

FCC Test Report

Report No.: RFBFOK-WTW-P23030724-3

FCC ID: RYQGW23

Test Model: GW23

Received Date: 2023/3/31

Test Date: 2023/6/14~ 2023/6/15

Issued Date: 2023/7/25

Applicant: FIH CO., LTD.

Address: No.4, Minsheng St., Tu-Cheng Dist., New Taipei City 23679, Taiwan

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: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, TAIWAN

FCC Registration / 788550 / TW0003
Designation Number:



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

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Modification Record	5
3 General Information	6
3.1 General Description of EUT	6
3.2 Description of Test Modes	6
3.2.1 Test Mode Applicability and Tested Channel Detail	7
3.3 Description of Support Units	8
3.3.1 Configuration of System under Test	8
3.4 General Description of Applied Standards	8
4 Test Types and Results	9
4.1 Radiated Emission and Bandedge Measurement	9
4.1.1 Limits of Radiated Emission and Bandedge Measurement	9
4.1.2 Test Instruments	10
4.1.3 Test Procedures	11
4.1.4 Deviation from Test Standard	11
4.1.5 Test Set Up	12
4.1.6 EUT Operating Conditions	12
4.1.7 Test Results	13
4.2 Conducted Emission Measurement	18
4.2.1 Limits of Conducted Emission Measurement	18
4.2.2 Test Instruments	18
4.2.3 Test Procedures	19
4.2.4 Deviation from Test Standard	19
4.2.5 Test Setup	19
4.2.6 EUT Operating Conditions	19
4.2.7 Test Results	20
4.3 20dB Bandwidth Measurement	22
4.3.1 Test Setup	22
4.3.2 Test Instruments	22
4.3.3 Test Procedure	22
4.3.4 Deviation from Test Standard	22
4.3.5 EUT Operating Conditions	22
4.3.6 Test Results	23
5 Pictures of Test Arrangements	24
Appendix – Information of the Testing Laboratories	25

Release Control Record

Issue No.	Description	Date Issued
RFBFOK-WTW-P23030724-3	Original release	2023/7/25

1 Certificate of Conformity

Product: Smartwatch

Brand: Gabb

Test Model: GW23

Sample Status: Identical Prototype

Applicant: FIH CO., LTD.

Test Date: 2023/6/14~ 2023/6/15

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.209)
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 : Polly Chien, **Date:** 2023/7/25
Polly Chien / Specialist

Approved by : Jeremy Lin, **Date:** 2023/7/25
Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.209)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -6.51dB at 1.02600MHz.
15.209	Radiated Emission Test	Pass	Meet the requirement of limit. Minimum passing margin is -3.7dB at 42.6113MHz & 43.5814MHz.

Note: 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	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

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smartwatch
Brand	Gabb
Test Model	GW23
Sample Status	Identical Prototype
Power Supply Rating	5Vdc or 9Vdc or 12Vdc (From adapter) 3.87Vdc (From battery)
Modulation Type	ASK
Operating Frequency Range	340kHz
Antenna Type	Loop antenna
Field Strength	-20.4dBuV/m (300m)(Average)
Accessory Device	Refer to note
Data Cable Supplied	Refer to note

Note:

1. The EUT uses following accessories.

Battery		
Manufacturer	Model	Specification
SHEN ZHEN UTILITY ENERGY CO.,LTD.	HE409	Rating: 3.87Vdc
WPC		
Brand	Model	Specification
Gabb	WX013	DC Input: 5V, 0.65A DC Output: 0.5A, 2.5W
USB cable attached on WPC		
Manufacturer	Model	Specification
Hubei Hongzhanxin Electronics Co., LTD	P04-0109000005-HF	900±20mm, non-shielded w/o core

2. The EUT uses following support unit only.

Adapter (Support unit)		
Manufacturer	Model	Specification
JiangSu ChenYang Electron Co., Ltd	CK18W02U	AC Input: 100-240 Vac, 50/60 Hz, 0.5A DC Output: 5Vdc, 3A; 9Vdc, 2A; 12Vdc, 1.5A

3. Due to radiated measurements are made and the antenna gain is already accounted for this device, so provide an antenna datasheet and/or antenna measurement report is not required. The antenna dimensions and pictures (include antenna wire length if have) are stated in EUT photo exhibit.

