TEST REPORT

Application No.:	SHEM1809008316CR
FCC ID:	SVC-PULSEBAR2I
IC:	152C-PULSEBAR2I
Applicant:	Lenbrook Industries Limited
Address of Applicant:	633 Granite Court, Pickering, Ontario, Canada L1W 3K1
Manufacturer:	Lenbrook Industries Limited
Address of Manufacturer:	633 Granite Court, Pickering, Ontario, Canada L1W 3K1
Factory:	Hansong (Nanjing) Technology Ltd.
Address of Factory:	8th Kangping Road, Jiangning Economy and Technology Development Zone, Nanjing, 211106, China.
Equipment Under Test (EUT):	
EUT Name:	Wireless Streaming Sound System
Model No.:	Pulse Soundbar 2i
Trade mark:	Bluesound
Standard(s) :	47 CFR Part 15, Subpart E 15.407 RSS-Gen Issue 5, April 2018
Date of Receipt:	2018-09-20
Date of Test:	2018-09-21 to 2018-10-17
Date of Issue:	2019-01-10
Test Result:	**Pass***

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

Parlam Zhan

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.

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.
Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2019-01-10	/

Authorized for issue by:				
		Bill Wu		
		Bill Wu / Project Engineer		
		Parlam zhan		
		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
99% Bandwidth	47 CFR Part 15, Subpart E 15.407	KDB 789033 II D	N/A	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

N/A: Not applicable

3 Contents

Page

1 COVER PAGE 1

2 TEST SUMMARY 3

3 CONTENTS 4

4 GENERAL INFORMATION 5

4.1 DETAILS OF E.U.T. 5
4.2 DESCRIPTION OF SUPPORT UNITS 5
4.3 MEASUREMENT UNCERTAINTY 5
4.4 TEST LOCATION 6
4.5 TEST FACILITY 6
4.6 DEVIATION FROM STANDARDS 6
4.7 ABNORMALITIES FROM STANDARD CONDITIONS 6

5 EQUIPMENT LIST 7

6 RADIO SPECTRUM TECHNICAL REQUIREMENT 8

6.1 ANTENNA REQUIREMENT 8
6.2 TRANSMISSION IN THE ABSENCE OF DATA 9

7 RADIO SPECTRUM MATTER TEST RESULTS 10

7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 10
7.2 99% BANDWIDTH 14
7.3 26DB EMISSION BANDWIDTH 16
7.4 MINIMUM 6 DB BANDWIDTH (5.725-5.85 GHZ BAND) 17
7.5 MAXIMUM CONDUCTED OUTPUT POWER 18
7.6 PEAK POWER SPECTRUM DENSITY 20
7.7 RADIATED EMISSIONS 22
7.8 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS 37
7.9 FREQUENCY STABILITY 93

8 TEST SETUP PHOTOGRAPHS 95

9 EUT CONSTRUCTIONAL DETAILS 95

4 General Information

4.1 Details of E.U.T.

Power supply:	AC 100-240V~50/60Hz 80W
Test voltage:	AC 120V/60Hz
Cable:	AC Cable 200cm
Antenna Gain	2dBi
Antenna Type	PIFA Antenna
DFS Function	Slave without Radar detection
TPC Function	Not Support

Power level setting using in test:

Band	802.11 a	802.11 n (HT20)	802.11 n (HT40)	802.11 ac (VHT20)	802.11 ac (VHT40)	802.11 ac (VHT80)
U-NII 1	15	14	13	13	12	11
U-NII 3	15	14	13	13	12	11

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Router	FIR302M	FIR302M	/
Laptop	LENOVO	R400	/

4.3 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.

4.4 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.

4.5 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.

4.6 Deviation from Standards

None

4.7 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

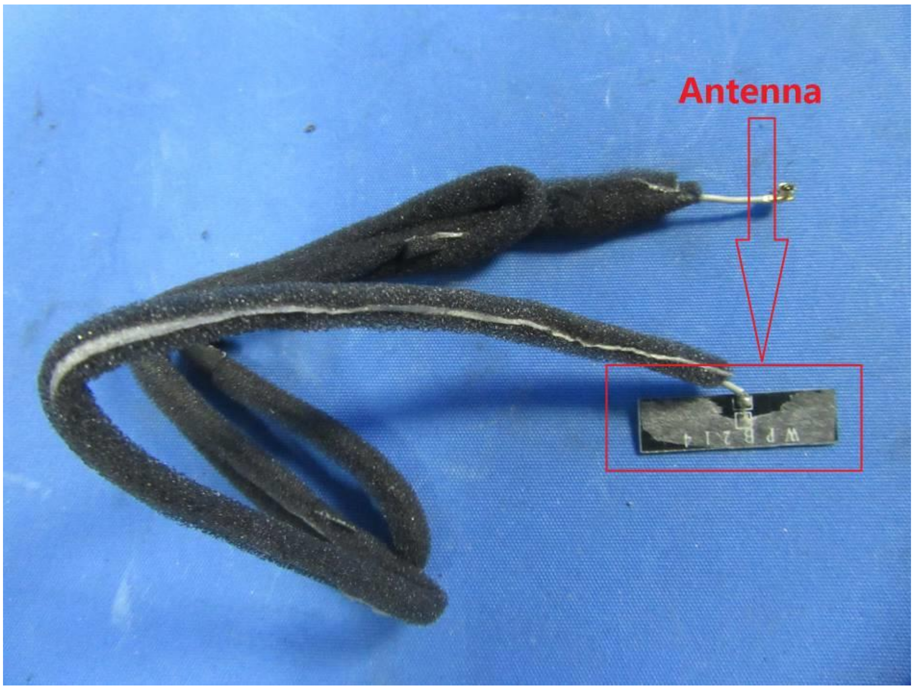
6.1.2 Conclusion

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 PIFA Antenna and no consideration of replacement. The best case gain of the antenna is 2dBi.



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 (8223A) 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.		

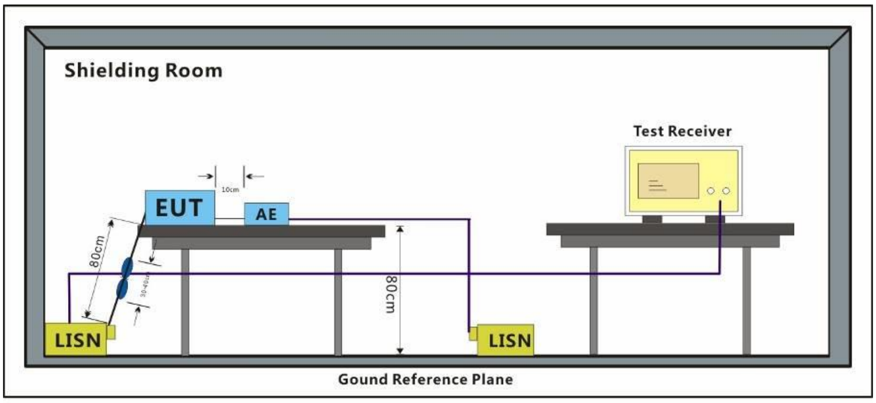
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Pretest these mode to find the worst case:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report. c: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.
The worst case for final test:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

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

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 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.

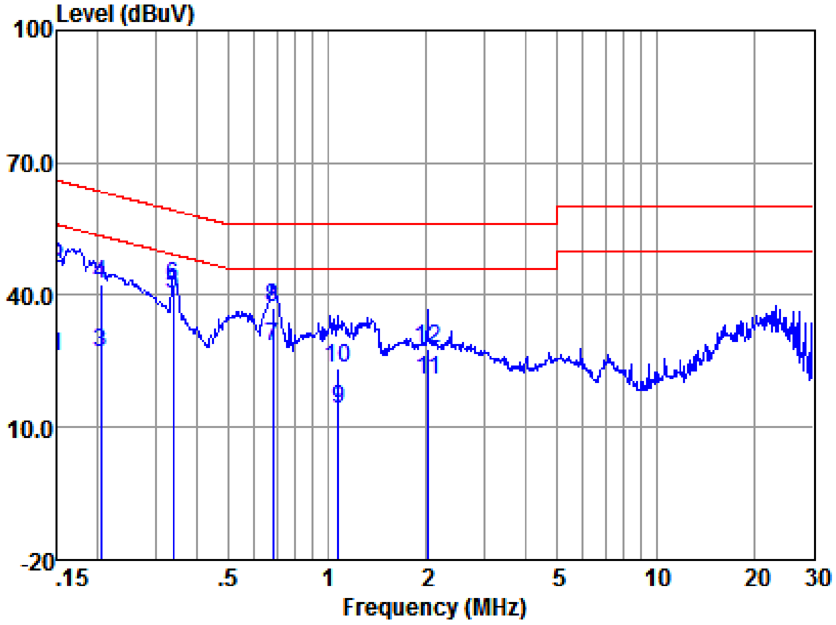
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

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

Mode:b; Line:Live Line

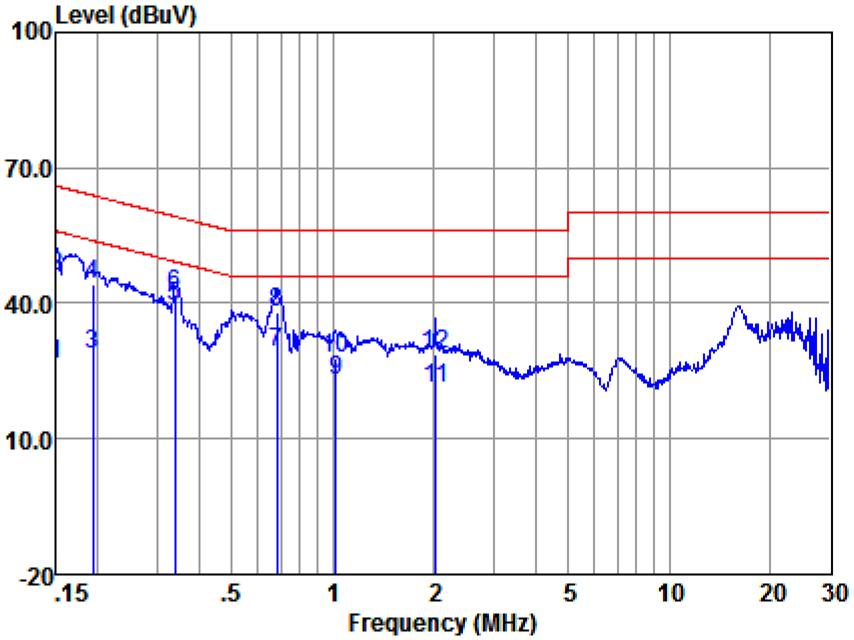


LISN : LINE
Test mode : b

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.15	16.24	0.05	9.82	26.11	56.00	-29.89	Average
2	0.15	36.12	0.05	9.82	45.99	66.00	-20.01	QP
3	0.20	16.94	0.05	9.83	26.82	53.45	-26.63	Average
4	0.20	32.78	0.05	9.83	42.66	63.45	-20.79	QP
5	0.34	30.27	0.05	9.84	40.16	49.22	-9.06	Average
6	0.34	31.96	0.05	9.84	41.85	59.22	-17.37	QP
7	0.68	18.38	0.04	9.85	28.27	46.00	-17.73	Average
8	0.68	27.26	0.04	9.85	37.15	56.00	-18.85	QP
9	1.08	4.41	0.05	9.82	14.28	46.00	-31.72	Average
10	1.08	13.58	0.05	9.82	23.45	56.00	-32.55	QP
11	2.02	10.91	0.05	9.87	20.83	46.00	-25.17	Average
12	2.02	17.94	0.05	9.87	27.86	56.00	-28.14	QP

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

Mode:b; Line:Neutral Line



LISN : NEUTRAL
Test mode : b

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.15	16.45	0.06	9.82	26.33	56.00	-29.67	Average
2	0.15	36.17	0.06	9.82	46.05	66.00	-19.95	QP
3	0.19	18.63	0.06	9.83	28.52	53.93	-25.41	Average
4	0.19	34.22	0.06	9.83	44.11	63.93	-19.82	QP
5	0.34	29.59	0.05	9.84	39.48	49.22	-9.74	Average
6	0.34	32.03	0.05	9.84	41.92	59.22	-17.30	QP
7	0.68	19.12	0.05	9.85	29.02	46.00	-16.98	Average
8	0.68	28.27	0.05	9.85	38.17	56.00	-17.83	QP
9	1.02	13.05	0.05	9.77	22.87	46.00	-23.13	Average
10	1.02	18.06	0.05	9.77	27.88	56.00	-28.12	QP
11	2.02	11.08	0.06	9.87	21.01	46.00	-24.99	Average
12	2.02	18.79	0.06	9.87	28.72	56.00	-27.28	QP

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

7.2 99% Bandwidth

Test Requirement	N/A
Test Method:	KDB 789033 II D

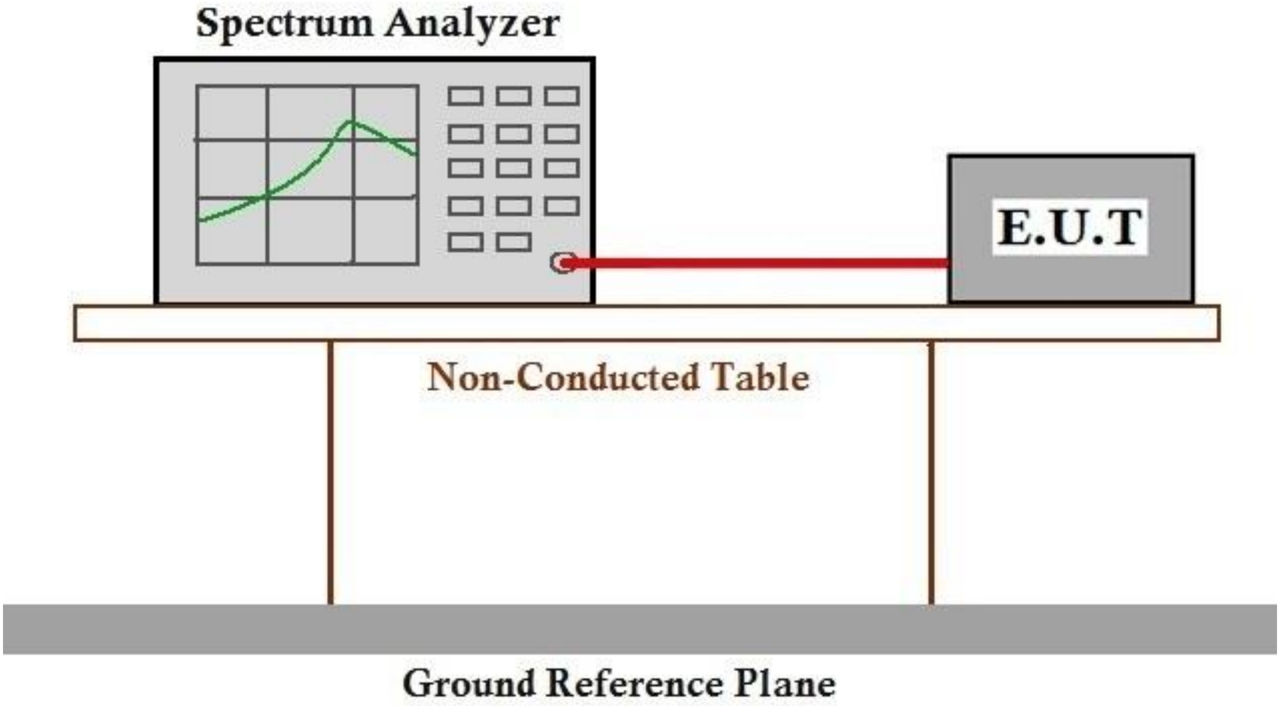
7.2.1 E.U.T. Operation

Operating Environment:

Temperature:	20	°C	Humidity:	50	% RH	Atmospheric Pressure:	1010	mbar

Pretest these mode to find the worst case:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.
	c: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.
The worst case for final test:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.

7.2.2 Test Setup Diagram


Spectrum Analyzer
E.U.T
Non-Conducted Table
Ground Reference Plane

7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix D for SHEM180900831604

7.3 26dB Emission bandwidth

Test Requirement	47 CFR Part 15, Subpart C 15.407 (a)
Test Method:	KDB 789033 D02 II C 1

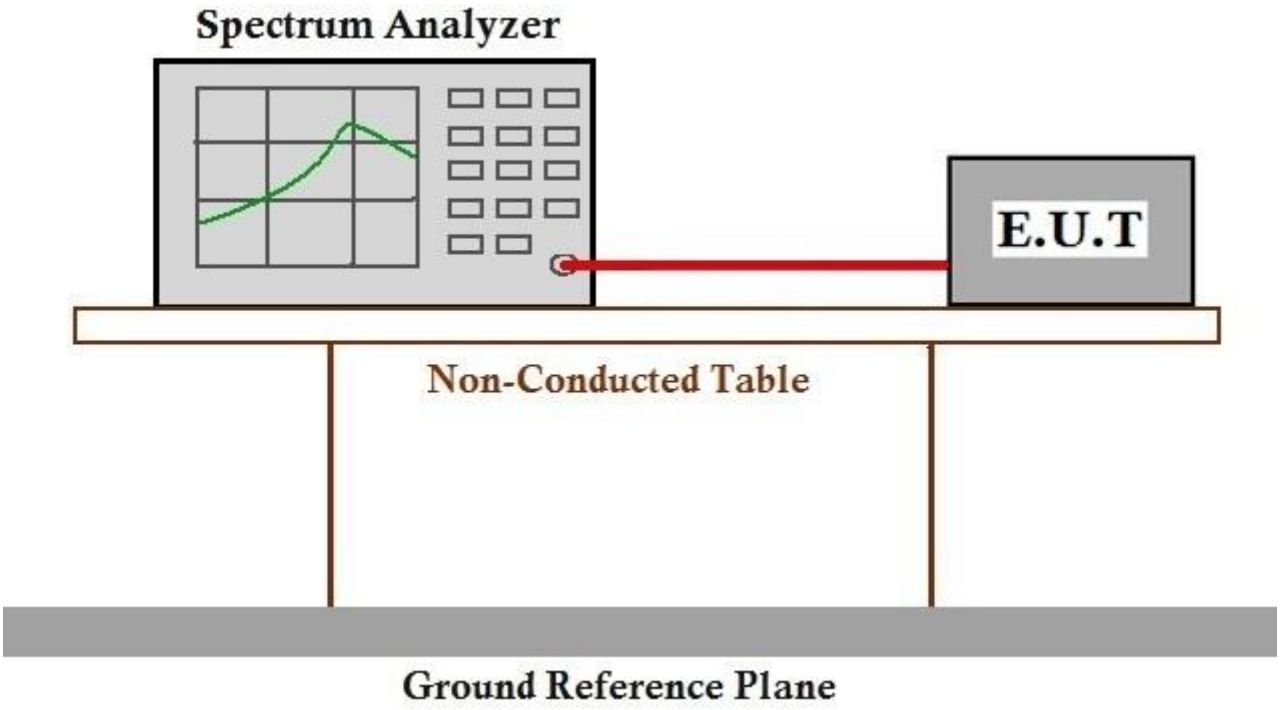
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode c: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix D for SHEM180900831604

7.4 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

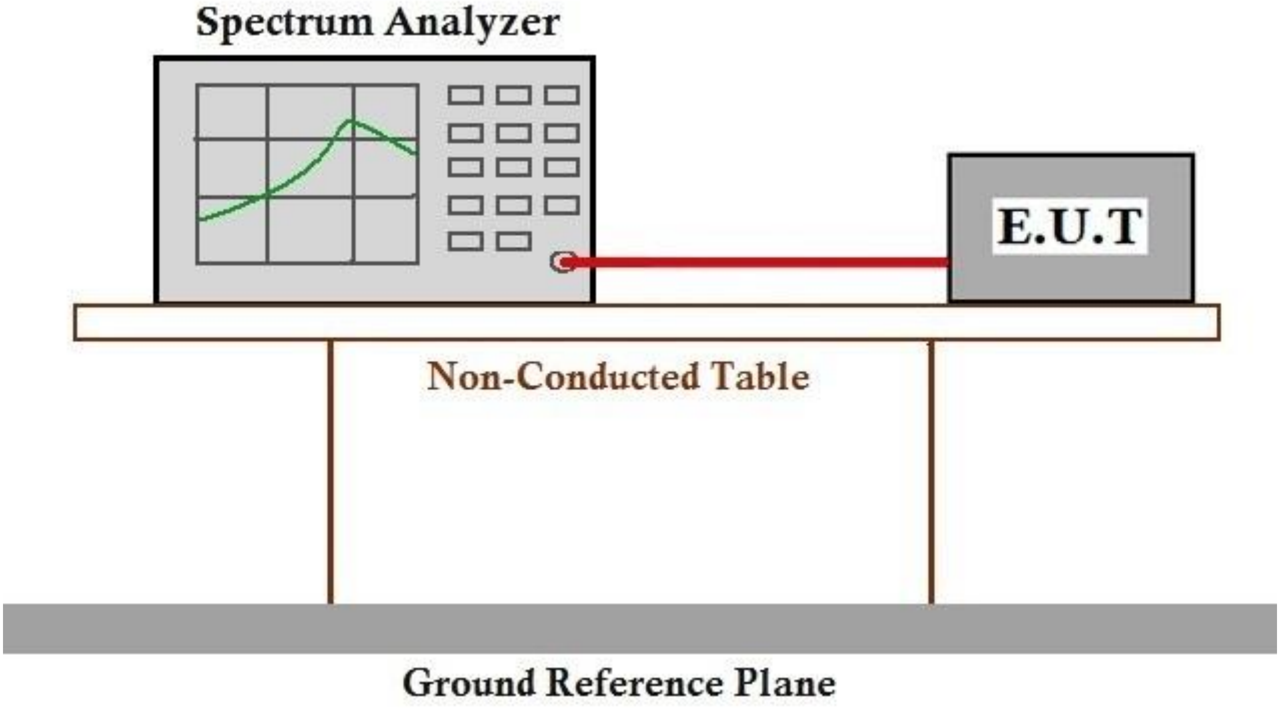
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode c: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix D for SHEM180900831604

7.5 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) for master device
	≤250mW(24dBm) for client device
5250-5350	≤250mW(24dBm) for client device or 11dBm+10logB*
5470-5725	≤250mW(24dBm) for client device or 11dBm+10logB*
5725-5850	≤1W(30dBm)
Remark:	* Where B is the 26dB emission bandwidth in MHz. The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. For IC 5150MHz to 5250MHz limit is EIRP≤200mW(23dBm)

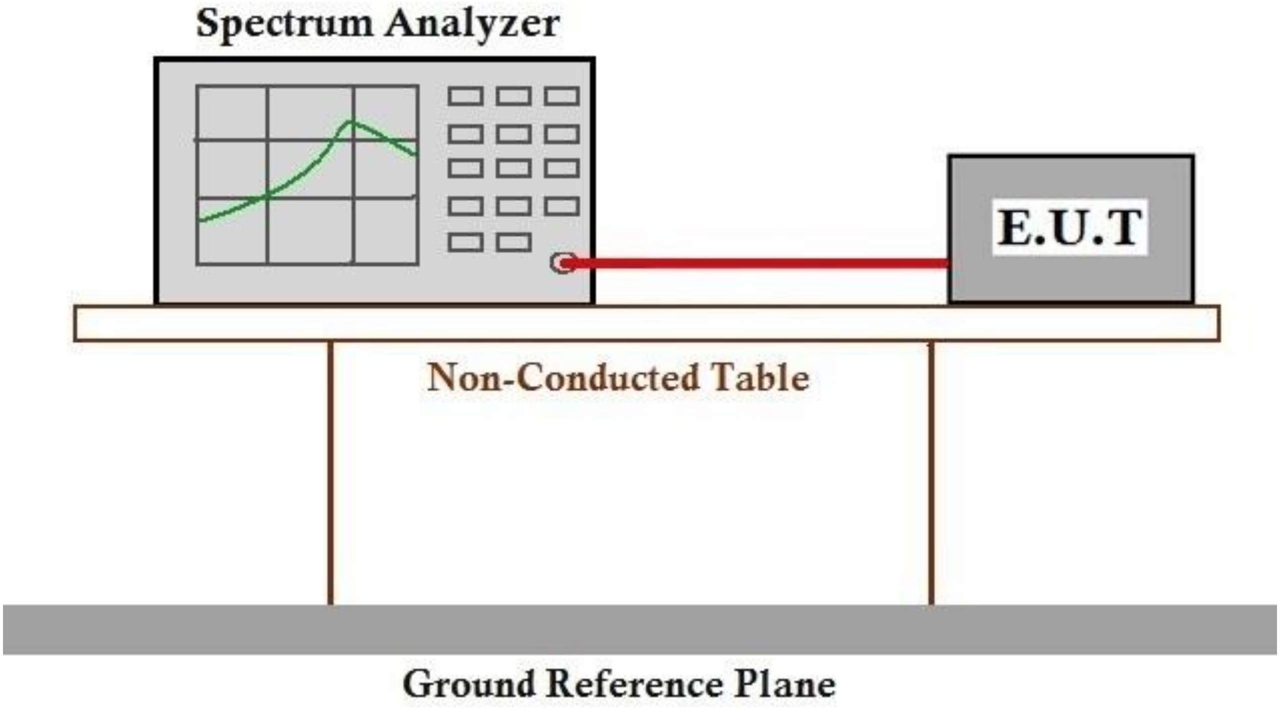
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Pretest these mode to find the worst case:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report. c: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.
The worst case for final test:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.

