

## Radio Test Report (BT LE)

**Report No.:** RJBARR-WTW-P21100969-4

**Test Model:** MT7902

**Received Date:** 2021/10/29

**Test Date:** 2021/12/16

**Issued Date:** 2022/1/14

**Applicant:** MediaTek Inc.

**Address:** No. 1, Dusing 1st Rd., Hsinchu Science Park, Hsinchu City, 30078 Taiwan

**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
RJBARR-WTW-P21100969-4	Original release.	2022/1/14

## 1 Certificate of Conformity

**Product:** 1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card

**Brand:** MediaTek

**Test Model:** MT7902

**Sample Status:** Engineering sample

**Applicant:** MediaTek Inc.

**Test Date:** 2021/12/16

**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:** 2022/1/14

Annie Chang / Senior Specialist

**Approved by :**

*Jeremy Lin*

**Date:** 2022/1/14

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)
<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)	4.3	Spurious emissions	C
<b>Transmitting Equipment</b>				
F	3.2 (2)	4.4	Antenna power	C
--	--	--	SAR	NA
<b>Transmitting Antenna</b>				
--	--	3.5	Type, configuration, etc. of transmitting antenna	C
--	--	3.5	Direction pattern of transmitting antenna	C
<b>Receiving Equipment</b>				
G	3.3 (1)	4.5	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	High Frequency	C
--	3.7 (1)	3.4	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)	4.4	Antenna power	C
--	3.6 (2)	4.4	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)	--	Spreading bandwidth	NA
--	3.2 (9)	--	Spreading factor	NA
--	3.2 (11)	--	Frequency retention time (FH employed)	NA
--	3.4.1(1)	4.6	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	0738404	2021/4/15	2022/4/14	ETC	c)
Peak Power meter Anritsu	ML2495A	0842014	2021/4/15	2022/4/14	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)
Programmable DC Power Supply (IDRC)	DSP80-180WE	701217	2021/3/9	2022/3/8	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	206.50 Hz
Spurious emissions	3.93 dB
Output power density	1.11 dB
Out of band radiated power	3.93 dB
Frequency Tolerance	603.76 Hz

## 2.3 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Brand	MediaTek
Test Model	MT7902
Status of EUT	Engineering sample
Nominal Voltage	3.3Vdc from host equipment
Modulation Type	GFSK
Transfer Rate	Up to 2Mbps
Operating Frequency	LE 1M: 2402 ~ 2480MHz LE 2M: 2404 ~ 2478MHz
Number of Channel	LE 1M: 40 LE 2M: 38
Rated RF Output Power	Refer to note
Conducted RF Output Power	Refer to note
Radiated RF Output Power	Refer to note
Antenna Type	Refer to section 3.5
Antenna Connector	Refer to section 3.5
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The power table as below:

Modulation Type	Rated power (mW)	Total Conducted RF output power (mW)	Radiated RF output power (mW)
GFSK (1Mbps)	7.6	7.516	15.631
GFSK (2Mbps)	7.6	7.780	16.180

2. The version information of EUT is listed as below.

EUT Version	Difference
Version A	➤ Version A & B are also same PCB with layout change.
Version B	➤ The difference is adding/removing MOSFET components in GPIO bus for function optional.

The above versions were pre-tested and the **Version A** was the worst case for final test.

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

LE 1M: 40 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
<b>0</b>	<b>2402</b>	10	2422	20	2442	30	2462
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	<b>19</b>	<b>2440</b>	29	2460	<b>39</b>	<b>2480</b>

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.

LE 2M: 38 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
<b>1</b>	<b>2404</b>	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	<b>38</b>	<b>2478</b>
9	2420	<b>19</b>	<b>2440</b>	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 provided by manufacture, the power levels during the tests were set according to the following codes:

Modulation type: GFSK (1Mbps)		Modulation type: GFSK (2Mbps)	
Channel	Power setting	Channel	Power setting
0	10	1	10
19	10	19	10
39	10	38	10



### 3.3 Test Conditions

Test Conditions		Voltage (Vdc)
$V_{normal}$	-	3.3
$V_{max.}$	+10%	3.63
$V_{min.}$	-10%	2.97

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
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
Interference Prevention Function	25 deg.C, 76% RH

### 3.4 Assembly

The shielded cover was stuck to the device firmly, therefore it could be damaged to the device if intending to separate the cover and the device.

### 3.5 Antenna Specifications

#### 3.5.1 Antenna Gain

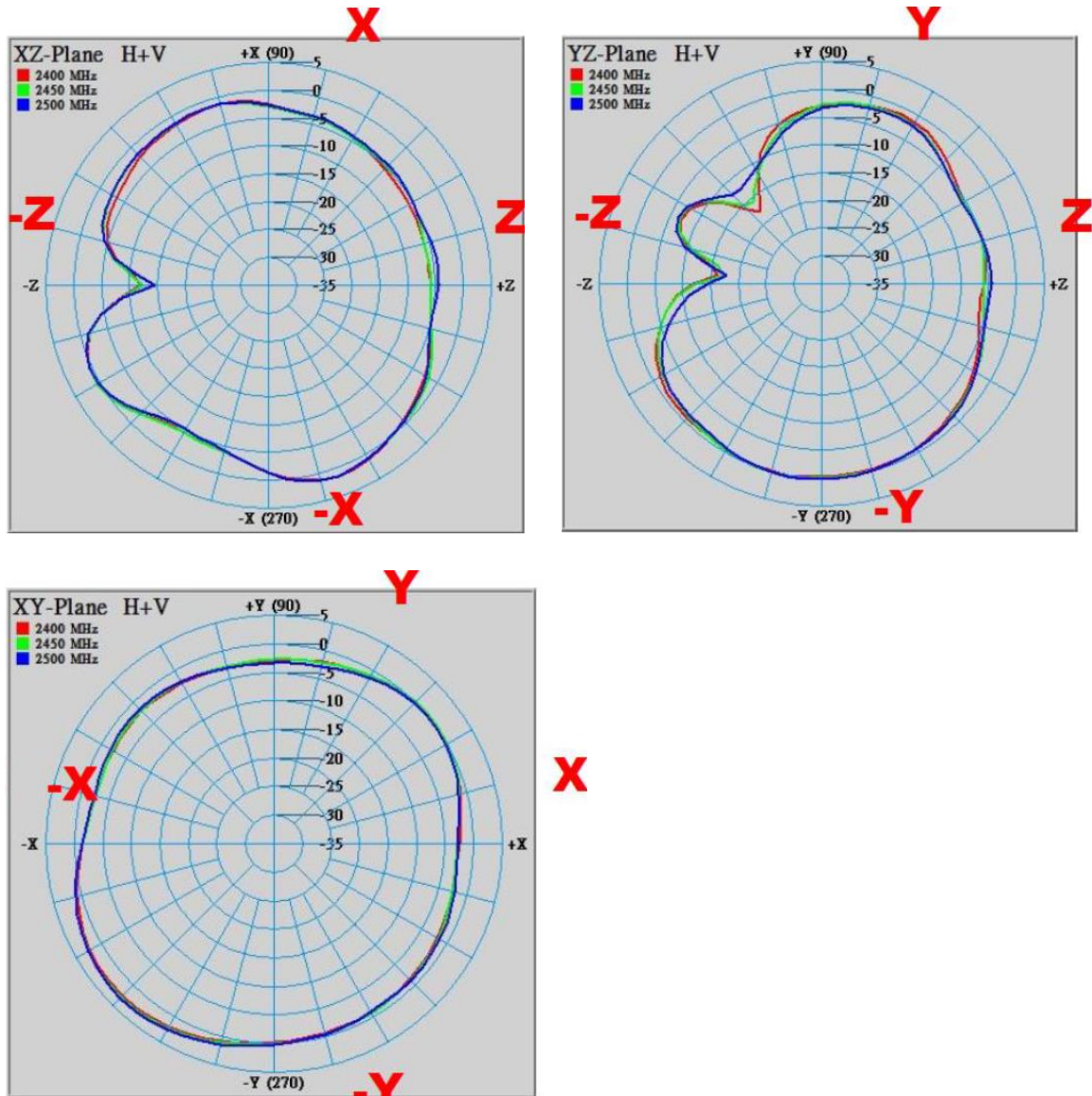
The EUT used antennas listed as below and the maximum antenna gain is chosen for final test.

Antenna No.	RF Chain NO.	Brand	Model	Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type	Cable Length
1	Chain0	PSA	RFMTA340718EMLB302	3.18	2.4~2.4835	PIFA	i-pex(MHF)	200mm
				4.92	5.15~5.85			
2	Chain1	PSA	RFMTA340718EMLB302	3.18	2.4~2.4835	PIFA	i-pex(MHF)	200mm
				4.92	5.15~5.85			
3	Chain0	PSA	RFMTA311020EMMB301	1.71	2.4~2.4835	PIFA	i-pex(MHF)	200mm
				4.82	5.15~5.85			
				4.76	5.925~6.425			
				4.29	6.425~6.525			
				4.61	6.525~6.875			
				4.09	6.875~7.125			
4	Chain1	PSA	RFMTA311020EMMB301	1.71	2.4~2.4835	PIFA	i-pex(MHF)	200mm
				4.82	5.15~5.85			
				4.76	5.925~6.425			
				4.29	6.425~6.525			
				4.61	6.525~6.875			
				4.09	6.875~7.125			

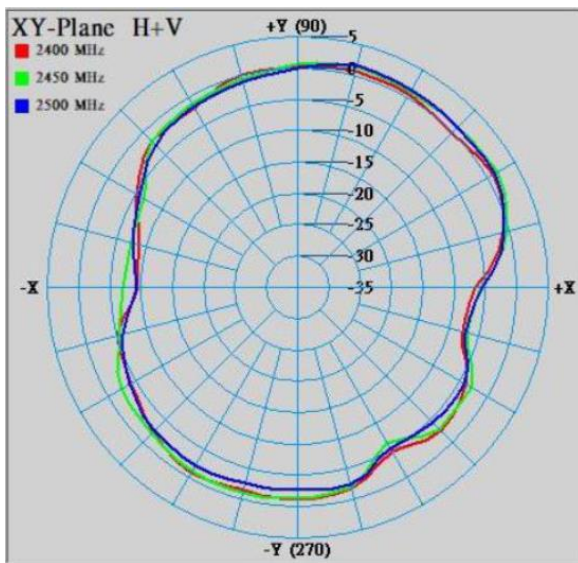
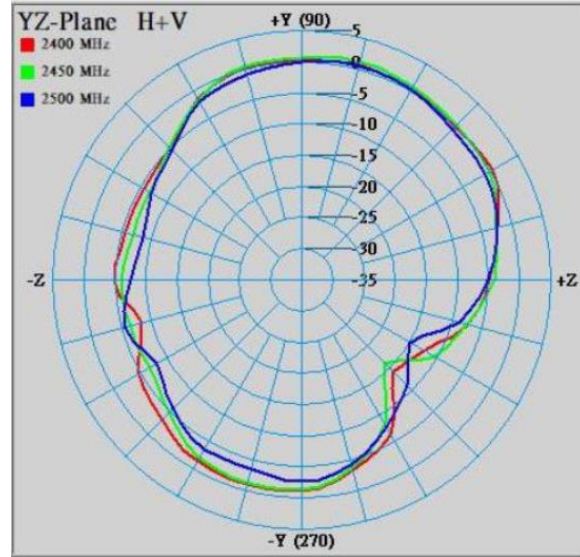
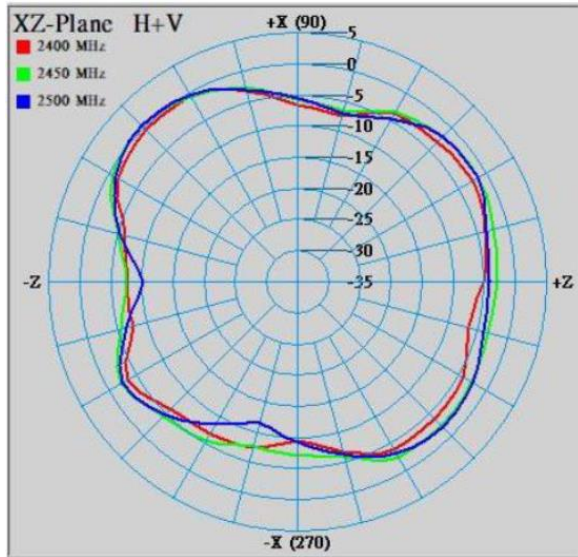
The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

### 3.5.2 Antenna Pattern

ANT Model: RFMTA340718EMLB302



ANT Model: RFMTA311020EMMB301



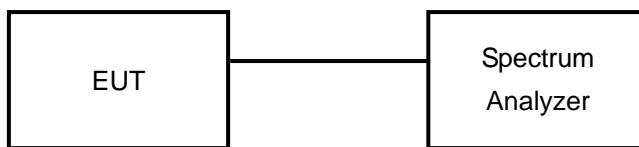
## 4 Test Results

### 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

##### GFSK (1Mbps)

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)
0	2402	2401.905921	-39.166	2401.905394	-39.386	2401.905103	-39.507
19	2440	2439.903459	-39.565	2439.903252	-39.650	2439.903074	-39.723
39	2480	2479.901745	-39.618	2479.901541	-39.701	2479.901434	-39.744

##### GFSK (2Mbps)

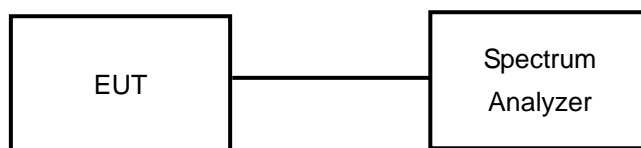
Channel	Frequency (MHz)	$V_{normal}$		$V_{max.}$		$V_{min.}$	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
1	2404	2403.905660	-39.242	2403.905394	-39.353	2403.905225	-39.423
19	2440	2439.904097	-39.304	2439.903865	-39.399	2439.903661	-39.483
38	2478	2477.902088	-39.512	2477.901943	-39.571	2477.901832	-39.615

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

### 4.2.1 Limits of Occupied Bandwidth Measurement

Item	Limit	Remark
Occupied bandwidth	<26MHz	-

### 4.2.2 Test Setup

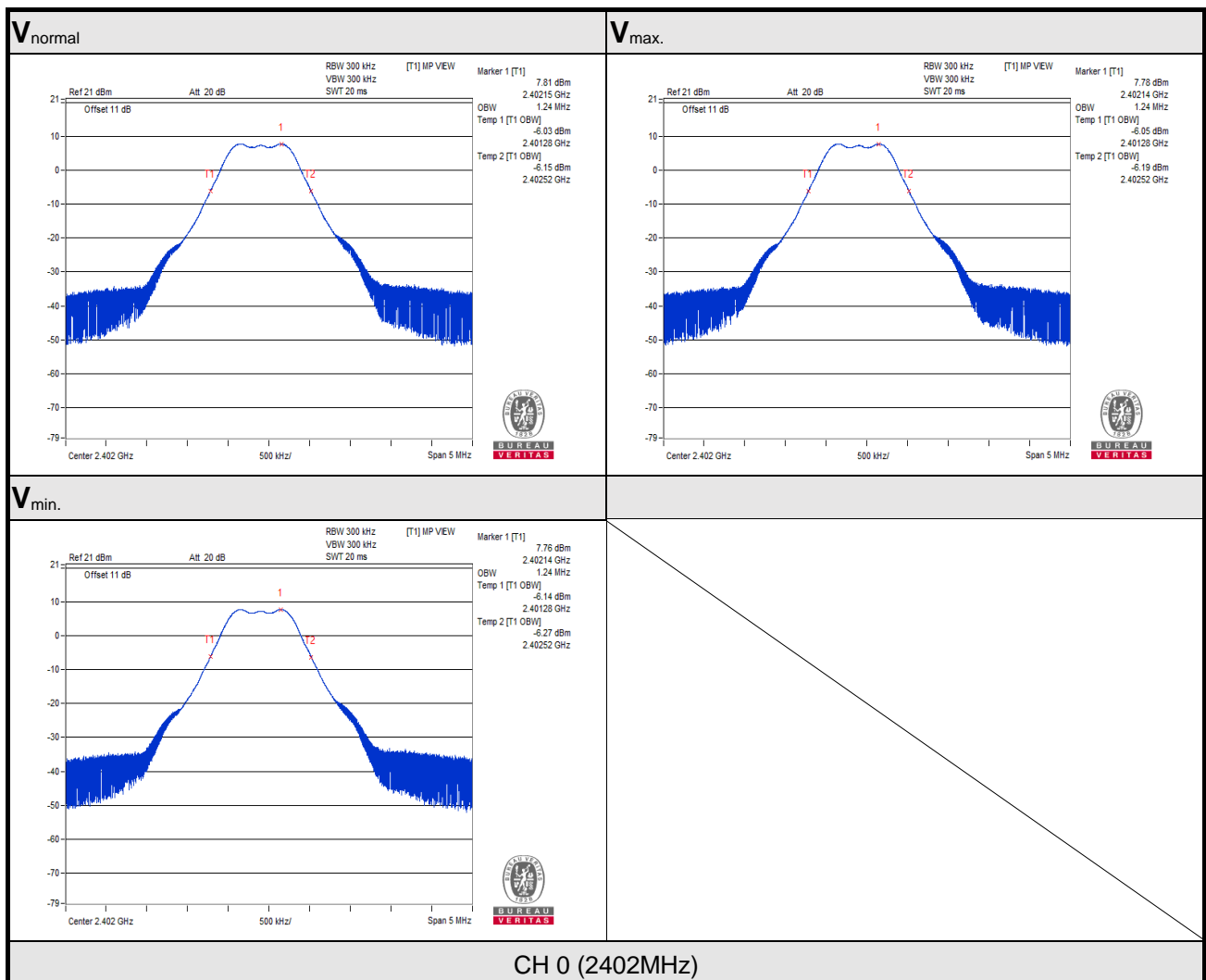


### 4.2.3 Test Results

#### GFSK (1Mbps)

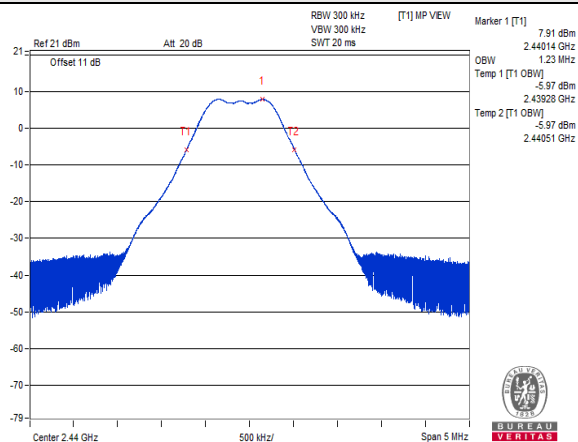
Channel	Frequency (MHz)	V <sub>normal</sub>	V <sub>max.</sub>	V <sub>min.</sub>
		Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
0	2402	1.24	1.24	1.24
19	2440	1.23	1.23	1.24
39	2480	1.24	1.24	1.24

