Shenzhen EBO Technology Co., Ltd.

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Shenzhen, P. R. China
Telephone：+86-755-29451282,
Fax: +86-755-22639141

FCC REPORT

Applicant:	Seco Larm USA Inc
Address of Applicant:	16842 Millikan Avenue, Irvine, California, United States

Equipment Under Test (EUT)

Product Name:	Wireless HDMI
Model No.:	MVE-WH010Q/R
FCC ID:	ERYMVE-WH010QR
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.407:2010
Date of sample receipt:	June 28, 2012
Date of Test:	July 3 ~ August 10, 2012
Date of report issue:	August 21, 2012
Test Result :	PASS *

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

Authorized Signature:

Kavin Yu
Laboratory Manager

2 Contents

3 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	PASS
AC Power Line Conducted Emission	15.207	PASS
Peak Transmit Power	15.407(a)(1)	PASS
Power Spectral Density	15.407(a)(1)	PASS
Peak Excursion	15.407(a)(6)	PASS
Undesirable Emission	15.407(b)(6), 15.205/15.209	PASS
Radiated Emission	15.205/15.209	PASS
Band Edge	15.205	PASS
Frequency Stability	15.407(f)	PASS

Remark:

Pass: The EUT complies with the essential requirements in the standard.

Fail: The EUT does not comply with the essential requirements in the standard.

4 General Information

4.1 Client Information

Applicant:	Seco Larm USA Inc
Address of Applicant:	16842 Millikan Avenue, Irvine, California, United States
Manufacturer/ Factory:	HANK Electronics Ltd.
Address of Manufacturer/ Factory:	2nd floor, Block B9 & 8th floor Block B20, Hengfeng Industrial City, Xixiang Town Baoan District, Shenzhen, China

4.2 General Description of E.U.T.

Product Name:	Wireless HDMI
Model No.:	MVE-WH010Q/R
Operation Frequency:	5190MHz, 5230MHz; 5755MHz, 5795MHz
Channel numbers:	4
Channel separation:	40MHz
Modulation technology:	OFDM
Antenna Type:	PCB Antenna (Transmit antenna: 1pcs; receive antenna: 4pcs)
Antenna gain:	2dBi
Power supply:	Adapter Trade mark:GOSPELL Adapter Model:GP005U-050-200 Adapter Input:100-240VAC, 50/60Hz, 0.5A Adapter Output:5VDC, 2.0A 10VA max

4.3 Test mode

Operation mode	Keep the EUT in transmitting with modulation. EUT transmitting at 100 % duty cycle at its maximum power control level

4.4 Test Facility

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

● **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)**

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.

4.5 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
Tel: 0755-27798480
Fax: 0755-27798960

4.6 Other Information Requested by the Customer

None.

4.7 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
1	3m Semi-Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS201	Mar. 30 2011	Mar. 29 2013
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS202	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 03 2012	Jul. 02 2013
4	Spectrum analyzer	Rohde & Schwarz	FSP40	GTS203	Sep. 8 2012	Sep. 7 2013
5	8-WAY Power Divider	JFW	50PD-647	GTS203	Sep. 8 2012	Sep. 7 2013
6	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS204	Feb. 25 2012	Feb. 24 2013
7	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS205	June 29 2012	June 28 2013
8	Horn Antenna	SCHWARZBECK MESS-ELEKTRONIK	9170	GTS205	Mar. 30 2011	Mar. 29 2013
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS400	Mar. 31 2012	Mar. 30 2013
11	Coaxial Cable	GTS	N/A	GTS401	Mar. 31 2012	Mar. 30 2013
12	Coaxial cable	GTS	N/A	GTS402	Mar. 31 2012	Mar. 30 2013
13	Coaxial Cable	GTS	N/A	GTS407	Mar. 31 2012	Mar. 30 2013
14	Coaxial Cable	GTS	N/A	GTS408	Mar. 31 2012	Mar. 30 2013
15	Amplifier	Sonnoma Instrument	305-1052	GTS210	Jul. 03 2012	Jul. 02 2013
16	Amplifier	HP	8349B	GTS231	Jul. 03 2012	Jul. 02 2013

Conducted Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS206	Jul. 03 2012	Jul. 02 2013
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS208	Jul. 03 2012	Jul. 02 2013
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS209	Jul. 03 2012	Jul. 02 2013
4	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS207	Jul. 03 2012	Jul. 02 2013
5	Coaxial Cable	GTS	N/A	GTS406	Mar. 31 2012	Mar. 30 2013
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

5 Test results and Measurement Data

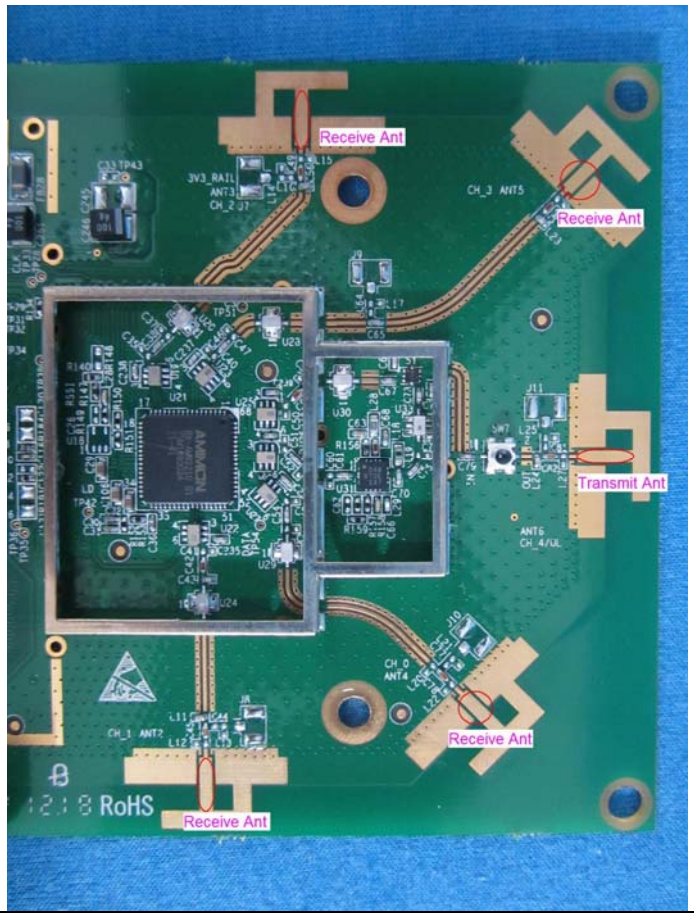
5.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203

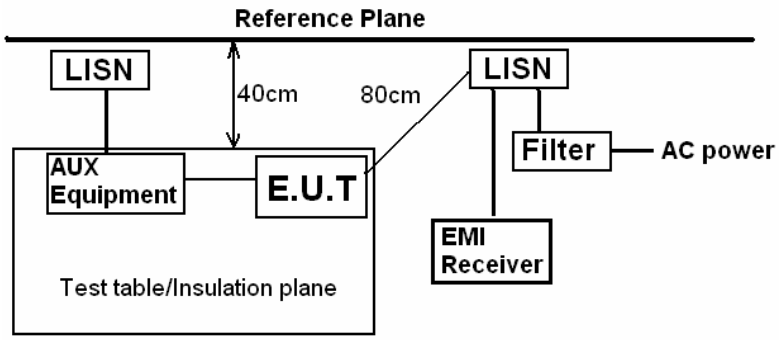
15.203 requirement:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer 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 antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2dBi.



