

TEST REPORT

Application No.: SHCR2108000032AT
FCC ID: 2A5PE-YUSHU001
Applicant: Unitree
Address of Applicant: 3rd Floor, Building 1, Fengda Creative Park, No. 88 Dongliu Road, Binjiang District, Hangzhou, Zhejiang, China
Manufacturer: Unitree
Address of Manufacturer: 3rd Floor, Building 1, Fengda Creative Park, No. 88 Dongliu Road, Binjiang District, Hangzhou, Zhejiang, China
Factory: Unitree
Address of Factory: 3rd Floor, Building 1, Fengda Creative Park, No. 88 Dongliu Road, Binjiang District, Hangzhou, Zhejiang, China
Equipment Under Test (EUT):
EUT Name: Quadraped Robot
Model No.: Go1,Go1 Air,Go1 Edu,Go1 Pro,Go1 Max,Go1 Nx,Go1 Pro Max
 Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standard(s) : 47 CFR Part 15, Subpart E 15.407
Date of Receipt: 2021-09-02
Date of Test: 2021-11-05 to 2022-01-07
Date of Issue: 2022-03-07

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan

Parlam Zhan
Laboratory Manager



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Revision Record			
Version	Description	Date	Remark
00	Original	2022-03-07	/

Authorized for issue by:			
		Wade Zhang	
		Wade Zhang / Project Engineer	
		Parlam Zhan	
		Parlam Zhan / Reviewer	



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NO.588 West Jindu Road, Songjiang District, Shanghai, China 201612
中国·上海·松江区金都西路588号 邮编: 201612

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

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
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

Declaration of EUT Family Grouping:

Note: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model Go1 was tested since their differences were the model number and appearance.



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

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NO.588 West Jindu Road, Songjiang District, Shanghai, China 201612
中国·上海·松江区金都西路588号 邮编: 201612

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

4 General Information

4.1 Details of E.U.T.

Power supply: DC 22.2V 6Ah Battery
Charger:
Model: KS150DU-2520600
Input: AC 100-240V, 50/60Hz, 2.5A
Output: DC 25.2V 6.0A
Test voltage: DC 22.2V

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band III	802.11a/n(HT20)/ac(HT20)	5745-5825	5
		802.11n(HT40)/ac(HT40)	5755-5795	2
		802.11ac(HT80)	5775	1
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)			
Date Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS0-MCS7 802.11ac: VHT MCS0-MCS7			
Channel Spacing:	802.11a/n(HT20)/ac(HT20): 20MHz 802.11n(HT40)/ac(HT40): 40MHz 802.11ac(HT80): 80MHz			
TPC Function:	Not support			
DFS Function:	Slaver without radar detection			
Antenna Gain:	Antenna 1: 4dBi Antenna 2: 4dBi (Provided by manufacturer) Directional gain: 7.01dBi			
Antenna Type:	Antenna 1: Dipole antenna Antenna 2: Dipole antenna			

4.2 Description of Support Units

The EUT has been tested with associated equipment below.

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



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

4.3 Measurement Uncertainty

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

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



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4.4 Test Location

All tests were performed at:

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

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

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

4.5 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 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 6332.01)**

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

- **FCC (Designation Number: CN1301)**

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

- **ISED (CAB Identifier: CN0020)**

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

- **VCCI (Member No.: 3061)**

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

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2021-12-20	2022-12-19
Spectrum Analyzer	Keysight	N9020B	SHEM241-1	2021-08-30	2022-08-29
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2021-08-13	2022-08-12
Signal Generator	R&S	SMR20	SHEM006-1	2021-08-13	2022-08-12
Signal Generator	Agilent	N5182A	SHEM182-1	2021-08-13	2022-08-12
Communication Tester	R&S	CMW270	SHEM183-1	2021-07-28	2022-07-27
Communication Tester	R&S	CMW500	SHEM183-2	2021-04-16	2022-04-15
Switcher	Tonscend	JS0806	SHEM184-1	2021-08-13	2022-08-12
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2021-08-13	2022-08-12
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2019-09-25	2022-09-24
AC Power Stabilizer	APC	KDF-31020T-V0-F0	SHEM216-1	2021-12-20	2022-12-19
DC Power Supply	MCH	MCH-303A	SHEM210-1	2021-12-20	2022-12-19
Conducted test Cable	/	RF01~RF04	/	2021-12-20	2022-12-19
Test software	Tonscend	JS Tonscend BT/WIFI System	Version: 2.6	/	/
RF Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2021-12-20	2022-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2021-12-20	2022-12-19
Communication Tester	R&S	CMW500	SHEM183-2	2021-04-16	2022-04-15
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2021-12-20	2022-12-19
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2021-09-11	2023-09-10
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2020-04-30	2022-04-29
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2019-10-24	2022-10-23
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2021-09-18	2023-09-17
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2021-09-18	2023-09-17
Pre-Amplifier	HP	8447D	SHEM236-1	2021-05-27	2022-05-26
Pre-Amplifier	PANSHAN	LNA 1-18G	SHEM235-1	2021-05-27	2022-05-26
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2021-12-20	2022-12-19
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2020-05-25	2023-05-24
RE test Cable	/	RE01, RE02, RE06	/	2021-12-20	2022-12-19
Test software	ESE	E3	Version: 6.111221a	/	/



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

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 dipole antenna and no consideration of replacement. The best case gain of the antenna is 4dBi.

Antenna location: Refer to Appendix (Internal Photos)



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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 (RTL8812) 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.



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7 Radio Spectrum Matter Test Results

7.1 Duty Cycle

Test Requirement KDB 789033 D02 II B 1

Test Method: KDB 789033 II B 1

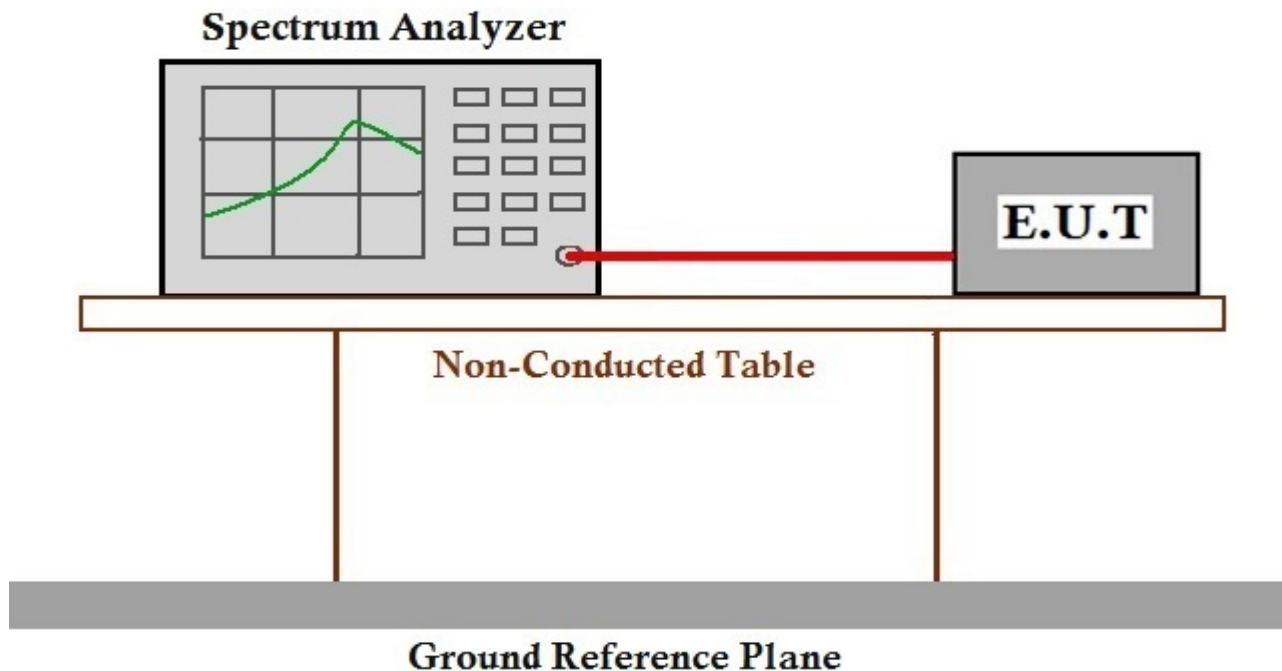
7.1.1 E.U.T. Operation

Operating Environment:

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

Test mode b: TX mode (Band 3)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE 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

The detailed test data see: Appendix A for SHCR210800003202



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7.2 99% Bandwidth

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

Test Method: KDB 789033 D02 II C 1

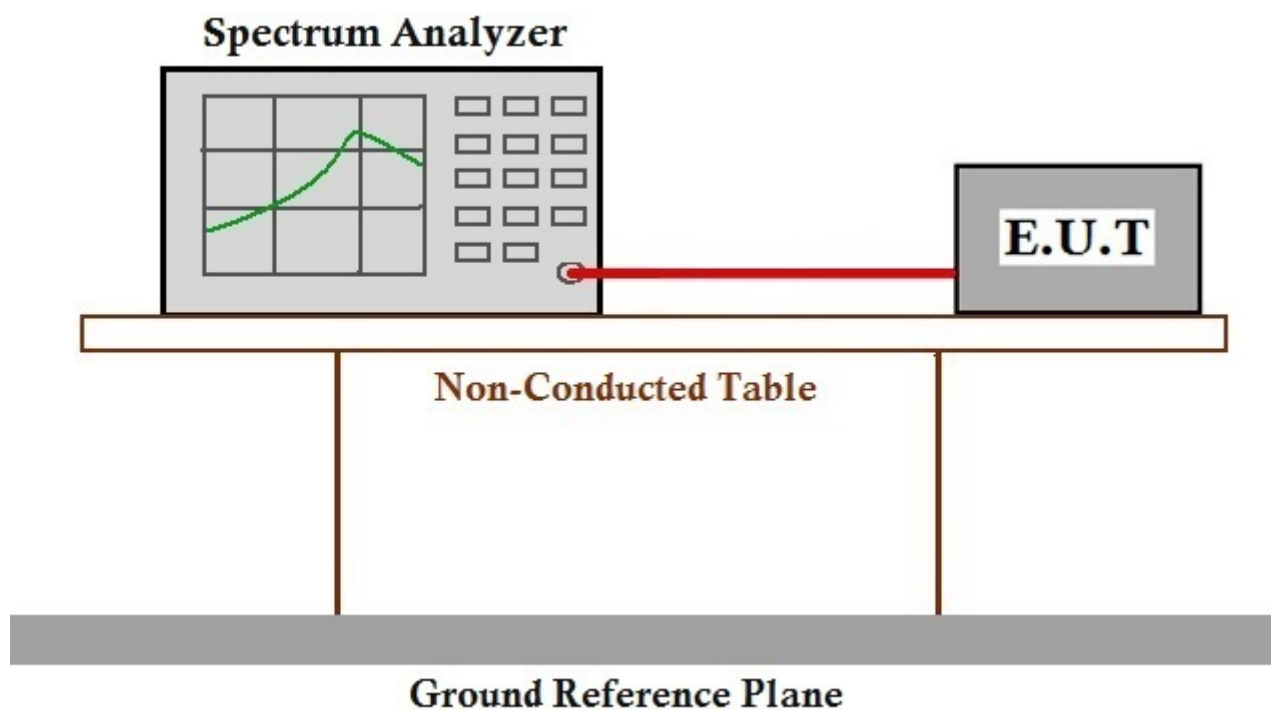
7.2.1 E.U.T. Operation

Operating Environment:

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

Test mode b:TX mode (Band 3)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE 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



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHCR210800003202



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7.3 26dB Emission bandwidth

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

Test Method: KDB 789033 D02 II C 1

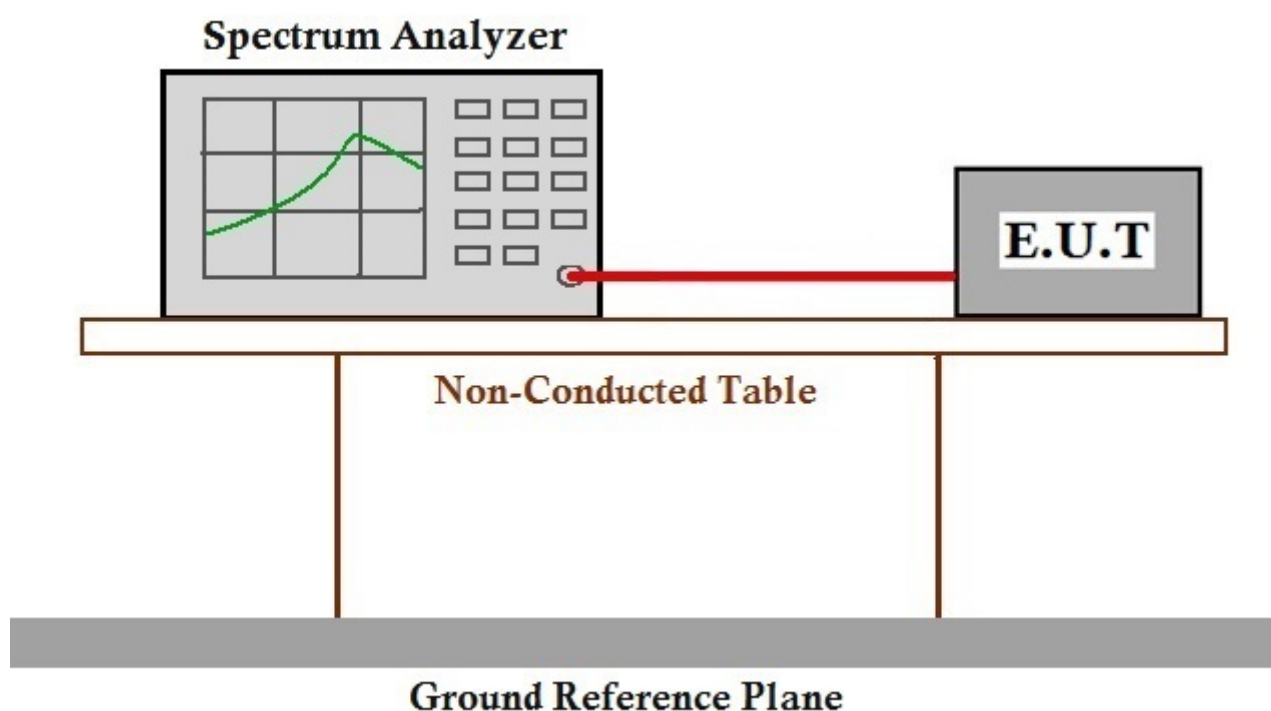
7.3.1 E.U.T. Operation

Operating Environment:

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

Test mode b: TX mode (Band 3)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE 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 A for SHCR210800003202



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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

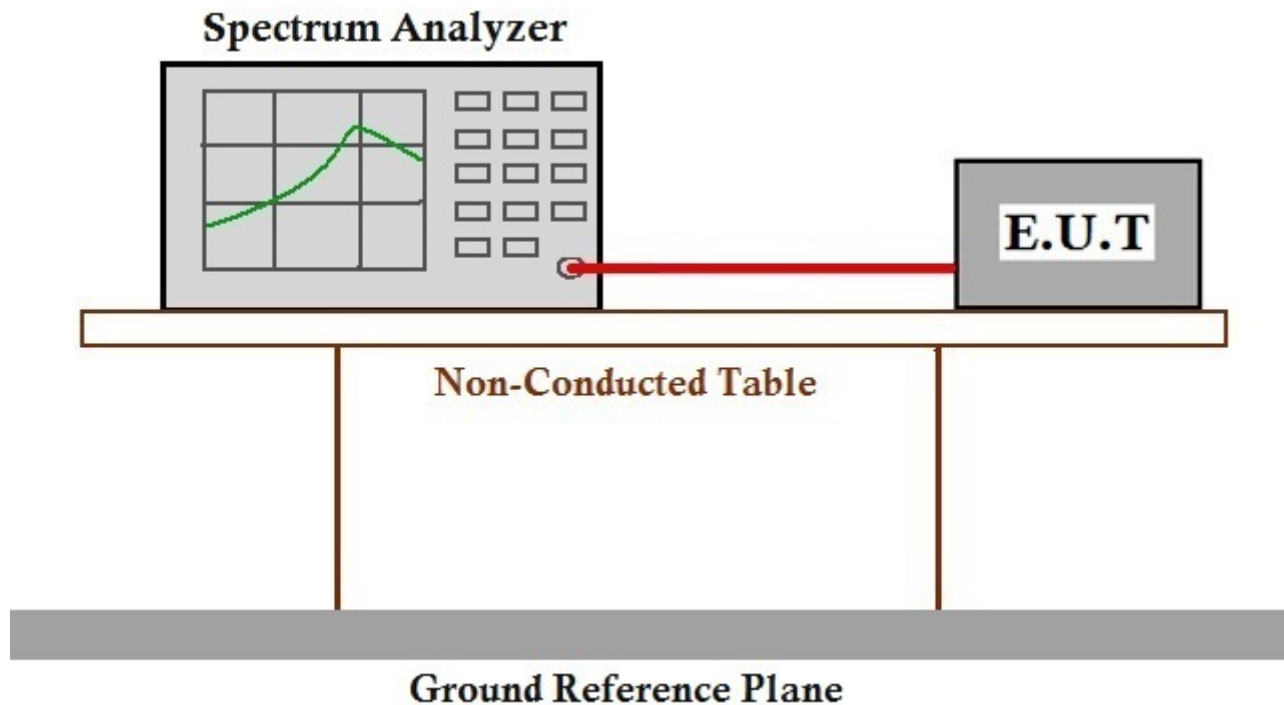
7.4.1 E.U.T. Operation

Operating Environment:

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

Test mode b: TX mode (Band 3)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE 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 A for SHCR210800003202



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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	$\leq 1W(30dBm)$ for master device
	$\leq 250mW(24dBm)$ for client device
5250-5350	$\leq 250mW(24dBm)$ for client device or $11dBm+10\log B^*$
5470-5725	$\leq 250mW(24dBm)$ for client device or $11dBm+10\log B^*$
5725-5850	$\leq 1W(30dBm)$
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 $EIRP \leq 200mW(23dBm)$ For MIMO function, two antennas are correlated, the Directional gain is 7.01dBi for 5725-5850MHz, the maximum Conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. So the limit For 5725-5850MHz: 28.99dBm.

7.5.1 E.U.T. Operation

Operating Environment:

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

Test mode b: TX mode (Band 3)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE 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.



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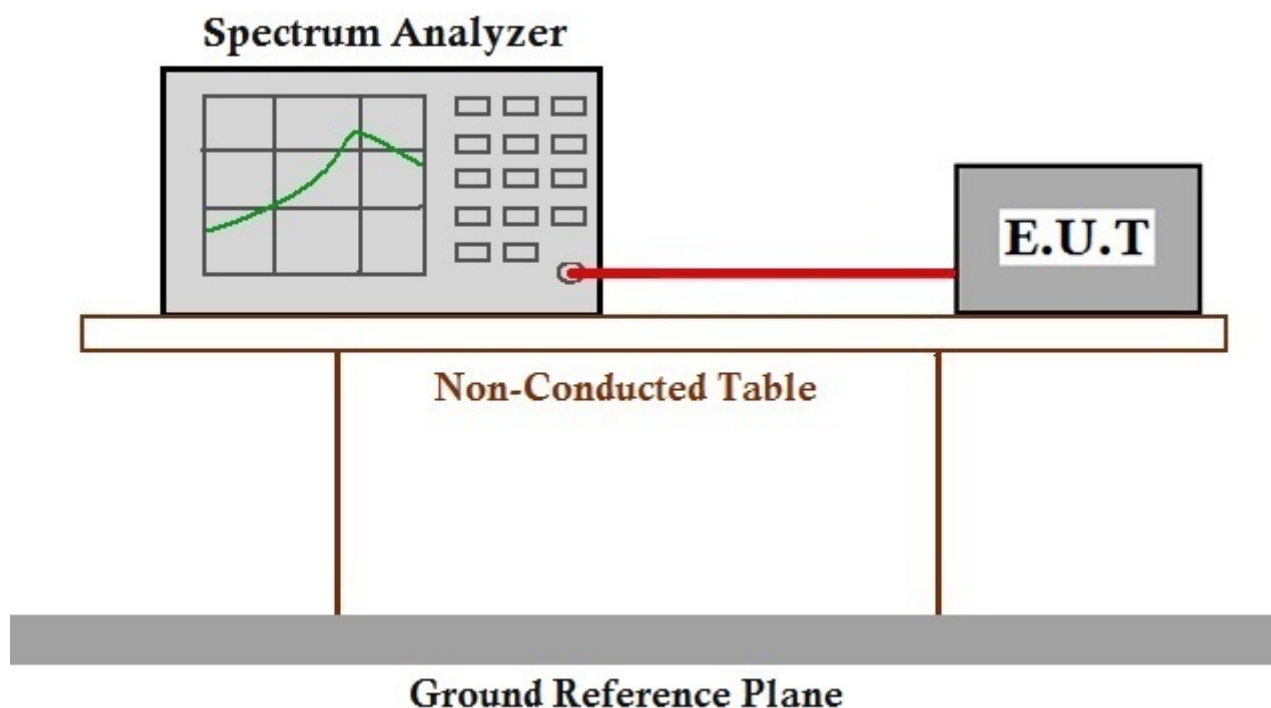
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7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHCR210800003202



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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/MHz. For MIMO function, two antennas are correlated, the Directional gain is 7.01dBi for 5725-5850MHz, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. So the limit For 5725-5850MHz: 28.99dBm/500KHz.

