

Report No.: SHCR230800162501

Page: 1 of 116

TEST REPORT

Application No.: SHCR2308001625AT FCC ID: 2AL8S-0235C7Q1

Applicant: Zhejiang Uniview Technologies Co., Ltd.

Address of Applicant: No. 369, Xietong Road, Xixing Sub-district, Binjiang District, Hangzhou City,

310051, Zhejiang Province, China

Manufacturer: Zhejiang Uniview Technologies Co., Ltd.

Address of Manufacturer: No. 369, Xietong Road, Xixing Sub-district, Binjiang District, Hangzhou City,

310051, Zhejiang Province, China

Equipment Under Test (EUT):

EUT Name: HD PT Camera

Model No.: Uho-S2, Uho-S2E, Uho-S2-NB, Uho-S2E-NB, Uho-S2xxxxxxxxx-yyyyyyy-

> zzz('x' can be 0-9,A-Z,a-z,@, or blank, denoting difference in interface; 'y' can be 0-9,A-Z,a-z,@, or blank, denoting difference in interface; 'z' can be 0-9,A-Z,a-z,@, or blank, denoting difference in interface;' -' may be blank)

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

actually tested and which were electrically identical.

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

2023-07-20 **Date of Receipt:**

Date of Test: 2023-07-27 to 2023-07-29

2023-08-14 Date of Issue:

Pass* Test Result:

Parlam Zhan Laboratory Manager

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^{*} In the configuration tested, the EUT complied with the standards specified above.



Report No.: SHCR230800162501

Page: 2 of 116

	Revision Record			
Version	Description	Date	Remark	
00	Original	2023-08-14	/	

Authorized for issue by:		
	Michael Nich	
	Micheal_Niu/Project Engineer	
	parlan 2han	
	Parlam Zhan/Reviewer	



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Report No.: SHCR230800162501

Page: 3 of 116

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)	Customer Declaration

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)		ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Conducted Peak Output Power		ANSI C63.10 (2013) Section 11.9.2	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions	Oubpart 0 15.247	ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

Declaration of EUT Family Grouping:

Note: There are series models mentioned in this report, and they are the Identical in electrical and electronic characters. Only the model Uho-S2E was tested since their differences were the model number and appearance.



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Report No.: SHCR230800162501

Page: 4 of 116

Contents

			Page
1	COV	/ER PAGE	1
2	Test	t Summary	3
		·	
3	Con	tents	4
4	Gen	eral Information	5
	4.1	Details of E.U.T.	
	4.1	Description of Support Units	
	4.3	Measurement Uncertainty	
	4.4	Test Location	
	4.5	Test Facility	
	4.6	Deviation from Standards	
	4.7	Abnormalities from Standard Conditions	7
5	Fau	ipment List	g
J	Lqu	ipment List	
6	Rad	io Spectrum Technical Requirement	10
	6.1	Antenna Requirement	10
7	Rad	io Spectrum Matter Test Results	11
•		•	
	7.1	Conducted Emissions at AC Power Line (150kHz-30MHz)	
	7.2 7.3	Conducted Peak Output Power	
	7.3 7.4	Power Spectrum Density	
	7. 4 7.5	Conducted Band Edges Measurement	
	7.6	Conducted Spurious Emissions	
	7.7	Radiated Emissions which fall in the restricted bands	
	7.8	Radiated Spurious Emissions Below 1GHz	
	7.9	Radiated Spurious Emissions Above 1GHz	
8	Test	t Setup Photo	71
9	ELIT	Constructional Details (EUT Photos)	74
3	LUI	Constructional Details (LOT Flictos)	/ ۱
10	0 App	endix	72



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Report No.: SHCR230800162501

Page: 5 of 116

General Information

4.1 Details of E.U.T.

Power supply:	DC 5V,1A
	Adapter model 1: TPA-98B050100CU01
	INPUT:100-240V,50/60Hz,0.15A
	OUTPUT:5V,1A
	Adapter model 2: TPA-141A050150UU01
	INPUT:100-240V,50/60Hz,0.3A
	OUTPUT:5V,1.5A
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
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
Channel Spacing:	5MHz
Antenna Type:	PCB Antenna
Antenna Gain:	2.29dBi (Provided by the manufacturer)

4.2 Description of Support Units

	pport ormio		
Description	Manufacturer	Model No.	Serial No.
Notebook	l enovo	/	/



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Report No.: SHCR230800162501

Page: 6 of 116

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4 x 10 ⁻⁸
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	DE Dadiated Dawer	5.2dB (Below 1GHz)
0	RF Radiated Power	5.9dB (Above 1GHz)
		4.2dB (Below 30MHz)
9	Dadiated Courieus Emission Test	4.5dB (30MHz-1GHz)
9	Radiated Spurious Emission Test	5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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Report No.: SHCR230800162501

Page: 7 of 116

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab 588 West Jindu Road, Xingiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

Note:

- 1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
- 2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

4.5 Test Facility

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

A2LA (Certificate No. 6332.01)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

• FCC (Designation Number: CN1301)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• ISED (CAB Identifier: CN0020)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 8617A

VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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Report No.: SHCR230800162501

Page: 8 of 116

Equipment List 5

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2022-12-20	2023-12-19
Spectrum Analyzer	Keysight	N9020B	SHEM241-1	2022-12-20	2023-12-19
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2022-08-02	2023-08-01
Signal Generator	R&S	SMR20	SHEM006-1	2022-08-02	2023-08-01
Signal Generator	Agilent	N5182A	SHEM182-1	2022-08-02	2023-08-01
Communication Tester	R&S	CMW270	SHEM183-1	2023-06-01	2024-05-31
Communication Tester	R&S	CMW500	SHEM268-1	2023-06-01	2024-05-31
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2022-08-02	2023-08-01
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2022-11-08	2024-11-07
AC Power Stabilizer	APC	KDF-31020T-V0-F0	SHEM216-1	2022-12-20	2023-12-19
DC Power Supply	MCH	MCH-303A	SHEM210-1	2022-12-20	2023-12-19
Conducted test Cable	/	RF01~RF04	/	2022-12-20	2023-12-19
Switcher	Tonscend	JS0806	SHEM184-1	2022-08-02	2023-08-01
Test software	Tonscend	JS Tonscend BT/WIFI System	Version: 2.6	/	/
Coaxial Cable	TST		SHEM263-1	2022-08-02	2023-08-01
Test software	TST	TST PASS	Version: 2.0	/	/
RF Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2022-12-20	2023-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2022-12-20	2023-12-19
Communication Tester	R&S	CMW500	SHEM268-1	2023-06-01	2024-05-31
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2022-12-20	2023-12-19
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2021-09-11	2023-09-10
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2022-05-07	2024-05-06
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2022-08-11	2024-08-10
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2021-09-18	2023-09-17
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2021-09-18	2023-09-17
Pre-Amplifier	HP	8447D	SHEM236-1	2022-08-02	2023-08-01
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2022-12-20	2023-12-19
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2021-05-25	2024-05-24
RE test Cable	/	RE01, RE02, RE06	/	2023-01-07	2024-01-06
Test software	ESE	E3	Version: 6.111221a	1	/



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Report No.: SHCR230800162501

Page: 9 of 116

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Conducted Emissions at A	C Mains Power	Port (150kHz-30MH	z)		
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2022/12/20	2023/12/19
Line impedance stabilization network	SCHWARZBE CK	NSLK8127	SHEM061-1	2022/12/20	2023/12/19
Line impedance stabilization network	EMCO	3816_2	SHEM019-1	2022/12/20	2023/12/19
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2022/12/20	2023/12/19
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2020/12/20	2023/12/19
CE test Cable	/	/	SHEM172-1	2022/12/20	2023/12/19
Test Software	ESE	e3	Version: 6.111221a	N/A	N/A



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Report No.: SHCR230800162501

Page: 10 of 116

6 Radio Spectrum Technical Requirement

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 2.29dBi.

Antenna location: Refer to internal photo.



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Report No.: SHCR230800162501

Page: 11 of 116

Radio Spectrum Matter Test Results 7

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:

Frequency of	Conducted limit(dBµV)				
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.					
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz					

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 26.8 °C Humidity: 50.5 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.



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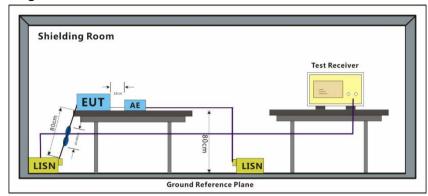
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Report No.: SHCR230800162501

Page: 12 of 116

7.1.3 Test Setup Diagram



7.1.4 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 + 5ohm 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: Level=Read Level+ Cable Loss+ LISN Factor



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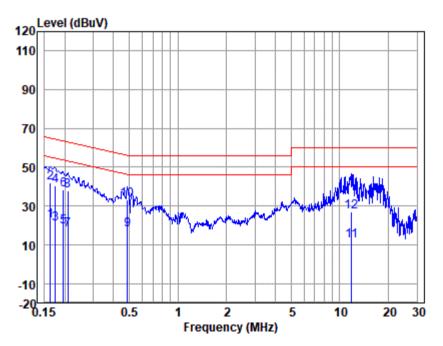
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Report No.: SHCR230800162501

Page: 13 of 116

Test Mode: 00; Line: Live line



LISN : LINE

EUT/Project No: 01625AT

Test Mode : 00

	Freq	Read level	LISN	Cable	Emission Level	n Limit	Over Limit	Remark
	(MHz)	(dBuV)	Factor (dB)	Loss (dB)	(dBuV)	(dBuV)	(dB)	Kemark
1	0.16	11.94	0.40	9.87	22.21	55.30	-33.09	Average
2	0.16	31.82	0.40	9.87	42.09	65.30	-23.21	QP
3	0.17	10.43	0.40	9.87	20.70	54.72	-34.02	Average
4	0.17	29.94	0.40	9.87	40.21	64.72	-24.51	QP
5	0.20	8.82	0.40	9.87	19.09	53.80	-34.71	Average
6	0.20	28.27	0.40	9.87	38.54	63.80	-25.26	QP
7	0.21	7.59	0.39	9.87	17.85	53.27	-35.42	Average
8	0.21	27.54	0.39	9.87	37.80	63.27	-25.47	QP
9	0.49	7.84	0.21	9.86	17.91	46.23	-28.32	Average
10	0.49	22.94	0.21	9.86	33.01	56.23	-23.22	QP
11	11.87	1.42	0.44	10.00	11.86	50.00	-38.14	Average
12	11.87	16.79	0.44	10.00	27.23	60.00	-32.77	QP
No	tes: Em	ission Le	vel = Re	ead Leve	1 +LISN F	actor +	Cable los	SS



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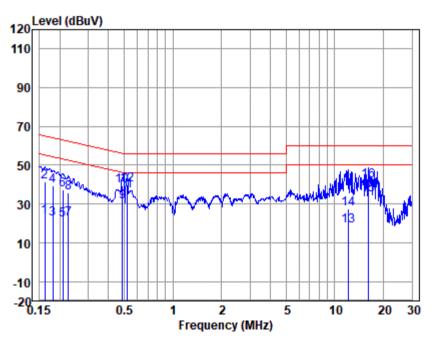
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Report No.: SHCR230800162501

Page: 14 of 116

Test Mode: 00; Line: Neutral Line



LISN : NEUTRAL EUT/Project No: 01625AT

Test Mode : 00

	Freq	Read	LISN	Cable	Emission		0ver	
		level	Factor	Loss	Level	Limit	Limit	Remark
	(MHz)	(dBuV)	(dB)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.16	12.94	0.33	9.87	23.14	55.38	-32.24	Average
2	0.16	31.17	0.33	9.87	41.37	65.38	-24.01	QP
3	0.18	12.38	0.31	9.87	22.56	54.42	-31.86	Average
4	0.18	29.11	0.31	9.87	39.29	64.42	-25.13	QP
5	0.21	11.59	0.30	9.87	21.76	53.27	-31.51	Average
6	0.21	27.43	0.30	9.87	37.60	63.27	-25.67	QP
7	0.23	12.44	0.30	9.87	22.61	52.57	-29.96	Average
8	0.23	25.65	0.30	9.87	35.82	62.57	-26.75	QP
9	0.49	21.12	0.30	9.86	31.28	46.23	-14.95	Average
10	0.49	29.19	0.30	9.86	39.35	56.23	-16.88	QP
11	0.52	26.53	0.30	9.86	36.69	46.00	-9.31	Average
12	0.52	29.92	0.30	9.86	40.08	56.00	-15.92	OP

Notes: Emission Level = Read Level +LISN Factor + Cable loss



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Report No.: SHCR230800162501

Page: 15 of 116

7.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3) Test Method: ANSI C63.10 (2013) Section 11.9.2

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

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 26.8 °C Humidity: 42.3 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

· ·=-= · · · · · · · · · · · · · · · · ·						
Pre-scan / Final test	Mode Code	Description				
Final test	00	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.				



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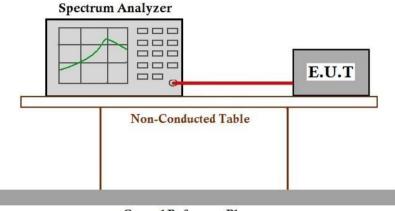
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Report No.: SHCR230800162501

Page: 16 of 116

7.2.3 Test Setup Diagram



Ground Reference Plane

7.2.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details



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Report No.: SHCR230800162501

Page: 17 of 116

7.3 Minimum 6dB Bandwidth

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

Limit: ≥500 kHz

7.3.1 E.U.T. Operation

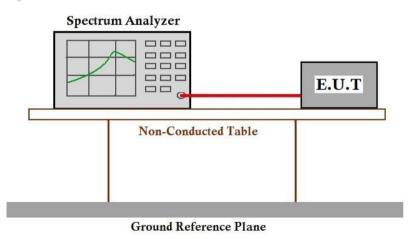
Operating Environment:

26.8 °C Temperature: Humidity: 42.3 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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Report No.: SHCR230800162501

Page: 18 of 116

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

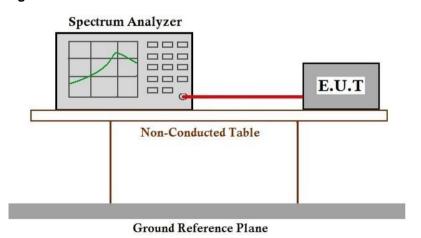
Operating Environment:

Temperature: 26.8 °C Humidity: 42.3 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

	THE TOOL MOUS BOOKINGTON					
Pre-scan / Final test	Mode Code	Description				
Final test	00	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.				

