



# RADIO TEST REPORT

Report No.: SHATBL2112037W01

Applicant:  
Chengdu Just Do It Information and Technology Co., Ltd.

Rm 604&605, Unit 1, Building 2, No. 1, Section 1, Huafu Avenue, Huayang  
Street, Tianfu New District, Chengdu, China.

Product Name : Bobcat LoRa Gateway Module

Brand Name : BOBCAT

Model Name : B100

Series Model : N/A

FCC ID : 2AZCK-B100

Test Standard : FCC Part 15.247

## TEST RESULT CERTIFICATION

**Applicant's Name**..... : Chengdu Just Do It Information and Technology Co., Ltd.  
**Address** ..... : Rm 604&605, Unit 1, Building 2, No. 1, Section 1, Huafu Avenue,  
Huayang Street, Tianfu New District, Chengdu, China.  
**Manufacture's Name**..... : Chengdu Just Do It Information and Technology Co., Ltd.  
**Address** ..... : Rm 604&605, Unit 1, Building 2, No. 1, Section 1, Huafu Avenue,  
Huayang Street, Tianfu New District, Chengdu, China.

### Product Description

**Product Name** ..... : Bobcat LoRa Gateway Module  
**Brand Name** ..... : BOBCAT  
**Model Name** ..... : B100  
**SeriesModel** ..... : N/A

**Test Standards**..... : FCC Part15.247  
**Test Procedure** ..... : ANSI C63.10-2013


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

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### Date of Test

**Date of receipt of test item** ..... : 30 Dec. 2021  
**Date (s) of performance of tests**..... : 31 Dec. 2021~07 Jan. 2022  
**Date of Issue**..... : 10 Jan. 2022  
**Test Result**..... : **Pass**


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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	10 Jan. 2022	SHATBL2112037W01	ALL	Initial Issue



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:  
KDB 558074 D01 15.247 Meas Guidance v05r02.

FCC Part15.247,Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	--
15.247 (a)(2)	6dB Bandwidth 99% Bandwidth	PASS	--
15.247 (b)(3)	Output Power	PASS	--
15.247 (c)	Radiated Spurious Emission	PASS	--
15.247 (d)	Conducted Spurious & Band Edge Emission	PASS	--
15.247 (e)	Power Spectral Density	PASS	--
15.205	Restricted bands of operation	PASS	--
Part 15.247(d)/part 15.209(a)	Band Edge Emission	PASS	--
15.203	Antenna Requirement	PASS	--

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report.
- (2) All tests are according to ANSI C63.10-2013.

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Bobcat LoRa Gateway Module	
Trade Name	BOBCAT	
Model Name	B100	
Series Model	N/A	
Model Difference	N/A	
Product Description	The EUT is a Bobcat Lora Module For USB	
	Operation Frequency:	902-928MHz(500KHz)
	Modulation Type:	LoRa
	Number Of Channel:	41 Channel
	Antenna Designation:	Please refer to the Note 3.
	AntennaGain (dBi)	4dBi
Channel List	Please refer to the Note 2.	
Power Rating	DC 3.3V 1A	
Hardware version number	VER:03	
Software versionnumber	VER:01	
Connecting I/O Port(s)	Please refer to the Note 1.	

Note:

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

Channel List	
Channel	Frequency (MHz)
Low	903.0
Middle	915.0
High	927.5

Note: Test frequency points are declared by the customer

- 
- 
- 

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	BOBCAT	B100	Non-common Interface Antenna	N/A	4	ANT

## 2.2 DESCRIPTION OF THE TEST MODES

For conducted test items and radiated spurious emissions

Each of these EUT operation mode(s) or test configuration mode(s) mentioned below was evaluated respectively.

Worst Mode	Description	Modulation
Mode 1	903.0MHz	LoRa
Mode 2	915.0 MHz	LoRa
Mode 3	927.5 MHz	LoRa

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

(2) We have be tested for all avaiable U.S. voltage and frequencies(For 120V,50/60Hz and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V/60Hz is shown in the report.

For AC Conducted Emission

Test Case	
AC Conducted Emission	Mode2: Keeping TX

## 2.3 TEST SOFTWARE AND POWER LEVEL

During testing channel & power controlling software provided by the customer was used to control the

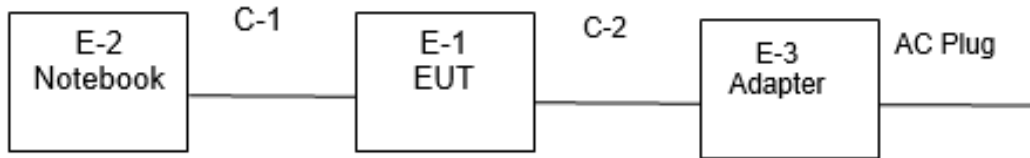
RF Function	Type	Mode Or Modulation type	Ant Gain(dBi)	Power Class	Software For Testing
LORA	500KHz	902MHz-928MHz	4	30	SecureCRT Portable

operating channel as well as the output power level.



## 2.4BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

### Radiated Spurious EmissionTest



### Conducted Emission Test



## 2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

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

### Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-3	Adapter	N/A	A-938-120100W-US1	N/A	N/A
C-2	DC Cable	N/A	N/A	110cm	N/A

### Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-2	Notebook	Lenovo	DESKTOP-USDEO09	/	N/A
C-1	USB Cable	N/A	100cm	N/A	N/A

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 2.6 TEST FACTORY

Company Name:	Shanghai ATBL Technology Co., Ltd.
Address:	Building 8, No.160 Basheng Road, Waigaoqiao Free Trade Zone, Pudong New Area, Shanghai
Telephone:	+86(0)21-51298625
A2LA Number:	6184.01
CNAS Number:	CNAS L14531

## 2.7 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.958\text{dB}$
2	Conducted spurious emissions	$\pm 2.988\text{dB}$
3	All emissions, radiated 30MHz-1GHz	$\pm 2.50\text{dB}$
4	All emissions, radiated 1GHz-18GHz	$\pm 3.51\text{dB}$
5	Occupied bandwidth	$\pm 23.20\text{dB}$
6	Power spectral density	$\pm 0.886\text{dB}$

## 2.8 EQUIPMENTS LIST

## Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Management number	Calibrated until
Test Receiver	R&S	ESCI	100469	SHATBL-E003	2022.07.13
Spectrum Analyzer	Agilent	N9020A	MY50200811	SHATBL-E017	2022.07.13
Bilog Antenna	SCHWARZBECK	VLUB 9168	01174	SHATBL-E008	2023.09.27
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	SHATBL-E009	2023.09.27
Pre-Amplifier (0.1M-3GHz)	JPT	JPA-10M1G35	2101010003500 1	SHATBL-E005	2022.10.07
Pre-Amplifier (1G-18GHz)	JPT	JPA0118-55-30 3A	1910001800055 000	SHATBL-E006	2022.07.13
Temperature & Humidity	DeLi	DeLi	N/A	SHATBL-E016	2022.10.08
Antenna/Turntable Controller	Brilliant	N/A	N/A	SHATBL-E007	N/A
Test SW	FALA	EMC-RI(Ver.4A2)		SHATBL-E046	N/A

## RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	equipment number	Calibrated until
MIMO Power measurement test Set	DARE	RPR3006W	16I00054SN01 6	SHATBL-W006	2022.10.07
			RPR6W-20001 005	SHATBL-W013	2022.10.07
Signal Analyzer	Agilent	N9020A	MY57300196	SHATBL-W004	2022.10.07
Signal Generator	Agilent	N5182B	MY46240556	SHATBL-W005	2022.10.07
Wireless Communications Test Set	R&S	CMW500	101331	SHATBL-W007	2022.10.07
Temperature & Humidity	Deli	deli	N/A	SHATBL-W011	2022.10.07
Attenuator	Agilent	8494B	DC-18G	SHATBL-W009	2022.10.07
Attenuator	Agilent	8496B	DC-18G	SHATBL-W010	2022.10.07
power splitter	MNK	MPD-DC/6-2 S	62315 G51	SHATBL-W015	2022.10.07
			62315 G52	SHATBL-W016	2022.10.07
Filter	Chengdu kangmaiwei	ZBSF-C2400 -2483.5-T3	N/A	SHATBL-W021	N/A
Constant temperature and humidity box	KSON	THS-B6C-15 0	6159K	SHATBL-W019	2022.01.26
Test SW	FALA	LZ-RF(Ver.LzRF-03A3.1)		SHATBL-W020	N/A

### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a)&RSS-Gen Issue 5 limit in the table below has to be followed.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