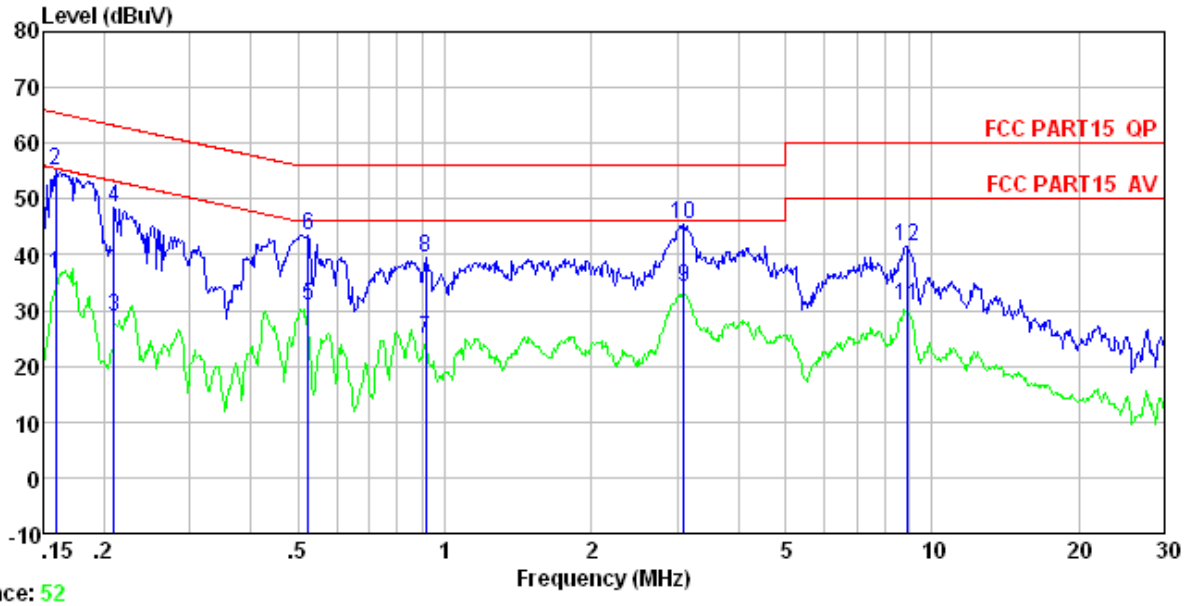
5.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.4: 2003
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz
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 procedure	The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). 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 C63.4: 2003 on conducted measurement.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Line:

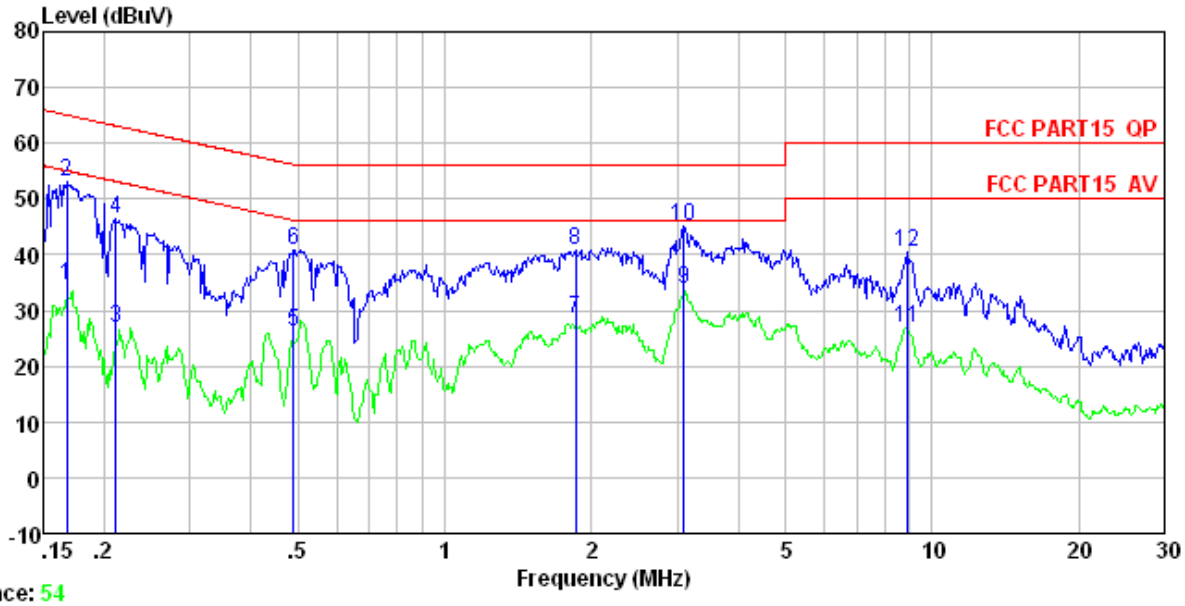


Trace: 52

Site : Shielded room
Condition : FCC PART15 QP LISN(2011) LINE
Job No. : 705RF
Test Mode : Operation
Test Engineer: HuXiaohe
Remark : Receiver

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.159	35.60	0.68	0.10	36.38	55.52	-19.14	Average
2	0.159	54.15	0.68	0.10	54.93	65.52	-10.59	QP
3	0.209	28.10	0.65	0.10	28.85	53.23	-24.38	Average
4	0.209	47.67	0.65	0.10	48.42	63.23	-14.81	QP
5	0.524	30.30	0.55	0.10	30.95	46.00	-15.05	Average
6	0.524	42.98	0.55	0.10	43.63	56.00	-12.37	QP
7	0.914	24.40	0.49	0.10	24.99	46.00	-21.01	Average
8	0.914	38.77	0.49	0.10	39.36	56.00	-16.64	QP
9	3.090	33.60	0.35	0.10	34.05	46.00	-11.95	Average
10	3.090	45.06	0.35	0.10	45.51	56.00	-10.49	QP
11	8.869	30.50	0.24	0.19	30.93	50.00	-19.07	Average
12	8.869	40.97	0.24	0.19	41.40	60.00	-18.60	QP

Neutral:



Trace: 54

Site : Shielded room
Condition : FCC PART15 QP LISN(2011) LINE
Job No. : 705RF
Test Mode : Operation
Test Engineer: HuXiaohe
Remark : Receiver

