



# RF TEST REPORT

**Report No.:** SET2019-09647

**Product Name:** Handheld Data Terminal

**FCC ID:** HLEHT510ABTNUFL

**Model No. :** HT510A

**Applicant:** unitech Electronics Co., LTD

**Address:** 5F., No.136, Ln. 235, Baoqiao Rd., Xindian Dist., New Taipei City,  
Taiwan

**Dates of Testing:** 07/01/2019 — 07/09/2019

**Issued by:** CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd.

**Lab Location:** Building 28/29, East of Shigu Xili Industrial Zone, Nanshan District  
Shenzhen, Guangdong 518055, China.

**Tel:** 86 755 26627338    **Fax:** 86 755 26627238

This test report consists of 44 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CCIC-SET. The test results in the report only apply to the tested sample. The test report shall be invalid without all the signatures of testing engineers, reviewer and approval. Any objections must be raised to CCIC-SET within 15 days since the date when the report is received. It will not be taken into consideration beyond this limit.



## Test Report

**Product Name** .....: Handheld Data Terminal

**Brand Name** .....: unitech

**Trade Name** .....: unitech

**Applicant**.....: unitech Electronics Co., LTD

**Applicant Address**.....: 5F., No.136, Ln. 235, Baoqiao Rd., Xindian Dist., New Taipei City, Taiwan

**Manufacturer** .....: unitech Electronics Co., LTD

**Manufacturer Address** .....: 5F., No.136, Ln. 235, Baoqiao Rd., Xindian Dist., New Taipei City, Taiwan.

**Test Standards**.....: 47 CFR Part 15 Subpart C  
ANSI C63.10:2013

**Test Result** .....: PASS

**Tested by** .....: Shallwe Yang 2019.08.07  
Shallwe Yang, Test Engineer

**Reviewed by** .....: Chris You 2019.08.07  
Chris You, Senior Engineer

**Approved by** .....: Shuangwen Zhang 2019.08.07  
Shuangwen Zhang, Manager



## Table of contents

**RF TEST REPORT .....1**

**1. GENERAL INFORMATION .....4**

1.1. EUT Description .....4

1.2. Test Standards and Results .....5

1.3. Description of Test Mode .....6

1.4. Facilities and Accreditations .....7

**2. 47 CFR PART 15C REQUIREMENTS .....8**

2.1. Antenna requirement .....8

2.2. Number of Hopping Frequency .....9

2.3. Peak Output Power .....11

2.4. Bandwidth .....12

2.5. Carried Frequency Separation .....15

2.6. Dwell time .....18

2.7. Conducted Spurious Emissions .....23

2.8. Conducted Band Edge .....27

2.9. Conducted Emission .....30

2.10. Radiated Band Edges and Spurious Emission .....34

**3. LIST OF MEASURING EQUIPMENT .....44**

Change History		
Issue	Date	Reason for change
1.0	2019.08.07	First edition



## 1. General Information

### 1.1. EUT Description

EUT Type	Handheld Data Terminal
Power Supply	DC 3.8V
Frequency Range	902MHz~928MHz
Operating Range	902.75MHz~927.25MHz
Number of channel	50
Modulation Type	DSB-ASK
Antenna Type	Internal Antenna
Antenna Gain	0dBi

## 1.2. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (ISM band radiators) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C 2017	Radio Frequency Devices
2	ANSI C63.10 2013	American National Standard for Testing Unlicensed Wireless Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Standard(s) Section	Description	Result
	FCC		
1	15.203	Antenna Requirement	PASS
2	15.247(a)	Number of Hopping Frequency	PASS
3	15.247(b)	Peak Output Power	PASS
4	15.247(a)	Bandwidth	PASS
5	15.247(a)	Carrier Frequency Separation	PASS
6	15.247(a)	Time of Occupancy (Dwell time)	PASS
7	15.247(d)	Conducted Spurious Emission	PASS
8	15.247(d)	Conducted Band Edge	PASS
9	15.207	Conducted Emission	PASS
10	15.209 15.205 15.247(c)	Radiated Band Edges and Spurious Emission	PASS

Note 1: The test of Radiated Emission was performed according to the method of measurements prescribed in ANSI C63.10 2013.



### 1.3. Description of Test Mode

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	902.75	26	915.25
2	903.25	27	915.75
3	903.75	28	916.25
4	904.25	29	916.75
5	904.75	30	917.25
6	905.25	31	917.75
7	905.75	32	918.25
8	906.25	33	918.75
9	906.75	34	919.25
10	907.25	35	919.75
11	907.75	36	920.25
12	908.25	37	920.75
13	908.75	38	921.25
14	909.25	39	921.75
15	909.75	40	922.25
16	910.25	41	922.75
17	910.75	42	923.25
18	911.25	43	923.75
19	911.75	44	924.25
20	912.25	45	924.75
21	912.75	46	925.25
22	913.25	47	925.75
23	913.75	48	926.25
24	914.25	49	926.75
25	914.75	50	927.25

Test channel: 1channel, 26 channel, 50channel



## 1.4. Facilities and Accreditations

### 1.4.1. Facilities

#### **CNAS-Lab Code: L1659**

CCIC-SET is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

#### **FCC-Registration No.: CN5031**

CCIC Southern Electronic Product Testing (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. Designation Number: CN5031, valid time is until December 31, 2018.

#### **ISED Registration: 11185A-1**

#### **CAB identifier:CN0064**

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Dec. 31, 2019.

#### **NVLAP Lab Code: 201008-0**

CCIC-SET is a third party testing organization accredited by NVLAP according to ISO/IEC 17025. The accreditation certificate number is 201008-0.

#### Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86KPa-106KPa

## 2. 47 CFR Part 15C Requirements

### 2.1. Antenna requirement

#### 2.1.1. Applicable Standard

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

And according to FCC 47 CFR Section 15.247(c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

#### 2.1.2. Antenna Information

**Antenna Category:** Internal Antenna

**Antenna General Information:**

No.	EUT	Ant. Type	Gain(dBi)
1	Handheld Data Terminal	Internal Antenna	0

#### 2.1.3. Result: comply

The EUT has a unique antenna connector. Please refer to the EUT internal photos.



## 2.2. Number of Hopping Frequency

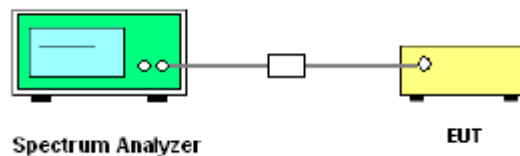
### 2.2.1. Limit of Number of Hopping Frequency

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies

### 2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.2.3. Test Setup



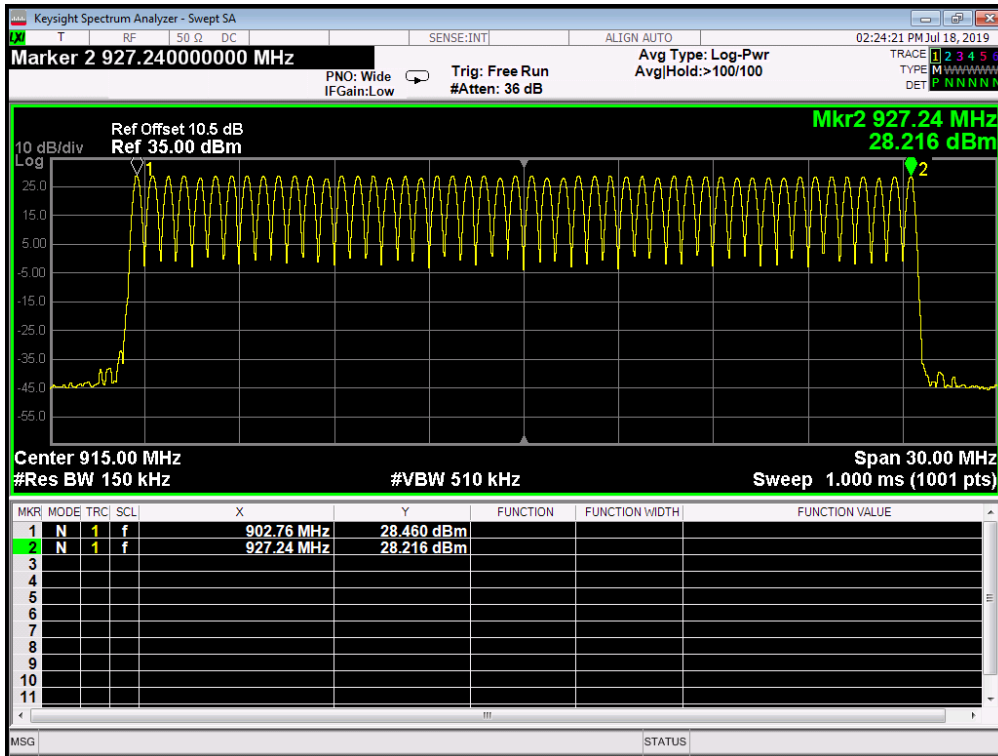
### 2.2.4. Test Procedure

1. The testing follows ANSI C63.10-2013 Clause 7.8.3
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = the frequency band of operation; Set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.  $VBW \geq RBW$ , Trace = max hold Sweep=auto, Detector function=peak.
6. The number of hopping frequency used is defined as the number of total channel.
7. Record the measurement data derived from spectrum analyzer.

### 2.2.5. Test Results of Number of Hopping Frequency

Frequency (MHz)	Measured Channel Numbers	Min. Limit	Verdict
902 - 928	50	50	PASS

### 2.2.6. Test Results (plots) of Number of Hopping Frequency



## 2.3. Peak Output Power

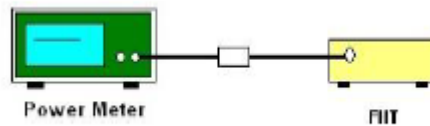
### 2.3.1. Limit of Peak Output Power

Section 15.247 (B)(2) For frequency hopping systems operating in the 902~928MHz band:1 watt for systems employing at least 50 hopping channels.

### 2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.3.3. Test Setup



### 2.3.4. Test Procedures

1. The testing follows ANSI C63.10-2013 Clause 7.8.5
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power with cable loss and record the results in the test report.
5. Measure and record the results in the test report.

### 2.3.5. Test Result of Output Power

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limit (dBm)	Verdict
1	902.75	28.57	30	PASS
26	915.25	28.63		PASS
50	927.25	28.34		PASS

## 2.4. Bandwidth

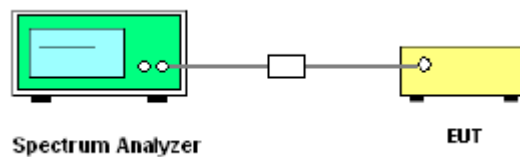
### 2.4.1. Definition

According to FCC §15.247(a)(1), the 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth ( $10 \cdot \log 1\% = 20\text{dB}$ ) taking the total RF output power.

