

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

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# TEST REPORT

Test Result:	Pass*
Date of Issue:	2021-06-12
Date of Test:	2021-05-07 to 2021-06-09
Date of Receipt:	2021-04-07
	RSS-Gen Issue 5 Amendment 2 (February 2021)
	RSS-247 Issue 2, February 2017
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Trade mark:	ROCKFIRE
Model No.:	RF320A
EUT Name:	, Robotic Lawn Mower Charging Station
Equipment Under Test (EU	Т):
Address of Manufacturer:	No.1-129, Zhenbei Road, Internet Town, Wuzhen Town, Tongxiang City, Jiaxing City, Zhejiang Province, China
Manufacturer:	Jiaxing Mogo Intelligent Technology Co., Ltd
Address of Applicant:	No.1-129, Zhenbei Road, Internet Town, Wuzhen Town, Tongxiang City, Jiaxing City, Zhejiang Province, China
Applicant:	Jiaxing Mogo Intelligent Technology Co., Ltd
IC:	26829-RF320A
FCC ID:	2AYIFRF320A
Application No.:	SHEM2104002998CR

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

parlan shan

Parlam Zhan Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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Revision Record				
Version	Description	Date	Remark	
00	Original	2021-06-12	/	

Authorized for issue by:	
	Bril WN
	Bill Wu / Project Engineer
	Parlam zhan
	Parlam Zhan / Reviewer



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# 2 Test Summary

Radio Spectrum Tech	•	1	1 1	
ltem	FCC Requirement	IC Requirement	Method	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	RSS-Gen Clause 6.8	N/A	Customer Declaration
N/A: Not applicable			·	
Radio Spectrum Matt	er Part			
ltem	FCC Requirement	IC Requirement	Method	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.207	RSS-Gen Clause 8.8	ANSI C63.10 (2013) Section 6	.2 Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247a(2)	RSS-247 Clause 5.2(a)	ANSI C63.10 (2013) Section 11.8.1	Pass
Conducted Average Output Power	47 CFR Part 15, Subpart C 15.247(b)(3)	RSS-247 Clause 5.4(d)	ANSI C63.10 (2013) Section 11.9.2	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247(e)	RSS-247 Clause 5.2(b)	ANSI C63.10 (2013) Section 11.10.3	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Clause 5.5	ANSI C63.10 (2013) Section 11.13.3.2	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Clause 5.5	ANSI C63.10 (2013) Section 11.11	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.10.5	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.4,6.5,6.6	Pass
99% Bandwidth	-	RSS-Gen Section 6.7	ANSI C63.10 Section 6.9.3	Pass



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#### **General Information** 4

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

Power supply:	DC 30V by adapter
	Charging adapter:
	Model:GM95-310250-1FE
	Input:100-240V~50/60Hz 2.5A
	Output:31V 2.5A
Test voltage:	AC 120V/60Hz
Antenna Gain:	2.5dBi (Provided by manufacturer)
Antenna Type:	PIFA Antenna
Channel Spacing:	5MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK)
	802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
	802.11n(HT40):7
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
	802.11n(HT40): 2422MHz to 2452MHz
Date Rate:	802.11b:1/2/5.5./11Mbps
	802.11g:6/9/12/18/24/36/48/54Mbps
	802.11n:MCS0-MCS7
S/N:	RF320AB8N1
Firmware Version:	V1.1.0
	wave Huste

#### 4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	ThinkPad X100e	/
Serial port adapter plate	/	Test Plate 3	/

#### 4.3 Power level setting using in test

30

30

Channel	802.11b	802.11g	802.11n(HT20)
1	20	29	30
6	20	29	30
11	20	29	30
Channel	802.11n(HT40)		
3	30		



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## 4.4 Measurement Uncertainty

Radio Frequency	
rtadio i requeito y	8.4 x 10 <sup>-8</sup>
Timeout	2s
Duty Cycle	0.37%
Occupied Bandwidth	3%
RF Conducted Power	0.6dB
RF Power Density	2.9dB
Conducted Spurious Emissions	0.75dB
PE Dedicted Dower	5.2dB (Below 1GHz)
RF Radiated Powel	5.9dB (Above 1GHz)
	4.2dB (Below 30MHz)
Dedicted Sourious Emission Test	4.5dB (30MHz-1GHz)
Radiated Spurious Emission Test	5.1dB (1GHz-18GHz)
	5.4dB (Above 18GHz)
Temperature Test	1°C
Humidity Test	3%
Supply Voltages	1.5%
Time	3%
	Duty Cycle         Occupied Bandwidth         RF Conducted Power         RF Power Density         Conducted Spurious Emissions         RF Radiated Power         Radiated Spurious Emission Test         Temperature Test         Humidity Test         Supply Voltages

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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### 4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

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

No tests were sub-contracted.

#### 4.6 Test Facility

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

#### • CNAS (No. CNAS L0599)

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2017 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. 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.

4.7 Deviation from Standards

None

# 4.8 Abnormalities from Standard Conditions



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# 5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Conducted Emission at Ma			inventory No	Gai Date	Cal Due Date
EMI test receiver	R&S	ESR7	SHEM162-1	2020-12-20	2021-12-19
LISN	Schwarzbeck	NSLK8127	SHEM061-1	2020-12-20	2021-12-19
LISN	EMCO	3816/2	SHEM019-1	2020-12-20	2021-12-19
	R&S				2021-12-19
Pulse limiter		ESH3-Z2	SHEM029-1	2020-12-20	
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2020-12-20	2021-12-19
CE test Cable	/	CE01	/	2020-12-20	2021-12-19
Test software	ESE	E3	Version: 6.111221a	/	/
RF Conducted Test	ł	L			
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2020-12-20	2021-12-19
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2020-08-13	2021-08-12
Signal Generator	R&S	SMR20	SHEM006-1	2020-08-13	2021-08-12
Signal Generator	Agilent	N5182A	SHEM182-1	2020-08-13	2021-08-12
Communication Tester	R&S	CMW270	SHEM183-1	2020-08-13	2021-08-12
Switcher	Tonscend	JS0806	SHEM184-1	2020-08-13	2021-08-12
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2020-08-13	2021-08-12
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	1	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2018-09-25	2021-09-24
AC Power Stabilizer	APC	KDF-31020T-V0-F0	SHEM216-1	2020-12-20	2021-12-19
DC Power Supply	MCH	MCH-303A	SHEM210-1	2020-12-20	2021-12-19
Conducted test Cable	/	RF01~RF04	/	2020-12-20	2021-12-19
	,	JS Tonscend			
Test software	Tonscend	BT/WIFI System	Version: 2.6	/	/
RF Radiated Test		,			
EMI test Receiver	R&S	ESU40	SHEM051-1	2020-12-20	2021-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2020-12-20	2021-12-19
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2020-12-20	2021-12-19
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2019-10-14	2021-10-13
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2020-04-30	2022-04-29
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2018-10-24	2021-10-23
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2019-10-14	2021-10-13
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2018-10-31	2021-10-30
Pre-amplifier (9KHz-2GHz)	CLAVIIO	BDLNA-0001	SHEM164-1	2020-08-13	2021-08-12
Pre-amplifier (1-18GHz)	CLAVIIO	BDLNA-0118	SHEM050-2	2020-08-13	2021-08-12
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2020-12-20	2021-12-19
Signal Generator	R&S	SMR40	SHEM058-1	2020-08-13	2021-08-12
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	SHEM153-1 SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-2 SHEM157-1	1	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	1	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM157-3 SHEM078-2	/ 2020-05-25	2023-05-24
RE test Cable	/	RE01, RE02, RE06	/	2020-03-23	2023-05-24
	/		Version:	2020-12-20	
Test software	ESE	E3	6.111221a	/	/



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# 6 Radio Spectrum Technical Requirement

#### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 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 PIFA antenna and no consideration of replacement. The best case gain of the antenna is 2.5dBi.

Antenna location: Refer to Appendix (Internal Photos)



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

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

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

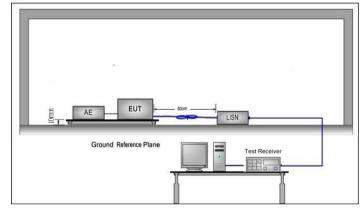
	Conducted limit(dBµV)				
Frequency of emission(MHz)	Quasi-peak	Average			
0.15-0.5	66 to 56*	56 to 46*			
0.5-5	56	46			
5-30	60	50			
*Decreases with the logarithm of the frequency.					

