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

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TEST REPORT

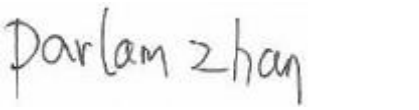
Application No.:	SHEM1808006449CR
FCC ID:	SVNDH-PFWB5
Applicant:	ZHEJIANG DAHUA VISION TECHNOLOGY CO.,LTD.
Address of Applicant:	No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China
Manufacturer:	ZHEJIANG DAHUA VISION TECHNOLOGY CO.,LTD.
Address of Manufacturer:	No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China
Factory:	1,ZHEJIANG DAHUA VISION TECHNOLOGY CO.,LTD. 2,ZHEJIANG DAHUA ZHILIAN CO.,LTD.
Address of Factory:	1,No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China 2,No.28, Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, P.R. China
Equipment Under Test (EUT):	
EUT Name:	Wireless Transmission Device
Model No.:	DH-PFWB5-10n
Add Model No.:	DH-PFWB2-60n, DH-PFWB2-30n, DH-PFWB2-90n, DH-PFWB5-30n, DH-PFWB5-90n, DH-PFWB5-10ac, DH-PFWB5-30ac, DH-PFWB5-90ac, PFWB2-60n, PFWB2-30n, PFWB2-90n, PFWB5-10n, PFWB5-30n, PFWB5-90n, PFWB5-10ac, PFWB5-30ac, PFWB5-90ac
Standard(s) :	47 CFR Part 15, Subpart E 15.407
Date of Receipt:	2018-08-02
Date of Test:	2018-09-11 to 2018-09-11
Date of Issue:	2018-10-09
Test Result:	**Pass***

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

Parlam Zhan
E&E Section 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.

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2018-10-09	/

Authorized for issue by:				
				
		Vincent Zhu / Project Engineer		
				
		Parlam Zhan / Reviewer		

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart E 15.407	N/A	47 CFR Part 15, Subpart C 15.203	Pass
Transmission in the Absence of Data	47 CFR Part 15, Subpart E 15.407	N/A	47 CFR Part 15, Subpart C 15.407 (c)	Pass

N/A: Not applicable

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart E 15.407	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207 & 15.407 b(6)	Pass
26dB Emission bandwidth	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II C 1	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Minimum 6 dB bandwidth (5.725-5.85 GHz band)	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II C 2	47 CFR Part 15, Subpart C 15.407 (e)	Pass
Maximum Conducted output power	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II E	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Peak Power spectrum density	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II F	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Radiated Emissions	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & 15.407(b)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & 15.407(b)	Pass
Frequency Stability	47 CFR Part 15, Subpart E 15.407	ANSI C63.10 (2013) Section 6.8	47 CFR Part 15, Subpart C 15.407 (g)	Pass

Note: There are series models mentioned in this report, and they are the identical in electrical and electronic characters. Only the model DH-PFWB5-10n was tested since their differences were the model number, trade name and appearance.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	DC 24V, 0.5A by POE
	MODEL: G0549A-240-050
	INPUT:100-240V~50/60Hz 0.5A MAX
	OUTPUT:24V-0.5A
Test voltage:	AC 120V
Cable:	AC Cable 70cm for adapter
Antenna Gain	20dBi
Antenna Type	Integral Antenna

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	ThinkPad X100e	/
SecureCRT	VanDyke	V 6.2.0	/
Serial port adapter plate	/	Test Plate 3	/

4.3 Power Setting

Band		802.11 a	802.11 n (HT20)	802.11 n (HT40)
NII 1	Antenna 1	12	9.5	9
	Antenna 2	11	9.5	8
	Antenna 1+2	/	9.5	8.5
NII 3	Antenna 1	8	6	6
	Antenna 2	8	6.5	6.5
	Antenna 1+2	/	6.5	6.5

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25 x 10-8
2	Timeout	2s
3	Duty cycle	0.37%
4	Occupied Bandwidth	3%
5	RF conducted power	0.75dB
6	RF power density	2.84dB
7	Conducted Spurious emissions	0.75dB
8	RF Radiated power	4.5dB (Below 1GHz)
		4.8dB (Above 1GHz)
9	Radiated Spurious emission test	4.2dB (Below 30MHz)
		4.4dB (30MHz-1GHz)
		4.6dB (1GHz-18GHz)
		5.2dB (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.

4.5 Test Location

All tests were performed at:

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

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 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• NVLAP (Certificate No. 201034-0)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

• FCC –Designation Number: CN5033

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

Designation Number: CN5033. Test Firm Registration Number: 479755.

• Industry Canada (IC) – IC Assigned Code: 8617A

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1.

• 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

None

5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Conducted Emission at AC Power Line					
EMI test receiver	R&S	ESR7	SHEM162-1	2017-12-20	2018-12-19
LISN	Schwarzbeck	NSLK8127	SHEM061-1	2017-12-20	2018-12-19
LISN	EMCO	3816/2	SHEM019-1	2017-12-20	2018-12-19
Pulse limiter	R&S	ESH3-Z2	SHEM029-1	2017-12-20	2018-12-19
CE test Cable	/	CE01	/	2017-12-26	2018-12-25
Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2017-12-20	2018-12-19
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2018-08-13	2019-08-12
Signal Generator	R&S	SMR20	SHEM006-1	2018-08-13	2019-08-12
Signal Generator	Agilent	N5182A	SHEM182-1	2018-08-13	2019-08-12
Communication Tester	R&S	CMW270	SHEM183-1	2018-08-13	2019-08-12
Switcher	Tonscend	JS0806	SHEM184-1	2018-08-13	2019-08-12
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2018-08-13	2019-08-12
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2017-09-25	2020-09-24
AC Power Stabilizer	WOCEN	6100	SHEM045-1	2017-12-26	2018-12-25
DC Power Supply	QJE	QJ30003SII	SHEM046-1	2017-12-26	2018-12-25
Conducted test Cable	/	RF01~RF04	/	2017-12-26	2018-12-25
Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2017-12-20	2018-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2017-12-20	2018-12-19
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2017-04-10	2020-04-09
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2017-02-28	2020-02-27
Antenna (25MHz-3GHz)	Schwarzbeck	HL562	SHEM010-1	2017-02-28	2020-02-27
Horn Antenna (1-8GHz)	Schwarzbeck	HF906	SHEM009-1	2017-10-24	2020-10-23
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2017-01-14	2020-01-13
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2017-12-03	2020-12-02
Pre-amplifier (9KHz-2GHz)	CLAVIIO	BDLNA-0001	SHEM164-1	2018-08-13	2019-08-12
Pre-amplifier (1-18GHz)	CLAVIIO	BDLNA-0118	SHEM050-2	2018-08-13	2019-08-12
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2017-12-20	2018-12-19
Signal Generator	R&S	SMR40	SHEM058-1	2018-08-13	2019-08-12
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	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	2017-07-22	2020-07-21
RE test Cable	/	RE01, RE02, RE06	/	2017-12-26	2018-12-25

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

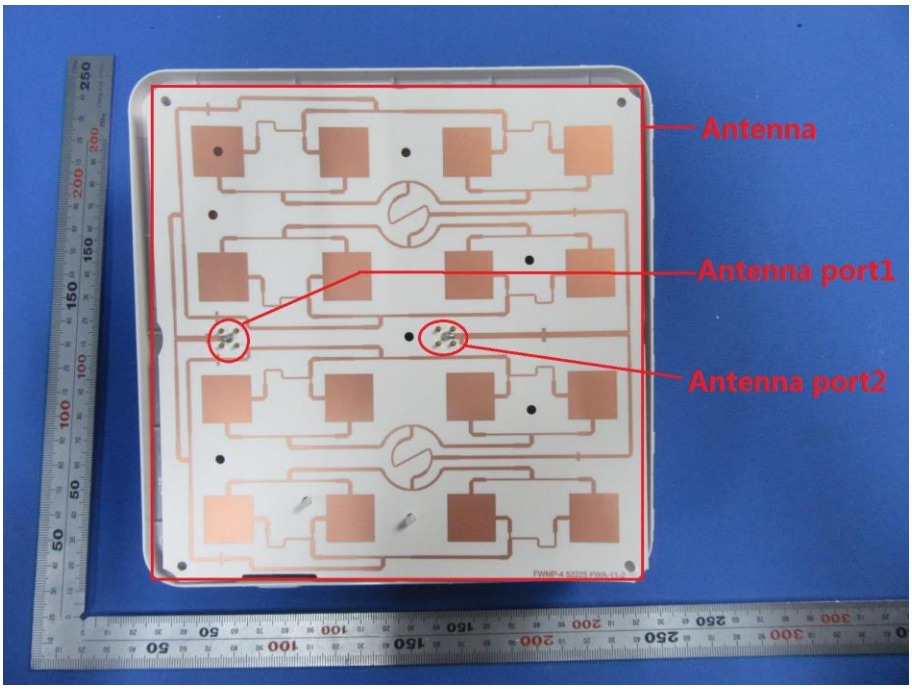
6.1.2 Conclusion

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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integral antenna and no consideration of replacement. The best case gain of the antenna is 20dBi.



6.2 Transmission in the Absence of Data

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.407 (c)

6.2.2 Conclusion

Standard Requirement:

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

Applicants shall include in their application for equipment authorization a description of how this requirement is met.

EUT Details:

WIFI chip (AR9342) support automatically discontinue transmission in case of either absence of information to transmit or operational failure, if the chip detect absence of information to transmit or operational failure, it will be automatically shut off.

7 Radio Spectrum Matter Test Results

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

Test Requirement 47 CFR Part 15, Subpart C 15.207 & 15.407 b(6)

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	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

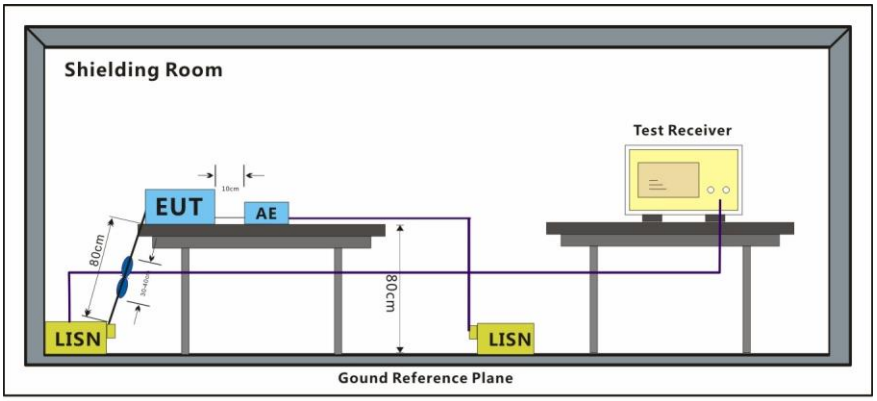
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Pretest these mode to find the worst case: a:TX mode (Band 1)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE b:TX mode (Band 3)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

The worst case for final test: a:TX mode (Band 1)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