### 2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.4.3. Test Setup



### 2.4.4. Test Procedure

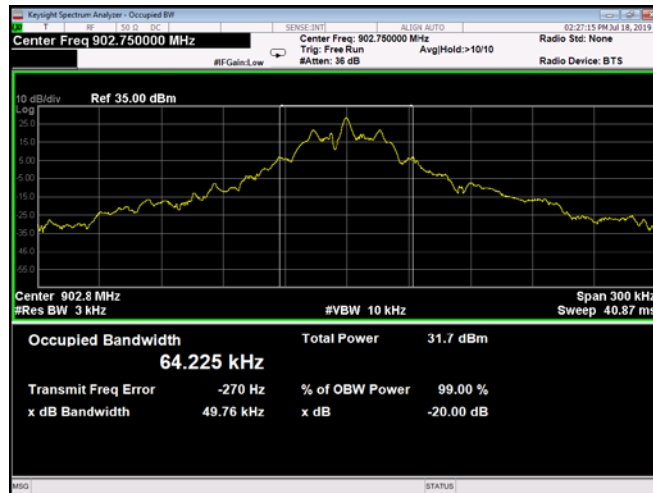
1. The testing follows ANSI C63.10-2013 Clause 6.9.2
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement.  
  
Span = approximately 2 to 5 times the OBW, centered on a hopping channel;  
  
RBW  $\geq$  1% to 5% of the OBW; VBW shall be approximately three times RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. Measure and record the results in the test report.



**2.4.5. Test Results of 20dB Bandwidth**

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
1	902.75	49.76
26	915.25	49.74
50	927.25	49.90

### 2.4.6. Test Results (plots) of Bandwidth



1 channel



26 channel



50 channel

## 2.5. Carried Frequency Separation

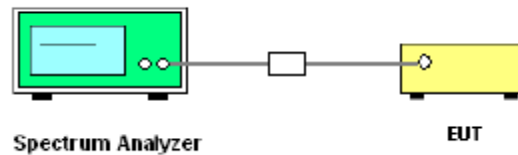
### 2.5.1. Limit of Carried Frequency Separation

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or 20dB bandwidth of the hopping channel, whichever is greater.

### 2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.5.3. Test Setup



### 2.5.4. Test Procedure

1. The testing follows ANSI C63.10-2013 Clause 7.8.2.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels; RBW: Start with the RBW set to approximately 30% of the channel spacing;

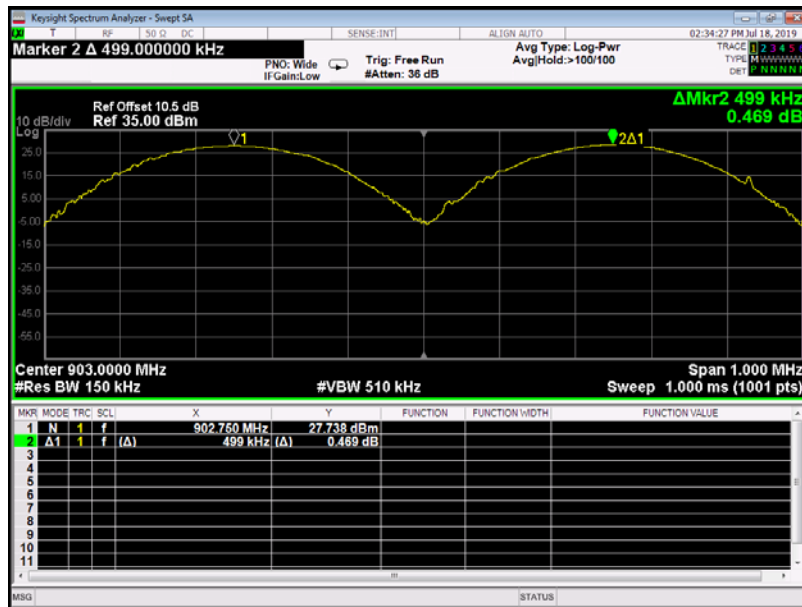
$VBW \geq RBW$ ; Sweep = auto; Detector function = peak; Trace = max hold.

6. Measure and record the results in the test report.

### 2.5.5. Test Results of Carried Frequency Separation

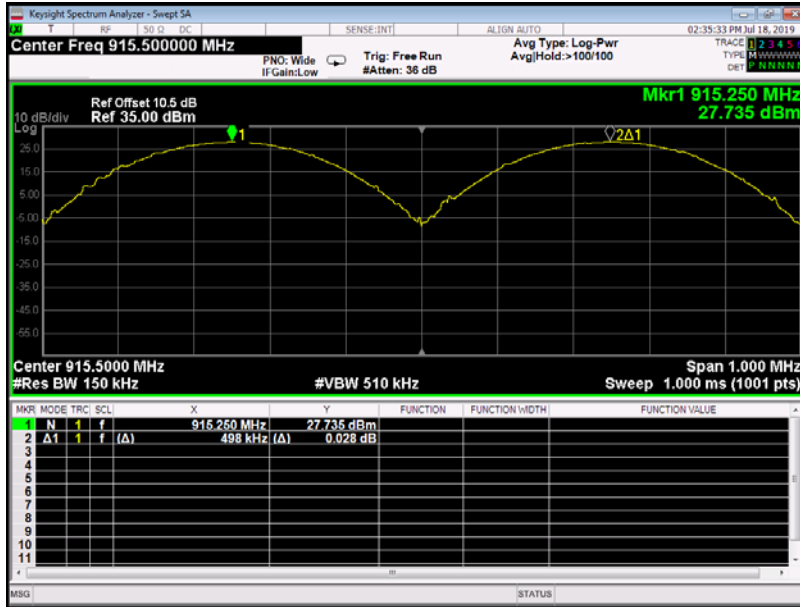
Frequency Separation(kHz)	(20dB BW) Limits (kHz)	Verdict
499	83.49	PASS
498	84.07	PASS
499	85.25	PASS

### 2.5.6. Test Results (plots) of Carried Frequency Separation

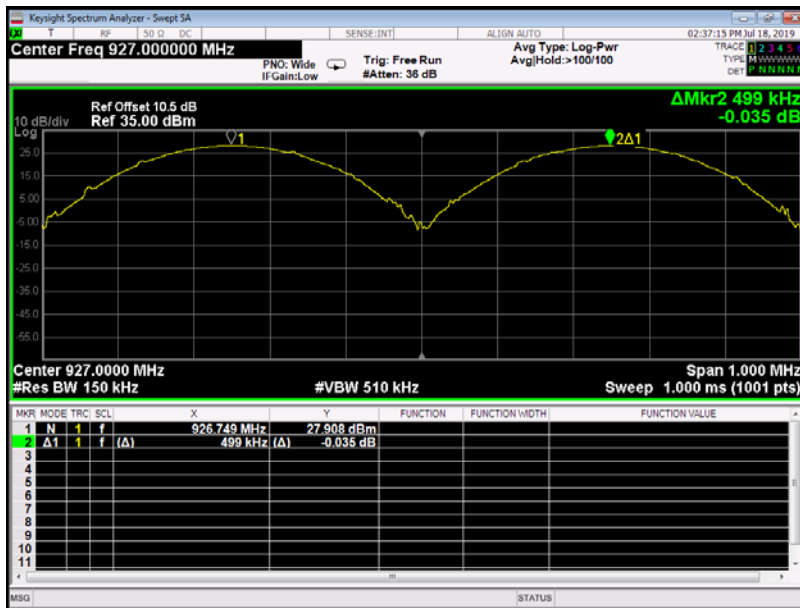


L channel





M channel



H channel

## 2.6. Dwell time

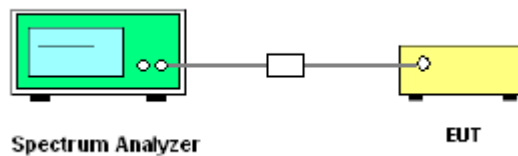
### 2.6.1. Limit of Dwell Time

the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period

### 2.6.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.6.3. Test Setup



### 2.6.4. Test Procedure

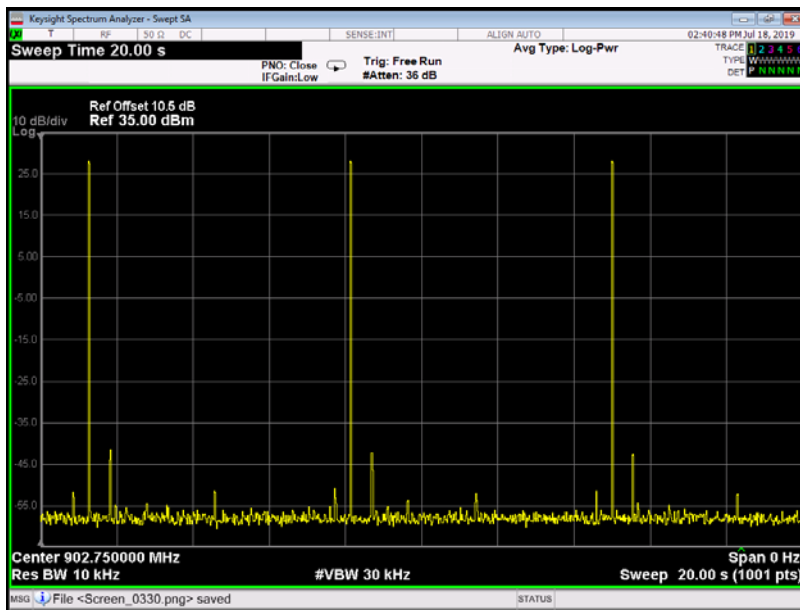
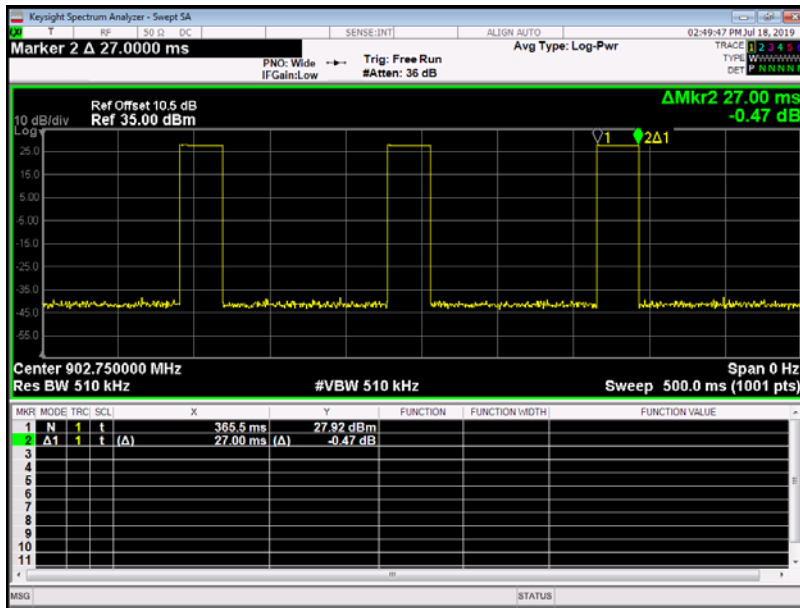
1. The testing follows ANSI C63.10-2013 Clause 7.8.4.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.  
The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW shall be  $\leq$  channel spacing and where possible RBW should be set  $\gg 1 / T$ , where T is the expected dwell time per channel; VBW  $\geq$  RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.



