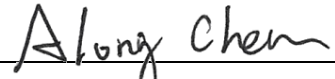


FCC Test Report

FCC ID : 2AXBO-UPIDO-BASIC
Equipment : UPIDO®
Model No. : Basic
Brand Name : 
Applicant : UnaBiz Co., Ltd.
Address : 10F., No. 618, Ruiguang Rd., Neihu Dist.,
Taipei City 114, Taiwan (R.O.C.)
Standard : 47 CFR FCC Part 15.247
Received Date : Jul. 17, 2020
Tested Date : Aug. 12 ~ Aug. 17, 2020

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:


Along Chen / Assistant Manager

Approved by:

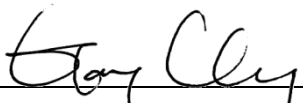

Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR071705	Rev. 01	Initial issue	Sep. 22, 2020

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	Note	N/A
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 581.60MHz 34.36 (Margin -11.64dB) - PK	Pass
15.247(d)	Band Edge	Meet the requirement of limit	Pass
15.247(b)(1)	Conducted Output Power	Power [dBm]: 22.73	Pass
15.247(a)(1)(iii)	Number of Hopping Channels	Meet the requirement of limit	Pass
15.247(a)(1)	Hopping Channel Separation	Meet the requirement of limit	Pass
15.247(a)(1)(iii)	Dwell Time	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass
Note: The EUT consumes DC power from battery, therefore this test is not required.			

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information			
Frequency Range (MHz)	Ch. Freq. (MHz)	Modulation	Data Rate
920 ~ 923	920.1375 ~ 922.6625	DBPSK	600bps

1.1.2 Antenna Details

Ant. No.	Type	Connector	Antenna Gain (dBi)
1	PIFA	UFL	-0.21

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.6 Vdc from battery
-------------------	----------------------

1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	Li-ion Battery	Brand: RAMWAY Model: ER34615 Power Rating: 3.6Vdc, 0.23A

1.1.5 Channel List

UL	Micro ch.1	Micro ch.2	Micro ch.3	Micro ch.4	Micro ch.5	Micro ch.6
1	920.1375	920.1625	920.1875	920.2125	920.2375	920.2625
2	920.4375	920.4625	920.4875	920.5125	920.5375	920.5625
3	920.7375	920.7625	920.7875	920.8125	920.8375	920.8625
4	921.0375	921.0625	921.0875	921.1125	921.1375	921.1625
5	921.3375	921.3625	921.3875	921.4125	921.4375	921.4625
6	921.6375	921.6625	921.6875	921.7125	921.7375	921.7625
7	921.9375	921.9625	921.9875	922.0125	922.0375	922.0625
8	922.2375	922.2625	922.2875	922.3125	922.3375	922.3625
9	922.5375	922.5625	922.5875	922.6125	922.6375	922.6625

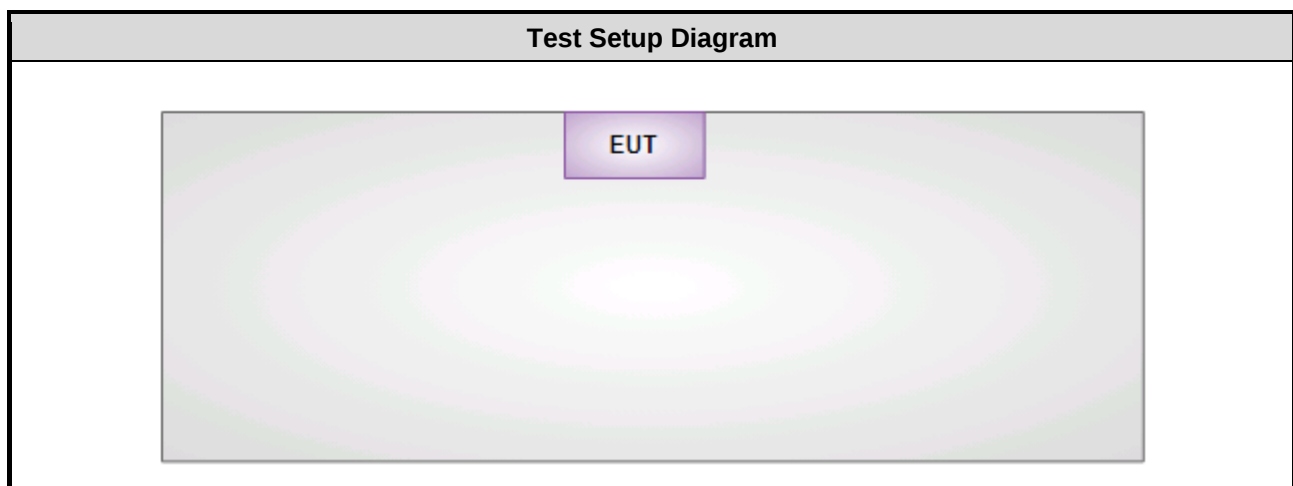
1.1.6 Test Tool and Duty Cycle

Test Tool	Tera Term, Version: V4.7.4	
Duty Cycle and Duty Factor	Duty Cycle (%)	Duty Factor (dB)
	95.26	0.21

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	S/N	Remarks
1	Notebook	DELL	Latitude E5470	3J5JVF2	---

1.3 Test Setup Chart



Note: The fixture and notebook is disconnected from EUT and removed from test table when EUT is set to transmit continuously.

