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Report No.: SZEMO11040172501

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FCC REPORT

Application No.: SZEMO110401725RF
Applicant: Long Range Systems, Inc
Product Name: Table Genie UHF
Model No.: TX-GENIE
Operation Frequency : 467.75MHz
FCC ID: M74TGUHF
Standards: FCC CFR Title 47 Part 15 Subpart C Section 15.231: 2010
Date of Receipt: 2011-04-15
Date of Test: 2011-04-19 to 2011-04-21
Date of Issue: 2011-07-06

Test Result :	PASS *
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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3 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Field strength of the fundamental signal	15.231 (b)	Pass
Spurious emissions	15.231 (b)/15.209	Pass
20dB Bandwidth	15.231 (c)	Pass
Dwell time	15.231 (a)	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:	Long Range Systems, Inc.
Address of Applicant:	4550 Excel Parkway #200 Addison, TX 75001 United States
Factory:	Seveco International Limited
Address of Factory:	Block 1-2, Sha Kok Tau, Sheung Yuen Estate, Char Shan, Dong Guan City.

4.2 General Description of E.U.T.

Product Name:	Table Genie UHF
Trade Name:	N/A
Model No.:	TX-GENIE
Operation Frequency:	467.75MHz
Modulation Type:	FSK
Antenna gain:	0dBi
Power supply:	1.5V DC (1.5V x 1"AA"Size Battery)

4.3 E.U.T Operation mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1008 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode.



4.4 Test Facility

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

- **CNAS (No. CNAS L2929)**
CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 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.
- **VCCI**
The 3m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197 and C-2383 respectively.
Date of Registration: September 29, 2008. Valid until September 28, 2011.
- **FCC – Registration No.: 556682**
SGS-CSTC Standards Technical 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 our files. Registration 556682, March 16, 2011
- **Industry Canada (IC)**
The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.6 Other Information Requested by the Customer

None.

**4.7 Test Instruments list**

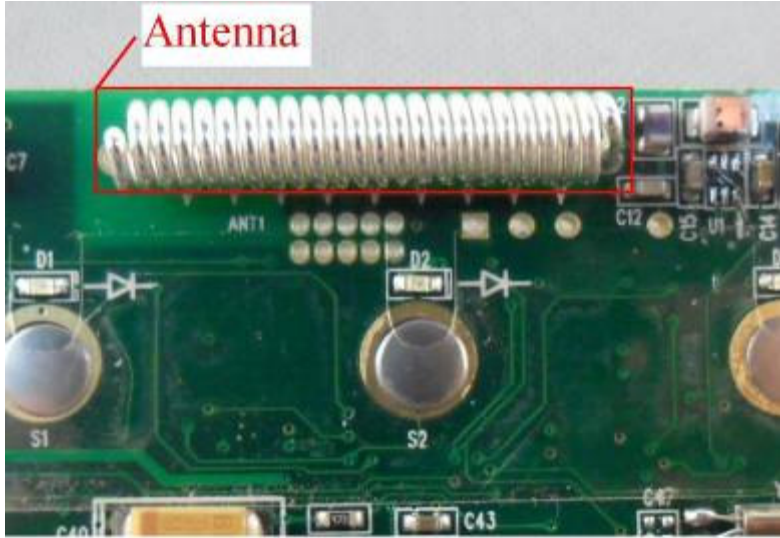
RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2010-06-17	2011-06-17
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	2010-11-05	2011-11-05
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	2008-06-18	2011-06-18
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2010-11-09	2011-11-09
6	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2010-11-09	2011-11-09
7	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2010-06-02	2011-06-02

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	N/A	N/A
2	LISN	ETS-LINDGREN	3816/2	SEL0021	2010-06-02	2011-06-02
3	Two-Line V-Network	Rohde & Schwarz	ENV216	SEL0152	2010-10-27	2011-10-27
4	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2010-06-02	2011-06-02
5	Coaxial Cable	SGS	N/A	SEL0024	2008-06-18	2011-06-18

RF conducted						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	Spectrum Analyzer	Rohde & Schwarz	FSP 30	SEL0154	2010-10-27	2011-10-27
2	Coaxial cable	SGS	N/A	SEL0028	2008-06-18	2011-06-18

5 Test results and Measurement Data

5.1 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>	
E.U.T Antenna:	
<p>The antenna is integrated on the main PCB and no consideration of replacement . The best case gain of the antenna is 0dBi.</p>	
	