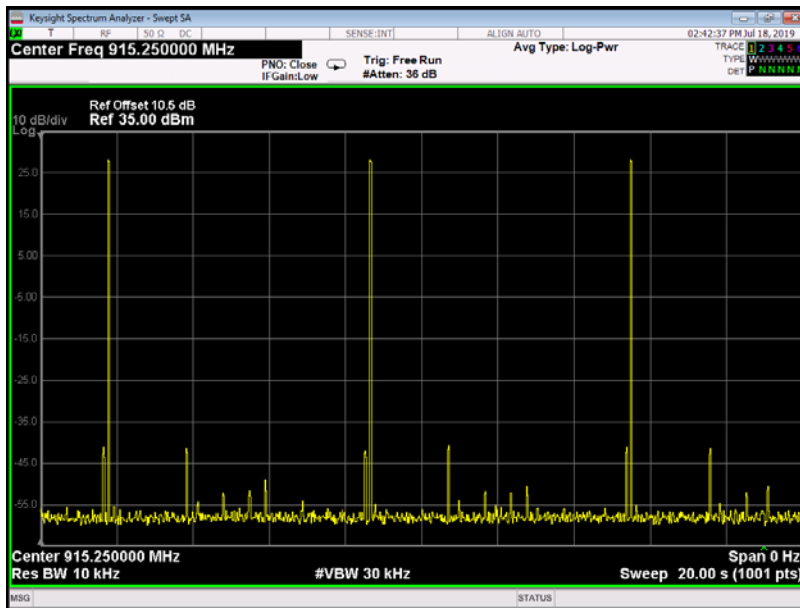
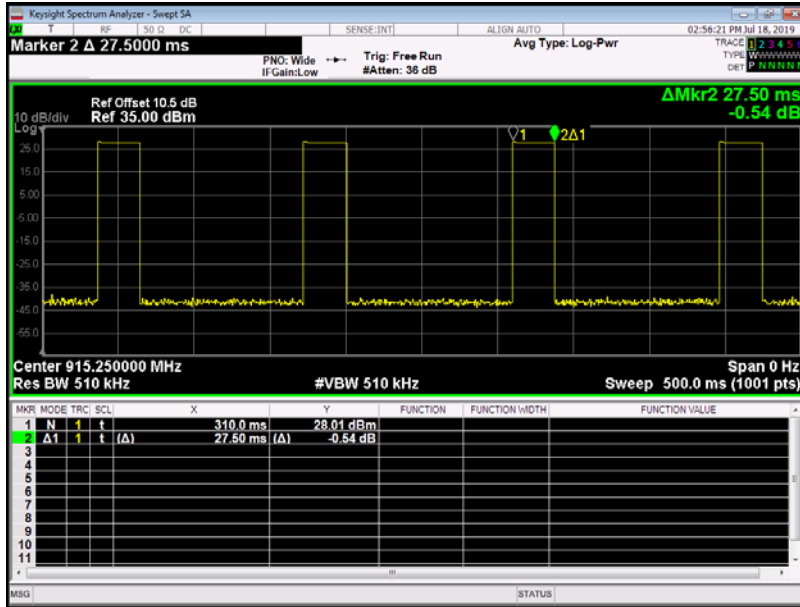
**2.6.5. Test Results of Dwell Time**

Frequency (MHz)	Length (ms)	Number	Dwell Time (ms)	Limit (ms)	Verdict
902.75	27	3	81	400	PASS
915.25	27.5	3	82.5		PASS
927.25	27	3	81		PASS

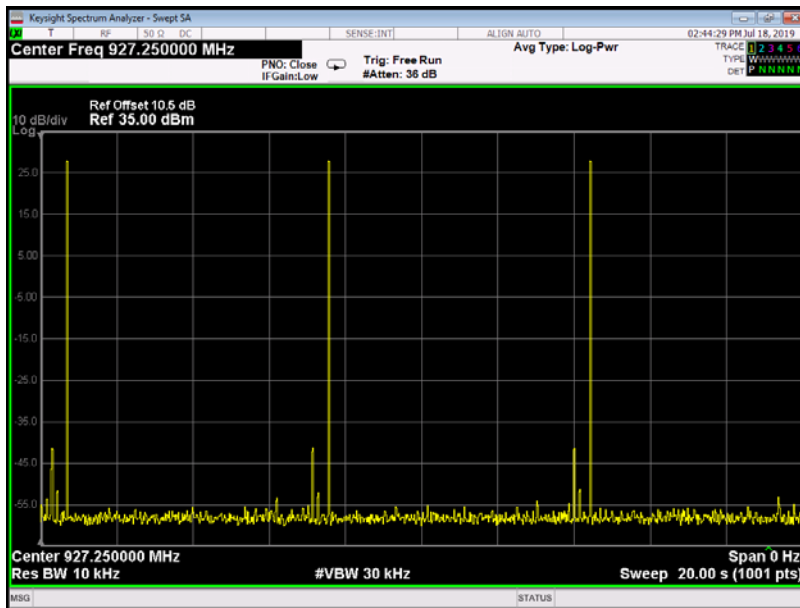
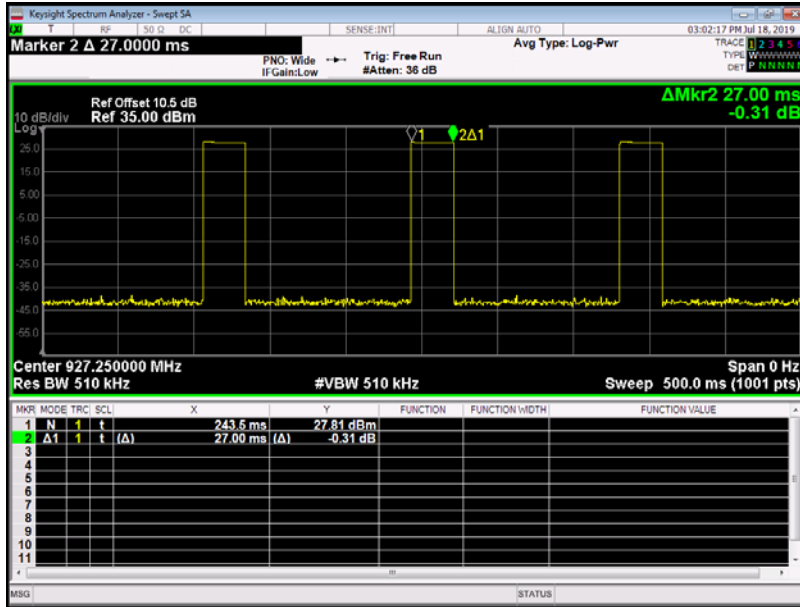
### 2.6.6. Test Results (plots) of Dwell Time



L channel



M channel



H channel

## 2.7. Conducted Spurious Emissions

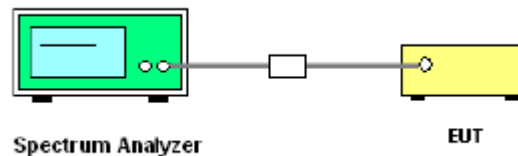
### 2.7.1. Limit of Spurious Emission

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

### 2.7.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

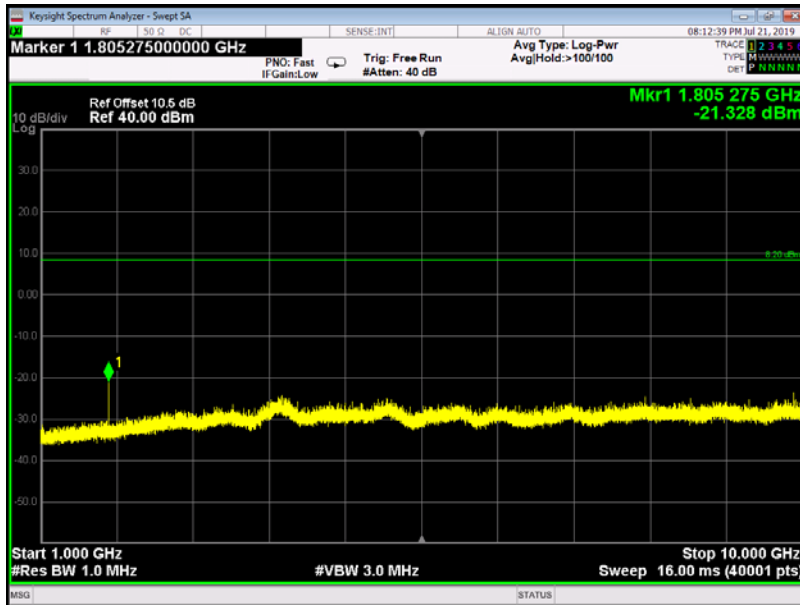
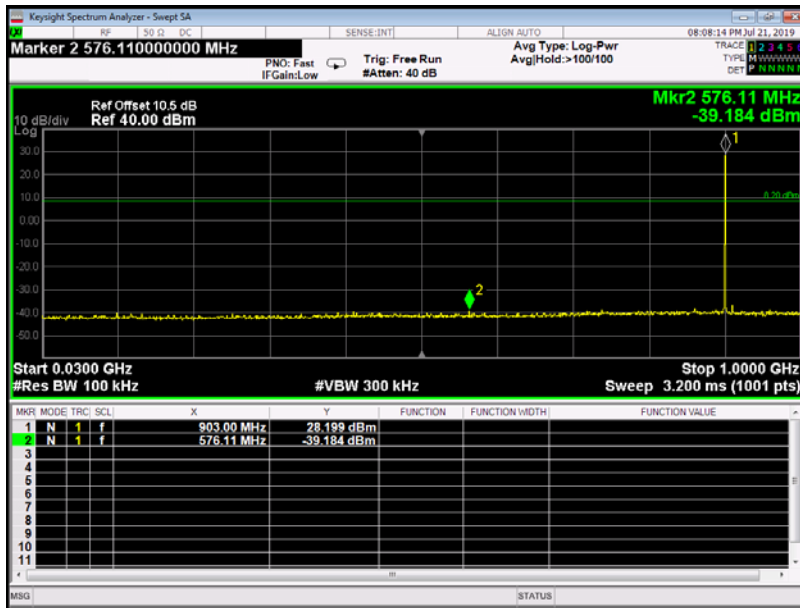
### 2.7.3. Test Setup