7.6.1 E.U.T. Operation

Operating Environment:

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

Test mode b: TX mode (Band 3) Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE 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.



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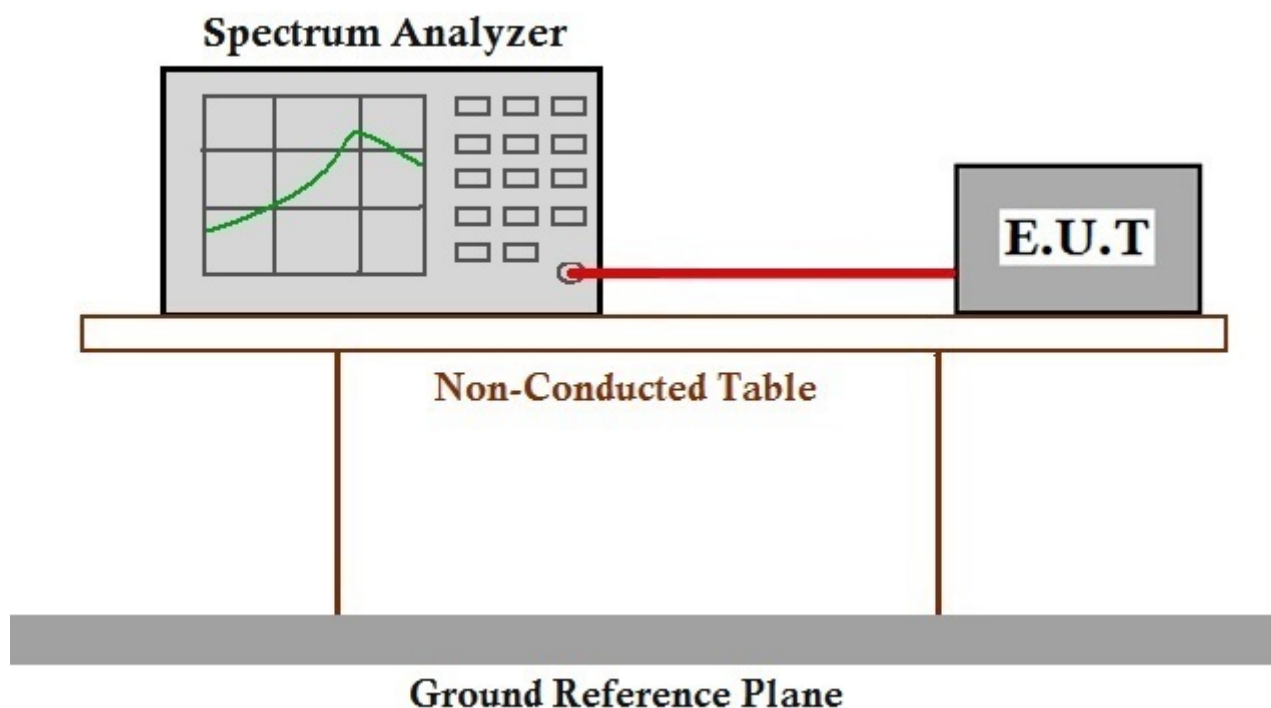
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7.6.2 Test Setup Diagram



7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHCR210800003202



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7.7 Radiated Emissions

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

Test Method: KDB 789033 D02 II G

Limit:

Limit:

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz (68.2dBuV/m).

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz (68.2dBuV/m).

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz (68.2dBuV/m).

For transmitters operating in the 5.725-5.85 GHz band: (i) All emissions shall be limited to a level of -27 dBm/MHz (68.2dBuV/m) at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz (105.2dBuV/m) at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz (110.8dBuV/m) at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz (122.2dBuV/m) at the band edge.

7.7.1 E.U.T. Operation

Operating Environment:

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

Test mode b: TX mode (Band 3) Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE 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.



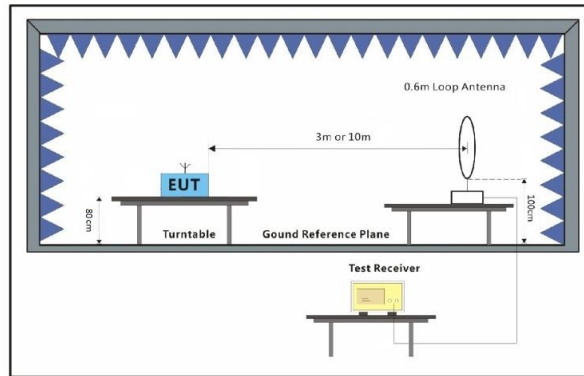
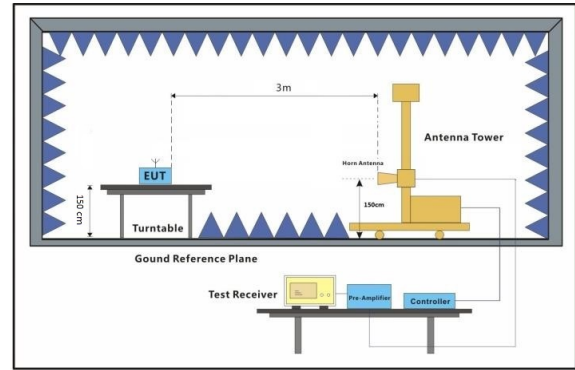
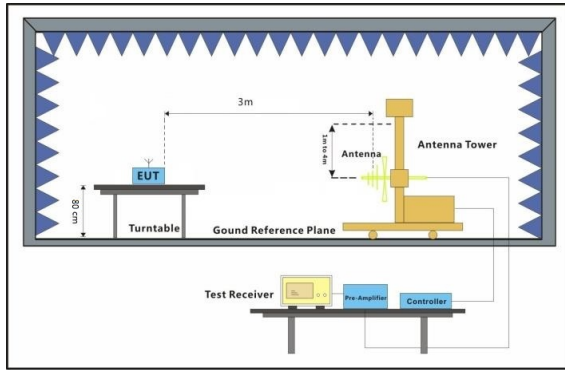
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7.7.2 Test Setup Diagram



7.7.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

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. This test item was investigated while operating in SISO and MIMO mode, however, it was determined that SISO antenna 1 operation for a modulation and MIMO antenna operation for n/ac modulation produced the worst emissions. So the emissions produced from other operation are not recorded in report.



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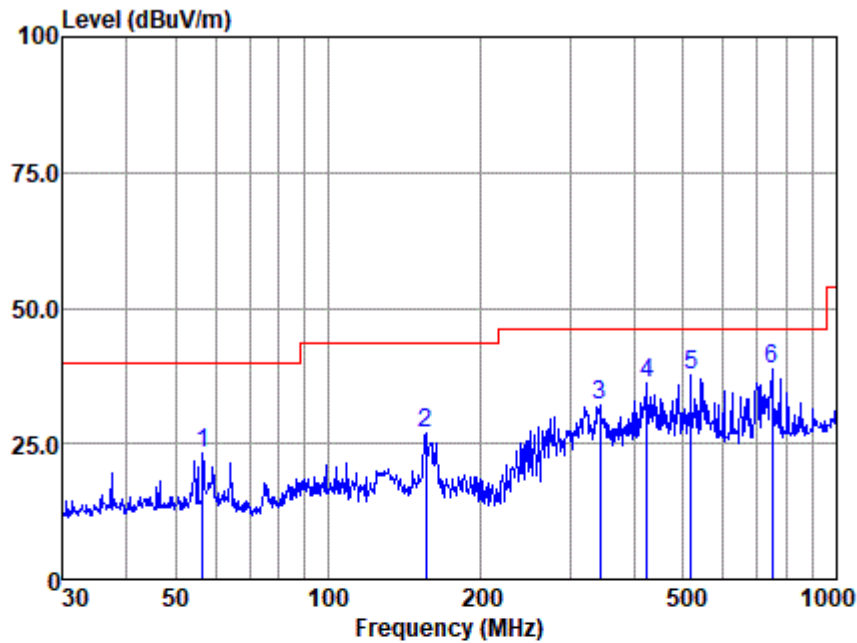
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中国·上海·松江区金都西路588号 邮编: 201612

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t(86-21) 61915666 f(86-21) 61915678 e sgs.china@sgs.com

Below 1GHz



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	
1	56.593	40.39	13.55	1.08	31.80	23.22	40.00	-16.78	QP
2	155.364	42.89	13.31	1.89	31.29	26.80	43.50	-16.70	QP
3	343.180	45.76	14.45	2.96	30.90	32.27	46.00	-13.73	QP
4	425.028	46.95	16.45	3.22	30.36	36.26	46.00	-9.74	QP
5	517.248	46.84	18.00	3.60	30.69	37.75	46.00	-8.25	QP
6	747.483	43.00	22.29	4.37	31.01	38.65	46.00	-7.35	QP

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



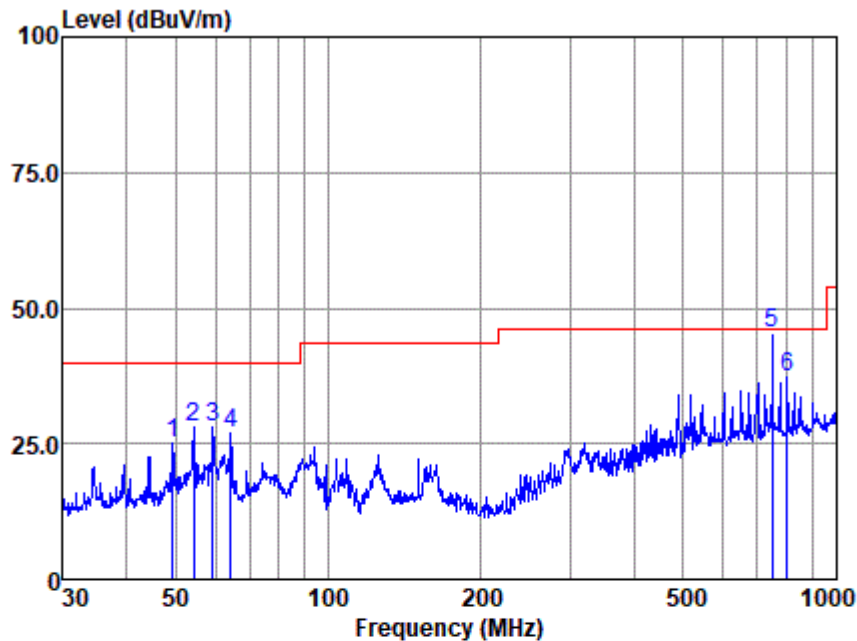
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Antenna Polarity : VERTICAL

	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	
1	49.359	42.37	13.83	0.99	32.06	25.13	40.00	-14.87	QP
2	54.261	45.02	13.71	1.05	31.86	27.92	40.00	-12.08	QP
3	59.232	45.15	13.32	1.11	31.67	27.91	40.00	-12.09	QP
4	64.208	44.55	12.69	1.16	31.45	26.95	40.00	-13.05	QP
5	750.108	49.74	22.30	4.37	30.89	45.52	46.00	-0.48	QP
6	801.786	42.85	22.28	4.52	32.21	37.44	46.00	-8.56	QP

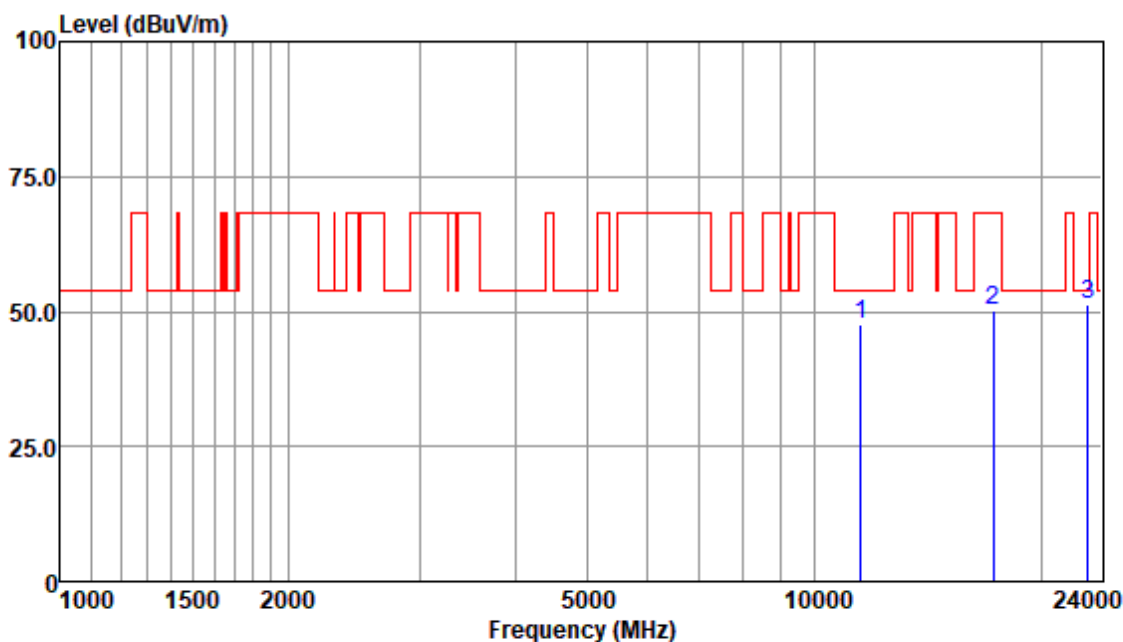
Note: Emission Level = Read Level + Antenna Factor + Cable loss - Preamp Factor



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



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11490.00	40.42	35.79	7.36	35.88	47.69	54.00	-6.31	Peak
17235.00	35.60	40.60	10.19	36.14	50.25	68.20	-17.95	Peak
22980.00	29.88	44.52	13.01	36.15	51.26	54.00	-2.74	Peak

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



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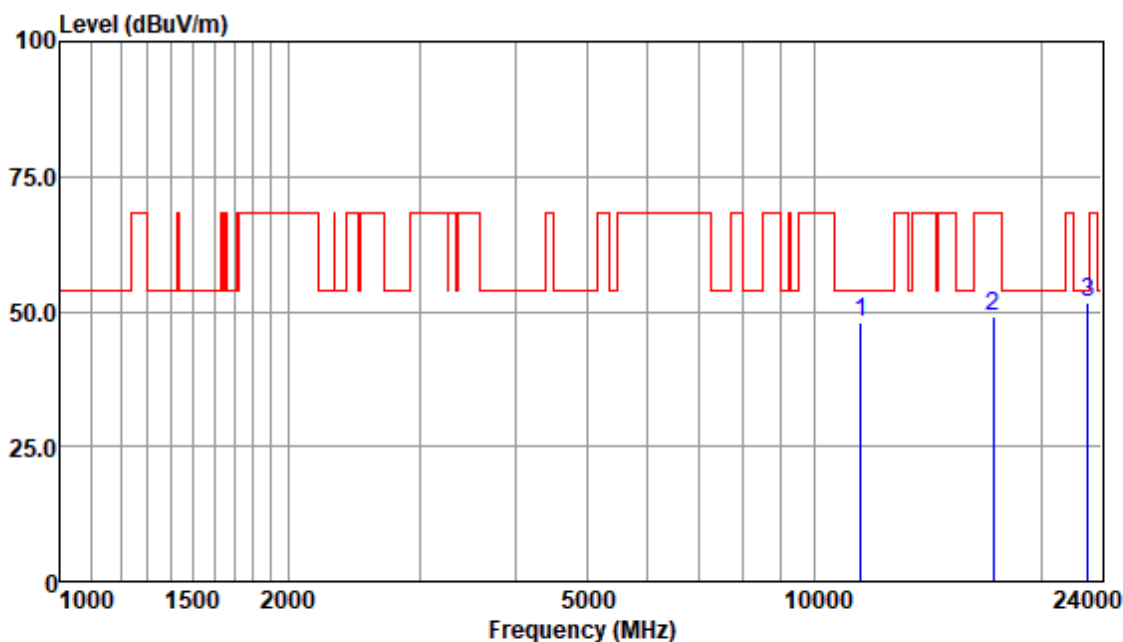
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t(86-21) 61915666 f(86-21) 61915678 www.sgsgroup.com.cn
t(86-21) 61915666 f(86-21) 61915678 e sgs.china@sgs.com

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



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11490.00	40.53	35.79	7.36	35.88	47.80	54.00	-6.20	Peak
17235.00	34.33	40.60	10.19	36.14	48.98	68.20	-19.22	Peak
22980.00	30.27	44.52	13.01	36.15	51.65	54.00	-2.35	Peak

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



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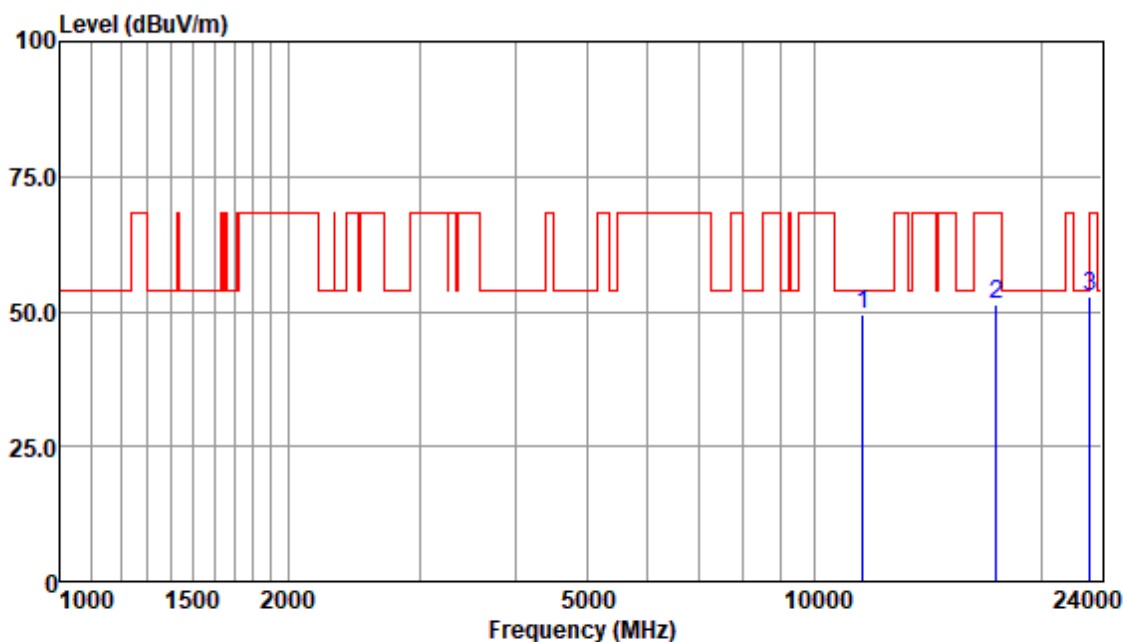
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t(86-21) 61915666 f(86-21) 61915678 e sgs.china@sgs.com

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



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11570.00	42.42	35.78	7.44	36.02	49.62	54.00	-4.38	Peak
17355.00	36.26	40.95	10.32	36.25	51.28	68.20	-16.92	Peak
23140.00	31.04	44.62	13.12	36.16	52.62	68.20	-15.58	Peak

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



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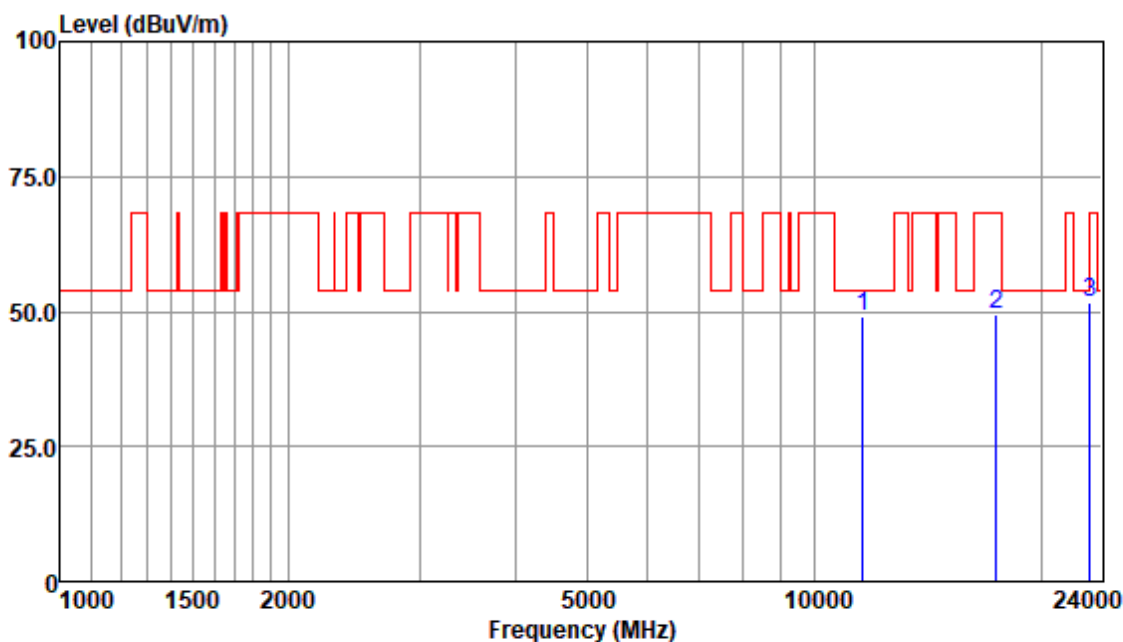
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Mode:b; Polarization:Vertical; Modulation:a; bandwidth:20MHz; Channel:middle



