

TEST REPORT

Applicant	Belkin International, Inc.
Address	555 S. Aviation Blvd., Suite 180, El Segundo, CA 90245-4852, USA

Manufacturer or Supplier	Belkin International, Inc.	
Address	555 S. Aviation Blvd., Suite 180, El Segundo, CA 90245-4852, USA	
Product	SOUNDFORM™ Play	
Brand Name	Belkin	
Model	AUC005(Right Earbud)	
Additional Model & Model Difference	N/A	
Date of tests	Oct. 31, 2021 ~ Jan. 11, 2022	

the tests have been carried out according to the requirements of the following standards:

☒ **ARIB STD-T66, Article 2 Section 1 Item 19**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Eric Fang Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	

Date: Jan. 18, 2022

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RJ2111WDG0821-2	Original release	Jan. 18, 2022



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Article 2 Section 1 Item 19 Reference	ARIB STD-T66 Ref.	Report reference	Parameter	Test Results (NOTE)
GENERAL PROVISIONS				
C	3.2(4)	3.1	Frequency tolerance	C
D	3.2(7)	3.2/3.3	Occupied bandwidth	C
E	3.2(6)	3.4	Spurious emissions	C
TRANSMITTING EQUIPMENT				
F	--	3.5	Antenna power	C
--	--	--	SAR	NA
TRANSMITTING ANTENNA				
--	--	2.5	Type, configuration, etc. of transmitting antenna	C
--	--	2.5	Direction pattern of transmitting antenna	C
RECEIVING EQUIPMENT				
H	3.3(1)	3.6	Spurious emissions of receiver	C
--	--	2.5	Refer to all articles for transmitting antenna	C
OPERATING FREQUENCY 2402 TO 2480MHz				
--	3.7 (1)	2.4	High Frequency/modulation section cannot be opened easily	C
--	3.1 (1)	2.1	Communication method	C
--	3.2 (1)a	2.1	Modulation method	C
--	3.2 (1)a	3.3	Spread spectrum method	C
--	3.2 (2)	3.5	Antenna power	C
--	3.6 (2)	3.5	Absolute gain of transmitting antenna	C
--	3.6 (2)	3.5	Angular width of principal radiation (AWPR)	C
--	3.2 (10)	--	Number of carriers within 1 MHz bandwidth in OFDM	NA
--	3.2 (8)	3.3	Diffusion bandwidth	C
--	3.2 (9)	3.3	Spreading factor	C
--	3.2 (11)	3.7	Frequency retention time (FH employed)	C
--	3.4.1(1)	3.8	Interference Prevention Function	C
NOTE 1: C = Conform NC = Not Conform NT = Not Tested NA = Not Applicable				



1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

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

ITEM	UNCERTAINTY
Occupied Bandwidth	206.50 Hz
Spurious emissions	$\pm 3.93\text{dB}$
Output power density	1.37dB
Out of band radiated power	2.52 dB
Frequency Tolerance	0.104 ppm

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



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	SOUNDFORM™ Play
MODEL NO.	AUC005(Right Earbud), See Note 4
POWER SUPPLY:	Earbuds: DC 3.7V Supplied by Li-ion Battery or DC 5V Charged by the Charging case Charging case: DC 3.7V Supplied by Li-ion Battery or DC 5V Charged by the Type C-USB port
TYPE OF EQUIPMENT	Data transmission equipment operating in the 2.4GHz
MODULATION TECHNOLOGY	FHSS
MODULATION TYPE	GFSK, $\pi/4$ -DQPSK, 8DPSK
OPERATING FREQUENCY	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	79
RATED RF OUTPUT POWER DENSITY	Please see NOTE 1
CONDUCTED POWER DENSITY	Please see NOTE 1
EIRP POWER DENSITY	Please see NOTE 1
HW-RELEASE NO	Ver1.2
SW-RELEASE NO	SAP215_20211115
ANTENNA TYPE	Ceramic Antenna, 1.56dBi Gain
CABLE SUPPLIED	Refer to user's manual

NOTES:

1. The power table as below table:

	Rated output power density (mW/MHz)	Conducted power density (mW/MHz)	EIRP power density (mW/MHz)
Normal mode			
GFSK	0.01	0.009	0.013
$\pi/4$-DQPSK	0.01	0.009	0.013
8DPSK	0.01	0.008	0.011
Enable AFH function			
GFSK	0.1	0.035	0.050
$\pi/4$-DQPSK	0.1	0.034	0.049
8DPSK	0.1	0.031	0.044

2. For the test results, the EUT had been tested with all conditions.
3. The above EUT information was declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or user's manual.
4. Because the circuits of the two earbuds are different, RJ2111WDG0821-1 is the report of the left earbuds and RJ2111WDG0821-2 is the report of the right earbuds. Both models are AUC005.



2.2 DESCRIPTION OF TEST CHANNELS

Seventy-nine channels are provided for Bluetooth.

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



Six modes are provided:

Mode	Conditions
Mode A	GFSK
Mode B	π /4-DQPSK
Mode C	8DPSK
Mode D	Enable AFH GFSK
Mode E	Enable AFH π /4-DQPSK
Mode F	Enable AFH 8DPSK

Note:

1. For the test results, the EUT had been tested with all conditions. But only the worst case (Mode A & Mode D) was shown in test report except the RF output power test was shown all conditions.
2. For AFH function only tested occupied bandwidth, spreading bandwidth, Antenna power and dwell time.
3. By means of test software which provided by manufacture, the power levels during the tests were set according to the following codes:

GFSK		π /4-DQPSK		8DPSK	
CHANNEL	POWER SETTING	CHANNEL	POWER SETTING	CHANNEL	POWER SETTING
0	6	0	6	0	6
39	6	39	6	39	6
78	6	78	6	78	6



2.3 TEST CONDITIONS

Test conditions	Voltage (V DC)
V_{normal}	3.7
V_{max}	4.07
V_{min}	3.33

2.4 ASSEMBLY

The RF circuits are located inside of the EUT. The RF circuit was covered by metal shielding case, Also it won't be easy to be opened. Frequency Band, channels and modulation parameters are fixed inside the module. They cannot be edited or modified by end-user.

2.5 ANTENNA SPECIFICATIONS

2.5.1 ANTENNA GAIN

Ant. Type	Connector Type	Highest Peak Gain (dBi) 2.4GHz ~ 2.5GHz
FPCB	N/A	1.56

2.5.2 ANTENNA PATTERN

Please refer to the attached file (Antenna report).



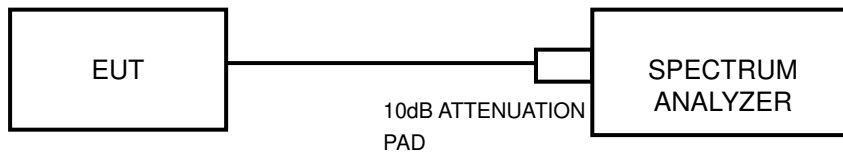
3 TEST TYPES AND RESULTS

3.1 FREQUENCY TOLERANCE MEASUREMENT

3.1.1 LIMITS OF FREQUENCY TOLERANCE MEASUREMENT

Tolerance of frequency shall be +/- 50ppm

3.1.2 TEST SETUP



3.1.3 TEST RESULTS – MODE A

ENVIRONMENTAL CONDITIONS		23 deg.C, 58 % RH					
Channel	Frequency (MHz)	Voltage normal		Voltage +10%		Voltage -10%	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
0	2402	2401.970119	-12.440	2401.969879	-12.539	2401.969800	-12.572
39	2441	2440.969000	-12.699	2440.968760	-12.798	2440.968840	-12.765
78	2480	2479.968040	-12.887	2479.967800	-12.983	2479.967919	-12.935

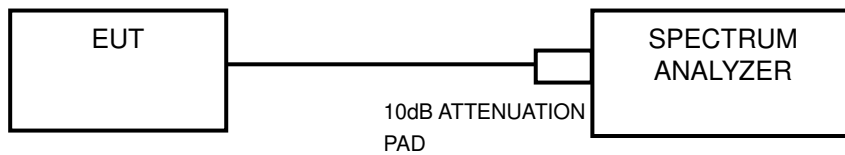


3.2 OCCUPIED BANDWIDTH MEASUREMENT (99% POWER BANDWIDTH)

3.2.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

Occupied bandwidth shall be 83.5MHz or less.

3.2.2 TEST SETUP



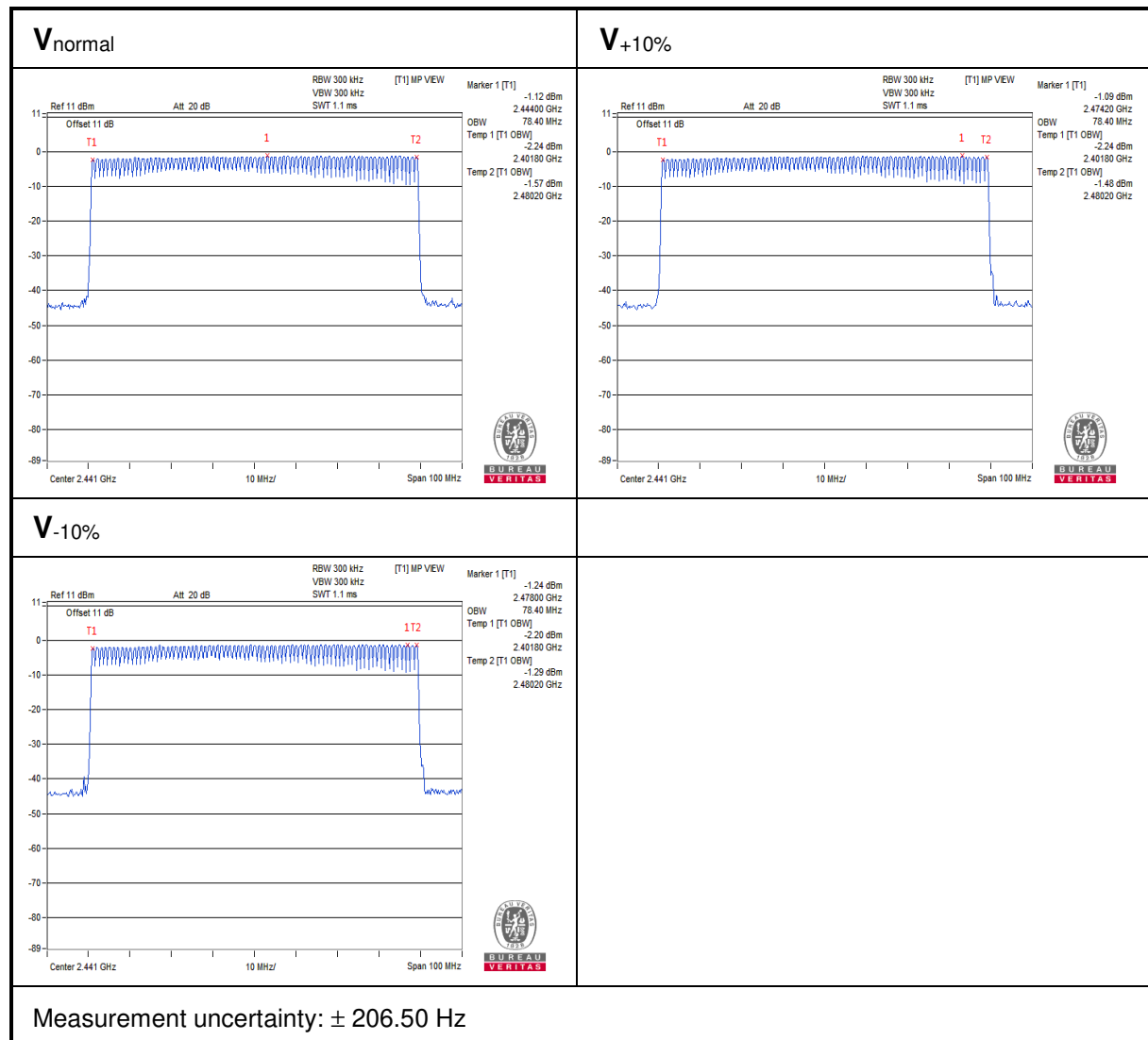


3.2.3 TEST RESULTS – MODE A

For GFSK:

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH		
HOPPING MODE	Voltage normal	Voltage +10%	Voltage -10%
	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
	78.40	78.40	78.40
Measurement uncertainty	± 206.50 Hz		