### 2.7.4. Test Procedure

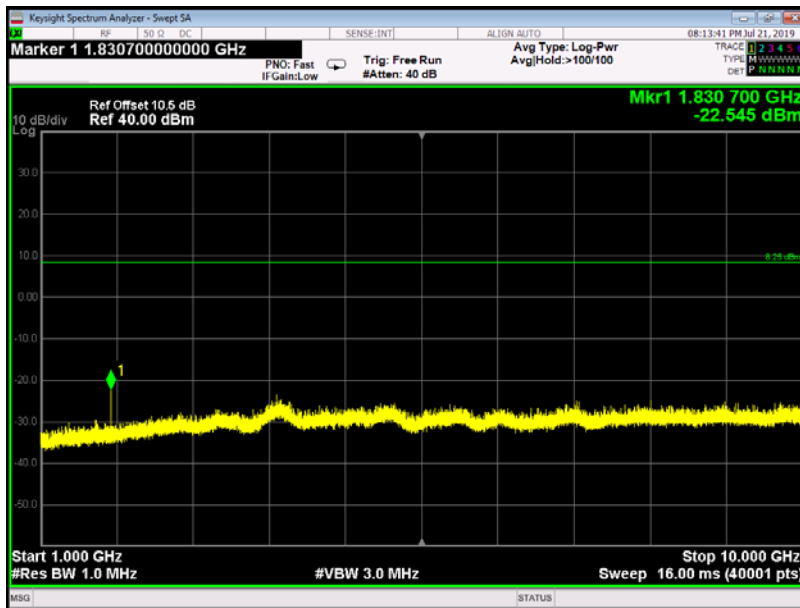
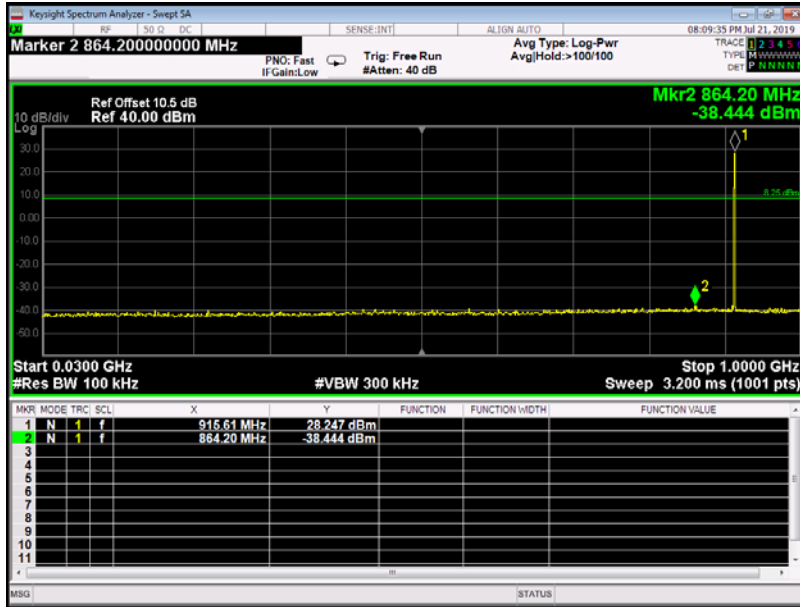
1. The testing follows ANSI C63.10-2013 Clause 7.8.8.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW = 300 kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

### 2.7.5. Test Results of Conducted Spurious Emissions

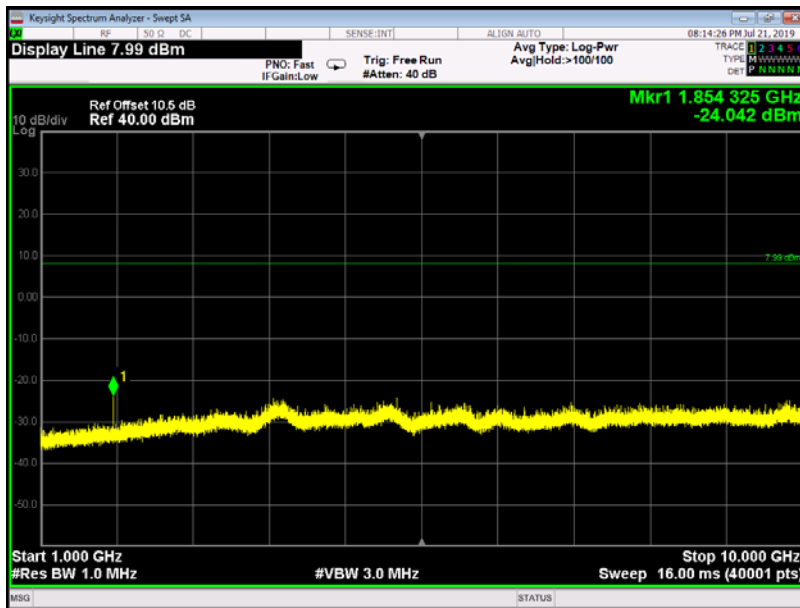
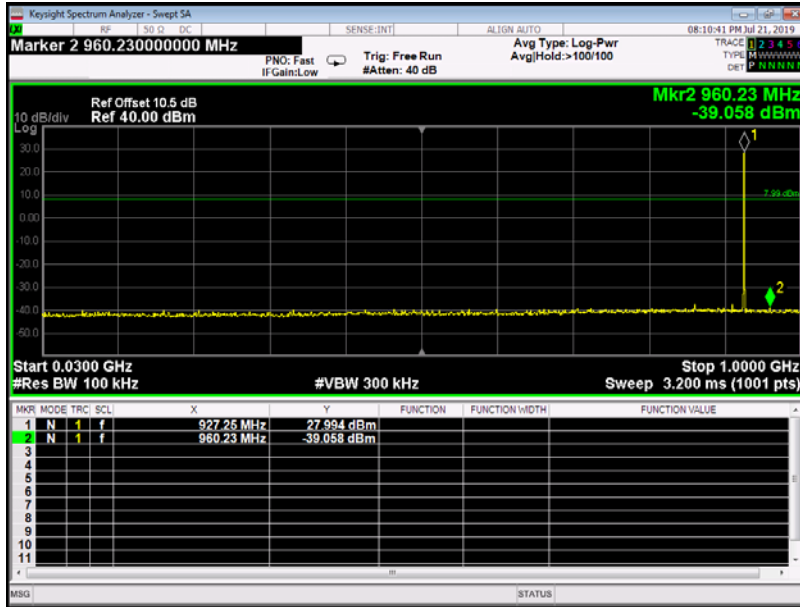


L channel





M channel



H channel

## 2.8. Conducted Band Edge

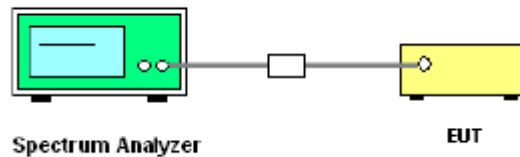
### 2.8.1. Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

### 2.8.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

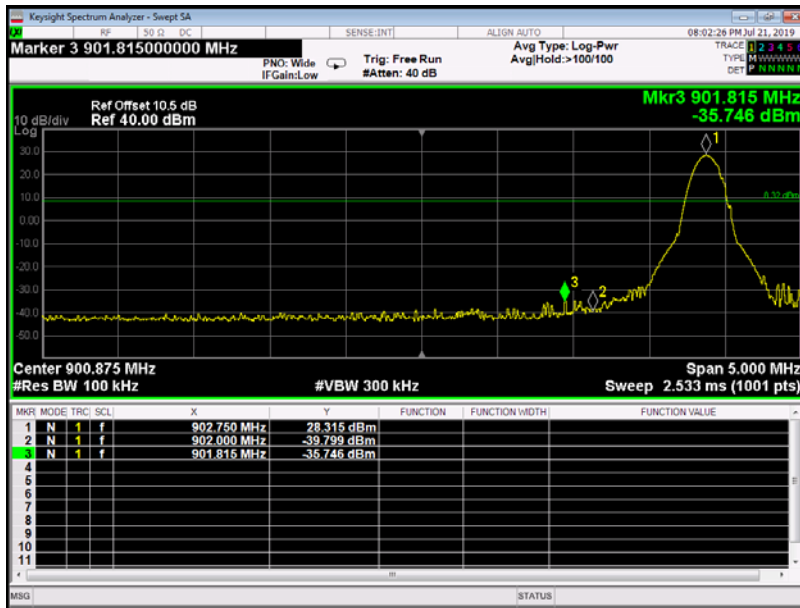
### 2.8.3. Test Setup



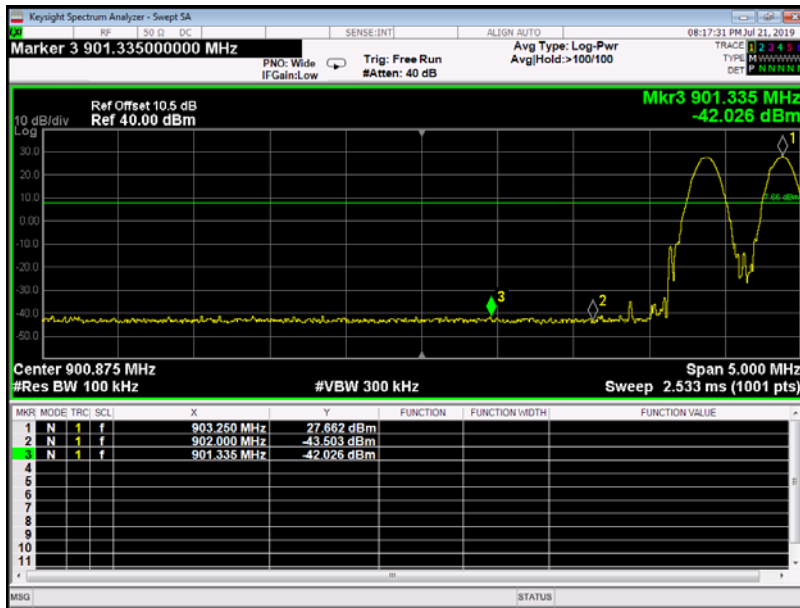
#### 2.8.1. Test Procedure

1. The testing follows ANSI C63.10-2013 Clause 7.8.6.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100kHz ( $\geq 1\%$  span=5MHz ), VBW = 300kHz ( $\geq$ RBW). Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
4. Enable hopping function of the EUT and then repeat step 2. and 3.
5. Measure and record the results in the test report.

