

TEST REPORT

Reference No. : WTS19S05032444W V1
FCC ID : 2AU33ELT100004
Applicant : EII-iot Incorporated
Address : 32 Journey, Aliso Viejo, California, 92656, United States
Manufacturer : Homewell Technology (Shenzhen) Co., Ltd.
Address : No.8, 5th Industrial Zone XiaCun, GongMing Town, GuangMing
New District, Shenzhen City, Guangdong Province, China
Product : HUB Air Quality
Model(s) : ELT-100004
Standards : FCC CFR47 Part 15 C Section 15.247: 2019
Date of Receipt sample : 2019-11-05
Date of Test : 2019-11-06 to 2019-12-17
Date of Issue : 2020-01-16
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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1 Contents

	Page
COVER PAGE	1
1 CONTENTS	2
2 REVISION HISTORY	4
3 GENERAL INFORMATION	5
3.1 GENERAL DESCRIPTION OF E.U.T	5
3.2 DETAILS OF E.U.T.....	5
3.3 CHANNEL LIST.....	5
3.4 TEST MODE	6
4 EQUIPMENT USED DURING TEST	7
4.1 EQUIPMENTS LIST	7
4.2 MEASUREMENT UNCERTAINTY	8
4.3 SUBCONTRACTED.....	8
4.4 TEST FACILITY.....	8
4.5 TEST EQUIPMENT CALIBRATION	8
5 TEST SUMMARY	9
6 CONDUCTED EMISSION	10
6.1 E.U.T. OPERATION	10
6.2 EUT SETUP.....	10
6.3 MEASUREMENT DESCRIPTION	10
6.4 CONDUCTED EMISSION TEST RESULT	11
7 RADIATED EMISSIONS	13
7.1 EUT OPERATION.....	13
7.2 TEST SETUP	14
7.3 SPECTRUM ANALYZER SETUP	15
7.4 TEST PROCEDURE	16
7.5 CORRECTED AMPLITUDE & MARGIN CALCULATION	16
7.6 SUMMARY OF TEST RESULTS	17
8 BAND EDGE MEASUREMENT	26
8.1 TEST PRODUCE	26
8.2 TEST RESULT	27
9 BANDWIDTH MEASUREMENT	30
9.1 TEST PROCEDURE:	30
9.2 TEST RESULT:	30
10 MAXIMUM OUTPUT POWER	36
10.1 TEST PROCEDURE:.....	36
10.2 TEST RESULT:	36
11 POWER SPECTRAL DENSITY	37
11.1 TEST PROCEDURE:.....	37
11.2 TEST RESULT:	37
12 ANTENNA REQUIREMENT	43
13 FCC ID: 2AU33ELT100004 RF EXPOSURE REPORT	44
13.1 REQUIREMENTS.....	44
13.2 EVALUATION RESULT	45
14 PHOTOGRAPHS - TEST SETUP PHOTOS	46
15 PHOTOGRAPHS - CONSTRUCTIONAL DETAILS	46

15.1	EXTERNAL PHOTOS.....	46
15.2	INTERNAL PHOTOS.....	46

2 Revision History

Test report #	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS19S05032444W	2019-11-05	2019-11-06 to 2019-12-17	2019-12-25	Original	-	Replaced
WTS19S05032444W V1	2019-11-05	2019-11-06 to 2019-12-17	2020-01-16	Revision1	Update the report	Valid

3 General Information

3.1 General Description of E.U.T

Product:	HUB Air Quality
Model(s):	ELT-100004
Operation Frequency:	802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40: 2422MHz~2452MHz
Antenna installation:	Integrated Antenna
Antenna Gain:	2.0dBi
Type of modulation:	IEEE 802.11b (CCK/QPSK/BPSK,11Mbps max.) IEEE 802.11g (BPSK/QPSK/16QAM/64QAM,54Mbps max.) IEEE 802.11n (BPSK/QPSK/16QAM/64QAM,HT20:72Mbps max., HT40:150Mbps max.)

3.2 Details of E.U.T

Ratings	AC adapter: Input: 100-240V~, 50/60Hz, 0.4A Output: DC 5V, 750mA
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3.3 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	-

3.4 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	3/6/9	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 Equipment Used during Test

4.1 Equipments List

Conducted Emissions at Mains Terminals Disturbance Voltage						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMI Test Receiver	R&S	ESCI	100947	2019-09-17	2020-09-16
2	LISN	R&S	ENV216	100115	2019-09-17	2020-09-16
3	Cable	Top	TYPE16(3.5M)	-	2019-09-17	2020-09-16
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	2019-04-19	2020-04-18
2	Broad-band Horn Antenna(1-18GHz)	SCHWARZBECK	BBHA 9120 D	667	2019-04-19	2020-04-18
3	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2019-04-19	2020-04-18
4	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	EW02014-7	2019-04-19	2020-04-18
5	Spectrum Analyzer	R&S	FSP40	100501	2019-09-17	2020-09-16
6	Broad-band Horn Antenna	SCHWARZBECK	BBV 9721	100472	2019-09-17	2020-09-16
7	Amplifier	Agilent	8447D	2944A10178	2019-09-17	2020-09-16
8	Coaxial Cable	ZT40-2.92J-2.92J-2.0M	10MHz-40GHz	17100919	2019-09-17	2020-09-16
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	2019-04-20	2020-04-19
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2019-05-24	2020-05-23
3	Active Loop Antenna	Com-Power Corp.	AL-130R	10160007	2019-04-28	2020-04-27
4	Amplifier	ANRITSU	MH648A	M43381	2019-04-19	2020-04-18
5	Cable	HUBER+SUHNER	CBL2	525178	2019-04-20	2020-04-19
6	Coaxial Cable (below 1GHz)	Top	TYPE16 (13M)	-	2019-09-17	2020-09-16

RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	Spectrum Analyzer	R&S	FSL6	100959	2019-09-17	2020-09-16
2	Coaxial Cable	Top	10Hz-30GHz	-	2019-09-17	2020-09-16
3	Antenna Connector*	Realacc	45RSm	-	2019-09-17	2020-09-16
4	DC Block	Gwave	GDCB-3G-N-SMA	140307001	2019-09-17	2020-09-16

“*”: 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.

4.2 Measurement Uncertainty

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

4.3 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

4.4 Test Facility

FCC Designation No.: CN1201. Test Firm Registration No.: 523476.

ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.

4.5 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.

5 Test Summary

Test Items	Test Requirement	Result
Spurious 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.		

6 Conducted Emission

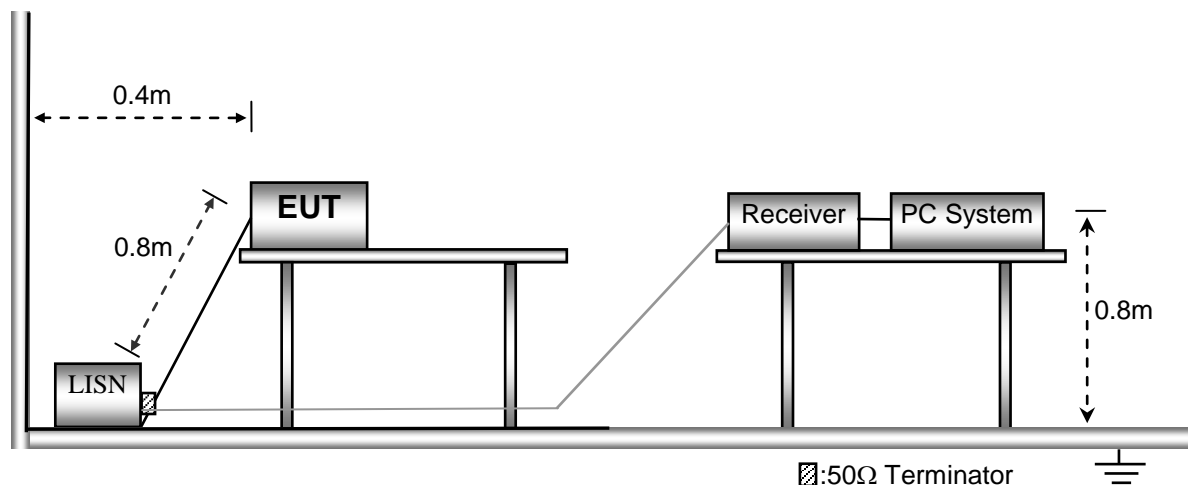
Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution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

6.1 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 Transmitting mode, Only the worst case 802.11b(Low channel) were record in the report.