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



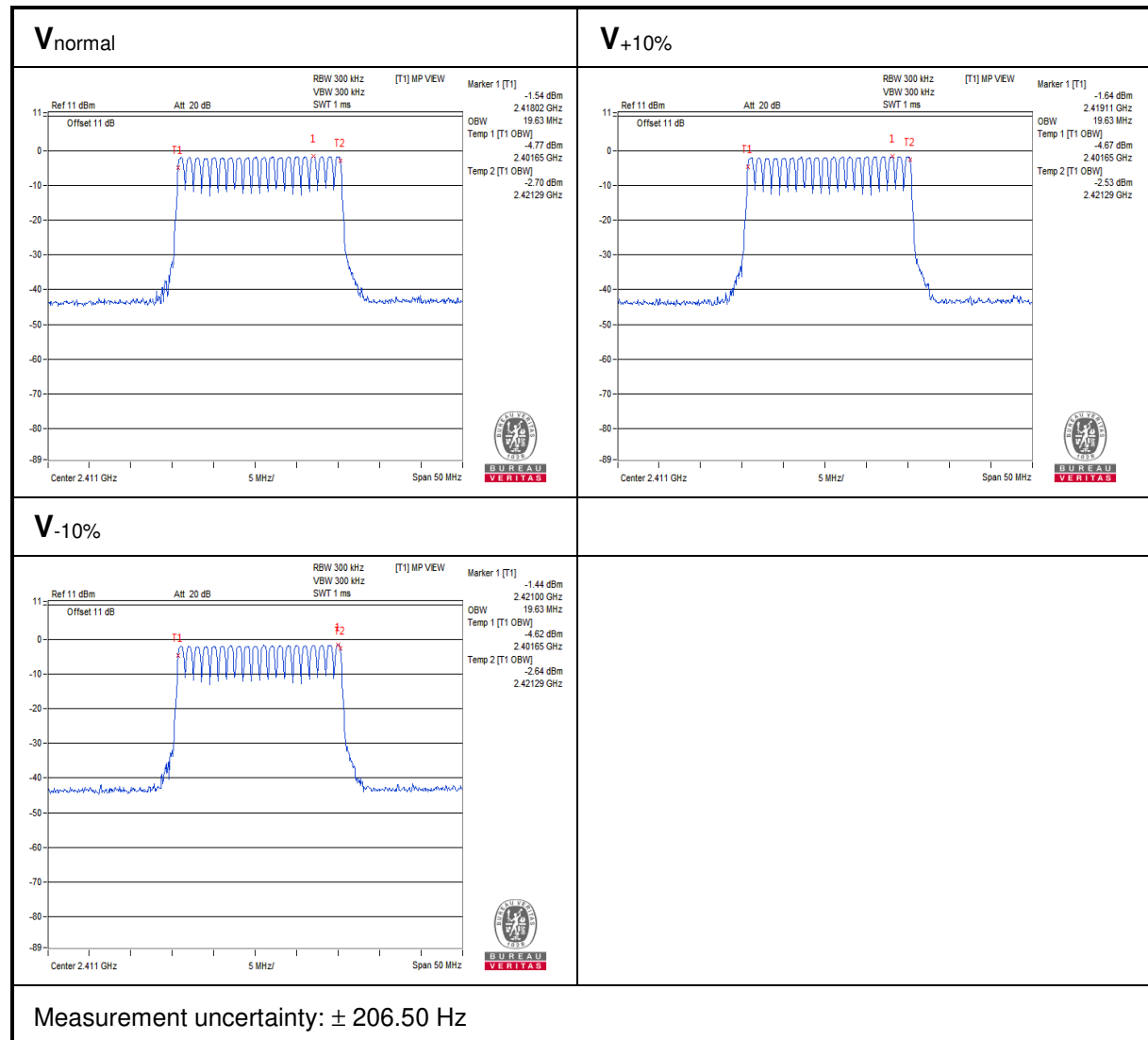


3.2.4 TEST RESULTS – MODE D

For GFSK < Enable AFH function>:

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH		
HOPPING MODE	Voltage normal	Voltage +10%	Voltage -10%
	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
	19.63	19.63	19.63
Measurement uncertainty	± 206.50 Hz		

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



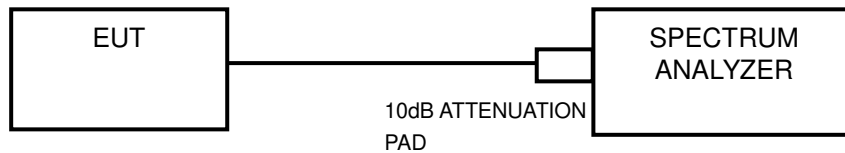


3.3 SPREADING BANDWIDTH MEASUREMENT (90% POWER BANDWIDTH)

3.3.1 LIMITS OF SPREADING BANDWIDTH AND SPREADING FACTOR

ITEM	LIMIT	REMARK
SPREADING BANDWIDTH	$\geq 500\text{kHz}$	-
SPREADING FACTOR	≥ 5	Operating frequency 2400 to 2483MHz

3.3.2 TEST SETUP





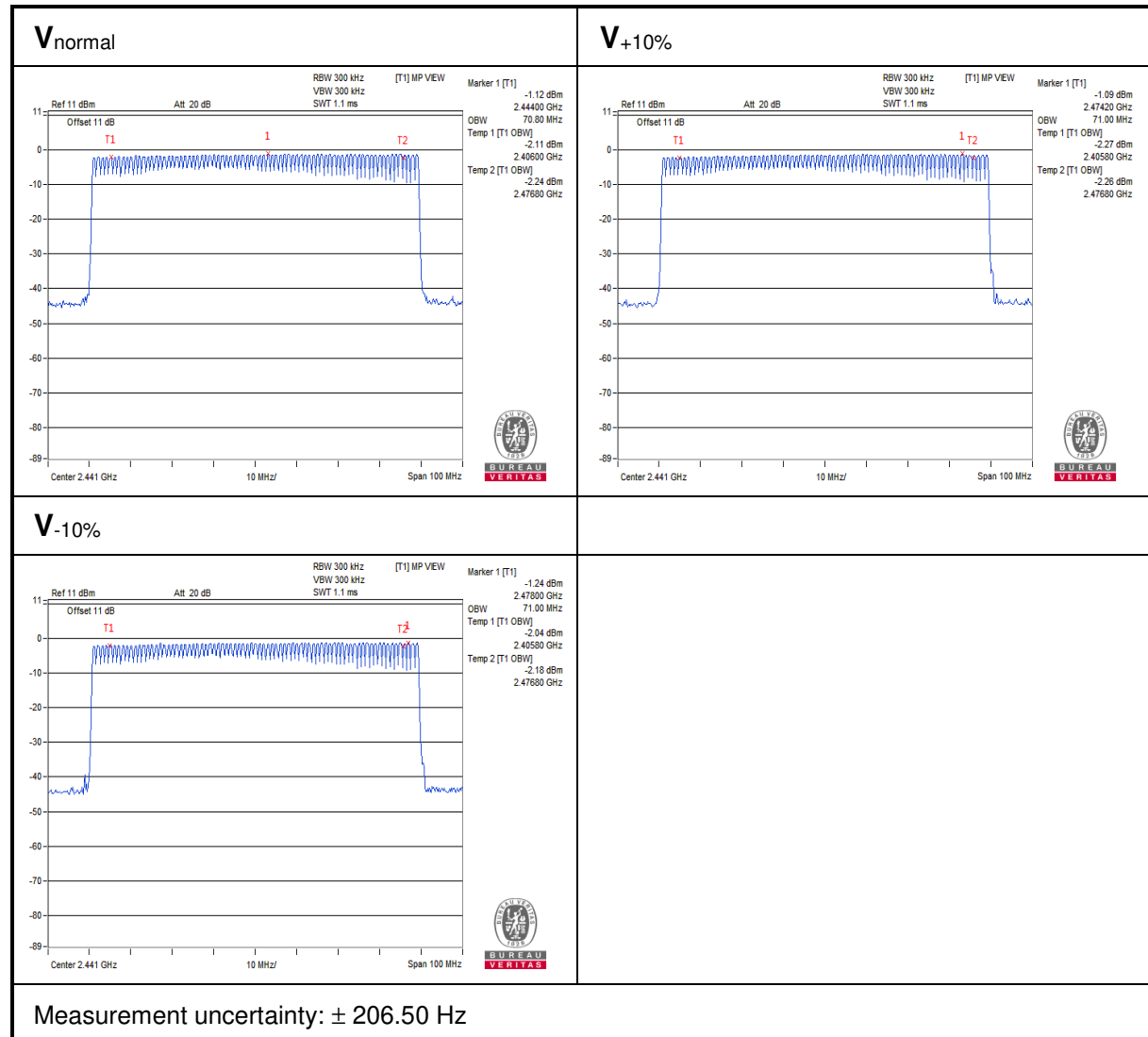
3.3.3 TEST RESULTS – MODE A

For GFSK:

ENVIRONMENTAL CONDITIONS	23 deg.C, 58% RH					
HOPPING MODE	Voltage normal		Voltage +10%		Voltage -10%	
	Spread bandwidth (MHz)	Spreading factor	Spread bandwidth (MHz)	Spreading factor	Spread bandwidth (MHz)	Spreading factor
	70.80	70.80	71.00	71.00	71.00	71.00
Measurement uncertainty	± 206.50 Hz					

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

Spreading Factor: 90% channel power bandwidth / 1.





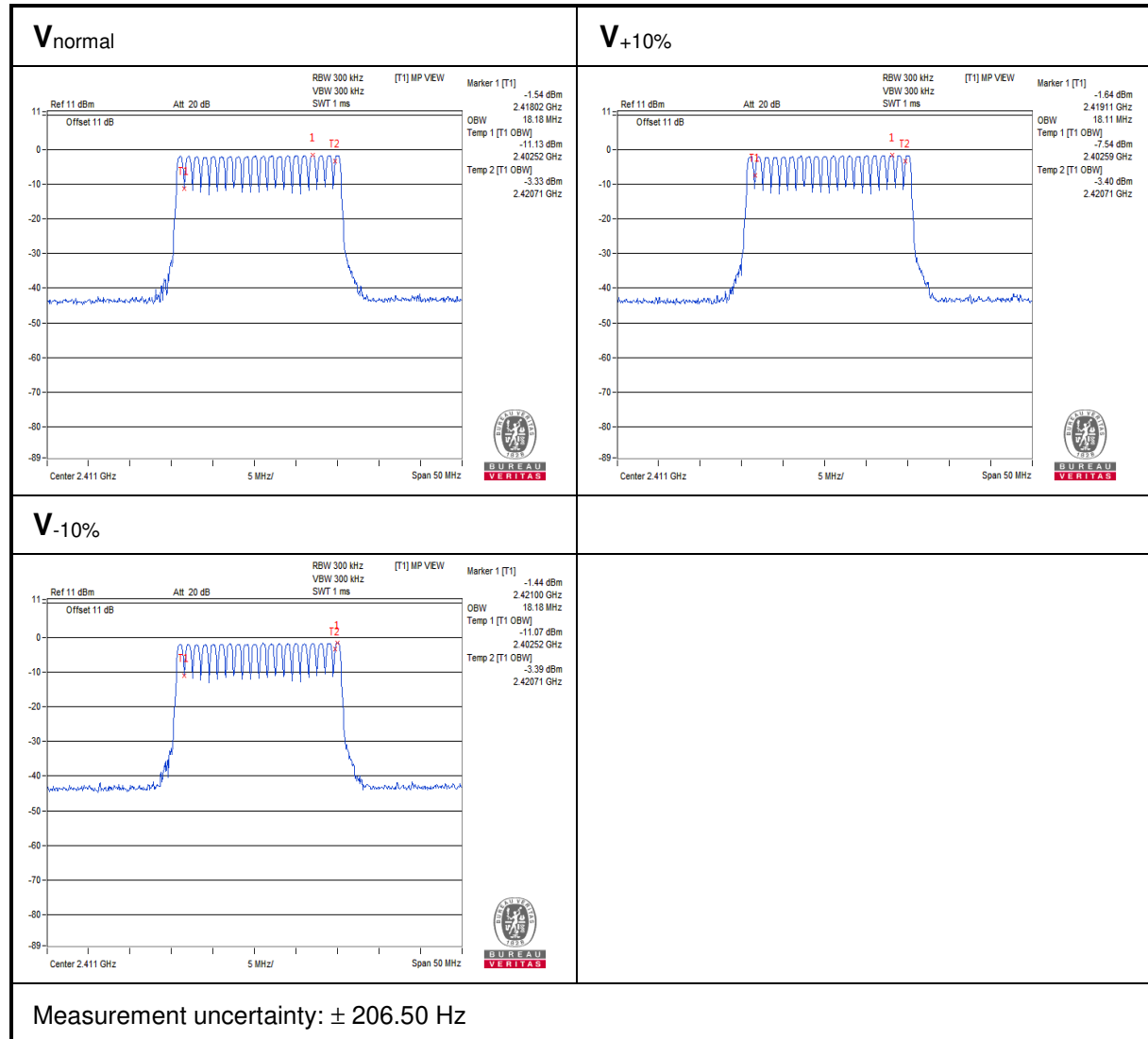
3.3.4 TEST RESULTS – MODE D

For GFSK< Enable AFH function>:

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH					
HOPPING MODE	Voltage normal		Voltage +10%		Voltage -10%	
	Spread bandwidth (MHz)	Spreading factor	Spread bandwidth (MHz)	Spreading factor	Spread bandwidth (MHz)	Spreading factor
	18.18	18.18	18.11	18.11	18.18	18.18
Measurement uncertainty	± 206.50 Hz					

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

Spreading Factor: 90% channel power bandwidth / 1.



