

# SGS-CSTC Standards Technical Services Co., Ltd.

**Shenzhen Branch** 



Report No.: SZEM190501451402

1 of 133 Page:

# TEST REPORT

**Application No.:** SZEM1905014514CR Anker Innovations Limited Applicant:

Room 1318-19, Hollywood Plaza 610 Nathan Road, Mongkok, Kowloon, **Address of Applicant:** 

Hong Kong

Manufacturer: Anker Innovations Limited

Room 1318-19, Hollywood Plaza 610 Nathan Road, Mongkok, Kowloon, Address of Manufacturer:

Hong Kong

Shenzhen Silver Star Intelligent Technology Co., Ltd. Factory:

Building A1 Silver Star Star Hi-Tech Industrial Park Guangdong Road, Address of Factory:

Guanlan Street Longhua District, Shenzhen Guangdong 518110, China

**Equipment Under Test (EUT):** 

**EUT Name:** RoboVac L70 Hybrid Model No.: T2190, T2191

Please refer to section 2 of this report which indicates which model was

actually tested and which were electrically identical.

Trade mark: eufy

FCC ID: 2AOKB-T2190

47 CFR Part 15, Subpart C 15.247 Standard(s):

**Date of Receipt:** 2019-05-28

**Date of Test:** 2019-06-03 to 2019-06-05

2019-06-17 Date of Issue:

**Test Result:** Pass\*

**EMC Laboratory Manager** 



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



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	Revision Record					
Version Chapter Date Modifier Remark						
01		2019-06-17		Original		

Authorized for issue by:		
	fane & Boro	
	Powell Bao /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 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass		

Radio Spectrum Matter Part							
Item	Standard	Method	Requirement	Result			
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass			
Minimum 6dB	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15, Subpart	Pass			
Bandwidth	Subpart C 15.247	Section 11.8.1	C 15.247a(2)				
Conducted Peak	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15, Subpart	Pass			
Output Power	Subpart C 15.247	Section 11.9.1	C 15.247(b)(3)				
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass			
Conducted Band	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15, Subpart	Pass			
Edges Measurement	Subpart C 15.247	Section 11.13.3.2	C 15.247(d)				
Conducted Spurious	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15, Subpart	Pass			
Emissions	Subpart C 15.247	Section 11.11	C 15.247(d)				
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass			
Radiated Spurious	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15, Subpart	Pass			
Emissions	Subpart C 15.247	Section 6.4,6.5,6.6	C 15.209 & 15.247(d)				

#### Remark:

Model No.: T2190, T2191

Only the model T2190 was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference as below:

T2190 has a water tank, T2191 has not water tank.



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### **General Information**

### Details of E.U.T.

Power supply:	Operation by DC14.4V rechargeable battery and can be charged by charging base
Adapter:	Model:SK05T-2400150U
	Input: AC100-240V, 50/60Hz, 1.5A
	Output: DC24V,1.5A
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
	802.11n(HT40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK)
	802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
	802.11n(HT40):7
Channel Spacing:	5MHz
Antenna Type:	Integral Antenna
Antenna Gain:	1.5dBi

### 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	Conduction Emission	± 3.0dB (150kHz to 30MHz)
4	Occupied Bandwidth	± 3%
5	RF conducted power	± 0.75dB
6	RF power density	± 2.84dB
7	Conducted Spurious emissions	± 0.75dB
	DE Dadiated newer	± 4.5dB (Below 1GHz)
8	RF Radiated power	± 4.8dB (Above 1GHz)
	Dedicted Courieus emission test	± 4.5dB (Below 1GHz)
9	Radiated Spurious emission test	± 4.8dB (Above 1GHz)
10	Temperature test	± 1 ℃
11	Humidity test	± 3%
12	Supply voltages	± 1.5%
13	Time	± 3%



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#### 4.4 Test Location

All tests were performed at:

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

Fax: +86 755 2671 0594 Tel: +86 755 2601 2053

No tests were sub-contracted.

#### 4.5 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.

#### • 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.

#### VCCI

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

#### **Abnormalities from Standard Conditions** 4.7

None



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# **Equipment List**

Conducted Emissions at AC Power Line (150kHz-30MHz)						
Equipment	Manufacturer	Model No	<b>Inventory No</b>	Cal Date	Cal Due Date	
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017-05-10	2020-05-09	
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM024-01	2018-07-12	2019-07-11	
LISN	Rohde & Schwarz	ENV216	SEM007-01	2018-09-25	2019-09-24	
LISN	ETS-LINDGREN	3816/2	SEM007-02	2019-04-01	2020-03-31	
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2019-04-01	2020-03-31	

Minimum 6dB Bandwidth						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24	
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26	
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11	
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A	
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26	
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24	

Conducted Peak Output Power						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24	
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26	
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11	
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A	
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26	
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24	

Power Spectrum Density						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24	
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26	
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11	
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A	



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Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Conducted Band Edges Measurement							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24		
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26		
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A		
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11		
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A		
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26		
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24		

Conducted Spurious Emissions								
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date			
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24			
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26			
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A			
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11			
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A			
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26			
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24			

Radiated Emissions which fall in the restricted bands							
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	2018-07-12	2019-07-11		
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2019-04-12	2020-04-11		
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12		
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16		
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2018-11-12	2019-11-11		
Pre-amplifier(18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2019-04-01	2020-03-31		



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Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2019-04-01	2020-03-31
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21

Radiated Spurious Emis	ssions				
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	2018-07-12	2019-07-11
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2019-04-12	2020-04-11
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2018-11-12	2019-11-11
Pre-amplifier(18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2019-04-01	2020-03-31
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2019-04-01	2020-03-31
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21

RE in Chamber					
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	2018-09-25	2019-09-24
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	2018-07-12	2019-07-11



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General used equipment							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2018-09-27	2019-09-26		
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2018-09-27	2019-09-26		
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2018-09-27	2019-09-26		
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2019-04-04	2020-04-03		



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#### Radio Spectrum Technical Requirement 6

#### Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

#### 6.1.2 Conclusion

#### Standard 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.

#### 15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **EUT Antenna:**

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.5dBi.

Antenna location: Refer to Appendix(Internal photos)





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

### 7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

47 CFR Part 15, Subpart C 15.207 Test Requirement Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Everyoney of emission/MUT)	Conducted limit(dBµV)				
Frequency of emission(MHz)	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.					



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#### 7.1.1 E.U.T. Operation

Operating Environment:

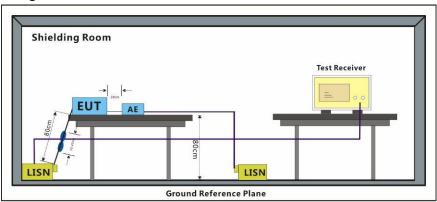
Temperature: 23.5 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Test mode d: TX mode Keep the EUT in continuously transmitting mode with all modulation

> types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).

Only the data of worst case is recorded in the report.

#### 7.1.2 Test Setup Diagram



#### 7.1.3 Measurement Procedure and Data

- The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50µH + 50hm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



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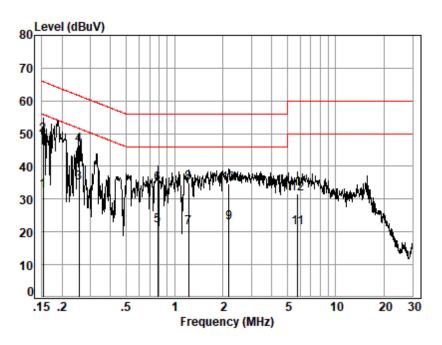
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Mode:d; Line:Live Line



: Shielding Room

Condition: Line Job No. : 14514CR

Test mode: d

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1524	0.01	9.66	22.74	32.41	55.87	-23.46	Average
2	0.1524	0.01	9.66	40.03	49.70	65.87	-16.17	QP
3	0.2548	0.03	9.67	25.21	34.91	51.60	-16.69	Average
4	0.2548	0.03	9.67	36.86	46.56	61.60	-15.04	QP
5	0.7835	0.08	9.73	12.11	21.92	46.00	-24.08	Average
6	0.7835	0.08	9.73	24.83	34.64	56.00	-21.36	QP
7	1.2226	0.11	9.73	11.54	21.38	46.00	-24.62	Average
8	1.2226	0.11	9.73	25.24	35.08	56.00	-20.92	QP
9	2.1783	0.16	9.72	13.02	22.90	46.00	-23.10	Average
10	2.1783	0.16	9.72	24.71	34.59	56.00	-21.41	QP
11	5.8050	0.17	9.76	11.30	21.23	50.00	-28.77	Average
12	5.8050	0.17	9.76	21.65	31.58	60.00	-28.42	QP



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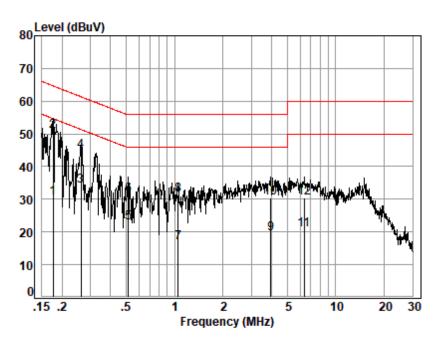
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Mode:d; Line:Neutral Line



: Shielding Room

Condition: Neutral Job No. : 14514CR

Test mode: d

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1758	0.02	9.64	20.87	30.53	54.68	-24.15	Average
2	0.1758	0.02	9.64	41.11	50.77	64.68	-13.91	QP
3	0.2630	0.03	9.64	24.42	34.09	51.34	-17.25	Average
4	0.2630	0.03	9.64	35.02	44.69	61.34	-16.65	QP
5	0.5155	0.06	9.64	13.15	22.85	46.00	-23.15	Average
6	0.5155	0.06	9.64	21.74	31.44	56.00	-24.56	QP
7	1.0541	0.09	9.71	6.86	16.66	46.00	-29.34	Average
8	1.0541	0.09	9.71	21.44	31.24	56.00	-24.76	QP
9	3.9430	0.16	9.69	9.58	19.43	46.00	-26.57	Average
10	3.9430	0.16	9.69	20.45	30.30	56.00	-25.70	QP
11	6.3859	0.17	9.75	10.87	20.79	50.00	-29.21	Average
12	6.3859	0.17	9.75	20.39	30.31	60.00	-29.69	QP



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#### 7.2 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1

Limit: ≥500 kHz

#### 7.2.1 E.U.T. Operation

Operating Environment:

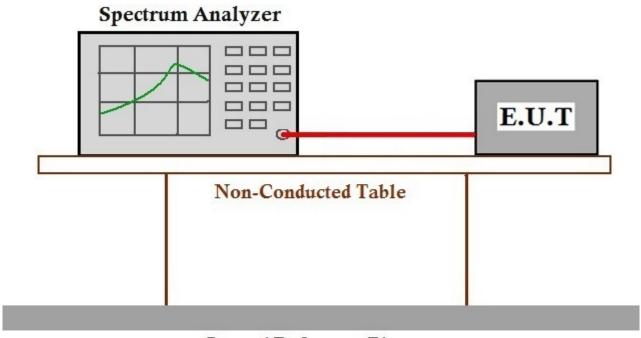
Temperature: 24.6 °C Humidity: 42.2 % RH Atmospheric Pressure: 1005 mbar

Test mode d: TX mode\_Keep the EUT in continuously transmitting mode with all modulation

types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).

Only the data of worst case is recorded in the report.

#### 7.2.2 Test Setup Diagram



### Ground Reference Plane

#### 7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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Report No.: SZEM190501451402

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### 7.3 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3) Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
	1 for ≥50 hopping channels
902-928	0.25 for 25≤ hopping channels <50
	1 for digital modulation
	1 for ≥75 non-overlapping hopping channels
2400-2483.5	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation



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Report No.: SZEM190501451402

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#### 7.3.1 E.U.T. Operation

Operating Environment:

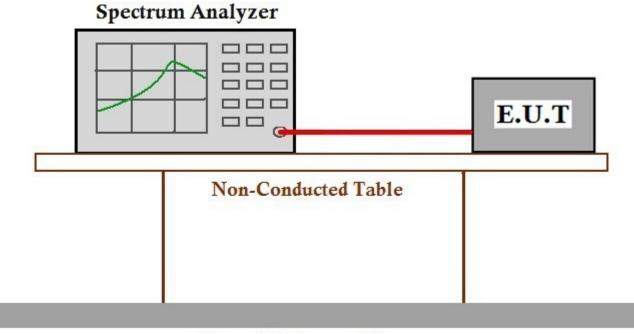
Temperature: 24.6 °C Humidity: 42.2 % RH Atmospheric Pressure: 1005 mbar

Test mode d: TX mode Keep the EUT in continuously transmitting mode with all modulation

> types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).

Only the data of worst case is recorded in the report.

#### 7.3.2 Test Setup Diagram



### Ground Reference Plane

#### 7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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### 7.4 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit: ≤8dBm in any 3 kHz band during any time interval of continuous

transmission

#### 7.4.1 E.U.T. Operation

Operating Environment:

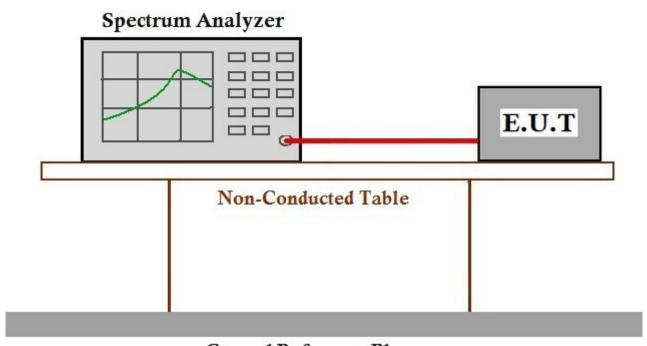
Temperature: 24.6 °C Humidity: 42.2 % RH Atmospheric Pressure: 1005 mbar

Test mode d: TX mode\_Keep the EUT in continuously transmitting mode with all modulation

types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).

Only the data of worst case is recorded in the report.

#### 7.4.2 Test Setup Diagram



### **Ground Reference Plane**

#### 7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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### 7.5 Conducted Band Edges Measurement

**Test Requirement** 47 CFR Part 15, Subpart C 15.247(d) Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)



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#### 7.5.1 E.U.T. Operation

Operating Environment:

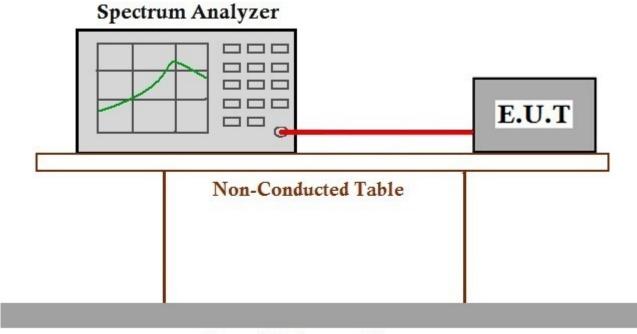
Temperature: 24.6 °C Humidity: 42.2 % RH Atmospheric Pressure: 1005 mbar

Test mode d: TX mode Keep the EUT in continuously transmitting mode with all modulation

> types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).

Only the data of worst case is recorded in the report.

#### 7.5.2 Test Setup Diagram



### Ground Reference Plane

#### 7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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### 7.6 Conducted Spurious Emissions

**Test Requirement** 47 CFR Part 15, Subpart C 15.247(d) Test Method: ANSI C63.10 (2013) Section 11.11

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)



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#### 7.6.1 E.U.T. Operation

Operating Environment:

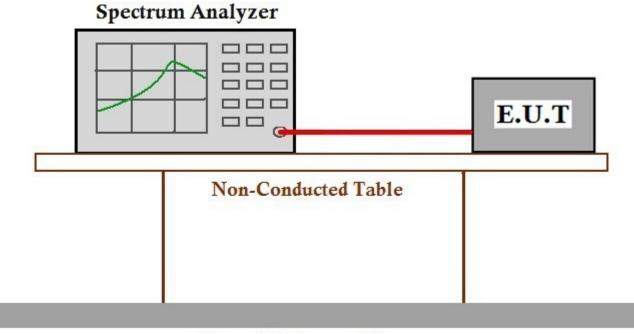
Temperature: 24.6 °C Humidity: 42.2 % RH Atmospheric Pressure: 1005 mbar

Test mode d: TX mode Keep the EUT in continuously transmitting mode with all modulation

> types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).

Only the data of worst case is recorded in the report.

### 7.6.2 Test Setup Diagram



### Ground Reference Plane

#### 7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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#### 7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)

Test Method: ANSI C63.10 (2013) Section 6.10.5

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

### 7.7.1 E.U.T. Operation

Operating Environment:

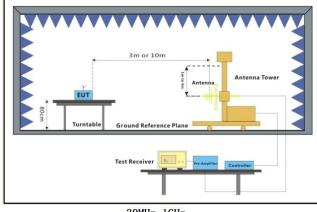
Temperature: Humidity: 66.2 % RH Atmospheric Pressure: 1005 mbar

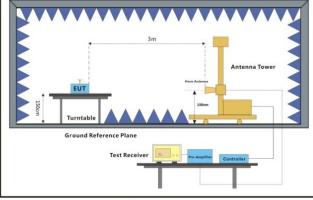
Test mode d: TX mode Keep the EUT in continuously transmitting mode with all modulation

types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).

Only the data of worst case is recorded in the report.

