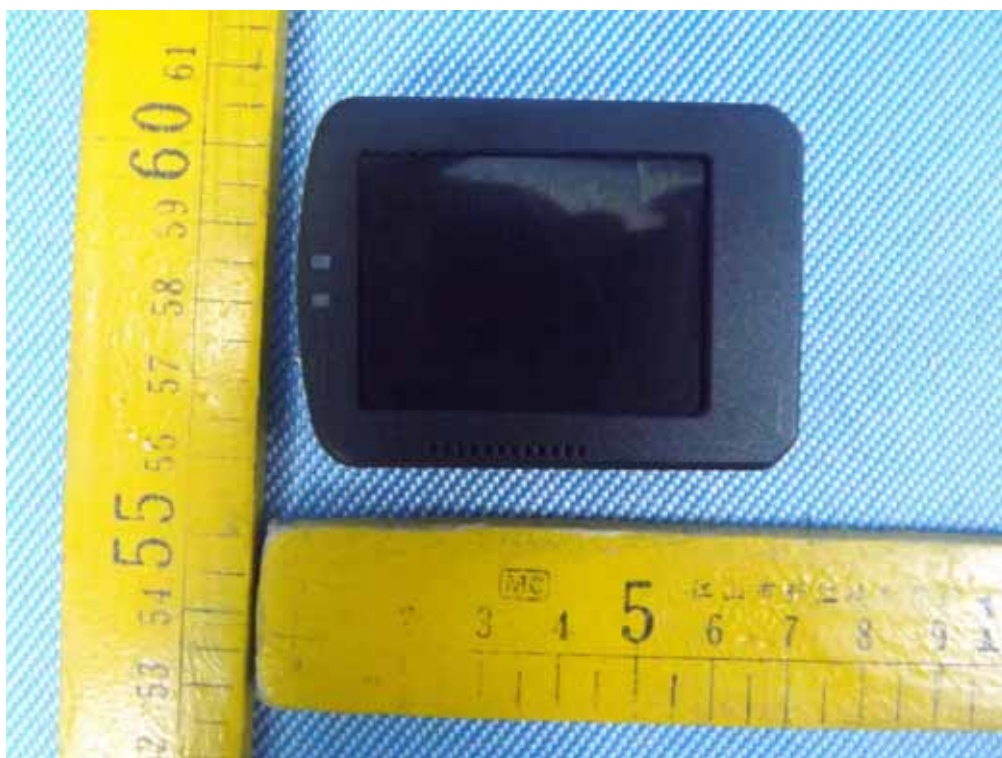
15.1 EUT –External View











