

FCC / ISED RF Test Report

Power Verification Report (BT)

Report No.: FCC_IC_RF_SL20062601-PCE-001_BT

FCC ID: WAP3027

IC ID: 7922A-3027

Received Date: 02/01/2021

Test Date: 02/01/2021 / 2/18/2021

Issued Date: 02/18/2021

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**FCC Registration /
Designation Number:** 540430

ISED# / CAB identifier: 4842D



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Release Control Record

Issue No.	Description	Date Issued
FCC_IC_RF_SL20062601-PCE-001_BT	Original Report	02/18/2021

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247) / ISED RSS-247				
RSS 247 Issue2, RSS Gen Issue5				
FCC Clause	RSS Section(s)	Test Item	Result	Remarks
15.207	RSS-Gen [8.8]	AC Power Conducted Emission	PASS	Note 3
15.247(a)(1)(iii)	RSS-Gen [8.9] RSS-247 [5.5]	Number of Hopping Frequency Used	PASS	Note 3
15.247(a)(1)(iii)	RSS-247 [5.5]	Dwell Time on Each Channel	PASS	Note 3
15.247(a)(1)	RSS-247[5.2]	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Note 3
15.247(b)	RSS-247 [5.4(4)]	Output Power	PASS	Meet the requirement of limit.
15.205 & 15.209 & 15.247(d)	RSS-247 [5.2]	Radiated Emissions & Band Edge Measurement	PASS	Note 3
15.247(d)	RSS-Gen [8.8]	Antenna Port Emission	PASS	Note 3
15.203		Antenna Requirement	PASS	Note 3

Note:

1. If The Frequency Hopping System operating in 2400-2483.5MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of hopping channel whichever is greater.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
3. The test result reference FCC ID: "WAP3027" done by DEKRA Testing & Certification (Suzhou) CO., Ltd.
- 4.

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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.856 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.638 dB
Radiated Emissions above 1 GHz	Above 1GHz	4.580dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product Type	Bluetooth wireless EZ-BT WICED Module
Brand	Peiker
Test Model	CEEEOACH PLUS
Status of EUT	Engineering Sample
Power Input	5Vdc
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8DPSK
Modulation Technology	FHSS
Transfer Rate	BDR/EDR: up to 3MB/s
Operating Frequency	2402~2480MHz
Number of Channel	79
Output Power	0.94mW (-0.24 dBm)
Antenna Type	Chip Antenna
Antenna Gain	-1 dBi
Antenna Connector	N/A

3.2 Description of Test Modes

79 channels are provided for BT-BDR/EDR mode:

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	APCM	
-	-	-	-	√	-

Where **RE \geq 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE:

1. The EUT had been pre-tested on the positions of each 3 axis. The worst case was found when positioned on **X-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

- 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 1GHz):

- 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	39	FHSS	GFSK	DH5
-	0 to 78	39	FHSS	8DPSK	3DH5

Antenna Port Conducted 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	25deg. C, 65%RH	-	-
RE<1G	25deg. C, 65%RH	-	-
APCM	21deg. C, 60%RH	-	Gary Chou

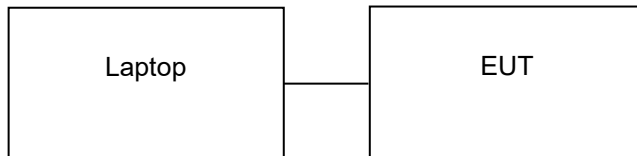
3.3 Description of Support Units

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.	Laptop	Dell	Latitude 3550	2MHWY32	N/A	Provided by Lab

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

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 15.247 Meas Guidance v05r02
ISED RSS-247
ANSI C63.10-2013

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

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 20dB 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:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, 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 20dB under any condition of modulation.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
PXA Signal Analyzer KEYSIGHT	N9020A	MY5124010	07/21/2020	07/21/2022

NOTE:

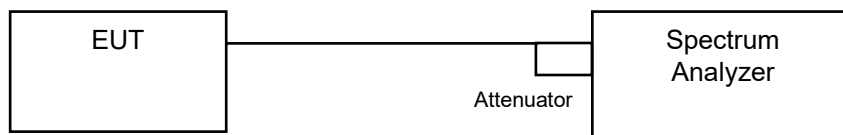
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.2 Maximum Output Power

4.2.1 Limits of Maximum Output Power Measurement

The Maximum Output Power Measurement is 1W.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3MHz RBW and 10 MHz VBW.
- d. Measure the captured power within the band and recording the plot.
- e. Repeat above procedures until all frequencies required were complete.