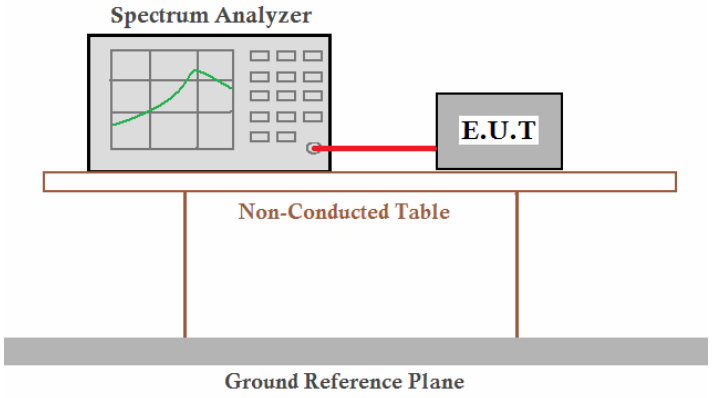
	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.168	33.70	0.68	0.10	34.48	55.08	-20.60	Average
2	0.168	52.18	0.68	0.10	52.96	65.08	-12.12	QP
3	0.212	26.20	0.65	0.10	26.95	53.14	-26.19	Average
4	0.212	45.64	0.65	0.10	46.39	63.14	-16.75	QP
5	0.489	25.54	0.56	0.10	26.20	46.19	-19.99	Average
6	0.489	40.20	0.56	0.10	40.86	56.19	-15.33	QP
7	1.858	28.06	0.41	0.10	28.57	46.00	-17.43	Average
8	1.858	40.42	0.41	0.10	40.93	56.00	-15.07	QP
9	3.090	33.36	0.35	0.10	33.81	46.00	-12.19	Average
10	3.090	44.78	0.35	0.10	45.23	56.00	-10.77	QP
11	8.869	26.56	0.24	0.19	26.99	50.00	-23.01	Average
12	8.869	39.94	0.24	0.19	40.37	60.00	-19.63	QP

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

5.3 Peak Transmit Power

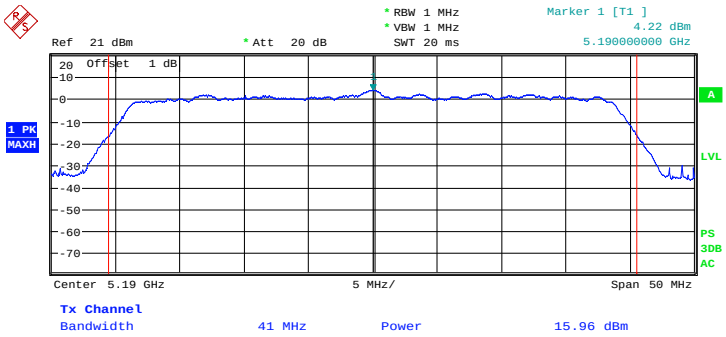
Test Requirement:	FCC Part15 E Section 15.407
Test Method:	ANSI C63.4: 2003 and KDB 789033
Limit:	For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10log B, where B is the -26dB emission bandwidth in MHz.
Test setup:	
Test procedure:	As an alternative to Publication: 662911 D01, the test method is “measure and sum”, In the measure and sum approach, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units (e.g., mW—not dBm). The EUT peak power was measured with a peak power meter employing a video bandwidth greater than 6dB BW of the emission under test. Peak output power was read directly from the spectrum analyzer across all data rates, Special care was used to make sure that the EUT was transmitting in continuous mode.
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Pass

Measurement Data

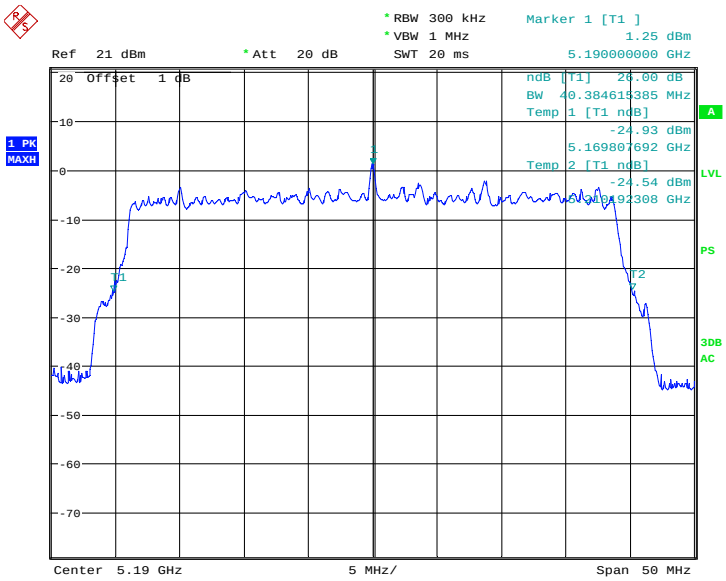
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Limit		Result
				dBm	4dBm+10log(BW)	
Low	5190	40.38	15.96	17.00	20.02	Pass
High	5230	40.30	15.26	17.00	20.02	Pass

Test plot as follows:

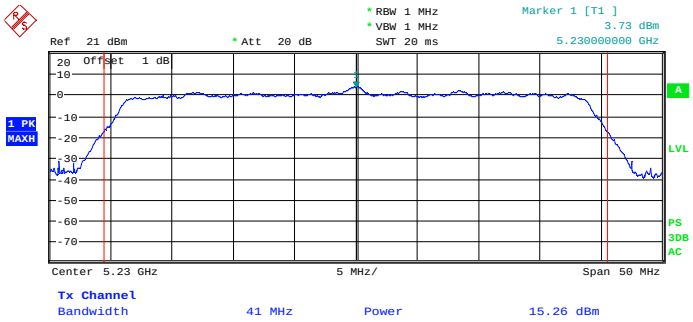
Channel:	Low channel	Test item:	Output power



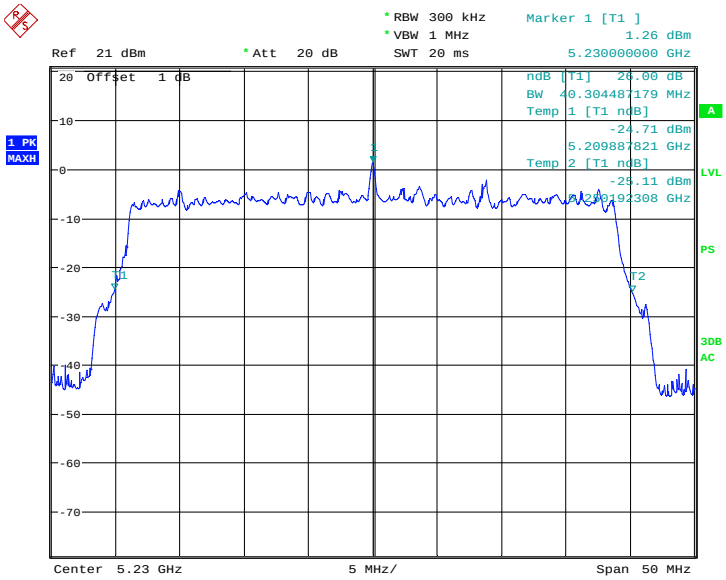
Channel:	Low channel	Test item:	26dB bandwidth



