TEST REPORT

Reference No.	:	WTU17S0683562E
FCC ID.....	:	2AARJ-ELST5016S
Applicant	:	Avision Technology (changzhou)Co.,Ltd
Address	:	No. 28 Xinsi Road, Xinbei District, Changzhou, China
Manufacturer	:	Avision Technology (changzhou)Co.,Ltd
Address	:	No. 28 Xinsi Road, Xinbei District, Changzhou, China
Product Name	:	50” FHD Digital LED TV
Model No.	:	ELST5016S
Standards.....	:	FCC CFR47 Part 15 C Section 15.247:2016
Date of Receipt sample.....	:	Jun. 30, 2017
Date of Test.....	:	Jul. 01 – 07, 2017
Date of Issue	:	Jul. 11, 2017
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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Approved by:

Philo Zhong / Manager

2 Contents

3 Report Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTU17S0683562E	Jun. 30, 2017	Jul. 01 – 07, 2017	Jul. 11, 2017	original	-	Valid

4 General Information

4.1 General Description of E.U.T.

Product Name:	50” FHD Digital LED TV
Model No.:	ELST5016S
Model Difference:	N/A
Operation Frequency:	802.11b/g/n HT20: 2412MHz ~ 2462MHz, 802.11n HT40: 2422MHz~2452MHz
The Lowest Oscillator:	:24MHz
Antenna Gain:	:2.0 dBi
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., HT40:150Mbps max.)

4.2 Details of E.U.T.

Technical Data: Input: AC 120V~ 60Hz, 80W

4.3 Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	2	2417	3	2422	4	2427
5	2432	6	2437	7	2442	8	2447
9	2452	10	2457	11	2462	12	-

4.4 Test Mode

Table 1 Tests Carried Out Under FCC part 15.247

Test Items	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	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
Power Spectral Density	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
Frequency Range	802.11b	11 Mbps	1/11	TX
	802.11g	54 Mbps	1/11	TX
	802.11n HT20	108 Mbps	1/11	TX
	802.11n HT40	150 Mbps	3/9	TX
Transmitter Spurious Emissions	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	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 .

4.5 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-1, October 15, 2015.

- **FCC Test Site – Registration No.: 328995**

  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 328995, December 3, 2014.

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	101155	Sep.12, 2016	Sep.11, 2017
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.12, 2016	Sep.11, 2017
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.12, 2016	Sep.11, 2017
4.	Cable	LARGE	RF300	-	Sep.12, 2016	Sep.11, 2017
3m Semi-anechoic Chamber for Radiation Emissions						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP	100091	Apr. 07, 2017	Apr. 06, 2018
2	Amplifier	Agilent	8447D	2944A10178	Jan. 12, 2017	Jan. 11, 2018
3	Active Loop Antenna	Beijing Dazhi	ZN30900A	0703	Oct. 17, 2016	Oct. 16, 2017
4	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr. 07, 2017	Apr. 06, 2018
5	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.12, 2016	Sep.11, 2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr. 07, 2017	Apr. 06, 2018
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr. 07, 2017	Apr. 06, 2018
8	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	EW02014-7	Apr. 07, 2017	Apr. 06, 2018
9	Test Receiver	R&S	ESCI	101296	Apr. 07, 2016	Apr. 06, 2017
10	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr. 07, 2016	Apr. 06, 2017
11	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Apr. 07, 2016	Apr. 06, 2017
12	Cable	HUBER+SUHNER	CBL2	525178	Apr. 07, 2016	Apr. 06, 2017
RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.12, 2016	Sep.11, 2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.12, 2016	Sep.11, 2017
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.12, 2016	Sep.11, 2017

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 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 GUANG ZHOU GRG METROLOGY & TEST CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave, Tianhe District, Guangzhou, Guangdong, China.

6 Test Summary

Test Items	Test Requirement	Result
Radiated Emissions	15.247 15.205(a) 15.209(a)	C
Conducted Emissions	15.207(a)	C
Bandwidth	15.247(a)(2)	C
Maximum Peak Output Power	15.247(b)(3),(4)	C
Power Spectral Density	15.247(e)	C
Band Edge	15.247(d)	C
Antenna Requirement	15.203	C
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	C
Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable		

7 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013&ANSI C63.4:2014
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dBμV between 0.15MHz & 0.5MHz
	56 dBμV between 0.5MHz & 5MHz
	60 dBμV between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

7.1 E.U.T. Operation

Operating Environment **:**

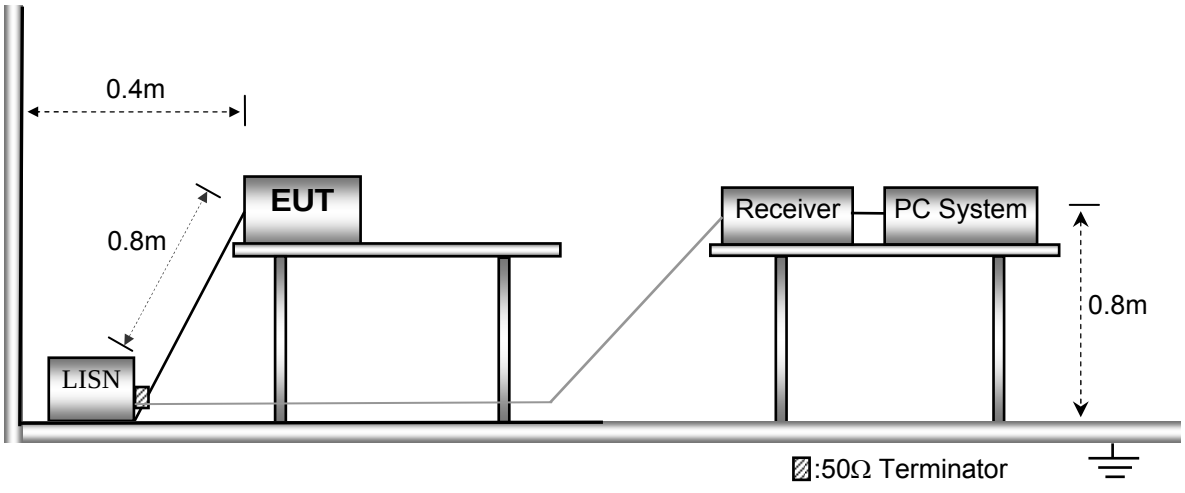
Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation **:**

The test was performed in Wi-Fi Transmitting mode, the test data were shown in the report.

7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10.



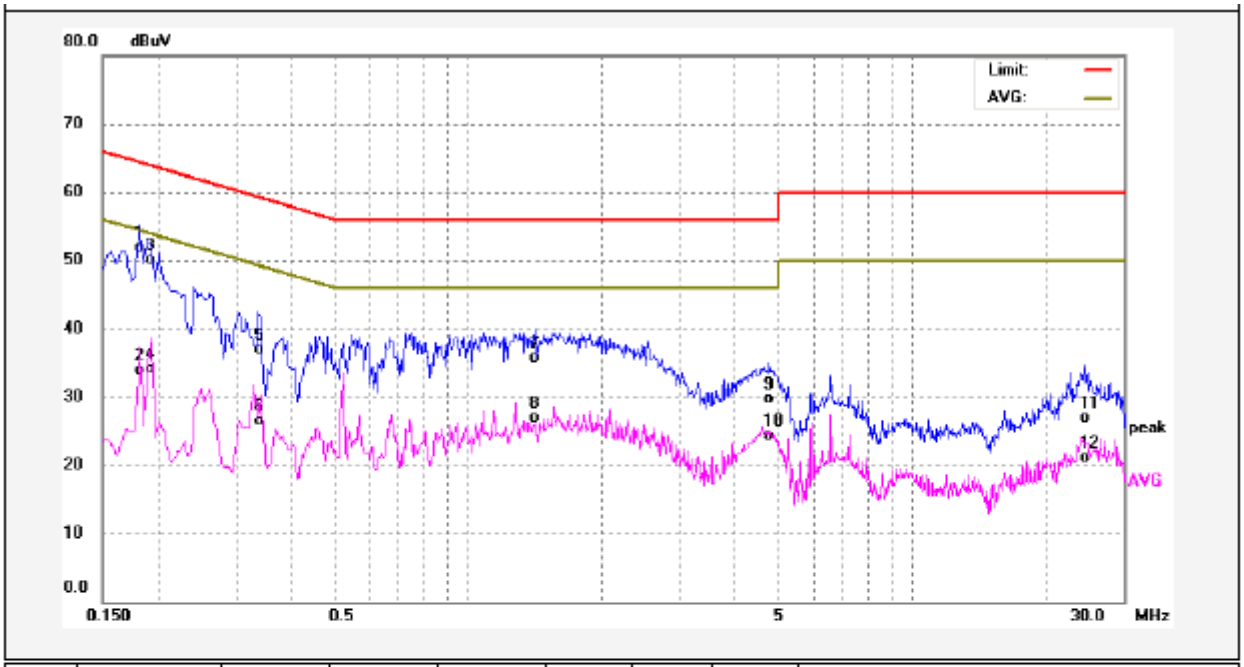
7.3 Measurement Description

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.

7.4 Conducted Emission Test Result

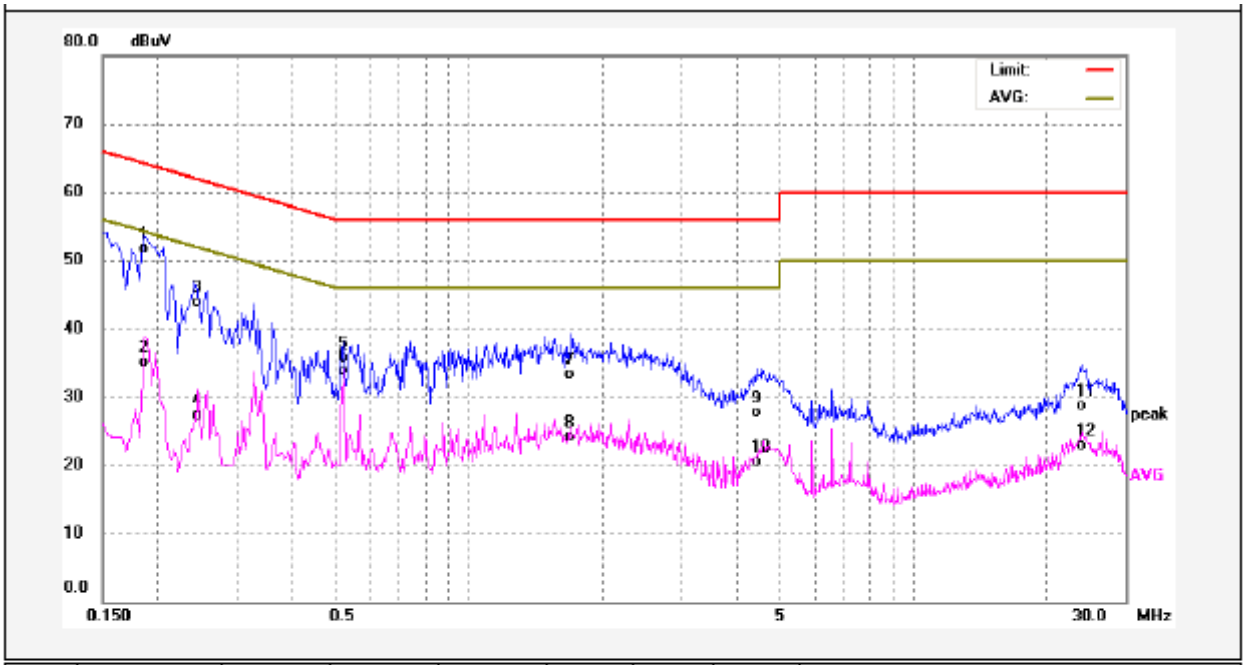
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1819	41.93	9.88	51.81	64.39	-12.58	QP	
2	0.1819	24.02	9.88	33.90	54.39	-20.49	AVG	
3	0.1940	40.30	9.90	50.20	63.86	-13.66	QP	
4	0.1940	24.12	9.90	34.02	53.86	-19.84	AVG	
5	0.3379	26.83	10.04	36.87	59.25	-22.38	QP	
6	0.3379	16.40	10.04	26.44	49.25	-22.81	AVG	
7	1.4180	25.58	10.22	35.80	56.00	-20.20	QP	
8	1.4180	16.68	10.22	26.90	46.00	-19.10	AVG	
9	4.7940	19.47	10.25	29.72	56.00	-26.28	QP	
10	4.7940	14.05	10.25	24.30	46.00	-21.70	AVG	
11	24.5340	16.27	10.56	26.83	60.00	-33.17	QP	
12	24.5340	10.52	10.56	21.08	50.00	-28.92	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1860	41.75	9.89	51.64	64.21	-12.57	QP	
2	0.1860	25.29	9.89	35.18	54.21	-19.03	AVG	
3	0.2420	33.85	9.99	43.84	62.02	-18.18	QP	
4	0.2420	17.30	9.99	27.29	52.02	-24.73	AVG	
5	0.5220	25.55	10.08	35.63	56.00	-20.37	QP	
6	0.5220	23.79	10.08	33.87	46.00	-12.13	AVG	
7	1.7020	23.22	10.17	33.39	56.00	-22.61	QP	
8	1.7020	13.98	10.17	24.15	46.00	-21.85	AVG	
9	4.4380	17.40	10.26	27.66	56.00	-28.34	QP	
10	4.4380	10.33	10.26	20.59	46.00	-25.41	AVG	
11	23.8340	18.23	10.54	28.77	60.00	-31.23	QP	
12	23.8340	12.30	10.54	22.84	50.00	-27.16	AVG	

8 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013&ANSI C63.4:2014

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	$20\log^{(500)}$

8.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

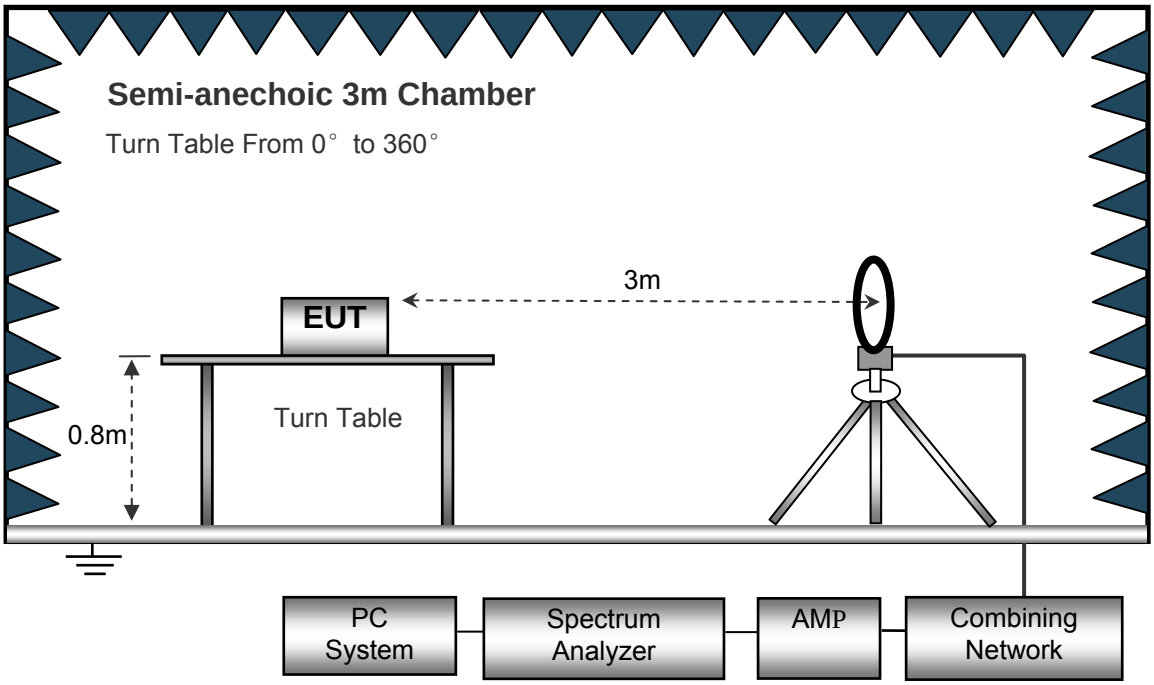
EUT Operation **:**

The test was performed in Wi-Fi transmitting mode, the test data were shown in the report.