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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Page: 19 of 116

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).

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 26.8 °C Humidity: 42.3 % RH Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

7.3.2 Test Mode Description							
Pre-scan / Final test	Mode Code	Description					
Final test	00	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.					



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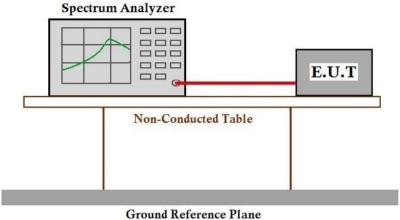
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Report No.: SHCR230800162501

Page: 20 of 116

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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Report No.: SHCR230800162501

Page: 21 of 116

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).

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 26.8 °C Humidity: 42.3 % RH Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.



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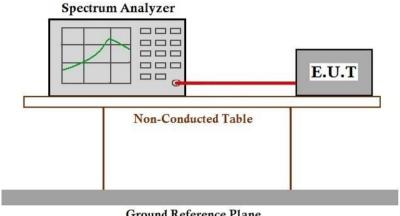
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Report No.: SHCR230800162501

Page: 22 of 116

7.6.3 Test Setup Diagram



Ground Reference Plane

7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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Report No.: SHCR230800162501

Page: 23 of 116

7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

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: 23 °C Humidity: 52.1 % RH Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

This foot mode becompain						
Pre-scan / Final test	Mode Code	Description				
Final test	00	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.				



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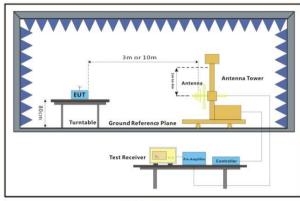
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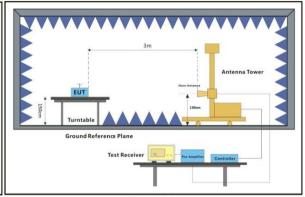


Report No.: SHCR230800162501

Page: 24 of 116

7.7.3 Test Setup Diagram





30MHz-1GHz Above 1GHz



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Report No.: SHCR230800162501

Page: 25 of 116

7.7.4 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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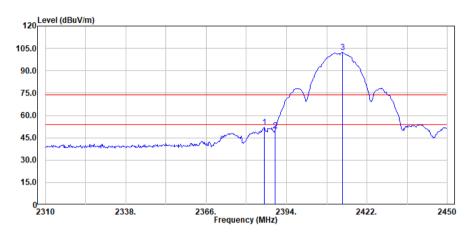
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Report No.: SHCR230800162501

Page: 26 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.						Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1	2386.29	71.96	27.55	2.65	50.14	52.02	74.00	-21.98	Peak
	2390.00	69.82	27.55	2.66	50.13	49.90	74.00	-24.10	Peak
	2413.48	121.97	27.56	2.67	50.04	102.16	74.00	28.16	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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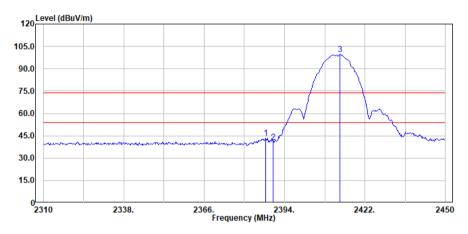
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Report No.: SHCR230800162501

Page: 27 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Vertical

No.	Freq					Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2387.51 2390.00					43.41 40.70			Peak Peak
	2413.28	119.28	27.56	2.67	50.04	99.47	74.00	25.47	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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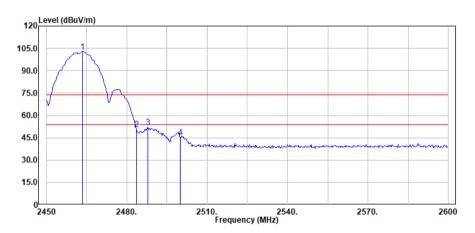
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Report No.: SHCR230800162501

Page: 28 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq MHz	Read level dBuv	Factor		Factor	Emission Level dBuv/m	Line	Limit	Remark
_	2463.48		27.58			102.90	74.00	28.90	Peak
_	2483.50 2487.83	70.48 71.48	27.58 27.58	2.73 2.73		50.89 51.88	74.00 74.00	-23.11 -22.12	Peak Peak
2	2500.00	65.07	27.59	2.74	49.94	45.46	74.00	-28.54	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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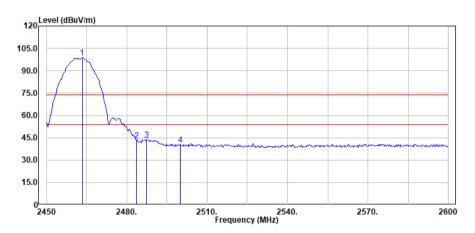
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Report No.: SHCR230800162501

Page: 29 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor			Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2463.26		27.58		49.86		74.00	24.78	Peak
	2483.50 2487.39	62.67 63.21	27.58 27.58	2.73	49.90 49.91	43.08 43.61	74.00 74.00	-30.92 -30.39	Peak Peak
	2500.00	59.74	27.59	2.74	49.94	40.13		-33.87	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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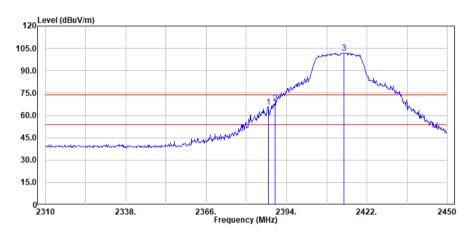
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Report No.: SHCR230800162501

Page: 30 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

Fre		I ac coi	LOSS	Factor	Level	Line	Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2390.0	0 88.31	27.55 27.55 27.56	2.66	50.13	68.39	74.00	-8.17 -5.61 28.11	Peak Peak Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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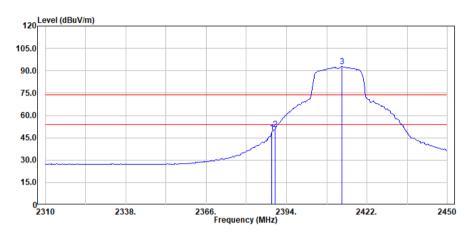
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Report No.: SHCR230800162501

Page: 31 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq 	Read level dBuv		Loss	Factor	Emission Level dBuv/m	Line	Limit	Remark
2	388.73 390.00	68.24 70.54 112.62	27.55 27.55 27.56	2.66	50.13	48.31 50.62 92.81		-5.69 -3.38 38.81	Average Average Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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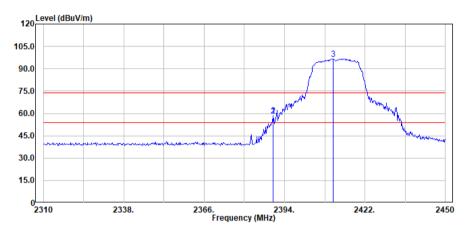
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Report No.: SHCR230800162501

Page: 32 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Vertical

No			Antenna Factor						Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2390.00	78.45	27.55 27.55 27.56	2.66	50.13	58.53	74.00	-15.47	Peak Peak Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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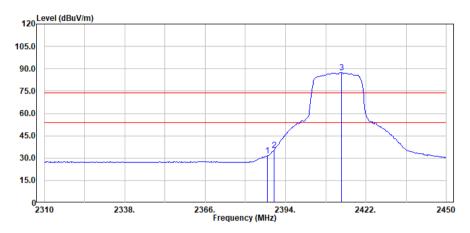
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Report No.: SHCR230800162501

Page: 33 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity : Vertical

No.	Freq MHz		Factor		Factor	Emission Level dBuv/m	Line	Limit	Remark
2		51.46 55.17 107.40	27.55 27.55 27.56	2.66	50.13 50.13 50.04		54.00	-22.47 -18.75 33.59	Average Average Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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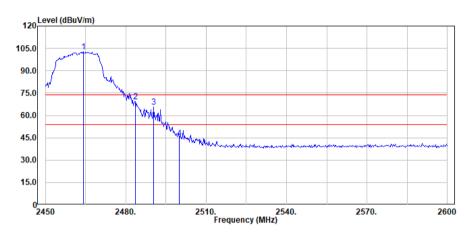
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Report No.: SHCR230800162501

Page: 34 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq MHz	Read level dBuv			Factor	Emission Level dBuv/m	Line		Remark
	2464.13	122.34	27.58	2.72	49.86	102.78	74.00	28.78	Peak
	2483.50	88.77	27.58	2.73	49.90	69.18	74.00	-4.82	Peak
	2490.44	85.06	27.58	2.74	49.92	65.46	74.00	-8.54	Peak
	2500.00	64.57	27.59	2.74	49.94	44.96	74.00	-29.04	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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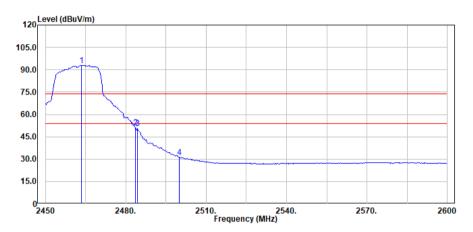
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Report No.: SHCR230800162501

Page: 35 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq 	Read level dBuv	Antenna Factor dB/m	Cable Loss dB		Emission Level dBuv/m	Limit Line dBuv/m	Over Limit dB	Remark
2	463.48	112.61	27.58	2.72	49.86	93.05	54.00	39.05	Average
2	483.50	70.62	27.58	2.73	49.90	51.03	54.00	-2.97	Average
2	484.35	70.41	27.58	2.73	49.91	50.81	54.00	-3.19	Average
2	500.00	50.78	27.59	2.74	49.94	31.17	54.00	-22.83	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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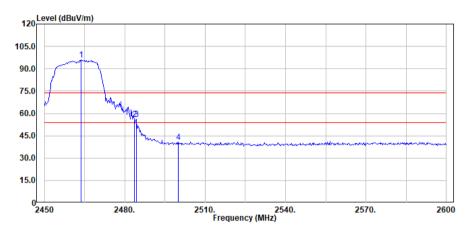
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Report No.: SHCR230800162501

Page: 36 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :Vertical

No. Freq MHz	Read level dBuv	Factor		Factor	Emission Level dBuv/m	Line		Remark
2463.70	115.51	27.58	2.72	49.86	95.95	74.00	21.95	Peak
2483.50	75.84	27.58	2.73	49.90	56.25	74.00	-17.75	Peak
2484.35	75.62	27.58	2.73	49.91	56.02	74.00	-17.98	Peak
2500.00	60.35	27.59	2.74	49.94	40.74	74.00	-33.26	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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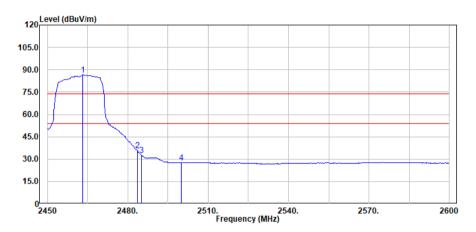
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Report No.: SHCR230800162501

Page: 37 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq	Read level	Factor	Loss	Factor		Line	Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2	463.04	106.20	27.58	2.71	49.86	86.63	54.00	32.63	Average
2	483.50	55.16	27.58	2.73	49.90	35.57	54.00	-18.43	Average
2	485.00	52.31	27.58	2.73	49.91	32.71	54.00	-21.29	Average
2	500.00	47.26	27.59	2.74	49.94	27.65	54.00	-26.35	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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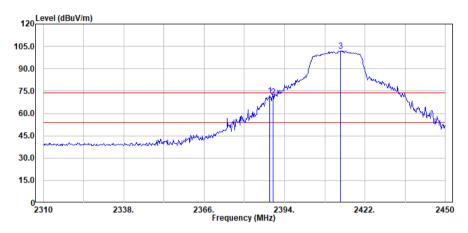
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Report No.: SHCR230800162501

Page: 38 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.						Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2388.93	91.75	27.55	2.65	50.13	71.82	74.00	-2.18	Peak
	2390.00	90.97	27.55	2.66	50.13	71.05	74.00	-2.95	Peak
	2413.48	121.81	27.56	2.67	50.04	102.00	74.00	28.00	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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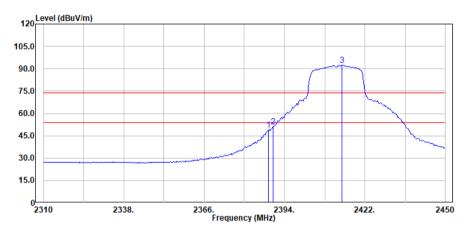
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Report No.: SHCR230800162501

Page: 39 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level				Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2	388.32 390.00 413.88	69.05 70.93 112.06	27.55 27.55 27.56	2.66	50.13	49.12 51.01 92.26	54.00 54.00 54.00	-4.88 -2.99 38.26	Average Average Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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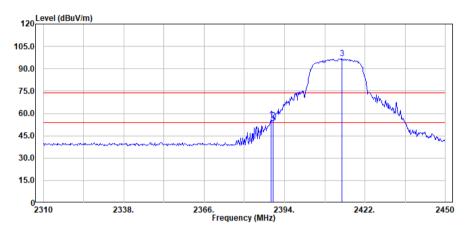
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Report No.: SHCR230800162501

Page: 40 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Vertical

No.	Freq 	level	Factor	Loss	Factor	Emission Level dBuv/m	Line	Limit	Remark
2	2389.33 2390.00	75.98 75.28	27.55 27.55	2.66 2.66	50.13 50.13	56.06 55.36 96.84	74.00 74.00	-17.94 -18.64	Peak Peak Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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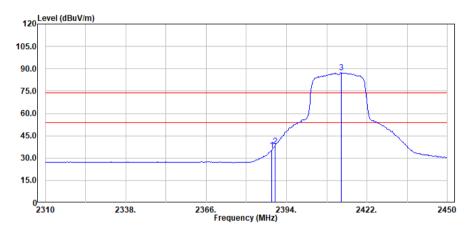
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Report No.: SHCR230800162501

Page: 41 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity : Vertical

No.	Freq 			Loss	Factor	Emission Level dBuv/m	Line	Limit	Remark
_	388.93 390.00	55.43 58.06	27.55 27.55			35.50 38.14		-18.50 -15.86	Average Average
2	413.07	107.01	27.56	2.67		87.20			Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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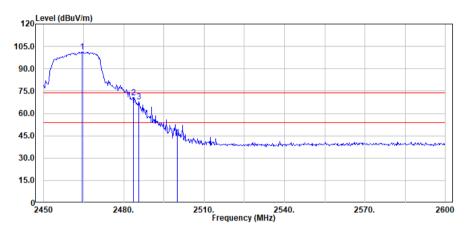
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Report No.: SHCR230800162501