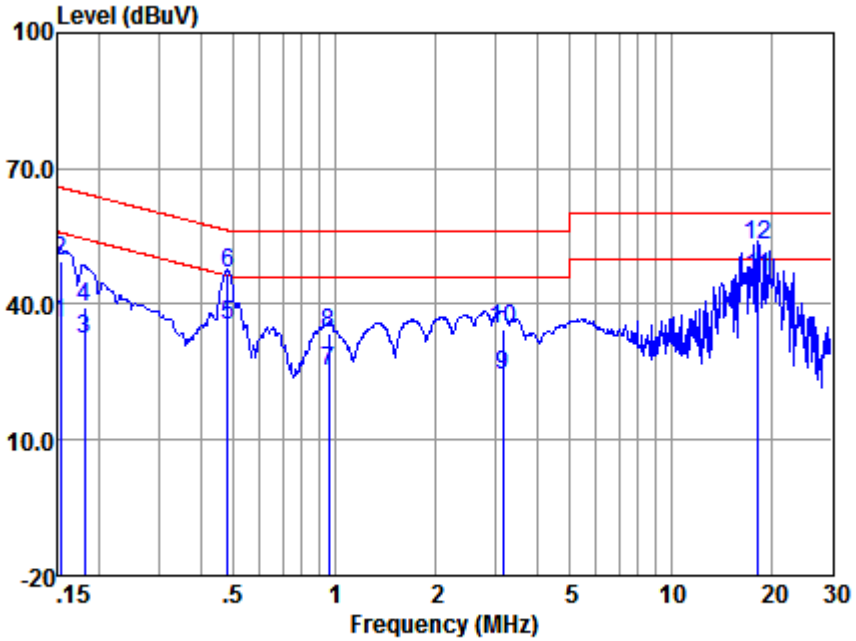
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as 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: LISN=Read Level+ Cable Loss+ LISN Factor

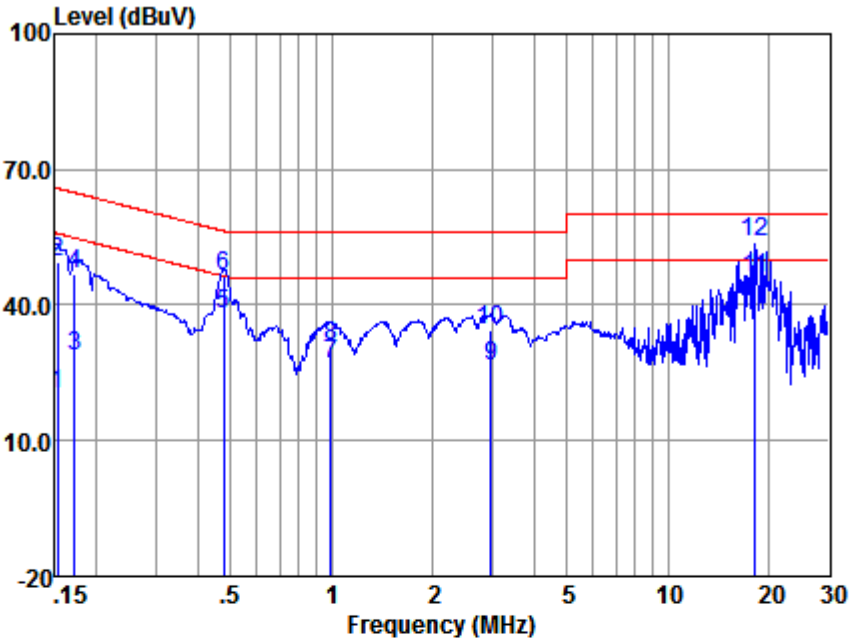


LISN : LINE

Test mode : a

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.15	25.87	0.05	9.82	35.74	55.87	-20.13	Average
2	0.15	39.61	0.05	9.82	49.48	65.87	-16.39	QP
3	0.18	22.38	0.05	9.83	32.26	54.50	-22.24	Average
4	0.18	29.27	0.05	9.83	39.15	64.50	-25.35	QP
5	0.48	25.51	0.05	9.81	35.37	46.32	-10.95	Average
6	0.48	36.99	0.05	9.81	46.85	56.32	-9.47	QP
7	0.96	15.51	0.05	9.80	25.36	46.00	-20.64	Average
8	0.96	23.62	0.05	9.80	33.47	56.00	-22.53	QP
9	3.17	14.51	0.07	9.88	24.46	46.00	-21.54	Average
10	3.17	24.32	0.07	9.88	34.27	56.00	-21.73	QP
11	18.23	35.90	0.29	9.90	46.09	50.00	-3.91	Average
12	18.23	42.66	0.29	9.90	52.85	60.00	-7.15	QP

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



LISN : NEUTRAL

Test mode : a

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.15	10.32	0.06	9.82	20.20	55.87	-35.67	Average
2	0.15	39.72	0.06	9.82	49.60	65.87	-16.27	QP
3	0.17	18.96	0.06	9.83	28.85	54.86	-26.01	Average
4	0.17	37.10	0.06	9.83	46.99	64.86	-17.87	QP
5	0.48	27.95	0.05	9.82	37.82	46.41	-8.59	Average
6	0.48	36.68	0.05	9.82	46.55	56.41	-9.86	QP
7	0.99	17.31	0.05	9.77	27.13	46.00	-18.87	Average
8	0.99	21.20	0.05	9.77	31.02	56.00	-24.98	QP
9	2.98	16.55	0.07	9.86	26.48	46.00	-19.52	Average
10	2.98	24.75	0.07	9.86	34.68	56.00	-21.32	QP
11	18.23	35.96	0.30	9.90	46.16	50.00	-3.84	Average
12	18.23	43.71	0.30	9.90	53.91	60.00	-6.09	QP

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

7.2 26dB Emission bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.407 (a)

Test Method: KDB 789033 D02 II C 1

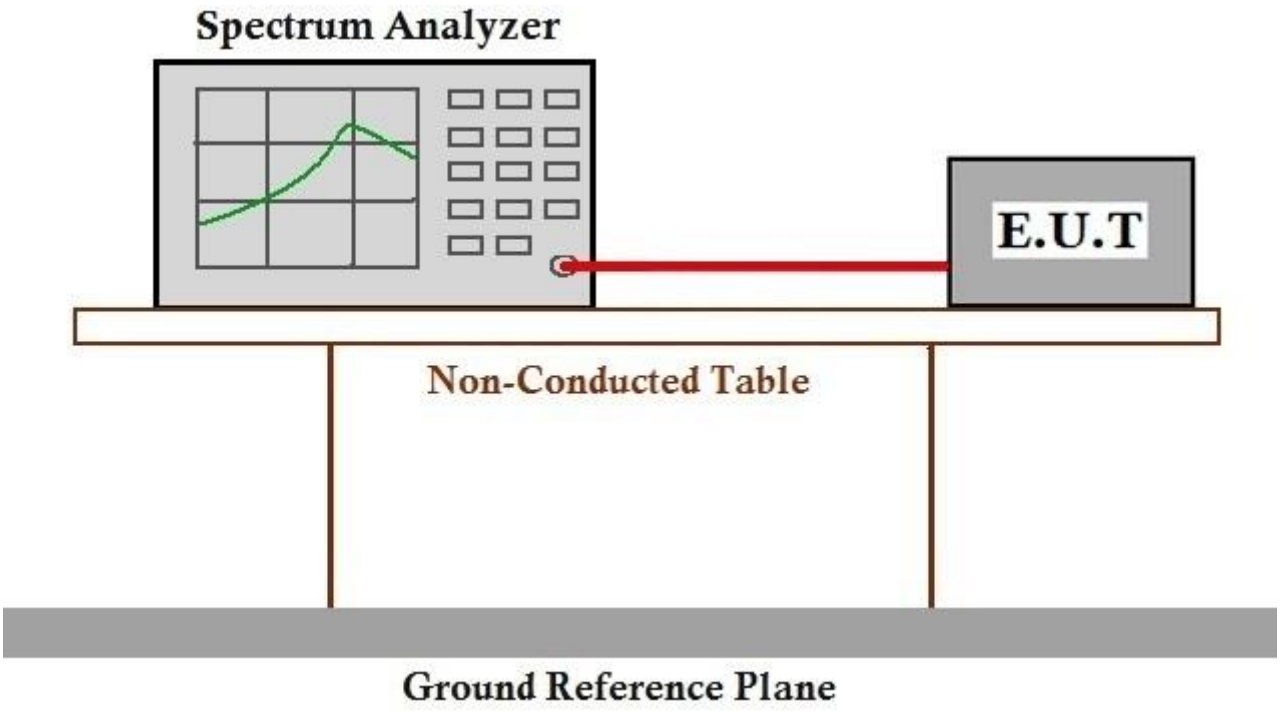
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 21 °C Humidity: 45 % RH Atmospheric Pressure: 1010 mbar

Test mode b:TX mode (Band 3)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix A SHEM180800644901

7.3 Minimum 6 dB bandwidth (5.725-5.85 GHz band)

Test Requirement 47 CFR Part 15, Subpart C 15.407 (e)

Test Method: KDB 789033 D02 II C 2

Limit: ≥500 kHz

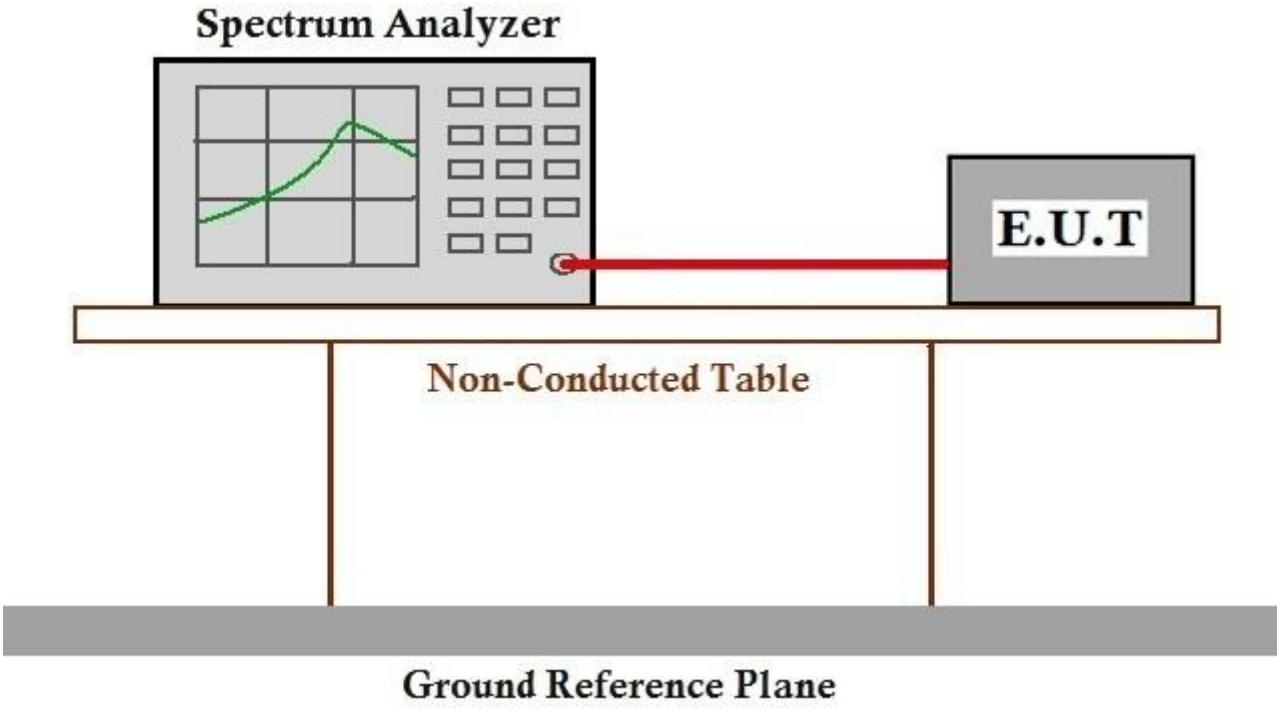
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 21 °C Humidity: 45 % RH Atmospheric Pressure: 1010 mbar

Test mode b:TX mode (Band 3)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix A SHEM180800644901

7.4 Maximum Conducted output power

Test Requirement 47 CFR Part 15, Subpart C 15.407 (a)

