



Certificate # 2861.01

GRGTEST

Page 1 of 33

# Test Report

Verified code: 952193

Report No.: E202112291004-16

Customer: Autel Intelligent Tech. Corp., Ltd.

Address: 7th-8th, 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd. Xili, Nanshan, Shenzhen, 518055  
China

Sample Name: Professional Key Tool

Sample Model: MaxiIM KM100

Receive Sample Date: Jan.06,2022

Test Date: Jan.10,2022 ~ Apr.14,2022

Reference Document: CFR 47, FCC Part 15 Subpart C  
RADIO FREQUENCY DEVICES: Subpart C—Intentional Radiators

Test Result: Pass

Prepared by: Yang Zhaoyun Reviewed by: JiangTao

Approved by: Xiao Liang

GUANGZHOU GRG METROLOGY & TEST CO., LTD

Issued Date: 2022-04-18

GUANGZHOU GRG METROLOGY & TEST CO., LTD.

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**REPORT ISSUED HISTORY**

Report Version	Report No.	Description	Compile Date
1.0	E202112291004-16	Original Issue	2022/04/16

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**1. TEST RESULT SUMMARY**

<b>CFR 47, FCC Part 15 Subpart C</b> <b>ANSI C63.10:2013</b>		
Standard	Test Item	Result
15.207	Conducted emission AC power port	Pass
§15.205(a), §15.209(a), §15.249(a), §15.249(c)	Field strength of emissions and Restricted bands	Pass
§15.215(c)	20dB bandwidth	Pass
§15.249(d)	Out of band emissions	Pass
§15.203	Antenna Requirement	Pass, Note <sup>1</sup>

Note <sup>1</sup>: The max gain of antenna is -10dBi which accordance 15.203.is considered sufficient to comply with the provisions of this section.

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## 2. GENERAL DESCRIPTION OF EUT

### 2.1 APPLICANT

Name: Autel Intelligent Tech. Corp., Ltd.

Address: 7th-8th, 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd. Xili, Nanshan, Shenzhen, 518055 China

### 2.2 MANUFACTURER

Name: Autel Intelligent Tech. Corp., Ltd.

Address: 7th-8th, 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd. Xili, Nanshan, Shenzhen, 518055 China

### 2.3 FACTORY

Name: Autel Intelligent Technology Corp., Ltd. Guangming Branch

Address: 7F&6F, East Wing, Building 2, and 6F of Electronical Building, Yanxiang Industrial Zone, Gaoxin Rd, Dongzhou Community of Guangming New District, Shenzhen

### 2.4 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: Professional Key Tool

Model No.: MaxiIM KM100

Adding Model /

Model Differences: /

Trade Name: AUTEL

Sample No: E202112291004-0001

FCC ID: WQ8IMKM100

Power Supply: 5Vdc power supplied by adapter  
3.85Vdc power supplied by Rechargeable Li-ion battery

Adapter Specification: Model: GME10C-050200FUu  
Input: 100-240V~50-60Hz 0.28A  
Output: 5.0V --- 2A 10W

Frequency Range: 915MHz

Max Antenna gain: Loop antenna, -10dBi(Max)

Sample submitting way :  Provided by customer  Sampling

Type of Modulation: FSK, ASK

Temperature Range: 0°C~55°C

Hardware Version: SM2031\_MAIN\_V5

Software Version: V1.20.24

Note: /

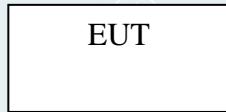
## 2.5 TEST MODE

Mode No.	Description of the modes
Mode 1	Transmitting

## 2.6 LOCAL SUPPORTIVE

Name of Equipment	Manufacturer	Model	Serial Number	Note
/	/	/	/	/

## 2.7 CONFIGURATION OF SYSTEM UNDER TEST



## 2.8 TEST SOFTWARE:

Software version	Test level
NA	Default

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### 3. LABORATORY AND ACCREDITATIONS

#### 3.1 LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co., Ltd.

Add.: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District  
Shenzhen, 518110, People's Republic of China.  
P.C.: 518000  
Tel : 0755-61180008  
Fax: 0755-61180008

#### 3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

**USA** A2LA(Certificate#:2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

**Canada** ISED (Company Number: 24897, CAB identifier:CN0069)

**USA** FCC (Registration Number: 759402, Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site,  
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### 3.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conduction Emission	9kHz~150kHz	2.8dB
	150kHz~10MHz	2.8dB
	10MHz~30MHz	2.2dB
Radiated Emission	9kHz~30MHz	4.46dB
	30MHz~1000MHz	4.3dB
	1GHz~18GHz	5.6dB
	9kHz~30MHz	4.46dB
	30MHz~1000MHz	4.3dB
	1GHz~18GHz	5.6dB

Measurement	Uncertainty
RF frequency	$6.0 \times 10^{-6}$
RF power conducted	0.78 dB
Occupied channel bandwidth	0.4 dB
Unwanted emission, conducted	0.68 dB
Humidity	6 %
Temperature	2°C

This uncertainty represents an expanded uncertainty factor of  $k=2$ .

#### 4. LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
<b>Conducted Emissions</b>				
EMI TEST RECEIVER	R&S	ESCI	100783	2022-09-13
LISN(EUT)	R&S	ENV216	101543	2022-09-14
EZ-EMC	EZ	CCS-3A1-CE	/	/
<b>Radiated Spurious Emission&amp;Restricted bands of operation</b>				
Test S/W	EZ	CCS-2ANT		
Loop Antenna	TESEQ	HLA6121	52599	2022-04-21
Test Receiver	R&S	ESR7	102444	2022-09-22
Amplifier	EMEC	EM330	/	2023-03-05
Bi-log Antenna	TESEQ	CBL6143A	32399	2022-11-25
Spectrum Analyzer	Agilent	N9020B	MY59050667	2022-12-10
Bilog Antenna	Schwarzbeck	VULB 9163	01279	2023-03-15
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	02143	2022-10-22
Amplifier	Tonscend	TAP9E6343	AP20E806065	2022-06-03
Amplifier	Tonscend	TAP01018048	AP20E8060075	2022-06-07
Test S/W	Tonscend	JS32-RE/2.5.2.4		
<b>20 dB Bandwidth &amp; Duty cycle</b>				
Spectrum Analyzer	Keysight	N9020B	MY59050813	2022-12-13

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## 5. CONDUCTED EMISSIONS

### 5.1. LIMITS

Frequency range	Limits (dB $\mu$ V)	
	Quasi-peak	Average
150kHz~0.5MHz	66~56	56~46
0.5MHz~5MHz	56	46
5MHz~30MHz	60	50

**NOTE:** (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the range of 150 kHz to 0.5MHz.

### 5.2. TEST PROCEDURES

#### Procedure of Preliminary Test

Test procedures follow ANSI C63.10:2013.

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

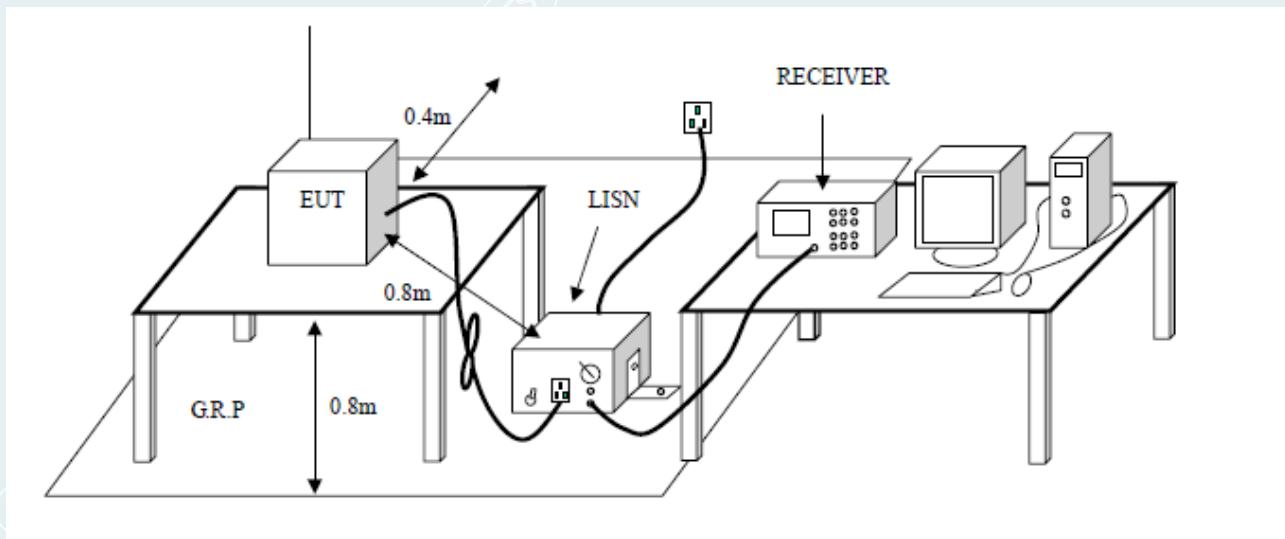
- Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:
  - 1) place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;
  - All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;
  - The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;
  - Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.
  - I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

The test mode(s) described in Item 2.5 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.5 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

#### Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, 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. The test data of the worst-case condition(s) was recorded.

