Partial FCC Test Report
(Spot Check)

Report No.:	RFBCUG-WTW-P22010682C-3
FCC ID:	B32UX700W
Test Model:	UX700-ML-1
Received Date:	Jan. 12, 2023
Test Date:	Jan. 31 ~ Feb. 06, 2023
Issued Date:	Feb. 15, 2023
Applicant:	Verifone, Inc.
Address:	1400 West Stanford Ranch Road Suite 150 Rocklin CA 95765 USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location (1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN
FCC Registration / Designation Number:	788550 / TW0003
Test Location (2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
FCC Registration / Designation Number:	281270 / TW0032

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RFBCUG-WTW-P22010682C-3	Original release	Feb. 15, 2023

1 Certificate of Conformity

Product:	Point of Sale Terminal
Brand:	Verifone
Test Model:	UX700-ML-1
Sample Status:	Engineering sample
Applicant:	Verifone, Inc.
Test Date:	Jan. 31 ~ Feb. 06, 2023
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 : Celine Chou , **Date:** Feb. 15, 2023

Celine Chou / Senior Specialist

Approved by : Jeremy Lin , **Date:** Feb. 15, 2023

Jeremy Lin / 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 -11.62dB at 0.39550MHz.
15.247(a)(1)(iii)	Number of Hopping Frequency Used	Pass	Refer to note 1
15.247(a)(1)(iii)	Dwell Time on Each Channel	Pass	Refer to note 1
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	Pass	Refer to note 1
15.247(a)(1)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
15.205 & 209 & 15.247(d)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -6.1dB at 30.00MHz.
15.247(d)	Antenna Port Emission	Pass	Refer to note 1
15.203	Antenna Requirement	Pass	Antenna connector is ipex(MHF) not a standard connector.

Note:

1. This report is a partial report. Therefore, only AC Power Conducted Emission, Output Power and Radiated Emissions were verified and recorded in this report. Other testing data please refer to the original BV CPS report no.: RFBCUG-WTW-P22010682-4.
2. For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
3. 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.
4. 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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~1000MHz	2.93 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Point of Sale Terminal
Brand	Verifone
Test Model	UX700-ML-1
Sample Status	Engineering sample
Power Supply Rating	9-43Vdc, 2.4A-0.5A
Modulation Type	GFSK, π/4-DQPSK, 8DPSK
Modulation Technology	FHSS
Transfer Rate	1/2/3Mbps
Operating Frequency	2402~2480MHz
Number of Channel	79
Output Power	13.062mW
Antenna Type	Dipole antenna with 2.60dBi gain
Antenna Connector	ipex(MHF)
Accessory Device	Refer to external photo
Cable Supplied	Refer to external photo

Note:

1. This report is FCC spot check verification report to the original BV CPS report no.: RFBCUG-WTW-P22010682-4. The differences compared with the original design is as below. Exhibit prepared for FCC Spot Check Verification report, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Therefore, only AC Power Conducted Emission, Output Power and Radiated Emissions were verified and recorded in this report. Radiated Emission tests according to original report radiated emission worst channel.

   Difference:

   a) Changing FCC ID.
   b) Changing model.
   c) HW IO Bard:
      - FCC ID: B32UX700 and B32-UX700W are identical expect for IO Board only.
      - SAM slot depopulated.
      - Add cover and no any RF Modify.
   d) HW Main Borad: UWB module & GPS module depopulated. (GPS and UWB function Removed)
   e) Add one HUB with tablet including accessories.
   f) Add two Dongle including accessories.
2. The accessory devices of EUT, please refer to external photo.
3. Detail antenna specification please refer to antenna datasheet an antenna gain measurement report.
4. 2.4GHz & BT or 5GHz & BT technology can transmit at same time.
5. Spurious emission of the simultaneous operation (2.4GHz & BT or 5GHz & BT) has been evaluated and no non-compliance was found.

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≥1G	RE<1G	PLC	Power	
A	√	√	√	√	EUT + 2AAAJ012F US adapter
B	-	√	√	-	EUT + 2ABL018F US adapter

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission Power: Conducted Output Power

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

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	Pakcet Type
A	0 to 78	0	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	Pakcet Type
A, B	0 to 78	0	FHSS	8DPSK	3DH5

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	Pakcet Type
A, B	0 to 78	0	FHSS	8DPSK	3DH5

Conducted 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.