Page: 42 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq 	Read level dBuv		Loss	Factor	Emission Level dBuv/m	Line		Remark
2	464.35	120.80	27.58	2.72	49.86	101.24	74.00	27.24	Peak
2	483.50	90.02	27.58	2.73	49.90	70.43	74.00	-3.57	Peak
2	485.65	87.68	27.58	2.73	49.91	68.08	74.00	-5.92	Peak
2	500.00	63.67	27.59	2.74	49.94	44.06	74.00	-29.94	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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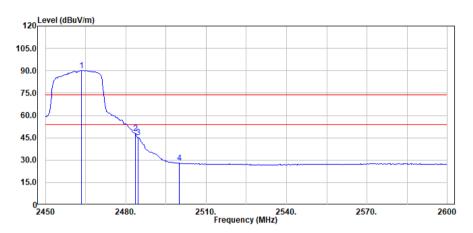
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Report No.: SHCR230800162501

Page: 43 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq 	Read level dBuv	Antenna Factor dB/m	Cable Loss dB	Preamp Factor dB	Emission Level dBuv/m	Limit Line dBuv/m	Over Limit dB	Remark
2	463.48	109.80	27.58	2.72	49.86	90.24	54.00	36.24	Average
2	483.50	67.40	27.58	2.73	49.90	47.81	54.00	-6.19	Average
2	484.57	64.85	27.58	2.73	49.91	45.25	54.00	-8.75	Average
2	500.00	47.47	27.59	2.74	49.94	27.86	54.00	-26.14	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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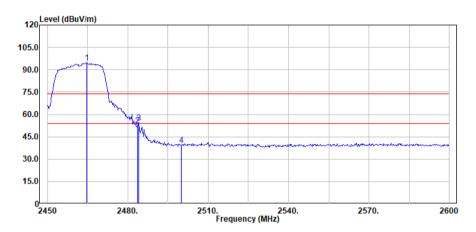
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Report No.: SHCR230800162501

Page: 44 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity : Vertical

No.	Freq	Read level	Antenna Factor			Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2464.57		27.58		49.86		74.00	20.62	Peak
		72.25	27.58					-21.34	Peak
	2484.13	73.88	27.58	2.73	49.91	54.28	74.00	-19.72	Peak
	2500.00	59.11	27.59	2.74	49.94	39.50	74.00	-34.50	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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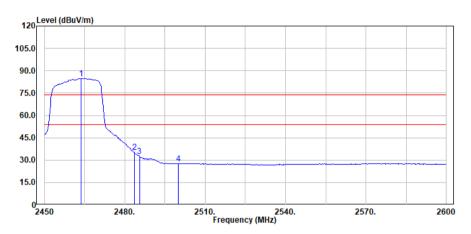
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Report No.: SHCR230800162501

Page: 45 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq MHz	Read level dBuv	Antenna Factor dB/m	Cable Loss dB		Emission Level dBuv/m	Limit Line dBuv/m	Over Limit dB	Remark
2	2463.70 2483.50 2485.44	104.39 54.73 52.06	27.58 27.58 27.58	2.72 2.73 2.73	49.86 49.90 49.91	84.83 35.14 32.46	54.00 54.00 54.00	30.83 -18.86 -21.54	Average Average Average
2	2500.00	47.40	27.59	2.74	49.94	27.79	54.00	-26.21	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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Report No.: SHCR230800162501

Page: 46 of 116

7.8 Radiated Spurious Emissions Below 1GHz

47 CFR Part 15, Subpart C 15.205 & 15.209 Test Requirement

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

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
960-1000	500	3

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 52.8 % RH Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

7.0.2 10011	7.2 Test mode Description									
Pre-scan / Final test	Mode Code	Description								
Final test	00	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.								



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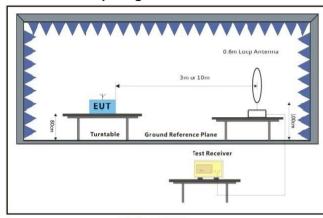
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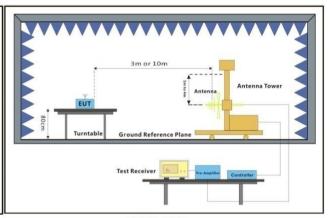


Report No.: SHCR230800162501

Page: 47 of 116

7.8.3 Test Setup Diagram





Below 30MHz 30MHz-1GHz



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Report No.: SHCR230800162501

Page: 48 of 116

7.8.4 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. 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.
- c. 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.
- d. 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.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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 quasi-peak method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. 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.
- i. Repeat above procedures until all frequencies measured was complete. Remark:
- 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- 2. Scan from 9kHz to 30MHz, the disturbance 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.
- 3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

Test Mode: 00; Polarity: Horizontal



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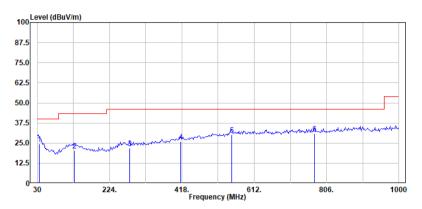
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Report No.: SHCR230800162501

Page: 49 of 116



Antenna Polarity :Horizontal

No.	Freq MHz	Read level dBuv	Antenna Factor dB/m	Cable Loss dB	Preamp Factor dB	Emission Level dBuv/m	Limit Line dBuv/m	Over Limit dB	Remark
3	35.82 128.94 3278.32 4414.12	0.35 1.10 1.77 2.04 2.71	23.87 18.44 19.02 22.49 25.09	0.34 1.01 1.25 1.48 2.25	0.00 0.00 0.00 0.00 0.00	24.56 20.55 22.04 26.01 30.05	40.00 43.50 46.00 46.00 46.00	-15.44 -22.95 -23.96 -19.99 -15.95	QP QP QP QP QP
_	773.02	2.49	25.96	2.31	0.00	30.76	46.00	-15.24	QΡ

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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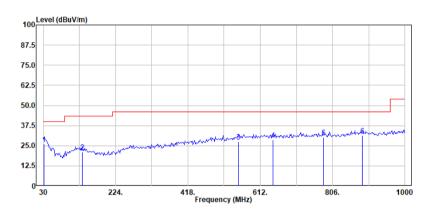
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Report No.: SHCR230800162501

Page: 50 of 116

Test Mode: 00; Polarity: Vertical



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
_								42.70	
1	31.94	1.00	24.91	0.31	0.00	26.22	40.00	-13.78	QP
2	134.76	1.98	18.10	1.05	0.00	21.13	43.50	-22.37	QP
3	553.80	0.14	25.05	2.25	0.00	27.44	46.00	-18.56	QP
4	646.92	0.74	25.41	2.40	0.00	28.55	46.00	-17.45	QΡ
5	780.78	1.92	25.87	2.27	0.00	30.06	46.00	-15.94	QP
6	885.54	1.77	27.00	2.39	0.00	31.16	46.00	-14.84	QP

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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Report No.: SHCR230800162501

Page: 51 of 116

7.9 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

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

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

7.9.1 E.U.T. Operation

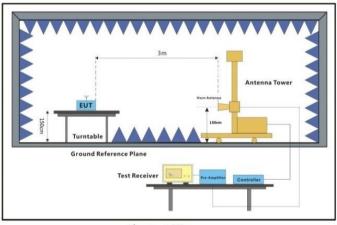
Operating Environment:

Temperature: 22 °C Humidity: 52.6 % RH Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.9.3 Test Setup Diagram



Above 1GHz



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Report No.: SHCR230800162501

Page: 52 of 116

7.9.4 Measurement Procedure and Data

- a. 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.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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 or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. 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.
- i. Repeat above procedures until all frequencies measured was complete. Remark:
- 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- 2. Scan from 1GHz to 25GHz, the disturbance above 18GHz 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.
- 3. As shown in this section, 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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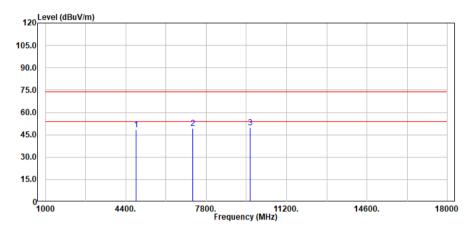
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Report No.: SHCR230800162501

Page: 53 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq					Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4824.00 7236.00	61.03 54.77				48.67 49.33		-25.33 -24.67	Peak Peak
	9648.00	52.20	38.24	5.72	46.15	50.01	74.00	-23.99	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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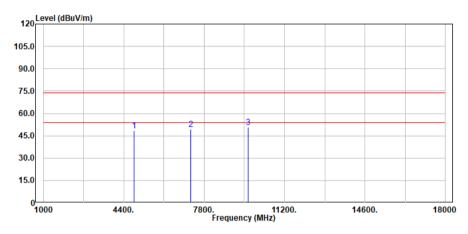
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Report No.: SHCR230800162501

Page: 54 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity : Vertical

No.	Freq					Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	824.00 236.00	60.98 54.98				48.62 49.54			Peak Peak
9	648.00	52.75	38.24	5.72	46.15	50.56	74.00	-23.44	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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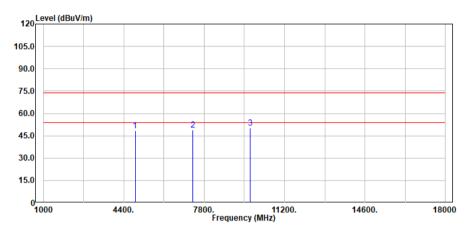
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Report No.: SHCR230800162501

Page: 55 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Antenna Polarity :Horizontal

No.						Emission Level			Romank
	rreq	Tevel	ractor	LU33	ractor	rever	LINE		Nelliai K
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4	4874.00	60.72	31.41	4.17	47.77	48.53	74.00	-25.47	Peak
-	7311.00	54.25	36.05	5.42	46.70	49.02	74.00	-24.98	Peak
9	9748.00	52.21	38.34	5.74	46.11	50.18	74.00	-23.82	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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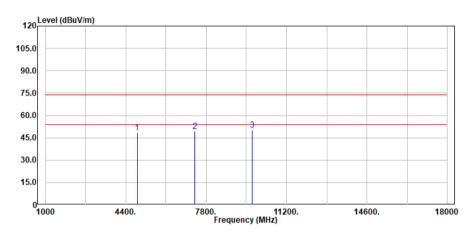
t (86-21) 61915666 t (86-21) 61915666 f (86-21) 61915678 www.sgsgroup.com.cn f (86-21) 61915678 sgs.china@sgs.com



Report No.: SHCR230800162501

Page: 56 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Antenna Polarity : Vertical

No.	Freq					Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
						48.58 49.18			Peak Peak
q	748 00	52 21	38 34	5 74	46 11	50 18	74 00	-23 82	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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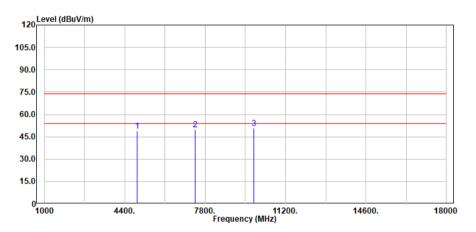
t (86-21) 61915666 t (86-21) 61915666 f (86-21) 61915678 www.sgsgroup.com.cn f (86-21) 61915678 sgs.china@sgs.com



Report No.: SHCR230800162501

Page: 57 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq					Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4924.00 7386.00	60.99 54.74	31.51 36.28			48.95 49.73			Peak Peak
	9848.00	52.36	38.44	5.77	46.06	50.51	74.00	-23.49	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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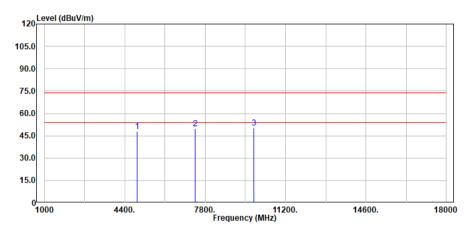
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Report No.: SHCR230800162501

Page: 58 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity : Vertical

No.		Read	Antenna	Cable	Preamp	Emission	Limit	0ver	
	Freq	level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4	924.00	60.21	31.51	4.19	47.74	48.17	74.00	-25.83	Peak
7.	386.00	54.94	36.28	5.49	46.78	49.93	74.00	-24.07	Peak
9	848.00	52.22	38.44	5.77	46.06	50.37	74.00	-23.63	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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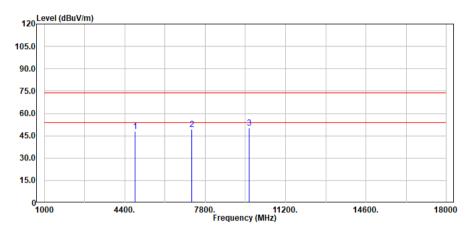
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Report No.: SHCR230800162501

Page: 59 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq					Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
72	824.00 236.00 648.00	60.54 54.73 52.25	35.83	5.36		48.18 49.29 50.06		-24.71	Peak Peak Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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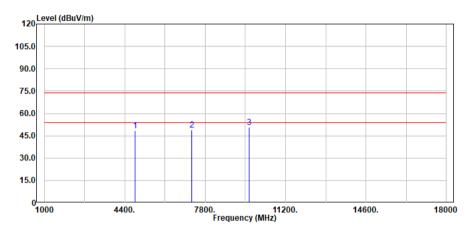
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Report No.: SHCR230800162501

Page: 60 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity : Vertical

No.		Read	Antenna	Cable	Preamp	Emission	Limit	0ver	
	Freq	level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4	824.00	60.95	31.30	4.14	47.80	48.59	74.00	-25.41	Peak
7	236.00	54.47	35.83	5.36	46.63	49.03	74.00	-24.97	Peak
9	648.00	52.87	38.24	5.72	46.15	50.68	74.00	-23.32	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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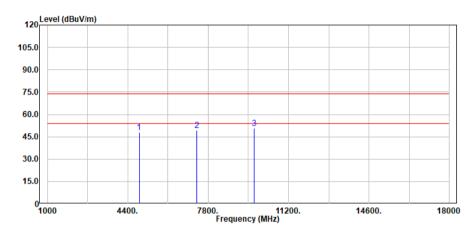
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Report No.: SHCR230800162501