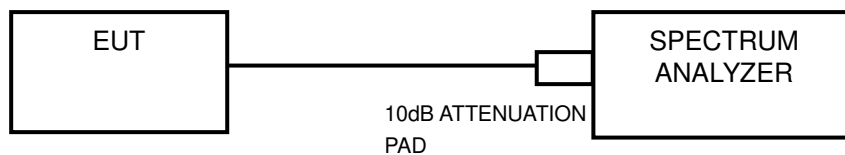


3.4 SPURIOUS EMISSIONS FOR TRANSMITTER MEASUREMENT

3.4.1 LIMITS OF SPURIOUS EMISSIONS

Frequencies (MHz)	Limit
Operating frequency 2400 to 2483.5MHz	
$2387 \leq f < 2400$	$\leq 25\mu\text{W}$
$2483.5 < f \leq 2496.5$	$\leq 25\mu\text{W}$
All other frequencies	$\leq 2.5\mu\text{W}$

3.4.2 TEST SETUP





3.4.3 SUMMARY OF TEST RESULTS – MODE A

GFSK

TEST CHANNEL		CH 0 (2402MHz)		CH 39 (2441MHz)		LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE. VALUE	FREQUENCY (MHz)	MEASURE. VALUE		
V _{normal}	30.0MHz to 1000.0MHz	710.940	0.027336uW	929.670	0.027685uW	0.25uW	PASS
	1000.0MHz to 2387MHz	1969.850	0.180219uW	2218.130	0.162188uW	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2399.920	1.934235uW	2397.720	0.182485uW	25uW	PASS
	2483.5MHz to 2496.5MHz	2490.610	0.216056uW	2489.460	0.194006uW	25uW	PASS
	2496.5MHz to 12500.0MHz	6998.070	0.744282uW	6973.060	0.641475uW	2.5uW	PASS
V _{+10%}	30.0MHz to 1000.0MHz	992.240	0.031417uW	680.140	0.03385uW	0.25uW	PASS
	1000.0MHz to 2387MHz	2252.460	0.190257uW	1656.050	0.171474uW	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2399.980	2.258697uW	2397.030	0.164006uW	25uW	PASS
	2483.5MHz to 2496.5MHz	2484.780	0.200081uW	2489.360	0.197955uW	25uW	PASS
	2496.5MHz to 12500.0MHz	6985.570	0.757721uW	6990.570	0.78063uW	2.5uW	PASS
V _{-10%}	30.0MHz to 1000.0MHz	638.430	0.029949uW	952.710	0.029563uW	0.25uW	PASS
	1000.0MHz to 2387MHz	1857.510	0.167941uW	2331.860	0.165277uW	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2399.900	1.86859uW	2390.880	0.178009uW	25uW	PASS
	2483.5MHz to 2496.5MHz	2489.290	0.184455uW	2492.320	0.202535uW	25uW	PASS
	2496.5MHz to 12500.0MHz	7000.570	0.921699uW	6983.060	0.785252uW	2.5uW	PASS



TEST CHANNEL		CH 78 (2480MHz)		LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE. VALUE		
V _{normal}	30MHz to 1000MHz	959.740	0.026855uW	0.25uW	PASS
	1000MHz to 2387MHz	2065.900	0.155966uW	2.5uW	PASS
	2387MHz to 2400MHz	2389.470	0.178715uW	25uW	PASS
	2483.5MHz to 2496.5MHz	2483.550	0.394877uW	25uW	PASS
	2496.5MHz to 12500MHz	6998.070	0.75827uW	2.5uW	PASS
V _{+10%}	30MHz to 1000MHz	795.570	0.028815uW	0.25uW	PASS
	1000MHz to 2387MHz	1764.230	0.163654uW	2.5uW	PASS
	2387MHz to 2400MHz	2397.130	0.161861uW	25uW	PASS
	2483.5MHz to 2496.5MHz	2483.500	0.412802uW	25uW	PASS
	2496.5MHz to 12500MHz	6965.560	0.979664uW	2.5uW	PASS
V _{-10%}	30MHz to 1000MHz	693.230	0.031551uW	0.25uW	PASS
	1000MHz to 2387MHz	2346.770	0.167928uW	2.5uW	PASS
	2387MHz to 2400MHz	2389.700	0.211499uW	25uW	PASS
	2483.5MHz to 2496.5MHz	2483.690	0.529611uW	25uW	PASS
	2496.5MHz to 12500MHz	6950.550	0.613502uW	2.5uW	PASS

NOTE: 1. The worst value in each frequency range v.s. each channel has been marked by boldface.
2. The spectrum plots are attached on the following pages.
3. The limit 2.5uW/MHz of frequency 30MHz to 1000MHz after conversion is 0.25uW/100kHz.