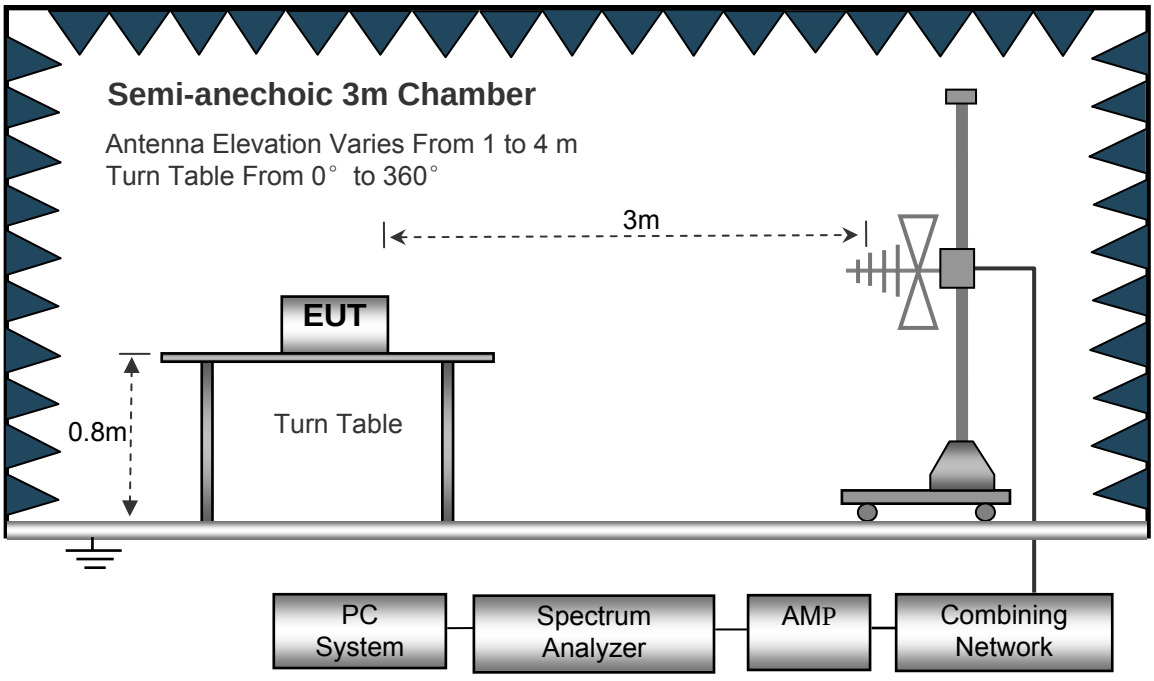
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

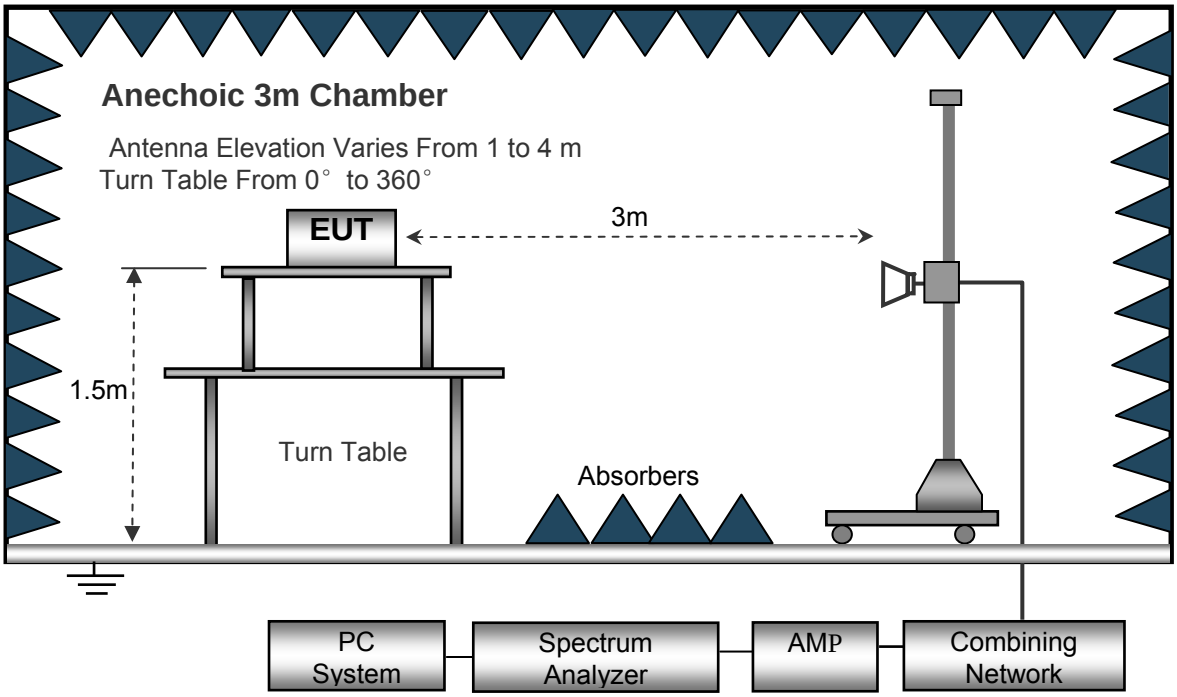
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



8.3 Spectrum Analyzer Setup

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

8.4 Test Procedure

1. The EUT is placed on a turntable, which is 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 druing radiated emissions above 1GHz measurement.

8.5 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:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - 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:

Margin = Corr. Ampl. – Limit

8.6 Summary of Test Results

Test Frequency : 9KHz to 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)
11b: Low Channel 2412MHz									
245.96	42.96	QP	117	1.4	H	-11.62	31.34	46.00	-14.66
245.96	34.88	QP	161	1.9	V	-11.62	23.26	46.00	-22.74
4824.00	49.07	PK	196	1.8	V	-1.06	48.01	74.00	-25.99
4824.00	45.12	Ave	196	1.8	V	-1.06	44.06	54.00	-9.94
7236.00	42.14	PK	291	1.8	H	1.33	43.47	74.00	-30.53
7236.00	38.61	Ave	291	1.8	H	1.33	39.94	54.00	-14.06
2348.86	45.49	PK	159	1.3	V	-13.19	32.30	74.00	-41.70
2348.86	37.54	Ave	159	1.3	V	-13.19	24.35	54.00	-29.65
2377.59	42.43	PK	234	1.4	H	-13.14	29.29	74.00	-44.71
2377.59	38.03	Ave	234	1.4	H	-13.14	24.89	54.00	-29.11
2493.23	42.47	PK	219	1.6	V	-13.08	29.39	74.00	-44.61
2493.23	38.31	Ave	219	1.6	V	-13.08	25.23	54.00	-28.77

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)
11b: Middle Channel 2437MHz									
245.96	42.83	QP	171	1.7	H	-11.62	31.21	46.00	-14.79
245.96	34.99	QP	184	1.2	V	-11.62	23.37	46.00	-22.63
4874.00	48.30	PK	139	1.2	V	-0.62	47.68	74.00	-26.32
4874.00	45.46	Ave	139	1.2	V	-0.62	44.84	54.00	-9.16
7311.00	42.11	PK	357	1.1	H	2.21	44.32	74.00	-29.68
7311.00	38.75	Ave	357	1.1	H	2.21	40.96	54.00	-13.04
2337.71	45.72	PK	349	1.1	V	-13.19	32.53	74.00	-41.47
2337.71	38.48	Ave	349	1.1	V	-13.19	25.29	54.00	-28.71
2388.60	42.45	PK	29	1.9	H	-13.14	29.31	74.00	-44.69
2388.60	37.16	Ave	29	1.9	H	-13.14	24.02	54.00	-29.98
2491.17	43.30	PK	355	1.7	V	-13.08	30.22	74.00	-43.78
2491.17	36.04	Ave	355	1.7	V	-13.08	22.96	54.00	-31.04

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)
11b: High Channel 2462MHz									
245.96	44.05	QP	180	1.4	H	-11.62	32.43	46.00	-13.57
245.96	33.52	QP	129	1.4	V	-11.62	21.90	46.00	-24.10
4924.00	46.94	PK	214	2.0	V	-0.24	46.70	74.00	-27.30
4924.00	46.51	Ave	214	2.0	V	-0.24	46.27	54.00	-7.73
7386.00	41.52	PK	286	1.6	H	2.84	44.36	74.00	-29.64
7386.00	37.94	Ave	286	1.6	H	2.84	40.78	54.00	-13.22
2330.54	46.63	PK	22	1.2	V	-13.19	33.44	74.00	-40.56
2330.54	39.79	Ave	22	1.2	V	-13.19	26.60	54.00	-27.40
2380.49	42.72	PK	130	1.2	H	-13.14	29.58	74.00	-44.42
2380.49	38.25	Ave	130	1.2	H	-13.14	25.11	54.00	-28.89
2487.03	43.01	PK	259	1.1	V	-13.08	29.93	74.00	-44.07
2487.03	37.80	Ave	259	1.1	V	-13.08	24.72	54.00	-29.28

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)
11g: Low Channel 2412MHz									
245.96	45.38	QP	5	1.6	H	-11.62	33.76	46.00	-12.24
245.96	33.02	QP	75	1.6	V	-11.62	21.40	46.00	-24.60
4824.00	47.21	PK	92	1.3	V	-1.06	46.15	74.00	-27.85
4824.00	47.73	Ave	92	1.3	V	-1.06	46.67	54.00	-7.33
7236.00	40.39	PK	117	1.1	H	1.33	41.72	74.00	-32.28
7236.00	39.00	Ave	117	1.1	H	1.33	40.33	54.00	-13.67
2327.82	45.34	PK	80	1.2	V	-13.19	32.15	74.00	-41.85
2327.82	39.75	Ave	80	1.2	V	-13.19	26.56	54.00	-27.44
2357.28	42.13	PK	71	1.7	H	-13.14	28.99	74.00	-45.01
2357.28	37.74	Ave	71	1.7	H	-13.14	24.60	54.00	-29.40
2492.65	42.07	PK	111	1.2	V	-13.08	28.99	74.00	-45.01
2492.65	36.59	Ave	111	1.2	V	-13.08	23.51	54.00	-30.49

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)
11g: Middle Channel 2437MHz									
245.96	44.89	QP	344	1.2	H	-11.62	33.27	46.00	-12.73
245.96	33.63	QP	140	1.6	V	-11.62	22.01	46.00	-23.99
4874.00	45.74	PK	253	1.4	V	-0.62	45.12	74.00	-28.88
4874.00	46.44	Ave	253	1.4	V	-0.62	45.82	54.00	-8.18
7311.00	40.08	PK	66	1.5	H	2.21	42.29	74.00	-31.71
7311.00	40.17	Ave	66	1.5	H	2.21	42.38	54.00	-11.62
2327.93	45.56	PK	317	1.3	V	-13.19	32.37	74.00	-41.63
2327.93	38.10	Ave	317	1.3	V	-13.19	24.91	54.00	-29.09
2365.86	42.73	PK	77	1.4	H	-13.14	29.59	74.00	-44.41
2365.86	38.44	Ave	77	1.4	H	-13.14	25.30	54.00	-28.70
2496.40	43.87	PK	171	1.2	V	-13.08	30.79	74.00	-43.21
2496.40	38.27	Ave	171	1.2	V	-13.08	25.19	54.00	-28.81

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)
11g: High Channel 2462MHz									
245.96	44.93	QP	327	1.3	H	-11.62	33.31	46.00	-12.69
245.96	32.21	QP	122	1.6	V	-11.62	20.59	46.00	-25.41
4924.00	45.79	PK	247	1.1	V	-0.24	45.55	74.00	-28.45
4924.00	46.80	Ave	247	1.1	V	-0.24	46.56	54.00	-7.44
7386.00	40.02	PK	219	1.2	H	2.84	42.86	74.00	-31.14
7386.00	41.62	Ave	219	1.2	H	2.84	44.46	54.00	-9.54
2333.51	45.78	PK	254	1.3	V	-13.19	32.59	74.00	-41.41
2333.51	37.57	Ave	254	1.3	V	-13.19	24.38	54.00	-29.62
2357.18	43.08	PK	123	1.3	H	-13.14	29.94	74.00	-44.06
2357.18	38.74	Ave	123	1.3	H	-13.14	25.60	54.00	-28.40
2492.39	43.57	PK	187	1.2	V	-13.08	30.49	74.00	-43.51
2492.39	38.72	Ave	187	1.2	V	-13.08	25.64	54.00	-28.36

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)
n20: Low Channel 2412MHz									
245.96	46.08	QP	126	1.7	H	-11.62	34.46	46.00	-11.54
245.96	30.89	QP	230	1.8	V	-11.62	19.27	46.00	-26.73
4824.00	45.30	PK	72	1.5	V	-1.06	44.24	74.00	-29.76
4824.00	48.12	Ave	72	1.5	V	-1.06	47.06	54.00	-6.94
7236.00	41.33	PK	137	1.0	H	1.33	42.66	74.00	-31.34
7236.00	42.06	Ave	137	1.0	H	1.33	43.39	54.00	-10.61
2329.25	46.62	PK	223	1.7	V	-13.19	33.43	74.00	-40.57
2329.25	37.78	Ave	223	1.7	V	-13.19	24.59	54.00	-29.41
2365.68	42.04	PK	260	1.1	H	-13.14	28.90	74.00	-45.10
2365.68	36.29	Ave	260	1.1	H	-13.14	23.15	54.00	-30.85
2499.67	44.19	PK	137	1.1	V	-13.08	31.11	74.00	-42.89
2499.67	38.56	Ave	137	1.1	V	-13.08	25.48	54.00	-28.52

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)
n20: Middle Channel 2437MHz									
245.96	45.60	QP	212	1.2	H	-11.62	33.98	46.00	-12.02
245.96	32.20	QP	279	1.6	V	-11.62	20.58	46.00	-25.42
4874.00	44.10	PK	40	1.2	V	-0.62	43.48	74.00	-30.52
4874.00	48.94	Ave	40	1.2	V	-0.62	48.32	54.00	-5.68
7311.00	40.05	PK	320	2.0	H	2.21	42.26	74.00	-31.74
7311.00	41.88	Ave	320	2.0	H	2.21	44.09	54.00	-9.91
2330.89	45.33	PK	294	1.1	V	-13.19	32.14	74.00	-41.86
2330.89	38.70	Ave	294	1.1	V	-13.19	25.51	54.00	-28.49
2379.14	44.58	PK	302	1.9	H	-13.14	31.44	74.00	-42.56
2379.14	37.07	Ave	302	1.9	H	-13.14	23.93	54.00	-30.07
2494.46	44.71	PK	180	1.2	V	-13.08	31.63	74.00	-42.37
2494.46	37.39	Ave	180	1.2	V	-13.08	24.31	54.00	-29.69

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)
n20: High Channel 2462MHz									
245.96	46.64	QP	100	1.9	H	-11.62	35.02	46.00	-10.98
245.96	30.95	QP	243	1.6	V	-11.62	19.33	46.00	-26.67
4924.00	45.00	PK	164	2.0	V	-0.24	44.76	74.00	-29.24
4924.00	49.47	Ave	164	2.0	V	-0.24	49.23	54.00	-4.77
7386.00	41.16	PK	22	1.1	H	2.84	44.00	74.00	-30.00
7386.00	41.41	Ave	22	1.1	H	2.84	44.25	54.00	-9.75
2337.07	45.09	PK	136	1.3	V	-13.19	31.90	74.00	-42.10
2337.07	38.02	Ave	136	1.3	V	-13.19	24.83	54.00	-29.17
2357.61	42.87	PK	166	1.6	H	-13.14	29.73	74.00	-44.27
2357.61	36.08	Ave	166	1.6	H	-13.14	22.94	54.00	-31.06
2492.93	43.53	PK	80	1.3	V	-13.08	30.45	74.00	-43.55
2492.93	36.57	Ave	80	1.3	V	-13.08	23.49	54.00	-30.51

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)
n40: Low Channel 2422MHz									
245.96	47.64	QP	308	1.9	H	-11.62	36.02	46.00	-9.98
245.96	30.82	QP	116	1.2	V	-11.62	19.20	46.00	-26.80
4844.00	43.84	PK	111	1.4	V	-1.06	42.78	74.00	-31.22
4844.00	47.15	Ave	111	1.4	V	-1.06	46.09	54.00	-7.91
7266.00	40.02	PK	260	2.0	H	1.33	41.35	74.00	-32.65
7266.00	40.02	Ave	260	2.0	H	1.33	41.35	54.00	-12.65
2330.12	46.55	PK	83	1.2	V	-13.19	33.36	74.00	-40.64
2330.12	39.42	Ave	83	1.2	V	-13.19	26.23	54.00	-27.77
2368.24	44.79	PK	295	1.2	H	-13.14	31.65	74.00	-42.35
2368.24	37.48	Ave	295	1.2	H	-13.14	24.34	54.00	-29.66
2490.79	44.31	PK	18	1.7	V	-13.08	31.23	74.00	-42.77
2490.79	37.65	Ave	18	1.7	V	-13.08	24.57	54.00	-29.43

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)
n40: Middle Channel 2437MHz									
245.96	48.47	QP	172	1.8	H	-11.62	36.85	46.00	-9.15
245.96	30.93	QP	303	1.2	V	-11.62	19.31	46.00	-26.69
4874.00	43.28	PK	125	1.7	V	-0.62	42.66	74.00	-31.34
4874.00	47.53	Ave	125	1.7	V	-0.62	46.91	54.00	-7.09
7311.00	39.76	PK	170	1.1	H	2.21	41.97	74.00	-32.03
7311.00	39.29	Ave	170	1.1	H	2.21	41.50	54.00	-12.50
2332.37	46.39	PK	142	2.0	V	-13.19	33.20	74.00	-40.80
2332.37	39.74	Ave	142	2.0	V	-13.19	26.55	54.00	-27.45
2352.30	42.10	PK	84	1.1	H	-13.14	28.96	74.00	-45.04
2352.30	38.83	Ave	84	1.1	H	-13.14	25.69	54.00	-28.31
2485.47	42.68	PK	326	1.5	V	-13.08	29.60	74.00	-44.40
2485.47	36.11	Ave	326	1.5	V	-13.08	23.03	54.00	-30.97

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)
n40: High Channel 2452MHz									
245.96	49.45	QP	226	1.5	H	-11.62	37.83	46.00	-8.17
245.96	31.59	QP	68	1.9	V	-11.62	19.97	46.00	-26.03
4904.00	44.11	PK	274	1.9	V	-0.24	43.87	74.00	-30.13
4904.00	47.42	Ave	274	1.9	V	-0.24	47.18	54.00	-6.82
7356.00	40.52	PK	97	1.8	H	2.84	43.36	74.00	-30.64
7356.00	38.61	Ave	97	1.8	H	2.84	41.45	54.00	-12.55
2329.11	46.77	PK	136	1.9	V	-13.19	33.58	74.00	-40.42
2329.11	37.29	Ave	136	1.9	V	-13.19	24.10	54.00	-29.90
2380.75	42.88	PK	295	1.4	H	-13.14	29.74	74.00	-44.26
2380.75	36.80	Ave	295	1.4	H	-13.14	23.66	54.00	-30.34
2489.17	43.89	PK	60	1.1	V	-13.08	30.81	74.00	-43.19
2489.17	36.20	Ave	60	1.1	V	-13.08	23.12	54.00	-30.88

Test Frequency: 18GHz~25GHz

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

9 Band Edge Measurement

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	558074 D01 DTS Meas Guidance v04, April 5, 2017
Test Limit:	Regulation 15.247 (d),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 Mode:	Transmitting

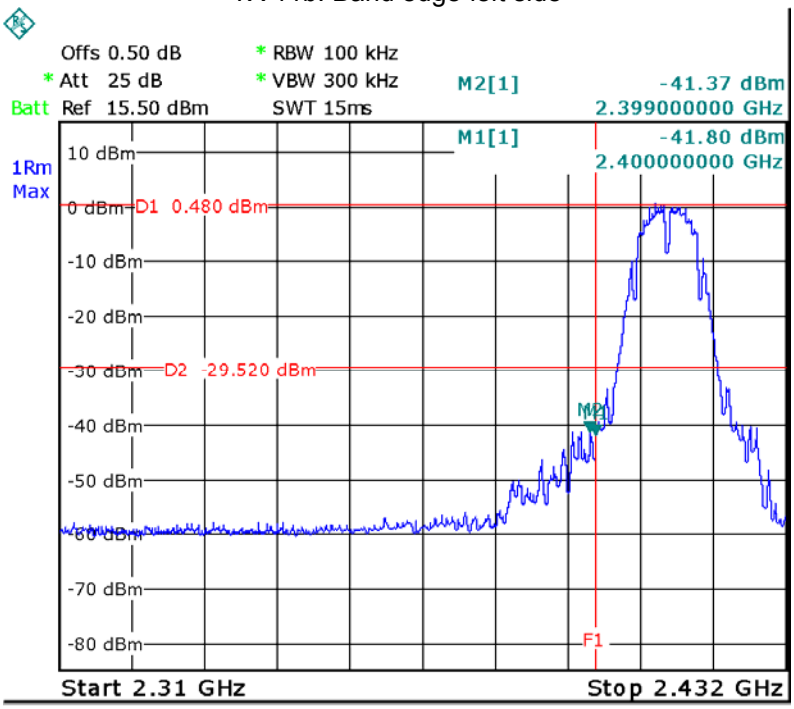
9.1 Test Produce

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.

