

lac-MRA ACC

Report No.: SZEM190401283904

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TEST REPORT

Application No.: SZEM1904012839CR

Applicant: Avnet Inc

Address of Applicant: 2211 S 47th St, Phoenix Arizona, 85034, United States

Manufacturer: Avnet Inc

Address of Manufacturer: 2211 S 47th St, Phoenix Arizona, 85034, United States

Factory: Embest Technology Co., Ltd

Address of Factory: Tower B 4/F, Shanshui Building, Nanshan Yungu Innovation Industry Park,

Liuxian Ave. No.1183, Nanshan District, Shenzhen, Guangdong, China

Equipment Under Test (EUT):

EUT Name: SmartEdge Industrial IoT Gateway

Model No.:AVTSE-RPI-IIOTGFCC ID:2AF62-SEIIOTG

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

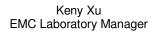
Date of Receipt: 2019-04-16

Date of Test: 2019-04-19 to 2019-05-09

Date of Issue: 2019-05-13

Test Result: Pass*

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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 Rema							
01		2019-05-13		Original			

Authorized for issue by:		
	Hank Yan	
	Hank Yan /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	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15, Subpart	Pass		
Density	Subpart C 15.247	Section 11.10.2	C 15.247(e)			
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)			



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General Information

4.1 Details of E.U.T.

Power supply:	DC 12V ~ 24V
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
Number of Channels:	802.11b/g/n(HT20):11
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK)
	802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Channel Spacing:	5MHz
Antenna Type:	Chip Antenna
Antenna Gain:	1.5dBi

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Power Supply	Provided by Client		

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)
2	Radio Frequency	± 7.25 x 10 ⁻⁸
3	Duty cycle	± 0.37%
4	Occupied Bandwidth	± 3%
5	RF conducted power	± 0.75dB
6	RF power density	± 2.84dB
7	Conducted Spurious emissions	± 0.75dB
	DE Dadiated payer	± 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:

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

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

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

No tests were sub-contracted.

4.5 Test Facility

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

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

None

4.7 Abnormalities from Standard Conditions

None



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Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)						
Equipment	Manufacturer	Model No	Inventory No	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	FSU43	SEM004-08	2019-04-01	2020-03-31	
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM031-01	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	FSU43	SEM004-08	2019-04-01	2020-03-31	
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM031-01	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	FSU43	SEM004-08	2019-04-01	2020-03-31					
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A					
Coaxial Cable	SGS	N/A	SEM031-01	2018-07-12	2019-07-11					



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Attenuator	Attenuator Weinschel Associates WA41 S		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 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	Schwarz FSU43 SEM004-08 2019-04-01		2019-04-01	2020-03-31					
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A					
Coaxial Cable	SGS N/A SEM031		SEM031-01	2018-07-12	2019-07-11					
Attenuator	Weinschel Associates	WA41 SEM021-09		N/A	N/A					
Signal Generator	Signal Generator KEYSIGHT		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	Schwarz FSU43 SEM004-08 2019-04		2019-04-01	2020-03-31					
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	. N/A N/A		N/A					
Coaxial Cable	SGS	N/A	SEM031-01	2018-07-12	2019-07-11					
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A					
Signal Generator	al Generator KEYSIGHT N5173B S		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	ement Software AUDIX e3 V8.2014-6-		N/A	N/A	N/A				
Coaxial Cable	Coaxial Cable SGS		SEM026-01	2018-07-12	2019-07-11				
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2019-04-01	2020-03-31				
Trilog-Broadband Antenna (30MHz-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-28				
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26				
Horn Antenna (1-18GHz)	enna Bohde & Schwarz		SEM003-06	2018-06-08	2021-06-07				



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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 (0.1-1300MHz)	· I HP I		· I HP		SEM005-02	2018-09-25	2019-09-24
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)	Pre-amplifier Compliance		SEM005-08	2019-04-01	2020-03-31		
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26		
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				

Radiated Spurious Emissions									
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date				
3m Semi-Anechoic Chamber	I AIIDIX I N/A I S		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				
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2019-04-01	2020-03-31				
Trilog-Broadband Antenna (30MHz-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-28				



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BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-06	2018-06-08	2021-06-07
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 (0.1-1300MHz)	HP	HP 8447D SEM005	SEM005-02	2018-09-25	2019-09-24
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
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
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

General used equipment									
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date				
Humidity/ Temperature Indicator	I MAIANTOINNICH I Z.II-ZB I S		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

6.1 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)

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

Limit:

Francisco of amicaian/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 fr	equency.				





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7.1.1 E.U.T. Operation

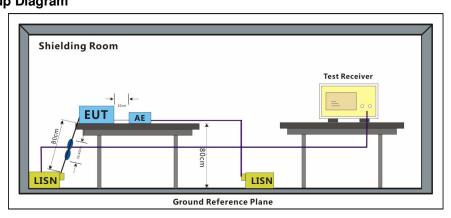
Operating Environment:

Temperature: 25 Humidity: 57 % 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). Only the data of worst case is recorded in the report.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

- 1) 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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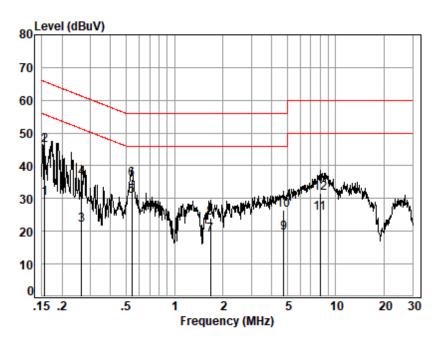
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Mode:d; Line:Live Line



Site : Shielding Room

Condition: Line Job No. : 12839CR

Test mode: d

		Cable	LISN	Read		Limit	0ver	
	Freq	Loss	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16	0.01	9.66	20.44	30.11	55.69	-25.58	Average
2	0.16	0.01	9.66	36.68	46.35	65.69	-19.34	QP
3	0.26	0.03	9.67	12.15	21.85	51.29	-29.44	Average
4	0.26	0.03	9.67	26.59	36.29	61.29	-25.00	QP
5	0.54	0.06	9.67	20.91	30.64	46.00	-15.36	Average
6	0.54	0.06	9.67	26.03	35.76	56.00	-20.24	QP
7	1.67	0.14	9.73	8.96	18.83	46.00	-27.17	Average
8	1.67	0.14	9.73	14.14	24.01	56.00	-31.99	QP
9	4.75	0.17	9.74	9.49	19.40	46.00	-26.60	Average
10	4.75	0.17	9.74	16.56	26.47	56.00	-29.53	QP
11	8.02	0.17	9.81	15.65	25.63	50.00	-24.37	Average
12	8.02	0.17	9.81	21.61	31.59	60.00	-28.41	QP



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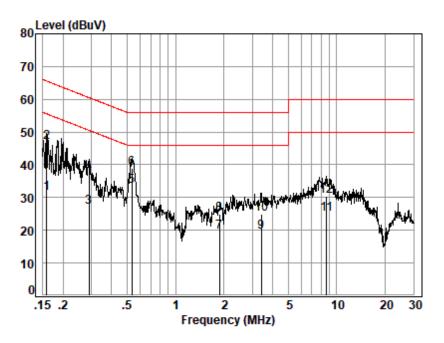
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Mode:d; Line:Neutral Line



Site : Shielding Room

Condition: Neutral Job No. : 12839CR

Test mode: d

		Cable	LISN	Read		Limit	0ver	
	Freq	Loss	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16	0.01	9.63	21.68	31.32	55.56	-24.24	Average
2	0.16	0.01	9.63	37.08	46.72	65.56	-18.84	QP
3	0.29	0.04	9.64	17.38	27.06	50.50	-23.44	Average
4	0.29	0.04	9.64	27.74	37.42	60.50	-23.08	QP
5	0.53	0.06	9.64	23.86	33.56	46.00	-12.44	Average
6	0.53	0.06	9.64	29.15	38.85	56.00	-17.15	QP
7	1.88	0.15	9.69	9.48	19.32	46.00	-26.68	Average
8	1.88	0.15	9.69	15.10	24.94	56.00	-31.06	QP
9	3.40	0.16	9.68	9.53	19.37	46.00	-26.63	Average
10	3.40	0.16	9.68	15.20	25.04	56.00	-30.96	QP
11	8.68	0.17	9.81	14.86	24.84	50.00	-25.16	Average
12	8.68	0.17	9.81	20.37	30.35	60.00	-29.65	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:

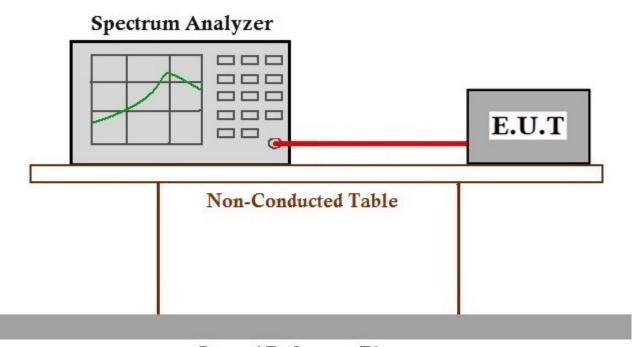
Temperature: Atmospheric Pressure: 1015 mbar 23.9 °C Humidity: 65.7 % RH

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). 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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7.3 Conducted Peak Output Power

47 CFR Part 15, Subpart C 15.247(b)(3) Test Requirement 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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7.3.1 E.U.T. Operation

Operating Environment:

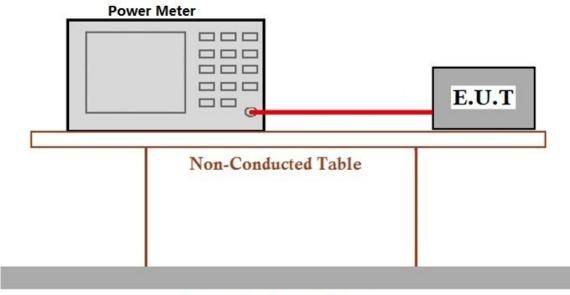
Temperature: 23.9 °C Humidity: 65.6 % RH Atmospheric Pressure: 1015 mbar

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). 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:

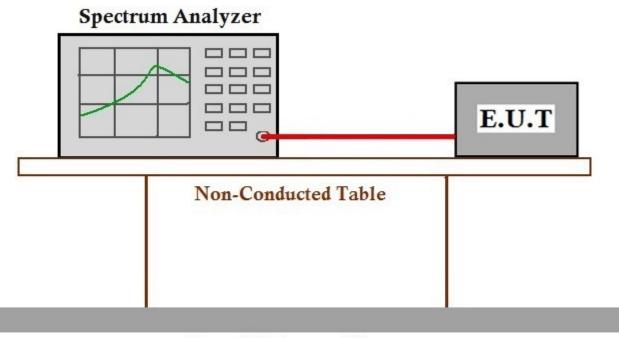
Temperature: 23.9 °C Humidity: 65.7 % RH Atmospheric Pressure: 1015 mbar

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). 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:

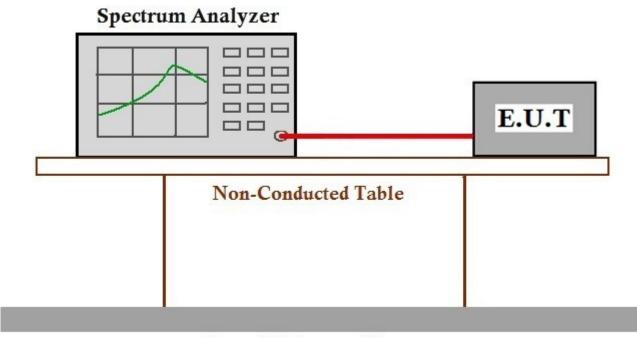
Temperature: 23.9 °C Humidity: 65.8 % RH Atmospheric Pressure: 1015 mbar

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). 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:

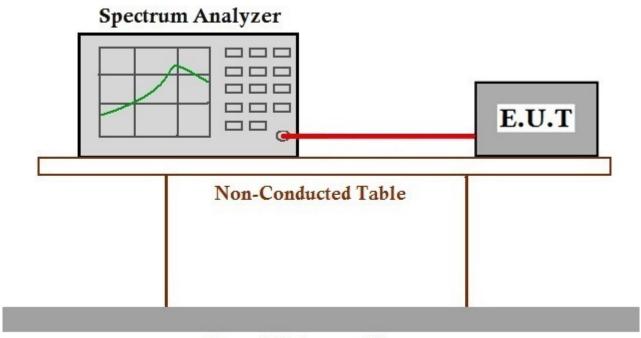
Temperature: 23.9 °C Humidity: 65.8 % RH Atmospheric Pressure: 1015 mbar

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). 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

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

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:

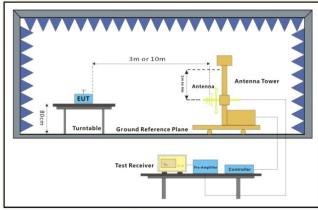
Temperature: Humidity: 50.2 % RH Atmospheric Pressure: 1015 mbar

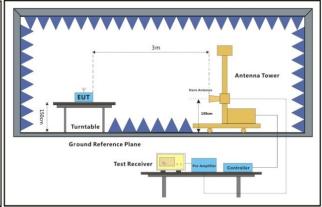
Test mode d:TX mode Keep the EUT in continuously transmitting mode with all modulation

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

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7.7.2 Test Setup Diagram





30MHz-1GHz Above 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.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