3.2 Description of Test Modes

1 channel is provided to this EUT

Channel	Freq. (kHz)
1	340

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT configure mode	Applicable to			Description
	RE<1G	PLC	BW	
-	√	√	√	Charged Mode

Where **RE<1G**: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

BW: 20dB Bandwidth

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 (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
-	1	1

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
-	1	1

20dB Bandwidth 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
-	1	1

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE<1G	21 deg. C, 69% RH	120Vac, 60Hz	Thomas Cheng
PLC	21.8 deg. C, 71.4% RH	120Vac, 60Hz	Thomas Cheng
BW	21 deg. C, 69% RH	120Vac, 60Hz	Thomas Cheng

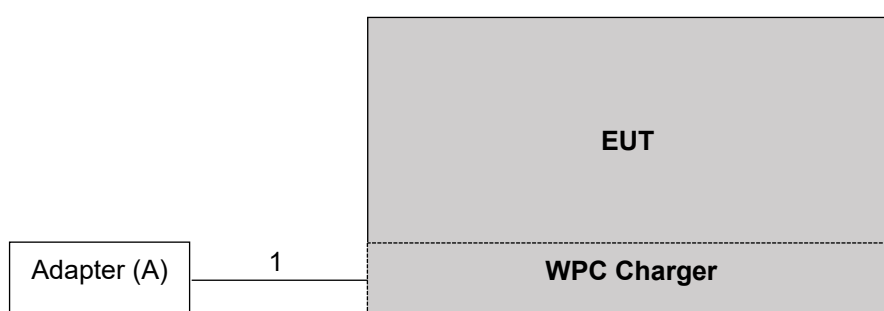
3.3 Description of Support Units

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	Manufacturer	Model No.	Serial No.	FCC ID	Remarks
A.	Adapter	JiangSu ChenYang Electron Co., Ltd	CK18W02U	N/A	N/A	Supplied by applicant

ID	Descriptions	Qty.	Length (mm)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	900±20	N	0	USB cable attached on WPC Accessory of EUT

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 (15.209)

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

FOR FREQUENCY BELOW 30MHz

Frequency (MHz)	Field Strength (dBuV/m)		Measurement Distance (meters)
	uV/m	dBuV/m	
0.009 – 0.490	2400 / F (kHz)	48.52-13.80	300
0.490 – 1.705	24000 / F (kHz)	33.80-22.97	30
1.705 – 30.0	30	29.54	30

FOR FREQUENCY BETWEEN 30-1000MHz

Frequency (MHz)	uV/m	dBuV/m
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	May 30, 2023	May 29, 2024
Signal Analyzer Agilent	N9010A	MY52220207	Jan. 03, 2023	Jan. 02, 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. 07, 2023	Jan. 06, 2024
Preamplifier EMCI	EMC 330H	980112	Oct. 01, 2022	Sep. 30, 2023
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Oct. 21, 2022	Oct. 20, 2023
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 01, 2022	Sep. 30, 2023
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 13, 2022	Nov. 12, 2023
Preamplifier EMCI	EMC 012645	980115	Oct. 01, 2022	Sep. 30, 2023
RF Coaxial Cable EMCI	EMC104-SM-SM-8000	171005	Oct. 01, 2022	Sep. 30, 2023
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000(140807)	Oct. 01, 2022	Sep. 30, 2023
RF FLITER MICRO-TRONICS	BRM50716	060	Jan. 11, 2023	Jan. 10, 2024
RF FLITER MICRO-TRONICS	BRM17690	004	Jan. 11, 2023	Jan. 10, 2024
Pre-Amplifier EMCI	EMC 184045	980116	Oct. 01, 2022	Sep. 30, 2023
Broadband Horn Antenna SCHWARZBECK	BBHA 9170	148	Nov. 13, 2022	Nov. 12, 2023
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	Jul. 09, 2022	Jul. 08, 2023
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	150929	Jul. 09, 2022	Jul. 08, 2023
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower Max-Full	MFA-440H	AT93021705	NA	NA
Turn Table Max-Full	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller Max-Full	MF-7802	NA	NA	NA
Boresight antenna tower fixture BV	BAF-02	7	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 - 966 chamber 5.

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, except for the frequency band (9 kHz-90 kHz, 110 kHz-490 kHz) set to average detect function and peak detect function.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz or 300 Hz at frequency band (9 kHz~150 kHz) and 9 kHz or 10 kHz at frequency below 30MHz (except 9 kHz~150 kHz).

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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.