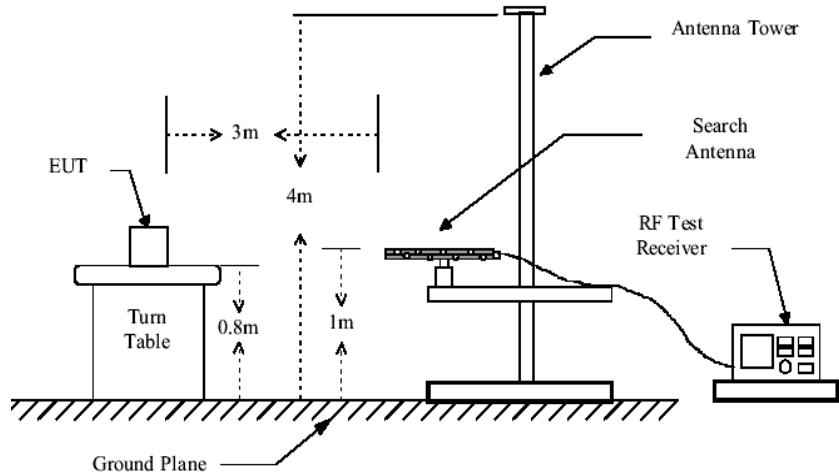


5.2 Radiated Emission

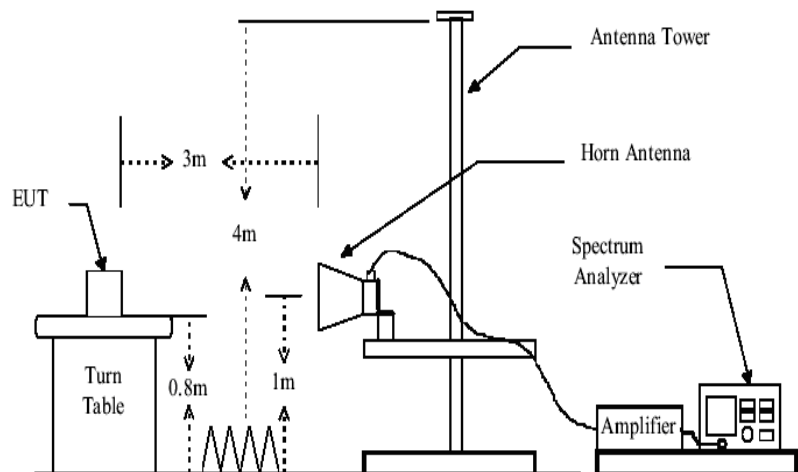
Test Requirement:	FCC Part15 C Section 15.231(b) and 15.209				
Test Method:	ANSI C63.10: 2009				
Test Frequency Range:	30MHz to 5000MHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver Detector setup:					
	Detector	Frequency	RBW	VBW	Remark
	Quasi-peak	30MHz-1GHz	100KHz	300KHz	Quasi-peak Value
	Peak	30MHz-1GHz	100KHz	300KHz	Peak Value
		Above 1GHz	1MHz	3MHz	Peak Value
	Average	30MHz-1GHz	100KHz	10Hz	Average Value
Above 1GHz		1MHz	10Hz	Average Value	
Limit: (Field strength of the fundamental signal)					
	Frequency		Limit (dBuV/m @3m)	Remark	
	467.75MHz		81.87	Average Value	
			101.87	Peak Value	
Limit: (Spurious Emissions)					
	Frequency		Limit (dBuV/m @3m)	Remark	
	30MHz-88MHz		40.0	Quasi-peak Value	
	88MHz-216MHz		43.5	Quasi-peak Value	
	216MHz-960MHz		46.0	Quasi-peak Value	
	960MHz-1GHz		54.0	Quasi-peak Value	
	Above 1GHz		54.0	Average Value	
			74.0	Peak Value	
Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits a higher field strength.					
Test Procedure:	<p>The E.U.T and its simulators are placed on a turn table which is 0.8meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.</p> <p>Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2009 on radiated measurement.</p> <p>The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.</p>				
Test Instruments:	Refer to section 4.7 for details				
Test mode:	Transmitting mode				
Test results:	Pass				

Test setup:

Below 1GHz



Above 1GHz



Note:

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

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$



Measurement Data

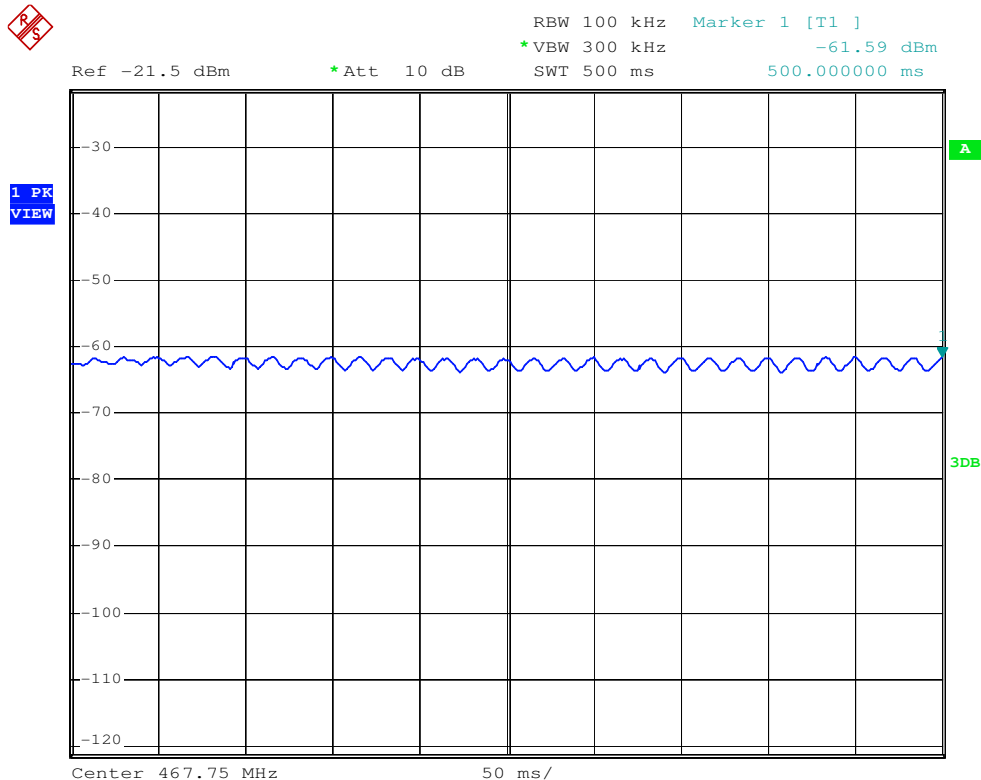
5.2.1 Field Strength Of The Fundamental Signal

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
467.75	2.48	17.54	27.54	91.00	83.48	101.87	-18.39	Horizontal
467.75	2.48	17.54	27.54	85.50	77.98	101.87	-23.89	Vertical

Average value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
467.75	2.48	17.54	27.54	88.60	81.08	81.87	-0.79	Horizontal
467.75	2.48	17.54	27.54	81.80	74.28	81.87	-7.59	Vertical

