

Radio Test Report (BT LE)

Report No.: RJBHKO-WTW-P21090237-2

Test Model: NF-D1

Received Date: 2021/9/7

Test Date: 2021/10/18 ~ 2021/10/25

Issued Date: 2021/11/25

Applicant: Neatframe Limited

Address: The Charter Building, Charter Place, Uxbridge, UB8 1JG, United Kingdom

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Release Control Record

Issue No.	Description	Date Issued
RJBHKO-WTW-P21090237-2	Original release.	2021/11/25

1 Certificate of Conformity

Product: Neat Bar Pro

Brand: neat.

Test Model: NF-D1

Sample Status: Engineering sample

Applicant: Neatframe Limited

Test Date: 2021/10/18 ~ 2021/10/25

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 :

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Date:

2021/11/25

Annie Chang / Senior Specialist

Approved by :

Jeremy Lin

Date:

2021/11/25

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)	4.3	Spurious emissions	C
Transmitting Equipment				
F	3.2 (2)	4.4	Antenna power	C
--	--	--	SAR	NA
Transmitting Antenna				
--	--	3.5	Type, configuration, etc. of transmitting antenna	C
--	--	3.5	Direction pattern of transmitting antenna	C
Receiving Equipment				
G	3.3 (1)	4.5	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	Radio Frequency section cannot be opened easily	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)	3.5.2	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)
AC POWER SOURCE Schaffner	Proflin2105-2 08NSG1007	55616	2021/6/2	2022/6/1	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	Neat Bar Pro
Brand	neat.
Test Model	NF-D1
Status of EUT	Engineering sample
Nominal Voltage	100Vac
Modulation Type	GFSK
Transfer Rate	Up to 2Mbps
Operating Frequency	2402 ~ 2480MHz
Number of Channel	40
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	Neat pad <Brand: Neat, Model: A1C or A1>
Data Cable Supplied	Shielded HDMI cable (2.0m) Shielded LAN cable (3.0m) Non-shielded AC 2-Pin cable (3.0m)

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)	3	2.812	6.502
GFSK (2Mbps)	3	2.742	6.340

2. 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

40 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	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	19	2440	29	2460	39	2480

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	Default	0	Default
19	Default	19	Default
39	Default	39	Default

3.3 Test Conditions

Test Conditions		Voltage (Vac)
V_{normal}	-	100
$V_{max.}$	+10%	110 (Note)
$V_{min.}$	-10%	90 (Note)

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

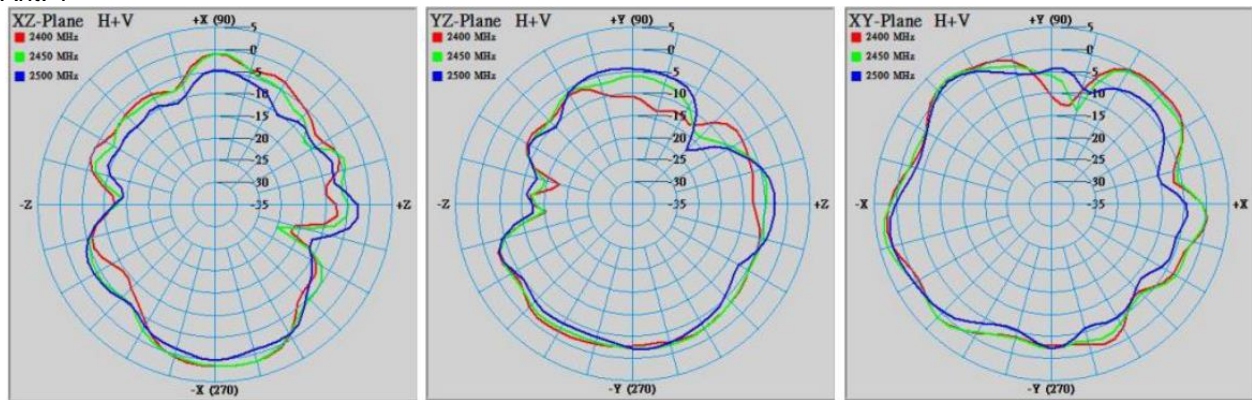
3.5.1 Antenna Gain

Ant. 1 Gain (dBi)	Ant. 2 Gain (dBi)	Antenna Type	Antenna Connector	Remark
3.64	3.01	PCB	ipex	Ant. 1 and Ant. 2 diversity

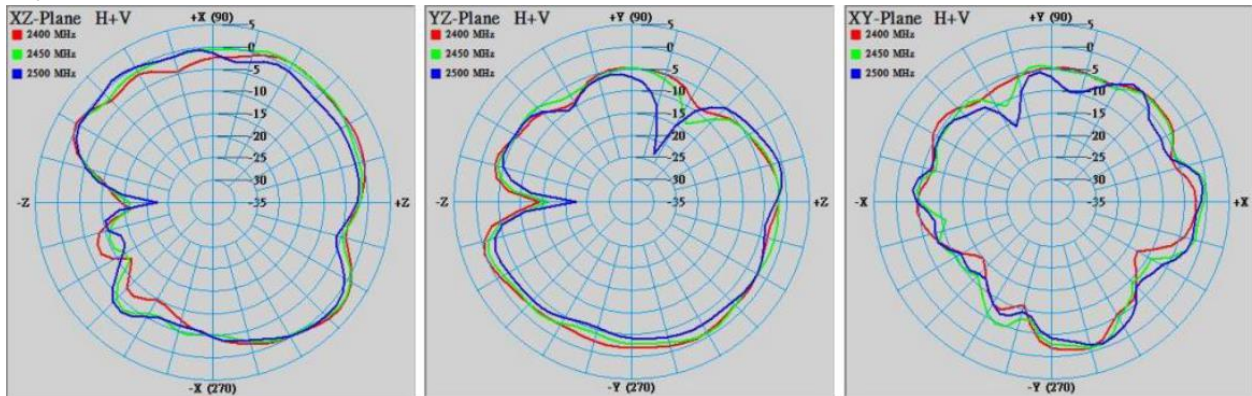
The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.5.2 Antenna Pattern

Ant. 1



Ant. 2



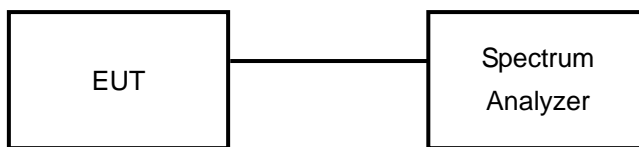
4 Test Results

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	2401.958060	-17.460	2401.958020	-17.477	2401.958020	-17.477
19	2440	2439.957379	-17.467	2439.957379	-17.467	2439.957339	-17.484
39	2480	2479.956659	-17.476	2479.956619	-17.492	2479.956659	-17.476

GFSK (2Mbps)

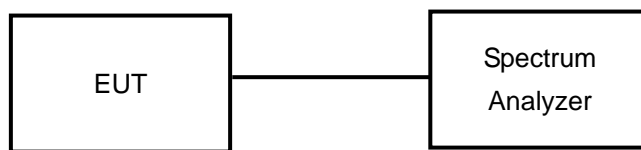
Channel	Frequency (MHz)	V_{normal}		$V_{max.}$		$V_{min.}$	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
0	2402	2401.957900	-17.527	2401.957900	-17.527	2401.957900	-17.527
19	2440	2439.957260	-17.516	2439.957180	-17.549	2439.957219	-17.533
39	2480	2479.956500	-17.540	2479.956460	-17.556	2479.956500	-17.540

4.2 Occupied Bandwidth Measurement (99% power bandwidth)

4.2.1 Limits of Occupied Bandwidth Measurement

Item	Limit
Occupied bandwidth	<26MHz

4.2.2 Test Setup

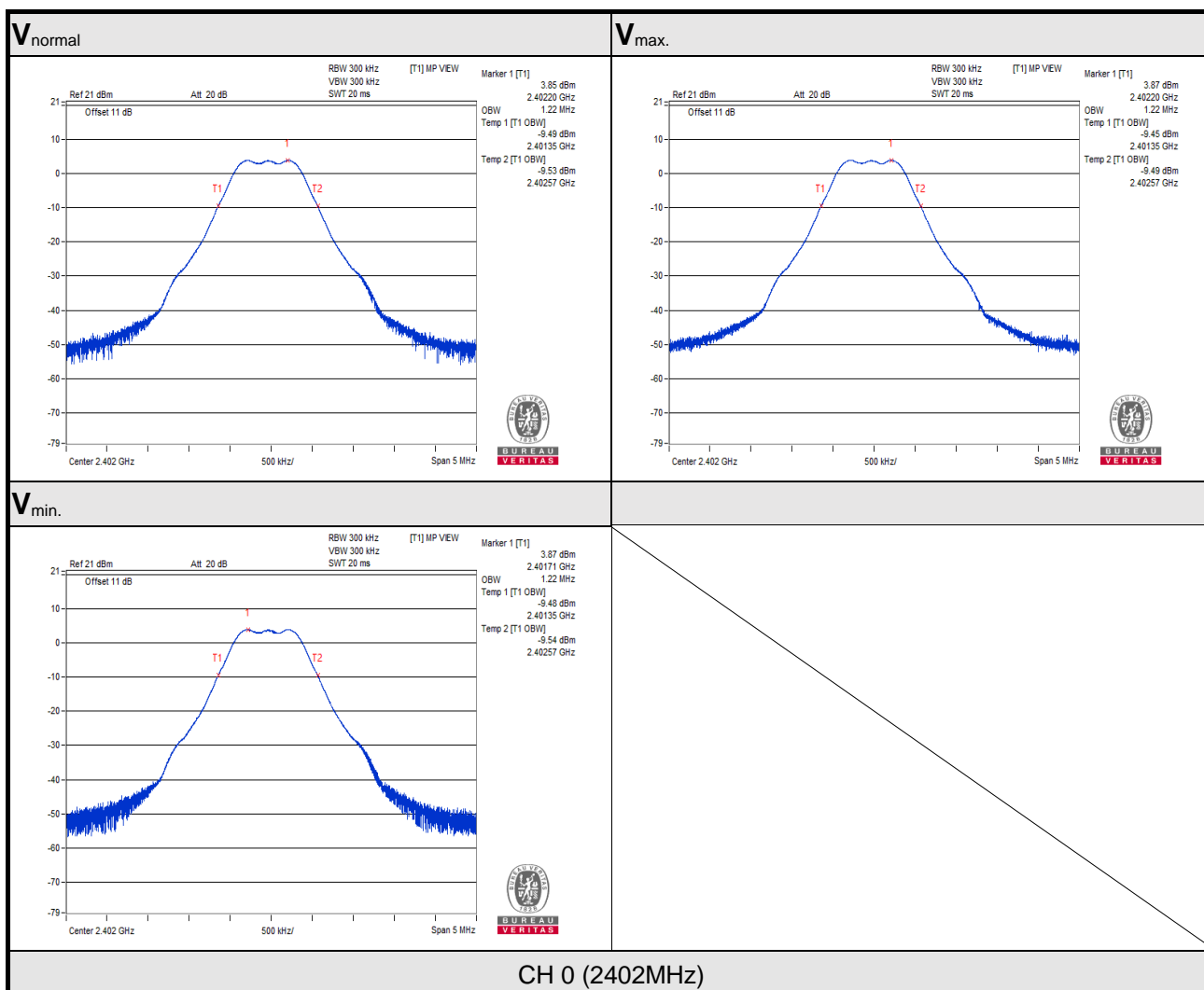


4.2.3 Test Results

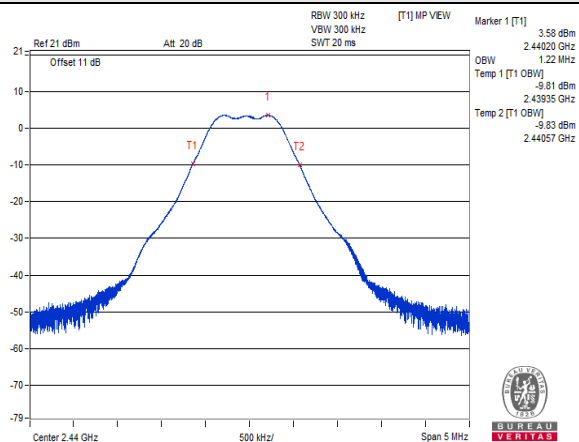
GFSK (1Mbps)

Channel	Frequency (MHz)	V_{normal}	$V_{max.}$	$V_{min.}$
		Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
0	2402	1.22	1.22	1.22
19	2440	1.22	1.22	1.22
39	2480	1.21	1.21	1.21

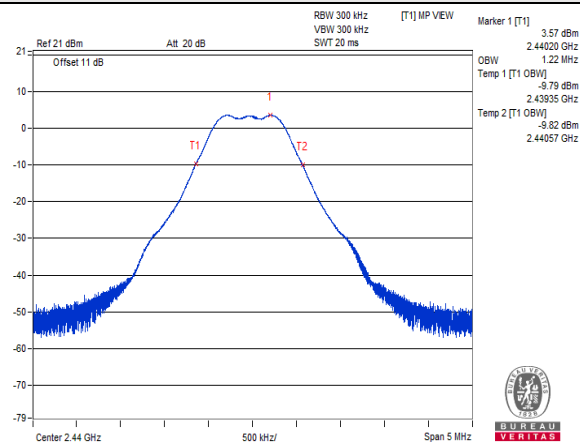
NOTE: For the test plots please refer to the below pages.



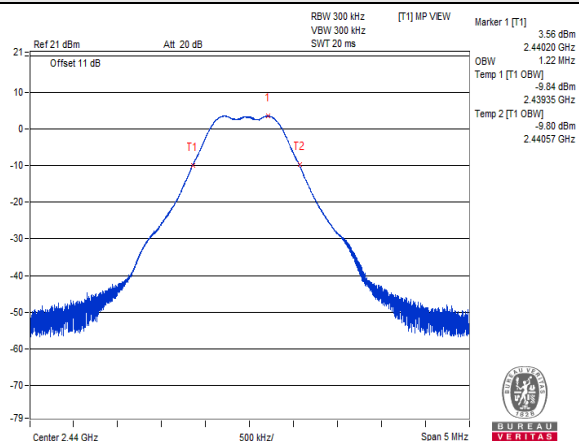
V_{normal}



V_{max.}



V_{min.}

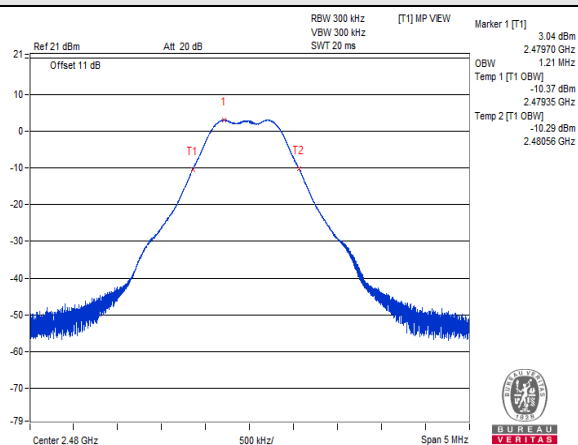


CH 19 (2440MHz)

