

Partial FCC Test Report

Report No.: RF200319C13

FCC ID: QYL9260NG

Test Model: 9260NGW

Received Date: Mar. 19, 2020

Test Date: Mar. 26 ~ Apr. 17, 2020

Issued Date: Apr. 29, 2020

Applicant: Getac Technology Corporation

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 427177 / TW0011



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Release Control Record

Issue No.	Description	Date Issued
RF200319C13	Original Release	Apr. 29, 2020

1 Certificate of Conformity

Product: WLAN and BT, 2x2 PCIe M.2 2230 adapter card

Brand: Getac

Test Model: 9260NGW

Sample Status: Mass product

Applicant: Getac Technology Corporation

Test Date: Mar. 26 ~ Apr. 17, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

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 : Gina Liu, **Date:** Apr. 29, 2020
Gina Liu / Specialist

Approved by : Dylan Chiou, **Date:** Apr. 29, 2020
Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -4.08 dB at 0.16524 MHz.
15.247(a)(1)(iii)	Number of Hopping Frequency Used	N/A	Refer to Note
15.247(a)(1)(iii)	Dwell Time on Each Channel	N/A	Refer to Note
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	N/A	Refer to Note
15.247(a)(1)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	N/A	Refer to Note
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -11.09 dB at 2483.5 MHz.
15.247(d)	Band Edge Measurement	N/A	Refer to Note
15.247(d)	Antenna Port Emission	N/A	Refer to Note
15.203	Antenna Requirement	N/A	Refer to Note

Note:

- Only test item of Peak Output Power, Radiated Emissions test and Conducted Emission tests were performed for this report. For other test data, please refer to Intel Report No.: 170524-01.TR05 for module (Brand: Intel, Model: 9260NGW).
- 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 CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	WLAN and BT, 2x2 PCIe M.2 2230 adapter card
Brand	Getac
Test Model	9260NGW
Status of EUT	Mass product
Power Supply Rating	19 Vdc (adapter) 7.4 Vdc (Li-ion battery)
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8DPSK
Transfer Rate	1/2/3 Mbps
Operating Frequency	2402 ~ 2480 MHz
Number of Channel	79
Output Power (Measured Max. Peak)	11.429 mW
Antenna Type	Refer to Note as below
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

- The EUT is authorized for use in specific End-product. Please refer to below table for more details.

Product	Brand	Model
Tablet	Getac	T800

- The antenna information is listed.

Ant. Type	Manufacturer	Parts Number	Frequency (MHz)					
			2400	2402	2442	2450	2484	2500
PIFA	GETAC	WLAN Main Antenna: 421122100003	2.40 dBi	2.43 dBi	2.40 dBi	2.34 dBi	3.16 dBi	3.11 dBi
		WLAN Aux. Antenna: 421122100001	-0.97 dBi	-0.97 dBi	-0.04 dBi	-0.08 dBi	1.17 dBi	0.87 dBi

Ant. Type	Manufacturer	Parts Number	Frequency (MHz)							
			5150	5250	5350	5470	5600	5725	5785	5850
PIFA	GETAC	WLAN Main Antenna: 421122100003	3.01 dBi	1.82 dBi	3.05 dBi	2.92 dBi	3.33 dBi	3.84 dBi	3.73 dBi	3.60 dBi
		WLAN Aux. Antenna: 421122100001	2.98 dBi	2.00 dBi	3.71 dBi	3.56 dBi	4.27 dBi	4.27 dBi	4.37 dBi	4.36 dBi

- The following accessories were for the End-product.

Product	Brand	Model	Description
Adapter	Chicony	A12-065N2A	I/P: 100-240 Vac, 50-60 Hz, 1.7 A O/P: 19 Vdc, 3.42 A, 65W
Battery	Getac	BP2S2P2100S	7.4 Vdc, 4200 mAh, 32 WAh
WLAN Module	Getac	9260NGW	--
LCD Panel	INNOLUX	HE080IA-06B	--
Photo Camera	FOXLINK	FO20FF-505H	--
Video Camera	FOXLINK	FO80AF-506H	--
CPU	Intel	Z8750	1.6GHz, burst up to 2.40 GHz - 2MB Cache
SSD	Sandisk	SDIN8CE4-128G	128G

- 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

79 channels are provided to this EUT:

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		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE<1G	PLC	Power	
-	√	√	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1 GHz **RE<1G**: Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **Power**: Maximum Output Power Measurement

Note:

1. For Radiated emission test, pre-tested GFSK, $\pi/4$ -DQPSK, 8DPSK modulation type and found 8DPSK was the worse, therefore chosen for the final test and presented in the test report.
2. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
3. "-" means no effect.