Note:

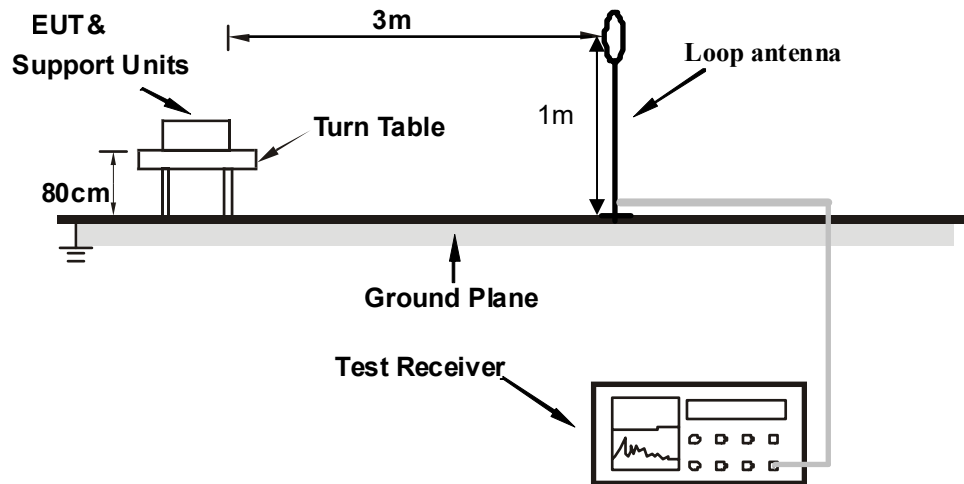
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

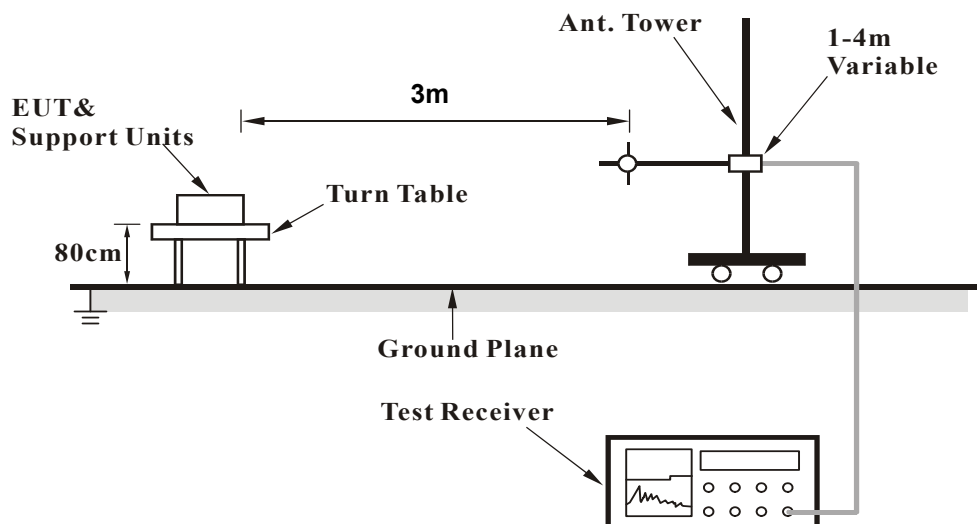
No deviation.

4.1.5 Test Set Up

For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



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

4.1.6 EUT Operating Conditions

- a. The EUT powered by WPC.

4.1.7 Test Results

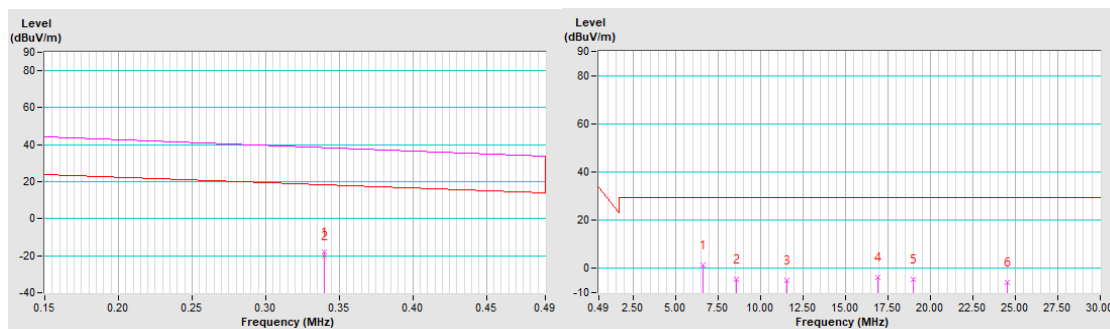
Below 30MHz Data:

Channel	TX Channel 1	Detector Function	Average (AV)
Frequency Range	9 kHz ~ 30 MHz		Peak (PK) Quasi-Peak (QP)

Antenna Polarity & Test Distance: Loop antenna Parallel at 3m								
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	*0.3400	-18.0 PK	37.0	-55.0	1.00	342	42.0	-60.0
2	*0.3400	-20.4 AV	17.0	-37.4	1.00	342	39.6	-60.0
3	6.6070	1.4 QP	29.5	-28.1	1.00	143	20.9	-19.5
4	8.5564	-4.4 QP	29.5	-33.9	1.00	246	14.4	-18.8
5	11.5555	-5.0 QP	29.5	-34.5	1.00	55	13.2	-18.2
6	16.8939	-3.7 QP	29.5	-33.2	1.00	177	14.5	-18.1
7	18.9933	-4.5 QP	29.5	-34.0	1.00	4	13.6	-18.1
8	24.5116	-5.7 QP	29.5	-35.2	1.00	25	12.4	-18.1

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) + Distance Factor
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. 0.009 ~ 0.49MHz, the measured field strength was extrapolated to distance 300 meters Distance factor@3m = $40 \cdot \log(3/300) = -80\text{dB}$
For 0.49 ~ 30MHz, the measured field strength was extrapolated to distance 30 meters Distance factor@3m = $40 \cdot \log(3/30) = -40\text{dB}$

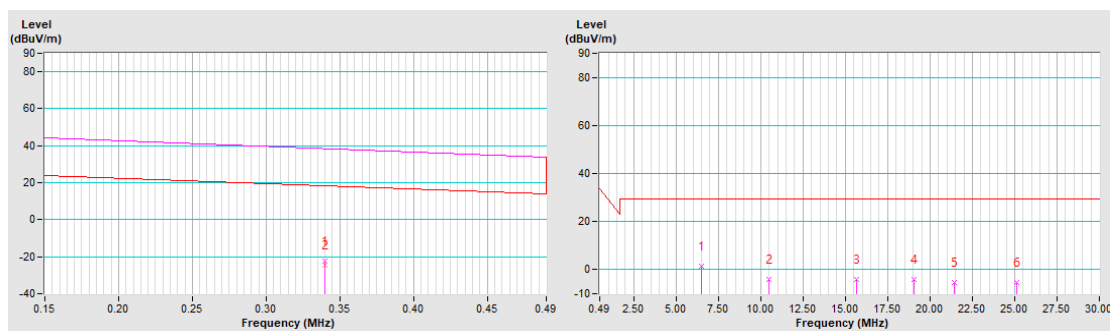


Channel	TX Channel 1	Detector Function	Average (AV)
Frequency Range	9 kHz ~ 30 MHz		Peak (PK) Quasi-Peak (QP)

Antenna Polarity & Test Distance: Loop antenna Perpendicular at 3m								
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	*0.3400	-22.1 PK	37.0	-59.1	1.00	74	37.9	-60.0
2	*0.3400	-24.7 AV	17.0	-41.7	1.00	74	35.3	-60.0
3	6.4871	1.3 QP	29.5	-28.2	1.00	2	20.8	-19.5
4	10.5059	-3.9 QP	29.5	-33.4	1.00	4	14.3	-18.2
5	15.6643	-4.2 QP	29.5	-33.7	1.00	283	14.0	-18.1
6	19.0533	-3.9 QP	29.5	-33.4	1.00	180	14.2	-18.1
7	21.4526	-5.5 QP	29.5	-35.0	1.00	350	12.6	-18.1
8	25.1415	-5.6 QP	29.5	-35.1	1.00	247	12.6	-18.1

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) + Distance Factor
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. 0.009 ~ 0.49MHz, the measured field strength was extrapolated to distance 300 meters Distance factor@3m = $40 \cdot \log(3/300) = -80\text{dB}$
For 0.49 ~ 30MHz, the measured field strength was extrapolated to distance 30 meters Distance factor@3m = $40 \cdot \log(3/30) = -40\text{dB}$