### 5.3. TEST SETUP



### 5.4. DATA SAMPLE

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62	Pass

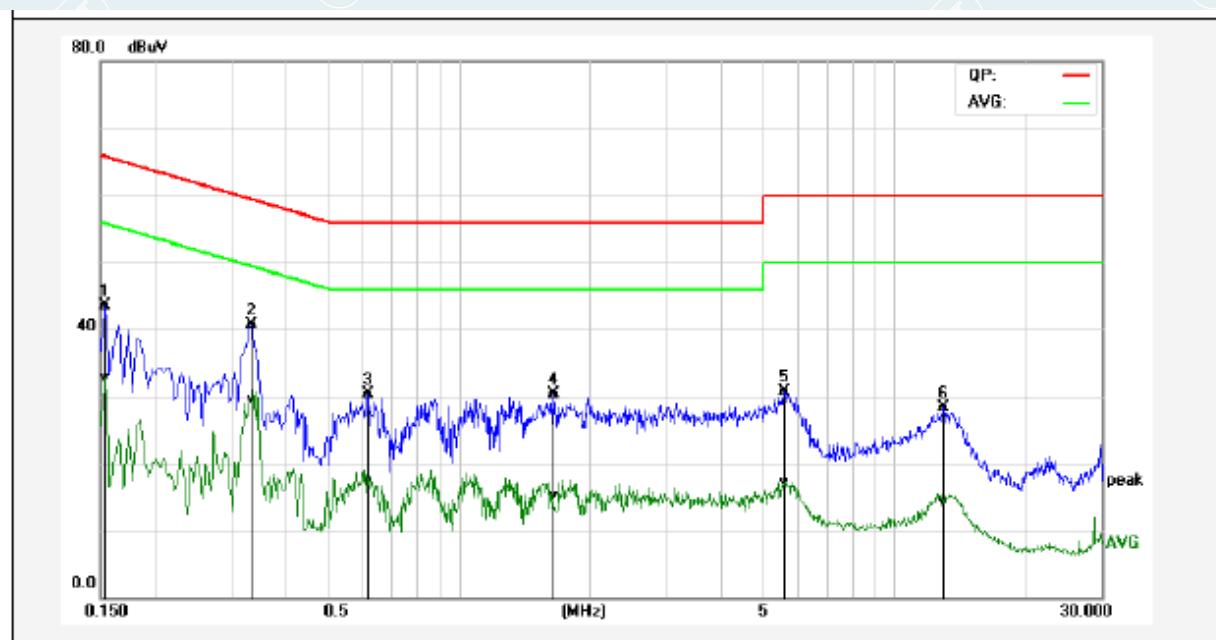
Factor = Insertion loss of LISN + Cable Loss  
 Result = Quasi-peak Reading/ Average Reading + Factor  
 Limit = Limit stated in standard  
 Margin = Result (dBuV) – Limit (dBuV)

## 5.5. TEST RESULTS

EUT Name	Professional Key Tool	Model	MaxiIM KM100
Environmental Conditions	23.4 °C/48%RH/101kPa	Test Mode	Mode 1
Power supply	AC120V/60Hz	Tested By	Tang Shenghui
Test Date	2022-04-14	Sample No.	E202112291004-0001

Line:

L1

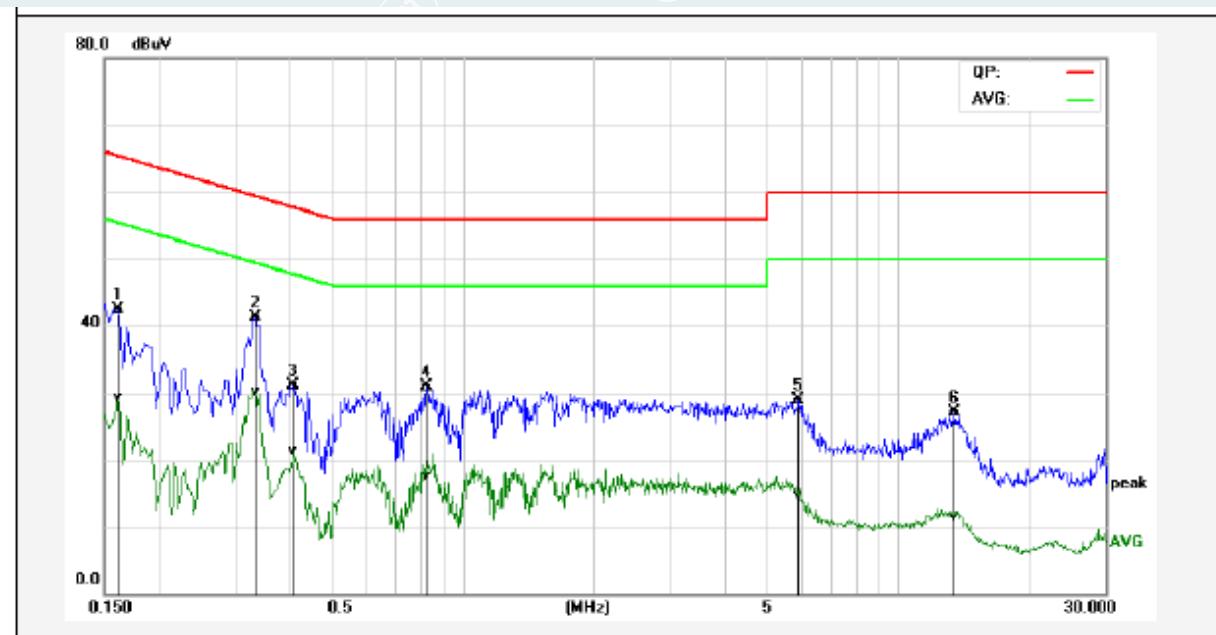


No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1539	33.96	23.13	9.53	43.49	32.66	65.78	55.79	-22.29	-23.13	Pass
2*	0.3339	31.15	20.02	9.56	40.71	29.58	59.35	49.35	-18.64	-19.77	Pass
3	0.6180	20.74	7.66	9.57	30.31	17.23	56.00	46.00	-25.69	-28.77	Pass
4	1.6460	20.70	5.50	9.60	30.30	15.10	56.00	46.00	-25.70	-30.90	Pass
5	5.5980	21.10	7.36	9.68	30.78	17.04	60.00	50.00	-29.22	-32.96	Pass
6	13.0020	18.56	4.31	9.82	28.38	14.13	60.00	50.00	-31.62	-35.87	Pass

EUT Name	Professional Key Tool	Model	MaxiIM KM100
Environmental Conditions	23.4°C/48%RH/101kPa	Test Mode	Mode 1
Power supply	AC120V/60Hz	Tested By	Tang Shenghui
Test Date	2022-04-14	Sample No.	E202112291004-0001

Line:

N



No.	Frequency (MHz)	QuasiPeak reading (dBuV)		Correction factor (dB)	QuasiPeak result (dBuV)		Average result (dBuV)		QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
		reading	result		result	margin	margin	margin					
1	0.1620	32.93	19.85	9.52	42.45	29.37	65.36	55.36	-22.91	-25.99	Pass		
2*	0.3339	31.58	20.49	9.63	41.21	30.12	59.35	49.35	-18.14	-19.23	Pass		
3	0.4100	21.49	11.72	9.66	31.15	21.38	57.65	47.65	-26.50	-26.27	Pass		
4	0.8300	21.22	7.87	9.64	30.86	17.51	56.00	46.00	-25.14	-28.49	Pass		
5	5.9060	19.22	4.97	9.68	28.90	14.65	60.00	50.00	-31.10	-35.35	Pass		
6	13.5340	17.16	1.74	9.86	27.02	11.60	60.00	50.00	-32.98	-38.40	Pass		

## 6. RADIATED SPURIOUS EMISSIONS

### 6.1 LIMITS

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required.

Frequency (MHz)	Quasi-peak( $\mu$ V/m)	Measurement distance(m)	Quasi-peak(dB $\mu$ V/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5~93.8
0.490-1.705	24000/F(kHz)	30	73.8~63
1.705-30.0	30	30	69.5
30~88	100	3	40
88~216	150	3	43.5
216~960	200	3	46
Above 960	500	3	54

#### NOTE:

- (1) The emission limits for the ranges 9-90kHz and 110-490kHz are based on measurements employing a linear average detector.
- (2) The lower limit shall apply at the transition frequencies.

