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# FCC Test Report

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Report No.: AGC00970240701FR01

**FCC ID** : 2AMUU-SSR01

**APPLICATION PURPOSE** : Original Equipment

**PRODUCT DESIGNATION** : Smart Temperature and Humidity Sensor

**BRAND NAME** : meross, Refoss, Flysocks

**MODEL NAME** : MS130

**APPLICANT** : Chengdu Meross Technology Co., Ltd.

**DATE OF ISSUE** : Sep. 06, 2024

**STANDARD(S)** : FCC Part 15 Subpart C §15.231

**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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**Report Revise Record**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Sep. 06, 2024	Valid	Initial Release

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## 1. General Information

Applicant	Chengdu Meross Technology Co., Ltd.
Address	Floor 3, Building A5, Shijicheng Road No 1129, Gaoxin, Free Trade Trial Zone, Chengdu, Sichuan, 610000, China
Manufacturer	Chengdu Meross Technology Co., Ltd.
Address	Floor 3, Building A5, Shijicheng Road No 1129, Gaoxin, Free Trade Trial Zone, Chengdu, Sichuan, 610000, China
Factory	Chengdu Xuguang Technology Co., Ltd.
Address	No.86, 2nd Section of Park Road, Longquanyi, Chengdu, Sichuan 610100, China
Product Designation	Smart Temperature and Humidity Sensor
Brand Name	meross, Refoss, Flysocks
Test Model	MS130
Series Model(s)	N/A
Difference Description	N/A
Date of receipt of test item	Jul. 16, 2024
Date of Test	Jul. 16, 2024~Sep. 06, 2024
Deviation from Standard	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Test Report Form No	AGCER-FCC-SRD1-V1

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By



Cici Li  
(Project Engineer)

Sep. 06, 2024

Reviewed By



Calvin Liu  
(Reviewer)

Sep. 06, 2024

Approved By



Max Zhang  
Authorized Officer

Sep. 06, 2024

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## 2. Product Information

### 2.1 Product Technical Description

Operation Frequency	433.75MHz-434.75MHz
Hardware Version	V1.3
Software Version	V1.1.12
Modulation Type	FSK
Number of channels	5
Field Strength of Fundamental	80.26dBuV/m(PK)@3m 69.45dBuV/m(AV)@3m
Antenna Designation	Spring Antenna
Antenna Gain	1.5dBi
Power Supply	DC 3V by battery

### 2.2 Test Frequency List

Frequency Band	Channel Number	Test Frequency
--	01	433.75 MHz
--	02	434MHz
--	03	434.25 MHz
--	04	434.5 MHz
--	05	434.75 MHz

Note : According to manufacturer's requirements, periodic operation in the band 40.66-40.70 MHz and above 70MHz

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### 2.3 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for FCC ID: **2AMUU-SSR01**, filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

### 2.4 Test Methodology

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

### 2.5 Special Accessories

Not available for this EUT intended for grant.

### 2.6 Equipment Modifications

Not available for this EUT intended for grant.

### 2.7 Antenna Requirement

Standard Requirement
<b>15.203 requirement:</b> An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
<b>EUT Antenna:</b> The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 1.5 dBi.

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### 3. Test Environment

#### 3.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

#### 3.2 Test Facility

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

##### **CNAS-Lab Code: L5488**

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories.)

##### **A2LA-Lab Cert. No.: 5054.02**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

##### **FCC-Registration No.: 975832**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

##### **IC-Registration No.: 24842(CAB identifier: CN0063)**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.



### 3.3 Environmental Conditions

	Normal Conditions
Temperature range (°C)	15 - 35
Relative humidity range	20 % - 75 %
Pressure range (kPa)	86 - 106
Power supply	DC 3V by battery

### 3.4 Measurement Uncertainty

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

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 2.9 \text{ dB}$
Uncertainty of Radiated Emission below 150kHz	$U_c = \pm 4.2 \text{ dB}$
Uncertainty of Radiated Emission below 30MHz	$U_c = \pm 3.8 \text{ dB}$
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 3.9 \text{ dB}$
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$
Uncertainty of spurious emissions, conducted	$U_c = \pm 2 \%$
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2.7 \%$

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### 3.5 List of Equipment Used

● Radiated Spurious Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
<input type="checkbox"/>	AGC-EM-E046	EMI Test Receiver	R&S	ESCI	10096	2024-02-01	2025-01-31
<input checked="" type="checkbox"/>	AGC-EM-E116	EMI Test Receiver	R&S	ESCI	100034	2024-05-24	2025-05-23
<input checked="" type="checkbox"/>	AGC-EM-E061	Spectrum Analyzer	Agilent	N9010A	MY53470504	2024-05-28	2025-05-27
<input checked="" type="checkbox"/>	AGC-EM-E086	Loop Antenna	ZHINAN	ZN30900C	18051	2024-03-05	2026-03-04
<input checked="" type="checkbox"/>	AGC-EM-E001	Wideband Antenna	SCHWARZBECK	VULB9168	D69250	2023-05-11	2025-05-10
<input checked="" type="checkbox"/>	AGC-EM-E029	Broadband Ridged Horn Antenna	ETS	3117	00034609	2024-03-31	2025-03-30
<input checked="" type="checkbox"/>	AGC-EM-E082	Horn Antenna	SCHWARZBECK	BBHA 9170	#768	2023-09-24	2025-09-23
<input checked="" type="checkbox"/>	AGC-EM-E146	Pre-amplifier	ETS	3117-PA	00246148	2022-08-04	2024-08-03
<input checked="" type="checkbox"/>	AGC-EM-E146	Pre-amplifier	ETS	3117-PA	00246148	2024-07-24	2026-07-23
<input checked="" type="checkbox"/>	AGC-EM-A119	2.4G Filter	SongYi	N/A	N/A	2024-05-23	2025-05-22
<input checked="" type="checkbox"/>	AGC-EM-A138	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2025-06-08
<input type="checkbox"/>	AGC-EM-A139	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2025-06-08

● AC Power Line Conducted Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
<input type="checkbox"/>	AGC-EM-E045	EMI Test Receiver	R&S	ESPI	101206	2024-05-28	2025-05-27
<input type="checkbox"/>	AGC-EM-A130	6dB Attenuator	Eeatsheep	LM-XX-6-5W	DC-6GZ	2023-06-09	2025-06-08
<input type="checkbox"/>	AGC-EM-E023	AMN	R&S	100086	ESH2-Z5	2024-05-28	2025-05-27

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● Test Software					
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Version Information
<input type="checkbox"/>	AGC-EM-S001	CE Test System	R&S	ES-K1	V1.71
<input type="checkbox"/>	AGC-EM-S003	RE Test System	FARA	EZ-EMC	V.RA-03A
<input checked="" type="checkbox"/>	AGC-EM-S004	RE Test System	Tonscend	TS <sup>+</sup> Ver2.1(JS32-RE)	4.0.0.0
<input type="checkbox"/>	AGC-ER-S012	BT/WIFI Test System	Tonscend	JS1120-2	2.6
<input checked="" type="checkbox"/>	AGC-EM-S011	RSE Test System	Tonscend	TS+-Ver2.1(JS36-RSE)	4.0.0.0

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## 4. System Test Configuration

### 4.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 4.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

### 4.3 Configuration of Tested System

Radiated Emission Configure:



### 4.4 Equipment Used in Tested System

The following peripheral devices and interface cables were connected during the measurement:

☐ Test Accessories Come From The Laboratory

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	--	--	--	--	--

☐ Test Accessories Come From The Manufacturer

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	--	--	--	--	--

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#### 4.5 Summary of Test Results

Item	FCC Rules	Description Of Test	Result
1	§15.203	Antenna Equipment	Pass
2	§15.231(a)	Provision for Momentary Operation	Pass
3	§15.231	Field Strength of Fundamental	Pass
4	§15.209	Radiated Emission	Pass
5	§15.205(a)	Restricted Bands of Operation	Pass
6	§15.231(c)	-20dB Bandwidth	Pass
7	§15.207	AC Power Line Conducted Emission	N/A

Note: 1.N/A means not applicable

2. The device under test is battery-powered and does not require evaluation of AC Power Line Conducted Emission.

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## 5. Description of Test Modes

Summary table of Test Cases	
Test Item	Equipment Type / Modulation
	Short Range Wireless Device/ FSK
Radiated & Conducted Test Cases	Mode 1: Normal Transmission Operation at 433.75MHz Mode 2: Normal Transmission Operation at 434.25MHz Mode 3: Normal Transmission Operation at 434.75MHz
AC Conducted Emission	N/A

**Note:**

1. Only the result of the worst case was recorded in the report, if no other cases.
2. The battery is full-charged during the test.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
4. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
5. EUT is a A transmitter activated automatically.
6. The EUT is in normal firmware working state when testing Transmission Time. When testing other test items, the EUT reaches the maximum dutycycle and maximum transmit power through special firmware.

