

Report No.: SZEM200300167602

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# TEST REPORT

**Application No.:** SZEM2003001676CR

Applicant: Mattel Asia Pacific Sourcing Ltd.

**Address of Applicant:** 13/F., South Tower, World Finance Centre, Harbour City, Tsimshatsui,

Kowloon, HongKong

Manufacturer: Mattel Asia Pacific Sourcing Ltd.

13/F., South Tower, World Finance Centre, Harbour City, Tsimshatsui, Address of Manufacturer:

Kowloon, HongKong

Guangdong First Union animation Technology Co., Ltd Factory:

Address of Factory: Xin Cun Village, Wan Jiang, Dong Guan City, Guangdong Province, China

**Equipment Under Test (EUT):** 

**EUT Name:** RC SUPERCHARGED SHARK

Model No.: GWB71T **Associated Toy Number:** GWB71 Trade mark: Mattel

FCC ID: PIYGWB71-20A5T

47 CFR Part 15, Subpart C 15.249 Standard(s):

**Date of Receipt:** 2020-03-20

2020-03-22 to 2020-03-23 Date of Test:

Date of Issue: 2020-03-25

Pass\* Test Result:

**EMC Laboratory Manager** 

Ceny. Ku



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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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	Revision Record						
Version	Version Chapter Date Modifier						
01		2020-03-25		Original			

Authorized for issue by:		
	Peter Goog	
	Peter Geng /Project Engineer	
	EvicFu	
	Eric Fu /Reviewer	



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# **Test Summary**

Radio Spectrum Technical Requirement						
Item	Standard	Method	Requirement	Result		
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass		

Radio Spectrum Matter Part							
Item	Standard	Method	Requirement	Result			
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass			
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass			
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass			
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass			



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### **General Information**

### 4.1 Details of E.U.T.

Power Supply:	remote: DC 6V by 4x1.5V "AA" batteries
Operation Frequency:	2412-2472MHz
Number of Channels:	61
Channel Spacing:	1MHz
Antenna Type:	Integral Antenna
Antenna Gain:	0 dBi

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



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### 4.2 Description of Support Units

The EUT has been tested as an independent unit.

### 4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	± 7.25 x 10 <sup>-8</sup>
2	Duty cycle	± 0.37%
3	Occupied Bandwidth	± 3%
4	Radiated Courieus amission test	± 4.5dB (Below 1GHz)
4	Radiated Spurious emission test	± 4.8dB (Above 1GHz)
5	Temperature test	± 1°C
6	Humidity test	± 3%
7	Supply voltages	± 1.5%
8	Time	± 3%



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### 4.4 Test Location

All tests were performed at:

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

No tests were sub-contracted.

### 4.5 Test Facility

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

#### A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

### • FCC -Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

#### • Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C

### 4.6 Deviation from Standards

None

### 4.7 Abnormalities from Standard Conditions



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#### **Equipment List** 5

20dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	SAEMC	MSR733	SEM001-09	2019-06-13	2022-06-12
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2019-09-24	2020-09-23
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2019-04-01	2020-03-31
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2019-07-11	2020-07-10
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019-09-24	2020-09-23
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019-09-24	2020-09-23
Electric and Magnetic Field Analyzer	Narda	EHP-50F	SEM022-05	2019-11-28	2020-11-27
Electric Field Probe	WANDEL & GOLTERMANN	EMR-20	EMC0907	2019-05-21	2020-05-20
EMF Tester	Narda	ELT-400	SZE039-4	2019-07-08	2020-07-07

Field Strength of the Fundamental Signal						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM026-01	2019-07-11	2020-07-10	
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2019-04-12	2020-04-11	
Horn Antenna	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12	
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16	
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-24	2020-09-23	
Pre-amplifier	Rohde & Schwarz	CH14-H052	SEM005-17	2019-04-01	2020-03-31	
Pre-amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2019-04-01	2020-03-31	
DC Power Supply	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23	
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21	



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Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2019-07-11	2020-07-10
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2019-04-12	2020-04-11
Horn Antenna	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-24	2020-09-23
Pre-amplifier	Rohde & Schwarz	CH14-H052	SEM005-17	2019-04-01	2020-03-31
Pre-amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2019-04-01	2020-03-31
DC Power Supply	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21

Radiated Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2019-07-11	2020-07-10
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2019-04-12	2020-04-11
Horn Antenna	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-24	2020-09-23
Pre-amplifier	Rohde & Schwarz	CH14-H052	SEM005-17	2019-04-01	2020-03-31
Pre-amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2019-04-01	2020-03-31
DC Power Supply	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21



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Radiated Emissions					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2019-09-24	2020-09-23
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2019-04-01	2020-03-31
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019-07-11	2020-07-10

General used equipmen	t				
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2019-09-26	2020-09-25
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2019-04-04	2020-04-03



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#### 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 Limit:

### 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.

#### 6.1.2 Conclusion

**EUT Antenna:** 

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

Antenna location: Refer to internal photo.