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11570.00	41.78	35.78	7.44	36.02	48.98	54.00	-5.02	Peak
17355.00	34.56	40.95	10.32	36.25	49.58	68.20	-18.62	Peak
23140.00	30.01	44.62	13.12	36.16	51.59	68.20	-16.61	Peak

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



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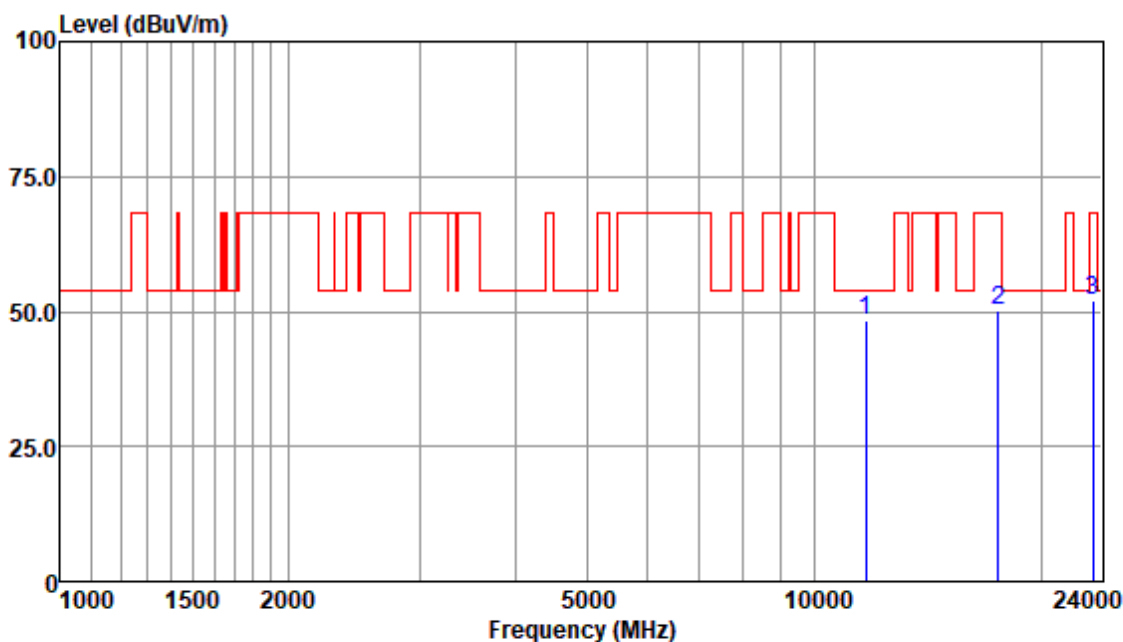
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Mode:b; Polarization:Horizontal; Modulation:a; bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11650.00	41.16	35.77	7.56	36.23	48.26	54.00	-5.74	Peak
17475.00	34.90	41.30	10.45	36.37	50.28	68.20	-17.92	Peak
23300.00	30.27	44.69	13.19	36.17	51.98	68.20	-16.22	Peak

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



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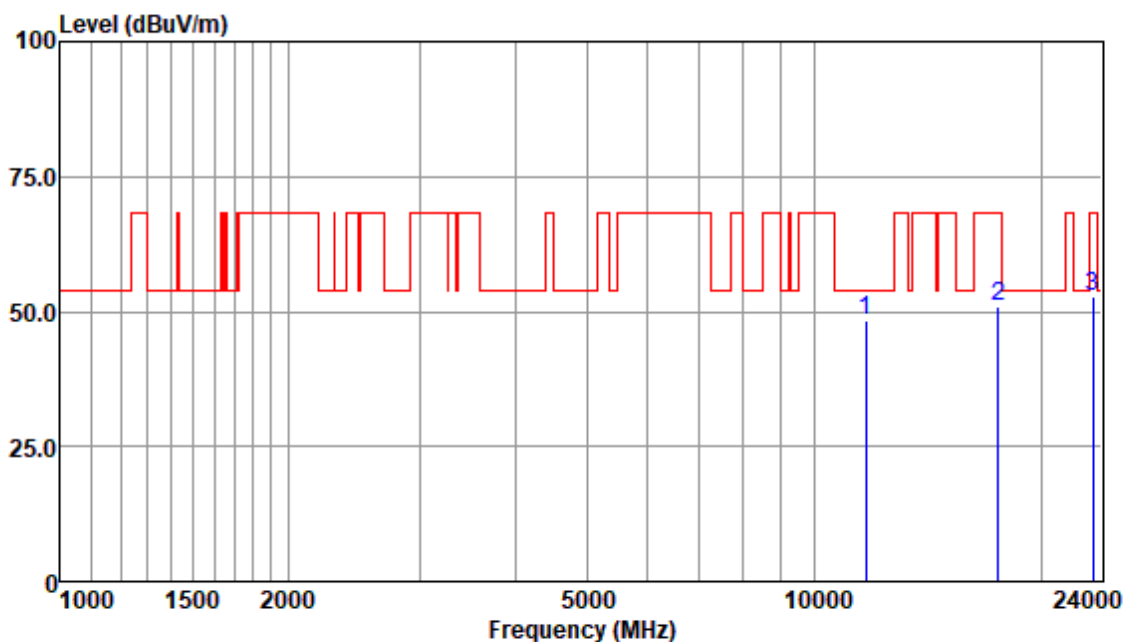
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Mode:b; Polarization:Vertical; Modulation:a; bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11650.00	41.42	35.77	7.56	36.23	48.52	54.00	-5.48	Peak
17475.00	35.54	41.30	10.45	36.37	50.92	68.20	-17.28	Peak
23300.00	30.95	44.69	13.19	36.17	52.66	68.20	-15.54	Peak

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



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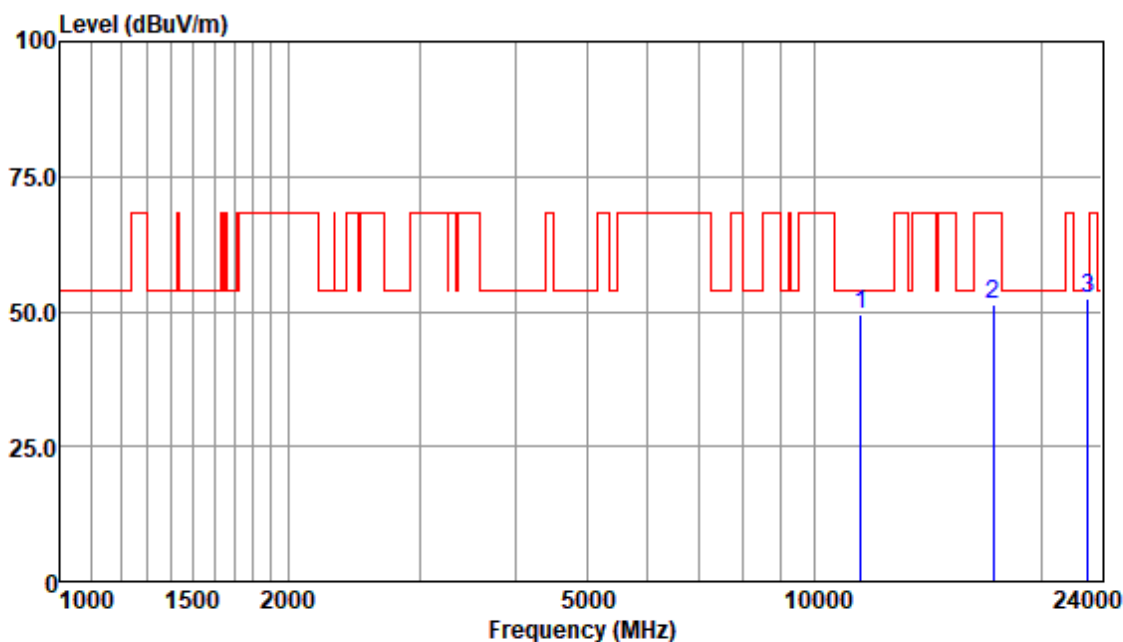
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t(86-21) 61915666 f(86-21) 61915678 e sgs.china@sgs.com

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



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11490.00	42.32	35.79	7.36	35.88	49.59	54.00	-4.41	Peak
17235.00	36.63	40.60	10.19	36.14	51.28	68.20	-16.92	Peak
22980.00	30.90	44.52	13.01	36.15	52.28	54.00	-1.72	Peak

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



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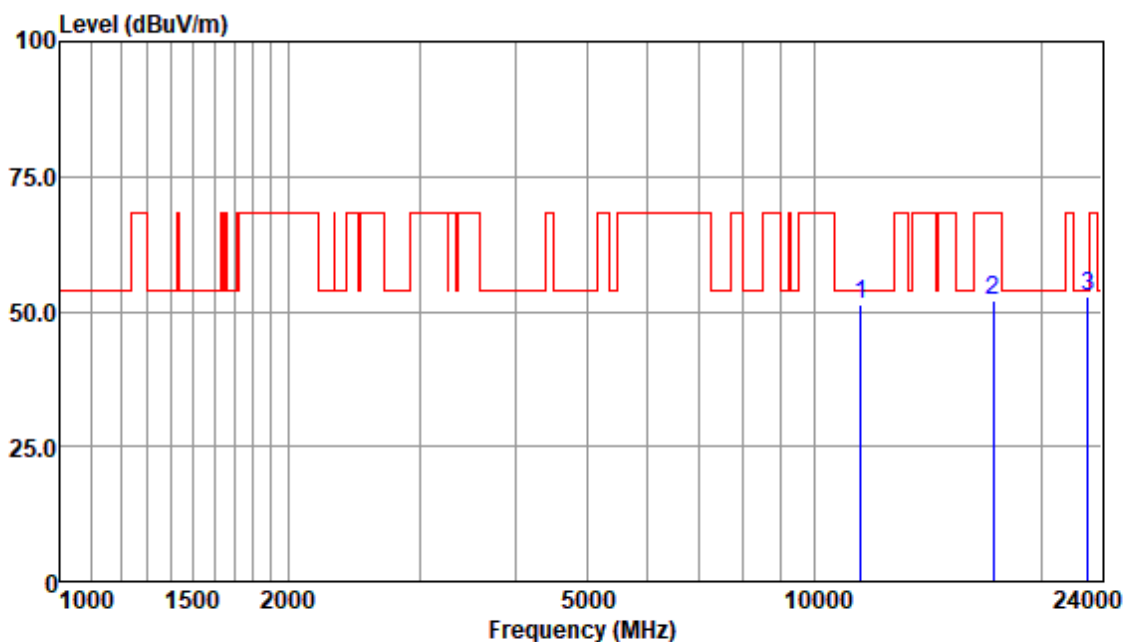
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Testing Center EMC Laboratory

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

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



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11490.00	44.01	35.79	7.36	35.88	51.28	54.00	-2.72	Peak
17235.00	37.24	40.60	10.19	36.14	51.89	68.20	-16.31	Peak
22980.00	31.51	44.52	13.01	36.15	52.89	54.00	-1.11	Peak

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



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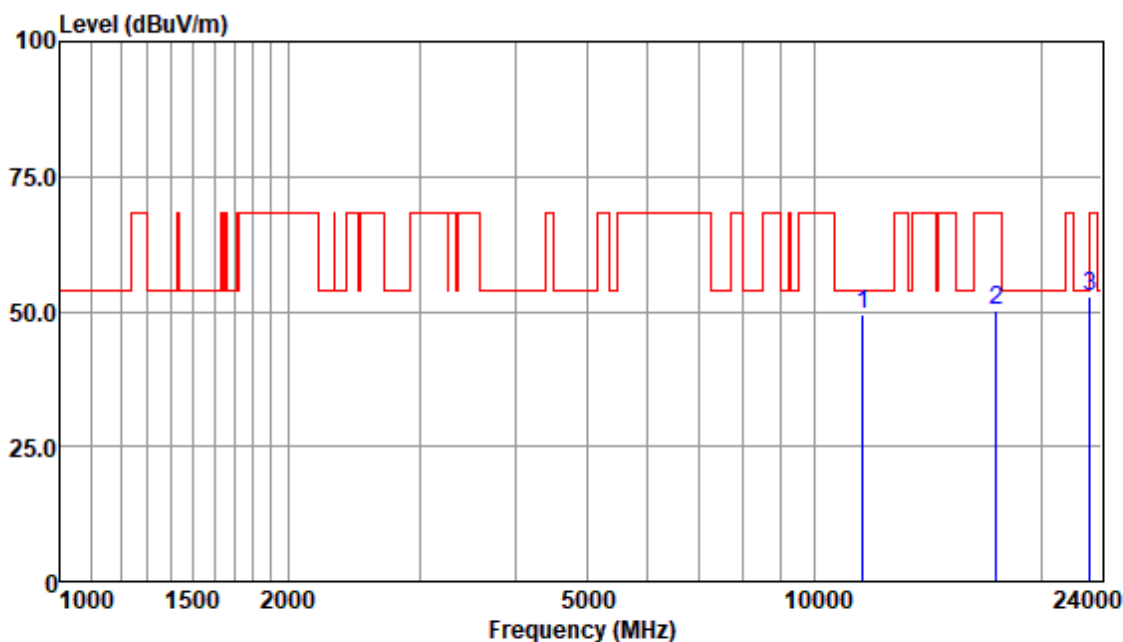
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Mode:b; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:middle



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11570.00	42.09	35.78	7.44	36.02	49.29	54.00	-4.71	Peak
17355.00	35.27	40.95	10.32	36.25	50.29	68.20	-17.91	Peak
23140.00	31.04	44.62	13.12	36.16	52.62	68.20	-15.58	Peak

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



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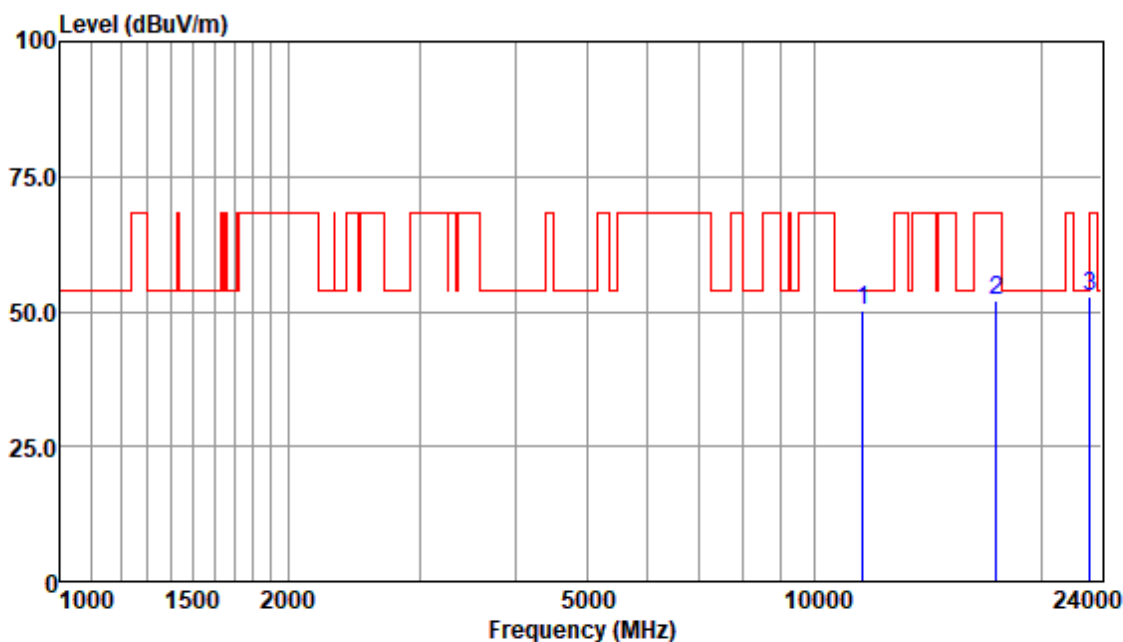
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Mode:b; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:middle



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11570.00	43.09	35.78	7.44	36.02	50.29	54.00	-3.71	Peak
17355.00	36.87	40.95	10.32	36.25	51.89	68.20	-16.31	Peak
23140.00	31.08	44.62	13.12	36.16	52.66	68.20	-15.54	Peak

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



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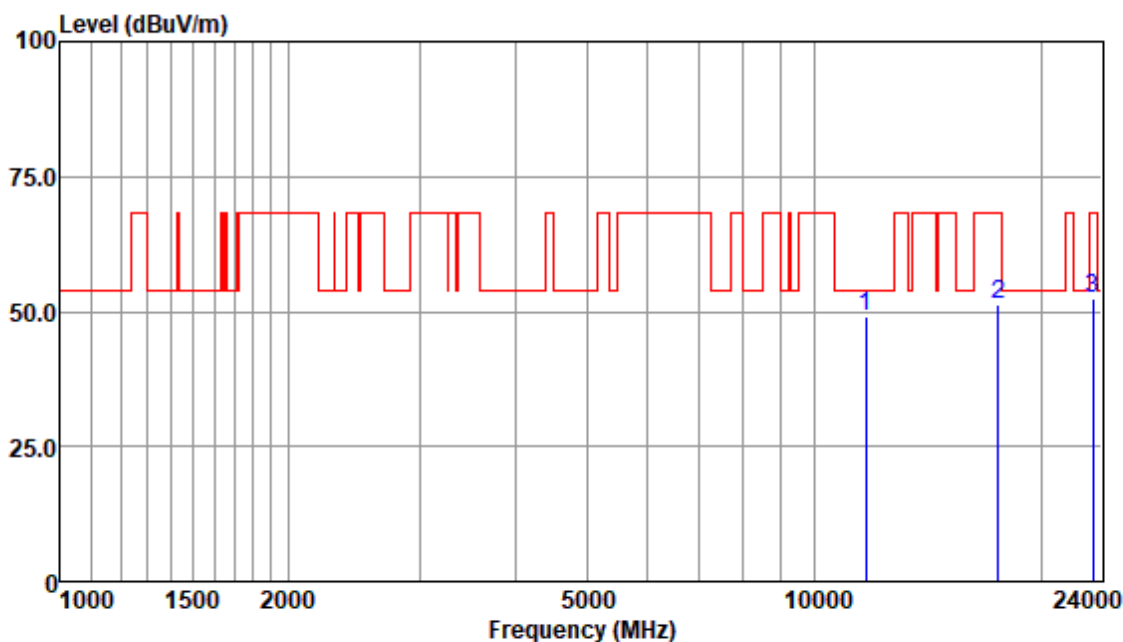
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Mode:b; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11650.00	42.16	35.77	7.56	36.23	49.26	54.00	-4.74	Peak
17475.00	35.88	41.30	10.45	36.37	51.26	68.20	-16.94	Peak
23300.00	30.55	44.69	13.19	36.17	52.26	68.20	-15.94	Peak

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



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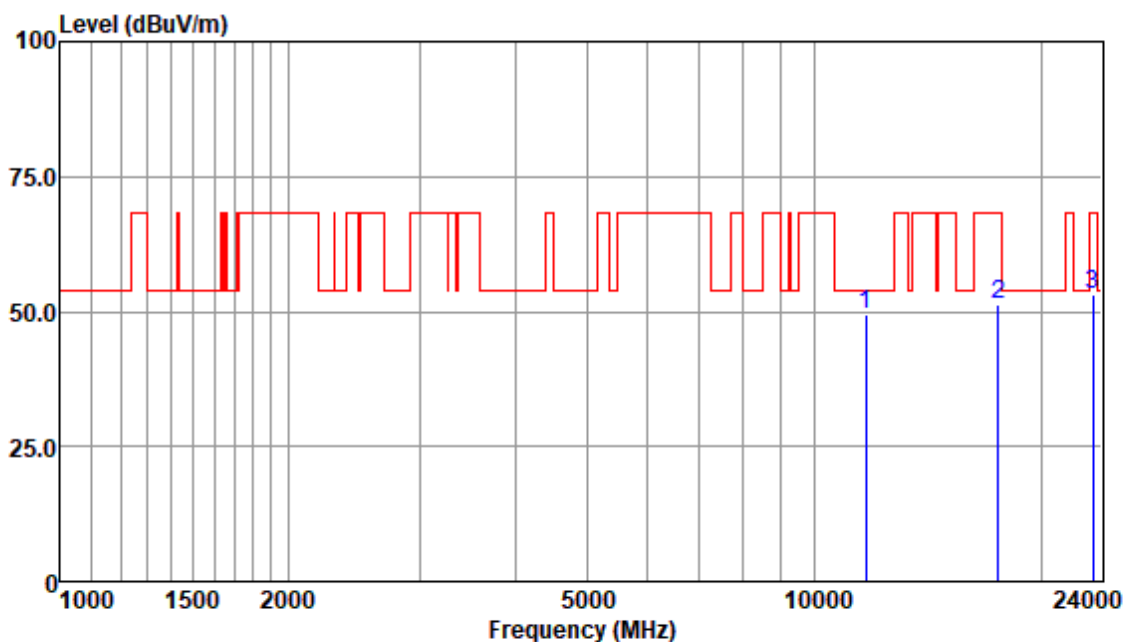
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Mode:b; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11650.00	42.19	35.77	7.56	36.23	49.29	54.00	-4.71	Peak
17475.00	35.91	41.30	10.45	36.37	51.29	68.20	-16.91	Peak
23300.00	31.55	44.69	13.19	36.17	53.26	68.20	-14.94	Peak