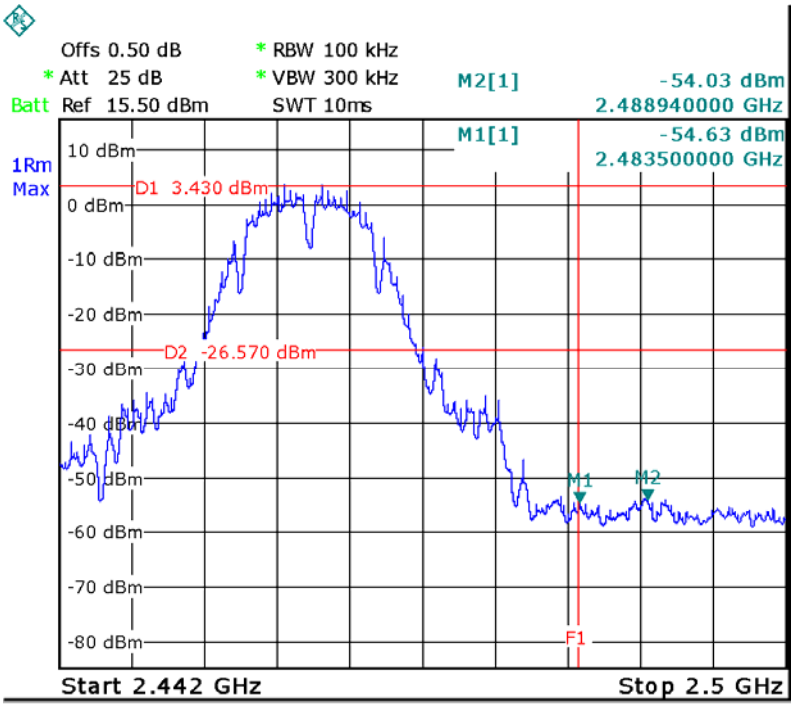
9.2 Test Result

Test result plots shown as follows:

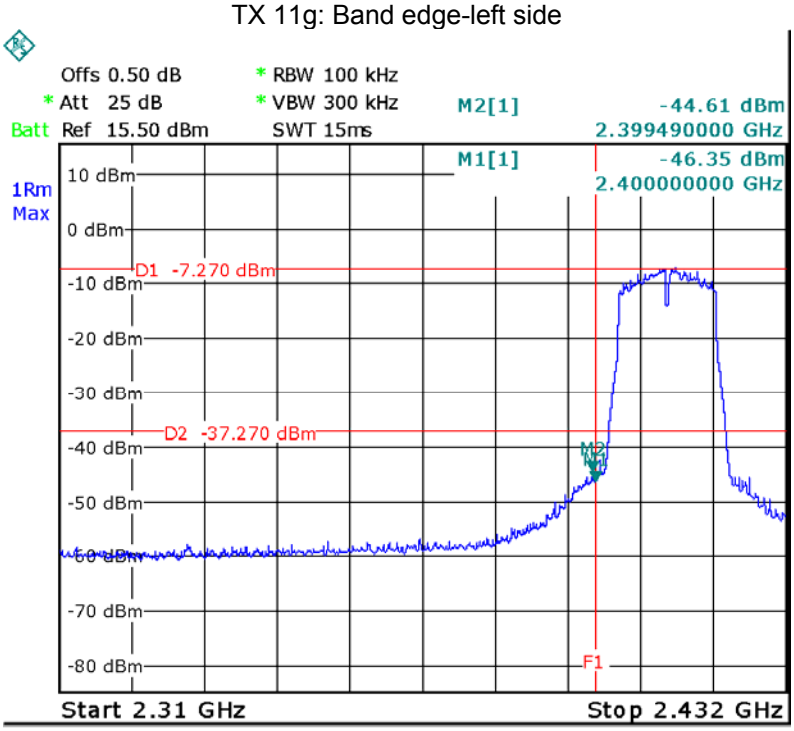
TX 11b: Band edge-left side



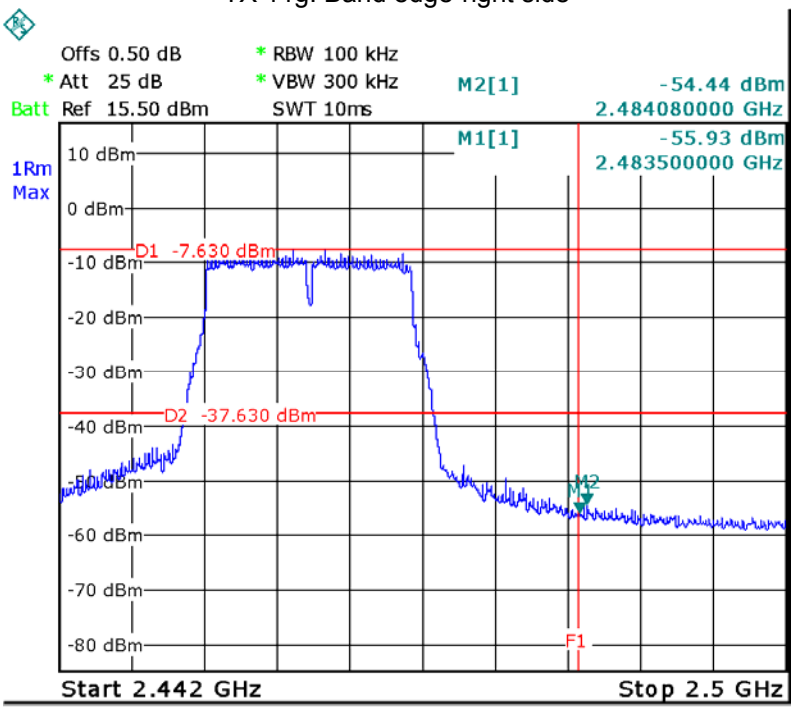
TX 11b: Band edge-right side



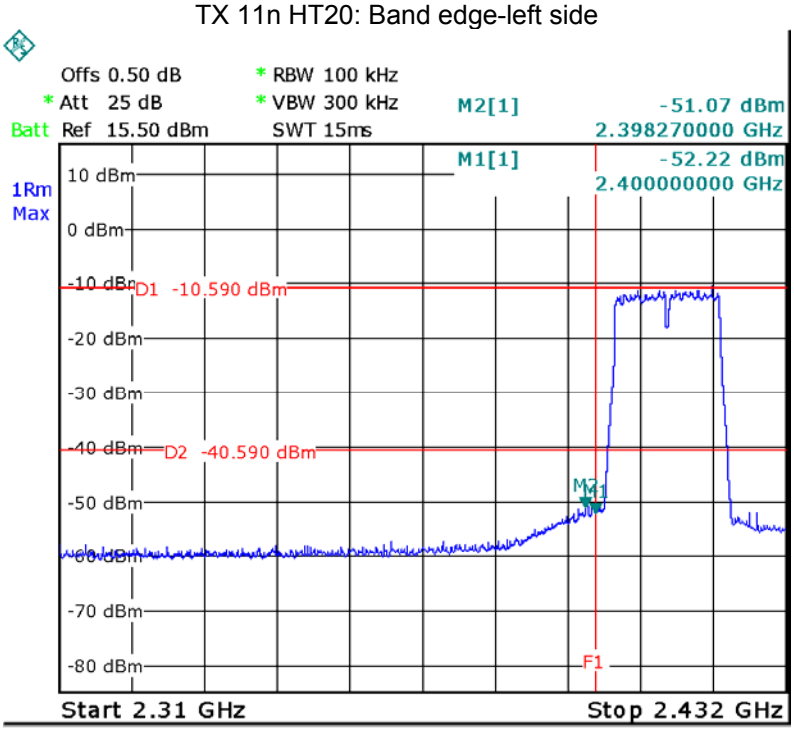
TX 11g: Band edge-left side



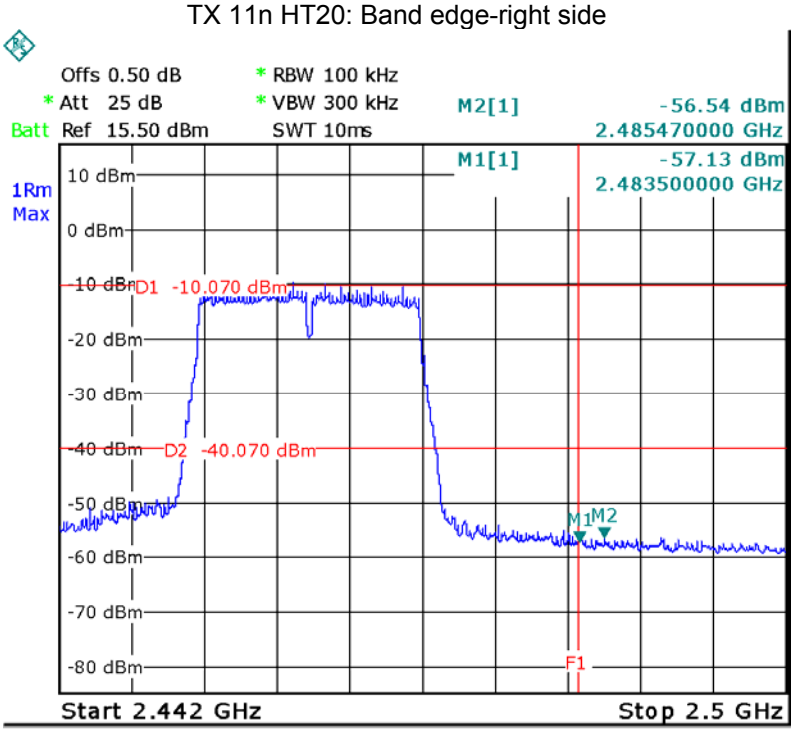
TX 11g: Band edge-right side



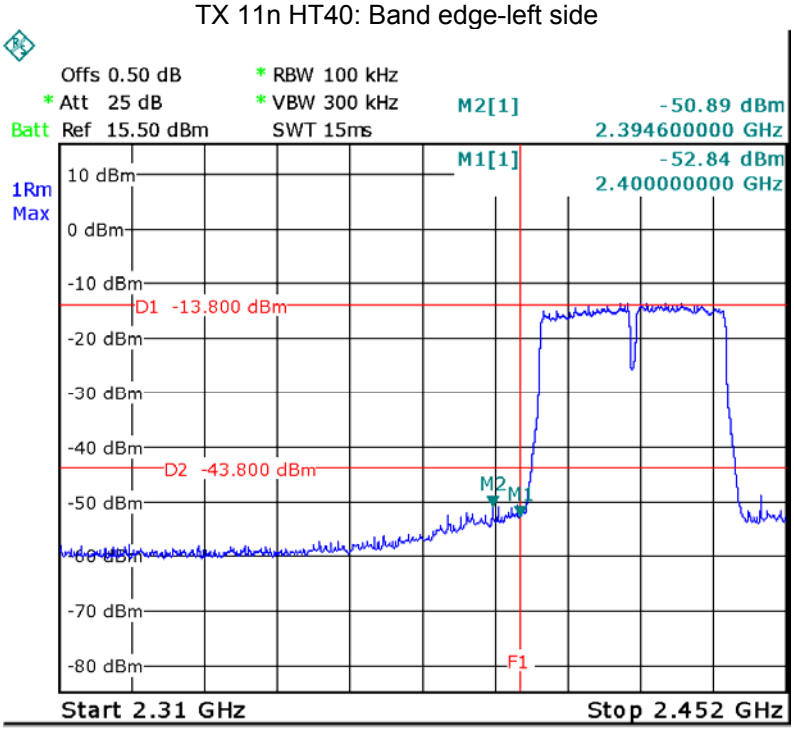
TX 11n HT20: Band edge-left side



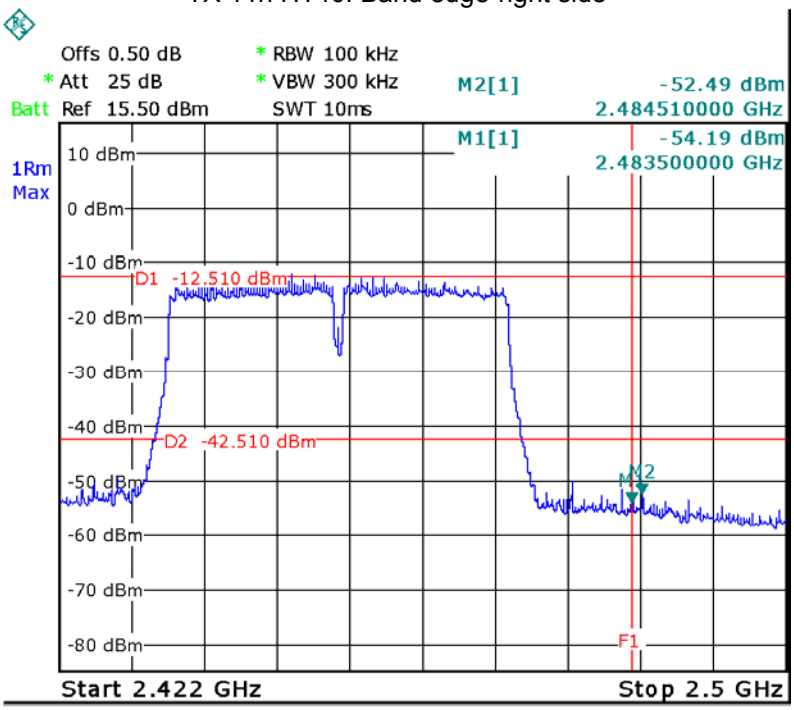
TX 11n HT20: Band edge-right side



TX 11n HT40: Band edge-left side



TX 11n HT40: Band edge-right side



10 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 DTS Meas Guidance v04, April 5, 2017

10.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

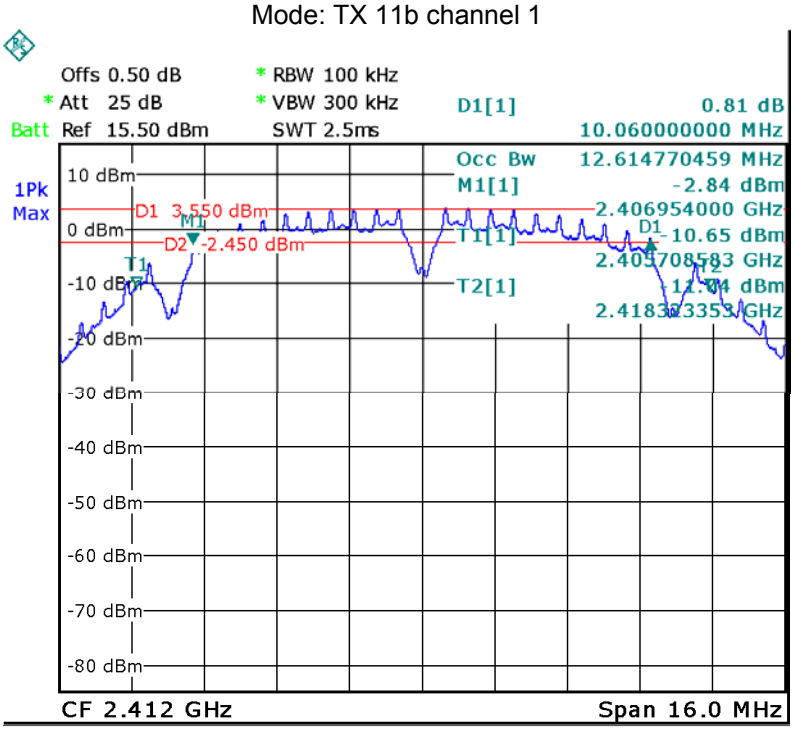
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