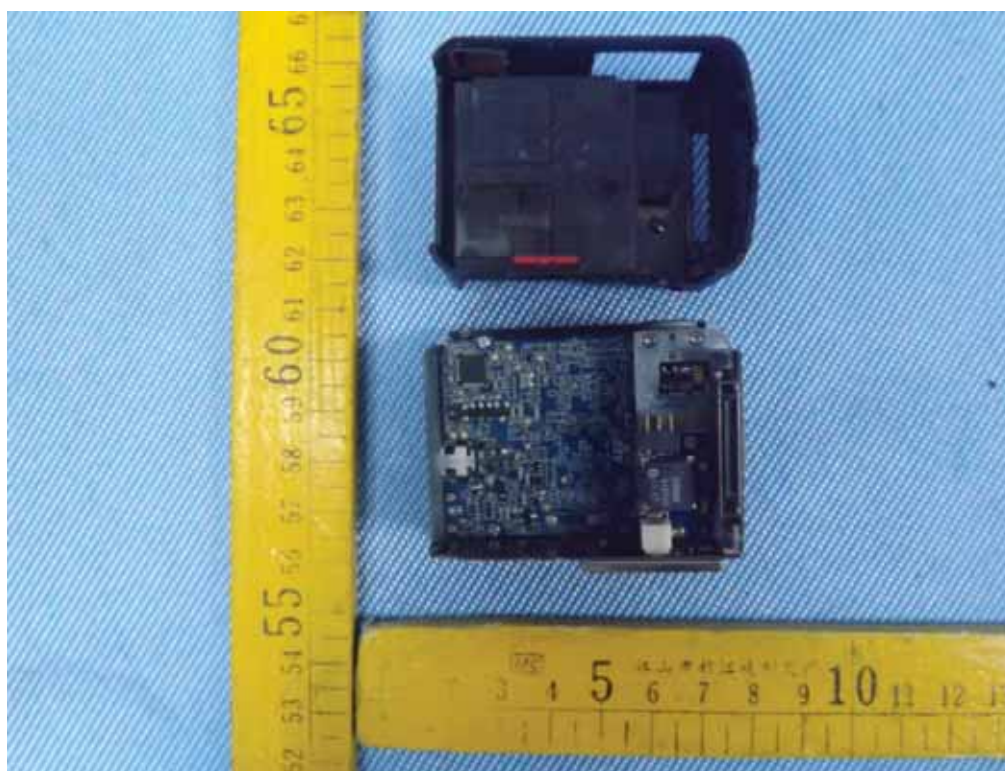


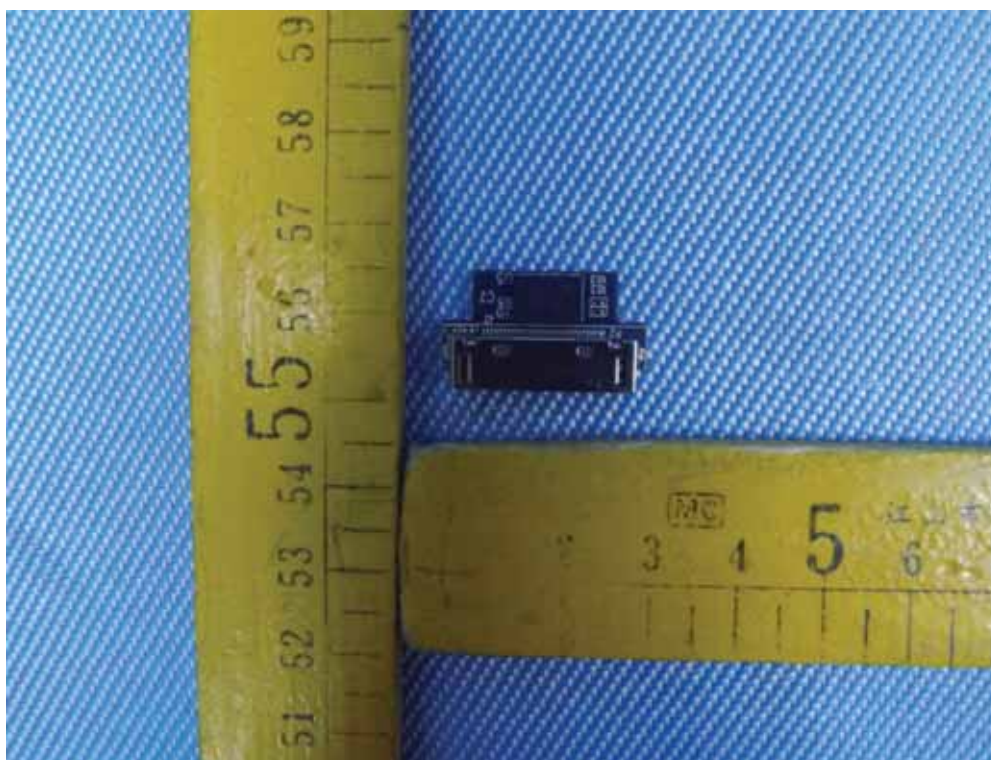


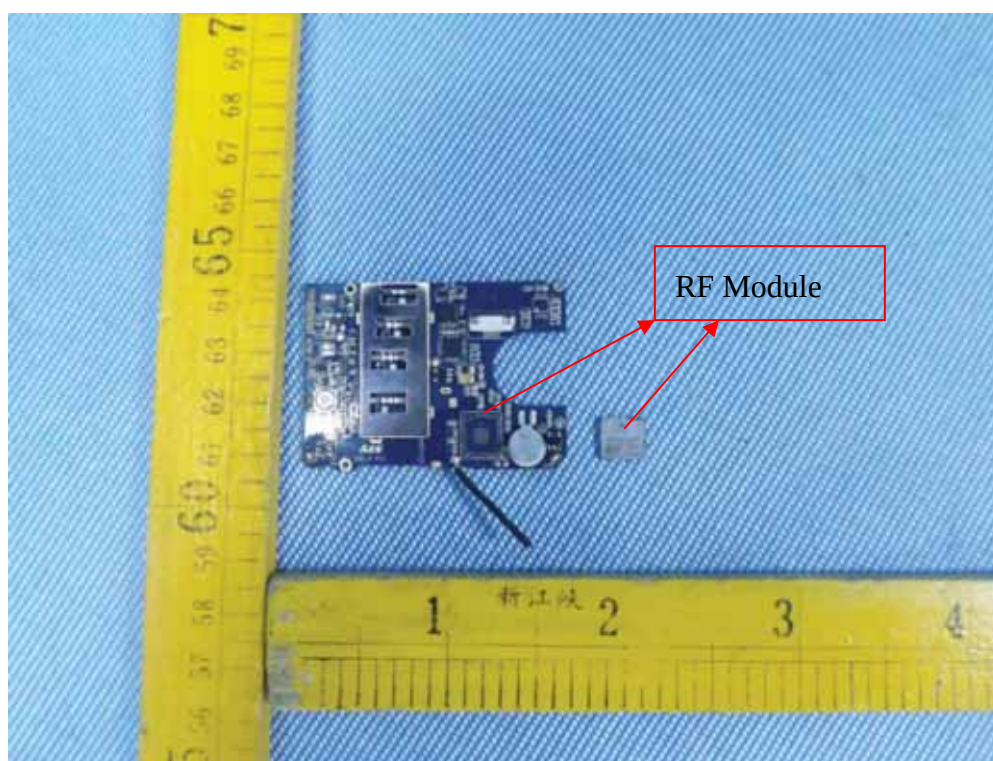