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.

Fundamental Frequency(MHz)	Field Strength of Fundamental Field Strength (mV/m)	Field Strength of Harmonics ( $\mu$ V/m)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500

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 §15.209, whichever is the lesser attenuation.

## Restricted band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	1435 - 1626.5	9.0 - 9.2
0.495 - 0.505	16.69475 - 16.69525	1645.5 - 1646.5	9.3 - 9.5
2.1735 - 2.1905	16.80425 - 16.80475	1660 - 1710	10.6 - 12.7
3.020 - 3.026	25.5 - 25.67	1718.8 - 1722.2	13.25 - 13.4
4.125 - 4.128	37.5 - 38.25	2200 - 2300	14.47 - 14.5
4.17725 - 4.17775	73 - 74.6	2310 - 2390	15.35 - 16.2
4.20725 - 4.20775	74.8 - 75.2	2483.5 - 2500	17.7 - 21.4
5.677 - 5.683	108 - 138	2655 - 2900	22.01 - 23.12
6.215 - 6.218	149.9 - 150.05	3260 - 3267	23.6 - 24.0
6.26775 - 6.26825	156.52475 - 156.52525	3332 - 3339	31.2 - 31.8
6.31175 - 6.31225	156.7 - 156.9	3345.8 - 3358	36.43 - 36.5
8.291 - 8.294	162.0125 - 167.17	3500 - 4400	Above 38.6
8.362 - 8.366	167.72 - 173.2	4500 - 5150	
8.37625 - 8.38675	240 - 285	5350 - 5460	
8.41425 - 8.41475	322 - 335.4	7250 - 7750	
12.29 - 12.293	399.9 - 410	8025 - 8500	
12.51975 - 12.52025	608 - 614	--	
12.57675 - 12.57725	960 - 1427		
13.36 - 13.41			

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## 6.2 TEST PROCEDURES

### 1) Sequence of testing 9kHz to 30MHz

#### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

#### Pre measurement:

- The turntable rotates from 0 ° to 360 °
- The antenna height is 0.8 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

#### Final measurement:

- Identified emissions during the pre measurement the software maximizes by rotating the turntable position (0 ° to 360 °) and by rotating the elevation axes (0 ° to 360 °).
- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

### 2) Sequence of testing 30MHz to 1GHz

#### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

#### Pre measurement:

- The turntable rotates from 0 ° to 360 °
- The antenna is polarized vertical and horizontal.

- The antenna height changes from 1 to 3 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

#### **Final measurement:**

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^\circ$ ) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

### **3) Sequence of testing 1GHz to 18GHz**

#### **Setup:**

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

#### **Pre measurement:**

- The turntable rotates from  $0^\circ$  to  $360^\circ$ .
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 2.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

#### **Final measurement:**

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^\circ$ ) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

### **4) Sequence of testing above 18GHz**

#### **Setup:**

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 1 meter.
- The EUT was set into operation.

#### Pre measurement:

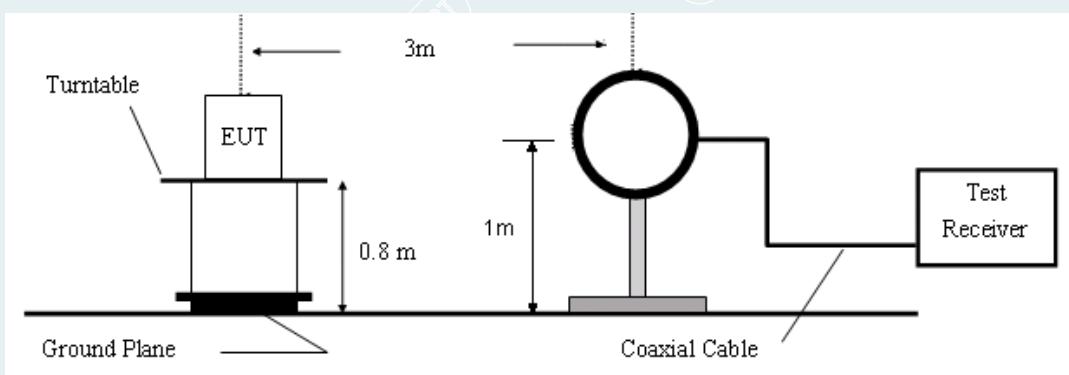
- The antenna is moved spherical over the EUT in different polarisations of the antenna.

#### Final measurement:

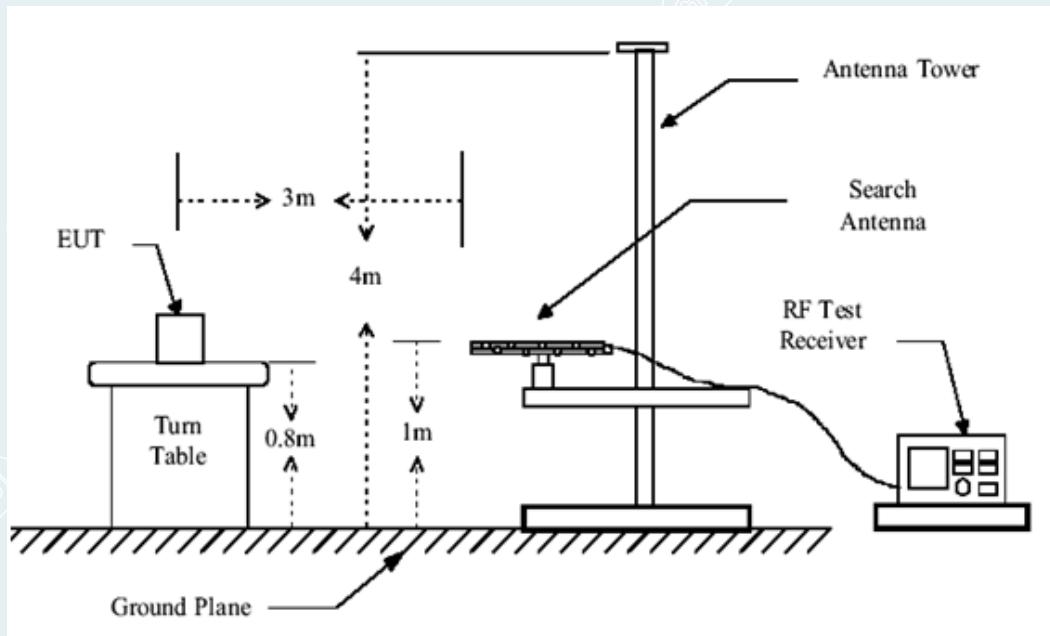
- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

NOTE: The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the Z position. So the data shown was the Z position only.

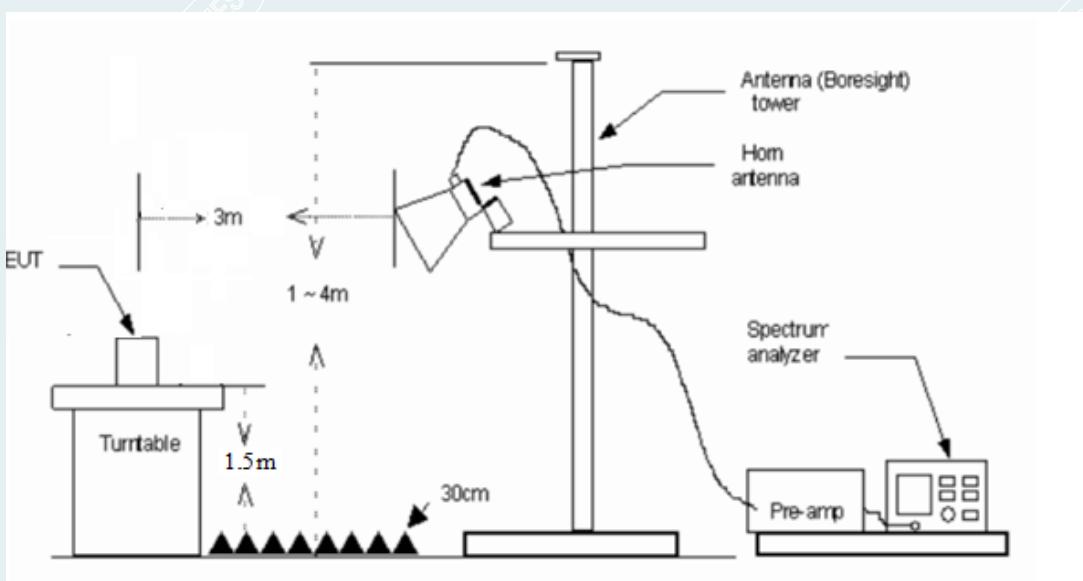
### 6.3 TEST SETUP



**Figure 1. 9kHz to 30MHz radiated emissions test configuration**



**Figure 2. 30MHz to 1GHz radiated emissions test configuration**



**Figure 3. Above 1GHz radiated emissions test configuration**

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## 6.4 TEST RESULT

## The field strength of fundamental

Environmental Conditions	23.4°C/48%RH/101kPa
Power Source:	DC 3.85V
Test Date:	2022-04-7
Test By :	Lu Wei