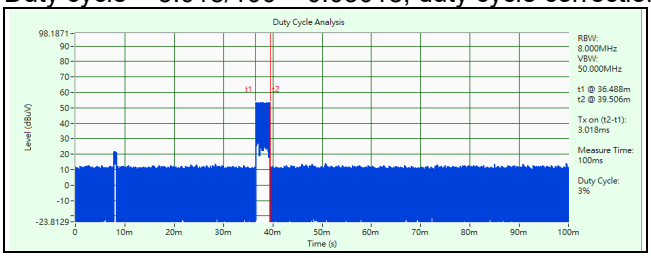
EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Pakcet Type
A	0 to 78	0, 39, 78	FHSS	GFSK	DH5
A	0 to 78	0, 39, 78	FHSS	8DPSK	3DH5

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	23 deg. C, 67% RH	120Vac, 60Hz	Greg Lin
RE<1G	23 deg. C, 67% RH	120Vac, 60Hz	Greg Lin
PLC	23 deg. C, 70% RH	120Vac, 60Hz	Greg Lin
Power	25 deg. C, 60% RH	120Vac, 60Hz	Jisyong Wang

3.3 Duty Cycle of Test Signal

Duty cycle = 3.018/100 = 0.03018, duty cycle correction factor = 20 * log(0.03018) = -30.4



3.4 Description of Support Units

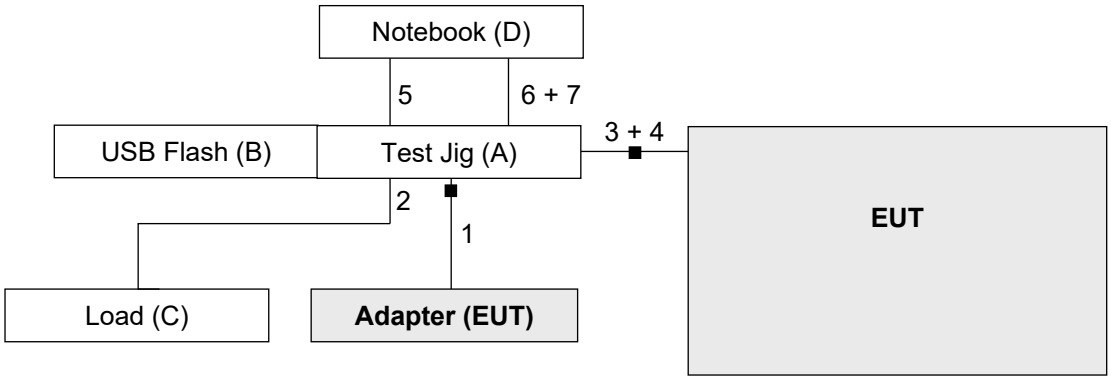
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Test Jig	NA	NA	NA	NA	Provided by manufacturer
B.	USB Flash	SanDisk	SDDD3-032G	NA	NA	-
C.	Load	NA	NA	NA	NA	-
D.	Notebook	Lenovo	20J4 MD A003TW	PF-11H9AK	FCC DoC Approved	-

Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC power cable	1	1.8	N	1	Attached on adapter
2.	LAN Cable	1	1.5	N	0	RJ45, Cat5e
3.	Type C Cable	1	1.0	Y	1	Attached on Test Jig
4.	Type C Cable	1	0.3	Y	0	Provided by manufacturer
5.	USB Cable	1	1.0	Y	0	Provided by manufacturer
6.	LAN to RS-232 Cable	1	1.0	Y	0	Provided by manufacturer
7.	RS-232 to USB Cable	1	1.0	N	0	-