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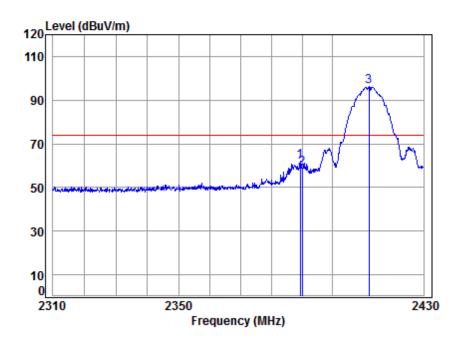
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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2412 Band edge : 2.4G WIFI 11B Note

	Freq						Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
	2389.363								•
	2390.000								•
3	* 2412.000	5.50	28.56	41.18	103.28	96.16	/4.00	22.16	peak



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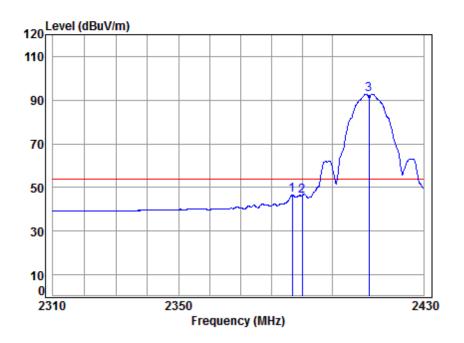
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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2412 Band edge : 2.4G WIFI 11B Note

Freq						Limit Line		Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2386.823								_
2390.000 2412.000								_



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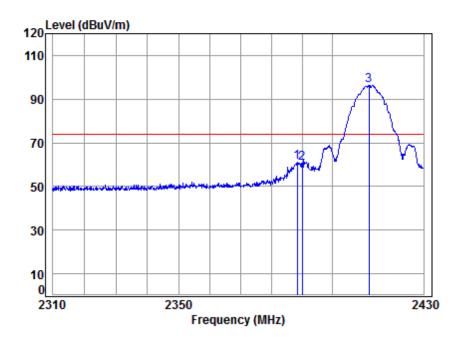
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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR : 2412 Band edge Mode : 2.4G WIFI 11B Note

000		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	2388.395	5.47	28.52	41.17	68.32	61.14	74.00	-12.86	peak	
2	2390.000	5.47	28.52	41.17	67.80	60.62	74.00	-13.38	peak	
3 *	2412.000	5.50	28.56	41.18	103.57	96.45	74.00	22.45	peak	



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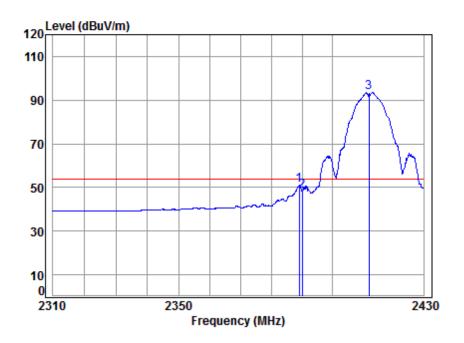
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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR Mode : 2412 Band edge : 2.4G WIFI 11B Note

	Freq						Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.121	5.47	28.52	41.17	58.16	50.98	54.00	-3.02	Average
2	2390.000	5.47	28.52	41.17	55.76	48.58	54.00	-5.42	Average
3 *	2412.000	5.50	28.56	41.18	100.62	93.50	54.00	39.50	Average



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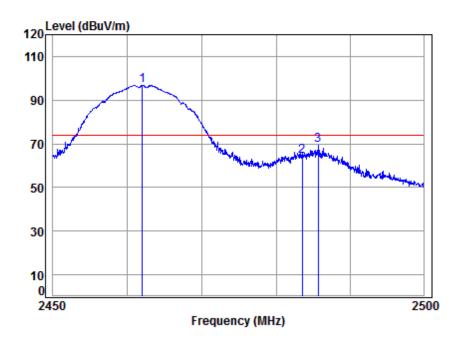
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Report No.: SZEM190401283904

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



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2462 Band edge : 2.4G WIFI 11B Note

	Freq						Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	5.57	28.64	41.20	103.83	96.84	74.00	22.84	peak
2	2483.500	5.60	28.67	41.21	71.37	64.43	74.00	-9.57	peak
3	2485.647	5.60	28.68	41.21	76.35	69.42	74.00	-4.58	peak



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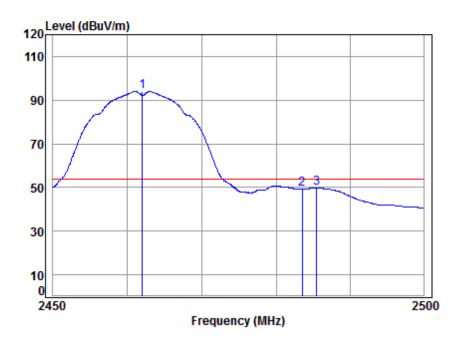
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Report No.: SZEM190401283904

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



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2462 Band edge : 2.4G WIFI 11B Note

	Freq						Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	5.57	28.64	41.20	100.88	93.89	54.00	39.89	Average
2	2483.500	5.60	28.67	41.21	56.16	49.22	54.00	-4.78	Average
3	2485.496	5.60	28.68	41.21	56.69	49.76	54.00	-4.24	Average



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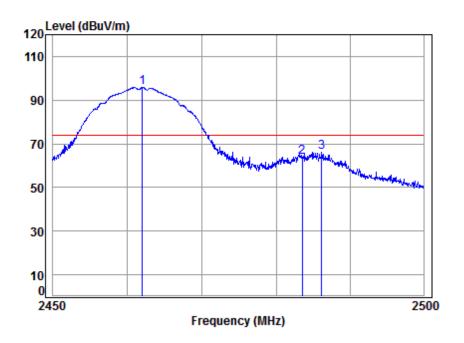
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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR Mode : 2462 Band edge · 2 4G WTFT 11B Note

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 *	2462.000	5.57	28.64	41.20	102.84	95.85	74.00	21.85	peak	
2	2483.500	5.60	28.67	41.21	70.99	64.05	74.00	-9.95	peak	
3	2486.149	5.60	28.68	41.21	72.97	66.04	74.00	-7.96	peak	



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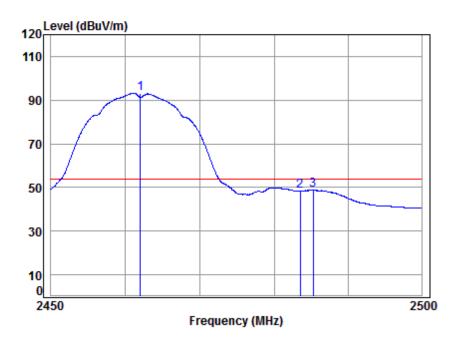
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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR Mode : 2462 Band edge : 2.4G WIFI 11B Note

	Freq						Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
	2462.000								_
2	2483.500	5.60	28.67	41.21	55.28	48.34	54.00	-5.66	Average
3	2485.245	5.60	28.68	41.21	55.75	48.82	54.00	-5.18	Average



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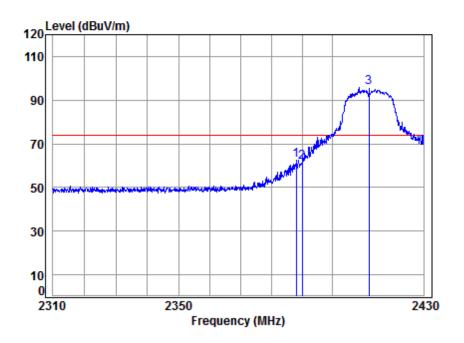
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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2412 Band edge · 2 4G WTFT 11G Note

Le	. 2.	+Q MIL	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		
	2388.154	5.47	28.52	41.17	69.84	62.66	74.00	-11.34	peak	
2	2390.000	5.47	28.52	41.17	68.87	61.69	74.00	-12.31	peak	
*	2412.000	5.50	28.56	41.18	102.99	95.87	74.00	21.87	peak	



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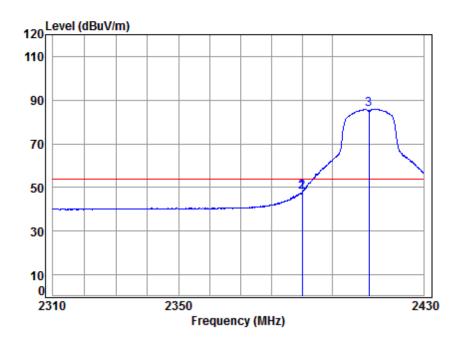
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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR : 2412 Band edge Mode : 2.4G WIFI 11G Note

OCC	. 2.40 WITT 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	2389.968	5.47	28.52	41.17	54.91	47.73	54.00	-6.27	Average	
2	2390.000	5.47	28.52	41.17	54.91	47.73	54.00	-6.27	Average	
3 *	2412.000	5.50	28.56	41.18	92.94	85.82	54.00	31.82	Average	



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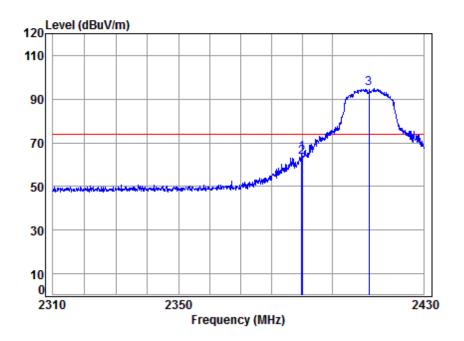
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Report No.: SZEM190401283904

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



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR Mode : 2412 Band edge · 2 4G WIFT 11G Note

, ce	. 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	2389.847	5.47	28.52	41.17	72.50	65.32	74.00	-8.68	peak	
2	2390.000	5.47	28.52	41.17	70.44	63.26	74.00	-10.74	peak	
3 *	2412.000	5.50	28.56	41.18	101.90	94.78	74.00	20.78	peak	



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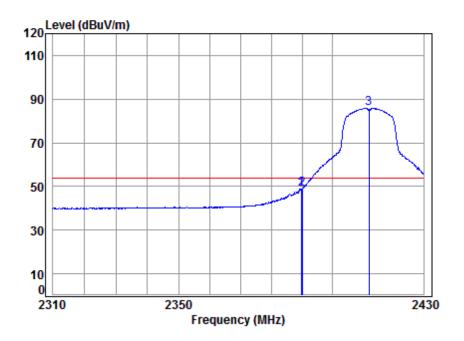
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Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR Mode : 2412 Band edge : 2.4G WIFI 11G Note

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
	2389.726								_
2	2390.000	5.47	28.52	41.17	55.90	48.72	54.00	-5.28	Average
3 *	2412.000	5.50	28.56	41.18	92.89	85.77	54.00	31.77	Average



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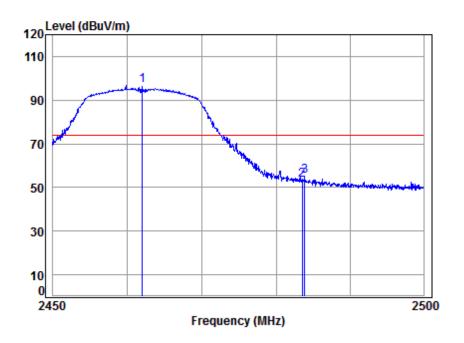
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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2462 Band edge : 2.4G WIFI 11G Note

OCC	. 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 *	2462.000	5.57	28.64	41.20	103.58	96.59	74.00	22.59	peak	
2	2483.500	5.60	28.67	41.21	60.31	53.37	74.00	-20.63	peak	
3	2483.840	5.60	28.67	41.21	62.06	55.12	74.00	-18.88	peak	



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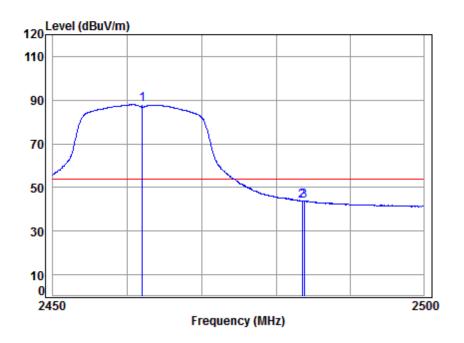
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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2462 Band edge : 2.4G WIFI 11G Note

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	5.57	28.64	41.20	94.88	87.89	54.00	33.89	Average
2	2483.500	5.60	28.67	41.21	50.86	43.92	54.00	-10.08	Average
3	2483.790	5.60	28.67	41.21	50.72	43.78	54.00	-10.22	Average



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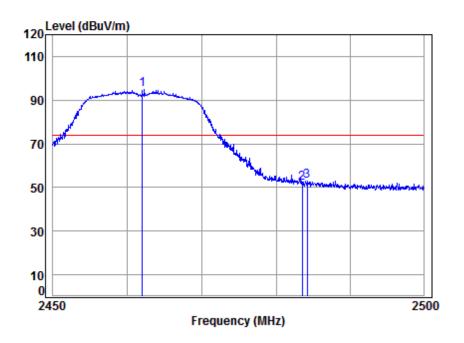
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Report No.: SZEM190401283904

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



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR Mode : 2462 Band edge : 2.4G WIFI 11G Note

OCC	. 2	TO MIL	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 *	2462.000	5.57	28.64	41.20	101.78	94.79	74.00	20.79	peak	
2	2483.500	5.60	28.67	41.21	58.79	51.85	74.00	-22.15	peak	
3	2484.191	5.60	28.67	41.21	59.96	53.02	74.00	-20.98	peak	