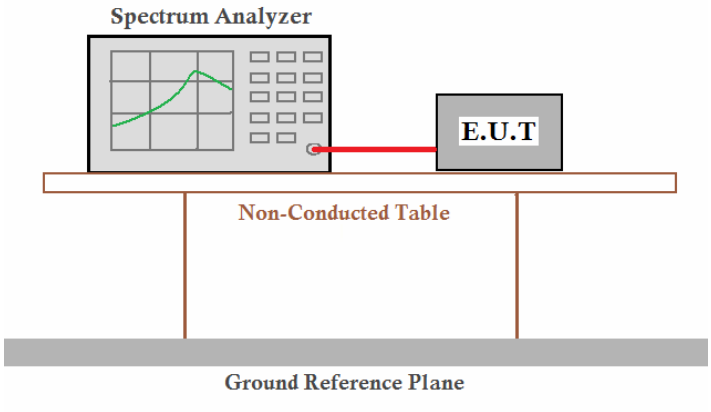
Channel:	High channel	Test item:	Output power



Channel:	High channel	Test item:	26dB bandwidth



5.4 Power Spectral Density

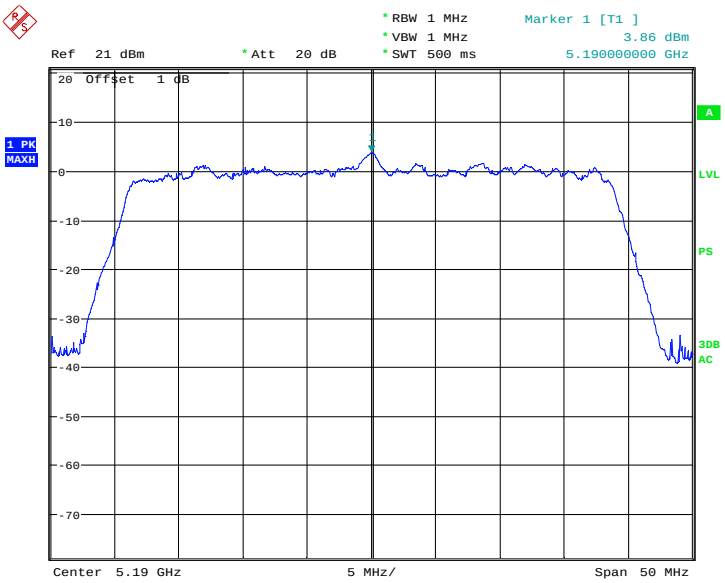
Test Requirement:	FCC Part15 E Section 15.407
Test Method:	ANSI C63.4: 2003 and KDB 789033
Limit:	4dBm
Test setup:	
Test procedure:	As an alternative to Publication: 662911 D01, Measure and sum the PSDs across the outputs. With this technique, PSD is measured at each output of the device. The individual PSDs are then summed mathematically in linear power units
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Pass

Measurement Data

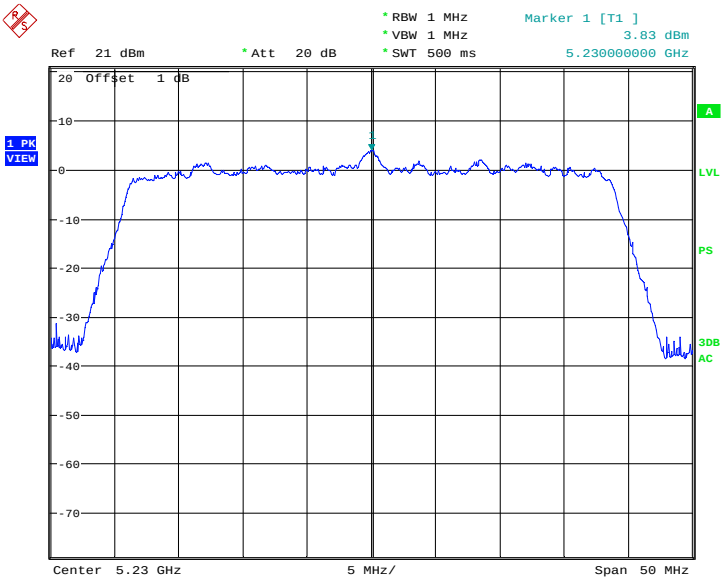
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Result
Low	5190	3.86	4.00	Pass
High	5230	3.83	4.00	Pass

Test plot as follows:

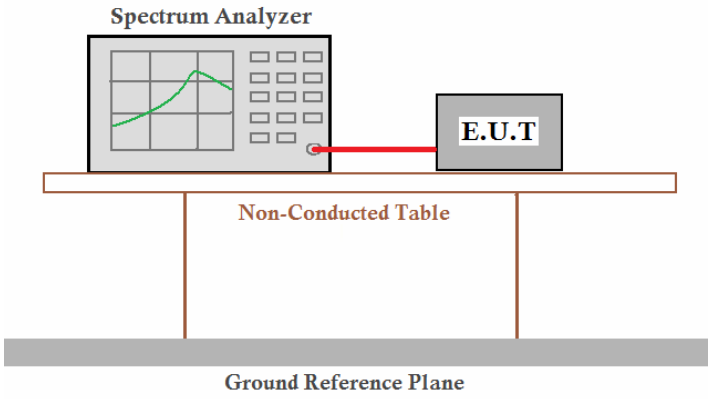
Lowe channel:



High channel



5.5 Peak Excursion

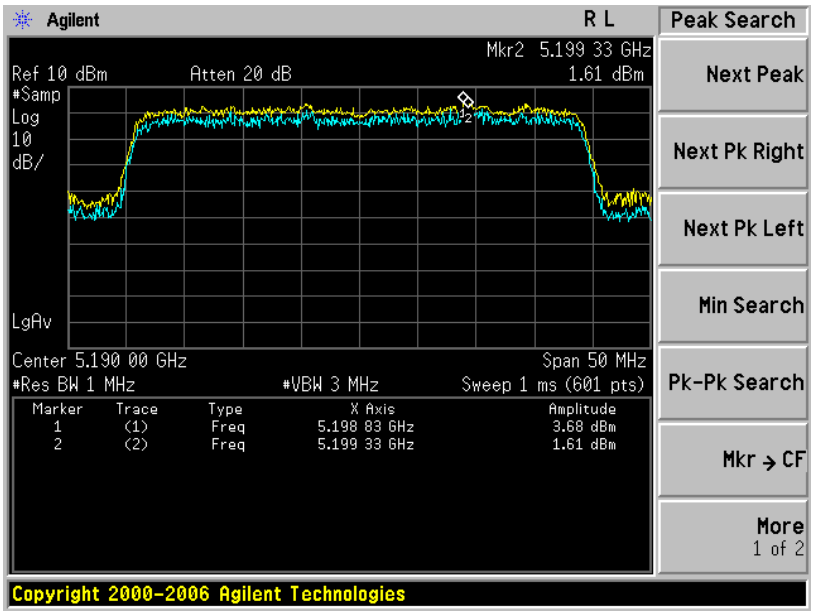
Test Requirement:	FCC Part15 E Section 15.407
Test Method:	ANSI C63.4: 2003 and KDB 789033
Limit:	The ratio of the peak excursion of the modulation envelope (measured suing a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.
Test setup:	
Test procedure:	The EUT was setup to ANSI C63.4, 2003; tested to KDB 789033 for compliance to FCC 47CFR Subpart E requirements.
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Pass