#### 7.7.2 Test Setup Diagram





Above 1GHz 30MHz-1GHz



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#### 7.7.3 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.
- a. 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 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits 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 the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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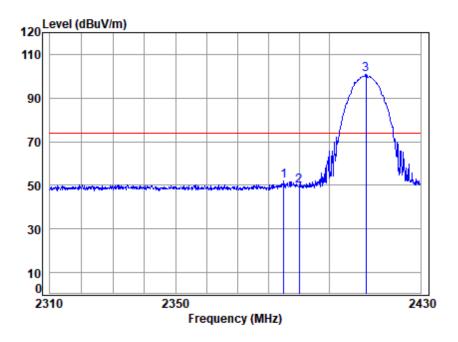
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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2412 Band edge : 2.4G WIFI 11B Note

	Freq					Level			Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2385.011	5.47	28.51	41.17	58.98	51.79	74.00	-22.21	peak
2	2390.000	5.47	28.52	41.17	56.76	49.58	74.00	-24.42	peak
3 *	2412.000	5.50	28.56	41.18	107.98	100.86	74.00	26.86	peak



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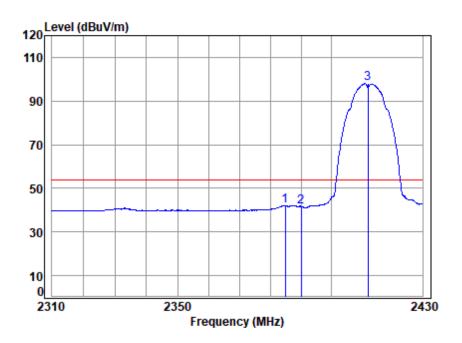
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2412 Band edge : 2.4G WIFI 11B Note

	Freq		Ant Factor						Remark
-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2384.890	5.47	28.51	41.17	49.37	42.18	54.00	-11.82	Average
2	2390.000	5.47	28.52	41.17	48.87	41.69	54.00	-12.31	Average
3 *	2412.000	5.50	28.56	41.18	105.03	97.91	54.00	43.91	Average



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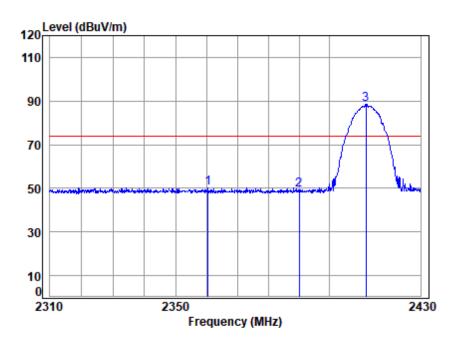
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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2412 Band edge : 2.4G WIFI 11B Note

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2360.498 2390.000								
* 2412.000	5.50	28.56	41.18	95.69	88.57	74.00	14.57	Peak



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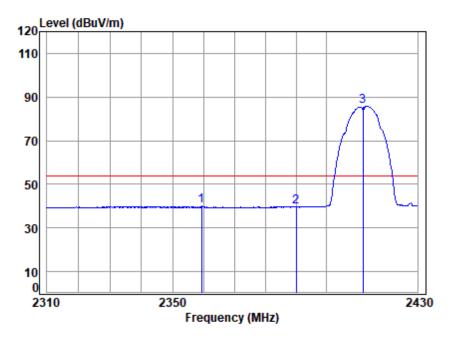
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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2412 Band edge : 2.4G WIFI 11B Note

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2359.422 2390.000 * 2412.000	5.47	28.52	41.17	46.69	39.51	54.00	-14.49	Average



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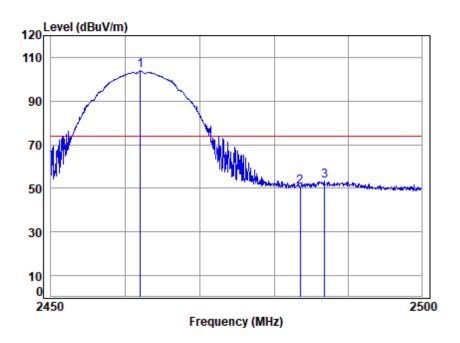
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

: 14514CR Job No

Mode : 2462 Band edge : 2.4G WIFI 11B Note

Freq		Ant Factor						Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
* 2462.000								•
2483.500 2486.802								•



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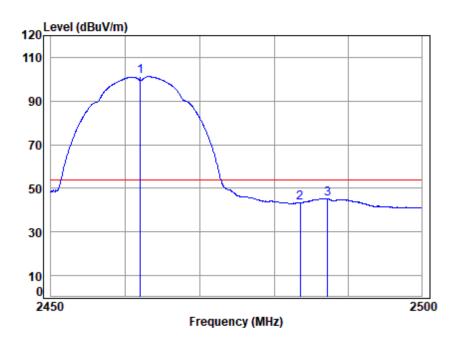
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2462 Band edge : 2.4G WIFI 11B Note

_										
		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		
*	2462.000	5.57	28.64	41.20	108.15	101.16	54.00	47.16	Average	
	2483.500	5.60	28.67	41.21	50.37	43.43	54.00	-10.57	Average	
	2487.254	5.60	28.68	41.21	52.24	45.31	54.00	-8.69	Average	



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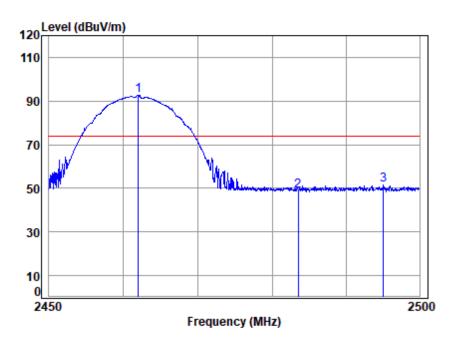
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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2462 Band edge : 2.4G WIFI 11B Note

Freq			Preamp Factor					
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
* 2462.000 2483.500 2495.106	5.60	28.67	41.21	55.72	48.78	74.00	-25.22	Peak



1 2 3

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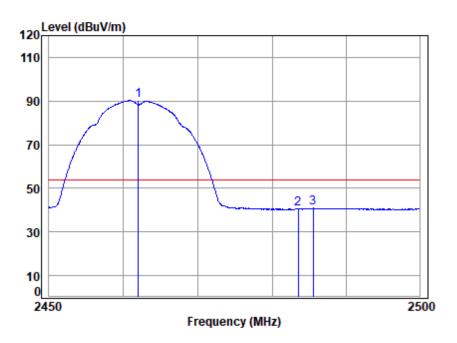
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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2462 Band edge : 2.4G WIFI 11B Note

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
* 2462.000 2483.500 2485.546	5.60	28.67	41.21	47.38	40.44	54.00	-13.56	Average



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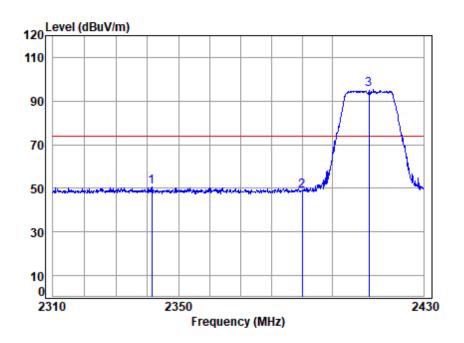
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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2412 Band edge : 2.4G WIFI 11G Note

Freq						Limit Line		Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2341.448 2390.000 * 2412.000	5.47	28.52	41.17	55.95	48.77	74.00	-25.23	peak



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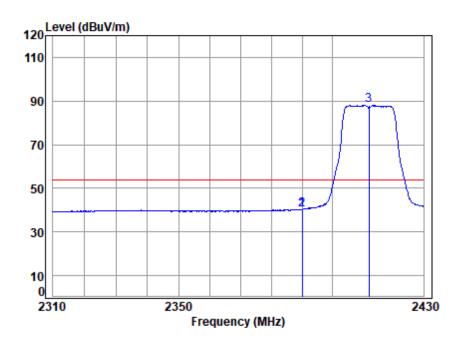
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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2412 Band edge : 2.4G WIFI 11G Note

		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	
	2389.968	5.47	28.52	41.17	47.52	40.34	54.00	-13.66	Average
	2390.000	5.47	28.52	41.17	47.52	40.34	54.00	-13.66	Average
*	2412.000	5.50	28.56	41.18	95.15	88.03	54.00	34.03	Average



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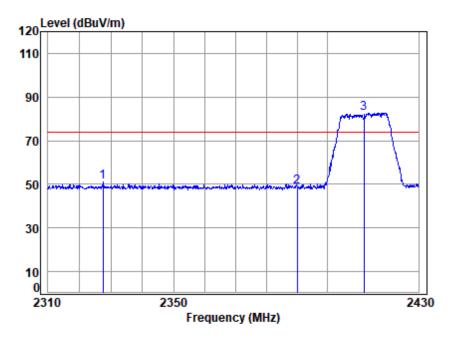
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Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2412 Band edge : 2.4G WIFI 11G Note

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2327.379								
2390.000 2412.000								



1 2 3

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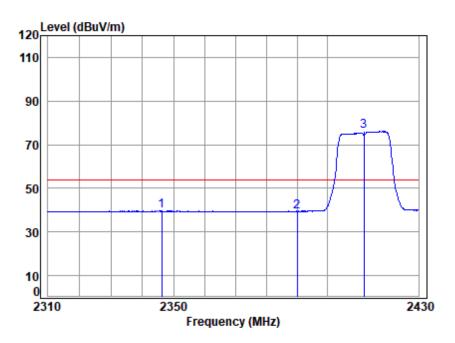
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Report No.: SZEM190501451402

Page: 38 of 133

Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2412 Band edge : 2.4G WIFI 11G Note

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2346.196 2390.000 * 2412.000	5.47	28.52	41.17	46.64	39.46	54.00	-14.54	Average



1 2 3

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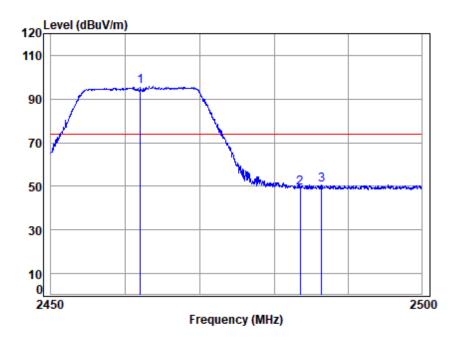
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2462 Band edge · 2 4G WTFT 11G Note

e	: Z.	4G WIF	1 110							
		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		
*	2462.000	5.57	28.64	41.20	102.92	95.93	74.00	21.93	peak	
	2483.500	5.60	28.67	41.21	56.12	49.18	74.00	-24.82	peak	
	2486.400	5.60	28.68	41.21	57.51	50.58	74.00	-23.42	peak	



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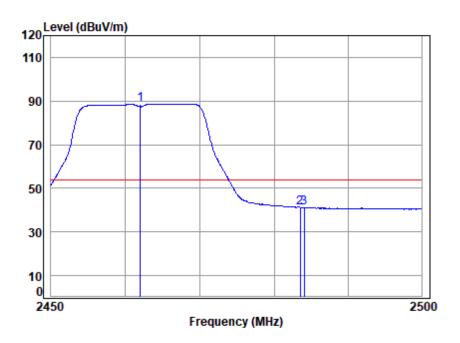
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Report No.: SZEM190501451402

Page: 40 of 133

Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2462 Band edge : 2.4G WIFI 11G Note

_										
		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		
*	2462.000	5.57	28.64	41.20	95.67	88.68	54.00	34.68	Average	
	2483.500	5.60	28.67	41.21	48.18	41.24	54.00	-12.76	Average	
	2484.041	5.60	28.67	41.21	48.18	41.24	54.00	-12.76	Average	



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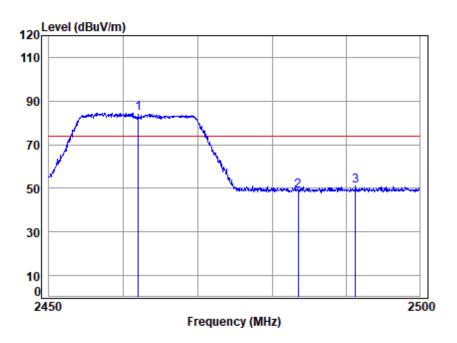
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2462 Band edge : 2.4G WIFI 11G Note

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
* 2462.000 2483.500 2491.278	5.60	28.67	41.21	55.55	48.61	74.00	-25.39	Peak



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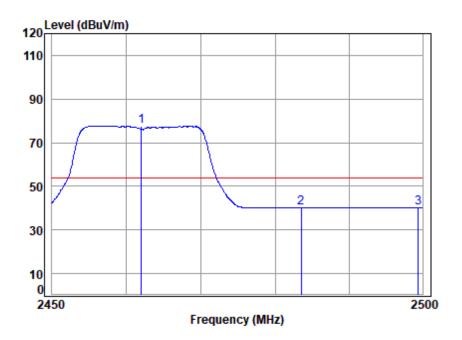
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2462 Band edge : 2.4G WIFI 11G Note

	Freq			Preamp Factor					Remark	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		-
2	* 2462.000 2483.500	5.60	28.67	41.21	46.94	40.00	54.00	-14.00	Average	
2		5.60	28.67	41.21	46.94	40.00	54.00	-14.00	Average	



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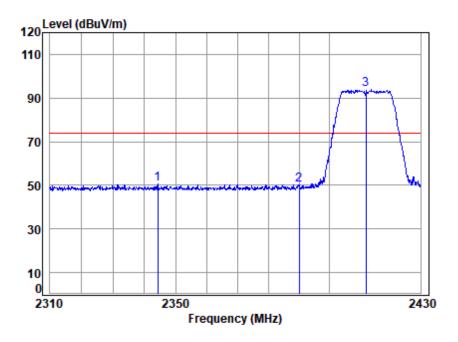
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2412 Band edge : 2.4G WIFI 11N20 Note

Freq						Limit Line		Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2344.295 2390.000 * 2412.000	5.47	28.52	41.17	57.41	50.23	74.00	-23.77	peak



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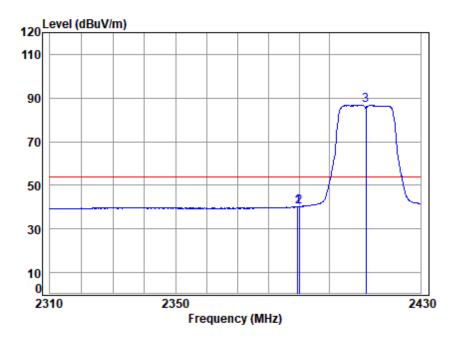
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2412 Band edge Note : 2.4G WIFI 11N20

				_					
		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	
	2389.605	5.47	28.52	41.17	47.44	40.26	54.00	-13.74	Average
	2390.000	5.47	28.52	41.17	47.32	40.14	54.00	-13.86	Average
*	2412.000	5.50	28.56	41.18	93.77	86.65	54.00	32.65	Average



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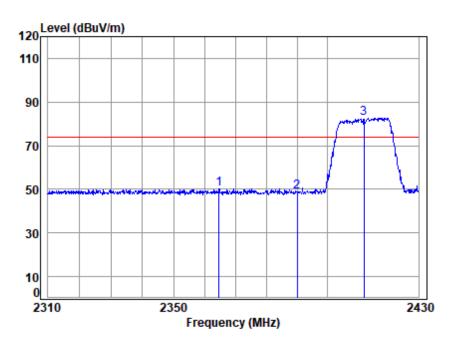
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2412 Band edge : 2.4G WIFI 11N20 Note

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2364.685 2390.000 * 2412.000	5.47	28.52	41.17	55.86	48.68	74.00	-25.32	Peak



1 2 3

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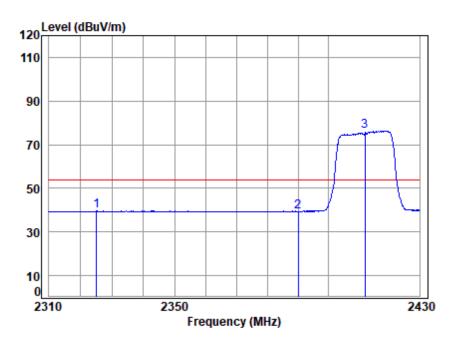
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2412 Band edge : 2.4G WIFI 11N20 Note

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2325.141 2390.000 * 2412.000	5.47	28.52	41.17	46.56	39.38	54.00	-14.62	Average



1 2 3

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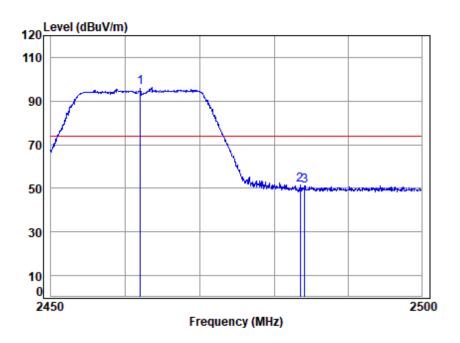
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2462 Band edge : 2.4G WIFI 11N20 Note

				_					
		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	
*	2462.000	5.57	28.64	41.20	103.21	96.22	74.00	22.22	peak
	2483.500	5.60	28.67	41.21	58.32	51.38	74.00	-22.62	peak
	2484.141	5.60	28.67	41.21	58.09	51.15	74.00	-22.85	peak



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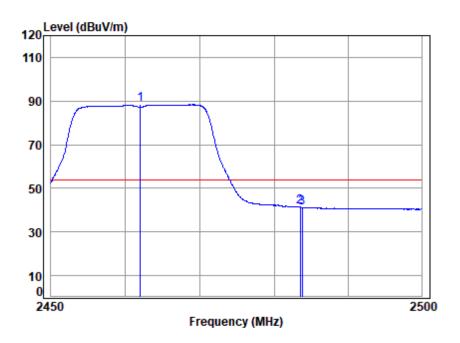
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2462 Band edge : 2.4G WIFI 11N20 Note

				_						
	Freq			Preamp Factor					Remark	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	——dB		_
*	2462.000								_	
	2483.500 2483.790								_	



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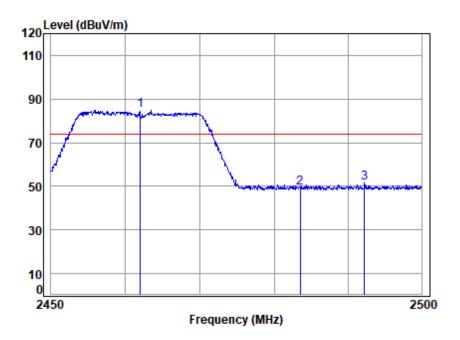
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2462 Band edge : 2.4G WIFI 11N20 Note

				_					
		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	
*	2462.000	5.57	28.64	41.20	92.02	85.03	74.00	11.03	Peak
	2483.500	5.60	28.67	41.21	55.99	49.05	74.00	-24.95	Peak
	2492.234	5.61	28.69	41.21	58.44	51.53	74.00	-22.47	Peak



1 2 3

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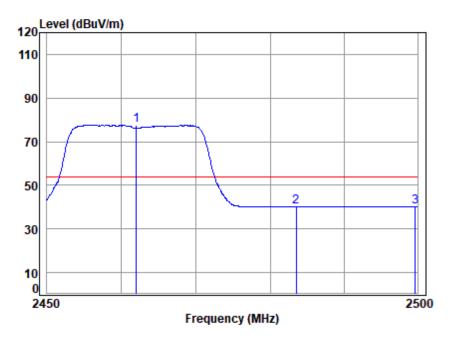
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2462 Band edge : 2.4G WIFI 11N20 Note

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2462.000 2483.500								_
2403.300								_



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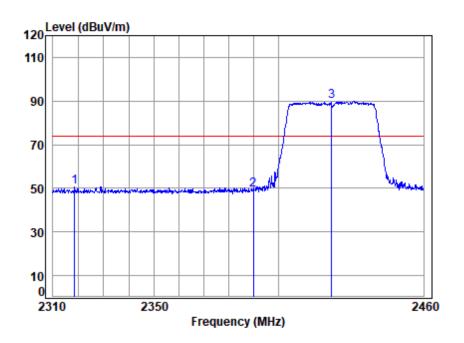
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:40MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2422 Band edge : 2.4G WIFI 11N40 Note