Radiated Emission Test (Above 1 GHz):

- ☒ 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.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	0, 39, 78	FHSS	GFSK	DH5
	0 to 78	0, 39, 78	FHSS	8DPSK	3DH5

Radiated Emission Test (Below 1 GHz):

- ☒ 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.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	78	FHSS	8DPSK	DH5

Power Line Conducted Emission Test:

- ☒ 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.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	78	FHSS	8DPSK	DH5

Maximum Output Power Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	0, 39, 78	FHSS	GFSK	DH5
-	0 to 78	0, 39, 78	FHSS	8DPSK	3DH5

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Harry Hsueh
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyong Wang
Power	25 deg. C, 65 % RH	7.4 Vdc	Gavin Wu

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Tablet	Getac	T800	N/A	N/A	Provided by Client
B.	Bluetooth Tester	R&S	CBT	100980	N/A	Provided by Lab

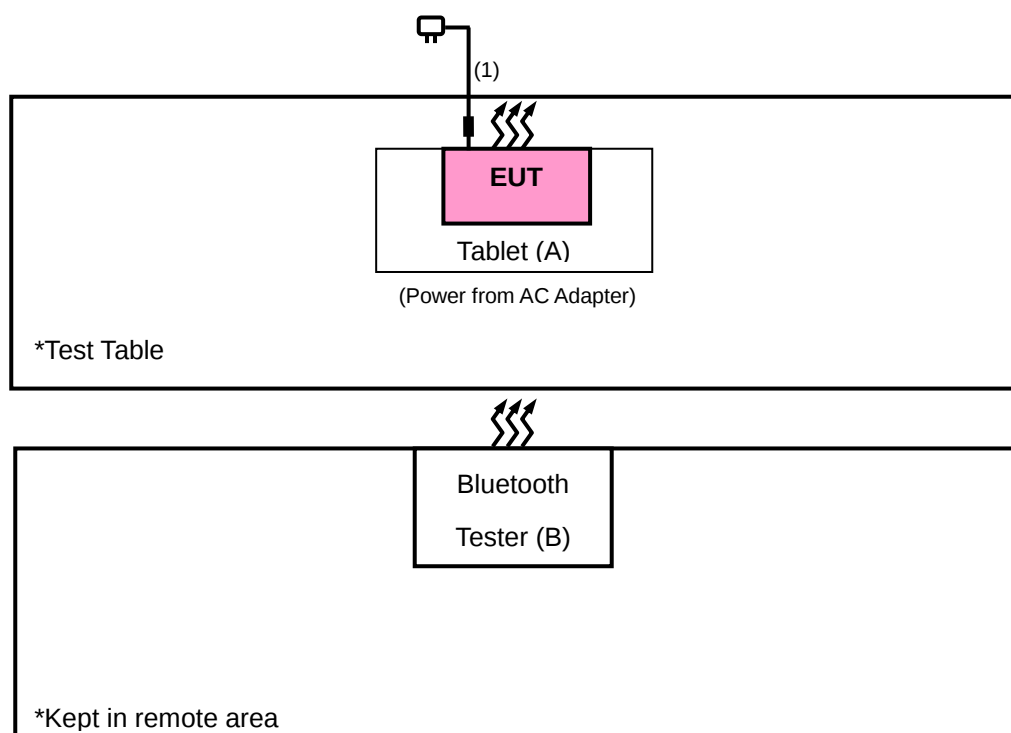
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item B acted as communication partner to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Adapter Cable	1	1.75	Y	1	Accessory of the EUT

Note: The core(s) is(are) originally attached to the cable(s).