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#### **Radio Spectrum Matter Test Results** 7

### 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215 Test Method: ANSI C63.10 (2013) Section 6.9

Limit: N/A

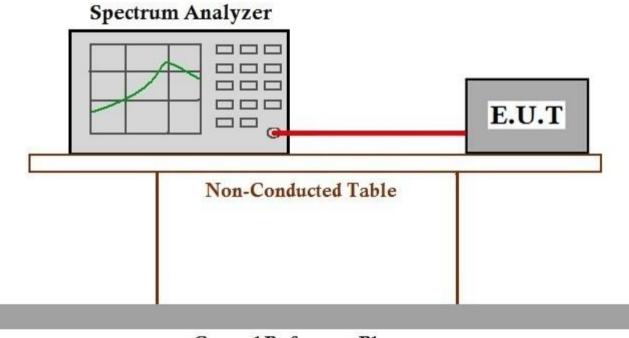
### 7.1.1 E.U.T. Operation

Operating Environment:

26 Temperature: Humidity: 45.5 % RH Atmospheric Pressure: 1015 mbar

Test mode b:TX mode\_Keep the EUT in transmitting with modulation mode.

### 7.1.2 Test Setup Diagram



### Ground Reference Plane

### 7.1.3 Measurement Procedure and Data



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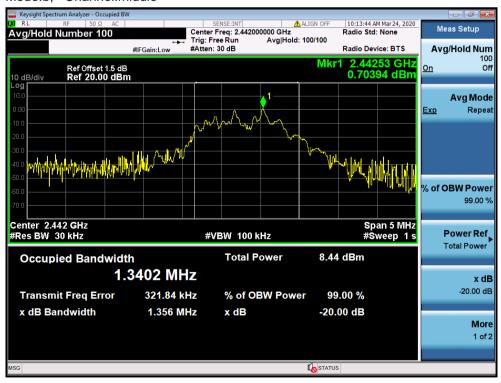
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#### Mode:b: Channel:Low



#### Channel:middle Mode:b:





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### Mode:b; Channel:High





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### 7.2 Field Strength of the Fundamental Signal (15.249(a))

Test Requirement 47 CFR Part 15, Subpart C 15.249(a) ANSI C63.10 (2013) Section 6.5&6.6 Test Method:

Measurement Distance: 3m

Limit:

Fundamental frequency(MHz)	Field strength of fundamental(millivolts/meter)	Field strength of harmonics(microvolts/meter)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

Remark: The frequencies above 1000MHz are based on average limits. However, 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.

For fundamental frequency in "902-928MHz", the field strength of fundamental is based on Quasi-Peak.

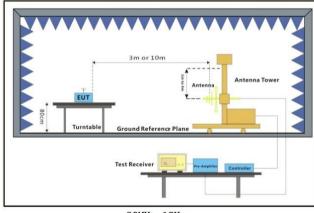
### 7.2.1 E.U.T. Operation

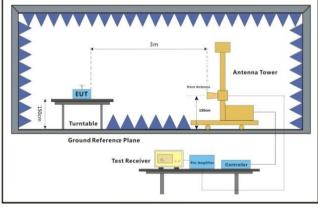
Operating Environment:

°C Temperature: 25 Atmospheric Pressure: 1015 mbar Humidity: 51 % RH

Test mode b:TX mode Keep the EUT in transmitting with modulation mode.

#### 7.2.2 Test Setup Diagram





30MHz-1GHz Above 1GHz



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#### 7.2.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 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 or 10 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 it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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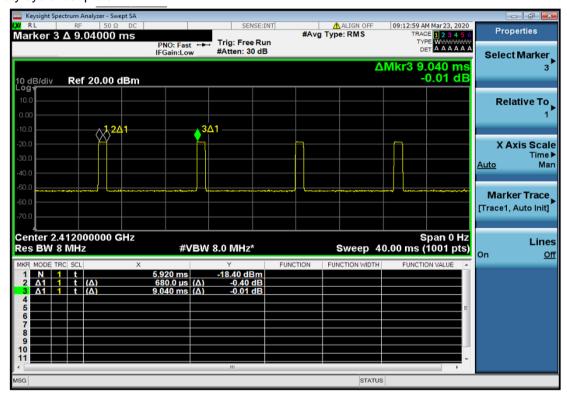
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### Average value:

, it or ago raise.	
	Average value=Peak value + PDCF
Calculate Formula:	PDCF=20 log(Duty cycle)
	Duty cycle= T on time / T period
	Ton time =0.68ms
Test data:	T period =9.04ms
	PDCF value= -22.47dB

#### Duty cycle test plots:





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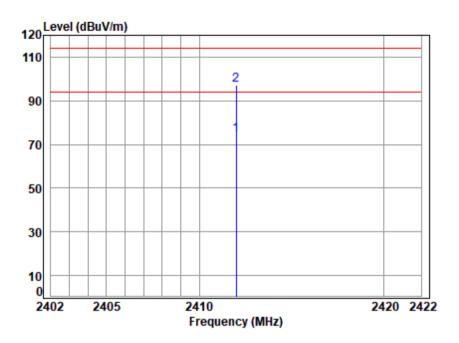
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Mode:b; Polarization:Horizontal; Channel:Low



Site : chamber

2412.000

Condition: 3m HORIZONTAL Job No : 01676CR\01675CR Mode : 2412 Field strength

Ant Preamp Cable Read Limit 0ver Loss Factor Factor Level Level Line Limit Remark Freq dBuV dBuV/m dBuV/m MHz dB dB/m 2412.000 3.68 28.56 40.98 83.30 74.56 94.00 -19.44 Average

3.68 28.56 40.98 105.77 97.03 114.00 -16.97 peak



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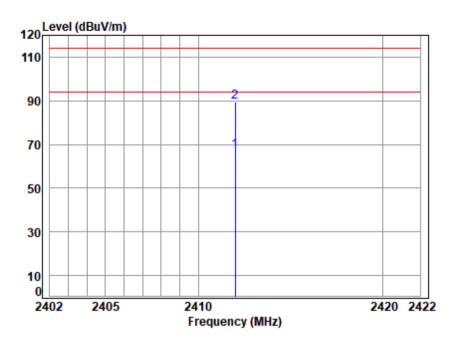
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Mode:b; Polarization:Vertical; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No : 01676CR\01675CR

: 2412 Field strength Mode

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2412.000 2412.000								_



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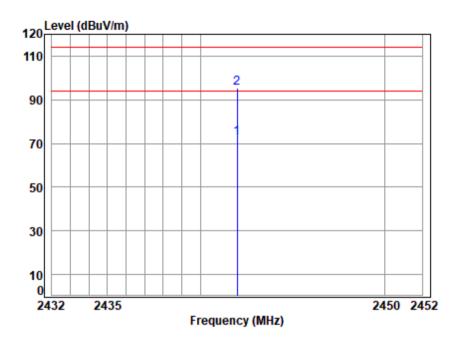
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Mode:b; Polarization:Horizontal; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL Job No : 01676CR\01675CR Mode : 2442 Field strength

Ant Preamp Cable Read Limit 0ver Loss Factor Factor Level Level Line Limit Remark Freq dBuV dBuV/m dBuV/m MHz dB dB/m 2442.000 3.82 28.61 40.99 81.26 72.70 94.00 -21.30 Average 2442,000 3.82 28.61 40.99 103.73 95.17 114.00 -18.83 peak



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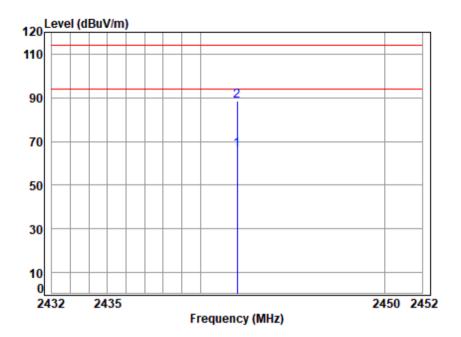
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Mode:b; Polarization:Vertical; Channel:middle



Site : chamber Condition: 3m VERTICAL Job No : 01676CR\01675CR

: 2442 Field strength Mode

Freq			Preamp Factor					
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2442.000 2442.000								_



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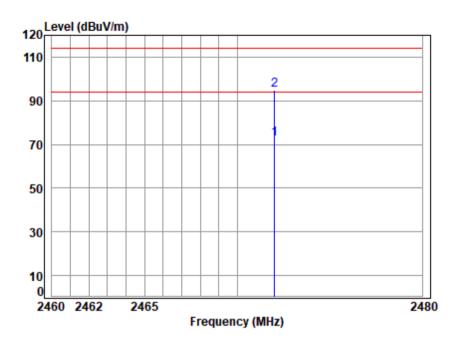
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Mode:b; Polarization:Horizontal; Channel:High