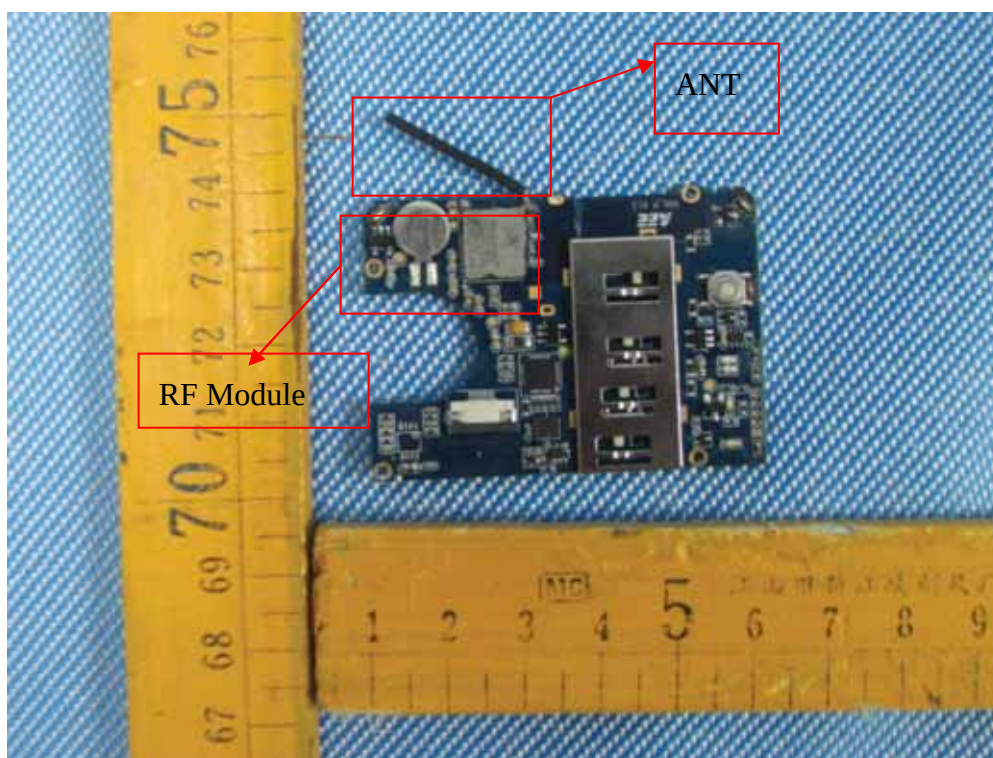


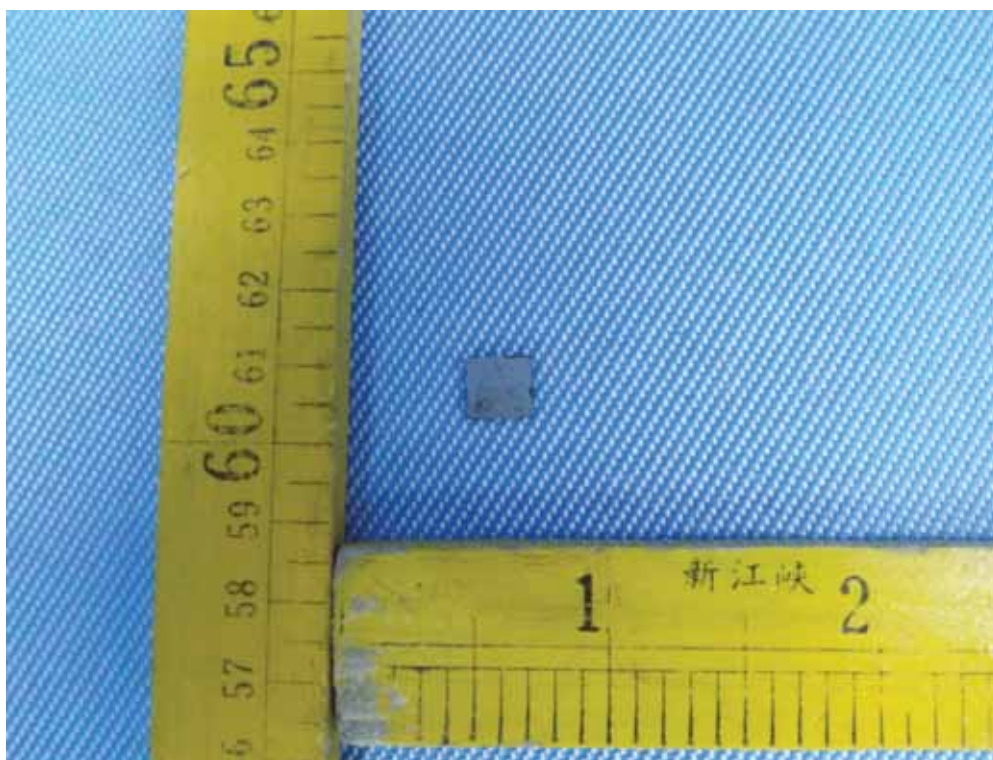