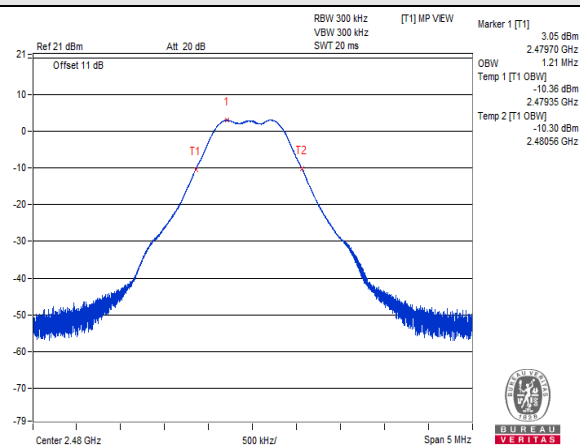


BUREAU
VERITAS

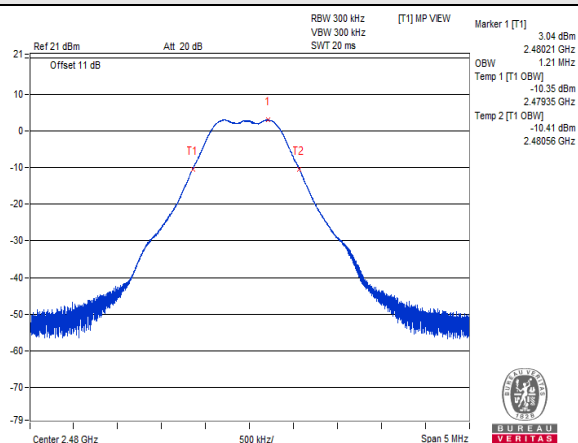
V_{normal}



V_{max.}



V_{min.}

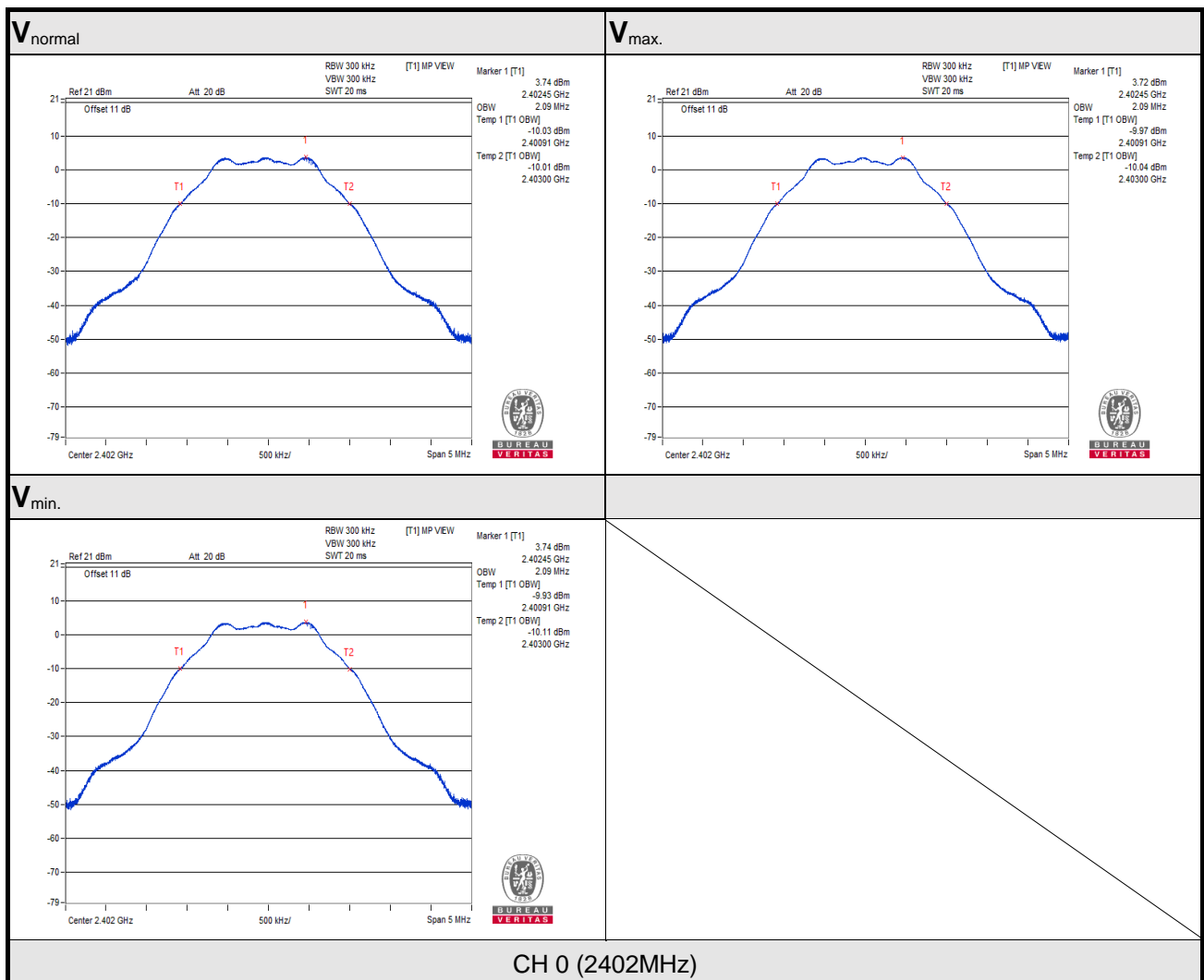


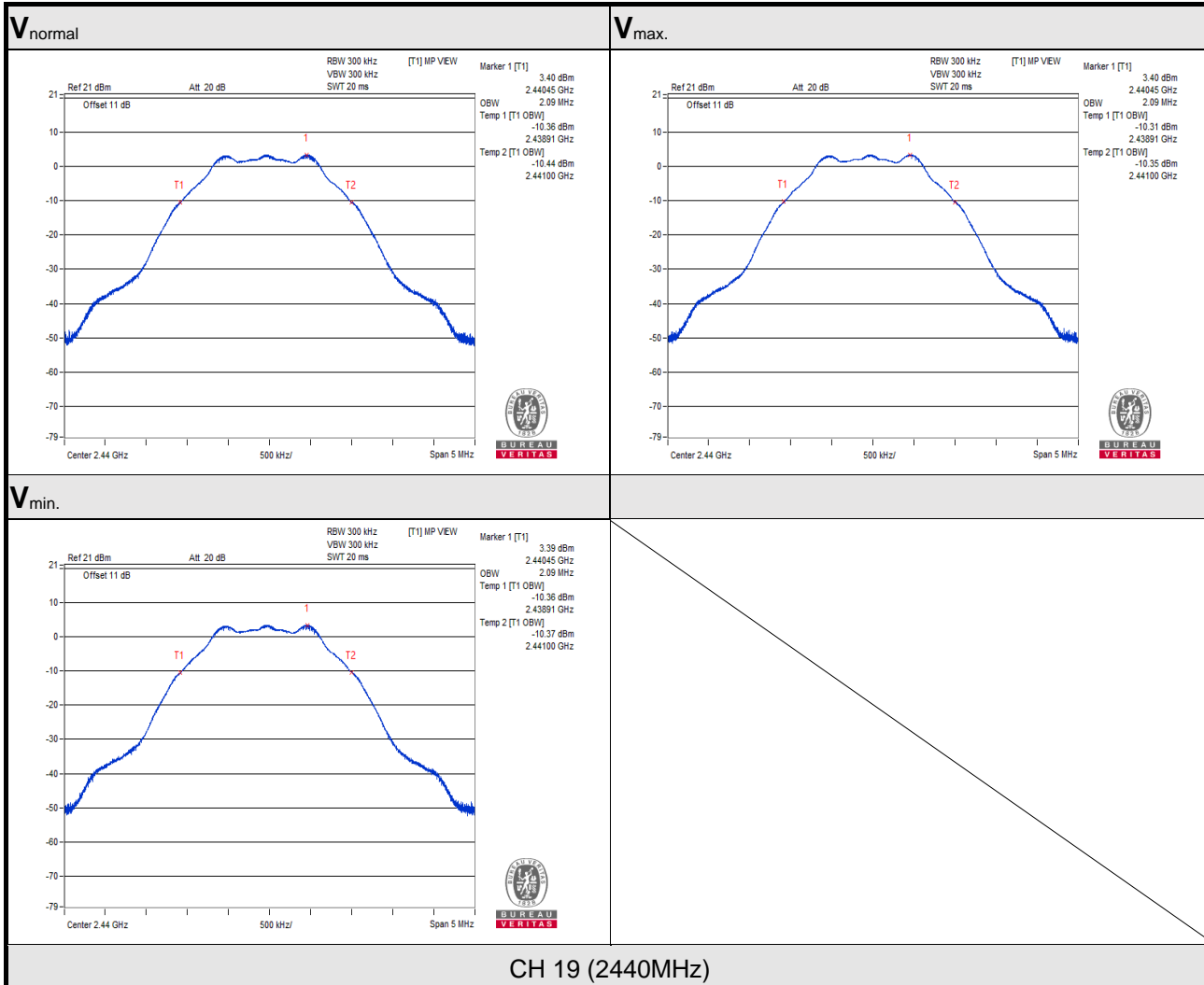
CH 39 (2480MHz)

GFSK (2Mbps)

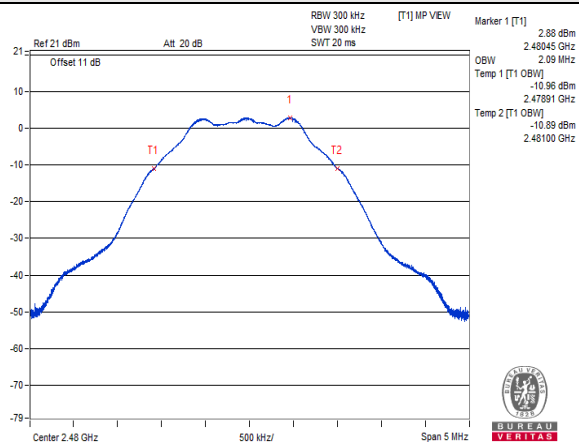
Channel	Frequency (MHz)	V _{normal}	V _{max.}	V _{min.}
		Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
0	2402	2.09	2.09	2.09
19	2440	2.09	2.09	2.09
39	2480	2.09	2.09	2.09

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

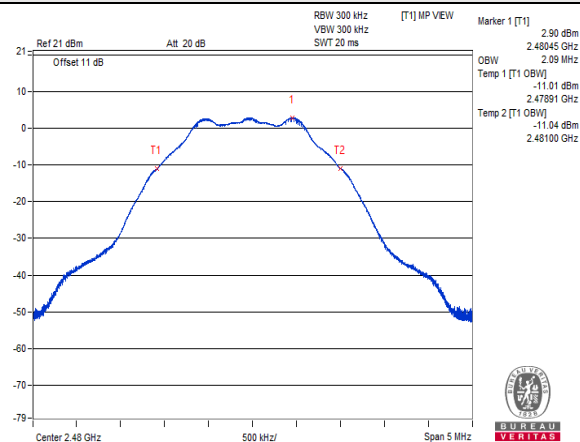




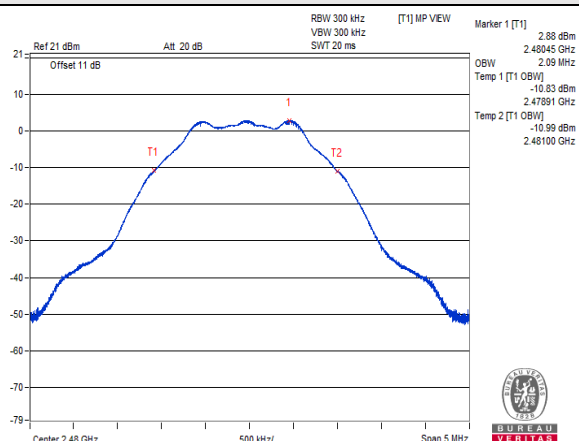
V_{normal}



V_{max.}



V_{min.}



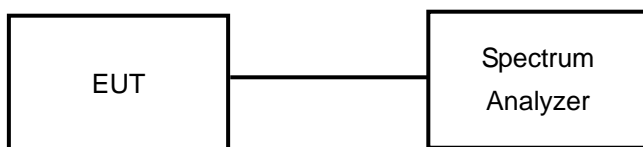
CH 39 (2480MHz)

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	$\leq 0.25 \mu\text{W}/100\text{kHz}$
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	$\leq 2.5 \mu\text{W}/\text{MHz}$

4.3.2 Test Setup



4.3.3 Test Results

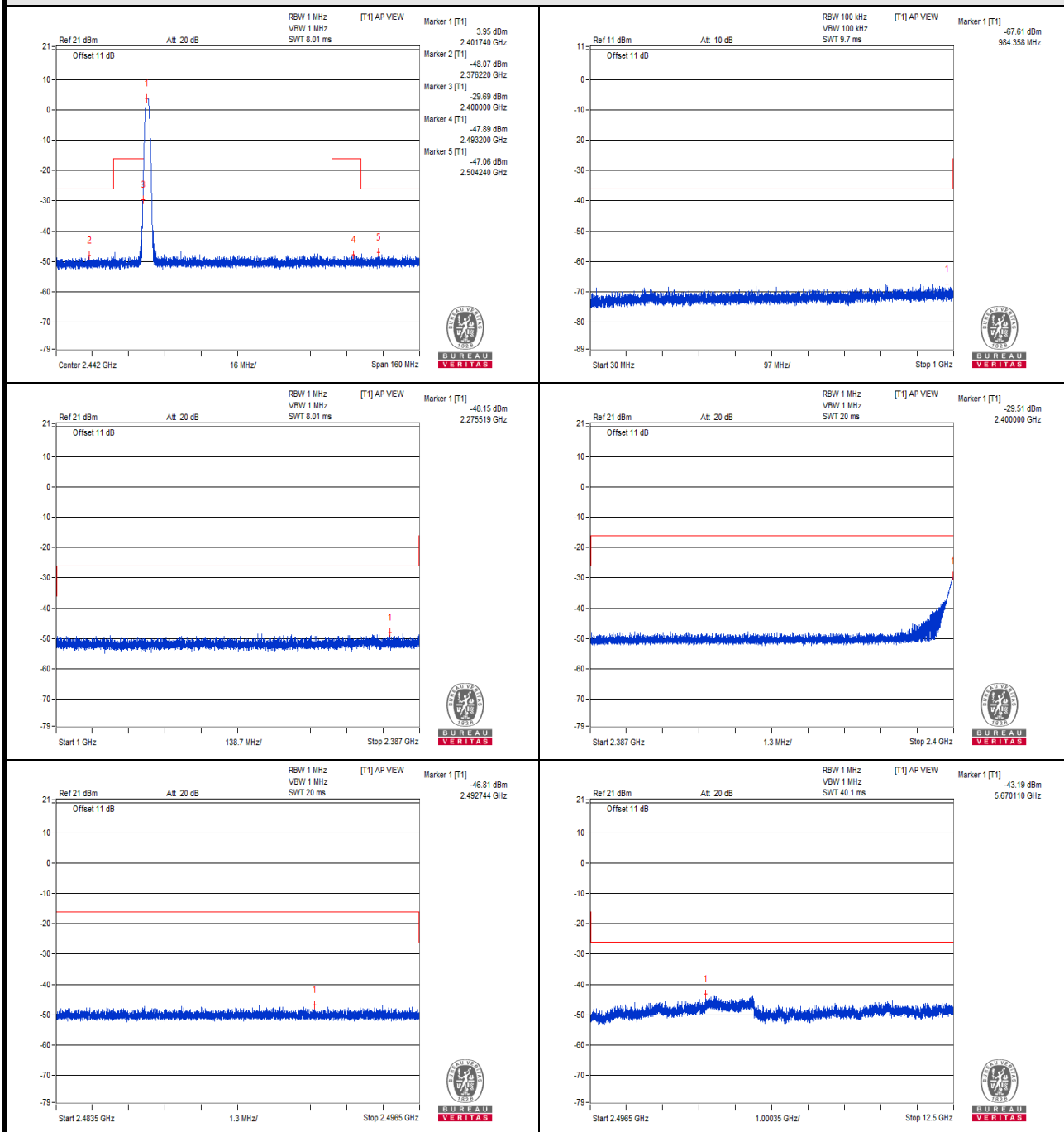
GFSK (1Mbps)

TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V_{normal}	30MHz to 1000MHz	984.358	0.000173	0.25	PASS
	1000MHz to 2387MHz	2275.519	0.015311	2.5	PASS
	2387MHz to 2400MHz	2400.000	1.119438	25	PASS
	2483.5MHz to 2496.5MHz	2492.744	0.020845	25	PASS
	2496.5MHz to 12500MHz	5670.110	0.047973	2.5	PASS
V_{max.}	30MHz to 1000MHz	890.875	0.000150	0.25	PASS
	1000MHz to 2387MHz	2170.628	0.020045	2.5	PASS
	2387MHz to 2400MHz	2399.998	1.127197	25	PASS
	2483.5MHz to 2496.5MHz	2488.087	0.020989	25	PASS
	2496.5MHz to 12500MHz	6944.306	0.048865	2.5	PASS
V_{min.}	30MHz to 1000MHz	932.342	0.000193	0.25	PASS
	1000MHz to 2387MHz	2334.294	0.015171	2.5	PASS
	2387MHz to 2400MHz	2400.000	1.135011	25	PASS
	2483.5MHz to 2496.5MHz	2488.612	0.022233	25	PASS
	2496.5MHz to 12500MHz	6377.858	0.041305	2.5	PASS
TEST CHANNEL		CH 19 (2440MHz)			
V_{normal}	30MHz to 1000MHz	886.631	0.000171	0.25	PASS
	1000MHz to 2387MHz	2071.110	0.016558	2.5	PASS
	2387MHz to 2400MHz	2398.058	0.018197	25	PASS
	2483.5MHz to 2496.5MHz	2486.010	0.019634	25	PASS
	2496.5MHz to 12500MHz	6975.567	0.049431	2.5	PASS
V_{max.}	30MHz to 1000MHz	913.548	0.000170	0.25	PASS
	1000MHz to 2387MHz	1704.422	0.016788	2.5	PASS
	2387MHz to 2400MHz	2394.393	0.019999	25	PASS
	2483.5MHz to 2496.5MHz	2488.649	0.018621	25	PASS
	2496.5MHz to 12500MHz	6990.572	0.047643	2.5	PASS
V_{min.}	30MHz to 1000MHz	225.576	0.000168	0.25	PASS
	1000MHz to 2387MHz	2151.210	0.016255	2.5	PASS
	2387MHz to 2400MHz	2391.259	0.021827	25	PASS
	2483.5MHz to 2496.5MHz	2489.998	0.022542	25	PASS
	2496.5MHz to 12500MHz	6961.812	0.050816	2.5	PASS

TEST CHANNEL		CH 39 (2480MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V_{normal}	30MHz to 1000MHz	949.681	0.000185	0.25	PASS
	1000MHz to 2387MHz	2135.779	0.014962	2.5	PASS
	2387MHz to 2400MHz	2393.363	0.023823	25	PASS
	2483.5MHz to 2496.5MHz	2487.757	0.022029	25	PASS
	2496.5MHz to 12500MHz	5842.670	0.041879	2.5	PASS
V_{max.}	30MHz to 1000MHz	861.896	0.000186	0.25	PASS
	1000MHz to 2387MHz	2267.544	0.014894	2.5	PASS
	2387MHz to 2400MHz	2399.471	0.019364	25	PASS
	2483.5MHz to 2496.5MHz	2495.536	0.022699	25	PASS
	2496.5MHz to 12500MHz	5853.924	0.048195	2.5	PASS
V_{min.}	30MHz to 1000MHz	728.763	0.000185	0.25	PASS
	1000MHz to 2387MHz	2196.981	0.015488	2.5	PASS
	2387MHz to 2400MHz	2389.279	0.018072	25	PASS
	2483.5MHz to 2496.5MHz	2483.787	0.025763	25	PASS
	2496.5MHz to 12500MHz	6950.558	0.041400	2.5	PASS

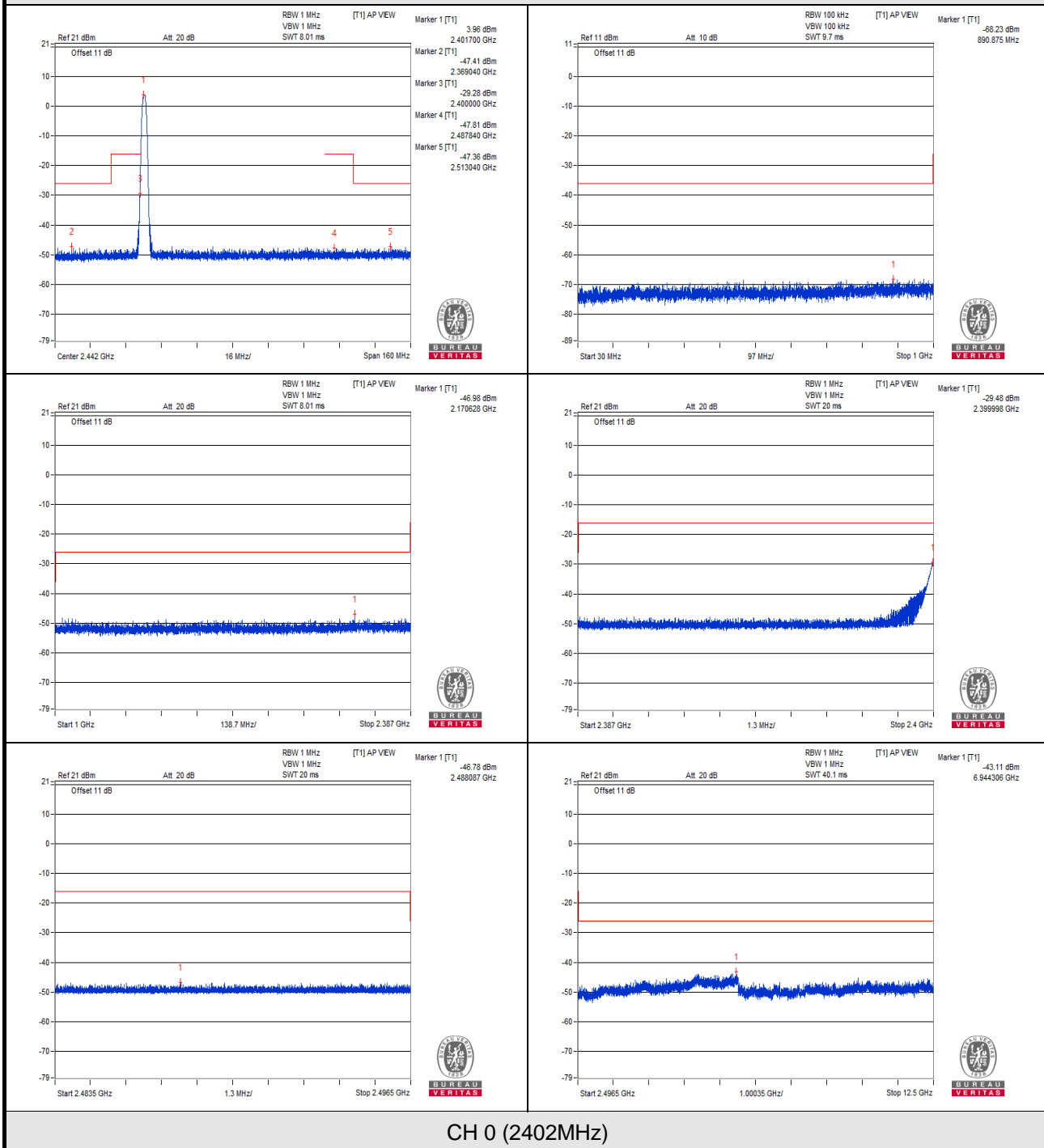
NOTE: The spectrum plots are attached on the following pages.