Test Method: KDB 789033 D02 II E

Limit:

Frequency band(MHz)	Limit
5150-5250	≤1W(30dBm)
5250-5350	≤250mW(24dBm)
5470-5725	≤250mW(24dBm)
5725-5850	≤1W(30dBm)

Remark:	1.The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. 2. 5150-5250MHz conduct power for SISO mode ⩽16dBm 5150-5250MHz conduct power for MIMO mode ⩽13dBm 5725-5850MHz conduct power for SISO mode ⩽16dBm 5725-5850MHz conduct power for MIMO mode ⩽13dBm

7.4.1 E.U.T. Operation

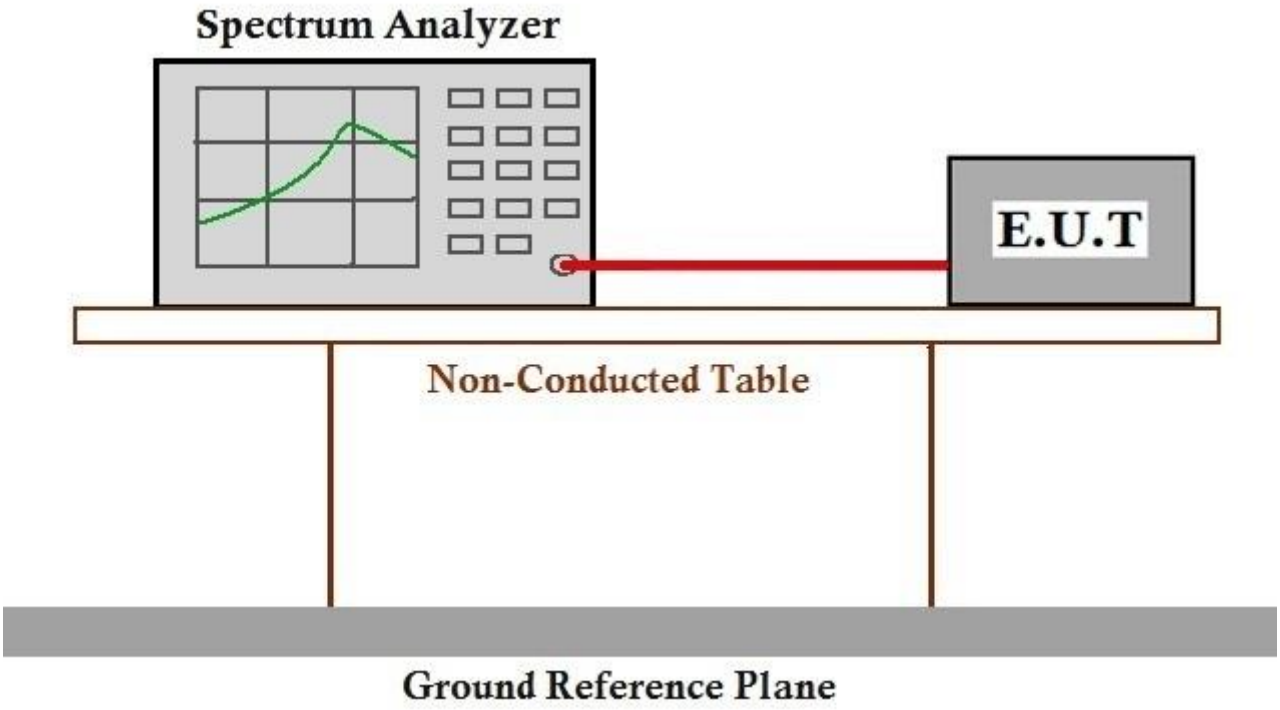
Operating Environment:

Temperature: 21 °C Humidity: 45 % RH Atmospheric Pressure: 1010 mbar

Test mode a:TX mode (Band 1)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

b:TX mode (Band 3)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix A SHEM180800644901

7.5 Peak Power spectrum density

Test Requirement 47 CFR Part 15, Subpart C 15.407 (a)

Test Method: KDB 789033 D02 II F

Limit:

Frequency band(MHz)	Limit
5150-5250	≤17dBm in 1MHz
5250-5350	≤11dBm in 1MHz
5470-5725	≤11dBm in 1MHz
5725-5850	≤30dBm in 500 kHz
Remark:	1.The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. 2. 5150-5250MHz PSD for SISO mode ⩽3 dBm 5150-5250MHz PSD for MIMO mode ⩽0dBm 5725-5850MHz PSD for SISO mode ⩽16dBm 5725-5850MHz PSD for MIMO mode ⩽13dBm

7.5.1 E.U.T. Operation

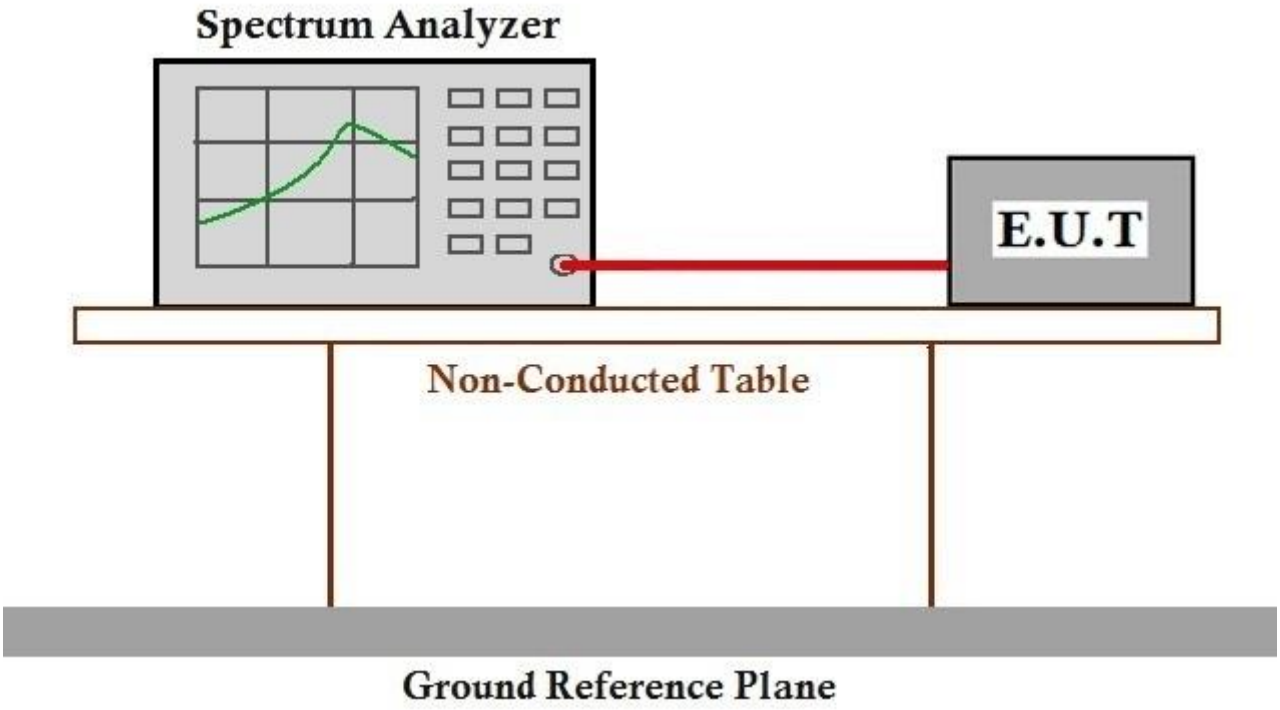
Operating Environment:

Temperature: 21 °C Humidity: 45 % RH Atmospheric Pressure: 1010 mbar

Test mode a:TX mode (Band 1)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

b:TX mode (Band 3)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix A SHEM180800644901

7.6 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.407(b)

Test Method: KDB 789033 D02 II G

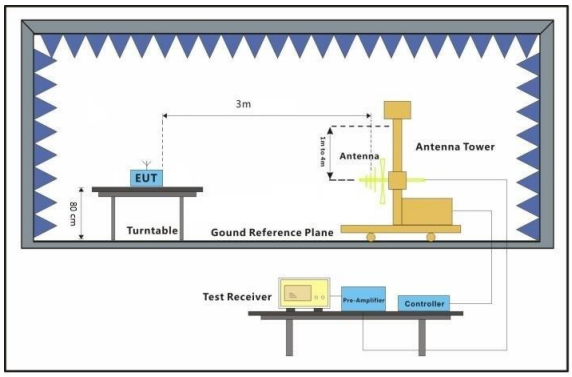
7.6.1 E.U.T. Operation

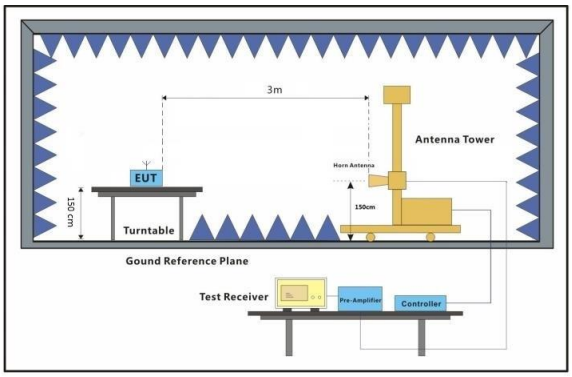
Operating Environment:

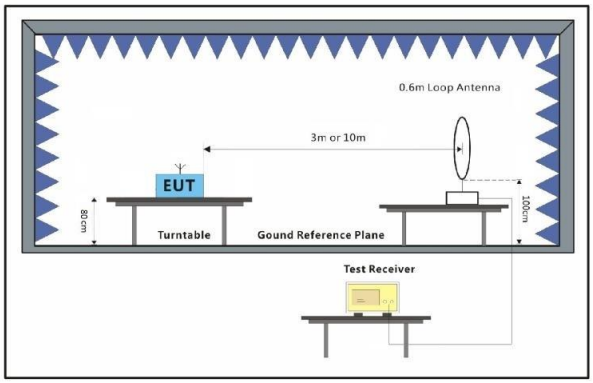
Temperature: 21 °C Humidity: 45 % RH Atmospheric Pressure: 1010 mbar

Test mode: a:TX mode (Band 1)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE b:TX mode (Band 3)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

7.6.2 Test Setup Diagram







7.6.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. For emission below 1GHz, through the pre-scan found the worst case is the lowest channel of 802.11a. Only the worst case is recorded in the report.

3. Scan from 9kHz to 40GHz, 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. 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.

