

## Radio Test Report

**Report No.:** RJBEAD-WTW-P21031019-2 R1

**Test Model:** AIM-78S-2

**Series Model:** AIM-78H-2 (refer to item 3.1 for more details)

**Received Date:** Apr. 01, 2021

**Test Date:** Jul. 03 ~ Jul. 13, 2021

**Issued Date:** Jan. 10, 2022

**Applicant:** ADVANTECH CO., LTD

**Address:** No.1, Alley 20, Lane 26, Rueiguang Rd, Neihu District, Taipei, Taiwan 114

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383,  
TAIWAN



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

## Table of Contents

Release Control Record .....	3
1 Certificate of Conformity .....	4
2 Summary of Test Results .....	4
2.1 Test Instruments .....	6
2.2 Measurement Uncertainty .....	6
2.3 Modification Record .....	6
3 General Information .....	7
3.1 General Description of EUT .....	7
3.2 Description of Test Modes .....	9
3.3 Test Conditions .....	10
3.4 Assembly .....	10
3.5 Antenna Specifications .....	11
3.5.1 Antenna Gain .....	11
3.5.2 Antenna Pattern .....	11
4 Test Results .....	12
4.1 Frequency Tolerance Measurement .....	12
4.1.1 Limits of Frequency Tolerance Measurement .....	12
4.1.2 Test Setup .....	12
4.1.3 Test Results .....	12
4.2 Occupied Bandwidth Measurement (99% power bandwidth) .....	13
4.2.1 Limits of Occupied Bandwidth Measurement .....	13
4.2.2 Test Setup .....	13
4.2.3 Test Results .....	14
4.3 Spreading Bandwidth Measurement (90% power bandwidth) .....	17
4.3.1 Test Setup .....	17
4.3.2 Test Results .....	18
4.4 Spurious Emissions for Transmitter Measurement .....	21
4.4.1 Limits of Spurious Emissions .....	21
4.4.2 Test Setup .....	21
4.4.3 Test Results .....	22
4.5 Antenna Power Measurement .....	28
4.5.1 Limits of Antenna Power .....	28
4.5.2 Test Setup .....	28
4.5.3 Test Results .....	29
4.6 Spurious Emissions for Receiver .....	30
4.6.1 Limits of Spurious Emissions for Receiver .....	30
4.6.2 Test Setup .....	30
4.6.3 Test Result .....	31
4.7 Dwell Time .....	33
4.7.1 Limits of Dwell Time .....	33
4.7.2 Test Setup .....	33
4.7.3 Test Result .....	34
4.8 Interference Prevention Function .....	43
4.8.1 Limits of Interference Prevention Function .....	43
4.8.2 Test Setup .....	43
4.8.3 Test Results .....	43
5 Photographs of the Test Configuration .....	44
Appendix - Information of the Testing Laboratories .....	45

### Release Control Record

Issue No.	Description	Date Issued
RJBEAD-WTW-P21031019-2	Original release.	Dec. 17, 2021
RJBEAD-WTW-P21031019-2 R1	Revised accessory devices of EUT.	Jan. 10, 2022

## 1 Certificate of Conformity

**Product:** 10.1" Tablet PC

**Brand:** ADVANTECH

**Test Model:** AIM-78S-2

**Series Model:** AIM-78H-2 (refer to item 3.1 for more details)

**Sample Status:** Engineering sample

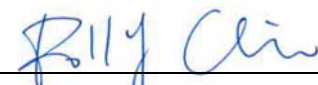
**Applicant:** ADVANTECH CO., LTD

**Test Date:** Jul. 03 ~ Jul. 13, 2021

**Standards:** ARIB STD-T66 (V3.7), MIC notice 88 Appendix 43  
Article 2 Paragraph 1 of Item 19

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.


**Prepared by :**

  
Polly Chien / Specialist

**Date:**

Jan. 10, 2022

**Approved by :**

  
Jeremy Lin / Project Engineer

**Date:**

Jan. 10, 2022

## 2 Summary of Test Results

The EUT has been tested according to the following specifications:

Notice 88 Appendix 43 Reference	ARIB STD-T66 Ref.	Report Reference	Parameter	Test Results (Note)
<b>General Provisions</b>				
C	3.2 (4)	4.1	Frequency tolerance	C
D	3.2 (7)	4.2	Occupied bandwidth	C
E	3.2 (6)	4.4	Spurious emissions	C
<b>Transmitting Equipment</b>				
F	3.2 (2)	4.5	Antenna power	C
--	--	--	SAR	NA
<b>Transmitting Antenna</b>				
--	--	3.4	Type, configuration, etc. of transmitting antenna	C
--	--	3.5	Direction pattern of transmitting antenna	C
<b>Receiving Equipment</b>				
G	3.3 (1)	4.6	Spurious emissions of receiver	C
--	--	3.5	Refer to all articles for transmitting antenna	C
<b>Operating Frequency 2400 to 2483.5MHz</b>				
--	3.7 (1)	3.4	Radio Frequency and modulation section cannot be opened easily	C
--	3.1 (1)	3.1	Communication method	C
--	3.2 (1)a	3.1	Modulation method	C
--	3.2 (1)a	3.1	Spread spectrum method	C
--	3.2 (2)	4.5	Antenna power	C
--	3.6 (2)	4.5	Absolute gain of transmitting antenna	C
--	3.6 (2)	--	Angular width of principal radiation (AWPR)	NA
--	3.2 (10)	--	Number of carriers within 1 MHz bandwidth in OFDM	NA
--	3.2 (8)	4.3	Spreading bandwidth	C
--	3.2 (9)	4.3	Spreading factor	C
--	3.2 (11)	4.7	Frequency retention time (FH employed)	NA
--	3.4.1(1)	4.8	Interference Prevention Function	C
--	3.4.1(3)	--	Carrier Sense Capability	NA
<b>Note:</b> 1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty. 2. C = Conform    NC = Not Conform    NT = Not Tested    NA = Not Applicable				

## 2.1 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration	Calibration Authority	Cal. Method
Spectrum Analyzer / Rohde & Schwarz	FSV40	100980	Apr. 14, 2021	Apr. 13, 2022	Electronics Testing Center, Taiwan	c)
Spectrum Analyzer / Rohde & Schwarz	FSU43	100115	Feb. 03, 2021	Feb. 02, 2022	Electronics Testing Center, Taiwan	c)
Signal Generator / Anritsu	E4438C	MY49071692	Oct. 13, 2020	Oct. 12, 2021	Keysight Technologies, Inc.	c)
Power Meter / Anritsu	ML2495A	1232003	Jan. 05, 2021	Jan. 04, 2022	Electronics Testing Center, Taiwan	c)
Power Sensor / Anritsu	MA2411B	1207333	Jan. 05, 2021	Jan. 04, 2022	Electronics Testing Center, Taiwan	c)
Power Splitter / Marvelous Microwave Inc.	MVE8546	20161123081	Jan. 13, 2021	Jan. 12, 2022	BV CPS E&E	d)
DC power supply / TWINTEX	TP-3305D	11T35D0801027	Note 3	Note 3	BV CPS E&E	d)
True RMS Clamp Meter / Fluke	325	31130711WS	Jun. 02, 2021	Jun. 01, 2022	Electronics Testing Center, Taiwan	c)

Note:

### 1. Calibration Method

- Calibration conducted by the National Institute of Information and Communications Technology~NICT~ or a designated calibration agency under Article 102-18 paragraph (1)~ TELEC EngineeringCenter, Intertek Japan K.K., Keysight Technologies, Inc~.
  - Correction conducted pursuant to the provisions of Article 135 or Article 144 of the MeasurementLaw (Law No. 51 of 1992)~Japan Calibration Service Syste~
  - Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted bythe NICT or a designated calibration agency under Article 102-18 paragraph (1)~ TELEC EngineeringCenter, Intertek Japan K.K., Keysight Technologies, Inc~.
  - Calibration conducted by using other equipment that listed above from a) to c)
- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  - The power supply no evaluation calibration, which used the digital multimeter to verify before each testing.

## 2.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in TR 100 028-1.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Parameter	Uncertainty
Occupied Bandwidth	491.896Hz
Spurious emissions	2.208dB
Output power density	2.889dB
Out of band radiated power	3.93dB
Frequency Tolerance	6805.18Hz

## 2.3 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	10.1" Tablet PC
Brand	ADVANTECH
Test Model	AIM-78S-2
Series Model	AIM-78H-2
Model Difference	For marketing purpose
Status of EUT	Engineering sample
Nominal Voltage	10.8Vdc (Battery) 19Vdc (from adapter)
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8DPSK
Modulation Technology	FHSS
Transfer Rate	1/2/3Mbps
Operating Frequency	2402 ~ 2480MHz
Number of Channel	79
Rated RF Output Power Density	Refer to note
Conducted RF Output Power Density	Refer to note
Radiated RF Output Power Density	Refer to note
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	Refer to note
Data Cable Supplied	Refer to note

Note:

1. The power table as below:

	Rated power (mW/MHz)	Total Conducted RF output power density (mW/MHz)	Radiated RF output power density (mW/MHz)
Normal mode	0.3	0.224324	0.486268
AFH mode	1	0.899802	1.950504

2. The EUT uses the following antennas.

Ant. Type	PIFA										
Ant. Connector	I-PEX_IV										
WiFi/BT_Main											
Frequency (MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	3.36	3.36	3.15	3.16	3.06	3.25	3.22	3.23	3.32	3.01	3.12
WiFi_Aux											
Frequency (MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	4.19	4.09	4.25	4.12	4.07	3.95	3.86	3.86	3.71	3.46	3.43

\* The max. gain was chosen for final tests.

\* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	Tamura	XEW1934N	Input: 100-240Vac~1.5A , 50/60Hz Output: 19Vdc / 3.42A Power Line: AC: 1.5m cable without core DC: 1.2m cable without core
Adapter 2 (option)	FSP	FSP065-DBCM1	Input: 100-240Vac~ 2.0-1.0A, 50-60Hz Output: 19Vdc / 3.43A Power Line: AC: 1.5m cable without core DC: 1.5m cable with 1 core
Battery	ADVANTECH	AIM-BAT-10	Rating: 10.8Vdc, 24.84Wh, 2300mAh
Docking Station (option)	ADVANTECH	AIM-DOC-0001	Rating: 19Vdc, 3.42A (VESA Dock)
Docking Station (option)	ADVANTECH	AIM-VED0	Rating: 9 ~ 32Vdc (Vehicle Dock)
Docking Station (option)	ADVANTECH	AIM-OFD-0000	Rating: 19Vdc (Office Dock)
Extension Modules-Barcode scanner (20° ) (option)	ADVANTECH	AIM-EXT0-0040 (20 degree)	Sensor: 640 x 480 CMOS sensor
Extension Modules-Barcode scanner (70° ) (option)	ADVANTECH	AIM-EXT0-0041 (70 degree)	Sensor: 640 x 480 CMOS sensor
WLAN module	USI	MS-01	-



### 3.2 Description of Test Modes

79 channels are provided for BT-EDR mode:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

Note 1: By means of test software (QRCT Version 4.0.00161.0) provided by manufacture, the power levels during the tests were set according to the following codes:

Note 2: Pre-Scan has been conducted to determine the worst-case mode from packet type; we found the DH5 was the worst case, and chosen for final test. Following test items were selected for the final test as listed below.

