

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: Certification Ordinance Article 2-1-19

Report No.: RJBWIN-WTW-P21040653K

Product: Wi-Fi 6E BT 5.2 M.2 1418 Module

Brand: Qualcomm

Model No.: QCNFA725

Received Date: 2023/10/26

Test Date: 2023/12/6 ~ 2024/1/25

Issued Date: 2024/2/16

Applicant: Qualcomm Technologies, Inc.

Address: 5775 Morehouse Drive, San Diego, CA 92121-1714

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Approved by: _____

May Chen / Manager

, Date: _____

2024/2/16

This test report consists of 40 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The test results in the report only apply to the tested sample. The test results in this report are traceable to the national or international standards.



Prepared by : Phoenix Huang / Specialist

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

Table of Contents

Release Control Record	3
1 Certificate.....	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Supplementary Information	5
3 General Information	6
3.1 General Description	6
3.2 Output Power Description of EUT	7
3.3 Antenna Description of EUT	8
3.4 Channel List	9
3.5 Power Setting	10
3.6 Test Mode Applicability and Tested Channel Detail	11
4 Test Instruments	12
4.1 Frequency Tolerance	12
4.2 Occupied Bandwidth	12
4.3 Spreading Bandwidth and Spreading Factor	12
4.4 Spurious Emissions	12
4.5 Spurious Emissions of Receiver	13
4.6 Antenna Power	13
4.7 Dwell Time	13
4.8 Interference Prevention Function	13
5 Limits of Test Items	14
5.1 Frequency Tolerance	14
5.2 Occupied Bandwidth	14
5.3 Spreading Bandwidth and Spreading Factor	14
5.4 Spurious Emissions	14
5.5 Spurious Emissions of Receiver	14
5.6 Antenna Power	15
5.7 Dwell Time	15
5.8 Interference Prevention Function	15
6 Test Arrangements	16
6.1 Frequency Tolerance	16
6.2 Occupied Bandwidth	16
6.3 Spreading Bandwidth and Spreading Factor	16
6.4 Spurious Emissions	16
6.5 Spurious Emissions of Receiver	16
6.6 Antenna Power	17
6.7 Dwell Time	17
6.8 Interference Prevention Function	17
7 Test Results of Test Item	18
7.1 Frequency Tolerance	18
7.2 Occupied Bandwidth	19
7.3 Spreading Bandwidth and Spreading Factor	23
7.4 Spurious Emissions	27
7.5 Spurious Emissions of Receiver	31
7.6 Antenna Power	33
7.7 Dwell Time	34
7.8 Interference Prevention Function	38
8 Pictures of Test Arrangements	39
9 Information of the Testing Laboratories	40

Release Control Record

Issue No.	Description	Date Issued
RJBWIN-WTW-P21040653K	Original release.	2024/2/16

1 Certificate

Product: Wi-Fi 6E BT 5.2 M.2 1418 Module

Brand: Qualcomm

Test Model: QCNFA725

Sample Status: Engineering sample

Applicant: Qualcomm Technologies, Inc.

Test Date: 2023/12/6 ~ 2024/1/25

Standard: Certification Ordinance Article 2-1-19

Measurement procedure: MIC notice 88 Appendix 43

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.

2 Summary of Test Results

Certification Ordinance Article 2-1-19		
Clause	Test Item	Result
OR: Article 5 OR: Annex 1 table 7-8	Frequency Tolerance	Pass
OR: Article 6 Annex 2.30	Occupied Bandwidth	Pass
OR: Article 7. Annex 3.26	Spurious Emissions	Pass
OR: Article 49-20	Antenna Specifications	Pass
OR: Article 24.2	Spurious Emissions of Receiver	Pass
OR: Article 49-20	Housing Requirements	Pass (Refer to Note 1)
OR: Article 49-20	Antenna Power	Pass
OR: Article 49-20	Absolute Gain of Transmitting Antenna	Pass
OR: Article 49-20	Angular Width of Principal Radiation (AWPR)	N/A
OR: Article 49-20	Number of Carriers within 1 MHz Bandwidth in OFDM	N/A
---	Spreading Bandwidth and Spreading Factor	- (Refer to Note 2)
OR: Article 49-20	Dwell Time (FH employed)	Pass
OR: Article 9-4.5 RE: Article 6-2.3 RE: Article 6-2.5	Interference Prevention Function	Pass
OR: Article 49-20	Carrier Sense Capability	N/A

Notes:

1. The relative information refer section 3.1 of this report.
2. The dwell time calculation is based on the spreading bandwidth.
3. OR: Ordinance Regulating Radio Equipment
4. RE: Regulations for Enforcement of the radio law
5. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in ETSI TR 100 028-1 and ETSI TR 100 028-2:

Parameter	Uncertainty (±)
Occupied Bandwidth	1050.00 Hz
Spurious Emissions	2.5 dB
Output Power Density	1.2 dB
Frequency Tolerance	960 Hz

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	Wi-Fi 6E BT 5.2 M.2 1418 Module
Brand	Qualcomm
Test Model	QCNFA725
Test Software Version	QRCT 4.0.00177.0
Status of EUT	Engineering sample
Power Supply Rating	3.3 Vdc from host equipment
Modulation Type	$\pi/4$ QPSK (HSL2, HSL3) $\pi/4$ DQPSK (HSL4) 8PSK (HSL5) D8PSK (HSL6)
Modulation Technology	FHSS
Transfer Rate	Up to 6 Mbps
Operating Frequency	2.404 GHz ~ 2.478 GHz
Number of Channel	Mode A: 37 Mode B: 38
Housing Requirements	Shielding case

Note:

1. This device of WLAN (2.4 GHz & 5 GHz U-NII-1 Band) can support hotspot mode.
2. There are Bluetooth (EDR, BLE, QHS) and WLAN (2.4 GHz & 5 GHz & 6 GHz) technology used for the EUT.
3. This module supports two modes, as shown in the table below. Since the power setting parameters and RF characteristics are the same, the test mainly uses mode A as the main representative mode.

Mode	The Number of Channels
A	37
B	38

4. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4 GHz	WLAN 6 GHz
2	WLAN 2.4 GHz	WLAN 5 GHz
3	WLAN 6 GHz	Bluetooth
4	WLAN 5 GHz	Bluetooth

5. The device of WLAN (2.4 GHz) and Bluetooth technology can't transmit simultaneously, it was used timely shared coexistence technology.
6. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 Output Power Description of EUT

Operation Mode	Rated Output Power Density (mW/MHz)	Conducted RF Output Power Density (mW/MHz)	Radiated RF Output Power Density (mW/MHz)
QHS	0.3	0.229171	0.516606
QHS AFH function	0.6	0.580004	1.307468

3.3 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length (mm)
1	Chain0/1	HONGBO	260-25094	3.53	2.4~2.4835	0.76	PIFA	i-pex(MHF 4L)	300
				3.06	5.15~5.25	1.16			
				3.07	5.25~5.35	1.18			
				4.81	5.47~5.725	1.2			
				4.2	5.725~5.850	1.27			
2	Chain0/1	HONGBO	260-25084	3.22	2.4~2.4835	0.5	Monopole	i-pex(MHF 4L)	200
				3.35	5.150~5.250	0.76			
				3.42	5.250~5.350	0.78			
				4.77	5.470~5.725	0.81			
				4.72	5.725~5.850	0.85			

Note: Max. gain was selected for the final test.

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. Antenna Pattern:

Please refer to the attached file (Antenna pattern).

3.4 Channel List

QHS channels:

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

Note. *Only mode B supported.

3.5 Power Setting

Operation Mode	Modulation	Power Setting
QHS 2M	$\pi/4$ QPSK	10
QHS 6M	D8PSK	10

3.6 Test Mode Applicability and Tested Channel Detail

Test Conditions	Voltage (Vdc)
V _{normal}	3.3

Note: After checking the fluctuation of input voltage to the circuit of the radio part (excluding the power supply) of the equipment to be tested, the fluctuation less than +/- 1 % when input voltage from an external supply into the equipment fluctuates +/- 10%, therefore, the test is carried out only at the normal voltage.

Pre-Scan:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
-----------	---

Following channel(s) was (were) selected for the final test as listed below:

Test Item	Mode	Tested Channel	Modulation	Data Rate
Frequency Tolerance	QHS	1, 18, 38	unmodulated	-
Occupied Bandwidth	QHS	Hopping Channel	$\pi/4$ QPSK / D8PSK	2Mbps / 6Mbps
Spreading Bandwidth and Spreading Factor	QHS	Hopping Channel	$\pi/4$ QPSK / D8PSK	2Mbps / 6Mbps
Spurious Emissions	QHS	Hopping Channel	$\pi/4$ QPSK / D8PSK	2Mbps / 6Mbps
Spurious Emissions of Receiver	QHS	1, 18, 38	-	-
Antenna Power	QHS	Hopping Channel	$\pi/4$ QPSK / D8PSK	2Mbps / 6Mbps
Dwell Time	QHS	Hopping Channel	$\pi/4$ QPSK / D8PSK	2Mbps / 6Mbps
Interference Prevention Function	QHS	Normal Operation		

Note: For AFH function only tested occupied bandwidth, spreading bandwidth, Antenna power and dwell time.

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Frequency Tolerance

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
MXA Signal Analyzer Keysight	N9020B	MY60112409	2023/2/18	2024/2/17	ETC	(c)
Software	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A	N/A	N/A

Notes:

- Calibration method:
 - Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - 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.
 - 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).
 - Calibration conducted by using other equipment that listed above from a) to c).
- The test was performed in Oven room 2.
- Tested Date: 2023/12/6

4.2 Occupied Bandwidth

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
MXA Signal Analyzer Keysight	N9020B	MY60112409	2023/2/18	2024/2/17	ETC	(c)
Software	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A	N/A	N/A

Notes:

- Calibration method:
 - Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - 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.
 - 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).
 - Calibration conducted by using other equipment that listed above from a) to c).
- The test was performed in Oven room 2.
- Tested Date: 2023/12/6 ~ 2024/1/25

4.3 Spreading Bandwidth and Spreading Factor

Refer to section 4.2 to get information of the instruments.

