

TEST REPORT

Applicant: Shenzhen Transtar Electronics Co., LTD

Address of Applicant: Colinda Industrial Park, Opposite Side of No. 15, Furong Road, Songgang, Bao'an, Shenzhen, China

Manufacturer/Factory: Shenzhen Transtar Electronics Co., LTD

Address of Manufacturer/Factory: Colinda Industrial Park, Opposite Side of No. 15, Furong Road, Songgang, Bao'an, Shenzhen, China

Equipment Under Test (EUT)

Product Name: wireless TV speaker

Model No.: SPK-1000FM, TV-5000, SPK-2000

Trade Mark: AudioRange, TOSIMA, Transtar

FCC ID: 2A12S-TV-5000

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.249

Date of sample receipt: December 09, 2020

Date of Test: December 10-21, 2020

Date of report issued: December 22, 2020

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo

Laboratory Manager

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2 Version

Version No.	Date	Description
00	December 22, 2020	Original

Prepared By:


Project Engineer

Date:

December 22, 2020

Check By:


Reviewer

Date:

December 22, 2020

3 Contents

	Page
1 COVER PAGE.....	1
2 VERSION.....	2
3 CONTENTS	3
4 TEST SUMMARY	4
4.1 MEASUREMENT UNCERTAINTY	4
5 GENERAL INFORMATION.....	5
5.1 GENERAL DESCRIPTION OF EUT	5
5.2 TEST MODE	7
5.3 DESCRIPTION OF SUPPORT UNITS	7
5.4 DEVIATION FROM STANDARDS.....	7
5.5 ABNORMALITIES FROM STANDARD CONDITIONS	7
5.6 TEST FACILITY.....	7
5.7 TEST LOCATION	7
5.8 ADDITIONAL INSTRUCTIONS.....	7
6 TEST INSTRUMENTS LIST	8
7 TEST RESULTS AND MEASUREMENT DATA.....	10
7.1 ANTENNA REQUIREMENT	10
7.2 CONDUCTED EMISSIONS	11
7.3 RADIATED EMISSION METHOD.....	14
7.3.1 <i>Field Strength of The Fundamental Signal</i>	16
7.3.2 <i>Spurious emissions</i>	17
7.3.3 <i>Bandedge emissions</i>	22
7.4 20dB OCCUPY BANDWIDTH.....	24
8 TEST SETUP PHOTO	26
9 EUT CONSTRUCTIONAL DETAILS	26

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

Remarks:

1. Test according to ANSI C63.10: 2013.
2. Pass: The EUT complies with the essential requirements in the standard.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	wireless TV speaker
Model No.:	SPK-1000FM, TV-5000, SPK-2000
Test Model No.:	SPK-1000FM
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are appearance color and model name for commercial purpose.	
Serial No.:	N/A
Hardware Version:	TV-5000RX-VER6 TV-5000TX-VER5
Software Version:	TV5000_TX_0xB6_20190809_V0.31
Test sample(s) ID:	GTS202012000086-1
Sample(s) Status	Engineered sample
Operation Frequency:	2403MHz~2478MHz
Channel numbers:	26
Channel separation:	3MHz
Modulation type:	GFSK
Antenna Type:	Integral Antenna
Antenna gain:	0dBi
Power supply:	Adapter Model: SW018S090150U1 Input: AC 100-240V, 50/60Hz, 0.5A Output: DC 9V, 1.5A

Operation Frequency each of channel					
Channel	Frequency(MHz)	Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2403	11	2433	21	2463
2	2406	12	2436	22	2466
3	2409	13	2439	23	2469
4	2412	14	2442	24	2472
5	2415	15	2445	25	2475
6	2418	16	2448	26	2478
7	2421	17	2451	27	
8	2424	18	2454	28	
9	2427	19	2457	29	
10	2430	20	2460	30	

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2403MHz
The middle channel	2439MHz
The Highest channel	2478MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
<i>Remark: During the test, the test voltage was tuned from AC100V to AC240V, and found that the worst case was the AC100V. So the report just shows that condition's data.</i>	

Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	88.25	89.91	87.34

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383.