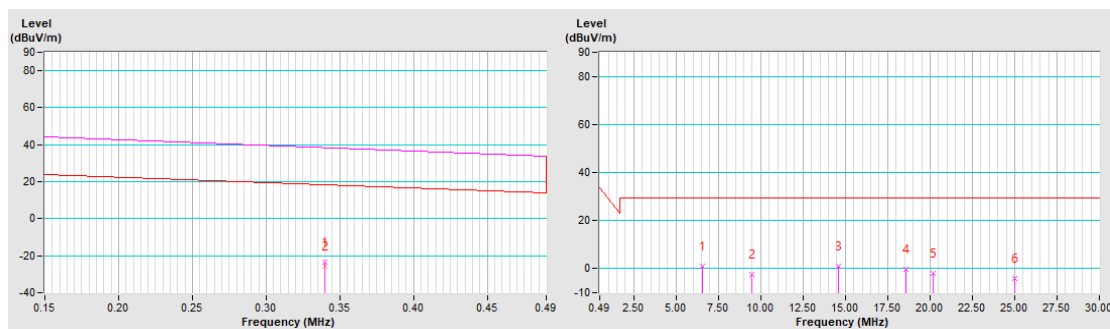


Channel	TX Channel 1	Detector Function	Average (AV)
Frequency Range	9 kHz ~ 30 MHz		Peak (PK) Quasi-Peak (QP)

Antenna Polarity & Test Distance: Loop antenna Ground-Parallel at 3m								
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	*0.3400	-23.2 PK	37.0	-60.2	1.00	163	36.8	-60.0
2	*0.3400	-25.9 AV	17.0	-42.9	1.00	163	34.1	-60.0
3	6.5770	0.9 QP	29.5	-28.6	1.00	227	20.4	-19.5
4	9.4862	-2.3 QP	29.5	-31.8	1.00	15	16.1	-18.4
5	14.5846	1.1 QP	29.5	-28.4	1.00	32	19.2	-18.2
6	18.5734	-0.3 QP	29.5	-29.8	1.00	18	17.9	-18.1
7	20.1630	-2.0 QP	29.5	-31.5	1.00	28	16.2	-18.1
8	25.0215	-4.2 QP	29.5	-33.7	1.00	130	13.9	-18.1

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) + Distance Factor
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. 0.009 ~ 0.49MHz, the measured field strength was extrapolated to distance 300 meters Distance factor@3m = $40 \cdot \log(3/300) = -80\text{dB}$
For 0.49 ~ 30MHz, the measured field strength was extrapolated to distance 30 meters Distance factor@3m = $40 \cdot \log(3/30) = -40\text{dB}$



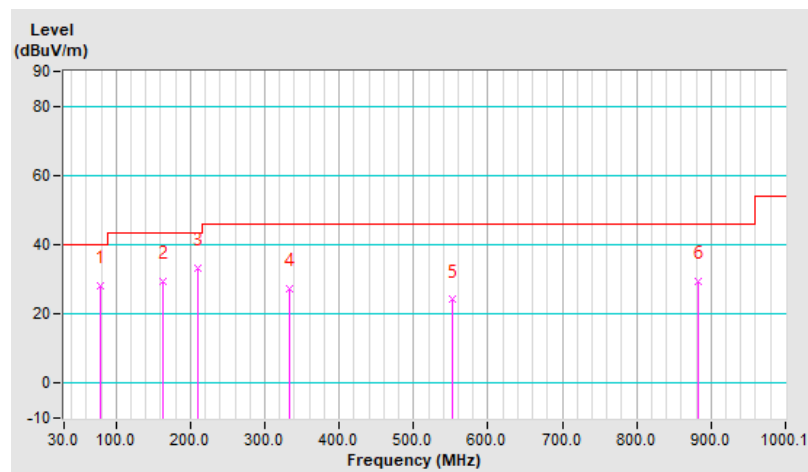
Below 1GHz Data:

Channel	TX Channel 1	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance: Horizontal At 3m								
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	78.5050	28.2 QP	40.0	-11.8	2.00 H	132	44.6	-16.4
2	163.8738	29.2 QP	43.5	-14.3	1.00 H	223	42.0	-12.8
3	210.4386	33.4 QP	43.5	-10.1	1.50 H	53	49.0	-15.6
4	332.6712	27.4 QP	46.0	-18.6	2.00 H	177	38.4	-11.0
5	552.8839	24.1 QP	46.0	-21.9	1.00 H	337	30.3	-6.2
6	882.7179	29.6 QP	46.0	-16.4	1.50 H	1	30.8	-1.2