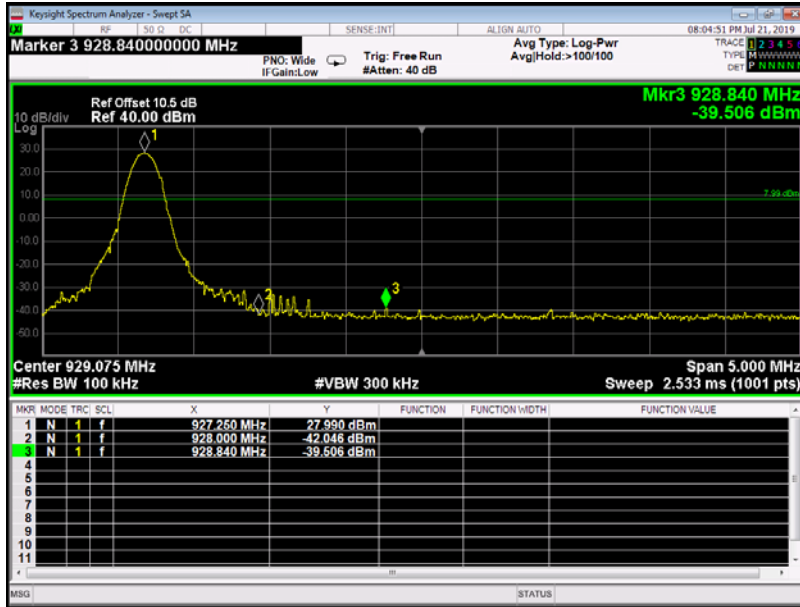
### 2.8.2. Test Results of Conducted Band Edge



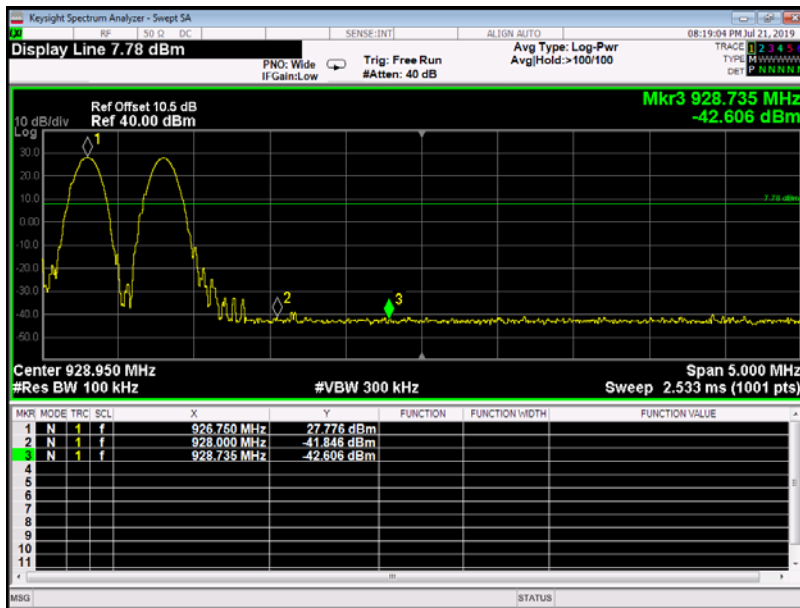
L channel



L channel Hopping Mode



H channel



H channel Hopping Mode

## 2.9. Conducted Emission

### 2.9.1. Limit of Conducted Emission

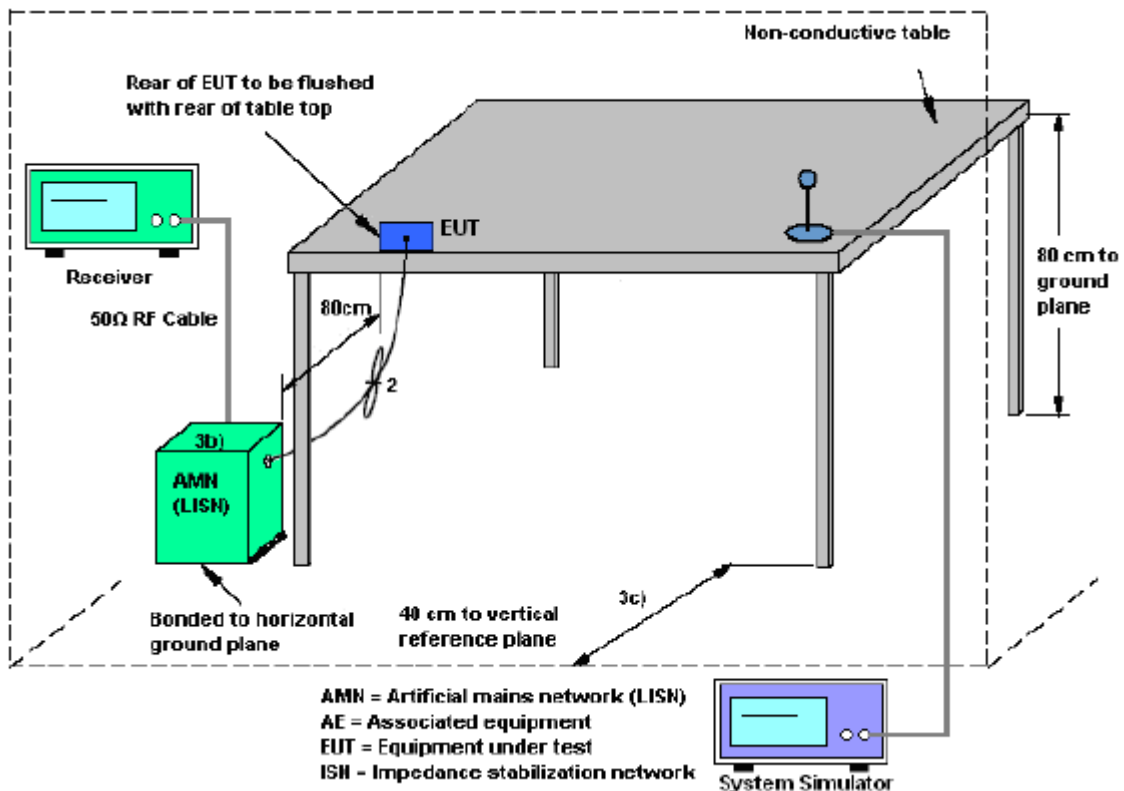
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dB $\mu$ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

### 2.9.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

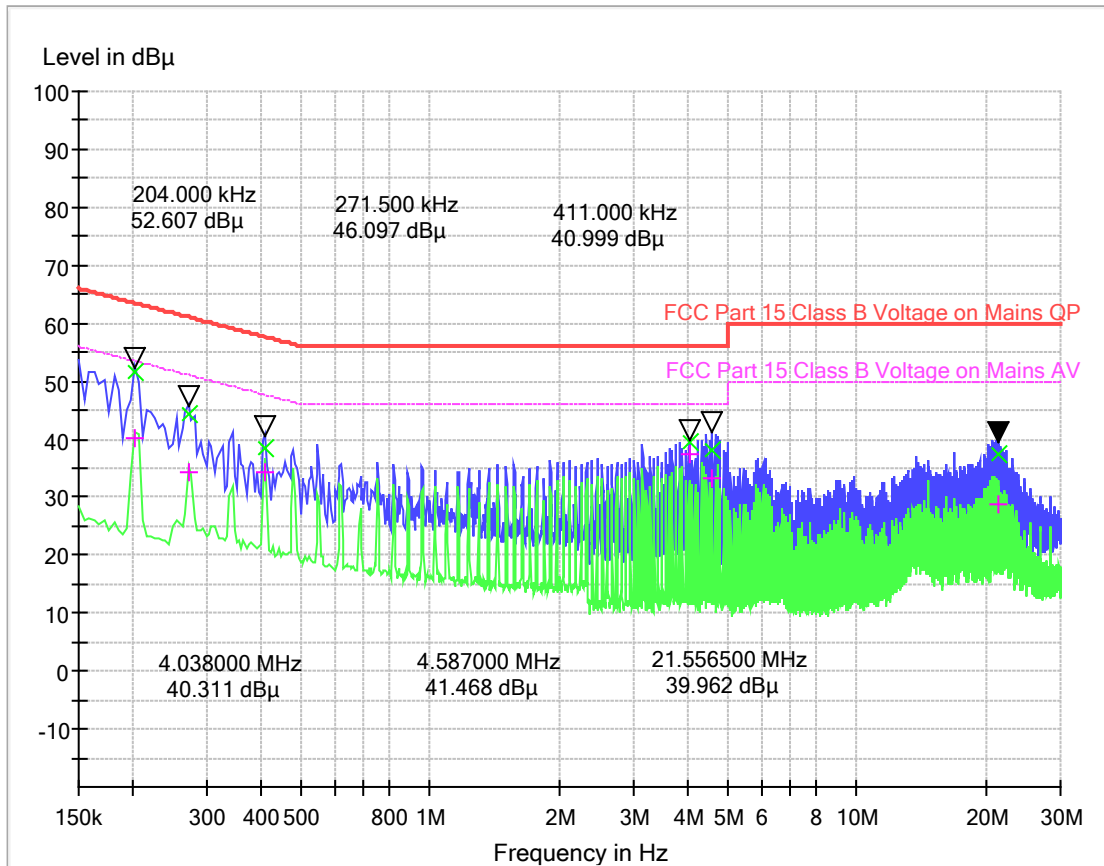
### 2.9.3. Test Setup



#### 2.9.4. Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 micrometry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

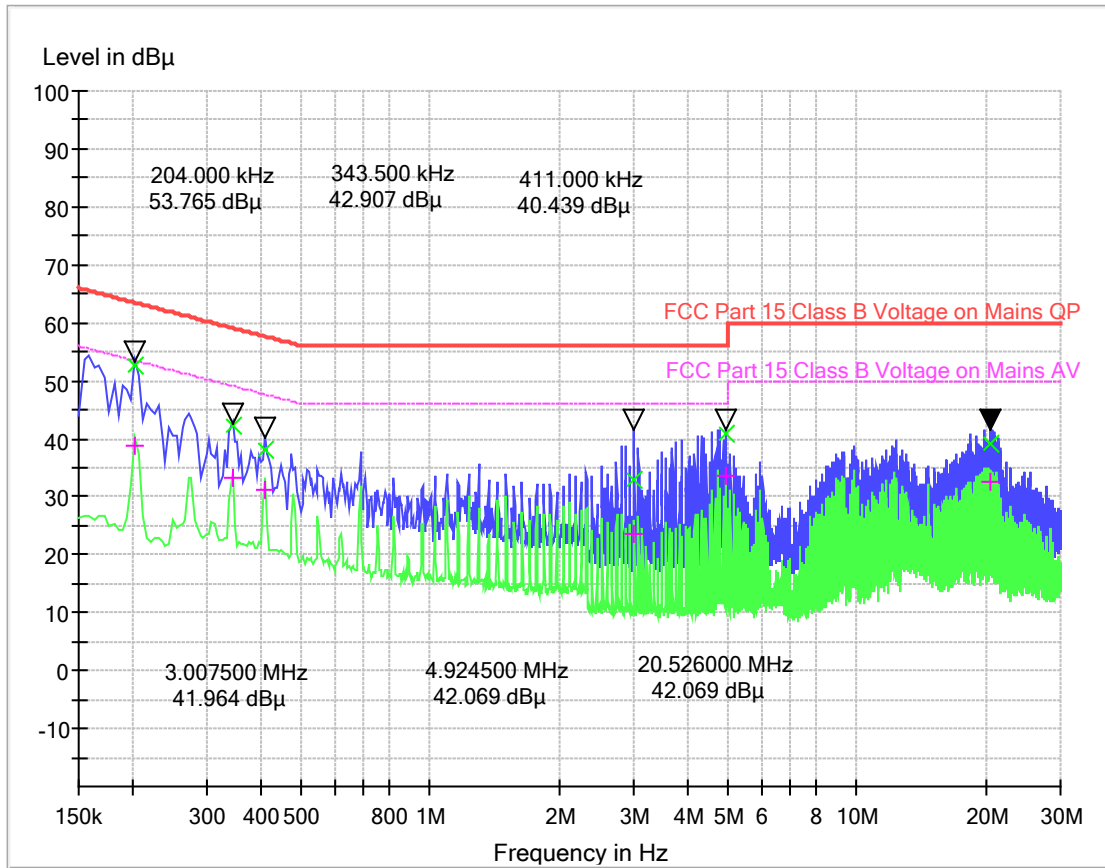
### 2.9.3. Test Results of Conducted Emission