Vnormal

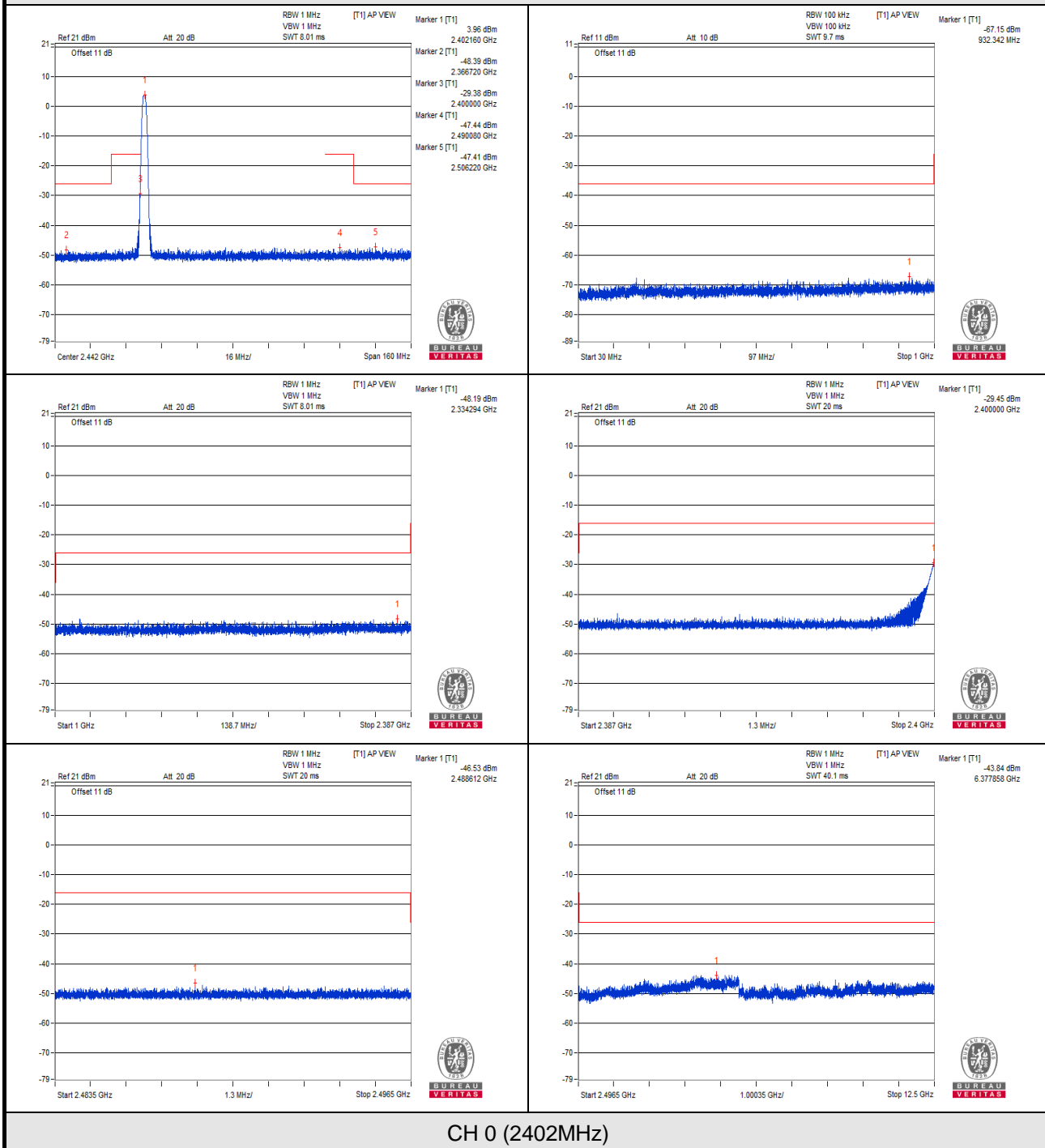


CH 0 (2402MHz)

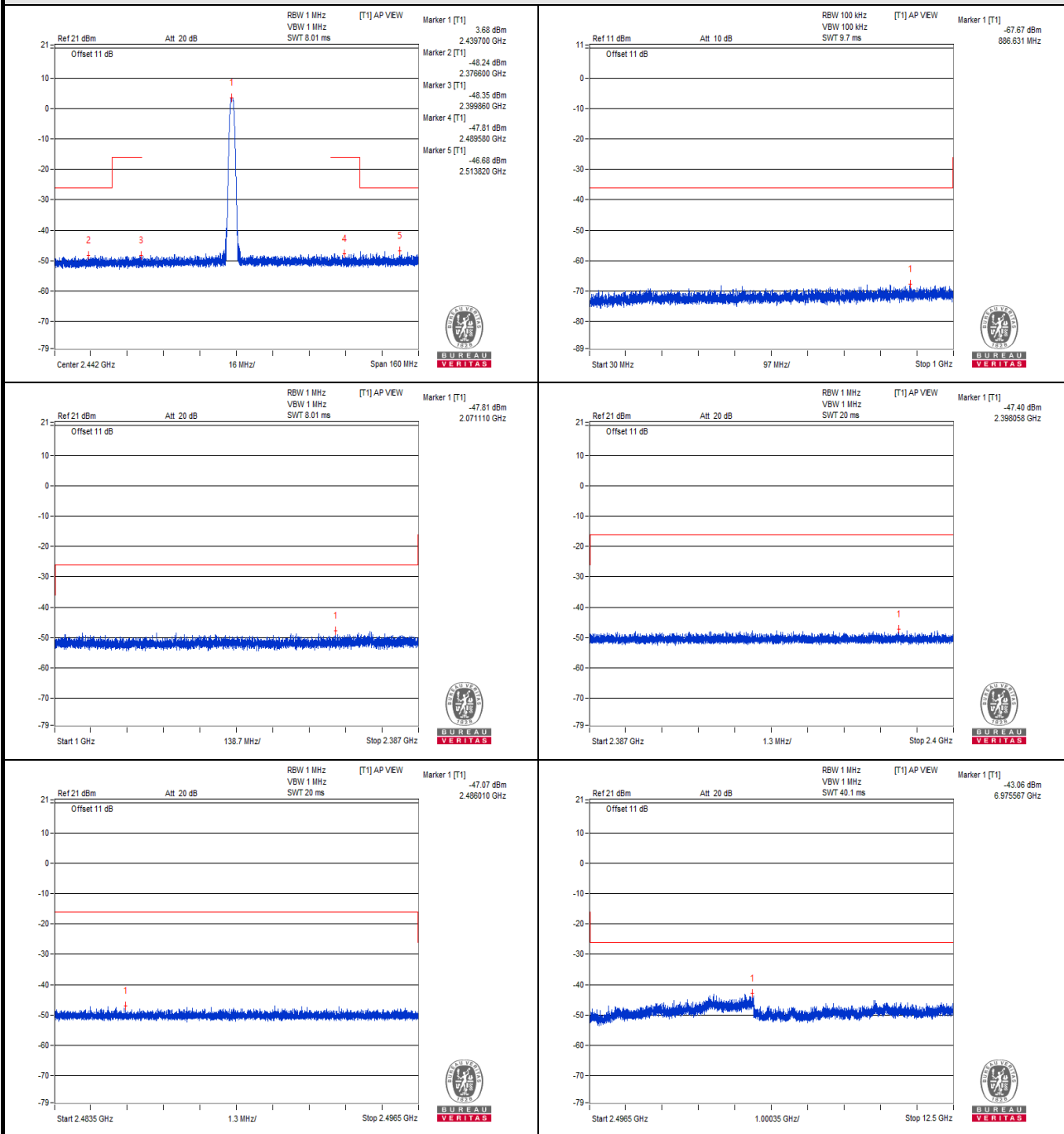
V_{max}.



V min.

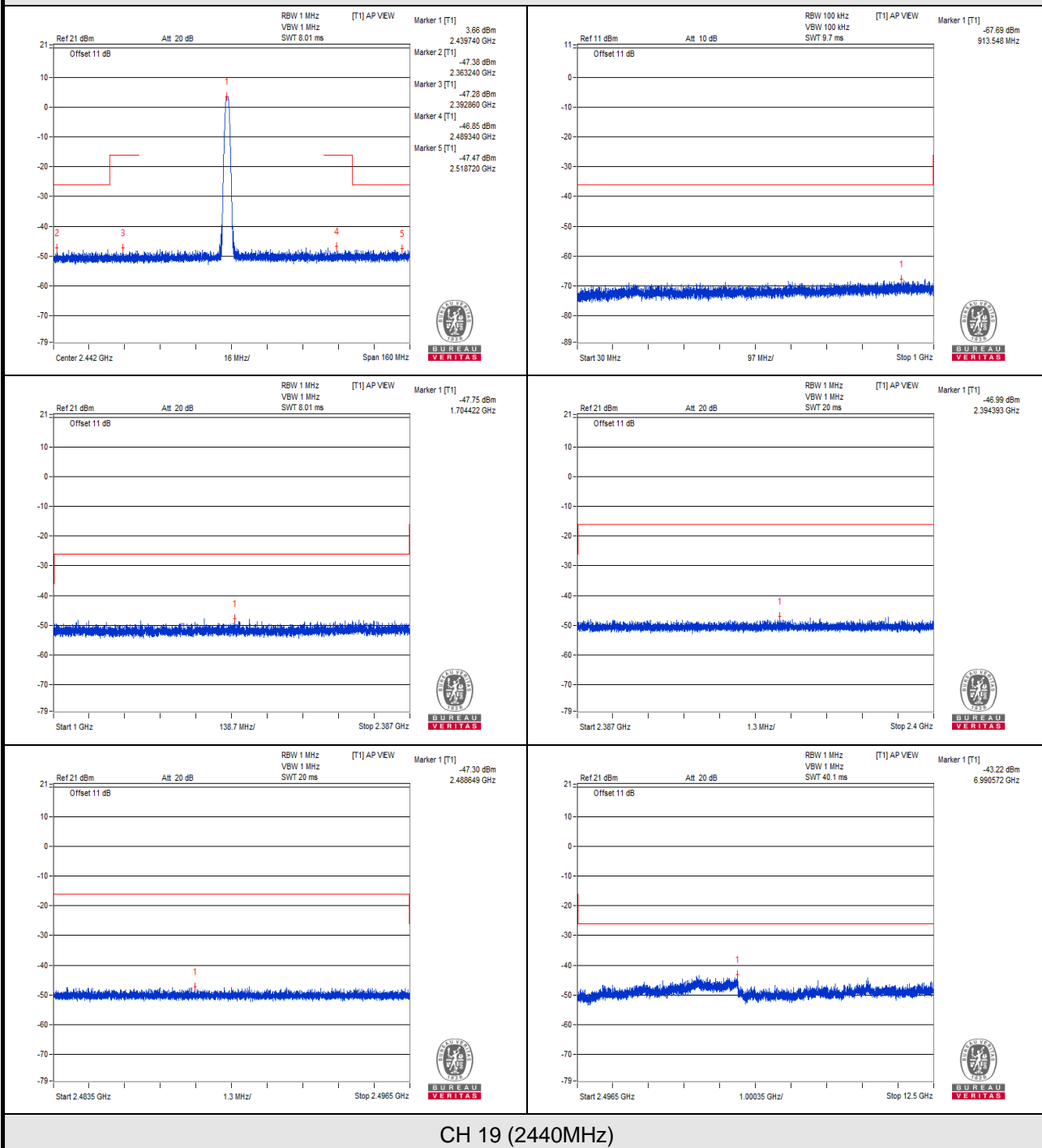


Vnormal

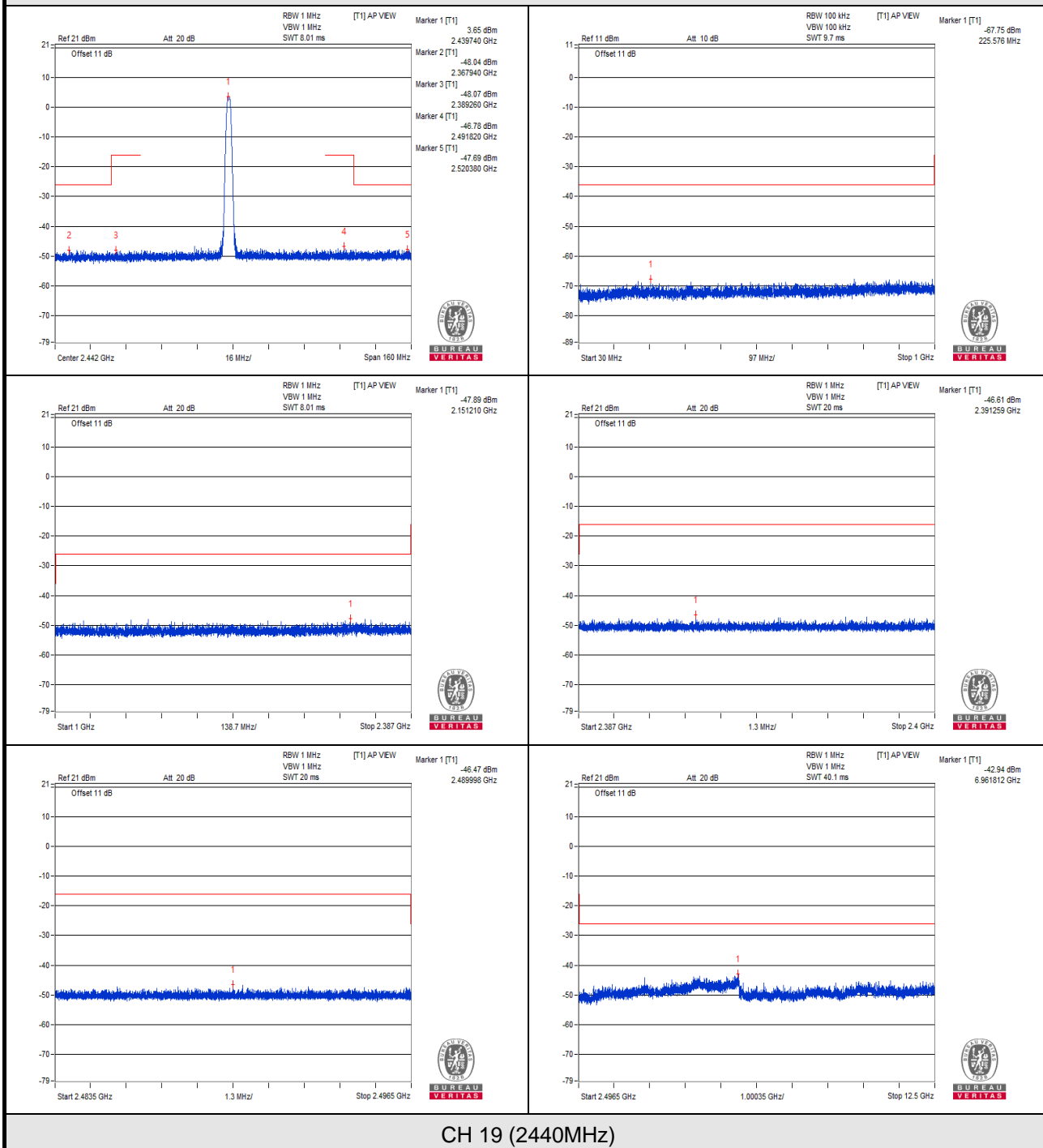


CH 19 (2440MHz)

V_{max}.



V_{min}.



