FCC Report

Applicant:	LRP electronic GmbH
Address of Applicant:	Hanfwiesenstrasse 15 73614 Schorndorf Germany
Equipment Under Test (EUT)	
Product Name:	A2-STX, A3-STX
Model No.:	87011, 87020
FCC ID:	2AB3J-87011
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of sample receipt:	28 September 2014
Date of Test:	28 September to 10 October 2014
Date of report issued:	10 October 2014
Test Result :	PASS *

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

Authorized Signature:

Robin Sch Lo
Laboratory Manager

4 Contents

Page

5 Test Summary

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

6 General Information

6.1 Client Information

Applicant:	LRP electronic GmbH
Address of Applicant:	Hanfwiesenstrasse 15 73614 Schorndorf Germany
Manufacturer/ Factory:	LRP electronic GmbH
Address of Manufacturer/ Factory:	Hanfwiesenstrasse 15 73614 Schorndorf Germany

6.2 General Description of EUT

Product Name:	A2-STX, A3-STX
Item No.:	87011, 87020
Operation Frequency:	2410MHz~2474MHz
Channel numbers:	81
Channel separation:	0.81MHz
Modulation type:	GFSK
Antenna Type:	Integral
Antenna gain:	2dBi
Power supply:	8*1.5V(“AA” size)=12.0V

6.3 EUT Operation mode

Operating Environment:

Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1008 mbar

Test mode:

Normal operation mode:

Transmitting mode: Keep the EUT in transmitting mode with modulation.

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	Channel	Frequency	Channel	Frequency
The lowest channel	2410MHz	The middle channel	2443.2MHz	The Highest channel	2474MHz

6.4 Test Facility

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

- **CNAS —Registration No.: CNAS L5775**

  CNAS has accredited Global United Technology Services Co., Ltd. to ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC —Registration No.: 600491**

  Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, July 20, 2010.

- **Industry Canada (IC) —Registration No.: 9079A-1**

  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-1.

6.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

6.6 Test Instruments list:

Instrument	Manufacturer	Model No.	Inventory No.	Next Cal. Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 27 2015
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A
EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jun. 30 2015
BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 22 2015
Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 26 2015
Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 27 2015
EMI Test Software	AUDIX	E3	N/A	N/A
Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015
Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015
Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015
Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015
Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jun. 30 2015
Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jun. 30 2015
Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 26 2015
Band filter	Amindeon	82346	GTS219	Mar. 28 2015
Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	May 09 2015
Signal Generator	Rohde & Schwarz	SML03	GTS236	May 09 2015
Temp. Humidity/ Barometer	Oregon Scientific	BA-888	GTS248	May 09 2015
D.C. Power Supply	Instek	PS-3030	GTS232	NA
Splitter	Agilent	11636B	GTS237	May 09 2015

7 Test results and Measurement Data

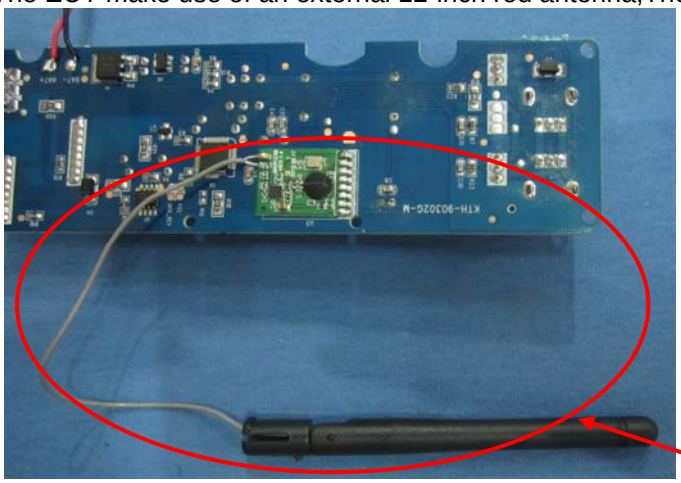
7.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203

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.