Page: 61 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



Antenna Polarity :Horizontal

No.						Emission Level			Pomonic
	rreq	Tevel	Fac tor	LUSS	rac ton	rever	Line	LIMIT	Kelliank
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4	4874.00	60.21	31.41	4.17	47.77	48.02	74.00	-25.98	Peak
-	7311.00	54.45	36.05	5.42	46.70	49.22	74.00	-24.78	Peak
9	9748.00	52.66	38.34	5.74	46.11	50.63	74.00	-23.37	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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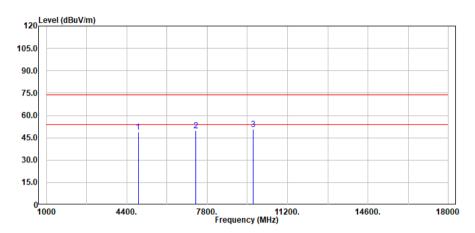
t (86-21) 61915666 t (86-21) 61915666 f (86-21) 61915678 f (86-21) 61915678



Report No.: SHCR230800162501

Page: 62 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



Antenna Polarity :Vertical

No			Antenna Factor						Romank
	rreq	Tevel	ractor.	LOSS	ractor.	rever	Line	LIMIT	Kelliank
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4874.00	60.94	31.41	4.17	47.77	48.75	74.00	-25.25	Peak
	7311.00	55.05	36.05	5.42	46.70	49.82	74.00	-24.18	Peak
	9748.00	52.91	38.34	5.74	46.11	50.88	74.00	-23.12	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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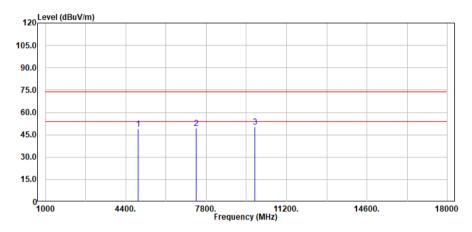
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Report No.: SHCR230800162501

Page: 63 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.						Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4924.00 7386.00	60.75 54.22				48.71 49.21		-25.29 -24.79	Peak Peak
	9848.00					50.42			Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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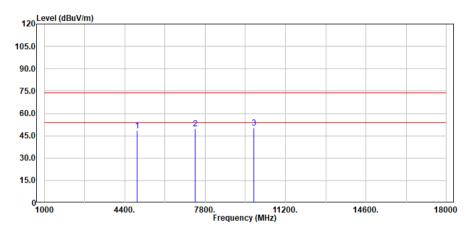
t (86-21) 61915666 t (86-21) 61915666 f (86-21) 61915678 f (86-21) 61915678



Report No.: SHCR230800162501

Page: 64 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity : Vertical

No.		Read	Antenna	Cable	Preamp	Emission	Limit	0ver	
	Freq	level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4	924.00	60.58	31.51	4.19	47.74	48.54	74.00	-25.46	Peak
7.	386.00	54.61	36.28	5.49	46.78	49.60	74.00	-24.40	Peak
9	848.00	52.31	38.44	5.77	46.06	50.46	74.00	-23.54	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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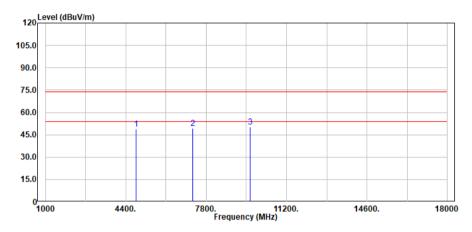
f (86-21) 61915678 f (86-21) 61915678



Report No.: SHCR230800162501

Page: 65 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.			Antenna Factor						Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	7236.00	54.81	31.30 35.83 38.24	5.36	46.63	49.37	74.00		Peak Peak Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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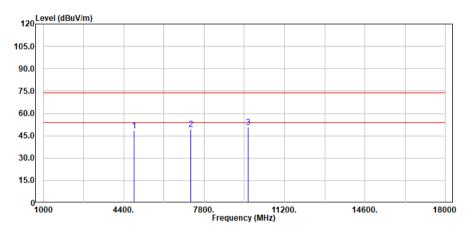
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Report No.: SHCR230800162501

Page: 66 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity : Vertical

No.		Read	Antenna	Cable	Preamp	Emission	Limit	0ver	
	Freq	level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4	824.00	60.78	31.30	4.14	47.80	48.42	74.00	-25.58	Peak
7	236.00	54.58	35.83	5.36	46.63	49.14	74.00	-24.86	Peak
9	648 00	52 93	38 24	5 72	46 15	50 74	74 00	-23 26	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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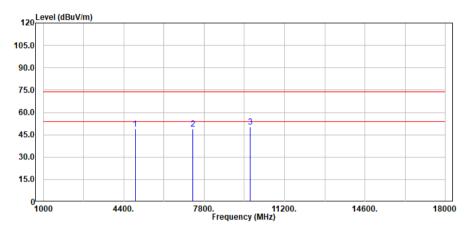
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Report No.: SHCR230800162501

Page: 67 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Antenna Polarity :Horizontal

No.	Freq					Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
						48.87 49.04			Peak Peak
q	748 00	52 52	38 34	5 74	46 11	50 49	74 00	-23 51	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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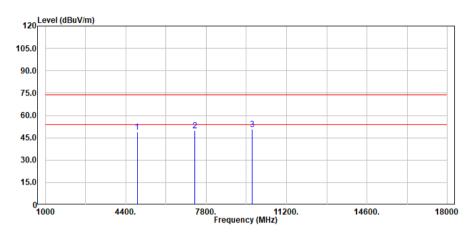
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Report No.: SHCR230800162501

Page: 68 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Antenna Polarity : Vertical

No.	Freq					Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
						48.73 49.79			Peak Peak
q	748.00	52.80	38.34	5.74	46.11	50.77	74.00	-23.23	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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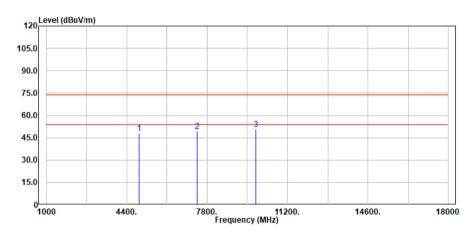
NO.588 West Jindu Road, Songjiang District, Shanghai China 201612 中国・上海・松江区金都西路588号 邮编: 201612 t (86-21) 61915666 t (86-21) 61915666 f (86-21) 61915678 f (86-21) 61915678



Report No.: SHCR230800162501

Page: 69 of 116

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq					Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
7:	924.00 386.00 848.00	60.12 54.48 52.45	31.51 36.28 38.44	5.49	46.78	49.47	74.00	-25.92 -24.53 -23.40	Peak Peak Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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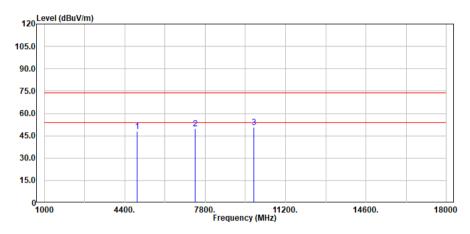
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Report No.: SHCR230800162501

Page: 70 of 116

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity : Vertical

No.	Freq					Emission Level			Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	1924.00 7386.00					48.22 49.81			Peak Peak
q	848.00	52.35	38.44	5.77	46.06	50.50	74.00	-23.50	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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Report No.: SHCR230800162501

71 of 116 Page:

8 **Test Setup Photo**

Refer to Appendix - Test Setup Photo for SHCR2308001625AT

EUT Constructional Details (EUT Photos) 9

Refer to Appendix - Photographs of EUT Constructional Details for SHCR2308001625AT



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Report No.: SHCR230800162501

Page: 72 of 116

10 Appendix

Power level setting using in test:

Channal	802.11b	802.11g	802.11n(HT20)
Channel	Ant 1	Ant 1	Ant 1
1	-3	-3	-5
6	-3	-3	-5
11	-3	-3	-5

1. Duty Cycle

1.1 Ant1

1.1.1 Test Result

				,	Ant1		
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
		2412	4.307	4.409	97.69	0.10	0.04
802.11b	SISO	2437	4.307	4.411	97.64	0.10	0.03
		2462	4.307	4.411	97.64	0.10	0.03
		2412	0.706	0.745	94.77	0.23	0.03
802.11g	SISO	2437	0.706	0.745	94.77	0.23	0.04
		2462	0.705	0.745	94.63	0.24	0.10
000.44		2412	0.670	0.709	94.50	0.25	0.10
802.11n (HT20)	SISO	2437	0.671	0.709	94.64	0.24	0.10
(11120)		2462	0.670	0.709	94.50	0.25	0.03



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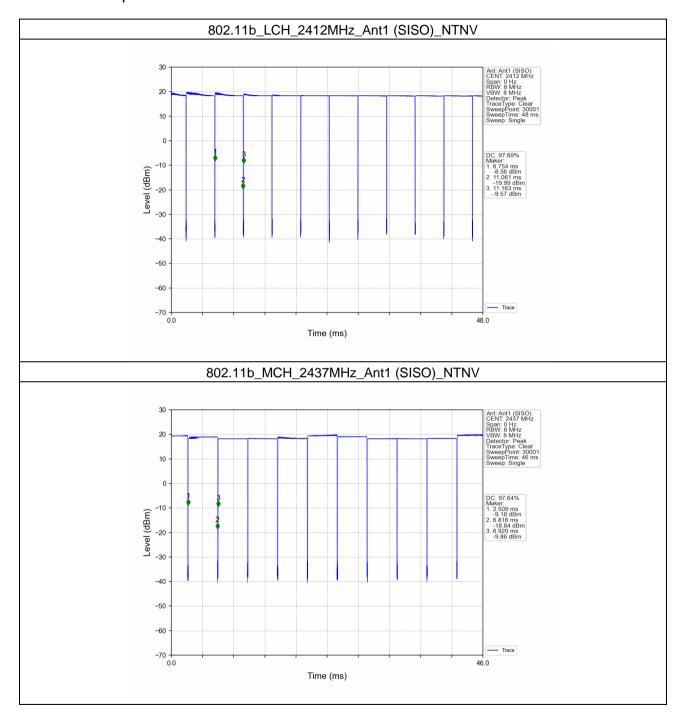
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Report No.: SHCR230800162501

Page: 73 of 116

1.1.2 Test Graph





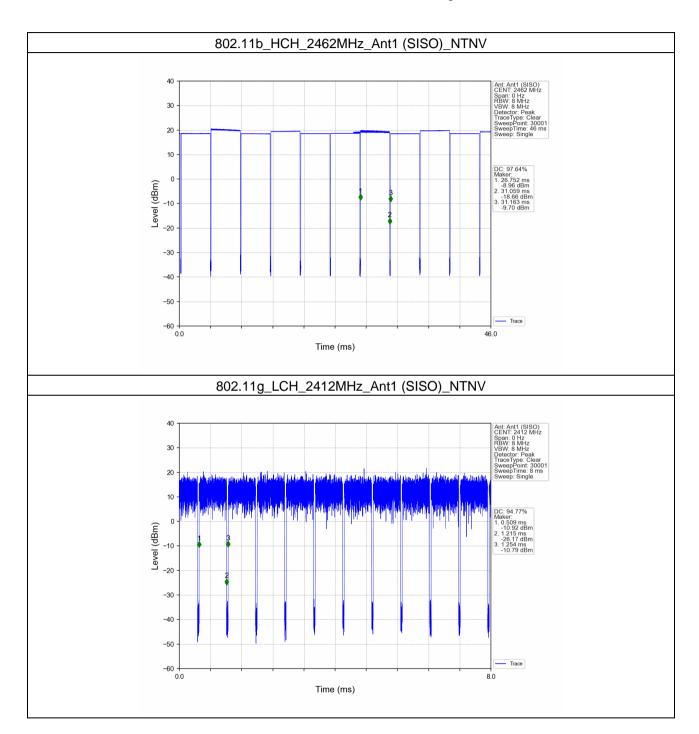
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Report No.: SHCR230800162501

Page: 74 of 116





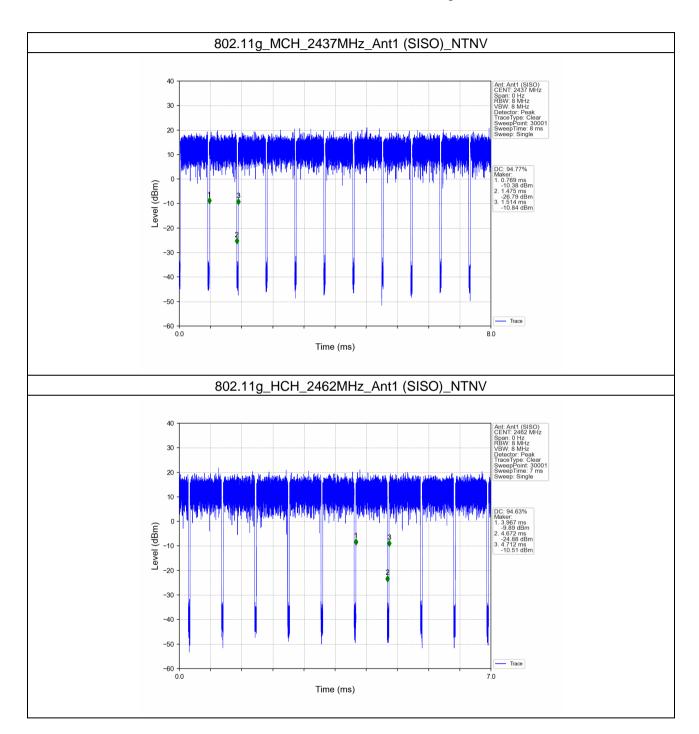
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Report No.: SHCR230800162501