3.4.1 Configuration of System under Test



3.5 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 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.	Cal. Date	Cal. Due
Test Receiver R&S	ESR3+	102782	Dec. 12, 2022	Dec. 11, 2023
Spectrum Analyzer R&S	FSW43	101866	Jan. 10, 2023	Jan. 09, 2024
Loop Antenna TESEQ	HLA 6121	45745	Jul. 27, 2022	Jul. 26, 2023
Pre-amplifier EMCI	EMC001340	980201	Sep. 23, 2022	Sep. 22, 2023
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	Jan. 15, 2022	Jan. 14, 2023
Preamplifier EMCI	EMC330N	980782	Jan. 16, 2023	Jan. 15, 2024
BILOG Antenna SCHWARZBECK	VULB9168	9168-1213	Oct. 20, 2022	Oct. 19, 2023
RF Coaxial Cable EMCI	EMCCFD400-NM-NM-500	201233	Jan. 16, 2023	Jan. 15, 2024
RF Coaxial Cable EMCI	EMCCFD400-NM-NM-3000	201235	Jan. 16, 2023	Jan. 15, 2024
RF Coaxial Cable EMCI	EMCCFD400-NM-NM-9000	201236	Jan. 16, 2023	Jan. 15, 2024
HORN Antenna RF SPIN	DRH18-E	210103A18E	Nov. 13, 2022	Nov. 12, 2023
Preamplifier EMCI	EMC118A45SE	980808	Dec. 29, 2022	Dec. 28, 2023
RF Coaxial Cable EMCI	EMC104-SM-SM-1000	210102	Jan. 16, 2023	Jan. 15, 2024
RF Coaxial Cable EMCI	EMC104-SM-SM-3000	201231	Jan. 16, 2023	Jan. 15, 2024
RF Coaxial Cable EMCI	EMC104-SM-SM-9000	201243	Jan. 16, 2023	Jan. 15, 2024
Preamplifier EMCI	EMC184045SE	980788	Jan. 16, 2023	Jan. 15, 2024
HORN Antenna SCHWARZBECK	BBHA 9170	9170-1049	Nov. 13, 2022	Nov. 12, 2023
RF signal cable EMCI	EMC101G-KM-KM-5000	201260	Jan. 16, 2023	Jan. 15, 2024
RF signal cable EMCI	EMC101G-KM-KM-3000	201257	Jan. 16, 2023	Jan. 15, 2024
RF signal cable EMCI	EMC101G-KM-KM-2000	201254	Jan. 16, 2023	Jan. 15, 2024
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower &Turn Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Max-Full	MF-7802BS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208674	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208674	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 WM - 966 chamber 8.

4.1.3 Test Procedures

For Radiated emission below 30MHz

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 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) 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 detect 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 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detector (AV) at frequency above 1GHz. For fundamental and harmonic signal measurement, according to ANSI C63.10 section 7.5, the average value = peak value + duty cycle correction factor. The duty cycle correction factor refer to Chapter 3.3 of this report.

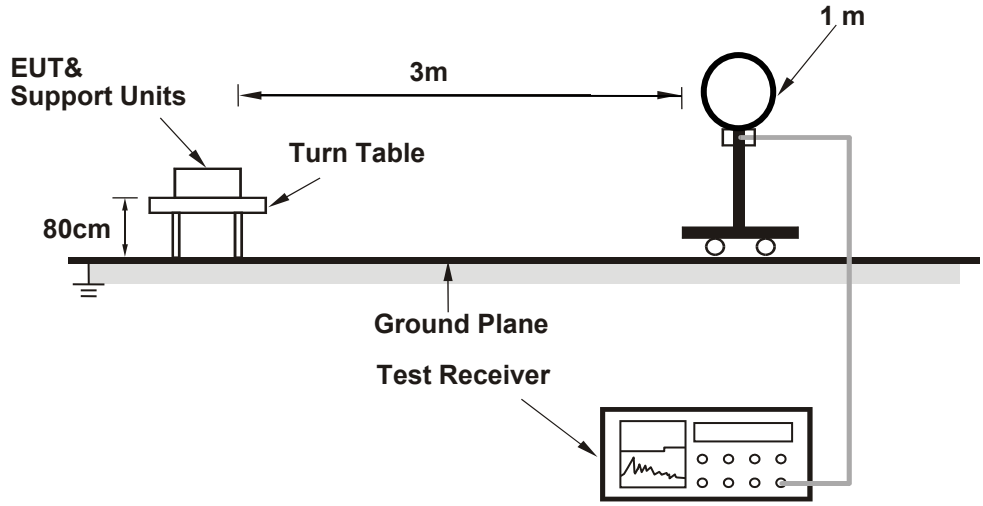
3. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

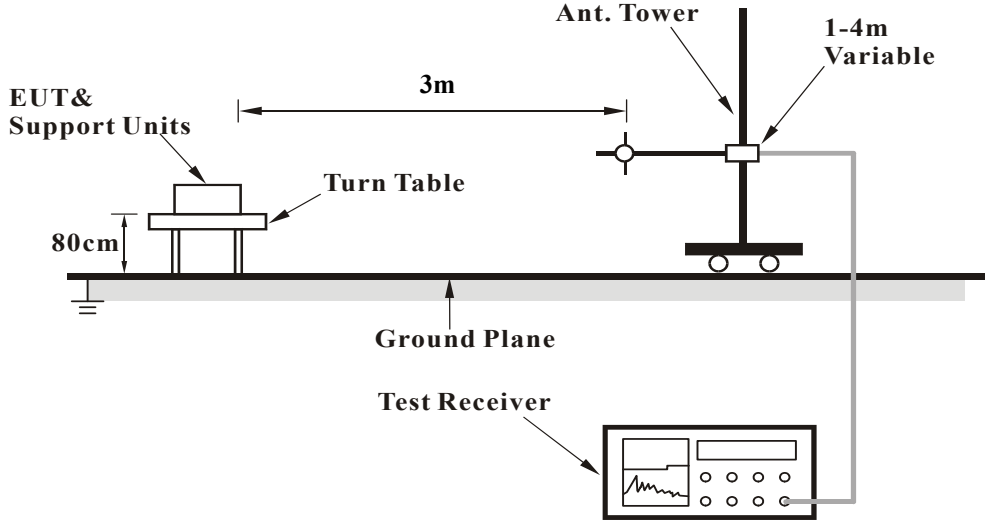
No deviation.