Test Items
Spurious emissions
Power density (Antenna power)
Occupied / spreading bandwidth

#### Bluetooth EDR

Modulation type	Power setting	
	Normal mode	AFH mode
GFSK	9	9
$\pi/4$ -DQPSK	9	9
8DPSK	9	9

### 3.3 Test Conditions

Test Conditions	Voltage (Vdc)
Vnormal	10.8

Note: When EUT be operated at  $\pm 10\%$  from the normal supply voltage, the supply voltage of RF part was varied within  $\pm 1\%$ . All test cases were done under the normal supply voltage.

Test Item	Environmental Conditions	Test Engineer
Frequency Tolerance	25 deg.C, 60 % RH	Wayne Lin
Occupied Bandwidth (99% power bandwidth)	25 deg.C, 60 % RH	Wayne Lin
Spreading Bandwidth (90% power bandwidth)	25 deg.C, 60 % RH	Wayne Lin
Spurious Emissions for Transmitter	25 deg.C, 60 % RH	Wayne Lin
Antenna Power	25 deg.C, 60 % RH	Wayne Lin
Spurious Emissions for Receiver	25 deg.C, 60 % RH	Wayne Lin

### 3.4 Assembly

The EUT is constructed as a standalone unit. The modulation section, preamplifier, RF component etc, are shielded on the metal housing, and is not capable of being open easily.

### 3.5 Antenna Specifications

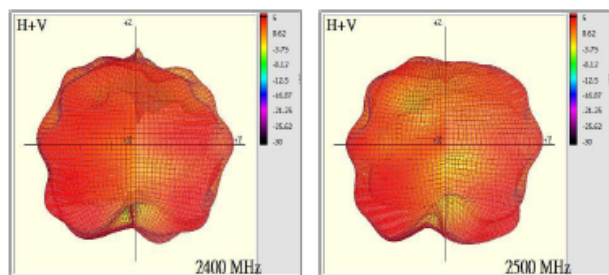
#### 3.5.1 Antenna Gain

Ant. Type	PIFA										
Ant. Connector	I-PEX_IV										
WiFi/BT_Main											
Frequency (MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	3.36	3.36	3.15	3.16	3.06	3.25	3.22	3.23	3.32	3.01	3.12
WiFi_Aux											
Frequency (MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	4.19	4.09	4.25	4.12	4.07	3.95	3.86	3.86	3.71	3.46	3.43

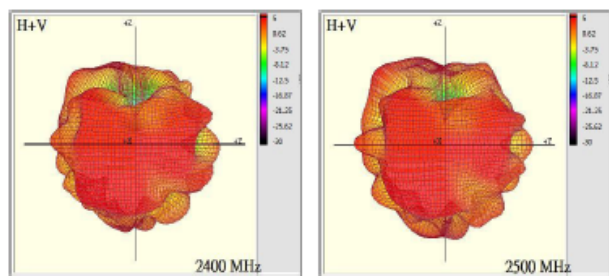
\* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

#### 3.5.2 Antenna Pattern

##### WiFi\_Main



##### WiFi\_Aux



## 4 Test Results

### 4.1 Frequency Tolerance Measurement

#### 4.1.1 Limits of Frequency Tolerance Measurement

Tolerance of frequency shall be +/- 50ppm

#### 4.1.2 Test Setup



#### 4.1.3 Test Results

Modulation: GFSK

Environmental Conditions		25 deg.C, 60% RH	
Channel	Frequency (MHz)	Vnormal	
		Carrier frequency (MHz)	Frequency tolerance (ppm)
0	2402	2401.988400	-4.829
39	2441	2440.988400	-4.752
78	2480	2479.988200	-4.758

## 4.2 Occupied Bandwidth Measurement (99% power bandwidth)

### 4.2.1 Limits of Occupied Bandwidth Measurement

Item	Limit
Occupied bandwidth	<83.5 MHz

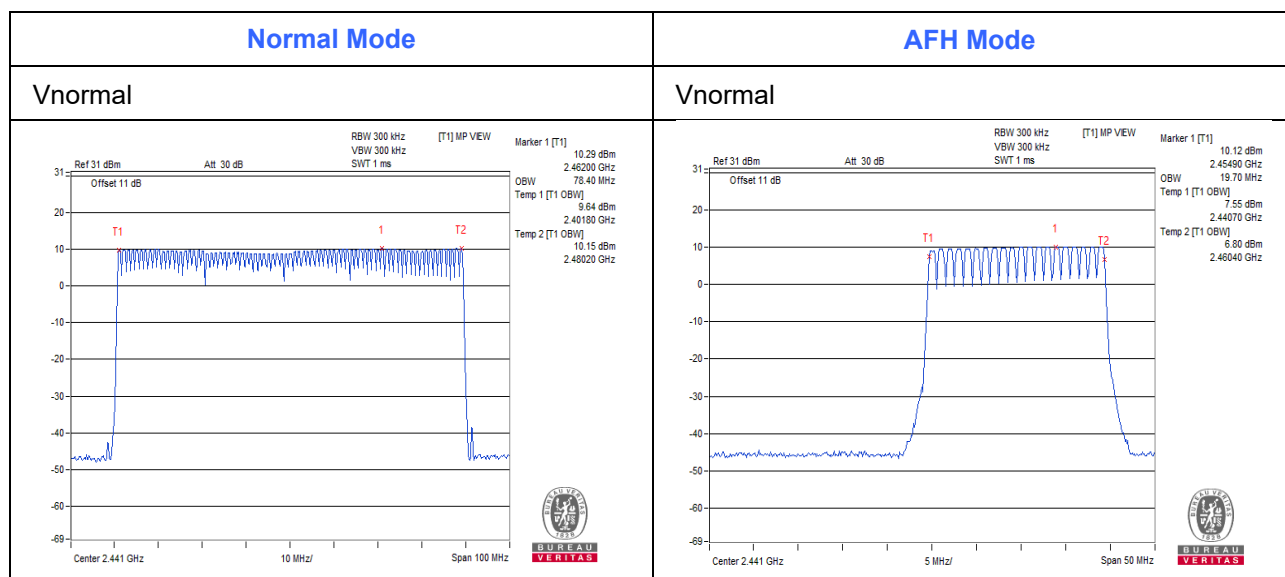
### 4.2.2 Test Setup



## 4.2.3 Test Results

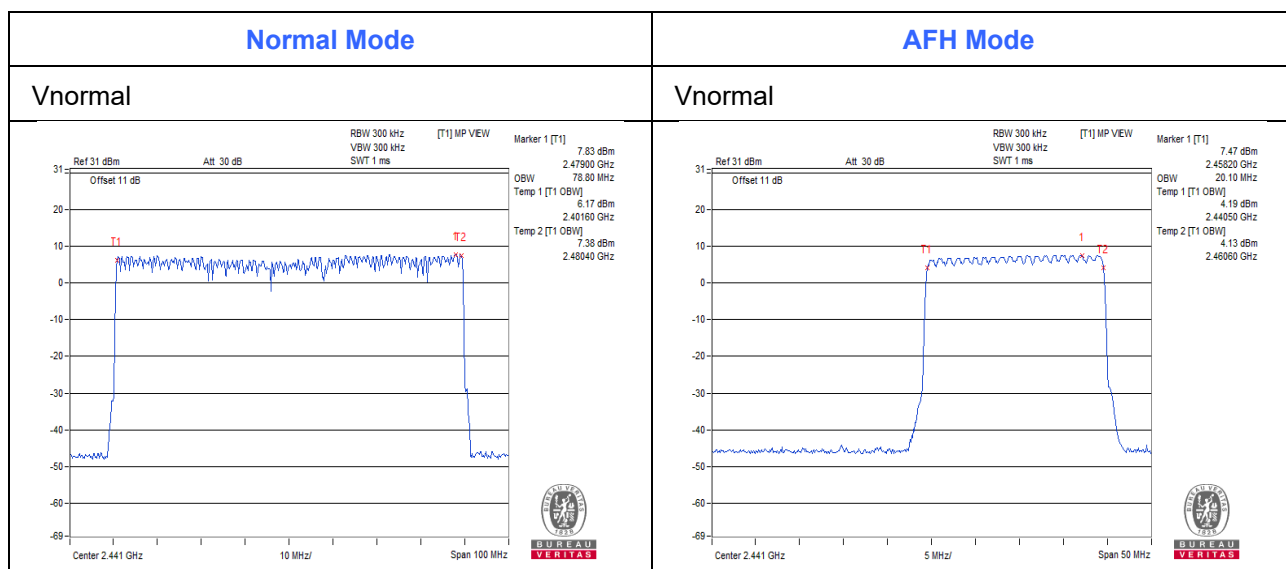
### Modulation: GFSK

Environmental Conditions	25 deg.C, 60% RH
Vnormal	
Occupied Bandwidth (MHz)	
Normal Mode	AFH Mode
78.40	19.70



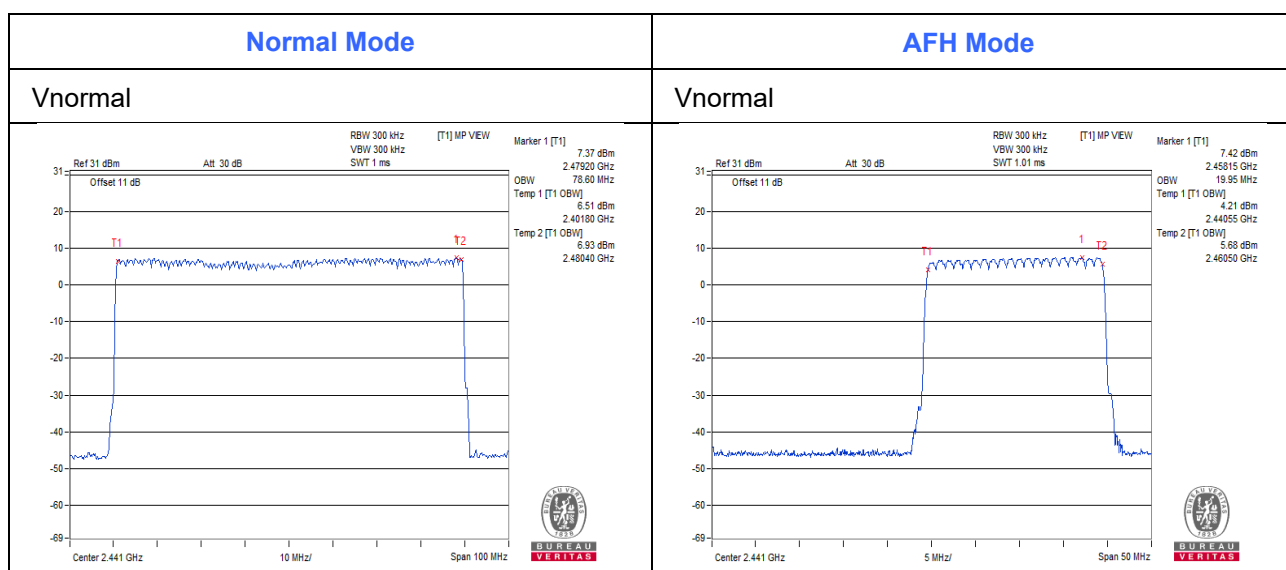
Modulation:  $\pi/4$ -DQPSK

Environmental Conditions	25 deg.C, 60% RH
Vnormal	
Occupied Bandwidth (MHz)	
Normal Mode	AFH Mode
78.80	20.10