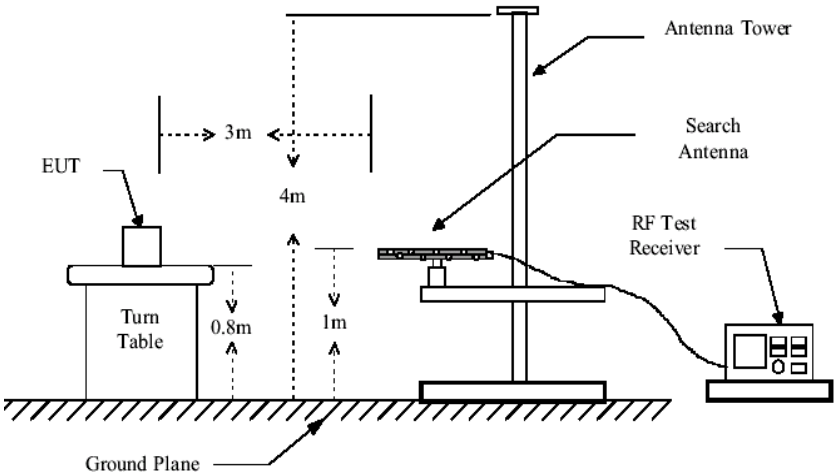
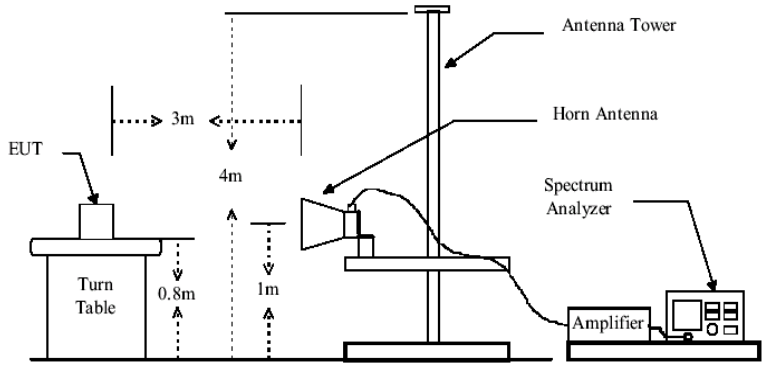
E.U.T Antenna:	

The EUT make use of an external 12-inch rod antenna,The typical gain of the antenna is 2dBi.



7.2 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.249, 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2003</td></tr>
<tr><td>Test Frequency Range:</td><td>30MHz to 25000MHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Field strength of the fundamental signal)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td rowspan="2">2400MHz-2483.5MHz</td><td>94.0</td><td>Average Value</td></tr>
<tr><td>114.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Spurious Emissions)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>74.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(band edge)</td><td>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.</td></tr>
<tr><td>Test Procedure:</td><td>a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. 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.
d. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. 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.</td></tr>
</table>

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 4.7 for details
Test mode:	Transmitting mode
Test results:	Passed

Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

Measurement Data

7.2.1 Field Strength Of The Fundamental Signal

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2410	6.38	32.26	38.85	94.41	94.20	114.00	-19.80	Horizontal
2410	6.38	32.26	38.85	98.02	97.81	114.00	-16.19	Vertical
2443.2	6.48	32.51	39.25	93.80	93.54	114.00	-20.46	Horizontal
2443.2	6.48	32.51	39.25	97.08	96.82	114.00	-17.18	Vertical
2474	6.61	32.68	39.81	93.64	93.12	114.00	-20.88	Horizontal
2474	6.61	32.68	39.81	96.92	96.40	114.00	-17.60	Vertical

Average value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2410	6.38	32.26	38.85	88.20	87.99	94.00	-6.01	Horizontal
2410	6.38	32.26	38.85	91.92	91.71	94.00	-2.29	Vertical
2443.2	6.48	32.51	39.25	87.65	87.39	94.00	-6.61	Horizontal
2443.2	6.48	32.51	39.25	91.00	90.74	94.00	-3.26	Vertical
2474	6.61	32.68	39.81	87.53	87.01	94.00	-6.99	Horizontal
2474	6.61	32.68	39.81	90.92	90.40	94.00	-3.60	Vertical