4.1.5 Test Setup

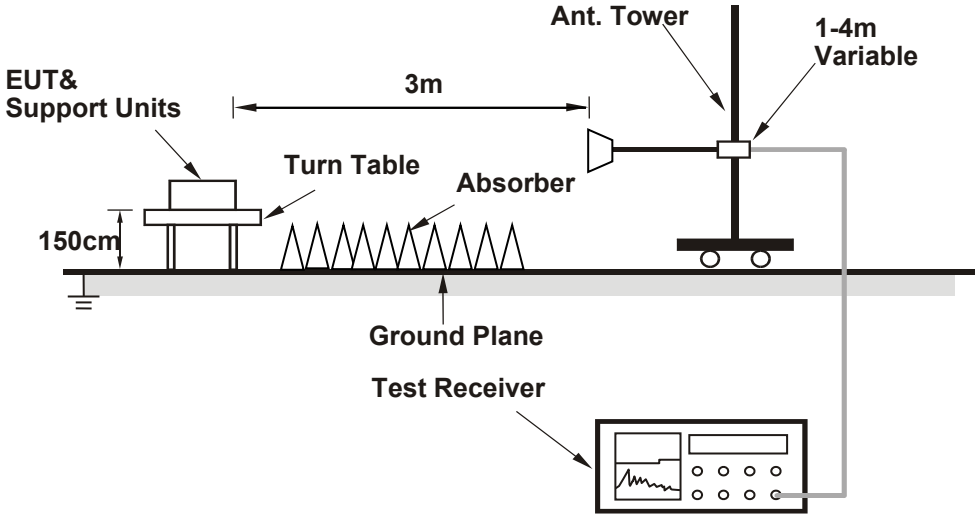
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz data:

RF Mode	TX BT_8DPSK	Channel	CH 0：2402 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	57.0 PK	74.0	-17.0	2.56 H	83	24.7	32.3
2	2390.00	44.7 AV	54.0	-9.3	2.56 H	83	12.4	32.3
3	*2402.00	101.9 PK			2.56 H	83	69.6	32.3
4	*2402.00	71.5 AV			2.56 H	83	39.2	32.3
5	4804.00	48.3 PK	74.0	-25.7	1.34 H	102	44.8	3.5
6	4804.00	17.9 AV	54.0	-36.1	1.34 H	102	14.4	3.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (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	57.4 PK	74.0	-16.6	2.53 V	116	25.1	32.3
2	2390.00	44.9 AV	54.0	-9.1	2.53 V	116	12.6	32.3
3	*2402.00	108.2 PK			2.53 V	116	75.9	32.3
4	*2402.00	77.8 AV			2.53 V	116	45.5	32.3
5	4804.00	48.8 PK	74.0	-25.2	1.27 V	128	45.3	3.5
6	4804.00	18.4 AV	54.0	-35.6	1.27 V	128	14.9	3.5

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.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(3.018 ms / 100 ms) = -30.4 dB (Please see item 3.3 for plotted duty).

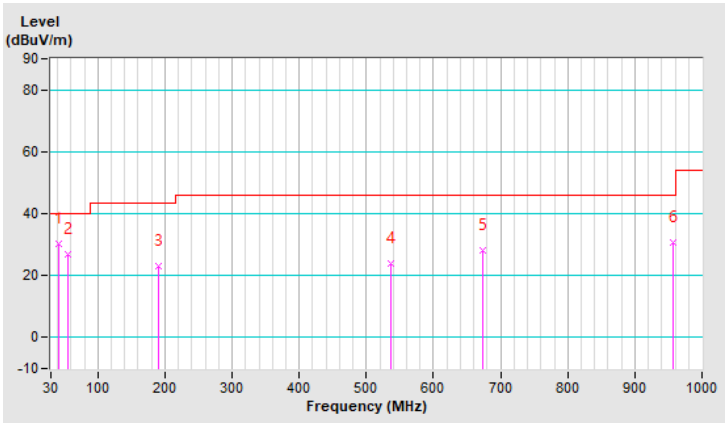
Below 1GHz worst-case data:

RF Mode	TX BT_8DPSK	Channel	CH 0：2402 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	A		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	42.61	30.4 QP	40.0	-9.6	1.00 H	18	43.8	-13.4
2	55.22	26.9 QP	40.0	-13.1	1.50 H	223	40.4	-13.5
3	191.02	23.2 QP	43.5	-20.3	1.25 H	152	39.2	-16.0
4	537.31	23.7 QP	46.0	-22.3	1.25 H	110	31.0	-7.3
5	673.11	28.3 QP	46.0	-17.7	1.25 H	174	32.9	-4.6
6	957.32	30.8 QP	46.0	-15.2	1.00 H	209	31.3	-0.5

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.

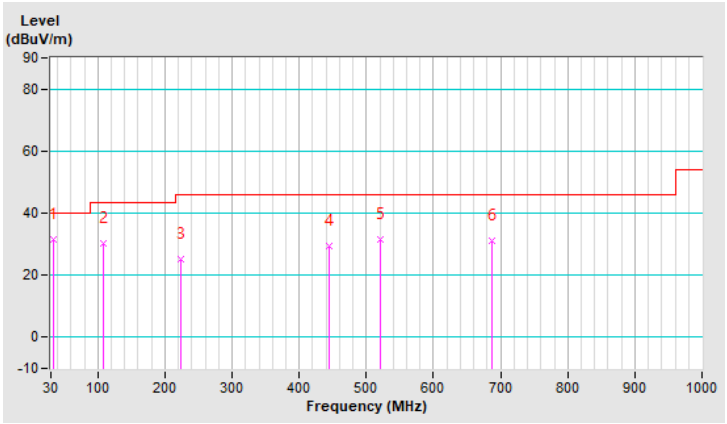


RF Mode	TX BT_8DPSK	Channel	CH 0：2402 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	A		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	33.88	31.5 QP	40.0	-8.5	1.00 V	5	45.7	-14.2
2	107.60	30.3 QP	43.5	-13.2	1.00 V	217	46.7	-16.4
3	223.03	25.3 QP	46.0	-20.7	1.50 V	310	42.0	-16.7
4	445.16	29.2 QP	46.0	-16.8	1.25 V	284	38.1	-8.9
5	521.79	31.4 QP	46.0	-14.6	1.00 V	2	38.8	-7.4
6	686.69	31.2 QP	46.0	-14.8	1.00 V	306	35.5	-4.3

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.

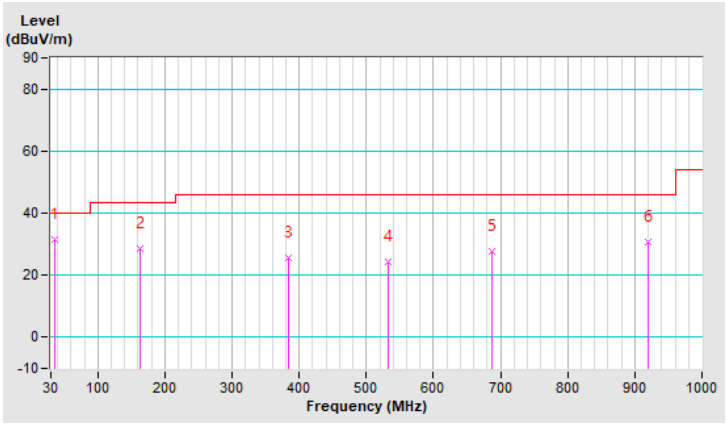


RF Mode	TX BT_8DPSK	Channel	CH 0：2402 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	B		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	36.79	31.7 QP	40.0	-8.3	1.00 H	115	45.7	-14.0
2	163.86	28.4 QP	43.5	-15.1	1.50 H	278	41.6	-13.2
3	384.05	25.8 QP	46.0	-20.2	1.00 H	267	36.4	-10.6
4	532.46	24.5 QP	46.0	-21.5	1.50 H	66	31.8	-7.3
5	687.66	27.9 QP	46.0	-18.1	1.25 H	186	32.2	-4.3
6	920.46	30.7 QP	46.0	-15.3	1.50 H	179	31.8	-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.