				_					
		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	
	2318.445	5.38	28.40	41.14	57.97	50.61	74.00	-23.39	peak
	2390.000	5.47	28.52	41.17	56.62	49.44	74.00	-24.56	peak
*	2422.000	5.52	28.57	41.19	97.09	89.99	74.00	15.99	peak



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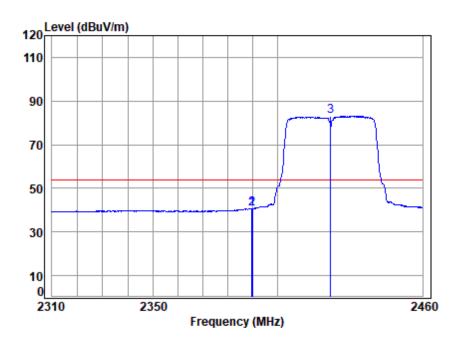
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:40MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2422 Band edge : 2.4G WIFI 11N40 Note

				_						
	Freq			Preamp Factor					Remark	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		_
	2389.827								_	
*	2390.000 2422.000								_	



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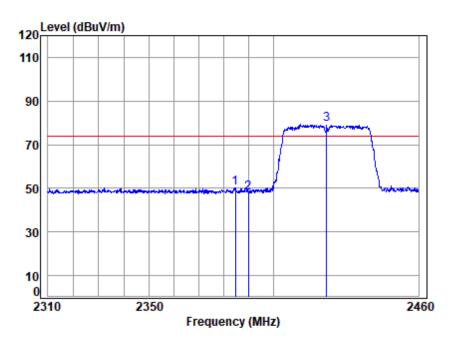
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:40MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2422 Band edge : 2.4G WIFI 11N40 Note

Freq			Preamp Factor					Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2384.720 2390.000								
* 2422.000	5.52	28.57	41.19	86.41	79.31	74.00	5.31	Peak



1 2 3

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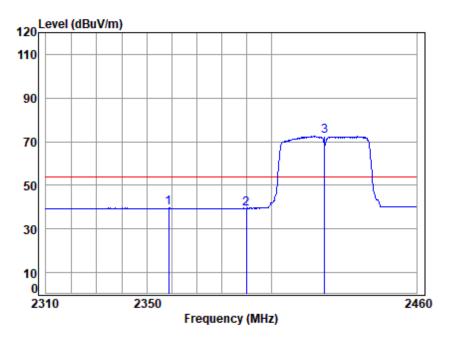
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:40MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2422 Band edge : 2.4G WIFI 11N40 Note

Freq			Preamp Factor					
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2358.757 2390.000								_
* 2422.000	5.52	28.57	41.19	79.47	72.37	54.00	18.37	Average



1 2 3

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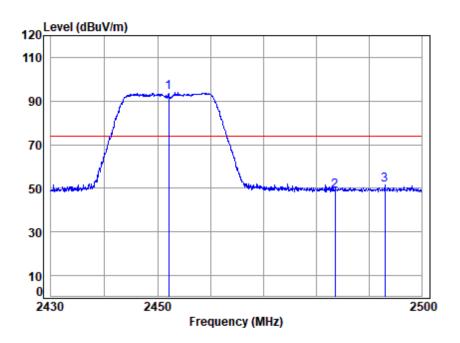
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:40MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

1 2 3

Mode : 2452 Band edge : 2.4G WIFI 11N40 Note

				_					
		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	
*	2452.000	5.56	28.62	41.20	100.96	93.94	74.00	19.94	peak
	2483.500	5.60	28.67	41.21	55.60	48.66	74.00	-25.34	peak
	2492.981	5.61	28.69	41.21	58.43	51.52	74.00	-22.48	peak



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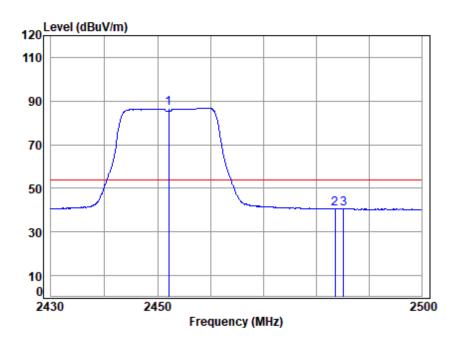
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:40MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2452 Band edge : 2.4G WIFI 11N40 Note

				_						
		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 *	2452.000	5.56	28.62	41.20	93.87	86.85	54.00	32.85	Average	
2	2483.500	5.60	28.67	41.21	47.51	40.57	54.00	-13.43	Average	
3	2485.135	5.60	28.68	41.21	47.67	40.74	54.00	-13.26	Average	



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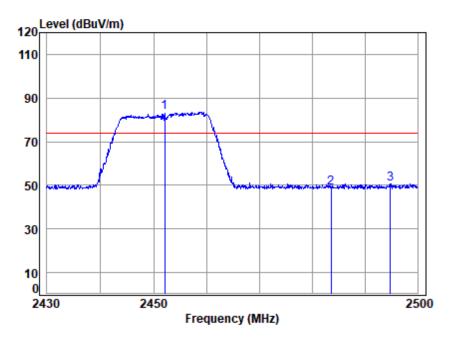
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:40MHz; Channel:High



Site : chamber Condition: 3m VERTICAL : 14514CR Job No

Mode : 2452 Band edge : 2.4G WIFI 11N40 Note

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 ,	* 2452.000	5.56	28.62	41.20	90.42	83.40	74.00	9.40	Peak
2	2483.500	5.60	28.67	41.21	55.79	48.85	74.00	-25.15	Peak
3	2494.823	5.61	28.69	41.22	57.65	50.73	74.00	-23.27	Peak



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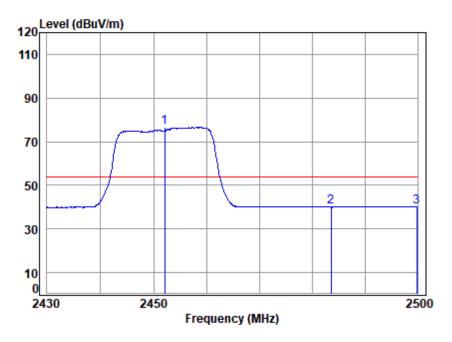
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:40MHz; Channel:High



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2452 Band edge : 2.4G WIFI 11N40 Note

Freq			Preamp Factor					
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
* 2452.000 2483.500 2499.858	5.60	28.67	41.21	46.96	40.02	54.00	-13.98	Average



1 2 3

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### 7.8 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)

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

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.





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### 7.8.1 E.U.T. Operation

Operating Environment:

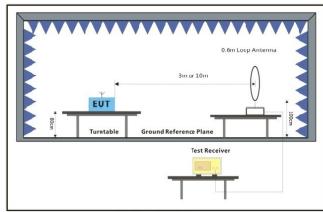
23.7 °C Temperature: Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

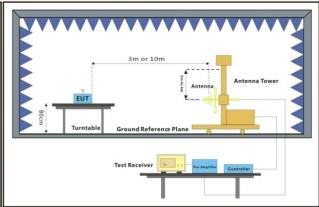
Test mode d: TX mode Keep the EUT in continuously transmitting mode with all modulation

> types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).

Only the data of worst case is recorded in the report.

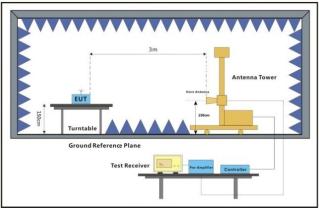
### 7.8.2 Test Setup Diagram





Below 30MHz

30MHz-1GHz



Above 1GHz



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### 7.8.3 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.
- a. 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:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) 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

- 3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 4) For frequencies above 1GHz, the field strength limits 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 the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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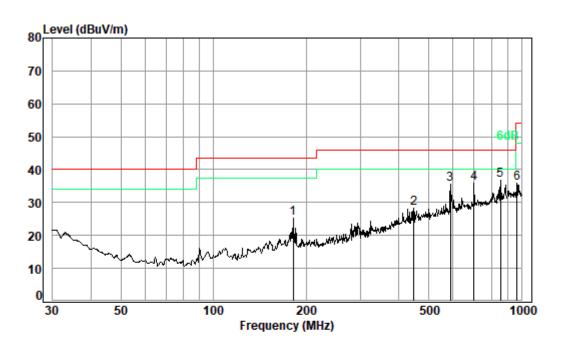


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30MHz~1GHz QP value:

Mode: d; Polarization: Horizontal;



Condition: 3m HORIZONTAL

Job No. : 14514CR

Test Mode: d

		Cable	Ant	Preamp	Read		Limit	0ver
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
_								
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	181.28	1.37	15.94	27.23	35.17	25.25	43.50	-18.25
2	447.98	2.40	23.52	27.63	29.90	28.19	46.00	-17.81
3	588.91	2.69	26.40	28.14	34.72	35.67	46.00	-10.33
4	701.76	2.91	27.91	27.92	33.14	36.04	46.00	-9.96
5 pp	854.02	3.42	29.22	27.48	31.60	36.76	46.00	-9.24
6	968.93	3.67	30.15	27.02	29.06	35.86	54.00	-18.14



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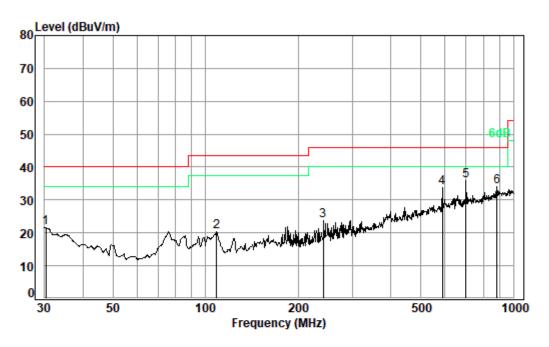
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Mode :d; Polarization: Vertical



Condition: 3m VERTICAL Job No. : 14514CR

Test Mode: d

	Freq			Preamp Factor				Over Limit
_	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.32	0.60	22.32	27.73	26.31	21.50	40.00	-18.50
2	108.65	1.22	13.59	27.58	33.26	20.49	43.50	-23.01
3	241.68	1.63	18.83	27.04	30.30	23.72	46.00	-22.28
4	588.91	2.69	26.40	28.14	32.74	33.69	46.00	-12.31
5 pp	701.76	2.91	27.91	27.92	32.86	35.76	46.00	-10.24
6	884.50	3.54	29.61	27.36	28.38	34.17	46.00	-11.83



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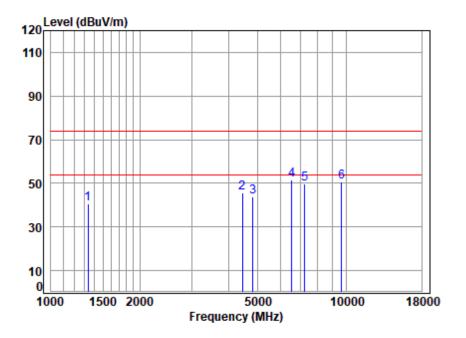


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### **Above 1GHz**

Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2412 TX RSE Note : 2.4G WIFI 11B

IOCC	. 2	+O MII	1 110						
		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	1335.141	4.93	25.11	40.59	51.05	40.50	74.00	-33.50	peak
2	4456.315	7.51	33.60	43.26	47.61	45.46	74.00	-28.54	peak
3	4824.000	7.91	34.19	43.63	45.36	43.83	74.00	-30.17	peak
4	6545.263	11.41	35.23	42.37	47.30	51.57	74.00	-22.43	peak
5	7236.000	10.07	36.40	41.83	44.97	49.61	74.00	-24.39	peak
6	9648.000	10.77	37.53	38.36	40.61	50.55	74.00	-23.45	peak



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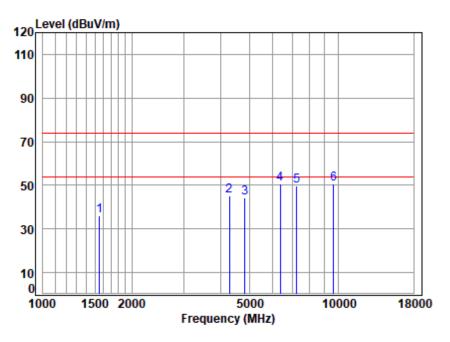
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2412 TX RSE : 2.4G WTFT 11B Note

oce	. 2	+G MII	1 110						
		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	1556.169	5.41	26.06	40.74	45.35	36.08	74.00	-37.92	peak
2	4291.977	7.33	33.60	43.08	47.36	45.21	74.00	-28.79	peak
3	4824.000	7.91	34.19	43.63	45.59	44.06	74.00	-29.94	peak
4	6358.789	11.27	34.99	42.52	46.91	50.65	74.00	-23.35	peak
5	7236.000	10.07	36.40	41.83	45.16	49.80	74.00	-24.20	peak
6	9648.000	10.77	37.53	38.36	40.86	50.80	74.00	-23.20	peak



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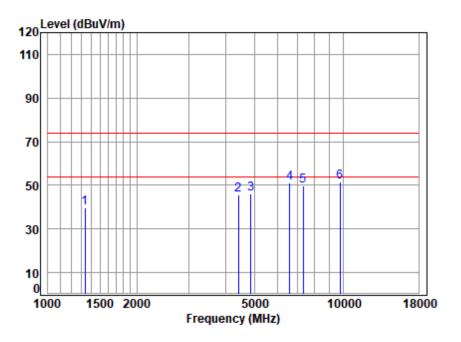
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2437 TX RSE Note : 2.4G WIFI 11B

		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	1335.141	4.93	25.11	40.59	50.10	39.55	74.00	-34.45	peak
2	4417.841	7.47	33.60	43.22	47.98	45.83	74.00	-28.17	peak
3	4874.000	7.96	34.28	43.68	47.52	46.08	74.00	-27.92	peak
4	6602.265	11.24	35.39	42.32	46.59	50.90	74.00	-23.10	peak
5	7311.000	10.05	36.37	41.78	45.00	49.64	74.00	-24.36	peak
6	9748.000	10.82	37.55	38.20	41.41	51.58	74.00	-22.42	peak



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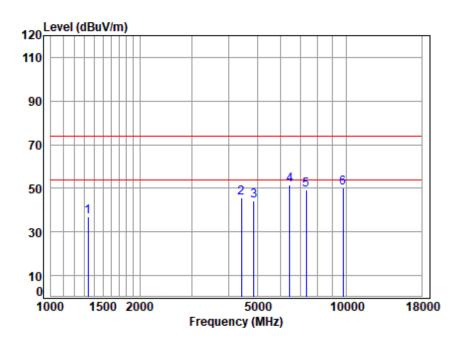
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:middle



: chamber Site

Condition: 3m VERTICAL

Job No : 14514CR

Mode : 2437 TX RSE Note : 2.4G WIFI 11B

	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	
1335.141	4.93	25.11	40.59	47.36	36.81	74.00	-37.19	peak
4417.841	7.47	33.60	43.22	47.78	45.63	74.00	-28.37	peak
4874.000	7.96	34.28	43.68	45.61	44.17	74.00	-29.83	peak
6451.353	11.45	35.06	42.44	47.27	51.34	74.00	-22.66	peak
7311.000	10.05	36.37	41.78	44.79	49.43	74.00	-24.57	peak
9748.000	10.82	37.55	38.20	39.88	50.05	74.00	-23.95	peak



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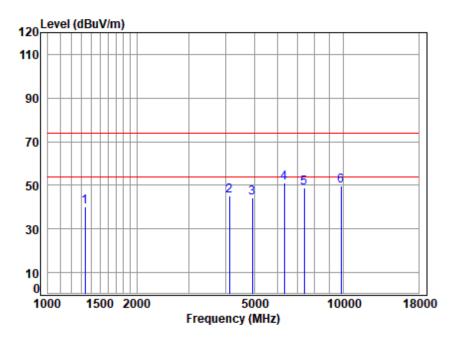
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2462 TX RSE : 2.4G WIFI 11B Note

WOLC.	. 2.	TO WITE	1 110						
		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
							ID 1//		
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1335.141	4.93	25.11	40.59	50.85	40.30	74.00	-33.70	peak
2	4121.768	7.13	33.60	42.89	47.52	45.36	74.00	-28.64	peak
3	4924.000	8.01	34.37	43.73	45.60	44.25	74.00	-29.75	peak
4	6322.136	11.20	34.96	42.55	47.60	51.21	74.00	-22.79	peak
5	7386.000	10.03	36.34	41.72	44.23	48.88	74.00	-25.12	peak
6	9848.000	10.87	37.57	38.04	39.17	49.57	74.00	-24.43	peak



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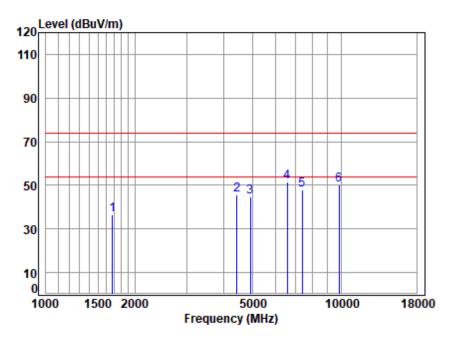
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2462 TX RSE Note : 2.4G WIFI 11B

		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	5.25	26.58	40.82	45.45	36.46	74.00	-37.54	peak	
2	4443.453	7.50	33.60	43.25	47.74	45.59	74.00	-28.41	peak	
3	4924.000	8.01	34.37	43.73	46.07	44.72	74.00	-29.28	peak	
4	6564.209	11.35	35.29	42.35	47.40	51.69	74.00	-22.31	peak	
5	7386.000	10.03	36.34	41.72	43.34	47.99	74.00	-26.01	peak	
6	9848.000	10.87	37.57	38.04	40.01	50.41	74.00	-23.59	peak	



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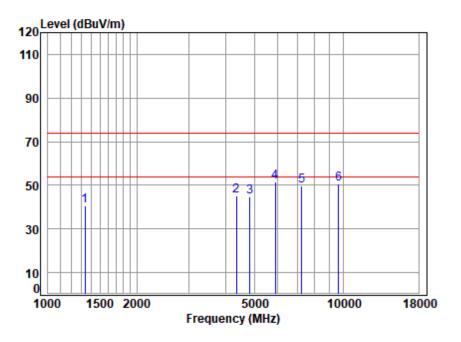
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2412 TX RSE Note : 2.4G WIFI 11G

IOCC	. 2	TO WILL	1 110							
		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	1335.141	4.93	25.11	40.59	50.99	40.44	74.00	-33.56	peak	
2	4354.454	7.40	33.60	43.15	47.28	45.13	74.00	-28.87	peak	
3	4824.000	7.91	34.19	43.63	46.03	44.50	74.00	-29.50	peak	
4	5881.418	10.18	34.63	42.94	49.62	51.49	74.00	-22.51	peak	
5	7236.000	10.07	36.40	41.83	44.96	49.60	74.00	-24.40	peak	
6	9648.000	10.77	37.53	38.36	40.51	50.45	74.00	-23.55	peak	