7.5.2 Test Setup Diagram


Spectrum Analyzer
E.U.T
Non-Conducted Table
Ground Reference Plane

7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix D for SHEM180900831604

7.6 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 for master device
	≤11dBm in 1MHz for client device
5250-5350	≤11dBm in 1MHz for client device
5470-5725	≤11dBm in 1MHz for client device
5725-5850	≤30dBm in 500 kHz
Remark:	The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. For IC 5150MHz to 5250MHz limit is EIRP PSD≤10dBm

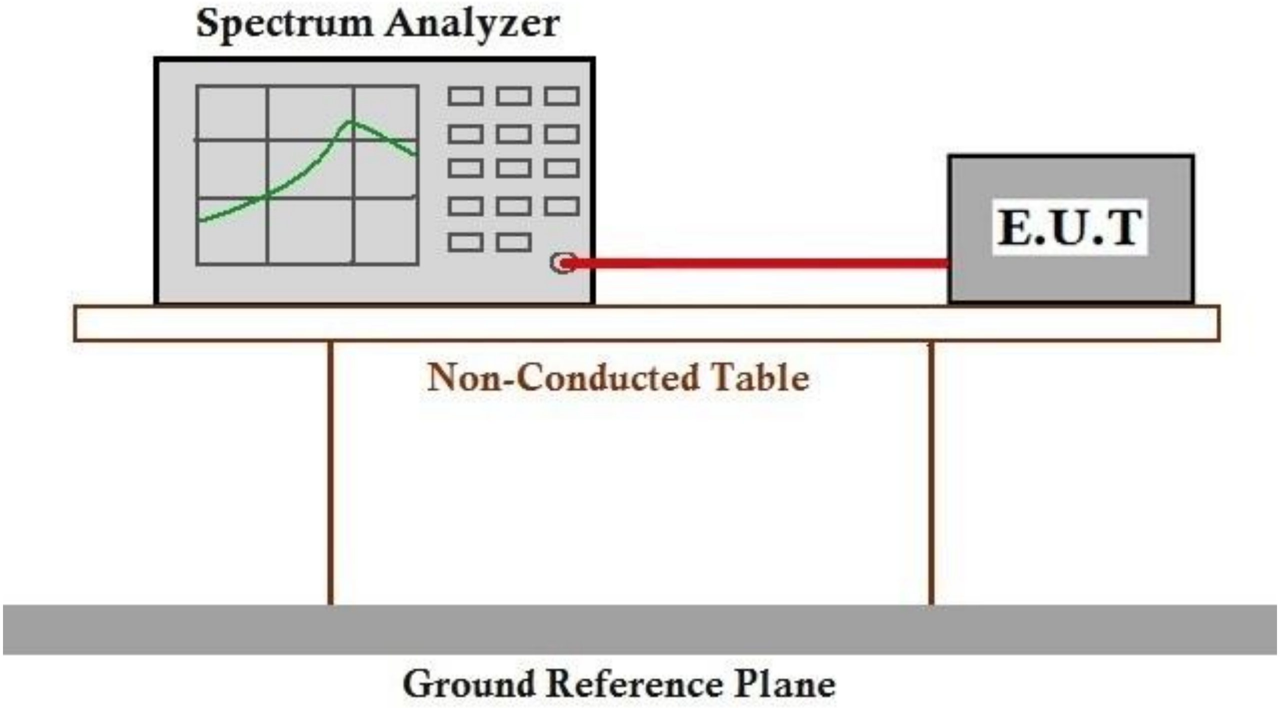
7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Pretest these mode to find the worst case:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report. c: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.
The worst case for final test:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.

7.6.2 Test Setup Diagram


Spectrum Analyzer
E.U.T
Non-Conducted Table
Ground Reference Plane

7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix D for SHEM180900831604

7.7 Radiated Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.209 & 15.407(b)
Test Method:	KDB 789033 D02 II G

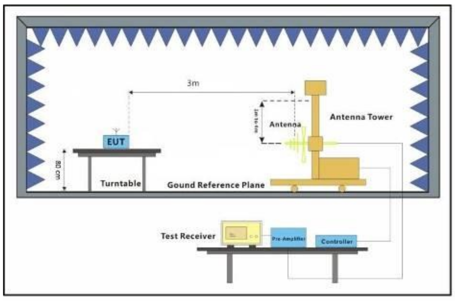
7.7.1 E.U.T. Operation

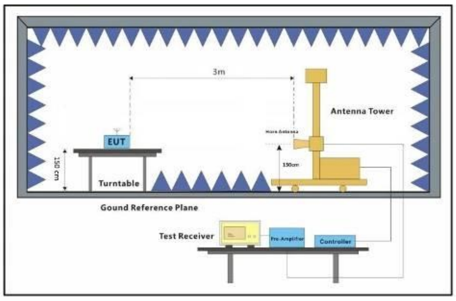
Operating Environment:

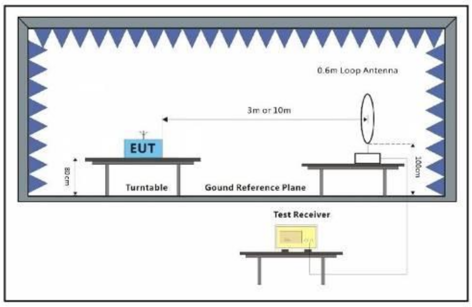
Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Pretest these mode to find the worst case:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.
	c: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.
The worst case for final test:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.

7.7.2 Test Setup Diagram


3m
1m to 4m
Antenna
Antenna Tower
EUT
80 cm
Turntable
Gound Reference Plane
Test Receiver
Pre-Amplifier
Controller


3m
Antenna Tower
Horn Antenna
EUT
150 cm
150cm
Turntable
Gound Reference Plane
Test Receiver
Pre-Amplifier
Controller


0.6m Loop Antenna
3m or 10m
EUT
80 cm
100cm
Turntable
Gound Reference Plane
Test Receiver

7.7.3 Measurement Procedure and Data

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

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

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

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

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

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

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

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

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

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

Remark:

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

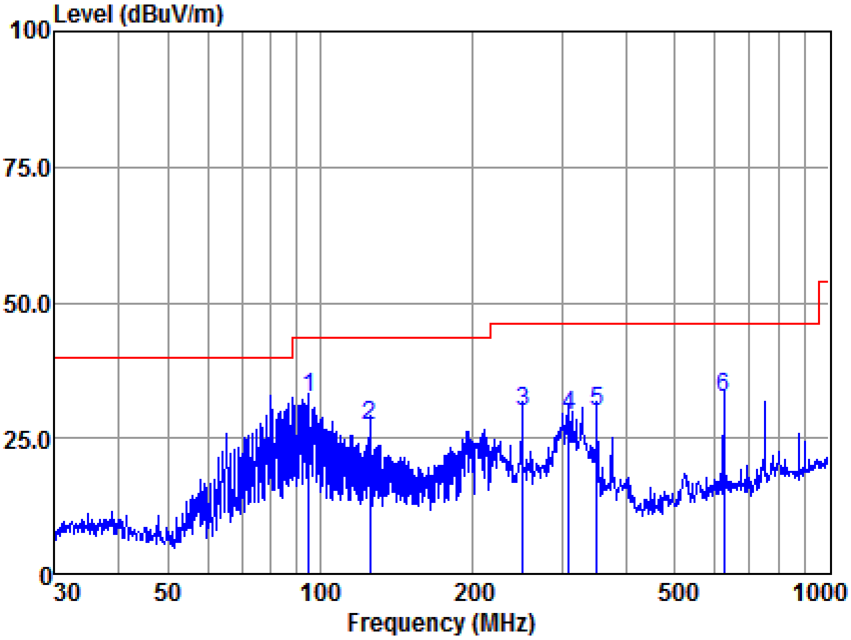
2. For emission below 1GHz, through the pre-scan found the worst case is the lowest channel of 802.11a. Only the worst case is recorded in the report.

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.

5: Peak limit for Band 1&3 is -27dBm/MHz, according EIRP[dBm] = E[dBμV/m] − 95.2, So the converted “E” value is 68.2dBuV/m

Below 1GHz
Mode:b; Polarization:Horizontal

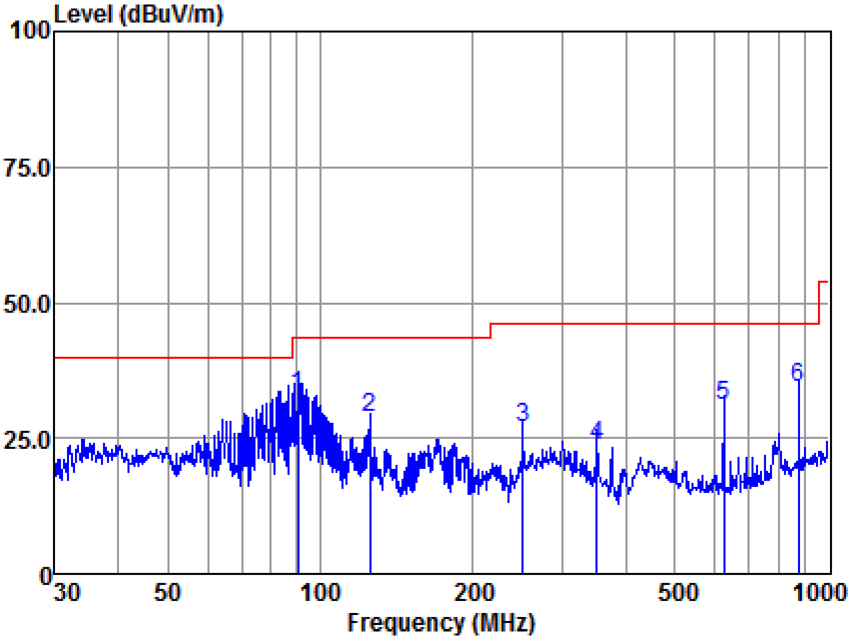


Antenna Polarity :HORIZONTAL
Test mode :b

	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	
1	95.09	65.70	8.85	0.44	42.69	32.30	43.50	-11.20	QP
2	125.01	57.87	11.46	0.55	42.67	27.21	43.50	-16.29	QP
3	250.30	59.92	11.50	0.77	42.46	29.73	46.00	-16.27	QP
4	308.91	57.35	13.39	0.86	42.38	29.22	46.00	-16.78	QP
5	350.48	56.81	14.22	0.92	42.24	29.71	46.00	-16.29	QP
6	625.08	53.79	19.62	1.41	42.19	32.63	46.00	-13.37	QP

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

Mode:b; Polarization:Vertical



Antenna Polarity :VERTICAL
Test mode :b

	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	
1	90.22	67.00	8.15	0.42	42.68	32.89	43.50	-10.61	QP
2	125.01	59.36	11.46	0.55	42.67	28.70	43.50	-14.80	QP
3	250.30	57.25	11.50	0.77	42.46	27.06	46.00	-18.94	QP
4	350.48	50.85	14.22	0.92	42.24	23.75	46.00	-22.25	QP
5	625.08	52.11	19.62	1.41	42.19	30.95	46.00	-15.05	QP
6	875.25	51.62	22.51	2.35	42.10	34.38	46.00	-11.62	QP

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

Above 1GHz:

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10360	35.41	14.28	49.69	68.2	-18.51	peak
15540	29.99	21.58	51.57	54	-2.43	peak
20720	26.15	23.16	49.31	54	-4.69	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10360	31.48	14.28	45.76	68.2	-22.44	peak
15540	28.91	21.58	50.49	54	-3.51	peak
20720	28.03	23.16	51.19	54	-2.81	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10440	34.17	14.14	48.31	68.2	-19.89	peak
15660	30.37	21.22	51.59	54	-2.41	peak
20880	29.88	23.24	53.12	54	-0.88	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10440	32.26	14.14	46.40	68.2	-21.80	peak
15660	26.31	21.22	47.53	54	-6.47	peak
20880	27.70	23.24	50.94	54	-3.06	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10480	32.87	14.08	46.95	68.2	-21.25	peak
15720	31.13	21.10	52.23	54	-1.77	peak
20960	26.72	23.64	50.36	54	-3.64	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10480	35.05	14.08	49.13	68.2	-19.07	peak
15720	27.70	21.10	48.80	54	-5.20	peak
20960	26.34	23.64	49.98	54	-4.02	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10360	32.61	14.28	46.89	68.2	-21.31	peak
15540	29.11	21.58	50.69	54	-3.31	peak
20720	25.91	23.16	49.07	54	-4.93	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10360	34.90	14.28	49.18	68.2	-19.02	peak
15540	28.14	21.58	49.72	54	-4.28	peak
20720	27.62	23.16	50.78	54	-3.22	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10440	30.78	14.14	44.92	68.2	-23.28	peak
15660	28.82	21.22	50.04	54	-3.96	peak
20880	27.74	23.24	50.98	54	-3.02	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10440	33.37	14.14	47.51	68.2	-20.69	peak
15660	25.52	21.22	46.74	54	-7.26	peak
20880	26.49	23.24	49.73	54	-4.27	peak

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

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10480	31.60	14.08	45.68	68.2	-22.52	peak
15720	28.97	21.10	50.07	54	-3.93	peak
20960	25.91	23.64	49.55	54	-4.45	peak

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

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10480	30.74	14.08	44.82	68.2	-23.38	peak
15720	29.15	21.10	50.25	54	-3.75	peak
20960	26.61	23.64	50.25	54	-3.75	peak

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

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10380	31.92	14.25	46.17	68.2	-22.03	peak
15570	27.97	21.49	49.46	54	-4.54	peak
20760	29.26	23.16	52.42	54	-1.58	peak

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

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10380	33.39	14.25	47.64	68.2	-20.56	peak
15570	26.96	21.49	48.45	54	-5.55	peak
20760	28.28	23.16	51.44	54	-2.56	peak

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

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10460	31.93	14.11	46.04	68.2	-22.16	peak
15690	27.27	21.14	48.41	54	-5.59	peak
20920	24.66	23.31	47.97	54	-6.03	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10460	32.94	14.11	47.05	68.2	-21.15	peak
15690	28.19	21.14	49.33	54	-4.67	peak
20920	29.48	23.31	52.79	54	-1.21	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10360	35.02	14.28	49.30	68.2	-18.90	peak
15540	27.78	21.58	49.36	54	-4.64	peak
20720	27.07	23.16	50.23	54	-3.77	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10360	29.55	14.28	43.83	68.2	-24.37	peak
15540	28.69	21.58	50.27	54	-3.73	peak
20720	28.31	23.16	51.47	54	-2.53	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10440	32.63	14.14	46.77	68.2	-21.43	peak
15660	28.47	21.22	49.69	54	-4.31	peak
20880	27.51	23.24	50.75	54	-3.25	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10440	30.33	14.14	44.47	68.2	-23.73	peak
15660	30.61	21.22	51.83	54	-2.17	peak
20880	26.24	23.24	49.48	54	-4.52	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10480	30.44	14.08	44.52	68.2	-23.68	peak
15720	28.75	21.10	49.85	54	-4.15	peak
20960	29.90	23.64	53.54	54	-0.46	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10480	32.24	14.08	46.32	68.2	-21.88	peak
15720	27.89	21.10	48.99	54	-5.01	peak
20960	28.68	23.64	52.32	54	-1.68	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10380	29.23	14.25	43.48	68.2	-24.72	peak
15570	27.05	21.49	48.54	54	-5.46	peak
20760	26.65	23.16	49.81	54	-4.19	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10380	33.82	14.25	48.07	68.2	-20.13	peak
15570	27.19	21.49	48.68	54	-5.32	peak
20760	27.01	23.16	50.17	54	-3.83	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10460	33.98	14.11	48.09	68.2	-20.11	peak
15690	26.76	21.14	47.90	54	-6.10	peak
20920	26.36	23.31	49.67	54	-4.33	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
10460	33.92	14.11	48.03	68.2	-20.17	peak
15690	28.77	21.14	49.91	54	-4.09	peak
20920	28.15	23.31	51.46	54	-2.54	peak

Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:80MHz; Channel:Low

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10420	30.44	14.17	44.61	68.2	-23.59	peak
15630	30.50	21.32	51.82	54	-2.18	peak
20840	27.71	23.54	51.25	54	-2.75	peak

Mode:b; Polarization:Vertical; Modulation:c; bandwidth:80MHz; Channel:Low

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
10420	31.48	14.17	45.65	68.2	-22.55	peak
15630	29.47	21.32	50.79	54	-3.21	peak
20840	27.94	23.54	51.48	54	-2.52	peak

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

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11490	36.09	14.41	50.50	54	-3.50	peak
17235	29.15	22.57	51.72	68.2	-16.48	peak
22980	25.95	24.45	50.40	54	-3.60	peak

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

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11490	34.81	14.41	49.22	54	-4.78	peak
17235	25.99	22.57	48.56	68.2	-19.64	peak
22980	27.69	24.45	52.14	54	-1.86	peak

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

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
11570	34.14	14.25	48.39	54	-8.23	peak
17355	28.84	21.86	50.70	68.2	-17.50	peak
23140	26.20	24.68	50.88	68.2	-17.32	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11570	33.44	14.25	46.58	54	-7.42	peak
17355	28.96	21.86	50.82	68.2	-17.04	peak
23140	28.50	24.68	53.18	68.2	-15.02	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11650	34.38	14.06	48.44	54	-5.56	peak
17475	29.53	21.15	50.68	68.2	-17.52	peak
23300	25.96	25.11	51.07	68.2	-17.13	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11650	33.06	14.06	47.12	54	-6.88	peak
17475	25.45	21.15	46.60	68.2	-21.60	peak
23300	26.91	25.11	52.02	68.2	-16.18	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11490	34.19	14.41	48.60	54	-5.40	peak
17235	30.31	22.57	52.88	68.2	-15.32	peak
22980	27.27	24.45	51.72	54	-2.28	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11490	33.89	14.41	48.30	54	-5.70	peak
17235	27.13	22.57	49.70	68.2	-18.50	peak
22980	28.35	24.45	52.80	54	-1.20	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11570	35.23	14.25	47.20	54	-6.80	peak
17355	29.86	21.86	51.72	68.2	-15.74	peak
23140	26.76	24.68	51.44	68.2	-16.76	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11570	31.96	14.25	49.69	54	-4.31	peak
17355	29.69	21.86	48.55	68.2	-19.65	peak
23140	24.07	24.68	48.75	68.2	-19.45	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11650	31.99	14.06	46.05	54	-7.95	peak
17475	26.10	21.15	47.25	68.2	-20.95	peak
23300	25.86	25.11	50.97	68.2	-17.23	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11650	32.80	14.06	46.86	54	-7.14	peak
17475	26.17	21.15	47.32	68.2	-20.88	peak
23300	28.92	25.11	54.03	68.2	-14.17	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11510	34.35	14.40	48.75	54	-5.20	peak
17265	29.72	22.40	52.23	68.2	-15.97	peak
23020	24.52	24.68	49.20	54	-2.54	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11510	32.67	14.40	47.07	54	-7.62	peak
17265	25.69	22.40	48.09	68.2	-20.11	peak
23020	26.34	24.68	51.02	54	-2.98	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11590	33.31	14.20	46.85	54	-7.15	peak
17385	26.28	21.68	47.96	68.2	-16.49	peak
23180	24.81	24.72	51.41	68.2	-16.79	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11590	33.59	14.20	47.79	54	-6.21	peak
17385	29.96	21.68	51.64	68.2	-16.56	peak
23180	26.62	24.72	51.34	68.2	-16.86	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11490	33.57	14.41	47.98	54	-6.02	peak
17235	29.01	22.57	51.58	68.2	-16.62	peak
22980	28.17	24.45	52.62	54	-1.38	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11490	32.77	14.41	47.18	54	-6.82	peak
17235	29.75	22.57	52.32	68.2	-15.88	peak
22980	28.24	24.45	52.69	54	-1.31	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11570	36.58	14.25	50.83	54	-3.17	peak
17355	27.51	21.86	49.37	68.2	-18.83	peak
23140	25.54	24.68	50.22	68.2	-17.98	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11570	32.62	14.25	46.87	54	-7.13	peak
17355	29.52	21.86	51.38	68.2	-16.82	peak
23140	29.07	24.68	53.75	68.2	-14.45	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11650	35.00	14.06	49.06	54	-4.94	peak
17475	27.03	21.15	48.18	68.2	-20.02	peak
23300	26.83	25.11	51.94	68.2	-16.26	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11650	33.86	14.06	47.92	54	-7.74	peak
17475	30.62	21.15	51.77	68.2	-16.43	peak
23300	27.05	25.11	52.16	68.2	-16.04	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11510	32.95	14.40	47.35	54	-6.65	peak
17265	26.63	22.40	49.03	68.2	-19.17	peak
23020	28.79	24.68	53.47	54	-0.53	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11510	35.05	14.40	49.45	54	-4.55	peak
17265	30.36	22.40	52.76	68.2	-15.44	peak
23020	27.19	24.68	51.87	54	-2.13	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11590	34.35	14.20	48.55	54	-5.45	peak
17385	28.16	21.68	49.84	68.2	-18.36	peak
23180	25.38	24.72	50.10	68.2	-18.10	peak

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

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11590	32.90	14.20	47.10	54	-6.90	peak
17385	27.22	21.68	48.90	68.2	-19.30	peak
23180	27.66	24.72	52.38	68.2	-15.82	peak

Mode:c; Polarization:Horizontal; Modulation:c; bandwidth:80MHz; Channel:Low

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11550	32.58	14.30	46.88	54	-7.12	peak
17325	26.80	22.04	48.84	68.2	-19.36	peak
23100	27.65	24.60	52.25	54	-1.75	peak

Mode:c; Polarization:Vertical; Modulation:c; bandwidth:80MHz; Channel:Low

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Over Limit dB	Detector
11550	31.61	14.30	45.91	54	-8.09	peak
17325	28.17	22.04	50.21	68.2	-17.99	peak
23100	22.65	24.60	47.25	54	-6.75	peak

7.8 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.		