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

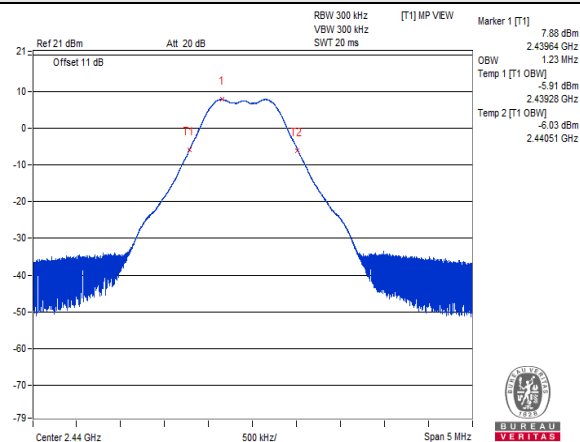




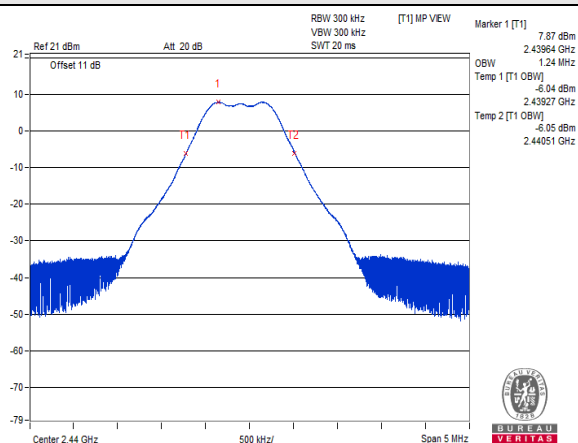
V<sub>normal</sub>



V<sub>max.</sub>

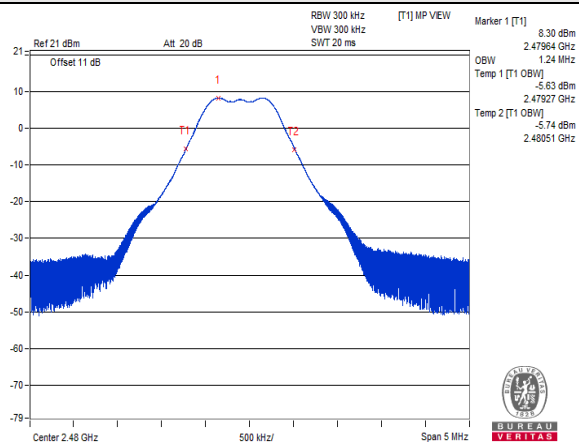


V<sub>min.</sub>

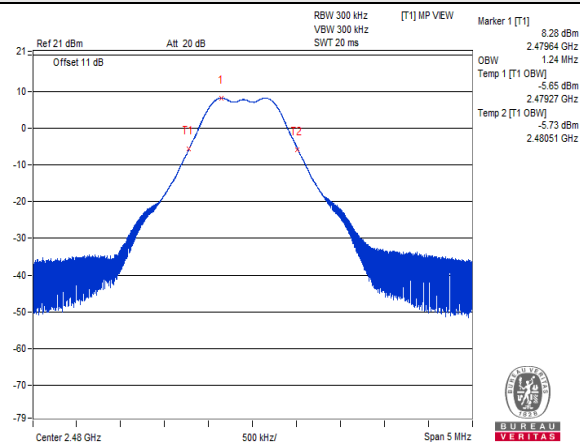


CH 19 (2440MHz)

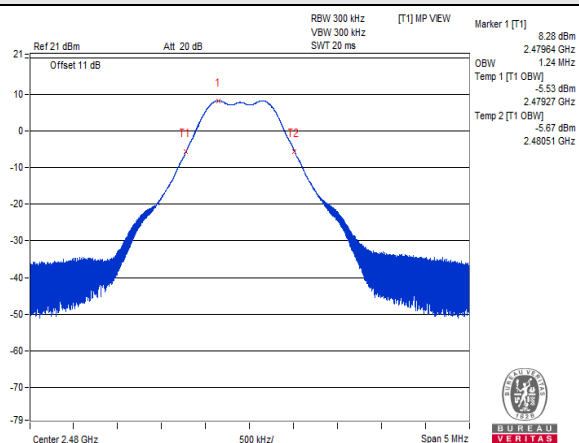
V<sub>normal</sub>



V<sub>max.</sub>



V<sub>min.</sub>

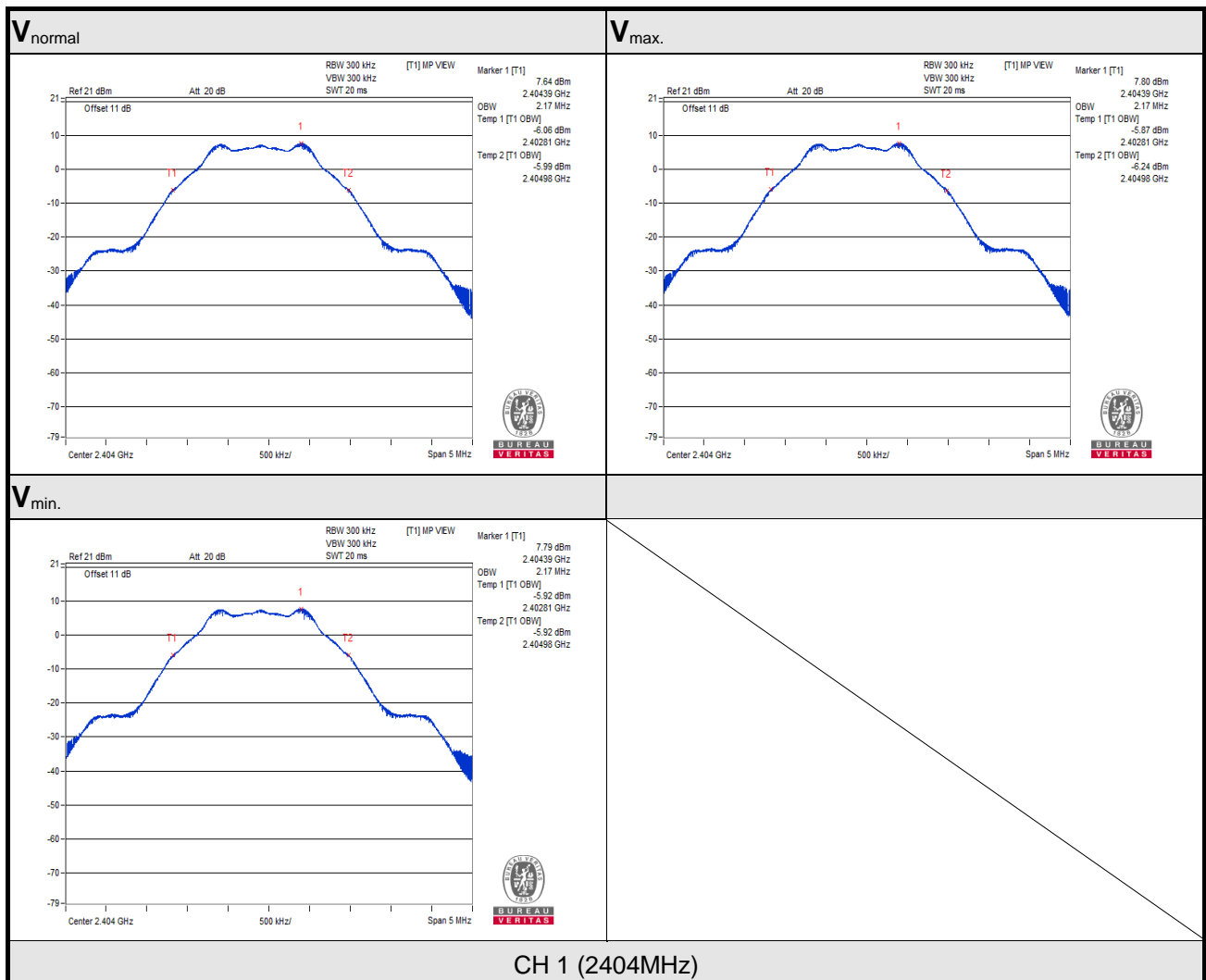


CH 39 (2480MHz)

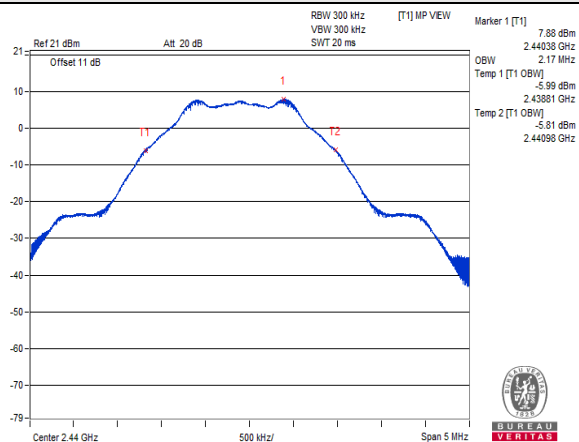
## GFSK (2Mbps)

Channel	Frequency (MHz)	V <sub>normal</sub>	V <sub>max.</sub>	V <sub>min.</sub>
		Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
1	2404	2.17	2.17	2.17
19	2440	2.17	2.17	2.17
38	2478	2.17	2.17	2.17

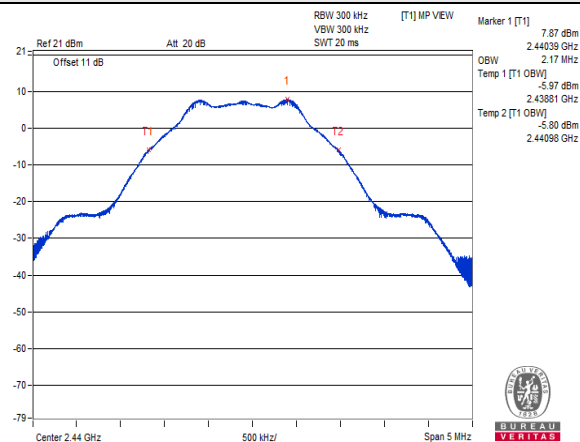
**NOTE:** For the test plots please refer to the below pages.



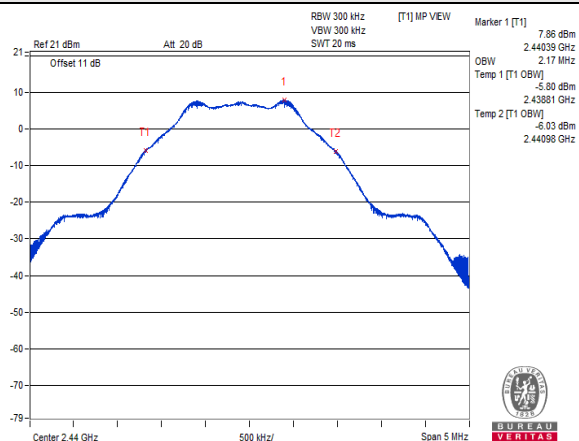
V<sub>normal</sub>



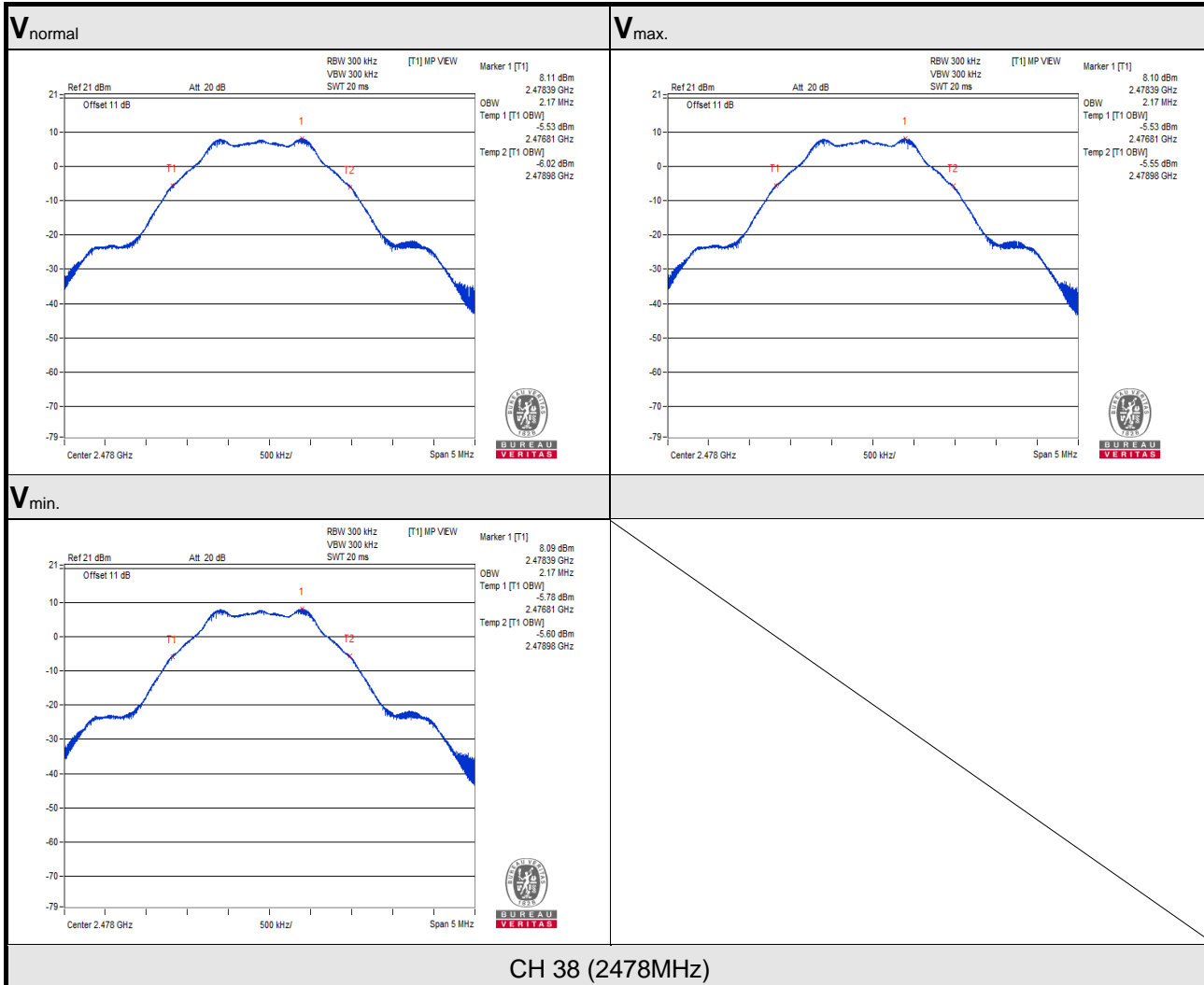
V<sub>max.</sub>



V<sub>min.</sub>



CH 19 (2440MHz)

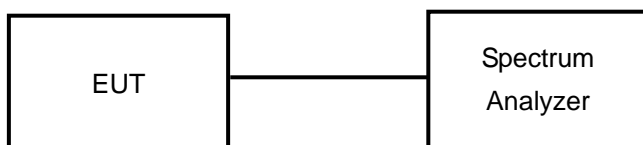


### 4.3 Spurious Emissions for Transmitter Measurement

#### 4.3.1 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	$\leq 2.5 \text{ uW/MHz}$

#### 4.3.2 Teset Setup



### 4.3.3 Test Results

#### GFSK (1Mbps)

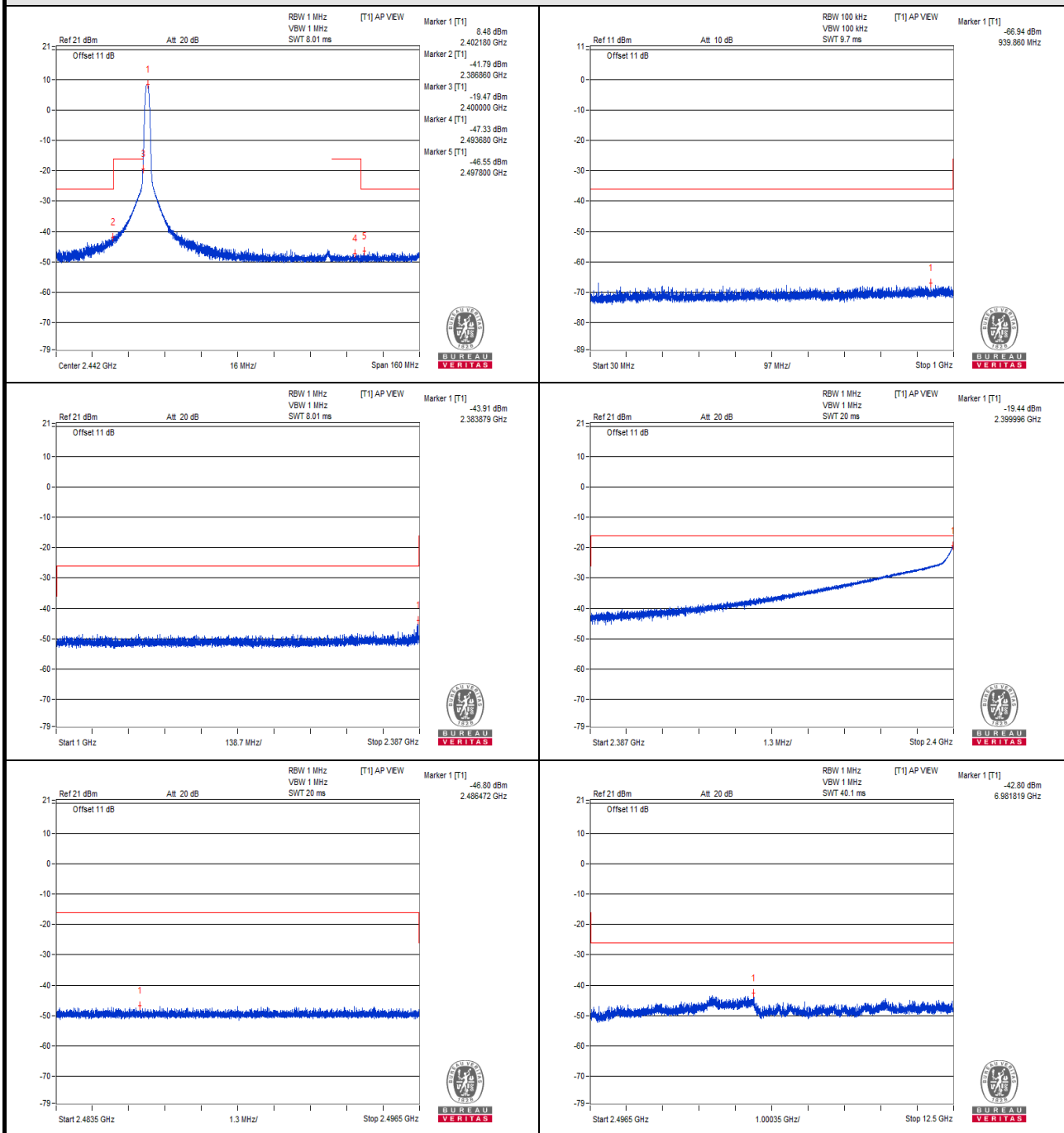
TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
<b>V<sub>normal</sub></b>	30MHz to 1000MHz	939.860	0.000202	0.25	PASS
	1000MHz to 2387MHz	2383.879	0.040644	2.5	PASS
	2387MHz to 2400MHz	2399.996	11.376273	25	PASS
	2483.5MHz to 2496.5MHz	2486.472	0.020893	25	PASS
	2496.5MHz to 12500MHz	6981.819	0.052481	2.5	PASS
<b>V<sub>max.</sub></b>	30MHz to 1000MHz	843.466	0.000170	0.25	PASS
	1000MHz to 2387MHz	2385.439	0.049888	2.5	PASS
	2387MHz to 2400MHz	2400.000	12.105981	25	PASS
	2483.5MHz to 2496.5MHz	2495.357	0.021232	25	PASS
	2496.5MHz to 12500MHz	5813.910	0.047098	2.5	PASS
<b>V<sub>min.</sub></b>	30MHz to 1000MHz	785.023	0.000181	0.25	PASS
	1000MHz to 2387MHz	2383.359	0.047098	2.5	PASS
	2387MHz to 2400MHz	2399.998	11.912420	25	PASS
	2483.5MHz to 2496.5MHz	2487.923	0.021528	25	PASS
	2496.5MHz to 12500MHz	5818.912	0.045290	2.5	PASS
TEST CHANNEL		CH 19 (2440MHz)			
<b>V<sub>normal</sub></b>	30MHz to 1000MHz	996.847	0.000226	0.25	PASS
	1000MHz to 2387MHz	1004.161	0.015311	2.5	PASS
	2387MHz to 2400MHz	2399.621	0.025177	25	PASS
	2483.5MHz to 2496.5MHz	2483.799	0.025704	25	PASS
	2496.5MHz to 12500MHz	6818.012	0.048306	2.5	PASS
<b>V<sub>max.</sub></b>	30MHz to 1000MHz	49.642	0.000185	0.25	PASS
	1000MHz to 2387MHz	2238.764	0.015560	2.5	PASS
	2387MHz to 2400MHz	2391.385	0.025061	25	PASS
	2483.5MHz to 2496.5MHz	2487.357	0.025003	25	PASS
	2496.5MHz to 12500MHz	6820.512	0.040458	2.5	PASS
<b>V<sub>min.</sub></b>	30MHz to 1000MHz	939.860	0.000192	0.25	PASS
	1000MHz to 2387MHz	1970.900	0.016144	2.5	PASS
	2387MHz to 2400MHz	2399.892	0.027416	25	PASS
	2483.5MHz to 2496.5MHz	2489.671	0.025003	25	PASS
	2496.5MHz to 12500MHz	6730.481	0.044875	2.5	PASS