- **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123- 128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 25 2020	June. 24 2021
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 25 2020	June. 24 2021
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 25 2020	June. 24 2021
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 25 2020	June. 24 2021
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 25 2020	June. 24 2021
9	Coaxial Cable	GTS	N/A	GTS211	June. 25 2020	June. 24 2021
10	Coaxial cable	GTS	N/A	GTS210	June. 25 2020	June. 24 2021
11	Coaxial Cable	GTS	N/A	GTS212	June. 25 2020	June. 24 2021
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 25 2020	June. 24 2021
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 25 2020	June. 24 2021
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 25 2020	June. 24 2021
15	Band filter	Amindeon	82346	GTS219	June. 25 2020	June. 24 2021
16	Power Meter	Anritsu	ML2495A	GTS540	June. 25 2020	June. 24 2021
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 25 2020	June. 24 2021
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 25 2020	June. 24 2021
19	Splitter	Agilent	11636B	GTS237	June. 25 2020	June. 24 2021
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 25 2020	June. 24 2021
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 18 2020	Oct. 17 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 25 2020	June. 24 2021

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 25 2020	June. 24 2021
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 25 2020	June. 24 2021
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 25 2020	June. 24 2021
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 25 2020	June. 24 2021
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 25 2020	June. 24 2021

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 25 2020	June. 24 2021
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 25 2020	June. 24 2021
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 25 2020	June. 24 2021
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 25 2020	June. 24 2021
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 25 2020	June. 24 2021
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 25 2020	June. 24 2021
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 25 2020	June. 24 2021

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 25 2020	June. 24 2021
2	Barometer	ChangChun	DYM3	GTS255	June. 25 2020	June. 24 2021

7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
<p>15.203 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, 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.</p> <p>15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p>	
EUT Antenna:	
<p><i>The antenna is Integral antenna, the best case gain of the are antennas 0dBi, reference to the appendix II for details</i></p>	

7.2 Conducted Emissions

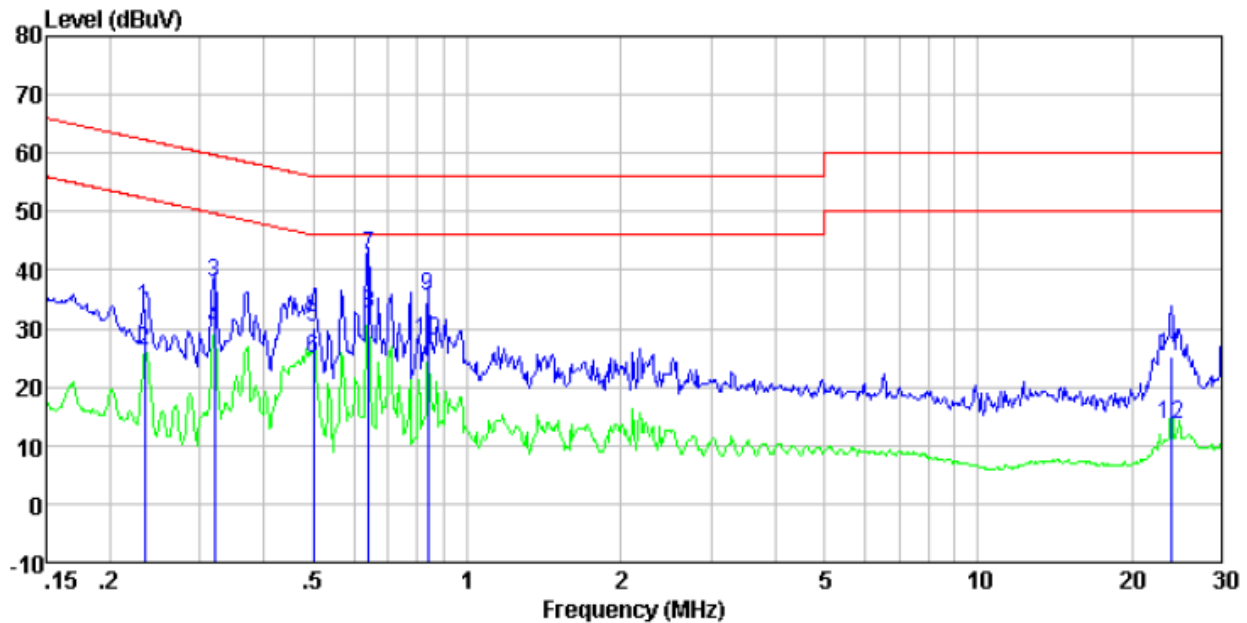
Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto					
Limit:	Frequency range (MHz)		Limit (dBuV)			
			Quasi-peak		Average	
	0.15-0.5		66 to 56*		56 to 46*	
	0.5-5		56		46	
5-30		60		50		
* Decreases with the logarithm of the frequency.						
Test setup:	<p><i>Remark:</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>					
Test procedure:	<ol style="list-style-type: none"> 1. The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. 					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data

