



Test Report No.:  
**FCC2021-0026-RF3**

## **RF Test Report**

**EUT** : **LoRa Magnetic Contact Switch**  
**MODEL** : **WS301-915M**  
**BRAND NAME** : **Milesight**  
**APPLICANT** : **Xiamen Milesight IoT Co., Ltd.**  
**Classification Of Test** : **N/A**

**CVC Testing Technology Co., Ltd.**



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<b>Client</b>		Name : Xiamen Milesight IoT Co., Ltd. Address : 4/F,NO. 63-2 Wanghai Road, 2nd Software Park,Xiamen ,China	
<b>Manufacturer</b>		Name : Xiamen Milesight IoT Co., Ltd. Address : 4/F,NO. 63-2 Wanghai Road, 2nd Software Park,Xiamen ,China	
<b>Equipment Under Test</b>		Name : LoRa Magnetic Contact Switch Model/Type: WS301-915M Trade mark : Milesight SerialNO.:N/A Sampe NO.:6-1	
Date of Receipt.	2021.09.8	Date of Testing	2021.09.08~2021.11.08
<b>Test Specification</b>		<b>Test Result</b>	
FCC Part 15, Subpart C, Section 15.247		PASS	
<b>Evaluation of Test Result</b>		The equipment under test was found to comply with the requirements of the standards applied.  <b>Issue Date: 2021.11.08</b>	
Tested by:  Xu ZhenFei Name                      Signature		Reviewed by:  Liu YongHai Name                      Signature	
Approved by:  Chen HuaWen Name                      Signature			
<b>Other Aspects: NONE.</b>			
Abbreviations:OK,    Pass= passed                      Fail = failed                      N/A= not applicable                      EUT= equipment, sample(s) under tested			
This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.			



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**RELEASE CONTROL RECORD**

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2021-0026-RF3	Original release	2021.11.08



## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

PPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	N/A	Power from battery
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Meet the requirement of limit.

### 1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Refer to Appendix A.

### 1.2 MEASUREMENT UNCERTAINTY

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

No.	ITEM	FREQUENCY	UNCERTAINTY
1	Conducted emissions	9kHz~30MHz	±2.66dB
2	Radiated emissions	9KHz ~ 30MHz	±0.769dB
		30MHz ~ 1GMHz	±0.877dB
		1GHz ~ 18GHz	±0.777dB
		18GHz ~ 40GHz	±1.315dB

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

### 1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.

Address: No.3,TiantaiyiRoad,KaitaiAvenue,ScienceCity,Guangzhou,China

Post Code: 510663 Tel: 020-32293888

FAX: 020-32293889 E-mail: office@cvc.org.cn

Test Firm Registration Number: 937273

CN Number: 26239 Wireless Test Site Registration Number : CN0103



## 2 GENERAL INFORMATION

### 2.1 GENERAL PRODUCT INFORMATION

<b>PRODUCT</b>	LoRa Magnetic Contact Switch
<b>BRAND</b>	Milesight
<b>MODEL</b>	WS301-915M
<b>ADDITIONAL MODEL</b>	N/A
<b>FCC ID</b>	2AYHY-WS301
<b>POWER SUPPLY</b>	DC 3.6V(3.6V*1*ER14250) from battery
<b>MODULATION TYPE</b>	Chirp Spread Spectrum
<b>OPERATING FREQUENCY</b>	DTS 500kHz,903MHz~914.2MHz
<b>NUMBER OF CHANNEL</b>	8
<b>PEAK OUTPUT POWER</b>	21.87dBm (Maximum)
<b>ANTENNA TYPE</b>	Spring antenna, 1dBi Gain
<b>I/O PORTS</b>	Refer to user's manual
<b>CABLE SUPPLIED</b>	N/A

Remark:

1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. EUT photo refer to the report (Report NO.: FCC2021-0026-E).
4. The EUT have SISO function, provides 1 completed transmitter and 1 receiver.

### 2.2 Description of Accessories

N/A



### 2.3 OTHER INFORMATION

Operating frequency of each channel

LORA DR8					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
<b>0</b>	<b>903</b>	<b>3</b>	<b>907.8</b>	6	912.6
1	904.6	4	909.4	<b>7</b>	<b>914.2</b>
2	906.2	5	911		

**Note:**The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.



## 2.4 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports

EUT CONFIGURE MODE	APPLICABLE TEST ITEMS				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	-	√	LORA link

Where **RE<1G**: Radiated Emission below 1GHz      **RE≥1G**: Radiated Emission above 1GHz  
**PLC**: Power Line Conducted Emission      **APCM**: Antenna Port Conducted Measurement

### RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE
A	0 to 7	0	Chirp Spread Spectrum	DR8

For the test results, only the worst case was shown in test report.

### RADIATED EMISSION TEST (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE
A	0 to 7	0,3,7	Chirp Spread Spectrum	DR8





**ANTENNA PORT CONDUCTED MEASUREMENT:**

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE
A	0 to 7	0,3,7	Chirp Spread Spectrum	DR8

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	24deg. C, 54%RH	DC 3.6V From battery	Li JiaLing
RE≥1G	24deg. C, 54%RH	DC 3.6V From battery	Li JiaLing
PLC	-	-	-
APCM	24deg. C, 55%RH	DC 3.6V From battery	Li JiaLing



## 2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

**FCC PART 15, Subpart C. Section 15.247**  
**KDB 558074 D01 15.247 Meas Guidance v05r02**  
**ANSI C63.10-2020**

All test items have been performed and recorded as per the above standards

## 2.6 DESCRIPTION OF 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.

Support Equipment							
NO	Description	Brand	Model No.	Serial Number	Supplied by		
1	Laptop	Lenovo	V14	PFNXB1628023	Lab		
Support Cable							
NO	Description	Quantity (Number)	Length (cm)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A