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Spectrum Analyzer ROHDE & SCHWARZ	FSU-26	101645	Jul. 04, 2019	Jul. 03, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020
			Apr. 16, 2020	Apr. 15, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 08, 2019	Oct. 07, 2020
Spectrum Analyzer KEYSIGHT	N9030B	MY57140953	Jul. 03, 2019	Jul. 02, 2020
Vector signal generator Agilent	E4438C	MY47271120	Nov. 11, 2019	Nov. 10, 2020
Signal Generator Agilent	N5182B	MY53050430	Nov. 25, 2019	Nov. 24, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-631	Nov. 12, 2019	Nov. 11, 2020
HORN Antenna Schwarzbeck	3117	00155510	Nov. 24, 2019	Nov. 23, 2020
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 15, 2019	Jul. 14, 2020
Preamplifier Agilent	310N	187246	Jun. 18, 2019	Jun. 17, 2020
Preamplifier Agilent	83017A	MY39501373	Jun. 18, 2019	Jun. 17, 2020
RF signal cable HUBER+SUHNER	5D-FB	Cable-RF1-01(RFC-SMS-100-SMS-120+MY13379/4)	Jun. 18, 2019	Jun. 17, 2020
RF signal cable HUBER+SUHNER	8D-FB	Cable-RF1-02(RFC-SMS-100-NMS-120+8120_5140_2911)	Jun. 18, 2019	Jun. 17, 2020
Software ADT	8.130425b	NA	NA	NA
Antenna Tower ADT	7-TR/POL	NA	NA	NA
Turn Table	TT100.	NA	NA	NA
Controller ADT	SC100	NA	NA	NA
Temperature & Humidity Chamber GIANT FORCE	GTH-120-40-CP-AR	MAA1306-019	Sep. 10, 2019	Sep. 09, 2020
Bluetooth Tester R&S	CBT	100980	Jul. 14, 2019	Jul. 13, 2020

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HsinTien RF Chamber 1.
3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

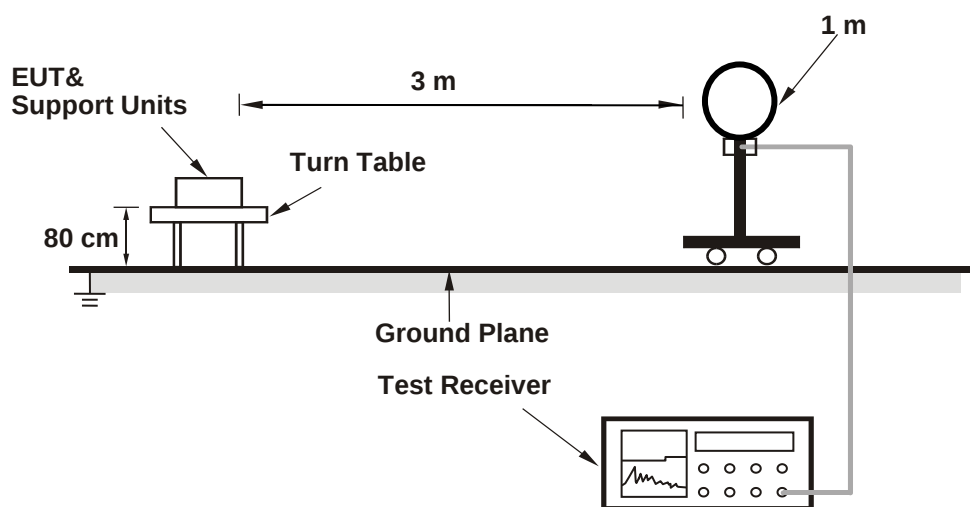
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz. (RBW = 1 MHz, VBW = 1 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