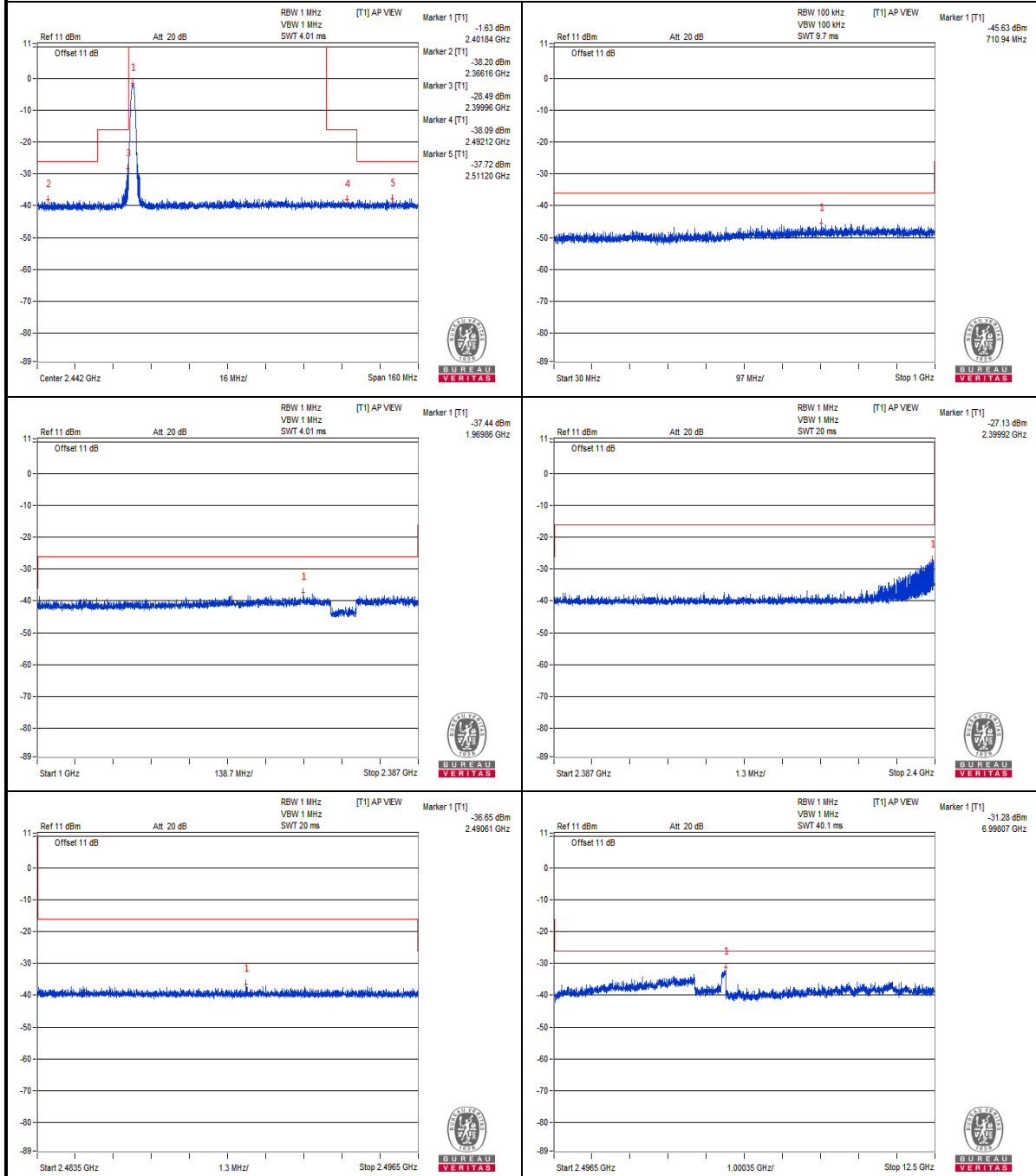


BUREAU
VERITAS

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GFSK

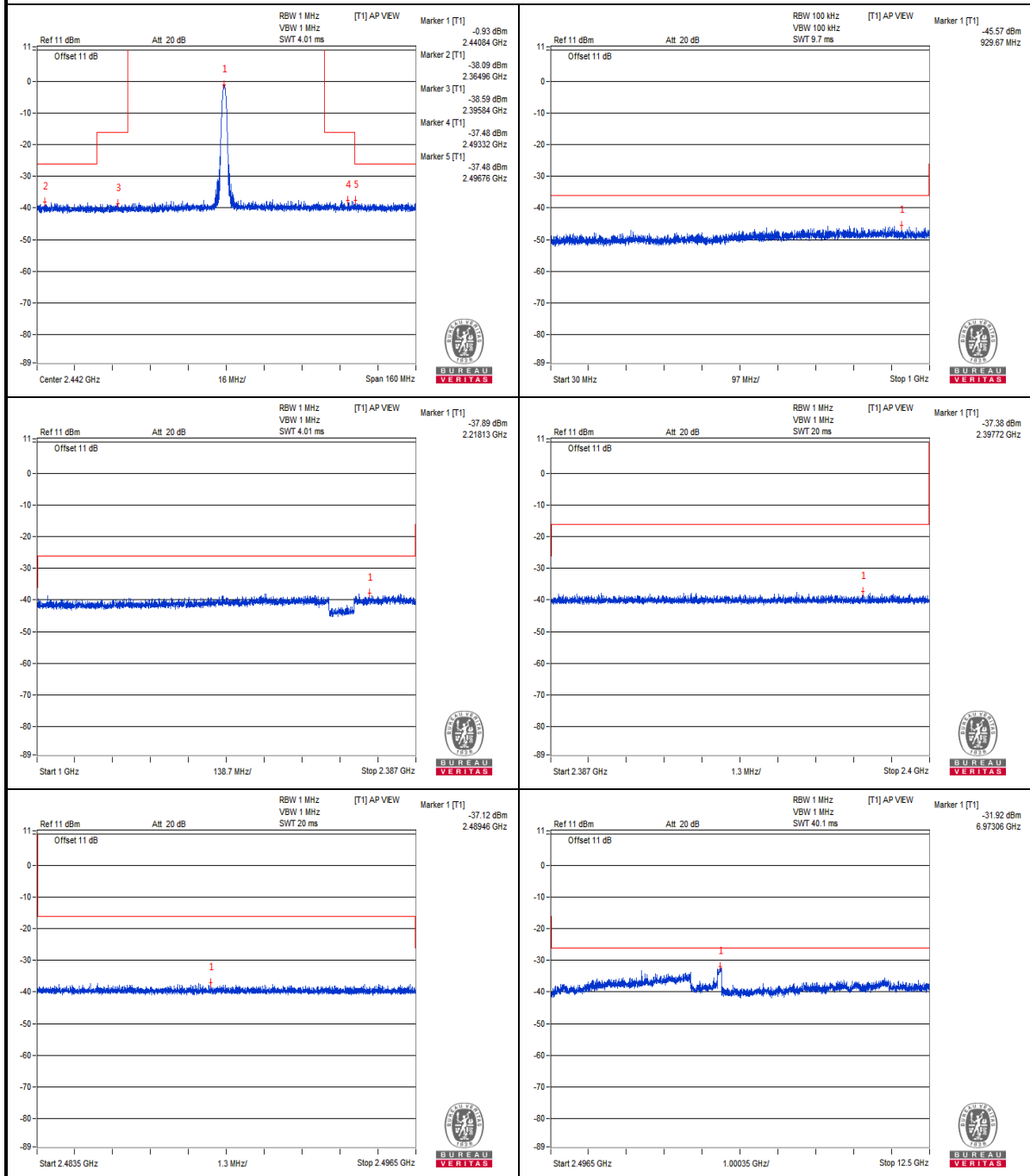
Vnormal Channel 0



Measurement uncertainty: $\pm 3.93\text{dB}$



Vnormal
Channel 39



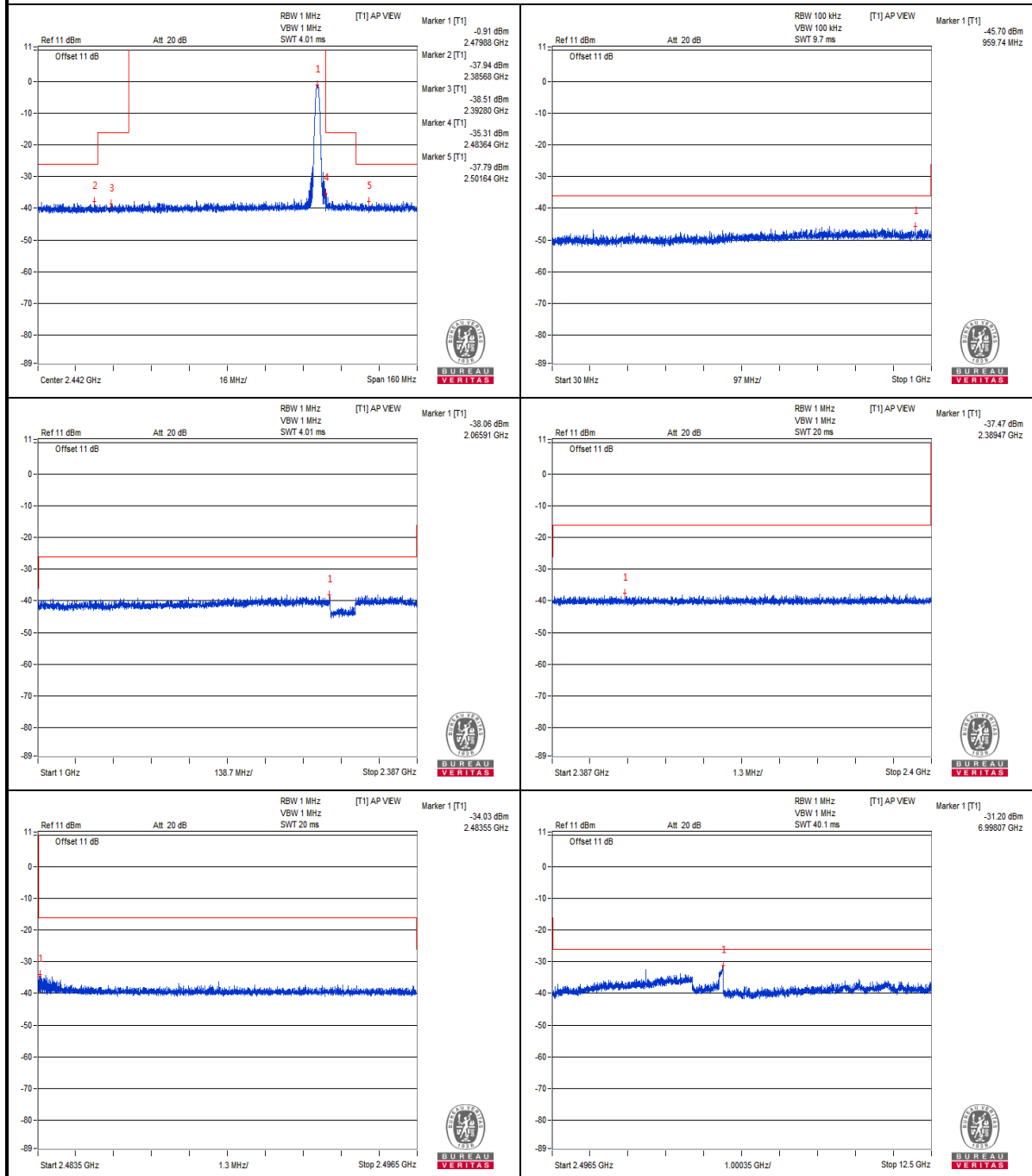
Measurement uncertainty: $\pm 3.93\text{dB}$



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VERITAS

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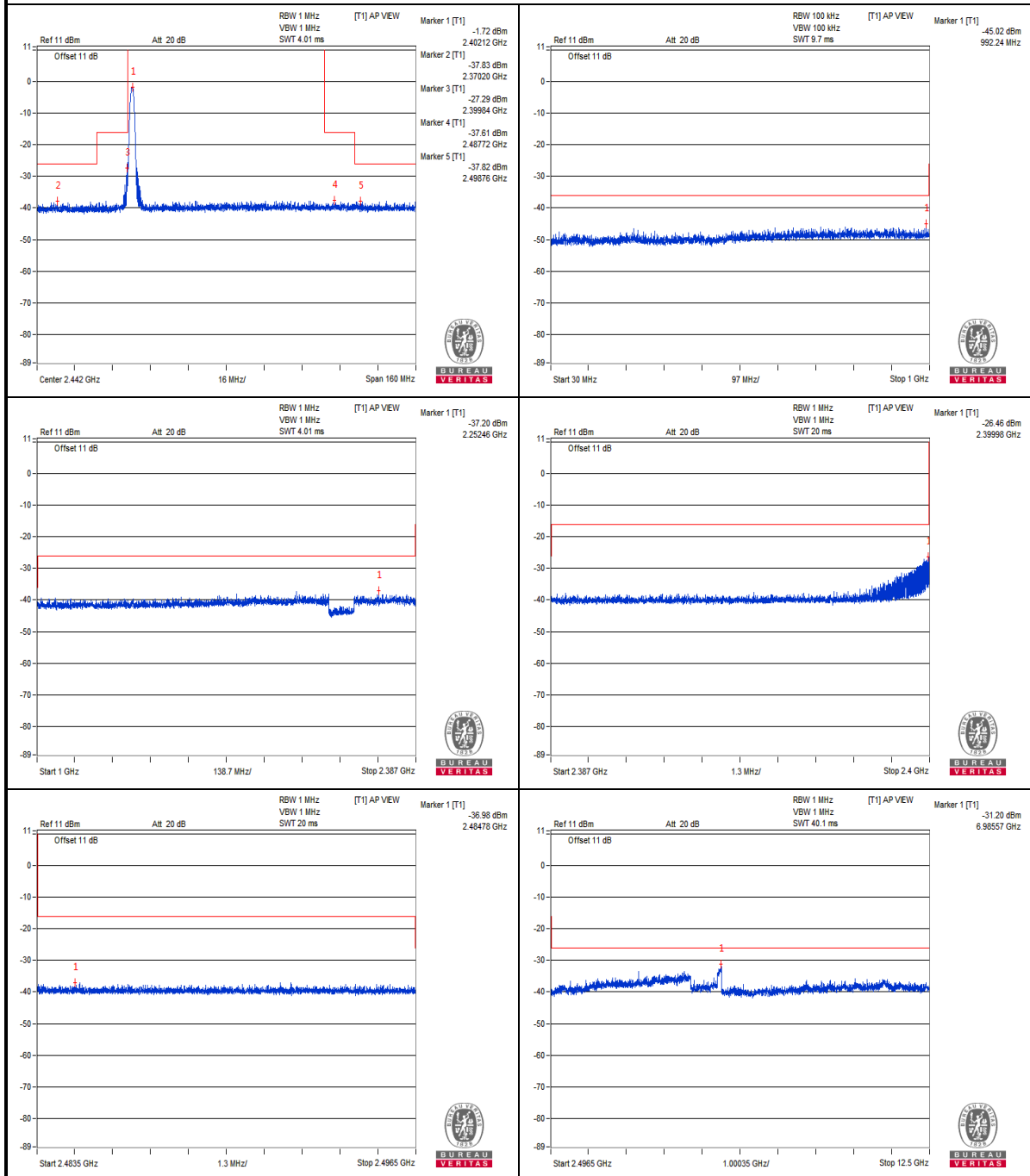
Vnormal Channel 78



Measurement uncertainty: $\pm 3.93\text{dB}$



V+10%
Channel 0



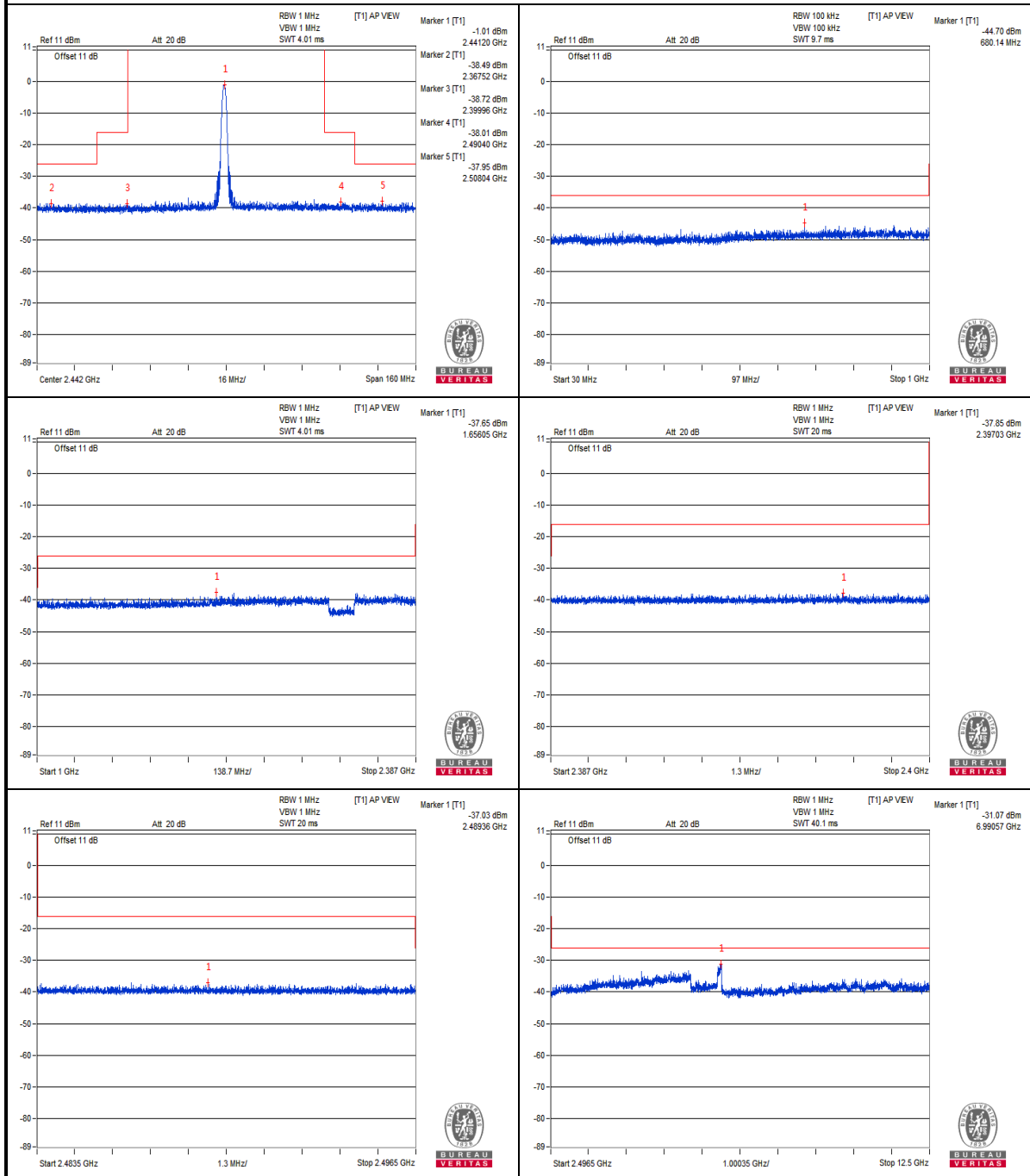
Measurement uncertainty: $\pm 3.93\text{dB}$