6.2 EUT Setup

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



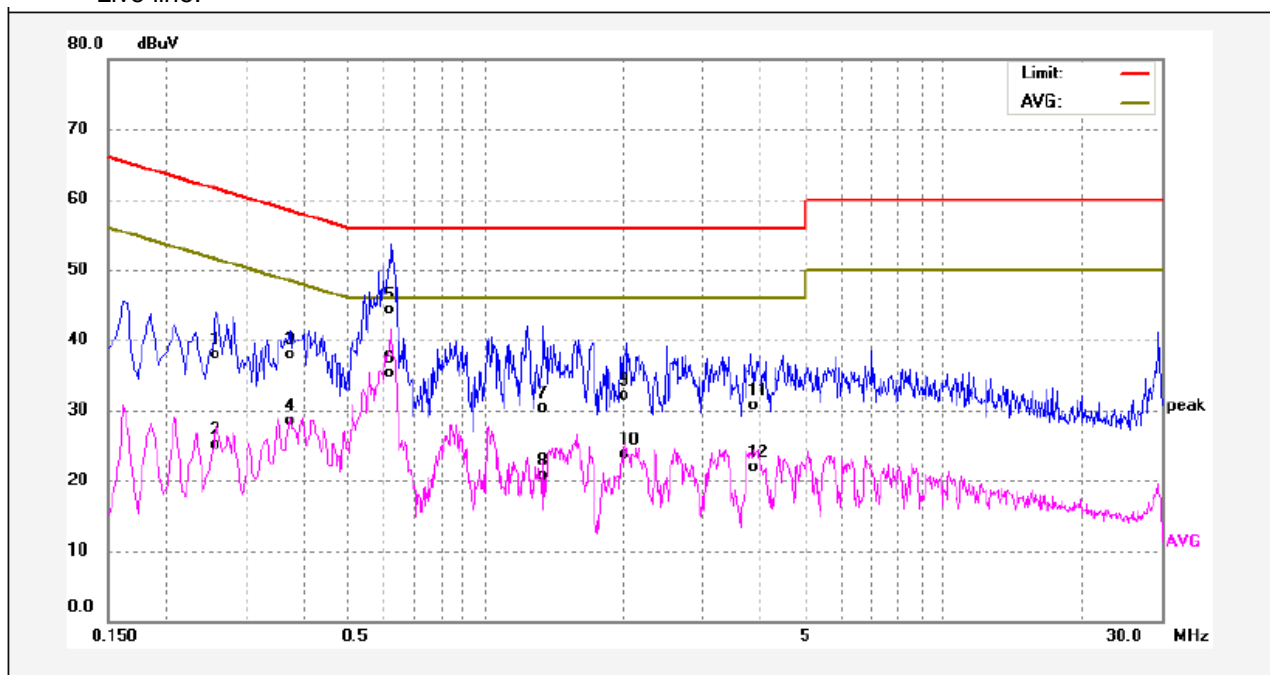
6.3 Measurement Description

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.

6.4 Conducted Emission Test Result

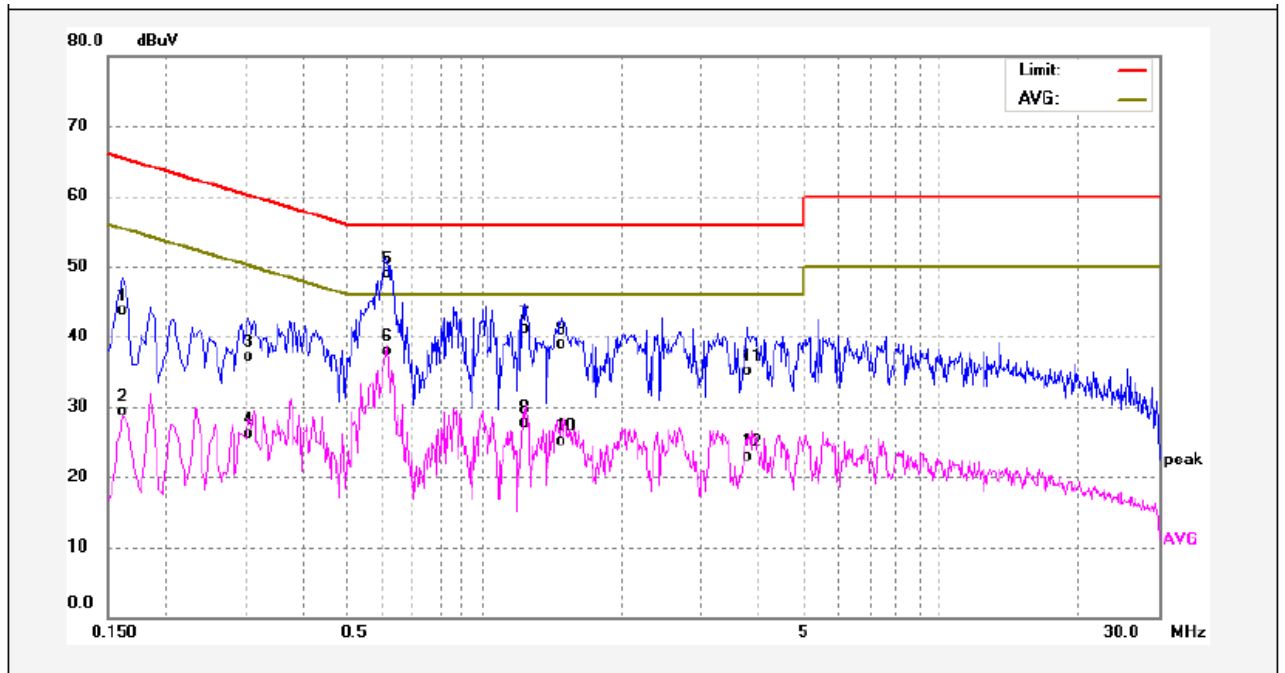
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2580	28.23	9.77	38.00	61.49	-23.49	QP	
2	0.2580	15.26	9.77	25.03	51.49	-26.46	AVG	
3	0.3740	28.02	9.81	37.83	58.41	-20.58	QP	
4	0.3740	18.79	9.81	28.60	48.41	-19.81	AVG	
5	0.6260	34.45	9.84	44.29	56.00	-11.71	QP	
6	0.6260	25.53	9.84	35.37	46.00	-10.63	AVG	
7	1.3420	20.46	9.90	30.36	56.00	-25.64	QP	
8	1.3420	10.90	9.90	20.80	46.00	-25.20	AVG	
9	2.0420	22.21	9.96	32.17	56.00	-23.83	QP	
10	2.0420	13.66	9.96	23.62	46.00	-22.38	AVG	
11	3.8060	20.84	9.94	30.78	56.00	-25.22	QP	
12	3.8060	11.95	9.94	21.89	46.00	-24.11	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1620	33.87	9.77	43.64	65.36	-21.72	QP	
2	0.1620	19.61	9.77	29.38	55.36	-25.98	AVG	
3	0.3060	27.37	9.82	37.19	60.08	-22.89	QP	
4	0.3060	16.34	9.82	26.16	50.08	-23.92	AVG	
5	0.6100	39.11	9.84	48.95	56.00	-7.05	QP	
6	0.6100	28.05	9.84	37.89	46.00	-8.11	AVG	
7	1.2340	31.24	9.90	41.14	56.00	-14.86	QP	
8	1.2340	17.84	9.90	27.74	46.00	-18.26	AVG	
9	1.4780	28.91	9.90	38.81	56.00	-17.19	QP	
10	1.4780	15.17	9.90	25.07	46.00	-20.93	AVG	
11	3.7740	25.20	9.94	35.14	56.00	-20.86	QP	
12	3.7740	12.90	9.94	22.84	46.00	-23.16	AVG	

7 Radiated 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	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

7.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

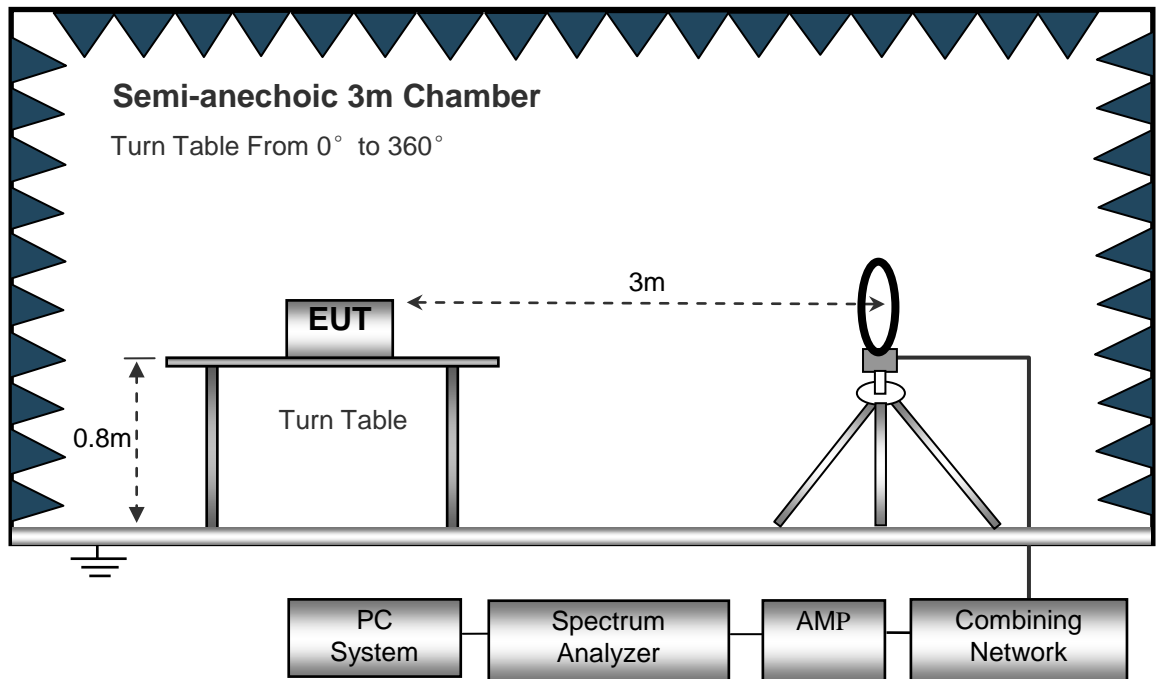
EUT Operation:

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

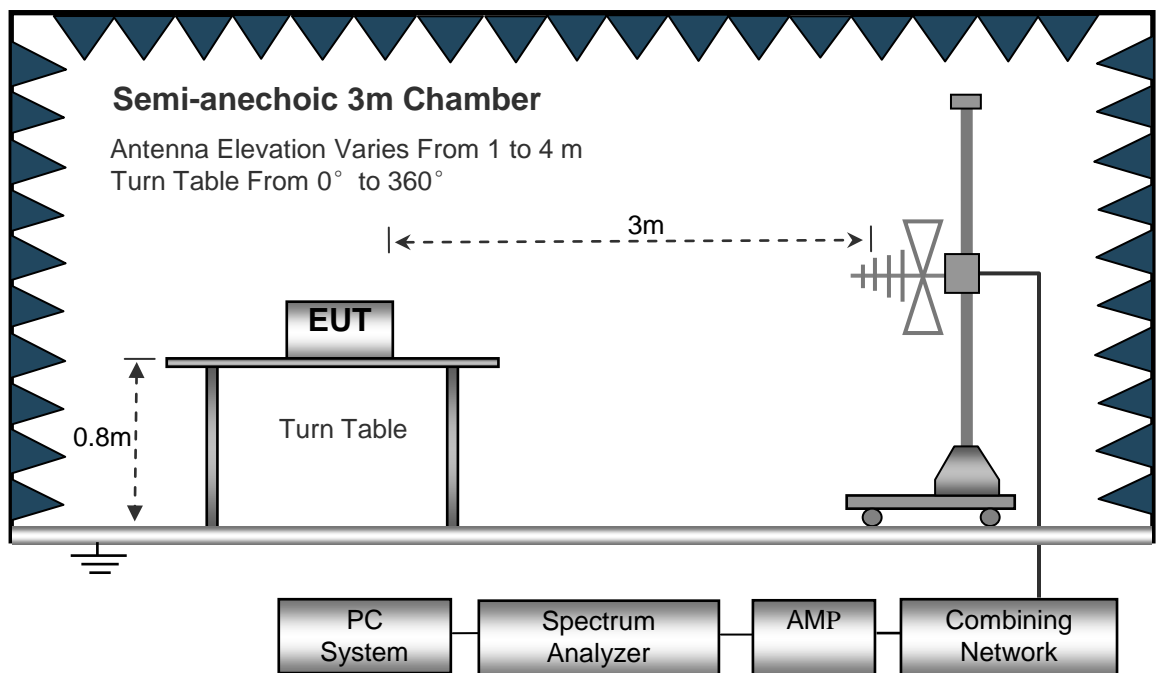
7.2 Test Setup

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

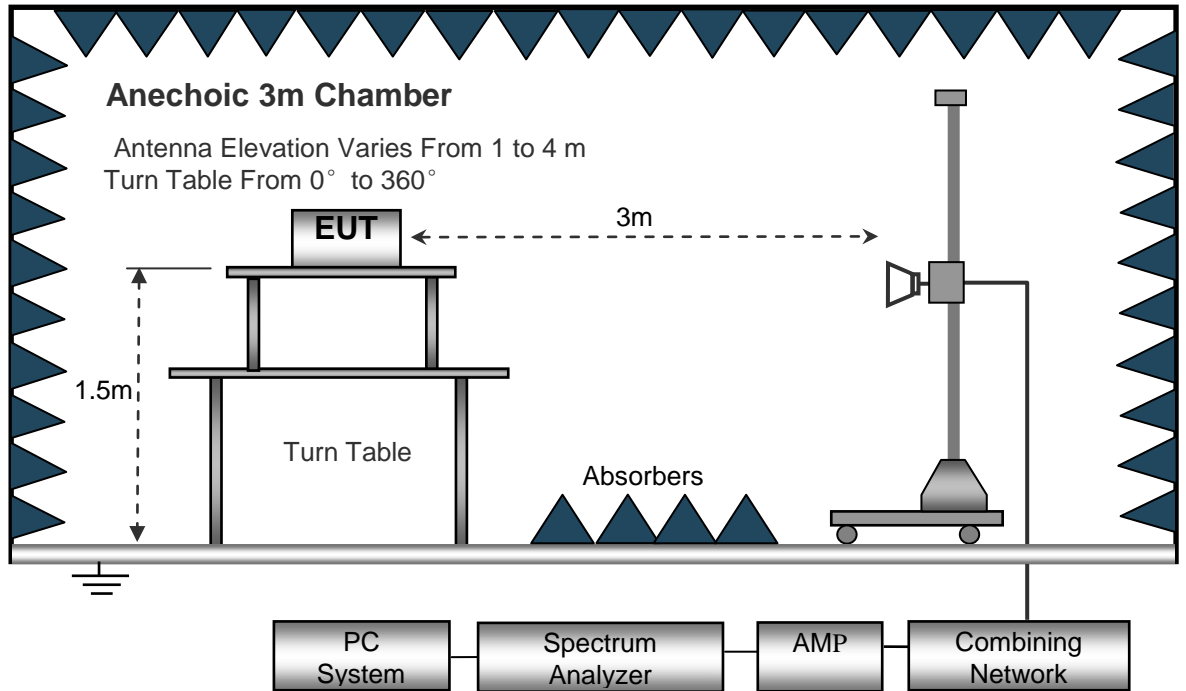
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



7.3 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

7.4 Test Procedure

1. The EUT is placed on a turntable. For below 1GHz, the EUT is 0.8m above ground plane;
For above 1GHz, 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 during radiated emissions above 1GHz measurement.

7.5 Corrected Amplitude & Margin Calculation

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

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

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

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

7.6 Summary of Test Results

Test Frequency: 9 kHz ~ 25GHz

Only the worst case and the worst frequency test data were recorded in the report, other frequency are attenuate more than 20dB below the permissible value and not reported.

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11b: Low Channel 2412MHz									
37.68	37.10	QP	179	1.7	H	-16.62	20.48	40.00	-19.52
37.68	53.02	QP	176	1.8	V	-16.62	36.40	40.00	-3.60
4824.00	52.52	PK	325	1.3	V	-1.06	51.46	74.00	-22.54
4824.00	42.61	Ave	325	1.3	V	-1.06	41.55	54.00	-12.45
7236.00	48.39	PK	223	1.1	H	1.33	49.72	74.00	-24.28
7236.00	38.14	Ave	223	1.1	H	1.33	39.47	54.00	-14.53
2331.28	46.18	PK	281	1.3	V	-13.19	32.99	74.00	-41.01
2331.28	38.38	Ave	281	1.3	V	-13.19	25.19	54.00	-28.81
2362.80	43.59	PK	285	1.5	H	-13.14	30.45	74.00	-43.55
2362.80	38.25	Ave	285	1.5	H	-13.14	25.11	54.00	-28.89
2490.77	43.56	PK	17	2.0	V	-13.08	30.48	74.00	-43.52
2490.77	38.96	Ave	17	2.0	V	-13.08	25.88	54.00	-28.12

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11b: Middle Channel 2437MHz									
37.68	38.42	QP	264	1.2	H	-16.62	21.80	40.00	-18.20
37.68	53.55	QP	28	1.3	V	-16.62	36.93	40.00	-3.07
4874.00	53.37	PK	324	1.4	V	-0.62	52.75	74.00	-21.25
4874.00	41.47	Ave	324	1.4	V	-0.62	40.85	54.00	-13.15
7311.00	48.16	PK	209	2.0	H	2.21	50.37	74.00	-23.63
7311.00	37.61	Ave	209	2.0	H	2.21	39.82	54.00	-14.18
2347.37	46.38	PK	260	1.6	V	-13.19	33.19	74.00	-40.81
2347.37	39.27	Ave	260	1.6	V	-13.19	26.08	54.00	-27.92
2365.52	44.24	PK	152	1.8	H	-13.14	31.10	74.00	-42.90
2365.52	38.59	Ave	152	1.8	H	-13.14	25.45	54.00	-28.55
2497.48	42.09	PK	157	1.5	V	-13.08	29.01	74.00	-44.99
2497.48	38.47	Ave	157	1.5	V	-13.08	25.39	54.00	-28.61