1.4 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Aug. 12, 2020				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Dec. 17, 2019	Dec. 16, 2020
Receiver	R&S	ESR3	101657	Feb. 14, 2020	Feb. 13, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 10, 2020	Jul. 09, 2021
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 12, 2019	Dec. 11, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2019	Nov. 14, 2020
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 13, 2019	Nov. 12, 2020
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 07, 2019	Oct. 06, 2020
Preamplifier	EMC	EMC02325	980225	Jul. 03, 2020	Jul. 02, 2021
Preamplifier	Agilent	83017A	MY39501308	Oct. 08, 2019	Oct. 07, 2020
Preamplifier	EMC	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021
RF Cable	EMC	EMC104-SM-SM-80 00	181106	Oct. 07, 2019	Oct. 06, 2020
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 07, 2019	Oct. 06, 2020
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 07, 2019	Oct. 06, 2020
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 07, 2019	Oct. 06, 2020
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 07, 2019	Oct. 06, 2020
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Oct. 07, 2019	Oct. 06, 2020
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Aug. 17, 2020				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Apr. 30, 2020	Apr. 29, 2021
Power Meter	Anritsu	ML2495A	1241002	Oct. 23, 2019	Oct. 22, 2020
Power Sensor	Anritsu	MA2411B	1207366	Oct. 23, 2019	Oct. 22, 2020
DC POWER SOURCE	GW INSTRON	GPC-6030D	GES855395	Oct. 29, 2019	Oct. 28, 2020
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 02, 2019	Dec. 01, 2020
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247

ANSI C63.10-2013

1.6 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

1.7 Deviation from Test Standard and Measurement Procedure

None

1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	± 34.130 Hz
AC conducted emission	± 2.92 dB
Radiated emission ≤ 1 GHz	± 3.41 dB
Radiated emission > 1 GHz	± 4.59 dB

2 Test Configuration

2.1 Testing Condition

Test Laboratory	International Certification Corp.
Test Site	03CH01-WS, TH01-WS
Address of Test Site	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Data Rate (Mbps)	Test Configuration
Conducted Emissions	DBPSK	920.1375/ 922.6625	600bps	---
Radiated Emissions ≤ 1GHz				
Radiated Emissions > 1GHz				
Conducted Output Power				
Number of Hopping Channels				
Hopping Channel Separation 20dB and Occupied bandwidth				
Dwell Time	DBPSK	920.1375	600bps	---
NOTE:				
1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.				

3 Transmitter Test Results

3.1 Unwanted Emissions into Restricted Frequency Bands

3.1.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9~90 kHz, 110~490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.1.2 Test Procedures

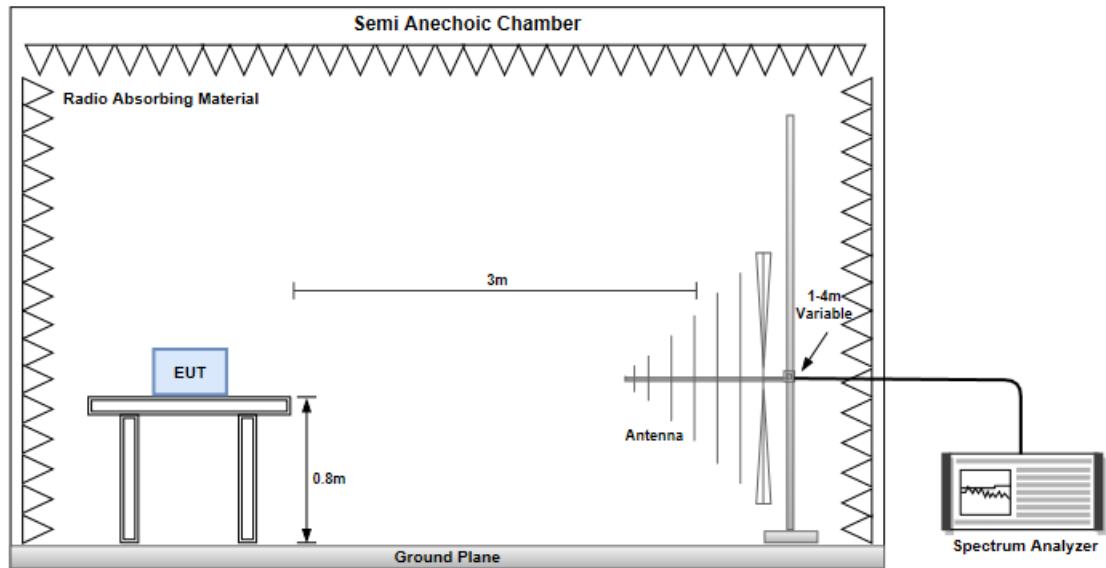
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

