

# **Variant FCC Test Report**

Report No.: RF180209C37E-1

FCC ID: UK7-DW7A

Test Model: DW7F2

Series Model: DW7F1, DW7M1, DW7E1, DW7E2, DW7B1, DW7S1, DW7T1, DW7M2,

DW7K1 (Refer to section 3.1 for more details)

Received Date: Apr. 09, 2019

Test Date: May 17 ~ May 20, 2019

Issued Date: May 22, 2019

Applicant: Fossil Group, Inc.

Address: 901 S. Central Expressway, Richardson, TX 75080, USA

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

(R.O.C)

Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City

33383, Taiwan, R.O.C.

FCC Registration /

788550 / TW0003

**Designation Number:** 





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# **Release Control Record**

Issue No.	Description	Date Issued
RF180209C37E-1	Original Release	May 22, 2019

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# 1 Certificate of Conformity

Product: Smart Watch

Test Model: DW7F2

Series Model: DW7F1, DW7M1, DW7E1, DW7E2, DW7B1, DW7S1, DW7T1, DW7M2, DW7K1

(Refer to section 3.1 for more details)

Sample Status: Identical Prototype

Applicant: Fossil Group, Inc.

**Test Date:** May 17 ~ May 20, 2019

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10:2013

This report is issued as a supplementary report to BV CPS report no.: RF180209C37-1. This report shall be used by combining with its original report.

Prepared by : \_\_\_\_\_\_, Date: \_\_\_\_\_\_, May 22, 2019

Gina Liu / Specialist

Approved by: , Date: May 22, 2019

Dylan Chiou / Project Engineer

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# 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)						
FCC Clause	FCC Clause Test Item		Remarks			
15.207	AC Power Conducted Emission	N/A	Refer to Note			
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			
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	N/A	Refer to Note			
	Occupied Bandwidth Measurement	N/A	Refer to Note			
15.205 & 209 Radiated Emissions		Pass	Meet the requirement of limit. Minimum passing margin is -6.9 dB at 41.54 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:

- 1. Only Radiated Emissions was performed for this report. Refer to original report for other test data.
- 2. 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	Expended Uncertainty (k=2) (±)
	9 kHz ~ 30 MHz	3.04 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	3.59 dB
	200 MHz ~ 1000 MHz	3.60 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.29 dB
Radiated Effissions above 1 GHZ	18 GHz ~ 40 GHz	2.29 dB

# 2.2 Modification Record

There were no modifications required for compliance.

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### 3 General Information

# 3.1 General Description of EUT

Product	Smart Watch
Test Model	DW7F2
Series Model	DW7F1, DW7M1, DW7E1, DW7E2, DW7B1, DW7S1, DW7T1, DW7M2, DW7K1
Status of EUT	Identical Prototype
Dawer Comply Dating	5.0 Vdc (adapter or host equipment)
Power Supply Rating	3.8 Vdc (Li-ion battery)
Modulation Type	GFSK, π/4-DQPSK, 8DPSK
Transfer Rate	1/2/3 Mbps
Operating Frequency	2402 ~ 2480 MHz
Number of Channel	79
Antenna Type	Loop antenna
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

### Note:

- 1. This report is issued as a supplementary report to BV CPS report no. RF180209C37-1. The difference compared with original report is adding models (DW7F2), appearance design / specifications / material. Therefore, only Radiated Emissions was verified worst channel and recorded in this report.
- 2. All models are listed as below. (New brand is marked in gray.)

Model	WLAN / BT Antenna Gain	GPS Antenna Gain	Description
DW7F1	-4.87 dBi	-7.3 dBi	
DW7M1	-4.93 dBi	-6.31 dBi	
DW7E1	-4.92 dBi	-5.67 dBi	
DW7E2	-5.65 dBi	-5.47 dBi	
DW7B1	-6.18 dBi	-4.46 dBi	The models have the same layout, circuit, and
DW7S1	-7.23 dBi	-7.58 dBi	components, but different appearance & brand.
DW7T1	-6.9 dBi	-7.25 dBi	
DW7M2	-7.29 dBi	-5.17 dBi	
DW7K1	-5.07 dBi	-8.14 dBi	
DW7F2	-7.12 dBi	-5.05 dBi	

- 3. The EUT accessories list refers to user manual.
- 4. 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.

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#### 3.2 **Description of Test Modes**

79 channels are provided to this EUT:

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		

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### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure	Applic	able To	Description	
Mode	RE≥1G	RE<1G	Description	
-	<b>V</b>	<b>V</b>	-	

Where

**RE≥1G:** Radiated Emission above 1 GHz

RE<1G: Radiated Emission below 1 GHz

#### Note:

- 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
- 2. "-" 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	FHSS	GFSK	DH5

### 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	0	FHSS	GFSK	DH5

## **Test Condition:**

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	<b>RE≥1G</b> 25 deg. C, 65 % RH		Han Wu
RE<1G	<b>RE&lt;1G</b> 25 deg. C, 65 % RH		Luis Lee

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# 3.3 Description of Support Units

