

Radio Test Report (BT QHS)

Report No.: RJBAYG-WTW-P22030448-5

Test Model: 911R

Received Date: 2022/3/14

Test Date: 2022/5/17

Issued Date: 2022/6/1

Applicant: Bose Corporation

Address: 100 The Mountain Road Framingham Massachusetts 01701-9168 United States

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

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Release Control Record

Issue No.	Description	Date Issued
RJBAYG-WTW-P22030448-5	Original release.	2022/6/1

1 Certificate of Conformity

Product: Wireless Headphone

Brand: BOSE

Test Model: 911R

Sample Status: Engineering sample

Applicant: Bose Corporation

Test Date: 2022/5/17

Standards: ARIB STD-T66 (V3.7), MIC notice 88 Appendix 43
Certification Ordinance Article 2-1-19

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 : Annie Chang, **Date:** 2022/6/1
Annie Chang / Senior Specialist

Approved by : Jeremy Lin, **Date:** 2022/6/1
Jeremy Lin / Project Engineer

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)
General Provisions				
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
Transmitting Equipment				
F	3.2 (2)	4.5	Antenna power	C
--	--	--	SAR	NA
Transmitting Antenna				
--	--	3.4	Type, configuration, etc. of transmitting antenna	C
--	--	3.5	Direction pattern of transmitting antenna	C
Receiving Equipment				
G	3.3 (1)	4.6	Spurious emissions of receiver	C
--	--	3.5	Refer to all articles for transmitting antenna	C
Operating Frequency 2400 to 2483.5MHz				
--	3.7 (1)	3.4	High Frequency/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)	C
--	3.4.1(1)	4.8	Interference Prevention Function	C
--	3.4.1(3)	--	Carrier Sense Capability	NA
Note: 1. C = Conform NC = Not Conform NT = Not Tested NA = Not Applicable 2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.				

2.1 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Cal. Method
MIMO Power measurement Test set (4X4) KEYSIGHT	U2021XA	U2021XA_001	2021/6/16	2022/6/15	ETC	c)
Spectrum Analyzer R&S	FSV40	101042	2021/9/9	2022/9/8	ETC	c)
Spectrum Analyzer KEYSIGHT	N9030A	MY54490260	2021/7/23	2022/7/22	ETC	c)
Pulse Power Sensor Anritsu	MA2411B	1207333	2022/1/9	2023/1/8	ETC	c)
Peak Power meter Anritsu	ML2495A	1232003	2022/1/9	2023/1/8	ETC	c)
MXG Vector Signal Generator KEYSIGHT	N5182B	MY53052658	2021/5/19	2022/5/18	ETC	c)
True RMS Clamp Meter Fluke	325	31130711WS	2021/6/2	2022/6/1	ETC	c)
AC POWER SOURCE Schaffner	Proflin2105-208NSG1007	55616	2021/6/2	2022/6/1	ETC	c)
Programmable DC Power Supply (IDRC)	DSP80-180WE	701217	2022/3/3	2023/3/2	ETC	c)

NOTE: Calibration Method

- a) : Calibration conducted by the National Institute of Information and Communications Technology(NICT) or a designated calibration agency under Article 102-18 paragraph (1) of the Radio Law.
- b) : Calibration conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) Japan Calibration Service System.
- c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
- d) : Calibration conducted by using other equipment that listed above from a) to c)

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	3.508dB
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	Wireless Headphone
Brand	BOSE
Test Model	911R
Status of EUT	Engineering sample
Nominal Voltage	3.85Vdc, 110mAh
Modulation Type	$\pi/4$ QPSK (HSL2, HSL3), $\pi/4$ DQPSK (HSL4), 8PSK (HSL5), D8PSK (HSL6)
Modulation Technology	FHSS
Transfer Rate	2 ~ 6Mbps
Operating Frequency	2404 ~ 2478MHz
Number of Channel	38
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	LDS antenna with 1.01dBi gain
Antenna Connector	N/A
Accessory Device	Charging Case
Data Cable Supplied	Shielded USB Type C cable (0.3m)

Note:

1. The power table as below:

Modulation Type	Rated power (mW/MHz)	Total Conducted RF output power density (mW/MHz)	Radiated RF output power density (mW/MHz)
Normal mode	0.3	0.253995	0.320498
AFH mode	2	1.188598	1.499806

2. 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 above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

38 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460		
10	2422	20	2442	30	2462		

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.

By means of test software (Blue Test 3 V3.3.13.1423) provided by manufacture, the power levels during the tests were set according to the following codes:

Bluetooth LE

Modulation type: $\pi/4$ QPSK		Modulation type: D8PSK	
Channel	Power setting	Channel	Power setting
1	7	1	7
19	7	19	7
38	7	38	7

3.3 Test Conditions

Test Conditions		Voltage (Vdc)
V_{normal}	-	3.85
$V_{max.}$	+10%	4.235
$V_{min.}$	-10%	3.465

Test modes are presented in the report as below:

Test Item	Environmental Conditions
Frequency Tolerance	25 deg.C, 76% RH
Occupied Bandwidth	25 deg.C, 76% RH
Spreading Bandwidth	25 deg.C, 76% RH
Spurious Emissions for Transmitter	25 deg.C, 76% RH
Antenna Power	25 deg.C, 76% RH
Spurious Emissions for Receiver	25 deg.C, 76% RH
Dwell Time	25 deg.C, 76% RH
Interference Prevention Function	25 deg.C, 76% RH

3.4 Assembly

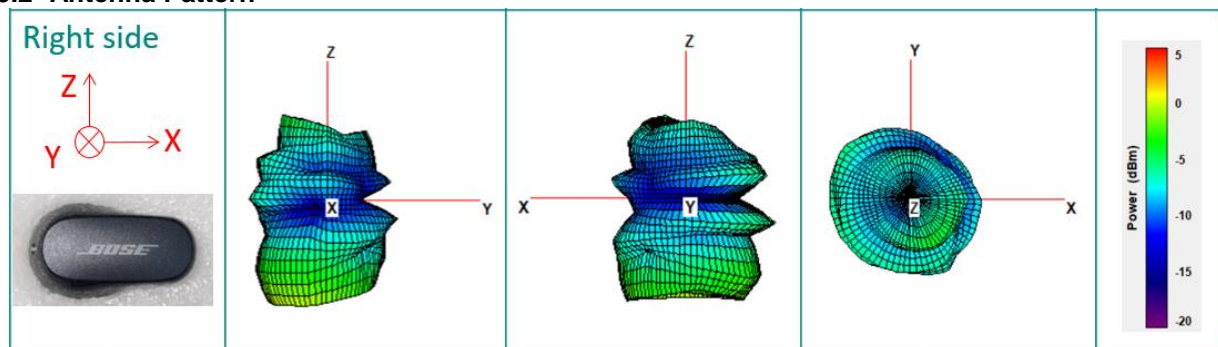
The EUT use ultrasonic welding to seal the product. Separating the two parts (i.e operating of the housing) was only possible by means of brute force.

3.5 Antenna Specifications

3.5.1 Antenna Gain

Antenna Type	Max. Gain (dBi)
LDS antenna	1.01

3.5.2 Antenna Pattern



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: $\pi/4$ QPSK

Channel	Frequency (MHz)	V_{normal}		$V_{max.}$		$V_{min.}$	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
1	2404	2403.992852	-2.973	2403.992120	-3.277	2403.991585	-3.500
19	2440	2439.991423	-3.515	2439.991350	-3.545	2439.991287	-3.570
38	2478	2477.991105	-3.589	2477.991162	-3.566	2477.991155	-3.569

Modulation: D8PSK

Channel	Frequency (MHz)	V_{normal}		$V_{max.}$		$V_{min.}$	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
1	2404	2403.994728	-2.193	2403.993155	-2.847	2403.992355	-3.180
19	2440	2439.991929	-3.307	2439.991803	-3.359	2439.991457	-3.501
38	2478	2477.991460	-3.446	2477.991498	-3.430	2477.991448	-3.451

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



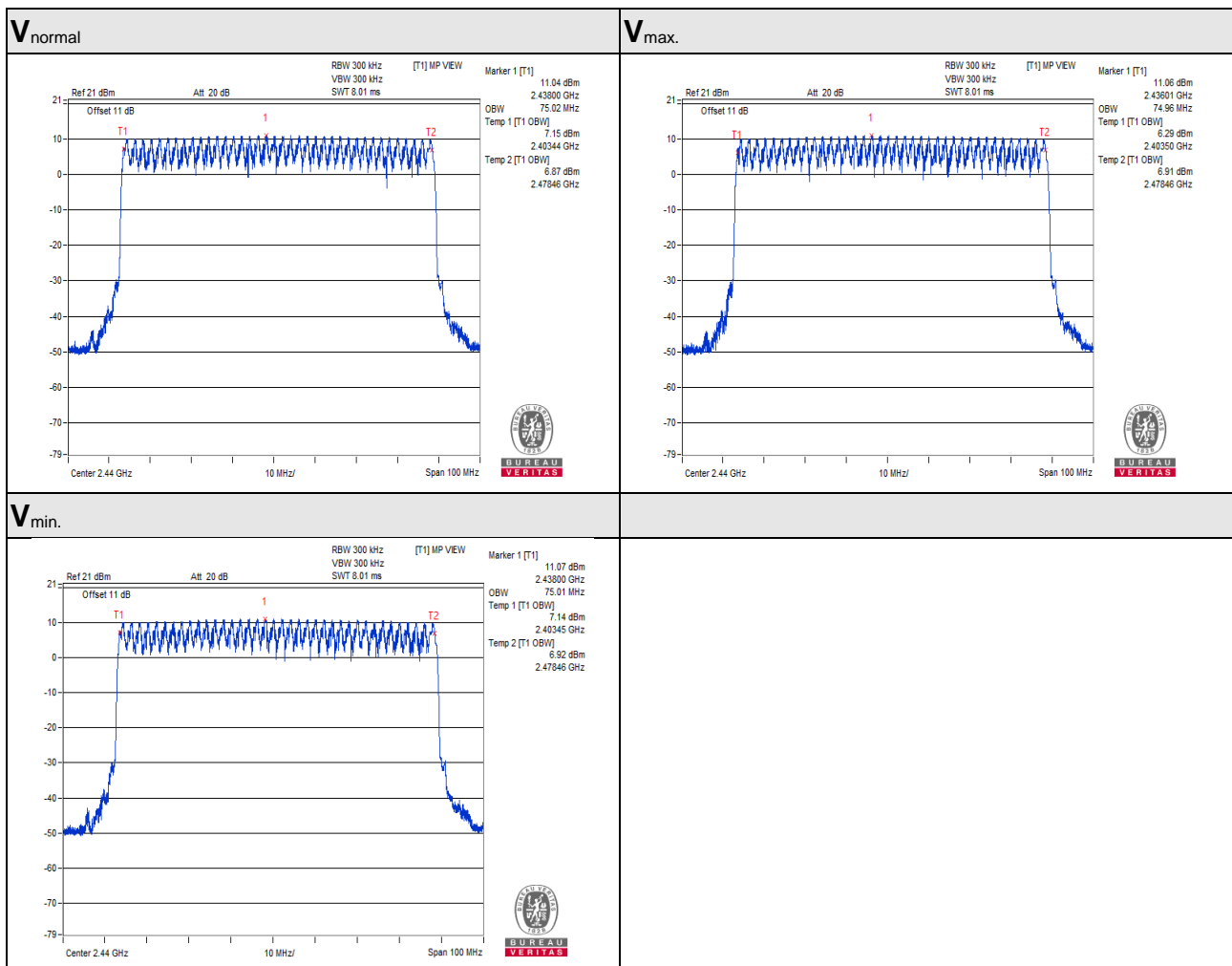
4.2.3 Test Results

Modulation: $\pi/4$ QPSK

Normal Mode:

V_{normal}	$V_{\text{max.}}$	$V_{\text{min.}}$
Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
75.02	74.96	75.01

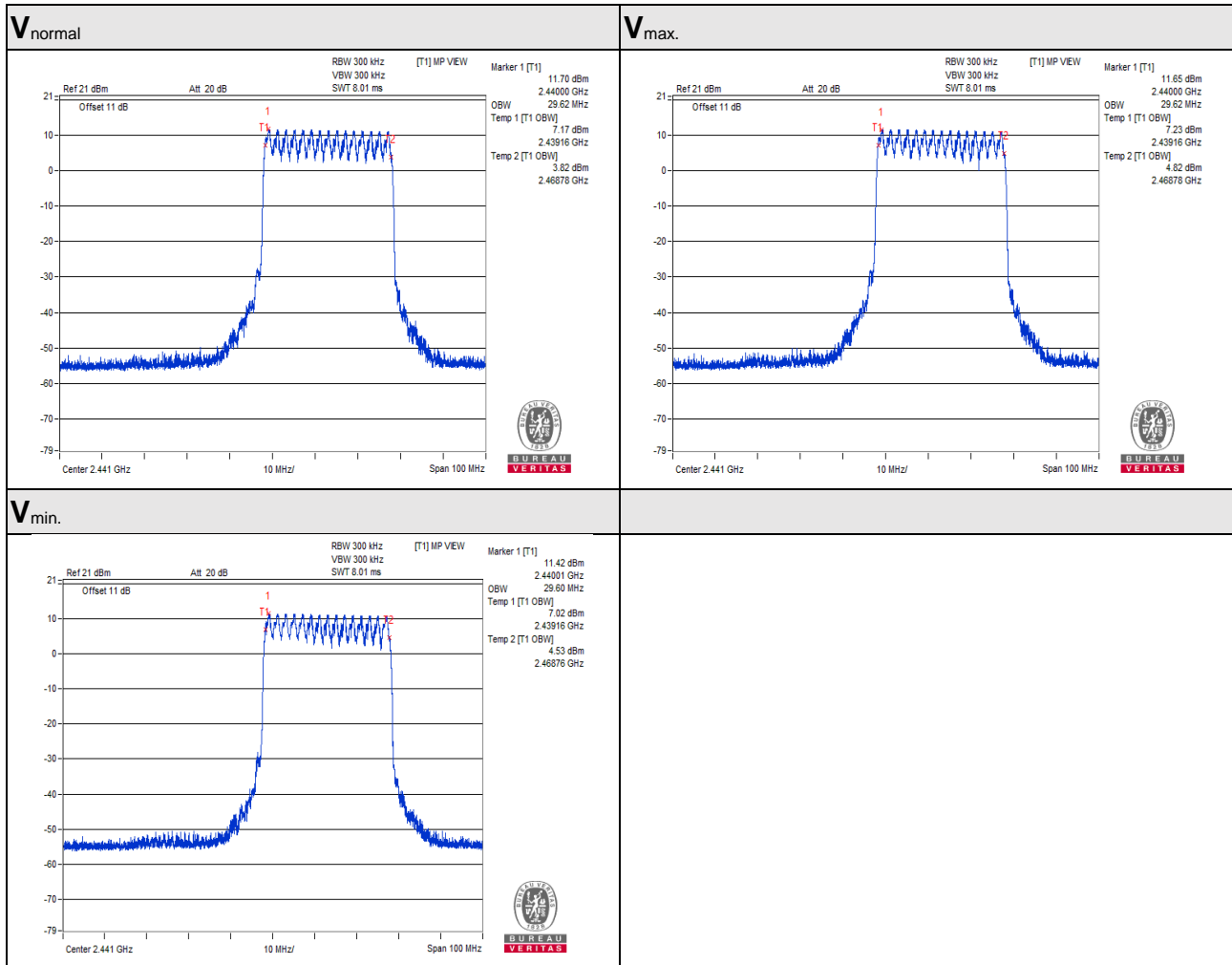
NOTE: For the test plots please refer to the below pages.



AFH Mode:

V_{normal}	$V_{max.}$	$V_{min.}$
Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
29.62	29.62	29.60

NOTE: For the test plots please refer to the below pages.

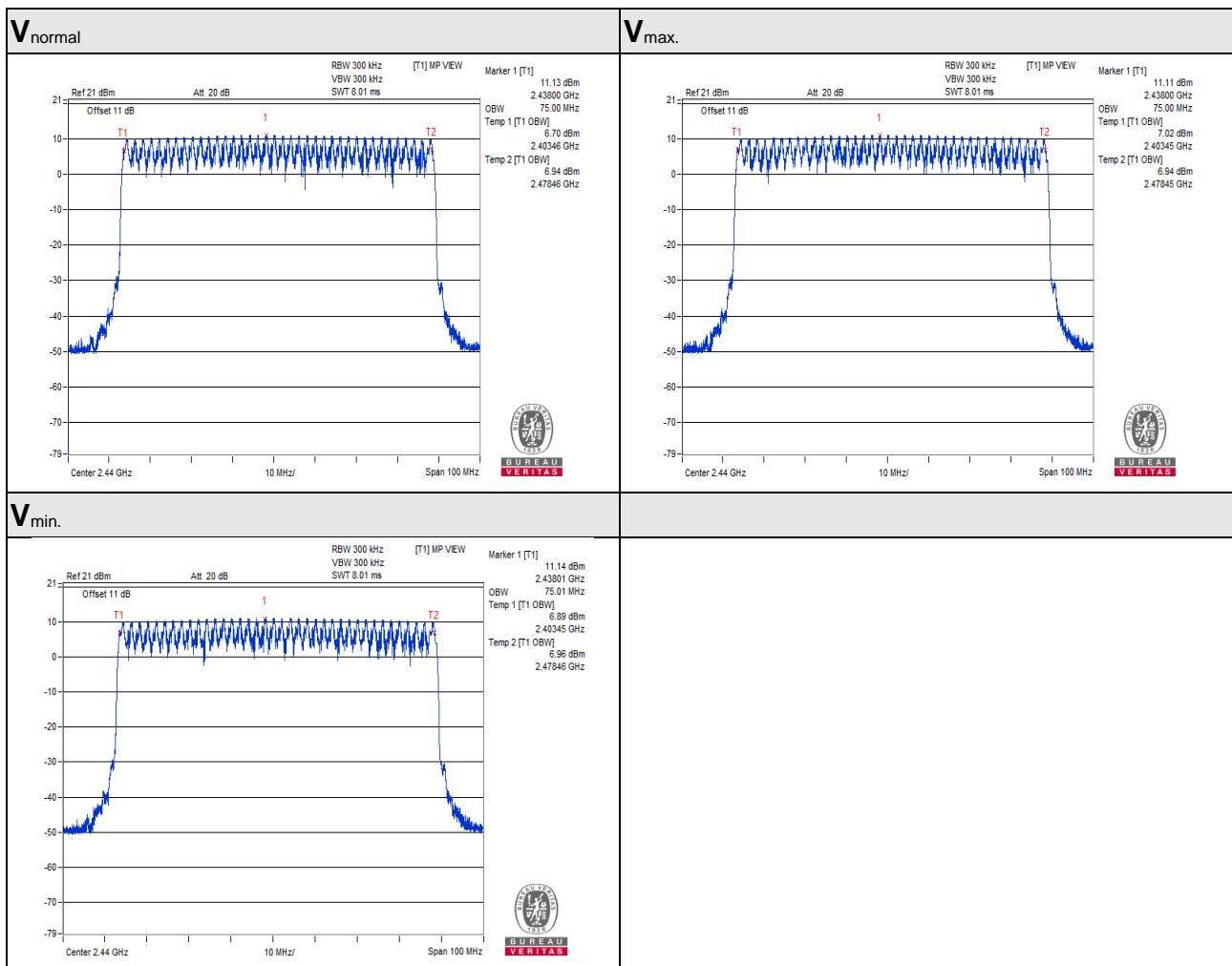


Modulation: D8PSK

Normal Mode:

V_{normal}	$V_{\text{max.}}$	$V_{\text{min.}}$
Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
75.00	75.00	75.01

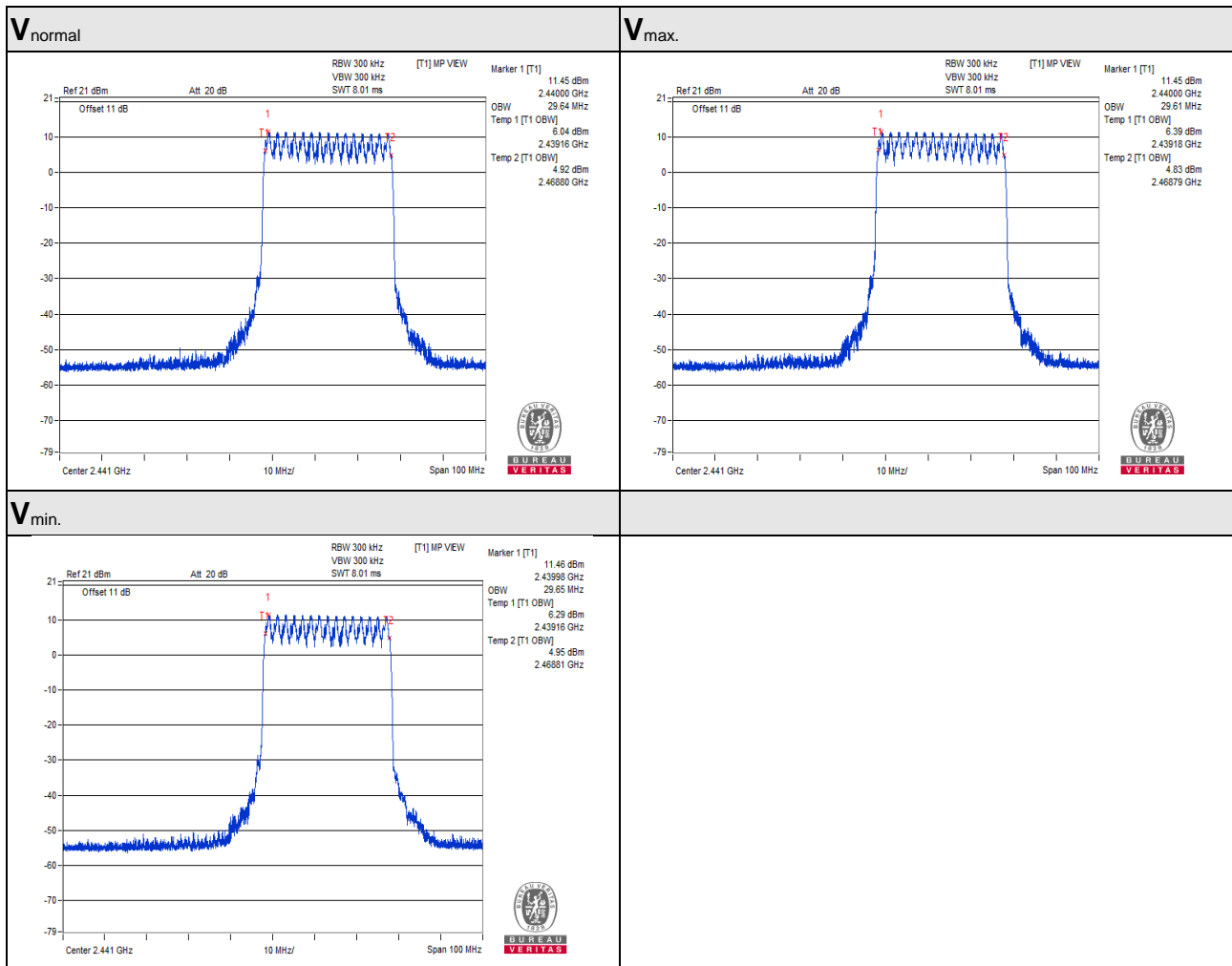
NOTE: For the test plots please refer to the below pages.



AFH Mode:

V_{normal}	$V_{max.}$	$V_{min.}$
Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
29.64	29.61	29.65

NOTE: For the test plots please refer to the below pages.



4.3 Spreading Bandwidth Measurement (90% power bandwidth)

4.3.1 Limits of Spreading Bandwidth and Spreading Factor Measurement

Item	Limit	Remark
Spreading Bandwidth	$\geq 500\text{kHz}$	(For DSSS, FHSS)
Spreading Factor	≥ 5	Operating frequency 2400 to 2483.5MHz

4.3.2 Test Setup



4.3.3 Test Results

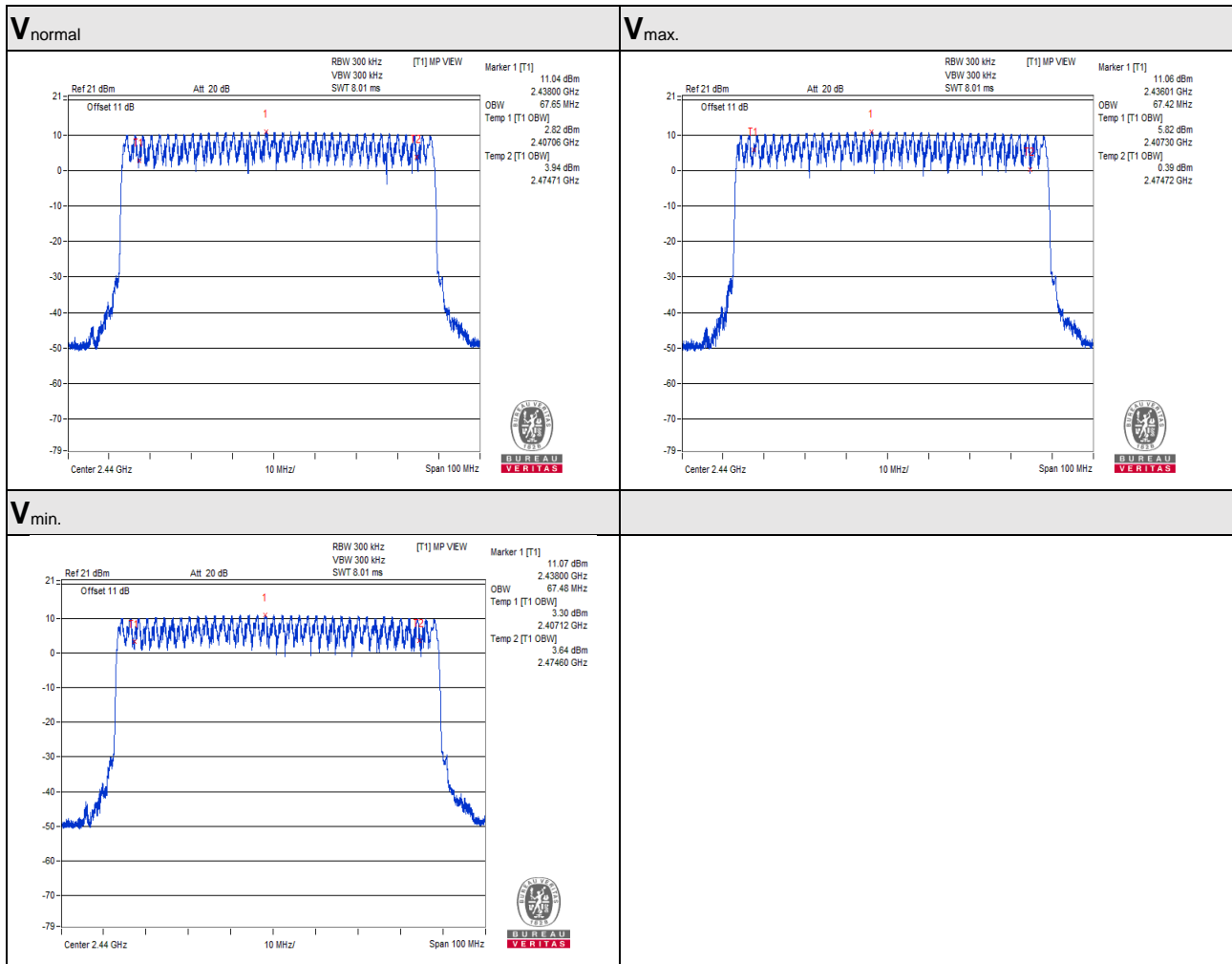
Modulation: $\pi/4$ QPSK

Normal Mode:

V_{normal}		$V_{max.}$		$V_{min.}$	
Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor
67.65	33.83	67.42	33.71	67.48	33.74

NOTE: For the test plots please refer to the below pages.

Spreading Factor: 90% channel power bandwidth / 2

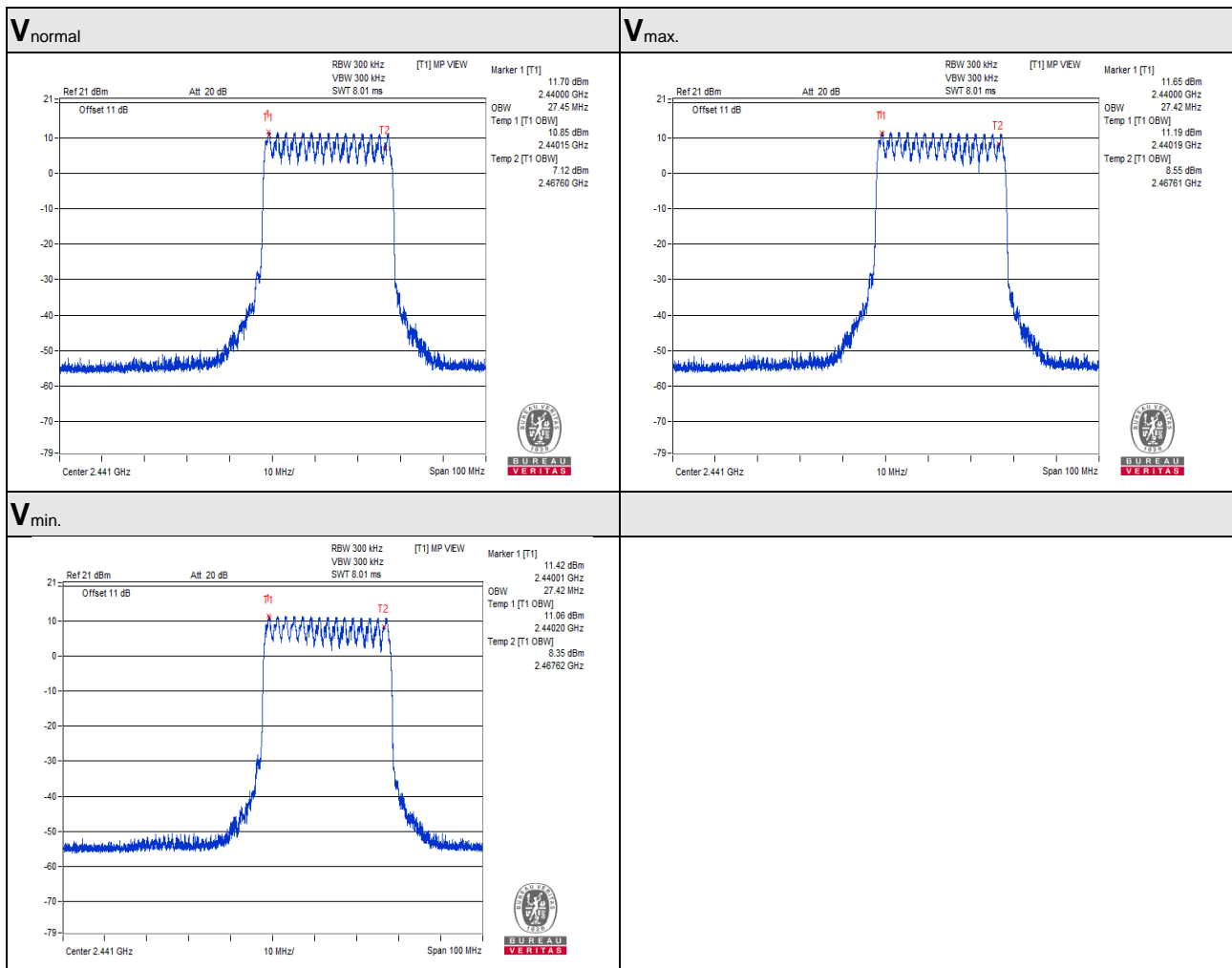


AFH Mode:

V _{normal}		V _{max.}		V _{min.}	
Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor
27.45	13.73	27.42	13.71	27.42	13.71

NOTE: For the test plots please refer to the below pages.

Spreading Factor: 90% channel power bandwidth / 2



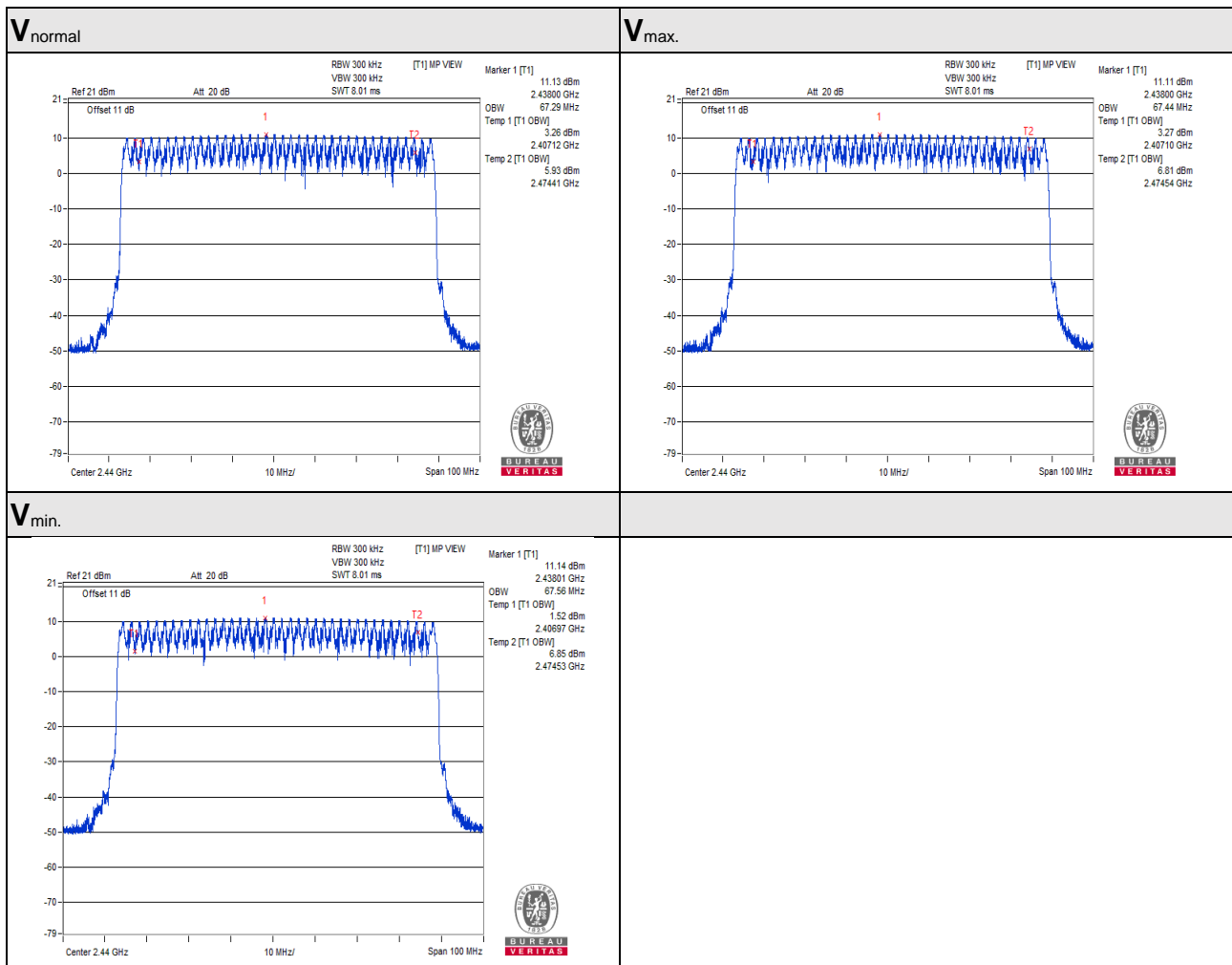
Modulation: D8PSK

Normal Mode:

V _{normal}		V _{max.}		V _{min.}	
Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor
67.29	33.65	67.44	33.72	67.56	33.78

NOTE: For the test plots please refer to the below pages.