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									
37.68	37.10	QP	256	1.9	H	-16.62	20.48	40.00	-19.52
37.68	51.16	QP	48	1.1	V	-16.62	34.54	40.00	-5.46
4924.00	53.82	PK	62	1.8	V	-0.24	53.58	74.00	-20.42
4924.00	44.03	Ave	62	1.8	V	-0.24	43.79	54.00	-10.21
7386.00	49.36	PK	205	1.5	H	2.84	52.20	74.00	-21.80
7386.00	38.18	Ave	205	1.5	H	2.84	41.02	54.00	-12.98
2328.07	46.70	PK	92	1.5	V	-13.19	33.51	74.00	-40.49
2328.07	37.84	Ave	92	1.5	V	-13.19	24.65	54.00	-29.35
2361.83	44.87	PK	172	1.3	H	-13.14	31.73	74.00	-42.27
2361.83	37.45	Ave	172	1.3	H	-13.14	24.31	54.00	-29.69
2492.63	43.28	PK	186	1.2	V	-13.08	30.20	74.00	-43.80
2492.63	36.92	Ave	186	1.2	V	-13.08	23.84	54.00	-30.16

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11g: Low Channel 2412MHz									
37.68	35.25	QP	252	1.6	H	-16.62	18.63	40.00	-21.37
37.68	50.92	QP	255	1.8	V	-16.62	34.30	40.00	-5.70
4824.00	54.82	PK	170	1.0	V	-1.06	53.76	74.00	-20.24
4824.00	42.10	Ave	170	1.0	V	-1.06	41.04	54.00	-12.96
7236.00	47.92	PK	172	1.9	H	1.33	49.25	74.00	-24.75
7236.00	39.18	Ave	172	1.9	H	1.33	40.51	54.00	-13.49
2346.75	45.60	PK	244	1.9	V	-13.19	32.41	74.00	-41.59
2346.75	37.59	Ave	244	1.9	V	-13.19	24.40	54.00	-29.60
2384.86	44.54	PK	282	1.2	H	-13.14	31.40	74.00	-42.60
2384.86	36.63	Ave	282	1.2	H	-13.14	23.49	54.00	-30.51
2498.89	44.86	PK	146	1.9	V	-13.08	31.78	74.00	-42.22
2498.89	36.19	Ave	146	1.9	V	-13.08	23.11	54.00	-30.89

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11g: Middle Channel 2437MHz									
37.68	35.22	QP	268	1.1	H	-16.62	18.60	40.00	-21.40
37.68	51.68	QP	190	1.6	V	-16.62	35.06	40.00	-4.94
4874.00	52.63	PK	239	1.3	V	-0.62	52.01	74.00	-21.99
4874.00	39.24	Ave	239	1.3	V	-0.62	38.62	54.00	-15.38
7311.00	46.71	PK	94	1.0	H	2.21	48.92	74.00	-25.08
7311.00	34.91	Ave	94	1.0	H	2.21	37.12	54.00	-16.88
2331.23	46.21	PK	287	1.1	V	-13.19	33.02	74.00	-40.98
2331.23	39.19	Ave	287	1.1	V	-13.19	26.00	54.00	-28.00
2372.07	43.26	PK	92	1.5	H	-13.14	30.12	74.00	-43.88
2372.07	37.59	Ave	92	1.5	H	-13.14	24.45	54.00	-29.55
2483.77	43.93	PK	99	1.5	V	-13.08	30.85	74.00	-43.15
2483.77	37.03	Ave	99	1.5	V	-13.08	23.95	54.00	-30.05

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
11g: High Channel 2462MHz									
37.68	35.43	QP	92	1.6	H	-16.62	18.81	40.00	-21.19
37.68	52.47	QP	209	1.3	V	-16.62	35.85	40.00	-4.15
4924.00	51.54	PK	177	1.3	V	-0.24	51.30	74.00	-22.70
4924.00	40.94	Ave	177	1.3	V	-0.24	40.70	54.00	-13.30
7386.00	47.13	PK	57	1.9	H	2.84	49.97	74.00	-24.03
7386.00	38.55	Ave	57	1.9	H	2.84	41.39	54.00	-12.61
2332.91	45.95	PK	144	1.3	V	-13.19	32.76	74.00	-41.24
2332.91	37.46	Ave	144	1.3	V	-13.19	24.27	54.00	-29.73
2352.53	42.84	PK	311	2.0	H	-13.14	29.70	74.00	-44.30
2352.53	38.86	Ave	311	2.0	H	-13.14	25.72	54.00	-28.28
2498.70	43.04	PK	292	1.5	V	-13.08	29.96	74.00	-44.04
2498.70	38.91	Ave	292	1.5	V	-13.08	25.83	54.00	-28.17

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
n20: Low Channel 2412MHz									
37.68	37.73	QP	231	1.4	H	-16.62	21.11	40.00	-18.89
37.68	52.68	QP	139	1.0	V	-16.62	36.06	40.00	-3.94
4824.00	51.57	PK	183	1.9	V	-1.06	50.51	74.00	-23.49
4824.00	38.97	Ave	183	1.9	V	-1.06	37.91	54.00	-16.09
7236.00	42.73	PK	29	1.1	H	1.33	44.06	74.00	-29.94
7236.00	42.45	Ave	29	1.1	H	1.33	43.78	54.00	-10.22
2340.44	45.62	PK	185	1.9	V	-13.19	32.43	74.00	-41.57
2340.44	37.06	Ave	185	1.9	V	-13.19	23.87	54.00	-30.13
2358.73	44.33	PK	161	1.3	H	-13.14	31.19	74.00	-42.81
2358.73	38.60	Ave	161	1.3	H	-13.14	25.46	54.00	-28.54
2484.62	43.08	PK	253	1.5	V	-13.08	30.00	74.00	-44.00
2484.62	38.58	Ave	253	1.5	V	-13.08	25.50	54.00	-28.50

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
n20: Middle Channel 2437MHz									
37.68	35.67	QP	58	1.7	H	-16.62	19.05	40.00	-20.95
37.68	52.92	QP	114	1.9	V	-16.62	36.30	40.00	-3.70
4874.00	54.03	PK	253	1.2	V	-0.62	53.41	74.00	-20.59
4874.00	38.68	Ave	253	1.2	V	-0.62	38.06	54.00	-15.94
7311.00	46.35	PK	238	1.5	H	2.21	48.56	74.00	-25.44
7311.00	33.29	Ave	238	1.5	H	2.21	35.50	54.00	-18.50
2339.01	46.17	PK	313	1.0	V	-13.19	32.98	74.00	-41.02
2339.01	37.65	Ave	313	1.0	V	-13.19	24.46	54.00	-29.54
2352.86	43.68	PK	144	1.5	H	-13.14	30.54	74.00	-43.46
2352.86	37.08	Ave	144	1.5	H	-13.14	23.94	54.00	-30.06
2492.53	44.46	PK	267	1.1	V	-13.08	31.38	74.00	-42.62
2492.53	38.40	Ave	267	1.1	V	-13.08	25.32	54.00	-28.68

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
n20: High Channel 2462MHz									
37.68	39.83	QP	172	1.7	H	-16.62	23.21	40.00	-16.79
37.68	52.13	QP	236	1.1	V	-16.62	35.51	40.00	-4.49
4924.00	57.51	PK	207	1.5	V	-0.24	57.27	74.00	-16.73
4924.00	39.70	Ave	207	1.5	V	-0.24	39.46	54.00	-14.54
7386.00	54.75	PK	214	1.6	H	2.84	57.59	74.00	-16.41
7386.00	41.65	Ave	214	1.6	H	2.84	44.49	54.00	-9.51
2326.38	46.13	PK	204	1.9	V	-13.19	32.94	74.00	-41.06
2326.38	37.91	Ave	204	1.9	V	-13.19	24.72	54.00	-29.28
2387.26	42.42	PK	22	1.1	H	-13.14	29.28	74.00	-44.72
2387.26	36.47	Ave	22	1.1	H	-13.14	23.33	54.00	-30.67
2483.95	44.78	PK	241	1.1	V	-13.08	31.70	74.00	-42.30
2483.95	38.68	Ave	241	1.1	V	-13.08	25.60	54.00	-28.40