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



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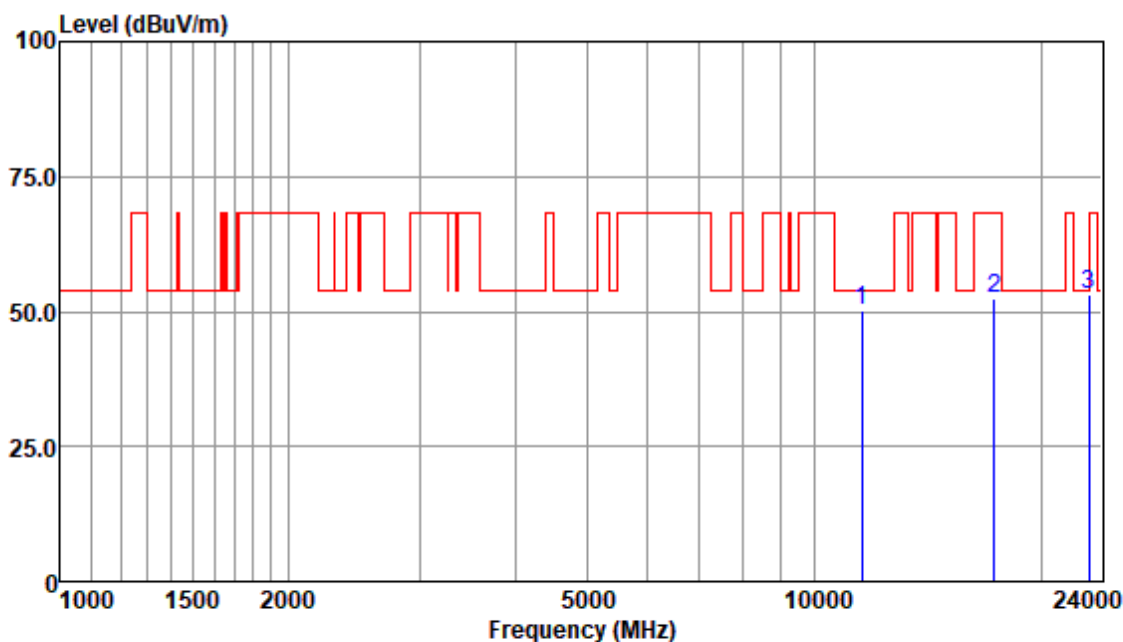
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Mode:b; Polarization:Horizontal; Modulation:n; bandwidth:40MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11510.00	43.03	35.78	7.40	35.95	50.26	54.00	-3.74	Peak
17265.00	37.61	40.60	10.19	36.14	52.26	68.20	-15.94	Peak
23020.00	31.55	44.55	13.05	36.16	52.99	54.00	-1.01	Peak

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



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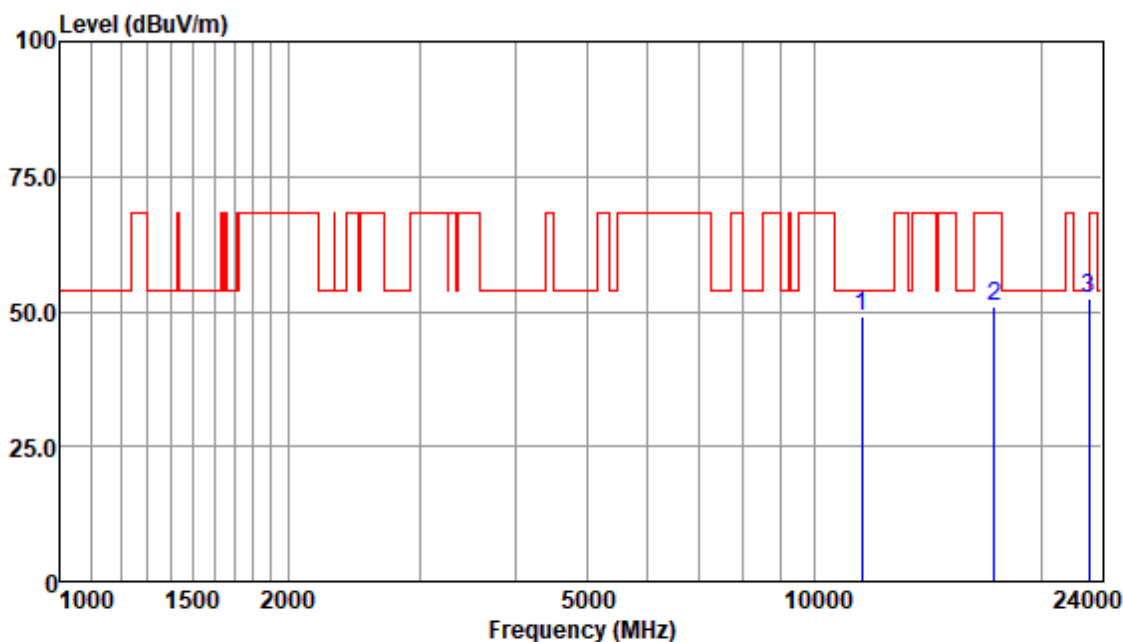
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Mode:b; Polarization:Vertical; Modulation:n; bandwidth:40MHz; Channel:Low



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11510.00	41.75	35.78	7.40	35.95	48.98	54.00	-5.02	Peak
17265.00	36.27	40.60	10.19	36.14	50.92	68.20	-17.28	Peak
23020.00	30.85	44.55	13.05	36.16	52.29	54.00	-1.71	Peak

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



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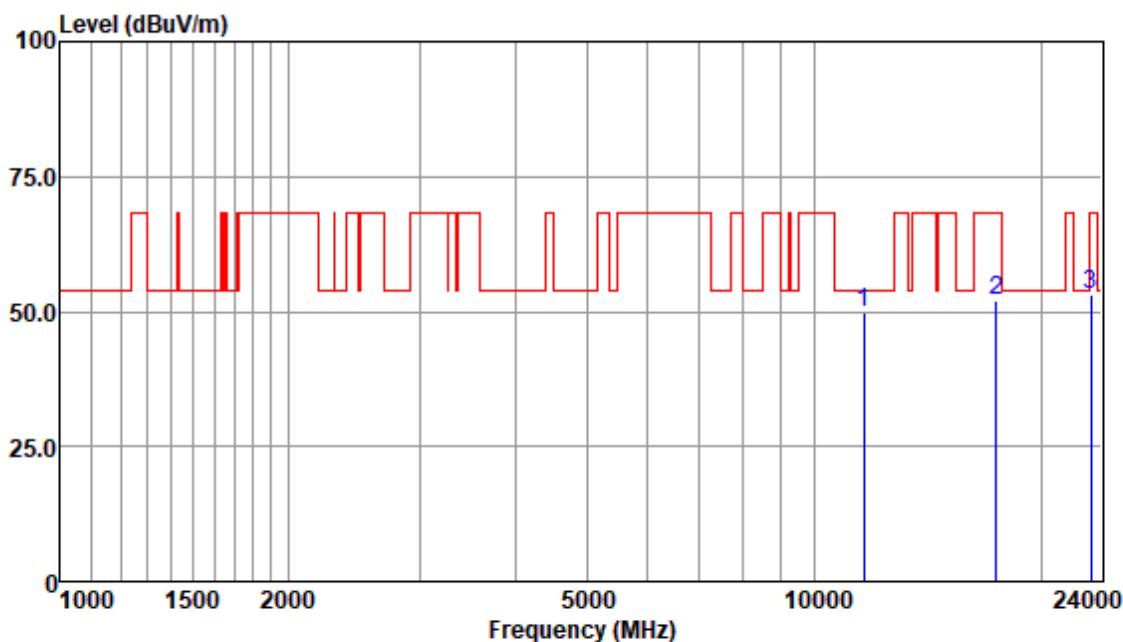
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Mode:b; Polarization:Horizontal; Modulation:n; bandwidth:40MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11590.00	42.72	35.78	7.48	36.09	49.89	54.00	-4.11	Peak
17385.00	36.78	41.12	10.39	36.31	51.98	68.20	-16.22	Peak
23180.00	31.67	44.62	13.12	36.16	53.25	68.20	-14.95	Peak

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



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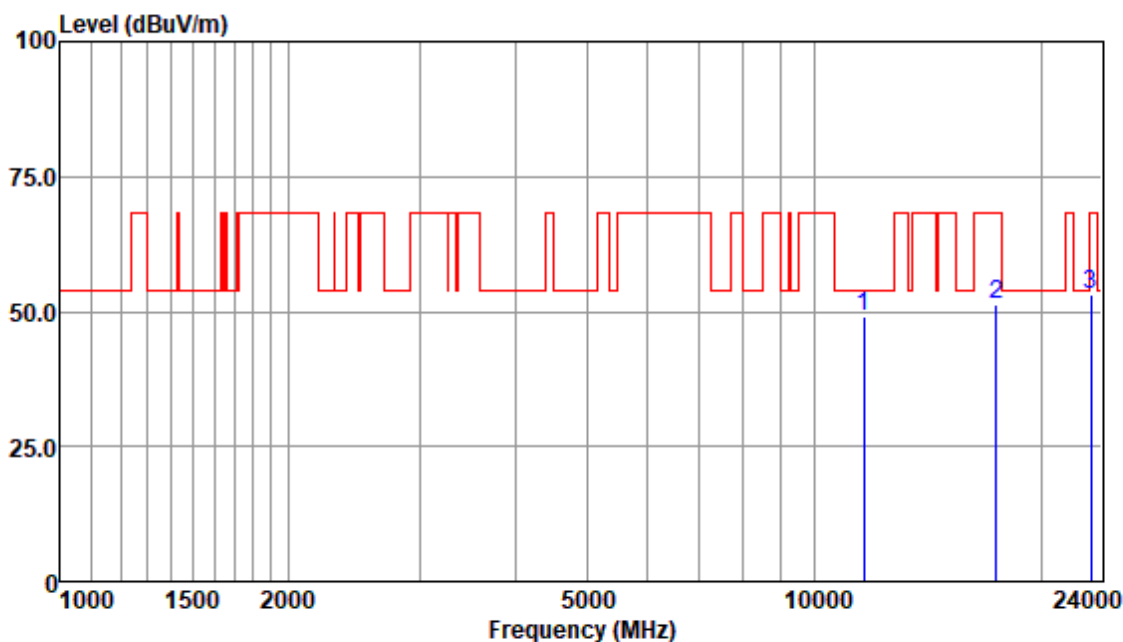
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Mode:b; Polarization:Vertical; Modulation:n; bandwidth:40MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11590.00	41.99	35.78	7.48	36.09	49.16	54.00	-4.84	Peak
17385.00	36.09	41.12	10.39	36.31	51.29	68.20	-16.91	Peak
23180.00	31.41	44.62	13.12	36.16	52.99	68.20	-15.21	Peak

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



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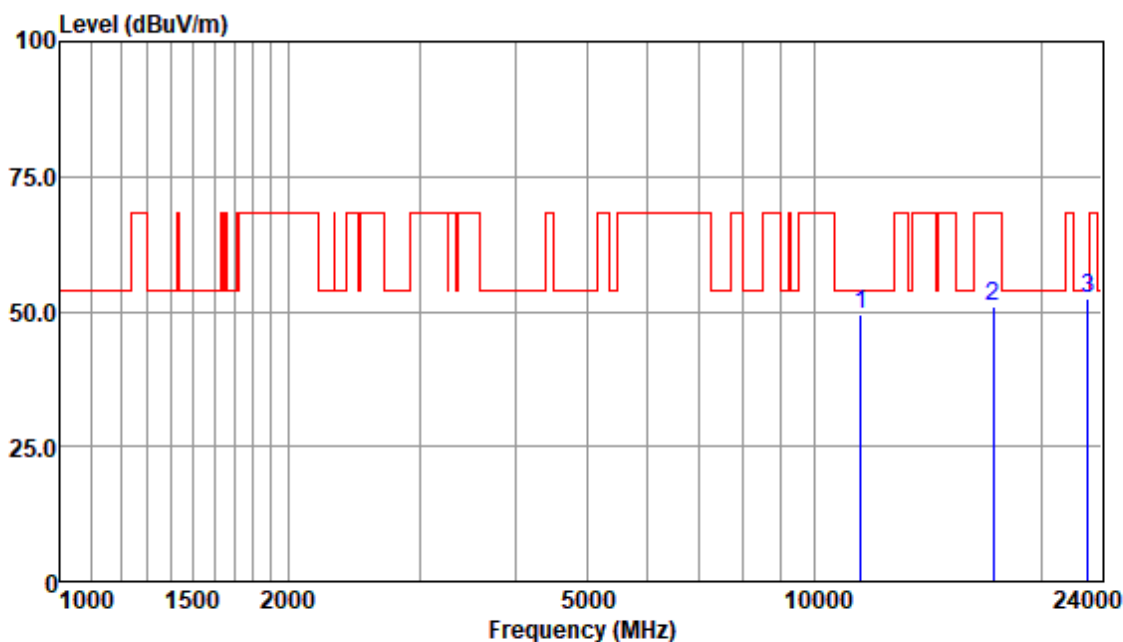
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Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:20MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11490.00	42.17	35.79	7.36	35.88	49.44	54.00	-4.56	Peak
17235.00	36.24	40.60	10.19	36.14	50.89	68.20	-17.31	Peak
22980.00	30.87	44.52	13.01	36.15	52.25	54.00	-1.75	Peak

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



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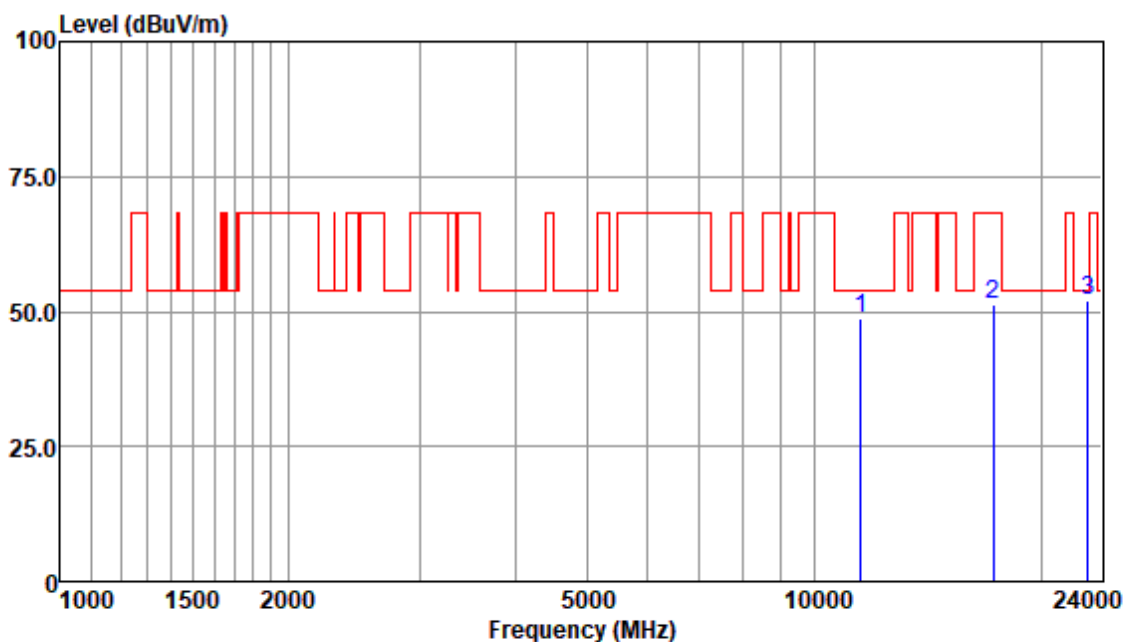
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t(86-21) 61915666 f(86-21) 61915678 www.sgsgroup.com.cn
t(86-21) 61915666 f(86-21) 61915678 e sgs.china@sgs.com

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



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11490.00	41.35	35.79	7.36	35.88	48.62	54.00	-5.38	Peak
17235.00	36.62	40.60	10.19	36.14	51.27	68.20	-16.93	Peak
22980.00	30.82	44.52	13.01	36.15	52.20	54.00	-1.80	Peak

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



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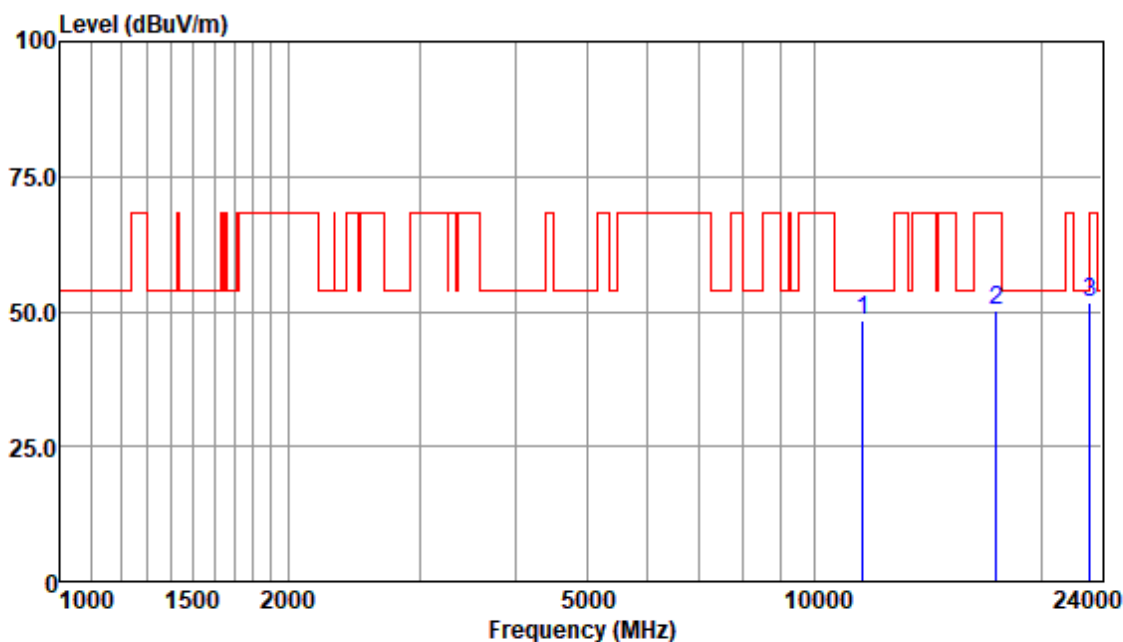
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Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:20MHz; Channel:middle



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11570.00	41.09	35.78	7.44	36.02	48.29	54.00	-5.71	Peak
17355.00	35.23	40.95	10.32	36.25	50.25	68.20	-17.95	Peak
23140.00	30.01	44.62	13.12	36.16	51.59	68.20	-16.61	Peak

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



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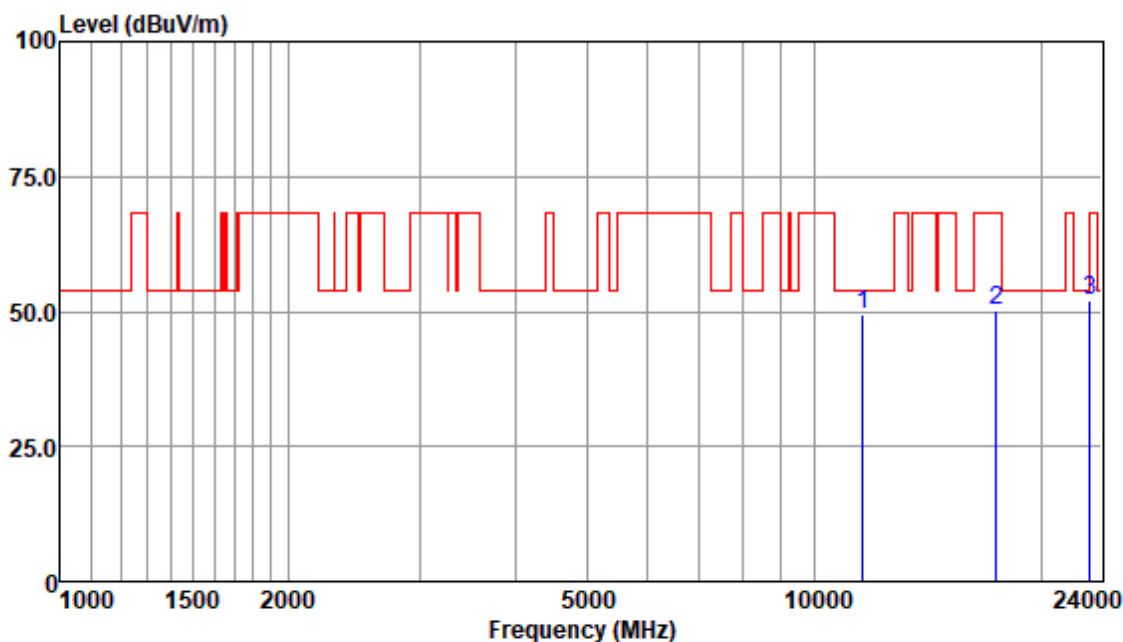
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t(86-21) 61915666 f(86-21) 61915678 e sgs.china@sgs.com