Spreading Factor: 90% channel power bandwidth / 2

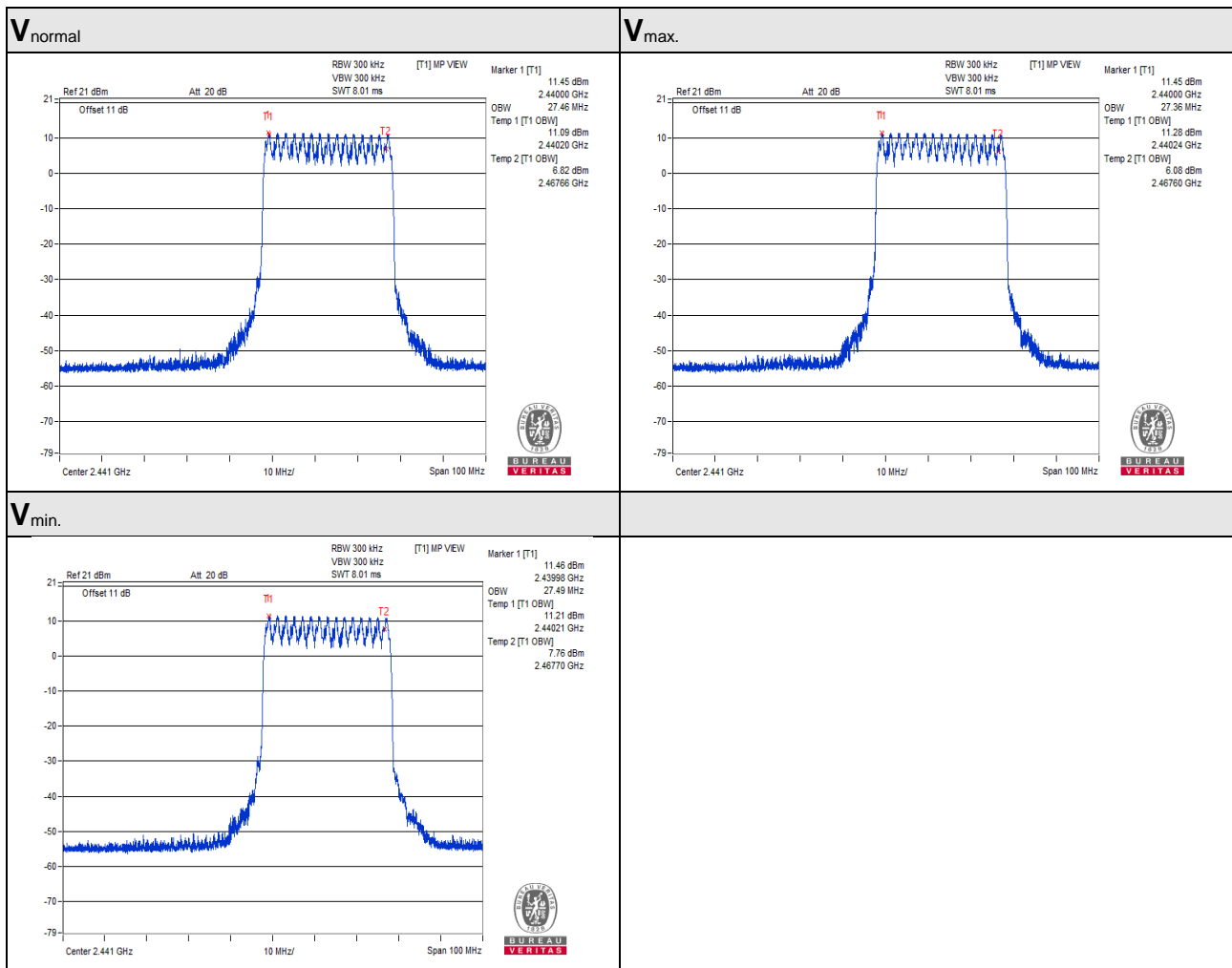


AFH Mode:

V _{normal}		V _{max.}		V _{min.}	
Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor
27.46	13.73	27.36	13.68	27.49	13.75

NOTE: For the test plots please refer to the below pages.

Spreading Factor: 90% channel power bandwidth / 2



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	$\leq 0.25 \text{ uW/100kHz}$
1000.0MHz to 2387MHz	$\leq 2.5 \text{ uW/MHz}$
2387.0MHz to 2400.0MHz	$\leq 25 \text{ uW/MHz}$
2483.5MHz to 2496.5MHz	$\leq 25 \text{ uW/MHz}$
2496.5MHz to 12500.0MHz	$\leq 2.5 \text{ uW/MHz}$

4.4.2 Test Setup



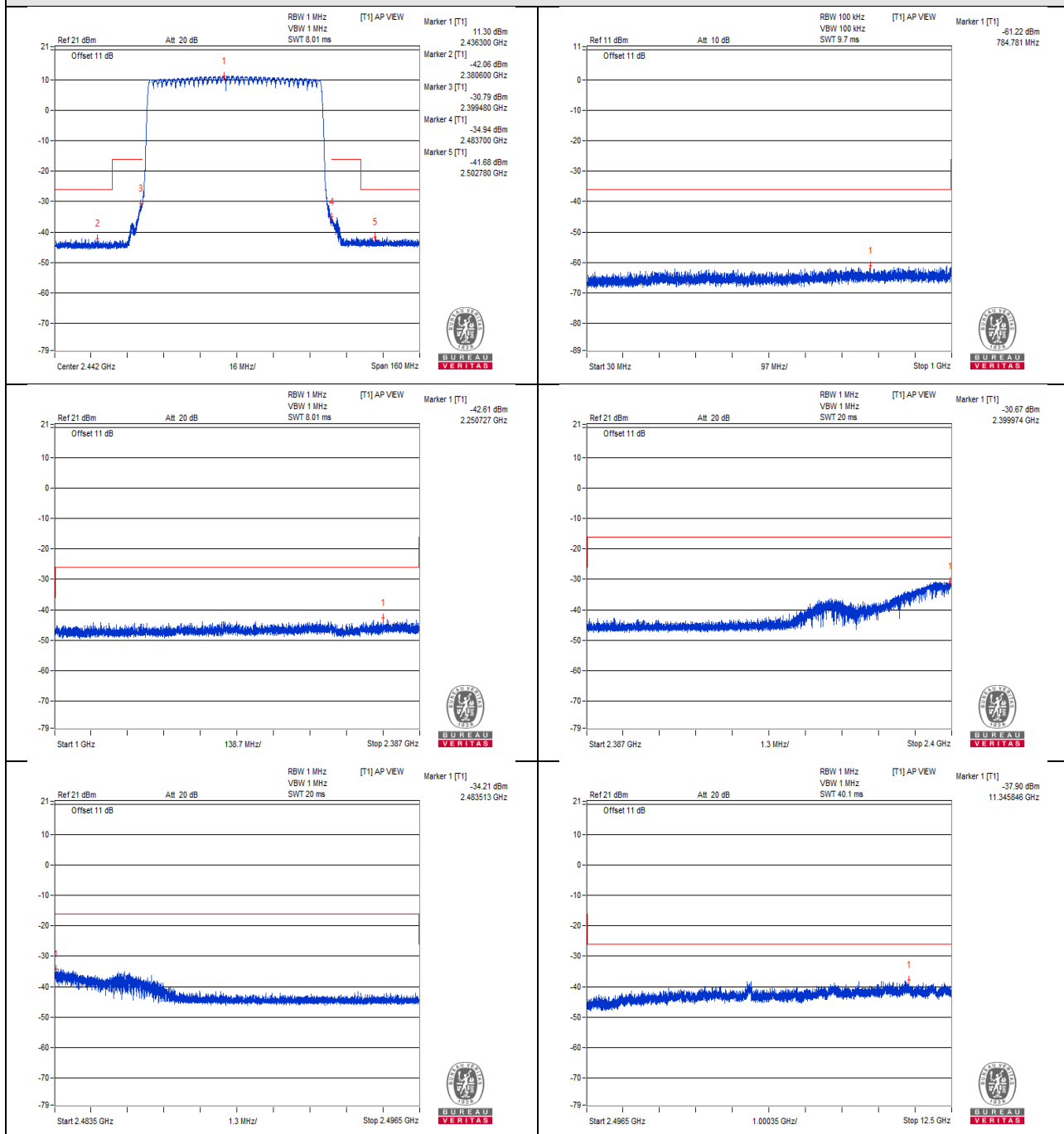
4.4.3 Test Results

Modulation: $\pi/4$ QPSK

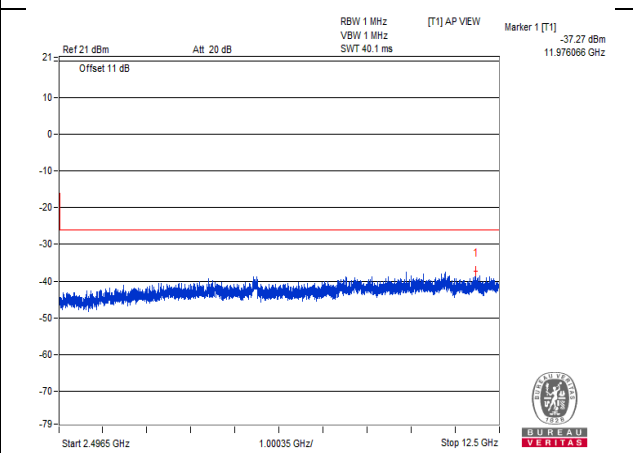
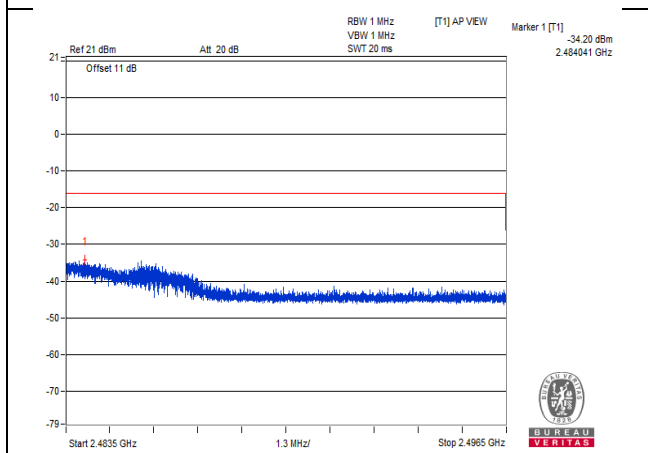
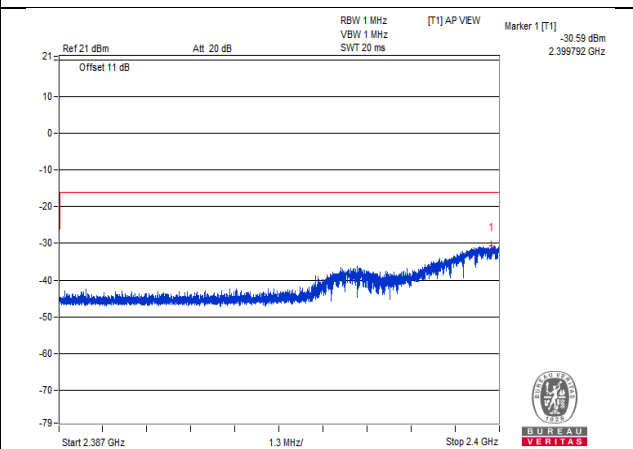
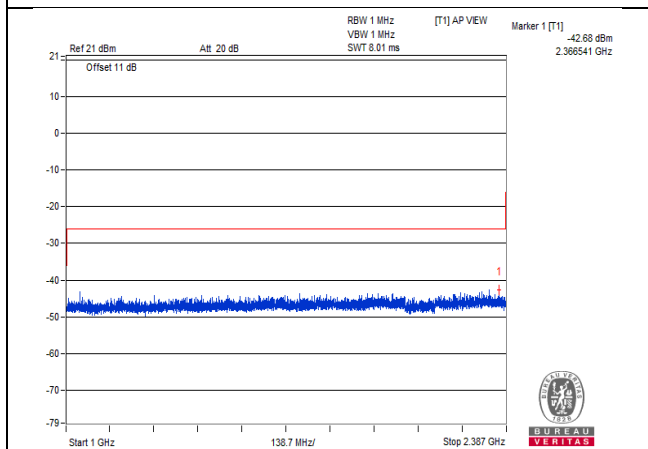
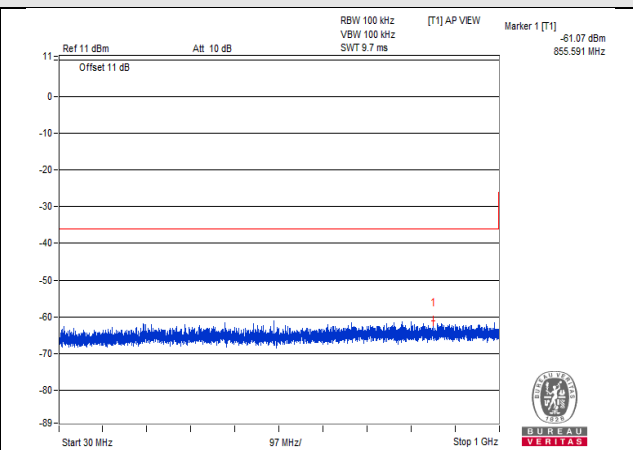
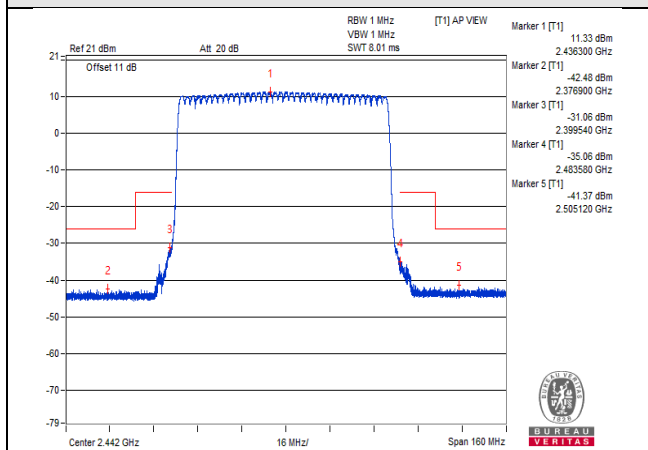
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(μ W)	LIMIT (μ W)	RESULT
V_{normal}	30MHz to 1000MHz	784.781	0.000755	0.25	PASS
	1000MHz to 2387MHz	2250.727	0.054828	2.5	PASS
	2387MHz to 2400MHz	2399.974	0.857038	25	PASS
	2483.5MHz to 2496.5MHz	2483.513	0.379315	25	PASS
	2496.5MHz to 12500MHz	11345.846	0.162181	2.5	PASS
V_{max.}	30MHz to 1000MHz	855.591	0.000782	0.25	PASS
	1000MHz to 2387MHz	2366.541	0.053951	2.5	PASS
	2387MHz to 2400MHz	2399.792	0.872971	25	PASS
	2483.5MHz to 2496.5MHz	2484.041	0.380189	25	PASS
	2496.5MHz to 12500MHz	11976.066	0.187499	2.5	PASS
V_{min.}	30MHz to 1000MHz	848.680	0.000942	0.25	PASS
	1000MHz to 2387MHz	2350.591	0.049774	2.5	PASS
	2387MHz to 2400MHz	2399.442	0.909913	25	PASS
	2483.5MHz to 2496.5MHz	2483.542	0.345939	25	PASS
	2496.5MHz to 12500MHz	6948.057	0.148936	2.5	PASS

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

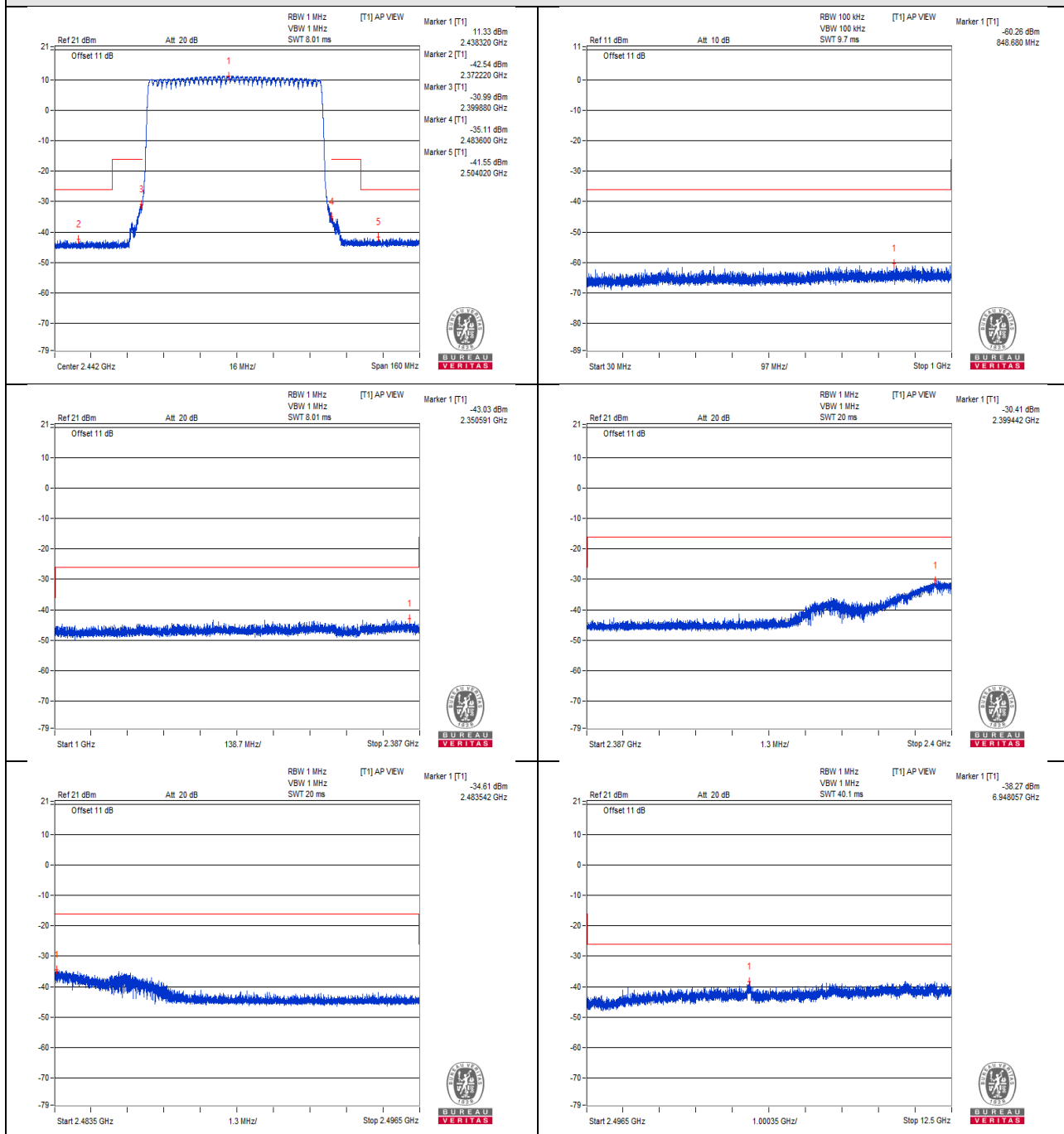
Vnormal



V_{max}.



V_{min}.