4.2.5 Deviation from Test Standard

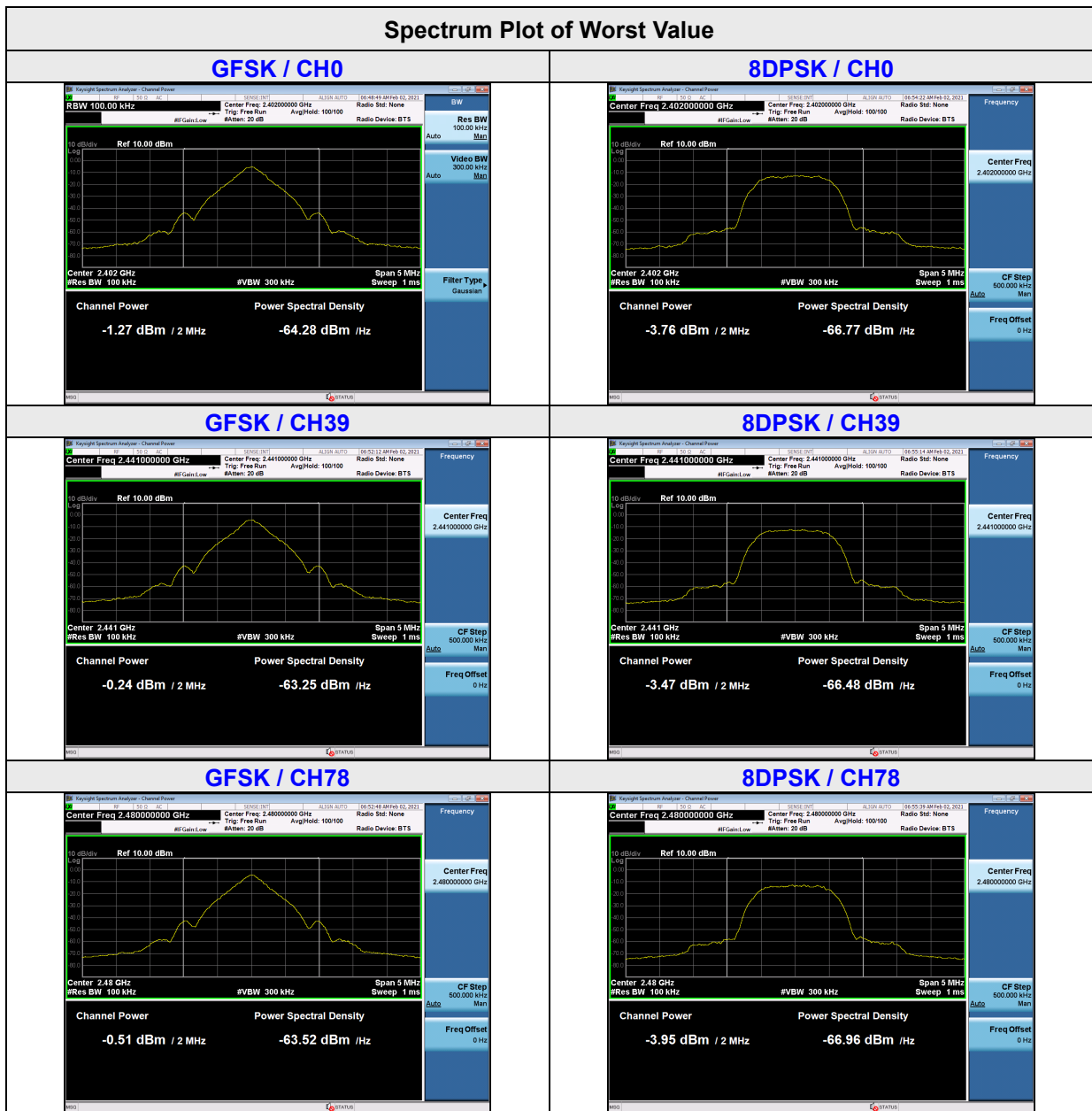
No deviation.

