





# RADIO TEST REPORT FCC ID: WA5WN67BN

**Product**: Weather Station (Transmitter)

Trade Mark: N/A

Model Name: WN67BN

Family Model: WN67

Report No.: S22081101401001

# **Prepared for**

Shenzhen Fine Offset Electronics Co., Ltd.

A, 4/F, Bldg.C, Dist.A, Minzhu Jiujiu Ind. City, Xihuan Rd., Shajing St.,
Baoan Dist. Shenzhen, Guangdong, China

# Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen 518126 P.R. China
Tel: 400-800-6106,0755-2320 0050 / 2320 0090
Website:http://www.ntek.org.cn

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# **TEST RESULT CERTIFICATION**

Applicant's name .....: Shenzhen Fine Offset Electronics Co., Ltd.

Address ...... : A, 4/F, Bldg.C, Dist.A, Minzhu Jiujiu Ind. City, Xihuan Rd., Shajing

St., Baoan Dist. Shenzhen, Guangdong, China

Manufacturer's Name .....: Shenzhen Fine Offset Electronics Co., Ltd.

Address ...... : A, 4/F, Bldg.C, Dist.A, Minzhu Jiujiu Ind. City, Xihuan Rd., Shajing

St., Baoan Dist. Shenzhen, Guangdong, China

**Product description** 

Product name .....: Weather Station (Transmitter)

Model and/or type reference : WN67BN

Family Model ..... WN67

Standards ..... FCC Part15.249

Test procedure ...... ANSI C63.10-2013

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of NTEK, this document may be altered or revised by NTEK, personnel only, and shall be noted in the revision of the document.

Date of Test .....

Date of Issue ...... Aug 19. 2022

Test Result..... Pass

Testing Engineer : Susan (i

(Susan li)

Authorized Signatory:

(Alex Li)

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# 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.249)				
Standard Section	Judgment	Remark		
15.207	Conducted Emission	N/A		
15.203	Antenna Requirement	Pass		
15.249 15.209	Radiated Spurious Emission	Pass		
15.249b(2)	Frequency Tolerance	N/A		
15.249(a)	Fundamental Measurement	Pass		
15.205	Band Edge Emission	Pass		
15.215	Occupied Bandwidth	Pass		

Note: "N/A" denotes test is not applicable in this Test Report.

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#### 1.1 FACILITIES AND ACCREDITATIONS

#### **FACILITIES**

All measurement facilities used to collect the measurement data are located at 1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District Shenzhen, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

#### 1.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

CNAS-Lab. : The Laboratory has been assessed and proved to be in compliance with

CNAS-CL01:2006 (identical to ISO/IEC 17025:2005)

The Certificate Registration Number is L5516.

IC-Registration The Certificate Registration Number is 9270A.

CAB identifier:CN0074

FCC- Accredited Test Firm Registration Number: 463705.

Designation Number: CN1184

A2LA-Lab. The Certificate Registration Number is 4298.01

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for

the competence of testing and calibration laboratories.

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Name of Firm : Shenzhen NTEK Testing Technology Co., Ltd.

Site Location : 1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District

Shenzhen, Guangdong, China

# 1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	±2.80dB
2	RF power, conducted	±0.16dB
3	Spurious emissions, conducted	±0.21dB
4	All emissions, radiated(9kHz~30MHz)	±2.6dB
5	All emissions, radiated(30MHz~1GHz)	±2.64dB
6	All emissions, radiated(1GHz~6GHz)	±2.40dB
7	All emissions, radiated( > 6GHz)	±2.52dB
8	Temperature	±0.5°C
9	Humidity	±2%

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# 2. GENERAL INFORMATION

# 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Weather Station (Transmitter)		
Trade Mark	N/A		
Model Name	WN67BN		
Family Model	WN67		
Model Difference	All models are the same circuit and RF module, except packaging is different		
	The EUT is a Weather S		
	Operation Frequency:	915MHz	
	Modulation Type:	FSK	
	Antenna Designation:	Spring antenna	
Product Description	Antenna Gain(Peak)	-2.1dBi	
	Based on the application, features, or specification exhibited in User's Manual. More details of EUT technical specification, please refer to the User's Manual.		
Channel List	Please refer to the Note	2.	
Adapter	N/A		
Battery	N/A		
Power supply	DC 2*1.5V from AA Battery		
Hardware version	N/A		
Software version	N/A		

# Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

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2.