Mode:a; Polarization:Horizontal; Modulation:a; bandwidth:20MHz; Channel:Low

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10360	34.60	14.28	48.88	68.2	-19.32	peak
15540	28.62	21.58	50.20	54	-3.80	peak
20720	28.59	23.16	51.75	54	-2.25	peak

Mode:a; Polarization:Vertical; Modulation:a; bandwidth:20MHz; Channel:Low

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10360	33.60	14.28	47.88	68.2	-20.32	peak
15540	27.70	21.58	49.28	54	-4.72	peak
20720	25.45	23.16	48.61	54	-5.39	peak

Mode:a; Polarization:Horizontal; Modulation:a; bandwidth:20MHz; Channel:middle

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10440	31.68	14.14	45.82	68.2	-22.38	peak
15660	25.86	21.22	47.08	54	-6.92	peak
20880	26.68	23.24	49.92	54	-4.08	peak

Mode:a; Polarization:Vertical; Modulation:a; bandwidth:20MHz; Channel:middle

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10440	31.61	14.14	45.75	68.2	-22.45	peak
15660	26.65	21.22	47.87	54	-6.13	peak
20880	25.36	23.24	48.60	54	-5.40	peak

Mode:a; Polarization:Horizontal; Modulation:a; bandwidth:20MHz; Channel:High

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10480	30.65	14.08	44.73	68.2	-23.47	peak
15720	27.85	21.10	48.95	54	-5.05	peak
20960	28.54	23.64	52.18	54	-1.82	peak

Mode:a; Polarization:Vertical; Modulation:a; bandwidth:20MHz; Channel:High

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10480	35.65	14.08	49.73	68.2	-18.47	peak
15720	27.16	21.10	48.26	54	-5.74	peak
20960	25.86	23.64	49.50	54	-4.50	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10360	32.70	14.28	46.98	68.2	-21.22	peak
15540	29.87	21.58	51.45	54	-2.55	peak
20720	27.92	23.16	51.08	54	-2.92	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10360	34.27	14.28	48.55	68.2	-19.65	peak
15540	30.64	21.58	52.22	54	-1.78	peak
20720	27.61	23.16	50.77	54	-3.23	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10440	29.74	14.14	43.88	68.2	-24.32	peak
15660	28.60	21.22	49.82	54	-4.18	peak
20880	22.65	23.24	45.89	54	-8.11	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10440	31.32	14.14	45.46	68.2	-22.74	peak
15660	26.57	21.22	47.79	54	-6.21	peak
20880	28.35	23.24	51.59	54	-2.41	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10480	30.23	14.08	44.31	68.2	-23.89	peak
15720	26.04	21.10	47.14	54	-6.86	peak
20960	23.80	23.64	47.44	54	-6.56	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10480	34.79	14.08	48.87	68.2	-19.33	peak
15720	29.76	21.10	50.86	54	-3.14	peak
20960	27.54	23.64	51.18	54	-2.82	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10380	32.94	14.25	47.19	68.2	-21.01	peak
15570	27.83	21.49	49.32	54	-4.68	peak
20760	26.55	23.16	49.71	54	-4.29	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10380	32.62	14.25	46.87	68.2	-21.33	peak
15570	30.78	21.49	52.27	54	-1.73	peak
20760	30.10	23.16	53.26	54	-0.74	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10460	31.67	14.11	45.78	68.2	-22.42	peak
15690	28.05	21.14	49.19	54	-4.81	peak
20920	28.72	23.31	52.03	54	-1.97	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10460	31.99	14.11	46.10	68.2	-22.10	peak
15690	28.93	21.14	50.07	54	-3.93	peak
20920	26.66	23.31	49.97	54	-4.03	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11490	33.51	14.41	47.92	54	-6.08	peak
17235	27.81	22.57	50.38	68.2	-17.82	peak
22980	27.61	24.45	52.06	54	-1.94	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11490	30.89	14.41	45.30	54	-8.70	peak
17235	25.66	22.57	48.23	68.2	-19.97	peak
22980	25.74	24.45	50.19	54	-3.81	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11570	31.90	14.25	46.15	54	-7.85	peak
17355	28.28	21.86	50.14	68.2	-18.06	peak
23140	25.91	24.68	50.59	68.2	-17.61	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11570	36.45	14.25	50.70	54	-3.30	peak
17355	26.24	21.86	48.10	68.2	-20.10	peak
23140	24.20	24.68	48.88	68.2	-19.32	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11650	31.14	14.06	45.20	54	-8.80	peak
17475	25.94	21.15	47.09	68.2	-21.11	peak
23300	29.87	25.11	54.98	68.2	-13.22	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11650	33.74	14.06	47.80	54	-6.20	peak
17475	26.42	21.15	47.57	68.2	-20.63	peak
23300	26.70	25.11	51.81	68.2	-16.39	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11490	32.47	14.41	46.88	54	-7.12	peak
17235	30.32	22.57	52.89	68.2	-15.31	peak
22980	27.24	24.45	51.69	54	-2.31	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11490	34.10	14.41	48.51	54	-5.49	peak
17235	27.81	22.57	50.38	68.2	-17.82	peak
22980	28.50	24.45	52.95	54	-1.05	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11570	36.43	14.25	50.68	54	-3.32	peak
17355	28.29	21.86	50.15	68.2	-18.05	peak
23140	23.01	24.68	47.69	68.2	-20.51	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11570	31.44	14.25	45.69	54	-8.31	peak
17355	27.38	21.86	49.24	68.2	-18.96	peak
23140	27.06	24.68	51.74	68.2	-16.46	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11650	30.35	14.06	44.41	54	-9.59	peak
17475	25.86	21.15	47.01	68.2	-21.19	peak
23300	25.50	25.11	50.61	68.2	-17.59	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11650	33.33	14.06	47.39	54	-6.61	peak
17475	29.27	21.15	50.42	68.2	-17.78	peak
23300	29.26	25.11	54.37	68.2	-13.83	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11510	30.70	14.40	45.10	54	-8.90	peak
17265	26.45	22.40	48.85	68.2	-19.35	peak
23020	23.51	24.68	48.19	54	-5.81	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11510	34.99	14.40	49.39	54	-4.61	peak
17265	26.32	22.40	48.72	68.2	-19.48	peak
23020	27.43	24.68	52.11	54	-1.89	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11590	31.53	14.20	45.73	54	-8.27	peak
17385	28.02	21.68	49.70	68.2	-18.50	peak
23180	26.89	24.72	51.61	68.2	-16.59	peak

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

Frequency	RX_R	Factor	Emission	Limit	Margin	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11590	33.22	14.20	47.42	54	-6.58	peak
17385	28.16	21.68	49.84	68.2	-18.36	peak
23180	25.63	24.72	50.35	68.2	-17.85	peak

7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.407(b)

Test Method: KDB 789033 D02 II G

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.		

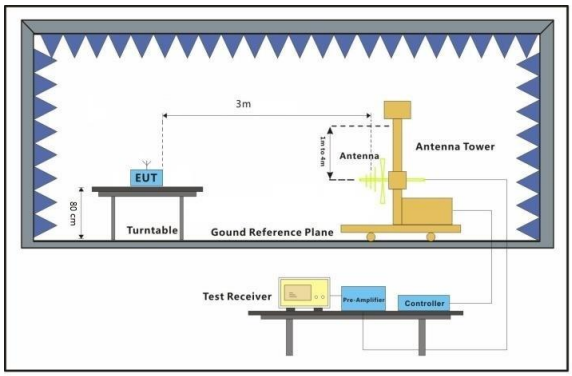
7.7.1 E.U.T. Operation

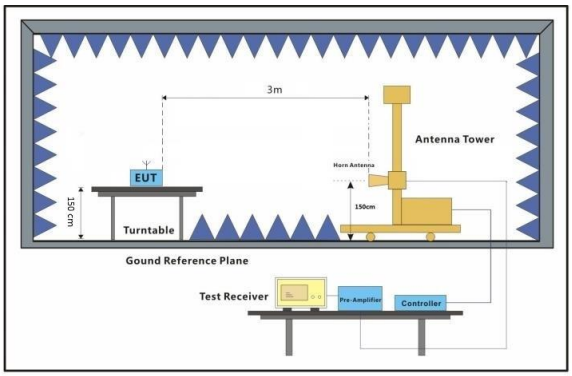
Operating Environment:

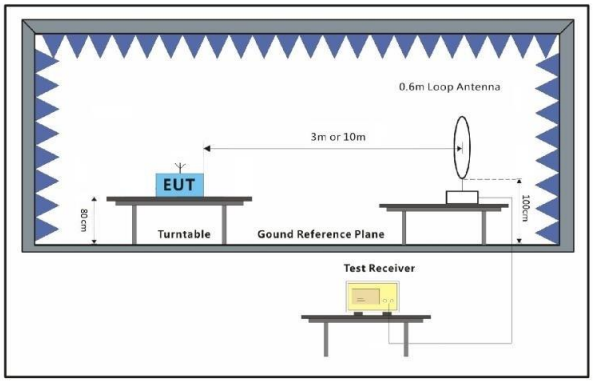
Temperature: 21 °C Humidity: 45 % RH Atmospheric Pressure: 1010 mbar

Test mode: a:TX mode (Band 1)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE b:TX mode (Band 3)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

7.7.2 Test Setup Diagram







7.7.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

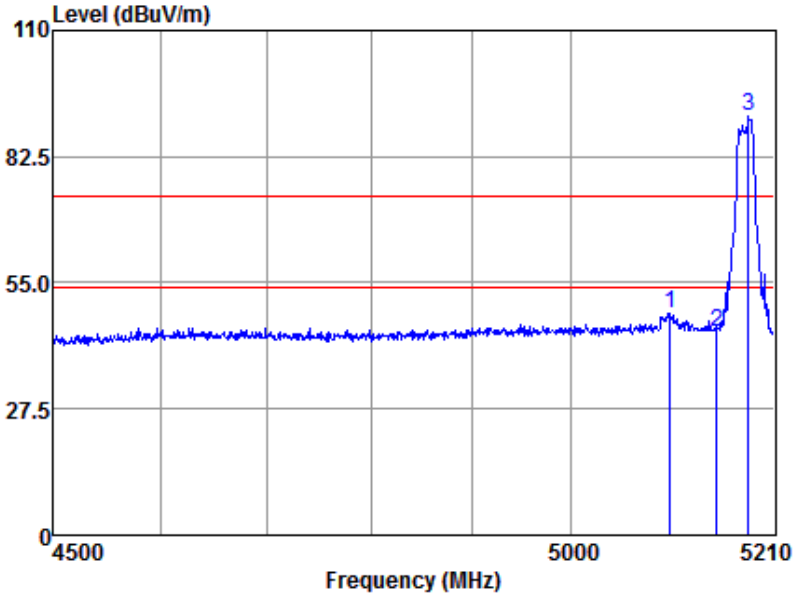
h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

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

Mode:a; Polarization:Horizontal; Modulation:a; bandwidth:20MHz; Channel:Low

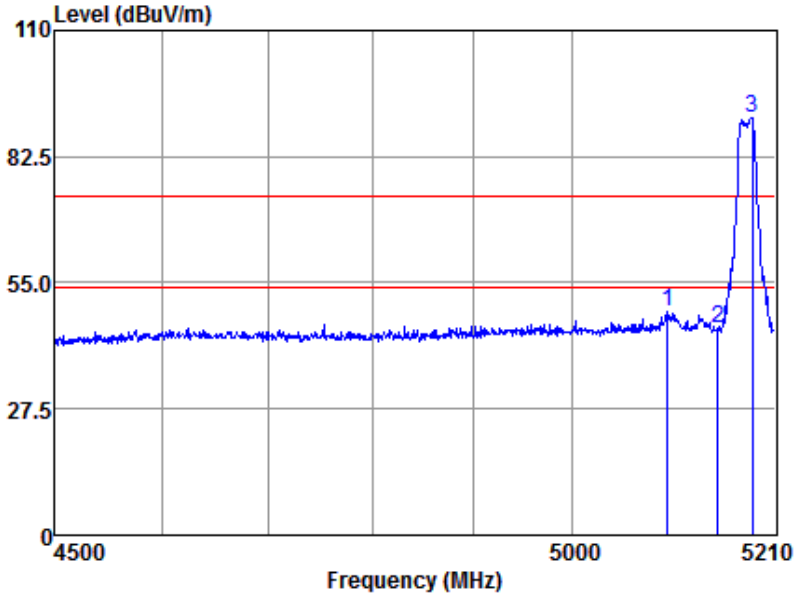


Antenna Polarity :HORIZONTAL

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	
5101.99	46.45	31.55	9.26	38.84	48.42	74.00	-25.58	Peak
5150.00	42.50	31.61	9.06	38.81	44.36	74.00	-29.64	Peak
5184.11	89.58	31.65	8.86	38.80	91.29	74.00	17.29	Peak