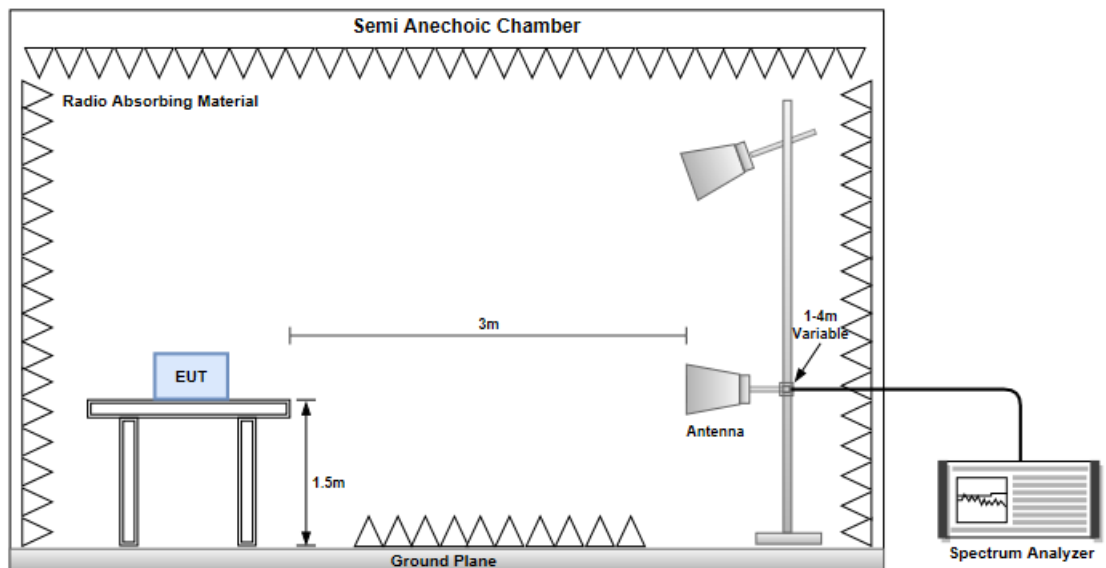
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.1.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



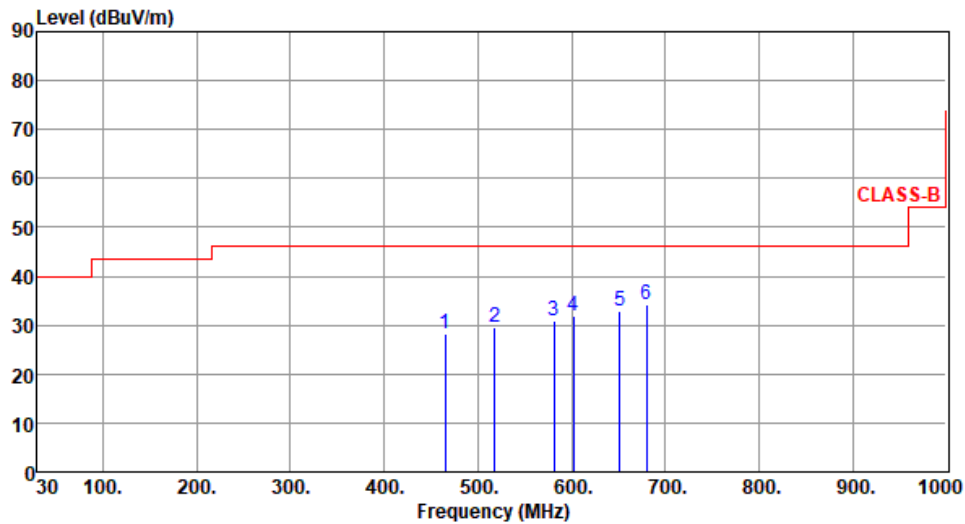
3.1.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	DBPSK	Test Freq. (MHz)	920.1375
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):22 Humidity(%):67			
Level (dBuV/m) </			

Modulation	DBPSK	Test Freq. (MHz)	920.1375
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):22 Humidity(%):67			
Level (dBuV/m)			

Modulation	DBPSK	Test Freq. (MHz)	922.6625
Polarization	Horizontal		

Test By :Akun Chung Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	465.60	28.22	46.00	-17.78	31.92	-3.70	Peak	---	---
2	517.60	29.42	46.00	-16.58	32.03	-2.61	Peak	---	---
3	581.60	30.91	46.00	-15.09	32.25	-1.34	Peak	---	---
4	602.40	31.87	46.00	-14.13	32.69	-0.82	Peak	---	---
5	651.20	32.75	46.00	-13.25	32.79	-0.04	Peak	---	---
6	680.00	34.12	46.00	-11.88	34.07	0.05	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation	DBPSK	Test Freq. (MHz)	922.6625
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):22 Humidity(%):67			
Level (dBuV/m) <			

3.1.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for GFSK

Modulation	DBPSK		Test Freq. (MHz)		920.1375				
Polarization	Horizontal								
Test By :Roger Lu			Temperature(°C):22			Humidity(%):67			
Level (dBuV/m)									

Modulation	DBPSK	Test Freq. (MHz)	920.1375
Polarization	Vertical		
Test By :Roger Lu Temperature(°C):22 Humidity(%):67			
Level (dBuV/m) </			

Modulation	DBPSK	Test Freq. (MHz)	922.6625
Polarization	Horizontal		
Test By :Roger Lu Temperature(°C):22 Humidity(%):67			
Level (dBUV/m)			