4.4 Spurious Emissions

Refer to section 4.2 to get information of the instruments.

4.5 Spurious Emissions of Receiver

Refer to section 4.2 to get information of the instruments.

4.6 Antenna Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
Power Meter Anritsu	ML2495A	1529002	2023/6/17	2024/6/16	ETC	(c)
Pulse Power Sensor Anritsu	MA2411B	1726434	2023/6/19	2024/6/18	ETC	(c)

Notes:

- Calibration method:
 - Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - 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.
 - 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).
 - Calibration conducted by using other equipment that listed above from a) to c).
- The test was performed in Oven room 2.
- Tested Date: 2024/1/25

4.7 Dwell Time

Refer to section 4.2 to get information of the instruments.

4.8 Interference Prevention Function

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
DC Power Supply Topward	6603D	795558	Note 2	Note 2	BV CPS E&E	(d)
Fixed Attenuator Woken	MDCS18N-10	MDCS18N-10-01	2023/3/27	2024/3/26	BV CPS E&E	(d)
True RMS Clamp Meter FLUKE	325	31130711WS	2023/6/8	2024/6/7	ETC	(c)

Notes:

- Calibration method:
 - Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - 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.
 - 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).
 - Calibration conducted by using other equipment that listed above from a) to c).
- The power supply no evaluation calibrated, which used the RMS clamp meter to verify before each testing.
- The test was performed in Oven room 2.
- Tested Date: 2024/1/25

5 Limits of Test Items

5.1 Frequency Tolerance

Tolerance of frequency shall be +/- 50ppm.

5.2 Occupied Bandwidth

Modulation Method	Limit	Remark
DSSS	<26 MHz	
OFDM	<26 MHz	Antenna power limitation is 10 mW/MHz
	26 – 40 MHz	Antenna power limitation is 5 mW/MHz
FHSS	<83.5 MHz	
Other Digital	<26 MHz	

5.3 Spreading Bandwidth and Spreading Factor

There are no specified limits on the spreading bandwidth and spreading factor.

5.4 Spurious Emissions

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

5.5 Spurious Emissions of Receiver

Frequencies	Limit
Below 1 GHz	$\leq 4 \text{ nW}$
Above 1 GHz	$\leq 20 \text{ nW}$

5.6 Antenna Power

Modulation System	Frequency Band Used	Antenna Power (Max.)	E.I.R.P. Limit (Note 3)
DSSS	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 1)	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 2)	2400 – 2483.5 MHz	5 mW/MHz	9.13 dBm/MHz ~ 19.13 dBm/MHz (8.184 mW/MHz ~ 81.84 mW/MHz)
FHSS	2400 – 2483.5 MHz	3 mW/MHz	6.91 dBm/MHz ~ 16.91 dBm/MHz (4.91 mW/MHz ~ 49.10 mW/MHz)
Other Digital	2400 – 2483.5 MHz	10 mW	12.14 dBm ~ 22.14 dBm (16.368 mW ~ 163.68 mW)

Notes:

1. Occupied bandwidth is less than 26 MHz
2. Occupied bandwidth is more than 26 MHz and less than 40 MHz
3. E.I.R.P. limit is variable by the HPBA, the HPBA (half-power beam width) of the antenna shall be $360 / A$ degrees or less, where $A = E.I.R.P. / (2.14 \text{ dBi} + \text{"Antenna Power (limit)"})$.
4. Tolerance of antenna power shall be +20% (upper value).
5. When an E.I.R.P. is less than 2.14 dBi + antenna power limit. The shortage can be compensated for by the antenna power. (Application to transmitting devices using "Other method" is Limited to "GFSK")

5.7 Dwell Time

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

Formula:

(Normal mode) dwell time = [diffusion rate/ 37] x duty-cycle x 0.4 seconds

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

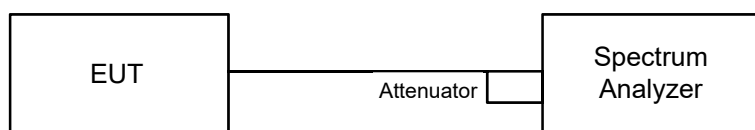
5.8 Interference Prevention Function

When conducting wireless communications that transmit data or other information: A function that automatically sends or receives an identification code.

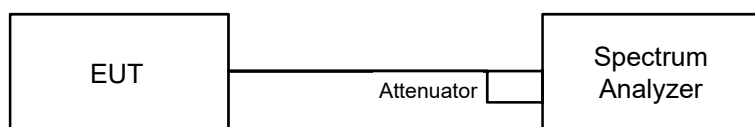
When performing radiolocation work: A function that allows you to distinguish between reflected waves of radio waves transmitted by your own station and radio waves transmitted by other radio stations by identifying the modulation method and other characteristics of received radio waves. (However, if it also has the function of transmitting signals for data transmission, both functions shall be included.)

6 Test Arrangements

6.1 Frequency Tolerance



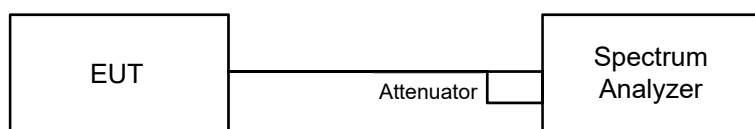
6.2 Occupied Bandwidth



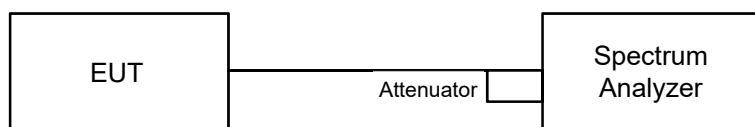
6.3 Spreading Bandwidth and Spreading Factor



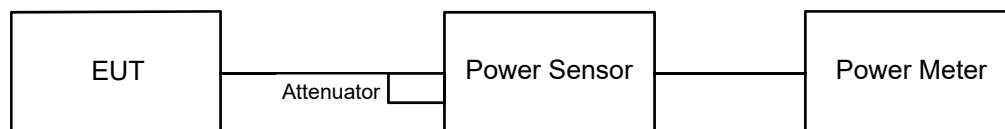
6.4 Spurious Emissions



6.5 Spurious Emissions of Receiver



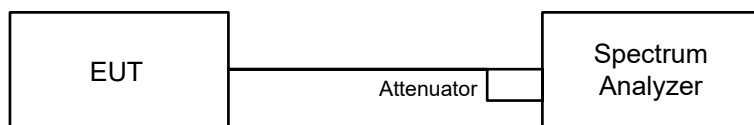
6.6 Antenna Power



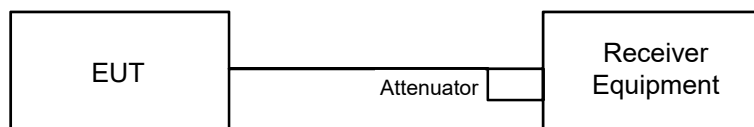
Output Power Density (mW/MHz) = Total Output Power (mW) / Spread Bandwidth (MHz)

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

6.7 Dwell Time



6.8 Interference Prevention Function



7 Test Results of Test Item

7.1 Frequency Tolerance

Environmental Conditions:	22°C, 55% RH	Tested By:	Kevin Ko
---------------------------	--------------	------------	----------

QHS 2M

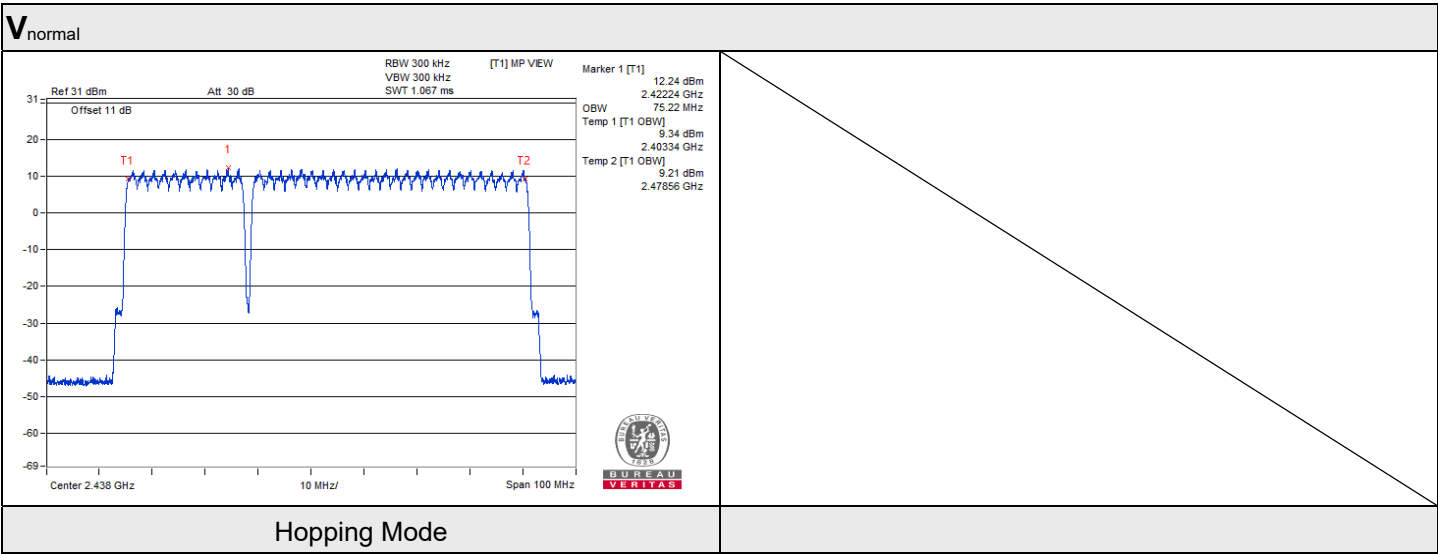
Channel	Frequency (MHz)	V_{normal}	
		Carrier frequency (MHz)	Frequency tolerance (ppm)
1	2404	2403.995980	-1.672
18	2438	2437.995490	-1.849
38	2478	2477.994760	-2.114