8 Band Edge Measurement

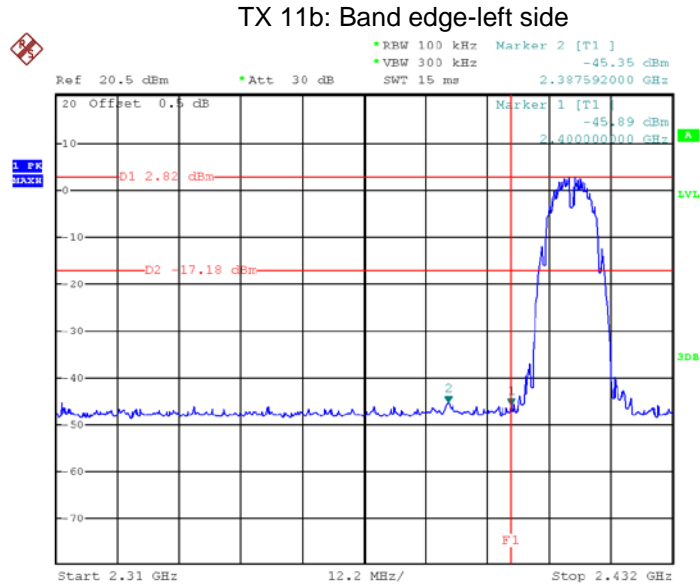
Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	558074 D01 15.247 Meas Guidance v05r02
Test Limit:	Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power 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

8.1 Test Produce

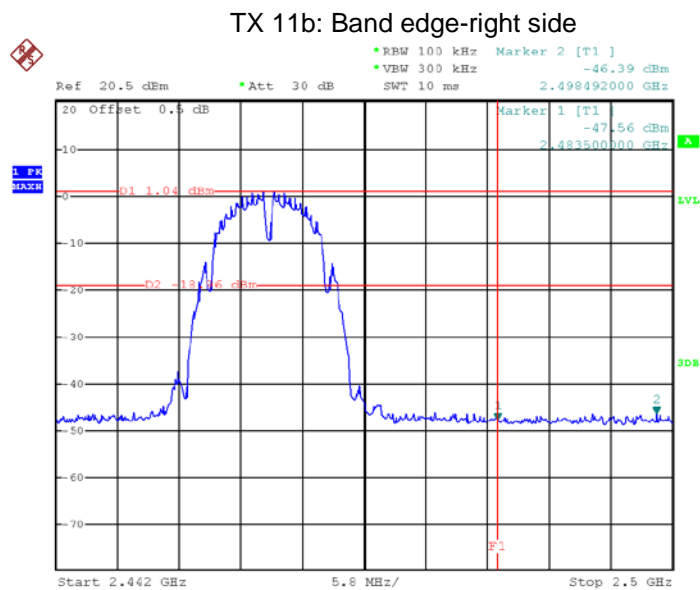
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then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

8.2 Test Result

Test result plots shown as follows:

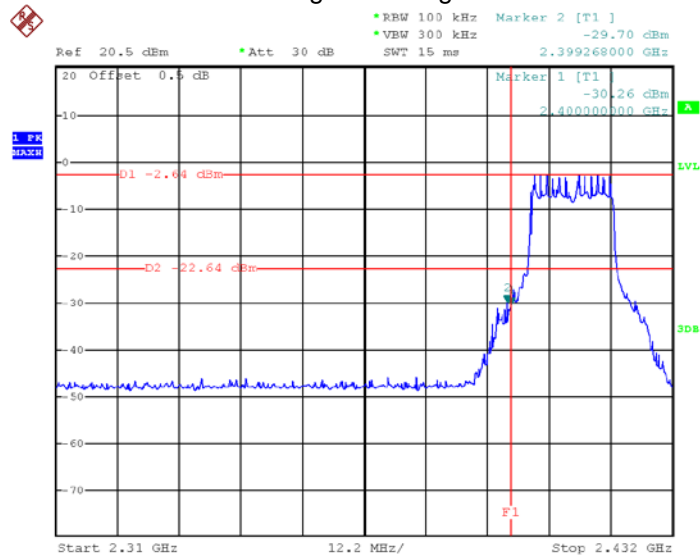


Date: 26.NOV.2019 21:24:18



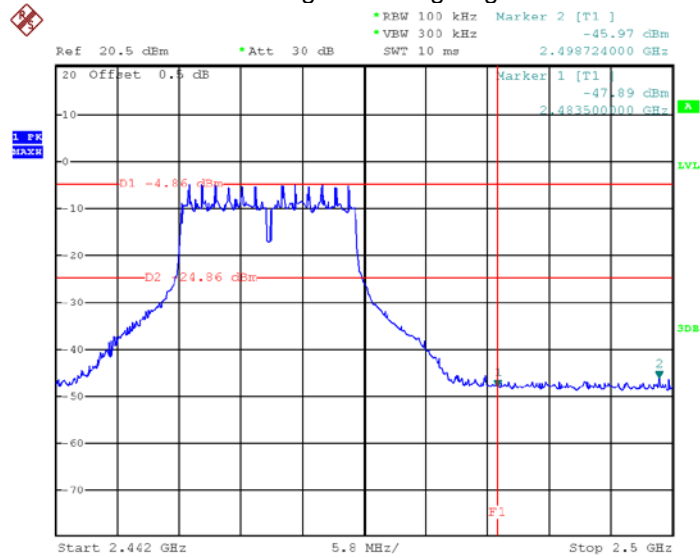
Date: 26.NOV.2019 21:20:12

TX 11g: Band edge-left side



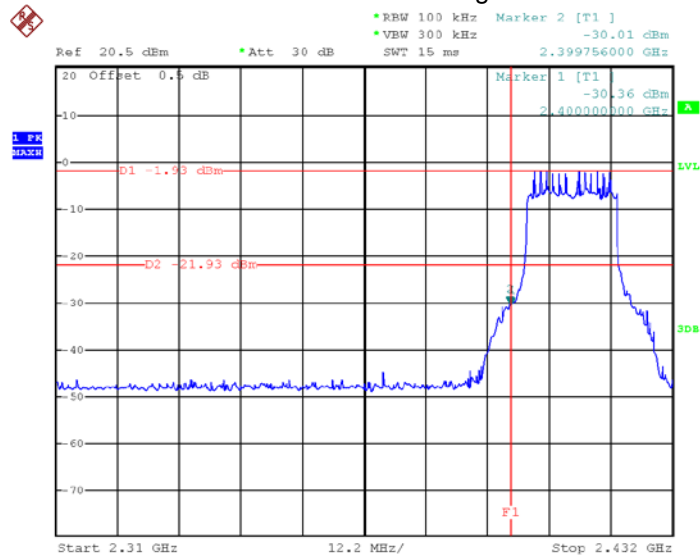
Date: 26.NOV.2019 21:27:30

TX 11g: Band edge-right side



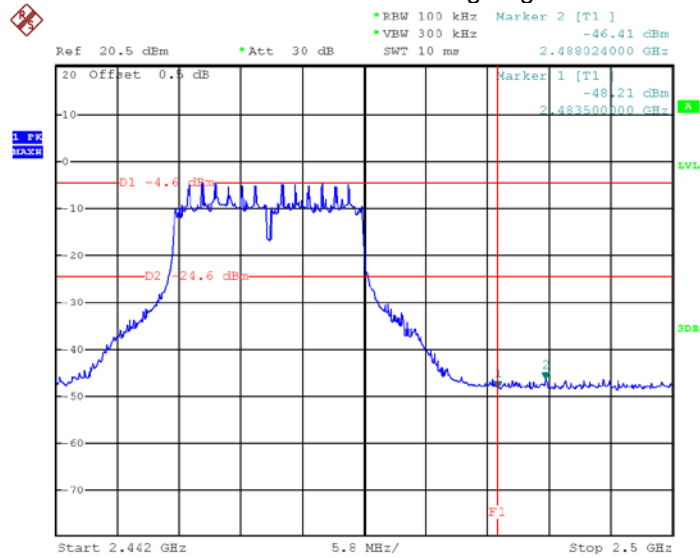
Date: 26.NOV.2019 21:17:29

TX 11n HT20: Band edge-left side



Date: 26.NOV.2019 21:29:58

TX 11n HT20: Band edge-right side



Date: 26.NOV.2019 21:15:07

9 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 15.247 Meas Guidance v05r02

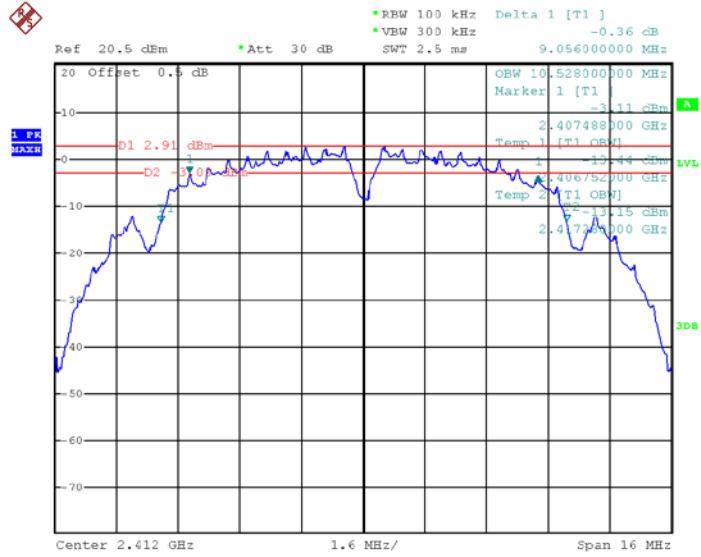
9.1 Test Procedure:

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

9.2 Test Result:

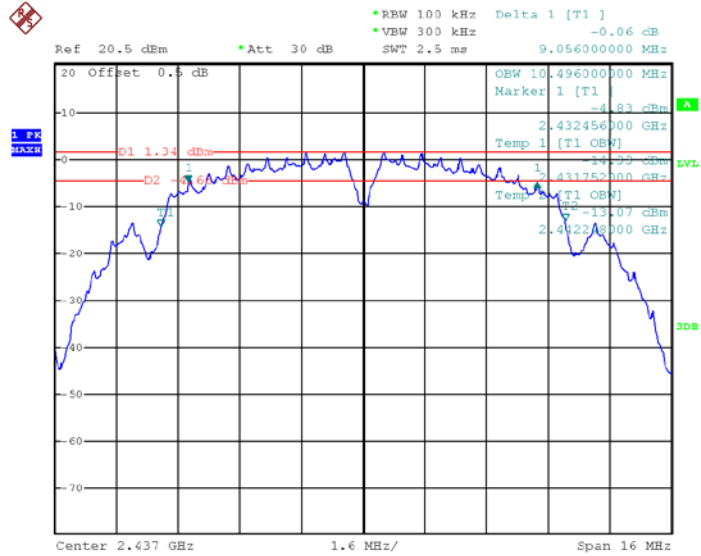
Operation mode	6dB Bandwidth (MHz)			99% Bandwidth (MHz)		
	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
TX 11b	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	9.056	9.056	9.056	10.528	10.496	10.464
TX 11g	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	16.456	16.450	16.450	16.500	16.500	16.500
TX 11n HT20	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	17.658	17.658	17.658	17.712	17.712	17.712