BUREAU
VERITAS

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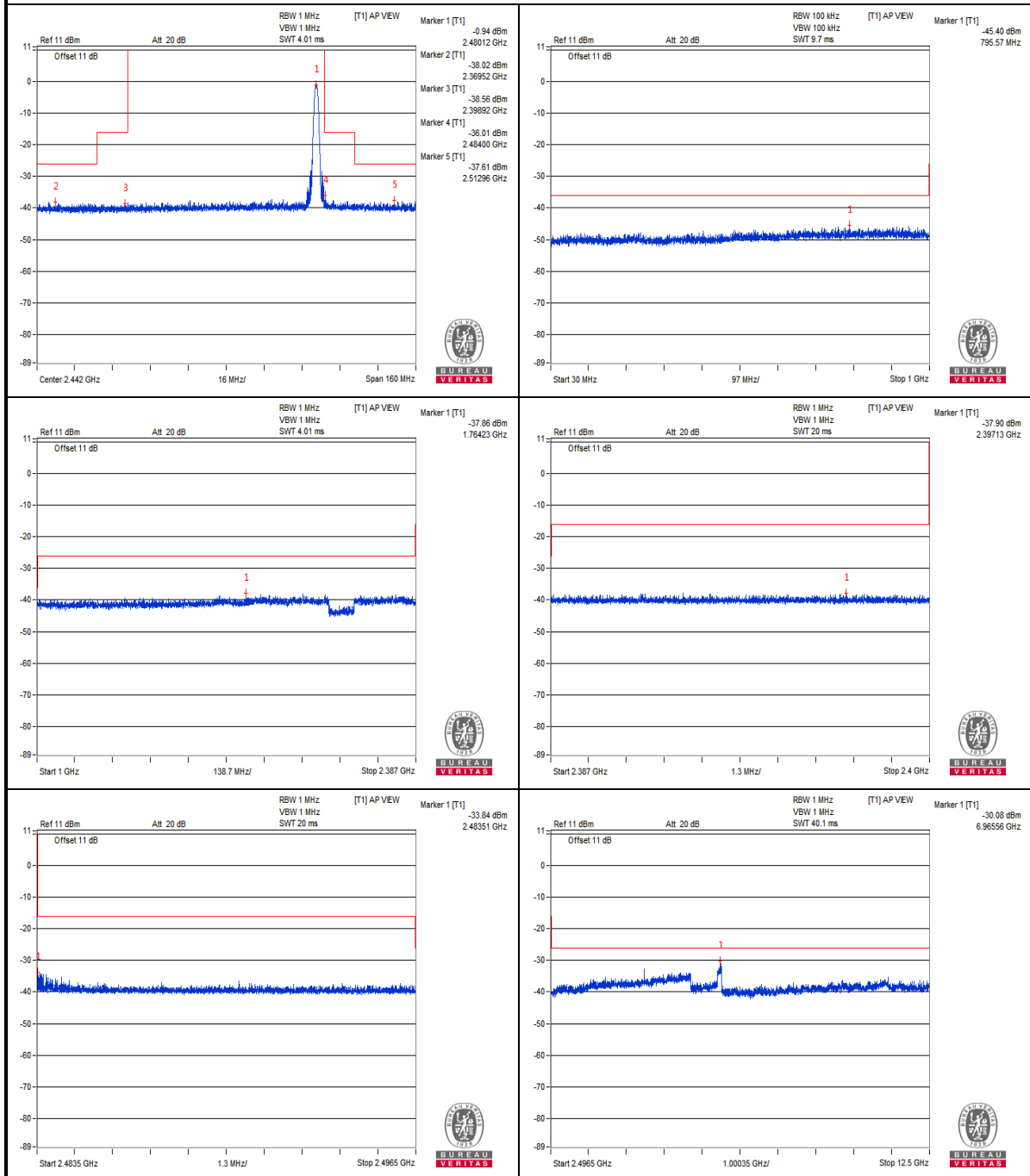
V+10%
Channel 39



Measurement uncertainty: $\pm 3.93\text{dB}$



V+10%
Channel 78



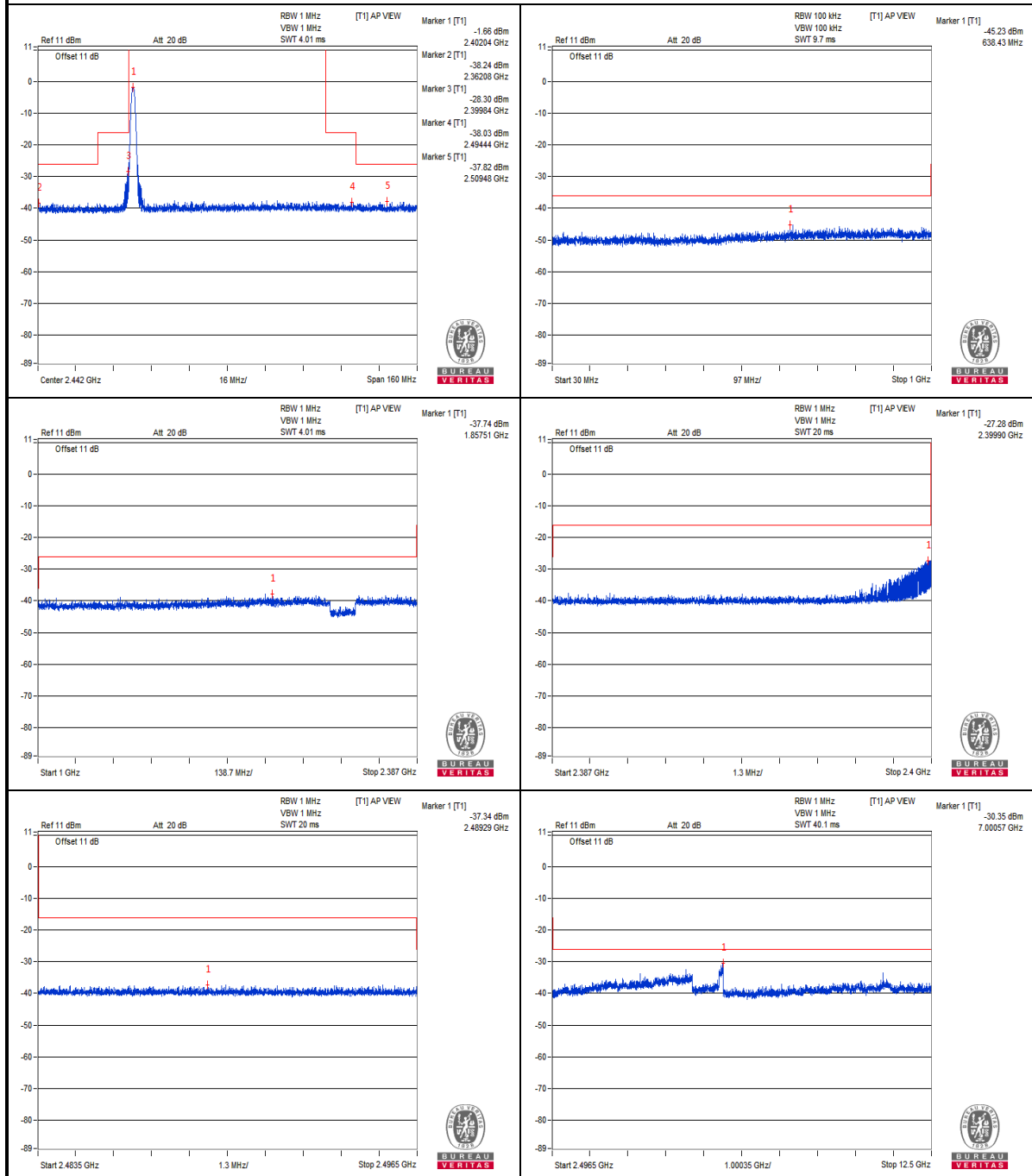
Measurement uncertainty: $\pm 3.93\text{dB}$



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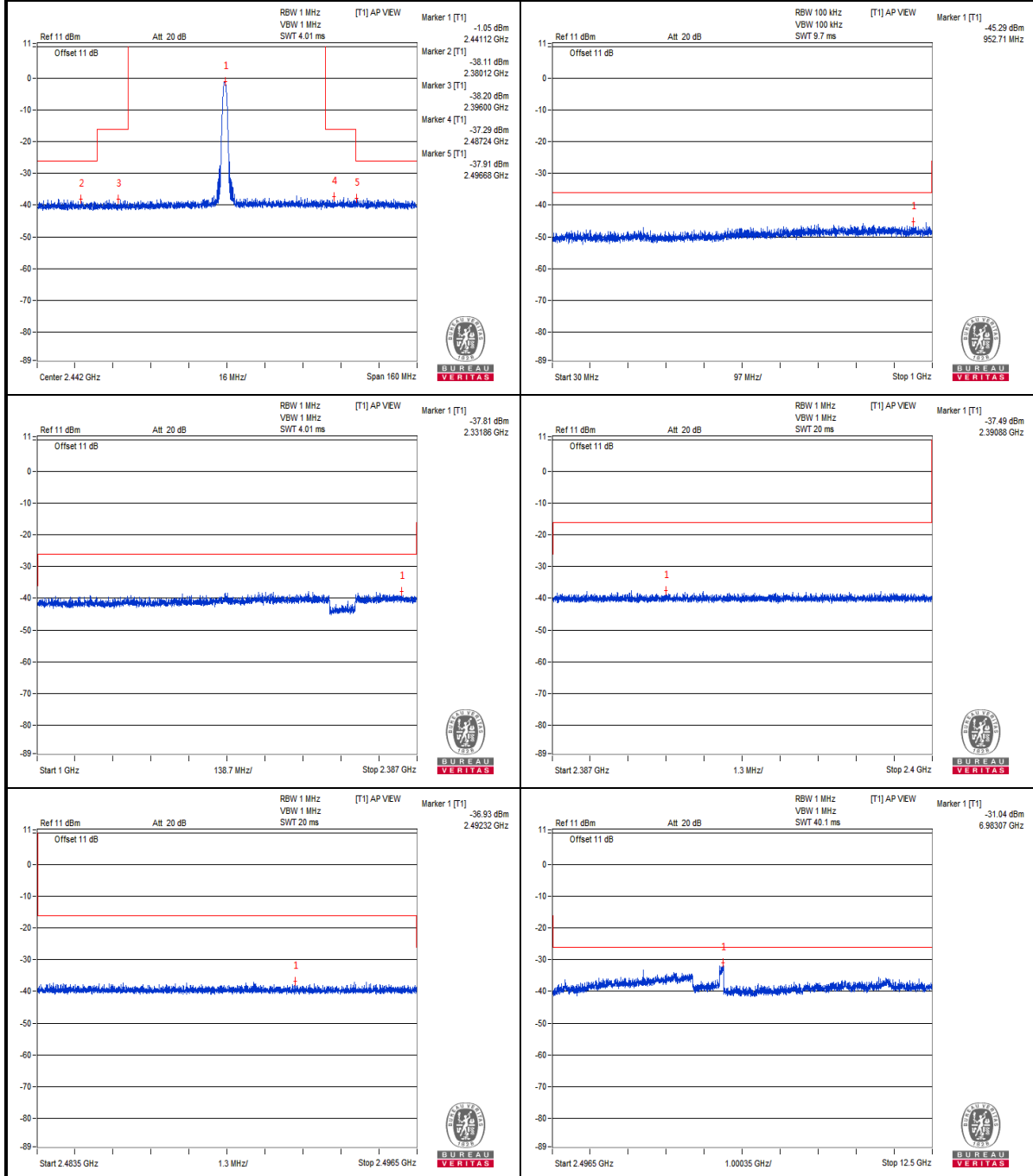
V-10%
Channel 0



Measurement uncertainty: $\pm 3.93\text{dB}$



V-10%
Channel 39



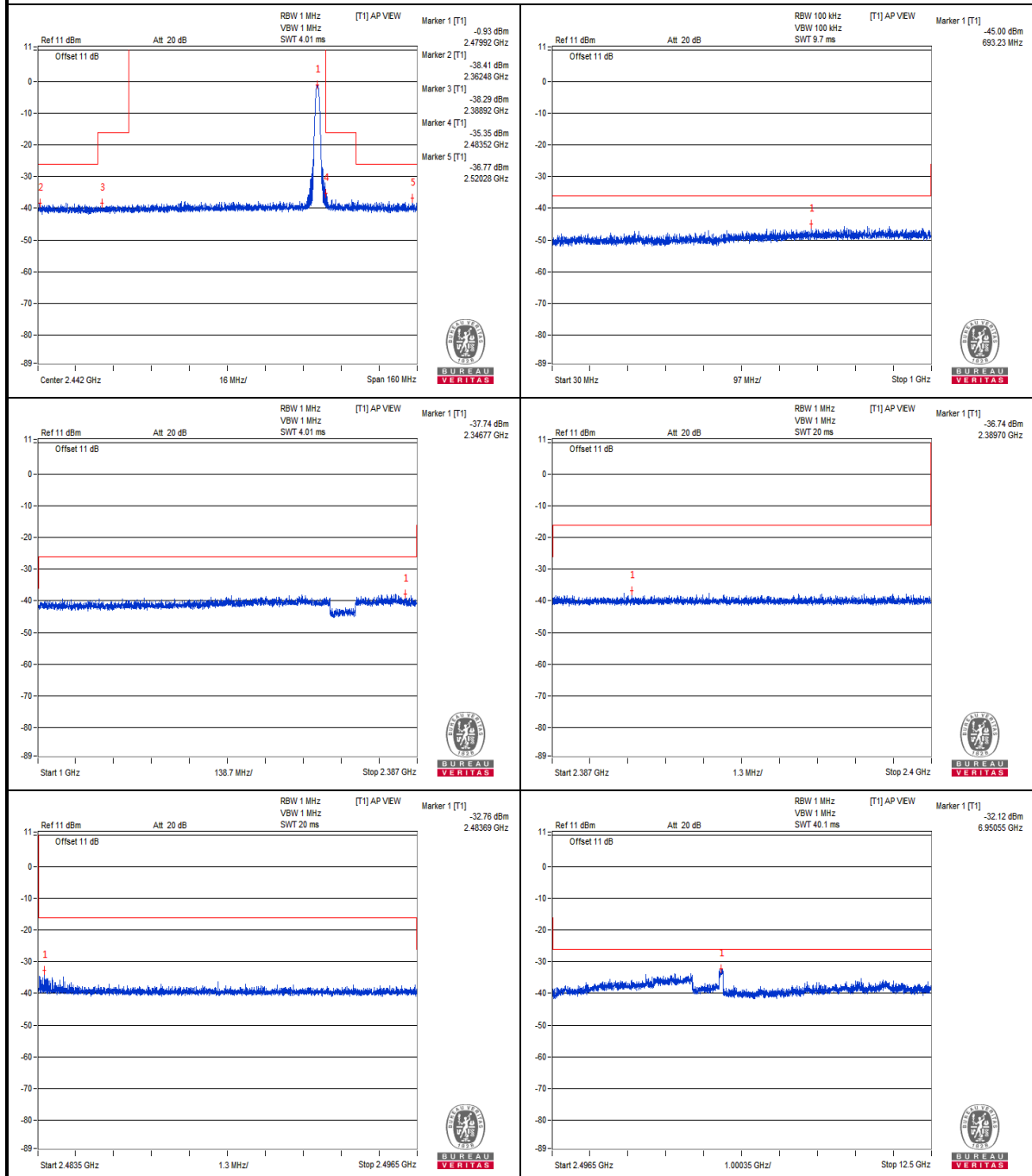
Measurement uncertainty: $\pm 3.93\text{dB}$