7.2 Occupied Bandwidth

Environmental Conditions:	22°C, 55% RH	Tested By:	Kevin Ko
---------------------------	--------------	------------	----------

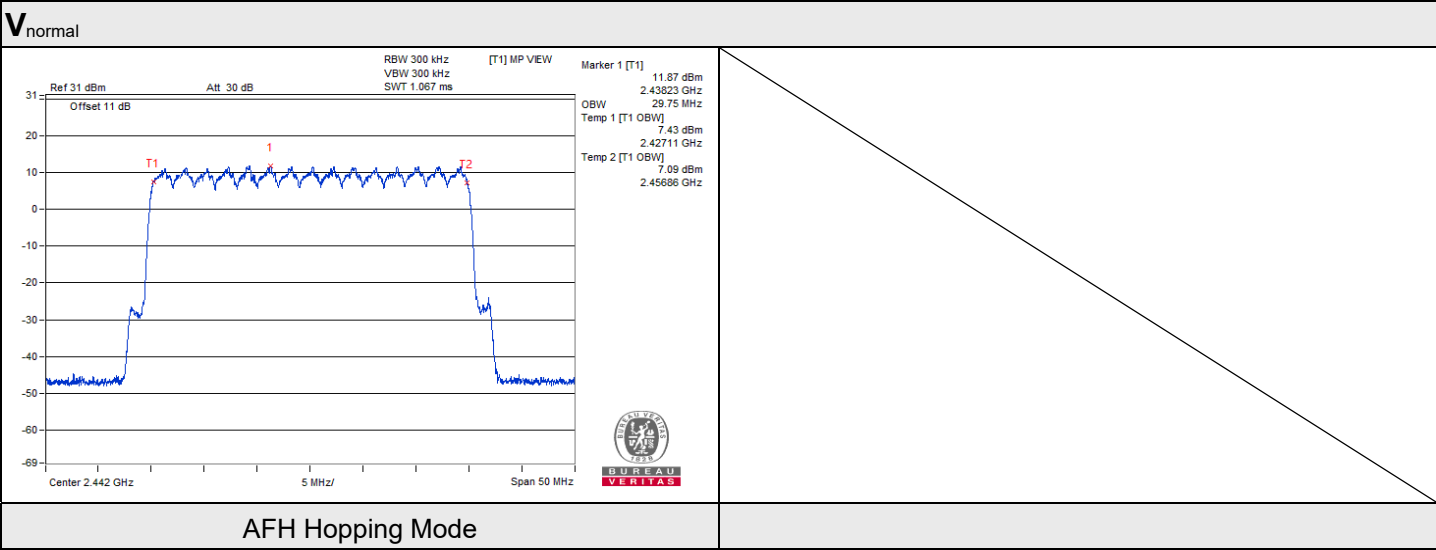
QHS 2M: Normal Mode

V _{normal}
Occupied bandwidth (MHz)
75.22



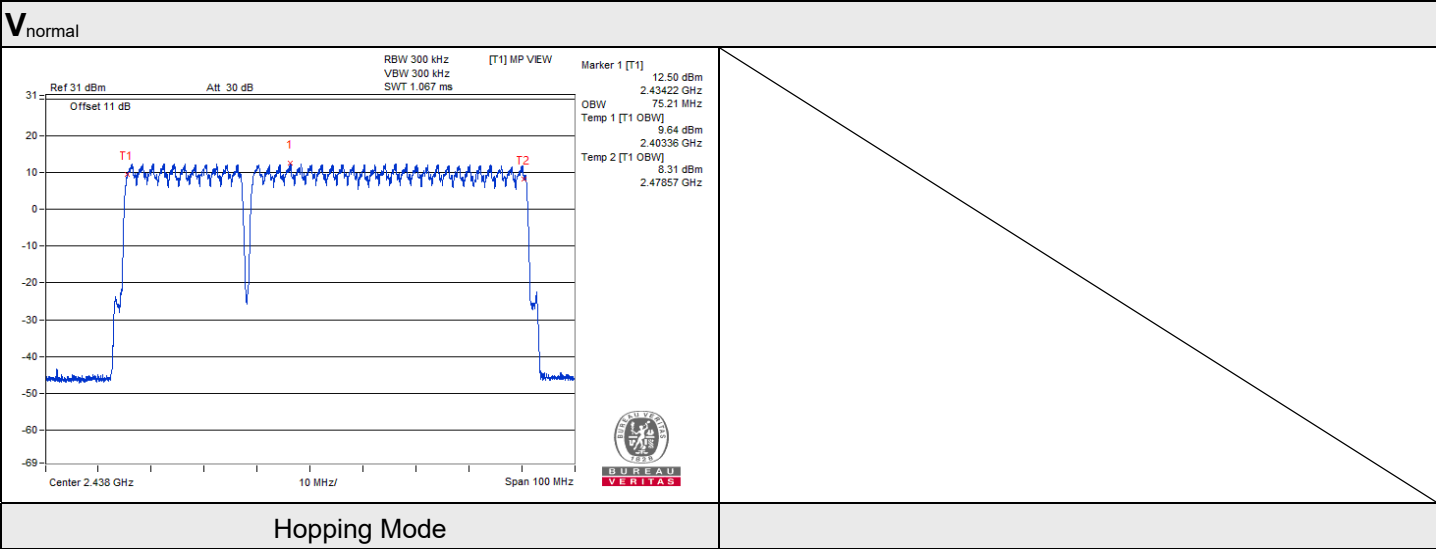
QHS 2M: AFH Mode

V _{normal}
Occupied bandwidth (MHz)
29.75



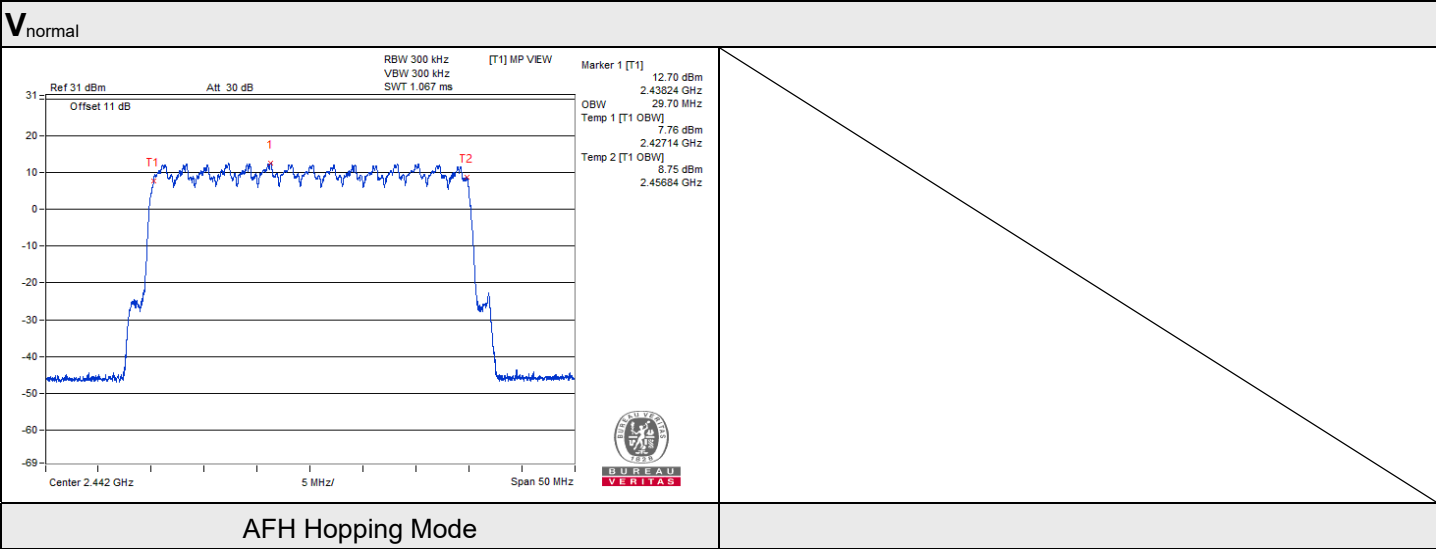
QHS 6M: Normal Mode

V_{normal}
Occupied bandwidth (MHz)
75.21



QHS 6M: AFH Mode

V _{normal}
Occupied bandwidth (MHz)
29.70



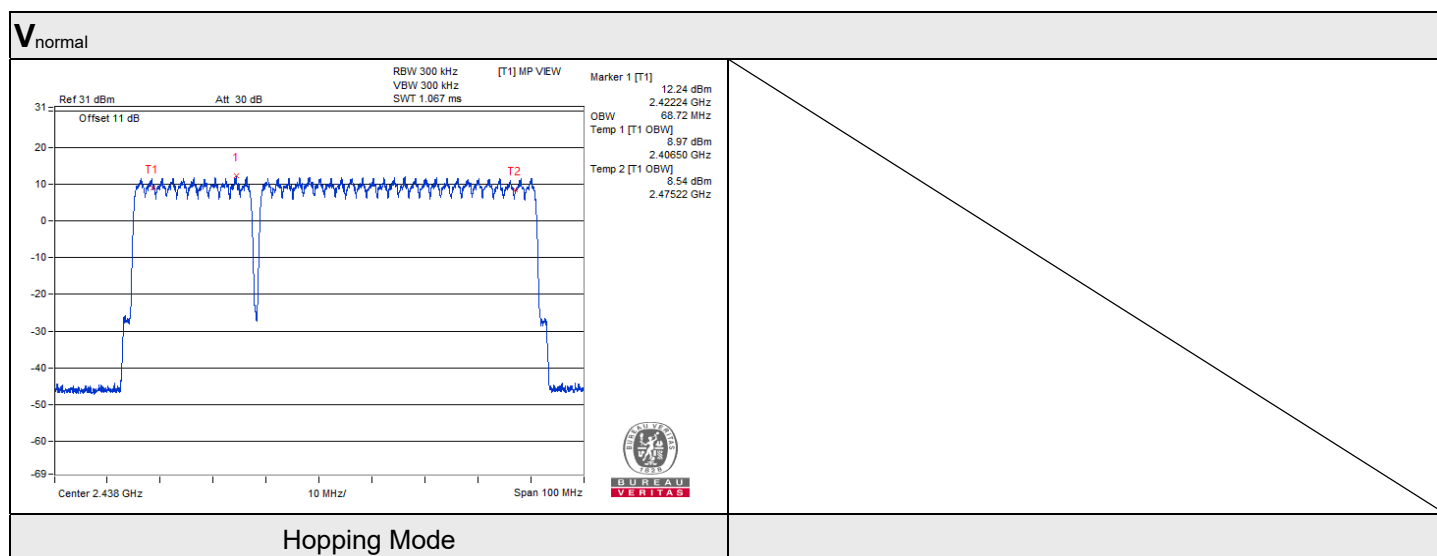
7.3 Spreading Bandwidth and Spreading Factor

Environmental Conditions:	22°C, 55% RH	Tested By:	Kevin Ko