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

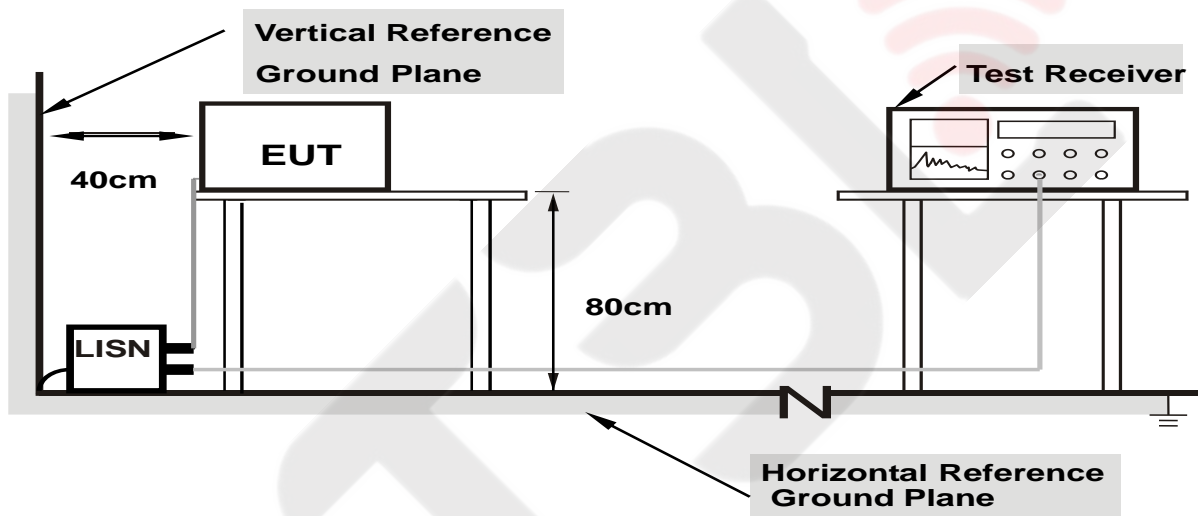
The following table is the setting of the receiver

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

### 3.2 TEST PROCEDURE

- a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.3 TEST SETUP



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

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

### 3.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

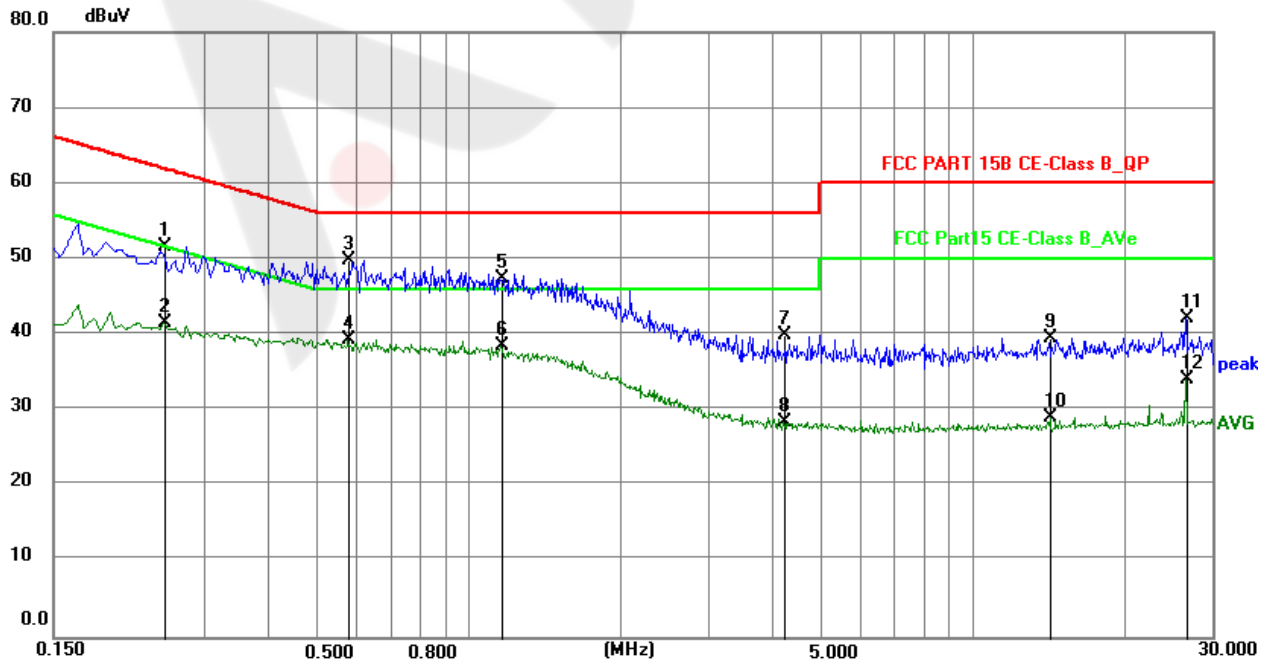
### 3.5TEST RESULTS

Temperature:	21.9(C)	Relative Humidity:	52%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 1		

No.	Frequen cy (MHz)	Reading (dBuV)	Correct Factor(d B)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2490	41.51	10.08	51.59	61.79	-10.20	QP
2	0.2490	31.50	10.08	41.58	51.79	-10.21	AVG
3	0.5774	39.86	10.02	49.88	56.00	-6.12	QP
4	0.5774	29.46	10.02	39.48	46.00	-6.52	AVG
5	1.1624	37.52	9.95	47.47	56.00	-8.53	QP
6	1.1624	28.70	9.95	38.65	46.00	-7.35	AVG
7	4.2404	29.89	10.05	39.94	56.00	-16.06	QP
8	4.2404	18.50	10.05	28.55	46.00	-17.45	AVG
9	14.3340	29.02	10.62	39.64	60.00	-20.36	QP
10	14.3340	18.52	10.62	29.14	50.00	-20.86	AVG
11	26.6235	31.10	11.12	42.22	60.00	-17.78	QP
12	26.6235	22.96	11.12	34.08	50.00	-15.92	AVG

Remark:

1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor )–Limit
3. Factor=LISN factor+Cableloss+Limiter ( 10dB )

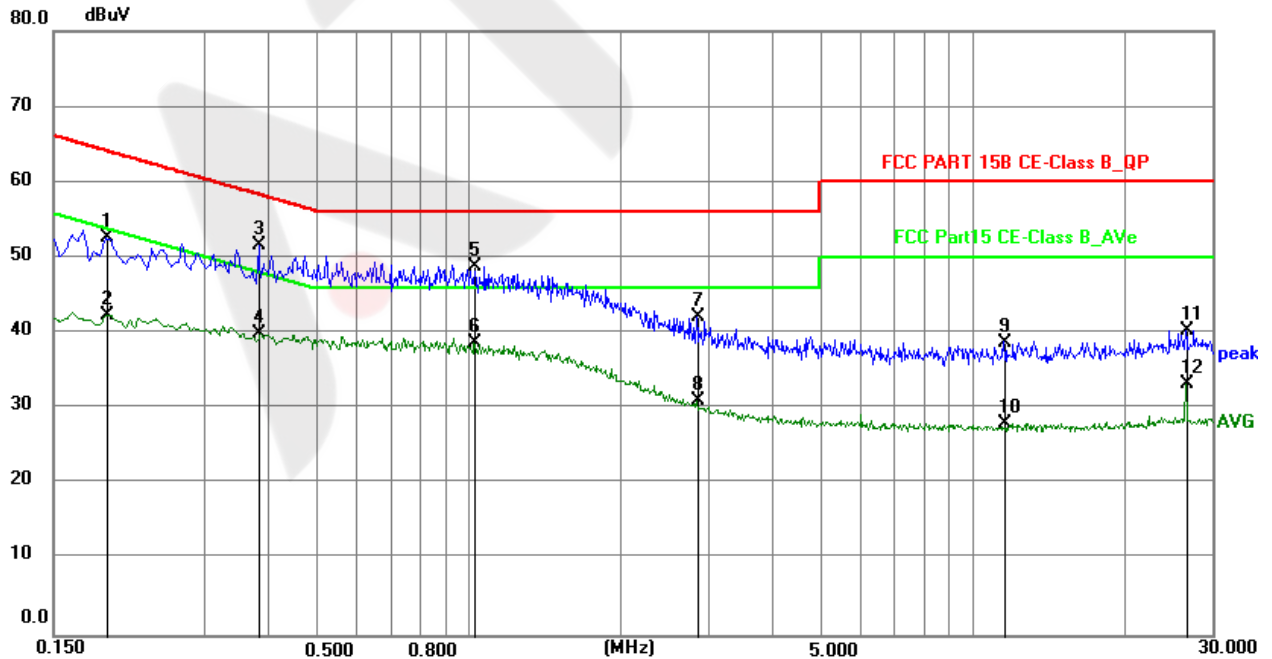


Temperature:	21.9(C)	Relative Humidity:	52%RH
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 1		