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

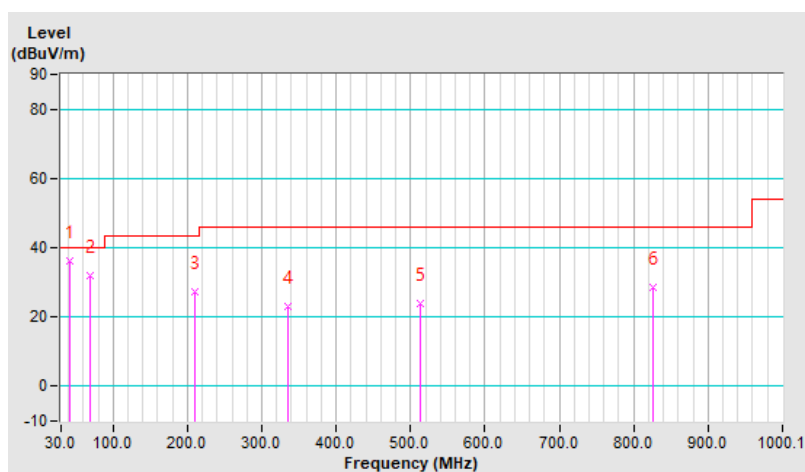


Channel	TX Channel 1	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance: Vertical At 3m								
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	42.6113	36.3 QP	40.0	-3.7	1.00 V	32	48.6	-12.3
2	68.8040	31.8 QP	40.0	-8.2	2.00 V	318	46.2	-14.4
3	209.4685	27.4 QP	43.5	-16.1	1.00 V	351	43.1	-15.7
4	334.6114	23.1 QP	46.0	-22.9	1.50 V	208	34.1	-11.0
5	513.1098	23.7 QP	46.0	-22.3	2.00 V	11	30.3	-6.6
6	826.4521	28.7 QP	46.0	-17.3	2.00 V	276	30.3	-1.6

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



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	ESR3	102783	Dec. 21, 2022	Dec. 20, 2023
RF signal cable Woken	5D-FB	Cable-cond2-01	Sep. 03, 2022	Sep. 02, 2023
LISN ROHDE & SCHWARZ (EUT)	NNLK 8121	8121-731	Jun. 09, 2023	Jun. 08, 2024
V-LISN ROHDE & SCHWARZ (Peripheral)	ESH2-Z5	100100	Mar. 07, 2023	Mar. 06, 2024
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 (Conduction 2).

3. The VCCI Site Registration No. is C-12047.

4. Tested date: 2023/6/14~ 2023/6/15

4.2.3 Test Procedures

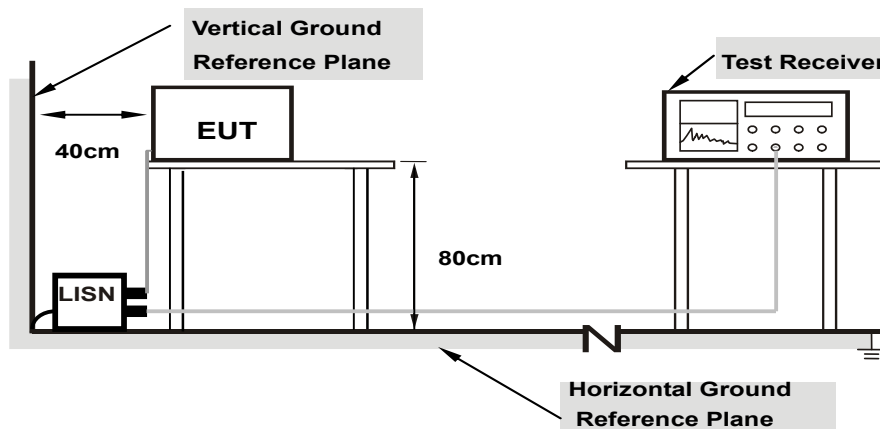
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were 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.