TX / 915MHz

FSK

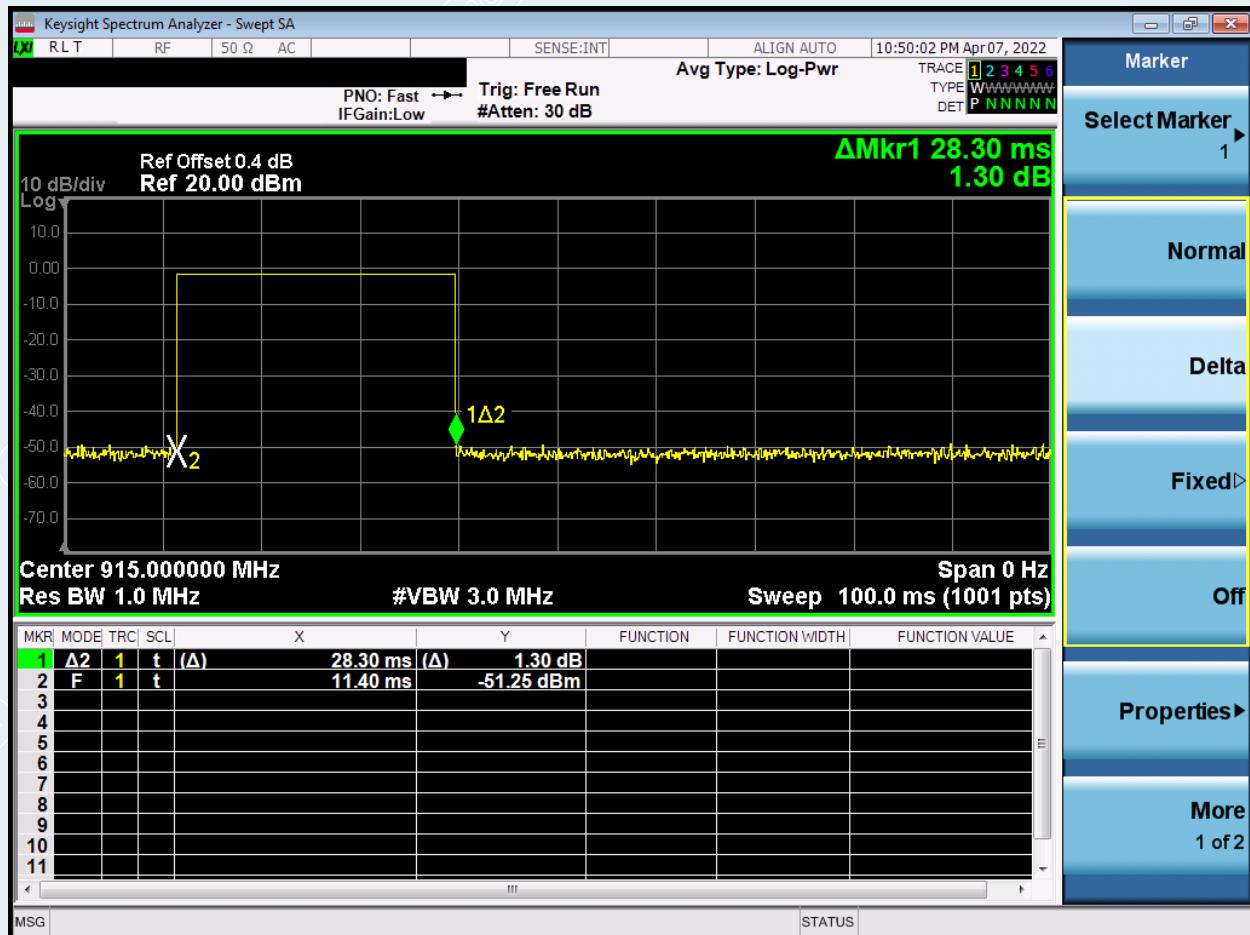
Freq. [MHz]	Reading [dB $\mu$ V/m]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
915	98.33	84.32	-14.01	114.00	29.68	100	124	Horizontal	Peak
915	105.80	91.79	-14.01	114.00	22.21	100	300	Vertical	Peak

Freq. [MHz]	Reading [dB $\mu$ V/m]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
915	84.32	73.36	-10.96	94.00	20.64	100	124	Horizontal	AVG
915	91.79	80.83	-10.96	94.00	13.17	100	300	Vertical	AVG

Remark:

1.  $\text{AVG} = \text{Peak} + 20 \log(\text{Duty Cycle})$
2. Duty Cycle = On time/Total time =  $28.3\text{ms}/100.0\text{ms} = 28.3\%$
3. Duty Cycle Correction Factor:  $20 \log (0.283) = -10.96$

### Duty Cycle:915MHz FSK:



TX / 915MHz

ASK

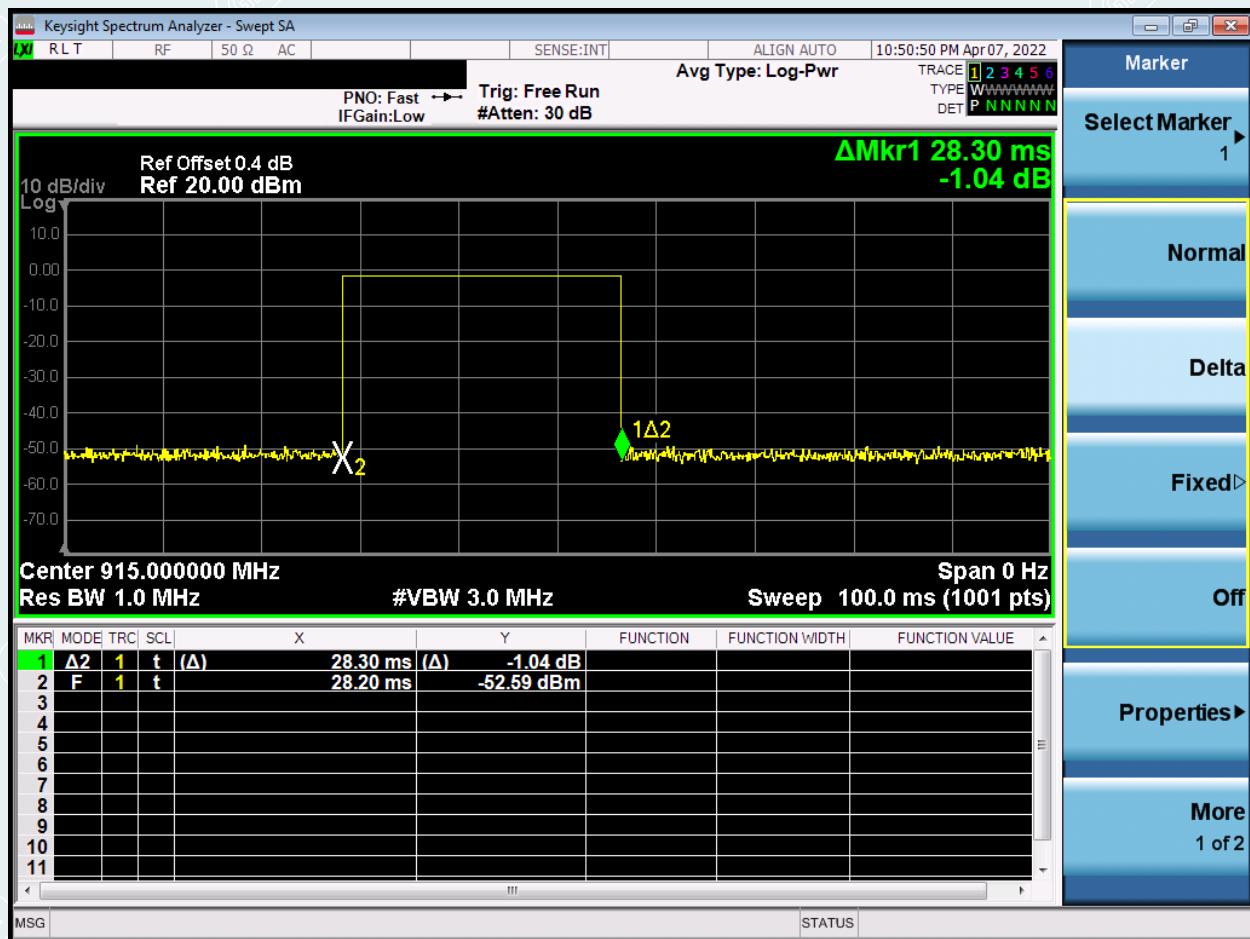
Freq. [MHz]	Reading [dB $\mu$ V/m]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
915	98.31	84.30	-14.01	114.00	29.70	200	18	Horizontal	Peak
915	105.80	91.79	-14.01	114.00	22.21	100	299	Vertical	Peak