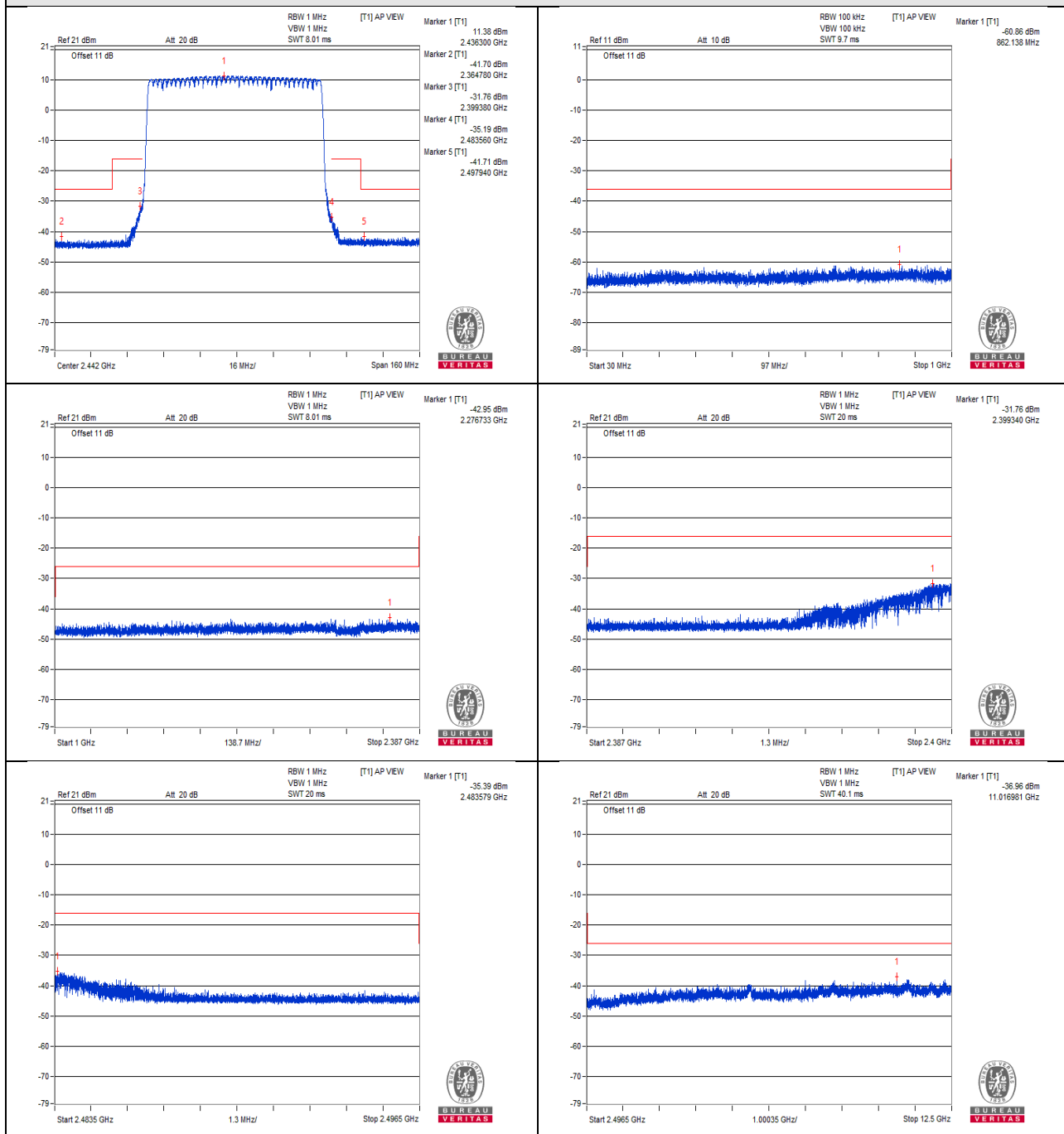


Modulation: D8PSK

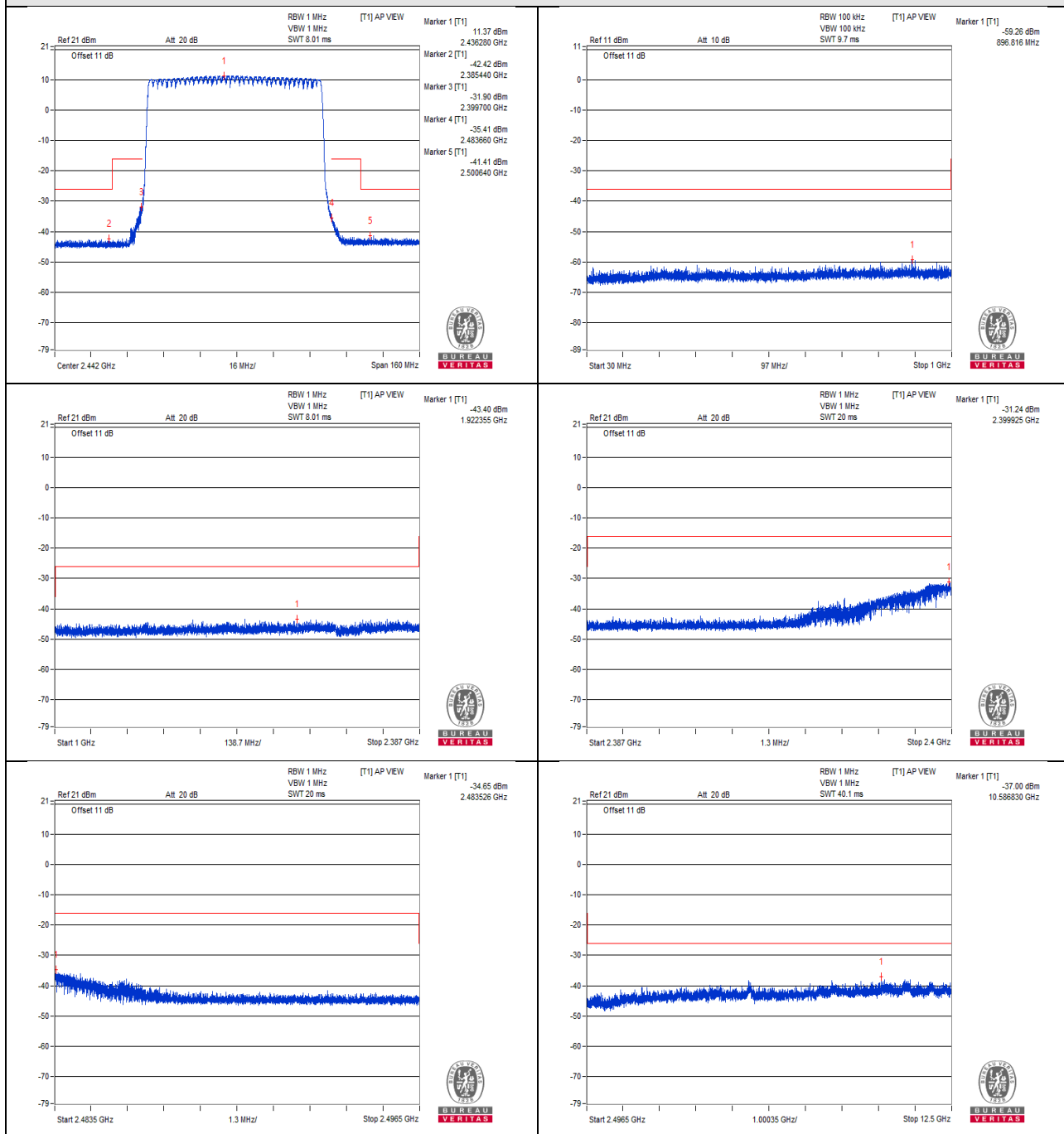
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(μ W)	LIMIT (μ W)	RESULT
V_{normal}	30MHz to 1000MHz	903.485	0.002506	0.25	PASS
	1000MHz to 2387MHz	2276.733	0.050699	2.5	PASS
	2387MHz to 2400MHz	2399.340	0.666807	25	PASS
	2483.5MHz to 2496.5MHz	2483.579	0.289068	25	PASS
	2496.5MHz to 12500MHz	11016.981	0.201372	2.5	PASS
V_{max.}	30MHz to 1000MHz	896.816	0.001186	0.25	PASS
	1000MHz to 2387MHz	1922.355	0.045709	2.5	PASS
	2387MHz to 2400MHz	2399.925	0.751623	25	PASS
	2483.5MHz to 2496.5MHz	2483.526	0.342768	25	PASS
	2496.5MHz to 12500MHz	10586.830	0.199526	2.5	PASS
V_{min.}	30MHz to 1000MHz	999.393	0.000883	0.25	PASS
	1000MHz to 2387MHz	1810.874	0.044875	2.5	PASS
	2387MHz to 2400MHz	2399.338	0.796159	25	PASS
	2483.5MHz to 2496.5MHz	2483.621	0.328852	25	PASS
	2496.5MHz to 12500MHz	12014.830	0.171791	2.5	PASS

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

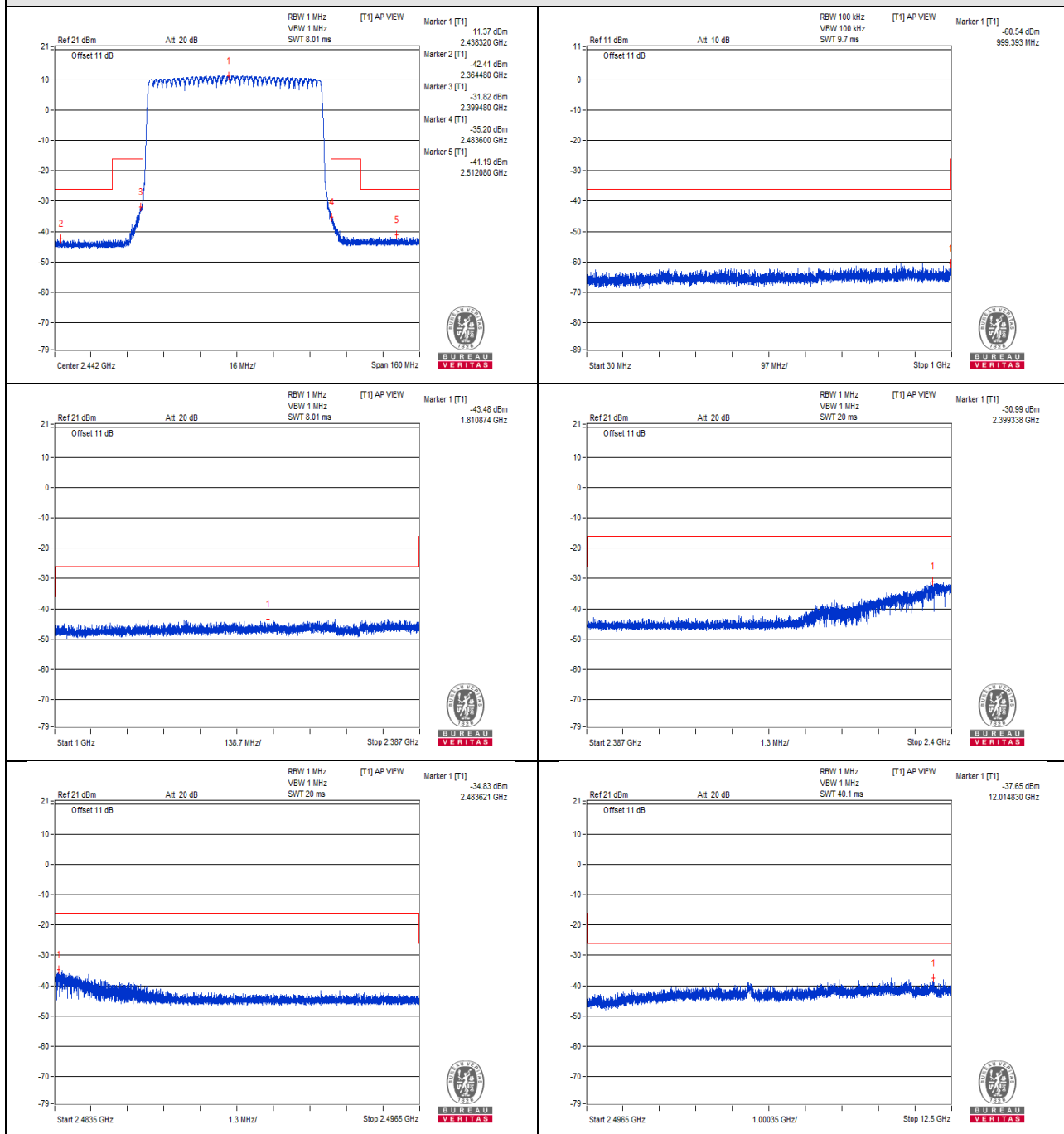
Vnormal



V_{max}.



V_{min}.



4.5 Antenna Power Measurement

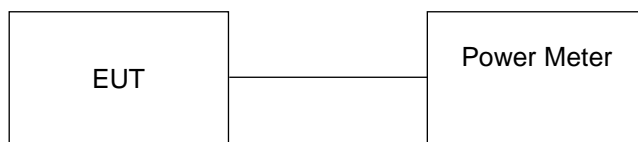
4.5.1 Limits of Antenna Power

Modulation System	Frequency Band Used	Antenna Power (Max.)	EIRP Limit (Note 3)
DS	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 1)	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 2)	2400 – 2483.5 MHz	5 mW/MHz	9.13 dBm/MHz ~ 19.13 dBm/MHz (8.185 mW/MHz ~ 81.846 mW/MHz)
FH	2400 – 2483.5 MHz	3 mW/MHz	6.91 dBm/MHz ~ 16.91 dBm/MHz (4.91 mW/MHz ~ 49.09 mW/MHz)

Note:

1. Occupied bandwidth is less than 26MHz
2. Occupied bandwidth is more than 26MHz and less than 40MHz
3. EIRP limit is variable by the HPBA, the HPBA (half-power beam width) of the antenna shall be 360/A degrees or less, where A = EIRP/(2.14 dBi + "Antenna Power (limit)).
4. Tolerance of antenna power shall be +20% (upper value) and -80% (lower value).

4.5.2 Test Setup



Output Power Density (mW/MHz) = Total Output Power (mW) / Spread Bandwidth (MHz)

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.5.3 Test Results

Normal Mode:

Voltage	Modulation	Data Rate	Conducted RF Output Power Density (mW/MHz)	Radiated RF Output Power Density (mW/MHz)
V_{normal}	$\pi/4$ QPSK	2Mbps	0.245689	0.310017
	D8PSK	6Mbps	0.240662	0.303674
$V_{max.}$	$\pi/4$ QPSK	2Mbps	0.250663	0.316293
	D8PSK	6Mbps	0.246065	0.310492
$V_{min.}$	$\pi/4$ QPSK	2Mbps	0.246038	0.310458
	D8PSK	6Mbps	0.253995	0.320498
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 1.01dBi.
 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	Modulation	Data Rate	Conducted RF Output Power Density (mW/MHz)	Radiated RF Output Power Density (mW/MHz)
V_{normal}	$\pi/4$ QPSK	2Mbps	1.156204	1.45893
	D8PSK	6Mbps	1.13772	1.435606
$V_{max.}$	$\pi/4$ QPSK	2Mbps	1.178516	1.487084
	D8PSK	6Mbps	1.15064	1.451909
$V_{min.}$	$\pi/4$ QPSK	2Mbps	1.159674	1.463309
	D8PSK	6Mbps	1.188598	1.499806
Max. Limit (mW/MHz)			3	-
Rated Power (mW/MHz)			2	-
Tolerance of Antenna Power (mW/MHz)			0.4 ~ 2.4	-
Max. EIRP Limit (mW/MHz)			-	4.91

- Note: 1. Antenna gain is 1.01dBi.
 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

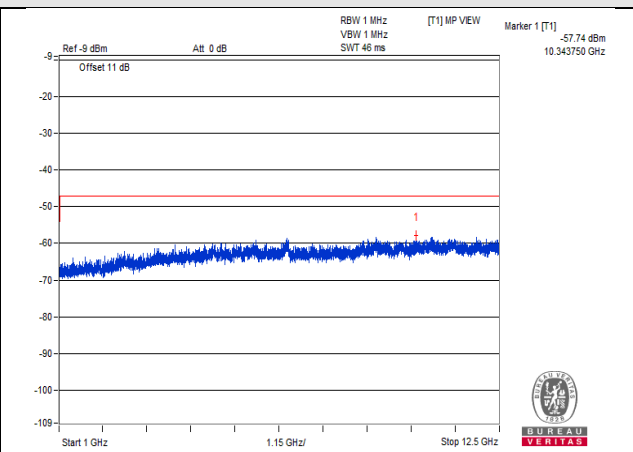
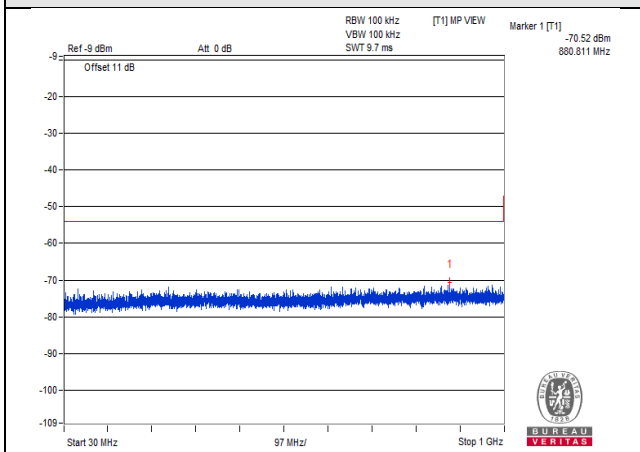


4.6.3 Test Result

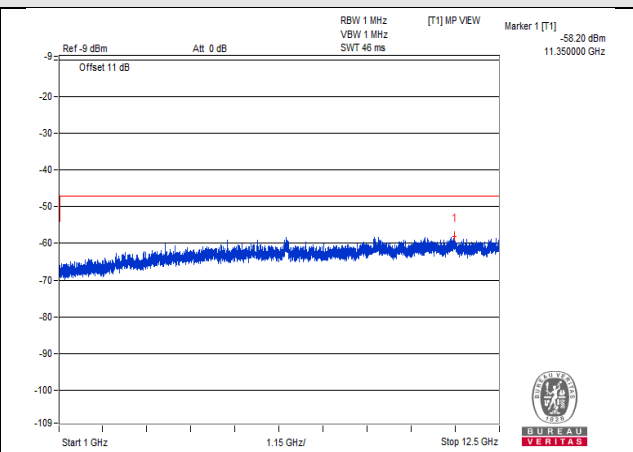
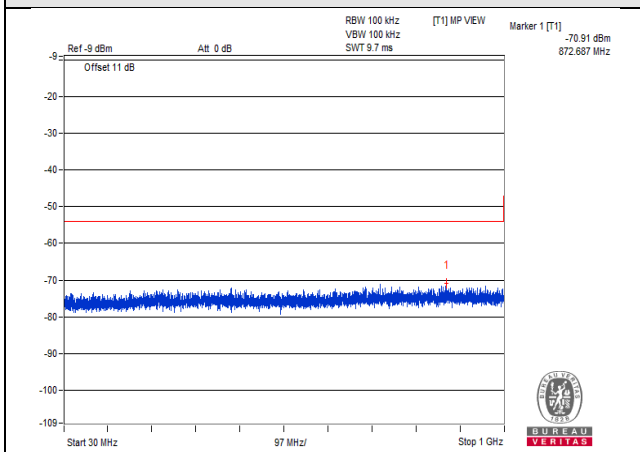
Modulation: $\pi/4$ QPSK