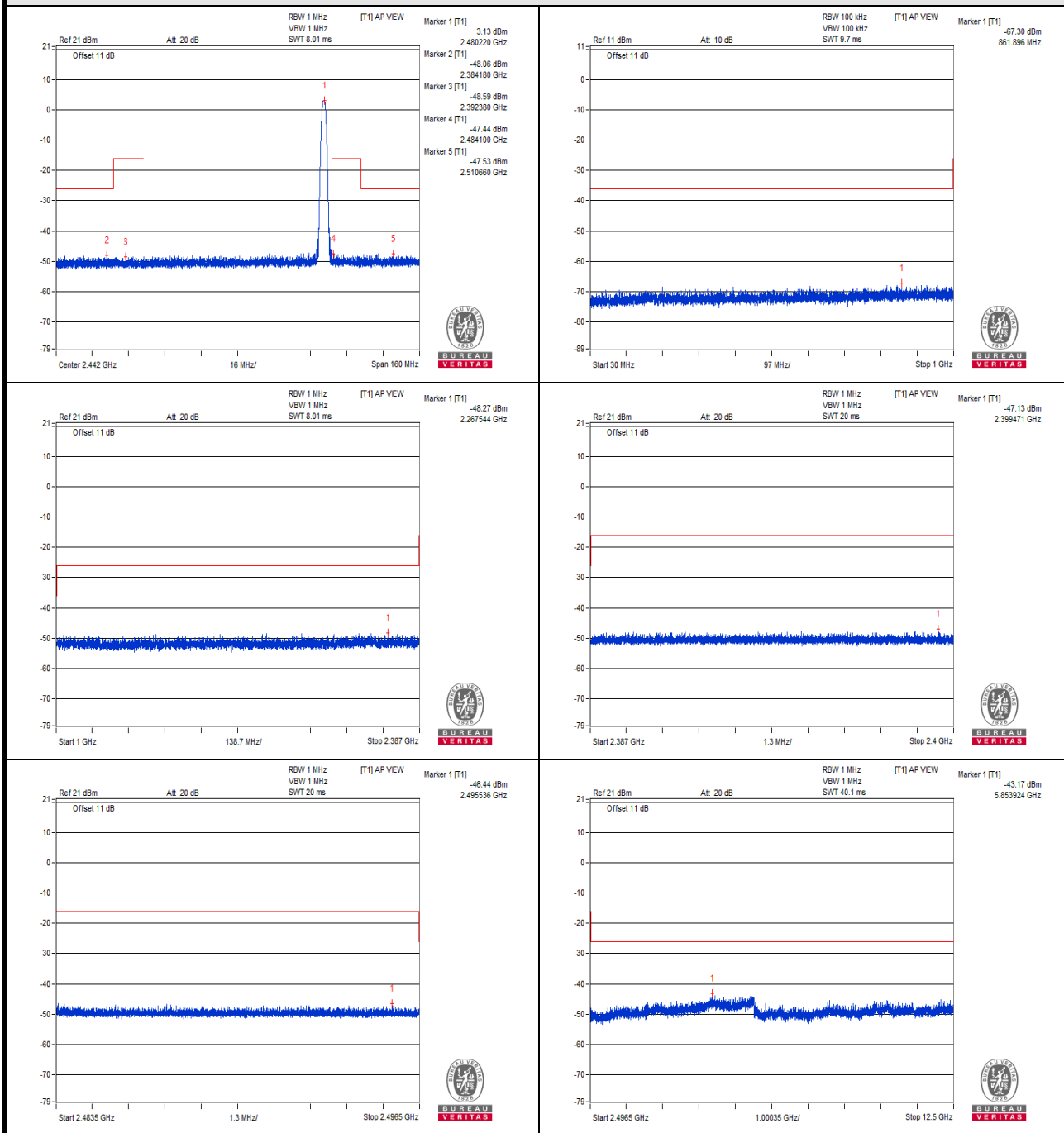
CH 19 (2440MHz)

Vnormal



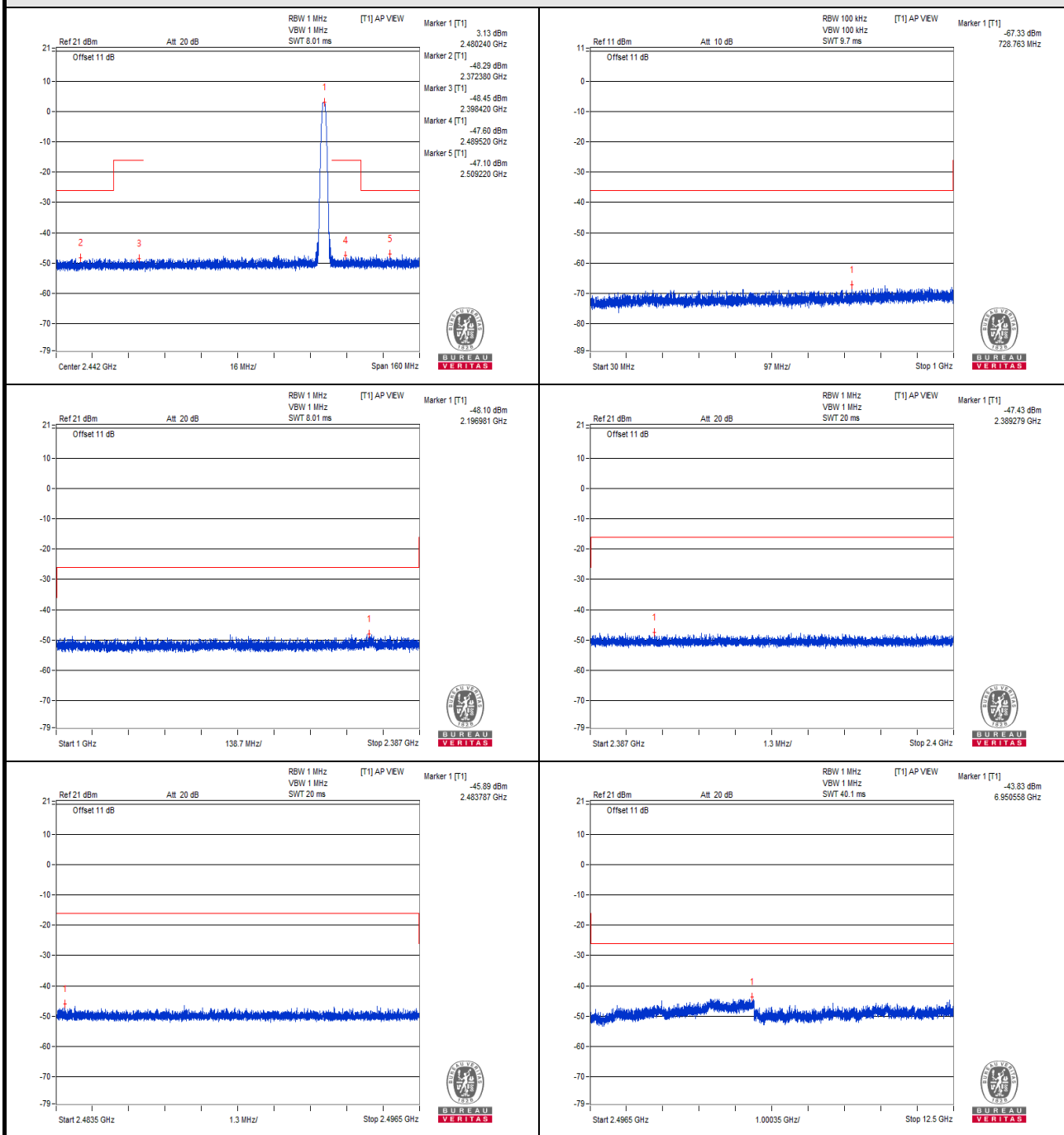
CH 39 (2480MHz)

V_{max}.



CH 39 (2480MHz)

V_{min}.



CH 39 (2480MHz)

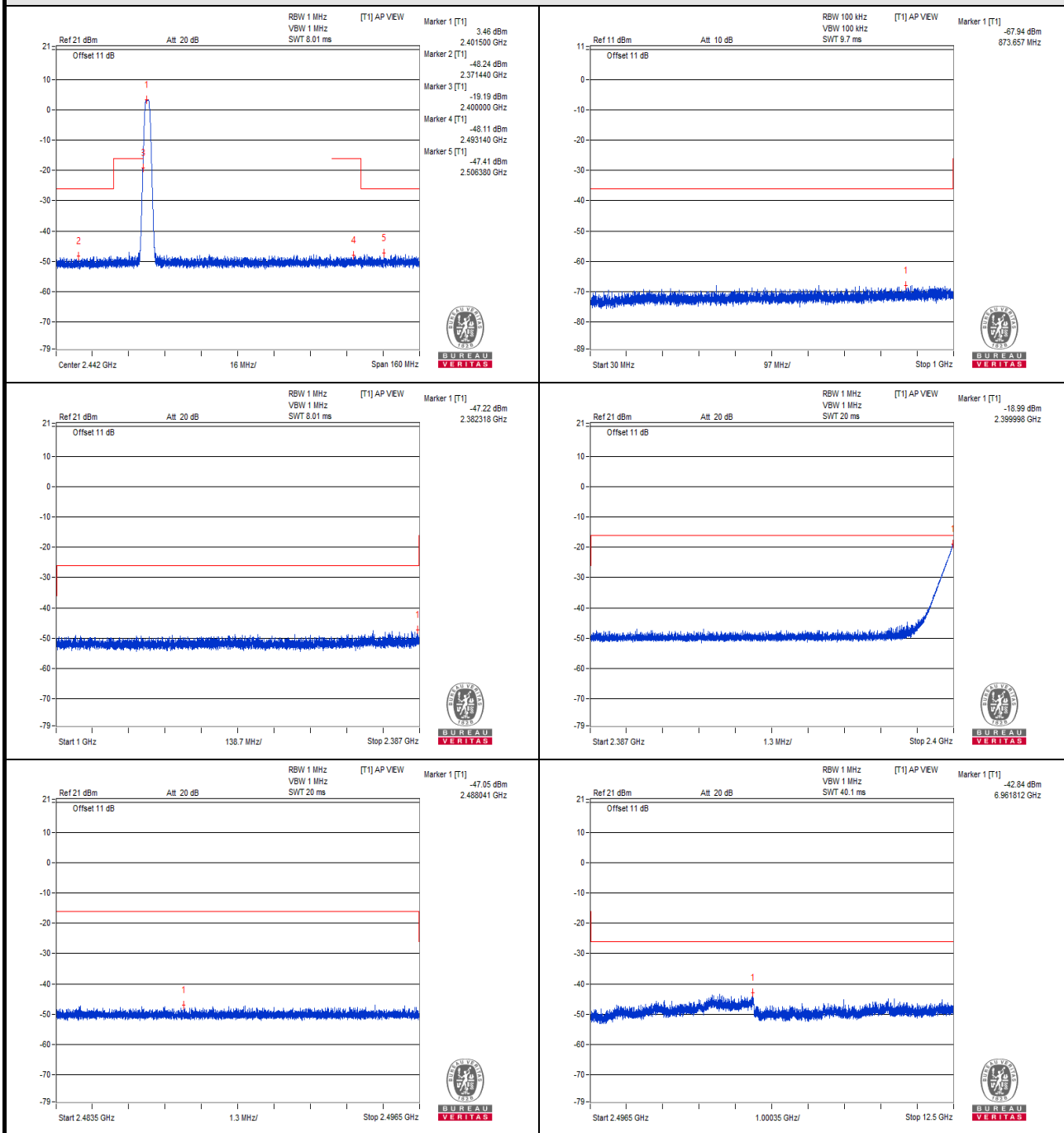
GFSK (2Mbps)

TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V_{normal}	30MHz to 1000MHz	873.657	0.000161	0.25	PASS
	1000MHz to 2387MHz	2382.318	0.018967	2.5	PASS
	2387MHz to 2400MHz	2399.998	3.809842	25	PASS(1)
	2483.5MHz to 2496.5MHz	2488.041	0.019724	25	PASS
	2496.5MHz to 12500MHz	6961.812	0.052000	2.5	PASS
V_{max.}	30MHz to 1000MHz	954.288	0.000178	0.25	PASS
	1000MHz to 2387MHz	2196.287	0.016982	2.5	PASS
	2387MHz to 2400MHz	2400.000	5.377046	25	PASS(2)
	2483.5MHz to 2496.5MHz	2488.844	0.021677	25	PASS
	2496.5MHz to 12500MHz	5792.653	0.047315	2.5	PASS
V_{min.}	30MHz to 1000MHz	889.420	0.000192	0.25	PASS
	1000MHz to 2387MHz	2246.913	0.015346	2.5	PASS
	2387MHz to 2400MHz	2400.000	5.384351	25	PASS(3)
	2483.5MHz to 2496.5MHz	2484.954	0.020989	25	PASS
	2496.5MHz to 12500MHz	6944.306	0.044668	2.5	PASS
TEST CHANNEL		CH 19 (2440MHz)			
V_{normal}	30MHz to 1000MHz	821.762	0.000152	0.25	PASS
	1000MHz to 2387MHz	2183.457	0.016866	2.5	PASS
	2387MHz to 2400MHz	2395.724	0.017620	25	PASS
	2483.5MHz to 2496.5MHz	2491.009	0.020091	25	PASS
	2496.5MHz to 12500MHz	5851.423	0.046559	2.5	PASS
V_{max.}	30MHz to 1000MHz	990.542	0.000178	0.25	PASS
	1000MHz to 2387MHz	2351.458	0.014825	2.5	PASS
	2387MHz to 2400MHz	2390.848	0.018072	25	PASS
	2483.5MHz to 2496.5MHz	2492.946	0.019907	25	PASS
	2496.5MHz to 12500MHz	5728.880	0.046774	2.5	PASS
V_{min.}	30MHz to 1000MHz	854.985	0.000162	0.25	PASS
	1000MHz to 2387MHz	2182.417	0.015631	2.5	PASS
	2387MHz to 2400MHz	2387.419	0.018535	25	PASS
	2483.5MHz to 2496.5MHz	2494.782	0.020091	25	PASS
	2496.5MHz to 12500MHz	6816.761	0.041879	2.5	PASS

TEST CHANNEL		CH 39 (2480MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V_{normal}	30MHz to 1000MHz	990.300	0.000188	0.25	PASS
	1000MHz to 2387MHz	2341.575	0.015488	2.5	PASS
	2387MHz to 2400MHz	2396.815	0.023335	25	PASS
	2483.5MHz to 2496.5MHz	2493.532	0.021429	25	PASS
	2496.5MHz to 12500MHz	5863.928	0.049431	2.5	PASS
V_{max.}	30MHz to 1000MHz	968.353	0.000193	0.25	PASS
	1000MHz to 2387MHz	2009.389	0.015959	2.5	PASS
	2387MHz to 2400MHz	2393.363	0.018030	25	PASS
	2483.5MHz to 2496.5MHz	2483.602	0.027479	25	PASS
	2496.5MHz to 12500MHz	5945.206	0.043652	2.5	PASS
V_{min.}	30MHz to 1000MHz	981.691	0.000159	0.25	PASS
	1000MHz to 2387MHz	2321.290	0.015276	2.5	PASS
	2387MHz to 2400MHz	2394.258	0.019099	25	PASS
	2483.5MHz to 2496.5MHz	2483.737	0.022856	25	PASS
	2496.5MHz to 12500MHz	6995.574	0.041687	2.5	PASS

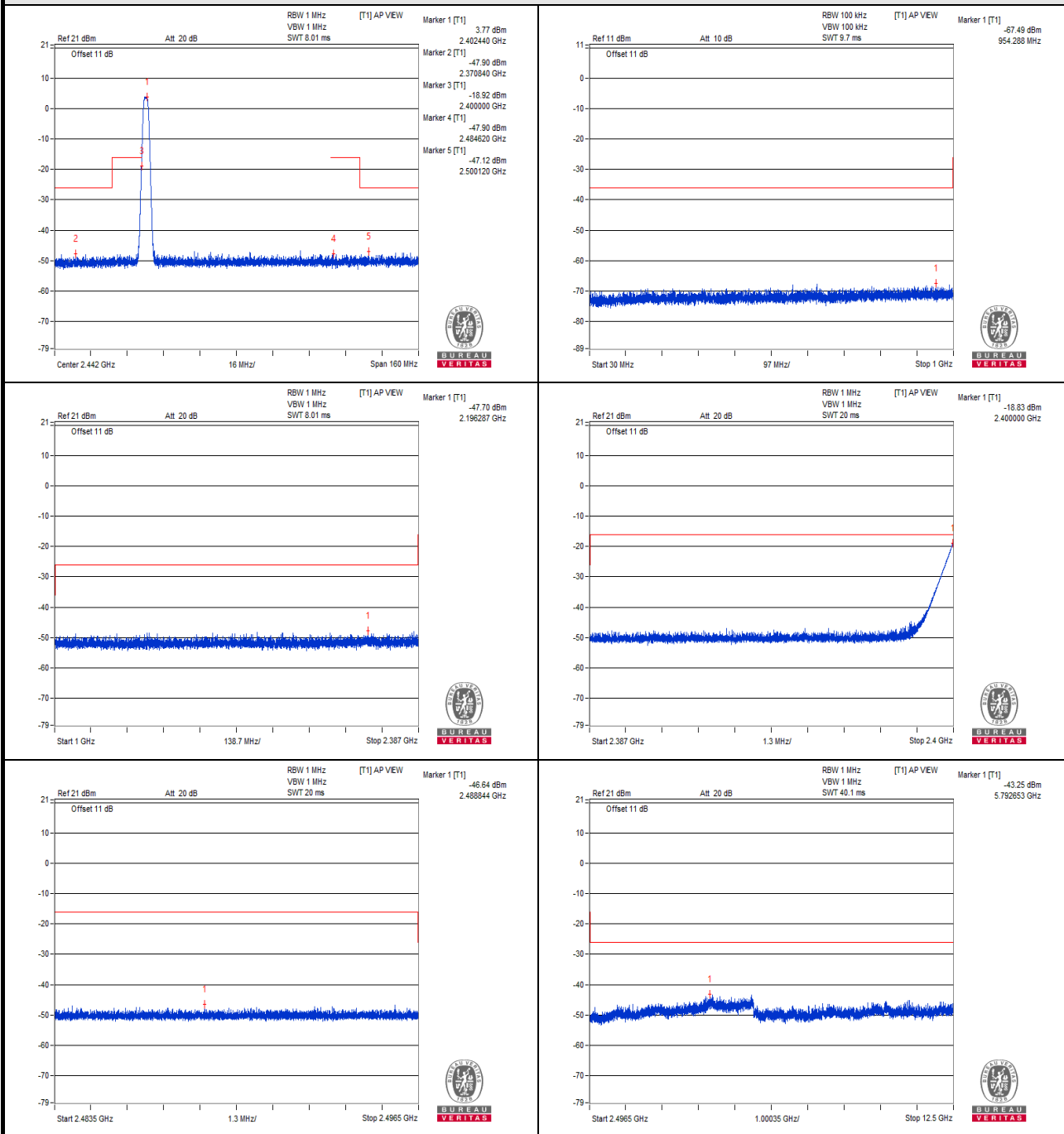
NOTE: 1. The spectrum plots are attached on the following pages.
 2. (No.): The value was tested under Measuring Mode *Zero Span.