Freq. [MHz]	Reading [dB $\mu$ V/m]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
915	84.30	73.34	-10.96	94.00	20.66	200	18	Horizontal	AVG
915	91.79	80.83	-10.96	94.00	13.17	100	299	Vertical	AVG

### Remark:

1.  $\text{AVG} = \text{Peak} + 20 \log(\text{Duty Cycle})$
2. Duty Cycle = On time/Total time =  $28.3\text{ms}/100.0\text{ms} = 28.3\%$
3. Duty Cycle Correction Factor:  $20 \log (0.283) = -10.96$

## DUTY CYCLE:915MHz ASK:



915MHz FSK

Environment:

24.0 (C) / 46 %RH

Power Source:

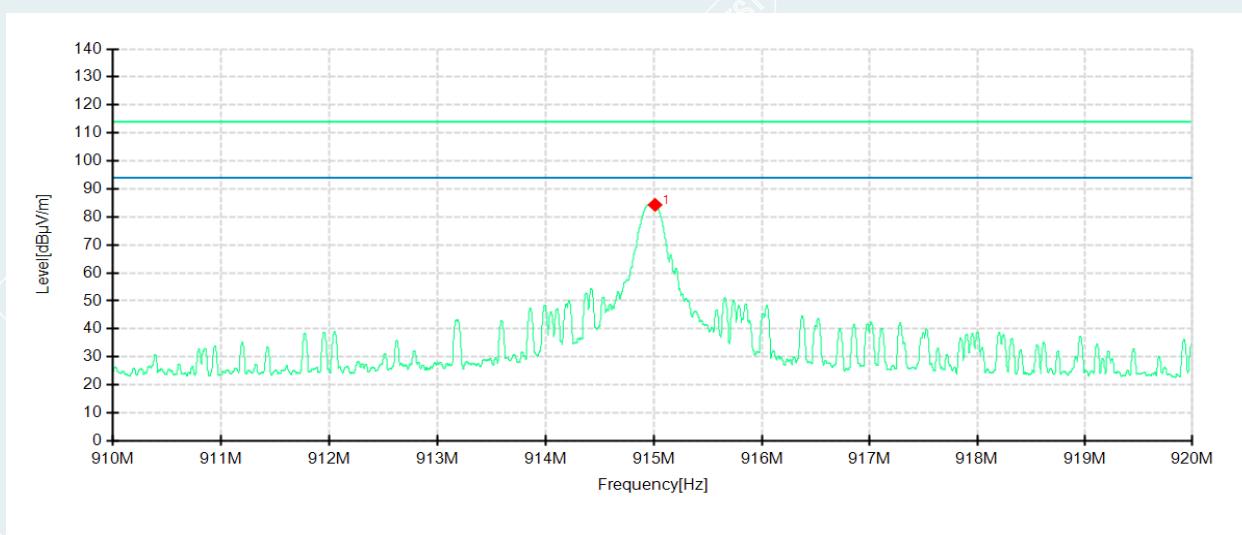
DC 3.85V

Test Date:

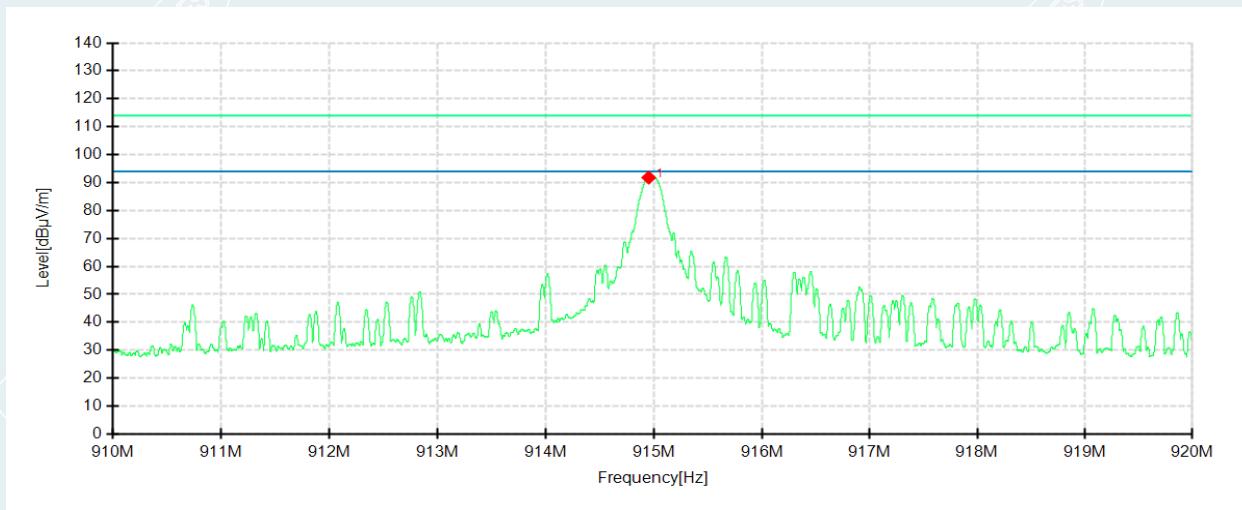
2022-04-12

Test By :

Lu Qiang

**Suspected Data List**

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	915.0100	98.33	84.32	-14.01	114.00	29.68	100	124	Horizontal

**Suspected Data List**

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	914.9513	105.80	91.79	-14.01	114.00	22.21	100	300	Vertical

## 915MHz ASK

Environment:

24.0 (C) / 46 %RH

Power Source:

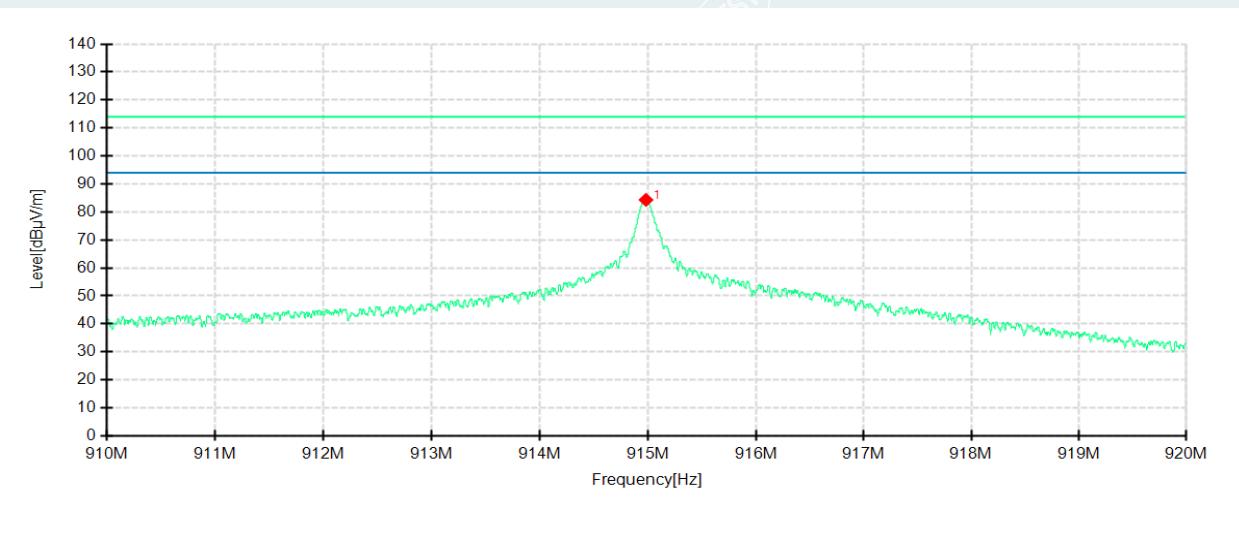
DC 3.85V

Test Date:

2022-04-12

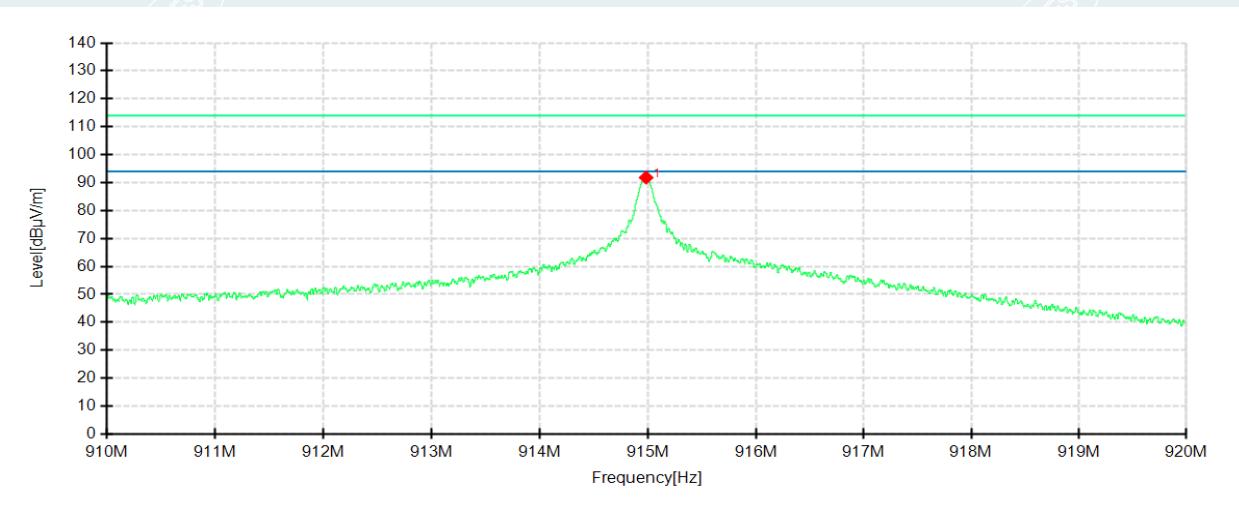
Test By :

Lu Qiang



## Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	914.9813	98.31	84.30	-14.01	114.00	29.70	200	18	Horizontal



## Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	914.9825	105.80	91.79	-14.01	114.00	22.21	100	299	Vertical

**Radiated Spurious Emission****Test Frequency 30MHz – 1GHz**

915MHz FSK

Environment:

24.0 (C) / 46 %RH

Power Source:

DC 3.85V

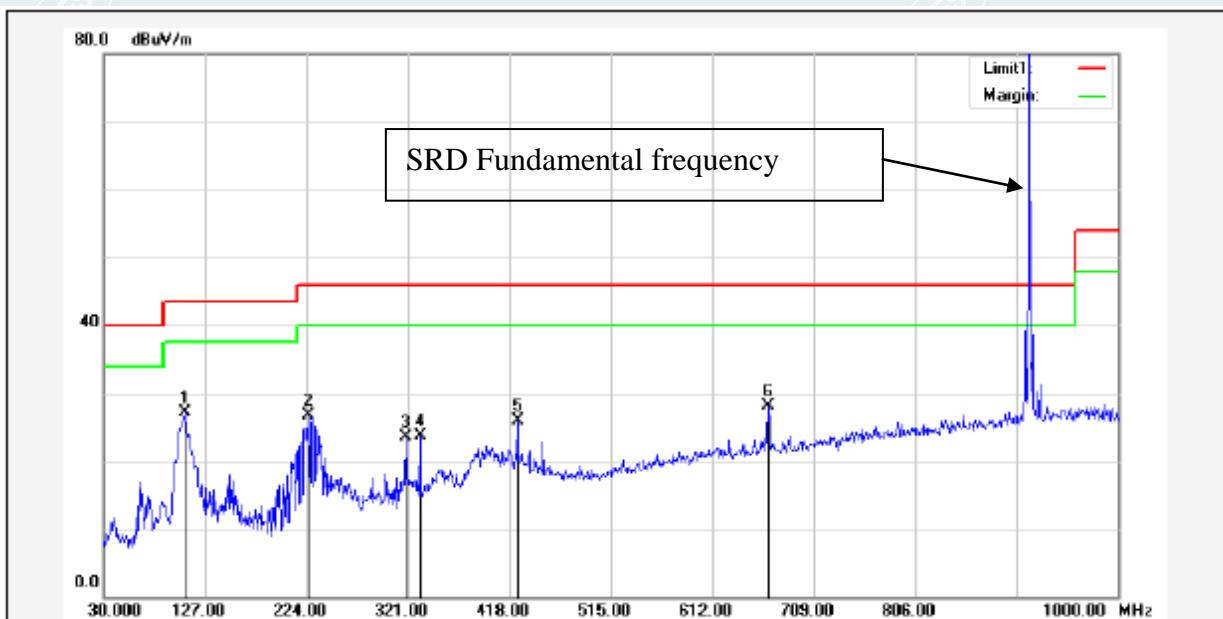
Test Date:

2022-04-12

Test By :

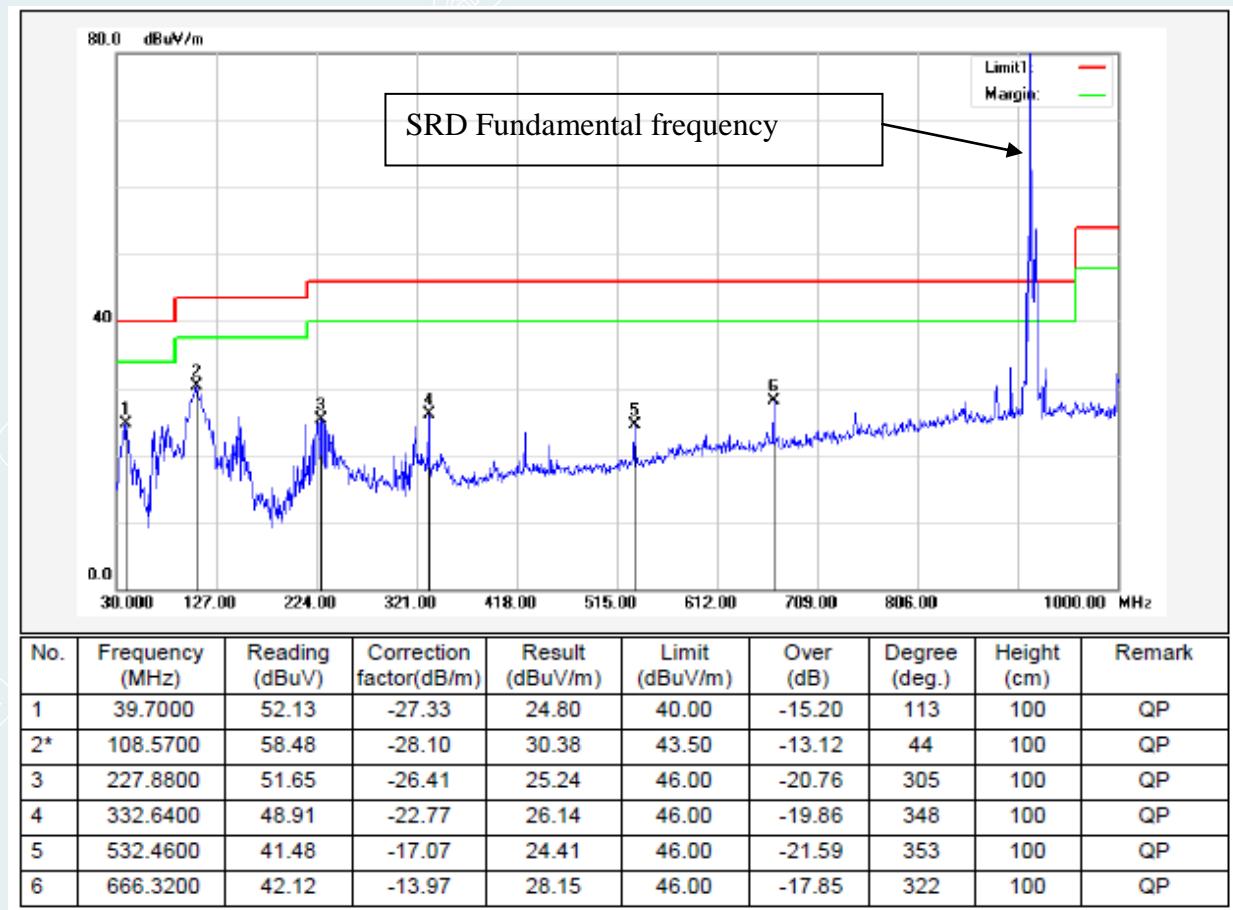
Lu Qiang

Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1*	107.6000	55.27	-28.23	27.04	43.50	-16.46	360	301	QP
2	225.9400	53.19	-26.50	26.69	46.00	-19.31	75	100	QP
3	319.0600	46.55	-23.10	23.45	46.00	-22.55	171	100	QP
4	332.6400	46.46	-22.77	23.69	46.00	-22.31	149	100	QP
5	425.7600	45.58	-19.60	25.98	46.00	-20.02	140	100	QP
6	665.3500	42.06	-13.99	28.07	46.00	-17.93	359	102	QP