TEST CHANNEL		CH 1 (2404MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(nW)	LIMIT (nW)	RESULT
V_{normal}	30MHz to 1000MHz	880.811	0.088716	4.0	PASS
	1000MHz to 12500MHz	10343.750	1.682674	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	872.687	0.081096	4.0	PASS
	1000MHz to 12500MHz	11350.000	1.513561	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	725.853	0.073114	4.0	PASS
	1000MHz to 12500MHz	11998.312	1.541700	20.0	PASS
TEST CHANNEL		CH 19 (2440MHz)			
V_{normal}	30MHz to 1000MHz	993.816	0.075336	4.0	PASS
	1000MHz to 12500MHz	11269.500	1.883649	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	847.103	0.072946	4.0	PASS
	1000MHz to 12500MHz	11952.312	1.870682	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	692.752	0.076736	4.0	PASS
	1000MHz to 12500MHz	11329.875	2.243882	20.0	PASS
TEST CHANNEL		CH 38 (2478MHz)			
V_{normal}	30MHz to 1000MHz	885.540	0.086497	4.0	PASS
	1000MHz to 12500MHz	11972.437	1.870682	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	676.990	0.075162	4.0	PASS
	1000MHz to 12500MHz	11200.500	1.753881	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	898.635	0.071779	4.0	PASS
	1000MHz to 12500MHz	11948.000	1.823896	20.0	PASS

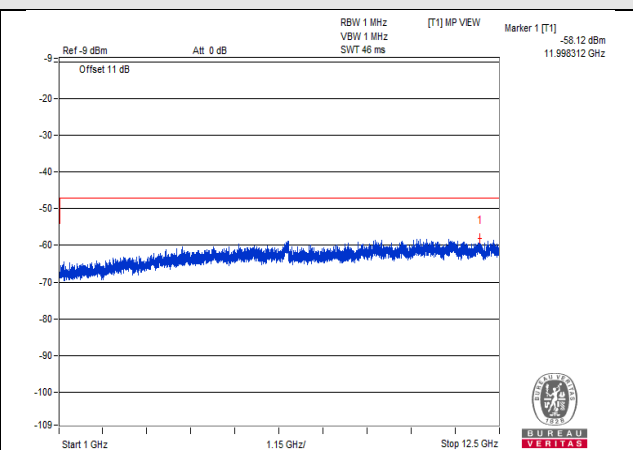
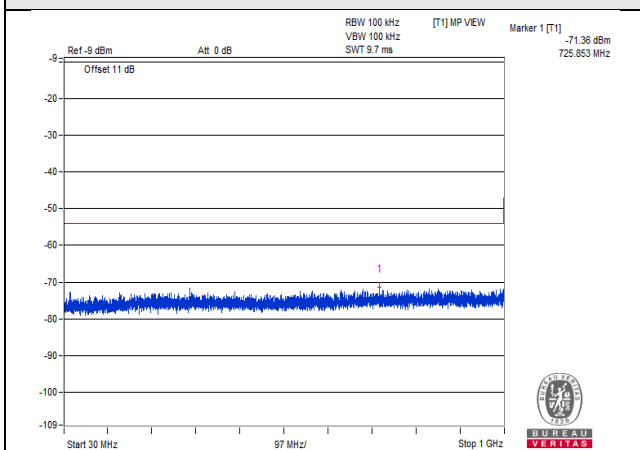
V_{normal}



V_{max.}

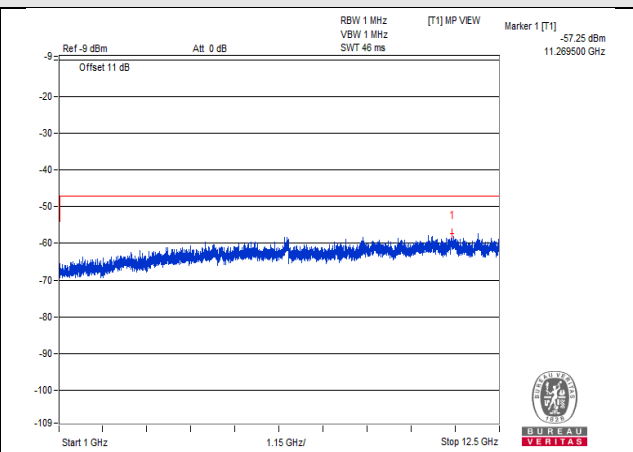
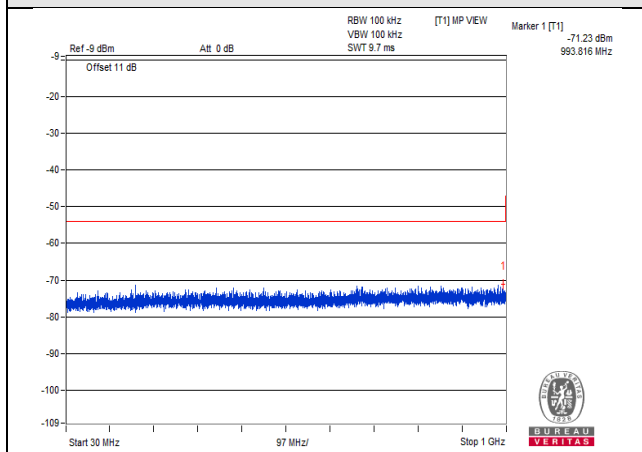


V_{min.}

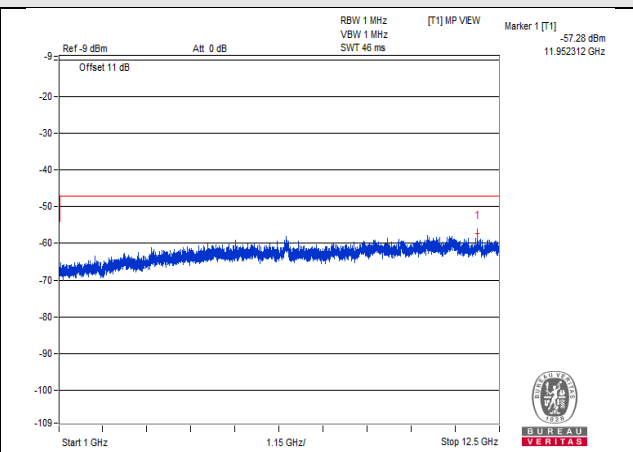
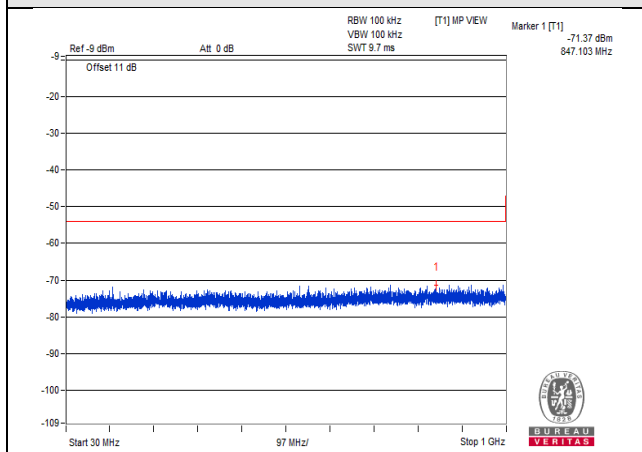


CH 1 (2404MHz)

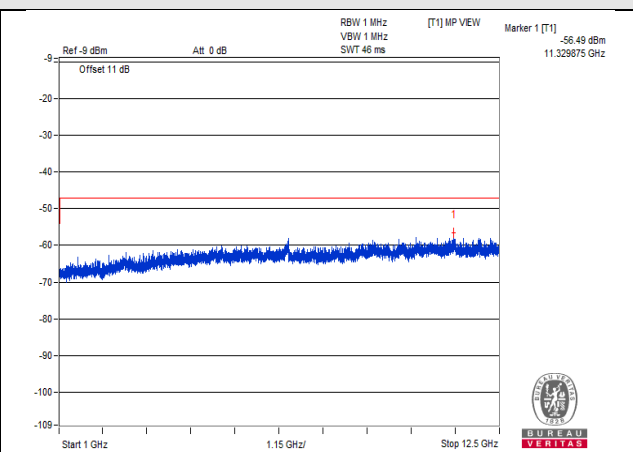
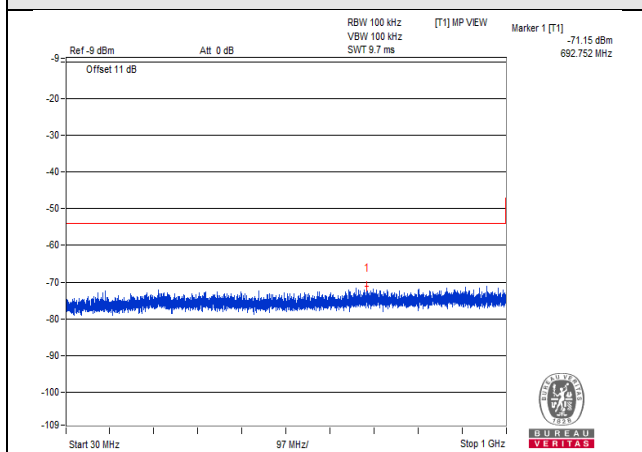
V_{normal}



V_{max.}

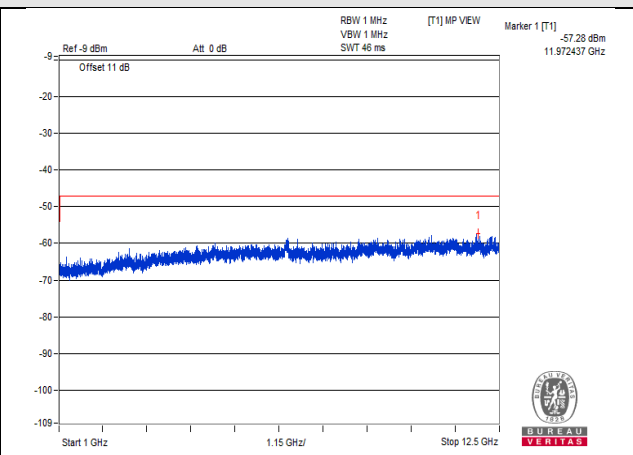
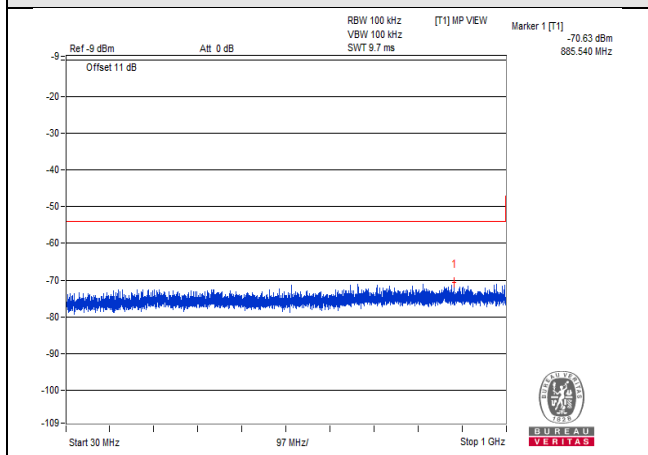


V_{min.}

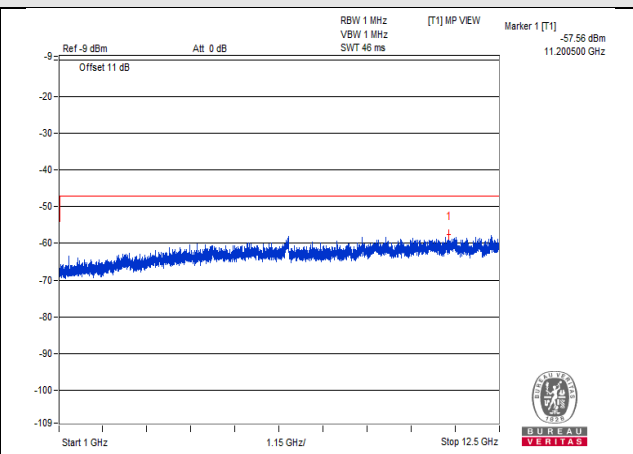
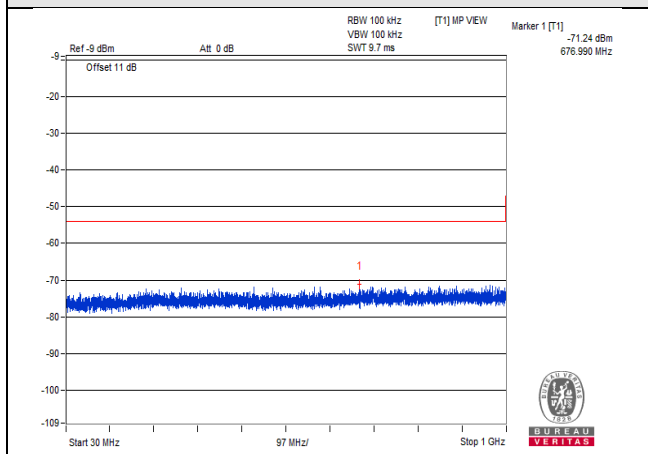


CH 19 (2440MHz)

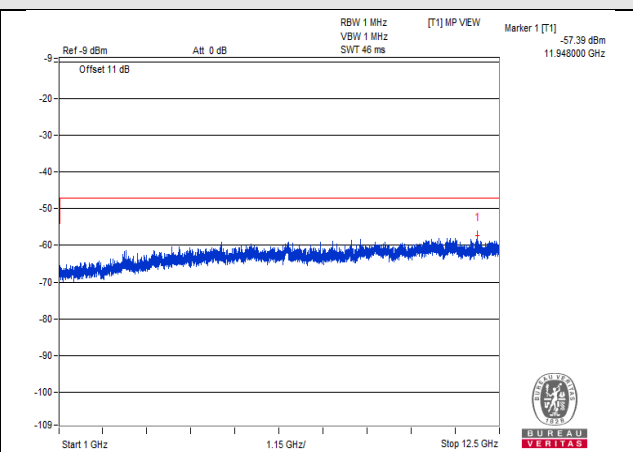
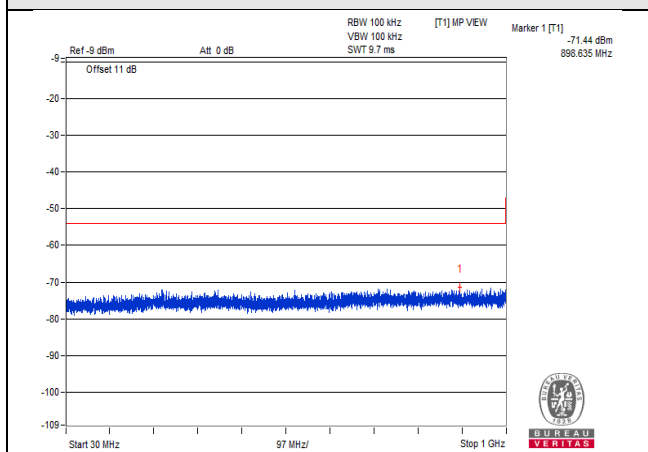
V_{normal}



V_{max.}



V_{min.}

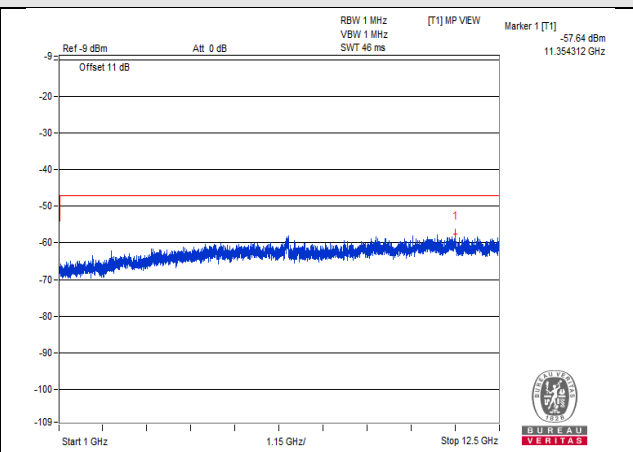
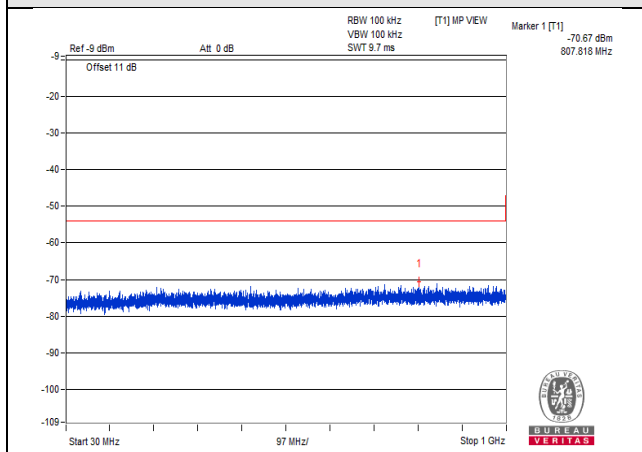


CH 38 (2478MHz)

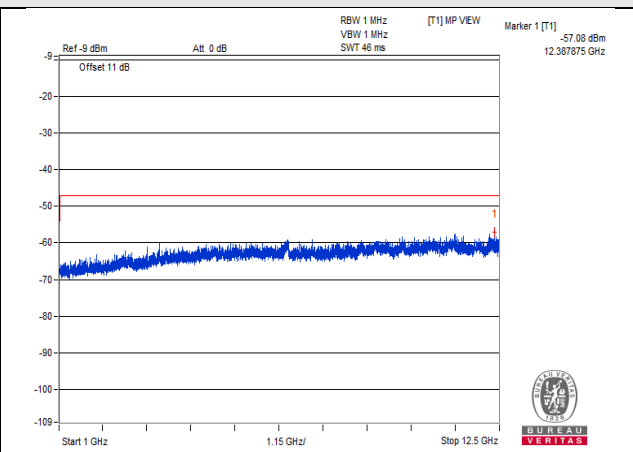
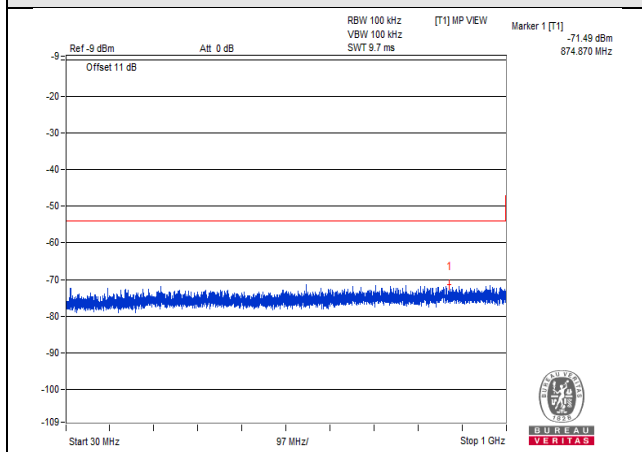
Modulation: D8PSK