Modulation	DBPSK	Test Freq. (MHz)	922.6625
Polarization	Vertical		
Test By :Roger Lu Temperature(°C):22 Humidity(%):67			
Level (dBuV/m)			

3.2 Unwanted Emissions into Non-Restricted Frequency Bands

3.2.1 Limit of Unwanted Emissions into Non-Restricted Frequency Bands

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power

3.2.2 Test Procedures

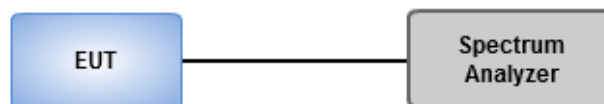
Reference Level Measurement

1. Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
2. Set Sweep time = auto couple, Trace mode = max hold.
3. Allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

Unwanted Emissions Level Measurement

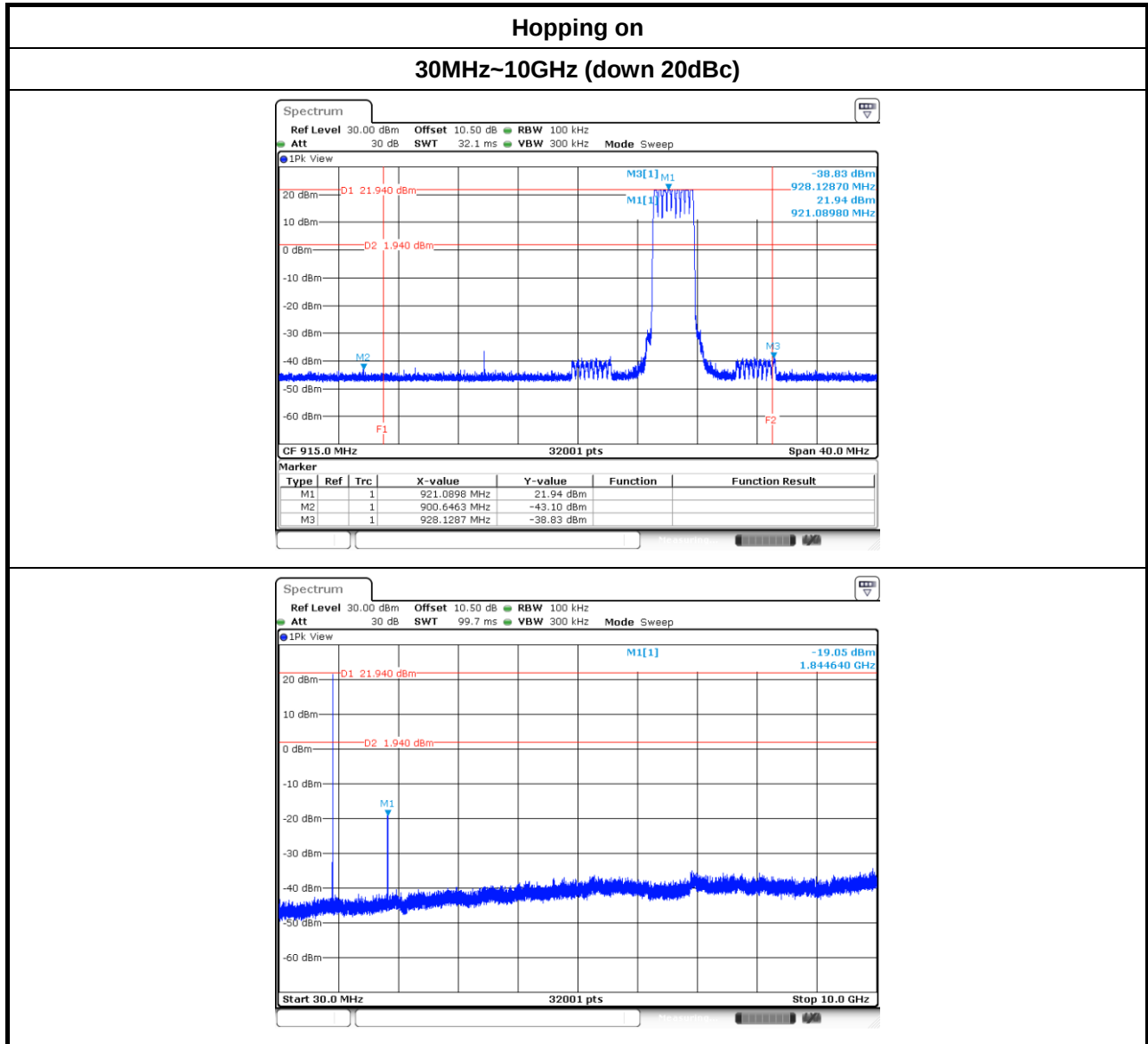
1. Set RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
2. Trace Mode = max hold, Sweep = auto couple.
3. Allow the trace to stabilize.
4. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