Site : chamber

2472.000

Condition: 3m HORIZONTAL Job No : 01676CR\01675CR Mode : 2472 Field strength

Ant Preamp Cable Read Limit 0ver Loss Factor Factor Level Level Limit Remark Freq Line dBuV dBuV/m dBuV/m MHz dB dB/m 2472.000 3.95 28.65 41.01 80.98 72.57 94.00 -21.43 Average

3.95 28.65 41.01 103.45 95.04 114.00 -18.96 peak



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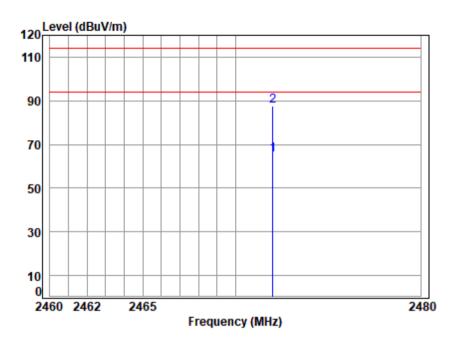
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Mode:b; Polarization:Vertical; Channel:High



Site : chamber Condition: 3m VERTICAL

2472.000

Job No : 01676CR\01675CR

Mode : 2472 Field strength

Cable Ant Preamp Read Limit Over
Freq Loss Factor Factor Level Level Line Limit Remark

MHz dB dB/m dB dBuV dBuV/m dBuV/m dB

2472.000 3.95 28.65 41.01 73.62 65.21 94.00 -28.79 Average

3.95 28.65 41.01 96.09 87.68 114.00 -26.32 peak



1

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### 7.3 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209

ANSI C63.10 (2013) Section 6.4&6.5&6.6 Test Method:

Measurement Distance: 3m

Limit:

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
Above 1GHz	74.0	Peak Value

Emission 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.

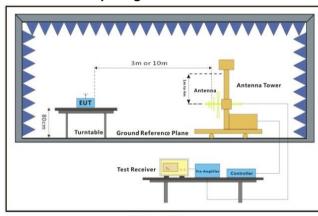
### 7.3.1 E.U.T. Operation

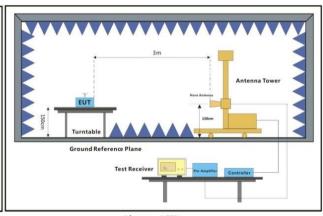
**Operating Environment:** 

Temperature: Atmospheric Pressure: 1015 mbar 23.5 °C Humidity: 56.3 % RH

Test mode b:TX mode\_Keep the EUT in transmitting with modulation mode.

### 7.3.2 Test Setup Diagram





Above 1GHz 30MHz-1GHz



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#### 7.3.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 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 or 10 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 it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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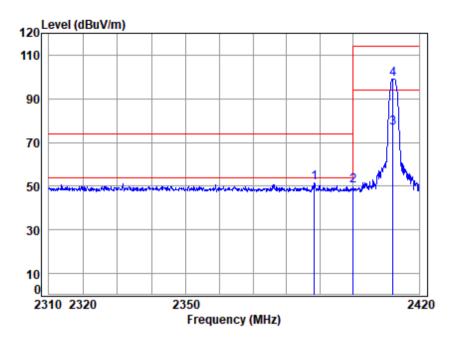
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Mode:b; Polarization:Horizontal; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL Job No : 01676CR\01675CR : 2412 Band edge Mode

-			~6-						
		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
	2388.349	3.70	28.52	40.97	60.17	51.42	74.00	-22.58	Peak
	2400.000	3.65	28.53	40.97	58.91	50.12	74.00	-23.88	peak
	2412.000	3.68	28.56	40.98	85.26	76.52	94.00	-17.48	Average
	2412.000	3.68	28.56	40.98	107.73	98.99	114.00	-15.01	peak



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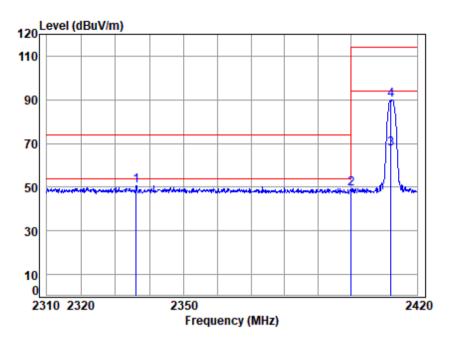
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Mode:b; Polarization:Vertical; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No : 01676CR\01675CR : 2412 Band edge Mode