BUREAU
VERITAS

Test Report No.: RJ2111WDG0821-2

V-10%
Channel 78



Measurement uncertainty: $\pm 3.93\text{dB}$



3.5 ANTENNA POWER MEASUREMENT

3.5.1 LIMITS OF ANTENNA POWER

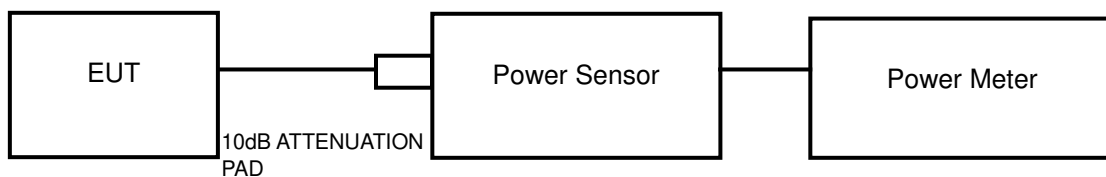
Antenna power shall be 3mW/MHz or less.

Tolerance of antenna power shall be +20% (upper value) and –80% (lower value).

3.5.2 CONDUCTED OUTPUT POWER

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH		
TEST CONDITION	Conducted output power (dBm)		
	GFSK	π /4-DQPSK	8DPSK
Voltage normal	-2.35	-2.51	-3.62
Voltage max	-1.97	-2.04	-2.51
Voltage min	-2.46	-2.69	-3.76

3.5.3 TEST SETUP



**3.5.4 TEST RESULTS – MODE A****For GFSK:**

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	Conducted power density (mW/MHz)
	HOPPING MODE
Voltage normal	0.008222
Voltage max	0.008948
Voltage min	0.007994
Rated power	0.01
Tolerance of antenna power	0.002 ~ 0.012

Note: 1. Conducted power density=Conducted output power/Spread-Spectrum

2. Tolerance of antenna power shall be +20% (upper value) and –80% (lower value).

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	EIRP power density (mW/MHz)
	HOPPING MODE
Voltage normal	0.011775
Voltage max	0.012815
Voltage min	0.011449

NOTE: The value of EIRP densities are "calculated" values.

**3.5.5 TEST RESULTS – MODE B****For $\pi/4$ DQPSK:**

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	Conducted power density (mW/MHz)
	HOPPING MODE
Normal Voltage	0.007880
Voltage max	0.008830
Voltage min	0.007581
Rated power	0.01
Tolerance of antenna power	0.002 ~ 0.012

Note: 1. Conducted power density=Conducted output power/Spread-Spectrum
2. Tolerance of antenna power shall be +20% (upper value) and –80% (lower value).

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	EIRP power density (mW/MHz)
	HOPPING MODE
Normal Voltage	0.011286
Voltage max	0.012646
Voltage min	0.010857

NOTE: The value of EIRP power density is "calculated" values.

**3.5.6 TEST RESULTS – MODE C****For 8DPSK:**

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	Conducted power density (mW/MHz)
	HOPPING MODE
Normal Voltage	0.006103
Voltage max	0.007880
Voltage min	0.005909
Rated power	0.01
Tolerance of antenna power	0.002 ~ 0.012

Note: 1. Conducted power density=Conducted output power/Spread-Spectrum
2. Tolerance of antenna power shall be +20% (upper value) and –80% (lower value).

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	EIRP power density (mW/MHz)
	HOPPING MODE
Normal Voltage	0.008741
Voltage max	0.011286
Voltage min	0.008463

NOTE: The value of EIRP densities are "calculated" values.

**3.5.7 TEST RESULTS – MODE D****For GFSK <Enable AFH function>:**

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	Conducted power density (mW/MHz)
	HOPPING MODE
Normal Voltage	0.032019
Voltage max	0.035082
Voltage min	0.031218
Rated power	0.1
Tolerance of antenna power	0.02 ~ 0.12

Note: 1. Conducted power density=Conducted output power/Spread-Spectrum

2. Tolerance of antenna power shall be +20% (upper value) and –80% (lower value).

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	EIRP power density (mW/MHz)
	HOPPING MODE
Normal Voltage	0.045857
Voltage max	0.050244
Voltage min	0.044710

NOTE: The value of EIRP densities are "calculated" values.

**3.5.8 TEST RESULTS – MODE E****For $\pi/4$ DQPSK <Enable AFH Function>:**

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	Conducted power density (mW/MHz)
	HOPPING MODE
Normal Voltage	0.030726
Voltage max	0.034237
Voltage min	0.029478
Rated power	0.1
Tolerance of antenna power	0.02 ~ 0.12

Note: 1. Conducted power density=Conducted output power/Spread-Spectrum

2. Tolerance of antenna power shall be +20% (upper value) and –80% (lower value).

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	EIRP power density (mW/MHz)
	HOPPING MODE
Normal Voltage	0.044005
Voltage max	0.049034
Voltage min	0.042218

NOTE: The value of EIRP densities are "calculated" values.

**3.5.9 TEST RESULTS – MODE F****For 8DPSK <Enable AFH function>:**

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	Conducted power density (mW/MHz)
	HOPPING MODE
Normal Voltage	0.023705
Voltage max	0.030726
Voltage min	0.022953
Rated power	0.1
Tolerance of antenna power	0.02 ~ 0.12

Note: 1. Conducted power density=Conducted output power/Spread-Spectrum

2. Tolerance of antenna power shall be +20% (upper value) and –80% (lower value).

ENVIRONMENTAL CONDITIONS	23 deg.C, 58 % RH
TEST CONDITION	EIRP power density (mW/MHz)
	HOPPING MODE
Normal Voltage	0.033950
Voltage max	0.044005
Voltage min	0.032873

NOTE: The value of EIRP densities are "calculated" values.

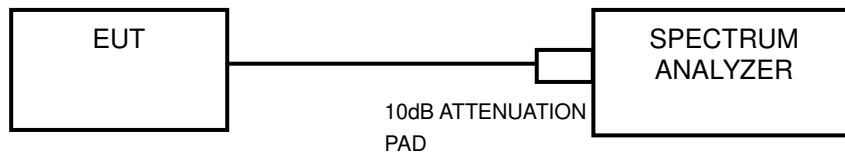


3.6 SPURIOUS EMISSIONS FOR RECEIVER

3.6.1 LIMITS OF SPURIOUS EMISSIONS FOR RECEIVER

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

3.6.2 TEST SETUP



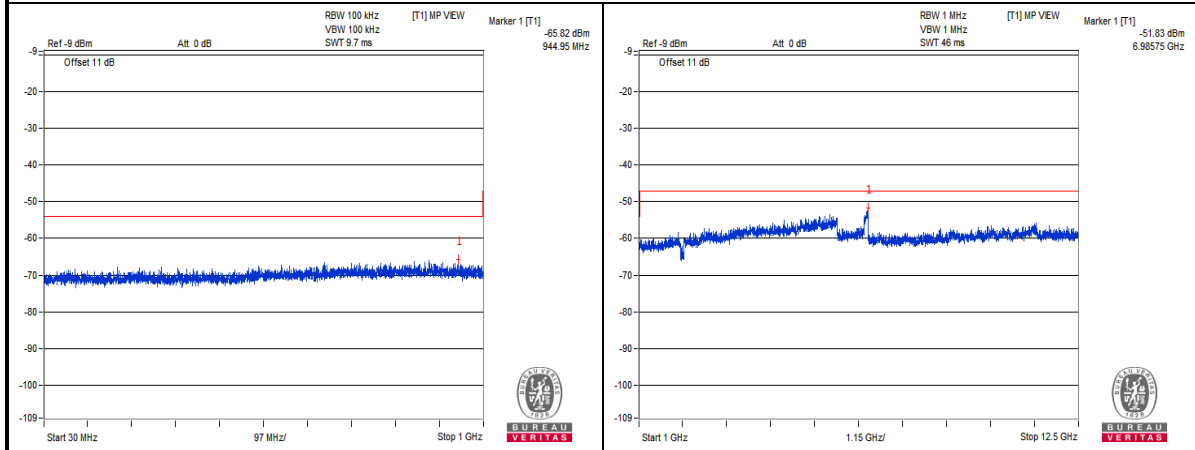
3.6.3 SUMMARY OF TEST RESULTS – MODE A

TEST CHANNEL		CH 0 (2402MHz)		CH 39 (2441MHz)		LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE. VALUE	FREQUENCY (MHz)	MEASURE. VALUE		
V _{normal}	below 1GHz	944.950	0.261663nW	764.530	0.297934nW	4nW	PASS
	above 1GHz	6985.750	6.558206nW	6965.620	4.81379nW	20nW	PASS
V _{max}	below 1GHz	906.150	0.232322nW	851.830	0.314943nW	4nW	PASS
	above 1GHz	6994.370	6.470143nW	6997.250	5.675796nW	20nW	PASS
V _{min}	below 1GHz	815.700	0.286129nW	830.970	0.249075nW	4nW	PASS
	above 1GHz	6977.120	6.072799nW	6991.500	6.711565nW	20nW	PASS
TEST CHANNEL		CH 78 (2480MHz)				LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)		MEASURE. VALUE			
V _{normal}	below 1GHz	969.680		0.286185nW		4nW	PASS
	above 1GHz	6974.250		5.986766nW		20nW	PASS
V _{max}	below 1GHz	960.230		0.224707nW		4nW	PASS
	above 1GHz	6980.000		6.956879nW		20nW	PASS
V _{min}	below 1GHz	857.410		0.274958nW		4nW	PASS
	above 1GHz	6991.500		6.122717nW		20nW	PASS

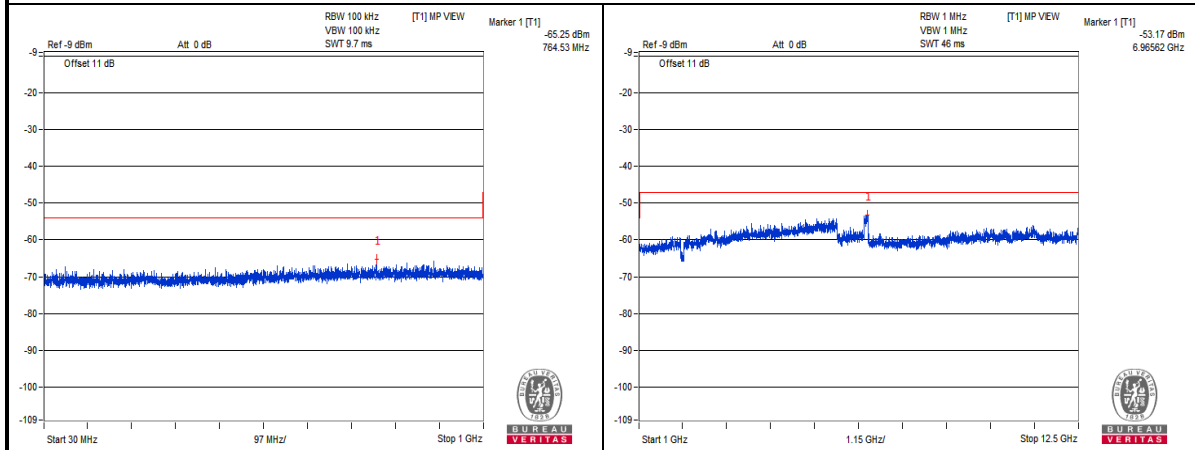
NOTE: 1. The worst value in each frequency range v.s. each channel has been marked by boldface.
2. The spectrum plots are attached on the following pages.