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

**Operating Environment:** 

Temperature: 22 °C Atmospheric Pressure: 1001 mbar Humidity: 50 % RH Test mode c:TX mode Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

#### 7.1.2 Test Setup Diagram





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#### 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/50 $\mu$ H + 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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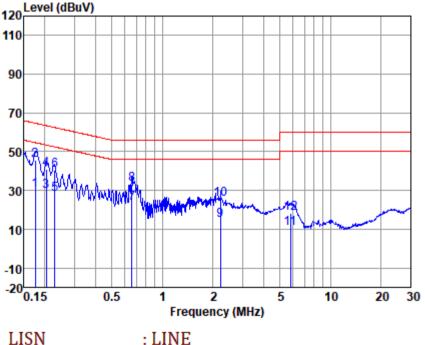
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Mode:a; Line:Live Line



EUT/Project No: 2997CR Test Mode : a

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.17	19.92	0.20	9.91	30.03	54.72	-24.69	Average
2	0.17	35.27	0.20	9.91	45.38	64.72	-19.34	QP -
3	0.20	19.44	0.20	9.93	29.57	53.45	-23.88	Average
4	0.20	31.00	0.20	9.93	41.13	63.45	-22.32	QP -
5	0.23	17.75	0.20	9.93	27.88	52.48	-24.60	Average
6	0.23	30.47	0.20	9.93	40.60	62.48	-21.88	QP -
7	0.66	13.49	0.20	9.91	23.60	46.00	-22.40	Average
8	0.66	23.34	0.20	9.91	33.45	56.00	-22.55	QP
9	2.22	4.37	0.20	9.95	14.52	46.00	-31.48	Average
10	2.22	15.37	0.20	9.95	25.52	56.00	-30.48	QP
11	5.80	0.23	0.20	10.05	10.48	50.00	-39.52	Average
12	5.80	8.22	0.20	10.05	18.47	60.00	-41.53	QP
No	Notor, Emission Loval - Road Loval - LTSN Easton - Cable loss							

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



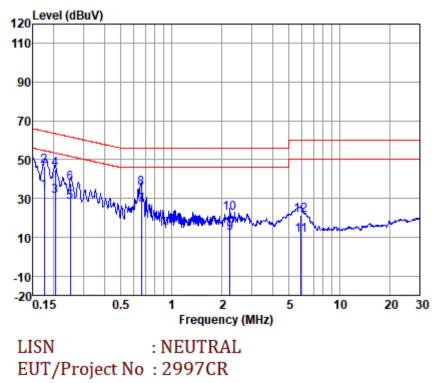
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Mode:a; Line:Neutral Line



Test Mode : a

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark		
1	0.17	23.43	0.20	9.91	33.54	54.72	-21.18	Average		
2	0.17	36.42	0.20	9.91	46.53	64.72	-18.19	QP -		
3	0.20	21.21	0.20	9.93	31.34	53.45	-22.11	Average		
4	0.20	34.82	0.20	9.93	44.95	63.45	-18.50	QP -		
5	0.25	17.69	0.20	9.93	27.82	51.73	-23.91	Average		
6	0.25	27.66	0.20	9.93	37.79	61.73	-23.94	QP		
7	0.66	16.36	0.20	9.91	26.47	46.00	-19.53	Average		
8	0.66	25.40	0.20	9.91	35.51	56.00	-20.49	QP		
9	2.24	1.84	0.20	9.95	11.99	46.00	-34.01	Average		
10	2.24	11.97	0.20	9.95	22.12	56.00	-33.88	QP		
11	5.93	0.62	0.20	10.05	10.87	50.00	-39.13	Average		
12	5.93	11.33	0.20	10.05	21.58	60.00	-38.42	QP		
No	Notes: Emission Level - Read Level +LISN Eactor + Cable loss									

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



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#### 7.2 Minimum 6dB Bandwidth

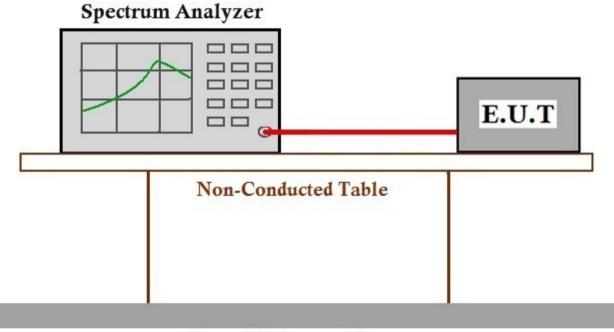
Test Requirement	47 CFR Part 15, Subpart C 15.247a(2)
Test Method:	ANSI C63.10 (2013) Section 11.8.1
Limit:	≥500 kHz

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

**Operating Environment:** 

Temperature:22 °CHumidity:50 % RHAtmospheric Pressure:1001 mbarTest modec:TX mode\_Keep the EUT in continuously transmitting mode with all modulation<br/>types. All data rates for each modulation type have been tested and found the<br/>data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the<br/>worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE<br/>802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).<br/>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 B for SHEM210400299802



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### 7.3 Conducted Average Output Power

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

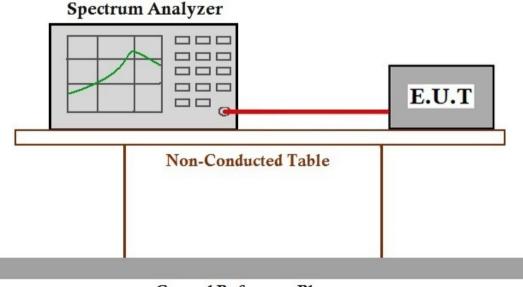
Frequency range(MHz)	Output power of the intentional radiator(watt)		
	1 for ≥50 hopping channels		
902-928	0.25 for 25≤ hopping channels <50		
	1 for digital modulation		
	1 for ≥75 non-overlapping hopping channels		
2400-2483.5	0.125 for all other frequency hopping systems		
	1 for digital modulation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

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

Operating Environment:

Humidity: 50 % RH Temperature: 22 °C Atmospheric Pressure: 1001 mbar Test mode c:TX mode Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

#### 7.3.2 Test Setup Diagram



## Ground Reference Plane

#### 7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix B for SHEM210400299802



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### 7.4 Power Spectrum Density

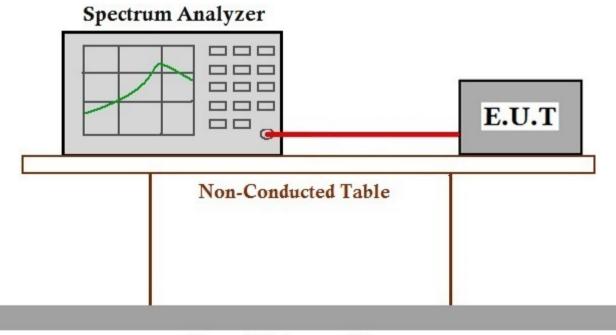
Test Requirement	47 CFR Part 15, Subpart C 15.247(e)
Test Method:	ANSI C63.10 (2013) Section 11.10.2
Limit:	$\leq$ 8dBm in any 3 kHz band during any time interval of continuous transmission

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

Operating Environment:

Temperature:22 °CHumidity:50 % RHAtmospheric Pressure:1001 mbarTest modec TX mode\_Keep the EUT in continuously transmitting mode with all modulation<br/>types. All data rates for each modulation type have been tested and found the<br/>data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the<br/>worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE<br/>802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).<br/>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 B for SHEM210400299802



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#### 7.5 Conducted Band Edges Measurement

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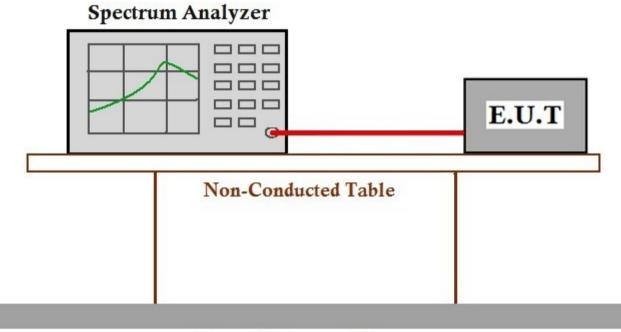


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#### 7.5.1 E.U.T. Operation

Operating Enviro	onment:			
Temperature:	22 °C Humie	dity: 50 % RH	Atmospheric Pressure:	1001 mbar
Test mode	types. All data rates for data rate @ 1Mbps is worst case of IEEE 80	or each modulation t the worst case of IE (2.11g; data rate @ ( rate @ 13.5Mbps is	transmitting mode with all r ype have been tested and for EE 802.11b; data rate @ 61 6.5Mbps is the worst case of the worst case of IEEE 802 the report.	ound the Mbps is the of IEEE

#### 7.5.2 Test Setup Diagram



# **Ground Reference Plane**

#### 7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix B for SHEM210400299802



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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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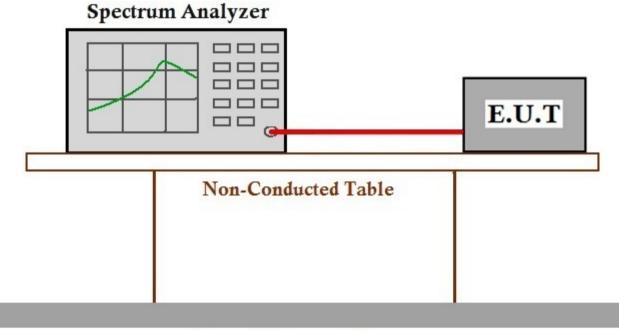


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#### 7.6.1 E.U.T. Operation

	=						
Operating Enviro	Operating Environment:						
Temperature:	22 °C	Humidity:	50	% RH	Atmospheric Pressure: 1001 mba	ar	
Test mode	types. All data data rate @ 1 worst case of 802.11n(HT2	a rates for eac IMbps is the w IEEE 802.11	ch mo /orst o g; dat D 13.	dulation ty case of IE a rate @ 6 5Mbps is t	transmitting mode with all modulation /pe have been tested and found the EE 802.11b; data rate @ 6Mbps is the 6.5Mbps is the worst case of IEEE the worst case of IEEE 802.11n(HT40). the report.		