TEST CHANNEL		CH 39 (2480MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
<b>V<sub>normal</sub></b>	30MHz to 1000MHz	993.331	0.000190	0.25	PASS
	1000MHz to 2387MHz	1057.560	0.017458	2.5	PASS
	2387MHz to 2400MHz	2399.873	0.020654	25	PASS
	2483.5MHz to 2496.5MHz	2483.543	1.534617	25	PASS
	2496.5MHz to 12500MHz	5877.683	0.043351	2.5	PASS
<b>V<sub>max.</sub></b>	30MHz to 1000MHz	993.088	0.000187	0.25	PASS
	1000MHz to 2387MHz	2313.662	0.016749	2.5	PASS
	2387MHz to 2400MHz	2398.724	0.022542	25	PASS
	2483.5MHz to 2496.5MHz	2483.508	1.584893	25	PASS
	2496.5MHz to 12500MHz	6824.264	0.043652	2.5	PASS
<b>V<sub>min.</sub></b>	30MHz to 1000MHz	935.737	0.000194	0.25	PASS
	1000MHz to 2387MHz	2201.142	0.018450	2.5	PASS
	2387MHz to 2400MHz	2399.610	0.025527	25	PASS
	2483.5MHz to 2496.5MHz	2483.530	1.531087	25	PASS
	2496.5MHz to 12500MHz	6079.003	0.047424	2.5	PASS

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

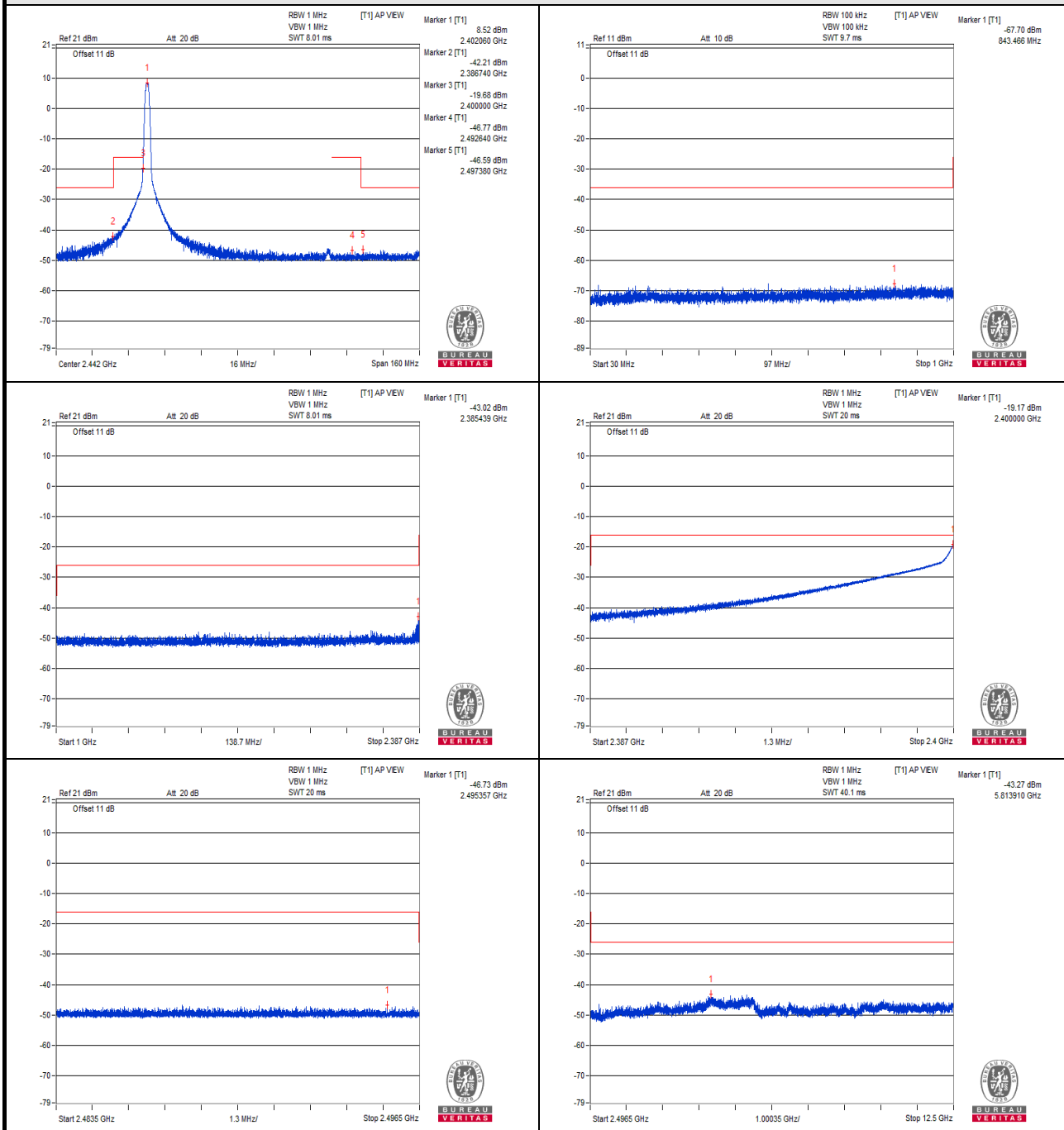


# Vnormal



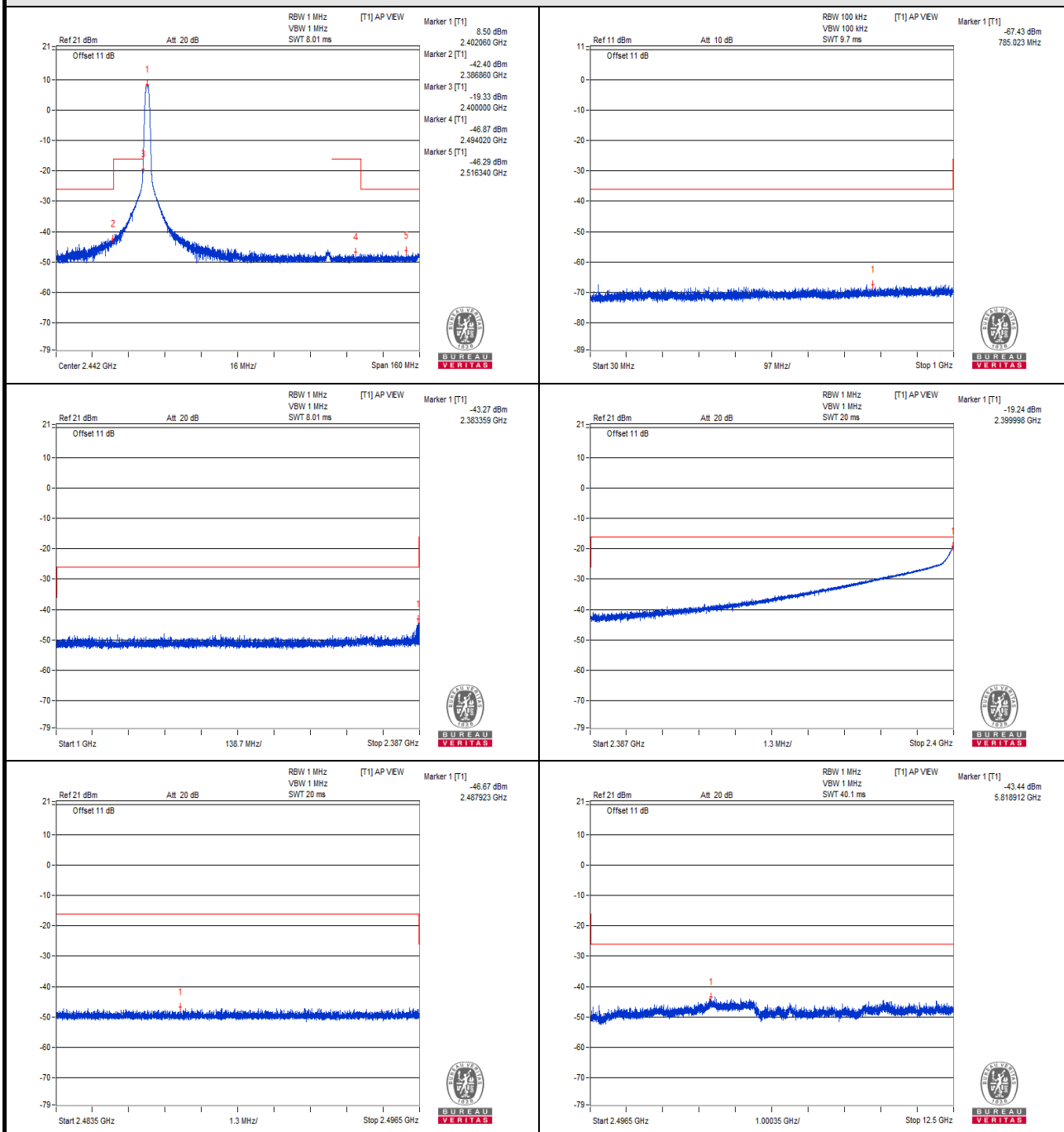
CH 0 (2402MHz)

V<sub>max</sub>.



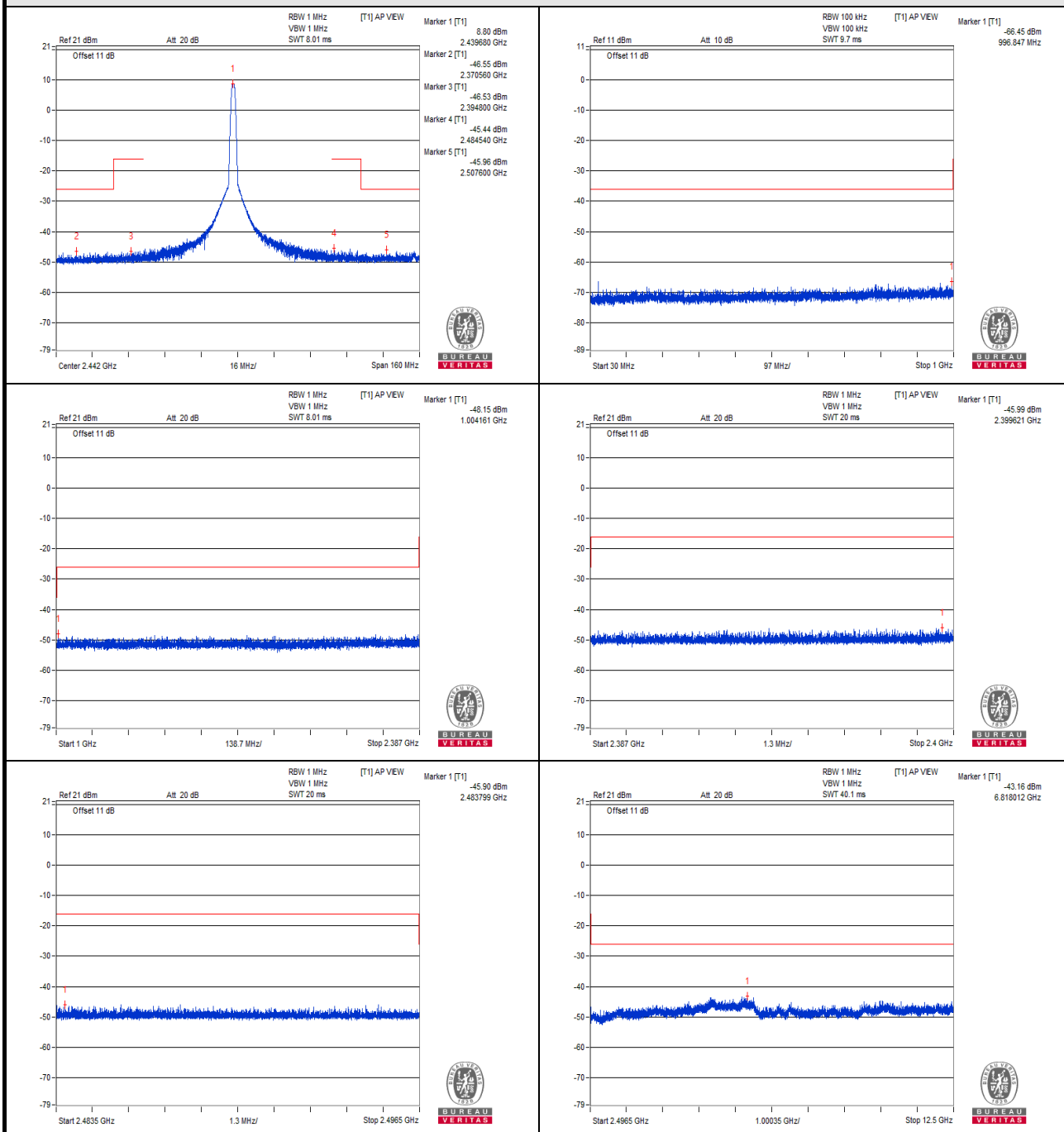
CH 0 (2402MHz)

V min.



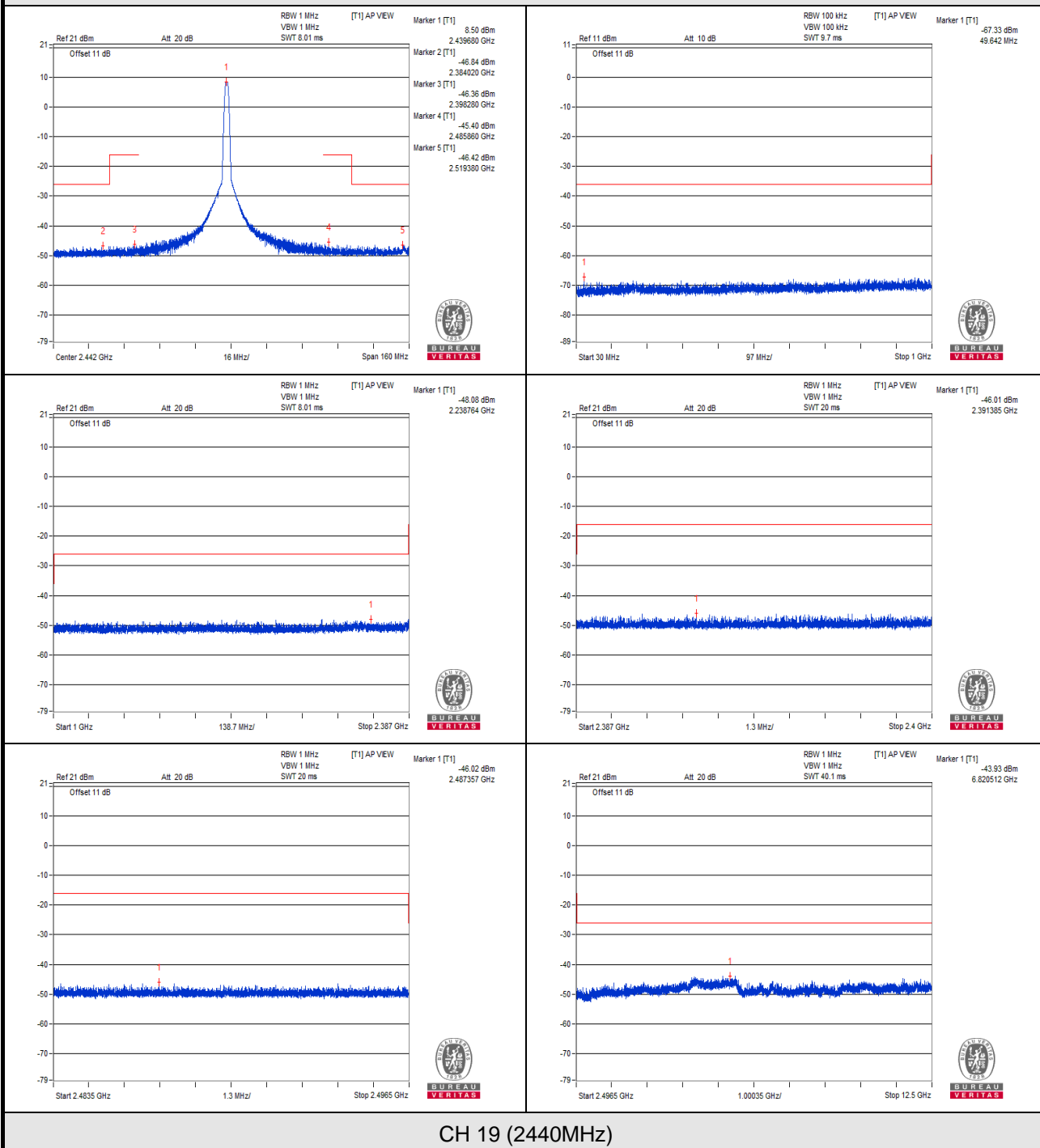
CH 0 (2402MHz)

# Vnormal

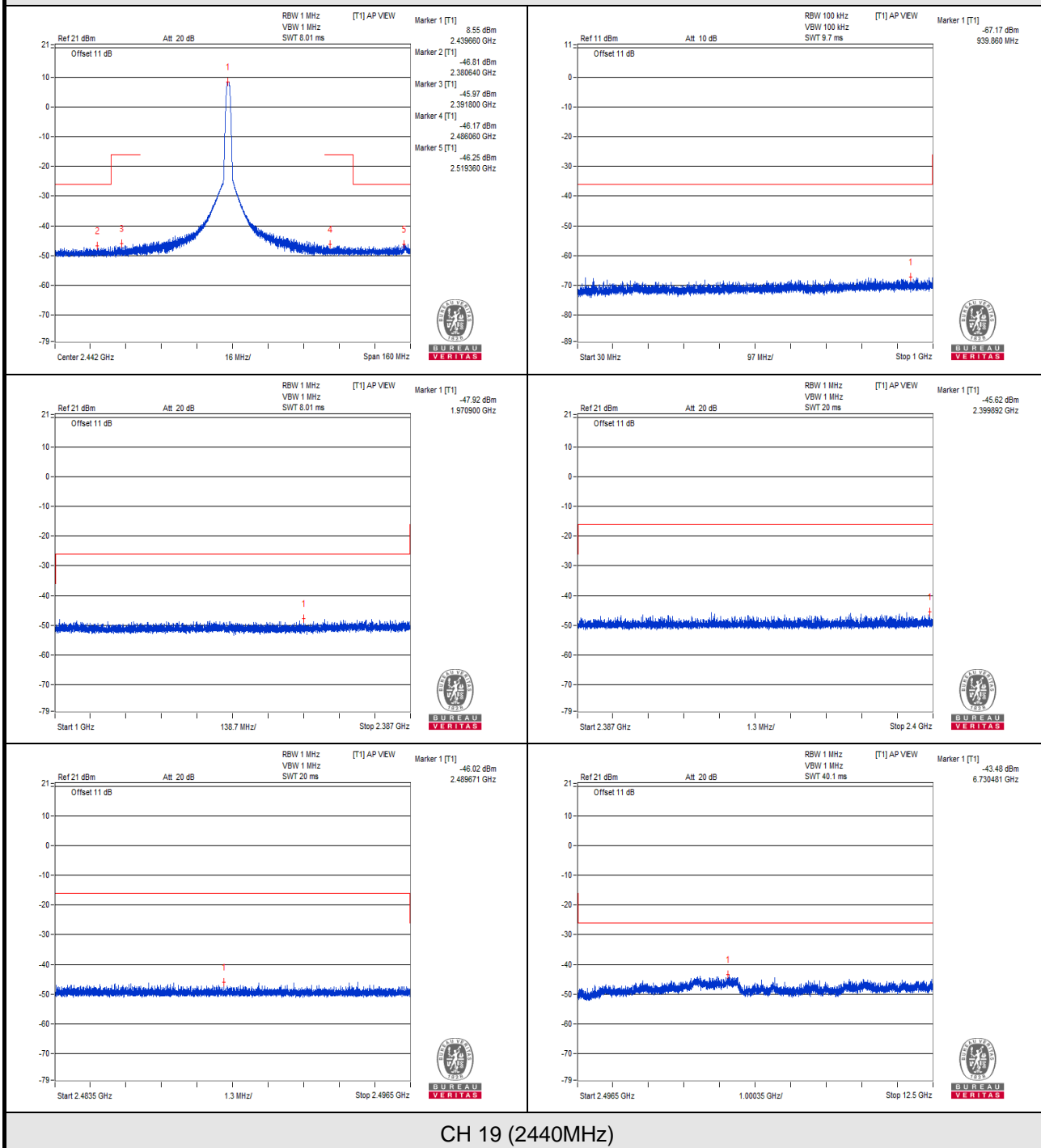


CH 19 (2440MHz)

V<sub>max</sub>.