---------------------------	--------------	------------	----------

QHS 2M: Normal Mode

V_{normal}	
90% Occupied bandwidth (MHz)	Spreading factor
68.72	34.36

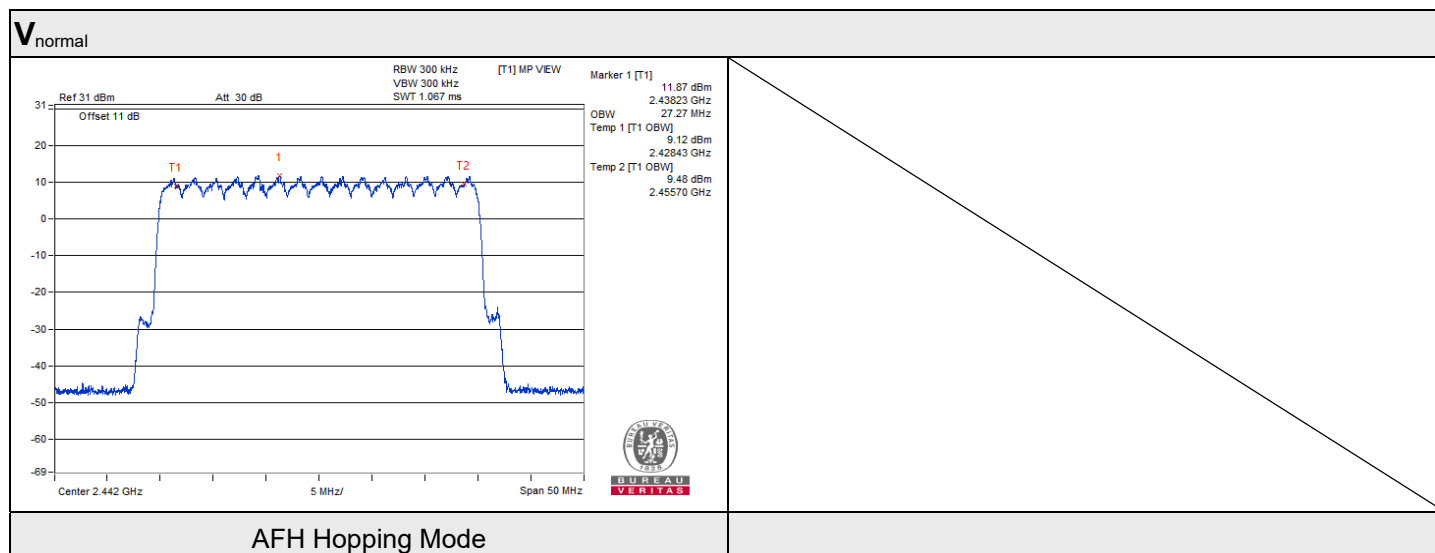
NOTE: Spreading Factor: 90% Occupied bandwidth / 2



QHS 2M: AFH Mode

V _{normal}	
90% Occupied bandwidth (MHz)	Spreading factor
27.27	13.63

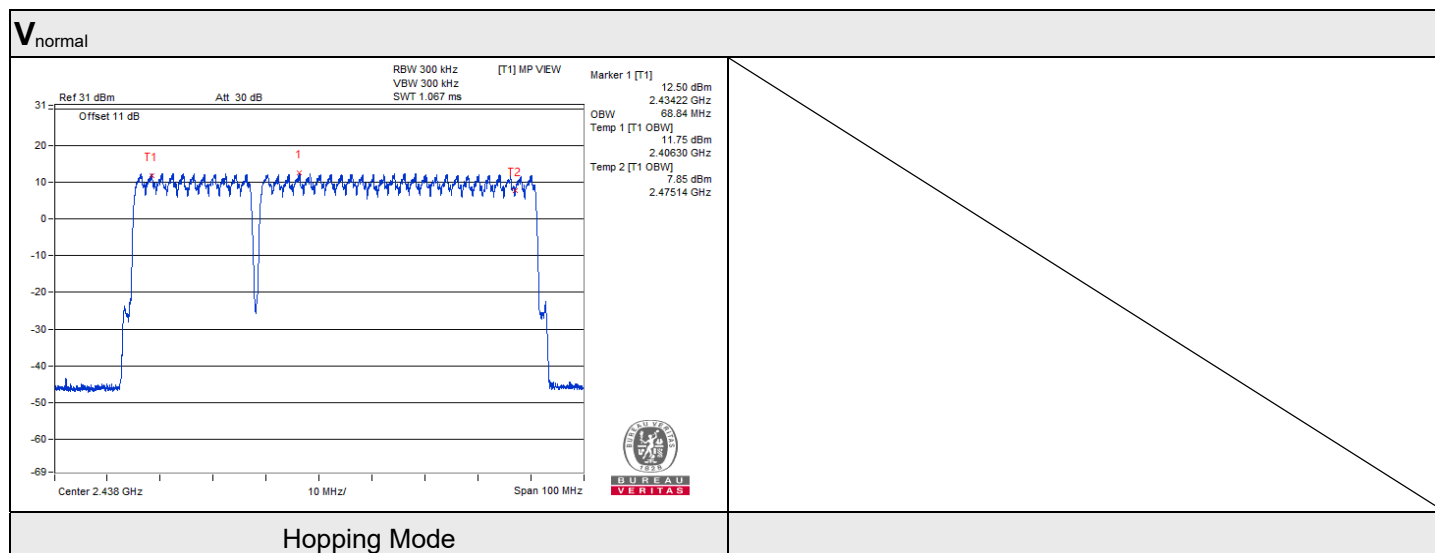
NOTE: Spreading Factor: 90% Occupied bandwidth / 2



QHS 6M: Normal Mode

V_{normal}	
90% Occupied bandwidth (MHz)	Spreading factor
68.84	34.42

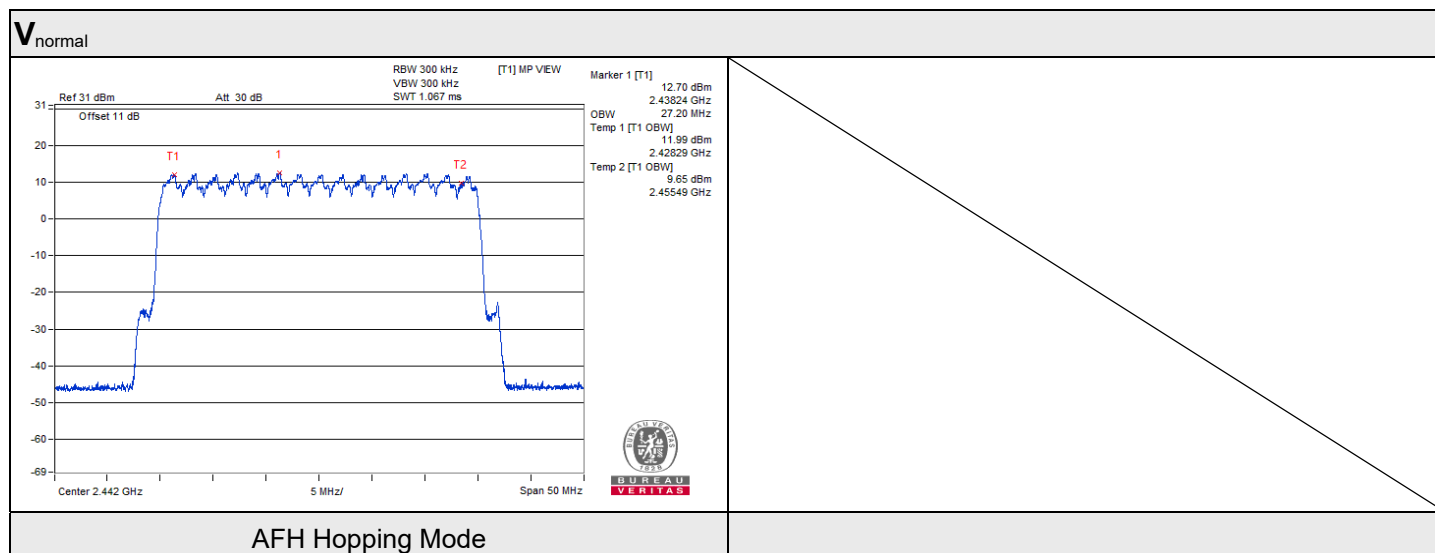
NOTE: Spreading Factor: 90% Occupied bandwidth / 2