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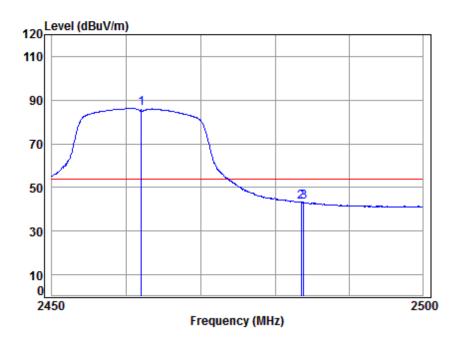
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Report No.: SZEM190401283904

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



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR : 2462 Band edge Mode : 2.4G WIFI 11G Note

OCC	. 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 *	2462.000	5.57	28.64	41.20	93.21	86.22	54.00	32.22	Average	
2	2483.500	5.60	28.67	41.21	50.08	43.14	54.00	-10.86	Average	
3	2483.840	5.60	28.67	41.21	50.08	43.14	54.00	-10.86	Average	



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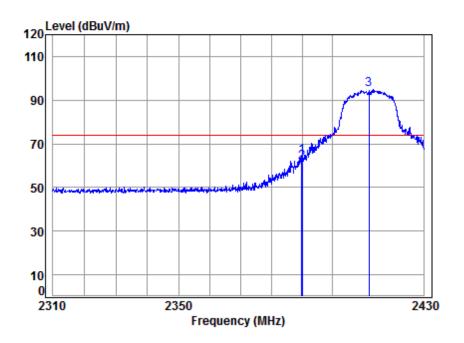
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Report No.: SZEM190401283904

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



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2412 Band edge : 2.4G WIFI 11N 20 Note

	Freq						Limit Line		Remark
-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.847	5.47	28.52	41.17	71.59	64.41	74.00	-9.59	peak
2	2390.000	5.47	28.52	41.17	68.83	61.65	74.00	-12.35	peak
3 *	2412.000	5.50	28.56	41.18	101.97	94.85	74.00	20.85	peak



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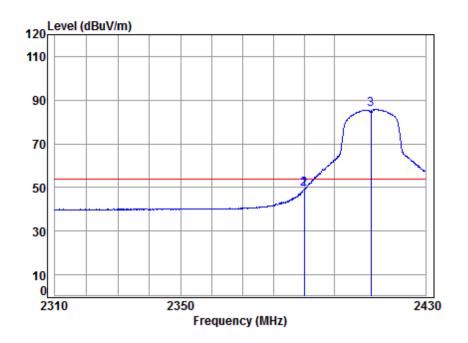
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Report No.: SZEM190401283904

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



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2412 Band edge · 2 4G WTFT 11N 20 Note

oce	. 2	+O MII	T TTIV 2	20						
		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	2389.968	5.47	28.52	41.17	56.25	49.07	54.00	-4.93	Average	
2	2390.000	5.47	28.52	41.17	56.25	49.07	54.00	-4.93	Average	
3 *	2412.000	5.50	28.56	41.18	92.79	85.67	54.00	31.67	Average	



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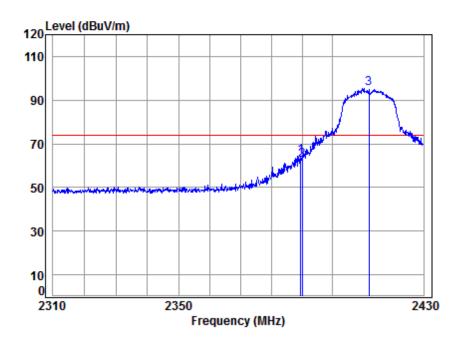
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Report No.: SZEM190401283904

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



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR Mode : 2412 Band edge · 2 4G WTFT 11N 20 Note

rce	. 2.4	+Q MIL	T TIM Y	20						
		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	2389.605	5.47	28.52	41.17	71.63	64.45	74.00	-9.55	peak	
2	2390.000	5.47	28.52	41.17	69.64	62.46	74.00	-11.54	peak	
3 *	2412.000	5.50	28.56	41.18	102.45	95.33	74.00	21.33	peak	



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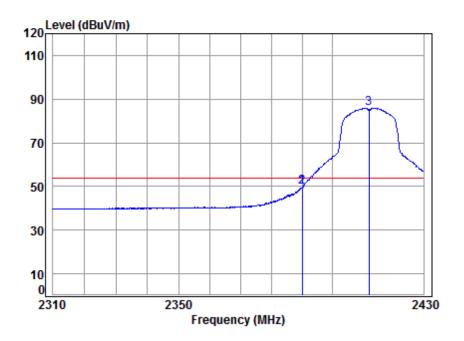
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Report No.: SZEM190401283904

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



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR Mode : 2412 Band edge : 2.4G WIFI 11N 20 Note

	Freq						Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2	2389.968 2390.000 2412.000	5.47	28.52	41.17	56.86	49.68	54.00	-4.32	Average



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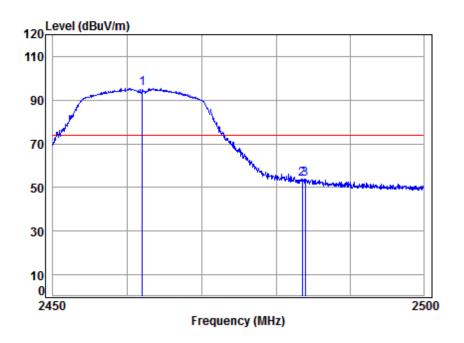
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Report No.: SZEM190401283904

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



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2462 Band edge : 2.4G WIFI 11N 20 Note

	Freq				Read Level				Remark
_	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2	2462.000 2483.500 2483.940	5.60	28.67	41.21	60.91	53.97	74.00	-20.03	peak



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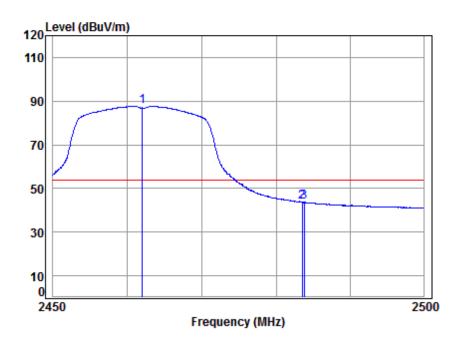
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR Mode : 2462 Band edge · 2 4G WTFT 11N 20 Note

ote	. 2.	+Q MIL	T TIM Y	20						
		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 *	2462.000	5.57	28.64	41.20	94.71	87.72	54.00	33.72	Average	
2	2483.500	5.60	28.67	41.21	50.54	43.60	54.00	-10.40	Average	
3	2483.790	5.60	28.67	41.21	50.58	43.64	54.00	-10.36	Average	



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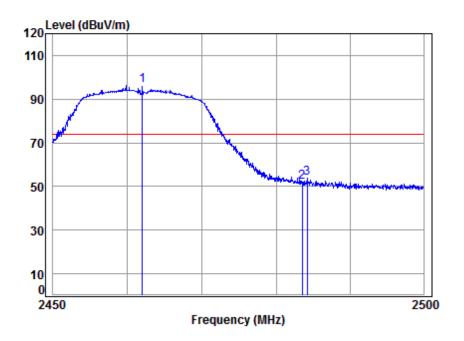
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR Mode : 2462 Band edge · 2 4G WTFT 11N 20 Note

oce	. 2	+O MII	T TIM A	20						
		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 *	2462.000	5.57	28.64	41.20	103.18	96.19	74.00	22.19	peak	
2	2483.500	5.60	28.67	41.21	59.15	52.21	74.00	-21.79	peak	
3	2484.191	5.60	28.67	41.21	61.00	54.06	74.00	-19.94	peak	



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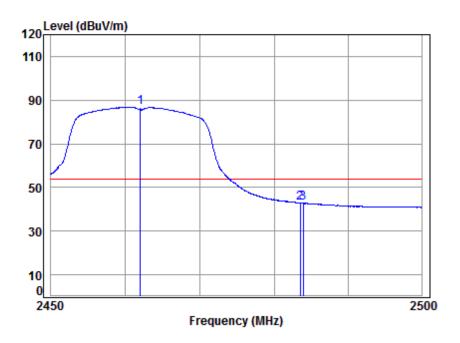
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Report No.: SZEM190401283904

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



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR Mode : 2462 Band edge : 2.4G WIFI 11N 20 Note

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	5.57	28.64	41.20	93.82	86.83	54.00	32.83	Average
2	2483.500	5.60	28.67	41.21	49.88	42.94	54.00	-11.06	Average
3	2483.940	5.60	28.67	41.21	49.79	42.85	54.00	-11.15	Average



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Report No.: SZEM190401283904

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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:

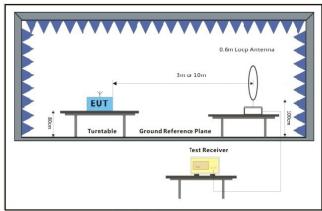
Temperature: 20.9 °C Humidity: 54.7 % RH Atmospheric Pressure: 1015 mbar

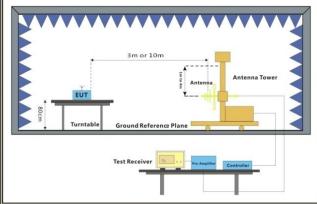
Test mode d:TX mode Keep the EUT in continuously transmitting mode with all modulation

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

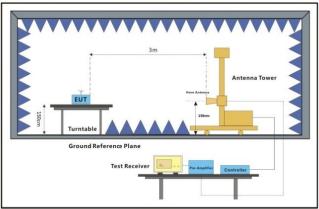
7.8.2 Test Setup Diagram





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.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

- 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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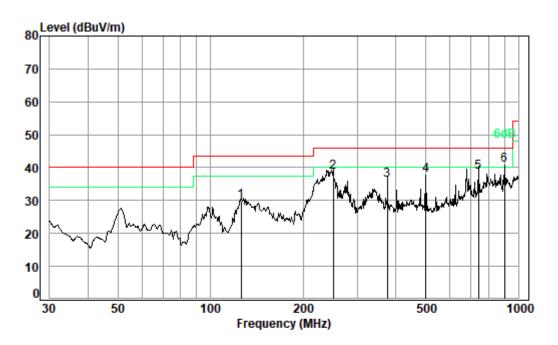
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Mode:d; Polarization:Horizontal



Condition: 3m HORIZONTAL

Job No. : 12839CR

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	125.89	1.27	13.29	27.20	42.47	29.83	43.50	-13.67
2	250.30	1.68	18.96	26.76	44.75	38.63	46.00	-7.37
3	375.94	2.13	21.80	27.07	39.32	36.18	46.00	-9.82
4	501.18	2.60	24.63	27.61	38.19	37.81	46.00	-8.19
5	742.26	3.03	28.16	27.72	35.06	38.53	46.00	-7.47
6 pp	900.15	3.60	29.80	27.05	34.46	40.81	46.00	-5.19



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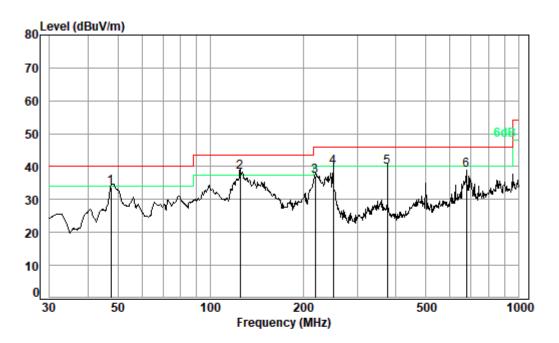
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Mode:d; Polarization:Vertical



Condition: 3m VERTICAL Job No. : 12839CR

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	47.49	0.75	14.96	27.41	45.52	33.82	40.00	-6.18
2 pp	125.01	1.26	13.26	27.21	51.13	38.44	43.50	-5.06
3	219.08	1.51	17.17	26.84	45.34	37.18	46.00	-8.82
4	250.30	1.68	18.96	26.76	46.05	39.93	46.00	-6.07
5	375.94	2.13	21.80	27.07	42.84	39.70	46.00	-6.30
6	677.58	2.86	27.63	27.82	36.26	38.93	46.00	-7.07



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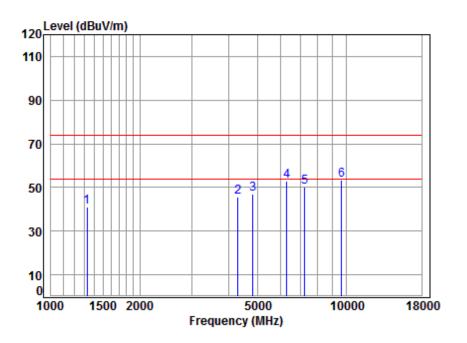
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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR

Mode : 2412 TX SE 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	1323.614	4.88	25.12	40.58	51.52	40.94	74.00	-33.06	peak
2	4304.400	7.34	33.26	43.10	48.26	45.76	74.00	-28.24	peak
3	4824.000	7.91	34.00	43.63	48.77	47.05	74.00	-26.95	peak
4	6303.890	11.17	35.41	42.57	49.07	53.08	74.00	-20.92	peak
5	7236.000	10.07	36.09	41.83	46.02	50.35	74.00	-23.65	peak
6	9648.000	10.77	37.69	38.36	43.39	53.49	74.00	-20.51	peak