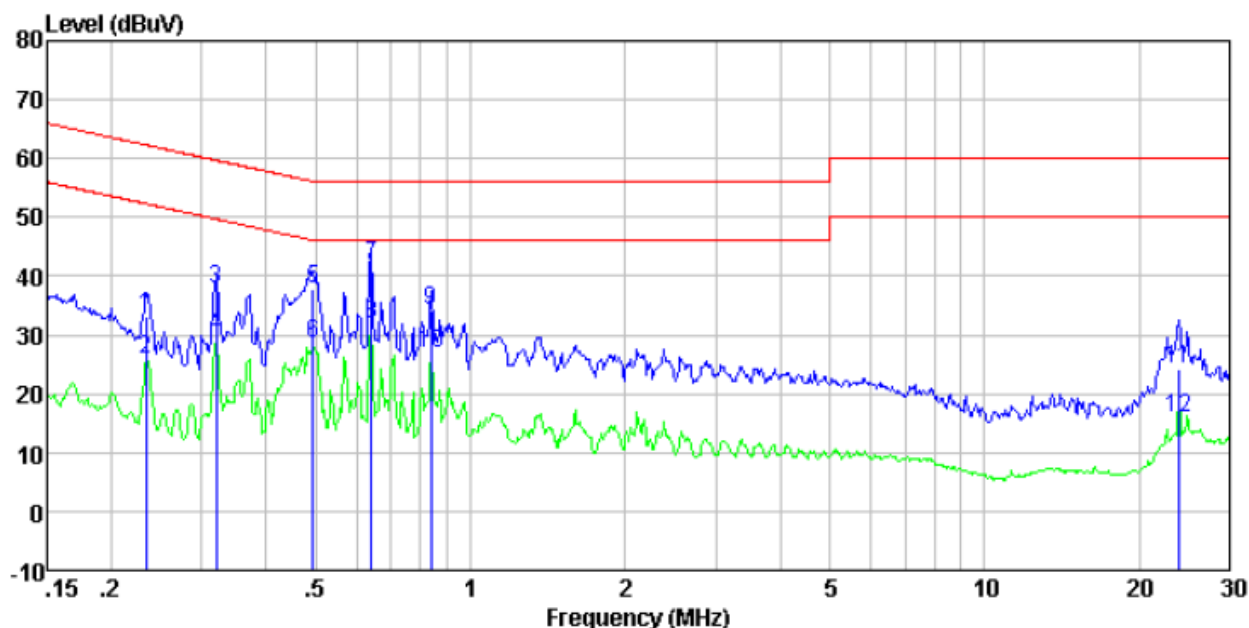
Pre-scan all test modes, found worst case at 2439MHz, and so only show the test result of 2439MHz

Line:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.23	13.01	20.40	0.11	33.52	62.30	-28.78	QP
0.23	5.63	20.40	0.11	26.14	52.30	-26.16	Average
0.32	17.50	20.39	0.10	37.99	59.71	-21.72	QP
0.32	9.46	20.39	0.10	29.95	49.71	-19.76	Average
0.50	9.85	20.32	0.11	30.28	56.01	-25.73	QP
0.50	4.58	20.32	0.11	25.01	46.01	-21.00	Average
0.64	22.03	20.27	0.12	42.42	56.00	-13.58	QP
0.64	12.00	20.27	0.12	32.39	46.00	-13.61	Average
0.84	15.08	20.23	0.14	35.45	56.00	-20.55	QP
0.84	7.34	20.23	0.14	27.71	46.00	-18.29	Average
23.89	4.60	20.34	0.23	25.17	60.00	-34.83	QP
23.89	-7.12	20.34	0.23	13.45	50.00	-36.55	Average

Neutral:

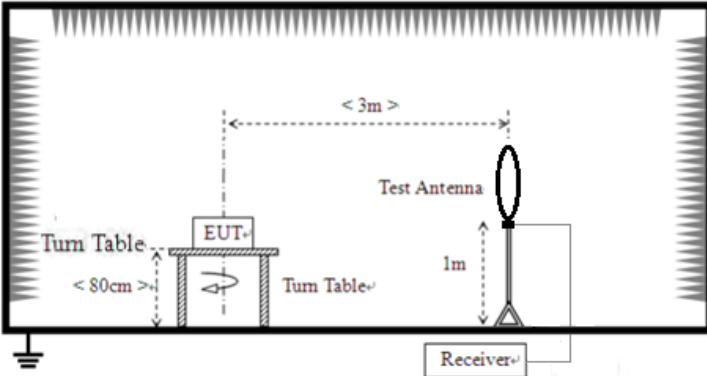


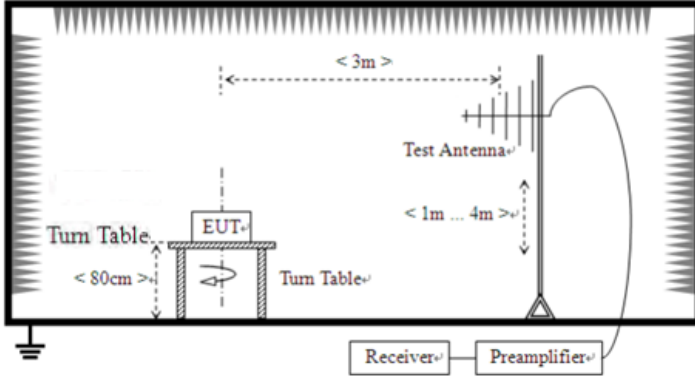
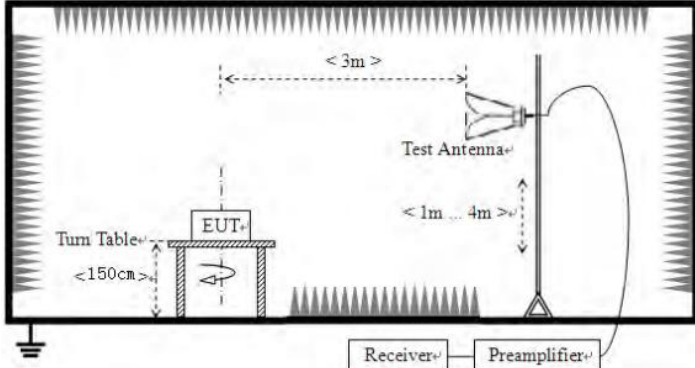
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.23	12.71	20.40	0.11	33.22	62.30	-29.08	QP
0.23	5.29	20.40	0.11	25.80	52.30	-26.50	Average
0.32	17.20	20.39	0.10	37.69	59.71	-22.02	QP
0.32	9.24	20.39	0.10	29.73	49.71	-19.98	Average
0.49	17.42	20.32	0.11	37.85	56.10	-18.25	QP
0.49	8.01	20.32	0.11	28.44	46.10	-17.66	Average
0.64	21.37	20.27	0.12	41.76	56.00	-14.24	QP
0.64	11.31	20.27	0.12	31.70	46.00	-14.30	Average
0.84	13.77	20.23	0.14	34.14	56.00	-21.86	QP
0.84	6.36	20.23	0.14	26.73	46.00	-19.27	Average
23.89	3.76	20.34	0.23	24.33	60.00	-35.67	QP
23.89	-4.74	20.34	0.23	15.83	50.00	-34.17	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz-150kHz	Quasi-peak	200Hz	300Hz	Quasi-peak Value
	150kHz-30MHz	Quasi-peak	9kHz	10kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark	
	2400MHz-2483.5MHz	94.00		Average Value	
		114.00		Peak Value	
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)		Remark	
	0.009MHz-0.490MHz	2400/F(kHz) @300m		Quasi-peak Value	
	0.490MHz-1.705MHz	24000/F(kHz) @30m		Quasi-peak Value	
	1.705MHz-30.0MHz	30 @30m		Quasi-peak Value	
	30MHz-88MHz	100 @3m		Quasi-peak Value	
	88MHz-216MHz	150 @3m		Quasi-peak Value	
	216MHz-960MHz	200 @3m		Quasi-peak Value	
	960MHz-1GHz	500 @3m		Quasi-peak Value	
	Above 1GHz	500 @3m		Average Value	
	5000 @3m		Peak Value		
Limit: (band edge)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.				
Test setup:	<p>For radiated emissions from 9kHz to 30MHz</p>  <p>For radiated emissions from 30MHz to 1GHz</p>				

	 <p>For radiated emissions above 1GHz</p> 						
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 						
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>						
<p>Test mode:</p>	<p>Refer to section 5.2 for details</p>						
<p>Test environment:</p>	<table border="1"> <tr> <td>Temp.:</td> <td>25 °C</td> <td>Humid.:</td> <td>52%</td> <td>Press.:</td> <td>1012mbar</td> </tr> </table>	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar		
<p>Test results:</p>	<p>Pass</p>						