## 3 TEST TYPES AND RESULTS

### 3.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

#### 3.1.1 Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (Microvolts/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

NOTE: 1. The lower limit shall apply at the transition frequencies.  
 NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).  
 NOTE: 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

#### 3.1.2 Measurement procedure

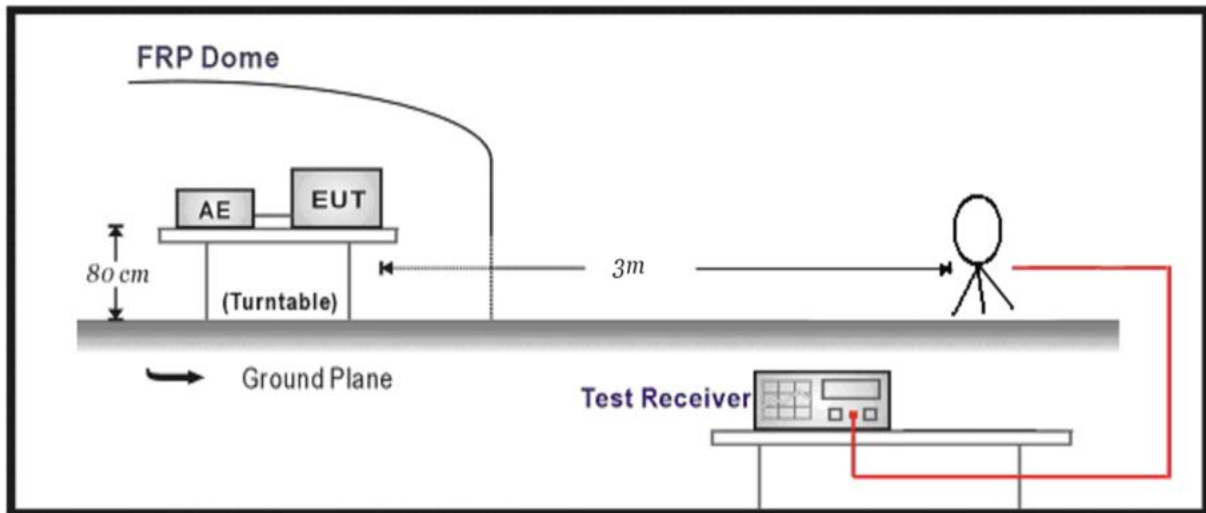
- The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

**NOTE:**

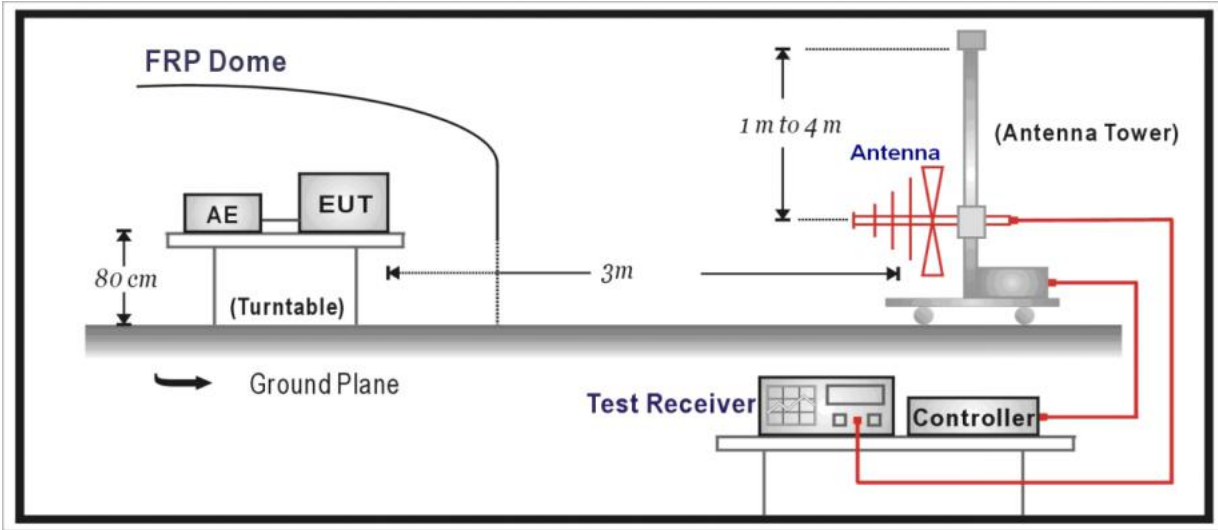
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

