TEST REPORT

Reference No.	:	WTS18S07116940-1W
FCC ID	:	2AOT9-NBDVR300GW
Applicant	:	Portable Multimedia Limited
Address	:	Unit 2,Caerphilly Business Park, Caerphilly, Mid Glamorgan CF833ED, United Kingdom
Manufacturer	:	Shenzhen Samoon Technology Co.,Ltd
Address	:	Floor5-6&9, Building 7, Zhongyuntai Ind. Park, Yingrenshi Road Crossing, Shiyan Town, Bao'an District, Shenzhen, Guangdong, 518108 China.
Product	:	Dash Cam
Model(s)	:	NBDVR300GW, FE-NBDVR300GW, NBDVR300GW-WHT, FE-NBDVR300GW-WHT, VYDVR300GW, FE-VYDVR300GW, NBDVR300GWL, FE-NBDVR300GWL, NBDVR300GWM, FE-NBDVR300GWM, VYDVR300GWN, FE-VYDVR300GWN, VYDVR300GWP, FE-VYDVR300GWP, NBDVR305GW, FE-NBDVR305GW, NBDVR300W, FE-NBDVR300W, NBDVR300W-WHT, FE-NBDVR300W-WHT, VYDVR300W, FE-VYDVR300W, NBDVR300WL, FE-NBDVR300WL, NBDVR300WM, FE-NBDVR300WM, VYDVR300WN, FE-VYDVR300WN, VYDVR300WP, FE-VYDVR300WP, NBDVR305W, FE-NBDVR305W
Standards	:	FCC CFR47 Part 15 C Section 15.247:2018
Date of Receipt sample	:	2018-07-03
Date of Test	:	2018-07-04 to 2018-07-28
Date of Issue	:	2018-07-30
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.

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Philo Zhong / Manager

1 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation) of USA, Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), IC(Industry Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.

Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

1.1 Test Facility

A. Accreditations for Conformity Assessment (International)

Country/Region	Accreditation Body	Scope	Note
USA	**A2LA (Certificate No.: 4243.01)**	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India	**International Services**	WPC	-
Thailand		NTC	-
Singapore		IDA	-

Note:

1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.
2. IC Canada Registration No.: 7760A

B.TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of …	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

2 Contents

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3 Report Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS18S07116940-1W	2018-07-03	2018-07-04 to 2018-07-28	2018-07-30	original	-	Valid

4 General Information

4.1 General Description of E.U.T.

Product:	Dash Cam
Model(s)	NBDVR300GW, FE-NBDVR300GW, NBDVR300GW-WHT, FE-NBDVR300GW-WHT, VYDVR300GW, FE-VYDVR300GW, NBDVR300GWL, FE-NBDVR300GWL, NBDVR300GWM, FE-NBDVR300GWM, VYDVR300GWN, FE-VYDVR300GWN, VYDVR300GWP, FE-VYDVR300GWP, NBDVR305GW, FE-NBDVR305GW, NBDVR300W, FE-NBDVR300W, NBDVR300W-WHT, FE-NBDVR300W-WHT, VYDVR300W, FE-VYDVR300W, NBDVR300WL, FE-NBDVR300WL, NBDVR300WM, FE-NBDVR300WM, VYDVR300WN, FE-VYDVR300WN, VYDVR300WP, FE-VYDVR300WP, NBDVR305W, FE-NBDVR305W
Model Difference:	: Only the appearance, brand name and model name are different. The model NBDVR300GW is the tested sample.

4.2 Details of E.U.T.

Operation Frequency:	802.11b/g/n HT20: 2412MHz ~ 2462MHz, 802.11n HT40: 2422MHz~2452MHz
Antenna installation:	Internal Integral Antenna
Antenna Gain:	-1.5dBi
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.)
Ratings:	DC 5V from Car Charger or DC 5V by USB from PC

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	N/A

4.4 Test Mode

Table 1 Tests Carried Out Under FCC part 15.247

Test Items	Mode	Data Rate	Channel	TX/RX
Maximum conducted (average) 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
Bandwidth	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
Band Edge	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	3/6/9	TX
Radiated 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 .

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

5 Equipment Used during Test

5.1 Equipment's List

Conducted Emissions						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	101155	2017-09-12	2018-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2017-09-12	2018-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2017-09-12	2018-09-11
4.	Cable	LARGE	RF300	-	2017-09-12	2018-09-11
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	FSP30	100091	2018-04-29	2019-04-28
2	Broad-band Horn Antenna(1-18GHz)	SCHWARZBECK	BBHA 9120 D	667	2018-04-29	2019-04-28
3	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2018-04-29	2019-04-28
4	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	EW02014-7	2018-04-29	2019-04-28
5	Spectrum Analyzer	R&S	FSP40	100501	2017-10-20	2018-10-19
6	Broad-band Horn Antenna(18-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170651	2017-10-25	2018-10-24
7	Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	100472	2017-10-25	2018-10-24
8	Cable	Top	18-40GHz	-	2017-10-25	2018-10-24
3m Semi-anechoic Chamber for Radiation Emissions						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	2018-04-29	2019-04-28
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2018-04-29	2019-04-28
3	Active Loop Antenna	Com-power	AL-130R	10160007	2018-04-17	2019-04-16
4	Amplifier	ANRITSU	MH648A	M43381	2018-04-29	2019-04-28
5	Cable	HUBER+SUHNER	CBL2	525178	2018-04-29	2019-04-28

6	Coaxial Cable (below 1GHz)	Top	TYPE16 (13M)	-	2017-09-12	2018-09-11
RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	Spectrum Analyzer	R&S	FSL6	100959	2017-09-12	2018-09-11
2	Coaxial Cable	Top	10Hz-30GHz	-	2017-09-12	2018-09-11
3	Antenna Connector*	Realacc	45RSm	-	2017-09-12	2018-09-11
4	DC Block	Gwave	GDCB-3G-N-SMA	140307001	2017-09-12	2018-09-11
"*": The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.						

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 Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)
Confidence interval：95%. Confidence factor:k=2	

5.3 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

6 Test Summary

Test Items	Test Requirement	Result
Radiated Spurious Emissions	15.247(d) 15.205(a) 15.209(a)	Pass
Conducted Emissions	15.207(a)	Pass
Bandwidth	15.247(a)(2)	Pass
Maximum conducted (average) 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
RF Exposure	1.1307(b)(1)	Pass
Note: Pass=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

Test Result: PASS

Frequency Range: 150kHz to 30MHz

Class/Severity: Class B

Limit:

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

7.1 E.U.T. Operation

Operating Environment **:**

Temperature: 21.5 °C

Humidity: 51.9 % RH

Atmospheric Pressure: 101.2kPa

Test Voltage: DC 5V by USB from PC

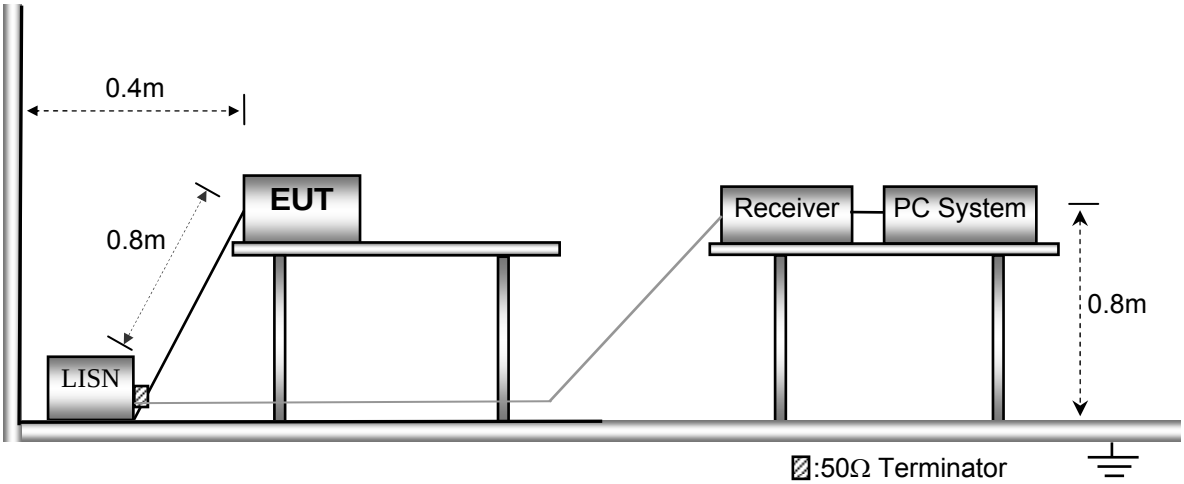
EUT Operation **:**

The test was performed in Wi-Fi Transmitting mode, the worst data (Wi-Fi b mode low channel) were shown in the report.

7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the

ANSI C63.10:2013.