Channel	Frequency(MHz)
01	915

3

# Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Spring antenna	N/A	2.15	Antenna

Note: The device does not support simultaneous transmission

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#### 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH01 TX

For Radiated Spurious Emission		
Pretest Mode	Description	
Mode 1	CH01 TX	

For Conducted Emission		
Final Test Mode	Description	
Mode 1	CH01 TX	

Note:

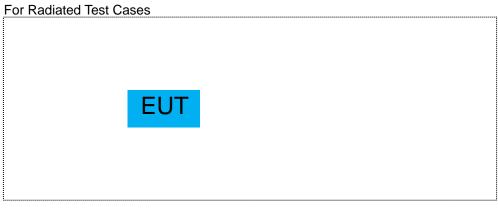
(1) EUT built-in battery-powered, the battery is fully-charged.

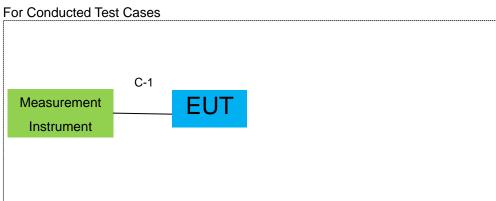
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# 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED





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# 2.4 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	RF Cable	NO	NO	0.5m	

## Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in <code>[Length\_]</code> column.

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# 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

**Radiation Test equipment** 

Itaui	ation rest equ	iibiiieiir					
	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibrati on period
1	Spectrum Analyzer	Aglient	E4407B	MY45108040	2022.04.01	2023.03.31	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2022.04.01	2023.03.31	1 year
3	Spectrum Analyzer	R&S	FSV40	101417	2022.04.01	2023.03.31	1 year
4	Test Receiver	R&S	ESPI7	101318	2022.04.06	2023.04.05	1 year
5	Bilog Antenna	TESEQ	CBL6111D	31216	2022.03.30	2023.03.29	1 year
6	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2020.05.11	2023.05.10	3 year
7	Horn Antenna	EM	EM-AH-1018 0	2011071402	2022.03.31	2023.03.30	1 year
8	Broadband Horn Antenna	SCHWARZBE CK	BBHA 9170	803	2022.03.31	2023.03.30	1 year
9	Amplifier	EMC	EMC051835 SE	980246	2022.04.01	2023.03.31	1 year
10	Active Loop Antenna	SCHWARZBE CK	FMZB 1519 B	055	2021.11.07	2022.11.06	1 year
11	Power Meter	DARE	RPR3006W	15I00041SN O84	2022.06.17	2023.06.16	1 year
12	Test Cable (9KHz-30MHz)	N/A	R-01	N/A	2022.06.16	2025.06.15	3 year
13	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2022.06.16	2025.06.15	3 year
14	High Test Cable(1G-40G Hz)	N/A	R-03	N/A	2022.06.16	2025.06.15	3 year
15	High Test Cable(1G-40G Hz)	N/A	R-04	N/A	2022.06.17	2023.06.16	1 year
16	Filter	TRILTHIC	2400MHz	29	2022.06.17	2023.06.16	1 year
17	temporary antenna connector (Note)	NTS	R001	N/A	N/A	N/A	N/A

#### Note:

The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

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<b>^</b> I	uction	T1		4
LANN	HICTION	IDCT	aniiin	ment
OULIG	ucuon	1631	cuuid	