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## 6. Provision for Momentary Operation

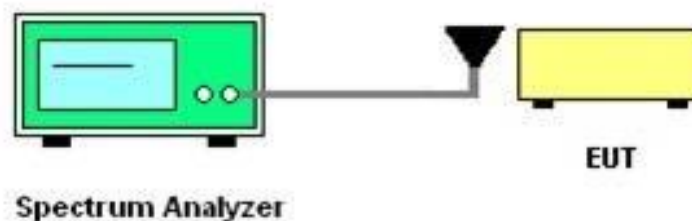
### 6.1 Provisions Applicable

- ☐ (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- ☐ (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- ☐ (3) Periodic transmissions at regular predetermined intervals are not permitted.  
However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.
- ☐ (4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.
- ☐ (5) Transmission of set-up information for security systems may exceed the transmission duration limits in (1) and (2) above, provided such transmission are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.
- ☒ Refer to T15.231(e), devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

### 6.2 Measurement Procedure

1. Set the parameters of SPA as below:
2. Centre frequency = Operation Frequency
3. RBW=1MHz, VBW=3MHz Span: 0Hz Sweep time: 60S
4. Set the EUT to transmit by manually operated. Use the "View" function of SPA to find the transmission time of being released.
5. Record the data and Reported.

### 6.3 Measurement Setup (Block Diagram of Configuration)

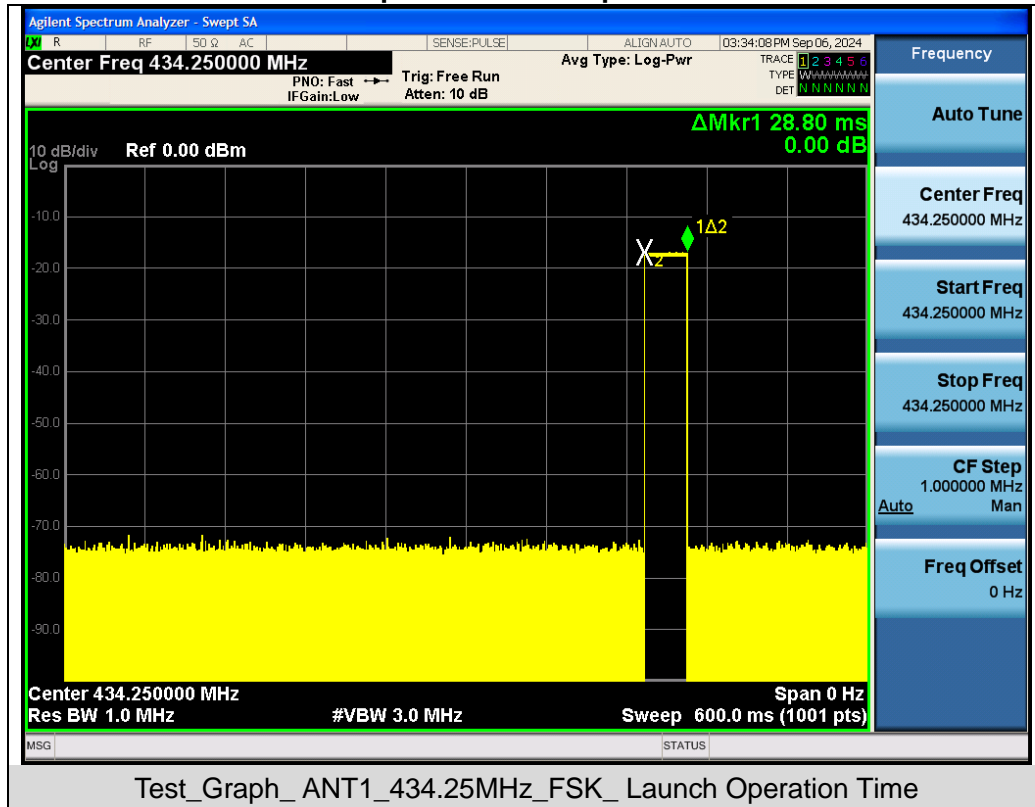


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## 6.4 Measurement Result

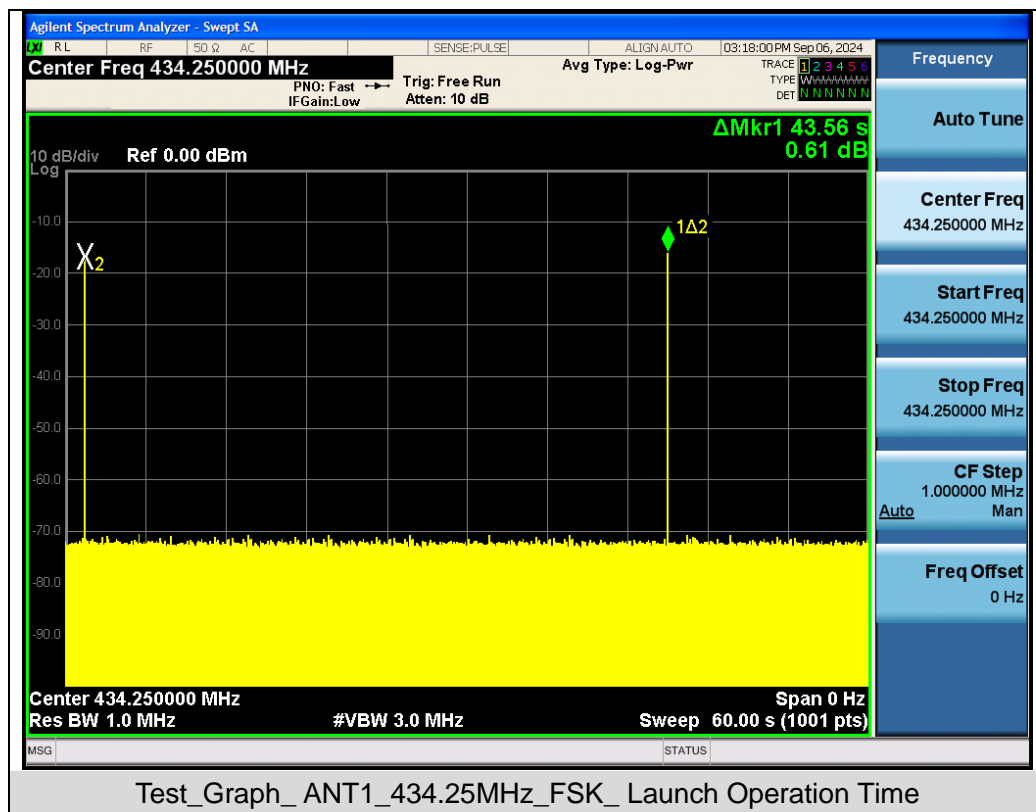
Test Mode	Test Channel (MHz)	Each transmission time (s)	Each transmission time Limits	Silent period between transmissions time (s)	Silent period between transmissions Limits	Pass or Fail
FSK	434.25	0.0288	< 1s	43.56	> 10s	Pass