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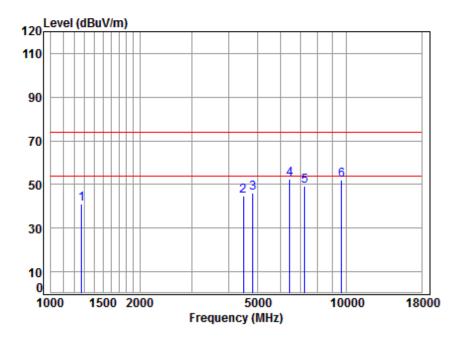
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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR

Mode : 2412 TX SE 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	1271.123	4.69	24.90	40.54	51.84	40.89	74.00	-33.11	peak
2	4482.150	7.54	33.57	43.29	46.84	44.66	74.00	-29.34	peak
3	4824.000	7.91	34.00	43.63	47.65	45.93	74.00	-28.07	peak
4	6451.353	11.45	35.55	42.44	47.95	52.51	74.00	-21.49	peak
5	7236.000	10.07	36.09	41.83	44.96	49.29	74.00	-24.71	peak
6	9648.000	10.77	37.69	38.36	41.78	51.88	74.00	-22.12	peak



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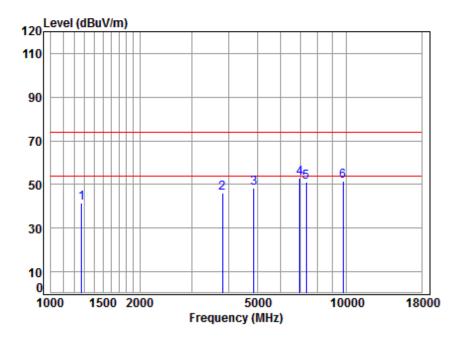
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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR

Mode : 2437 TX SE 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	1271.123	4.69	24.90	40.54	52.55	41.60	74.00	-32.40	peak
2	3812.336	6.79	32.34	42.53	49.26	45.86	74.00	-28.14	peak
3	4874.000	7.96	34.05	43.68	49.81	48.14	74.00	-25.86	peak
4	6954.852	10.25	35.87	42.04	48.86	52.94	74.00	-21.06	peak
5	7311.000	10.05	36.15	41.78	46.73	51.15	74.00	-22.85	peak
6	9748.000	10.82	37.75	38.20	41.36	51.73	74.00	-22.27	peak



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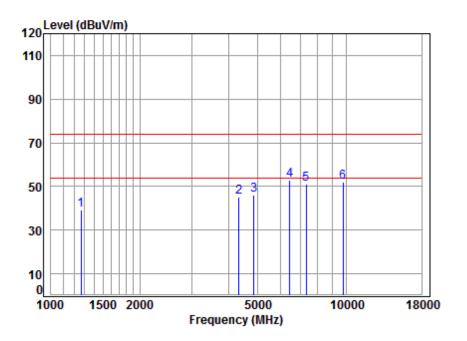
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Mode:d; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:middle



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR

Mode : 2437 TX SE 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	1267.454	4.68	24.89	40.54	50.13	39.16	74.00	-34.84	peak
2	4341.886	7.38	33.33	43.14	47.51	45.08	74.00	-28.92	peak
3	4874.000	7.96	34.05	43.68	47.95	46.28	74.00	-27.72	peak
4	6432.732	11.41	35.54	42.46	48.29	52.78	74.00	-21.22	peak
5	7311.000	10.05	36.15	41.78	46.63	51.05	74.00	-22.95	peak
6	9748.000	10.82	37.75	38.20	41.52	51.89	74.00	-22.11	peak



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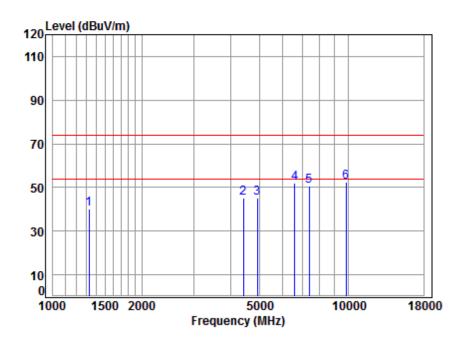
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Mode:d; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR

Mode : 2462 TX SE 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	1323.614	4.88	25.12	40.58	50.89	40.31	74.00	-33.69	peak
2	4417.841	7.47	33.46	43.22	47.50	45.21	74.00	-28.79	peak
3	4924.000	8.01	34.11	43.73	46.98	45.37	74.00	-28.63	peak
4	6583.209	11.30	35.65	42.34	47.18	51.79	74.00	-22.21	peak
5	7386.000	10.03	36.21	41.72	46.17	50.69	74.00	-23.31	peak
6	9848.000	10.87	37.81	38.04	41.71	52.35	74.00	-21.65	peak



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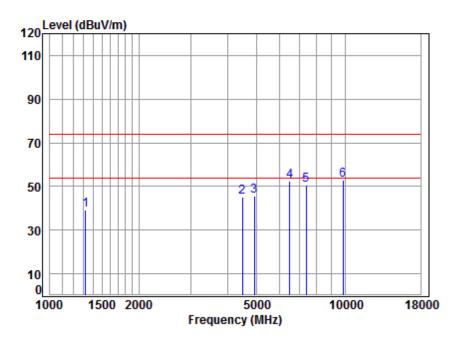
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Report No.: SZEM190401283904

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



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR

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

	Freq		Ant Factor	Preamp Factor		Level			Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1319.794	4.87	25.11	40.58	49.68	39.08	74.00	-34.92	peak
2	4495.125	7.55	33.59	43.30	47.16	45.00	74.00	-29.00	peak
3	4924.000	8.01	34.11	43.73	47.26	45.65	74.00	-28.35	peak
4	6488.754	11.52	35.59	42.41	47.68	52.38	74.00	-21.62	peak
5	7386.000	10.03	36.21	41.72	46.00	50.52	74.00	-23.48	peak
6	9848.000	10.87	37.81	38.04	42.24	52.88	74.00	-21.12	peak



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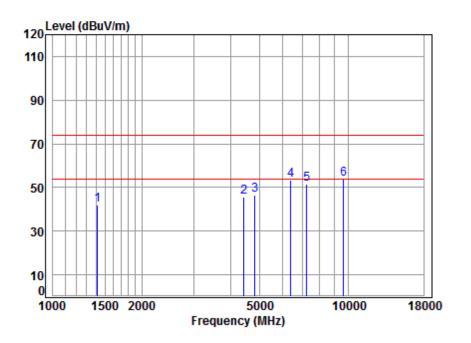
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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR

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

		Cabla	An+	Preamp	Pood		Limit	Over	
		Capie	AITC	rreamp	Read		LIMIT	over.	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1418.692	5.21	25.50	40.65	51.96	42.02	74.00	-31.98	peak
2	4443.453	7.50	33.50	43.25	48.09	45.84	74.00	-28.16	peak
3	4824.000	7.91	34.00	43.63	48.26	46.54	74.00	-27.46	peak
4	6395.654	11.34	35.50	42.49	48.94	53.29	74.00	-20.71	peak
5	7236.000	10.07	36.09	41.83	47.18	51.51	74.00	-22.49	peak
6	9648.000	10.77	37.69	38.36	43.73	53.83	74.00	-20.17	peak



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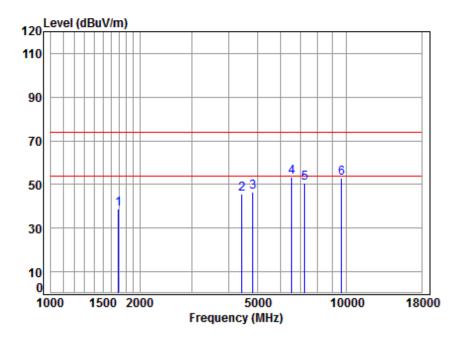
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Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR

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

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1692.231	5.24	26.64	40.83	47.62	38.67	74.00	-35.33	peak
2	4430.628	7.48	33.48	43.23	48.06	45.79	74.00	-28.21	peak
3	4824.000	7.91	34.00	43.63	48.33	46.61	74.00	-27.39	peak
4	6545.263	11.41	35.63	42.37	48.64	53.31	74.00	-20.69	peak
5	7236.000	10.07	36.09	41.83	46.50	50.83	74.00	-23.17	peak
6	9648.000	10.77	37.69	38.36	42.81	52.91	74.00	-21.09	peak



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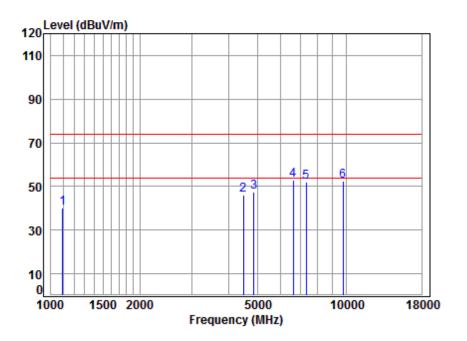
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Mode:d; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR

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

	Freq			Preamp Factor			Limit Line		Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1096.904	3.99	24.10	40.39	52.59	40.29	74.00	-33.71	peak
2	4495.125	7.55	33.59	43.30	48.15	45.99	74.00	-28.01	peak
3	4874.000	7.96	34.05	43.68	49.07	47.40	74.00	-26.60	peak
4	6621.375	11.19	35.67	42.31	48.22	52.77	74.00	-21.23	peak
5	7311.000	10.05	36.15	41.78	47.71	52.13	74.00	-21.87	peak
6	9748.000	10.82	37.75	38.20	42.12	52.49	74.00	-21.51	peak



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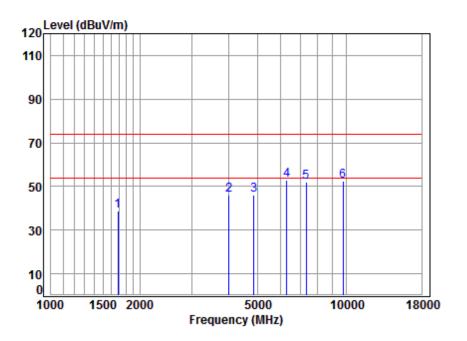
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Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:middle



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR

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

, ce	. 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	1687.347	5.24	26.62	40.82	47.65	38.69	74.00	-35.31	peak	
2	4004.339	6.99	32.71	42.76	49.20	46.14	74.00	-27.86	peak	
3	4874.000	7.96	34.05	43.68	47.93	46.26	74.00	-27.74	peak	
4	6285.695	11.13	35.39	42.58	49.15	53.09	74.00	-20.91	peak	
5	7311.000	10.05	36.15	41.78	47.52	51.94	74.00	-22.06	peak	
6	9748.000	10.82	37.75	38.20	42.00	52.37	74.00	-21.63	peak	



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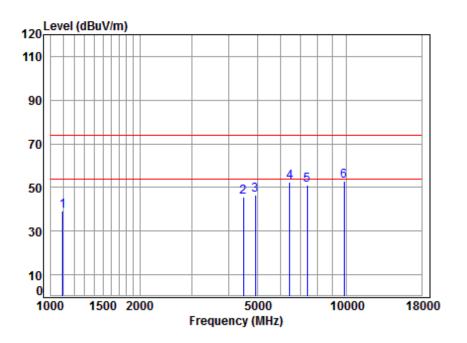
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Report No.: SZEM190401283904

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



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR

Mode : 2462 TX SE 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	1096.904	3.99	24.10	40.39	51.65	39.35	74.00	-34.65	peak
2	4482.150	7.54	33.57	43.29	47.89	45.71	74.00	-28.29	peak
3	4924.000	8.01	34.11	43.73	48.09	46.48	74.00	-27.52	peak
4	6451.353	11.45	35.55	42.44	47.82	52.38	74.00	-21.62	peak
5	7386.000	10.03	36.21	41.72	46.51	51.03	74.00	-22.97	peak
6	9848.000	10.87	37.81	38.04	42.35	52.99	74.00	-21.01	peak



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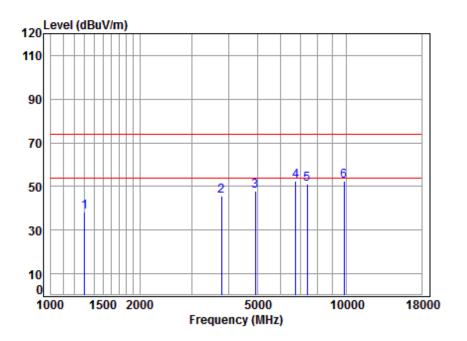
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Mode:d; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR

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

	Freq		Ant Factor	Preamp Factor		Level			Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1300.858	4.80	25.03	40.56	49.28	38.55	74.00	-35.45	peak
2	3779.422	6.76	32.28	42.49	49.29	45.84	74.00	-28.16	peak
3	4924.000	8.01	34.11	43.73	49.65	48.04	74.00	-25.96	peak
4	6737.207	10.86	35.75	42.21	48.24	52.64	74.00	-21.36	peak
5	7386.000	10.03	36.21	41.72	46.65	51.17	74.00	-22.83	peak
6	9848.000	10.87	37.81	38.04	41.89	52.53	74.00	-21.47	peak



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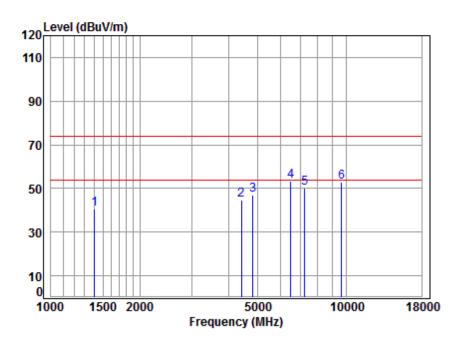
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR

Mode : 2412 TX SE

Note : 2.4G WIFI 11N 20

	Freq			Preamp Factor		Level			Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1406.443	5.17	25.45	40.64	50.73	40.71	74.00	-33.29	peak
2	4417.841	7.47	33.46	43.22	46.99	44.70	74.00	-29.30	peak
3	4824.000	7.91	34.00	43.63	48.49	46.77	74.00	-27.23	peak
4	6488.754	11.52	35.59	42.41	48.63	53.33	74.00	-20.67	peak
5	7236.000	10.07	36.09	41.83	45.86	50.19	74.00	-23.81	peak
6	9648.000	10.77	37.69	38.36	42.69	52.79	74.00	-21.21	peak



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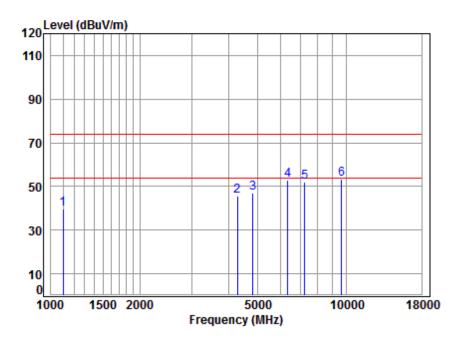
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:Low



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR

Mode : 2412 TX SE

Note : 2.4G WIFI 11N 20

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1100.079	4.00	24.12	40.40	51.86	39.58	74.00	-34.42	peak
2	4291.977	7.33	33.24	43.08	48.26	45.75	74.00	-28.25	peak
3	4824.000	7.91	34.00	43.63	48.56	46.84	74.00	-27.16	peak
4	6340.436	11.24	35.44	42.54	48.82	52.96	74.00	-21.04	peak
5	7236.000	10.07	36.09	41.83	47.47	51.80	74.00	-22.20	peak
	9648.000	10.77	37.69	38.36	43.25	53.35	74.00	-20.65	peak



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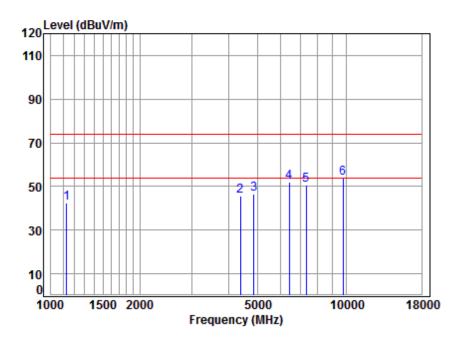
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR, 12840CR

Mode : 2437 TX SE

Note : 2.4G WIFI 11N 20

	Freq			Preamp Factor		Level			Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1129.072	4.13	24.26	40.42	54.53	42.50	74.00	-31.50	peak
2	4379.699	7.43	33.39	43.18	47.87	45.51	74.00	-28.49	peak
3	4874.000	7.96	34.05	43.68	48.30	46.63	74.00	-27.37	peak
4	6414.167	11.38	35.52	42.48	47.80	52.22	74.00	-21.78	peak
5	7311.000	10.05	36.15	41.78	46.35	50.77	74.00	-23.23	peak
6	9748.000	10.82	37.75	38.20	43.32	53.69	74.00	-20.31	peak



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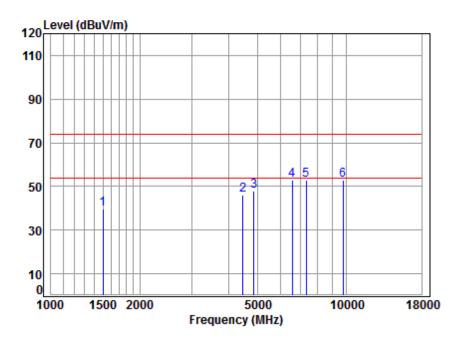
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:middle



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR

Mode : 2437 TX SE

Note : 2.4G WIFI 11N 20

		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	1498.781	5.48	25.80	40.71	49.12	39.69	74.00	-34.31	peak
2	4469.214	7.53	33.55	43.27	48.40	46.21	74.00	-27.79	peak
3	4874.000	7.96	34.05	43.68	49.40	47.73	74.00	-26.27	peak
4	6564.209	11.35	35.64	42.35	48.46	53.10	74.00	-20.90	peak
5	7311.000	10.05	36.15	41.78	48.29	52.71	74.00	-21.29	peak
6	9748.000	10.82	37.75	38.20	42.63	53.00	74.00	-21.00	peak



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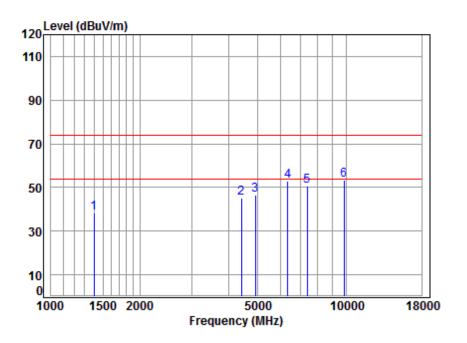
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Mode:d; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m HORIZONTAL Job No : 12839CR,12840CR

Mode : 2462 TX SE

Note : 2.4G WIFI 11N 20

		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	1402.384	5.16	25.43	40.64	48.25	38.20	74.00	-35.80	peak
2	4417.841	7.47	33.46	43.22	47.62	45.33	74.00	-28.67	peak
3	4924.000	8.01	34.11	43.73	48.13	46.52	74.00	-27.48	peak
4	6340.436	11.24	35.44	42.54	48.73	52.87	74.00	-21.13	peak
5	7386.000	10.03	36.21	41.72	45.92	50.44	74.00	-23.56	peak
6	9848.000	10.87	37.81	38.04	42.67	53.31	74.00	-20.69	peak



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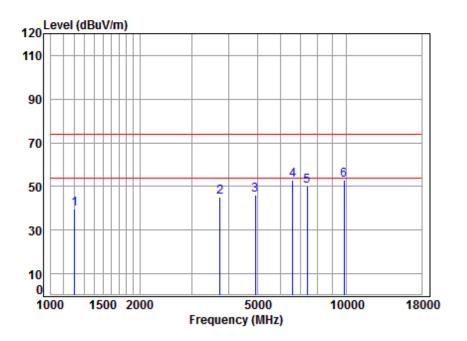
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Mode:d; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber Condition: 3m VERTICAL

Job No : 12839CR, 12840CR

Mode : 2462 TX SE

Note : 2.4G WIFI 11N 20

		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	1203.199	4.43	24.60	40.49	51.27	39.81	74.00	-34.19	peak
2	3746.792	6.73	32.21	42.44	48.69	45.19	74.00	-28.81	peak
3	4924.000	8.01	34.11	43.73	47.70	46.09	74.00	-27.91	peak
4	6583.209	11.30	35.65	42.34	48.44	53.05	74.00	-20.95	peak
5	7386.000	10.03	36.21	41.72	45.67	50.19	74.00	-23.81	peak
6	9848.000	10.87	37.81	38.04	42.29	52.93	74.00	-21.07	peak



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Photographs 8

8.1 Test Setup

Please refer to setup photo.

8.2 EUT Constructional Details (EUT Photos)

Please refer to external and internal photos for details.



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9 **Appendix**

9.1 Appendix 15.247

1.6dB Bandwidth

Test Mode	Test	Ant	EBW[MHz]	Limit[MHz]	Verdict
11B	2412	Ant1	9.120	>=0.5	PASS
11B	2437	Ant1	9.060	>=0.5	PASS
11B	2462	Ant1	9.090	>=0.5	PASS
11G	2412	Ant1	15.150	>=0.5	PASS
11G	2437	Ant1	15.180	>=0.5	PASS
11G	2462	Ant1	15.150	>=0.5	PASS
11N20SISO	2412	Ant1	15.180	>=0.5	PASS
11N20SISO	2437	Ant1	15.180	>=0.5	PASS
11N20SISO	2462	Ant1	15.180	>=0.5	PASS



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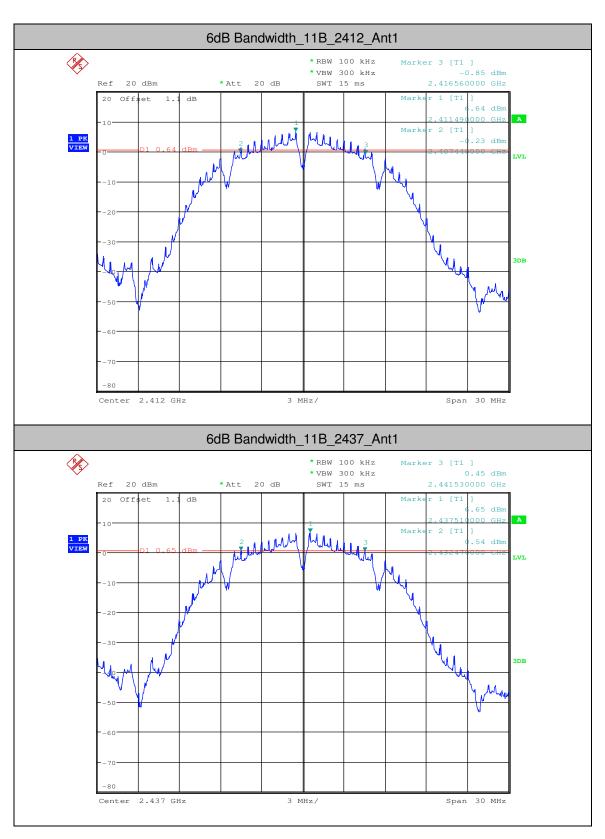
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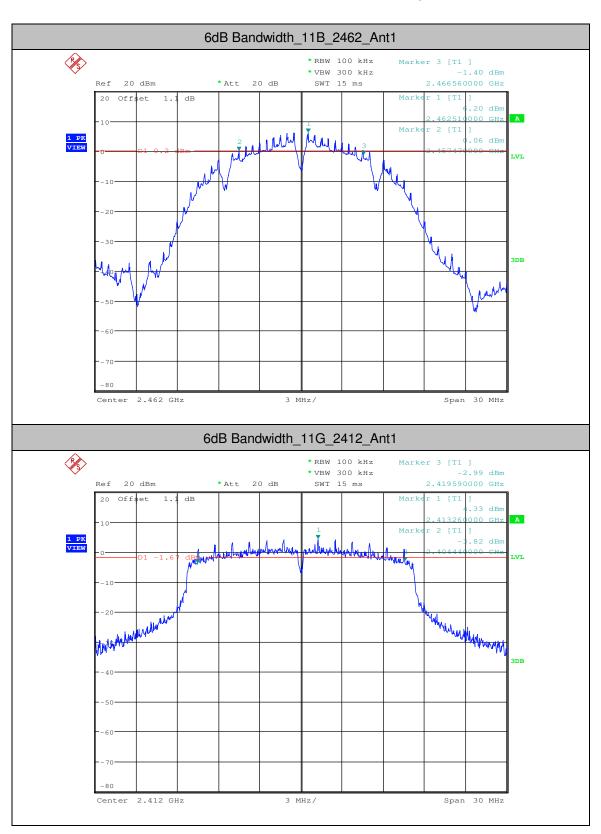
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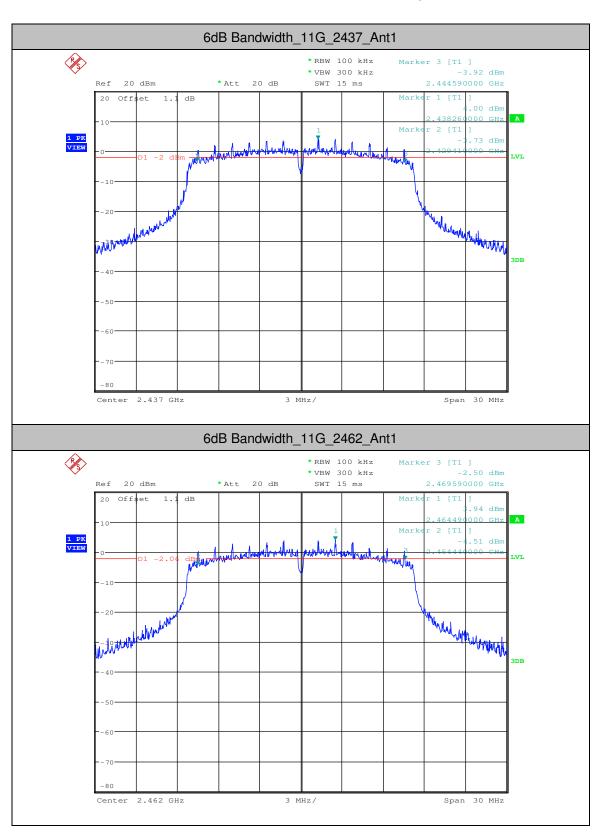
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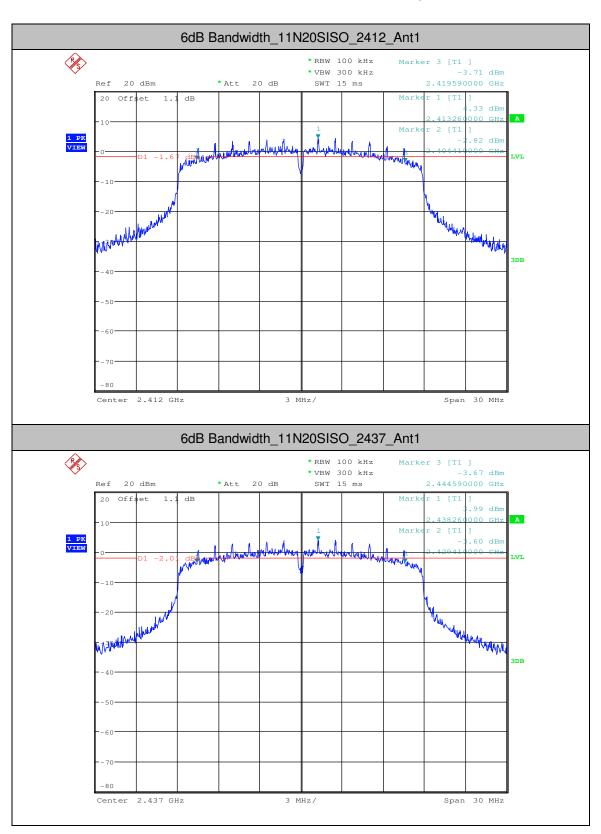
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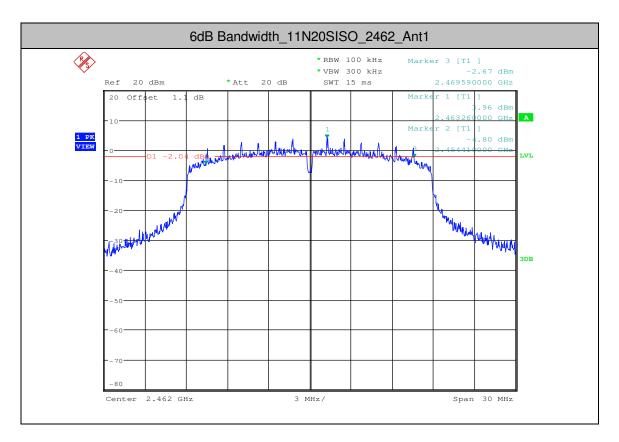
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2.Maximum peak conducted output power