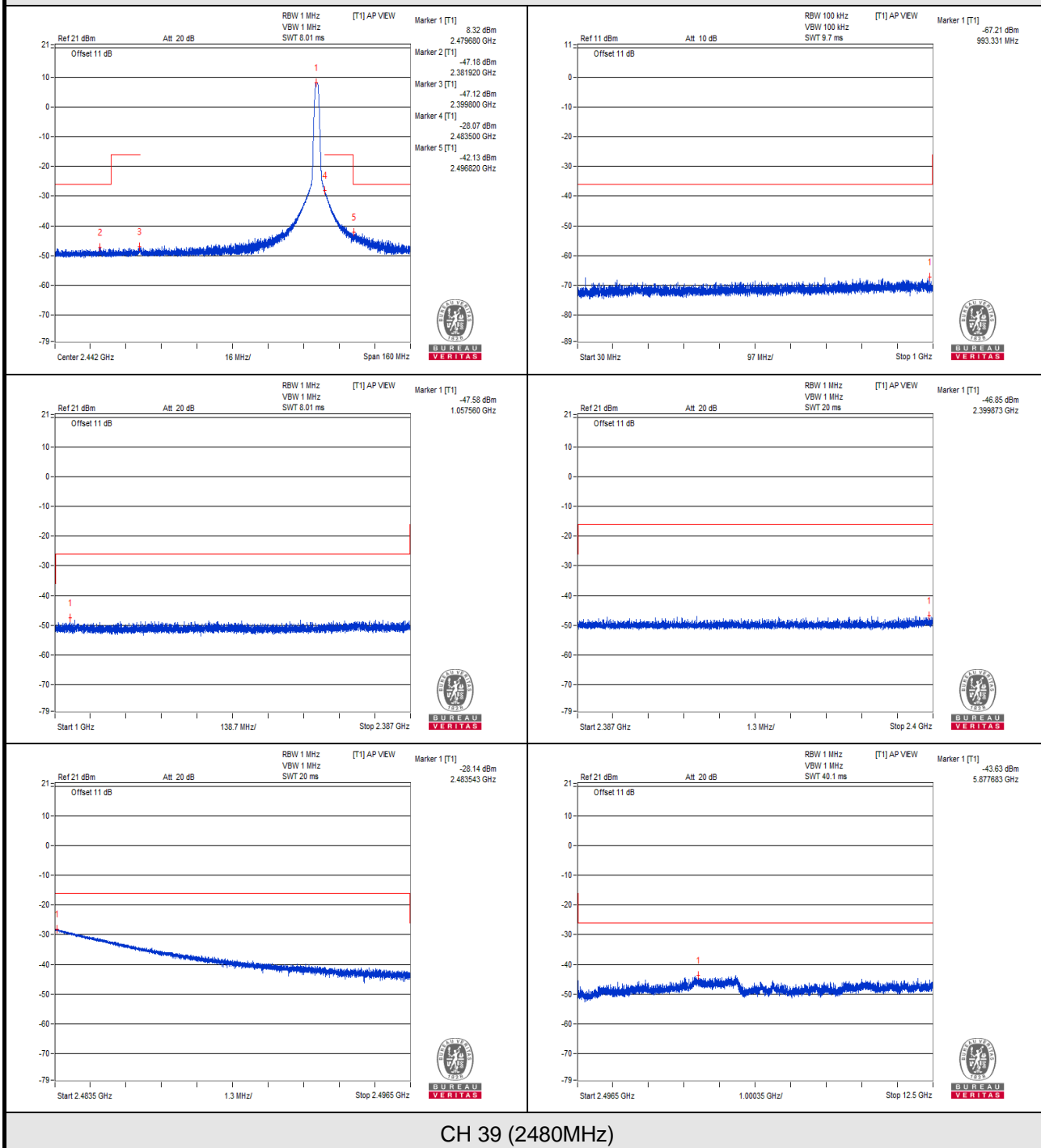


V<sub>min</sub>.



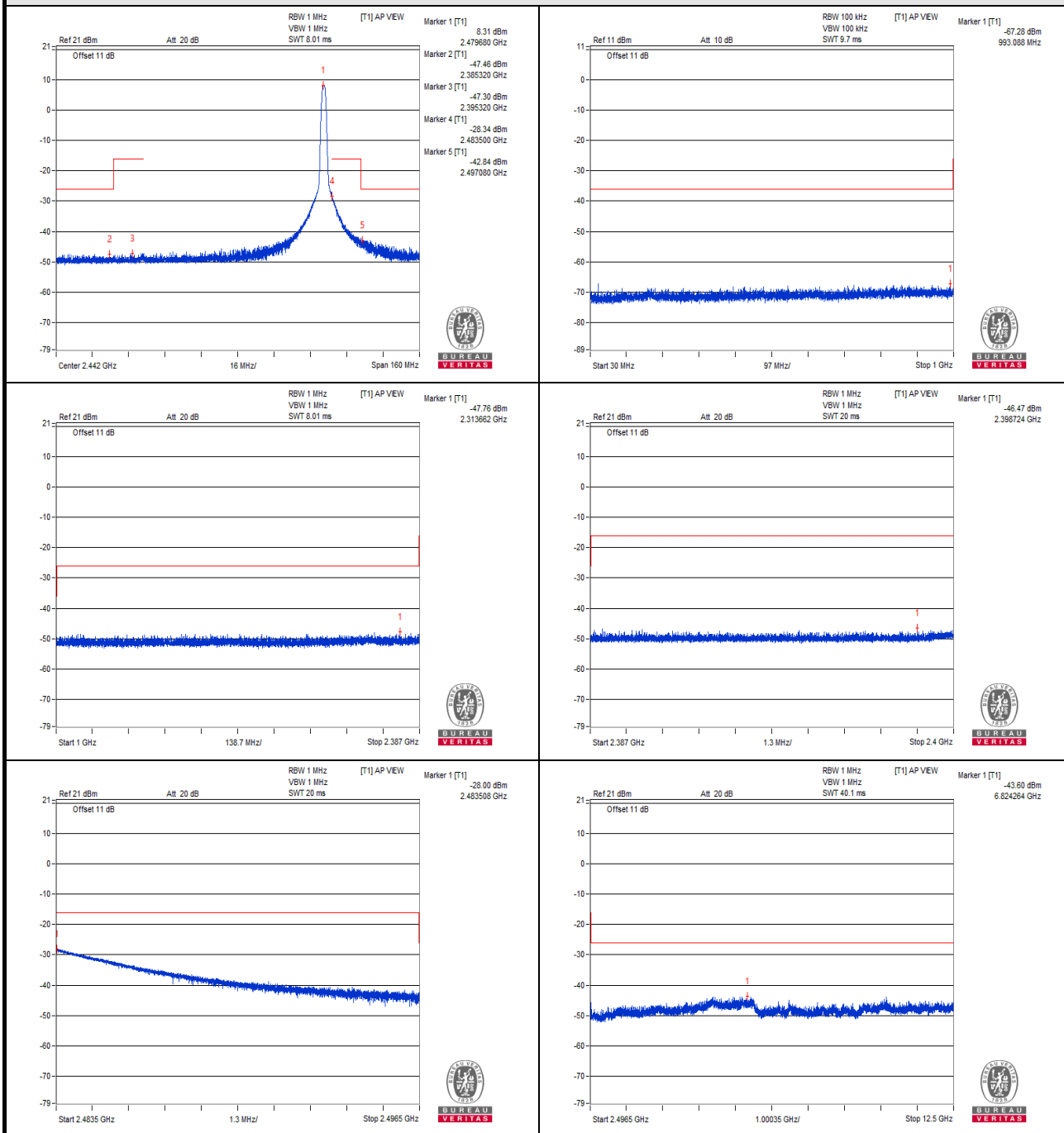
CH 19 (2440MHz)

# Vnormal



CH 39 (2480MHz)

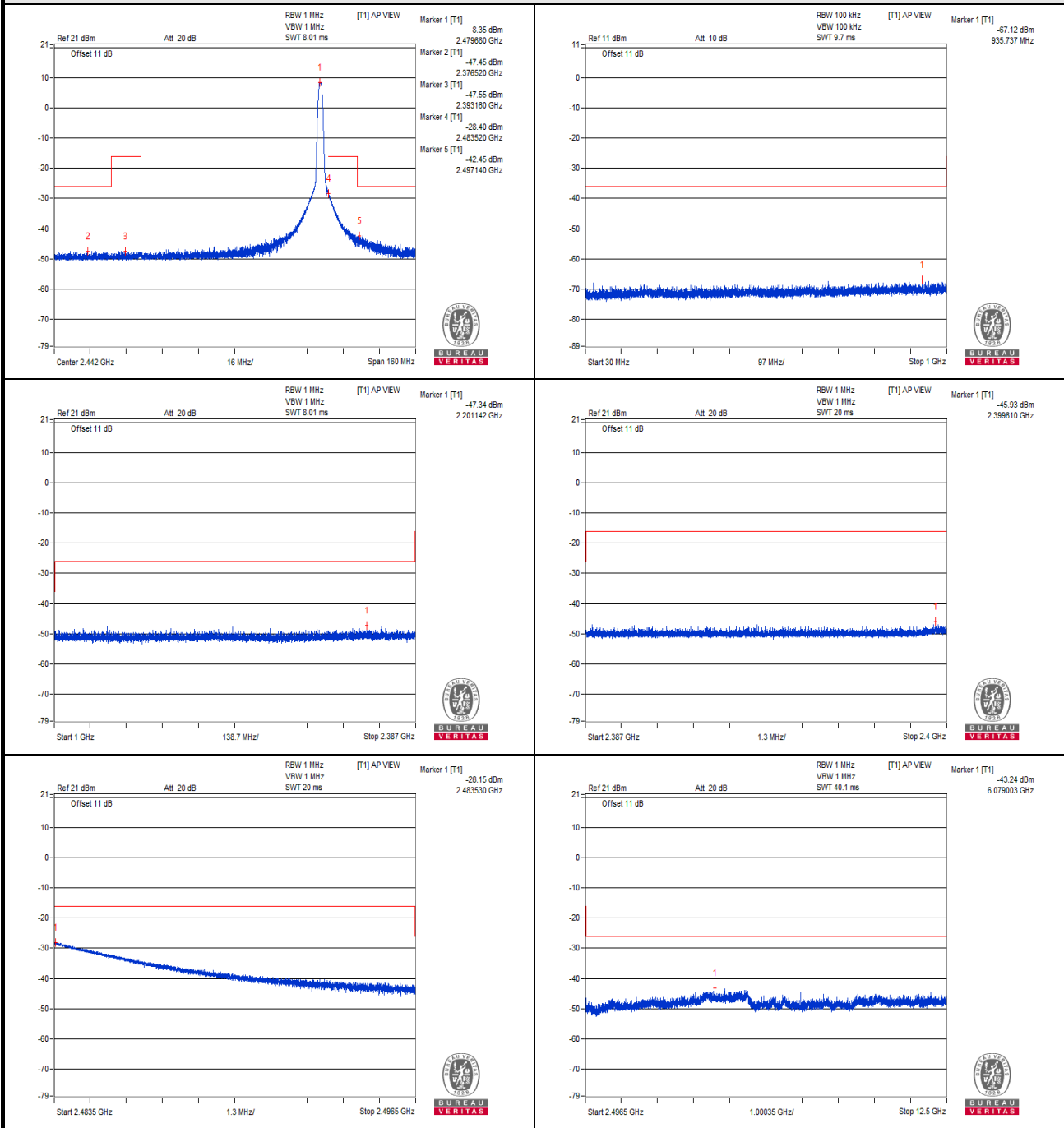
V<sub>max</sub>.



CH 39 (2480MHz)



V<sub>min</sub>.



CH 39 (2480MHz)

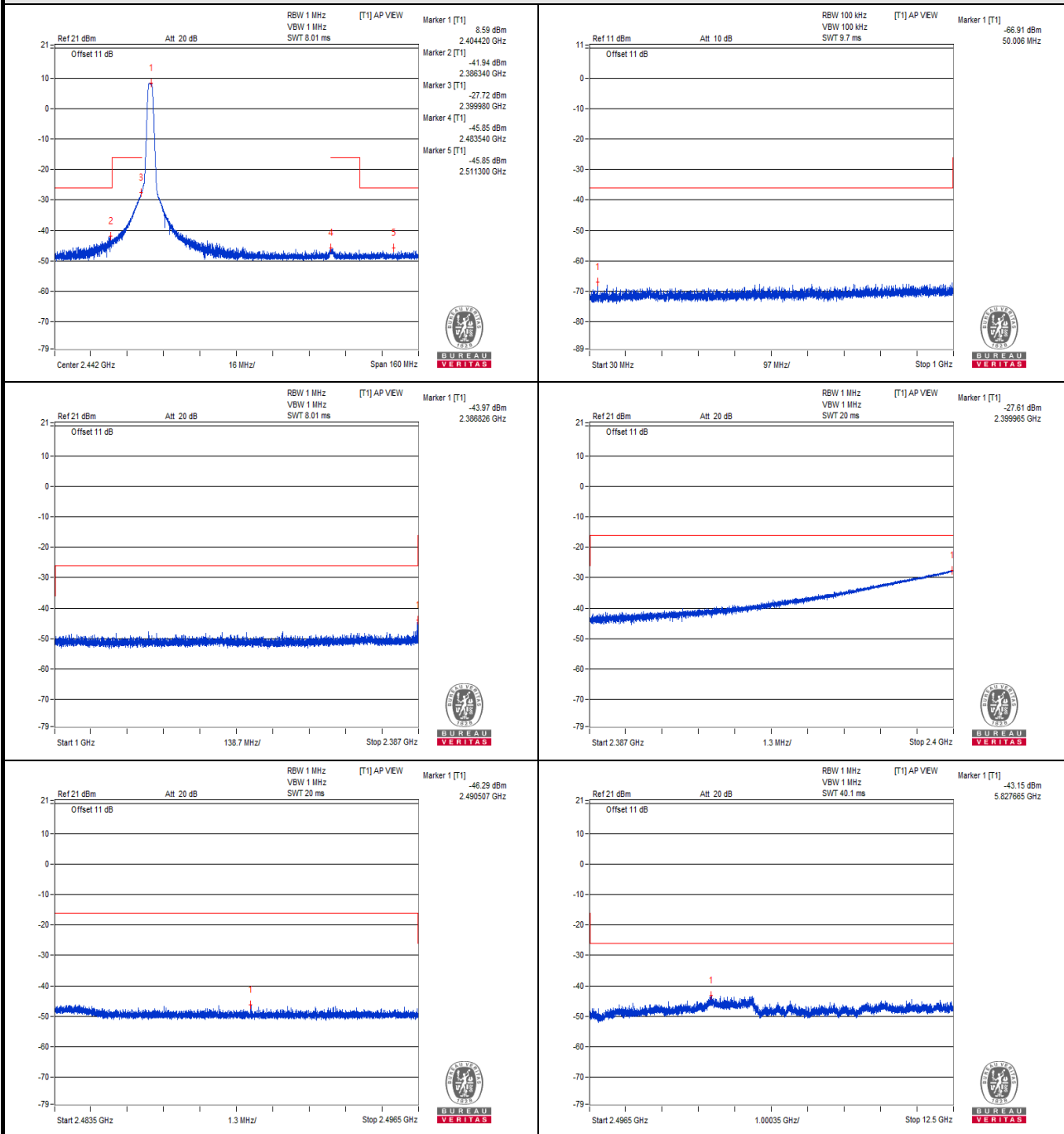
### GFSK (2Mbps)

TEST CHANNEL		CH 1 (2404MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
<b>V<sub>normal</sub></b>	30MHz to 1000MHz	50.006	0.000204	0.25	PASS
	1000MHz to 2387MHz	2386.826	0.040087	2.5	PASS
	2387MHz to 2400MHz	2399.965	1.733804	25	PASS
	2483.5MHz to 2496.5MHz	2490.507	0.023496	25	PASS
	2496.5MHz to 12500MHz	5827.665	0.048417	2.5	PASS
<b>V<sub>max.</sub></b>	30MHz to 1000MHz	983.752	0.000210	0.25	PASS
	1000MHz to 2387MHz	2386.306	0.029854	2.5	PASS
	2387MHz to 2400MHz	2399.987	1.749847	25	PASS
	2483.5MHz to 2496.5MHz	2484.332	0.029648	25	PASS
	2496.5MHz to 12500MHz	5901.441	0.046881	2.5	PASS
<b>V<sub>min.</sub></b>	30MHz to 1000MHz	815.578	0.000179	0.25	PASS
	1000MHz to 2387MHz	2386.826	0.042462	2.5	PASS
	2387MHz to 2400MHz	2399.995	1.753881	25	PASS
	2483.5MHz to 2496.5MHz	2484.410	0.028642	25	PASS
	2496.5MHz to 12500MHz	6012.730	0.044463	2.5	PASS
TEST CHANNEL		CH 19 (2440MHz)			
<b>V<sub>normal</sub></b>	30MHz to 1000MHz	838.858	0.000189	0.25	PASS
	1000MHz to 2387MHz	2307.594	0.015740	2.5	PASS
	2387MHz to 2400MHz	2397.673	0.027416	25	PASS
	2483.5MHz to 2496.5MHz	2490.172	0.023174	25	PASS
	2496.5MHz to 12500MHz	6665.458	0.043752	2.5	PASS
<b>V<sub>max.</sub></b>	30MHz to 1000MHz	950.772	0.000200	0.25	PASS
	1000MHz to 2387MHz	2215.705	0.018072	2.5	PASS
	2387MHz to 2400MHz	2397.361	0.025177	25	PASS
	2483.5MHz to 2496.5MHz	2488.947	0.023388	25	PASS
	2496.5MHz to 12500MHz	6910.544	0.046989	2.5	PASS
<b>V<sub>min.</sub></b>	30MHz to 1000MHz	49.400	0.000224	0.25	PASS
	1000MHz to 2387MHz	1570.403	0.015031	2.5	PASS
	2387MHz to 2400MHz	2398.176	0.023442	25	PASS
	2483.5MHz to 2496.5MHz	2485.076	0.026122	25	PASS
	2496.5MHz to 12500MHz	6870.530	0.047973	2.5	PASS