Test Graphs of Launch Operation Time



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## 7. Duty Cycle of Correction Factor

### 7.1 Provisions Applicable

According to FCC Part 15.231 (b)(2) and 15.35 (c), For pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

### 7.2 Measurement Procedure

After the antenna of the EUT is connected, the output signal of the EUT is received by the connected test antenna

To the spectrum analyzer. Set the center frequency to the actual working frequency of the EUT, and then set the spectrum analyzer to Zero Span for

Release time reading. During the test, the switch is released and the EUT is automatically closed

1. Set the parameters of SPA as below:

Centre frequency = Operation Frequency

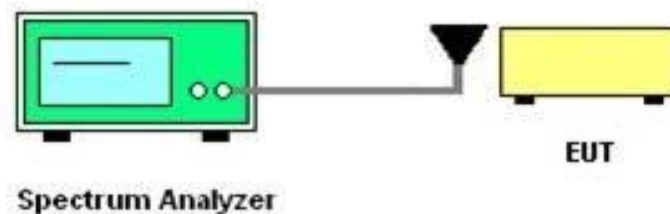
RBW=1MHz, VBW=3MHz

Span: 0Hz

Sweep time: more than two pulse trains or more than each type of pulse occupancy time

2. Set the EUT to transmit by manually operated. Use the "Delta mark" function of SPA to find the period time between two pulse trains and each type of pulse occupancy time.
3. Record the plots and Reported.

### 7.3 Measurement Setup (Block Diagram of Configuration)



### 7.4 Measurement Result

Test Channel (MHz)	Test Period (Ton) (ms)	Test Period (Total) (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
433.75	31.2	100	31.20	-10.12
434.25	28.8	100	28.80	-10.81
434.75	31.2	100	31.20	-10.12

Note 1: Duty Cycle Factor=20 log (Duty Cycle)

Note 2: The maximum reference value of the test cycle is 100ms.

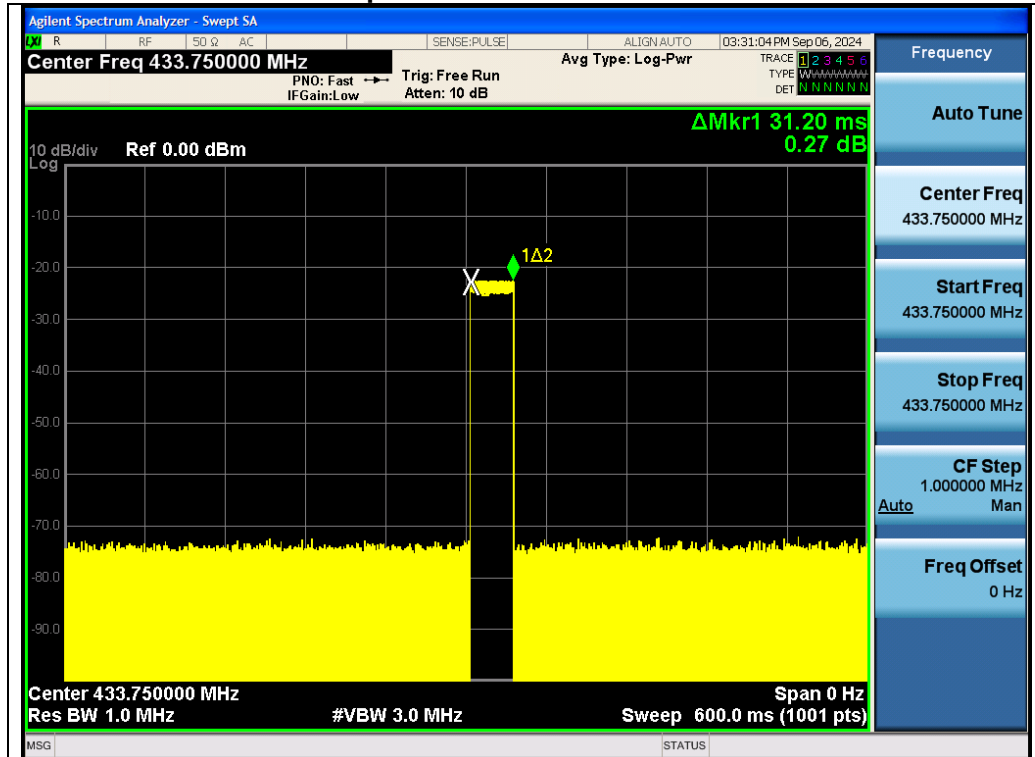
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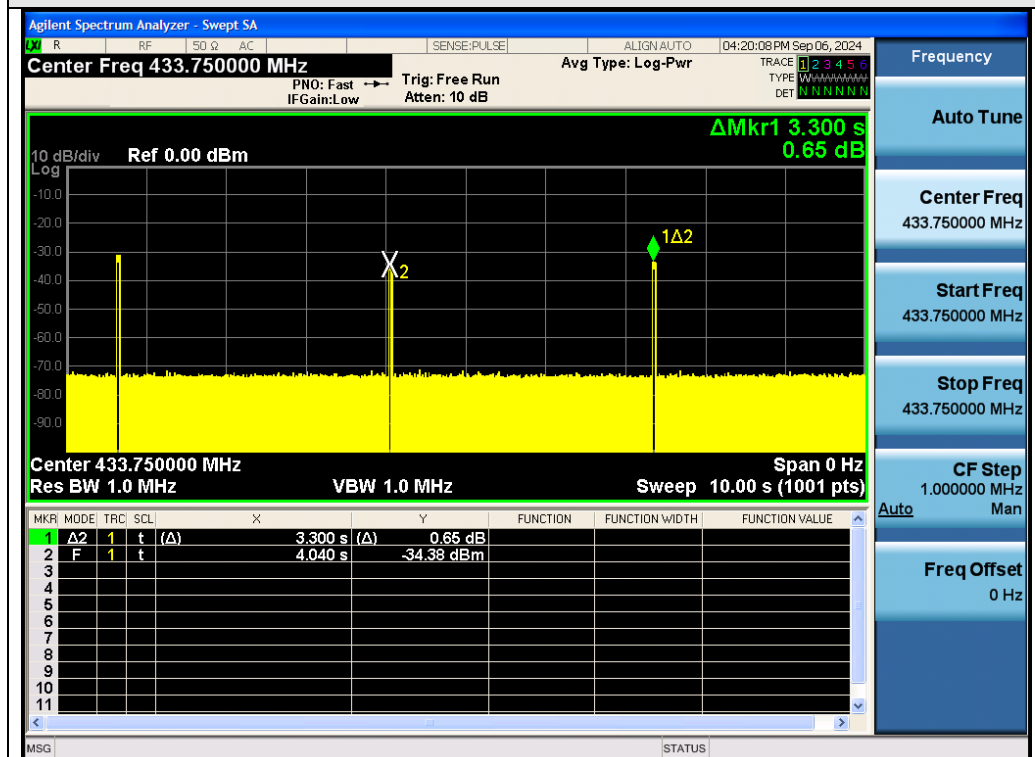
Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd

Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: <http://www.agccert.com/>

### Test Graphs of Pulse Emission Time Test

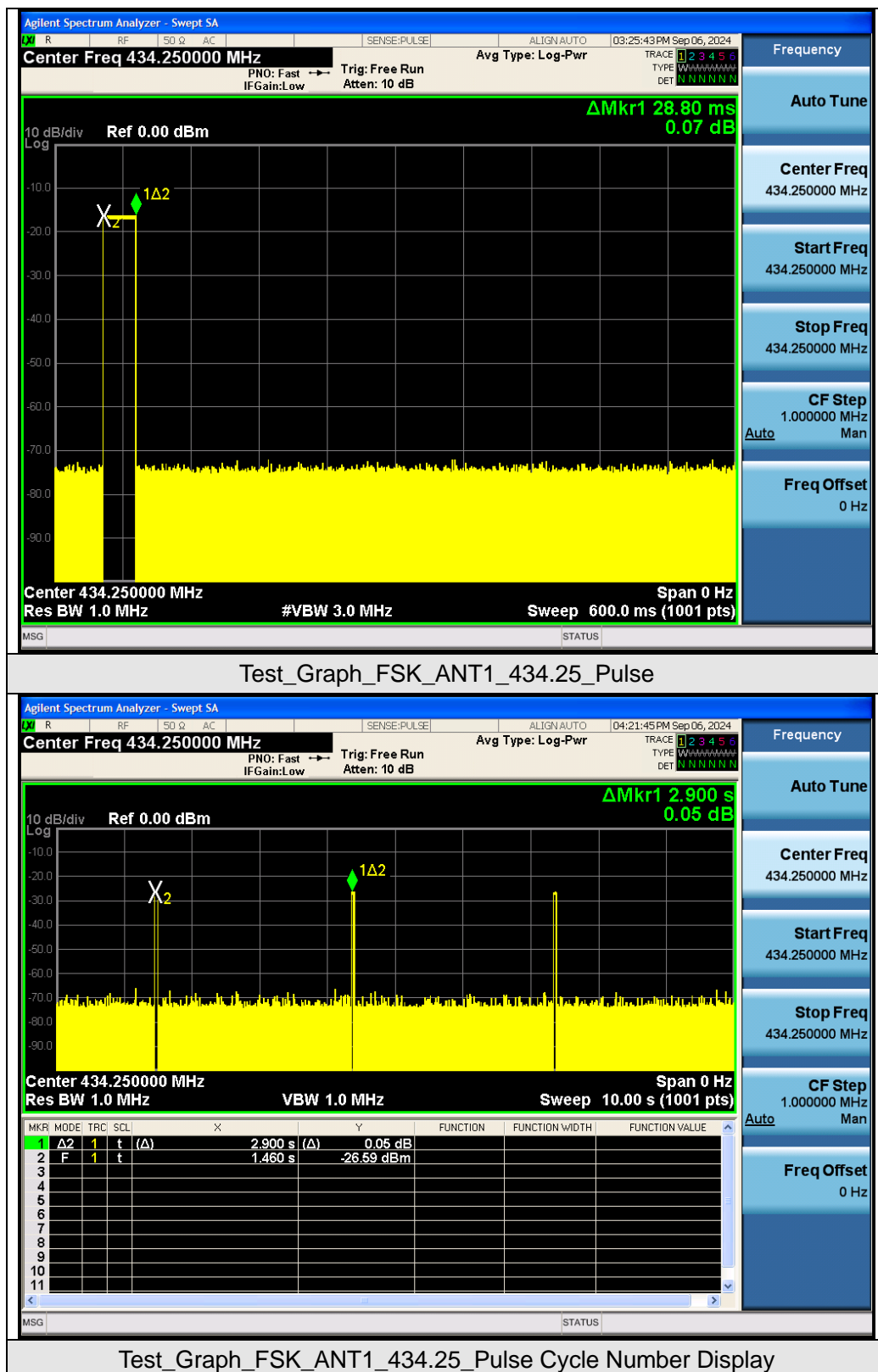


### Test\_Graph\_FSK\_ANT1\_433.75\_Pulse

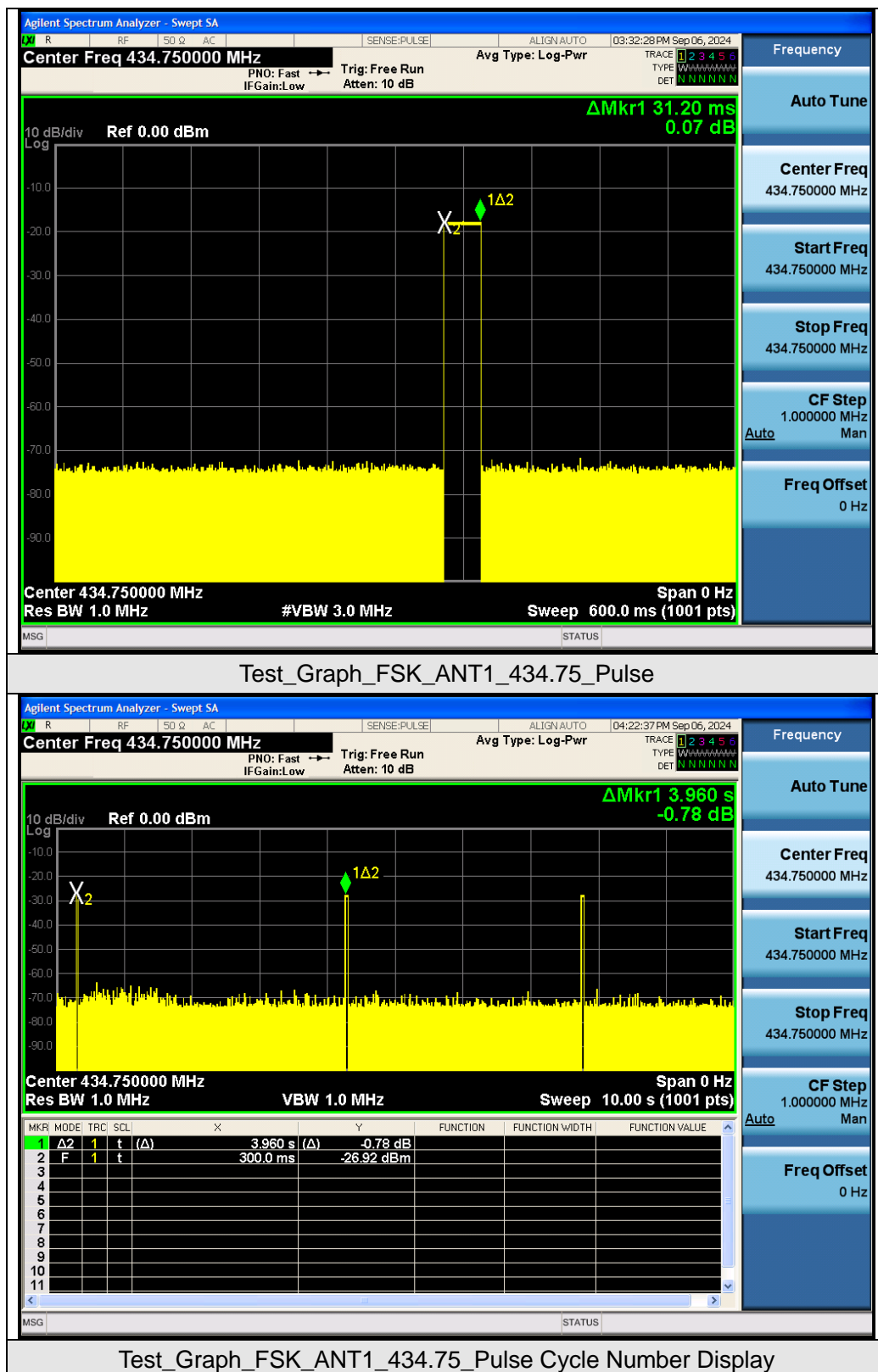


### Test\_Graph\_FSK\_ANT1\_433.75\_Pulse Cycle Number Display

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## 8. Field Strength of Fundamental and Radiated Emission

### 8.1 Provisions Applicable

15.209 Limit in the below table has to be followed:

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
0.009 ~ 0.490	300	$2400/F(\text{kHz})$	---
0.490 ~ 1.705	30	$24000/F(\text{kHz})$	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Remark:

- 1) Emission level  $\text{dB}\mu\text{V} = 20 \log$  Emission level  $\mu\text{V/m}$
- 2) The smaller limit shall apply at the cross point between two frequency bands
- 3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

15.231(b) Limit in the below table has to be followed:

Fundamental Frequency	Field Strength of Fundamental (microvolts/meter)	Field Strength of Harmonics (microvolts/meter)
40.66-40.70MHz	2250	225
70-130MHz	1250	125
130-174MHz	1250 to 3750	125 to 375
174-260MHz	3750	375
260-470MHz	3750 to 12500	375 to 1250
Above 470MHz	12500	1250

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15.231(e) Limit in the below table has to be followed:

Fundamental Frequency	Field Strength of Fundamental (microvolts/meter)	Field Strength of Harmonics (microvolts/meter)
40.66-40.70MHz	1000	100
70-130MHz	500	50
130-174MHz	500 to 1500	50 to 150
174-260MHz	1500	150
260-470MHz	1500 to 5000	150 to 500
Above 470MHz	5000	500

## 8.2 Measurement Procedure

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.