(Plot A: L Phase)

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB μ V)
0.204000	51.60	40.33	0.1	10.1	11.8	63.4	13.07	53.4
0.271500	44.46	34.29	0.1	10.1	16.64	61.1	16.81	51.1
0.411000	38.54	34.37	0.1	10.1	19.06	57.6	13.23	47.6
4.038000	39.50	37.54	0.1	10.1	16.5	56	8.46	46
4.587000	38.02	33.16	0.2	10.1	17.98	56	12.84	46
21.55650	37.44	28.80	0.2	10.1	22.56	60	21.2	50





(Plot B: N Phase)

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB μ V)
0.204000	52.70	38.77	0.1	10.1	10.7	63.4	14.63	53.4
0.343500	42.08	33.17	0.1	10.1	17.02	59.1	15.93	49.1
0.411000	38.04	31.32	0.1	10.1	19.56	57.6	16.28	47.6
3.007500	33.01	23.65	0.1	10.1	22.99	56	22.35	46
4.924500	40.89	33.56	0.2	10.1	15.11	56	12.44	46
20.52600	39.06	32.62	0.2	10.1	20.94	60	17.38	50

**Test Result: PASS**

## 2.10. Radiated Band Edges and Spurious Emission

### 2.10.1. Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

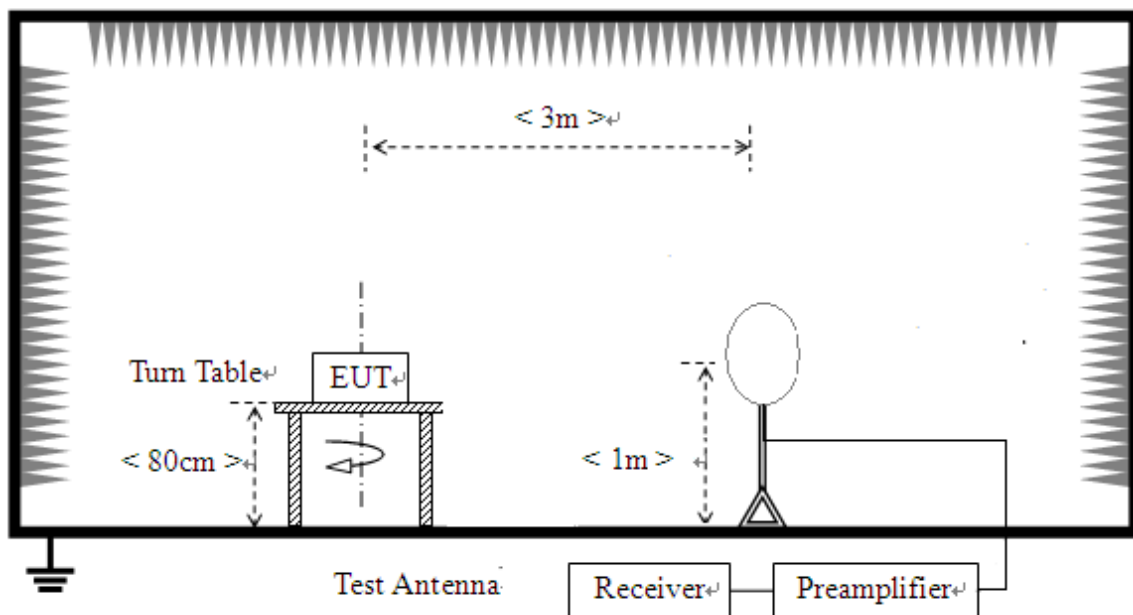
Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

### 2.10.2. Measuring Instruments

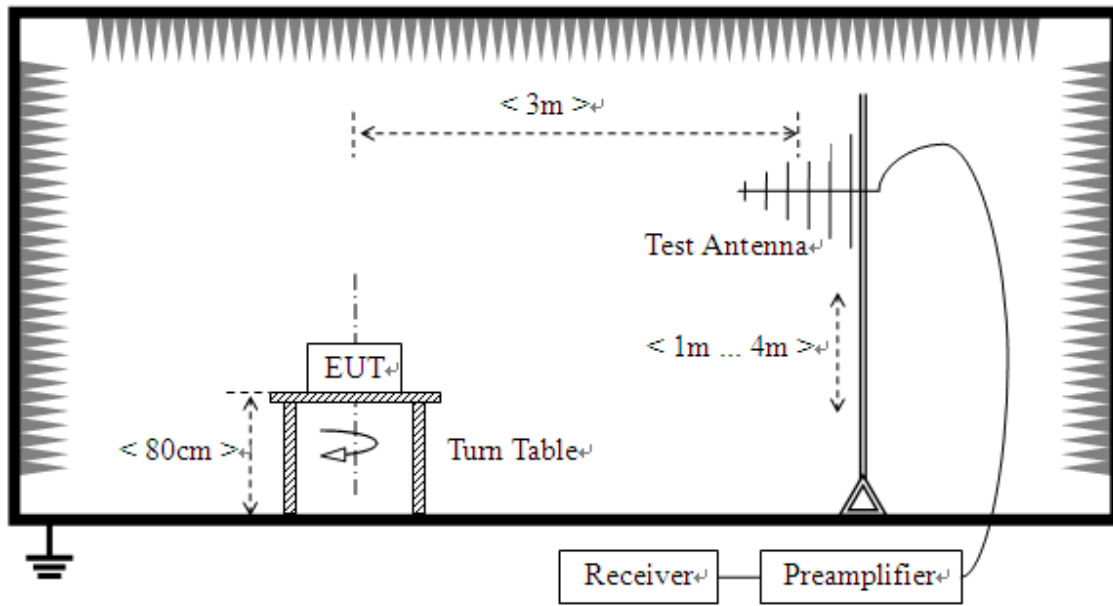
The measuring equipment is listed in the section 3 of this test report.

### 2.10.3. Test Setup

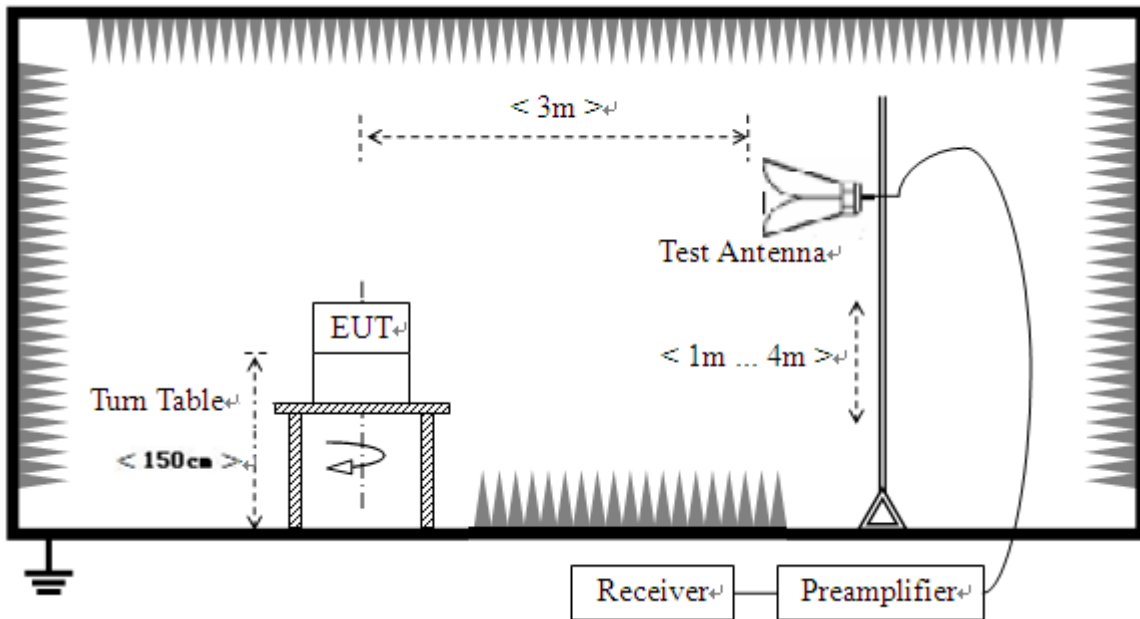
- 1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to 1GHz