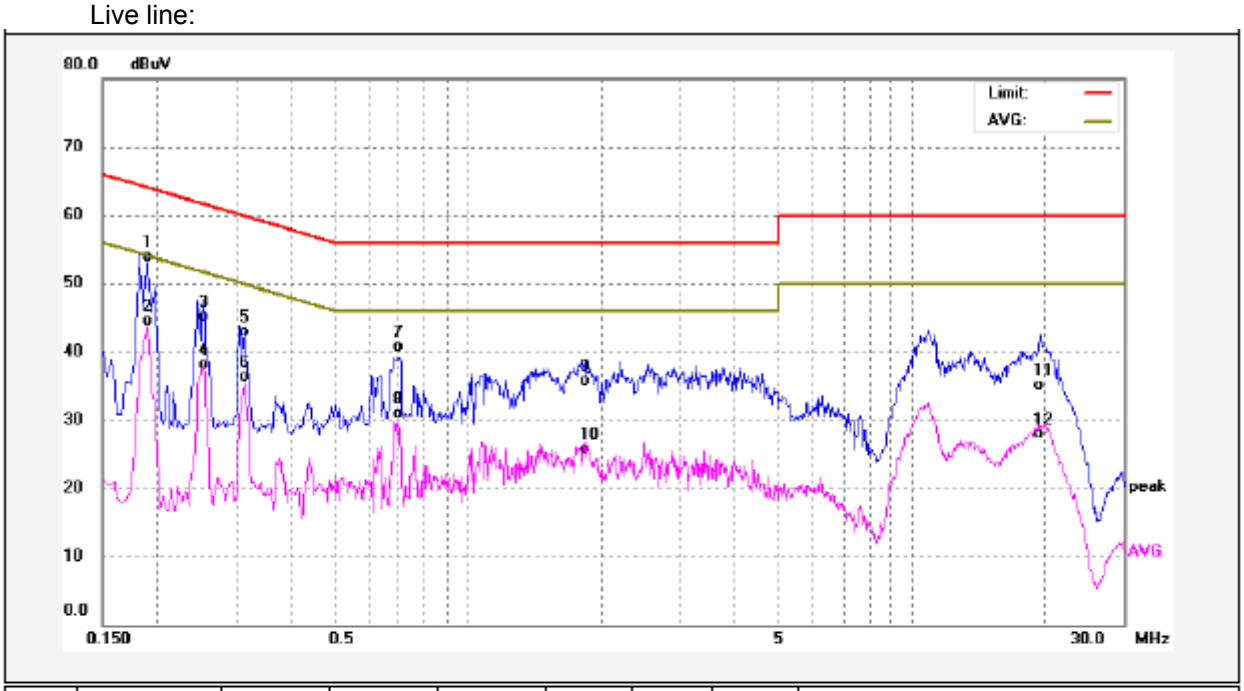
7.3 Measurement Description

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

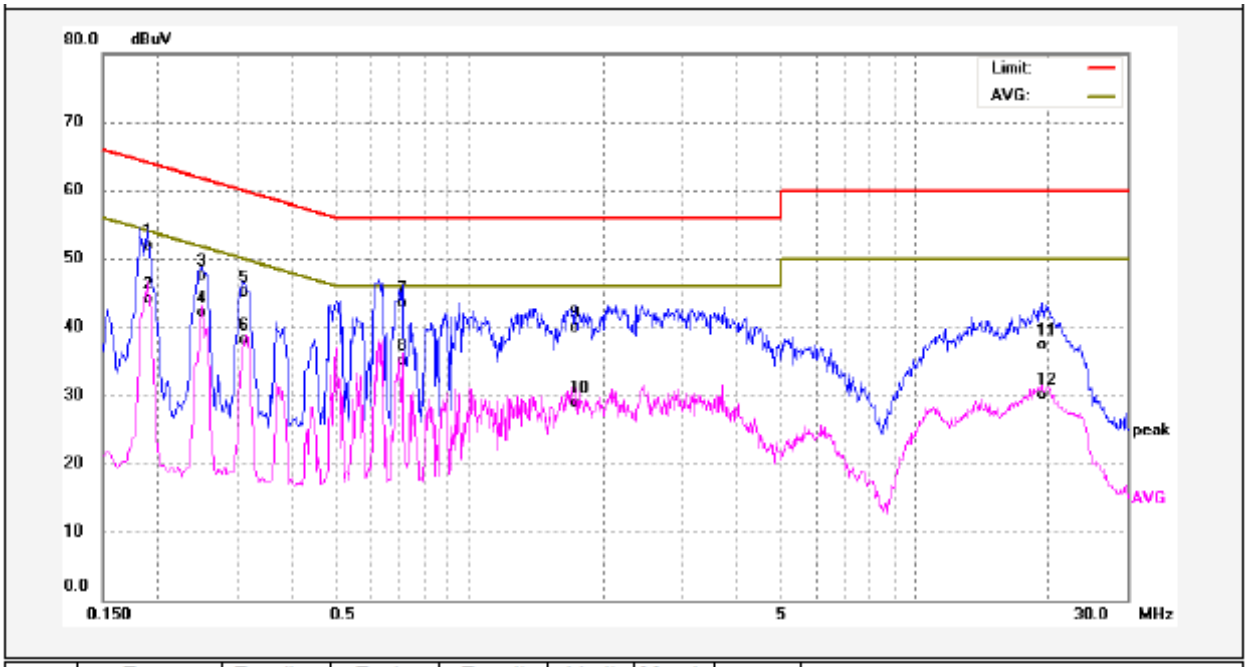
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1900	43.92	9.90	53.82	64.03	-10.21	QP	
2	0.1900	34.62	9.90	44.52	54.03	-9.51	AVG	
3	0.2540	35.09	10.01	45.10	61.62	-16.52	QP	
4	0.2540	28.13	10.01	38.14	51.62	-13.48	AVG	
5	0.3140	32.93	10.00	42.93	59.86	-16.93	QP	
6	0.3140	26.21	10.00	36.21	49.86	-13.65	AVG	
7	0.6980	30.67	10.11	40.78	56.00	-15.22	QP	
8	0.6980	20.89	10.11	31.00	46.00	-15.00	AVG	
9	1.8380	25.62	10.18	35.80	56.00	-20.20	QP	
10	1.8380	15.44	10.18	25.62	46.00	-20.38	AVG	
11	19.4460	24.70	10.46	35.16	60.00	-24.84	QP	
12	19.4460	17.43	10.46	27.89	50.00	-22.11	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1900	41.98	9.90	51.88	64.03	-12.15	QP	
2	0.1900	34.18	9.90	44.08	54.03	-9.95	AVG	
3	0.2500	37.44	10.01	47.45	61.75	-14.30	QP	
4	0.2500	32.17	10.01	42.18	51.75	-9.57	AVG	
5	0.3100	35.12	10.00	45.12	59.97	-14.85	QP	
6	0.3100	28.02	10.00	38.02	49.97	-11.95	AVG	
7	0.7060	33.32	10.11	43.43	56.00	-12.57	QP	
8	0.7060	24.99	10.11	35.10	46.00	-10.90	AVG	
9	1.7180	29.64	10.17	39.81	56.00	-16.19	QP	
10	1.7180	18.64	10.17	28.81	46.00	-17.19	AVG	
11	19.3500	26.77	10.46	37.23	60.00	-22.77	QP	
12	19.3500	19.65	10.46	30.11	50.00	-19.89	AVG	

8 Radiated Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013

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

Test Voltage: DC 5V from Car Charger

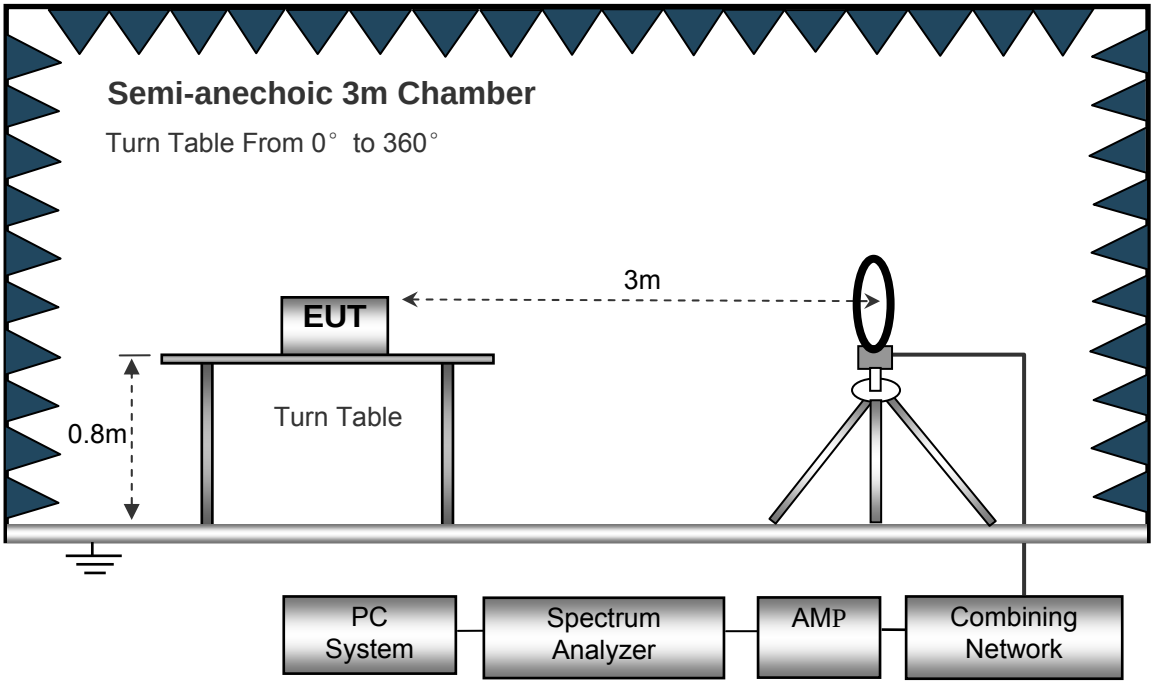
EUT Operation **:**

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

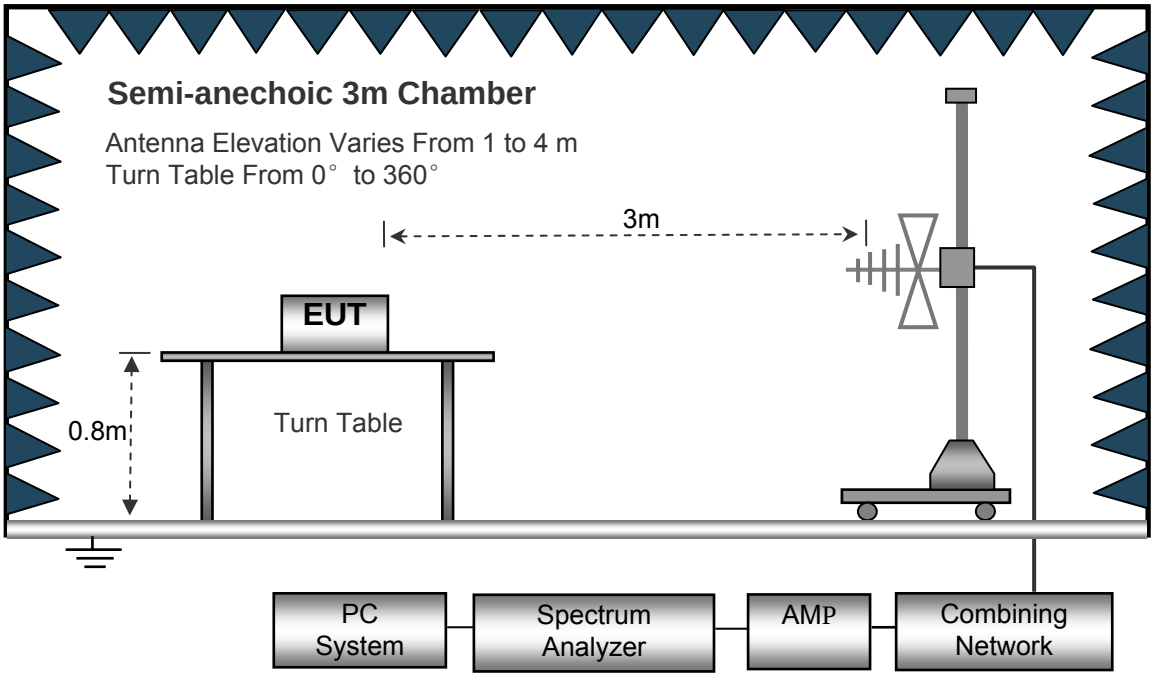
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10:2013.