### 3.1.3 Test setup

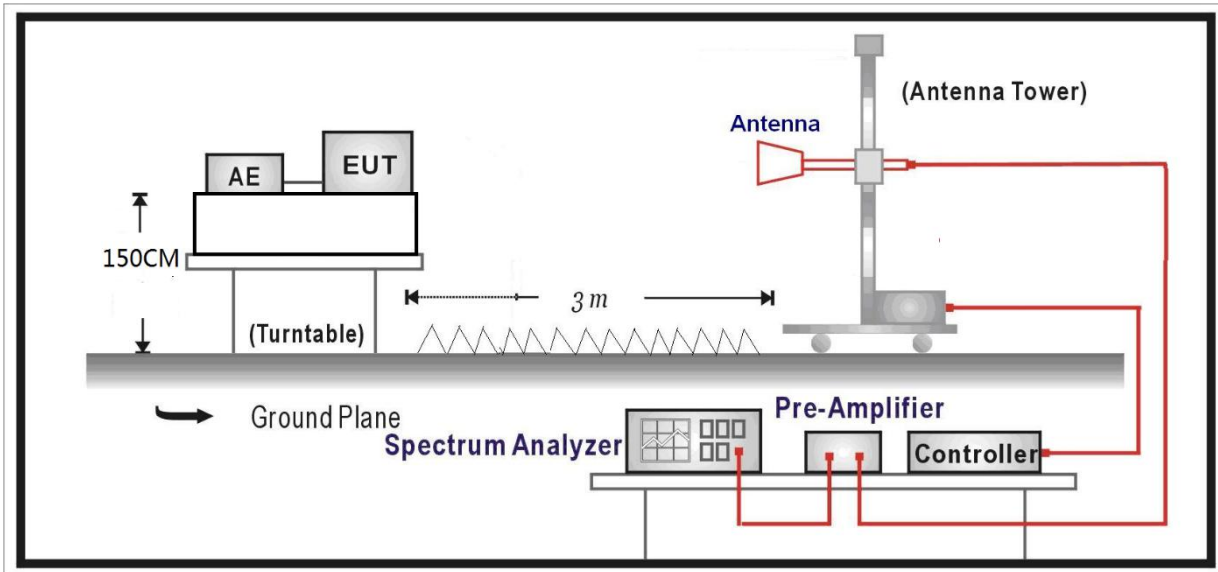
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:

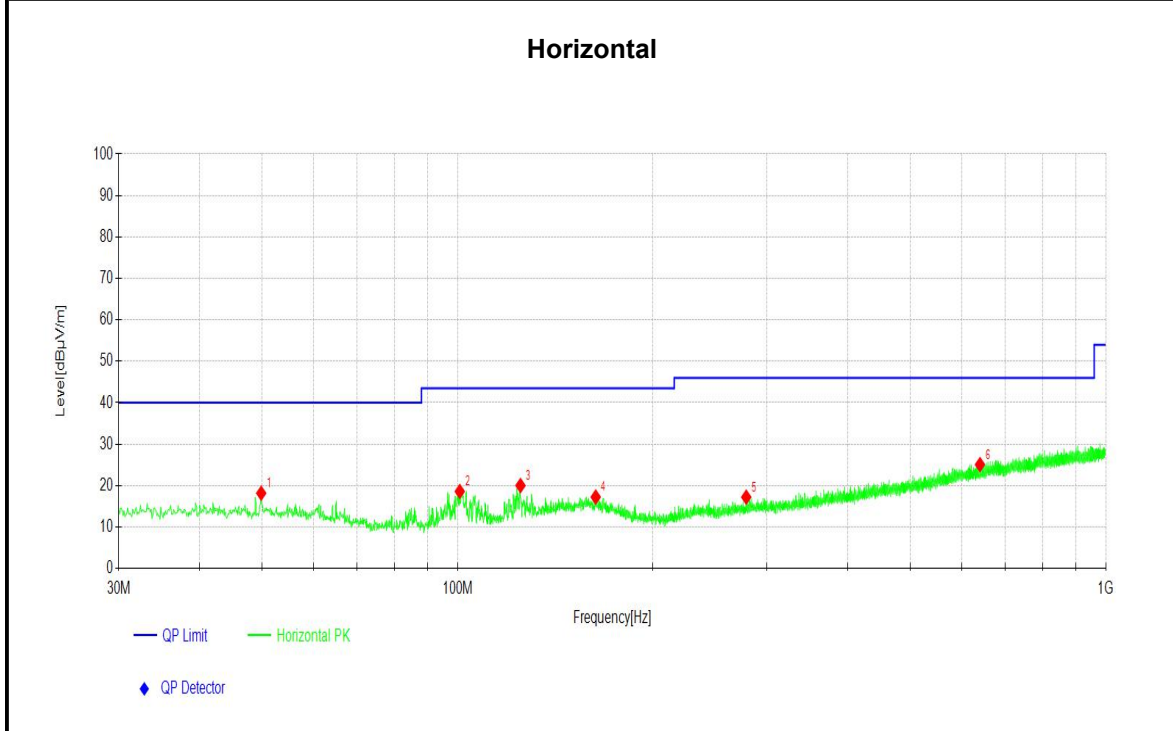




3.1.4 Test results

BELOW 1GHz WORST-CASE DATA:

<b>Worst Test Mode</b>	DR8	<b>Channel</b>	CH 0
<b>Frequency Range</b>	9KHz ~ 1GHz	<b>Detector Function</b>	Quasi-Peak (QP)