3.2.3 Test Setup



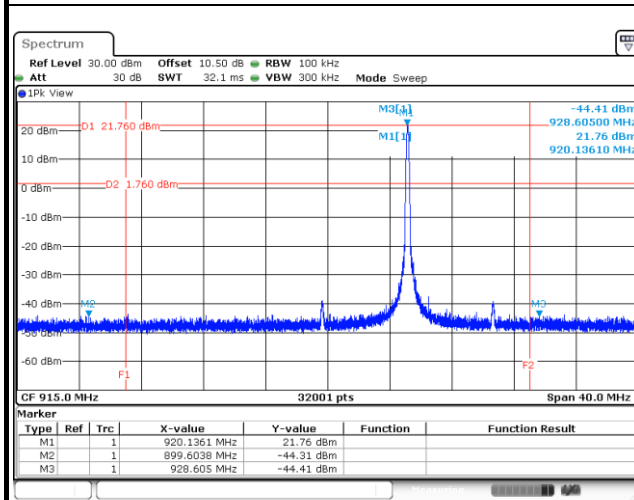
3.2.4 Unwanted Emissions into Non-Restricted Frequency Bands

Ambient Condition	24°C / 67%	Tested By	Aska Huang
-------------------	------------	-----------	------------



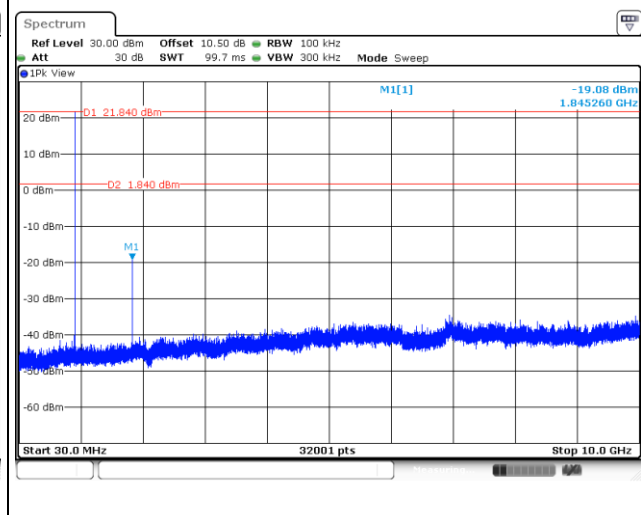
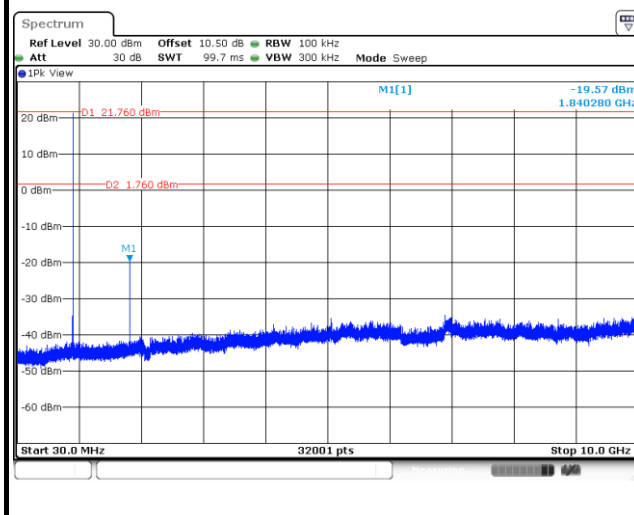
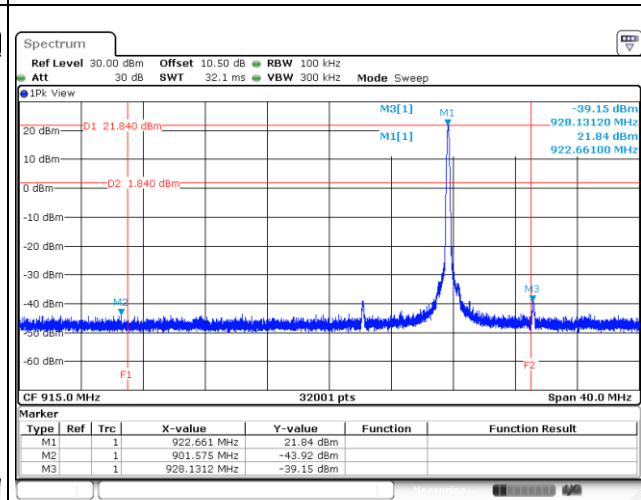
Hopping off

920.1375MHz/ 30MHz~10GHz (down 20dBc)



Hopping off

922.6625MHz / 30MHz~10GHz (down 20dBc)



3.3 RF Output Power

3.3.1 Limit of RF Output Power

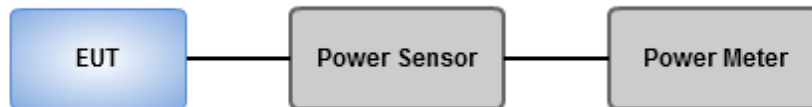
1 watt for systems employing at least 50 hopping channels

3.3.2 Test Procedures

A wideband power meter is used for power measurement. Bandwidth of power sensor and meter is 50MHz

If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power

3.3.3 Test Setup



3.3.4 Test Result of Maximum Output Power

Ambient Condition	24°C / 67%	Tested By	Aska Huang
-------------------	------------	-----------	------------

Modulation Mode	Freq. (MHz)	Output Power (mW)	Output Power (dBm)	Limit (dBm)
DBPSK	920.1375	182.81	22.62	30
DBPSK	922.6625	187.50	22.73	30

Modulation Mode	Freq. (MHz)	AV Output Power (mW)	AV Output Power (dBm)
DBPSK	920.1375	180.72	22.57
DBPSK	922.6625	185.78	22.69

Note: Average power is for reference only.