Test Mode	Test Channel	Ant	Power[dBm]	Limit[dBm]	Verdict
11B	2412	Ant1	18.81	<30	PASS
11B	2437	Ant1	18.71	<30	PASS
11B	2462	Ant1	18.47	<30	PASS
11G	2412	Ant1	23.89	<30	PASS
11G	2437	Ant1	23.53	<30	PASS
11G	2462	Ant1	23.45	<30	PASS
11N20SISO	2412	Ant1	23.79	<30	PASS
11N20SISO	2437	Ant1	23.43	<30	PASS
11N20SISO	2462	Ant1	23.25	<30	PASS



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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	-6.68	<8.00	PASS
11B	2437	Ant1	-8.14	<8.00	PASS
11B	2462	Ant1	-7.78	<8.00	PASS
11G	2412	Ant1	-9.7	<8.00	PASS
11G	2437	Ant1	-9.74	<8.00	PASS
11G	2462	Ant1	-10.27	<8.00	PASS
11N20SISO	2412	Ant1	-10.62	<8.00	PASS
11N20SISO	2437	Ant1	-10.06	<8.00	PASS
11N20SISO	2462	Ant1	-10.57	<8.00	PASS



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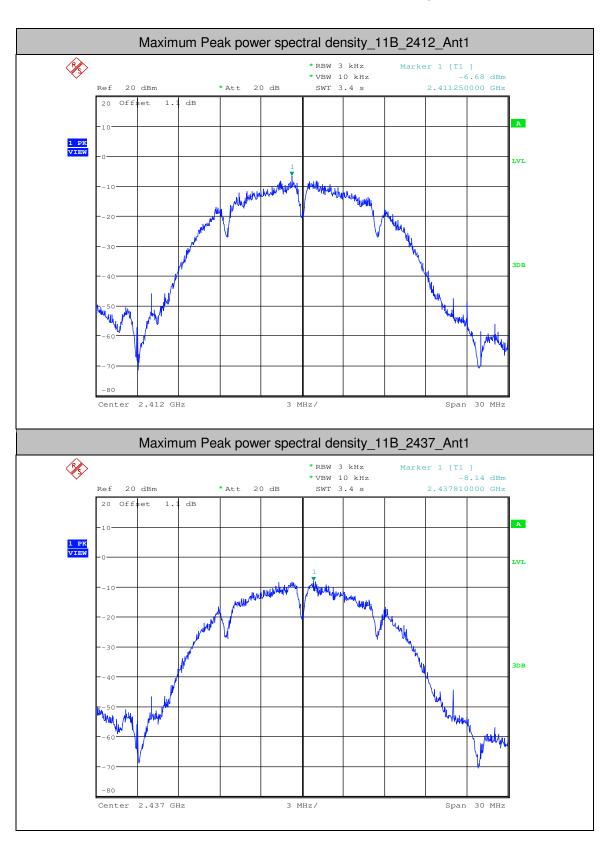
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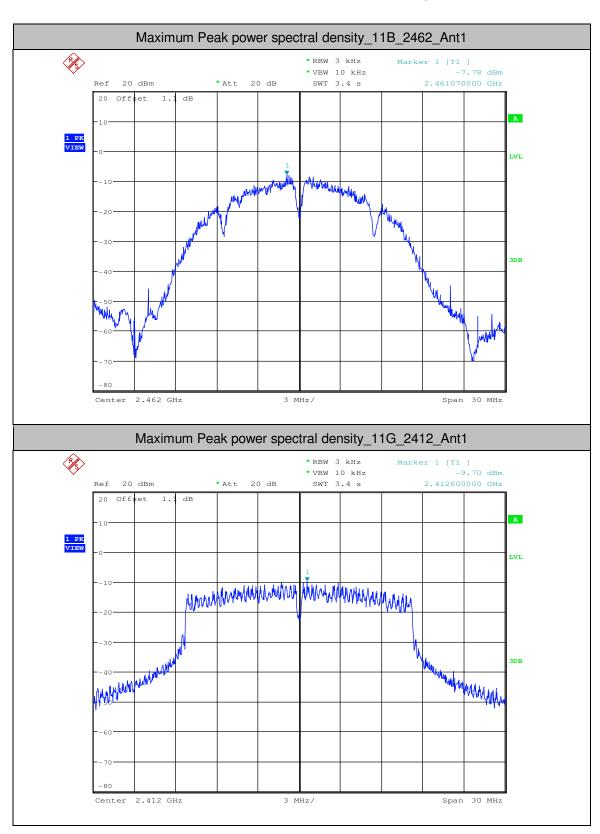
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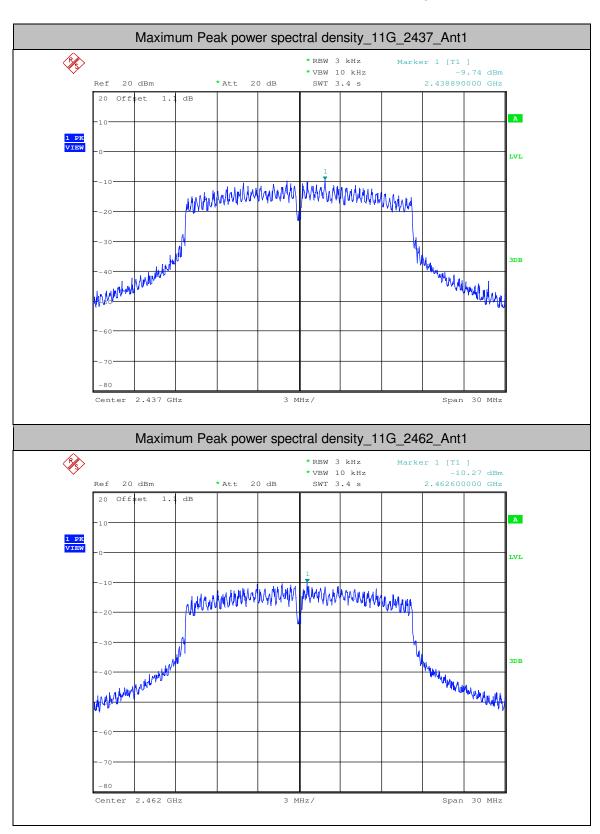
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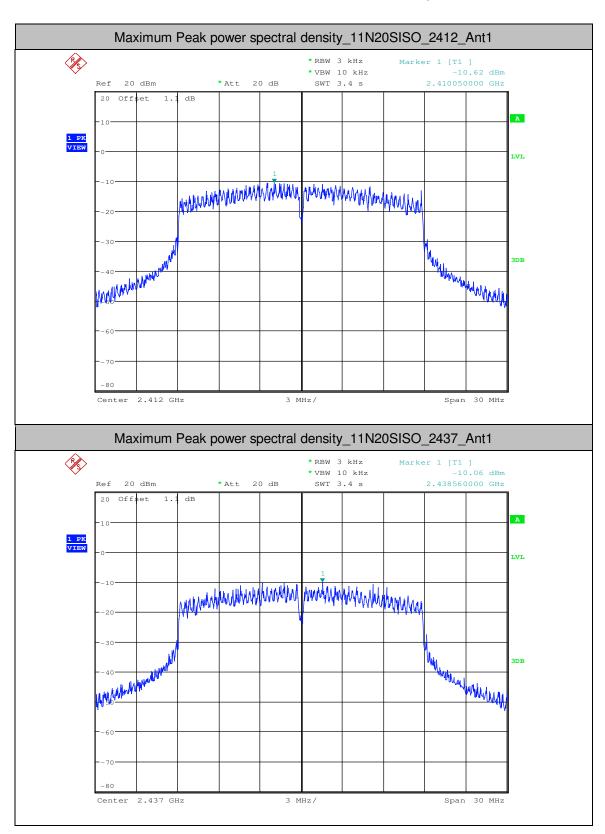
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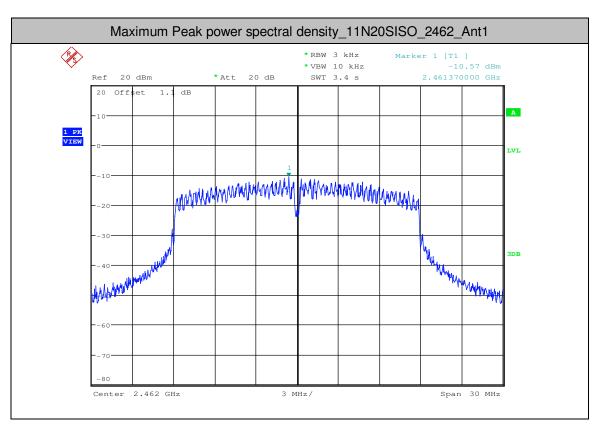
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4.Band-edge for RF Conducted Emissions

Test Mode	Test Channel	Ant	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
11B	2412	Ant1	6.650	-44.735	<-13.35	PASS
11B	2462	Ant1	5.600	-45.171	<-14.4	PASS
11G	2412	Ant1	3.930	-39.706	<-16.07	PASS
11G	2462	Ant1	3.620	-39.465	<-16.38	PASS
11N20SISO	2412	Ant1	4.500	-40.005	<-15.5	PASS
11N20SISO	2462	Ant1	3.530	-38.137	<-16.47	PASS