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



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11570.00	42.09	35.78	7.44	36.02	49.29	54.00	-4.71	Peak
17355.00	35.24	40.95	10.32	36.25	50.26	68.20	-17.94	Peak
23140.00	30.31	44.62	13.12	36.16	51.89	68.20	-16.31	Peak

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



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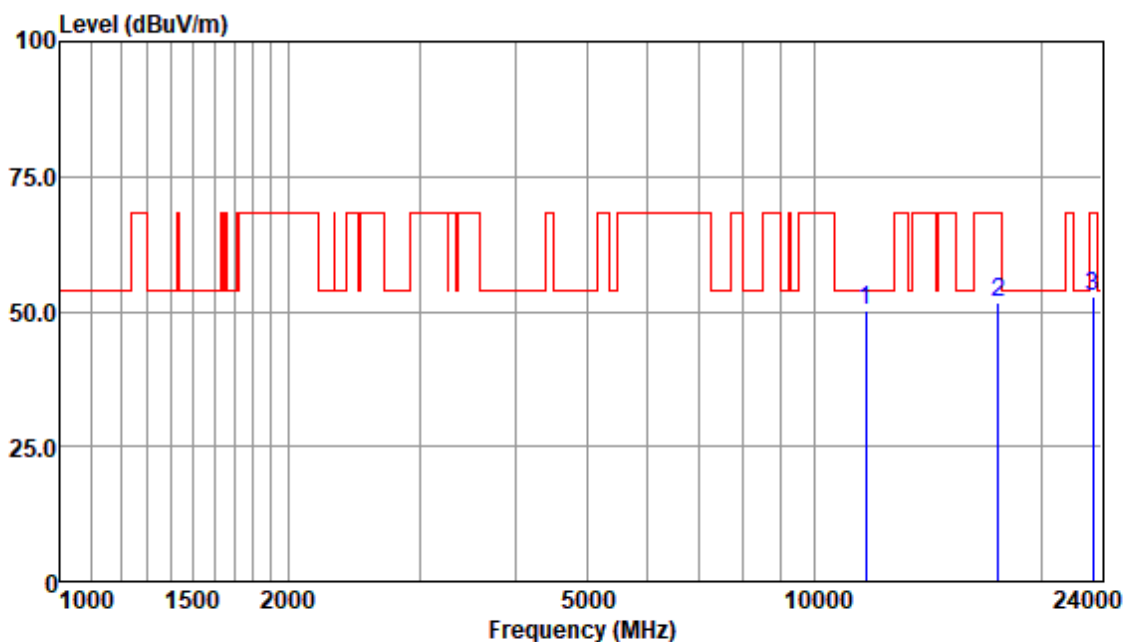
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t(86-21) 61915666 f(86-21) 61915678 www.sgsgroup.com.cn
t(86-21) 61915666 f(86-21) 61915678 e sgs.china@sgs.com

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



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11650.00	43.15	35.77	7.56	36.23	50.25	54.00	-3.75	Peak
17475.00	36.24	41.30	10.45	36.37	51.62	68.20	-16.58	Peak
23300.00	30.88	44.69	13.19	36.17	52.59	68.20	-15.61	Peak

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



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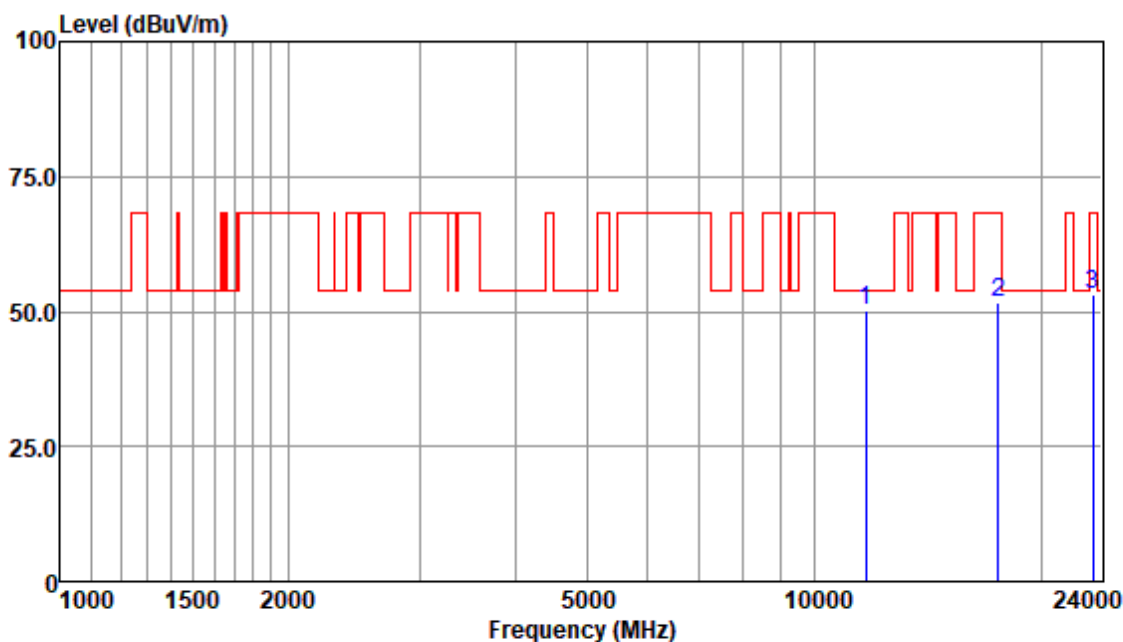
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Mode:b; Polarization:Vertical; Modulation:c; bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11650.00	43.15	35.77	7.56	36.23	50.25	54.00	-3.75	Peak
17475.00	36.17	41.30	10.45	36.37	51.55	68.20	-16.65	Peak
23300.00	31.54	44.69	13.19	36.17	53.25	68.20	-14.95	Peak

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



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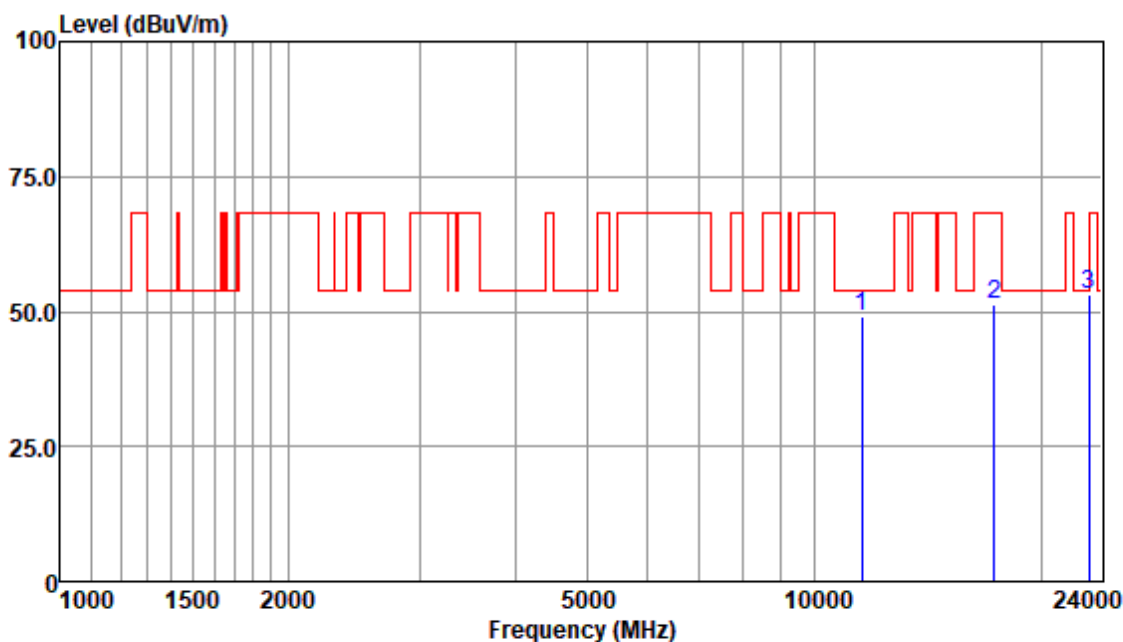
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Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:40MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11510.00	42.03	35.78	7.40	35.95	49.26	54.00	-4.74	Peak
17265.00	36.64	40.60	10.19	36.14	51.29	68.20	-16.91	Peak
23020.00	31.55	44.55	13.05	36.16	52.99	54.00	-1.01	Peak

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



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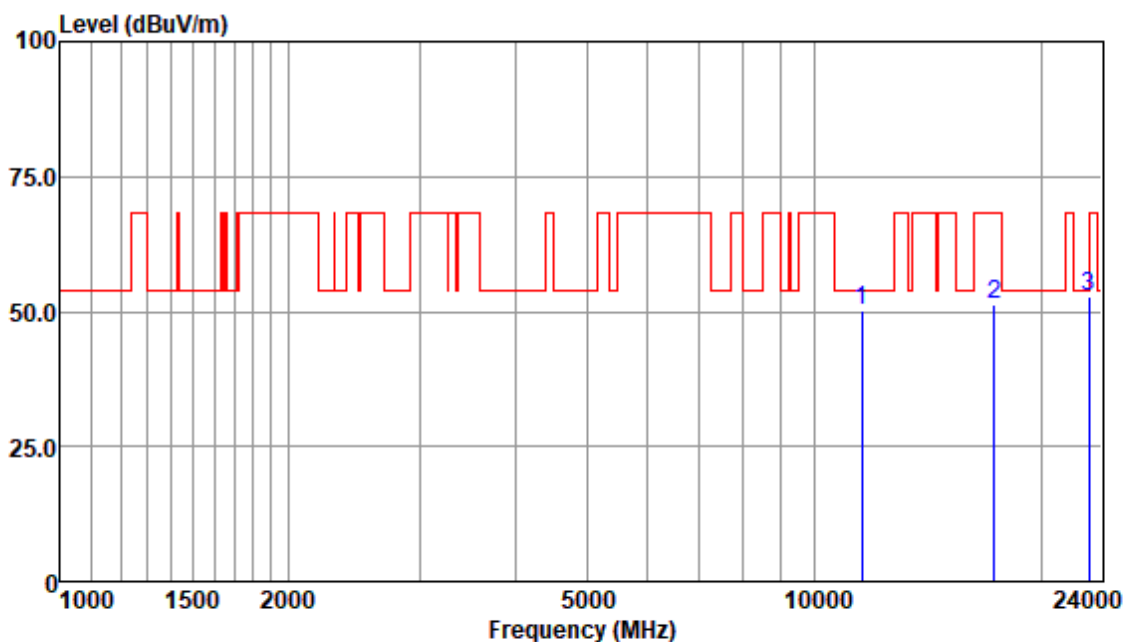
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Mode:b; Polarization:Vertical; Modulation:c; bandwidth:40MHz; Channel:Low



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11510.00	43.06	35.78	7.40	35.95	50.29	54.00	-3.71	Peak
17265.00	36.64	40.60	10.19	36.14	51.29	68.20	-16.91	Peak
23020.00	31.45	44.55	13.05	36.16	52.89	54.00	-1.11	Peak

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



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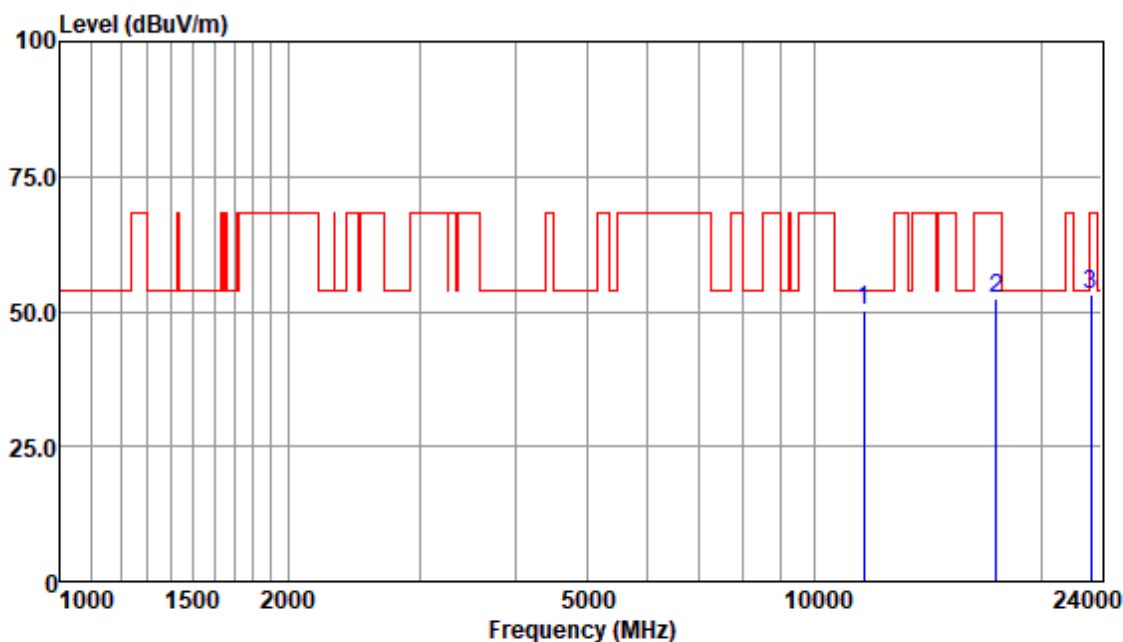
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Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:40MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11590.00	43.12	35.78	7.48	36.09	50.29	54.00	-3.71	Peak
17385.00	37.10	41.12	10.39	36.31	52.30	68.20	-15.90	Peak
23180.00	31.40	44.62	13.12	36.16	52.98	68.20	-15.22	Peak

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



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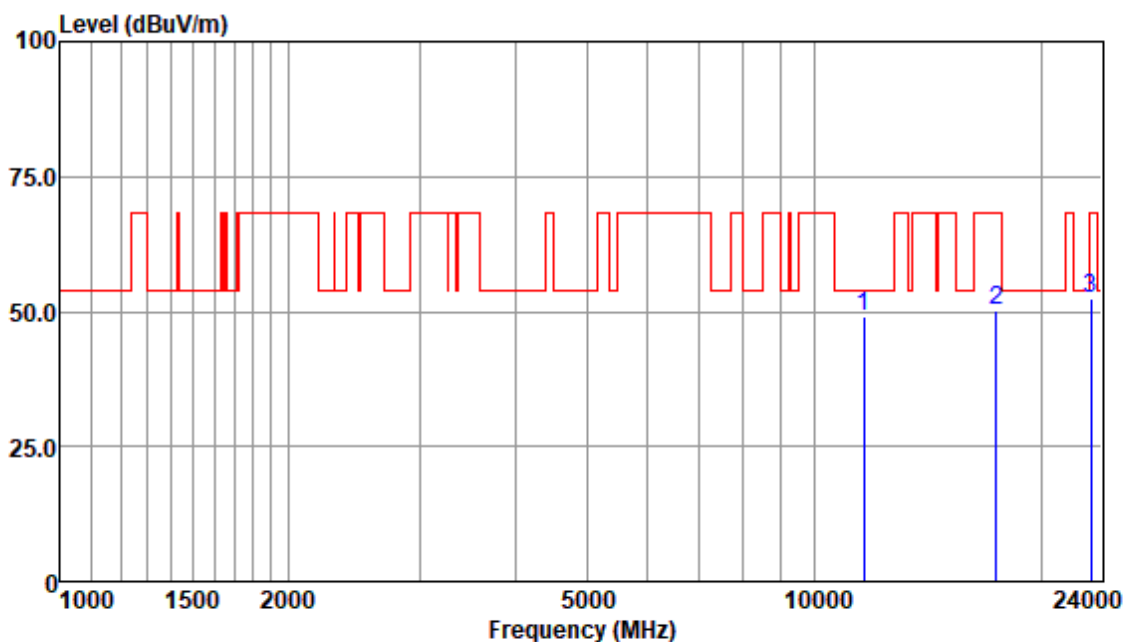
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Mode:b; Polarization:Vertical; Modulation:c; bandwidth:40MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11590.00	42.09	35.78	7.48	36.09	49.26	54.00	-4.74	Peak
17385.00	35.09	41.12	10.39	36.31	50.29	68.20	-17.91	Peak
23180.00	30.68	44.62	13.12	36.16	52.26	68.20	-15.94	Peak

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



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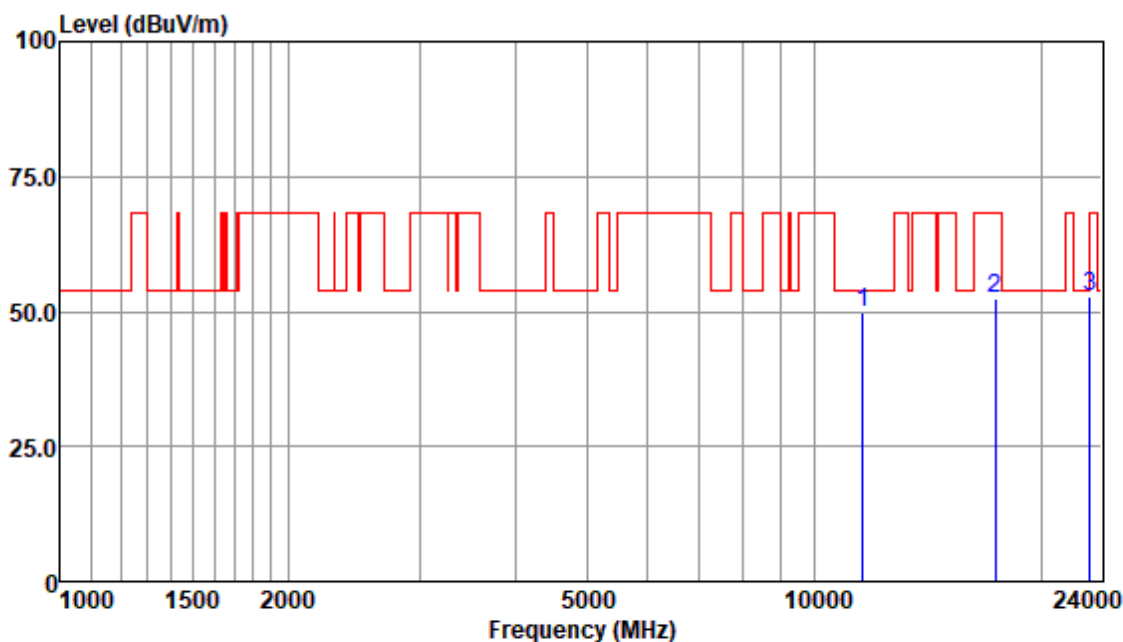
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Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:80MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11550.00	42.67	35.78	7.44	36.02	49.87	54.00	-4.13	Peak
17325.00	37.47	40.77	10.25	36.20	52.29	68.20	-15.91	Peak
23100.00	31.17	44.59	13.08	36.16	52.68	54.00	-1.32	Peak

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



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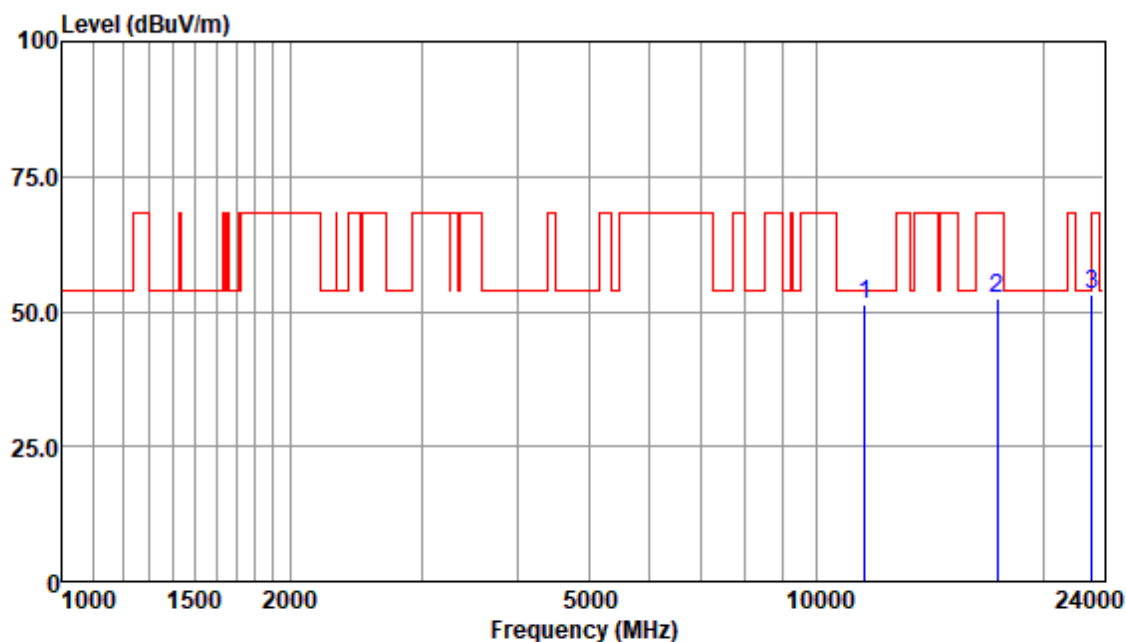
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t(86-21) 61915666 f(86-21) 61915678 e sgs.china@sgs.com

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	
11550.00	44.06	35.78	7.44	36.02	51.26	54.00	-2.74	Peak
17325.00	37.44	40.77	10.25	36.20	52.26	68.20	-15.94	Peak
23100.00	31.75	44.59	13.08	36.16	53.26	54.00	-0.74	Peak

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



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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.