Polarity: Vertical



915MHz ASK

Environment:

24.0 (C) / 46 %RH

Power Source:

DC 3.85V

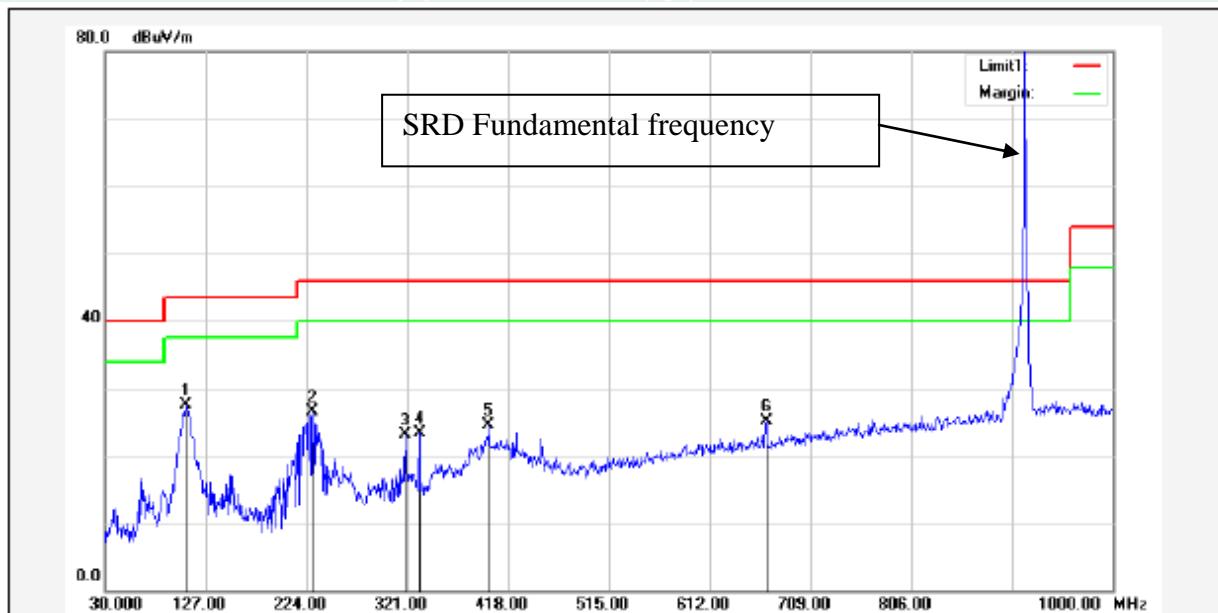
Test Date:

2022-04-12

Test By :

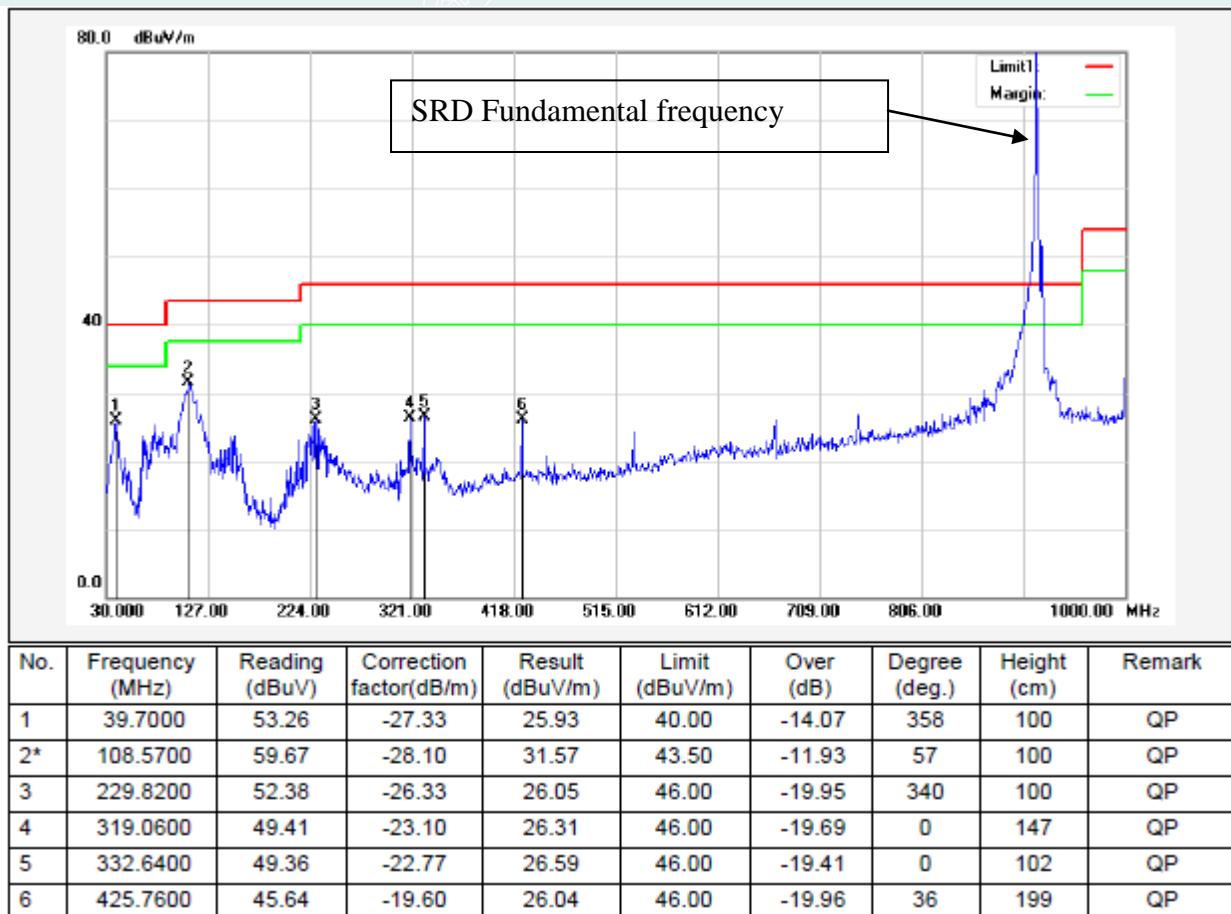
Lu Qiang

Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1*	108.5700	55.54	-28.10	27.44	43.50	-16.06	0	324	QP
2	229.8200	52.90	-26.33	26.57	46.00	-19.43	76	100	QP
3	319.0600	46.12	-23.10	23.02	46.00	-22.98	154	100	QP
4	332.6400	46.12	-22.77	23.35	46.00	-22.65	315	100	QP
5	399.5700	44.99	-20.51	24.48	46.00	-21.52	185	100	QP
6	666.3200	39.13	-13.97	25.16	46.00	-20.84	199	100	QP

Polarity: Vertical

**Remark:**

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Quasi-peak detector mode.
- 3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.
- 4 Below 1GHz: factor = Antenna Factor + Cable Loss.