TEST CHANNEL		CH 38 (2478MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
<b>V<sub>normal</sub></b>	30MHz to 1000MHz	942.527	0.000205	0.25	PASS
	1000MHz to 2387MHz	1646.168	0.016444	2.5	PASS
	2387MHz to 2400MHz	2397.578	0.024774	25	PASS
	2483.5MHz to 2496.5MHz	2483.511	0.552077	25	PASS
	2496.5MHz to 12500MHz	5922.698	0.047424	2.5	PASS
<b>V<sub>max.</sub></b>	30MHz to 1000MHz	49.885	0.000244	0.25	PASS
	1000MHz to 2387MHz	1690.032	0.017498	2.5	PASS
	2387MHz to 2400MHz	2397.255	0.021777	25	PASS
	2483.5MHz to 2496.5MHz	2483.623	0.530884	25	PASS
	2496.5MHz to 12500MHz	6457.886	0.044566	2.5	PASS
<b>V<sub>min.</sub></b>	30MHz to 1000MHz	613.091	0.000182	0.25	PASS
	1000MHz to 2387MHz	1158.464	0.017298	2.5	PASS
	2387MHz to 2400MHz	2397.554	0.022491	25	PASS
	2483.5MHz to 2496.5MHz	2483.558	0.532108	25	PASS
	2496.5MHz to 12500MHz	5851.423	0.044361	2.5	PASS

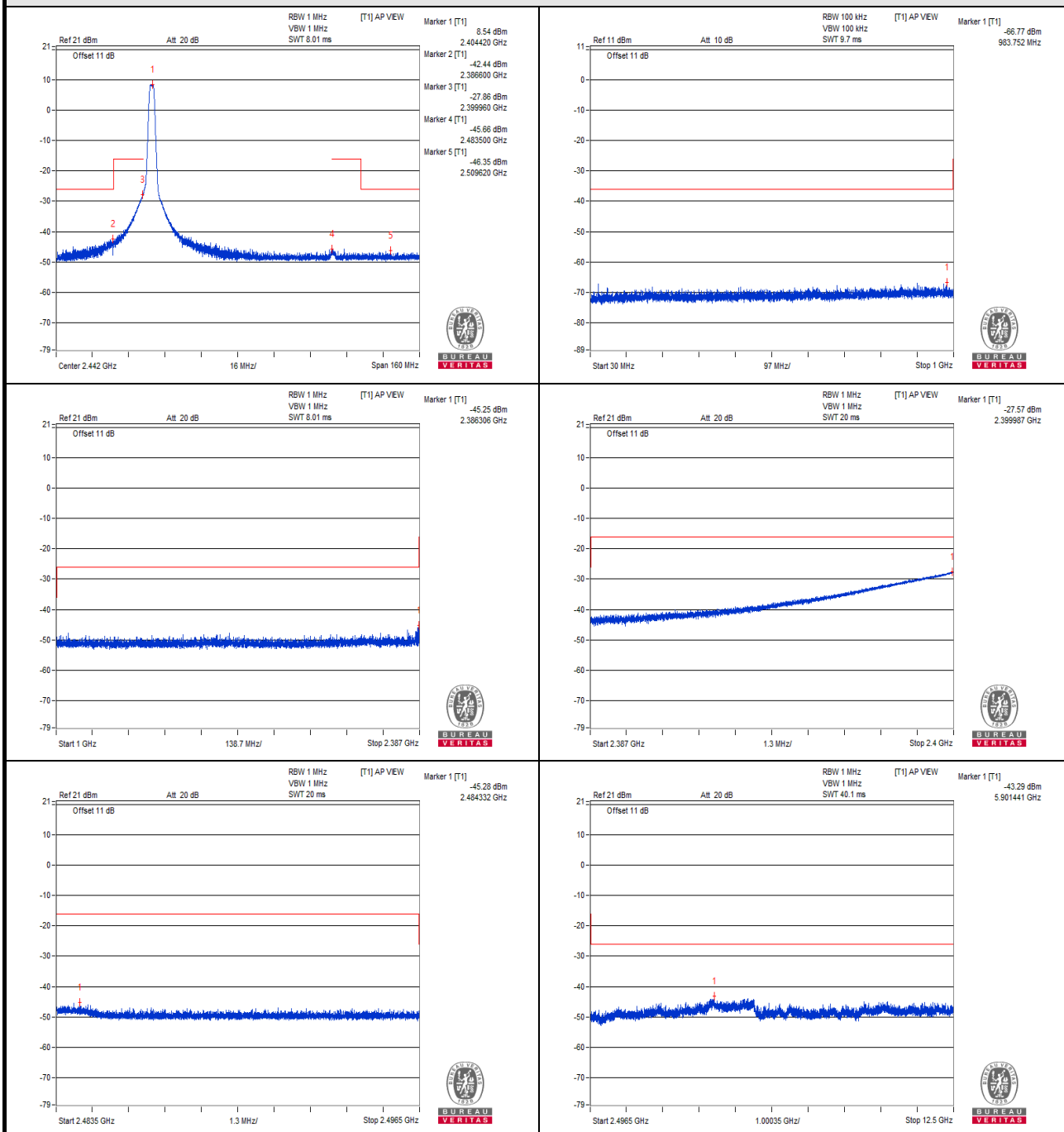
**NOTE:** The spectrum plots are attached on the following pages.

# Vnormal



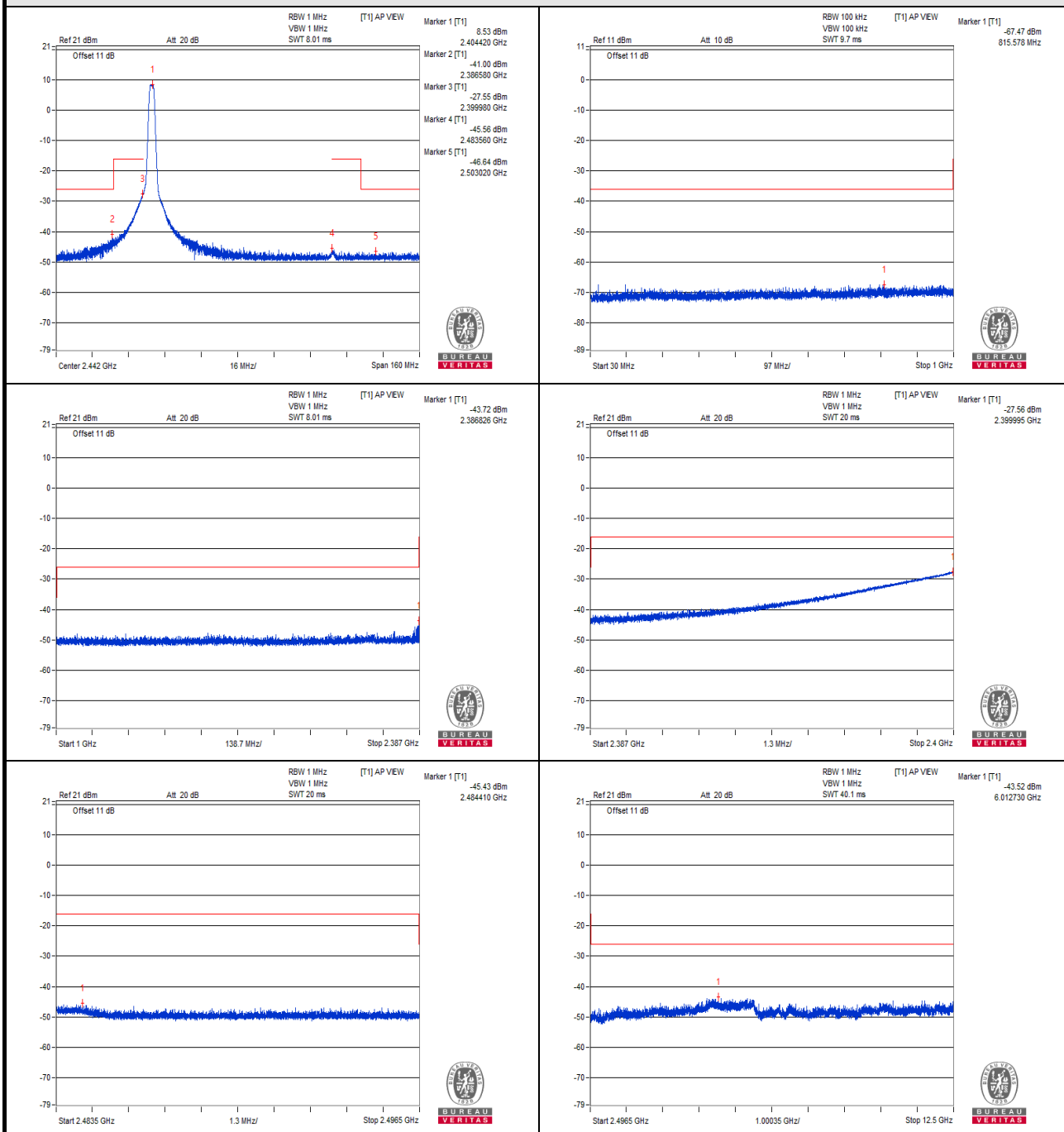
CH 1 (2404MHz)

V<sub>max</sub>.



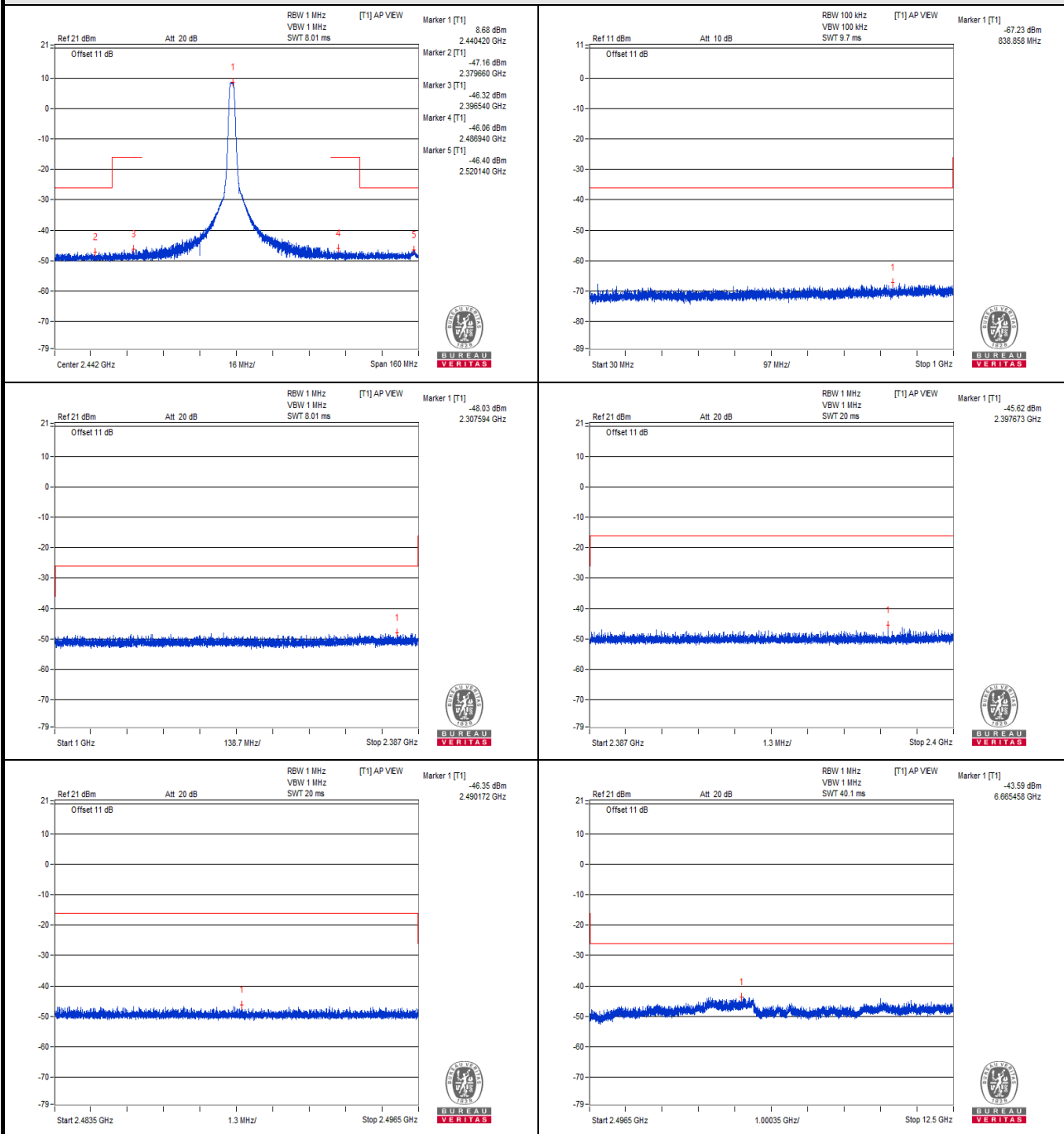
CH 1 (2404MHz)

V min.



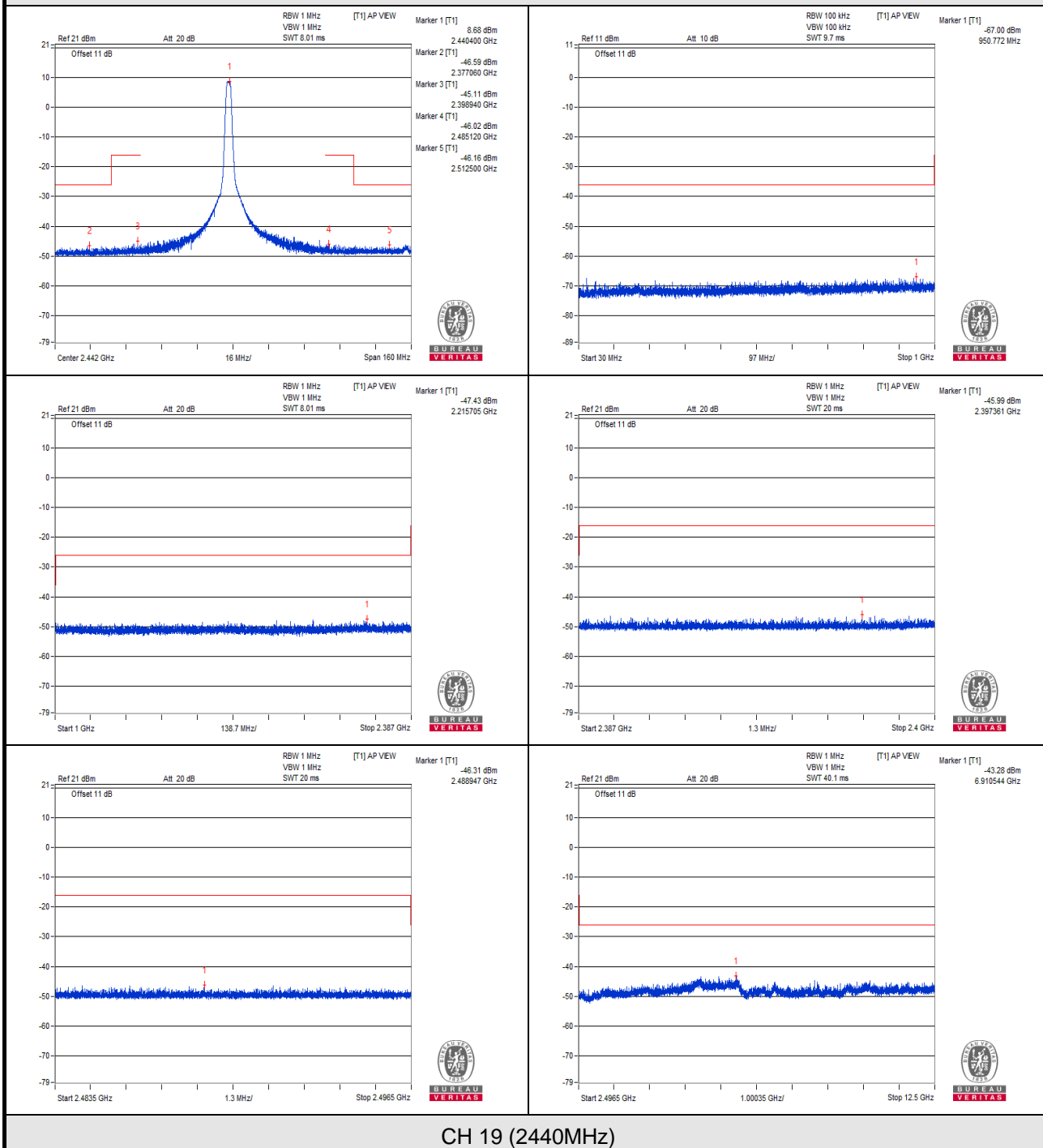
CH 1 (2404MHz)

# Vnormal



CH 19 (2440MHz)

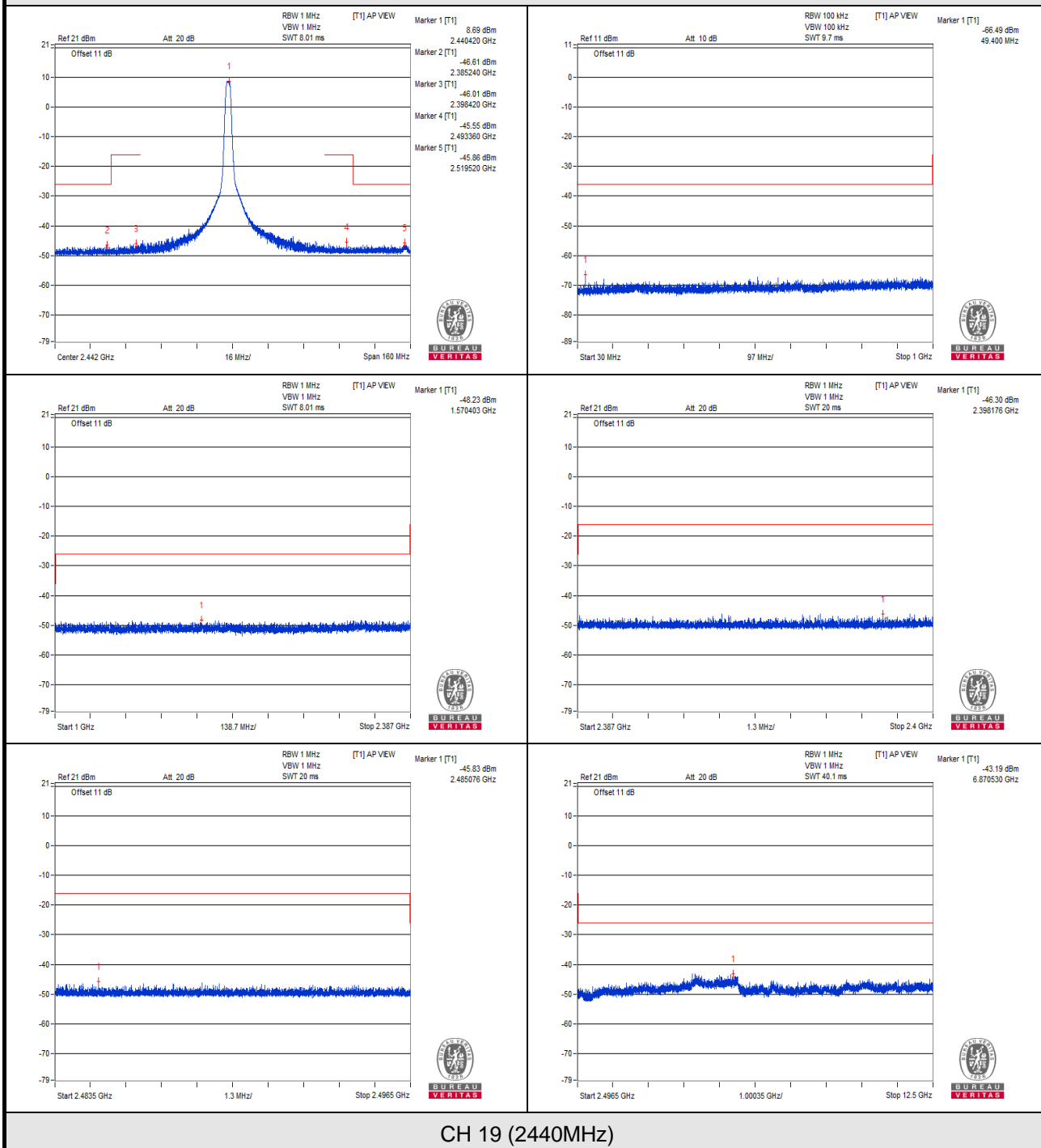
V<sub>max</sub>.