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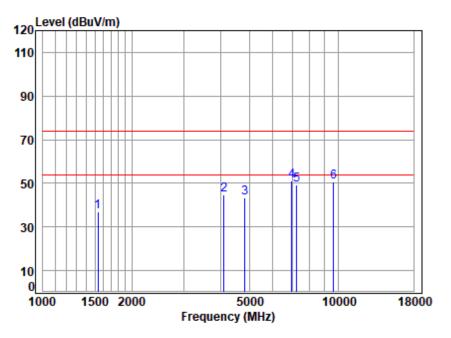
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2412 TX RSE : 2.4G WTFT 11G Note

oce	. 2	+G MII	1 110						
		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	1538.281	5.43	25.98	40.73	46.19	36.87	74.00	-37.13	peak
2	4098.010	7.10	33.60	42.87	46.85	44.68	74.00	-29.32	peak
3	4824.000	7.91	34.19	43.63	44.73	43.20	74.00	-30.80	peak
4	6954.852	10.25	36.38	42.04	46.66	51.25	74.00	-22.75	peak
5	7236.000	10.07	36.40	41.83	44.47	49.11	74.00	-24.89	peak
6	9648.000	10.77	37.53	38.36	40.54	50.48	74.00	-23.52	peak



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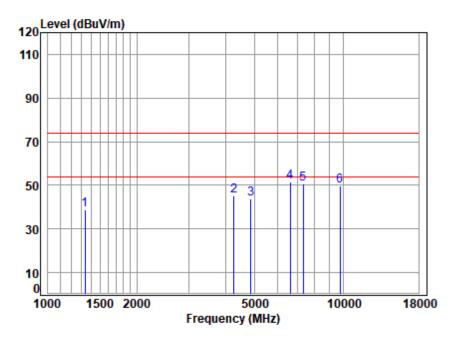
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2437 TX RSE Note : 2.4G WIFI 11G

IOCC	. 2	TO WILL	1 110						
		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	1335.141	4.93	25.11	40.59	49.17	38.62	74.00	-35.38	peak
2	4267.237	7.30	33.60	43.06	47.27	45.11	74.00	-28.89	peak
3	4874.000	7.96	34.28	43.68	45.41	43.97	74.00	-30.03	peak
4	6621.375	11.19	35.45	42.31	47.32	51.65	74.00	-22.35	peak
5	7311.000	10.05	36.37	41.78	46.21	50.85	74.00	-23.15	peak
6	9748.000	10.82	37.55	38.20	39.72	49.89	74.00	-24.11	peak



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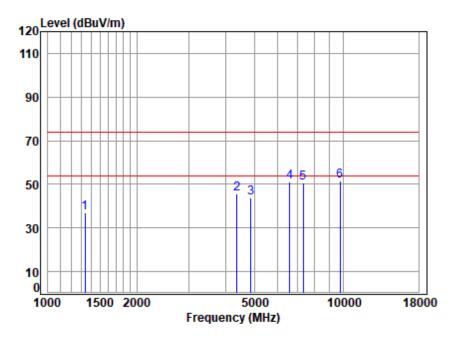
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:middle



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2437 TX RSE Note : 2.4G WIFI 11G

oce	. 2	+O MII	1 110						
		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	1335.141	4.93	25.11	40.59	47.32	36.77	74.00	-37.23	peak
2	4367.058	7.41	33.60	43.16	47.62	45.47	74.00	-28.53	peak
3	4874.000	7.96	34.28	43.68	45.47	44.03	74.00	-29.97	peak
4	6602.265	11.24	35.39	42.32	46.90	51.21	74.00	-22.79	peak
5	7311.000	10.05	36.37	41.78	46.00	50.64	74.00	-23.36	peak
6	9748.000	10.82	37.55	38.20	41.32	51.49	74.00	-22.51	peak



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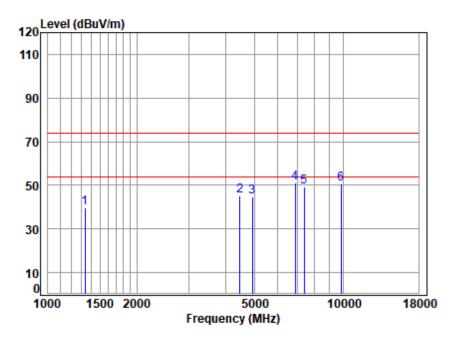
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2462 TX RSE : 2.4G WIFI 11G Note

		10 111	1 110						
		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	
4	4225 444	4.03	25 44	40.50	FO 47	30.00	74.00	24.00	
1	1335.141	4.93	25.11	40.59	50.4/	39.92	74.00	-34.08	реак
2	4469.214	7.53	33.60	43.27	47.36	45.22	74.00	-28.78	peak
3	4924.000	8.01	34.37	43.73	46.13	44.78	74.00	-29.22	peak
4	6874.906	10.47	36.16	42.11	46.68	51.20	74.00	-22.80	peak
5	7386.000	10.03	36.34	41.72	44.81	49.46	74.00	-24.54	peak
6	9848.000	10.87	37.57	38.04	40.15	50.55	74.00	-23.45	peak



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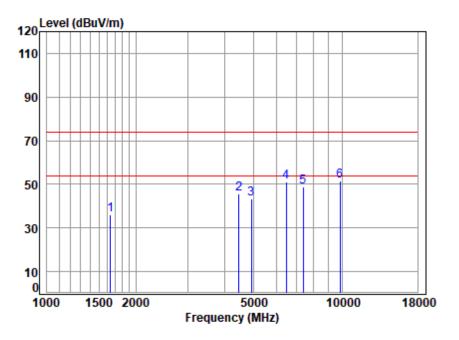
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2462 TX RSE Note : 2.4G WIFI 11G

		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	1639.274	5.30	26.42	40.79	45.24	36.17	74.00	-37.83	peak
2	4469.214	7.53	33.60	43.27	47.68	45.54	74.00	-28.46	peak
3	4924.000	8.01	34.37	43.73	44.91	43.56	74.00	-30.44	peak
4	6470.026	11.48	35.08	42.43	46.92	51.05	74.00	-22.95	peak
5	7386.000	10.03	36.34	41.72	44.33	48.98	74.00	-25.02	peak
6	9848.000	10.87	37.57	38.04	41.16	51.56	74.00	-22.44	peak



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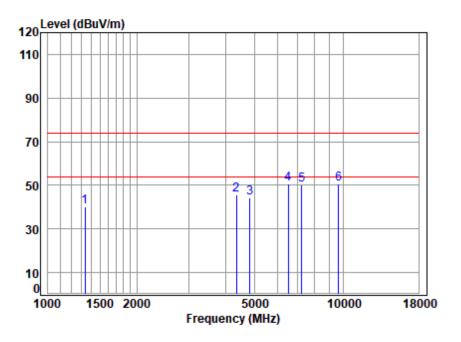
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2412 TX RSE

: 2.4G WIFI 11N20 Note

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1335.141	4.93	25.11	40.59	50.51	39.96	74.00	-34.04	peak
2	4354.454	7.40	33.60	43.15	47.85	45.70	74.00	-28.30	peak
3	4824.000	7.91	34.19	43.63	45.73	44.20	74.00	-29.80	peak
4	6507.536	11.52	35.12	42.40	46.49	50.73	74.00	-23.27	peak
5	7236.000	10.07	36.40	41.83	45.34	49.98	74.00	-24.02	peak
	9648,000								•



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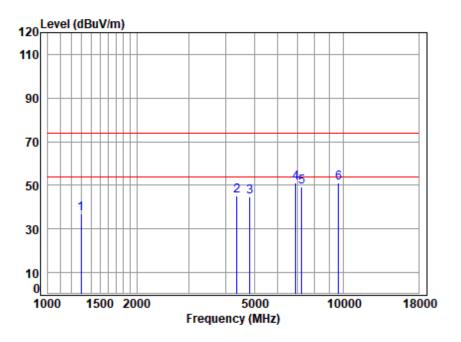
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2412 TX RSE

: 2.4G WIFI 11N20 Note

		10 111	1 11112							
		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	1297.103	4.79	24.94	40.56	47.67	36.84	74.00	-37.16	peak	
2	4367.058	7.41	33.60	43.16	47.47	45.32	74.00	-28.68	peak	
3	4824.000	7.91	34.19	43.63	46.02	44.49	74.00	-29.51	peak	
4	6894.806	10.42	36.21	42.09	46.74	51.28	74.00	-22.72	peak	
5	7236.000	10.07	36.40	41.83	44.52	49.16	74.00	-24.84	peak	
6	9648.000	10.77	37.53	38.36	41.29	51.23	74.00	-22.77	peak	



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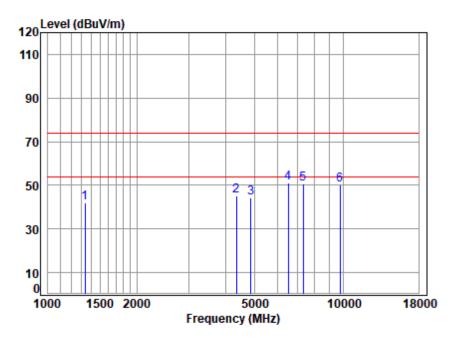
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2437 TX RSE

: 2.4G WIFI 11N20 Note

	Freq			Preamp Factor					Remark
	MHz			dB					
	1335.141	4.93	25.11	40.59	52.36	41.81	74.00	-32.19	peak
2	4354.454	7.40	33.60	43.15	47.20	45.05	74.00	-28.95	peak
}	4874.000	7.96	34.28	43.68	45.79	44.35	74.00	-29.65	peak
ļ	6507.536	11.52	35.12	42.40	46.66	50.90	74.00	-23.10	peak
,	7311.000	10.05	36.37	41.78	45.80	50.44	74.00	-23.56	peak
,	9748,000	10.82	37.55	38.20	40.10	50.27	74.00	-23.73	neak



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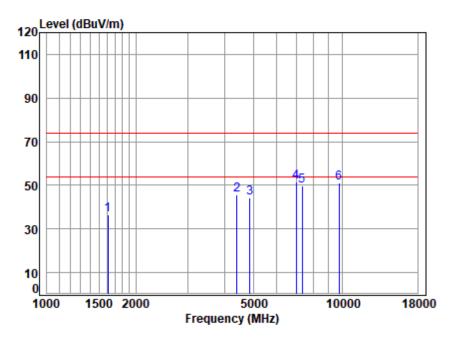
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:middle



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2437 TX RSE

: 2.4G WIFI 11N20 Note

				_					
		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	1611.091	5.34	26.30	40.78	45.43	36.29	74.00	-37.71	peak
2	4405.090	7.46	33.60	43.20	47.58	45.44	74.00	-28.56	peak
3	4874.000	7.96	34.28	43.68	45.76	44.32	74.00	-29.68	peak
4	6974.982	10.20	36.43	42.03	46.91	51.51	74.00	-22.49	peak
5	7311.000	10.05	36.37	41.78	44.94	49.58	74.00	-24.42	peak
6	9748.000	10.82	37.55	38.20	40.85	51.02	74.00	-22.98	peak



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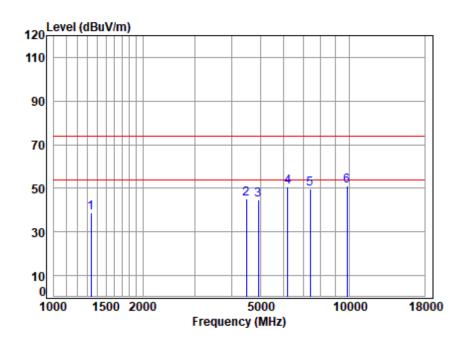
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2462 TX RSE

Note : 2.4G WIFI 11N20

_				-					
		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	
	1335.141	4.93	25.11	40.59	49.52	38.97	74.00	-35.03	peak
	4495.125	7.55	33.60	43.30	47.40	45.25	74.00	-28.75	peak
	4924.000	8.01	34.37	43.73	46.00	44.65	74.00	-29.35	peak
	6195.508	10.96	34.86	42.66	47.37	50.53	74.00	-23.47	peak
	7386.000	10.03	36.34	41.72	44.87	49.52	74.00	-24.48	peak
	9848.000	10.87	37.57	38.04	40.67	51.07	74.00	-22.93	peak



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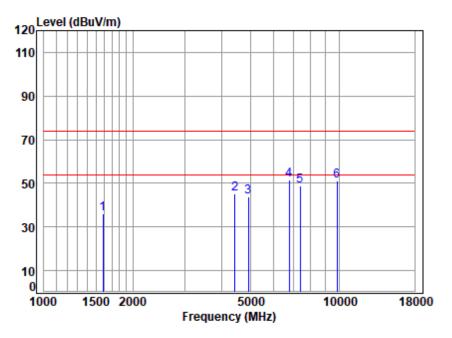
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2462 TX RSE

: 2.4G WIFI 11N20 Note

				_					
		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	1583.392	5.37	26.18	40.76	45.18	35.97	74.00	-38.03	peak
2	4443.453	7.50	33.60	43.25	47.36	45.21	74.00	-28.79	peak
3	4924.000	8.01	34.37	43.73	45.30	43.95	74.00	-30.05	peak
4	6776.265	10.75	35.89	42.18	46.94	51.40	74.00	-22.60	peak
5	7386.000	10.03	36.34	41.72	44.25	48.90	74.00	-25.10	peak
6	9848.000	10.87	37.57	38.04	40.51	50.91	74.00	-23.09	peak



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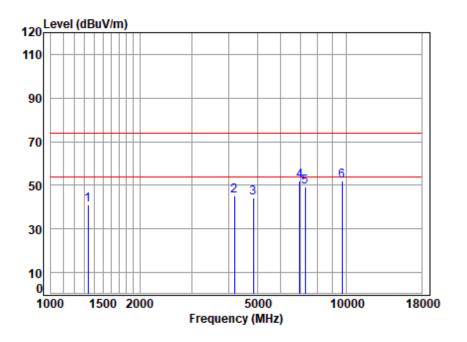
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:40MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2422 TX RSE

Note : 2.4G WIFI 11N40

				-					
		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	1335.141	4.93	25.11	40.59	51.48	40.93	74.00	-33.07	peak
2	4181.768	7.20	33.60	42.96	47.30	45.14	74.00	-28.86	peak
3	4844.000	7.93	34.23	43.65	45.80	44.31	74.00	-29.69	peak
4	6954.852	10.25	36.38	42.04	47.31	51.90	74.00	-22.10	peak
5	7266.000	10.06	36.39	41.81	44.65	49.29	74.00	-24.71	peak
6	9688.000	10.79	37.54	38.30	41.86	51.89	74.00	-22.11	peak



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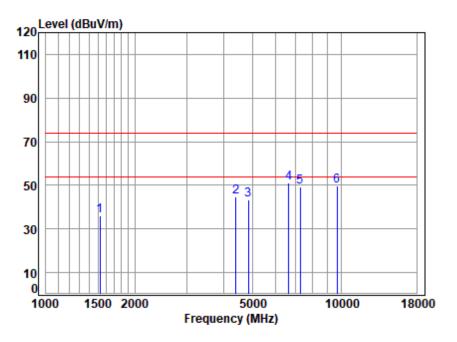
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Report No.: SZEM190501451402

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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:40MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2422 TX RSE

: 2.4G WIFI 11N40 Note

				-					
		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	1525.000	5.45	25.91	40.72	45.28	35.92	74.00	-38.08	peak
2	4405.090	7.46	33.60	43.20	46.95	44.81	74.00	-29.19	peak
3	4844.000	7.93	34.23	43.65	44.97	43.48	74.00	-30.52	peak
4	6640.542	11.13	35.50	42.29	46.78	51.12	74.00	-22.88	peak
5	7266.000	10.06	36.39	41.81	44.59	49.23	74.00	-24.77	peak
6	9688.000	10.79	37.54	38.30	39.92	49.95	74.00	-24.05	peak



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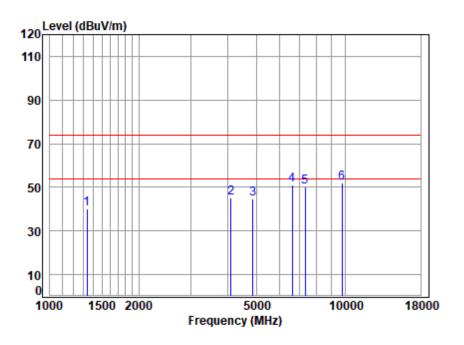
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Report No.: SZEM190501451402

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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:40MHz; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2437 TX RSE

: 2.4G WIFI 11N40 Note

				-					
		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	1335.141	4.93	25.11	40.59	50.77	40.22	74.00	-33.78	peak
2	4109.872	7.11	33.60	42.88	47.12	44.95	74.00	-29.05	peak
3	4874.000	7.96	34.28	43.68	45.94	44.50	74.00	-29.50	peak
4	6621.375	11.19	35.45	42.31	46.87	51.20	74.00	-22.80	peak
5	7311.000	10.05	36.37	41.78	45.33	49.97	74.00	-24.03	peak
6	9748.000	10.82	37.55	38.20	42.03	52.20	74.00	-21.80	peak



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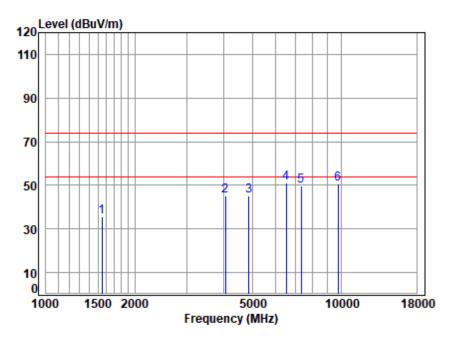
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:40MHz; Channel:middle



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2437 TX RSE

: 2.4G WIFI 11N40 Note

				_					
		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	1547.199	5.42	26.02	40.74	45.03	35.73	74.00	-38.27	peak
2	4062.629	7.06	33.60	42.82	47.38	45.22	74.00	-28.78	peak
3	4874.000	7.96	34.28	43.68	46.41	44.97	74.00	-29.03	peak
4	6507.536	11.52	35.12	42.40	46.87	51.11	74.00	-22.89	peak
5	7311.000	10.05	36.37	41.78	45.31	49.95	74.00	-24.05	peak
6	9748.000	10.82	37.55	38.20	40.36	50.53	74.00	-23.47	peak



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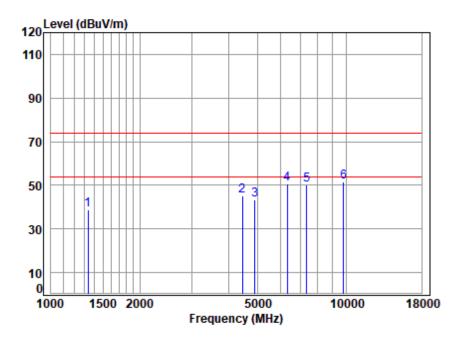
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:40MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 14514CR

Mode : 2452 TX RSE

: 2.4G WIFI 11N40 Note

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1335.141	4.93	25.11	40.59	49.14	38.59	74.00	-35.41	peak
2	4456.315	7.51	33.60	43.26	47.17	45.02	74.00	-28.98	peak
3	4904.000	7.99	34.33	43.71	44.61	43.22	74.00	-30.78	peak
4	6322.136	11.20	34.96	42.55	47.22	50.83	74.00	-23.17	peak
5	7356.000	10.04	36.36	41.75	45.53	50.18	74.00	-23.82	peak
6	9808,000	10.85	37.56	38.10	41.21	51.52	74.00	-22.48	neak



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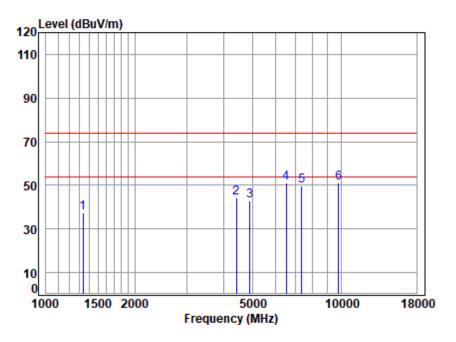
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:40MHz; Channel:High



Site : chamber Condition: 3m VERTICAL Job No : 14514CR

Mode : 2452 TX RSE

Note : 2.4G WIFI 11N40

				_						
		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	1335.141	4.93	25.11	40.59	48.05	37.50	74.00	-36.50	peak	
2	4417.841	7.47	33.60	43.22	46.61	44.46	74.00	-29.54	peak	
3	4904.000	7.99	34.33	43.71	44.36	42.97	74.00	-31.03	peak	
4	6526.373	11.46	35.18	42.38	46.85	51.11	74.00	-22.89	peak	
5	7356.000	10.04	36.36	41.75	45.31	49.96	74.00	-24.04	peak	
6	9808.000	10.85	37.56	38.10	40.84	51.15	74.00	-22.85	peak	



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#### 8 **Photographs**

#### 8.1 **Test Setup**

Please refer to setup photos.