Mode: TX 11b channel 1



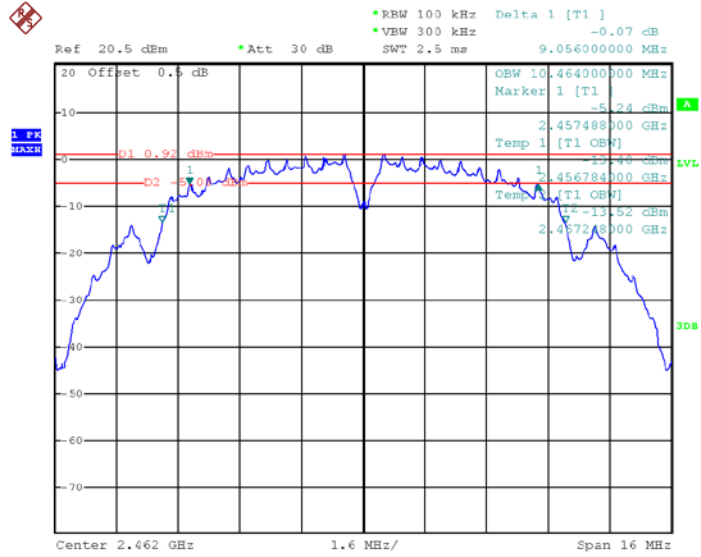
Date: 26.NOV.2019 20:49:43

Mode: TX 11b channel 6



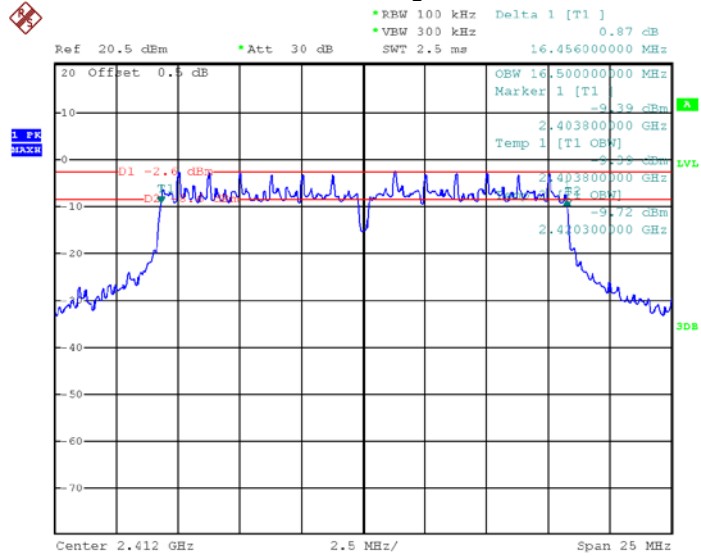
Date: 26.NOV.2019 20:48:03

Mode: TX 11b channel 11



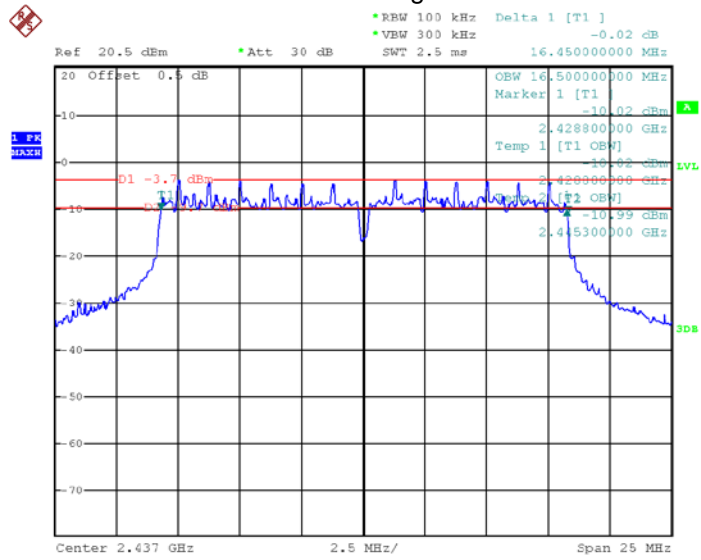
Date: 26.NOV.2019 20:45:53

Mode: TX 11g channel 1



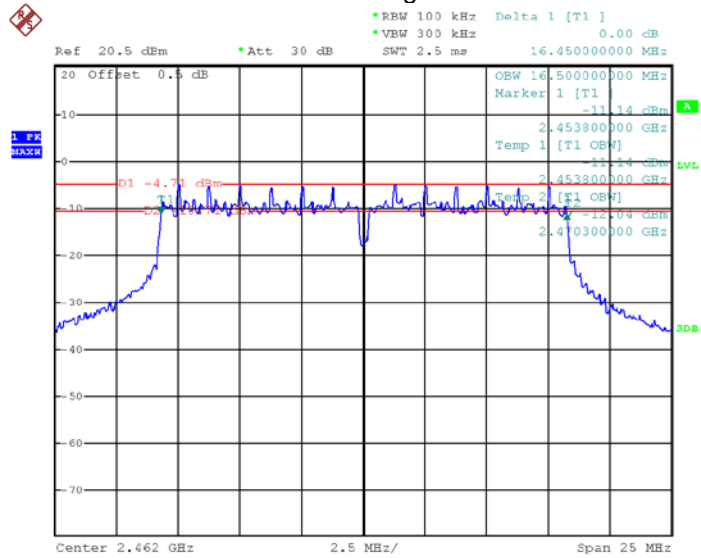
Date: 26.NOV.2019 20:37:41

Mode: TX 11g channel 6



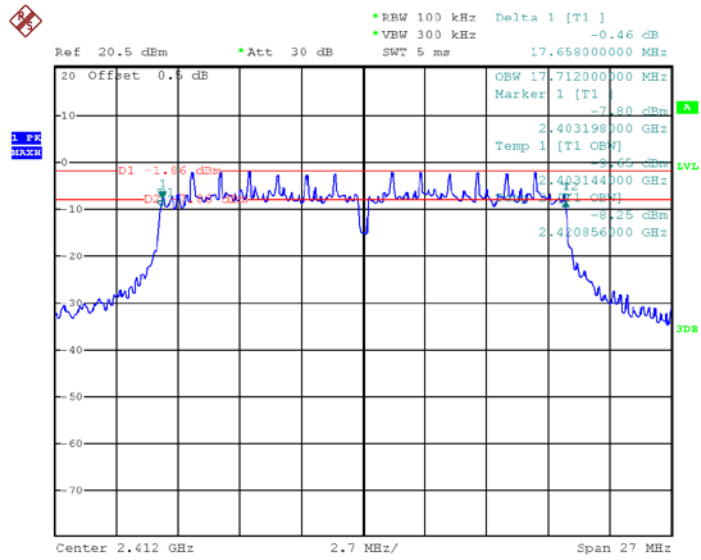
Date: 26.NOV.2019 20:40:49

Mode: TX 11g channel 11



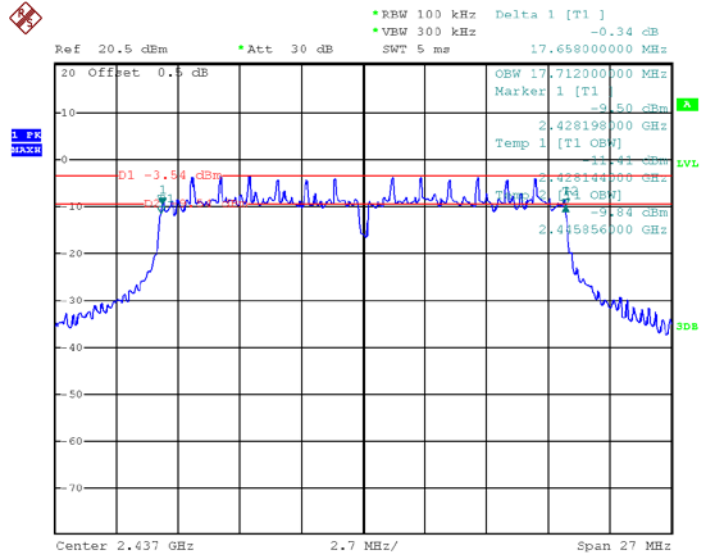
Date: 26.NOV.2019 20:42:47

Mode: TX 11n HT20 channel 1



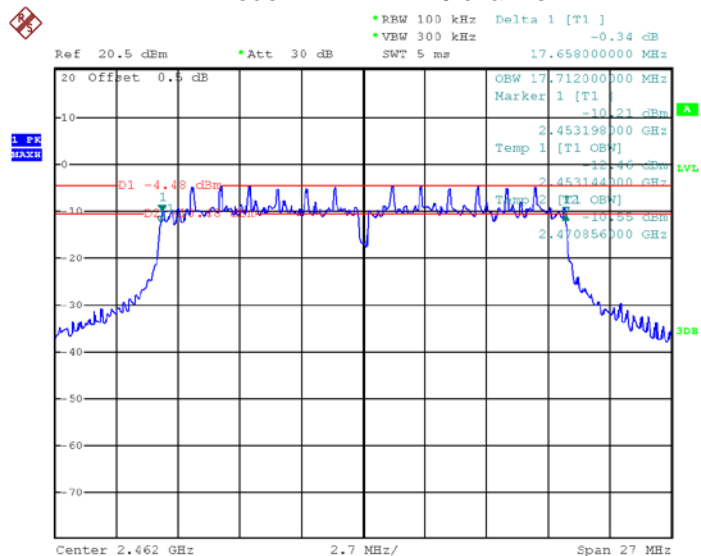
Date: 26.NOV.2019 20:32:45

Mode: TX 11n HT20 channel 6



Date: 26.NOV.2019 20:29:39

Mode: TX 11n HT20 channel 11



Date: 26.NOV.2019 20:26:59

10 Maximum Output Power

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

558074 D01 15.247 Meas Guidance v05r02

10.1 Test Procedure:

558074 D01 15.247 Meas Guidance v05r02

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

10.2 Test Result:

Test mode :TX 11b		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
15.31	13.73	13.18
Limit: 1W/30dBm		
Test mode :TX 11g		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
16.04	14.08	13.84
Limit: 1W/30dBm		
Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
16.35	14.72	13.83
Limit: 1W/30dBm		

11 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 15.247 Meas Guidance v05r02

11.1 Test Procedure:

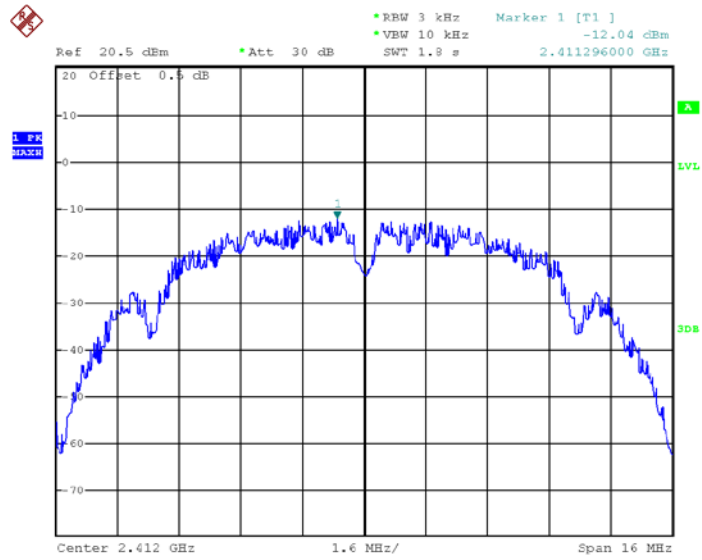
558074 D01 15.247 Meas Guidance v05r02

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

11.2 Test Result:

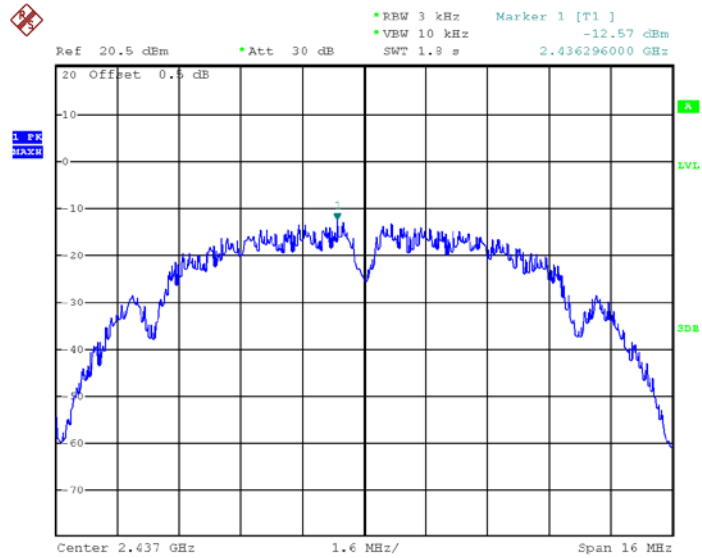
Test mode :TX 11b		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-12.04	-12.57	-13.43
Limit: 8dBm per 3kHz		
Test mode :TX 11g		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-18.19	-19.40	-20.32
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-19.40	-20.03	-20.96
Limit: 8dBm per 3kHz		