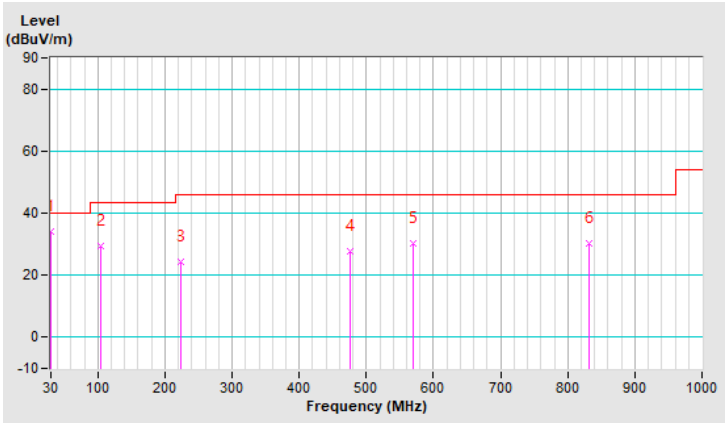


RF Mode	TX BT_8DPSK	Channel	CH 0：2402 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	B		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**30.00**	**33.9 QP**	**40.0**	**-6.1**	**1.00 V**	**18**	**48.3**	**-14.4**
2	104.69	29.2 QP	43.5	-14.3	1.50 V	226	46.0	-16.8
3	223.03	24.5 QP	46.0	-21.5	1.25 V	211	41.2	-16.7
4	476.20	27.6 QP	46.0	-18.4	1.00 V	270	35.9	-8.3
5	570.29	30.2 QP	46.0	-15.8	1.00 V	324	36.8	-6.6
6	831.22	30.1 QP	46.0	-15.9	1.50 V	68	32.1	-2.0

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.



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 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 05, 2022	Dec. 04, 2023
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 07, 2023	Jan. 06, 2024
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Mar. 14, 2022	Mar. 13, 2023
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Sep. 12, 2022	Sep. 11, 2023
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 HY - Conduction 1.
3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

a. 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/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

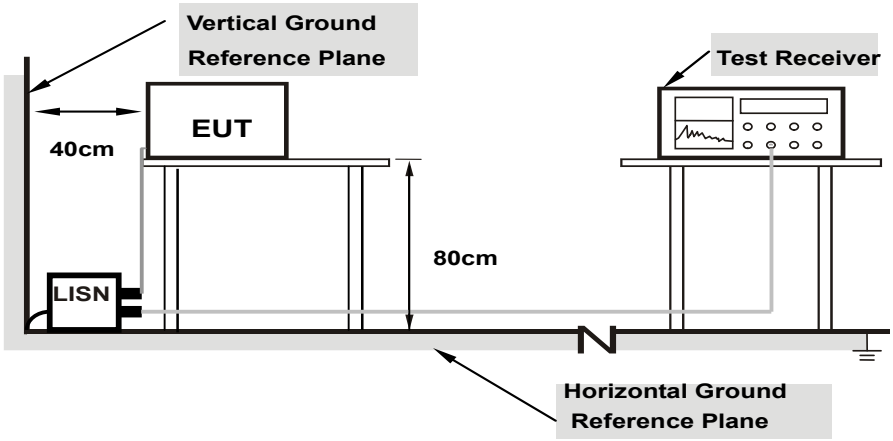
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

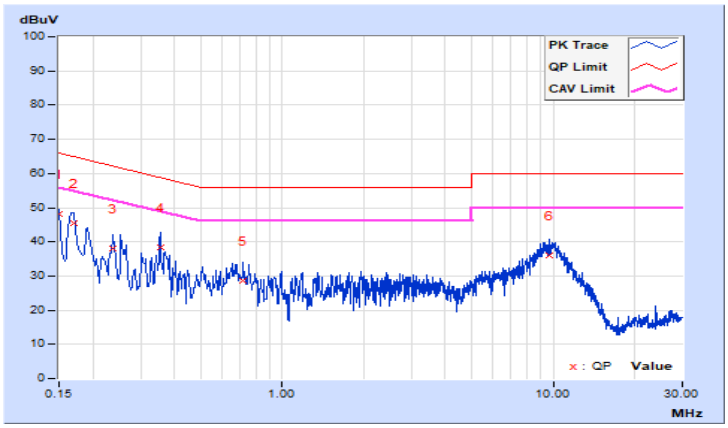
8DPSK

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.68	38.42	24.06	48.10	33.74	66.00	56.00	-17.90	-22.26
2	0.17000	9.70	35.89	23.26	45.59	32.96	64.96	54.96	-19.37	-22.00
3	0.23786	9.74	28.31	17.88	38.05	27.62	62.17	52.17	-24.12	-24.55
4	0.35400	9.79	28.54	19.05	38.33	28.84	58.87	48.87	-20.54	-20.03
5	0.71400	9.84	18.69	12.47	28.53	22.31	56.00	46.00	-27.47	-23.69
6	9.64200	10.04	25.95	17.55	35.99	27.59	60.00	50.00	-24.01	-22.41

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.