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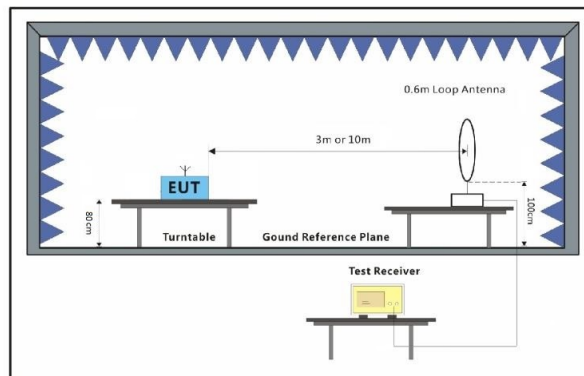
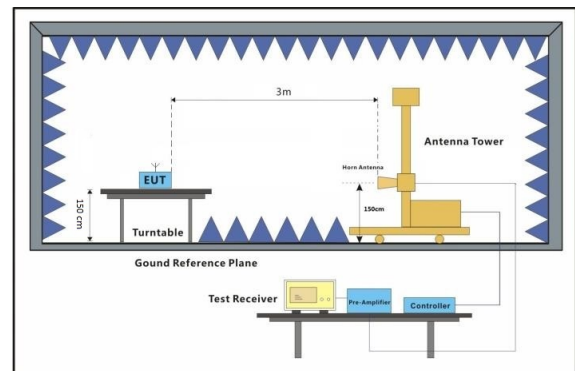
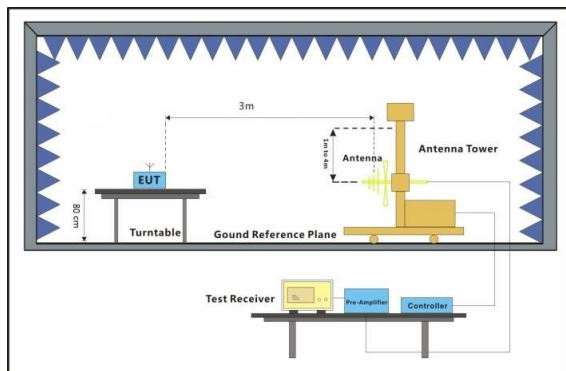
7.8.1 E.U.T. Operation

Operating Environment:

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

Test mode b: TX mode (Band 3)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE 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



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

Remark: This test item was investigated while operating in SISO and MIMO mode, however, it was determined that SISO antenna 1 operation for a modulation and MIMO antenna operation for n/ac modulation produced the worst emissions. So the emissions produced from other operation are not recorded in report.



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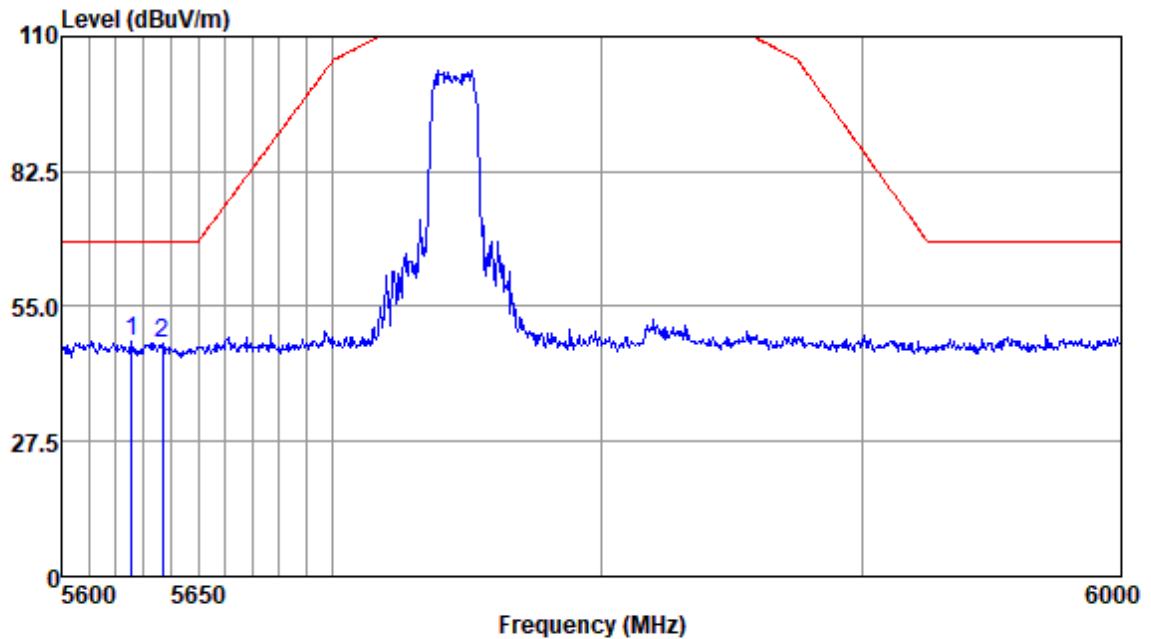
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Mode:b; Polarization:Horizontal; Modulation:a; bandwidth:20MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
5625.56	46.53	34.90	3.66	37.00	48.09	68.20	-20.11	Peak
5636.83	46.12	34.90	3.66	37.00	47.68	68.20	-20.52	Peak

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



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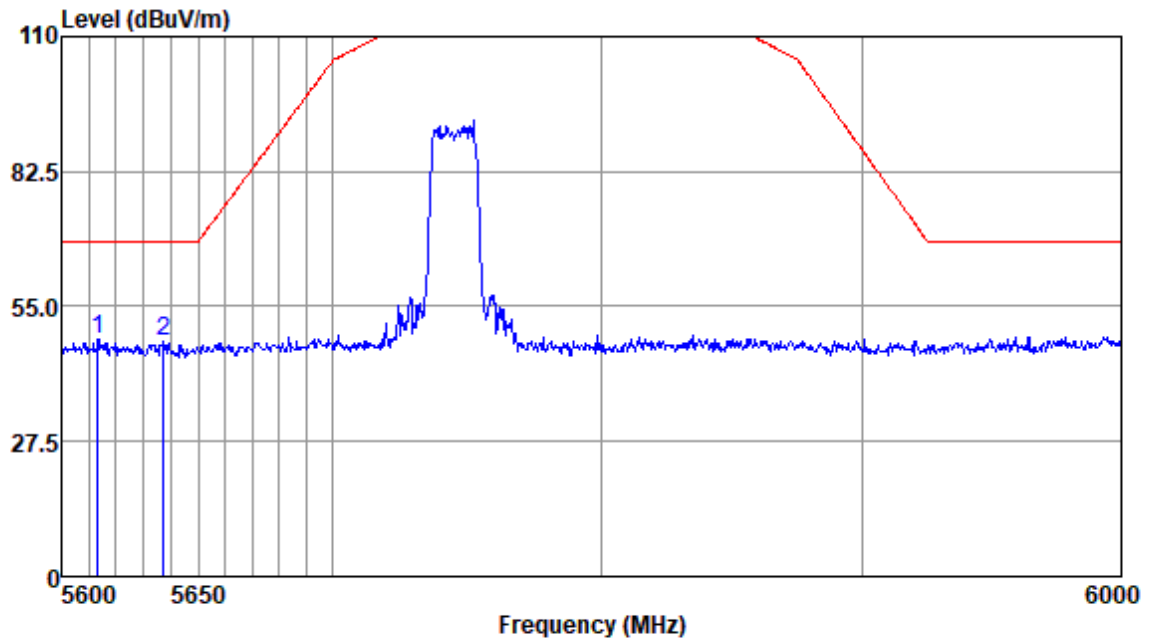
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Mode:b; Polarization:Vertical; Modulation:a; bandwidth:20MHz; Channel:Low



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5613.15	46.97	34.87	3.66	37.00	48.50	68.20	-19.70	Peak
5637.21	46.32	34.90	3.66	37.00	47.88	68.20	-20.32	Peak

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



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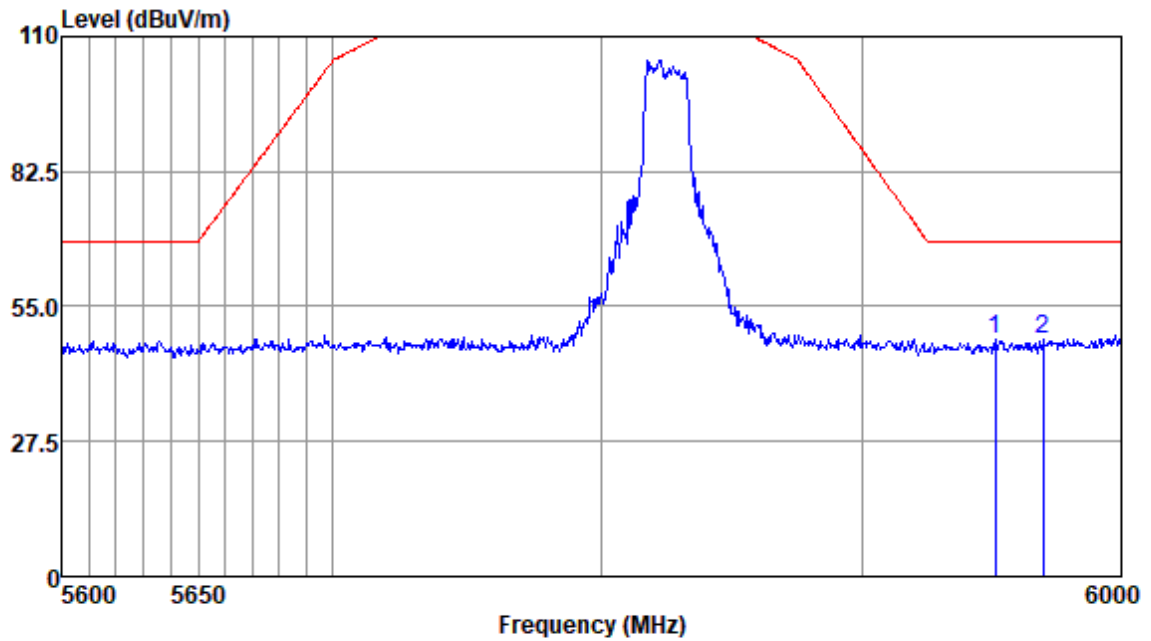
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Mode:b; Polarization:Horizontal; Modulation:a; bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5950.94	46.11	35.26	3.82	37.05	48.14	68.20	-20.06	Peak
5969.45	46.40	35.26	3.82	37.05	48.43	68.20	-19.77	Peak

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



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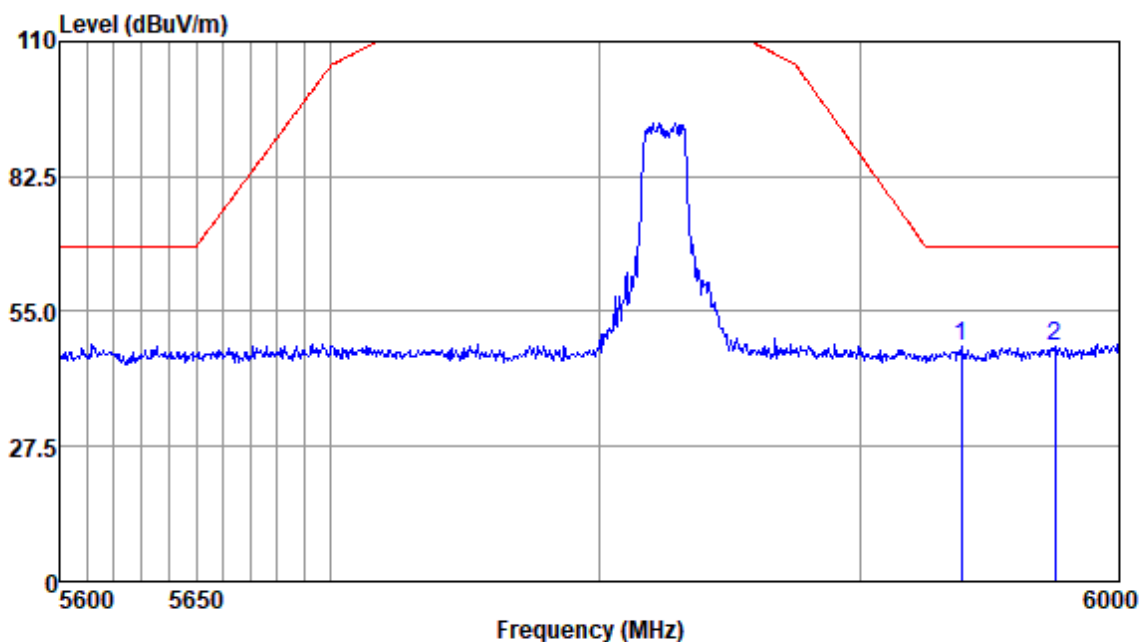
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Mode:b; Polarization:Vertical; Modulation:a; bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5938.64	45.69	35.27	3.81	37.05	47.72	68.20	-20.48	Peak
5974.80	45.80	35.26	3.82	37.05	47.83	68.20	-20.37	Peak

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



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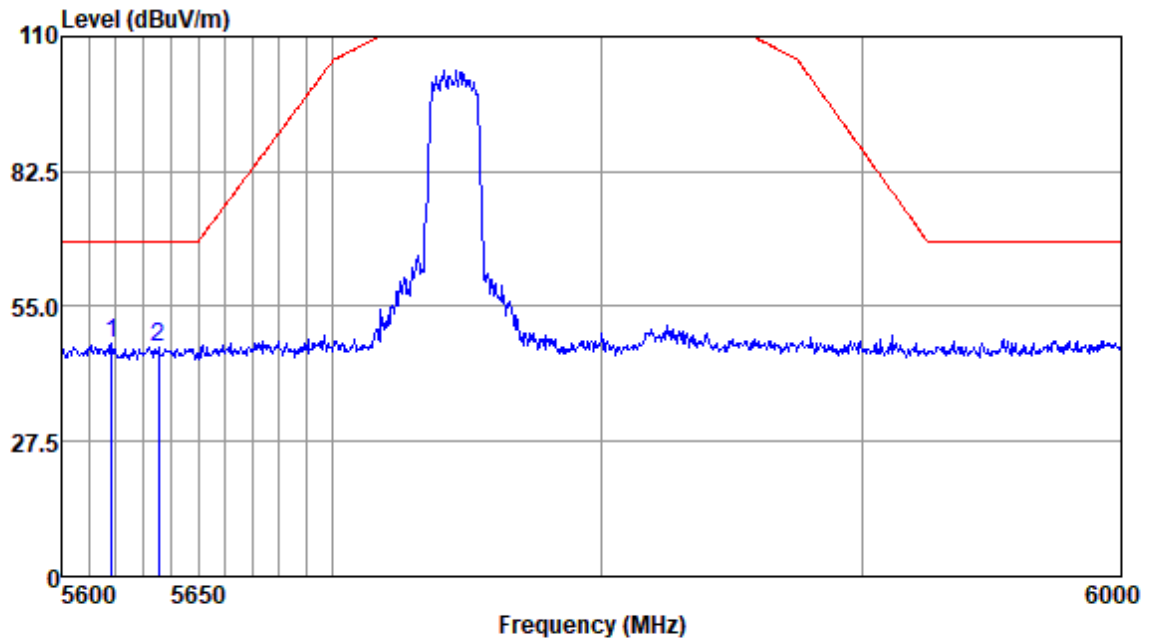
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Mode:b; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5618.19	46.02	34.87	3.66	37.00	47.55	68.20	-20.65	Peak
5635.66	45.19	34.90	3.66	37.00	46.75	68.20	-21.45	Peak

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



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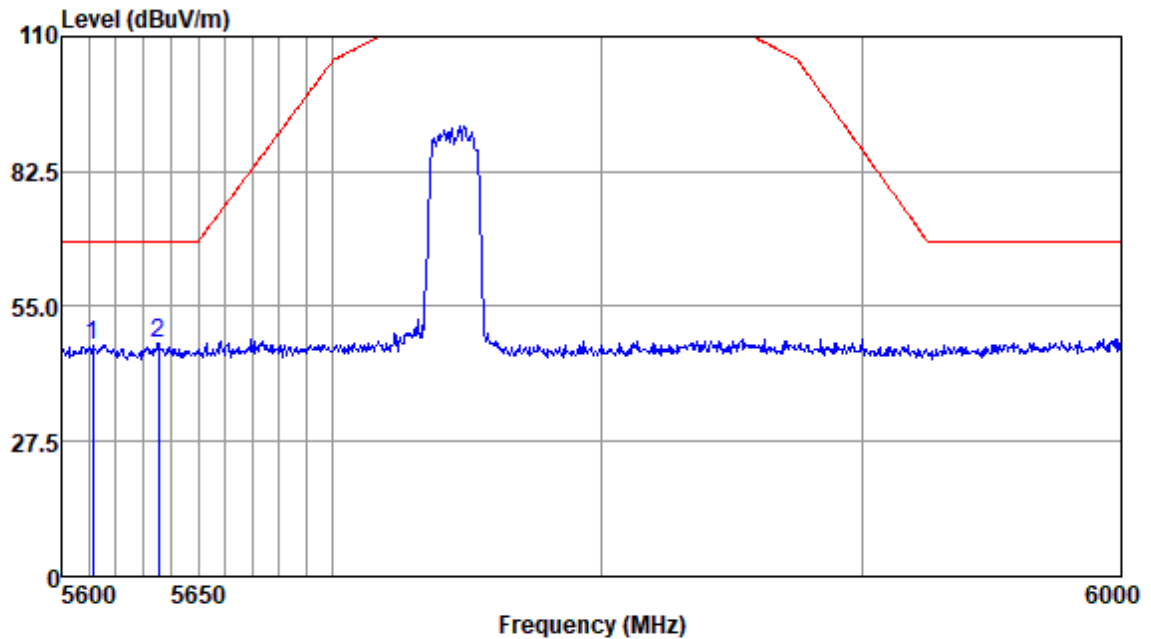
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Mode:b; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:Low



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5611.60	45.70	34.87	3.66	37.00	47.23	68.20	-20.97	Peak
5635.66	45.93	34.90	3.66	37.00	47.49	68.20	-20.71	Peak

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



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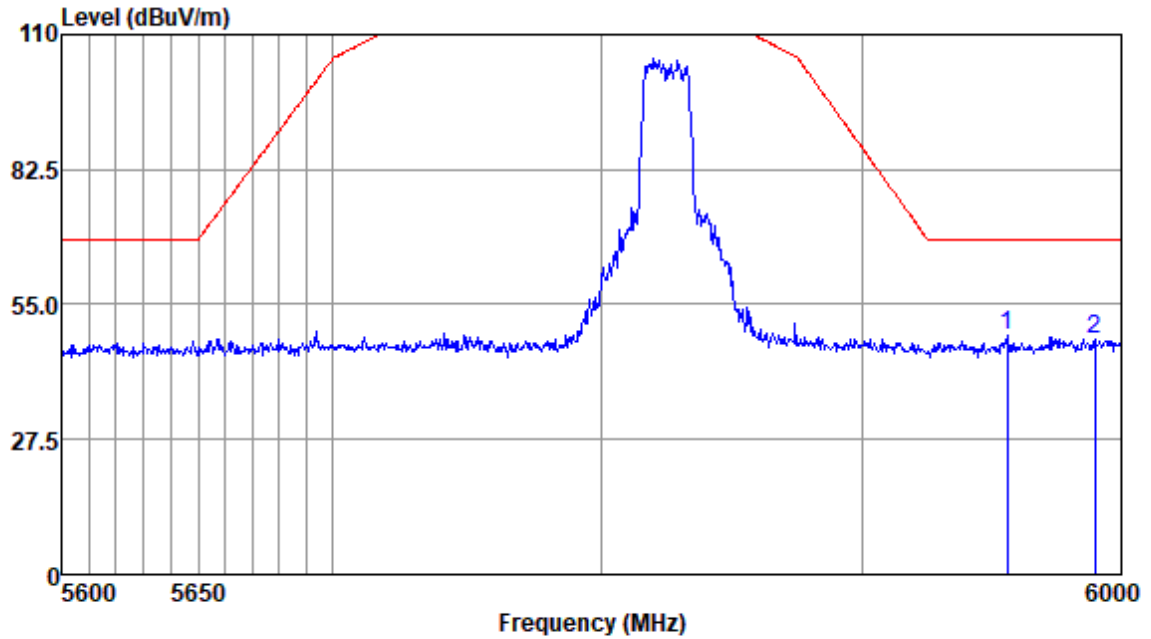
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Mode:b; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5955.46	46.54	35.26	3.82	37.05	48.57	68.20	-19.63	Peak
5989.66	46.02	35.26	3.83	37.06	48.05	68.20	-20.15	Peak