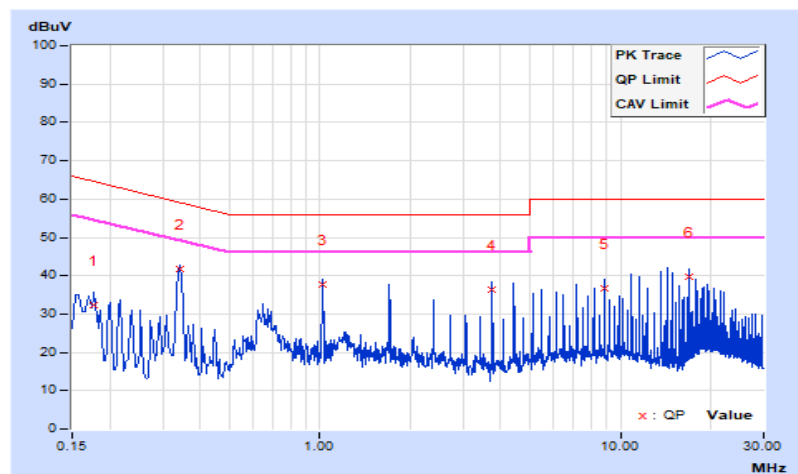
4.2.7 Test Results

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17800	10.12	22.27	11.94	32.39	22.06	64.58	54.58	-32.19	-32.52
2	0.34100	10.14	31.49	30.11	41.63	40.25	59.18	49.18	-17.55	-8.93
3	1.02200	10.16	27.67	21.57	37.83	31.73	56.00	46.00	-18.17	-14.27
4	3.75000	10.24	26.18	23.17	36.42	33.41	56.00	46.00	-19.58	-12.59
5	8.86200	10.27	26.29	22.25	36.56	32.52	60.00	50.00	-23.44	-17.48
6	17.03800	10.39	29.21	24.09	39.60	34.48	60.00	50.00	-20.40	-15.52

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.

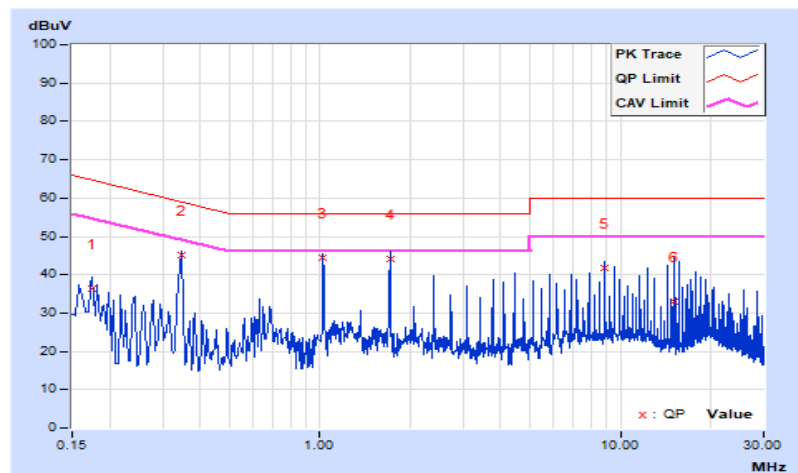


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	-----------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17400	10.13	26.16	17.30	36.29	27.43	64.77	54.77	-28.48	-27.34
2	0.34600	10.16	35.09	29.87	45.25	40.03	59.06	49.06	-13.81	-9.03
3	1.02600	10.18	34.14	29.31	44.32	39.49	56.00	46.00	-11.68	-6.51
4	1.71000	10.21	33.87	29.15	44.08	39.36	56.00	46.00	-11.92	-6.64
5	8.89000	10.35	31.27	26.60	41.62	36.95	60.00	50.00	-18.38	-13.05
6	15.05000	10.49	22.59	13.18	33.08	23.67	60.00	50.00	-26.92	-26.33

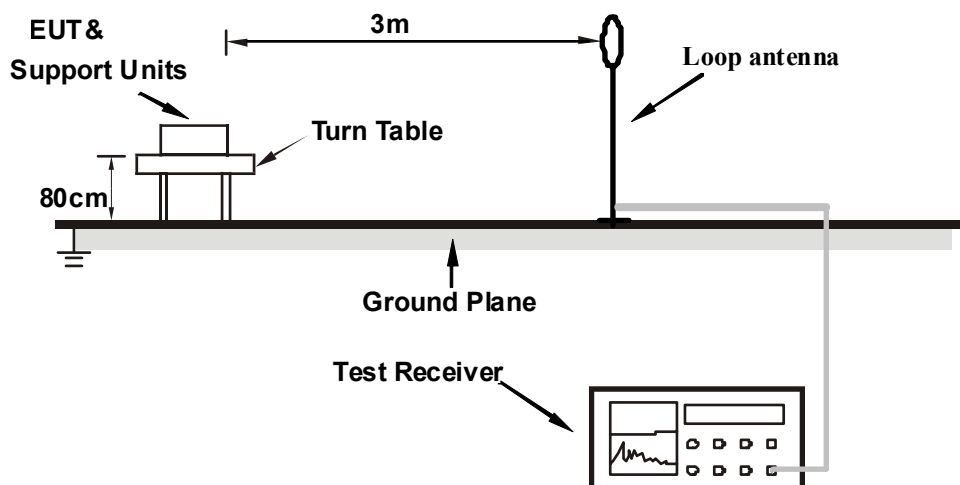
Remarks:

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 20dB Bandwidth Measurement

4.3.1 Test Setup



4.3.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.3 Test Procedure

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Then the Loop antenna was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a broadband loop antenna, which is fixed of a 1m height above the ground, and set away from 3m to the EUT to find the disturbance reading on each frequency.
- The test-receiver system was set to Quasi-peak detect function and specified bandwidth.