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2022.04.06	2023.04.05	1 year
2	LISN	R&S	ENV216	101313	2022.04.06	2023.04.05	1 year
3	LISN	SCHWARZBE CK	NNLK 8129	8129245	2022.04.06	2023.04.05	1 year
4	50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200983704	2020.05.11	2023.05.10	3 year
5	Test Cable (9KHz-30MH z)	N/A	C01	N/A	2020.05.11	2023.05.10	3 year
6	Test Cable (9KHz-30MH z)	N/A	C02	N/A	2020.05.11	2023.05.10	3 year
7	Test Cable (9KHz-30MH z)	N/A	C03	N/A	2020.05.11	2023.05.10	3 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable which is scheduled for calibration every 3 years.

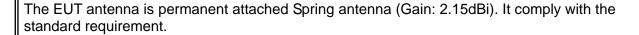
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# 3. ANTENNA REQUIREMENT

# 3.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: 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.

## 3.2 EUT ANTENNA



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## 3.3 CONDUCTED EMISSION MEASUREMENT

# 3.3.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

	Class A (dBuV)		Class B (dBuV)		Standard
FREQUENCY (MHz)	Quasi-peak	Average	Quasi-peak	Average	Statiuatu
0.15 -0.5			66 - 56 *	56 - 46 *	CISPR
0.50 -5.0			56.00	46.00	CISPR
5.0 -30.0			60.00	50.00	CISPR

0.15 -0.5		66 - 56 *	56 - 46 *	LP002.
0.50 -5.0		56.00	46.00	LP002.
5.0 -30.0		60.00	50.00	LP002.

## Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

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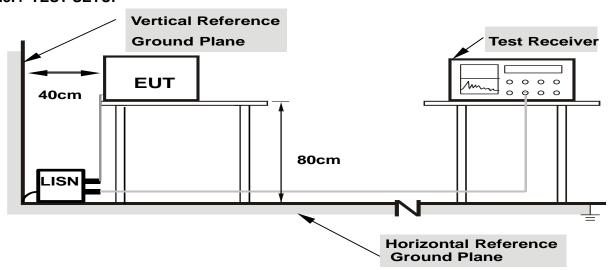
#### 3.3.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

#### 3.3.3 DEVIATION FROM TEST STANDARD

No deviation

#### 3.3.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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# 3.2.5 TEST RESULT

EUT:	Weather Station (Transmitter)	Model Name. :	WN67BN
Temperature :	<b>25</b> ℃	Relative Humidity:	55%
Pressure :	1010hPa	Phase :	N/A
Test Voltage :	N/A	Test Mode :	N/A

Note: The EUT is powered by battery, so this item is not applicable

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#### 3.4 RADIATED EMISSION MEASUREMENT

# **3.4.1 Radiated Emission Limits** (FCC 15.209)

Frequencies (MHz)	Field Strength (micorvolts/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
Frequency (MHz)	Limit (dBuV)	
30~88	40	3
88~216	43.5	3
216~960	46	3
960 -10000	54.00	3
902-928	94	3

#### Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).
- (3) \*Note: This is the limit for the fundamental frequency.

# LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.249)

Frequency of Emission (MHz)	Field Strength of fundamental (millivolts /meter)	Field Strength of Harmonics (microvolts/meter)
902-928	50	500

#### Notes:

(1) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

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#### 3.4.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos. Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

#### 3.4.3 DEVIATION FROM TEST STANDARD

No deviation

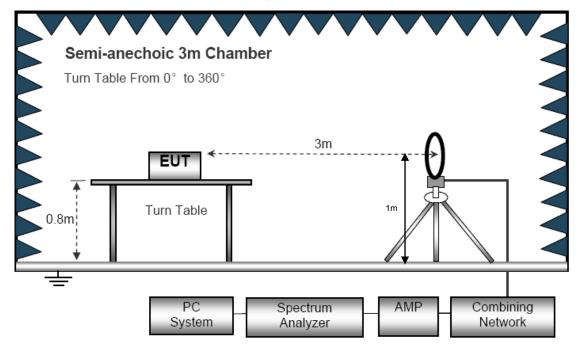
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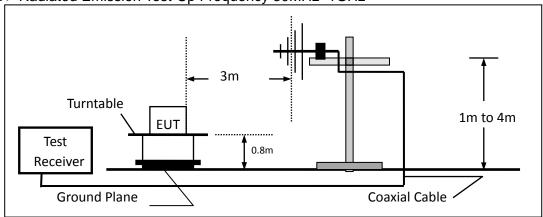