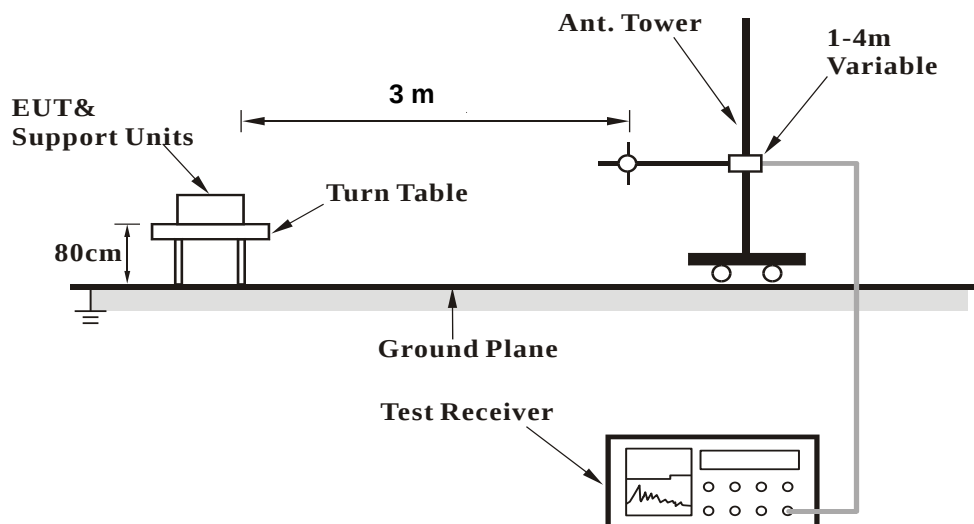
No deviation.

4.1.5 Test Set Up

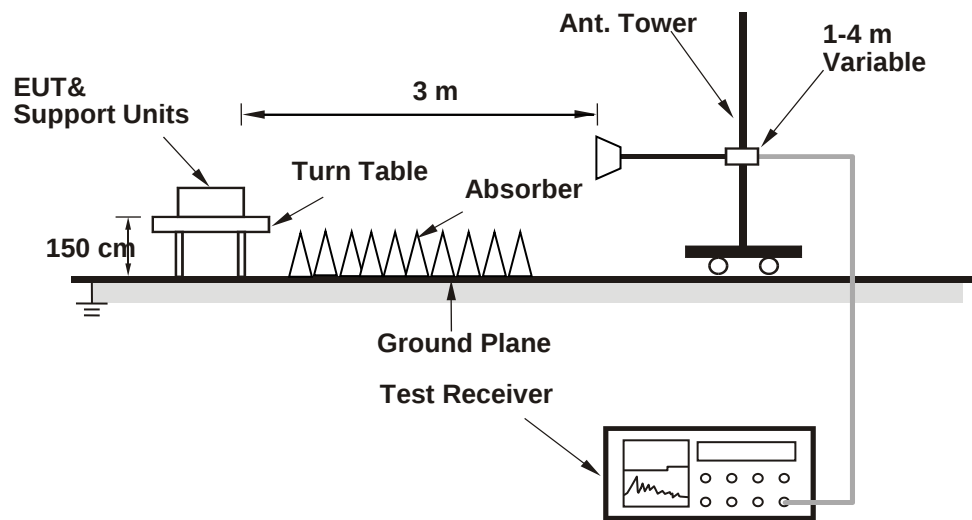
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data: GFSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.35	36.85	4.5	54	-12.65	201	358	Average
2390	51.55	47.05	4.5	74	-22.45	201	358	Peak
2402	99.47	94.95	4.52			201	358	Average
2402	100.86	96.34	4.52			201	358	Peak
4804	41.54	31.19	10.35	54	-12.46	105	105	Average
4804	48.26	37.91	10.35	74	-25.74	105	105	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.17	36.67	4.5	54	-12.83	322	117	Average
2390	51.39	46.89	4.5	74	-22.61	322	117	Peak
2402	92.95	88.43	4.52			322	117	Average
2402	94.51	89.99	4.52			322	117	Peak
4804	41.69	31.34	10.35	54	-12.31	134	167	Average
4804	47.99	37.64	10.35	74	-26.01	134	167	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2402 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.97	37.47	4.5	54	-12.03	201	358	Average
2390	51.3	46.8	4.5	74	-22.7	201	358	Peak
2441	99.81	95.23	4.58			201	358	Average
2441	101.28	96.7	4.58			201	358	Peak
2483.5	41.75	37.09	4.66	54	-12.25	201	358	Average
2483.5	51.86	47.2	4.66	74	-22.14	201	358	Peak
4882	41.3	31.09	10.21	54	-12.7	134	209	Average
4882	48.36	38.15	10.21	74	-25.64	134	209	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.37	36.87	4.5	54	-12.63	322	117	Average
2390	51.52	47.02	4.5	74	-22.48	322	117	Peak
2441	93.41	88.83	4.58			322	117	Average
2441	94.87	90.29	4.58			322	117	Peak
2483.5	41.65	36.99	4.66	54	-12.35	322	117	Average
2483.5	52	47.34	4.66	74	-22	322	117	Peak
4882	41.54	31.33	10.21	54	-12.46	148	188	Average
4882	48.19	37.98	10.21	74	-25.81	148	188	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 2441 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	99.45	94.81	4.64			201	358	Average
2480	101.5	96.86	4.64			201	358	Peak
2483.5	41.27	36.61	4.66	54	-12.73	201	358	Average
2483.5	53.04	48.38	4.66	74	-20.96	201	358	Peak
4960	41.77	31.41	10.36	54	-12.23	105	5	Average
4960	47.23	36.87	10.36	74	-26.77	105	5	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	92.54	87.9	4.64			322	117	Average
2480	94.65	90.01	4.64			322	117	Peak
2483.5	40.68	36.02	4.66	54	-13.32	322	117	Average
2483.5	52.7	48.04	4.66	74	-21.3	322	117	Peak
4960	41.79	31.43	10.36	54	-12.21	145	144	Average
4960	47.62	37.26	10.36	74	-26.38	145	144	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2480 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

8DPSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.45	36.95	4.5	54	-12.55	201	358	Average
2390	51.42	46.92	4.5	74	-22.58	201	358	Peak
2402	94.24	89.72	4.52			201	358	Average
2402	97.64	93.12	4.52			201	358	Peak
4804	41.45	31.1	10.35	54	-12.55	168	8	Average
4804	48.34	37.99	10.35	74	-25.66	168	8	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.22	36.72	4.5	54	-12.78	322	117	Average
2390	51.72	47.22	4.5	74	-22.28	322	117	Peak
2402	89	84.48	4.52			322	117	Average
2402	92.45	87.93	4.52			322	117	Peak
4804	41.6	31.25	10.35	54	-12.4	154	127	Average
4804	47.27	36.92	10.35	74	-26.73	154	127	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2402 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.16	36.66	4.5	54	-12.84	201	358	Average
2390	51.96	47.46	4.5	74	-22.04	201	358	Peak
2441	94.45	89.87	4.58			201	358	Average
2441	97.97	93.39	4.58			201	358	Peak
2483.5	41.8	37.14	4.66	54	-12.2	201	358	Average
2483.5	52.06	47.4	4.66	74	-21.94	201	358	Peak
4882	41.25	31.04	10.21	54	-12.75	178	5	Average
4882	47.56	37.35	10.21	74	-26.44	178	5	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.21	36.71	4.5	54	-12.79	322	117	Average
2390	51.19	46.69	4.5	74	-22.81	322	117	Peak
2441	88.97	84.39	4.58			322	117	Average
2441	92.61	88.03	4.58			322	117	Peak
2483.5	41.69	37.03	4.66	54	-12.31	322	117	Average
2483.5	51.93	47.27	4.66	74	-22.07	322	117	Peak
4882	41.46	31.25	10.21	54	-12.54	137	277	Average
4882	47.77	37.56	10.21	74	-26.23	137	277	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 2441 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	94.89	90.25	4.64			201	358	Average
2480	98.33	93.69	4.64			201	358	Peak
2483.5	42.91	38.25	4.66	54	-11.09	201	358	Average
2483.5	54.15	49.49	4.66	74	-19.85	201	358	Peak
4960	41.71	31.35	10.36	54	-12.29	167	7	Average
4960	47.91	37.55	10.36	74	-26.09	167	7	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	89.71	85.07	4.64			322	117	Average
2480	93.2	88.56	4.64			322	117	Peak
2483.5	42.04	37.38	4.66	54	-11.96	322	117	Average
2483.5	52.1	47.44	4.66	74	-21.9	322	117	Peak
4960	42.54	32.18	10.36	54	-11.46	134	277	Average
4960	49.23	38.87	10.36	74	-24.77	134	277	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2480 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