Measurement Data

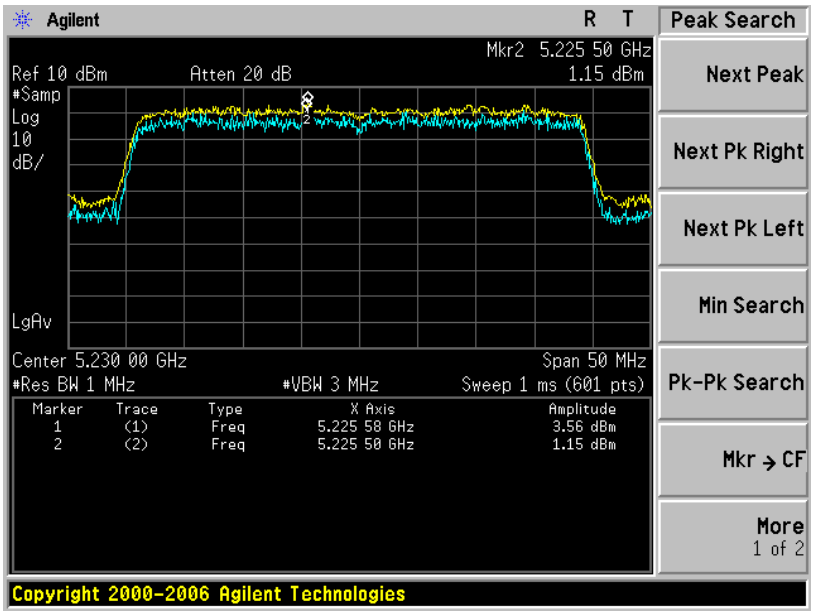
Channel	Frequency (MHz)	Measurement Level (dB)	Limit (dB)	Result
Low	5190	2.07	13.00	Pass
High	5230	2.41	13.00	Pass

Test plot as follows:

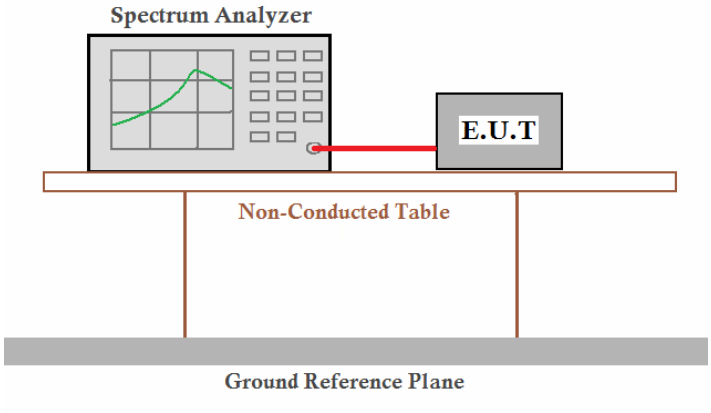
Low channel:



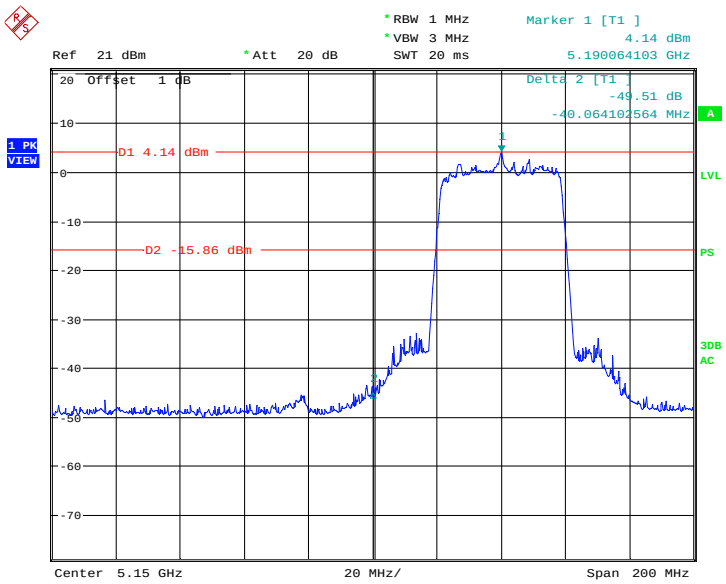
High channel:



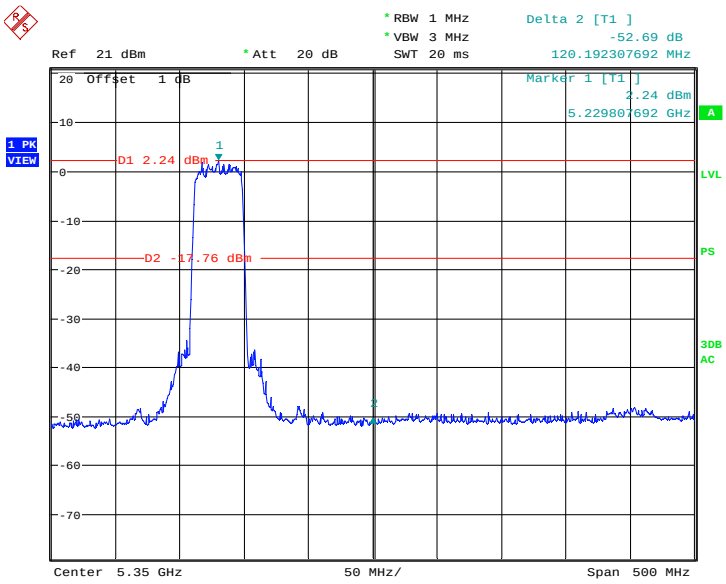
5.6 Undesirable Emission

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	ANSI C63.4:2003
Limit:	The 20 dB bandwidth of the emission, not exceed in operation frequency range.
Test setup:	
Test procedure:	The EUT was setup according to ANSI C63.4, 2003 and tested according to FCC Public Notice DA 02-2138 test procedure for compliance to FCC 47CFR 15. 407 requirements. The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Pass