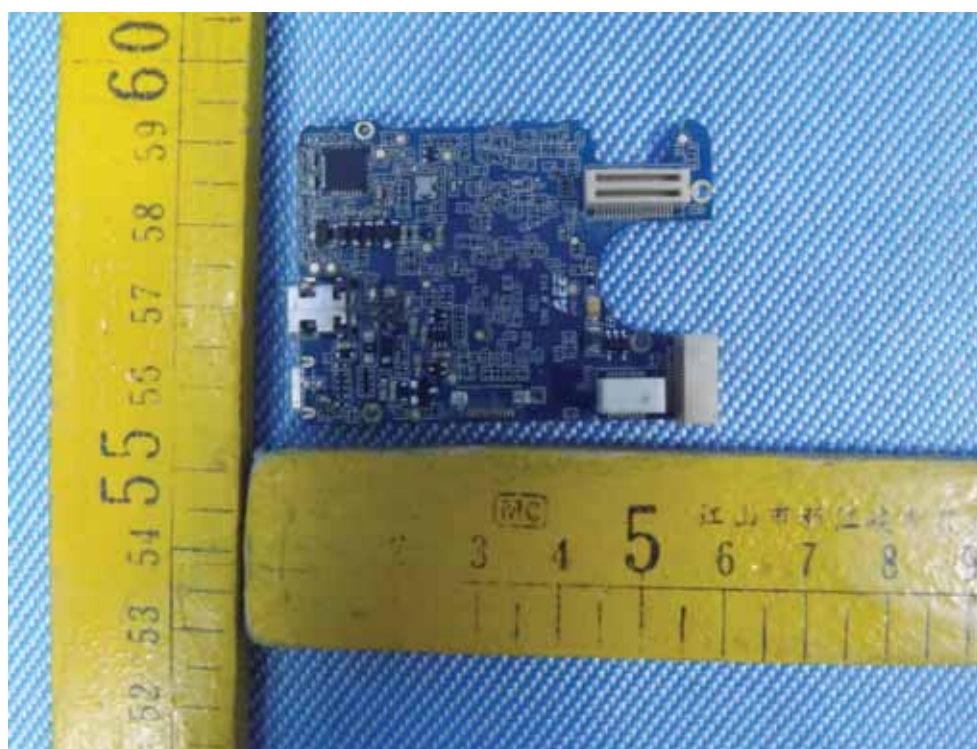
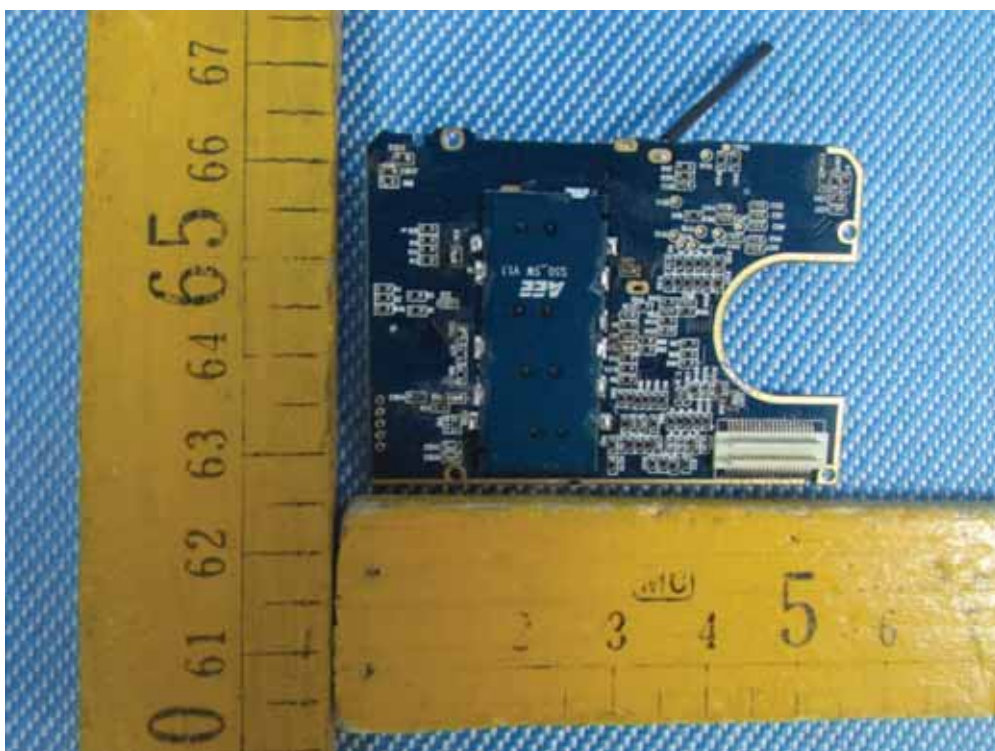