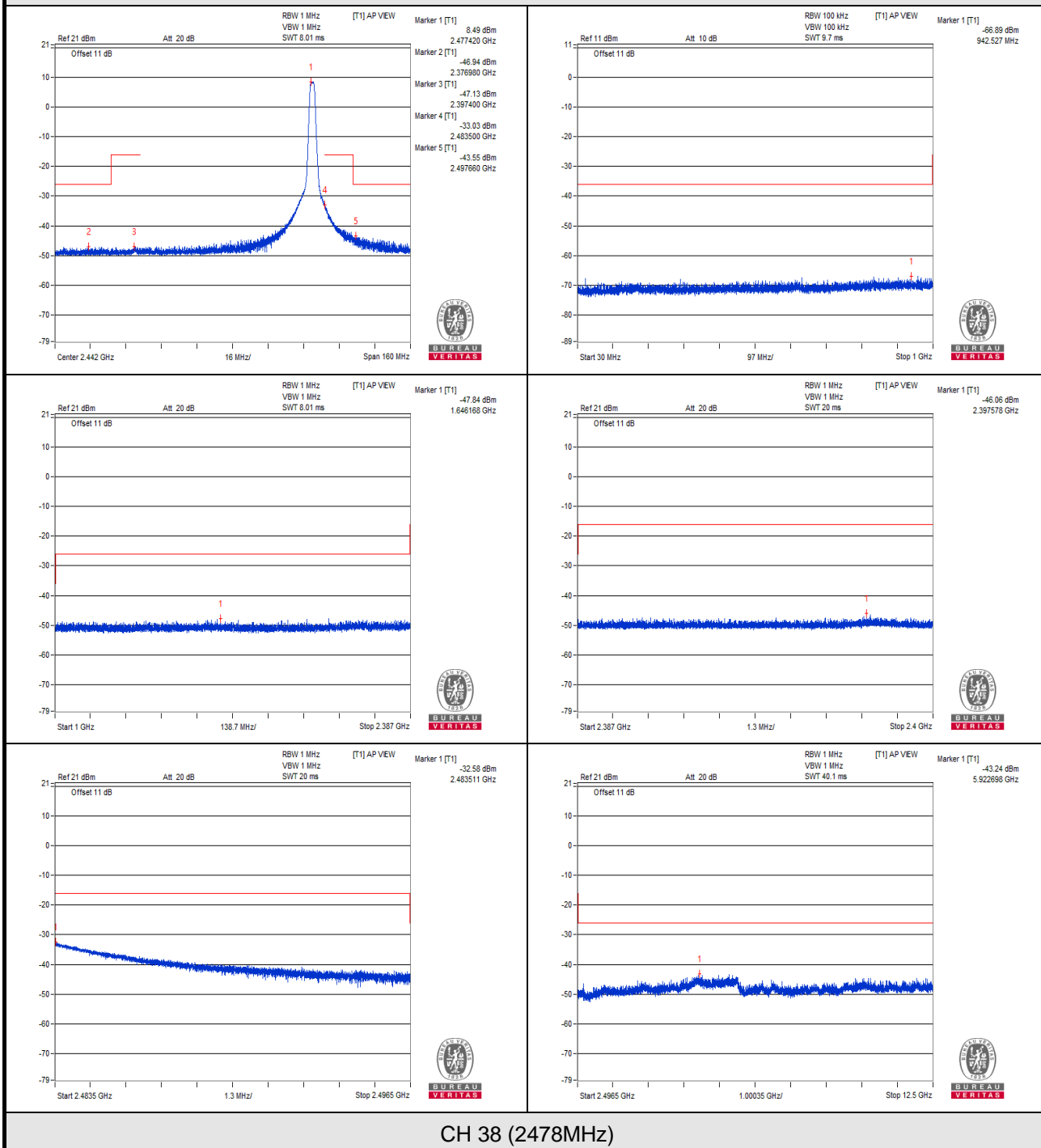
CH 19 (2440MHz)



V<sub>min</sub>.

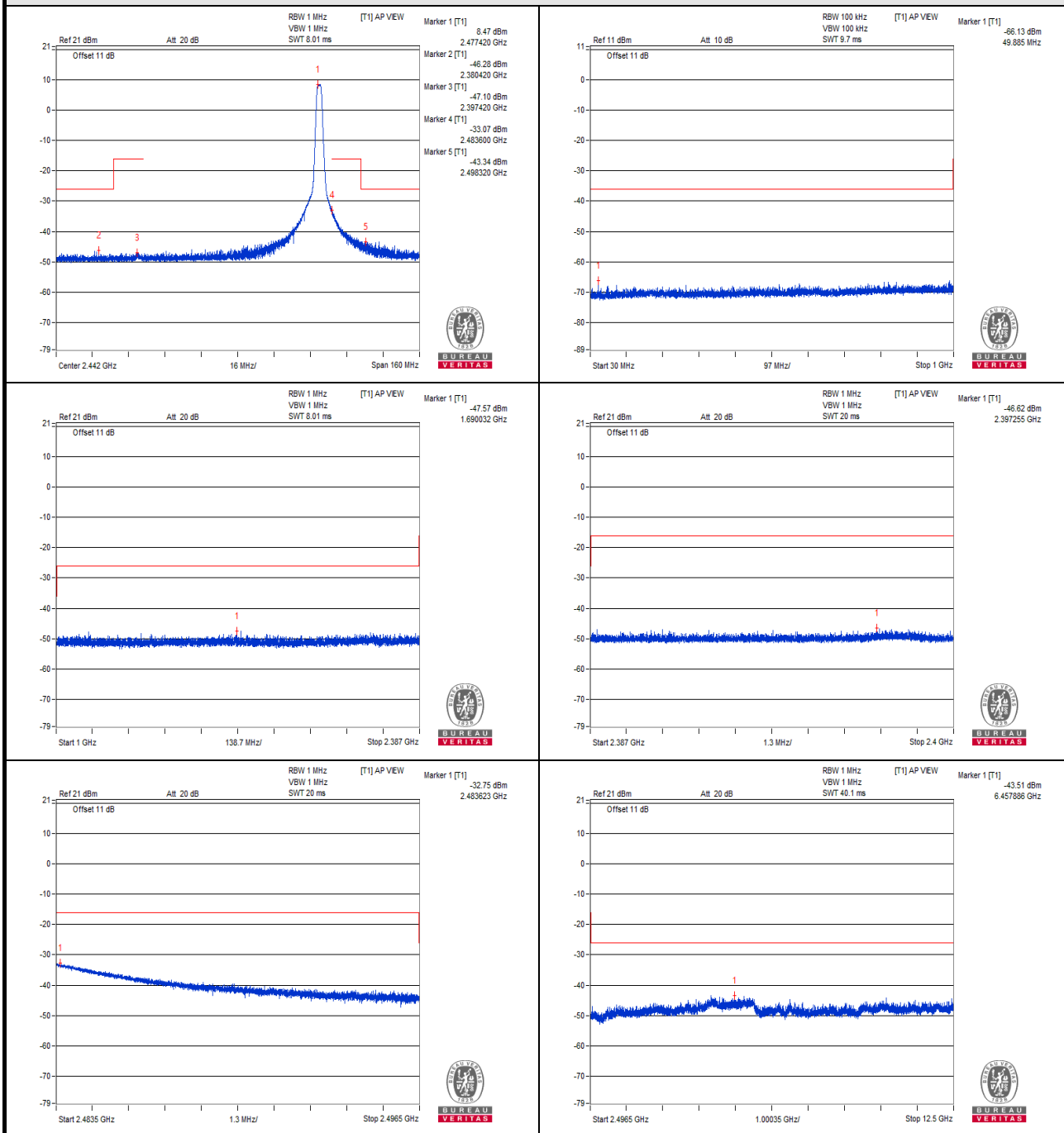


# Vnormal



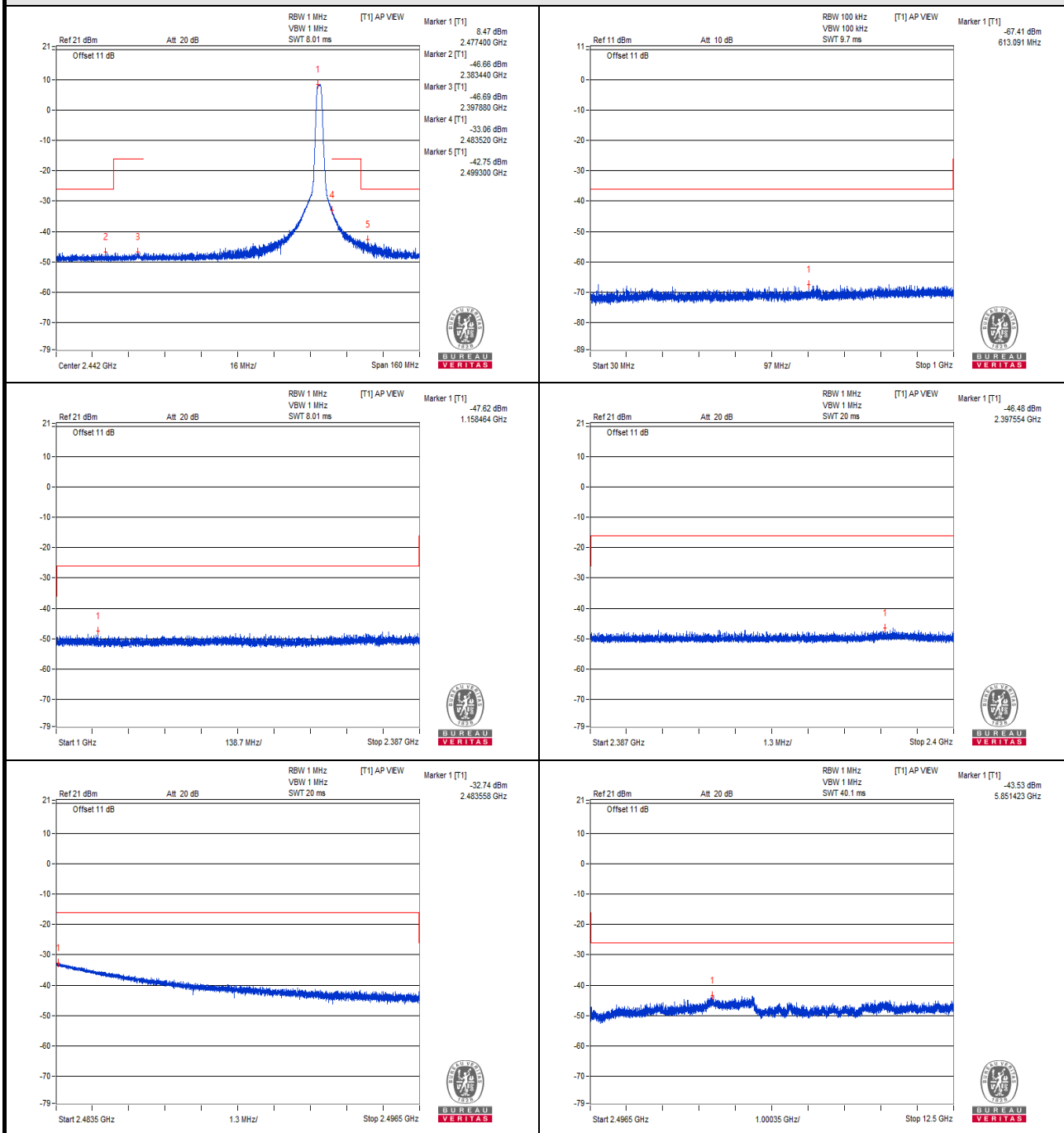
CH 38 (2478MHz)

V<sub>max</sub>.



CH 38 (2478MHz)

V<sub>min</sub>.



CH 38 (2478MHz)

## 4.4 Antenna Power Measurement

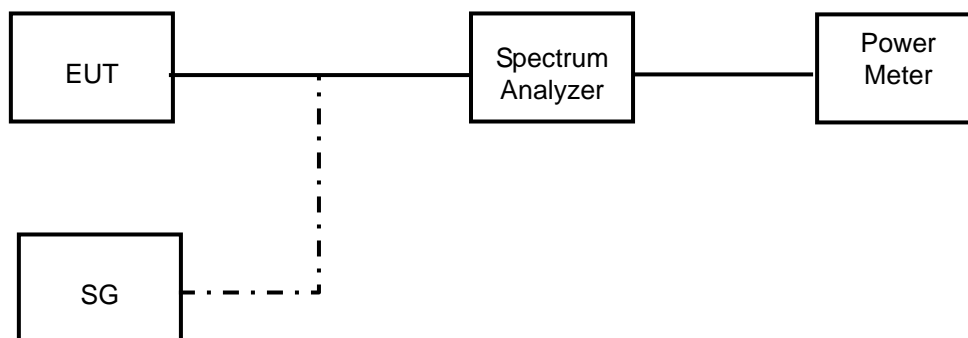
### 4.4.1 Limits of Antenna Power

Modulation Method	Frequency Band Used	Antenna Power (Max.)	EIRP Limit (Note 3)
DSSS	2400 – 2483.5 MHz	10mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 1)	2400 – 2483.5 MHz	10mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 2)	2400 – 2483.5 MHz	5mW/MHz	9.13 dBm/MHz ~ 19.13 dBm/MHz (8.185 mW/MHz ~ 81.846 mW/MHz)
Other than the above	2400 – 2483.5 MHz	10mW	12.14 dBm ~ 22.14 dBm (16.368 mW ~ 163.68 mW)

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  $A = \text{EIRP} / (2.14 \text{ dBi} + \text{Antenna Power (limit)})$ .
4. Tolerance of antenna power shall be +20% (upper value) and -80% (lower value).

### 4.4.2 Test Setup



#### 4.4.3 Test Results

##### GFSK (1Mbps)

Voltage	Channel Number	Frequency (MHz)	Conducted RF Output Power (mW)	Radiated RF Output Power (mW)
<b>V<sub>normal</sub></b>	<b>0</b>	<b>2402</b>	6.637	13.803
	<b>19</b>	<b>2440</b>	7.063	14.689
	<b>39</b>	<b>2480</b>	<b>7.516</b>	<b>15.631</b>
<b>V<sub>max.</sub></b>	<b>0</b>	<b>2402</b>	6.546	13.614
	<b>19</b>	<b>2440</b>	6.902	14.354
	<b>39</b>	<b>2480</b>	7.178	14.928
<b>V<sub>min.</sub></b>	<b>0</b>	<b>2402</b>	6.839	14.223
	<b>19</b>	<b>2440</b>	6.887	14.323
	<b>39</b>	<b>2480</b>	7.261	15.101
<b>Max. Limit (mW)</b>			10	-
<b>Rated Power (mW)</b>			7.6	-
<b>Tolerance of Antenna Power (mW)</b>			1.52 ~ 9.12	-
<b>Max. EIRP Limit (mW)</b>			-	16.368

Note: 1. Antenna gain is 3.18 dBi.

2. The radiated RF output power is a “calculated” value derived from the conducted value.

3. Formula: Radiated RF output power = Conducted RF output power + Antenna gain

##### GFSK (2Mbps)

Voltage	Channel Number	Frequency (MHz)	Conducted RF Output Power (mW)	Radiated RF Output Power (mW)
<b>V<sub>normal</sub></b>	<b>1</b>	<b>2404</b>	6.699	13.932
	<b>19</b>	<b>2440</b>	7.079	14.722
	<b>38</b>	<b>2478</b>	7.551	15.704
<b>V<sub>max.</sub></b>	<b>1</b>	<b>2404</b>	6.561	13.645
	<b>19</b>	<b>2440</b>	6.761	14.061
	<b>38</b>	<b>2478</b>	7.464	15.523
<b>V<sub>min.</sub></b>	<b>1</b>	<b>2404</b>	6.699	13.932
	<b>19</b>	<b>2440</b>	7.129	14.826
	<b>38</b>	<b>2478</b>	<b>7.780</b>	<b>16.180</b>
<b>Max. Limit (mW)</b>			10	-
<b>Rated Power (mW)</b>			7.6	-
<b>Tolerance of Antenna Power (mW)</b>			1.52 ~ 9.12	-
<b>Max. EIRP Limit (mW)</b>			-	16.368

Note: 1. Antenna gain is 3.18 dBi.