QHS 6M: AFH Mode

V _{normal}	
90% Occupied bandwidth (MHz)	Spreading factor
27.20	13.60

NOTE: Spreading Factor: 90% Occupied bandwidth / 2



7.4 Spurious Emissions

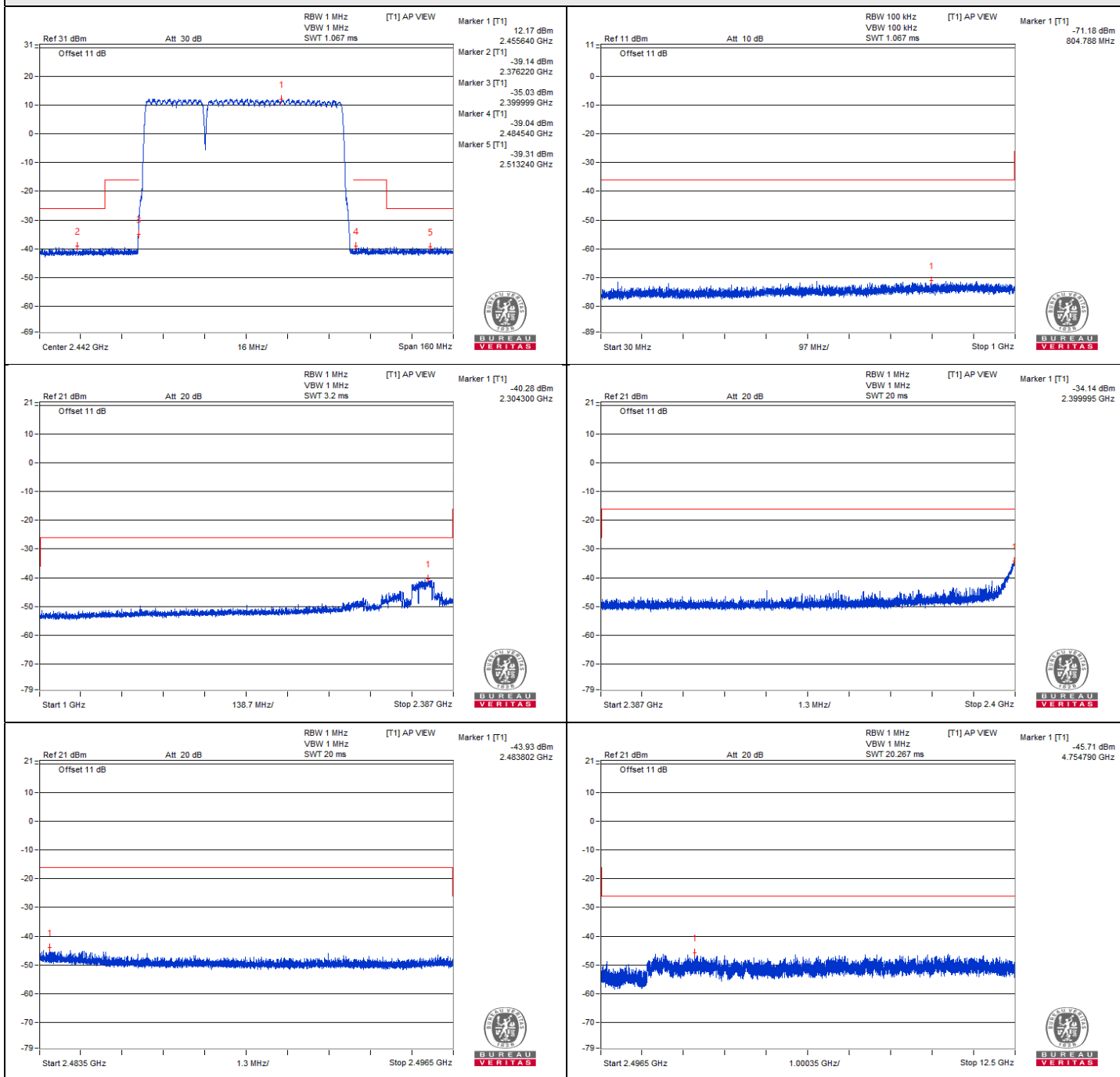
Environmental Conditions:	22°C, 55% RH	Tested By:	Kevin Ko
---------------------------	--------------	------------	----------

QHS 2M

TEST CHANNEL		Hopping			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE	LIMIT	RESULT
V_{normal}	30MHz to 1000MHz	804.788	0.000076 uW/100kHz	0.25 uW/100kHz	PASS
	1000MHz to 2387MHz	2304.300	0.093756 uW/MHz	2.5 uW/MHz	PASS
	2387MHz to 2400MHz	2399.995	0.385478 uW/MHz	25 uW/MHz	PASS
	2483.5MHz to 2496.5MHz	2483.802	0.040458 uW/MHz	25 uW/MHz	PASS
	2496.5MHz to 12500MHz	4754.790	0.026853 uW/MHz	2.5 uW/MHz	PASS

NOTE: 1. The spectrum plots are attached on the following pages.

Vnormal



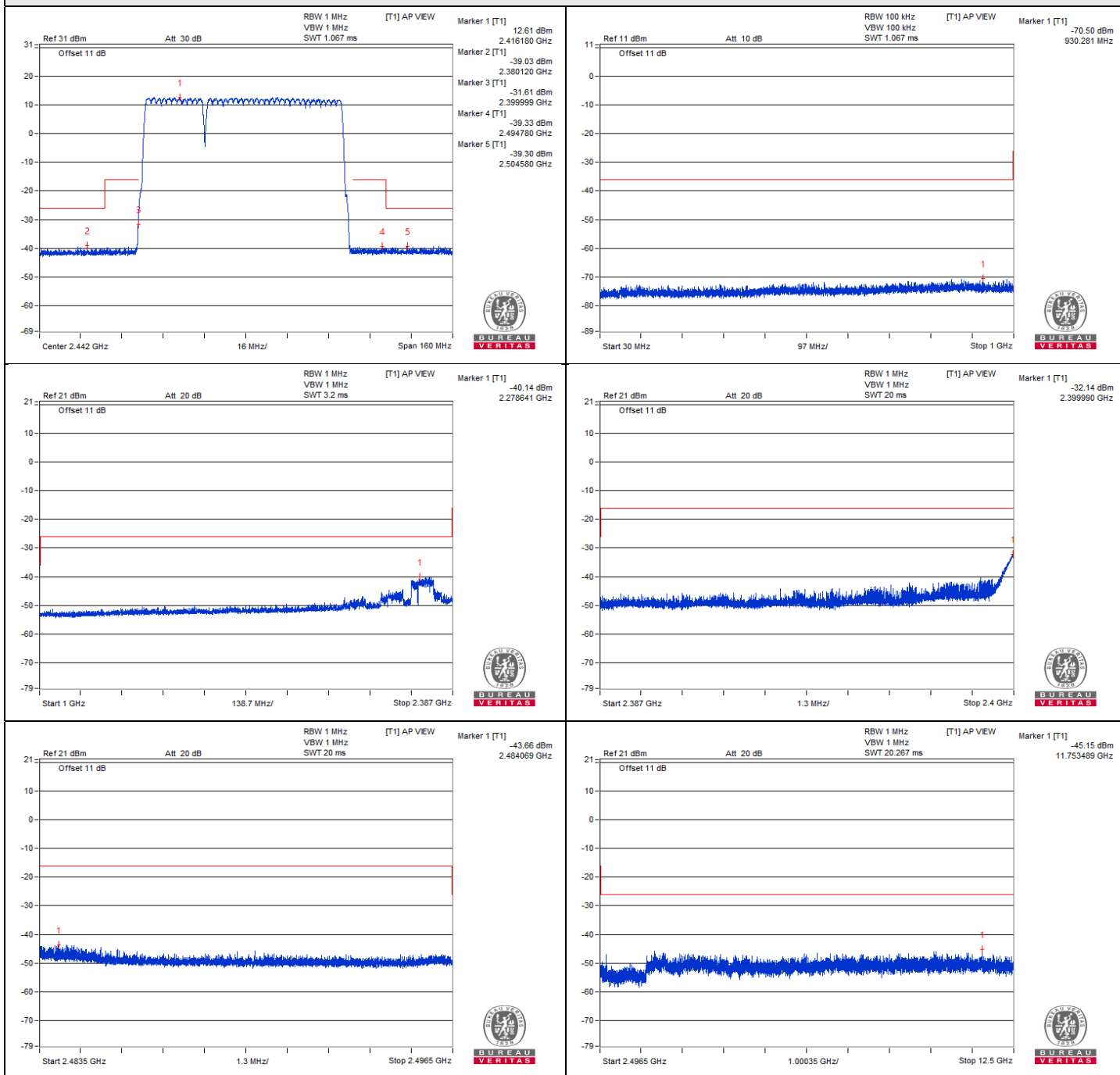
Hopping

QHS 6M

TEST CHANNEL		Hopping			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE	LIMIT	RESULT
V_{normal}	30MHz to 1000MHz	930.281	0.000089 μ W/100kHz	0.25 μ W/100kHz	PASS
	1000MHz to 2387MHz	2278.641	0.096828 μ W/MHz	2.5 μ W/MHz	PASS
	2387MHz to 2400MHz	2399.990	0.610942 μ W/MHz	25 μ W/MHz	PASS
	2483.5MHz to 2496.5MHz	2484.069	0.043053 μ W/MHz	25 μ W/MHz	PASS
	2496.5MHz to 12500MHz	11753.489	0.030549 μ W/MHz	2.5 μ W/MHz	PASS

NOTE: 1. The spectrum plots are attached on the following pages.