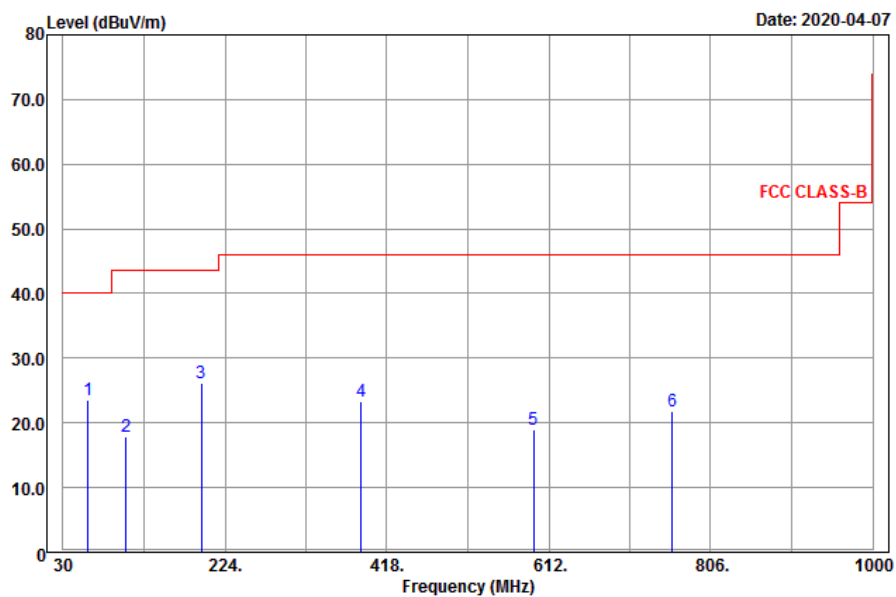
9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

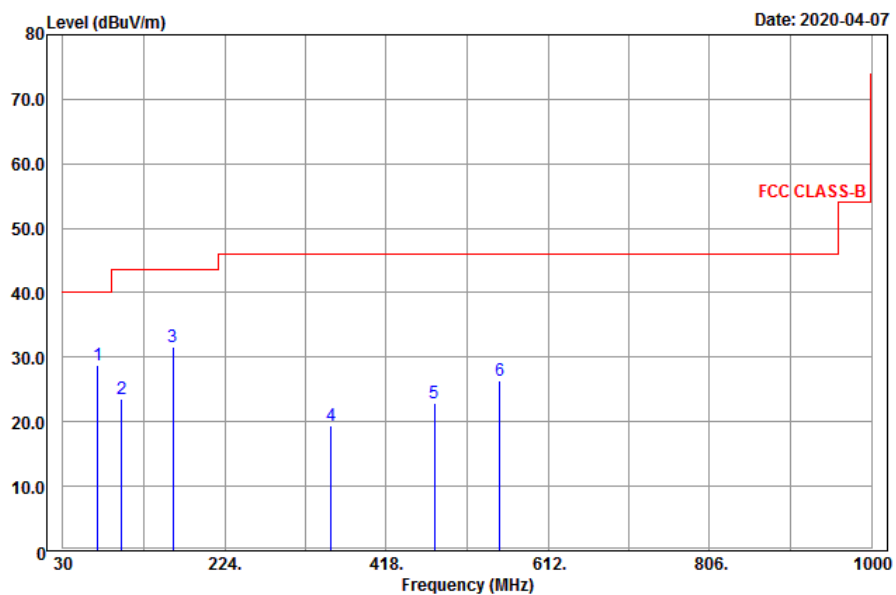
30 MHz ~ 1 GHz Worst-Case Data:

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
59.7	23.64	39.78	-16.14	40	-16.36	142	158	Peak
105.6	17.86	35.06	-17.2	43.5	-25.64	166	196	Peak
195.78	26.13	44.49	-18.36	43.5	-17.37	142	135	Peak
386.8	23.25	37.39	-14.14	46	-22.75	154	157	Peak
594	18.93	29.72	-10.79	46	-27.07	184	195	Peak
759.9	21.9	30.17	-8.27	46	-24.1	155	160	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
71.85	28.84	49.05	-20.21	40	-11.16	169	153	Peak
100.74	23.65	40.83	-17.18	43.5	-19.85	105	198	Peak
162.3	31.59	52.14	-20.55	43.5	-11.91	175	168	Peak
351.8	19.47	34.17	-14.7	46	-26.53	136	125	Peak
475.7	22.89	35.71	-12.82	46	-23.11	105	124	Peak
554.1	26.38	37.89	-11.51	46	-19.62	155	169	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- The emission levels of other frequencies were very low against the limit.

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Feb. 17, 2020	Feb. 16, 2021
RF signal cable Woken	5D-FB	Cable-cond2-01	Sep. 05, 2019	Sep. 04, 2020
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 20, 2020	Jan. 19, 2021
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 13, 2019	Aug. 12, 2020
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 2.
 3. The VCCI Site Registration No. is C-12047.

4.2.3 Test Procedures

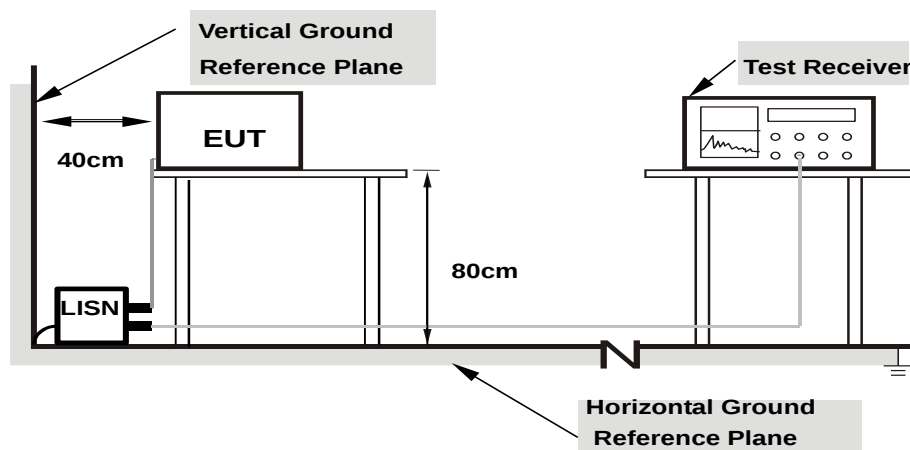
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz - 30 MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Condition

Set the EUT under transmission condition continuously at specific channel frequency.

4.2.7 Test Results

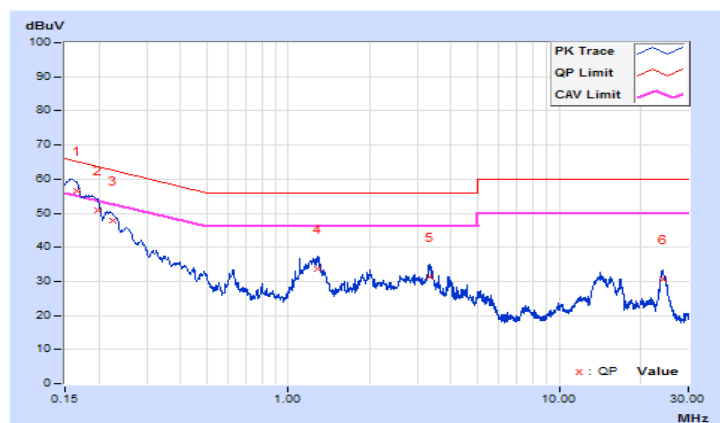
CONDUCTED WORST-CASE DATA : 8DPSK

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Jisyong Wang	Test Date	2020/3/26