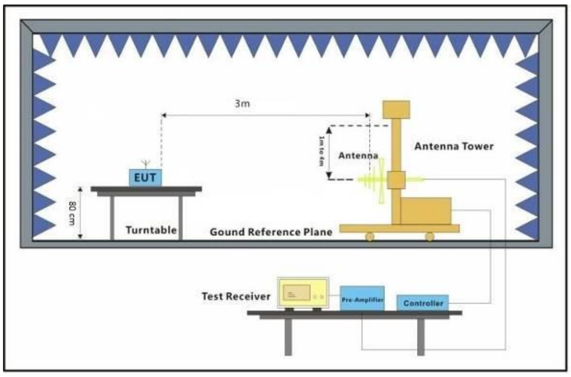
7.8.1 E.U.T. Operation

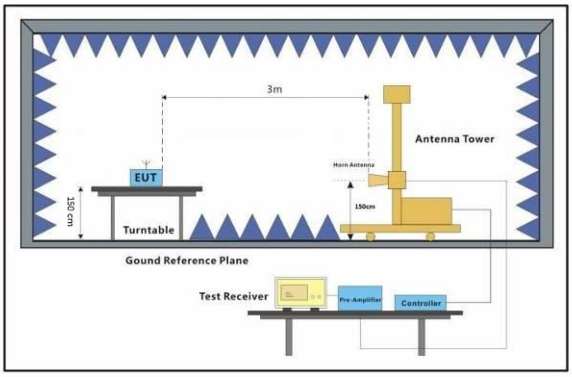
Operating Environment:

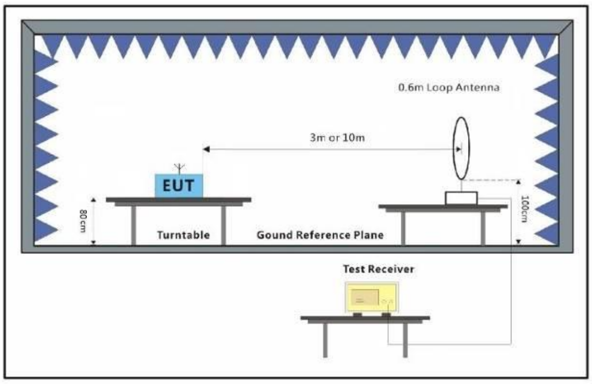
Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Pretest these mode to find the worst case:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.
	c: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.
The worst case for final test:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report

7.8.2 Test Setup Diagram


3m
1m to 4m
Antenna
Antenna Tower
EUT
80 cm
Turntable
Gound Reference Plane
Test Receiver
Pre-Amplifier
Controller


3m
Antenna Tower
Horn Antenna
EUT
150 cm
150cm
Turntable
Gound Reference Plane
Test Receiver
Pre-Amplifier
Controller


0.6m Loop Antenna
3m or 10m
EUT
80 cm
100cm
Turntable
Gound Reference Plane
Test Receiver

7.8.3 Measurement Procedure and Data

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

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

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

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

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

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

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

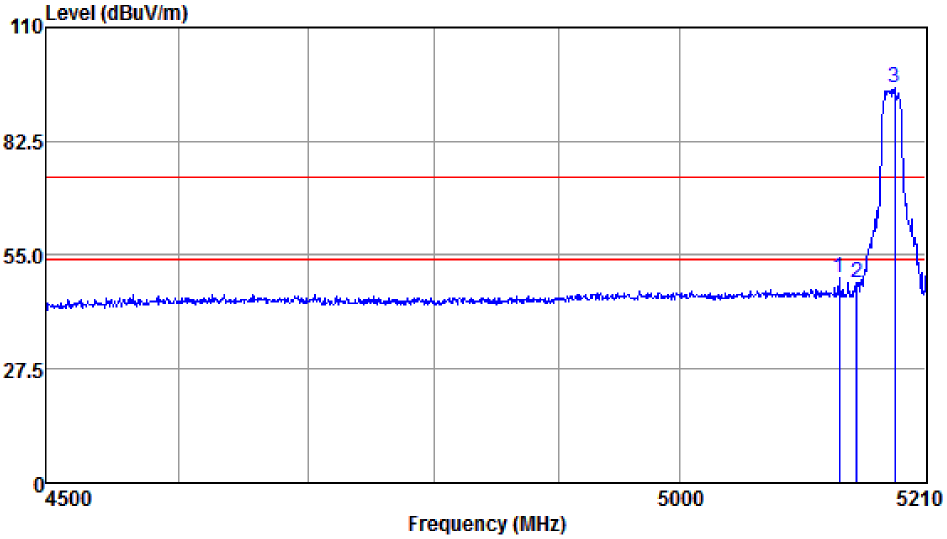
h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

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

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

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

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

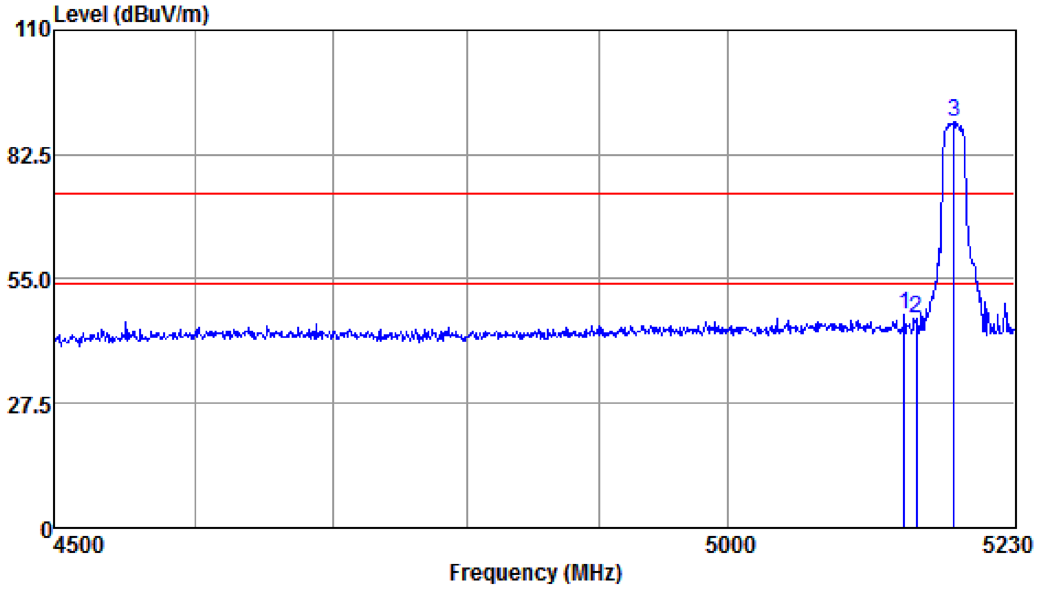


```
Antenna Polarity :HORIZONTAL

        Read   Antenna Cable Preamp Emission Limit  Over
 Freq   Level  Factor  Loss  Factor Level    Line   Limit  Remark
------ -----  ------- ----- ------ ------   ------ ------ ------
  MHz   dBuv   dB/m    dB    dB    dBuv/m   dBuv/m   dB
5134.98 47.53  31.59   9.06  38.82  49.36   74.00  -24.64  Peak
5150.00 46.63  31.61   9.06  38.81  48.49   74.00  -25.51  Peak
5182.59 93.86  31.65   8.86  38.80  95.57   74.00   21.57  Peak

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

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

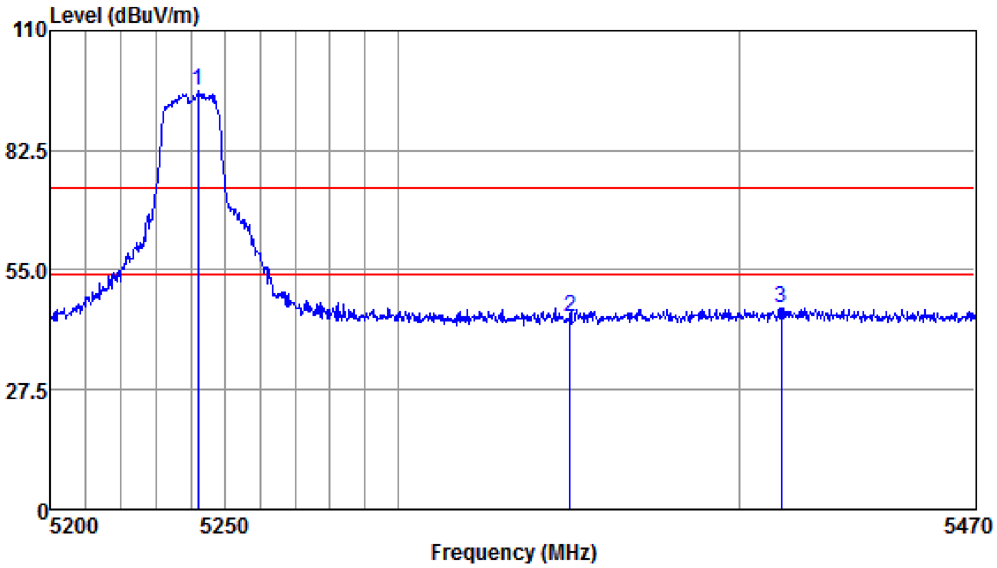


Antenna Polarity :VERTICAL

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	
5140.36	45.44	31.59	9.06	38.82	47.27	74.00	-26.73	Peak
5150.00	44.23	31.61	9.06	38.81	46.09	74.00	-27.91	Peak
5179.92	87.94	31.65	8.86	38.80	89.65	74.00	15.65	Peak

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

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

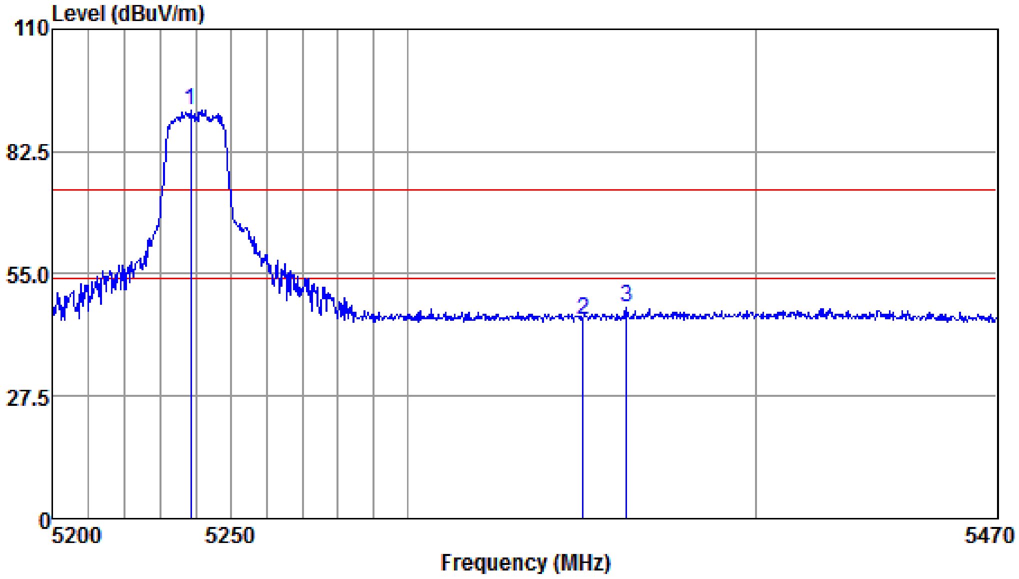


```
Antenna Polarity :HORIZONTAL

          Read    Antenna Cable Preamp Emission Limit   Over
  Freq    Level   Factor  Loss  Factor Level    Line    Limit  Remark
 ------   -----   ------- ----- ------ ------   ------  ------ ------
   MHz     dBuv    dB/m    dB     dB   dBuv/m   dBuv/m   dB
5242.02   94.45   31.74   8.68  38.77   96.10   74.00   22.10   Peak
5350.00   41.81   31.89   9.20  38.70   44.20   74.00  -29.80   Peak
5412.16   43.54   31.97   9.44  38.67   46.28   74.00  -27.72   Peak

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

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

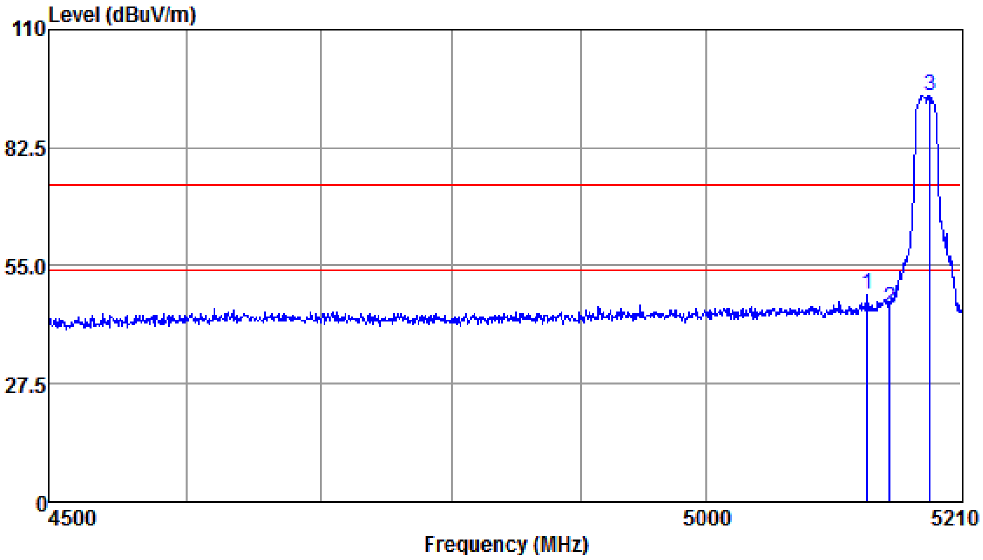


Antenna Polarity :VERTICAL

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	
5238.57	90.03	31.74	8.68	38.77	91.68	74.00	17.68	Peak
5350.00	42.17	31.89	9.20	38.70	44.56	74.00	-29.44	Peak
5362.53	45.21	31.91	9.20	38.69	47.63	74.00	-26.37	Peak

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

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

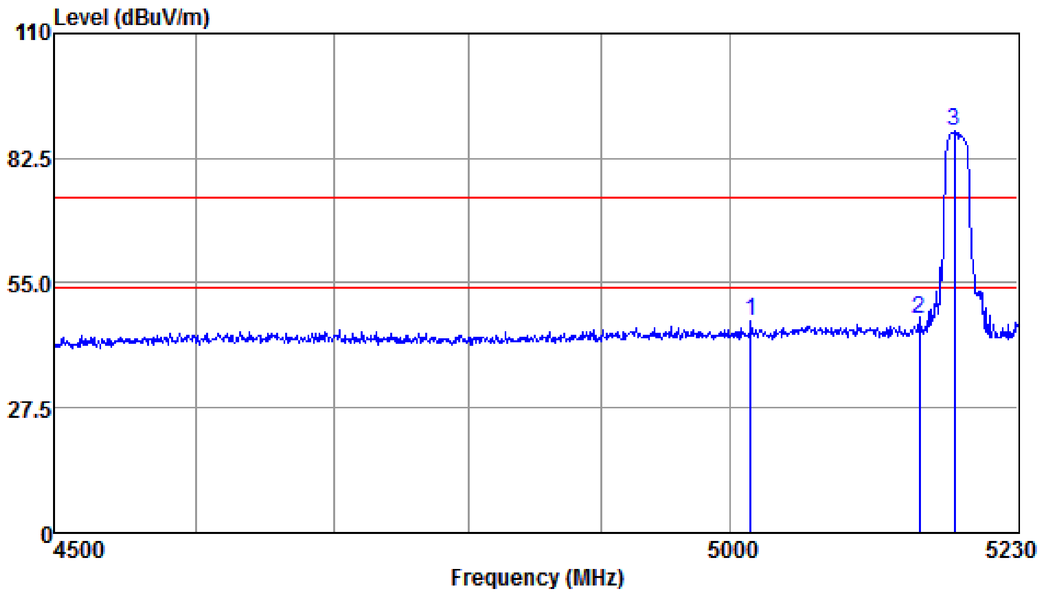


```
Antenna Polarity :HORIZONTAL

         Read    Antenna Cable Preamp Emission Limit   Over
 Freq    Level   Factor  Loss  Factor Level    Line    Limit  Remark
------  -----   ------- ----- ------ ------   ------  ------ ------
  MHz    dBuv     dB/m    dB     dB   dBuv/m   dBuv/m    dB
5131.22  46.62   31.59   9.06  38.82  48.45    74.00  -25.55  Peak
5150.00  43.05   31.61   9.06  38.81  44.91    74.00  -29.09  Peak
5183.35  92.88   31.65   8.86  38.80  94.59    74.00   20.59  Peak

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

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

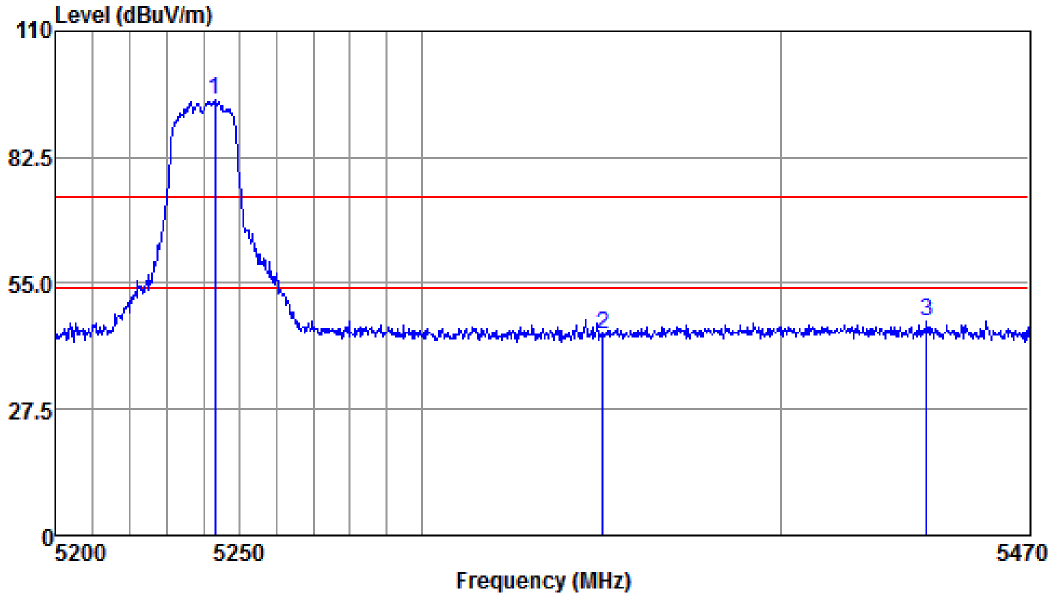


```
Antenna Polarity :VERTICAL

          Read    Antenna Cable Preamp Emission Limit  Over
  Freq    Level   Factor  Loss  Factor Level    Line   Limit  Remark
 ------   -----   ------- ----- ------ ------   ------ ------ ------
   MHz     dBuv    dB/m    dB     dB   dBuv/m   dBuv/m   dB
5015.93  44.26    31.42   9.81  38.88  46.61    74.00  -27.39  Peak
5150.00  45.31    31.61   9.06  38.81  47.17    74.00  -26.83  Peak
5178.36  86.76    31.65   8.86  38.80  88.47    74.00   14.47  Peak

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

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

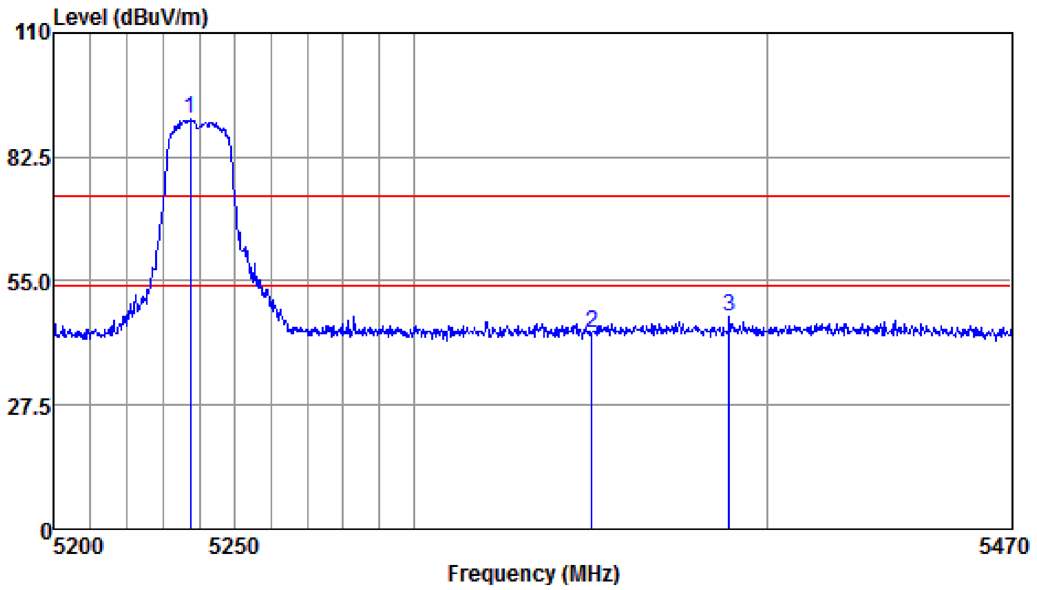


Antenna Polarity :HORIZONTAL

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	
5243.08	93.27	31.74	8.68	38.77	94.92	74.00	20.92	Peak
5350.00	41.47	31.89	9.20	38.70	43.86	74.00	-30.14	Peak
5440.73	43.96	32.02	9.34	38.65	46.67	74.00	-27.33	Peak