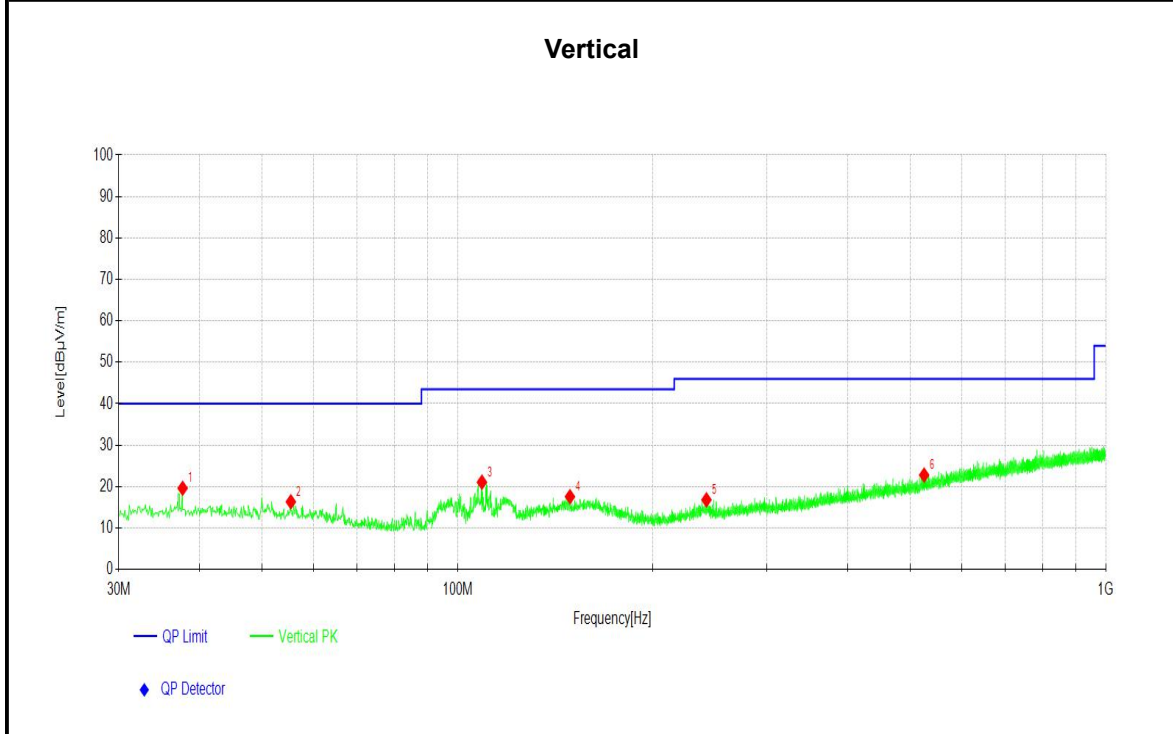


NO	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	49.7900	3.89	18.17	14.28	40.00	21.83	200	107
2	100.8171	7.24	18.60	11.36	43.50	24.90	100	127
3	125.0695	6.83	20.03	13.20	43.50	23.47	200	15
4	163.3883	1.63	17.25	15.62	43.50	26.25	200	319
5	278.9269	2.97	17.22	14.25	46.00	28.78	100	194
6	639.9000	3.19	25.08	21.89	46.00	20.92	200	34

Remark: 1. 9KHz~30MHz have been test and test data more than 20dB margin.  
 2. The emission levels of other frequencies were greater than 20dB margin.  
 3. Level (dBµV/m) = Reading (dBµV/m) + Factor (dB).  
 4. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
 5. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]



<b>Worst Test Mode</b>	DR8	<b>Channel</b>	CH 0
<b>Frequency Range</b>	9KHz ~ 1GHz	<b>Detector Function</b>	Quasi-Peak (QP)



NO	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	37.6638	5.32	19.61	14.29	40.00	20.39	100	74
2	55.3195	2.19	16.34	14.15	40.00	23.66	100	129
3	109.0629	9.27	21.07	11.80	43.50	22.43	200	121
4	149.1279	2.19	17.58	15.39	43.50	25.92	100	148
5	242.1602	3.47	16.81	13.34	46.00	29.19	200	267
6	524.6525	3.41	22.79	19.38	46.00	23.21	100	257

Remark: 1. 9KHz~30MHz have been test and test data more than 20dB margin.  
 2. The emission levels of other frequencies were greater than 20dB margin.  
 3. Level (dBµV/m) = Reading (dBµV/m) + Factor (dB).  
 4. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
 5. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]



### ABOVE 1GHz DATA

<b>Channel</b>	CH 0	<b>Frequency</b>	903MHz
<b>Frequency Range</b>	1GHz~9.3G	<b>Detector Function</b>	PK/AV

#### Horizontal

NO	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	1806	47.21	54.95	7.74	74.00	19.05	184	346	PK
2	1806	44.69	52.43	7.74	54.00	1.57	184	346	AV
3	2709	33.50	44.69	11.19	54.00	9.31	209	85	AV
4	2709	39.79	50.92	11.13	74.00	23.08	209	85	PK
5	3612	28.61	43.33	14.72	54.00	10.67	191	186	AV
6	3612	35.97	50.98	15.01	74.00	23.02	191	186	PK

#### Vertical

NO	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	1806	45.56	53.30	7.74	54.00	0.70	203	264	AV
2	1806	47.18	54.92	7.74	74.00	19.08	203	264	PK
3	2709	37.09	48.49	11.40	74.00	25.51	224	252	PK
4	2709	30.17	41.57	11.40	54.00	12.43	224	252	AV
5	3612	35.46	51.16	15.70	74.00	22.84	217	184	PK
6	3612	28.19	44.04	15.85	54.00	9.96	217	184	AV

- Remark: 1. The emission levels of other frequencies were greater than 20dB margin.  
 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).  
 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
 4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]





<b>Channel</b>	CH 3	<b>Frequency</b>	907.8MHz
<b>Frequency Range</b>	1GHz~9.3G	<b>Detector Function</b>	PK/AV

### Horizontal

NO	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	1815.6	45.34	53.12	7.78	74.00	20.88	180	226	PK
2	1815.6	43.29	51.07	7.78	54.00	2.93	180	226	AV
3	2723.4	32.66	43.79	11.13	54.00	10.21	169	194	AV
4	2723.4	40.68	51.81	11.13	74.00	22.19	169	194	PK
5	3631.2	36.32	51.57	15.25	74.00	22.43	229	10	PK
6	3631.2	28.11	43.53	15.42	54.00	10.47	229	10	AV

### Vertical

NO	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	1815.6	45.24	53.02	7.78	74.00	20.98	156	149	PK
2	1815.6	43.76	51.54	7.78	54.00	2.46	156	149	AV
3	2723.4	34.29	45.51	11.22	54.00	8.49	223	347	AV
4	2723.4	41.94	53.16	11.22	74.00	20.84	223	347	PK
5	3631.2	29.04	43.19	14.15	54.00	10.81	180	172	AV
6	3631.2	36.82	51.09	14.27	74.00	22.91	180	172	PK