#### 7.6.2 Test Setup Diagram



# **Ground Reference Plane**

#### 7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix B for SHEM210400299802



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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** ANSI C63.10 (2013) Section 6.10.5 Test Method: 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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#### 7.7.1 E.U.T. Operation

Operating Enviro	onment:			
Temperature:	22 °C	Humidity:	50 % RH	Atmospheric Pressure: 1001 mbar
Test mode	types. All da data rate @ worst case 802.11n(HT	ata rates for eac 1Mbps is the w of IEEE 802.11g	h modulatio orst case of g; data rate 0 13.5Mbps	sly transmitting mode with all modulation n type have been tested and found the IEEE 802.11b; data rate @ 6Mbps is the @ 6.5Mbps is the worst case of IEEE is the worst case of IEEE 802.11n(HT40). in the report.



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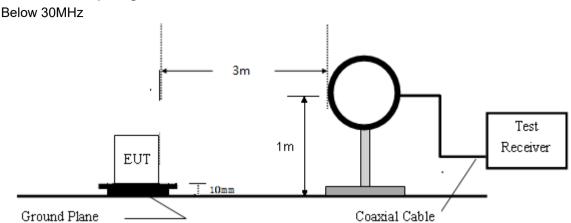
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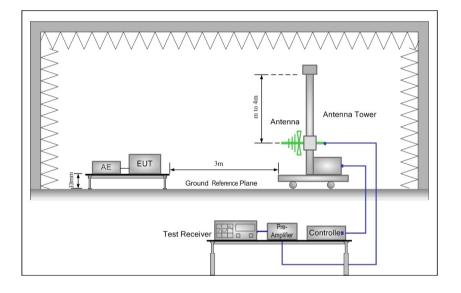
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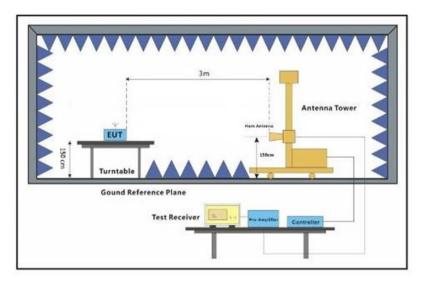
#### 7.7.2 Test Setup Diagram



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 10 mm 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

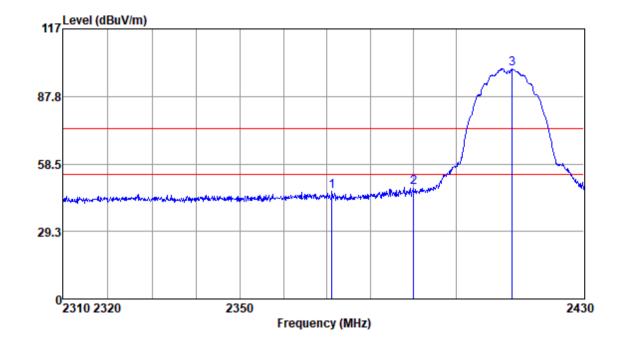
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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

#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
2371.16 2390.00	52.50 54.16	28.96 28.97	2.75 2.77	37.39 37.40	dBuv/m 46.82 48.50 99.55	74.00 74.00	-27.18 -25.50	Peak

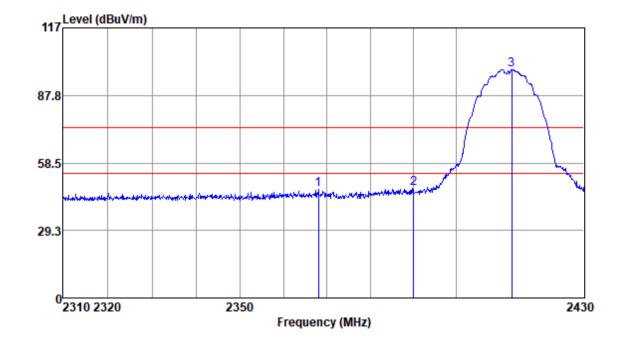
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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

#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2368.04	52.65	28.94	2.75	37.38	46.96	74.00	-27.04	Peak
2390.00	53.00	28.97	2.77	37.40	47.34	74.00	-26.66	Peak
2412.95	104.56	29.02	2.80	37.43	98.95	74.00	24.95	Peak

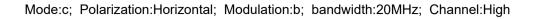
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

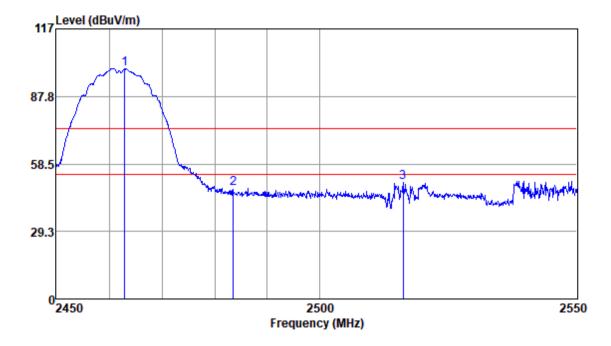


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#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
2462.87 2483.50	105.36 53.59	29.07 29.11	2.86 2.88	37.53 37.57	dBuv/m 99.76 48.01 50.49	74.00 74.00	25.76 -25.99	Peak

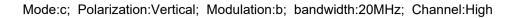
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

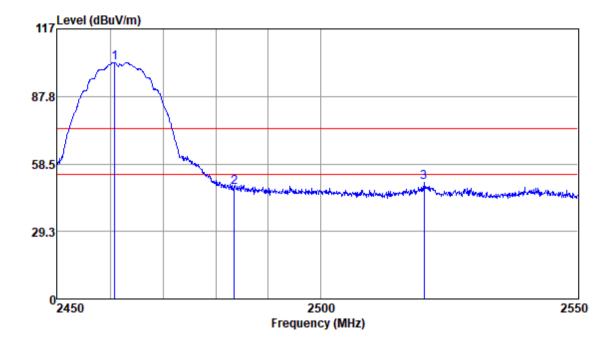


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#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
2460.81 2483.50	108.03 54.13	29.07 29.11	2.86 2.88	37.53 37.57	dBuv/m 102.43 48.55 50.36	74.00 74.00	28.43 -25.45	Peak

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

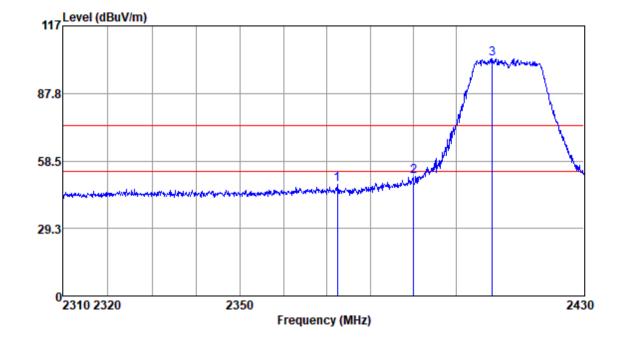


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Report No.: SHEM210400299802 Page: 29 of 75



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

#### Antenna Polarity :HORIZONTAL

Freq				-	Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2372.36	53.86	28.96	2.75	37.39	48.18	74.00	-25.82	Peak
2390.00	57.52	28.97	2.77	37.40	51.86	74.00	-22.14	Peak
2408.44	108.42	29.00	2.79	37.43	102.78	74.00	28.78	Peak

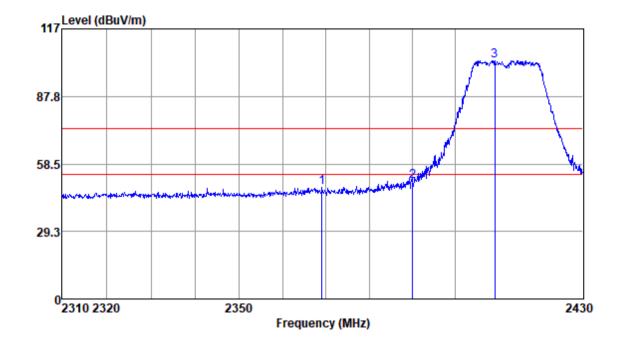
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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