7.2.2 Spurious Emissions

30MHz~1GHz					
Test mode:	Transmitting	Test channel:	Middle	Remark:	Worst case

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
77.87	0.93	7.01	25.68	36.98	19.24	40.00	-20.76	Vertical
155.91	1.55	7.82	25.63	36.14	19.88	43.50	-23.62	Vertical
197.89	1.76	10.30	25.62	45.39	31.83	43.50	-11.67	Vertical
364.26	2.20	14.95	25.57	43.63	35.21	46.00	-10.79	Vertical
390.72	2.24	15.42	25.57	46.25	38.34	46.00	-7.66	Vertical
468.88	2.36	16.54	25.55	42.11	35.46	46.00	-10.54	Vertical
84.11	1.00	8.76	25.68	32.02	16.11	40.00	-23.89	Horizontal
89.90	1.06	10.64	25.67	30.68	16.71	43.50	-26.79	Horizontal
191.75	1.74	10.22	25.62	41.10	27.44	43.50	-16.06	Horizontal
312.18	2.10	13.54	25.58	30.97	21.03	46.00	-24.97	Horizontal
390.72	2.24	15.42	25.57	35.52	27.61	46.00	-18.39	Horizontal
468.88	2.36	16.54	25.55	34.89	28.24	46.00	-17.76	Horizontal

Remark: the data above is tested with QP detector mode.

Above 1GHz					
Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390	6.28	32.24	39.03	58.76	58.25	74.00	-15.75	Vertical
2400	6.34	32.25	38.87	60.22	59.94	74.00	-14.06	Vertical
4804	9.36	34.04	41.53	49.14	51.01	74.00	-22.99	Vertical
7206	13.38	36.33	40.98	43.35	52.08	74.00	-21.92	Vertical
2390	6.28	32.24	39.03	55.29	54.78	74.00	-19.22	Horizontal
2400	6.34	32.25	38.87	56.37	56.09	74.00	-17.91	Horizontal
4804	9.36	34.04	41.53	48.76	50.63	74.00	-23.37	Horizontal
7206	13.38	36.33	40.98	43.1	51.83	74.00	-22.17	Horizontal

Test mode:	Transmitting	Test channel:	Lowest	Remark:	average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390	6.28	32.24	39.03	48.36	47.85	54.00	-6.15	Vertical
2400	6.34	32.25	38.87	49.01	48.73	54.00	-5.27	Vertical
4804	9.36	34.04	41.53	41.1	42.97	54.00	-11.03	Vertical
7206	13.38	36.33	40.98	35.35	44.08	54.00	-9.92	Vertical
2390	6.28	32.24	39.03	44.98	44.47	54.00	-9.53	Horizontal
2400	6.34	32.25	38.87	46.72	46.44	54.00	-7.56	Horizontal
4804	9.36	34.04	41.53	40.34	42.21	54.00	-11.79	Horizontal
7206	13.38	36.33	40.98	34.95	43.68	54.00	-10.32	Horizontal

Test mode:	Transmitting	Test channel:	Middle	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2400	6.34	32.25	38.87	57.21	56.93	74.00	-17.07	Vertical
2500	5.76	32.30	39.15	58.76	57.67	74.00	-16.33	Vertical
4882	10.57	34.02	40.33	48.56	52.82	74.00	-21.18	Vertical
7323	12.91	36.10	40.40	43.17	51.78	74.00	-22.22	Vertical
2400	6.34	32.25	38.87	56.37	56.09	74.00	-17.91	Horizontal
2500	5.76	32.30	39.15	55.29	54.2	74.00	-19.8	Horizontal
4882	10.57	34.02	40.33	48.76	53.02	74.00	-20.98	Horizontal
7323	12.91	36.10	40.40	43.1	51.71	74.00	-22.29	Horizontal

Test mode:	Transmitting	Test channel:	Middle	Remark:	average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2400	6.34	32.25	38.87	47.35	47.07	54.00	-6.93	Vertical
2500	5.76	32.30	39.15	48.27	47.18	54.00	-6.82	Vertical
4882	10.57	34.02	40.33	40.06	44.32	54.00	-9.68	Vertical
7323	12.91	36.10	40.40	33.35	41.96	54.00	-12.04	Vertical
2400	6.34	32.25	38.87	46.17	45.89	54.00	-8.11	Horizontal
2500	5.76	32.30	39.15	45.01	43.92	54.00	-10.08	Horizontal
4882	10.57	34.02	40.33	40.34	44.60	54.00	-9.40	Horizontal
7323	12.91	36.10	40.40	33.25	41.86	54.00	-12.14	Horizontal

Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak

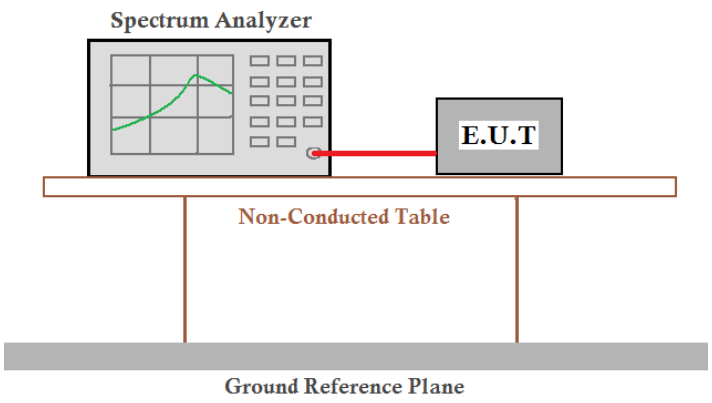
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.5	6.22	32.29	39.53	57.3	56.28	74.00	-17.72	Vertical
2500	5.76	32.30	39.15	56.82	55.73	74.00	-18.27	Vertical
4960	10.43	34.01	41.03	47.95	51.36	74.00	-22.64	Vertical
7440	12.72	35.91	40.01	43.11	51.73	74.00	-22.27	Vertical
2483.5	6.22	32.29	39.53	55.82	54.8	74.00	-19.2	Horizontal
2500	5.76	32.30	39.15	55.1	54.01	74.00	-19.99	Horizontal
4960	10.43	34.01	41.03	44.92	48.33	74.00	-25.67	Horizontal
7440	12.72	35.91	40.01	42.8	51.42	74.00	-22.58	Horizontal

Test mode:	Transmitting	Test channel:	Highest	Remark:	average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.5	6.22	32.29	39.53	47.23	46.21	54.00	-7.79	Vertical
2500	5.76	32.30	39.15	46.86	45.77	54.00	-8.23	Vertical
4960	10.43	34.01	41.03	36.81	40.22	54.00	-13.78	Vertical
7440	12.72	35.91	40.01	33.21	41.83	54.00	-12.17	Vertical
2483.5	6.22	32.29	39.53	45.25	44.23	54.00	-9.77	Horizontal
2500	5.76	32.30	39.15	45.11	44.02	54.00	-9.98	Horizontal
4960	10.43	34.01	41.03	33.71	37.12	54.00	-16.88	Horizontal
7440	12.72	35.91	40.01	33.26	41.88	54.00	-12.12	Horizontal

Remark: The disturbance above 8GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

7.3 20dB Bandwidth

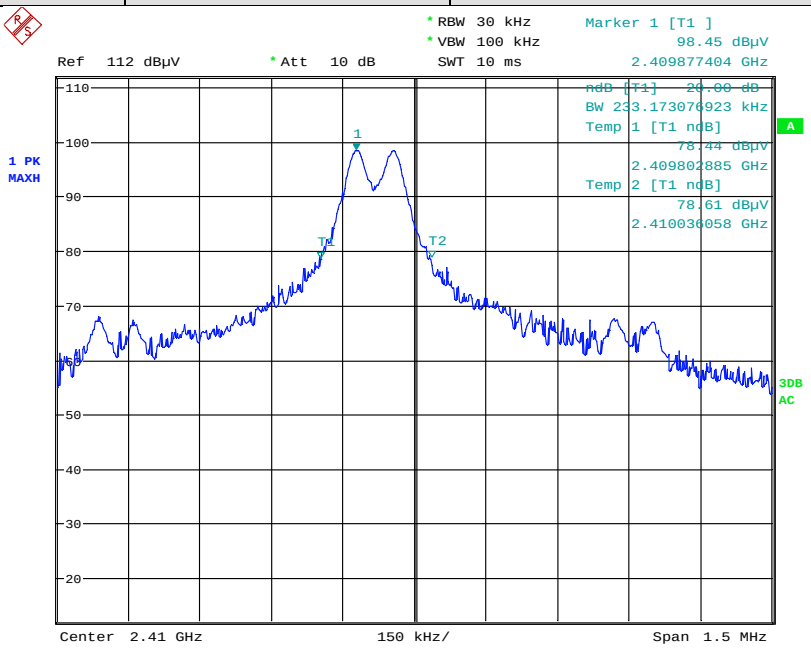
Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW=30KHz, VBW=100KHz, detector: Peak
Limit:	Operation Frequency range 2400MHz-2483.5MHz
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set the EUT to proper test channel. 3. Max hold the radiated emissions, mark the peak power frequency point and the -20dB upper and lower frequency points. 4. Read 20dB bandwidth.
Test setup:	
Test Instruments:	Refer to section 4.7 for details
Test mode:	Keep the EUT in transmitting with modulation.
Test results:	Pass