Page: 75 of 116





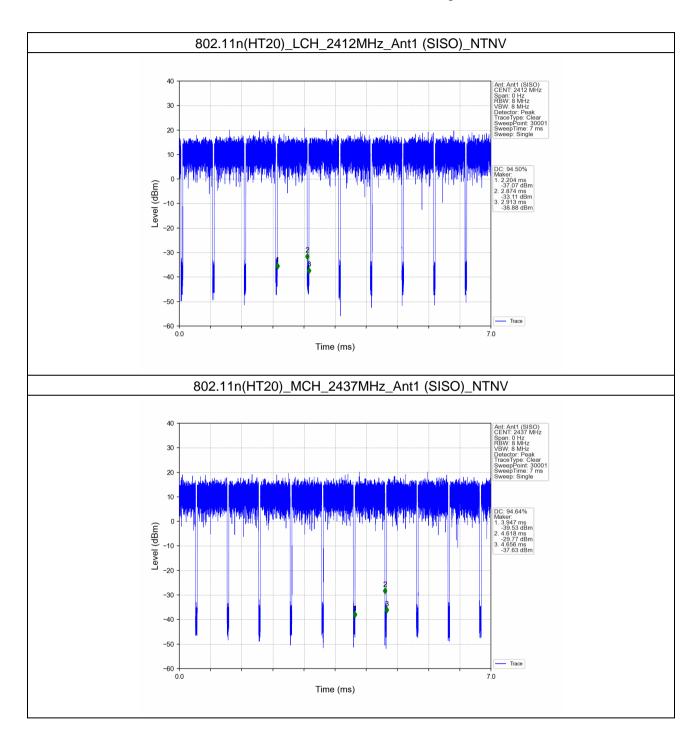
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Report No.: SHCR230800162501

Page: 76 of 116





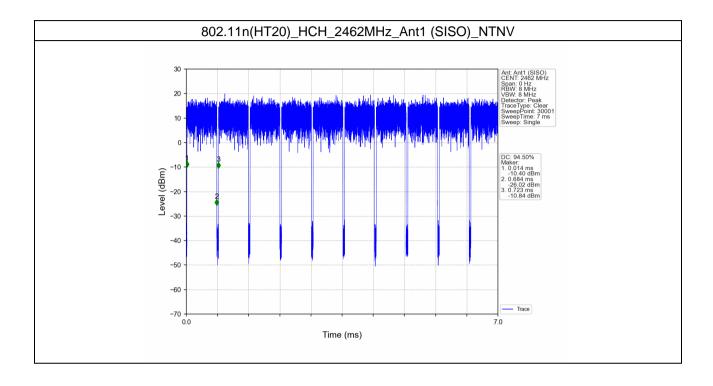
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Page: 77 of 116





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Report No.: SHCR230800162501

Page: 78 of 116

2. Bandwidth

2.1 OBW

2.1.1 Test Result

Mode	TX	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)	Verdict
	Type			Result	
		2412	1	13.105	Pass
802.11b	SISO	2437	1	13.111	Pass
		2462	1	13.128	Pass
	SISO	2412	1	17.380	Pass
802.11g		2437	1	17.343	Pass
		2462	1	17.341	Pass
802.11n (HT20)		2412	1	17.969	Pass
	SISO	2437	1	17.971	Pass
		2462	1	17.967	Pass



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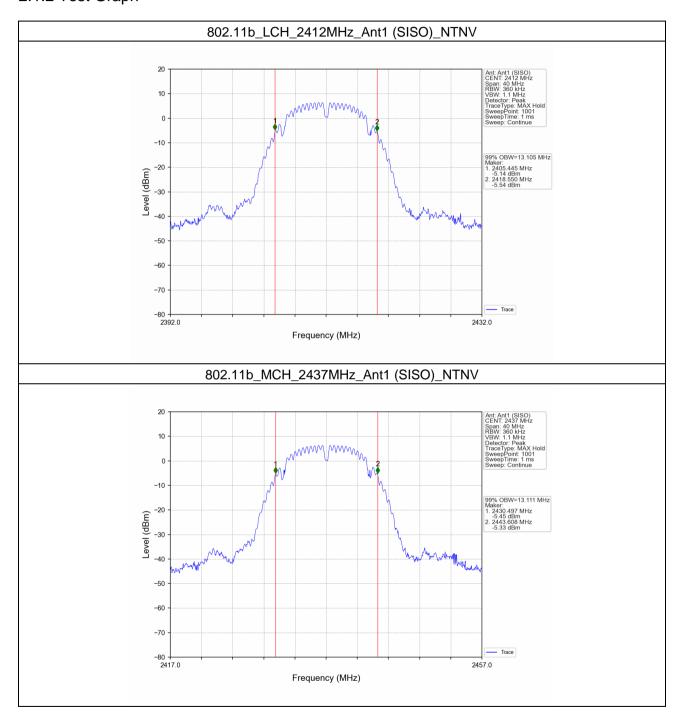
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Report No.: SHCR230800162501

Page: 79 of 116

2.1.2 Test Graph





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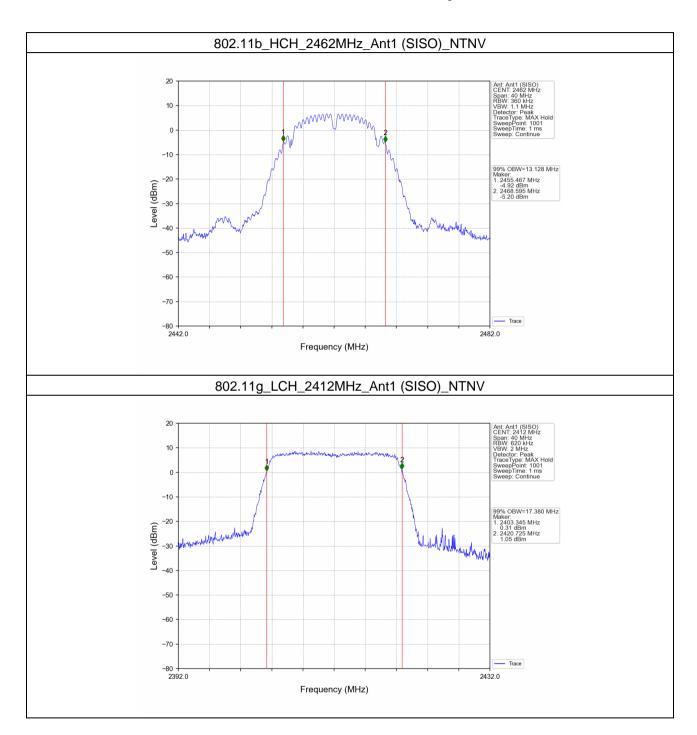
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Report No.: SHCR230800162501

Page: 80 of 116





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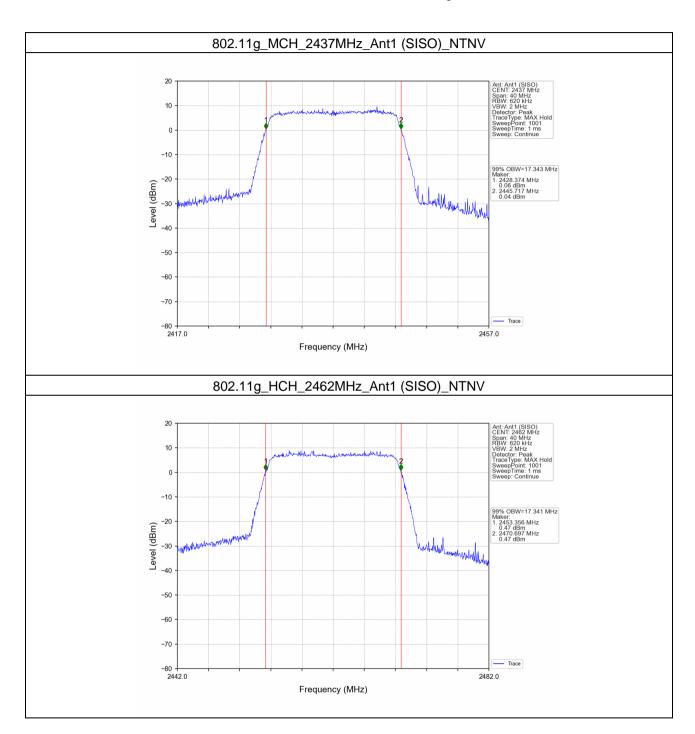
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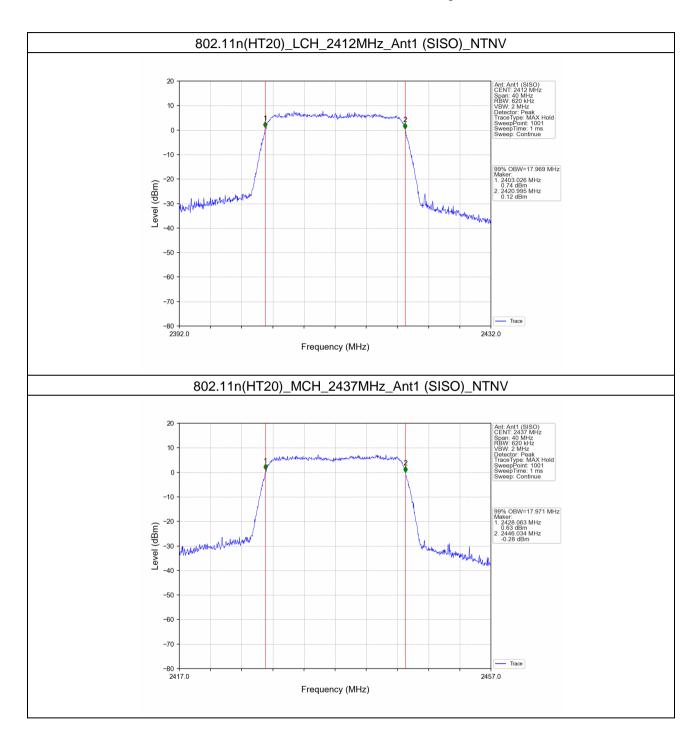
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Report No.: SHCR230800162501

Page: 82 of 116





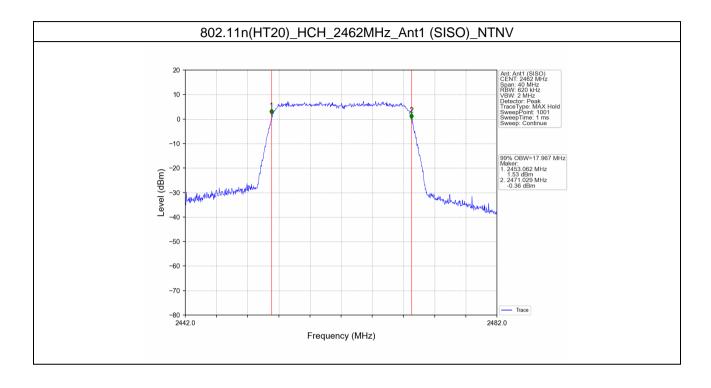
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Report No.: SHCR230800162501

Page: 83 of 116





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Page: 84 of 116

2.2 6dB BW

2.2.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Vardiet
				Result	Limit	Verdict
		2412	1	10.101	>=0.5	Pass Pass Pass Pass Pass Pass
802.11b	SISO	2437	1	10.102	>=0.5	
		2462	1	10.101	>=0.5	Pass
		2412	1	16.408	>=0.5	Pass
802.11g	SISO	2437	1	16.416	>=0.5	
		2462	1	16.421	>=0.5	
802.11n (HT20)		2412	1	17.198	>=0.5	Pass
	SISO	2437	1	17.371	>=0.5	Pass
		2462	1	17.311	>=0.5	Pass Pass Pass Pass



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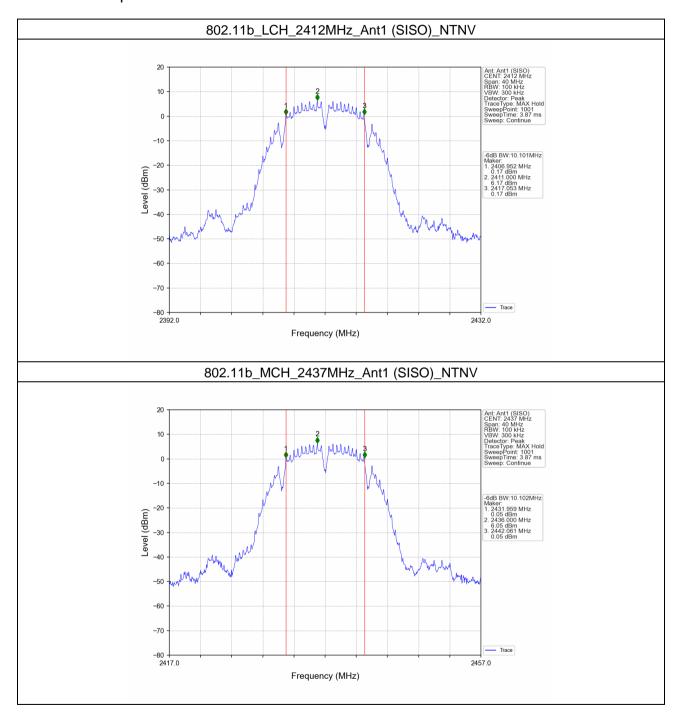
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Report No.: SHCR230800162501

Page: 85 of 116

2.2.2 Test Graph





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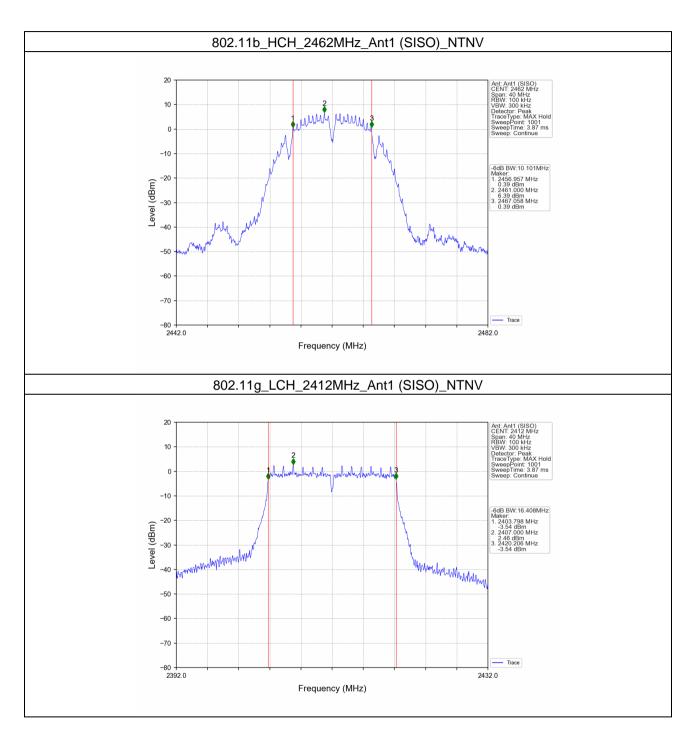
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Report No.: SHCR230800162501