#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2369.12	54.18	28.94	2.75	37.39	48.48	74.00	-25.52	Peak
2390.00	56.67	28.97	2.77	37.40	51.01	74.00	-22.99	Peak
2409.17	109.03	29.00	2.79	37.43	103.39	74.00	29.39	Peak

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



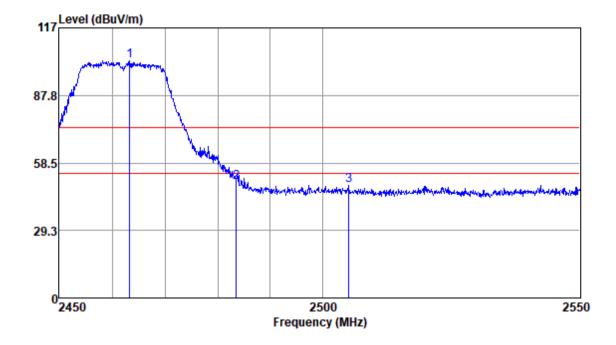
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Report No.: SHEM210400299802 Page: 31 of 75

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



#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
2463.27 2483.50	108.19 55.63	29.07 29.11	2.86 2.88	37.53 37.57	dBuv/m 102.59 50.05 48.84	74.00 74.00	28.59 -23.95	Peak

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

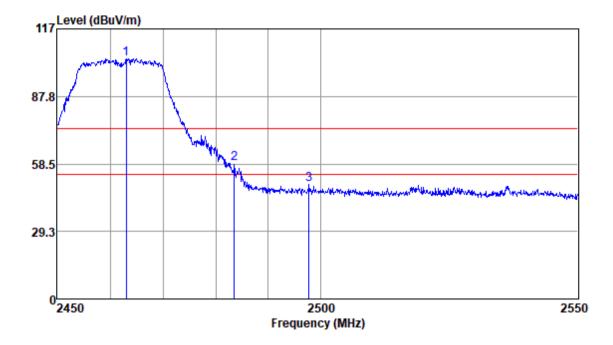


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Mode:c; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:High



#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
2462.97 2483.50	109.82 64.39	29.07 29.11	2.86 2.88	37.53 37.57	dBuv/m 104.22 58.81 49.61	74.00 74.00	30.22 -15.19	Peak

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

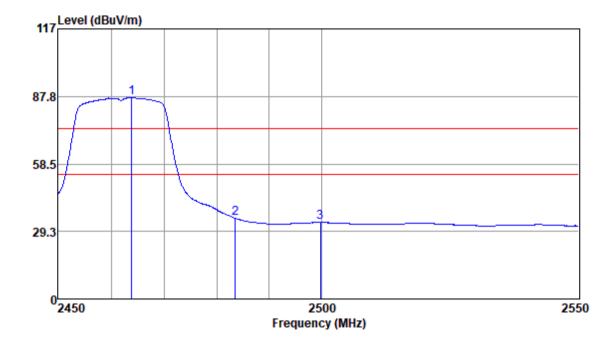


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Mode:c; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:High



#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHZ	abuv	ab/m	aB	aB	dBuv/m	aBuv/m	aB	
2463.86	92.92	29.07	2.86	37.53	87.32	54.00	33.32	Average
2483.50	40.42	29.11	2.88	37.57	34.84	54.00	-19.16	Average
2499.80	38.68	29.14	2.90	37.60	33.12	54.00	-20.88	Average

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

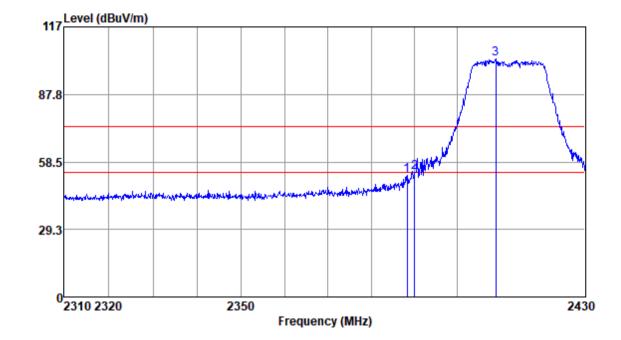


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Mode:c; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:Low

#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
2388.27 2390.00	58.23 59.69	28.97 28.97	2.77 2.77	37.40 37.40	dBuv/m 52.57 54.03 103.04	74.00 74.00	-21.43 -19.97	Peak

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

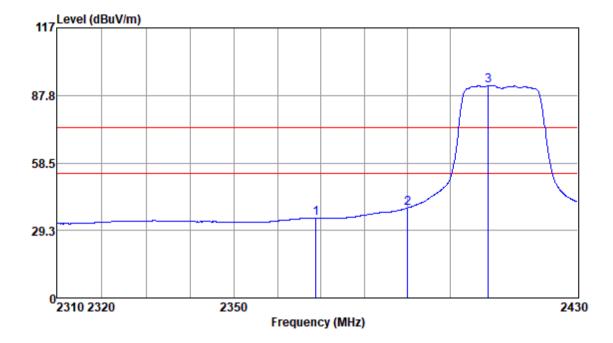


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#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2368.88	40.34	28.94	2.75	37.39	34.64	54.00	-19.36	Average
2390.00	44.56	28.97	2.77	37.40	38.90	54.00	-15.10	Average
2408.80	97.56	29.00	2.79	37.43	91.92	54.00	37.92	Average

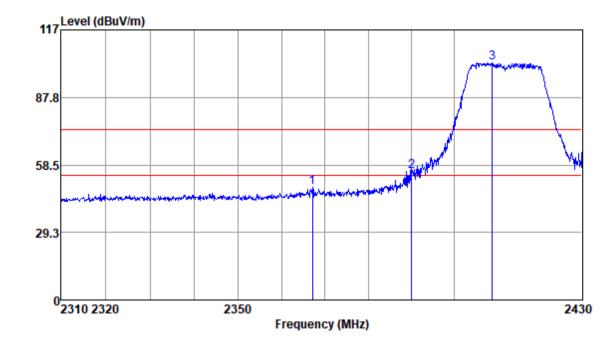
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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

#### Antenna Polarity :VERTICAL

Freq		-	Emission Level		Remark
			dBuv/m 48.97		Peak
			55.68 102.81		

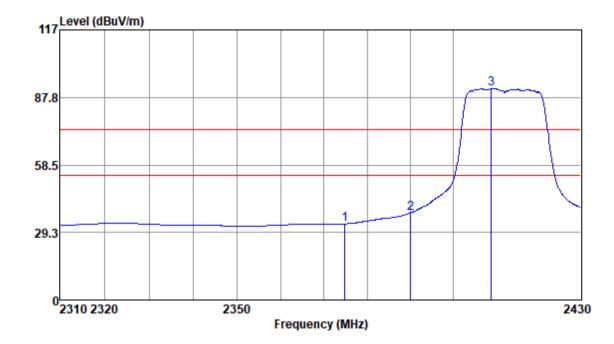
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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

#### Antenna Polarity :VERTICAL

Freq				-	Emission Level			Remark
2374.77 2390.00	38.71 43.41	28.96 28.97	2.75 2.77	37.39 37.40	dBuv/m 33.03 37.75 91.51	54.00 54.00	-20.97 -16.25	Average

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

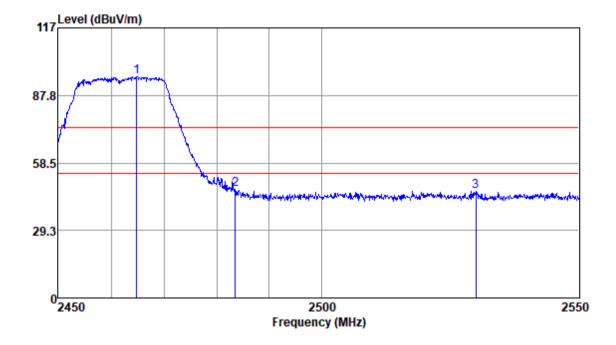


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Mode:c; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:High



#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
2464.85 2483.50	101.34 52.83	29.07 29.11	2.86 2.88	37.53 37.57	dBuv/m 95.74 47.25 46.21	74.00 74.00	21.74 -26.75	Peak

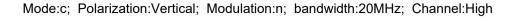
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