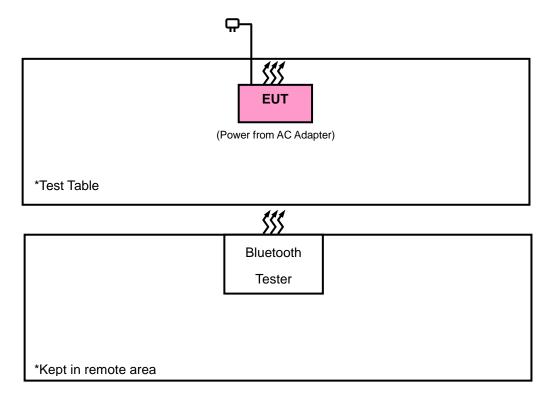
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Adapter	HTC	TC U250	N/A	N/A
2.	Cradle	Simula Technology Inc.	CB846E-5040-102	N/A	N/A

No.	Signal Cable Description of The Above Support Units
1.	USB cable 1 m

Note:

# 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

ANSI C63.10-2013

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

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<sup>1.</sup> All power cords of the above support units are non-shielded (1.8m).



# 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:

- a. The lower limit shall apply at the transition frequencies.
- b. Emission level  $(dBuV/m) = 20 \log Emission level (uV/m)$ .
- c. 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.

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# 4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 15, 2019	Apr. 14, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	May 29, 2018	May 28, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 21, 2018	Nov. 20, 2019
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Aug. 08, 2018	Aug. 07, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 19, 2019	Feb. 18, 2020
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM80 00	CABLE-CH9-02 (248780+171006)	Jan. 19, 2019	Jan. 18, 2020
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(2507 95/4)	Aug. 08, 2018	Aug. 07, 2019
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 31, 2018	Jul. 30, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55 190004/MY551900 07/MY55210005	Jul. 17, 2018	Jul. 16, 2019

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 Chamber 9.
- 3. The IC Site Registration No. is 7450F-9.

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#### 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. Both 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.
- 2. There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

### 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 ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 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.

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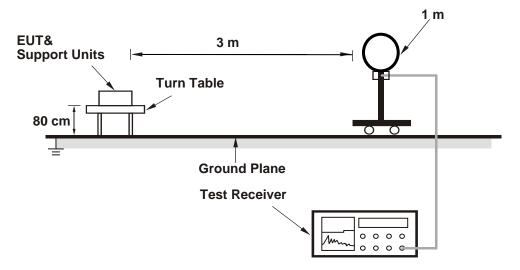


# 4.1.4 Deviation from Test Standard

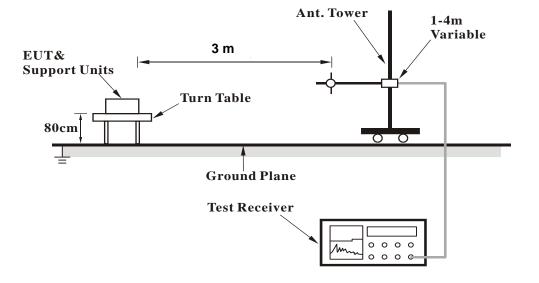
No deviation.

# 4.1.5 Test Set Up

# <Radiated Emission below 30 MHz>



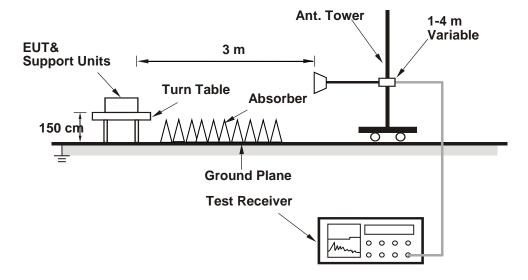
# <Radiated Emission 30 MHz to 1 GHz>



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# <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.

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# 4.1.7 Test Results

# **ABOVE 1GHz DATA**

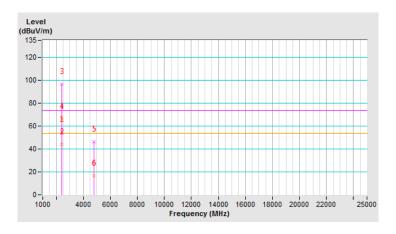
# **BT\_GFSK**

CHANNEL	TX Channel 0	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	Average (AV)

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)	
1	2390.00	55.2 PK	74.0	-18.8	1.13 H	161	23.4	31.8	
2	2390.00	43.8 AV	54.0	-10.2	1.13 H	161	12.0	31.8	
3	*2402.00	96.6 PK			1.13 H	164	64.8	31.8	
4	*2402.00	66.5 AV			1.13 H	164	34.7	31.8	
5	4804.00	46.6 PK	74.0	-27.4	1.13 H	162	42.9	3.7	
6	4804.00	16.5 AV	54.0	-37.5	1.13 H	162	12.8	3.7	

# **REMARKS:**

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) Pre-Amplifier Factor(dB)
- 3. Margin value = Emission Level Limit value
- 4. The other emission levels were very low against the limit.
- 5. " \* ": Fundamental frequency.