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.  
 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).  
 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
 4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]



<b>Channel</b>	CH 7	<b>Frequency</b>	914.2MHz
<b>Frequency Range</b>	1GHz~9.3G	<b>Detector Function</b>	PK/AV

### Horizontal

NO	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	1828.4	41.11	48.96	7.85	54.00	5.04	149	23	AV
2	1828.4	43.85	51.70	7.85	74.00	22.30	149	23	PK
3	2742.6	32.87	44.01	11.14	54.00	9.99	198	214	AV
4	2742.6	41.20	52.34	11.14	74.00	21.66	198	214	PK
5	3656.8	35.60	50.24	14.64	74.00	23.76	167	37	PK
6	3656.8	28.13	43.21	15.08	54.00	10.79	167	37	AV

### Vertical

NO	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	1828.4	40.84	48.69	7.85	54.00	5.31	190	272	AV
2	1828.4	43.67	51.52	7.85	74.00	22.48	190	272	PK
3	2742.6	35.19	46.34	11.15	54.00	7.66	200	293	AV
4	2742.6	42.23	53.38	11.15	74.00	20.62	200	293	PK
5	3656.8	35.98	51.63	15.65	74.00	22.37	174	194	PK
6	3656.8	28.34	44.16	15.82	54.00	9.84	174	194	AV

- Remark: 1. The emission levels of other frequencies were greater than 20dB margin.  
 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).  
 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
 4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

## 3.2 6dB BANDWIDTH MEASUREMENT

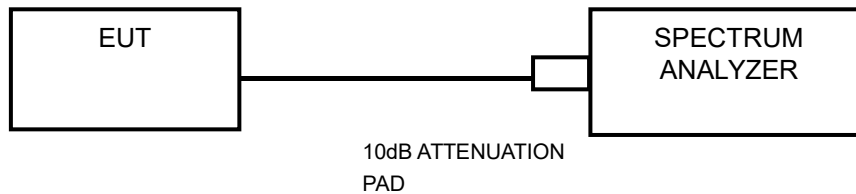
### 3.2.1 Limits

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 3.2.2 Measurement procedure

- a. Set resolution bandwidth (RBW) = 100KHz
- b. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

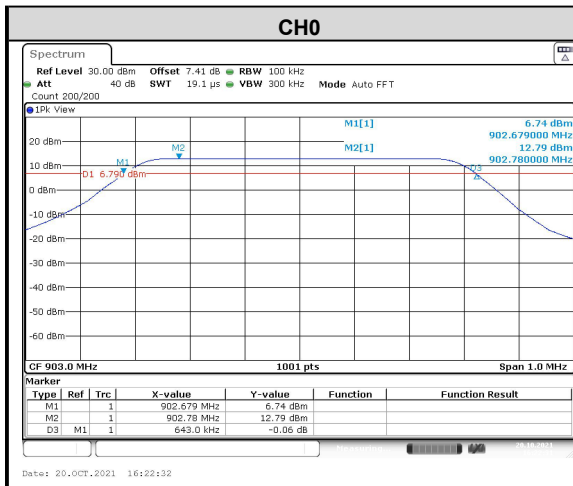
### 3.2.3 Test setup



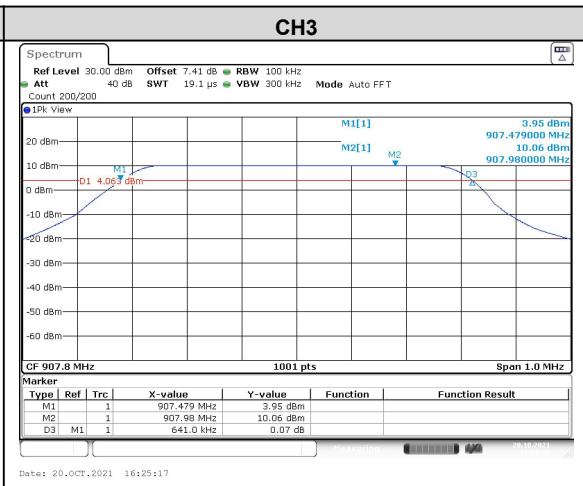


### 3.2.4 Test result

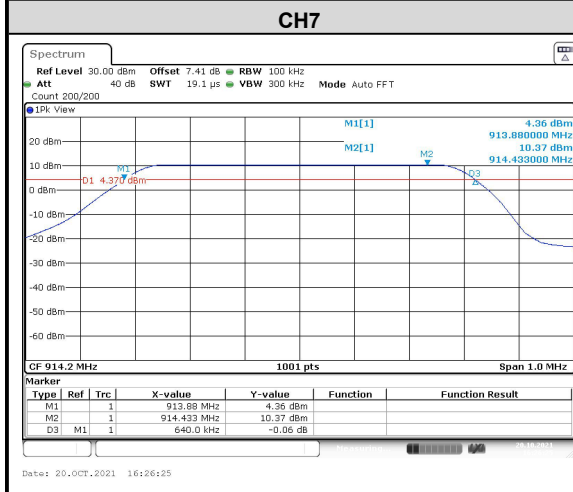
Mode	Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
DR8	0	903.0	643	≥500
	3	907.8	641	≥500
	7	914.2	640	≥500



Date: 20\_OCT\_2021 16:22:32



Date: 20\_OCT\_2021 16:25:17



Date: 20\_OCT\_2021 16:26:25

## 3.3 CONDUCTED OUTPUT POWER

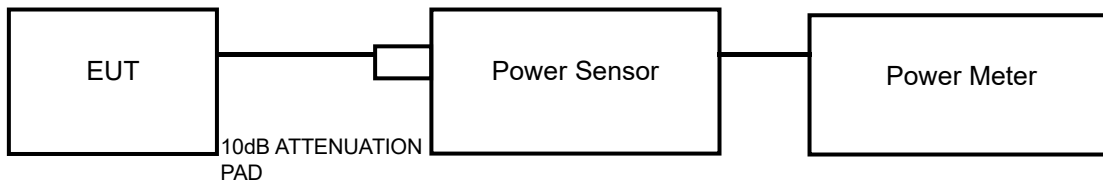
### 3.3.1 Limits

Forsystems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm).