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

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

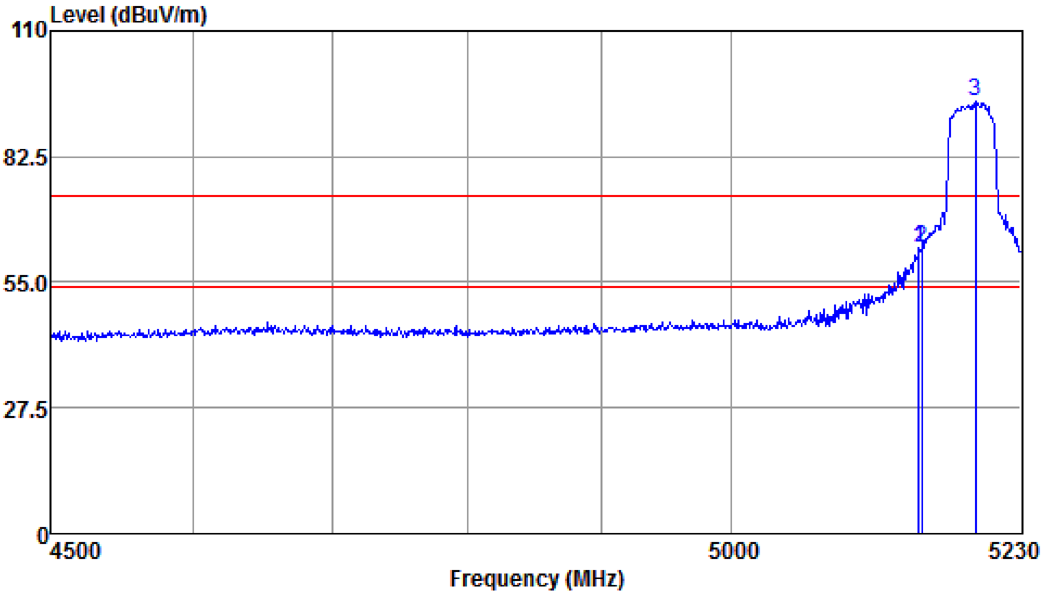


```
Antenna Polarity :VERTICAL

          Read   Antenna Cable Preamp Emission Limit  Over
  Freq    Level  Factor  Loss  Factor Level    Line   Limit  Remark
 ------   -----  ------- ----- ------ ------  ------  ------ ------
   MHz    dBuv    dB/m    dB    dB    dBuv/m  dBuv/m   dB
 5237.51  89.26   31.74   8.68  38.77  90.91   74.00   16.91  Peak
 5350.00  40.85   31.89   9.20  38.70  43.24   74.00  -30.76  Peak
 5388.92  44.28   31.95   9.44  38.68  46.99   74.00  -27.01  Peak

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

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

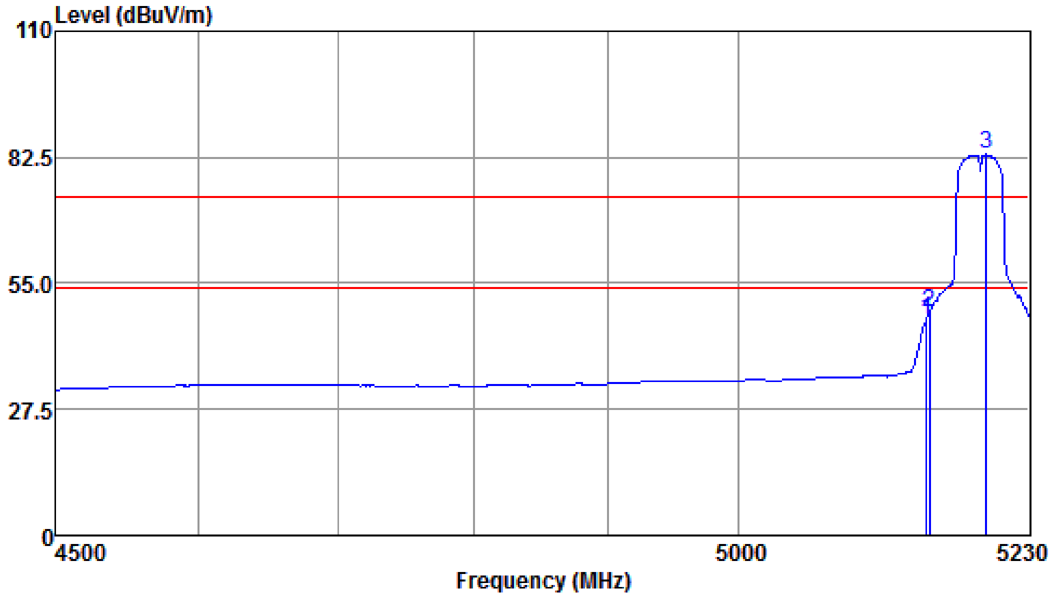


Antenna Polarity :HORIZONTAL

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	
5147.32	60.55	31.61	9.06	38.81	62.41	74.00	-11.59	Peak
5150.00	60.76	31.61	9.06	38.81	62.62	74.00	-11.38	Peak
5193.18	92.65	31.68	8.86	38.79	94.40	74.00	20.40	Peak

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

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

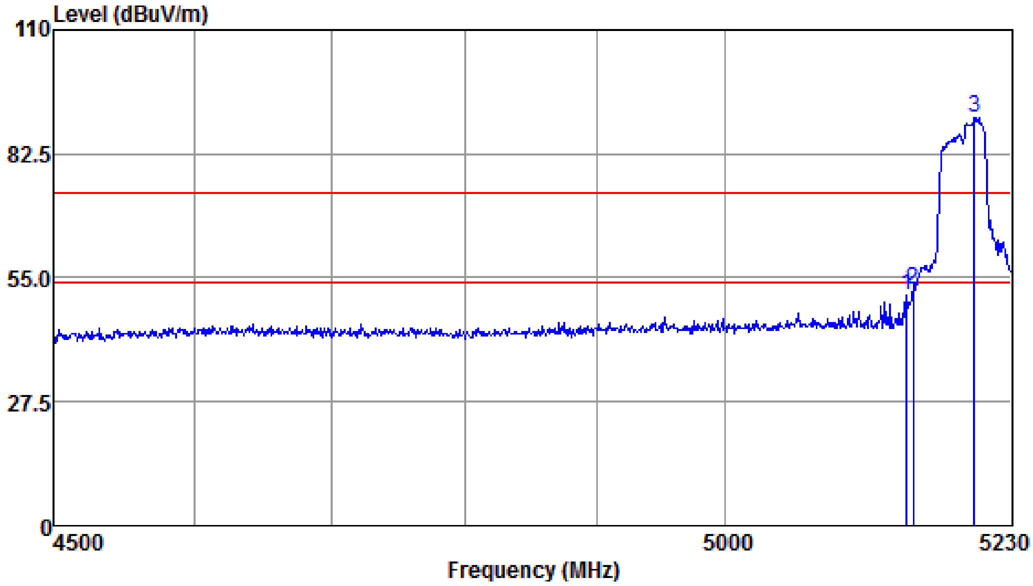


Antenna Polarity :HORIZONTAL

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	
5147.32	45.40	31.61	9.06	38.81	47.26	54.00	-6.74	Average
5150.00	46.76	31.61	9.06	38.81	48.62	54.00	-5.38	Average
5195.52	81.27	31.68	8.86	38.79	83.02	54.00	29.02	Average

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

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

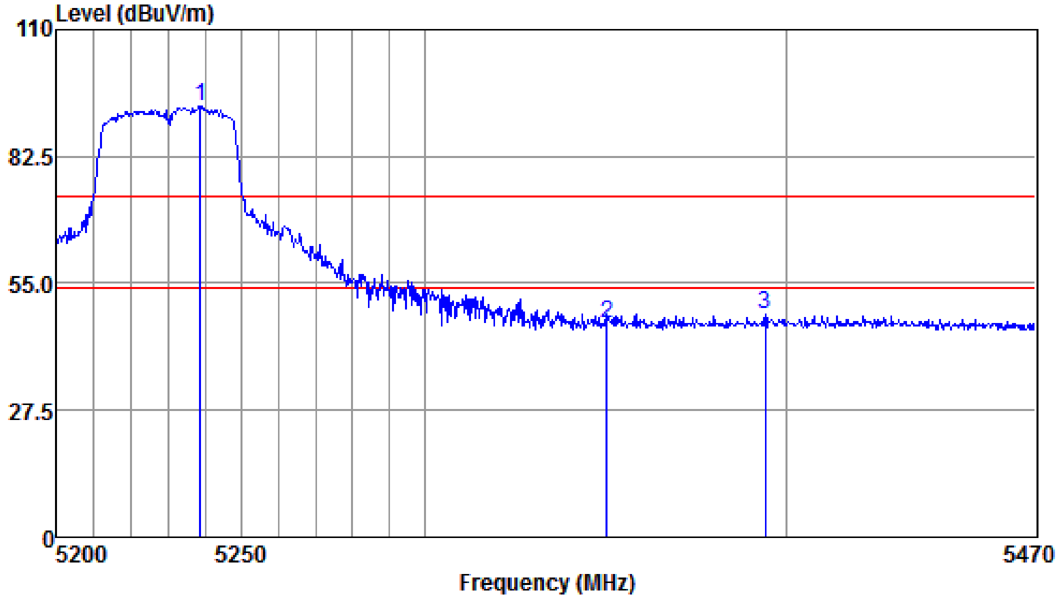


```
Antenna Polarity :VERTICAL

         Read    Antenna Cable Preamp Emission Limit   Over
  Freq   Level   Factor  Loss  Factor Level    Line    Limit  Remark
 ------  -----   ------- ----- ------ ------   ------  ------ ------
  MHz     dBuv    dB/m    dB     dB   dBuv/m   dBuv/m    dB
5145.00  49.39   31.61   9.06  38.81   51.25   74.00  -22.75  Peak
5150.00  50.66   31.61   9.06  38.81   52.52   74.00  -21.48  Peak
5199.43  88.93   31.68   8.66  38.79   90.48   74.00   16.48  Peak

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

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

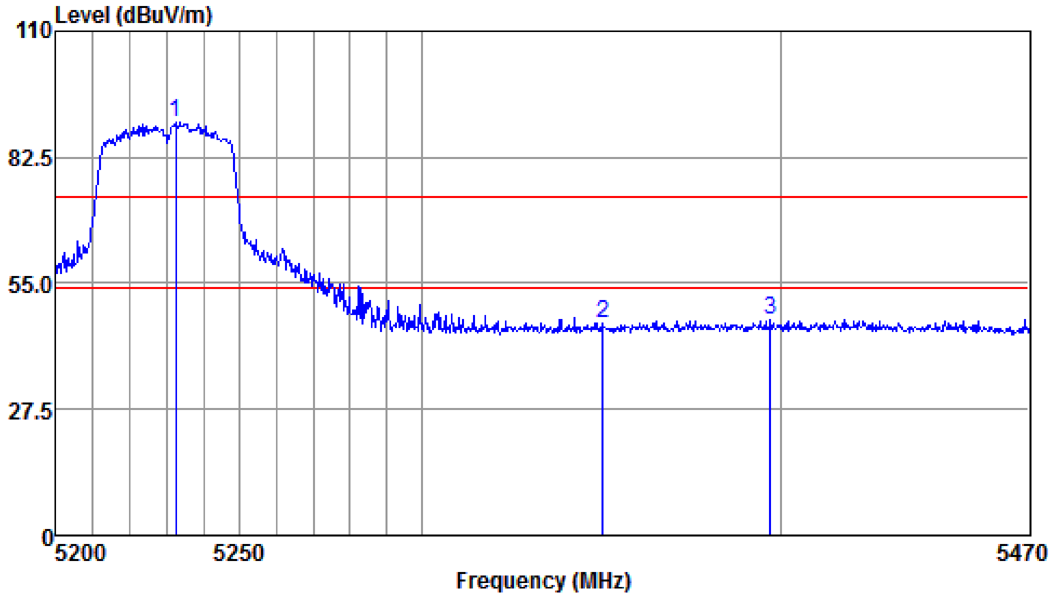


Antenna Polarity :HORIZONTAL

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	
5238.84	91.79	31.74	8.68	38.77	93.44	74.00	19.44	Peak
5350.00	43.72	31.89	9.20	38.70	46.11	74.00	-27.89	Peak
5393.84	45.69	31.95	9.44	38.68	48.40	74.00	-25.60	Peak

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

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

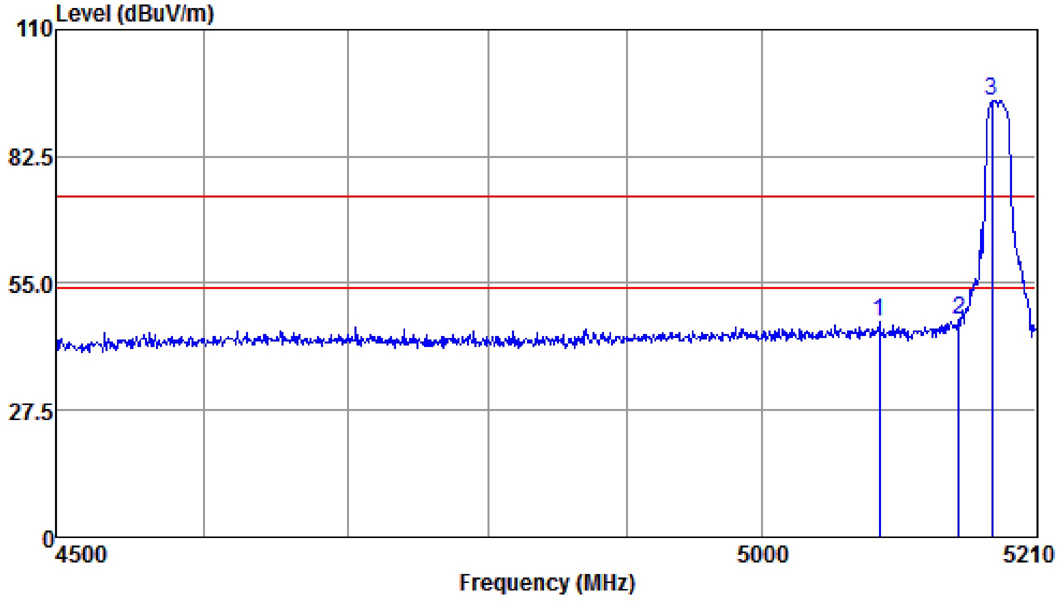


Antenna Polarity :VERTICAL

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	
5232.48	88.61	31.74	8.66	38.77	90.24	74.00	16.24	Peak
5350.00	43.73	31.89	9.20	38.70	46.12	74.00	-27.88	Peak
5396.84	44.48	31.95	9.44	38.68	47.19	74.00	-26.81	Peak

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

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

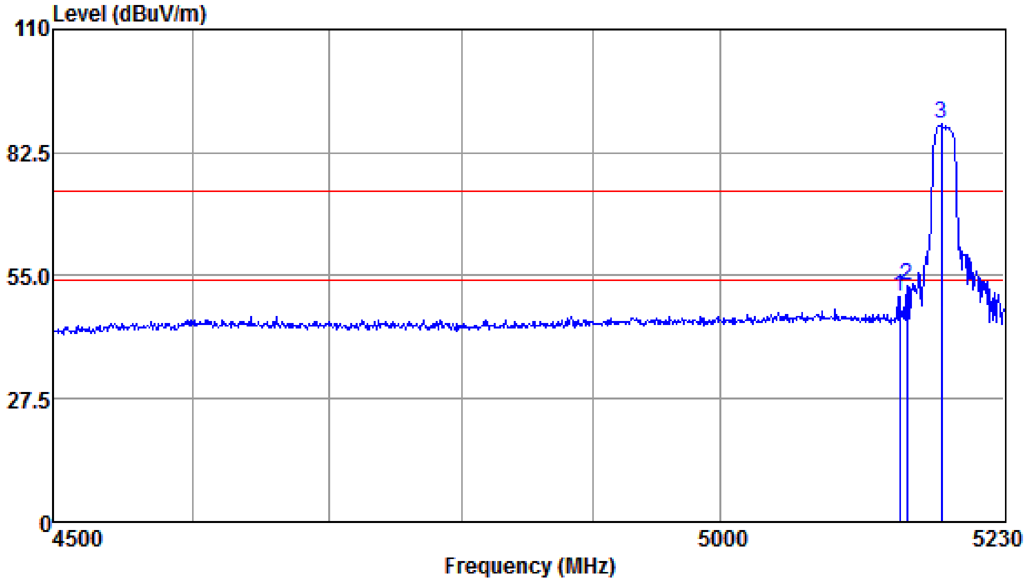


Antenna Polarity :HORIZONTAL

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	
5089.30	44.49	31.53	9.44	38.84	46.62	74.00	-27.38	Peak
5150.00	45.40	31.61	9.06	38.81	47.26	74.00	-26.74	Peak
5175.77	92.93	31.65	8.86	38.80	94.64	74.00	20.64	Peak

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

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

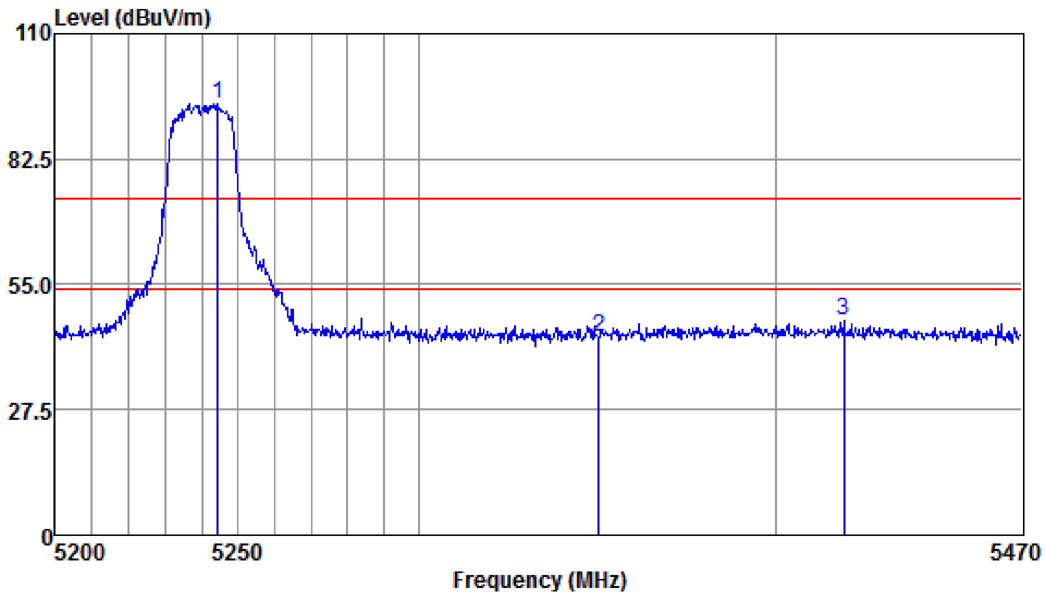


```
Antenna Polarity :VERTICAL

          Read    Antenna Cable Preamp Emission Limit   Over
  Freq    Level   Factor  Loss  Factor Level    Line    Limit  Remark
 ------   -----   ------- ----- ------ ------   ------  ------ ------
   MHz     dBuv    dB/m    dB     dB   dBuv/m   dBuv/m    dB
 5144.22  48.49   31.61   9.06  38.81  50.35    74.00  -23.65  Peak
 5150.00  50.82   31.61   9.06  38.81  52.68    74.00  -21.32  Peak
 5178.36  87.00   31.65   8.86  38.80  88.71    74.00   14.71  Peak

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

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

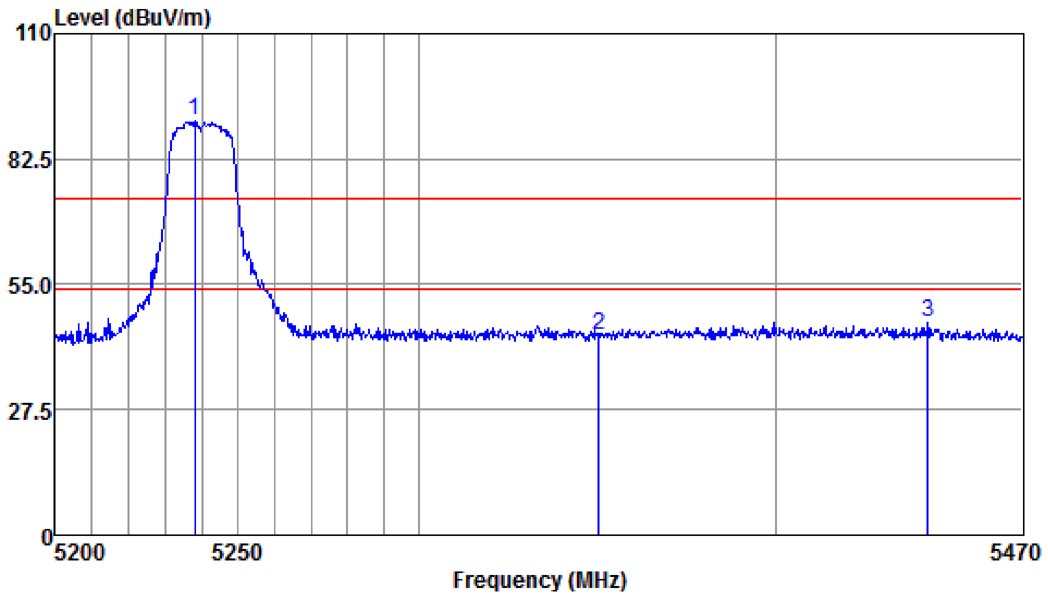


```
Antenna Polarity :HORIZONTAL

          Read     Antenna Cable Preamp Emission Limit   Over
  Freq    Level    Factor  Loss  Factor Level    Line    Limit   Remark
 ------   -----    ------- ----- ------ ------   ------  ------  ------
   MHz     dBuv     dB/m    dB     dB    dBuv/m   dBuv/m   dB
 5244.41  92.96    31.74   8.68  38.77   94.61   74.00    20.61   Peak
 5350.00  41.24    31.89   9.20  38.70   43.63   74.00   -30.37   Peak
 5419.01  44.53    31.99   9.34  38.66   47.20   74.00   -26.80   Peak

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

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

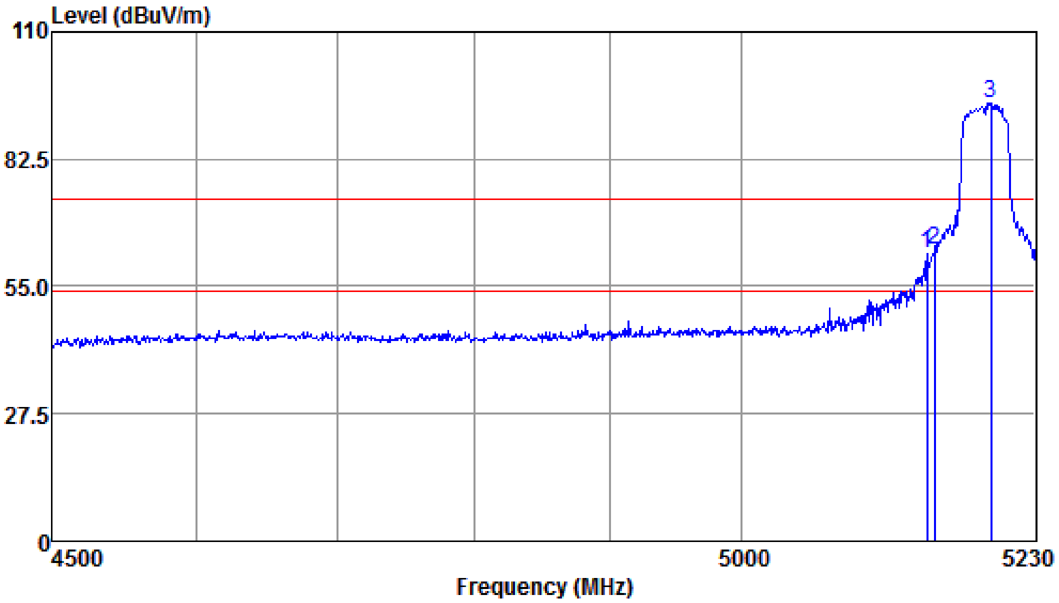


```
Antenna Polarity :VERTICAL

           Read    Antenna Cable Preamp Emission Limit   Over
   Freq    Level   Factor  Loss  Factor Level    Line    Limit   Remark
 ------    -----   ------- ----- ------ ------   ------  ------  ------
    MHz     dBuv    dB/m    dB     dB    dBuv/m  dBuv/m    dB
 5238.04   89.23   31.74   8.68  38.77   90.88   74.00   16.88   Peak
 5350.00   41.27   31.89   9.20  38.70   43.66   74.00  -30.34   Peak
 5442.93   43.85   32.02   9.34  38.65   46.56   74.00  -27.44   Peak

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

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

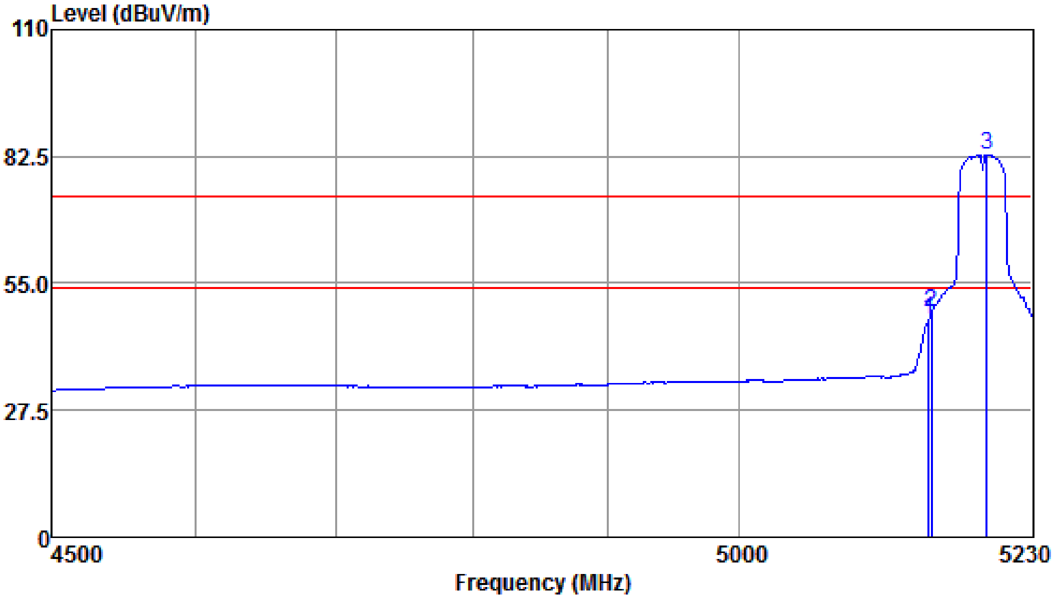