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

Mode:a; Polarization:Vertical; Modulation:a; bandwidth:20MHz; Channel:Low

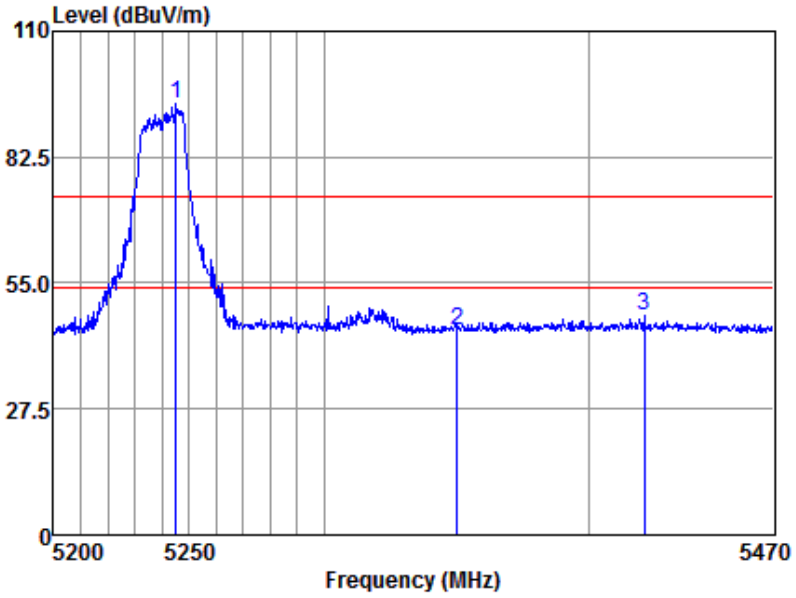


Antenna Polarity :VERTICAL

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	
5098.25	46.79	31.55	9.26	38.84	48.76	74.00	-25.24	Peak
5150.05	43.10	31.61	9.06	38.81	44.96	74.00	-29.04	Peak
5186.39	89.08	31.65	8.86	38.80	90.79	74.00	16.79	Peak

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

Mode:a; Polarization:Horizontal; Modulation:a; bandwidth:20MHz; Channel:High

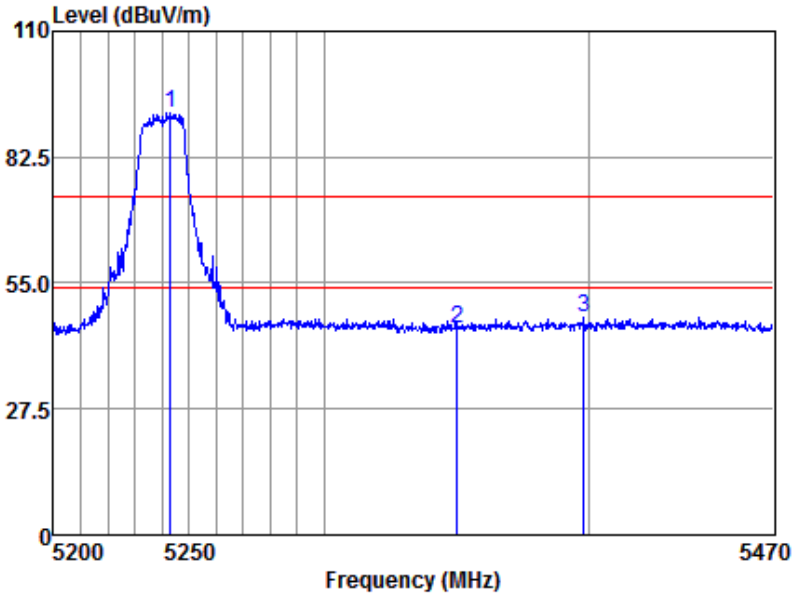


Antenna Polarity :HORIZONTAL

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	
5245.21	92.38	31.74	8.68	38.77	94.03	74.00	20.03	Peak
5350.00	42.15	31.89	9.20	38.70	44.54	74.00	-29.46	Peak
5420.94	45.31	31.99	9.34	38.66	47.98	74.00	-26.02	Peak

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

Mode:a; Polarization:Vertical; Modulation:a; bandwidth:20MHz; Channel:High

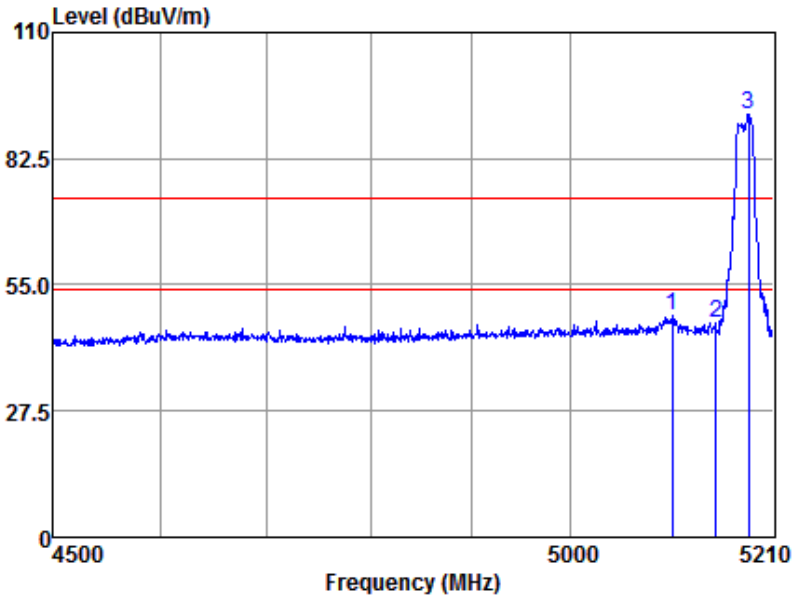


Antenna Polarity :VERTICAL

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	
5243.08	90.61	31.74	8.68	38.77	92.26	74.00	18.26	Peak
5350.00	42.55	31.89	9.20	38.70	44.94	74.00	-29.06	Peak
5397.66	44.67	31.95	9.44	38.68	47.38	74.00	-26.62	Peak

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

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

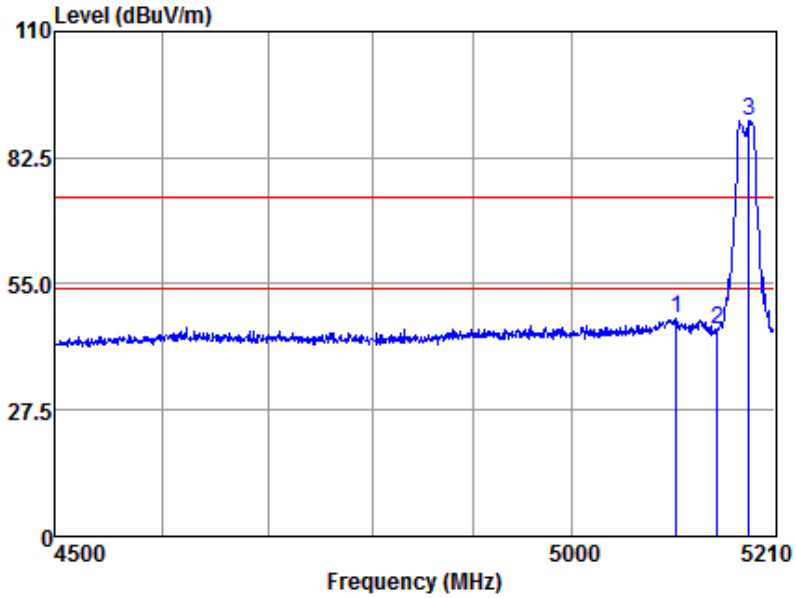


Antenna Polarity :HORIZONTAL

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	
5104.23	46.19	31.55	9.26	38.84	48.16	74.00	-25.84	Peak
5150.00	44.71	31.61	9.06	38.81	46.57	74.00	-27.43	Peak
5184.87	90.57	31.65	8.86	38.80	92.28	74.00	18.28	Peak

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

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

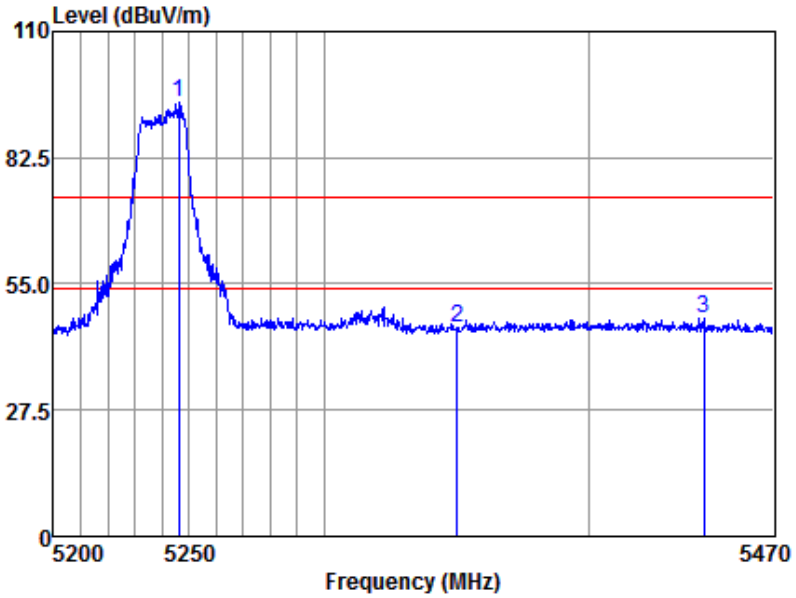


Antenna Polarity :VERTICAL

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	
5107.22	45.44	31.55	9.26	38.84	47.41	74.00	-26.59	Peak
5150.00	43.02	31.61	9.06	38.81	44.88	74.00	-29.12	Peak
5184.11	89.00	31.65	8.86	38.80	90.71	74.00	16.71	Peak

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

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

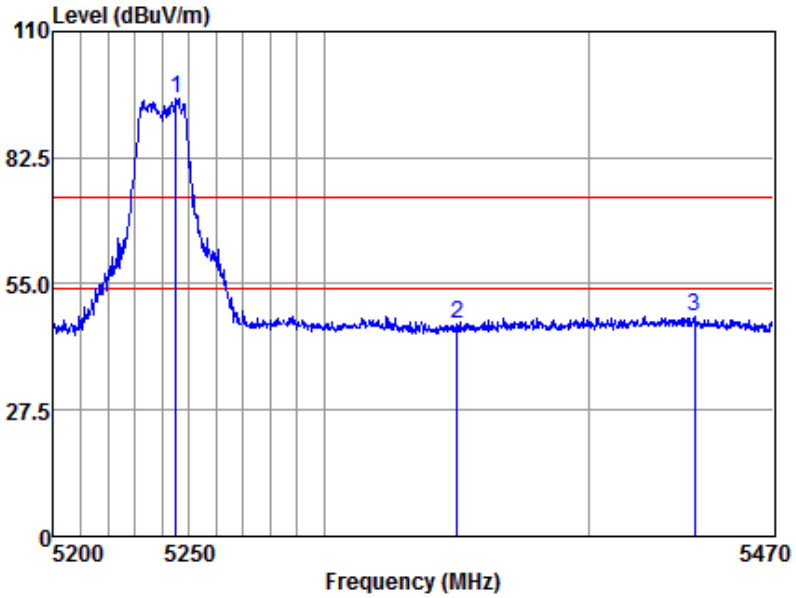


Antenna Polarity :HORIZONTAL

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	
5246.00	93.09	31.74	8.68	38.77	94.74	74.00	20.74	Peak
5350.00	43.20	31.89	9.20	38.70	45.59	74.00	-28.41	Peak
5443.76	44.96	32.02	9.34	38.65	47.67	74.00	-26.33	Peak