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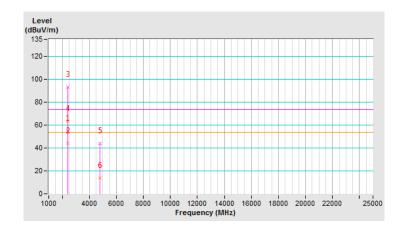


CHANNEL	TX Channel 0	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	Average (AV)

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)	
1	2390.00	54.8 PK	74.0	-19.2	1.36 V	96	23.0	31.8	
2	2390.00	43.8 AV	54.0	-10.2	1.36 V	96	12.0	31.8	
3	*2402.00	93.4 PK			1.32 V	97	61.6	31.8	
4	*2402.00	63.3 AV			1.32 V	97	31.5	31.8	
5	4804.00	43.9 PK	74.0	-30.1	1.19 V	187	40.2	3.7	
6	4804.00	13.8 AV	54.0	-40.2	1.19 V	187	10.1	3.7	

# **REMARKS:**

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) Pre-Amplifier Factor(dB)
- 3. Margin value = Emission Level Limit value
- 4. The other emission levels were very low against the limit.
- 5. " \* ": Fundamental frequency.



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### 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.

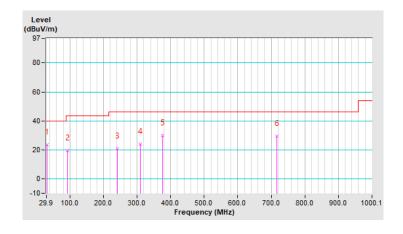
# 30 MHz ~ 1 GHz Worst-Case Data:

CHANNEL	TX Channel 0	DETECTOR	Oversi Parak (OP)
FREQUENCY RANGE	30MHz ~ 1GHz	FUNCTION	Quasi-Peak (QP)

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)	
1	30.90	23.4 QP	40.0	-16.6	2.00 H	118	39.0	-15.6	
2	91.99	19.6 QP	43.5	-23.9	2.00 H	186	39.0	-19.4	
3	241.40	20.7 QP	46.0	-25.3	1.01 H	70	35.3	-14.6	
4	309.32	24.0 QP	46.0	-22.0	1.01 H	128	35.9	-11.9	
5	375.29	29.8 QP	46.0	-16.2	1.01 H	47	40.5	-10.7	
6	716.80	29.3 QP	46.0	-16.7	1.01 H	253	33.0	-3.7	

### **REMARKS:**

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) Pre-Amplifier Factor(dB)
- 3. Margin value = Emission Level Limit value
- 4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
- 5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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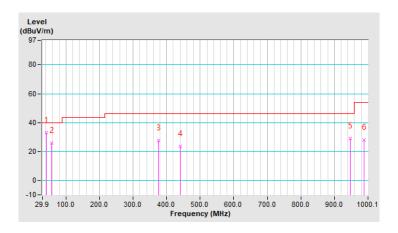


CHANNEL	TX Channel 0	DETECTOR	Ougo: Dook (OD)
FREQUENCY RANGE	30MHz ~ 1GHz	FUNCTION	Quasi-Peak (QP)

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)	
1	41.54	33.1 QP	40.0	-6.9	1.01 V	29	47.5	-14.4	
2	57.07	26.0 QP	40.0	-14.0	1.51 V	20	40.2	-14.2	
3	375.29	27.6 QP	46.0	-18.4	1.51 V	247	38.3	-10.7	
4	441.26	23.4 QP	46.0	-22.6	1.01 V	193	32.7	-9.3	
5	947.71	29.0 QP	46.0	-17.0	1.51 V	7	28.0	1.0	
6	988.46	28.1 QP	54.0	-25.9	1.51 V	7	27.0	1.1	

### **REMARKS:**

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) Pre-Amplifier Factor(dB)
- 3. Margin value = Emission Level Limit value
- 4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
- 5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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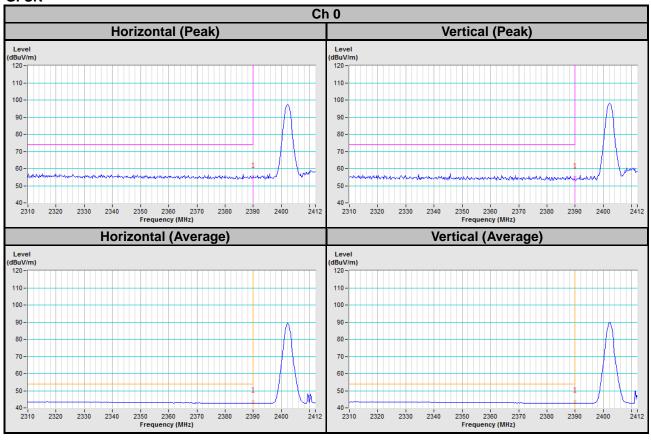
5 Pictures of Test Arrangements	
Please refer to the attached file (Test Setup Photo).	

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# **Annex A- Band-edge measurement**

# **GFSK**





# 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.

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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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