```
 Antenna Polarity :HORIZONTAL

            Read    Antenna Cable Preamp Emission Limit  Over
   Freq     Level   Factor  Loss  Factor Level    Line   Limit  Remark
  ------    -----   ------- ----- ------ ------  ------  ------ ------
    MHz      dBuv     dB/m    dB    dB   dBuv/m  dBuv/m    dB
  5144.22   60.29    31.61   9.06  38.81  62.15   74.00  -11.85   Peak
  5150.00   61.02    31.61   9.06  38.81  62.88   74.00  -11.12   Peak
  5194.74   92.82    31.68   8.86  38.79  94.57   74.00   20.57   Peak

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

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

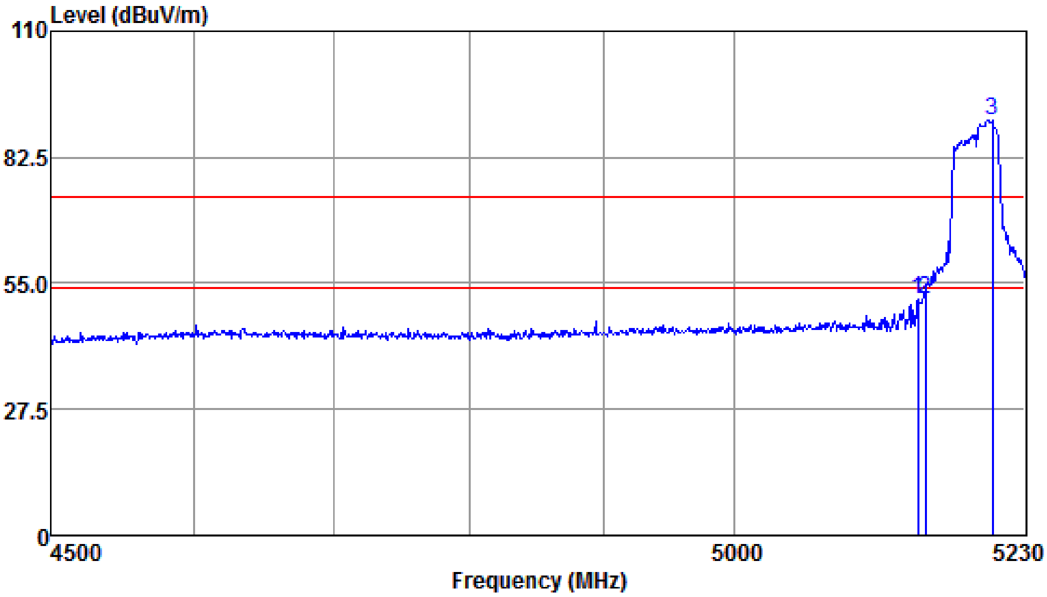


Antenna Polarity :HORIZONTAL

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	
5147.32	45.31	31.61	9.06	38.81	47.17	54.00	-6.83	Average
5150.00	46.67	31.61	9.06	38.81	48.53	54.00	-5.47	Average
5193.96	81.17	31.68	8.86	38.79	82.92	54.00	28.92	Average

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

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

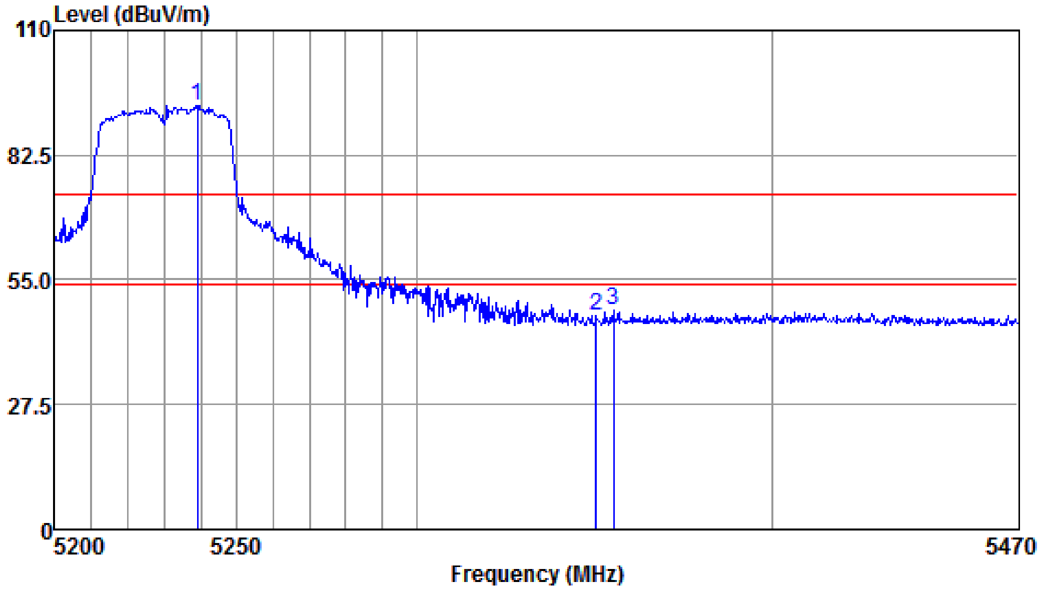


```
Antenna Polarity :VERTICAL

          Read   Antenna Cable Preamp Emission Limit  Over
  Freq    Level  Factor  Loss  Factor Level    Line   Limit  Remark
 ------   -----  ------- ----- ------ ------  ------  ------ ------
  MHz     dBuv    dB/m    dB     dB   dBuv/m  dBuv/m    dB
5144.22  49.87   31.61   9.06  38.81  51.73   74.00  -22.27  Peak
5150.00  49.65   31.61   9.06  38.81  51.51   74.00  -22.49  Peak
5203.34  89.05   31.70   8.66  38.78  90.63   74.00   16.63  Peak

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

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

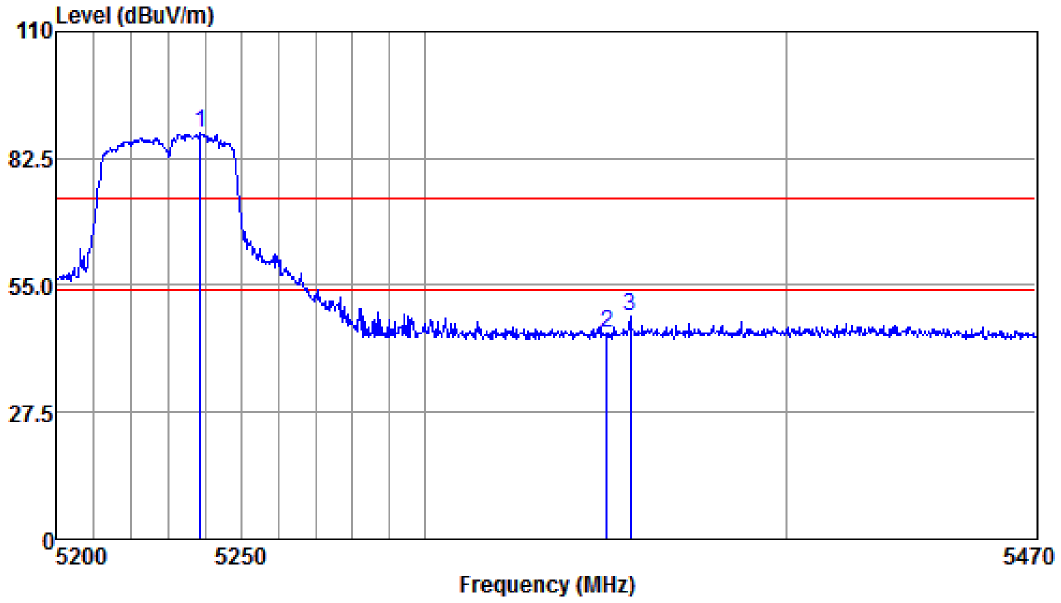


Antenna Polarity :HORIZONTAL

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	
5239.10	91.86	31.74	8.68	38.77	93.51	74.00	19.51	Peak
5350.00	44.59	31.89	9.20	38.70	46.98	74.00	-27.02	Peak
5354.93	45.86	31.91	9.20	38.69	48.28	74.00	-25.72	Peak

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

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

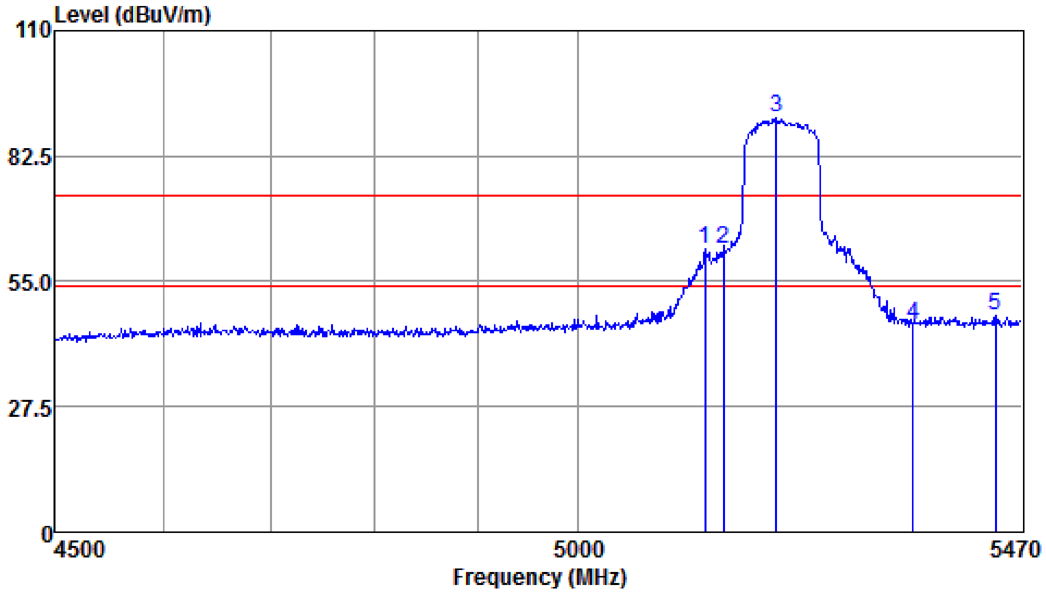


Antenna Polarity :VERTICAL

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	
5238.84	86.57	31.74	8.68	38.77	88.22	74.00	14.22	Peak
5350.00	42.34	31.89	9.20	38.70	44.73	74.00	-29.27	Peak
5356.56	45.72	31.91	9.20	38.69	48.14	74.00	-25.86	Peak

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

Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:80MHz; Channel:Low

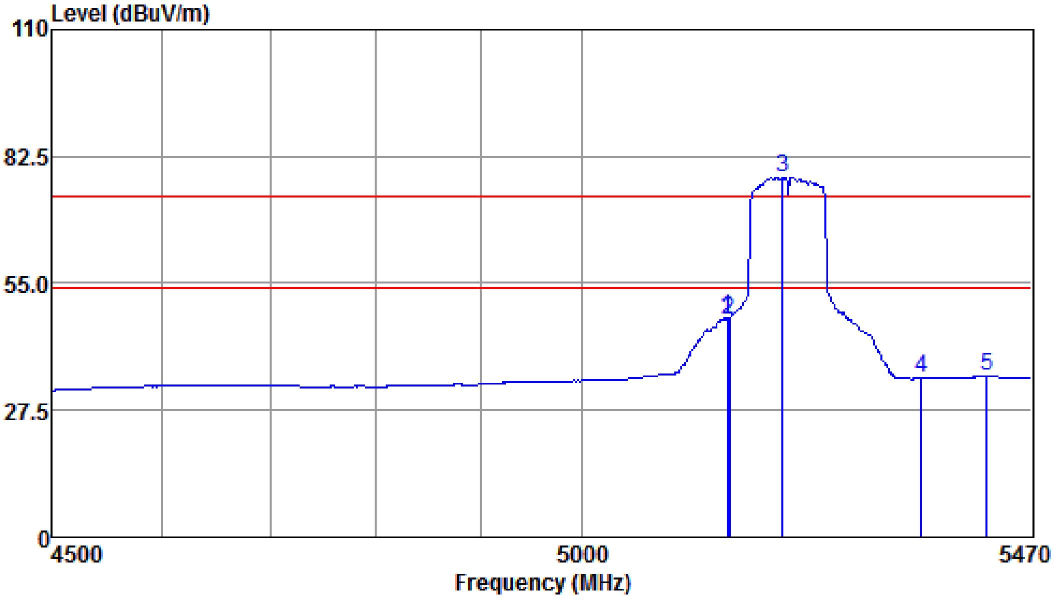


```
Antenna Polarity :HORIZONTAL

          Read    Antenna Cable Preamp Emission Limit   Over
  Freq    Level   Factor  Loss  Factor Level    Line    Limit  Remark
 ------   -----   ------- ----- ------ ------   ------  ------ ------
   MHz     dBuv    dB/m    dB     dB   dBuv/m   dBuv/m    dB
5130.75   60.27   31.59   9.06  38.82  62.10    74.00  -11.90   Peak
5150.00   60.17   31.61   9.06  38.81  62.03    74.00  -11.97   Peak
5204.39   89.19   31.70   8.66  38.78  90.77    74.00   16.77   Peak
5350.00   43.16   31.89   9.20  38.70  45.55    74.00  -28.45   Peak
5440.19   44.98   32.02   9.34  38.65  47.69    74.00  -26.31   Peak

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

Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:80MHz; Channel:Low

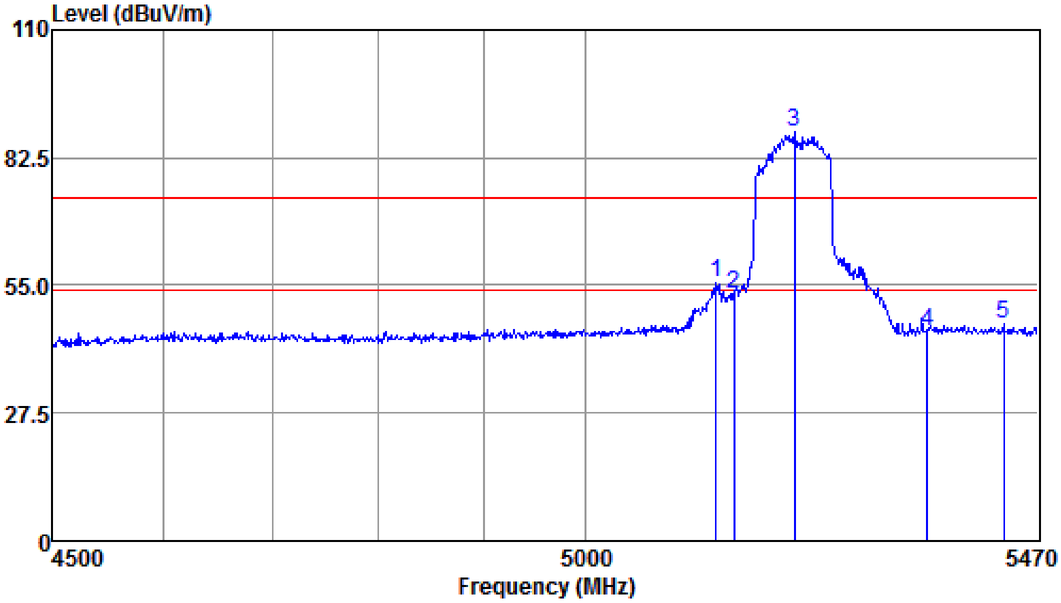


Antenna Polarity :HORIZONTAL

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	
5147.81	45.61	31.61	9.06	38.81	47.47	54.00	-6.53	Average
5150.00	45.31	31.61	9.06	38.81	47.17	54.00	-6.83	Average
5204.39	76.42	31.70	8.66	38.78	78.00	54.00	24.00	Average
5350.00	32.17	31.89	9.20	38.70	34.56	54.00	-19.44	Average
5421.10	32.12	31.99	9.34	38.66	34.79	54.00	-19.21	Average

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

Mode:b; Polarization:Vertical; Modulation:c; bandwidth:80MHz; Channel:Low

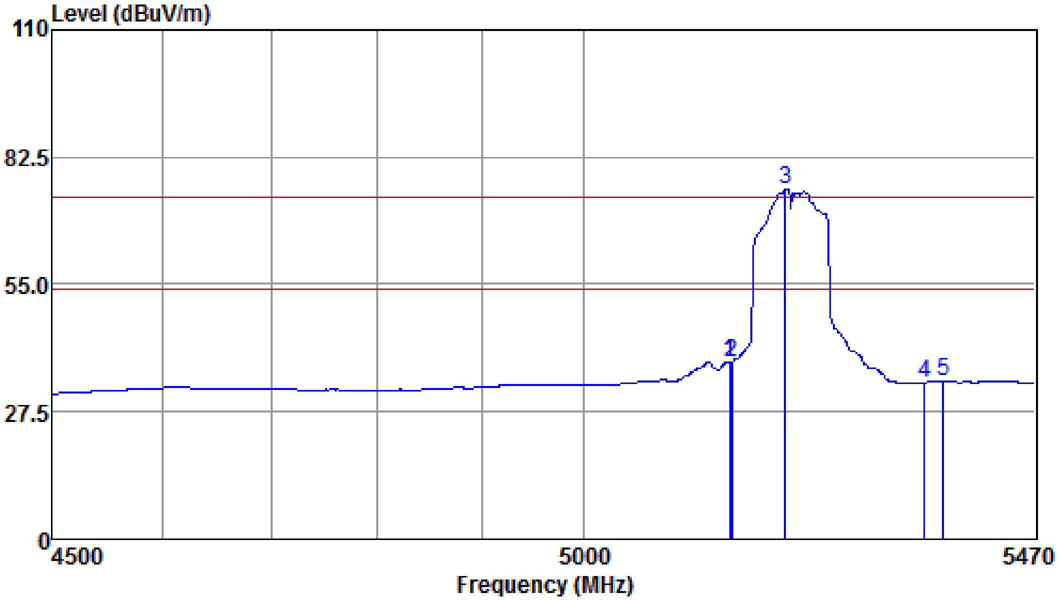


```
Antenna Polarity :VERTICAL

         Read   Antenna Cable Preamp Emission Limit  Over
 Freq    Level  Factor  Loss  Factor Level    Line   Limit  Remark
------- -----  ------- ----- ------ ------  ------ ------ ------
  MHz    dBuv    dB/m    dB     dB   dBuv/m  dBuv/m   dB
5131.76 53.94   31.59   9.06  38.82  55.77   74.00  -18.23  Peak
5150.00 51.22   31.61   9.06  38.81  53.08   74.00  -20.92  Peak
5211.51 86.46   31.70   8.66  38.78  88.04   74.00   14.04  Peak
5350.00 42.57   31.89   9.20  38.70  44.96   74.00  -29.04  Peak
5431.70 44.17   31.99   9.34  38.66  46.84   74.00  -27.16  Peak

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

Mode:b; Polarization:Vertical; Modulation:c; bandwidth:80MHz; Channel:Low

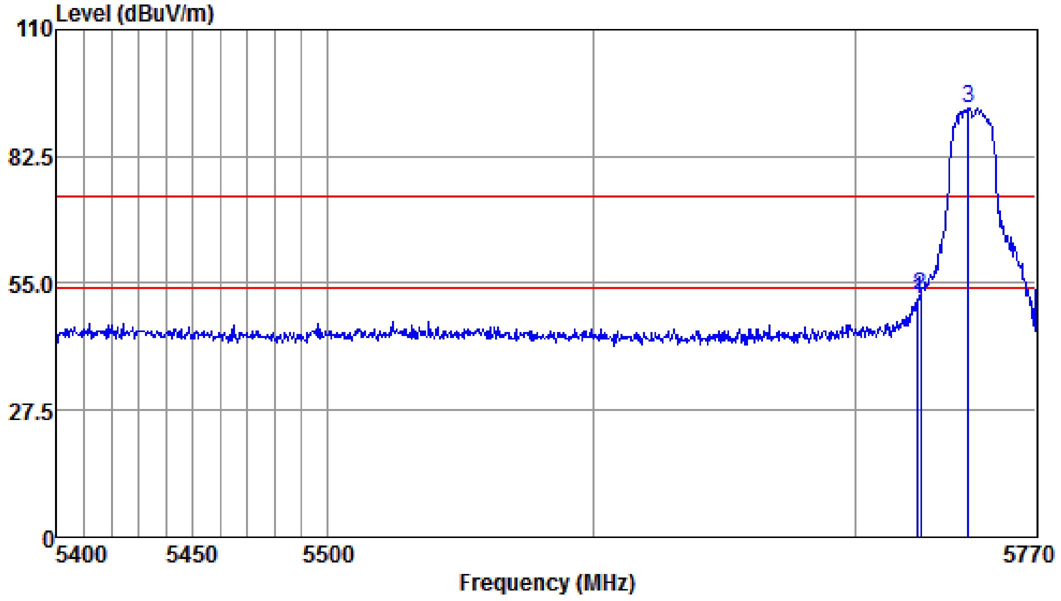


Antenna Polarity :VERTICAL

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	
5147.81	36.47	31.61	9.06	38.81	38.33	54.00	-15.67	Average
5150.00	36.23	31.61	9.06	38.81	38.09	54.00	-15.91	Average
5204.39	74.07	31.70	8.66	38.78	75.65	54.00	21.65	Average
5350.00	31.43	31.89	9.20	38.70	33.82	54.00	-20.18	Average
5370.55	31.65	31.93	9.20	38.68	34.10	54.00	-19.90	Average

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

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

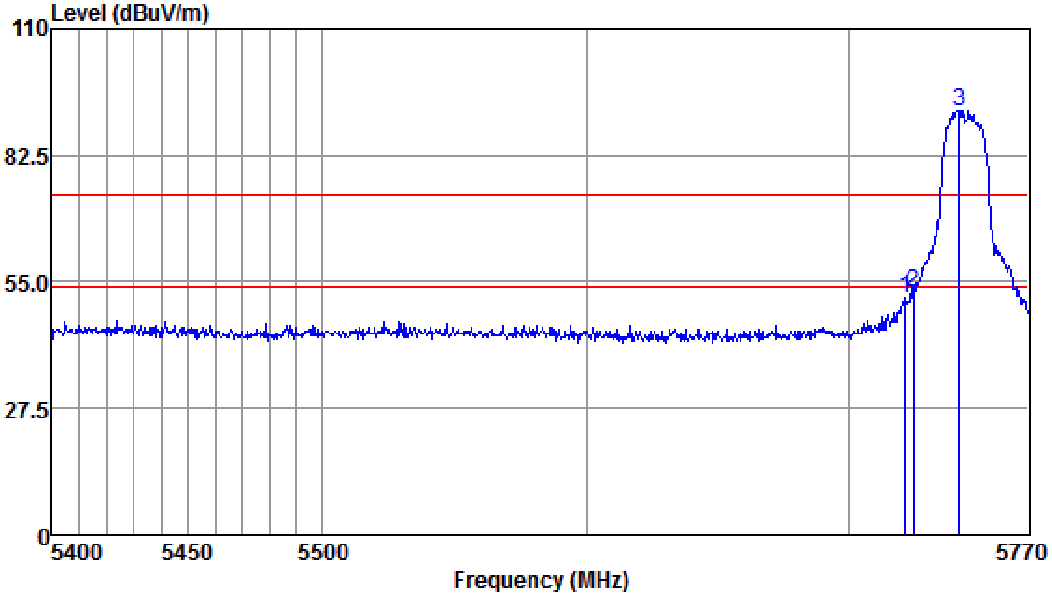