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

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

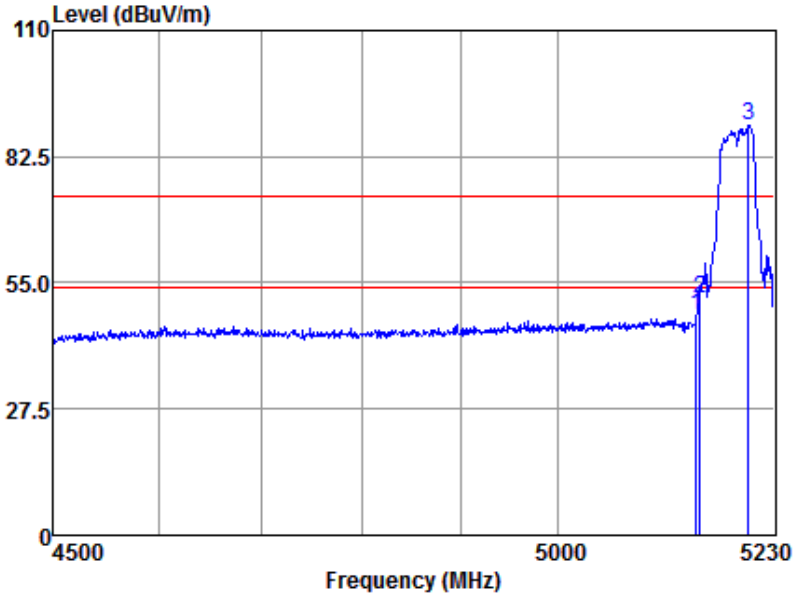


Antenna Polarity :VERTICAL

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	
5245.21	93.78	31.74	8.68	38.77	95.43	74.00	21.43	Peak
5350.00	43.97	31.89	9.20	38.70	46.36	74.00	-27.64	Peak
5439.90	45.13	32.02	9.34	38.65	47.84	74.00	-26.16	Peak

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

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

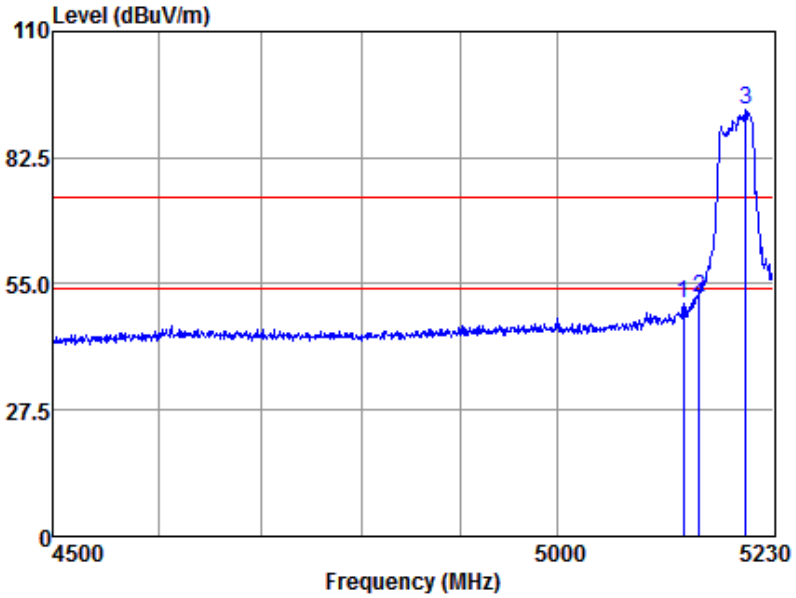


Antenna Polarity :HORIZONTAL

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	
5146.54	46.11	31.61	9.06	38.81	47.97	74.00	-26.03	Peak
5150.00	49.74	31.61	9.06	38.81	51.60	74.00	-22.40	Peak
5203.34	87.86	31.70	8.66	38.78	89.44	74.00	15.44	Peak

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

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

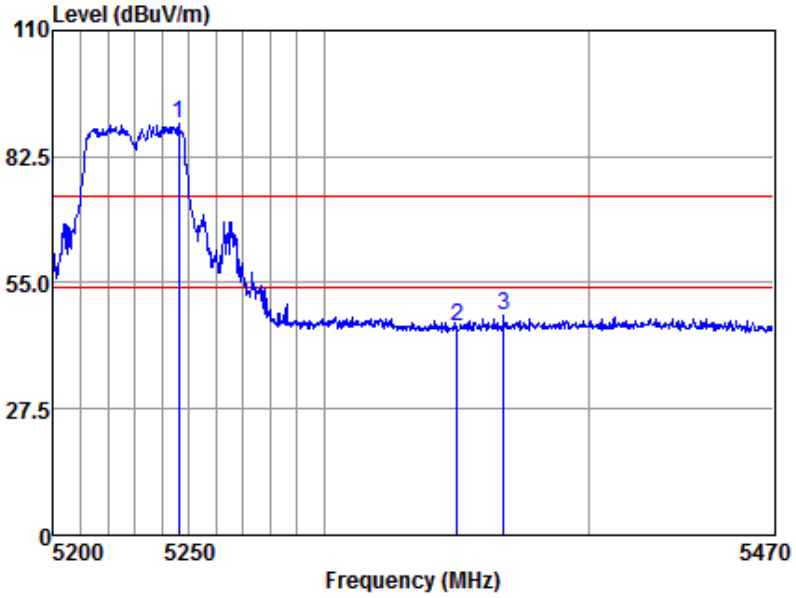


Antenna Polarity :VERTICAL

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	
5133.41	48.83	31.59	9.06	38.82	50.66	54.00	-3.34	Average
5150.00	50.16	31.61	9.06	38.81	52.02	54.00	-1.98	Average
5200.99	91.34	31.68	8.66	38.79	92.89	54.00	38.89	Average

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

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

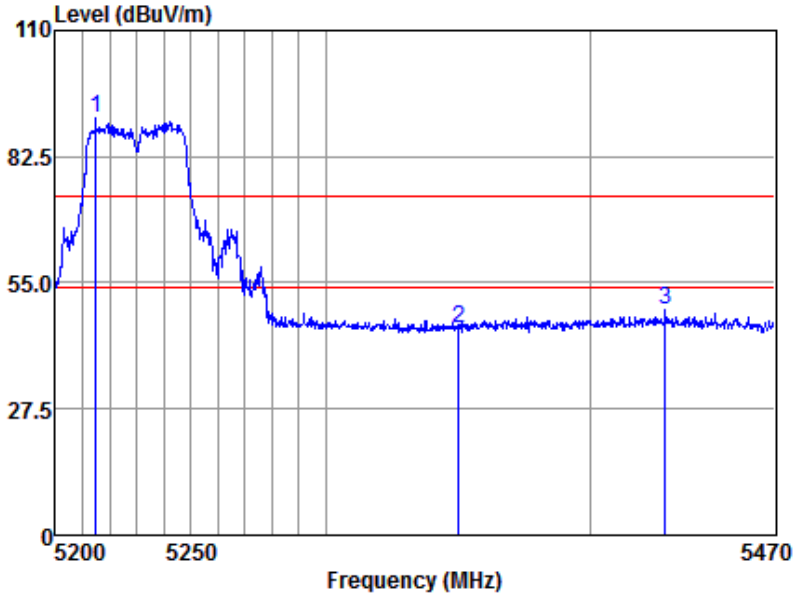


Antenna Polarity :HORIZONTAL

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	
5246.00	87.99	31.74	8.68	38.77	89.64	74.00	15.64	Peak
5350.00	43.15	31.89	9.20	38.70	45.54	74.00	-28.46	Peak
5367.42	45.30	31.91	9.20	38.69	47.72	74.00	-26.28	Peak

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

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

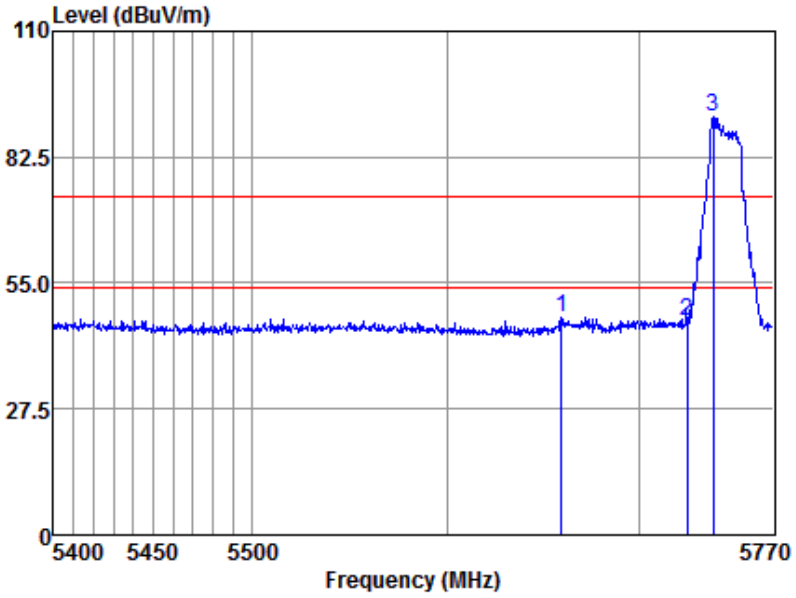


Antenna Polarity :VERTICAL

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	
5214.76	89.26	31.70	8.66	38.78	90.84	74.00	16.84	Peak
5350.00	42.59	31.89	9.20	38.70	44.98	74.00	-29.02	Peak
5428.35	46.47	31.99	9.34	38.66	49.14	74.00	-24.86	Peak

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

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

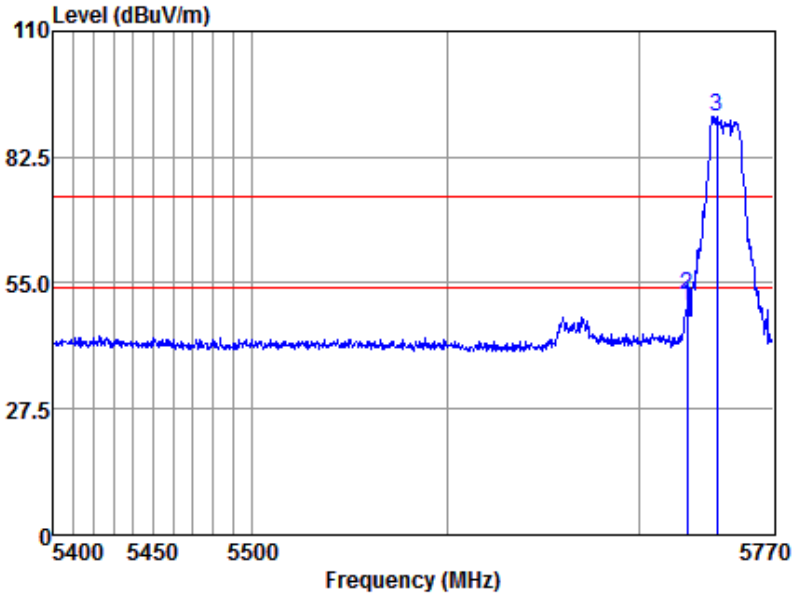


Antenna Polarity :HORIZONTAL

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	
5658.66	45.07	32.13	9.01	38.71	47.50	74.00	-26.50	Peak
5725.00	44.37	32.15	9.00	38.75	46.77	74.00	-27.23	Peak
5738.35	88.81	32.15	9.00	38.75	91.21	74.00	17.21	Peak