#### 8.2 EUT Constructional Details (EUT Photos)

Please refer to external and internal photos for details.



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#### **Appendix** 9

#### 9.1 Appendix 15.247

#### 1.6dB Bandwidth

Test Mode	Test	Ant	EBW[MHz]	Limit[MHz]	Verdict
11B	2412	Ant1	8.610	>=0.5	PASS
11B	2437	Ant1	9.120	>=0.5	PASS
11B	2462	Ant1	9.120	>=0.5	PASS
11G	2412	Ant1	16.410	>=0.5	PASS
11G	2437	Ant1	16.410	>=0.5	PASS
11G	2462	Ant1	16.410	>=0.5	PASS
11N20SISO	2412	Ant1	17.610	>=0.5	PASS
11N20SISO	2437	Ant1	17.610	>=0.5	PASS
11N20SISO	2462	Ant1	17.610	>=0.5	PASS
11N40SISO	2422	Ant1	35.700	>=0.5	PASS
11N40SISO	2437	Ant1	35.940	>=0.5	PASS
11N40SISO	2452	Ant1	36.000	>=0.5	PASS



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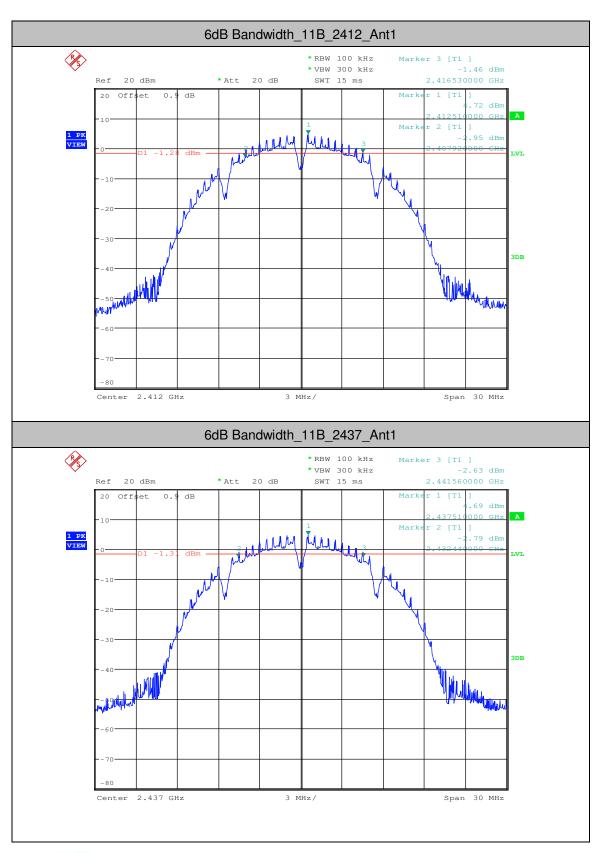
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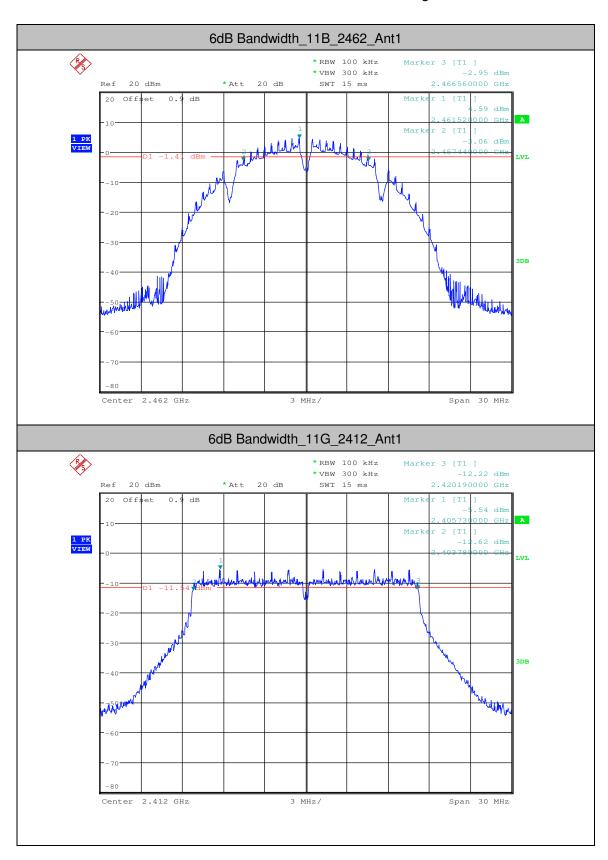
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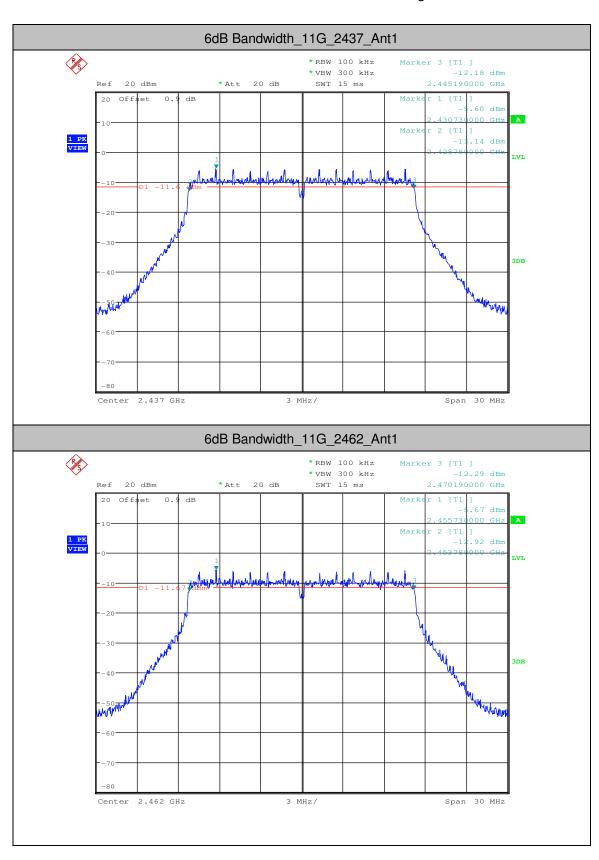
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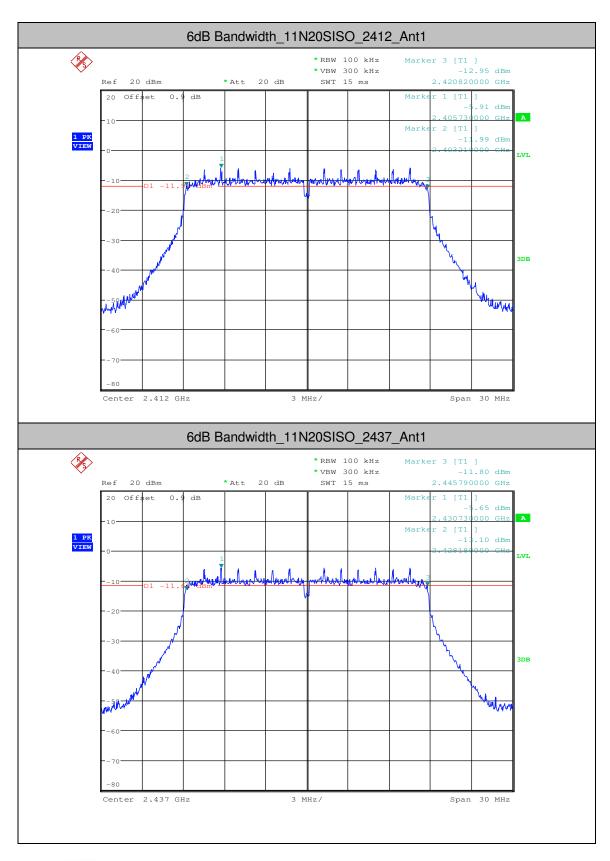
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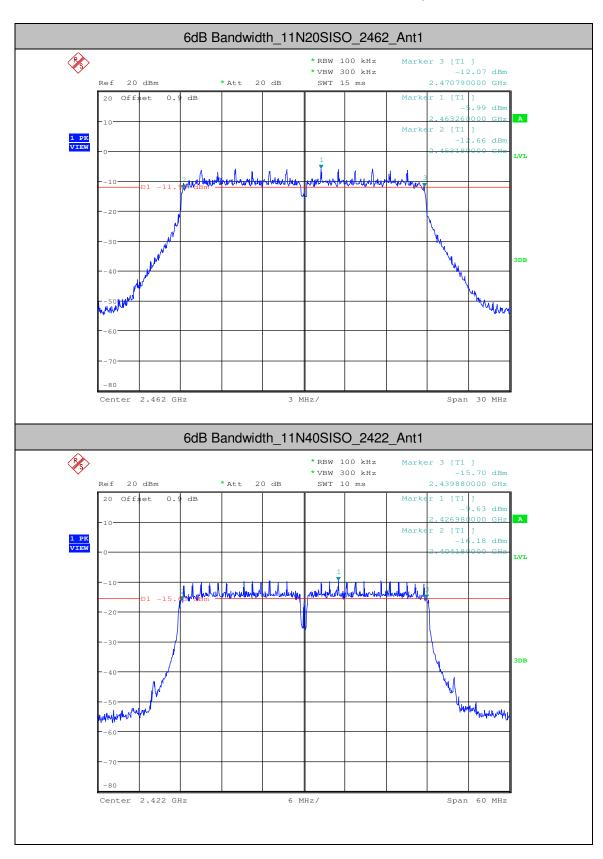
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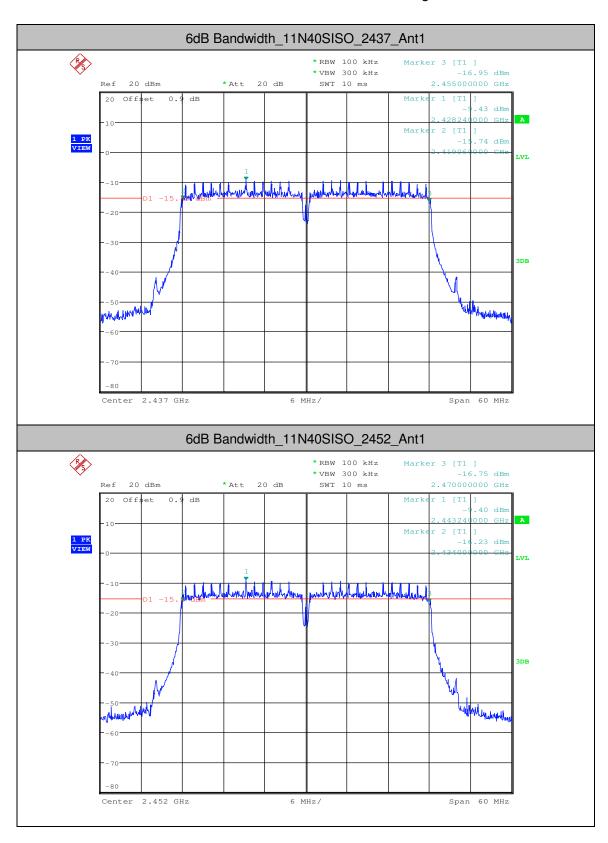
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#### 2.Maximum peak conducted output power

Test Mode	Test Channel	Ant	Power[dBm]	Limit[dBm]	Verdict
11B	2412	Ant1	17.29	<30	PASS
11B	2437	Ant1	17.56	<30	PASS
11B	2462	Ant1	17.38	<30	PASS
11G	2412	Ant1	14.68	<30	PASS
11G	2437	Ant1	14.67	<30	PASS
11G	2462	Ant1	14.40	<30	PASS
11N20SISO	2412	Ant1	14.24	<30	PASS
11N20SISO	2437	Ant1	14.35	<30	PASS
11N20SISO	2462	Ant1	14.29	<30	PASS
11N40SISO	2422	Ant1	13.31	<30	PASS
11N40SISO	2437	Ant1	13.53	<30	PASS
11N40SISO	2452	Ant1	13.58	<30	PASS