10.2 Test Result:

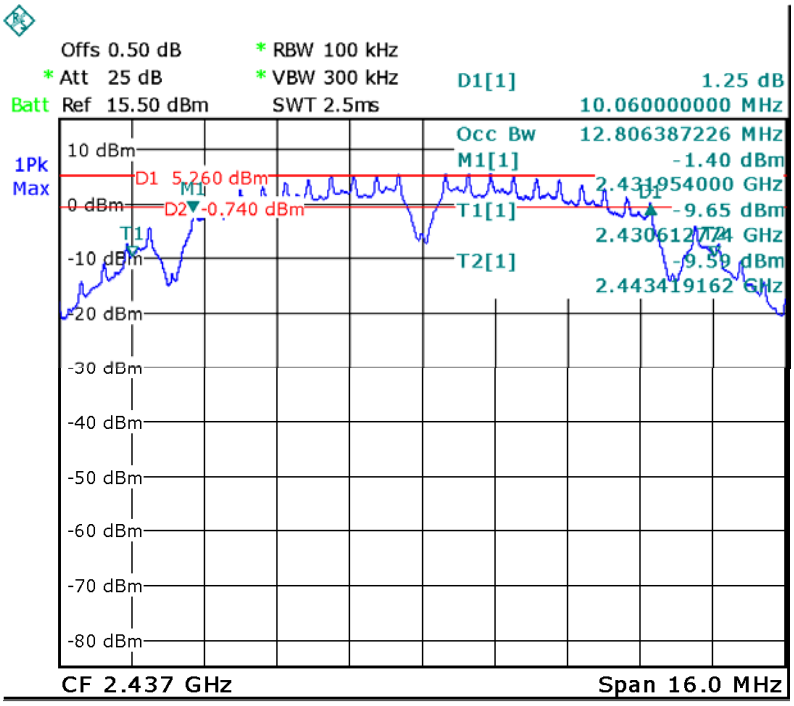
Operation mode	6dB Bandwidth (MHz)			99% Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	10.060	10.060	10.060	12.615	12.806	12.870
TX 11g	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	16.218	16.467	16.467	16.367	16.467	16.517
TX 11n HT20	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	17.677	17.677	17.677	17.677	17.677	17.622
TX 11n HT40	Channel 3	Channel 6	Channel 9	Channel 3	Channel 6	Channel 9
	36.220	36.220	36.220	36.008	35.898	35.898

Test result plot as follows:

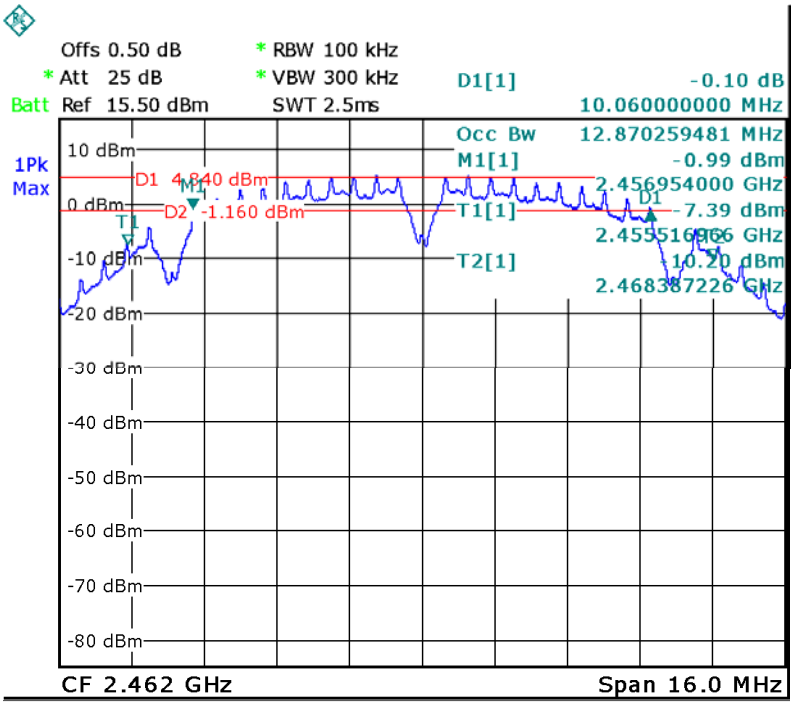
Mode: TX 11b channel 1



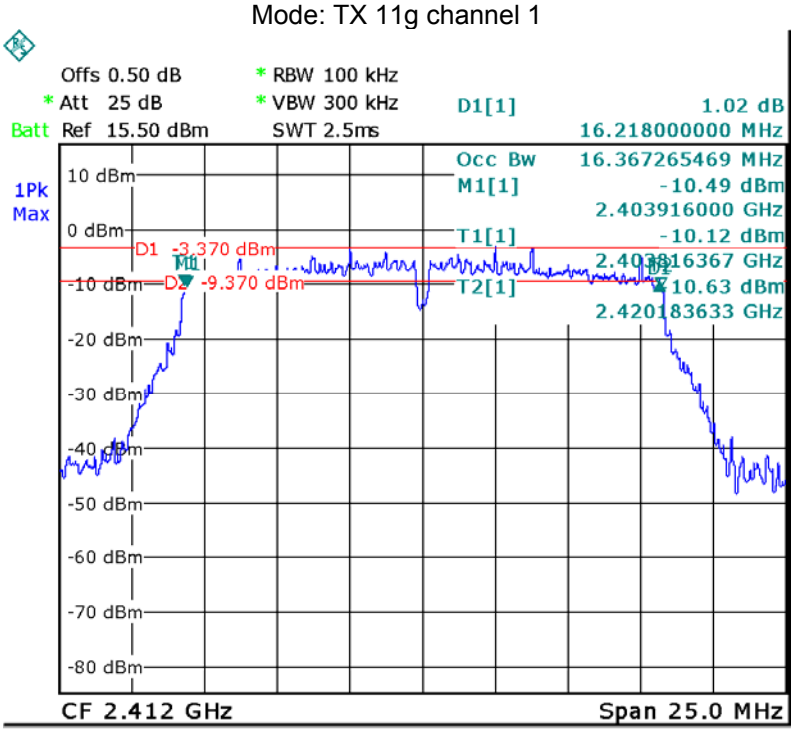
Mode: TX 11b channel 6



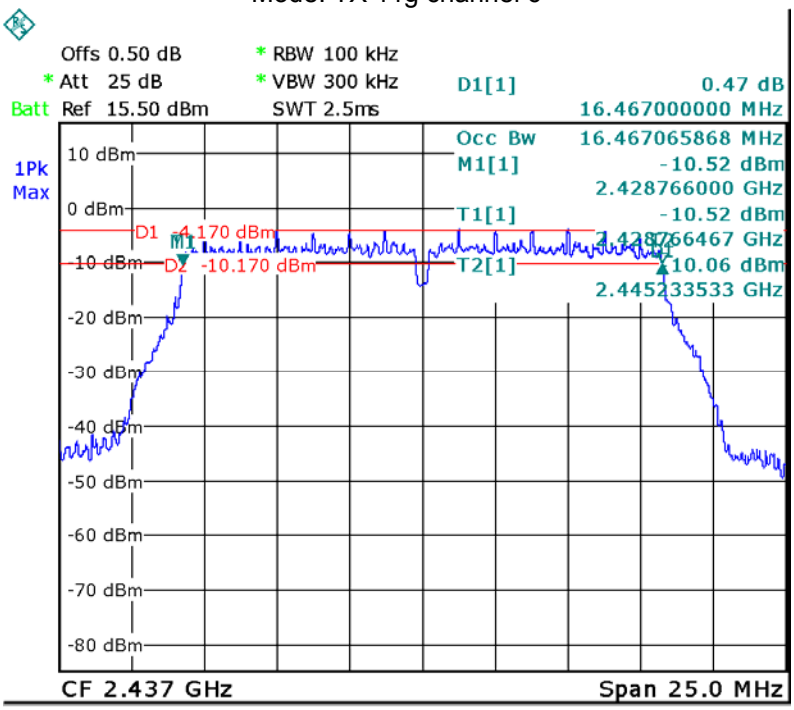
Mode: TX 11b channel 11



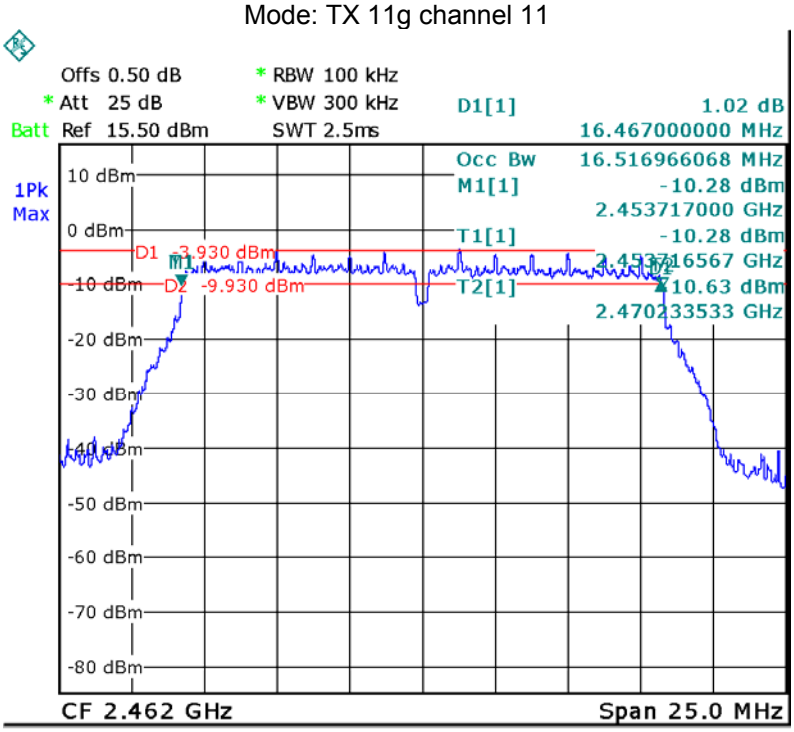
Mode: TX 11g channel 1



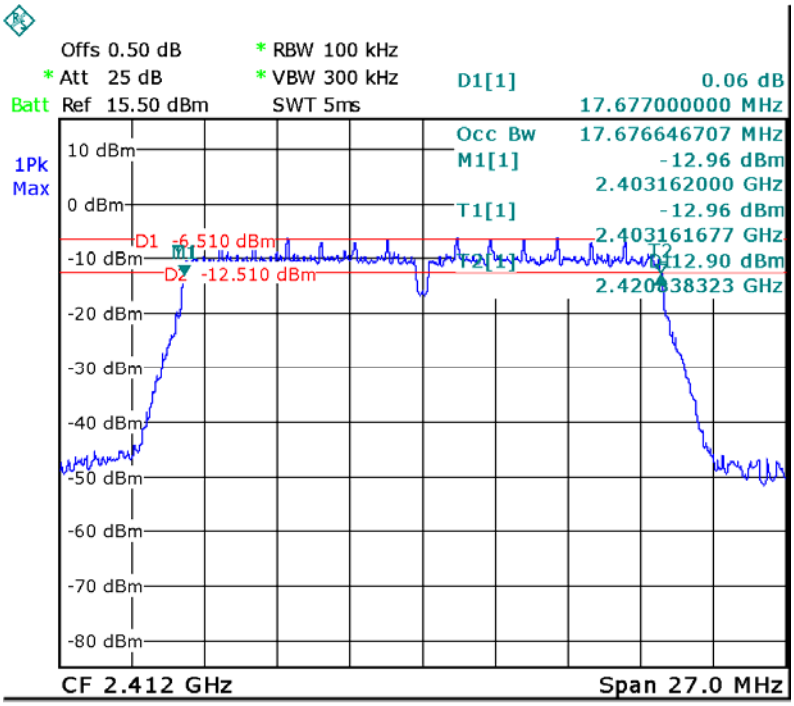
Mode: TX 11g channel 6



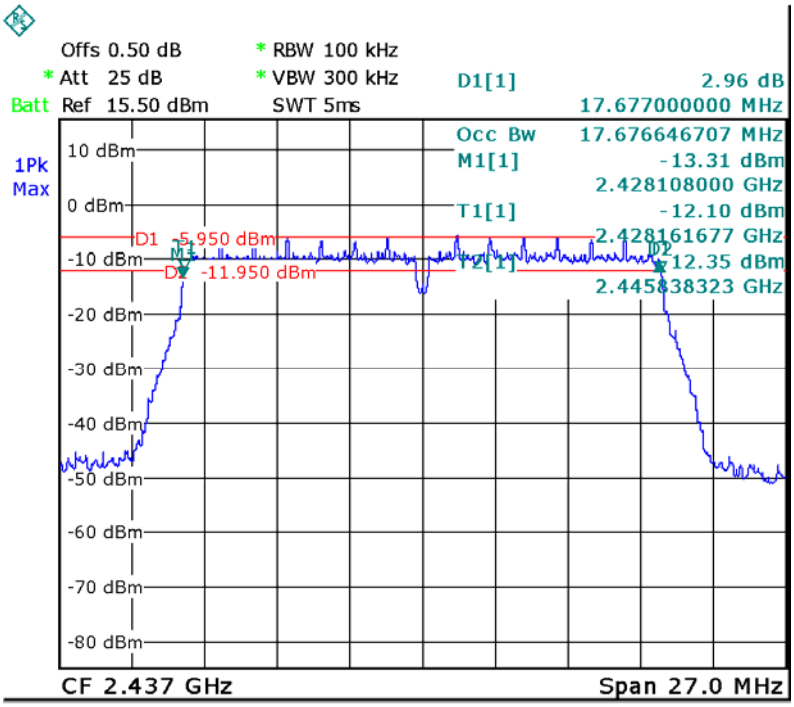
Mode: TX 11g channel 11



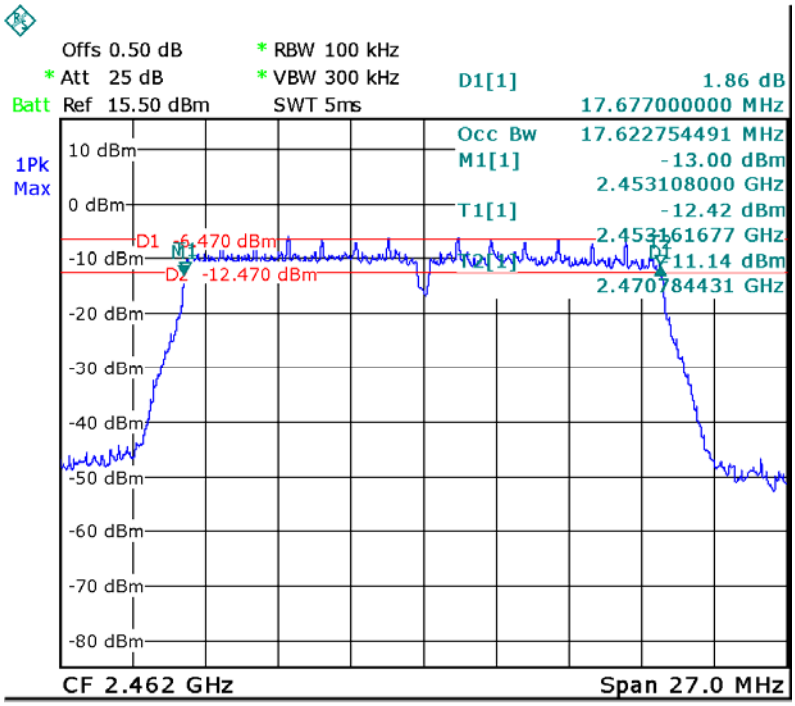
Mode: TX 11n HT20 channel 1



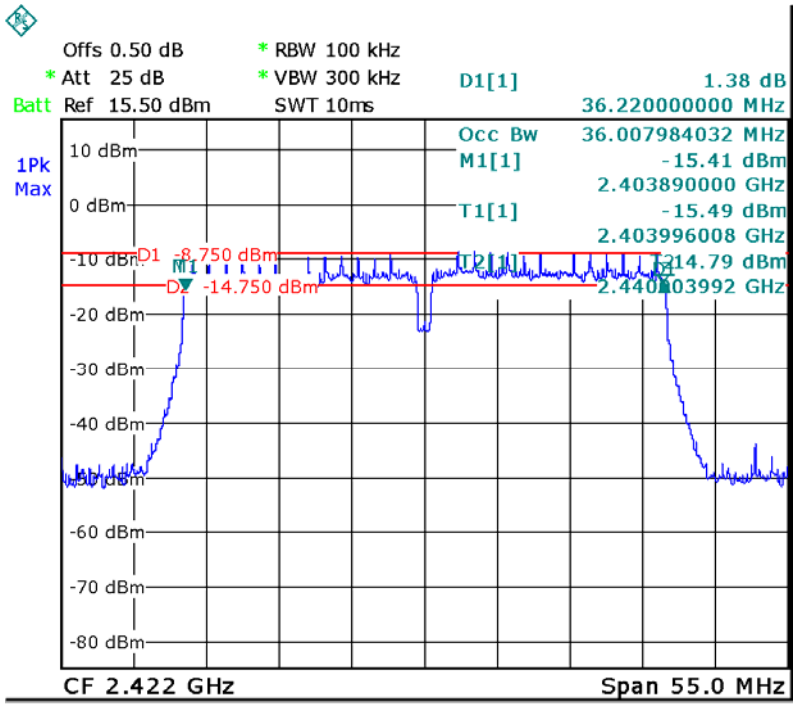
Mode: TX 11n HT20 channel 6



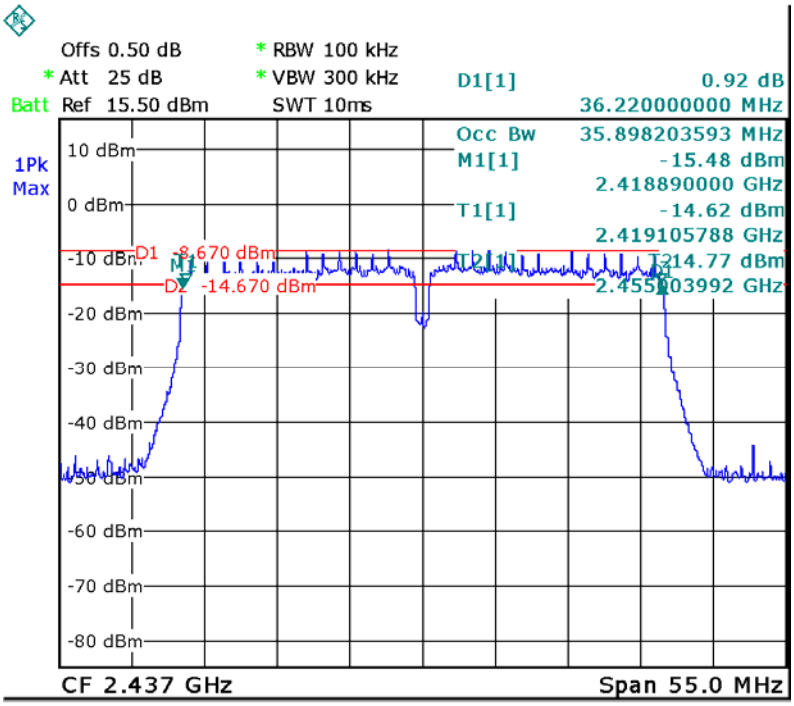
Mode: TX 11n HT20 channel 11



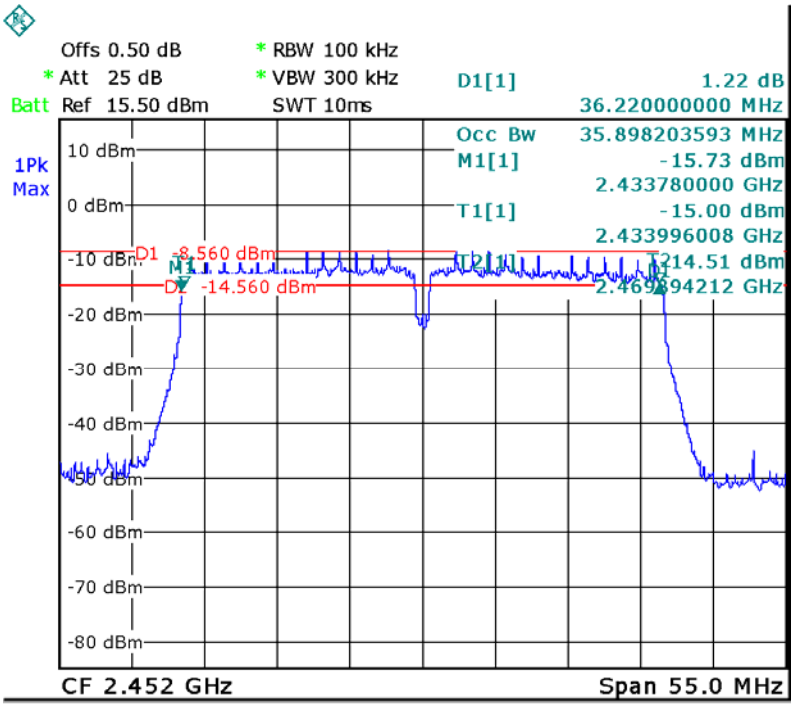
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



11 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 DTS Meas Guidance v04, April 5, 2017

11.1 Test Procedure:

558074 D01 DTS Meas Guidance v04, April 5, 2017

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.

11.2 Test Result:

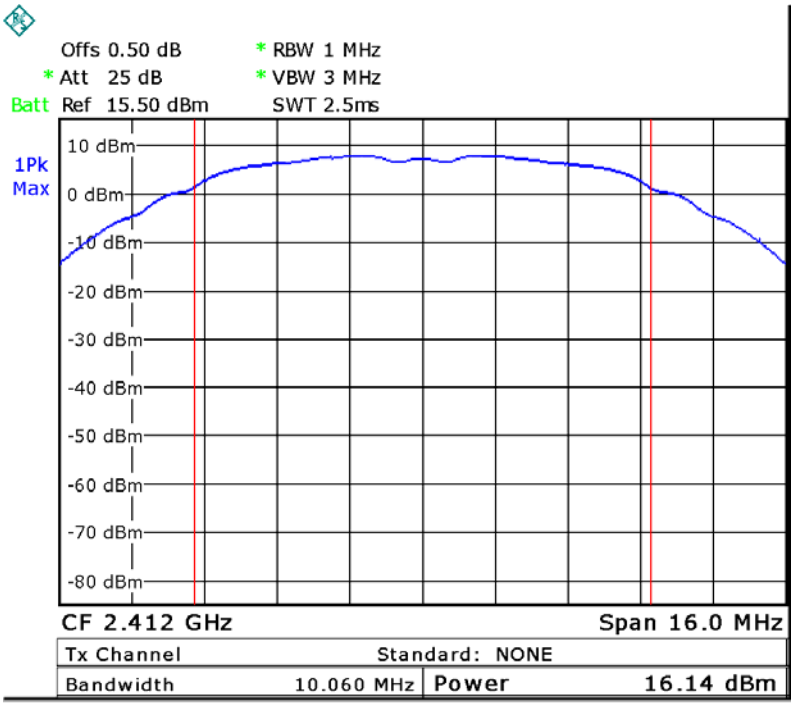
Test mode :TX 11b		
Maximum Peak Output Power (dBm)		
Channel 1	Channel 6	Channel 11
16.14	16.78	17.26
Limit: 1W/30dBm		

Test mode :TX 11g		
Maximum Peak Output Power (dBm)		
Channel 1	Channel 6	Channel 11
16.17	15.54	15.94
Limit: 1W/30dBm		

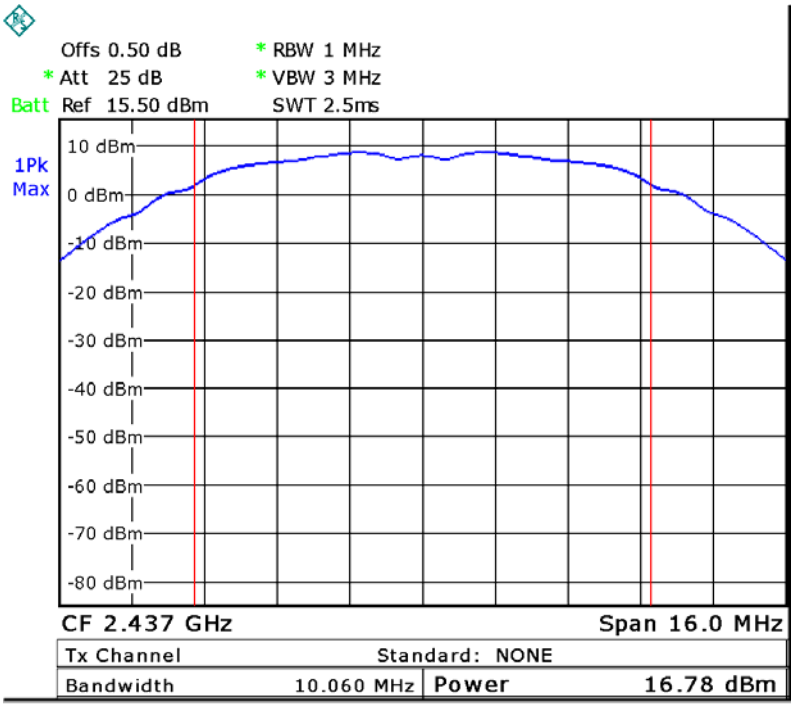
Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
Channel 1	Channel 6	Channel 11
13.35	13.61	13.69
Limit: 1W/30dBm		

Test mode : TX 11n HT40		
Maximum Peak Output Power (dBm)		
Channel 3	Channel 6	Channel 9
14.14	14.05	13.93
Limit: 1W/30dBm		