```
Antenna Polarity :HORIZONTAL

            Read    Antenna Cable Preamp Emission Limit   Over
  Freq      Level   Factor  Loss  Factor Level    Line    Limit  Remark
 ------     -----   ------- ----- ------ ------   ------  ------ ------
   MHz       dBuv     dB/m    dB     dB  dBuv/m   dBuv/m    dB
5723.92   49.04    32.15   9.00  38.75  51.44    74.00  -22.56   Peak
5725.00   50.12    32.15   9.00  38.75  52.52    74.00  -21.48   Peak
5743.68   90.76    32.15   9.00  38.76  93.15    74.00   19.15   Peak

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

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

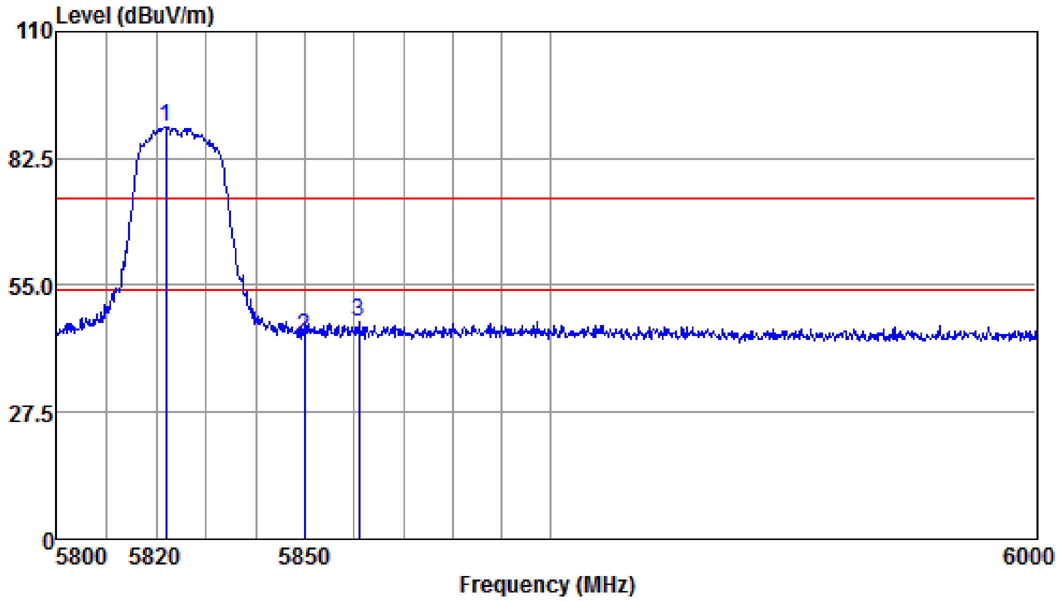


Antenna Polarity :VERTICAL

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	
5721.64	49.23	32.14	9.00	38.74	51.63	74.00	-22.37	Peak
5725.00	50.17	32.15	9.00	38.75	52.57	74.00	-21.43	Peak
5742.91	89.88	32.15	9.00	38.76	92.27	74.00	18.27	Peak

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

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

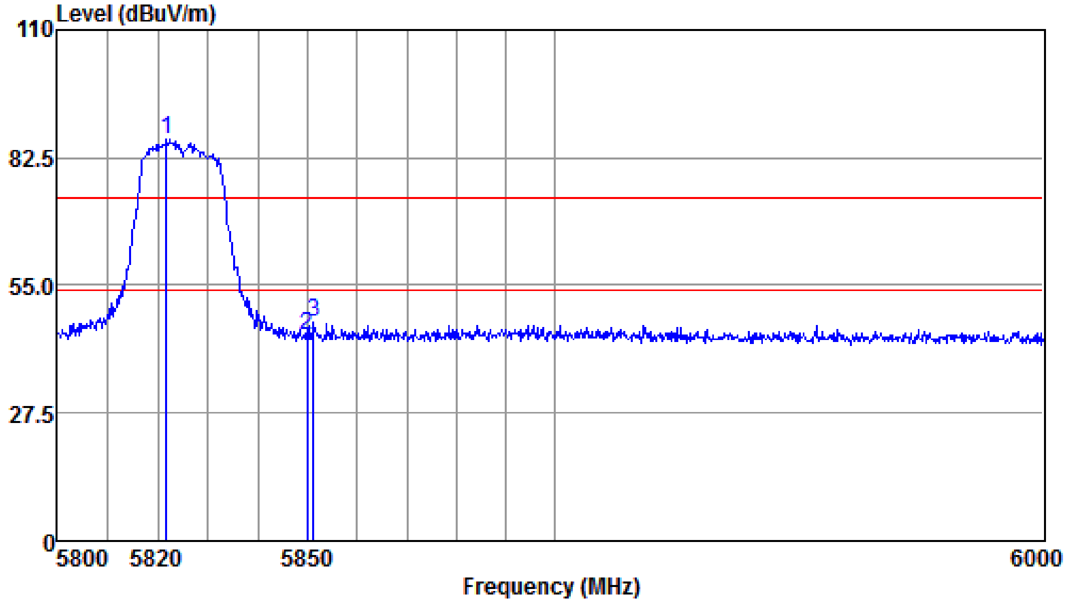


Antenna Polarity :HORIZONTAL

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	
5821.87	87.17	32.16	8.87	38.78	89.42	74.00	15.42	Peak
5850.00	41.59	32.17	8.90	38.75	43.91	74.00	-30.09	Peak
5860.88	44.72	32.17	8.90	38.74	47.05	74.00	-26.95	Peak

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

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

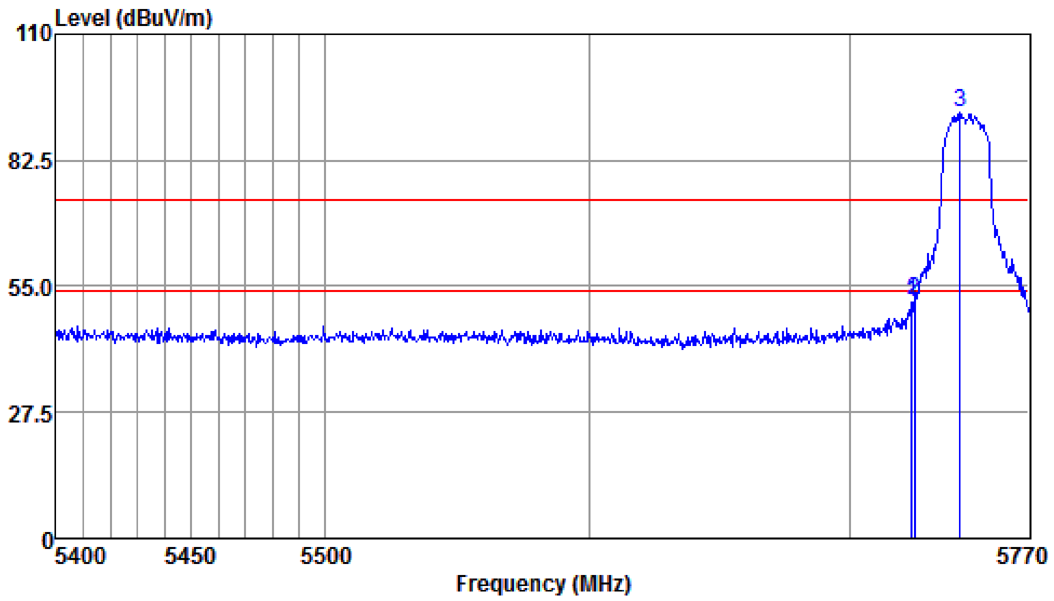


Antenna Polarity :VERTICAL

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	
5821.67	84.11	32.16	8.87	38.78	86.36	74.00	12.36	Peak
5850.00	41.84	32.17	8.90	38.75	44.16	74.00	-29.84	Peak
5851.35	44.79	32.17	8.90	38.75	47.11	74.00	-26.89	Peak

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

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

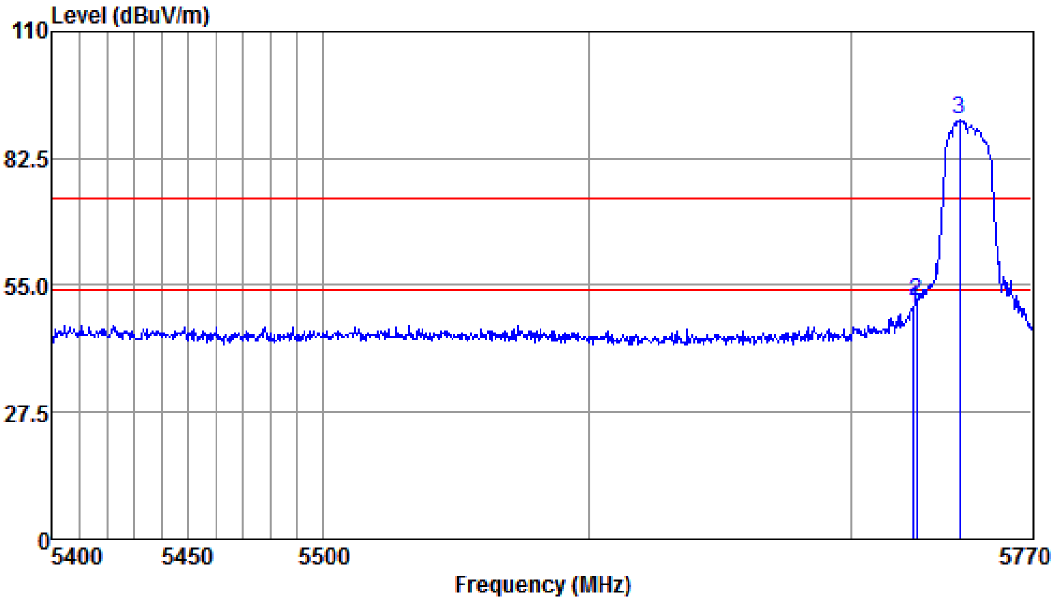


Antenna Polarity :HORIZONTAL

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	
5723.92	49.15	32.15	9.00	38.75	51.55	74.00	-22.45	Peak
5725.00	49.40	32.15	9.00	38.75	51.80	74.00	-22.20	Peak
5742.91	90.70	32.15	9.00	38.76	93.09	74.00	19.09	Peak

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

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

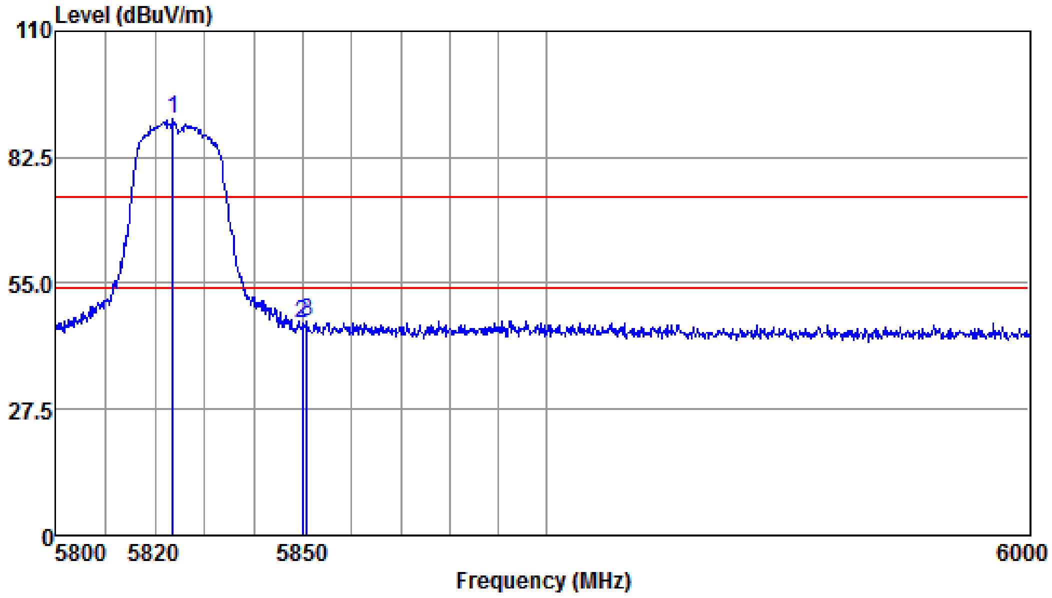


Antenna Polarity :VERTICAL

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	
5723.92	47.64	32.15	9.00	38.75	50.04	74.00	-23.96	Peak
5725.00	48.97	32.15	9.00	38.75	51.37	74.00	-22.63	Peak
5741.77	88.46	32.15	9.00	38.76	90.85	74.00	16.85	Peak

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

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

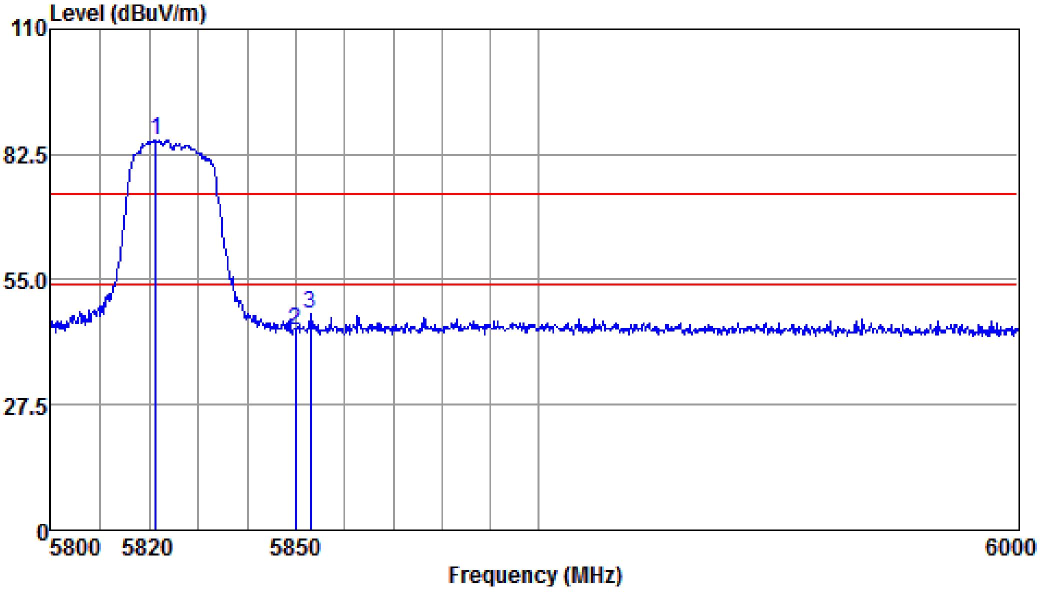


```
Antenna Polarity :HORIZONTAL

          Read    Antenna Cable Preamp Emission Limit   Over
 Freq     Level   Factor  Loss  Factor Level    Line    Limit  Remark
------    -----   ------- ----- ------ ------   ------  ------ ------
  MHz      dBuv    dB/m    dB     dB   dBuv/m   dBuv/m    dB
5823.64   88.53   32.17   8.87  38.77  90.80    74.00   16.80  Peak
5850.00   44.14   32.17   8.90  38.75  46.46    74.00  -27.54  Peak
5850.95   44.52   32.17   8.90  38.75  46.84    74.00  -27.16  Peak

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

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

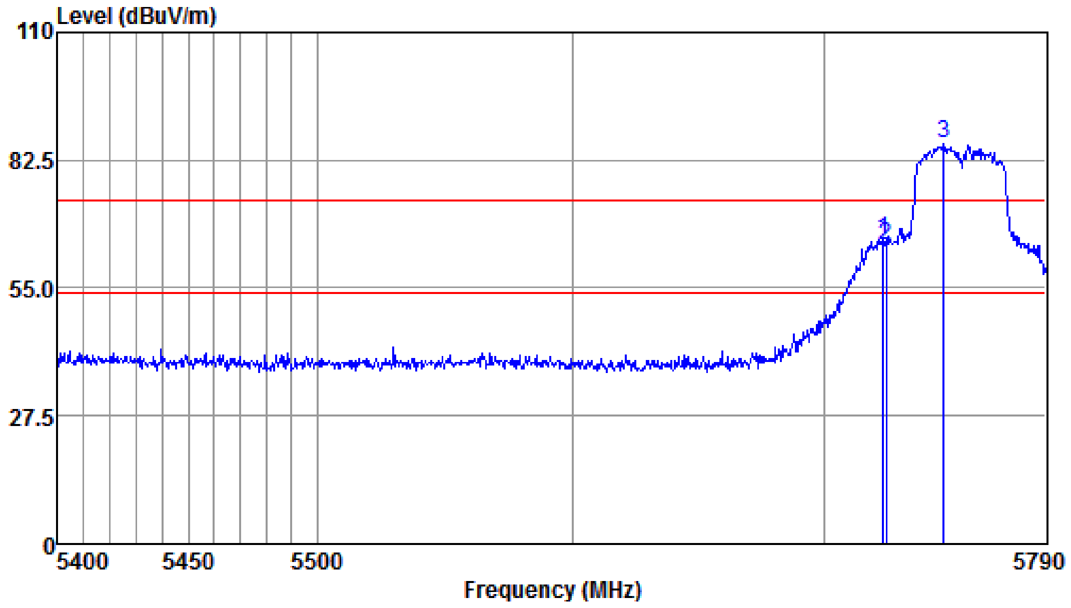


```
Antenna Polarity :VERTICAL

          Read    Antenna Cable Preamp Emission Limit   Over
  Freq    Level   Factor  Loss  Factor Level    Line    Limit   Remark
 ------   -----   -------- ----- ------ ------  ------  ------ ------
  MHz     dBuv     dB/m    dB     dB   dBuv/m  dBuv/m    dB
5821.28  83.52    32.16   8.87  38.78  85.77   74.00   11.77   Peak
5850.00  41.46    32.17   8.90  38.75  43.78   74.00  -30.22   Peak
5852.94  45.07    32.17   8.90  38.75  47.39   74.00  -26.61   Peak

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

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

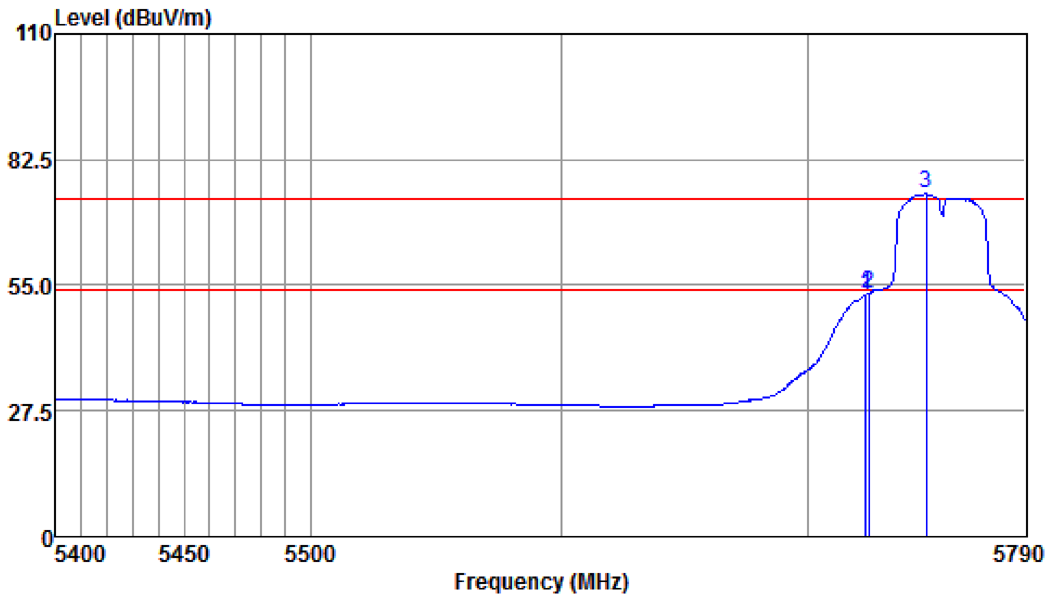


Antenna Polarity :HORIZONTAL

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	63.12	32.15	9.00	38.75	65.52	74.00	-8.48	Peak
5725.00	61.92	32.15	9.00	38.75	64.32	74.00	-9.68	Peak
5748.16	83.50	32.15	9.00	38.76	85.89	74.00	11.89	Peak