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2403.00	91.72	27.58	5.39	34.01	90.68	114.00	-23.32	Vertical
2403.00	86.19	27.58	5.39	34.01	85.15	114.00	-28.85	Horizontal
2439.00	91.88	27.48	5.43	33.96	90.83	114.00	-23.17	Vertical
2439.00	85.88	27.48	5.43	33.96	84.83	114.00	-29.17	Horizontal
2478.00	90.66	27.52	5.47	33.92	89.73	114.00	-24.27	Vertical
2478.00	84.83	27.52	5.47	33.92	83.90	114.00	-30.10	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2403.00	81.76	27.58	5.39	34.01	80.72	94.00	-13.28	Vertical
2403.00	76.61	27.58	5.39	34.01	75.57	94.00	-18.43	Horizontal
2439.00	82.02	27.48	5.43	33.96	80.97	94.00	-13.03	Vertical
2439.00	75.32	27.48	5.43	33.96	74.27	94.00	-19.73	Horizontal
2478.00	81.09	27.52	5.47	33.92	80.16	94.00	-13.84	Vertical
2478.00	75.56	27.52	5.47	33.92	74.63	94.00	-19.37	Horizontal

7.3.2 Spurious emissions

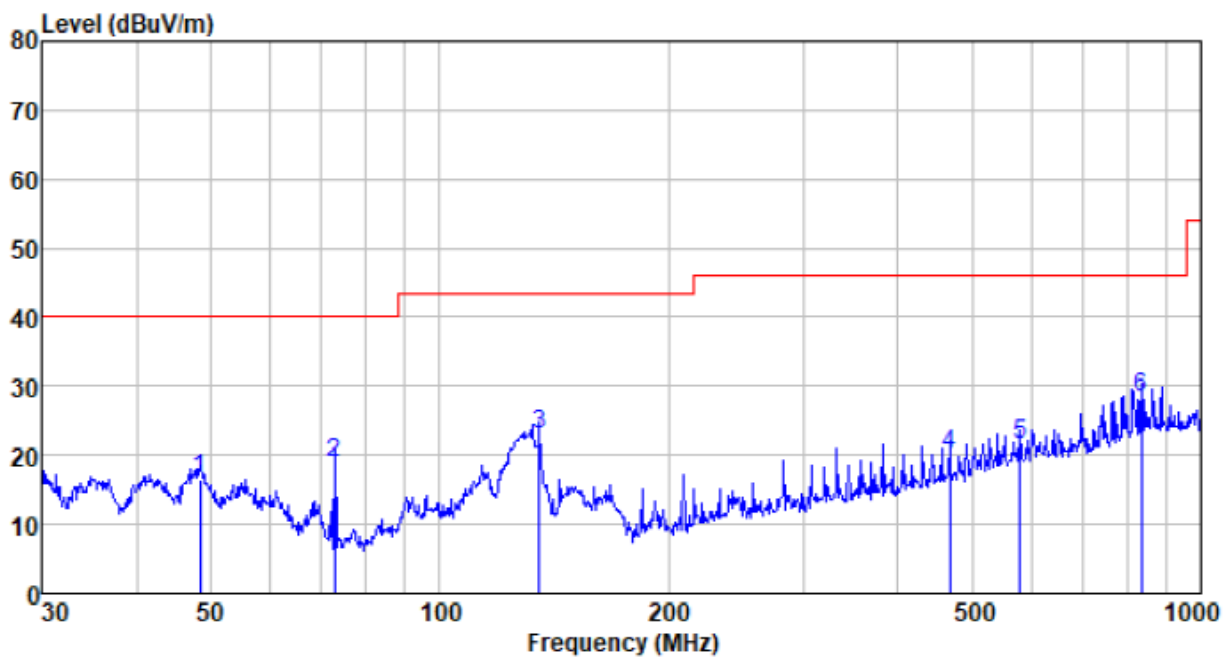
■ Below 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