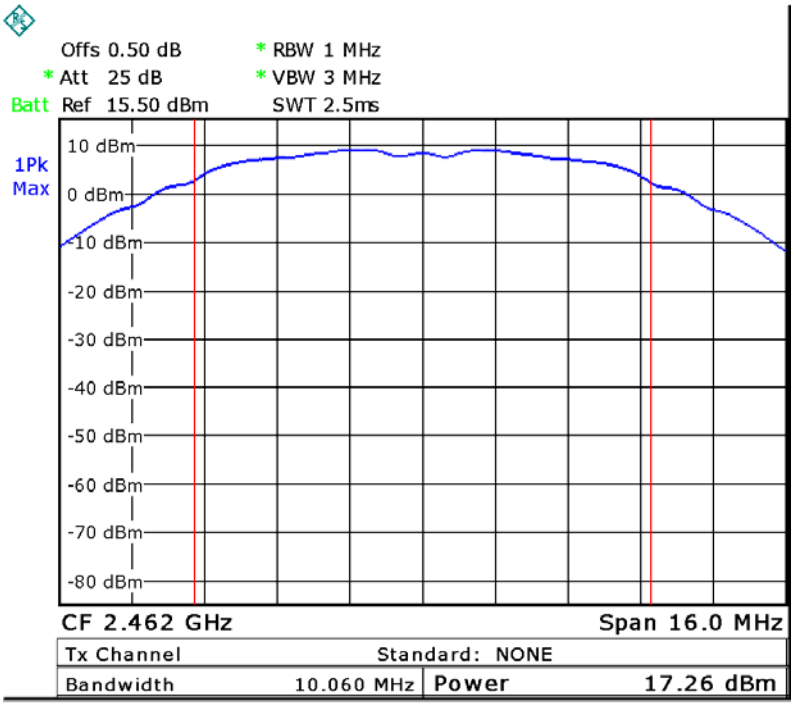
Mode: TX 11b channel 1



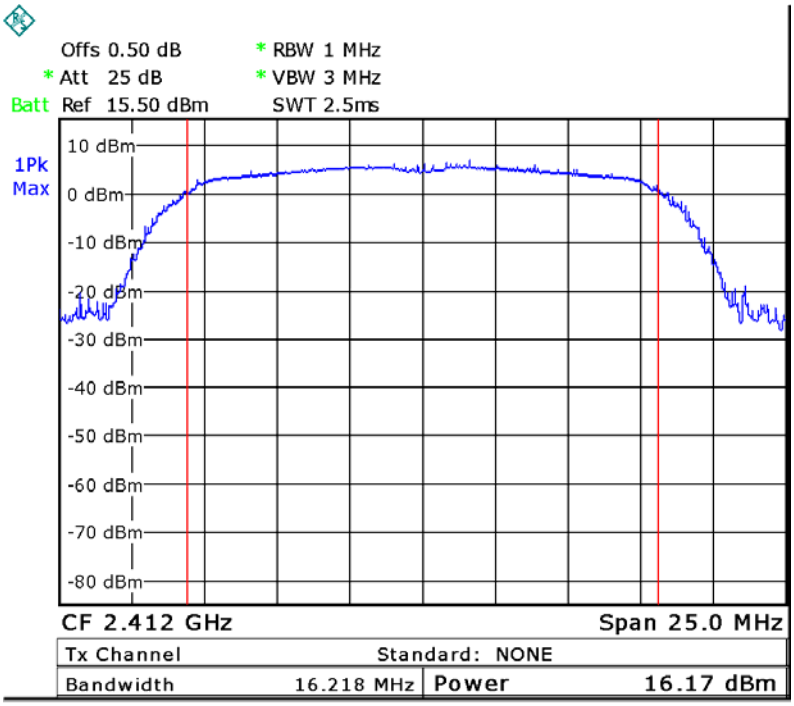
Mode: TX 11b channel 6



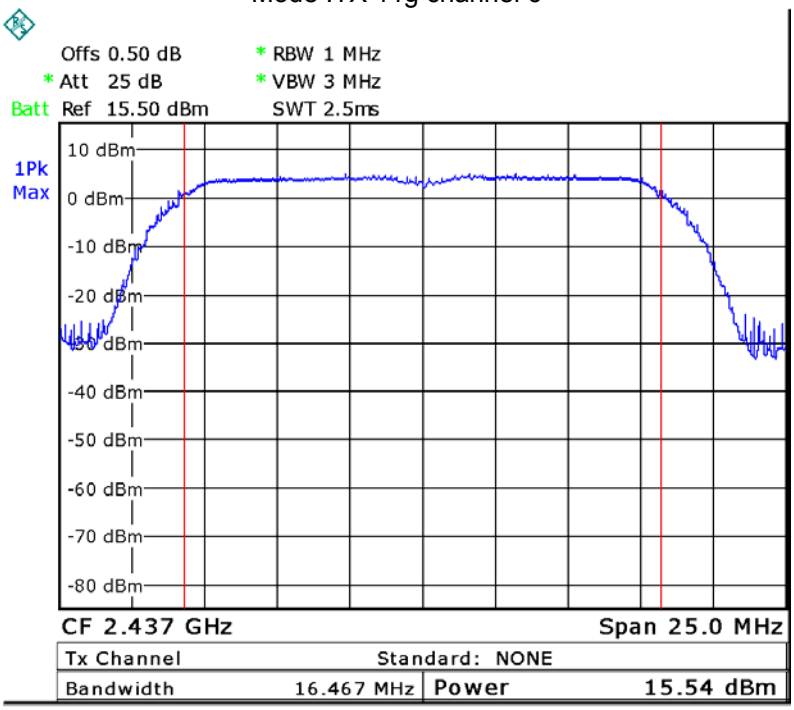
Mode: TX 11b channel 11



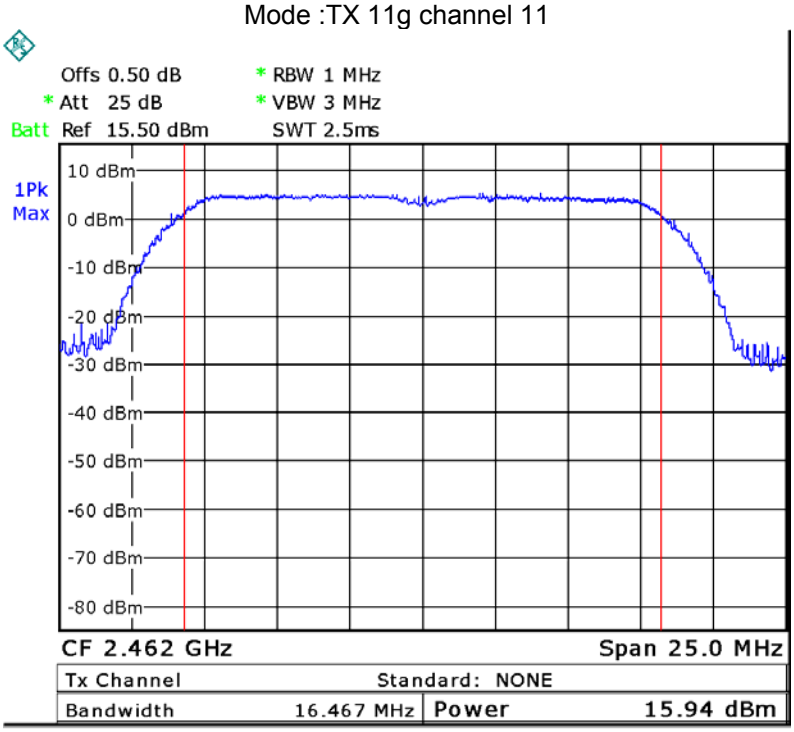
Mode :TX 11g channel 1



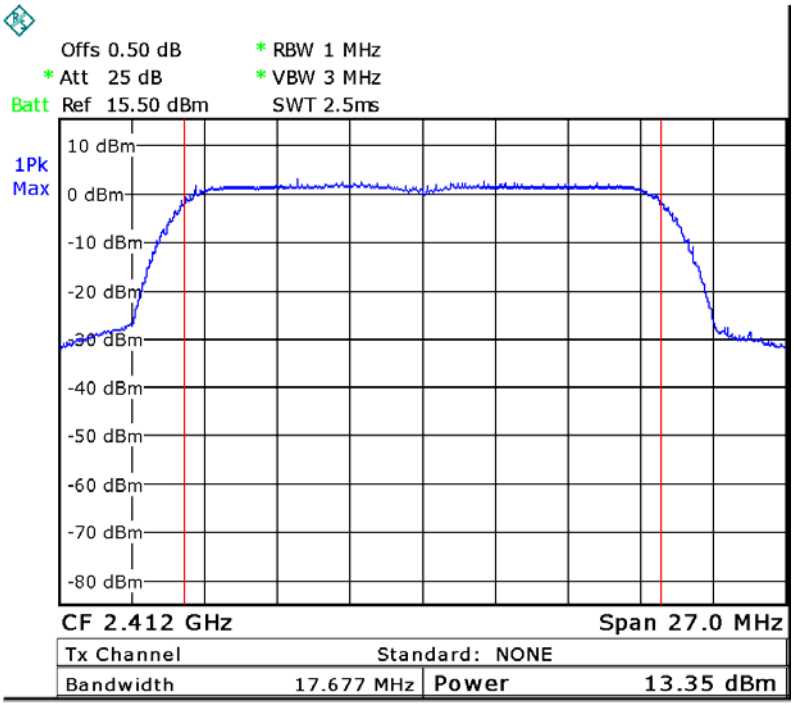
Mode :TX 11g channel 6



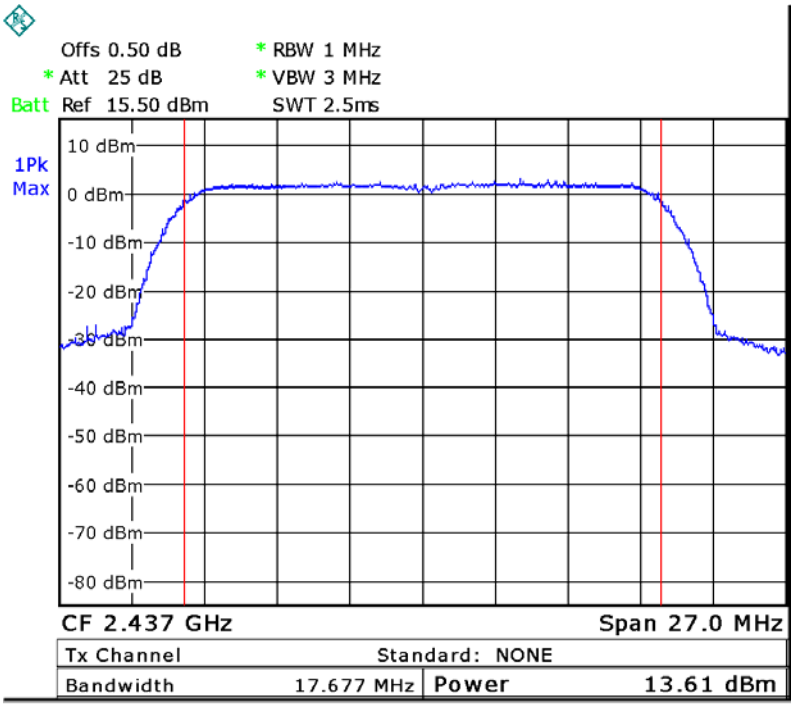
Mode :TX 11g channel 11



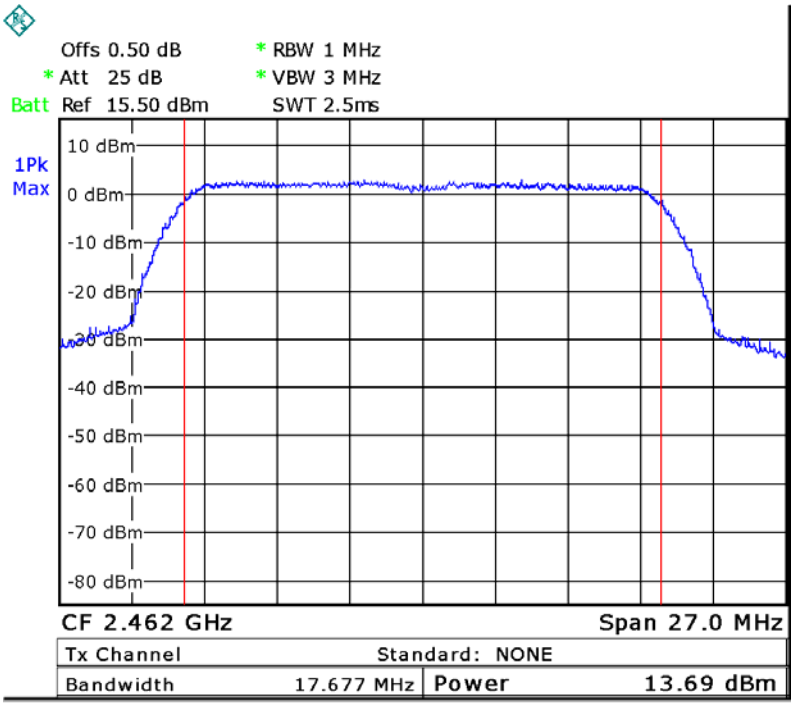
Mode: TX 11n HT20 channel 1



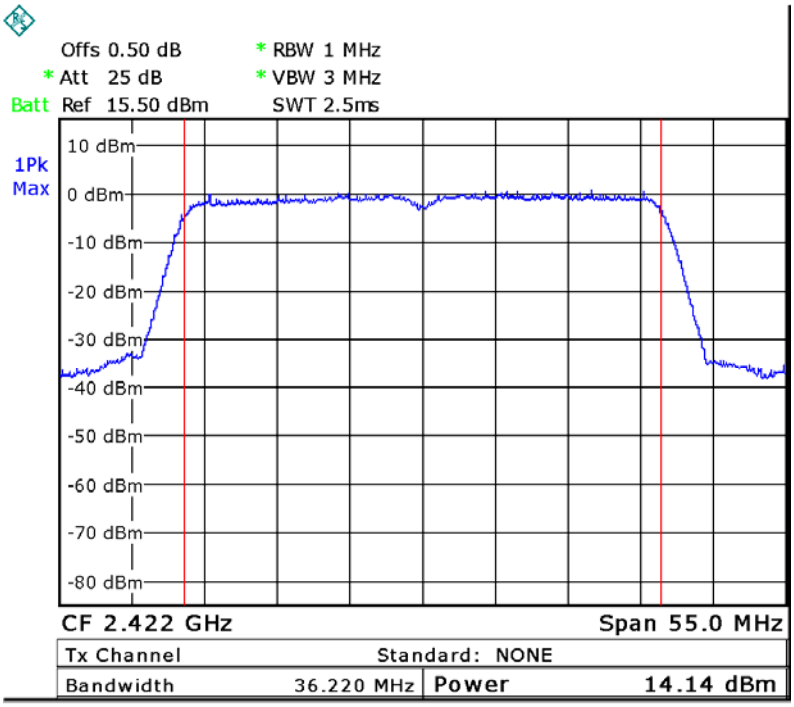
Mode: TX 11n HT20 channel 6



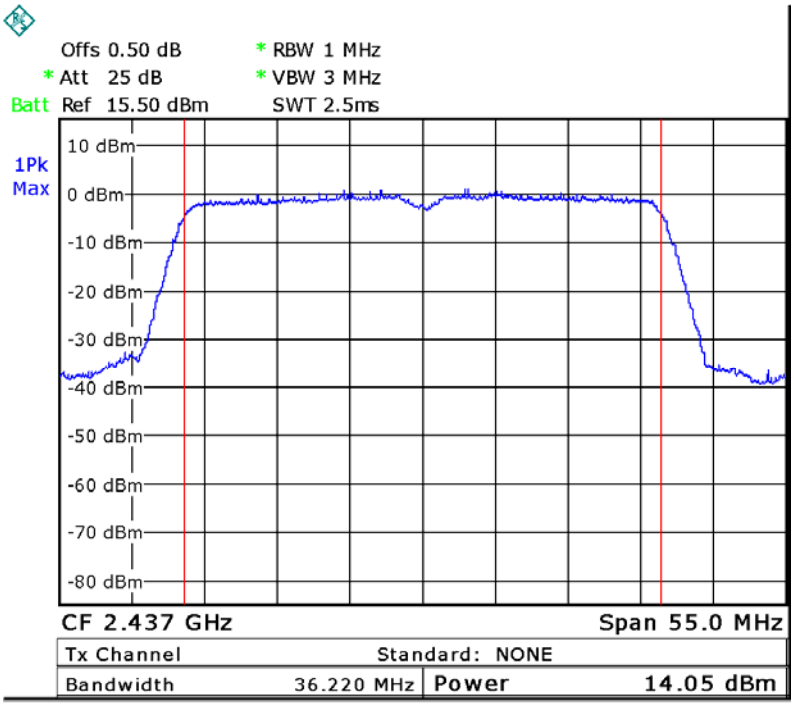
Mode: TX 11n HT20 channel 11



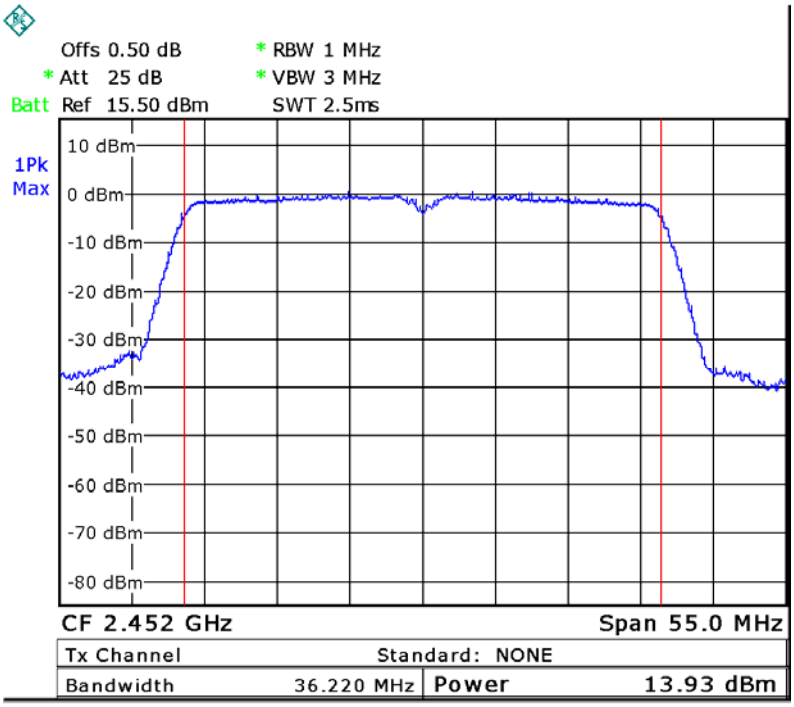
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



12 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 DTS Meas Guidance v04, April 5, 2017

12.1 Test Procedure:

558074 D01 DTS Meas Guidance v04, April 5, 2017

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.

12.2 Test Result:

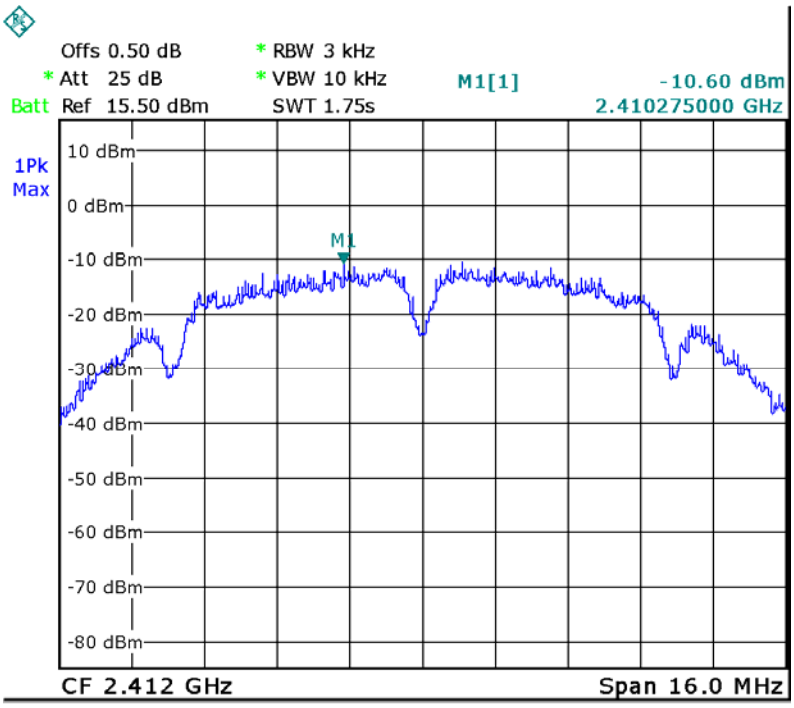
Test mode :TX 11b		
Power Spectral (dBm per 3kHz)		
Channel 1	Channel 6	Channel 11
-10.60	-8.67	-8.83
Limit: 8dBm per 3kHz		

Test mode :TX 11g		
Power Spectral (dBm per 3kHz)		
Channel 1	Channel 6	Channel 11
-16.29	-17.75	-18.07
Limit: 8dBm per 3kHz		

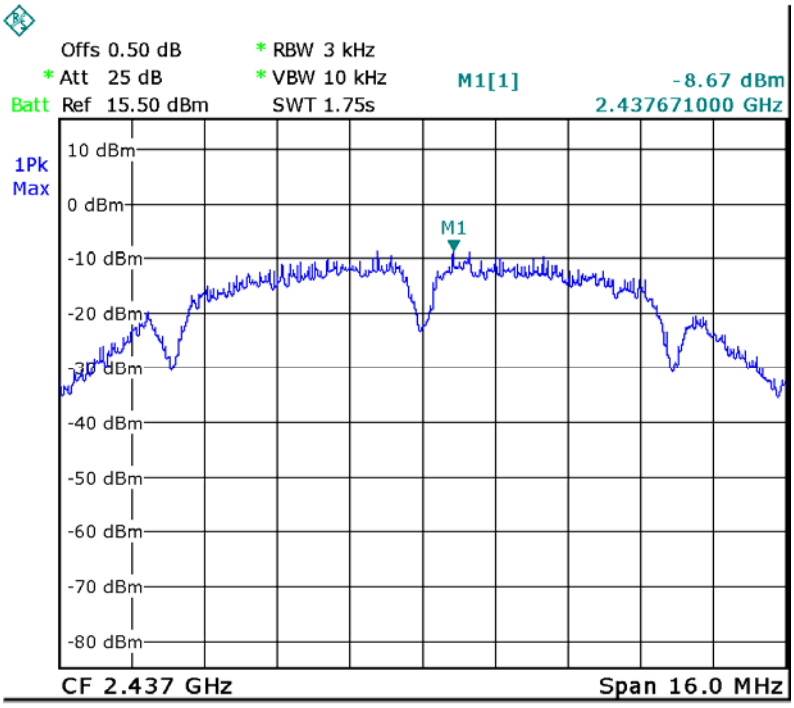
Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
Channel 1	Channel 6	Channel 11
-20.64	-20.09	-20.47
Limit: 8dBm per 3kHz		

Test mode : TX 11n HT40		
Power Spectral (dBm per 3kHz)		
Channel 3	Channel 6	Channel 9
-23.07	-23.20	-23.12
Limit: 8dBm per 3kHz		