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



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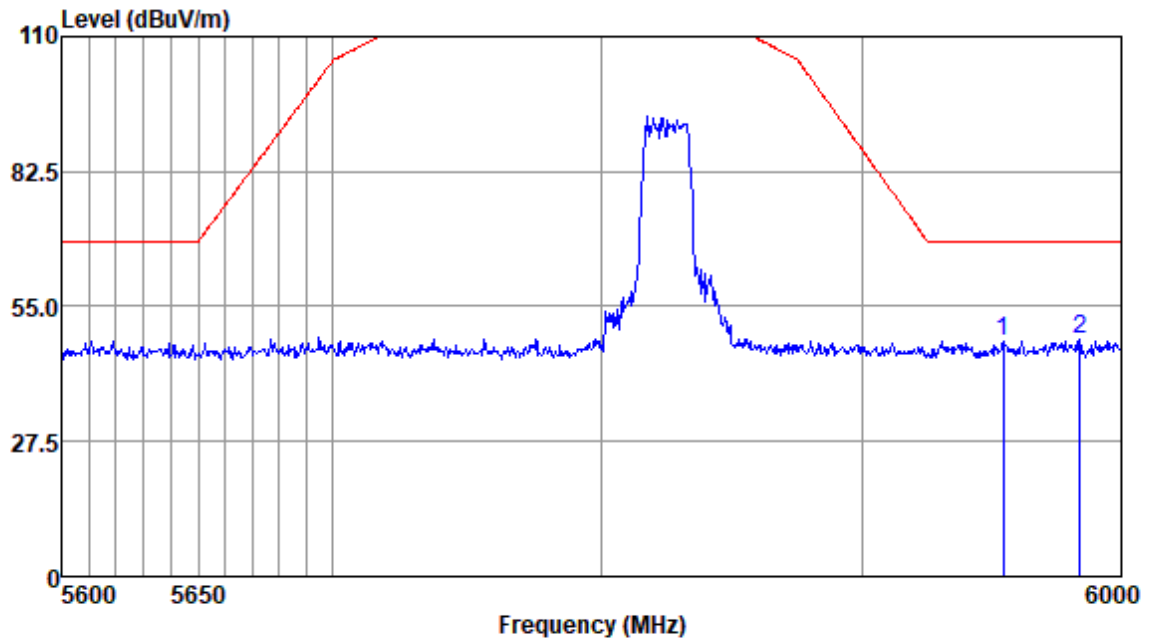
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中国·上海·松江区金都西路588号 邮编: 201612

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

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



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5954.23	45.89	35.26	3.82	37.05	47.92	68.20	-20.28	Peak
5983.88	46.17	35.26	3.83	37.06	48.20	68.20	-20.00	Peak

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



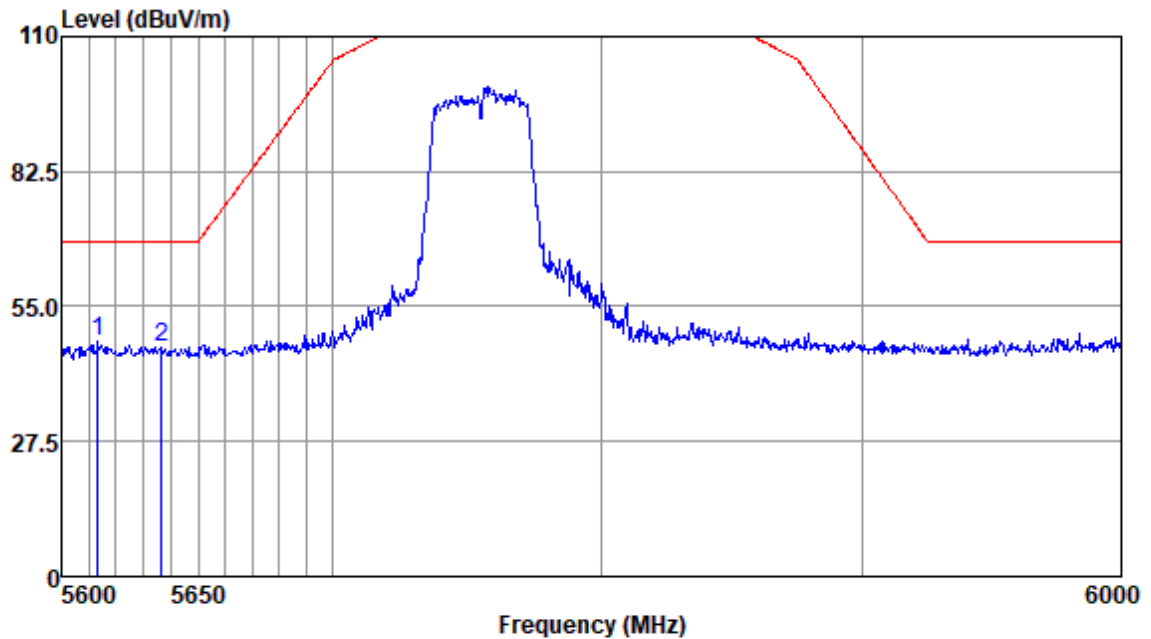
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t(86-21) 61915666 f(86-21) 61915678 e.sgs.china@sgs.com

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	
5613.15	46.26	34.87	3.66	37.00	47.79	68.20	-20.41	Peak
5636.44	45.02	34.90	3.66	37.00	46.58	68.20	-21.62	Peak

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



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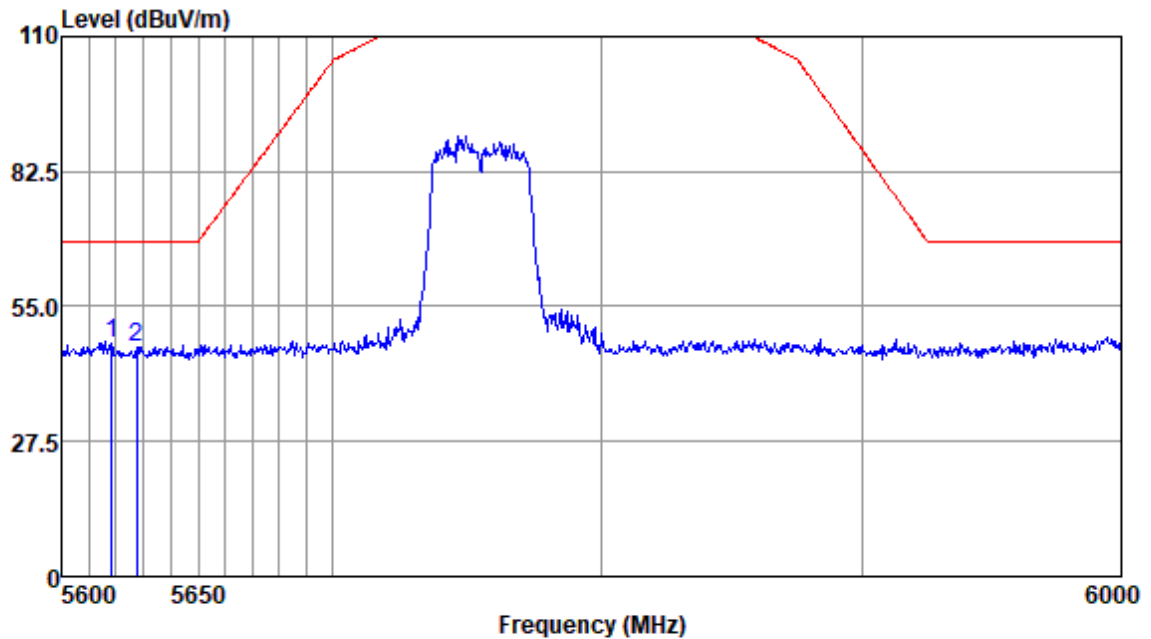
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t(86-21) 61915666 f(86-21) 61915678 e.sgs.china@sgs.com

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



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
5618.19	45.78	34.87	3.66	37.00	47.31	68.20	-20.89	Peak
5627.50	45.23	34.90	3.66	37.00	46.79	68.20	-21.41	Peak

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



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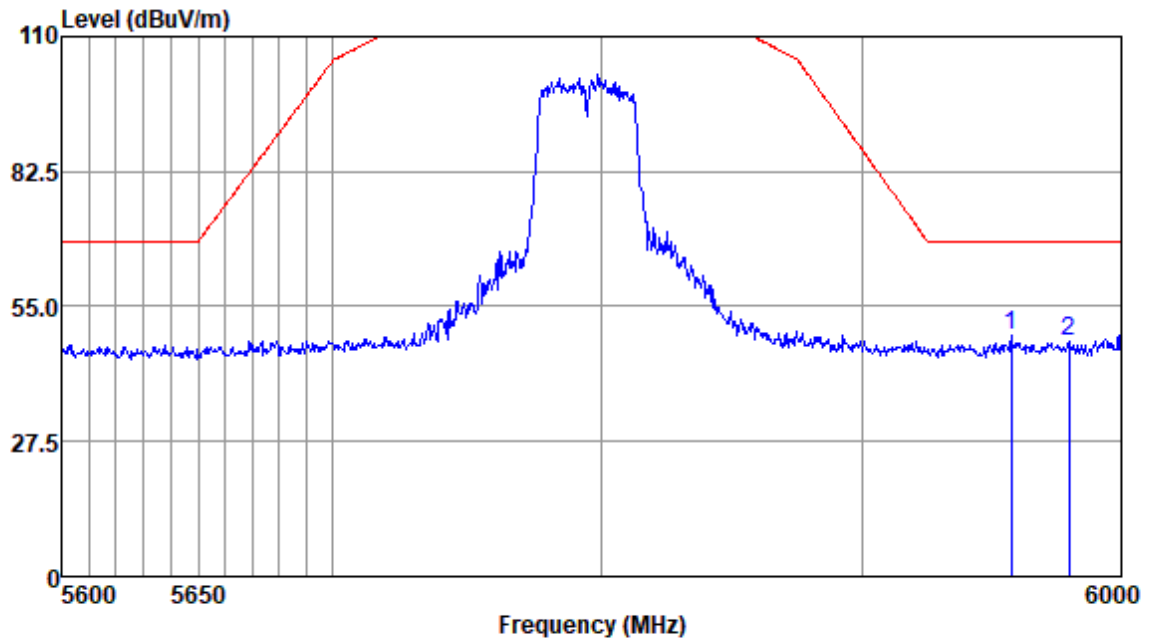
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Mode:b; Polarization:Horizontal; Modulation:n; bandwidth:40MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5957.10	47.10	35.26	3.82	37.05	49.13	68.20	-19.07	Peak
5979.75	45.75	35.26	3.83	37.06	47.78	68.20	-20.42	Peak

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



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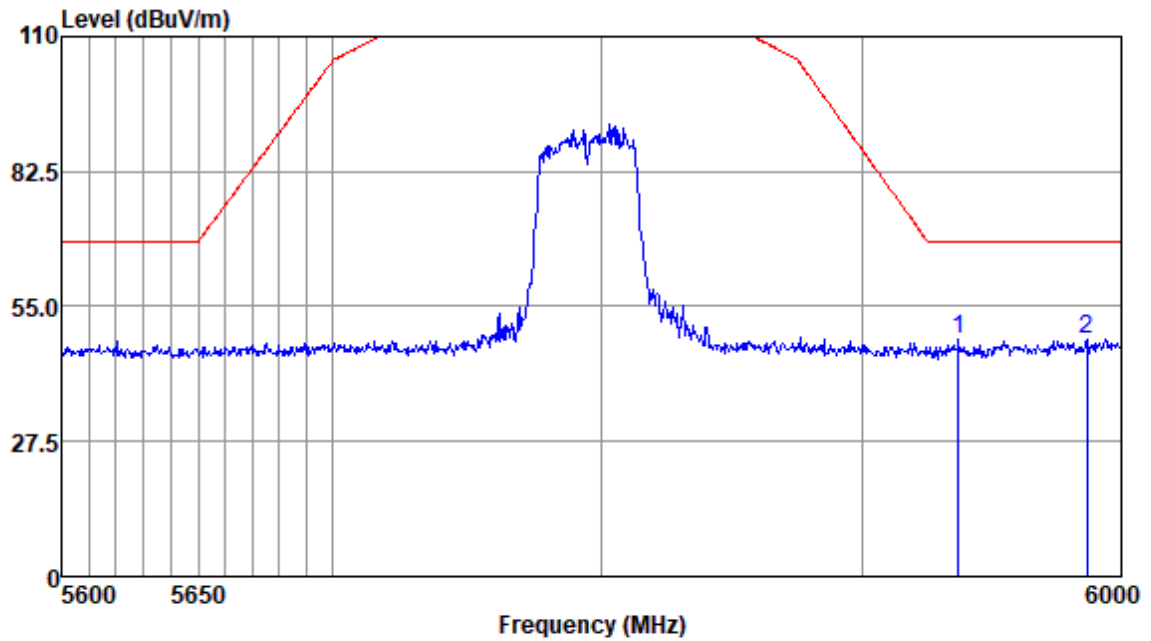
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Mode:b; Polarization:Vertical; Modulation:n; bandwidth:40MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5936.59	46.13	35.27	3.81	37.05	48.16	68.20	-20.04	Peak
5986.77	46.17	35.26	3.83	37.06	48.20	68.20	-20.00	Peak

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



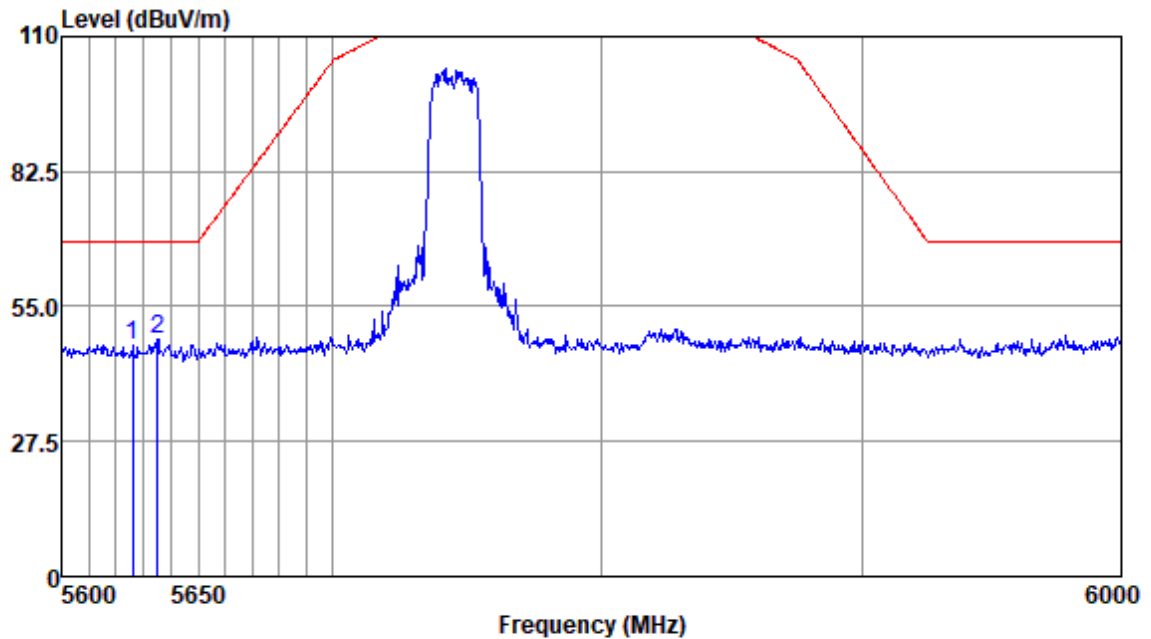
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Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:20MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5625.95	45.68	34.90	3.66	37.00	47.24	68.20	-20.96	Peak
5635.27	46.67	34.90	3.66	37.00	48.23	68.20	-19.97	Peak

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



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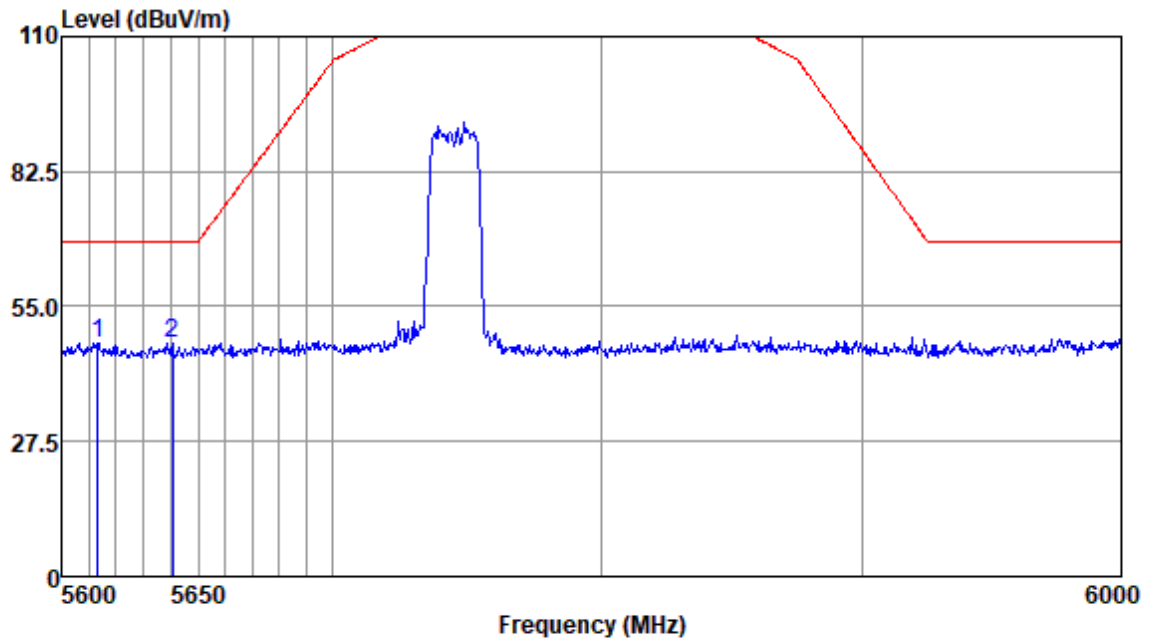
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t(86-21) 61915666 f(86-21) 61915678 e.sgs.china@sgs.com

Mode:b; 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	
5613.15	46.03	34.87	3.66	37.00	47.56	68.20	-20.64	Peak
5640.72	45.92	34.94	3.67	37.00	47.53	68.20	-20.67	Peak

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



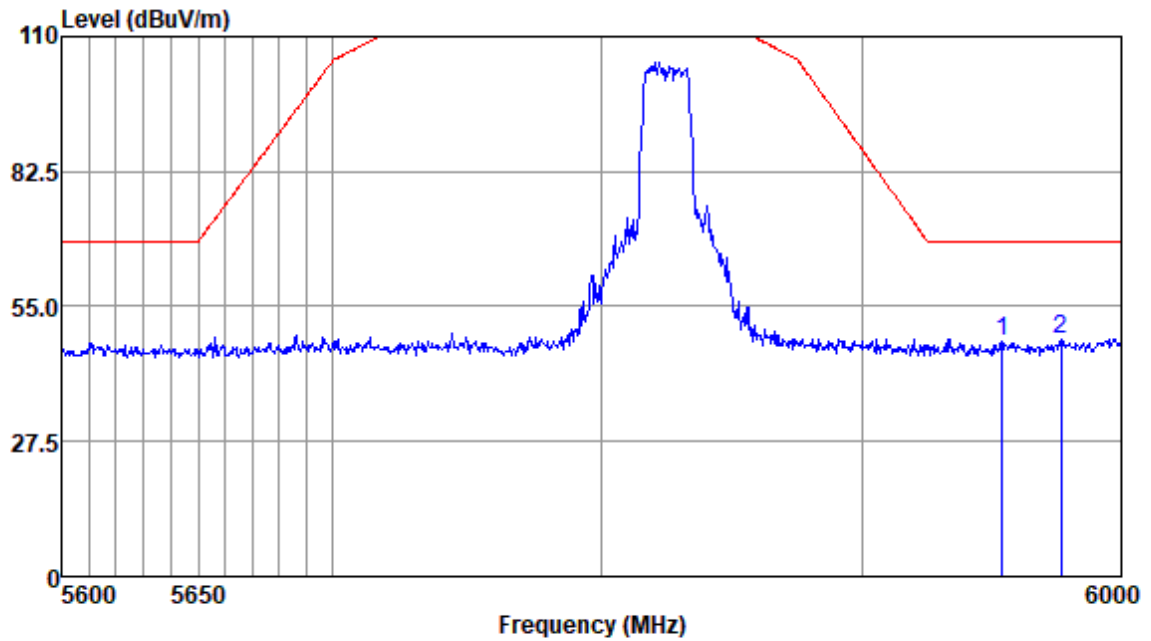
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Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5953.82	45.89	35.26	3.82	37.05	47.92	68.20	-20.28	Peak
5976.45	46.15	35.26	3.83	37.06	48.18	68.20	-20.02	Peak