TEST CHANNEL		CH 1 (2404MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(nW)	LIMIT (nW)	RESULT
V_{normal}	30MHz to 1000MHz	807.818	0.085704	4.0	PASS
	1000MHz to 12500MHz	11354.312	1.721869	20.0	PASS
V_{max.}	30MHz to 1000MHz	874.870	0.070958	4.0	PASS
	1000MHz to 12500MHz	12387.875	1.958845	20.0	PASS
V_{min.}	30MHz to 1000MHz	816.912	0.068391	4.0	PASS
	1000MHz to 12500MHz	11344.250	1.640590	20.0	PASS
TEST CHANNEL		CH 19 (2440MHz)			
V_{normal}	30MHz to 1000MHz	947.983	0.073621	4.0	PASS
	1000MHz to 12500MHz	10779.312	1.706082	20.0	PASS
V_{max.}	30MHz to 1000MHz	743.556	0.078524	4.0	PASS
	1000MHz to 12500MHz	11949.437	1.667247	20.0	PASS
V_{min.}	30MHz to 1000MHz	805.272	0.092897	4.0	PASS
	1000MHz to 12500MHz	10661.437	1.936422	20.0	PASS
TEST CHANNEL		CH 38 (2478MHz)			
V_{normal}	30MHz to 1000MHz	906.031	0.100000	4.0	PASS
	1000MHz to 12500MHz	11288.187	1.592209	20.0	PASS
V_{max.}	30MHz to 1000MHz	939.496	0.069984	4.0	PASS
	1000MHz to 12500MHz	10789.375	1.621810	20.0	PASS
V_{min.}	30MHz to 1000MHz	858.501	0.081658	4.0	PASS
	1000MHz to 12500MHz	10902.937	1.610646	20.0	PASS

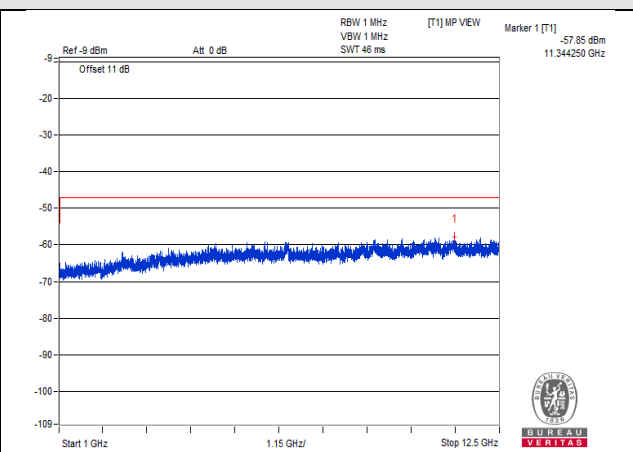
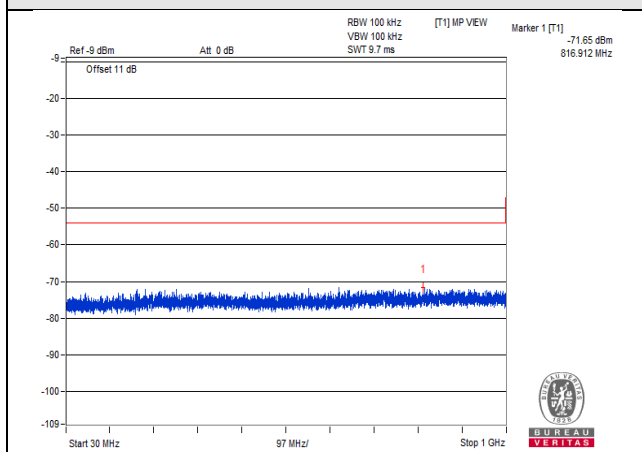
V_{normal}



V_{max.}

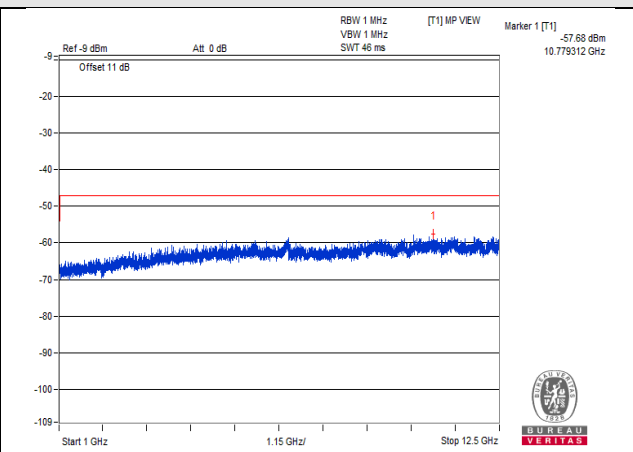
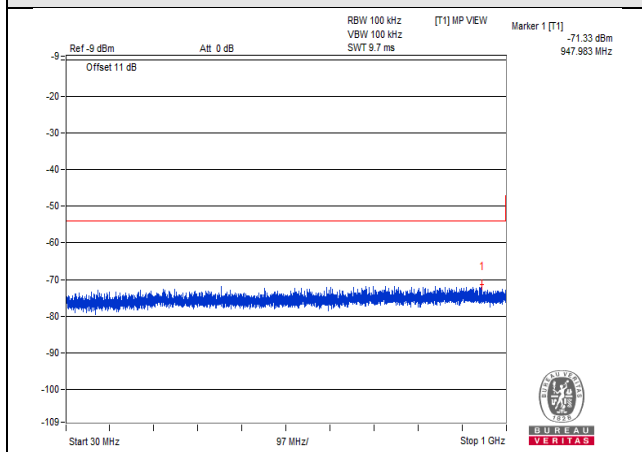


V_{min.}

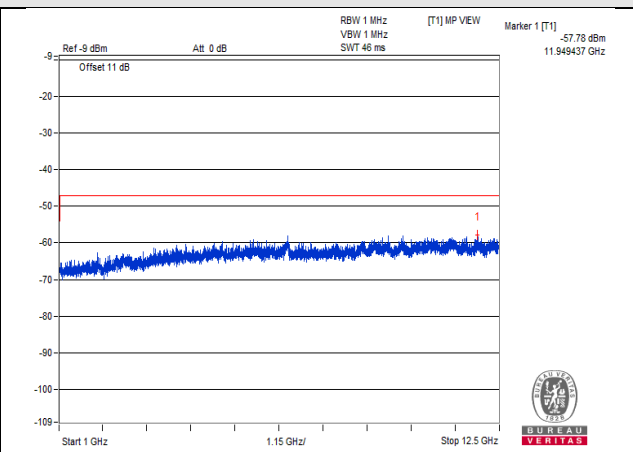
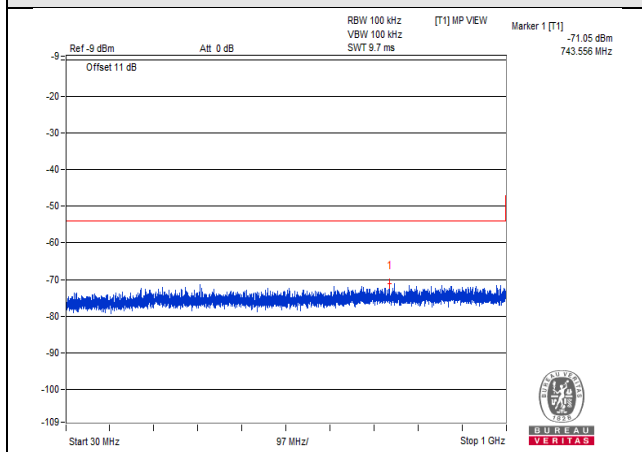


CH 1 (2404MHz)

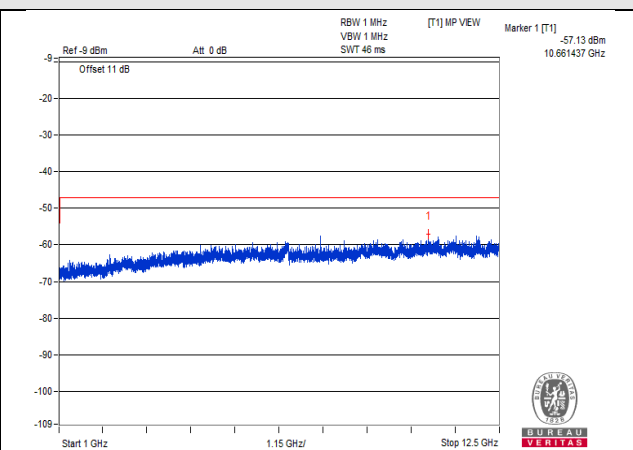
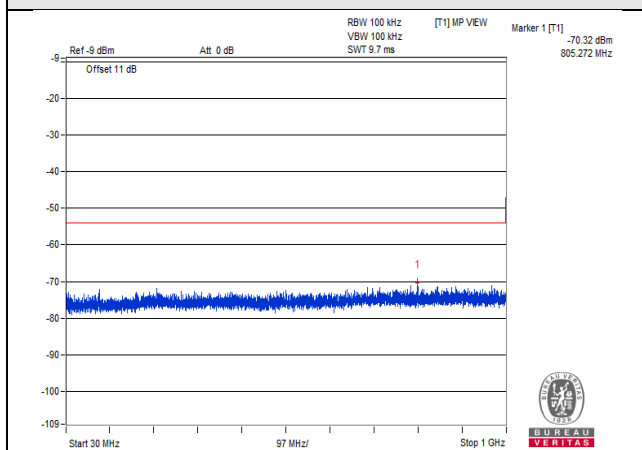
V_{normal}



V_{max.}

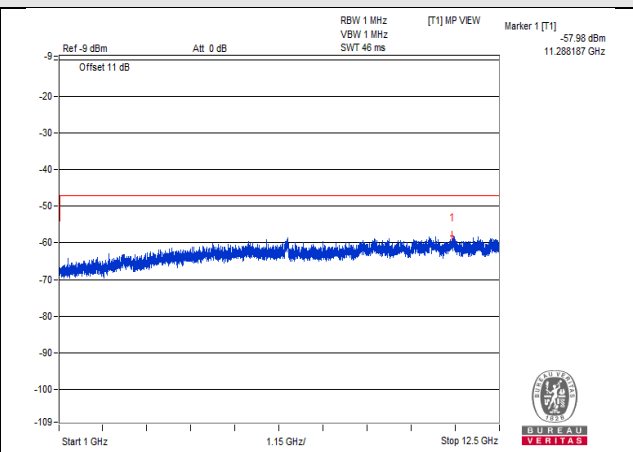
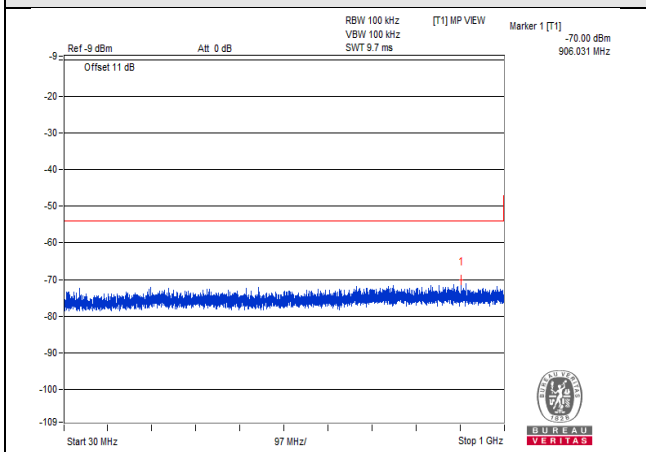


V_{min.}

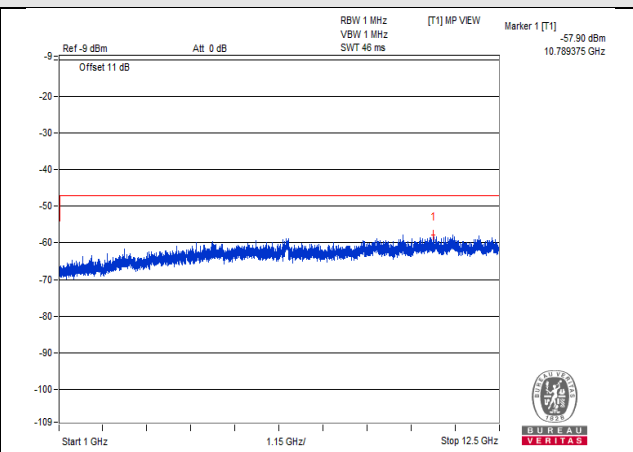
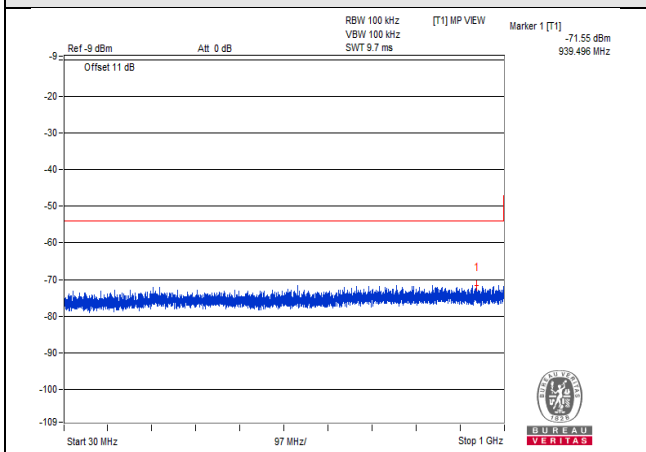


CH 19 (2440MHz)

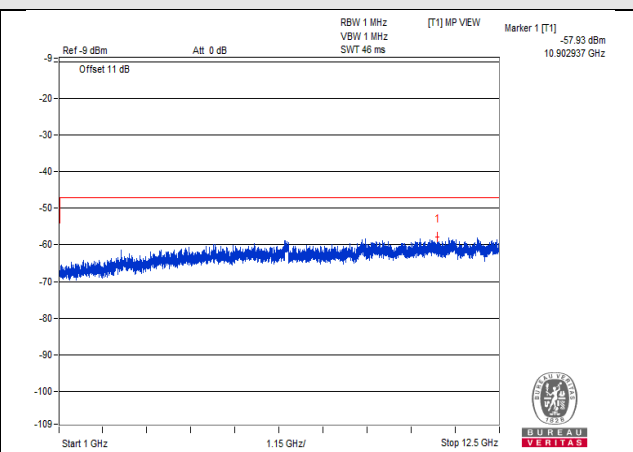
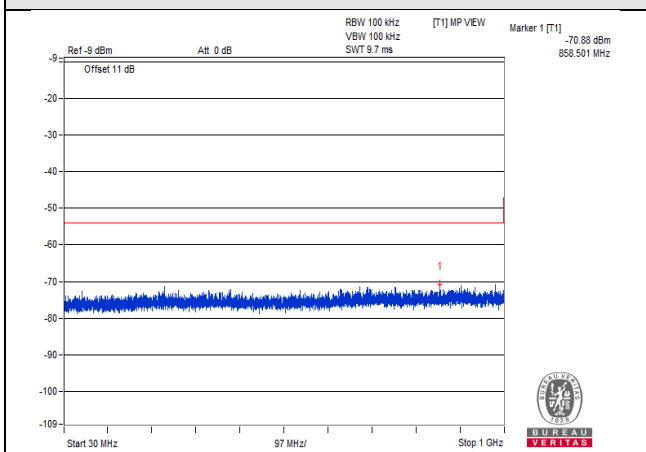
V_{normal}



V_{max.}



V_{min.}



CH 38 (2478MHz)

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/38] x duty-cycle x 0.4 second