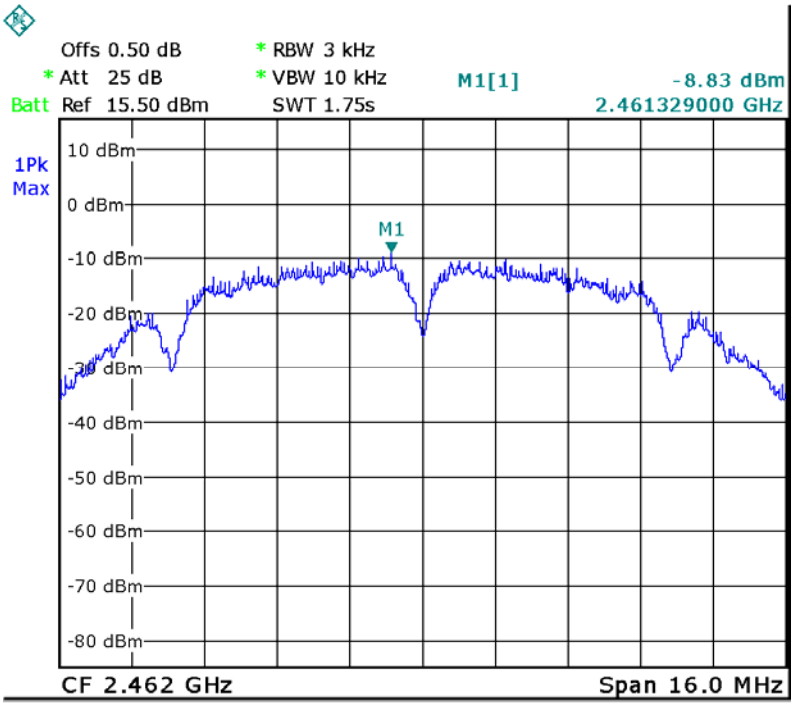
Mode: TX 11b channel 1



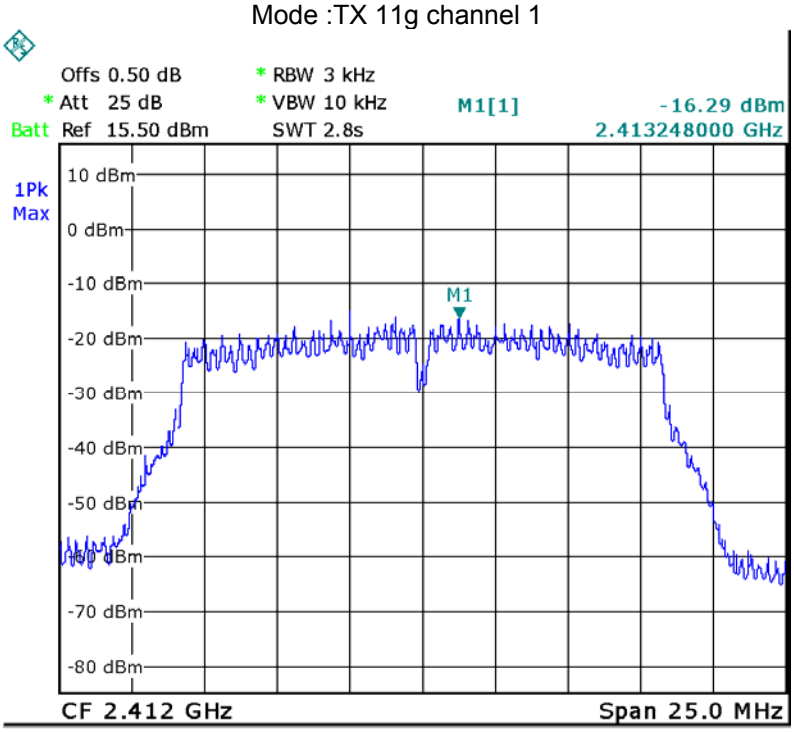
Mode: TX 11b channel 6



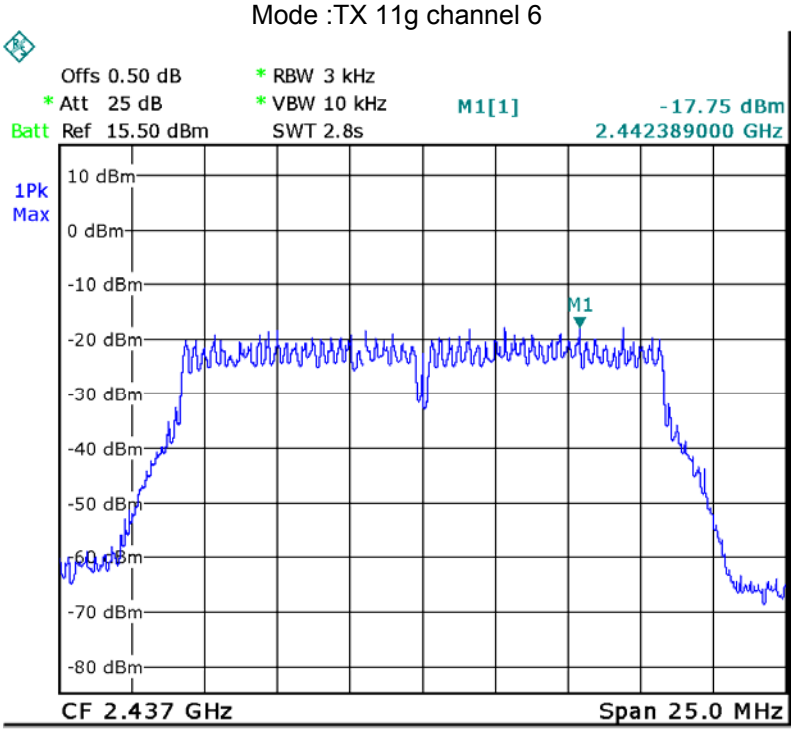
Mode: TX 11b channel 11



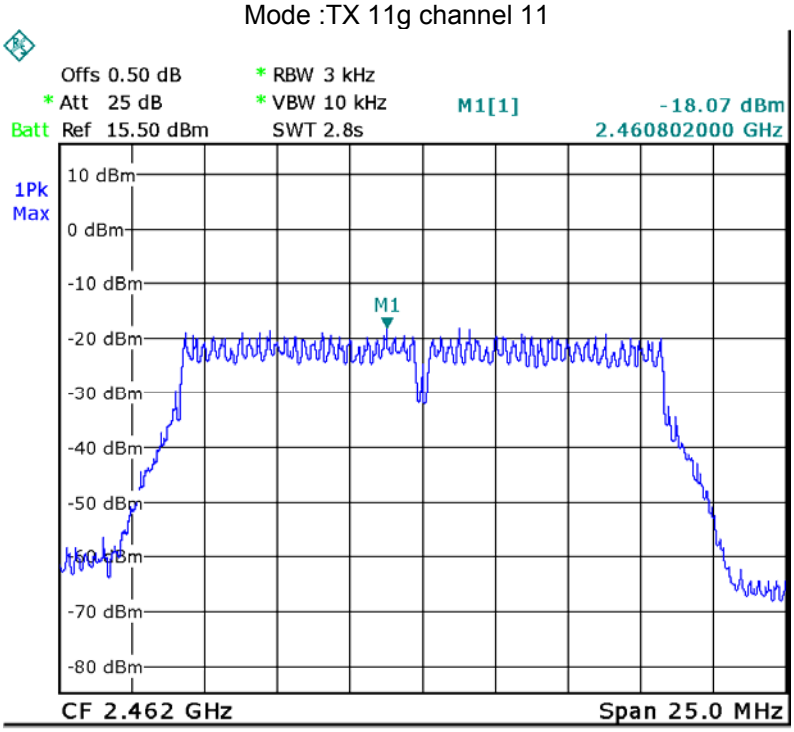
Mode :TX 11g channel 1



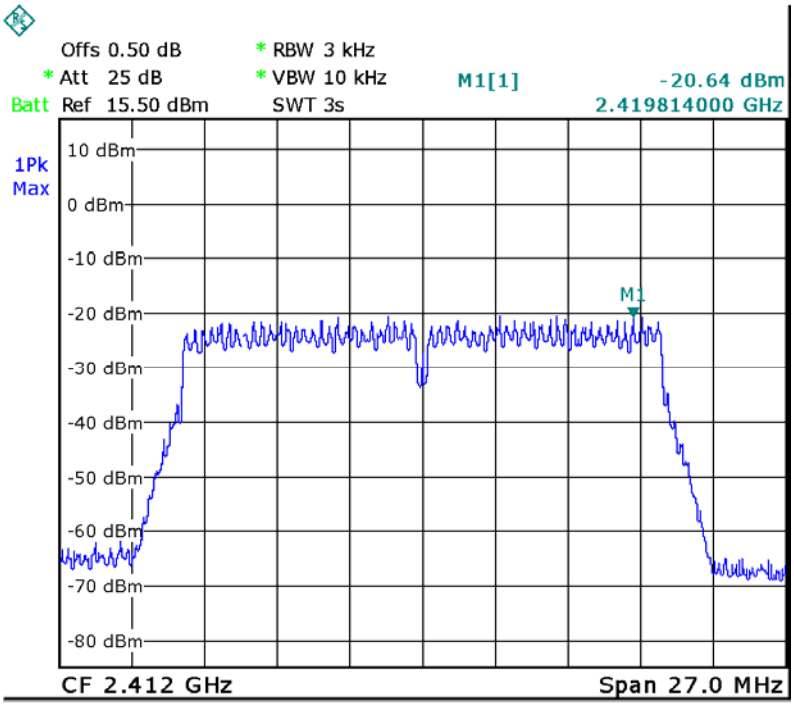
Mode :TX 11g channel 6



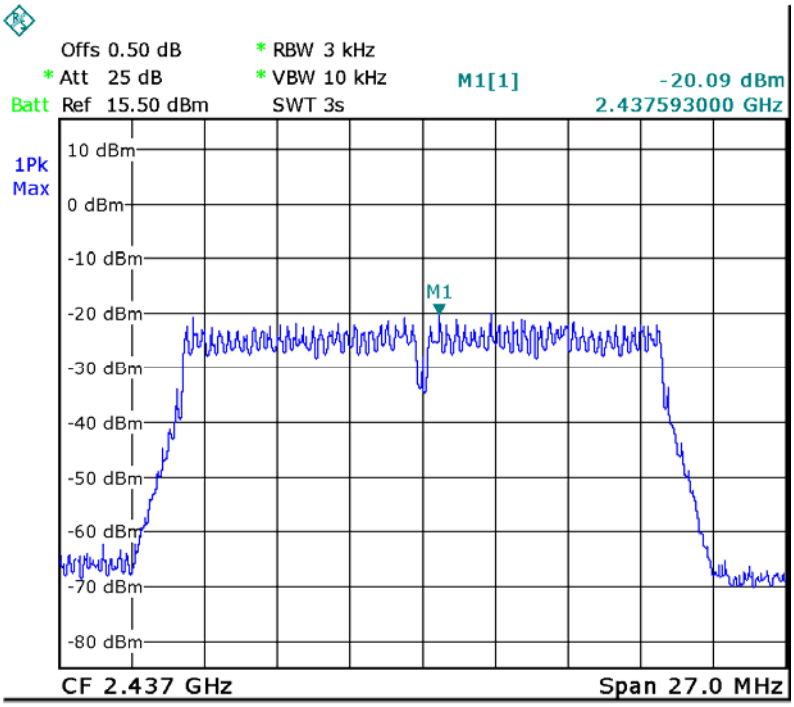
Mode :TX 11g channel 11



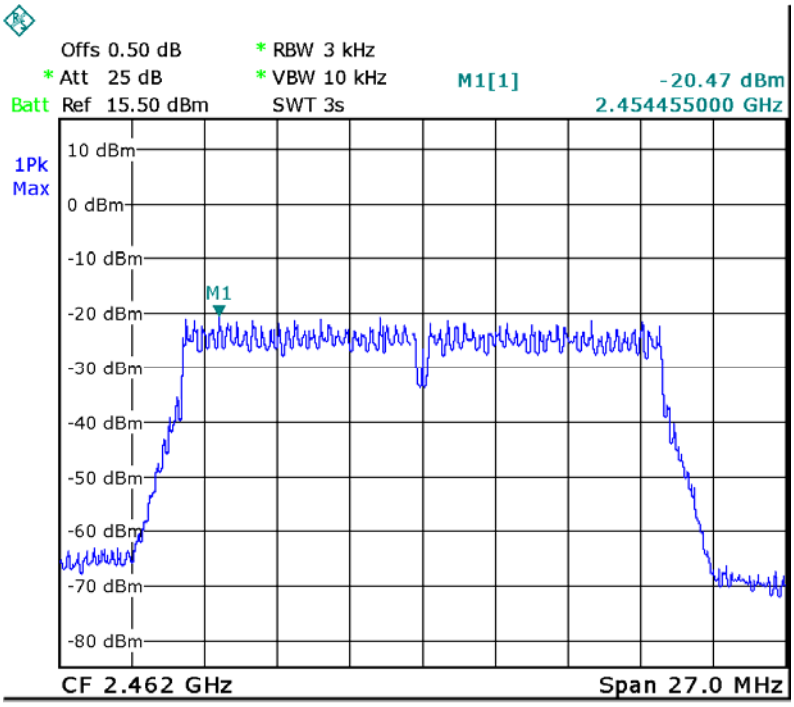
Mode: TX 11n HT20 channel 1



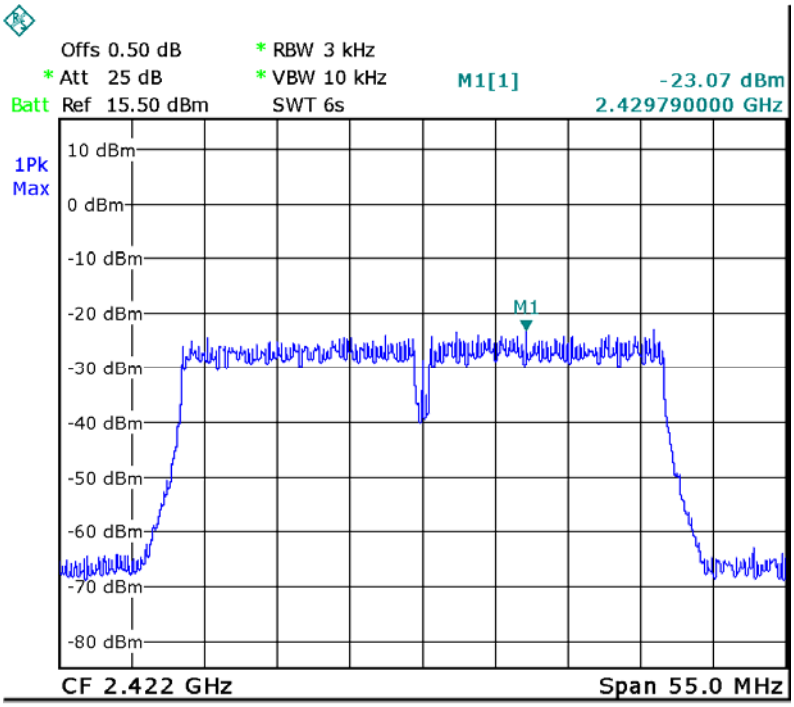
Mode: TX 11n HT20 channel 6



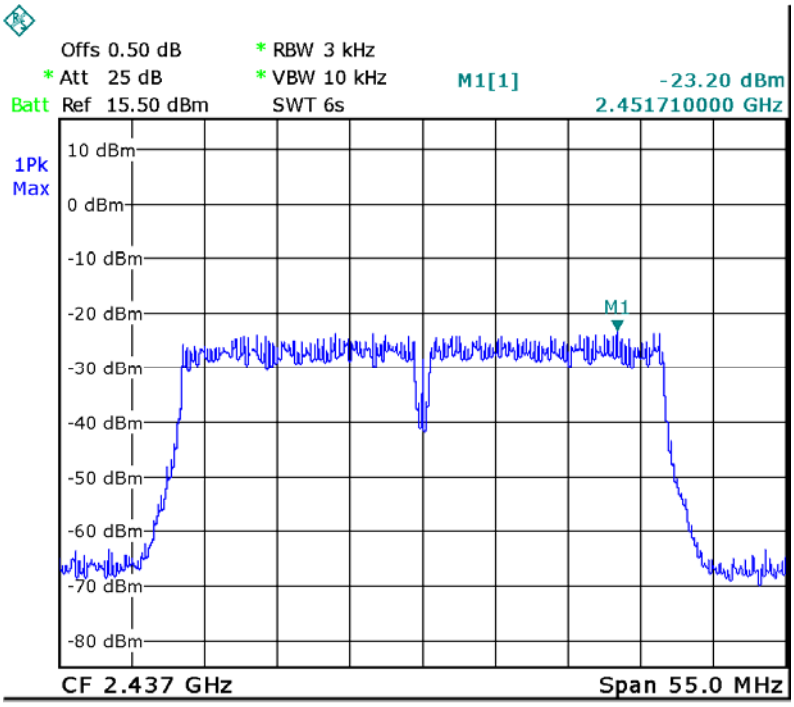
Mode: TX 11n HT20 channel 11



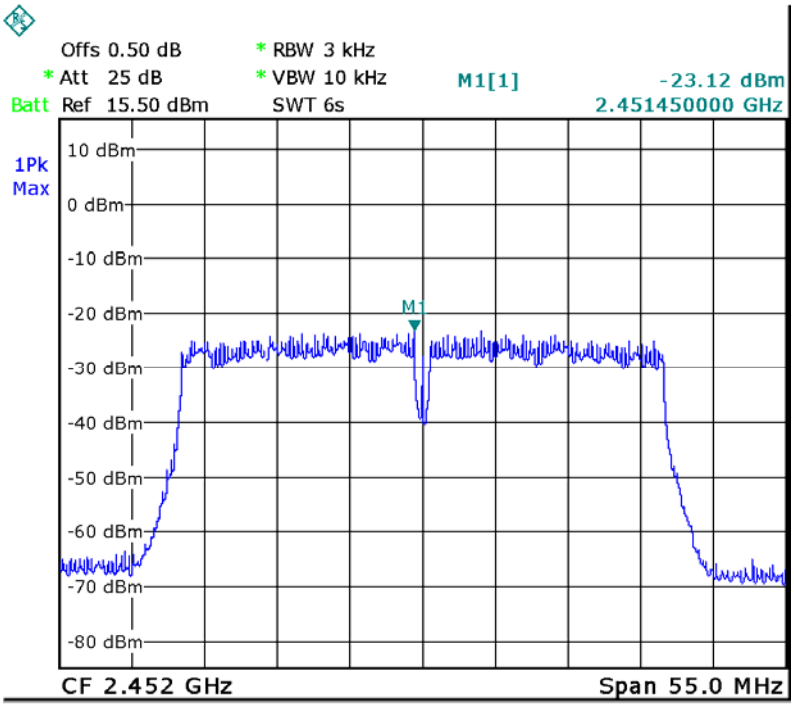
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



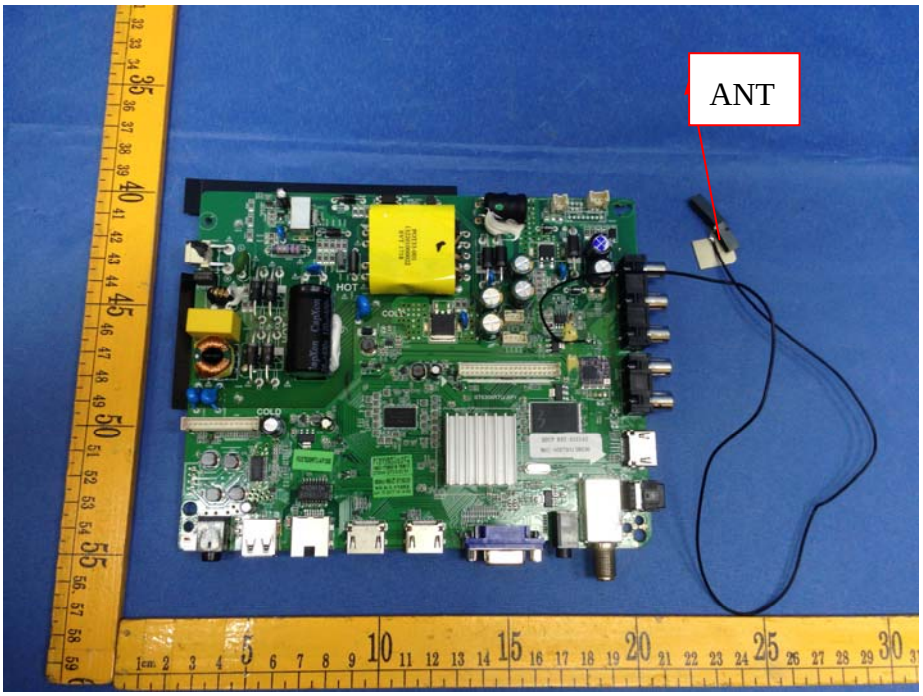
13 Antenna Requirement

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 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.

Result:

The EUT has one Internal Integrated Antenna, the gain is 2.0 dBi. meets the requirements of FCC 15.203.