## Modulation: 8DPSK

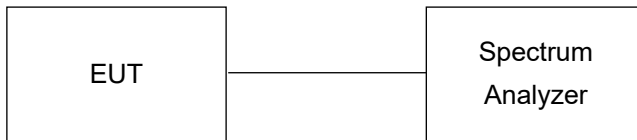
Environmental Conditions	25 deg.C, 60% RH	
Vnormal		
Occupied Bandwidth (MHz)		
Normal Mode		AFH Mode
78.60		19.95





### 4.3 Spreading Bandwidth Measurement (90% power bandwidth)

#### 4.3.1 Test Setup

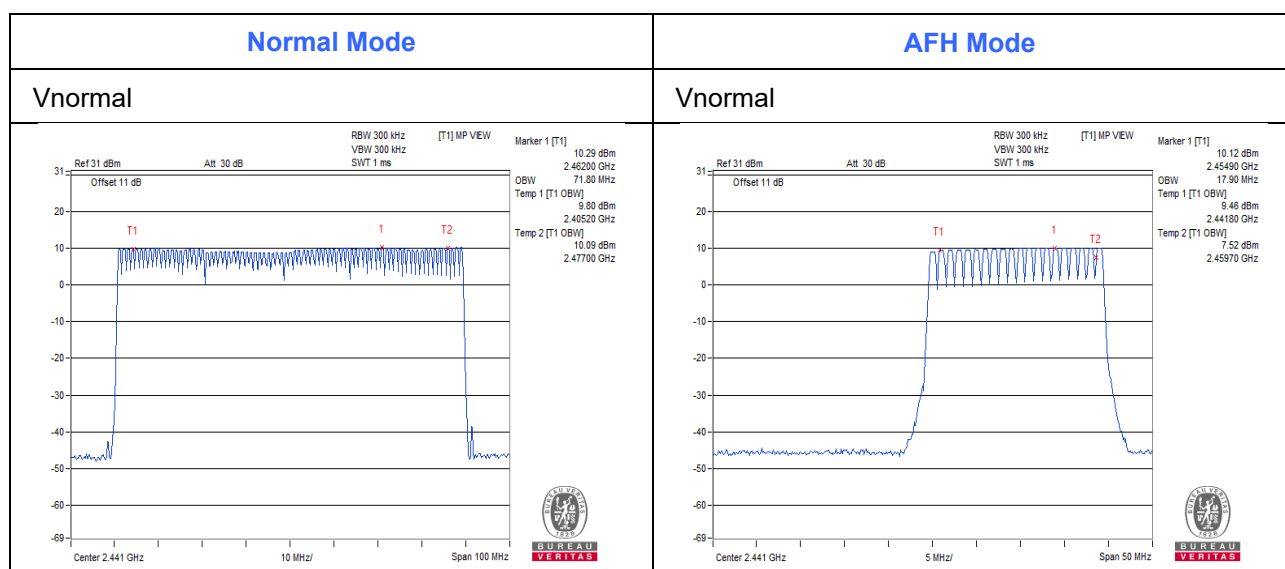


## 4.3.2 Test Results

### Modulation: GFSK

Environmental Conditions		25 deg.C, 60% RH	
Vnormal			
Normal Mode		AFH Mode	
Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor
71.80	71.80	17.90	17.90

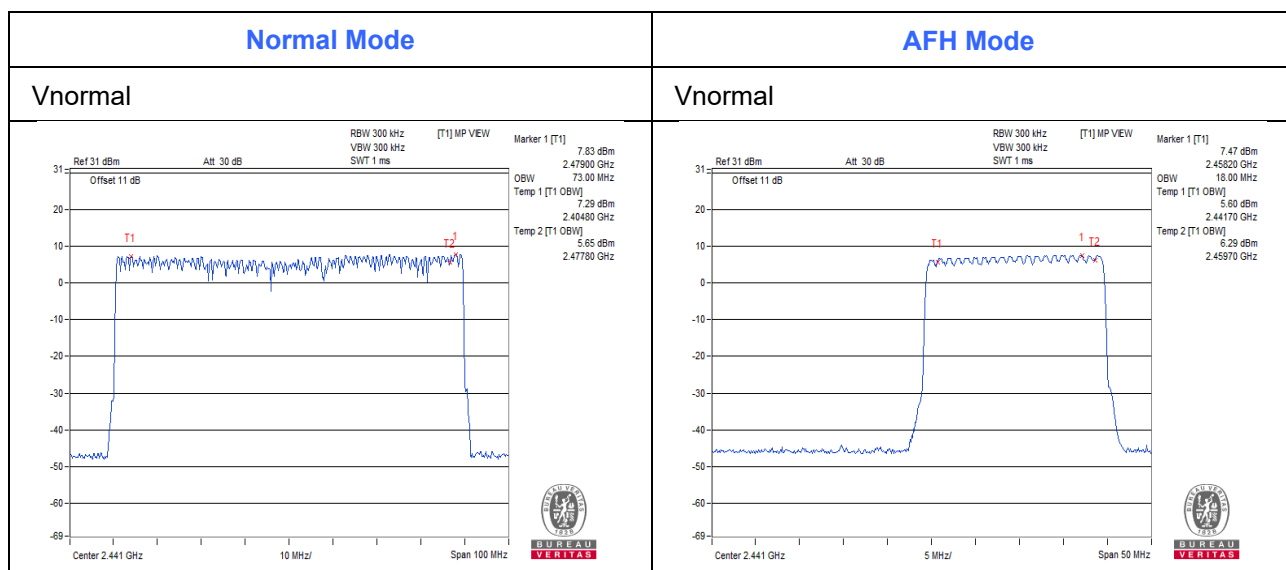
Note: 1. Spreading Factor: 90% channel power bandwidth / 1.



# Modulation: $\pi/4$ -DQPSK

Environmental Conditions		25 deg.C, 60% RH	
Vnormal			
Normal Mode		AFH Mode	
Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor
73.00	73.00	18.00	18.00

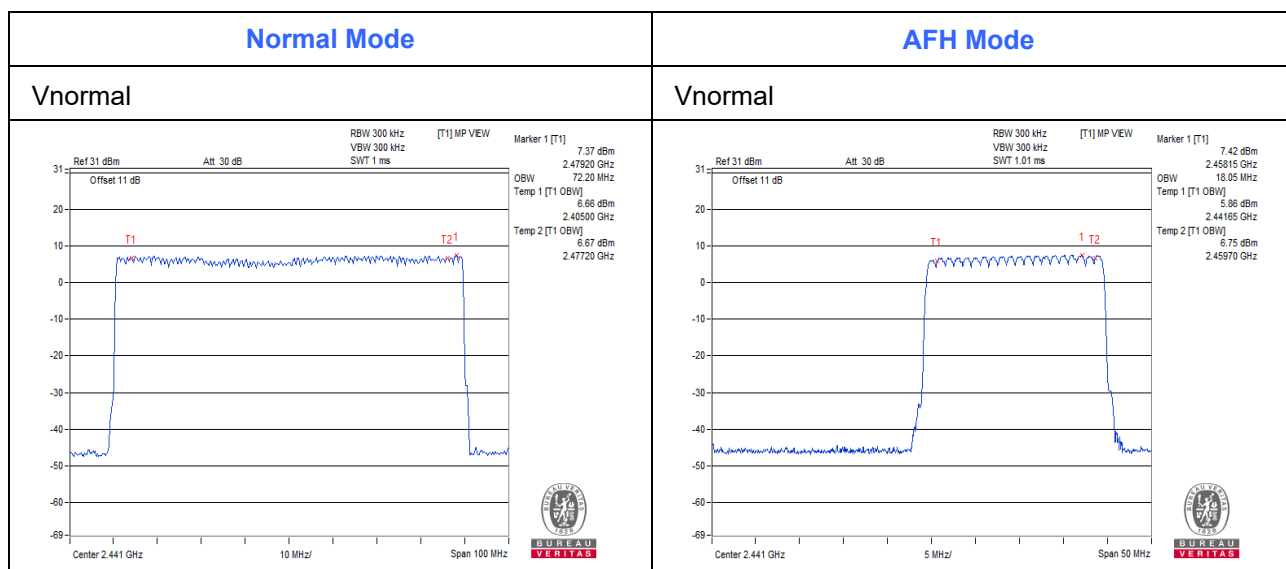
Note: 1. Spreading Factor: 90% channel power bandwidth / 1.



# Modulation: 8DPSK

Environmental Conditions		25 deg.C, 60% RH	
Vnormal			
Normal Mode		AFH Mode	
Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor
72.20	72.20	18.05	18.05

Note: 1. Spreading Factor: 90% channel power bandwidth / 1.