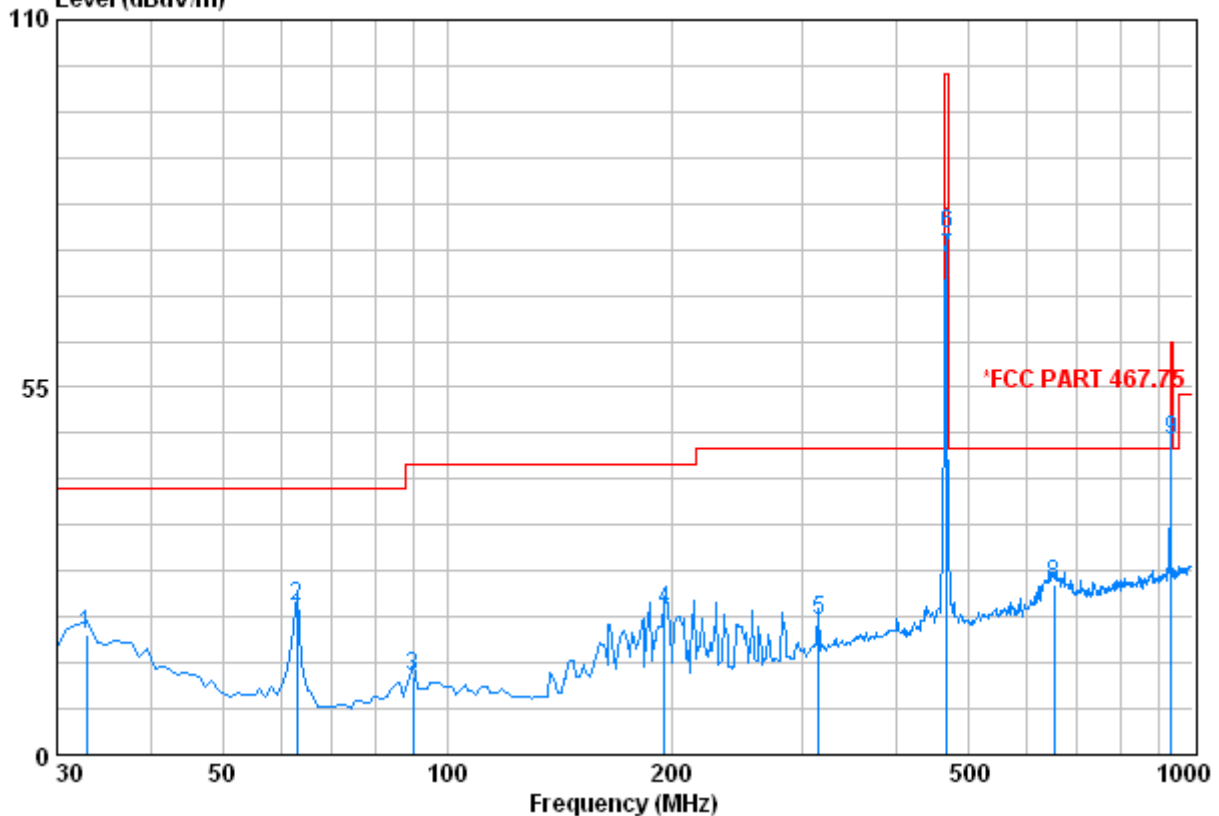


**5.2.2 Spurious Emissions****30MHz~1GHz**

Vertical

Data: 8

Level (dBuV/m)