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

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

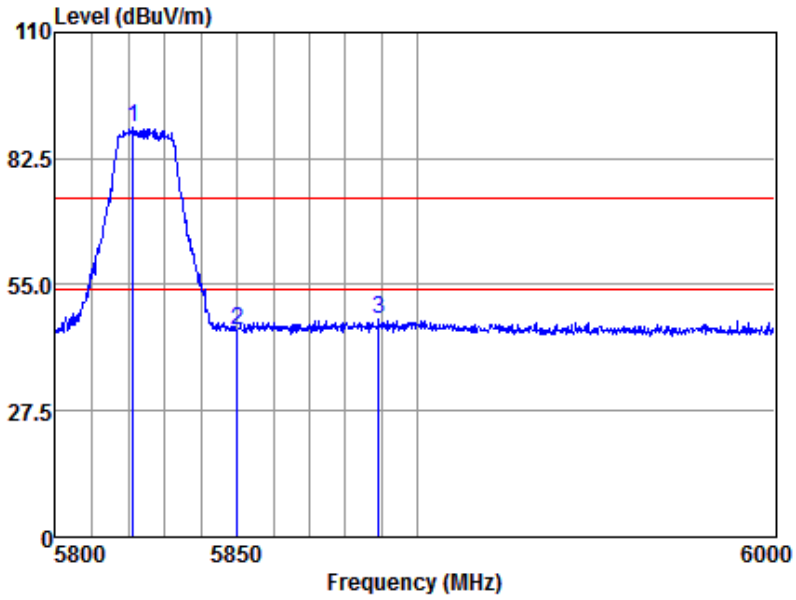


Antenna Polarity :VERTICAL

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	
5724.67	47.57	32.15	9.00	38.75	49.97	74.00	-24.03	Peak
5725.00	50.00	32.15	9.00	38.75	52.40	74.00	-21.60	Peak
5740.63	89.12	32.15	9.00	38.76	91.51	74.00	17.51	Peak

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

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

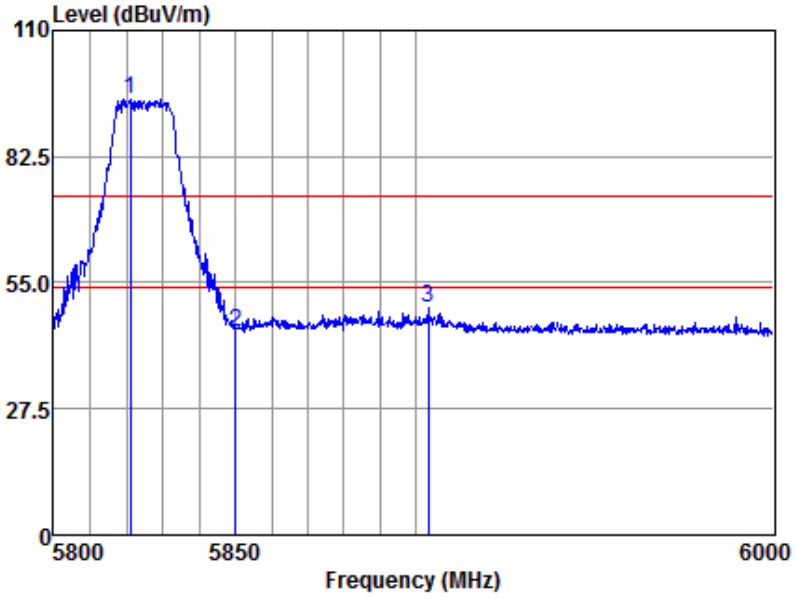


Antenna Polarity :HORIZONTAL

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	
5821.47	86.91	32.16	8.87	38.78	89.16	74.00	15.16	Peak
5850.00	42.65	32.17	8.90	38.75	44.97	74.00	-29.03	Peak
5889.16	44.98	32.18	8.93	38.72	47.37	74.00	-26.63	Peak

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

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

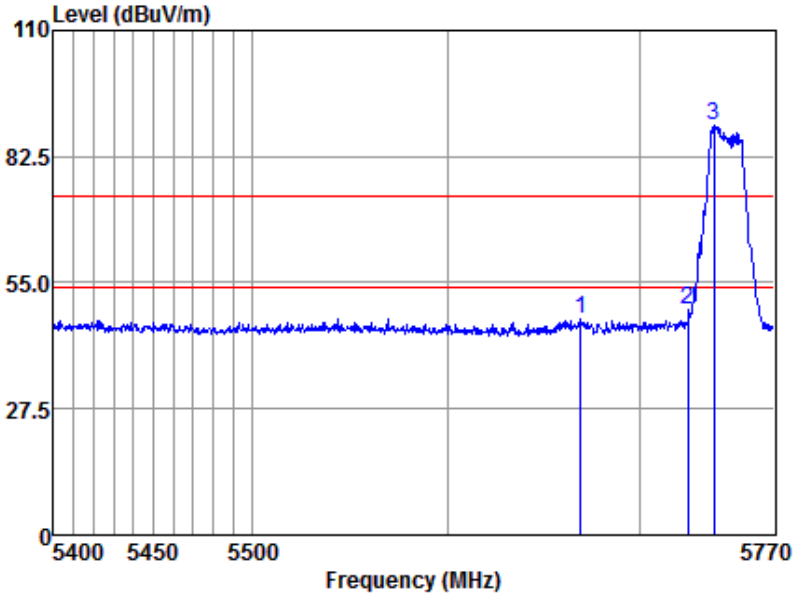


Antenna Polarity :VERTICAL

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	
5821.08	92.70	32.16	8.87	38.78	94.95	74.00	20.95	Peak
5850.00	41.84	32.17	8.90	38.75	44.16	74.00	-29.84	Peak
5903.35	47.26	32.18	8.93	38.70	49.67	74.00	-24.33	Peak

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

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

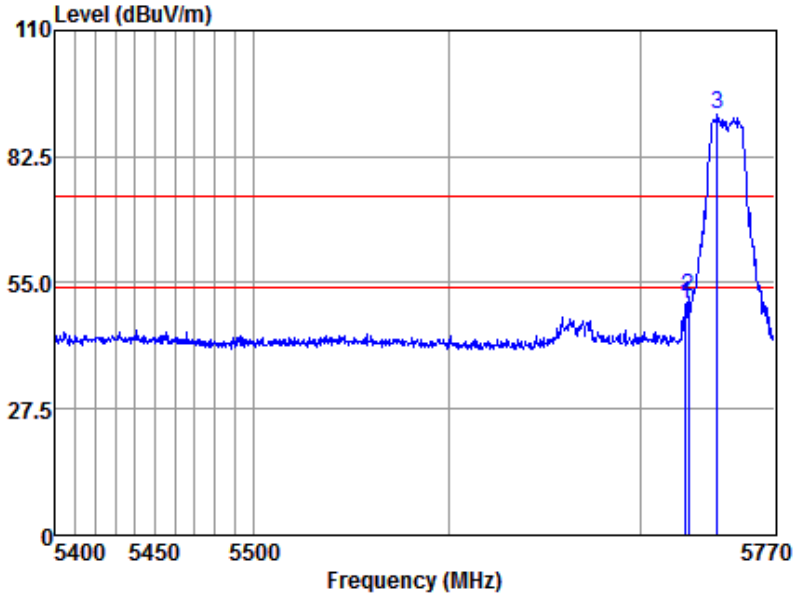


Antenna Polarity :HORIZONTAL

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	
5668.80	44.69	32.13	9.01	38.71	47.12	74.00	-26.88	Peak
5725.00	46.91	32.15	9.00	38.75	49.31	74.00	-24.69	Peak
5738.35	86.71	32.15	9.00	38.75	89.11	74.00	15.11	Peak

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

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

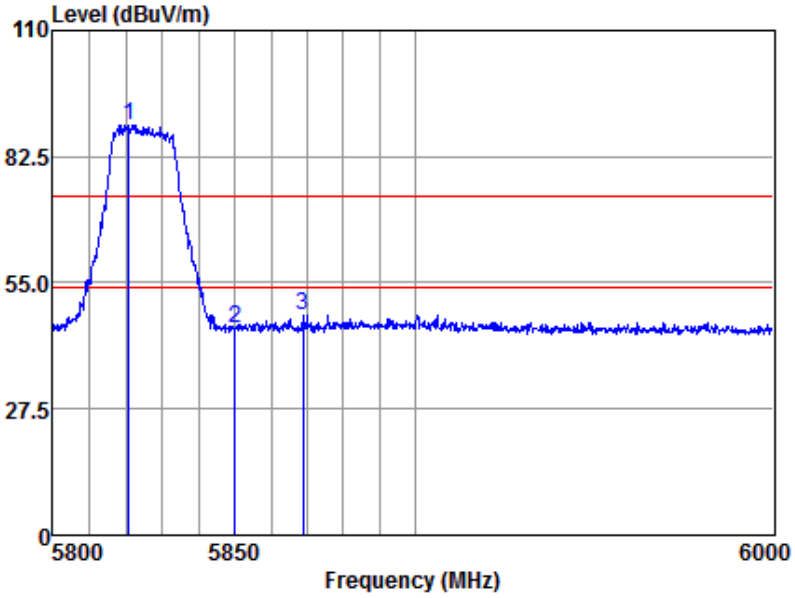


Antenna Polarity :VERTICAL

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	
5723.16	47.90	32.15	9.00	38.75	50.30	74.00	-23.70	Peak
5725.00	49.65	32.15	9.00	38.75	52.05	74.00	-21.95	Peak
5739.87	89.50	32.15	9.00	38.76	91.89	74.00	17.89	Peak

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

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

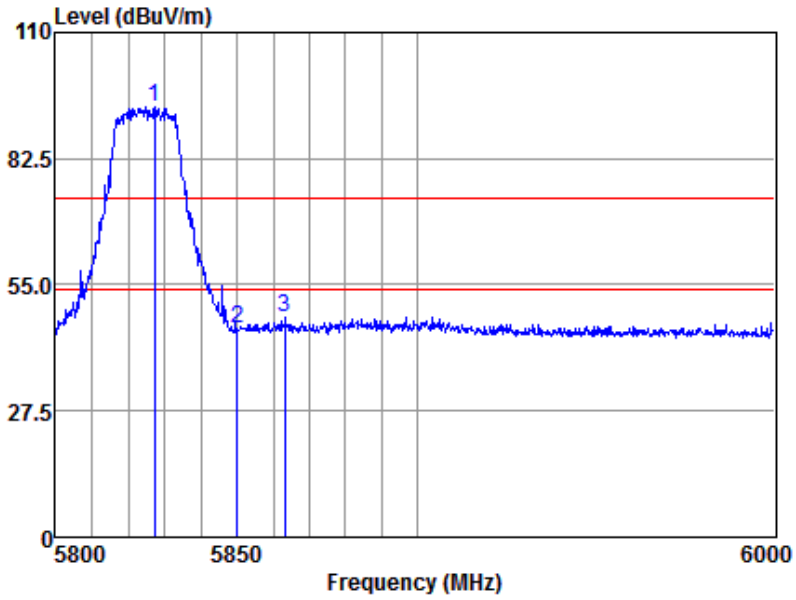


Antenna Polarity :HORIZONTAL

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	
5820.88	87.20	32.16	8.87	38.78	89.45	74.00	15.45	Peak
5850.00	42.73	32.17	8.90	38.75	45.05	74.00	-28.95	Peak
5868.83	45.65	32.17	8.93	38.74	48.01	74.00	-25.99	Peak