4.2.6 EUT Operating Condition

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

4.2.7 Test Results
Time average power:

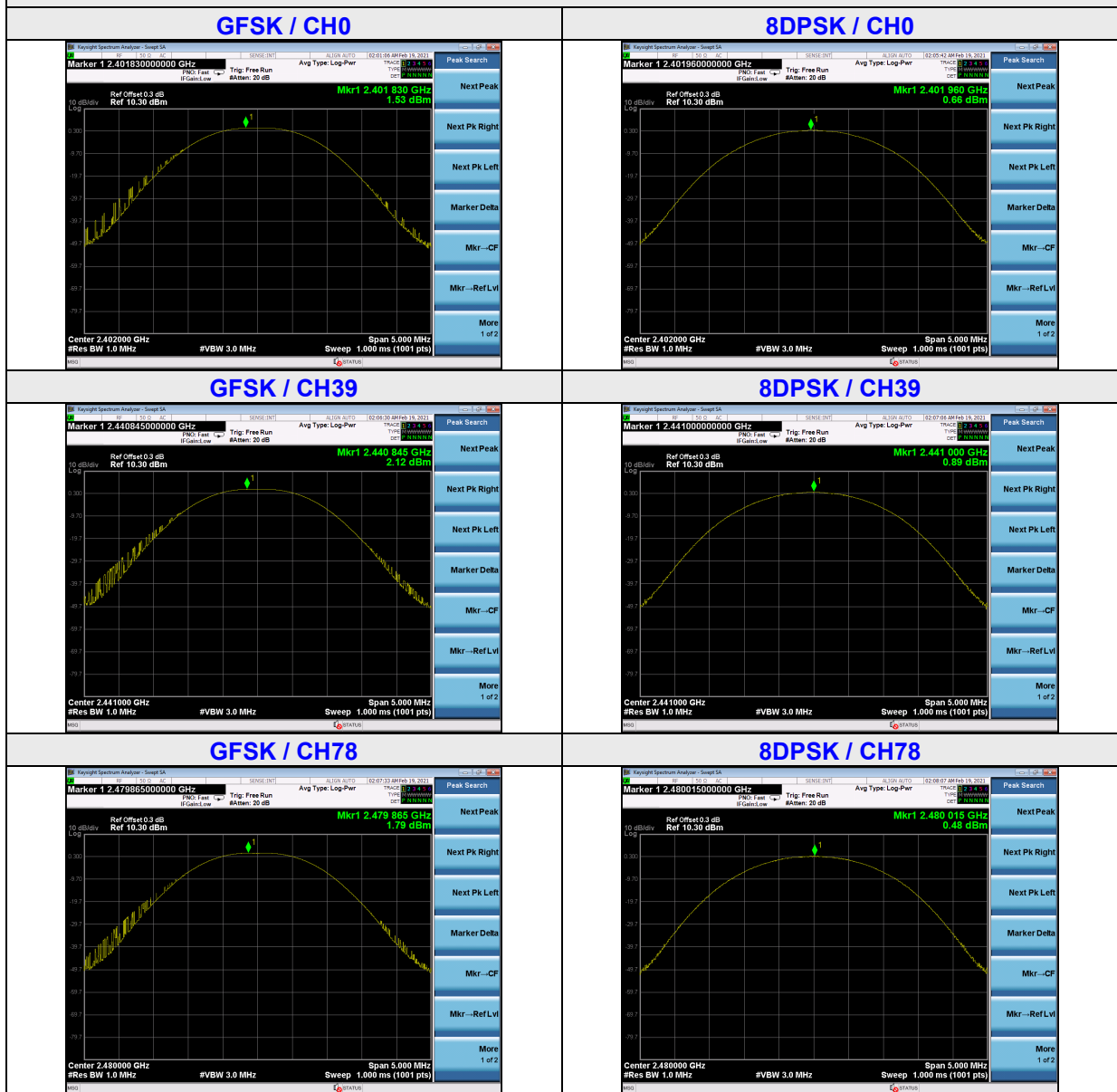
Channel	Frequency (MHZ)	Output Power (mW)		Output Power (dBm)		Power Limit (W)	Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	0.74	0.42	-1.27	-3.76	1	Pass
39	2441	0.94	0.44	-0.24	-3.47	1	Pass
78	2480	0.88	0.40	-0.51	-3.95	1	Pass



Peak Power:

Channel	Frequency (MHZ)	Output Power (mW)		Output Power (dBm)		Power Limit (W)	Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	1.42	1.16	1.53	0.66	1	Pass
39	2441	1.63	1.22	2.12	0.89	1	Pass
78	2480	1.51	1.11	1.79	0.48	1	Pass

Spectrum Plot of Worst Value



Appendix – Information on the Testing Laboratories

Bureau Veritas is a global leader in testing, inspection and certification (TIC) services. We help businesses improve safety, sustainability and productivity; and our clients include the majority of leading brands in retail, manufacturing and other industries. With a presence in every major country around the world, our quality assurance and compliance solutions are vital in helping our customers enhance product quality and concept-to-consumer journeys. We also assist with increasing speed to market, profitability and brand equity throughout the supply chain. Bureau Veritas is a leading wireless/IoT testing, inspection, audit and certification provider, with a global network of test laboratories to support the IoT industry in areas of connectivity, security, interoperability as well as quality, health & safety, and environmental/chemical requirements.

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

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

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