3.4 Number of Hopping Frequency

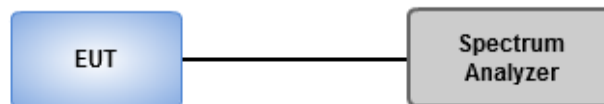
3.4.1 Limit of Number of Hopping Frequency

The 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies.

3.4.2 Test Procedures

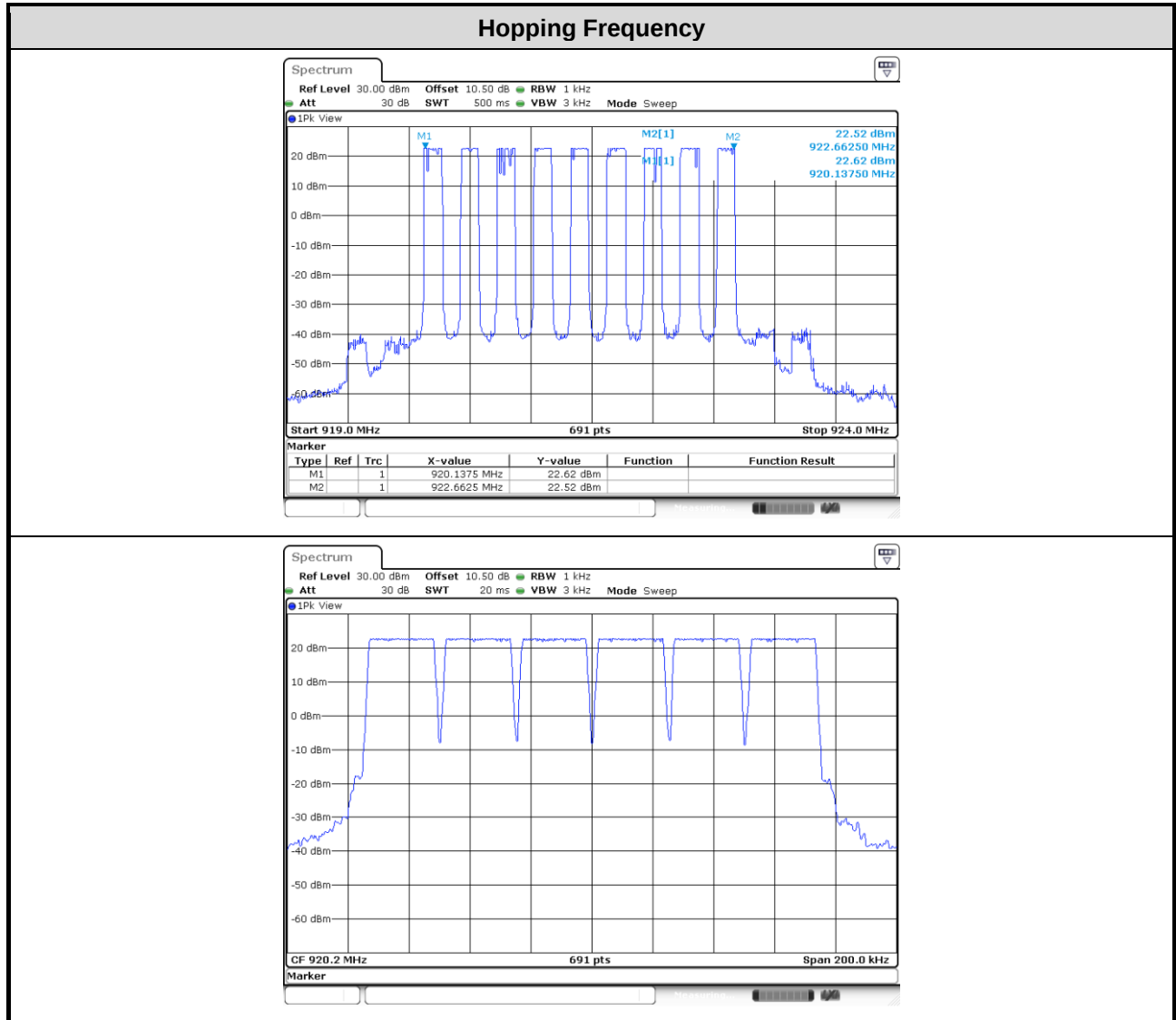
1. Set RBW = 1 kHz, VBW = 3 kHz, Sweep time = Auto, Detector = Peak Trace max hold.
2. Allow trace to stabilize.

3.4.3 Test Setup



3.4.4 Test Result of Number of Hopping Frequency

Ambient Condition	24°C / 67%	Tested By	Aska Huang
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3.5 20dB and Occupied Bandwidth

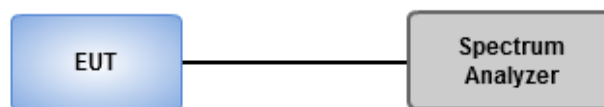
3.5.1 Limit of Number of 20dB Bandwidth

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

3.5.2 Test Procedures

1. Set resolution bandwidth (RBW) = 500 Hz, Video bandwidth = 2 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20dB relative to the maximum level measured in the fundamental emission.
5. Use the occupied measurement function of spectrum analyzer to measure 99% occupied bandwidth.

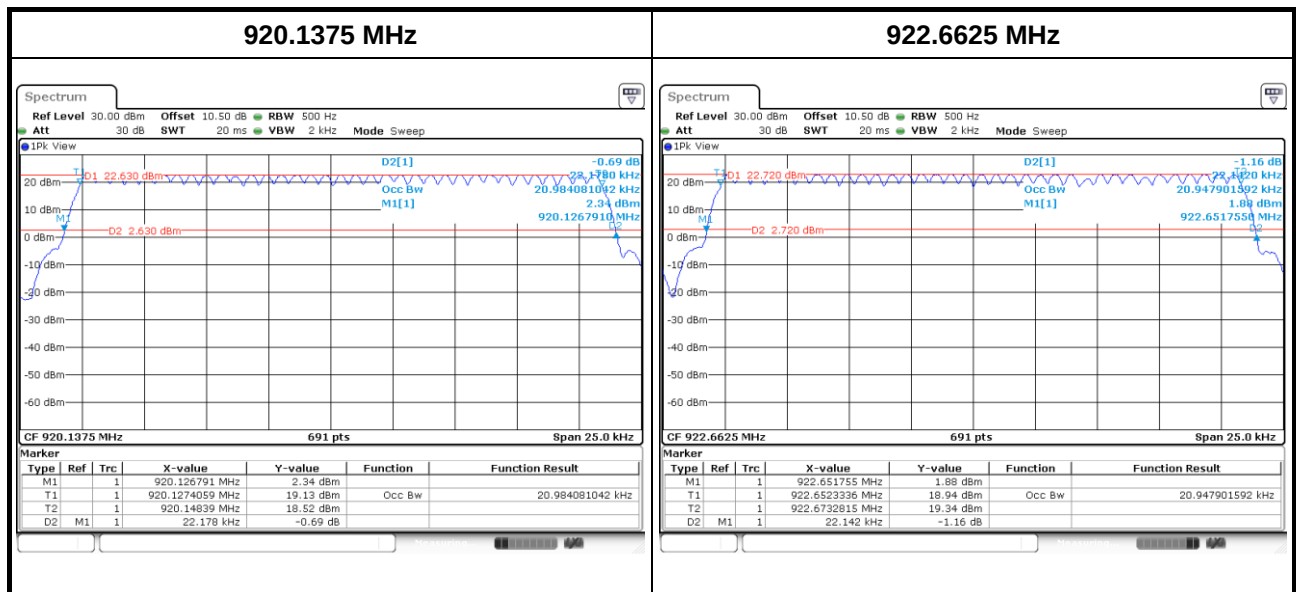
3.5.3 Test Setup



3.5.4 20dB and Occupied Bandwidth

Ambient Condition	24°C / 67%	Tested By	Aska Huang
-------------------	------------	-----------	------------

Modulation Mode	Freq. (MHz)	20dB Bandwidth (kHz)	Occupied Bandwidth (kHz)
DBPSK	920.1375	22.18	20.98
DBPSK	922.6625	22.14	20.95
Limit(kHz)		500	---



3.6 Channel Separation

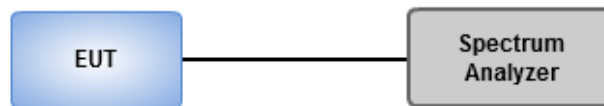
3.6.1 Limit of Channel Separation

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

3.6.2 Test Procedures

1. Set RBW=1 kHz, VBW=3 kHz, Sweep time = Auto, Detector=Peak Trace max hold
2. Allow trace to stabilize
3. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The EUT shall show compliance with the appropriate regulatory limit