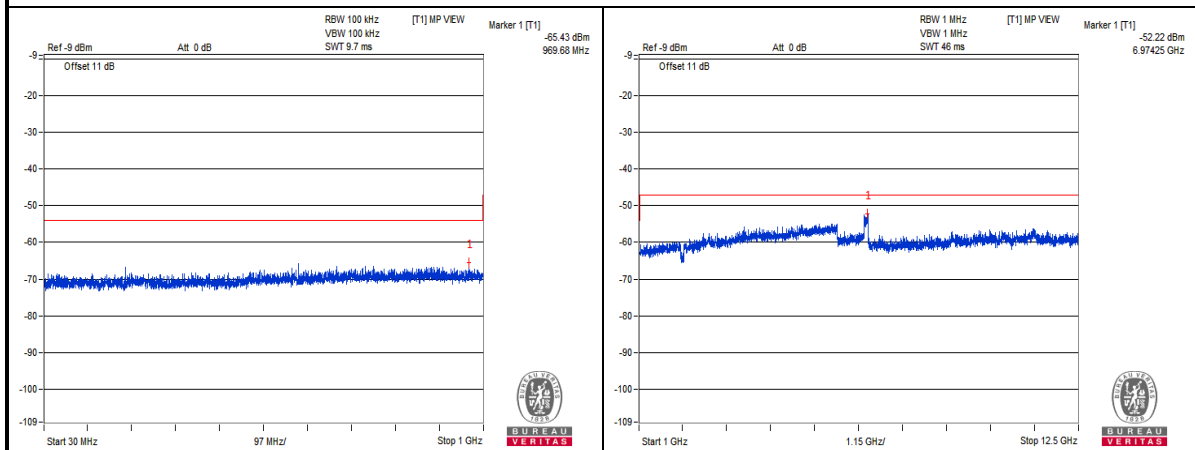
Vnormal



Channel 0



Channel 39



Channel 78

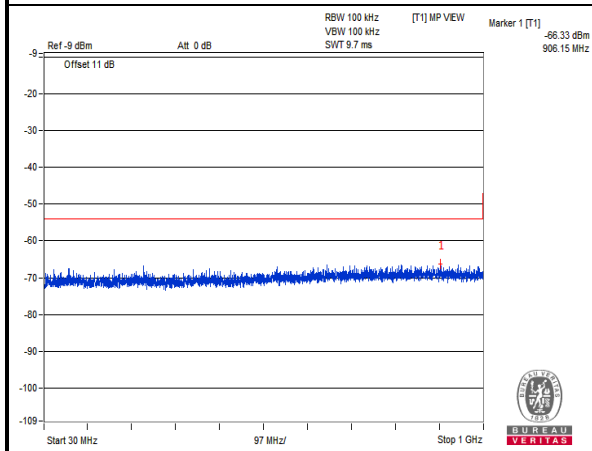
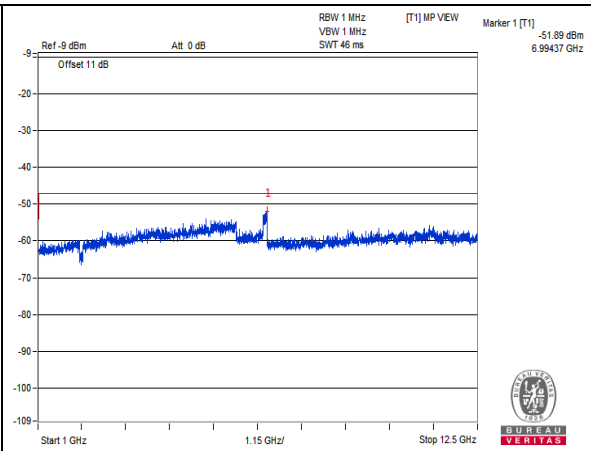
Measurement uncertainty: $\pm 3.93\text{dB}$



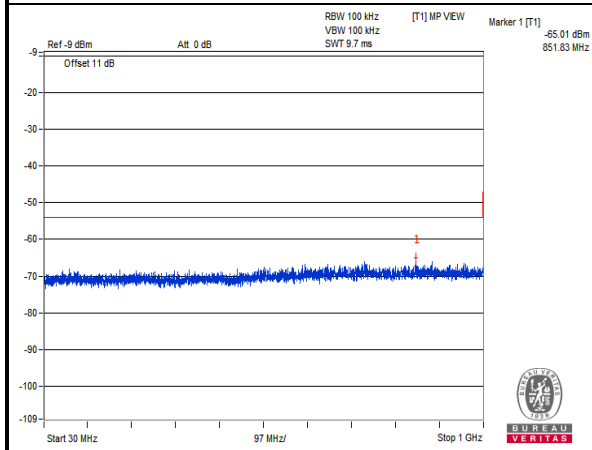
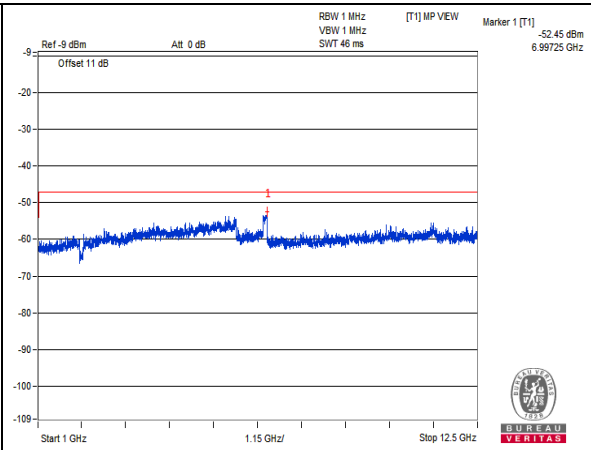
BUREAU
VERITAS

Test Report No.: RJ2111WDG0821-2

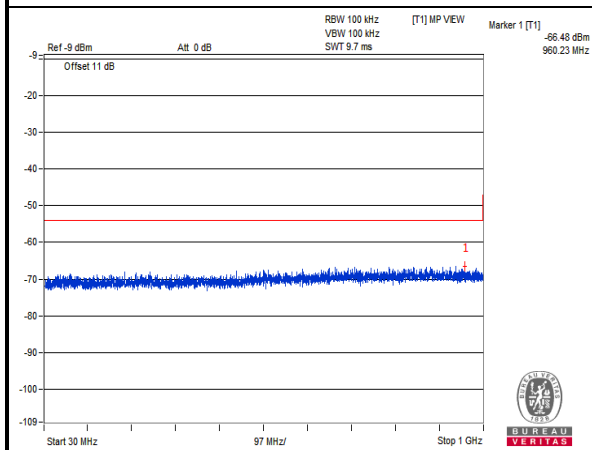
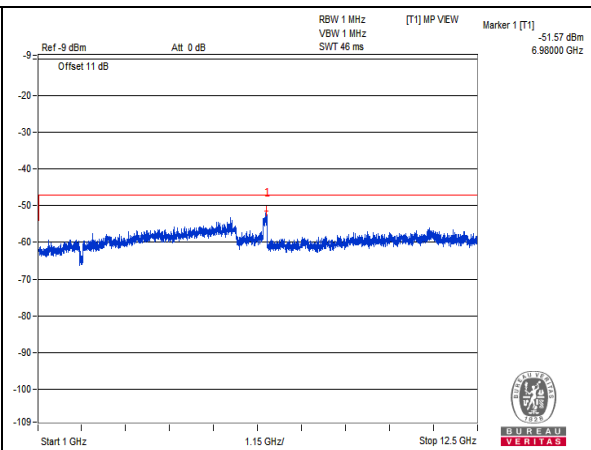
V_{+10%}



Channel 0



Channel 39



Channel 78

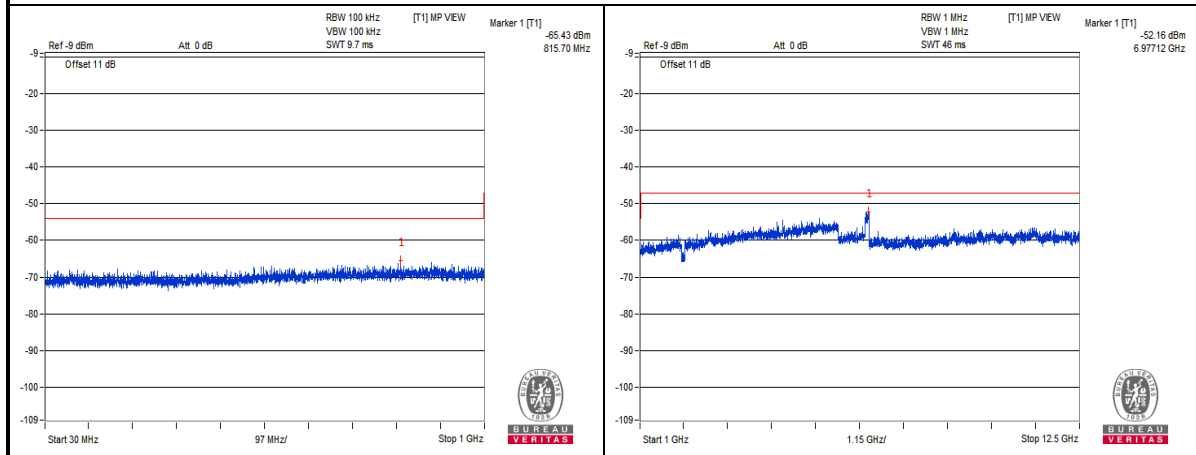
Measurement uncertainty: $\pm 3.93\text{dB}$



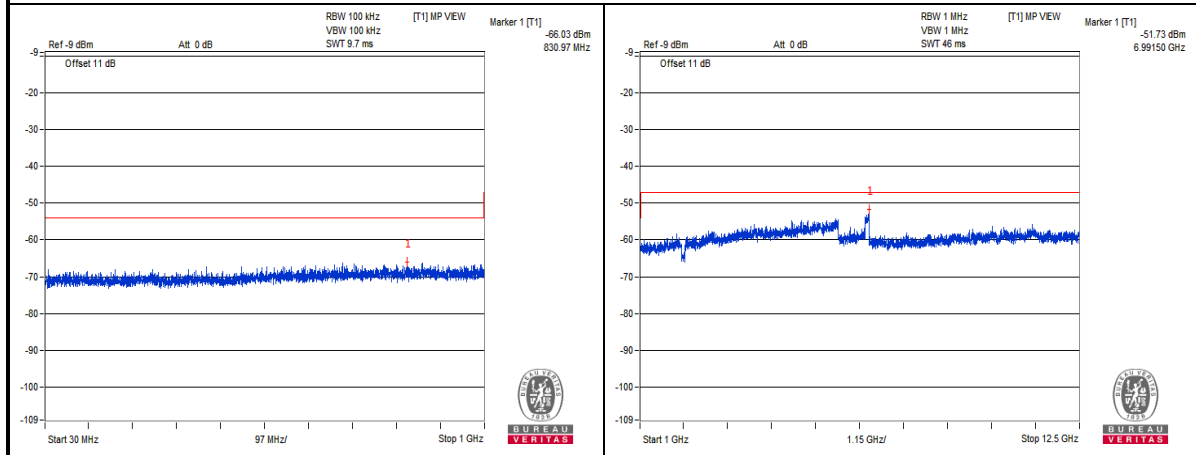
BUREAU
VERITAS

Test Report No.: RJ2111WDG0821-2

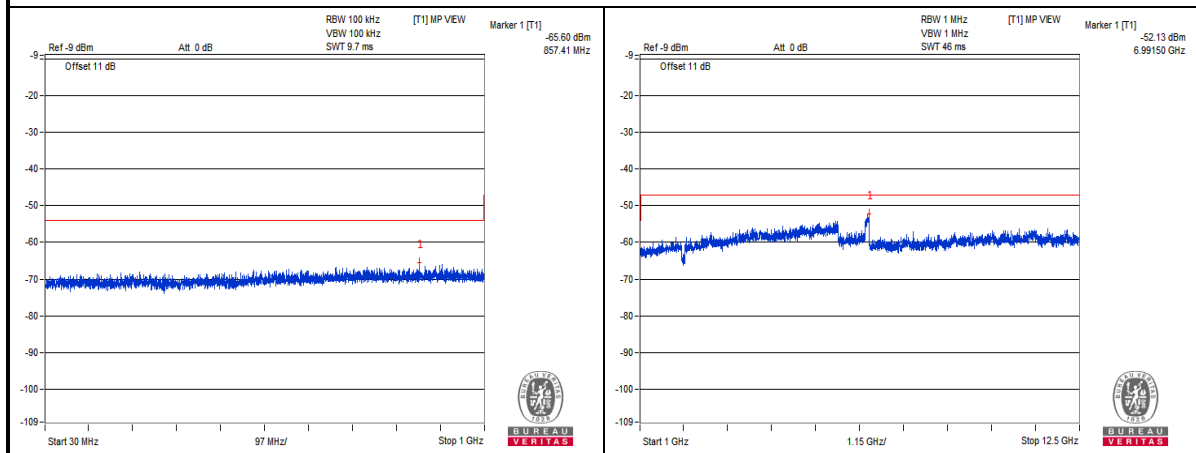
V-10%



Channel 0



Channel 39



Channel 78

Measurement uncertainty: $\pm 3.93\text{dB}$



3.7 DWELL TIME

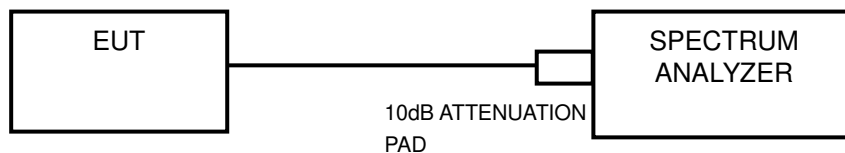
3.7.1 LIMITS OF DWELL TIME

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 = [Spreading rate/79] x duty ratio x 0.4 seconds