### 3.3.2 Measurement procedure

- a. A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor and set the detector to PEAK. Record the power level.
- b. An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor and set the detector to AVERAGE. Record the power level.

### 3.3.3 Test setup





3.3.4 Test result

PEAK OUTPUT POWER

GFSK

CHANNEL	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power (mW)	Peak Power Limit (mW)	Verdict
0	903.0	21.87	153.82	1000	PASS
3	907.8	21.67	146.89	1000	PASS
7	914.2	21.79	151.01	1000	PASS

AVERAGE OUTPUT POWER(For reference)

Mode	Channel Frequency (MHz)	Average Power (dBm)	Average Power (mW)	Average Power Limit (mW)	Verdict
0	903.0	5.66	3.68	1000	PASS
3	907.8	5.44	3.50	1000	PASS
7	914.2	5.72	3.73	1000	PASS

## 3.4 POWER SPECTRAL DENSITY MEASUREMENT

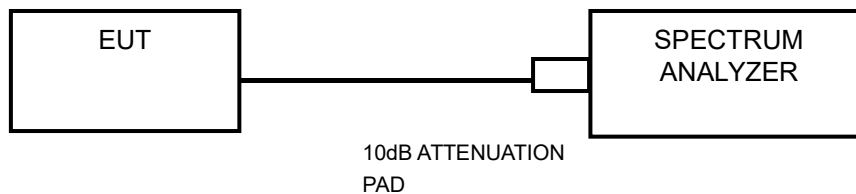
### 3.4.1 Limits

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

### 3.4.2 Measurement procedure

- a. Set instrument center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set RBW to: 3KHz
- d. Set VBW  $\geq 3 \times$  RBW.
- e. Detector = peak
- f. Ensure that the number of measurement points in the sweep  $\geq 2 \times$  span/RBW.
- g. Sweep time = auto couple.
- h. Use the peak marker function to determine the maximum amplitude level.

### 3.4.3 Test setup

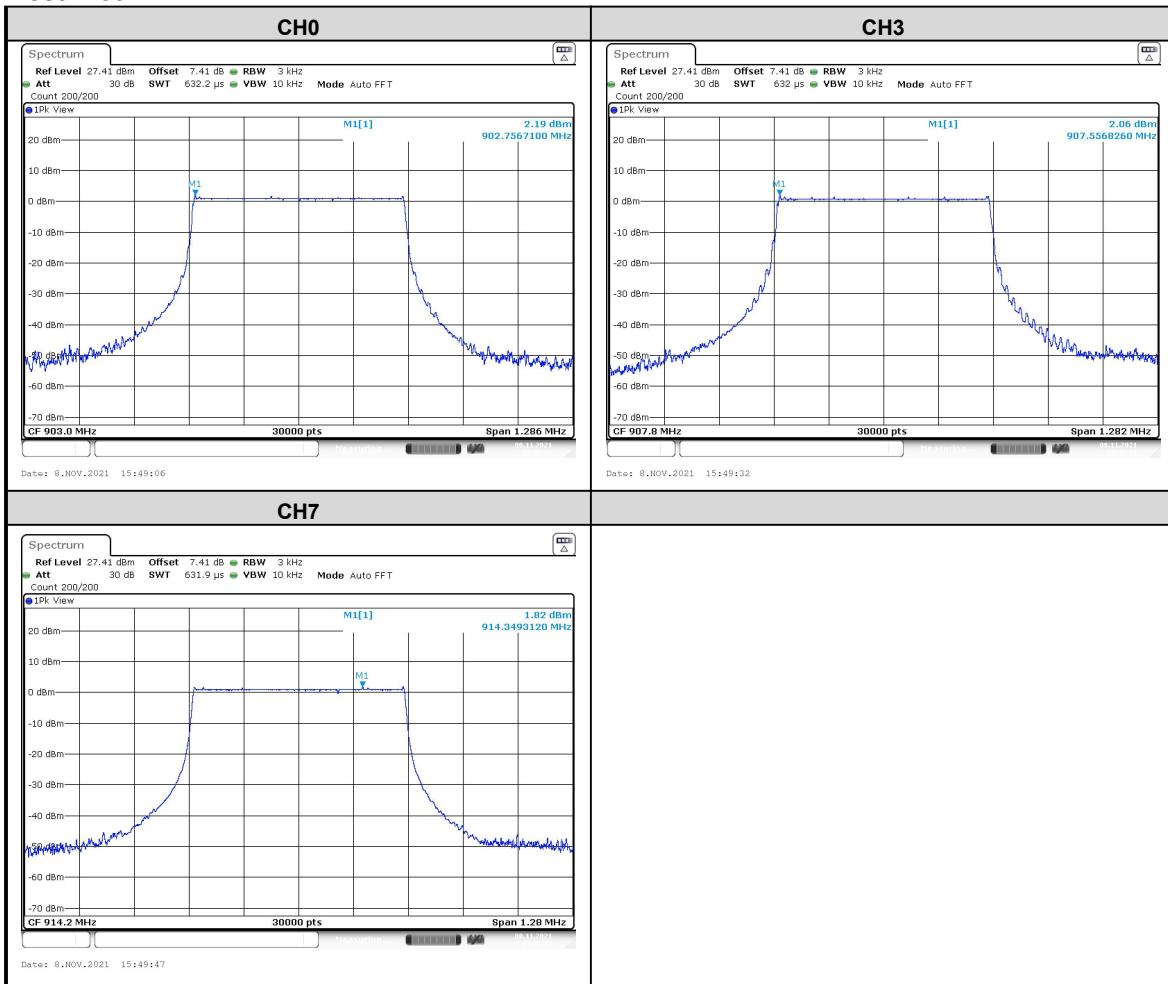




### 3.4.4 Test result

CHANNEL	CHANNEL FREQUENCY (MHz)	PSD(dBm/3kHz)	Limit (dBm/3kHz)	PASS / FAIL
0	903.0	2.19	8	PASS
3	907.8	2.06	8	PASS
7	914.2	1.82	8	PASS