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

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

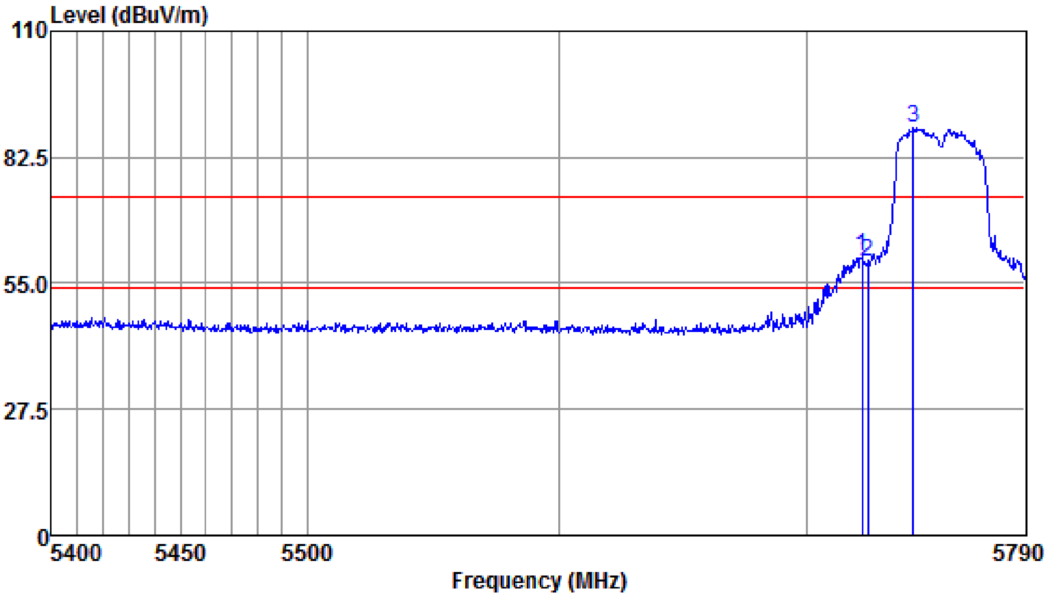


```
Antenna Polarity :HORIZONTAL

             Read    Antenna Cable Preamp Emission Limit   Over
  Freq       Level   Factor  Loss  Factor Level    Line    Limit   Remark
 ------     -----   -------- ----- ------ ------  ------  ------  ------
   MHz       dBuv     dB/m    dB     dB   dBuv/m  dBuv/m    dB
 5723.76    50.56    32.15   9.00  38.75  52.96   54.00   -1.04   Average
 5725.00    50.72    32.15   9.00  38.75  53.12   54.00   -0.88   Average
 5748.56    72.59    32.15   9.00  38.76  74.98   54.00   20.98   Average

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

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

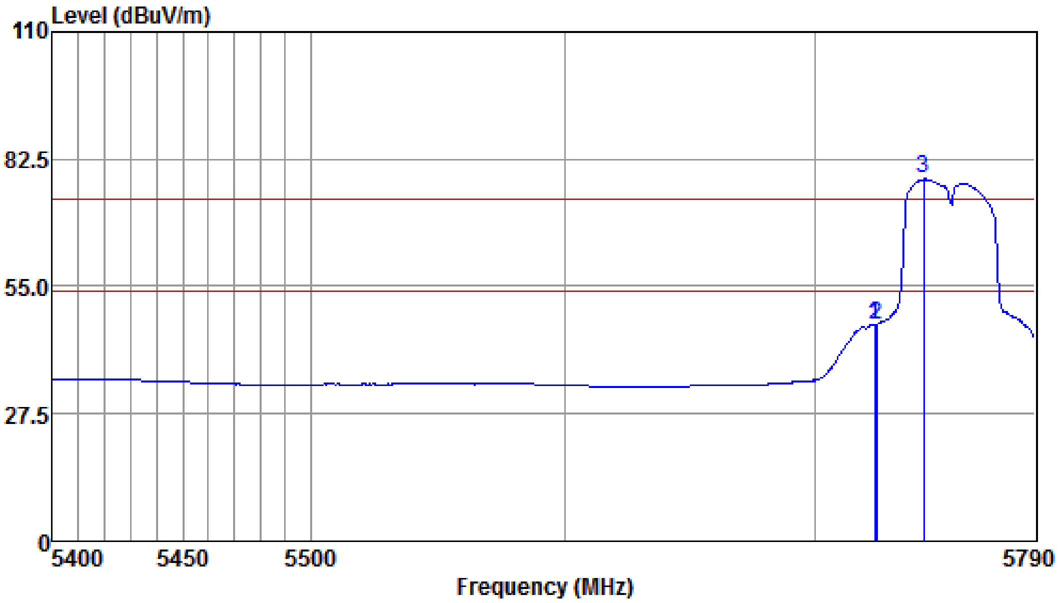


```
Antenna Polarity :VERTICAL

           Read    Antenna Cable Preamp Emission Limit   Over
   Freq    Level   Factor  Loss  Factor Level    Line    Limit  Remark
  ------   -----   ------- ----- ------ ------   ------  ------ ------
   MHz     dBuv     dB/m    dB     dB   dBuv/m   dBuv/m   dB
 5722.57  58.56    32.15   9.00  38.75  60.96    74.00  -13.04  Peak
 5725.00  57.11    32.15   9.00  38.75  59.51    74.00  -14.49  Peak
 5743.75  86.42    32.15   9.00  38.76  88.81    74.00   14.81  Peak

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

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

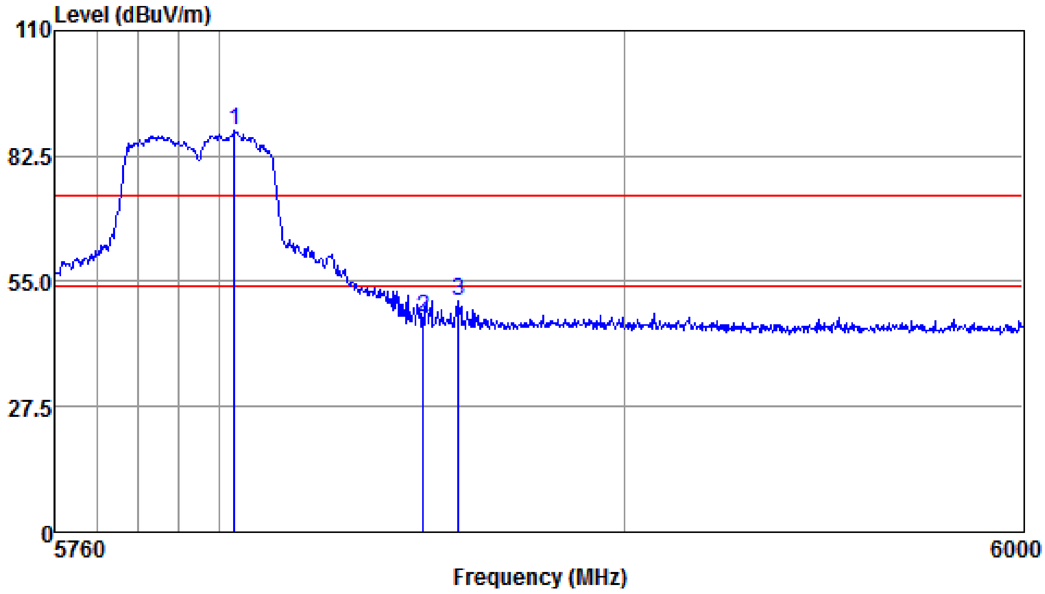


Antenna Polarity :VERTICAL

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	
5724.16	44.41	32.15	9.00	38.75	46.81	54.00	-7.19	Average
5725.00	44.39	32.15	9.00	38.75	46.79	54.00	-7.21	Average
5744.15	75.80	32.15	9.00	38.76	78.19	54.00	24.19	Average

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

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

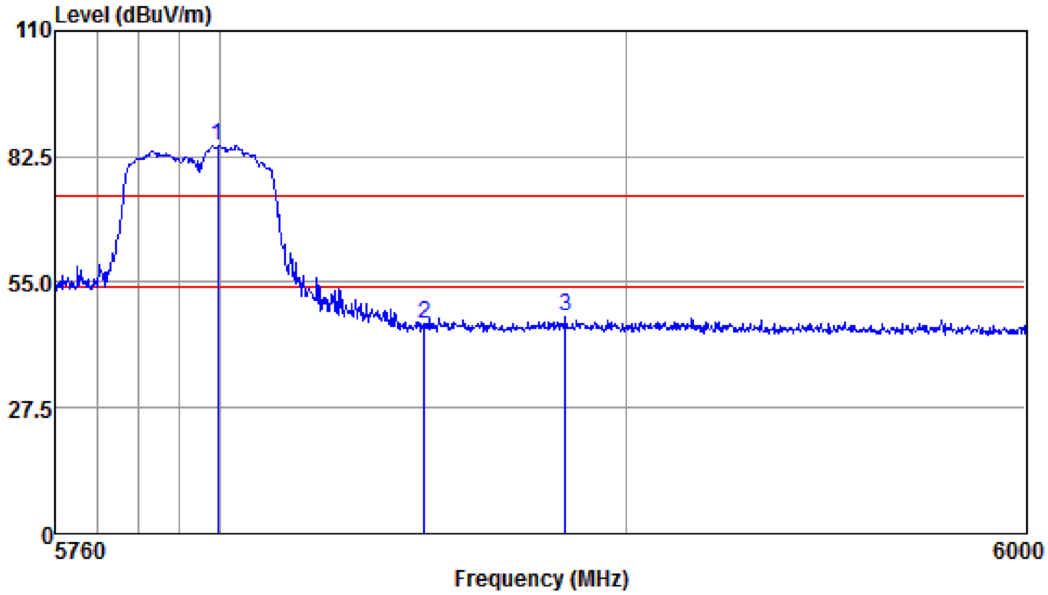


Antenna Polarity :HORIZONTAL

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	
5803.67	85.74	32.16	8.87	38.80	87.97	74.00	13.97	Peak
5850.00	44.83	32.17	8.90	38.75	47.15	74.00	-26.85	Peak
5858.65	48.52	32.17	8.90	38.74	50.85	74.00	-23.15	Peak

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

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

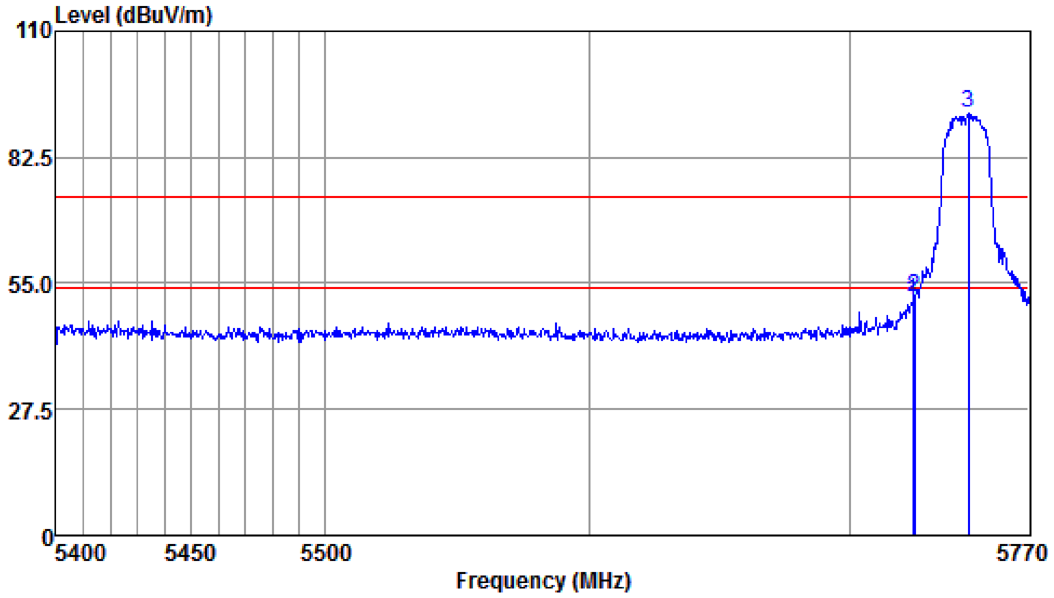


Antenna Polarity :VERTICAL

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	
5799.40	82.78	32.16	8.87	38.80	85.01	74.00	11.01	Peak
5850.00	43.49	32.17	8.90	38.75	45.81	74.00	-28.19	Peak
5884.78	44.96	32.18	8.93	38.72	47.35	74.00	-26.65	Peak

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

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

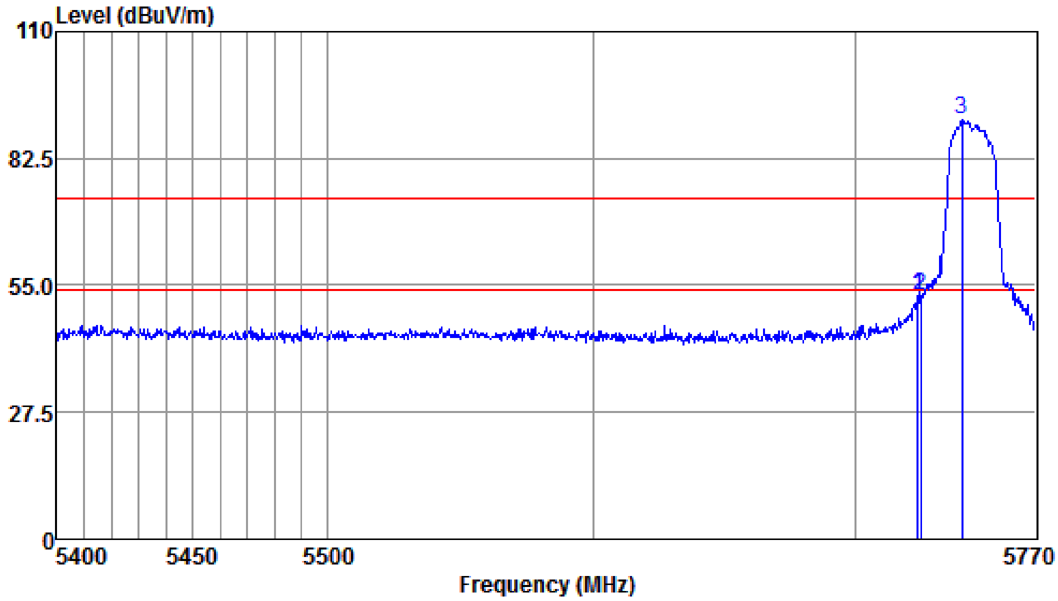


Antenna Polarity :HORIZONTAL

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	
5724.29	48.63	32.15	9.00	38.75	51.03	74.00	-22.97	Peak
5725.00	49.74	32.15	9.00	38.75	52.14	74.00	-21.86	Peak
5745.96	89.66	32.15	9.00	38.76	92.05	74.00	18.05	Peak

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

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

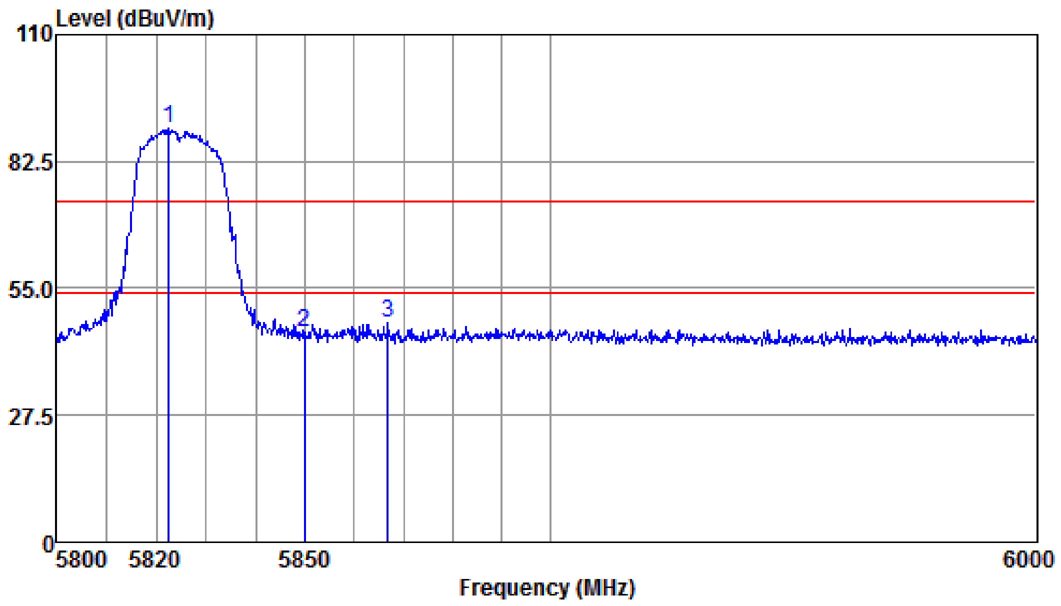


Antenna Polarity :VERTICAL

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	
5723.92	50.35	32.15	9.00	38.75	52.75	74.00	-21.25	Peak
5725.00	50.44	32.15	9.00	38.75	52.84	74.00	-21.16	Peak
5741.01	88.41	32.15	9.00	38.76	90.80	74.00	16.80	Peak

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

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

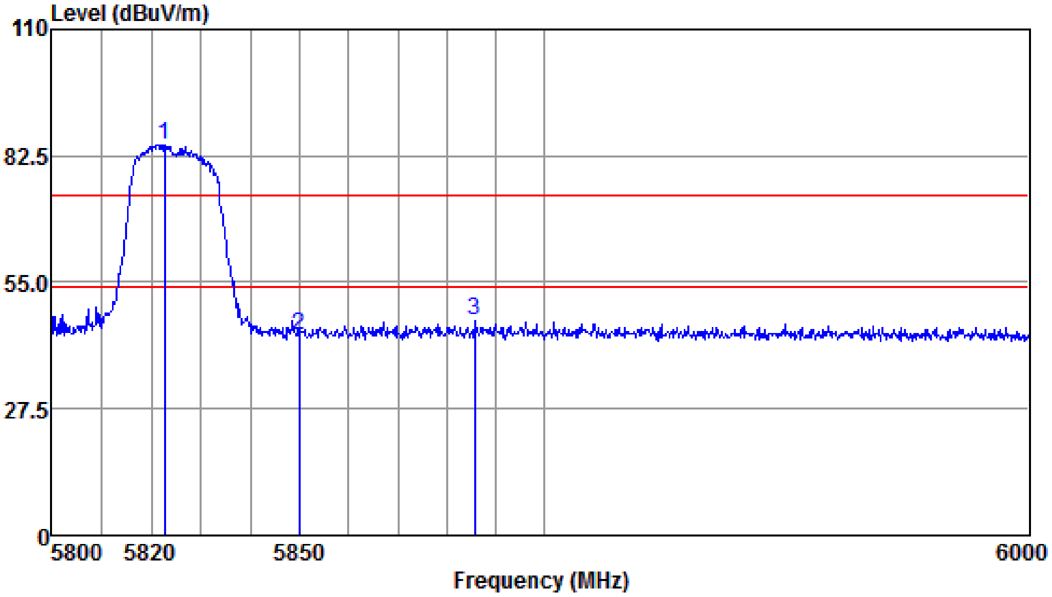


Antenna Polarity :HORIZONTAL

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	
5822.46	87.53	32.17	8.87	38.77	89.80	74.00	15.80	Peak
5850.00	43.30	32.17	8.90	38.75	45.62	74.00	-28.38	Peak
5866.84	45.03	32.17	8.90	38.74	47.36	74.00	-26.64	Peak

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

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

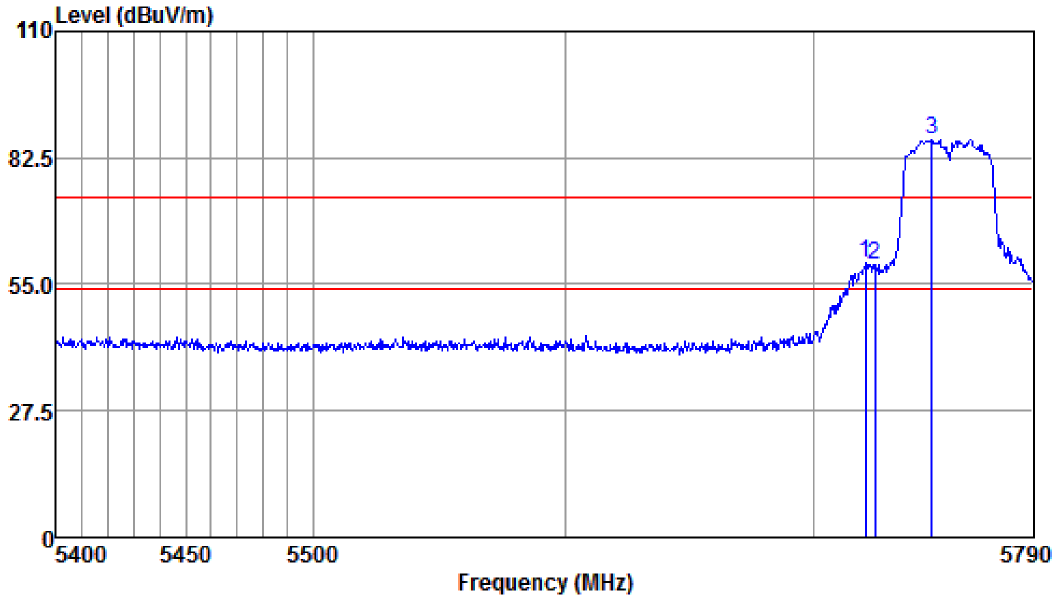


Antenna Polarity :VERTICAL

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	
5822.66	82.76	32.17	8.87	38.77	85.03	74.00	11.03	Peak
5850.00	41.10	32.17	8.90	38.75	43.42	74.00	-30.58	Peak
5885.77	44.13	32.18	8.93	38.72	46.52	74.00	-27.48	Peak

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

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

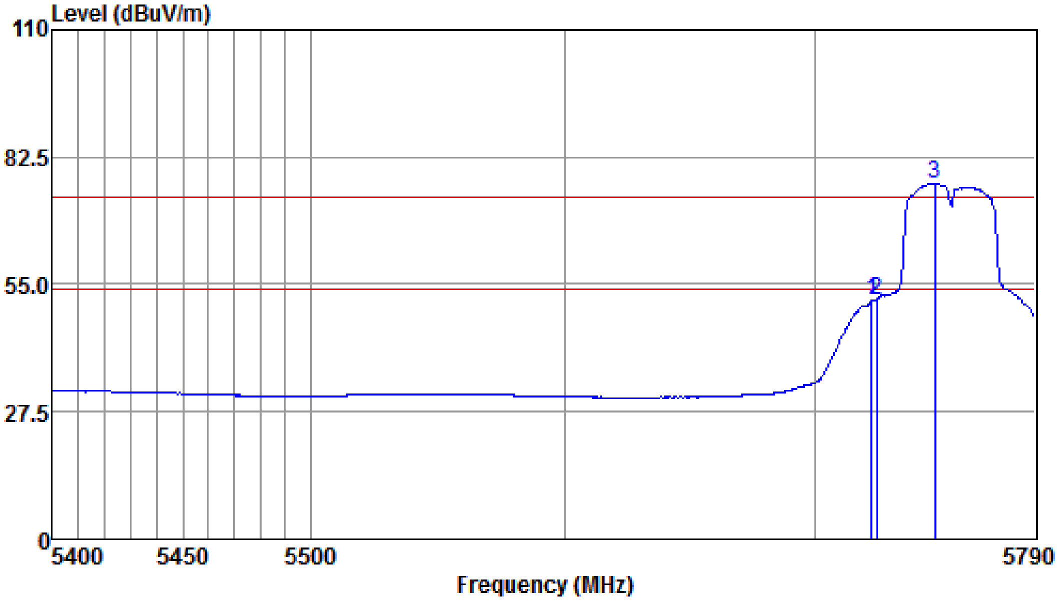


Antenna Polarity :HORIZONTAL

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	
5720.97	57.22	32.14	9.00	38.74	59.62	74.00	-14.38	Peak
5725.00	56.72	32.15	9.00	38.75	59.12	74.00	-14.88	Peak
5748.16	84.15	32.15	9.00	38.76	86.54	74.00	12.54	Peak

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

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

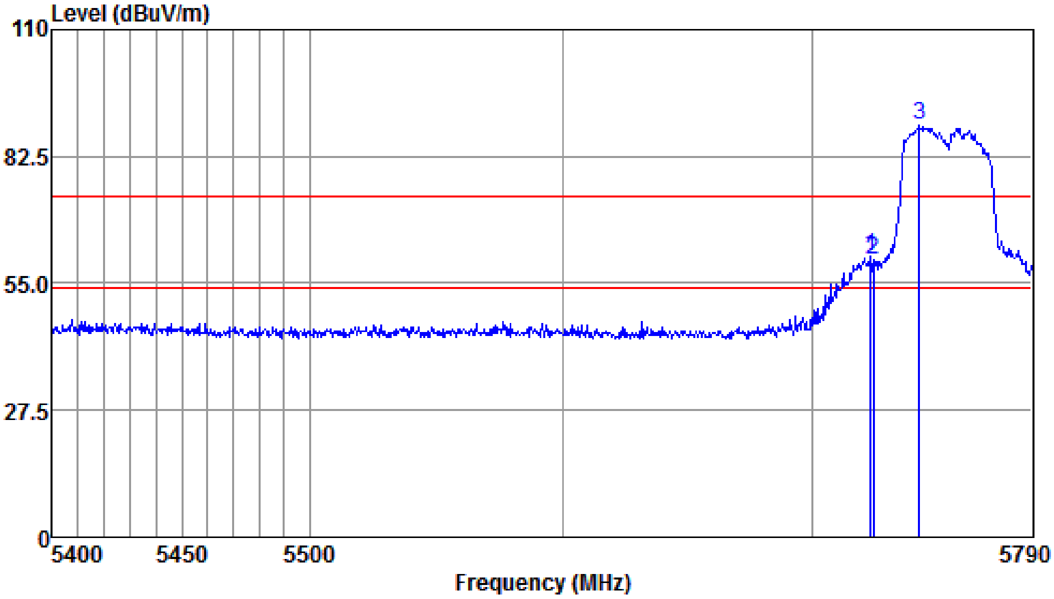


Antenna Polarity :HORIZONTAL

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	
5722.96	49.14	32.15	9.00	38.75	51.54	54.00	-2.46	Average
5725.00	49.32	32.15	9.00	38.75	51.72	54.00	-2.28	Average
5748.56	74.40	32.15	9.00	38.76	76.79	54.00	22.79	Average