2. The radiated RF output power is a “calculated” value derived from the conducted value.

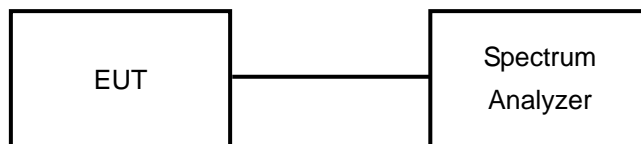
3. Formula: Radiated RF output power = Conducted RF output power + Antenna gain

## 4.5 Spurious Emissions for Receiver

### 4.5.1 Limits of Spurious Emissions For Receiver

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

### 4.5.2 Test Setup



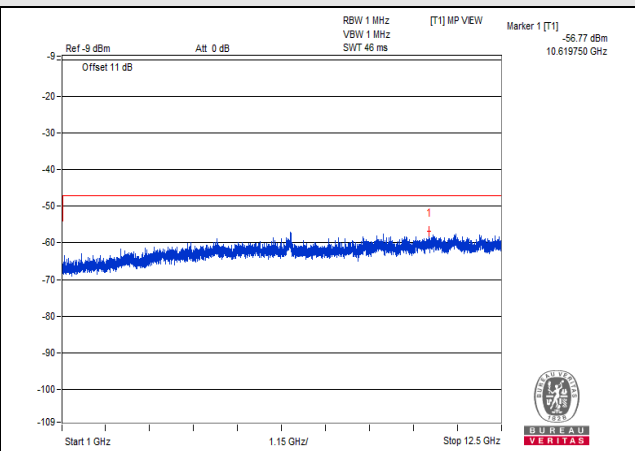
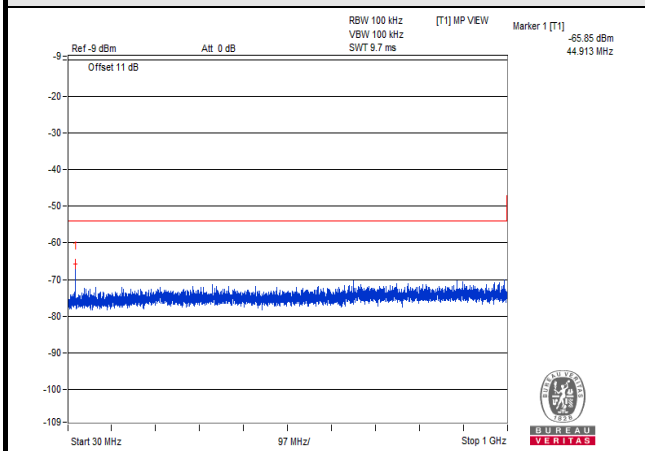
#### 4.5.3 Test Result

##### GFSK (1Mbps)

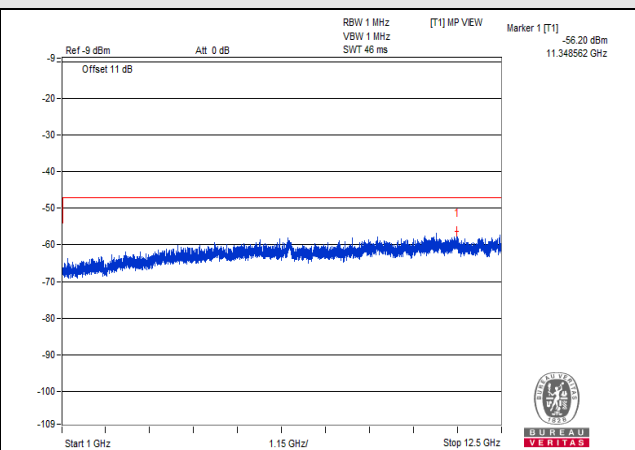
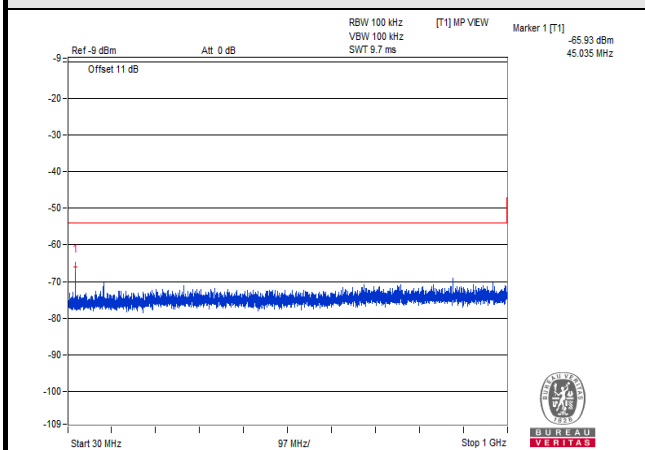
TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(nW)	LIMIT (nW)	RESULT
$V_{normal}$	30MHz to 1000MHz	44.913	0.260016	4.0	PASS
	1000MHz to 12500MHz	10619.750	2.103778	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	45.035	0.255270	4.0	PASS
	1000MHz to 12500MHz	11348.562	2.398833	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	44.913	0.235505	4.0	PASS
	1000MHz to 12500MHz	10438.625	1.815516	20.0	PASS
TEST CHANNEL		CH 19 (2440MHz)			
$V_{normal}$	30MHz to 1000MHz	44.913	0.235505	4.0	PASS
	1000MHz to 12500MHz	9604.875	2.506109	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	45.035	0.233884	4.0	PASS
	1000MHz to 12500MHz	11360.062	2.060630	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	45.035	0.311172	4.0	PASS
	1000MHz to 12500MHz	11325.562	2.027683	20.0	PASS
TEST CHANNEL		CH 39 (2480MHz)			
$V_{normal}$	30MHz to 1000MHz	45.035	0.252348	4.0	PASS
	1000MHz to 12500MHz	10293.437	1.999862	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	45.035	0.244343	4.0	PASS
	1000MHz to 12500MHz	12113.312	1.909853	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	45.035	0.218273	4.0	PASS
	1000MHz to 12500MHz	11233.562	1.949845	20.0	PASS



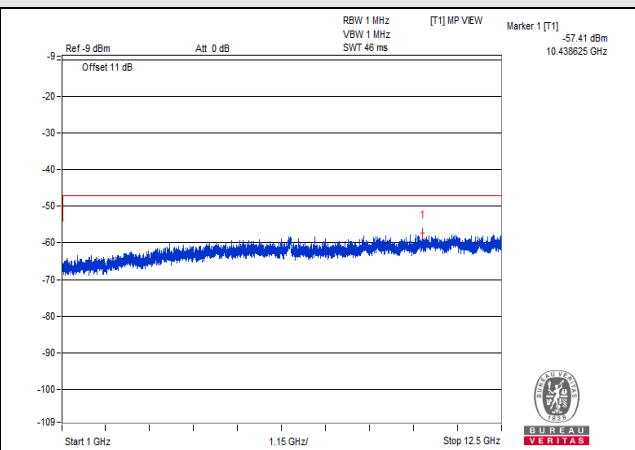
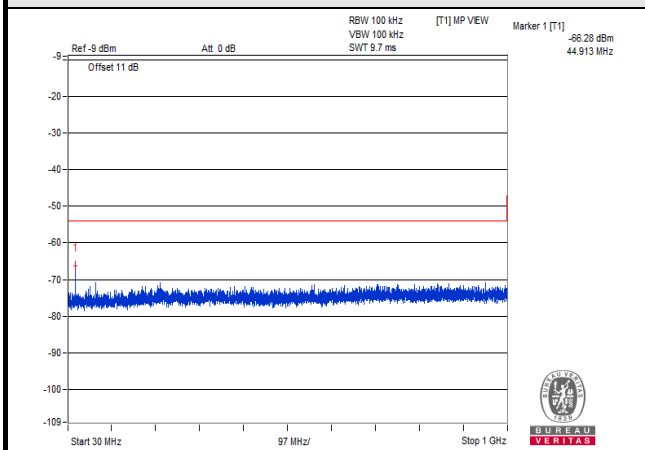
## V<sub>normal</sub>



## V<sub>max.</sub>

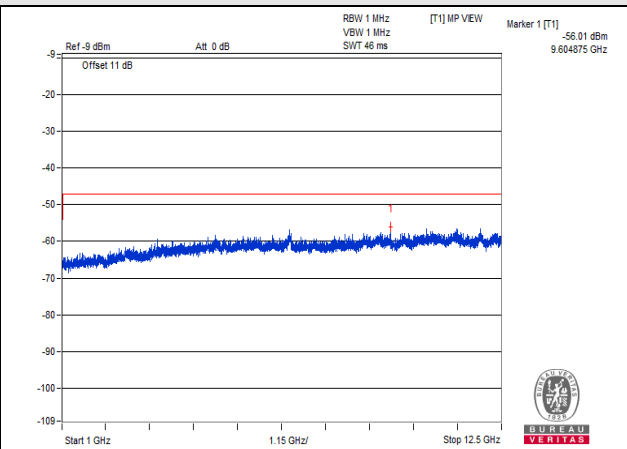
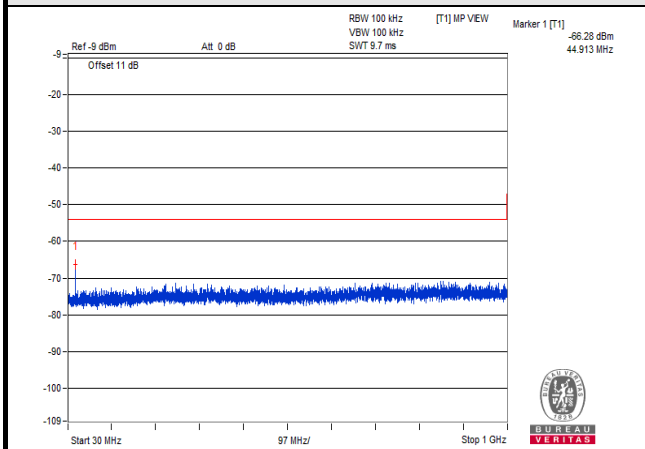


## V<sub>min.</sub>

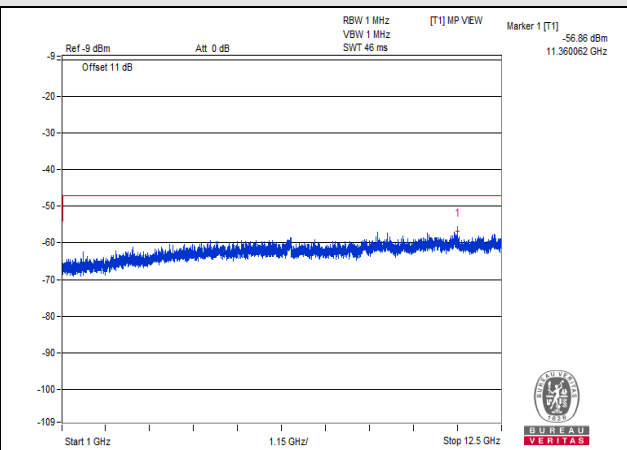
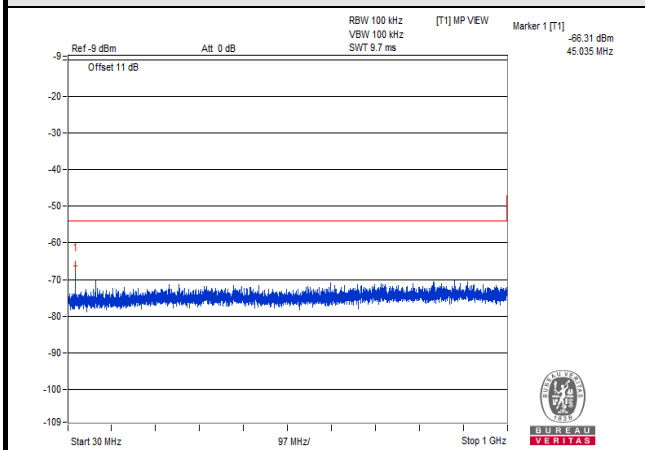


CH 0 (2402MHz)

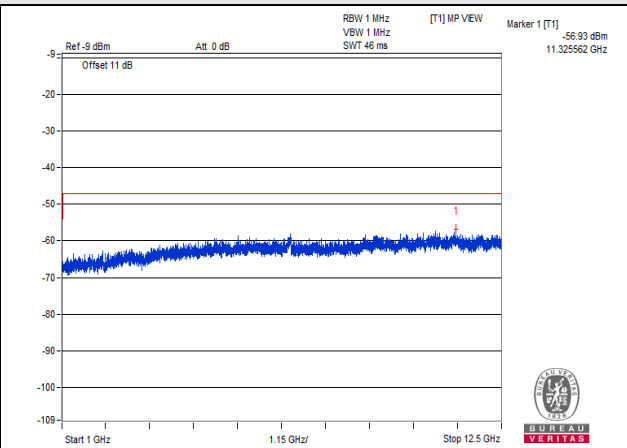
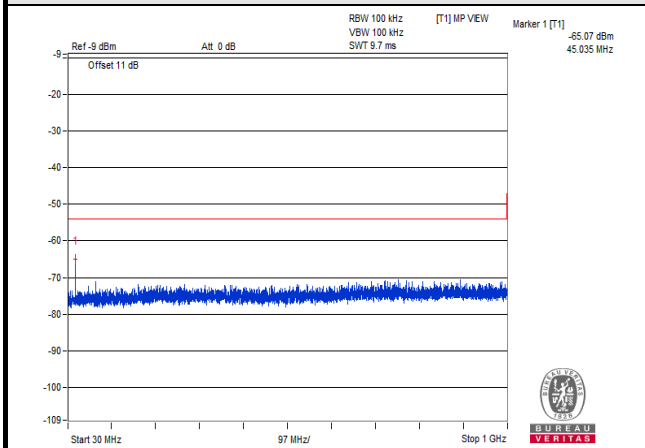
## V<sub>normal</sub>



## V<sub>max.</sub>

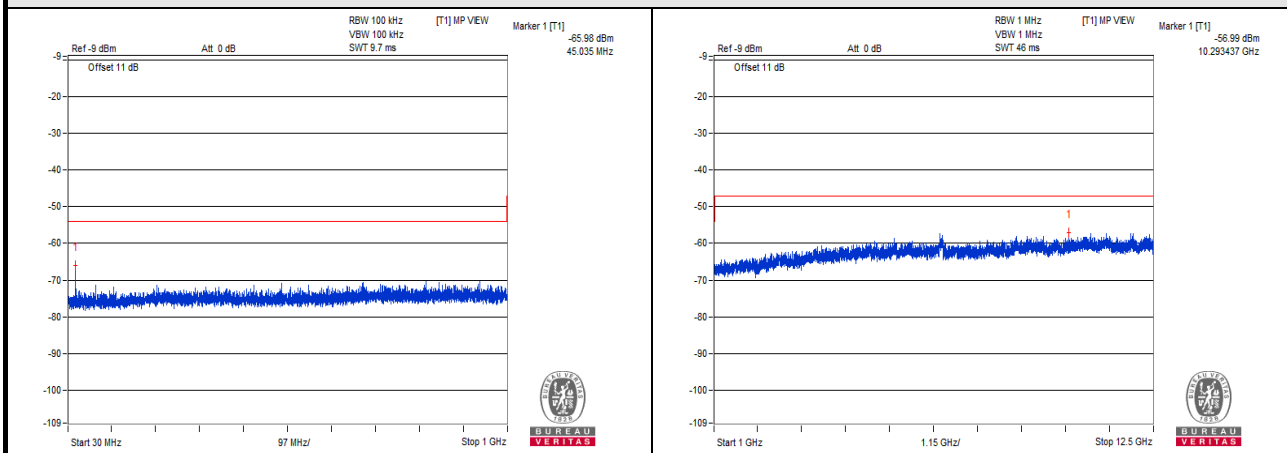


## V<sub>min.</sub>

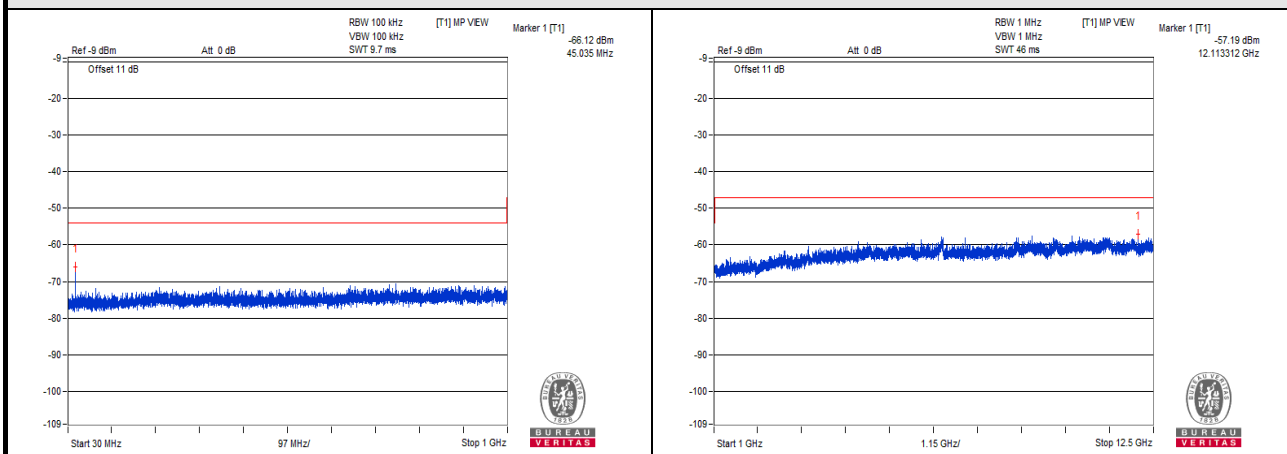


CH 19 (2440MHz)

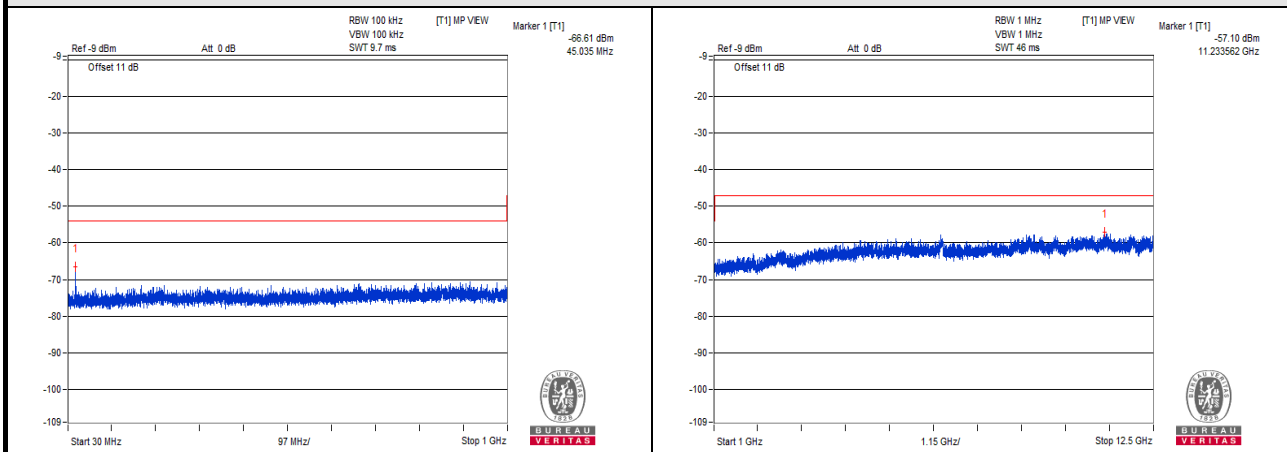
## V<sub>normal</sub>



## V<sub>max.</sub>



## V<sub>min.</sub>

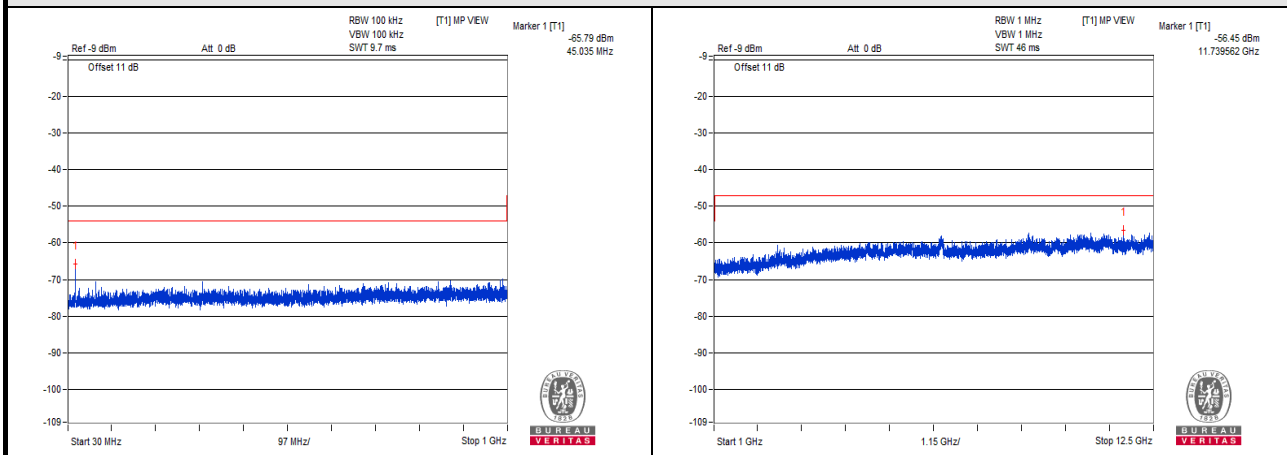


CH 39 (2480MHz)

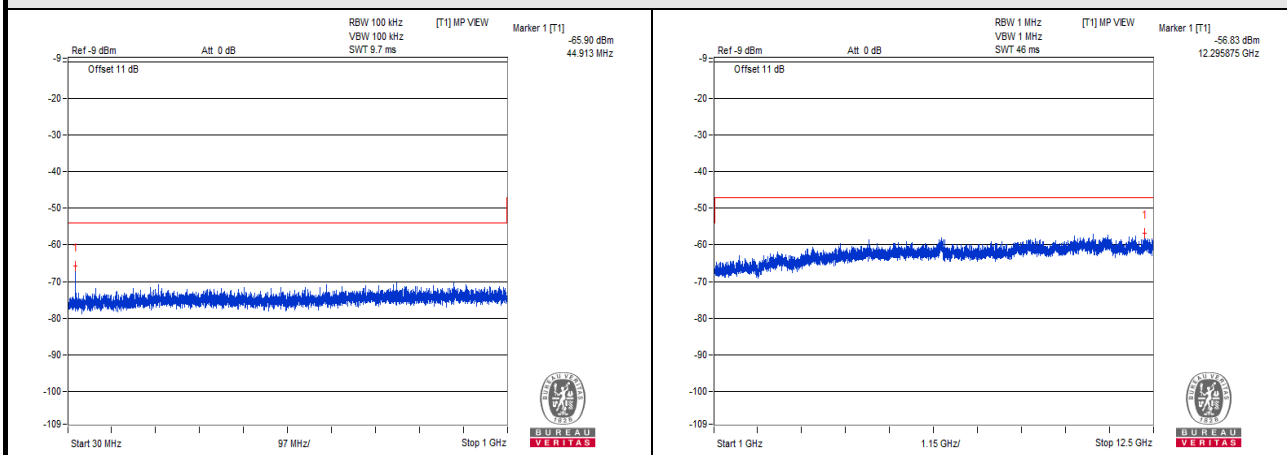
### GFSK (2Mbps)