#### 4.4 Spurious Emissions for Transmitter Measurement

##### 4.4.1 Limits of Spurious Emissions

Frequencies (MHz)	Limit
Operating frequency 2400 to 2483.5MHz	
30.0MHz to 1000.0MHz	$\leq 0.25 \mu\text{W}/100\text{kHz}$
1000.0MHz to 2387MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$
2387.0MHz to 2400.0MHz	$\leq 25 \mu\text{W}/\text{MHz}$
2483.5MHz to 2496.5MHz	$\leq 25 \mu\text{W}/\text{MHz}$
2496.5MHz to 12500.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$

##### 4.4.2 Test Setup



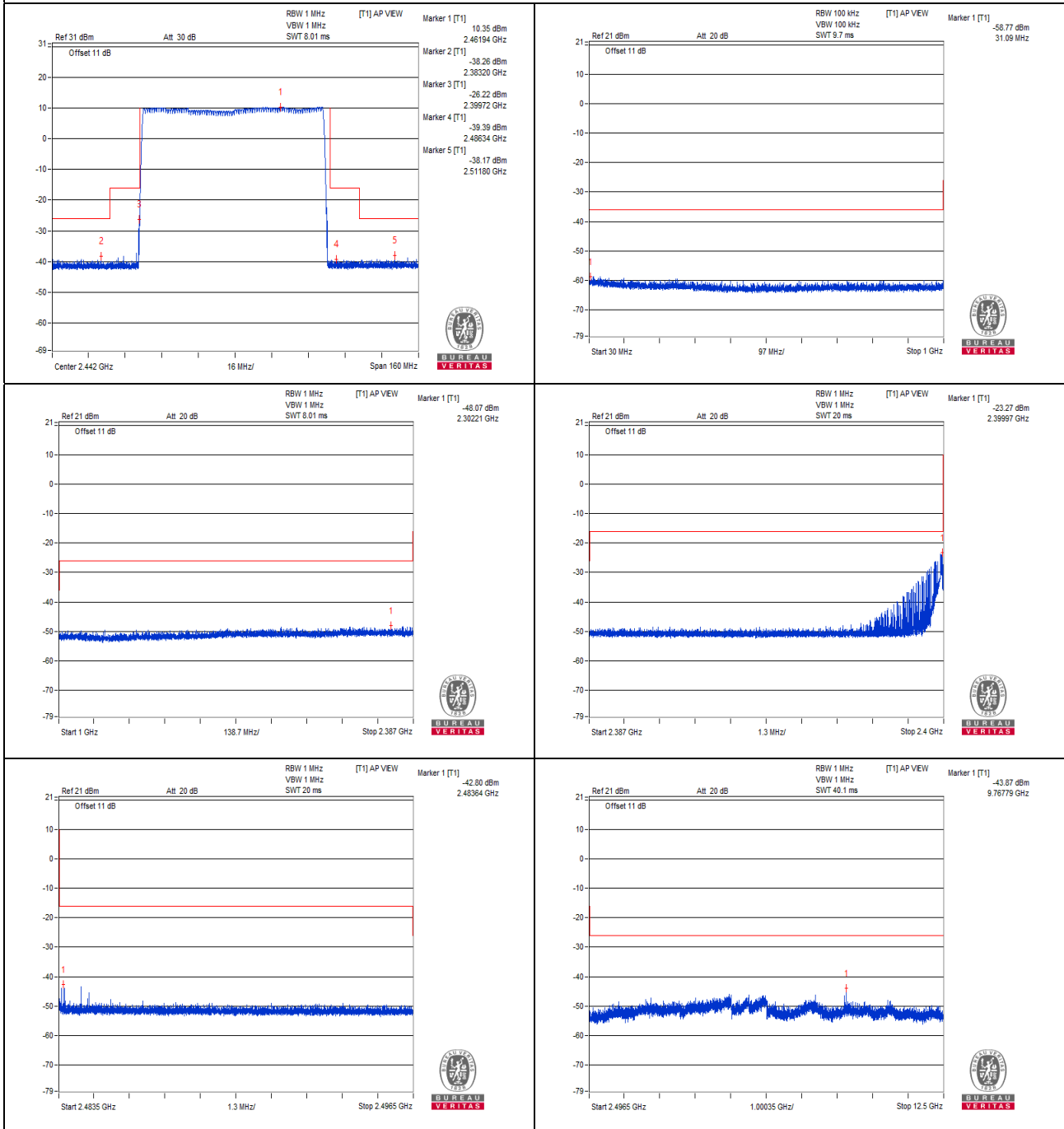
#### 4.4.3 Test Results

##### Modulation: GFSK

Environmental Conditions		20 deg.C, 70% RH			
Test Channel		Vnormal Mode		LIMIT (uW)	Result
Test Condition	Frequency Range	Frequency (MHz)	Measure. Value		
Vnormal	30.0MHz to 1000.0MHz	31.090	0.001000	0.25	PASS
	1000.0MHz to 2387MHz	2302.210	0.015000	2.5	PASS
	2387.0MHz to 2400.0MHz	2399.970	4.709000	25	PASS
	2483.5MHz to 2496.5MHz	2483.640	0.052000	25	PASS
	2496.5MHz to 12500.0MHz	9767.790	0.041000	2.5	PASS

**NOTE:** The spectrum plots are attached on the following pages.

# Vnormal



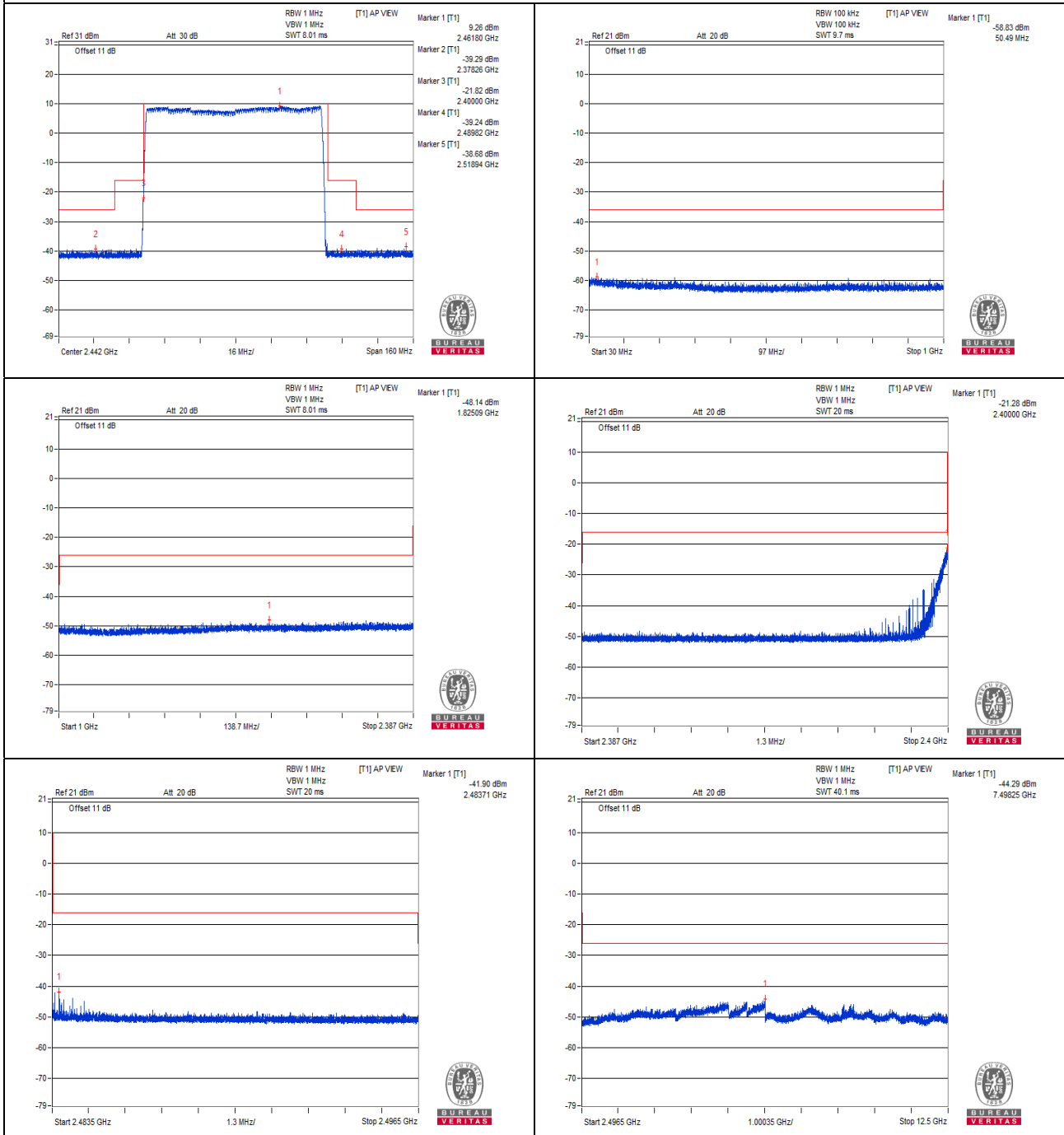
**Modulation:  $\pi/4$ -DQPSK**

Environmental Conditions		20 deg.C, 70% RH			
Test Channel		Vnormal Mode		LIMIT (uW)	Result
Test Condition	Frequency Range	Frequency (MHz)	Measure. Value		
Vnormal	30.0MHz to 1000.0MHz	50.490	0.001000	0.25	PASS
	1000.0MHz to 2387MHz	1825.090	0.015000	2.5	PASS
	2387.0MHz to 2400.0MHz	2400.000	7.447000	25	PASS
	2483.5MHz to 2496.5MHz	2483.710	0.064000	25	PASS
	2496.5MHz to 12500.0MHz	7498.250	0.037000	2.5	PASS