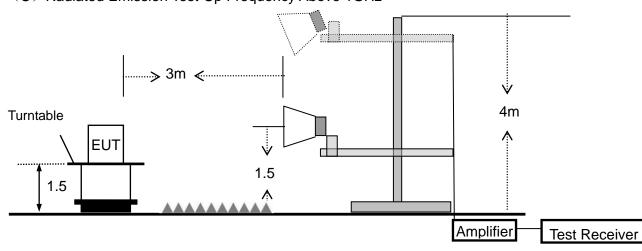
# (A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



# (C) Radiated Emission Test-Up Frequency Above 1GHz



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# 3.4.4 TEST RESULTS (BELOW 30MHz)

EUT :	Weather Station (Transmitter)	Model Name. :	WN67BN
Temperature :	20 ℃	Relative Humidtity:	48%
Pressure :	1010 hPa	Test Voltage :	DC 3V
Test Mode :	TX	Polarization :	

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				PASS
				PASS

## NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =20 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

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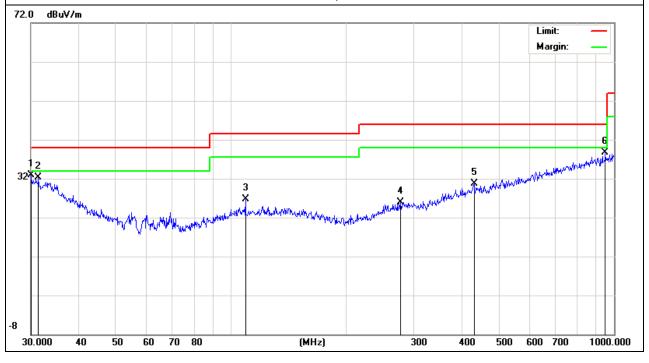
# 3.4.5 TEST RESULTS (BELOW 1000 MHz)

EUT :	Weather Station (Transmitter)	Model Name :	WN67BN
Temperature :	25 ℃	Relative Humidity:	51%
Pressure :	1010 hPa	Test Voltage :	DC 3V
Test Mode :	Mode 1	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
30.0000	7.16	25.81	32.97	40.00	-7.03	QP
31.3992	6.92	25.35	32.27	40.00	-7.73	QP
109.0285	8.68	18.12	26.80	43.50	-16.70	QP
277.0935	6.22	19.71	25.93	46.00	-20.07	QP
431.0316	6.79	24.01	30.80	46.00	-15.20	QP
948.7608	7.85	30.87	38.72	46.00	-7.28	QP

# Remark:

1. Factor = Antenna Factor + Cable Loss - Pre-amplifier.



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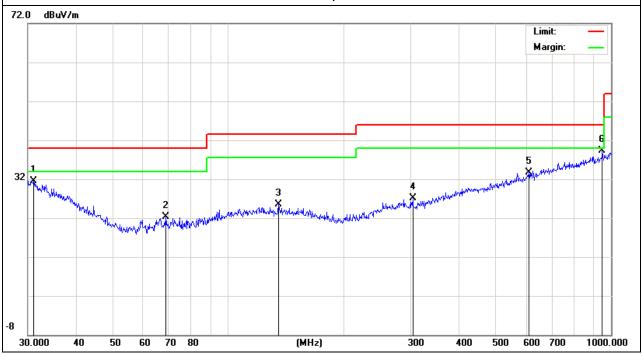