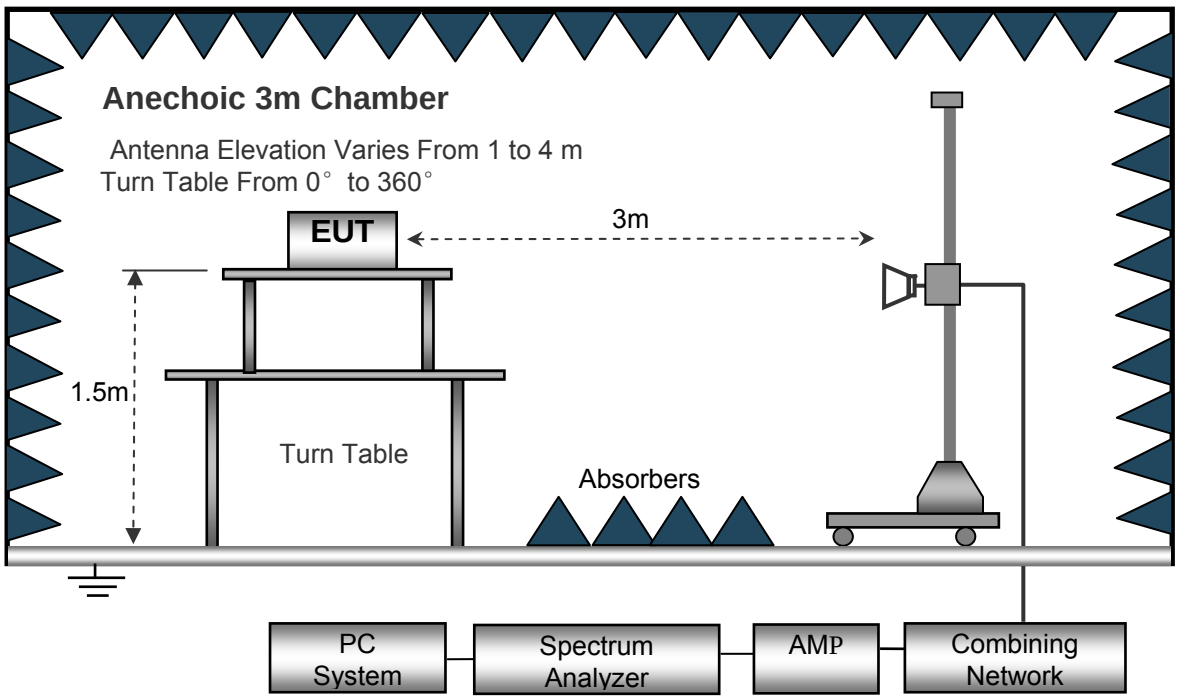
The test setup for emission measurement below 30MHz.



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. For below 1GHz, the EUT is 0.8m above ground plane; For above1GHz, the EUT is 1.5m 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 : 9 kHz to 30 MHz

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

Test Frequency : 30 MHz ~ 18 GHz

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									
260.14	44.86	QP	317	1.4	H	-16.72	28.14	46.00	-17.86
260.14	37.85	QP	202	1.6	V	-16.72	21.13	46.00	-24.87
4824.00	53.68	PK	204	1.6	V	-1.06	52.62	74.00	-21.38
4824.00	36.99	Ave	204	1.6	V	-1.06	35.93	54.00	-18.07
7236.00	49.66	PK	201	2.0	H	1.33	50.99	74.00	-23.01
7236.00	40.75	Ave	201	2.0	H	1.33	42.08	54.00	-11.92
2330.34	46.55	PK	73	1.7	V	-13.19	33.36	74.00	-40.64
2330.34	37.62	Ave	73	1.7	V	-13.19	24.43	54.00	-29.57
2386.11	43.45	PK	273	1.6	H	-13.14	30.31	74.00	-43.69
2386.11	37.80	Ave	273	1.6	H	-13.14	24.66	54.00	-29.34
2494.65	44.96	PK	180	1.2	V	-13.08	31.88	74.00	-42.12
2494.65	38.07	Ave	180	1.2	V	-13.08	24.99	54.00	-29.01

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									
260.14	43.67	QP	126	1.5	H	-11.62	32.05	46.00	-13.95
260.14	37.64	QP	292	1.8	V	-11.62	26.02	46.00	-19.98
4874.00	53.41	PK	119	2.0	V	-0.62	52.79	74.00	-21.21
4874.00	37.84	Ave	119	2.0	V	-0.62	37.22	54.00	-16.78
7311.00	50.94	PK	157	1.2	H	2.21	53.15	74.00	-20.85
7311.00	39.54	Ave	157	1.2	H	2.21	41.75	54.00	-12.25
2311.82	45.18	PK	183	1.4	V	-13.19	31.99	74.00	-42.01
2311.82	39.53	Ave	183	1.4	V	-13.19	26.34	54.00	-27.66
2365.30	44.97	PK	242	1.9	H	-13.14	31.83	74.00	-42.17
2365.30	37.45	Ave	242	1.9	H	-13.14	24.31	54.00	-29.69
2499.15	43.59	PK	218	1.1	V	-13.08	30.51	74.00	-43.49
2499.15	37.57	Ave	218	1.1	V	-13.08	24.49	54.00	-29.51

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)
11b: High Channel 2462MHz									
260.14	42.57	QP	288	1.5	H	-11.62	30.95	46.00	-15.05
260.14	36.97	QP	129	1.7	V	-11.62	25.35	46.00	-20.65
4924.00	54.21	PK	226	1.9	V	-0.24	53.97	74.00	-20.03
4924.00	39.28	Ave	226	1.9	V	-0.24	39.04	54.00	-14.96
7386.00	50.56	PK	290	1.3	H	2.84	53.40	74.00	-20.60
7386.00	38.48	Ave	290	1.3	H	2.84	41.32	54.00	-12.68
2328.31	46.37	PK	183	1.6	V	-13.19	33.18	74.00	-40.82
2328.31	38.85	Ave	183	1.6	V	-13.19	25.66	54.00	-28.34
2386.57	43.89	PK	127	1.1	H	-13.14	30.75	74.00	-43.25
2386.57	36.45	Ave	127	1.1	H	-13.14	23.31	54.00	-30.69
2486.23	43.98	PK	282	2.0	V	-13.08	30.90	74.00	-43.10
2486.23	38.16	Ave	282	2.0	V	-13.08	25.08	54.00	-28.92

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									
260.14	44.03	QP	83	1.9	H	-11.62	32.41	46.00	-13.59
260.14	37.87	QP	246	2.0	V	-11.62	26.25	46.00	-19.75
4824.00	53.44	PK	43	1.4	V	-1.06	52.38	74.00	-21.62
4824.00	40.36	Ave	43	1.4	V	-1.06	39.30	54.00	-14.70
7236.00	51.87	PK	272	1.5	H	1.33	53.20	74.00	-20.80
7236.00	37.89	Ave	272	1.5	H	1.33	39.22	54.00	-14.78
2338.46	46.24	PK	38	1.3	V	-13.19	33.05	74.00	-40.95
2338.46	37.34	Ave	38	1.3	V	-13.19	24.15	54.00	-29.85
2378.11	43.88	PK	68	1.5	H	-13.14	30.74	74.00	-43.26
2378.11	38.88	Ave	68	1.5	H	-13.14	25.74	54.00	-28.26
2497.08	44.35	PK	292	1.4	V	-13.08	31.27	74.00	-42.73
2497.08	38.45	Ave	292	1.4	V	-13.08	25.37	54.00	-28.63

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)
11g: Middle Channel 2437MHz									
260.14	44.96	QP	325	1.6	H	-11.62	33.34	46.00	-12.66
260.14	39.26	QP	200	1.8	V	-11.62	27.64	46.00	-18.36
4874.00	53.79	PK	242	1.8	V	-0.62	53.17	74.00	-20.83
4874.00	40.33	Ave	242	1.8	V	-0.62	39.71	54.00	-14.29
7311.00	53.27	PK	84	1.8	H	2.21	55.48	74.00	-18.52
7311.00	38.01	Ave	84	1.8	H	2.21	40.22	54.00	-13.78
2331.22	45.14	PK	136	1.5	V	-13.19	31.95	74.00	-42.05
2331.22	38.86	Ave	136	1.5	V	-13.19	25.67	54.00	-28.33
2383.00	43.17	PK	25	2.0	H	-13.14	30.03	74.00	-43.97
2383.00	36.98	Ave	25	2.0	H	-13.14	23.84	54.00	-30.16
2499.92	43.56	PK	311	1.1	V	-13.08	30.48	74.00	-43.52
2499.92	36.54	Ave	311	1.1	V	-13.08	23.46	54.00	-30.54

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									
260.14	44.42	QP	171	1.1	H	-11.62	32.80	46.00	-13.20
260.14	39.36	QP	44	1.8	V	-11.62	27.74	46.00	-18.26
4924.00	55.13	PK	91	1.0	V	-0.24	54.89	74.00	-19.11
4924.00	41.27	Ave	91	1.0	V	-0.24	41.03	54.00	-12.97
7386.00	52.37	PK	253	1.6	H	2.84	55.21	74.00	-18.79
7386.00	38.11	Ave	253	1.6	H	2.84	40.95	54.00	-13.05
2321.48	45.54	PK	156	1.0	V	-13.19	32.35	74.00	-41.65
2321.48	38.12	Ave	156	1.0	V	-13.19	24.93	54.00	-29.07
2374.78	42.37	PK	338	1.2	H	-13.14	29.23	74.00	-44.77
2374.78	37.94	Ave	338	1.2	H	-13.14	24.80	54.00	-29.20
2485.28	44.61	PK	121	1.5	V	-13.08	31.53	74.00	-42.47
2485.28	37.71	Ave	121	1.5	V	-13.08	24.63	54.00	-29.37

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									
260.14	43.52	QP	294	1.0	H	-11.62	31.90	46.00	-14.10
260.14	39.85	QP	242	1.0	V	-11.62	28.23	46.00	-17.77
4824.00	54.04	PK	5	1.2	V	-1.06	52.98	74.00	-21.02
4824.00	40.34	Ave	5	1.2	V	-1.06	39.28	54.00	-14.72
7236.00	51.55	PK	314	1.9	H	1.33	52.88	74.00	-21.12
7236.00	38.43	Ave	314	1.9	H	1.33	39.76	54.00	-14.24
2345.11	47.00	PK	162	1.2	V	-13.19	33.81	74.00	-40.19
2345.11	37.91	Ave	162	1.2	V	-13.19	24.72	54.00	-29.28
2375.48	42.22	PK	215	1.3	H	-13.14	29.08	74.00	-44.92
2375.48	36.63	Ave	215	1.3	H	-13.14	23.49	54.00	-30.51
2489.59	42.78	PK	240	1.6	V	-13.08	29.70	74.00	-44.30
2489.59	36.73	Ave	240	1.6	V	-13.08	23.65	54.00	-30.35

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									
260.14	43.43	QP	39	1.3	H	-11.62	31.81	46.00	-14.19
260.14	38.71	QP	307	1.0	V	-11.62	27.09	46.00	-18.91
4874.00	52.88	PK	17	2.0	V	-0.62	52.26	74.00	-21.74
4874.00	40.97	Ave	17	2.0	V	-0.62	40.35	54.00	-13.65
7311.00	52.57	PK	250	2.0	H	2.21	54.78	74.00	-19.22
7311.00	38.37	Ave	250	2.0	H	2.21	40.58	54.00	-13.42
2326.94	45.95	PK	123	1.1	V	-13.19	32.76	74.00	-41.24
2326.94	39.86	Ave	123	1.1	V	-13.19	26.67	54.00	-27.33
2382.11	44.92	PK	9	1.5	H	-13.14	31.78	74.00	-42.22
2382.11	36.14	Ave	9	1.5	H	-13.14	23.00	54.00	-31.00
2494.92	44.42	PK	333	1.7	V	-13.08	31.34	74.00	-42.66
2494.92	37.14	Ave	333	1.7	V	-13.08	24.06	54.00	-29.94