3) For radiated emissions above 1GHz



#### 2.10.4. Test Procedure

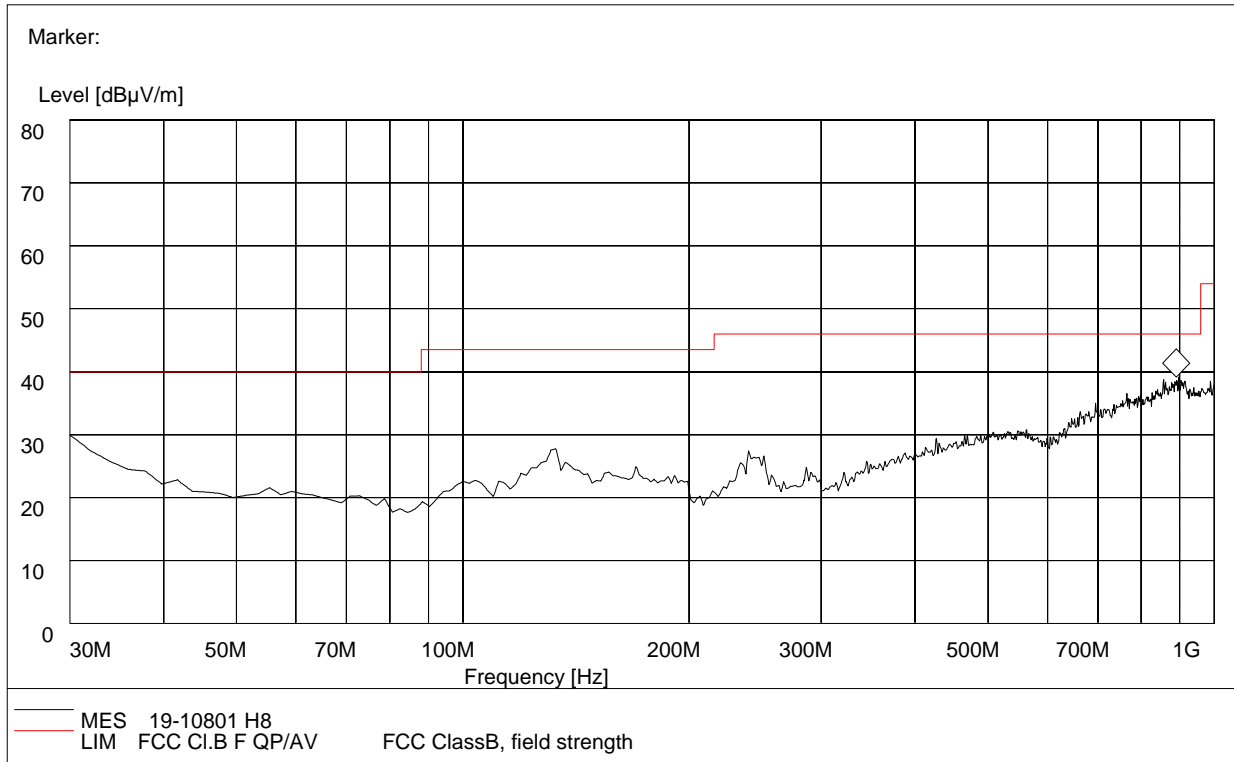
1. The EUT was placed on a turntable with 0.8m below 1GHz 1.5m above 1GHz above the ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz, RBW=1MHz for  $f > 1$ GHz ; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
  - (3) For average measurement: use duty cycle correction factor method per 15.35(c).  
Duty cycle = On time/100 milliseconds  
On time =  $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{N_{n-1}} + N_n * L_n$   
Where  $N_1$  is number of type 1 pulses, L1 is length of type 1 pulses, etc.  
Average Emission Level = Peak Emission Level + 20\*log(Duty cycle)
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. Device under transmit mode and filter the fundamental .

### 2.10.5. Test Results of Radiated Band Edge and Spurious Emission

#### For 9 KHz to 30MHz

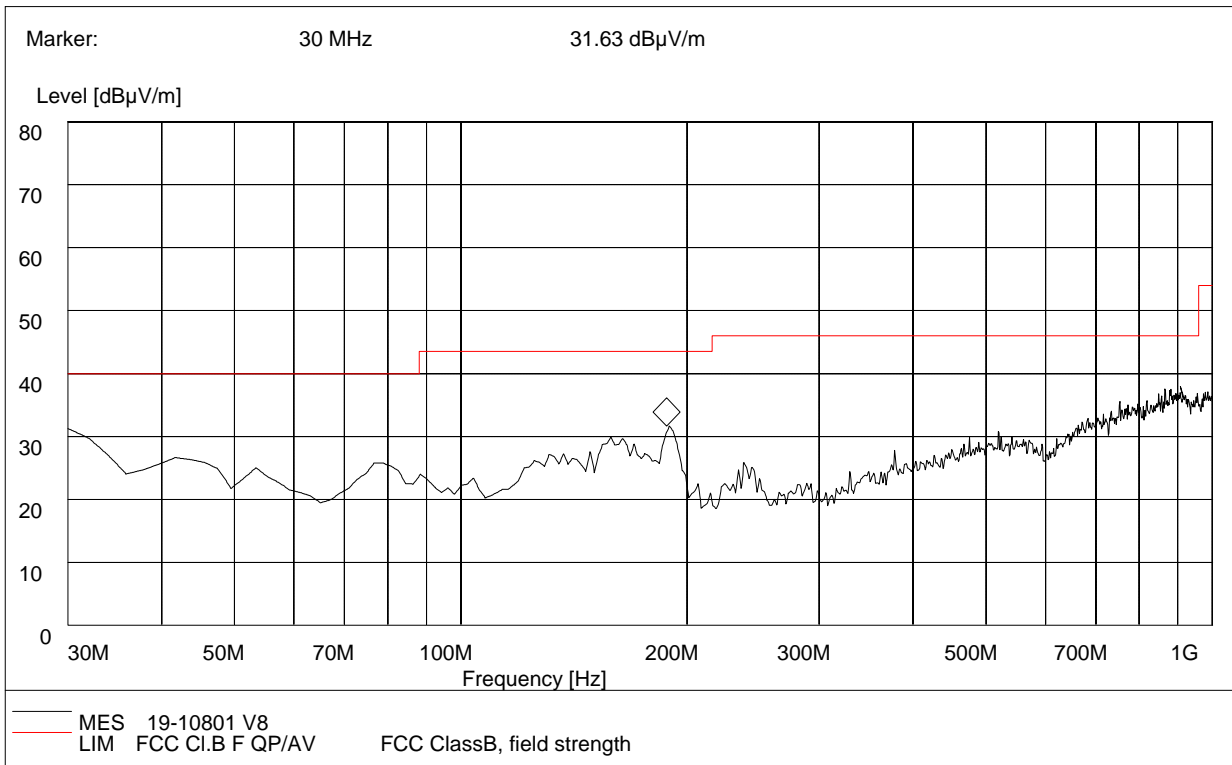
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

#### For 30MHz to 1000MHz



Frequency (MHz)	QuasiPeak (dB µ V/m)	Bandwidth (kHz)	Antenna height (cm)	Cable Loss(dB)	ANT. Factor(dB)	Limit (dB µ V/m)	Antenna	Verdict
899.54	38.95	120.000	100.0	0.4	27.4	46.0	Horizontal	Pass

(30MHz to 1GHz, Antenna Horizontal)



Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Cable Loss(dB)	ANT. Factor(dB)	Limit (dB $\mu$ V/m)	Antenna	Verdict
189.56	32.56	120.000	120.0	0.3	26.7	43.5	Vertical	Pass

(30MHz to 1GHz, Antenna Vertical)

**Above 1GHz Data:****ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (1CH\_902.75MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	902.00	51.81	PK	74.00	-22.19	1.60	320.00	43.16	8.65
2	902.00	41.03	AV	54.00	-12.97	1.60	320.00	32.38	8.65
3	1805.50	49.56	PK	74.00	-24.44	1.60	320.00	33.65	11.17
4	1805.50	39.82	AV	54.00	-14.18	1.60	320.00	28.65	11.17
5	2708.25	52.14	PK	74.00	-21.86	1.60	320.00	39.54	16.00
6	2708.25	41.39	AV	54.00	-12.61	1.60	320.00	31.21	16.00
7	3611.00	54.33	PK	74.00	-19.67	1.60	320.00	38.95	19.14
8	3611.00	43.95	AV	54.00	-10.05	1.60	320.00	30.21	19.14

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (1CH\_902.75MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	902.00	48.72	PK	74.00	-25.28	1.80	180.00	40.07	8.65
2	902.00	41.02	AV	54.00	-12.98	1.80	180.00	32.37	8.65
3	1805.50	48.95	PK	74.00	-25.05	1.80	180.00	36.25	11.17
4	1805.50	39.52	AV	54.00	-14.48	1.80	180.00	29.14	11.17
5	2708.25	52.34	PK	74.00	-21.66	1.80	360.00	37.95	16.00
6	2708.25	41.58	AV	54.00	-12.42	1.80	360.00	29.65	16.00
7	3611.00	55.39	PK	74.00	-18.61	1.80	320.00	38.25	19.14
8	3611.00	54.28	AV	54.00	0.28	1.80	320.00	31.26	19.14

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (26CH\_915.25MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	1830.50	48.88	PK	74.00	-25.12	1.00	100.00	33.15	10.42
2	1830.50	39.65	AV	54.00	-14.35	1.00	100.00	28.54	10.42
3	2745.75	53.62	PK	74.00	-20.38	1.00	100.00	34.65	16.40
4	2745.75	43.05	AV	54.00	-10.95	1.00	100.00	29.54	16.43
5	3661.00	54.98	PK	74.00	-19.02	1.00	100.00	38.50	18.12
6	3661.00	44.25	AV	54.00	-9.75	1.00	100.00	31.00	18.15

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (26CH\_915.25MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	1830.50	47.65	PK	74.00	-26.35	1.00	360.00	31.33	10.32
2	1830.50	38.25	AV	54.00	-15.75	1.00	360.00	28.95	10.33
3	2745.75	52.89	PK	74.00	-21.11	1.00	360.00	36.95	15.94
4	2745.75	45.10	AV	54.00	-8.90	1.00	360.00	29.12	15.98
5	3661.00	57.95	PK	74.00	-16.05	1.00	360.00	38.65	19.30
6	3661.00	49.62	AV	54.00	-4.38	1.00	360.00	30.21	19.41



**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (50CH\_927.25MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	928.00	55.94	PK	74.00	-18.06	1.50	40.00	47.13	8.81
2	928.00	46.41	AV	54.00	-7.59	1.50	40.00	37.60	8.81
3	1854.50	46.00	PK	74.00	-28.00	2.00	180.00	35.24	10.76
4	1854.50	39.77	AV	54.00	-14.23	2.00	180.00	28.98	10.79
5	2781.75	55.16	PK	74.00	-18.84	2.00	180.00	38.77	16.39
6	2781.75	47.65	AV	54.00	-6.35	2.00	180.00	31.26	16.39
7	3709.00	58.96	PK	74.00	-15.04	2.00	180.00	38.12	20.84
8	3709.00	50.97	AV	54.00	-3.03	2.00	180.00	30.11	20.86