(AFH mode) dwell time = [diffusion rate/15] x duty-cycle x 0.4 second

4.7.2 Test Setup

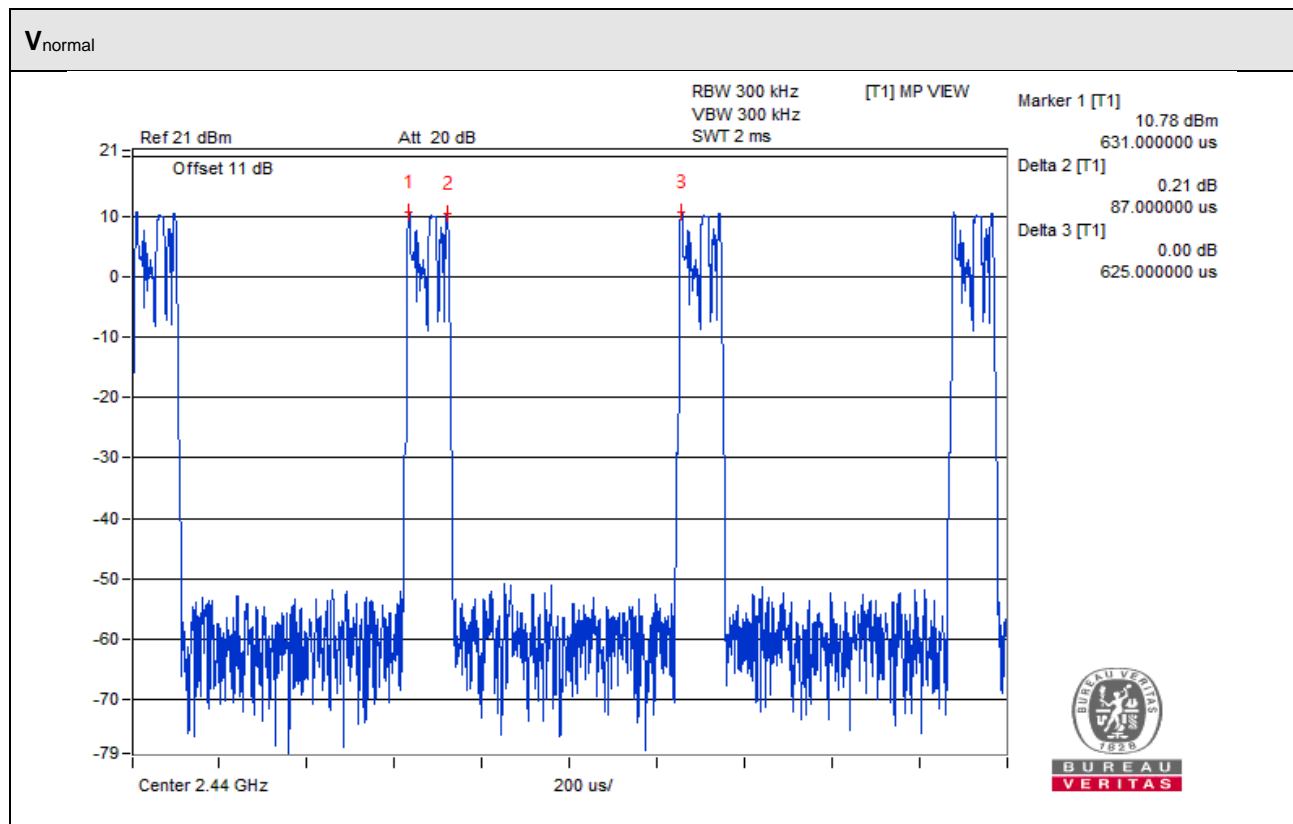


4.7.3 Test Result

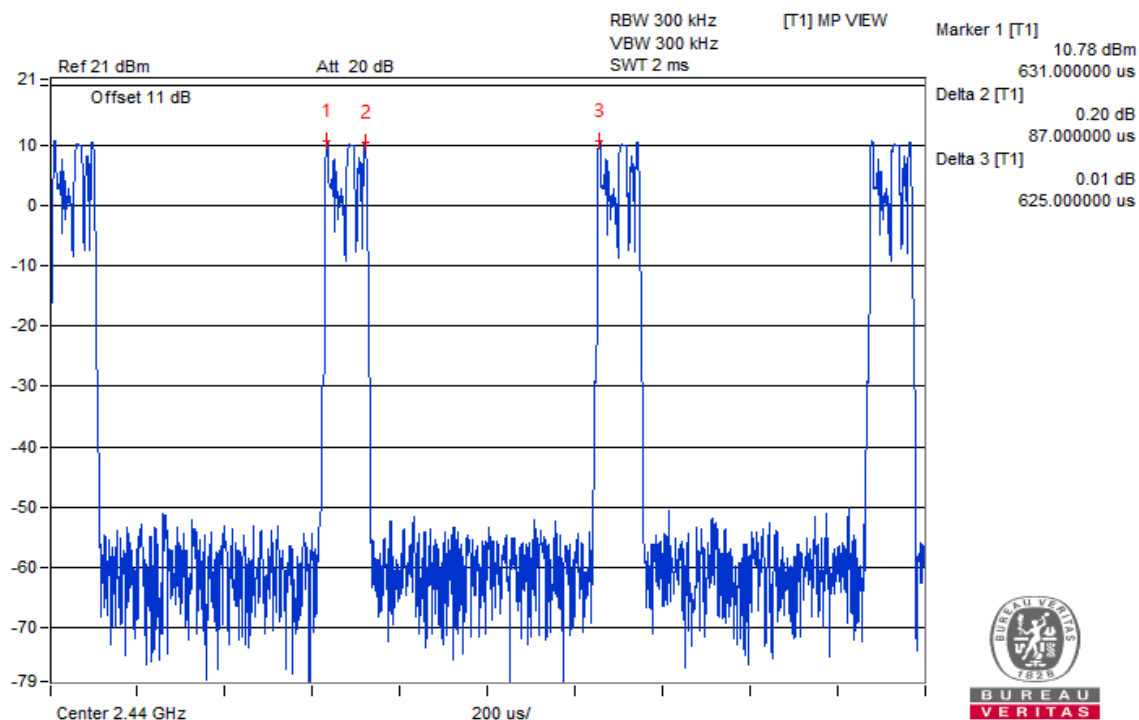
Modulation: $\pi/4$ QPSK

Normal Mode:

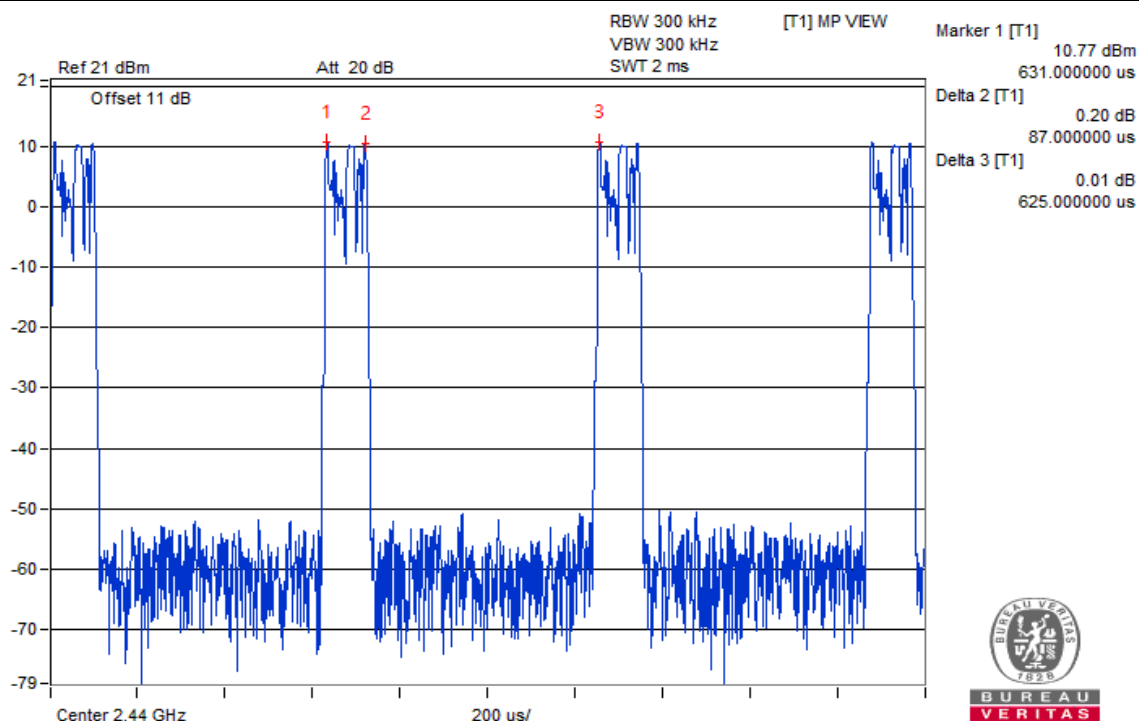
Test Condition	Diffusion Rate	(Diffusion Rate/38)*0.4 sec	Duty Cycle	Result (msec)	Limit (msec)
V_{normal}	67.65	0.712	0.139	98.968	400
$V_{max.}$	67.42	0.710	0.139	98.690	400
$V_{min.}$	67.48	0.710	0.139	98.690	400



V_{max}.

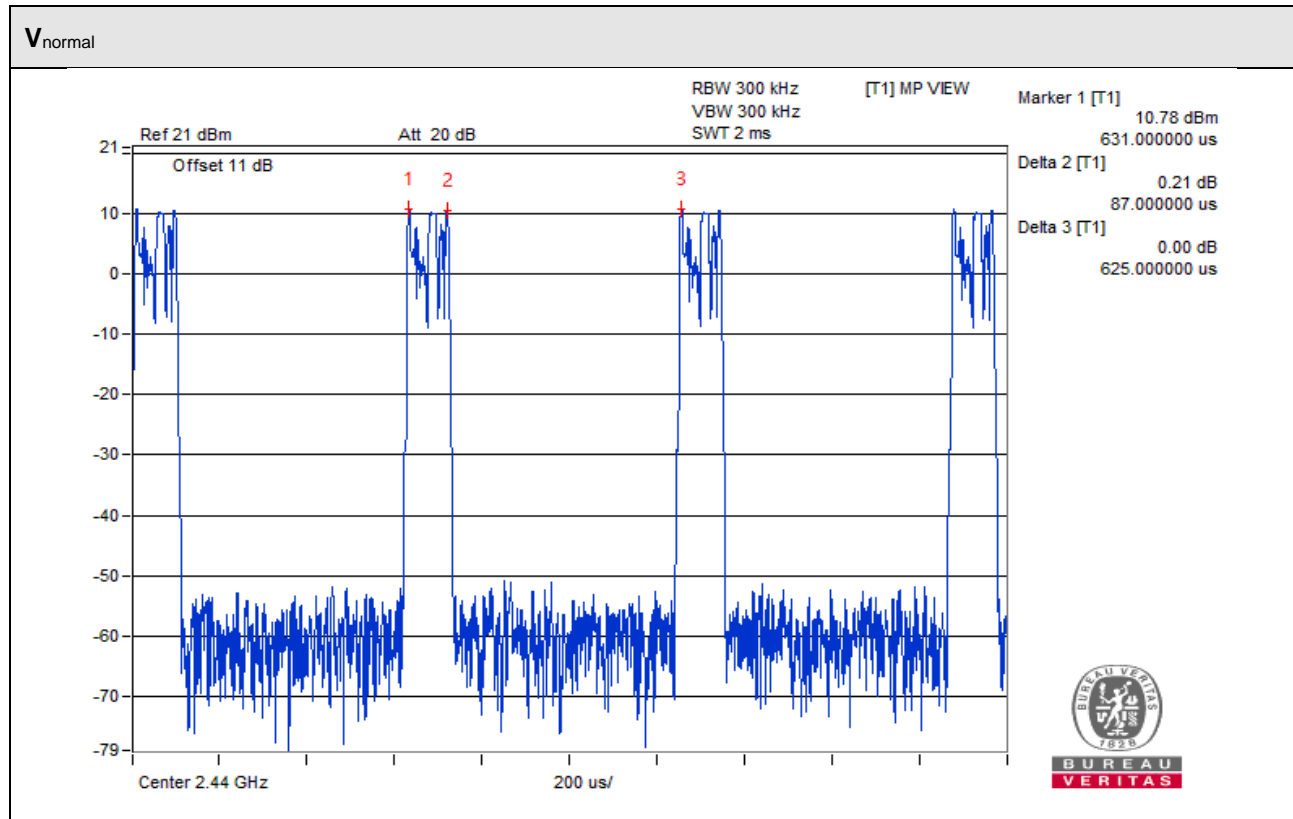


V_{min}.

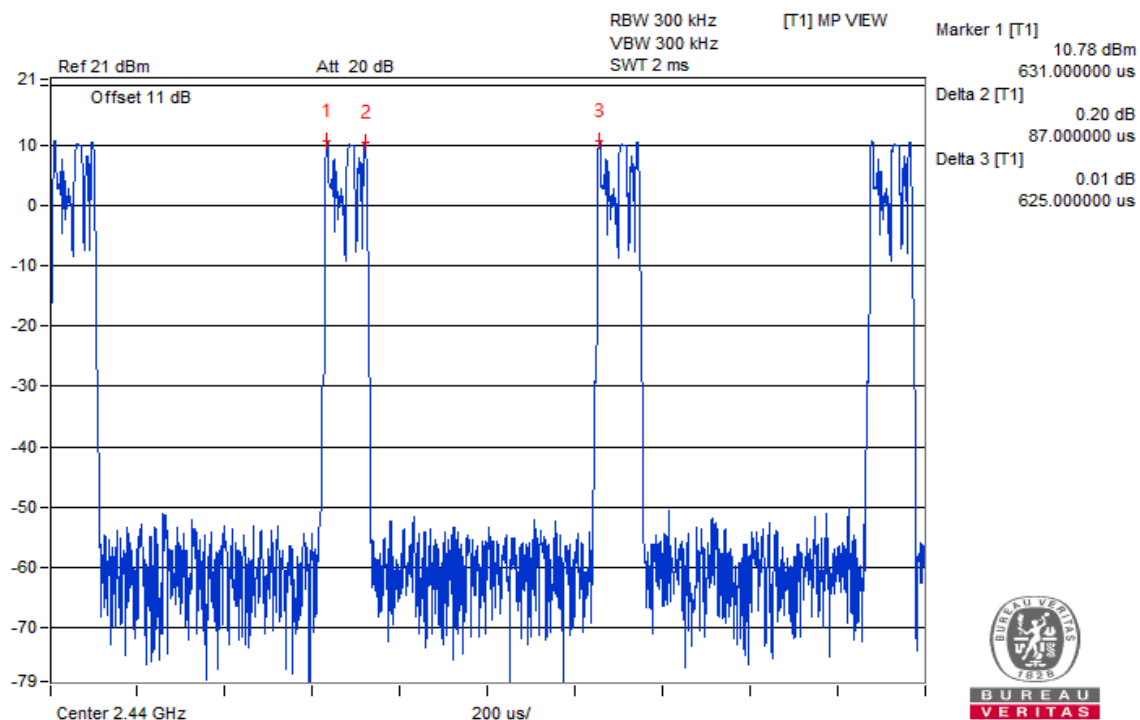


AFH Mode:

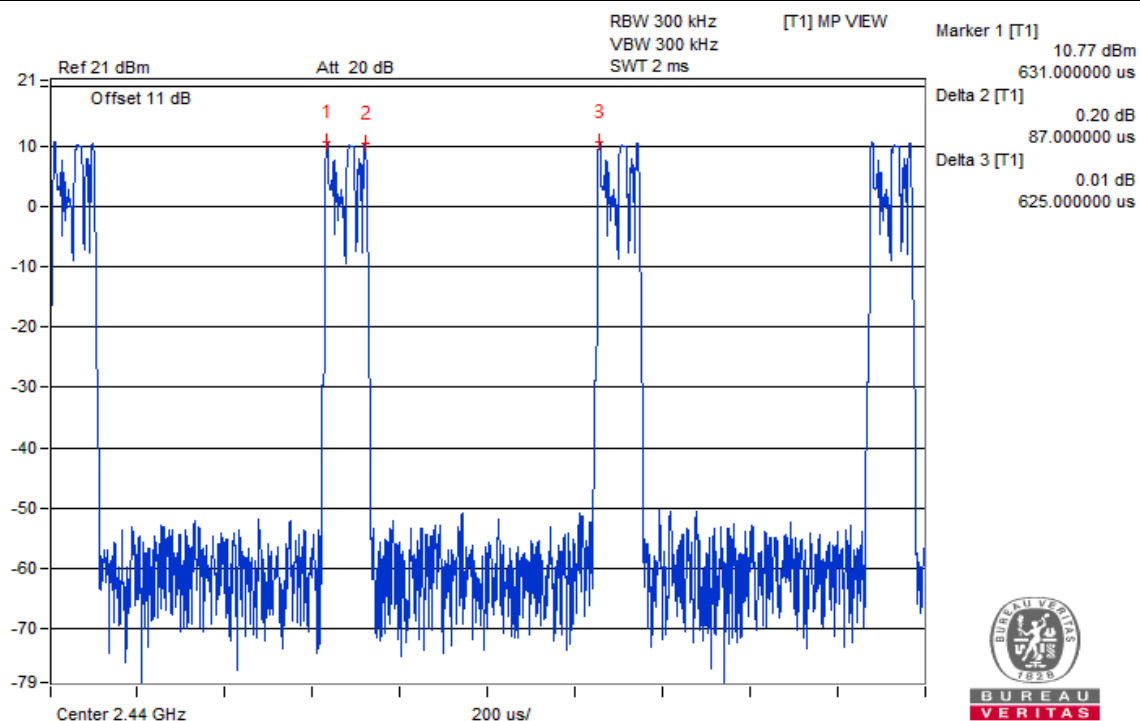
Test Condition	Diffusion Rate	(Diffusion Rate/15)*0.4 sec	Duty Cycle	Result (msec)	Limit (msec)
V _{normal}	27.45	0.732	0.139	101.748	400
V _{max.}	27.42	0.731	0.139	101.609	400
V _{min.}	27.42	0.731	0.139	101.609	400



V_{max}.



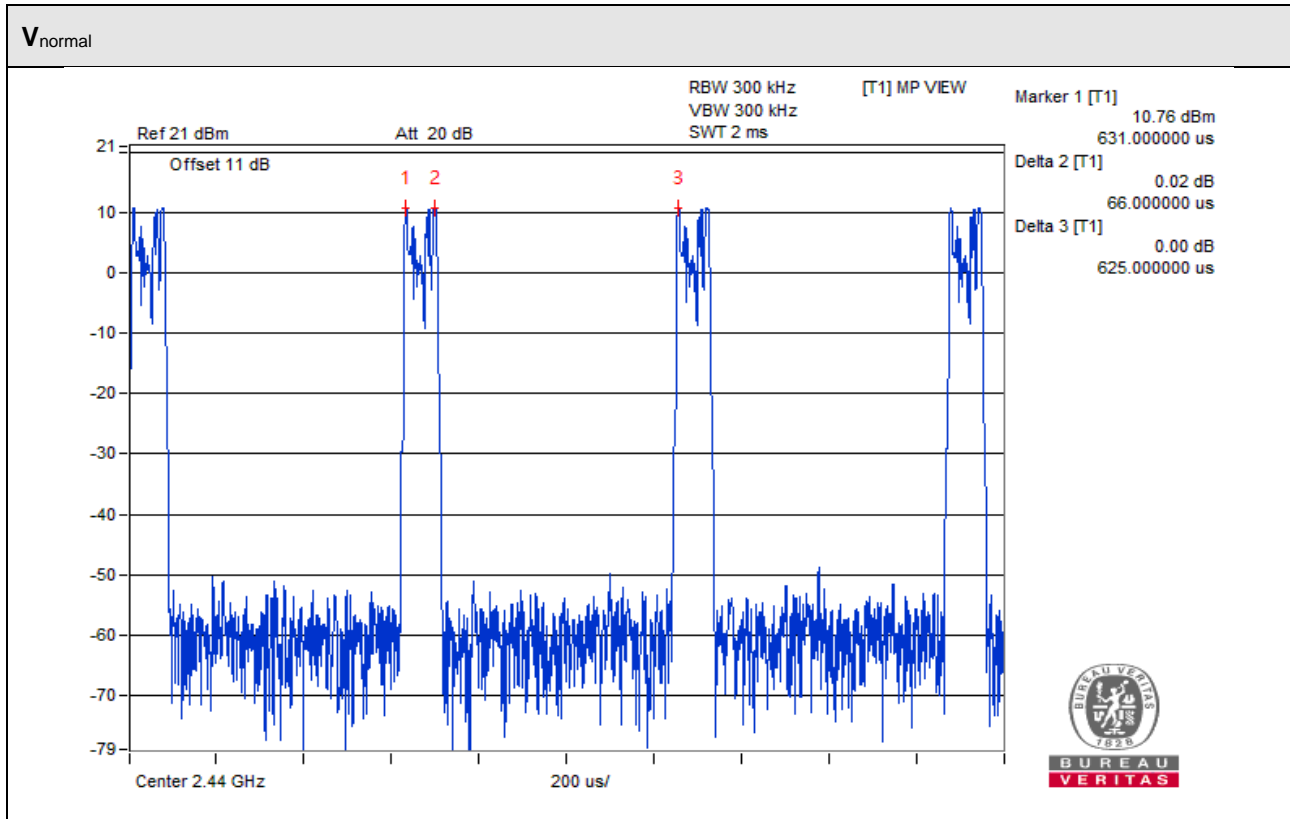
V_{min}.