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



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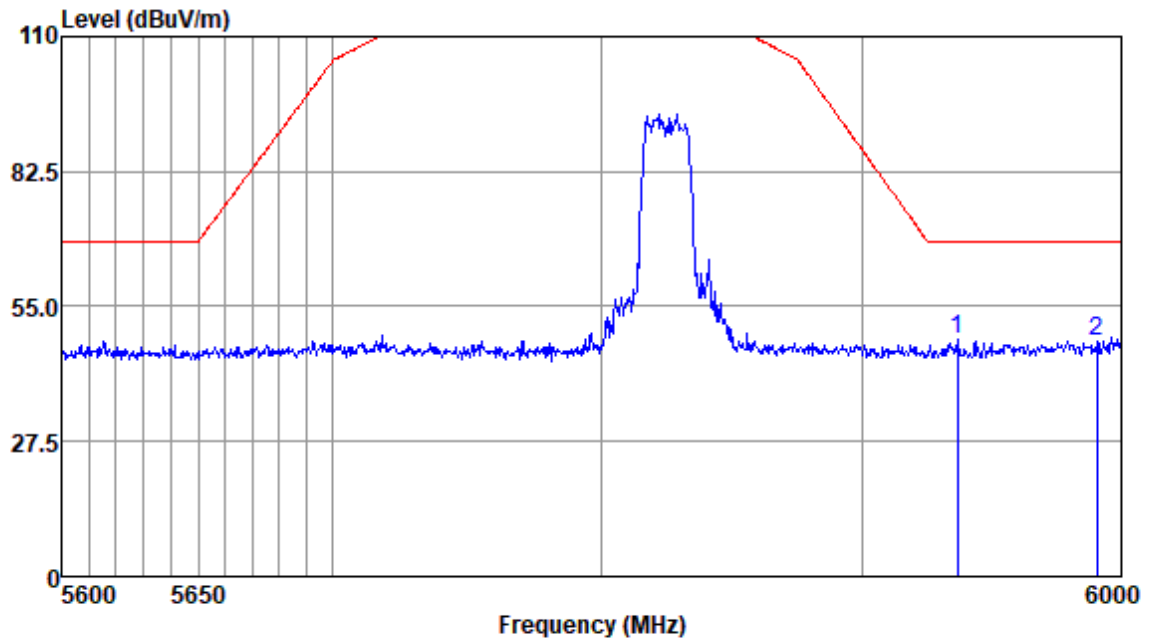
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Mode:b; Polarization:Vertical; Modulation:c; bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5936.18	46.17	35.27	3.81	37.05	48.20	68.20	-20.00	Peak
5990.49	45.92	35.26	3.83	37.06	47.95	68.20	-20.25	Peak

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



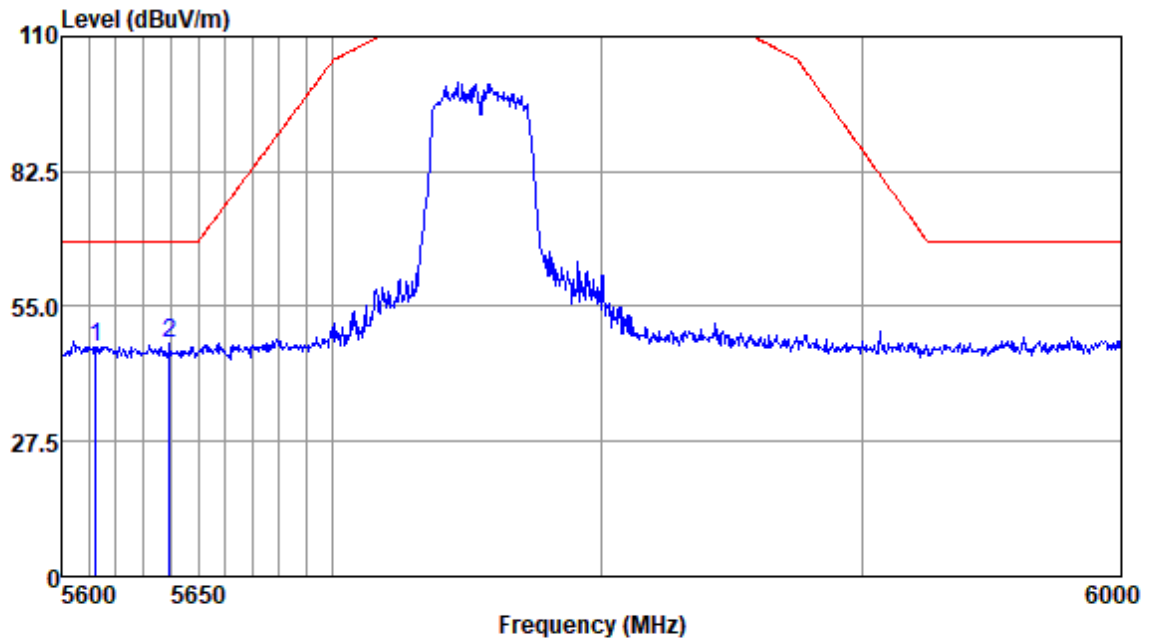
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Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:40MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5612.38	45.35	34.87	3.66	37.00	46.88	68.20	-21.32	Peak
5639.55	45.78	34.90	3.66	37.00	47.34	68.20	-20.86	Peak

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



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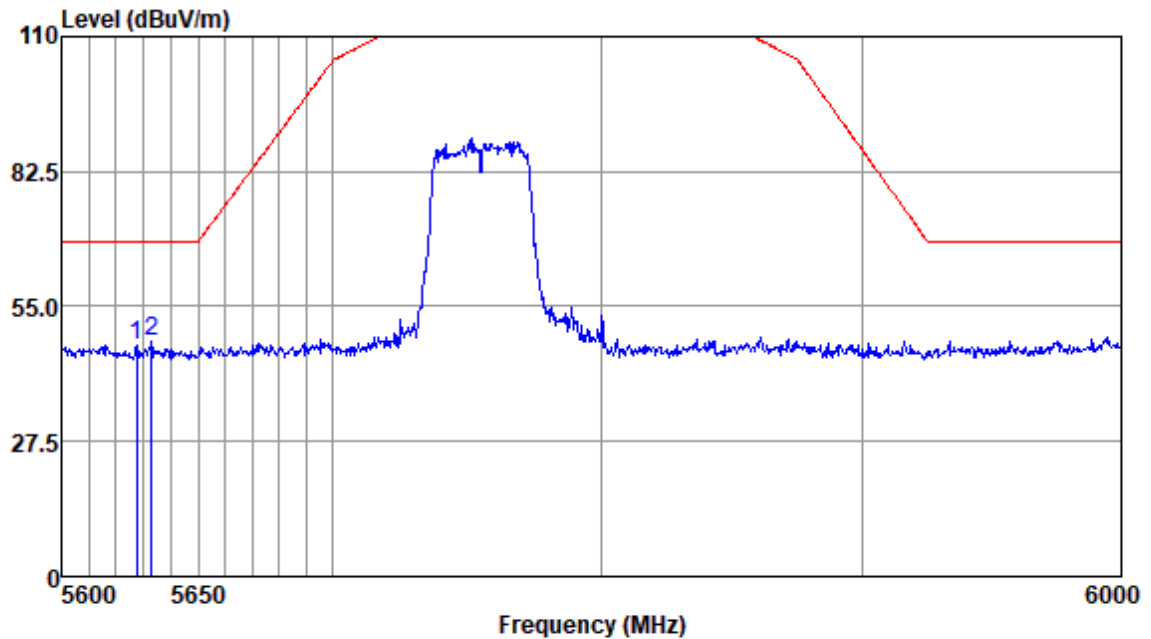
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Mode:b; Polarization:Vertical; Modulation:c; bandwidth:40MHz; Channel:Low



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	
5627.50	45.42	34.90	3.66	37.00	46.98	68.20	-21.22	Peak
5632.94	46.28	34.90	3.66	37.00	47.84	68.20	-20.36	Peak

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



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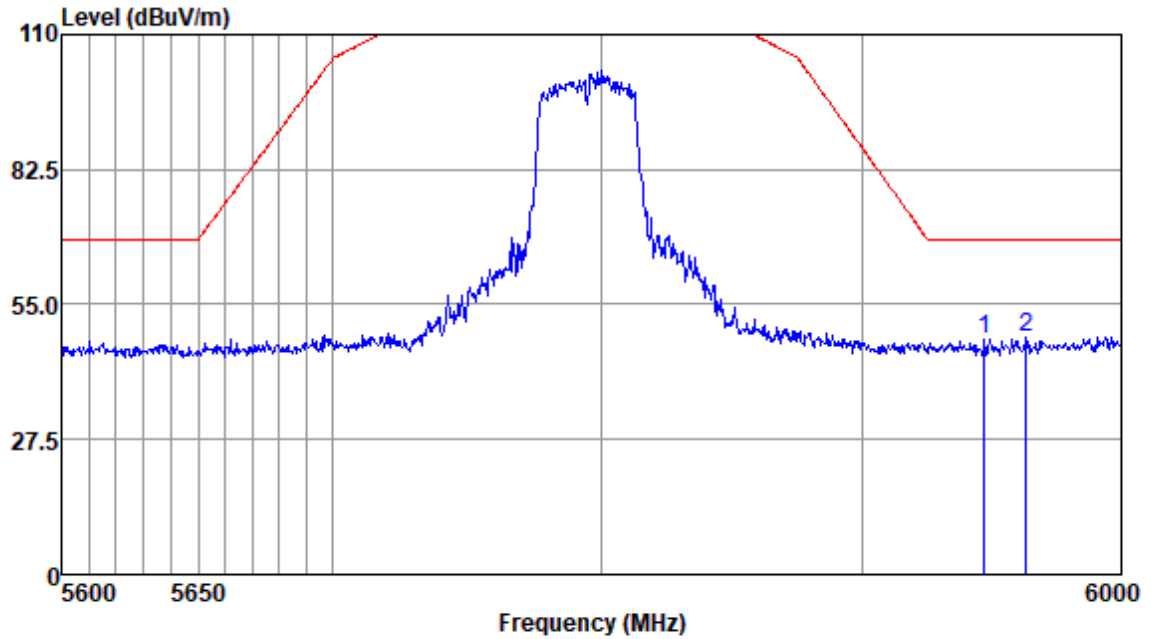
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Testing Center EMC Lab (Shanghai)

NO.588 West Jindu Road, Songjiang District, Shanghai, China 201612
中国·上海·松江区金都西路588号 邮编: 201612

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

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	
5946.84	45.75	35.26	3.82	37.05	47.78	68.20	-20.42	Peak
5962.86	46.13	35.26	3.82	37.05	48.16	68.20	-20.04	Peak

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



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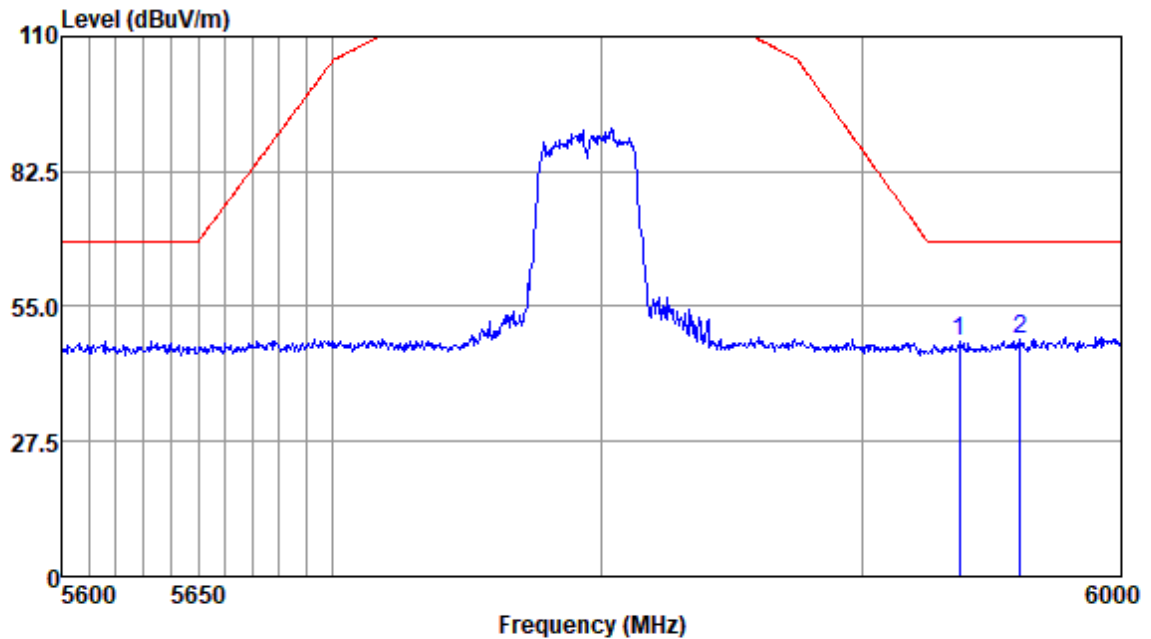
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t(86-21) 61915666 f(86-21) 61915678 e sgs.china@sgs.com

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



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5937.00	45.82	35.27	3.81	37.05	47.85	68.20	-20.35	Peak
5960.80	46.18	35.26	3.82	37.05	48.21	68.20	-19.99	Peak

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



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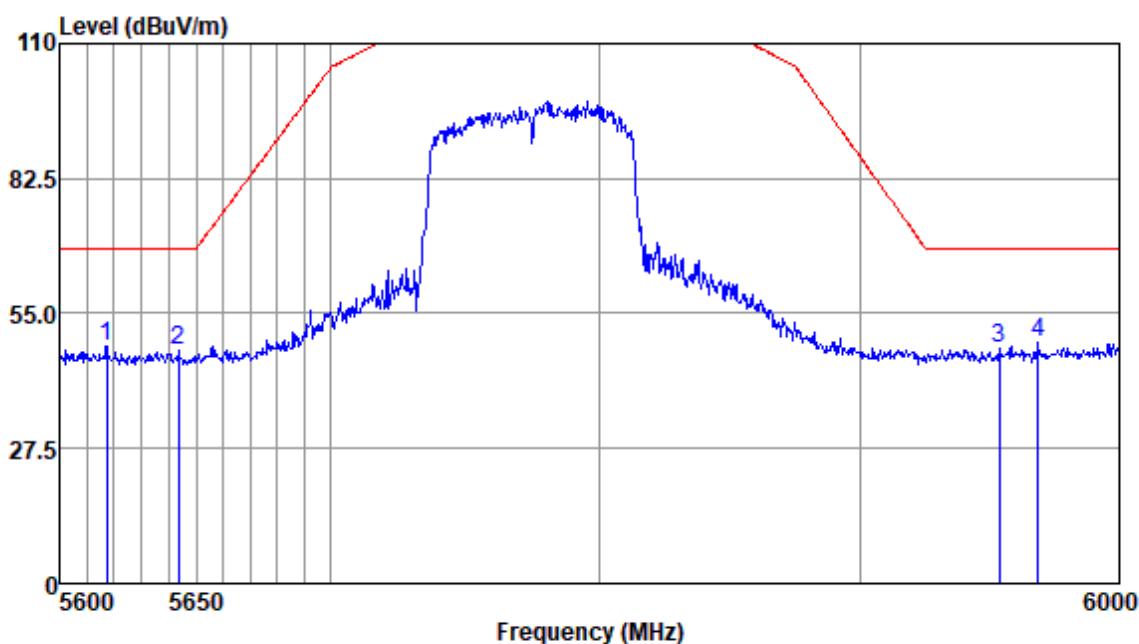
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Mode:b; Polarization:Horizontal; Modulation:c; bandwidth:80MHz; Channel:Low



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	
5617.41	46.88	34.87	3.66	37.00	48.41	68.20	-19.79	Peak
5643.44	45.89	34.94	3.67	37.00	47.50	68.20	-20.70	Peak
5953.41	45.76	35.26	3.82	37.05	47.79	68.20	-20.41	Peak
5968.21	47.16	35.26	3.82	37.05	49.19	68.20	-19.01	Peak

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



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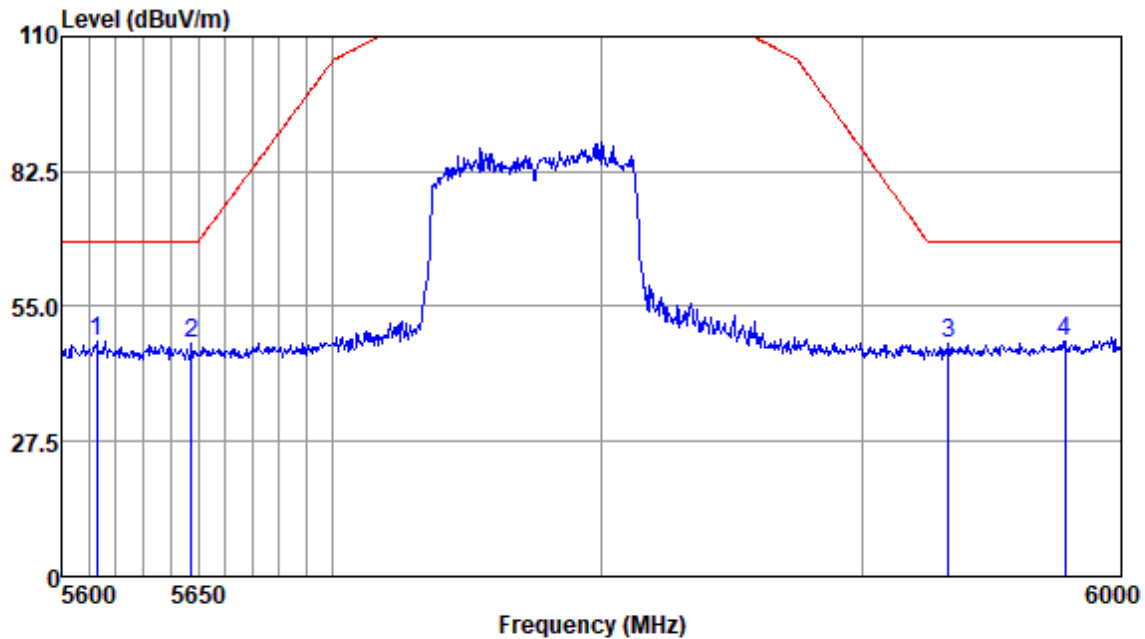
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t(86-21) 61915666 f(86-21) 61915678 e sgs.china@sgs.com

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	
5612.77	46.41	34.87	3.66	37.00	47.94	68.20	-20.26	Peak
5647.73	45.73	34.94	3.67	37.00	47.34	68.20	-20.86	Peak
5932.90	45.41	35.27	3.81	37.05	47.44	68.20	-20.76	Peak
5978.10	45.99	35.26	3.83	37.06	48.02	68.20	-20.18	Peak

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



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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 0 degrees to 35 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.

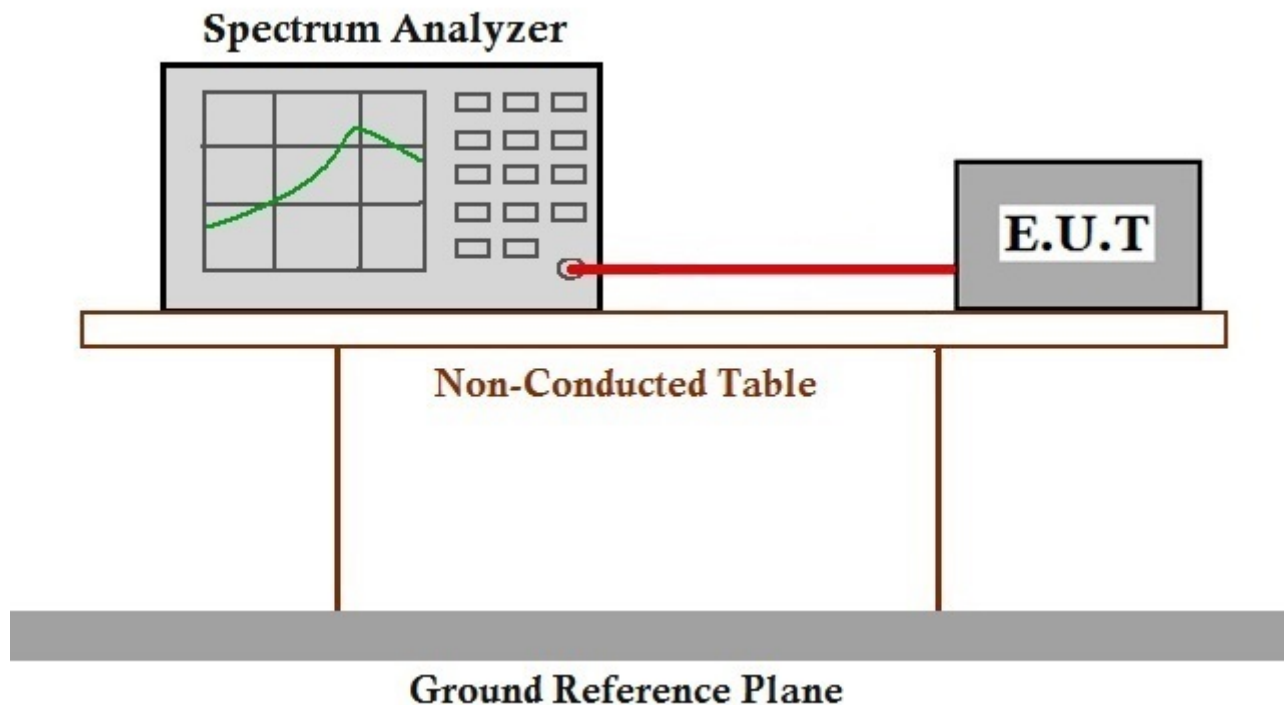
7.9.1 E.U.T. Operation

Operating Environment:

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

Test mode b: TX mode (Band 3)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n(HT20); data rate @ MCS0 is the worst case of IEEE 802.11n(HT40); data rate @ MCS0 is the worst case of IEEE 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



7.9.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHCR210800003202



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8 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

9 EUT Constructional Details

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

- End of the Report -