■ Below 1GHz

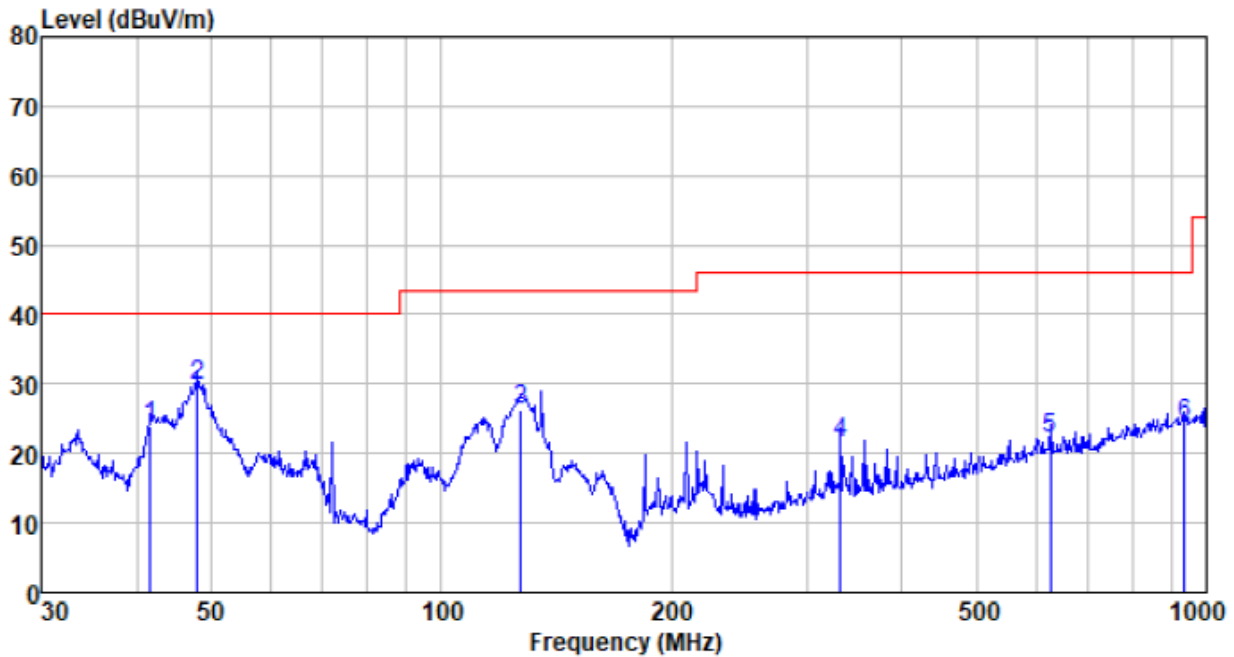
Pre-scan all test modes, found worst case at 2439MHz, and so only show the test result of 2439MHz

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
48.502	39.69	12.29	0.76	36.11	16.63	40.00	-23.37	QP
72.847	47.05	7.47	0.96	36.47	19.01	40.00	-20.99	QP
135.032	50.62	7.78	1.47	36.98	22.89	43.50	-20.61	QP
467.235	37.84	16.69	3.17	37.51	20.19	46.00	-25.81	QP
578.670	36.52	19.06	3.64	37.53	21.69	46.00	-24.31	QP
836.244	39.60	21.75	4.60	37.61	28.34	46.00	-17.66	QP

Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
41.713	46.63	12.22	0.68	35.76	23.77	40.00	-16.23	QP
47.994	52.99	12.28	0.75	36.09	29.93	40.00	-10.07	QP
127.218	53.23	8.51	1.41	36.93	26.22	43.50	-17.28	QP
332.519	42.28	14.20	2.53	37.46	21.55	46.00	-24.45	QP
625.078	36.46	19.52	3.82	37.56	22.24	46.00	-23.76	QP
935.546	34.21	22.45	4.99	37.57	24.08	46.00	-21.92	QP

■ Above 1GHz

Test channel:	Lowest channel
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4806.00	35.34	31.78	8.60	32.09	43.63	74.00	-30.37	Vertical
7209.00	30.53	36.15	11.65	32.00	46.33	74.00	-27.67	Vertical
9612.00	30.31	37.95	14.14	31.62	50.78	74.00	-23.22	Vertical
12015.00	*					74.00		Vertical
14418.00	*					74.00		Vertical
4806.00	39.23	31.78	8.60	32.09	47.52	74.00	-26.48	Horizontal
7209.00	32.11	36.15	11.65	32.00	47.91	74.00	-26.09	Horizontal
9612.00	29.55	37.95	14.14	31.62	50.02	74.00	-23.98	Horizontal
12015.00	*					74.00		Horizontal
14418.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4806.00	24.53	31.78	8.60	32.09	32.82	54.00	-21.18	Vertical
7209.00	19.44	36.15	11.65	32.00	35.24	54.00	-18.76	Vertical
9612.00	18.64	37.95	14.14	31.62	39.11	54.00	-14.89	Vertical
12015.00	*					54.00		Vertical
14418.00	*					54.00		Vertical
4806.00	28.54	31.78	8.60	32.09	36.83	54.00	-17.17	Horizontal
7209.00	21.48	36.15	11.65	32.00	37.28	54.00	-16.72	Horizontal
9612.00	18.20	37.95	14.14	31.62	38.67	54.00	-15.33	Horizontal
12015.00	*					54.00		Horizontal
14418.00	*					54.00		Horizontal