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9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Test Setting
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
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

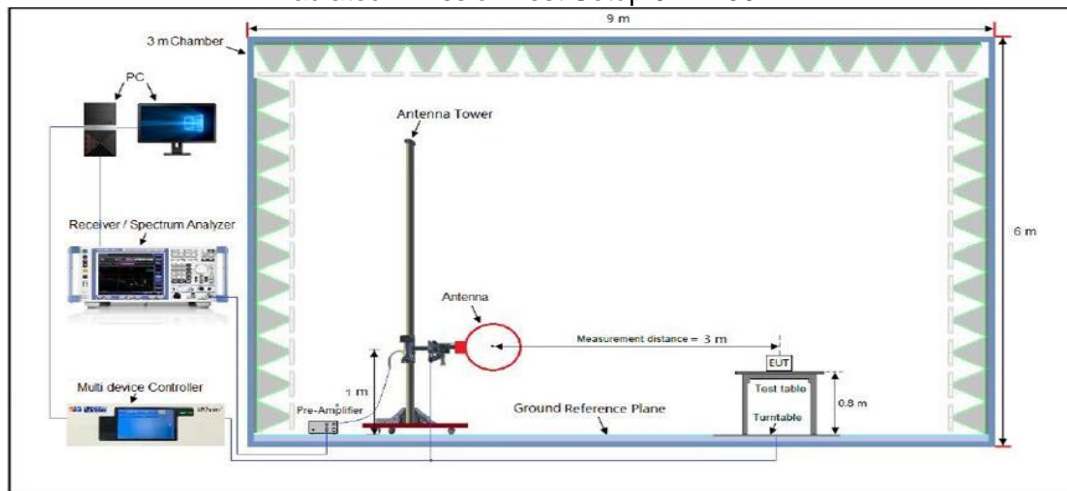
Receiver Parameter	Test Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

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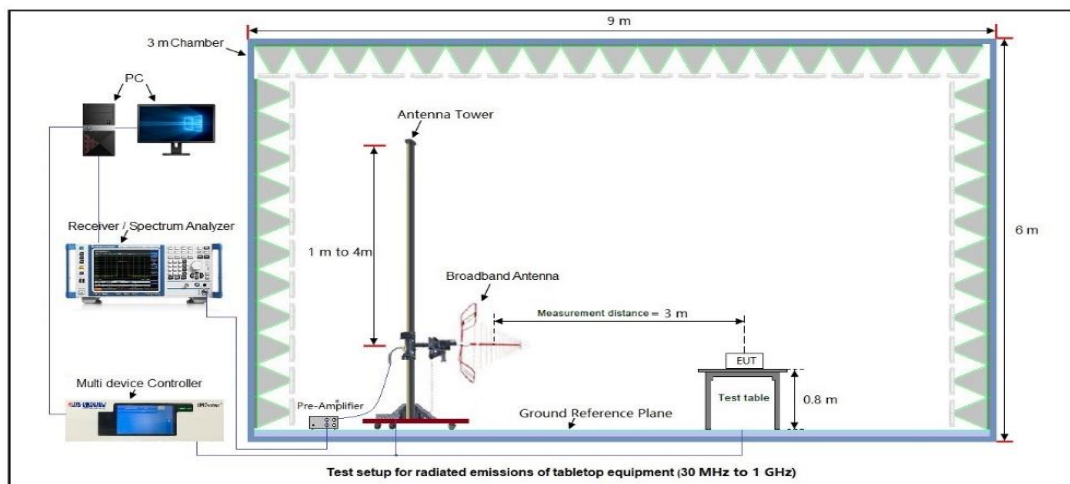


### 8.3 Measurement Setup (Block Diagram of Configuration)

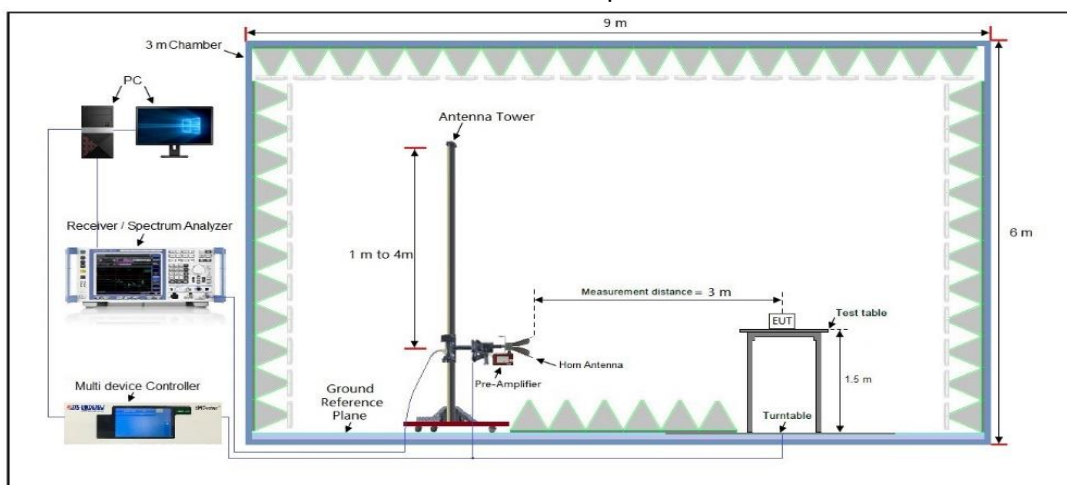
Radiated Emission Test Setup 9kHz-30MHz



Radiated Emission Test Setup 30MHz-1000MHz



Radiated Emission Test Setup Above 1000MHz



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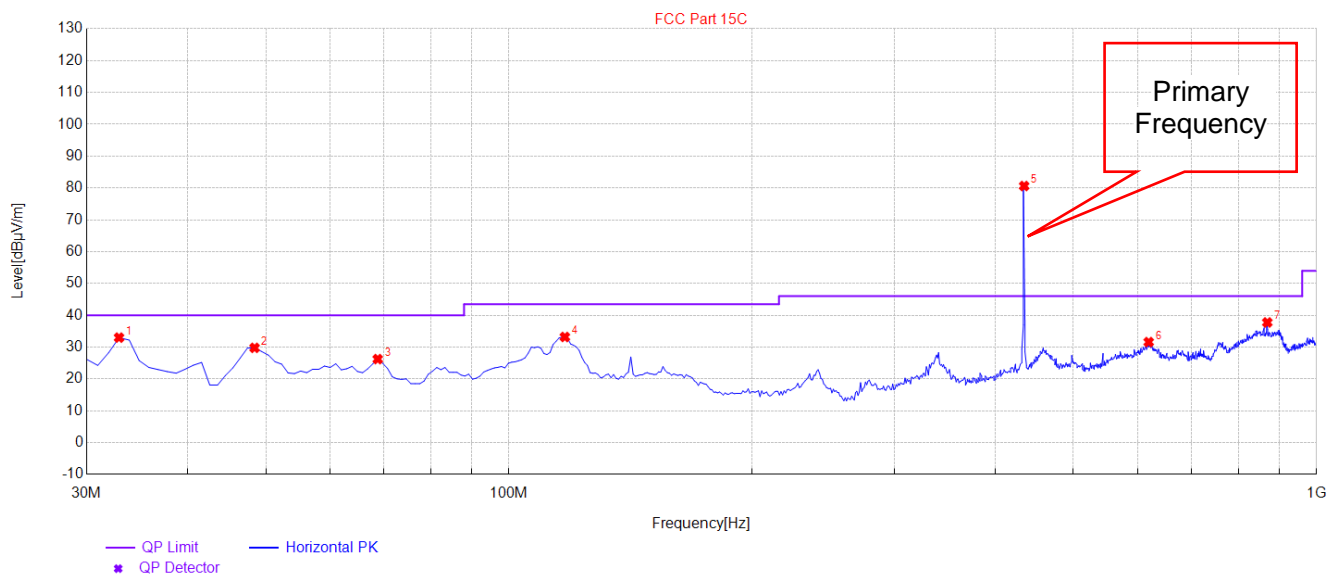
## 8.4 Measurement Result