(AFH mode) dwell time = [Spreading rate/20] x duty ratio x 0.4 seconds

3.7.2 TEST SETUP



3.7.3 TEST RESULTS – MODE A

For GFSK:

Test Condition	23 deg.C, 58 % RH					
	Mode	SPREADING RATE	[Spreading rate/79]*0.4	Duty Ratio	Result (msec)	Limit (msec)
Normal Voltage	DH1	70.80	0.358	0.289	103.568	400
	DH3	70.80	0.358	0.642	230.074	400
	DH5	70.80	0.358	0.767	275.069	400
Voltage +10%	DH1	71.00	0.359	0.289	103.860	400
	DH3	71.00	0.359	0.642	230.724	400
	DH5	71.00	0.359	0.763	274.232	400
Voltage -10%	DH1	71.00	0.359	0.289	103.860	400
	DH3	71.00	0.359	0.642	230.724	400
	DH5	71.00	0.359	0.763	274.232	400



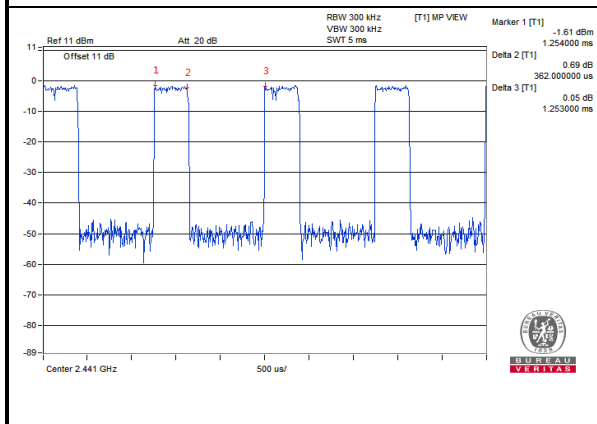
3.7.4 TEST RESULTS – MODE D

For GFSK< Enable AFH function>:

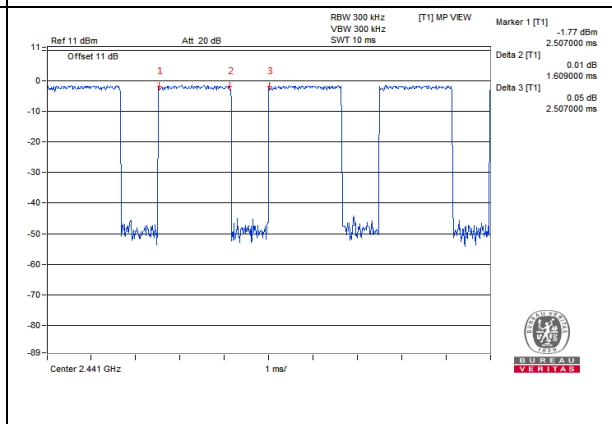
Test Condition	23 deg.C, 58 % RH					
Normal Voltage	Mode	SPREADING RATE	[Spreading rate/20]*0.4	Duty Ratio	Result (msec)	Limit (msec)
	DH1	18.18	0.363	0.289	105.046	400
	DH3	18.18	0.363	0.642	233.360	400
	DH5	18.18	0.363	0.767	278.997	400
Voltage +10%	DH1	18.11	0.362	0.289	104.642	400
	DH3	18.11	0.362	0.642	232.461	400
	DH5	18.11	0.362	0.763	276.297	400
Voltage -10%	DH1	18.18	0.363	0.289	105.046	400
	DH3	18.18	0.363	0.642	233.360	400
	DH5	18.18	0.363	0.763	277.365	400



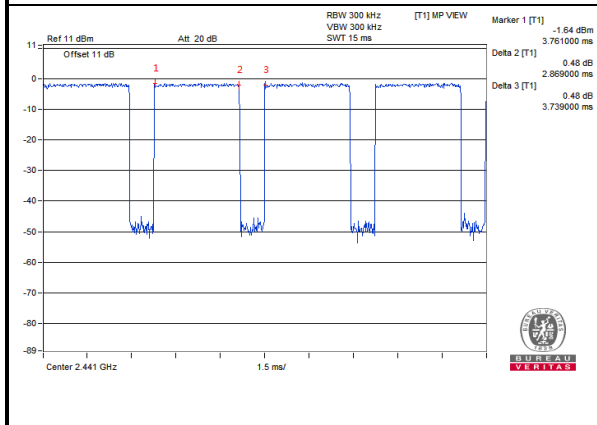
DH1 Normal Voltage



DH3 Normal Voltage

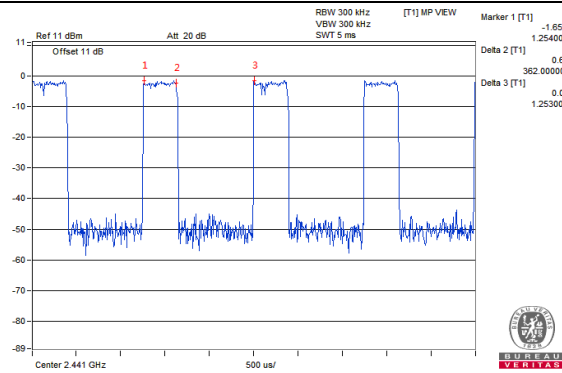


DH5 Normal Voltage

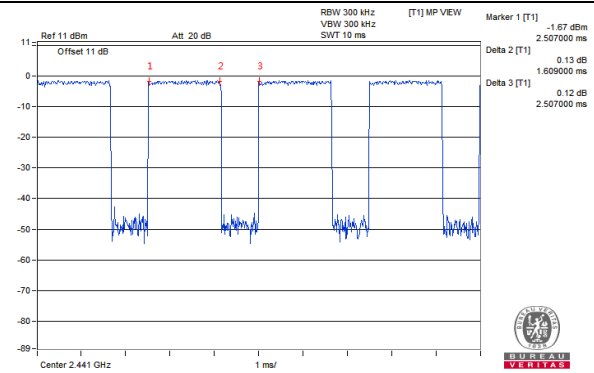




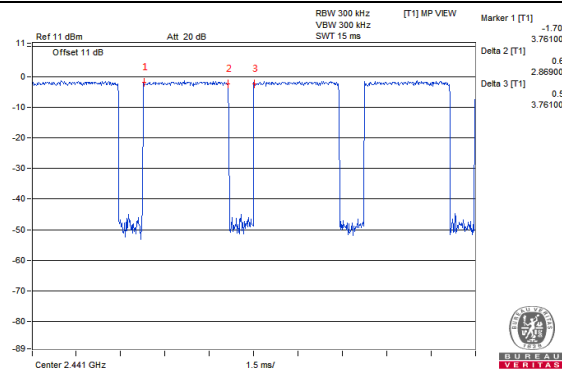
DH1 Voltage +10%



DH3 Voltage +10%

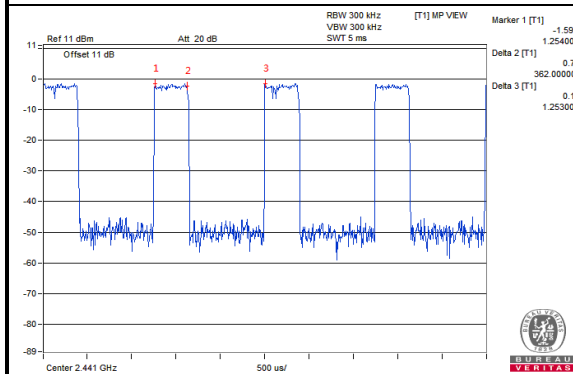


DH5 Voltage +10%

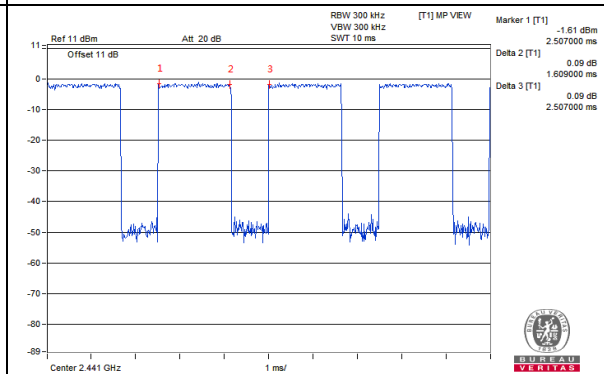




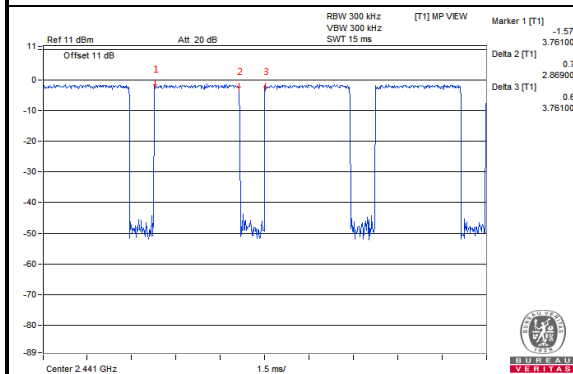
DH1 Voltage -10%



DH3 Voltage -10%



DH5 Voltage -10%



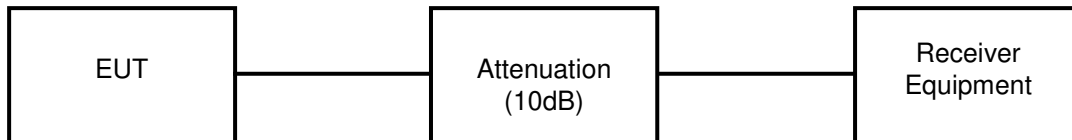


3.8 INTERFERENCE PREVENTION FUNCTION

3.8.1 LIMITS OF INTERFERENCE PREVENTION FUNCTION

N/A

3.8.2 TEST SETUP



3.8.3 TEST RESULTS

ENVIRONMENTAL CONDITIONS	23 deg.C, 58% RH
LINK MODE	TEST RESULT
BT	PASS



4 TEST INSTRUMENTS

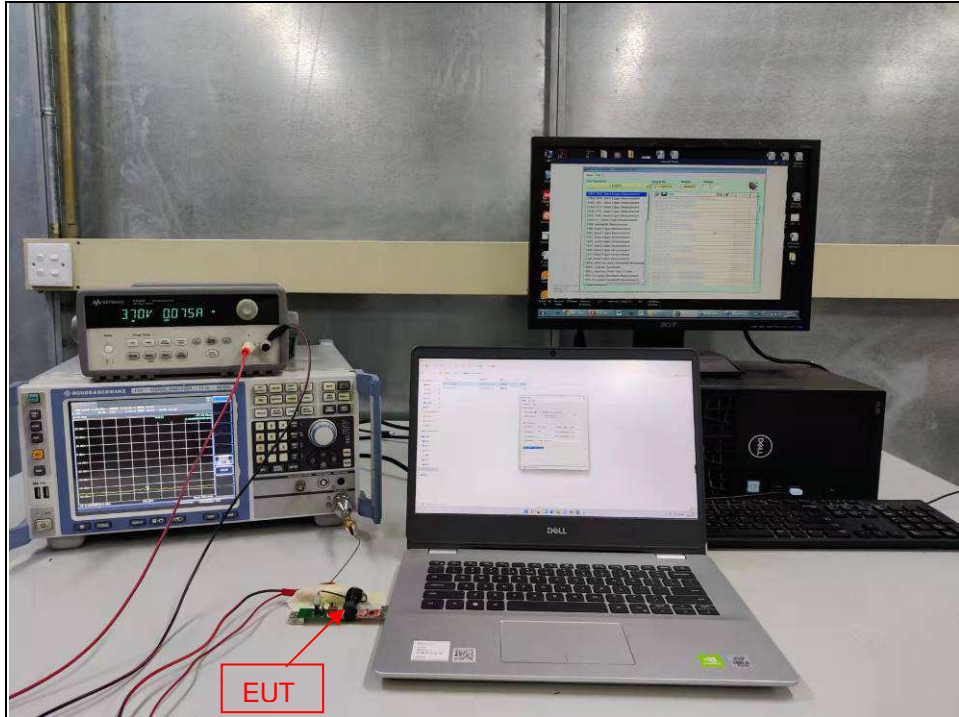
Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Apr. 04, 22
Power Sensor	Keysight	U2021XA	MY55060016	May 18, 22
Power Sensor	Keysight	U2021XA	MY55060018	May 18, 22
Digital Multimeter	FLUKE	15B	A1220010DG	Oct.12, 22
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A

NOTE:

1. The test was performed in RF Ovenroom.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



5 PHOTOGRAPHS OF THE TEST CONFIGURATION





6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

--- END ---