No.	Frequen cy (MHz)	Reading (dBuV)	Correct Factor(d B)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1905	42.21	10.39	52.60	64.01	-11.41	QP
2	0.1905	32.11	10.39	42.50	54.01	-11.51	AVG
3	0.3840	41.33	10.28	51.61	58.19	-6.58	QP
4	0.3840	29.66	10.28	39.94	48.19	-8.25	AVG
5	1.0274	38.75	10.15	48.90	56.00	-7.10	QP
6	1.0274	28.73	10.15	38.88	46.00	-7.12	AVG
7	2.8500	31.92	10.28	42.20	56.00	-13.80	QP
8	2.8500	20.95	10.28	31.23	46.00	-14.77	AVG
9	11.5620	28.69	10.20	38.89	60.00	-21.11	QP
10	11.5620	17.85	10.20	28.05	50.00	-21.95	AVG
11	26.6235	29.37	11.08	40.45	60.00	-19.55	QP
12	26.6235	22.36	11.08	33.44	50.00	-16.56	AVG

Remark:

1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor )–Limit
3. Factor=LISN factor+Cableloss+Limiter (10dB)





#### 4. RADIATED EMISSION MEASUREMENT

##### 4.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part 15.205(a)&209(a), RSS-Gen Issue 5 and RSS-247 Issue 2, February 2017 (5.5) limit in the table and according to ANSI C63.10-2013 below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT(Frequency Range 9kHz-1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

##### LIMITS OF RESTRICTED FREQUENCY BANDS

FCC:

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

## For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP/AV
Start Frequency	9 KHz/150KHz(Peak/QP/AV)
Stop Frequency	150KHz/30MHz(Peak/QP/AV)
RB / VB (emission in restricted band)	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz); 200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP
Start Frequency	30 MHz(Peak/QP)
Stop Frequency	1000 MHz (Peak/QP)
RB / VB (emission in restricted band)	120 KHz / 300 KHz

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	1MHz / 3MHz(Peak) 1 MHz/1/T MHz(AVG)

## For Band Edge

Note: The EUT main frequency is too far away from the restricted band, so the band edge of the radiation method is not tested.

Receiver Parameter	Setting
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

#### 4.2 TEST PROCEDURE

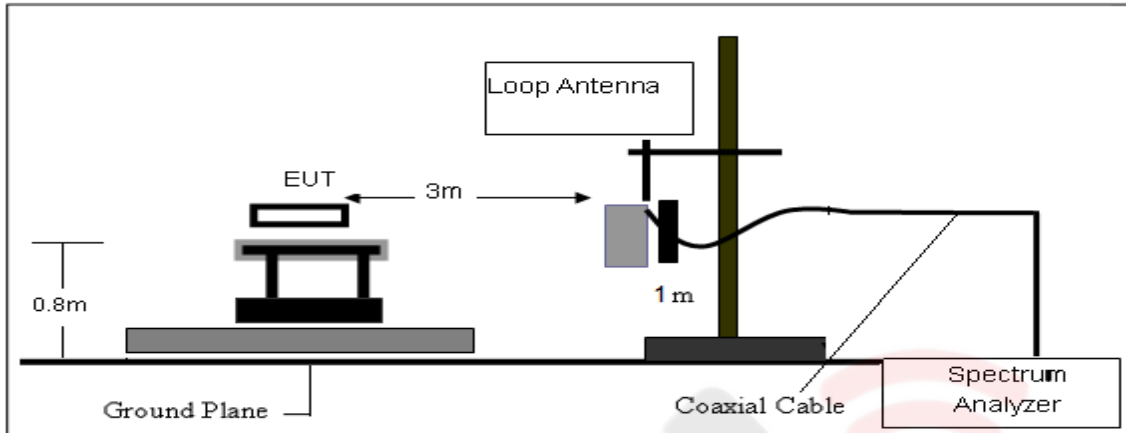
- a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarizations of the antenna are set to make the measurement
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

**Note:**

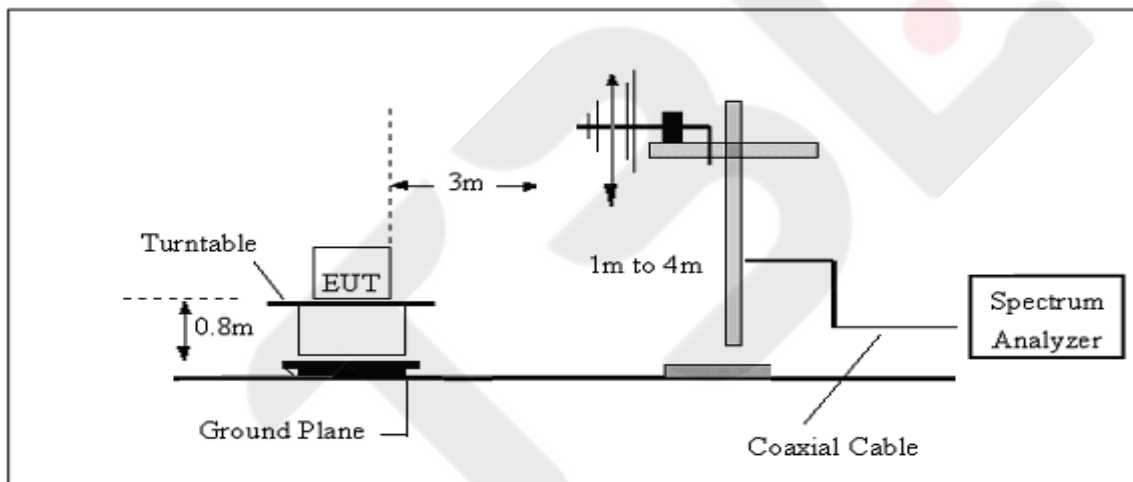
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

### 4.3 TEST SETUP

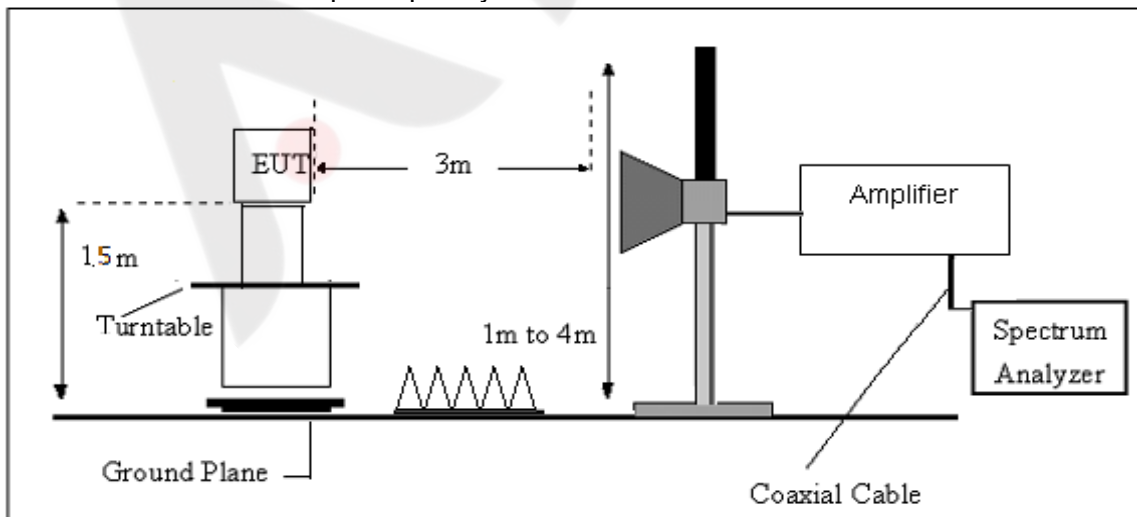
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



### 4.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 4.5 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency (MHz)	FS (dB $\mu$ V/m)	RA (dB $\mu$ V/m)	AF (dB)	CL (dB)	AG (dB)	Factor (dB)
300	40	58.1	12.2	1.6	31.9	-18.1

$$\text{Factor} = \text{AF} + \text{CL} - \text{AG}$$

### 4.6 TEST RESULTS

(Between 9KHz – 30 MHz)

Temperature:	23.3(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.3V	Polarization:	--
Test Mode:	TX Mode		

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

**Note:**

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

Distance extrapolation factor =  $40 \log(\text{specific distance}/\text{test distance})$ (dB);