Model: TX 11b Low Channel



Date: 26.NOV.2019 20:51:38

Model: TX 11b Middle channel



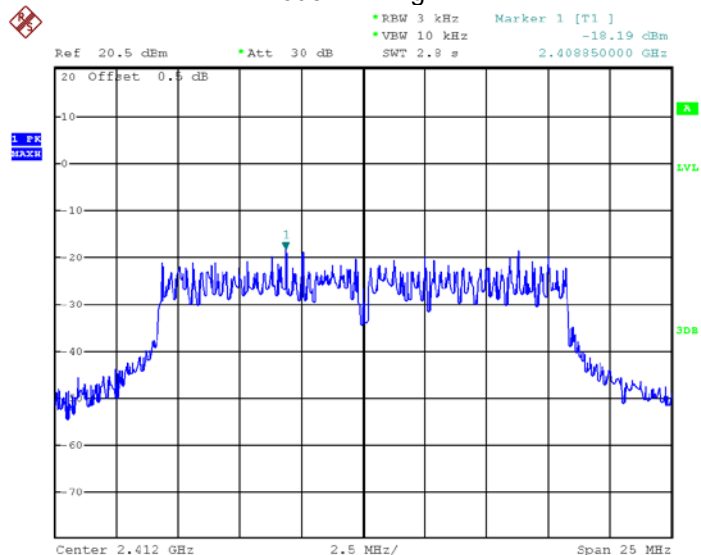
Date: 26.NOV.2019 20:55:39

Model: TX 11b High channel



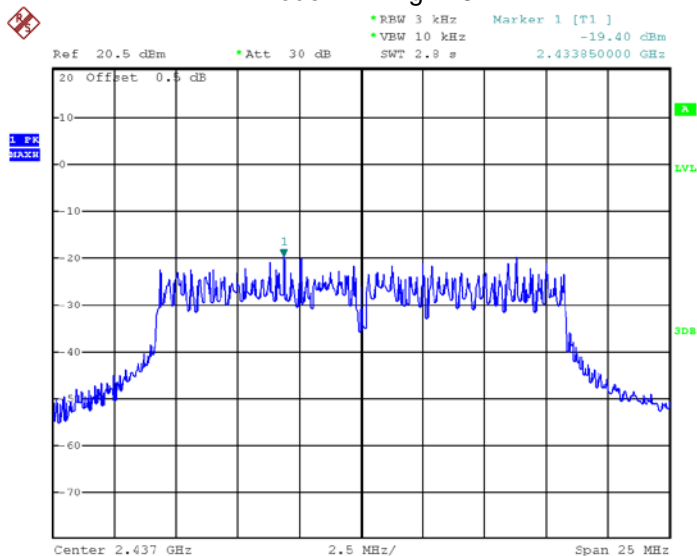
Date: 26.NOV.2019 20:59:18

Mode :TX 11g 2412MHz



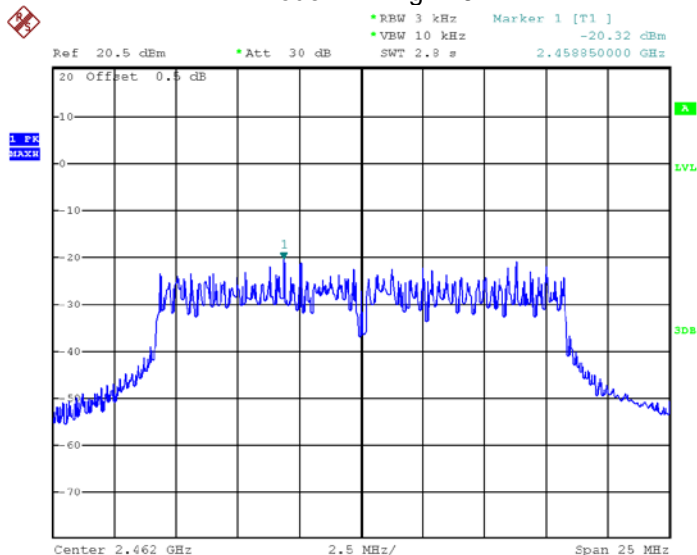
Date: 26.NOV.2019 21:05:20

Mode :TX 11g 2437MHz



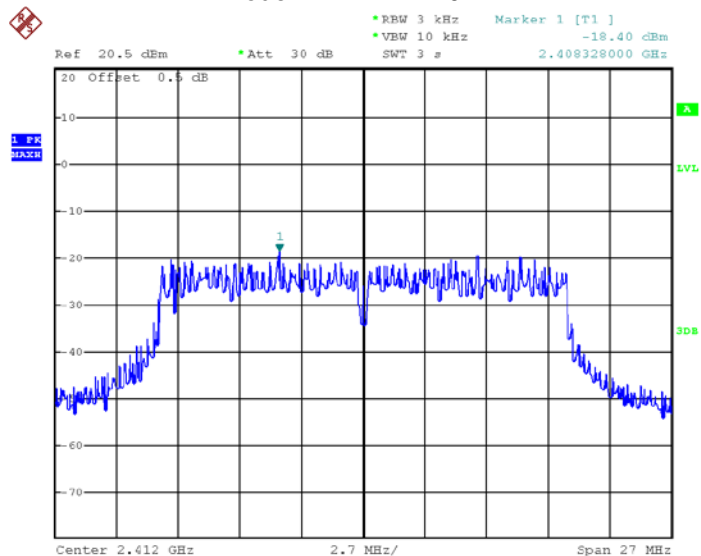
Date: 26.NOV.2019 21:03:22

Mode :TX 11g 2462MHz



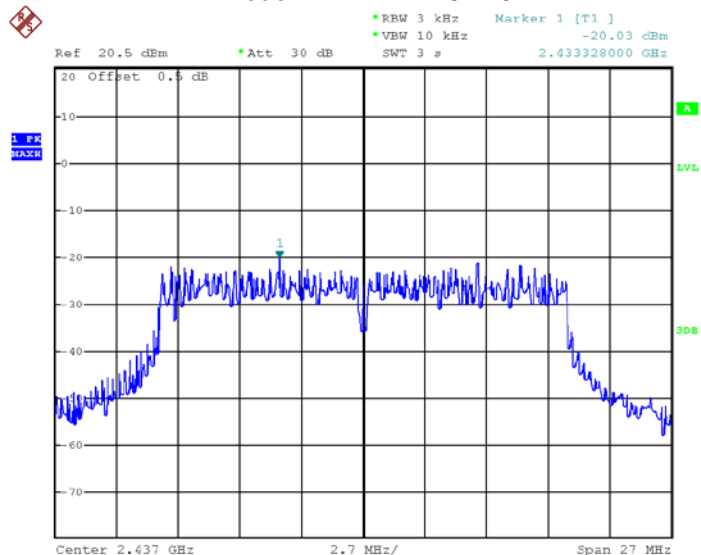
Date: 26.NOV.2019 21:01:12

Mode: TX 11n HT20 2412MHz

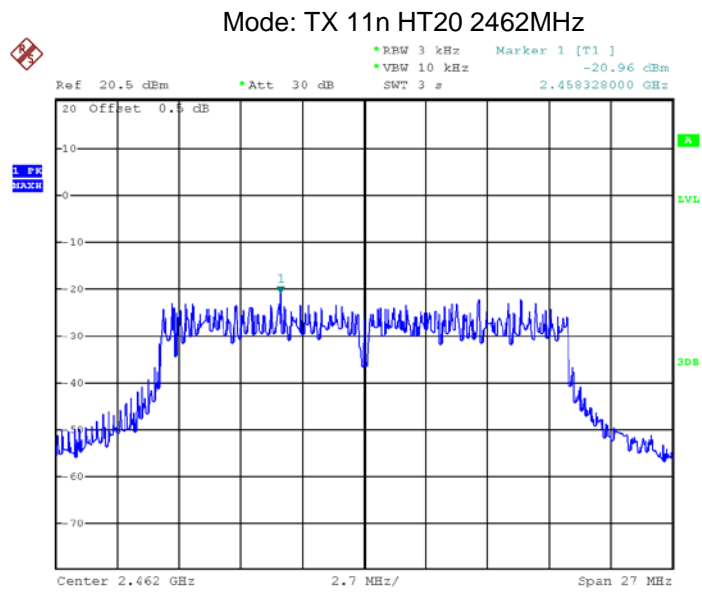


Date: 26.NOV.2019 21:07:23

Mode: TX 11n HT20 2437MHz



Date: 26.NOV.2019 21:08:44



Date: 26.NOV.2019 21:10:42

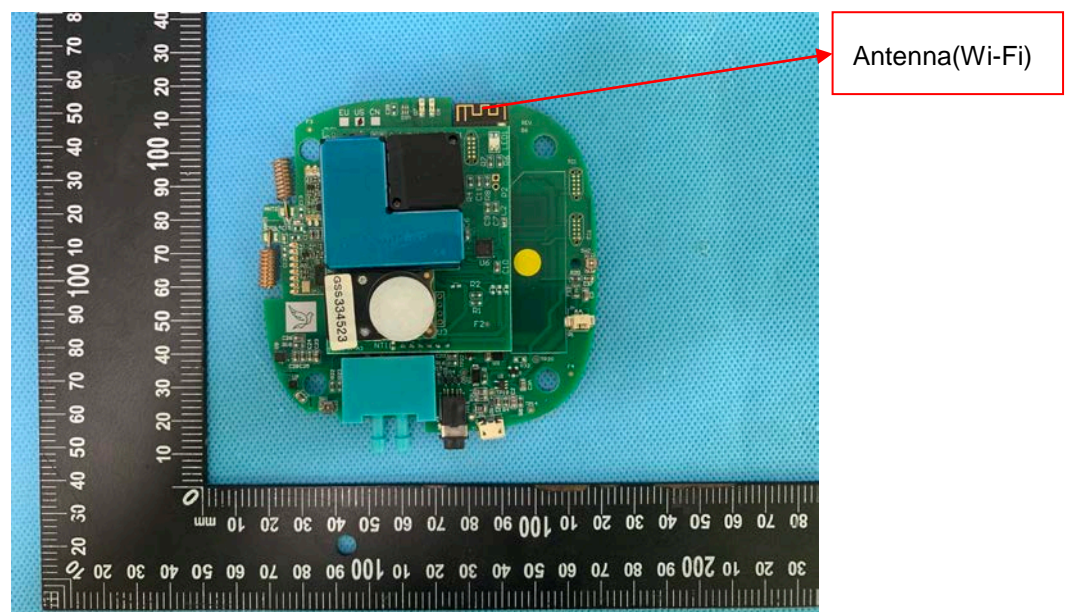
12 Antenna Requirement

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 have one Integrated Antenna, meets the requirements of FCC 15.203.



13 FCC ID: 2AU33ELT100004 RF Exposure Report

Test Requirement: FCC Part 1.1307

Test Method: FCC Part 2.1091

13.1 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.

(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

13.2 Evaluation Result

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the EUT RF output power, the minimum mobile separation distance, $d=0.2\text{m}$, as well as the gain of the used antenna, the RF power density can be obtained

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Output Power (dBm)	Output Power (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
2.0	1.585	16.35	43.15	0.0136	1

Result: Compliance

No SAR measurement is required.

14 Photographs - Test Setup Photos

Note: Please refer to Photos: ELT-100004_Test Setup Photos.

15 Photographs - Constructional Details

15.1 External Photos

Note: Please refer to Photos: ELT-100004_External Photos.

15.2 Internal Photos

Note: Please refer to Photos: ELT-100004_Internal Photos.

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