14 RF Exposure

Test Requirement: FCC Part 1.1307

Evaluation Method: FCC Part 2.1091 & KDB 447498 D01 General RF Exposure Guidance v06

14.1 Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

14.2 The procedures / limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

14.3 MPE Calculation Method

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

S = power density (in appropriate units, e.g. mW/cm^2)
P = output power to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

From the peak EUT RF output power, the minimum mobile separation distance, R=20cm, as well as the gain of the used antenna, the RF power density can be obtained

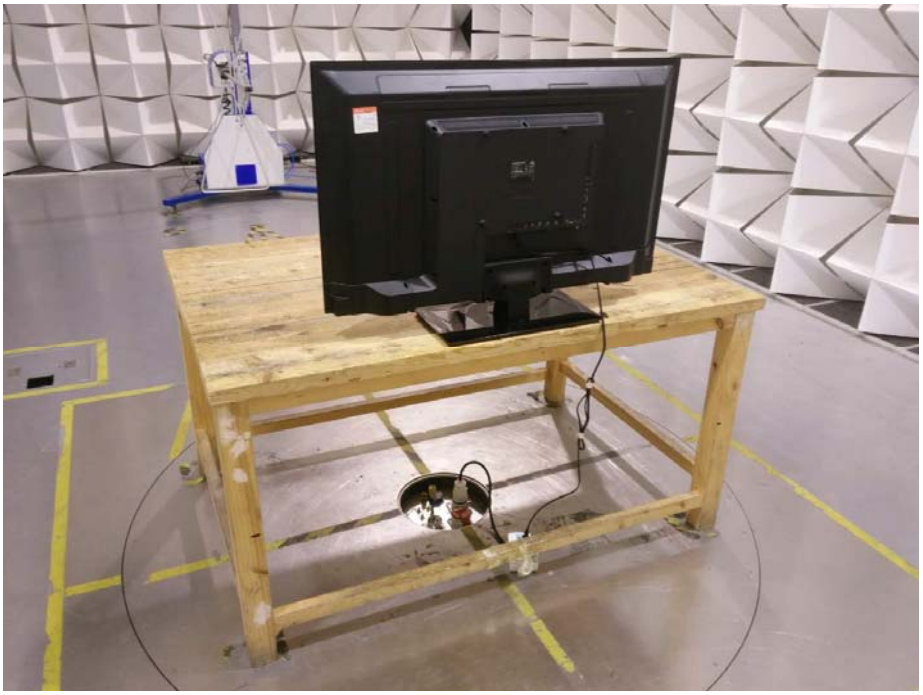
Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm2)	Limit of Power Density (mW/cm2)
2.0	1.585	17.26	53.21	0.017	1

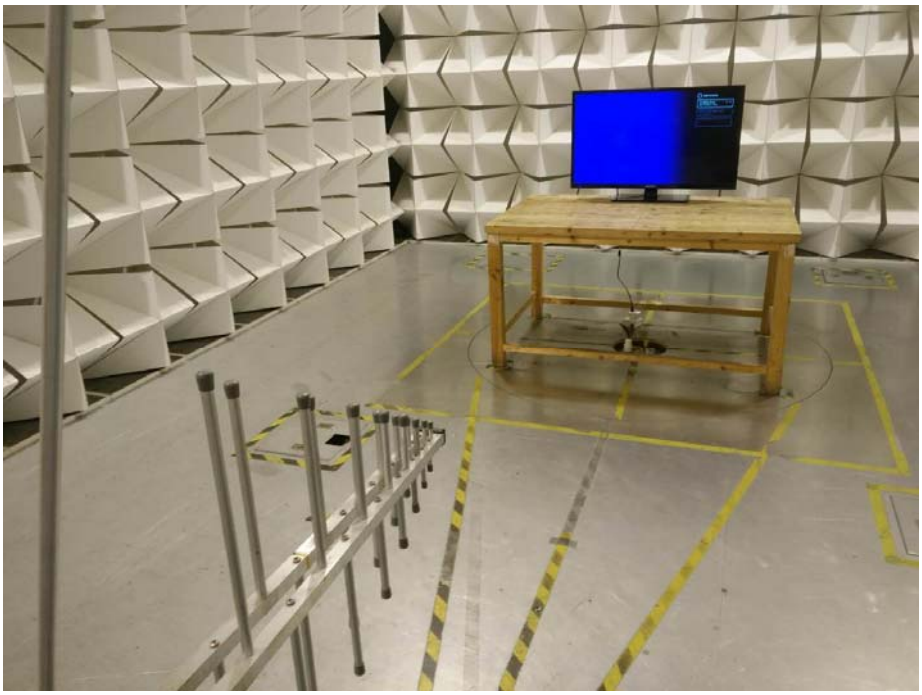
15 Photographs – Model ELST5016S Test Setup

15.1 Radiated Emission

Test frequency 9KHz to 30MHz

Test frequency from 30MHz to 1GHz



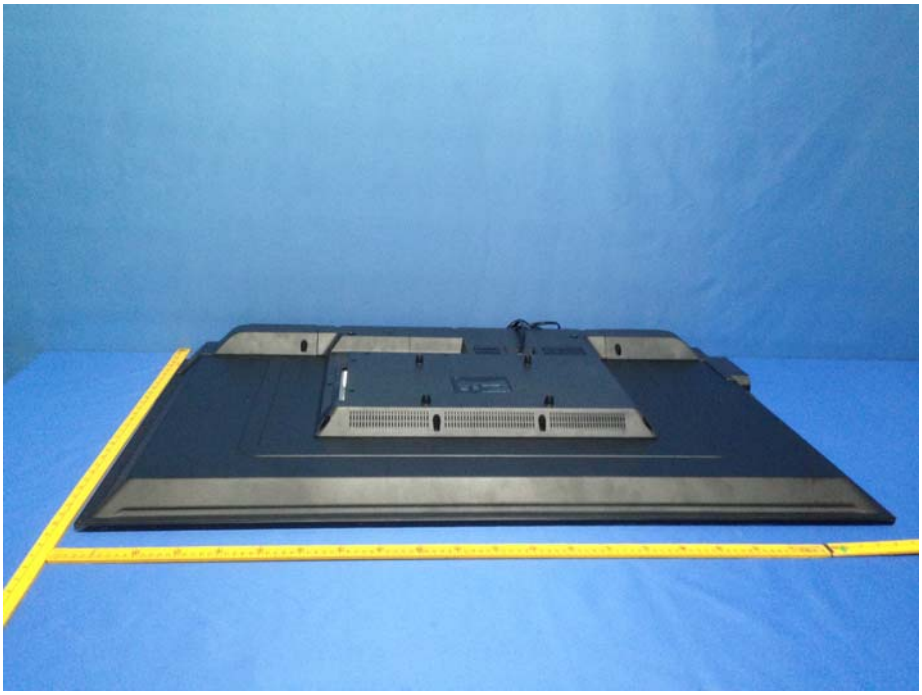


Test frequency above 1GHz at Test Site 1#

15.2 Conducted Emission

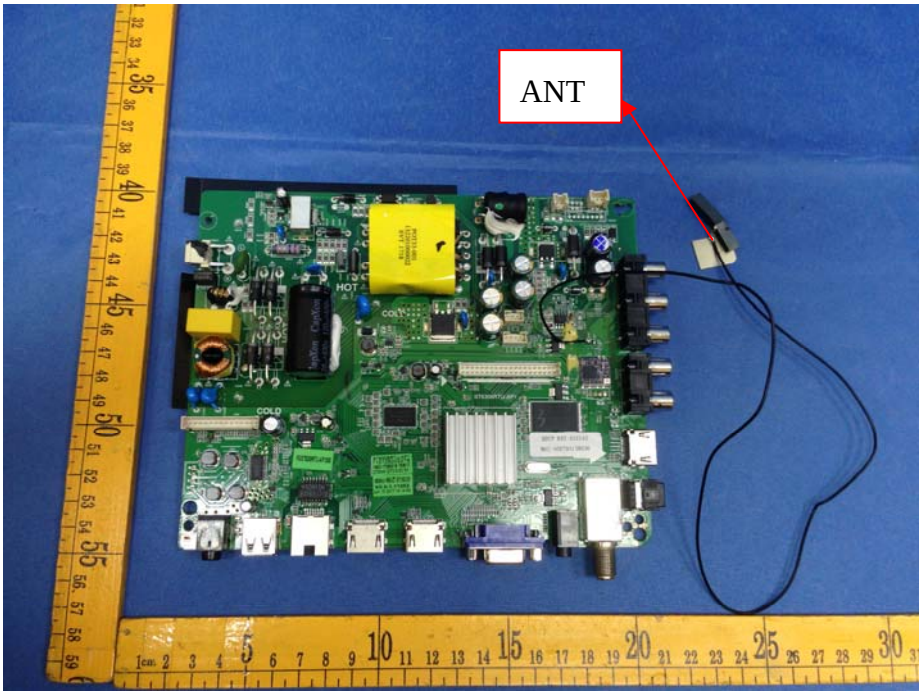
16 Photographs - Constructional Details

16.1 Model ELST5016S–External Photos




AUDIO OUT
USB
5V 500mA
LAN
HDMI 2
HDMI 1
VGA
PC AUDIO
/AUDIO IN
RF

16.2 Model ELST5016S – Internal Photos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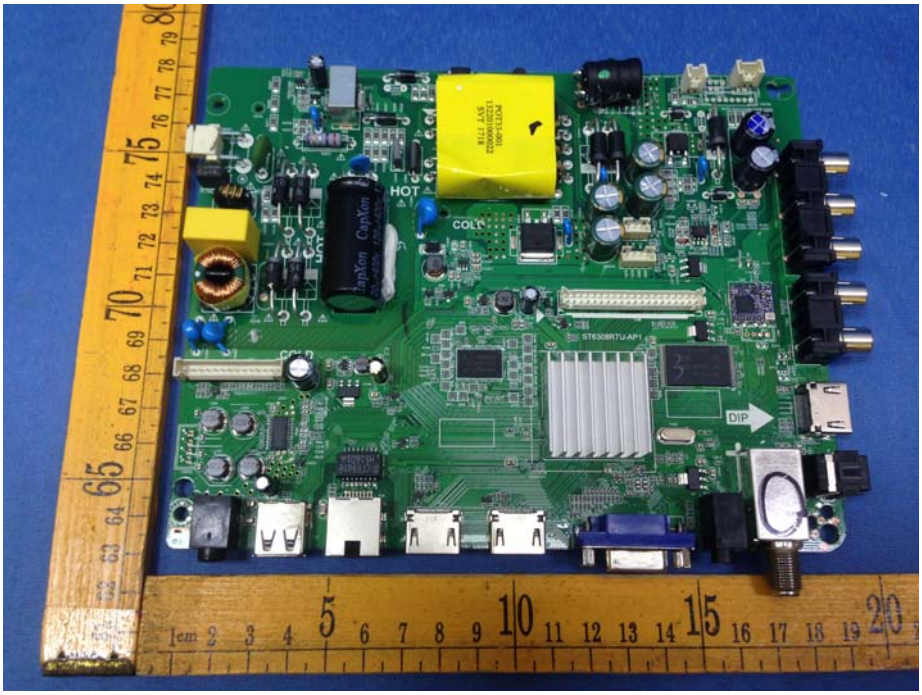
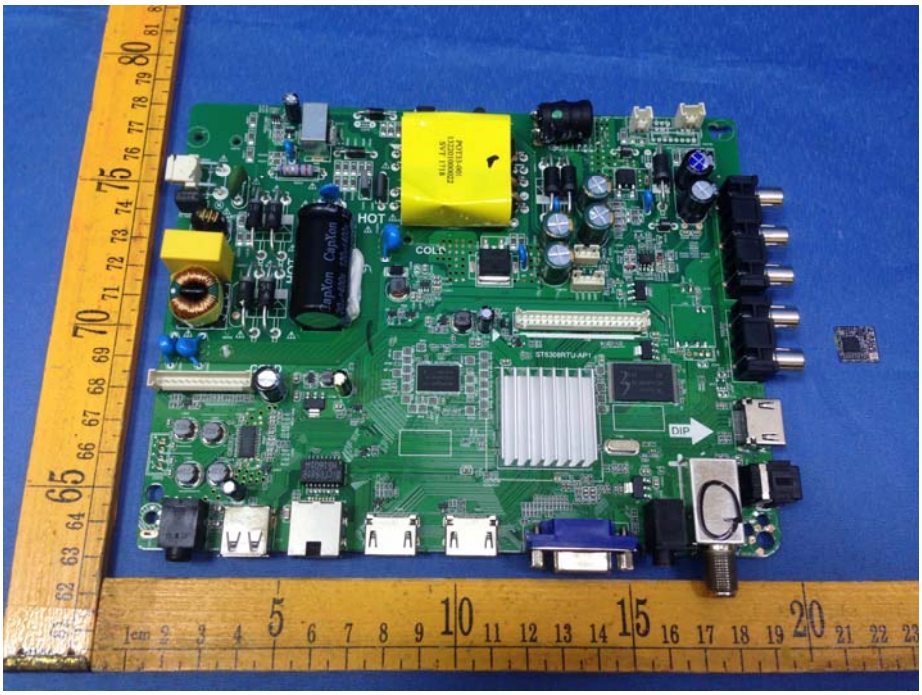
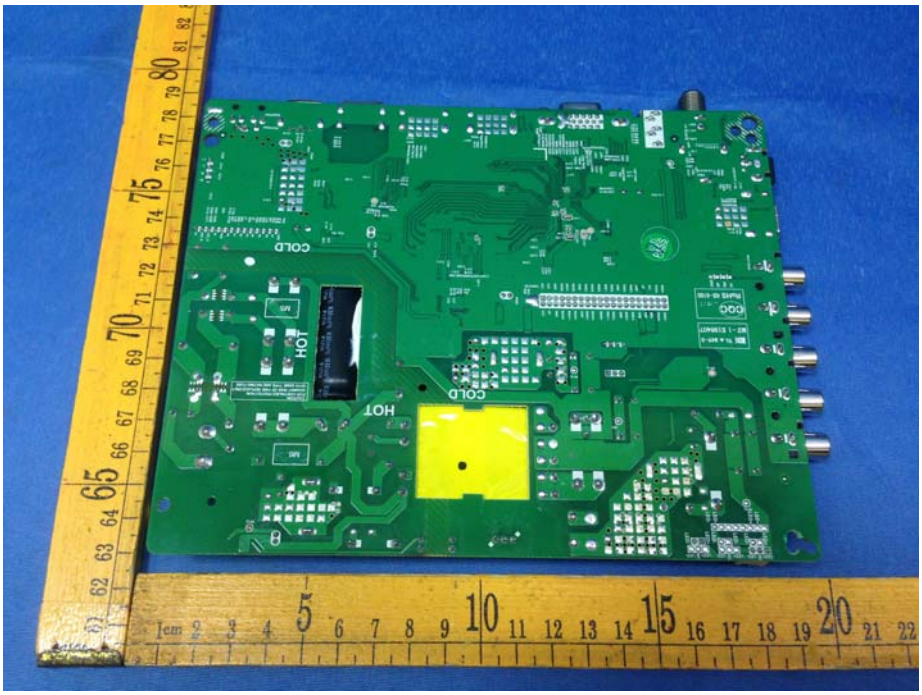
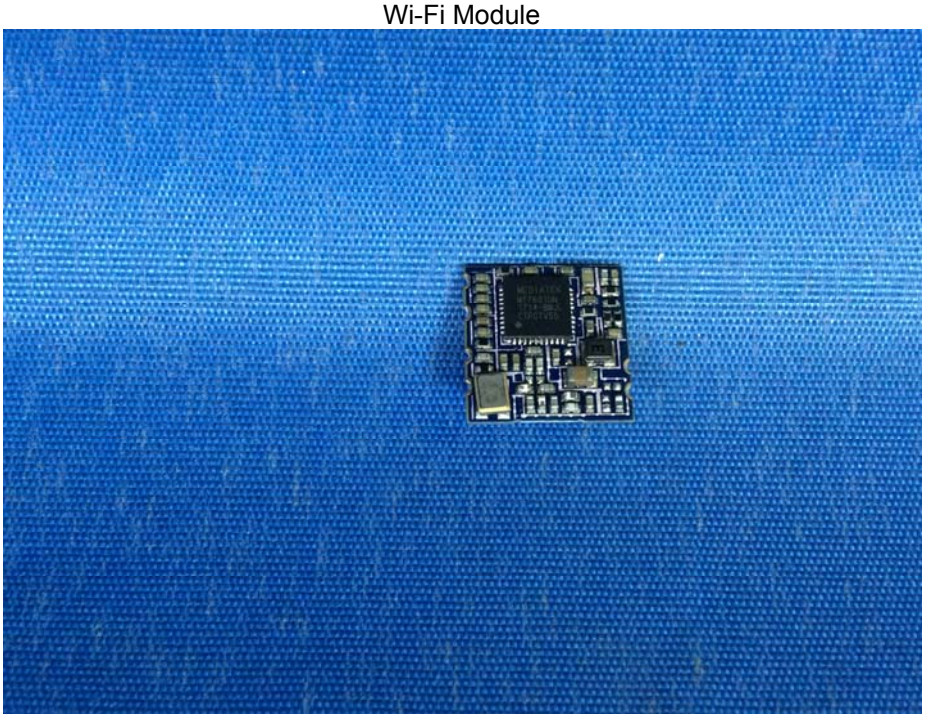


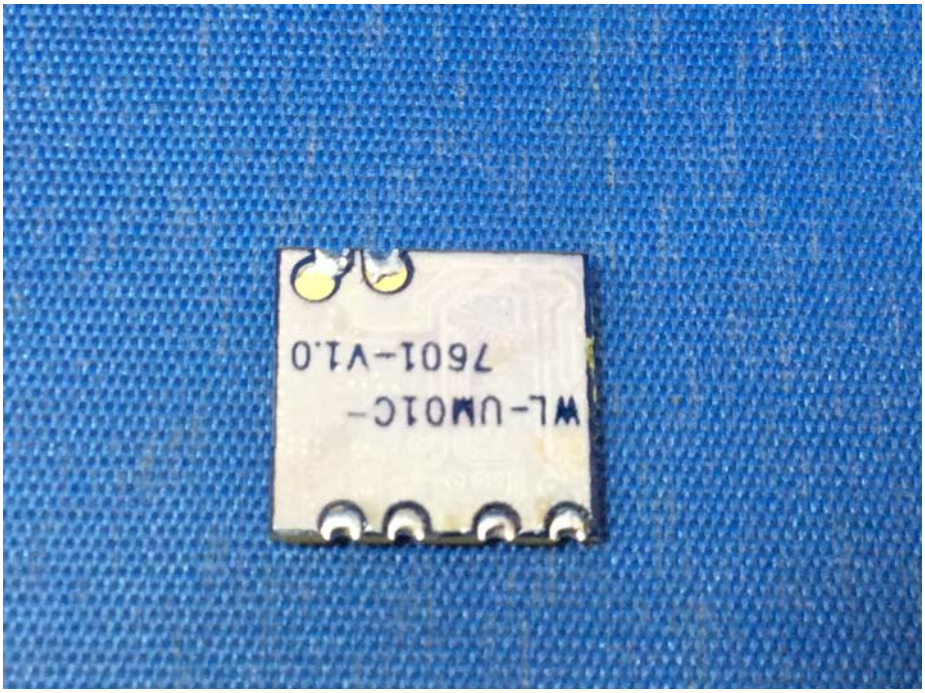

HOT
COLD
DIP


HOT
COLD
DIP



Wi-Fi Module





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