### Radiated Emission from 9kHz~30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

### Radiated Emission from 30MHz~1000MHz

<b>EUT Name</b>	Smart Temperature and Humidity Sensor	<b>Model Name</b>	MS130
<b>Temperature</b>	22.3° C	<b>Relative Humidity</b>	55.8 %
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	DC 3V by battery
<b>Test Mode</b>	Mode 2	<b>Antenna</b>	Horizontal



### Suspected Data List\_ Peak Detection

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	32.91	32.99	12.41	40.00	7.01	150	120	Horizontal
2	48.43	29.78	14.44	40.00	10.22	150	180	Horizontal
3	68.8	26.24	15.04	40.00	13.76	150	130	Horizontal
4	117.3	33.19	15.88	43.50	10.31	150	80	Horizontal
5	434.25	80.26	19.06	92.90	12.64	150	150	Horizontal
6	619.76	31.60	25.90	46.00	14.40	150	150	Horizontal
7	869.05	37.76	29.70	46.00	8.24	150	60	Horizontal

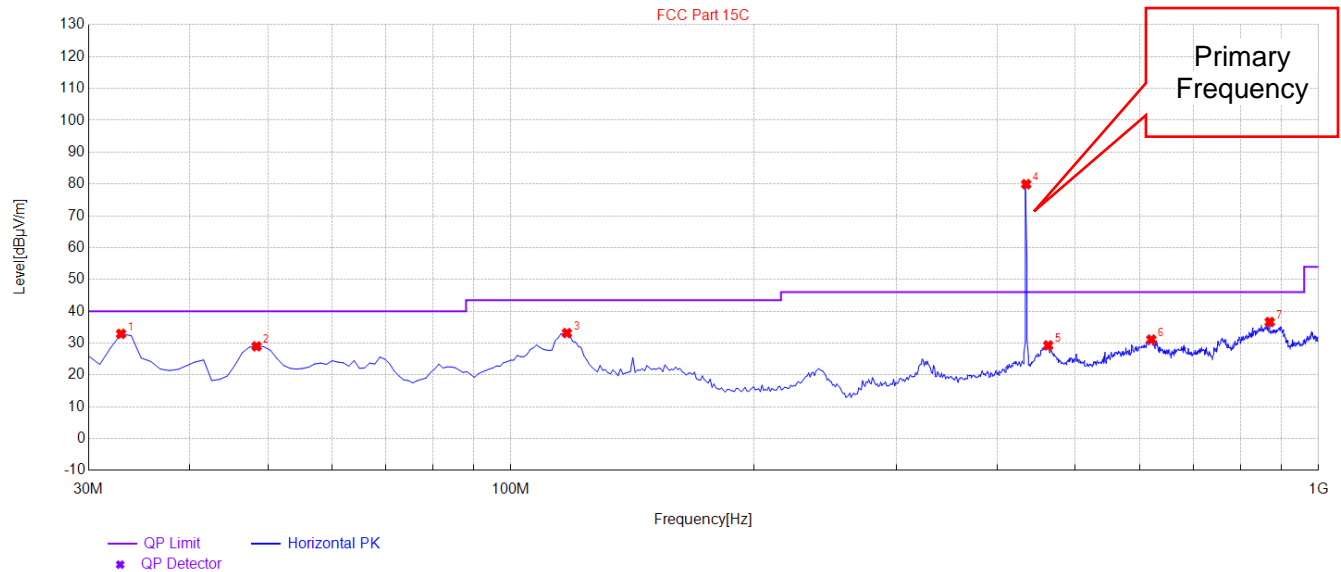
### Final data result\_ Average Detection

NO	Freq. [MHz]	PK Level [dBμV/m]	Duty cycle factor(dB)	AV Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	434.25	80.26	-10.81	69.45	72.90	3.45	Horizontal

## RESULT: PASS

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EUT Name	Smart Temperature and Humidity Sensor	Model Name	MS130
Temperature	22.3° C	Relative Humidity	55.8 %
Pressure	960hPa	Test Voltage	DC 3V by battery
Test Mode	Mode 2	Antenna	Vertical



#### Suspected Data List\_ Peak Detection

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	32.91	32.93	12.41	40.00	7.07	150	340	Vertical
2	48.43	29.00	14.44	40.00	11.00	150	140	Vertical
3	117.3	33.17	15.88	43.50	10.33	150	310	Vertical
4	434.25	79.94	19.06	92.90	12.96	150	160	Vertical
5	462.62	29.29	24.11	46.00	16.71	150	60	Vertical
6	620.73	31.12	25.82	46.00	14.88	150	10	Vertical
7	870.02	36.63	29.67	46.00	9.37	150	30	Vertical

#### Final data result\_ Average Detection

NO.	Freq. [MHz]	PK Level [dBμV/m]	Duty cycle factor (dB)	AV Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	434.25	79.97	-10.81	69.16	72.90	3.74	Vertical

#### RESULT: PASS

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. All test modes had been pre-tested. The mode 2 is the worst case and recorded in the report.

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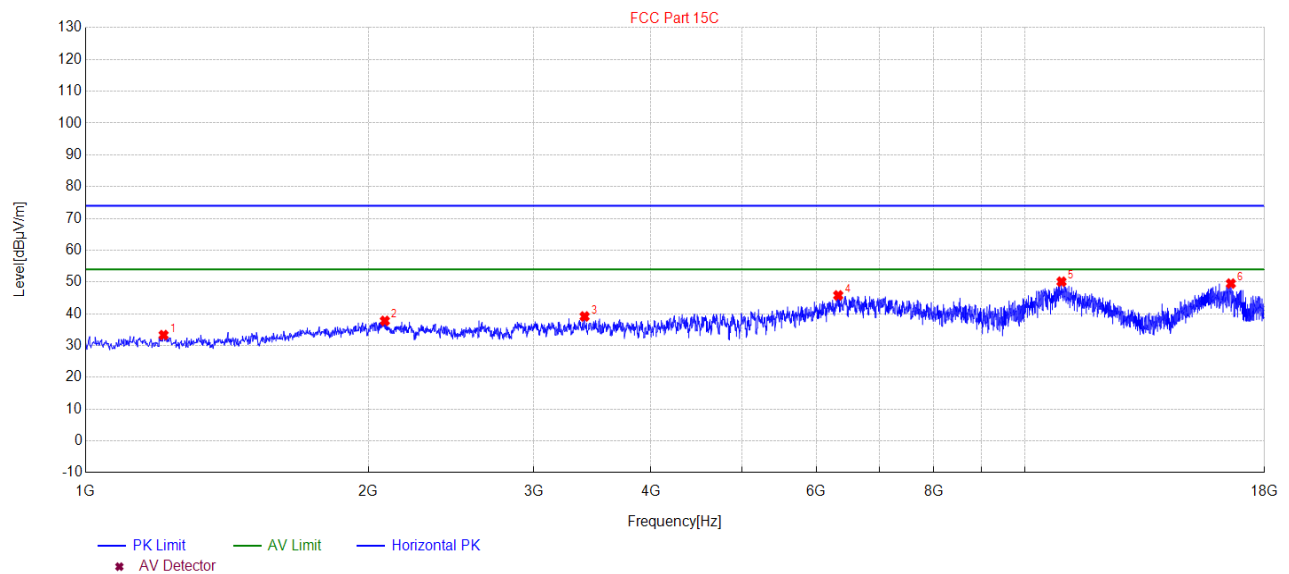
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Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: http://www.agccert.com/