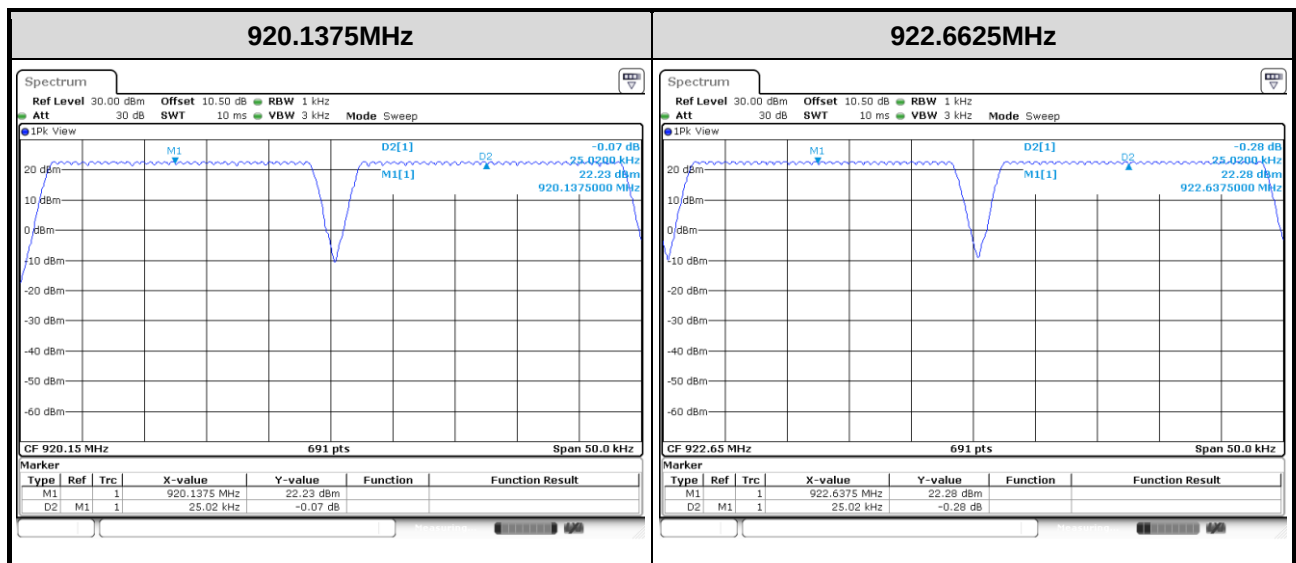
3.6.3 Test Setup



3.6.4 Test result of Channel Separation

Ambient Condition	24°C / 67%	Tested By	Aska Huang
-------------------	------------	-----------	------------

Modulation Mode	Freq. (MHz)	Channel Separation (kHz)	Limit (kHz)
DBPSK	920.1375	25.02	25.00
DBPSK	922.6625	25.02	25.00



3.7 Number of Dwell Time

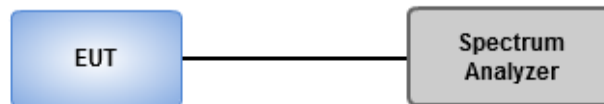
3.7.1 Limit of Dwell time

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

3.7.2 Test Procedures

1. Set RBW=100kHz,VBW=300kHz,Sweep time = 500 ms, Detector=Peak, Span=0Hz,Trace max hold
2. Enable gating and trigger function of spectrum analyzer to measure burst on time.

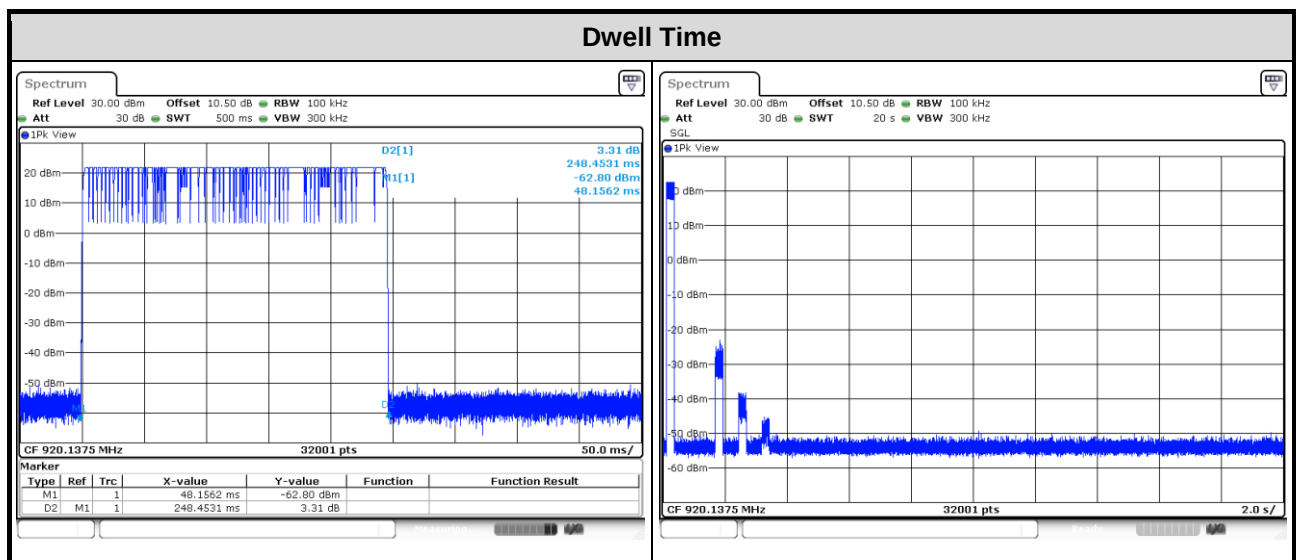
3.7.3 Test Setup



3.7.4 Test Result of Dwell Time

Ambient Condition	24°C / 67%	Tested By	Aska Huang
-------------------	------------	-----------	------------

Modulation Mode	Freq. (MHz)	Length of Transmission Time (sec)	Number of Transmission in 9.6s (24 Hopping*0.4)	Result (s)	Limit (s)
DBPSK	920.1375	0.2484531	1	0.2484531	0.4



4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin
Kou District, New Taipei City,
Taiwan, R.O.C.

Kwei Shan

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd St.,
Kwei Shan District, Tao Yuan City
333, Taiwan, R.O.C.

Kwei Shan Site II

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd
St., Kwei Shan District, Tao Yuan
City 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666

Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

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