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

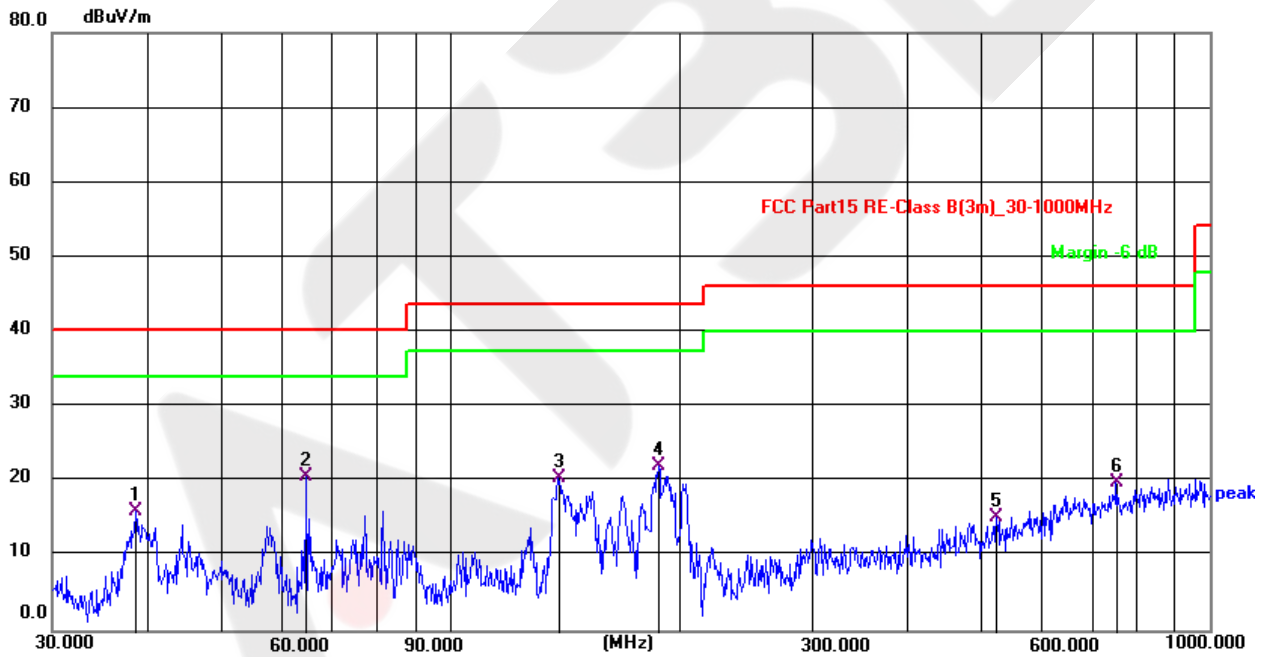
(30MHz-1000MHz)

Temperature:	23.3(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.3 V	Phase:	Horizontal
Test Mode:	Mode 1		

N o.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	38.6160	34.05	-18.06	15.99	40.00	-24.01	QP
2	64.8865	41.26	-20.60	20.66	40.00	-19.34	QP
3	138.8735	39.04	-18.56	20.48	43.50	-23.02	QP
4	188.4125	42.57	-20.52	22.05	43.50	-21.45	QP
5	524.5541	27.87	-12.67	15.20	46.00	-30.80	QP
6	752.7432	28.62	-8.69	19.93	46.00	-26.07	QP

Remark:

1. Margin = Result (Result =Reading + Factor )-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



Temperature:	23.3(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.3V	Phase:	Vertical
Test Mode:	Mode 1		

N o.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	37.9450	41.30	-18.12	23.18	40.00	-16.82	QP
2	60.2801	40.34	-19.70	20.64	40.00	-19.36	QP
3	111.3468	50.34	-20.70	29.64	43.50	-13.86	QP
4	171.3926	48.33	-18.57	29.76	43.50	-13.74	QP
5	296.1836	36.77	-17.32	19.45	46.00	-26.55	QP
6	435.5898	35.64	-14.26	21.38	46.00	-24.62	QP

Remark:

1. Margin = Result (Result =Reading + Factor) –Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain







## (1GHz-12.75GHz)Restricted band and Spurious emission Requirements

## LoRa

Freq.(MHz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Deg.(deg.)	Ant.F/G.(dB/m)	Amp.G.(dB)	Detector	Polarity
Low channel								
1818.841662	50.6	74.0	23.4	31	21.7	52.7	PK	Horizontal
1818.841662	30.8	74.0	43.2	306	21.7	52.7	AV	Horizontal
1809.605356	48.7	74.0	25.3	119	21.7	52.8	PK	Vertical
1818.841662	29.5	74.0	44.5	346	21.7	52.7	AV	Vertical
2525.839248	54.0	74.0	20.0	126	22.9	50.3	PK	Horizontal
2456.094628	47.0	74.0	27.0	5	22.8	50.2	AV	Horizontal
2525.839248	51.0	74.0	23.0	91	23.4	50.3	PK	Vertical
2406.583938	46.2	74.0	27.8	0	23.1	50.2	AV	Vertical
5230.962662	50.6	74.0	23.4	9	24.9	49.2	PK	Horizontal
5244.295203	28.0	74.0	46.0	344	49.2	49.2	AV	Horizontal
5164.806665	38.9	74.0	35.1	2	25.6	49.2	PK	Vertical
5311.469368	28.8	74.0	45.2	71	25.5	49.1	AV	Vertical
9985.761911	45.8	74.0	28.2	185	27.6	48.5	PK	Horizontal
10011.213360	36.3	74.0	37.7	0	27.6	48.5	AV	Horizontal
10062.311034	46.0	74.0	28.0	123	28.5	48.5	PK	Vertical
10011.213360	36.2	74.0	37.8	302	28.4	48.5	AV	Vertical
High channel								
1818.841662	47.2	74.0	26.8	277	21.7	52.7	PK	Horizontal
1842.139200	21.5	74.0	52.5	53	21.7	52.4	AV	Horizontal
1856.260721	44.6	74.0	29.4	135	21.8	52.2	PK	Vertical
1809.605356	24.3	74.0	49.7	354	21.7	52.8	AV	Vertical
2782.371360	38.4	74.0	35.6	72	23.6	51.1	PK	Horizontal
2768.242130	23.2	74.0	50.8	1	23.5	51.1	AV	Horizontal
2782.371360	39.2	74.0	34.8	245	24.0	51.1	PK	Vertical
2691.804172	26.7	74.0	47.3	335	23.8	50.8	AV	Vertical
6379.863906	39.0	74.0	35.0	164	25.3	48.9	PK	Horizontal
6412.427012	27.2	74.0	46.8	42	25.3	48.9	AV	Horizontal
6379.863906	40.5	74.0	33.5	151	25.8	48.9	PK	Vertical
6251.256700	30.2	74.0	43.8	360	25.8	48.9	AV	Vertical
9042.037624	42.4	74.0	31.6	228	26.9	48.6	PK	Horizontal
9042.037624	30.7	74.0	43.3	360	26.9	48.6	AV	Horizontal
9042.037624	42.3	74.0	31.7	41	27.5	48.6	PK	Vertical
9042.037624	33.1	74.0	40.9	195	27.5	48.6	AV	Vertical

## 5. CONDUCTED SPURIOUS & BAND EDGE EMISSION

### 5.1 LIMIT

According to FCC section 15.247(d)&RSS-247 Issue 2, in any 100 kHz 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 100 kHz 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 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### 5.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	AV
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	RMS hold

For Band edge

Spectrum Parameter	Setting
Detector	AV
Span	Measure to the appropriate range of Band edge
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	RMS hold

### 5.3 TEST SETUP



The EUT which is powered by the DC Power, is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50 Ohm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

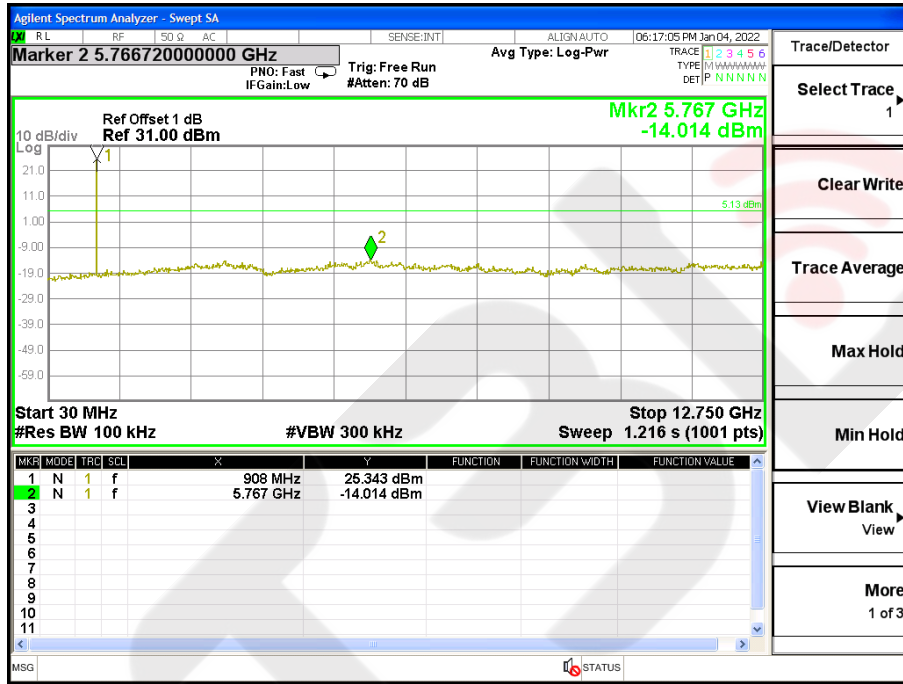
### 5.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