**NOTE:** The spectrum plots are attached on the following pages.



Vnormal

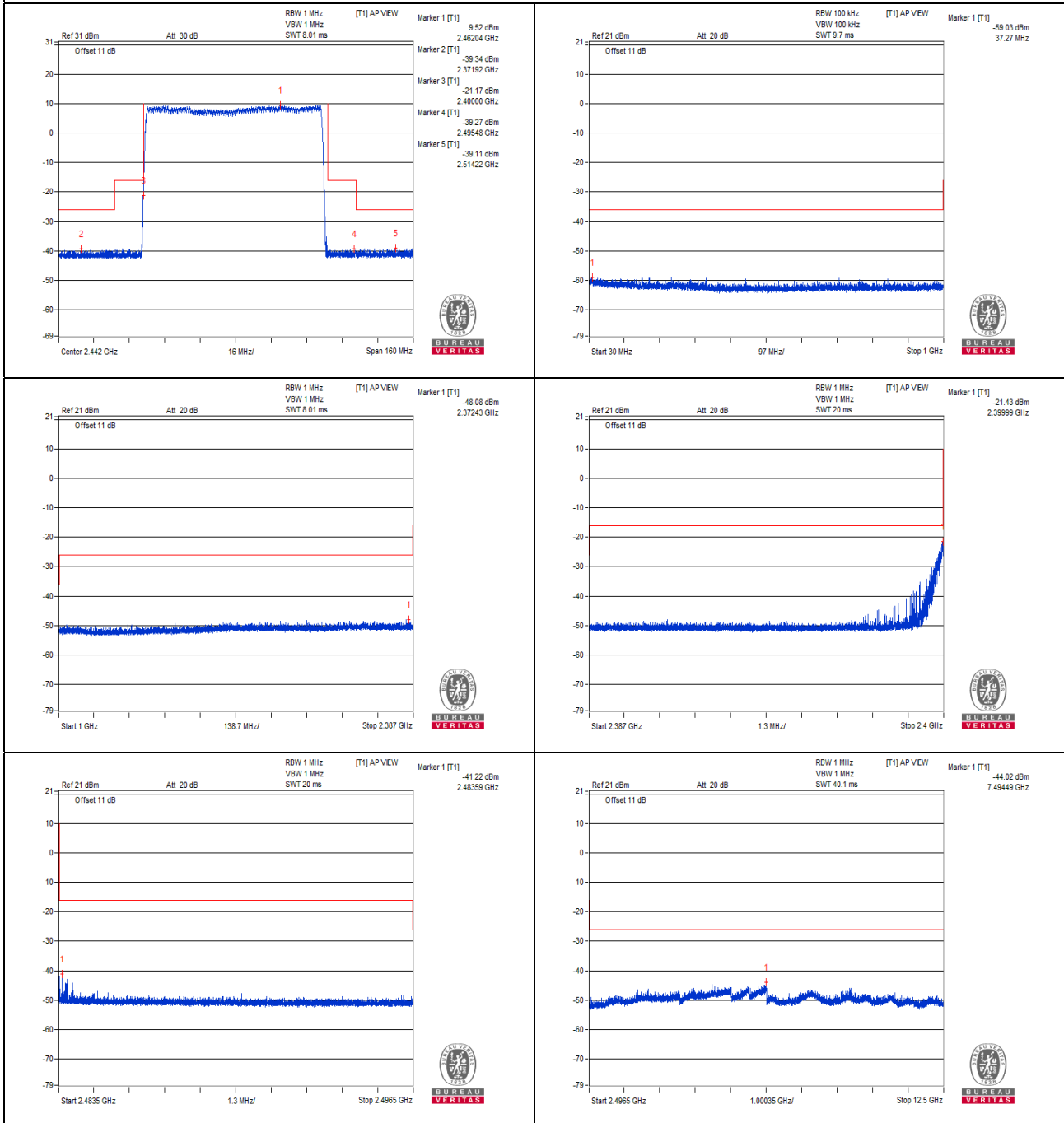


### Modulation: 8DPSK

<b>Environmental Conditions</b>		20 deg.C, 70% RH			
<b>Test Channel</b>		<b>Vnormal Mode</b>		<b>LIMIT (uW)</b>	<b>Result</b>
<b>Test Condition</b>	<b>Frequency Range</b>	<b>Frequency (MHz)</b>	<b>Measure. Value</b>		
<b>Vnormal</b>	30.0MHz to 1000.0MHz	37.270	0.001000	0.25	PASS
	1000.0MHz to 2387MHz	2372.430	0.015000	2.5	PASS
	2387.0MHz to 2400.0MHz	2399.990	7.194000	25	PASS
	2483.5MHz to 2496.5MHz	2483.590	0.075000	25	PASS
	2496.5MHz to 12500.0MHz	7494.490	0.039000	2.5	PASS

**NOTE:** The spectrum plots are attached on the following pages.

Vnormal



## 4.5 Antenna Power Measurement

### 4.5.1 Limits of Antenna Power

Modulation System	Frequency Band Used	Antenna Power (Max.)	EIRP (Max.)	
			Omni-Directional Case	Directional Case
DS	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz (16.37 mW/MHz)	22.14 dBm/MHz (163.68 mW/MHz)
OFDM (Note 1)	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz (16.37 mW/MHz)	22.14 dBm/MHz (163.68 mW/MHz)
OFDM (Note 2)	2400 – 2483.5 MHz	5 mW/MHz	9.14 dBm/MHz (8.20mW/MHz)	19.14 dBm/MHz (82.04 mW/MHz)
FH	2400 – 2483.5 MHz	3 mW/MHz	6.91 dBm/MHz (4.91 mW/MHz)	16.91 dBm/MHz (49.10 mW/MHz)

Note:

1. Occupied bandwidth is less than 26MHz
2. Occupied bandwidth is more that 26MHz and less than 38MHz
3. The half-power beam width for directional antenna shall be 360/A degrees or less, where A is a ratio which causes the EIRP concerned to exceed the omnidirectional EIRP upper limit.
4. Tolerance of antenna power shall be +20% (upper value) and –80% (lower value).

### 4.5.2 Test Setup



#### 4.5.3 Test Results

##### Normal Mode:

Voltage (Vdc)	Modulation	Data Rate	Conducted RF Output Power Density (mW/MHz)	Radiated RF Output Power Density (mW/MHz)
10.8	GFSK	DH5	0.224324	0.486268
	$\pi/4$ -DQPSK	2DH5	0.185642	0.402417
	8DPSK	3DH5	0.186407	0.404075
Max. Limit (mW/MHz):			3	-
Rated Power (mW/MHz):			0.3	-
Tolerance of Antenna Power (mW/MHz):			0.06 ~ 0.36	-
Max. EIRP Limit (mW/MHz):			-	4.91

- Note:
1. Antenna gain is 3.36 dBi.
  2. The radiated RF output power density is a “calculated” value derived from the conducted value.
  3. Formula: Radiated RF output power density = Conducted RF output power density + Antenna gain

##### AFH Mode:

Voltage (Vdc)	Modulation	Data Rate	Conducted RF Output Power Density (mW/MHz)	Radiated RF Output Power Density (mW/MHz)
10.8	GFSK	DH5	0.899802	1.950504
	$\pi/4$ -DQPSK	2DH5	0.752881	1.632023
	8DPSK	3DH5	0.745628	1.616301
Max. Limit (mW/MHz):			3	-
Rated Power (mW/MHz):			1	-
Tolerance of Antenna Power (mW/MHz):			0.2 ~ 1.2	-
Max. EIRP Limit (mW/MHz):			-	4.91

- Note:
1. Antenna gain is 3.36 dBi.
  2. The radiated RF output power density is a “calculated” value derived from the conducted value.
  3. Formula: Radiated RF output power density = Conducted RF output power density + Antenna gain

## 4.6 Spurious Emissions for Receiver

### 4.6.1 Limits of Spurious Emissions for Receiver

Frequencies (MHz)	Limit
Below 1GHz	$\leq 4\text{nW}$ (-54dBm)
Above 1GHz	$\leq 20\text{nW}$ (-47dBm)

### 4.6.2 Test Setup



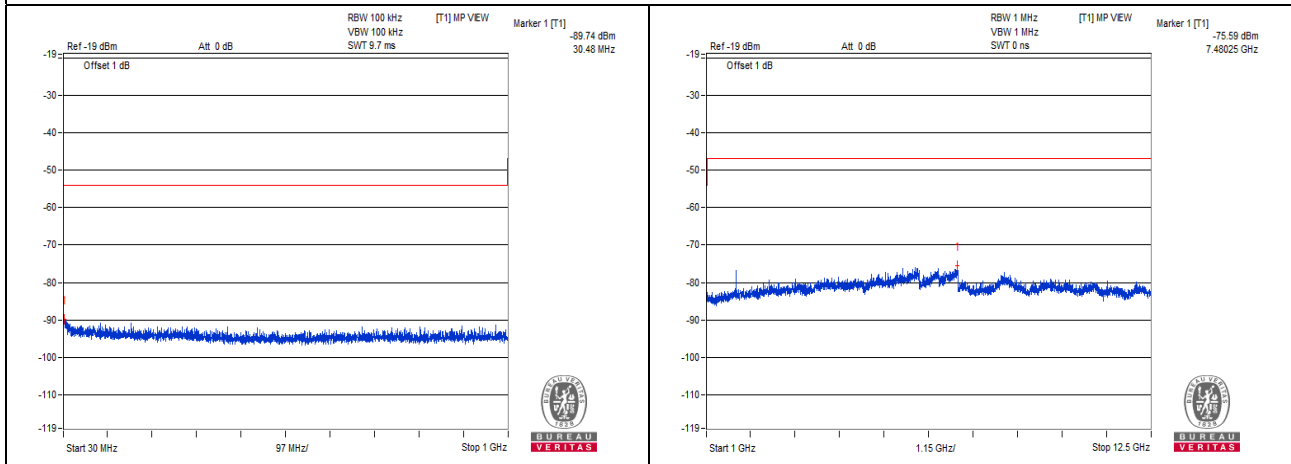
### 4.6.3 Test Result

#### Modulation: GFSK

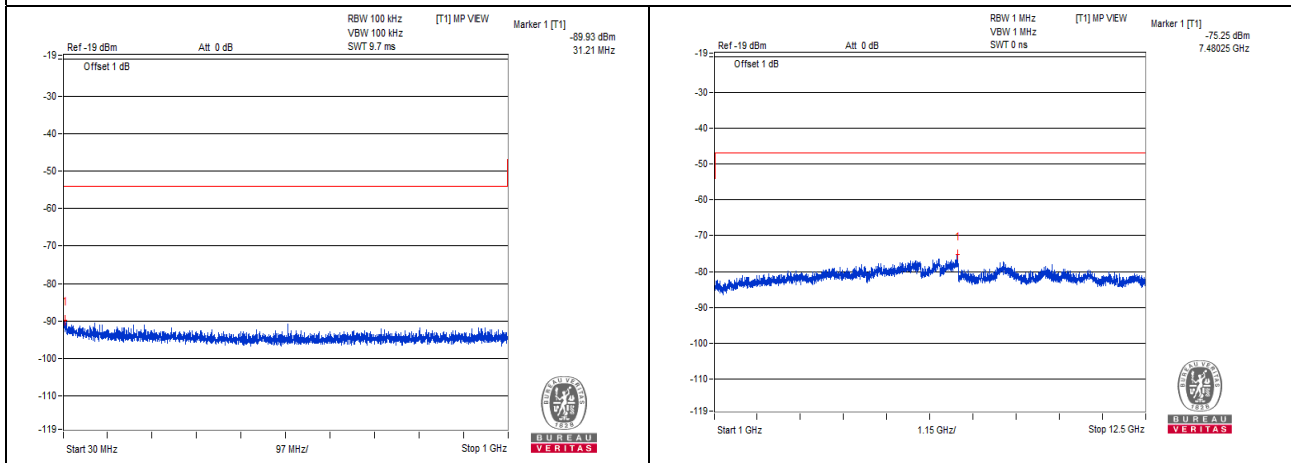
Environmental Conditions		25 deg.C, 60% RH					
Test Channel		Channel 0 (2402MHz)		Channel 39 (2441MHz)		LIMIT (nW)	Result
Test Condition	Frequency Range	Frequency (MHz)	Measured Value(nW)	Frequency (MHz)	Measured Value(nW)		
Vnormal	Below 1GHz	30.480	0.001062	31.210	0.001016	4.0	Pass
	Above 1GHz	7480.250	0.027606	7480.250	0.029854	20.0	Pass
Test Channel		Channel 78 (2480MHz)				Limit (nW)	Result
Test Condition	Frequency Range	Frequency (MHz)		Measured Value(nW)			
Vnormal	Below 1GHz	32.910		0.001245		4.0	Pass
	Above 1GHz	7457.250		0.025235		20.0	Pass

Note: The spectrum plots are attached on the following pages.