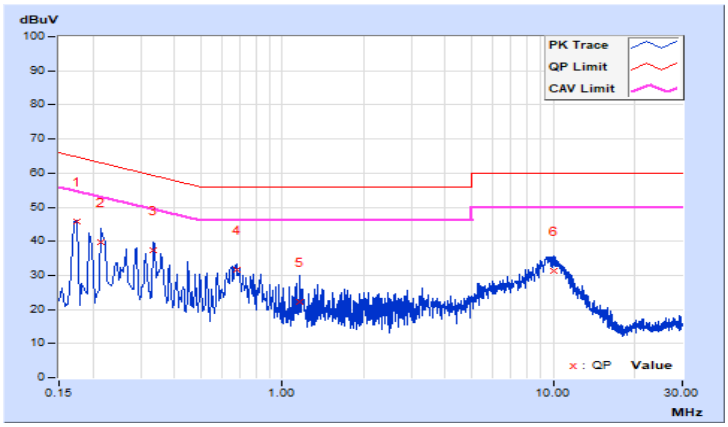


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17384	9.70	36.07	20.29	45.77	29.99	64.77	54.77	-19.00	-24.78
2	0.21400	9.72	29.95	16.74	39.67	26.46	63.05	53.05	-23.38	-26.59
3	0.33400	9.77	27.64	14.68	37.41	24.45	59.35	49.35	-21.94	-24.90
4	0.67800	9.82	21.85	16.18	31.67	26.00	56.00	46.00	-24.33	-20.00
5	1.16200	9.86	12.21	4.58	22.07	14.44	56.00	46.00	-33.93	-31.56
6	9.99800	10.08	21.32	12.21	31.40	22.29	60.00	50.00	-28.60	-27.71

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.

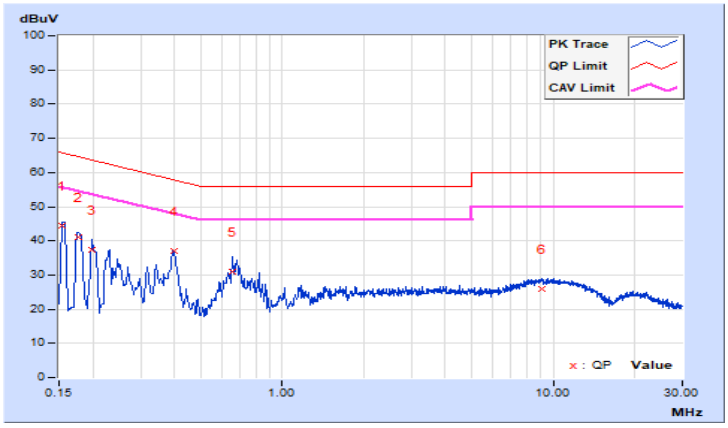


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.68	34.90	19.53	44.58	29.21	65.78	55.78	-21.20	-26.57
2	0.17615	9.70	31.27	16.64	40.97	26.34	64.67	54.67	-23.70	-28.33
3	0.19800	9.72	27.59	13.52	37.31	23.24	63.69	53.69	-26.38	-30.45
4	0.39655	9.81	27.07	26.05	36.88	35.86	57.93	47.93	-21.05	-12.07
5	0.65800	9.84	21.10	15.68	30.94	25.52	56.00	46.00	-25.06	-20.48
6	9.06600	10.03	15.90	12.15	25.93	22.18	60.00	50.00	-34.07	-27.82

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.