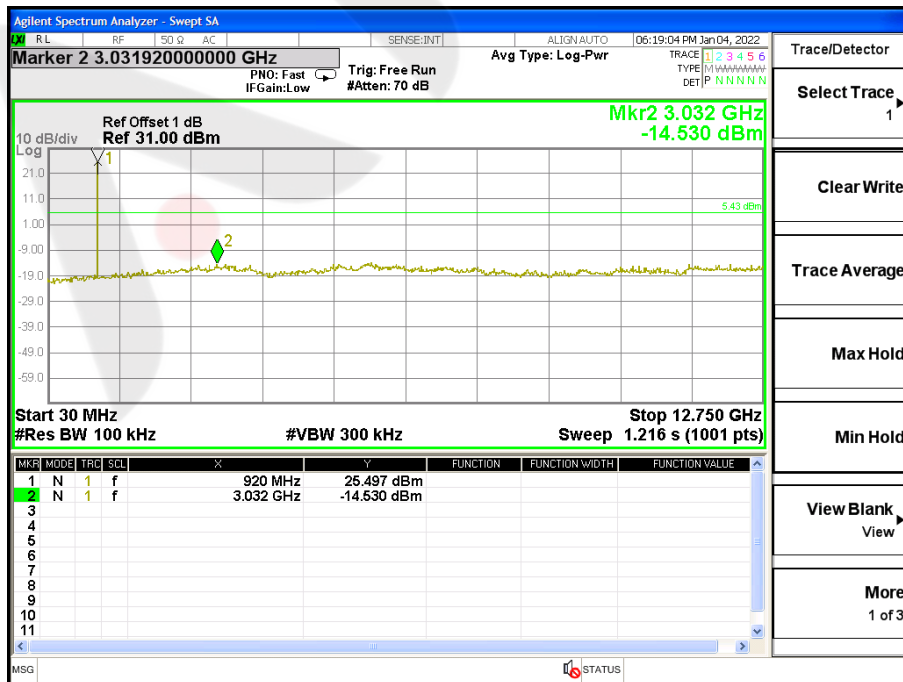
5.5 TEST RESULTS

Temperature:	25°C	Relative Humidity:	50%
Test Voltage:	DC 3.3V	Test Mode:	TX Mode 1/2/3

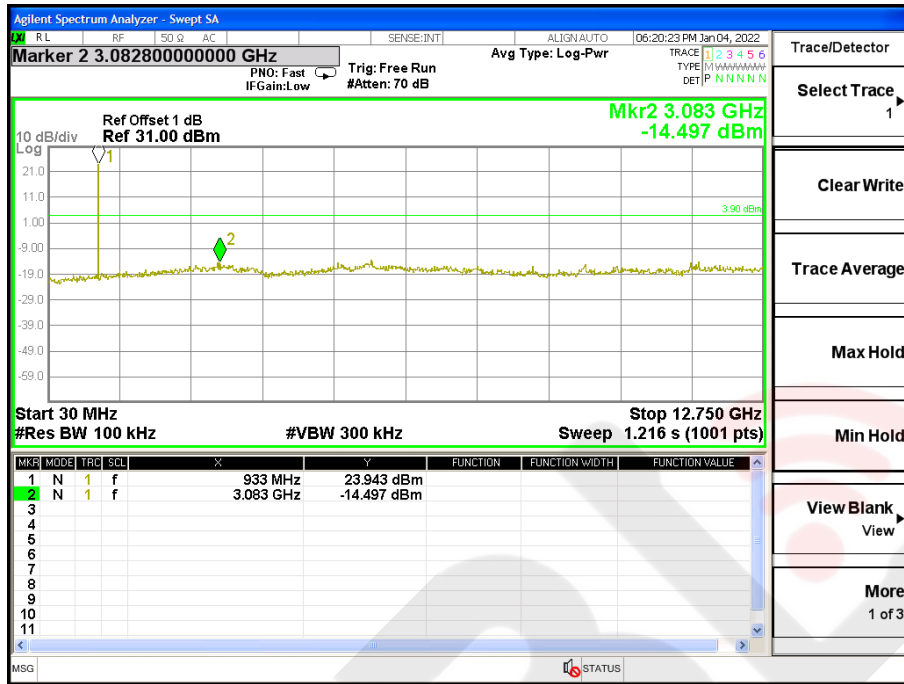
Mode 1



Mode 2

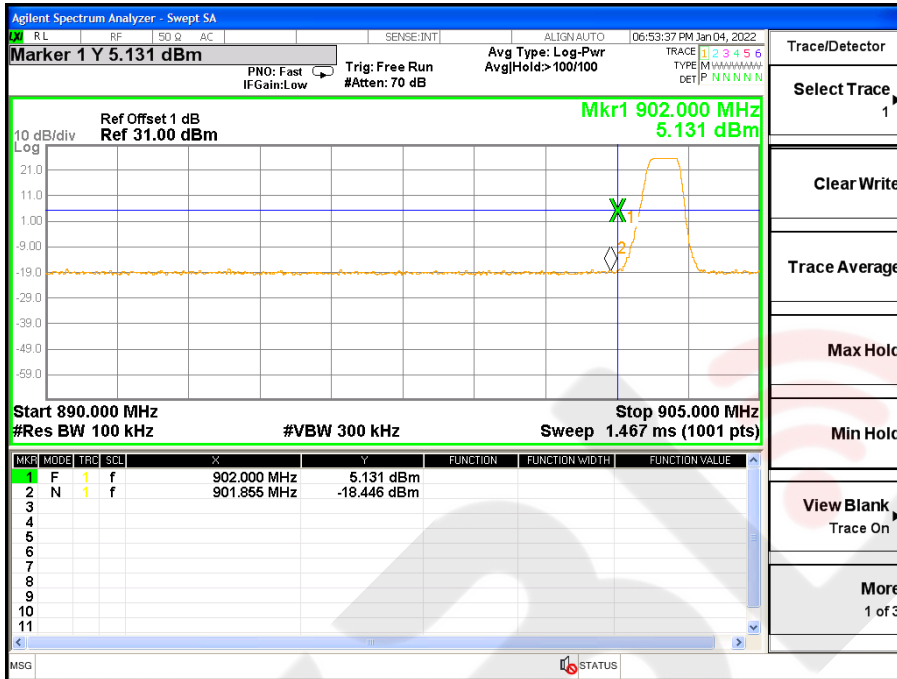


Mode 3

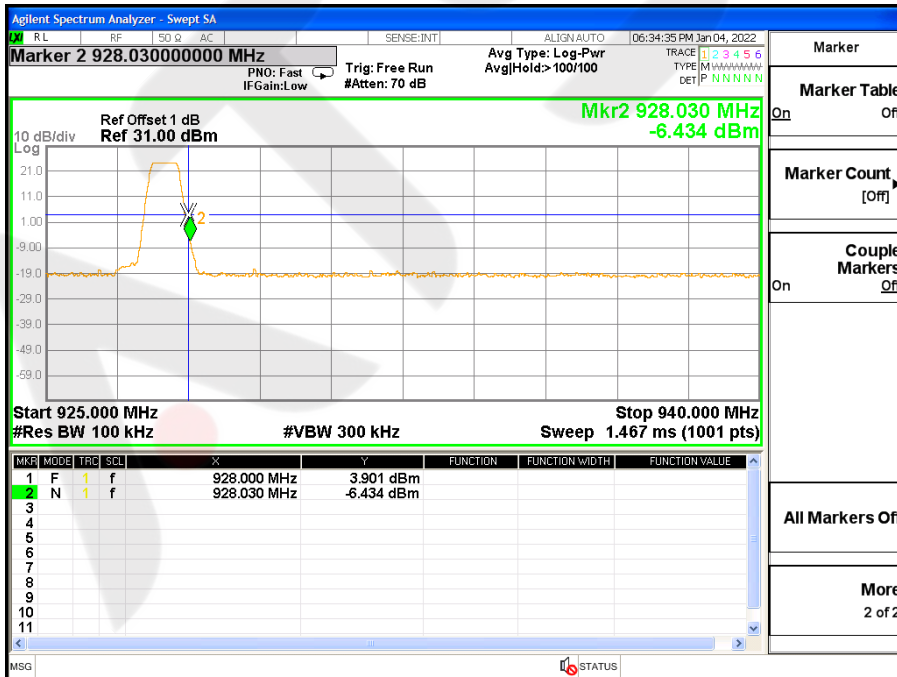


For Band edge(it's also the reference level for conducted spurious emission)

Mode 1



Mode 3



## 6. POWER SPECTRAL DENSITY TEST

### 6.1 LIMIT

FCC Part15.247,Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	$\leq 8$ dBm (RBW $\geq 3$ KHz)	902-928	PASS

### 6.2 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW to: 3 kHz.
4. Set the VBW  $\geq 3 \times$  RBW.
5. Detector = AV.
6. Sweep time = auto couple.
7. Trace mode = RMS hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### 6.3 TEST SETUP