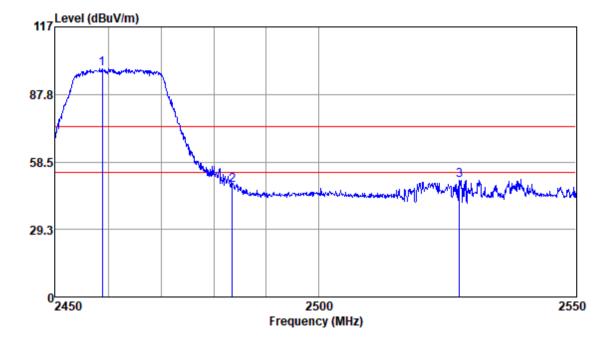


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#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
2458.84 2483.50	104.47 53.87	29.07 29.11	2.85 2.88	37.53 37.57	dBuv/m 98.86 48.29 50.63	74.00 74.00	24.86 -25.71	Peak

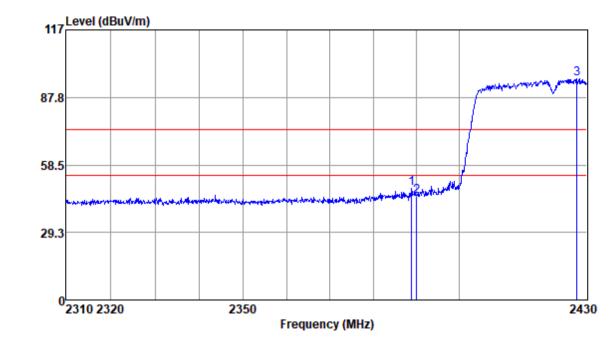
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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

#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2388.88	54.03	28.97	2.77	37.40	48.37	74.00	-25.63	Peak
2390.00	50.59	28.97	2.77	37.40	44.93	74.00	-29.07	Peak
2427.54	101.45	29.05	2.82	37.47	95.85	74.00	21.85	Peak

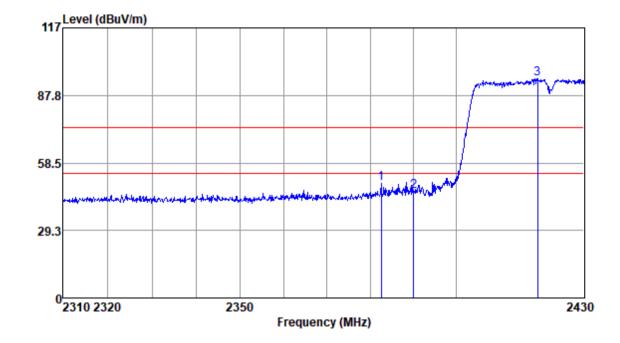
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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

#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2382.48	56.07	28.40	2.76	37.39	49.84	74.00	-24.16	Peak
2390.00	52.03	28.97	2.77	37.40	46.37	74.00	-27.63	Peak
2419.07	100.73	29.04	2.81	37.43	95.15	74.00	21.15	Peak

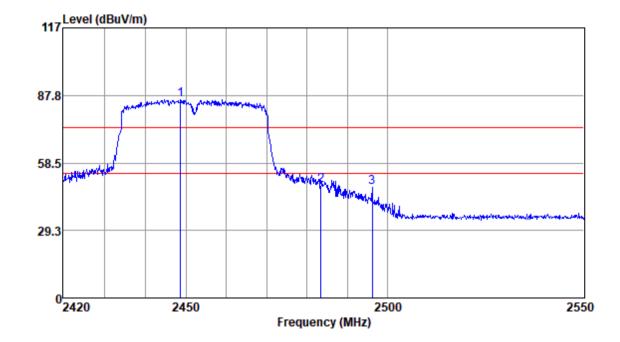
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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

#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2448.66	91.45	29.07	2.84	37.50	85.86	74.00	11.86	Peak
2483.50	54.32	29.11	2.88	37.57	48.74	74.00	-25.26	Peak
2496.27	53.48	29.13	2.89	37.60	47.90	74.00	-26.10	Peak

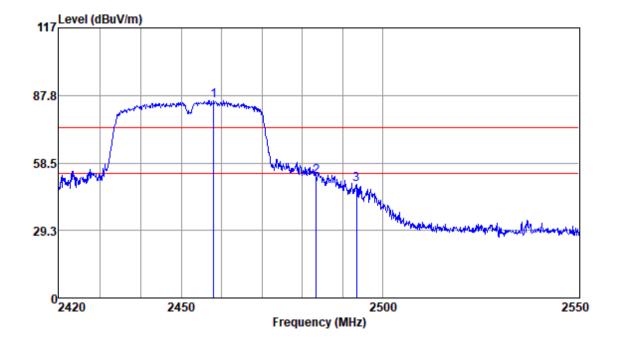
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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

#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2458.03	91.01	29.07	2.85	37.53	85.40	74.00	11.40	Peak
2483.50	58.09	29.11	2.88	37.57	52.51	74.00	-21.49	Peak
2493.53	54.72	29.13	2.89	37.60	49.14	74.00	-24.86	Peak

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



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#### 7.8 Radiated Spurious Emissions

**Test Requirement** 47 CFR Part 15, Subpart C 15.209 & 15.247(d) ANSI C63.10 (2013) Section 6.4,6.5,6.6 Test Method: 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 Enviro	onment:				
Temperature:	22 °C	Humidity:	50	% RH	Atmospheric Pressure: 1001 mbar
Test mode	types. All da data rate @ worst case 802.11n(HT	ata rates for eac 1Mbps is the w of IEEE 802.11g	h mod orst ca j; data 0 13.5	lulation ty ase of IE rate @ 6 Mbps is t	transmitting mode with all modulation ype have been tested and found the EE 802.11b; data rate @ 6Mbps is the 6.5Mbps is the worst case of IEEE the worst case of IEEE 802.11n(HT40). the report.



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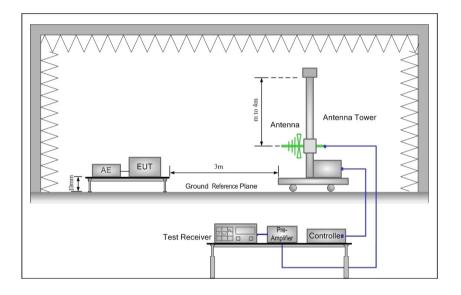
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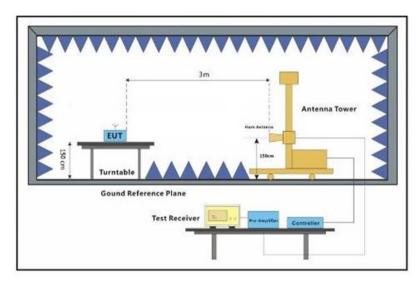
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7.8.2 Test Setup Diagram Below 30MHz 3m Test 1m Receiver EUT 10**mm** Ground Plane Coaxial Cable

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 10 mm 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



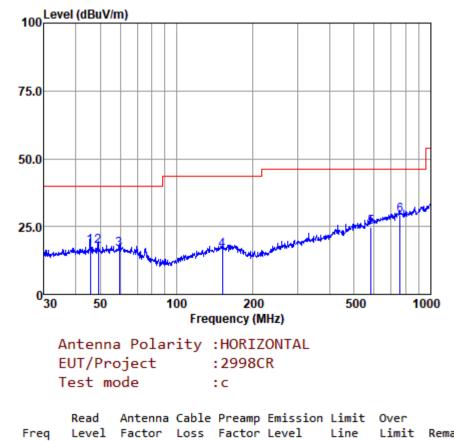
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Below 1GHz



	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	45.695	35.25	13.53	0.95	32.10	17.63	40.00	-22.37	QP
2	49.187	34.97	13.67	0.99	32.06	17.57	40.00	-22.43	QP
3	59.441	34.21	13.13	1.11	31.67	16.78	40.00	-23.22	QP
4	151.597	32.89	12.95	1.87	31.36	16.35	43.50	-27.15	QP
5	582.743	32.26	19.17	3.86	30.49	24.80	46.00	-21.20	QP
6	758.041	33.57	22.13	4.40	30.98	29.12	46.00	-16.88	QP

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

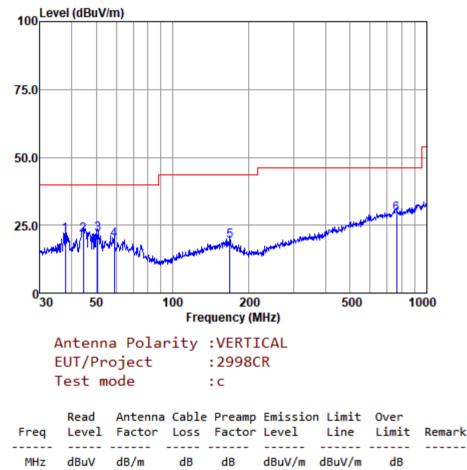


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	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	37.812	39.51	12.86	0.85	31.93	21.29	40.00	-18.71	QP
2	44.431	39.06	13.46	0.94	32.12	21.34	40.00	-18.66	QP
3	50.764	39.02	13.65	1.01	32.02	21.66	40.00	-18.34	QP
4	58.819	36.91	13.17	1.10	31.67	19.51	40.00	-20.49	QP
5	168.414	35.55	12.87	1.97	31.28	19.11	43.50	-24.39	QP
6	763.376	33.98	22.16	4.40	31.35	29.19	46.00	-16.81	QP