15.2 Internal View

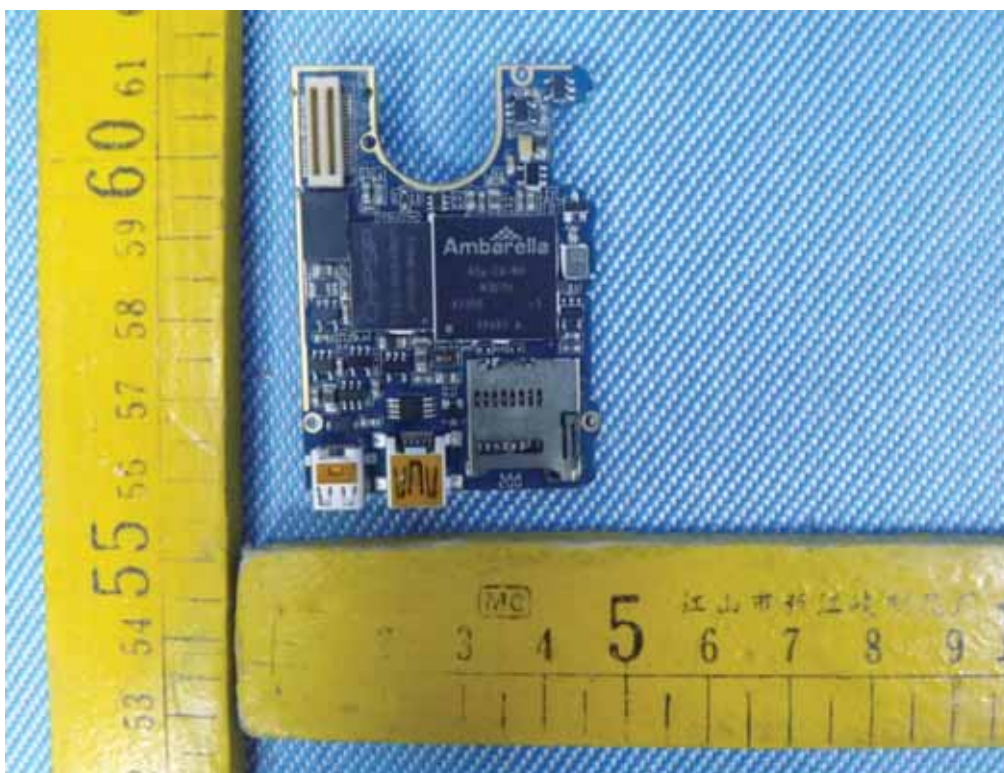












===== End of Report =====