EUT:	Weather Station (Transmitter)	Model Name :	WN67BN
Temperature :	25 ℃	Relative Humidity:	51%
Pressure :	1010 hPa	Test Voltage :	DC 3V
Test Mode :	Mode 1	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
31.0705	5.81	25.75	31.56	40.00	-8.44	QP
68.8721	8.98	13.33	22.31	40.00	-17.69	QP
135.5062	6.57	18.87	25.44	43.50	-18.06	QP
303.5437	6.73	20.43	27.16	46.00	-18.84	QP
609.9215	6.91	26.70	33.61	46.00	-12.39	QP
948.7608	8.44	30.87	39.31	46.00	-6.69	QP

# Remark:

1. Factor = Antenna Factor + Cable Loss - Pre-amplifier.



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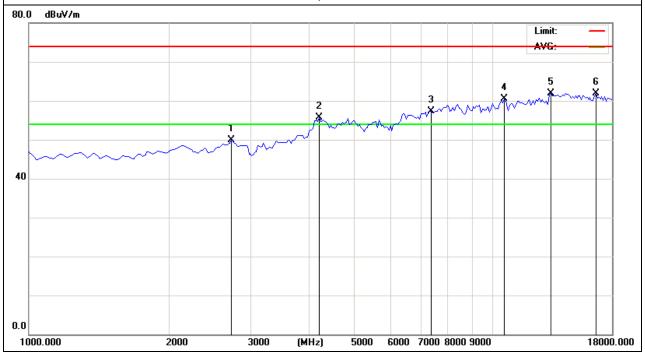
# 3.4.6 TEST RESULTS (ABOVE 1000 MHZ)

EUT :	Weather Station (Transmitter)	Model Name :	WN67BN
Temperature :	25 ℃	Relative Humidity:	51%
Pressure :	1010 hPa	Test Voltage :	DC 3V
Test Mode :	Mode 1	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2742.500	38.45	11.52	49.97	74.00	-24.03	peak
4230.000	38.19	17.46	55.65	74.00	-18.35	peak
7375.000	35.36	22.03	57.39	74.00	-16.61	peak
10562.50	34.59	25.88	60.47	74.00	-13.53	peak
13325.00	32.90	29.04	61.94	74.00	-12.06	peak
16725.00	29.65	32.34	61.99	74.00	-12.01	peak

## Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.



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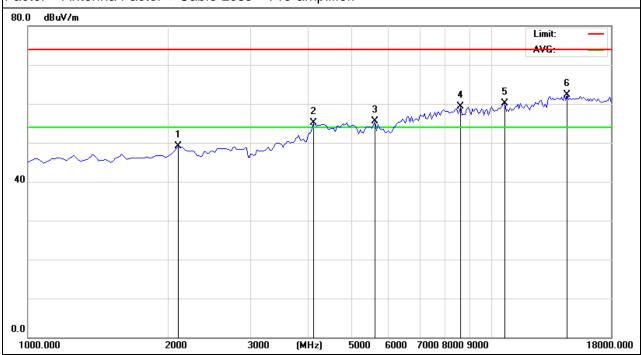


EUT:	Weather Station (Transmitter)	Model Name :	WN67BN
Temperature :	25 ℃	Relative Humidity:	51%
Pressure :	1010 hPa	Test Voltage :	DC 3V
Test Mode :	Mode 1	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2105.000	37.50	11.56	49.06	74.00	-24.94	peak
4145.000	37.22	17.83	55.05	74.00	-18.95	peak
5590.000	36.93	18.62	55.55	74.00	-18.45	peak
8607.500	36.05	23.32	59.37	74.00	-14.63	peak
10690.00	34.96	25.11	60.07	74.00	-13.93	peak
14515.00	33.23	29.13	62.36	74.00	-11.64	peak

# Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.



Note: EUT Pre-scan X/Y/Z orientation, only worst case is presented in the report(X orientation).