### 6.4 EUT OPERATION CONDITIONS

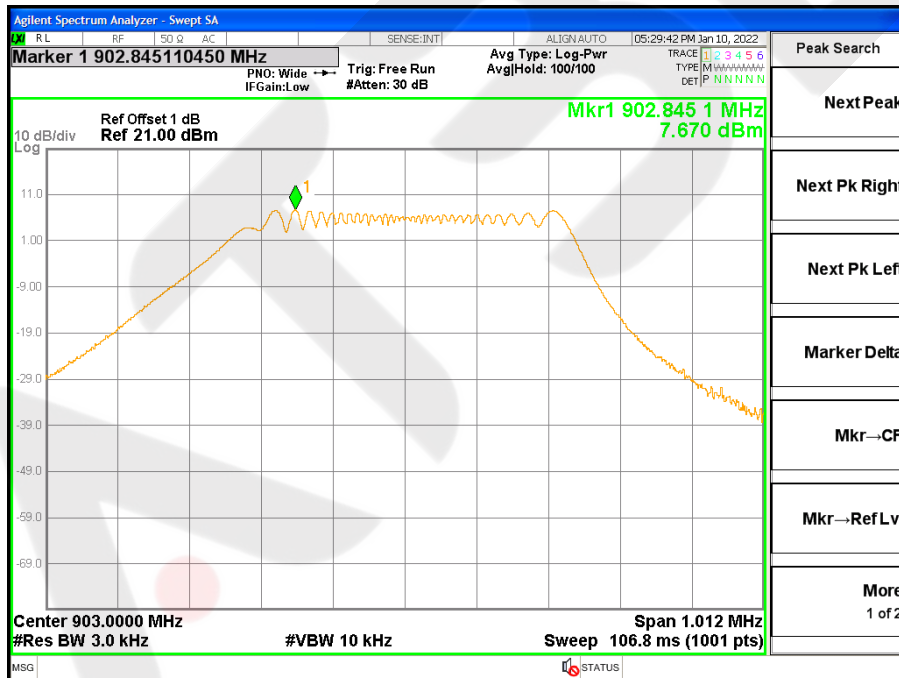
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

6.5 TEST RESULTS

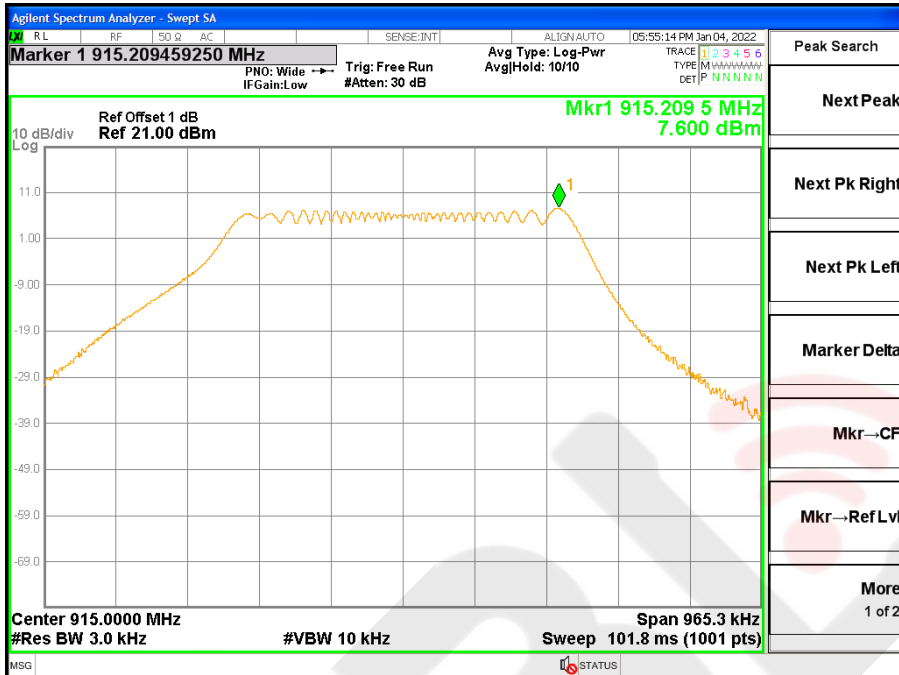
Temperature:	25 °C	Relative Humidity:	60%
Test Voltage:	DC 3.3V	Test Mode:	TX Mode 1/2/3

Test mode	Power Density	Limit (dBm/3KHz)	Result
	(dBm/3kHz)		
Mode 1	7.670	≤8	PASS
Mode 2	7.600	≤8	PASS
Mode 3	6.233	≤8	PASS

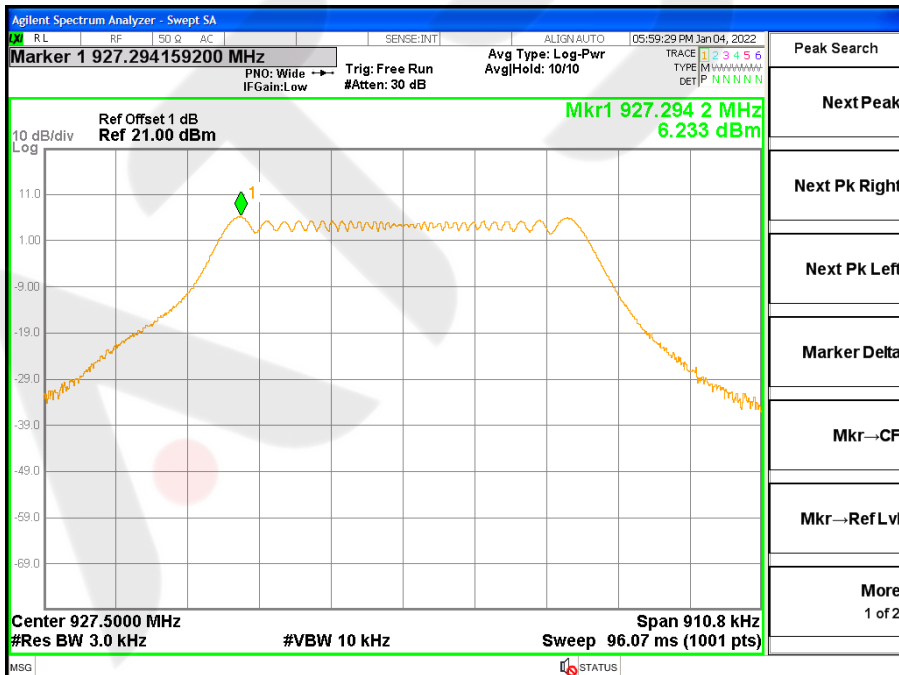
Mode 1



### Mode 2



### Mode 3





## 7. BANDWIDTH TEST

### 7.1 LIMIT

FCC Part15.247,Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	902-928	PASS

### 7.2 TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth : 100KHz For 99% Bandwidth : 1% to 5% of the occupied bandwidth
VBW	For 6dB Bandwidth : $\geq 3 \times \text{RBW}$ For 99% Bandwidth : approximately $3 \times \text{RBW}$
Trace	Max hold
Sweep	Auto

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB and 99% relative to the maximum level measured in the fundamental emission.

### 7.3 TEST SETUP



### 7.4 EUT OPERATION CONDITIONS

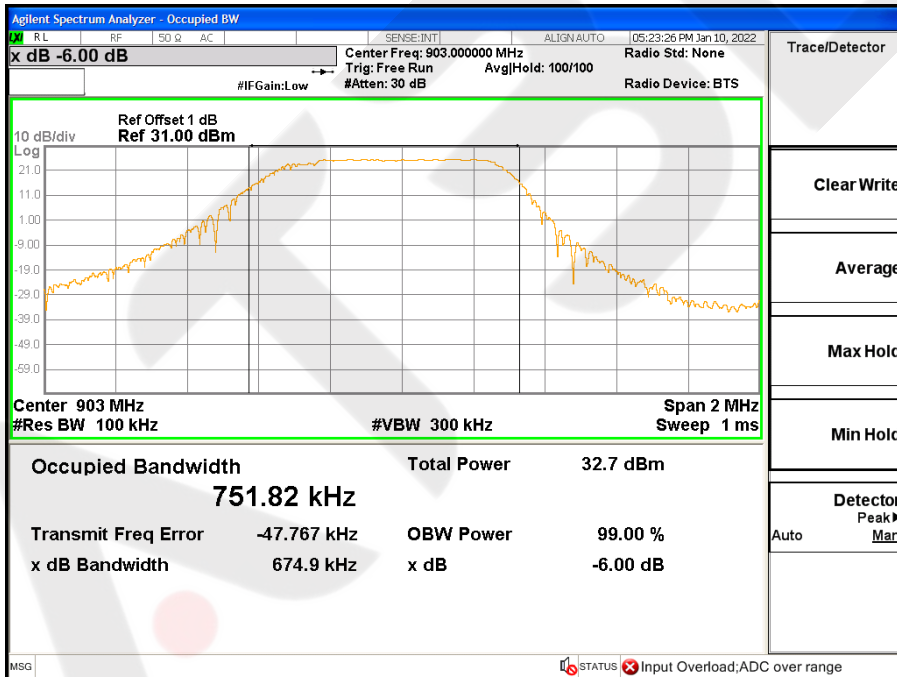
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