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



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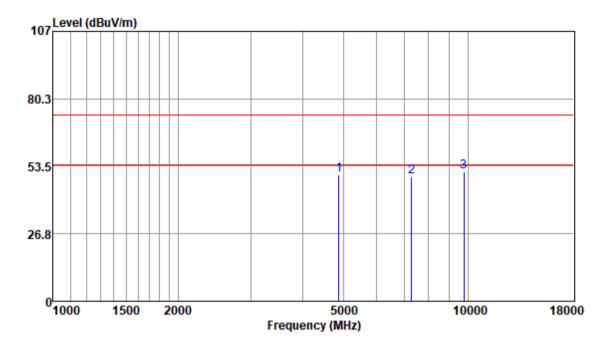
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Report No.: SHEM210400299802 Page: 50 of 75

#### Above 1GHz

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



#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	50.68	33.93	4.47	38.78	50.30	74.00	-23.70	Peak
7311.00	44.11	36.47	5.83	37.11	49.30	74.00	-24.70	Peak
9748.00	41.27	37.68	6.50	34.15	51.30	74.00	-22.70	Peak

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

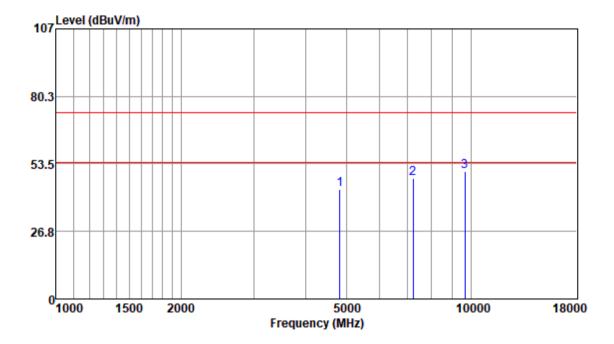


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#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	44.09	33.78	4.46	38.73	43.60	74.00	-30.40	Peak
7236.00	42.65	36.35	5.76	37.16	47.60	74.00	-26.40	Peak
9648.00	40.55	37.69	6.53	34.17	50.60	74.00	-23.40	Peak

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

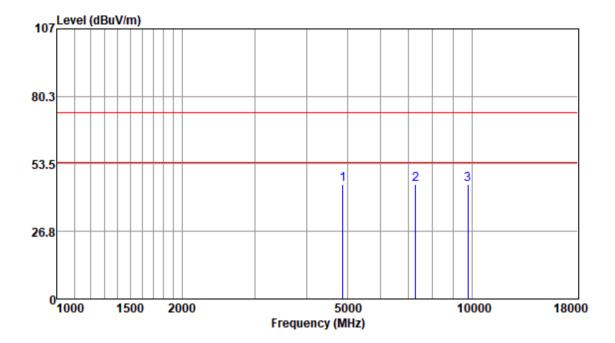


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Mode:c; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:middle



#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	45.98	33.93	4.47	38.78	45.60	74.00	-28.40	Peak
7311.00	40.41	36.47	5.83	37.11	45.60	74.00	-28.40	Peak
9748.00	35.57	37.68	6.50	34.15	45.60	74.00	-28.40	Peak

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

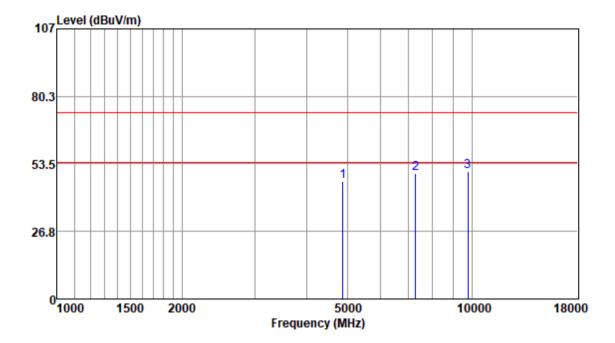


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Mode:c; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:middle



#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	47.08	33.93	4.47	38.78	46.70	74.00	-27.30	Peak
7311.00	44.51	36.47	5.83	37.11	49.70	74.00	-24.30	Peak
9748.00	40.67	37.68	6.50	34.15	50.70	74.00	-23.30	Peak

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

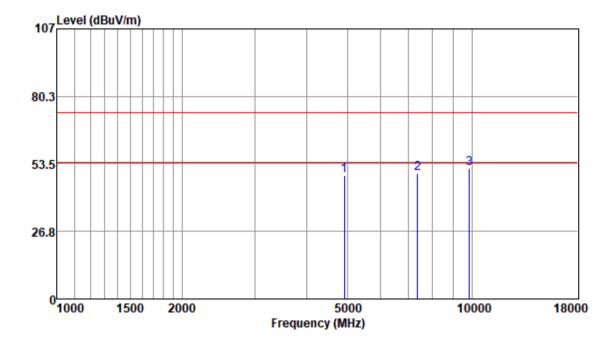


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Mode:c; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:High



#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	49.17	33.98	4.48	38.83	48.80	74.00	-25.20	Peak
7386.00	44.46	36.48	5.92	37.06	49.80	74.00	-24.20	Peak
9848.00	41.88	37.56	6.49	34.13	51.80	74.00	-22.20	Peak

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

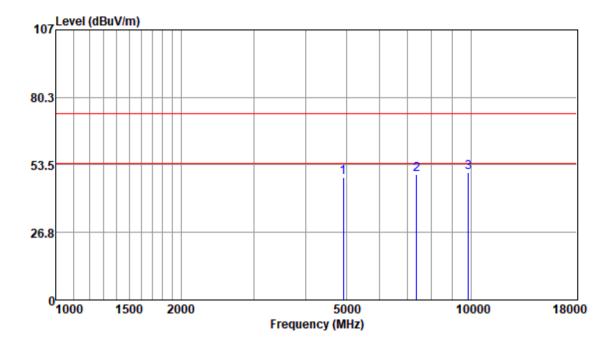


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Mode:c; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:High



#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	49.07	33.98	4.48	38.83	48.70	74.00	-25.30	Peak
7386.00	44.36	36.48	5.92	37.06	49.70	74.00	-24.30	Peak
9848.00	40.78	37.56	6.49	34.13	50.70	74.00	-23.30	Peak

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

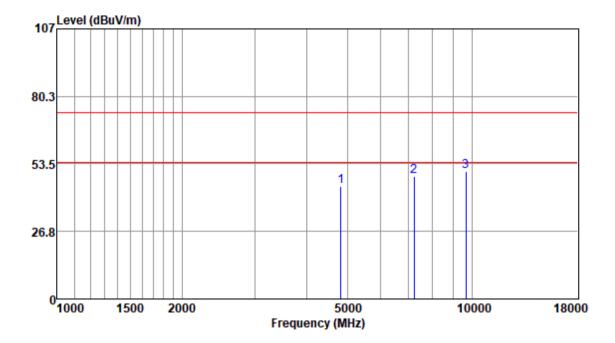


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Mode:c; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:Low



#### Antenna Polarity :HORIZONTAL

Enog					Emission Level			Romank
rreq	LEVET	ractor	LUSS	ractor	LEVET	LTHE	LINITC	IVEIIIOT K
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	45.09	33.78	4.46	38.73	44.60	74.00	-29.40	Peak
7236.00	43.65	36.35	5.76	37.16	48.60	74.00	-25.40	Peak
9648.00	40.55	37.69	6.53	34.17	50.60	74.00	-23.40	Peak

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

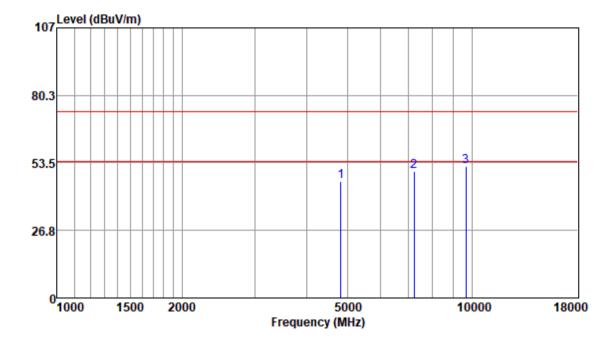


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#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	46.79	33.78	4.46	38.73	46.30	74.00	-27.70	Peak
7236.00	45.35	36.35	5.76	37.16	50.30	74.00	-23.70	Peak
9648.00	42.25	37.69	6.53	34.17	52.30	74.00	-21.70	Peak