Vnormal



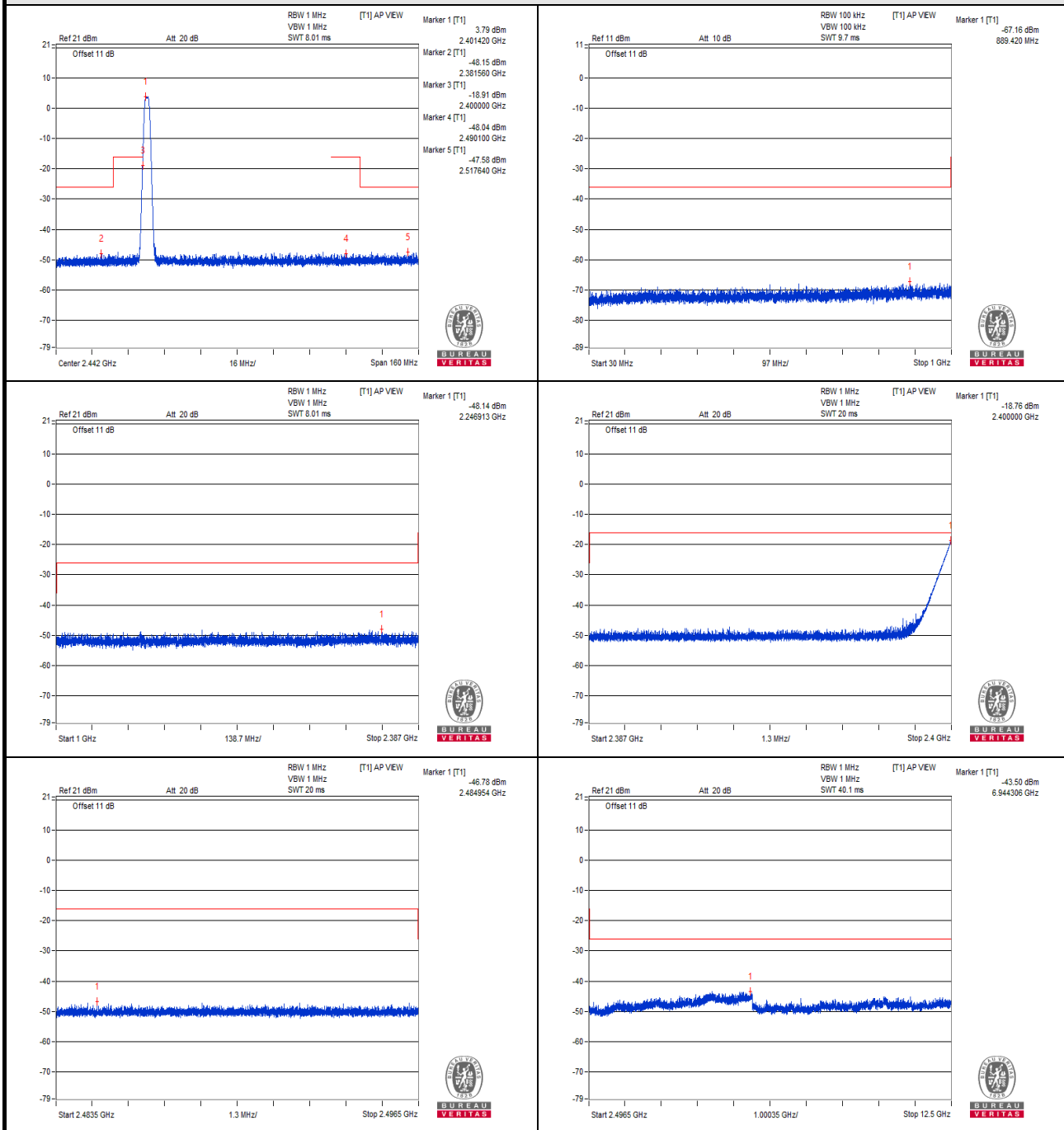
CH 0 (2402MHz)

V_{max}.



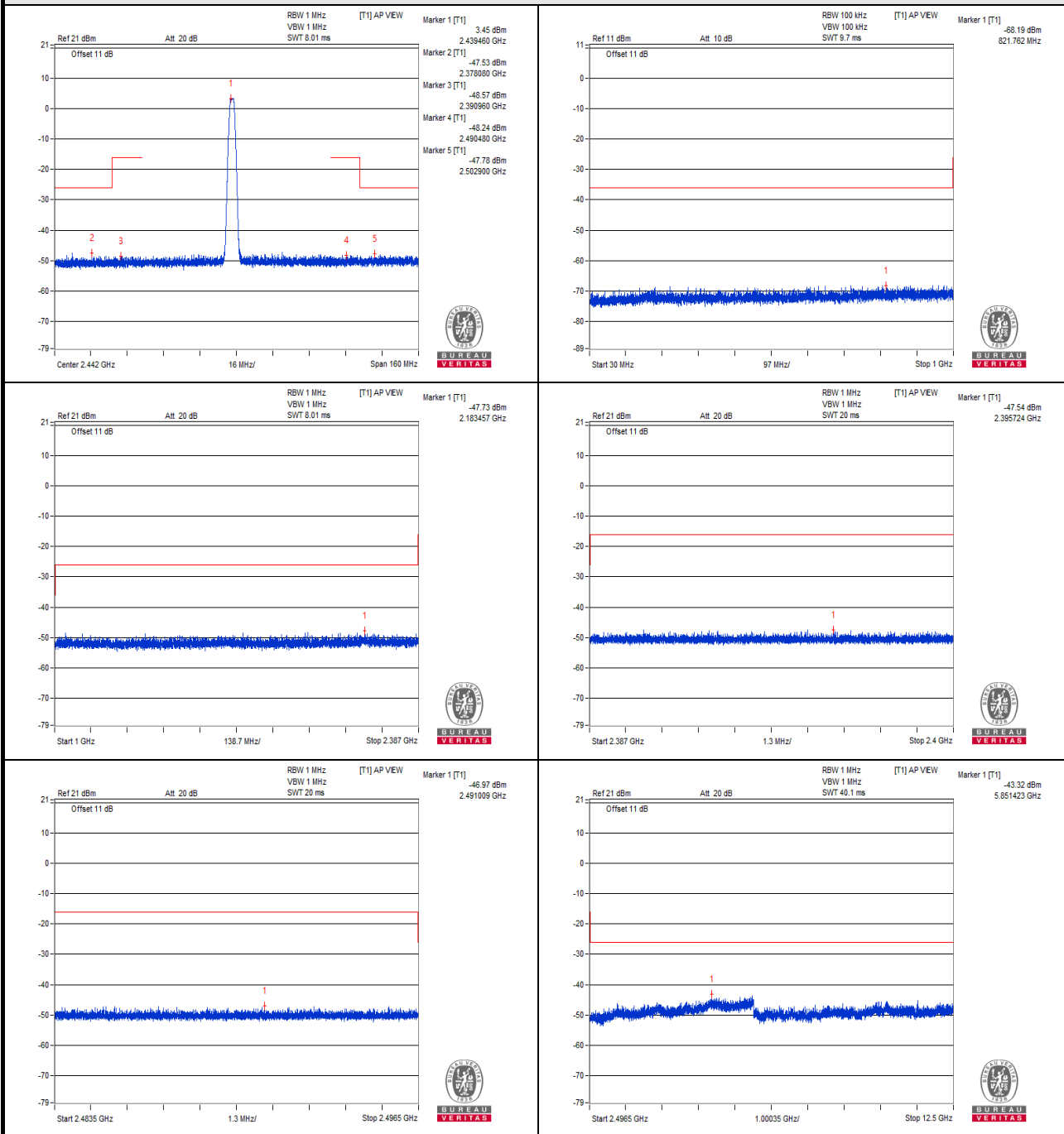
CH 0 (2402MHz)

V min.



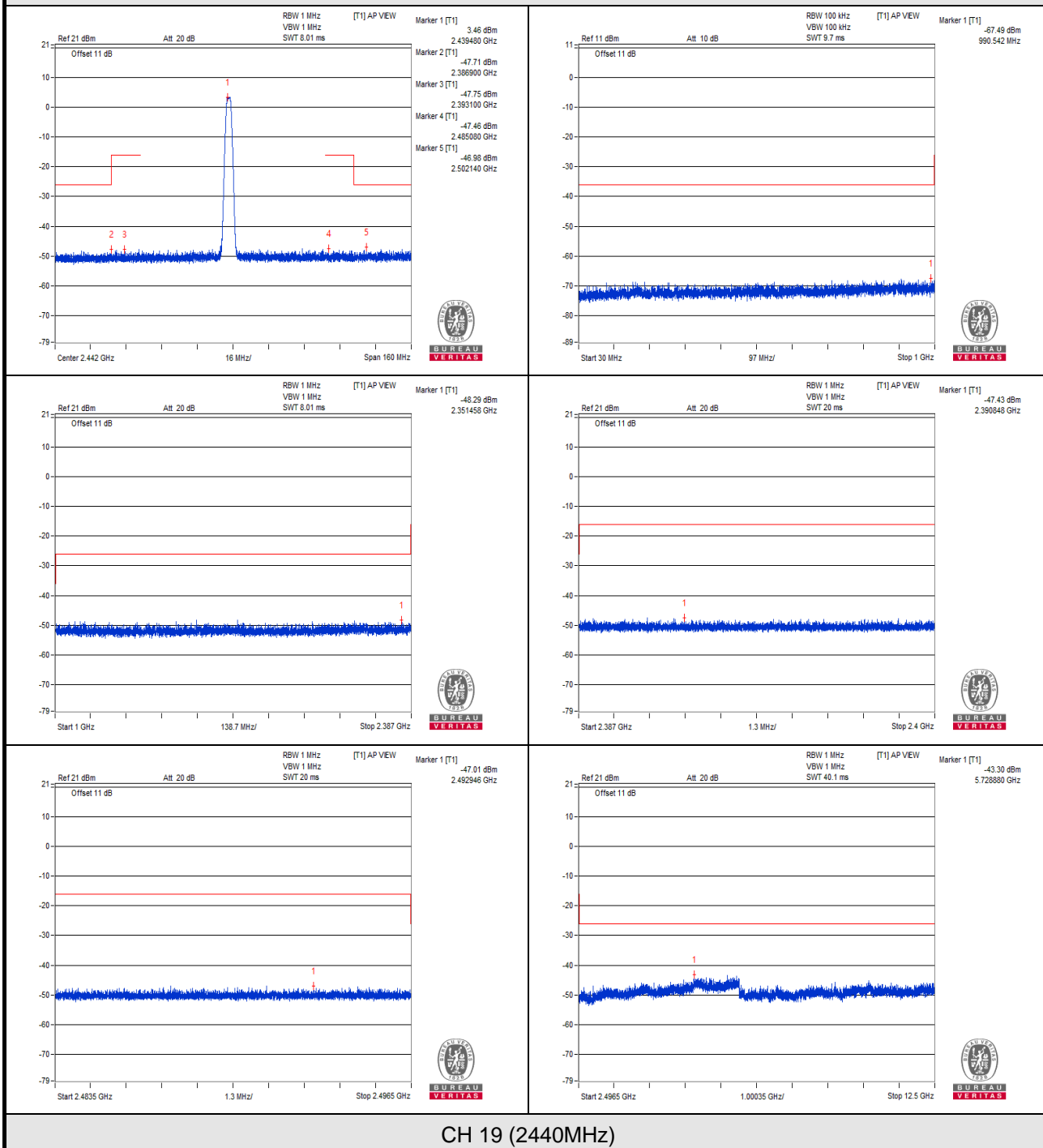
CH 0 (2402MHz)

Vnormal



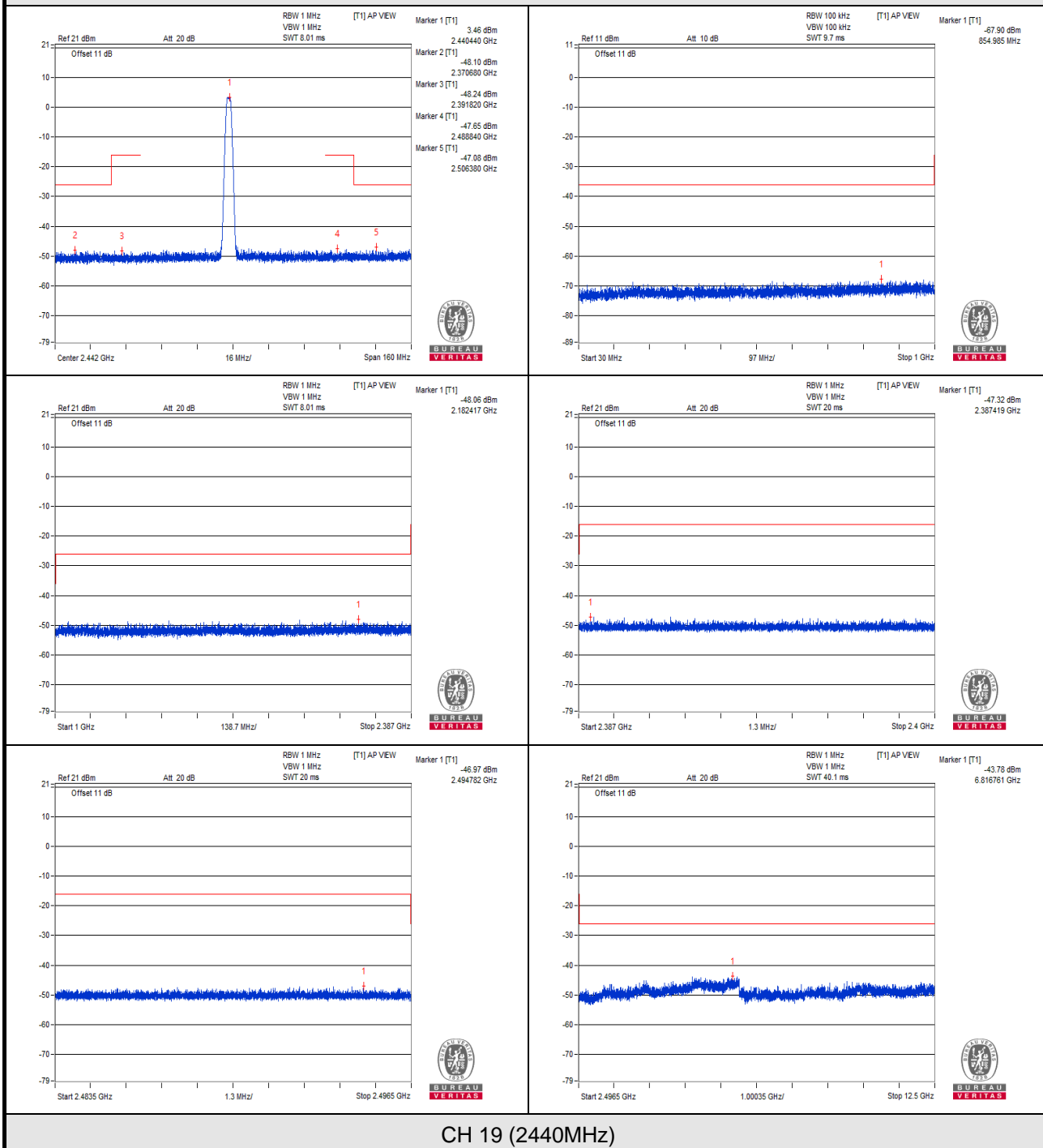
CH 19 (2440MHz)

V_{max}.



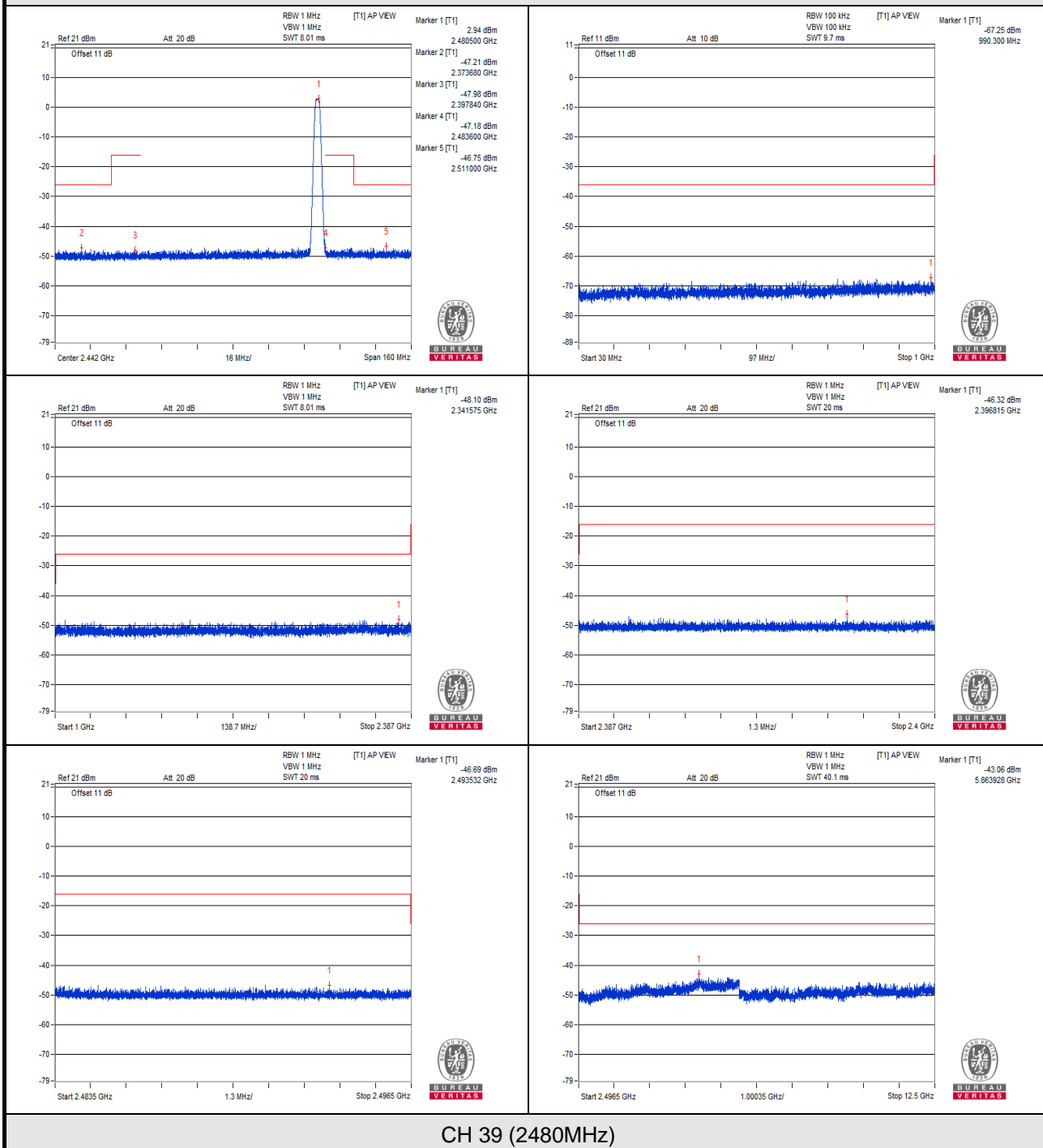
CH 19 (2440MHz)

V_{min}.