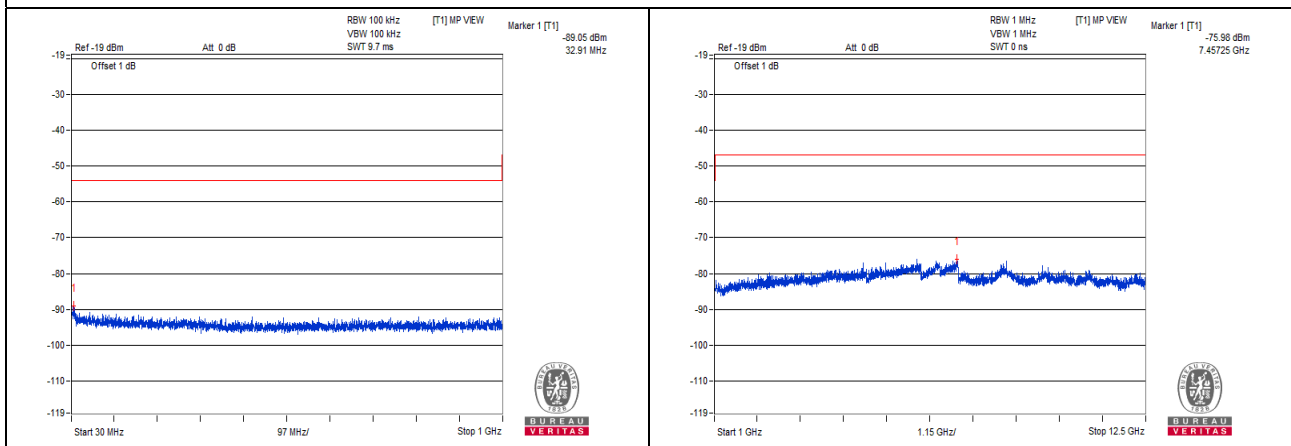
## Vnormal



## Channel 0



## Channel 39



## Channel 78



## 4.7 Dwell Time

### 4.7.1 Limits of Dwell Time

The frequency retention time in the frequency hopping method shall be 0.4 second or less. The total sum of the frequency retention time in any frequency within the time obtained by multiplying the diffusion rate by 0.4 second shall be 0.4 second or shorter.

Formula:

(Normal mode) dwell time = [diffusion rate/ 79] x duty-cycle x 0.4 seconds

(AFH mode) dwell time = [diffusion rate/20] x duty-cycle x 0.4 sec

### 4.7.2 Test Setup



#### 4.7.3 Test Result

Modulation: GFSK

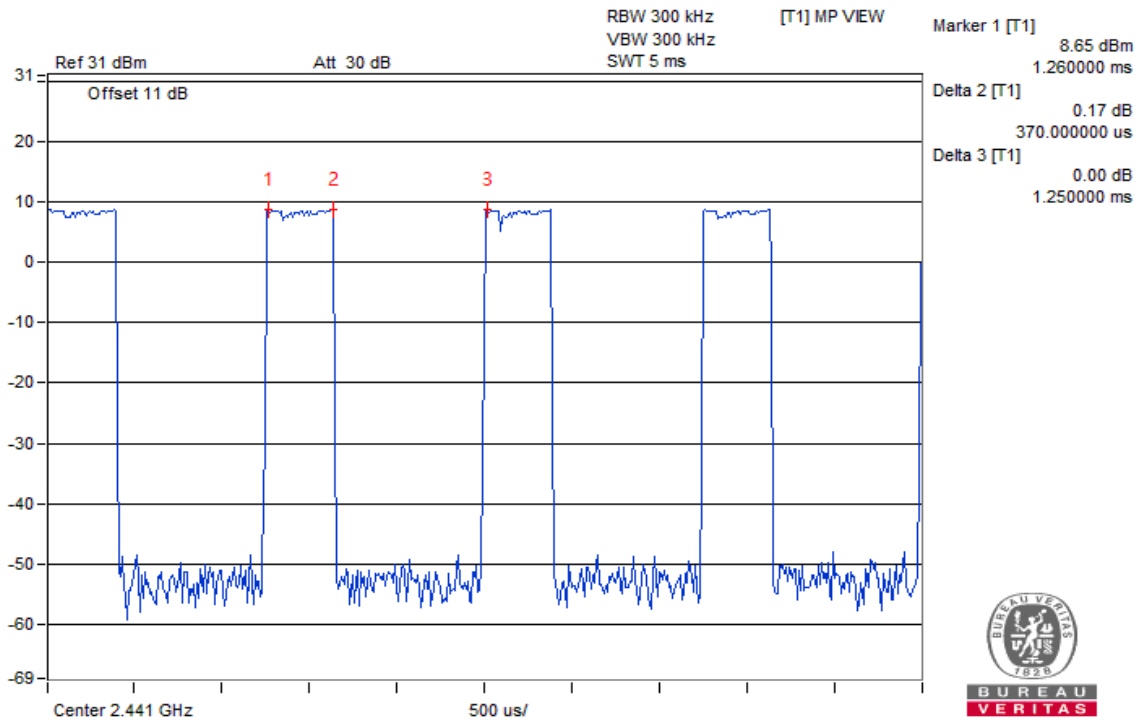
Normal Mode:

Test Condition	Mode	Spreading Rate	[Spreading Rate/79]*0.4	Duty Cycle	Result (msec)	Limit (msec)
Vnormal	DH1	71.80	0.363	0.296	107.448	400
	DH3	71.80	0.363	0.650	235.950	400
	DH5	71.80	0.363	0.768	278.784	400

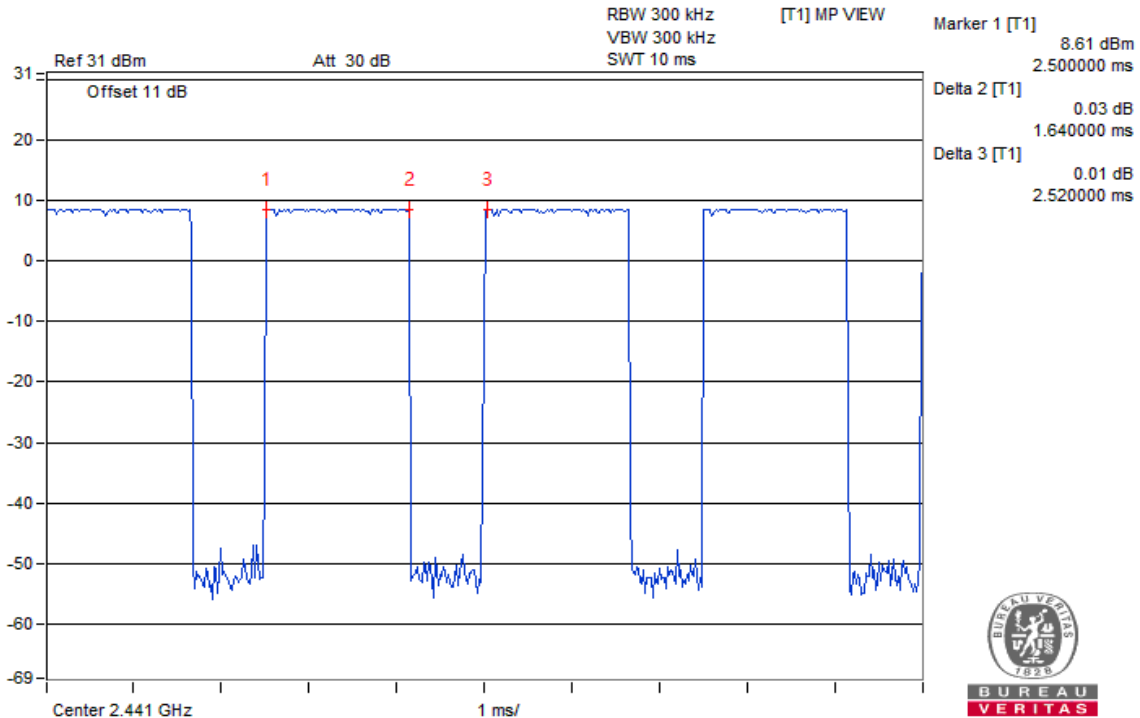
AFH Mode:

Test Condition	Mode	Spreading Rate	[Spreading Rate/20]*0.4	Duty Cycle	Result (msec)	Limit (msec)
Vnormal	DH1	17.90	0.358	0.296	105.968	400
	DH3	17.90	0.358	0.650	232.700	400
	DH5	17.90	0.358	0.768	274.944	400