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

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

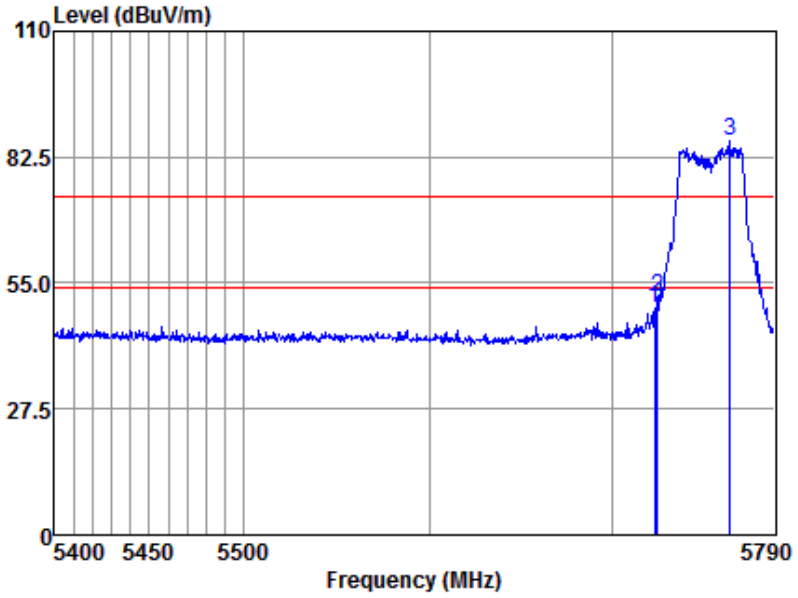


Antenna Polarity :VERTICAL

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	
5827.20	91.55	32.17	8.87	38.77	93.82	74.00	19.82	Peak
5850.00	43.07	32.17	8.90	38.75	45.39	74.00	-28.61	Peak
5863.26	45.65	32.17	8.90	38.74	47.98	74.00	-26.02	Peak

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

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

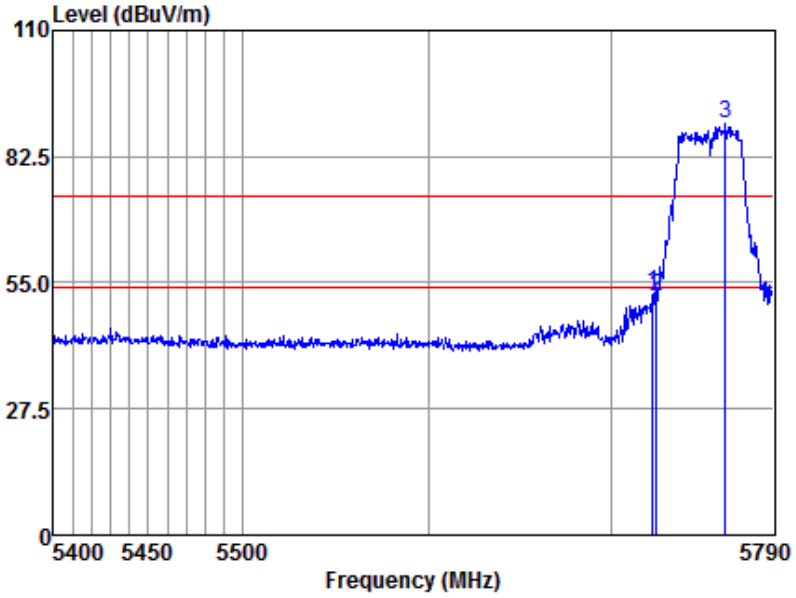


Antenna Polarity :HORIZONTAL

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	
5723.76	47.04	32.15	9.00	38.75	49.44	74.00	-24.56	Peak
5725.00	49.40	32.15	9.00	38.75	51.80	74.00	-22.20	Peak
5765.83	83.68	32.15	8.93	38.78	85.98	74.00	11.98	Peak

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

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

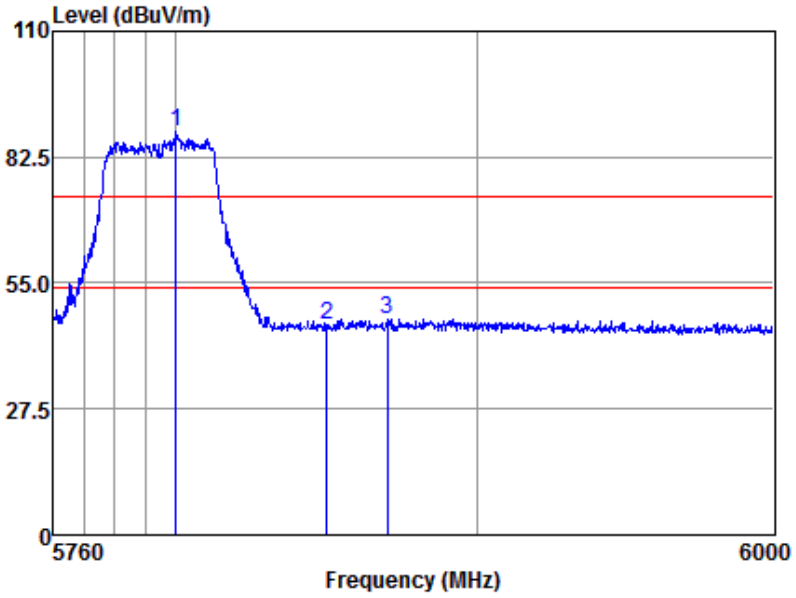


Antenna Polarity :VERTICAL

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	
5723.36	50.29	32.15	9.00	38.75	52.69	74.00	-21.31	Peak
5725.00	49.44	32.15	9.00	38.75	51.84	74.00	-22.16	Peak
5763.41	87.59	32.15	8.93	38.78	89.89	74.00	15.89	Peak

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

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

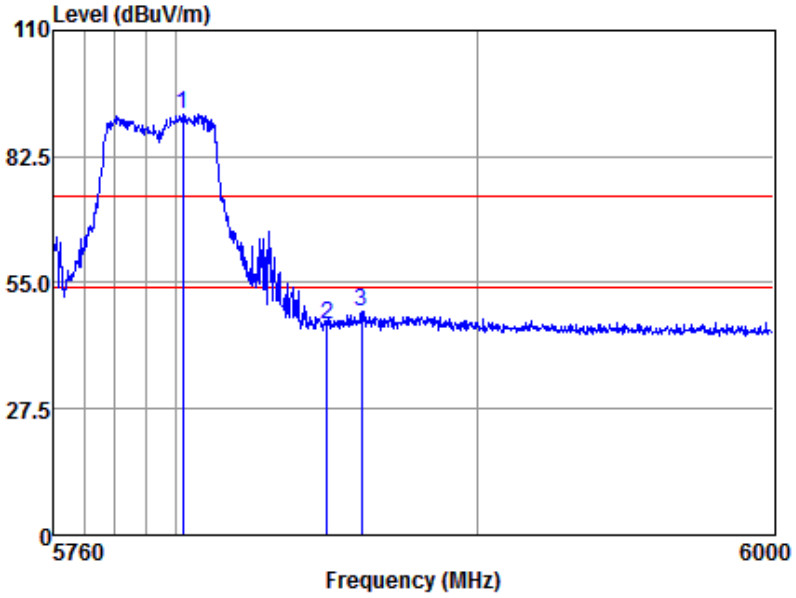


Antenna Polarity :HORIZONTAL

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	
5800.35	85.79	32.16	8.87	38.80	88.02	74.00	14.02	Peak
5850.00	43.59	32.17	8.90	38.75	45.91	74.00	-28.09	Peak
5870.14	44.87	32.17	8.93	38.74	47.23	74.00	-26.77	Peak

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

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



Antenna Polarity :VERTICAL

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	
5802.24	89.62	32.16	8.87	38.80	91.85	74.00	17.85	Peak
5850.00	43.56	32.17	8.90	38.75	45.88	74.00	-28.12	Peak
5861.52	46.46	32.17	8.90	38.74	48.79	74.00	-25.21	Peak

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

7.8 Frequency Stability

Test Requirement	47 CFR Part 15, Subpart C 15.407 (g)
Test Method:	ANSI C63.10 (2013) Section 6.8
Limit:	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of -20 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

7.8.1 E.U.T. Operation

Operating Environment:

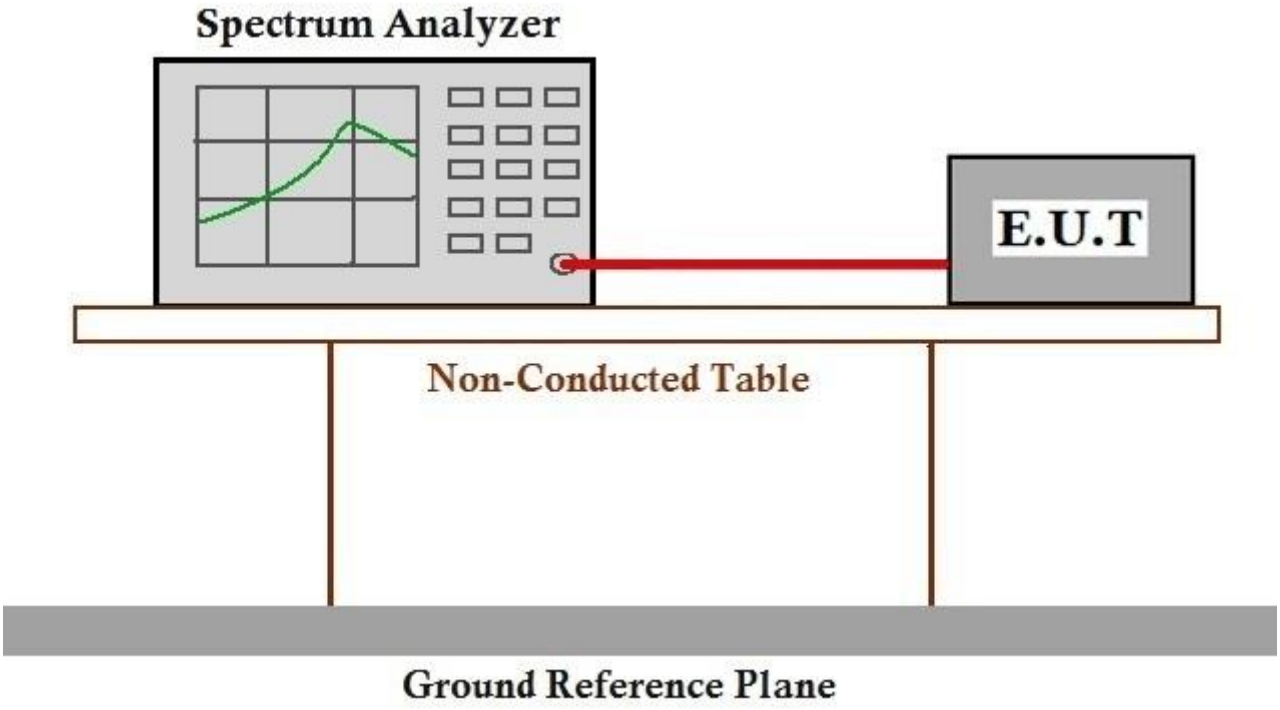
Temperature: 21 °C Humidity: 45 % RH Atmospheric Pressure: 1010 mbar

Pretest these mode to find the worst case:

a:TX mode (Band 1)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

b:TX mode (Band 3)_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 @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE

7.8.2 Test Setup Diagram



7.8.3 Measurement Procedure and Data

The detailed test data see: Appendix A SHEM180800644901

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 -