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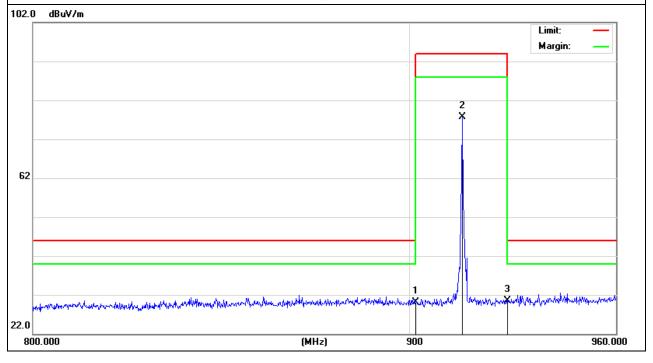
# 3.4.7 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

EUT :	Weather Station (Transmitter)	Model Name :	WN67BN
Temperature :	<b>25</b> ℃	Relative Humidity:	51%
Pressure :	1010 hPa	Test Voltage :	DC 3V
Test Mode :	TX-915MHz	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type
902.0000	5.69	24.33	30.02	46.00	-15.98	peak
915.0400	52.93	24.80	77.73	94.00	-16.27	peak
928.0000	5.74	24.76	30.50	46.00	-15.50	peak

# Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



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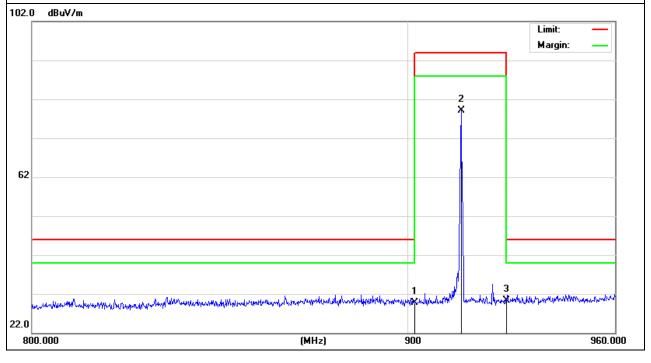


EUT:	Weather Station (Transmitter)	Model Name :	WN67BN
Temperature :	25 ℃	Relative Humidity:	51%
Pressure :	1010 hPa	Test Voltage :	DC 3V
Test Mode :	TX-915MHz	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type
902.0000	5.41	24.33	29.74	46.00	-16.26	QP
915.0400	54.34	24.80	79.14	94.00	-14.86	QP
928.0000	5.49	24.76	30.25	46.00	-15.75	QP

#### Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



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# 4. BANDWIDTH TEST

#### **4.1 TEST PROCEDURE**

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value., Sweep time = Auto.

## **4.2 DEVIATION FROM STANDARD**

No deviation.

## **4.3 TEST SETUP**

EUT	SPECTRUM
	ANALYZER

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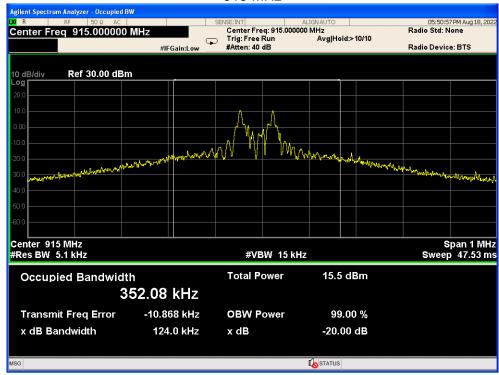


#### 4.4. TEST RESULTS

EUT:	Weather Station (Transmitter)	Model Name :	WN67BN
Temperature :	26 ℃	Relative Humidity:	53%
Pressure :	1020 hPa	Test Power :	DC 3V
Test Mode :	Mode 1		

Test Channel	Frequency	20 dBc Bandwidth
lest Chamilei	(MHz)	(MHz)
CH01	915	0.124





**END OF REPORT** 

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