7.5 TEST RESULTS

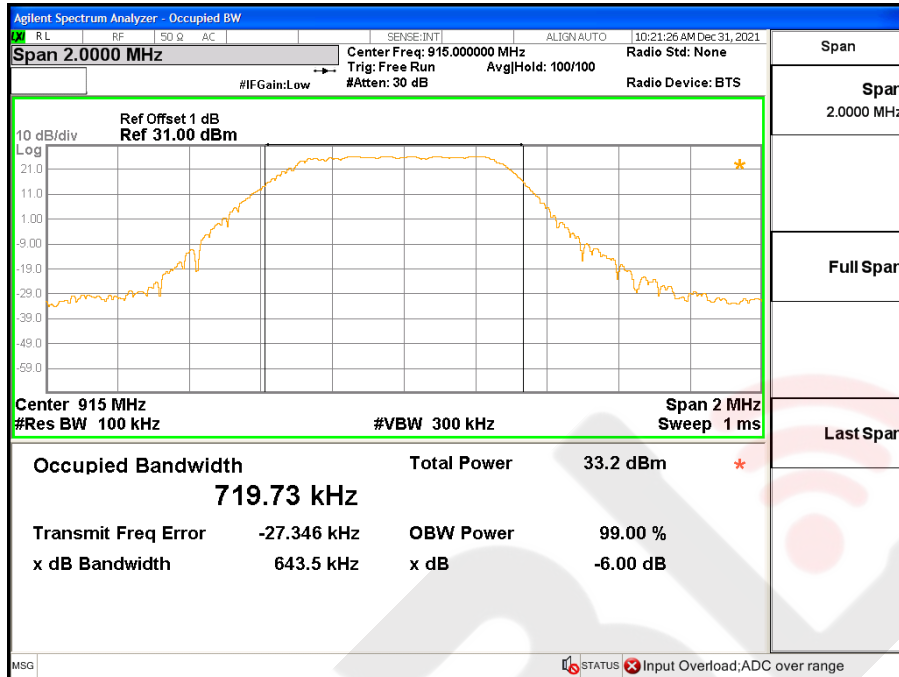
Temperature:	25 °C	Relative Humidity:	60%
Test Voltage:	DC 3.3V	Test Mode:	TX Mode 1/2/3

Test mode	6dB Bandwidth (KHz)	99% Bandwidth (KHz)	Limit (KHz)	Result
Mode 1	674.9	582.11	≥500KHz	PASS
Mode 2	643.5	544.15	≥500KHz	PASS
Mode 3	607.2	501.77	≥500KHz	PASS