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

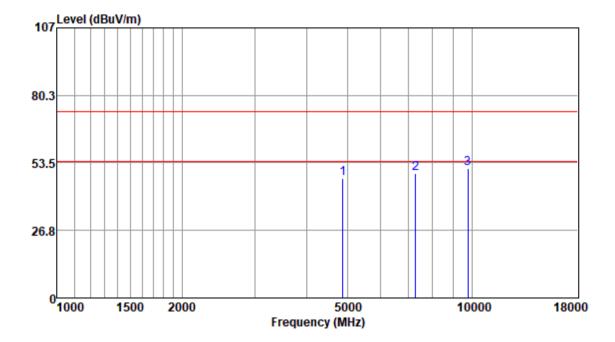


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Mode:c; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:middle



#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	47.58	33.93	4.47	38.78	47.20	74.00	-26.80	Peak
7311.00	44.01	36.47	5.83	37.11	49.20	74.00	-24.80	Peak
9748.00	41.17	37.68	6.50	34.15	51.20	74.00	-22.80	Peak

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

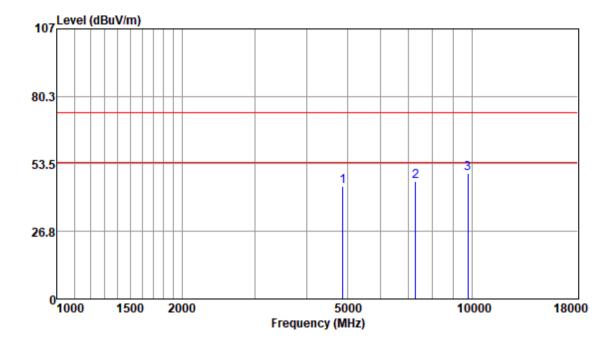


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Mode:c; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:middle



#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	44.98	33.93	4.47	38.78	44.60	74.00	-29.40	Peak
7311.00	41.41	36.47	5.83	37.11	46.60	74.00	-27.40	Peak
9748.00	39.57	37.68	6.50	34.15	49.60	74.00	-24.40	Peak

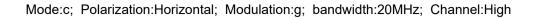
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

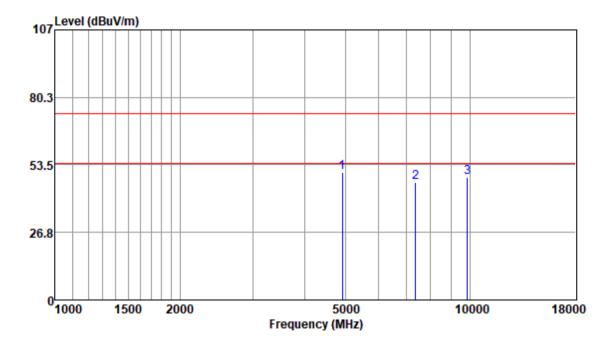


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#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	50.97	33.98	4.48	38.83	50.60	74.00	-23.40	Peak
7386.00	41.26	36.48	5.92	37.06	46.60	74.00	-27.40	Peak
9848.00	38.68	37.56	6.49	34.13	48.60	74.00	-25.40	Peak

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

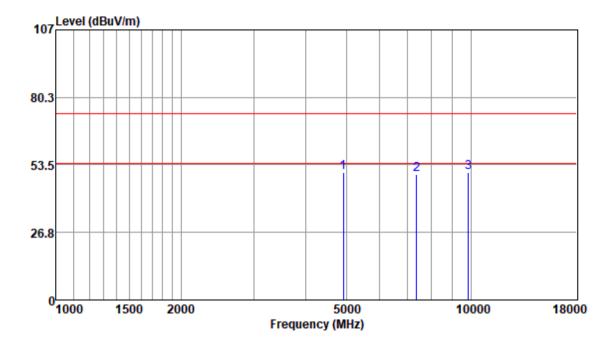


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Mode:c; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:High



#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	50.97	33.98	4.48	38.83	50.60	74.00	-23.40	Peak
7386.00	44.26	36.48	5.92	37.06	49.60	74.00	-24.40	Peak
9848.00	40.68	37.56	6.49	34.13	50.60	74.00	-23.40	Peak

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

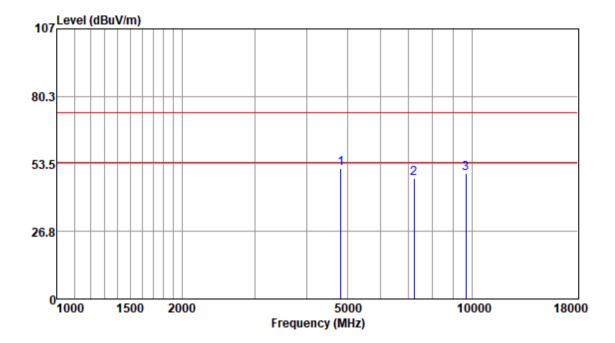


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Mode:c; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:Low



#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
		, accoi	2033					The liter is
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	52.09	33.78	4.46	38.73	51.60	74.00	-22.40	Peak
7236.00	42.65	36.35	5.76	37.16	47.60	74.00	-26.40	Peak
9648.00	39.55	37.69	6.53	34.17	49.60	74.00	-24.40	Peak

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

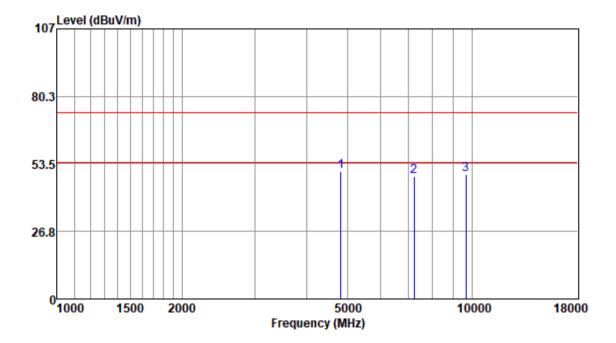


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Mode:c; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:Low



#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	50.99	33.78	4.46	38.73	50.50	74.00	-23.50	Peak
7236.00	43.55	36.35	5.76	37.16	48.50	74.00	-25.50	Peak
9648.00	39.45	37.69	6.53	34.17	49.50	74.00	-24.50	Peak

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

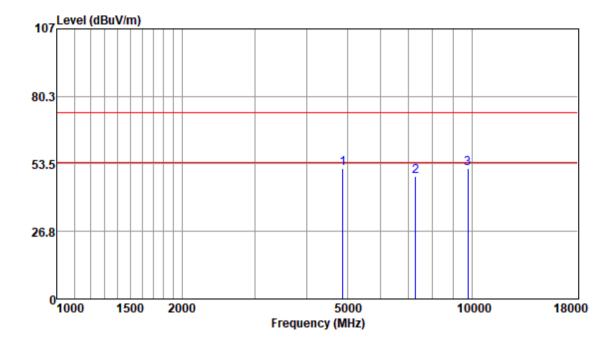


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Mode:c; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:middle



#### Antenna Polarity :HORIZONTAL

Frea					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	51.98	33.93	4.47	38.78	51.60	74.00	-22.40	Peak
7311.00	43.41	36.47	5.83	37.11	48.60	74.00	-25.40	Peak
9748.00	41.57	37.68	6.50	34.15	51.60	74.00	-22.40	Peak

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

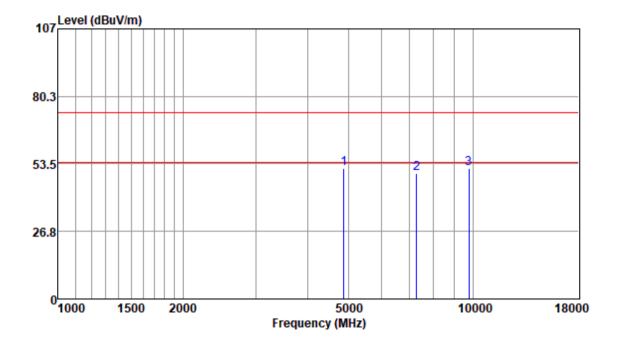


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Mode:c; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:middle



#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	52.01	33.93	4.47	38.78	51.63	74.00	-22.37	Peak
7311.00	44.44	36.47	5.83	37.11	49.63	74.00	-24.37	Peak
9748.00	41.60	37.68	6.50	34.15	51.63	74.00	-22.37	Peak

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

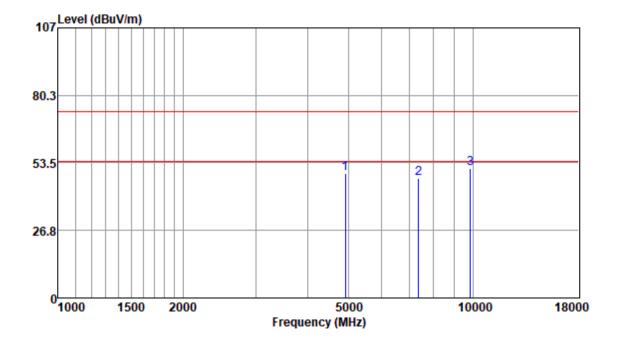


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Mode:c; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:High