_	. 2-1.	IZ Dun	u cubc						
		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
	2336.153	4.04	28.43	40.95	59.23	50.75	74.00	-23.25	Peak
	2400.000	3.64	28.53	40.98	58.04	49.23	74.00	-24.77	peak
	2412.000	3.68	28.56	40.98	76.13	67.39	94.00	-26.61	Average
	2412.000	3.68	28.56	40.98	98.60	89.86	114.00	-24.14	peak



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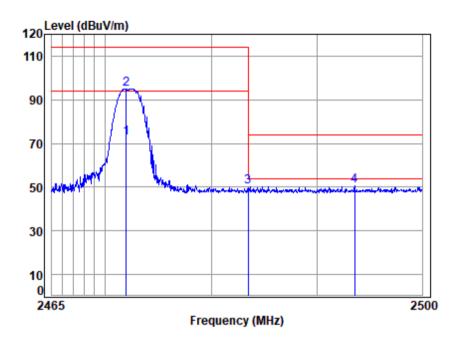
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Mode:b; Polarization:Horizontal; Channel:High



Site : chamber

Condition: 3m HORIZONTAL Job No : 01676CR\01675CR : 2472 Band edge Mode

_									
		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
	2472.000	3.95	28.65	41.01	80.80	72.39	94.00	-21.61	Average
	2472.000	3.95	28.65	41.01	103.27	94.86	114.00	-19.14	peak
	2483.500	4.01	28.67	41.01	58.38	50.05	74.00	-23.95	peak
	2493.593								•



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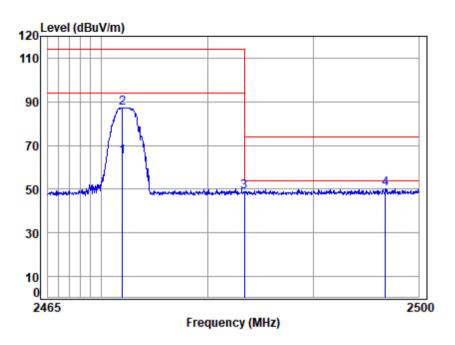
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Mode:b; Polarization:Vertical; Channel:High



Site : chamber Condition: 3m VERTICAL Job No : 01676CR\01675CR Mode : 2472 Band edge

			8-							
		Cable	Ant	Preamp	Read		Limit	0ver		
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2472.000	3.95	28.65	41.01	73.25	64.84	94.00	-29.16	Average	
2	2472.000	3.95	28.65	41.01	95.72	87.31	114.00	-26.69	peak	
3	2483.500	4.01	28.67	41.01	57.29	48.96	74.00	-25.04	peak	
4	2496.865	4.07	28.69	41.02	58.30	50.04	74.00	-23.96	Peak	



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### 7.4 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)

ANSI C63.10 (2013) Section 6.4&6.5&6.6 Test Method:

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3



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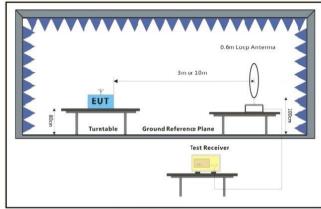
### 7.4.1 E.U.T. Operation

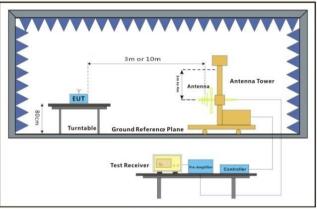
Operating Environment:

25 Temperature: °C Humidity: 51 % RH Atmospheric Pressure: 1015 mbar

Test mode b:TX mode Keep the EUT in transmitting with modulation mode.

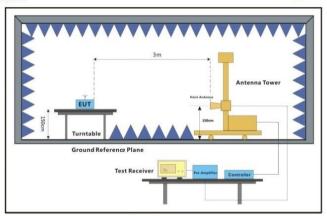
### 7.4.2 Test Setup Diagram





Below 30MHz

30MHz-1GHz



Above 1GHz



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#### 7.4.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 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 or 10 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 it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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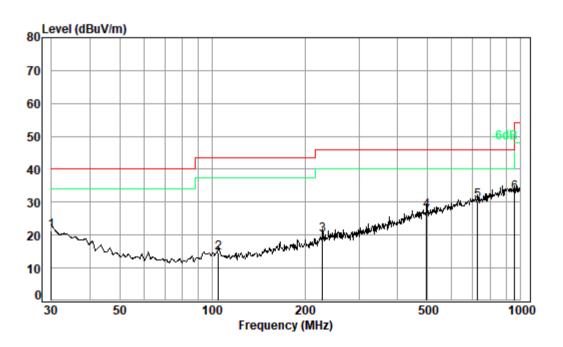