### Radiated Emission from Above 1GHz

EUT Name	Smart Temperature and Humidity Sensor	Model Name	MS130
Temperature	22.3° C	Relative Humidity	55.8 %
Pressure	960hPa	Test Voltage	DC 3V by battery
Test Mode	Mode 2	Antenna	Horizontal



### Suspected Data List\_ Peak Detection

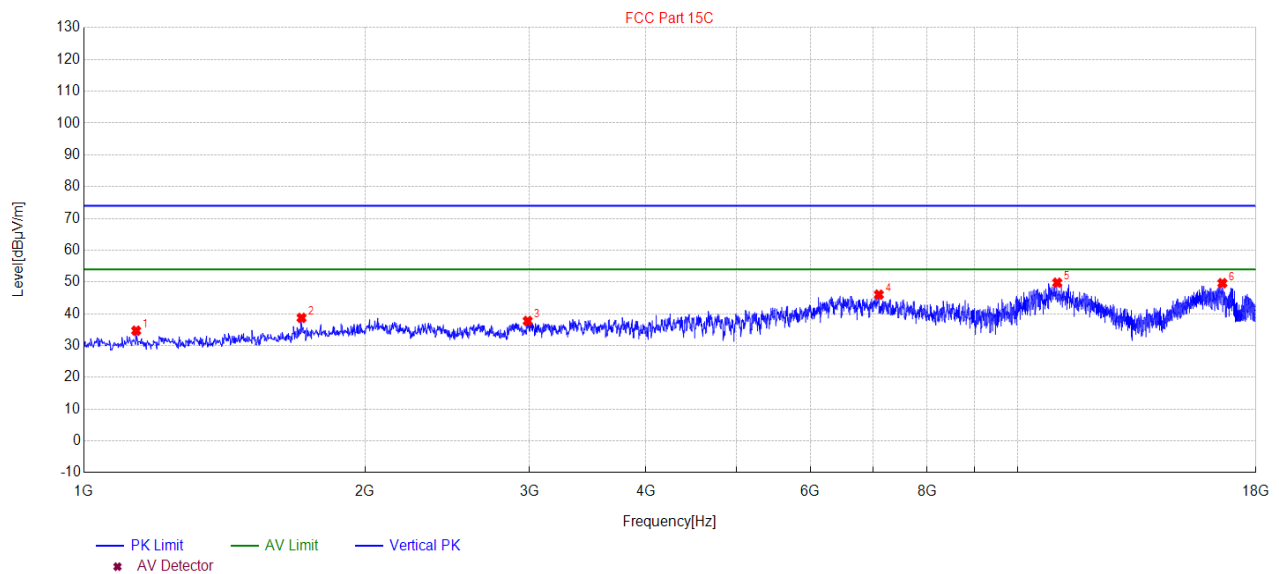
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1210.8211	33.30	-18.00	74.00	40.70	150	359	Horizontal
2	2083.0083	37.76	-13.21	74.00	36.24	150	38	Horizontal
3	3398.9399	39.16	-10.91	74.00	34.84	150	42	Horizontal
4	6330.033	45.78	-4.80	74.00	28.22	150	42	Horizontal
5	10942.5943	50.10	2.47	74.00	23.90	150	48	Horizontal
6	16576.9577	49.50	5.70	74.00	24.50	150	114	Horizontal

### RESULT: PASS

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### Radiated Emission from Above 1GHz

EUT	Smart Temperature and Humidity Sensor	Model Name	MS130
Temperature	22.3° C	Relative Humidity	55.8 %
Pressure	960hPa	Test Voltage	DC 3V by battery
Test Mode	Mode 2	Antenna	Vertical



### Suspected Data List\_ Peak Detection

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1137.7138	34.67	-18.12	74.00	39.33	150	359	Vertical
2	1710.6711	38.71	-15.80	74.00	35.29	150	38	Vertical
3	2987.4988	37.73	-11.98	74.00	36.27	150	42	Vertical
4	7103.6104	46.02	-3.62	74.00	27.98	150	42	Vertical
5	11027.6028	49.77	2.61	74.00	24.23	150	48	Vertical
6	16571.8572	49.63	5.70	74.00	24.37	150	114	Vertical

### RESULT: PASS

#### Note:

- The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.
- Factor = Antenna Factor + Cable loss - Amplifier gain, Margin=Measure result-Limit.
- The "Factor" value can be calculated automatically by software of measurement system.

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## 9. -20dB Bandwidth Measurement

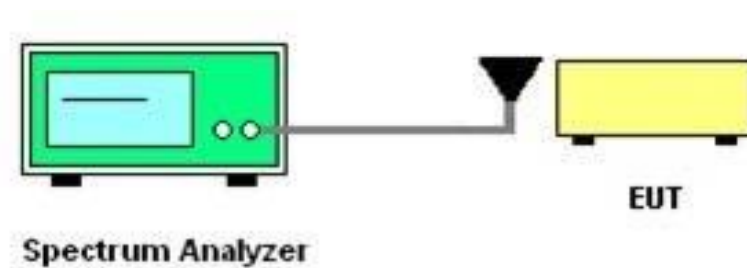
### 9.1 Provisions Applicable

According to FCC Part 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier

### 9.2 Measurement Procedure

1. Set the parameters of SPA as below:
2. Centre frequency = Operation Frequency
3. RBW=1kHz, VBW=3kHz
4. Span: 150kHz
5. Sweep time: Auto
6. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
7. Record the plots and Reported.

### 9.3 Measurement Setup (Block Diagram of Configuration)



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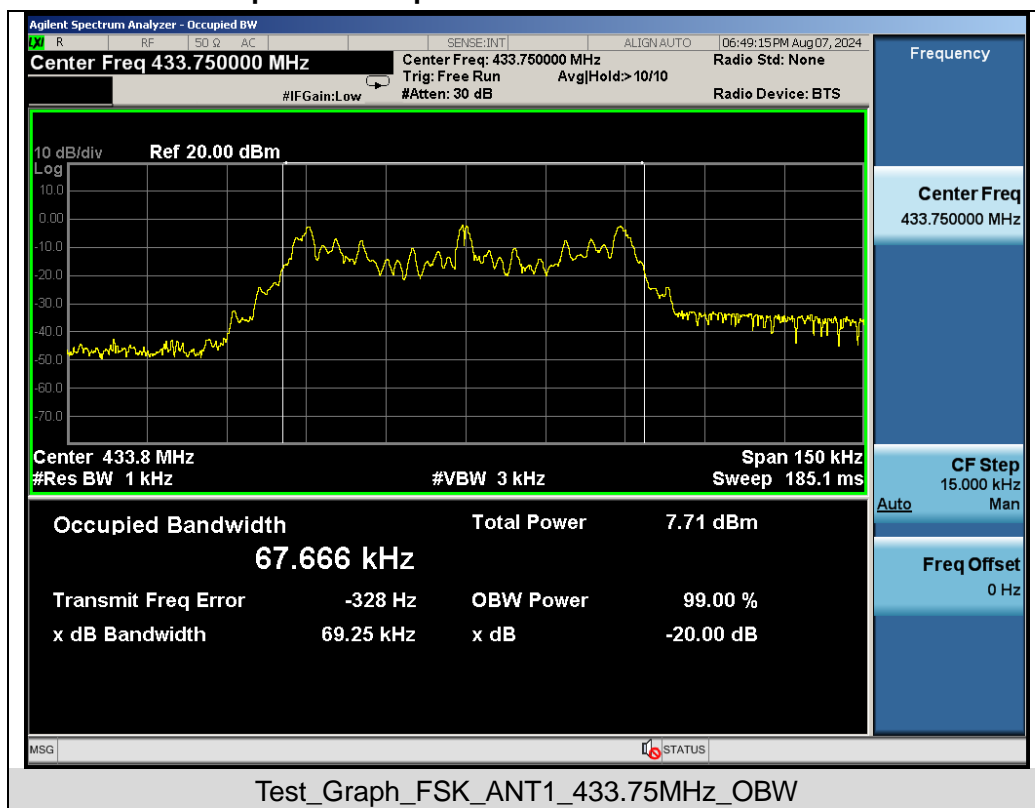