Page: 86 of 116





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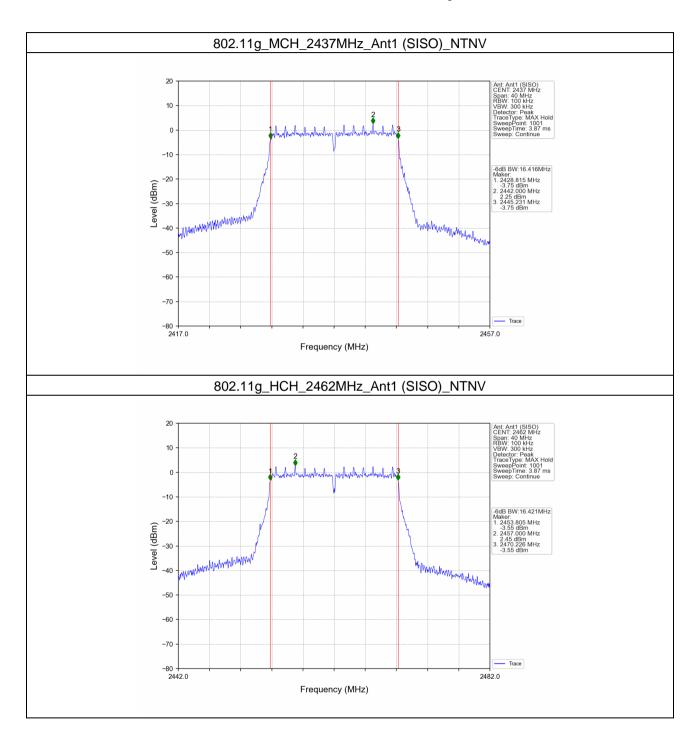
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Report No.: SHCR230800162501

87 of 116 Page:





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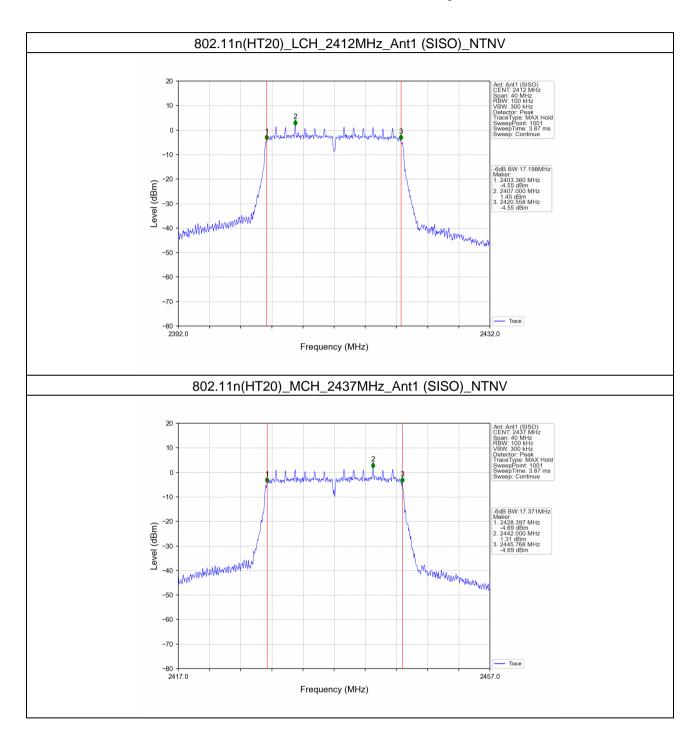
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Report No.: SHCR230800162501

Page: 88 of 116





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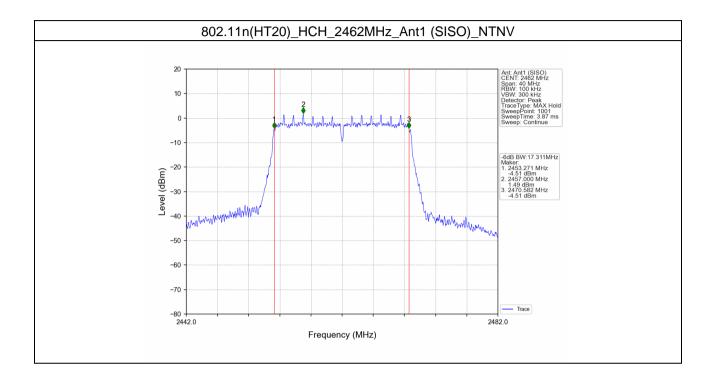
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Report No.: SHCR230800162501

Page: 89 of 116





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Report No.: SHCR230800162501

Page: 90 of 116

3. Maximum Conducted Output Power

3.1 Power

3.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum Average Co (dE	Verdict		
			ANT1	Limit		
802.11b		2412	15.13	<=30	Pass Pass Pass Pass Pass Pass Pass Pass	
	SISO	2437	15.05	<=30	Pass	
		2462	15.34	<=30	Pass	
		2412	13.63	<=30	Pass	
802.11g	SISO	2437	13.42	<=30	Pass	
		2462	13.70	<=30	Pass	
802.11n (HT20)		2412	12.51	<=30	Pass	
	SISO	2437	12.35	<=30	Pass Pass Pass Pass Pass Pass Pass Pass	
		2462	12.63	<=30	Pass	
Note1: Antenna Gain: Ant1: 2.29dBi;						



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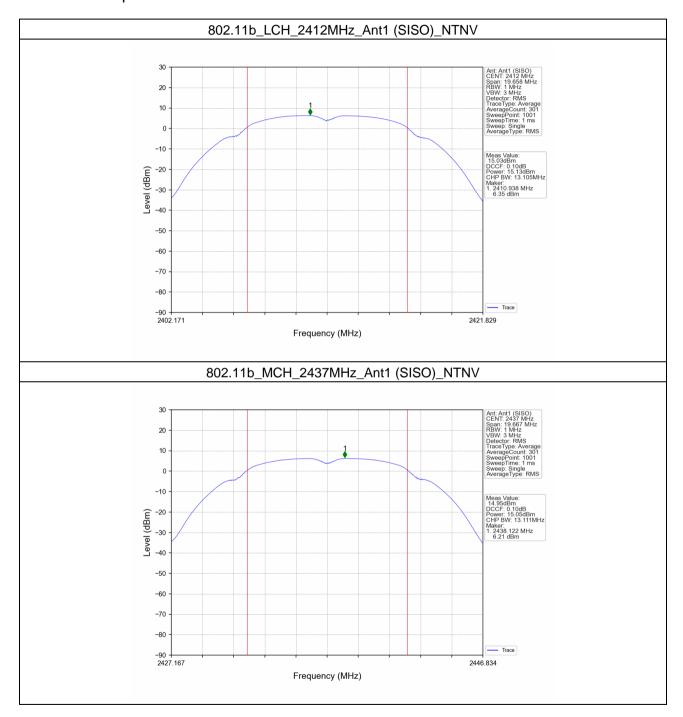
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Report No.: SHCR230800162501

Page: 91 of 116

3.1.2 Test Graph





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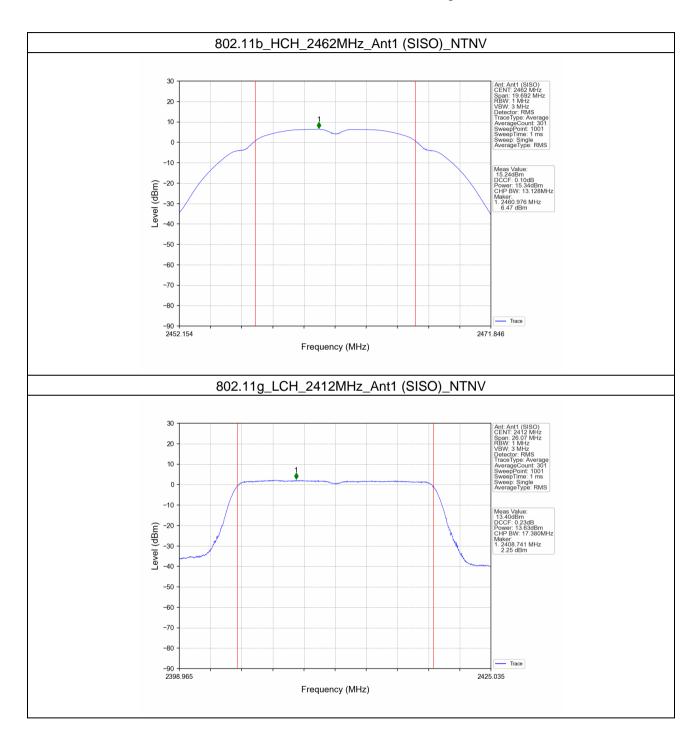
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Report No.: SHCR230800162501

Page: 92 of 116





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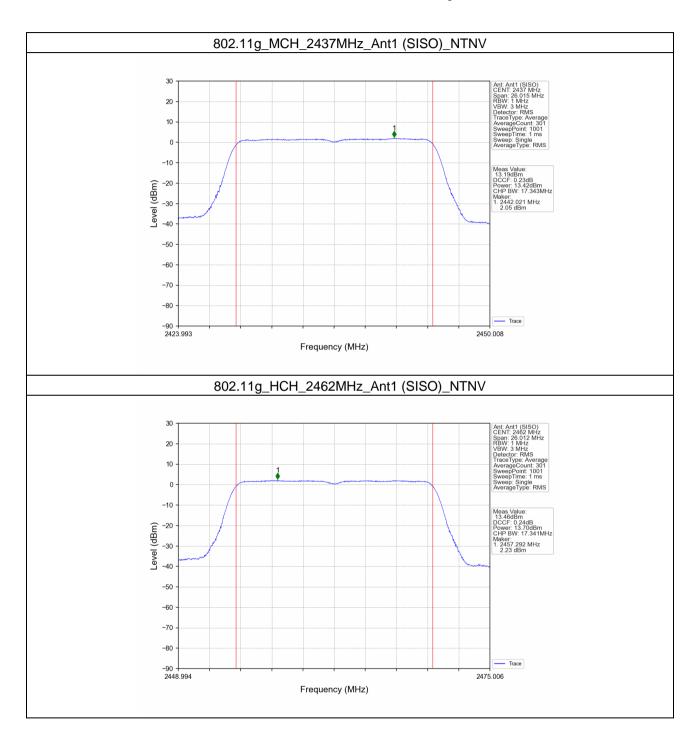
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Report No.: SHCR230800162501

Page: 93 of 116





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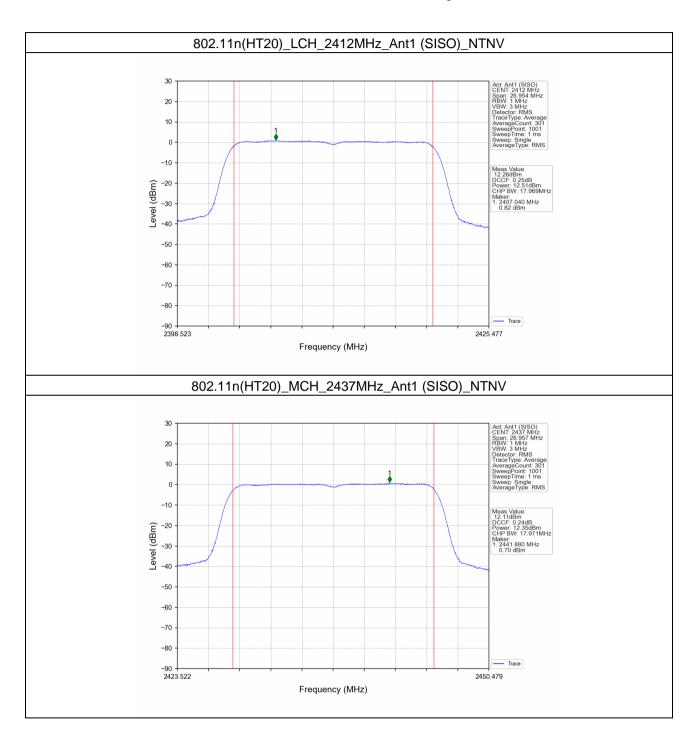
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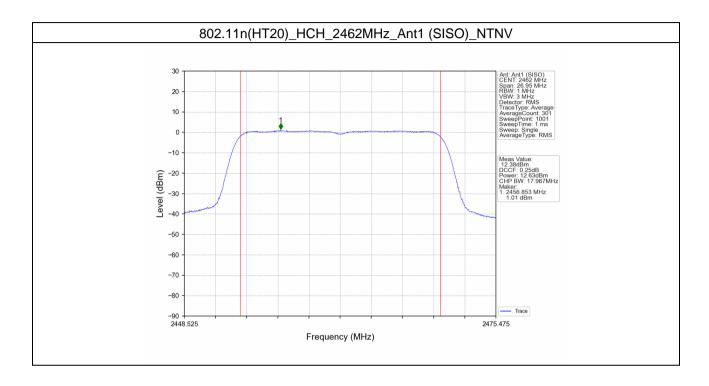
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Report No.: SHCR230800162501

Page: 96 of 116

4. Maximum Power Spectral Density

4.1 PSD

4.1.1 Test Result

Mode	TX	Frequency (MHz)	Maximum PS	\/a = d; a t		
	Туре		ANT1	Limit	Verdict	
		2412	-8.47	<=8	Pass	
802.11b	SISO	2437	-5.77	<=8	Pass	
		2462	-4.85	<=8	Pass	
802.11g	SISO	2412	-12.13	<=8	Pass	
		2437	-11.23	<=8	Pass	
		2462	-11.68	<=8	Pass	
802.11n (HT20)	SISO	2412	-13.15	<=8	Pass	
		2437	-13.61	<=8	Pass	
		2462	-11.94	<=8	Pass	
Note1: Antenna Gain: Ant1: 2.29dBi;						