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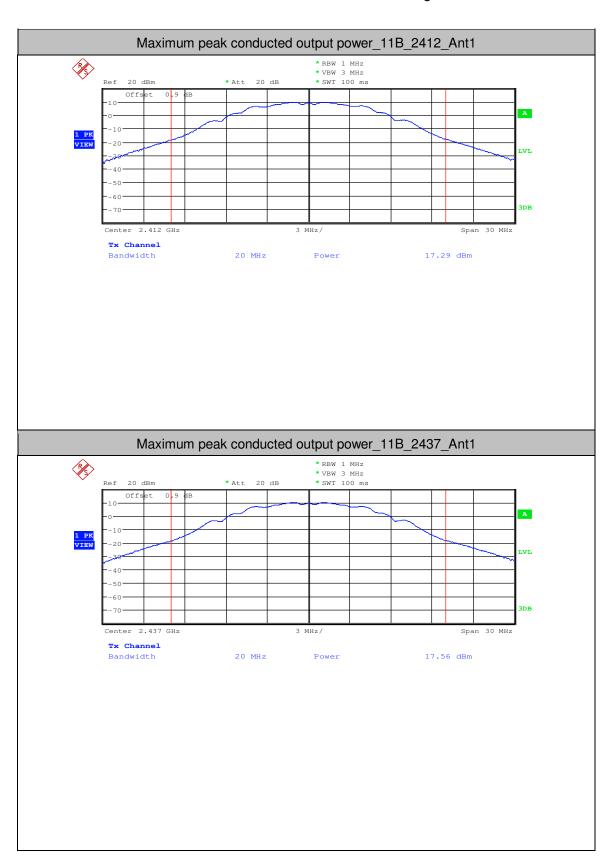
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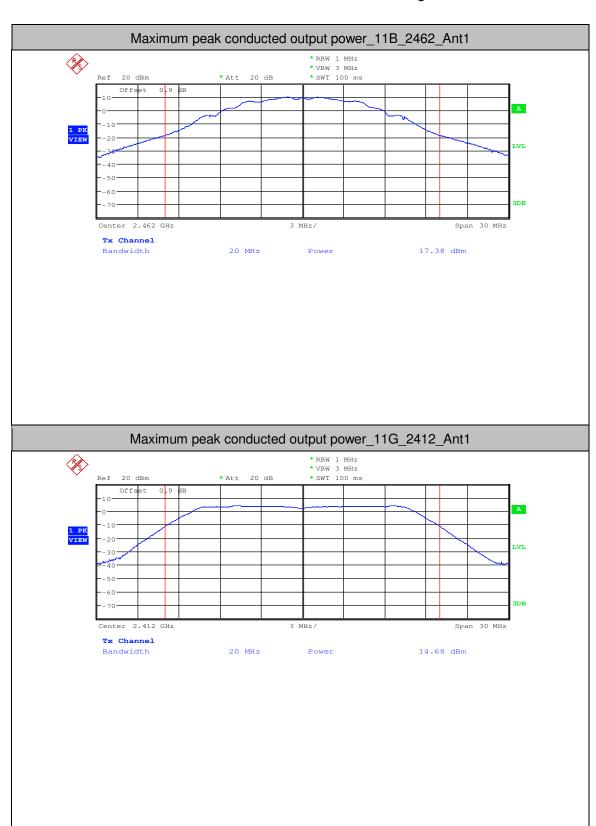
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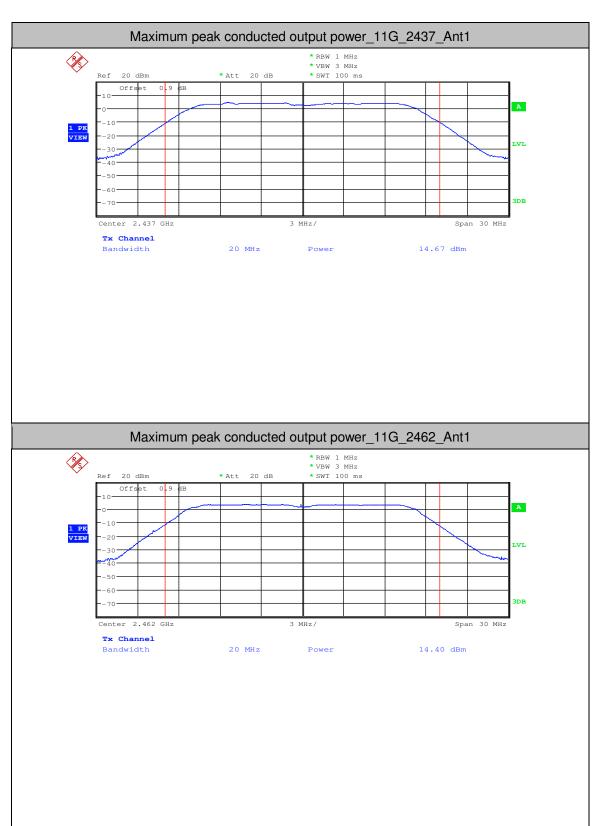
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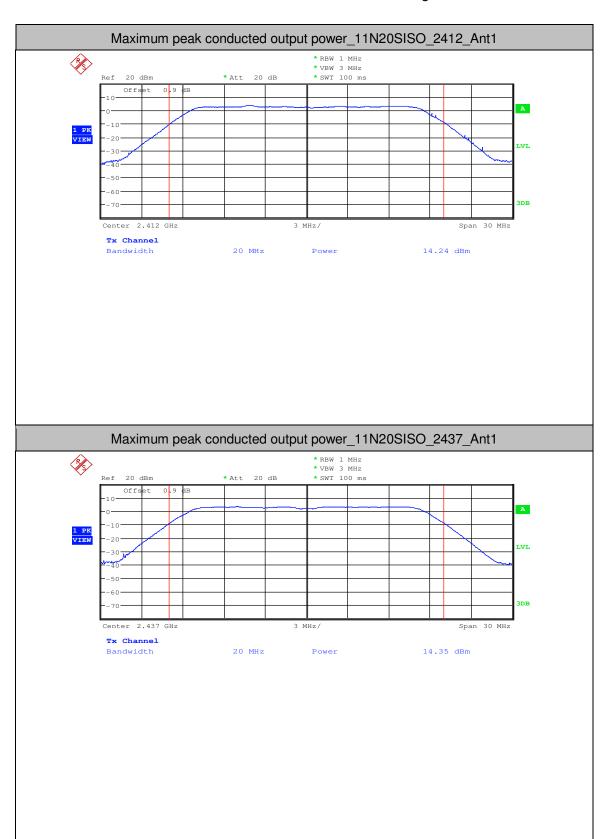
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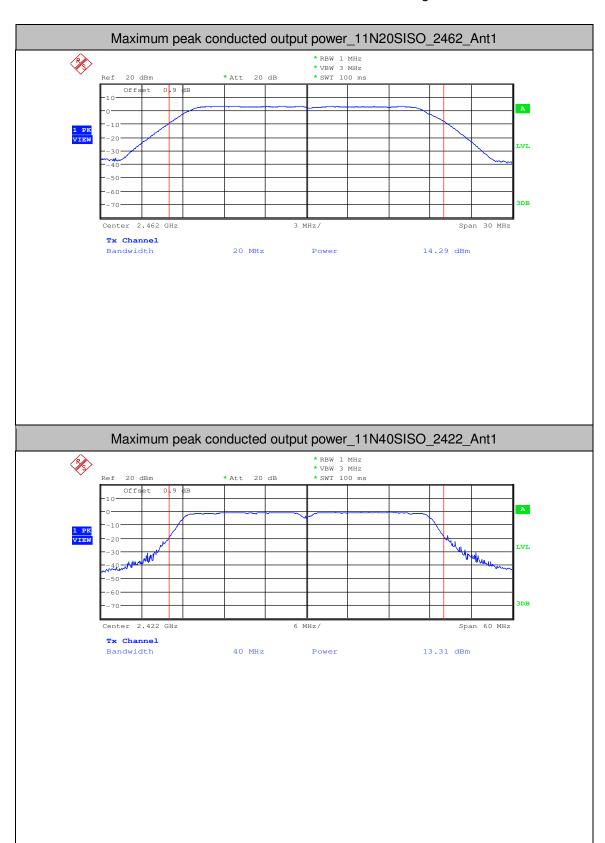
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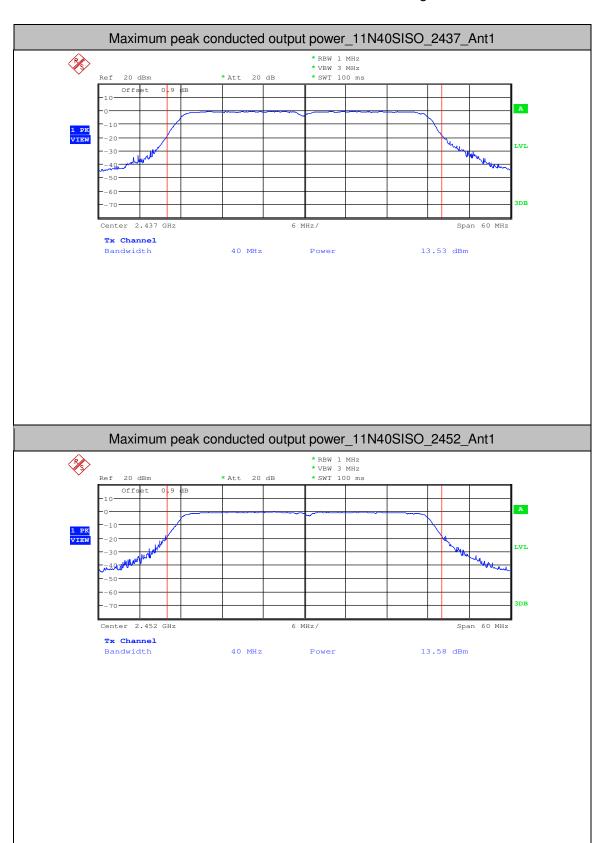
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#### 3. Maximum Peak power spectral density

Test Mode	Test Channel	Ant	PSD[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	2412	Ant1	-9.88	<8.00	PASS
11B	2437	Ant1	-9.67	<8.00	PASS
11B	2462	Ant1	-9.4	<8.00	PASS
11G	2412	Ant1	-19.42	<8.00	PASS
11G	2437	Ant1	-19.17	<8.00	PASS
11G	2462	Ant1	-19.48	<8.00	PASS
11N20SISO	2412	Ant1	-19.77	<8.00	PASS
11N20SISO	2437	Ant1	-19.53	<8.00	PASS
11N20SISO	2462	Ant1	-19.69	<8.00	PASS
11N40SISO	2422	Ant1	-19.79	<8.00	PASS
11N40SISO	2437	Ant1	-19.63	<8.00	PASS
11N40SISO	2452	Ant1	-19.71	<8.00	PASS



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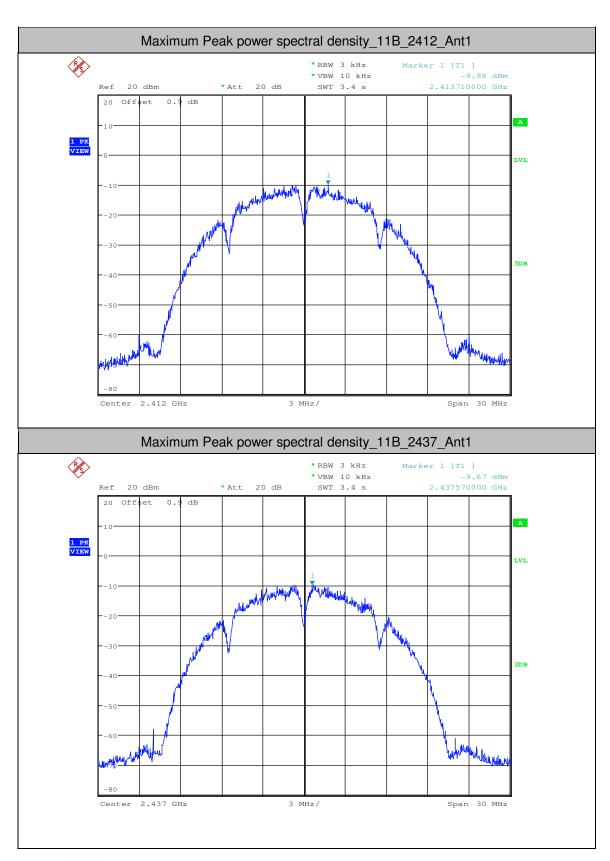
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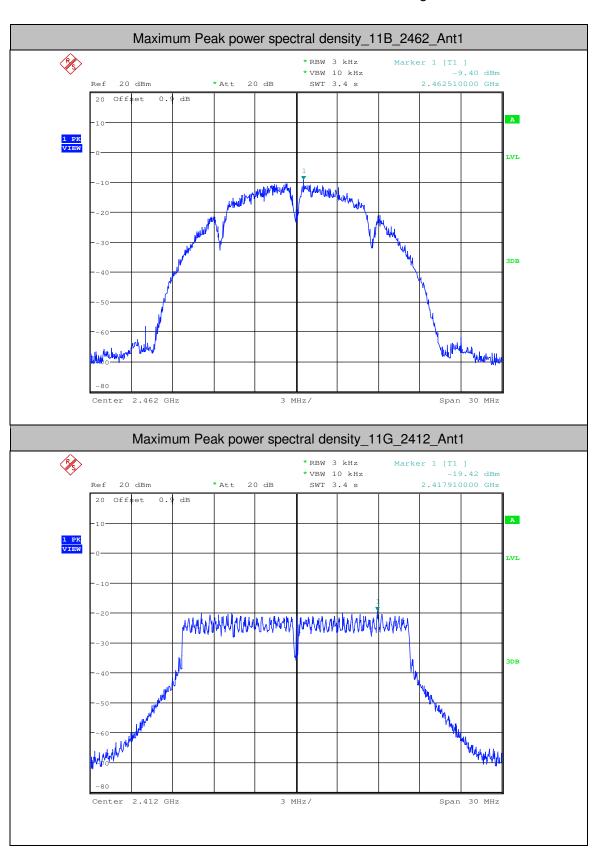
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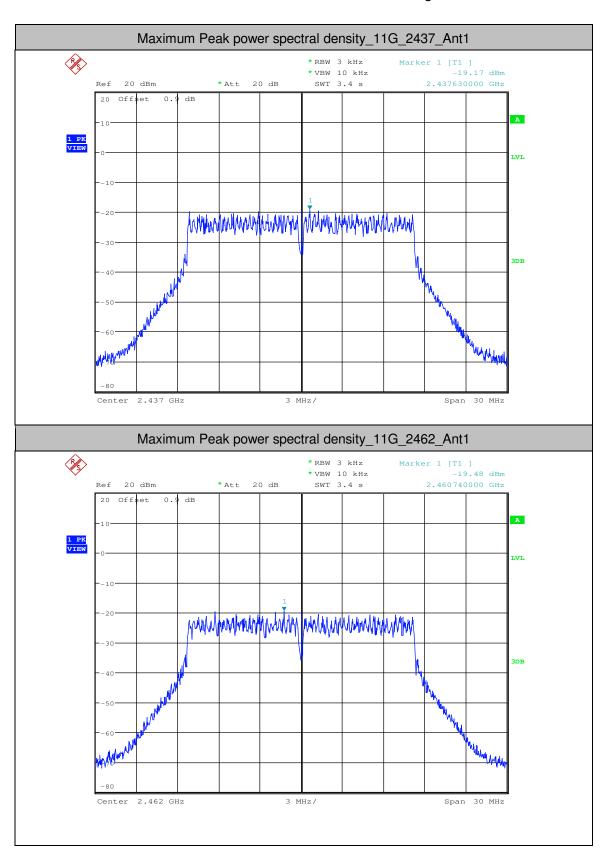
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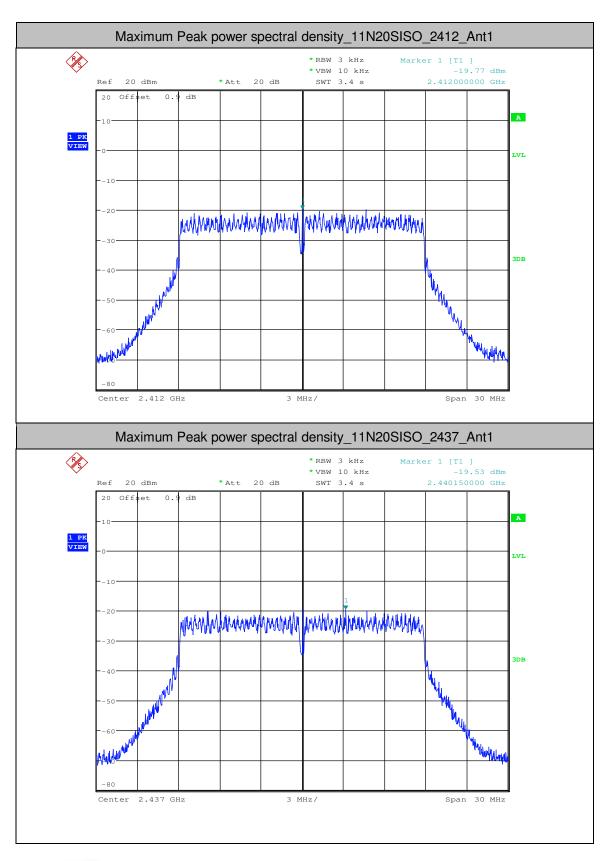
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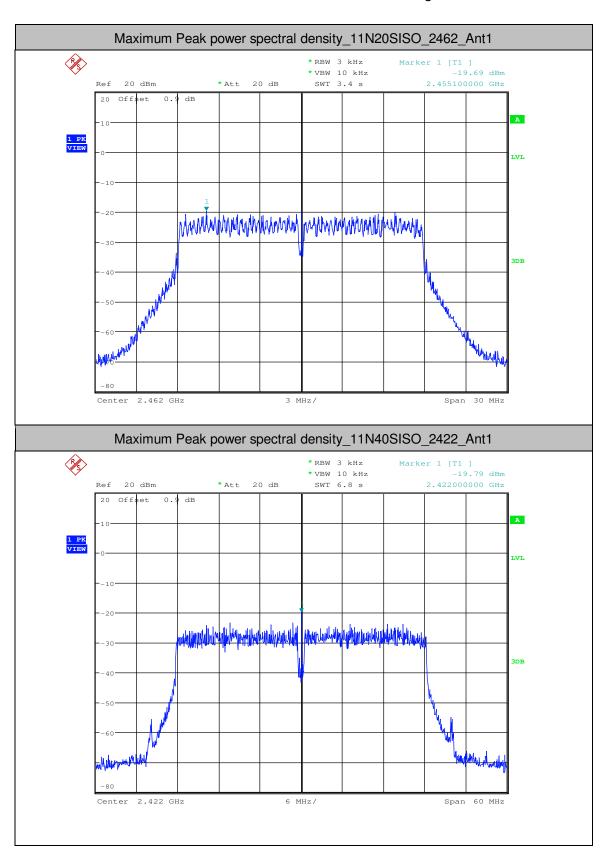
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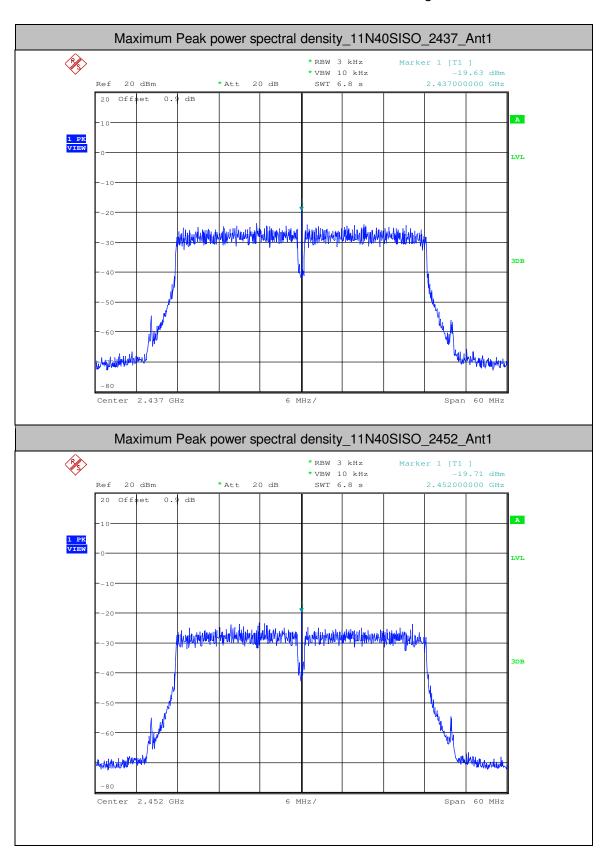
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#### 4.Band-edge for RF Conducted Emissions

Test Mode	Test Channel	Ant	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
11B	2412	Ant1	4.650	-51.931	<-15.35	PASS
11B	2462	Ant1	4.190	-51.708	<-15.81	PASS
11G	2412	Ant1	-5.540	-55.205	<-25.54	PASS
11G	2462	Ant1	-5.920	-54.985	<-25.92	PASS
11N20SISO	2412	Ant1	-6.060	-55.290	<-26.06	PASS
11N20SISO	2462	Ant1	-6.020	-54.913	<-26.02	PASS
11N40SISO	2422	Ant1	-9.740	-55.333	<-29.74	PASS
11N40SISO	2452	Ant1	-9.560	-53.807	<-29.56	PASS