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									
260.14	43.80	QP	168	1.5	H	-11.62	32.18	46.00	-13.82
260.14	37.93	QP	140	1.7	V	-11.62	26.31	46.00	-19.69
4924.00	53.21	PK	194	1.6	V	-0.24	52.97	74.00	-21.03
4924.00	41.83	Ave	194	1.6	V	-0.24	41.59	54.00	-12.41
7386.00	52.56	PK	86	1.9	H	2.84	55.40	74.00	-18.60
7386.00	39.08	Ave	86	1.9	H	2.84	41.92	54.00	-12.08
2325.99	46.47	PK	131	1.7	V	-13.19	33.28	74.00	-40.72
2325.99	37.93	Ave	131	1.7	V	-13.19	24.74	54.00	-29.26
2361.44	43.54	PK	53	1.0	H	-13.14	30.40	74.00	-43.60
2361.44	37.54	Ave	53	1.0	H	-13.14	24.40	54.00	-29.60
2496.37	43.02	PK	163	1.4	V	-13.08	29.94	74.00	-44.06
2496.37	36.37	Ave	163	1.4	V	-13.08	23.29	54.00	-30.71

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									
260.14	43.87	QP	274	1.1	H	-11.62	32.25	46.00	-13.75
260.14	37.59	QP	110	2.0	V	-11.62	25.97	46.00	-20.03
4844.00	51.46	PK	220	1.1	V	-1.06	50.40	74.00	-23.60
4844.00	39.70	Ave	220	1.1	V	-1.06	38.64	54.00	-15.36
7266.00	50.18	PK	235	1.8	H	1.33	51.51	74.00	-22.49
7266.00	37.50	Ave	235	1.8	H	1.33	38.83	54.00	-15.17
2328.12	45.44	PK	146	1.3	V	-13.19	32.25	74.00	-41.75
2328.12	38.46	Ave	146	1.3	V	-13.19	25.27	54.00	-28.73
2357.50	43.57	PK	255	1.3	H	-13.14	30.43	74.00	-43.57
2357.50	36.43	Ave	255	1.3	H	-13.14	23.29	54.00	-30.71
2498.94	44.41	PK	280	1.6	V	-13.08	31.33	74.00	-42.67
2498.94	37.19	Ave	280	1.6	V	-13.08	24.11	54.00	-29.89

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									
260.14	43.18	QP	346	1.3	H	-11.62	31.56	46.00	-14.44
260.14	38.23	QP	129	1.3	V	-11.62	26.61	46.00	-19.39
4874.00	50.71	PK	284	1.6	V	-0.62	50.09	74.00	-23.91
4874.00	39.70	Ave	284	1.6	V	-0.62	39.08	54.00	-14.92
7311.00	50.80	PK	67	1.3	H	2.21	53.01	74.00	-20.99
7311.00	38.26	Ave	67	1.3	H	2.21	40.47	54.00	-13.53
2315.56	46.79	PK	156	1.3	V	-13.19	33.60	74.00	-40.40
2315.56	39.15	Ave	156	1.3	V	-13.19	25.96	54.00	-28.04
2376.89	42.62	PK	355	1.1	H	-13.14	29.48	74.00	-44.52
2376.89	36.64	Ave	355	1.1	H	-13.14	23.50	54.00	-30.50
2495.32	42.19	PK	331	1.1	V	-13.08	29.11	74.00	-44.89
2495.32	38.39	Ave	331	1.1	V	-13.08	25.31	54.00	-28.69

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)
n40: High Channel 2452MHz									
260.14	43.92	QP	147	1.3	H	-11.62	32.30	46.00	-13.70
260.14	38.82	QP	100	1.7	V	-11.62	27.20	46.00	-18.80
4904.00	51.18	PK	260	1.2	V	-0.24	50.94	74.00	-23.06
4904.00	39.24	Ave	260	1.2	V	-0.24	39.00	54.00	-15.00
7356.00	51.19	PK	144	1.6	H	2.84	54.03	74.00	-19.97
7356.00	39.15	Ave	144	1.6	H	2.84	41.99	54.00	-12.01
2331.16	46.52	PK	14	1.8	V	-13.19	33.33	74.00	-40.67
2331.16	37.56	Ave	14	1.8	V	-13.19	24.37	54.00	-29.63
2362.19	43.98	PK	320	2.0	H	-13.14	30.84	74.00	-43.16
2362.19	36.46	Ave	320	2.0	H	-13.14	23.32	54.00	-30.68
2493.24	42.13	PK	270	1.8	V	-13.08	29.05	74.00	-44.95
2493.24	36.91	Ave	270	1.8	V	-13.08	23.83	54.00	-30.17

Test Frequency: 18 GHz~25 GHz

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

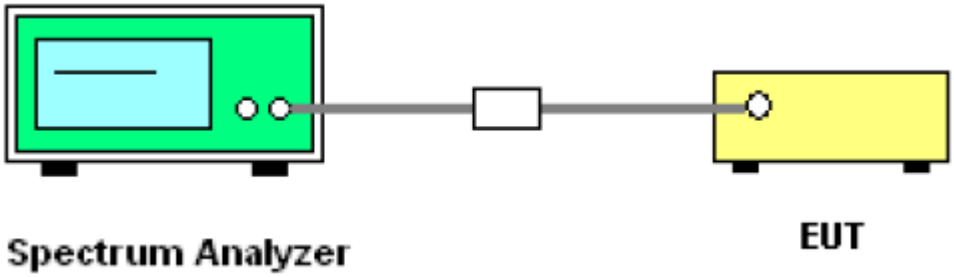
9 Band Edge Measurement

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.

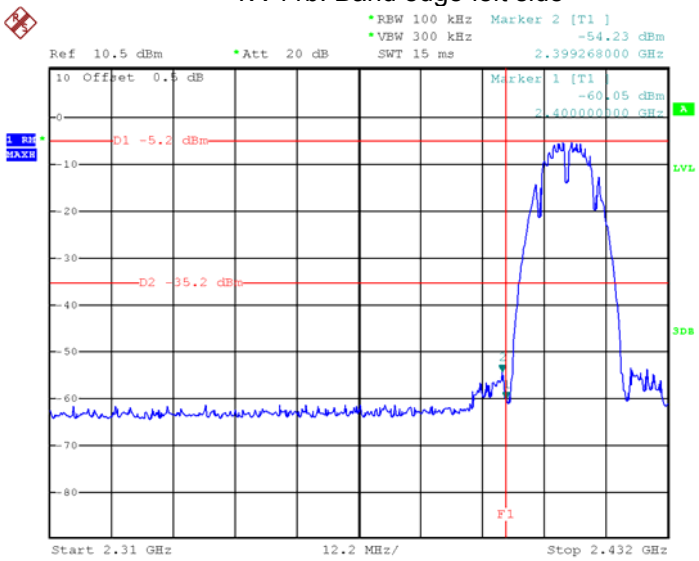
9.2 Test Setup



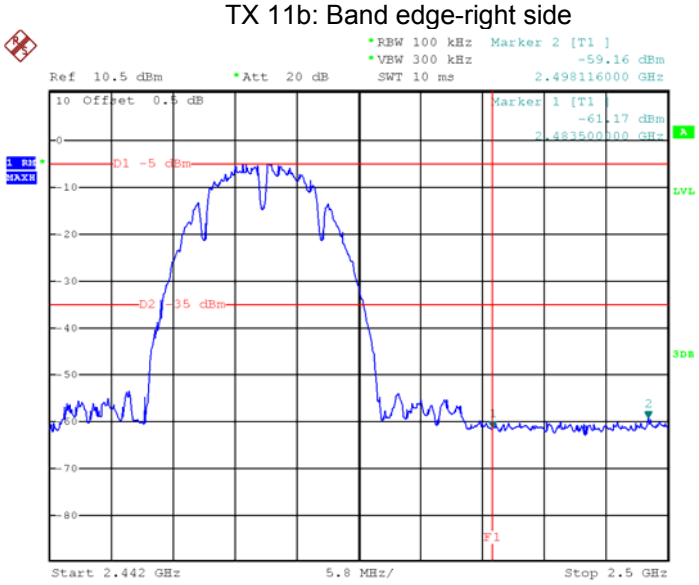
9.3 Test Result

Test result plots shown as follows:

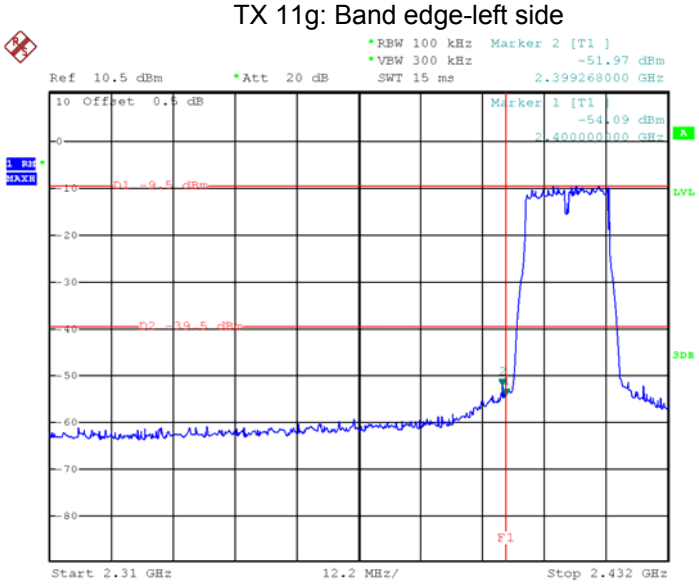
TX 11b: Band edge-left side



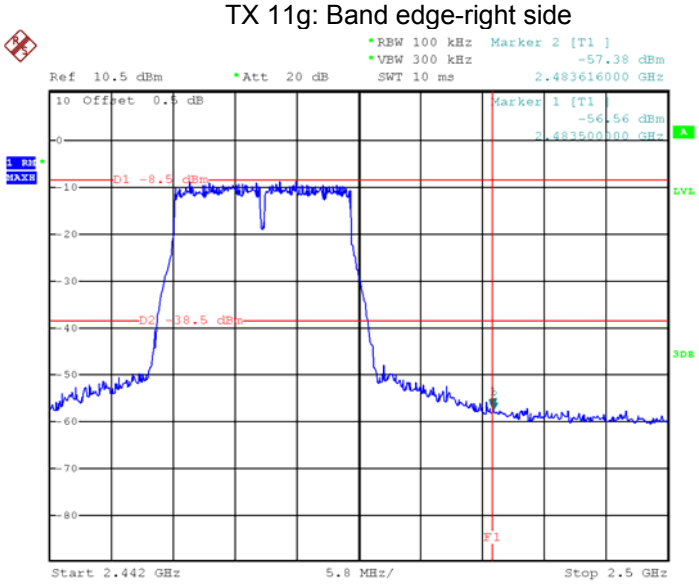
TX 11b: Band edge-right side



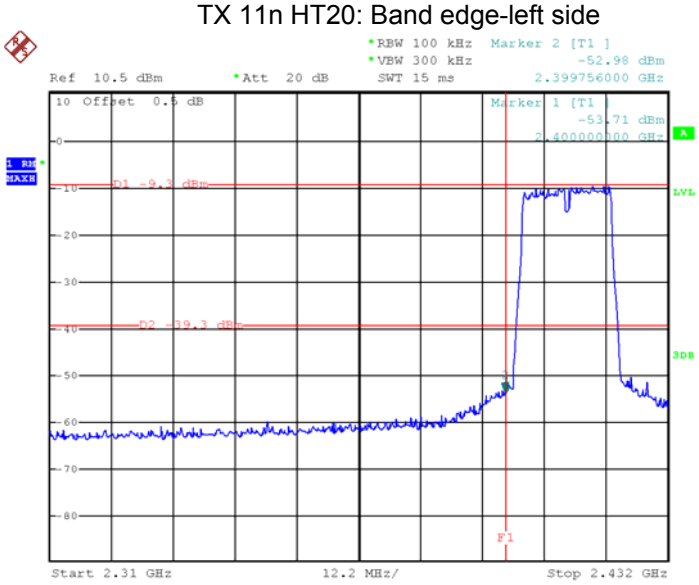
TX 11g: Band edge-left side



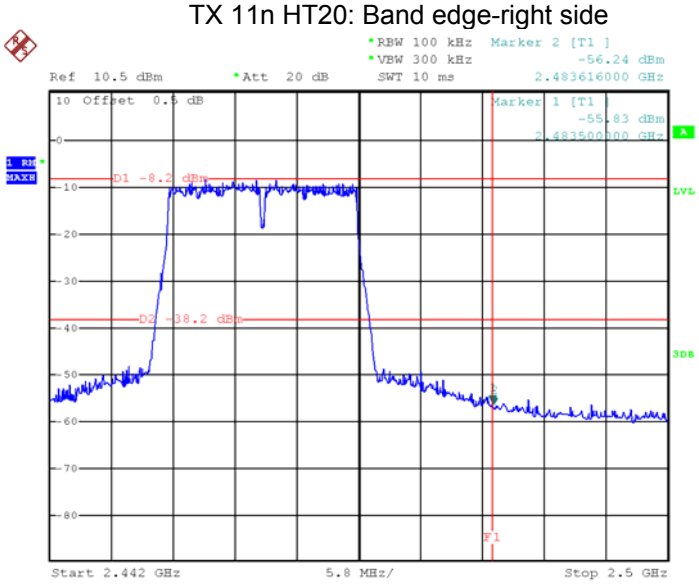
TX 11g: Band edge-right side



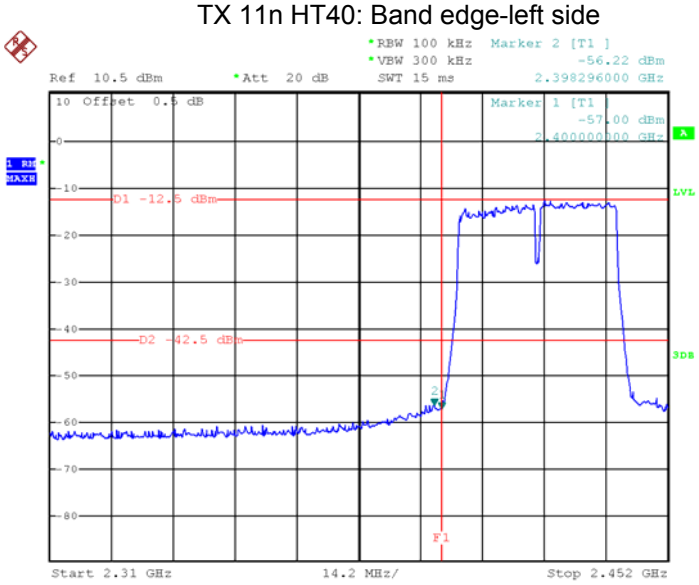
TX 11n HT20: Band edge-left side



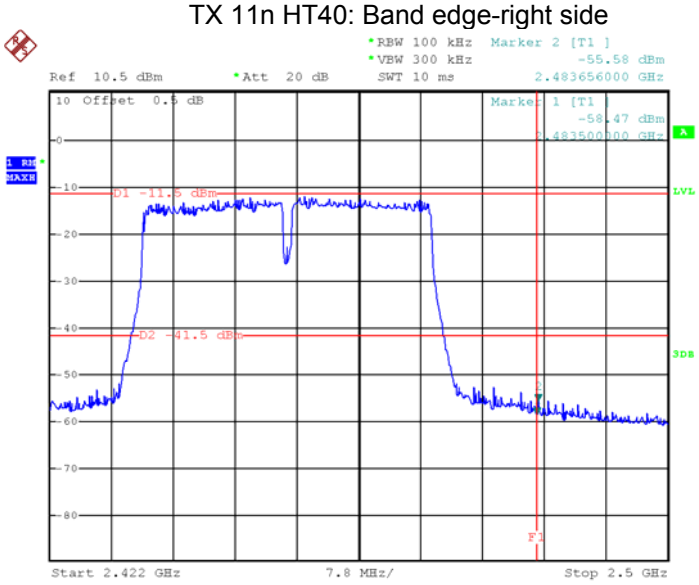
TX 11n HT20: Band edge-right side



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

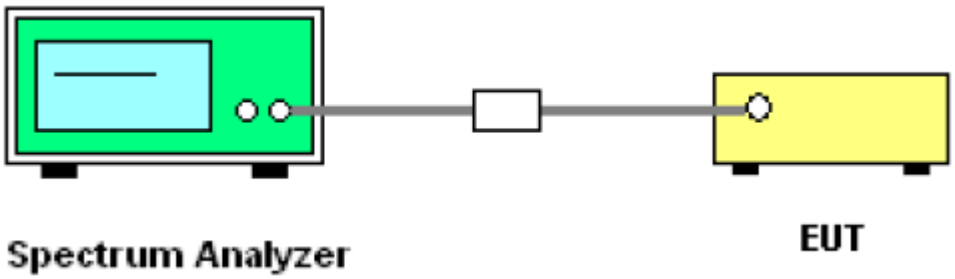
Test Method: 558074 D01 DTS Meas Guidance v04, April 5, 2017

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 Setup

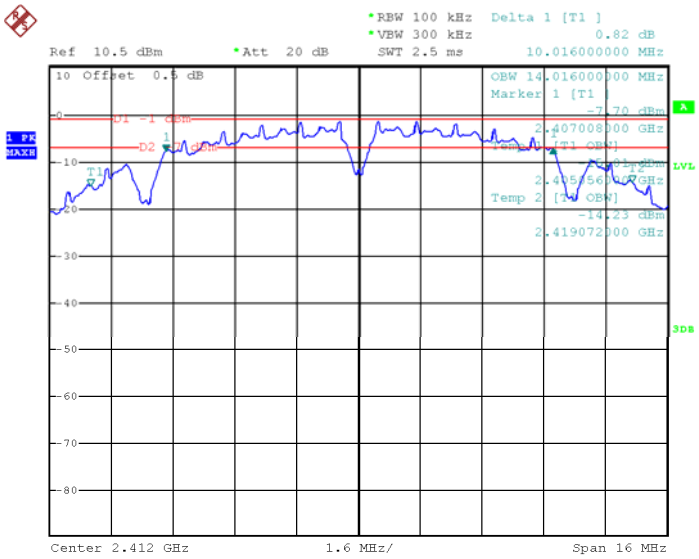


10.3 Test Result:

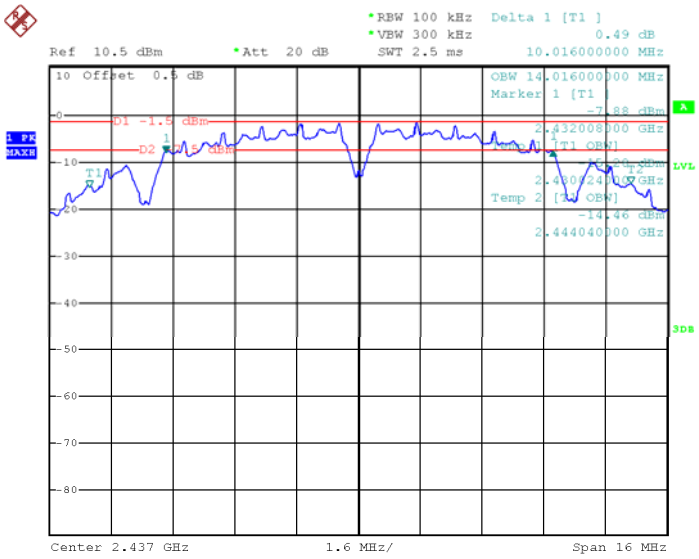
Operation mode	6dB Bandwidth (MHz)			99% Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	10.016	10.016	10.016	14.016	14.016	14.016
TX 11g	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	16.650	16.650	16.650	16.550	16.550	16.550
TX 11n HT20	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	17.874	17.874	17.874	17.712	17.712	17.712
TX 11n HT40	Channel 3	Channel 6	Channel 9	Channel 3	Channel 6	Channel 9
	36.630	36.630	36.630	36.190	36.190	36.190

Test result plot as follows:

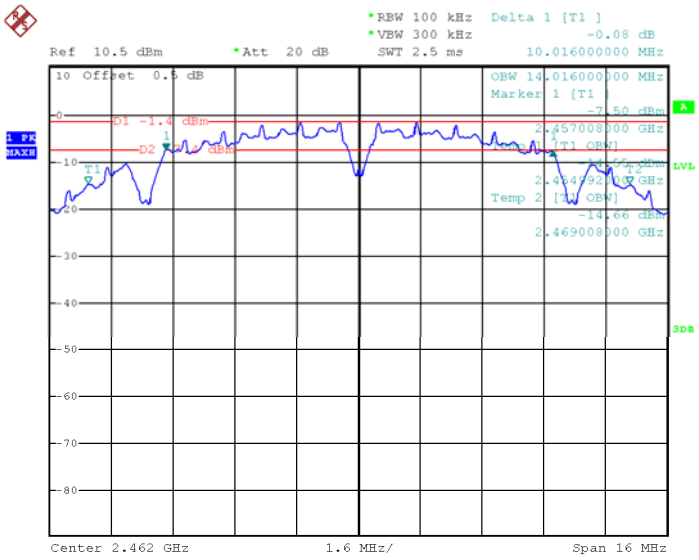
Mode: TX 11b channel 1



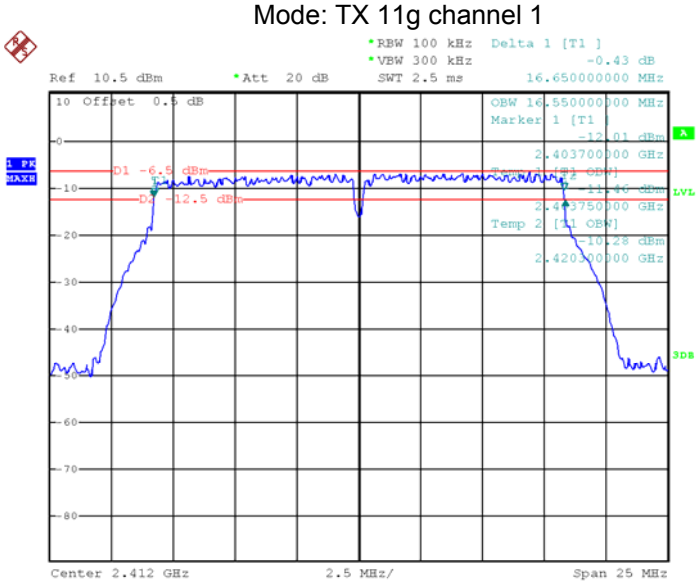
Mode: TX 11b channel 6



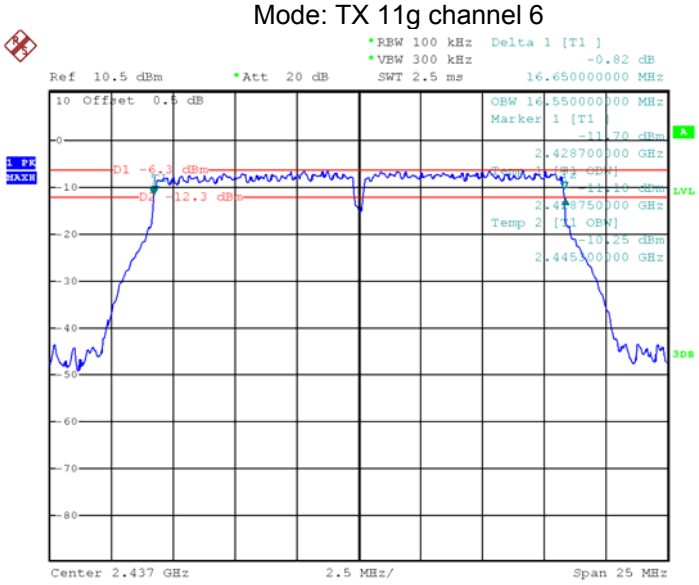
Mode: TX 11b channel 11



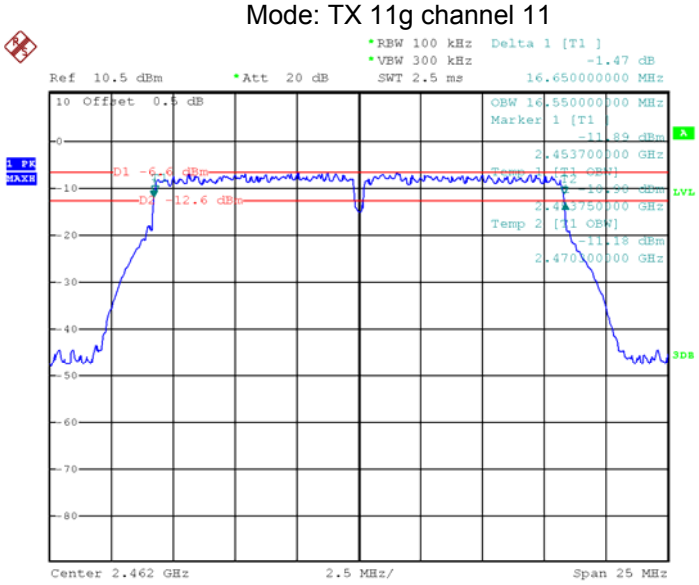
Mode: TX 11g channel 1



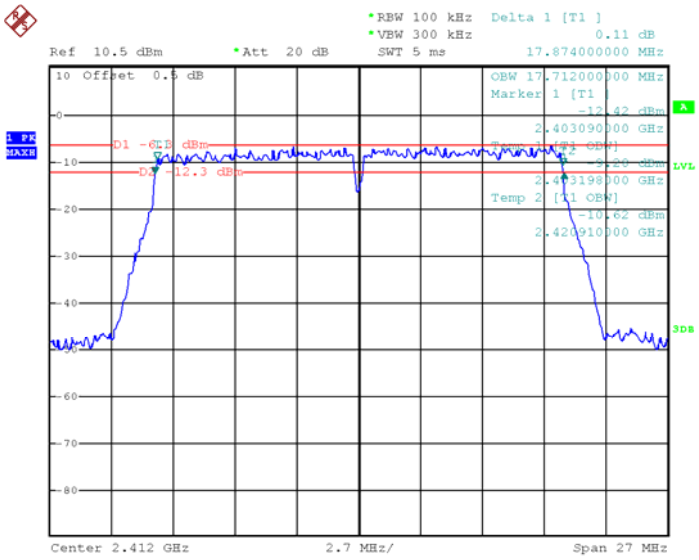
Mode: TX 11g channel 6



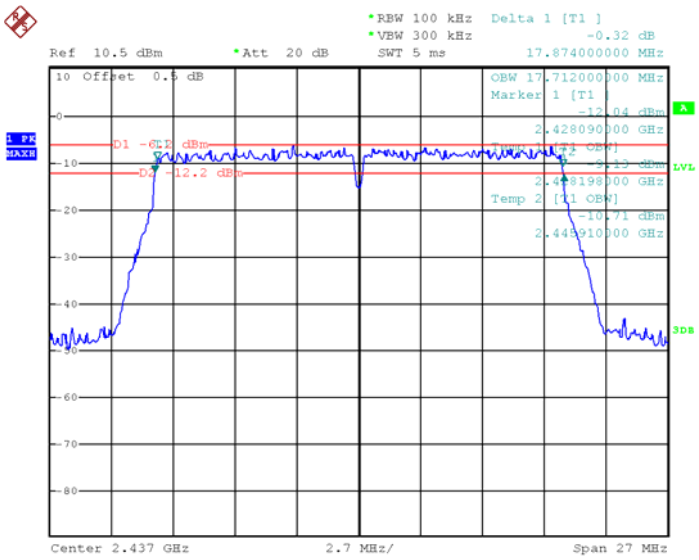
Mode: TX 11g channel 11



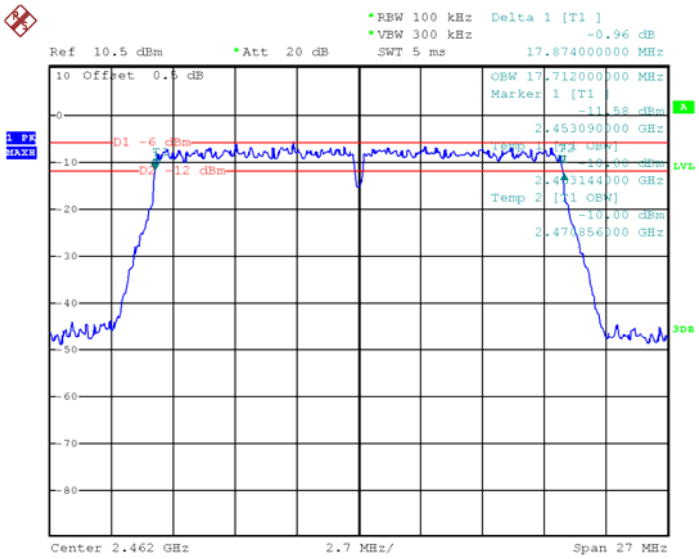
Mode: TX 11n HT20 channel 1



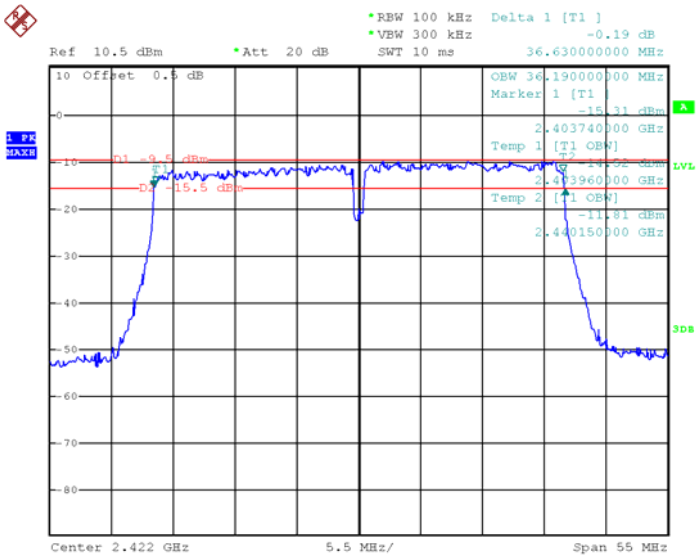
Mode: TX 11n HT20 channel 6



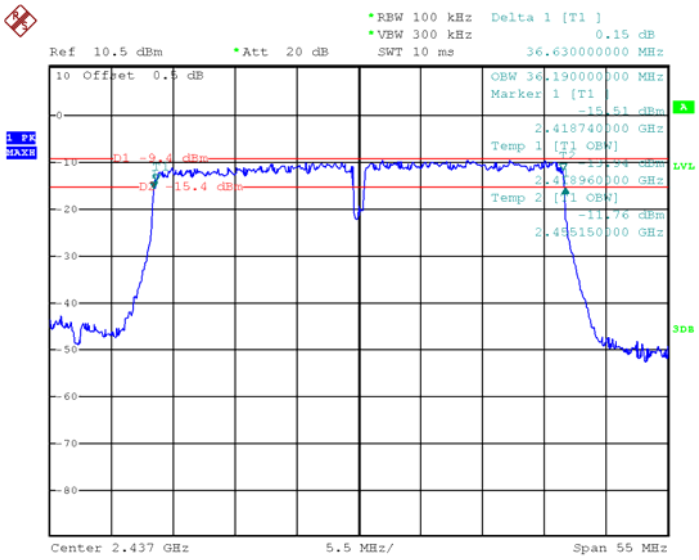
Mode: TX 11n HT20 channel 11



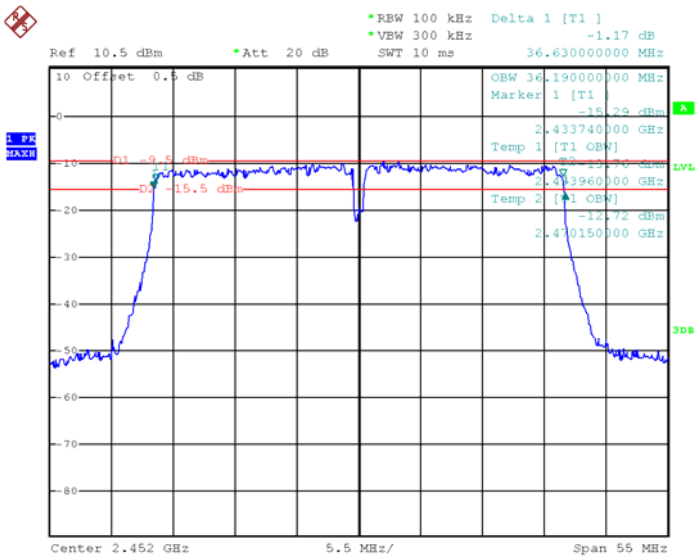
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



11 Maximum conducted (average) Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

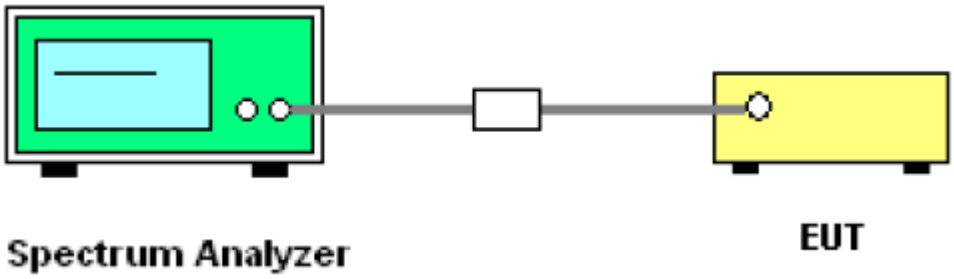
Test Method: 558074 D01 DTS Meas Guidance v04, April 5, 2017