#### 9.4 Measurement Result

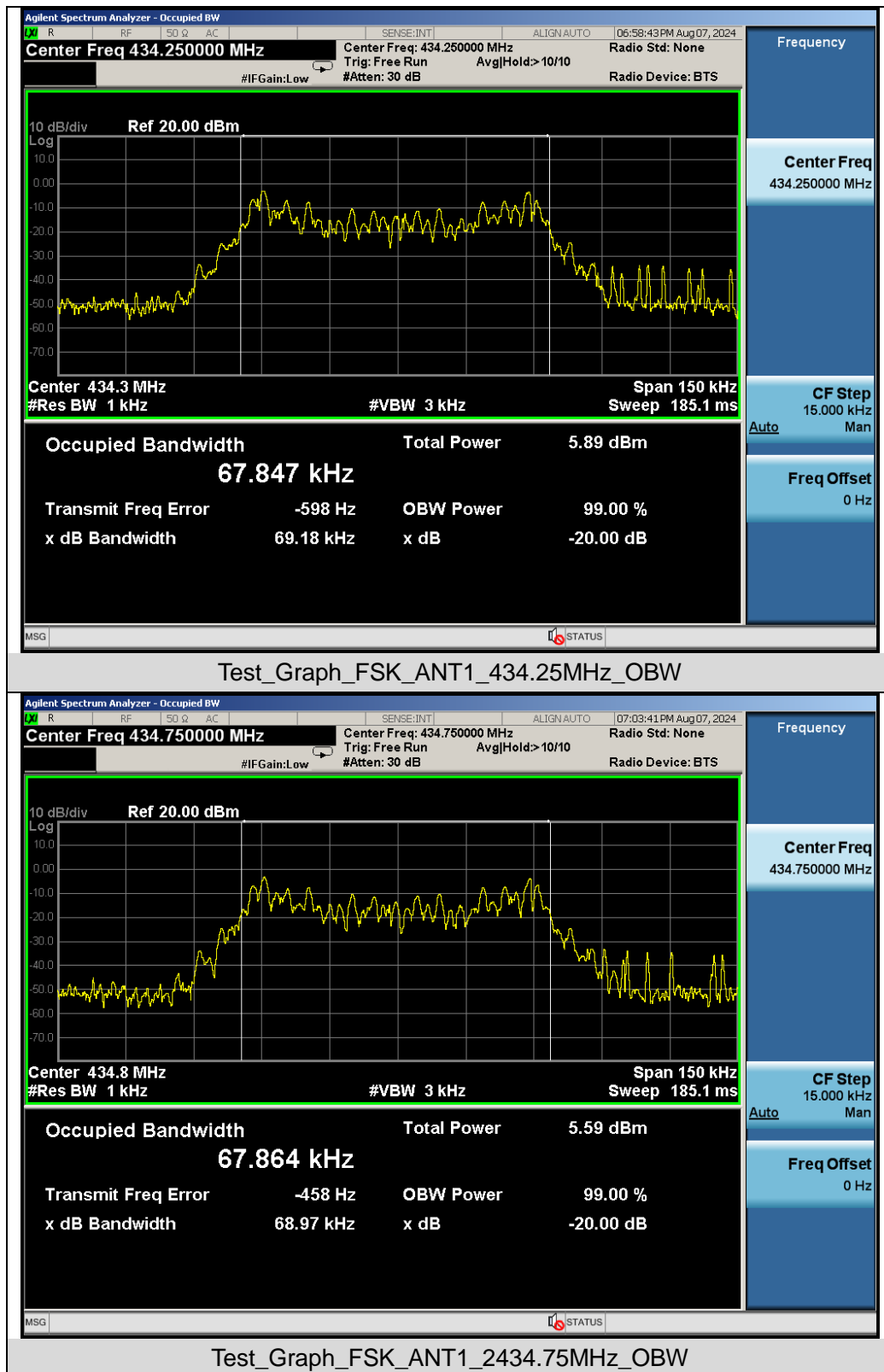
Test Data of Bandwidth Measurement					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (kHz)	-20dB Bandwidth (kHz)	Limits (kHz)	Pass or Fail
FSK	433.75	67.666	69.25	108.44	Pass
FSK	434.25	67.847	69.18	108.56	Pass
FSK	434.75	67.864	68.97	108.69	Pass

Note: Limit= Operation Frequency × 0.25%

#### Test Graphs of Occupied Bandwidth and -20dB Bandwidth



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## 10. AC Power Line Conducted Emission Test

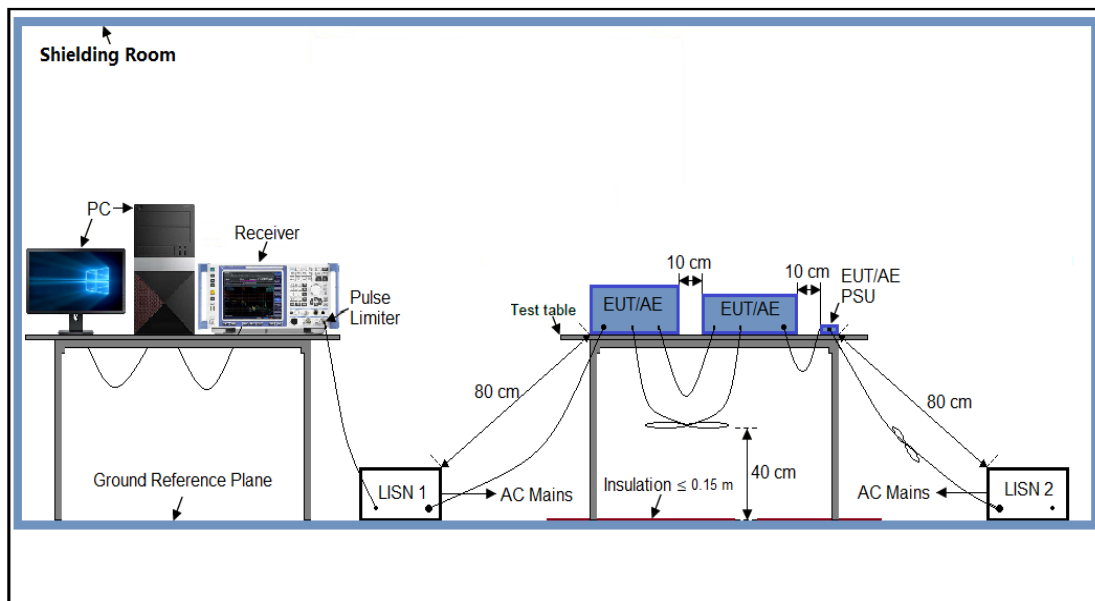
### 10.1 Measurement Limit

Frequency Range	Maximum RF Line Voltage	
	Q.P. (dB $\mu$ V)	Average (dB $\mu$ V)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

### 10.2 Measurement Setup (Block Diagram of Configuration)



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### 10.3 Preliminary Procedure of Line Conducted Emission Test

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 3V power from battery.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### 10.4 Final Procedure of Line Conducted Emission Test

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

### 10.5 Measurement Result

Not Applicable

Note: This device is battery powered, there is no AC power supply

## **APPENDIX I: PHOTOGRAPHS OF TEST SETUP**

Refer to the Report No.: AGC00970240701AP02

## **APPENDIX II: PHOTOGRAPHS OF TEST EUT**

Refer to the Report No.: AGC00970240701AP03

**-----END OF REPORT-----**

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