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (50CH\_927.25MHz)**

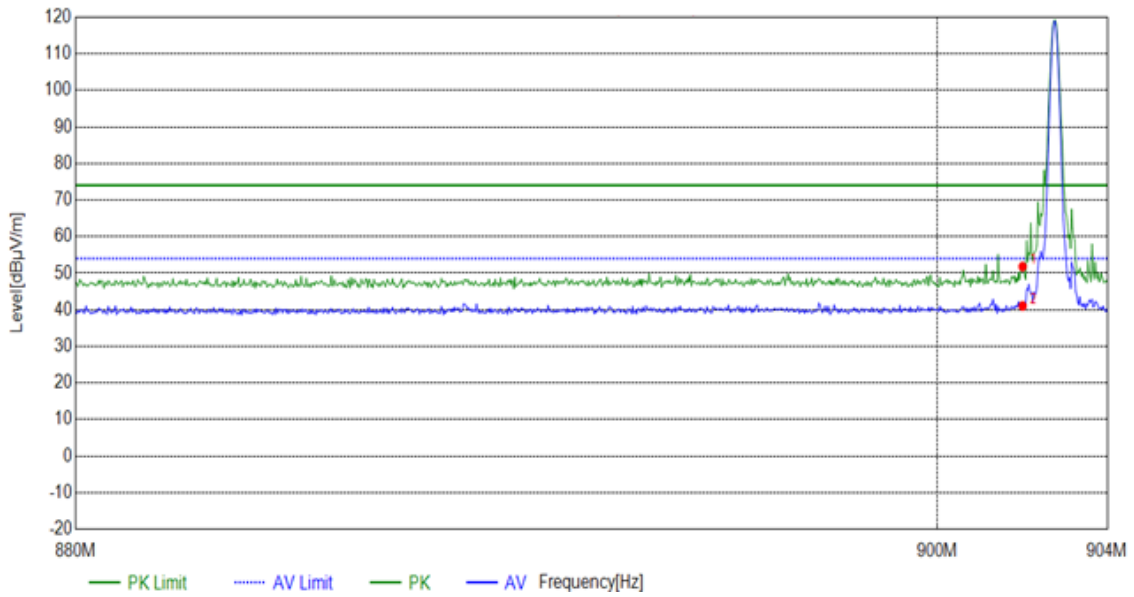
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	928.00	47.06	PK	74.00	-26.94	2.00	150.00	38.25	8.81
2	928.00	39.62	AV	54.00	-14.38	2.00	150.00	30.81	8.81
3	1854.50	45.62	PK	74.00	-28.38	2.00	150.00	32.29	8.13
4	1854.50	35.20	AV	54.00	-18.80	2.00	150.00	28.65	8.15
5	2781.75	53.21	PK	74.00	-20.79	2.00	150.00	34.21	11.82
6	2781.75	44.09	AV	54.00	-9.91	2.00	150.00	26.21	11.88
7	3709.00	57.36	PK	74.00	-16.64	2.00	150.00	32.45	16.39
8	3709.00	46.32	AV	54.00	-7.68	2.00	150.00	24.35	16.40

**REMARKS:**

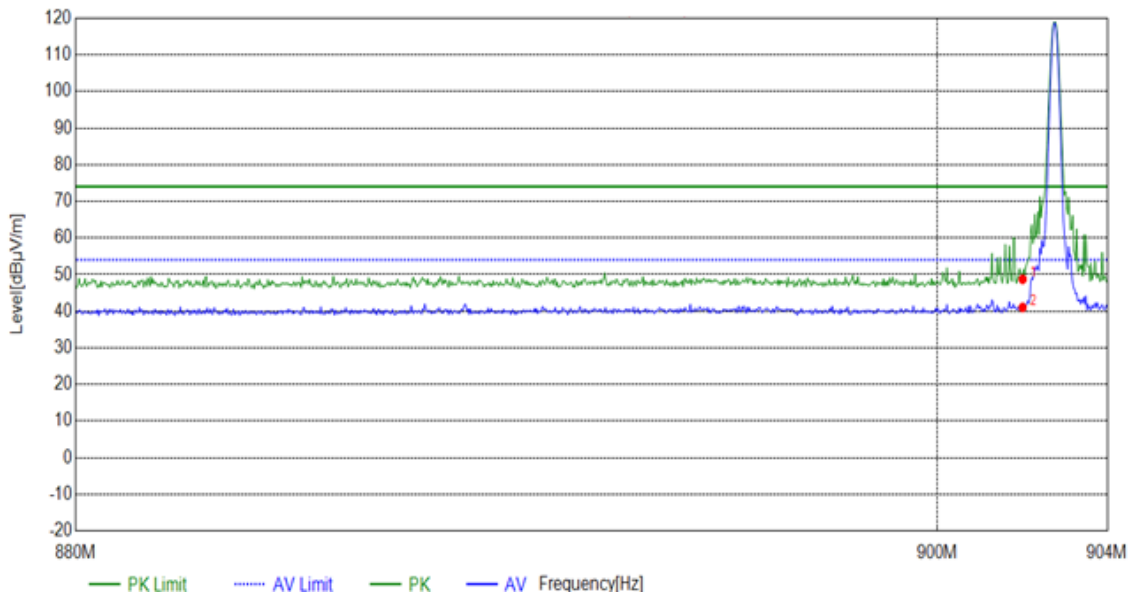
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

**Test plots of Radiation bandedge**

**CH01 902.75  
POLARITY HORIZONTAL**

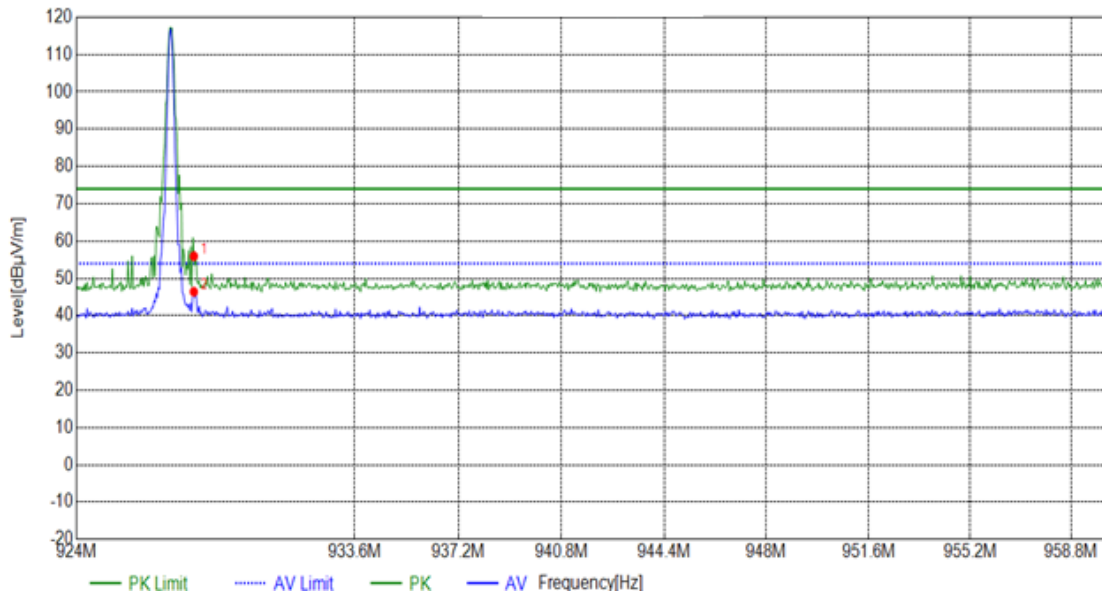


**POLARITY VERTICAL**

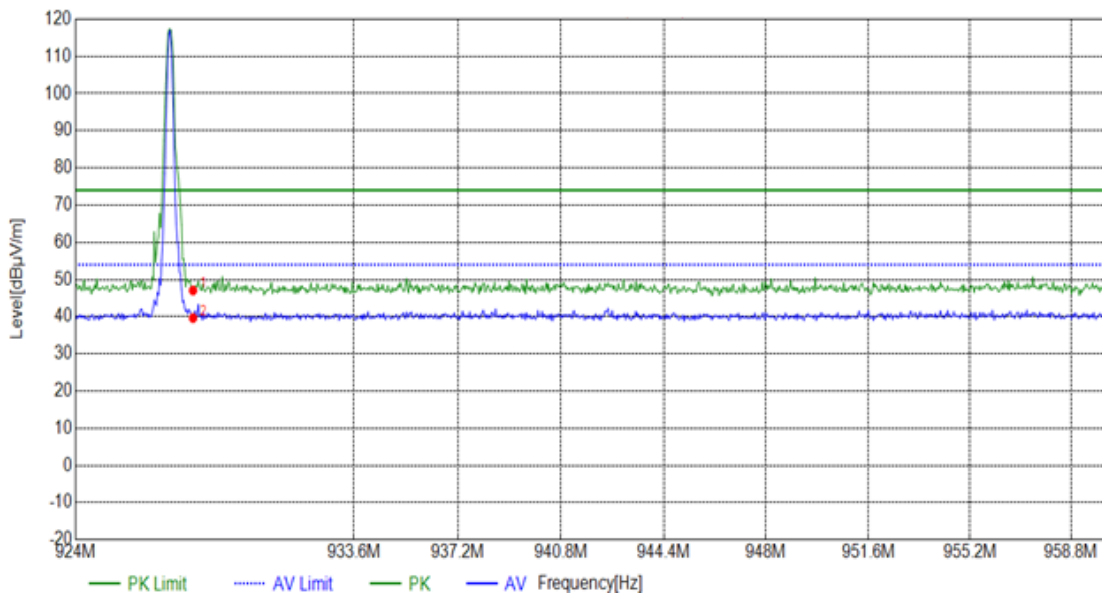




### CH50 927.25 POLARITY HORIZONTAL



### POLARITY VERTICAL





### 3. List of measuring equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI TEST RECEIVER	R&S	ESW26	A180502935	2018.11.1	2019.10.31
2	Power Meter	R&S	NRP-Z31	102872	2019.5.5	2020.05.04
3	TURNTABLE	ETS	2088	2149	N/A	N/A
4	ANTENNA MAST	ETS	2075	2346	N/A	N/A
5	EMI TEST Software	R&S	ESK1	N/A	N/A	N/A
6	Horn antenna (18GHz~26.5GHz)	AR	AT4002A	305753	2017.11.10	2020.11.09
7	Amplifer	MILMEGA	80RF1000-250	A140901925	2017.10.09	2020.10.08
8	JS amplifer	AR	25S1G4AM1	A0304248	2017.10.09	2020.10.08
9	High pass filter	Compliance Direction systems	BSU-6	34202	2018.11.11	2019.11.10
13	Horn Antenna	ShwarzBeck	9120D	1012	2018.11.11	2019.11.10
14	Horn Antenna	ShwarzBeck	BBHA9170	25841	2018.11.11	2019.11.10
15	ULTRA-BROADBAND ANTENNA	R&S	HL562	A0304224	2017.07.14	2020.07.13
16	Passive Loop Antenna	R&S	HFH2-Z2	100047	2019.04.26	2022.04.25
17	Temperature chamber	Dongguan gaoda instrument CO.LTD	GD-7005-100	130130101	2019.04.22	2020.04.21
18	Spectrum Analyzer	Keysight	N9030A	A160702554	2018.11.15	2019.11.14
19	Power Supply	R&S	NGMO1	101037	2019.08.03	2020.08.02
20	EMI TEST RECEIVER	KEYSIGHT	ESIB26	A0304218	2019.05.20	2020.05.19
21	LISN	ROHDE&SCHWARZ	ENV216	A140701847	2018.12.10	2019.12.10
22	Cable	MATCHING PAD	W7	/	2019.01.02	2020.01.01

\*\* END OF REPORT \*\*