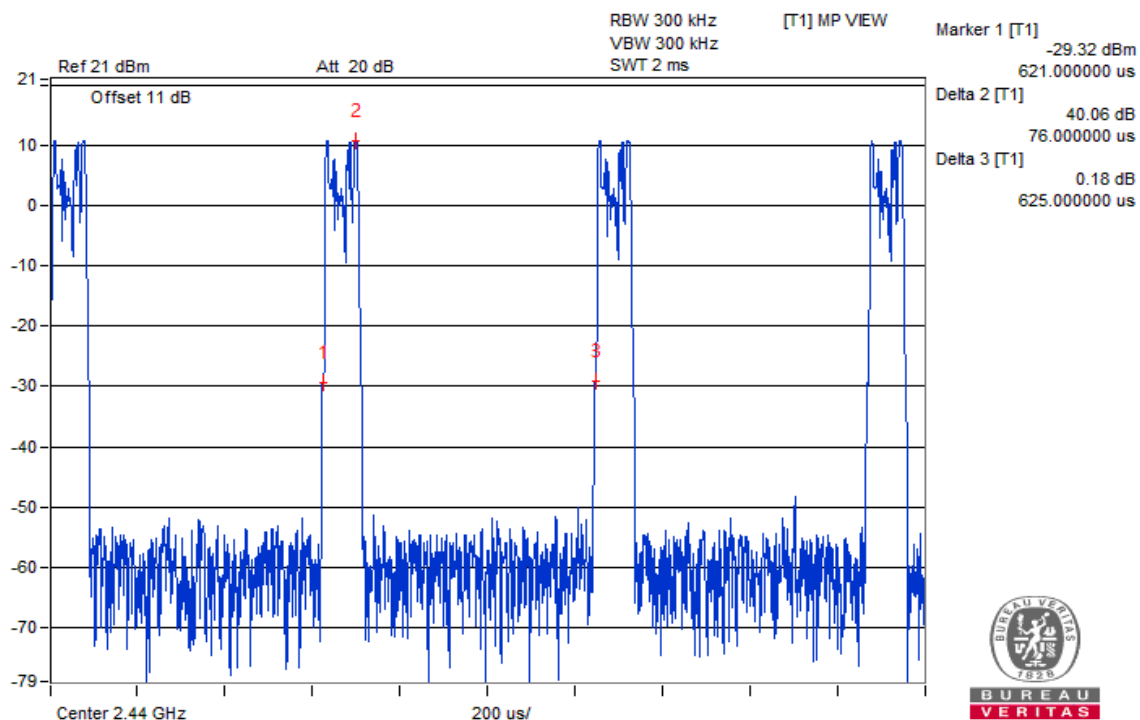
Modulation: D8PSK

Normal Mode:

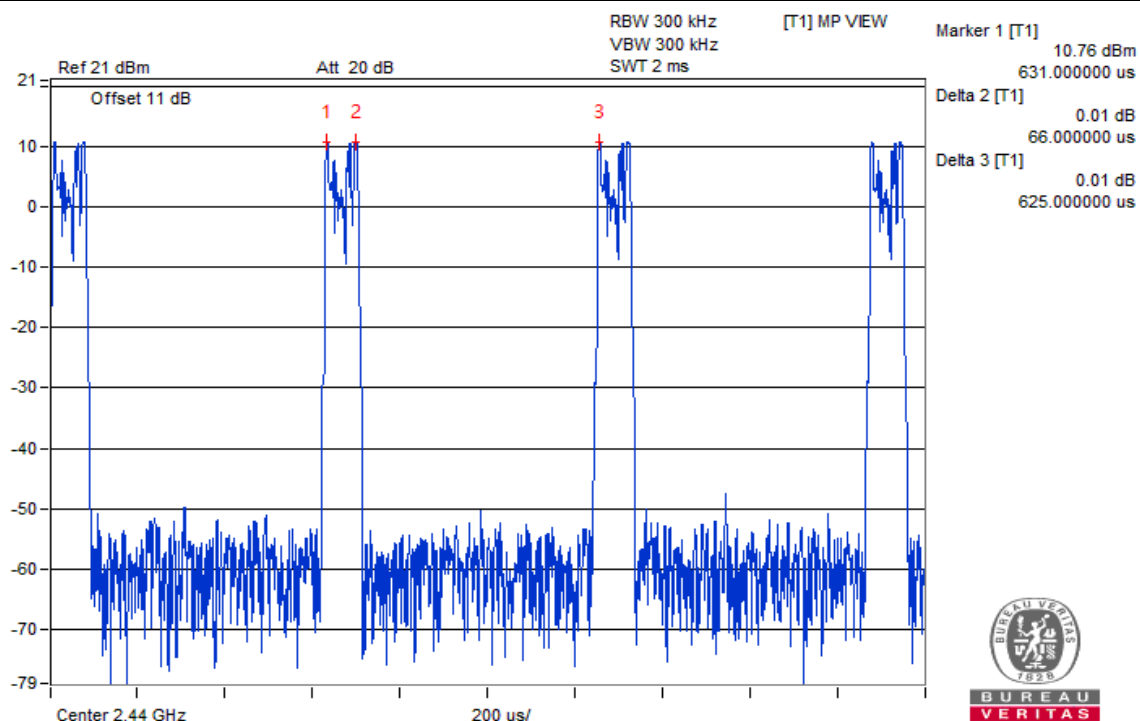
Test Condition	Diffusion Rate	(Diffusion Rate/38)*0.4 sec	Duty Cycle	Result (msec)	Limit (msec)
V _{normal}	67.29	0.708	0.105	74.340	400
V _{max.}	67.44	0.710	0.121	85.910	400
V _{min.}	67.56	0.711	0.105	74.655	400



V_{max}.

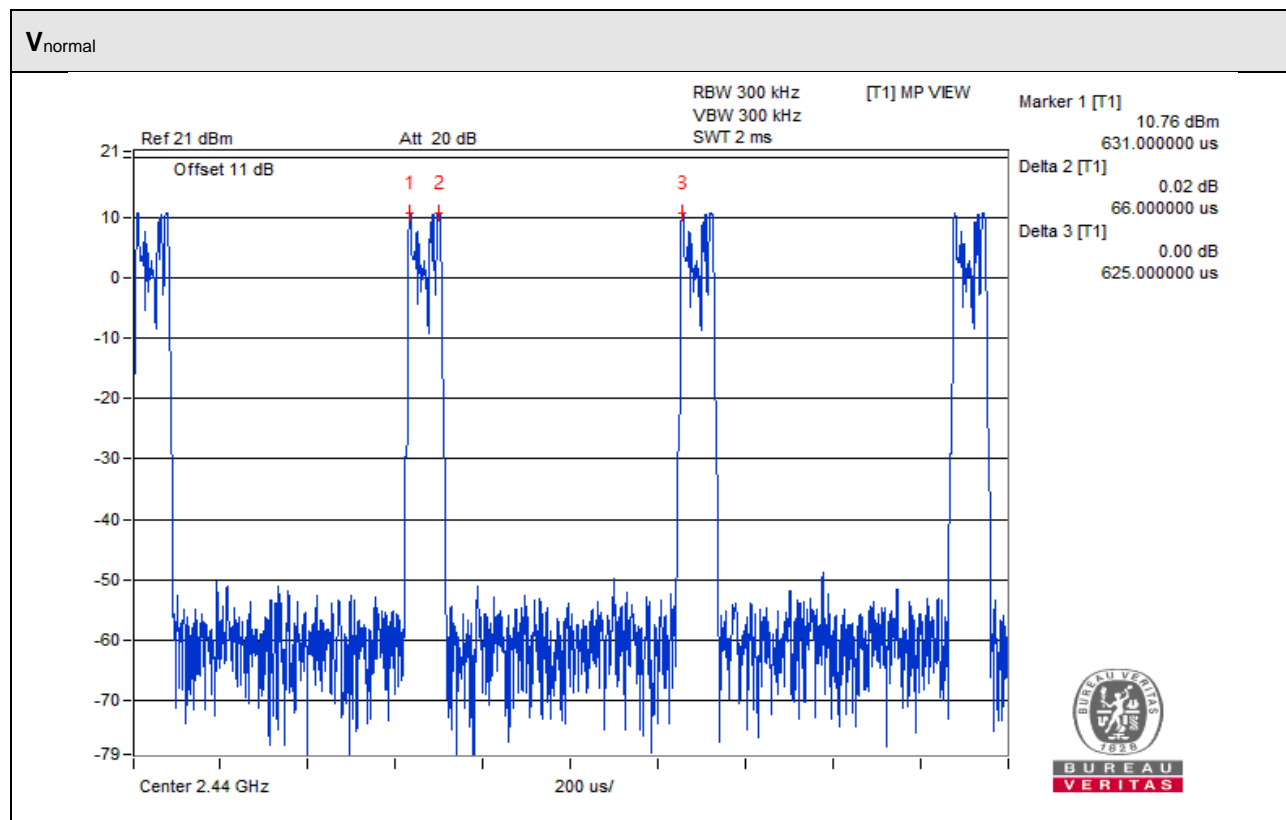


V_{min}.

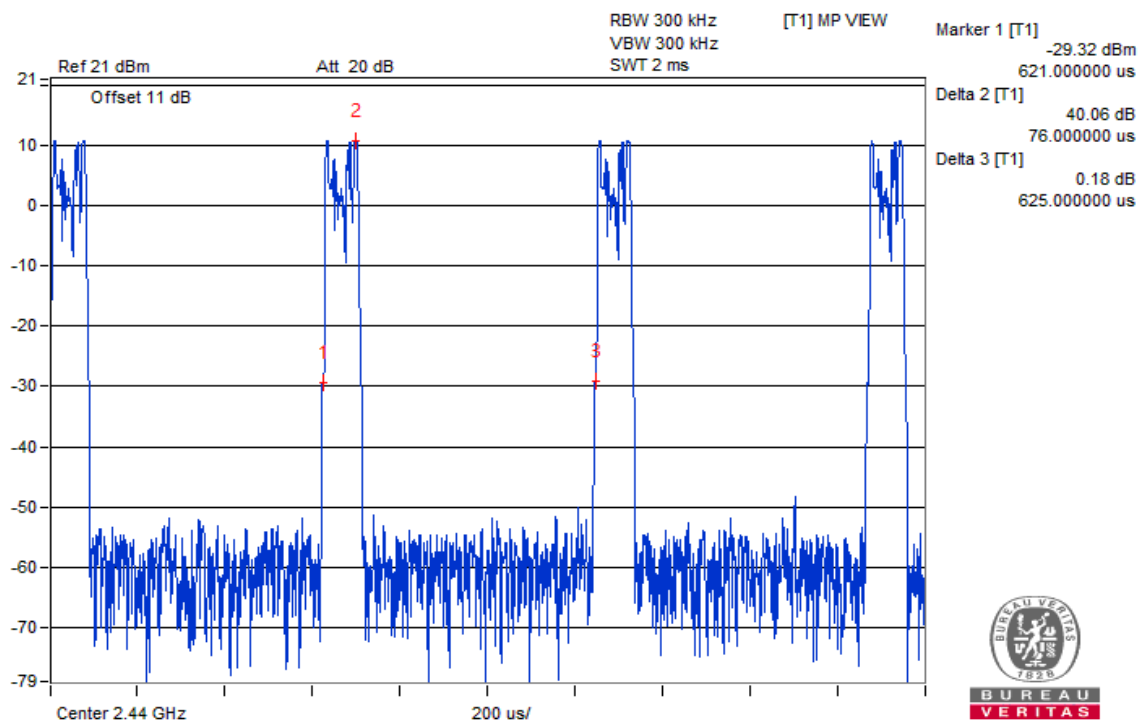


AFH Mode:

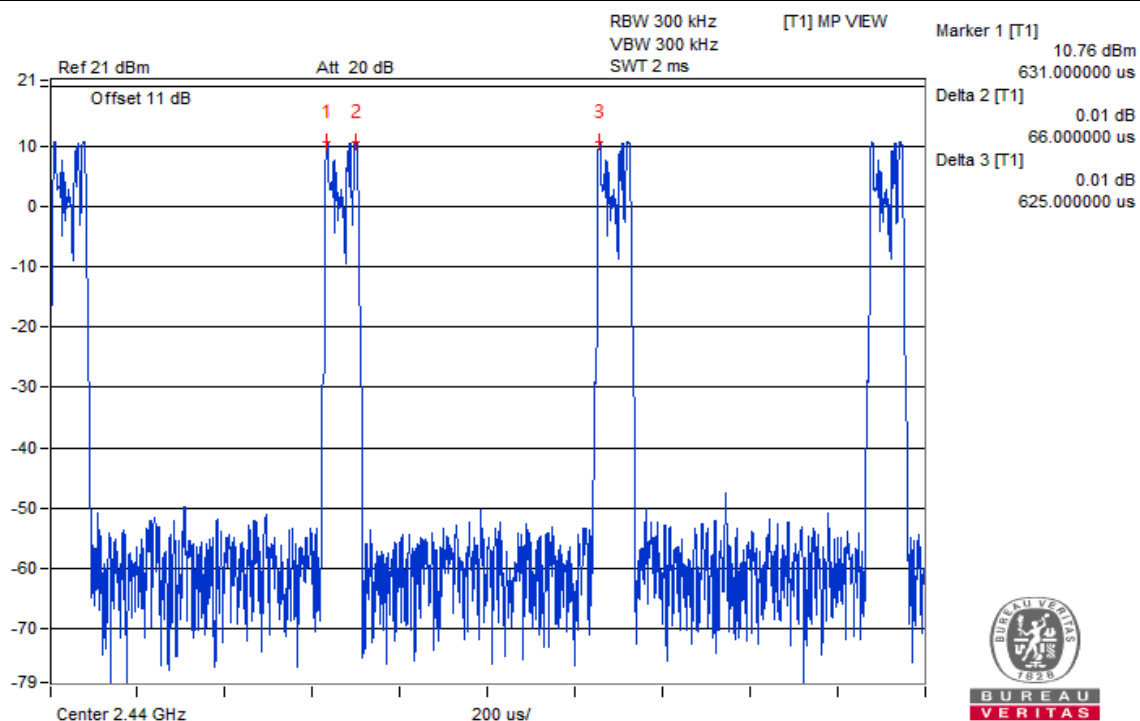
Test Condition	Diffusion Rate	(Diffusion Rate/15)*0.4 sec	Duty Cycle	Result (msec)	Limit (msec)
V _{normal}	27.46	0.732	0.105	76.860	400
V _{max.}	27.36	0.730	0.121	88.330	400
V _{min.}	27.49	0.733	0.105	76.965	400



V_{max}.



V_{min}.

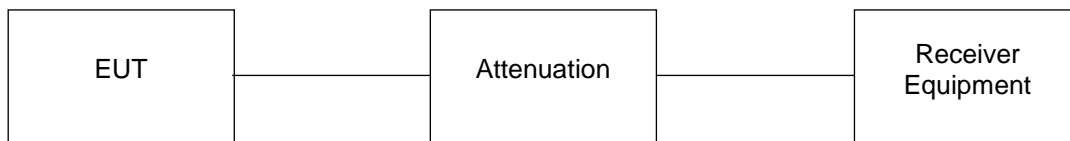


4.8 Interference Prevention Function

4.8.1 Limits of Interference Prevention Function

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

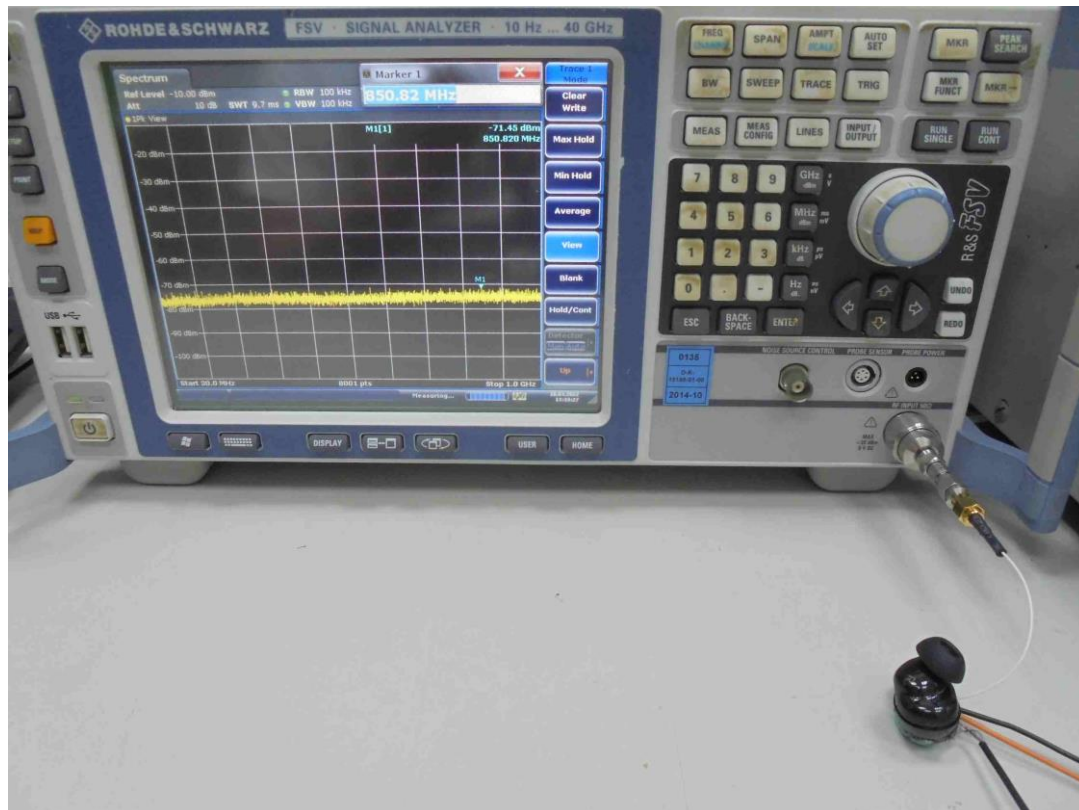
4.8.2 Test Setup



4.8.3 Test Results

Link Mode	Test Result
Bluetooth LE	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 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

Web Site: www.bureauveritas-adt.com

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

--- END ---