## Vnormal

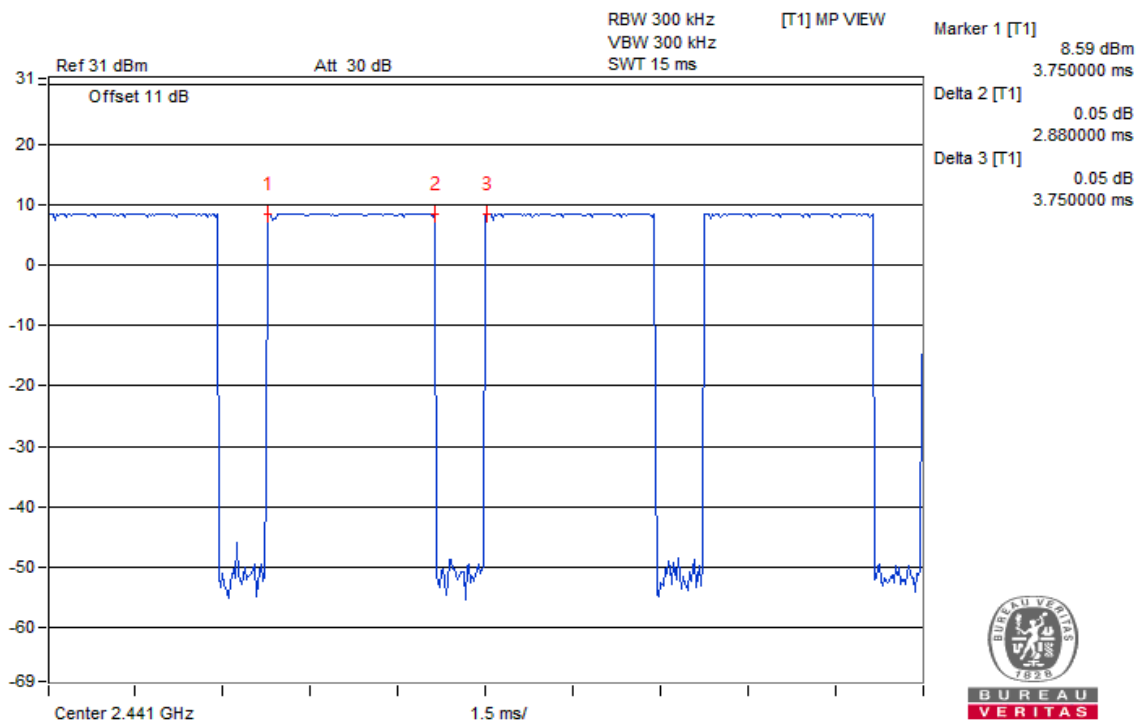


## DH1



## DH3

## Vnormal



DH5

Modulation:  $\pi/4$ -DQPSK

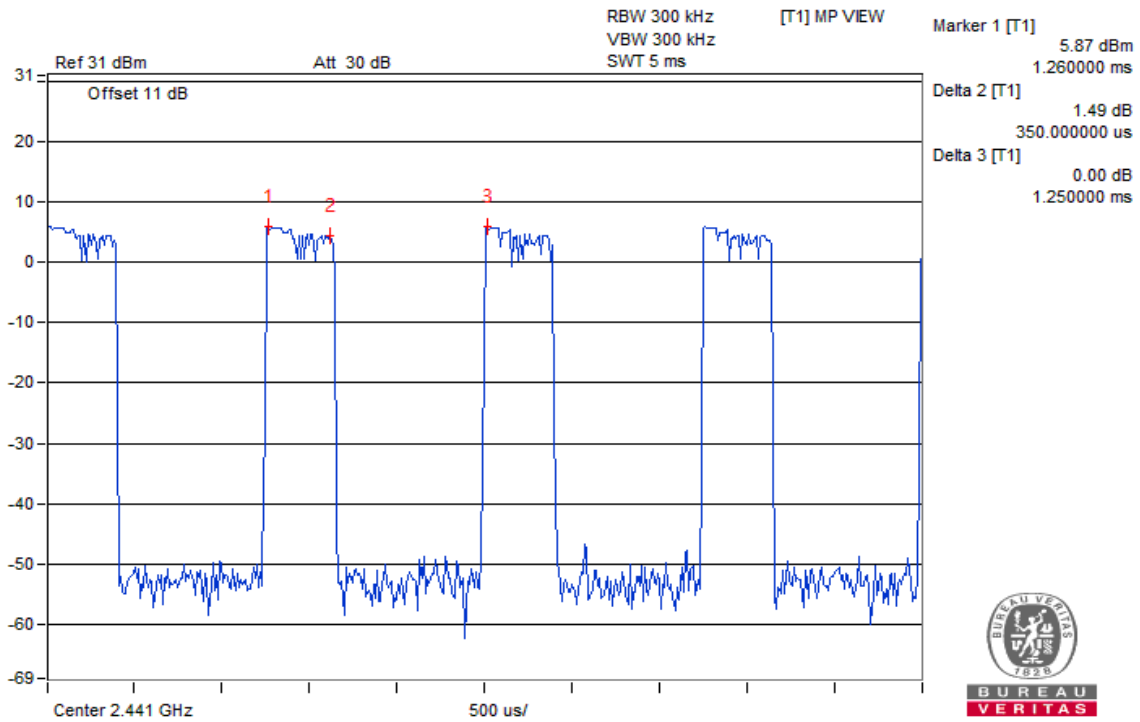
Normal Mode:

Test Condition	Mode	Spreading Rate	[Spreading Rate/79]*0.4	Duty Cycle	Result (msec)	Limit (msec)
Vnormal	2DH1	73.00	0.369	0.280	103.320	400
	2DH3	73.00	0.369	0.650	239.850	400
	2DH5	73.00	0.369	0.740	273.060	400

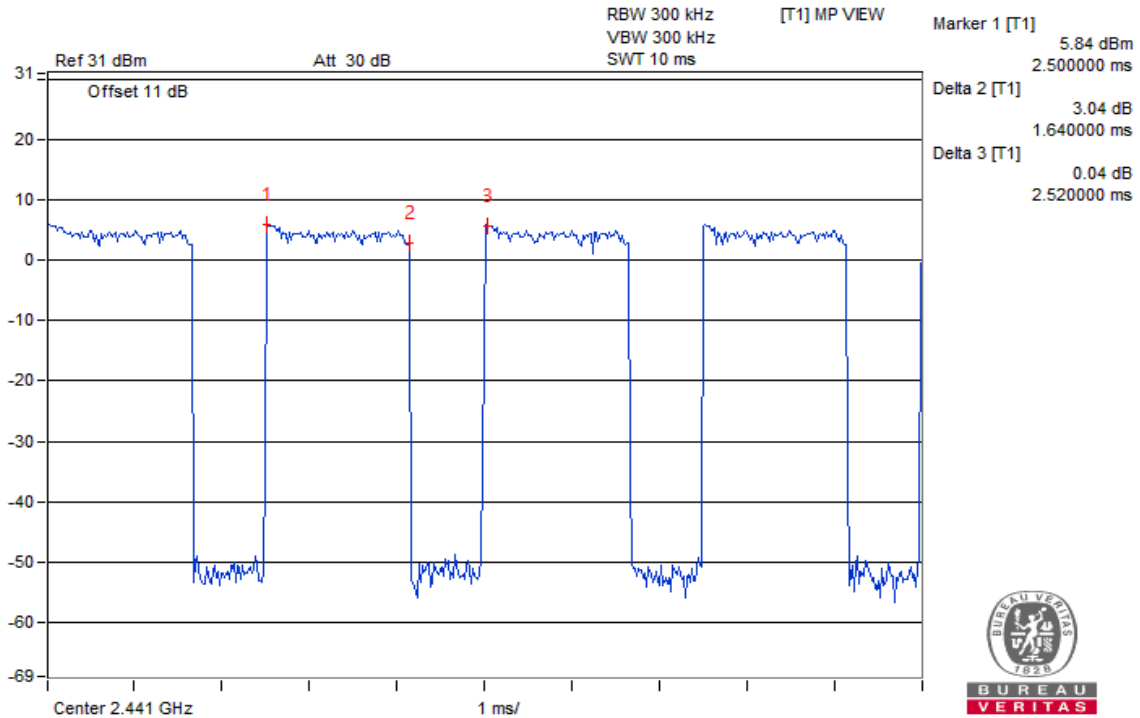
AFH Mode:

Test Condition	Mode	Spreading Rate	[Spreading Rate/20]*0.4	Duty Cycle	Result (msec)	Limit (msec)
Vnormal	2DH1	18.00	0.360	0.280	100.800	400
	2DH3	18.00	0.360	0.650	234.000	400
	2DH5	18.00	0.360	0.740	266.400	400

## Vnormal

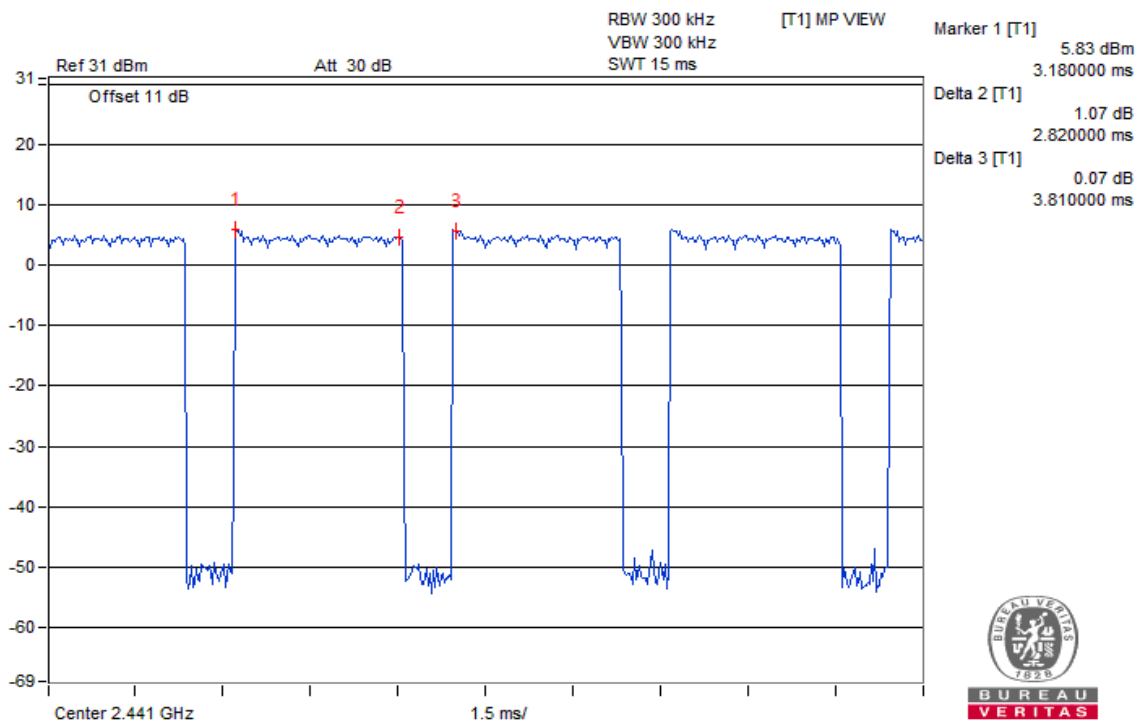


## 2DH1



## 2DH3

## Vnormal



2DH5

**Modulation: 8DPSK**

**Normal Mode:**

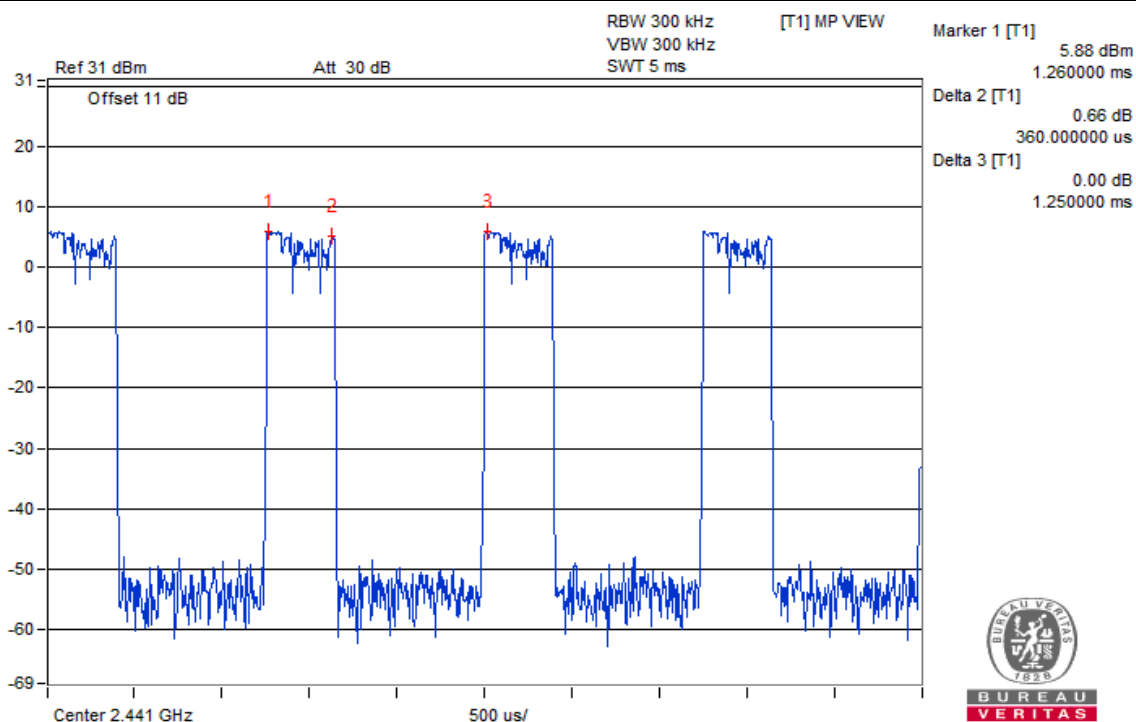
Test Condition	Mode	Spreading Rate	[Spreading Rate/79]*0.4	Duty Cycle	Result (msec)	Limit (msec)
<b>Vnormal</b>	3DH1	72.20	0.365	0.288	105.120	400
	3DH3	72.20	0.365	0.652	237.980	400
	3DH5	72.20	0.365	0.764	278.860	400