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 = RMS, 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 Setup



11.3 Test Result:

Test mode :TX 11b		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
9.56	9.18	9.32
Limit: 1W/30dBm		

Test mode :TX 11g		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
9.39	9.64	9.35
Limit: 1W/30dBm		

Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
9.51	**9.70**	9.67
Limit: 1W/30dBm		

Test mode :TX 11n HT40		
Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
9.23	9.44	9.21
Limit: 1W/30dBm		

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:

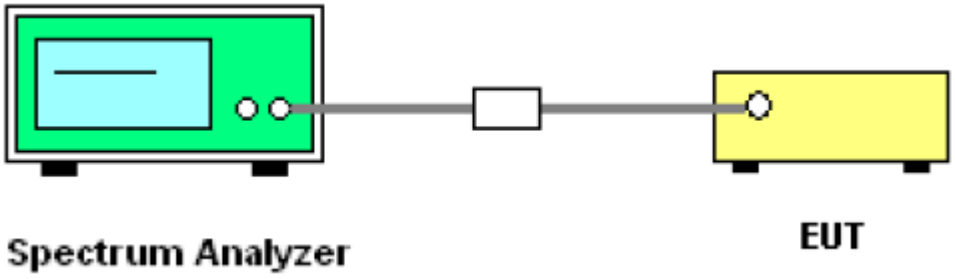
558074 D01 DTS Meas Guidance v04, April 5, 2017

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 Setup



12.3 Test Result:

Test mode :TX 11b		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-19.59	-19.94	-19.83
Limit: 8dBm per 3kHz		

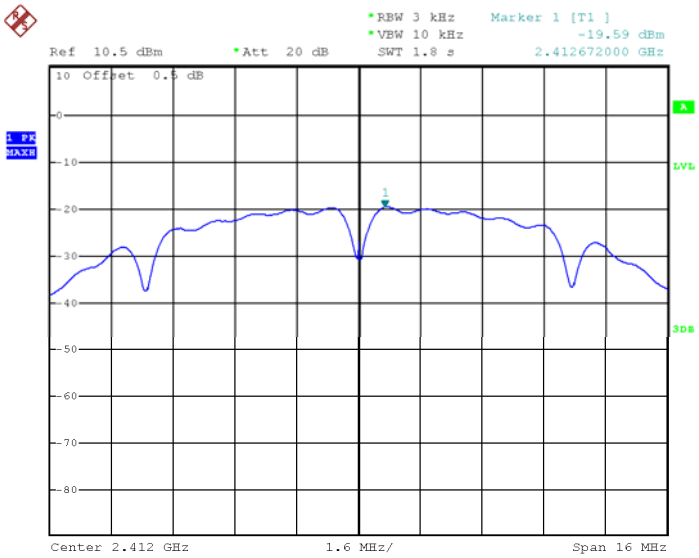
Test mode :TX 11g		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-20.97	-20.49	-20.58
Limit: 8dBm per 3kHz		

Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-20.40	-20.05	-20.36
Limit: 8dBm per 3kHz		

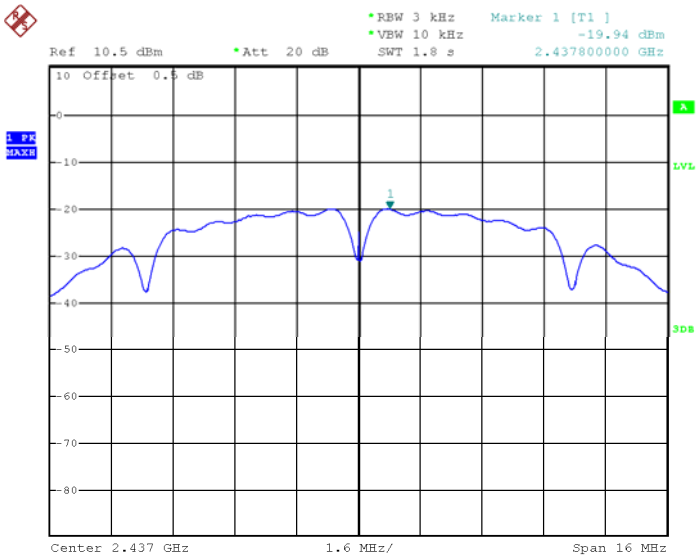
Test mode :TX 11n HT40		
Power Spectral (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-22.76	-21.60	-22.63
Limit: 8dBm per 3kHz		