**Above 1 GHz**

915MHz FSK

Environment:

Temp: 25°C; Humi:60%

Power Source:

DC 3.85V

Test Date:

2022-04-04

Test By :

Zhang Zishan

<b>Suspected Data List</b>									
NO.	Freq. [MHz]	Reading [dB $\mu$ V/m]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1278.0000	56.97	33.35	-23.62	74.00	40.65	200	55	Horizontal
2	1830.0000	57.14	36.37	-20.77	74.00	37.63	200	183	Horizontal
3	2664.0000	56.04	37.35	-18.69	74.00	36.65	100	324	Horizontal
4	3330.0000	58.84	41.80	-17.04	74.00	32.20	200	227	Horizontal
5	3740.0000	53.45	37.38	-16.07	74.00	36.62	100	148	Horizontal
6	4662.0000	51.86	39.06	-12.80	74.00	34.94	200	266	Horizontal

<b>Suspected Data List</b>									
NO.	Freq. [MHz]	Reading [dB $\mu$ V/m]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1202.0000	56.92	32.84	-24.08	74.00	41.16	200	306	Vertical
2	1332.0000	57.86	34.55	-23.31	74.00	39.45	200	181	Vertical
3	1830.0000	68.76	47.99	-20.77	74.00	26.01	100	140	Vertical
4	2745.0000	64.19	45.78	-18.41	74.00	28.22	100	114	Vertical
5	3330.0000	64.37	47.33	-17.04	74.00	26.67	200	186	Vertical
6	4875.0000	68.51	57.02	-11.49	74.00	16.98	100	254	Vertical

<b>AV Final Data List</b>									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dB $\mu$ V/m]	AV Value [dB $\mu$ V/m]	AV Limit [dB $\mu$ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1830.3294	-20.77	71.12	50.35	54.00	3.65	110	175.5	Vertical
2	4853.6963	-11.49	37.94	26.45	54.00	27.55	100	2	Vertical

915MHz ASK

Environment:

Temp: 25°C; Humi:60%

Power Source:

DC 3.85V

Test Date:

2022-04-04

Test By :

Zhang Zishan

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB $\mu$ V/m]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1278.0000	56.90	33.28	-23.62	74.00	40.72	200	38	Horizontal
2	1958.0000	55.21	34.07	-21.14	74.00	39.93	200	228	Horizontal
3	2630.0000	54.63	35.96	-18.67	74.00	38.04	200	147	Horizontal
4	3330.0000	57.84	40.80	-17.04	74.00	33.20	200	216	Horizontal
5	3857.0000	53.60	38.06	-15.54	74.00	35.94	100	279	Horizontal
6	4878.0000	51.06	39.58	-11.48	74.00	34.42	100	271	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB $\mu$ V/m]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1332.0000	57.56	34.25	-23.31	74.00	39.75	200	144	Vertical
2	1769.0000	54.14	33.69	-20.45	74.00	40.31	100	271	Vertical
3	2664.0000	56.86	38.17	-18.69	74.00	35.83	200	191	Vertical
4	3330.0000	63.47	46.43	-17.04	74.00	27.57	200	209	Vertical
5	3663.0000	54.75	38.31	-16.44	74.00	35.69	200	191	Vertical
6	4982.0000	49.84	39.07	-10.77	74.00	34.93	100	3	Vertical

**Note:**

- 1 Radiated emissions measured in frequency range from 1GHz – 10GHz were made with an instrument using Peak/AV detector mode.
- 2 According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it's unnecessary to perform an average measurement.
- 3 The IF bandwidth of Receiver between above was 1MHz
- 4 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.

## 7. 20DB BANDWIDTH

### 7.1 LIMITS

The test of the item was performed in accordance with the standards §15.215(c).

### 7.2 TEST PROCEDURES

- 1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
- 2) Set the spectrum analyzer as RBW=1% to 3% OBW, VBW=3RBW, Span>Declare bandwidth, Sweep = auto.
- 3) Record 20dB of the bandwidth value.
- 4) Repeat above procedures until all frequencies measured were complete.

### 7.3 TEST SETUP

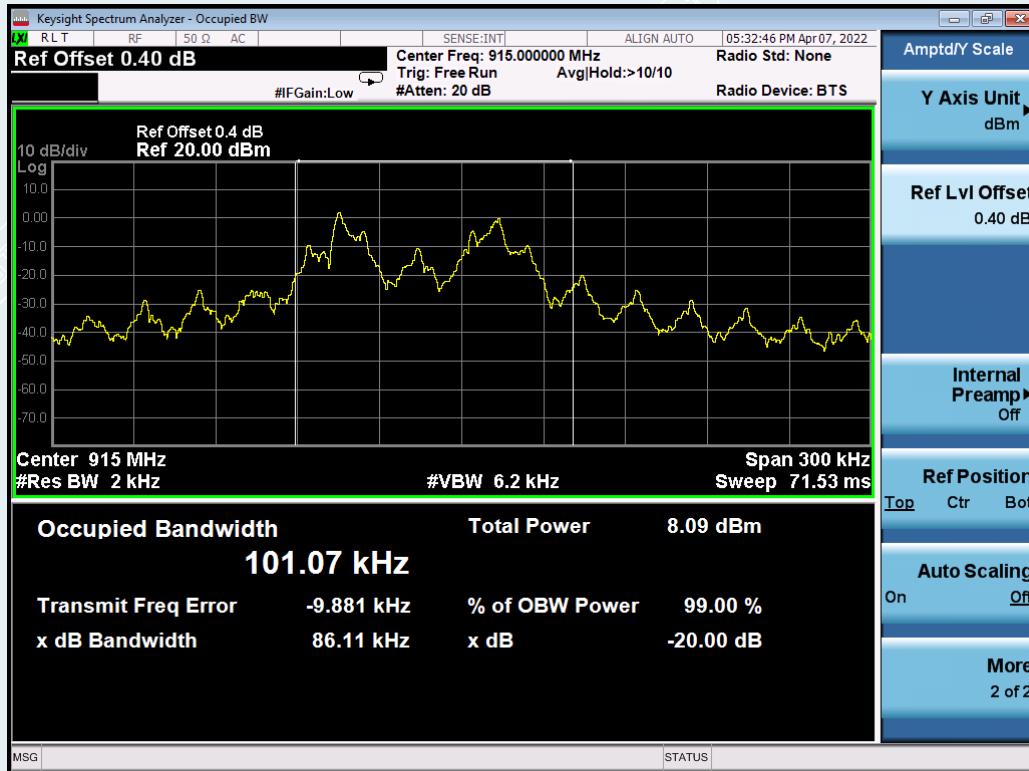


### 7.4 TEST RESULTS

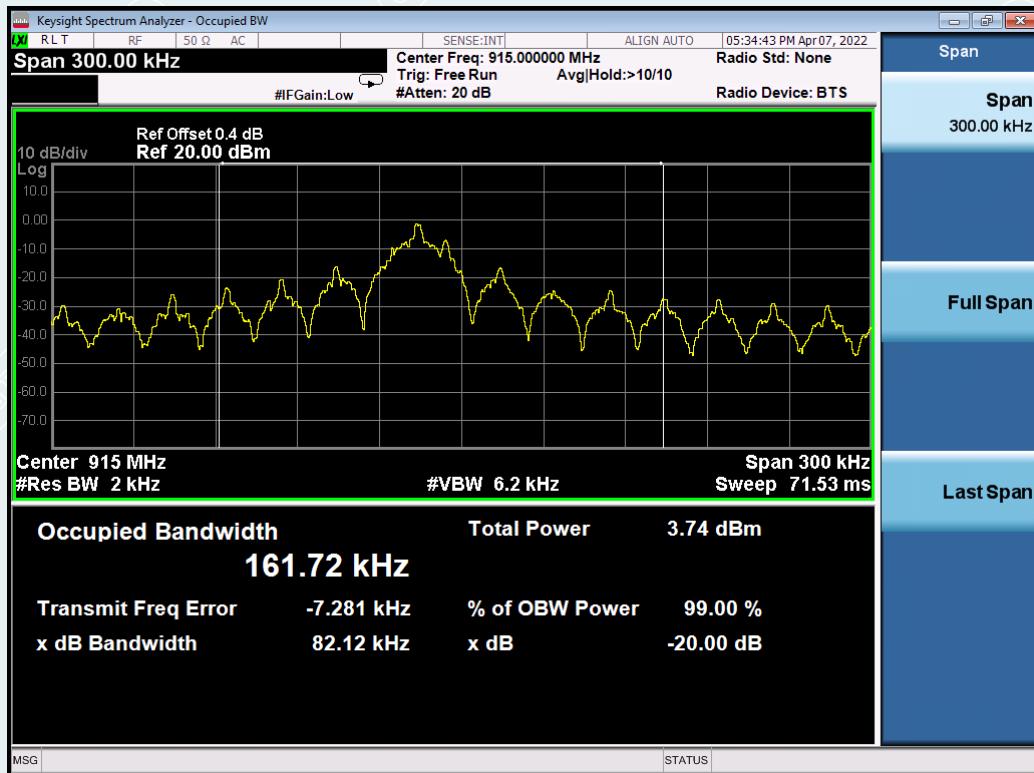
Environmental Conditions	23.4°C/48%RH/101kPa
Power Source:	DC 3.85V
Test Date:	2022-04-7
Test By :	Lu Wei

Test Mode	Frequency (MHz)	20dB Bandwidth (kHz)	Test Result
915MHz FSK	915	86.11	PASS
915MHz ASK	915	82.12	PASS

915MHz FSK



## 915MHz ASK



----- The following blanks -----

## **APPENDIX A. PHOTOGRAPH OF THE TEST CONNECTION DIAGRAM**

Please refer to the attached document E202112291004-26-Test photo.

## **APPENDIX B. PHOTOGRAPH OF THE EUT**

Please refer to the attached document E202112291004-27-EUT photo.

----- End of Report -----