Test channel:	Middle
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4878.00	35.46	31.85	8.67	32.12	43.86	74.00	-30.14	Vertical
7317.00	30.61	36.37	11.72	31.89	46.81	74.00	-27.19	Vertical
9756.00	30.38	38.35	14.25	31.62	51.36	74.00	-22.64	Vertical
12195.00	*					74.00		Vertical
14634.00	*					74.00		Vertical
4878.00	39.37	31.85	8.67	32.12	47.77	74.00	-26.23	Horizontal
7317.00	32.20	36.37	11.72	31.89	48.40	74.00	-25.60	Horizontal
9756.00	29.63	38.35	14.25	31.62	50.61	74.00	-23.39	Horizontal
12195.00	*					74.00		Horizontal
14634.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4878.00	24.63	31.85	8.67	32.12	33.03	54.00	-20.97	Vertical
7317.00	19.50	36.37	11.72	31.89	35.70	54.00	-18.30	Vertical
9756.00	18.70	38.35	14.25	31.62	39.68	54.00	-14.32	Vertical
12195.00	*					54.00		Vertical
14634.00	*					54.00		Vertical
4878.00	28.65	31.85	8.67	32.12	37.05	54.00	-16.95	Horizontal
7317.00	21.56	36.37	11.72	31.89	37.76	54.00	-16.24	Horizontal
9756.00	18.27	38.35	14.25	31.62	39.25	54.00	-14.75	Horizontal
12195.00	*					54.00		Horizontal
14634.00	*					54.00		Horizontal

Test channel:	Highest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4956.00	36.06	31.93	8.73	32.16	44.56	74.00	-29.44	Vertical
7434.00	31.01	36.59	11.79	31.78	47.61	74.00	-26.39	Vertical
9912.00	30.74	38.81	14.38	31.88	52.05	74.00	-21.95	Vertical
12390.00	*					74.00		Vertical
14868.00	*					74.00		Vertical
4956.00	40.10	31.93	8.73	32.16	48.60	74.00	-25.40	Horizontal
7434.00	32.65	36.59	11.79	31.78	49.25	74.00	-24.75	Horizontal
9912.00	30.04	38.81	14.38	31.88	51.35	74.00	-22.65	Horizontal
12390.00	*					74.00		Horizontal
14868.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4956.00	25.16	31.93	8.73	32.16	33.66	54.00	-20.34	Vertical
7434.00	19.87	36.59	11.79	31.78	36.47	54.00	-17.53	Vertical
9912.00	19.02	38.81	14.38	31.88	40.33	54.00	-13.67	Vertical
12390.00	*					54.00		Vertical
14868.00	*					54.00		Vertical
4956.00	29.26	31.93	8.73	32.16	37.76	54.00	-16.24	Horizontal
7434.00	21.96	36.59	11.79	31.78	38.56	54.00	-15.44	Horizontal
9912.00	18.65	38.81	14.38	31.88	39.96	54.00	-14.04	Horizontal
12390.00	*					54.00		Horizontal
14868.00	*					54.00		Horizontal

Remarks:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *“*” means this data is too weak instrument of signal is unable to test.*

7.3.3 Bandedge emissions

All of the restriction bands were tested, and only the data of worst case was exhibited.

Test channel:	Lowest channel
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	46.06	27.91	5.30	24.64	54.63	74.00	-19.37	Horizontal
2390.00	50.30	27.59	5.38	24.71	58.56	74.00	-15.44	Horizontal
2400.00	52.04	27.41	5.39	24.72	60.12	74.00	-13.88	Horizontal
2310.00	46.91	27.91	5.30	24.64	55.48	74.00	-18.52	Vertical
2390.00	51.68	27.59	5.38	24.71	59.94	74.00	-14.06	Vertical
2400.00	53.28	27.41	5.39	24.72	61.36	74.00	-12.64	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	35.89	27.91	5.30	24.64	44.46	54.00	-9.54	Horizontal
2390.00	37.31	27.59	5.38	24.71	45.57	54.00	-8.43	Horizontal
2400.00	38.73	27.41	5.39	24.72	46.81	54.00	-7.19	Horizontal
2310.00	36.06	27.91	5.30	24.64	44.63	54.00	-9.37	Vertical
2390.00	38.27	27.59	5.38	24.71	46.53	54.00	-7.47	Vertical
2400.00	39.27	27.41	5.39	24.72	47.35	54.00	-6.65	Vertical

Test channel:	Highest channel
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	48.54	27.53	5.47	24.80	56.74	74.00	-17.26	Horizontal
2500.00	47.11	27.55	5.49	24.86	55.29	74.00	-18.71	Horizontal
2483.50	49.91	27.53	5.47	24.80	58.11	74.00	-15.89	Vertical
2500.00	48.41	27.55	5.49	24.86	56.59	74.00	-17.41	Vertical