Test Plot

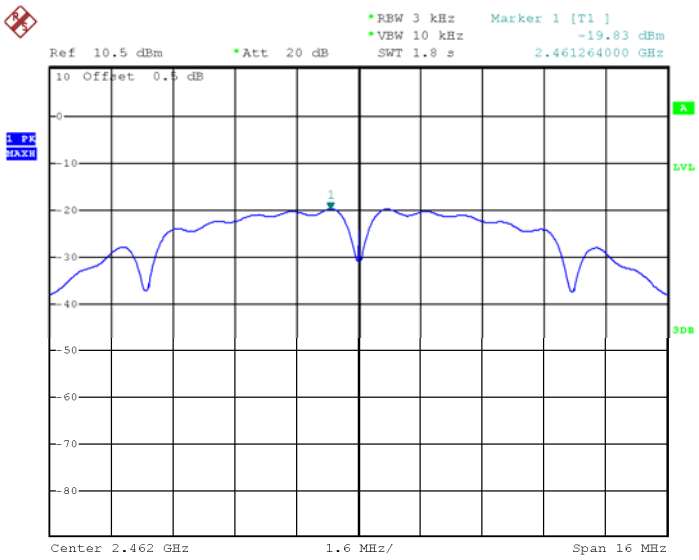
Mode: TX 11b 2412MHz



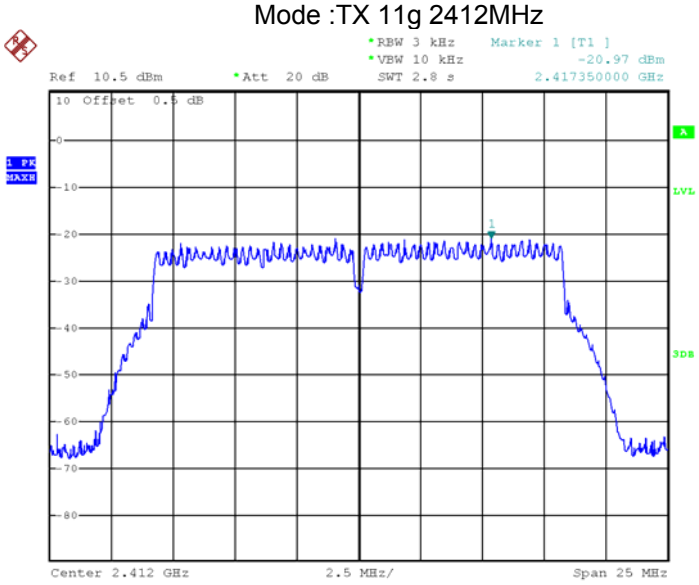
Mode: TX 11b 2437MHz



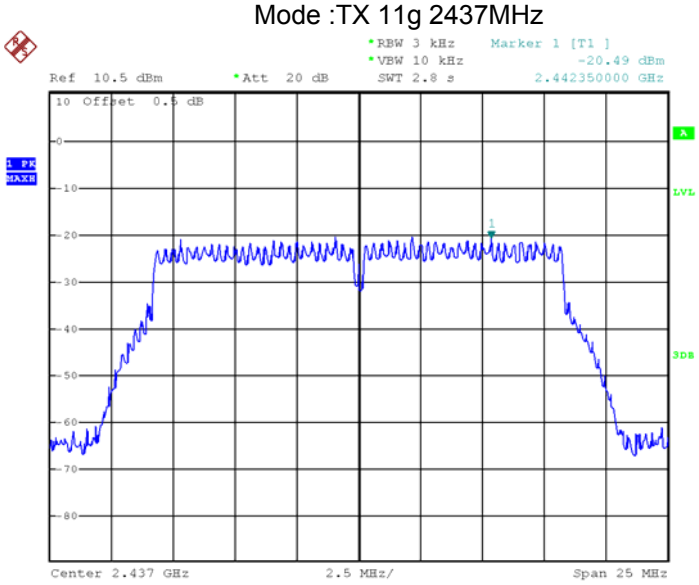
Mode: TX 11b 2462MHz



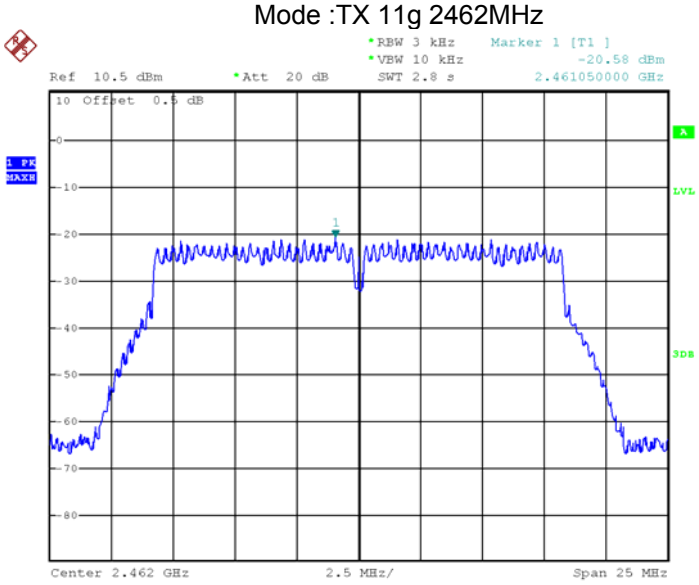
Mode :TX 11g 2412MHz



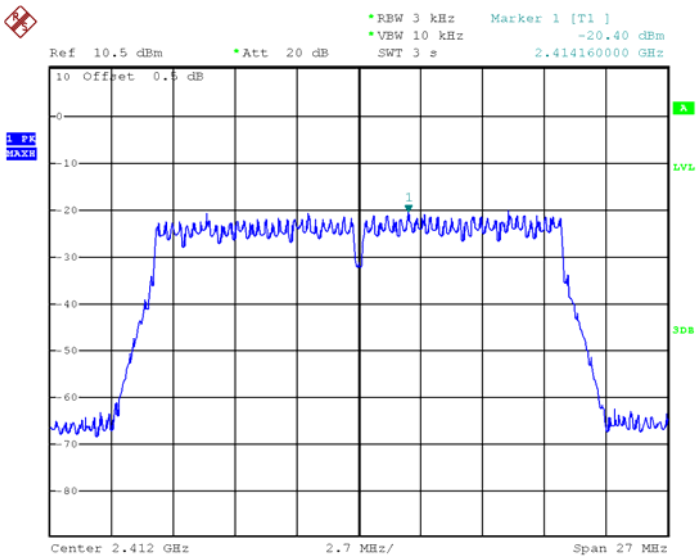
Mode :TX 11g 2437MHz



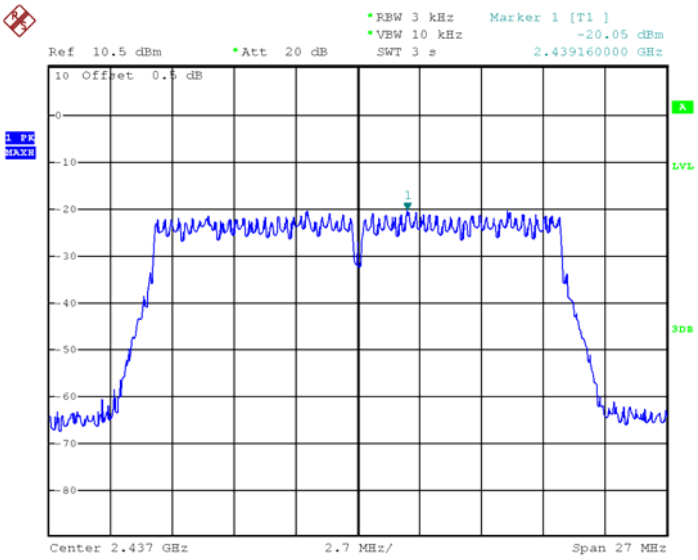
Mode :TX 11g 2462MHz



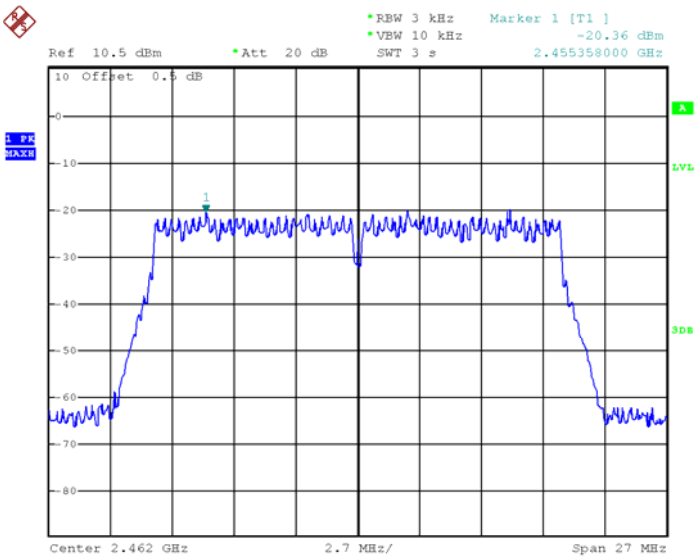
Mode: TX 11n HT20 2412MHz



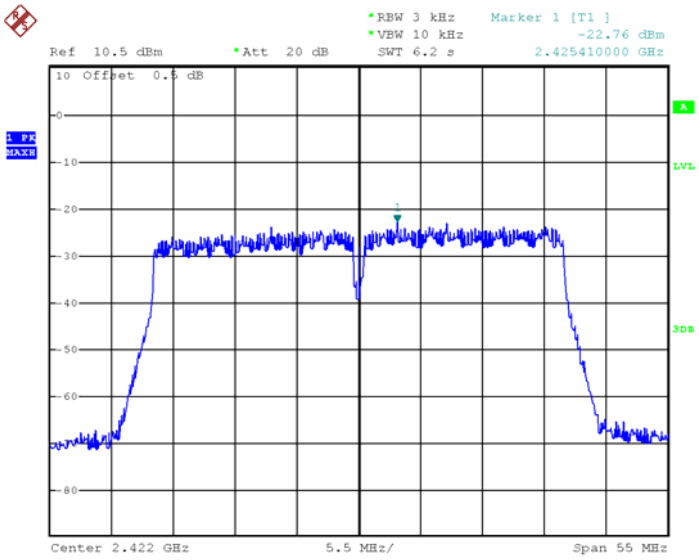
Mode: TX 11n HT20 2437MHz



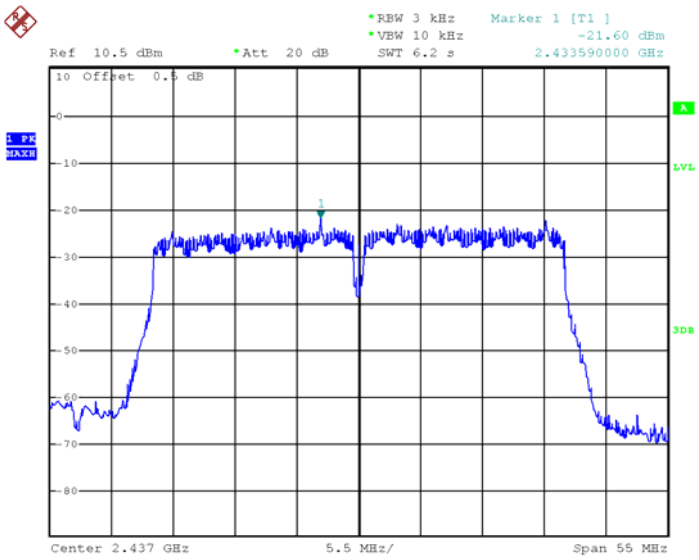
Mode: TX 11n HT20 2462MHz



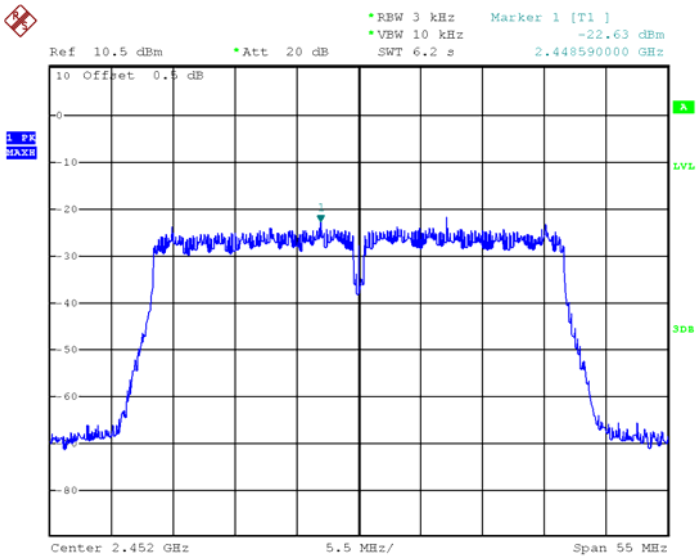
Mode: TX 11n HT40 2422MHz



Mode: TX 11n HT40 2437MHz



Mode: TX 11n HT40 2452MHz



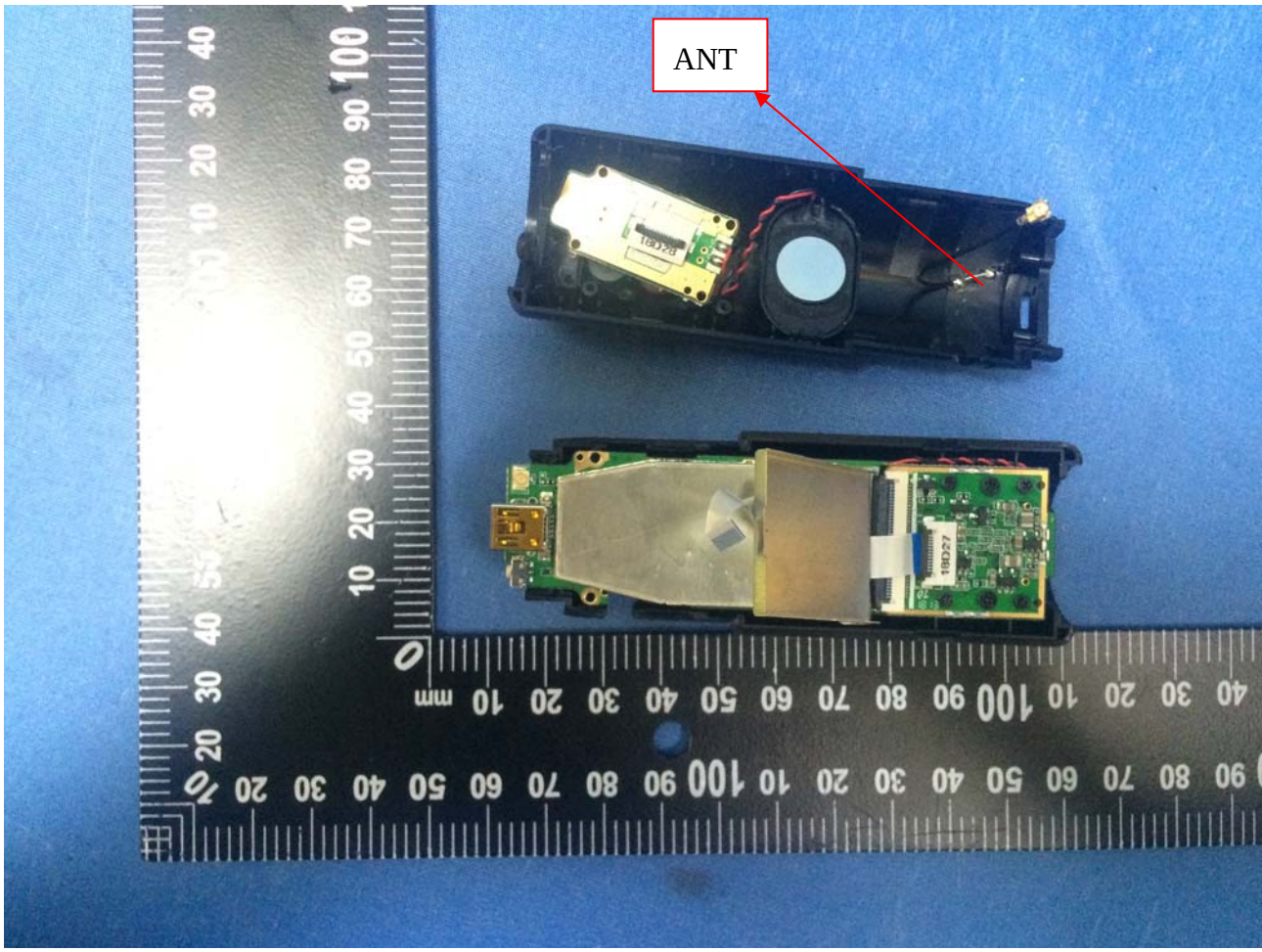
13 Antenna Requirement

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 -1.5dBi. meets the requirements of FCC 15.203.



14 FCC ID: 2AOT9-NBDVR300GW RF Exposure Report

Note: Please refer to RF Exposure Report: WTS18S07116940-2W.

15 Photographs–Model NBDVR300GW Test Setup Photos

Note: Please refer to Photos: WTS18S07116940-3W.

16 Photographs - Constructional Details

16.1 EUT- Model NBDVR300GW External Photos

Note: Please refer to Photos: WTS18S07116940-3W.

16.2 EUT- Model NBDVR300GW Internal Photos

Note: Please refer to Photos: WTS18S07116940-3W.

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