TEST CHANNEL		CH 1 (2404MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(nW)	LIMIT (nW)	RESULT
<b>V<sub>normal</sub></b>	30MHz to 1000MHz	45.035	0.263633	4.0	PASS
	1000MHz to 12500MHz	11739.562	2.264644	20.0	PASS
<b>V<sub>max.</sub></b>	30MHz to 1000MHz	44.913	0.257040	4.0	PASS
	1000MHz to 12500MHz	12295.875	2.074914	20.0	PASS
<b>V<sub>min.</sub></b>	30MHz to 1000MHz	45.035	0.207970	4.0	PASS
	1000MHz to 12500MHz	10913.000	1.923092	20.0	PASS
TEST CHANNEL		CH 19 (2440MHz)			
<b>V<sub>normal</sub></b>	30MHz to 1000MHz	44.913	0.251768	4.0	PASS
	1000MHz to 12500MHz	11887.625	2.393316	20.0	PASS
<b>V<sub>max.</sub></b>	30MHz to 1000MHz	44.913	0.239332	4.0	PASS
	1000MHz to 12500MHz	10787.937	2.582260	20.0	PASS
<b>V<sub>min.</sub></b>	30MHz to 1000MHz	45.035	0.250035	4.0	PASS
	1000MHz to 12500MHz	6945.500	2.103778	20.0	PASS
TEST CHANNEL		CH 38 (2478MHz)			
<b>V<sub>normal</sub></b>	30MHz to 1000MHz	45.035	0.297167	4.0	PASS
	1000MHz to 12500MHz	11592.937	1.811340	20.0	PASS
<b>V<sub>max.</sub></b>	30MHz to 1000MHz	45.035	0.225424	4.0	PASS
	1000MHz to 12500MHz	6974.250	2.094112	20.0	PASS
<b>V<sub>min.</sub></b>	30MHz to 1000MHz	45.035	0.232274	4.0	PASS
	1000MHz to 12500MHz	8923.500	2.046445	20.0	PASS

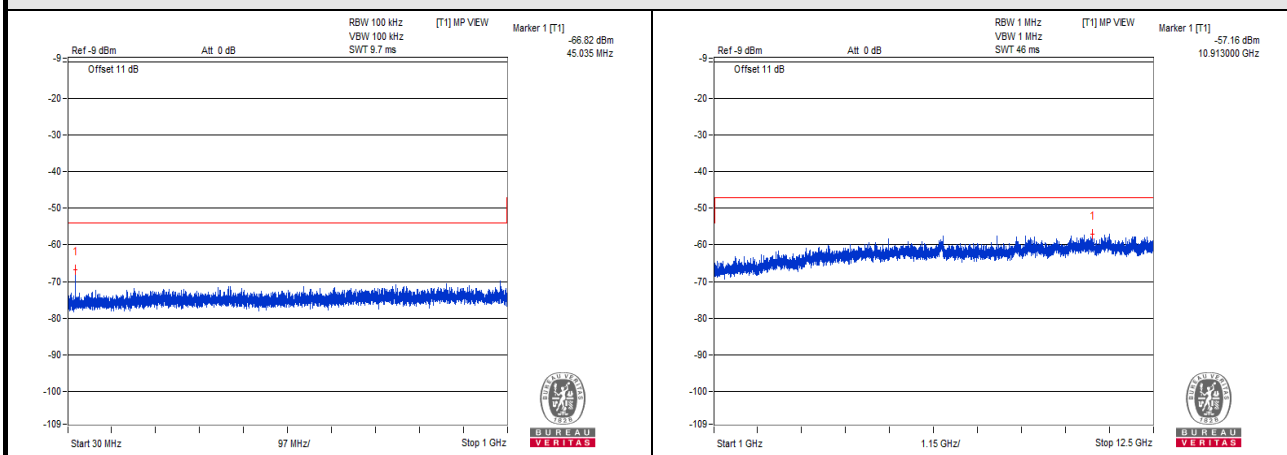
## V<sub>normal</sub>



## V<sub>max.</sub>

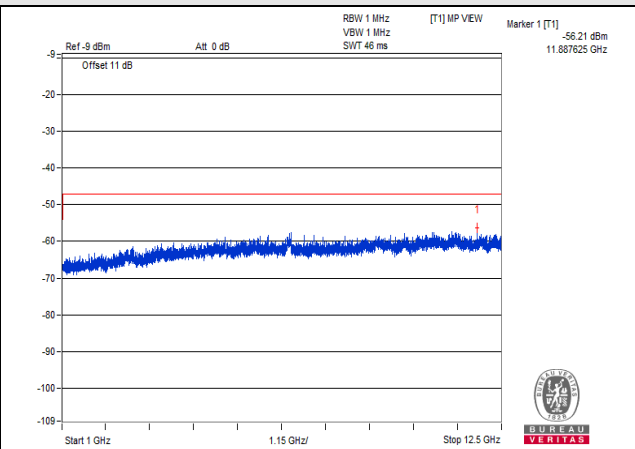
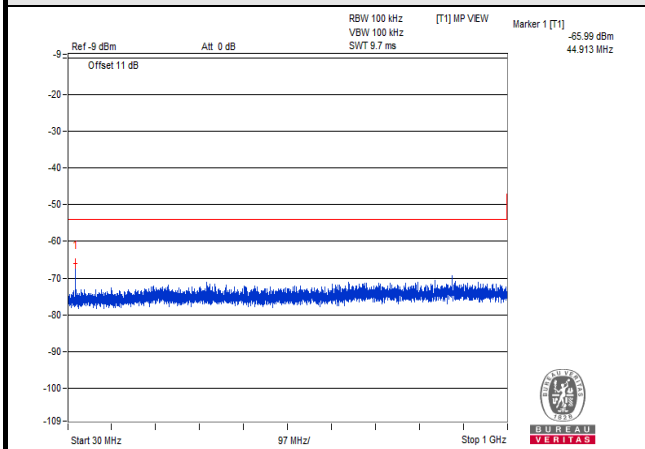


## V<sub>min.</sub>

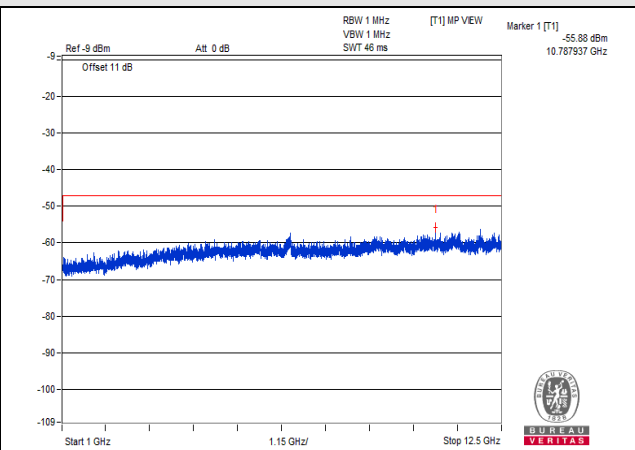
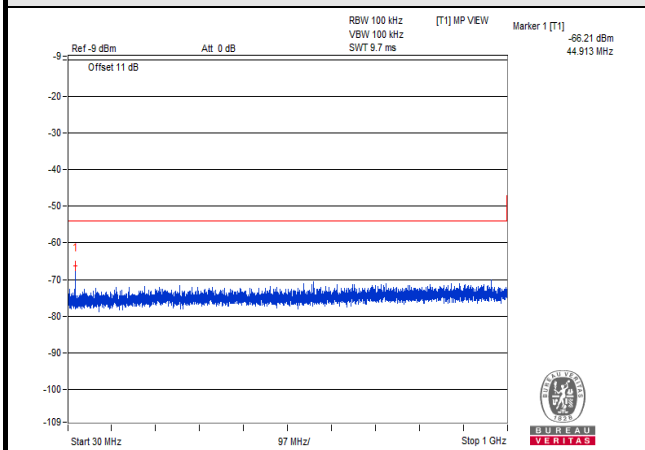


CH 1 (2404MHz)

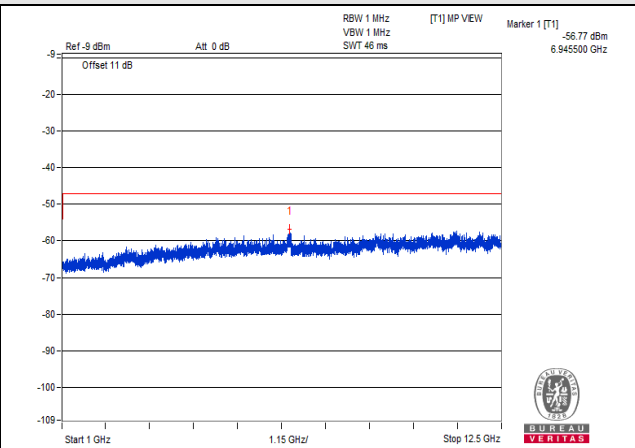
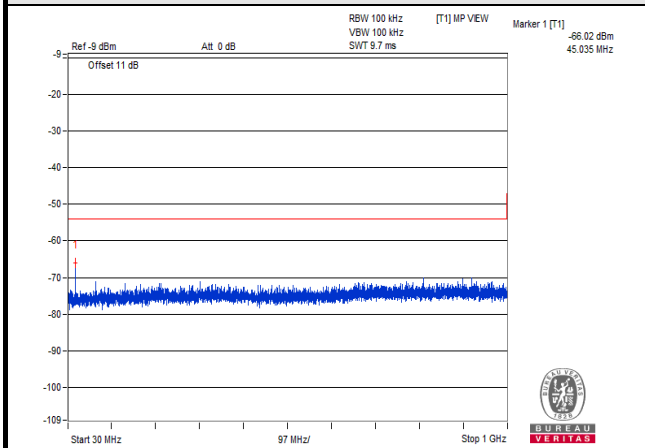
## V<sub>normal</sub>



## V<sub>max.</sub>

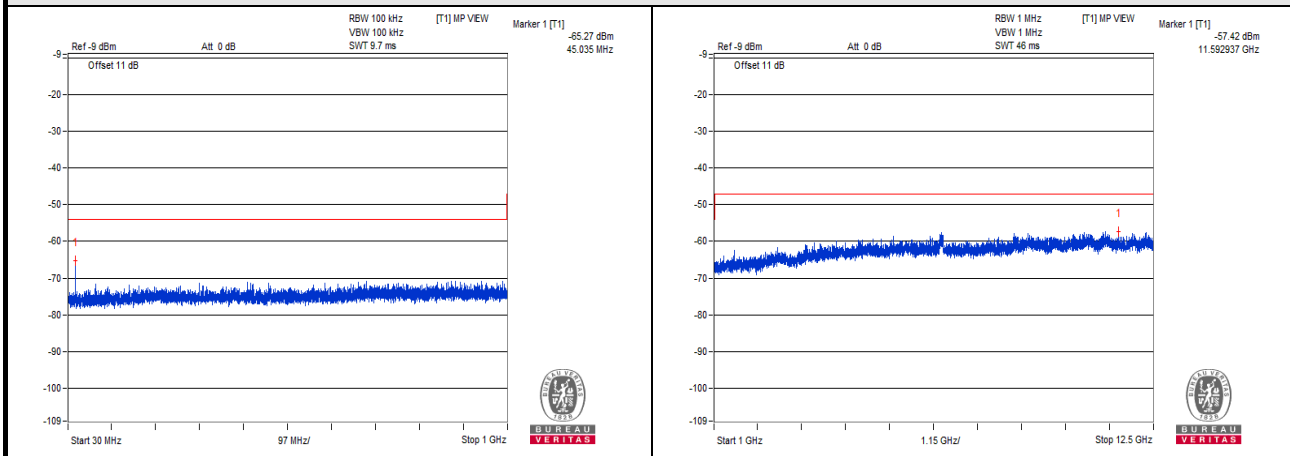


## V<sub>min.</sub>

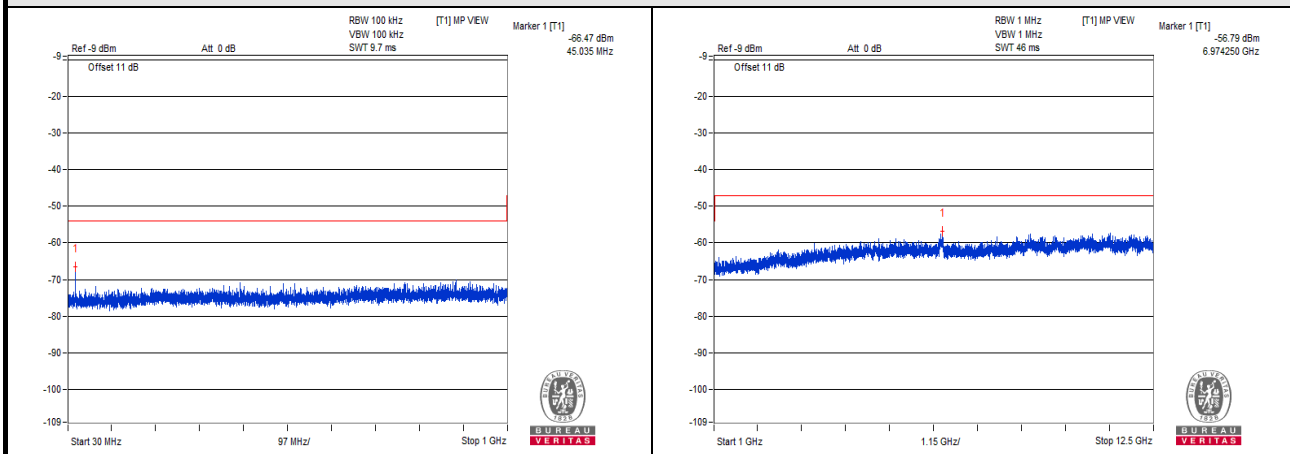


CH 19 (2440MHz)

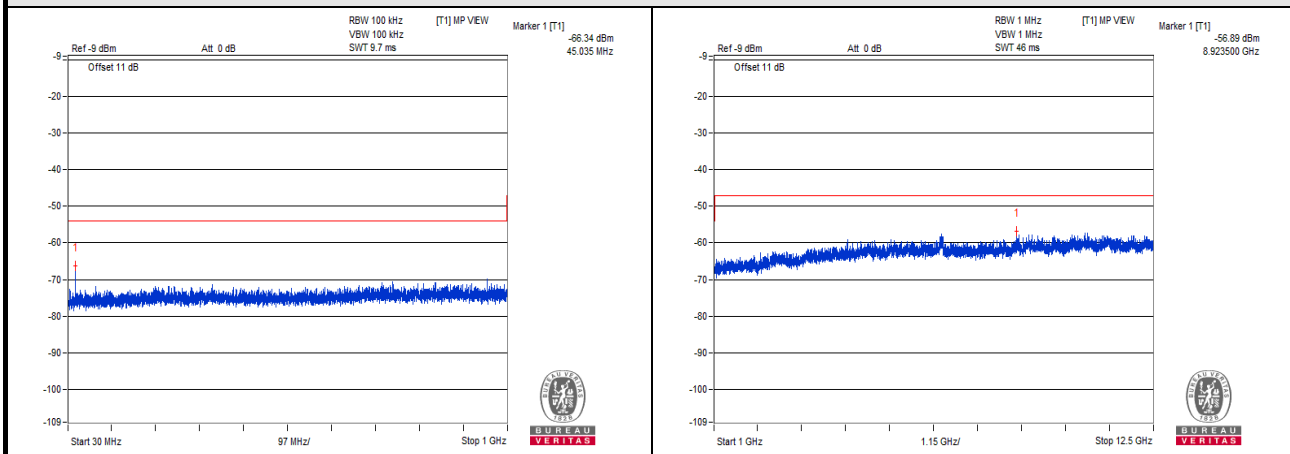
## V<sub>normal</sub>



## V<sub>max.</sub>



## V<sub>min.</sub>



CH 38 (2478MHz)

## 4.6 Interference Prevention Function

### 4.6.1 Limits of Interference Prevention Function

NA

### 4.6.2 Test Setup

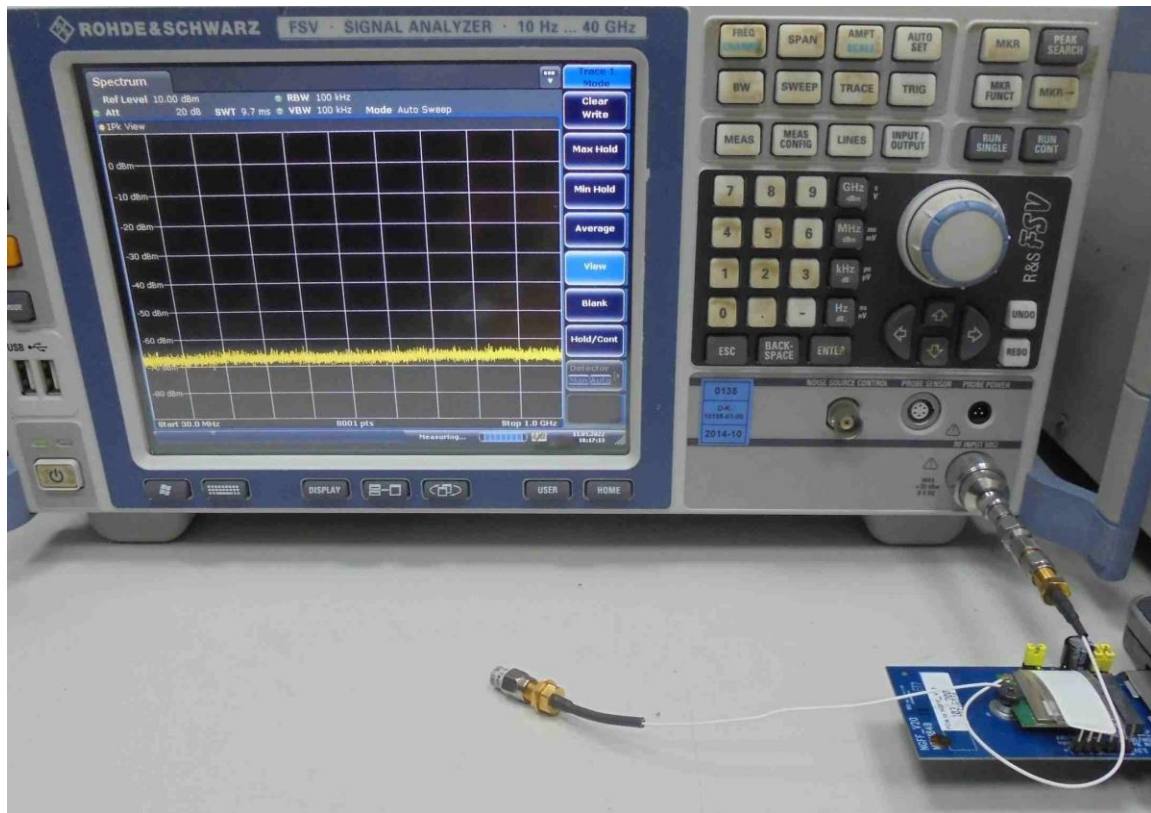


### 4.6.3 Test Results

Link Mode	Test Result
Bluetooth	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.

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

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