Operation channel	Reference Frequency (MHz)	Measurement level (dB)	Limit (dB)	Result
Low	5150	-49.51	-20	Pass

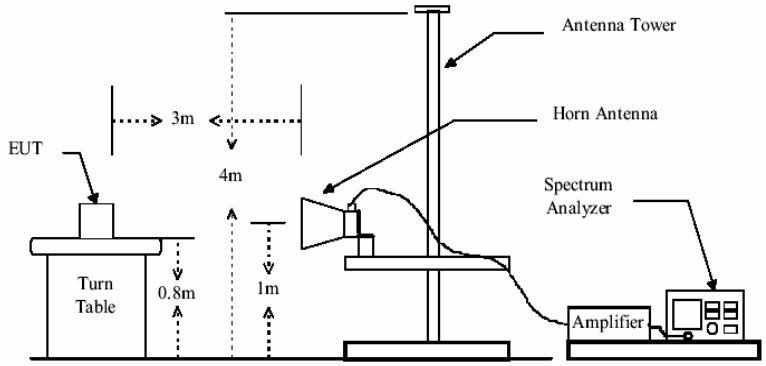


Operation channel	Reference Frequency (MHz)	Measurement level (dB)	Limit (dB)	Result
High	5350	-52.69	-20	Pass



5.7 Band Edge

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407 and 5.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2003</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>100KHz</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>AV</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</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>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 rotable 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>
<tr><td>Test setup:</td><td>Above 1GHz</td></tr>
</table>

	
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Pass

Test channel:	Low			Remark:		Peak		
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
5100.00	41.34	32.54	5.26	30.75	48.39	74.00	-25.61	Vertical
5150.00	42.25	32.58	5.28	30.82	49.29	74.00	-24.71	Vertical
5250.00	36.34	32.86	5.31	31.05	43.46	74.00	-30.54	Vertical
5350.00	35.26	32.91	5.32	31.12	42.37	74.00	-31.63	Vertical
5100.00	44.08	32.54	5.26	30.75	51.13	74.00	-22.87	Horizontal
5150.00	45.53	32.58	5.28	30.82	52.57	74.00	-21.43	Horizontal
5250.00	40.16	32.86	5.31	31.05	47.28	74.00	-26.72	Horizontal
5350.00	39.62	32.91	5.32	31.12	46.73	74.00	-27.27	Horizontal

Test channel:	Low			Remark:		Average		
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
5100.00	30.56	32.54	5.26	30.75	37.61	54.00	-16.39	Vertical
5150.00	32.74	32.58	5.28	30.82	39.78	54.00	-14.22	Vertical
5250.00	27.11	32.86	5.31	31.05	34.23	54.00	-19.77	Vertical
5350.00	24.60	32.91	5.32	31.12	31.71	54.00	-22.29	Vertical
5100.00	33.30	32.54	5.26	30.75	40.35	54.00	-13.65	Horizontal
5150.00	36.02	32.58	5.28	30.82	43.06	54.00	-10.94	Horizontal
5250.00	30.93	32.86	5.31	31.05	38.05	54.00	-15.95	Horizontal
5350.00	28.96	32.91	5.32	31.12	36.07	54.00	-17.93	Horizontal

Test channel:	High			Remark:		Peak		
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
5100.00	38.03	32.54	5.26	30.75	45.08	74.00	-28.92	Vertical
5150.00	39.13	32.58	5.28	30.82	46.17	74.00	-27.83	Vertical
5250.00	48.67	32.86	5.31	31.05	55.79	74.00	-18.21	Vertical
5350.00	38.76	32.91	5.32	31.12	45.87	74.00	-28.13	Vertical
5100.00	39.52	32.54	5.26	30.75	46.57	74.00	-27.43	Horizontal
5150.00	40.79	32.58	5.28	30.82	47.83	74.00	-26.17	Horizontal
5250.00	50.51	32.86	5.31	31.05	57.63	74.00	-16.37	Horizontal
5350.00	40.83	32.91	5.32	31.12	47.94	74.00	-26.06	Horizontal

Test channel:	High			Remark:		Average		
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
5100	29.3	32.54	5.26	30.75	36.35	54.00	-17.65	Vertical
5150	29.32	32.58	5.28	30.82	36.36	54.00	-17.64	Vertical
5250	36.78	32.86	5.31	31.05	43.90	54.00	-10.10	Vertical
5350	31.55	32.91	5.32	31.12	38.66	54.00	-15.34	Vertical
5100	30.79	32.54	5.26	30.75	37.84	54.00	-16.16	Horizontal
5150	30.98	32.58	5.28	30.82	38.02	54.00	-15.98	Horizontal
5250	38.62	32.86	5.31	31.05	45.74	54.00	-8.26	Horizontal
5350	33.62	32.91	5.32	31.12	40.73	54.00	-13.27	Horizontal

According to FCC Part 15.407 (b)(1) for transmitters operating in the 5.15–5.25 GHz band: all emissions out-side of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

According to KDB 789033 D01 G(2), the field strength @3m is converted to EIRP as below:

EIRP[dBm] = E[dBuV/m] - 95.2

* E is the field strength in dBuV/m.

The calculated result is below:

Test channel:	5190MHz	Remark:	Peak	Test channel:
Frequency (MHz)	Field Strength (dBuV/m)	EIRP (dBm)	Limit (dBm/MHz)	polarization
5150	49.29	-45.91	-27	Vertical
5150	52.57	-42.63	-27	Horizontal
Test channel:	5230MHz	Remark:	Peak	
5350	45.87	-49.33	-27	Vertical
5350	47.94	-47.26	-27	Horizontal

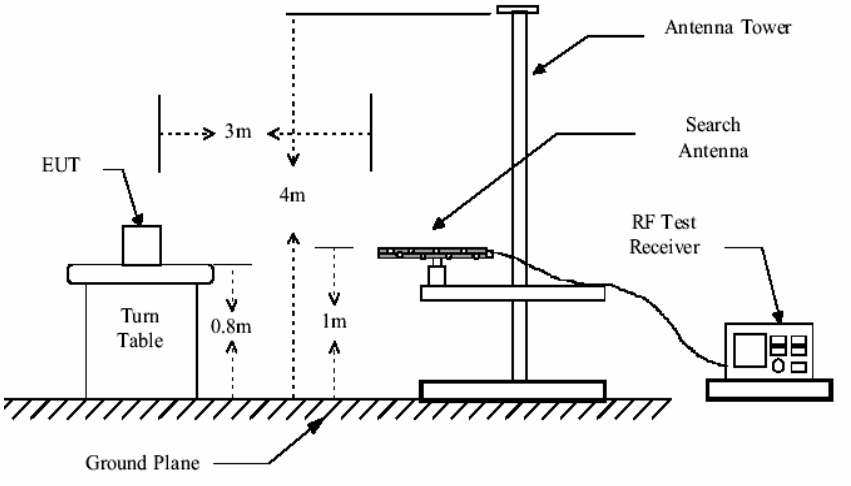
5.8 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 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 40GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</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>AV</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></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>Frequency</td><td>Limit (dBm/MHz)</td><td>Remark</td></tr>
<tr><td>Above 1GHz</td><td>-27.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>
Substitution method was performed to determine the actual ERP emission levels of the EUT.
The following test procedure as below:

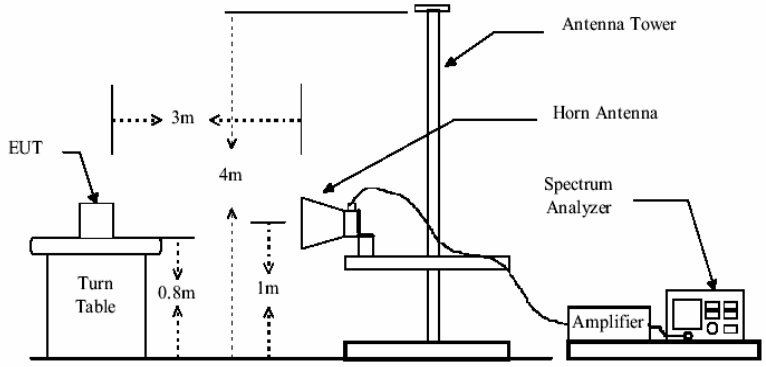
1>.Below 1GHz test procedure:
1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, 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 rotable 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.

2>.Above 1GHz test procedure:
1. On the test site as test setup graph above,the EUT shall be placed at
</td></tr>
</table>

	the 0.8m support on the turntable and in the position closest to normal use as declared by the provider. 2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver. 3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test. 4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. 5. Repeat step 4 for test frequency with the test antenna polarized horizontally. 6. Remove the transmitter and replace it with a substitution antenna 7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output. 8. Repeat step 7 with both antennas horizontally polarized for each test frequency. 9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula: EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi) where: Pg is the generator output power into the substitution antenna.
Test setup:	Below 1GHz



Above 1GHz



Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Pass

Measurement Record:

Below 1GHz

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
32.07	52.40	15.73	0.57	32.06	36.64	40.00	-3.36	Vertical
49.19	49.62	16.41	0.76	31.97	34.82	40.00	-5.18	Vertical
135.03	58.14	11.72	1.47	31.92	39.41	43.50	-4.09	Vertical
297.22	54.48	16.03	2.35	32.18	40.68	46.00	-5.32	Vertical
406.09	55.20	17.22	2.88	31.87	43.43	46.00	-2.57	Vertical
675.21	47.61	21.46	4.00	31.16	41.91	46.00	-4.09	Vertical
135.03	49.66	11.72	1.47	31.92	30.93	43.50	-12.57	Horizontal
243.38	55.07	15.09	2.09	32.16	40.09	46.00	-5.91	Horizontal
297.22	55.71	16.03	2.35	32.18	41.91	46.00	-4.09	Horizontal
406.09	53.66	17.22	2.88	31.87	41.89	46.00	-4.11	Horizontal
704.23	47.15	21.86	4.10	31.20	41.91	46.00	-4.09	Horizontal
810.27	44.68	23.15	4.49	31.30	41.02	46.00	-4.98	Horizontal

Above 1GHz:

Test channel:	Low		Remark:		Peak	
Frequency (MHz)	Read Level (dBm)	Factor (dB)	Level (dBm)	Limit Line (dBm/MHz)	Over Limit (dB)	polarization
10380	-75.47	30.24	-45.23	-27	-18.23	Vertical
15570	-74.85	34.58	-40.27	-27	-13.27	Vertical
20760	*	*	*	-27	*	Vertical
25950	*	*	*	-27	*	Vertical
31140	*	*	*	-27	*	Vertical
36330	*	*	*	-27	*	Vertical
10380	-73.19	30.24	-42.95	-27	-15.95	Horizontal
15570	-71.5	34.58	-36.92	-27	-9.92	Horizontal
20760	*	*	*	-27	*	Horizontal
25950	*	*	*	-27	*	Horizontal
31140	*	*	*	-27	*	Horizontal
36330	*	*	*	-27	*	Horizontal

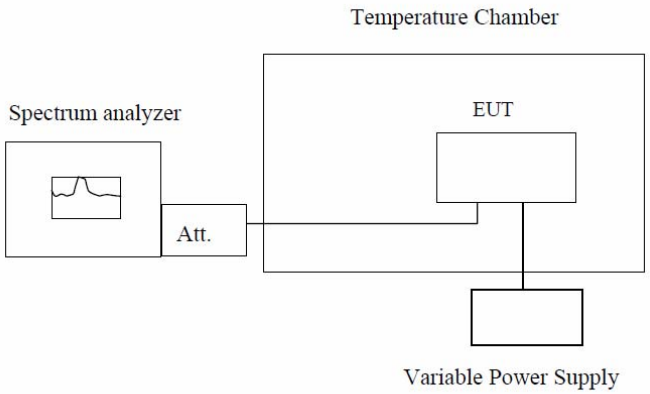
Test channel:	High		Remark:		Peak	
Frequency (MHz)	Read Level (dBm)	Factor (dB)	Level (dBm)	Limit Line (dBm/MHz)	Over Limit (dB)	polarization
10460	-77.13	30.58	-46.55	-27	-19.55	Vertical
15690	-78.3	34.86	-43.44	-27	-16.44	Vertical
20920	*	*	*	-27	*	Vertical
26150	*	*	*	-27	*	Vertical
31380	*	*	*	-27	*	Vertical
36610	*	*	*	-27	*	Vertical
10460	-73.12	30.58	-42.54	-27	-15.54	Horizontal
15690	-76.21	34.86	-41.35	-27	-14.35	Horizontal
20920	*	*	*	-27	*	Horizontal
26150	*	*	*	-27	*	Horizontal
31380	*	*	*	-27	*	Horizontal
36610	*	*	*	-27	*	Horizontal

Remark:
1. " * ", means this data is the too weak instrument of signal is unable to test.
2. Level = Reading Level + Factor
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

Emissions fall into restricted band

Detector	Peak					
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
15570	30.35	34.58	60.93	74.00	-13.07	Vertical
15570	32.52	34.58	62.72	74.00	-11.28	Horizontal
15690	28.47	34.86	59.48	74.00	-14.52	Vertical
15690	31.64	34.86	62.17	74.00	-11.83	Horizontal
Detector	Average					
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
15570	15.11	34.58	49.69	54.00	-4.31	Vertical
15570	17.25	34.58	51.83	54.00	-2.17	Horizontal
15690	14.08	34.86	48.94	54.00	-5.06	Vertical
15690	15.94	34.86	50.80	54.00	-3.20	Horizontal

5.9 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407
Test Method:	ANSI C63.4: 2003
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	The EUT was setup to ANSI C63.4, 2003; tested to KDB 789033 for compliance to FCC 47CFR Subpart E requirements.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Pass