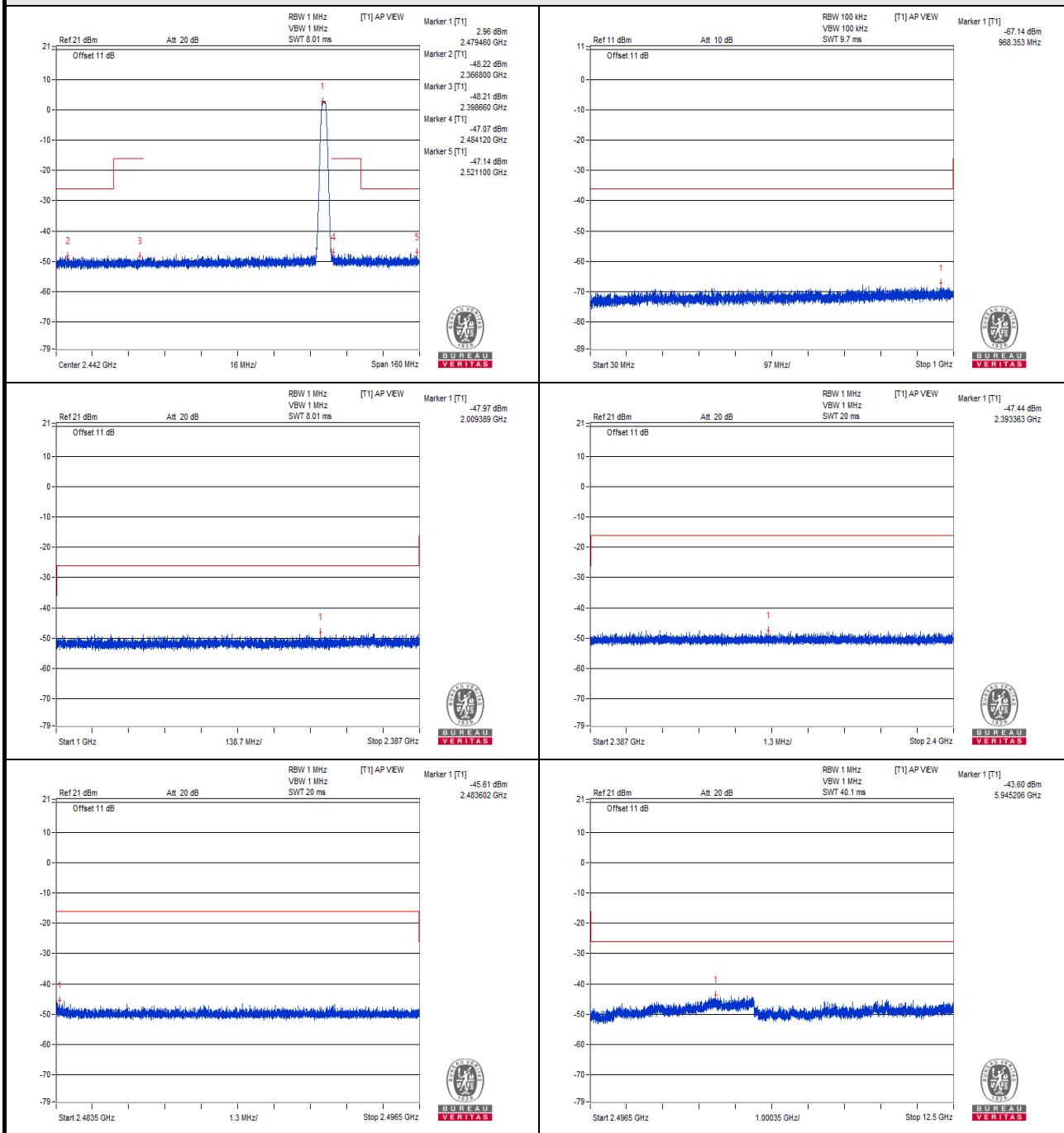
CH 19 (2440MHz)

Vnormal



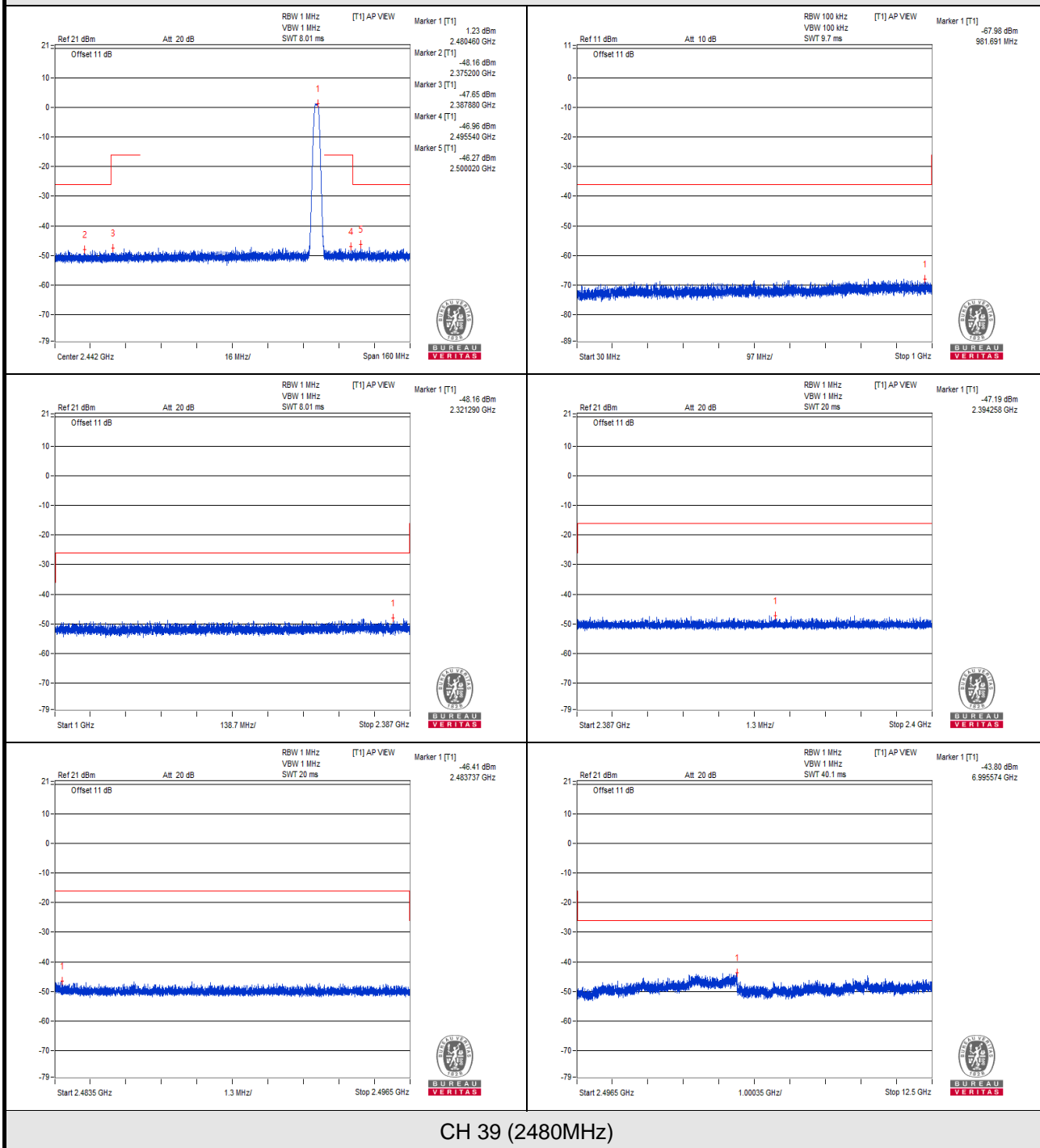
CH 39 (2480MHz)

V_{max}.



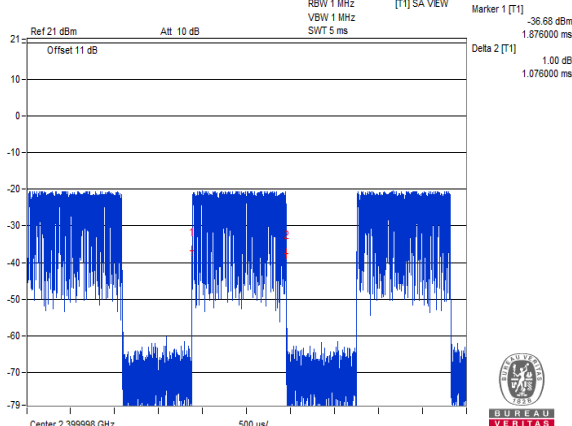
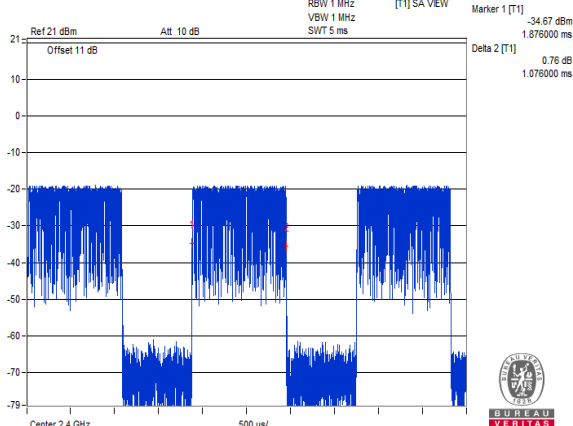
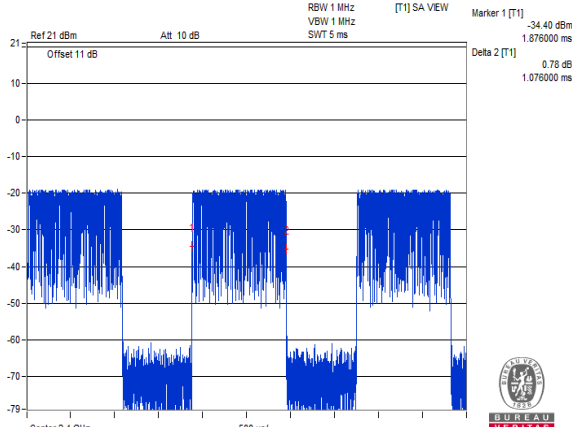
CH 39 (2480MHz)

V_{min}.



Measuring Mode *Zero Span

1. Set the spectrum analyzer as below and it takes in a value of all data point.
2. Regarding the all data value, it transforms the “dBm” value into “uW” value.
3. It adds the all values and calculates a grand total. Define a grand total as “P”.
4. It divides “P” by sample data point (ex.501) and calculates the mean value.
5. It reports the mean value.

	
<p>1 2399.998MHz P = 3.809842uW</p> 	<p>2 2400.000MHz P = 5.377046uW</p>
<p>3 2400.000MHz P = 5.384351uW</p>	

4.4 Antenna Power Measurement

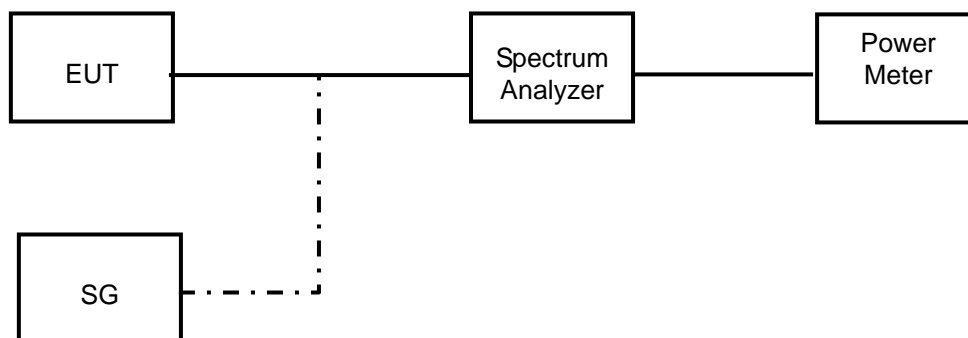
4.4.1 Limits of Antenna Power

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)
V_{normal}	0	2402	2.729	6.310
	19	2440	2.618	6.053
	39	2480	2.249	5.200
V_{max.}	0	2402	2.692	6.224
	19	2440	2.559	5.917
	39	2480	2.148	4.966
V_{min.}	0	2402	2.812	6.502
	19	2440	2.553	5.903
	39	2480	2.173	5.024
Max. Limit (mW):			10	-
Rated Power (mW):			3	-
Tolerance of Antenna Power (mW):			0.6 ~ 3.6	-
Max. EIRP Limit (mW):			-	16.368

Note: 1. Antenna gain is 3.64 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 + Antenna gain

GFSK (2Mbps)

Voltage	Channel Number	Frequency (MHz)	Conducted RF Output Power (mW)	Radiated RF Output Power (mW)
V_{normal}	0	2402	2.742	6.340
	19	2440	2.624	6.067
	39	2480	2.280	5.272
V_{max.}	0	2402	2.685	6.208
	19	2440	2.506	5.794
	39	2480	2.254	5.211
V_{min.}	0	2402	2.742	6.340
	19	2440	2.642	6.108
	39	2480	2.350	5.433
Max. Limit (mW):			10	-
Rated Power (mW):			3	-
Tolerance of Antenna Power (mW):			0.6 ~ 3.6	-
Max. EIRP Limit (mW):			-	16.368

Note: 1. Antenna gain is 3.64 dBi.

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

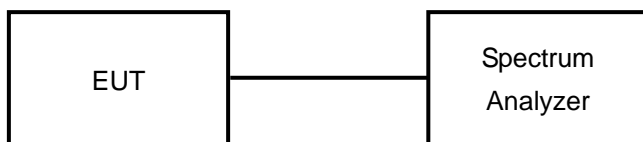
3. Formula: Radiated RF output power density = Conducted RF output power + Antenna gain

4.5 Spurious Emissions for Receiver

4.5.1 Limits of Spurious Emissions For Receiver

Frequencies (MHz)	Limit
Below 1GHz	$\leq 4\text{nW}/100\text{kHz}$ (-54dBm)
Above 1GHz	$\leq 20\text{nW}/\text{MHz}$ (-47dBm)

4.5.2 Test Setup

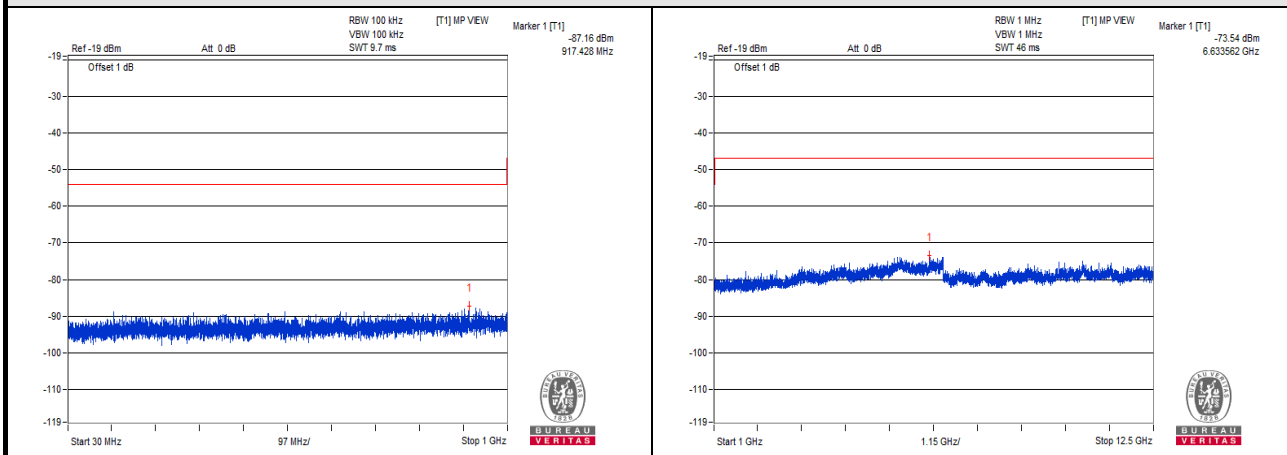


4.5.3 Test Result

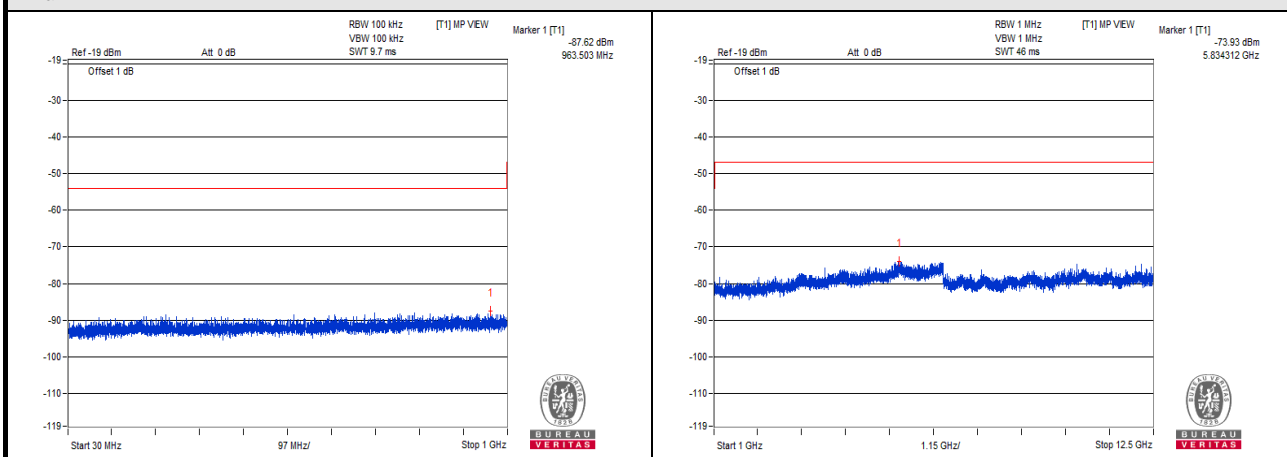
GFSK (1Mbps)

TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(nW)	LIMIT (nW)	RESULT
V_{normal}	30MHz to 1000MHz	917.428	0.001923	4.0	PASS
	1000MHz to 12500MHz	6633.562	0.044259	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	963.503	0.001730	4.0	PASS
	1000MHz to 12500MHz	5834.312	0.040458	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	219.635	0.001824	4.0	PASS
	1000MHz to 12500MHz	6745.687	0.045082	20.0	PASS
TEST CHANNEL		CH 19 (2440MHz)			
V_{normal}	30MHz to 1000MHz	970.051	0.001954	4.0	PASS
	1000MHz to 12500MHz	6784.500	0.045920	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	458.376	0.001807	4.0	PASS
	1000MHz to 12500MHz	6755.750	0.044566	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	874.385	0.001734	4.0	PASS
	1000MHz to 12500MHz	9370.562	0.035892	20.0	PASS
TEST CHANNEL		CH 39 (2480MHz)			
V_{normal}	30MHz to 1000MHz	966.535	0.001884	4.0	PASS
	1000MHz to 12500MHz	5834.312	0.040738	20.0	PASS
$V_{max.}$	30MHz to 1000MHz	501.177	0.001820	4.0	PASS
	1000MHz to 12500MHz	6110.312	0.049659	20.0	PASS
$V_{min.}$	30MHz to 1000MHz	903.970	0.001774	4.0	PASS
	1000MHz to 12500MHz	6083.000	0.050350	20.0	PASS

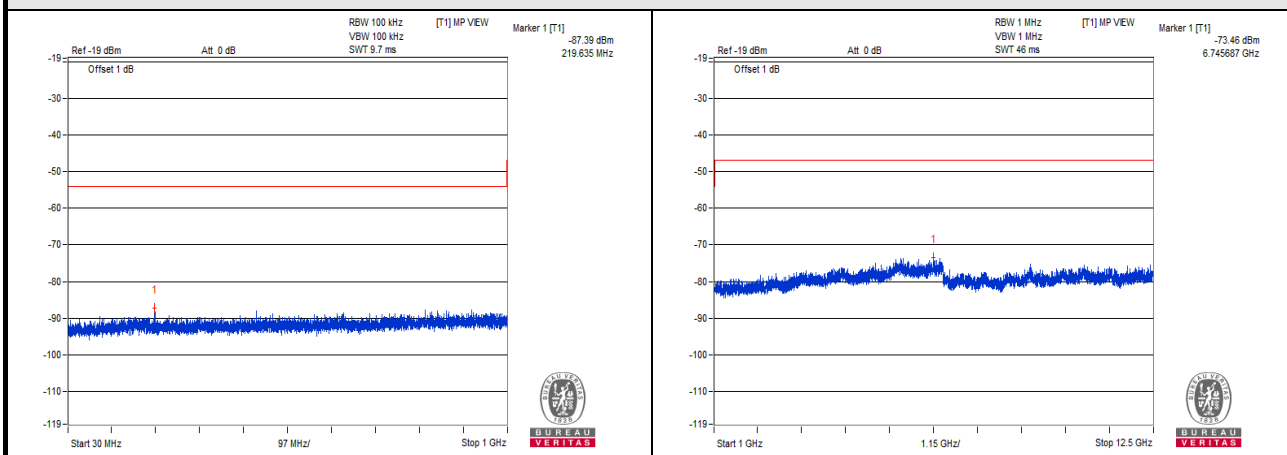
V_{normal}



V_{max.}

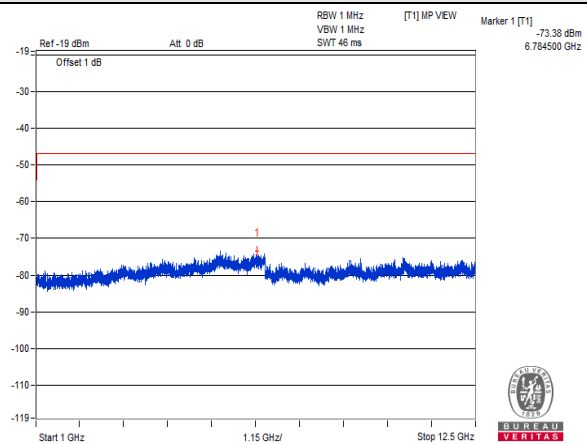
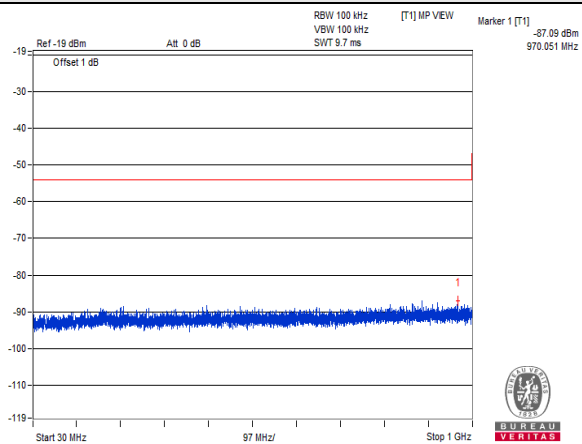


V_{min.}

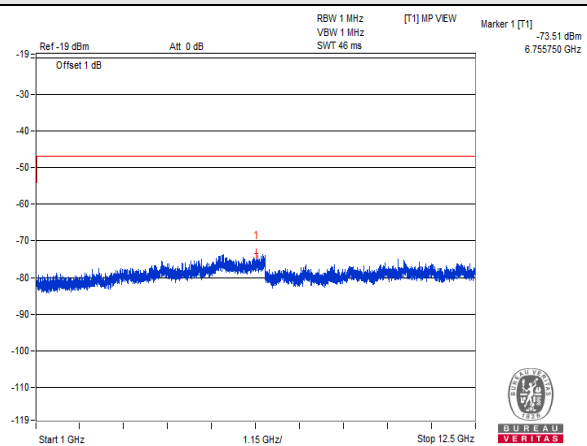
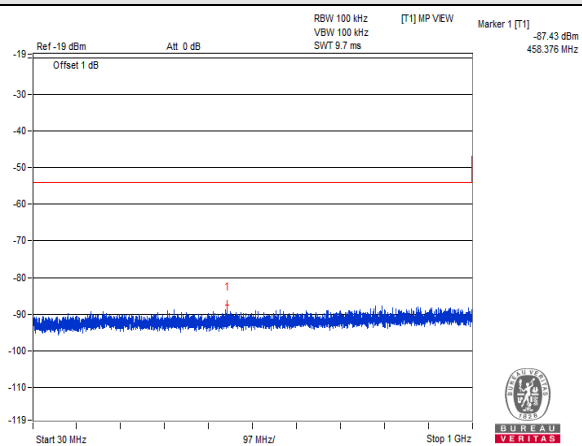


CH 0 (2402MHz)

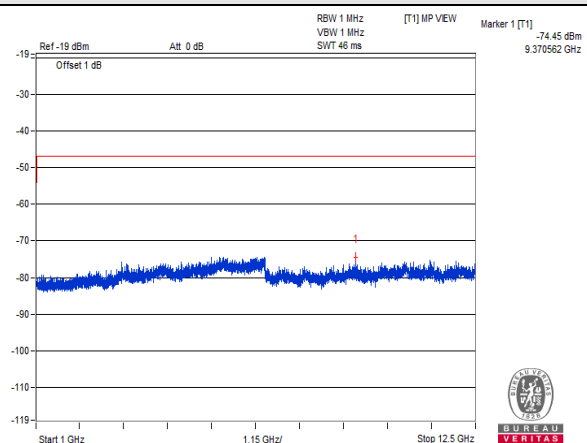
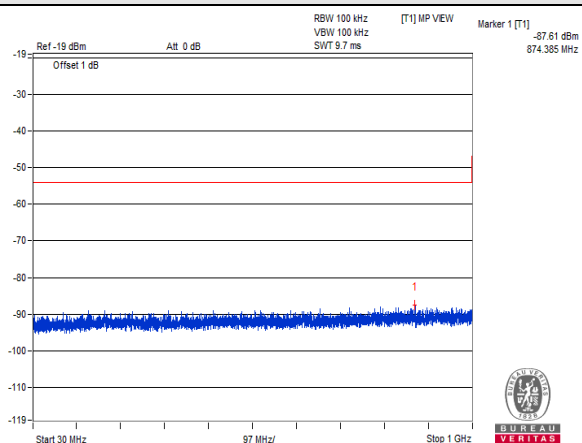
V_{normal}



V_{max.}

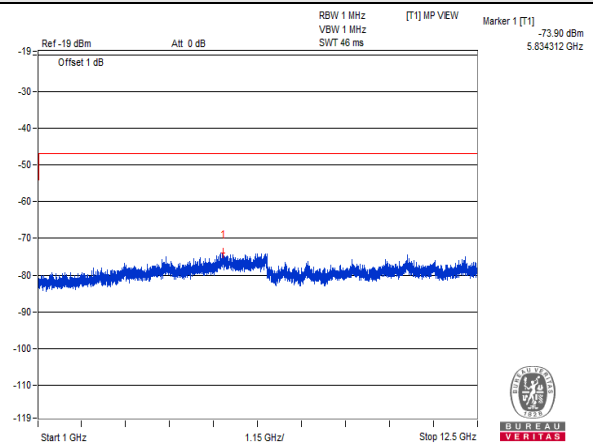
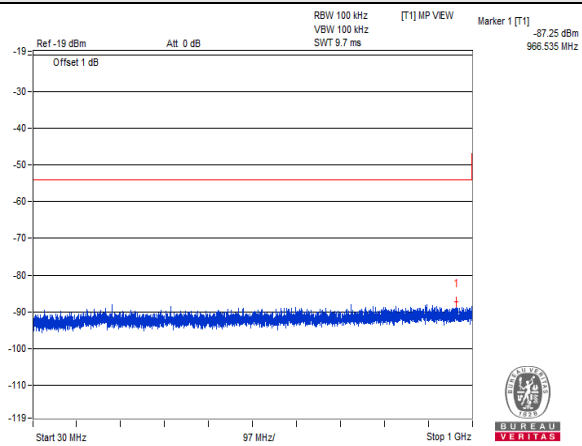


V_{min.}

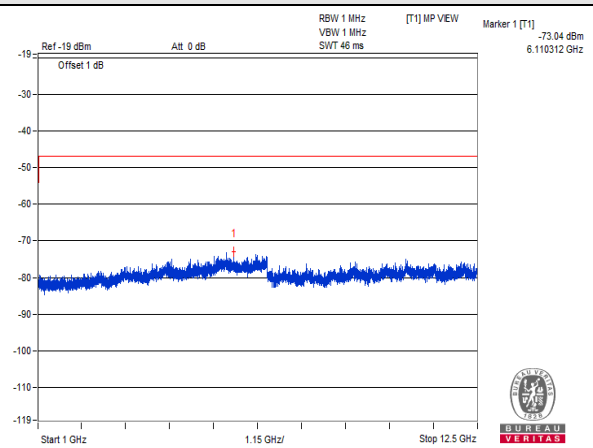
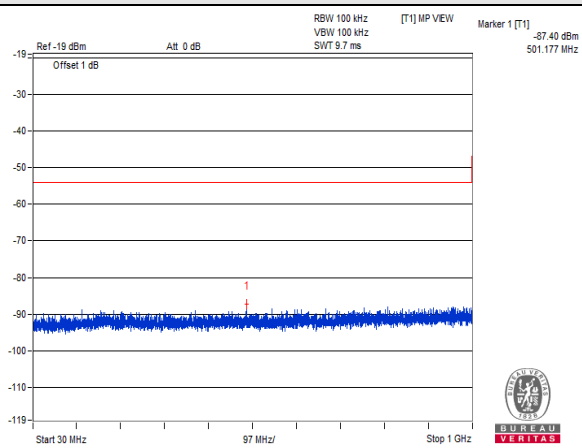


CH 19 (2440MHz)

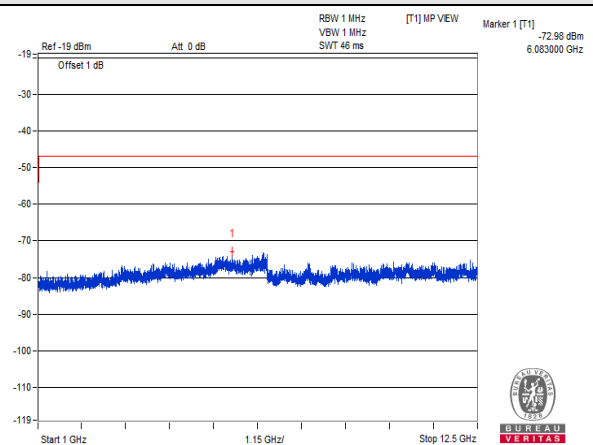
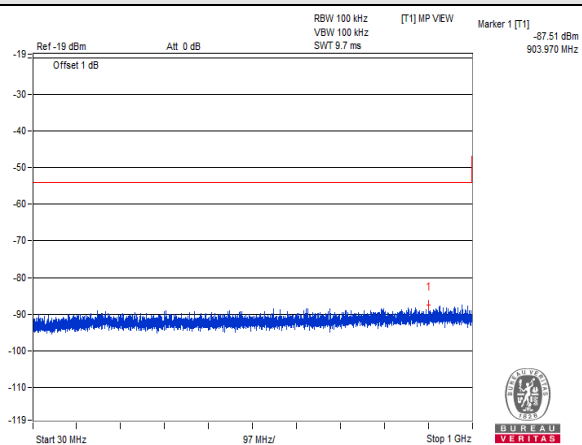
V_{normal}



V_{max.}



V_{min.}

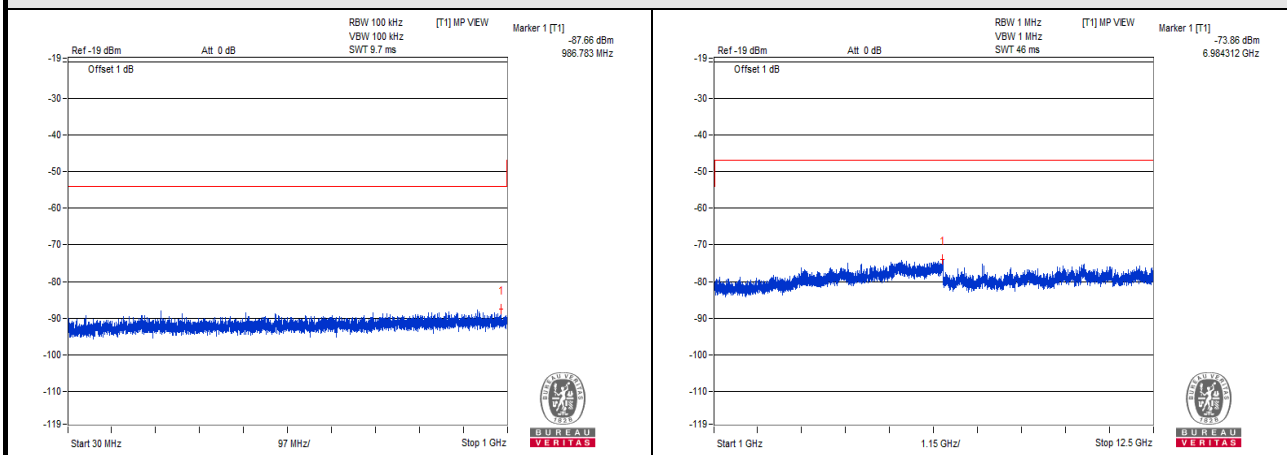


CH 39 (2480MHz)

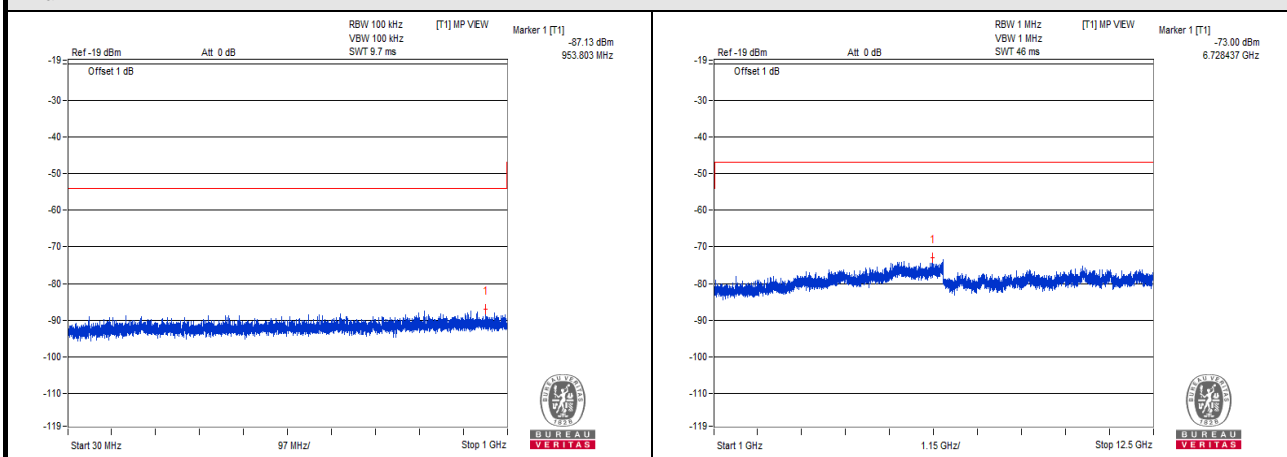
GFSK (2Mbps)

TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(nW)	LIMIT (nW)	RESULT
V_{normal}	30MHz to 1000MHz	986.783	0.001714	4.0	PASS
	1000MHz to 12500MHz	6984.312	0.041115	20.0	PASS
V_{max.}	30MHz to 1000MHz	953.803	0.001936	4.0	PASS
	1000MHz to 12500MHz	6728.437	0.050119	20.0	PASS
V_{min.}	30MHz to 1000MHz	945.316	0.001968	4.0	PASS
	1000MHz to 12500MHz	6916.750	0.046026	20.0	PASS
TEST CHANNEL		CH 19 (2440MHz)			
V_{normal}	30MHz to 1000MHz	954.895	0.001968	4.0	PASS
	1000MHz to 12500MHz	6039.875	0.044259	20.0	PASS
V_{max.}	30MHz to 1000MHz	771.080	0.001807	4.0	PASS
	1000MHz to 12500MHz	6958.437	0.042267	20.0	PASS
V_{min.}	30MHz to 1000MHz	967.626	0.001750	4.0	PASS
	1000MHz to 12500MHz	6962.750	0.041783	20.0	PASS
TEST CHANNEL		CH 39 (2480MHz)			
V_{normal}	30MHz to 1000MHz	929.432	0.001718	4.0	PASS
	1000MHz to 12500MHz	6773.000	0.042560	20.0	PASS
V_{max.}	30MHz to 1000MHz	846.861	0.001875	4.0	PASS
	1000MHz to 12500MHz	5873.125	0.041687	20.0	PASS
V_{min.}	30MHz to 1000MHz	929.675	0.001622	4.0	PASS
	1000MHz to 12500MHz	6430.875	0.043853	20.0	PASS

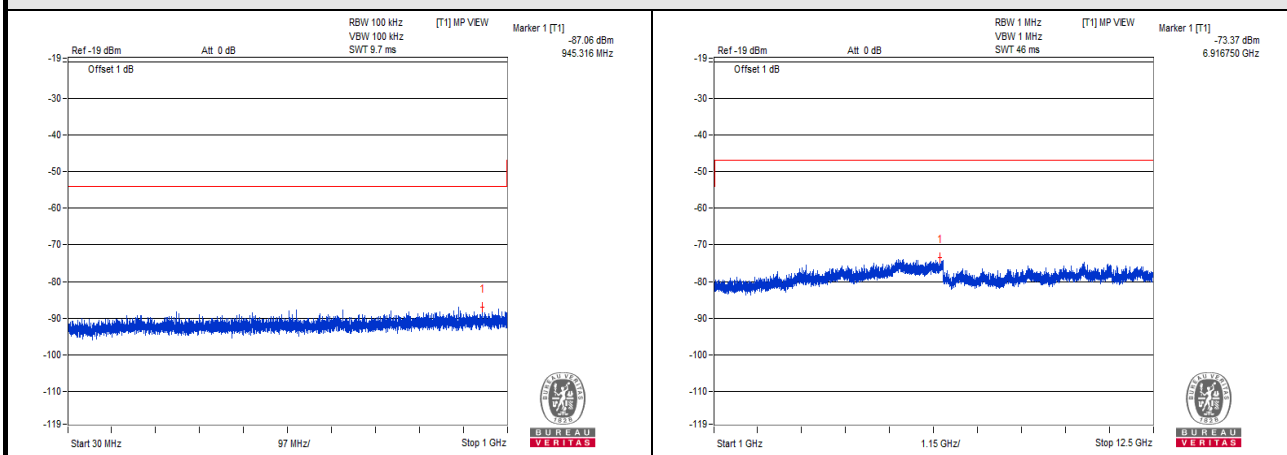
V_{normal}



V_{max.}

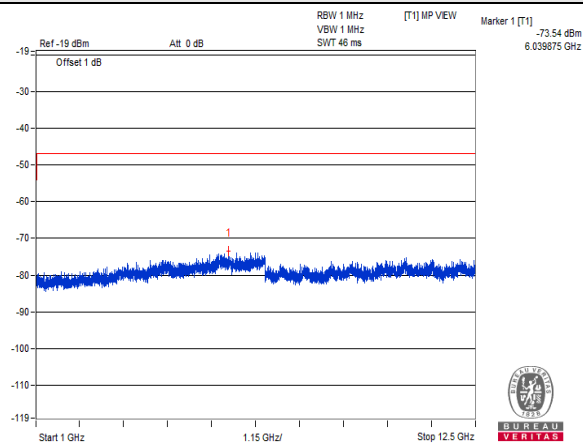
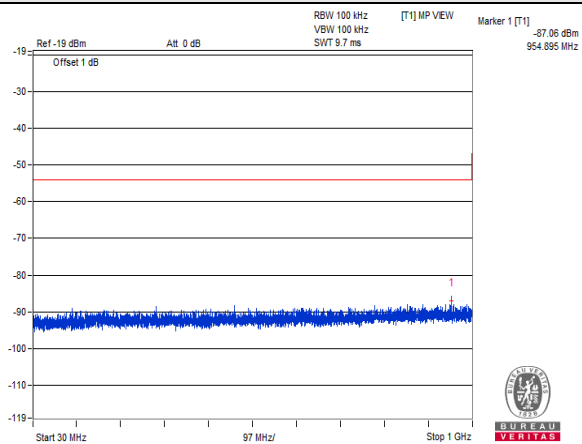


V_{min.}

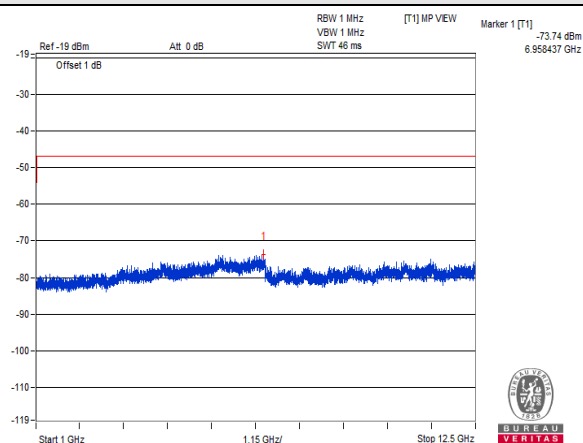
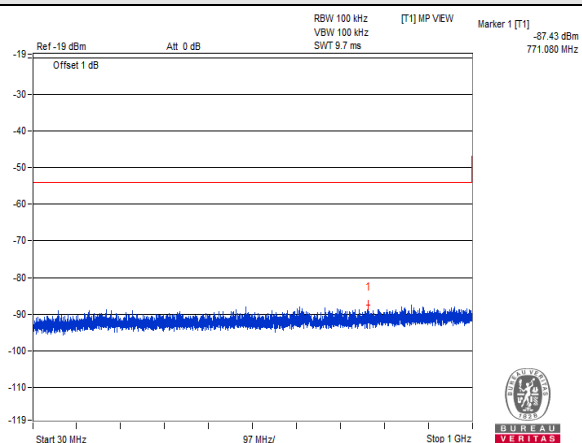


CH 0 (2402MHz)

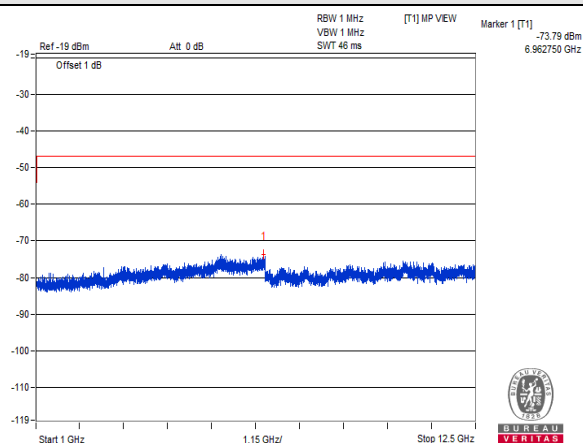
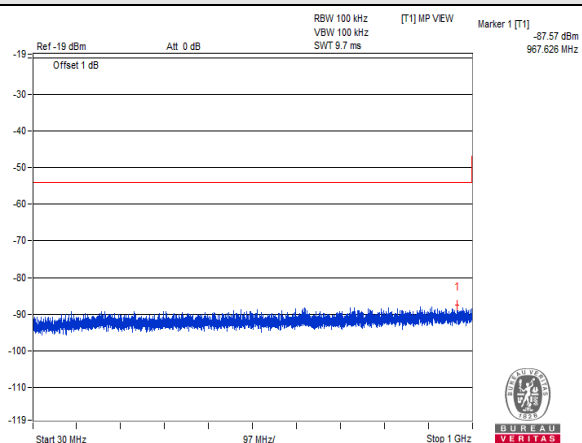
V_{normal}



V_{max.}

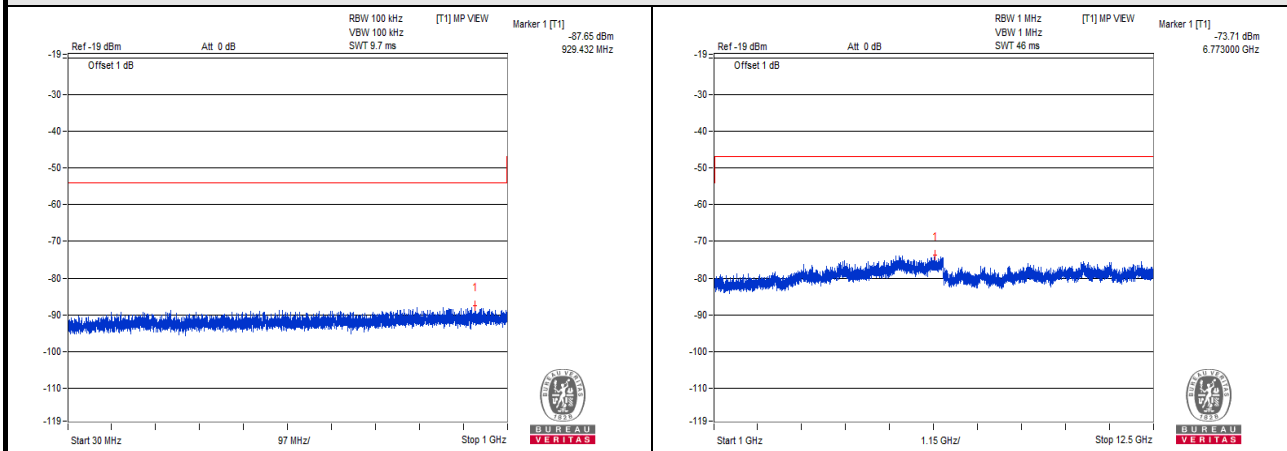


V_{min.}

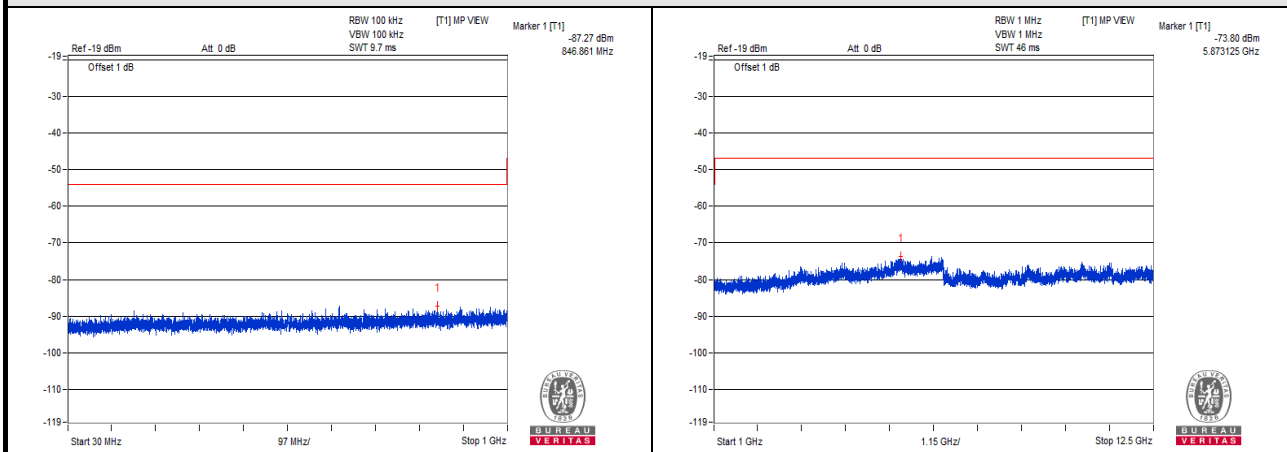


CH 19 (2440MHz)

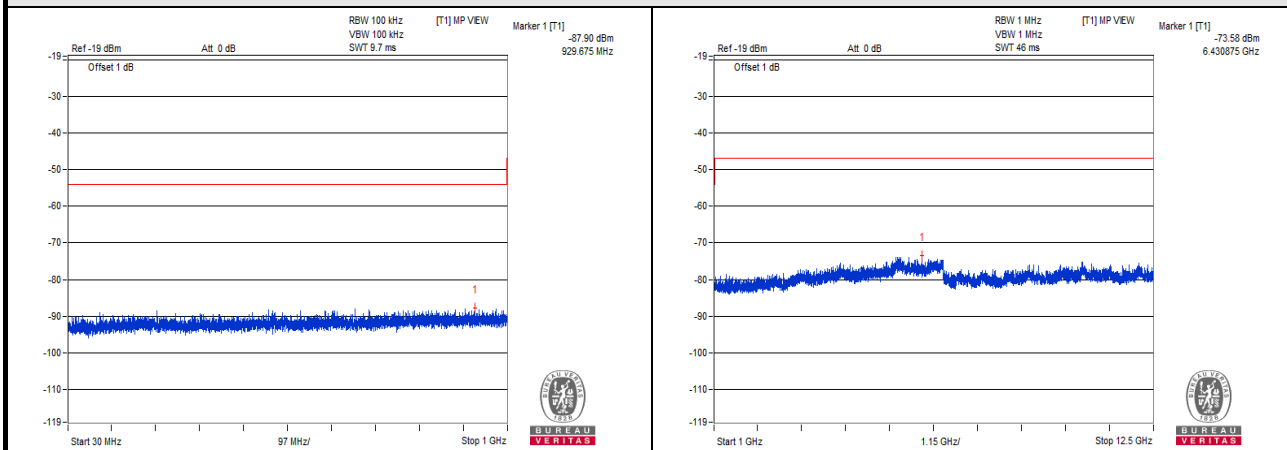
V_{normal}



V_{max.}



V_{min.}



CH 39 (2480MHz)

4.6 Interference Prevention Function

4.6.1 Limits of Interference Prevention Function

NA

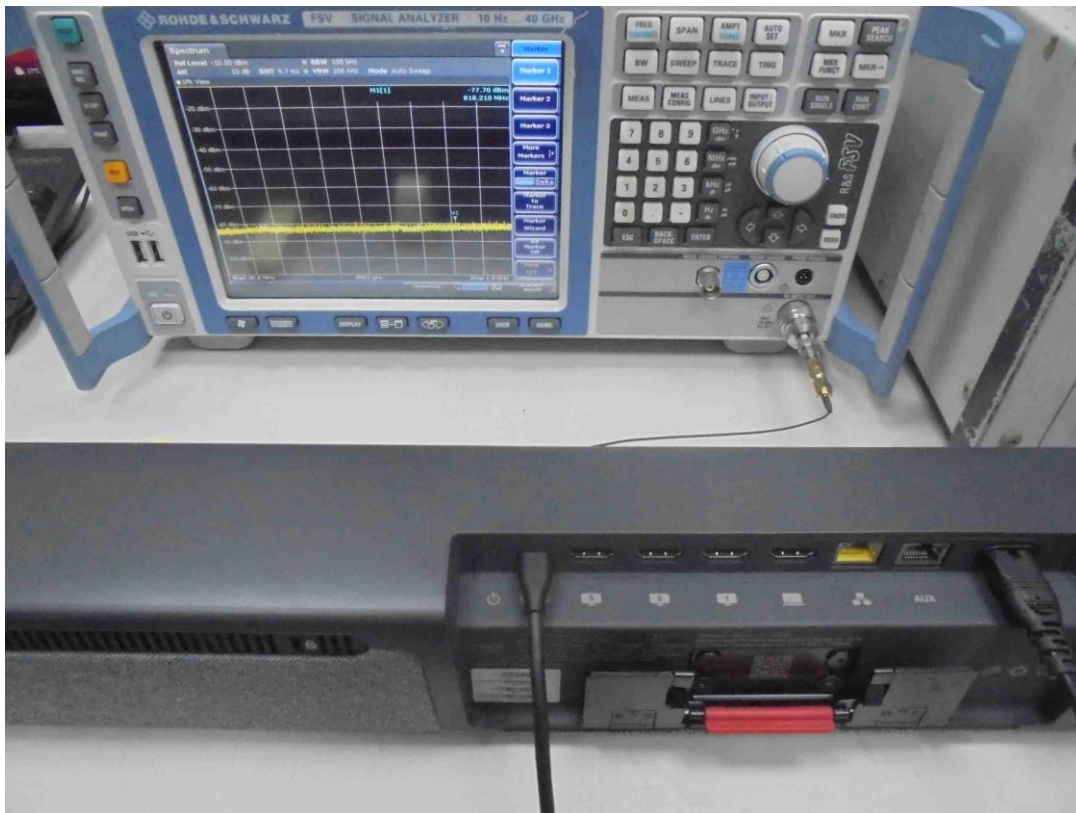
4.6.2 Test Setup



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.

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

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

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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 ---