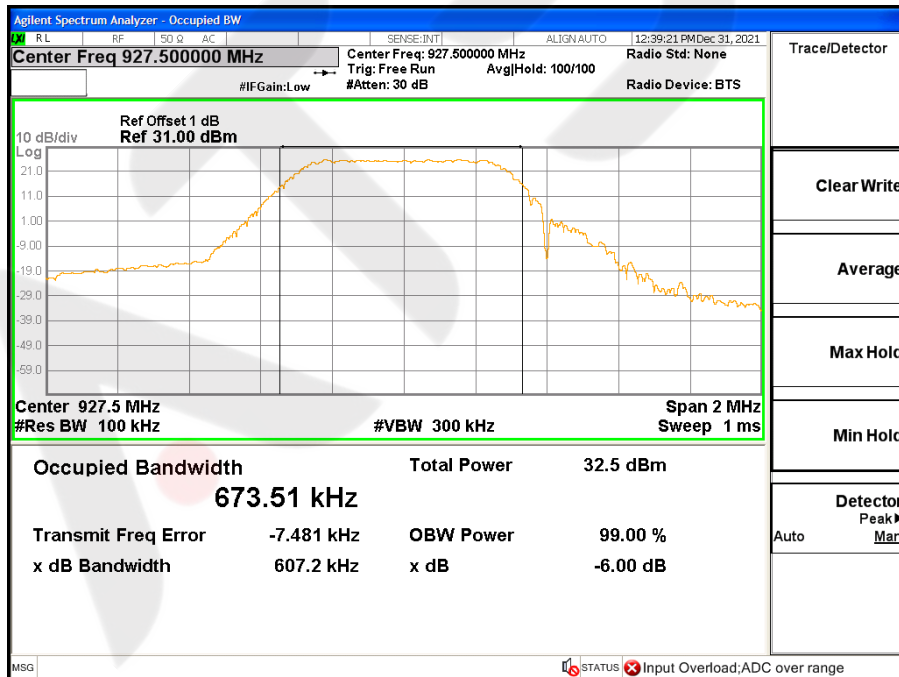
6dB Bandwidth Mode 1



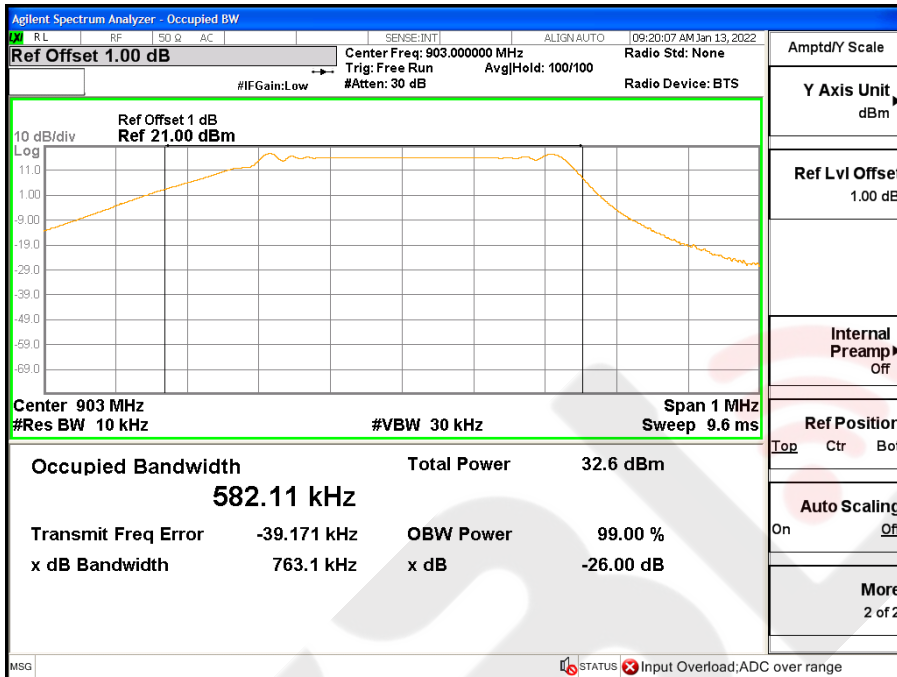
### 6dB Bandwidth Mode 2



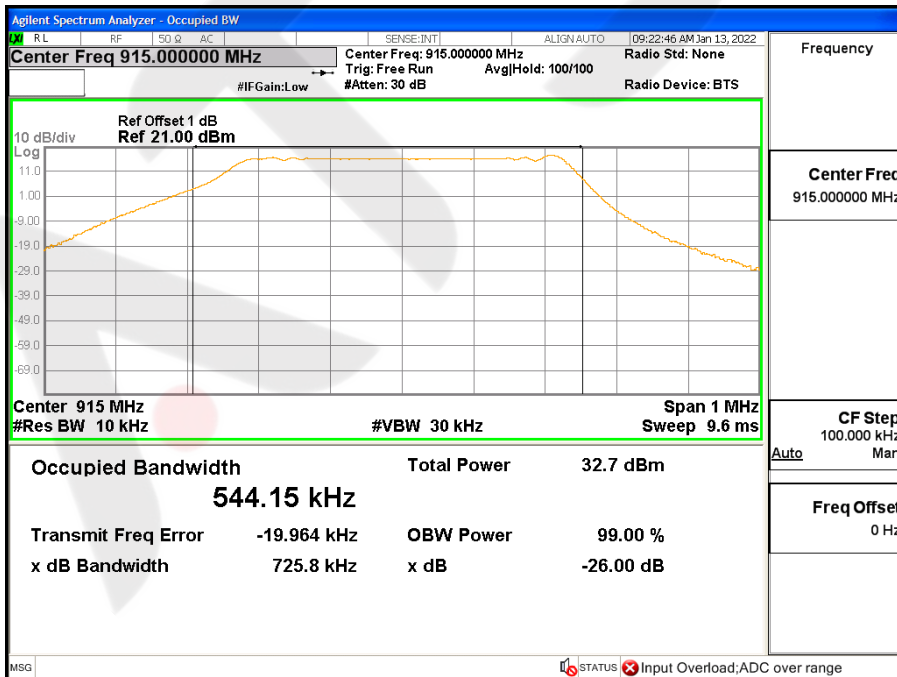
### 6dB Bandwidth Mode 3



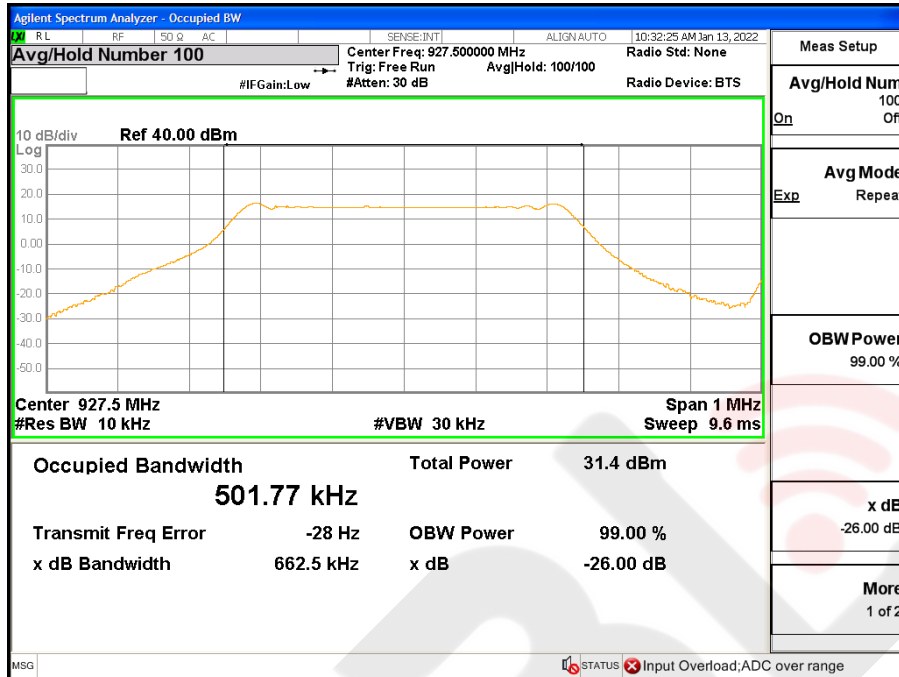
### 99% BandwidthMode 1



### 99% BandwidthMode 2



### 99% BandwidthMode 3



## 8. PEAK OUTPUT POWER TEST

### 8.1 LIMIT

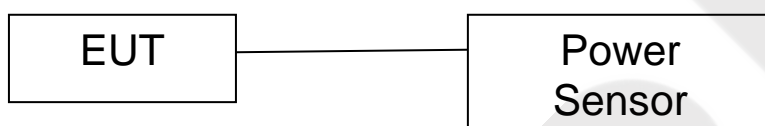
FCC Part15.247,Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Output Power	1 watt or 30dBm	902-928	PASS

### 8.2 TEST PROCEDURE

PKPM1 Peak power meter method:

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

### 8.3 TEST SETUP



### 8.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

## 8.5 TEST RESULTS

Temperature:	25 °C	Relative Humidity:	60%
Test Voltage:	DC 3.3V	Test Mode:	TX Mode 1/2/3

Test mode	Frequency	Peak Conducted Output Power	AVG Conducted Output Power	LIMIT
	(MHz)	(dBm)	(dBm)	dBm
Mode 1	903.0	24.28	24.24	30
Mode 2	915.0	24.26	24.19	30
Mode 3	927.5	22.97	22.92	30

Note: Our power sensor test AVG power has no duty cycle display. The power sensor measures AVG power is Burst power. The software has considered the factor of the duty cycle factor, so it is unnecessary to add it again.

## EIRP Power

Test mode	Frequency	Peak Conducted Output Power	Antenna Gain	ERP Power	EIRP Power	LIMIT
	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	dBm
Mode 1	903.0	24.28	4.00	26.13	28.28	36
Mode 2	915.0	24.26	4.00	26.11	28.26	36
Mode 3	927.5	22.97	4.00	24.82	26.97	36

Note: EIRP = ERP+2.15dB.

Duty cycle



Ton	Tp	Duty cycle(%)	Duty factor(dB)
/	/	100.00%	0.00



## 9. ANTENNA REQUIREMENT

### 9.1 STANDARD REQUIREMENT

15.203&RSS GEN requirement: For intentional device, according to 15.203&RSS GEN: an intentional ra requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### 9.2 EUT ANTENNA

Antenna Type	Frequency range	Gain (dBi)
Non-common Interface Antenna	902MHz-928MHz	4

It comply with the standard requirement.



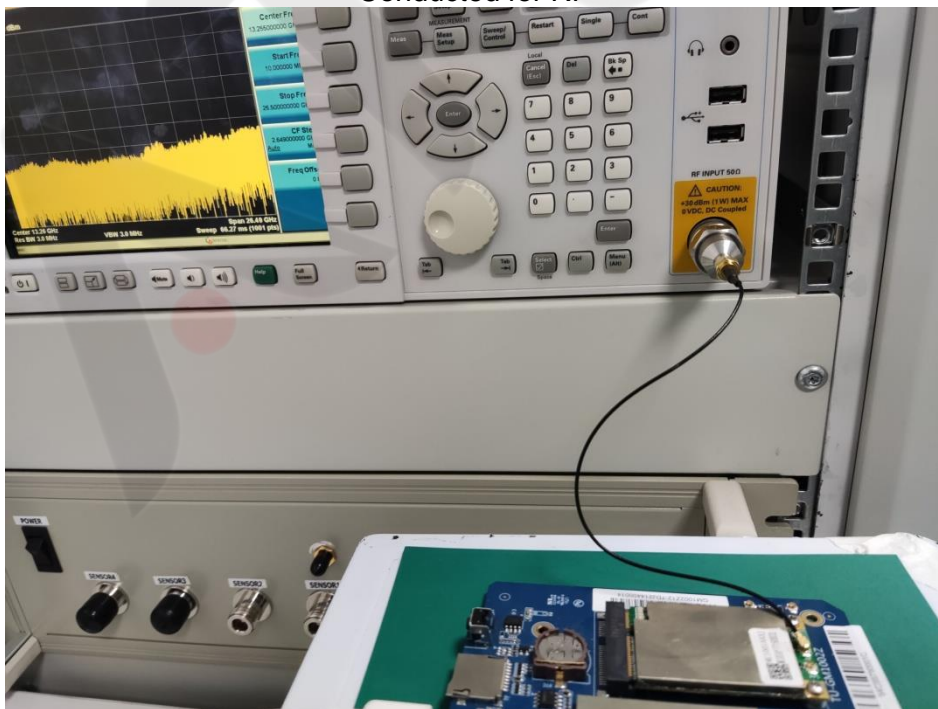
### APPENDIX-PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

Conducted for EMC



Conducted for RF



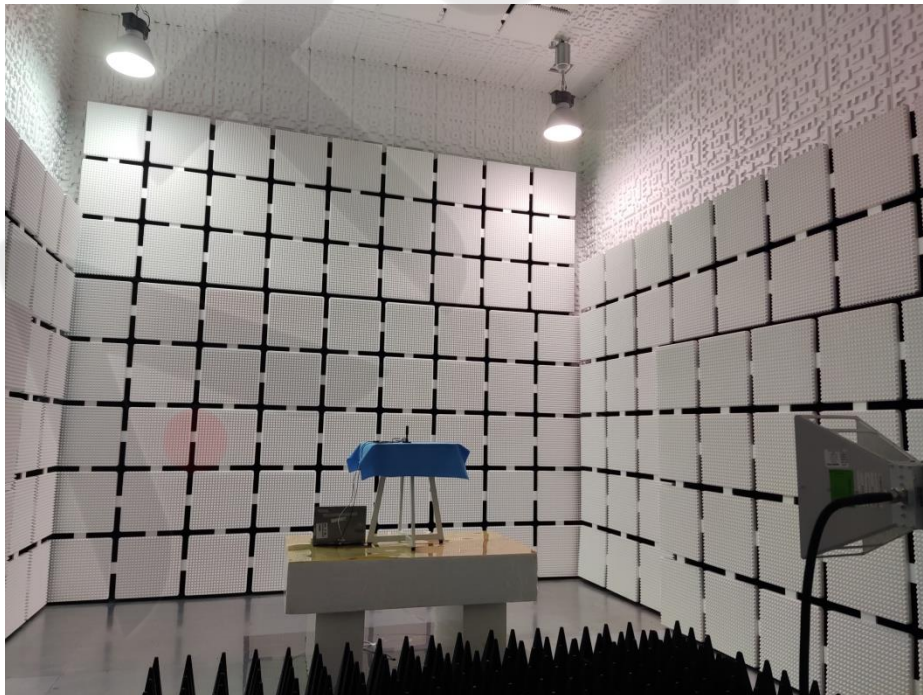
Radiation Emission  
30MHz-1000MHz



Radiated Spurious Emission  
30MHz-1000MHz



1GHz-18GHz



※※※※END OF THE REPORT※※※※