### Test Plot:





## 3.5 OUT OF BAND EMISSION MEASUREMENT

### 3.5.1 Limits

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 3.5.2 Measurement procedure

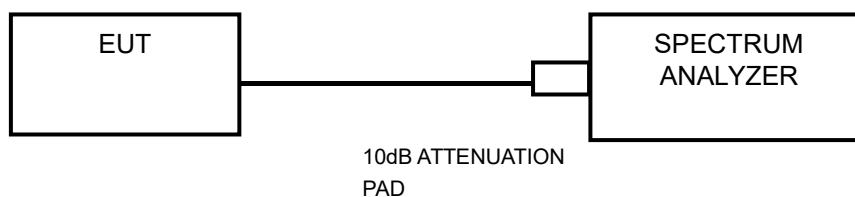
#### Measurement Procedure -Reference Level

- Set the RBW = 100 kHz.
- Set the VBW  $\geq$  300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHzband segment within the fundamental EBW.

#### Measurement Procedure –Unwanted Emission Level

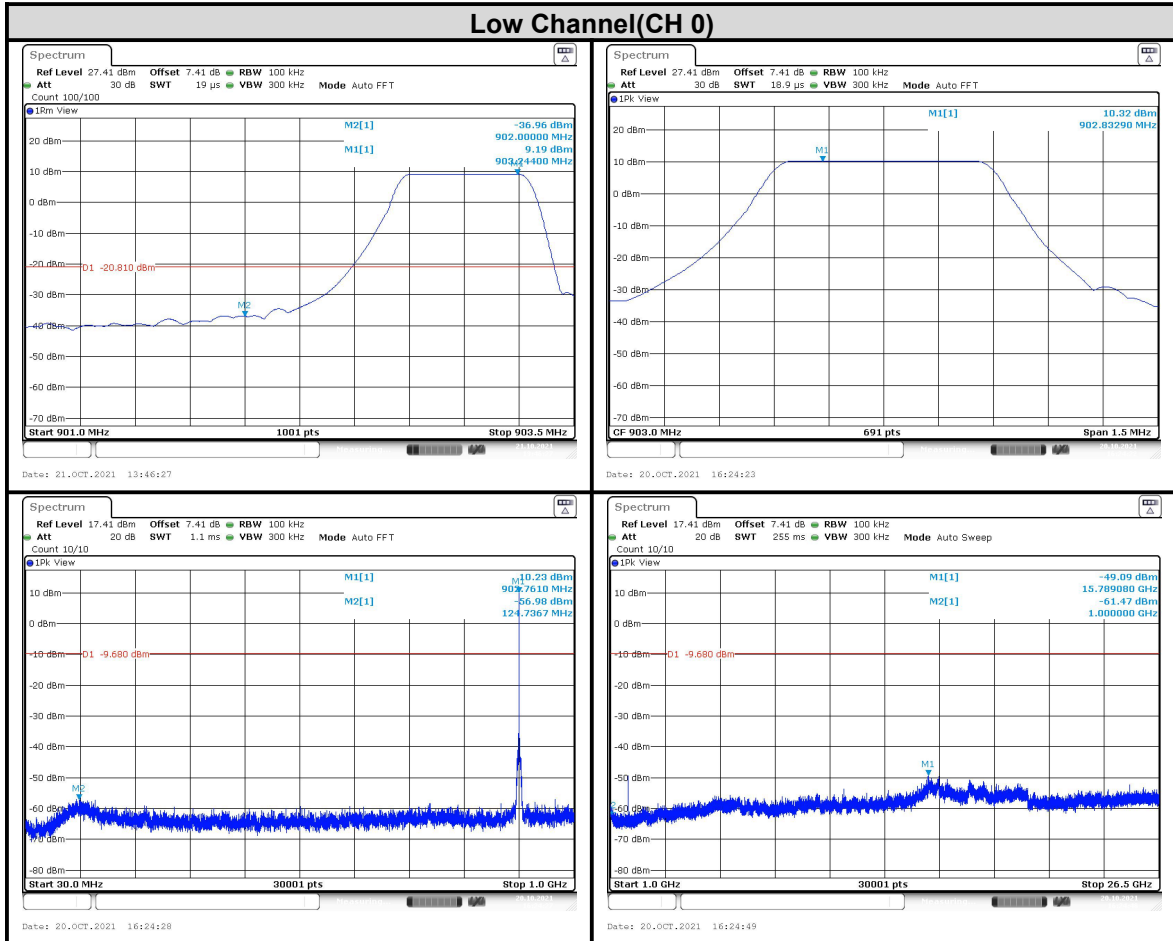
- Set RBW = 100 kHz.
- Set VBW  $\geq$  300 kHz.
- Set span to encompass the spectrum to be examined
- Detector = peak.
- Trace Mode = max hold.
- Sweep = auto couple.