Measurement data:

Frequency stability versus Temp.									
Operating Frequency: 5190MHz									
Temp. (℃)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)
55	120	5190.0031	0.0031	5190.0030	0.0030	5190.0029	0.0029	5190.0032	0.0032
50	120	5190.0027	0.0027	5190.0029	0.0029	5190.0029	0.0029	5190.0030	0.0030
40	120	5190.0024	0.0024	5190.0024	0.0024	5190.0020	0.0020	5190.0022	0.0022
30	120	5190.0017	0.0017	5190.0020	0.0020	5190.0014	0.0014	5190.0016	0.0016
20	120	5190.0019	0.0019	5190.0022	0.0022	5190.0016	0.0016	5190.0019	0.0019
10	120	5190.0016	0.0016	5190.0019	0.0019	5190.0014	0.0014	5190.0017	0.0017
0	120	5190.0017	0.0017	5190.0018	0.0018	5190.0020	0.0020	5190.0018	0.0018
-10	120	5190.0016	0.0016	5190.0017	0.0017	5190.0015	0.0015	5190.0016	0.0016
-20	120	5190.0008	0.0008	5190.0011	0.0011	5190.0007	0.0007	5190.0008	0.0008

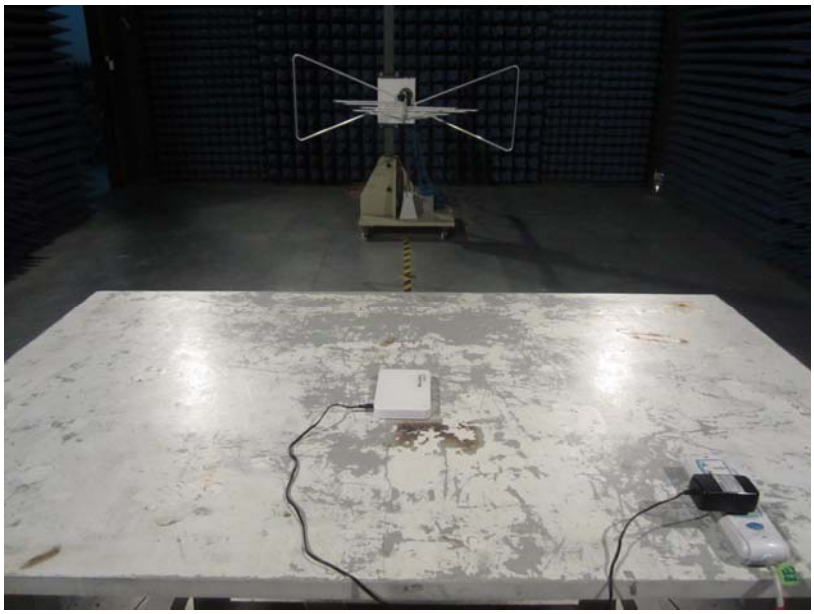
Frequency stability versus voltage									
Operating Frequency: 5190MHz									
Temp. (℃)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)
20	102	5190.0015	0.0015	5190.0016	0.0016	5190.0017	0.0017	5190.0018	0.0018
	120	5190.0017	0.0017	5190.0020	0.0020	5190.0014	0.0014	5190.0017	0.0017
	138	5190.0019	0.0019	5190.0023	0.0023	5190.0017	0.0017	5190.0023	0.0023

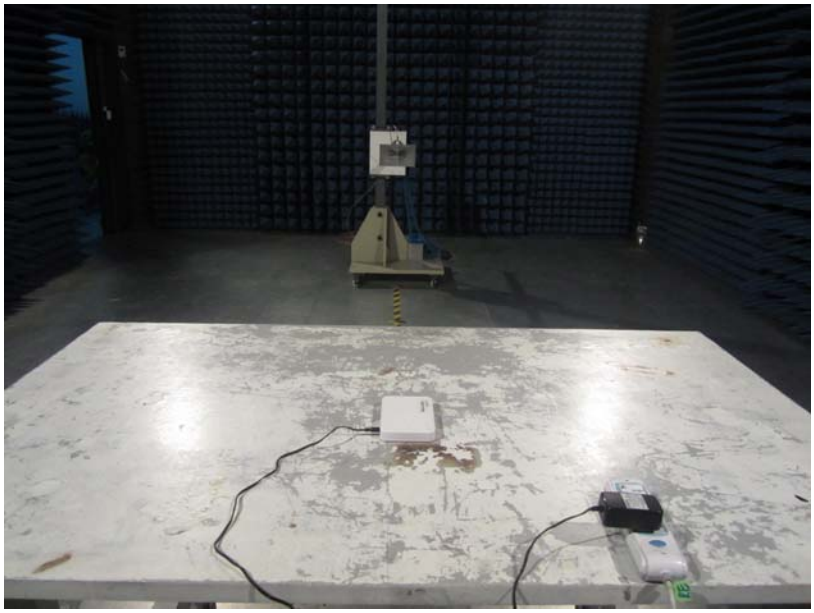
Frequency stability versus Temp.									
Operating Frequency: 5230MHz									
Temp. (℃)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)
55	120	5230.0038	0.0038	5230.0029	0.0029	5230.0030	0.0030	5230.0025	0.0025
50	120	5230.0033	0.0033	5230.0029	0.0029	5230.0028	0.0028	5230.0022	0.0022
40	120	5230.0031	0.0031	5230.0026	0.0026	5230.0026	0.0026	5230.0021	0.0021
30	120	5230.0025	0.0025	5230.0024	0.0024	5230.0024	0.0024	5230.0017	0.0017
20	120	5230.0030	0.0030	5230.0026	0.0026	5230.0025	0.0025	5230.0021	0.0021
10	120	5230.0026	0.0026	5230.0024	0.0024	5230.0023	0.0023	5230.0017	0.0017
0	120	5230.0020	0.0020	5230.0020	0.0020	5230.0021	0.0021	5230.0015	0.0015
-10	120	5230.0025	0.0025	5230.0023	0.0023	5230.0023	0.0023	5230.0018	0.0018
-20	120	5230.0021	0.0021	5230.0019	0.0019	5230.0022	0.0022	5230.0016	0.0016

Frequency stability versus voltage									
Operating Frequency: 5230MHz									
Temp. (℃)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)	Measured Frequency (MHz)	Frequency drift (MHz)
20	102	5230.0019	0.0019	5230.0024	0.0024	5230.0020	0.0020	5230.0023	0.0023
	120	5230.0023	0.0023	5230.0026	0.0026	5230.0025	0.0025	5230.0021	0.0021
	138	5230.0023	0.0023	5230.0026	0.0026	5230.0023	0.0023	5230.0026	0.0026

6 Test Setup Photo

Radiated Emission





Conducted Emissions

7 EUT Constructional Details

Reference to the test report No. : FCC12-RTE082101

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