4.3.4 Deviation from Test Standard

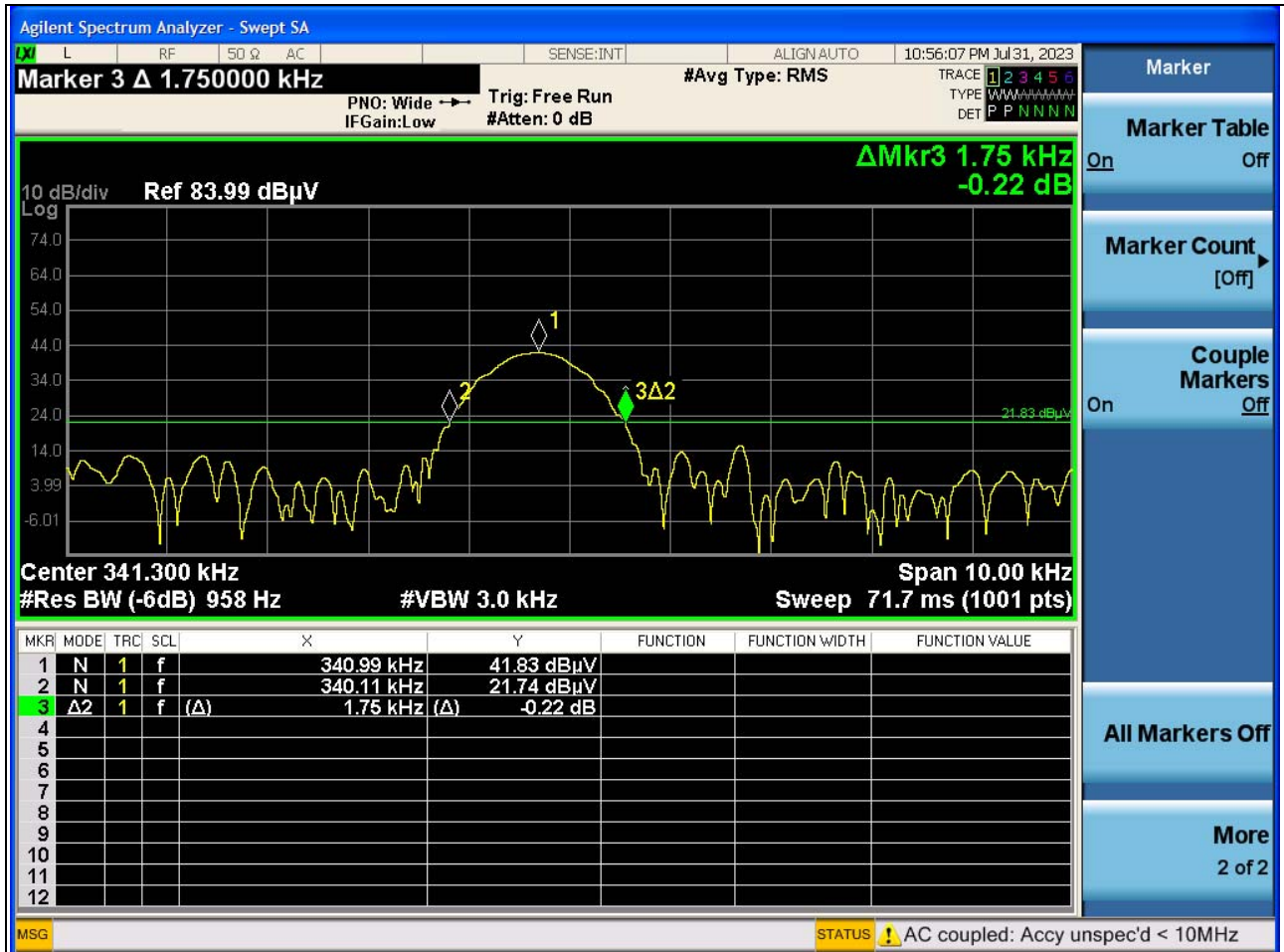
No deviation.

4.3.5 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously.

4.3.6 Test Results

Frequency (kHz)	20dB Bandwidth (kHz)	Pass / Fail
340	1.75	Pass



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:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

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

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

--- END ---