Measurement Data

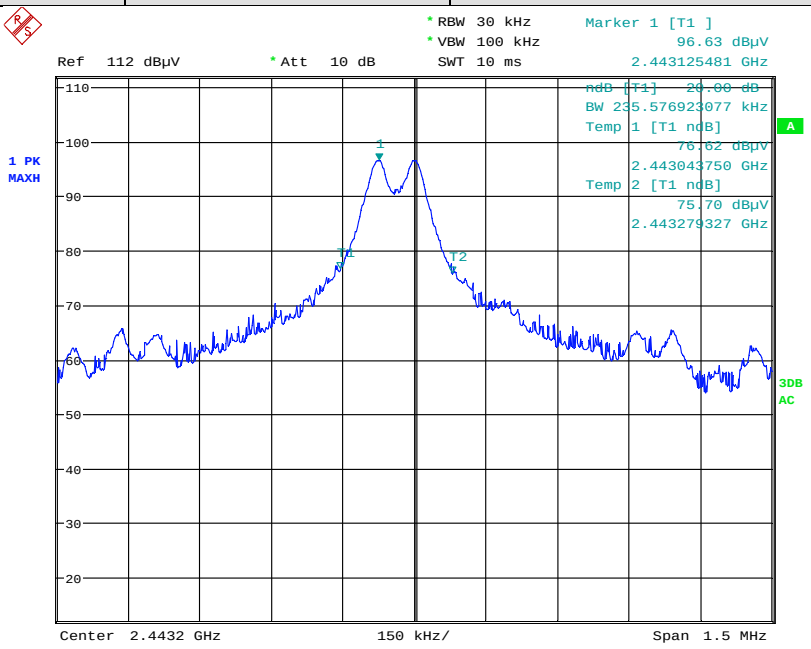
Test channel	20dB bandwidth (kHz)	Results
Lowest	233.173	Pass
Middle	235.577	Pass
Highest	235.577	Pass

Test plot as follows:

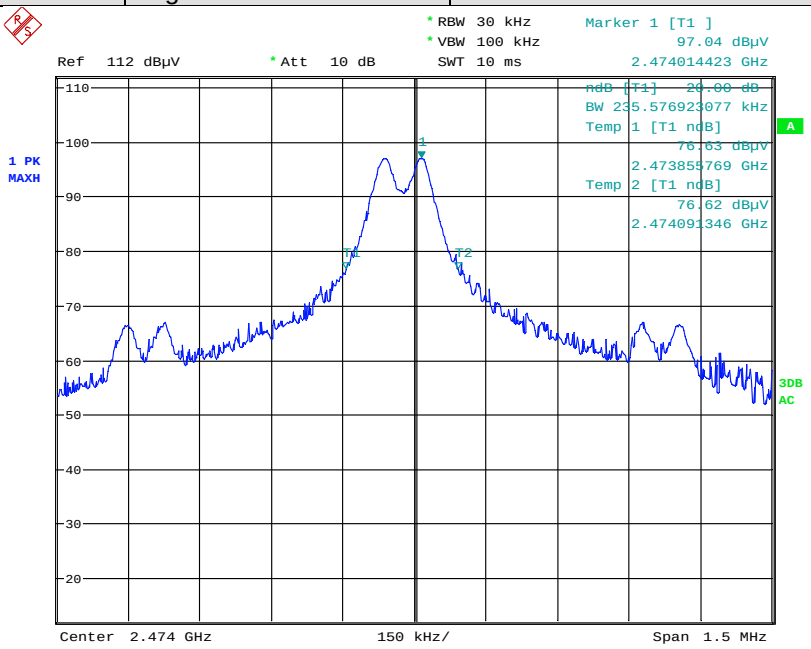
Test channel:	Lowest	



Test channel:	Middle	



Test channel:	Highest	



-----End------