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#### 30MHz~1GHz

Mode: b; Polarization: Horizontal;



Condition: 3m HORIZONTAL

Job No. : 01675CR

Test mode: b

	Freq			Preamp Factor					Remark
-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.00	0.60	22.50	27.73	25.78	21.15	40.00	-18.85	QP
2	104.54	1.21	13.78	27.61	27.10	14.48	43.50	-29.02	QP
3	228.49	1.56	17.90	27.08	27.58	19.96	46.00	-26.04	QP
4	497.68	2.59	24.55	27.82	28.16	27.48	46.00	-18.52	QP
5 pp	729.36	2.99	28.08	27.86	27.15	30.36	46.00	-15.64	QР
6	962.16	3.66	30.12	27.05	26.24	32.97	54.00	-21.03	OP



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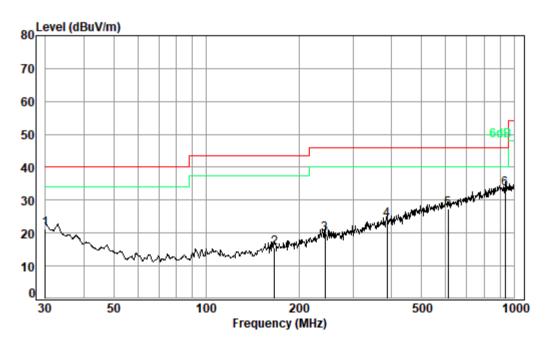
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Mode:b; Polarization: Vertical



Condition: 3m VERTICAL Job No. : 01675CR

Test mode: b

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
_									
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.00	0.60	22.50	27.73	25.87	21.24	40.00	-18.76	QР
2	166.65	1.35	15.64	27.29	25.74	15.44	43.50	-28.06	QP
3	243.38	1.64	18.85	27.03	26.36	19.82	46.00	-26.18	QP
4	386.63	2.16	22.07	27.36	27.11	23.98	46.00	-22.02	QP
5	609.92	2.72	26.74	28.14	26.17	27.49	46.00	-18.51	QP
6 pp	935.55	3.64	29.98	27.15	27.08	33.55	46.00	-12.45	OP



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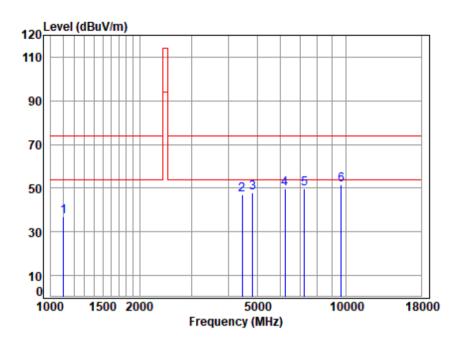


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#### **Above 1GHz**

Mode:b; Polarization:Horizontal; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL Job No : 01676CR\01675CR : 2412 TX RSE Mode

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1103.264	2.20	24.13	40.20	50.76	36.89	74.00	-37.11	peak
2	4456.315	6.51	33.53	42.52	49.26	46.78	74.00	-27.22	peak
3	4824.000	6.86	34.00	42.78	49.67	47.75	74.00	-26.25	peak
4	6231.427	7.49	35.34	42.10	49.13	49.86	74.00	-24.14	peak
5	7236.000	8.43	36.09	41.56	46.62	49.58	74.00	-24.42	peak
6	9648.000	9.41	37.69	38.51	42.91	51.50	74.00	-22.50	peak



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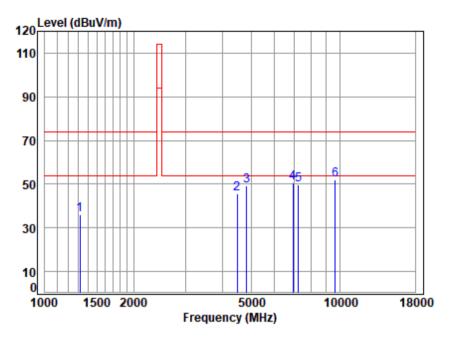
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Mode:b; Polarization:Vertical; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No : 01676CR\01675CR