**AFH Mode:**

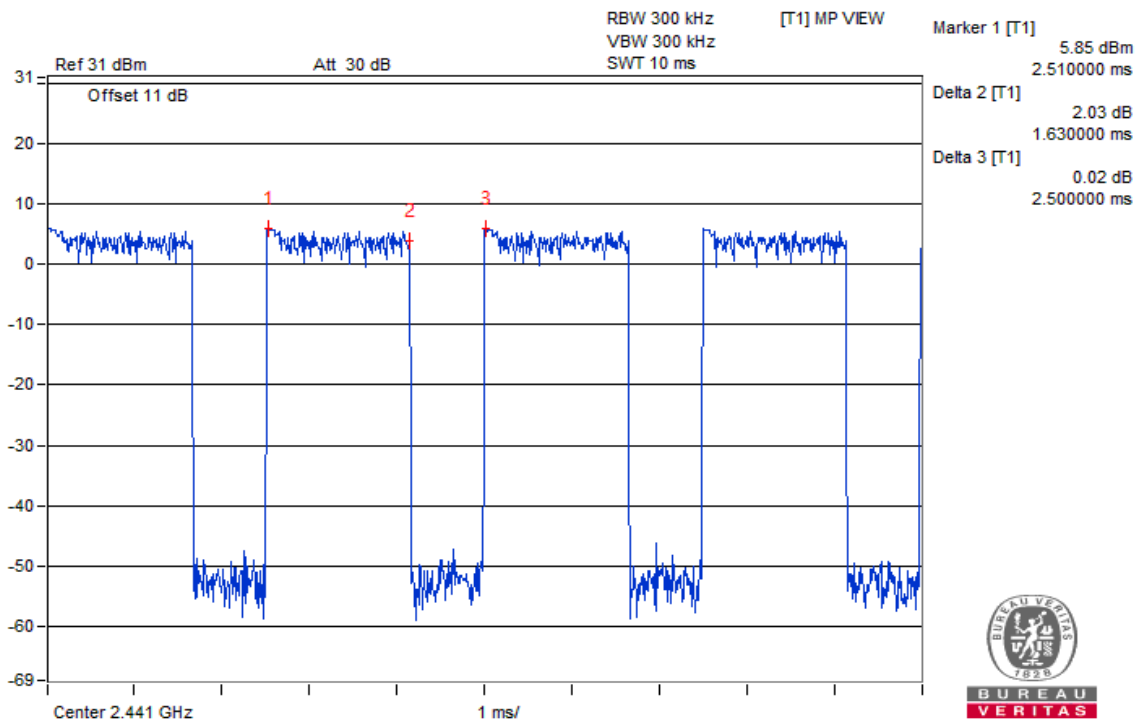
Test Condition	Mode	Spreading Rate	[Spreading Rate/20]*0.4	Duty Cycle	Result (msec)	Limit (msec)
<b>Vnormal</b>	3DH1	18.05	0.361	0.288	103.968	400
	3DH3	18.05	0.361	0.652	235.372	400
	3DH5	18.05	0.361	0.764	275.804	400



## Vnormal

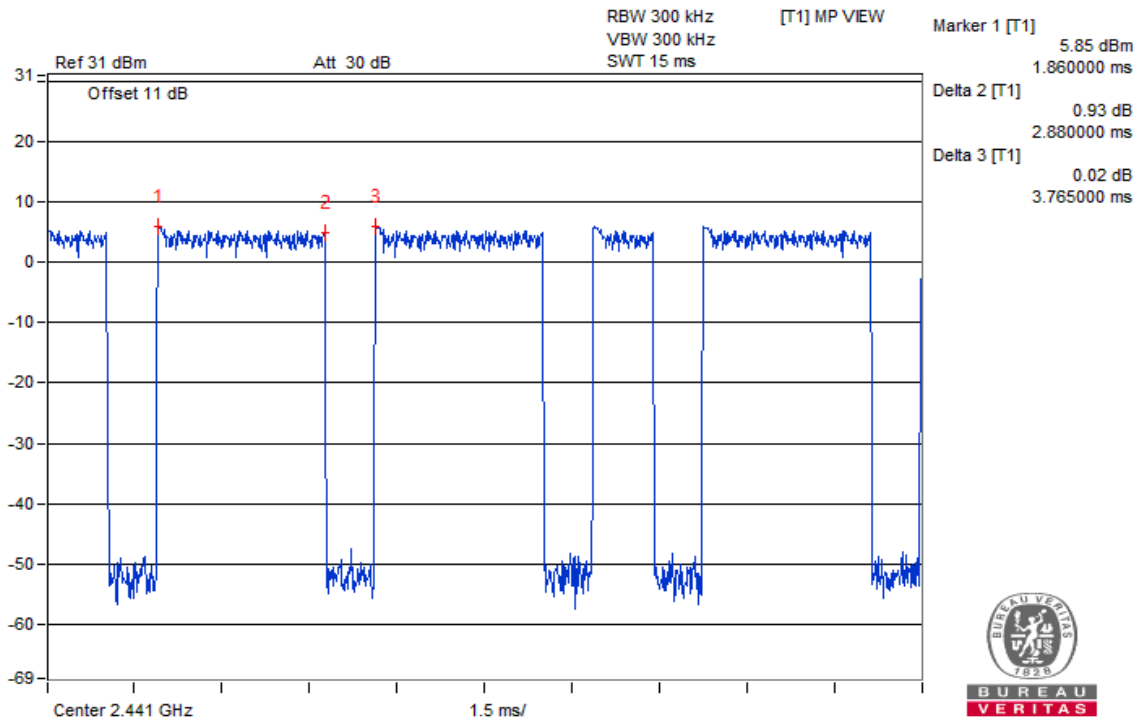


## 3DH1



## 3DH3

## Vnormal



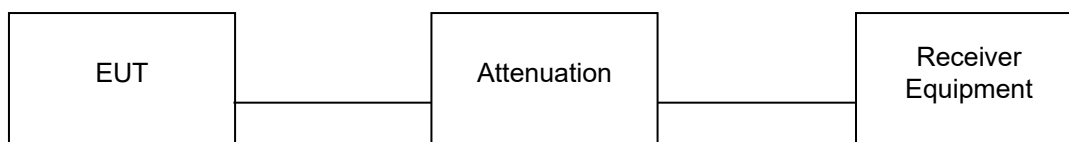
3DH5

## 4.8 Interference Prevention Function

### 4.8.1 Limits of Interference Prevention Function

Radio equipment used mainly on the same premises and automatically transmits or receives identification code.

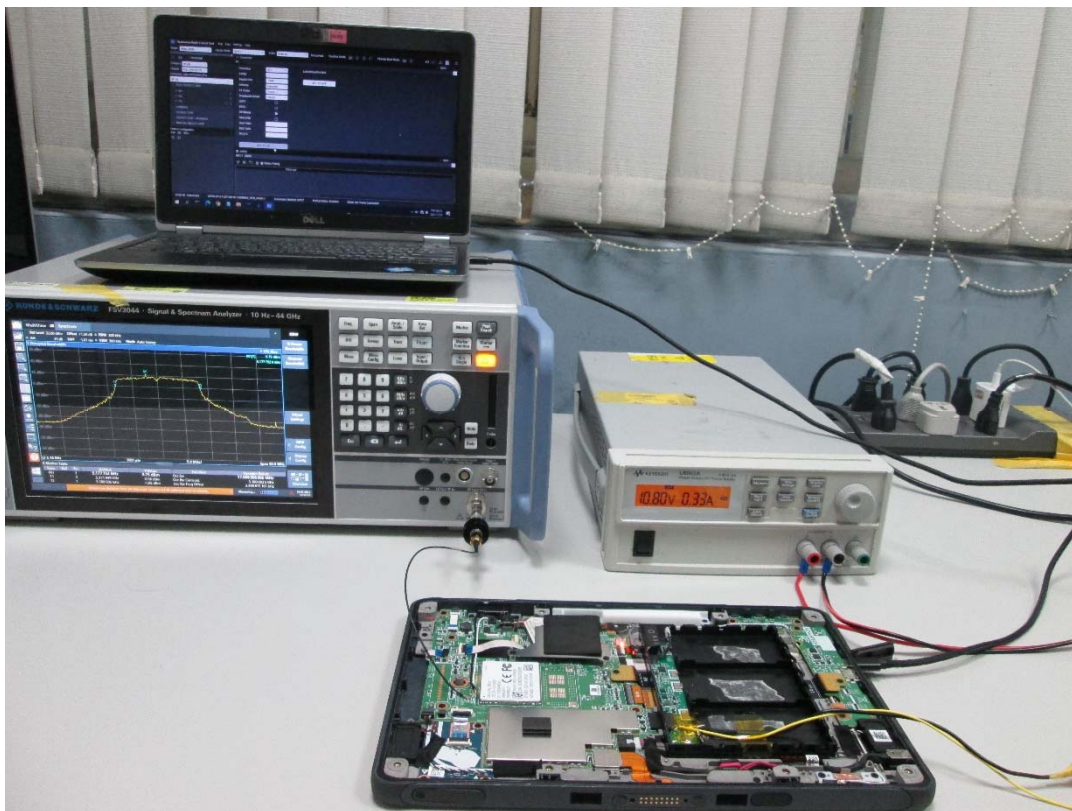
### 4.8.2 Test Setup



### 4.8.3 Test Results

<b>Environmental Conditions</b>	25 deg.C, 60% RH
<b>Link Mode</b>	<b>Test Result</b>
Bluetooth EDR	Pass

## 5 Photographs of the Test Configuration



## Appendix - Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

### Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

### Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

### Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

--- END ---