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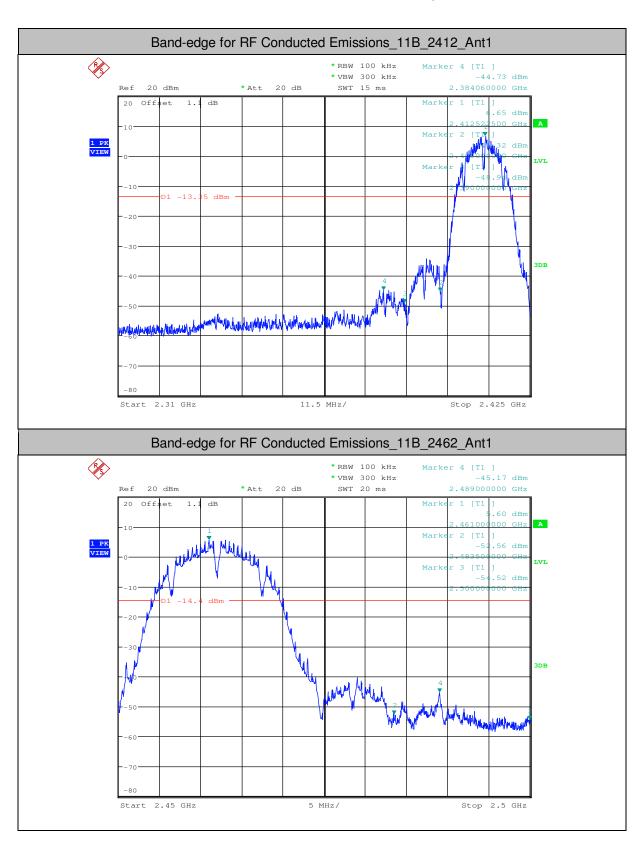
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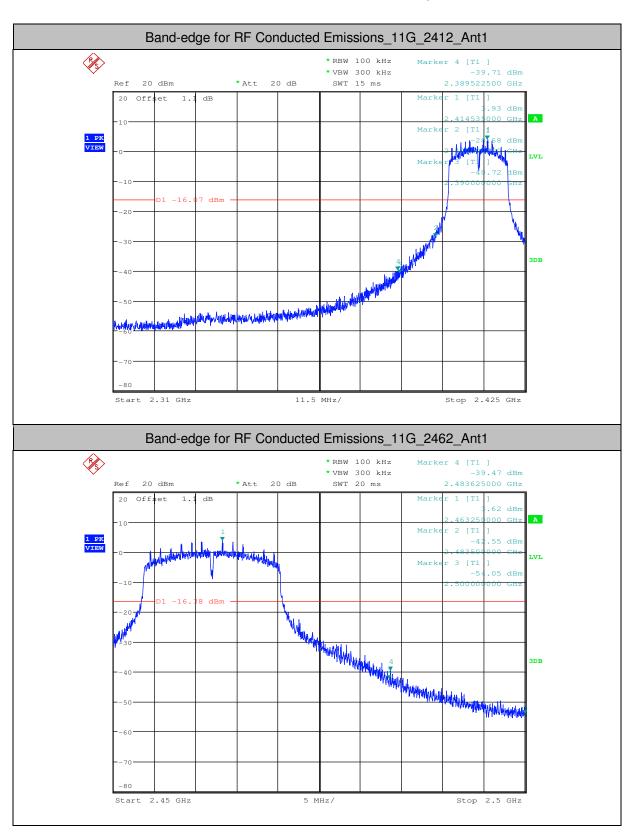
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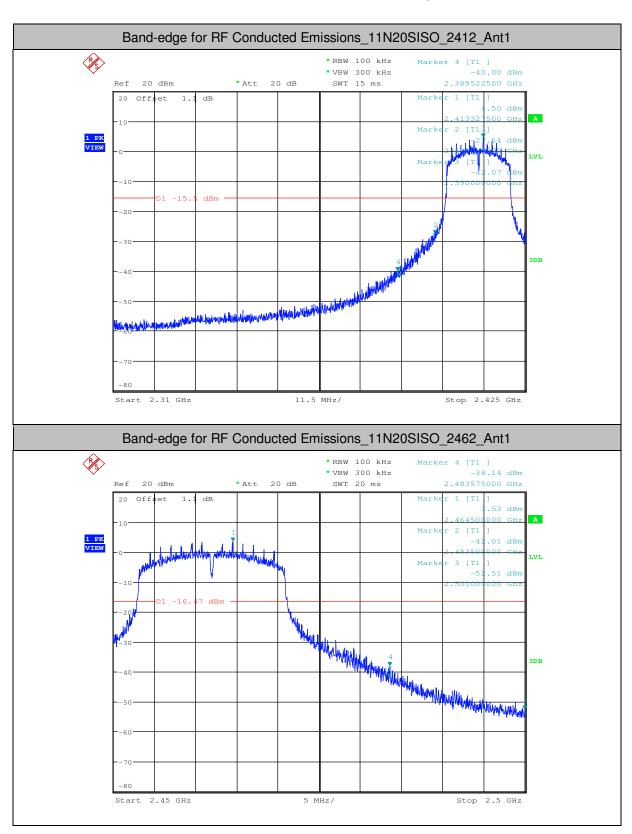
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5.RF Conducted Spurious Emissions

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	6.69	-30.770	<-13.31	PASS
11B	2412	10000	25000	1000	3000	6.69	-55.170	<-13.31	PASS
11B	2437	30	10000	1000	3000	6.42	-31.890	<-13.58	PASS
11B	2437	10000	25000	1000	3000	6.42	-55.230	<-13.58	PASS
11B	2462	30	10000	1000	3000	6.32	-32.560	<-13.68	PASS
11B	2462	10000	25000	1000	3000	6.32	-54.750	<-13.68	PASS
11G	2412	30	10000	1000	3000	3.97	-31.000	<-16.03	PASS
11G	2412	10000	25000	1000	3000	3.97	-55.190	<-16.03	PASS
11G	2437	30	10000	1000	3000	3.54	-33.430	<-16.46	PASS
11G	2437	10000	25000	1000	3000	3.54	-55.380	<-16.46	PASS
11G	2462	30	10000	1000	3000	3.93	-33.490	<-16.07	PASS
11G	2462	10000	25000	1000	3000	3.93	-54.190	<-16.07	PASS
11N20SISO	2412	30	10000	1000	3000	4.06	-32.410	<-15.94	PASS
11N20SISO	2412	10000	25000	1000	3000	4.06	-55.090	<-15.94	PASS
11N20SISO	2437	30	10000	1000	3000	4.18	-31.100	<-15.82	PASS
11N20SISO	2437	10000	25000	1000	3000	4.18	-54.840	<-15.82	PASS
11N20SISO	2462	30	10000	1000	3000	3.5	-33.450	<-16.5	PASS
11N20SISO	2462	10000	25000	1000	3000	3.5	-55.020	<-16.5	PASS