: 2412 TX RSE Mode

	Cable	Ant	Preamp	Read		Limit	0ver		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark	
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
4345 005	0.04	25 22	40.37	40 57	26.40	74.00	27.00		
1315.985	2.81	25.09	40.37	48.57	36.10	74.00	-37.90	peak	
4482.150	6.43	33.57	42.54	48.30	45.76	74.00	-28.24	peak	
4824.000	6.86	34.00	42.78	51.10	49.18	74.00	-24.82	peak	
6934.778	7.82	35.86	41.72	48.68	50.64	74.00	-23.36	peak	
7236.000	8.43	36.09	41.56	46.97	49.93	74.00	-24.07	peak	
9648.000	9.41	37.69	38.51	43.21	51.80	74.00	-22.20	peak	
	MHz 1315.985 4482.150 4824.000 6934.778 7236.000	Freq Loss  MHz dB  1315.985 2.81 4482.150 6.43 4824.000 6.86 6934.778 7.82 7236.000 8.43	Freq         Loss Factor           MHz         dB         dB/m           1315.985         2.81         25.09           4482.150         6.43         33.57           4824.000         6.86         34.00           6934.778         7.82         35.86           7236.000         8.43         36.09	Freq         Loss Factor         Factor           MHz         dB         dB/m         dB           1315.985         2.81         25.09         40.37           4482.150         6.43         33.57         42.54           4824.000         6.86         34.00         42.78           6934.778         7.82         35.86         41.72           7236.000         8.43         36.09         41.56	Freq         Loss Factor Factor         Level           MHz         dB         dB/m         dB         dBuV           1315.985         2.81         25.09         40.37         48.57           4482.150         6.43         33.57         42.54         48.30           4824.000         6.86         34.00         42.78         51.10           6934.778         7.82         35.86         41.72         48.68           7236.000         8.43         36.09         41.56         46.97	Freq         Loss Factor Factor         Level         Level           MHz         dB         dB/m         dB         dBuV         dBuV/m           1315.985         2.81         25.09         40.37         48.57         36.10           4482.150         6.43         33.57         42.54         48.30         45.76           4824.000         6.86         34.00         42.78         51.10         49.18           6934.778         7.82         35.86         41.72         48.68         50.64           7236.000         8.43         36.09         41.56         46.97         49.93	Freq         Loss Factor         Factor         Level         Level         Line           MHz         dB         dB/m         dB         dBuV         dBuV/m         dBuV/m           1315.985         2.81         25.09         40.37         48.57         36.10         74.00           4482.150         6.43         33.57         42.54         48.30         45.76         74.00           4824.000         6.86         34.00         42.78         51.10         49.18         74.00           6934.778         7.82         35.86         41.72         48.68         50.64         74.00           7236.000         8.43         36.09         41.56         46.97         49.93         74.00	MHz dB dB/m dB dBuV dBuV/m dBuV/m dB 1315.985 2.81 25.09 40.37 48.57 36.10 74.00 -37.90 4482.150 6.43 33.57 42.54 48.30 45.76 74.00 -28.24 4824.000 6.86 34.00 42.78 51.10 49.18 74.00 -24.82 6934.778 7.82 35.86 41.72 48.68 50.64 74.00 -23.36 7236.000 8.43 36.09 41.56 46.97 49.93 74.00 -24.07	Freq         Loss Factor Factor         Level         Level         Line         Limit         Remark           MHz         dB         dB/m         dB         dBuV         dBuV/m         dBuV/m         dB           1315.985         2.81         25.09         40.37         48.57         36.10         74.00         -37.90         peak           4482.150         6.43         33.57         42.54         48.30         45.76         74.00         -28.24         peak           4824.000         6.86         34.00         42.78         51.10         49.18         74.00         -24.82         peak



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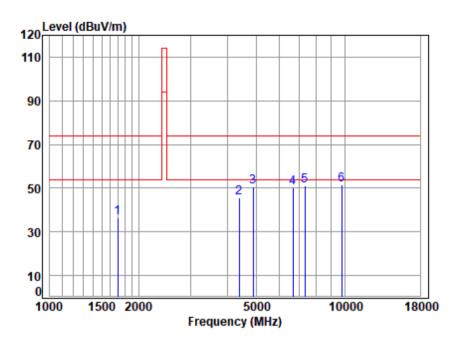
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Mode:b; Polarization:Horizontal; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL Job No : 01676CR\01675CR : 2442 TX RSE Mode

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
_	4507 400	2 20				26.00	74.00		
1	1697.129	3.30	26.66	40.63	46.95	36.28	/4.00	-3/./2	peak
2	4392.376	6.66	33.42	42.47	48.19	45.80	74.00	-28.20	peak
3	4884.000	7.03	34.07	42.82	52.36	50.64	74.00	-23.36	peak
4	6679.040	8.27	35.71	41.85	48.13	50.26	74.00	-23.74	peak
5	7326.000	8.35	36.16	41.52	48.18	51.17	74.00	-22.83	peak
6	9768.000	9.27	37.76	38.34	42.83	51.52	74.00	-22.48	peak