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16524	10.16	46.46	40.96	56.62	51.12	65.20	55.20	-8.58	-4.08
2	0.19725	10.17	40.51	30.07	50.68	40.24	63.73	53.73	-13.05	-13.49
3	0.22425	10.17	37.69	30.72	47.86	40.89	62.66	52.66	-14.80	-11.77
4	1.28175	10.27	23.54	20.97	33.81	31.24	56.00	46.00	-22.19	-14.76
5	3.34950	10.36	20.86	10.35	31.22	20.71	56.00	46.00	-24.78	-25.29
6	24.04050	10.51	20.17	10.65	30.68	21.16	60.00	50.00	-29.32	-28.84

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

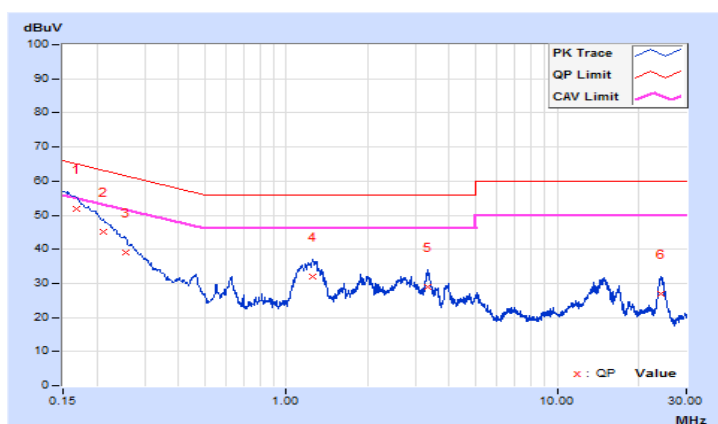


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Jisyong Wang	Test Date	2020/3/26

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16800	10.12	41.86	32.79	51.98	42.91	65.06	55.06	-13.08	-12.15
2	0.21067	10.13	35.07	31.31	45.20	41.44	63.18	53.18	-17.98	-11.74
3	0.25575	10.14	28.85	21.28	38.99	31.42	61.57	51.57	-22.58	-20.15
4	1.24542	10.25	21.79	18.66	32.04	28.91	56.00	46.00	-23.96	-17.09
5	3.33150	10.35	18.66	16.16	29.01	26.51	56.00	46.00	-26.99	-19.49
6	24.15300	10.68	16.38	14.33	27.06	25.01	60.00	50.00	-32.94	-24.99

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



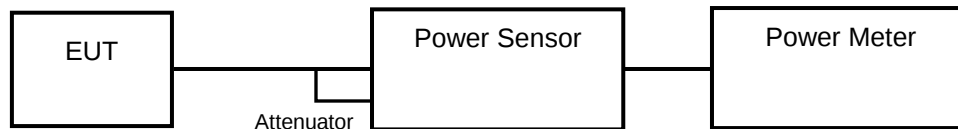
4.3 Maximum Output Power

4.3.1 Limits of Maximum Output Power Measurement

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt.

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.3.7 Test Results

<GFSK>

Channel	Freq. (MHz)	Peak Power		Average Power		Power Limit (mW)	Pass / Fail
		(mW)	(dBm)	(mW)	(dBm)		
0	2402	8.933	9.51	8.810	9.45	125 / 1000 ^{Note}	Pass
39	2441	9.977	9.99	9.863	9.94	125 / 1000 ^{Note}	Pass
78	2480	11.429	10.58	11.350	10.55	125 / 1000 ^{Note}	Pass

Note: RF Output Power limit depends on the operating channel numbers, please refer to section 4.3 of the results.

<8DPSK>

Channel	Freq. (MHz)	Peak Power		Average Power		Power Limit (mW)	Pass / Fail
		(mW)	(dBm)	(mW)	(dBm)		
0	2402	8.375	9.23	8.260	9.17	125 / 1000 ^{Note}	Pass
39	2441	9.705	9.87	9.594	9.82	125 / 1000 ^{Note}	Pass
78	2480	11.220	10.50	11.194	10.49	125 / 1000 ^{Note}	Pass

Note: RF Output Power limit depends on the operating channel numbers, please refer to section 4.3 of the results.

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

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 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:

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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.

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