#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	49.87	33.98	4.48	38.83	49.50	74.00	-24.50	Peak
7386.00	42.16	36.48	5.92	37.06	47.50	74.00	-26.50	Peak
9848.00	41.58	37.56	6.49	34.13	51.50	74.00	-22.50	Peak

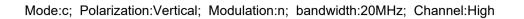
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

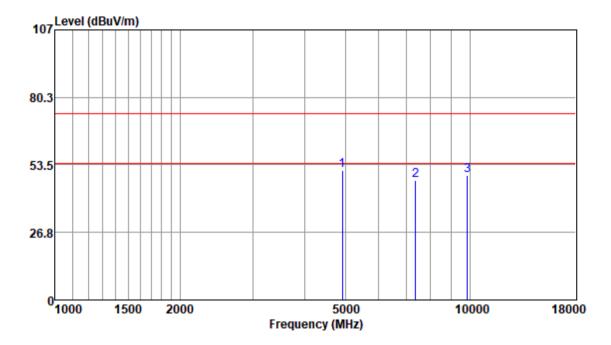


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#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	51.57	33.98	4.48	38.83	51.20	74.00	-22.80	Peak
7386.00	41.86	36.48	5.92	37.06	47.20	74.00	-26.80	Peak
9848.00	39.28	37.56	6.49	34.13	49.20	74.00	-24.80	Peak

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

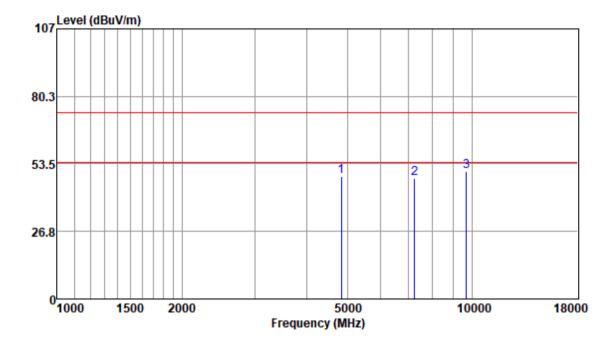


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Mode:c; Polarization:Horizontal; Modulation:n; bandwidth:40MHz; Channel:Low



#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4844.00	48.98	33.89	4.47	38.74	48.60	74.00	-25.40	Peak
7266.00	42.56	36.39	5.78	37.13	47.60	74.00	-26.40	Peak
9688.00	40.45	37.79	6.52	34.16	50.60	74.00	-23.40	Peak

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

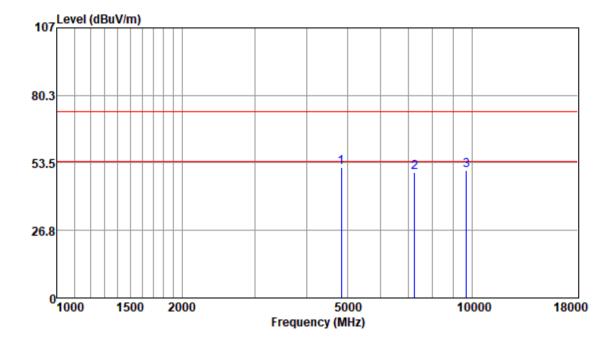


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Mode:c; Polarization:Vertical; Modulation:n; bandwidth:40MHz; Channel:Low



#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4844.00	51.98	33.89	4.47	38.74	51.60	74.00	-22.40	Peak
7266.00	44.56	36.39	5.78	37.13	49.60	74.00	-24.40	Peak
9688.00	40.45	37.79	6.52	34.16	50.60	74.00	-23.40	Peak

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

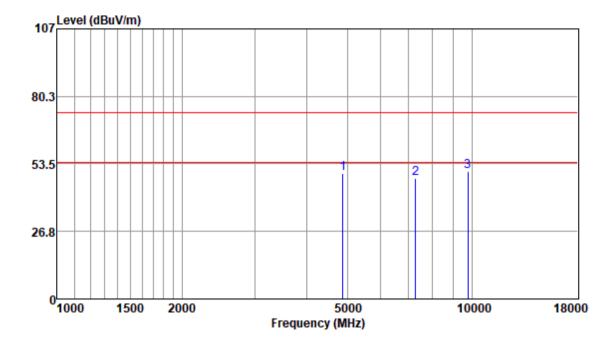


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Mode:c; Polarization:Horizontal; Modulation:n; bandwidth:40MHz; Channel:middle



#### Antenna Polarity :HORIZONTAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	49.98	33.93	4.47	38.78	49.60	74.00	-24.40	Peak
7311.00	42.41	36.47	5.83	37.11	47.60	74.00	-26.40	Peak
9748.00	40.57	37.68	6.50	34.15	50.60	74.00	-23.40	Peak

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

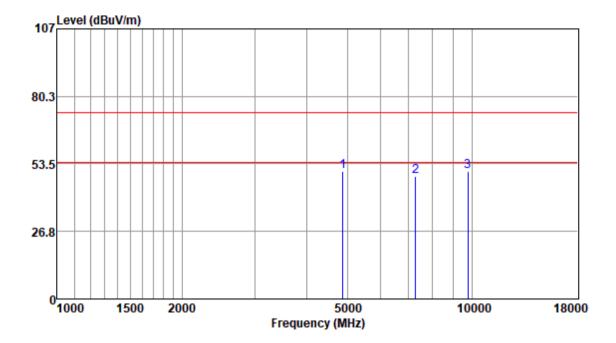


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Mode:c; Polarization:Vertical; Modulation:n; bandwidth:40MHz; Channel:middle



#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	50.98	33.93	4.47	38.78	50.60	74.00	-23.40	Peak
7311.00	43.41	36.47	5.83	37.11	48.60	74.00	-25.40	Peak
9748.00	40.57	37.68	6.50	34.15	50.60	74.00	-23.40	Peak

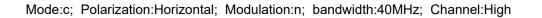
Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

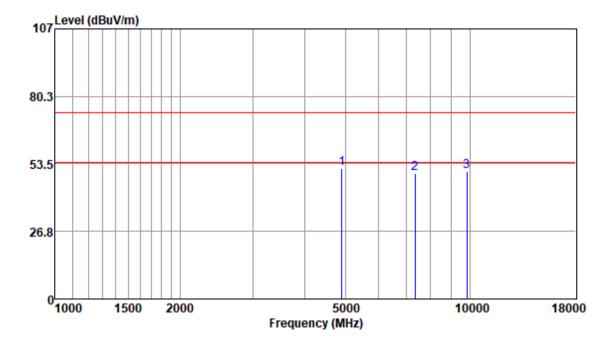


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#### Antenna Polarity :HORIZONTAL

	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	
4904.00	51.97	33.97	4.47	38.81	51.60	74.00	-22.40	Peak
7356.00	44.33	36.47	5.88	37.08	49.60	74.00	-24.40	Peak
9808.00	40.70	37.55	6.49	34.14	50.60	74.00	-23.40	Peak

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



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107 Level (dBuV/m) 80.3 53.5 2 26.8 1000 1500 2000 10000 18000 5000 Frequency (MHz)

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

#### Antenna Polarity :VERTICAL

Freq					Emission Level			Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4904.00	50.97	33.97	4.47	38.81	50.60	74.00	-23.40	Peak
7356.00	43.33	36.47	5.88	37.08	48.60	74.00	-25.40	Peak
9808.00	40.70	37.55	6.49	34.14	50.60	74.00	-23.40	Peak

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



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### 7.9 99% Bandwidth

Fest Requirement	RSS-Gen Section 6.7
Fest Method:	ANSI C63.10 Section 6.9.3

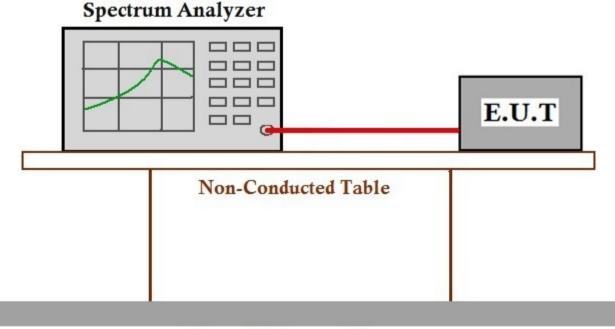
#### 7.9.1 E.U.T. Operation

Т

**Operating Environment:** 

Temperature:22 °CHumidity:50 % RHAtmospheric Pressure:1001mbarTest modec:TX mode\_Keep the EUT in continuously transmitting mode with all modulation<br/>types. All data rates for each modulation type have been tested and found the<br/>data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the<br/>worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE<br/>802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40).<br/>Only the data of worst case is recorded in the report.

#### 7.9.2 Test Setup Diagram



## **Ground Reference Plane**

#### 7.9.3 Measurement Procedure and Data

The detailed test data see: Appendix B for SHEM210400299802



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# 8 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

## 9 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -



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