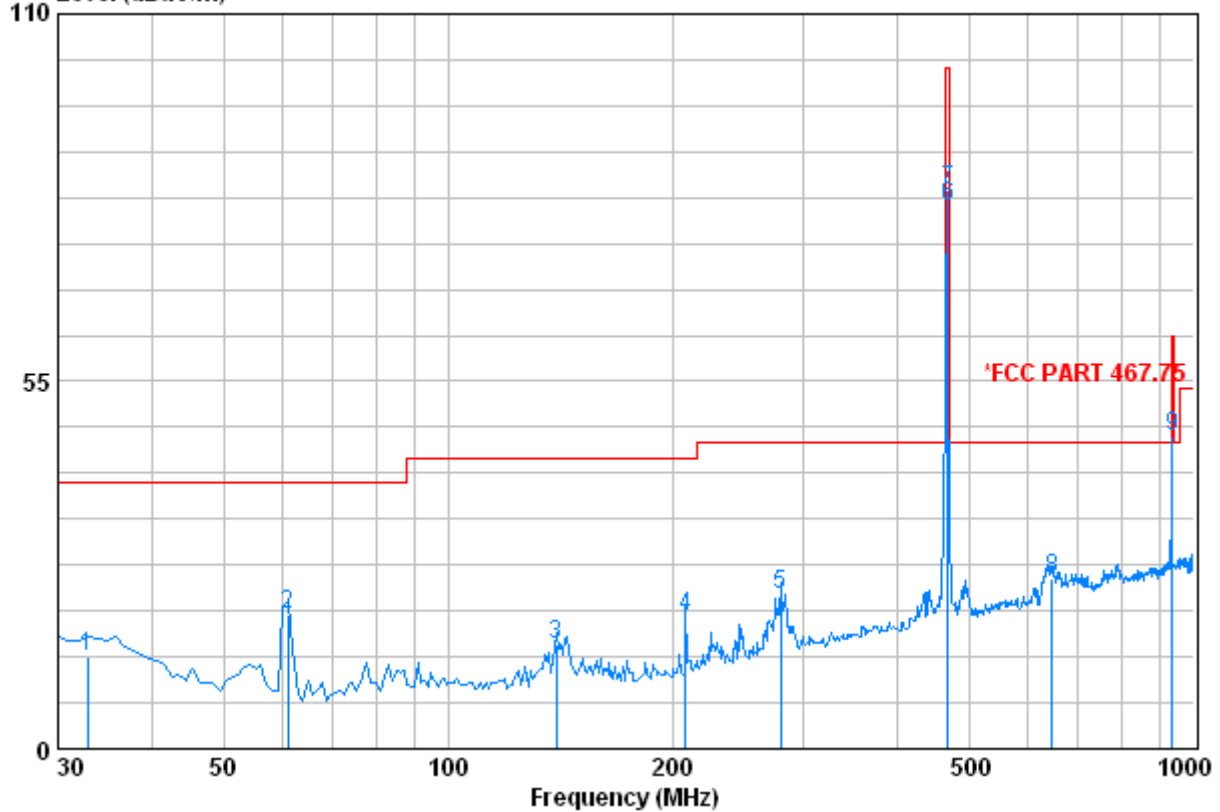


	Freq	Cable&Antenna Loss	Antenna Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	32.910	0.60	13.91	27.35	30.85	18.02	40.00	-21.98	QP
2	62.980	0.80	7.11	27.26	41.61	22.25	40.00	-17.75	QP
3	90.140	1.10	8.71	27.21	29.23	11.84	43.60	-31.76	QP
4	195.870	1.39	10.16	26.71	36.80	21.64	43.60	-21.96	QP
5	315.180	1.95	14.46	26.52	30.08	19.97	46.00	-26.03	QP
6	467.750	2.48	17.54	27.54	85.50	77.98	101.87	-23.89	Peak
7 8	467.750	2.48	17.54	27.54	81.80	74.28	81.87	-7.59	Average
8	650.800	2.81	20.68	27.47	29.36	25.37	46.00	-20.63	QP
9	935.500	3.64	23.30	26.61	46.70	47.03	61.87	-14.84	QP

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Horizontal
Data: 7
Level (dBuV/m)



		Cable	Antenna	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	32.910	0.60	13.84	27.35	26.81	13.91	40.00	-26.09	QP
2	61.040	0.80	7.16	27.26	39.48	20.18	40.00	-19.82	QP
3	139.610	1.30	8.08	26.96	33.10	15.52	43.60	-28.08	QP
4	208.480	1.45	10.65	26.67	34.26	19.69	43.60	-23.91	QP
5	279.290	1.81	12.98	26.46	34.68	23.01	46.00	-22.99	QP
6	467.750	2.48	17.54	27.54	88.60	81.08	81.87	-0.79	Average
7	467.750	2.48	17.54	27.54	91.00	83.48	101.87	-18.39	Peak
8	645.950	2.80	20.59	27.48	29.51	25.42	46.00	-20.58	QP
9	935.500	3.64	23.30	26.61	46.36	46.69	61.87	-15.18	QP

**Above 1GHz**

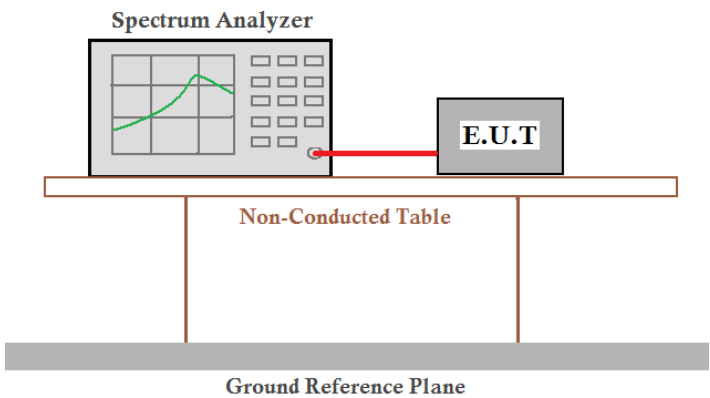
Peak Level Measurement:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Peak Level (dBuV/m)	Average Limit Line (dBuV/m)	Over Limit (dB)	polarization
1402.115	2.45	27.94	39.31	51.27	42.35	54.00	-11.65	Vertical
1959.609	2.81	31.43	39.55	48.15	42.84	61.87	-19.03	Vertical
2584.594	3.09	32.82	39.99	48.13	44.05	61.87	-17.82	Vertical
3196.365	3.49	33.32	40.45	50.02	46.38	61.87	-15.49	Vertical
3927.575	4.10	33.72	40.98	49.95	46.79	54.00	-7.21	Vertical
4496.121	4.49	35.20	41.40	49.76	48.05	61.87	-13.82	Vertical
1402.115	2.45	27.94	39.31	53.84	44.92	54.00	-9.08	Horizontal
1873.261	2.75	30.81	39.51	49.54	43.59	61.87	-18.28	Horizontal
2407.896	2.99	32.54	39.86	48.82	44.49	61.87	-17.38	Horizontal
3135.225	3.42	33.34	40.40	49.87	46.23	61.87	-15.64	Horizontal
4161.859	4.27	34.27	41.15	50.39	47.78	54.00	-6.22	Horizontal
4613.404	4.56	35.01	41.49	50.36	48.44	54.00	-5.56	Horizontal