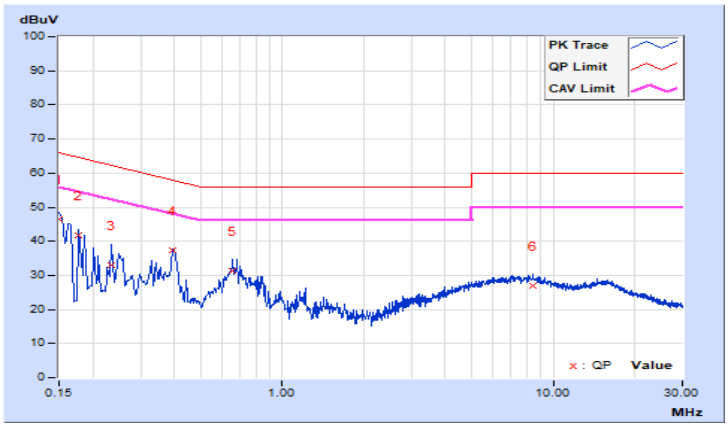


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.68	36.66	20.18	46.34	29.86	66.00	56.00	-19.66	-26.14
2	0.17800	9.70	32.03	16.82	41.73	26.52	64.58	54.58	-22.85	-28.06
3	0.23400	9.73	23.28	14.24	33.01	23.97	62.31	52.31	-29.30	-28.34
4	**0.39550**	**9.79**	**27.54**	**26.54**	**37.33**	**36.33**	**57.95**	**47.95**	**-20.62**	**-11.62**
5	0.65800	9.82	21.65	16.31	31.47	26.13	56.00	46.00	-24.53	-19.87
6	8.43400	10.06	16.85	13.69	26.91	23.75	60.00	50.00	-33.09	-26.25

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.



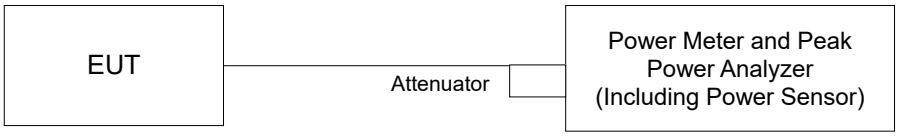
4.3 Maximum Output Power

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

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	Jan. 18, 2023	Jan. 17, 2024
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 19, 2023	Jan. 18, 2024
Spectrum Analyzer R&S	FSV40	100979	Mar. 25, 2022	Mar. 24, 2023

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

4.3.4 Test Procedure

For Peak Power
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.

For Average Power
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 fromTest 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

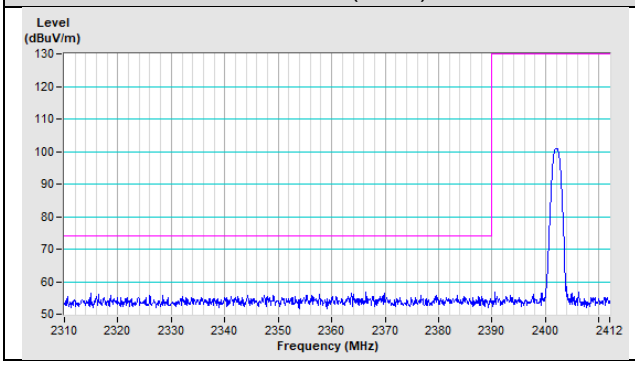
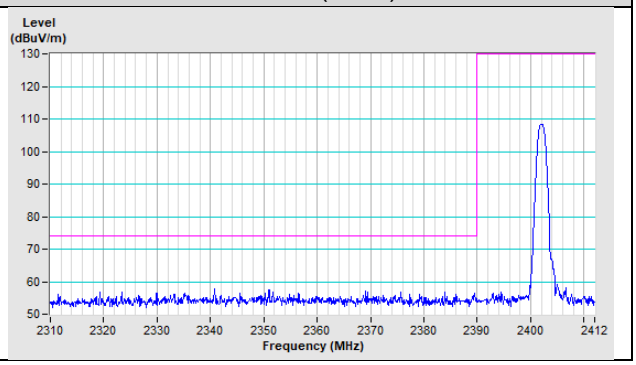
For Peak Power

Channel	Frequency (MHz)	Output Power (mW)		Output Power (dBm)		Power Limit (mW)	Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	11.885	12.106	10.75	10.83	125.00	Pass
39	2441	13.062	12.677	11.16	11.03	125.00	Pass
78	2480	7.621	7.228	8.82	8.59	125.00	Pass

For Average Power

Channel	Frequency (MHz)	Output Power (mW)		Output Power (dBm)	
		GFSK	8DPSK	GFSK	8DPSK
0	2402	10.789	6.730	10.33	8.28
39	2441	11.776	7.112	10.71	8.52
78	2480	6.934	4.159	8.41	6.19

Annex A - Band Edge Measurement

BT_8DPSK Channel 0	
Horizontal (Peak)	Vertical (Peak)
	

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 and approved according to ISO/IEC 17025.

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

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Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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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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