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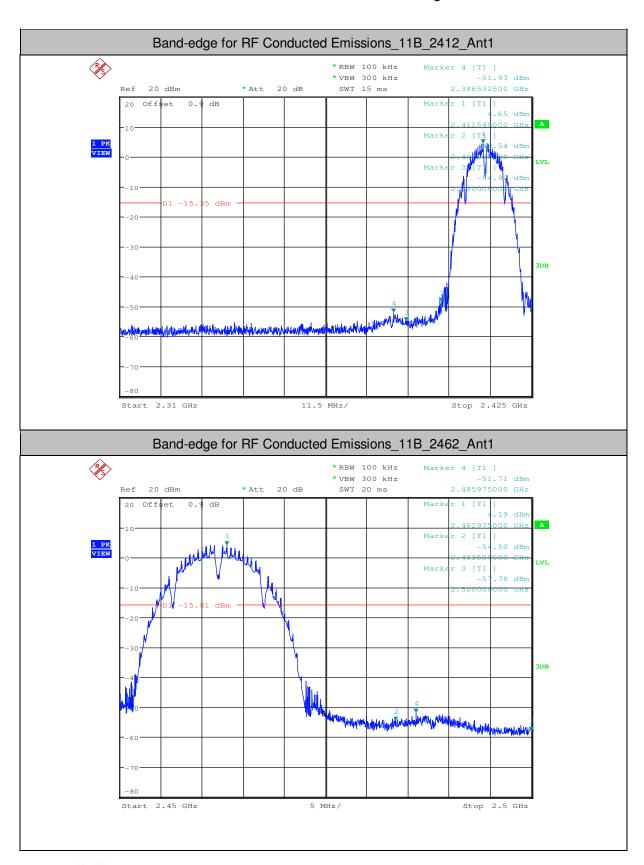
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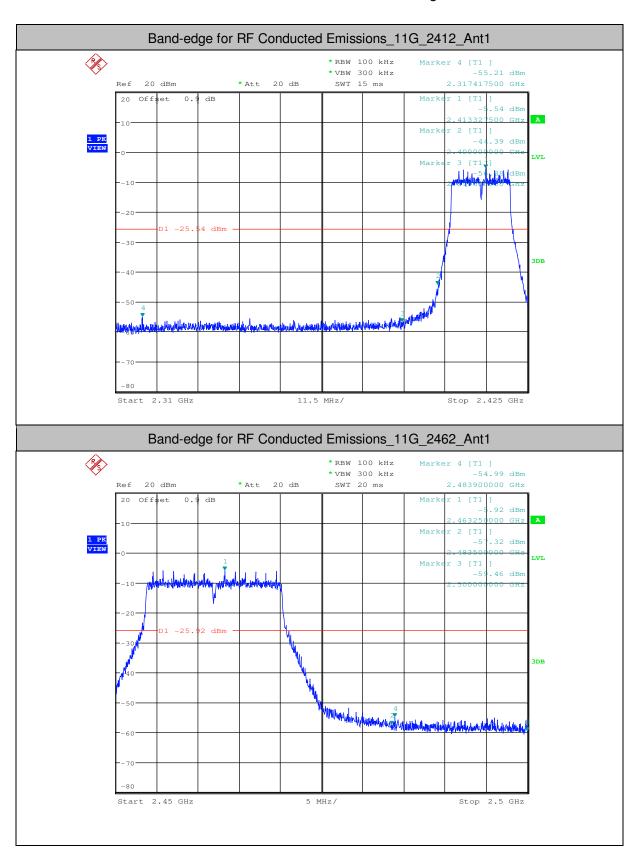
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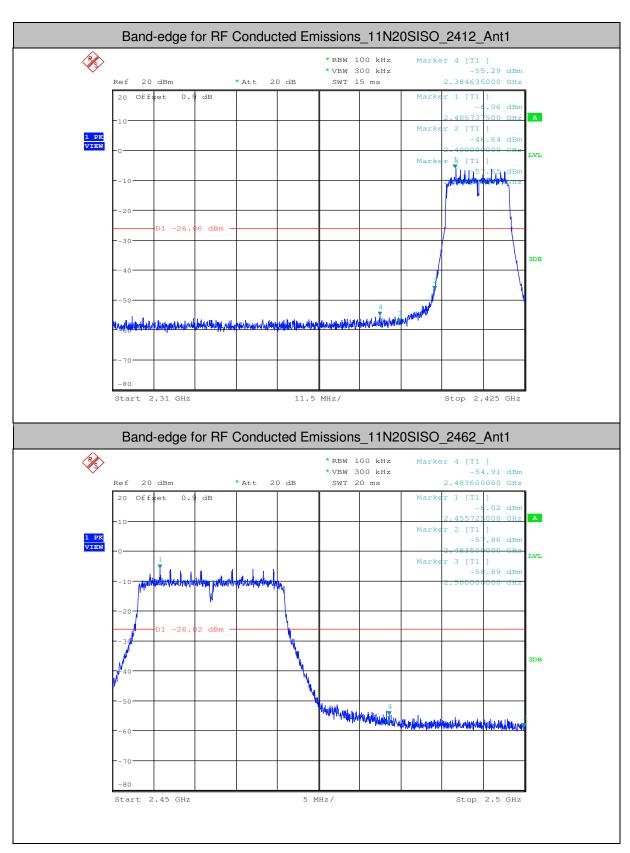
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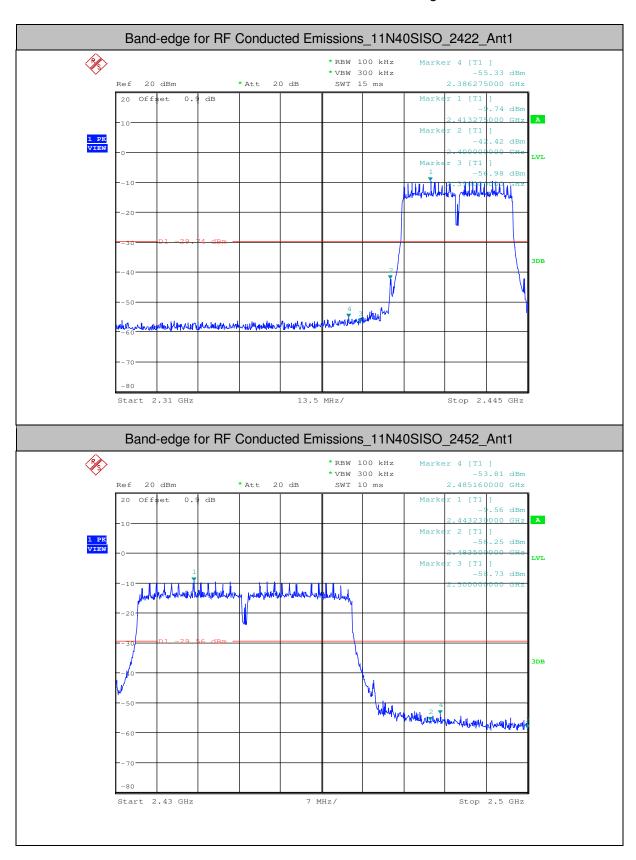
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#### **5.RF Conducted Spurious Emissions**

Test Mode	Test Channel	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	2412	30	10000	1000	3000	4.44	-34.790	<-15.56	PASS
11B	2412	10000	25000	1000	3000	4.44	-55.270	<-15.56	PASS
11B	2437	30	10000	1000	3000	4.87	-34.870	<-15.13	PASS
11B	2437	10000	25000	1000	3000	4.87	-55.320	<-15.13	PASS
11B	2462	30	10000	1000	3000	4.45	-35.030	<-15.55	PASS
11B	2462	10000	25000	1000	3000	4.45	-54.720	<-15.55	PASS
11G	2412	30	10000	1000	3000	-5.89	-48.590	<-25.89	PASS
11G	2412	10000	25000	1000	3000	-5.89	-55.450	<-25.89	PASS
11G	2437	30	10000	1000	3000	-5.55	-49.510	<-25.55	PASS
11G	2437	10000	25000	1000	3000	-5.55	-55.220	<-25.55	PASS
11G	2462	30	10000	1000	3000	-6.25	-48.420	<-26.25	PASS
11G	2462	10000	25000	1000	3000	-6.25	-54.980	<-26.25	PASS
11N20SISO	2412	30	10000	1000	3000	-6.19	-49.680	<-26.19	PASS
11N20SISO	2412	10000	25000	1000	3000	-6.19	-54.850	<-26.19	PASS
11N20SISO	2437	30	10000	1000	3000	-5.88	-47.720	<-25.88	PASS
11N20SISO	2437	10000	25000	1000	3000	-5.88	-54.280	<-25.88	PASS
11N20SISO	2462	30	10000	1000	3000	-6.01	-47.950	<-26.01	PASS
11N20SISO	2462	10000	25000	1000	3000	-6.01	-54.790	<-26.01	PASS
11N40SISO	2422	30	10000	1000	3000	-10.12	-53.390	<-30.12	PASS
11N40SISO	2422	10000	25000	1000	3000	-10.12	-54.770	<-30.12	PASS
11N40SISO	2437	30	10000	1000	3000	-9.57	-52.730	<-29.57	PASS
11N40SISO	2437	10000	25000	1000	3000	-9.57	-55.270	<-29.57	PASS
11N40SISO	2452	30	10000	1000	3000	-9.76	-53.320	<-29.76	PASS
11N40SISO	2452	10000	25000	1000	3000	-9.76	-55.390	<-29.76	PASS