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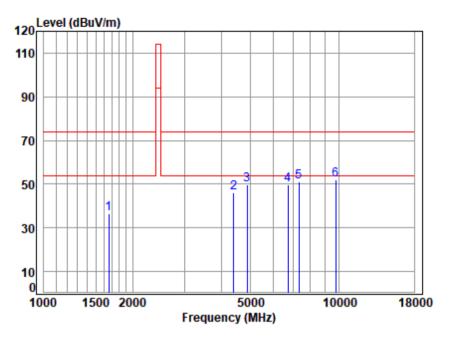
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Mode:b; Polarization:Vertical; Channel:middle



Site : chamber Condition: 3m VERTICAL Job No : 01676CR\01675CR : 2442 TX RSE Mode

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1663.137	3.18	26.52	40.61	47.41	36.50	74.00	-37.50	peak
2	4405.090	6.67	33.44	42.48	48.44	46.07	74.00	-27.93	peak
3	4884.000	7.03	34.07	42.82	51.53	49.81	74.00	-24.19	peak
4	6717.762	8.28	35.73	41.83	47.68	49.86	74.00	-24.14	peak
5	7326.000	8.35	36.16	41.52	48.30	51.29	74.00	-22.71	peak
6	9768.000	9.27	37.76	38.34	43.39	52.08	74.00	-21.92	peak



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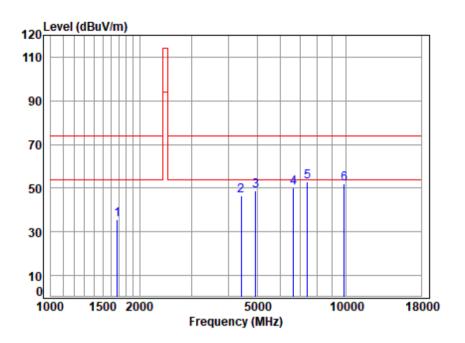
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Mode:b; Polarization:Horizontal; Channel:High



Site : chamber

Condition: 3m HORIZONTAL Job No : 01676CR\01675CR : 2472 TX RSE Mode

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1677.621	3.23	26.58	40.62	46.48	35.67	74.00	-38.33	peak
2	4417.841	6.63	33.46	42.49	48.71	46.31	74.00	-27.69	peak
3	4944.000	7.04	34.14	42.86	50.66	48.98	74.00	-25.02	peak
4	6640.542	8.14	35.69	41.87	48.10	50.06	74.00	-23.94	peak
5	7416.000	8.15	36.23	41.47	50.13	53.04	74.00	-20.96	peak
6	9888.000	8.99	37.83	38.16	43.27	51.93	74.00	-22.07	peak



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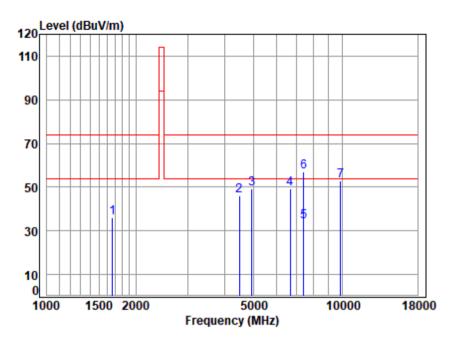
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Mode:b; Polarization:Vertical; Channel:High



Site : chamber Condition: 3m VERTICAL Job No : 01676CR\01675CR Mode : 2472 TX RSE

ouc	. 247	2 1/	NJL						
		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1667.951	3.20	26.54	40.61	47.12	36.25	74.00	-37.75	peak
2	4482.150	6.43	33.57	42.54	48.54	46.00	74.00	-28.00	peak
3	4944.000	7.04	34.14	42.86	50.90	49.22	74.00	-24.78	peak
4	6659.763	8.21	35.70	41.86	47.40	49.45	74.00	-24.55	peak
5	7416.000	8.15	36.23	41.47	31.52	34.43	54.00	-19.57	Average
6	7416.000	8.15	36.23	41.47	53.99	56.90	74.00	-17.10	peak
7	9888.000	8.99	37.83	38.16	44.40	53.06	74.00	-20.94	peak



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#### 8 **Photographs**

### **Test Setup**

Please refer to setup photos.

### 8.2 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for details.

- End of the Report -



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