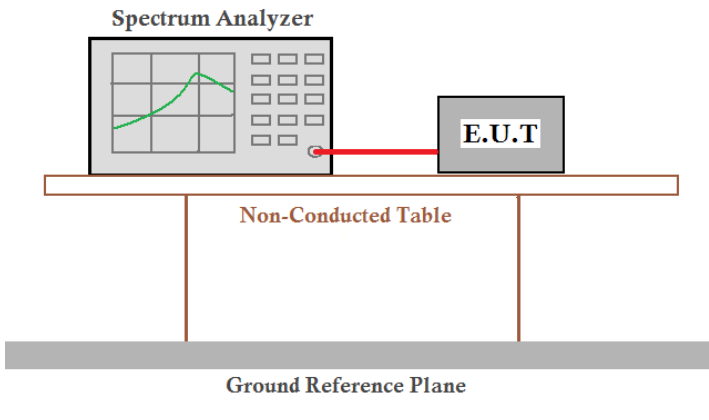
Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	36.75	27.53	5.47	24.80	44.95	54.00	-9.05	Horizontal
2500.00	36.30	27.55	5.49	24.86	44.48	54.00	-9.52	Horizontal
2483.50	36.57	27.53	5.47	24.80	44.77	54.00	-9.23	Vertical
2500.00	36.49	27.55	5.49	24.86	44.67	54.00	-9.33	Vertical

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*

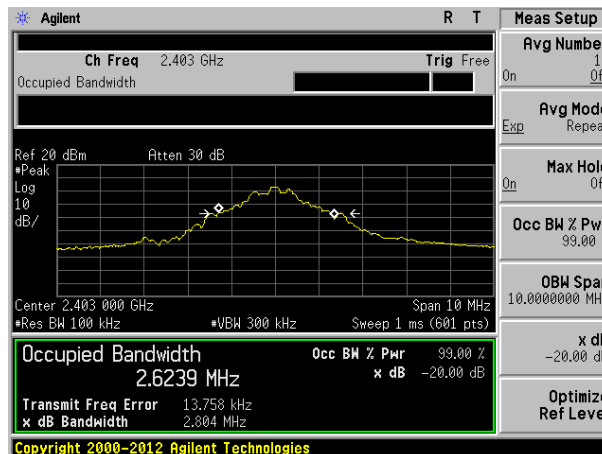
7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.10:2013
Limit:	Operation Frequency range 2400MHz~2483.5MHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by two legs. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

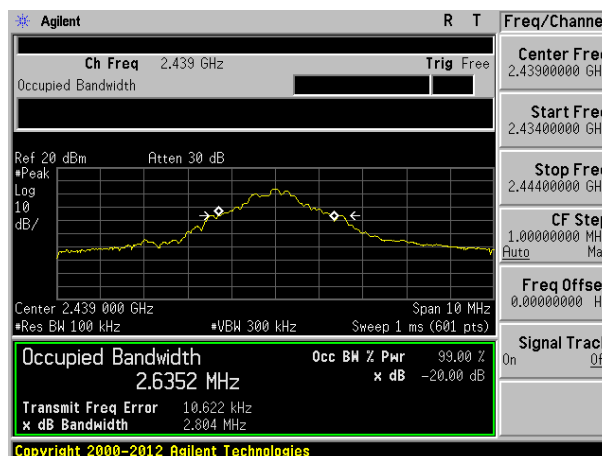
Measurement Data

Test channel	20dB bandwidth(MHz)	Result
Lowest	2.804	Pass
Middle	2.804	Pass
Highest	2.525	Pass

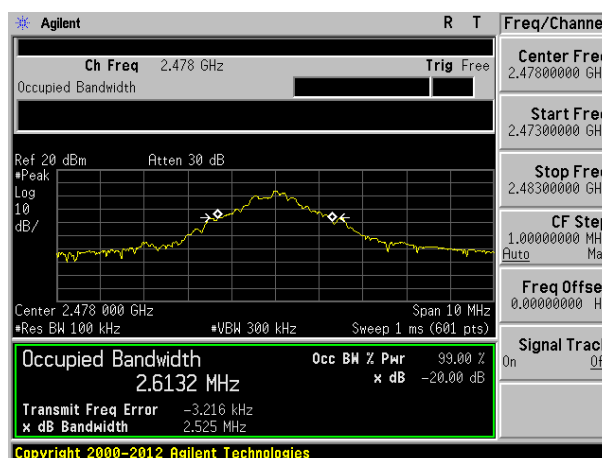
Test plot as follows:



Lowest channel



Middle channel



Highest channel

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----