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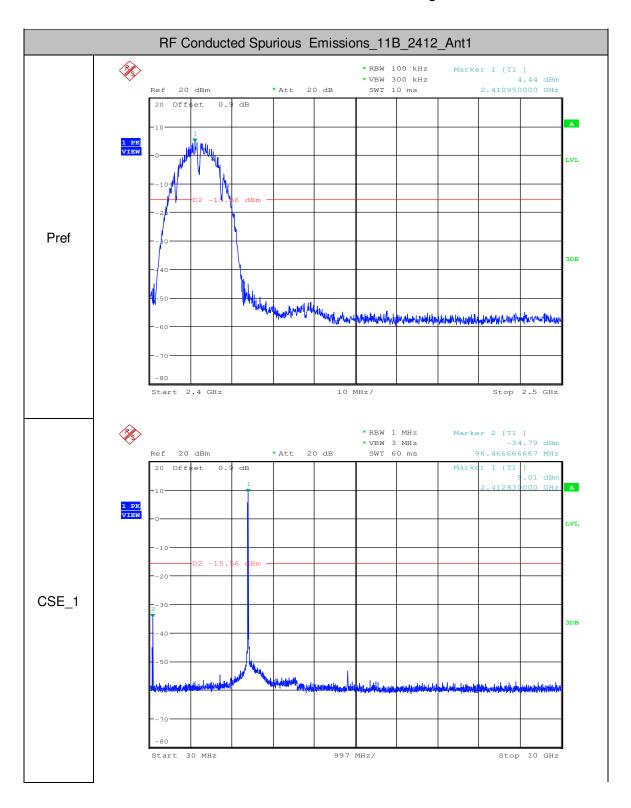
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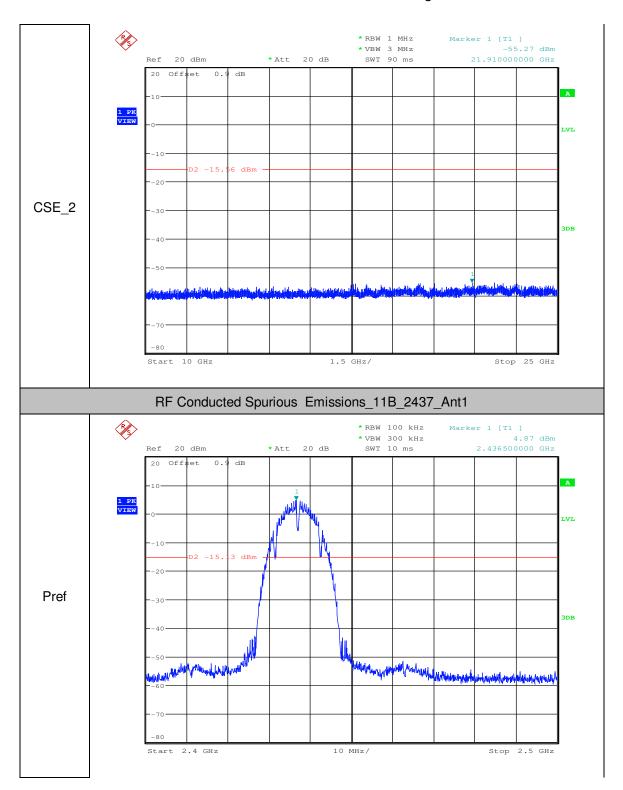
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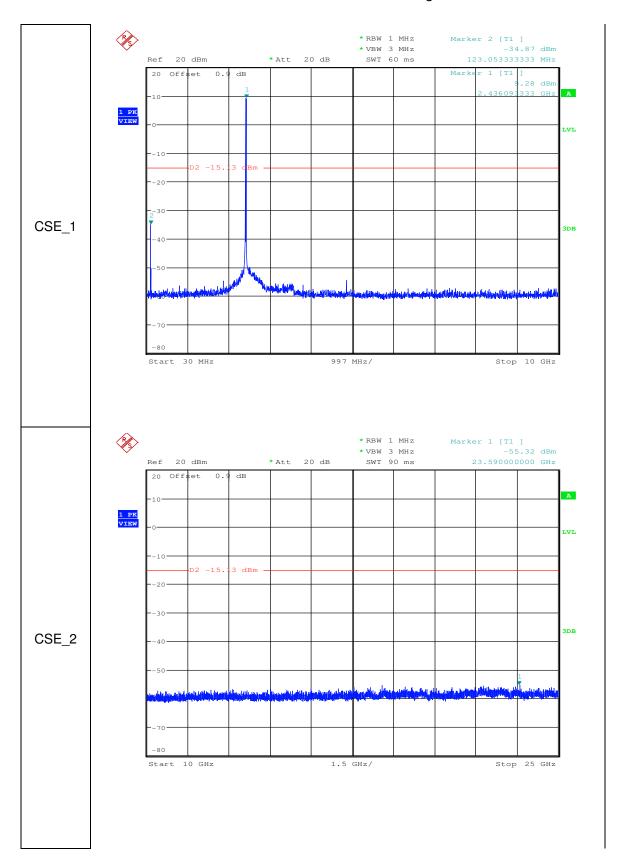
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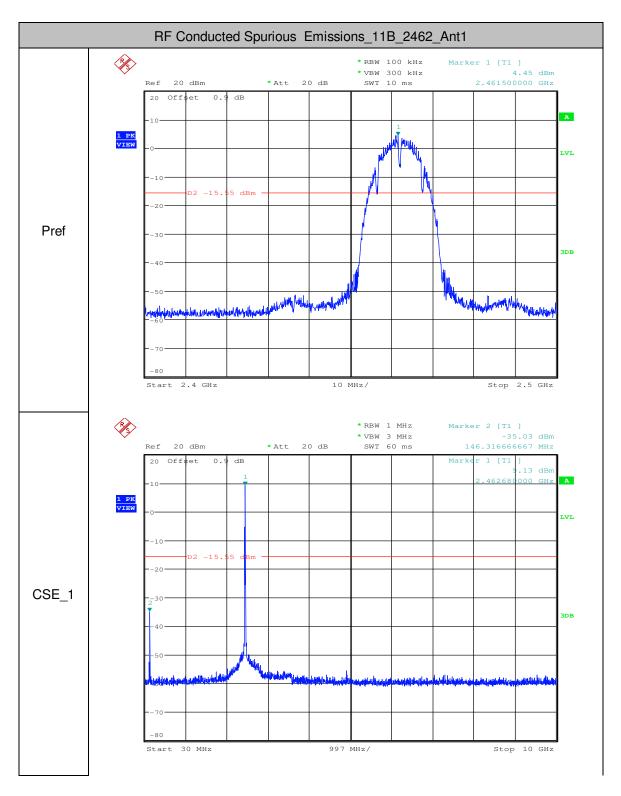
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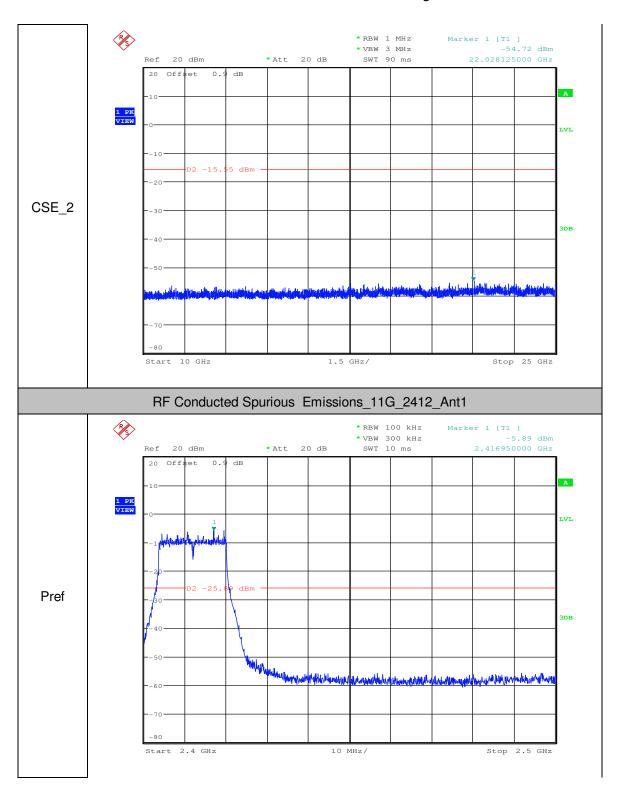
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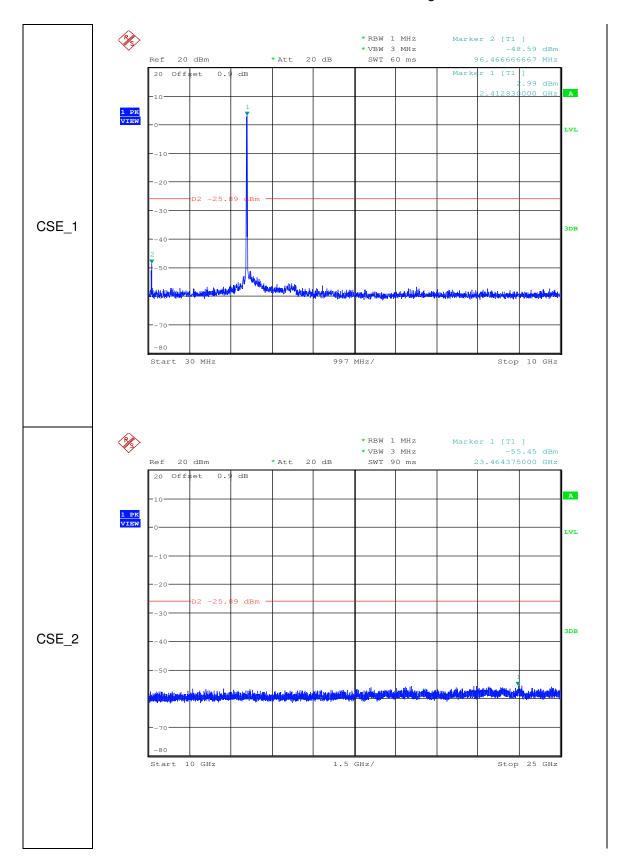
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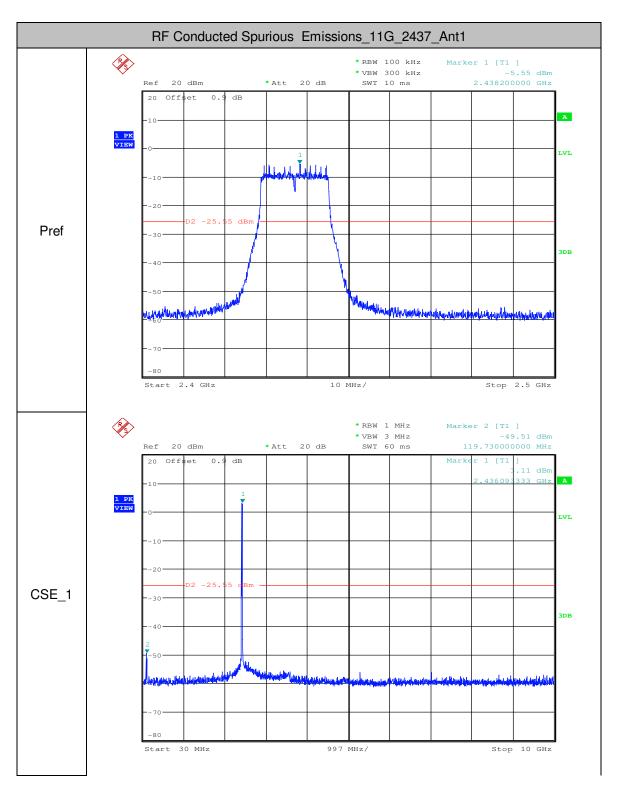
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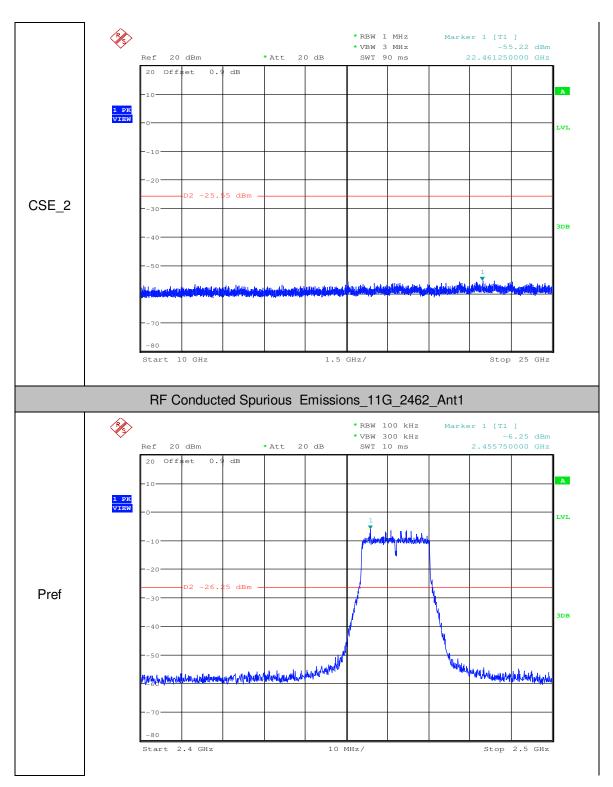
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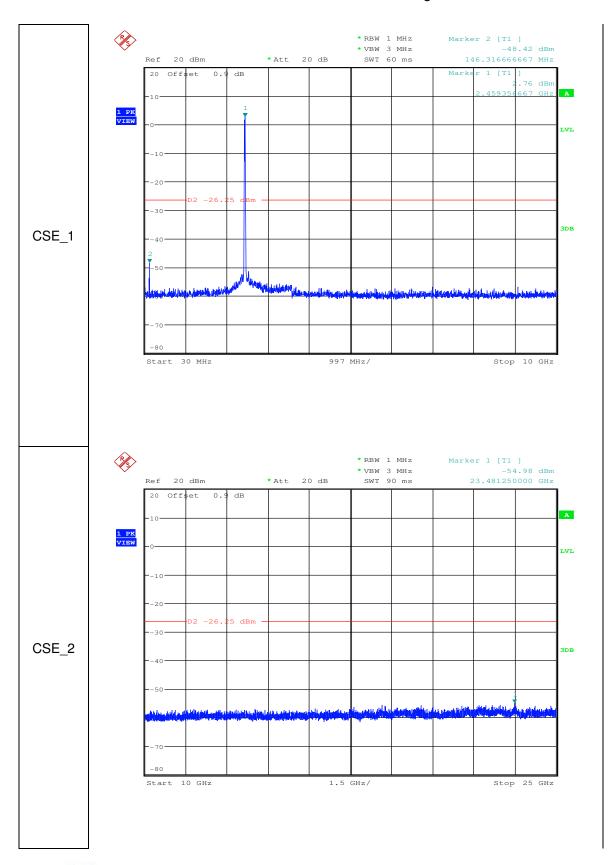
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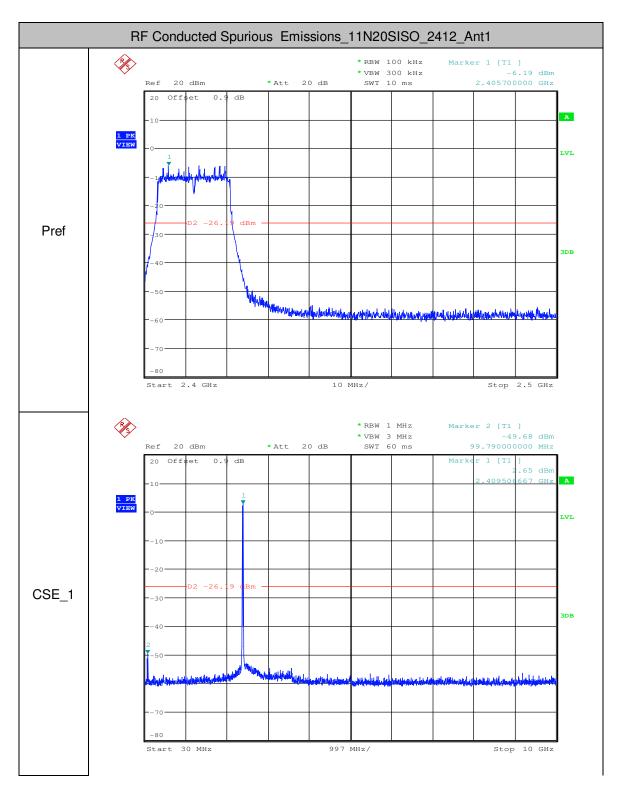
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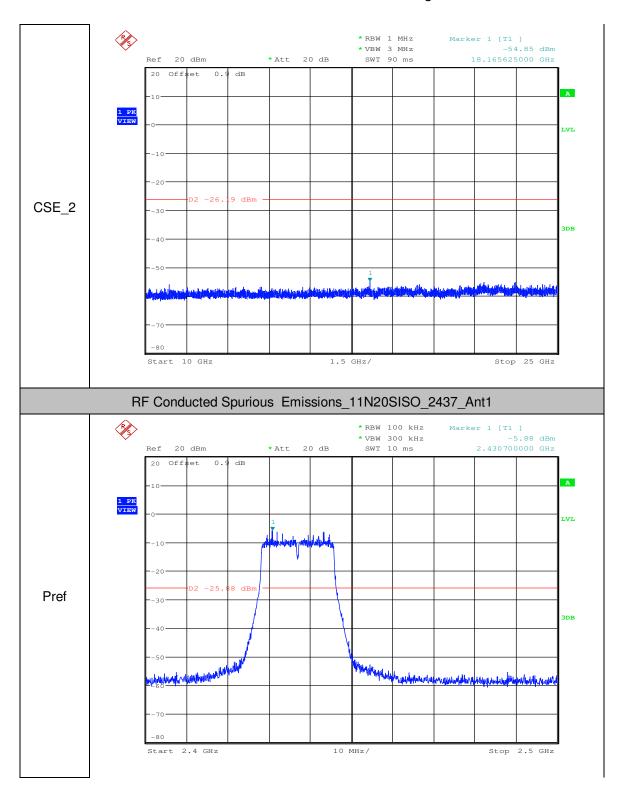
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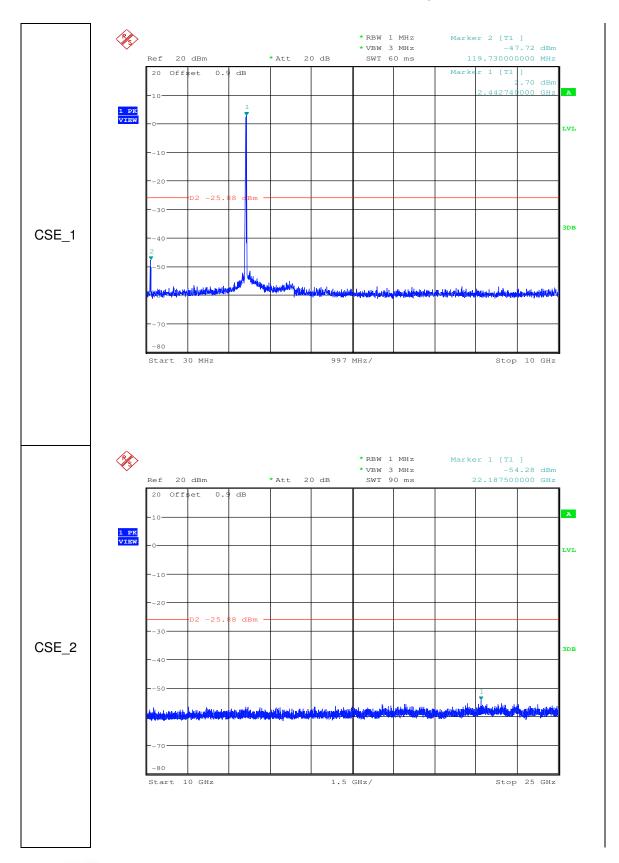
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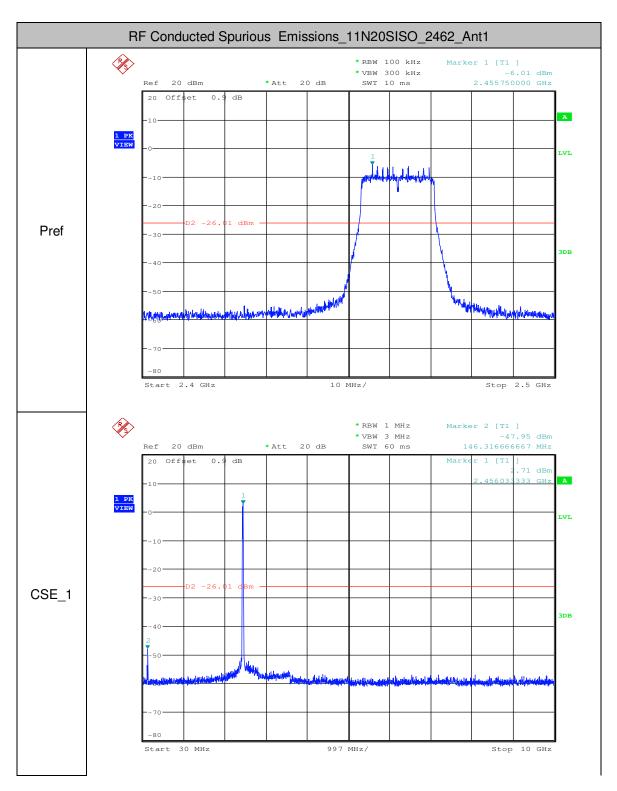
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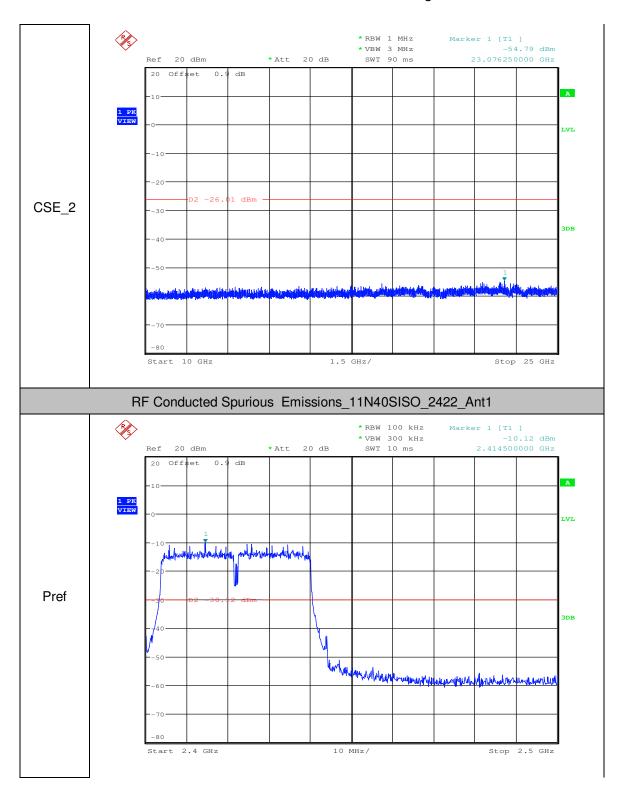
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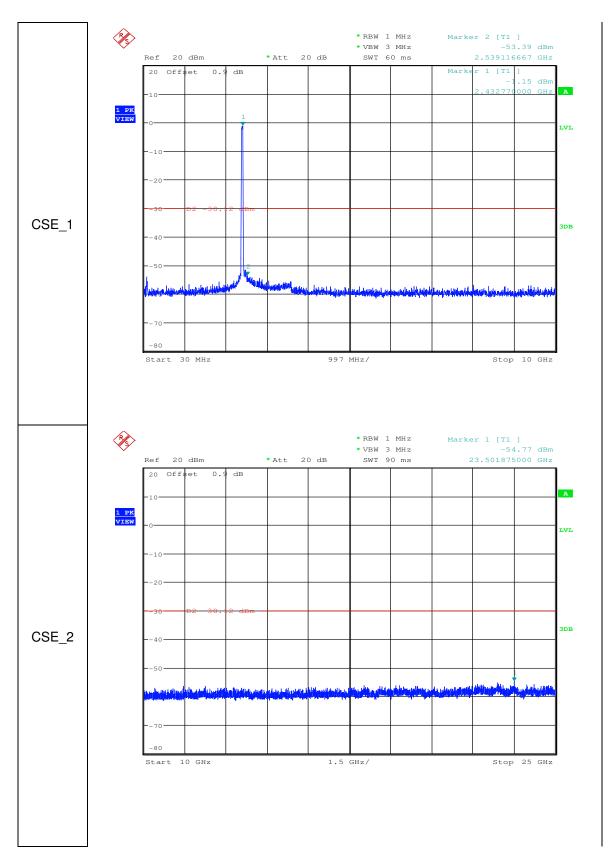
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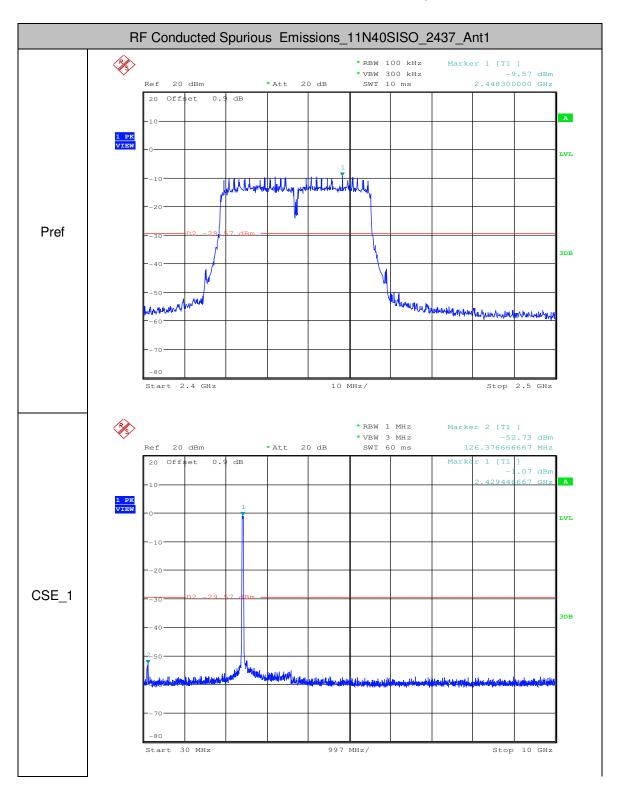
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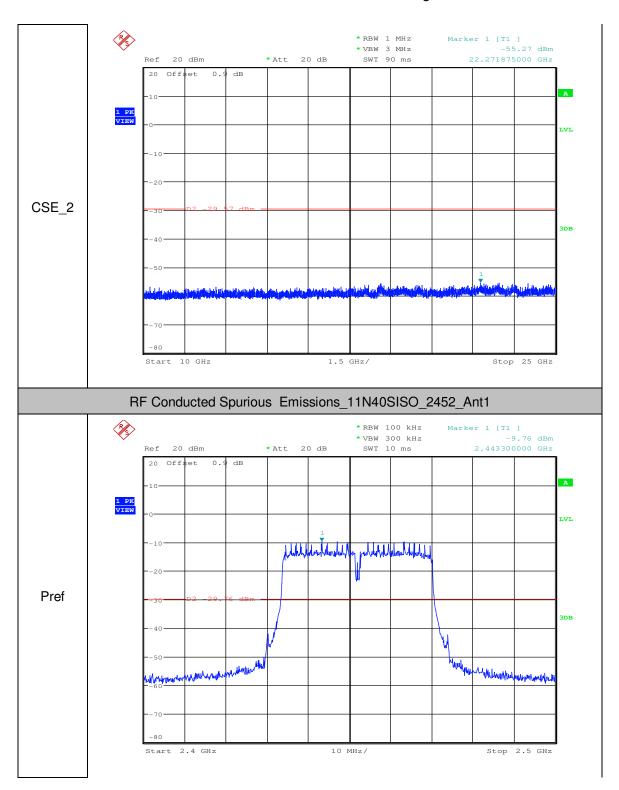
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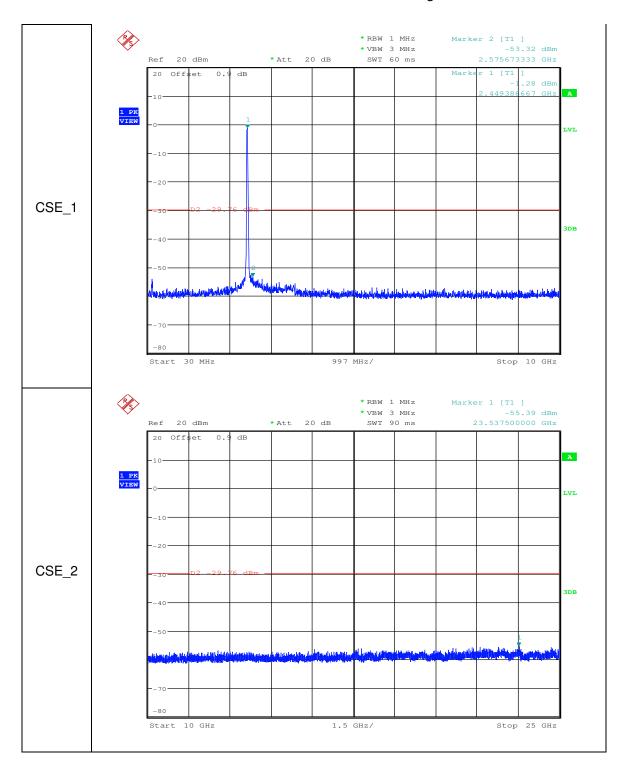
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