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

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

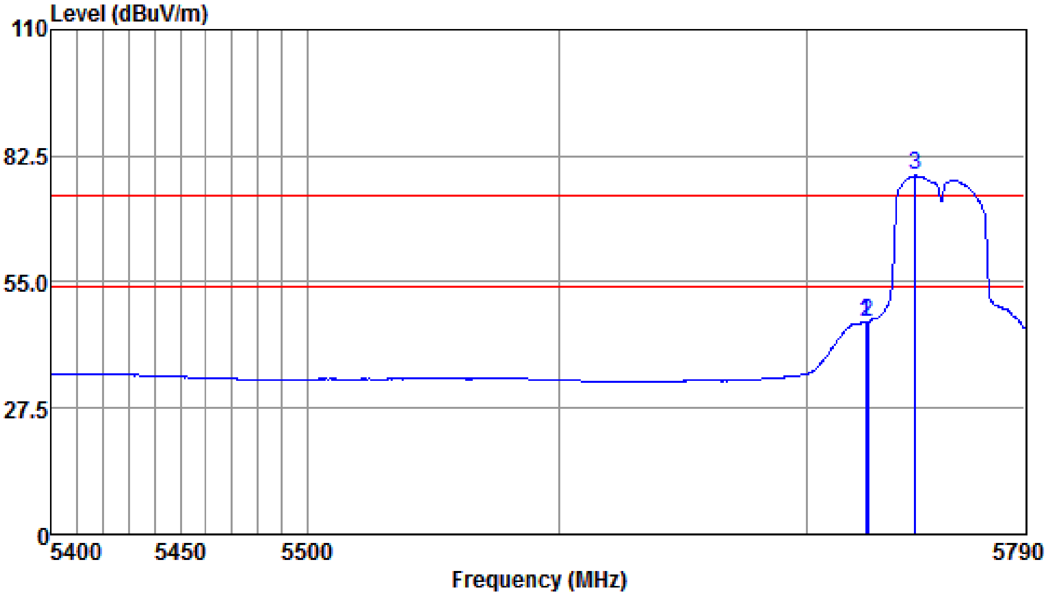


Antenna Polarity :VERTICAL

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	
5723.76	58.46	32.15	9.00	38.75	60.86	74.00	-13.14	Peak
5725.00	57.66	32.15	9.00	38.75	60.06	74.00	-13.94	Peak
5743.75	86.73	32.15	9.00	38.76	89.12	74.00	15.12	Peak

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

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

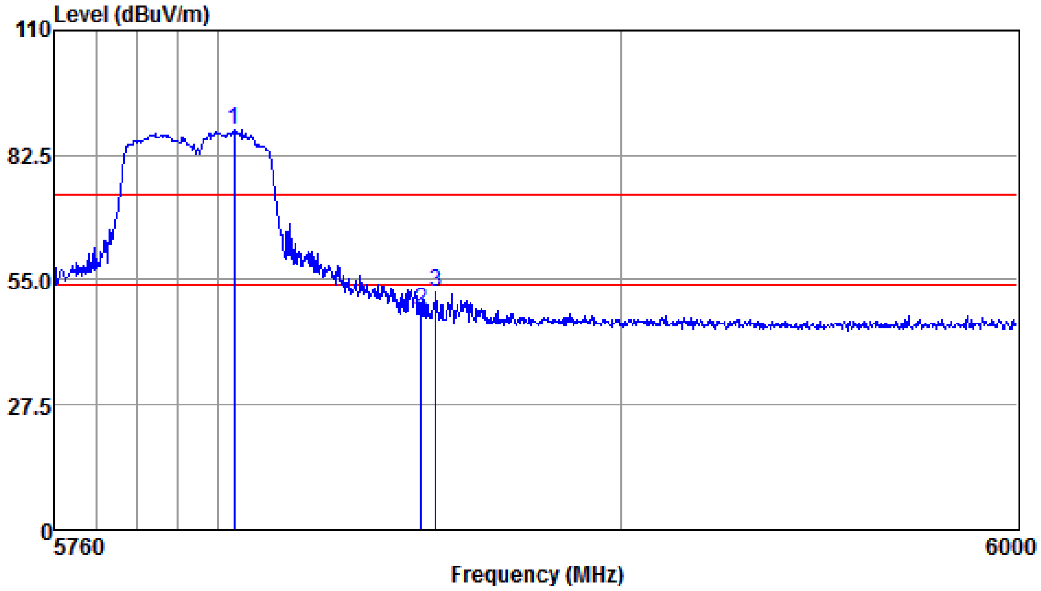


Antenna Polarity :VERTICAL

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	
5724.16	44.00	32.15	9.00	38.75	46.40	54.00	-7.60	Average
5725.00	43.84	32.15	9.00	38.75	46.24	54.00	-7.76	Average
5744.56	75.82	32.15	9.00	38.76	78.21	54.00	24.21	Average

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

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

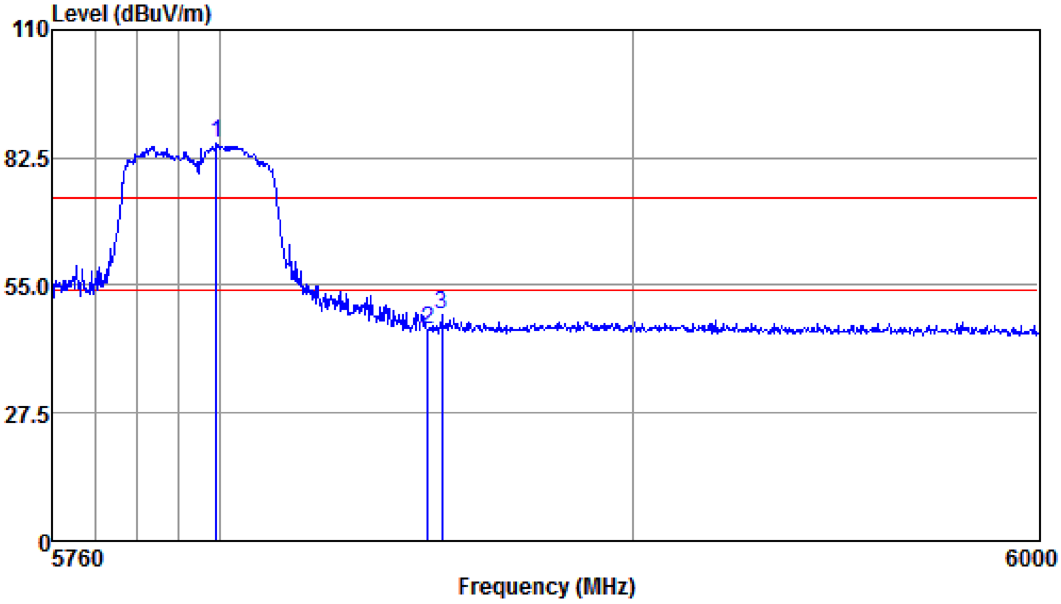


```
Antenna Polarity :HORIZONTAL

           Read    Antenna Cable Preamp Emission Limit  Over
  Freq     Level   Factor  Loss  Factor Level    Line   Limit  Remark
 ------    -----   ------- ----- ------ ------   ------ ------ ------
   MHz      dBuv    dB/m    dB     dB   dBuv/m   dBuv/m   dB
5803.90   85.78    32.16   8.87  38.80  88.01    74.00   14.01  Peak
5850.00   45.80    32.17   8.90  38.75  48.12    74.00  -25.88  Peak
5853.63   49.94    32.17   8.90  38.75  52.26    74.00  -21.74  Peak

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

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

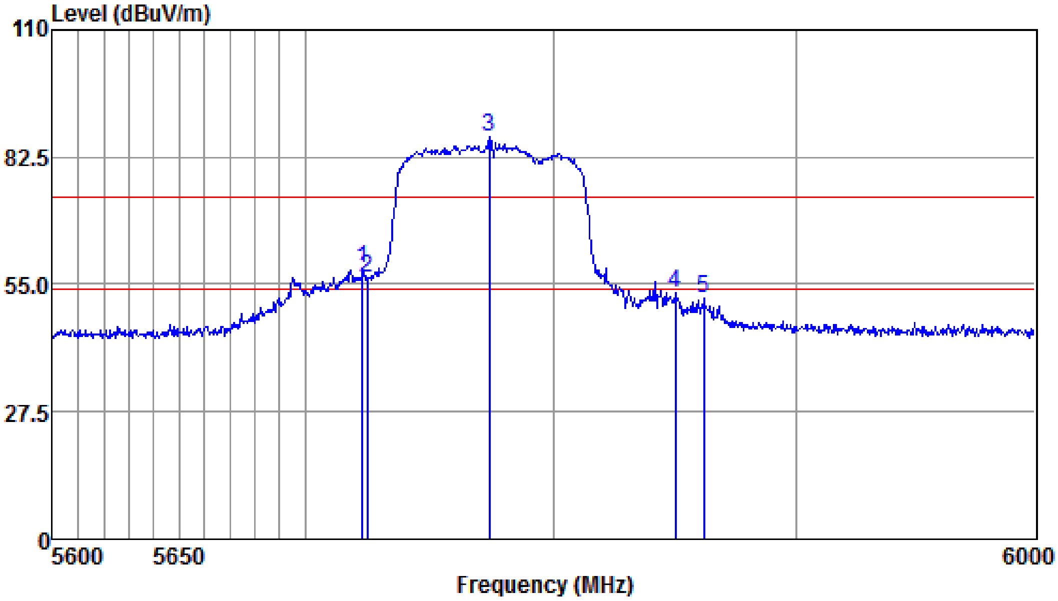


Antenna Polarity :VERTICAL

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	
5799.17	83.40	32.16	8.87	38.80	85.63	74.00	11.63	Peak
5850.00	43.29	32.17	8.90	38.75	45.61	74.00	-28.39	Peak
5853.39	46.55	32.17	8.90	38.75	48.87	74.00	-25.13	Peak

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

Mode:c; Polarization:Horizontal; Modulation:c; bandwidth:80MHz; Channel:Low

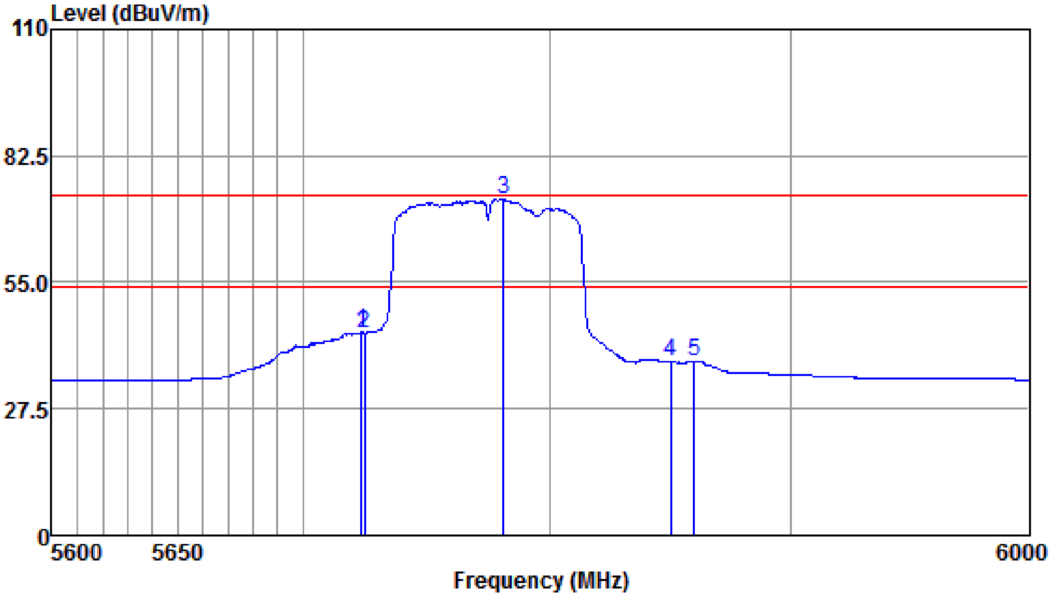


Antenna Polarity :HORIZONTAL

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	
5723.04	56.09	32.15	9.00	38.75	58.49	74.00	-15.51	Peak
5725.00	53.93	32.15	9.00	38.75	56.33	74.00	-17.67	Peak
5774.20	84.67	32.16	8.93	38.79	86.97	74.00	12.97	Peak
5850.00	50.93	32.17	8.90	38.75	53.25	74.00	-20.75	Peak
5861.70	49.53	32.17	8.90	38.74	51.86	74.00	-22.14	Peak

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

Mode:c; Polarization:Horizontal; Modulation:c; bandwidth:80MHz; Channel:Low

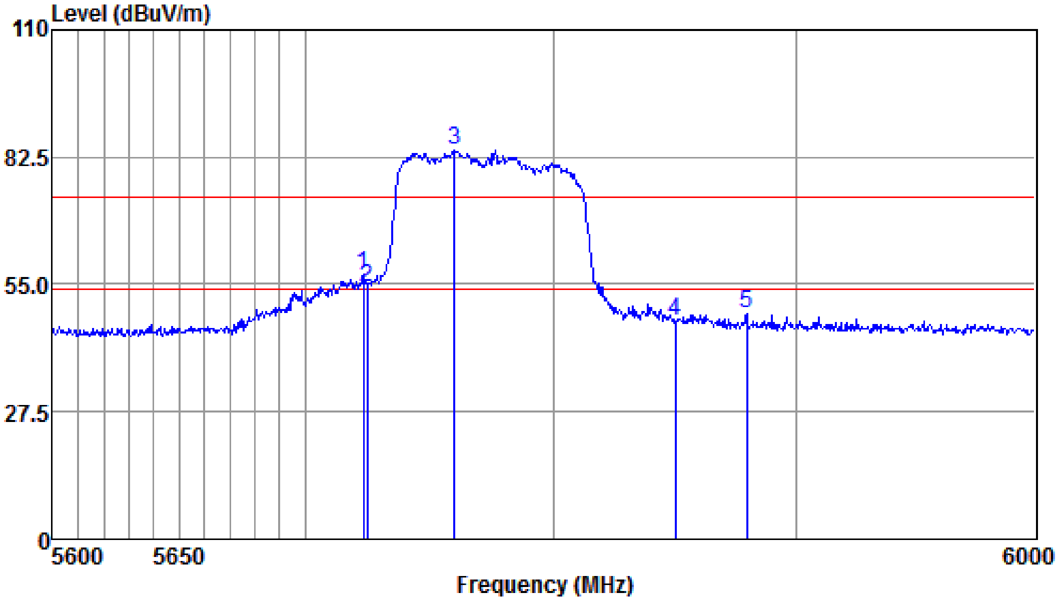


```
Antenna Polarity :HORIZONTAL

         Read    Antenna Cable Preamp Emission Limit  Over
 Freq    Level   Factor  Loss  Factor Level    Line   Limit  Remark
------  -----   ------- ----- ------ ------   ------ ------ ------
  MHz    dBuv    dB/m    dB    dB    dBuv/m   dBuv/m  dB
5723.83  41.79   32.15   9.00  38.75  44.19   54.00   -9.81  Average
5725.00  41.42   32.15   9.00  38.75  43.82   54.00  -10.18  Average
5781.37  70.85   32.16   8.93  38.79  73.15   54.00   19.15  Average
5850.00  35.31   32.17   8.90  38.75  37.63   54.00  -16.37  Average
5859.68  35.41   32.17   8.90  38.74  37.74   54.00  -16.26  Average

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

Mode:c; Polarization:Vertical; Modulation:c; bandwidth:80MHz; Channel:Low

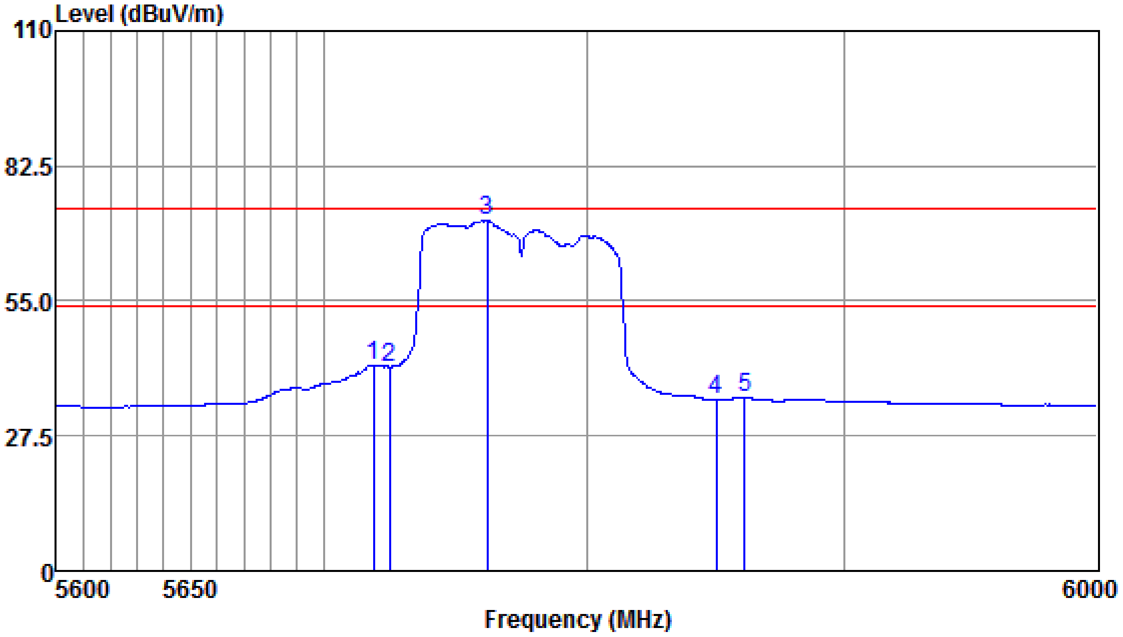


Antenna Polarity :VERTICAL

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	
5723.43	54.73	32.15	9.00	38.75	57.13	74.00	-16.87	Peak
5725.00	52.14	32.15	9.00	38.75	54.54	74.00	-19.46	Peak
5760.27	81.91	32.15	8.93	38.78	84.21	74.00	10.21	Peak
5850.00	44.90	32.17	8.90	38.75	47.22	74.00	-26.78	Peak
5879.52	46.48	32.18	8.93	38.72	48.87	74.00	-25.13	Peak

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

Mode:c; Polarization:Vertical; Modulation:c; bandwidth:80MHz; Channel:Low



```
Antenna Polarity :VERTICAL

         Read    Antenna Cable Preamp Emission Limit   Over
 Freq    Level   Factor  Loss  Factor Level    Line    Limit  Remark
------  -----   ------- -----  ------ ------   ------  ------ ------
  MHz    dBuv    dB/m     dB     dB    dBuv/m   dBuv/m   dB
5718.69  39.56   32.14   9.00  38.74  41.96   54.00  -12.04  Average
5725.00  39.05   32.15   9.00  38.75  41.45   54.00  -12.55  Average
5761.86  69.19   32.15   8.93  38.78  71.49   54.00   17.49  Average
5850.00  32.64   32.17   8.90  38.75  34.96   54.00  -19.04  Average
5861.30  32.95   32.17   8.90  38.74  35.28   54.00  -18.72  Average

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

7.9 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 55 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.

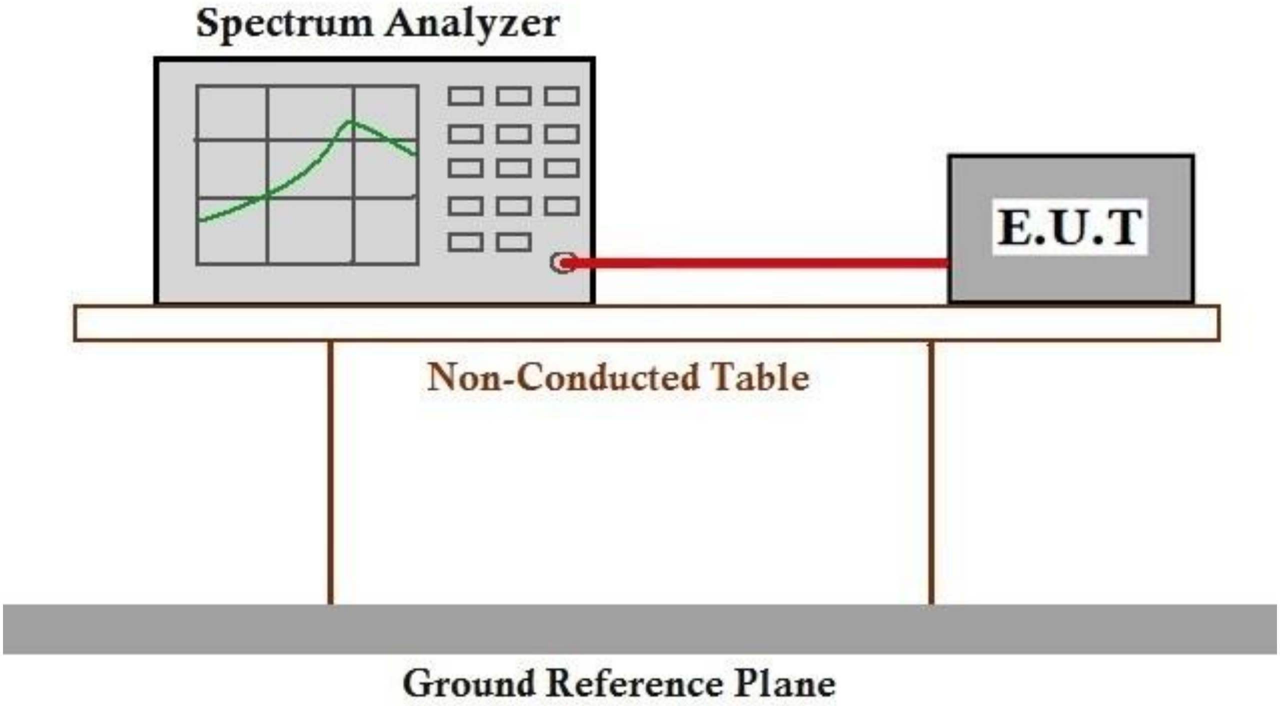
7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Pretest these mode to find the worst case:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report. c: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.
The worst case for final test:	b: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 802.11ac(VHT20); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT40); data rate @ MCS0 is the worst case of IEEE 802.11ac(VHT80). Only the data of worst case is recorded in the report.

7.9.2 Test Setup Diagram


Spectrum Analyzer
E.U.T
Non-Conducted Table
Ground Reference Plane

7.9.3 Measurement Procedure and Data

The detailed test data see: Appendix D for SHEM180900831604

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 -