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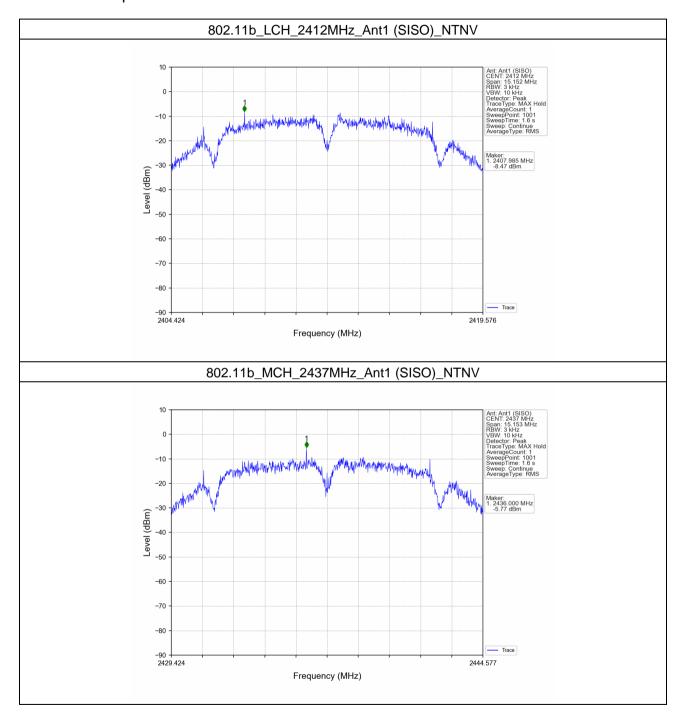
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Page: 97 of 116

4.1.2 Test Graph





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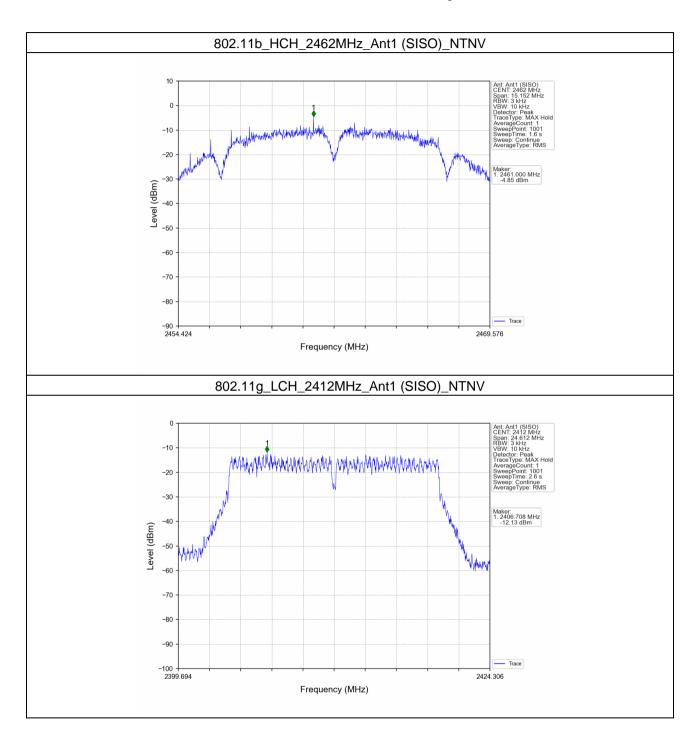
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Report No.: SHCR230800162501

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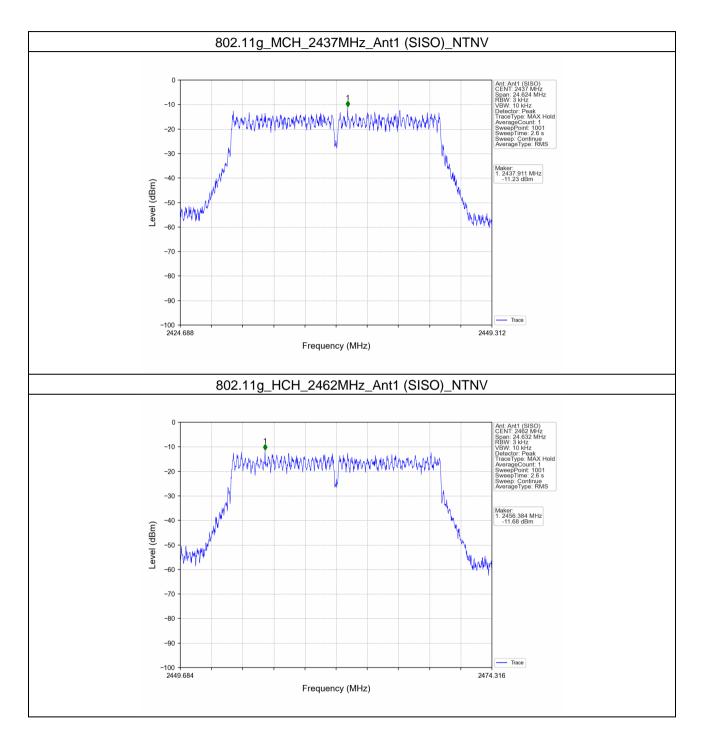
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Page: 99 of 116





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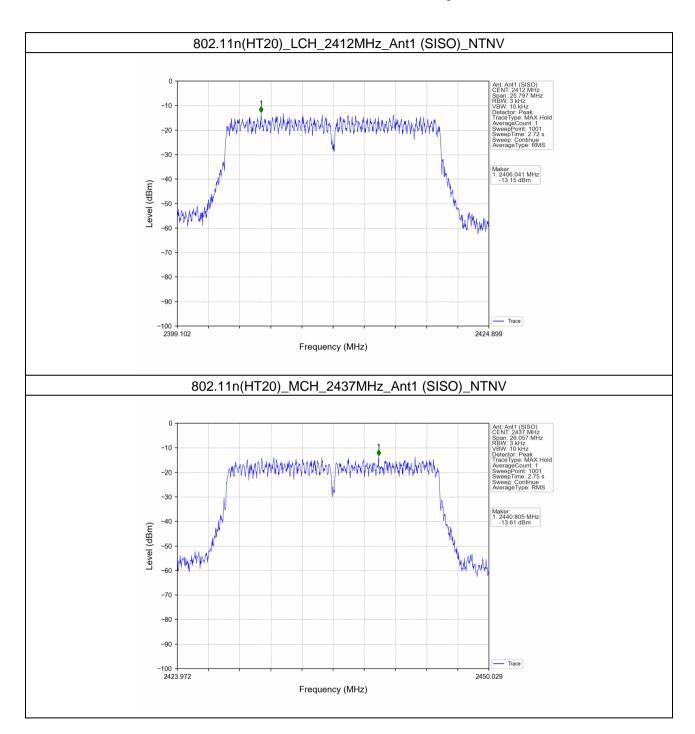
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Page: 100 of 116





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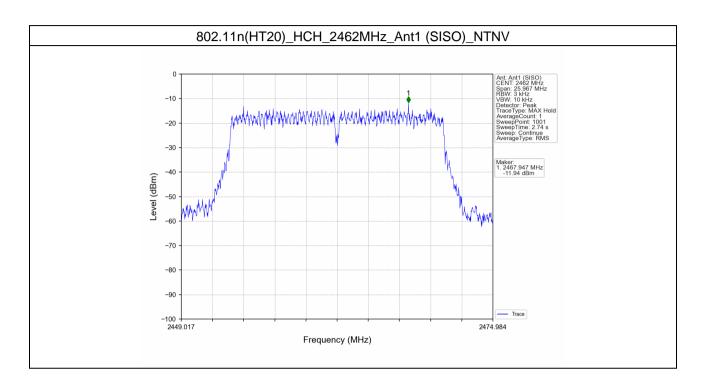
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Report No.: SHCR230800162501

Page: 101 of 116





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Report No.: SHCR230800162501

Page: 102 of 116

5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Ref

5.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
	SISO	2412	1	6.14
802.11b		2437	1	6.07
002.110		2462	1	6.37
	SISO	2412	1	2.44
802.11g		2437	1	2.13
		2462	1	2.37
802.11n (HT20)	SISO	2412	1	1.45
		2437	1	1.29
		2462	1	1.41

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.



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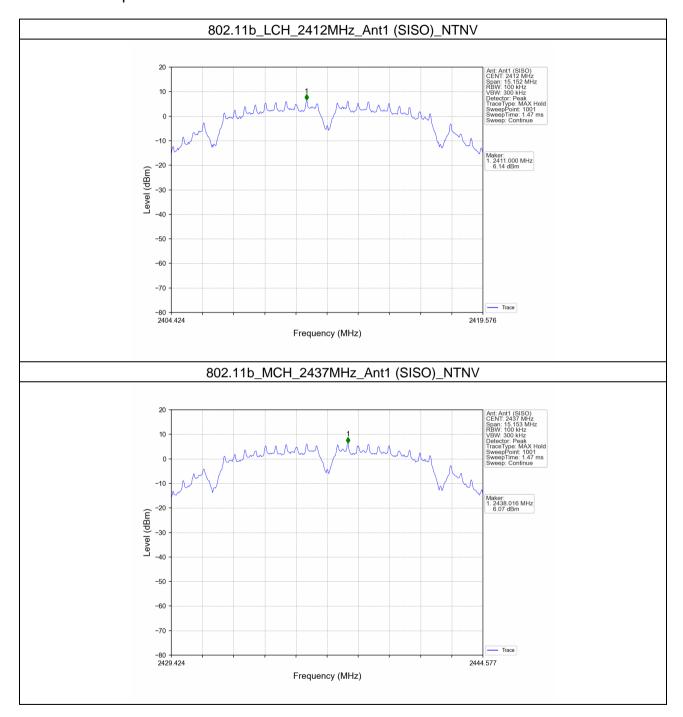
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Report No.: SHCR230800162501

Page: 103 of 116

5.1.2 Test Graph





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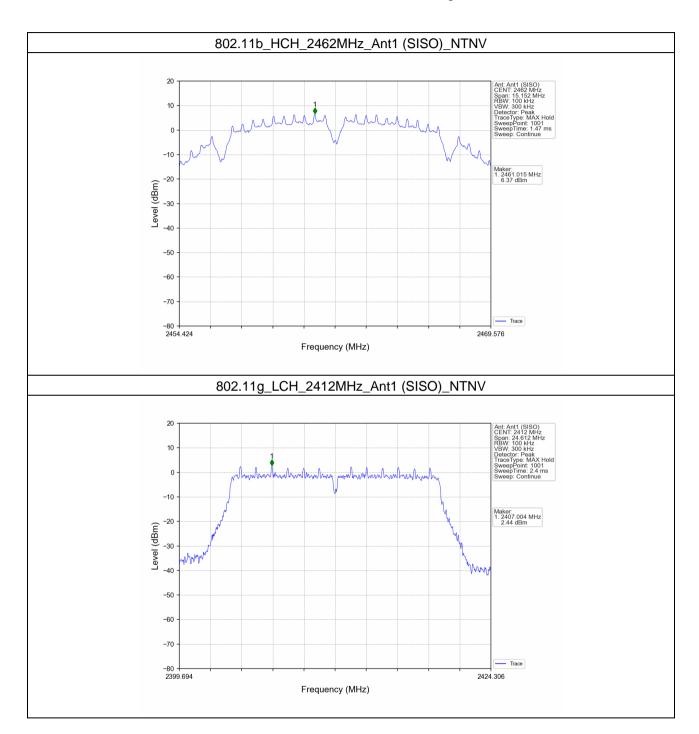
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Report No.: SHCR230800162501

Page: 104 of 116





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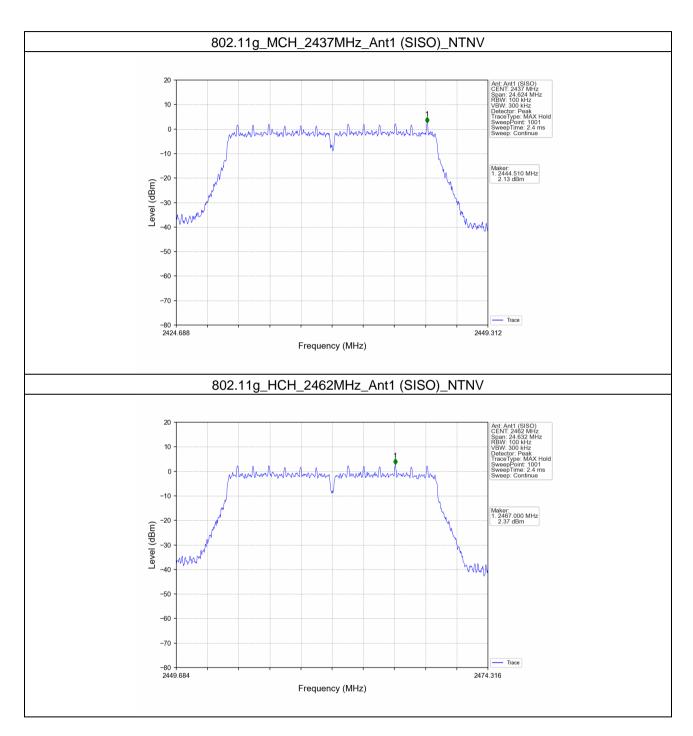
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Report No.: SHCR230800162501

Page: 105 of 116





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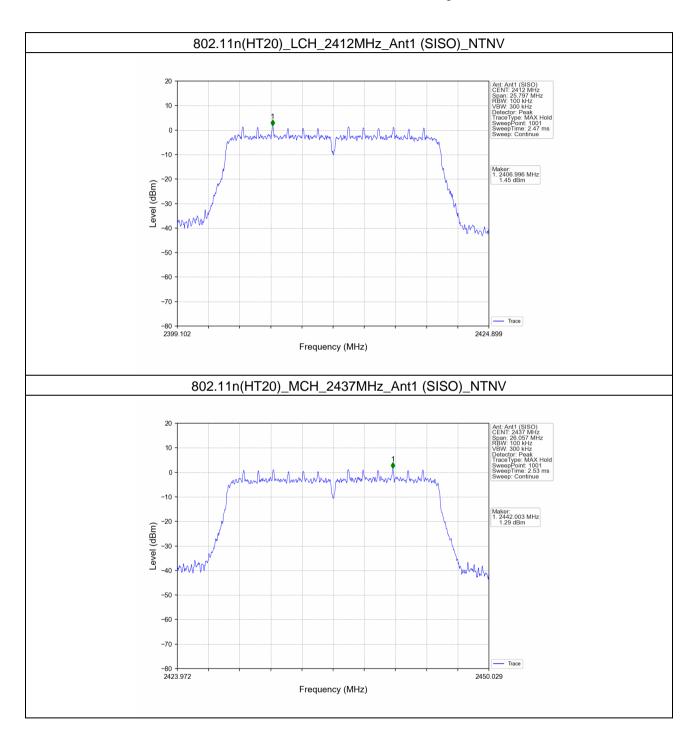
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Report No.: SHCR230800162501

Page: 106 of 116





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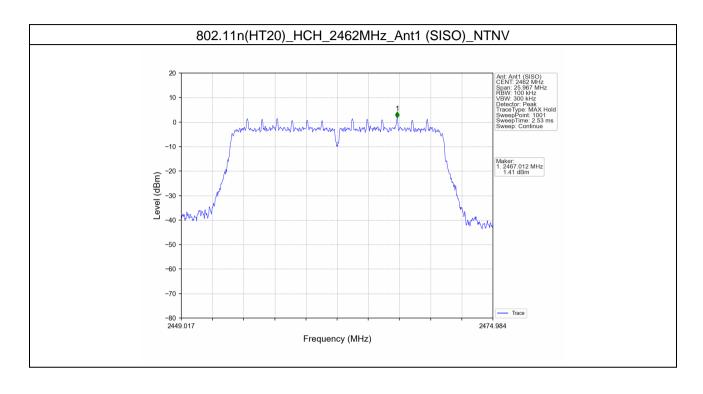
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Report No.: SHCR230800162501

Page: 107 of 116





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Report No.: SHCR230800162501

Page: 108 of 116

5.2 CSE

5.2.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
		2412	1	6.37	-23.63	Pass
802.11b	SISO	2437	1	6.37	-23.63	Pass
		2462	1	6.37	-23.63	Pass
802.11g		2412	1	2.44	-27.56	Pass
	SISO	2437	1	2.44	-27.56	Pass Pass
		2462	1	2.44	-27.56	
802.11n (HT20)		2412	1	1.45	-28.55	Pass
	SISO	2437	1	1.45	-28.55	Pass
		2462	1	1.45	-28.55	Pass

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.