Vnormal



Hopping

7.5 Spurious Emissions of Receiver

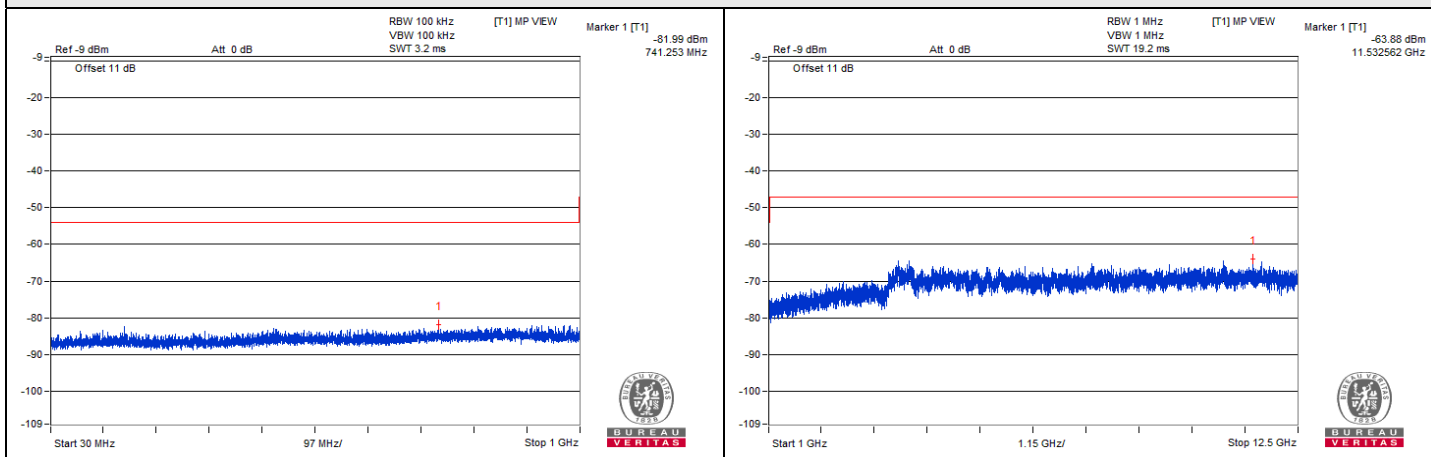
Environmental Conditions:	22°C, 55% RH	Tested By:	Kevin Ko
---------------------------	--------------	------------	----------

QHS 2M

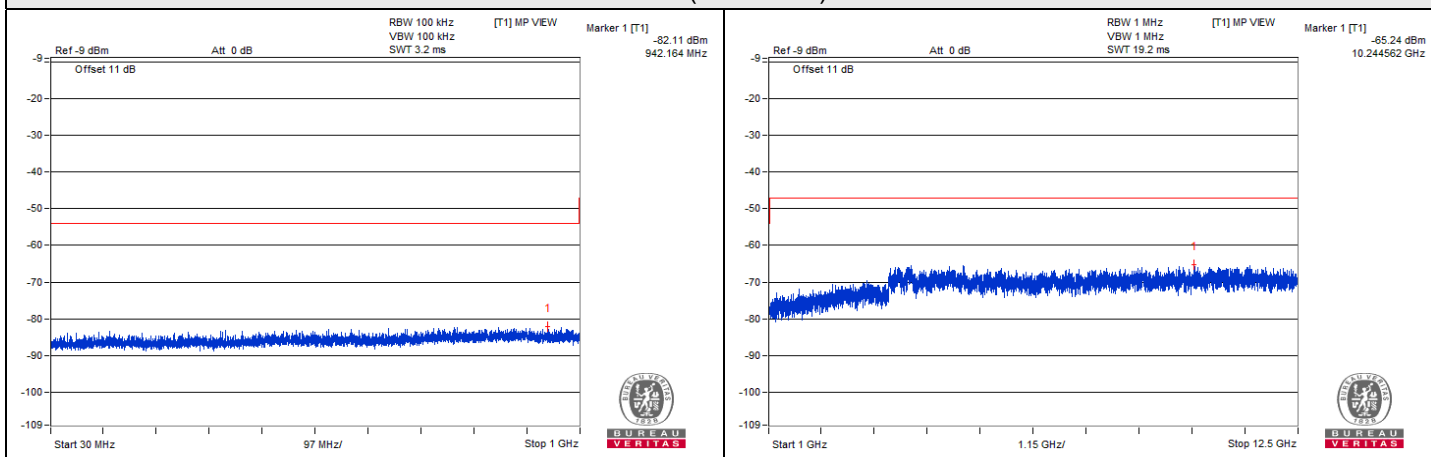
TEST CHANNEL		CH 1 (2404 MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE(nW)	LIMIT (nW)	RESULT
V_{normal}	30.0 to 1000.0	741.253	0.006324	4	PASS
	1000.0 to 12500.0	11532.562	0.409261	20	PASS
TEST CHANNEL		CH 18 (2438 MHz)			
V_{normal}	30.0 to 1000.0	942.164	0.006152	4	PASS
	1000.0 to 12500.0	10244.562	0.299226	20	PASS
TEST CHANNEL		CH 38 (2478 MHz)			
V_{normal}	30.0 to 1000.0	748.770	0.007413	4	PASS
	1000.0 to 12500.0	11799.937	0.301301	20	PASS

NOTE: 1. The spectrum plots are attached on the following pages.

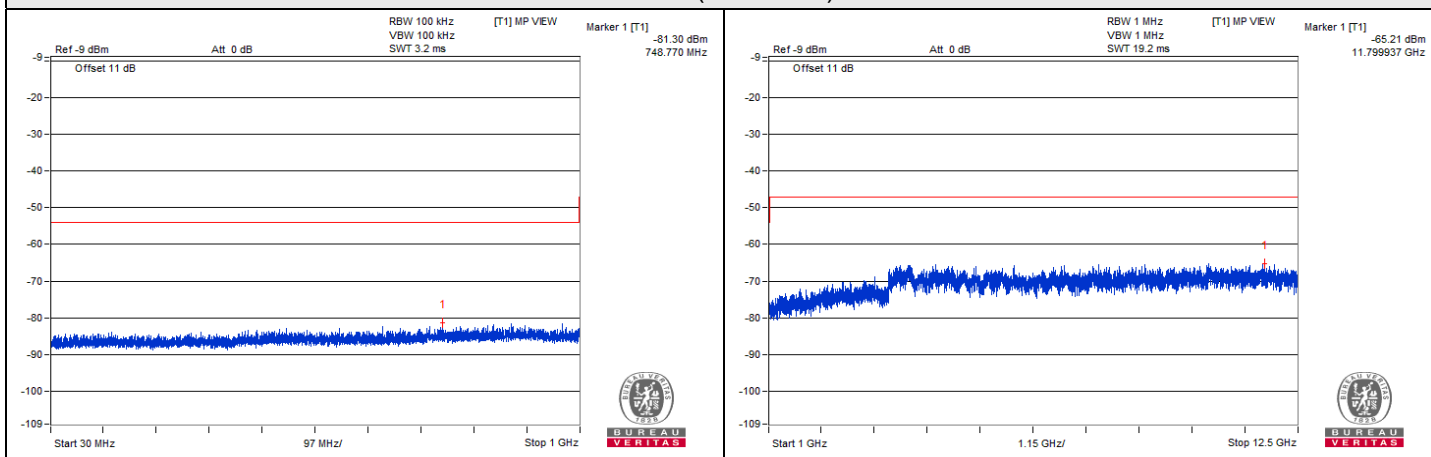
Vnormal



CH 1 (2404 MHz)



CH 18 (2438 MHz)



CH 38 (2478 MHz)

7.6 Antenna Power

Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko
---------------------------	--------------	------------	----------

For QHS

Voltage (Vdc)	Modulation	Data Rate	Conducted RF Output Power Density (mW/MHz)	Radiated RF Output Power Density (mW/MHz)
3.3	QHS 2M	2Mbps	0.212284	0.478539
	QHS 6M	6Mbps	0.229171	0.516606
Maximum Limit (mW/MHz):			3	-
Rated Power (mW/MHz):			0.3	-
Tolerance of Antenna Power (mW/MHz):			0.36	-
Maximum EIRP Limit (mW/MHz):			-	4.91

Notes:

1. Antenna gain is 3.53 dBi.
2. The radiated RF output power density is a “calculated” value derived from the conducted value.
3. Formula: Radiated RF output power density = Conducted RF output power density + Antenna gain

For QHS AFH function

Voltage (Vdc)	Modulation	Data Rate	Conducted RF Output Power Density (mW/MHz)	Radiated RF Output Power Density (mW/MHz)
3.3	QHS 2M	2Mbps	0.534952	1.205910
	QHS 6M	6Mbps	0.580004	1.307468
Maximum Limit (mW/MHz):			3	-
Rated Power (mW/MHz):			0.6	-
Tolerance of Antenna Power (mW/MHz):			0.72	-
Maximum EIRP Limit (mW/MHz):			-	4.91

Notes:

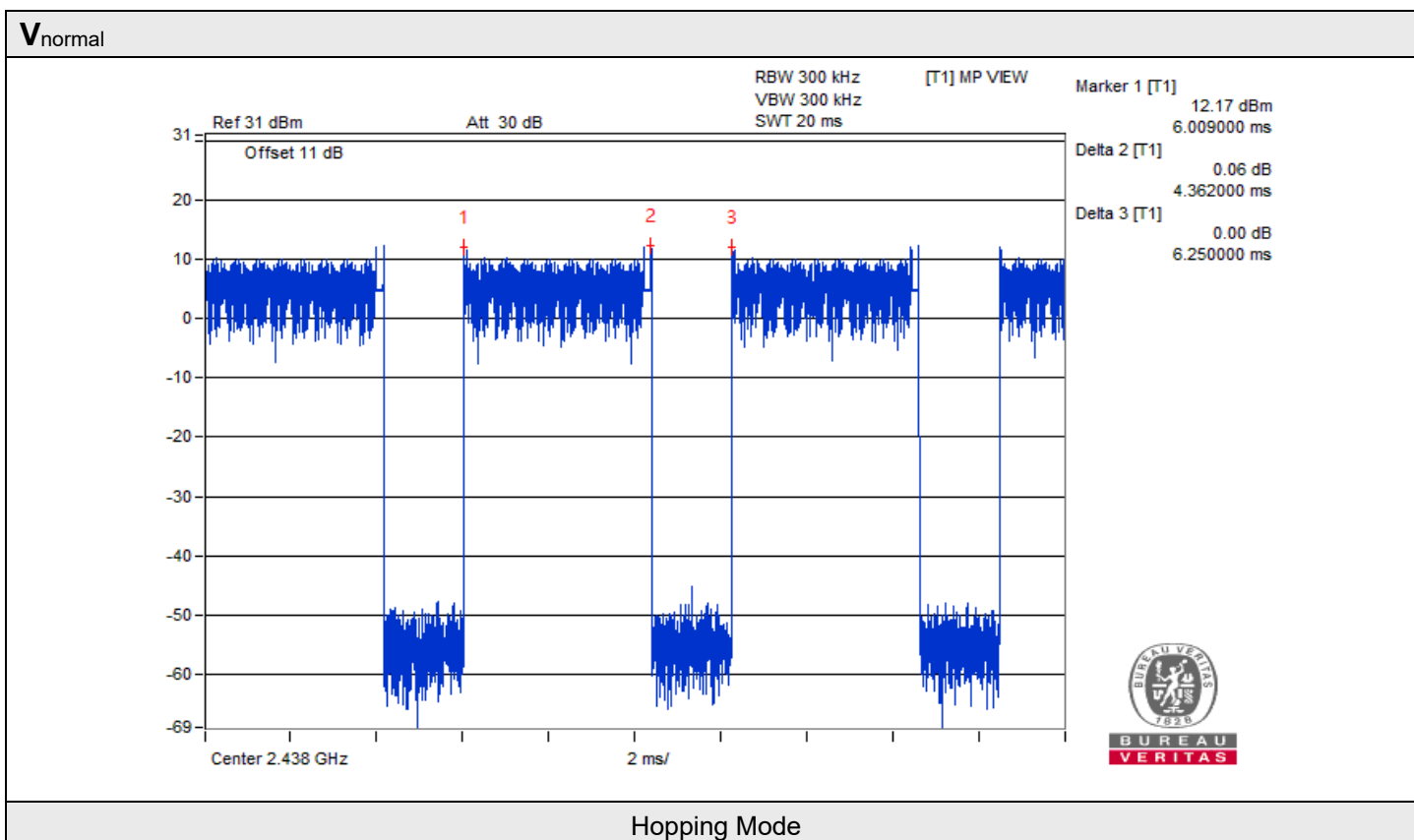
1. Antenna gain is 3.53 dBi.
2. The radiated RF output power density is a “calculated” value derived from the conducted value.
3. Formula: Radiated RF output power density = Conducted RF output power density + Antenna gain

7.7 Dwell Time

Environmental Conditions:	22°C, 55% RH	Tested By:	Kevin Ko
---------------------------	--------------	------------	----------

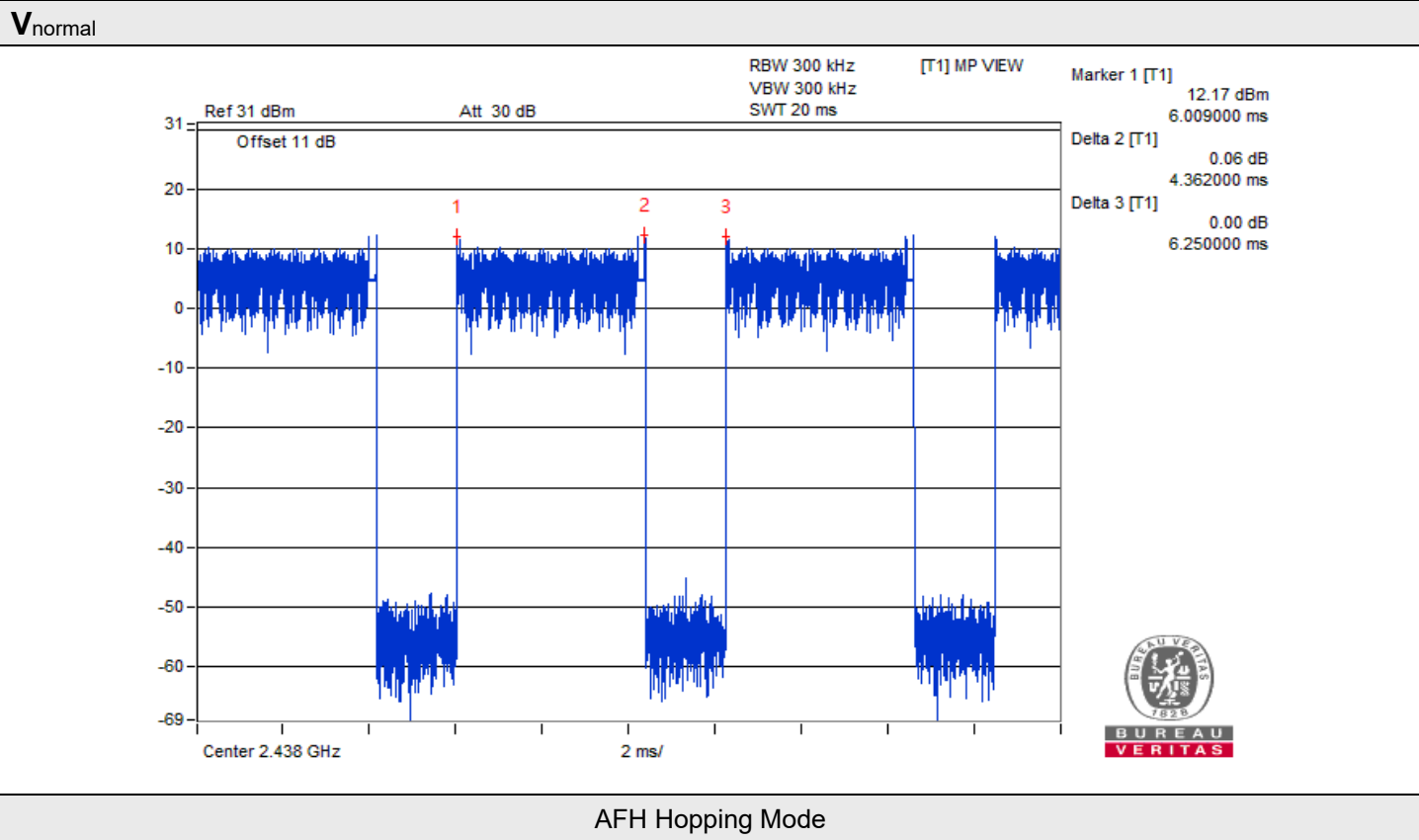
QHS 2M: Normal Mode

Test Condition	Diffusion Rate	(Diffusion Rate/37)*0.4 sec	Duty Cycle	Dwell Time (msec)	Limit (msec)	Result
V _{normal}	34.36	0.371	0.697	258.587	400	PASS