Remark:

As shown in this section, for frequencies above 1GHz, the peak spurious emissions of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

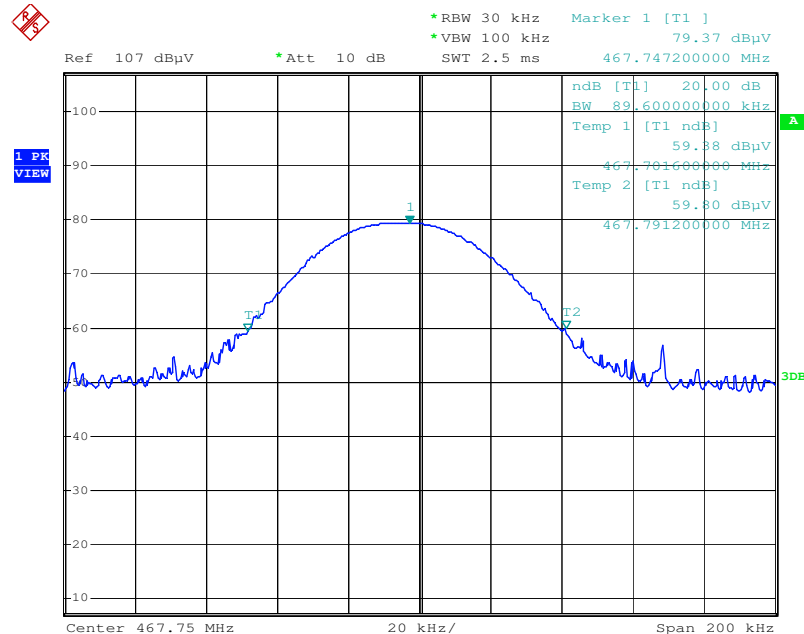
5.3 20dB Bandwidth

Test Requirement:	FCC Part15 C Section 15.231 (c)
Test Method:	ANSI C63.10:2009
Receiver setup:	RBW=10kHz, VBW=30kHz, detector: Peak
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test mode:	Transmitting mode
Test Procedure:	<ol style="list-style-type: none"> 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:	 <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 the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane, which is represented by a thick grey bar at the bottom.</p>
Test Instruments:	Refer to section 4.7 for details
Test results:	Pass

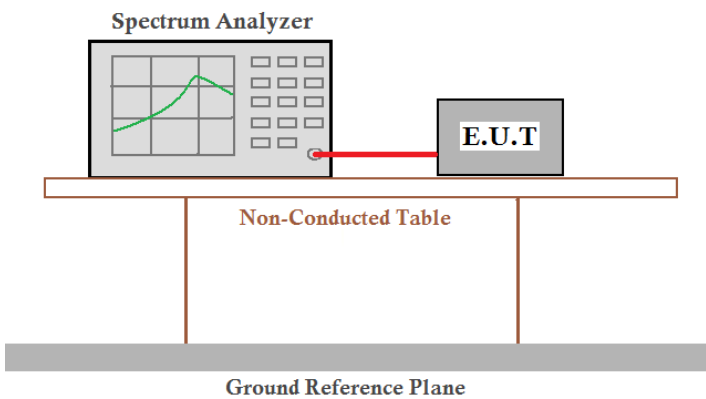
Measurement Data

20dB bandwidth (kHz)	Limit (kHz)	Results
89.6	1169.375	Pass

Test plot as follows:



5.4 Dwell Time:

Test Requirement:	FCC Part15 C Section 15.231 (a)
Test Method:	ANSI C63.10:2009
Receiver setup:	RBW=100kHz, VBW=300kHz, span=0Hz, detector: Peak
Limit:	Not more than 5 seconds
Test mode:	Transmitting mode
Test Procedure:	<ol style="list-style-type: none"> 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. Single scan the transmit, and read the transmission time.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 4.7 for details
Test results:	Pass

Measurement Data

Dwell time (second)	Limit (second)	Results
1.0975	5	Pass



Test plot as follows:

