



Report No.: SZEM161201032302
Page: 1 of 31

FCC REPORT

Application No. : SZEM1612010323CR (SGS SZ No.: T51610280008EM)
Applicant: TOY STATE INTERNATIONAL LTD
Product Name: CAT Construction RC-Dump Truck, Wheel Loader
Model No.(EUT): 82101
Add Model No.: 82102
Assortment no. 82100
Labeled Age Grading: 5+
Country of Origin: China
FCC ID: V9Q-82100R24
Standards: 47 CFR Part 15, Subpart C (2015)
Date of Receipt: 2016-12-02
Date of Test: 2016-12-07 to 2016-12-14
Date of Issue: 2016-12-26

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

TSANG KA TING, Calvin

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.

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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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2016-12-26		Original

Authorized for issue by:				
Tested By		Gebin Sun		2016-12-14
		(Gebin Sun) /Project Engineer		Date
Checked By		Eric Fu		2016-12-26
		(Eric Fu) /Reviewer		Date

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203	ANSI C63.10 (2013)	PASS
Field Strength of the Fundamental Signal	47 CFR Part 15, Subpart C Section 15.249 (a)	ANSI C63.10 (2013)	PASS
Spurious Emissions	47 CFR Part 15, Subpart C Section 15.249 (a)/15.209	ANSI C63.10 (2013)	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.249(a)/15.205	ANSI C63.10 (2013)	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.215 (c)	ANSI C63.10 (2013)	PASS

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5 General Information

5.1 Client Information

Applicant:	TOY STATE INTERNATIONAL LTD
Address of Applicant:	Unit 905, 9/F, West Wing, Tsimshatsui Centre, 66 Mody Road, Tsimshatsui East, Kowloon, Hong Kong

5.2 General Description of EUT

Name:	CAT Construction RC-Dump Truck, Wheel Loader
Model No.:	82101
Frequency Range:	2.4GHz (2410 MHz ~ 2475MHz)
Modulation Type:	GFSK
Sample Type:	Portable production
Antenna Type:	Integral
Antenna Gain:	0dBi
Power Supply:	6.0V DC (1.5Vx4 "AA" Size Batteries) for Car

Remark:

Model No.: 82101, 82102

Only the model 82101 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for all above models, only different on model number and outer casing.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2410MHz	19	2428MHz	37	2446MHz	55	2464MHz
2	2411MHz	20	2429MHz	38	2447MHz	56	2465MHz
3	2412MHz	21	2430MHz	39	2448MHz	57	2466MHz
4	2413MHz	22	2431MHz	40	2449MHz	58	2467MHz
5	2414MHz	23	2432MHz	41	2450MHz	59	2468MHz
6	2415MHz	24	2433MHz	42	2451MHz	60	2469MHz
7	2416MHz	25	2434MHz	43	2452MHz	61	2470MHz
8	2417MHz	26	2435MHz	44	2453MHz	62	2471MHz
9	2418MHz	27	2436MHz	45	2454MHz	63	2472MHz
10	2419MHz	28	2437MHz	46	2455MHz	64	2473MHz
11	2420MHz	29	2438MHz	47	2456MHz	65	2474MHz
12	2421MHz	30	2439MHz	48	2457MHz	66	2475MHz
13	2422MHz	31	2440MHz	49	2458MHz		
14	2423MHz	32	2441MHz	50	2459MHz		
15	2424MHz	33	2442MHz	51	2460MHz		
16	2425MHz	34	2443MHz	52	2461MHz		
17	2426MHz	35	2444MHz	53	2462MHz		
18	2427MHz	36	2445MHz	54	2463MHz		

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(CH1)	2410MHz
The Middle channel(CH31)	2440MHz
The Highest channel(CH66)	2475MHz

5.3 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	50 % RH
Atmospheric Pressure:	1015 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation.

5.4 Description of Support Units

The EUT has been tested independently.

5.5 Test Location

All tests were subcontracted to Shenzhen EMC Lab:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch,
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.
Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

5.8 Other Information Requested by the Customer

None.

5.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio frequency	7.25×10^{-8}
2	RF power (conducted)	0.75dB
3	Radiated Spurious emission	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-25GHz)
4	Temperature test	1 °C
5	Humidity test	3%

5.10 Equipment List

RF connected test						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
2	Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
3	Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
4	Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

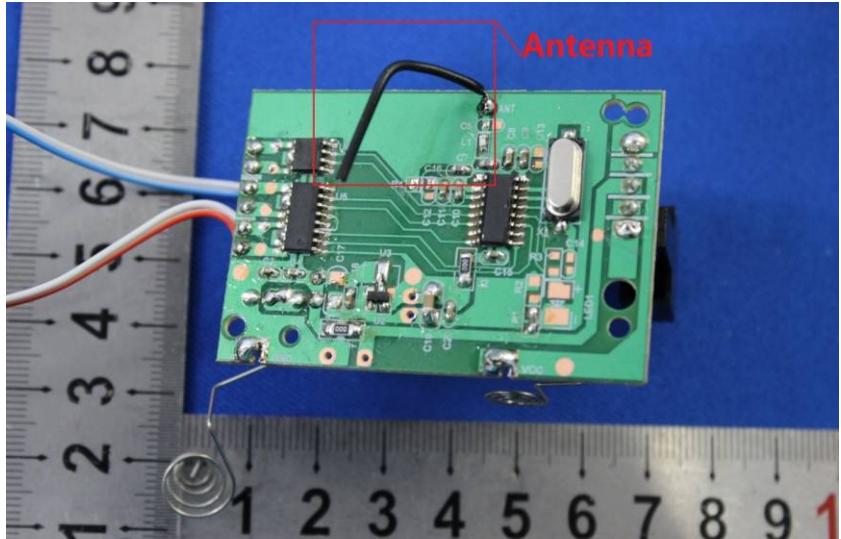
RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2016-05-13	2017-05-13
2	EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2016-10-09	2017-10-09
3	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2014-11-01	2017-11-01
4	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEM003-11	2015-10-17	2018-10-17
5	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEM003-12	2014-11-24	2017-11-24
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2016-04-25	2017-04-25
7	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A

8	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
9	Loop Antenna	Beijing Daze	ZN30401	SEM003-09	2015-05-13	2018-05-13

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	AUDIX	N/A	SEM001-02	2016-05-13	2017-05-13
2	EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-09	2016-07-19	2017-07-19
3	BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2014-11-15	2017-11-15
4	Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2016-10-09	2017-10-09
5	Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
6	Horn Antenna (18-26GHz)	ETS-Lindgren	3160	SEM003-12	2014-11-24	2017-11-24
7	Horn Antenna(26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2015-02-12	2018-02-12
8	Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
9	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C 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>	
EUT 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>	

6.2 Spurious Emissions

6.2.1 Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.249 and 15.209				
Test Method:	ANSI C63.10: 2013 Clause 6.4,6.5 and 6.6				
Test Site:	Measurement Distance: 3m				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100 kHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit: (Spurious Emissions)	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F (kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F (kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.					
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark	
	2400MHz-2483.5MHz	94.0		Average Value	
		114.0		Peak Value	

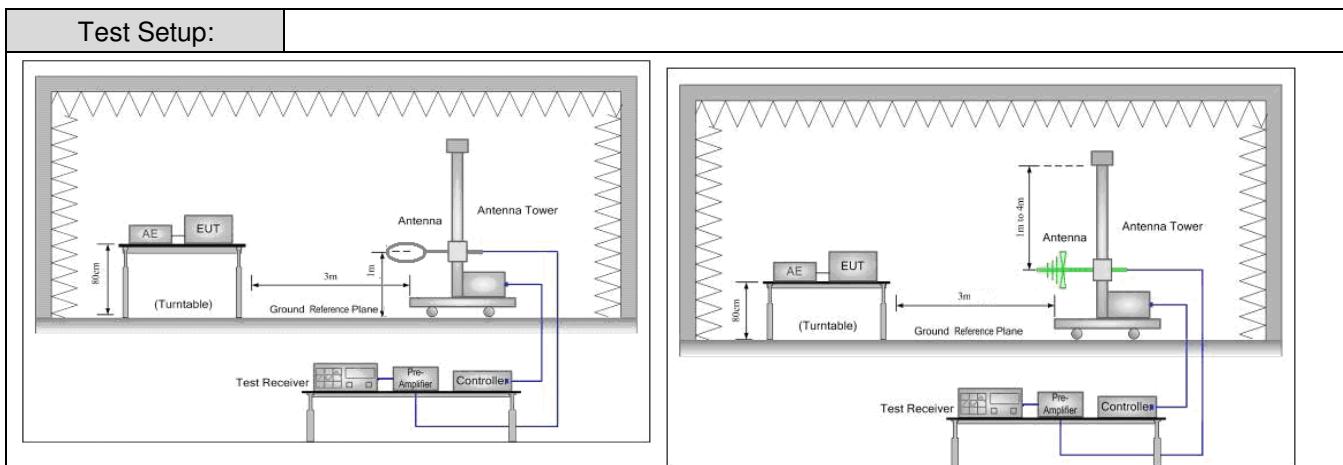


Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz

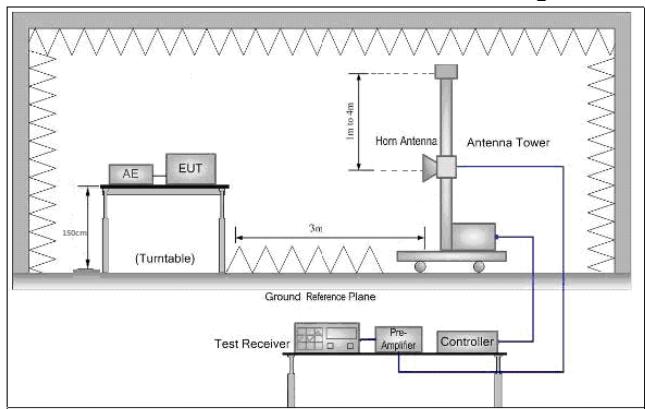


Figure 3. Above 1 GHz

Test Procedure:	
	<ol style="list-style-type: none"> a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. d. 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. e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. g. 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. h. Test the EUT in the lowest channel, the middle channel, the Highest channel i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which is worse case.

	j. Repeat above procedures until all frequencies measured was complete.
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting mode
Final Test Mode:	Transmitting mode Only the worst case is recorded in the report.
Test Results:	Pass

Measurement Data

6.2.1.1 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
2410.450	29.14	5.35	38.15	91.15	87.49	114.00	-26.51	Horizontal
2410.450	29.14	5.35	38.15	86.01	82.35	114.00	-31.65	Vertical
2439.958	29.23	5.38	38.15	91.87	88.33	114.00	-25.67	Horizontal
2440.478	29.23	5.38	38.15	89.98	86.44	114.00	-27.56	Vertical
2475.553	29.33	5.40	38.15	91.36	87.94	114.00	-26.06	Horizontal
2474.925	29.33	5.40	38.15	90.16	86.74	114.00	-27.26	Vertical

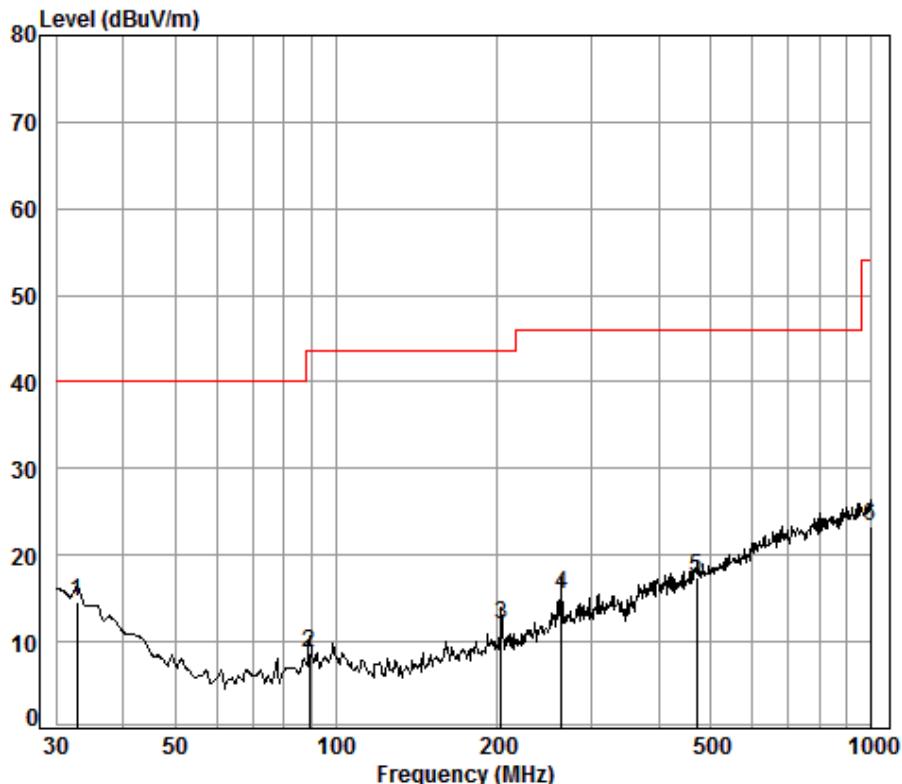
Remark:

The peak field strength 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.

6.2.1.2 Spurious Emissions

30MHz~1GHz

The worse mode: Transmitting mode (Lowest channel) Vertical



Condition: 3m VERTICAL

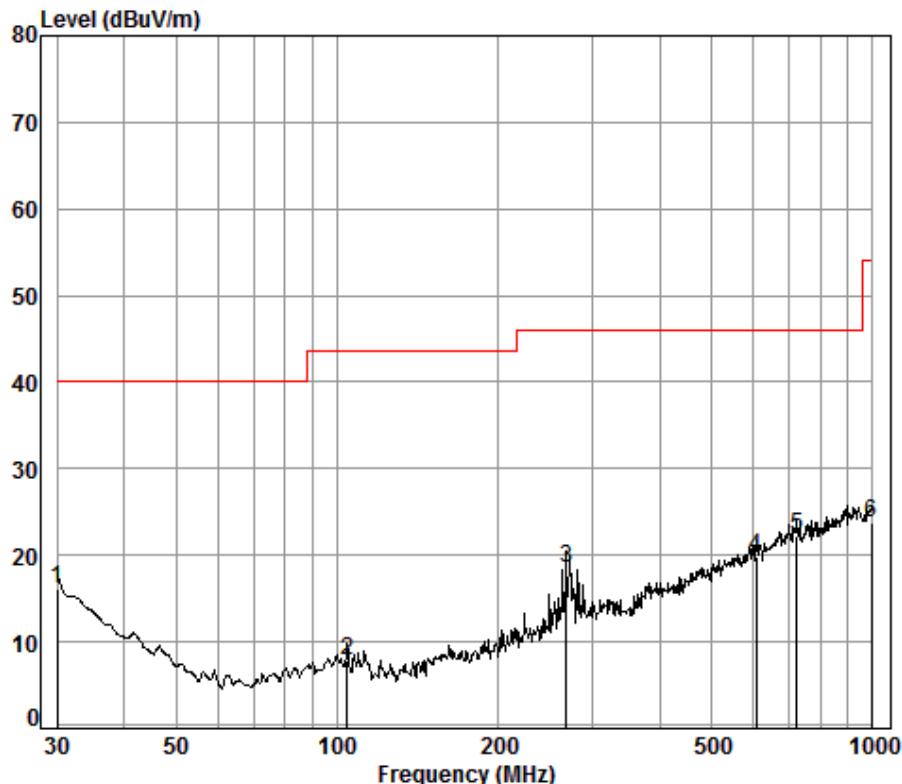
Job No. : 10323CR

Test mode: TX mode

: Car

	Cable Freq	Ant Loss	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	32.86	0.60	17.10	27.35	24.21	14.56	40.00	-25.44
2	89.28	1.10	8.63	27.22	26.24	8.75	43.50	-34.75
3	203.52	1.42	10.38	26.69	26.83	11.94	43.50	-31.56
4	263.82	1.74	12.58	26.50	27.63	15.45	46.00	-30.55
5	472.18	2.50	17.70	27.56	24.78	17.42	46.00	-28.58
6	996.50	3.70	24.16	26.33	21.76	23.29	54.00	-30.71

The worse mode:	Transmitting mode (Lowest channel)	Horizontal
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Condition: 3m HORIZONTAL

Job No. : 10323CR

Test mode: TX mode

: Car

Freq	Cable	Ant	Preamp	Read	Limit		Over	
	Loss	Factor	Factor	Level	Level	Line	Limit	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.00	0.60	18.70	27.36	24.08	16.02	40.00	-23.98
2	104.54	1.21	8.87	27.17	24.87	7.78	43.50	-35.72
3	267.55	1.76	12.65	26.49	30.58	18.50	46.00	-27.50
4	605.66	2.71	19.96	27.53	24.72	19.86	46.00	-26.14
5 pp	721.73	2.97	21.60	27.39	24.99	22.17	46.00	-23.83
6	993.01	3.69	24.02	26.33	22.40	23.78	54.00	-30.22

Above 1GHz								
Test mode:		Transmitting		Test channel:		Lowest	Remark:	Peak
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3853.298	33.21	7.76	38.64	44.85	47.18	74.00	-26.82	Vertical
4820.000	34.19	8.89	39.03	47.68	51.73	74.00	-22.27	Vertical
6060.637	34.75	10.48	38.96	44.96	51.23	74.00	-22.77	Vertical
7230.000	36.41	10.69	38.16	44.93	53.87	74.00	-20.13	Vertical
9640.000	37.53	12.52	36.97	39.46	52.54	74.00	-21.46	Vertical
12208.390	38.73	14.39	38.52	38.94	53.54	74.00	-20.46	Vertical
3943.545	33.45	7.79	38.68	44.80	47.36	74.00	-26.64	Horizontal
4820.000	34.19	8.89	39.03	49.27	53.32	74.00	-20.68	Horizontal
5845.324	34.61	10.13	39.01	45.19	50.92	74.00	-23.08	Horizontal
7230.000	36.41	10.69	38.16	48.13	57.07	74.00	-16.93	Horizontal
9640.000	37.53	12.52	36.97	40.48	53.56	74.00	-20.44	Horizontal
12297.040	38.78	14.31	38.61	38.87	53.35	74.00	-20.65	Horizontal

Test mode:		Transmitting		Test channel:		Lowest	Remark:	Average
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
7230.000	36.41	10.69	38.16	36.20	45.14	54.00	-8.86	Horizontal

Test mode:		Transmitting		Test channel:		Middle	Remark:		Peak
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	
3819.990	33.12	7.75	38.62	45.41	47.66	74.00	-26.34	Vertical	
4880.000	34.29	8.97	39.06	49.61	53.81	74.00	-20.19	Vertical	
6078.201	34.76	10.46	38.95	45.00	51.27	74.00	-22.73	Vertical	
7320.000	36.37	10.72	38.07	47.52	56.54	74.00	-17.46	Vertical	
9760.000	37.55	12.58	36.92	40.11	53.32	74.00	-20.68	Vertical	
12226.070	38.74	14.37	38.53	39.20	53.78	74.00	-20.22	Vertical	
3972.178	33.53	7.80	38.69	44.97	47.61	74.00	-26.39	Horizontal	
4880.000	34.29	8.97	39.06	49.56	53.76	74.00	-20.24	Horizontal	
6302.093	34.95	10.17	38.81	45.33	51.64	74.00	-22.36	Horizontal	
7320.000	36.37	10.72	38.07	44.69	53.71	74.00	-20.29	Horizontal	
9760.000	37.55	12.58	36.92	40.69	53.90	74.00	-20.10	Horizontal	
12639.790	38.87	14.55	38.95	38.80	53.27	74.00	-20.73	Horizontal	

Test mode:		Transmitting		Test channel:		Middle	Remark:		Average
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	
7320.000	36.37	10.72	38.07	34.51	43.53	54.00	-10.47	Vertical	

Test mode:		Transmitting		Test channel:		Highest	Remark:		Peak
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	
3853.298	33.21	7.76	38.64	44.74	47.07	74.00	-26.93	Vertical	
4950.000	34.41	9.07	39.08	49.22	53.62	74.00	-20.38	Vertical	
5939.103	34.66	10.39	39.01	45.69	51.73	74.00	-22.27	Vertical	
7425.000	36.33	10.76	37.96	44.63	53.76	74.00	-20.24	Vertical	
9900.000	37.58	12.66	36.85	40.00	53.39	74.00	-20.61	Vertical	
12261.500	38.76	14.34	38.57	38.96	53.49	74.00	-20.51	Vertical	
3847.726	33.19	7.76	38.63	44.50	46.82	74.00	-27.18	Horizontal	
4950.000	34.41	9.07	39.08	51.48	55.88	74.00	-18.12	Horizontal	
5904.828	34.64	10.30	39.01	44.76	50.69	74.00	-23.31	Horizontal	
7425.000	36.33	10.76	37.96	44.68	53.81	74.00	-20.19	Horizontal	
9900.000	37.58	12.66	36.85	40.06	53.45	74.00	-20.55	Horizontal	
12137.940	38.68	14.45	38.44	39.03	53.72	74.00	-20.28	Horizontal	

Test mode:		Transmitting		Test channel:		Highest	Remark:		Average
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	
4950.000	34.41	9.07	39.08	40.10	44.50	54.00	-9.50	Horizontal	

Remark:

- 1) 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
- 2) Scan from 9kHz to 25GHz, The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

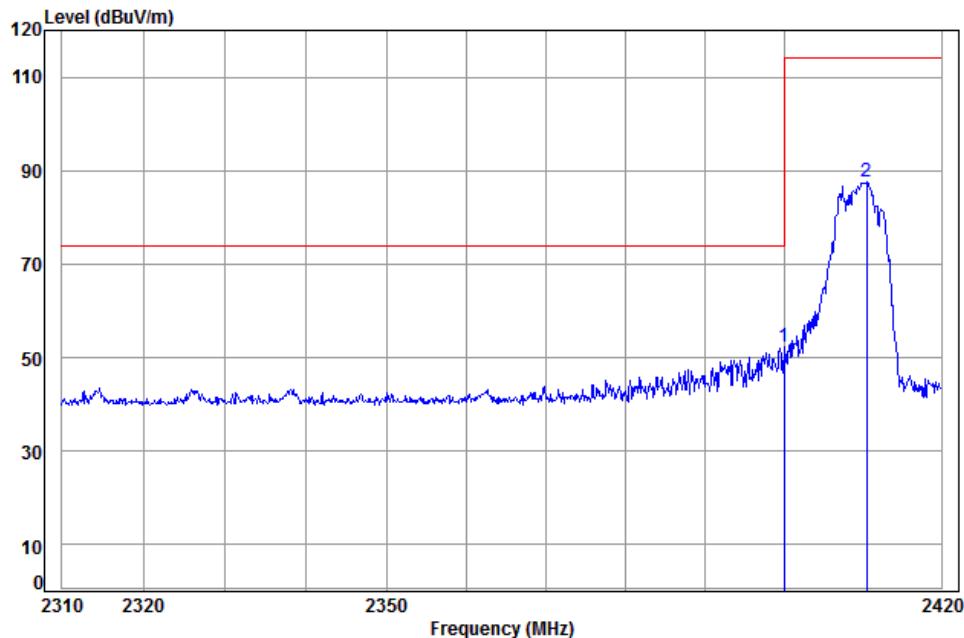
6.3 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205																					
Test Method:	ANSI C63.10: 2013 Clause 6.10																					
Test site:	Measurement Distance: 3m																					
Limit(band edge):	<p>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.</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBuV/m @3m)</th> <th>Remark</th> </tr> </thead> <tbody> <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> </tbody> </table>		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
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																				
Test Setup:																						
	Figure 1. 30MHz to 1GHz	Figure 2. Above 1 GHz																				

Test Procedure:	<ul style="list-style-type: none">a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.d. 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.e. 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.f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channelh. Test the EUT in the lowest channel , the Highest channeli. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case..j. Repeat above procedures until all frequencies measured was complete.
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting mode
Final Test Mode:	Transmitting mode Only the worst case is recorded in the report.
Test Results:	Pass

Measurement Data**Band edge (Radiated Emission)**

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak	Horizontal
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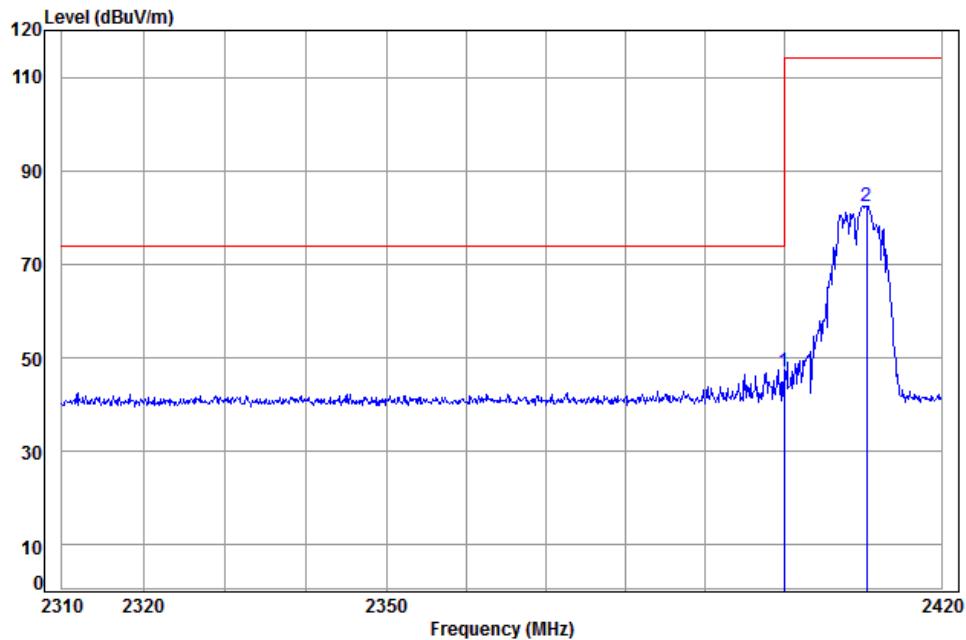
Condition: 3m Horizontal

Job No: : 10323CR

Mode: : 2410 Band edge
: Car

	Cable Freq	Ant Loss	Preamp Factor	Read Level	Limit Level	Line Limit	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1 pp	2400.000	5.34	29.11	38.14	55.93	52.24	74.00 -21.76
2	2410.450	5.35	29.14	38.15	91.15	87.49	114.00 -26.51

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak	Vertical
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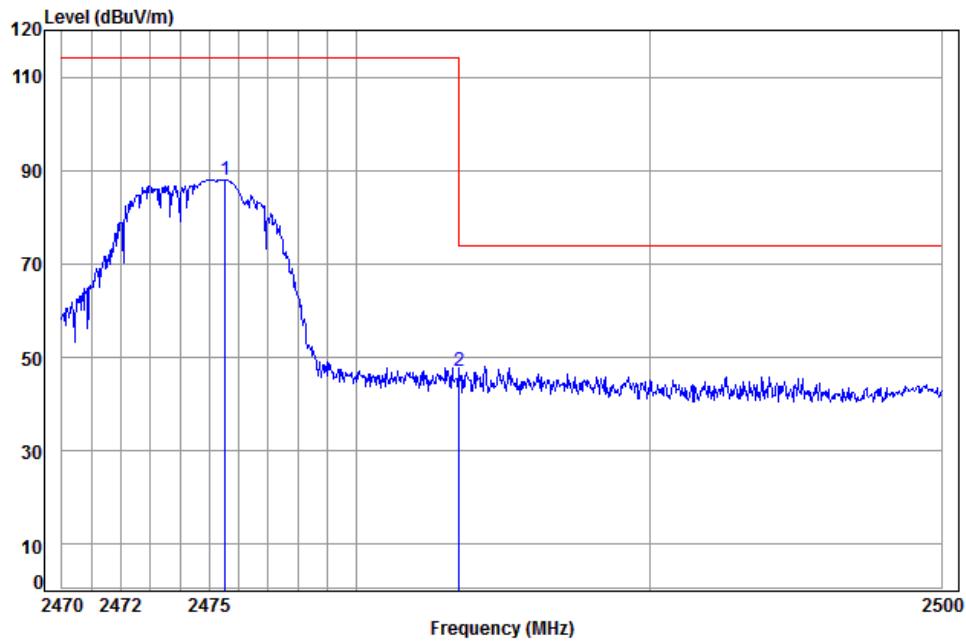
Condition: 3m Vertical

Job No: : 10323CR

 Mode: : 2410 Band edge
 : Car

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m		dB	dBuV	dBuV/m	dB
1 pp	2400.000	5.34	29.11	38.14	50.76	47.07	74.00 -26.93
2	2410.450	5.35	29.14	38.15	86.01	82.35	114.00 -31.65

Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak	Horizontal
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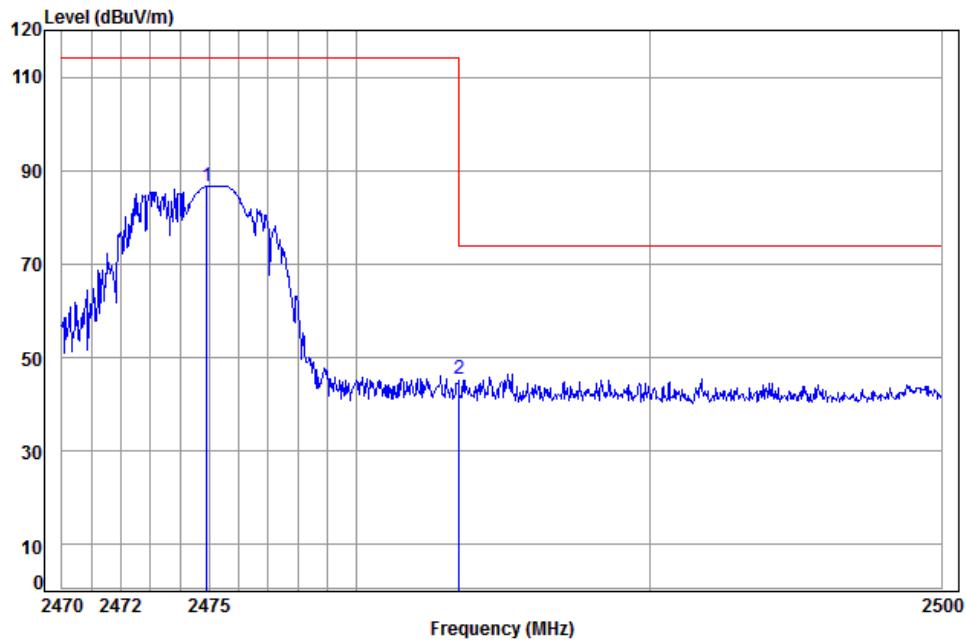
Condition: 3m Horizontal

Job No: : 10323CR

Mode: : 2475 Band edge
: Car

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
1 pp	2475.553	5.40	29.33	38.15	91.36	87.94	114.00 -26.06
2	2483.500	5.41	29.35	38.15	50.63	47.24	74.00 -26.76

Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak	Vertical
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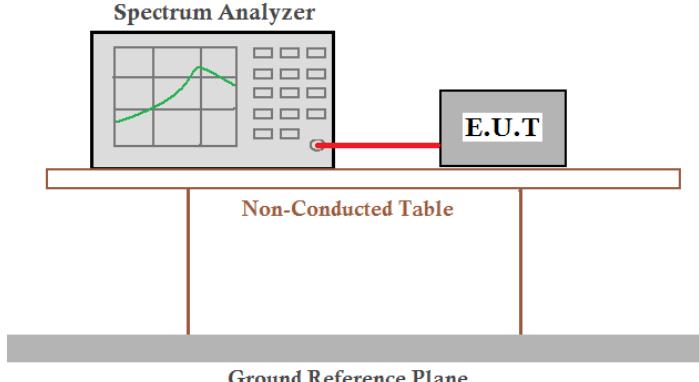
	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	2474.925	5.40	29.33	38.15	90.16	86.74	114.00 -27.26
2	2483.500	5.41	29.35	38.15	48.94	45.55	74.00 -28.45

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

6.4 20dB Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.215
Test Method:	ANSI C63.10:2013 Clause 6.9
Test Setup:	
Instruments Used:	Refer to section 5.10 for details
Test mode:	Transmitting mode
Limit:	N/A
Test Results:	Pass

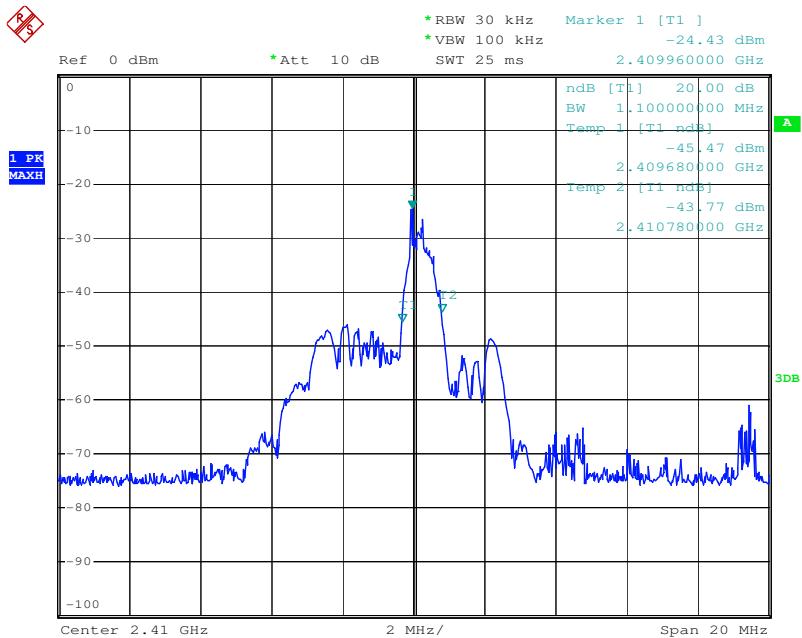
Measurement Data

Test channel	20dB bandwidth (MHz)	Results
Lowest	1.10	Pass
Middle	1.12	Pass
Highest	1.12	Pass

Test plot as follows:

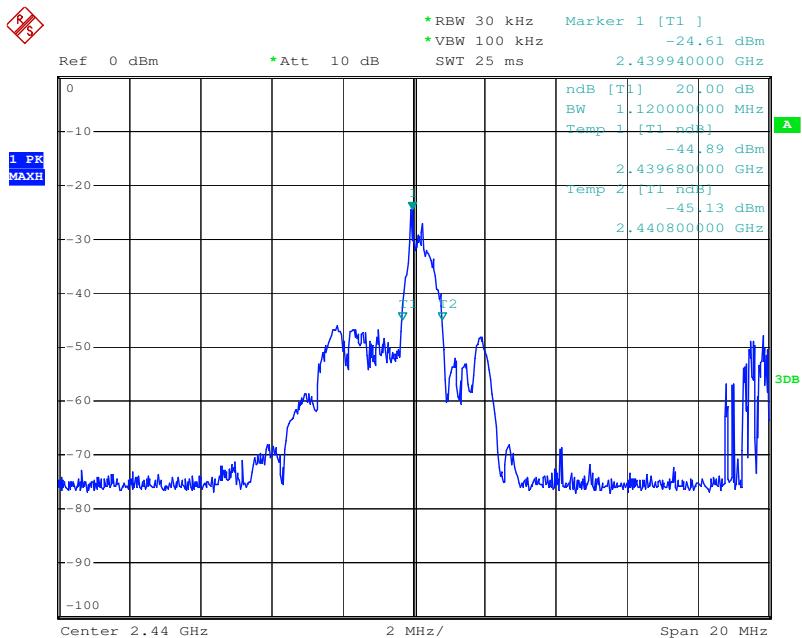
Test channel:

Lowest

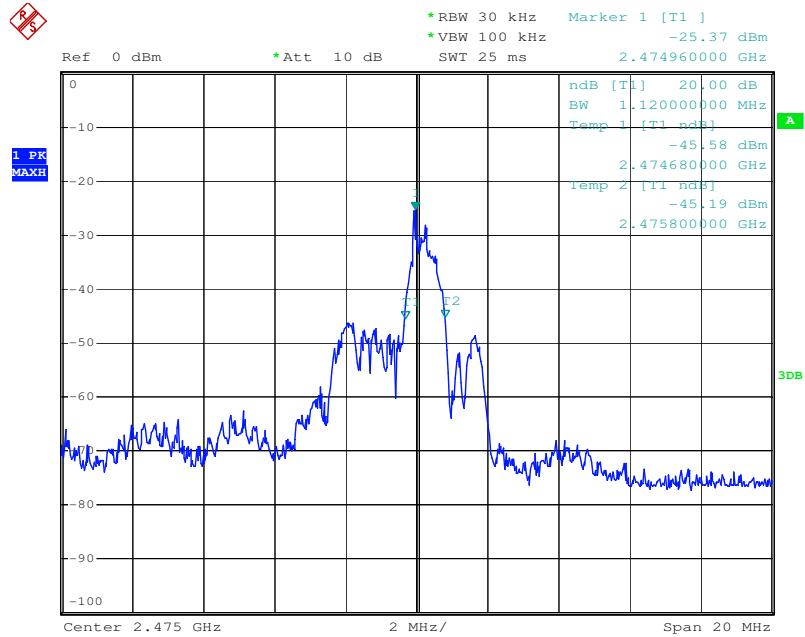


Test channel:

Middle



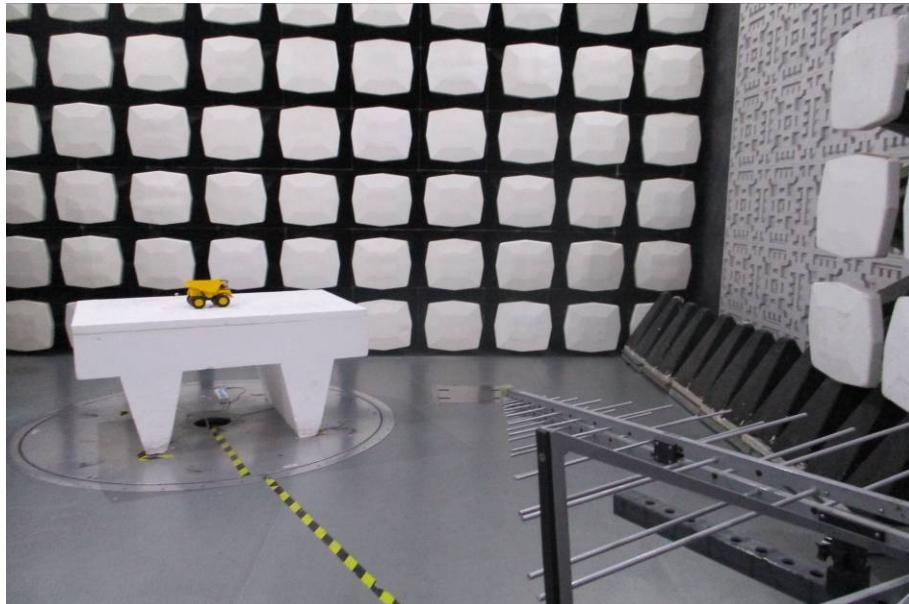
Test channel:	Highest
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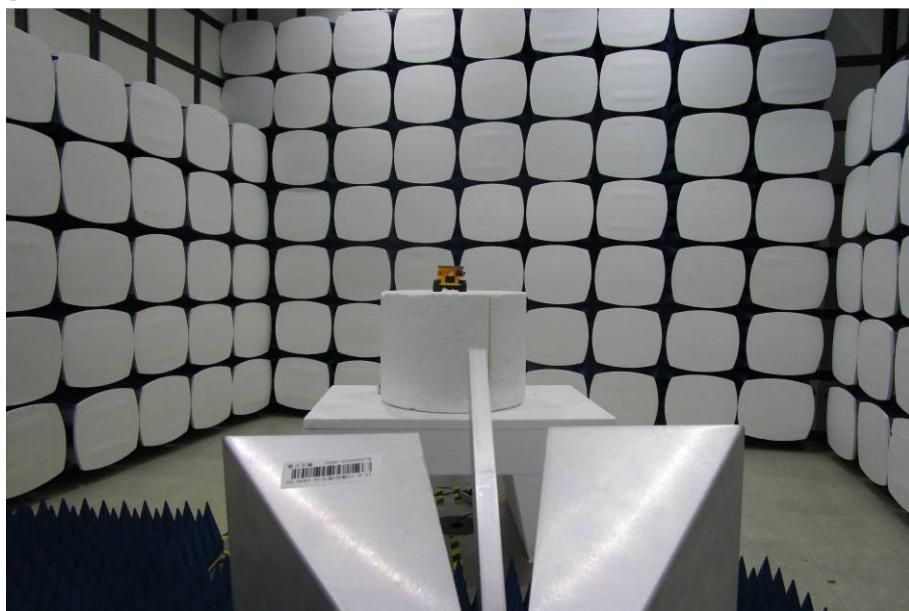
7 Photographs

Test model No.: 82101

7.1 Radiated Emission Test Setup



7.2 Spurious Emissions



7.3 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1612010323CR.