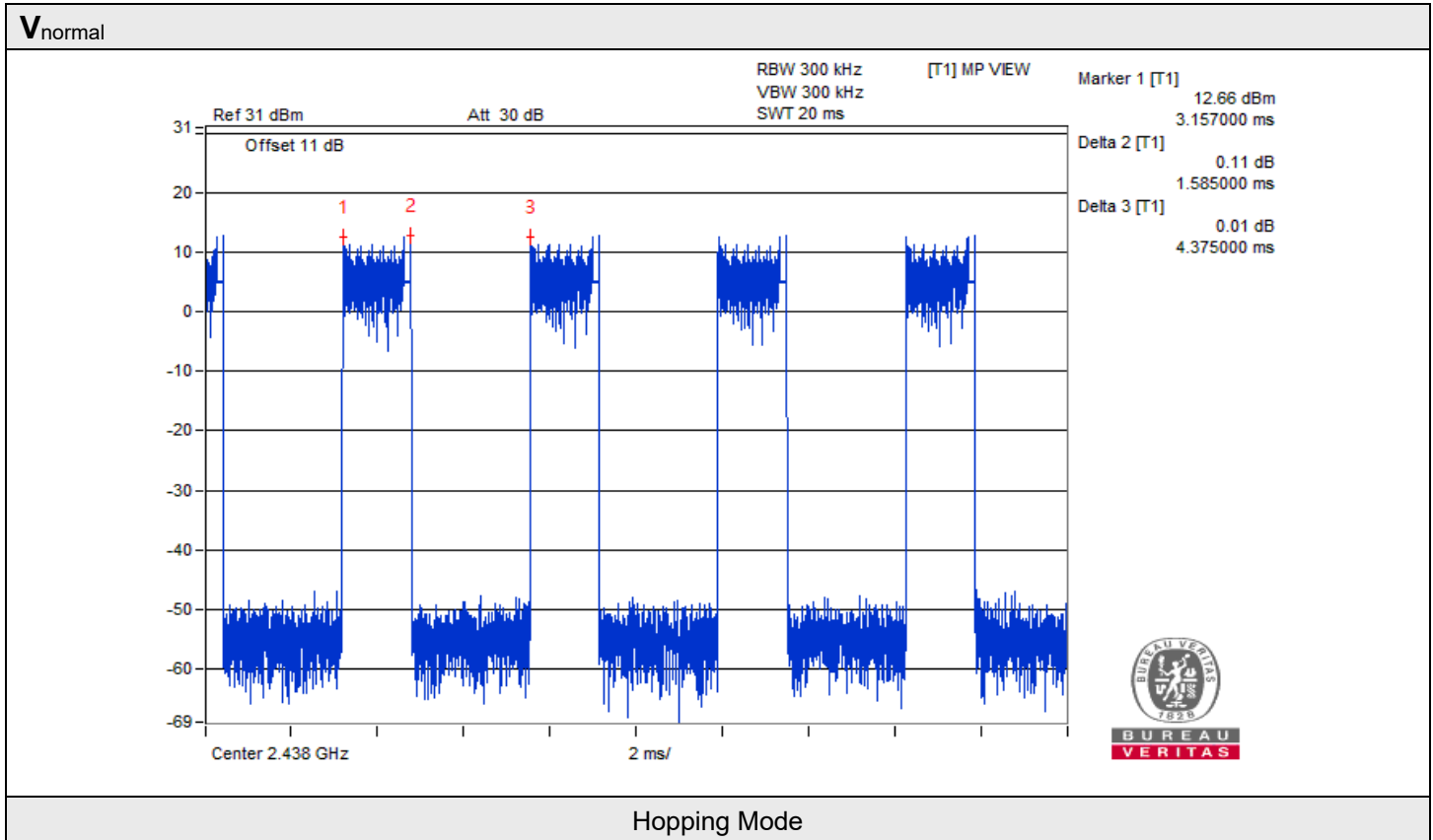
QHS 2M: AFH Mode

Test Condition	Diffusion Rate	(Diffusion Rate/15)*0.4 sec	Duty Cycle	Dwell Time (msec)	Limit (msec)	Result
V _{normal}	13.63	0.363	0.697	253.011	400	PASS



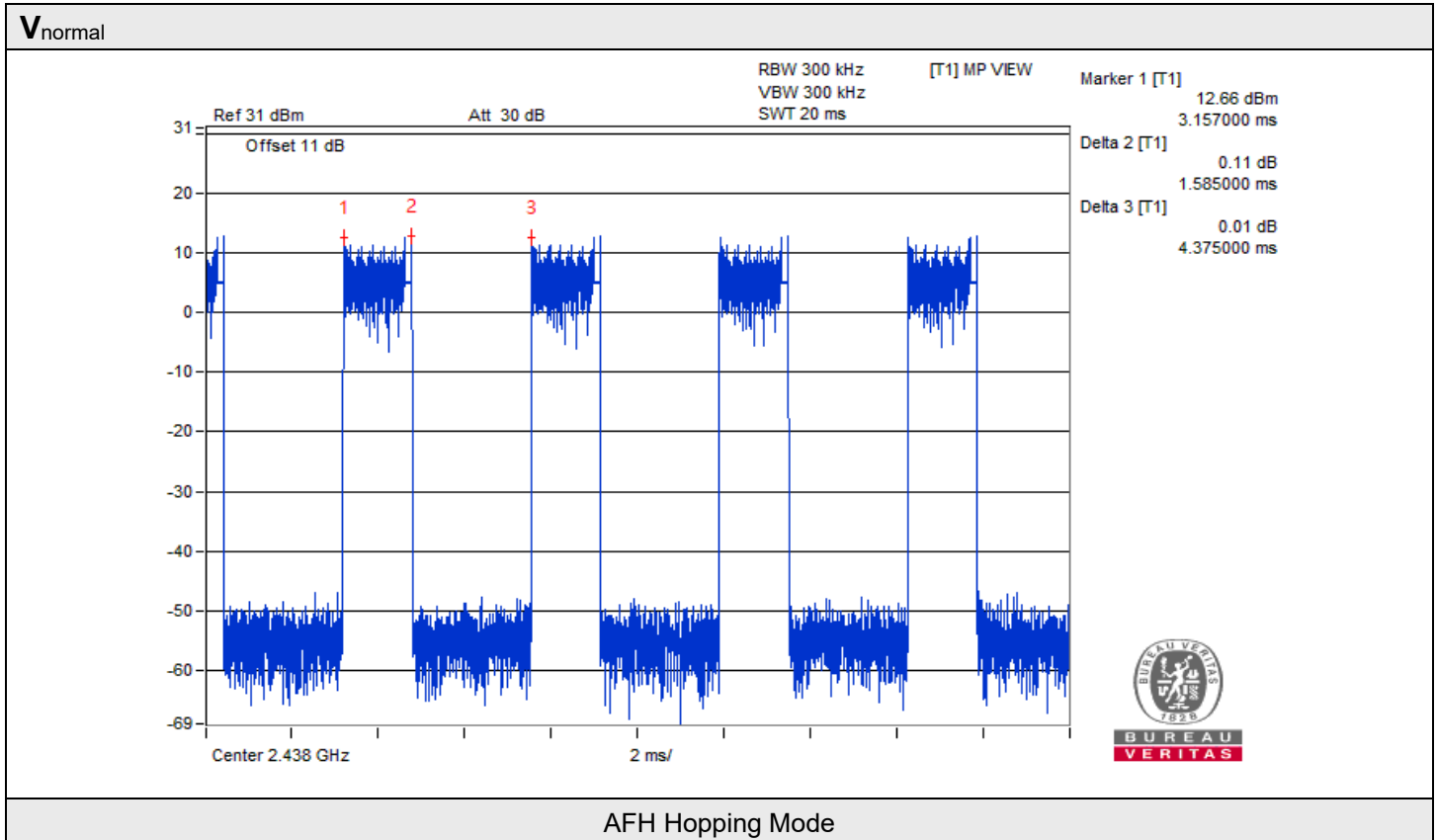
QHS 6M: Normal Mode

Test Condition	Diffusion Rate	$(\text{Diffusion Rate}/37) \times 0.4 \text{ sec}$	Duty Cycle	Dwell Time (msec)	Limit (msec)	Result
V _{normal}	34.42	0.372	0.362	134.664	400	PASS



QHS 6M: AFH Mode

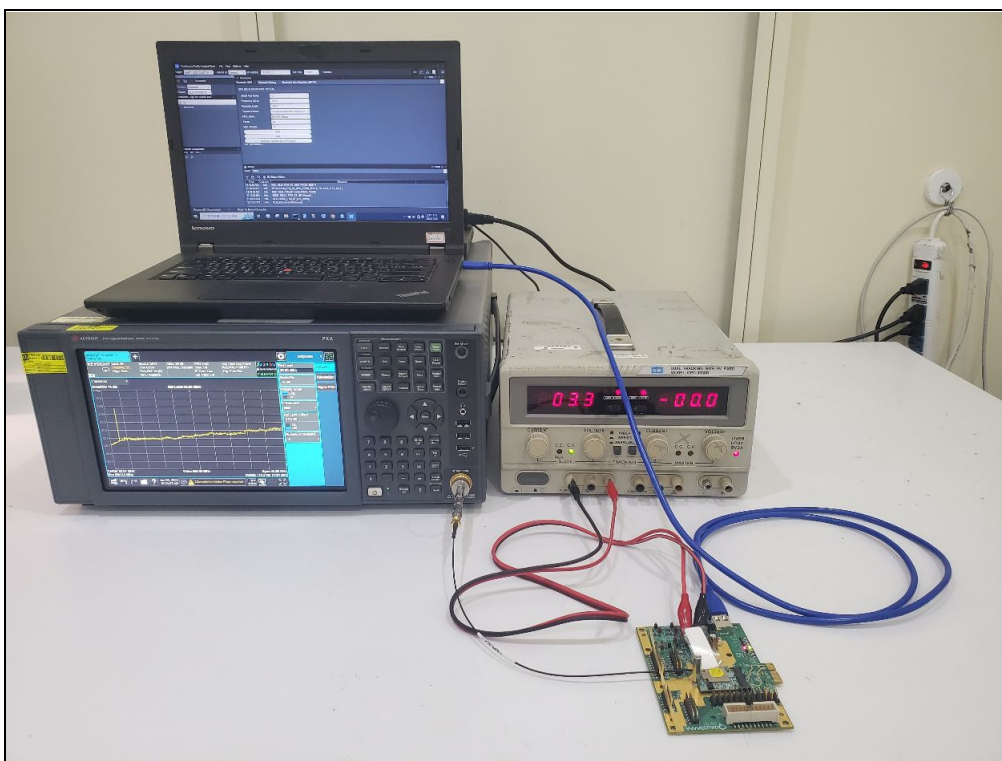
Test Condition	Diffusion Rate	$(\text{Diffusion Rate}/15) \times 0.4 \text{ sec}$	Duty Cycle	Dwell Time (msec)	Limit (msec)	Result
V _{normal}	13.60	0.362	0.362	131.044	400	PASS



7.8 Interference Prevention Function

Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko
Link Mode		Test Result	
QHS		Pass	

8 Pictures of Test Arrangements



9 Information of the Testing Laboratories

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

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

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

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

--- END ---