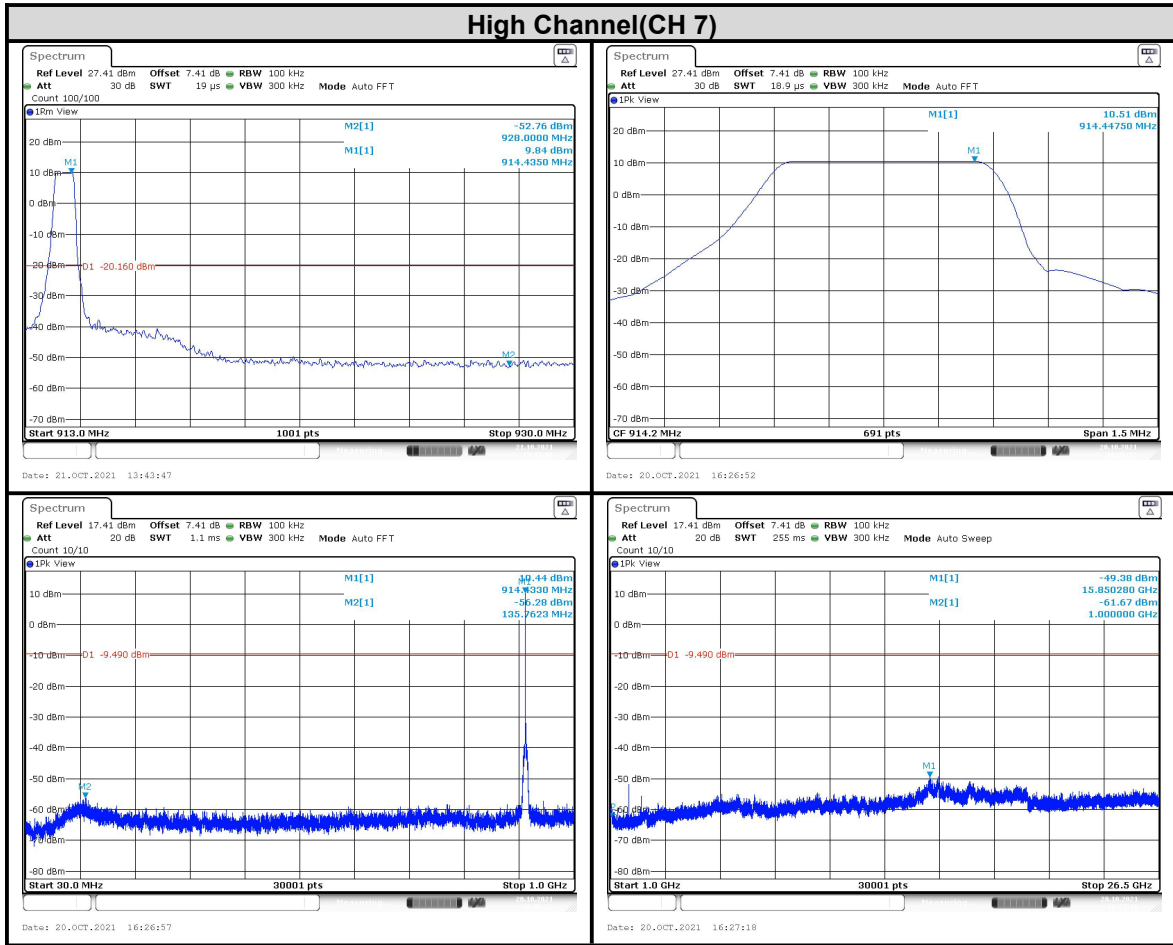
### 3.5.3 Test setup



### 3.5.4 Test result

The spectrum plots are attached on the following images.







#### **4 PHOTOGRAPHS OF TEST SETUP**

Please refer to the attached file (Test Setup Photo).



## Appendix A

Antenna Port Conducted Test				
Equipment	Model No.	Serial Number	Manufacturer	Cal. Due
Communication Shielded Room 2	4m*3m*3m	CRTDSWKS44301	CRT	2023/04/25
Spectrum Analyzer	FSV40	101580	R&S	2022/06/30
Comprehensive Test Instrument	CMW270	100304	R&S	2021/12/08
Analog Signal Generator	SMB100A	181858	R&S	2022/06/30
Vector Signal Generator	SGT100A	111661	R&S	2022/06/30
RF Radio Frequency Switch	JS0806-2	19H9080187	Tonscend	2022/06/30
Programmable DC Power Supply	E3644A	MY58036222	KEYSIGHT	2022/04/22

Radiated Emission Test - 3M Chamber				
Equipment	Model No.	Serial Number	Manufacturer	Cal. Due
3m Semi-Anechoic Chamber	FACT-4	ST08035	ETS	2024/12/12
Spectrum Analyzer	N9010B	MY57470323	KEYSIGHT	2022/03/05
EMI Test Receiver	N9038A-508	MY532290079	Agilent	2022/03/05
Broadband Antenna	VULB 9163	9163-530	SCHWARZBECK	2022/06/26
Waveguide Horn Antenna	HF906	360306/008	R&S	2022/03/05
Waveguide Horn Antenna	BBHA9170	00949	SCHWARZBECK	2022/03/05
Preamplifier	BBV 9721	9721-050	SCHWARZBECK	2022/06/30
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	1	WI	2021/12/16
Comprehensive tester	CMW500	159000	R&S	2022/01/04



### Important

- (1) The test report is valid with the official seal of the laboratory and the signatures of Test engineer, Author and Reviewer simultaneously.
- (2) The test report is invalid if altered.
- (3) Any photocopies or part photocopies in the test report are forbidden without the written permission from the laboratory.
- (4) Objections to the test report must be submitted to the laboratory within 15 days.
- (5) Generally, commission test is responsible for the tested samples only.

*Address of the laboratory:*

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