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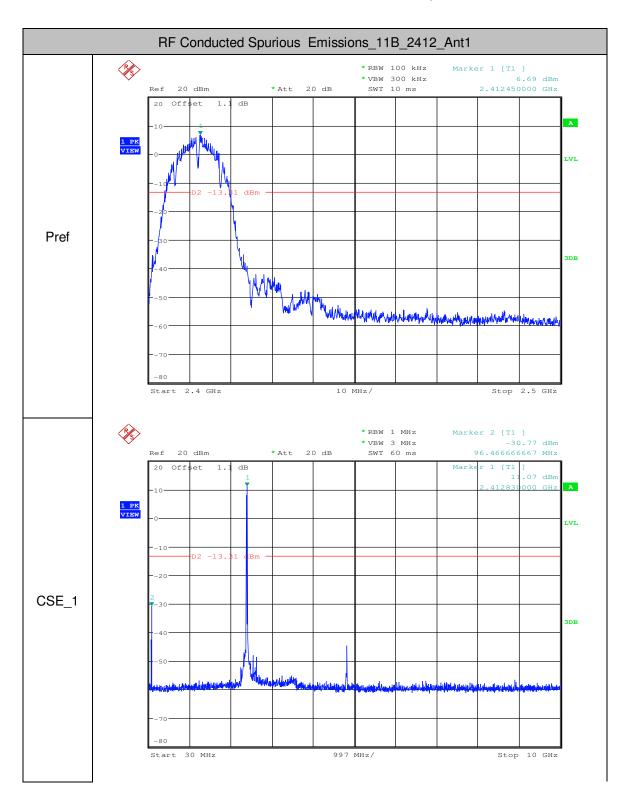
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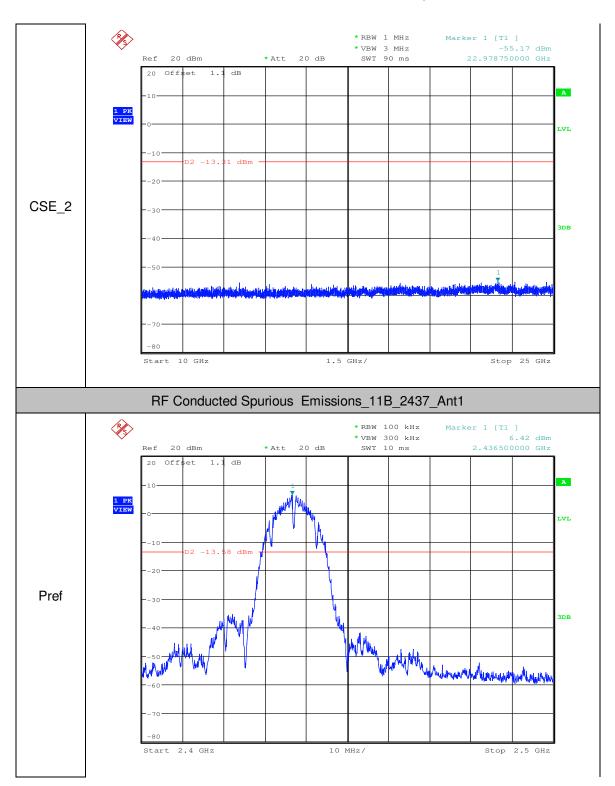
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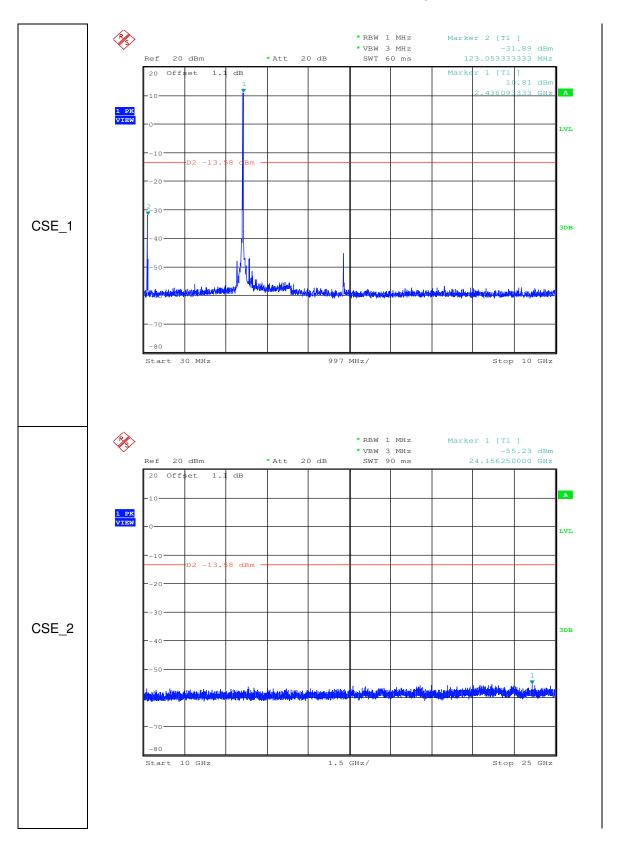
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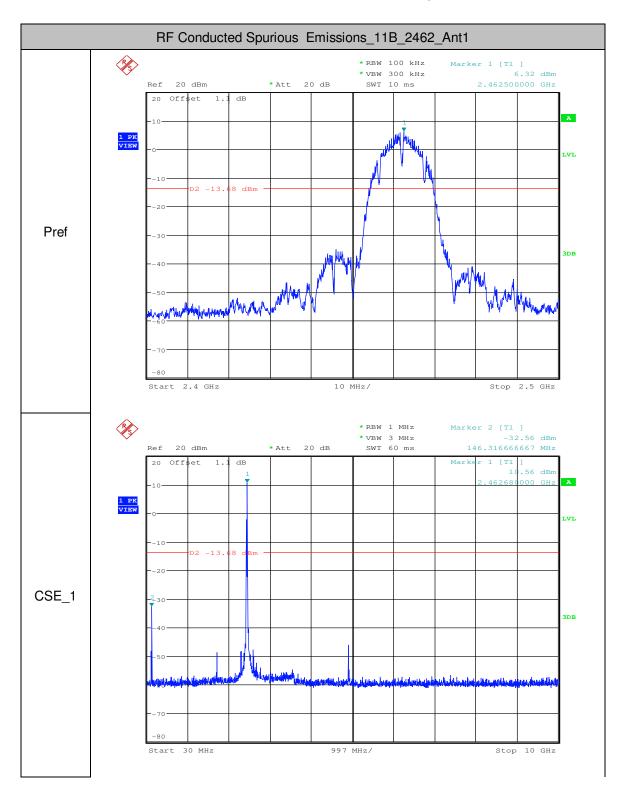
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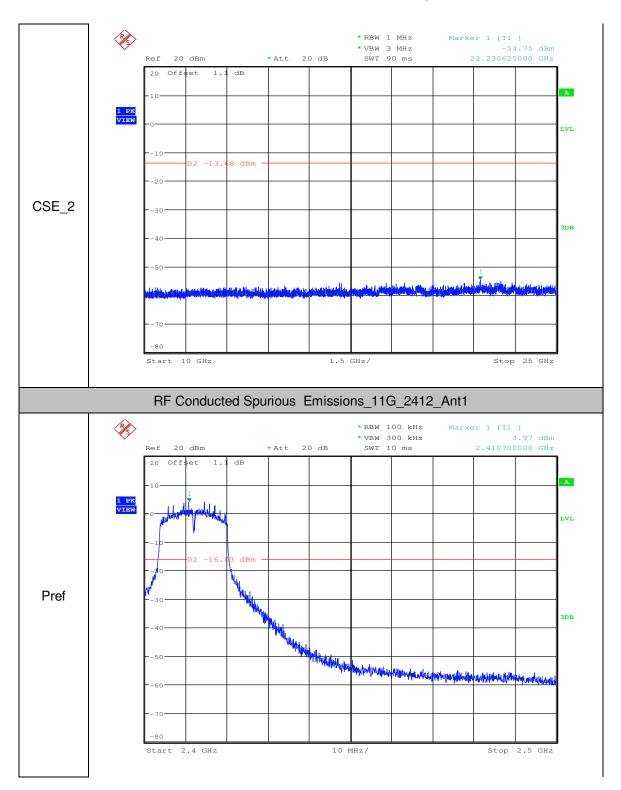
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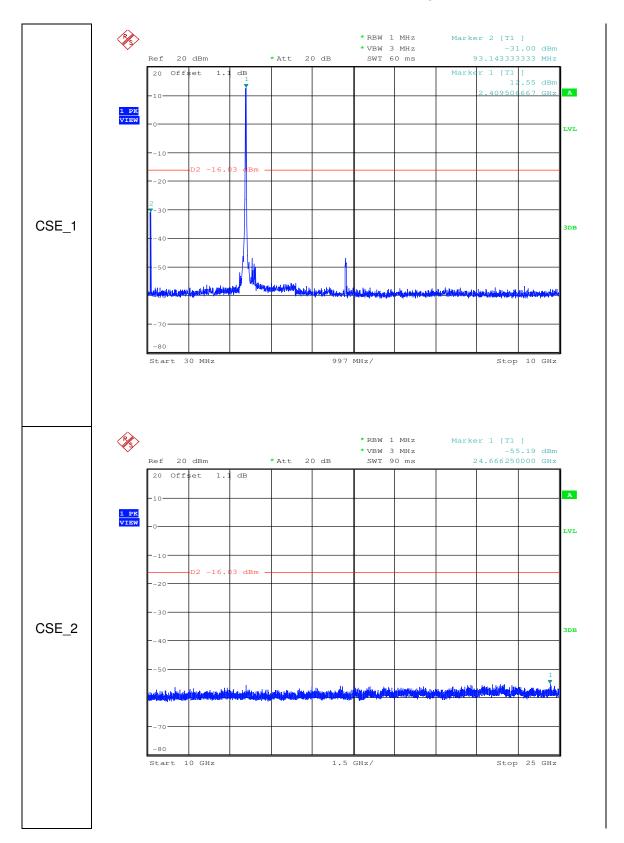
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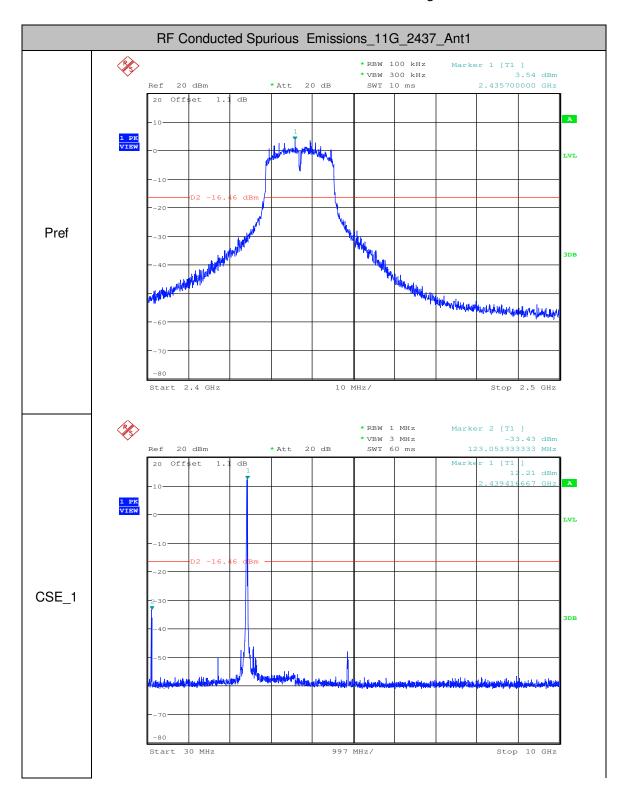
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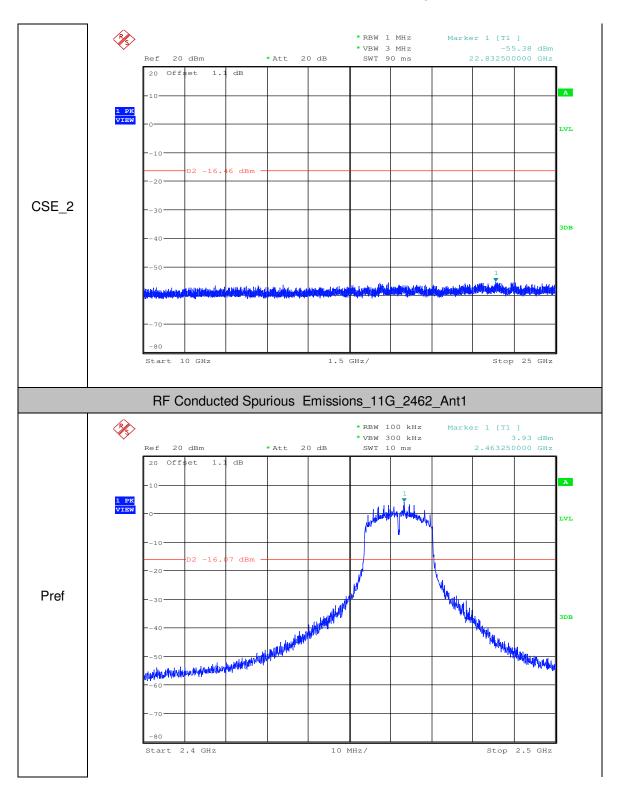
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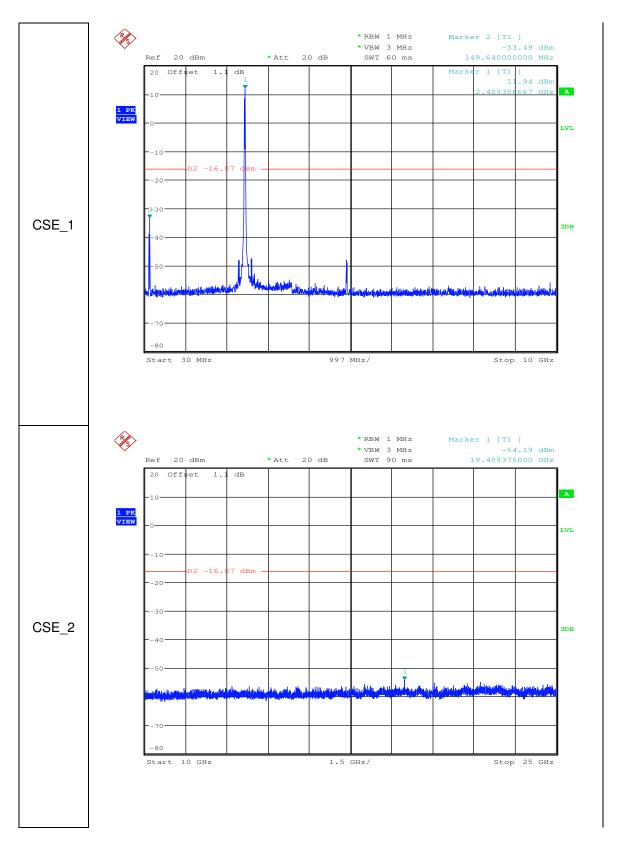
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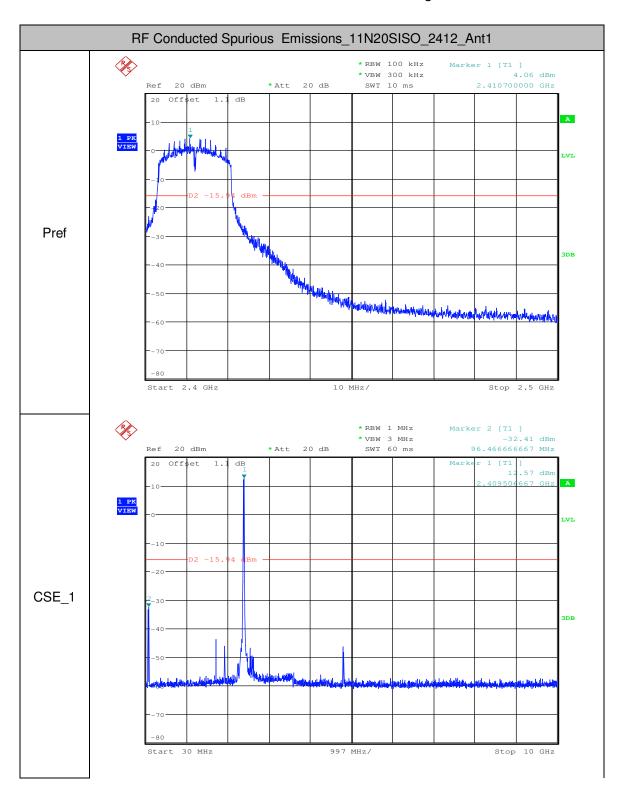
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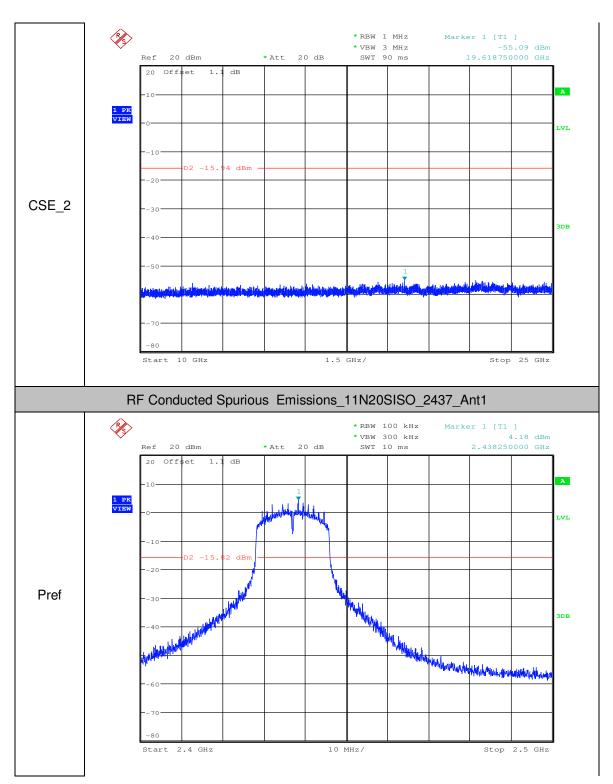
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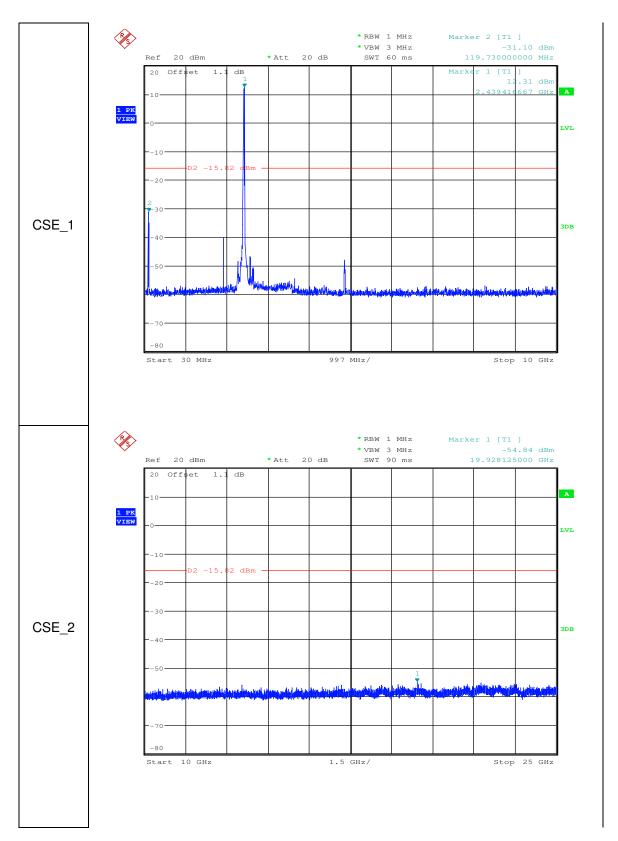
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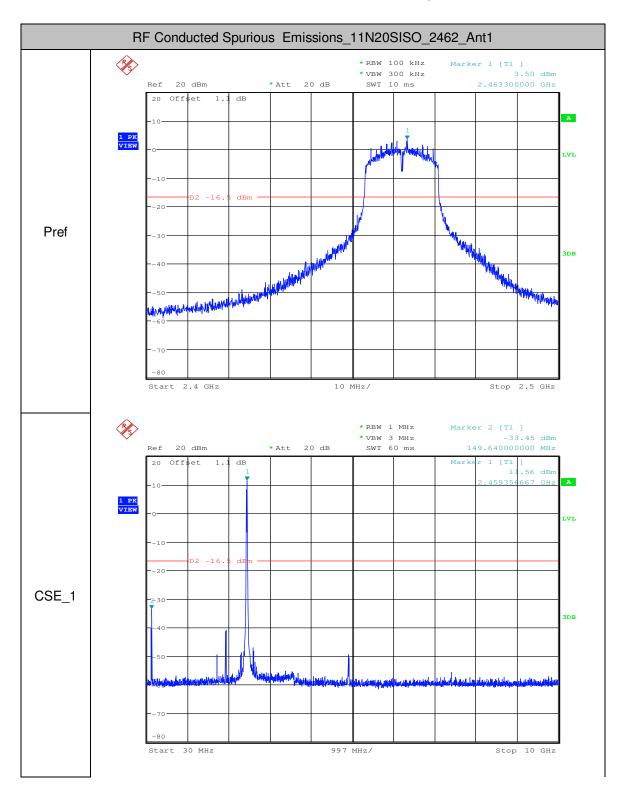
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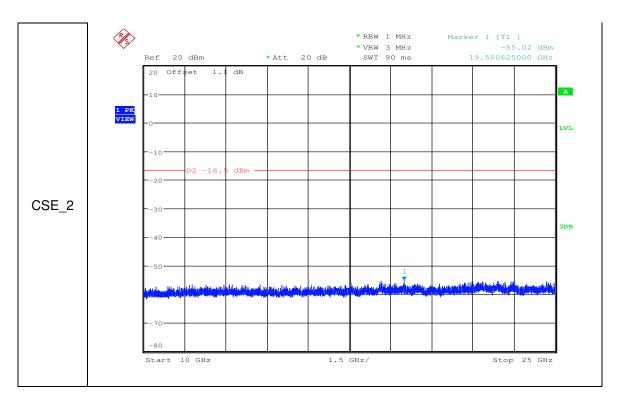
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