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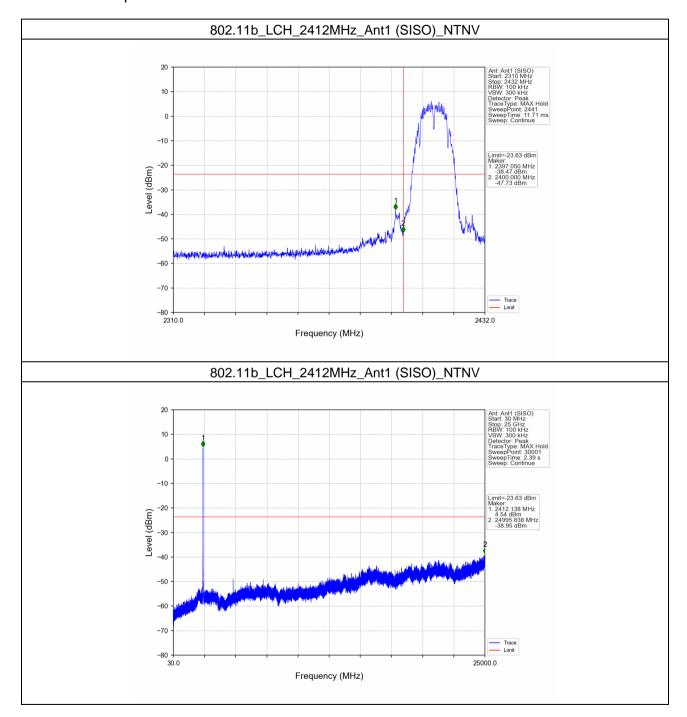
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Report No.: SHCR230800162501

Page: 109 of 116

5.2.2 Test Graph





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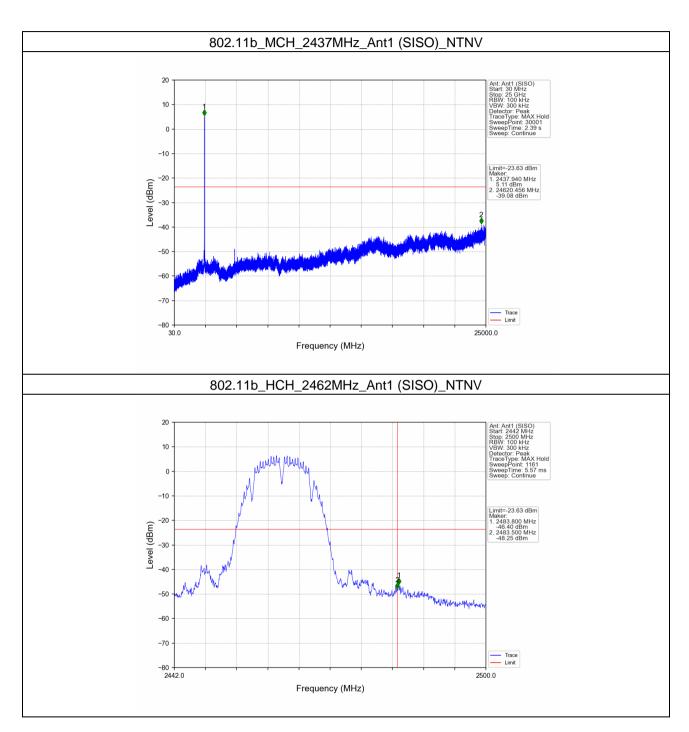
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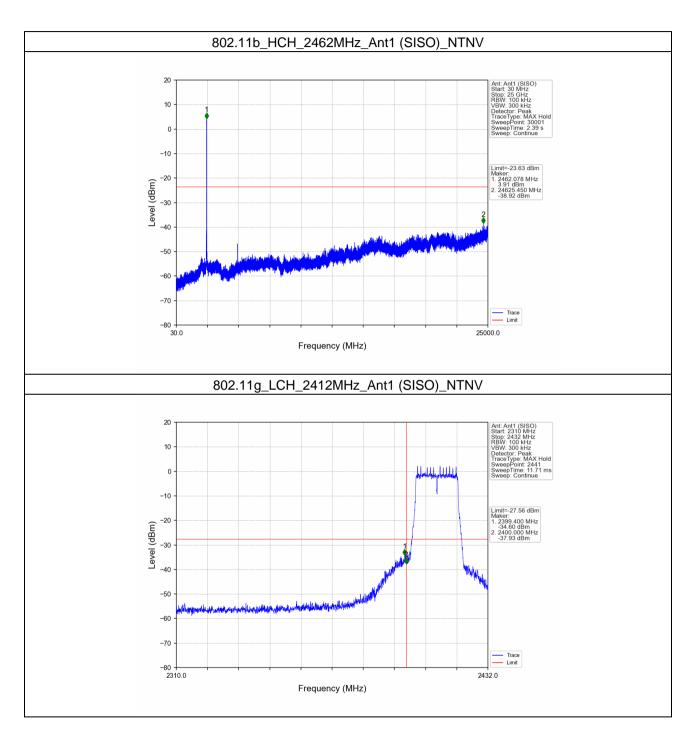
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Report No.: SHCR230800162501

111 of 116 Page:





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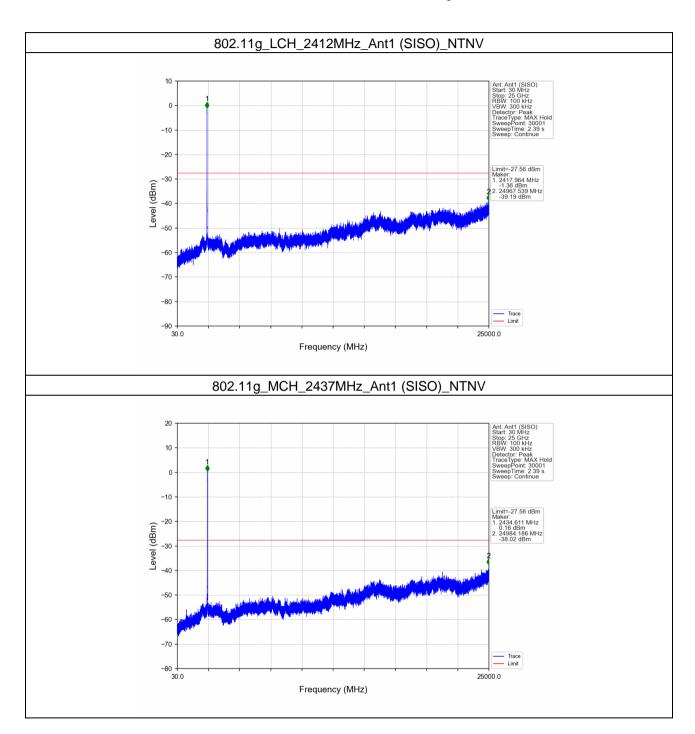
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Report No.: SHCR230800162501

112 of 116 Page:





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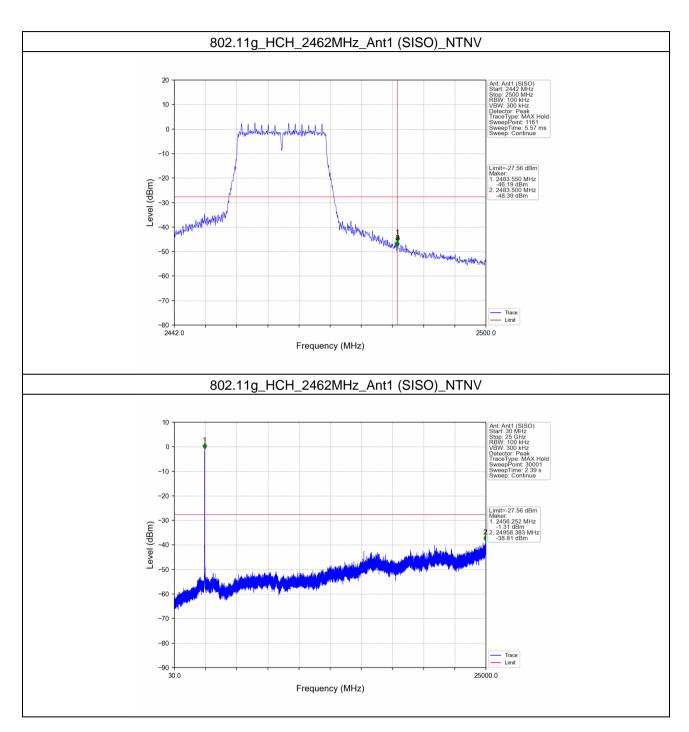
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Report No.: SHCR230800162501

113 of 116 Page:





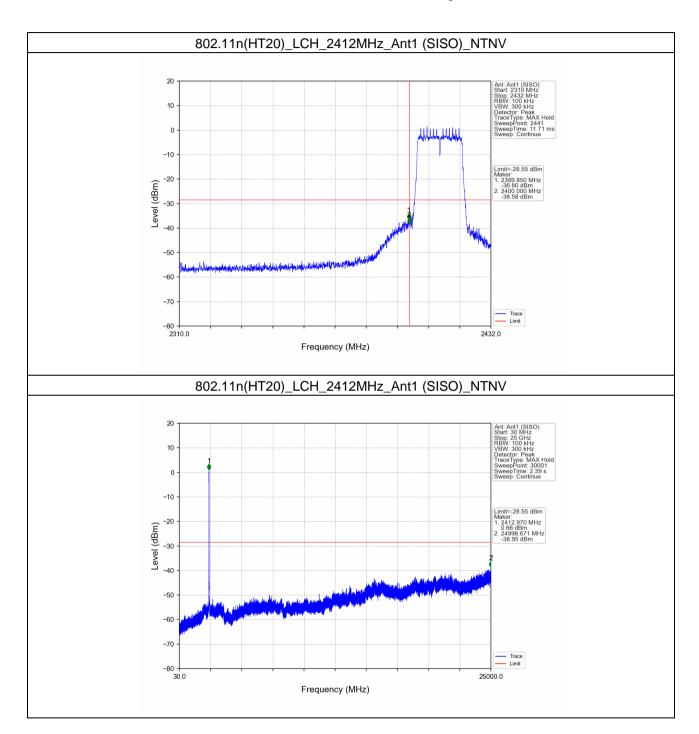
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Page: 114 of 116





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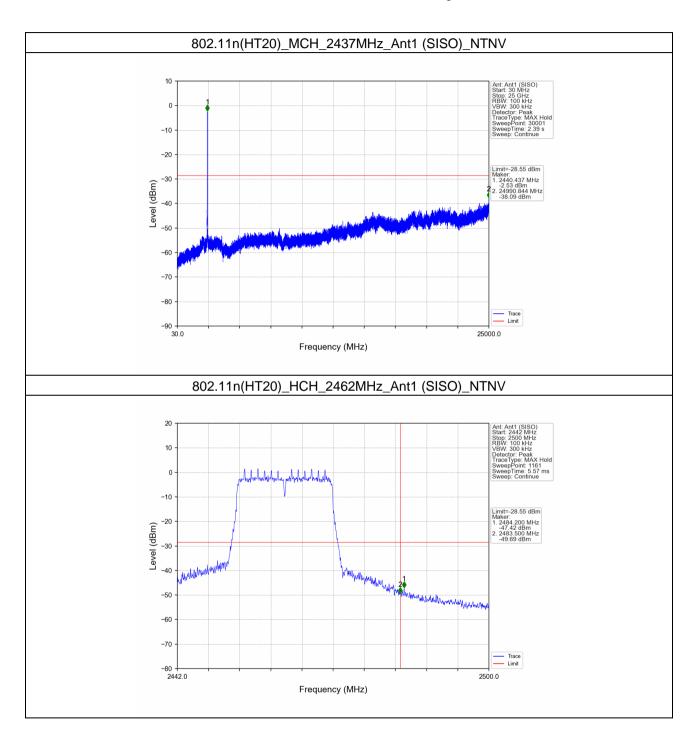
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Report No.: SHCR230800162501

Page: 115 of 116





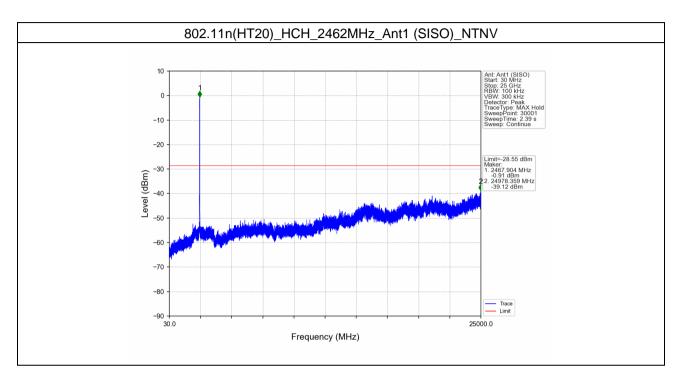
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Report No.: SHCR230800162501

Page: 116 of 116



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